OILFIELD RESEARCH LABORATORIES
536 NORTH HIGHLAND - CHANUTE, KANSAS 66720 - PHONE (316) 431-2650

January 21, 1981

Ajax Drilling Company
166 Harbor Drive # 2
Key Biscayne, Florida 33149

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Kirchhofer Lease, Well No. 2, located in Franklin County, Kansas and submitted to our laboratory on December 4, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

4 c to Key Biscayne, Florida
1 c to Rantoul, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Ajax Drilling Company Lease Kirchhofer Well No. 2

Location -

Section 29 Twp. ~~20~~ 15 S Rge. ~~15~~ 20 E County Franklin State Kansas

Elevation, Feet - - - - - - - - - - - - - - - - -

Name of Sand	Squirrel
Top of Core	724.0
Bottom of Core	774.0
Top of Sand	724.0
Bottom of Sand	774.0
Total Feet of Permeable Sand	25.8
Total Feet of Floodable Sand	15.2

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 10	5.3	5.3
10 - 30	2.0	7.3
30 - 60	3.4	10.7
60 - 90	6.2	16.9
90 - 120	3.9	20.8
120 - 165	4.0	24.8
200 & Above	1.0	25.8

Average Permeability Millidarcys	72.4
Average Percent Porosity	21.7
Average Percent Oil Saturation	44.4
Average Percent Water Saturation	36.0
Average Oil Content, Bbls./A. Ft.	767.
Total Oil Content, Bbls./Acre	19,800.
Average Percent Oil Recovery by Laboratory Flooding Tests	6.6
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	116.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	1,767.
Total Calculated Oil Recovery, Bbls./Acre	See "Calculated Recovery" Section

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 semi-virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
724.0 - 735.2	Dark brown slightly calcareous sandstone.
735.2 - 736.0	Gray sandy shale.
736.0 - 736.9	Dark brown slightly calcareous sandstone.
736.9 - 738.6	Dark brown and gray laminated slightly calcareous sandstone and shale.
738.6 - 744.0	Dark brown slightly calcareous sandstone.
754.0 - 757.0	Brown slightly calcareous sandstone.
757.0 - 757.8	Grayish brown very shaly sandstone.
757.8 - 770.1	Gray sandy shale.
770.1 - 771.8	Grayish light brown shaly sandstone.
771.8 - 772.9	Gray sandy shale.
772.9 - 774.0	Light brown and gray laminated sandstone and shale.

LABORATORY FLOODING TESTS

The upper portion of the sand in this core responded to laboratory flooding tests, as a total recovery of 1,767 barrels of oil per acre was obtained from 15.2 feet of sand. The weighted average percent oil saturation was reduced from 51.8 to 45.2, or represents an average recovery of 6.6 percent. The weighted average effective permeability of the samples is 5.52 millidarcys, while the average initial fluid production pressure is 30.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 26 samples tested, 15 produced water and oil, and 10 samples produced water only. This indicates that approximately 58 percent of the sand represented by these samples is floodable 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 3,970 barrels of oil per acre. This is an average recovery of 261 barrels per acre foot from 15.2 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.05
Reservoir water saturation, percent, estimated	20.0
Average porosity, percent	21.7
Oil saturation after flooding, percent	45.2
Performance factor, percent, estimated	50.0
Net floodable sand, feet	15.2

Oilfield Research Laboratories

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Ajax Drilling Company Lease Kirchhofer Well No. 2

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.		
1	724.5	21.9	46	28	74	782	24.	1.0	1.0	782	24.00
2	725.5	19.3	45	38	83	674	103.	1.0	2.0	674	103.00
3	726.5	23.6	52	23	75	952	64.	1.0	3.0	952	64.00
4	727.5	23.3	49	26	75	886	133.	1.0	4.0	886	133.00
5	728.5	22.2	53	25	78	913	101.	1.0	5.0	913	101.00
6	729.5	20.7	56	24	80	899	141.	1.0	6.0	899	141.00
7	730.5	24.7	54	24	78	1035	47.	1.0	7.0	1035	47.00
8	731.5	23.7	52	25	77	956	203.	1.0	8.0	956	203.00
9	732.6	20.9	51	31	82	827	105.	1.0	9.0	827	105.00
10	733.5	23.9	52	25	77	964	80.	1.0	10.0	964	80.00
11	734.5	24.3	55	22	77	1037	74.	1.2	11.2	1252	88.80
12	736.7	22.2	50	35	85	861	115.	0.9	12.1	775	103.50
13	737.5	24.3	51	29	80	961	1.6	1.0	13.1	961	1.60
14	738.5	22.8	51	29	80	902	5.2	0.7	13.8	631	3.64
15	739.5	23.9	57	22	79	1057	39.	1.4	15.2	1478	54.60
16	740.6	23.0	43	31	74	767	163.	1.0	16.2	767	163.00
17	741.5	21.6	40	33	73	670	62.	1.0	17.2	670	62.00
18	742.5	23.5	49	30	79	893	21.	1.0	18.2	893	21.00
19	743.5	22.1	43	32	75	737	52.	1.0	19.2	737	52.00
20	754.5	16.0	42	52	94	521	147.	1.0	20.2	521	147.00
21	755.5	23.6	37	38	75	677	62.	1.0	21.2	677	62.00
22	756.5	23.1	37	38	75	663	89.	1.0	22.2	663	89.00
23	757.5	15.0	12	86	98	140	0.29	0.8	23.0	112	0.23
24	770.5	18.1	27	66	93	379	8.5	1.0	24.0	379	8.50
25	771.5	17.0	16	77	93	211	6.5	0.7	24.7	148	4.55
26	773.2	17.1	17	72	89	226	5.9	1.1	25.8	248	6.49

Oilfield Research Laboratories

SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Ajax Drilling Company Lease Kirchhofer Well No. 2

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
724.0 - 740.0	15.2	82.4	1253.14
740.0 - 774.0	10.6	58.1	615.77
724.0 - 774.0	25.8	72.4	1868.91

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
724.0 - 740.0	15.2	22.8	51.8	26.8	920	13,985
740.0 - 774.0	10.6	20.2	33.7	49.2	549	5,815
724.0 - 774.0	25.8	21.7	44.4	36.0	767	19,800

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Ajax Drilling Company Lease Kirchhofer Well No. 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.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
1	724.5	21.5	46	767	7	117	39	49	650	6	0.45	50
2	725.5	19.8	45	691	3	46	42	49	645	79	2.10	30
3	726.5	23.5	52	948	5	91	47	44	857	229	4.20	25
4	727.5	23.0	49	873	4	71	45	50	802	308	7.95	25
5	728.5	22.6	53	929	12	210	41	55	719	272	10.65	25
6	729.5	21.0	56	911	14	228	42	46	683	263	10.95	25
7	730.5	24.4	54	1022	7	132	47	50	890	52	1.50	30
8	731.5	24.1	52	971	4	75	48	42	896	210	12.74	15
9	732.6	21.3	51	842	7	116	44	48	726	111	3.30	30
10	733.5	24.0	52	968	6	112	46	53	856	331	10.65	20
11	734.5	23.9	55	1020	10	185	45	53	835	69	1.80	30
12	736.7	22.7	50	880	2	35	48	50	845	344	9.75	25
13	737.5	24.2	51	958	5	94	46	50	864	20	0.85	45
14	738.5	23.1	51	913	2	36	49	47	877	92	2.99	40
15	739.5	23.6	57	1043	8	147	49	43	896	141	3.90	30
16	740.6	23.5	43	784	0	0	43	49	784	279	9.90	25
17	741.5	21.2	41	674	0	0	41	52	674	200	4.47	30
18	742.5	23.0	48	856	0	0	48	48	856	320	6.75	25
19	743.5	21.9	44	748	0	0	44	52	748	87	2.25	25
20	754.5	16.4	43	546	0	0	43	55	546	152	15.29	10
21	755.5	23.3	39	705	0	0	39	59	705	209	3.75	20
22	756.5	22.7	37	651	0	0	37	60	651	393	5.85	15
23	757.5	15.5	15	180	0	0	15	82	180	0	Imp.	-
24	770.5	17.8	28	386	0	0	28	68	386	188	2.55	15
25	771.5	17.3	15	201	0	0	15	78	201	70	0.90	20
26	773.2	17.3	17	228	0	0	17	77	228	48	1.20	25

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.

Oilfield Research Laboratories

SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company Ajax Drilling Company Lease Kirchhofer Well No. 2

Depth Interval, Feet	724.0 - 740.0
Feet of Core Analyzed	15.2
Average Percent Porosity	22.9
Average Percent Original Oil Saturation	51.8
Average Percent Oil Recovery	6.6
Average Percent Residual Oil Saturation	45.2
Average Percent Residual Water Saturation	48.5
Average Percent Total Residual Fluid Saturation	93.7
Average Original Oil Content, Bbls./A. Ft.	920.
Average Oil Recovery, Bbls./A. Ft.	116.
Average Residual Oil Content, Bbls./A. Ft.	804.
Total Original Oil Content, Bbls./Acre	13,987.
Total Oil Recovery, Bbls./Acre	1,767.
Total Residual Oil Content, Bbls./Acre	12,220.
Average Effective Permeability, Millidarcys	5.52
Average Initial Fluid Production Pressure, p.s.i.	30.0

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