DISCUSSION

Phillips Petroleum Company's No. 17 E. Coop, Osage County, Oklahoma, was cored for the purpose of determining the connate water saturation of the Burbank sand.

3019
1128
1191

Cable tools were used in the coring of this well. Precautions were taken to insure recovery of a core which had been subjected only to a very minimum of water contamination and would as nearly represent formation connate water conditions as this method of coring would permit. A drilling fluid consisting of oil and a compound known by the trade name "Mulsor" was used in an effort to avoid or reduce contamination of the core by drilling water.

The drilling fluid was used in the following manner: First; to condition the hole and remove any water which may have been present, 20 gallons of fluid (90% oil and 10% Mulsor) was run into the hole with the bailer, agitated, and then bailed out. The water left in the hole after drilling the plug was emulsified with the oil by this treatment and then removed by three trips of the bailer. Second; for coring, 20 gallons of the fluid was mixed and run into the hole. The formation was then cored with a 4-1/2 inch Baker Cable tool core barrel employing 36 inch stroke with 24 strokes per minute. After pulling the core barrel, the hole was reamed down and the fluid bailed therefrom. Samples of the fluid recovered in the bailer consisted of an emulsion containing an appreciable amount of suspended sand cuttings. At no time during the coring operation was there any evidence of free water being bailed from the well.

This drilling fluid was used in the above described manner while coring from 2991 to 3019 feet.

The core from 3019 to 3029.5 feet was cut using oil alone as the drilling fluid. However, the drilling crew reported that effects from the Mulsor were noticed over the entire section.

From the standpoint of providing a method for securing an uncontaminated core, results obtained from analysis of the core, indicate that the method has promising possibilities. Insofar, however, as the recovery and condition of the core was concerned further improvements in obtaining larger biscuits of core are necessary. All of the core from the section of soft sand in the top of the formation was very badly broken. Only a few very thin biscuits and fragments of biscuits were obtained from this section, the greater part of the recovery consisting of unconsolidated sand. The biscuits from the firm sand in the bottom of the formation were of much more satisfactory size for analytical purposes than those obtained from the top of the formation.

Results from the analysis show that the formation consists of two sections of sandstone distinctly different in characteristics from each other. The upper section down to approximately 3019 feet consisted of soft, highly permeable sandstone with high porosity. The lower section, however, consisted of firm to hard sandstone with permeability considerably lower than that in the upper section and with porosity averaging from 15 to 16 per cent.

C2

DISCUSSION

Total liquid saturation was found to be high throughout the entire core, averaging about 94 per cent of the pore space in the highly permeable section and about 90 per cent in the less permeable section. In the highly permeable sections, both water and oil saturations are higher than actual reservoir conditions due to infiltration of the emulsified drilling fluid. The infiltration of drilling fluid was greatest in the gas bearing section from 2991 to 3002 feet due to the lower liquid saturation in this part of the reservoir. The indicated connate water saturation in this gas bearing section is from 25 to 35 per cent of the pore space. Due to the small size of the recovered biscuits of core, it was necessary to use a sample composed of four to eight biscuits for each of the saturation determinations. The saturation tests were made on these consolidated biscuits of core, which were later also used for permeability and chloride determinations, the largest biscuit being used for the permeability test. Due to the small size of the biscuits, the infiltration of drilling fluid was greater than would be encountered if larger biscuits of core could be recovered.

The permeability-connate water saturation relation for the core data is presented in Figure 1. The solid line in the figure represents the uncontaminated samples. Less weight is given to some of the higher and intermediate permeability ranges due to these samples being affected by natural segregation and capillarity effects. The dashed curve gives weight to contaminated samples and represents minimum possible values for the connate water saturation. The solid line is considered to be the more reliable data in view of information available at this time.

CH

CORING RECORD

Depth From	Depth To	Recovered Feet	Remarks
2191.	2195.	4.	Very badly broken sandstone and unconsolidated sand.
2195.	3001	8.5	Upper 2-1/2 feet of recovery, unconsolidated sand believed to be cavings. Remainder of recovery consisted of unconsolidated sand and badly broken sandstone.
3001	3007	4.5	Badly broken biscuits of soft sandstone and unconsolidated sand.
3007.	3013.	6.	Badly broken biscuits of soft sandstone and unconsolidated sand.
3013	3019	4.	Badly broken biscuits of soft sandstone and unconsolidated sand.
3019	3024.5	4.5	Small biscuits of firm sandstone
3024.5	3029.5	3.	Small biscuits of firm sandstone.
3029.5 1901.5	3034 1906.0		Drilled sand (a small amount of water in bottom bailer)
3034. 1906.0	3034.5 1906.5		Drilled shale.

Core Lab
RESERVOIR EVALUATION

Petroleum Services Division
2001 Commerce
Midland, Texas 79703
Tel: (432) 694-7761
Fax: (432) 694-3191
www.corelab.com

December 20, 2005

CALUMET OIL COMPANY
2455 EAST 51st
Tulsa, Oklahoma 74105

File No.: 57181-19029
Subject: Core Analysis
North Burbank Unit 39-28
Burbank Field
Osage County, Oklahoma

Gentlemen:

The subject well was cored using diamond coring equipment and fresh mud to obtain 4 inch diameter cores from 3000 to 3035 feet and 3060 to 3071.4 feet from the Burbank Sand formation.

Core analysis data is presented in tabular and graphical form for your convenience. A porosity vs. permeability plot was prepared for statistical evaluation. Core analysis data is contained on a 3 1/2 inch computer diskette. Digital core photographs are contained on a CD.

We trust these data will be useful in the evaluation of your property and thank you for the opportunity of serving you.

Very truly yours,
CORE LABORATORIES

John Sebian
Laboratory Supervisor

JS/ym

CLB
NYSE

CALUMET OIL COMPANY
North Burbank Unit 39-28
File No. 57181-19029
Procedural Page

The cores were preserved at the wellsite in plastic bags and transported to Midland via motor freight by Stim-Lab personnel.

A Core Gamma Log was recorded for downhole E-log correlation.

The core was photographed under ultraviolet light.

Fresh core was taken from selected intervals and preserved in CoreSeal. The unanalyzed core with oil show was sealed in CoreSeal. The shale samples were wrapped in saran and foil.

Core analysis was made on selected intervals requested on full diameter samples. Plug samples taken were full diameter sampling was not possible.

Fluid removal and saturations were determined using a Dean Stark/ gas solvent extraction method.

Full diameter porosity was determined by direct pore volume measurement using Boyle's law helium expansion. Bulk volume was measured by Archimedes Principle. Grain density was calculated from dry weight, bulk volume and pore volume measurements.

$$\text{Grain Density} = \frac{\text{Dry Weight}}{\text{Bulk Vol.} - \text{Pore Vol.}}$$

Plug direct grain volume measurement was made using Boyle's law helium expansion. Bulk volume was measured by Archimedes Principle on samples after cleaning. Porosity was calculated using bulk volume and grain volume measurements.

$$\text{Porosity} = \frac{\text{Bulk Vol.} - \text{Grain Vol.}}{\text{Bulk Vol.}} \times 100$$

Steady State Air Permeability was measured in two horizontal directions and vertically while the core was confined in a Hassler rubber sleeve.

The core was boxed after analysis.

The core will remain at our Midland facility (thirty days free of charge) as we await further disposition instructions.

CORE LABORATORIES

Company : CALUMET OIL COMPANY
Well : NORTH BURBANK UNIT 39-28
Location : NW/4 SEC 23, T-27-N, R-5-E
Co,State : OSAGE, OKLAHOMA

Field : BURBANK FIELD
Formation : BURBANK SAND
Coring Fluid : FRESH WATER MUD
Elevation : 1138' KB

File No.: 57181-19029
Date : 12/13/05
API No. :
Analysts: SEBIAN

CORE ANALYSIS RESULTS

SAMPLE NUMBER	DEPTH ft	PERMEABILITY (MAXIMUM) Kair md	PERMEABILITY (90 DEG) Kair md	PERMEABILITY (VERTICAL) Kair md	POROSITY (HELIUM) %	SATURATION (PORE VOLUME) OIL %	SATURATION (PORE VOLUME) WATER %	GRAIN DENSITY gm/cc	DESCRIPTION
				CORE NO. 1 3000.0-3035.0 CUT 35' REC 35'					
1	3000.0- 01.0	1548.	1404.	914.	28.0	26.6	61.4	2.66	Sd, gry, med-f gr, 95% yel flu
2	3001.0- 02.0	764.	681.	274.	25.9	28.3	63.9	2.66	Sd, gry, med-f gr, 95% yel flu
3	3002.0- 03.0	647.	647.	317.	25.8	29.8	61.7	2.70	Sd, gry, med-f gr, 95% yel flu
4	3003.0- 04.0	420.	418.	114.	24.3	29.5	61.0	2.68	Sd, gry, med-f gr, 95% yel flu
5	3004.0- 05.0	319.	304.	93.0	23.1	28.2	69.0	2.67	Sd, gry, f-med gr, 95% yel flu
6	3005.0- 06.0	129.	126.	10.5	19.8	21.1	74.0	2.66	Sd, gry, f-med gr, 95% yel flu
7	3006.0- 07.0	69.6	69.1	15.6	18.7	19.0	72.4	2.68	Sd, gry, f-med gr, 95% yel flu
8	3007.0- 08.0	60.2	59.8	7.89	18.0	18.4	69.9	2.68	Sd, gry, f-vf gr, 95% yel flu
9	3008.0- 09.0	210.	207.	21.7	19.8	16.0	75.5	2.67	Sd, gry, f-vf gr, 95% yel flu
10	3009.0- 10.0	358.	355.	348.	22.8	16.3	68.6	2.67	Sd, gry, med-f gr, 60% dull gld flu
11	3010.0- 11.0	442.	420.	358.	23.8	17.7	72.1	2.67	Sd, gry, med-f gr, 50% dull gld flu
12	3011.0- 12.0	443.	443.	224.	23.6	19.2	71.5	2.66	Sd, gry, med-f gr, 50% dull gld flu
* 13	3012.0- 13.0		0.07		8.9	13.5	81.0	2.75	Sd, gry, vf-slt gr, 40% v/pale yel flu
* 14	3013.0- 14.0		0.39		10.0	17.1	76.1	2.71	Sd, gry, vf-slt gr, 60% v/pale yel flu
* 15	3014.0- 15.0		0.04		6.4	13.7	85.9	2.75	Sd, gry, vf-slt gr, tr% v/pale yel flu
* 16	3015.0- 16.0		462.		27.0	32.2	60.3	2.69	Sd, gry, med-f gr, 100% yel flu
17	3016.0- 17.0	1303.	1259.	631.	28.9	31.1	66.9	2.63	Sd, gry, med-f gr, 90% yel flu
18	3017.0- 18.0	783.	696.	60.8	27.9	26.2	70.3	2.66	Sd, gry, med-f gr, 80% yel flu
19	3018.0- 19.0	688.	681.	113.	28.0	29.5	68.0	2.66	Sd, gry, f-med gr, 90% yel flu
20	3019.0- 20.0	742.	734.	430.	28.5	26.7	59.7	2.67	Sd, gry, f-med gr, 90% yel flu
21	3020.0- 21.0	838.	829.	433.	27.6	26.2	72.5	2.62	Sd, gry, f-med gr, 95% yel flu
22	3021.0- 22.0	677.	665.	337.	27.5	21.2	74.1	2.63	Sd, gry, f-med gr, 95% yel flu
23	3022.0- 23.0	688.	675.	451.	27.7	20.2	77.2	2.65	Sd, gry, f-med gr, 90% yel flu
24	3023.0- 24.0	471.	468.	72.8	25.6	21.9	75.7	2.67	Sd, gry, med-f gr, 75% yel flu
25	3024.0- 25.0	554.	549.	237.	26.3	16.8	80.2	2.66	Sd, gry, med-f gr, 50% dull gld flu

CORE LABORATORIES

Company : CALUMET OIL COMPANY
Well : NORTH BURBANK UNIT 39-28

Field : BURBANK FIELD
Formation : BURBANK SAND

File No.: 57181-19029
Date : 12/13/05

CORE ANALYSIS RESULTS

SAMPLE NUMBER	DEPTH ft	PERMEABILITY (MAXIMUM) Kair md	PERMEABILITY (90 DEG) Kair md	PERMEABILITY (VERTICAL) Kair md	POROSITY (HELIUM) %	SATURATION (PORE VOLUME) OIL %	SATURATION (PORE VOLUME) WATER %	GRAIN DENSITY gm/cc	DESCRIPTION
26	3025.0- 26.0	499.	474.	199.	26.1	17.5	77.0	2.67	Sd, gry, med-f gr, 50% dull gld flu
27	3026.0- 27.0	181.	179.	147.	26.5	21.7	72.6	2.67	Sd, gry, med-vf gr, 80% yel flu
28	3027.0- 28.0	426.	406.	95.0	26.0	18.0	76.6	2.68	Sd, gry, f-med gr, 80% yel flu
29	3028.0- 29.0	432.	413.	277.	25.3	16.3	78.3	2.67	Sd, gry, f-med gr, 80% yel flu
30	3029.0- 30.0	241.	234.	39.4	22.5	15.6	70.9	2.68	Sd, gry, med-vf gr, 80% yel flu
31	3030.0- 31.0	376.	370.	402.	25.7	14.9	74.8	2.67	Sd, gry, med-vf gr, 80% dull gld flu
32	3031.0- 32.0	305.	305.	292.	24.4	10.5	80.7	2.65	Sd, dk gry, med-vf gr, 20% dull gld flu
33	3032.0- 33.0	177.	175.	69.5	21.8	13.2	80.2	2.66	Sd, dk gry, med-vf gr, 20% dull gld flu
34	3033.0- 34.0	107.	102.	9.50	18.4	11.9	73.1	2.68	Sd, dk gry, f-vf gr, 70% yel flu
35	3034.0- 35.0	68.0	62.2	44.6	17.5	12.5	59.9	2.68	Sd, dk gry, f-vf gr, 85% yel flu
	DRILLED INTERVAL 3035-3060								
	CORE NO. 2 3060.0-3071.4 CUT 11.4' REC 11.4'								
* 36	3060.0- 61.0		2.84		13.9	12.6	47.1	2.63	Sd, dk gry, vf-f gr, 0% flu gd cut
* 37	3061.0- 62.0		1.71		11.2	10.5	53.7	2.67	Sd, dk gry, vf-f gr, 0% flu gd cut
38	3062.0- 63.0	1.39	1.36	0.02	11.1	5.3	51.6	2.64	Sd, dk gry, vf-f gr, tr% yel flu gd cut
39	3063.0- 64.0	8.55	8.08	4.80	14.0	4.9	43.1	2.63	Sd, dk gry, med-vf gr, tr% yel flu gd cut
40	3064.0- 65.0	7.37	6.22	3.98	13.7	4.3	44.9	2.64	Sd, dk gry, med-vf gr, tr% yel flu gd cut
41	3065.0- 66.0	0.81	0.74	0.28	11.3	16.6	38.2	2.63	Sd, dk gry, med-vf gr, 10% dull gld flu
	3066.0- 71.4								No Analysis, Shale, blk

* INDICATES PLUG ANALYSIS

Chaparral Area permit pr18

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Phillips Petroleum Co. Lease N.B.U. Well No. 9-W26

Location NW¼

Section 11 Twp. 27N Rge. 5E County Osage State Oklahoma

Name of Sand	Burbank
Top of Core	2976.0
Bottom of Core	3024.0
Top of Sand (Received)	2976.0
Bottom of Sand (Received)	3024.0
Total Feet of Permeable Sand	45.0
Total Feet of Floodable Sand	

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 1	16.0	16.0
1 - 20	4.0	20.0
20 - 100	6.0	26.0
100 - 500	15.0	41.0
500 & above	4.0	45.0

Average Permeability Millidarcys	154.2
Average Percent Porosity	19.8
Average Percent Oil Saturation	
Average Percent Water Saturation	
Average Oil Content, Bbls./A. Ft.	
Total Oil Content, Bbls./Acre	
Average Percent Oil Recovery by Laboratory Flooding Tests	
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	
Total Calculated Oil Recovery, Bbls./Acre	
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

OILFIELD RESEARCH LABORATORIES

-LOG-

Company Phillips Petroleum Co. Lease N.B.U. Well No. 9-W26

Depth Interval, Feet	Description
2976.0 - 3000.0	Brown sandstone.
3000.0 - 3024.0	Dark carbonaceous sandstone.

Oilfield Research Laboratories

RESULTS OF PERMEABILITY AND POROSITY TESTS

TABLE I A

Company Phillips Petroleum Co. Lease N.B.U. Well No. 9-W26

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.	Percent Porosity
			Ft.	Cum. Ft.		
1	2976.1	247.	1.0	1.0	247.00	28.4
2	2977.1	415.	1.0	2.0	415.00	29.1
3	2978.1	130.	1.0	3.0	130.00	27.5
4	2979.1	153.	1.0	4.0	153.00	27.1
5	2980.1	644.	1.0	5.0	644.00	29.4
6	2981.1	436.	1.0	6.0	436.00	28.5
7	2982.1	122.	1.0	7.0	122.00	23.2
8	2983.1	68.	1.0	8.0	68.00	21.7
9	2984.1	44.	1.0	9.0	44.00	20.0
10	2985.1	20.	1.0	10.0	20.00	19.7
11	2986.1	226.	1.0	11.0	226.00	24.6
12	2987.1	143.	1.0	12.0	143.00	23.2
13	2988.1	61.	1.0	13.0	61.00	20.4
14	2989.1	60.	1.0	14.0	60.00	21.8
15	2990.1	314.	1.0	15.0	314.00	27.4
16	2991.1	399.	1.0	16.0	399.00	27.8
17	2992.1	384.	1.0	17.0	384.00	28.1
18	2993.1	319.	1.0	18.0	319.00	27.0
19	2994.1	436.	1.0	19.0	436.00	27.7
20	2995.1	599.	1.0	20.0	599.00	28.4
21	2996.1	556.	1.0	21.0	556.00	29.5
22	2997.1	298.	1.0	22.0	298.00	28.2
23	2998.1	509.	1.0	23.0	509.00	27.8
24	2999.1	322.	1.0	24.0	322.00	26.0
25	3000.1	0.70	1.0	25.0	0.70	11.0
26	3001.1	4.5	1.0	26.0	4.50	12.9
27	3002.1	27.	1.0	27.0	27.00	19.0
28	3003.1	0.34	1.0	28.0	0.34	10.3
29	3004.1	0.29	1.0	29.0	0.29	9.9
30	3005.1	Imp.	-	-	-	-
31	3006.1	0.24	1.0	30.0	0.24	8.6
32	3007.1	0.35	1.0	31.0	0.35	11.7
33	3008.1	0.93	1.0	32.0	0.93	13.1
34	3009.1	0.25	1.0	33.0	0.25	11.0
35	3010.1	0.30	1.0	34.0	0.30	12.2
36	3011.1	0.26	1.0	35.0	0.26	12.2
37	3012.1	0.36	1.0	36.0	0.36	12.9
38	3013.1	0.22	1.0	37.0	0.22	11.1
39	3014.1	0.21	1.0	38.0	0.21	10.9
40	3015.1	Imp.	-	-	-	-
41	3016.1	1.5	1.0	39.0	1.50	15.1
42	3017.1	2.0	1.0	40.0	2.00	18.0
43	3018.1	0.25	1.0	41.0	0.25	8.2

Oilfield Research Laboratories

RESULTS OF PERMEABILITY AND POROSITY TESTS

TABLE I A

Company Phillips Petroleum Co. Lease N.B.U. Well No. 9-W26

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.	Percent Porosity
			Ft.	Cum. Ft.		
44	3019.1	Imp.	-	-	-	-
45	3020.1	0.85	1.0	42.0	0.85	15.7
46	3021.1	1.8	1.0	43.0	1.80	15.5
47	3022.1	0.38	1.0	44.0	0.38	13.7
48	3023.1	0.26	1.0	45.0	0.26	13.0

Oilfield Research Laboratories

SUMMARY OF PERMEABILITY & POROSITY TESTS

TABLE II A

Company: Phillips Petroleum Co. Lease: N.B.U. Well No. 9-W26

Depth Interval, Feet	Feet of Core Analyzed	Average Air Permeability, Millidarcys	Average Effective Permeability, Millidarcys	Permeability Capacity Ft. x Md.	Average Percent Porosity
2976.0 - 3000.0	24.0	288.0		6,905.00	26.0
3000.0 - 3024.0	21.0	2.0		42.99	12.7
2976.0 - 3024.0	45.0	154.2		6,947.99	19.8

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Phillips Petroleum Co. Lease N.B.U. Well No. 14-W22

Location SE¼

Section 10 Twp. 27N Rge. 5E County Osage State Oklahoma

Name of Sand	Burbank
Top of Core	2995.0
Bottom of Core	3045.0
Top of Sand	2995.0
Bottom of Sand	3045.0
Total Feet of Permeable Sand	50.0
Total Feet of Floodable Sand	

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 50	18.0	18.0
50 - 200	6.0	24.0
200 - 500	7.0	31.0
500 - 700	7.0	38.0
700 - 900	6.0	44.0
900 & above	6.0	50.0

Average Permeability Millidarcys	389.0
Average Percent Porosity	24.1
Average Percent Oil Saturation	
Average Percent Water Saturation	
Average Oil Content, Bbls./A. Ft.	
Total Oil Content, Bbls./Acre	
Average Percent Oil Recovery by Laboratory Flooding Tests	
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	
Total Calculated Oil Recovery, Bbls./Acre	
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

OILFIELD RESEARCH LABORATORIES

-LOG-

Company Phillips Petroleum Co. Lease N.B.U. Well No. 14-W22

Depth Interval, Feet	Description
2995.0 - 3025.0	Fine grained, light brown sandstone.
3025.0 - 3045.0	Brown, fine grained sandstone.

Oilfield Research Laboratories

RESULTS OF PERMEABILITY AND POROSITY TESTS

TABLE I A

Company Phillips Petroleum Co. Lease N.B.U. Well No. 14-W22

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.	Percent Porosity
			Ft.	Cum. Ft.		
1	2995.5	967.	1.0	1.0	967.00	28.7
2	2996.5	533.	1.0	2.0	533.00	26.2
3	2997.5	146.	1.0	3.0	146.00	24.4
4	2998.5	1503.	1.0	4.0	1503.00	31.0
5	2999.5	125.	1.0	5.0	125.00	25.3
6	3000.5	458.	1.0	6.0	458.00	27.9
7	3001.5	46.	1.0	7.0	46.00	19.2
8	3002.5	148.	1.0	8.0	148.00	23.4
9	3003.5	1562.	1.0	9.0	1562.00	28.2
10	3004.5	81.	1.0	10.0	81.00	21.8
11	3005.5	321.	1.0	11.0	321.00	26.8
12	3006.5	829.	1.0	12.0	829.00	25.6
13	3007.5	956.	1.0	13.0	956.00	28.7
14	3008.5	713.	1.0	14.0	713.00	29.8
15	3009.5	1015.	1.0	15.0	1015.00	30.1
16	3010.5	1112.	1.0	16.0	1112.00	30.4
17	3011.5	581.	1.0	17.0	581.00	25.8
18	3012.5	788.	1.0	18.0	788.00	30.1
19	3013.5	572.	1.0	19.0	572.00	28.4
20	3014.5	581.	1.0	20.0	581.00	29.2
21	3015.5	502.	1.0	21.0	502.00	29.0
22	3016.5	542.	1.0	22.0	542.00	28.2
23	3017.5	553.	1.0	23.0	553.00	28.4
24	3018.5	738.	1.0	24.0	738.00	29.8
25	3019.5	873.	1.0	25.0	873.00	30.0
26	3020.5	738.	1.0	26.0	738.00	29.0
27	3021.5	492.	1.0	27.0	492.00	28.0
28	3022.5	324.	1.0	28.0	324.00	29.2
29	3023.5	365.	1.0	29.0	365.00	28.9
30	3024.5	472.	1.0	30.0	472.00	27.8
31	3025.5	266.	1.0	31.0	266.00	27.1
32	3026.5	100.	1.0	32.0	100.00	22.6
33	3027.5	59.	1.0	33.0	59.00	20.4
34	3028.5	36.	1.0	34.0	36.00	19.0
35	3029.5	10.	1.0	35.0	10.00	19.1
36	3030.5	33.	1.0	36.0	33.00	18.2
37	3031.5	36.	1.0	37.0	36.00	18.7
38	3032.5	19.	1.0	38.0	19.00	18.4
39	3033.5	28.	1.0	39.0	28.00	18.5
40	3034.5	24.	1.0	40.0	24.00	18.7
41	3035.5	26.	1.0	41.0	26.00	18.9
42	3036.5	15.	1.0	42.0	15.00	17.5
43	3037.5	20.	1.0	43.0	20.00	18.8

Oilfield Research Laboratories

RESULTS OF PERMEABILITY AND POROSITY TESTS

TABLE I A

Company Phillips Petroleum Co. Lease N.B.U. Well No. 14-W22

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.	Percent Porosity
			Ft.	Cum. Ft.		
44	3038.5	8.1	1.0	44.0	8.10	18.0
45	3039.5	8.3	1.0	45.0	8.30	17.2
46	3040.5	29.	1.0	46.0	29.00	17.6
47	3041.5	20.	1.0	47.0	20.00	17.7
48	3042.5	18.	1.0	48.0	18.00	17.5
49	3043.5	21.	1.0	49.0	21.00	17.5
50	3044.5	20.	1.0	50.0	20.00	17.4

Oilfield Research Laboratories

SUMMARY OF PERMEABILITY & POROSITY TESTS

TABLE II A

Company Phillips Petroleum Co. Lease N.B.U. Well No. 14-W22

Depth Interval, Feet	Feet of Core Analyzed	Average Air Permeability, Millidarcys	Average Effective Permeability, Millidarcys	Permeability Capacity Ft. x Md.	Average Percent Porosity
2995.0 - 3011.0	16.0	658.0	-	10,515.00	26.7
3011.0 - 3027.0	16.0	530.0	-	8,487.00	28.2
3027.0 - 3045.0	18.0	23.9	-	430.40	18.3
2995.0 - 3045.0	50.0	389.0	-	19,432.40	24.1

PHILLIPS PETROLEUM COMPANY

AFE No. P-3399

EXPLORATION AND PRODUCTION DEPARTMENT

No. CA-29

Date Nov. 8, 1963

Laboratory Reservoir Engineering

CORE ANALYSIS REPORT

NBU
Pool

Company Phillips Petroleum et al Lease NBU 15 Well No. W-26

Description Sec. 11 - T27N - R5E County Osage State Oklahoma

Sec. Twp. Rge.

420' FNL & 1285' FWL of SW/4

Dates of Coring: Started October 28, 1963 Completed October 29, 1963

Core Barrel Size Core 2 3/4"

Elevations: Surface 1087.25' Starting Point for Depth Measurements RKB 1094.75'

Depth Measurements by Drill pipe Last Steel Line Measurements

Formation Cored: Name Burbank Sand Top 2929' Bottom

Purpose of Coring

Requested by Mr. Earl Griffin

Copies to Messrs.: M. J. Kaufman (r)
T. A. Matthews (12)
W. A. Roberts
R. W. O'Neill
J. W. Marx
F. W. Beghtel
J. F. Downie

COPY FOR

11-18

Form 864 1-61

NBU 15 WELL No. W-26

Form 864—C 1-61

CORE ANALYSIS

Sample No.	Core No.	DEPTH IN FEET From	DEPTH IN FEET To	PERMEABILITY MILLIDARCYS Perpendicular	PERMEABILITY MILLIDARCYS Parallel	POROSITY PER CENT On Perm. Sample	POROSITY PER CENT On Sat. Sample	SATURATION PER CENT Oil	SATURATION PER CENT Water	SATURATION PER CENT Total	GRAIN DENSITY	COMBUSTIBLE GAS Methane Plus	COMBUSTIBLE GAS Propane Plus	COMBUSTIBLE GAS Butane Plus	REMARKS
	1	CORED FROM	2932' TO	2982'		RECOVERED	50'				100%				
1		2932	2933		450.	25.5					2.68				
2		2933	2934		280.	26.8					2.70				
3		2934	2935		135.	25.0					2.73				
4		2935	2936		43	11.5					2.83				
5		2936	2937		108.	25.9					2.68				
6		2937	2938		146.	25.7					2.68				
7		2938	2939		210.	25.1					2.67				
8		2939	2940		780.	26.6					2.67				
9		2940	2941		128.	25.4					2.68				
10		2941	2942		210.	25.9					2.68				
11		2942	2943		160.	26.2					2.67				
12		2943	2944		573	26.7					2.67				
13		2944	2945		491.	27.3					2.68				
14		2945	2946		220.	25.0					2.68				
15		2946	2947		266.	24.7					2.68				
16		2947	2948		791.	26.7					2.68				
17		2948	2949		525.	26.7					2.69				
18		2949	2950		84.	26.0					2.70				
19		2950	2951		536.	26.7					2.68				
20		2951	2952		177.	26.1					2.69				
21		2952	2953		133.	23.3					2.69				
22		2953	2954		119.	24.6					2.69				
23		2954	2955		622.	27.2					2.69				
24		2955	2956		625.	27.6					2.68				
25		2956	2957		440.	26.9					2.69				
26		2957	2958		89.	21.7					2.68				
27		2958	2959		78.	27.8					2.67				
28		2959	2960		760.	27.5					2.68				
29		2960	2961		500.	27.0					2.68				
30		2961	2962		808.	27.4					2.68				
31		2962	2963		675.	26.3					2.68				
32		2963	2964		945.	27.6					2.68				
33		2964	2965		365.	25.5					2.68				
34		2965	2966		735.	26.7					2.68				
35		2966	2967		660.	26.4					2.67				
36		2967	2968		329.	23.0					2.68				
37		2968	2969		445.	24.3					2.68				
38		2969	2970		616.	24.8					2.70				

* Parts chloride per million parts of water from core.

Approved _____ Test Made By COST & BUCE Date NOV. 8, 1963

Page No. 1

NBU 15 WELL NO. W-26

Form 864—C 1-61

CORE ANALYSIS

Sample No.	Core No.	DEPTH IN FEET From	DEPTH IN FEET To	PERMEABILITY MILLIDARCYS Perpendicular	PERMEABILITY MILLIDARCYS Parallel	POROSITY PER CENT On Perm. Sample	POROSITY PER CENT On Sat. Sample	SATURATION PER CENT Oil	SATURATION PER CENT Water	SATURATION PER CENT Total	GRAIN DENSITY	COMBUSTIBLE GAS Methane Plus	COMBUSTIBLE GAS Propane Plus	COMBUSTIBLE GAS Butane Plus	REMARKS
39	1	2970	2971		422.	24.1					2.66				
40		2971	2972		368.	23.2					2.65				
41		2972	2973		465.	23.5					2.65				
42		2973	2974		465.	23.0					2.63				
43		2974	2975		190.	20.3					2.63				
44		2975	2976		180.	24.4					2.65				
45		2976	2977		332.	22.5					2.65				
46		2977	2978		81.6	17.2					2.62				
47		2978	2979		5.1	11.3					2.57				
48		2979	2980		<.05	3.8					2.63				
49		2980	2981		13.7	14.5					2.65				
50		2981	2982		9.	10.8					2.61				

* Parts chloride per million parts of water from core.

Approved _____ Test Made By COST & BUCE Date NOV. 8, 1963

Page No. 2

30-25

AFE No. _____

PHILLIPS PETROLEUM COMPANY
Production Department
Technical Services Division
Laboratory Reservoir Engineering Section

No. CA-22-62TS
Date March 28, 1962

CORE ANALYSIS REPORT

NBU
Pool

Company Phillips Petroleum Company Lease NBU 30 Well No. W-25
Description Sec. 15-T27N-R5E County Osage State Oklahoma
Sec. Twp. Rge.

420' NL, 565' WL, SE/4

Dates of Coring: Started 1962 Completed 1962
Core Barrel Diamond Conventional Size Core
Elevations: Surface 1161.20' Starting Point for Depth Measurements RKB 1167.78'
Depth Measurements by Drill Pipe Last Steel Line Measurements
Formation Cored: Name Burbank Top Bottom

Purpose of Coring Water Flood Studies
Requested by Mr. Earl Griffin

Copies to Messrs.: Earl Griffin
H. M. Barrett
R. W. O'Neill
T. A. Matthews (15)
W. A. Roberts ← COPY FOR
C. E. Turner
J. W. Marx
R. R. Harvey
Heino Purre
J. F. Downie (2)

3-26-62

9-24

Form 864 1-61—92838-D

Form 864-C 1 1—53098-D

CORE ANALYSIS

Sample No.	Core No.	DEPTH, FEET FROM	DEPTH, FEET TO	PERMEABILITY MILLIDARCYS Perpendicular	PERMEABILITY MILLIDARCYS PARALLEL	Porosity Per Cent	SATURATION OIL PER CENT	SATURATION WATER PER CENT	SATURATION TOTAL PER CENT	Chloride Content Water P. P. M. P. *	COMBUSTIBLE GAS METHANE PLUS	COMBUSTIBLE GAS PROPANE PLUS	COMBUSTIBLE GAS BUTANE PLUS	REMARKS
1		3020.0	3020.5		959.	27.1								
2		3022.0	3022.5		784.	29.1								
3		3024.0	3024.5		83.3	21.0								
4		3026.0	3026.5		168.	23.2								
5		3028.0	3028.5		349.	21.8								
6		3030.0	3030.5		56.7	19.5								
7		3032.0	3032.5		340.	22.2								
8		3034.0	3034.5		503.	26.6								
9		3036.0	3036.5		323.	23.5								
10		3038.0	3038.5		382.	24.4								
11		3040.0	3040.5		741.	25.7								
12		3042.0	3042.5		.08	11.4								
13		3044.0	3044.5		405.	22.8								
14		3046.0	3046.5		38.7	21.2								
15		3048.0	3048.5		.1	11.5								
16		3050.0	3050.5		.02	5.7								
17		3052.0	3052.5		1.3	18.6								
18		3054.0	3054.5		161.	22.0								
19		3056.0	3056.5		183.	21.6								
20		3058.0	3058.5		104.	19.5								
21		3060.0	3060.5		76.2	19.5								
22		3062.0	3062.5		.7	12.3								
23		3064.0	3064.5		8.0	14.9								
24		3066.0	3066.5		3.3	13.1								
25		3068.0	3068.5		1.5	10.1								
26		3070.0	3070.5		.9	10.7								
27		3072.0	3072.5		5.9	13.1								
28		3074.0	3074.5		3.6	11.8								
29		3076.0	3076.5		3.9	12.1								
30		3078.0	3078.5		2.7	11.3								
31		3080.0	3080.5		4.1	11.5								
32		3080.5	3081.0		1.7	11.2								

* Parts chloride per million parts of water from core

Approved _____ Tests made by D. L. Cost Date March 28, 1962

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