CORE ANALYSIS REPORT

FOR

UNION OIL COMPANY OF CANADA LIMITED

UNION MOBIL COLEVILLE D-45
COLEVILLE AREA
N. W. T.

67-20

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY - EDMONTON - REGINA

COMPANY UNION OIL COMPANY OF CANADA LIMITED
WELL UNION MOBIL COLEVILLE D-45

FILE 7004-3241

SAMPLE NUMBER	INTERVAL REPRESENTED, FEET		HORIZ. PERM TO AIR, MILLIDARCYS	PERMEABILITY FEET	POROSITY, PER CENT	POROSITY FEET	RESIDUAL SATURATIONS, PER CENT PORE SPACE		VISUAL EXAMINATION
	DEPTH	THICK					OIL	TOTAL WATER	
	CORE NO. 4 (Cont'd)								
10	3095.7-96.7	1.0	0.18	0.18	12.7	12.70	26.6	19.2	FS
11	3096.7-97.7	1.0	0.12	0.12	11.6	11.60	27.2	36.9	FS SHY
12	3097.7-98.6	0.9	0.41	0.37	16.0	14.40	22.9	14.8	FS
13	3098.6-99.2	0.6	-0.01	-	9.2	5.52	37.0	18.5	FS
-	3099.2-99.9	0.7	-	-	-	-	-	-	DENSE SHY
14	3099.9-00.1	0.2	-0.01	-	8.4	1.68	27.7	43.9	FS
-	3100.1-00.4	0.3	-	-	-	-	-	-	DENSE SHY
15	3100.4-01.0	0.6	-0.01	-	10.5	6.30	16.6	48.0	FS SHY
16	3101.0-01.5	0.5	-0.01	-	13.2	6.60	24.1	25.5	FS SHY
-	3101.5-01.7	0.2	-	-	-	-	-	-	DENSE SH
-	3101.7-16.5	14.8	-	-	-	-	-	-	NABR
17	3116.5-17.5	1.0	-0.01	-	8.8	8.80	0.0	80.9	FS
18	3117.5-18.5	1.0	-0.01	-	7.4	7.40	0.0	77.6	FS
19	3118.5-19.4	0.9	-0.01	-	8.5	7.65	0.0	83.5	FS
20	3119.4-20.4	1.0	1.41	1.41	15.9	15.90	19.7	11.8	FS
21	3120.4-22.0	1.6	1.70	2.72	18.5	29.60	32.1	12.6	FS PART RUBBLE
	CORE NO. 5 3122' - 3152' (REC. 30')								
22	3122.0-22.7	0.7	0.59	0.41	15.1	10.57	35.4	17.7	FS
23	3122.7-23.3	0.6	0.70	0.42	16.2	9.72	24.0	20.6	FS
24	3123.3-24.5	1.2	0.82	1.18	18.0	21.60	31.1	18.3	FS
25	3124.5-24.9	0.4	0.06	0.02	11.2	4.48	19.3	50.8	FS
26	3124.9-25.7	0.8	0.35	0.28	15.7	12.56	31.9	20.9	FS
27	3125.7-26.7	1.0	0.30	0.30	16.2	16.20	24.2	27.6	FS
28	3126.7-27.3	0.6	0.24	0.14	13.1	7.86	25.5	8.5	FS
29	3127.3-27.8	0.5	0.24	0.12	11.7	5.85	30.8	19.1	FS
-	3127.8-31.5	3.7	-	-	-	-	-	-	DENSE SHY
-	3131.5-52.0	20.5	-	-	-	-	-	-	NABR
	CORE NO. 6 3152' - 3173' (REC. 21')								
-	3152.0-54.1	2.1	-	-	-	-	-	-	DENSE SHY
30	3154.1-54.7	0.6	-0.01	-	3.7	2.22	Trace	65.5	I
31	3154.7-56.6	0.9	-0.01	-	3.3	2.97	0.0	37.6	I SANDY

CORE LABORATORIES – CANADA LTD.

COMPANY	UNION OIL COMPANY OF CANADA LIMITED	**FORMATION**	OLD FORT SAND - CAMBRIAN	**PAGE**	1 of 12
WELL	UNION MOBIL COLEVILLE D-45	**DRILLING FLUID**	WATER BASE MUD	**FILE**	7004-3241
FIELD	COLEVILLE AREA, N.W.T.	**ELEVATION**		**DATE REPORT**	OCT. 24/73
LOCATION	67° 14' 08.57" N. LAT.	**ANALYSIS**	CONVENTIONAL	**ANALYSTS**	BK SP MH
	125° 09' 20.87" W. LONG.	**REMARKS**			

CONG = CONGLOMERATE; DOL = DOLOMITE; SH = SHALE; LMY = LIMY; SHY = SHALY; /BK = BREAK; BIT = PYROBITUMEN; CARB = CARBONACEOUS; A = ANHYDRITE; FOSS = FOSSILIFEROUS; XLN = CRYSTALLINE; LAM = LAMINATIONS; V = VUGULAR; LV = LARGE VUGS; SV = SMALL VUGS; PPV = PIN POINT VUGS; I = INTERGRANULAR; STY = STYLOLITIC; HF = HORIZONTAL FRACTURE; VF = VERTICAL FRACTURE

NABR - Not Analyzed By Request

SAMPLE NUMBER	INTERVAL REPRESENTED, FEET		HORIZ. PERM TO AIR, MILLIDARCYS	PERMEABILITY FEET	POROSITY, PER CENT	POROSITY FEET	RESIDUAL SATURATIONS, PER CENT PORE SPACE		VISUAL EXAMINATION
	DEPTH	THICK					OIL	TOTAL WATER	
	CORED INTERVAL 3018' - 3233'								
	CORE NO. 1 3018' - 3032' (REC. 14')								
-	3018.0-32.0	14.0	-	-	-	-	-	-	NABR
	CORE NO. 2 3032' - 3062' (REC. 30')								
-	3032.0-40.0	8.0	-	-	-	-	-	-	NABR
1A	3040.0-41.0	1.0	-0.01	-	8.0	8.00	32.5	37.5	
-	3041.0-62.0	21.0	-	-	-	-	-	-	NABR
	CORE NO. 3 3062' - 3092' (REC. 30')								
-	3062.0-82.6	20.6	-	-	-	-	-	-	NABR
-	3082.6-85.4	2.8	-	-	-	-	-	-	DENSE SHY
1	3085.4-85.9	0.5	-0.01	-	6.2	3.10	12.7	57.5	FS SHY
-	3085.9-88.1	2.2	-	-	-	-	-	-	DENSE SHY
2	3088.1-89.1	1.0	-0.01	-	6.1	6.10	48.6	32.4	FS SHY
3	3089.1-90.1	1.0	-0.01	-	4.8	4.80	29.2	46.0	FS
4	3090.1-91.1	1.0	-0.01	-	1.9	1.90	Trace	48.3	FS
5	3091.1-92.0	0.9	-0.01	-	1.8	1.62	Trace	37.9	FS
	CORE NO. 4 3092' - 3122' (REC. 30')								
6	3092.0-93.0	1.0	-0.01	-	3.4	3.40	31.9	44.7	FS SHY
-	3093.0-93.6	0.6	-	-	-	-	-	-	DENSE SHY
7	3093.6-94.4	0.8	-0.01	-	5.7	4.56	24.6	45.8	FS SHY
8	3094.4-94.9	0.5	0.59	0.30	15.9	7.95	30.5	28.9	FS
-	3094.9-95.1	0.2	-	-	-	-	-	-	DENSE SHY
9	3095.1-95.7	0.6	0.18	0.11	14.6	8.76	29.4	19.2	FS

SAMPLE NUMBER	INTERVAL REPRESENTED, FEET		HORIZ. PERM TO AIR, MILLIDARCYS	PERMEABILITY FEET	POROSITY, PER CENT	POROSITY FEET	RESIDUAL SATURATIONS, PER CENT PORE SPACE		VISUAL EXAMINATION
	DEPTH	THICK					OIL	TOTAL WATER	
	CORE NO. 6 (Cont'd)								
32	3155.6-56.3	0.7	-0.01	-	2.4	1.68	Trace	44.9	I SANDY
-	3156.3-59.9	3.6	-	-	-	-	-	-	DENSE SHY
33	3159.9-61.4	1.5	-0.01	-	3.8	5.70	17.1	51.5	I SANDY
-	3161.4-73.0	11.6	-	-	-	-	-	-	DENSE SH
	CORE NO. 7 3173' - 3203' (REC. 28.9')								
34	3173.0-73.5	0.5	-0.01	-	7.6	3.80	33.2	33.2	I SANDY
-	3173.5-73.8	0.3	-	-	-	-	-	-	I SANDY
35	3173.8-74.4	0.6	-0.01	-	4.0	2.40	27.5	44.1	I SANDY
-	3174.4-75.4	1.0	-	-	-	-	-	-	DENSE SH
36	3175.4-76.4	1.0	-0.01	-	1.5	1.50	Trace	27.4	I SANDY
37	3176.4-77.8	1.4	-0.01	-	6.0	8.40	30.2	23.4	I SANDY
38	3177.8-78.4	0.6	46.40	27.84	15.6	9.36	16.8	4.5	FS MS
39	3178.4-79.0	0.6	459.00	275.40	15.2	9.12	11.7	13.0	FS
-	3179.0-80.3	1.3	-	-	-	-	-	-	DENSE SH
40	3180.3-81.5	1.2	2.05	2.46	11.3	13.56	Trace	55.4	MS CS
41	3181.5-82.0	0.5	7.48	3.74	13.1	6.55	12.7	38.3	MS CS
42	3182.0-82.2	0.2	0.53	0.11	12.5	2.50	30.4	13.6	FS MS
-	3182.2-82.3	0.1	-	-	-	-	-	-	DENSE SH
43	3182.3-82.7	0.4	0.82	0.33	12.7	5.08	19.3	28.3	FS
44	3182.7-83.7	1.0	0.70	0.70	14.3	14.30	14.4	26.2	FS
45	3183.7-84.4	0.7	0.18	0.13	9.1	6.37	18.8	48.8	FS
46	3184.4-85.1	0.7	0.18	0.13	10.5	7.35	14.8	20.3	FS
-	3185.1-85.5	0.4	-	-	-	-	-	-	DENSE SH
47	3185.5-86.0	0.5	0.70	0.35	14.2	7.10	16.5	16.5	FS
48	3186.0-86.7	0.7	0.41	0.29	11.6	8.12	12.9	40.4	FS
49	3186.7-87.5	0.8	-0.01	-	8.6	6.88	15.6	22.3	FS
-	3187.5-87.9	0.4	-	-	-	-	-	-	DENSE SH
50	3187.9-88.8	0.9	0.59	0.53	19.4	17.46	6.4	32.4	FS
51	3188.8-89.1	0.3	-0.01	-	6.9	2.07	11.3	59.5	FS SHY
52	3189.1-89.9	0.8	0.30	0.24	12.9	10.32	11.6	51.1	FS
53	3189.9-91.1	1.2	0.12	0.14	7.0	8.40	19.9	28.5	FS
54	3191.1-92.3	1.2	0.18	0.22	8.3	9.96	16.6	37.9	FS
-	3192.3-94.7	2.4	-	-	-	-	-	-	DENSE SH

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	DEPTH	THICK					OIL	TOTAL WATER	
	CORE NO. 7 (Cont'd)								
55	3194.7-95.5	0.8	0.24	0.19	8.8	7.04	0.0	72.5	FS MS SHY
56	3195.5-96.4	0.9	4.84	4.36	19.6	17.64	17.1	29.7	FS MS SHY
57	3196.4-97.1	0.7	0.41	0.29	12.6	8.82	11.8	66.9	FS SHY
-	3197.1-97.6	0.5	-	-	-	-	-	-	DENSE SH
58	3197.6-98.4	0.8	0.76	0.61	14.0	11.20	6.6	48.0	FS SHY
59	3198.4-99.5	1.1	0.12	0.13	8.3	9.13	0.0	80.3	FS SHY
-	3199.5-00.3	0.8	-	-	-	-	-	-	DENSE SH
60	3200.3-01.1	0.8	-0.01	-	6.7	5.36	0.0	52.1	FS SHY
61	3201.1-01.9	0.8	21.50	17.20	10.3	8.24	9.2	9.2	FS
-	3201.9-03.0	1.1	-	-	-	-	-	-	LOST CORE
	CORE NO. 8 3203' - 3233' (REC. 26.3')								
62	3203.0-04.0	1.0	8.79	8.79	12.3	12.30	16.5	4.5	FS
63	3204.0-05.0	1.0	2.64	2.64	13.1	13.10	27.3	7.2	FS
64	3205.0-06.0	1.0	2.23	2.23	13.1	13.10	28.9	8.6	FS
65	3206.0-07.0	1.0	5.72	5.72	13.0	13.00	23.2	9.5	FS
66	3207.0-08.0	1.0	53.60	53.60	15.6	15.60	10.4	6.9	FS
67	3208.0-09.0	1.0	7.04	7.04	15.4	15.40	21.3	9.4	FS
68	3209.0-10.0	1.0	3.28	3.28	13.3	13.30	26.8	8.4	FS
69	3210.0-11.0	1.0	7.92	7.92	16.4	16.40	23.1	4.6	FS
70	3211.0-12.0	1.0	35.10	35.10	16.0	16.00	19.3	9.0	FS
71	3212.0-13.0	1.0	11.40	11.40	15.3	15.30	20.1	3.1	FS
72	3213.0-14.0	1.0	14.90	14.90	15.3	15.30	17.7	3.5	FS
73	3214.0-15.0	1.0	9.67	9.67	13.4	13.40	20.7	6.9	FS
74	3215.0-16.0	1.0	2.81	2.81	14.3	14.30	21.8	7.6	FS
75	3216.0-17.0	1.0	10.10	10.10	16.3	16.30	21.1	6.6	FS
76	3217.0-18.0	1.0	9.23	9.23	14.4	14.40	16.5	5.0	FS
77	3218.0-19.0	1.0	7.04	7.04	13.2	13.20	22.5	7.0	FS
78	3219.0-20.0	1.0	6.16	6.16	13.0	13.00	21.4	4.2	FS
79	3220.0-21.0	1.0	21.10	21.10	14.3	14.30	20.5	8.9	FS
80	3221.0-21.5	0.5	118.00	59.00	15.0	7.50	24.9	2.3	FS
81	3221.5-22.4	0.9	1.06	0.95	11.2	10.08	20.5	3.4	FS
82	3222.4-23.4	1.0	17.60	17.60	17.0	17.00	16.5	4.1	FS

SAMPLE NUMBER	INTERVAL REPRESENTED, FEET		HORIZ. PERM TO AIR, MILLIDARCYS	PERMEABILITY FEET	POROSITY, PER CENT	POROSITY FEET	RESIDUAL SATURATIONS, PER CENT PORE SPACE		VISUAL EXAMINATION
	DEPTH	THICK					OIL	TOTAL WATER	
	CORE NO. 8 (Cont'd)								
83	3223.4-24.4	1.0	2.58	2.50	12.2	12.20	18.3	6.1	FS
84	3224.4-25.4	1.0	5.72	5.72	11.4	11.40	26.8	5.0	FS
85	3225.4-26.4	1.0	39.20	39.20	16.3	16.30	14.2	5.4	FS
86	3226.4-26.8	0.4	11.90	4.76	13.7	5.48	16.9	4.9	FS
87	3226.8-27.3	0.5	8.36	4.18	14.5	7.25	23.9	5.0	FS
-	3227.3-29.3	2.0	-	-	-	-	-	-	SH PART RUBBLE
-	3229.3-33.0	3.7	-	-	-	-	-	-	LOST CORE.

WELL: UNION MOBIL COLEVILLE D-45

FORMATION: OLD FORT SAND - CAMBRIAN

FILE: 70044-3241

SUMMARY INTERVAL: 3018.0 - 3233.0

TOTAL FOOTAGE: 215.0

FOOTAGE ANALYZED 74.1

FOOTAGE NOT ANALYZED: TOTAL: 140.9 DENSE 37.2 LOST 4.8 DRILLED .0 *NABR 98.9 RUBBLE .0

SUMMARY OF ANALYZED CORE:

	FOOTAGE	% OF ANALYZED CORE	WEIGHTED AVERAGE POROS. %	POROSITY FEET	WEIGHTED AVERAGE PERM. MD.	PERM. FEET	WEIGHTED AVERAGE RES. OIL %	WEIGHTED AVERAGE TOT WATER %
TOTAL	74.1	100.00	11.51	852.69	9.39	695.99	18.47	27.08
BY PERM RANGES:								
LESS THAN 0.10 Md.	21.5	29.01	5.81	124.89	.00	.02	15.94	45.87
0.10 0.49 Md.	14.3	19.30	11.57	165.44	.24	3.38	18.58	37.08
0.50 0.99 Md.	6.8	9.18	15.81	107.48	.70	4.74	20.40	26.06
1.00 9.99 Md.	20.6	27.80	14.03	289.08	4.89	100.65	21.28	11.89
GREATER THAN 9.99 Md.	10.9	14.71	15.21	165.80	53.87	587.20	16.83	6.28

*NOT ANALYZED BY REQUEST

CORE LABORATORIES-CANADA LTD.

File 7004-3241

Company UNION OIL COMPANY OF CANADA LIMITED

Formation OLD FORT SAND - CAMBRIAN

Field COLEVILLE AREA

Province N.W.T.

Identification of Samples

Sample Number	Depth	Well
C-2	3040	Union Mobil Coleville D-45
72	3213	Union Mobil Coleville D-45
75	3216	Union Mobil Coleville D-45
76	3217	Union Mobil Coleville D-45

CORE LABORATORIES-CANADA LTD.

File 7004-3241

Company UNION OIL COMPANY OF CANADA LIMITED

Formation OLD FORT SAND - CAMBRIAN

Field COLEVILLE AREA

Province N.W.T.

Mercury Injection Data

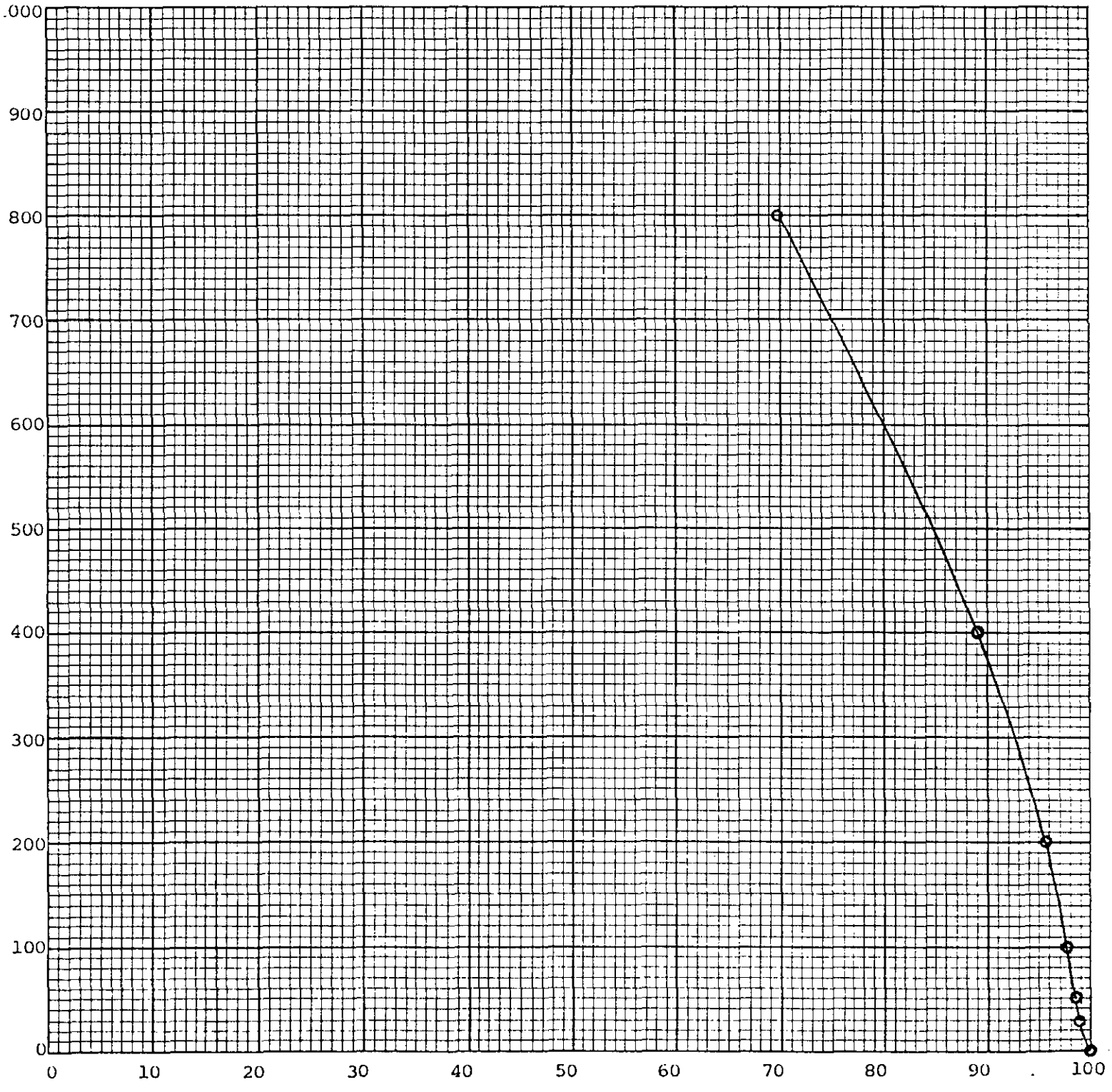
Sample Number	C-2	72	75	76
Porosity, Per cent	12.4	12.6	13.2	12.1
Permeability, Millidarcys	-0.01	14.90	10.10	9.23

Pressure, Psia	Wetting Phase Saturation, Per Cent Pore Volume			
1	100.0	100.0	100.0	100.0
2	100.0	99.8	99.9	99.9
4	99.8	97.7	99.6	99.4
8	99.7	85.3	99.5	98.6
14	99.7	71.5	99.2	93.1
25	98.9	50.9	94.0	63.3
50	98.6	47.1	82.1	57.6
100	97.6	33.2	51.5	39.6
200	95.7	20.6	30.9	24.3
400	89.2	9.9	17.1	12.8
800	69.9	3.5	10.2	6.8

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY 9, ALBERTA, CANADA

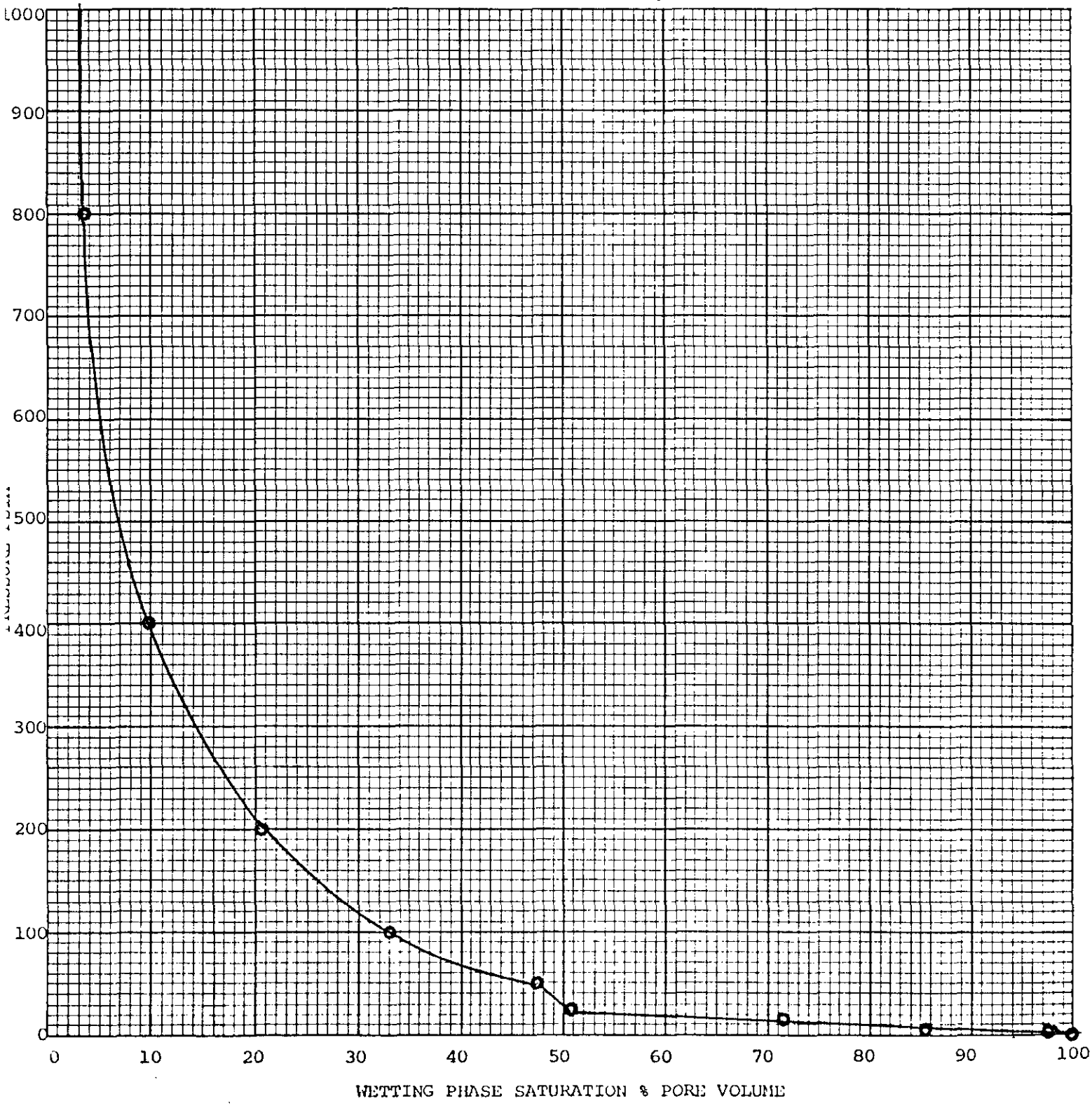
File 7004-3241

Company Union Oil Company of Canada Limited
Well Union Mobil Coleville D-45
Location 67° 14' 08.57" N. LAT. 125° 09' 20.87" W. LONG.
Formation Old Fort Sand - Cambrian
Field Coleville Area
Province N.W.T.
Sample No. C-2
Porosity % 12.4
Permeability Md. -0.01



CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY 9, ALBERTA, CANADA

Company Union Oil Company of Canada Limited
Well Union Mobil Coleville D-45
Location 67° 14' 08.57" N. LAT. 125° 09' 20.87" W. LONG.
Formation Old Fort Sand - Cambrian
Field Coleville Area
Province N.W.T.
Sample No. 72
Porosity % 12.6
Permeability Md. 14.90



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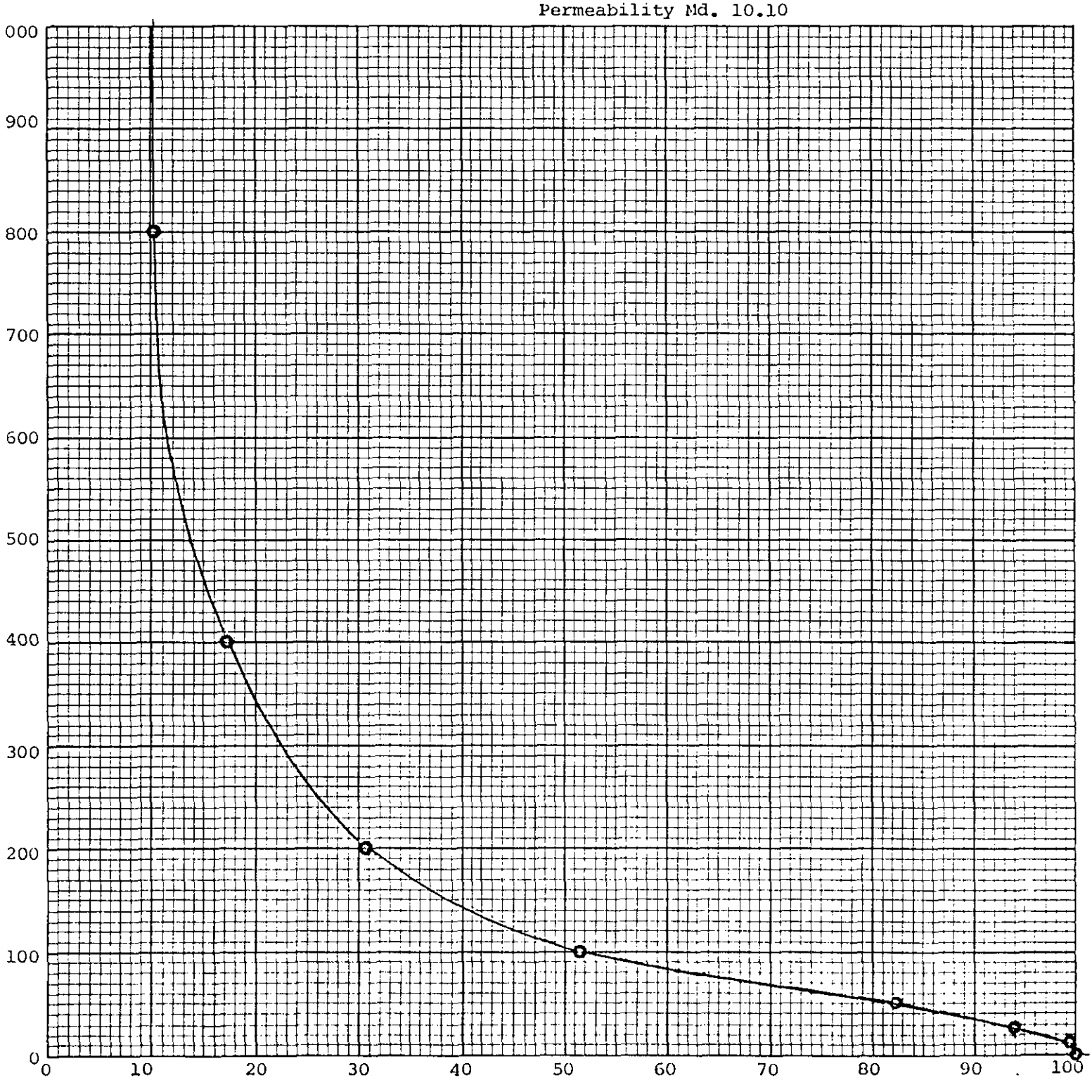
Petroleum Reservoir Engineering
CALGARY 9, ALBERTA, CANADA

File 7004-3241

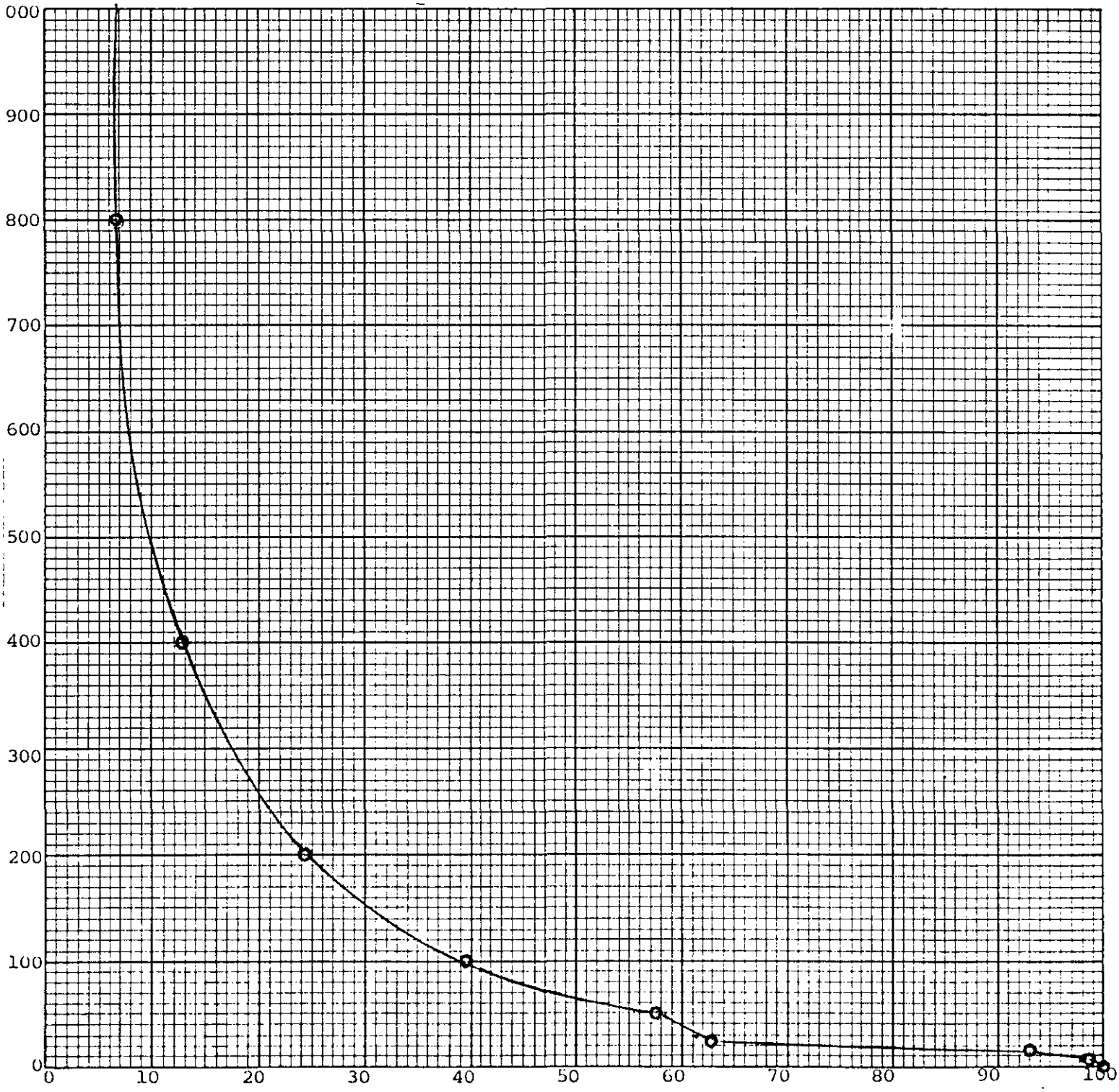
Company Union Oil Company of Canada Limited
Well Union Mobil Coleville D-45
Location 67° 14' 08.57" N. Lat. 125° 09' 20.87" W. Long.

Formation Old Fort Sand - Cambrian
Field Coleville Area
Province N.W.T.
Sample No. 75
Porosity % 13.2
Permeability Md. 10.10



CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY 9, ALBERTA, CANADA

Company Union Oil Company of Canada Limited
Well Union Mobil Coleville D-45
Location 67° 14' 08.57" N. Lat. 125° 09' 20.87" W. Long.
Formation Old Fort Sand - Cambrian
Field Coleville Area
Province N.W.T.
Sample No. 76
Porosity % 12.1
Permeability Md. 9.23



CORE ANALYSIS REPORT

FOR

UNION OIL COMPANY OF CANADA LIMITED

UNION IOL STOPOVER K-44
WILDCAT — STOPOVER
NORTHWEST TERRITORIES

CORE LABORATORIES - CANADA LTD.

Petroleum Reservoir Engineering

CALGARY - EDMONTON - REGINA

CORE ANALYSIS REPORT

FOR

UNION OIL COMPANY OF CANADA LIMITED

UNION IOL STOPOVER K-44
WILDCAT – STOPOVER
NORTHWEST TERRITORIES

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY - EDMONTON - REGINA

Company	UNION OIL COMPANY OF CANADA LIMITED	Formation		Page	1 of 5
Well	UNION IOL STOPOVER K-44	Drilling Fluid	WATER BASE MUD	File	7004-5155
Field	WILDCAT - STOPOVER, NORTHWEST TERRITORIES			Date Report	APR. 7/75
Location	67° 33' 31.00" N. LAT.	Analysis	FULL DIAMETER	Analysts	TH BK
	123° 38' 32.00" W. LONG.	Remarks	RESIDUAL SATURATIONS DETERMINED ON SAMPLE END PIECES.		

AST - APPEARS SIMILAR TO; * - BROKEN CORE (NOT USED FOR SUMMARY PURPOSES); ** - PERMEABILITY > 3000 MD; — - PERMEABILITY < FS - FINE SAND; MS - MEDIUM SAND; CS - COARSE SAND; CONG - CONGLOMERATE; DOL - DOLOMITE; SH - SHALE; LMY - LIMY; SHY - SHALY; /BK - BREAK; BIT - PYROBITUMEN; CARB - CARBONACEOUS; A - ANHYDRITE; FOSS - FOSSILIFEROUS; XLN - CRYSTALLINE; LAMS - LAMINATIONS; V - VUGULAR; LV - LARGE VUGS; SV - SMALL VUGS; PPV - PIN POINT VUGS; I - INTERGRANULAR; STY - STYLOLITIC; HF - HORIZONTAL FRACTURE; VF - VERTICAL FRACTURE; SS - SMALL PLUG SAMPLE; SLI - SLIGHTLY; VI - VERY; WI - 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 2750' - 2840'												
	CORE NO. 1 2750' - 2780' (REC. 29') (7 BOXES)												
1	2750.0-50.7	0.7	0.13	0.13	-0.01	0.09	11.0	7.70	2.36	2.65	-	-	FS SILTY
2	2750.7-51.4	0.7	0.04	0.04	-0.01	0.03	6.6	4.62	2.46	2.64	-	-	FS SILTY
3	2751.4-52.2	0.8	0.13	0.11	-0.01	0.10	11.0	8.80	2.36	2.66	-	-	FS SILTY
4	2752.2-52.6	0.4	0.44	0.37	0.12	0.18	15.0	6.00	2.24	2.64	-	-	FS
5	2752.6-53.8	1.2	1.59	1.34	0.22	1.91	16.0	19.20	2.21	2.63	-	-	FS
6	2753.8-54.6	0.8	1.37	0.97	-0.01	1.10	15.0	12.00	2.29	2.70	-	-	FS
7	2754.6-55.0	0.4	0.14	0.14	-0.01	0.06	10.5	4.20	2.42	2.70	-	-	FS SILTY
8	2755.0-55.8	0.8	0.26	0.24	-0.01	0.21	9.4	7.52	2.45	2.70	-	-	FS
9	2755.8-57.0	1.2	0.09	0.05	-0.01	0.11	12.5	15.00	2.33	2.66	-	-	FS SILTY SH/BKS F
10	2757.0-57.5	0.5	1.06	0.80	0.06	0.53	10.6	5.30	2.39	2.68	-	-	FS
11	2757.5-58.5	1.0	0.25	0.25	-0.01	0.25	9.2	9.20	2.42	2.67	-	-	FS
12	2758.5-59.4	0.9	0.52	0.38	-0.01	0.46	5.5	4.95	2.50	2.65	-	-	FS F
13	2759.4-60.0	0.6	0.64	0.64	0.06	0.38	9.4	5.64	2.44	2.69	-	-	FS
14	2760.0-60.7	0.7	0.54	0.29	-0.01	0.38	9.6	6.72	2.43	2.69	-	-	FS F
15	2760.7-61.1	0.4	0.10	0.10	-0.01	0.04	6.4	2.56	2.48	2.66	-	-	FS
-	2761.1-61.3	0.2	-	-	-	-	-	-	-	-	-	-	SH
16	2761.3-61.7	0.4	0.34	0.25	-0.01	0.14	12.8	5.12	2.33	2.67	-	-	FS SILTY
17	2761.7-62.1	0.4	0.77	0.64	-0.01	0.31	15.7	6.28	2.22	2.64	-	-	FS
18	2762.1-62.9	0.8	0.51	0.35	-0.01	0.41	16.9	13.52	2.22	2.67	-	-	FS SILTY
19	2762.9-63.7	0.8	0.23	0.21	-0.01	0.18	12.0	9.60	2.35	2.67	-	-	FS SILTY
20	2763.7-64.1	0.4	2.29	1.82	0.14	0.92	15.3	6.12	2.26	2.66	-	-	FS
21	2764.1-64.3	0.2	0.74	0.64	0.14	0.15	14.0	2.80	2.35	2.73	-	-	FS
22	2764.3-64.8	0.5	0.08	0.08	-0.01	0.04	7.0	3.50	2.51	2.70	-	-	FS
23	2764.8-65.3	0.5	0.14	0.14	-0.01	0.07	13.6	6.80	2.29	2.65	-	-	FS SILTY
24	2765.3-66.4	1.1	1.45	1.13	-0.01	1.60	15.2	16.72	2.24	2.64	-	-	FS

Company UNION OIL COMPANY OF CANADA LIMITED Formation
Well UNION IOL STOPOVER K-44 Drilling Fluid WATER BASE MUD

File 7004-5155

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. 1 (Cont'd)												
25	2766.4-67.0	0.6	0.18	0.14	-0.01	0.11	9.7	5.82	2.43	2.69	-	-	FS
26	2767.0-67.6	0.6	2.79	1.06	-0.01	1.67	14.2	8.52	2.28	2.66	-	-	FS F
27	2767.6-68.4	0.8	1.22	1.12	0.20	0.98	15.1	12.08	2.26	2.66	-	-	FS F
28	2768.4-68.9	0.5	5.64	4.03	2.16	2.82	16.3	8.15	2.22	2.66	-	-	FS
29	2768.9-69.4	0.5	0.71	0.58	-0.01	0.35	9.2	4.60	2.40	2.65	-	-	FS
30	2769.4-70.3	0.9	0.44	0.40	-0.01	0.39	6.8	6.12	2.48	2.66	-	-	FS
31	2770.3-71.0	0.7	*	1.27	*	0.89	10.3	7.21	2.36	2.64	-	-	FS OVF
32	2771.0-71.7	0.7	0.73	0.73	-0.01	0.51	6.9	4.83	2.48	2.67	-	-	FS
33	2771.7-72.8	1.1	14.50	14.40	2.10	15.95	13.8	15.18	2.27	2.64	-	-	FS
34	2772.8-73.2	0.4	13.30	13.10	0.36	5.32	9.6	3.84	2.40	2.66	-	-	FS
35	2773.2-73.8	0.6	269.00	269.00	37.20	161.40	15.5	9.30	2.23	2.64	0.0	12.1	FS
SS36	2773.8-74.2	0.4	259.00	-	-	103.60	21.1	8.44	-	-	-	-	FS
37	2774.2-75.1	0.9	78.70	77.70	34.00	70.83	17.0	15.30	2.19	2.64	0.0	20.6	FS
38	2775.1-75.6	0.5	86.80	79.90	1.73	43.40	15.1	7.55	2.25	2.65	0.0	32.7	FS
39	2775.6-76.0	0.4	79.20	62.80	23.40	31.68	13.3	5.32	2.29	2.64	-	-	FS
40	2776.0-76.4	0.4	4.91	3.91	0.64	1.96	11.6	4.64	2.34	2.65	-	-	FS
41	2776.4-76.9	0.5	315.00	285.00	28.60	157.50	14.2	7.10	2.25	2.62	0.0	23.7	FS
42	2776.9-77.4	0.5	26.40	19.60	9.35	13.20	14.3	7.15	2.23	2.60	-	-	FS
43	2777.4-78.0	0.6	1.00	0.81	-0.01	0.60	7.2	4.32	2.53	2.72	0.0	43.4	FS SHY F
44	2778.0-79.0	1.0	73.10	0.47	0.34	73.10	11.0	11.00	2.37	2.66	0.0	24.4	FS VF
-	2779.0-80.0	1.0	-	-	-	-	-	-	-	-	-	-	LOST CORE
	CORE NO. 2	2780' - 2810' (REC. 30') (7 BOXES)											
45	2780.0-80.7	0.7	0.09	0.02	-0.01	0.06	4.9	3.43	2.50	2.63	0.0	12.5	FS VF
46	2780.7-81.9	1.2	43.50	0.25	0.11	52.20	11.4	13.68	2.35	2.66	0.0	17.3	FS VF
47	2781.9-82.6	0.7	0.03	-0.01	-0.01	0.02	9.8	6.86	2.41	2.68	0.0	45.5	FS SILTY
48	2782.6-83.4	0.8	0.01	0.01	-0.01	0.01	9.6	7.68	2.46	2.73	Trace	16.7	FS SILTY
49	2783.4-84.1	0.7	4.00	3.80	0.60	2.80	4.6	3.22	2.59	2.71	0.0	2.0	FS
50	2784.1-85.0	0.9	0.62	0.58	0.10	0.56	7.4	6.66	2.44	2.63	0.0	4.2	FS
51	2785.0-85.6	0.6	1.45	1.45	0.04	0.87	12.5	7.50	2.32	2.65	0.0	14.2	FS
52	2785.6-86.3	0.7	0.32	0.26	-0.01	0.22	10.8	7.56	2.38	2.67	0.0	10.4	FS SILTY
53	2786.3-87.2	0.9	0.34	0.28	-0.01	0.31	5.5	4.95	2.50	2.64	0.0	14.6	FS

Company UNION OIL COMPANY OF CANADA LIMITED Formation
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File 7004-5155

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 (Cont'd)												
54	2787.2-88.0	0.8	1.57	1.23	0.04	1.26	8.2	6.56	2.40	2.62	0.0	13.3	FS
55	2788.0-88.5	0.5	0.27	0.25	-0.01	0.13	10.3	5.15	2.39	2.67	0.0	28.4	FS SILTY
56	2788.5-89.0	0.5	10.90	10.50	0.35	5.45	13.4	6.70	2.28	2.63	0.0	17.6	FS
57	2789.0-89.5	0.5	0.31	0.22	-0.01	0.15	8.9	4.45	2.41	2.64	-	-	FS SILTY
58	2789.5-89.9	0.4	5.50	4.49	-0.01	2.20	10.1	4.04	2.41	2.68	-	-	FS
59	2789.9-90.7	0.8	1.90	1.86	0.19	1.52	9.0	7.20	2.37	2.61	-	-	FS
60	2790.7-91.6	0.9	3.71	3.48	-0.01	3.34	7.2	6.48	2.45	2.64	-	-	FS
61	2791.6-92.4	0.8	1.78	1.70	0.67	1.42	8.4	6.72	2.42	2.65	-	-	FS
62	2792.4-93.1	0.7	1.76	1.49	0.15	1.23	7.3	5.11	2.43	2.63	-	-	FS
63	2793.1-93.9	0.8	5.66	5.52	0.58	4.53	6.8	5.44	2.43	2.61	-	-	FS
64	2793.9-94.9	1.0	4.47	4.34	1.64	4.47	8.8	8.80	2.41	2.64	-	-	FS
65	2794.9-95.4	0.5	18.50	18.40	4.30	9.25	10.6	5.30	2.36	2.64	-	-	FS
66	2795.4-96.1	0.7	1.13	1.10	0.11	0.79	9.8	6.86	2.37	2.63	-	-	FS
67	2796.1-96.9	0.8	0.70	0.67	0.08	0.56	12.0	9.60	2.32	2.64	-	-	FS
68	2796.9-97.6	0.7	0.84	0.82	0.10	0.58	10.8	7.56	2.33	2.61	-	-	FS
69	2797.6-98.2	0.6	4.24	2.44	1.73	2.54	11.3	6.78	2.34	2.64	-	-	FS F
70	2798.2-99.0	0.8	1.51	1.27	0.09	1.21	14.0	11.20	2.29	2.66	-	-	FS F
71	2799.0-99.9	0.9	0.14	0.12	-0.01	0.13	10.9	9.81	2.41	2.71	-	-	FS SHY
72	2799.9-01.0	1.1	3.39	2.69	0.73	3.73	13.1	14.41	2.28	2.63	-	-	FS
73	2801.0-01.5	0.5	4.88	4.30	1.55	2.44	16.2	8.10	2.20	2.65	-	-	FS
SS74	2801.5-01.9	0.4	15.70	-	-	6.28	13.3	5.32	-	-	-	-	FS
75	2801.9-02.6	0.7	9.87	9.02	0.09	6.91	10.6	7.42	2.37	2.65	-	-	FS
76	2802.6-03.7	1.1	17.30	13.90	1.02	19.03	12.0	13.20	2.34	2.66	-	-	FS F
77	2803.7-04.9	1.2	2.74	2.20	1.64	3.29	7.6	9.12	2.46	2.66	-	-	FS F
78	2804.9-06.2	1.3	2.86	0.65	0.29	3.72	11.7	15.21	2.30	2.60	-	-	FS F
79	2806.2-07.1	0.9	26.40	23.60	3.00	23.76	12.8	11.52	2.32	2.66	-	-	FS
80	2807.1-08.4	1.3	3.03	2.92	0.18	3.94	13.0	16.90	2.27	2.61	-	-	FS
SS81	2808.4-09.0	0.6	10.70	-	-	6.42	16.2	9.72	-	-	-	-	FS
82	2809.0-10.0	1.0	24.50	20.00	0.16	24.50	12.1	12.10	2.34	2.66	-	-	FS
	CORE NO. 3 2810' - 2840' (REC. 28.5') (7 BOXES)												
83	2810.0-10.4	0.4	279.00	246.00	33.70	111.60	15.6	6.24	2.23	2.64	-	-	FS F

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File 7004-5155

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	Depth	Thick	K Max	K90°	KV				Bulk	Grain	Oil	Total Water	
	CORE NO. 3 (Cont'd)												
84	2810.4-11.2	0.8	50.80	18.70	0.34	40.64	13.0	10.40	2.30	2.65	-	-	FS F
85	2811.2-12.0	0.8	0.41	0.39	-0.01	0.33	8.4	6.72	2.39	2.61	0.0	3.1	FS
86	2812.0-12.5	0.5	5.77	4.39	1.25	2.89	11.5	5.75	2.34	2.64	0.0	2.2	FS
87	2812.5-13.2	0.7	498.00	478.00	15.70	348.60	14.6	10.22	2.26	2.64	0.0	1.3	FS
SS88	2813.2-13.5	0.3	118.00	-	-	35.40	14.5	4.35	-	-	-	-	FS
89	2813.5-14.3	0.8	467.00	445.00	31.10	373.60	15.2	12.16	2.25	2.65	0.0	1.2	F
90	2814.3-15.1	0.8	405.00	246.00	52.30	324.00	13.2	10.56	2.28	2.63	-	-	FS VF
91	2815.1-16.0	0.9	7.21	6.10	0.53	6.49	9.8	8.82	2.40	2.66	0.0	11.1	FS
92	2816.0-16.8	0.8	1.69	1.69	0.56	1.35	10.9	8.72	2.36	2.65	-	-	FS
93	2816.8-17.5	0.7	4.57	4.29	0.80	3.20	10.4	7.28	2.35	2.63	-	-	FS
94	2817.5-18.0	0.5	17.60	12.30	0.57	8.80	9.8	4.90	2.37	2.63	0.0	11.1	FS
95	2818.0-18.6	0.6	52.00	49.50	6.32	31.20	11.0	6.60	2.36	2.65	-	-	FS F
96	2818.6-19.8	1.2	4.92	3.85	1.32	5.90	10.0	12.00	2.39	2.65	-	-	FS
97	2819.8-20.8	1.0	4.09	3.95	1.56	4.09	8.5	8.50	2.38	2.61	0.0	19.0	FS
98	2820.8-21.9	1.1	7.77	7.27	3.24	8.55	10.6	11.66	2.38	2.66	0.0	11.5	FS
99	2821.9-22.9	1.0	3.68	3.55	0.87	3.68	9.0	9.00	2.41	2.65	0.0	7.7	FS
100	2822.9-23.9	1.0	4.26	3.65	1.77	4.26	8.7	8.70	2.38	2.61	-	-	FS
101	2823.9-24.6	0.7	3.21	3.10	0.62	2.25	9.1	6.37	2.41	2.65	-	-	FS
102	2824.6-25.6	1.0	14.70	14.30	7.71	14.70	11.2	11.20	2.33	2.63	-	-	FS
103	2825.6-26.2	0.6	60.60	55.50	36.30	36.36	13.4	8.04	2.29	2.64	-	-	FS
104	2826.2-26.8	0.6	2.39	2.07	0.42	1.43	9.3	5.58	2.37	2.62	-	-	FS
105	2826.8-27.3	0.5	0.09	0.09	-0.01	0.05	8.1	4.05	2.44	2.66	-	-	FS SILTY
106	2827.3-27.9	0.6	0.11	0.06	-0.01	0.07	8.3	4.98	2.44	2.67	-	-	FS SILTY
-	2827.9-28.0	0.1	-	-	-	-	-	-	-	-	-	-	CARB/BK
107	2828.0-28.8	0.8	0.35	0.27	-0.01	0.28	11.3	9.04	2.31	2.61	0.0	2.3	FS SILTY
108	2828.8-29.6	0.8	0.49	0.32	-0.01	0.39	11.2	8.96	2.37	2.67	0.0	8.3	FS SILTY
109	2829.6-29.9	0.3	0.03	-0.01	-0.01	0.01	10.6	3.18	2.39	2.67	-	-	FS SILTY
110	2829.9-30.5	0.6	0.08	0.06	-0.01	0.05	11.7	7.02	2.39	2.70	0.0	36.3	FS SILTY
111	2830.5-31.6	1.1	0.13	0.12	-0.01	0.15	10.0	11.00	2.39	2.66	0.0	13.1	FS SILTY
112	2831.6-32.4	0.8	0.74	0.59	-0.01	0.59	7.5	6.00	2.47	2.67	0.0	4.1	FS SILTY F
113	2832.4-33.1	0.7	0.97	0.83	0.34	0.68	6.7	4.69	2.47	2.65	0.0	2.9	FS
114	2833.1-34.3	1.2	2.57	2.48	0.59	3.08	7.4	8.88	2.42	2.62	-	-	FS
115	2834.3-34.9	0.6	1.55	1.26	0.31	0.93	10.0	6.00	2.35	2.62	0.0	2.3	FS

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Formation
Drilling Fluid WATER BASE MUD

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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. 3 (Cont'd)												
116	2834.9-35.7	0.8	1.19	1.13	0.25	0.95	10.2	8.16	2.36	2.63	-	-	FS
117	2835.7-36.2	0.5	1.02	1.01	-0.01	0.51	8.5	4.25	2.41	2.64	0.0	1.8	FS
118	2836.2-36.7	0.5	0.83	0.78	-0.01	0.42	9.3	4.65	2.40	2.65	-	-	FS
119	2836.7-37.2	0.5	0.40	0.31	-0.01	0.20	7.5	3.75	2.43	2.63	-	-	FS
120	2837.2-37.7	0.5	0.09	0.05	-0.01	0.05	7.6	3.80	2.44	2.64	-	-	FS SILTY
121	2837.7-38.5	0.8	0.28	0.23	-0.01	0.22	8.2	6.56	2.42	2.63	0.0	16.4	FS PART RUBBLE
-	2838.5-40.0	1.5	-	-	-	-	-	-	-	-	-	-	LOST CORE

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REPORT

ON THE

DRILLING AND ABANDONMENT

OF

UNION IMP. STOPOVER K-44

N.T.S. 96-0-12, GRID CORNER

UNIT K, SECTION 44

April 8, 1975

Reported By: K. A. Jasinski
Drilling Foreman

WELL HISTORY REPORTS

SECTION I SUMMARY OF WELL DATA

(a) Well name and number: Union Imp. Stopover K-44

(b) Permittee: Imperial Oil Enterprises Ltd.

(c) Operator: Union Oil Company of Canada Limited
P. O. Box 999
Calgary, Alberta

(d) Location: K-44 - 67°40'N, 123°30'W
NTS 96-O-12

(e) Co-ordinates: Latitude - 67°33'31" N
Longitude- 123°38'32" W
Unique Well Identifier - 300K446740123300
Universal Well Location Reference - 67.52527 N
123.64222 W

(f) Permit No: 6573

(g) Drilling Contractor: Tri City Drilling Rig #2
Unit U-34 Trailer Rig w/97' mast

(h) Drilling Authority No. 784 October 15, 1974

(i) Classification: N.F.W. (New Field Wildcat)

(j) Elevation: Ground 1192'
Kelly Bushing 1204'

(k) Date Spudded: 4:30 PM February 15, 1975

(l) Date Completed Drilling: March 22, 1975

(m) Total Depth & Plugged Back Total Depth: 3092', surface

(n) Well Status: Dry Hole - Abandoned

(o) Rig Release Date: 5:00 P.M. March 24, 1975

(p) Hole Sizes to Total Depth:

17½"	-	Surface to	50'
12¼"	-	50'	-	446'
8½"	-	446'	-	2460'
6¼"	-	2460'	-	3092'

(q) Casing Sizes and Setting Depths:

13-3/8 O.D.	54.5#	K-55	Landed @	50'
9-5/8" O.D.	40#	K-55	" @	440'
7" O.D.	23#	N-80	" @	2442'

(r) Land Use Permit: N74A904

(s) Water Authorization: - N7A3-0257
Latitude - 67°33' N
Longitude - 123° 37' W

(t) Water Source Analysis: ATTACHED

SECTION II - GEOLOGICAL SUMMARY

(a) Formation Tops:

Marker	Top	Subsea
Saline River	1846	- 642
Saline River Salt	2130	- 926
Mount Cap	2306	-1102
Basal Mount Cap Sandstone	2686	-1482
Old Fort Island	2730	-1526
Proterozoic	2847	-1643
Total Depth	3092	-1888

(b) Cored Intervals:

#1 2750' - 2780'
#2 2780' - 2810'
#3 2810' - 2840'

(c) Core Description: ATTACHED

SECTION III - ENGINEERING SUMMARY

(a) Report of Drill Stem Tests: (CHARTS ATTACHED)

DST #1 - By Johnston in Old Fort Island Sand.
Interval 2724' - 2840' w/5½" O.D. packer
½" S.S. choke. 10 min. Pre Flow. I.S.I. - 60 min.
T.O. - 120 min. commencing @ 4:50 PM F.S.I. - 120 min.
G.I.A.P. followed by fair air blow, slowly decreasing throughout test to week air blow at end of test.
3½" D.P. recovery - 2550' of salt water (PPMCl - 11,540)
Samples - 3 - 1 qt. samples, 1 - 1 qt sample system mud.
I.H.S.P. - 1264, F.H.S.P. - 1264, I.F.P. - 285', F.F.P. - 1182,
I.S.I.P. - 1254, F.S.I.P. - 1264

(b) Casing Record

(1) Conductor:

13-3/8" O.D. 54.5# K-55 set @ 50'
Cemented w/46 sx 1:1 Calseal + Oilwell cement.

..... 3

(2) Surface Casing

Ran 11 jts. 9-5/8" O.D. 40# 8RTH K-55 Class A casing set @ 440' Total tally - 440.06. Net Tally - 429.06'. Ground Elevation 1192' K.B. elevation 1204'. Ran 1 centralizer on bottom 40', w/Baker Float Collar and Texas Shoe. D.V. Tool @ 85' from surface. Cemented by Dowell w/250 sx Oilwell + 3% $CaCl_2$ on first stage. Pumped 410 sx Oilwell + 3% $CaCl_2$ on second stage down annulus while adding 55 sx L.C.M. during cementing.

(3) Intermediate:

Ran 63 jts 7" O.D. 23# 8RTH N-80 Class A
Casing set @ 2442'. Total tally 2443.79'
Net Tally - 2429.79. Ground elevation 1192' K.B. elevation 1204'.
Float shoe and float collar - Baker. Cleaned to bottom w/air and foam. Cemented by Dowell w/250 sx oilwell cement.
Plug down @ 10:40 P.M. March 16, 1975

(c) Bit Record

No.	Size	Type	Depth Out	Footage	Hrs.	Bit Cond. TBG	WOB	RPM
1B	12¼"	D-TJ	30	30	4	Drill Rat Hole		
2B	17½"	H-7JP	40	40	10	5-4-1	4	75
3B	17½"	S-88P	50	10	2	6-3-1	4	75
4B	12¼"	S-88P	439	389	35	5-7-1	6/10	80
5B	12¼"	S-88P	478	40	2½	3-4-1	10/	80
RR1B	12¼"	D-TJ	Clean out to top of fish					
6B	12¼"	S-88P	Clean out to top of fish					
1	8½"	S-86P	902	424	36	2-8-1	8/10	70
2	8½"	S-88P	1166	264	35	1-6-1	10	70
3	8½"	S-88P	1400	267	35-3/4	2-6-1	10	70
4	8½"	3JS	1481	81	10	1-3-1	10	70
5	8½"	M-88P	1544	63	15¼	1-4-1	8/10	70
6	8½"	3JS-P	1633	89	23¼	2-4-1	10/20	70
7	8½"	S-88P	2028	395	30-3/4	7-8-1	20	65/70
8	8½"	S-88P	2460	432	21¼	6-8-1	20	70
9	6¼"	S-88F	2750	290	24	1-2-1	8/10	70
10	6-7/32"		2840	90	7½	Good	8/10	70
11	6¼"	S-88F	2960	120	14¼	7-8-1	20	70
12	6¼"	S-88F	3055	95	13¼	6-8-1	20	70
13	6¼"	F-4RR	3092	37	4-3/4	2-1-1	20	70

(d) Mud Report

Type and amount used - Gel Polymer
Gel 12,800 Kelzan - 900' Caustic 150#
Hole drilled w/air and foam - surface to 2460'
Mud drilled from 2460' - 3092' (T.D.)
Full tank volume on standby at all times while air drilling

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(e) Deviation Record

DEPTH	ANGLE°	DEPTH	ANGLE°
80	1/2	1320	1
170	1/2	1440	1-3/4
263	1	1530	1-1/4
320	1	1690	1-1/2
380	1/2	1910	1
505	1/2	2260	1
720	1/4	2611	1-1/4
852	2	2960	1/2
880	2		
946	1-1/4		
1040	1-1/4		
1135	1-1/4		
1259	2		

(f) Abandonment Plugs:

P&A #1 3092' - 2700' by Dowell w/125 sx oilwell cement
Plug in place @ 9:45 PM

P&A #2 2500' - 2350' by Dowell w/40 sx oilwell cement + 3% $CaCl_2$. Plug down @ 10:30 PM. W.O.C. Felt for plug #2 @ 5:00 A.M. @ 2380'.

(g) Lost Circulation Zones:

Surface Hole:

(1) Gravel section 70' - 110' casing badly unable to stabilize
Ran Plug #1 by Dowell w/66 sx 1:1 Oilwell + CA/seal cement.
Plug in place @ 6:05 A.M.

(2) Ran in to 80' no trace of cement to 110'
Ran Plug #2 by Dowell from 60'w/130 sx cement = 8% NaCl
Plug down @ 4:30 PM W.O.C. 3 hours.

(3) Ran in dropped Plug #3 by Dowell frame 60' w/150 sx + 8% NaCl.
Plug down 7:35 PM February 8, 1975 W.O.C. 3 hours.

(4) Ran Plug #4 by Dowell from 60' w/50 sx cement + 10% Gel.
Plug down @ 10:05 PM. February 18, 1975. W.O.C. 10 hours.

(5) Ran in cleaned out plugs from 60' - 85' and cleaned hole to 140'.
Hole sloughing.

(6) Ran Plug #5 by Dowell @ 140' W/90 sx Oilwell + 8% NaCl.
Plug down @ 12:15 PM. February 19, 1975. W.O.C. 4 hours.
Ran in drilled out cement to 135'. Had stringers of shale and gravel to 170'. Good foam returns to 269'.

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(7) Drilled to 330' w/stiff foam. Hole making water approx. 50/60 Bbls per hour Drilled to 421'. From 421' to 439' drilled in 5 min. Lost returns. Hole sloughing, unable to stabilize.

(8) Ran Plug #6 @ 429' w/50 sx Oilwell + 3% $CaCl_2$. Plug down @ 11:45 AM. February 21, 1975. W.O.C. Ran in to drill out. No indication of plug and hole sloughing.

(9) Ran in open end and ran Plug #7 @ 408' w/80 sx Oilwell cement + 3% $CaCl_2$. Plug down @ 9:00 PM. W.O.C. Ran in w/no cement to 414'. Hole sloughing and stuck pipe @ 374', worked free. Pulled to 250' and stuck pipe. Unable to free same.

(10) Backed off pipe leaving 2 D.C. in hole from 190 - 250'.

(11) Ran in to 75' and tried to fill hole w/mud. Pumped 340 bbls away and no returns.

(12) Rig up and run diesel gel Plugs #1, #2, #3, & #4 @ 30' intervals.

(13) Cleaned out to 184'. Ran Plug #8 by Dowell w/100 sx cement + 3% $CaCl_2$. Plug down @ 9:25 A.M. February 23, 1975

(14) Ran Plug #9 by Dowell @ 110' w/50 sx cement + 3% $CaCl_2$. Plug down @ 4:30 PM February 23, 1975.

(15) Drill out cement from 70' - 201'. Circ. top of fish Cement good.

(16) Wash over fish and dropped same to bottom. Ran in w/ overshot and retrieved fish.

(17) Ran in open end to 425'. Ran B.J. chemical Plug #1 w/50 sx cement and D-31, R-5 + A-2 added. Plug down @ 4:30 P.M. W.O.C. 4 hours. Feel for plug. No plug.

(18) Ran diesel gel plug #5 by Dowell w/15 sx cement + 5 bbls diesel, plug in place @ 9:30 P.M. @ 425'. Hole sloughing. Cleaned to 430' still sloughing badly.

(19) Run in and started cleaning hole from 75' - 415'. Pulled up to 347' and dropped diesel - gel plug #6 w/15 sx gel _ 5 bbls diesel. Plug in place @ 12:00 Noon. Followed w/plug #10 @ 347' w/30 sx cement + 3% $CaCl_2$ + 40# Kwik Seal added. Plug in place @ 2:00 P.M. W.O.C. 5 hr.

(20) Ran in, no plugs to 408'. Pulled up to 350' and dropped 40 sx sand plug. Wait 1/2 hour and tagged sand fill @ 423'.

(21) Ran Plug #7 diesel gel @ 380' w/15 sx gel + 5 bbls diesel. Plug in place @ 12:40 A.M. Followed by Plug #12 w/20 sx 1:1 cement + Cal Seal. Plug in place @ 1:15 A.M. Fel: for plug to 425'. No plug.

.....6

(22) Run in and pushed ahead gunny sacks to 390'. Ran Plug #13 @ 385' by Dowell w/ 15 sx 1:1 cement and Cal Seal. Plug down @ 9:00 A.M. No plug. Ran plug #14 by Dowell @ 414' w/20 sx 1:1 cement + Cal Seal. Plug down @ 11:30 A.M. No Plug.

(23) Ran in and run diesel gel Plug #8 by Dowell from 200' w/15 sx gel + 5 bbls diesel. Plug in place @ 2:15 A.M. Followed by Plug #15 w/20 sx cement. 1:1 and Cal Seal. Plug down @ 2:30 AM No plug. Ran Plug #16 by Dowell @ 415' w/20 sx 1:1 cement and Cal Seal. Plug down @ 11:30 A.M. W.O.C. 4 hours. Plug #16 @ 185'.

(24) Ran diesel gel plug #9 @ 185' by Dowell w/15 sx gel + 5 bbls diesel. Plug in place @ 6:05 A.M. March 2, 1975. Followed by Plug #17 w/10 sx 1:1 cement and Cal Seal. Plug down @ 6:15 PM. Found plug @ 175'

(25) Ran Plug #18 by Dowell @ 175'. w/130 sx cement + 3% $CaCl_2$. Plug down @ 8:45 P.M. March 2, 1975. Felt plug @ 88'. Ran Plug #19 @ 88' by Dowell w/60 sx cement + 3% $CaCl_2$. Plug down @ 5:30 A.M. March 2, 1975. W.O.C.

(26) Cleaned to 446'. Ran Plug #1 by Nowsco & Dowell w/20 bbls water w/2½ bbls Silicate Soda 41 Baume + 3½ sx of 21-0-0 Fertilizer added. Plug down @ 8:45 PM. Followed by Plug #2 as above. Plug down @ 9:30 P.M. Cleaned out w/good returns to 438'. Lost returns from 438' 478'.

(27) Rigged up and ran 9-5/8" casing set @ 440'.

8½" Hole:

(1) 440' - 630' good foam returns
480' - Fresh water influx - Analysis attached.

(2) 630' - Lost all returns

(3) 630' - 2460' - No returns to surface. Hole standing water to approximate 200' level.

(4) Ran 7" casing @ 2442'

(5) 2460' - 2715' - Drilled w/ air and foam with good returns. Changed over to mud @ 2715'

(6) 2715' - 3092' - Mud drilled with good returns.

(h) Report of Well Kicks & Blowouts: None

KAJ

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

Plastic — CONTAINER IDENTITY

WATER ANALYSIS

7021-5330 — LABORATORY NUMBER

67° 33' 31" N.L.
123° 20' 16" W.L. — LOCATION

Union Oil Company Of Canada Limited — OPERATOR

1 of 1 — PAGE

Union Imp Stopover A-94 — WELL OR SAMPLE LOCATION NAME

1178' — KB ELEV. / GRD. ELEV.

Stopover Area, Northwest Territories — FIELD OR AREA

POOL OR ZONE

SAMPLER

TEST TYPE & NO.

TEST RECOVERY

Depth 480' - Water from blooie line before returns were lost — POINT OF SAMPLE

AMT. & TYPE CUSHION

@ °F — MUD RESISTIVITY

TEST INTERVALS OR PERFS.

PUMPING FLOWING GAS LIFT SWAB

WATER BBLS/D. OIL BBLS/D. GAS MFC/D.

SEPARATOR RESERVOIR

@ °F — CONTAINER WHEN SAMPLED

@ °F — CONTAINER WHEN RECEIVED

SEPARATOR

PRESSURES, PSIG

TEMPERATURES, °F

March 18/75 — DATE SAMPLED (D/M/Y)
March 24/75 — DATE RECEIVED (D/M/Y)
GBW — DATE ANALYSED (D/M/Y) / ANALYST

REMARKS

ION	MG/L	MG%	MEQ/L
Na+K	53	9.9	2.3
K			
Ca	92	17.1	4.6
Mg	5	1.0	0.4
Ba			
Sr			
Fe		TRACE	

ION	MG/L	MG%	MEQ/L
Cl	19	3.5	0.5
Br			
I			
HCO_3	205	38.1	3.4
SO_4	164	30.5	3.4
CO_3	0	0.0	0.0
OH	0	0.0	0.0
H_2S	NOT DETECTED		

TOTAL SOLIDS MG/L

BY EVAPORATION @ 110°C

BY EVAPORATION @ 180°C

AT IGNITION

538 — CALCULATED

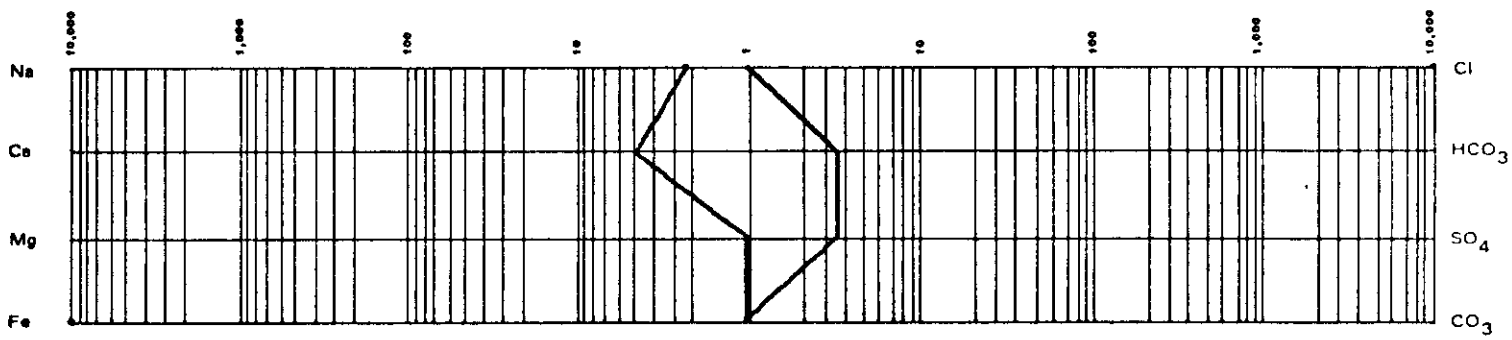
1.0006 @ 60°F — SPECIFIC GRAVITY

1.3315 @ 25°C — REFRACTIVE INDEX

7.8 — pH

14.5 @ 25°C — RESISTIVITY (OHM/METERS)

LOGARITHMIC PATTERN MEQ PER LITER



REMARKS

NaCl equiv 307

CORE LABORAT .IES - CANADA, LTD.

Company	UNION OIL COMPANY OF CANADA LIMITED	Formation		Page	1 of 5
Well	UNION IOL STOPOVER K-44	Drilling Fluid	WATER BASE MUD	File	7004-5155
Field	WILDCAT - STOPOVER, NORTHWEST TERRITORIES			Date Report	APR. 7/75
Location	67° 33' 31.00" N. LAT.	Analysis	FULL DIAMETER	Analysts	TH BK
	123° 38' 32.00" W. LONG.	Remarks	RESIDUAL SATURATIONS DETERMINED ON SAMPLE END PIECES.		

AST - APPEARS SIMILAR TO
* - BROKEN CORE (K90 USED FOR SUMMARY PURPOSES)
** - PERMEABILITY > 3000 MD
– - PERMEABILITY <
FS - FINE SAND
MS - MEDIUM SAND
CS - COARSE SAND
CONG - CONGLOMERATE
DOL - DOLOMITE
SH - SHALE
LMY - LIMY
SHY - SHALY
/BK - BREAK
BIT - PYROBITUMEN
CARB - CARBONACEOUS
A - ANHYDRITE
FOSS - FOSSILIFEROUS
XLN - CRYSTALLINE
LAM - LAMINATIONS
V - VUGULAR
LV - LARGE VUGS
SV - SMALL VUGS
PPV - PIN POINT VUGS
I - INTERGRANULAR
STY - STYLOLITIC
HF - HORIZONTAL FRACTURE
VF - VERTICAL FRACTURE
SS - SMALL PLUG SAMPLE
SL/ - SLIGHTLY
V/ - VERY
W/ - 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	2750' - 2840'											
	CORE NO. 1	2750' - 2780' (REC. 29') (7 BOXES)											
1	2750.0-50.7	0.7	0.13	0.13	-0.01	0.09	11.0	7.70	2.36	2.65	-	-	FS SILTY
2	2750.7-51.4	0.7	0.04	0.04	-0.01	0.03	6.6	4.62	2.46	2.64	-	-	FS SILTY
3	2751.4-52.2	0.8	0.13	0.11	-0.01	0.10	11.0	8.80	2.36	2.66	-	-	FS SILTY
4	2752.2-52.6	0.4	0.44	0.37	0.12	0.18	15.0	6.00	2.24	2.64	-	-	FS
5	2752.6-53.8	1.2	1.59	1.34	0.22	1.91	16.0	19.20	2.21	2.63	-	-	FS
6	2753.8-54.6	0.8	1.37	0.97	-0.01	1.10	15.0	12.00	2.29	2.70	-	-	FS
7	2754.6-55.0	0.4	0.14	0.14	-0.01	0.06	10.5	4.20	2.42	2.70	-	-	FS SILTY
8	2755.0-55.8	0.8	0.26	0.24	-0.01	0.21	9.4	7.52	2.45	2.70	-	-	FS
9	2755.8-57.0	1.2	0.09	0.05	-0.01	0.11	12.5	15.00	2.33	2.66	-	-	FS SILTY SH/BKS F
10	2757.0-57.5	0.5	1.06	0.80	0.06	0.53	10.6	5.30	2.39	2.68	-	-	FS
11	2757.5-58.5	1.0	0.25	0.25	-0.01	0.25	9.2	9.20	2.42	2.67	-	-	FS
12	2758.5-59.4	0.9	0.52	0.38	-0.01	0.46	5.5	4.95	2.50	2.65	-	-	FS F
13	2759.4-60.0	0.6	0.64	0.64	0.06	0.38	9.4	5.64	2.44	2.69	-	-	FS
14	2760.0-60.7	0.7	0.54	0.29	-0.01	0.38	9.6	6.72	2.43	2.69	-	-	FS F
15	2760.7-61.1	0.4	0.10	0.10	-0.01	0.04	6.4	2.56	2.48	2.66	-	-	FS
-	2761.1-61.3	0.2	-	-	-	-	-	-	-	-	-	-	SH
16	2761.3-61.7	0.4	0.34	0.25	-0.01	0.14	12.8	5.12	2.33	2.67	-	-	FS SILTY
17	2761.7-62.1	0.4	0.77	0.64	-0.01	0.31	15.7	6.28	2.22	2.64	-	-	FS
18	2762.1-62.9	0.8	0.51	0.35	-0.01	0.41	16.9	13.52	2.22	2.67	-	-	FS SILTY
19	2762.9-63.7	0.8	0.23	0.21	-0.01	0.18	12.0	9.60	2.35	2.67	-	-	FS SILTY
20	2763.7-64.1	0.4	2.29	1.82	0.14	0.92	15.3	6.12	2.26	2.66	-	-	FS
21	2764.1-64.3	0.2	0.74	0.64	0.14	0.15	14.0	2.80	2.35	2.73	-	-	FS
22	2764.3-64.8	0.5	0.08	0.08	-0.01	0.04	7.0	3.50	2.51	2.70	-	-	FS
23	2764.8-65.3	0.5	0.14	0.14	-0.01	0.07	13.6	6.80	2.29	2.65	-	-	FS SILTY
24	2765.3-66.4	1.1	1.45	1.13	-0.01	1.60	15.2	16.72	2.24	2.64	-	-	FS

Company UNION OIL COMPANY OF CANADA LIMITED Formation
Well UNION IOL STOPOVER K-44 Drilling Fluid WATER BASE MUD

File 7004-5155

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. 1 (Cont'd)												
25	2766.4-67.0	0.6	0.18	0.14	-0.01	0.11	9.7	5.82	2.43	2.69	-	-	FS
26	2767.0-67.6	0.6	2.79	1.06	-0.01	1.67	14.2	8.52	2.28	2.66	-	-	FS F
27	2767.6-68.4	0.8	1.22	1.12	0.20	0.98	15.1	12.08	2.26	2.66	-	-	FS F
28	2768.4-68.9	0.5	5.64	4.03	2.16	2.82	16.3	8.15	2.22	2.66	-	-	FS
29	2768.9-69.4	0.5	0.71	0.58	-0.01	0.35	9.2	4.60	2.40	2.65	-	-	FS
30	2769.4-70.3	0.9	0.44	0.40	-0.01	0.39	6.8	6.12	2.48	2.66	-	-	FS
31	2770.3-71.0	0.7	*	1.27	*	0.89	10.3	7.21	2.36	2.64	-	-	FS OVF
32	2771.0-71.7	0.7	0.73	0.73	-0.01	0.51	6.9	4.83	2.48	2.67	-	-	FS
33	2771.7-72.8	1.1	14.50	14.40	2.10	15.95	13.8	15.18	2.27	2.64	-	-	FS
34	2772.8-73.2	0.4	13.30	13.10	0.36	5.32	9.6	3.84	2.40	2.66	-	-	FS
35	2773.2-73.8	0.6	269.00	269.00	37.20	161.40	15.5	9.30	2.23	2.64	0.0	12.1	FS
SS36	2773.8-74.2	0.4	259.00	-	-	103.60	21.1	8.44	-	-	-	-	FS
37	2774.2-75.1	0.9	78.70	77.70	34.00	70.83	17.0	15.30	2.19	2.64	0.0	20.6	FS
38	2775.1-75.6	0.5	86.80	79.90	1.73	43.40	15.1	7.55	2.25	2.65	0.0	32.7	FS
39	2775.6-76.0	0.4	79.20	62.80	23.40	31.68	13.3	5.32	2.29	2.64	-	-	FS
40	2776.0-76.4	0.4	4.91	3.91	0.64	1.96	11.6	4.64	2.34	2.65	-	-	FS
41	2776.4-76.9	0.5	315.00	285.00	28.60	157.50	14.2	7.10	2.25	2.62	0.0	23.7	FS
42	2776.9-77.4	0.5	26.40	19.60	9.35	13.20	14.3	7.15	2.23	2.60	-	-	FS
43	2777.4-78.0	0.6	1.00	0.81	-0.01	0.60	7.2	4.32	2.53	2.72	0.0	43.4	FS SHY F
44	2778.0-79.0	1.0	73.10	0.47	0.34	73.10	11.0	11.00	2.37	2.66	0.0	24.4	FS VF
-	2779.0-80.0	1.0	-	-	-	-	-	-	-	-	-	-	LOST CORE
	CORE NO. 2 2780' - 2810' (REC. 30') (7 BOXES)												
45	2780.0-80.7	0.7	0.09	0.02	-0.01	0.06	4.9	3.43	2.50	2.63	0.0	12.5	FS VF
46	2780.7-81.9	1.2	43.50	0.25	0.11	52.20	11.4	13.68	2.35	2.66	0.0	17.3	FS VF
47	2781.9-82.6	0.7	0.03	-0.01	-0.01	0.02	9.8	6.86	2.41	2.68	0.0	45.5	FS SILTY
48	2782.6-83.4	0.8	0.01	0.01	-0.01	0.01	9.6	7.68	2.46	2.73	Trace	16.7	FS SILTY
49	2783.4-84.1	0.7	4.00	3.80	0.60	2.80	4.6	3.22	2.59	2.71	0.0	2.0	FS
50	2784.1-85.0	0.9	0.62	0.58	0.10	0.56	7.4	6.66	2.44	2.63	0.0	4.2	FS
51	2785.0-85.6	0.6	1.45	1.45	0.04	0.87	12.5	7.50	2.32	2.65	0.0	14.2	FS
52	2785.6-86.3	0.7	0.32	0.26	-0.01	0.22	10.8	7.56	2.38	2.67	0.0	10.4	FS SILTY
53	2786.3-87.2	0.9	0.34	0.28	-0.01	0.31	5.5	4.95	2.50	2.64	0.0	14.6	FS

Company UNION OIL COMPANY OF CANADA LIMITED Formation
Well UNION IOL STOPOVER K-44 Drilling Fluid WATER BASE MUD

File 7004-5155

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 (Cont'd)												
54	2787.2-88.0	0.8	1.57	1.23	0.04	1.26	8.2	6.56	2.40	2.62	0.0	13.3	FS
55	2788.0-88.5	0.5	0.27	0.25	-0.01	0.13	10.3	5.15	2.39	2.67	0.0	28.4	FS SILTY
56	2788.5-89.0	0.5	10.90	10.50	0.35	5.45	13.4	6.70	2.28	2.63	0.0	17.6	FS
57	2789.0-89.5	0.5	0.31	0.22	-0.01	0.15	8.9	4.45	2.41	2.64	-	-	FS SILTY
58	2789.5-89.9	0.4	5.50	4.49	-0.01	2.20	10.1	4.04	2.41	2.68	-	-	FS
59	2789.9-90.7	0.8	1.90	1.86	0.19	1.52	9.0	7.20	2.37	2.61	-	-	FS
60	2790.7-91.6	0.9	3.71	3.48	-0.01	3.34	7.2	6.48	2.45	2.64	-	-	FS
61	2791.6-92.4	0.8	1.78	1.70	0.67	1.42	8.4	6.72	2.42	2.65	-	-	FS
62	2792.4-93.1	0.7	1.76	1.49	0.15	1.23	7.3	5.11	2.43	2.63	-	-	FS
63	2793.1-93.9	0.8	5.66	5.52	0.58	4.53	6.8	5.44	2.43	2.61	-	-	FS
64	2793.9-94.9	1.0	4.47	4.34	1.64	4.47	8.8	8.80	2.41	2.64	-	-	FS
65	2794.9-95.4	0.5	18.50	18.40	4.30	9.25	10.6	5.30	2.36	2.64	-	-	FS
66	2795.4-96.1	0.7	1.13	1.10	0.11	0.79	9.8	6.86	2.37	2.63	-	-	FS
67	2796.1-96.9	0.8	0.70	0.67	0.08	0.56	12.0	9.60	2.32	2.64	-	-	FS
68	2796.9-97.6	0.7	0.84	0.82	0.10	0.58	10.8	7.56	2.33	2.61	-	-	FS
69	2797.6-98.2	0.6	4.24	2.44	1.73	2.54	11.3	6.78	2.34	2.64	-	-	FS F
70	2798.2-99.0	0.8	1.51	1.27	0.09	1.21	14.0	11.20	2.29	2.66	-	-	FS F
71	2799.0-99.9	0.9	0.14	0.12	-0.01	0.13	10.9	9.81	2.41	2.71	-	-	FS SHY
72	2799.9-01.0	1.1	3.39	2.69	0.73	3.73	13.1	14.41	2.28	2.63	-	-	FS
73	2801.0-01.5	0.5	4.88	4.30	1.55	2.44	16.2	8.10	2.20	2.65	-	-	FS
SS74	2801.5-01.9	0.4	15.70	-	-	6.28	13.3	5.32	-	-	-	-	FS
75	2801.9-02.6	0.7	9.87	9.02	0.09	6.91	10.6	7.42	2.37	2.65	-	-	FS
76	2802.6-03.7	1.1	17.30	13.90	1.02	19.03	12.0	13.20	2.34	2.66	-	-	FS F
77	2803.7-04.9	1.2	2.74	2.20	1.64	3.29	7.6	9.12	2.46	2.66	-	-	FS F
78	2804.9-06.2	1.3	2.86	0.65	0.29	3.72	11.7	15.21	2.30	2.60	-	-	FS F
79	2806.2-07.1	0.9	26.40	23.60	3.00	23.76	12.8	11.52	2.32	2.66	-	-	FS
80	2807.1-08.4	1.3	3.03	2.92	0.18	3.94	13.0	16.90	2.27	2.61	-	-	FS
SS81	2808.4-09.0	0.6	10.70	-	-	6.42	16.2	9.72	-	-	-	-	FS
82	2809.0-10.0	1.0	24.50	20.00	0.16	24.50	12.1	12.10	2.34	2.66	-	-	FS
	CORE NO. 3 2810' - 2840' (REC. 28.5') (7 BOXES)												
83	2810.0-10.4	0.4	279.00	246.00	33.70	111.60	15.6	6.24	2.23	2.64	-	-	FS F

Company UNION OIL COMPANY OF CANADA LIMITED Formation
Well UNION IOL STOPOVER K-44 Drilling Fluid WATER BASE MUD

File 7004-5155

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. 3 (Cont'd)												
84	2810.4-11.2	0.8	50.80	18.70	0.34	40.64	13.0	10.40	2.30	2.65	-	-	FS F
85	2811.2-12.0	0.8	0.41	0.39	-0.01	0.33	8.4	6.72	2.39	2.61	0.0	3.1	FS
86	2812.0-12.5	0.5	5.77	4.39	1.25	2.89	11.5	5.75	2.34	2.64	0.0	2.2	FS
87	2812.5-13.2	0.7	498.00	478.00	15.70	348.60	14.6	10.22	2.26	2.64	0.0	1.3	FS
SS88	2813.2-13.5	0.3	118.00	-	-	35.40	14.5	4.35	-	-	-	-	FS
89	2813.5-14.3	0.8	467.00	445.00	31.10	373.60	15.2	12.16	2.25	2.65	0.0	1.2	F
90	2814.3-15.1	0.8	405.00	246.00	52.30	324.00	13.2	10.56	2.28	2.63	-	-	FS VF
91	2815.1-16.0	0.9	7.21	6.10	0.53	6.49	9.8	8.82	2.40	2.66	0.0	11.1	FS
92	2816.0-16.8	0.8	1.69	1.69	0.56	1.35	10.9	8.72	2.36	2.65	-	-	FS
93	2816.8-17.5	0.7	4.57	4.29	0.80	3.20	10.4	7.28	2.35	2.63	-	-	FS
94	2817.5-18.0	0.5	17.60	12.30	0.57	8.80	9.8	4.90	2.37	2.63	0.0	11.1	FS
95	2818.0-18.6	0.6	52.00	49.50	6.32	31.20	11.0	6.60	2.36	2.65	-	-	FS F
96	2818.6-19.8	1.2	4.92	3.85	1.32	5.90	10.0	12.00	2.39	2.65	-	-	FS
97	2819.8-20.8	1.0	4.09	3.95	1.56	4.09	8.5	8.50	2.38	2.61	0.0	19.0	FS
98	2820.8-21.9	1.1	7.77	7.27	3.24	8.55	10.6	11.66	2.38	2.66	0.0	11.5	FS
99	2821.9-22.9	1.0	3.68	3.55	0.87	3.68	9.0	9.00	2.41	2.65	0.0	7.7	FS
100	2822.9-23.9	1.0	4.26	3.65	1.77	4.26	8.7	8.70	2.38	2.61	-	-	FS
101	2823.9-24.6	0.7	3.21	3.10	0.62	2.25	9.1	6.37	2.41	2.65	-	-	FS
102	2824.6-25.6	1.0	14.70	14.30	7.71	14.70	11.2	11.20	2.33	2.63	-	-	FS
103	2825.6-26.2	0.6	60.60	55.50	36.30	36.36	13.4	8.04	2.29	2.64	-	-	FS
104	2826.2-26.8	0.6	2.39	2.07	0.42	1.43	9.3	5.58	2.37	2.62	-	-	FS
105	2826.8-27.3	0.5	0.09	0.09	-0.01	0.05	8.1	4.05	2.44	2.66	-	-	FS SILTY
106	2827.3-27.9	0.6	0.11	0.06	-0.01	0.07	8.3	4.98	2.44	2.67	-	-	FS SILTY
-	2827.9-28.0	0.1	-	-	-	-	-	-	-	-	-	-	CARB/BK
107	2828.0-28.8	0.8	0.35	0.27	-0.01	0.28	11.3	9.04	2.31	2.61	0.0	2.3	FS SILTY
108	2828.8-29.6	0.8	0.49	0.32	-0.01	0.39	11.2	8.96	2.37	2.67	0.0	8.3	FS SILTY
109	2829.6-29.9	0.3	0.03	-0.01	-0.01	0.01	10.6	3.18	2.39	2.67	-	-	FS SILTY
110	2829.9-30.5	0.6	0.08	0.06	-0.01	0.05	11.7	7.02	2.39	2.70	0.0	36.3	FS SILTY
111	2830.5-31.6	1.1	0.13	0.12	-0.01	0.15	10.0	11.00	2.39	2.66	0.0	13.1	FS SILTY
112	2831.6-32.4	0.8	0.74	0.59	-0.01	0.59	7.5	6.00	2.47	2.67	0.0	4.1	FS SILTY F
113	2832.4-33.1	0.7	0.97	0.83	0.34	0.68	6.7	4.69	2.47	2.65	0.0	2.9	FS
114	2833.1-34.3	1.2	2.57	2.48	0.59	3.08	7.4	8.88	2.42	2.62	-	-	FS
115	2834.3-34.9	0.6	1.55	1.26	0.31	0.93	10.0	6.00	2.35	2.62	0.0	2.3	FS

Company UNION OIL COMPANY OF CANADA LIMITED Formation
Well UNION IOL STOPOVER K-44 Drilling Fluid WATER BASE MUD

File 7004-5155

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. 3 (Cont'd)												
116	2834.9-35.7	0.8	1.19	1.13	0.25	0.95	10.2	8.16	2.36	2.63	-	-	FS
117	2835.7-36.2	0.5	1.02	1.01	-0.01	0.51	8.5	4.25	2.41	2.64	0.0	1.8	FS
118	2836.2-36.7	0.5	0.83	0.78	-0.01	0.42	9.3	4.65	2.40	2.65	-	-	FS
119	2836.7-37.2	0.5	0.40	0.31	-0.01	0.20	7.5	3.75	2.43	2.63	-	-	FS
120	2837.2-37.7	0.5	0.09	0.05	-0.01	0.05	7.6	3.80	2.44	2.64	-	-	FS SILTY
121	2837.7-38.5	0.8	0.28	0.23	-0.01	0.22	8.2	6.56	2.42	2.63	0.0	16.4	FS PART RUBBLE
-	2838.5-40.0	1.5	-	-	-	-	-	-	-	-	-	-	LOST CORE

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

CONTAINER IDENTITY		LABORATORY NUMBER 7012-5310
	Union Oil Company of Canada Limited (OPERATOR)	1 of 3 (PAGE)
67° 40' N.L. / 123° 30' W.L. (LOCATION)	Union IOL Stopover K-44 (WELL OR SAMPLE LOCATION NAME)	1204' (KB ELEV.) GRD. ELEV.
Stopover Area, Northwest Territories (FIELD OR AREA)	Old Fort Island (POOL OR ZONE)	SAMPLER
DST #1 (TEST TYPE & NO.)	2550' Salt Water (TEST RECOVERY)	
Top of Tool (POINT OF SAMPLE)	AMT. & TYPE CUSHION	@ °F MUD RESISTIVITY
2724' - 2840' (TEST INTERVALS OR PERFS.)	PUMPING FLOWING GAS LIFT SWAB	
	WATER BBLS/D. OIL BBLS/D. GAS MFC/D.	
SEPARATOR RESERVOIR	@ °F CONTAINER WHEN SAMPLED / @ °F CONTAINER WHEN RECEIVED	SEPARATOR
PRESSURES, PSIG		TEMPERATURES, °F
March 20/75 (DATE SAMPLED (D/M/Y))	March 31/75 (DATE RECEIVED (D/M/Y))	April 3/75 (DATE ANALYSED (D/M/Y)) B.G. (ANALYST) REMARKS

MICRO BENZENE-TOLUENE ANALYSIS

Benzene	<0.5 ppm
Toluene	<0.5 ppm

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

WATER ANALYSIS

Plastic — CONTAINER IDENTITY

7012-5310 — LABORATORY NUMBER

Union Oil Company of Canada Limited — OPERATOR

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67° 40' N.L.
123° 30' W.L. — LOCATION

Union IOL Stopover K-44 — WELL OR SAMPLE LOCATION NAME

1204' — KB ELEV.

GRD. ELEV.

Stopover Area, Northwest Territories — FIELD OR AREA

Old Fort Island — POOL OR ZONE

SAMPLER

DST #1 — TEST TYPE & NO.

2550' Salt Water — TEST RECOVERY

Top of Tool — POINT OF SAMPLE

AMT. & TYPE CUSHION

@ °F — MUD RESISTIVITY

2724' - 2840' — TEST INTERVALS OR PERFS.

PUMPING FLOWING GAS LIFT SWAB

WATER BBLS/D. OIL BBLS/D. GAS MFC/D.

SEPARATOR RESERVOIR — @ °F CONTAINER WHEN SAMPLED — @ °F CONTAINER WHEN RECEIVED — SEPARATOR

PRESSURES, PSIG — TEMPERATURES, °F

March 20/75 — DATE SAMPLED (D/M/Y)

March 26/75 — DATE RECEIVED (D/M/Y)

April 4/75 — DATE ANALYSED (D/M/Y)

L.S. — ANALYST

REMARKS

ION	MG/L	MG%	MEQ/L
Na+K	9738	34.5	423.6
K			
Ca	786	2.8	39.2
Mg	245	0.9	20.1
Ba			
Sr			
Fe		PRESENT	

ION	MG/L	MG%	MEQ/L
Cl	16269	57.6	458.9
Br			
I			
HCO_3	195	0.7	3.2
SO_4	998	3.5	20.8
CO_3	0	0.0	0.0
OH	0	0.0	0.0
H_2S	NOT DETECTED		

TOTAL SOLIDS MG/L

BY EVAPORATION @ 110°C

BY EVAPORATION @ 180°C

28231 — CALCULATED

AT IGNITION

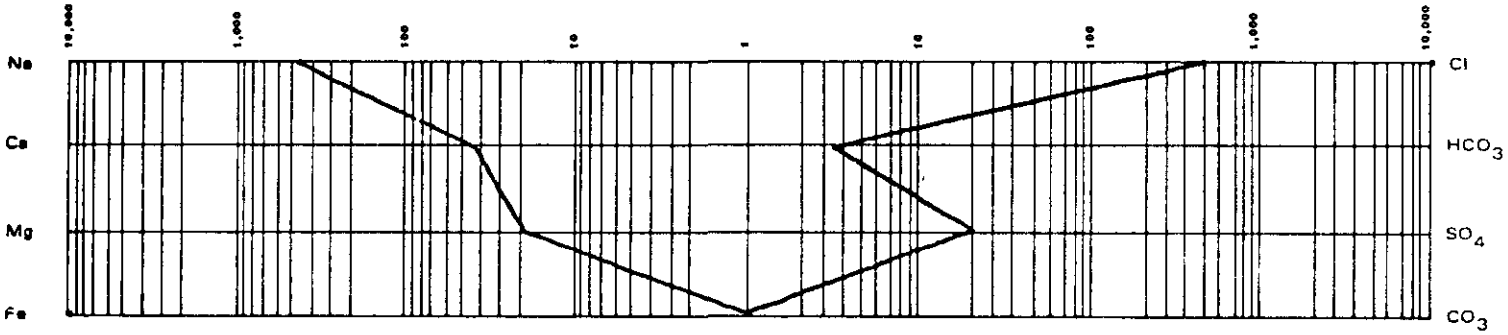
1.0230 @ 60°F — SPECIFIC GRAVITY

.3377 @ 21°C — REFRACTIVE INDEX

7.9 — pH

0.205 @ 25°C — RESISTIVITY (OHM/METERS)

LOGARITHMIC PATTERN MEQ PER LITER



REMARKS NaCl equiv 27795

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

WATER ANALYSIS

Plastic — CONTAINER IDENTITY

7012-5310 — LABORATORY NUMBER

Union Oil Company of Canada Limited — OPERATOR

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67° 40' N.L.
123° 30' W.L. — LOCATION

Union IOL Stopover K-44 — WELL OR SAMPLE LOCATION NAME

1204' — KB ELEV. — GRD. ELEV.

Stopover Area, Northwest Territories — FIELD OR AREA

Old Fort Island — POOL OR ZONE

SAMPLER

DST #1 — TEST TYPE & NO.

TEST RECOVERY

Drilling Mud - Make up Water — POINT OF SAMPLE

AMT. & TYPE CUSHION

@ °F — MUD RESISTIVITY

2724' - 2840' — TEST INTERVALS OR PERFS.

PUMPING FLOWING GAS LIFT SWAB

WATER BBLS/D. OIL BBLS/D. GAS MFC/D.

SEPARATOR RESERVOIR

@ °F — CONTAINER WHEN SAMPLED

@ °F — CONTAINER WHEN RECEIVED

SEPARATOR

PRESSURES, PSIG — TEMPERATURES, °F

March 20/75 — DATE SAMPLED (D/M/Y)

March 26/75 — DATE RECEIVED (D/M/Y)

April 4/75 — DATE ANALYSED (D/M/Y)

L.S. — ANALYST

REMARKS

ION	MG/L	MG%	MEQ/L
Na+K	883	28.0	38.4
K			
Ca	59	1.9	3.0
Mg	15	0.5	1.3
Ba			
Sr			
Fe		PRESENT	

ION	MG/L	MG%	MEQ/L
Cl	435	13.8	12.3
Br			
I			
HCO_3	1469	46.5	24.1
SO_4	286	9.0	6.0
CO_3	10	0.3	0.3
OH	0	0.0	0.0
H_2S	NOT DETECTED		

TOTAL SOLIDS MG/L

BY EVAPORATION @ 110°C

BY EVAPORATION @ 180°C

AT IGNITION

3158 — CALCULATED

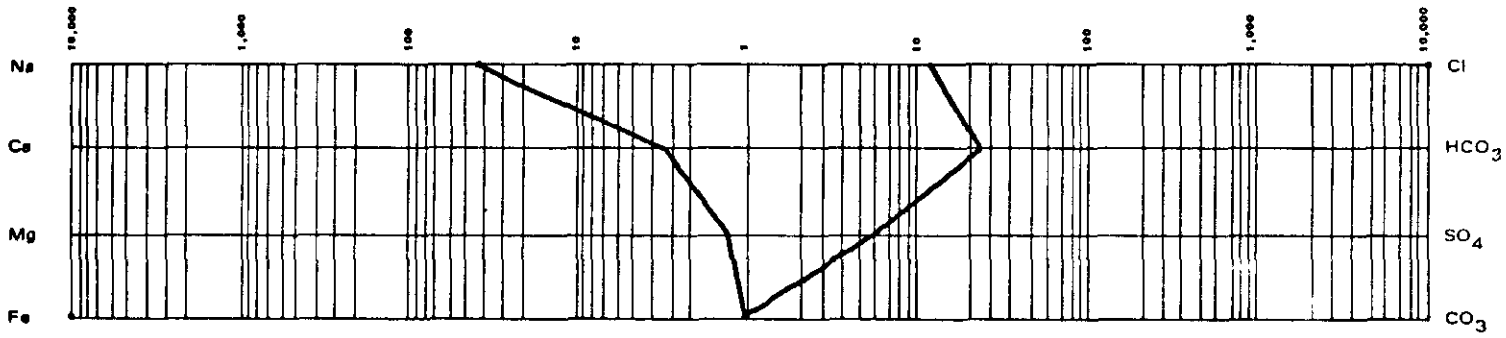
1.0024 @ 60°F — SPECIFIC GRAVITY

1.3312 @ 23°C — REFRACTIVE INDEX

8.50 — pH

2.35 @ 25°C — RESISTIVITY (OHM/METERS)

LOGARITHMIC PATTERN MEQ PER LITER



REMARKS NaCl equiv 1957

CORE LABORATORIES – CANADA LTD.

WATER QUALITY STUDY

Company	Union Oil Company of Canada Limited	File No.	7044-5161
Location	Union Imp Stopover K-44	PAGE	1 of 1
Sampled From	Source Water		
Date Sampled		Date Received	March 24, 1975
Date Analyzed	April 1, 1975		
Appearance	Yellow with flaky brown suspended solids		

ANALYSIS

ph	8.1
Color	250 Platinum Cobalt Color Units
Turbidity	8.8 Turbidity Units
Specific Conductance	446 umhos/cm @ 24°C
Total Alkalinity as $CaCO_3$	216 mg/liter
Total Hardness as $CaCO_3$	219 mg/liter
Chloride	19 mg/liter
Sulphate	64 mg/liter
Iron	8.9 mg/liter
Nitrate as NO_3	1.59 mg/liter
Nitrite as NO_2	<0.01 mg/liter
Total Soluble Phosphate	0.15 mg/liter

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

Plastic — CONTAINER IDENTITY

WATER ANALYSIS

7021-5504 — LABORATORY NUMBER

Union Oil Company of Canada Limited — OPERATOR

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Union Imp Stopover K-44 — WELL OR SAMPLE LOCATION NAME

LOCATION — KB ELEV. — GRD. ELEV.

Stopover Area, Northwest Territories — FIELD OR AREA

POOL OR ZONE — SAMPLER

TEST TYPE & NO. — TEST RECOVERY

Water after drilling operations completed — POINT OF SAMPLE

AMT. & TYPE CUSHION — @ °F MUD RESISTIVITY

PUMPING — FLOWING — GAS LIFT — SWAB

WATER BBLS/D. — OIL BBLS/D. — GAS MFC/D.

TEST INTERVALS OR PERFS.

SEPARATOR — RESERVOIR — @ °F CONTAINER WHEN SAMPLED — @ °F CONTAINER WHEN RECEIVED — SEPARATOR

PRESSURES, PSIG — TEMPERATURES, °F

April 10/75 — DATE SAMPLED (D/M/Y)

April 15/75 — DATE RECEIVED (D/M/Y)

L.S. — DATE ANALYSED (D/M/Y) — ANALYST — REMARKS

ION	MG/L	MG%	MEQ/L
Na+K	28	4.7	1.2
K			
Ca	119	20.1	5.9
Mg	5	0.9	0.4
Ba			
Sr			
Fe		PRESENT	

ION	MG/L	MG%	MEQ/L
Cl	19	3.2	0.5
Br			
I			
HCO_3	386	65.2	6.3
SO_4	35	5.8	0.7
CO_3	0	0.0	0.0
OH	0	0.0	0.0
H_2S	NOT DETECTED		

TOTAL SOLIDS MG/L

BY EVAPORATION @ 110°C — BY EVAPORATION @ 180°C.

AT IGNITION — 591 CALCULATED

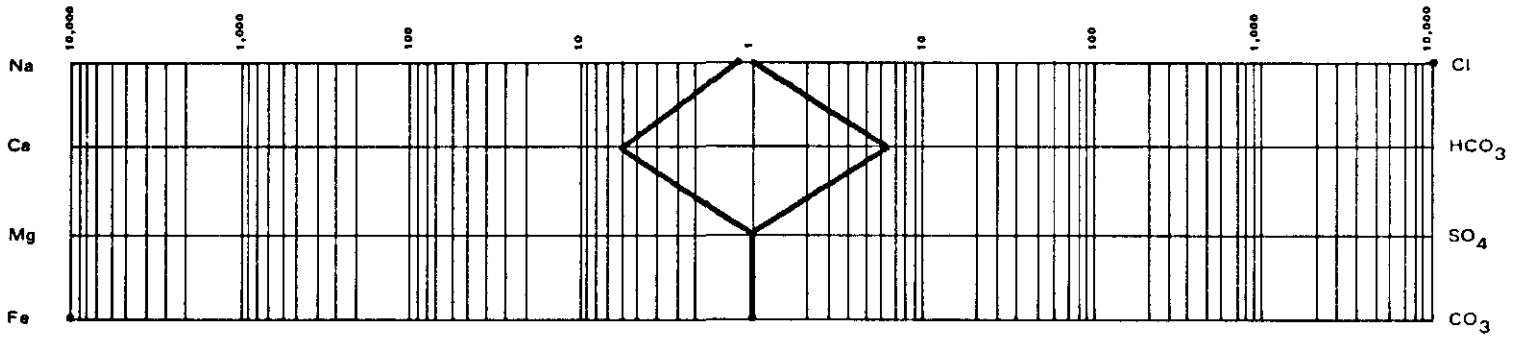
1.0008 @ 60°F — SPECIFIC GRAVITY

1.3322 @ 21°C — REFRACTIVE INDEX

8.15 — pH

12.4 @ 25°C — RESISTIVITY (OHM/METERS)

LOGARITHMIC PATTERN MEQ PER LITER



REMARKS — NaCl equiv 292

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DRILL STEM TEST SPECIAL DATA ANALYSIS

Union Oil Company of Canada Limited DST #1
Union IOL Stopover K-44 Unit Corner
123°38'32.00, 67°33'31.00 E10771
2724 - 2840'
March 20, 1975

April 10, 1975

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 209 bbls/day of water was noted during this test.

2. Reservoir Pressure: Extrapolation of the initial shut-in pressure build-up indicates a maximum reservoir pressure of 1,253 psig at recorder depth. Mechanical stabilization of the final shut-in pressure build-up indicates a maximum reservoir pressure of 1,251 psig at recorder depth. The difference between the initial and final shut-in pressure of 2 psi is insignificant.

3. Permeability: The calculated transmissibility factor of 6,796.7 md.ft./cp. indicates an average effective permeability to water of 75.5 md. for the reported 10 foot porous interval. The calculations were based on a slope of 5 psi/log cycle obtained from the final shut-in build-up plot. It was assumed for these calculations the product of the viscosity and formation volume factor to be 1.0.

4. Well Bore Damage: The calculated estimated damage ratio of 2.7 indicates that minor well bore damage is present at the time and conditions of this test. This value infers that the rate of production observed at the formation face during this test may be increased 2.7 times if the well bore damage alone were removed.

5. Radius of Investigation: The calculated radius of investigation of this test is 712 feet based on an assumed porosity of 10.2%, compressibility of 33×10^{-6} vol/vol/psi, and other assumptions made in number 3 above.

6. General Comments: The formation exhibits the characteristics of relatively good permeability effective to the reservoir fluid and minor well bore damage is indicated. No unusual characteristics were noted from the analysis of the test data presented.

Yours truly,

Margaret Anderson

B.C. Tanner/M.M. Anderson
Interpretation & Evaluation Department

MMA/pym

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RESERVOIR DATA

WELL: UNIØN ØIL STØPØVER K-44 DST #1

FLØW RATE PRIØR TØ SHUT IN	(BBLS/DAY)	209.000
FØRMATIØN VØLUME FACTØR	(VØL/VØL)	1.000
HØRNER PLØT SLØPE	(PSI/LØG CYCLE)	5.
VISCØSITY	(CP)	1.000
NET THICKNESS	(FT)	90.000
MAX RESERVØIR PRESSURE	(PSIG)	1253.0
FLØWING PRESSURE	(PSIG)	1167.0
FLØW TIME	(MIN)	130.0
PØRØSITY		0.102
CØMPRESSIBILITY	(1/PSI)	0.00000330
WELL BØRE RADIUS	(IN)	3.94
WELL ELEVATIØN	(FT)	1204.0
RECØRDER DEPTH	(FT)	2740.0

TRANSMISSIBILITY	(MD-FT/CP)	6796.68
FLØW CAPACITY	(MD-FT)	6796.68
AVERAGE EFF. PERMEABILITY	(MD)	75.52
PRØDUCTIVITY INDEX	(BBL/DAY/PSI)	6.332
DAMAGE RATIØ		2.68
FLØW WITH DAMAGE REMØVED	(BBL/DAY)	559.74
PØTENTIØMETRIC SURFACE	(FT)	1357.2
RADIUS ØF INVESTIGATIØN	(FT)	711.6

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INPUT DATA FOR OIL RESERVOIR

Q = Flow rate (bbls./day)

B = Formation volume factor (vol./vol.)

M = Horner Plot Slope (psi/log cycle)

P_o = Original pressure, or maximum pressure (psig)

P_f = Flowing pressure (psig)

T = Flow time (min.)

ϕ = Porosity

c = Compressibility (1/psi)

r_w = Well bore radius (in.)

WE = Well elevation (ft.)

RD = Recorder depth (ft.)

Transmissibility: $\frac{kh}{\mu} = \frac{162.6\ QB}{M}$

Flow Capacity: $kh = \left\langle \frac{kh}{\mu} \right\rangle \mu$

Permeability: $k = \left\langle \frac{kh}{\mu} \right\rangle \frac{\mu}{h}$

Productivity Index: $J = 0.0009316 \left\langle \frac{kh}{\mu} \right\rangle$

Damage Ratio: $DR = \frac{Q \text{ theor}}{Q \text{ actual}} = \frac{P_o - P_f}{M \left\langle \log \left\langle \frac{KT}{\phi \mu c r_w^2} \right\rangle - 2.85 \right\rangle}$

Flow with Damage Removed: $= Q\ (DR)$

Potentiometric Surface: $2.309\ P_o + WE - RD$

Radius of Investigation: $r_i = \sqrt{\frac{KT}{57600 \phi \mu c}}$

RESERVOIR PRESSURE PLOT

JOHNSTON
Schlumberger

RECORDER No. AK1-2562 CAPACITY 0-4000 FIELD REPORT No. E10771

MAXIMUM RESERVOIR PRESSURE P_o = 1253 psig

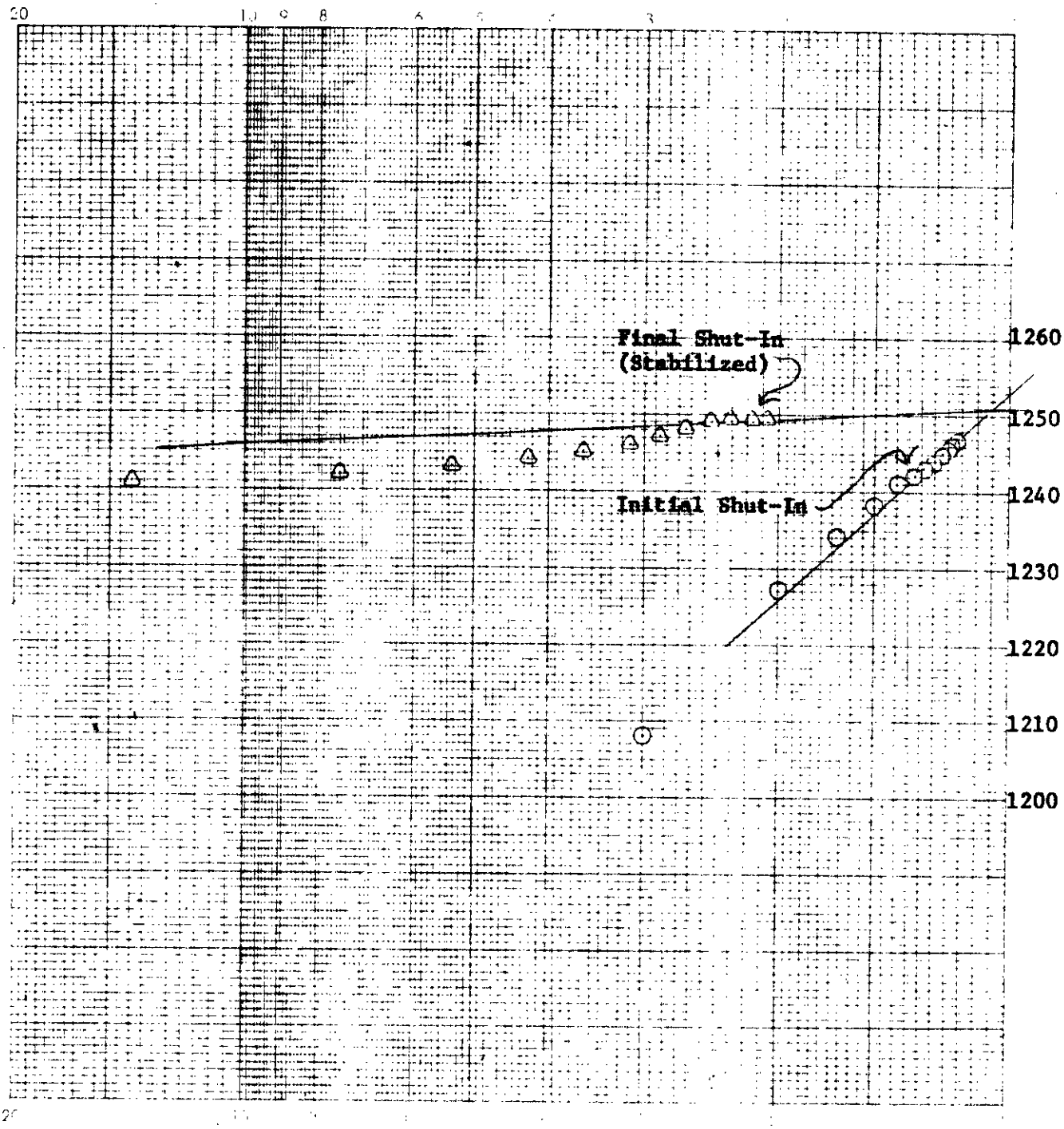
SLOPE OF SHUT-IN CURVE M 1 = .5 psig / LOG CYCLE

SLOPE M 1 = P_1 1251 − P_{10} 1246 = psig / LOG CYCLE

SLOPE M 2 = P_1 − P_{10} = psig / LOG CYCLE

Initial Shut-In = 1253 psig

Final Shut-In = 1251 psig



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

JT-CD 2A

JT-1 8 E-45

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TEST DATA

Type of Test	Open hole, Bottom hole.				
Time Started in Hole	1400	Hrs.	Tool Opened	1540	Hrs.
First Flow	10	Min.	Initial Shut-In	60	Min.
Second Flow	120	Min.	Second Shut In		Min.
Third Flow		Min.	Final Shut In	120	Min.
Pulled Loose @	2058	Hrs.	Out of Hole	2230	Hrs.
Wt. Set/on Packers	20,000	#	Pulled Loose Wt.	4,000	#

Description of Blow During Test: Strong air blow on preflow and flow, decreasing to fair.

FLUID RECOVERY Was Test Reverse Circulated Yes ☐ No ☒

Total Fluid Recovered: 2,550 Ft.

Description of Fluid Recovered: 2,550' Salty water.

GAS BLOW MEASUREMENT

Measured With: I.D. Riser

Time	Sfce. Choke		M Cubic Feet/Day
		NIL	

REMARKS: Test satisfactory.

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

TOOL SEQUENCE

Tool	Length	O.D.
P.O. Sub	.80	
Jars	5.65	
Sub	.65	
MFE Tool	10.65	
Bypass Tool	3.83	
Recorder	4.40	
Safety Joint	1.75	
S.S. & Packer	7.56	5 1/2"
Total	35.29	
Packer Stub	1.00	
Perfs	10.00	
Recorder	4.40	
Recorder	4.40	
Sub	.65	
Drill Collars	93.23	
Sub	.65	
Bull Nose	1.00	
Total Interval	115.33	
TOTAL LENGTH		

Elevation G.L. 1192 K.B. 1204

Bottom Hole Choke Size 1/2"

Fluid Cushion Type Nil Amt.

MUD AND HOLE DATA

Mud Type Gel W.L.

Filter Cake Visc. 52 Wt. 8.6

Time Taken March 20, 1975

Contractor Tri-City Drilling Rig No. 2

Drill Pipe Size 3 1/2" IF

Drill Collar Size 3 1/2" IF &

Drill Collar Length 218' &

Main Hole Size Rat Hole 6 7/32"

District	Inuvik	Ticket No.	E10771	Date	March 20, 1975
Company	Union Oil Company of Canada			Address	335 - 8 Avenue S.W.
Well Name	Union IOL Stopover K-44 Unit Corner				Calgary, Alberta T2P 2K6
Number	123°38'32.00, 67°33'31.00			Field	Stopover Province N.W.T.
Formation		Thickness		Co. Rep.	T. Ramsey
Interval	2724 - 2840'	T.D.	2840'	Technician	M. Matson

Test No. 1 J.T. No. 1

Distribution of Reports: 10 - Calgary Attention: D. Connolly

1 - Fort St. John Attention: Production Department

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E10771

PRESSURE DATA

INSTRUMENT No.		AKI-2525	AKI-5013	AKI-2562	
CAPACITY (psig)		3200	3250	4000	
INSTRUMENT DEPTH FT.		2711	2736	2740	
INSTRUMENT OPENING		Inside	Outside	Outside	
WELL TEMP. °F.	75				
INITIAL HYDROSTATIC	A	1231#	1242#	1253#	
FIRST FLOW	B	55#	64#	71#	
	B-1	289#	298#	299#	
INITIAL SHUT-IN	C	1231#	1241#	1247#	
SECOND FLOW	D	292#	308#	310#	
	D-1	1150#	1160#	1167#	
SECOND SHUT-IN	E				
THIRD FLOW	F				
	F-1				
FINAL SHUT-IN	G	1233#	1243#	1249#	
FINAL HYDROSTATIC	H	1229#	1241#	1249#	

FLUID SAMPLE REPORT

Sample No.
Type 4 1/4"
Depth 2707'
Volume 2050 cc

Sample Pressure:
psig. at Surface
Gravity API @ °F
Gas/Oil Ratio Cu.Ft./bbl.

Recovery:
Cu. Ft. Gas
cc. Oil
cc. Water
cc. Mud
Total Liquid cc.

REMARKS: MFE sample sent to service centre.

PRESSURE INCREMENTS ON RECORDER # AK1-2562

Initial Shut-In

POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$
0	299	-----
5	1208	3.00
10	1227	2.00
15	1234	1.67
20	1238	1.50
25	1241	1.40
30	1242	1.33
35	1243	1.29
40	1244	1.25
45	1245	1.22
50	1246	1.20
55	1246.5	1.18
60	1247	1.17

Final Shut-In

POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$
0	1167	-----
10	1241	14.00
20	1242	7.50
30	1243	5.33
40	1244	4.25
50	1245	3.60
60	1246	3.12
70	1247	2.86
80	1248	2.63
90	1249	2.44
100	1249	2.30
110	1249	2.18
120	1249	2.08

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

IT-185-5B

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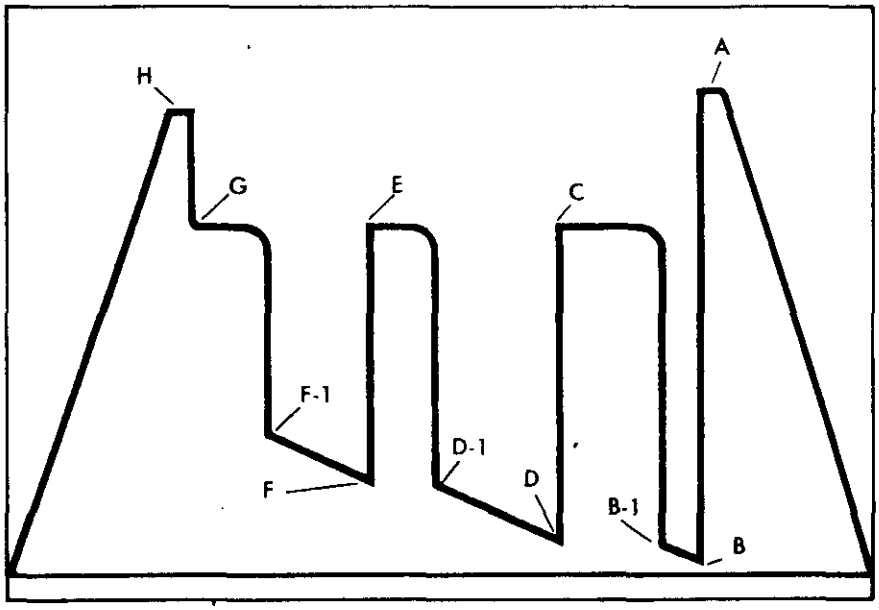
GUIDE TO IDENTIFICATION OF DRILL STEM TEST PRESSURE CHARTS

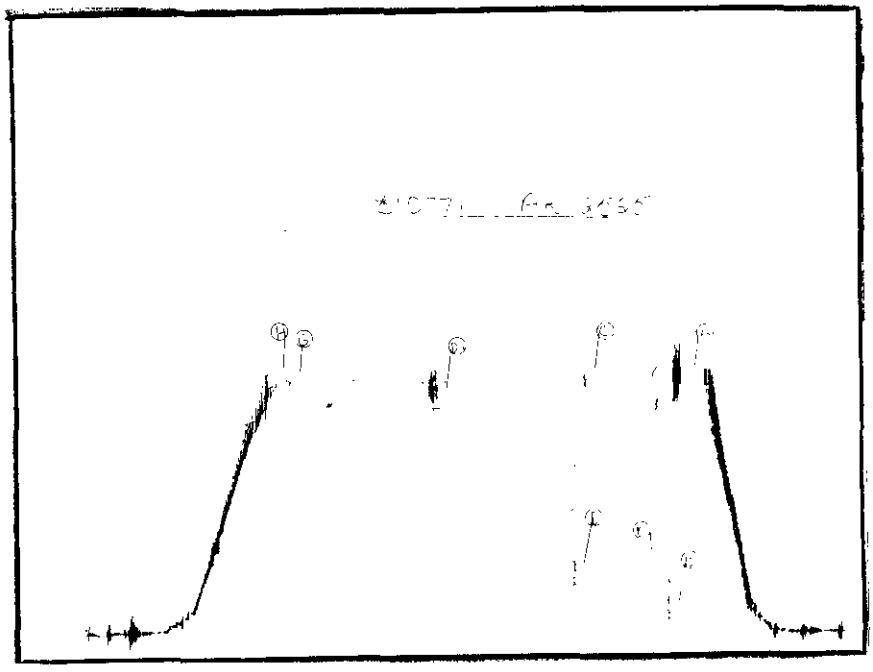
FIELD REPORT NO.	RECORDER NO.
E10771	AK1-2525

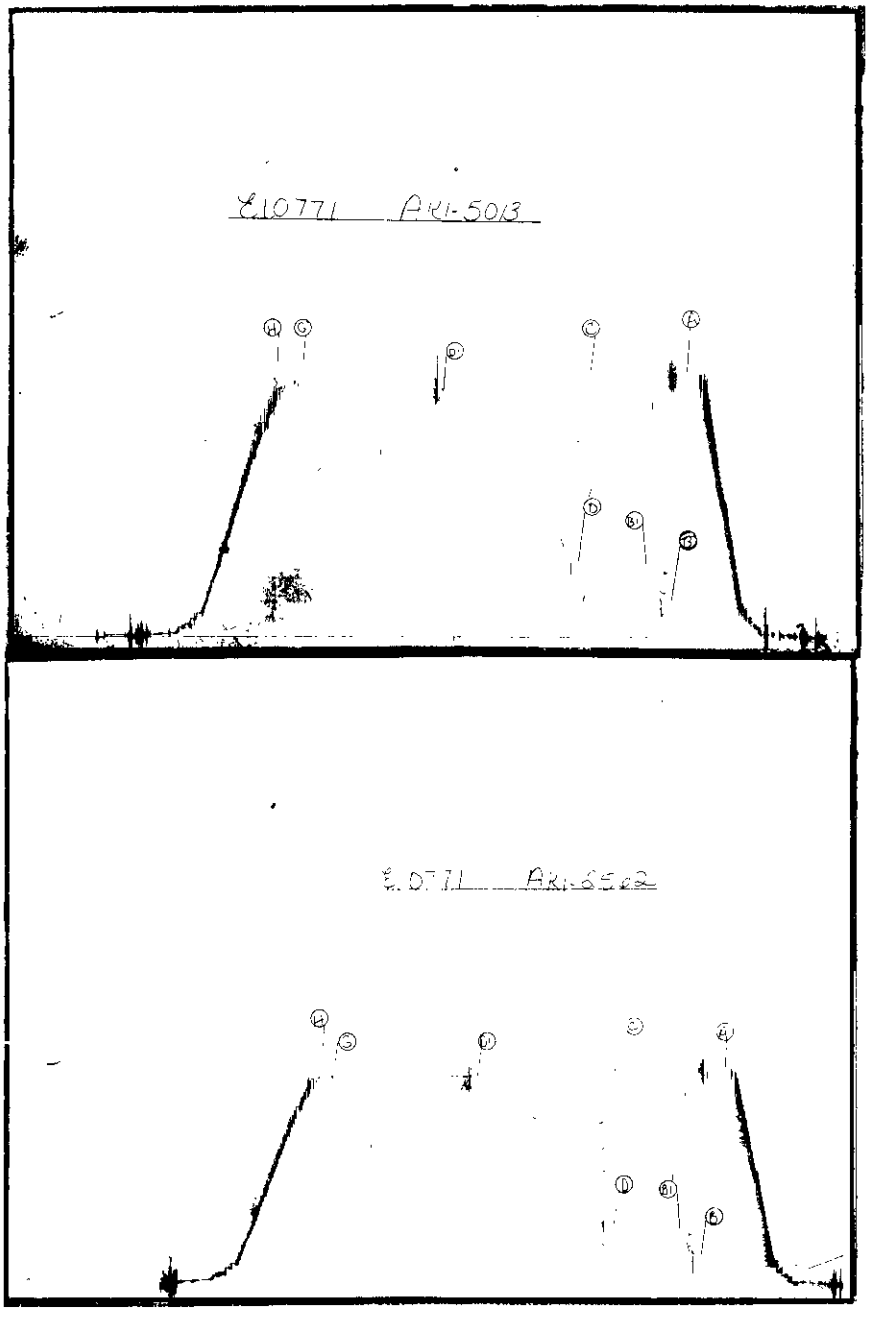


A. Initial Hyd. Mud
B. First Flow
C. Initial Shut-In
D. Second Flow
E. Second Shut-In
F. Third Flow
G. Final Shut-In
H. Final Hyd. Mud

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.




E10771 ARI-5013
E.10771 ARI-5012

2645

REPORT

on the

DRILLING AND ABANDONMENT

of

UNION I.O.L. STOPOVER K-44

NTS 96-O-12; GRID CORNER

UNIT K, SECTION 44

Reported by:

MACRAE GEOLOGICAL CONSULTANTS LTD.

L. B. MacRae

L. B. MacRae, P. Geol.

April, 1975

TABLE OF CONTENTS

GEOLOGICAL SUMMARY & PERTINENT DATA

Company: Union Oil Company of Canada Limited,
335 Eighth Avenue South West,
Calgary, Alberta.

Well Name: Union I.O.L. Stopover K-44

Location: NTS 96-O-12: Grid Corner
Unit K, Section 44

Coordinates: 123° 38' 32" W
67° 33' 31" N

Well Classification: New Field Wildcat

Drilling Authority: No. 784

Land Permit: No. 6573

Elevations: Kelly Bushing - 1204 feet
Ground - 1192 feet

Objective: To test the porous basal Cambrian Sands of the Old Fort Island Formation, and the porous sands in the lower part of the Mount Cap Formation, where they have been folded into a closed anticline.

Final Status: Dryhole - Abandoned

Stratigraphy:

Marker	Top	Subsea
Pleistocene:	Surface	+1192
Lower Ordovician:		
Cherty Unit	170	+1034
Rhythmic Unit	838	+ 366
Cyclic Unit	1568	- 364
Cambrian:		
Saline River	1852	- 648
Salt	2130	- 926
Mount Cap	2306	-1102
Old Fort Island	2742	-1538
Proterozoic:	2847	-1643

Total Depth: 3092 feet

GEOLOGICAL SUMMARY & PERTINENT DATA

Formation Tests:	No. 1 - 2724 to 2840. Recovered 2550 ft. salt water.
Cored Intervals:	No. 1 - 2750 to 2780. Recovered 29 feet. No. 2 - 2780 to 2810. Recovered 30 feet. No. 3 - 2810 to 2840. Recovered 28.5 feet.
Oil Shows:	2620 - 2630 Trace live oil stain. 2720 - 2730 Trace live oil stain. 2772 - 2777 Patchy oil bleeding. 2783 - 2795 Patchy oil bleeding. 2803 - 2805 Trace bitumin.
Gas Shows:	See Gas Log
Schlumberger Logs:	Gamma Ray-Neutron Log: Run No. 1 - 1535 to surface. Combination DIL-BHC Sonic Log: Run No. 1 - 3094 to 2639. Gamma Ray-CNL: Run No. 1 - 3094 to 80. Gamma Ray-FDL: Run No. 1 - 3094 to 2639.
Gas Logging:	Frontier Mud Logging Ltd.
Contractor:	Tri-City Drilling (1968) Ltd.
Rig:	No. 2
Hole Size:	17½" - Surface to 50 feet 12¼" - 50 to 478 feet 8¾" - 478 to 2460 feet 6¼" - 2460 to 3092 feet
Casing Record:	13⅜"; 54.5#; K-55 - Landed at 50 feet. 9⅝"; 40#; K-55 - Landed at 440 feet. 7"; 23#; N-80 - Landed at 2444 feet.
Plugs:	No. 1 - 3092 to 2700 feet. No. 2 - 2500 to 2350 feet.
Spud Date:	February 15, 1975 at 4:30 P.M.
Rig Released:	March 24, 1975 at 5:00 P.M.

SAMPLE DESCRIPTIONS

0 - 20	No samples.
20 - 30	Gravel - composed of small pebbles of white to light buff quartzites, some red granite fragments, some light grey sandstone, occasional dolomite and chert.
30 - 40	Sandstone - dirty reddish-grey, very fine to very coarse grained conglomeratic, quartzose, subangular, loose, cemented with clay, with common red granite pebbles and some iron oxide stained dolomite.
40 - 50	Clay - medium grey, soft, with common interbeds of above sandstone.
50 - 60	No sample.
60 - 70	Gravel - composed of pebble fragments of quartzite, buff to white, common green igneous rock fragments, some chert, occasional dolomite and shale fragments.
70 - 80	Gravel - composed of dark green meta sediments, common quartzite, common vari-coloured chert, occasional pink granite, occasional dolomite pebble.
80 - 90	Gravel - composed of pebbles of dark green igneous rocks, common white to pink quartzites, some dolomites.
90 - 100	Gravel - as above (sample mostly composed of cement cavings).
100 - 110	Gravel - composed of pebbles of vari-coloured chert, some quartzite pebbles, some igneous rock fragments.
110 - 120	Gravel - composed of pebbles of dolomite - quartzites and sandstone, igneous, trace chert.
120 - 130	Gravel - as above.
130 - 140	Gravel - as above.
140 - 150	Gravel - as above.
150 - 160	Gravel - composed of white chert pebble fragments, some buff dolomite - some pink sandstones.
160 - 170	Gravel - composed of pebble fragments of medium grey dolomite, some white chert, some quartzites, trace weathered green igneous rock fragments.

SAMPLE DESCRIPTIONS (cont'd)

170 - 180		Conglomerate - composed of crushed pebbles and cobbles of dolomite - light buff, common medium grey, crypto-x-lline to very finely crystalline, trace igneous rock fragments.
180 - 190		Conglomerate - composed of crushed pebbles and cobbles of dolomite, medium grey, some light buff, crypto-x-lline to very finely crystalline, trace white chert, trace igneous and trace sandstone fragments.
190 - 200	100%	Dolomite - light buff, finely crystalline, trace secondary dolomite and quartz crystals, poor vuggy porosity.
	Tr.	Chert - white.
200 - 210	95%	Dolomite - light buff, occasionally medium grey, ill-formed medium crystalline, trace vuggy porosity.
	5%	Chert - white, crypto-x-lline, hard.
210 - 220	95%	Dolomite - light buff, occasionally light grey, trace medium grey, micro-x-lline to finely crystalline, trace vuggy porosity.
	5%	Chert - white, occasionally light grey.
220 - 230	90%	Dolomite - light buff, very finely to medium crystalline, no visible porosity.
	10%	Chert - white.
230 - 240	70%	Dolomite - light buff, coarsely to very coarsely crystalline, no visible porosity.
	10%	Chert - white, crypto-x-lline, hard.
	20%	Gravel - (cavings).
240 - 250	60%	Dolomite - light buff, common light grey, very finely to medium crystalline, trace secondary quartz crystals, trace vuggy porosity.
	40%	Chert - white.
250 - 260	60%	Chert - light grey to white.
	40%	Dolomite - light buff, common medium grey, medium crystalline, no visible porosity.
260 - 270	70%	Dolomite - light buff, some medium grey, ill-formed medium crystalline, no visible porosity.
	30%	Chert - light grey to white.

SAMPLE DESCRIPTIONS (cont'd)

270 - 280	70%	Chert - snow white to pale buff.
	30%	Dolomite - medium grey, coarsely crystalline, trace secondary quartz crystals, trace vuggy porosity.
280 - 290	80%	Dolomite - light buff, very coarsely crystalline, estimate poor inter-x-lline porosity.
	20%	Chert - snow white, pale buff, crypto-x-lline, hard.
290 - 300	50%	Chert - snow white to pale buff.
	50%	Dolomite - light buff, occasionally medium grey, finely to very coarsely crystalline, trace secondary quartz crystals, trace vuggy porosity.
300 - 310	95%	Dolomite - light buff, medium to very coarsely crystalline, trace pyritic, estimate very poor inter-x-lline porosity, trace vuggy porosity, trace clear dolomite rhombs.
	5%	Chert - as above.
310 - 320	95%	Dolomite - light buff, occasionally medium grey, some iron oxide stain, very finely to very coarsely crystalline, common clear secondary quartz crystals, some yellow quartz crystals, estimate poor vuggy porosity.
	5%	Chert - as above.
320 - 330	70%	Chert - white, pale buff, crypto-x-lline, hard.
	30%	Dolomite - light buff to light grey, micro-x-lline, common clear secondary quartz crystals, some yellow quartz crystals, estimate poor vuggy porosity.
330 - 340	70%	Dolomite - light buff, some medium grey, very finely to very coarsely crystalline, common secondary quartz crystals, estimate poor vuggy porosity.
	30%	Chert - white to pale buff.
340 - 350	95%	Dolomite - light buff, very coarsely crystalline, trace pyritic, no visible porosity.
	5%	Chert - as above.
350 - 360	100%	Dolomite - light buff, finely to very coarsely crystalline, trace pyritic, no visible porosity.
	Tr.	Chert.

SAMPLE DESCRIPTIONS (cont'd)

360 - 370	80%	Dolomite - light buff, some medium grey, trace iron oxide stain, very fine to very coarsely crystalline, abundant clear and some yellow quartz crystals, estimate poor to fair vuggy porosity.
	20%	Chert - white.
370 - 380	100%	Dolomite - light buff to white, micro-x-lline, no visible porosity.
380 - 390	60%	Trip sample - sand and gravel.
	40%	Dolomite - as above.
390 - 400	90%	Dolomite - light buff, some white, micro-x-lline, no visible porosity.
	10%	Chert - white, crypto-x-lline, hard.
400 - 410	100%	Dolomite - light buff, micro-x-lline, no visible porosity.
410 - 420	95%	Dolomite - light buff, micro-x-lline, no visible porosity.
	5%	Chert - white.
420 - 440		No samples - lost circulation zone - drilling time indicates a large cavern.
440 - 470		No sample - lost circulation zone.
470 - 480	90%	Dolomite - buff, crypto-x-lline to micro-x-lline, trace vuggy porosity.
	10%	Sand and gravel cavings.
	Tr.	Chert.
480 - 490	90%	Dolomite - buff, micro-x-lline, some secondary quartz crystals, poor vuggy porosity.
	10%	Gravel cavings.
490 - 500	100%	Dolomite - light buff, common white, coarsely crystalline, some secondary quartz and dolomite crystals, some pyrite crystals, estimate poor vuggy porosity.
	Tr.	Gravel.
500 - 510	100%	Dolomite - light buff to buff, some white, occasionally stained with iron oxide, very coarsely crystalline, some secondary quartz crystals, occasional clear dolomite rhombs, estimate poor vuggy porosity.
	Tr.	Gravel.

SAMPLE DESCRIPTIONS (cont'd)

510 - 520	100%	Dolomite - brown to buff, some iron oxided stain, medium to coarsely crystalline, some secondary quartz crystals, occasional clear dolomite crystal, estimate poor vuggy porosity.
520 - 530	100%	Dolomite - buff, occasionally white, finely to coarsely crystalline, some secondary quartz crystals, estimate poor vuggy porosity.
	Tr.	Gravel.
530 - 540	60%	Shale - dark green, platy to splintery, slightly dolomitic, medium hard.
	30%	Dolomite - as above.
	10%	Gravel.
540 - 550	70%	Shale - dark green, platy to splintery, medium hard.
	30%	Dolomite - buff, some white, fine to coarsely crystalline, some stained with iron oxide, occasional chip of dolomite, red, crypto-x-lline.
	Tr.	Shale - red.
	Tr.	Chert - white.
550 - 560	50%	Shale - dark green, platy to splintery, medium hard.
	40%	Dolomite - white, medium crystalline, some red and micro-x-lline, no visible porosity.
	10%	Chert - white, occasionally red, crypto-x-lline, with common to abundant oolites.
	Tr.	Cement cavings.
560 - 570	100%	Dolomite - light grey, micro-x-lline, no visible porosity.
	Tr.	Gravel.
570 - 580	100%	Dolomite - light grey, micro-x-lline, occasionally finely crystalline, trace secondary quartz and dolomite crystals, trace vuggy porosity.
580 - 590	95%	Dolomite - light grey to white, micro-x-lline, occasionally medium crystalline, some secondary quartz and dolomite crystals, estimate very poor vuggy porosity.
	5%	Gravel.
590 - 600	100%	Dolomite - white, finely to coarsely crystalline, estimate poor vuggy porosity.

SAMPLE DESCRIPTIONS (cont'd)

600 - 610	100%	Dolomite - white, finely to medium crystalline, some coarsely crystalline, some clear dolomite rhombs, estimate very poor vuggy porosity.
	Tr.	Gravel.
610 - 620	100%	Dolomite - white, some light buff, coarsely crystalline, some finely to coarsely crystalline, estimate very poor vuggy porosity.
620 - 630	100%	Dolomite - light buff, finely to coarsely crystalline, some secondary clear dolomite crystals, poor vuggy porosity.
630 - 640		No samples - no returns.
640 - 650		No samples - no returns.
650 - 660		No samples - no returns.
660 - 670		No samples - no returns.
670 - 680		No samples - no returns.
680 - 690		No samples - no returns.
690 - 700		No samples - no returns.
700 - 710		No samples - no returns.
710 - 720		No samples - no returns.
720 - 730		No samples - no returns.
730 - 740		No samples - no returns.
740 - 750		No samples - no returns.
750 - 760		No samples - no returns.
760 - 770		No samples - no returns.
770 - 780		No samples - no returns.
780 - 790		No samples - no returns.
790 - 800		No samples - no returns.
800 - 810		No samples - no returns.

SAMPLE DESCRIPTIONS (cont'd)

810 - 820	No samples - no returns.
820 - 830	No samples - no returns.
830 - 840	No samples - no returns.
840 - 850	No samples - no returns.
850 - 860	No samples - no returns.
860 - 870	No samples - no returns.
870 - 880	No samples - no returns.
880 - 890	No samples - no returns.
890 - 900	No samples - no returns.
900 - 910	No samples - no returns.
910 - 920	No samples - no returns.
920 - 930	No samples - no returns.
930 - 940	No samples - no returns.
940 - 950	No samples - no returns.
950 - 960	No samples - no returns.
960 - 970	No samples - no returns.
970 - 980	No samples - no returns.
980 - 990	No samples - no returns.
990 - 1000	No samples - no returns.
1000 - 1010	No samples - no returns.
1010 - 1020	No samples - no returns.
1020 - 1030	No samples - no returns.
1030 - 1040	No samples - no returns.
1040 - 1050	No samples - no returns.
1050 - 1060	No samples - no returns.

SAMPLE DESCRIPTIONS (cont'd)

1060 - 1070	No samples - no returns.
1070 - 1080	No samples - no returns.
1080 - 1090	No samples - no returns.
1090 - 1100	No samples - no returns.
1100 - 1110	No sample - no returns.
1110 - 1120	No sample - no returns.
1120 - 1130	No sample - no returns.
1130 - 1140	No sample - no returns.
1140 - 1150	No sample - no returns.
1150 - 1160	No sample - no returns.
1160 - 1170	No sample - no returns.
1170 - 1180	No sample - no returns.
1180 - 1190	No sample - no returns.
1190 - 1200	No sample - no returns.
1200 - 1210	No sample - no returns.
1210 - 1220	No sample - no returns.
1220 - 1230	No sample - no returns.
1230 - 1240	No sample - no returns.
1240 - 1250	No sample - no returns.
1250 - 1260	No sample - no returns.
1260 - 1270	No sample - no returns.
1270 - 1280	No sample - no returns.
1280 - 1290	No sample - no returns.
1290 - 1300	No sample - no returns.
1300 - 1310	No sample - no returns.

SAMPLE DESCRIPTIONS (cont'd)

1310 - 1320	No sample - no returns.
1320 - 1330	No sample - no returns.
1330 - 1340	No sample - no returns.
1340 - 1350	No sample - no returns.
1350 - 1360	No sample - no returns.
1360 - 1370	No sample - no returns.
1370 - 1380	No sample - no returns.
1380 - 1390	No sample - no returns.
1390 - 1400	No sample - no returns.
1400 - 1410	No sample - no returns.
1410 - 1420	No sample - no returns.
1420 - 1430	No sample - no returns.
1430 - 1440	No sample - no returns.
1440 - 1450	No sample - no returns.
1450 - 1460	No sample - no returns.
1460 - 1470	No sample - no returns.
1470 - 1480	No sample - no returns.
1480 - 1490	No sample - no returns.
1490 - 1500	No sample - no returns.
1500 - 1510	No sample - no returns.
1510 - 1520	No sample - no returns.
1520 - 1530	No sample - no returns.
1530 - 1540	No sample - no returns.
1540 - 1550	No sample - no returns.
1550 - 1560	No sample - no returns.

SAMPLE DESCRIPTIONS (cont'd)

1560 - 1570	No sample - no returns.
1570 - 1580	No sample - no returns.
1580 - 1590	No sample - no returns.
1590 - 1600	No sample - no returns.
1600 - 1610	No sample - no returns.
1610 - 1620	No sample - no returns.
1620 - 1630	No sample - no returns.
1630 - 1640	No sample - no returns.
1640 - 1650	No sample - no returns.
1650 - 1660	No sample - no returns.
1660 - 1670	No sample - no returns.
1670 - 1680	No sample - no returns.
1680 - 1690	No sample - no returns.
1690 - 1700	No sample - no returns.
1700 - 1710	No sample - no returns.
1710 - 1720	No sample - no returns.
1720 - 1730	No sample - no returns.
1730 - 1740	No sample - no returns.
1740 - 1750	No sample - no returns.
1750 - 1760	No sample - no returns.
1760 - 1770	No sample - no returns.
1770 - 1780	No sample - no returns.
1780 - 1790	No sample - no returns.
1790 - 1800	No sample - no returns.
1800 - 1810	No sample - no returns.

SAMPLE DESCRIPTIONS (cont'd)

1810 - 1820	No sample - no returns.
1820 - 1830	No sample - no returns.
1830 - 1840	No sample - no returns.
1840 - 1850	No sample - no returns.
1850 - 1860	No sample - no returns.
1860 - 1870	No sample - no returns.
1870 - 1880	No sample - no returns.
1880 - 1890	No sample - no returns.
1890 - 1900	No sample - no returns.
1900 - 1910	No sample - no returns.
1910 - 1920	No sample - no returns.
1920 - 1930	No sample - no returns.
1930 - 1940	No sample - no returns.
1940 - 1950	No sample - no returns.
1950 - 1960	No sample - no returns.
1960 - 1970	No sample - no returns.
1970 - 1980	No sample - no returns.
1980 - 1990	No sample - no returns.
1990 - 2000	No sample - no returns.
2000 - 2010	No sample - no returns.
2010 - 2020	No sample - no returns.
2020 - 2030	No sample - no returns.
2030 - 2040	No sample - no returns.
2040 - 2050	No sample - no returns.
2050 - 2060	No sample - no returns.

SAMPLE DESCRIPTIONS (cont'd)

2060 - 2070	No sample - no returns.
2070 - 2080	No sample - no returns.
2080 - 2090	No sample - no returns.
2090 - 2100	No sample - no returns.
2100 - 2110	No sample - no returns.
2110 - 2120	No sample - no returns.
2120 - 2130	No sample - no returns.
2130 - 2140	No sample - no returns.
2140 - 2150	No sample - no returns.
2150 - 2160	No sample - no returns.
2160 - 2170	No sample - no returns.
2170 - 2180	No sample - no returns.
2180 - 2190	No sample - no returns.
2190 - 2200	No sample - no returns.
2200 - 2210	No sample - no returns.
2210 - 2220	No sample - no returns.
2220 - 2230	No sample - no returns.
2230 - 2240	No sample - no returns.
2240 - 2250	No sample - no returns.
2250 - 2260	No sample - no returns.
2260 - 2270	No sample - no returns.
2270 - 2280	No sample - no returns.
2280 - 2290	No sample - no returns.
2290 - 2300	No sample - no returns.
2300 - 2310	No sample - no returns.

SAMPLE DESCRIPTIONS (cont'd)

2310 - 2320		No sample - no returns.
2320 - 2330		No sample - no returns.
2330 - 2340		No sample - no returns.
2340 - 2350		No sample - no returns.
2350 - 2360		No sample - no returns.
2360 - 2370		No sample - no returns.
2370 - 2380		No sample - no returns.
2380 - 2390		No sample - no returns.
2390 - 2400		No sample - no returns.
2400 - 2410		No sample - no returns.
2410 - 2420		No sample - no returns.
2420 - 2430		No sample - no returns.
2430 - 2440		No sample - no returns.
2440 - 2450		No sample - no returns.
2450 - 2460		No sample - no returns.
2460 - 2470	70%	Shale - (cavings) - green, dolomitic, chunky, medium hard.
	20%	Dolomite - (cavings) - mottled dark brown and light buff, crypto-x-lline, hard.
	10%	Shale - (cavings) - red, chunky, medium hard.
2470 - 2480	50%	Shale - (cavings) - red, platy, medium hard.
	50%	Shale - (cavings) - green, dolomitic, platy, medium hard.
	Tr.	Dolomite.
	Tr.	Shale - dark grey.
	NOTE:	Increase lag time for following samples.
2480 - 2490	60%	Shale - (cavings) - green and red, as above.
	30%	Dolomite - (cavings) - slightly mottled medium brown and light buff, crypto-x-lline, hard.
	10%	Shale - dark grey, slightly micromicaceous, non-calcareous, medium hard.

SAMPLE DESCRIPTIONS (cont'd)

2490 - 2500	50%	Shale - dark grey, chunky to platy, medium hard.
	30%	Shale - (cavings) - green, dolomitic, chunky, medium hard.
	20%	Shale - (cavings) - red, chunky, medium hard.
	Tr.	Dolomite and anhydrite cavings.
2500 - 2510	50%	Shale - dark grey, occasionally black, commonly dark brown, chunky, medium hard.
	20%	Dolomite - slightly mottled medium brown and light buff, micro-x-lline, no visible porosity.
	20%	Shale - (cavings) - green, as above.
	10%	Shale - (cavings) - red, as above.
2510 - 2520	40%	Shale - green, dolomitic, chunky to platy, medium hard.
	30%	Dolomite - slightly mottled dark and light brown, crypto-x-lline to micro-x-lline, no visible porosity.
	20%	Shale - dark grey to blackish-grey.
	10%	Shale - (cavings) - red.
	Tr.	Anhydrite.
2520 - 2530	70%	Shale - medium green, occasionally dark grey, chunky to platy, medium hard.
	30%	Dolomite - mottled dark brown and light buff, occasionally glauconitic, no visible porosity.
	Tr.	Sandstone - mottled green and white, very fine grained to medium grained, quartz and glauconite, well cemented, tight.
	Tr.	Siltstone - light grey.
2530 - 2540	70%	Shale - medium green, non-calcareous, platy to splintery, medium hard, trace slickensides.
	20%	Dolomite - mottled medium brown and light buff, occasionally blackish-brown, micro-x-lline to finely crystalline, trace pyrite, argillaceous, no visible porosity.
	10%	Siltstone - light grey to whitish-grey, clean, quartzose, dolomitic, hard.
2540 - 2550	50%	Shale - dark green, some dark grey, platy, hard.
	20%	Dolomite - mottled medium to dark brown with light buff, crypto-x-lline to micro-x-lline, no visible porosity.
	30%	Siltstone - light grey, clean, quartzose, dolomitic, hard.

SAMPLE DESCRIPTIONS (cont'd)

2550 - 2560	40%	Shale - medium grey, common green, trace red, trace pyritic, chunky, hard.
	30%	Siltstone - light grey to slightly medium grey, clean to dirty, quartzose, trace glauconitic, dolomitic, hard.
	30%	Dolomite - dark brown, mottled dark brown and light buff, occasionally mottled dark grey and brown, crypto-x-lline, very argillaceous, no visible porosity.
2560 - 2570	40%	Shale - medium grey, common medium green, slightly micromicaceous, platy, hard.
	30%	Dolomite - mottled dark brown and light buff, crypto-x-lline to micro-x-lline, some finely crystalline, argillaceous, no visible porosity.
	30%	Siltstone - light grey, mottled medium grey in part, quartzose, dolomitic, hard.
2570 - 2580	80%	Shale - dark grey, very micromicaceous, platy, hard.
	20%	Dolomite - buff, mottled light buff, finely to medium crystalline, no visible porosity, with white dolomite (fracture fill).
	Tr.	Siltstone - as above.
2580 - 2590	50%	Shale - medium grey to greenish-grey, slightly to very micromicaceous, platy, some chunky, hard.
	30%	Dolomite - buff, mottled light buff, finely to medium crystalline, argillaceous, occasional closed fracture infilled with white dolomite.
	20%	Dolomite - dark greyish-brown, crypto-x-lline, very argillaceous, hard.
2590 - 2600	90%	Dolomite - light grey, very finely crystalline, silty, no visible porosity.
	10%	Shale - medium greenish-grey to medium green, slightly pyritic, chunky, hard.
2600 - 2610	80%	Dolomite - buff, slightly mottled light buff, finely crystalline, argillaceous, no visible porosity, with occasional closed fracture filled with white dolomite.
	20%	Shale - medium greyish-green, platy, hard.
2610 - 2620	90%	Dolomite - mottled light and dark buff, finely crystalline, slightly pyritic, argillaceous, no visible porosity, with some white dolomite (fracture fill).
	10%	Shale - medium green, occasionally greenish-grey.

SAMPLE DESCRIPTIONS (cont'd)

2620 - 2630	50%	Shale - dark grey, micromicaceous, silty, very fine black flecks, chunky, hard.
	50%	Dolomite - mottled light and dark buff, occasionally blackish-brown, very finely to finely crystalline, commonly pyritic, argillaceous, trace pin point or small vuggy porosity, trace light oil stain, scattered bright yellow fluorescence.
2630 - 2640	50%	Siltstone - light grey, quartzose, micaceous, glauconitic, some chips with coarse to medium grained size green and black glauconite, very slightly dolomitic, hard.
	30%	Shale - dark grey, as above.
	20%	Dolomite - mottled light and dark buff, micro-xlline to finely crystalline, argillaceous, no visible porosity.
2640 - 2650	40%	Siltstone - light to medium grey, some dirty, quartzose, slightly dolomitic, micaceous, with occasional chip with medium to coarse grained size green glauconite.
	30%	Dolomite - mottled light and dark buff, micro-xlline to finely crystalline, argillaceous, no visible porosity.
	30%	Shale - dark grey, micaceous, very fine black flecks, as above.
2650 - 2660	60%	Siltstone - light grey to slightly buff, occasionally mottled medium grey, quartzose, slightly sandy, micaceous, with occasional medium grained green and black glauconite grains.
	40%	Shale - dark grey, commonly dark green, very micaceous in part, chunky, hard.
	Tr.	Dolomite - as above.
2660 - 2670	70%	Siltstone - light grey, occasionally slightly light buff, generally clean, quartzose, micaceous, slight to occasional very finely glauconite grains, dolomitic, hard.
	30%	Shale - dark green, common dark grey, as above.
	Tr.	Dolomite.
2670 - 2680	70%	Siltstone - light grey, clean, some medium grey and dirty, quartzose, micaceous, trace glauconitic, very slightly dolomitic, hard.
	20%	Shale - dark green, occasionally medium grey, platy, hard.
	10%	Sandstone - light grey to white, very fine to fine grained, quartzose, glauconitic, very well cemented, siliceous, tight.

SAMPLE DESCRIPTIONS (cont'd)

2680 - 2690	50%	Sandstone - pink to occasionally light grey, occasionally red, very fine grained, quartzose, glauconitic to occasionally very glauconitic, well cemented, silty, tight. Trace medium grained, well rounded, loose quartz grains.
	30%	Shale - dark grey, micromicaceous, some very fine black flecks, platy, hard.
	20%	Siltstone - light grey, as above.
2690 - 2700	90%	Sandstone - pinkish-grey, trace red, very fine to occasionally fine grained, trace medium grained, quartzose, common glauconite, well cemented, silt to occasionally siliceous, tight, with some loose rounded medium to coarse quartz grains (white to commonly pink).
	10%	Shale - dark grey, dark greenish-grey, very micaceous, platy, hard.
2700 - 2710	60%	Sandstone - light grey to pink, occasionally red, very fine to fine grained, trace coarse grains, quartzose, occasionally very glauconitic, well cemented, silt, tight.
	30%	Shale - dark grey, very micaceous (white and black), silty, chunky, hard.
	10%	Siltstone - red, sandy, very argillaceous.
2710 - 2720	90%	Sandstone - light pinkish-grey, very fine grained, quartzose, very finely glauconitic, trace micaceous, well cemented, silt, tight.
	10%	Shale - dark green, platy, hard.
2720 - 2730	100%	Sandstone - pink, some light to medium greenish-grey, very fine grained, occasionally very fine grained, quartzose, slightly glauconitic to very glauconitic, trace micaceous, well cemented, silt, tight. One chip with scattered bright yellow fluorescence.
2730 - 2740	80%	Sandstone - pinkish-grey, occasionally pale greenish-grey, very fine grained, quartzose, very finely glauconitic, well cemented, silt, tight.
	20%	Sandstone - white to light grey, very fire to fine grained, with common medium to coarse grains, quartzose, trace glauconitic, poorly sorted, subrounded to rounded, well cemented, silt, tight.
	Tr.	Siltstone - medium grey.

SAMPLE DESCRIPTIONS (cont'd)

2740 - 2750	50%	Sandstone - white, very fine to fine grained, with common medium to coarse grains, quartzose, trace glauconitic, subrounded to rounded, poorly sorted, well cemented, silt, tight.
	40%	Sandstone - pinkish-grey, some greenish-grey, very fine to fine grained, quartzose, slightly glauconitic, some very glauconitic, well cemented, silt, tight.
	10%	Siltstone - red, sandy (coarse quartz grains), firm.
2750 - 2840		See Core Descriptions.
2840 - 2850	95%	Dolomite - red, common light buff to light grey, crypto-x-lline, argillaceous, no visible porosity.
	5%	Shale - dark greyish-greer, platy, hard.
	Tr.	Sandstone - pink to white, very fine to fine grained, quartzose, well sorted, well cemented, silty, tight, with some scattered loose coarse round grains of quartz.
2850 - 2860	100%	Dolomite - red, some slightly mottled light grey, crypto-x-lline, argillaceous, no visible porosity.
	Tr.	Shale - dark greyish-green, platy, hard.
2860 - 2870	100%	Dolomite - pink to red, common mottled red and light grey, crypto-x-lline, argillaceous, no visible porosity.
	Tr.	Shale - dark greyish-green, as above.
2870 - 2880	95%	Dolomite - red, slightly mottled light grey, trace tan, crypto-x-lline, argillaceous, no visible porosity.
	5%	Shale - bright green, common dark greyish-green, occasionally waxy, chunky to splintery, hard.
2880 - 2890	95%	Dolomite - red, slightly mottled light grey, some pale tannish-grey to buff (occasionally silicified), crypto-x-lline, argillaceous, no visible porosity.
	5%	Shale - dark green, as above.
2890 - 2900	100%	Dolomite - red, slightly mottled light grey, some buff, crypto-x-lline, argillaceous, no visible porosity.
	Tr.	Shale - dark green, as above.
	Tr.	Chert - pink.

SAMPLE DESCRIPTIONS (cont'd)

2900 - 2910	60%	Dolomite - medium grey, lithographic, common silicified to chert, no visible porosity.
	40%	Dolomite - red, slightly mottled light grey, some buff to tan, crypto-x-lline, trace chert, argillaceous, no visible porosity.
	Tr.	Dolomite - mottled light grey and dark brown, pelletal, no visible porosity.
2910 - 2920	40%	Dolomite - brown, light buff to buff, tan, occasionally mottled light buff and tan, some light grey, crypto-x-lline, argillaceous, no visible porosity.
	30%	Dolomite - medium grey, lithographic to crypto-x-lline, silicified in part, argillaceous, no visible porosity.
	20%	Dolomite - red to pink, as above.
	10%	Shale - black, some dark green, chunky, hard.
2920 - 2930	100%	Dolomite - buff, common light grey, occasionally tan, red, and medium grey, crypto-x-lline, occasionally micro-x-lline, trace pelletal (oolites), no visible porosity.
	Tr.	Shale - dark greyish-green, as above.
2930 - 2940	100%	Dolomite - light grey to buff, some medium grey (silicified in part), some pink, micro-x-lline to crypto-x-lline, no visible porosity.
	Tr.	Shale - as above.
2940 - 2950	100%	Dolomite - light tan to buff, some red, occasionally light grey, occasionally medium grey, crypto-x-lline to lithographic, argillaceous, no visible porosity.
2950 - 2960	90%	Dolomite - light grey, common light to medium tan (silicified in part), some red, occasionally medium grey, crypto-x-lline, argillaceous, no visible porosity.
	10%	Shale - dark grey, occasionally blackish-grey, occasionally dark greyish-green, platy, occasionally splintery, hard.
2960 - 2970	100%	Dolomite - medium grey, some medium to dark tan, crypto-x-lline to lithographic, argillaceous to very argillaceous, no visible porosity.
2970 - 2980	90%	Dolomite - dark tan mottled light grey, some red, crypto-x-lline to occasionally micro-x-lline, trace fossil pellets, trace medium grey chert, some argillaceous partings, no visible porosity.
	10%	Shale - medium grey, some dark greyish-green.

SAMPLE DESCRIPTIONS (cont'd)

2980 - 2990	100%	Dolomite - medium tan slightly mottled light grey, some dark tan, trace red, crypto-x-lline, some argillaceous partings, no visible porosity.
	Tr.	Shale - as above.
2990 - 3000	70%	Dolomite - mottled tan and light grey, crypto-x-lline, argillaceous, no visible porosity.
	30%	Dolomite - medium grey, crypto-x-lline, very argillaceous, no visible porosity grading to a dolomitic shale.
	Tr.	Dolomite - limy, light grey, micro-x-lline, no visible porosity.
3000 - 3010	60%	Dolomite - medium grey, crypto-x-lline, very argillaceous, silicified in part, no visible porosity.
	30%	Dolomite - light to medium tan, crypto-x-lline to lithographic, argillaceous, no visible porosity.
	10%	Limestone - white to light grey, micro-x-lline, slightly chalky, no visible porosity.
3010 - 3020	60%	Dolomite - mottled buff and light grey, occasionally red, occasionally light grey, crypto-x-lline, trace glauconitic, no visible porosity.
	40%	Shale - medium grey, very slightly dolomitic, hard.
3020 - 3030	60%	Shale - medium grey, medium greenish-grey, siliceous in part, grading in part to chert, hard.
	40%	Dolomite - light grey, common mottled light buff and light grey, occasionally red, crypto-x-lline, no visible porosity.
3030 - 3040	80%	Dolomite - buff to tan, common slightly mottled light grey, some light grey to white, occasionally red, crypto-x-lline, no visible porosity.
	20%	Shale - medium grey, as above.
3040 - 3050	80%	Dolomite - buff to tan, common slightly mottled light grey, some light grey, trace red, crypto-x-lline, no visible porosity.
	20%	Shale - medium grey to green, chunky, hard.

SAMPLE DESCRIPTIONS (cont'd)

3050 - 3060	100%	Dolomite - pink, some light buff to tan, crypto-x-lline to lithographic, argillaceous, no visible porosity.
	Tr.	Shale - as above.
3060 - 3070	100%	Dolomite - dark greyish-tan, common dark tan, slightly mottled light grey, occasionally light buff, crypto-x-lline, argillaceous, no visible porosity.
3070 - 3080	90%	Dolomite - dark tan, common light grey, crypto-x-lline, argillaceous, no visible porosity.
	10%	Shale - medium grey, chunky, hard.
3080 - 3090	80%	Dolomite - dark tan, common buff and slightly mottled light grey, some light grey, crypto-x-lline, trace pelletal, argillaceous, no visible porosity.
	20%	Shale - medium grey to greenish-grey, as above.

CORE DESCRIPTIONS

CORE NO. 1 - 2750 to 2780 (30 ft.) - Recovered 29 ft.

2750.0 - 2752.3 (2.3') Sandstone - pale greenish-grey, very fine grained, with occasional to many medium and coarse grains, quartzose, poorly sorted, subrounded, well cemented, silt, tight, hard.

2752.3 - 2757.0 (4.7') Siltstone - red, sandy, (scattered medium and coarse quartz grains), firm.

2757.0 - 2757.3 (0.3') Sandstone - mottled pale green and slightly pinkish-grey, very fine to fine grained, some scattered coarse grains, quartzose, abundant very fine glauconite grains, sub-rounded, well cemented, silt, tight, hard.

2757.3 - 2759.3 (2.0') Sandstone - red, mottled light grey in part, medium to coarse grained, with some fine grains, quartzose, (red coated), with some partings of red siltstone, trace very fine glauconite, subrounded, fair sorting, fair to well cemented, siliceous, poor inter-granular porosity.

2759.3 - 2759.9 (0.6') Sandstone - medium greenish-grey to light grey, very fine grained, with many coarse grains (bi-modal), quartzose, subrounded, poorly sorted, very well cemented, silt, tight, hard.

2759.9 - 2760.5 (0.6') Siltstone - red, sandy, hard.

2760.5 - 2767.6 (7.1') Siltstone - predominately red, with thin interbeds of green siltstone, some patchy cut and fill structure.

2767.6 - 2767.8 (0.2') Sandstone - brick red, fine to medium grained, quartzose, (red coated), round, well sorted, abundant red clay cement, friable, tight, soft.

2767.8 - 2768.0 (0.2') Sandstone - pale greenish-grey, fine to medium grained, quartzose, subrounded, well sorted, well cemented, silt, tight, medium hard.

2768.0 - 2770.0 (2.0') Sandstone - predominately red, some green and light grey thin bands, very fine grained and coarse grained (bi-modal), quartzose, (red coated with iron oxide), abundant silt and very fine grained sand cement, friable, tight, soft.

CORE DESCRIPTIONS (cont'd)

CORE NO. 2 - 2780 - 2810 (30 ft.) - Recovered 30 ft.

2780.0 - 2783.3 (3.3') Sandstone - red, very fine to fine grained, quartzose (red coated), very finely glauconitic, very well cemented, red silt, tight, some slump structure.

2783.3 - 2784.0 (0.7') Sandstone - white, very fine to medium grained, clean, quartzose, subrounded, fair sorting, very well cemented, silt and silica, tight. Streaks of light brown oil bleeding with bright golden yellow fluorescence. Contact with red sandstone (above and below) indicates dip of less than five degrees.

2784.0 - 2786.2 (2.2') Sandstone - red, very fine grained to silty, with many scattered medium grains, quartzose, (red coated with iron oxide), well cemented, silt and clay, tight, hard, with one large green sandstone bleb.

2786.2 - 2786.8 (0.6') Sandstone - pinkish-grey to slightly greenish-grey, very fine to medium grained, occasional coarse grains, quartzose, subrounded, poorly sorted, well cemented, silt, tight. Streaky light brown oil bleeding and streaky golden yellow fluorescence.

2786.8 - 2791.6 (4.8') Sandstone - red, fine to medium grained, quartzose, (red coated), subrounded, well sorted, abundant red silt cement, trace very poor porosity. Occasional pebble size green sandstone bleb.

2791.6 - 2795.0 (3.4') Sandstone - pinkish-grey, very fine and medium grained (bi-modal), quartzose, subrounded, very well cemented, silt - very fine sand, tight, with lenses of trace porosity and light brown oil bleeding. Fluorescence is golden yellow.

2795.0 - 2803.7 (8.7') Sandstone - red, very fine grained to silt, with scattered fine grains, quartzose, (red coated), well cemented, red silt and red clay, tight, with many light grey sandstone blebs, pebbles and cobbles. Slump structure is indicated.

CORE DESCRIPTIONS (cont'd)

2803.7 - 2805.0 (1.3') Sandstone - white, very fine to fine grained, clean, quartzose, subrounded, well sorted, well cemented, siliceous, tight, trace black bitumin.

2805.0 - 2808.5 (3.5') Sandstone - red, very fine and medium grained, quartzose, (red coated), subrounded, poorly sorted, well cemented in red clay (sand grains partially floating in red clay), some silica cement, tight, with occasional pebble and cobble of sandstone (green and light grey).

2808.5 - 2809.1 (0.6') Sandstone - white, occasionally bright green, very fine to medium grained, clean, quartzose, fair sorting, very well cemented, silt, tight.

2809.1 - 2810.0 (0.9') Sandstone - red, very fine to medium grained, quartzose, (red coated with iron oxide), subrounded to rounded, fair sorting, well cemented in red silt with some red clay, tight, with occasional pale green sandstone bleb.

NOTE: Oil bleeding only apparent after one hour exposure to atmospheric pressure.

CORE TIMES

2780 - 2790	3; 5; 3; 3; 4; 2; 2; 3; 3; 1
2790 - 2800	2; 4; 3; 4; 4; 2; 3; 2; 3; 2
2800 - 2810	2; 3; 2; 1; 2; 2; 4; 2; 2; 2

CORE DESCRIPTIONS (cont'd)

CORE NO. 3 - 2810 to 2840 (30 ft.) - Recovered 28.5 ft.

2810.0 - 2811.2 (1.2') Sandstone - red, dark greyish-red, fine to medium grained, quartzose, clear, common red coated with iron oxide, some coated black, well sorted, subrounded, well cemented with red silt, very poor porosity.

2811.2 - 2814.0 (2.8') Sandstone - white, mottled red, fine to medium grained, quartzose, clear to red coated, well sorted, occasional bands of very well sorted, medium grained, red coated quartz grains, well cemented to occasionally poorly cemented, generally very poor porosity, occasional band of fair porosity.

2814.0 - 2814.3 (0.3') Sandstone - mottled white and red, with inclusions of blackish-grey, fine to medium grained, quartzose, clear, some red coated, some black coated, well sorted, well cemented, silt, tight.

2814.3 - 2816.5 (2.2') Sandstone - red, with some bands of white, medium grained, quartzose, red coated, round, very well sorted, poor to fair cement, red silt and clay, tight to patches of good porosity.

2816.5 - 2818.1 (1.6') Sandstone - red, with minor white streaks and thin bands, fine to medium grained, quartzose, red coated with iron oxide, round, well sorted, fair cementing, red silt, poor to fair porosity.

2818.1 - 2820.3 (2.2') Sandstone - red, very fine to coarse grained, quartzose, red coated, very poorly sorted, round to subround, well cemented, red silt and very fine grained sand, tight to very poor porosity. Slight salty taste below 2818.7 feet.

2820.3 - 2822.8 (2.5') Sandstone - red, with common interbeds of white, very fine to medium grained, quartzose, red coated to clear, fair sorting, subrounded, well cemented, red silt and very fine grained sand, tight to very poor porosity. Faint salty taste.

CORE DESCRIPTIONS (cont'd)

2822.8 - 2825.6 (2.8') Sandstone - dark red, very fine to medium grained, quartzose, red coated with iron oxide, fair sorting, subrounded, well cemented, red silt, tight to very poor porosity. Faint salty taste.

2825.6 - 2827.1 (1.5') Sandstone - pink,(finely mottled red and light grey), fine grained, quartzose, clear patches and red coated patches, very well sorted, sub-angular, well cemented, silt, tight. Faint salty taste.

2827.1 - 2827.3 (0.2') Sandstone - black, fine to medium grained, quartzose, black coated, well to very well sorted, round, fair cementing, blackish-grey silt, poor to fair porosity.

2827.3 - 2828.0 (0.7') Sandstone - red, very fine grained, quartzose, red coated, very well sorted, very well cemented, red silt, tight.

2828.0 - 2831.6 (3.6') Sandstone - white to pink, very fine to fine grained, quartzose, thin patches of clear and red coated quartz, some medium beds of white, well sorted, well cemented, silt, tight. Some crossbedding, some steep dips (30 degrees) at bed contacts, and some slump structure. Fair salty taste.

2831.6 - 2837.1 (5.5') Sandstone - red at top, grading to pinkish-grey at middle and slightly pinkish-grey at base, very fine to fine grained, occasional medium grains, quartzose, red coated, some white patches to white beds, well sorted, well cemented, very poor porosity. Salt taste strong near base.

2837.1 - 2837.6 (0.5') Sandstone - white, fine to medium grained, clean, quartzose, clear, round, well sorted, fair cementing, silt, poor to fair porosity. Strong salt taste.

NOTE: Core described after six hours exposure to atmospheric pressure.

CORE TIMES

2810 - 2820	1; 1; 2; 2; 2; 3; 3; 3; 3; 3
2820 - 2830	3; 3; 3; 3; 3; 1; 2; 3; 4; 4
2830 - 2840	6; 5; 4; 3; 4; 4; 4; 5; 4; 8

DAILY DRILLING RECORD

DATE	DEPTH	PROGRESS	OPERATION	DAY	REMARKS
Feb.16/75	50	50	Reaming	1	Union IOL Stopover was spudded at 4:30 P.M. Feb. 15/75. Drilled 17½" hole.
Feb.17/75	50	-0-	W.O.C.	2	Ran conductor pipe to 35 ft. Work and rotate pipe to 50 ft. Conductor pipe consisted of 2 jts. of 13⅜"; 54.5#; K-55 casing. Cemented w/46 sxs of Oilwell 1:1 Calseal.Cement in place at 5:30 P.M. Feb.16/75. Cut off casing. Weld on flange and head up w/12" air head. Install Blowie line.
Feb.18/75	148	98	W.O .C.	3	Drld 12¼" hole. Gravel caving badly. Ran cement plug at 60 ft. Cemented w/65 sxs of Oilwell 1:1 Calseal. Plug down at 6:05 A.M. Feb.18/75. W.O.C.
Feb.19/75	148	-0-	W.O.C.	4	W.O.C. Run in w/bit.Clean hole from 80 to 110 ft w/no trace of cement. Gravel still caving. Ran cement plug No. 2 at 60 ft. w/130 sxs of cement plus 8% NaCl. Plug down at 4:30 P.M. Feb. 18/75. W.O.C. 3 hrs. Ran Plug No. 3 from 60 ft. w/ 150 sxs of cement plus 8% NaCl. Plug down at 7:35 P.M. Feb. 18/75. Wait on cement 3 hrs. Ran Plug No. 4 from 60 ft. w/50 sxs plus 10% Gel. Plug down 10:05 P.M. Feb. 18/75. Had full return on Plug No. 4. W.O.C. 10 hrs.

DAILY DRILLING RECORD (cont'd)

DATE	DEPTH	PROGRESS	OPERATION	DAY	REMARKS
Feb.20/75	269	121	Drilling	5	RIH w/bit. Cleaned out plugs from 60 to 85 ft. Clean hole to 140 feet. Hole caving. Ran Plug No. 5 at 140 ft. w/90 sys Oilwell plus 8% NaCl. Plug down at 12:15 P.M. Feb.19/75. W.O.C. 4 hrs. Drld out plug to 135 ft. Drld 12¼" hole.
Feb.21/75	439	170	Cleaning hole	6	Drld to 330 ft. w/stiff foam. Hole started to make 50 bbls water per hr. Drld to 389 ft. POH. RIH w/bit No. 5B. Drld to 439 ft. No returns from 421 to 439 ft.
Feb.22/75	439	-0-	Stuck pipe	7	Work pipe and unable to reach bottom because of caving gravel. POH. Ran Plug No. 6 at 420 ft. w/50 sys of Oilwell plus 3% $CaCl_2$. Plug down 11:45 P.M. Feb.21/75. W.O.C. Attempt to drill out plug. No indication of plug. Hole still caving. Trip to 120 ft. Work stuck pipe. Freed pipe and cont'd out of hole. RIH open end. Run Plug No. 7 at 408 ft. w/80 sys of Oilwell plus 3% $CaCl_2$. Plug down at 9:00 P.M. W.O.C. Feel for plug. No indication of cement. Hole caving. Stuck pipe at 374 ft.
Feb.23/75	439	-0-	Prepare to run plug No.8	8	Work stuck pipe. Freed pipe. Hole caving badly. Pull pipe. Stuck pipe at 250 ft. Work pipe. Jar pipe. Backed off pipe leaving bit & 2 DC's in hole. RIH w/8¾" bit to 75 ft. Tried to fill hole w/mud. No returns after pumping 340 bbls of mud.

DAILY DRILLING RECORD (cont'd)

DATE	DEPTH	PROGRESS	OPERATION	DAY	REMARKS
Feb.23/75	439	-0-	Prepare to run Plug No.8	8	(cont'd)... POH. RIH w/ 12¼" bit to 120 ft. Clean hole. Ran Diesel Gel plugs No. 1; 2; 3; 4 at 30 ft. intervals from 120 ft. RIH. Clean to 184 ft. POH. RIH oper end to run cement Plug No. 8.
Feb.24/75	439	-0-	Circulating	9	Ran Plug No. 8 w/100 sxs Oilwell plus 3% $CaCl_2$. Plug down 9:25 A.M. Feb.23/75. Feel plug at 3:45 P.M. at 110 ft. Ran Plug No. 9 w/50 sxs Oilwell plus 3% $CaCl_2$. Plug down at 4:30 P.M. Feb. 23/75. W.O.C.
Feb.25/75	439	-0-	Clean hole	10	Finish circ top fish. POH. RIH w/8⅛".Wash overpipe. Unable to get over fish. POH. Change shoes and RIH. Wash over fish to 224 ft. POH. Change shoes. RIH and wash over fish to 242 ft. (Very slow and rough.) POH, change shoes. RIH and wash over to 255 ft. POH. Pick up 12¼" shoe. RIH. Wash over bell sub. Fish dropped. Clean hole.
Feb.26/75	446	7	Clean hole	11	POH. RIH w/8⅛"overshot. Wash over fish. Pull 30 ft. Fish let go and dropped to bottom. Wash over fish. POH. Lay down overshot and fish. RIH open end to 425 ft. Ran BJ Chemical Plug No. 1 w/50 sxs Cement plus D-31; R-5 and A-2. Plug down 3:15 PM. Feel for plug w/no indication of plug. Ran BJ Chemical Plug No. 2 w/30 sxs cement plus D-31: R-5 and A-2. Plug down 4:30 PM. W.O.C. 4 hrs. RIH to feel plug - no indication of plug. Ran Diesel Gel Plug

DAILY DRILLING RECORD (cont'd)

DATE	DEPTH	PROGRESS	OPERATION	DAY	REMARKS
Feb.26/75	446	7	Clean hole	11	(cont'd)...No. 5 w/15 sxs Gel plus 5bbls diesel. Plug down 9:30 P.M. POH. RIH w/ drill string. Clean hole from 422 to 439 ft. Drilled ahead 7 ft. Made connection. Hole caving badly. Clean hole 5 hrs. POH. RIH to 415 ft. Clean hole.
Feb.27/75	446	-0-	Clean hole	12	Clean hole to 430 ft. Hole caving badly. Work pipe out of hole. W.O.O. RIH. Clean from 75 to 415 ft.
Feb.28/75	446	-0-	Tripping	13	Clean hole to 425 ft. POH. RIH open ended to 347 ft. Ran Diesel Gel Plug No. 6 w/15 sxs Gel and 5 bbls diesel. Plug down 12:00 Noon. Ran cement Plug No.10 at 347 ft w/30 sxs cement plus 3% $CaCl_2$ and 40 lbs. Kwik Seal. Plug down 2:00 P.M. W.O.C. 5 hrs. RIH to feel plug. No indication of plug. Ran 40 sxs cement and sand plug No. 1 at 350 ft. Tagged sand plug or fill at 423 ft. Pulled to 350 ft. Ran Plug No. 11 w/50 sxs 1:1 cement and Calseal w/2 sxs Unibeads. Plug down at 9:15 P.M. W.O.C. RIH to feel plug at 11:00 P.M. No indication of plug. Ran Diesel Gel Plug No. 7 at 380 ft. w/15 sxs Gel and 5 bbls Diesel. Plug down 12:40 A.M. Ran Plug No. 12 w/20 sxs 1:1 cement plus Calseal. Plug down at 1:15 A.M. Feel for plug at 4:30 A.M. No indication of plug. Pushed rolled up burlap sacks to 390 ft. w/12¼" bit.

DAILY DRILLING RECORD (cont'd)

DATE	DEPTH	PROGRESS	OPERATION	DAY	REMARKS
Mar. 1/75	446	-0-	W. O. C.	14	RIH open end to 385 ft. Ran plug No. 13 w/15 sxs 1:1 cement and Calseal. Plug down at 9:00 A.M. Feel for plug at 11:15 A.M. Found plug at 414 ft. Ran Plug No. 14 at 414 ft w/20 sxs 1:1 cement and Calseal.Plug down at 11:30 A.M. Feel for plug at 1:45 P.M. No indication of plug. POH. RIH w/bit 6B to 415 ft. Rotate and work pipe. Hole caving from estimated 60 to 170 ft. POH. Hole tight from 415 to 360 ft; 250 to 240 ft; and 110 to 100 ft. W.O.C. RIH w/Diesel Gel Plug No. 8 at 200 ft. w/15 sxs Gel and 5 bbls diesel. Plug down at 2:15 A.M. Ran Plug No. 15 w/20 sxs 1:1 cement and Calseal. Plug down at 2:30 A.M. W.O.C.
Mar. 2/75	446	-0-	W.O.C.	15	W.O.C. Felt for plug No.15. No indication of plug. Ran Plug No. 16 at 185 ft. w/20 sxs 1:1 cement and Calseal. Plug down at 11:30 A.M. W.O.C. 4 hrs. Felt for plug. Hole bridged at 140 ft. POH. RIH w/bit. Cleaned to 185 ft. POH. RIH open end Ran Diesel Gel Plug No. 9 at 185 ft. w/15 sxs Gel and 5 bbls diesel. Plug down 6:05 A.M. Ran Plug No. 17 w/10 sxs 1:1 cement and Calseal. Felt Plug No. 17 at 175 ft. at 8:15 P.M. Ran Plug No. 18 w/130 sxs cement plus 3% $CaCl_2$. Plug down at 8:45 P.M. Felt plug at 4:45 A.M. at 88 ft. Ran Plug No. 19 at 88 ft. w/60 sxs cement plus 3% $CaCl_2$. Plug down at 5:30 A.M. W.O.C.

DAILY DRILLING RECORD (cont'd)

DATE	DEPTH	PROGRESS	OPERATION	DAY	REMARKS
Mar. 3/75	478	32	Tripping	16	W.O.C. RIH and drilled out cement plugs to 185 ft. Run in to 415 ft. Clean from 415 to 446 ft. POH. RIH open end to 441. Ran NOWSCO Plug No. 1 w/20 bbls water w/2½ bbls Sodium Silicate; 41 Baume and 3½ sxs 21-0-0 Fertilizer. Plug down at 8:45 P.M. Repeat procedure for Plug No. 2. Plug down 9:30 P.M. POH. RIH w/bit and cleaned 8 ft to bottom. POH. RIH w/bit. Drilled to 478 ft. without returns.
Mar. 4/75	478	-0-	W.O.C.	17	RIH w/bit and hammer. Unable to clean to bottom. POH. RIH w/bit. Clean 30 ft. to bottom. POH. Ran 11 jts 9⅝"; 40#; K-55 casing to 440 ft. Cemented w/250 sxs Oilwell cement plus 3% $CaCl_2$ on first stage. Pumped 410 sxs Oilwell cement plus 3% $CaCl_2$ on second stage from surface. W.O.C. and nipple up BOP's.
Mar. 5/75	478	-0-	Work on Pipe Rams	18	Nipple up BOP's. Drill Mouse hole. Pressure test Blind Rams; 4½" pipe rams and hydrill to 1500 psi. Held okay. Test Kelly cock and motor shut-off. Pressure test Manifold to 1200 psi for 15 min. Work on pipe rams.
Mar. 6/75	600	122	Drilling	19	Work on 4½" pipe rams. RIH. Drill out DV tool at 85 ft, float collar at 398 ft. Clean to bottom. POH. RIH w/stabilizers & jars. Clean 10 ft. to bottom. Hole making approx. 70 bbls of water per hr.

DAILY DRILLING RECORD (cont'd)

DATE	DEPTH	PROGRESS	OPERATION	DAY	REMARKS
Mar. 7/75	872	272	Drilling	20	Drld 8½" hole to 630 ft w/good returns. Below 630 ft. lost all returns to surface.
Mar. 8/75	1015	143	Drilling	21	Drld to 902 ft. POH. RIH w/bit No. 2 S88P 8½". Hole bridged at 600 ft. Clean 100 ft to bottom. Drilling w/no returns to surface.
Mar. 9/75	1163	148	Drilling	22	Drilling w/no returns to surface.
Mar.10/75	1272	109	Drilling	23	Drilling w/no returns to surface. Hole loading w/ water as indicated by air pressure surges.
Mar.11/75	1433	161	Drilling	24	Drilling w/no returns to surface.
Mar.12/75	1535	102	Drilling	25	Drilling w/no returns to surface. Ran GRN Log thru drilling string.
Mar.13/75	1610	75	Drilling	26	RIH w/bit No. 6. Drld w/no returns to surface.
Mar.14/75	1737	127	Drilling	27	Drilling w/no returns to surface.
Mar.15/75	2028	291	Tripping	28	Drilling w/no returns to surface. Trip for new bit.
Mar.16/75	2433	405	Drilling	29	Drilling w/no returns to surface.
Mar.17/75	2460	27	W.O.C.	30	Drld to 2460 ft. Stack pipe while repairing soap pump motor. Circ w/air. POH laying down drill pipe and collar. Ran 63 jts of 7": 23#; N-80 casing. Total length 2443.79 ft.Cemented w/250 sxs Oilwell Neat cement. Plug down 10:40 PM. Mar.16/75.Nipple up BOP's. Change pipe rams.

DAILY DRILLING RECORD (cont'd)

DATE	DEPTH	PROGRESS	OPERATION	DAY	REMARKS
Mar.18/75	2515	55	Drilling	31	Finished heading up. Pressure test BOP's. Found small leak in Ram Gates. Resealed. Retested to 1000 Psi. Held okay. RIH w/bit No. 9. Found shoe at 2442 ft. Drld ahead w/foam. Good returns.
Mar.19/75	2736	221	Drilling	32	Drld to 2715 ft. Circ. sample. Change over to mud. Drld ahead.
Mar.20/75	2810	74	Coring	33	Drld to 2750. Cut Core No.1 2750 - 80 (30 ft). Rec 29 ft. Cut Core No. 2, 2780-2810 (30 ft). Rec 30 ft. Start cutting Core No. 3.
Mar.21/75	2874	64	Drilling	34	Cont'd cutting Core No. 3. Cored 30 ft. Recovered 28.5 ft. Ran DST #1-2724 to 2840. Recovered 2550 ft. of salt water. RIH w/bit No. 11.
Mar.22/75	3017	143	Drilling	35	Drilling ahead.
Mar.23/75	3092	75	Logging	36	Drilled to 3092. Ran Combination DIL & BHC Sonic from 3094 to 2639. Ran GR-CNL from 3094 to 80 ft. Ran GR-FDL from 3094 to 2639.
Mar.24/75	3092	-0-	Abandoning	37	Finished logging. W.O.O. Ran Plug No. 1 - 3092 to 2700' w/125 sxs Oilwell. Plug down 9:45 P.M. Ran Plug No. 2 - 2350 to 2500' w/40 sxs Oilwell cement plus 3% $CaCl_2$. Plug down 10:30 P.M. Tagged Plug No. 2 at 2380' at 5:00 A.M. Lay down pipe.
Mar.25/75	3092	-0-	Rig release	38	Rig released at 5:00 P.M. March 24, 1975.

BIT RECORD

NO.	SIZE	TYPE	DEPTH OUT	FOOTAGE	HOURS	DULL CONDITION T	B	G
1B	12¼	DTJ	30	30	4	4	2	I
2B	17½	H7JP	40	40	10	5	4	I
3B	17½	S88P	50	10	2	7	3	I
4B	12¼	S88P	389	339	35	7	4	I
5B	12¼	S88P	439	50	2½	1	1	I
6B	12¼	S88P	478	39	9	1	1	I
1	8½	S86P	902	424	36	2	8	I
2	8½	S88P	1166	264	35	1	6	I
3	8½	S88P	1400	267	35¾	2	6	I
4	8½	3JS	1481	81	10	1	3	I
5	8½	M88P	1544	63	15¼	1	4	I
6	8½	3JSP	1633	89	23¼	2	4	I
7	8½	S88P	2028	395	30¾	1	7	I
8	8½	S88P	2460	432	21¼	2	8	I
9	6¼	S88F	2750	290	24	1	2	I
10	6⅛	◇	2840	90	6	--- Good ---		
11	6¼	S88F	2960	120	14¼	7	8	I
12	6¼	S88F	3055	95	13¼	6	8	I
13	6¼	F4	3092	37	4¾	2	1	I

DEVIATION RECORD

DEPTH	ANGLE
80	½
170	½
263	1
320	1
380	½
505	½
720	¼
852	2
880	2
946	1¼
1040	1¼
1135	1¼
1259	2
1320	1
1530	1¼
1690	1½
1910	1
2260	1
2611	1¼
2960	½

FLUID ANALYSES

FOR

UNION OIL COMPANY OF CANADA LIMITED

UNION IMP STOPOVER K-44
STOPOVER AREA
NORTHWEST TERRITORIES

CORE LABORATORIES - CANADA LTD.

Petroleum Reservoir Engineering

CALGARY - EDMONTON - REGINA

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

CONTAINER IDENTITY		7012-5310 LABORATORY NUMBER
	Union Oil Company of Canada Limited (OPERATOR)	1 of 3 PAGE
67° 40' N.L. / 123° 30' W.L. LOCATION	Union IOL Stopover K-44 (WELL OR SAMPLE LOCATION NAME)	1204' KB ELEV. / GRD. ELEV.
Stopover Area, Northwest Territories (FIELD OR AREA)	Old Fort Island (POOL OR ZONE)	SAMPLER
DST #1 (TEST TYPE & NO.)	2550' Salt Water (TEST RECOVERY)	
Top of Tool (POINT OF SAMPLE)	AMT. & TYPE CUSHION	@ °F MUD RESISTIVITY
2724' - 2840' (TEST INTERVALS OR PERFS.)	PUMPING FLOWING GAS LIFT SWAB WATER BBLS/D. OIL BBLS/D. GAS MFC/D.	
SEPARATOR RESERVOIR	@ °F CONTAINER WHEN SAMPLED / @ °F CONTAINER WHEN RECEIVED	SEPARATOR
PRESSURES, PSIG		TEMPERATURES, °F
March 20/75 (DATE SAMPLED (D/M/Y))	March 31/75 (DATE RECEIVED (D/M/Y))	April 3/75 (DATE ANALYSED (D/M/Y)) B.G. (ANALYST) REMARKS

MICRO BENZENE-TOLUENE ANALYSIS

Benzene	<0.5 ppm
Toluene	<0.5 ppm

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

WATER ANALYSIS

Plastic (CONTAINER IDENTITY)		7012-5310 (LABORATORY NUMBER)
	Union Oil Company of Canada Limited (OPERATOR)	2 of 3 (PAGE)
67° 40' N.L. 123° 30' W.L. (LOCATION)	Union IOL Stopover K-44 (WELL OR SAMPLE LOCATION NAME)	1204' (KB ELEV.) (GRD. ELEV.)
Stopover Area, Northwest Territories (FIELD OR AREA)	Old Fort Island (POOL OR ZONE)	(SAMPLER)
DST #1 (TEST TYPE & NO.)	2550' Salt Water (TEST RECOVERY)	
Top of Tool (POINT OF SAMPLE)	(AMT. & TYPE CUSHION)	@ °F (MUD RESISTIVITY)
2724' - 2840' (TEST INTERVALS OR PERFS.)	PUMPING FLOWING GAS LIFT SWAB	
	WATER BBLS/D. OIL BBLS/D. GAS MFC/D.	
SEPARATOR RESERVOIR	@ °F CONTAINER WHEN SAMPLED; @ °F CONTAINER WHEN RECEIVED	SEPARATOR
PRESSURES, PSIG		TEMPERATURES, °F
March 20/75 (DATE SAMPLED (D/M/Y))	March 26/75 (DATE RECEIVED (D/M/Y))	April 4/75 (DATE ANALYSED (D/M/Y)) L.S. (ANALYST) (REMARKS)

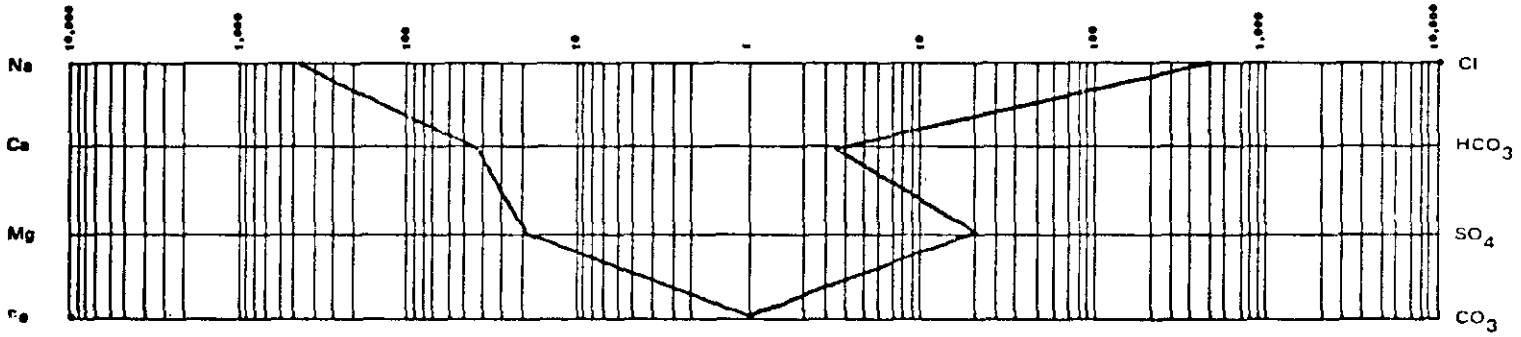
ION	MG/L	MG%	MEQ/L
Na+K	9738	34.5	423.6
K			
Ca	786	2.8	39.2
Mg	245	0.9	20.1
Ba			
Sr			
Fe		PRESENT	

ION	MG/L	MG%	MEQ/L
Cl	16269	57.6	458.9
Br			
I			
HCO_3	195	0.7	3.2
SO_4	998	3.5	20.8
CO_3	0	0.0	0.0
OH	0	0.0	0.0
H_2S	NOT DETECTED		

TOTAL SOLIDS MG/L

BY EVAPORATION @ 110°C	BY EVAPORATION @ 180°C
	28231
AT IGNITION	CALCULATED
1.0230 @ 60°F	1.3377 @ 21°C
SPECIFIC GRAVITY	REFRACTIVE INDEX
7.9	0.205 @ 25°C
pH	RESISTIVITY (OHM/METERS)

LOGARITHMIC PATTERN MEQ PER LITER



REMARKS NaCl equiv 27795

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

WATER ANALYSIS

Plastic — CONTAINER IDENTITY

7012-5310 — LABORATORY NUMBER

Union Oil Company of Canada Limited — OPERATOR

3 of 3 — PAGE

67° 40' N.L. / 123° 30' W.L. — LOCATION

Union IOL Stopover K-44 — WELL OR SAMPLE LOCATION NAME

1204' — KB ELEV. — GRD. ELEV.

Stopover Area, Northwest Territories — FIELD OR AREA

Old Fort Island — POOL OR ZONE

SAMPLER

DST #1 — TEST TYPE & NO.

TEST RECOVERY

Drilling Mud - Make up Water — POINT OF SAMPLE

AMT. & TYPE CUSHION

@ °F — MUD RESISTIVITY

2724' - 2840' — TEST INTERVALS OR PERFS.

PUMPING FLOWING GAS LIFT SWAB

WATER BBLS/D. OIL BBLS/D. GAS MFC/D.

SEPARATOR RESERVOIR @ °F CONTAINER WHEN SAMPLED @ °F CONTAINER WHEN RECEIVED SEPARATOR

PRESSURES, PSIG — TEMPERATURES, °F

March 20/75 — DATE SAMPLED (D/M/Y)

March 26/75 — DATE RECEIVED (D/M/Y)

April 4/75 — DATE ANALYSED (D/M/Y)

L.S. — ANALYST

REMARKS

ION	MG/L	MG%	MEQ/L
Na+K	883	28.0	38.4
K			
Ca	59	1.9	3.0
Mg	15	0.5	1.3
Ba			
Sr			
Fe		PRESENT	

ION	MG/L	MG%	MEQ/L
Cl	435	13.8	12.3
Br			
I			
HCO_3	1469	46.5	24.1
SO_4	286	9.0	6.0
CO_3	10	0.3	0.3
OH	0	0.0	0.0
H_2S	NOT DETECTED		

TOTAL SOLIDS MG/L

BY EVAPORATION @ 110°C

BY EVAPORATION @ 180°C — 3158

AT IGNITION

CALCULATED

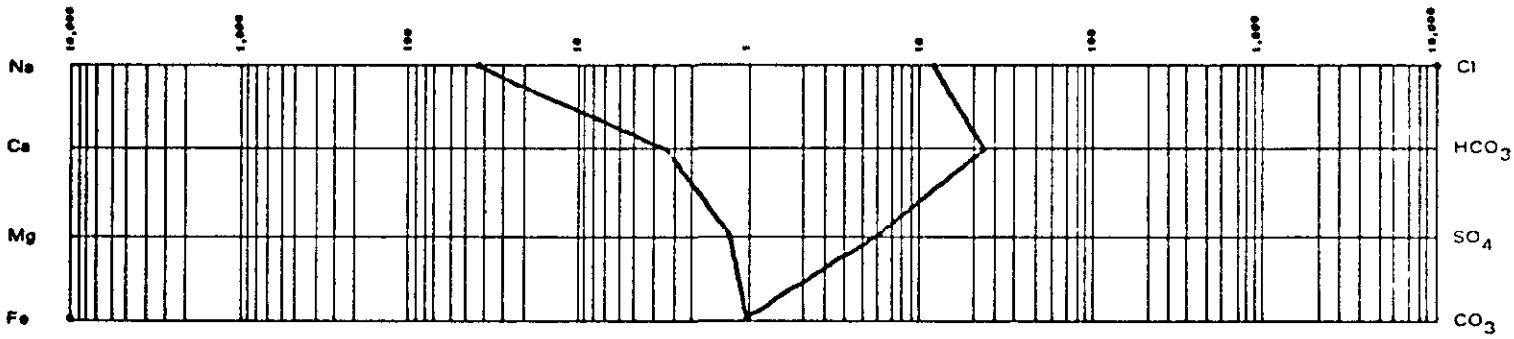
1.0024 @ 60°F — SPECIFIC GRAVITY

1.3312 @ 23°C — REFRACTIVE INDEX

8.50 — pH

2.35 @ 25°C — RESISTIVITY (OHM/METERS)

LOGARITHMIC PATTERN MEQ PER LITER



REMARKS NaCl equiv 1957

CORE LABORATORIES – CANADA LTD.

WATER QUALITY STUDY

Company: Union Oil Company of Canada Limited — File No.: 7044-5161

Location: Union Imp Stopover K-44 — PAGE: 1 of 1

Sampled From: Source Water

Date Sampled: _____ Date Received: March 24, 1975 Date Analyzed: April 1, 1975

Appearance: Yellow with flaky brown suspended solids

ANALYSIS

ph	8.1
Color	250 Platinum Cobalt Color Units
Turbidity	8.8 Turbidity Units
Specific Conductance	446 umhos/cm @ 24°C
Total Alkalinity as $CaCO_3$	216 mg/liter
Total Hardness as $CaCO_3$	219 mg/liter
Chloride	19 mg/liter
Sulphate	64 mg/liter
Iron	8.9 mg/liter
Nitrate as NO_3	1.59 mg/liter
Nitrite as NO_2	<0.01 mg/liter
Total Soluble Phosphate	0.15 mg/liter

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

WATER ANALYSIS

Plastic — CONTAINER IDENTITY

7021-5330 — LABORATORY NUMBER

51"
67° 33' ~~33.00~~ N.L.
123° 38' ~~16.00~~ W.L. — LOCATION 32"

Union Oil Company Of Canada Limited — OPERATOR

Union Imp Stopover K-44 — WELL OR SAMPLE LOCATION NAME

1 of 1 — PAGE

1178' — KB ELEV. / GRD. ELEV.

Stopover Area, Northwest Territories — FIELD OR AREA

POOL OR ZONE

SAMPLER

TEST TYPE & NO.

TEST RECOVERY

Depth 480' - Water from blooie line before returns were lost — POINT OF SAMPLE

AMT. & TYPE CUSHION

@ °F — MUD RESISTIVITY

TEST INTERVALS OR PERFS.

PUMPING FLOWING GAS LIFT SWAB

WATER BBLS/D. OIL BBLS/D. GAS MFC/D.

SEPARATOR RESERVOIR PRESSURES, PSIG

@ °F — CONTAINER WHEN SAMPLED

@ °F — CONTAINER WHEN RECEIVED

SEPARATOR TEMPERATURES, °F

March 18/75 — DATE SAMPLED (D/M/Y)

March 24/75 — DATE RECEIVED (D/M/Y)

GBW — DATE ANALYSED (D/M/Y) / ANALYST

REMARKS

ION	MG/L	MG%	MEQ/L
Na+K	53	9.9	2.3
K			
Ca	92	17.1	4.6
Mg	5	1.0	0.4
Ba			
Sr			
Fe		TRACE	

ION	MG/L	MG%	MEQ/L
Cl	19	3.5	0.5
Br			
I			
HCO_3	205	38.1	3.4
SO_4	164	30.5	3.4
CO_3	0	0.0	0.0
OH	0	0.0	0.0
H_2S	NOT DETECTED		

TOTAL SOLIDS MG/L

BY EVAPORATION @ 110°C

BY EVAPORATION @ 180°C

AT IGNITION

538 — CALCULATED

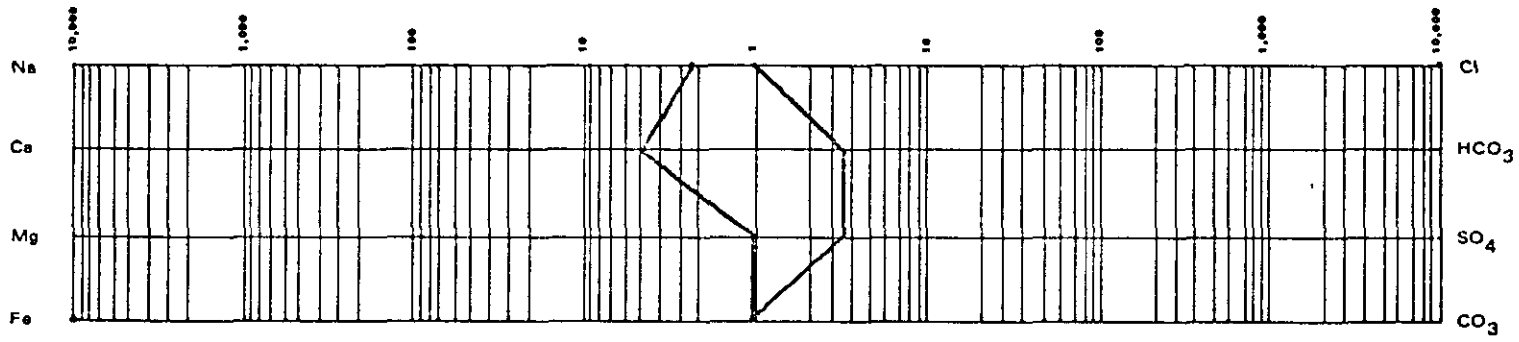
1.0006 @ 60°F — SPECIFIC GRAVITY

1.3315 @ 25°C — REFRACTIVE INDEX

7.8 — pH

14.5 @ 25°C — RESISTIVITY (OHM/METERS)

LOGARITHMIC PATTERN MEQ PER LITER



REMARKS

NaCl equiv 307

SCAL-75150
18 MAY 76

Microfilmed	Date Released
4/19	

CORE LAB

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Special Core Analysis Study

for

UNION OIL COMPANY OF CANADA LIMITED

Stopover K-44 and Colville D-45 Wells

Northwest Territories Canada

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

May 18, 1976

Union Oil Company of Canada Limited
P. O. Box 999
Calgary, Alberta T2P 2K6
Canada

Attention: Mr. Lorne D. McCluskey

Subject: Special Core Analysis Study
Stopover K-44 and Colville D-45 Wells
Northwest Territories
Canada
File Number: SCAL-75150

Gentlemen:

In letters dated April 25, 1975, June 2, 1975, and June 16, 1975, from Lorne D. McCluskey, Core Laboratories, Inc., was requested to perform: (1) Water-Oil Relative Permeability Tests, (2) Mercury Injection Tests, (3) Capillary Pressure Tests, (4) Formation Resistivity Factor Measurements, and (5) Formation Resistivity Index Measurements on sandstone core plugs from the subject wells. The results of the water-oil relative permeability tests were submitted in final form on March 25, 1976. The remaining tests are presented herein. The core plugs used in this study are identified as to well, sample number, and depth interval on Page 1 and are lithologically described on Page 2.

Fifteen core plugs and nine slabbed well cores were submitted for use in this study. Core plugs 1 inch in diameter were drilled from the nine slabbed cores with a diamond core bit using water as the bit coolant and lubricant. All core plugs were extracted of hydrocarbons with toluene, leached of salt with methyl alcohol, and then dried. Air permeabilities and porosities were determined on the cleaned and dried core plugs. The results of the permeability and porosity determinations were submitted to a representative of Union Oil Company of Canada Limited. Based on

the permeability and porosity determinations, core plugs were selected for further testing.

Eight core plugs, five from the Stopover well and three from the Colville well, were evacuated and saturated with appropriate simulated formation water. Six-point capillary pressure tests were performed using a porous-plate cell and an air-brine system. The results of the capillary pressure tests are presented by well in tabular form on Page 3 and in graphical form on Pages 4 through 8. The measured capillary pressure-saturation relationships correlate with both permeability and porosity for the Stopover and Colville wells.

Prior to performing the air-brine capillary pressure tests, the electrical resistivities of the brines and the brine saturated core plugs were measured. These measurements were repeated over a period of several days until the electrical resistivities stabilized indicating that ionic equilibrium within the core plugs had been attained. Formation resistivity factors were calculated from the electrical resistivity measurements and their relationships with porosity are presented in tabular form on Page 9 and in graphical form on Pages 10 and 11. Using Archie's equation, a cementation exponent "m" of 1.71 was calculated for the Stopover well. Using Archie's generalized equation, a cementation exponent "m" of 1.83 at an "a" intercept of 1.10 was calculated for the Colville well.

Electrical resistivities were measured at one equilibrium desaturation point on three core plugs from each the Stopover and the Colville wells. The formation resistivity-saturation relationships yield calculated saturation exponents "n" of 1.47 and 1.68 for the Stopover and Colville wells respectively.

Multi-point mercury injection tests were performed on eleven core plugs, six from the Stopover well and five from the Colville well, using injection pressures ranging from 3 psia to 1500 psia. The multi-point mercury injection tests are presented by well in tabular form on Pages 14 and 15, and in graphical form on Pages 16 through 21. The results of the wetting phase saturation injection pressure relationships correlate

with permeability and porosity for both wells. The inflections exhibited by the test results for Samples 89, 103A, 12, and 9 (Pages 18, 19 and 20) indicate the presence of multi-modal pore size distribution. The heterogeneous porosity systems present in the core plugs tested is not unusual for poorly sorted sandstone core material.

Should you have any questions pertaining to these test results or if we can be of any assistance, please do not hesitate to contact us.

Very truly yours,

Core Laboratiories, Inc.

Duane L. Archer (mf)

Duane L. Archer, Manager
Special Core Analysis

DLA:JWW:gb
10 cc. - Addressee

Company Union Oil Co. of Canada Limited
Number of Wells Two
Field Stopover and Colville
Formation Old Fort Sand
County Northwest Territories
State Canada

Identification of Samples

Sample Number	Company	Well	Depth, Feet
		Stopover Field	
45	Union Oil Company of Canada Ltd.	Union Oil Stopover K-44	2780.0-80.7
50			2784.1-85.0
50A			2784.1-85.0
70			2798.2-99.0
88			2813.2-13.5
89			2813.5-14.3
98			2820.8-21.9
98A			2820.8-21.9
103			2825.6-26.2
103A			2825.6-26.2
113			2832.4-33.1
115			2834.3-34.9
		Colville Field	
1	Union Oil Company of Canada Ltd.	Union Mobile Colville D-45	3183.2-83.7
4			3185.6-86.0
9			3190.8-91.8
10			3190.8-91.8
11			3218.0-18.7
12			3218.0-18.7
15			3223.0-23.4
18			3225.9-26.4

Lithological Description

Sample Number	Description
	Stopover Field
45	Ss, reddish brn, v/fn grn, well indurated, w/sh inclusions
50	Ss, gry-red, fn-v/fn grn, well indurated, w/sh
50A	Ss, red-brn, cse-v/fn grn, apparent SiO_2 cement, well indurated, cse grn concentrations
70	Ss, red & gry, fn grn, v/sl/calc, mod indurated, w/clay pockets
88	Ss, buff-white, med-fn grn, apparent SiO_2 cement, mod indurated, red-brn staining an upper portion
89	Ss, gry, med-fn grn, v/sl/calc, mod indurated, w/fn grn lams, red stks
98	Ss, red-brn-buff white, med-fn grn, apparent SiO_2 cement, well indurated, blotchy color staining, grns uniform
98A	Ss, red & gry, fn-med grn, well indurated, w/clay pockets
103	Ss, red-brn, cse-fn grn, apparent SiO_2 cement, mod-poor in-indurated, blotchy color appearance
103A	Ss, red, fn-med grn, v/sl/calc, mod indurated
113	Ss, red, fn grn, well indurated, w/sh stks
115	Ss, red-brn-buff white, med-fn grn, apparent SiO_2 cement, well indurated, blotchy color appearance
	Colville Field
1	Ss, lt gry, v/fn-silt grn, apparent SiO_2 cement, well indurated, tr musc, pyrite
4	Ss, gry, v/fn grn, sl/calc, well indurated
9	Ss, gry, v/fn grn, sl/calc, well indurated
10	Ss, tan, v/fn grn, sl/calc, mod indurated,
11	Ss, lt gry-white, fn-v/fn grn, apparent SiO_2 cement, mod-poor indurated, med grn laminar, tr musc
12	Ss, gry, fn grn, mod indurated
15	Ss, lt gry-white, fn-v/fn grn, apparent SiO_2 cement, mod-poor indurated, med grn laminae, tr musc
18	Ss, lt gry-white, fn-v/fn grn, apparent SiO_2 cement, mod-poor indurated, med grn laminae

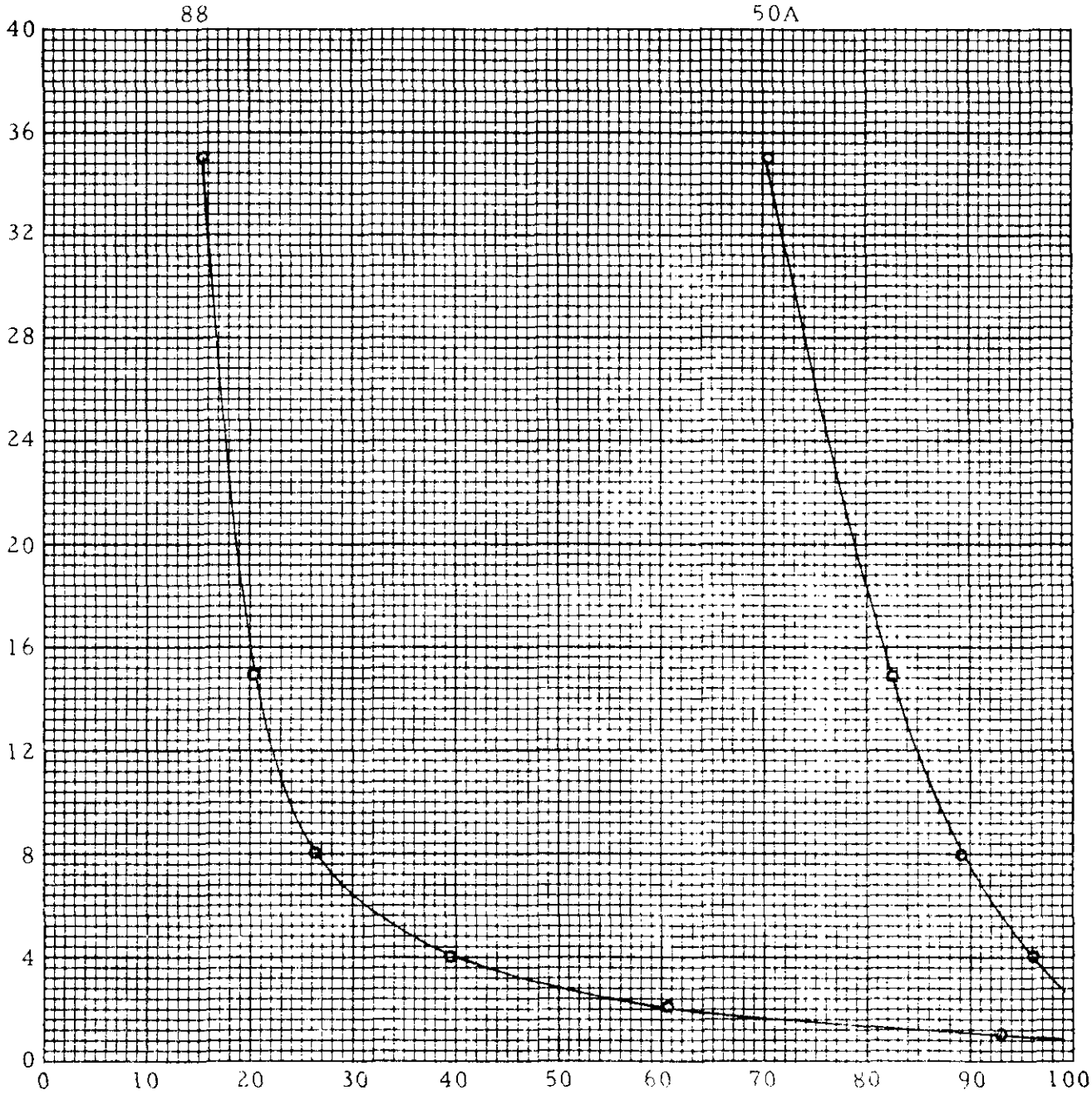
Air-Brine Capillary Pressure Data

Pressure, PSI:	1	2	4	8	15	35

Sample Number	Permeability, Millidarcys	Porosity, Per Cent	Brine Saturation, Per Cent Pore Space					
					Stopover Field			
50A	1.2	8.3	100.0	100.0	96.0	89.0	82.6	70.3
88	130	12.8	92.9	60.8	39.5	26.3	20.3	15.6
98	12	10.1	100.0	100.0	89.4	64.0	42.0	31.9
103	118	14.4	100.0	69.4	44.8	31.5	25.6	21.3
115	1.7	10.8	100.0	100.0	91.6	63.9	41.7	31.9
					Colville Field			
11	12	14.0	100.0	95.4	75.3	50.6	31.2	16.9
15	7.3	13.2	100.0	100.0	93.2	63.2	34.6	18.0
18	20	15.1	100.0	100.0	83.0	39.6	26.4	15.9

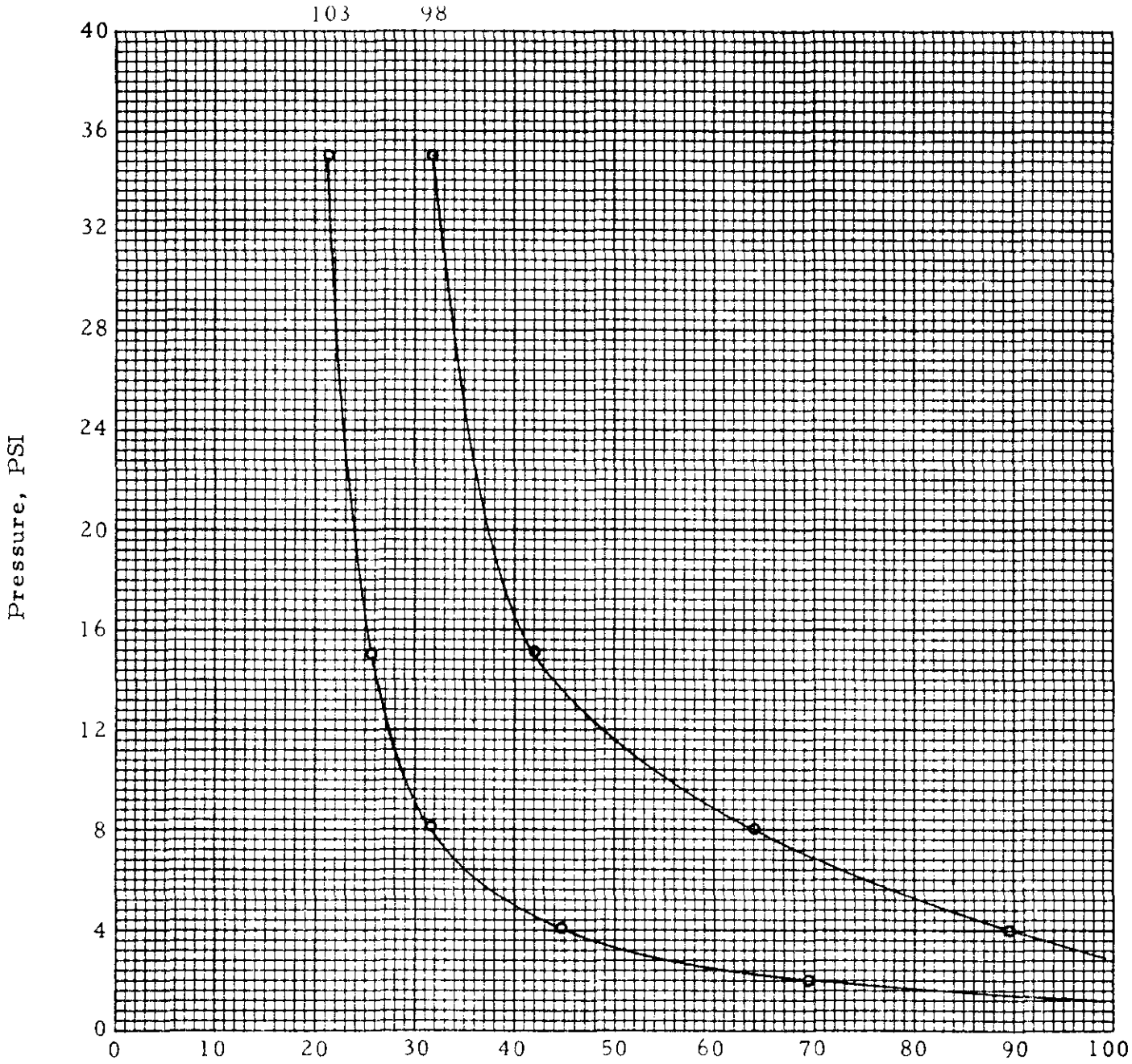
Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 County Northwest Territories
Field Stopover State Canada

Sample Number:	88	50A
Permeability, Md.:	130	1.2



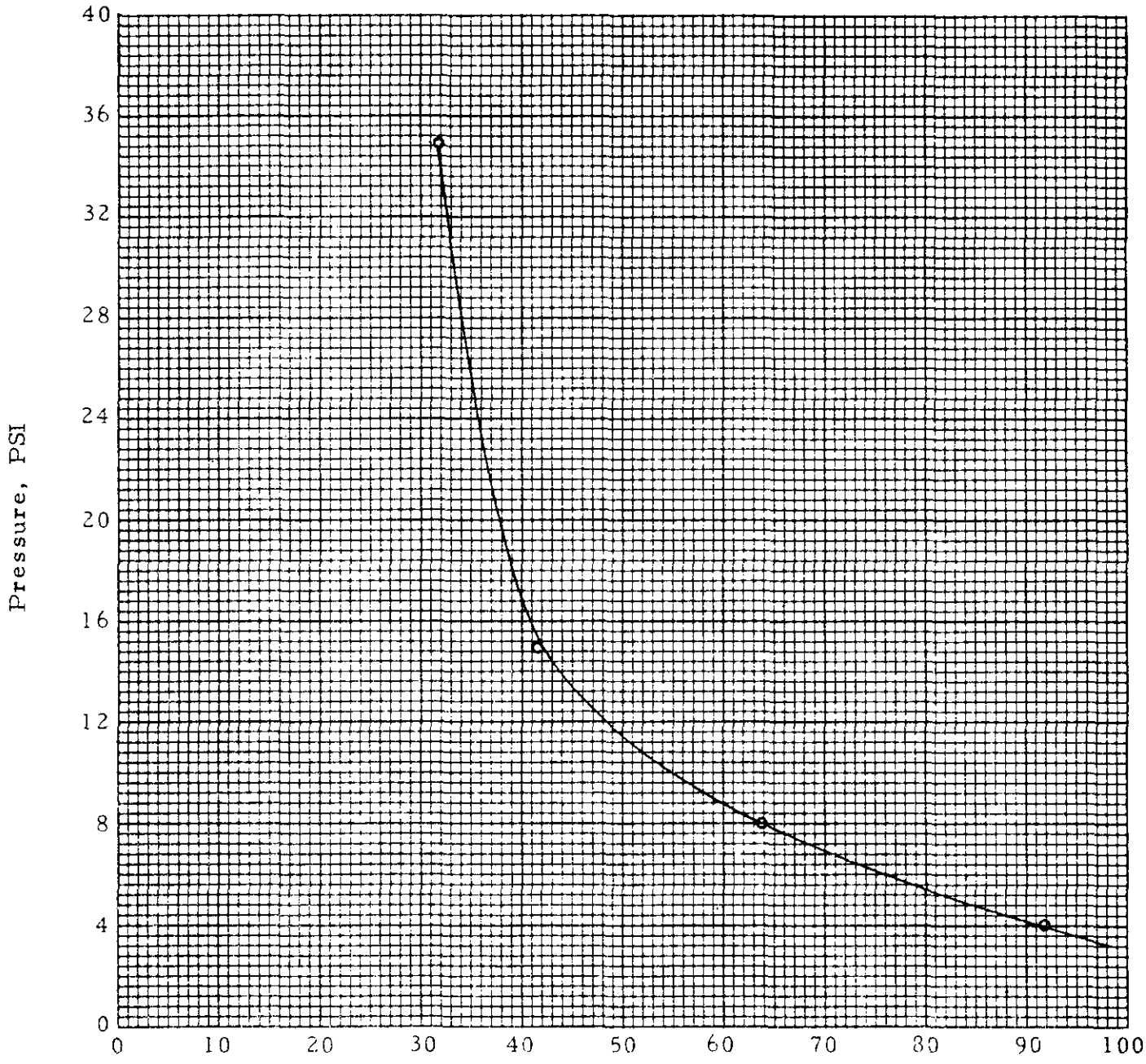
Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 County Northwest Territories
Field Stopover State Canada

Sample Number:	103	98
Permeability, Md.:	118	12



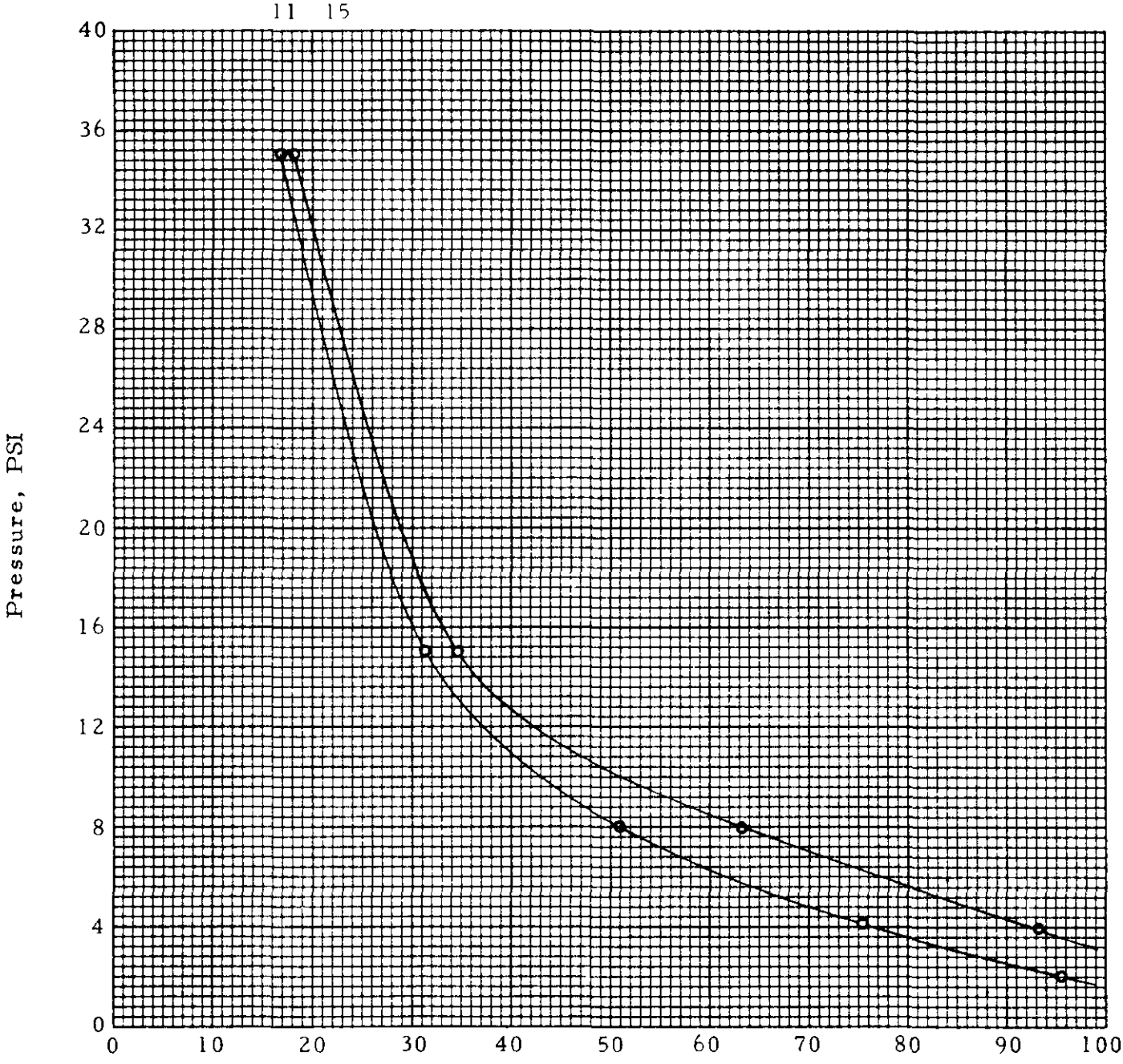
Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 County Northwest Territories
Field Stopover State Canada

Sample Number: 115
Permeability, Md.: 1.7



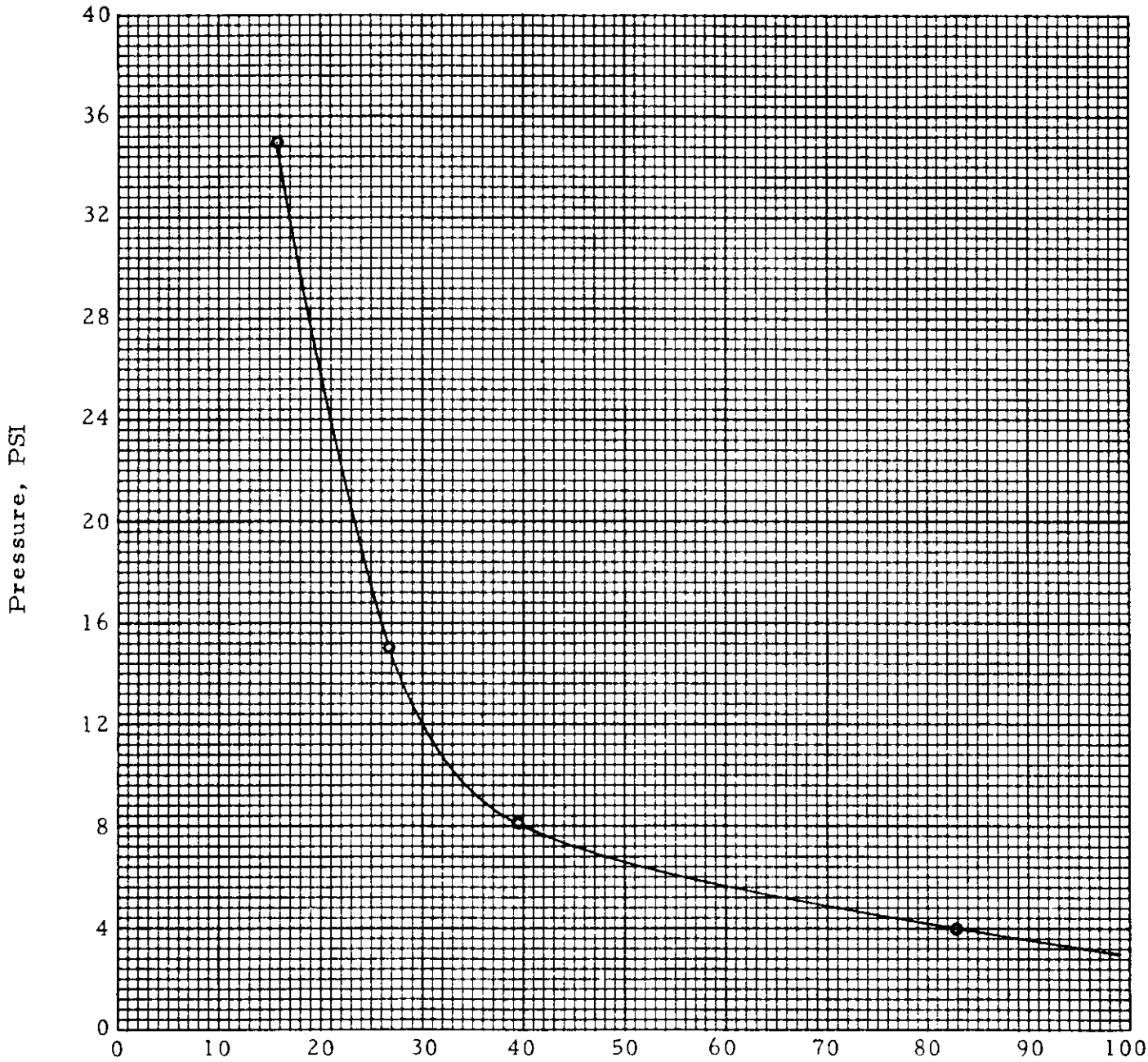
Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D45 County Northwest Territories
Field Colville State Canada

Sample Number:	11	15
Permeability, Md.:	12	7.3



Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 County Northwest Territories
Field Colville State Canada

Sample Number: 18
Permeability, Md.: 20



Formation Factor and Resistivity Index Data

Stopover Field

Resistivity of Saturating Brine, Ohm-Meters: 0.253 @ 71°F.

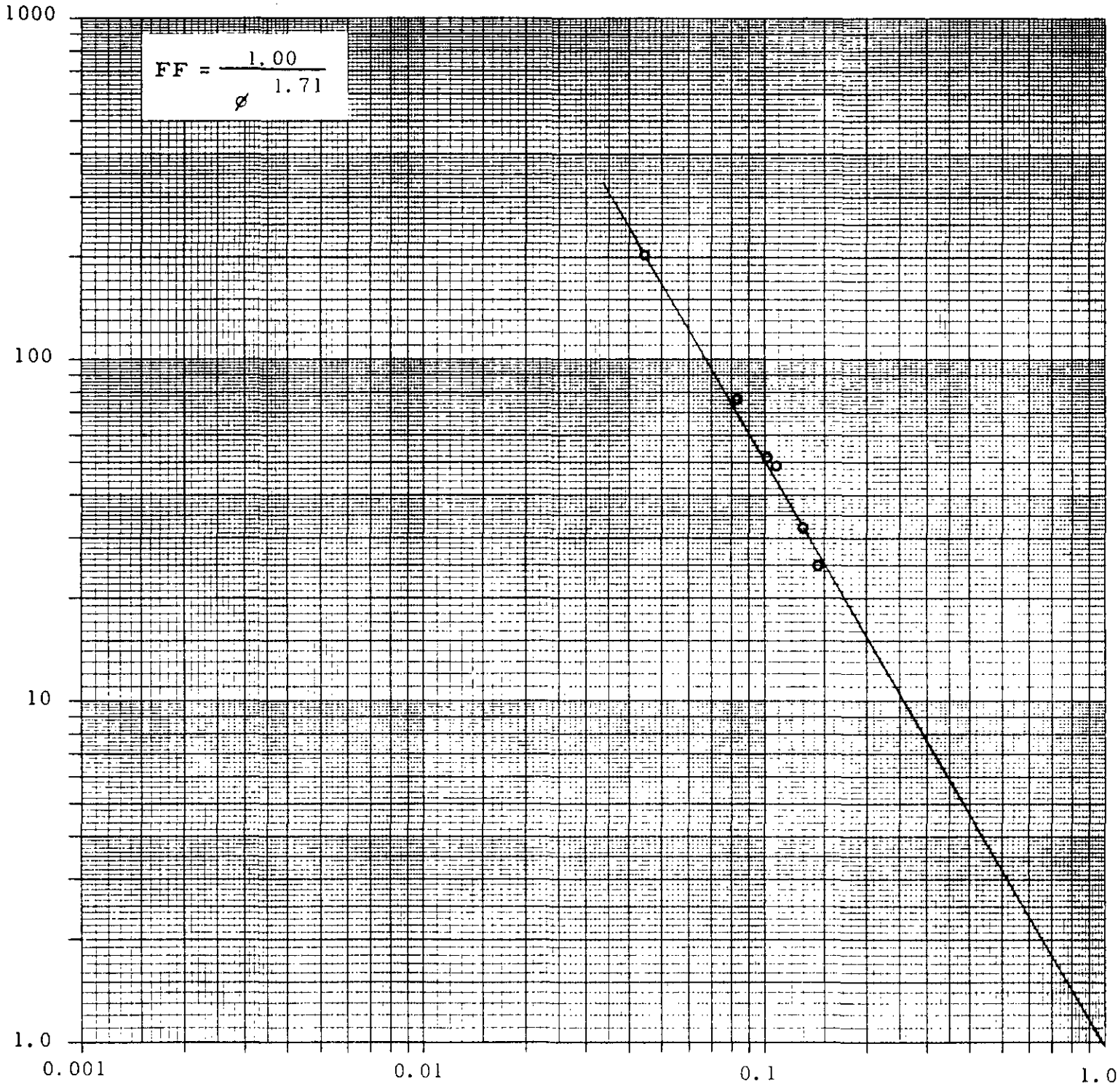
Sample Number	Porosity, Per Cent	Formation Factor	Brine Saturation, Per Cent Pore Space	Resistivity Index
50A	8.3	76.1	100.0	1.00
			70.3	2.13
88	12.8	32.1	100.0	1.00
			15.6	9.29
98	10.1	51.8	100.0	1.00
			31.9	5.98
103	14.4	24.8	100.0	1.00
113	4.5	201	100.0	1.00
115	10.8	49.7	100.0	1.00

Colville Field

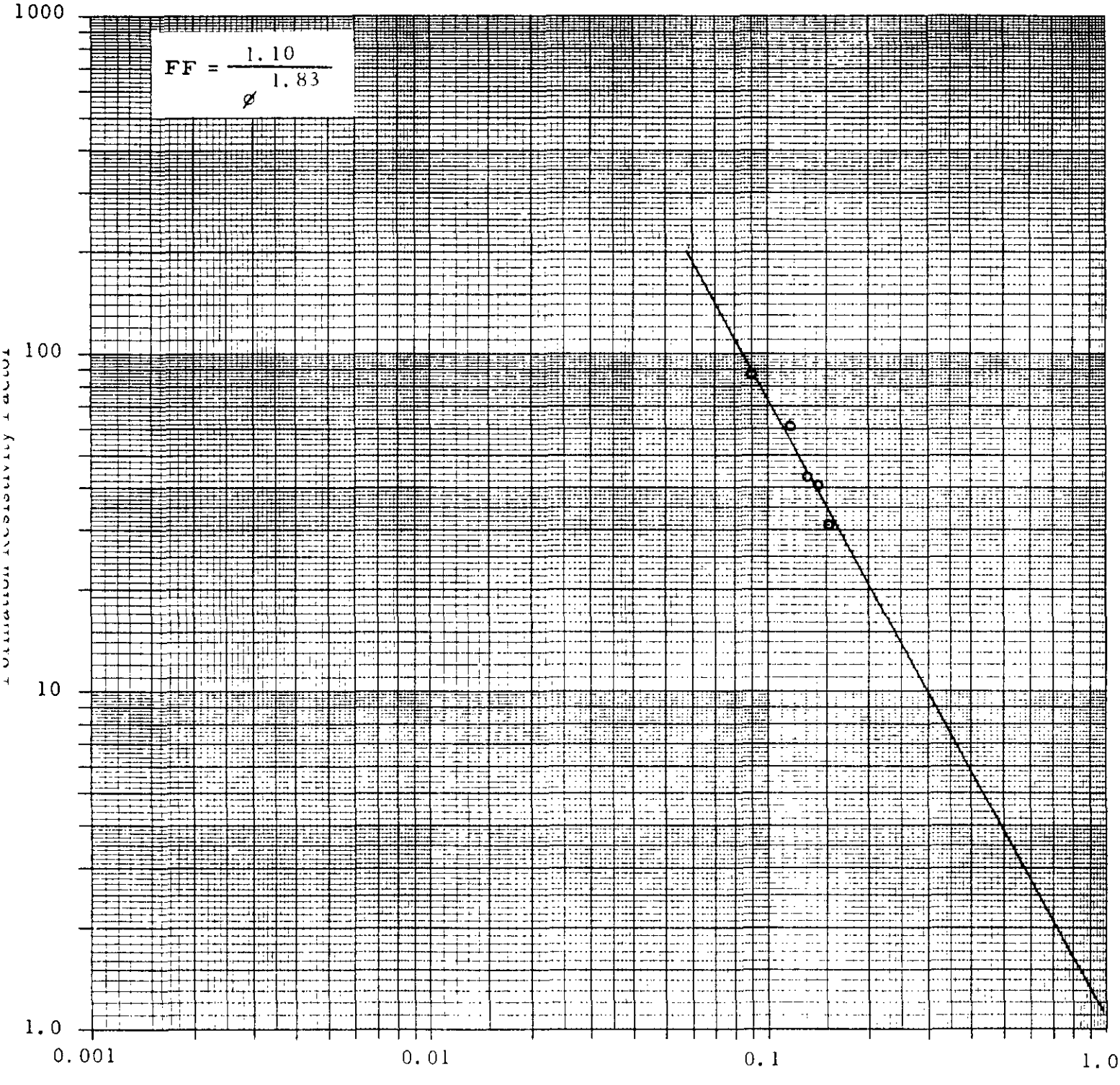
Resistivity of Saturating Brine, Ohm-Meters: 0.120 @ 74°F.

1	11.7	60.8	100.0	1.00
			80.5	1.89
10	9.0	87.0	100.0	1.00
11	14.0	41.2	100.0	1.00
15	13.2	43.2	100.0	1.00
			18.0	12.0
18	15.1	31.1	100.0	1.00
			15.9	23.3

Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 County Northwest Territories
Field Stopover State Canada

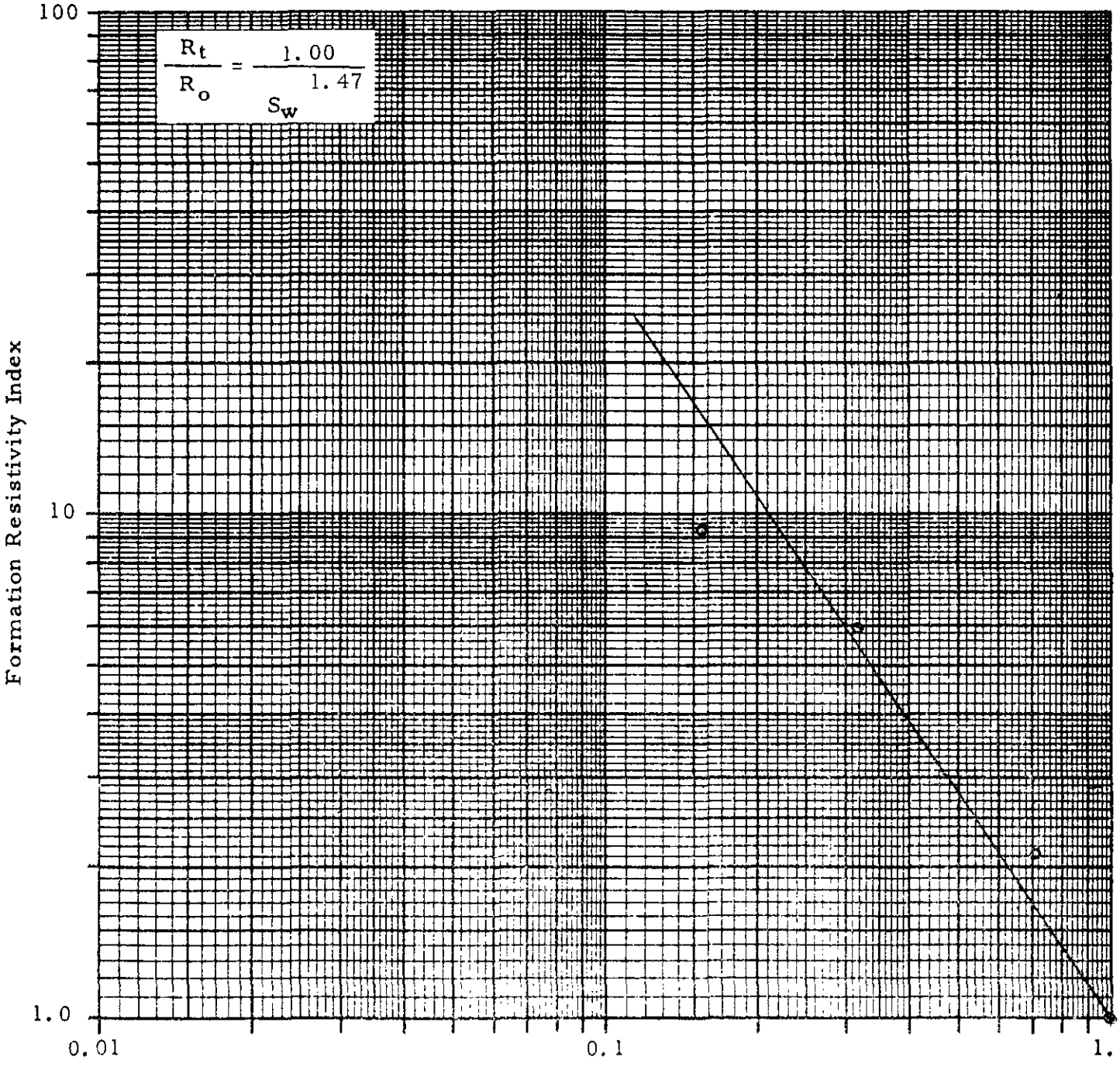


Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 County Northwest Territories
Field Colville State Canada



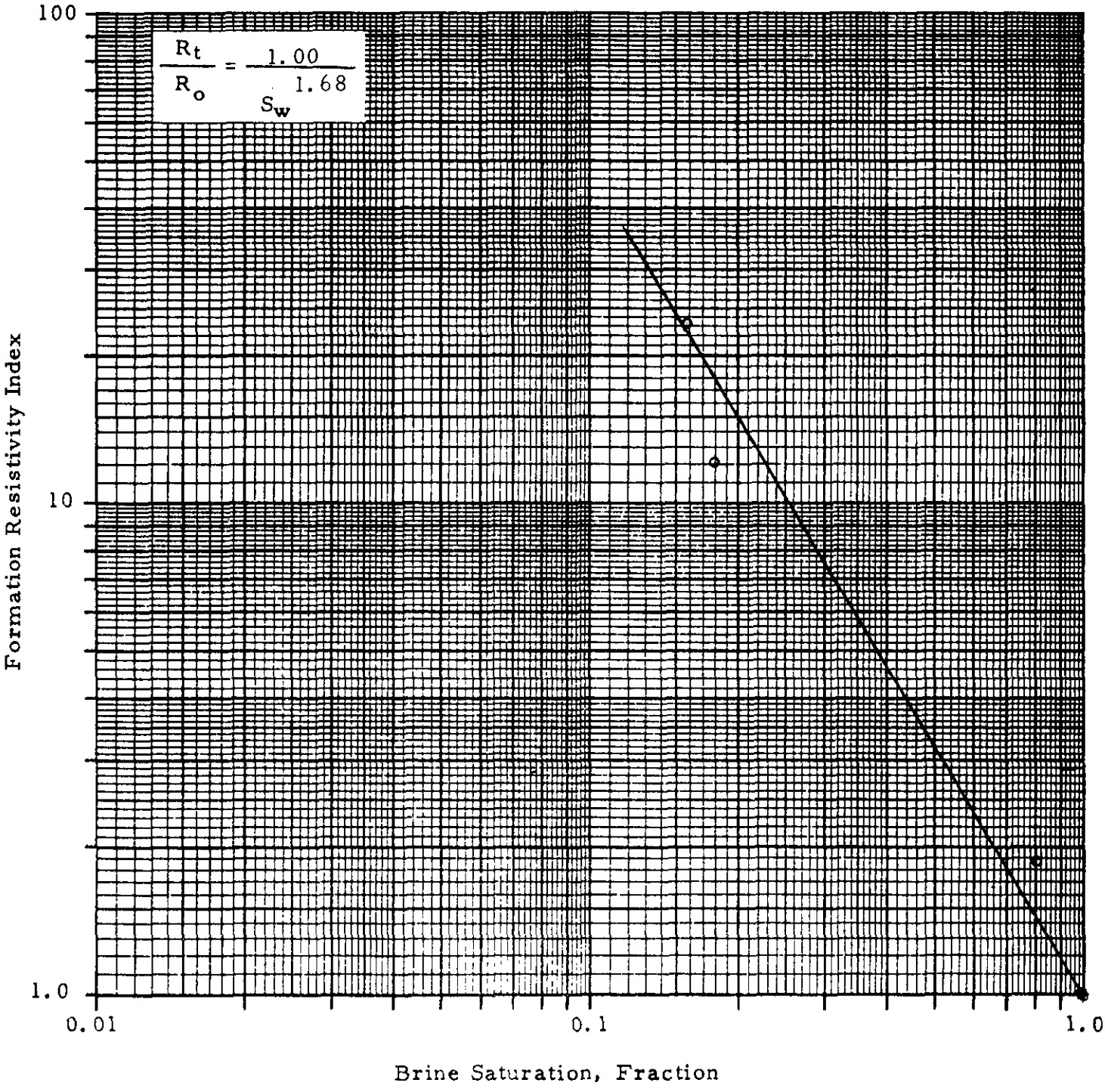
Company Union Oil Co. of Canda — Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 — County Northwest Territories
Field Stopover — State Canada

Composite



Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 County Northwest Territories
Field Colville State Canada

Composite



Stopover Field

Mercury Injection Capillary Pressure Data

Sample Number:	45	50	70	89	98A	103A
Permeability, Md.:	0.033	0.28	1.3	233	5.5	60
Porosity, Per Cent:	5.6	6.6	13.7	13.2	9.7	14.6
Injection Pressure, PSIA	Wetting Phase Saturation, Per Cent Pore Space					
3	100.0	100.0	100.0	93.0	100.0	100.0
6	100.0	100.0	100.0	71.9	100.0	100.0
9	100.0	100.0	100.0	55.8	100.0	96.9
12	100.0	100.0	100.0	44.1	100.0	85.6
15	100.0	100.0	100.0	38.3	100.0	74.4
18	100.0	100.0	100.0	32.8	100.0	62.9
21	100.0	100.0	100.0	30.1	100.0	57.2
24	100.0	100.0	100.0	27.6	100.0	52.4
27	100.0	100.0	100.0	25.7	100.0	48.9
30	100.0	100.0	100.0	24.5	98.2	46.4
40	100.0	100.0	98.6	21.4	88.0	39.5
60	100.0	100.0	94.0	17.8	67.7	32.7
80	100.0	100.0	89.9	15.8	57.4	30.0
100	100.0	96.6	84.9	14.4	51.0	28.2
200	100.0	73.2	63.5	10.7	39.8	24.2
300	100.0	62.6	54.0	8.7	34.1	22.4
500	91.7	45.5	44.0	6.3	27.7	19.6
750	72.0	34.2	35.6	4.5	23.2	17.2
1000	55.6	28.3	29.3	4.2	20.8	15.0
1250	44.5	23.5	24.9	2.8	19.1	14.5
1500	34.5	21.4	21.9	2.7	18.1	12.2

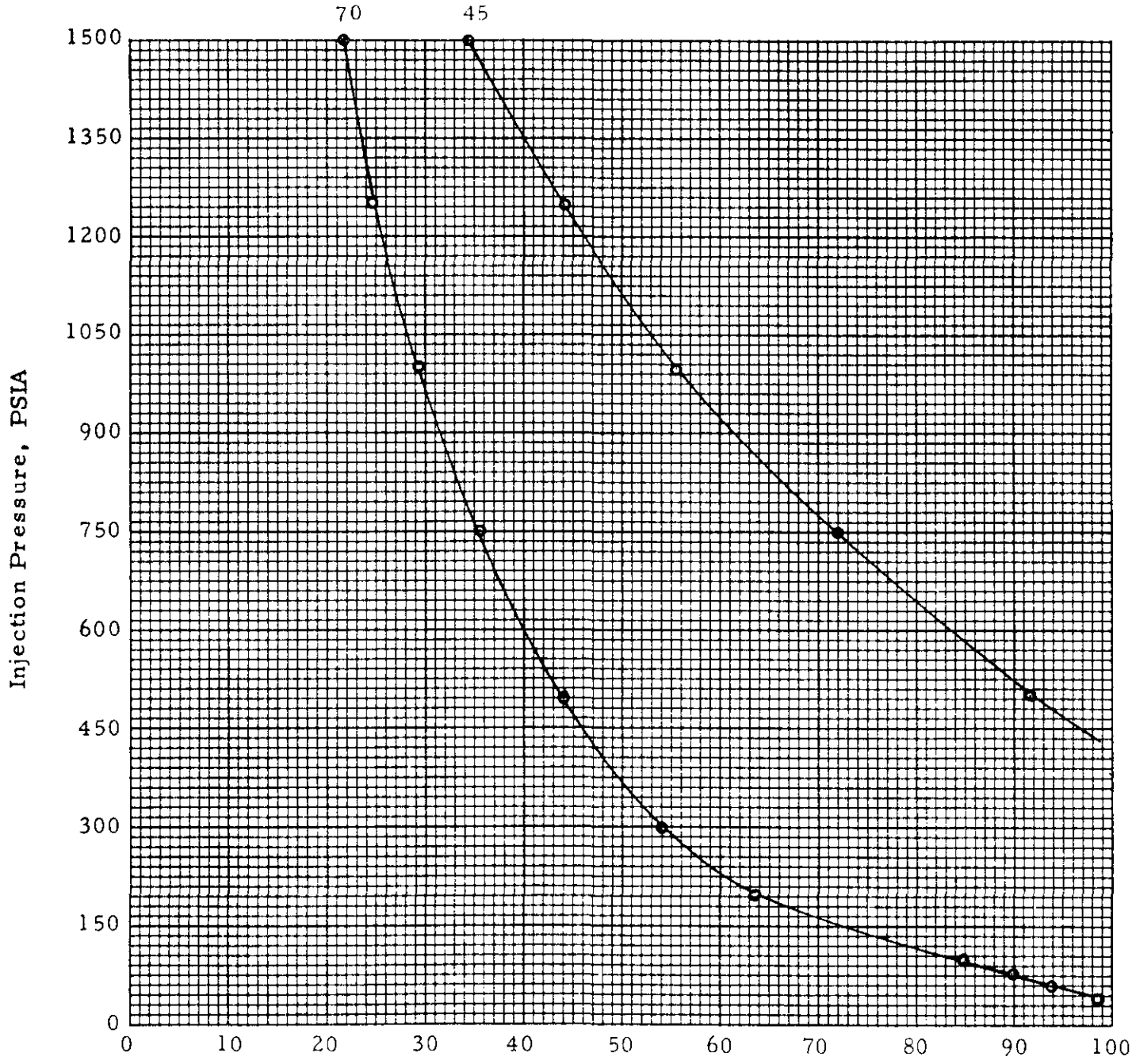
Colville Field

Mercury Injection Capillary Pressure Data

Sample Number:	4	9	11	12	18
Permeability, Md.:	0.56	0.035	18	82	25
Porosity, Per Cent:	11.8	7.9	13.9	12.6	14.6
Injection Pressure, PSIA	Wetting Phase Saturation, Per Cent Pore Space				
3	100.0	100.0	100.0	100.0	100.0
6	100.0	100.0	100.0	100.0	100.0
9	100.0	100.0	100.0	100.0	100.0
12	100.0	100.0	100.0	100.0	100.0
15	100.0	100.0	95.4	100.0	100.0
18	100.0	100.0	89.0	98.5	100.0
21	100.0	100.0	83.9	96.1	95.8
24	100.0	100.0	79.9	92.1	85.1
27	100.0	100.0	76.1	90.4	75.9
30	100.0	100.0	73.5	87.6	67.8
40	100.0	100.0	64.7	77.7	51.3
60	100.0	100.0	55.1	65.6	42.0
80	100.0	100.0	48.1	57.3	36.0
100	100.0	100.0	43.2	51.8	31.8
200	73.7	100.0	30.3	38.6	23.2
300	63.7	100.0	24.0	31.3	18.8
500	54.3	100.0	16.8	24.1	13.5
750	46.6	100.0	14.1	20.3	10.9
1000	40.7	78.2	12.2	17.5	9.8
1250	35.5	69.9	10.6	14.5	8.8
1500	31.4	60.5	10.2	13.8	8.7

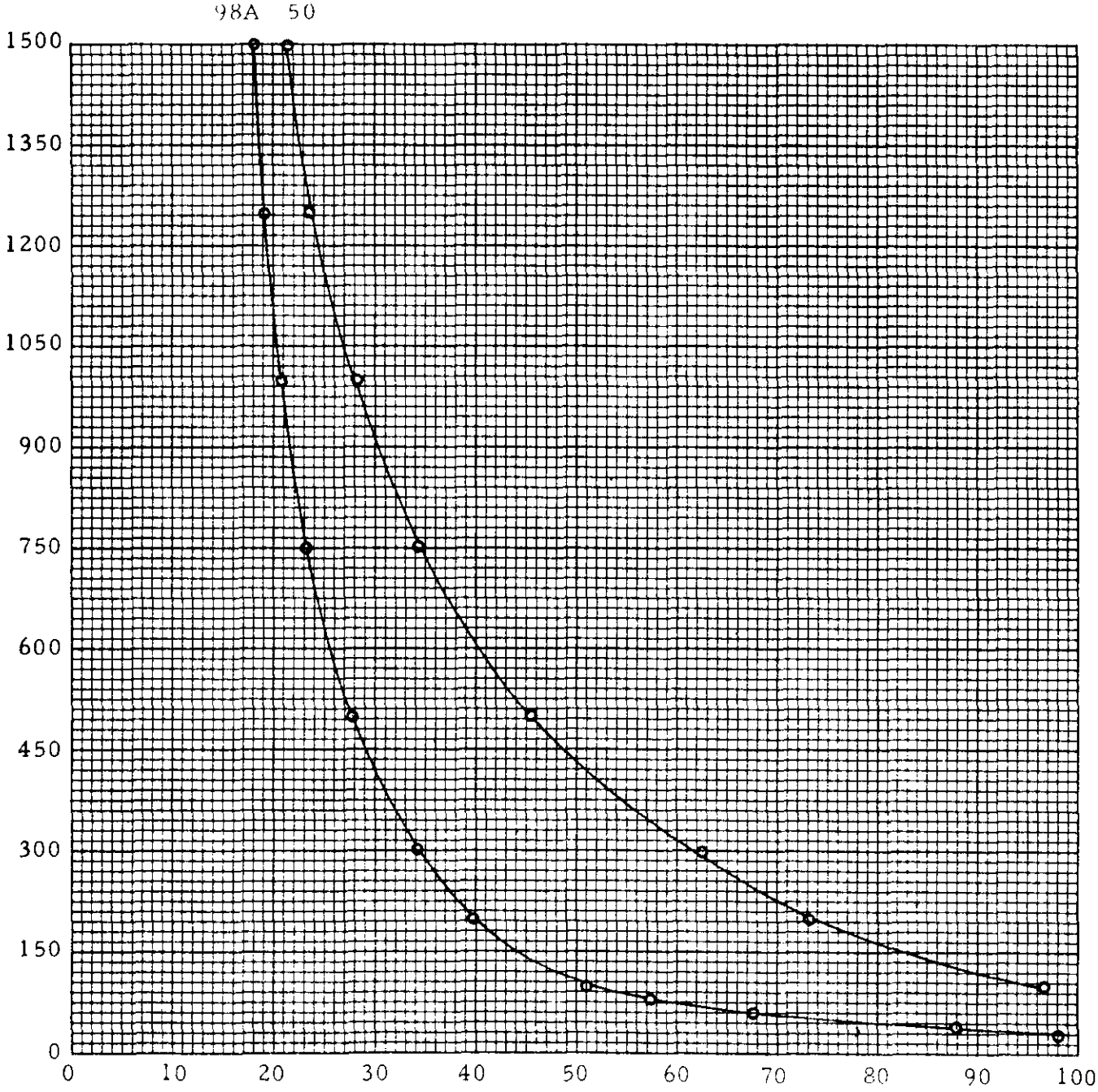
Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 County Northwest Territories
Field Stopover State Canada

Sample Number:	70	45
Permeability, Md.:	1.3	0.033



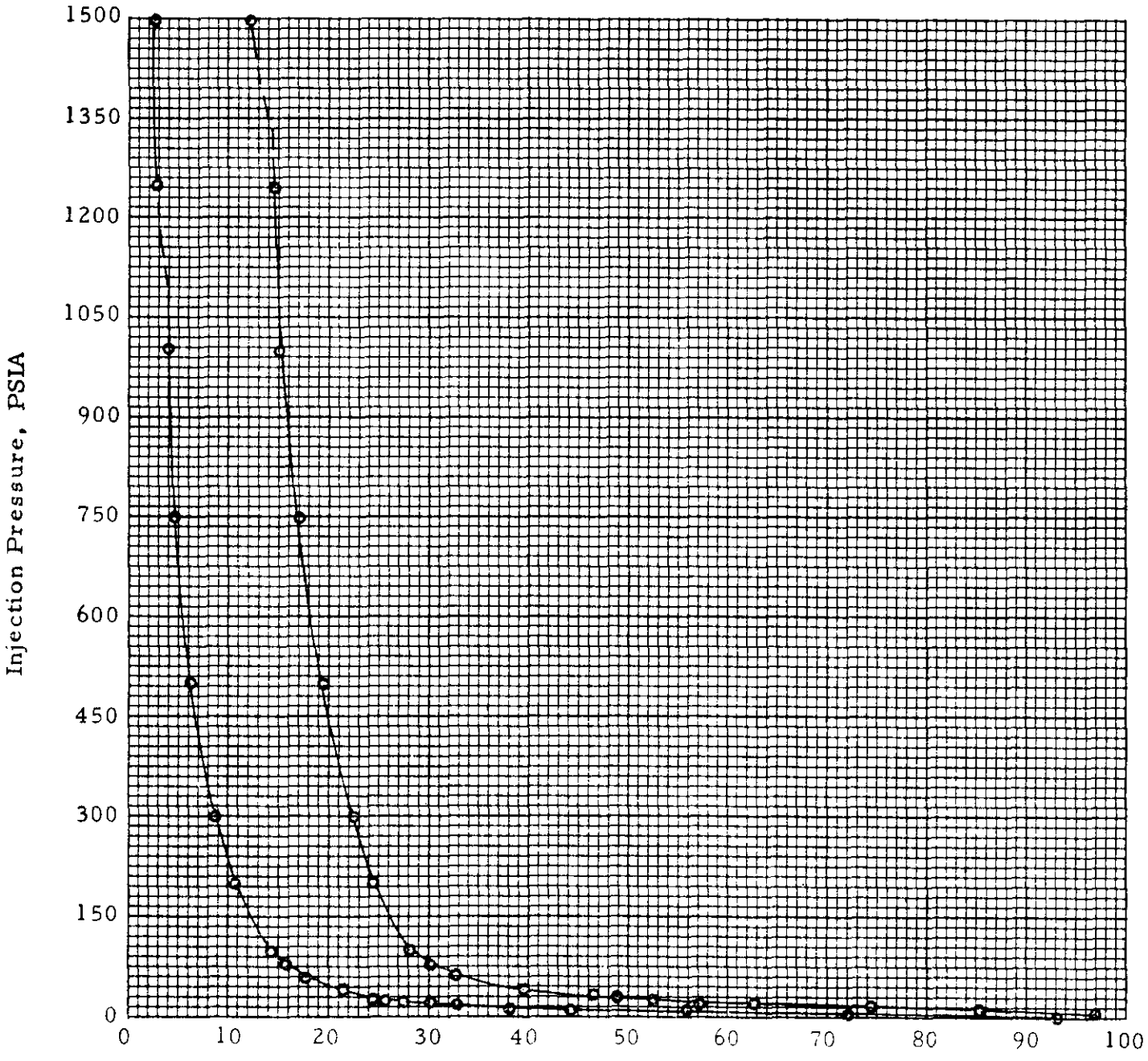
Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 County Northwest Territories
Field Stopover State Canada

Sample Number:	98A	50
Permeability, Md.:	5.5	0.28



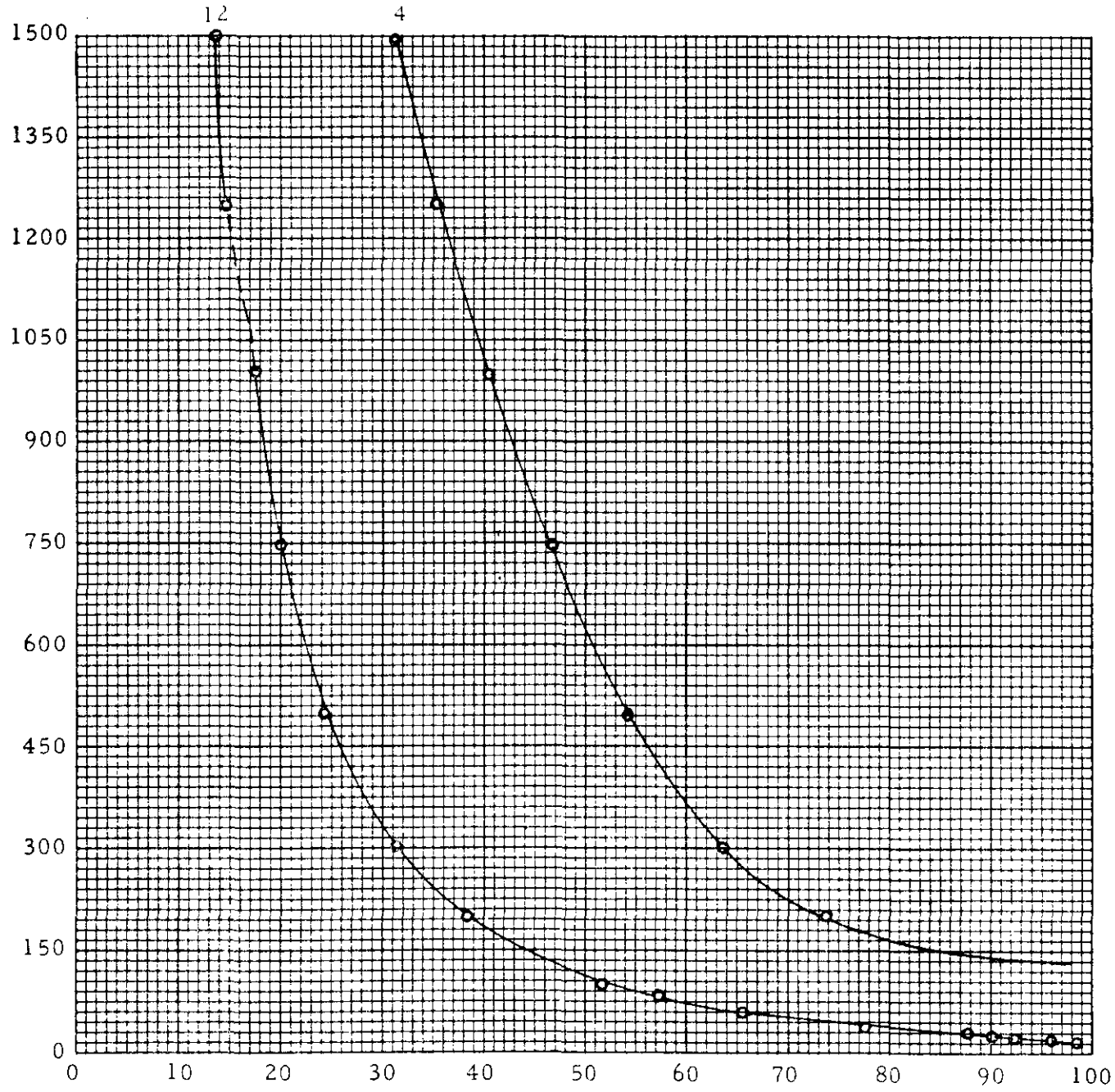
Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 County Northwest Territories
Field Stopover State Canada

Sample Number:	89	103A
Permeability, Md.:	233	60



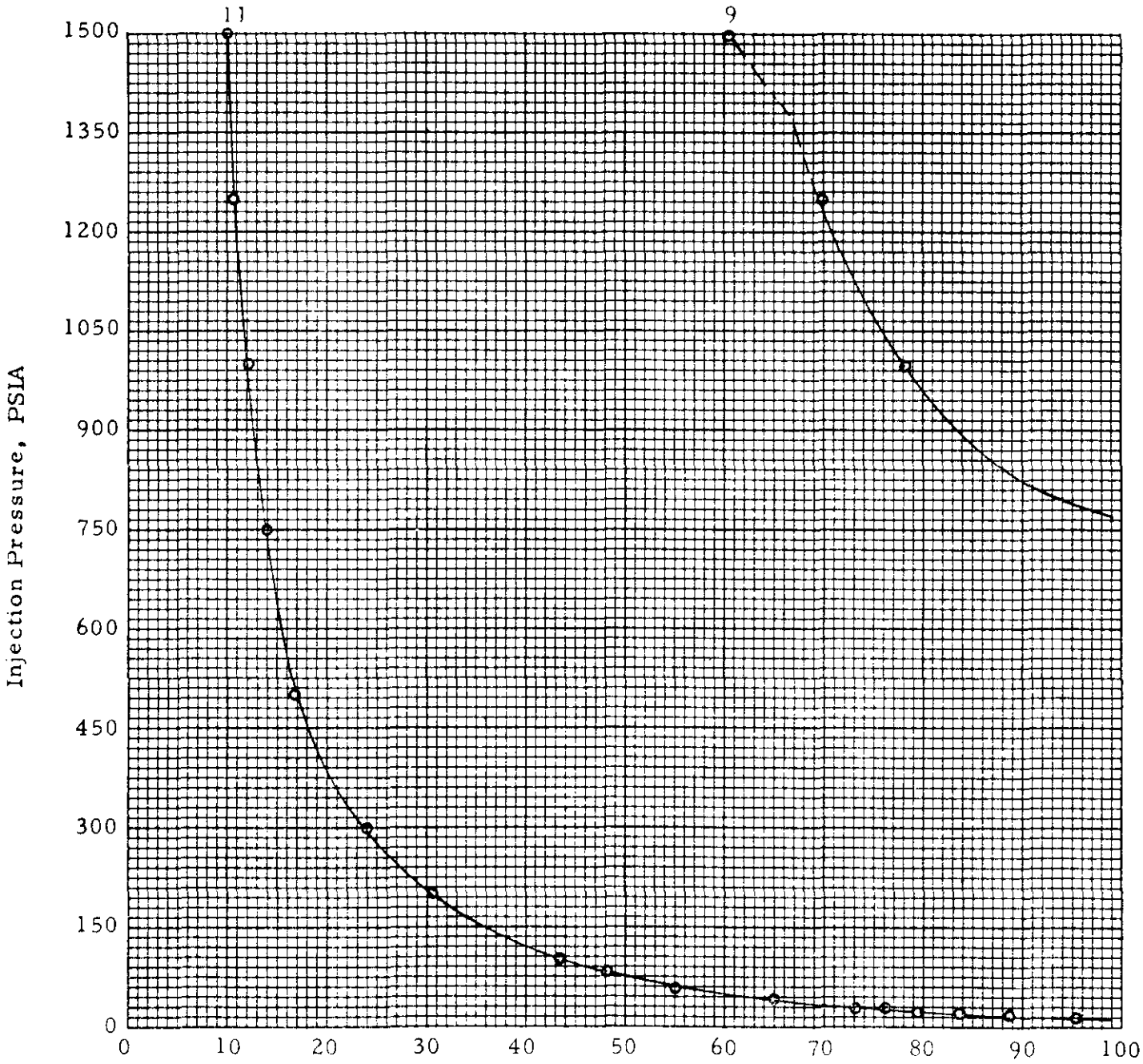
Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 County Northwest Territories
Field Colville State Canada

Sample Number:	12	4
Permeability, Md.:	8.2	0.56



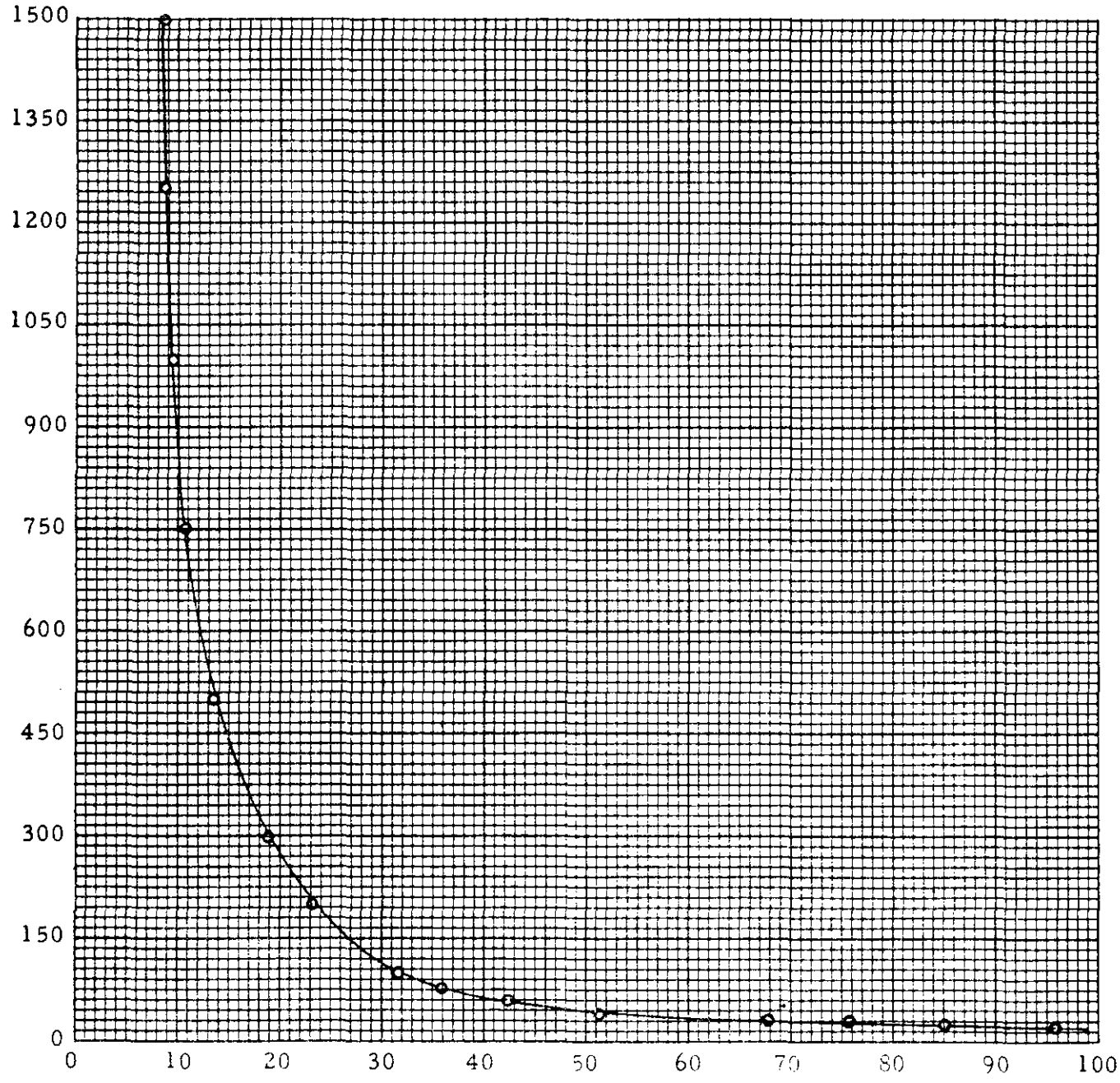
Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 County Northwest Territories
Field Colville State Canada

Sample Number:	11	9
Permeability, Md.:	18	0.035



Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 & Colville D-45 County Northwest Territories
Field Colville State Canada

Sample Number: 18
Permeability, Md.: 25



SCAL-75150
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CORE LAB

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Special Core Analysis Study

for

UNION OIL COMPANY OF CANADA LIMITED

Stopover K-44 and Colville D-45 Wells

Northwest Territories, Canada

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

March 25, 1976

Union Oil Company of Canada Limited
P. O. Box 999
Calgary, Alberta T2P 2K6
Canada

Attention: Mr. Lorne D. McCluskey

Subject: Special Core Analysis Study
Stopover K-44 and Colville D-45 Wells
Northwest Territories, Canada
File Number: SCAL-75150

Gentlemen:

In letters dated April 25, 1975, June 2, 1975, and June 16, 1975 from Lorne D. McClusky, Core Laboratories, Inc., was requested to perform: (1) Water-Oil Relative Permeability Tests, (2) Mercury Injection Tests, (3) Capillary Pressure Tests, (4) Formation Resistivity Factor Measurements, and (5) Formation Resistivity Index Measurements on sandstone core plugs from the subject wells. The results of the water-oil relative permeability tests are presented herein. The remaining tests are in progress and test results will be submitted as the data becomes available. The core plugs used in this study are identified as to well, sample number, and depth interval on Page 1 and are lithologically described on Page 2.

Fifteen core plugs and nine slabbed well cores were submitted for use in this study. Core plugs, 1-inch in diameter, were drilled from the nine slabbed cores using a diamond core bit with water as the bit coolant and lubricant. All core plugs were extracted of hydrocarbons with toluene, leached of salt with methyl alcohol, and then dried. Air permeabilities and Boyle's law porosities were determined on the cleaned and dried core plugs. The results of the permeability and porosity determinations were submitted to a representative of Union Oil Company of

Canada Limited. Based on the permeability and porosity determinations, core plugs were selected for further testing.

Eleven core plugs, six from the Stopover well and five from the Colville well, were evacuated and saturated with either a simulated Stopover formation water or a simulated Colville formation water. Initial (pseudo-connate) water saturations which averaged 13.0 per cent pore space for the Colville D-45 well and 21.5 per cent pore space for the Stopover K-44 well were established using a centrifugal technique. Effective permeabilities to oil were measured in the presence of the initial water saturations. One core plug from each well contained insufficient permeability for further testing and was deleted from the testing program. Water-oil relative permeability tests were performed using the proper injection water. The results of the water-oil relative permeability tests are summarized by well on Page 3, presented in tabular form on Pages 4 through 11, and in graphical form on Pages 12 through 27.

Because of the limited oil production following water breakthrough for Sample 115, insufficient data was available to calculate the relative permeability characteristics. The results of this test are summarized on Page 3 with the water-oil relative permeability data; however, only end-point data is presented.

The properties of the fluids used in the water-oil relative permeability tests are listed below for your convenience.

Fluid	Temperature, °F.	Density, gm/cc.	Viscosity, Centipoises
Refined Mineral Oil	70	0.8348	20.6
	90	0.8272	12.9
	110	0.8196	8.61
Simulated Colville Water	70	1.038	1.067
	90	1.035	0.845
	110	1.032	0.687
Simulated Stopover Water	70	1.023	1.026
	90	1.019	0.810
	110	1.014	0.653

The results of the tests on Samples 50A and 98 from the Stopover K-44 well indicate both channeling and plugging. The channeling is indicated by the rapid increase in the relative permeability-to-water curves (Pages 21 and 25) at the low water saturations and the plugging is indicated by the suppressed relative permeability-to-water curves at the high water saturations.

Should you have any questions pertaining to these test results, or if we can be of any assistance, please do not hesitate to contact us.

Very truly yours,

Core Laboratories, Inc.

Duane L. Archer (BB)

Duane L. Archer, Manager
Special Core Analysis

DLA:JWW:tl
10 cc. - Addressee

Company Union Oil Company of Canada Limited
Formation Old Fort Sand
Number of Wells Two
County Northwest Territories
Field As Noted
State Canada

Identification of Samples

Sample Number	Company	Well	Depth, Feet
		Stopover Field	
50A	Union Oil Co. of Canada Ltd.	Union Oil Stopover K-44	2784.1-85.0
88			2813.2-13.5
98			2820.8-21.9
103			2825.6-26.2
115			2834.3-34.9
		Colville Field	
1	Union Oil Co. of Canada Ltd.	Union Mobile Colville D-45	3183.2-83.7
11			3218.0-18.7
15			3223.0-23.4
18			3225.9-26.4

Lithological Description

Sample Number	Description
	Colville D-45
1	Ss, lt gry, v/fn-silt grn, apparent SiO_2 cement, well indurated, tr musc,pyrite
11	Ss, lt gry-white, fn-v/fn grn, apparent SiO_2 cement, mod-poor indurated, med grn laminar, tr musc
15	Ss, lt gry-white, fn-v/fn grn, apparent SiO_2 cement, mod-poor indurated, med grn laminae, tr musc
18	Ss, lt gry-white, fn-v/fn grn, apparent SiO_2 cement, mod-poor indurated, med grn laminae
	Stopover K-44
50A	Ss, red-brn, cse-v/fn grn, apparent SiO_2 cement, well indurated, cse grn concentrations
88	Ss, buff-white, med-fn grn, apparent SiO_2 cement, mod indurated, red-brn staining an upper portion
98	Ss, red-brn-buff white, med-fn grn, apparent SiO_2 cement, well indurated, blotchy color staining, grns uniform
103	Ss, red-brn, cse-fn grn, apparent SiO_2 cement, mod-poor indurated, blotchy color appearance
115	Ss, red-brn-buff white, med-fn grn, apparent SiO_2 cement, well indurated, blotchy color appearance

Summary of Waterflood Test Results

Sample Number	Depth, Feet	Air Permeability, Millidarcys	Porosity, Per Cent	Initial Conditions: Water Saturation, Per Cent Pore Space	Initial Conditions: Oil Permeability, Millidarcys	Terminal Conditions: Oil Saturation, Per Cent Pore Space	Terminal Conditions: Water Permeability, Millidarcys	Oil Recovered, Per Cent Pore Space	Oil Recovered, Per Cent Oil in Place
				Colville D-45					
1	3183.2-83.7	0.35	11.7	14.6	0.065	39.2	0.028	46.2	54.0
11	3218.0-18.7	12	14.0	13.8	8.5	49.3	6.4	36.9	42.8
15	3223.0-23.4	7.3	13.2	11.6	4.8	52.4	4.1	36.0	40.8
18	3225.9-26.4	20	15.1	11.9	10.5	38.8	8.8	49.3	55.9
				Stopover K-44					
50A	2784.1-85.0	1.2	8.3	28.7	0.67	52.4	0.001	18.9	26.6
88	2813.2-13.5	130	12.8	12.6	117	48.6	27	38.8	44.4
98	2820.8-21.9	12	10.1	25.8	9.0	55.3	0.15	18.9	25.5
103	2825.6-26.2	118	14.7	18.1	100	42.0	7.5	39.9	48.7
115*	2834.3-34.9	1.7	10.8	22.2	8.7	49.0	0.29	28.8	37.0

* Insufficient data for relative permeability calculation.

Water-Oil Relative Permeability Data

Sample Number 1
Air Permeability, Md. 0.35
Oil Permeability at Initial Water Saturation, Md. 0.065
Initial Water Saturation, Per Cent Pore Space 14.6
Porosity, Per Cent 11.7

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
14.6		.000	1.000
35.5	.070	.027	.388
43.2	.687	.103	.150
49.4	4.66	.205	.044
54.3	25.3	.304	.012
56.3	59.5	.345	.0058
58.6	216	.389	.0018
59.6	540	.405	.00075
60.8		.431	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

Sample Number 11
Air Permeability, Md. 12
Oil Permeability at
Initial Water Saturation, Md. 8.5

Initial Water Saturation,
Per Cent Pore Space 13.8
Porosity, Per Cent 14.0

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
13.8		.000	1.000
19.7	.098	.035	.355
23.4	.973	.178	.183
25.0	1.74	.240	.138
29.1	5.72	.389	.068
35.2	22.4	.538	.024
39.8	57.3	.617	.011
43.5	124	.661	.0053
45.5	188	.690	.0037
50.7		.746	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

Sample Number 15
Air Permeability, Md. 7.3
Oil Permeability at Initial Water Saturation, Md. 4.8
Initial Water Saturation, Per Cent Pore Space 11.6
Porosity, Per Cent 13.2

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
11.6		.000	1.000
16.6	.511	.225	.440
20.7	2.07	.420	.203
22.1	2.93	.468	.160
23.5	4.12	.515	.125
27.8	10.4	.617	.059
31.7	22.7	.680	.030
39.0	97.5	.780	.0080
41.3	162	.805	.0050
47.6		.850	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

Sample Number 18
Air Permeability, Md. 20
Oil Permeability at Initial Water Saturation, Md. 10.5

Initial Water Saturation, Per Cent Pore Space 11.9
Porosity, Per Cent 15.1

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
11.9		.000	1.000
24.2	.108	.038	.350
29.4	.723	.141	.195
32.0	1.43	.209	.146
36.3	4.00	.332	.083
42.5	15.0	.540	.036
44.9	23.0	.621	.027
47.3	36.5	.693	.019
50.0	58.4	.759	.013
53.1	87.9	.800	.0091
55.0	120	.825	.0069
61.2		.839	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

Sample Number 50A
Air Permeability, Md. 1.2
Oil Permeability at
Initial Water Saturation, Md. 0.67

Initial Water Saturation,
Per Cent Pore Space 28.7
Porosity, Per Cent 8.3

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
28.7		.000	1.000
30.4	.050	.0049	.098
32.5	1.00	.010	.010
34.5	4.33	.013	.0030
35.9	7.78	.014	.0018
38.4	17.2	.016	.00093
40.6	33.8	.017	.00051
43.0	59.8	.018	.00030
47.6		.019	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

Sample Number 88
Air Permeability, Md. 130
Oil Permeability at Initial Water Saturation, Md. 117
Initial Water Saturation, Per Cent Pore Space 12.6
Porosity, Per Cent 12.8

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
12.6		.000	1.000
19.1	.0080	.0049	.610
24.3	.068	.027	.399
28.5	.199	.055	.277
31.3	.369	.076	.206
35.5	.835	.106	.127
39.4	1.94	.132	.068
42.4	4.62	.157	.034
44.4	9.10	.173	.019
45.8	14.8	.183	.012
46.7	21.6	.190	.0088
48.5	53.9	.205	.0038
49.3	92.2	.211	.0023
51.4		.231	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

Sample Number 98
Air Permeability, Md. 12
Oil Permeability at Initial Water Saturation, Md. 9.0
Initial Water Saturation, Per Cent Pore Space 25.8
Porosity, Per Cent 10.1

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
25.8		.000	1.000
30.3	.040	.0078	.195
33.7	.214	.012	.056
38.3	1.52	.014	.0092
41.1	4.41	.015	.0034
43.1	16.7	.015	.0009
44.3	533	.016	.00003
44.7		.016	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

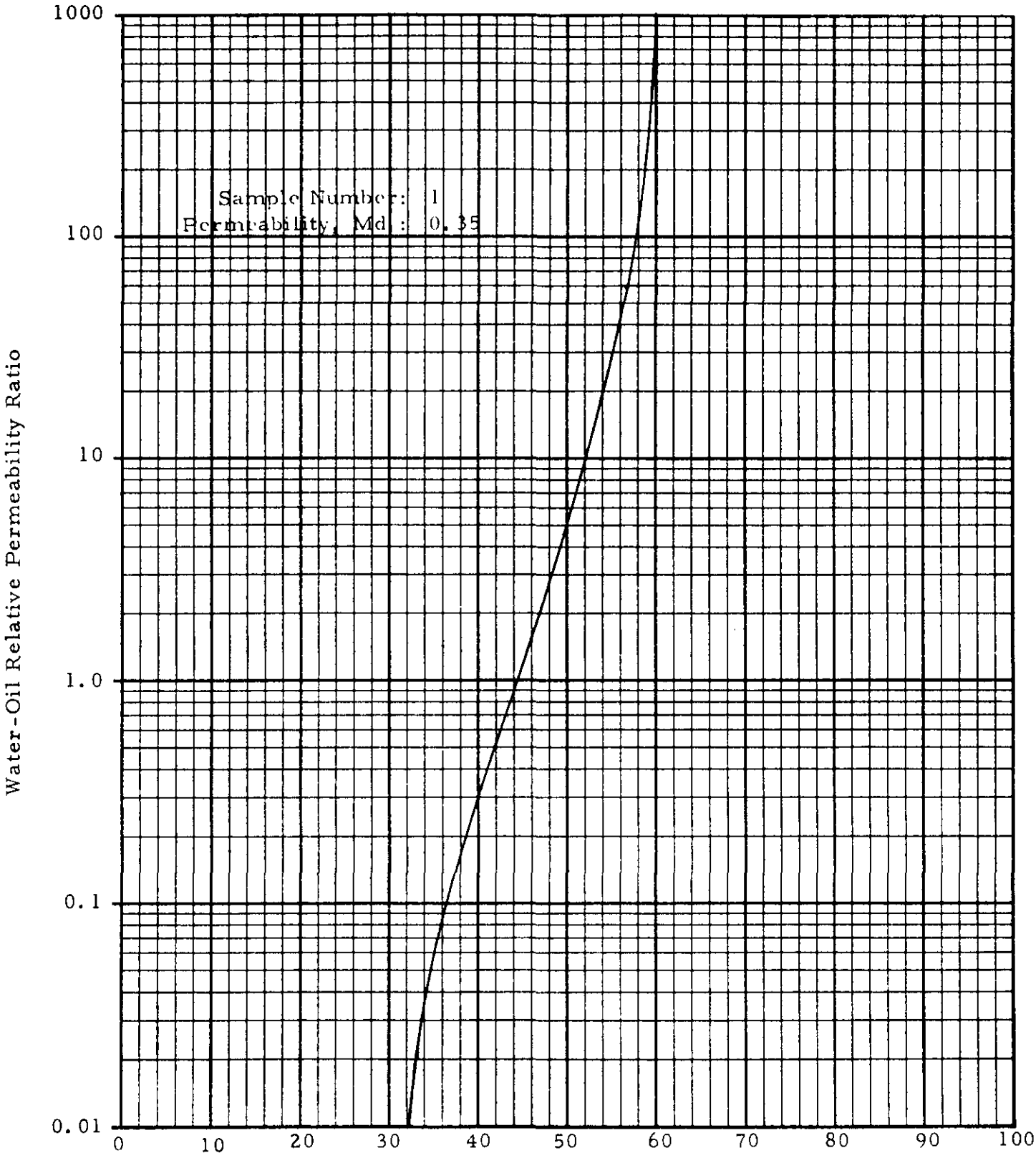
Sample Number 103
Air Permeability, Md. 118
Oil Permeability at Initial Water Saturation, Md. 100

Initial Water Saturation, Per Cent Pore Space 18.1
Porosity, Per Cent 14.7

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
18.1		.000	1.000
35.3	.0063	.0014	.221
41.2	.058	.0070	.121
47.3	.444	.024	.054
52.3	2.68	.045	.017
54.9	11.4	.057	.0050
55.9	35.8	.061	.0017
56.8	112	.067	.00060
57.3	260	.069	.00027
58.1		.075	

* Relative to oil permeability.

Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Union Mobile Colville D-45 County Northwest Territories
Field Colville State Canada



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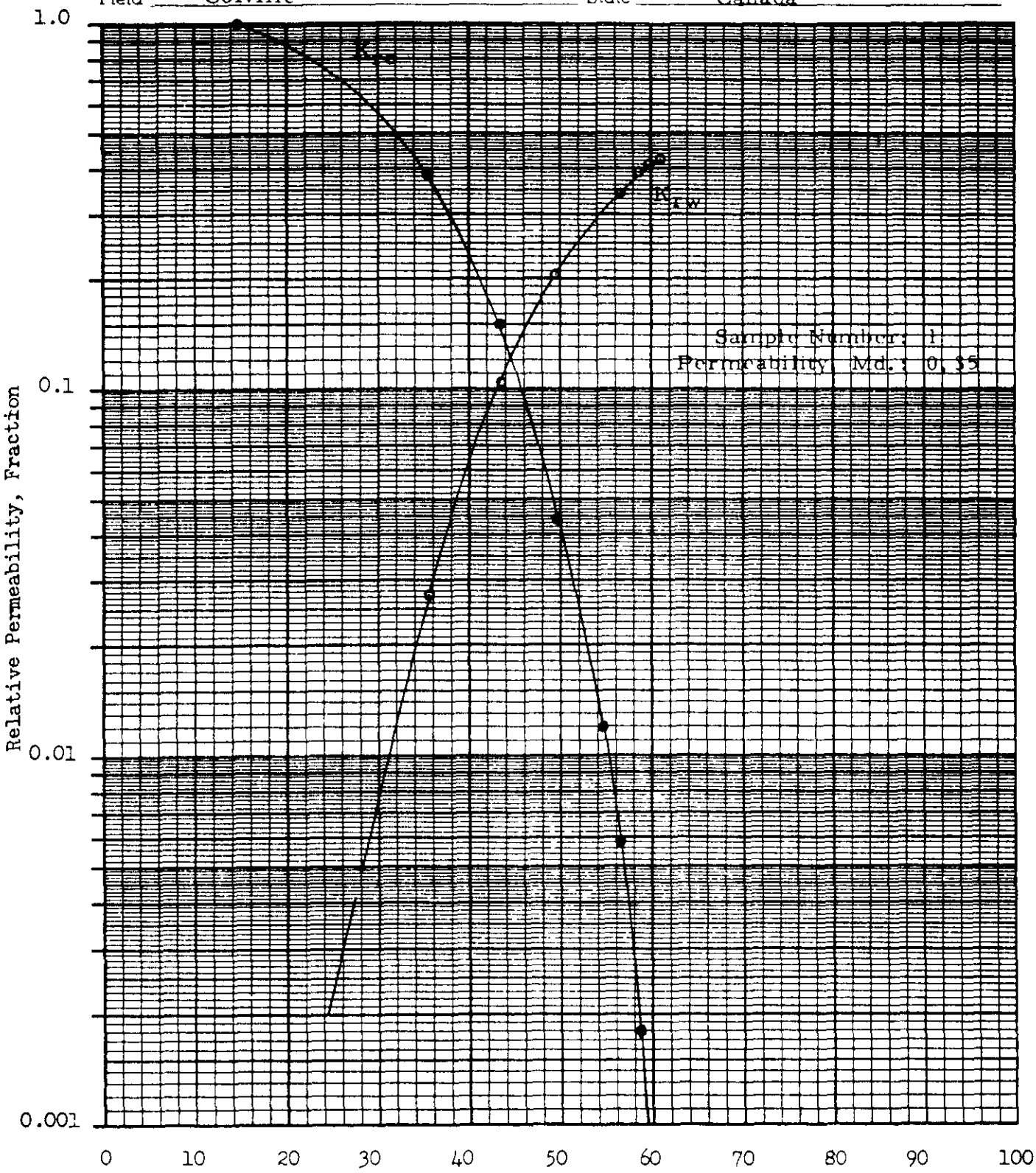
Field Colville State Canada



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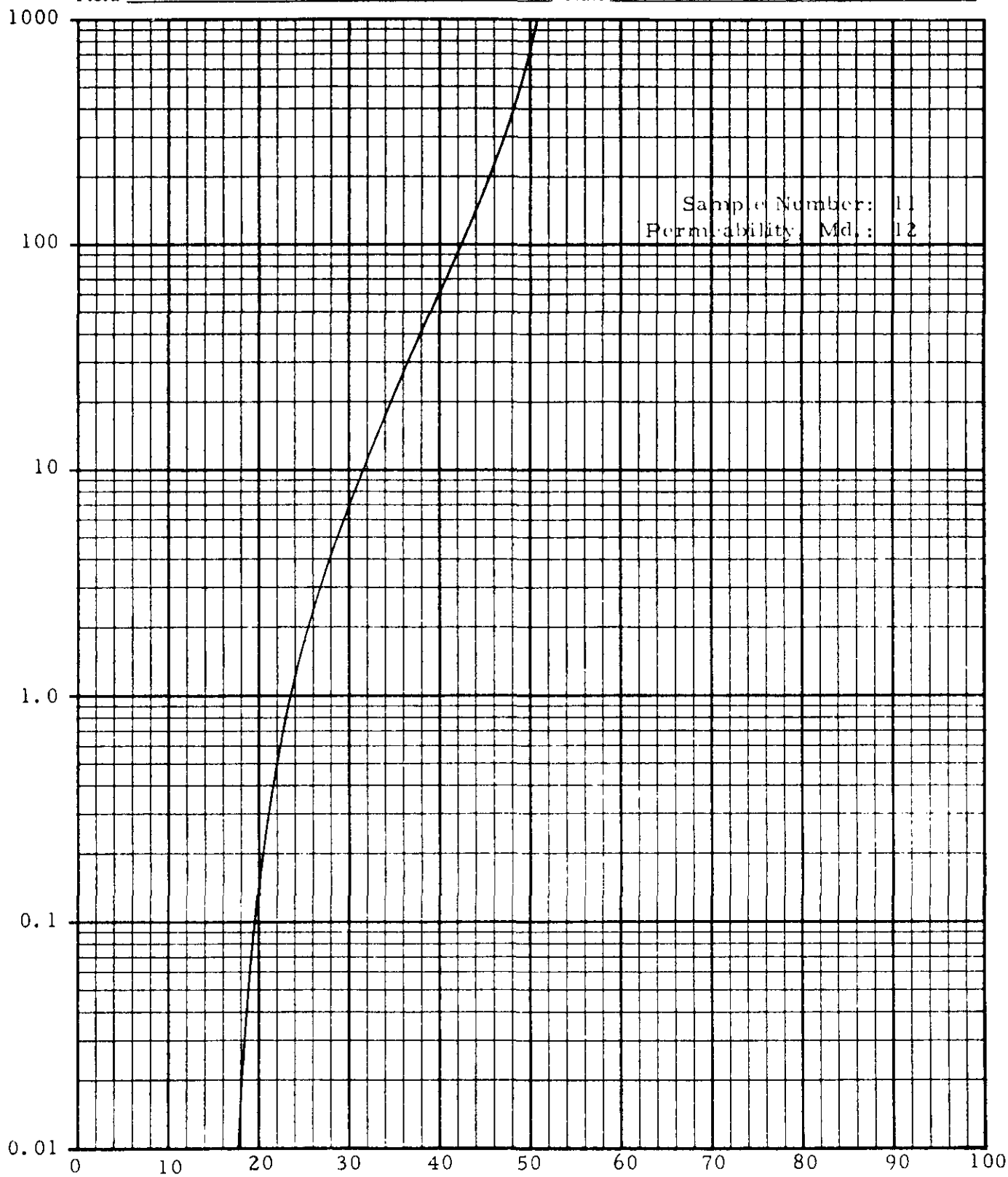

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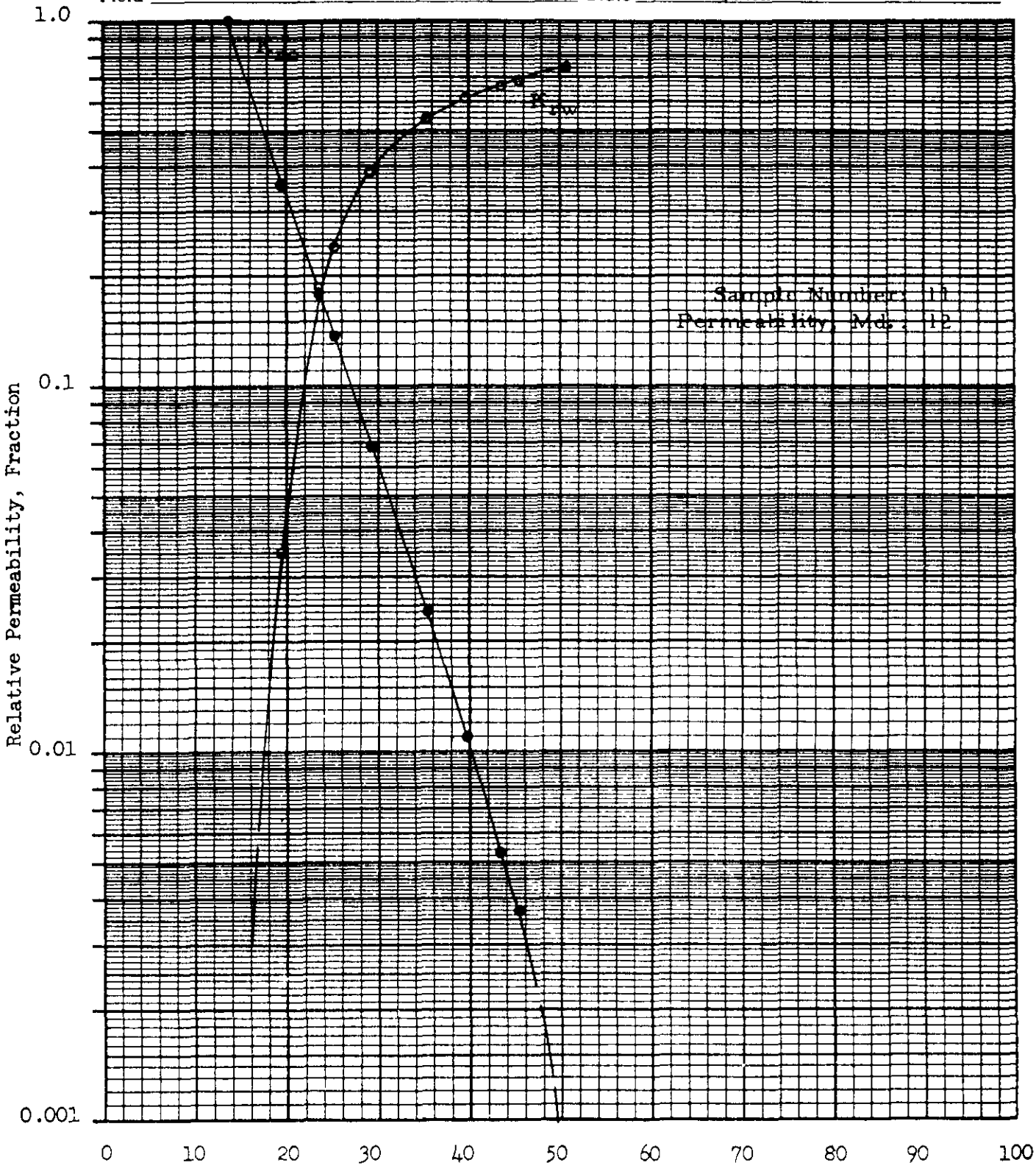

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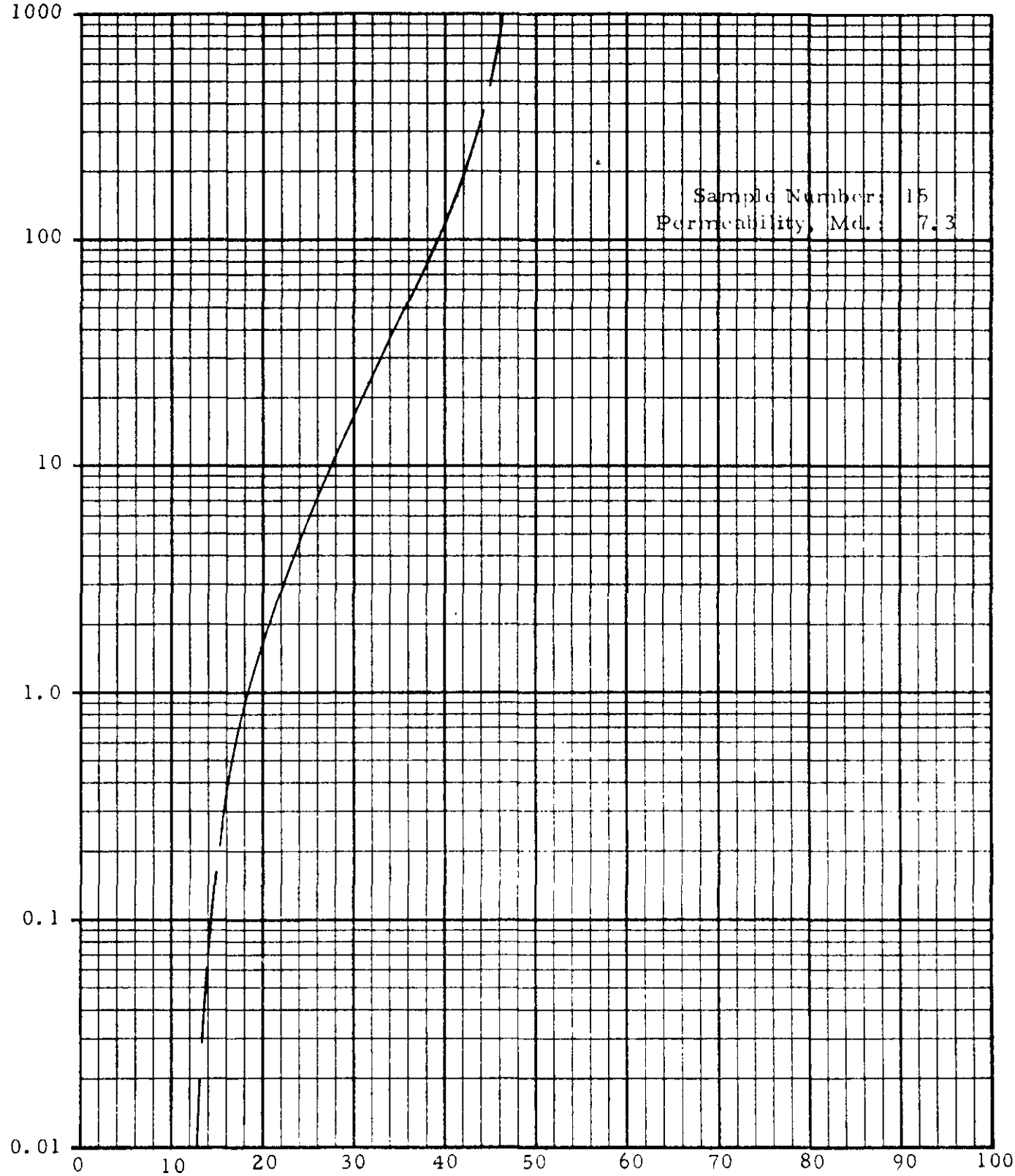

Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
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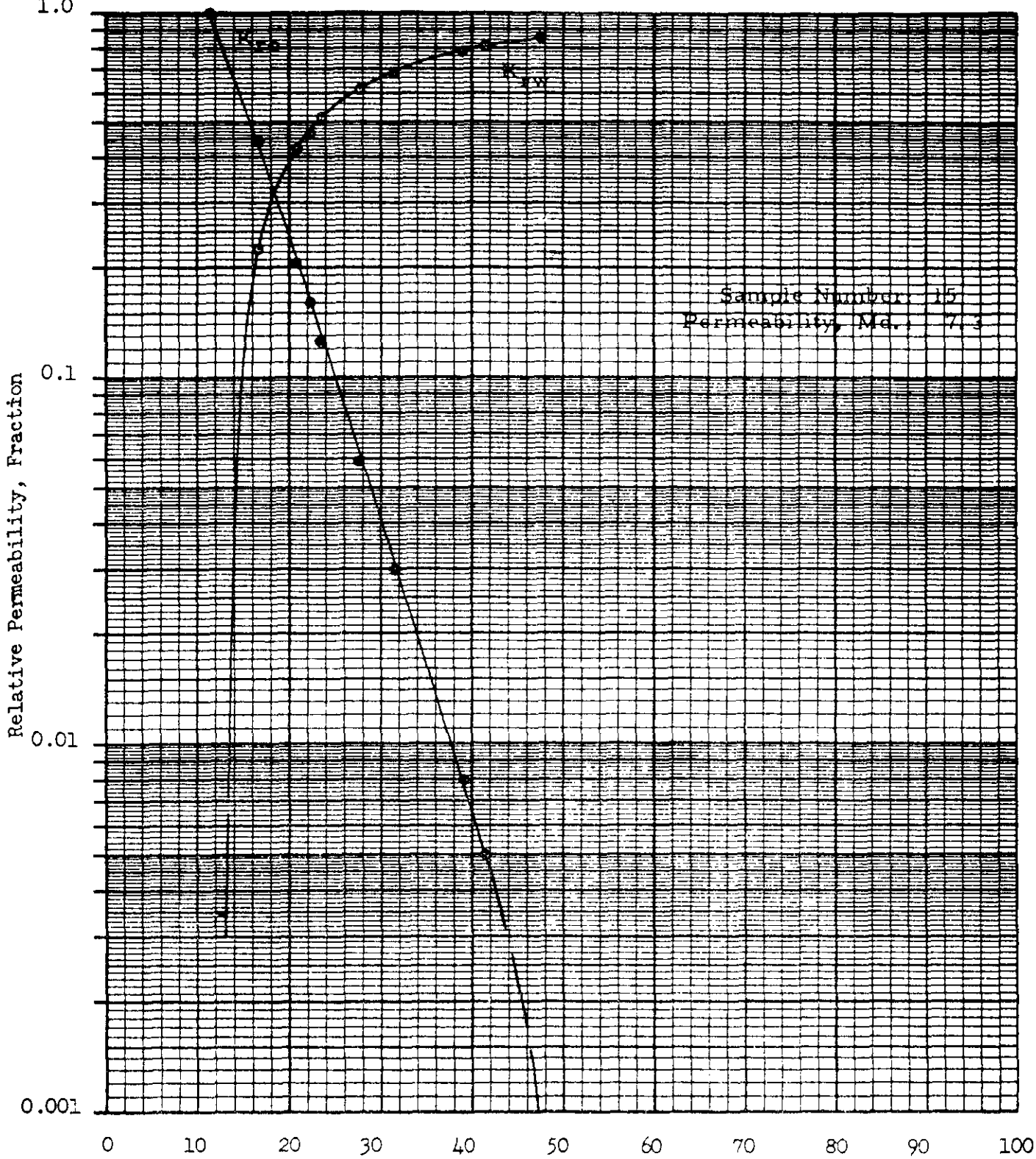
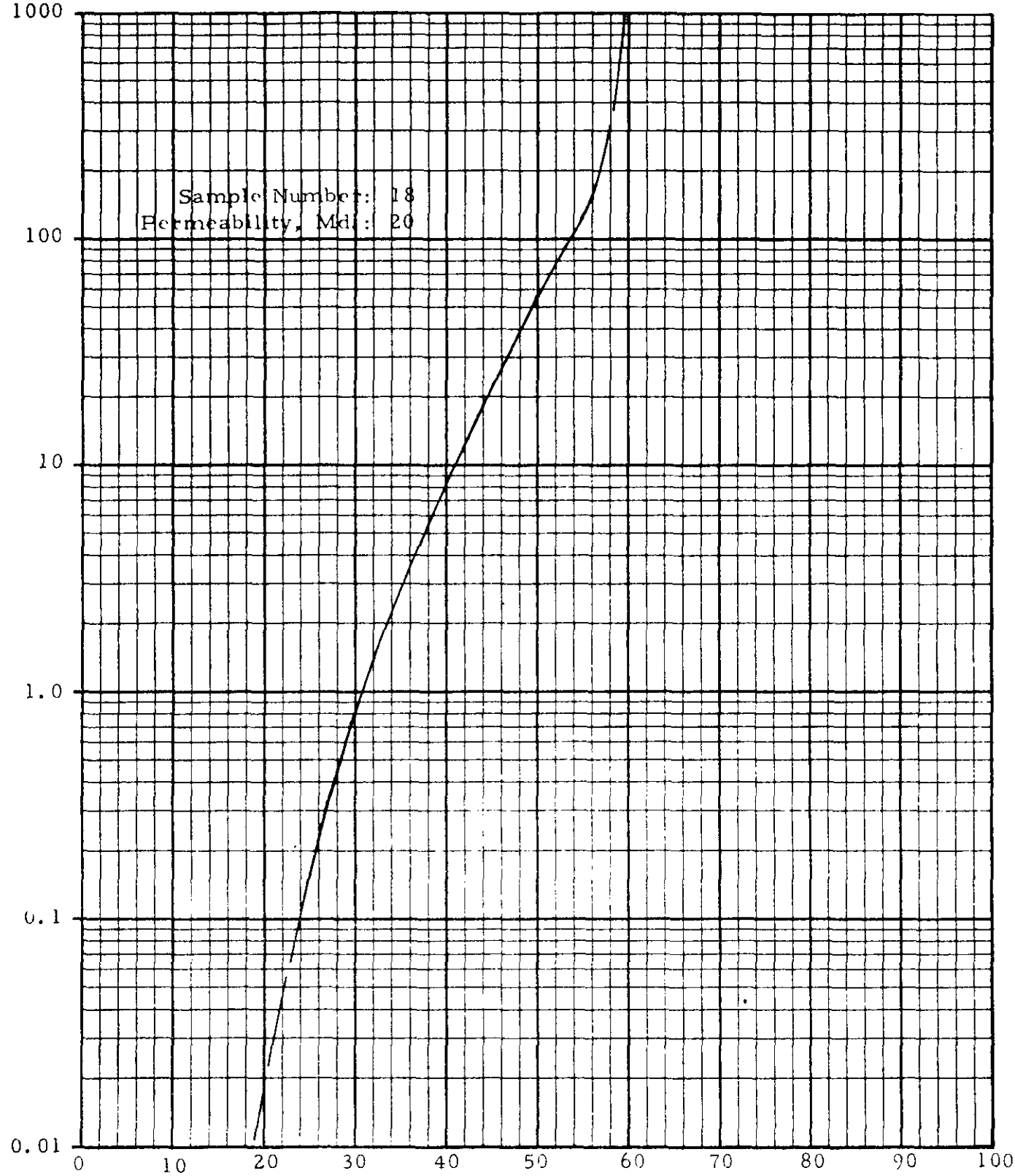
Field Colville State Canada



Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Union Mobile Colville D-45 County Northwest Territories
Field Colville State Canada



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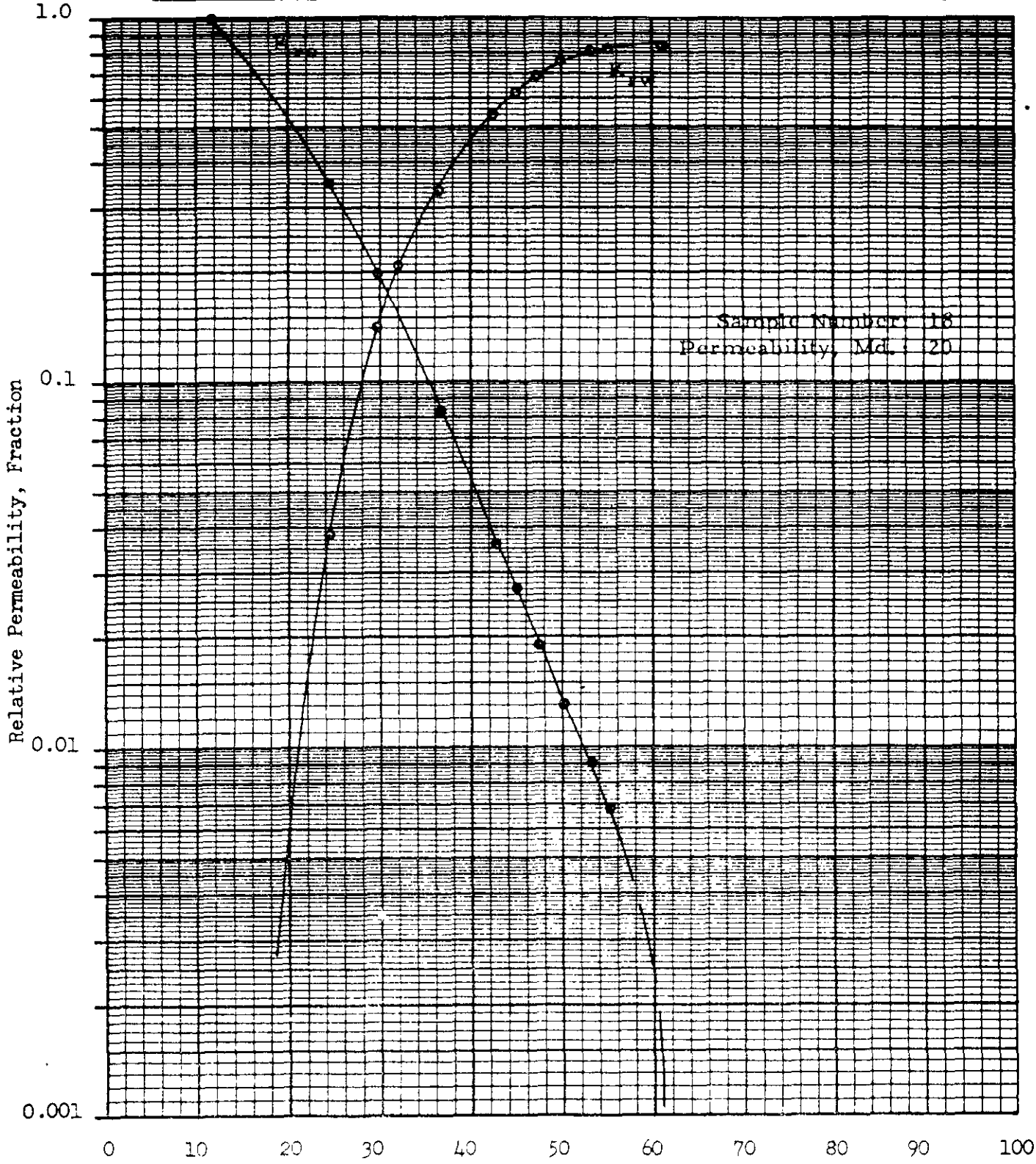
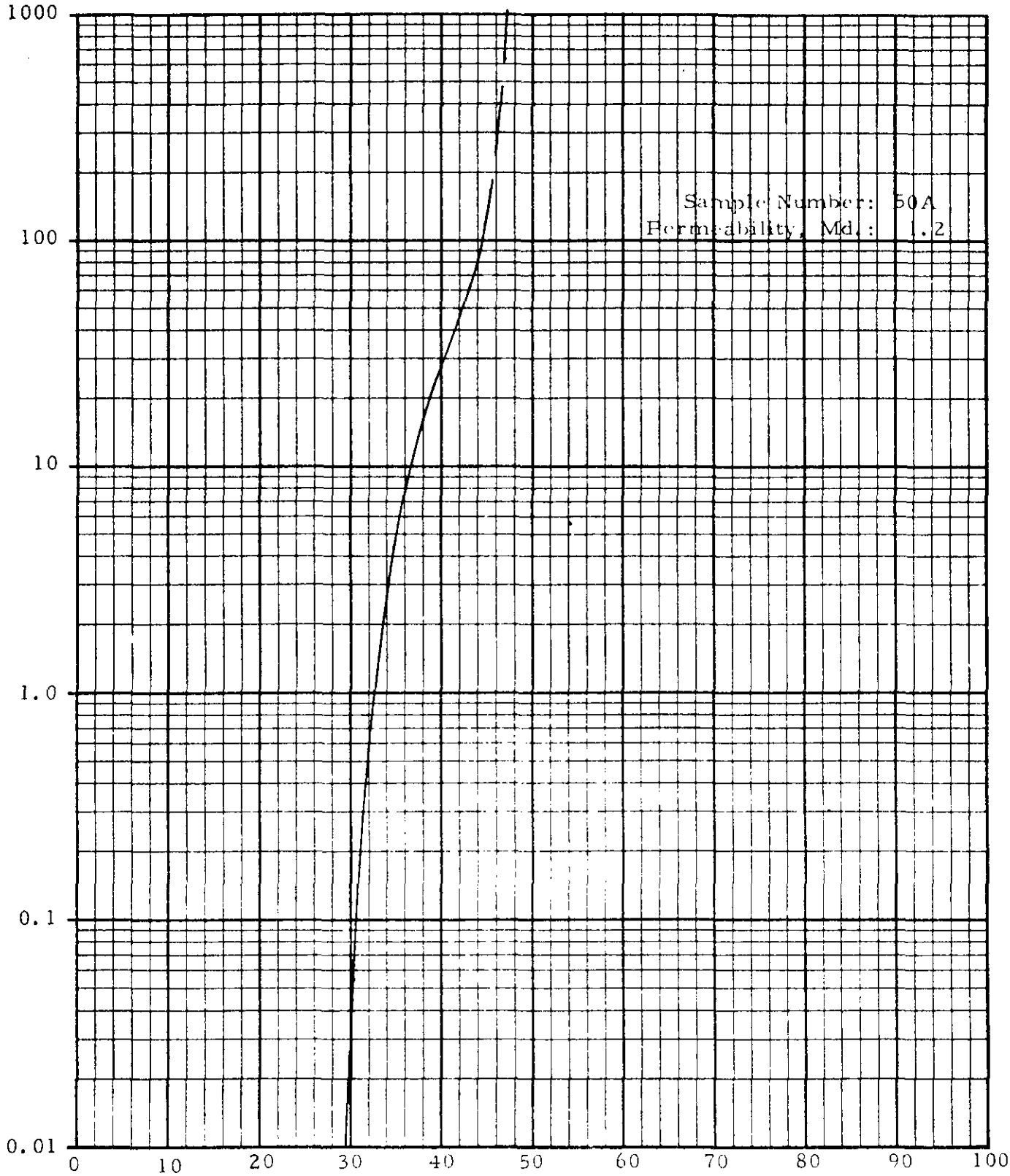
Well Union Mobile Colville D-45 County Northwest Territories
Field Colville State Canada



Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Union Oil Stopover K-44 County Northwest Territories
Field Stopover State Canada



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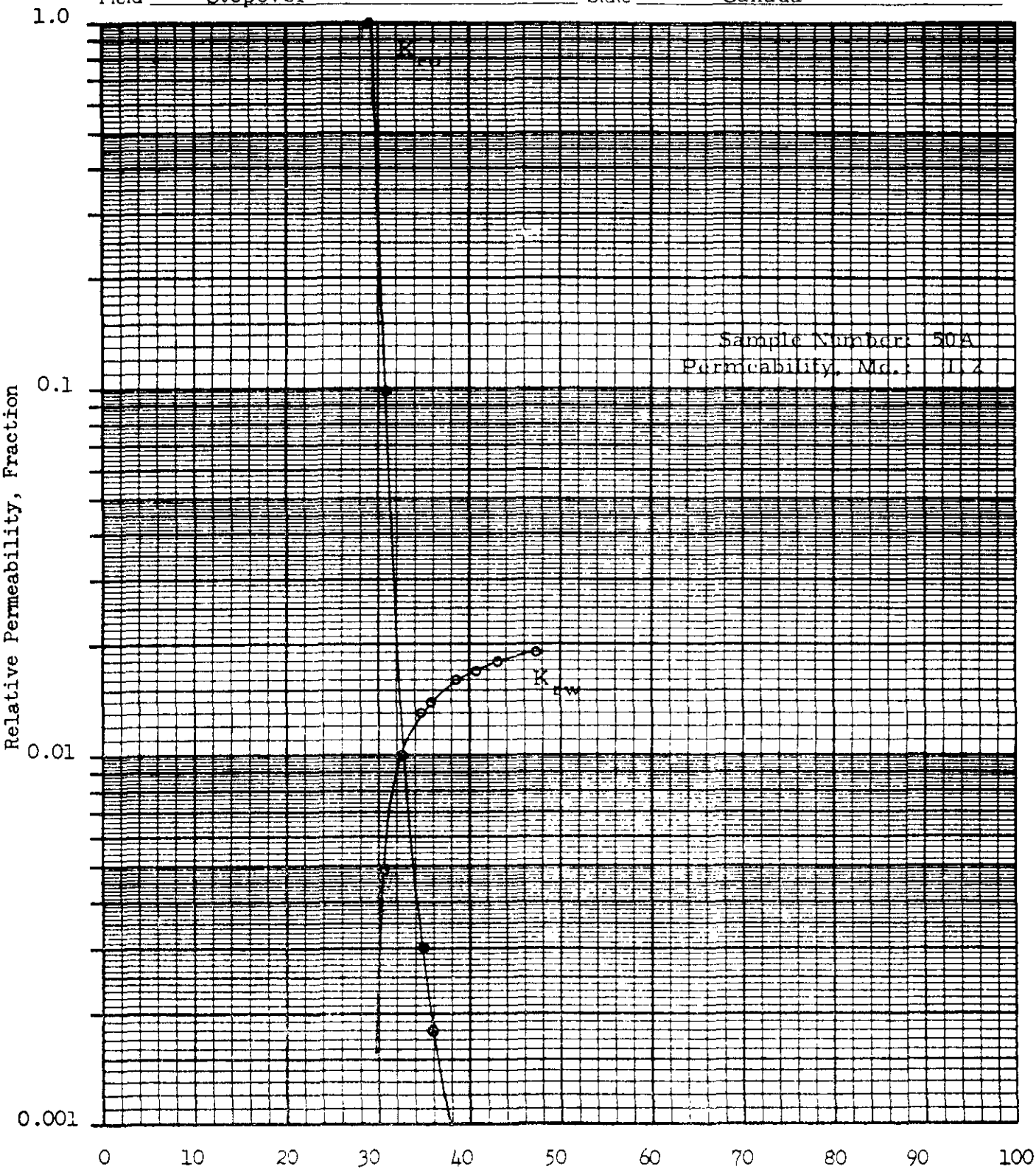
Well Union Oil Stopover K-44 County Northwest Territories
Field Stopover State Canada



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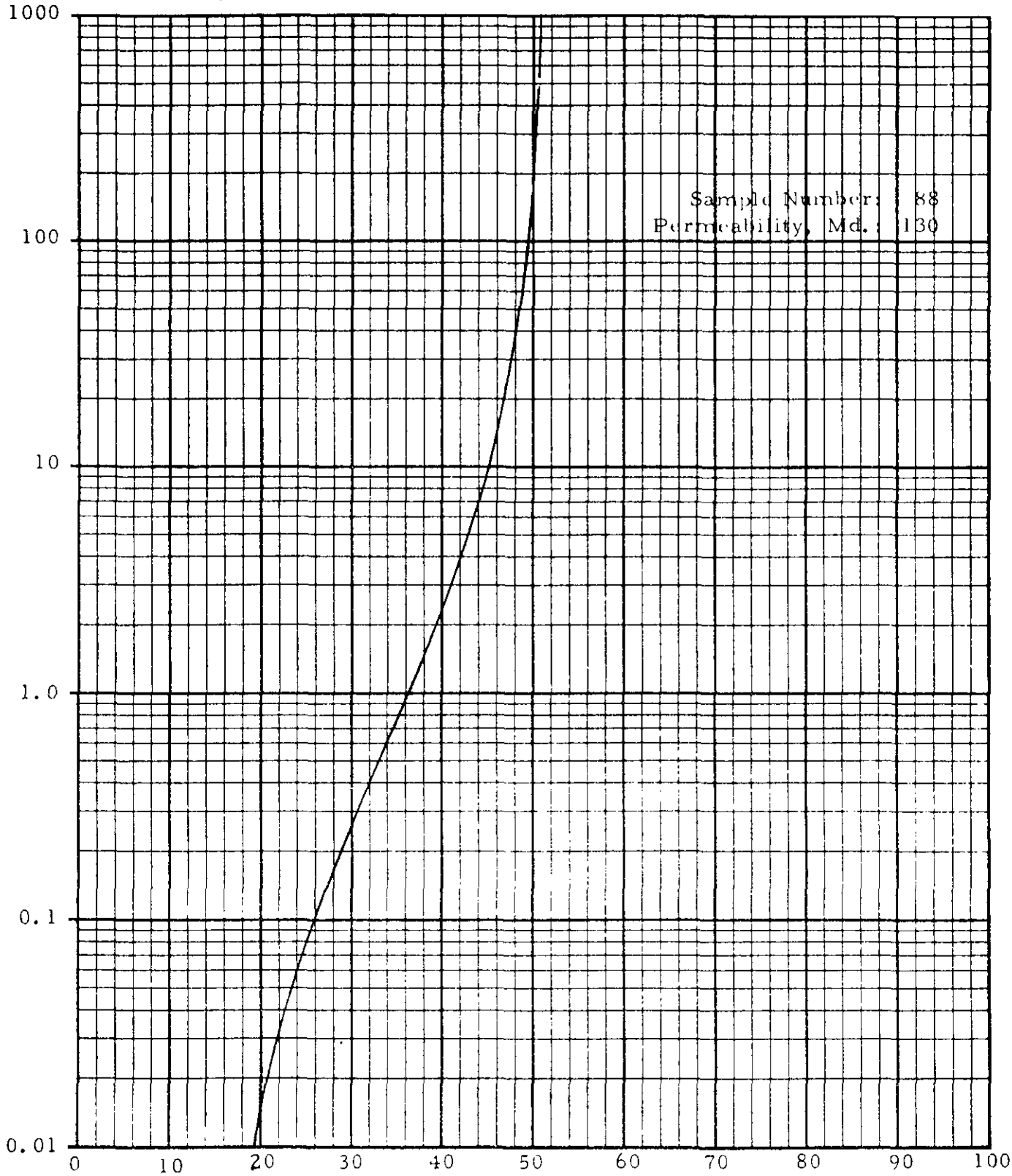
Field Stopover State Canada



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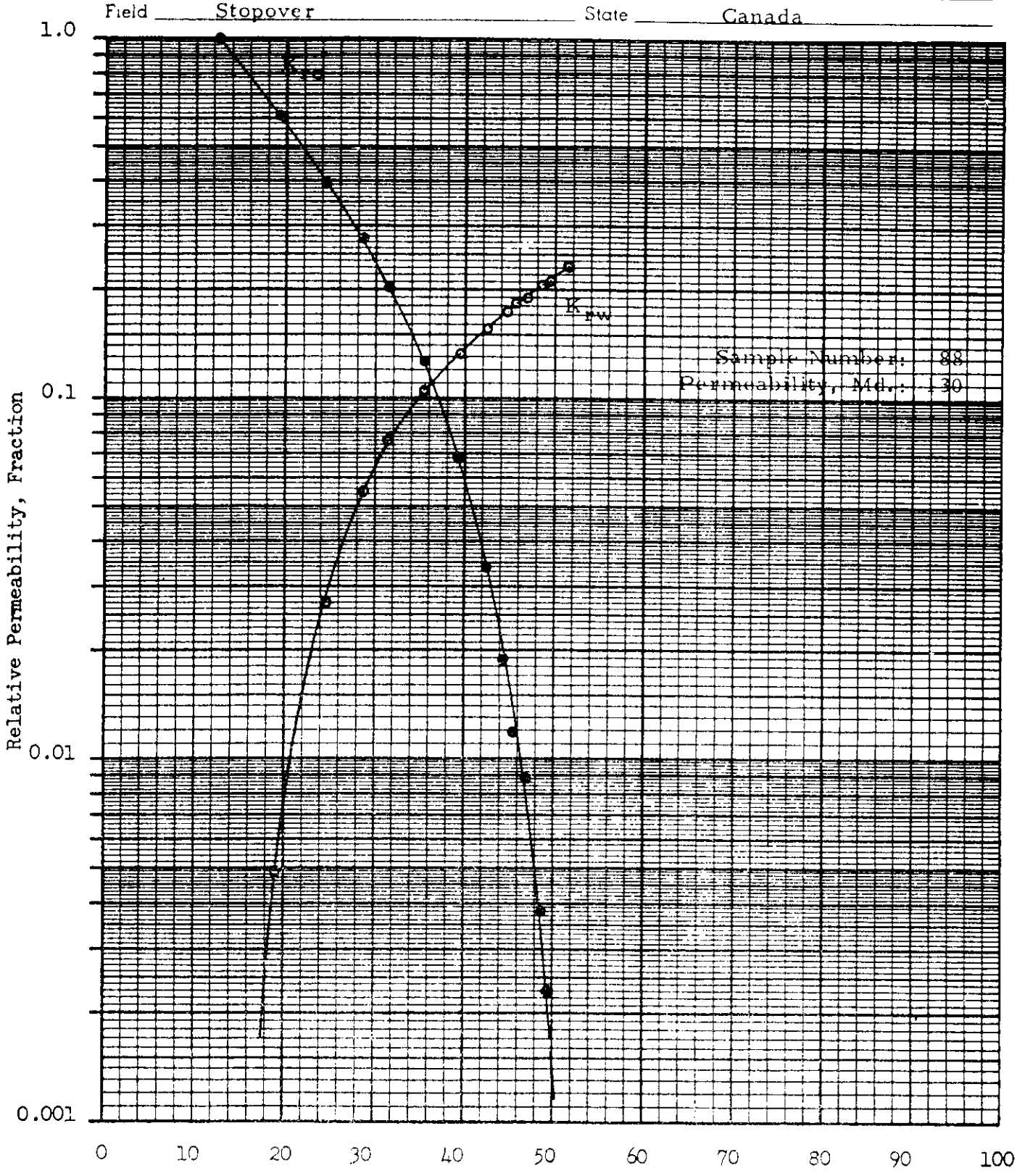

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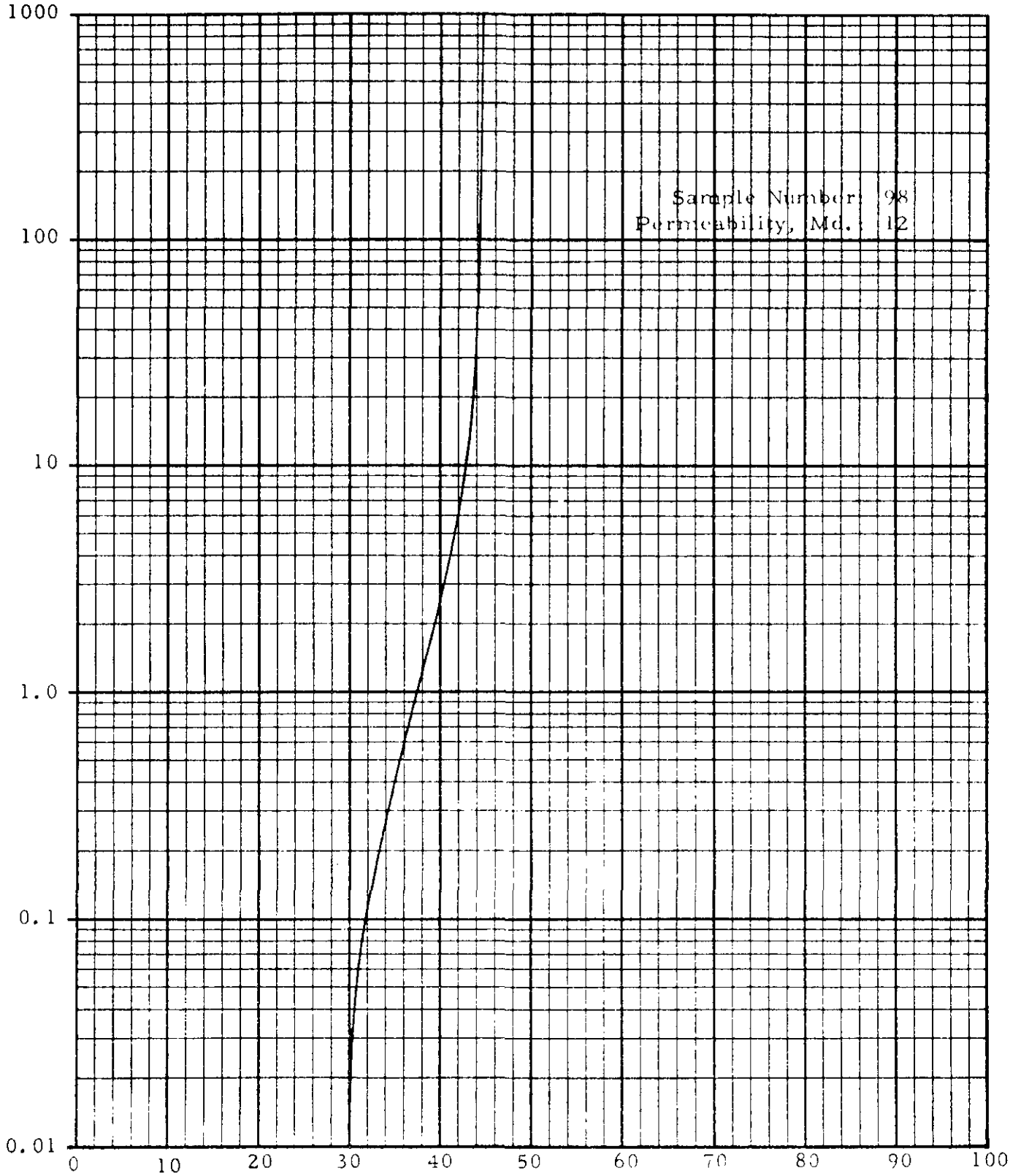
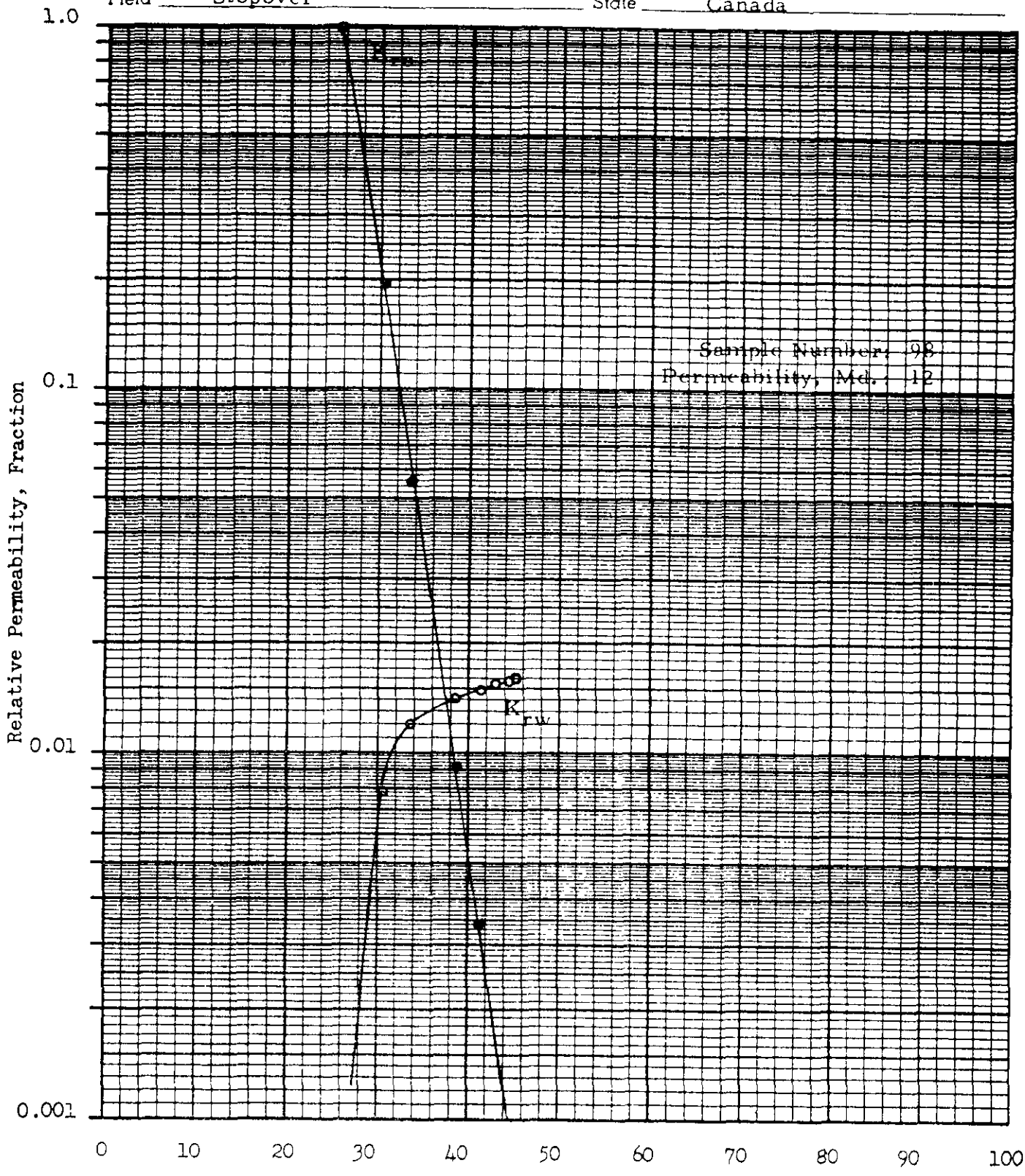
Field Stopover State Canada



Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Union Oil Stopover K-44 County Northwest Territories
Field Stopover State Canada



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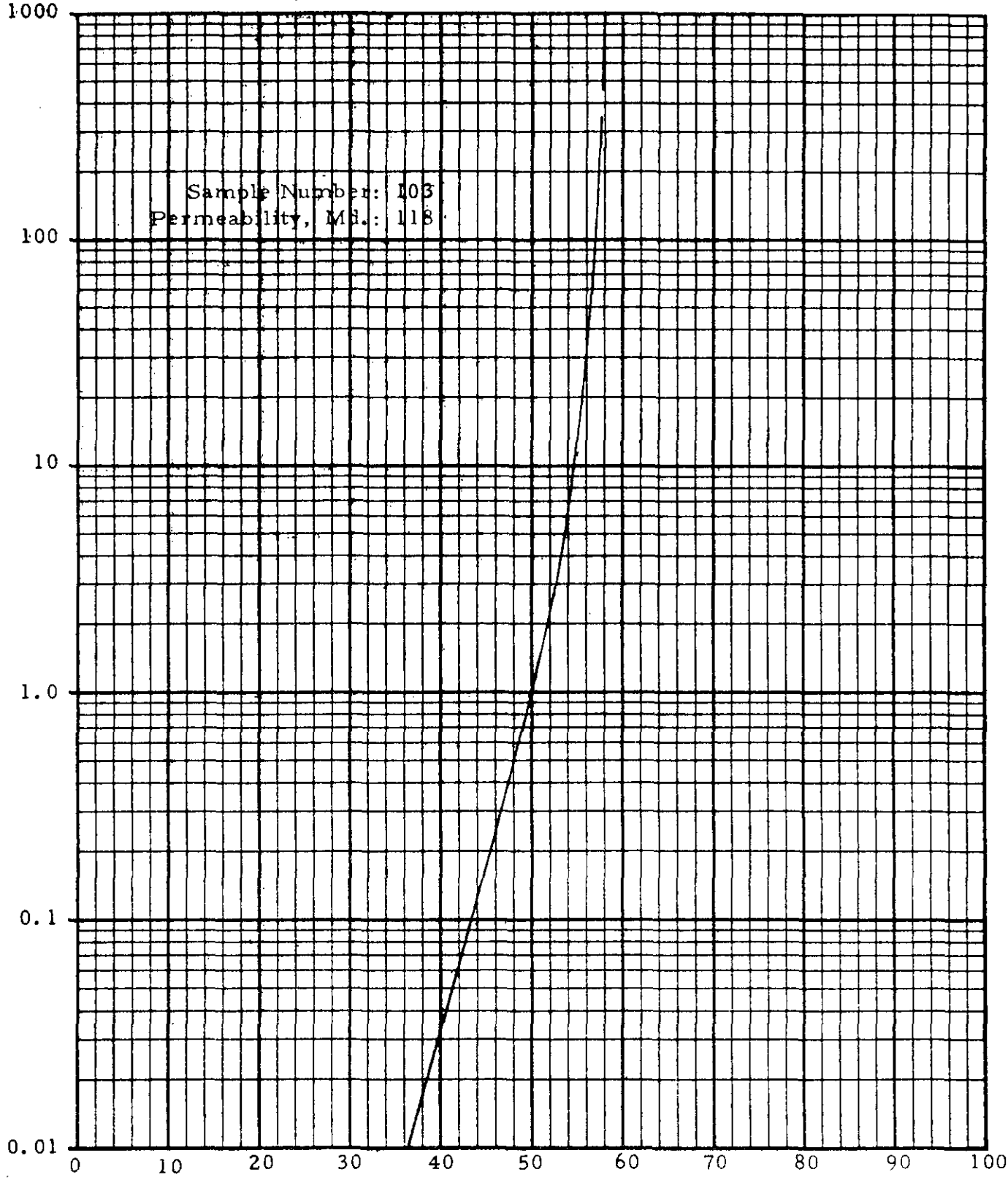
Well Union Oil Stopover K-44 County Northwest Territories
Field Stopover State Canada



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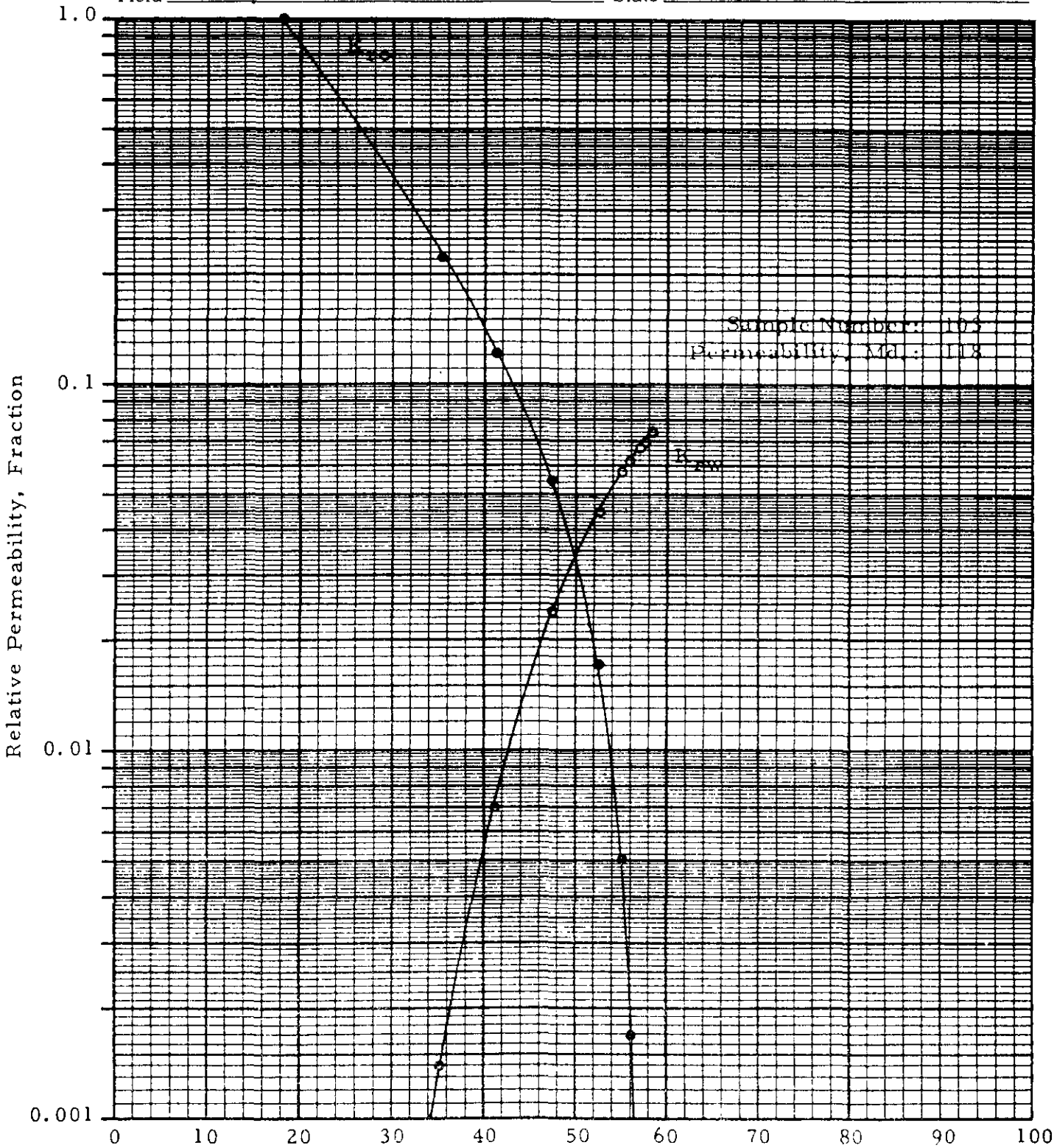

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CORE LAB

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Special Core Analysis Study

for

UNION OIL COMPANY OF CANADA LIMITED

Stopover No. K-44 and
Colville D-45 Wells
Canada

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

February 24, 1978

Union Oil Company of Canada Limited
P.O. Box 999
Calgary, Alberta 2TP 2K6
Canada

Attention: Mr. Lorne D. McCluskey

Subject: Special Core Analysis Study
Stopover No. K-44 and
Colville D-45 Wells
Northwest Territories
Canada
File Number: SCAL-75150A

Gentlemen:

On May 18, 1976, a Special Core Analysis Study identified as SCAL-75150 was submitted in final form. In subsequent communications and conversations between representatives of Union Oil Company of Canada Limited and Core Laboratories, Inc., it was noted that there was a difference in the results of the multi-point mercury injection tests as compared to the porous-plate capillary pressure tests. It was decided that Core Laboratories, Inc., would attempt to resolve these differences by performing additional tests. Presented in this report are the results of the following: (1) Porous-Plate Capillary Pressure Tests with a final high-speed centrifugal point performed in an air-brine system, and (2) Multi-Point Mercury Injection Tests on sandstone core plugs from the subject wells. There will be no charges incurred by Union Oil Company of Canada Limited for this study. The core plugs used in this study are identified as to well, sample number, and depth interval on Page 1, and are lithologically described on Page 2.

The nine core plugs used in this study were previously prepared for use in the study identified as SCAL-75150. Each core plug was extracted of hydrocarbons with alternate injections of toluene and acetone, leached of salt with methyl alcohol, and then dried. Air permeabilities and Boyle's law porosities were determined on each cleaned and dried core plug.

Three core plugs (Numbers 65A, 88A, and 115A) from the Stopover K-44 Well, and two core plugs (Numbers 16 and 17) from the Colville D-45 Well were evacuated and saturated with the appropriate simulated formation water, synthesized from water analyses submitted for use in this study. With the exception of a final high-speed centrifuge point, a porous-plate cell and an air-brine system were used in performing these 7-point capillary pressure tests. The results of these data are presented by well in tabular form on Page 3, and in graphical form on Pages 4 through 7.

The five core plugs used for the capillary pressure tests were leached of salt with methyl alcohol, and dried. Air permeabilities and Boyle's law porosities were again determined on the cleaned and dried core plugs. Multi-point mercury injection tests were performed on six core plugs from the Stopover K-44 Well and three core plugs from the Colville D-45 Well using injection pressures ranging from 3 psia to 2000 psia. The results of these multi-point mercury injection test data are presented by well in tabular form on Pages 8 and 9, and in graphical form on Pages 10 through 18.

The air-brine capillary pressure data were converted to an air-mercury system by multiplying the air-brine capillary pressure by 5.11. A comparison was then made to the average mercury injection plot. These comparisons are valid only when comparing tests performed on the same core plug. The multi-point mercury injection data and the converted air-brine data for the three core plugs (Numbers 65A, 88A, and 115A) from the Stopover K-44 Well correlate extremely well. The two core plugs (Numbers 16 and 17) from the Colville D-45 Well exhibit differences in capillary pressure-saturation relationships that correlate generally at the low pressures (approximately 50 psi air-mercury) but deviate considerably beyond this point.

In the study which was submitted on May 18, 1976, and identified by our file number SCAL-75150, air-brine capillary pressure tests and multi-point mercury injection tests were performed on two core plugs (Numbers 11 and 18) from the Colville D-45 Well. The capillary pressure-saturation relationships for these two core plugs correlate generally at the low pressures (approximately 50 psi air-mercury) and deviate considerably beyond this point. There is no readily apparent reason to explain why the air-mercury and air-brine data do not correlate for the Colville Well.

In summary, it is believed that either the air-brine capillary pressure data or the multi-point mercury injection data would be applicable for reservoir calculations for the Stopover K-44 Well. It is extremely difficult to access the air-brine capillary pressure and multi-point mercury injection data from the Colville D-45 Well, but based on all of the test results it appears that the multi-point mercury injection data from the Colville D-45 Well would be the most applicable for reservoir calculations.

It has been a pleasure working for you on this study. Should you have any questions pertaining to these test results, please do not hesitate to contact us.

Very truly yours,

Core Laboratories, Inc.

John W. White (BB)

John W. White
for Duane L. Archer, Manager
Special Core Analysis

JWW:fm
10 cc. - Addresee

Company Union Oil Company of Canada Limited
Formation Old Fort Sand
Number of Wells Two
County Northwest Territories
Field As Noted
State Canada

Identification of Samples

Sample Number	Company	Well	Depth, Feet
		Stopover Field	
50B	Union Oil Co. of Canada Ltd.	Union Oil Stopover K-44	2784.1 - 85.0
65A			2794.9 - 95.4
88A			2813.2 - 13.5
98B			2820.8 - 21.9
103B			2825.6 - 26.2
115A			2834.3 - 34.9
		Colville Field	
15	Union Oil Co. of Canada Ltd.	Union Mobile Colville D-45	3223.0 - 23.4
16			3223.0 - 23.4
17			3225.9 - 26.4

Lithological Description

Sample Number	Description
	Stopover K-44
50B	Ss, red-brn, cse-v/fn grn, apparent SiO_2 cement, well indurated, cse grn concentrations
65A	Ss, red-brn, med-fn grn, apparent SiO_2 cement, well indurated
88A	Ss, lt gry-white, fn-v/fn grn, apparent SiO_2 cement, well indurated
98B	Ss, red-brn-buff white, med-fn grn, apparent SiO_2 cement, well indurated, blotchy color staining, grns uniform
103B	Ss, red-brn, cse-fn grn, apparent SiO_2 cement, mod-poor indurated, blotchy color appearance
115A	Ss, red-brn, fn grn, apparent SiO_2 cement, well indurated, blotchy color appearance
	Colville D-45
15	Ss, lt gry-white, fn-v/fn grn, apparent SiO_2 cement, mod-poor indurated, med grn laminae, tr mosc
16	Ss, lt gry-white, fn-med grn, apparent SiO_2 cement, well indurated
17	Ss, lt gry, v/fn-fn grn, apparent SiO_2 cement, well indurated

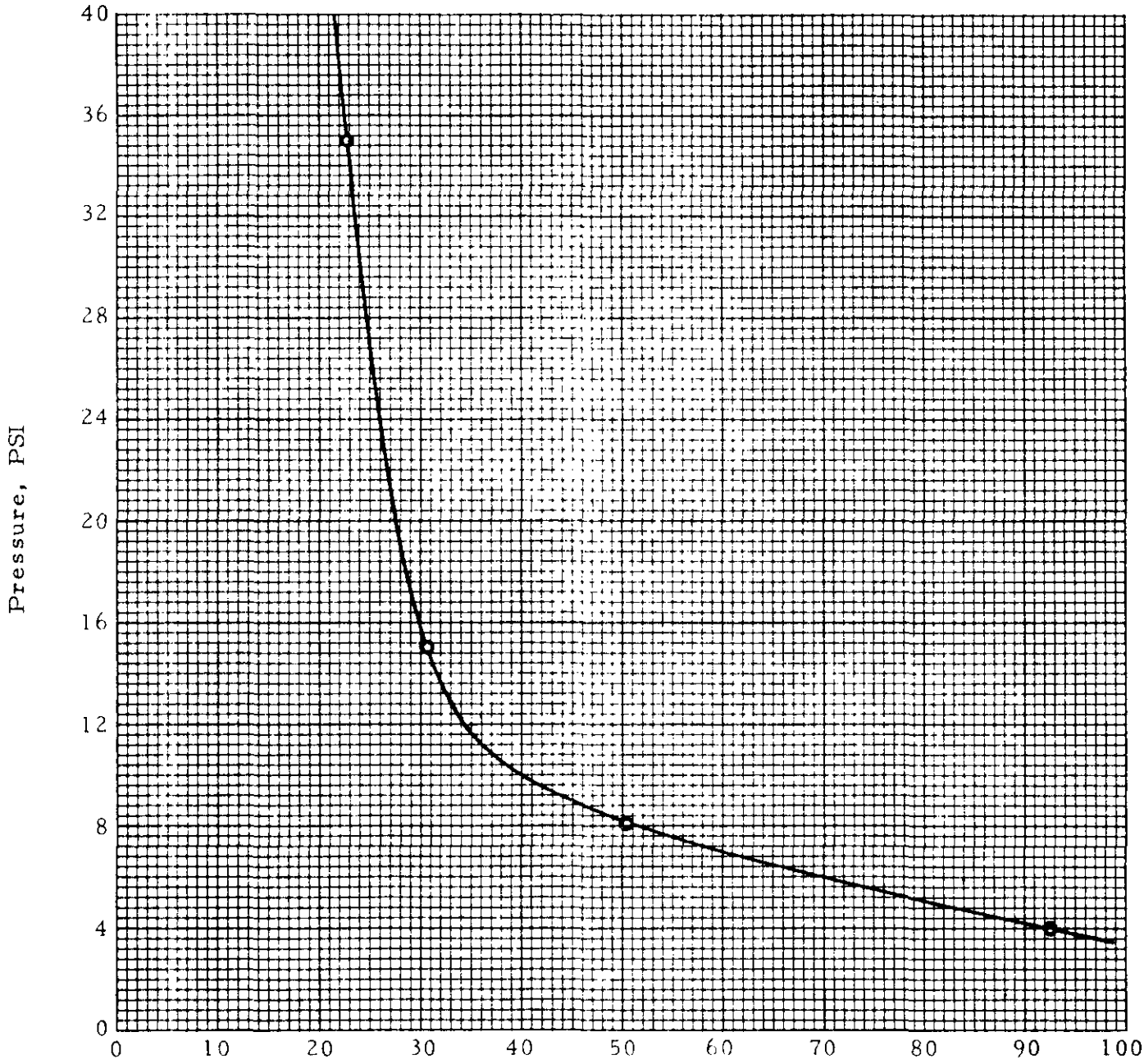
Air-Brine Capillary Pressure Data

Pressure, PSI:			1	2	4	8	15	35	300*
Sample Number	Permeability, Millidarcys	Porosity, Per Cent	Brine Saturation, Per Cent Pore Space						
			Stopover K-44						
65A	22	10.8	100.0	100.0	92.6	50.3	30.7	22.7	12.9
88A	172	13.0	80.9	50.0	27.9	20.6	15.2	11.8	5.9
115A	20	11.1	100.0	100.0	86.0	53.6	36.3	28.5	18.4
			Colville D-45						
16	5.1	11.7	100.0	100.0	98.4	68.3	43.9	26.0	14.6
17	7.2	16.8	100.0	100.0	100.0	78.1	39.9	21.8	13.7

*Equivalent Pressure from Centrifuge (Air-Brine System)

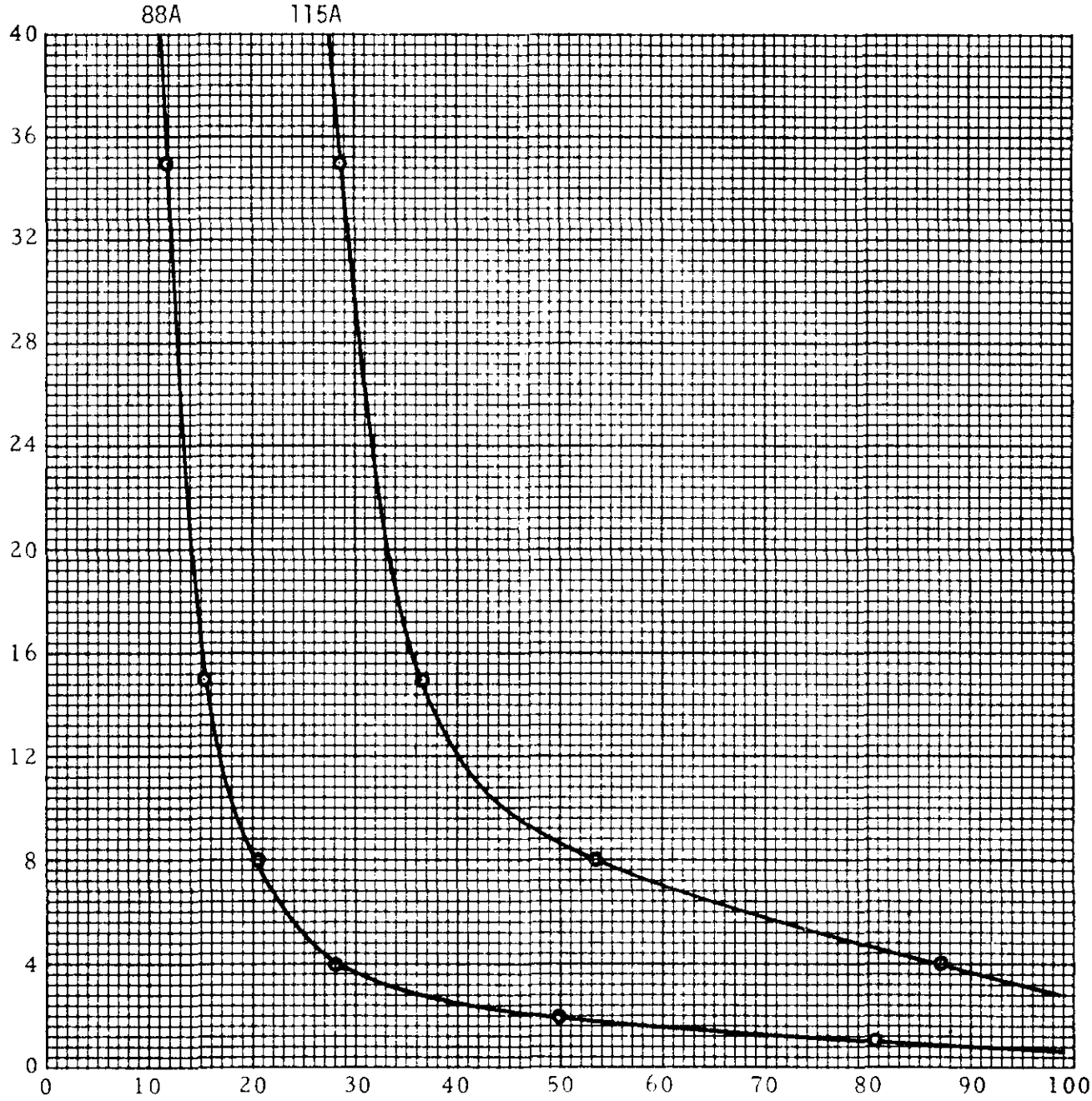
Company Union Oil Company of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 County Northwest Territories
Field Stopover State Canada

Sample Number: 65A
Permeability, Md.: 22



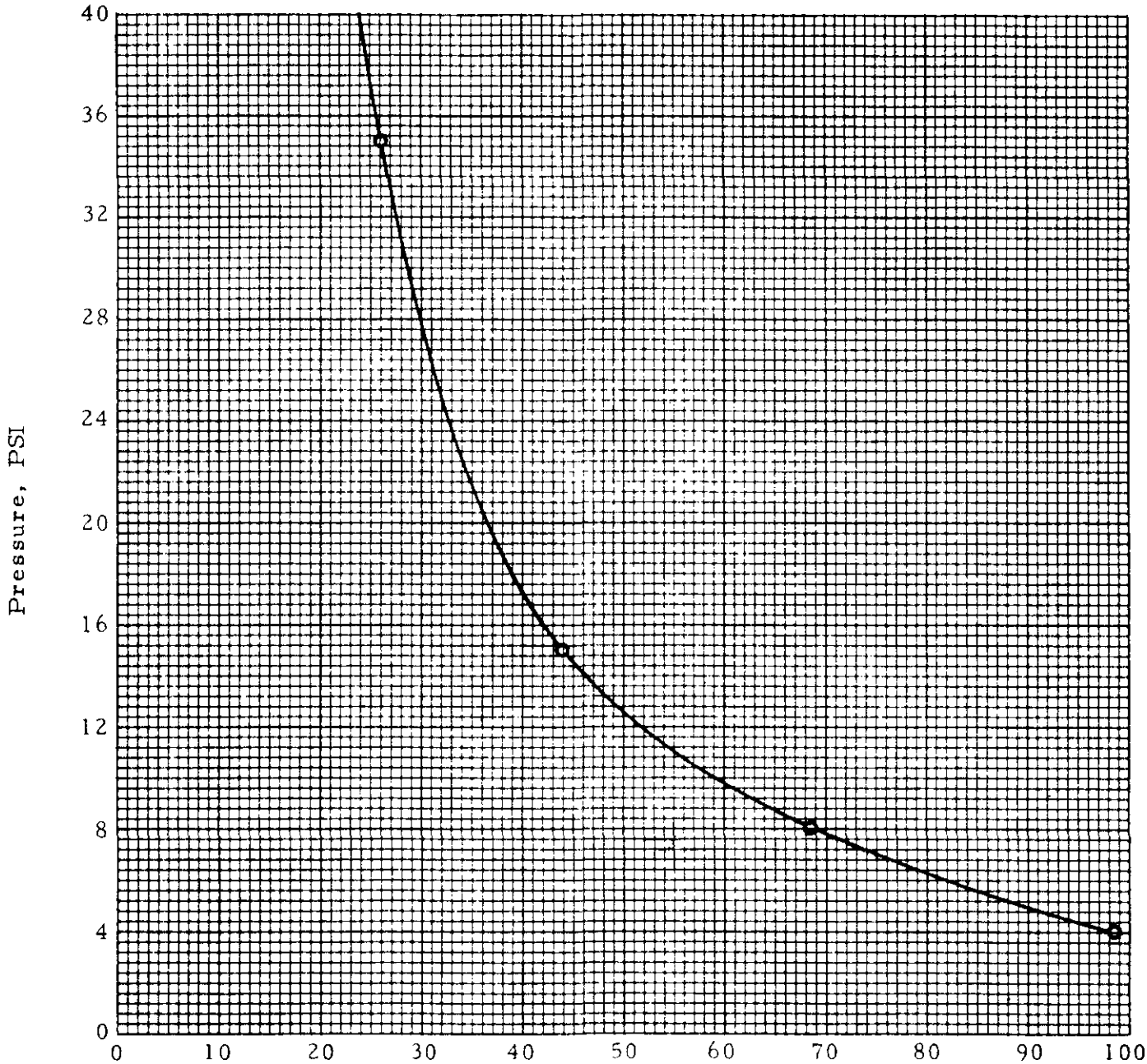
Company Union Oil Company of Canada — Formation Old Fort Sand
Well Stopover K-44 — County Northwest Territories
Field Stopover — State Canada

Sample Number:	88A	115A
Permeability, Md.:	172	20



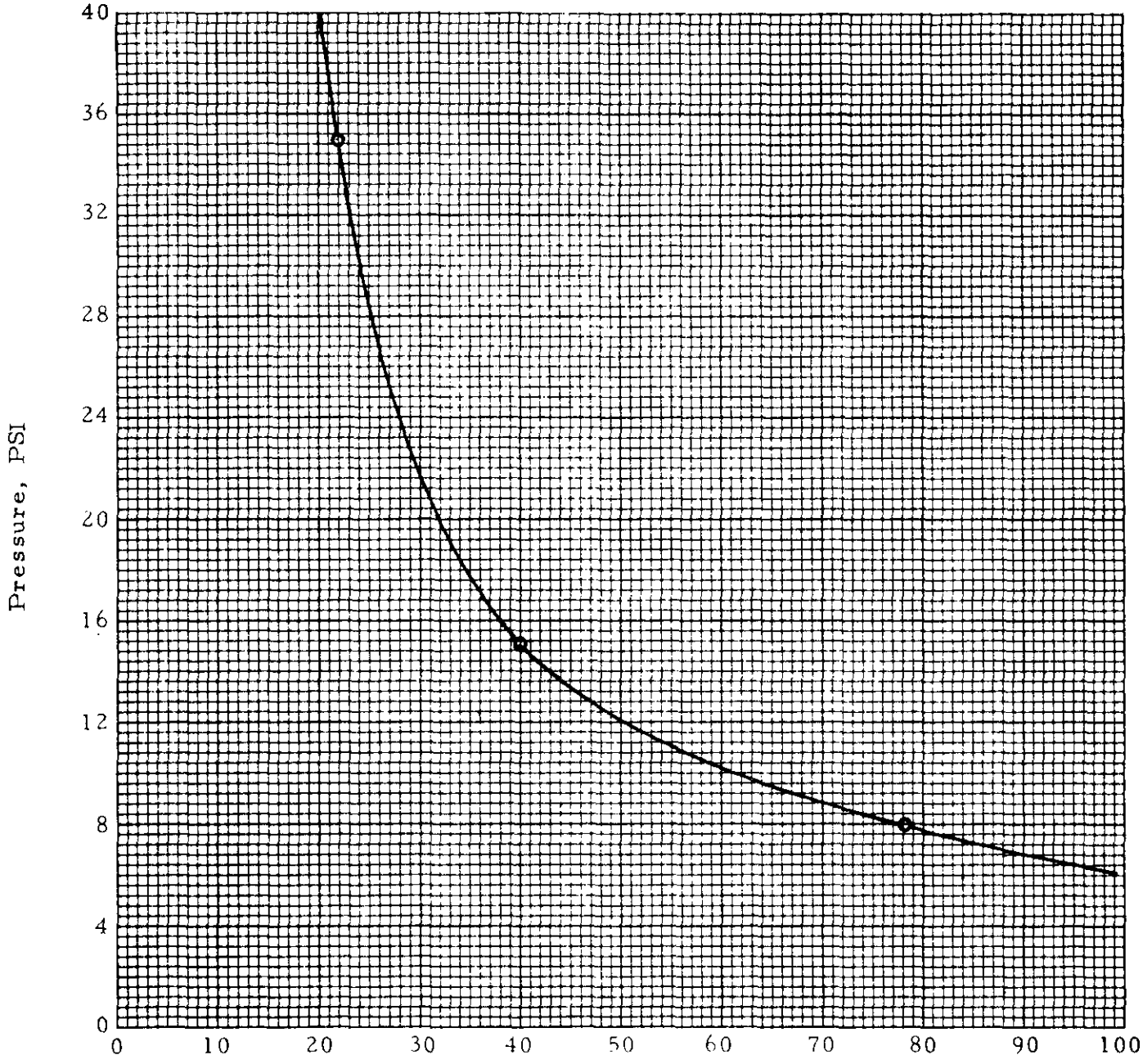
Company Union Oil Company of Canada Ltd. Formation Old Fort Sand
Well Colville D-45 County Northwest Territories
Field Colville State Canada

Sample Number: 16
Permeability, Md.: 5.1



Company Union Oil Company of Canada Ltd. Formation Old Fort Sand
Well Colville D-45 County Northwest Territories
Field Colville State Canada

Sample Number: 17
Permeability, Md.: 7.2



Mercury Injection Capillary Pressure Data

Stopover K-44

Sample Number:	50B	65A	88A	98B	103B	115B
Permeability, Md.:	0.86	28	218	122	9.9	22
Porosity, Per Cent:	8.3	11.0	13.0	14.8	10.4	13.0
Injection Pressure, PSIA	Wetting Phase Saturation, Per Cent Pore Space					
3	100.0	100.0	100.0	100.0	100.0	100.0
6	100.0	100.0	85.0	100.0	100.0	100.0
9	100.0	100.0	55.7	94.6	100.0	100.0
12	100.0	100.0	42.5	75.1	100.0	93.3
15	100.0	100.0	37.2	60.8	98.0	85.0
18	100.0	94.3	32.2	52.0	93.3	77.7
21	100.0	80.4	27.5	46.0	89.1	71.2
24	100.0	72.7	25.7	42.7	85.1	64.8
27	100.0	61.9	23.7	38.4	81.3	60.1
30	100.0	55.7	23.7	37.3	77.8	56.0
40	98.6	40.9	19.7	32.3	67.8	45.9
60	95.4	31.2	16.2	28.6	50.4	37.8
80	92.3	27.8	15.2	27.0	43.2	34.2
100	88.7	25.6	13.7	25.3	39.6	33.2
200	75.2	22.2	10.7	23.3	30.6	29.5
300	66.2	21.0	10.2	22.4	25.4	27.5
500	52.4	18.7	9.2	21.0	21.0	24.4
750	41.8	16.8	7.7	19.2	18.2	22.3
1000	33.2	14.8	6.7	17.5	18.0	19.7
1250	27.6	14.5	5.7	16.8	16.4	18.1
1500	24.3	13.9	5.7	16.8	15.0	16.8
1750	21.9	13.4	5.7	16.7	14.9	16.6
2000	21.4	13.1	5.7	16.4	13.8	16.1

Mercury Injection Capillary Pressure Data

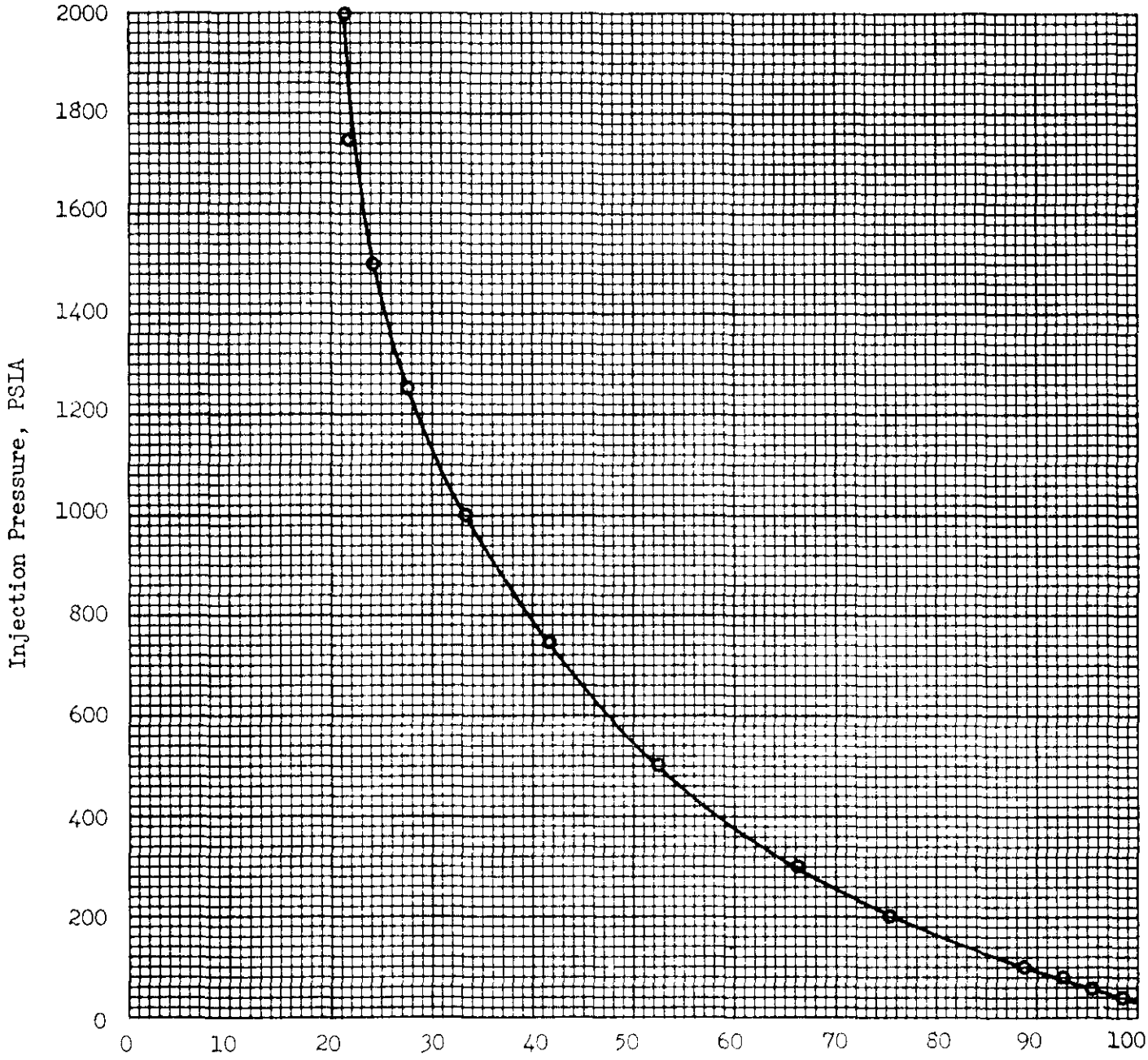
Colville D-45

Sample Number:	15	15	17
Permeability, Md.:	10	5.1	7.2
Porosity, Per Cent:	13.1	10.9	16.2

Injection Pressure, PSIA	Wetting Phase Saturation, Per Cent Pore Space		
3	100.0	100.0	100.0
6	100.0	100.0	100.0
9	100.0	100.0	100.0
12	100.0	100.0	100.0
15	100.0	100.0	100.0
18	100.0	100.0	100.0
21	100.0	100.0	100.0
24	99.1	100.0	100.0
27	90.6	100.0	100.0
30	86.7	96.7	100.0
40	77.4	84.0	91.3
60	65.4	61.5	60.7
80	57.3	50.8	49.7
100	47.8	48.4	43.2
200	35.1	35.2	28.4
300	27.6	27.9	22.4
500	20.8	21.3	16.4
750	17.1	17.2	12.6
1000	15.1	15.6	10.4
1250	13.7	13.9	8.7
1500	12.8	13.9	8.5
1750	11.6	13.9	7.1
2000	11.3	13.9	7.1

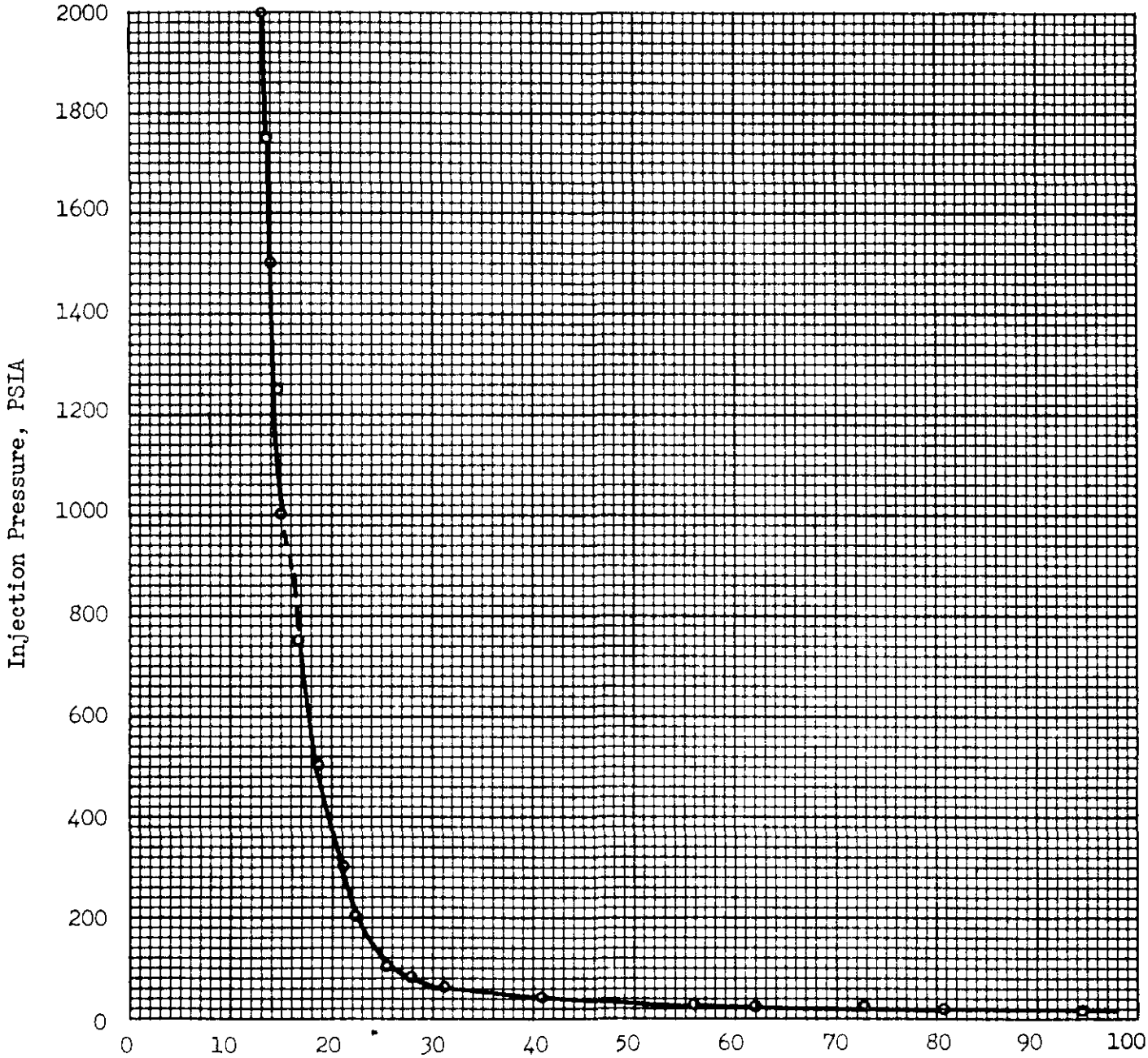
Company Union Oil Company of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 County Northwest Territories
Field Stopover State Canada

Sample Number: 50B
Permeability, Md.: 0.86



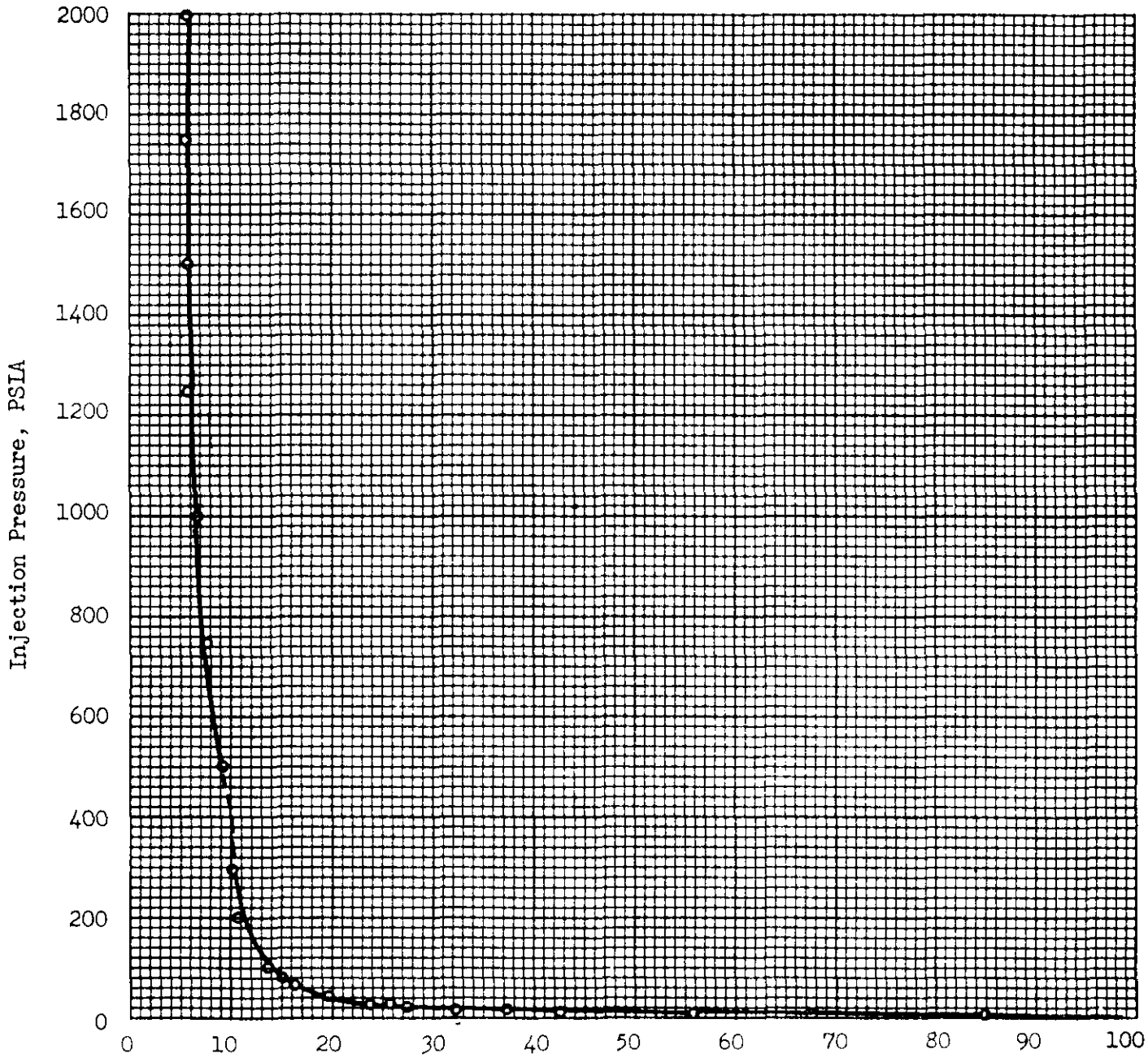
Company Union Oil Company of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 County Northwest Territories
Field Stopover State Canada

Sample Number: 65A
Permeability, Md.: 28



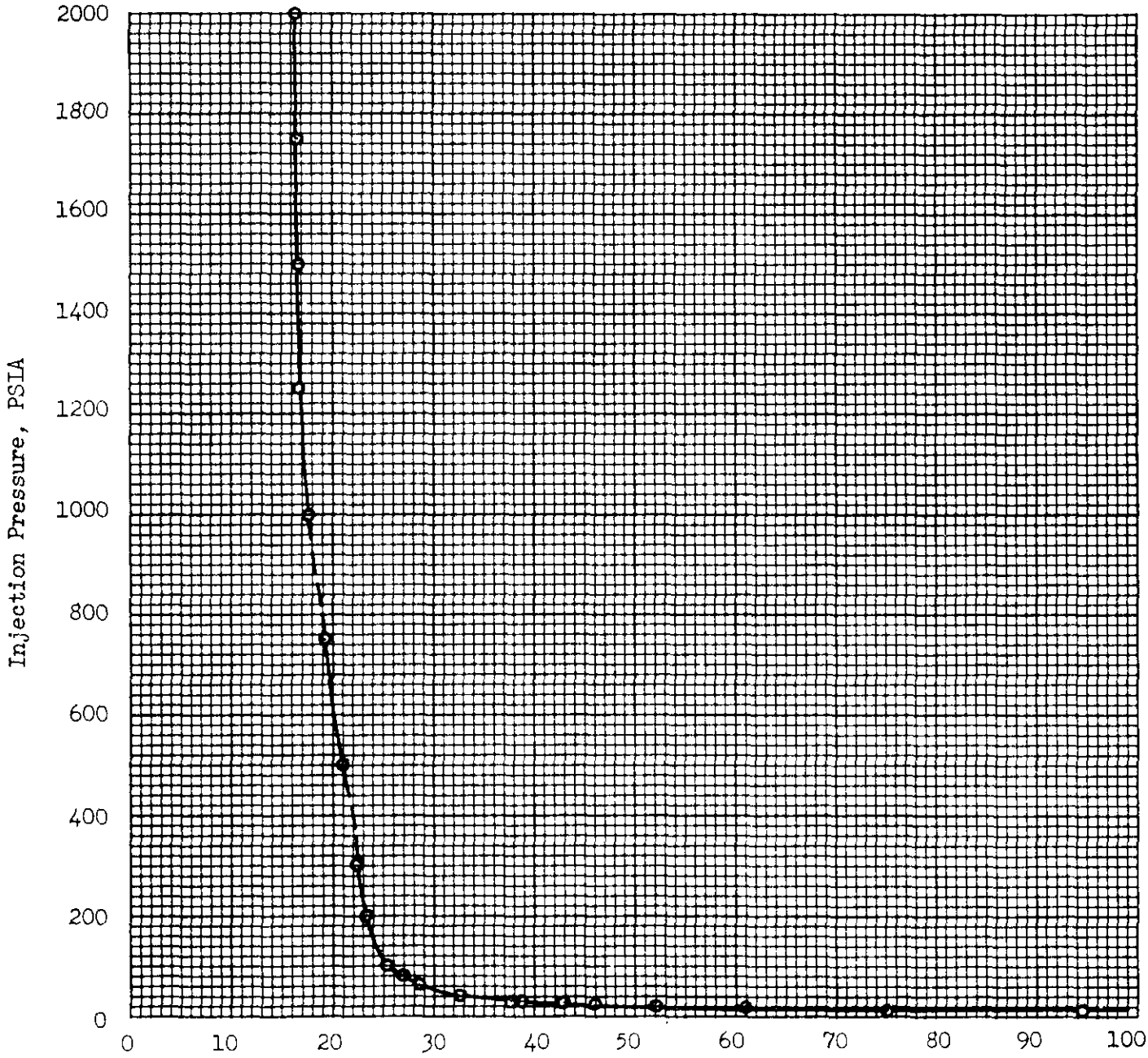
Company Union Oil Company of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 County Northwest Territories
Field Stopover State Canada

Sample Number: 88A
Permeability, Md.: 218



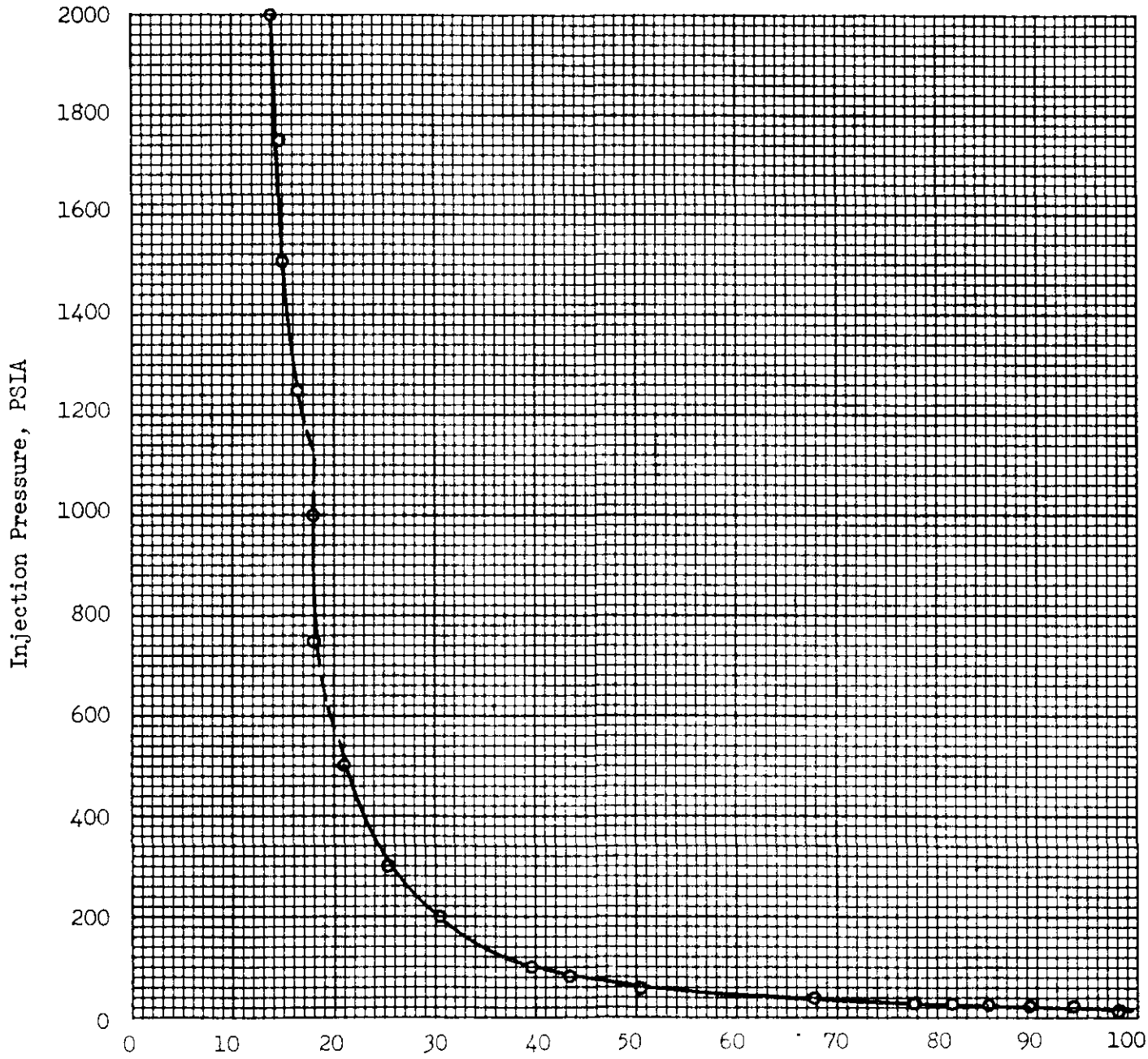
Company Union Oil Company of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 County Northwest Territories
Field Stopover State Canada

Sample Number: 98B
Permeability, Md.: 122



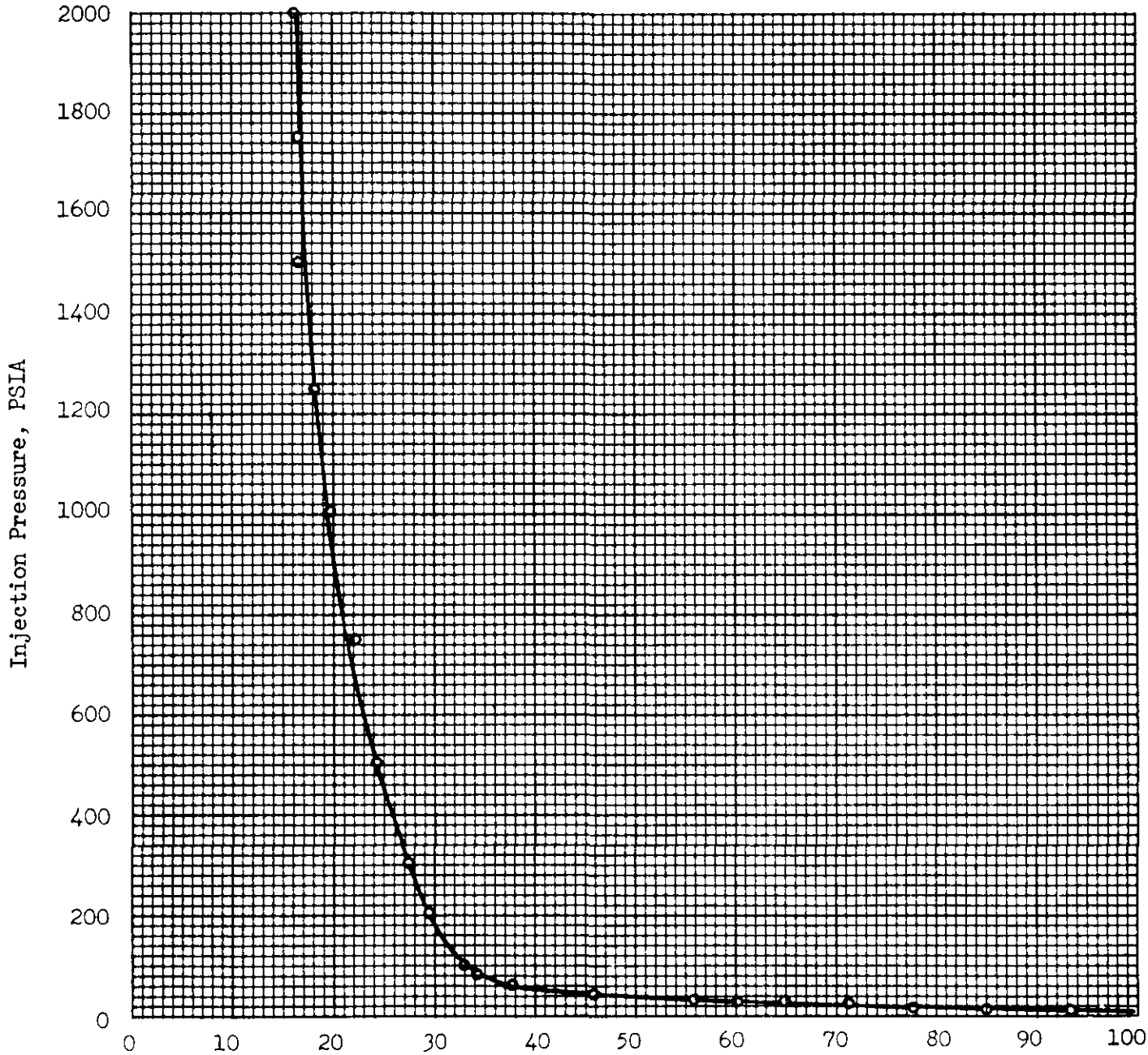
Company Union Oil Company of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 County Northwest Territories
Field Stopover State Canada

Sample Number: 103B
Permeability, Md.: 9.9



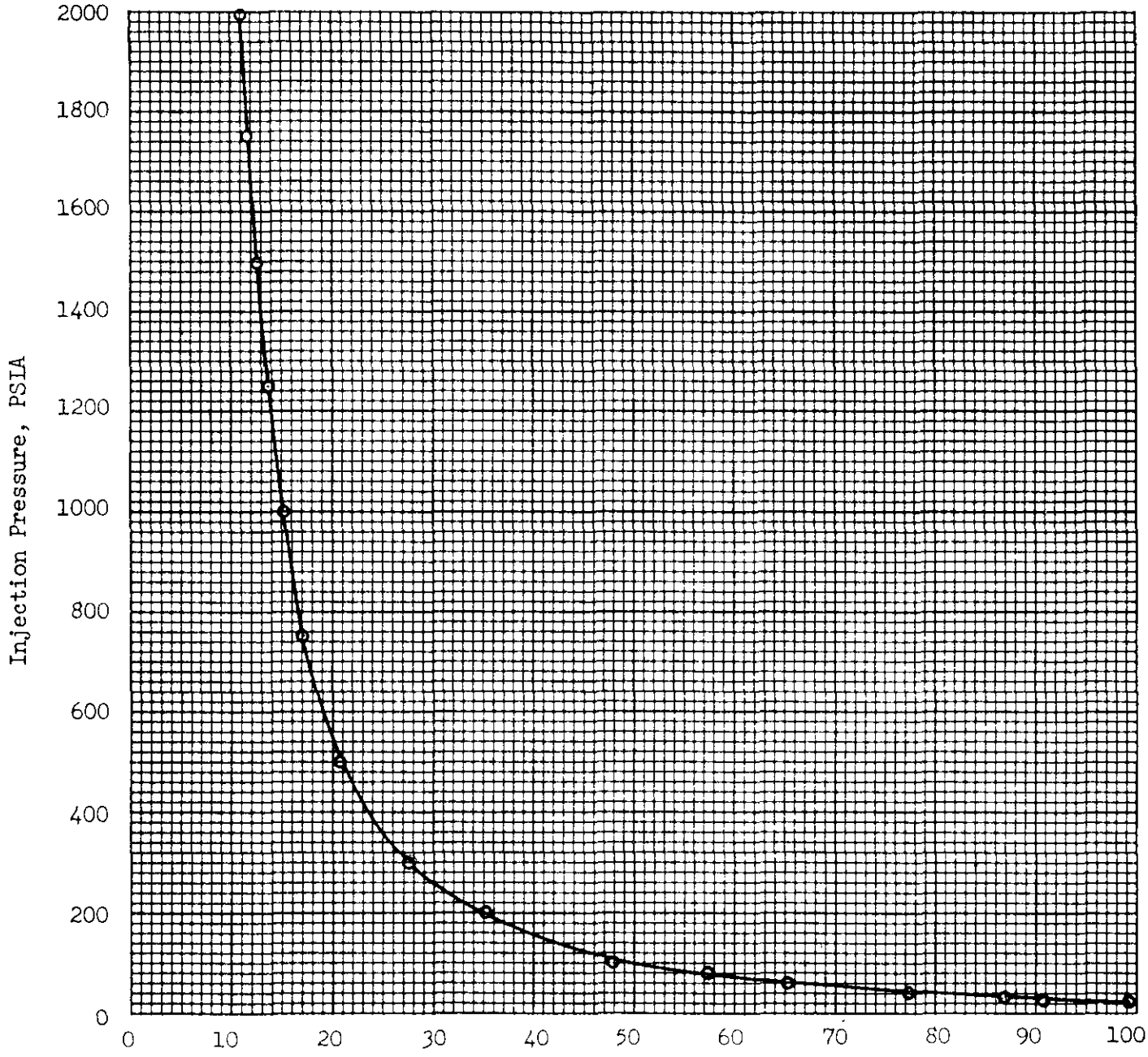
Company Union Oil Company of Canada Ltd. Formation Old Fort Sand
Well Stopover K-44 County Northwest Territories
Field Stopover State Canada

Sample Number: 115A
Permeability, Md.: 22



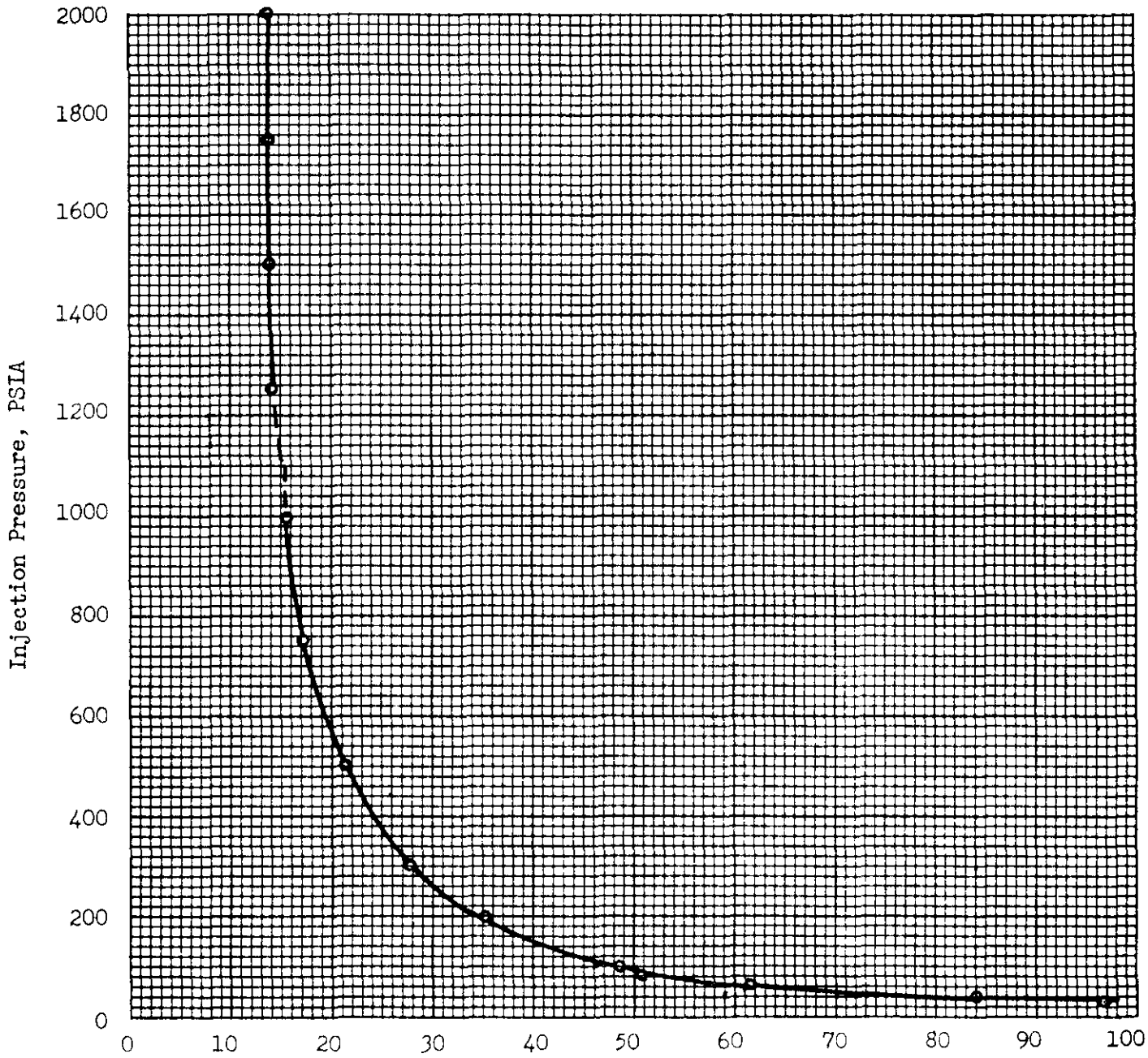
Company Union Oil Company of Canada Ltd. Formation Old Fort Sand
Well Colville D-45 County Northwest Territories
Field Colville State Canada

Sample Number: 15
Permeability, Md.: 10



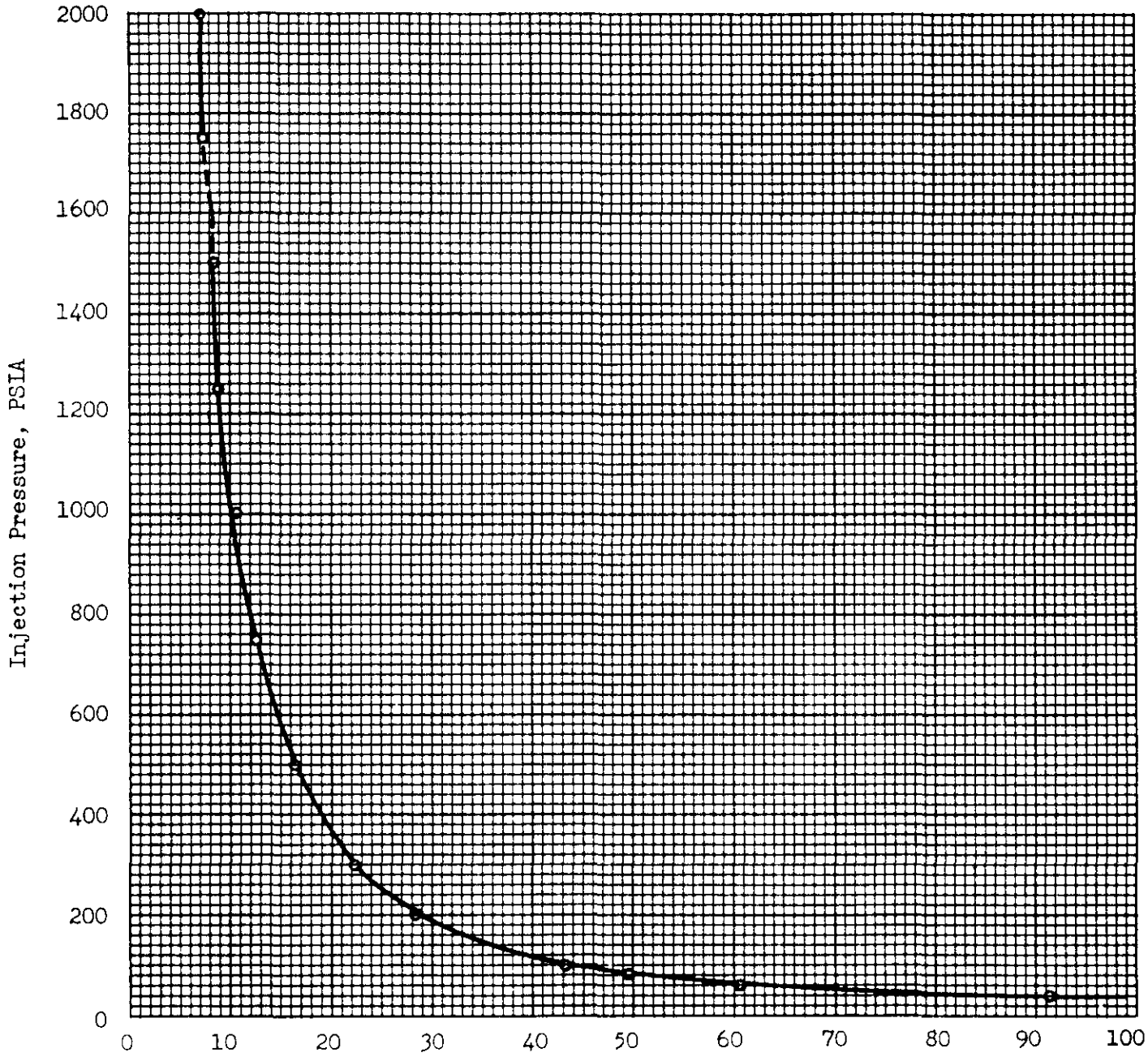
Company Union Oil Company of Canada Ltd. Formation Old Fort Sand
Well Colville D-45 County Northwest Territories
Field Colville State Canada

Sample Number: 16
Permeability, Md.: 5.1



Company Union Oil Company of Canada Ltd. Formation Old Fort Sand
Well Colville D-45 County Northwest Territories
Field Colville State Canada

Sample Number: 17
Permeability, Md.: 7.2



CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Special Core Analysis Study

for

UNION OIL COMPANY OF CANADA LIMITED

Stopover K-44 and Colville D-45 Wells

Northwest Territories, Canada

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

March 25, 1976

Union Oil Company of Canada Limited
P. O. Box 999
Calgary, Alberta T2P 2K6
Canada

Attention: Mr. Lorne D. McCluskey

Subject: Special Core Analysis Study
Stopover K-44 and Colville D-45 Wells
Northwest Territories, Canada
File Number: SCAL-75150

Gentlemen:

In letters dated April 25, 1975, June 2, 1975, and June 16, 1975 from Lorne D. McClusky, Core Laboratories, Inc., was requested to perform: (1) Water-Oil Relative Permeability Tests, (2) Mercury Injection Tests, (3) Capillary Pressure Tests, (4) Formation Resistivity Factor Measurements, and (5) Formation Resistivity Index Measurements on sandstone core plugs from the subject wells. The results of the water-oil relative permeability tests are presented herein. The remaining tests are in progress and test results will be submitted as the data becomes available. The core plugs used in this study are identified as to well, sample number, and depth interval on Page 1 and are lithologically described on Page 2.

Fifteen core plugs and nine slabbed well cores were submitted for use in this study. Core plugs, 1-inch in diameter, were drilled from the nine slabbed cores using a diamond core bit with water as the bit coolant and lubricant. All core plugs were extracted of hydrocarbons with toluene, leached of salt with methyl alcohol, and then dried. Air permeabilities and Boyle's law porosities were determined on the cleaned and dried core plugs. The results of the permeability and porosity determinations were submitted to a representative of Union Oil Company of

Canada Limited. Based on the permeability and porosity determinations, core plugs were selected for further testing.

Eleven core plugs, six from the Stopover well and five from the Colville well, were evacuated and saturated with either a simulated Stopover formation water or a simulated Colville formation water. Initial (pseudo-connate) water saturations which averaged 13.0 per cent pore space for the Colville D-45 well and 21.5 per cent pore space for the Stopover K-44 well were established using a centrifugal technique. Effective permeabilities to oil were measured in the presence of the initial water saturations. One core plug from each well contained insufficient permeability for further testing and was deleted from the testing program. Water-oil relative permeability tests were performed using the proper injection water. The results of the water-oil relative permeability tests are summarized by well on Page 3, presented in tabular form on Pages 4 through 11, and in graphical form on Pages 12 through 27.

Because of the limited oil production following water breakthrough for Sample 115, insufficient data was available to calculate the relative permeability characteristics. The results of this test are summarized on Page 3 with the water-oil relative permeability data; however, only end-point data is presented.

The properties of the fluids used in the water-oil relative permeability tests are listed below for your convenience.

Fluid	Temperature, °F.	Density, gm/cc.	Viscosity, Centipoises
Refined Mineral Oil	70	0.8348	20.6
	90	0.8272	12.9
	110	0.8196	8.61
Simulated Colville Water	70	1.038	1.067
	90	1.035	0.845
	110	1.032	0.687
Simulated Stopover Water	70	1.023	1.026
	90	1.019	0.810
	110	1.014	0.653

The results of the tests on Samples 50A and 98 from the Stopover K-44 well indicate both channeling and plugging. The channeling is indicated by the rapid increase in the relative permeability-to-water curves (Pages 21 and 25) at the low water saturations and the plugging is indicated by the suppressed relative permeability-to-water curves at the high water saturations.

Should you have any questions pertaining to these test results, or if we can be of any assistance, please do not hesitate to contact us.

Very truly yours,

Core Laboratories, Inc.

Duane L. Archer (JB)

Duane L. Archer, Manager
Special Core Analysis

DLA:JWW:tl
10 cc. - Addressee

Company Union Oil Company of Canada Limited
Formation Old Fort Sand
Number of Wells Two
County Northwest Territories
Field As Noted
State Canada

Identification of Samples

Sample Number	Company	Well	Depth, Feet
		Stopover Field	
50A	Union Oil Co. of Canada Ltd.	Union Oil Stopover K-44	2784.1-85.0
88			2813.2-13.5
98			2820.8-21.9
103			2825.6-26.2
115			2834.3-34.9
		Colville Field	
1	Union Oil Co. of Canada Ltd.	Union Mobile Colville D-45	3183.2-83.7
11			3218.0-18.7
15			3223.0-23.4
18			3225.9-26.4

Lithological Description

Sample Number	Description
	Colville D-45
1	Ss, lt gry, v/fn-silt grn, apparent SiO_2 cement, well indurated, tr musc,pyrite
11	Ss, lt gry-white, fn-v/fn grn, apparent SiO_2 cement, mod-poor indurated, med grn laminar, tr musc
15	Ss, lt gry-white, fn-v/fn grn, apparent SiO_2 cement, mod-poor indurated, med grn laminae, tr musc
18	Ss, lt gry-white, fn-v/fn grn, apparent SiO_2 cement, mod-poor indurated, med grn laminae
	Stopover K-44
50A	Ss, red-brn, cse-v/fn grn, apparent SiO_2 cement, well indurated, cse grn concentrations
88	Ss, buff-white, med-fn grn, apparent SiO_2 cement, mod indurated, red-brn staining an upper portion
98	Ss, red-brn-buff white, med-fn grn, apparent SiO_2 cement, well indurated, blotchy color staining, grns uniform
103	Ss, red-brn, cse-fn grn, apparent SiO_2 cement, mod-poor indurated, blotchy color appearance
115	Ss, red-brn-buff white, med-fn grn, apparent SiO_2 cement, well indurated, blotchy color appearance

Summary of Waterflood Test Results

Sample Number	Depth, Feet	Air Permeability, Millidarcys	Porosity, Per Cent	Initial Conditions: Water Saturation, Per Cent Pore Space	Initial Conditions: Oil Permeability, Millidarcys	Terminal Conditions: Oil Saturation, Per Cent Pore Space	Terminal Conditions: Water Permeability, Millidarcys	Oil Recovered, Per Cent Pore Space	Oil Recovered, Per Cent Oil in Place
				Colville D-45					
1	3183.2-83.7	0.35	11.7	14.6	0.065	39.2	0.028	46.2	54.0
11	3218.0-18.7	12	14.0	13.8	8.5	49.3	6.4	36.9	42.8
15	3223.0-23.4	7.3	13.2	11.6	4.8	52.4	4.1	36.0	40.8
18	3225.9-26.4	20	15.1	11.9	10.5	38.8	8.8	49.3	55.9
				Stopover K-44					
50A	2784.1-85.0	1.2	8.3	28.7	0.67	52.4	0.001	18.9	26.6
88	2813.2-13.5	130	12.8	12.6	117	48.6	27	38.8	44.4
98	2820.8-21.9	12	10.1	25.8	9.0	55.3	0.15	18.9	25.5
103	2825.6-26.2	118	14.7	18.1	100	42.0	7.5	39.9	48.7
115*	2834.3-34.9	1.7	10.8	22.2	8.7	49.0	0.29	28.8	37.0

* Insufficient data for relative permeability calculation.

Water-Oil Relative Permeability Data

Sample Number 1
Air Permeability, Md. 0.35
Oil Permeability at
Initial Water Saturation, Md. 0.065

Initial Water Saturation,
Per Cent Pore Space 14.6
Porosity, Per Cent 11.7

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
14.6		.000	1.000
35.5	.070	.027	.388
43.2	.687	.103	.150
49.4	4.66	.205	.044
54.3	25.3	.304	.012
56.3	59.5	.345	.0058
58.6	216	.389	.0018
59.6	540	.405	.00075
60.8		.431	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

Sample Number 11
Air Permeability, Md. 12
Oil Permeability at
Initial Water Saturation, Md. 8.5

Initial Water Saturation,
Per Cent Pore Space 13.8
Porosity, Per Cent 14.0

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
13.8		.000	1.000
19.7	.098	.035	.355
23.4	.973	.178	.183
25.0	1.74	.240	.138
29.1	5.72	.389	.068
35.2	22.4	.538	.024
39.8	57.3	.617	.011
43.5	124	.661	.0053
45.5	188	.690	.0037
50.7		.746	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

Sample Number 15
Air Permeability, Md. 7.3
Oil Permeability at
Initial Water Saturation, Md. 4.8

Initial Water Saturation,
Per Cent Pore Space 11.6
Porosity, Per Cent 13.2

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
11.6		.000	1.000
16.6	.511	.225	.440
20.7	2.07	.420	.203
22.1	2.93	.468	.160
23.5	4.12	.515	.125
27.8	10.4	.617	.059
31.7	22.7	.680	.030
39.0	97.5	.780	.0080
41.3	162	.805	.0050
47.6		.850	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

Sample Number 18
Air Permeability, Md. 20
Oil Permeability at Initial Water Saturation, Md. 10.5

Initial Water Saturation, Per Cent Pore Space 11.9
Porosity, Per Cent 15.1

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
11.9		.000	1.000
24.2	.108	.038	.350
29.4	.723	.141	.195
32.0	1.43	.209	.146
36.3	4.00	.332	.083
42.5	15.0	.540	.036
44.9	23.0	.621	.027
47.3	36.5	.693	.019
50.0	58.4	.759	.013
53.1	87.9	.800	.0091
55.0	120	.825	.0069
61.2		.839	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

Sample Number 50A
Air Permeability, Md. 1.2
Oil Permeability at
Initial Water Saturation, Md. 0.67

Initial Water Saturation,
Per Cent Pore Space 28.7
Porosity, Per Cent 8.3

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
28.7		.000	1.000
30.4	.050	.0049	.098
32.5	1.00	.010	.010
34.5	4.33	.013	.0030
35.9	7.78	.014	.0018
38.4	17.2	.016	.00093
40.6	33.8	.017	.00051
43.0	59.8	.018	.00030
47.6		.019	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

Sample Number 88
Air Permeability, Md. 130
Oil Permeability at Initial Water Saturation, Md. 117
Initial Water Saturation, Per Cent Pore Space 12.6
Porosity, Per Cent 12.8

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
12.6		.000	1.000
19.1	.0080	.0049	.610
24.3	.068	.027	.399
28.5	.199	.055	.277
31.3	.369	.076	.206
35.5	.835	.106	.127
39.4	1.94	.132	.068
42.4	4.62	.157	.034
44.4	9.10	.173	.019
45.8	14.8	.183	.012
46.7	21.6	.190	.0088
48.5	53.9	.205	.0038
49.3	92.2	.211	.0023
51.4		.231	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

Sample Number 98
Air Permeability, Md. 12
Oil Permeability at Initial Water Saturation, Md. 9.0
Initial Water Saturation, Per Cent Pore Space 25.8
Porosity, Per Cent 10.1

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
25.8		.000	1.000
30.3	.040	.0078	.195
33.7	.214	.012	.056
38.3	1.52	.014	.0092
41.1	4.41	.015	.0034
43.1	16.7	.015	.0009
44.3	533	.016	.00003
44.7		.016	

* Relative to oil permeability.

Water-Oil Relative Permeability Data

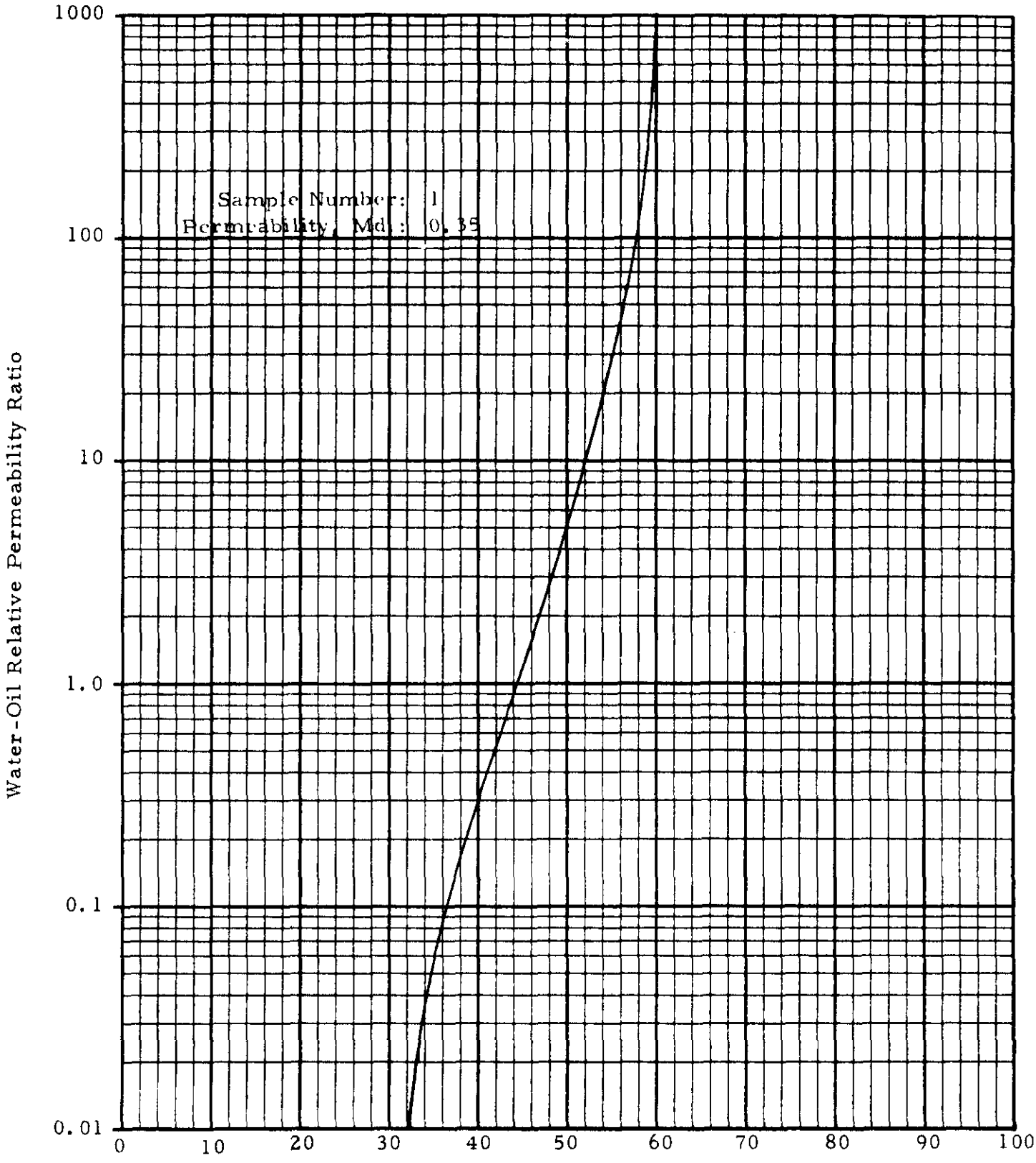
Sample Number 103
Air Permeability, Md. 118
Oil Permeability at Initial Water Saturation, Md. 100

Initial Water Saturation, Per Cent Pore Space 18.1
Porosity, Per Cent 14.7

Water Saturation, Per Cent Pore Space	Water-Oil Relative Permeability Ratio	Relative Permeability To Water*, Fraction	Relative Permeability to Oil*, Fraction
18.1		.000	1.000
35.3	.0063	.0014	.221
41.2	.058	.0070	.121
47.3	.444	.024	.054
52.3	2.68	.045	.017
54.9	11.4	.057	.0050
55.9	35.8	.061	.0017
56.8	112	.067	.00060
57.3	260	.069	.00027
58.1		.075	

* Relative to oil permeability.

Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Union Mobile Colville D-45 County Northwest Territories
Field Colville State Canada



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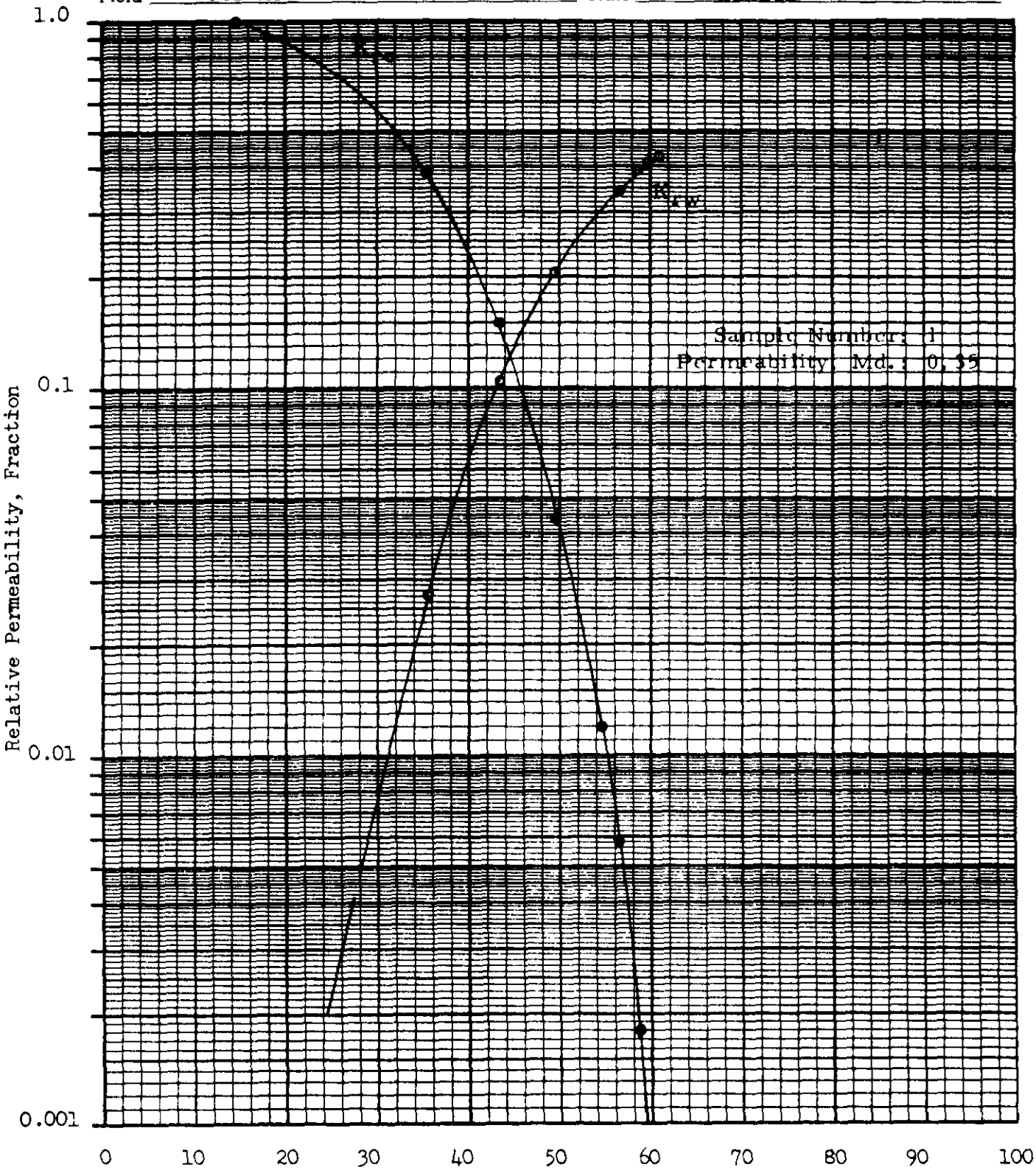
Field Colville State Canada



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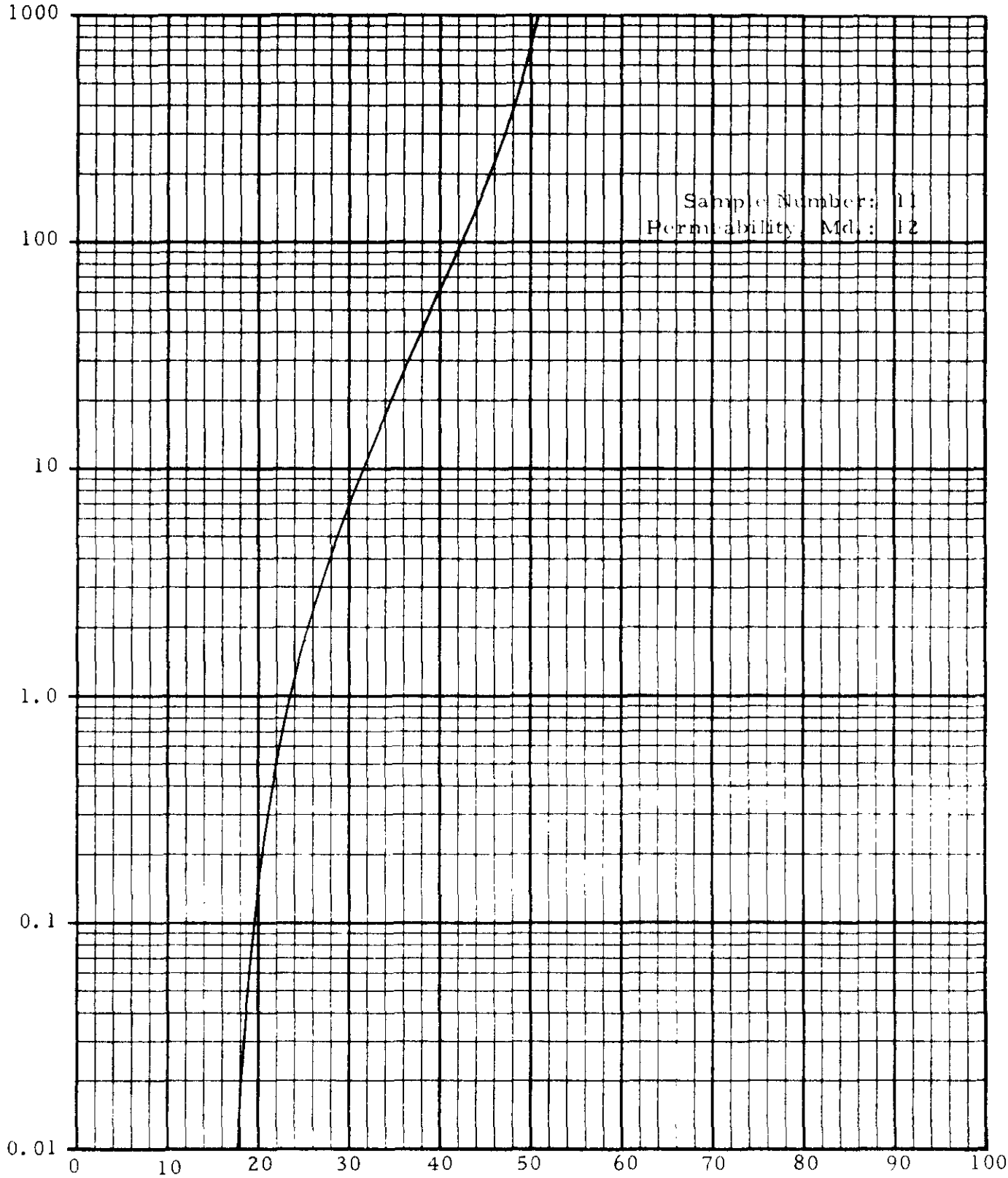

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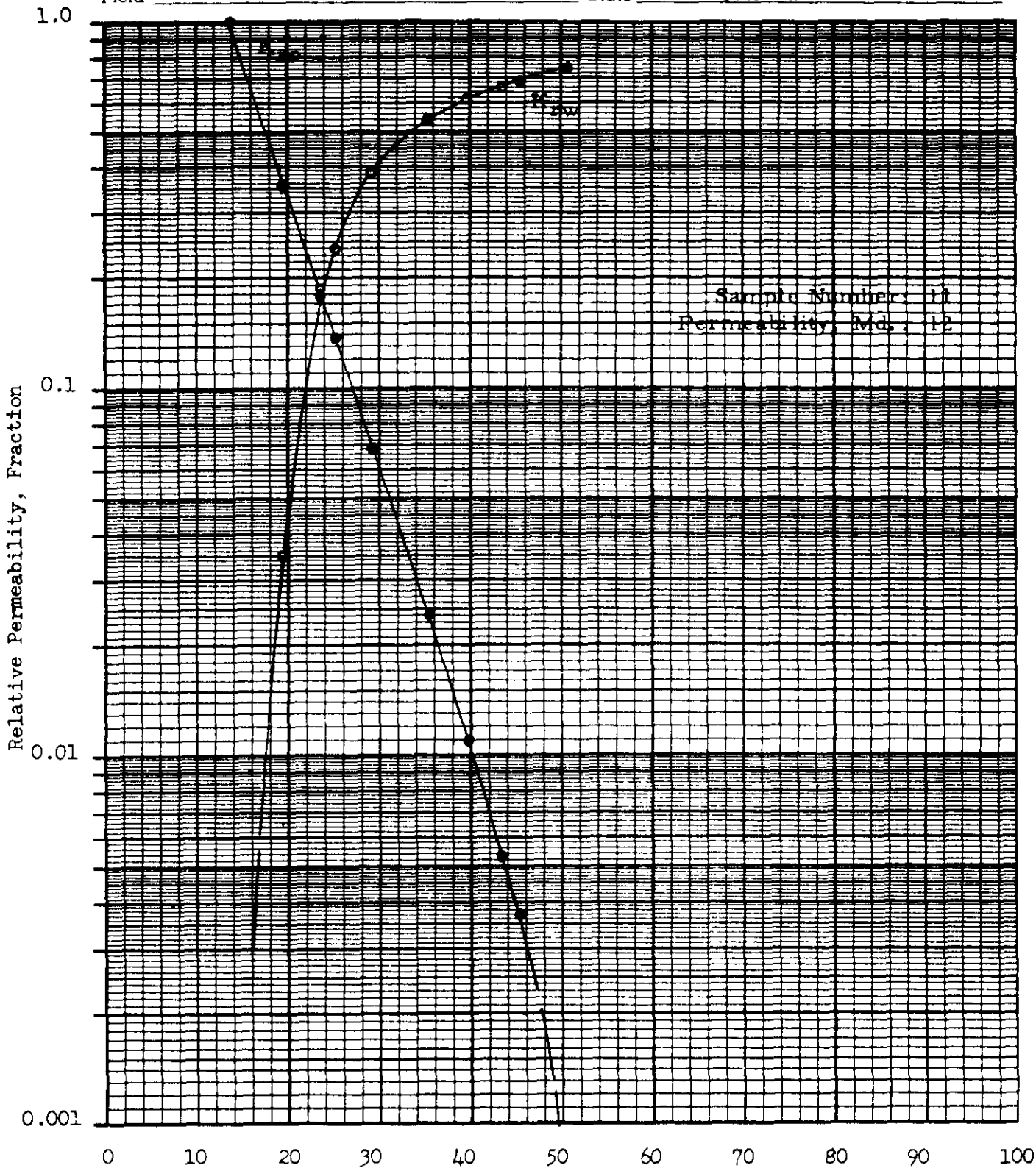

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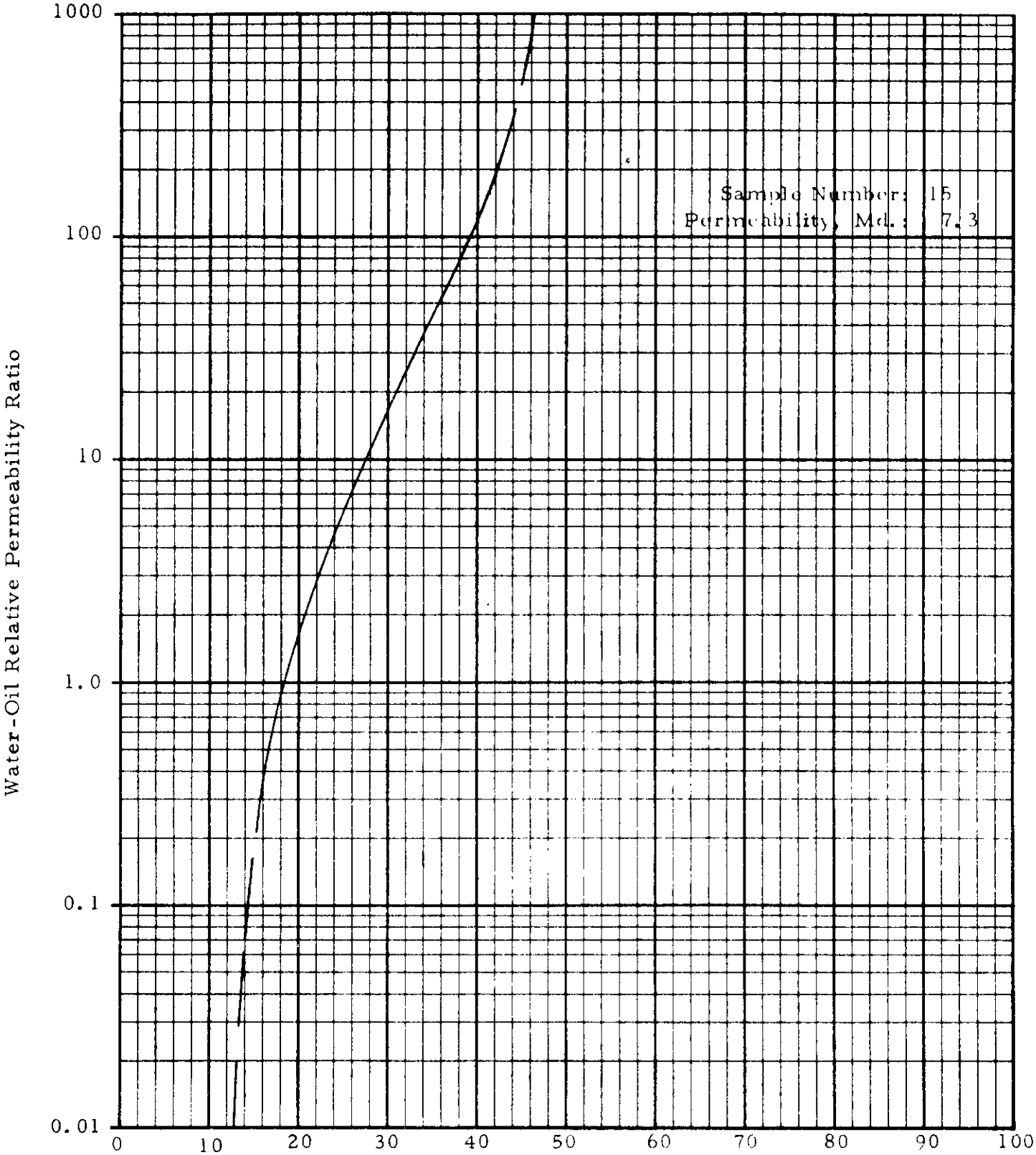
Field Colville State Canada



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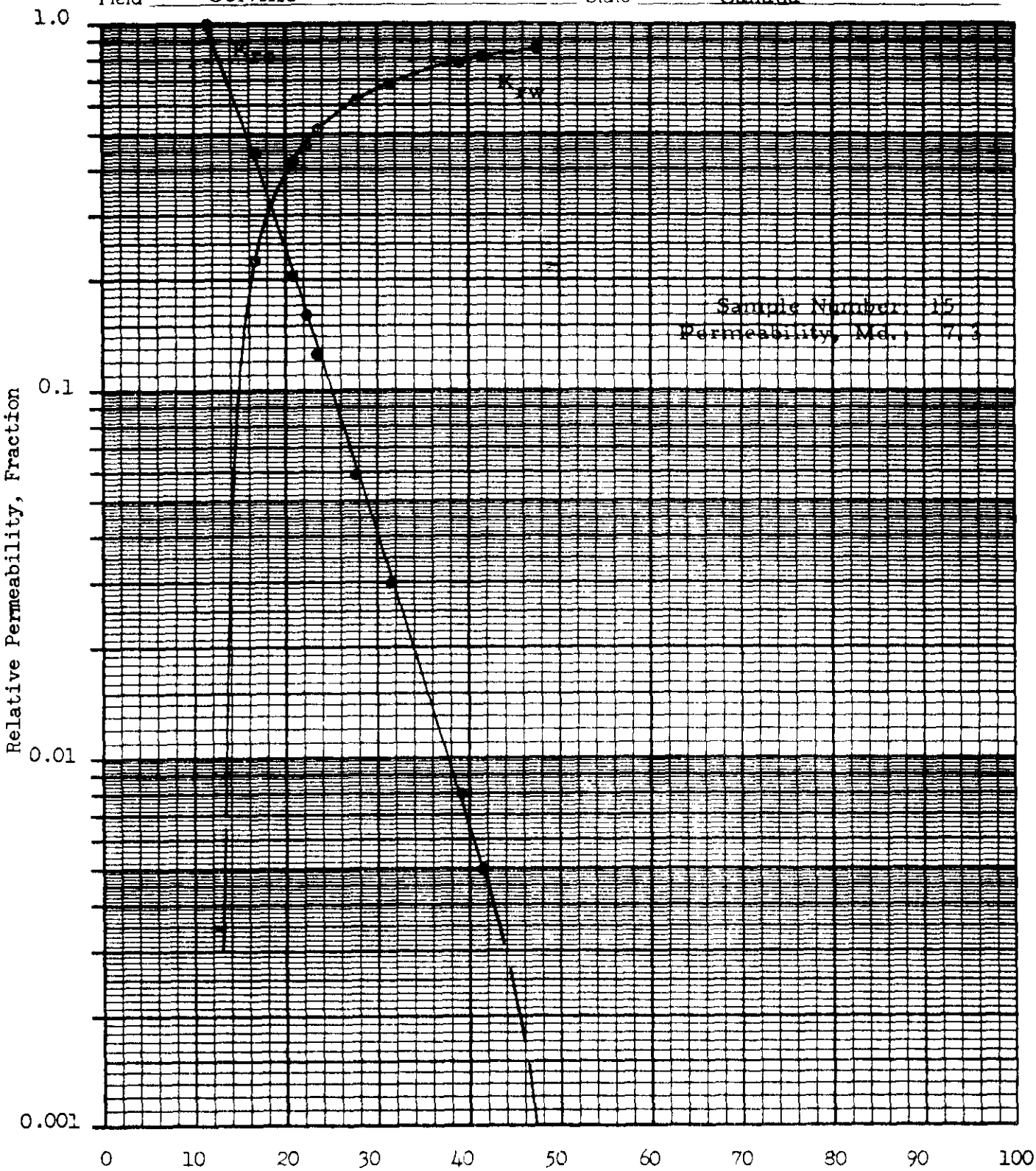
Field Colville State Canada



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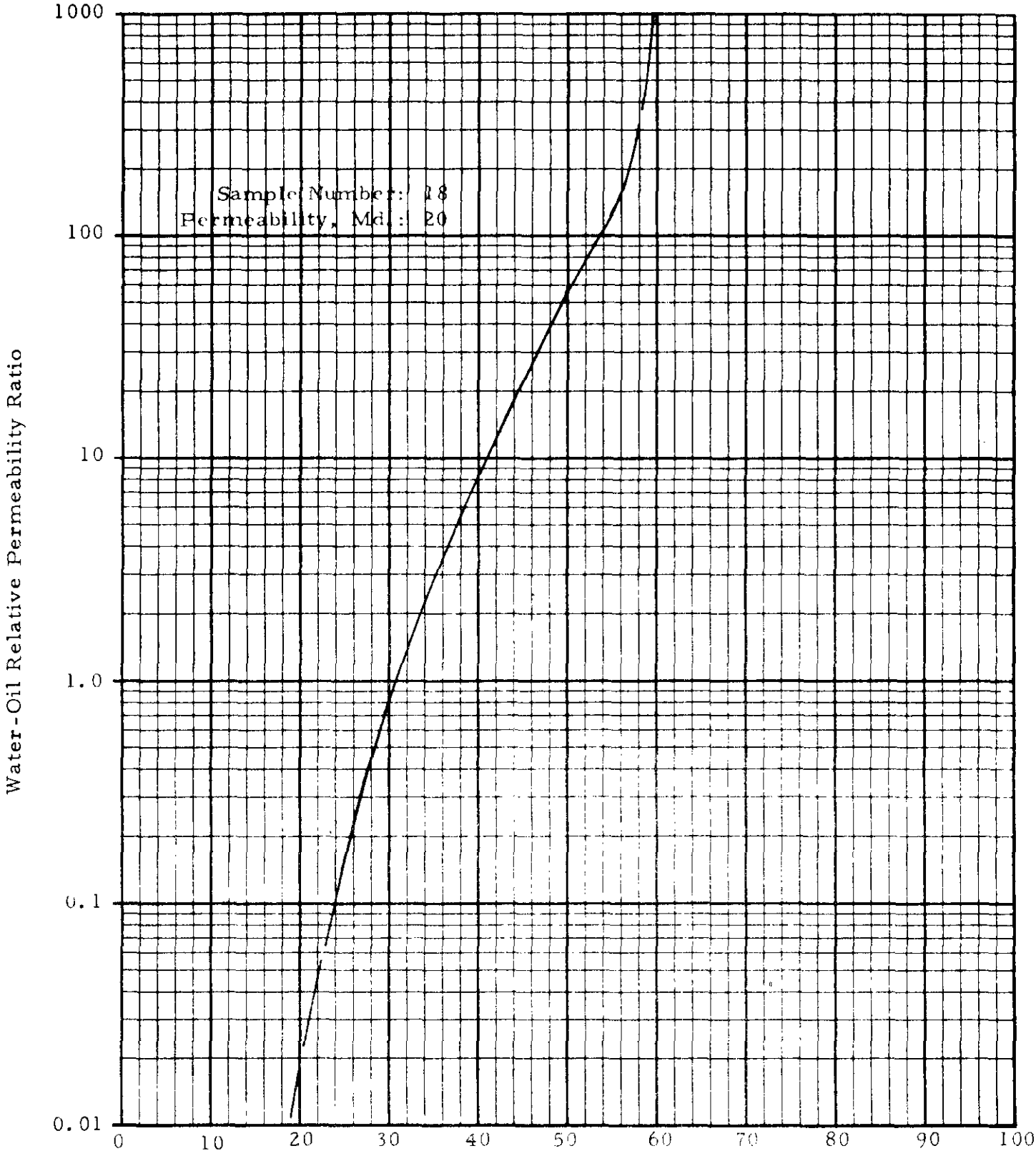
Field Colville State Canada



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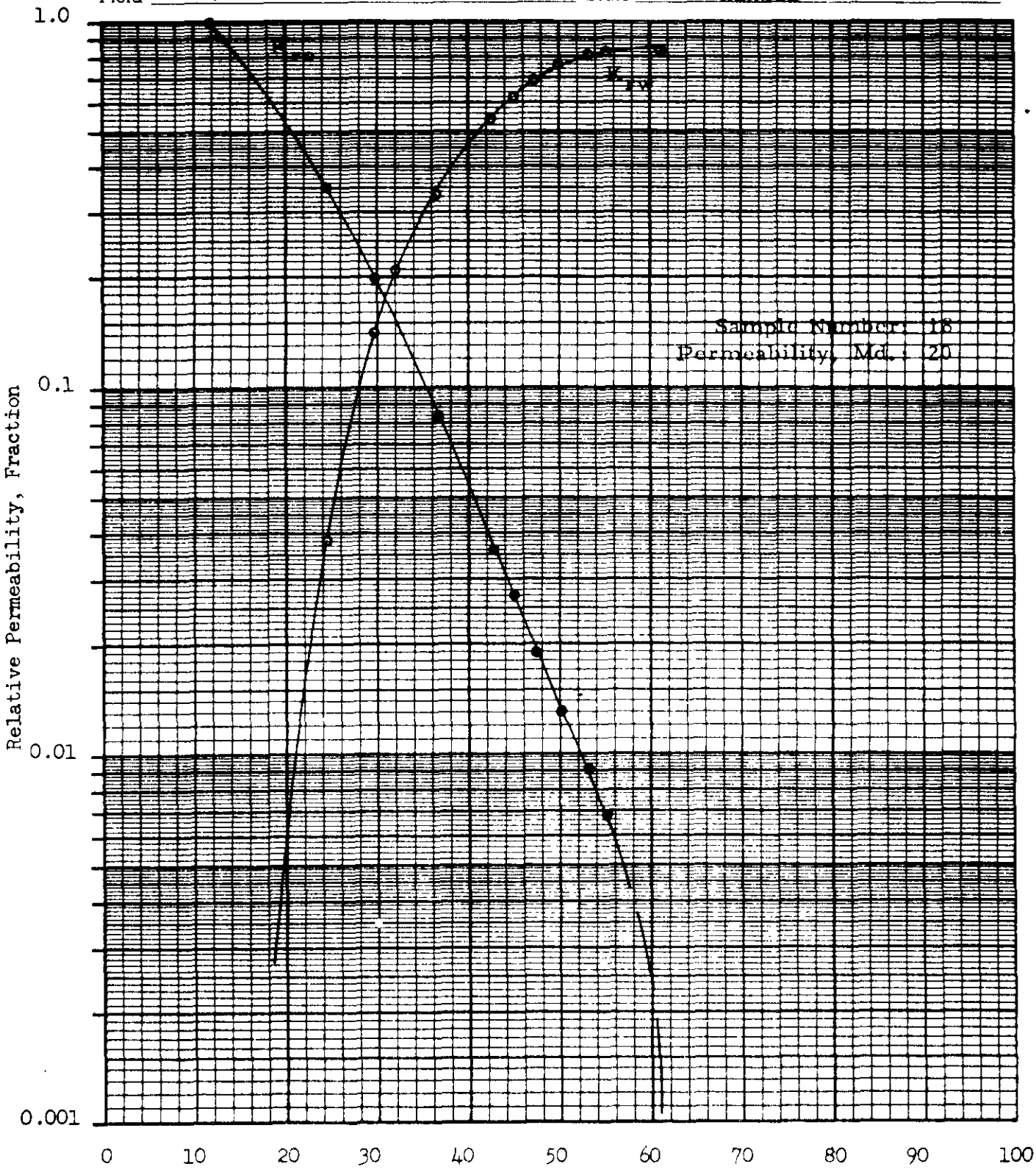
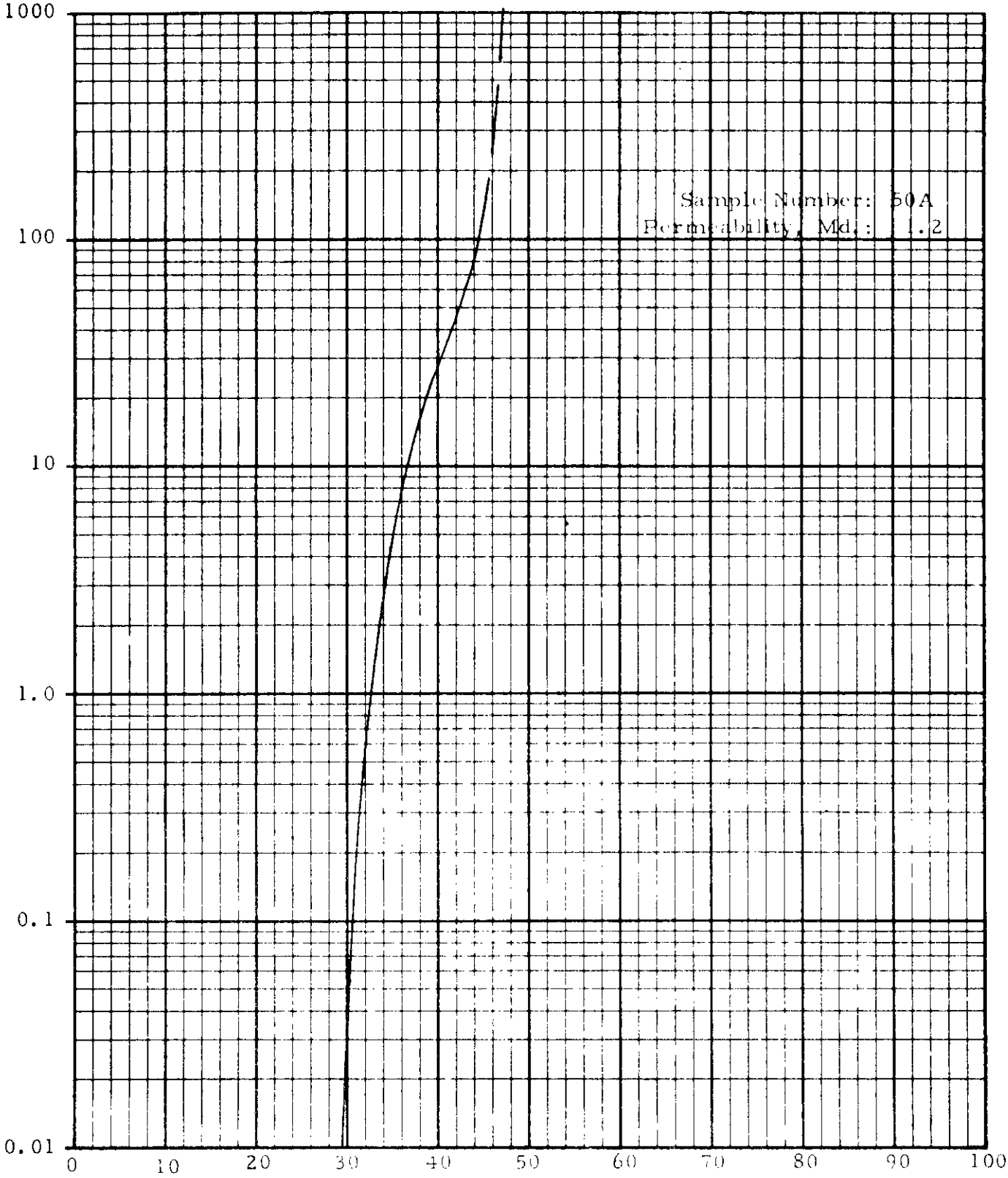
Well Union Mobile Colville D-45 County Northwest Territories
Field Colville State Canada



Company Union Oil Co. of Canada Ltd. Formation Old Fort Sand
Well Union Oil Stopover K-44 County Northwest Territories
Field Stopover State Canada



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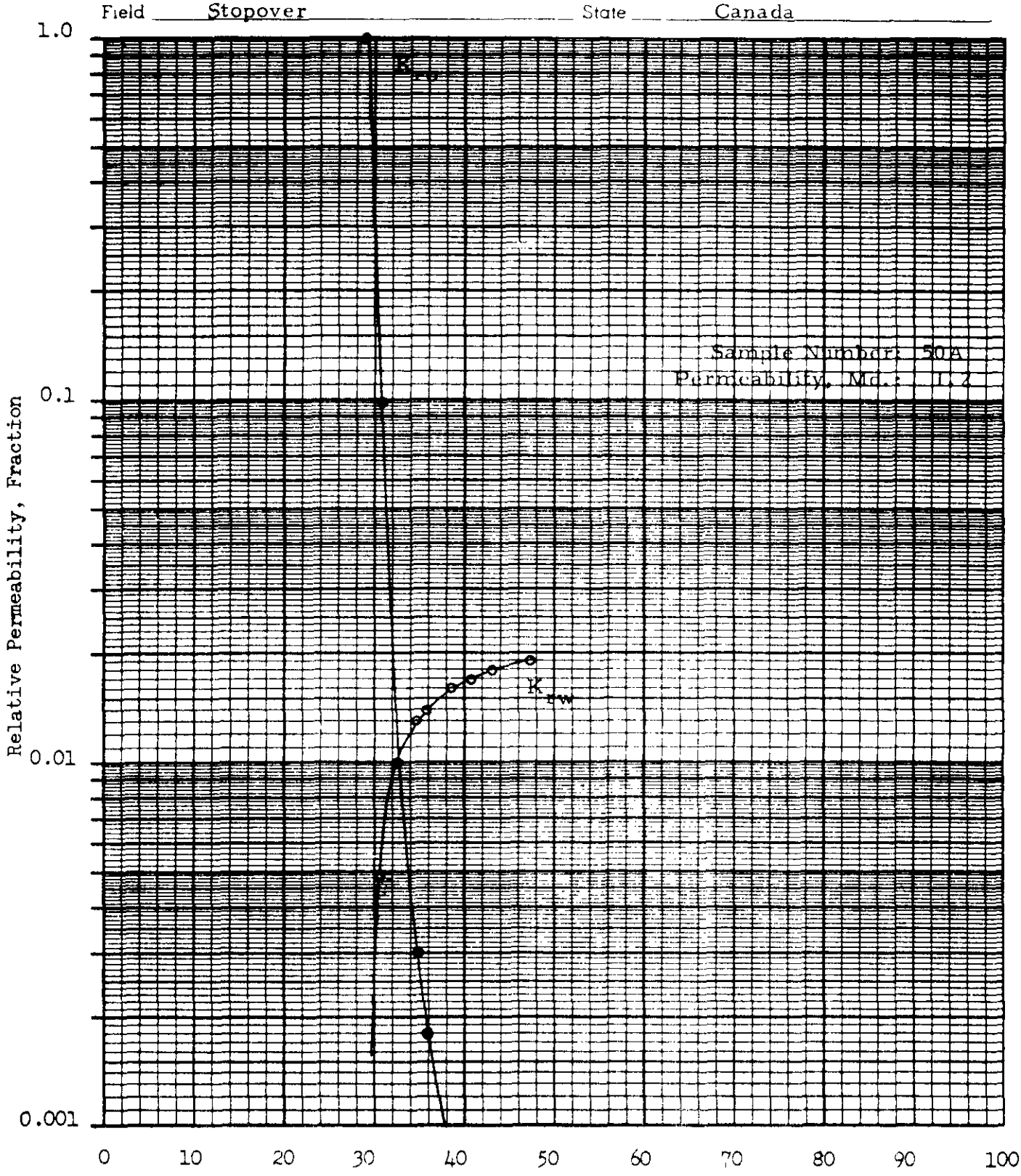
Well Union Oil Stopover K-44 County Northwest Territories
Field Stopover State Canada



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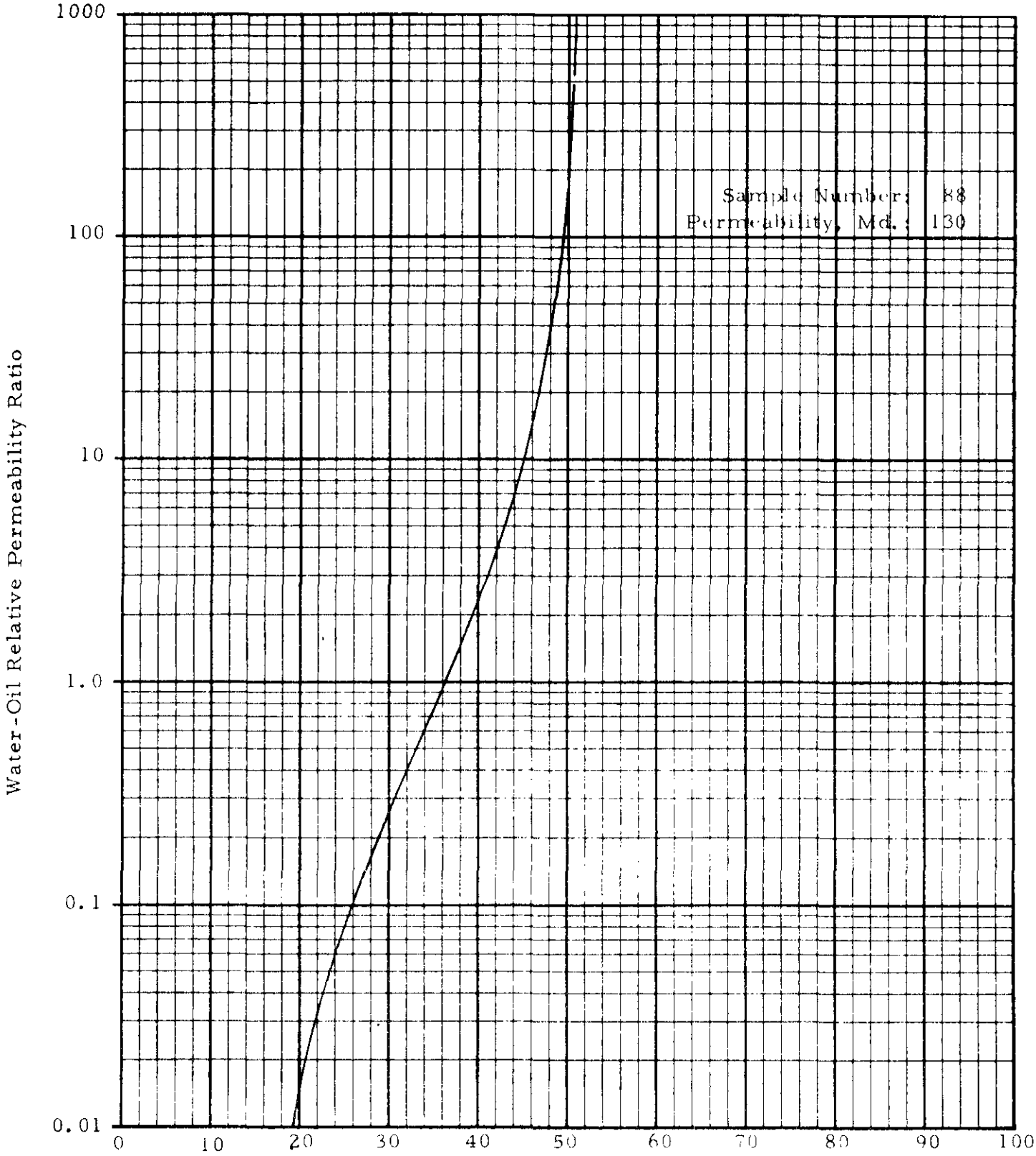
Well Union Oil Stopover K-44 County Northwest Territories
Field Stopover State Canada



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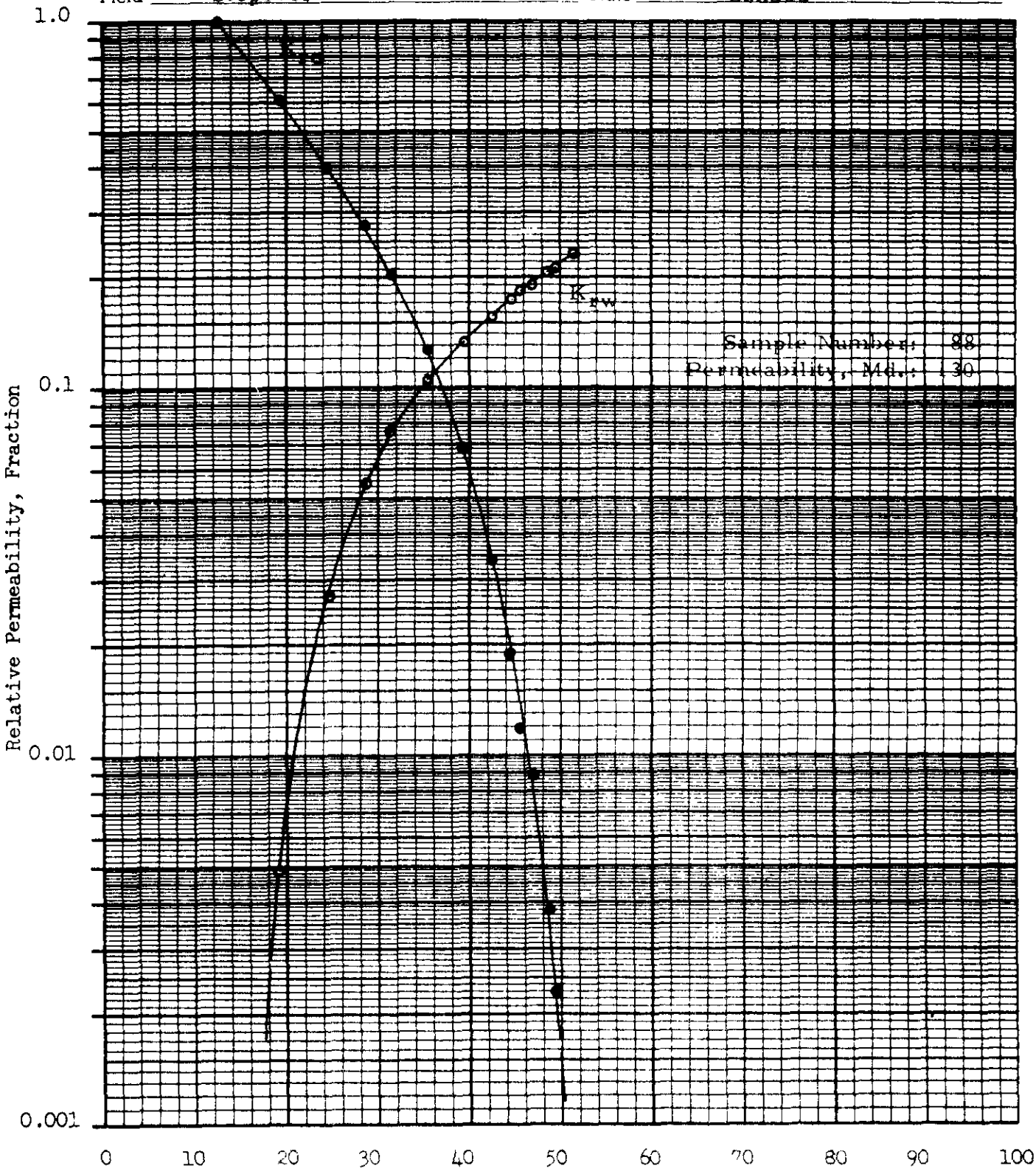

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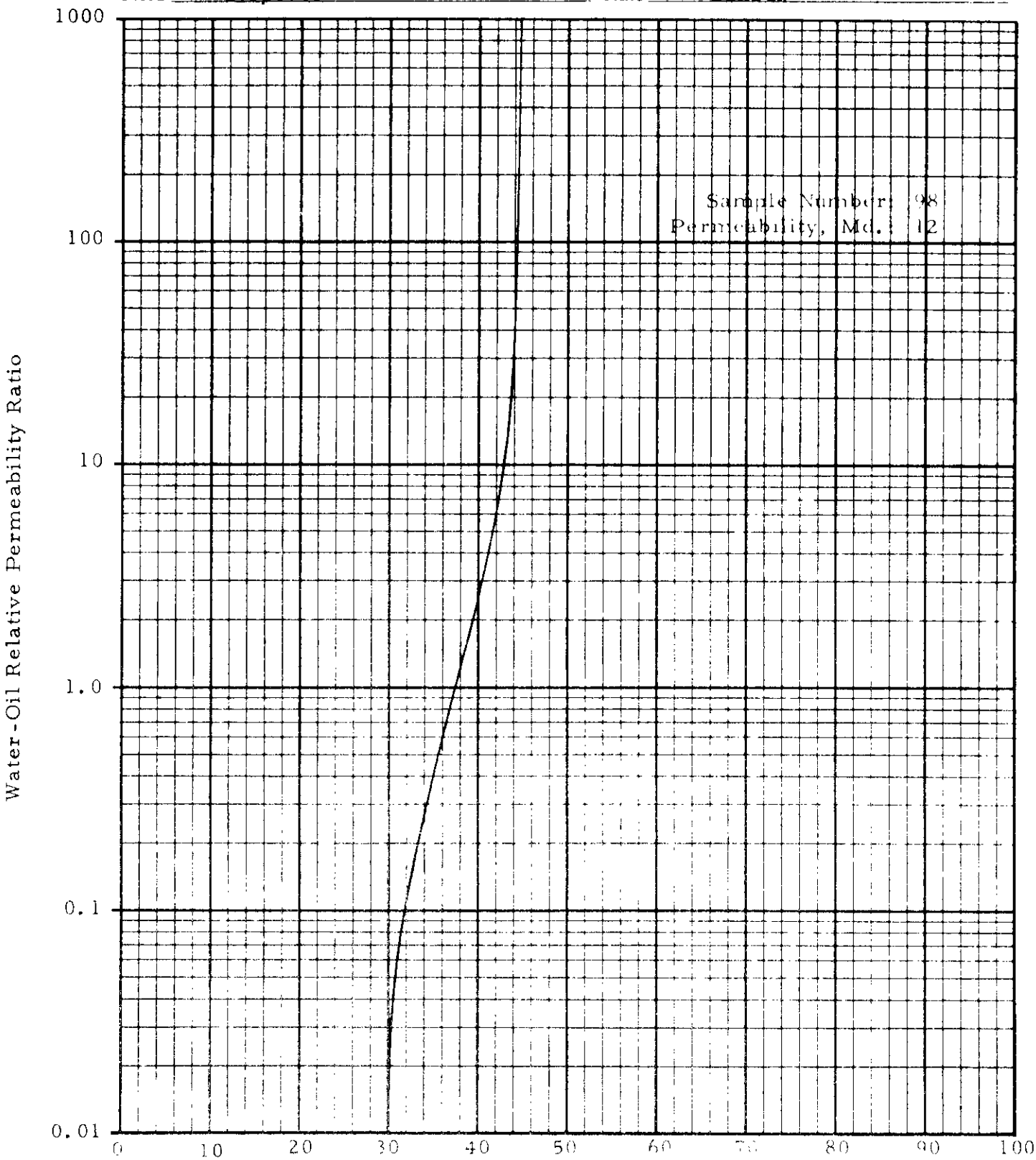

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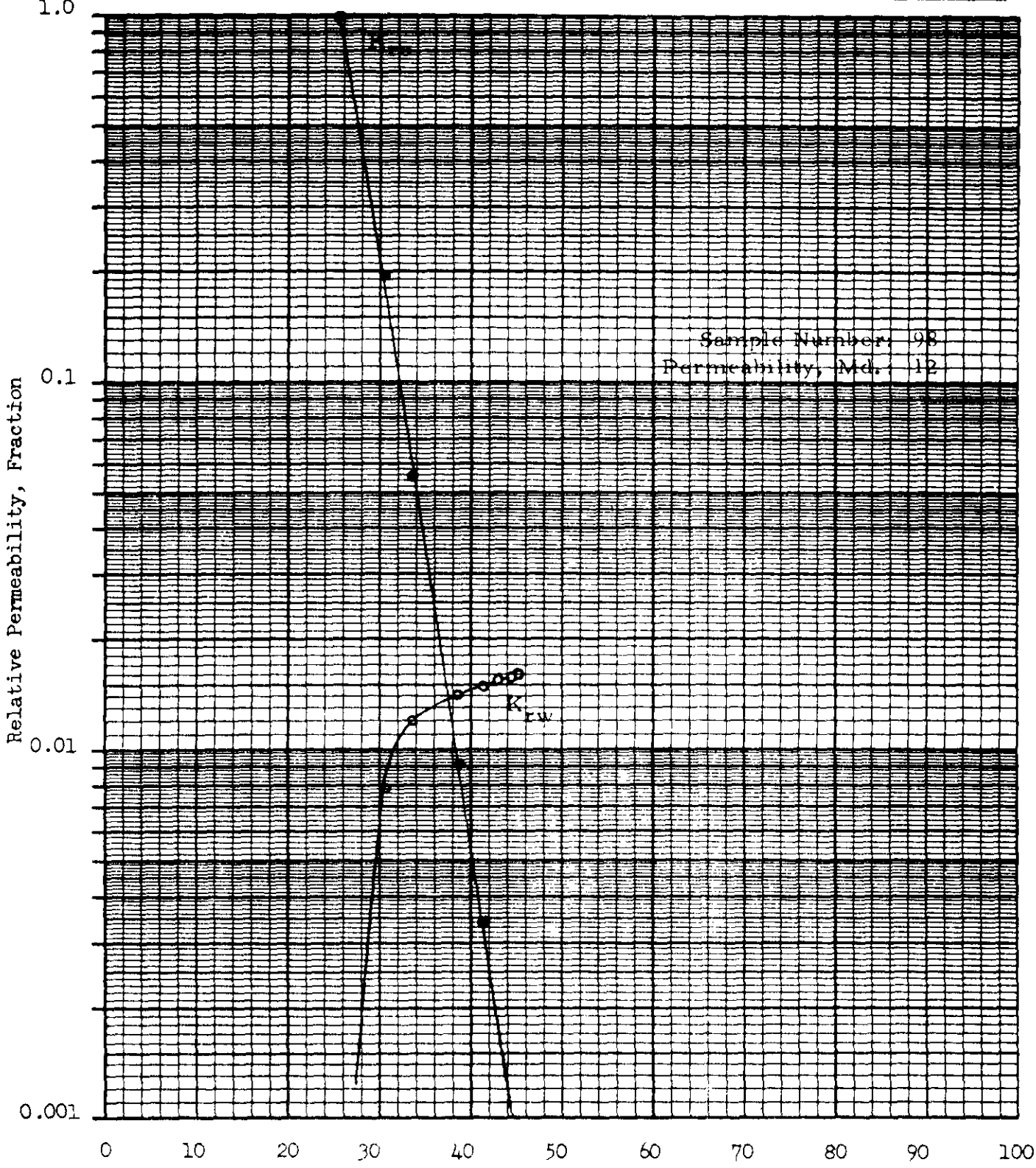

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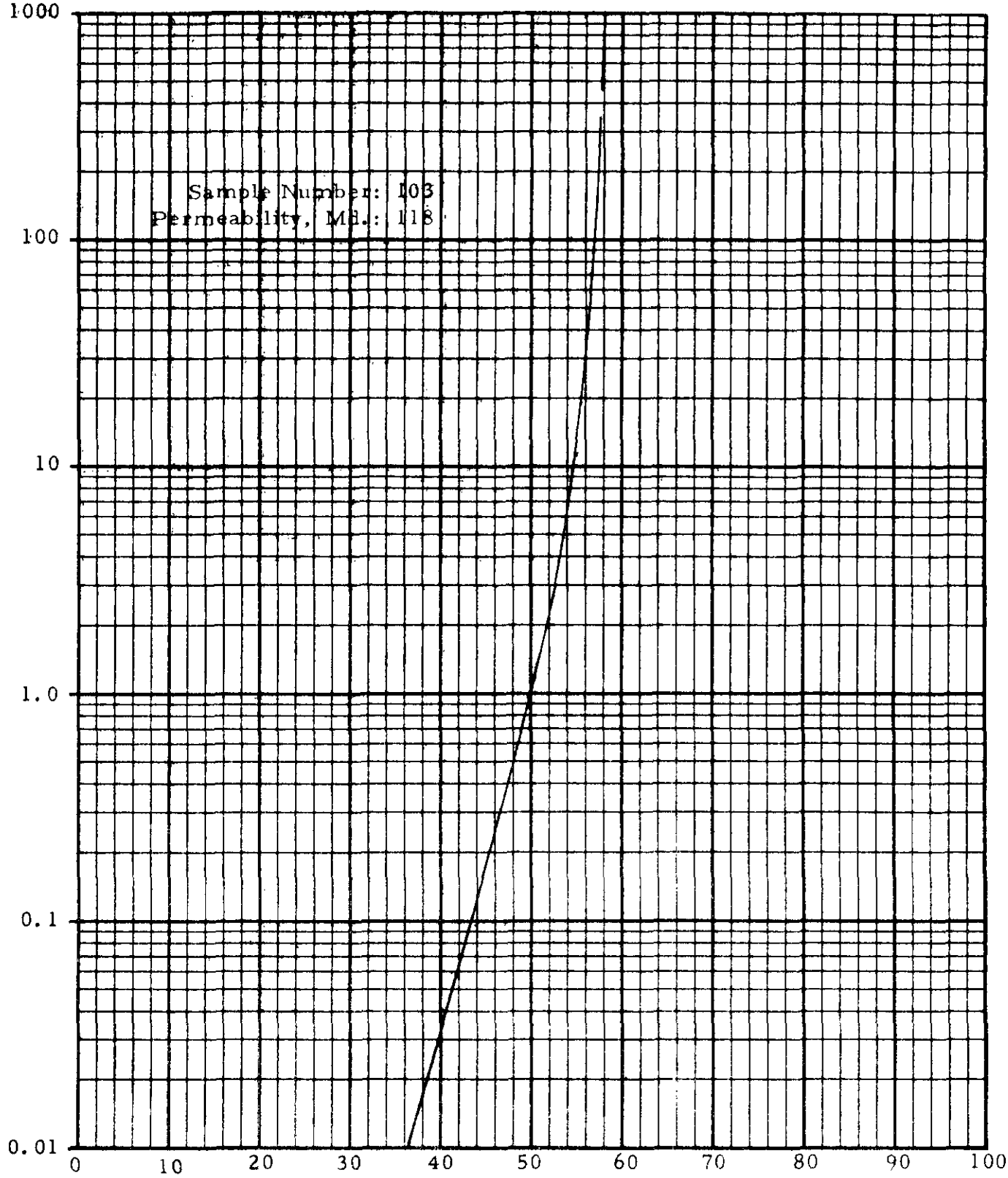

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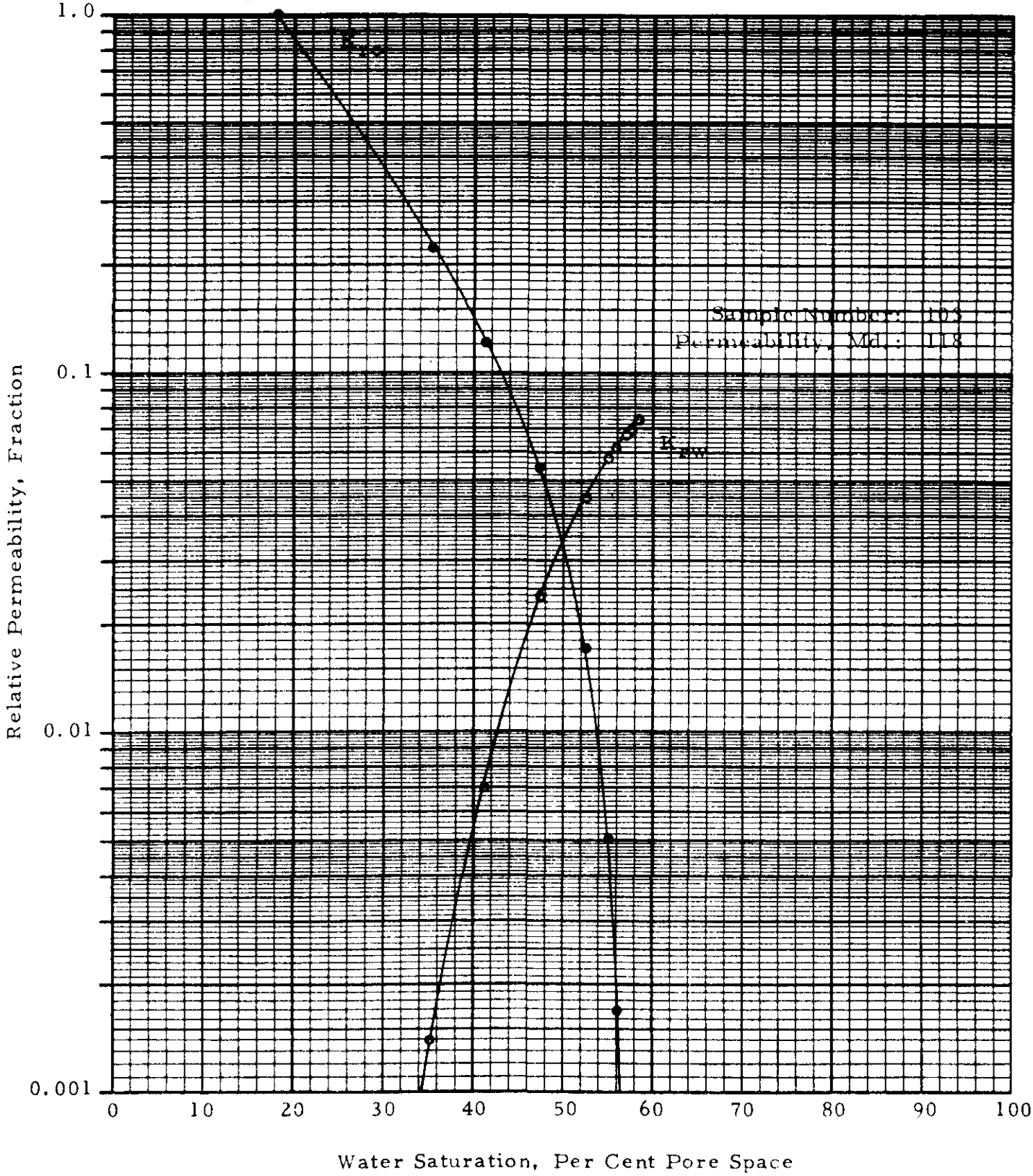

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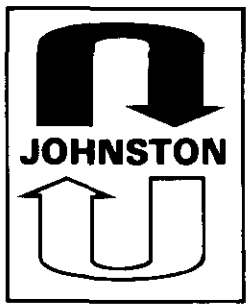
technical report



SPECIAL DATA ANALYSIS

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DRILL STEM TEST SPECIAL DATA ANALYSIS

Union Oil Company of Canada Limited DST #1
Union IOL Stopover K-44 Unit Corner
123°38'32.00, 67°33'31.00 E10771
2724 - 2840'
March 20, 1975

April 10, 1975

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 209 bbls/day of water was noted during this test.

2. Reservoir Pressure: Extrapolation of the initial shut-in pressure build-up indicates a maximum reservoir pressure of 1,253 psig at recorder depth. Mechanical stabilization of the final shut-in pressure build-up indicates a maximum reservoir pressure of 1,251 psig at recorder depth. The difference between the initial and final shut-in pressure of 2 psi is insignificant.

3. Permeability: The calculated transmissibility factor of 6,796.7 md.ft./cp. indicates an average effective permeability to water of 75.5 md. for the reported 10 foot porous interval. The calculations were based on a slope of 5 psi/log cycle obtained from the final shut-in build-up plot. It was assumed for these calculations the product of the viscosity and formation volume factor to be 1.0.

4. Well Bore Damage: The calculated estimated damage ratio of 2.7 indicates that minor well bore damage is present at the time and conditions of this test. This value infers that the rate of production observed at the formation face during this test may be increased 2.7 times if the well bore damage alone were removed.

5. Radius of Investigation: The calculated radius of investigation of this test is 712 feet based on an assumed porosity of 10.2%, compressibility of 33×10^{-6} vol/vol/psi, and other assumptions made in number 3 above.

6. General Comments: The formation exhibits the characteristics of relatively good permeability effective to the reservoir fluid and minor well bore damage is indicated. No unusual characteristics were noted from the analysis of the test data presented.

Yours truly,

Margaret Anderson

B.C. Tanner/M.M. Anderson
Interpretation & Evaluation Department

MMA/pym

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RESERVOIR DATA

WELL: UNIØN ØIL STØPØVER K-44 DST #1

FLØW RATE PRIØR TØ SHUT IN	(BBLS/DAY)	209.000
FØRMATIØN VØLUME FACTØR	(VØL/VØL)	1.000
HØRNER PLØT SLØPE	(PSI/LØG CYCLE)	5.
VISCØSITY	(CP)	1.000
NET THICKNESS	(FT)	90.000
MAX RESERVØIR PRESSURE	(PSIG)	1253.0
FLØWING PRESSURE	(PSIG)	1167.0
FLØW TIME	(MIN)	130.0
PØRØSITY		0.102
CØMPRESSIBILITY	(1/PSI)	0.00000330
WELL BØRE RADIUS	(IN)	3.94
WELL ELEVATIØN	(FT)	1204.0
RECØRDER DEPTH	(FT)	2740.0

TRANSMISSIBILITY	(MD-FT/CP)	6796.68
FLØW CAPACITY	(MD-FT)	6796.68
AVERAGE EFF. PERMEABILITY	(MD)	75.52
PRØDUCTIVITY INDEX	(BBL/DAY/PSI)	6.332
DAMAGE RATIØ		2.68
FLØW WITH DAMAGE REMØVED	(BBL/DAY)	559.74
PØTENTIØMETRIC SURFACE	(FT)	1357.2
RADIUS ØF INVESTIGATIØN	(FT)	711.6

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INPUT DATA FOR OIL RESERVOIR

Q = Flow rate (bbls./day)

B = Formation volume factor (vol./vol.)

M = Horner Plot Slope (psi/log cycle)

P_o = Original pressure, or maximum pressure (psig)

P_f = Flowing pressure (psig)

T = Flow time (min.)

ϕ = Porosity

c = Compressibility (1/psi)

r_w = Well bore radius (in.)

WE = Well elevation (ft.)

RD = Recorder depth (ft.)

Transmissibility: $\frac{kh}{\mu} = \frac{162.6\ QB}{M}$

Flow Capacity: $kh = \left\langle \frac{kh}{\mu} \right\rangle \mu$

Permeability: $k = \left\langle \frac{kh}{\mu} \right\rangle \frac{\mu}{h}$

Productivity Index: $J = 0.0009316 \left\langle \frac{kh}{\mu} \right\rangle$

Damage Ratio: $DR = \frac{Q\ \text{theor}}{Q\ \text{actual}} = \frac{P_o - P_f}{M \left\langle \log \left\langle \frac{KT}{\phi \mu c r_w^2} \right\rangle - 2.85 \right\rangle}$

Flow with Damage Removed: $= Q\ (DR)$

Potentiometric Surface: $2.309\ P_o + WE - RD$

Radius of Investigation: $r_i = \sqrt{\frac{KT}{57600 \phi \mu c}}$

RESERVOIR PRESSURE PLOT

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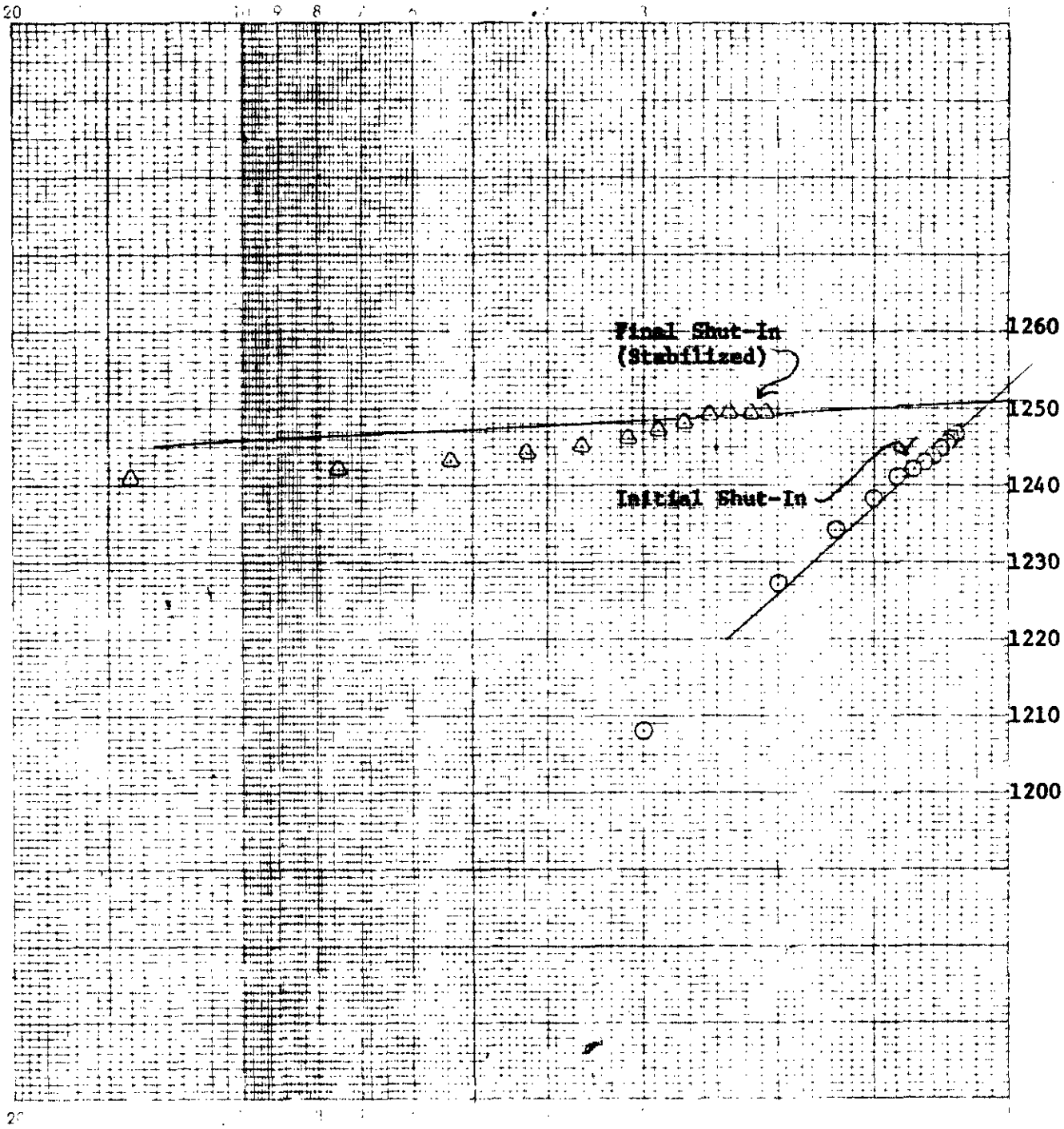
RECORDER No. AK1-2562 CAPACITY 0-4000 FIELD REPORT No E10771

MAXIMUM RESERVOIR PRESSURE P_o = 1253 psig **Initial Shut-In = 1253 psig**

SLOPE OF SHUT-IN CURVE M 1 .5 psig/LOG CYCLE

SLOPE M 1 = P_1 1251 P_{1o} 1246 psig/LOG CYCLE **Final Shut-In = 1251 psig**

SLOPE M 2 = P_1 P_{1o} psig/LOG CYCLE



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

JT-CD-2A

JT-1&E-4B

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321 - 50th AVENUE S.E. CALGARY, ALBERTA T2G 2B3

TEST DATA

Type of Test	Open hole, Bottom hole.				
Time Started in Hole	1400	Hrs.	Tool Opened	1540	Hrs.
First Flow	10	Min.	Initial Shut-In	60	Min.
Second Flow	120	Min.	Second Shut In		Min.
Third Flow		Min.	Final Shut In	120	Min.
Pulled Loose @	2058	Hrs.	Out of Hole	2230	Hrs.
Wt. Set/on Packers	20,000	#	Pulled Loose Wt.	4,000	#

Description of Blow During Test: Strong air blow on preflow and flow, decreasing to fair.

FLUID RECOVERY Was Test Reverse Circulated Yes ☐ No ☒

Total Fluid Recovered: 2,550 Ft.

Description of Fluid Recovered: 2,550' Salty water.

GAS BLOW MEASUREMENT

Measured With: I.D. Riser

Time	Sfce. Choke		M Cubic Feet/Day
		NIL	

REMARKS: Test satisfactory.

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

TOOL SEQUENCE

Tool	Length	O.D.
P.O. Sub	.80	
Jars	5.65	
Sub	.65	
MFE Tool	10.65	
Bypass Tool	3.83	
Recorder	4.40	
Safety Joint	1.75	
S.S. & Packer	7.56	5 1/2"
Total	35.29	
Packer Stub	1.00	
Perfs	10.00	
Recorder	4.40	
Recorder	4.40	
Sub	.65	
Drill Collars	93.23	
Sub	.65	
Bull Nose	1.00	
Total Interval	115.33	
TOTAL LENGTH		

Elevation G.L. 1192 K.B. 1204

Bottom Hole Choke Size 1/2"

Fluid Cushion Type Nil Amt.

MUD AND HOLE DATA

Mud Type Gel W.L.

Filter Cake Visc. 52 Wt. 8.6

Time Taken March 20, 1975

Contractor Tri-City Drilling Rig No. 2

Drill Pipe Size 3 1/2" IF

Drill Collar Size 3 1/2" IF &

Drill Collar Length 218' &

Main Hole Size Rat Hole 6 7/32"

District	Inuvik	Ticket No.	E10771	Date	March 20, 1975 Test No. 1 J.T. No. 1
Company	Union Oil Company of Canada			Address	335 - 8 Avenue S.W.
Well Name	Union IOL Stopover K-44 Unit Corner				Calgary, Alberta T2P 2K6
Number	123°38'32.00, 67°33'31.00			Field	Stopover Province N.W.T.
Formation		Thickness		Co. Rep.	T. Ramsey
Interval	2724 - 2840'	T.D.	2840'	Technician	M. Matson
Distribution of Reports	10 - Calgary			Attention:	D. Connolly
	1 - Fort St. John			Attention:	Production Department

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321 - 50th AVENUE S.E CALGARY, ALBERTA T2G 2B3

E10771

PRESSURE DATA

INSTRUMENT No.		AK1-2525	AK1-5013	AK1-2562	
CAPACITY (psig)		3200	3250	4000	
INSTRUMENT DEPTH FT.		2711	2736	2740	
INSTRUMENT OPENING		Inside	Outside	Outside	
WELL TEMP. °F.	75				
INITIAL HYDROSTATIC	A	1231#	1242#	1253#	
FIRST FLOW	B	55#	64#	71#	
	B-1	289#	298#	299#	
INITIAL SHUT-IN	C	1231#	1241#	1247#	
SECOND FLOW	D	292#	308#	310#	
	D-1	1150#	1160#	1167#	
SECOND SHUT-IN	E				
THIRD FLOW	F				
	F-1				
FINAL SHUT-IN	G	1233#	1243#	1249#	
FINAL HYDROSTATIC	H	1229#	1241#	1249#	

FLUID SAMPLE REPORT

Sample No.
Type 4 1/4"
Depth 2707'
Volume 2050 cc

Sample Pressure:
psig. at Surface
Gravity API @ °F
Gas/Oil Ratio Cu.Ft./bbl.

Recovery:
Cu. Ft. Gas
cc. Oil
cc. Water
cc. Mud
Total Liquid cc.

REMARKS: MFE sample sent to service centre.

PRESSURE INCREMENTS ON RECORDER # AK1-2562

Initial Shut-In

POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$
0	299	----
5	1208	3.00
10	1227	2.00
15	1234	1.67
20	1238	1.50
25	1241	1.40
30	1242	1.33
35	1243	1.29
40	1244	1.25
45	1245	1.22
50	1246	1.20
55	1246.5	1.18
60	1247	1.17

Final Shut-In

POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$
0	1167	-----
10	1241	14.00
20	1242	7.50
30	1243	5.33
40	1244	4.25
50	1245	3.60
60	1246	3.12
70	1247	2.86
80	1248	2.63
90	1249	2.44
100	1249	2.30
110	1249	2.18
120	1249	2.08

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

IT-185-SB

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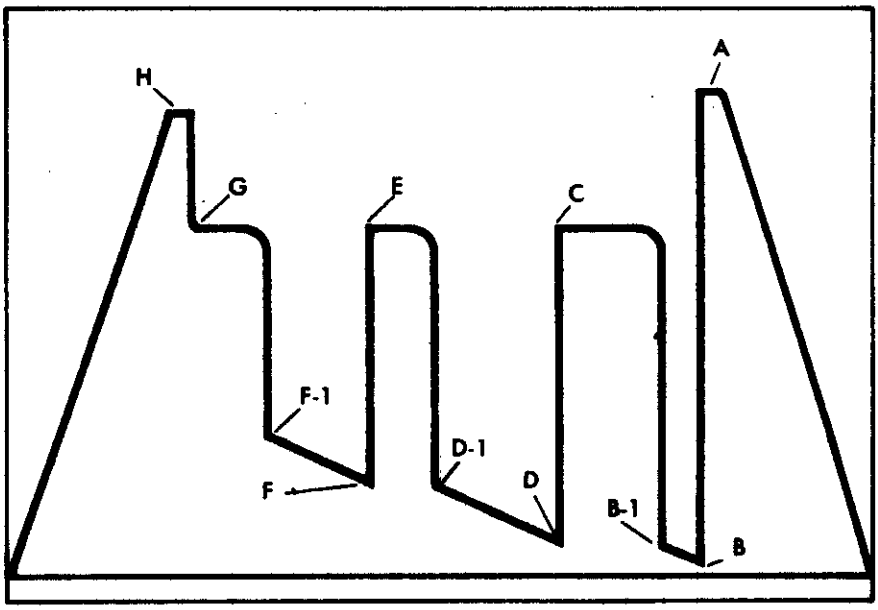
321 - 50th AVENUE S.E. CALGARY, ALBERTA T2G 2B3

GUIDE TO IDENTIFICATION OF DRILL STEM TEST PRESSURE CHARTS

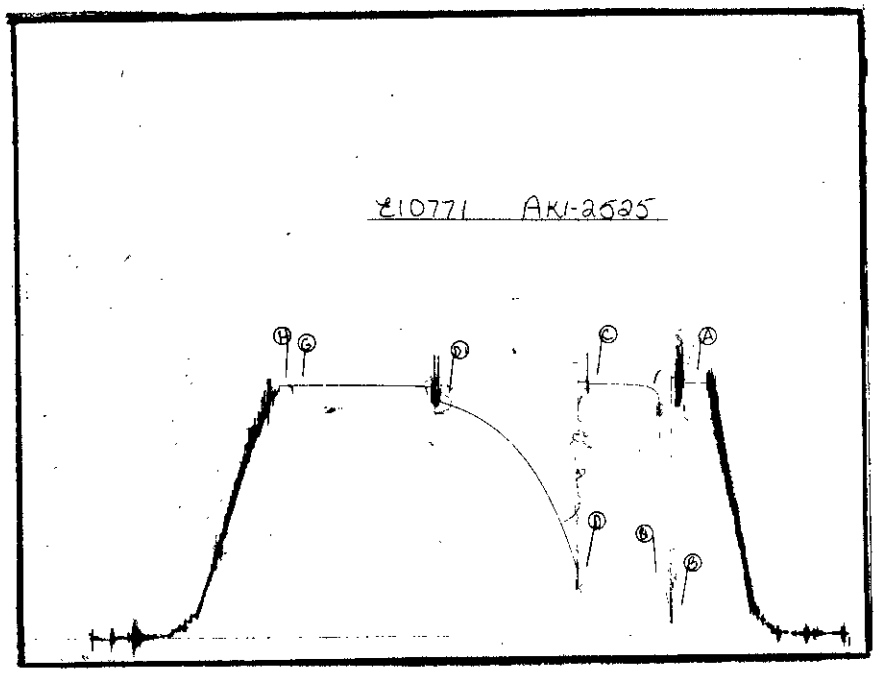
FIELD REPORT NO.	RECORDER NO.
E10771	AK1-2525



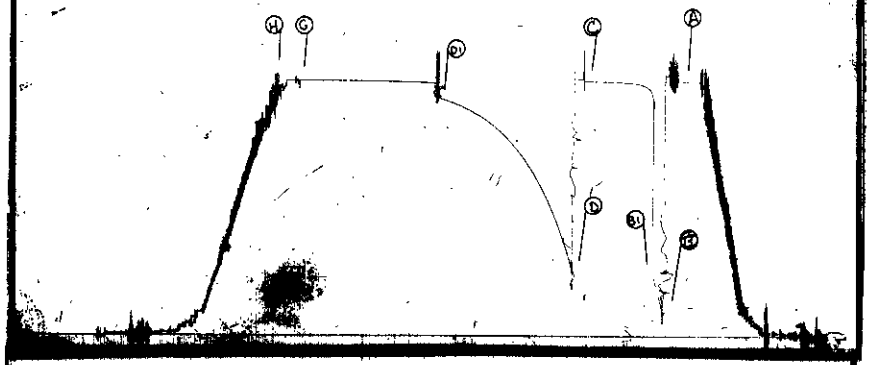
A. Initial Hyd. Mud
B. First Flow
C. Initial Shut-In
D. Second Flow
E. Second Shut-In
F. Third Flow
G. Final Shut-In
H. Final Hyd. Mud

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.



E10771 AKI-5013



E10771 AKI-2562