OIL FIELD RESEARCH LABORATORIES
CHANUTE, KANSAS

April 19, 1952

Deep Rock Oil Corporation
Atlas Life Building
Tulsa, Oklahoma

Gentlemen:

Enclosed herewith is the report of the analysis made on the 2½" Rotary core taken from the Gingrich Lease, Well No. U-7, Franklin County, Kansas, and submitted to our laboratory on April 8, 1952.

Very truly yours,

OIL FIELD RESEARCH LABORATORIES

Carl L. Pate

CLP:eda
c.c.

DEEP ROCK OIL CORPORATION

CORE ANALYSIS REPORT

GINGRICH LEASE WELL NO. U-7

FRANKLIN COUNTY, KANSAS

OIL FIELD RESEARCH LABORATORIES

CHANUTE, KANSAS

APRIL 19, 1952

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Deep Rock Oil Corporation Lease Gingrich Well No. U-7

Location NE

Section 28 Twp. 16S Rge. 21E County Franklin State Kansas

Name of Sand	Squirrel
Top of Core	624.86
Bottom of Core	657.46
Top of Pay Sand	632.55
Bottom of Sand	644.80
Total Feet of Permeable Sand (Analyzed)	9.06
Total Feet of Floodable Sand (Analyzed)	6.11

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 2	1.80	1.80
2 - 4	0.83	2.63
4 - 20	1.50	4.13
20 - 60	2.60	6.73
60 - 100	0.98	7.71
100 & above	1.35	9.06

Average Permeability Millidarcys	43.13
Average Percent Porosity	19.14
Average Percent Oil Saturation	36.17
Average Percent Water Saturation	40.69
Average Oil Content, Bbls./A. Ft.	559.
Total Oil Content, Bbls./Acre	4,642.
Average Percent Oil Recovery by Laboratory Flooding Tests	16.73
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	278.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	1,699.
Total Calculated Oil Recovery, Bbls./Acre	1,900.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

Salt water was used as the 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
624.86 - 629.00	According to log, shaley limestone (Discarded at well).
629.00 - 630.00	According to log, broken sand (Discarded at well).
630.00 - 630.25	Gray sandy shale.
630.25 - 630.70	Laminated shaley sandstone.
630.70 - 631.40	Light brown fine grained laminated micaceous shaley sandstone.
631.40 - 632.55	Light brown fine grained micaceous sandstone.
632.55 - 633.58	Brown fine grained micaceous shaley sandstone.
633.58 - 634.30	Shaley limestone.
634.30 - 634.60	Shaley sandstone.
634.60 - 635.30	Dark brown fine grained micaceous sandstone.
635.30 - 635.60	Dark brown fine grained micaceous calcareous sandstone.
635.60 - 637.98	Dark brown fine grained micaceous sandstone.
637.98 - 639.70	Gray shale.
639.70 - 643.70	According to log, shale (Discarded at well).
643.70 - 644.10	Gray sandy shale.
644.10 - 644.70	Gray shale.
644.70 - 645.10	Shaley sandstone.
645.10 - 645.80	Brown fine grained micaceous shaley sandstone.
645.80 - 647.80	Brown fine grained micaceous sandstone.
647.80 - 649.80	Gray shale.

649.80 - 657.46 - According to log, dense blue shale (Discarded at well).

Coring was started at a depth of 624.86 feet in shaley limestone and completed at 657.46 feet in dense blue shale. This core shows a total of 9.26 feet of sandstone. For the most part, the pay is made up of fine grained micaceous to shaley sandstone. The sand section is divided by a shale break extending from 637.98 to 644.70 feet.

PERMEABILITY

For the sake of distribution, the core was divided into two sections. The weighted average permeability of the upper and lower sections is 13.39 and 62.55 millidarcys respectively; the overall average being 43.13 (See Table II). By observing the data given on the coregraph, it is noticeable that the sand has a very irregular permeability profile.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a fair weighted average percent oil saturation, namely, 36.17. The weighted average percent oil saturation of the upper and lower sections is 27.20 and 41.79 respectively. The weighted average percent water saturation of the upper and lower sections is 50.88 and 34.31 respectively; the overall average being 40.69 (See Table IV). This gives an overall weighted average total fluid saturation of 76.86 percent. This comparatively low total fluid saturation indicates that an appreciable amount of fluid was lost during coring which was probably oil.

Inasmuch as salt water was used as the circulating fluid in the coring of the sand in this well, no chloride determinations

were made as the results would not be representative.

The weighted average oil content of the upper and lower sections is 331 and 707 barrels per acre foot respectively; the overall average being 559. The total oil content, as shown by this core, is 4,642 barrels per acre (See Table IV).

LABORATORY FLOODING TESTS

The pay sand in this core responded very well to laboratory flooding tests, as a total recovery of 1,699 barrels of oil per acre was obtained from 6.11 feet of sand. The weighted average percent oil saturation was reduced from 41.61 to 24.88, or represents an average recovery of 16.73 percent. The weighted average effective permeability of the samples is 4.14 millidarcys, while the average initial fluid production pressure is 16.4 pounds per square inch (See Table VI).

By observing the data given in Table V, you will note that of the 10 samples tested, 8 produced water and 7 oil. This indicates that most of the sand represented by these samples is floodable. The tests also show that the sand has a fairly uniform effective permeability.

CONCLUSION

From a study of the above data, we believe that an efficient water flood within the vicinity of this well will recover approximately 1,900 barrels of oil per acre, or an average of 311 barrels per acre foot from the 6.11 feet of floodable sand analyzed. In calculating this recovery, an allowance was made for oil lost during coring, and it was assumed that the primary production and the true water saturation of the sand are 7 and 35 percent respectively.

The principle drawback of this core is the fact that it has a rather thin floodable sand section. It is understood that this is an edge well which probably accounts for the small sand body.

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SHOT RECOMMENDATION

Company Deep Rock Oil Corporation Lease Gingrich Well No. U-7

Depth Interval, Feet	Feet of Sand	Size of Shell Inches	Qts./Ft.	Total Quarts
635.0 - 638.0	3.0	3.5	2.0	6.0
638.0 - 645.0	7.0	Spacer	-	-
645.0 - 648.0	3.0	4.5	3.1	9.3
Total	6.0			15.3

Recommended Packer Setting 631.0 feet.
Note: Plug hole back to 648.0 feet.

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RESULTS OF PERMEABILITY TESTS

TABLE I

Company Deep Rock Oil Corporation Lease Gingrich Well No. U-7

Sample No.	Depth, Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
1	630.56	Imp.	0.45	0.45	0.00
2	631.19	1.9	0.70	1.15	1.33
3	631.78	0.74	0.65	1.80	0.48
4	632.30	3.7	0.50	2.30	1.85
5	632.62	13.	0.25	2.55	3.25
6	633.00	1.9	0.45	3.00	0.86
7	633.50	3.1	0.33	3.33	1.02
8	634.70	126.	0.25	3.58	31.50
9	635.05	17.	0.45	4.03	7.65
10	635.65	35.	0.30	4.33	10.50
11	636.08	129.	0.30	4.63	38.70
12	636.30	74.	0.35	4.98	25.90
13	636.77	99.	0.45	5.43	44.55
14	637.15	130.	0.40	5.83	52.00
15	637.65	163.	0.40	6.23	65.20
16	637.95	62.	0.18	6.41	11.16
17	644.86	5.1	0.40	6.81	2.04
18	645.45	34.	0.70	7.51	23.80
19	645.90	15.	0.40	7.91	6.00
20	646.40	30.	0.35	8.26	10.50
21	646.70	29.	0.35	8.61	10.15
22	647.13	51.	0.50	9.11	25.50
23	647.65	42.	0.40	9.51	16.80

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SUMMARY OF PERMEABILITY TESTS

TABLE II

Company Deep Rock Oil Corporation Lease Gingrich Well No. U-7

Depth Interval Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity, Ft. x Md.
630.25 - 635.30	3.58	13.39	47.94
635.60 - 647.80	5.48	62.55	342.80
630.25 - 647.80	9.06	43.13	390.74

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RESULTS OF SATURATION TESTS

TABLE III

Company Deep Rock Oil Corporation Lease Gingrich Well No. U-7

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	630.85	15.6	20.6	55.2	75.8	260	0.70	0.70	182
2	632.05	15.0	20.2	51.1	71.3	235	1.15	1.85	270
3	633.25	15.9	41.8	44.1	85.9	517	1.03	2.88	533
4	634.45	14.9	19.3	62.7	82.0	223	0.30	3.18	67
5	635.85	21.8	46.6	25.3	71.9	788	0.60	3.78	474
6	636.55	23.6	50.2	23.2	73.4	920	0.80	4.58	736
7	637.45	24.0	52.5	23.8	76.3	978	0.98	5.56	959
8	645.25	21.2	36.4	31.1	67.5	589	0.70	6.26	412
9	646.15	18.2	30.7	46.6	77.3	433	0.95	7.21	412
10	647.35	20.3	36.1	48.6	84.7	569	1.05	8.26	597
							Total - - - - - - - - -		4,642

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SUMMARY OF SATURATION TESTS

TABLE IV

Company Deep Rock Oil Corporation Lease Gingrich Well No. U-7

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
630.70-634.60	3.18	15.41	27.20	50.88	331	1,052
635.60-647.80	5.08	21.48	41.79	34.31	707	3,590
630.70-647.80	8.26	19.14	36.17	40.69	559	4,642

Oil Field Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE V

Company Deep Rock Oil Corporation Lease Gingrich Well No. U-7

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation			Volume of Water Recovered cc*	Effective Permeability, Millidarcys **	Initial Fluid Production Pressure Lbs./Sq. In.
			Percent	Bbls./A. Ft.	Percent	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
1	630.85	15.3	22.7	270	0.0	0	22.7	68.9	270	0	Imp.	50
2	632.05	14.5	21.3	240	0.0	0	21.3	74.3	240	4	0.162	45
3	633.25	16.4	40.6	510	15.2	194	25.4	67.2	324	18	0.717	20
4	634.45	14.7	17.9	204	0.0	0	17.9	76.3	204	0	Imp.	50
5	635.85	22.3	44.7	774	19.1	331	25.6	66.7	443	67	8.19	10
6	636.55	23.1	51.9	930	27.9	500	24.0	65.8	430	130	6.60	10
7	637.45	25.6	52.6	964	28.7	526	23.9	70.2	438	33	7.98	5
8	645.25	21.2	37.9	624	12.3	201	25.7	66.5	423	48	1.71	20
9	646.15	18.1	31.0	436	6.6	93	24.4	68.7	343	6	0.182	35
10	647.35	20.4	34.7	550	9.3	147	25.4	72.0	403	162	4.96	15

Notes: cc = cubic centimeter.
* = Volume of water recovered at the time of maximum oil recovery.
** = Determined by passing water through sample which still contains residual oil.

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE VI

Company Deep Rock Oil Corporation Lease Gingrich Well No. U-7

Depth Interval, Feet	632.55 - 647.80
Feet of Core Analyzed	6.11
Average Percent Porosity	20.52
Average Percent Original Oil Saturation	41.61
Average Percent Oil Recovery	16.73
Average Percent Residual Oil Saturation	24.88
Average Percent Residual Water Saturation	68.45
Average Percent Total Residual Fluid Saturation	93.33
Average Original Oil Content, Bbls./A. Ft.	674.
Average Oil Recovery, Bbls./A. Ft.	278.
Average Residual Oil Content, Bbls./A. Ft.	396.
Total Original Oil Content, Bbls./Acre	4,118.
Total Oil Recovery, Bbls./Acre	1,699.
Total Residual Oil Content, Bbls./Acre	2,419.
Average Effective Permeability, Millidarcys	4.14
Average Initial Fluid Production Pressure, p.s.i.	16.4

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