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

December 1, 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 Alexander Lease, Well No. GK 1-1, located in Leavenworth County, Kansas and submitted to our laboratory on November 18, 1981.

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 Alexander Well No. GK 1-1

Location 330' N & 330' W of the SE corner of the SE¼, NE¼

Section 18 Twp. 8S Rge. 21E County Leavenworth State Kansas

Elevation, Feet	
Name of Sand	Burgess
Top of Core	1407.0
Bottom of Core	1425.0
Top of Sand	1407.0
Bottom of Sand	1423.7
Total Feet of Permeable Sand	13.1
Total Feet of Floodable Sand	6.5

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 10	4.9	4.9
200 - 500	1.2	6.1
500 - 1000	2.7	8.8
1000 - 1500	4.3	13.1

Average Permeability Millidarcys	577.7
Average Percent Porosity	19.0
Average Percent Oil Saturation	30.8
Average Percent Water Saturation	45.5
Average Oil Content, Bbls./A. Ft.	511.
Total Oil Content, Bbls./Acre	7,416.
Average Percent Oil Recovery by Laboratory Flooding Tests	12.0
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	203.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	1,318.
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 non-virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
1407.0 - 1408.3	Light grayish brown silty slightly shaly sandstone.
1408.3 - 1411.1	Very light grayish brown silty sandstone with dark gray fine shale partings.
1411.1 - 1413.3	Grayish black shale.
1413.3 - 1413.9	Light grayish brown silty sandstone with dark gray fine shale partings.
1413.9 - 1414.8	Light grayish brown silty, slightly conglomeratic shaly sandstone.
1414.8 - 1415.9	Brownish black sandstone.
1415.9 - 1417.4	Brownish black sandstone with intermittent small shale inclusions.
1417.4 - 1418.4	Brownish black sandstone with fine intermittent shale partings.
1418.4 - 1420.8	Brownish black sandstone.
1420.8 - 1421.8	Brownish black sandstone with fine intermittent shale partings.
1421.8 - 1423.0	Brownish black sandstone with intermittent small shale inclusions.
1423.0 - 1423.7	Grayish brown slightly calcareous slightly shaly sandstone.
1423.7 - 1425.0	Grayish brown vuggy limestone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 1,318 barrels of oil per acre was obtained from 6.5 feet of sand. The weighted average percent oil saturation was reduced from 46.3 to 34.3, or represents an average recovery of 12.0 percent. The weighted average effective permeability of the samples is 19.41 millidarcys, while the average initial fluid production pressure is 15.8 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 15 samples tested, 6 produced water and oil, and 3 samples produced water only. This indicates that approximately 40 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 2,400 barrels of oil per acre. This is an average recovery of 370 barrels per acre foot from 6.5 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	22.8
Oil saturation after flooding, percent	34.3
Performance factor, percent, estimated	50.0
Net floodable sand, feet	6.5

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Ajax Drilling Company Lease Alexander Well No. GK 1-1

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	1407.9	16.5	5	73	78	64	7.2	1.3	1.3	83	9.36
2	1408.4	10.2	2	92	94	16	Imp.	0.8	2.1	13	0.00
3	1409.4	14.2	4	54	58	44	0.95	1.0	3.1	44	0.95
4	1410.6	16.6	9	73	82	116	1.0	1.0	4.1	116	1.00
5	1413.5	13.7	14	71	85	149	Imp.	0.6	4.7	89	0.00
6	1414.5	5.8	11	84	95	49	0.36	0.9	5.6	44	0.32
7	1415.4	23.3	41	23	64	741	1202.	1.1	6.7	815	1322.20
8	1416.5	23.7	45	24	69	827	1226.	1.5	8.2	1241	1839.00
9	1417.7	24.2	31	37	68	582	559.	1.0	9.2	582	559.00
10	1418.6	24.3	53	22	75	999	1251.	0.7	9.9	699	875.70
11	1419.6	24.3	43	24	67	811	902.	0.7	10.6	568	631.40
12	1420.5	25.1	44	24	68	857	1076.	1.0	11.6	857	1076.00
13	1421.3	23.9	39	28	67	723	989.	1.0	12.6	723	989.00
14	1422.4	17.6	63	34	97	860	216.	1.2	13.8	1032	259.20
15	1423.5	17.7	53	32	85	728	6.3	0.7	14.5	510	4.41

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Ajax Drilling Company Lease Alexander Well No. GK 1-1

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
1407.0 - 1414.8	4.2	2.8	11.63
1414.8 - 1423.7	8.9	849.0	7555.91
1407.0 - 1423.7	13.1	577.7	7567.54

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
1407.0 - 1414.8	5.6	13.3	7.0	73.9	69	389
1414.8 - 1423.7	8.9	22.7	45.7	27.6	790	7,027
1407.0 - 1423.7	14.5	19.0	30.8	45.5	511	7,416

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Ajax Drilling Company Lease Alexander Well No. GK 1-1

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.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
1	1407.9	16.4	5	64	0	0	5	74	64	0	Imp.	-
2	1408.4	10.2	2	19	0	0	2	92	19	0	Imp.	-
3	1409.4	14.1	4	44	0	0	4	56	44	0	Imp.	-
4	1410.6	16.3	10	126	0	0	10	74	126	0	Imp.	-
5	1413.5	13.8	14	150	0	0	14	71	150	0	Imp.	-
6	1414.5	6.3	10	49	0	0	10	86	49	0	Imp.	-
7	1415.4	23.4	41	744	9	163	32	50	581	392	27.48	15
8	1416.5	23.6	45	824	13	238	32	53	586	346	23.73	15
9	1417.7	24.2	31	582	0	0	31	52	582	146	21.74	10
10	1418.6	24.5	53	1007	0	0	53	44	1007	178	17.99	10
11	1419.6	24.1	43	804	6	112	37	43	692	156	12.74	20
12	1420.5	25.1	44	857	10	195	34	47	662	274	16.28	15
13	1421.3	23.7	39	717	7	129	32	55	588	160	11.14	20
14	1422.4	17.7	63	865	23	316	40	57	549	272	19.99	10
15	1423.5	17.8	53	732	0	0	53	40	732	242	2.47	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.

Oilfield Research Laboratories

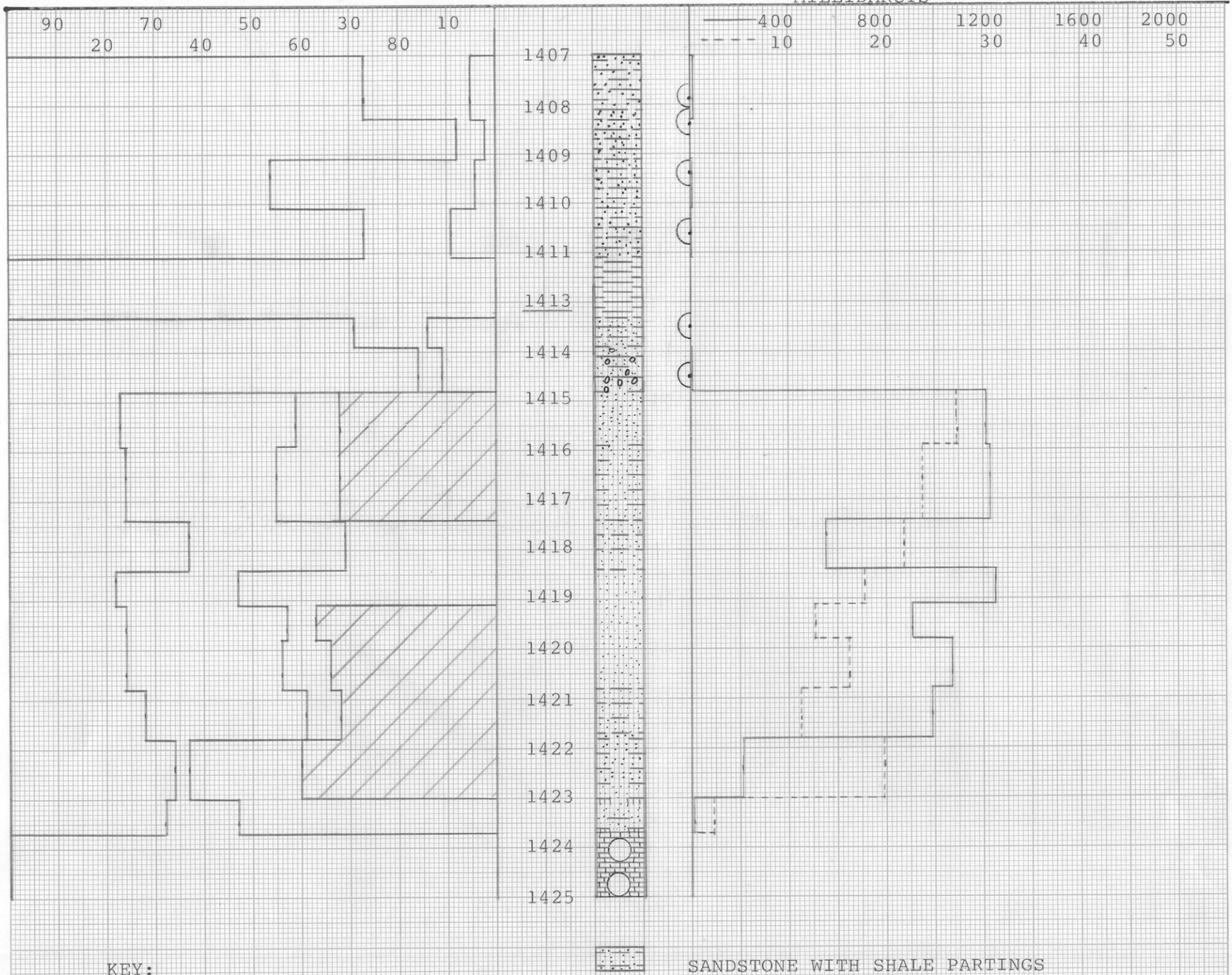
SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company Ajax Drilling Company Lease Alexander Well No. GK 1-1

Depth Interval, Feet	1414.8 - 1423.7
Feet of Core Analyzed	6.5
Average Percent Porosity	22.8
Average Percent Original Oil Saturation	46.3
Average Percent Oil Recovery	12.0
Average Percent Residual Oil Saturation	34.3
Average Percent Residual Water Saturation	51.5
Average Percent Total Residual Fluid Saturation	85.8
Average Original Oil Content, Bbls./A. Ft.	805.
Average Oil Recovery, Bbls./A. Ft.	203.
Average Residual Oil Content, Bbls./A. Ft.	602.
Total Original Oil Content, Bbls./Acre	5,229.
Total Oil Recovery, Bbls./Acre	1,318.
Total Residual Oil Content, Bbls./Acre	3,911.
Average Effective Permeability, Millidarcys	19.41
Average Initial Fluid Production Pressure, p.s.i.	15.8

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


WATER SAT., PERCENT
OIL SAT., PERCENT
PERMEABILITY, IN MILLIDARCYS
EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS
90 70 50 30 10
20 40 60 80
400 800 1200 1600 2000
10 20 30 40 50
1407
1408
1409
1410
1411
1413
1414
1415
1416
1417
1418
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1420
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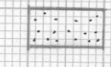
1422
1423
1424
1425
KEY:
SANDSTONE WITH SHALE PARTINGS

1425

KEY:


SANDSTONE

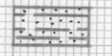

SHALE

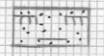

SANDSTONE WITH SHALE INCLUSIONS


SHALY SILTY SANDSTONE


IMPERMEABLE TO WATER

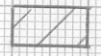

SANDSTONE WITH SHALE PARTINGS


SILTY SANDSTONE WITH SHALE PARTINGS


CALCAREOUS SHALY SANDSTONE


CONGLOMERATIC SHALY SILTY SANDSTONE


VUGGY LIMESTONE


FLOODPOT RESIDUAL OIL SATURATION

AJAX DRILLING COMPANY

ALEXANDER LEASE

WELL NO. GK 1-1

LEAVENWORTH COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY BBLS. / ACRE
1407.0 - 1414.8	5.6	13.3	7.0	73.9	2.8	
1414.8 - 1423.7	8.9	22.7	45.7	27.6	849.0	
1407.0 - 1423.7	14.5	19.0	30.8	45.5	577.7	2400 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
NOVEMBER, 1981

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