Case File
Case 1016

RESERVOIR FLUID STUDY

FOR

SINCLAIR OIL & GAS COMPANY

STATE 735 NO. 1 WELL

WILDCAT

LEA COUNTY, NEW MEXICO

CORE

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

February 13, 1956

Sinclair Oil and Gas Company
520 East Broadway
Hobbs, New Mexico

Attention: Mr. George C. Confer

Subject: Reservoir Fluid Study
State 735 No. 1 Well
Wildcat
Lea County, New Mexico

Gentlemen:

On January 30, 1956, subsurface fluid samples were collected from the subject well and transported to our Dallas laboratory. Presented in the report following are the results of fluid studies performed using these samples.

During a constant composition expansion at the reservoir temperature of 172° F., the fluid exhibited a bubble point of 3859 psig. This value is in good agreement with the static reservoir pressure and is indicative that the reservoir exists in a saturated condition. It should be noted that the presence of a small column of water in the bottom of the tubing necessitated sampling some 180 feet above the perforations.

The fluid evolved 2334 standard cubic feet of gas per barrel of residual oil under differential pressure depletion conditions. This depletion resulted in a formation volume factor of 2.315 barrels of saturated fluid per barrel of residual oil. Under similar conditions, the viscosity of the liquid phase present varied from a minimum of 0.155 centipoise at saturation pressure to a maximum of 1.215 centipoises at atmospheric pressure.

Flash vaporization tests were performed at four operating pressures and atmospheric temperature to determine the effects of changes in

separation pressure upon gas-oil ratio, formation volume factor, and tank oil gravity. The data indicates the optimum separation pressure to be near 200 psig with maximum surface recovery per unit of reservoir withdrawal being attained by operation of separators near this optimum. The nature of the fluid, however, is such that near optimum separation conditions prevail at pressures as low as 80 to 100 psig.

As always, it was a pleasure to cooperate with you in any way possible. If you have any question in regard to this study or if we may help you in any further manner, please do not hesitate to call.

Very truly yours,

CORE LABORATORIES, INC.
F. O. Reudelhuber

P. L. Moses
Senior Engineer

PLM:se

Form 69385

CORE LABORATORIES, Inc.
Petroleum Reservoir Engineering
DALLAS, TEXAS

File RFL 635

Company Sinclair Oil and Gas Company Date Sampled January 30, 1956

Well State 735 No. 1 County Lea

Field Wildcat State New Mexico

FORMATION CHARACTERISTICS

Formation Name	Pennsylvanian
Date First Well Completed	December 24, 1955
Original Reservoir Pressure	PSI @ ft.
Original Produced Gas-Oil Ratio	1577 cu. ft./bbl.
Production Rate	792 bbl./d.
Separator Pressure and Temperature	25 PSI, ° F.
Oil Gravity at 60° F.	42.4 ° API
Datum	7716 ft. subsea
Original Gas Cap	

WELL CHARACTERISTICS

Elevation	3864 Feet Gl.
Total Depth	13735 P.B. ft.
Completion Depth	11560-600 ft.
Tubing Size and Depth	2.5 in. to 11615 ft.
Productivity Index	0.57 bbl./d./PSI @ 129 bbl./d.
Last Reservoir Pressure	3997 PSI @ 11580 ft.
Date	January 30, 19 56
Reservoir Temperature	172 ° F. @ 11580 ft.
Status of Well	Shut-In 75.5 Hours
Pressure Gauge	Amerada (D.O.)
Normal Production Rate	230 bbl./d.
Gas-Oil Ratio	2139 cu. ft./bbl.
Separator Pressure and Temperature	35 PSI, ° F.
Base Pressure	PSI Abs.
Well Making Water	3-4 % Cut

SAMPLING CONDITIONS

Sampled at	11400 Feet
Status of Well	Shut-In 75.5 Hours
Gas-Oil Ratio	cu. ft./bbl.
Separator Pressure and Temperature	PSI, ° F.
Tubing Pressure	1390 PSI
Casing Pressure	1400 PSI
Core Laboratories Engineer	J.N.C.
Type Sampler	Perco

REMARKS:

Form 54801

CORE LABORATORIES, Inc.
Petroleum Reservoir Engineering
DALLAS, TEXAS

File RFL 635

Well State 735 No. 1

VOLUMETRIC DATA OF Reservoir Fluid SAMPLE

1. **Saturation pressure (bubble-point pressure)** 3859 **PSI @** 172 **° F.**

2. **Thermal expansion of saturated oil @** 5000 **PSI** $= \frac{V @ 172 \text{ ° F.}}{V @ 74 \text{ ° F.}} =$ 1.08876

3. **Compressibility of saturated oil @ reservoir temperature: Vol./Vol./PSI:**

   From 5000 **PSI to** 4600 **PSI =** 22.90×10^{-6}

   From 4600 **PSI to** 4200 **PSI =** 25.83×10^{-6}

   From 4200 **PSI to** 3859 **PSI =** 30.60×10^{-6}

4. **Specific volume at saturation pressure: cu. ft./#** 0.02844 **@** 172 **° F.**

Form 50870

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

File RFL 635

Well State 735 No. 1

Reservoir Fluid SAMPLE TABULAR DATA

PRESSURE PSI GAUGE	PRESSURE-VOLUME RELATION @ 172 °F., RELATIVE VOLUME OF OIL AND GAS, $V/V_{SAT.}$	VISCOSITY OF OIL @ 172 °F., CENTIPOISES	DIFFERENTIAL LIBERATION @ 172 °F.		
			GAS/OIL RATIO LIBERATED PER BARREL OF RESIDUAL OIL	GAS/OIL RATIO IN SOLUTION PER BARREL OF RESIDUAL OIL	RELATIVE OIL VOLUME, V/V_R
5000	0.9703	0.171			2.246
4800	0.9746	0.169			2.256
4600	0.9793				2.267
4500	0.9817	0.165			2.273
4400	0.9843				2.279
4300	0.9868				2.284
4200	0.9895	0.160			2.291
4100	0.9925				2.298
4000	0.9954	0.158			2.304
3900	0.9986				2.312
3859	1.0000	0.155	0	2334	2.315
3835	1.0016				
3818	1.0033				
3792	1.0048				
3770	1.0063				
3765			158	2176	2.220
3751	1.0079				
3700		0.161			
3660	1.0159				
3600			359	1975	2.105
3575	1.0239				
3420	1.0399				
3400		0.175	555	1779	1.998
3170	1.0723				
3100			795	1539	1.871
2940		0.194			
2834	1.1210				
2801			980	1354	1.776
2600	1.1870				
2500		0.234			
2400			1198	1136	1.665
2342	1.2697				
2104	1.3860				

V = Volume at given pressure
$V_{SAT.}$ = Volume at saturation pressure at the specified temperature.
V_R = Residual Oil Volume at 14.7 PSI absolute and 60° F.

Form 50870

CORE LABORATORIES, Inc.
Petroleum Reservoir Engineering
DALLAS, TEXAS

File RFL 635

Well State 735 No. 1

Reservoir Fluid SAMPLE TABULAR DATA

PRESSURE PSI GAUGE	PRESSURE-VOLUME RELATION @ 172 °F. RELATIVE VOLUME OF OIL AND GAS, V/Vsat.	VISCOSITY OF OIL @ 172° F. CENTIPOISES	DIFFERENTIAL LIBERATION @ 172 ° F. GAS/OIL RATIO LIBERATED PER BARREL OF RESIDUAL OIL	GAS/OIL RATIO IN SOLUTION PER BARREL OF RESIDUAL OIL	RELATIVE OIL VOLUME, V/VR
2000		0.274			
1992			1384	950	1.574
1870	1.5021				
1670	1.6522				
1593			1549	785	1.494
1500	1.8179	0.329			
1264	2.1274				
1193			1701	633	1.422
1000		0.403			
953	2.8193				
789			1852	482	1.351
710	3.8095				
571	4.8031				
500		0.522			
478	5.7923				
400			2003	331	1.275
200			2095	239	1.228
98			2159	175	1.182
0		1.215	2334	0	1.057
				@ 60°F.	1.000

Gravity of Residual Oil

41.1° API @ 60° F.

Supplementary Data

Pressure PSIG	Gas Gravity	Oil Density Gms/Cc	Deviation Factor Z
3859		0.5626	
3765	0.9603	0.5719	0.8467
3600	0.9136	0.5839	0.8157
3400	0.9059	0.5958	0.7967
0	0.9589	0.7752	

V = Volume at given pressure
$V_{SAT.}$ = Volume at saturation pressure at the specified temperature.
V_R = Residual Oil Volume at 14.7 PSI absolute and 60° F.

Form 54802

CORE LABORATORIES, Inc.
Petroleum Reservoir Engineering
DALLAS, TEXAS

File RFL 635

Well State 735 No. 1

SEPARATOR TESTS OF Reservoir Fluid SAMPLE

SEPARATOR PRESSURE, PSI GAUGE	SEPARATOR TEMPERATURE, ° F.	SEPARATOR GAS/OIL RATIO *See Foot Note (1)*	STOCK TANK GAS/OIL RATIO *See Foot Note (1)*	STOCK TANK GRAVITY, ° API @ 60° F.	SHRINKAGE FACTOR, $V_R/V_{SAT.}$ *See Foot Note (2)*	FORMATION VOLUME FACTOR, $V_{SAT.}/V_R$ *See Foot Note (3)*	SPECIFIC GRAVITY OF FLASHED GAS
0	74	2170		42.3	0.4523	2.211	0.9344
75	75	1846	79	45.1	0.4904	2.039	
150	75	1755	154	45.3	0.4916	2.034	
300	75	1623	294	45.3	0.4919	2.033	

(1) Separator and stock tank Gas/Oil Ratio in cubic feet of gas @ 60° F. and 14.7 PSI absolute per barrel of stock tank oil @ 60° F.

(2) Shrinkage Factor: $V_R/V_{SAT.}$ is barrels of stock tank oil @ 60° F. per barrel of saturated oil @ 3859 PSI gauge and 172 ° F.

(3) Formation Volume Factor: $V_{SAT.}/V_R$ is barrels of saturated oil @ 3859 PSI gauge and 172 °F. per barrel of stock tank oil @ 60° F.

Form 55849

CORE LABORATORIES, Inc.
Petroleum Reservoir Engineering
DALLAS, TEXAS

File RFL 635

Company Sinclair Oil and Gas Company Formation Pennsylvanian

Well State 735 No. 1 County Lea

Field Wildcat State New Mexico

HYDROCARBON ANALYSIS OF Reservoir Fluid SAMPLE

COMPONENT	WEIGHT %	MOL %	DENSITY @ 60° F. GRAMS PER CUBIC CENTIMETER	° API @ 60° F.	MOLECULAR WEIGHT
Nitrogen	0.77	1.60			
Methane	13.63	49.50			
Ethane	6.16	11.93			
Propane	6.02	7.96			
Iso-butane	0.96	0.97			
N-butane	3.47	3.47			
Iso-pentane	1.34	1.08			
N-pentane	1.63	1.32			
Hexanes	4.41	2.98			
Heavier	61.61	19.19	0.8282	39.2	187
	100.00	100.00			

Core Laboratories, Inc.
F. O. Reudelhuber

P. L. Moses

RM 6-2

CORE LABORATORIES, INC. *Petroleum Reservoir Engineering*

COMPANY SINCLAIR OIL & GAS COMPANY — DATE ON 10-19-55 — FILE NO. WP-3-340 S
WELL STATE NO. 1-735 — DATE OFF 10-24-55 — ENGRS. BOONE
FIELD WILDCAT — FORMATION AS NOTED — ELEV. 3864' GL
COUNTY LEA — STATE NEW MEXICO — DRLG. FLD. WATER BASE MUD — CORES HILLMAC 3½"
LOCATION SEC 26-15S -36 E. — REMARKS SAMPLED BY A REPRESENTATIVE OF SINCLAIR OIL & GAS COMPANY

Special Analysis

CORE REPORT

SAND · LIMESTONE · CONGLOMERATE · CHERT · SHALE · DOLOMITE

SV-SLIGHTLY VUGULAR
ST-STYLOLITIC
FO-FOSSILIFEROUS SF-SLIGHTLY FRACTURED

PERMEABILITY, Maximum O—O MILLIDARCYS 40 30 20 10 0
TOTAL WATER O—O PERCENT PORE SPACE 80 60 40 20 0
POROSITY X----X PERCENT 40 30 20 10 0
OIL SATURATION X----X PERCENT PORE SPACE 0 20 40 60 80

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILIDARCYS MAX.	PERMEABILITY MILIDARCYS 90°	POROSITY %	RESIDUAL SATURATION % PORE SPACE OIL	RESIDUAL SATURATION % PORE SPACE TOTAL WATER	VISUAL DESCRIPTION
1	11578.0-79.8	0.5	0.4	5.5	5.5	23.6	SV,FO
2	11579.8-81.1	0.3	0.5	6.3	6.4	22.2	SV,FO
3	81.1-82.5	0.7	0.5	6.1	6.6	27.9	SV,FO
4	11582.5-83.9	1.3	0.9	6.0	5.0	35.0	SV,FO,SF
5	83.9-85.5	1.7	1.0	6.1	1.6	32.8	SV,FO
6	11585.5-86.6	0.4	0.3	5.8	3.4	32.8	SV,FO,ST
7	86.6-87.6	0.4	0.4	5.1	2.0	41.2	SV,FO,ST
8	87.6-88.3	0.3	0.3	3.1	TR	54.3	ST
9	88.3-90.4	0.3	0.2	3.4	2.9	33.2	ST
10	11590.4-91.3	0.2	0.2	4.5	TR	37.3	ST
11	91.3-93.3	0.8	0.6	6.2	6.5	24.2	SV
12	93.3-94.5	0.7	0.2	4.1	4.9	29.3	
13	11594.5-96.1	0.9	0.1	2.7	TR	59.3	SF,FO
14	96.1-97.0	<0.1*	<0.1	3.1	9.7	54.3	FO
15	97.0-98.6	0.6	0.1	2.0	0.0	45.0	
16	11598.6-00.0	0.4	0.1	2.0	TR	60.0	FO
17	11600.0-01.0	<0.1	<0.1	2.1	TR	57.2	FO
18	01.0-02.0	<0.1	<0.1	2.2	0.0	50.0	FO
19	02.0-03.6	0.7	0.6	1.8	0.0	55.6	FO
20	11603.6-05.2	0.3	0.2	1.8	0.0	50.0	SF
21	05.2-06.5	0.3	0.2	1.8	0.0	50.0	ST,FO
22	06.5-07.6	0.9	0.3	1.2	0.0	50.0	ST
23	11607.6-09.1	0.2	0.1	1.5	0.0	60.0	ST
24	09.1-10.4	0.3	0.2	1.2	0.0	50.0	ST
25	11610.4-11.0	0.3	0.1	2.5	0.0	55.0	ST,FO

* - REFER TO ATTACHED LETTER

STRAWN
1 9.9
2 8.19
3 8.54
4 8.9
5 9.76
6 6.38
7 5.1
8 3.72
9 5.44

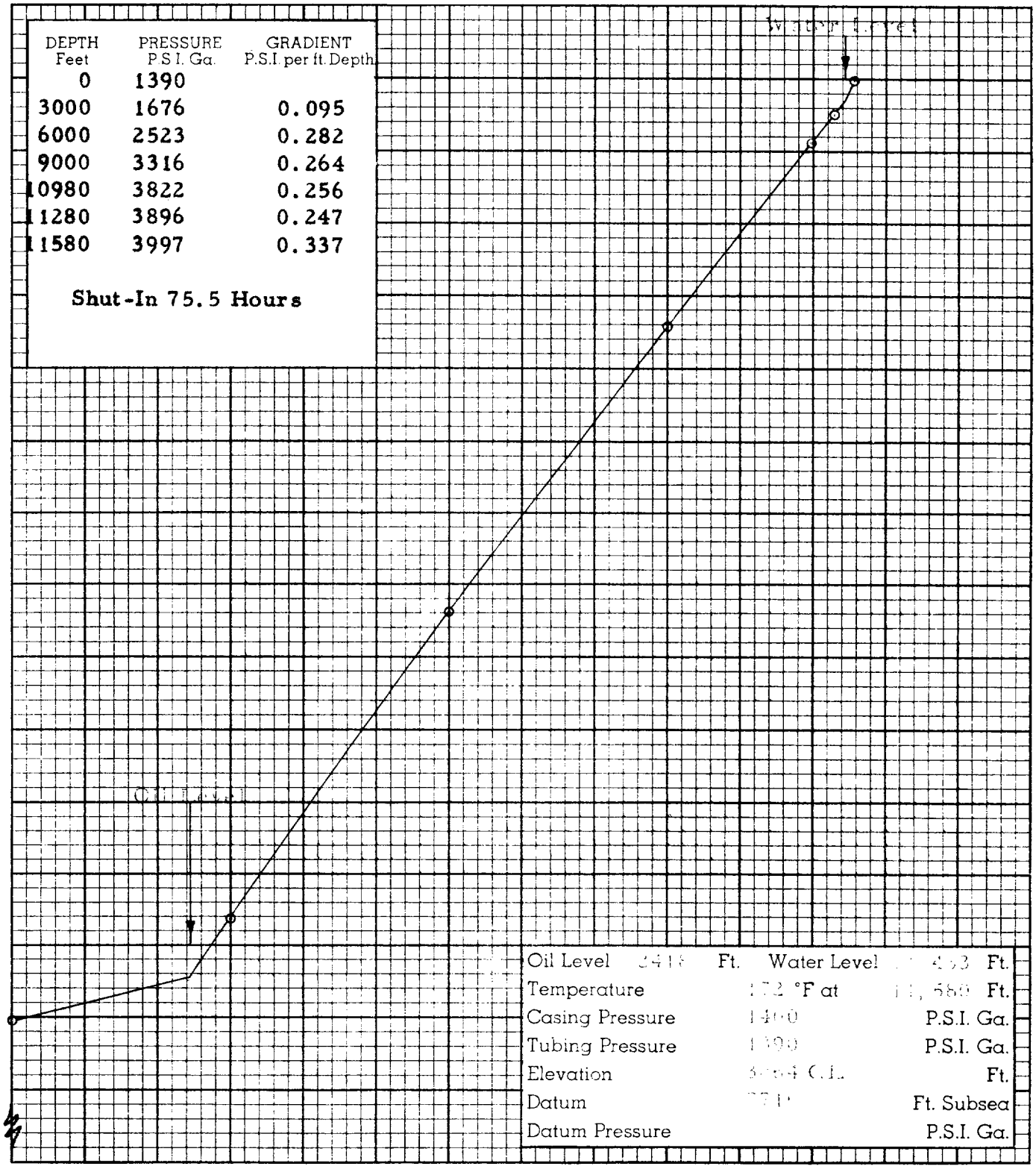
CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

File RFL 635

Company Sinclair Oil and Gas Company Formation Pennsylvanian
Well State 735 No. 1 County Lea
Field Wildcat State New Mexico

DEPTH Feet	PRESSURE P.S.I. Ga.	GRADIENT P.S.I. per ft. Depth
0	1390	
3000	1676	0.095
6000	2523	0.282
9000	3316	0.264
10980	3822	0.256
11280	3896	0.247
11580	3997	0.337

Shut-In 75.5 Hours



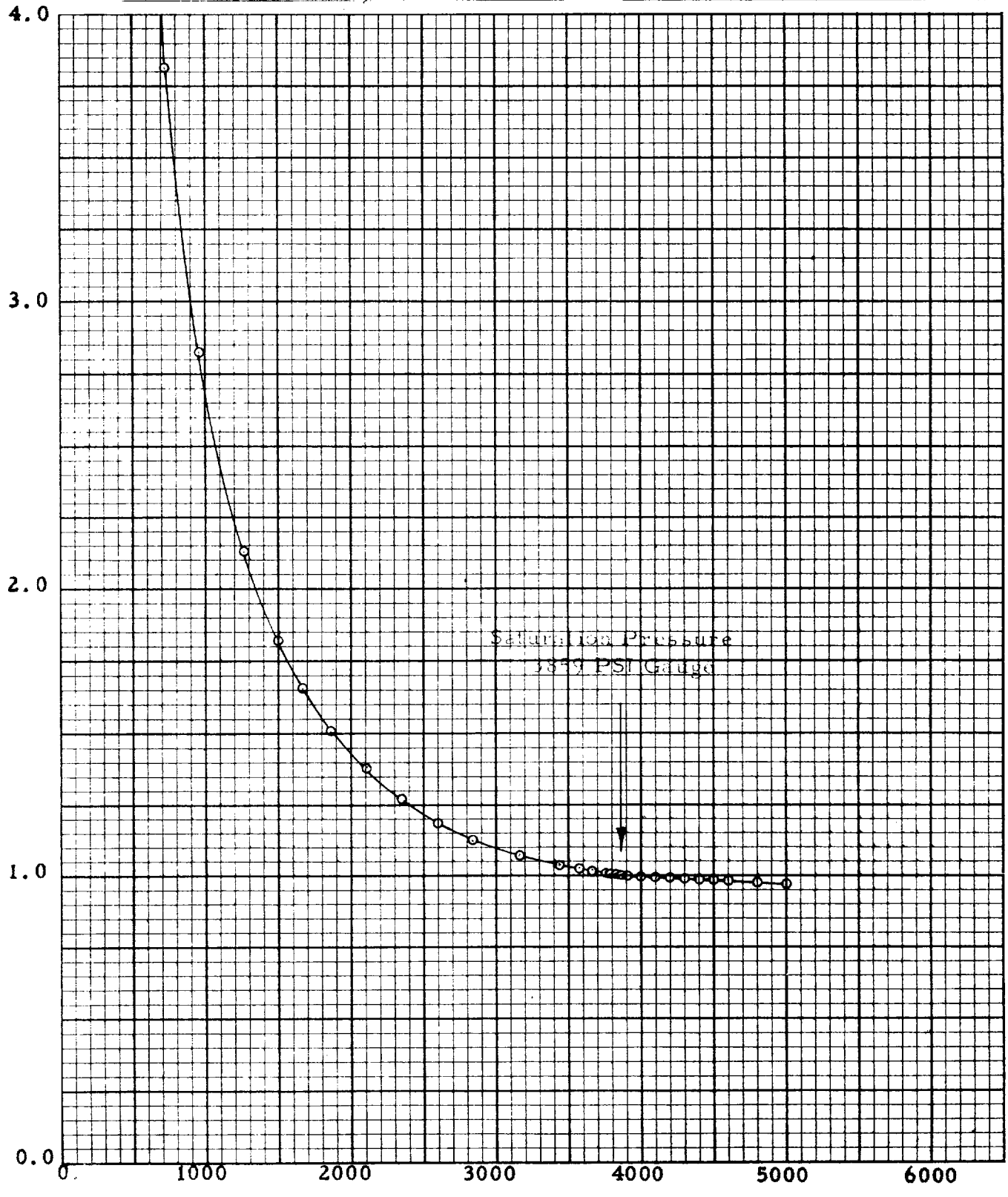
PRESSURE POUNDS PER SQUARE INCH GAUGE

DEPTH FEET

Oil Level	[illegible]	Ft. Water Level	[illegible] Ft.
Temperature	[illegible] °F at		[illegible] Ft.
Casing Pressure	1400		P.S.I. Ga.
Tubing Pressure	1390		P.S.I. Ga.
Elevation	[illegible] G.L.		Ft.
Datum	[illegible]		Ft. Subsea
Datum Pressure			P.S.I. Ga.

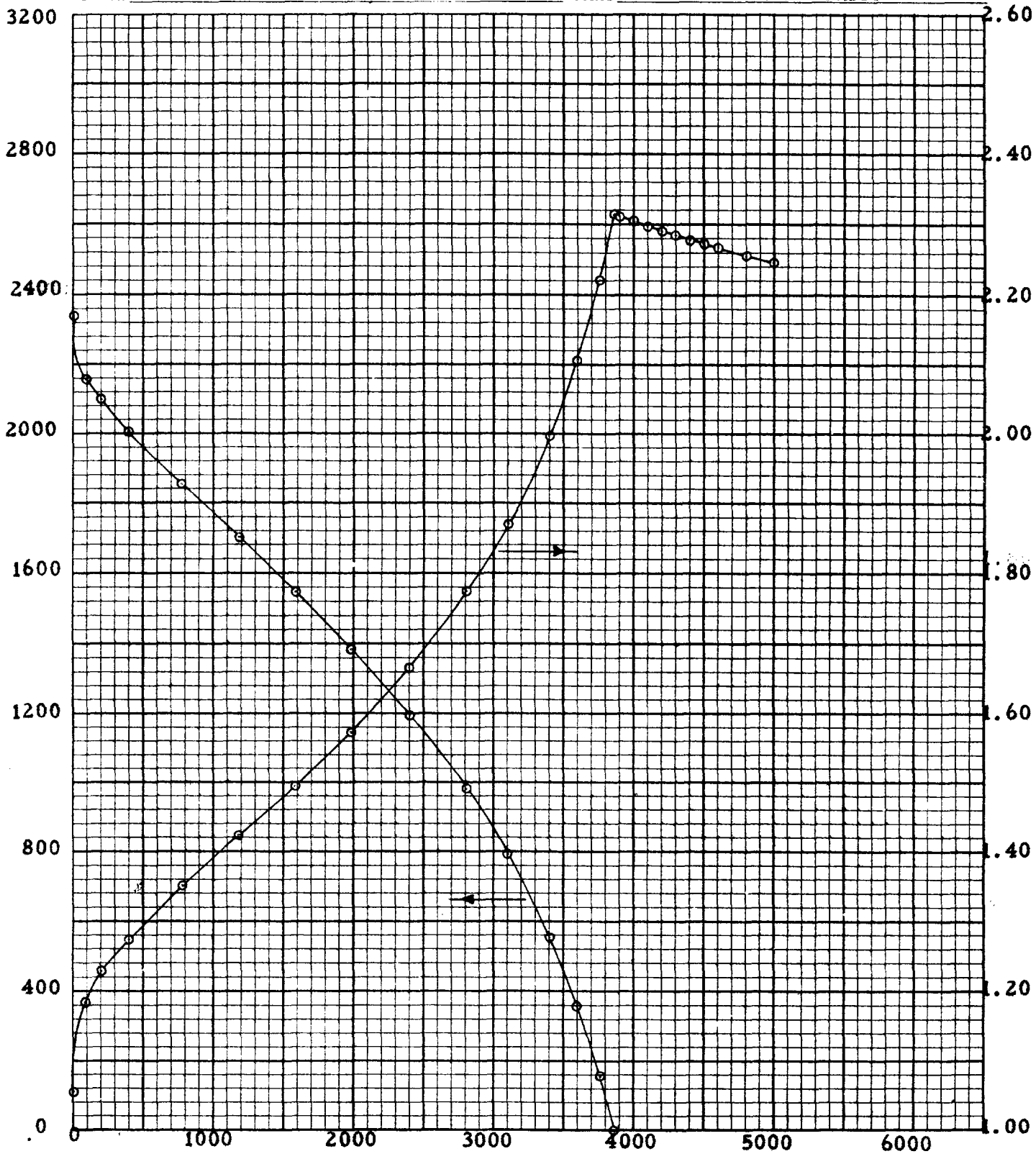
PRESSURE-VOLUME RELATIONS OF RESERVOIR FLUID

Company Sinclair Oil and Gas Company Formation Pennsylvanian
Well State 735 No. 1 County Lea
Field Wildcat State New Mexico



DIFFERENTIAL VAPORIZATION OF RESERVOIR FLUID

Company **Sinclair Oil and Gas Company** Formation **Pennsylvanian**
Well **State 735 No. 1** County **Lea**
Field **Wildcat** State **New Mexico**



GAS LIBERATED: STANDARD CUBIC FEET PER BARREL OF RESIDUAL OIL

RELATIVE LIQUID VOLUME: V/V_R

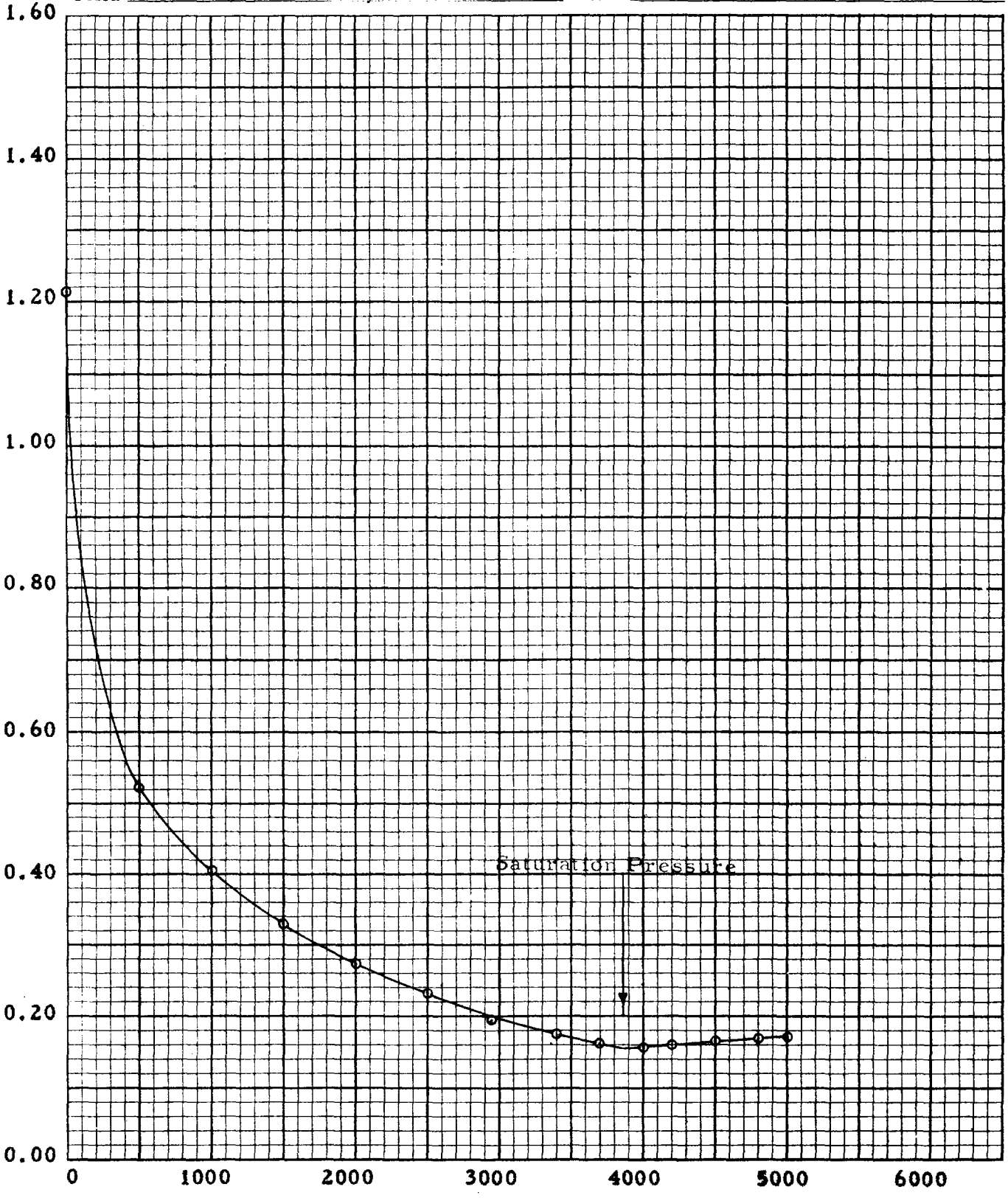
PRESSURE: POUNDS PER SQUARE INCH GAUGE

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

File RFL 635

VISCOSITY OF RESERVOIR FLUID

Company Sinclair Oil and Gas Company Formation Pennsylvanian
Well State 735 No. 1 County Lea
Field Wildcat State New Mexico



1 • St 396

CORE ANALYSES

ENGINEERING & OPERATING LABORATORIES

THE ATLANTIC REFINING CO.

OPERATOR Atlantic LEASE & WELL NO. Federal Dow #1 FIELD OR LOCATION (Undesignated) Devonian Pool PARISH COUNTY Lea STATE New Mexico

DATE SAMPLES RECEIVED 12-13-55 DATE ANALYSIS FINISHED 12-20-55 DATE REPORTED 12-20-55 ELEVATION Gr. Not Given D.F. K.B.

TYPE OF CORE: ~~ROTARY~~ DIAMOND ☐ WIRE LINE ☐ SIDE WALL ☐ HOW RECEIVED: ~~XXXXXX~~ CYLINDERS ☐ BOXED ☐ SACKED ☐ JARS ☐

CORE NO. RECOVERY DEPTH	COLOR INDEX NO.	AVERAGE PER CENT POROSITY	PERMEABILITY MILLIDARCYS		RESIDUAL SATURATIONS IN % PORE SPACE			RESIDUAL CHLORIDES P. P. M.	EST. % CONNATE WATER*	A. P. I. GRAV. EXTR. OIL @ 60° F.	PRODUCTION		FORMATION DESCRIPTION DRILLING OR CORING TIME ETC.
			Horiz.	Vert.	Oil	Water	Vacuum				Predicted	Actual	
CORE #1 —— 11520 – 11551 —— Rec'y 29'													
11,520 - 21	0	1.2 1.0	0.05	0.05	0	-		-					Dense limestone with shale breaks
11,521 - 22	0	1.1 1.1	0.05	0.05	0	-		-					Ditto
11,522 - 23	0	0.9 0.8	0.05	0.05	0	-		-					Ditto
11,523 - 24	0	1.0 0.9	0.05	0.05	0	-		-					Ditto
11,524 - 25	0	0.7	0.10	0.10	0	-		-					Ditto
11,525 - 26	0	1.1 1.2	0.05	0.05	0	-		-					Ditto
11,526 - 27	0	0.2 0.2	0.05	<0.05	0	-		-					Ditto
11,527 - 28	0	0.1 0.1	0.05	0.05	0	-		-					Ditto
11,528 - 29	0	0.2 0.1	0.05	0.05	0	-		-					Crystalline limestone
11,529 - 30	0	0.2 0.1	0.05	0.05	0	-		-					Ditto
11,530 - 31	0	0.1 0.1	0.05	0.05	0	-		-					Ditto
11,531 - 32	0	1.0 0.8	0.05	0.05	Tr.	-		-					Ditto

* Calculated from bottom water having P.P.M. Chlorides
Actual
Assumed

DRILLING MUD DATA
Weight ____ Visc. ____
Chlorides ____ P.P.M.
Water loss ____ cc/____ min.

ANALYSTS

CHECKED BY

DISTRIBUTION

REMARKS
Drilling fluid: oil emulsion
Continued on page 2

APPROVED 550786 and 550785

CORE ANALYSES

ENGINEERING & OPERATING LABORATORIES
THE ATLANTIC REFINING CO.

OPERATOR Atlantic LEASE & WELL NO. Federal Dow #1 FIELD OR LOCATION (Undesignated) Devonian Pool PARISH / COUNTY Lea STATE New Mexico

DATE SAMPLES RECEIVED 12-13-55 DATE ANALYSIS FINISHED 12-20-55 DATE REPORTED 12-20-55 ELEVATION Gr. Not Given D.F. ______ R.B. ______

TYPE OF CORE: XXXXXXXX DIAMOND ☐ WIRE LINE ☐ SIDE WALL ☐ HOW RECEIVED: XXXXXXX CYLINDERS ☐ BOXED ☐ SACKED ☐ JARS ☐

CORE NO. RECOVERY DEPTH	COLOR INDEX NO.	AVERAGE PER CENT POROSITY	PERMEABILITY MILLIDARCYS		RESIDUAL SATURATIONS IN % PORE SPACE			RESIDUAL CHLORIDES P.P.M.	EST. % CONNATE WATER*	A.P.I. GRAV. EXTR. OIL @ 60° F.	PRODUCTION		FORMATION DESCRIPTION DRILLING OR CORING TIME ETC.
			Horiz.	Vert.	Oil	Water	Vacant				Predicted	Actual	
11,532 - 33	0	2.0	0.05		0	-		-					Crystalline limestone with stylites
		1.5		0.05									
11,533 - 34	0	1.1	0.05		0	-		-					Ditto
		1.2		0.05									
11,534 - 35	0	0.5	0.05		0	-		-					Ditto
		0.4		0.05									
11,535 - 36	0	1.3	0.10	0.10	0	-		-					Ditto
11,536 - 37	Tr.	1.2	0.05		0	-		-					Ditto
		0.8		0.05									
11,537 - 38	Tr.	4.0	0.40		Tr.	-		-					Ditto
		3.8		0.10									
11,538 - 39	1-	4.0	0.10		6.5	-		-					Ditto
		3.9		0.05									
11,539 - 40	Tr.	3.2	0.05		0	-		-					ditto
		2.9		0.05									
11,540 - 41	Tr.	1.3	0.05		0	-		-					Ditto
		18.6		<0.05									
11,541 - 42	[illegible]	7.3	7.0	0.35	1.4	-		-					Ditto
11,542 - 43	[illegible]	12.3	0.20	0.15	Tr.	-		-					Vugular crystalline limestone
11,543 - 44	1-	6.0	0.25	2.1	3.5	-		-					Ditto
11,544 - 45	[illegible]	10.5	407.0	3610.0	1.4	-		-					Vugular crystalline limestone
11,545 - 46	[illegible]	6.8	0.50	0.25	2.3	-		-					Ditto
11,546 - 47	[illegible]	6.4	0.70	0.50	2.6	-		-					Ditto
11,547 - 48	[illegible]	[illegible]	0.50	0.65	[illegible]	-		-					Ditto
11,548 - 49	1-	[illegible]	31.5	3.6	1.2	-		-					Ditto

* Calculated from bottom water ... [illegible]

DRILLING MUD DATA
Weight ______ Visc. ______
Chlorides ______ P.P.M.
Water loss ______ cc/ ______ min.

ANALYSTS
J. [illegible] Henegar

CHECKED BY

DISTRIBUTION
J. [illegible] Vickery
E. [illegible] -R.Childers
G. [illegible]
S. [illegible] (2)
J. [illegible] - File

REMARKS
Drilling fluid: Oil emulsion

APPROVED
550784, 550783 and 550782
K. V. Terrell

CORE ANALYSES

ENGINEERING & OPERATING LABORATORIES

THE ATLANTIC REFINING CO.

OPERATOR Atlantic LEASE & WELL NO. Federal Dow #2 FIELD OR LOCATION ~~Bevenden Pool~~ Dea PARISH COUNTY Lea STATE New Mexico

DATE SAMPLES RECEIVED 12-14-55 DATE ANALYSIS FINISHED 12-20-55 DATE REPORTED 12-21-55 ELEVATION Gr. Not Given D.F. R.B.

TYPE OF CORE: ~~WIRE LINE~~ DIAMOND ☐ WIRE LINE ☐ SIDE WALL ☐ HOW RECEIVED: ~~CARTONS~~ CYLINDERS ☐ BOXED ☐ SACKED ☐ JARS ☐

CORE NO. RECOVERY DEPTH	COLOR INDEX NO.	AVERAGE PER CENT POROSITY	PERMEABILITY MILLIDARCYS Horiz.	PERMEABILITY MILLIDARCYS Vert.	RESIDUAL SATURATIONS IN % PORE SPACE Oil	RESIDUAL SATURATIONS IN % PORE SPACE Water	RESIDUAL SATURATIONS IN % PORE SPACE Vacuo	RESIDUAL CHLORIDES P. P. M.	EST. % CONNATE WATER*	A. P. I. GRAV. EXTR. OIL @ 60° F.	PRODUCTION Predicted	PRODUCTION Actual	FORMATION DESCRIPTION / DRILLING OR CORING TIME ETC.
* CORE #2 —— 11,551 —— 11,564 —— Rec'y 6½'													
11,551 - 52	1-	9.9 9.4	4.8	35.9	3.3	-		-					Vugular crystalline limestone
11,552 - 53	1-	6.4 9.6	0.20	6.3	5.0	-		-					Ditto
11,553 - 54	½-	8.2 7.1	1.7	0.20	1.9	-		-					Ditto
11,554 - 55	½-	5.7 5.6	0.15	0.05	1.8	-		-					Ditto
11,555 - 56	½-	5.5 4.3	2.1	0.05	2.1	-		-					Ditto
11,556 - 57	½-	10.4 5.1	2.5	0.10	1.9	-		-					Ditto

* Calculated from bottom water having P.P.M. Chlorides
Actual
Assumed

DRILLING MUD DATA
Weight Visc.
Chlorides P.P.M.
Water loss cc/ min.

ANALYSTS
J. P. Albough

CHECKED BY

DISTRIBUTION
J. H. Vickery
E. Arens
R. C. Childers
G. F. Nathman
S. L. Smith (2)
J. Whiteman - File

REMARKS
Drilling fluid: oil emulsion
* Probably last 6½ feet not recovered

APPROVED 550787
K. V. Terrell

CORE ANALYSES

ENGINEERING & OPERATING LABORATORIES
THE ATLANTIC REFINING CO.

OPERATOR Atlantic LEASE & WELL NO. Federal - Roy #1 FIELD OR LOCATION [illegible] Pool COUNTY Lea STATE New Mexico

DATE SAMPLES RECEIVED 12-19-55 DATE ANALYSIS FINISHED 12-22-55 DATE REPORTED 12-22-55 ELEVATION [illegible]

TYPE OF CORE: DIAMOND ☐ WIRE LINE ☐ SIDE WALL ☐ [illegible] ☐ BOXES ☐ SACKS ☐ JARS ☐

Core No. & Depth, Feet	[illegible]	Average Porosity	Permeability Horiz.	Permeability Vert.	Residual Saturation Oil	Water	Chloride	Formation Description
Core #3 — 11,564 — 11,614 — Rec'y 50'								
11,564 - 65	[illegible]	7.6 / 10.8	1.1	8.2	2.7	–	–	Crystalline limestone with numerous large and small vugular cavities.
11,565 - 66	[illegible]	10.1 / 6.4	0.30	0.85	5.9	–	–	Ditto
11,566 - 67	[illegible]	11.3 / [illegible]	10.5	0.20	1.2	–	–	Ditto
11,567 - 68	[illegible]	9.7 / [illegible]	13.7	2.7	2.1	–	–	Ditto
11,568 - 69	[illegible]	6.6 / 9.4	0.30	[illegible]	Tr	–	–	Ditto
11,569 - 70	[illegible]	[illegible]	0.80	0.05	0	–	–	Crystalline limestone with numerous horizontal fractures.
11,570 - 71	0	[illegible]	0.05	0.05	0	–	–	Ditto
11,571 - 72	0	[illegible]	[illegible]	0.05	0	–	–	Ditto
11,572 - 73	0	1.4	0.45	0.20	0	–	–	Ditto
11,573 - 74	0	0.1 / 0.5	0.19	0.20	0	–	–	Ditto
11,574 - 75	0	0.4 / 0.3	0.05	0.05	0	–	–	Ditto
11,575 - 76	0	0.9 / 0.3	[illegible]	[illegible]	0	–	–	Ditto
11,576 - 77	0	1.1	0.10	0.10	0	–	–	Ditto

ILLEGIBLE

DRILLING MUD DATA
Weight ____ Vis. ____
Chlorides ____ P.P.M.
Water loss ____ cc ____ Min.

ANALYSTS

CHECKED BY

DISTRIBUTION

REMARKS
Drilling fluids oil analysis
Continued on page 2

APPROVED
550793,550792

CORE ANALYSES

ENGINEERING & OPERATING LABORATORIES
THE ATLANTIC REFINING CO.

OPERATOR Atlantic LEASE & WELL NO. Federal - Dow #1 FIELD OR LOCATION Devonian Pool COUNTY Lea STATE New Mexico

DATE SAMPLES RECEIVED 12-15-55 DATE ANALYSIS FINISHED 12-22-55 DATE REPORTED 12-22-55 ELEVATION Gr. Not Given D.F. D.B.

TYPE OF CORE: DIAMOND ☐ WIRE LINE ☐ SIDE WALL ☐ HOW RECEIVED: CYLINDERS ☐ BOXED ☐ SACKED ☑ JARS ☐

CORE NO. RECOVERY DEPTH	COLOR INDEX NO.	AVERAGE PER-CENT POROSITY	PERMEABILITY MILLIDARCYS		RESIDUAL SATURATIONS IN % PORE SPACE			RESIDUAL CHLORIDES P. P. M.	EST. % CONNATE WATER*	A. P. I. GRAV. EXTR. OIL @ 60° F.	PRODUCTION		FORMATION DESCRIPTION DRILLING OR CORING TIME ETC.
			Horiz.	Vert.	Oil	Water	Vacant				Predicted	Actual	
11,577 - 78	0	2.1	0.15		0	-		-					Highly fractured crystalline limestone
		0.3		0.05	*								
11,578 - 79	0	0.4	0.05		0	-		-					Ditto
		0.2		0.05									
11,579 - 80	0	2.0	0.20	0.15	0	-		-					Ditto
11,580 - 81	0	1.4	0.20	0.20	0	-		-					Ditto
11,581 - 82	0	0.8	0.10	0.10	0	-		-					Ditto
11,582 - 83	0	1.5	0.10	0.10	0	-		-					Ditto
11,583 - 84	0	0.7	0.10	0.10	0	-		-					Ditto
11,584 - 85	0	0.7	0.10		0	-		-					Ditto
		0.3		0.05									
11,585 - 86	0	0.5	0.05		0	-		-					Ditto
		1.1		0.05									
11,586 - 87	Tr.	1.6	0.15	0.10	Tr.	-		-					Ditto
11,587 - 88	0	21.0	*3.0	*128.0	0	-		-					Ditto
11,588 - 89	0	1.5	0.10	0.10	0	-		-					Ditto
11,589 - 90	0	1.3	0.10	0.05	0	-		-					Ditto
11,590- 91	0	1.8	0.10	0.10	0	-		-					Ditto
11,591 - 92	0	2.1	0.10	0.05	0	-		-					Ditto
11,592 - 93	0	2.2	0.15	0.15	0	-		-					Ditto
11,593 - 94	0	1.1	0.15	0.10	0	-		-					Ditto
11,594 - 95	0	3.0	0.10		0	-		-					Ditto
		1.6		0.10									
11,595 - 96	0	2.5	0.25	0.25	0	-		-					Ditto
11,596 - 97	0	1.7	0.10	0.10	0	-		-					Ditto

* Calculated from bottom water having
P.P.M. Chlorides
Actual
Assumed

DRILLING MUD DATA
Weight _____ Visc. _____
Chlorides _____ P.P.M.
Water loss _____ cc/_____ min.

ANALYSTS

CHECKED BY

DISTRIBUTION

REMARKS
Drilling fluid: oil emulsion
* Natural fracture noted

Continued on page 3

APPROVED
550791, 550790 and 550789

CORE ANALYSES

ENGINEERING & OPERATING LABORATORIES

THE ATLANTIC REFINING CO.

OPERATOR Atlantic LEASE & WELL NO. Federal - Dow #1 FIELD OR LOCATION Devonian Pool COUNTY Lea STATE New Mexico

DATE SAMPLES RECEIVED 12-15-55 DATE ANALYSIS FINISHED 12-[illegible]-55 DATE REPORTED 12-22-55 ELEVATION ft. Not Given D.F.

TYPE OF CORE: DIAMOND ☐ WIRE LINE ☐ SIDE WALL ☐ HOW RECEIVED: CARTONS CYLINDERS ☐ BOXED ☐ SACKED ☐

CORE NO. RECOVERY DEPTH	COLOR INDEX NO.	AVERAGE PER CENT POROSITY	PERMEABILITY MILLIDARCYS. Horiz.	PERMEABILITY MILLIDARCYS. Vert.	RESIDUAL SATURATIONS IN % PORE SPACE Oil	RESIDUAL SATURATIONS IN % PORE SPACE Water	RESIDUAL SATURATIONS IN % PORE SPACE Vacant	RESIDUAL CHLORIDES P. P. M.	EST. % CONNATE WATER*	A. P. I. GRAV. EXTR. OIL @ [illegible]° F.	PRODUCTION Predicted	PRODUCTION Actual	FORMATION DESCRIPTION DRILLING OR CORING TIME ETC.
11,597 - 98	0	1.1	0.10	0.10	0	-		-					Highly fractured crystalline limestone
11,598 - 99	0	1.0	0.25	0.20	0	-		-					Ditto
11,599 -11,600	0	1.3	0.05		0	-		-					Ditto
		1.0		0.05									
11,600 - 01	0	1.3	0.10	0.10	0	-		-					Ditto
11,601 - 02	0	1.4	0.10	0.10	0	-		-					Ditto
11,602 - 03	Tr.	1.2	0.10	0.10	Tr.	-		-					Ditto
11,603 - 04	0	1.6	0.10	0.10	0	-		-					Ditto
11,604 - 05	0	1.7	0.30		0	-		-					Ditto
		1.6		0.05									
11,605 - 06	0	0.8	0.10		0	-		-					Ditto
		2.8		0.10									
11,606 - 07	0	2.5	0.10		0	-		-					Ditto
		1.9		0.05									
11,607 - 08	0	0.6	0.10	0.10	0	-		-					Ditto
11,608 - 09	0	1.4	0.25	0.15	0	-		-					Ditto
11,609 - 10	0	1.1	0.30	0.15	0	-		-					Ditto
11,610 - 11	0	0.8	*2.6		0	-		-					Ditto
		0.2		0.05									
11,611 - 12	0	0.6	0.15		0	-		-					Ditto
		0.3		0.05									
11,612 - 13	0	1.1	0.10	0.10	0	-		-					Ditto
11,613 - 14	0	1.2	*1.5	0.20	0	-		-					Ditto

* Calculated from bottom water having P.P.M. Chlorides
Actual
Assumed

DRILLING MUD DATA
Weight Visc.
Chlorides P.P.M.
Water loss cc/30 min. cake

ANALYSTS
W. E. Wilson

CHECKED BY

DISTRIBUTION
J. F. Vickery
E. Krans-R. Childers
G. P. Hayward
S. L. Smith (2)
J. Whiteman - File

REMARKS
Drilling Fluid: oil emulsion
* Natural fracture noted

APPROVED
550789 and 550788
K. V. Fetrow