

OIL FIELD RESEARCH LABORATORIES
CHANUTE, KANSAS

January 18, 1951

Sunray Oil Corporation
First National Bank Building
Tulsa, Oklahoma

Attention: Mr. J. F. Adkisson

Gentlemen:

Enclosed herewith is the report of the partial analysis of the 2½" Rotary core taken from the McMinn Lease, Well No. 1, Cowley County, Kansas, and submitted to our laboratory on January 2, 1951.

In calculating the recovery for the sand within the vicinity of this well, an allowance was made for oil lost during coring; and it was assumed that the true water saturation of the sand is 38 percent.

Very truly yours,

OIL FIELD RESEARCH LABORATORIES

Carl L. Pate

CLP:eam

c.c. to Mr. C. C. Shreve
Mr. Orville Hilbert

31-31-6E

SUNRAY OIL CORPORATION

CORE ANALYSIS REPORT

MCMINN LEASE

WELL NO. 1

COWLEY COUNTY, KANSAS

OIL FIELD RESEARCH LABORATORIES

CHANUTE, KANSAS

JANUARY 17, 1951

Oil Field Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Sunray Oil Corporation Lease McMinn Well No. 1
 Location NE $\frac{1}{4}$, NE $\frac{1}{4}$, NW $\frac{1}{4}$
 Section 31 Twp. 31S Rge. 6E County Cowley State Kansas

Name of Sand	Bartlesville
Top of Core	2928.00
Bottom of Core	2962.00
Top of Sand	2945.10
Bottom of Sand	?
Total Feet of Permeable Sand	13.27

Distribution of Permeable Sand:
 Permeability Range
 Millidarcys

Feet

Cum. Ft.

	Feet	Cum. Ft.
0 - 2	3.02	3.02
2 - 4	4.30	7.32
4 - 6	3.40	10.72
6 & above	2.55	13.27

Average Permeability Millidarcys	4.09
Average Percent Porosity	15.02
Average Percent Oil Saturation	21.94
Average Percent Water Saturation	50.98
Average Oil Content, Bbls./A. Ft.	257.
Total Oil Content, Bbls./Acre	3,655.
Average Percent Oil Recovery by Laboratory Flooding Tests	0.60
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	7.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	21.
Total Calculated Oil Recovery, Bbls./Acre	1,550.

Casing Point
~~Water-Facing~~ Feet

Note: The above averages are for that part of the sand section extending from the casing point to the bottom of the core.

2947.00

Viscosity, Centipoises @

A. P. I. Gravity, degrees @ 60 °F

OIL FIELD RESEARCH LABORATORIES
CHANUTE, KANSAS

LOG

Company Sunray Oil Corporation Lease McMinn Well No. 1

<u>Depth Interval, Feet</u>	<u>Description</u>
2928.00 - 2937.70	- Gray fine grained micaceous shaley sandstone.
2937.70 - 2940.25	- Gray fine grained laminated micaceous shaley sandstone.
2940.25 - 2941.45	- Hard gray fine grained micaceous calcareous sandstone containing a vertical fracture.
2941.45 - 2941.90	- Gray fine grained laminated micaceous shaley sandstone.
2941.90 - 2942.85	- Hard gray fine grained micaceous calcareous sandstone containing a vertical fracture.
2942.85 - 2944.70	- Gray shale.
2944.70 - 2945.10	- Laminated shaley sandstone.
2945.10 - 2953.15	- Gray fine grained micaceous sandstone.
2953.15 - 2953.30	- Gray fine grained micaceous shaley sandstone.
2953.30 - 2953.50	- Gray fine grained micaceous sandstone.
2953.50 - 2954.13	- Finely laminated shaley sandstone.
2954.13 - 2955.75	- Gray fine grained micaceous slightly shaley sandstone.
2955.75 - 2962.00	- Gray fine grained micaceous sandstone.

Oil Field Research Laboratories
RESULTS OF PERMEABILITY TESTS
TABLE I

Company Sunray Oil Corporation Lease McMinn Well No. 1

Sample No.	Depth, Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
1	2945.88	0.57	0.60	0.60	0.34
2	2946.36	2.9	0.50	1.10	1.45
3	2946.75	4.7	0.40	1.50	1.88
4	2947.30	3.7	0.50	2.00	1.85
5	2947.70	4.3	0.50	2.50	2.15
6	2948.30	4.9	0.40	2.90	1.96
7	2948.63	6.0	0.45	3.35	2.70
8	2949.10	15.	0.45	3.80	6.75
9	2949.53	15.	0.40	4.20	2.00
10	2949.90	7.2	0.40	4.60	2.88
11	2950.30	2.5	0.40	5.00	1.00
12	2950.63	1.1	0.30	5.30	0.33
13	2950.96	5.1	0.30	5.60	1.53
14	2951.24	6.0	0.35	5.95	2.10
15	2951.65	4.9	0.45	6.40	2.21
16	2952.20	4.9	0.45	6.85	2.21
17	2952.55	1.3	0.80	7.65	1.04
18	2953.24	Imp.	0.15	7.80	0.00
19	2953.58	Imp.	0.30	8.10	0.00
20	2953.96	Imp.	0.33	8.43	0.00
21	2954.40	0.81	0.47	8.90	0.38
22	2954.83	0.96	0.40	9.30	0.38
23	2955.15	Imp.	0.40	9.70	0.00
24	2955.67	Imp.	0.35	10.05	0.00
25	2956.10	0.87	0.55	10.60	0.48
26	2956.55	3.5	0.40	11.00	1.40
27	2956.86	5.6	0.40	11.40	2.24
28	2957.32	3.0	0.40	11.80	1.20
29	2957.78	3.0	0.50	12.30	1.50
30	2958.23	2.3	0.40	12.70	0.92
31	2958.58	1.6	0.50	13.20	0.80
32	2959.21	3.7	0.70	13.90	2.59
33	2960.00	2.1	0.60	14.50	1.26
34	2960.41	2.3	0.40	14.90	0.92
35	2960.80	4.7	0.40	15.30	1.88
36	2961.29	5.9	0.50	15.80	2.95
37	2961.76	9.3	0.50	16.30	4.65

Oil Field Research Laboratories
SUMMARY OF PERMEABILITY TESTS

TABLE II

Company	Sunray Oil Corporation	Lease	McMinn	Well No.	1
Depth Interval Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity, Ft. x Md.		
2945.10 - 2953.15	7.65	4.49	34.38		
2953.15 - 2962.00	7.12	3.31	23.55		
2947.00 - 2962.00	13.27	4.09	54.26		

Oil Field Research Laboratories

RESULTS OF SATURATION TESTS

TABLE III

Company Sunray Oil Corporation Lease McMinn Well No. 1

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.	
F-1	2945.44	16.3	16.3	-	158	0.90	0.90	142
2	2946.54	15.9	18.2	50.0	224	1.00	1.90	224
F-3	2947.50	16.3	23.4	-	296	1.00	2.90	296
4	2948.43	15.4	22.6	50.0	270	0.85	3.75	230
F-5	2949.30	14.1	21.1	-	231	0.95	4.70	219
6	2950.45	14.7	24.8	47.5	283	1.15	5.85	325
F-7	2951.45	16.0	20.9	-	260	0.95	6.80	247
8	2952.35	14.8	29.1	48.2	334	1.25	8.05	418
F-9	2953.40	15.0	16.6	-	193	0.20	8.25	39
10	2954.60	14.5	14.9	52.9	168	1.62	9.87	272
F11	2955.85	13.9	20.2	-	218	0.55	10.42	120
12	2956.70	16.1	22.2	51.0	277	0.80	11.22	222
F13	2957.60	15.4	21.5	-	257	0.90	12.12	231
14	2958.40	14.8	23.3	53.0	268	0.90	13.02	241
F15	2959.44	14.5	22.4	-	254	1.10	14.12	279
16	2960.60	15.4	21.1	54.2	252	1.10	15.22	277
F17	2961.50	15.2	22.5	-	266	0.90	16.12	239
Total						-	-	4,021

Oil Field Research Laboratories

SUMMARY OF SATURATION TESTS

TABLE IV

Company	Sunray Oil Corporation	Lease	McMinn	Well No.					
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbls./A. Ft.	Total Oil Content Bbls./Acre			
2945.10-2953.15	8.05	15.45	22.39	48.73	261	2,101			
2953.30-2962.00	8.07	14.85	20.41	52.92	238	1,920			
2947.00-2962.00	14.22	15.02	21.94	50.98	257	3,655			

Oil Field Research Laboratories
RESULTS OF LABORATORY FLOODING TESTS

TABLE V

Company Sunray Oil Corporation Lease McMill Well No. 1

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	2945.44	16.3	16.3	158	0.0	0	16.3	69.4	158	0	Imp.	50 7
3	2947.50	16.3	23.4	296	0.6	8	22.8	62.4	288	7	0.254	35
5	2949.30	14.1	21.1	231	0.0	0	21.1	61.4	231	0	Imp.	50 7
7	2951.45	16.0	20.9	260	0.5	6	20.4	66.7	254	6	0.200	35
9	2953.40	15.0	16.6	193	0.0	0	16.6	66.6	193	0	Imp.	50 7
11	2955.85	13.9	20.2	218	0.0	0	20.2	64.4	218	0	Imp.	50 7
13	2957.60	15.4	21.5	257	0.0	0	21.5	63.0	257	0	Imp.	50 7
15	2959.44	14.5	22.4	254	0.0	0	22.4	56.5	254	0	Imp.	50 7
17	2961.50	15.2	22.5	266	0.7	8	21.8	62.8	258	4	0.300	35

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.

Oil Field Research Laboratories

SUMMARY OF LABORATORY FLOODING TESTS

TABLE VI

Company	Sunray Oil Corporation	Lease	McMinn	Well No.	1
Depth Interval, Feet	2947.00 - 2962.00				
Feet of Core Analyzed	2.85				
Average Percent Porosity	15.86				
Average Percent Original Oil Saturation	22.28				
Average Percent Oil Recovery	0.60				
Average Percent Residual Oil Saturation	21.68				
Average Percent Residual Water Saturation	63.96				
Average Percent Total Residual Fluid Saturation	85.64				
Average Original Oil Content, Bbls./A. Ft.	274.				
Average Oil Recovery, Bbls./A. Ft.	7.				
Average Residual Oil Content, Bbls./A. Ft.	267.				
Total Original Oil Content, Bbls./Acre	782.				
Total Oil Recovery, Bbls./Acre	21.				
Total Residual Oil Content, Bbls./Acre	761.				
Average Effective Permeability, Millidarcys	0.251				
Average Initial Fluid Production Pressure, p.s.i.	35.0				

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

Oil Field Research Laboratories
RESULTS OF WATER DIFFERENTIATION TESTS
TABLE VII

Company Sunray Oil Corporation Lease McMinn Well No. 1

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Percent Water Saturation	
			Connate	Drilling & Foreign
			Total	
2	2946.54	56,000		
4	2948.43	51,800		
6	2950.45	62,500		
8	2952.35	61,100		
10	2954.60	67,000		
12	2956.70	64,800		
14	2958.40	64,300		
16	2960.60	49,000		
Note:		ppm parts per million.		

Oil Field Research Laboratories

SUMMARY OF WATER DIFFERENTIATION TESTS

TABLE VIII

Company Sunray Oil Corporation **Lease** McMinn **Well No.** 1

Depth Interval, Feet	Chloride Content of Brine in Sand, ppm	Average Percent Connate Water	Average Percent Drilling & Foreign Water
2946.00-2953.15	58,419		
2954.13-2961.10	61,572		
2947.00-2962.00	60,551		

Note: ppm - parts per million