



OILFIELD RESEARCH LABORATORIES

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May 15, 1980

Savco Oil Company
Box 707
Chanute, Kansas 66720

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Larson Lease, Well No. ~~I-36~~ ~~I-26~~, Allen County, Kansas, and submitted to our laboratory on April 9, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Sanford A. Michel

SAM/tem

5 c to Chanute, Kansas

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GENERAL INFORMATION & SUMMARY

Company Savco Oil Company Lease Larson Well No. I-26 I-36

Location NE $\frac{1}{4}$

Section 32 Twp. 26S Rge. 20E County Allen State Kansas

Elevation, Feet - - - - -

Name of Sand - - - - - Tucker

Top of Core - - - - - 802.0

Bottom of Core - - - - - 842.0

Top of Sand - - - - - 808.0

Bottom of Sand - - - - - 842.0

Total Feet of Permeable Sand - - - - - 33.2

Total Feet of Floodable Sand - - - - - 22.9

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 100

3.7

3.7

100 - 500

12.0

15.7

500 - 1000

14.9

30.6

1000 - 2000

1.6

32.2

2000 - 3000

1.0

33.2

Average Permeability Millidarcys - - - - - 589.1

Average Percent Porosity - - - - - 18.8

Average Percent Oil Saturation - - - - - 41.7

Average Percent Water Saturation - - - - - 40.6

Average Oil Content, Bbls./A. Ft. - - - - - 597.

Total Oil Content, Bbls./Acre - - - - - 19,832.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 5.9

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 85.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 1,949.

Total Calculated Oil Recovery, Bbls./Acre - - - - - See "Calculated Recovery" Section.

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The core was sampled by a representative of Oilfield Research Laboratories. Fresh water mud was used as a drilling fluid. The core was reported to be from a non-virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
802.0 - 808.0	Gray sandy shale.
808.0 - 809.7	Dark brown conglomeratic sandstone.
809.7 - 813.2	Dark brown sandstone.
813.2 - 833.6	Dark brown carbonaceous slightly calcareous sandstone.
833.6 - 834.4	Gray shaly sandstone.
834.4 - 841.0	Black carbonaceous calcareous sandstone.
841.0 - 842.0	Gray shaly sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 1,949 barrels of oil per acre was obtained from 22.9 feet of sand. The weighted average percent oil saturation was reduced from 45.3 to 39.4, or represents an average recovery of 5.9 percent. The weighted average effective permeability of the samples is 24.50 millidarcys, while the average initial fluid production pressure is 14.2 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 34 samples tested, 24 produced water and oil, and 9 samples produced water only. This indicates that approximately 71 percent of the sand represented by these samples is floodable

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pay sand.

CALCULATED RECOVERY

It would appear from a study of the core data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 5,430 barrels of oil per acre. This is an average recovery of 237 barrels per acre foot from 22.9 feet of floodable sand analyzed in this core.

These recovery values were calculated using the following data and assumptions:

Original formation volume factor, estimated	1.04
Reservoir water saturation, percent, estimated	25.0
Average porosity, percent	18.7
Oil saturation after flooding, percent	39.4
Performance factor, percent, estimated	50.0
Net floodable sand, feet	22.9

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Savco Oil Company Lease Larson Well No. I-26 I-36

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation		Oil Content Bbls. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water			Ft.	Cum. Ft.		
1	808.5	16.1	41	50	512	21.	1.0	1.0	512	21.00
2	809.5	19.9	39	29	602	36.	0.7	1.7	421	25.20
3	810.5	20.1	27	29	421	873.	1.3	3.0	547	1134.90
4	811.5	20.9	26	70	422	899.	1.0	4.0	422	899.00
5	812.5	21.9	32	55	544	436.	1.2	5.2	653	523.20
6	813.5	22.2	29	44	500	352.	0.8	6.0	400	281.60
7	814.5	20.6	43	32	687	259.	1.0	7.0	687	259.00
8	815.5	19.9	42	30	648	518.	1.0	8.0	648	518.00
9	816.5	19.7	42	32	642	599.	1.0	9.0	642	599.00
10	817.5	20.4	37	36	586	485.	1.0	10.0	586	485.00
11	818.5	19.2	26	38	387	986.	1.0	11.0	387	986.00
12	819.5	21.0	44	36	717	225.	1.0	12.0	717	225.00
13	820.5	20.0	56	33	869	637.	1.0	13.0	869	637.00
14	821.5	21.0	45	39	733	566.	1.0	14.0	733	566.00
15	822.5	17.6	58	33	792	470.	1.0	15.0	792	470.00
16	823.5	19.6	50	34	760	377.	1.0	16.0	760	377.00
17	824.5	17.4	50	35	675	745.	1.0	17.0	675	745.00
18	825.5	18.0	56	38	782	873.	1.0	18.0	782	873.00
19	826.5	16.1	45	44	562	485.	1.0	19.0	562	485.00
20	827.5	17.0	47	43	620	611.	1.0	20.0	620	611.00
21	828.5	17.1	40	54	531	728.	1.0	21.0	531	728.00
22	829.5	15.7	50	35	609	78.	1.0	22.0	609	78.00
23	830.5	29.9	25	19	580	336.	1.0	23.0	580	336.00
24	831.5	16.9	50	42	656	679.	1.0	24.0	656	679.00
25	832.5	16.5	49	46	627	873.	1.0	25.0	627	873.00
26	833.5	17.9	48	41	667	826.	0.6	25.6	400	495.60
27	834.5	19.0	44	38	649	1019.	0.6	26.2	389	611.40
28	835.5	18.1	39	41	548	1223.	1.0	27.2	548	1223.00
29	836.5	16.6	40	36	515	397.	1.0	28.2	515	397.00
30	837.5	18.1	47	41	660	2044	1.0	29.2	660	2044.00

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Savco Oil Company Lease Larson Well No. I-26 I-36

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water	Total			Ft.	Cum. Ft.		
31	838.5	16.0	52	40	92	646	259.	1.0	30.2	646	259.00
32	839.5	14.0	47	51	98	511	415.	1.0	31.2	511	415.00
33	840.5	17.4	27	69	96	365	695.	1.0	32.2	365	695.00
34	841.5	15.8	31	43	74	380	2.7	1.0	33.2	380	2.70

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Savco Oil Company		Lease	Larson	Well No.	I-26 I-36
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
808.0 - 820.0	12.0	20.2	35.4	40.3	552	6,622
820.0 - 842.0	21.2	18.0	45.3	40.7	623	13,210
808.0 - 842.0	33.2	18.8	41.7	40.6	597	19,832

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Savco Oil Company Lease Larson Well No. I-26 I-36

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.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water			
1	808.5	16.2	41	515	0	0	41	44	118	5.00	25
2	809.5	20.1	39	608	2	31	37	51	295	20.50	15
3	810.5	20.2	27	423	0	0	27	57	140	52.48	10
4	811.5	20.8	26	420	0	0	26	54	241	59.97	10
5	812.5	20.4	32	506	2	32	30	58	175	30.00	15
6	813.5	22.0	29	495	2	34	27	57	354	32.99	10
7	814.5	21.0	43	701	6	98	37	42	209	13.24	15
8	815.5	20.1	42	655	6	94	36	45	258	25.49	15
9	816.5	19.8	42	645	8	123	34	45	300	33.00	15
10	817.5	20.6	37	591	4	64	33	51	343	38.98	15
11	818.5	19.2	26	387	0	0	26	51	295	29.40	15
12	819.5	21.2	44	724	8	132	36	44	273	38.61	15
13	820.5	20.1	56	873	13	203	43	44	251	24.00	10
14	821.5	21.0	45	733	8	130	37	51	204	29.24	10
15	822.5	17.9	58	805	15	208	43	43	221	29.40	10
16	823.5	19.4	50	753	5	75	45	44	291	34.86	10
17	824.5	17.4	50	675	5	67	45	48	242	50.48	10
18	825.5	17.5	56	760	5	68	51	47	327	8.58	20
19	826.5	16.2	45	566	5	63	40	57	222	18.90	10
20	827.5	17.0	47	620	7	92	40	55	292	29.09	10
21	828.5	17.2	40	534	2	27	38	59	244	31.11	10
22	829.5	15.7	65	792	0	0	55	43	93	70.5	25
23	830.5	29.4	26	593	0	0	26	62	264	2.32	25
24	831.5	17.0	50	659	5	66	45	53	243	13.00	10
25	832.5	16.6	49	631	6	77	43	50	239	15.00	15
26	833.5	17.4	48	648	5	67	43	54	178	5.68	20
27	834.5	19.0	44	649	3	44	41	49	315	7.96	20
28	835.5	17.6	39	533	0	0	39	58	260	6.37	20

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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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Savco Oil Company Lease Larson Well No. T-26 7-36

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.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water			
29	836.5	16.7	40	518	2	26	38	50	242	19.80	15
30	837.5	17.8	47	649	6	83	41	51	124	18.74	15
31	838.5	15.9	52	641	8	99	44	54	283	4.65	30
32	839.5	14.1	47	514	0	0	47	28	246	12.00	15
33	840.5	17.0	27	356	0	0	27	70	229	18.59	15
34	841.5	15.8	31	380	0	0	31	50	0	Imp.	-

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 V

Company	Savco Oil Company	Lease	Larson	Well No.	I-26	I-36
Depth Interval, Feet	808.0 - 820.0	820.0 - 842.0	808.0 - 842.0			
Feet of Core Analyzed	7.7	15.2	22.9			
Average Percent Porosity	20.6	17.7	18.7			
Average Percent Original Oil Saturation	38.6	48.7	45.3			
Average Percent Oil Recovery	4.9	6.4	5.9			
Average Percent Residual Oil Saturation	33.7	42.3	39.4			
Average Percent Residual Water Saturation	49.1	50.5	50.0			
Average Percent Total Residual Fluid Saturation	82.8	92.8	89.4			
Average Original Oil Content, Bbls./A. Ft.	617.	672.	653.			
Average Oil Recovery, Bbls./A. Ft.	78.	89.	85.			
Average Residual Oil Content, Bbls./A. Ft.	539.	583.	568.			
Total Original Oil Content, Bbls./Acre	4,745.	10,217.	14,962.			
Total Oil Recovery, Bbls./Acre	598.	1,351.	1,949.			
Total Residual Oil Content, Bbls./Acre	4,147.	8,866.	13,013.			
Average Effective Permeability, Millidarcys	29.36	22.04	24.50			
Average Initial Fluid Production Pressure, p.s.i.	14.4	14.1	14.2			

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