



Well Five

Socony Mobil Oil Company, Inc.

300 NORTH BROADWAY, WICHITA 2, KANSAS

CENTRAL PIPE LINES DIVISION

May 4, 1962

United Producing Company, Inc.
Drawer 30
Liberal, Kansas

Attn: Mr. J. L. Jenkins

RESERVOIR FLUID ANALYSIS
M. ROONEY #1
CUTTER UNIT, CUTTER FIELD
STEVENS & SEWARD COUNTIES, KANSAS

Gentlemen:

In accordance with instructions in your letter of November 25, 1960, enclosed are two copies of the Reservoir Fluid Analysis for the subject well.

Yours very truly,

JTEberl/kkr
Enclosure

A. P. Lobrecht, Superintendent

By:


C. L. Barney, District Engineer
Wichita Producing District

FRANK



COMPANY

● petroleum engineers ● consultants

CABLE: "SUBSURFACE"

P. O. Box 1827

TULSA, OKLA., U.S.A.

Phone LU 4-5819

To United
Drawer 30
Subsidiary

March 5, 1962
62-26

Mobil Oil Company
P. O. Box 98
Hugoton, Kansas

Attention: Mr. John Campbell

Gentlemen:

Please find attached our report giving the results of our testing on your Rooney No. 1 Well, Cutter Field, Seward County, Kansas, February 28th through March 1, 1962.

We appreciate the opportunity of serving you.

Yours truly,

FRANK PURDUM COMPANY

Frank Purdum
Frank Purdum

FP:jw

Attach: Report (4)

FRANK



COMPANY

● petroleum engineers ● consultants

CABLE: "SUBSURFACE"

P. O. Box 1827

TULSA, OKLA., U.S.A.

Phone LU 4-5819

Company: Mobil Oil Company

Field: Cutter
Rooney No. 1
Seward County
Kansas

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FRANK



COMPANY

● petroleum engineers ● consultants

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Phone LU 4-5819

Company: Mobil Oil Company

Field: Cutter
Rooney No. 1
Seward County
Kansas

PROCEDURE -

After flowing several days at 180 barrels per day, the well was shut in February 20, 1962 for a bottom hole pressure build-up test. At that time it was reported that 3031 barrels of oil had been produced from the well.

On February 28, 1962 we ran a gradient bottom hole pressure. Two bottom hole samples were then taken at depth 5160 feet subsurface. At this time, a sample of well head gas was taken from the tubing. The well was then set flowing on a 32/64 inch choke.

On March 1, 1962 periodic gauges indicated that the well production had stabilized.

After the gas oil ratio measurement test had been completed samples of the separator gas and separator oil were taken for recombination. These samples were brought back to Tulsa to be analyzed by Wright Petroleum Laboratories and will be reported by them under separate cover.

FRANK



COMPANY

● petroleum engineers ● consultants

CABLE: "SUBSURFACE"

P. O. Box 1827

TULSA, OKLA., U.S.A.

Phone LU 4-5819

Field Cutter Invoice No. _____

Company Mobil Oil Company

Lease Rooney Well No. 1

Date 2-28-62 Time 13:05 Status of Well Static

Pay Morrow Top 5316 ft. Bottom 5329 ft. T.D. _____ ft. Datum -2350 ft.

Seating Nipple

Tubing 2 3/8" Depth 5315 ft. B.H.C. 5267 ft. Plug or Pin Open Packer 5274 ft.

C.P. 5332

Casing 5 1/2" Depth 5380 ft. Perfs. 5318-28 ft. Liner _____ Tree Connection _____

Depth Feet	Pressure lbs. sq. in.	Pressure Δ	Gradient lbs./ft.	
				Casing Press. <u>248#</u> GA D.W.T.
				Tubing press. <u>226</u> D.W.T.
20	226			Oil Level <u>1776</u> ft.
1000	232	6	.006	Water Level <u>None</u> ft.
2000	309	77	.077	Hours—Shut In <u>188</u> Flowing
3000	632	323	.323	Temp. @ <u>5260</u> Ft. <u>132</u> °F. <u>132</u> °F.
4000	955	323	.323	Elevation—K.B. <u>2955</u> ft. Ground _____ ft.
4860	1232	277	.323	Last Test Date _____
5060	1296	64	.320	Press. Last Test _____ Paig
5260	1360	64	.320	B.H.P. Change _____ #s in Days
<u>45</u>	<u>14</u>			Loss _____ #s/day
5305	1374	Datum	.320	Choke Size _____
-2350	1374	Datum	.320	Oil Bbls./day _____
				Water Bbls./day _____
				Total Bbls./day _____
				Orifice _____ in. Line _____ in.
				Static _____ psi Differential _____ in.
				Gas Sp. Gr. _____ Tf _____
				Cu. ft./day _____
				GOR _____ cu. ft./Bbl.
				GFR _____ cu. ft./Bbl.

PRODUCTIVITY INDEX—BBLs./DAY/LBS. DROP

Last Cumulative Production	3031	Present Cumulative Production	3184-3/1/62	Production Between Tests	None
Instrument	Amerada	Number	15435-N	Recovery Factor Bbls./pound Loss	
Run by	BJ	Calibration No.	6-23-59	Calculated By	

Calculations and Remarks:

FRANK PURDUM COMPANY

PRODUCTION DATA

Company Mobil Oil CompanyWell & No. Rooney #1 Field Cutter
Seward County, KansasWest
Tank No.Oil Gauges

1" = 1.67Bbl.

Date	Time	Elapsed Time	Gauges	Oil Inch	Oil Bbls/Per	Oil Bbls/Hr.	Oil Bbls/Day	Ck. Size
3-1-62	11:00	00:00	7' 2 1/2"					32/64
	11:30	00:30	7' 4 1/2"	2	3.34	6.68	160.32	
	12:00	01:00	7' 6 1/2"	2	3.34	6.68	160.32	
	12:32	01:32	7' 8 7/8"	2.4	4.01	7.92	190.	
	13:00	02:00	7' 10 7/8"	2	3.34	6.68	160.3	
	14:04	03:04	8' 3 1/4"	4 3/8	7.31	6.86	170.6	
	14:30	03:30	8' 5 1/8"	1 7/8	3.13	6.30	174.5	
	15:00	04:00	8' 7 3/8"	2 1/4	3.76	7.52	169.5	
	15:30	04:30	8' 9 1/2"	2 1/8	3.55	7.10	170.4	
	16:00	05:00	8' 11 7/8"	2 3/8	4.01	8.02	192.5	

GAS-OIL RATIO TEST

COMPANY Mobil Oil Company

Well & No. Rooney No. 1 Field Cutter

Tank No. _____ Oil Gages _____ 1" = 1.67 Bbl.

Date	Time	Elapsed Time Hr. Min.	Tank Gage	Oil Temp. °F	Oil In. or Bbls.	Oil Bbls. per Per'd.	Oil Bbls. per Hour	Oil Bbls. per Day	Ck. Sz.
------	------	-----------------------------	-----------	--------------------	---------------------------	-------------------------------	-----------------------------	----------------------------	------------

3-1-62	11:00	00 00	7' 2 1/2"						32/64"
	12:00	01 00	7' 6 1/2"		4.0	6.68	6.68	160.3	
	13:00	02 00	7' 10 7/8"		4.4	7.35	7.35	176.4	
	14:00	03 00	8' 3 1/4"		4.4	7.35	7.35	176.4	
	15:00	04 00	8' 7 3/8"		4.1	6.85	6.85	164.4	
	16:00	05 00	8' 11 7/8"		4.5	7.52	7.52	180.5	

Average 5 Hours 171.6

Oil Gravity _____ °API @ _____ °F. Gas Meter Description OWT

Oil Gravity _____ °API @ 60°F. Meter Range 100 PSI _____ In.

Water Produced _____ Bbls/Day Meter Conn. OWT

Time	Pressures TP CP Pkr.	Orifice <u>1/4"</u> Line <u>2"</u>
11:00	70 248	Static Press. <u>36.22#</u> Average 5 hrs.
14:00	70 248	Diff. Press. _____ "
		Atmos. Press. _____
		Temp. <u>49°F.</u> °F. Sp. Gr. <u>.949</u>

Gas Calculations:

$$Q = C. \times T_F \times G_F = 56447 \times 1.0107 \times 1.0265 = 58563.$$

G.O.R. = $\frac{58563}{171.6}$ = 341. Cu.Ft./Bbl.

FRANK PURDUM COMPANY

-4- Run by _____

WRIGHT PETROLEUM LABORATORIES

JOE R. WRIGHT
J. F. PURDUM

P. O. BOX 1827

TULSA 1, OKLAHOMA

PHONE LU 3-5822 OR RI 2-5298

April 24, 1962
File 3892
SSS 421

Mobil Oil Company
P. O. Box 98
Hugoton, Kansas

API 15-175-10048
SWNW 7-315-34W

Attention: Mr. John Campbell

Gentlemen:

On the following pages the data of our reservoir fluid analysis from samples taken from your Rooney Well No. 1, Cutter Field, Seward County, Kansas is presented.

The analytical work requested at the time the well was sampled was done and is reported.

The remainder of the samples will be held about four weeks. At that time they will be dumped unless we receive instructions otherwise.

We enjoy serving you and look forward to the time we may again have this pleasure.

Yours truly,

WRIGHT PETROLEUM LABORATORIES



Clair C. Wilson, Chief Engineer

CCW:jw

Attach: Report

WRIGHT PETROLEUM LABORATORIES
RESERVOIR FLUID ANALYSIS REPORT
TULSA, OKLAHOMA

COMPANY	Mobil Oil Company	WELL NO.	1	POOL	Morrow
LEASE	Rooney	LOCATION	Cutter Field, Seward County, Kansas		
OUR LAB. NO.	SSS 421	FILE NO.	3892	DATE SAMPLED	2-28-62
				DATE REPORTED	4-24-62

S U M M A R Y

Saturation Pressure at 133°F.----- 1293.

Thermal Expansion of Saturated Oil from 71°F. to 133°F., (%/°F.)

At 3015 PSIA ----- 0.0668

Compressibility of Saturated Oil at 133°F. (Vol/Vol/PSI)(10⁶)

From 1293 PSIA to 1415 PSIA----- 18.03

From 1415 PSIA to 1615 PSIA----- 15.54

From 1615 PSIA to 1815 PSIA----- 14.07

Saturated Oil at 1293 PSIA, 133°F.

Density, pounds per barrel----- 244.67

Specific Gravity, (Water 60°F. = 1.000)----- 0.6996

Formation Volume Factor of Oil----- 1.3012

Gas Liberated, cu. ft. at 14.7 psia, 60°F.
per barrel saturated oil----- 326.

Saturated Oil at 1400 PSIA, 133°F.

Specific Volume cu. ft./lb.----- 0.02304

Specific Gravity (Water 60°F. = 1.000)----- 0.6966

Viscosity Centipoise----- 0.69

Formation Volume Factor----- 1.3112

Gas Liberated, cu. ft. at 14.7 psia, 60°F.
per barrel saturated oil----- 338.

Field Data

Bottom Hole Pressure at 5304 feet, PSIG----- 1374.

Bottom Hole Pressure at 5160 feet, PSIG----- 1328.

WRIGHT PETROLEUM LABORATORIES

JOE R. WRIGHT
J. F. PURDUM

P. O. BOX 1827

TULSA 1, OKLAHOMA

PHONE LUS-5822 OR RI 2-5298

File 3892
SSS 421

Procedure for the Analysis of Reservoir Fluid
Sample from Mobil Oil Company's Rooney Well No. 1
Cutter Field, Seward County, Kansas

Sampling:

Prior to sampling, the well had flowed several days at 180 barrels oil per day. The well was shut in February 20, 1962 for a pressure build-up test. At that time, 3031 barrels of oil had been produced from the well.

On February 28, 1962 a gradient bottom hole pressure was run, and two bottom hole samples taken at the depth 5160 feet subsurface where the pressure was 1328 psig. A sample of the well head gas was taken.

The well was then put flowing on a 32/64 inch choke and produced 172 barrels oil per day at a ratio of 341 cu. ft. at 14.65 psia, 60°F. of gas per barrel of stock tank oil. The separator temperature was 165°F. and the pressure was 40 psig. Samples of the separator gas and separator oil were taken.

On arrival in the laboratory the bottom hole samples were found to have a saturation pressure of 1293 psia at 133°F. This was 50 psi lower than the pressure at sampling depths and indicated that the well had not been successively pinched back before being shut in.

Analysis:

Pressure volume relations, differential liberation measurements, and hydrocarbon analysis were determined on the bottom hole sample. These data were then extrapolated to the saturation pressure 1400 psia indicated by the build up data. The hydrocarbon analysis was computed by adding the necessary gas of a composition as liberated at 1215 psia to the reservoir fluid sample.

A sample was recombined to 1400 psia saturation at 133°F. The viscosity of the oil at 133°F. during differential liberation was measured.

**WRIGHT PETROLEUM LABORATORIES
RESERVOIR FLUID ANALYSIS REPORT
TULSA, OKLAHOMA**

COMPANY	Mobil Oil Company	WELL NO.	1	POOL	Morrow
LEASE	Rooney				
LOCATION	Cutter Field, Seward County, Kansas				
OUR LAB. NO.	SSS 421	FILE NO.	3892	DATE SAMPLED	2-28-62
				DATE REPORTED	4-24-62

PROCEDURE: (continued)

Results:

The results obtained in this analysis are summarized on Page 1 of this report and presented tabularly and graphically as follows:

Page No. Figure No.

Fluid Saturated at 1400 psia, 133°F:

Pressure Volume Relations	4	1
Formation Volume Factor of Oil	4	3
Dissolved & Liberated Gas	4	4
Viscosity of Saturated Oil	4	5
Hydrocarbon Analysis	7	

Bottom Hole Sample:

Pressure Volume Function	5	2
Liberated Gas Properties	5	
Separator Tests	6	
Pressure Volume Relations	11	
Dissolved & Liberated Gas	11	

Hydrocarbon Analysis:

Separator Gas	8	
Well Head Gas	9	
Gas Liberated at 1215 psia, 133°F.	10	

Discussion:

The gas oil ratio measured in the field was lower than the gas oil ratio measured in the laboratory on the bottom hole sample. This indicates that some of the gas liberated by the pressure drop between the reservoir and the bottom of the well, 1400 to 738 psia, is being retained in the reservoir rocks. This and the build up curve indicated that the reservoir fluid is probably saturated at original reservoir pressure. No data except the viscosity was measured on samples recombined from the separator fluids, and these were recombined to a saturation pressure 1400 psia at 133°F.

WRIGHT PETROLEUM LABORATORIES
RESERVOIR FLUID ANALYSIS REPORT
TULSA, OKLAHOMA

COMPANY Mobil Oil Company
LEASE Rooney **WELL NO.** 1 **POOL** Morrow
LOCATION Cutter Field, Seward County, Kansas
OUR LAB. NO. SSS 421 **FILE NO.** 3892 **DATE SAMPLED** 2-28-62 **DATE REPORTED** 4-24-62

TABULAR DATA

PRESSURE PSI ABSOLUTE	PRESSURE VOLUME RELATION @ 133 °F. RELATIVE VOL. V/V _{SAT}	VISCOSITY OF OIL @ 133 °F. CENTIPOISE	DIFFERENTIAL LIBERATION @ 133 °F.				
			CU. FT. GAS @ 60°F. & 14.7 PSI ABSOLUTE/BBL.				
			RESERVOIR OIL @ 1400 PSI ABS. & 133°F.		STOCK TANK OIL @ 14.7 PSI ABS. & 60°F. LIBERATED IN SOLUTION		BARRELS RESERVOIR OIL/BBL. STOCK TANK OIL V/V _S
			LIBERATED	IN SOLUTION			
1615	0.9949	0.70	0.02292				
1400	1.0000	0.69	0.02304	338	0	443	1.3112
1395	1.0011	----	0.02307	----	----	----	----
1385	1.0032	----	0.02311	----	----	----	----
1365	1.0077	----	0.02322	----	----	----	----
1315	1.0197	0.70	0.02349	326	16	427	1.3018
1215	1.0486	0.71	0.02416	310	36	407	1.2908
1115	1.0847	0.73	0.02499	296	55	388	1.2809
1015	1.1317	0.75	0.02607	281	75	368	1.2694
815	1.2742	0.78	0.02936	249	116	327	1.2495
615	1.5404	0.83	0.03549	216	160	283	1.2274
415	2.1238	0.91	0.04893	179	208	235	1.2035
235	3.6355	1.04	0.08376	----	----	----	----
215	-----	1.08	-----	139	261	182	1.1755
115	-----	1.34	-----	113	295	148	1.1538
15	-----	2.37	-----	0	443	0	1.0448
15	-----	3.11**	-----	0	443	0	1.0000

* Specific
Volume
Cu.Ft./Lb.

* Pressure Volume Relations at 133°F.
** At 100°F.

V_{SAT} = Volume Reservoir Oil @ 1400 PSI Absolute and 133 °F.
V_S = Stock tank oil Volume at 14.7 PSI Absolute and 60°F.
V = Volume at Given Pressure.

**WRIGHT PETROLEUM LABORATORIES
RESERVOIR FLUID ANALYSIS REPORT
TULSA, OKLAHOMA**

COMPANY	Mobil Oil Company		
LEASE	Rooney	WELL NO.	1
LOCATION	Cutter Field	POOL	Morrow
	Seward County, Kansas		
OUR LAB. NO.	SSS 421	FILE NO.	3892
	DATE SAMPLED	2-28-62	DATE REPORTED 4-24-62

TABULAR DATA II

PRESSURE PSI ABSOLUTE	$\gamma = \frac{(P_{SAT} - P)}{(P) (V/V_{SAT} - 1.000)}$	COMPRESSIBILITY FACTOR $z = \frac{PV}{NRT}$	SPECIFIC GRAVITY LIBERATED GAS (AIR = 1.000)
1293	Saturation Pressure at 133°F.		
1285	3.276	-----	-----
1275	3.209	-----	-----
1266	3.136	-----	-----
1256	3.168	-----	-----
1215	3.116	0.922	0.771
1115	3.017	0.918	0.756
1015	2.932	0.916	0.738
815	2.605	0.923	0.736
615	2.362	0.929	0.757
415	2.125	0.946	0.777
235	1.881	-----	-----
215	-----	-----	0.877
115	-----	-----	1.015
15	-----	-----	1.771

**WRIGHT PETROLEUM LABORATORIES
RESERVOIR FLUID ANALYSIS REPORT
TULSA, OKLAHOMA**

COMPANY	Mobil Oil Company				
LEASE	Rooney	WELL NO.	1	POOL	Morrow
LOCATION	Cutter Field, Seward County, Kansas				
OUR LAB. NO.	SSS 421	FILE NO.	3892	DATE SAMPLED	2-28-62
				DATE REPORTED	4-24-62

SEPARATOR TESTS

SEPARATOR PRESSURE PSI GAUGE	GAS/OIL RATIOS SEE FOOTNOTE (A)		STOCK TANK GRAVITY °API @ 60°F.	SHRINKAGE FACTOR V _s /V _{sat}	V _{sat} /V _s	SPECIFIC GRAVITY OF FLASHED GAS	SEPARATOR TEMP. °F.
	SEPARATOR	TOTAL					
				SEE FOOTNOTE (B)	SEE FOOTNOTE (C)	SEE FOOTNOTE (D)	

Fluid Saturated at 1293 PSIA, 133°F.

80	389	447	42.4	0.7644	1.3083	1.037	165
40	418	444	42.4	0.7620	1.3124	1.078	165
0	430	430	43.0	0.7675	1.3030	1.073	62

Fluid Saturated at 1400 PSIA, 133°F.

40	445	471	42.2	0.7560	1.3228	1.078	165
----	-----	-----	------	--------	--------	-------	-----

- (a) Gas/Oil Ratio in cubic feet of gas @ 60° F. and 14.7 PSI Absolute per barrel of stock tank oil @ 60°F.
 (b) Shrinkage Factor V_s/V_{sat} is barrels of stock oil @ 60° F. per barrel of saturated oil @ * PSI Absolute and 133 °F.
 (c) V_{sat}/V_s is barrels saturated oil @ * PSI Absolute and 133 °F. per barrel stock tank oil @ 60°F.
 (d) Air = 1.000.

* At Saturation Pressure

WRIGHT PETROLEUM LABORATORIES
RESERVOIR FLUID ANALYSIS REPORT
TULSA, OKLAHOMA

COMPANY	Mobil Oil Company	WELL NO.	1	POOL	Morrow
LEASE	Rooney				
LOCATION	Cutter Field, Seward County, Kansas				
OUR LAB. NO.	SSS 421	FILE NO.	3892	DATE SAMPLED	2-28-62
				DATE REPORTED	4-24-62

HYDROCARBON ANALYSIS OF RESERVOIR FLUID SAMPLE
Saturation Pressure 1293 PSIA at 133°F.

<u>Components</u>	<u>Mol. %</u>	<u>Liq. Vol. %</u>
Inerts	2.37	0.54
Methane	20.45	7.19
Ethane	5.40	2.85
Propane	7.99	4.54
Iso-Butane	2.12	1.44
N-Butane	6.30	4.12
Iso-Pentane	2.31	1.75
N-Pentane	2.79	2.10
Hexane	4.84	4.13
Heptane Plus	45.29	71.29
Carbon Dioxide	<u>0.14</u>	<u>0.05</u>
Totals	100.00	100.00
Molecular Weight of Heptane Plus -----		199.
Specific Gravity of Heptane Plus @ 60°F.-----		0.8309
°API Gravity of Heptane Plus @ 60°F.-----		38.8

WRIGHT PETROLEUM LABORATORIES

JOE R. WRIGHT
J. F. PURDUM

P. O. BOX 1827

TULSA 1, OKLAHOMA

PHONE LU3-5822 OR RI 2-5298

Bomb No. X-38 Sampled 500XXX 3/1/62

April 24, 1962

File 3892

Field or Plant Cutter

Mobil Oil Company

Well or Line Rooney #1 Separator

Sec. T. R. County

Sepr. ~~XXX~~ Pressure 38 Psig. Temp. 165°F.

Our Invoice No. Our Lab.No. 4173

GAS ANALYSIS BY MASS SPECTROMETER

<u>Components</u>	<u>Mol. %</u>	<u>Gals/MCF</u>
Helium	0.00	-----
Nitrogen	7.69	-----
Oxygen	0.00	-----
Methane	52.95	-----
Ethane	15.59	-----
Propane	14.35	3.948
Iso-Butane	1.36	0.444
N-Butane	4.87	1.534
Iso-Pentane	1.01	0.369
N-Pentane	1.17	0.424
Hexane	0.37	0.152
Benzene	0.00	-----
Heptane Plus	0.04	0.019
Toluene	0.00	-----
Carbon Dioxide	<u>0.60</u>	<u>-----</u>
	100.00	6.890

Gasoline Content:

1.364 Gals/mcf of 26# R.V.P.

0.902 Gals/mcf of 14# R.V.P.

Heating Value, Gross BTU/CF Bone Dry @ 14.7 Psia, 60°F. ----- 1482.

Calculation Basis: Components & Mixture Perfect Gases 0.949

Specific Gravity of Gas (Air = 1.000) -----

Clair C. Wilson, Chief Engineer

WRIGHT PETROLEUM LABORATORIES

JOE R. WRIGHT
J. F. PURDUM

P. O. BOX 1827

TULSA 1, OKLAHOMA

PHONE LU 3-5822 OR RI 2-5298

Bomb No. 29 Sampled 515xx p.m. 2/28/62

April 24, 1962
File 3892

Field ~~on Plant~~ Cutter

Mobil Oil Company

Well ~~on Plant~~ Rooney #1 Wellhead

Sec. T. R. County

~~Top of Line~~ Line Pressure 206 Psig. Temp. 10°F.

Our Invoice No. Our Lab.No. 4174

GAS ANALYSIS BY MASS SPECTROMETER

<u>Components</u>	<u>Mol. %</u>	<u>Gals/MCF</u>
Helium	0.17	-----
Nitrogen	15.50	-----
Oxygen	0.00	-----
Methane	67.50	-----
Ethane	9.33	-----
Propane	5.07	1.395
Iso-Butane	0.44	0.144
N-Butane	1.26	0.397
Iso-Pentane	0.11	0.040
N-Pentane	0.20	0.072
Hexane Plus	0.04	0.016
Benzene		
Heptane Plus		
Toluene		
Carbon Dioxide	<u>0.38</u>	-----
	100.00	2.064

Gasoline Content: 0.182Gals/mcf of 26# R.V.P.

0.117Gals/mcf of 14# R.V.P.

Heating Value, Gross BTU/CF Bone Dry @ 14.7 Psia, 60°F.----- 1044.

Calculation Basis: Components & Mixture Perfect Gases 0.747

Specific Gravity of Gas (Air = 1.000) -----

Clair C. Wilson, Chief Engineer

WRIGHT PETROLEUM LABORATORIES
RESERVOIR FLUID ANALYSIS REPORT
TULSA, OKLAHOMA

COMPANY	Mobil Oil Company	WELL NO.	1	POOL	Morrow
LEASE	Rooney				
LOCATION	Cutter Field, Seward County, Kansas				
OUR LAB. NO.	SSS 421	FILE NO.	3892	DATE SAMPLED	2-28-62
				DATE REPORTED	4-24-62

ANALYSIS OF GAS DIFFERENTIALLY LIBERATED AT 133°F.

<u>Components</u>	<u>1215 PSIA</u> <u>Mol. %</u>	<u>Gals/MCF</u>
Helium	0.43	-----
Nitrogen	19.68	-----
Oxygen	0.00	-----
Methane	66.36	-----
Ethane	6.73	-----
Propane	4.03	1.109
Iso-Butane	0.64	0.209
N-Butane	0.99	0.312
Iso-Pentane	0.22	0.080
N-Pentane	0.37	0.134
Hexane	0.15	0.062
Benzene	0.00	-----
Heptane Plus	0.05	0.024
Toluene	0.00	-----
Carbon Dioxide	<u>0.35</u>	<u>-----</u>
Totals	100.00	1.930

Gasoline Content: 0.439 Gals/mcf of 26# R.V.P.
 0.306 Gals/mcf of 14# R.V.P.
 Heating Value Gross BTU/CF Bone Dry @ 14.7 Psia, 60°F.----- 978.
 Calculation Basis: Components & Mixture Perfect Gases
 Specific Gravity of Gas (Air = 1.000)----- 0.749

**WRIGHT PETROLEUM LABORATORIES
RESERVOIR FLUID ANALYSIS REPORT
TULSA, OKLAHOMA**

COMPANY Mobil Oil Company
LEASE Rooney **WELL NO.** 1 **POOL** Morrow
LOCATION Cutter Field Seward County, Kansas
OUR LAB. NO. SSS 421 **FILE NO.** 3892 **DATE SAMPLED** 2-28-62 **DATE REPORTED** 4-24-62

TABULAR DATA

PRESSURE PSI ABSOLUTE	PRESSURE VOLUME RELATION @ 133 °F. RELATIVE VOL. V/V _{SAT}	VISCOSITY OF OIL @ 133 °F. CENTIPOISE	DIFFERENTIAL LIBERATION @ 133 °F.				BARRELS RESERVOIR OIL/BBL. STOCK TANK OIL V/V _s
			CU. FT. GAS @ 60°F. & 14.7 PSI ABSOLUTE/BBL.				
			RESERVOIR OIL @ 1293 PSI ABS. & 133 °F.		STOCK TANK OIL @ 14.7 PSI ABS. & 60°F.		
			LIBERATED	IN SOLUTION	LIBERATED	IN SOLUTION	
3015	0.9782						
2615	0.9825						
2215	0.9871						
2015	0.9893						
1815	0.9919						
1615	0.9947						
1415	0.9978						
1293	1.0000		0	326	0	424	1.3012
1285	1.0019		---	---	---	---	---
1275	1.0044		---	---	---	---	---
1266	1.0068		---	---	---	---	---
1256	1.0093		---	---	---	---	---
1215	1.0206		13	313	17	407	1.2908
1115	1.0529		28	298	36	388	1.2809
1015	1.0952		43	283	56	368	1.2694
815	1.2251		75	251	97	327	1.2495
615	1.4666		109	217	141	283	1.2274
415	1.9956		145	181	189	235	1.2035
235	3.3930		---	---	---	---	---
215	-----		186	140	242	182	1.1755
115	-----		212	114	276	148	1.1538
15	-----		326	0	424	0	1.0480
15	-----		326	0	424	0	1.0000

V_{SAT} = Volume Reservoir Oil @ 1293 PSI Absolute and 133 °F.

V_S = Stock tank oil Volume at 14.7 PSI Absolute and 60°F.

V = Volume at Given Pressure.

WRIGHT PETROLEUM LABORATORIES
PRODUCTION ENGINEERING SERVICE
TULSA, OKLAHOMA

Company	Mobil Oil Company	Our Lab. No.	SSS 421
Lease	Rooney	Well No.	1
Location	Cutter Field, Seward County, Kansas	Pool	Morrow
		File	3892

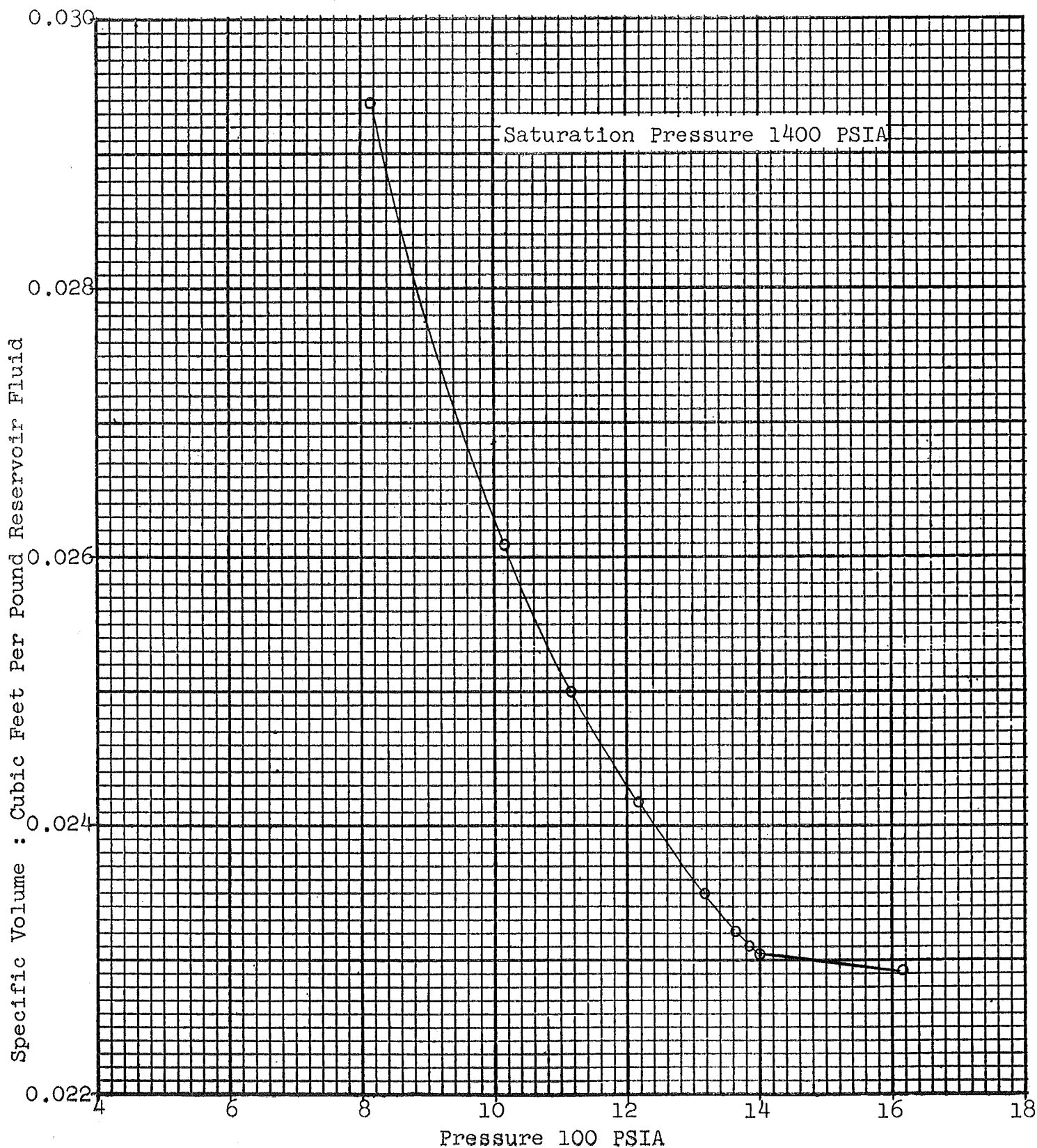


FIGURE 1

PRESSURE VOLUME RELATIONS AT 133°F.

WRIGHT PETROLEUM LABORATORIES
PRODUCTION ENGINEERING SERVICE
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Company Mobil Oil Company
Lease Rooney Well No. 1
Location Cutter Field, Seward County, Kansas

Our Lab. No. SSS 421
Pool Morrow
File 3892

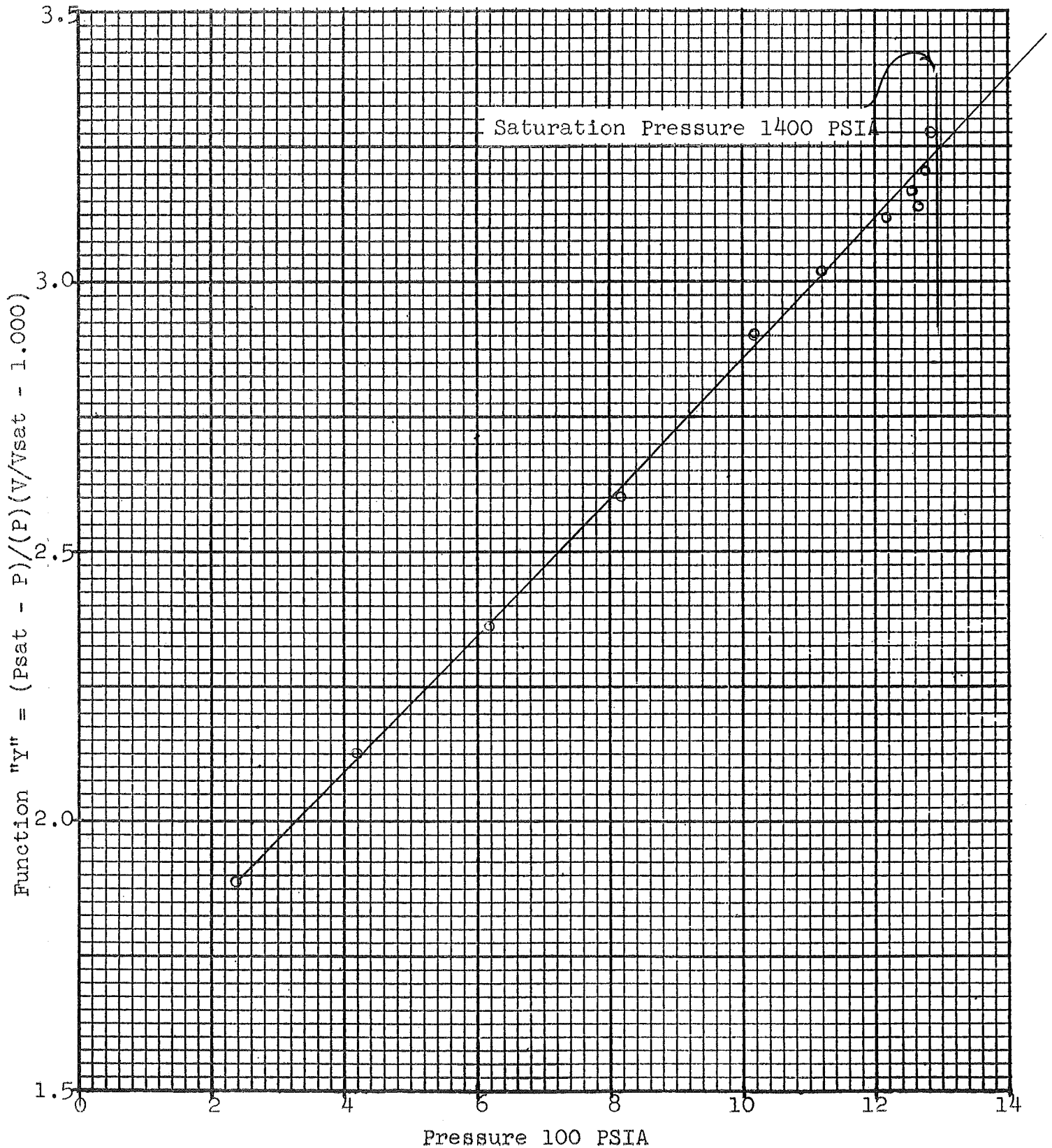


FIGURE 2

PRESSURE VOLUME FUNCTION AT 133°F.

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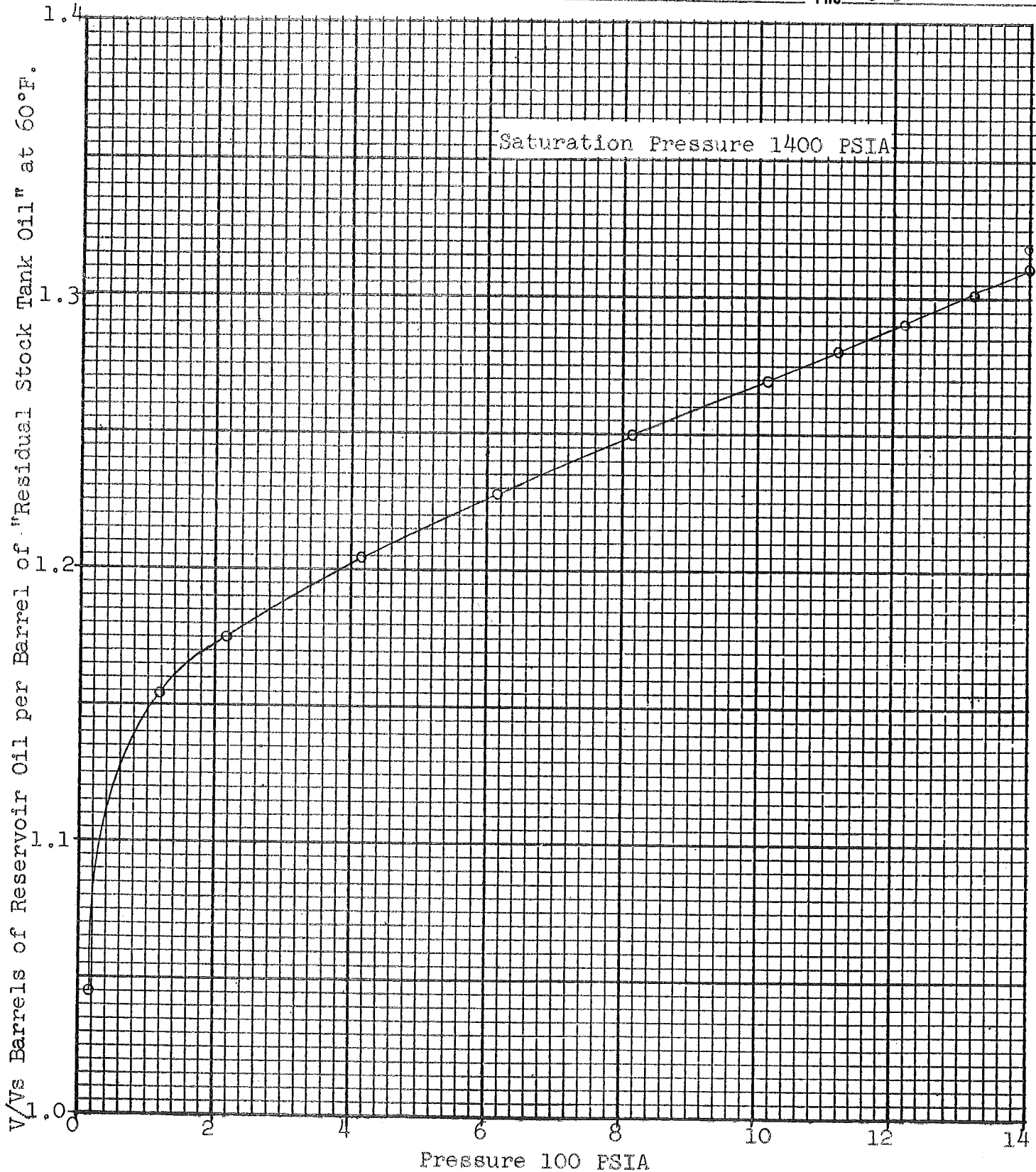


FIGURE 3 RELATIVE VOLUME OF SATURATED OIL DURING DIFFERENTIAL LIBERATION AT 133°F.

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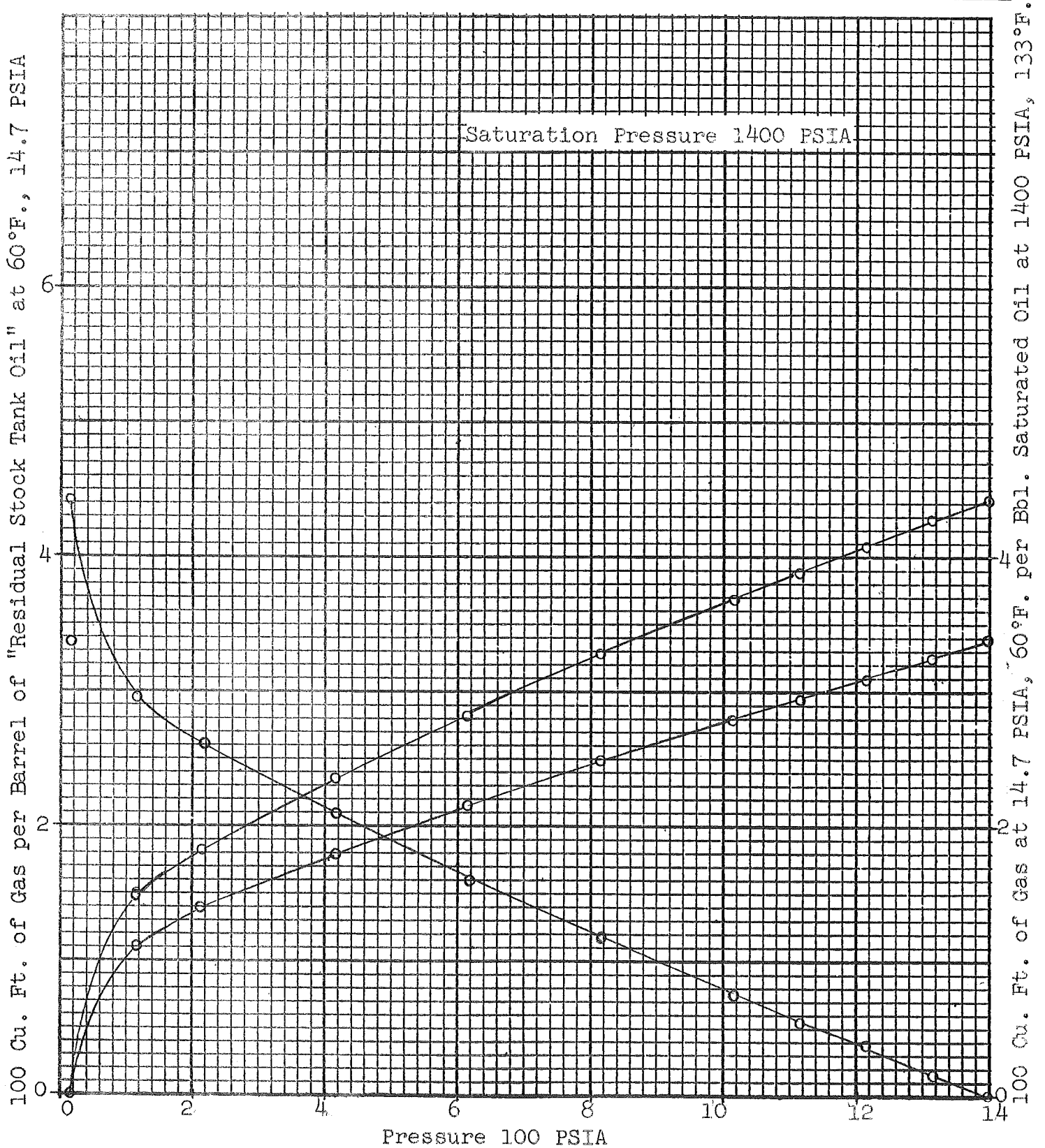


FIGURE 4
DISSOLVED AND LIBERATED GAS DURING
DIFFERENTIAL LIBERATION AT 133°F.

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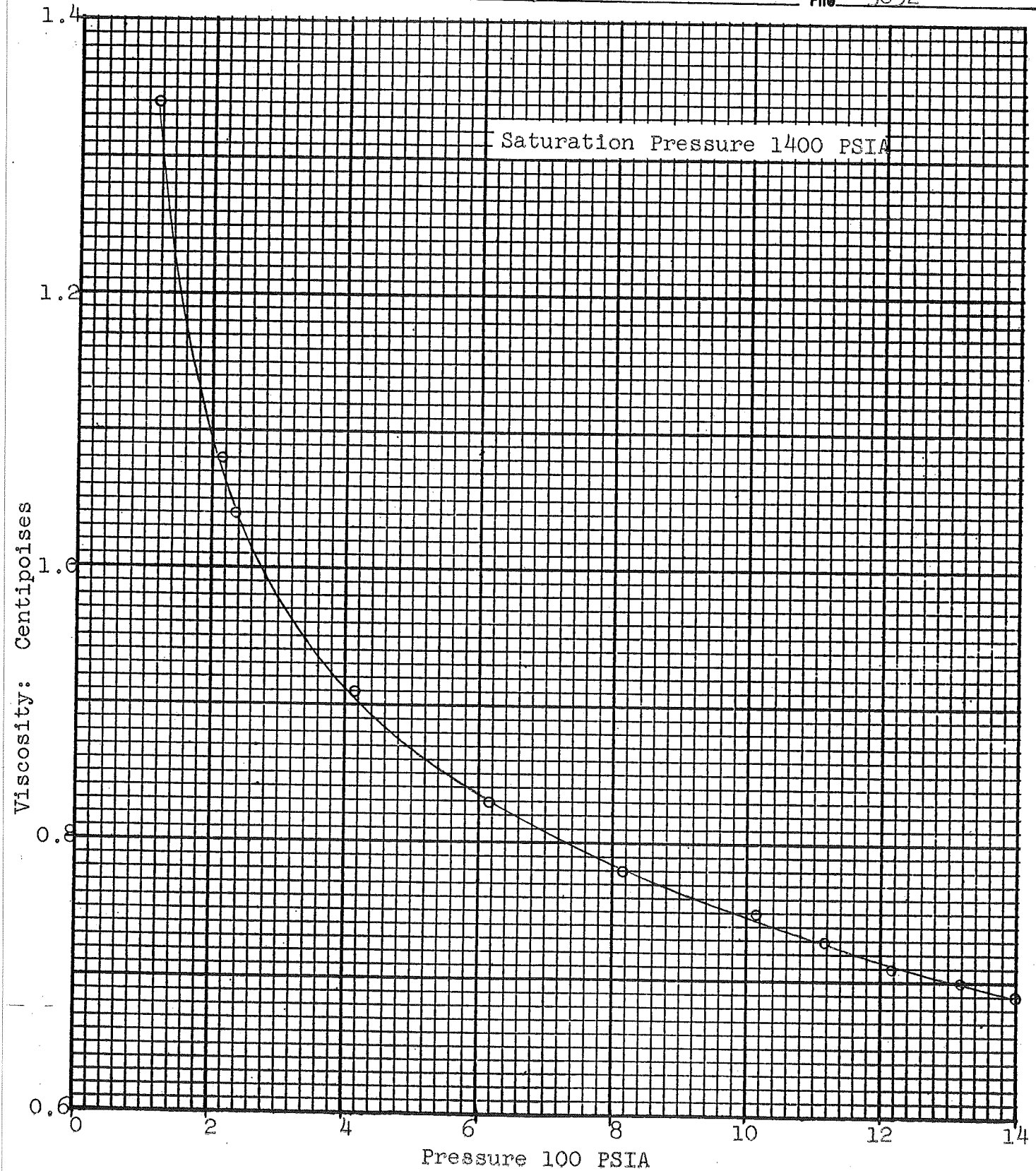


FIGURE 5 VISCOSITY OF DIFFERENTIALLY LIBERATED OIL AT 133°F.

