THE OHIO OIL COMPANY

CORE ANALYSIS REPORT

R. BRYDEN A/C 1 LEASE WELL NO. 16

GREENWOOD COUNTY, KANSAS

OILFIELD RESEARCH LABORATORIES

CHANUTE, KANSAS

AUGUST 14, 1954

August 14, 1954

The Ohio Oil Company
Thompson Building
Tulsa 3, Oklahoma

Gentlemen:

Enclosed herewith is the report of the analysis of the 2 11/16" Rotary core taken from the R. Bryden A/C 1 Lease, Well No. 16, Greenwood County, Kansas, and submitted to our laboratory on July 30, 1954.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Carl L. Pate

CLP:cr

4 c.c.

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company The Ohio Oil Company Lease R. Bryden A/C 1 Well No. 16

Location

Section 36 Twp. 25S Rge. 8E County Greenwood State Kansas

Name of Sand		Bartlesville
Top of Core		2287.00
Bottom of Core		2372.00
Top of Sand	(According to field log)	2285.00
Bottom of Sand		2369.75
Total Feet of Permeable Sand	(Analyzed)	77.45
Total Feet of Floodable Sand	(Analyzed)	63.35

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 5	12.90	12.90
5 - 10	12.75	25.65
10 - 20	13.95	39.60
20 - 30	11.20	50.80
30 - 40	9.40	60.20
40 - 60	9.75	69.95
60 & above	7.50	77.45

Average Permeability Millidarcys	27.50
Average Percent Porosity	17.21
Average Percent Oil Saturation	25.95
Average Percent Water Saturation	53.03
Average Oil Content, Bbls./A. Ft.	347.
Total Oil Content, Bbls./Acre	25,579.
Average Percent Oil Recovery by Laboratory Flooding Tests	4.23
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	58.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	2,836.
Total Calculated Oil Recovery, Bbls. Acre	9,200.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

A water base mud was used as a circulating fluid in the coring of the sand in this well.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
2287.00 - 2289.20	Light brown fine grained micaceous sandstone.
2289.20 - 2289.60	Gray sandy shale.
2289.60 - 2290.40	Light brown fine grained micaceous sandstone.
2290.40 - 2290.70	Grayish brown fine grained micaceous sandstone.
2290.70 - 2291.10	Light brown fine grained micaceous sandstone.
2291.10 - 2291.40	Light brown fine grained laminated micaceous shaley sandstone.
2291.40 - 2292.90	Light brown fine grained micaceous sandstone.
2292.90 - 2295.40	Brown fine grained micaceous sandstone.
2295.40 - 2302.30	Light brown fine grained micaceous sandstone.
2302.30 - 2303.70	Light brown fine grained slightly laminated micaceous shaley sandstone.
2303.70 - 2304.00	Light brown fine grained micaceous sandstone.
2304.00 - 2305.00	Loss.
2305.00 - 2314.20	Grayish brown fine grained micaceous sandstone.
2314.20 - 2314.50	Light brown fine grained slightly laminated micaceous shaley sandstone.
2314.50 - 2315.30	Grayish brown fine grained micaceous sandstone.
2315.30 - 2316.70	Grayish brown fine grained conglomeratic micaceous sandstone.
2316.70 - 2317.05	Gray sandy shale.
2317.05 - 2326.50	Grayish brown fine grained micaceous sandstone.
2326.50 - 2326.90	Grayish brown fine grained laminated micaceous shaley sandstone.
2326.90 - 2329.00	Brown fine grained micaceous conglomeratic sandstone.

2329.00 - 2332.40 - Brown fine grained micaceous sandstone.

2332.40 - 2332.85 - Brown fine grained micaceous conglomeratic sandstone.

2332.85 - 2335.30 - Brown fine grained micaceous sandstone.

2335.30 - 2335.50 - Brown fine grained micaceous conglomeratic sandstone.

2335.50 - 2340.65 - Brown fine grained micaceous sandstone.

2340.65 - 2341.00 - Loss.

2341.00 - 2343.80 - Light brown fine grained micaceous sandstone.

2343.80 - 2344.20 - Conglomeratic sandstone.

2344.20 - 2359.00 - Light brown fine grained micaceous sandstone.

2359.00 - 2359.40 - Gray fine grained micaceous sandstone.

2359.40 - 2366.75 - Grayish light brown fine grained micaceous sandstone.

2366.75 - 2367.30 - Grayish light brown fine grained micaceous slightly carbonaceous sandstone.

2367.30 - 2367.80 - Light brown fine grained micaceous sandstone.

2367.80 - 2369.75 - Grayish light brown fine grained micaceous slightly carbonaceous sandstone.

2369.75 - 2371.00 - Sandy conglomerate.

2371.00 - 2372.00 - Loss.

Coring was started at a depth of 2287.00 feet in light brown fine grained micaceous sandstone and completed at 2372.00 feet, probably in sandy conglomerate. There was a core loss extending from 2371.00 to 2372.00 feet. This core shows a total of 81.90 feet of sandstone. There were three core losses totaling 2.35 feet of which, 1.35 feet was probably sandstone. For the most part, the pay is made up of fine grained micaceous sandstone.

PERMEABILITY

For the sake of distribution, the core was divided into four sections. The weighted average permeability of the four sections in order of increasing depth is 25.09, 8.12, 66.10 and 23.91 millidarcys respectively; the overall average being 27.50 (See Table II). By observing the data given

on the coregraph, it is noticeable that the sand has a very irregular permeability profile. The permeability of the sand varies from impermeable to a maximum of 137 millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a fairly low weighted average percent oil saturation, namely, 25.95. The weighted average percent oil saturation of the four sections in order of increasing depth is 23.96, 29.19, 28.98 and 25.14 respectively. The weighted average percent water saturation of the four corresponding sections is 57.32, 53.11, 44.20 and 52.39 respectively; the overall average being 53.03 (See Table IV). This gives an overall weighted average total fluid saturation of 78.98 percent. This low total fluid saturation indicates considerable fluid was lost during coring which was probably oil.

The weighted average oil content of the four sections in order of increasing depth is 328, 375, 403 and 332 barrels per acre foot respectively; the overall average being 347. The total oil content, as shown by this core, is 27,579 barrels per acre (See Table IV).

LABORATORY FLOODING TESTS

When taking into consideration that the sand in the core has a fairly low oil saturation, the sand responded satisfactorily to laboratory flooding tests, as a total recovery of 2,836 barrels of oil per acre was obtained from 48.65 feet of sand. The weighted average percent oil saturation was reduced from 26.78 to 22.55, or represents an average recovery of 4.23 percent. The weighted average effective permeability of the samples is 3.32 millidarcys, while the average initial fluid production pressure is 18.5 pounds per square inch (See Table VI).

By observing the data given in Table V, you will note that of the 83

samples tested, 76 produced water and 49 oil. This indicates that approximately 91 percent of the sand represented by these samples is permeable to water. The tests also show that the sand has a wide variation in effective permeability.

CONCLUSION

On the basis of the above data, it is evident that an efficient water flood, within the vicinity of this well, will recover approximately 9,200 barrels of oil per acre or an average of 145 barrels per acre foot from the 63.35 feet of good floodable sand analyzed. In calculating this recovery an allowance was made for oil lost during coring and it is assumed that the primary production and the true water saturation of the sand are 17 and 38 percent respectively and that the sand reservoir is not affected by an artificial or planned water drive.

This core shows a thick clean sand section having a wide variation in permeability and a fairly low oil saturation. The rather low oil saturation is probably due to the flushing of the sand during the coring of same.

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SUMMARY OF PERMEABILITY TESTS

TABLE II

Company The Ohio Oil Company Lease R. Bryden A/C Well No. 16

Depth Interval Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity, Ft. x Md.
2287.00 - 2314.20	25.00	25.09	627.14
2314.50 - 2329.00	13.05	8.12	105.93
2329.00 - 2339.95	10.75	66.10	711.60
2339.95 - 2369.75	28.65	23.91	685.05
2287.00 - 2369.75	77.45	27.50	2,129.72

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RESULTS OF SATURATION TESTS

TABLE III

Company The Ohio Oil Company Lease R. Bryden A/C 1 Well No. 16

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
1	2287.75	18.7	22.6	57.6	80.2	328	1.25	1.25	410
2	2288.75	19.3	22.7	59.2	81.9	340	0.95	2.20	323
3	2289.85	17.1	25.7	57.4	83.1	341	0.80	3.00	273
4	2290.55	15.1	15.8	70.0	85.8	185	0.70	3.70	130
5	2291.25	16.1	22.7	63.6	86.3	284	0.30	4.00	85
6	2292.75	19.9	26.3	47.5	73.8	406	1.50	5.50	609
7	2293.45	17.6	24.7	56.9	81.6	338	1.10	6.60	372
8	2294.60	18.8	26.4	54.5	80.9	386	1.40	8.00	540
9	2295.60	17.2	24.1	55.4	79.5	322	0.60	8.60	193
10	2296.45	16.6	25.8	58.0	83.8	332	0.90	9.50	299
11	2297.30	13.3	25.8	62.2	88.0	266	1.10	10.60	293
12	2298.75	17.8	25.4	58.2	83.6	351	1.20	11.80	421
13	2299.65	18.1	23.6	59.5	83.1	332	0.85	12.65	282
14	2300.40	17.7	17.0	68.6	85.6	234	0.80	13.45	187
15	2301.35	19.7	27.0	56.8	83.8	413	1.45	14.90	599
16	2302.45	16.0	15.0	75.3	90.3	186	0.55	15.45	102
17	2303.25	16.4	14.8	74.2	89.0	188	1.15	16.60	216

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Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
18	2305.15	18.9	21.5	61.0	82.5	315	0.95	17.55	299
19	2306.75	17.1	26.0	56.3	82.3	345	1.10	18.65	380
20	2307.35	17.1	25.1	53.4	78.5	333	0.95	19.60	316
21	2308.65	18.2	26.0	53.1	79.1	367	1.00	20.60	367
22	2309.35	18.7	23.5	49.3	72.8	341	0.90	21.50	307
23	2310.45	17.4	25.7	47.3	73.0	347	1.15	22.65	399
24	2311.65	16.7	24.4	47.0	71.4	316	1.10	23.75	348
25	2312.65	16.9	27.8	55.5	83.3	365	0.90	24.65	328
26	2313.45	16.6	25.5	54.9	80.4	328	1.15	25.80	377
27	2314.35	15.9	27.5	55.6	83.1	339	0.30	26.10	102
28	2315.45	17.3	19.4	63.9	83.3	260	0.65	26.75	169
29	2316.45	14.8	22.3	51.9	74.2	256	0.75	27.50	192
30	2317.45	14.8	23.8	61.7	85.5	274	0.75	28.25	206
31	2318.15	16.2	30.6	56.7	87.3	384	0.85	29.10	326
32	2319.25	16.0	30.3	59.0	89.3	376	1.30	30.40	489
33	2320.65	16.5	25.0	52.0	87.0	320	1.15	31.55	368
34	2321.55	16.6	32.0	54.8	86.8	411	1.10	32.65	451

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RESULTS OF SATURATION TESTS

TABLE III

Company The Ohio Oil Company Lease R. Bryden A/C 1 Well No. 16

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
35	2322.80	17.5	34.3	51.5	85.8	466	1.05	33.70	489
36	2323.75	17.7	25.6	52.0	77.6	352	0.95	34.65	334
37	2324.65	17.4	25.1	51.4	76.5	339	0.95	35.60	322
38	2325.65	16.6	28.5	51.5	80.0	367	1.35	36.95	495
39	2326.65	15.3	33.2	50.0	83.2	394	0.40	37.35	158
40	2327.35	18.2	39.7	42.5	82.2	560	1.00	38.35	560
41	2328.45	15.7	33.8	49.2	83.0	412	1.10	39.45	453
42	2329.52	18.9	29.5	43.0	72.5	433	0.90	40.35	390
43	2330.22	18.0	27.5	45.5	73.0	384	1.05	41.40	403
44	2331.65	18.7	28.2	45.9	74.1	409	1.00	42.40	409
45	2332.25	17.7	27.8	45.3	73.1	382	0.45	42.85	172
46	2333.65	18.1	26.7	48.0	74.7	375	1.30	44.15	487
47	2334.65	16.8	27.5	47.0	74.5	359	1.15	45.30	413
48	2335.75	18.5	27.9	39.1	67.0	400	0.70	46.00	280
49	2336.60	17.9	34.0	38.2	72.2	472	0.65	46.65	307
50	2337.15	18.3	29.5	44.0	73.5	419	1.05	47.70	440
51	2338.60	17.3	34.3	42.3	76.6	460	1.25	48.95	575

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RESULTS OF SATURATION TESTS

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Company The Ohio Oil Company Lease R. Bryden A/C 1 Well No. 16

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
52	2339.70	17.5	25.4	43.2	68.6	344	0.80	49.75	275
53	2340.25	18.0	30.8	41.6	72.4	430	0.70	50.45	301
54	2341.32	17.2	26.2	50.0	76.2	350	0.75	51.20	262
55	2342.18	17.4	24.1	50.7	74.8	326	1.00	52.20	326
56	2343.35	17.4	27.1	48.7	75.8	366	1.05	53.25	384
57	2344.50	17.8	23.1	50.0	73.1	319	0.65	53.90	207
58	2345.25	18.3	26.7	47.0	73.7	379	0.90	54.80	341
59	2346.20	18.2	28.1	48.8	76.9	397	1.10	55.90	437
60	2347.52	17.9	24.4	46.0	70.4	339	1.25	57.15	424
61	2348.60	17.8	27.9	46.6	74.5	385	0.90	58.05	346
62	2349.45	18.9	29.2	42.3	71.5	428	1.15	59.20	493
63	2350.35	17.0	24.5	49.3	73.8	323	1.10	60.30	356
64	2351.70	16.5	26.1	52.5	78.6	334	0.80	61.10	267
65	2352.45	16.8	22.9	54.5	77.4	298	1.05	62.15	313
66	2353.70	17.4	19.8	56.1	75.9	267	0.90	63.05	240
67	2354.25	18.2	20.7	50.8	71.5	292	0.75	63.80	219
68	2355.25	18.2	21.6	51.3	72.9	305	0.95	64.75	290

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RESULTS OF SATURATION TESTS

TABLE III

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Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
69	2356.15	17.5	21.7	52.7	74.4	294	1.25	66.00	368
70	2357.70	17.0	24.7	53.5	78.2	326	1.00	67.00	326
71	2358.25	16.7	21.8	53.5	75.3	282	1.05	68.05	296
72	2359.20	16.5	18.1	72.1	90.2	232	0.40	68.45	93
73	2360.55	15.6	25.6	56.5	82.1	310	1.65	70.10	511
74	2361.55	15.6	23.7	60.8	84.5	287	1.10	71.20	316
75	2362.75	17.8	25.5	56.2	81.7	352	0.90	72.10	317
76	2363.35	16.3	26.9	55.3	82.2	340	0.80	72.90	272
77	2364.30	18.6	29.4	51.3	80.7	425	1.00	73.90	425
78	2365.40	17.5	24.7	61.6	86.3	336	1.15	75.05	386
79	2366.60	17.3	29.9	61.3	91.2	401	0.75	75.80	301
80	2367.45	18.1	27.4	56.0	83.4	385	0.50	76.30	192
81	2368.30	16.9	27.3	59.0	86.3	358	1.15	77.45	412
82	2369.65	13.3	24.4	62.5	86.9	252	0.80	78.25	202
83	2370.45	10.3	23.6	60.7	84.3	189	1.25	79.50	236
						Total - - - - - - - - - -			27,579

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SUMMARY OF SATURATION

TABLE IV

Company The Ohio Oil Company Lease R. Bryden A/C 1 Well No. 16

Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
2287.00-2314.50	26.10	17.58	23.96	57.32	328	8,557
2315.30-2329.00	13.35	16.56	29.19	53.11	375	5,012
2329.00-2339.95	10.30	17.94	28.98	44.20	403	4,151
2339.95-2371.00	29.75	16.95	25.14	52.39	332	9,859
2287.00-2371.00	79.50	17.21	25.95	53.03	347	27,579

RESULTS OF LABORATORY FLOODING TESTS

TABLE V

Company The Ohio Oil Company Lease R. Bryden A/C 1 Well No. 16

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation			Volume of Water Recovered cc*	Effective Permeability, Millidarcys **	Initial Flu Production Pr Lbs./ Sq.
			Percent	Bbls/A. Ft.	Percent	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
1	2287.75	18.6	22.6	327	3.4	49	19.2	74.0	278	139	7.06	15
2	2288.75	19.1	22.7	336	1.7	25	21.0	66.6	311	58	1.63	20
3	2289.85	16.9	25.7	337	1.7	22	24.0	69.5	315	37	0.990	25
4	2290.55	15.2	15.3	181	0.0	0	15.3	73.7	181	7	0.173	25
5	2291.25	16.3	21.4	271	0.0	0	21.4	74.4	271	18	0.371	25
6	2292.75	20.0	26.3	408	6.5	101	19.8	70.5	307	153	6.00	15
7	2293.45	17.5	24.7	335	3.4	46	21.3	75.5	289	219	9.24	5
8	2294.60	18.5	26.4	379	8.6	124	17.8	73.7	255	245	24.87	5
9	2295.60	17.2	24.1	322	4.8	64	19.3	71.8	258	179	9.74	10
10	2296.45	16.5	25.8	330	1.3	17	24.5	69.7	313	17	0.346	25
11	2297.30	13.2	25.8	264	0.5	5	25.3	67.8	259	6	0.238	30
12	2298.75	17.3	25.4	341	2.4	32	23.0	69.7	309	47	1.20	15
13	2299.65	17.7	23.6	324	1.7	23	21.9	64.3	301	16	0.337	30
14	2300.40	17.5	16.7	227	0.0	0	16.7	65.9	227	19	0.527	30
15	2301.35	19.9	27.0	416	1.0	15	26.0	63.1	401	30	0.664	25
16	2302.45	16.3	14.9	189	0.0	0	14.9	78.7	189	4	0.089	40
17	2303.25	16.3	14.7	186	0.0	0	14.7	77.3	186	6	0.094	40
18	2305.15	20.5	19.7	314	0.0	0	19.7	71.9	314	10	0.272	35
19	2306.75	17.0	26.0	343	3.4	45	22.6	67.3	298	30	0.555	25
20	2307.35	17.2	25.1	335	0.5	7	24.6	64.9	328	15	0.284	25
21	2308.65	18.2	26.0	367	4.4	62	21.6	66.7	305	74	1.41	20
22	2309.35	18.5	23.5	338	4.5	65	19.0	67.5	273	161	5.06	15
23	2310.45	17.3	25.7	345	2.9	39	22.8	65.5	306	46	1.15	25
24	2311.65	16.5	24.4	313	1.3	17	23.1	63.1	296	28	0.970	25
25	2312.65	17.0	27.8	367	5.1	67	22.7	69.9	300	166	3.90	15
26	2313.45	16.7	23.7	307	0.0	0	23.7	68.6	307	20	0.366	30
27	2314.35	15.9	27.5	339	3.3	41	24.2	66.8	298	22	0.419	25
28	2315.45	17.2	19.5	260	0.0	0	19.5	71.5	260	87	2.49	20
29	2316.45	14.4	22.5	252	0.0	0	22.5	67.8	252	0	Imp.	50+
30	2317.45	14.9	23.4	270	0.0	0	23.4	62.2	270	0	Imp.	50+
31	2318.15	16.0	30.8	382	0.0	0	30.8	56.7	382	0	Imp.	50+
32	2319.25	16.2	30.3	381	0.0	0	30.3	54.7	381	0	Imp.	50+

RESULTS OF LABORATORY FLOODING TESTS

TABLE V

Company The Ohio Oil Company Lease R. Bryden A/C 1 Well No. 16

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation			Volume of Water Recovered cc*	Effective Permeability, Millidarcys **	Initial Fl Production P Lbs./ Sq.
			Percent	Bbls/A. Ft.	Percent	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
33	2320.65	16.4	24.6	313	0.0	0	24.6	58.7	313	5	0.386	50
34	2321.55	16.7	30.6	396	0.0	0	30.6	63.3	396	0	Imp.	50
35	2322.80	17.2	34.6	435	0.0	0	34.6	58.3	435	4	0.081	45
36	2323.75	17.5	24.8	337	0.0	0	24.8	61.5	337	8	0.232	45
37	2324.65	17.2	24.7	329	0.0	0	24.7	63.0	329	7	0.236	45
38	2325.65	16.6	28.2	364	0.0	0	28.2	66.8	364	11	0.224	35
39	2326.65	15.0	33.6	391	0.0	0	33.6	54.7	391	5	0.145	45
40	2327.35	18.2	39.5	558	0.0	0	39.5	54.5	558	0	Imp.	50
41	2328.45	15.7	33.8	412	6.9	84	26.9	63.5	328	39	1.18	25
42	2329.52	18.7	29.5	428	6.0	87	23.5	70.9	341	110	3.52	20
43	2330.22	17.9	27.5	382	3.9	54	23.6	71.8	328	125	4.31	20
44	2331.65	18.7	28.2	409	6.7	97	21.5	66.6	312	198	5.29	15
45	2332.25	18.0	27.7	387	4.3	60	23.4	69.4	327	138	7.65	15
46	2333.65	18.3	26.7	379	3.2	45	23.5	69.6	334	159	4.63	15
47	2334.65	16.8	27.5	359	3.8	50	23.7	74.0	309	130	3.74	20
48	2335.75	18.4	27.9	398	3.0	43	24.9	69.2	355	80	2.12	25
49	2336.60	18.0	34.0	475	7.1	99	26.9	68.9	376	35	0.849	25
50	2337.15	18.3	29.5	419	4.7	67	24.8	72.2	352	71	1.83	15
51	2338.60	17.2	34.3	458	9.3	124	25.0	68.7	334	52	0.960	15
52	2339.70	17.7	25.3	348	0.0	0	25.3	70.1	348	47	1.02	20
53	2340.25	18.1	30.8	432	6.4	90	24.4	66.6	342	72	1.96	20
54	2341.32	17.0	26.2	346	0.6	8	25.6	65.3	338	49	1.15	20
55	2342.18	17.2	24.1	321	4.1	54	20.0	73.8	267	74	1.67	15
56	2343.35	17.3	27.1	364	3.2	43	23.9	70.5	321	63	1.44	15
57	2344.50	18.0	23.1	323	2.1	29	21.0	73.4	294	107	2.84	15
58	2345.25	18.5	26.7	383	5.8	83	20.9	69.5	300	100	2.31	15
59	2346.20	18.1	28.1	395	9.5	134	18.6	77.6	261	110	2.71	15
60	2347.52	17.8	24.4	337	2.4	33	22.0	78.8	304	79	1.76	15
61	2348.60	17.7	27.9	383	6.7	92	21.2	73.5	291	85	2.14	20
62	2349.45	18.8	29.2	426	5.6	82	23.6	72.0	344	84	2.07	20
63	2350.35	16.8	24.5	320	0.0	0	24.5	68.0	320	32	0.570	25
64	2351.70	16.4	26.2	334	0.0	0	26.2	63.4	334	16	0.335	25
65	2352.45	16.6	22.2	286	0.0	0	22.2	69.5	286	44	0.973	20
66	2353.70	17.4	18.2	246	0.0	0	18.2	73.6	246	107	2.40	20

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RESULTS OF LABORATORY

TABLE V

Company The Ohio Oil Company Lease

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery	
			Percent	Bbls/A. Ft.	Percent	Bbls./A. F.
67	2354.25	18.0	20.8	290	0.0	0
68	2355.25	18.5	20.5	294	0.0	0
69	2356.15	17.8	19.7	272	0.0	0
70	2357.70	17.1	24.7	328	3.5	47
71	2358.25	16.7	21.8	282	0.0	0
72	2359.20	16.6	18.0	232	0.0	0
73	2360.55	15.3	25.6	304	4.3	51
74	2361.55	15.5	23.1	278	0.0	0
75	2362.75	17.4	25.5	344	4.3	58
76	2363.35	16.7	25.6	332	0.0	0
77	2364.30	18.3	29.4	417	7.7	109
78	2365.40	17.7	24.7	339	2.5	34
79	2366.60	17.2	29.9	400	6.1	82
80	2367.45	17.9	27.4	381	5.4	75
81	2368.30	16.8	27.3	356	3.8	50
82	2369.65	13.1	24.6	250	0.0	0
83	2370.45	10.6	23.3	192	0.0	0

Notes: cc - cubic centimeter.
* - Volume of water recovered at th
** - Determined by passing water thr

ield Research Laboratories

OF LABORATORY FLOODING TESTS

TABLE V

Lease R. Bryden A/C 1 Well No. 16

covery	Residual Saturation			Volume of Water Recovered cc*	Effective Permeability, Millidarcys **	Initial Fluid Production Pressure Lbs./ Sq. In.
Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
0	20.8	70.9	290	141	3.36	15
0	20.5	70.5	294	94	2.27	15
0	19.7	70.6	272	206	7.06	15
47	21.2	61.8	281	59	1.39	20
0	21.8	65.7	282	36	0.670	20
0	18.0	75.8	232	86	1.57	15
51	21.3	73.7	253	38	0.759	20
0	23.1	69.5	278	36	0.751	20
58	21.2	68.0	286	69	1.64	20
0	25.6	65.5	332	50	0.906	20
109	21.7	72.6	308	109	2.78	15
34	22.2	72.4	305	191	4.32	15
82	23.8	72.0	318	115	5.40	15
75	22.0	70.9	306	181	4.06	15
50	23.5	67.2	306	234	3.45	10
0	24.6	68.9	250	27	0.550	25
0	23.3	65.7	192	0	Imp.	50+

vered at the time of maximum oil recovery.
g water through sample which still contains residual oil.

Oilfield Research Laboratories

RESULTS OF PERMEABILITY TESTS

TABLE I

Company The Ohio Oil Company Lease R. Bryden A/C 1 Well No. 16

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
1	2287.50	9.9	0.75	0.75	7.42
2	2288.00	27.	0.50	1.25	13.50
3	2288.55	34.	0.50	1.75	17.00
4	2288.95	19.	0.45	2.20	8.55
5	2289.55	8.1	0.40	2.60	3.24
6	2290.35	16.	0.80	3.40	12.80
7	2290.80	2.6	0.40	3.80	1.04
8	2291.50	3.5	0.30	4.10	1.05
9	2291.90	6.3	0.45	4.55	2.84
10	2292.40	10.	0.75	5.30	7.50
11	2293.10	28.	0.60	5.90	16.80
12	2293.85	Imp.	0.60	6.50	0.00
13	2294.30	54.	0.45	6.95	24.30
14	2294.85	30.	0.45	7.40	13.50
15	2295.20	42.	0.40	7.80	16.80
16	2295.80	63.	0.55	8.35	34.65
17	2296.15	62.	0.50	8.85	31.00
18	2296.75	4.3	0.45	9.30	1.94
19	2297.10	5.0	0.40	9.70	2.00
20	2297.65	2.3	0.60	10.30	1.38
21	2298.15	5.1	0.45	10.75	2.30
22	2298.50	7.9	0.40	11.15	3.16
23	2299.00	8.2	0.45	11.60	3.69
24	2299.40	3.2	0.50	12.10	1.60
25	2300.00	10.	0.60	12.70	6.00
26	2300.60	51.	0.60	13.30	30.60
27	2301.15	43.	0.50	13.80	21.50
28	2301.60	18.	0.50	14.30	9.00
29	2302.20	23.	0.40	14.70	9.20
30	2302.65	1.4	0.50	15.20	0.70
31	2303.00	1.5	0.40	15.60	0.60
32	2303.45	1.5	0.50	16.10	0.75
33	2303.90	4.3	0.30	16.40	1.29
34	2305.40	24.	0.65	17.05	15.60
35	2305.90	55.	0.55	17.60	30.25
36	2306.50	9.9	0.55	18.15	5.44
37	2307.00	11.	0.55	18.70	6.05
38	2307.60	6.1	0.70	19.40	4.27
39	2308.45	123.	0.75	20.15	92.25
40	2309.00	29.	0.55	20.70	15.95

Oilfield Research Laboratories

RESULTS OF PERMEABILITY TESTS

TABLE I

Company The Ohio Oil Company Lease R. Bryden A/C 1 Well No. 16

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
41	2309.60	45.	0.45	21.15	20.25
42	2309.90	5.8	0.30	21.45	1.74
43	2310.15	8.6	0.40	21.85	3.44
44	2310.70	21.	0.40	22.25	8.40
45	2311.00	27.	0.35	22.60	9.45
46	2311.35	16.	0.45	23.05	7.20
47	2311.95	14.	0.50	23.55	7.00
48	2312.45	45.	0.55	24.10	24.75
49	2312.85	3.8	0.35	24.45	1.33
50	2313.25	3.7	0.45	24.90	1.67
51	2313.75	- 134.	0.40	25.30	53.60
52	2314.10	36.	0.30	25.60	10.80
53	2314.60	11.	0.40	26.00	4.40
54	2315.20	16.	0.40	26.40	6.40
55	2315.70	10.	0.70	27.10	7.00
56	2317.20	0.92	0.45	27.55	0.41
57	2317.80	1.1	0.60	28.15	0.66
58	2318.35	1.1	0.50	28.65	0.55
59	2318.80	1.7	0.55	29.20	0.94
60	2319.50	1.3	0.70	29.90	0.91
61	2320.25	6.7	0.70	30.60	4.69
62	2320.80	4.4	0.50	31.10	2.20
63	2321.30	1.5	0.55	31.65	0.83
64	2321.85	1.2	0.60	32.25	0.72
65	2322.50	3.4	0.60	32.85	2.04
66	2323.15	3.5	0.50	33.35	1.75
67	2323.50	4.3	0.45	33.80	1.94
68	2324.00	8.6	0.45	34.25	3.87
69	2324.40	7.0	0.45	34.70	3.15
70	2324.90	11.	0.50	35.20	5.50
71	2325.40	13.	0.50	35.70	6.50
72	2325.95	7.0	0.50	36.20	3.50
73	2326.40	6.3	0.35	36.55	2.21
74	2326.95	7.7	0.30	36.85	2.31
75	2327.60	30.	0.65	37.50	19.50
76	2328.10	13.	0.55	38.05	7.15
77	2328.75	28.	0.60	38.65	16.80
78	2329.30	44.	0.55	39.20	24.20
79	2329.80	63.	0.40	39.60	25.20
80	2330.05	41.	0.35	39.95	14.35

Oilfield Research Laboratories

RESULTS OF PERMEABILITY TESTS

TABLE I

Company The Ohio Oil Company Lease R. Bryden A/C 1 Well No. 16

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
81	2330.50	85.	0.45	40.40	38.25
82	2331.00	104.	0.45	40.85	46.80
83	2331.40	106.	0.50	41.35	53.00
84	2331.95	95.	0.70	42.05	66.50
85	2332.50	7.1	0.45	42.50	3.20
86	2333.00	113.	0.35	42.85	39.55
87	2333.40	137.	0.50	43.35	68.50
88	2333.95	109.	0.45	43.80	49.05
89	2334.35	13.	0.50	44.30	6.50
90	2334.95	10.	0.65	44.95	6.50
91	2335.55	64.	0.30	45.25	19.20
92	2336.05	69.	0.40	45.65	27.60
93	2336.35	76.	0.45	46.10	34.20
94	2336.90	59.	0.50	46.60	29.50
95	2337.45	55.	0.60	47.20	33.00
96	2337.95	55.	0.45	47.65	24.75
97	2338.35	54.	0.40	48.05	21.60
98	2338.85	52.	0.50	48.55	26.00
99	2339.30	36.	0.30	48.85	10.80
100	2339.55	114.	0.35	49.20	39.95
101	2340.00	17.	0.50	49.70	8.50
102	2340.50	24.	0.40	50.10	9.60
103	2341.05	23.	0.30	50.40	6.90
104	2341.50	26.	0.45	50.85	11.70
105	2341.95	24.	0.45	51.30	10.80
106	2342.45	25.	0.40	51.70	10.00
107	2342.75	25.	0.35	52.05	8.75
108	2343.10	27.	0.40	52.45	10.80
109	2343.65	22.	0.45	52.90	9.90
110	2344.25	10.	0.30	53.20	3.00
111	2344.75	41.	0.40	53.60	16.40
112	2345.05	41.	0.40	54.00	16.40
113	2345.45	27.	0.40	54.40	10.80
114	2345.90	38.	0.50	54.90	19.00
115	2346.45	36.	0.45	55.35	16.20
116	2346.85	38.	0.40	55.75	15.20
117	2347.25	36.	0.45	56.20	16.20
118	2347.75	39.	0.55	56.75	21.45
119	2348.35	36.	0.65	57.40	23.40
120	2349.05	34.	0.65	58.05	22.10

Oilfield Research Laboratories

RESULTS OF PERMEABILITY TESTS

TABLE I

Company The Ohio Oil Company Lease R. Bryden A/C 1 Well No. 16

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
121	2349.65	31.	0.50	58.55	15.50
122	2350.05	30.	0.50	59.05	15.00
123	2350.60	42.	0.40	59.45	16.80
124	2350.95	32.	0.45	59.90	14.40
125	2351.45	6.0	0.60	60.50	3.60
126	2352.15	10.	0.60	61.10	6.00
127	2352.65	4.3	0.40	61.50	1.72
128	2352.95	47.	0.45	61.95	21.15
129	2353.45	28.	0.50	62.45	14.00
130	2354.00	28.	0.50	62.95	14.00
131	2354.45	36.	0.50	63.45	18.00
132	2354.95	35.	0.45	63.90	15.75
133	2355.45	19.	0.50	64.40	9.50
134	2355.90	26.	0.45	64.85	11.70
135	2356.40	27.	0.50	65.35	13.50
136	2356.90	47.	0.50	65.85	23.50
137	2357.45	24.	0.50	66.35	12.00
138	2357.85	21.	0.55	66.90	11.55
139	2358.50	5.0	0.50	67.40	2.50
140	2358.90	8.2	0.30	67.70	2.46
141	2359.50	3.5	0.30	68.00	1.05
142	2359.90	23.	0.40	68.40	9.20
143	2360.30	28.	0.45	68.85	12.60
144	2360.80	6.6	0.50	69.35	3.30
145	2361.30	5.1	0.50	69.85	2.55
146	2361.80	6.0	0.60	70.45	3.60
147	2362.50	15.	0.60	71.05	9.00
148	2363.05	8.3	0.55	71.60	4.57
149	2363.60	11.	0.55	72.15	6.05
150	2364.05	16.	0.45	72.60	7.20
151	2364.55	27.	0.55	73.15	14.85
152	2365.15	35.	0.55	73.70	19.25
153	2365.65	39.	0.60	74.30	23.40
154	2366.35	53.	0.75	75.05	39.75
155	2366.80	5.2	0.25	75.30	1.30
156	2367.20	13.	0.30	75.60	3.90
157	2367.65	4.5	0.50	76.10	2.25
158	2368.05	9.4	0.50	76.60	4.70
159	2368.60	15.	0.50	77.10	7.50
160	2369.00	4.0	0.45	77.55	1.80
161	2369.45	1.8	0.50	78.05	0.90
162	2369.80	Imp.	0.50	78.55	0.00
163	2370.75	Imp.	0.75	79.30	0.00

Oilfield Research Laboratories

SUMMARY OF LABORATORY FLOODING TESTS

TABLE VI

Company The Ohio Oil Company Lease R. Bryden A/C 1 Well No. 16

Depth Interval, Feet	2287.00 - 2314.50	2327.90 - 2339.15	2339.95 - 2368.95	2287.00 - 2368.95
Feet of Core Analyzed	20.50	10.60	17.55	48.65
Average Percent Porosity	17.68	17.22	17.46	17.51
Average Percent Original Oil Saturation	25.31	29.71	26.64	26.78
Average Percent Oil Recovery	3.23	5.42	4.66	4.23
Average Percent Residual Oil Saturation	22.08	24.29	21.98	22.55
Average Percent Residual Water Saturation	68.48	69.55	71.44	69.81
Average Percent Total Residual Fluid Saturation	90.56	93.84	93.42	92.36
Average Original Oil Content, Bbls./A. Ft.	348.	408.	363.	366.
Average Oil Recovery, Bbls./A. Ft.	46.	74.	64.	58.
Average Residual Oil Content, Bbls./A. Ft.	302.	334.	299.	308.
Total Original Oil Content, Bbls./Acre	7,122.	4,328.	6,357.	17,807.
Total Oil Recovery, Bbls./Acre	933.	787.	1,116.	2,836.
Total Residual Oil Content, Bbls./Acre	6,189.	3,541.	5,241.	14,971.
Average Effective Permeability, Millidarcys	4.25	3.13	2.32	3.32
Average Initial Fluid Production Pressure, p.s.i.	19.8	19.1	16.7	18.5

NOTE: Only those samples which recovered oil were used in calculating the above averages.