

December 23, 1950

4-22-12E

Sunray Oil Corporation  
First National Bank Building  
Tulsa, Oklahoma

Attention: Mr. J. F. Adkisson

Gentlemen:

Enclosed herewith is the report of the partial analysis made on the 2 $\frac{1}{2}$ " Rotary core taken from the Fankhauser Unit Lease, Well No. 32A, Greenwood County, Kansas, and submitted to our laboratory on November 24, 1950.

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 40 percent.

Very truly yours,

OIL FIELD RESEARCH LABORATORIES

Carl L. Pate

CLP:cc  
c.c. to Mr. C. C. Shreve  
Mr. L. T. Moffatt

Fankhauser Unit 32A

SUNRAY OIL CORPORATION

CORE ANALYSIS REPORT

FANKHAUSER UNIT LEASE      WELL NO. 32A

GREENWOOD COUNTY, KANSAS

OIL FIELD RESEARCH LABORATORIES

CHANUTE, KANSAS

DECEMBER 23, 1950

# Oil Field Research Laboratories

## GENERAL INFORMATION & SUMMARY

Company Sunray Oil Corporation Lease Fankhauser Unit Well No. 32A  
 Location 660' North of South Line and 330' West of East Line, SW<sup>1</sup><sub>4</sub>  
 Section 4 Twp. 22S Rge. 12E County Greenwood State Kansas

Name of Sand	Bartlesville
Top of Core	1816.00
Bottom of Core	1865.00
Top of Sand	1829.60
Bottom of Sand	1846.00
Total Feet of Permeable Sand	11.68

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 20	0.65	0.65
20 - 40	2.18	2.83
40 - 80	5.60	8.43
80 - 120	1.60	10.03
120 - 160	1.10	11.13
160 & above	0.55	11.68

Average Permeability, Millidarcys	72.63
Average Percent Porosity	19.38
Average Percent Oil Saturation	20.69
Average Percent Water Saturation	55.31
Average Oil Content, Bbls./A. Ft.	311.
Total Oil Content, Bbls./Acre	3,596.
Average Percent Oil Recovery by Laboratory Flooding Tests	1.34
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	21.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	128.
Total Calculated Oil Recovery, Bbls./Acre	2,650.
Casing Point	1,828.00
<del>Packer Setting, Feet</del>	

Viscosity, Centipoises @

A. P. I. Gravity, degrees @ 60 °F

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LOG

Company Sunray Oil Corporation Lease Fankhauser Unit Well No. 32A

<u>Depth Interval, Feet</u>	<u>Description</u>
1816.00 - 1817.00	- Gray shale.
1817.00 - 1818.25	- Laminated sandy shale.
1818.25 - 1818.80	- Gray shale.
1818.80 - 1829.00	- Finely laminated sandy shale.
1829.00 - 1829.60	- Loss.
1829.60 - 1832.10	- Light brown fine grained micaceous sandstone.
1832.10 - 1832.45	- Gray shale.
1832.45 - 1834.00	- Light brown fine grained micaceous sandstone.
1834.00 - 1835.00	- Loss.
1835.00 - 1835.10	- Light brown fine grained micaceous sandstone.
1835.10 - 1835.60	- Gray shale.
1835.60 - 1835.80	- Gray fine grained micaceous sandstone.
1835.80 - 1835.90	- Gray shale.
1835.90 - 1837.55	- Light brown fine grained micaceous sandstone.
1837.55 - 1838.22	- Gray shale.
1838.22 - 1838.60	- Light brown fine grained micaceous sandstone.
1838.60 - 1839.45	- Loss.
1839.45 - 1841.95	- Light brown fine grained micaceous sandstone.
1841.95 - 1842.75	- Finely laminated sandy shale.
1842.75 - 1843.00	- Coal.
1843.00 - 1846.00	- Light brown fine grained micaceous sandstone.
1846.00 - 1852.00	- Gray shale.
1852.00 - 1865.00	- According to log, shale (discarded at well).

**Oil Field Research Laboratories**  
**RESULTS OF PERMEABILITY TESTS**  
**TABLE I**

Company Sunray Oil Corporation Lease Fankhauser Unit Well No. 32A

Sample No.	Depth, Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
1	1829.85	29.	0.40	0.40	11.60
2	1830.30	27.	0.50	0.90	13.50
3	1830.65	56.	0.30	1.20	16.80
4	1830.92	58.	0.40	1.60	23.20
5	1831.43	38.	0.40	2.00	15.20
6	1831.75	37.	0.25	2.25	9.25
7	1832.05	36.	0.25	2.50	9.00
8	1832.70	49.	0.40	2.90	19.60
9	1833.00	49.	0.35	3.25	17.15
10	1833.35	55.	0.30	3.55	16.50
11	1833.75	71.	0.50	4.05	35.50
12	1835.05	19.	0.10	4.15	11.90
13	1835.93	17.	0.20	4.35	3.40
14	1836.25	70.	0.30	4.65	21.00
15	1836.62	59.	0.35	5.00	20.65
16	1836.92	53.	0.35	5.35	18.55
17	1837.25	61.	0.45	5.80	27.45
18	1838.33	35.	0.38	6.18	13.00
19	1839.54	73.	0.35	6.53	25.55
20	1840.05	67.	0.35	6.88	23.45
21	1840.30	57.	0.30	7.18	17.10
22	1840.65	114.	0.35	7.53	39.90
23	1841.00	107.	0.30	7.83	32.10
24	1841.25	111.	0.30	8.13	33.30
25	1841.65	107.	0.35	8.48	37.45
26	1841.90	162.	0.20	8.68	32.40
27	1843.13	63.	0.25	8.93	15.75
28	1843.40	122.	0.25	9.18	30.50
29	1843.70	149.	0.40	9.58	59.60
30	1844.15	153.	0.45	10.03	68.85
31	1844.54	167.	0.35	10.38	58.45
32	1844.91	74.	0.30	10.68	22.20
33	1845.15	97.	0.30	10.98	29.10
34	1845.46	73.	0.35	11.33	25.55
35	1845.82	11.	0.35	11.68	3.85

**Oil Field Research Laboratories**

**SUMMARY OF PERMEABILITY TESTS**

**TABLE II**

Company Sunray Oil Corporation Lease Fankhauser Unit Well No. 32A

<u>Depth Interval Feet</u>	<u>Feet of Core Analyzed</u>	<u>Average Permeability, Millidarcys</u>	<u>Permeability Capacity, Ft. x Md.</u>
1829.60 - 1838.60	6.18	47.45	293.25
1839.45 - 1846.00	5.50	100.93	555.10
1829.60 - 1846.00	11.68	72.63	848.35

**Oil Field Research Laboratories**

**RESULTS OF SATURATION TESTS**

**TABLE III**

Company Sunray Oil Corporation Lease Fankhauser Unit Well No. 32A

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.	
F-1	1829.70	16.3	20.2	-	-	255	0.55	0.55	140
2	1830.50	18.7	23.8	55.0	78.8	346	0.90	1.45	312
F-3	1831.60	18.6	23.6	-	-	341	1.05	2.50	358
4	1832.55	17.9	22.6	57.0	79.6	314	0.40	2.90	126
F-5	1833.15	18.9	22.1	-	-	324	1.15	4.05	372
6	1836.40	19.5	18.9	56.4	75.3	286	0.95	5.00	272
F-7	1837.45	19.6	20.9	-	-	318	0.70	5.70	222
8	1838.50	18.7	16.7	57.2	73.9	243	0.38	6.08	92
F-9	1839.90	19.6	21.6	-	-	329	0.75	6.83	246
10	1840.50	20.2	17.7	55.7	73.4	278	0.80	7.63	222
F-11	1841.45	21.2	19.6	-	-	323	0.95	8.58	307
12	1843.55	21.2	18.2	55.7	73.9	300	1.10	9.68	330
F-13	1844.75	18.6	18.6	-	-	269	1.10	10.78	296
14	1845.64	19.9	24.3	51.5	75.8	376	0.80	11.58	301
							<b>Total</b>	<b>- - - -</b>	<b>3,596</b>

# Oil Field Research Laboratories

## SUMMARY OF SATURATION TESTS

TABLE IV

Company Sunray Oil Corporation Lease Fankhauser Unit Well No. 32A

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
1829.60 - 1838.60	6.08	18.68	21.50	56.16	312	1,894
1839.45 - 1846.00	5.50	20.15	19.80	54.48	309	1,702
1829.60 - 1846.00	11.58	19.38	20.69	55.31	311	3,596

Oil Field Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE V

Company Sunray Oil Corporation

Lease Fankhauser Unit

Well No. 32A

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	1829.70	16.3	20.2	255	0.2	3	19.9	69.5	252	52	1.10	15
3	1831.60	18.6	23.6	341	2.0	29	21.6	64.8	312	75	1.49	15
5	1833.15	18.9	22.1	324	1.2	18	20.9	70.9	306	76	1.40	15
7	1837.45	19.6	20.9	318	1.1	17	19.8	68.0	301	168	7.65	10
9	1839.90	19.6	21.6	329	1.1	17	20.5	68.5	312	130	3.30	15
11	1841.45	21.2	19.6	323	2.0	33	17.6	72.2	290	65	11.75	10
13	1844.75	18.6	18.6	269	1.2	17	17.4	74.1	252	151	9.15	5

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	Fankhauser Unit	Well No.	32A
Depth Interval, Feet	1829.60 - 1837.55		1839.45 - 1845.20		1829.60 - 1845.20	
Feet of Core Analyzed	3.45		2.80		6.25	
Average Percent Porosity	18.55		19.75		19.09	
Average Percent Original Oil Saturation	22.01		19.71		20.97	
Average Percent Oil Recovery	1.28		1.43		1.34	
Average Percent Residual Oil Saturation	20.73		18.28		19.63	
Average Percent Residual Water Saturation	68.20		71.96		69.89	
Average Percent Total Residual Fluid Saturation	88.93		90.24		89.52	
Average Original Oil Content, Bbls./A. Ft.	317.		304.		312.	
Average Oil Recovery, Bbls./A. Ft.	19.		23.		21.	
Average Residual Oil Content, Bbls./A. Ft.	298.		281.		291.	
Total Original Oil Content, Bbls./Acre	1,094.		850.		1,944.	
Total Oil Recovery, Bbls./Acre	65.		63.		128.	
Total Residual Oil Content, Bbls./Acre	1,029.		787.		1,816.	
Average Effective Permeability, Millidarcys	2.65		8.48		5.26	
Average Initial Fluid Production Pressure, p.s.i.	13.8		10.0		12.1	

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 Fankhauser Unit Well No. 32A

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Percent Water Saturation		Total
			Connate	Drilling & Foreign	
2	1830.50	3,800	7.0	48.0	55.0
4	1832.55	25,200	47.9	9.1	57.0
6	1836.40	18,000	33.8	22.6	56.4
8	1838.50	18,200	34.7	22.5	57.2
10	1840.50	22,200	41.2	14.5	55.7
12	1843.55	5,300	9.8	45.9	55.7
14	1845.65	13,400	23.0	28.5	51.5
	Note:	ppm - parts per million.			

**Oil Field Research Laboratories**

**SUMMARY OF WATER DIFFERENTIATION TESTS**

**TABLE VIII**

Company Surray Oil Corporation Lease Fankhauser Unit Well No. 32A

<u>Depth Interval, Feet</u>	<u>Chloride Content of Brine in Sand, ppm</u>	<u>Average Percent Connate Water</u>	<u>Average Percent Drilling &amp; Foreign Water</u>
1830.15 - 1838.60	14,273	26.92	29.20
1840.20 - 1846.00	12,715	23.04	31.44
1830.15 - 1846.00	13,484	24.95	30.34

Note: ppm - parts per million