

OIL FIELD RESEARCH LABORATORIES
CHANUTE, KANSAS

December 31, 1951

France Central Oil Company
512 Fourth National Bank Building
Wichita 2, Kansas

Gentlemen:

Enclosed herewith is the report of the analysis of the 2½" Rotary core taken from the Hughes Lease, Well No. W-2, Butler County, Kansas, and submitted to our laboratory on December 15, 1951.

Very truly yours,

OIL FIELD RESEARCH LABORATORIES

Carl L. Pate

CLP:pc
c.c.

FRANCO CENTRAL OIL COMPANY

CORE ANALYSIS REPORT

HUGHES LEASE

WELL NO. W-2

BUTLER COUNTY, KANSAS

OIL FIELD RESEARCH LABORATORIES

CHANUTE, KANSAS

DECEMBER 31, 1951

Oil Field Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Pranco Central Oil Company Lease Hughes Well No. W-2

Location NE Corner of the E₂ of the SE₂

Section 9 Twp. 26S Rge. 8E County Butler State Kansas

Name of Sand Bartlesville

Top of Core 2400.00

Bottom of Core 2542.00

Top of Sand 2473.00

Bottom of Sand 2536.40

Total Feet of Permeable Sand (Analyzed) 38.95

Total Feet of Floodable Sand (Analyzed) 33.45

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
<u>0 - 15</u>	<u>10.80</u>	<u>10.80</u>
<u>15 - 30</u>	<u>11.60</u>	<u>22.40</u>
<u>30 - 60</u>	<u>6.60</u>	<u>29.00</u>
<u>60 - 90</u>	<u>6.00</u>	<u>35.00</u>
<u>90 & above</u>	<u>3.95</u>	<u>38.95</u>

Average Permeability Millidarcys 37.83

Average Percent Porosity 19.08

Average Percent Oil Saturation 23.46

Average Percent Water Saturation 59.87

Average Oil Content, Bbls./A. Ft. 347.

Total Oil Content, Bbls./Acre 13,426.

Average Percent Oil Recovery by Laboratory Flooding Tests 3.02

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. 45.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre 1,429.

Total Calculated Oil Recovery, Bbls./Acre 4,600.

Packer Setting, Feet

Viscosity, Centipoises @

A. P. I. Gravity, degrees @ 60 °F

Elevation, Feet

Salt water was used in making up the circulating fluid used in the coring of the sand in this well.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
2400.00 - 2410.00	- Gray shale (Discarded at well).
2410.00 - 2419.00	- Drilled.
2419.00 - 2473.00	- Gray shale (Discarded at well).
2473.00 - 2475.05	- Brown fine grained micaceous sandstone.
2475.05 - 2475.15	- Gray sandy shale.
2475.15 - 2476.30	- Brown fine grained micaceous sandstone.
2476.30 - 2476.50	- Brown fine grained micaceous shaley sandstone.
2476.50 - 2477.58	- Brown fine grained micaceous sandstone.
2477.58 - 2477.70	- Gray sandy shale.
2477.70 - 2478.40	- Brown fine grained micaceous sandstone.
2478.40 - 2478.50	- Gray sandy shale.
2478.50 - 2479.70	- Brown fine grained micaceous sandstone.
2479.70 - 2480.00	- Laminated sandstone and shale.
2480.00 - 2480.40	- Brown fine grained micaceous shaley sandstone.
2480.40 - 2481.00	- Brown fine grained micaceous sandstone.
2481.00 - 2482.00	- Gray sandy shale.
2482.00 - 2483.00	- Brown fine grained micaceous sandstone.
2483.00 - 2485.00	- Light brown fine grained micaceous sandstone.
2485.00 - 2485.70	- Gray sandy shale.
2485.70 - 2487.15	- Brown fine grained micaceous shaley sandstone.
2487.15 - 2487.35	- Gray sandy shale.

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2487.35 - 2487.70 - Brown fine grained micaceous shaley sandstone.
2487.70 - 2488.12 - Brown fine grained micaceous sandstone.
2488.12 - 2488.35 - Gray sandy shale.
2488.35 - 2488.70 - Brown fine grained micaceous shaley sandstone.
2488.70 - 2489.00 - Brown fine grained micaceous sandstone.
2489.00 - 2489.55 - Brown fine grained micaceous shaley sandstone.
2489.55 - 2490.55 - Brown fine grained micaceous sandstone.
2490.55 - 2491.35 - Brown fine grained micaceous shaley sandy conglomerate.
2491.35 - 2491.50 - Brown fine grained micaceous sandstone.
2491.50 - 2492.00 - Loss.
2492.00 - 2494.00 - Drilled.
2494.00 - 2498.30 - Brown fine grained micaceous sandstone.
2498.30 - 2503.30 - Gray sandy shale.
2503.30 - 2503.40 - Laminated shaley sandstone.
2503.40 - 2509.00 - Brown fine grained micaceous sandstone.
2509.00 - 2513.00 - Loss.
2513.00 - 2513.85 - Brown fine grained micaceous slightly shaley sandstone.
2513.85 - 2519.30 - Brown fine grained micaceous sandstone.
2519.30 - 2524.50 - Gray sandy shale.
2524.50 - 2527.43 - Laminated sandy shale.
2527.43 - 2528.28 - Light brown fine grained micaceous slightly shaley sandstone.
2528.28 - 2528.45 - Laminated sandstone and shale.
2528.45 - 2536.40 - Brown fine grained micaceous sandstone.
2536.40 - 2538.90 - Gray shale.
2538.90 - 2542.00 - Gray shale (Discarded at well).

Coring was started at a depth of 2400.00 feet in gray shale and

and completed at 2542.00 feet in gray shale. This core shows a total of 40.25 feet of sandstone. There was a core loss of 4.50 feet extending from 2491.50 to 2492.00 feet and from 2509.00 to 2513.00 feet which is probably sandstone. Two feet of formation was drilled from 2492.00 to 2494.00 feet which was also 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 three sections. The weighted average permeability of the upper, middle and lower sections is 68.29, 19.49 and 49.36 millidarcys respectively; the overall average being 37.83 (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 low weighted average percent oil saturation, namely, 23.46. The weighted average percent oil saturation of the upper, middle and lower sections is 24.45, 23.83 and 21.46 respectively. The weighted average percent water saturation of the upper, middle and lower sections is 58.76, 61.95 and 59.84 respectively; the overall average being 59.87 (See Table IV). This gives an overall weighted average total fluid saturation of 83.33 percent.

In an effort to determine the degree of flushing of sand during coring, all of the saturation samples were analyzed for chloride content. The results of these tests are given in Tables VII and VIII. From the data given in these tables and on the coregraph, it is evident that some flushing did occur during coring, as for the most part,

the zones of higher permeability have the lower chloride content.

The weighted average oil content of the upper, middle and lower sections is 387, 343 and 311 barrels per acre foot respectively; the overall average being 347. The total oil content, as shown by this core, is 13,426 barrels per acre (See Table IV).

LABORATORY FLOODING TESTS

Inasmuch as the sand in this core shows a low weighted average percent oil saturation, naturally one would not expect very much oil to be recovered by laboratory flooding tests. A total recovery of 1,429 barrels of oil per acre was obtained from 31.43 feet of sand. The weighted average percent oil saturation was reduced from 23.60 to 20.58, or represents an average recovery of 3.02 percent. The weighted average effective permeability of the samples is 1.99 millidarcys, while the average initial fluid production pressure is 18.4 pounds per square inch (See Table VI).

By observing the data given in Table V, you will note that of the 41 samples tested, 40 produced water and 32 oil. This indicates that practically all of the sand represented by these samples is floodable. The tests also show that the sand has a fairly wide variation in 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 4,600 barrels of oil per acre, or an average of 138 barrels of oil per acre foot from the 33.45 feet of floodable sand analyzed. In calculating this recovery, an allowance was made for oil lost during coring and it

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was assumed that the primary production and the true water saturation of the sand are 20 and 38 percent respectively.

This core shows a somewhat greater sand thickness than we expected at this location.

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RESULTS OF PERMEABILITY TESTS

TABLE I

Company Franco Central Oil Company Lease Hughes Well No. V-2

Sample No.	Depth, Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
1	2473.25	3.6	0.40	0.40	1.44
2	2473.55	5.1	0.40	0.80	2.04
3	2474.07	44.	0.45	1.25	19.80
4	2474.45	94.	0.30	1.55	28.20
5	2474.65	62.	0.50	2.05	31.00
6	2475.20	64.	0.20	2.25	12.80
7	2475.50	113.	0.45	2.70	50.85
8	2476.18	52.	0.50	3.20	26.00
9	2476.55	24.	0.30	3.50	7.20
10	2476.99	66.	0.40	3.90	26.40
11	2477.40	56.	0.38	4.28	21.28
12	2478.15	26.	0.70	4.98	18.20
13	2478.59	99.	0.40	5.38	39.60
14	2479.20	70.	0.50	5.88	35.00
15	2479.60	49.	0.30	6.18	14.70
16	2480.10	Imp.	0.40	6.58	0.00
17	2480.60	86.	0.60	7.18	51.60
18	2482.15	106.	0.35	7.53	37.10
19	2482.54	97.	0.45	7.98	43.65
20	2483.11	88.	0.50	8.48	44.00
21	2483.54	97.	0.50	8.98	48.50
22	2484.10	93.	0.55	9.53	51.15
23	2484.60	88.	0.65	10.18	57.20
24	2485.20	14.	0.30	10.48	4.20
25	2485.50	Imp.	0.40	10.88	0.00
26	2486.15	21.	0.70	11.58	14.70
27	2486.65	20.	0.75	12.33	15.00
28	2487.20	1.4	0.20	12.53	0.28
29	2487.46	3.3	0.35	12.88	1.16
30	2488.05	36.	0.42	13.30	15.12
31	2488.50	25.	0.35	13.65	8.75
32	2489.20	0.99	0.55	14.20	0.54
33	2489.65	40.	0.30	14.50	12.00
34	2490.10	34.	0.45	14.95	15.30
35	2490.53	32.	0.30	15.25	9.60
36	2490.98	86.	0.80	16.05	68.80
37	2491.40	6.8	0.15	16.20	1.02
38	2494.20	3.0	0.30	16.50	0.90
39	2494.45	6.0	0.40	16.90	2.40
40	2494.90	12.	0.30	17.20	3.60

Oil Field Research Laboratories
RESULTS OF PERMEABILITY TESTS
TABLE I

Company France Central Oil Company Lease Hughes Well No. W-2

Sample No.	Depth, Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
41	2495.20	3.7	0.50	17.70	1.85
42	2495.85	3.0	0.60	18.30	1.80
43	2496.47	7.7	0.55	18.85	4.24
44	2496.85	3.7	0.45	19.30	1.67
45	2497.31	8.0	0.50	19.80	4.00
46	2497.91	16.	0.70	20.50	11.20
47	2503.35	1.1	0.10	20.60	0.11
48	2503.87	25.	0.70	21.30	17.50
49	2504.41	14.	0.55	21.85	7.70
50	2504.86	11.	0.40	22.25	4.40
51	2505.28	11.	0.45	22.70	4.95
52	2505.85	27.	0.60	23.30	16.20
53	2506.30	25.	0.50	23.80	12.50
54	2506.85	38.	0.60	24.40	22.80
55	2507.45	17.	0.50	24.90	8.50
56	2507.91	14.	0.45	25.35	6.30
57	2508.42	29.	0.45	25.80	13.05
58	2508.86	6.6	0.40	26.20	2.64
59	2513.45	7.4	0.85	27.05	6.29
60	2513.96	32.	0.35	27.40	11.20
61	2514.35	19.	0.40	27.80	7.60
62	2514.85	13.	0.40	28.20	5.20
63	2515.15	9.2	0.30	28.50	2.76
64	2515.45	15.	0.40	28.90	6.00
65	2515.96	8.3	0.40	29.30	3.32
66	2516.31	12.	0.55	29.85	6.60
67	2516.91	23.	0.40	30.25	9.20
68	2517.18	21.	0.45	30.70	9.45
69	2517.83	27.	0.45	31.15	12.15
70	2518.07	41.	0.30	31.45	12.30
71	2518.41	19.	0.35	31.80	6.65
72	2518.85	Imp.	0.70	32.50	0.00
73	2527.35	Imp.	0.43	32.93	0.00
74	2528.35	Imp.	0.17	33.10	0.00
75	2528.95	35.	0.75	33.85	26.25
76	2529.43	25.	0.80	34.65	20.00
77	2530.43	42.	0.60	35.25	25.20
78	2530.85	100.	0.50	35.75	50.00
79	2531.35	27.	0.50	36.25	13.50
80	2531.90	41.	0.50	36.75	20.50

Oil Field Research Laboratories
RESULTS OF PERMEABILITY TESTS
TABLE I

Company Franeo Central Oil Company Lease Hughes Well No. W-2

Sample No.	Depth, Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
81	2532.38	68.	0.50	37.25	34.00
82	2532.90	71.	0.55	37.80	39.05
83	2533.41	27.	0.50	38.30	17.50
84	2533.90	105.	0.45	38.75	47.25
85	2534.33	57.	0.50	39.25	28.50
86	2534.85	25.	0.50	39.75	12.50
87	2535.25	58.	0.50	40.25	29.00
88	2535.85	62.	0.40	40.65	24.80
89	2536.16	21.	0.40	41.05	8.40

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SUMMARY OF PERMEABILITY TESTS

TABLE II

Company Fransco Central Oil Company Lease Hughes Well No. W-2

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity, Ft. x Md.
2473.00 - 2485.00	9.78	68.29	667.71
2485.00 - 2527.43	21.22	19.49	413.50
2527.43 - 2536.40	7.95	49.36	392.45
2473.00 - 2536.40	38.95	37.83	1,473.66

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RESULTS OF SATURATION TESTS

TABLE III

Company **Franceo Central Oil Company** Lease **Hughes** Well No. **W-2**

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation		Oil Content, Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water		Ft.	Cum. Ft.	
1	2473.93	18.7	30.6	69.1	444	1.30	1.30	577
2	2474.97	20.0	18.7	60.5	290	0.75	2.05	218
3	2475.92	20.6	25.5	58.4	408	1.15	3.20	470
4	2476.84	20.1	27.4	61.7	428	1.08	4.28	463
5	2477.93	19.8	24.7	46.7	380	0.70	4.98	266
6	2478.93	20.5	24.6	65.7	392	1.20	6.18	471
8	2480.94	20.1	27.0	47.7	422	1.00	7.18	422
F9A	2482.25	21.8	25.7	-	435	0.50	7.68	217
10	2482.94	21.7	25.0	52.5	422	0.90	8.58	380
11	2483.93	21.6	16.5	56.9	276	1.00	9.58	276
12	2484.93	21.9	17.9	59.0	304	0.60	10.18	182
13	2485.94	14.2	24.9	66.0	274	0.70	10.88	192
14	2486.97	14.7	36.9	58.8	421	0.75	11.63	316
15	2487.94	15.7	19.5	60.0	238	0.42	12.05	100
16	2488.93	18.8	26.8	48.4	390	0.65	12.70	254
17	2489.94	20.4	24.9	51.4	394	1.00	13.70	394

Oil Field Research Laboratories

RESULTS OF SATURATION TESTS

TABLE III

Company **Franco Central Oil Company** Lease **Hughes** Well No. **W-2**

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.	
19	2494.73	18.0	21.7	68.2	89.9	304	1.20	14.90	365
20	2795.73	18.8	22.6	68.2	90.8	330	1.00	15.90	330
21	2496.73	17.9	20.3	74.2	94.5	282	1.00	16.90	282
22	2497.74	19.5	20.4	61.0	80.4	309	1.10	18.00	340
23	2503.73	20.4	22.8	56.6	79.4	362	0.80	18.80	290
24	2504.73	19.5	29.4	62.0	91.4	446	1.00	19.80	446
25	2505.73	18.1	23.2	63.1	86.3	326	1.00	20.80	326
26	2506.73	20.6	21.2	66.1	87.3	340	1.00	21.80	340
27	2507.73	18.4	20.3	73.0	93.3	290	1.00	22.80	290
28	2508.74	18.6	29.4	62.5	91.9	425	0.80	23.60	340
29	2513.74	17.3	20.6	57.0	77.6	277	0.85	24.45	233
30	2514.73	18.1	23.6	56.4	80.0	332	1.35	25.80	448
31	2515.74	17.8	20.4	67.0	87.4	282	1.00	26.80	282
32	2516.73	19.8	24.6	59.7	84.3	378	1.00	27.80	378
33	2517.73	20.0	25.2	56.8	82.0	391	1.00	28.80	391
34	2518.74	19.7	25.3	50.3	83.6	387	1.10	29.90	426
35	2527.73	19.5	19.9	65.7	85.6	301	0.85	30.75	256

Oil Field Research Laboratories

RESULTS OF SATURATION TESTS

TABLE III

Company France Central Oil Company Lease Hughes Well No. K-2

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation		Oil Content, Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water		Ft.	Cum. Ft.	
36	2528.74	18.1	24.5	59.0	344	0.70	31.45	240
37	2529.73	18.0	19.3	70.8	270	1.00	32.45	270
38	2530.73	18.0	23.0	56.4	322	1.00	33.45	322
39	2531.72	18.3	25.1	71.2	356	1.00	34.45	356
40	2532.74	18.9	21.6	47.9	317	1.00	35.45	317
41	2533.74	19.2	20.5	51.3	306	1.00	36.45	306
42	2534.74	19.3	20.0	59.5	300	1.00	37.45	300
43	2535.73	18.6	20.3	57.9	293	1.20	38.65	352
					Total	Total	- - - -	13,426

Oil Field Research Laboratories

SUMMARY OF SATURATION TESTS

TABLE IV

Company	Fransco Central Oil Company	Lease	Hughes	Well No.	W-2	
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
2473.00-2485.00	10.18	20.46	24.45	58.76	387	3,942
2485.70-2519.30	19.72	18.56	23.83	61.95	343	6,765
2527.43-2536.40	8.75	18.66	21.46	59.84	311	2,719
2473.00-2536.40	38.65	19.08	23.46	59.87	347	13,426

Oil Field Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE V

Company Franco Central Oil Company Lease Hughes Well No. 5-2

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	2473.78	19.2	28.3	421	3.7	55	24.6	67.3	366	47	1.04	15
2	2474.84	19.5	17.7	268	0.0	0	17.7	74.2	268	100	2.18	10
3	2475.77	20.8	24.3	393	2.7	44	21.6	73.2	349	132	4.03	15
4	2476.67	20.5	25.8	411	4.3	72	21.3	72.5	339	103	3.16	15
5	2477.77	19.8	25.3	389	2.8	43	22.5	67.1	343	32	0.907	25
6	2478.76	20.6	25.1	369	2.9	46	20.2	73.2	323	146	6.85	15
8	2480.76	20.2	26.2	411	6.3	99	19.9	74.4	312	154	6.45	15
9A	2482.23	21.8	25.7	435	3.3	64	21.9	73.3	371	166	3.37	16
10	2483.77	21.4	24.0	399	2.5	42	21.3	72.2	357	178	3.23	10
11	2485.78	21.4	15.7	261	0.0	0	15.7	78.1	261	207	7.24	10
12	2484.77	21.4	18.2	302	0.0	0	18.2	73.5	302	170	7.37	10
13	2485.77	14.3	24.8	275	0.0	0	24.8	68.5	275	8	0.190	35
14	2486.83	14.6	36.8	412	0.0	0	36.8	33.9	412	0	Imp.	50*
15	2487.78	16.0	18.4	228	0.0	0	18.4	70.5	228	24	0.349	25
16	2488.77	18.9	25.3	320	3.5	51	20.4	72.4	293	65	2.43	15
17	2489.78	20.1	25.2	393	3.1	93	19.1	71.8	293	56	1.36	20
19	2494.58	17.9	21.2	293	0.0	0	21.2	70.8	293	3	0.190	45
20	2495.57	19.0	23.2	341	3.7	55	19.5	68.9	266	12	0.090	25
21	2496.56	18.4	19.6	279	2.2	31	17.4	70.3	248	11	0.168	15
22	2497.58	19.2	19.8	293	1.4	21	18.4	73.0	274	7	0.166	30
23	2503.58	20.0	21.9	341	2.1	33	19.8	69.6	308	22	0.321	20
24	2504.59	19.1	29.7	438	3.8	66	23.9	62.8	382	8	0.292	30
25	2505.58	18.2	24.8	350	2.0	28	22.8	71.0	322	36	0.670	20
26	2506.57	20.3	20.3	323	1.3	21	19.0	70.9	302	21	1.78	15
27	2507.58	18.3	21.3	306	0.7	10	20.6	70.9	296	22	0.433	25
28	2508.58	18.4	27.8	396	1.7	24	26.1	71.0	372	23	0.475	25
29	2513.59	17.2	19.0	254	0.0	0	19.0	70.2	254	17	0.300	25
30	2514.57	17.9	22.4	311	2.4	33	20.0	71.4	278	13	0.177	25
31	2515.58	17.6	20.0	276	0.0	0	20.0	70.4	276	10	0.196	30
32	2516.57	19.5	24.8	373	2.2	35	22.6	71.3	342	26	0.433	20

RESULTS OF LABORATORY FLOODING TESTS

Company France Central Oil Company Lease Hughes Well No. W-2

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.			
33	2517.59	19.9	25.4	392	1.4	22	24.0	68.6	370	22	0.516	25
34	2518.58	19.7	24.2	370	2.9	44	21.3	70.9	328	30	0.383	20
35	2527.58	19.5	20.5	310	0.3	4	20.2	74.4	308	21	0.684	20
36	2528.59	18.5	25.7	366	4.2	60	21.5	74.2	306	20	0.497	25
37	2529.57	17.7	20.9	287	1.9	26	19.0	72.0	281	40	0.800	20
38	2530.56	18.5	23.1	325	3.6	51	19.5	72.4	277	117	3.06	15
39	2531.56	18.6	24.7	357	4.4	64	20.3	71.7	293	125	3.33	10
40	2532.59	19.0	22.0	324	4.5	66	17.5	74.2	258	153	4.91	10
41	2533.56	19.0	19.9	294	2.0	30	17.9	73.4	264	168	4.19	10
42	2534.57	19.3	21.5	321	4.3	67	17.0	72.0	254	109	2.80	15
43	2535.58	18.4	20.6	295	3.4	49	17.2	75.2	245	120	2.83	10

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.

"A" - Sample was taken from core after it was received in the laboratory.

Oil Field Research Laboratories
SUMMARY OF LABORATORY FLOODING TESTS

TABLE VI

Company	Lease	Hughes	Well No.
Franco Central Oil Company	2473.00	2488.35	W-2
Depth Interval Feet			
Feet of Core Analyzed	2483.40	2519.30	2536.40
Average Percent Porosity	7.83	14.80	31.43
Average Percent Original Oil Saturation	20.43	19.12	19.33
Average Percent Oil Recovery	25.32	23.64	23.60
Average Percent Residual Oil Saturation	3.61	2.57	3.02
Average Percent Residual Water Saturation	21.71	21.07	20.98
Average Percent Total Residual Fluid Saturation	71.61	70.18	71.74
Average Original Oil Content, Bbls./A. Ft.	93.32	91.25	92.32
Average Oil Recovery, Bbls./A. Ft.	402.	350.	354.
Average Residual Oil Content, Bbls./A. Ft.	58.	38.	43.
Total Original Oil Content, Bbls./Acre	3,147.	312.	309.
Total Oil Recovery, Bbls./Acre	455.	5,183.	11,134.
Total Residual Oil Content, Bbls./Acre	2,692.	563.	1,429.
Average Effective Permeability, Millidarcys	3.82	4,620.	9,703.
Average Initial Fluid Production Pressure, p.s.i.	15.6	0.626	1.99
		22.0	18.4

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 France Central Oil Company Lease Hughes Well No. W-2

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Percent Water Saturation	
			Connate	Drilling & Foreign
1	2473.93	46,100		
2	2474.97	33,700		
3	2475.92	21,300		
4	2476.84	21,900		
5	2477.93	36,100		
6	2478.93	32,900		
8	2480.94	10,250		
10	2482.94	3,710		
11	2483.93	4,230		
12	2484.93	4,000		
13	2485.94	40,900		
14	2486.97	37,600		
15	2487.94	40,000		
16	2488.93	30,900		
17	2489.94	28,600		
19	2494.73	36,100		
20	2495.73	42,500		
21	2496.73	36,300		
22	2497.74	36,200		
23	2503.73	51,000		
24	2504.73	46,700		
25	2505.73	47,900		
26	2506.73	48,700		
27	2507.73	37,000		
28	2508.74	50,000		
29	2513.74	56,700		
30	2514.73	50,300		
31	2515.74	48,900		
32	2516.73	41,900		
33	2517.73	52,900		
34	2518.74	55,100		
35	2527.75	57,600		
36	2528.74	46,800		
37	2529.73	51,000		
38	2530.73	30,700		
39	2531.72	35,800		
40	2532.74	59,500		
41	2533.74	15,300		
42	2534.74	37,200		
43	2539.73	30,200		

Note: ppm - parts per million.

Oil Field Research Laboratories

SUMMARY OF WATER DIFFERENTIATION TESTS

TABLE VIII

Company France Central Oil Company Lease Hughes Well No. W-2

Depth Interval, Feet	Chloride Content of Brine in Sand, ppm	Average Percent Connate Water	Average Percent Drilling & Foreign Water
2473.00-2485.00	22,600.		
2485.70-2519.30	43,900.		
2527.43-2536.40	39,600.		
2473.00-2536.40	37,500.		

Note: ppm - parts per million.