

To File

From LRD

Re: West Kirkella Area Pressure and PVT Properties

In response to requests from the Petroleum Branch, ~~the~~ pressure surveys and reservoir fluid analyses were obtained at wells operated by Rideau Petroleums Ltd and Saskoil Resources Inc., ~~the~~ in the West Kirkella area. The following is a summary of analysis of this data:

#### Conclusions:

1. The Lodgepole B or Daly pool in West Kirkella is a highly undersaturated pool having an apparently strong water drive. Although no PVT data ~~is~~ is available for the Lodgepole A or Dolomitic Pool, the similarity in density of produced fluid suggests its PVT properties are similar to those of the "B pool".
2. Pressure maintenance operations in the "B pool" would not appear necessary at this time. Pressure data on the "A pool" is <sup>too</sup> limited to completely rule out the need for pressure maintenance.
3. Due to the high viscosity of reservoir crude, conventional waterflooding would not likely result in an efficient sweep of the reservoir.

#### Recommendations:

1. Additional pressure data be obtained, late in 1982 on both A and B pools. This data could, in most cases

be obtained by monitoring of casing pressure after ~~the well was~~ shut in. For the Lodgepole A pool, it may be necessary to obtain fluid levels using a well sounder.

## Discussion

### PVT Properties

Pressurized samples of reservoir crude were obtained ~~on~~ during 1981 on the following wells:

Susteil W. Kirkella Prov. 5-18-12-29

Rideau W. Kirkella 5-17-12-29

These samples were analysed by Core Labs with the following results

	5-18-12-29	5-17-12-29	Average
Bubble point pressure psig (kPag)	85	123 (848)	104
Solution GOR SCF/STB ( $m^3/m^3$ )	9.94 (1.77)	1791 (3.19)	1393 (2.48)
Formation Volume Factor at $P_b$	1.024	1.025	1.0245
at $P_i$			
viscosity cp at $P_b$	16.27	11.61	13.94
at $P_i$			
Compressibility of oil $v/v/psi$ ( $v/v/mPa$ )	$9.72 \times 10^{-8}$ ( $6.7 \times 10^{-4}$ )	$1.06 \times 10^{-7}$ ( $7.28 \times 10^{-4}$ )	$1.04 \times 10^{-7}$ ( $6.99 \times 10^{-4}$ )

### Pressure

~~The current pressure of the Lodgepole B pool at a datum depth of 700 ft ss averages~~ A pressure survey conducted in 1981 exhibits an average static bottom hole pressure of 999 psig (6887 kPa) ~~at~~ at a datum depth of 700 ft ~~sub~~ feet subsea, ~~and a pressure~~ for the B Pool and 960.2 psig (6620 kPa) at a datum depth of 640 feet subsea for the A Pool.

~~Six~~<sup>Seven</sup> of the nine pressure surveys were obtained by measurement of the casing pressure after sufficient shut in time. As these wells all supported a full column of fluid (assumed to be oil), the bottom hole pressure could be determined.

The remaining two tests were obtained by means of a bottom hole pressure gauge.

Both methods of measurement appear to give fairly consistent results.

## Summary

1981 pressure survey - West Kinkelu

### Lodgepole B Pool

(DATUM = -720 ft ss)

Well	Date	P	@	ft ss	RES GRAB	$\Delta P$	P@ datum
9-8-12-29	12/81	1003.83	<del>222</del>	712.00	389	- 4.67	999.2
13-8-12-29	12/81	997.08		705.54	389	- 2.16	994.9
14-8-12-29	12/81	1005.27		704.40	389	- 1.71	1003.6
15-8-12-29	12/81	1004.02		695.60	389	+ 1.71	1005.7
3-17-12-29	12/81	1008.23		698.03	389	+ 0.77	1009.0
4-17-12-29	12/81	980.81		641.54	389	+ 22.74	1003.6
12-18-12-29	7/81	982.74		697.10	389	+ 1.13	983.9
5-18-12-29	10/81	987.09		686.72	389	+ 5.17	992.3

Ave. Pressure 999.0 psi  
6887.3 kPa

### Lodgepole A Pool

Datum -640

13-8-12-29	12/81	NO OIL TO SURFACE / NO FLUID LEVEL					
14-8-12-29	12/81	959.87		639.11	389	+ 0.35	960.2

# West Kirkella Pressures

Lodge pole A

13-8 LgA - 12-29

NO OIL TO SURFACE

NO FLUID LEVEL

∴ SBHP CANNOT BE DETERMINED

14-8 - 12-29

$$KB = 533.8 \quad (1751.31)$$

$$MP \text{ PERFORATIONS AT} = 728.6 \quad (2390.42)$$

$$CASING \text{ PRESSURE} = 30 \text{ psi}$$

$$\nabla_{oil} \quad \text{psi / ft.}$$

$$D_{oil} = .898 \text{ g/cc}$$

$$\nabla_w = .433 \text{ psi / ft}$$

$$\nabla_{oil} = .433 \times .898 = 0.389$$

$$P = 959.87 @ -639.11$$

$P_i$ from	DST #1	- initial buildup	5579 kPa	} 14-8
		second buildup	4753 kPa	

DST #1	initial buildup	983 psi	}	10-8
	second buildup	849 psi		

DST #2	ISI	6696	}	12-8
	FSI	6150		

# LOGGE FOLE B

9-8-12-29

KB 530.35 (1740)

Perforations MP 747.37 (2452)

Casing Pressure 50 psi

$$P = 50 + P_{mp} \times 0.389 = 1003.83 @ 2712.00 \text{ ft ss}$$

13-8-12-29

KB 530.95 (1741.96)

Perforations MP 2447.5

Casing Pressure 45 psi

$$P = 45 + P_{mp} \times 0.389 = 997.08 @ 705.54 \text{ ft ss}$$

14-8-12-29

KB 533.80 (1751.31)

Port. MP 748.5 (2455.71)

Casing Pressure 50 psi

$$P = 50 + P_{mp} \times 0.389 = 1005.27 @ 704.40$$

15-8-12-29

KB 531.58 (1744.03)

Port MP ~~743.6~~ 743.6 (2439.63) ~~695.60~~

Casing Pressure 55 psi

$$P = 55 + P_{mp} \times 0.389 = 1004.02 @ 695.60$$

3-17-12-29

KB 534.14 (1752.43)

Perf MP 746.9 (2450.46)

Casing Pressure 55 psi

$P = 55 + P_{MP} \times 0.389$  1008.23 @ 698.03 ft ss

4-17-12-29

KB 537.71 (1764.14)

Perf MP 733.25 (2405.68)

Casing Pressure 45 psi

$P = 45 + P_{MP} \times 0.389$  980.81 @ 641.54 ft ss

12-18-12-29

KB = 541.87 (1777.4) MP = 754.38 (2475.0)

$P_{sand}$  extrapolated = 6775 kPa = 982.74 psi @ MP Perf  
@ -697.1

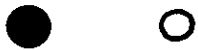
5-18-12-29

$P_{sand}$  6805 kPa = 987.09 @ MP perf

KB = 537.19 (1762.43) MP Perf: 746.5 (2449.15) @ <sup>-686.72</sup>  
~~686.72~~ psi @

1981 Pressure Survey

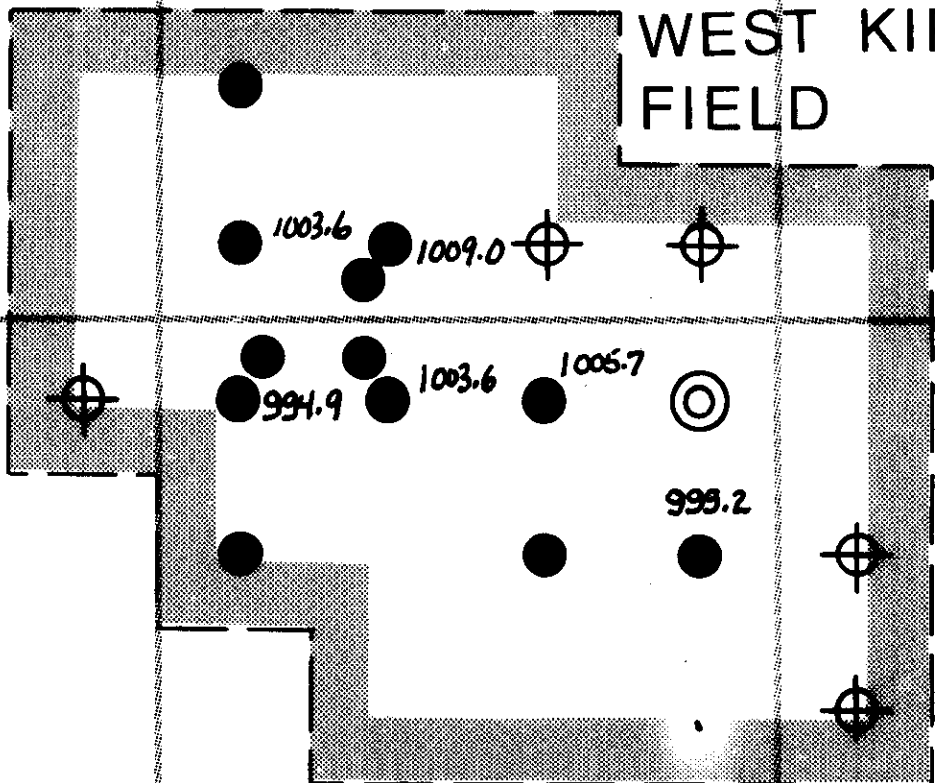
1003.6 Lg B Pool @ -700ftss



983.9



992.3



WEST KIRKFIELD



1003.6



1009.0



994.9



1003.6



1005.7



993.2





SASKOIL W. Kirkella

5-18-12-29

1.030

$P_b = 85 \text{ psi}$   
 $B_{ob} = 1.024$

DIETZGEN CORPORATION  
MADE IN U.S.A.

$B_o$   
vol/vol

1.020

NO. 341-10 DIETZGEN GRAPH PAPER  
10 X 10 PER INCH

1.010

200

400

600

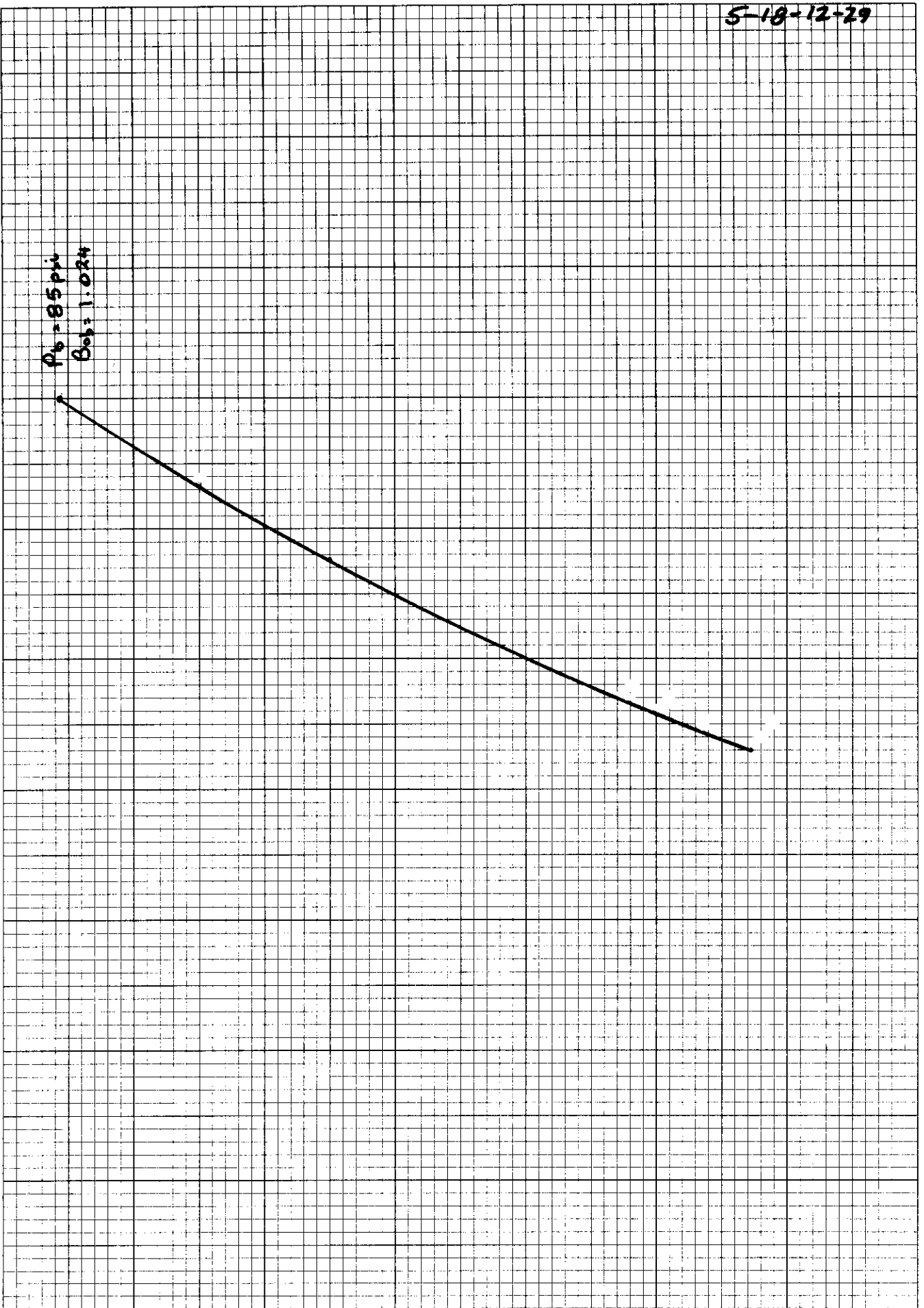
800

1000

1200

1400

Pressure (psig)



RIDEAU W. Kirkella  
5-17-12-29

1.030

$P_0 = 123 \text{ psig}$   
 $B_0 = 1.025$

DIETZGEN CORPORATION  
MADE IN U.S.A.

$B_0$

1.020

NO. 341-10 DIETZGEN GRAPH PAPER  
10 X 10 PER INCH

1.010

200

400

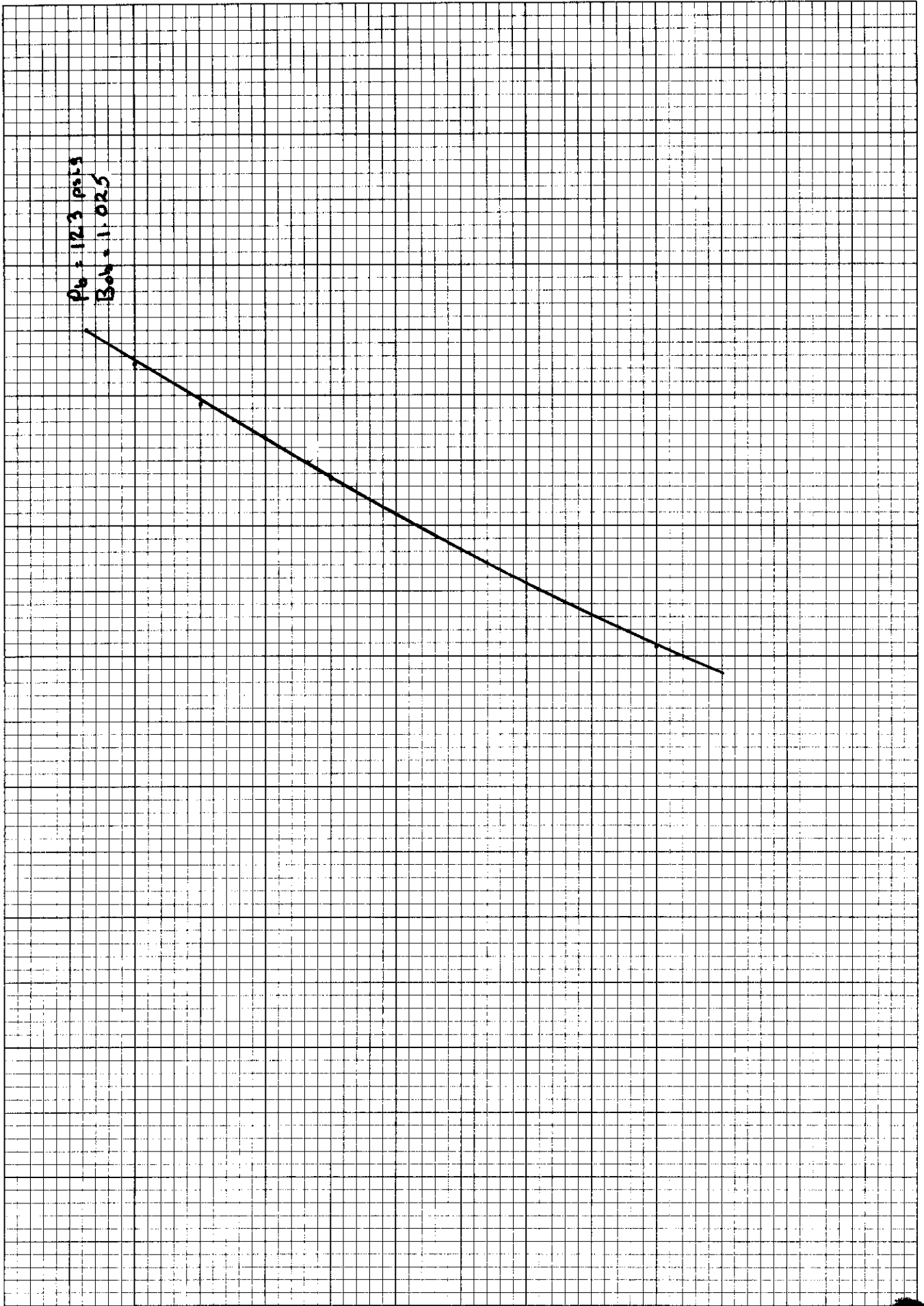
600

800

1000

1200

Pressure (psig)



West KIRKELLA  
LODGEPOLE 8 (Daly) Pool  
AVERAGE OF 2 PVT  
TESTS

1.030

$B_{ob} = 1.0245$   
 $P_b = 104 \text{ psi}$

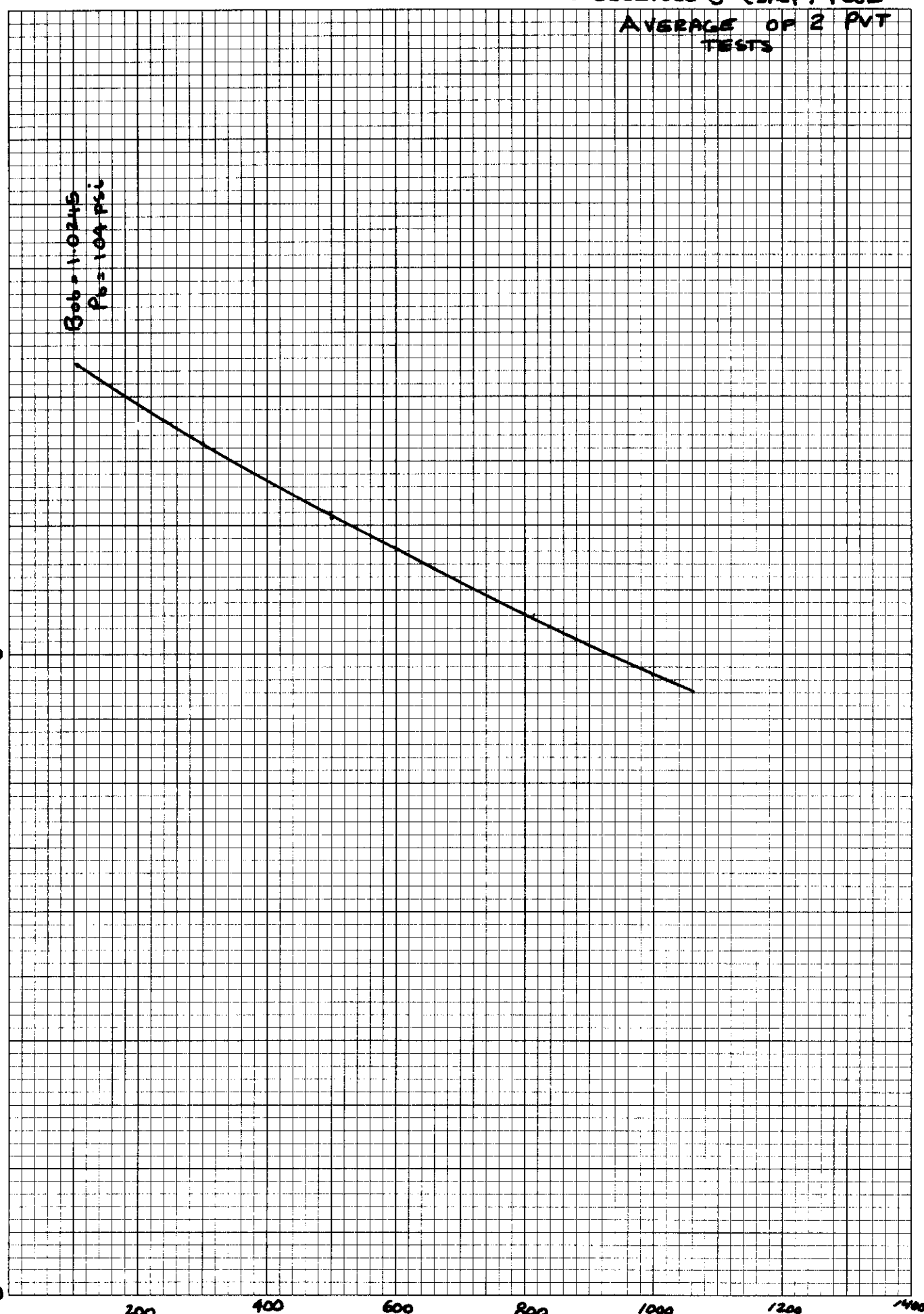
DIETZGEN CORPORATION  
MADE IN U.S.A.

$B_o$

1.020

NO. 341-10 DIETZGEN GRAPH PAPER  
10 X 10 PER INCH

1.010



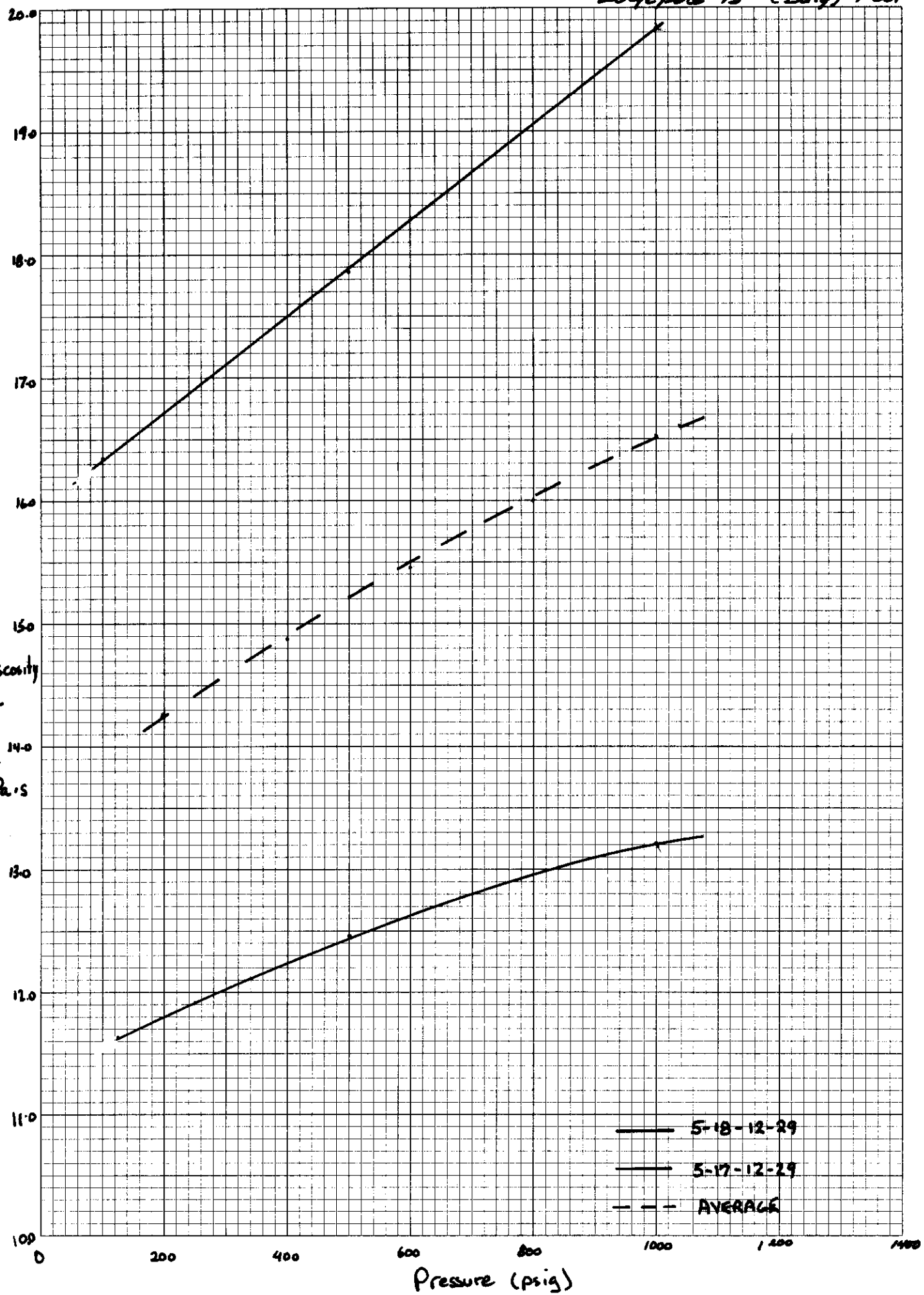
Pressure (psig)

West. Kirkella  
Lodpole B (Daly) Pool

DIETZGEN CORPORATION  
MADE IN U.S.A.

NO. 341-10 DIETZGEN GRAPH PAPER  
10 X 10 PER INCH

Viscosity  
 $\mu$   
cp  
or  
mPa.s



— 5-18-12-29  
— 5-17-12-29  
- - - AVERAGE

## GAS OIL RATIO (solution)

5-18-12-29

$$1.77 \text{ m}^3/\text{m}^3 =$$

9.94 scf/b

5-17-12-29

$$3.19 \text{ m}^3/\text{m}^3 =$$

17.91 scf/stb

average

$$2.48 \text{ m}^3/\text{m}^3$$

13.93 scf/stb

# RIDEAU PETROLEUMS LTD.

2809, 505 - 4 Ave. S.W.  
Calgary, Alberta T2P 0J8

Telephone:  
(403) 264-7693

April 12, 1982

Manitoba Department of Energy & Mines  
Mineral Resources Division  
Petroleum Branch  
989 Century Street  
Winnipeg, Manitoba  
R3H 0W4



Attention: L. R. Dubreuil, Chief Petroleum Engineer

Dear Sir:

Re: Pressure Survey West Kirkella Wells

Attached are the results of a pressure survey on most of our wells in West Kirkella conducted in December, 1981. All surveyed wells were shut in a minimum of 72 hours. All pressures were measured on the well annulus.

With the exception of Rideau W. Kirkella 13-8LgA-12-29 all surveyed wells supported a full column of oil on the annulus after 24 hours.

After being shut in for one week, Rideau W. Kirkella 10-8-12-29 had not built any pressure on the annulus. The well was then put back on production.

Yours sincerely,

RIDEAU PETROLEUMS LTD.

  
D. R. Burns

DRB:LB

Attachment

PRESSURE SURVEY, RIDEAU WEST KIRKELLA WELLS

<u>WELL</u>	<u>DATE</u>	<u>WELLHEAD PRESSURE ON ANNULUS</u>	<u>FLUID LEVEL</u>	<u>TYPE OF FLUID</u>
Rideau W. Kirkella 9-8-12-29	Dec 6/81	40 psi	Surface	Oil
	Dec 7/81	50 psi	Surface	Oil
	Dec 8/81	50 psi	Surface	Oil
Rideau W. Kirkella 13-8-12-29	Dec 18/81	18 psi	Below Sur.	Gas
	Dec 19/81	45 psi	Surface	Oil
	Dec 20/81	45 psi	Surface	Oil
Rideau W. Kirkella 13-8LgA-12-29	Dec 18/81	8 psi	Below Sur.	Gas
	Dec 19/81	6 psi	Below Sur.	Gas
	Dec 20/81	6 psi	Below Sur.	Gas
	Dec 21/81	6 psi	Below Sur.	Gas
Rideau W. Kirkella 14-8-12-29	Dec 6/81	20 psi	Below Sur.	Gas
	Dec 7/81	30 psi	Surface	Oil
	Dec 8/81	30 psi	Surface	Oil
Rideau W. Kirkella 14-8LgB-12-29	Dec 6/81	40 psi	Below Sur.	Gas
	Dec 7/81	50 psi	Surface	Oil
	Dec 8/81	50 psi	Surface	Oil
Rideau W. Kirkella 15-8-12-29	Dec 9/81	60 psi	Below Sur.	Gas
	Dec 10/81	55 psi	Surface	Oil
	Dec 11/81	55 psi	Surface	Oil
Rideau W. Kirkella 3-17-12-29	Dec 9/81	46 psi	Surface	Oil
	Dec 10/81	55 psi	Surface	Oil
	Dec 11/81	55 psi	Surface	Oil
Rideau W. Kirkella 4-17-12-29	Dec 9/81	70 psi	Below Sur.	Gas
	Dec 10/81	45 psi	Surface	Oil
	Dec 11/81	45 psi	Surface	Oil

*L.R.O study (work)  
on Kirkella field  
w/r/t pressure  
maintenance (M.E.M)  
1982*