OILFIELD RESEARCH LABORATORIES

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

October 29, 1979

Akandas, Inc.
1102 West 1st
Chanute, Kansas 66720

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Brazil Lease, Well No. 6, Wilson County, Kansas, and submitted to our laboratory on October 15, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman

Benjamin R. Pearman

SAM:km
5 c to Chanute, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Akandas, Inc. Lease Brazil Well No. 6

Location 825' FSL & 495' FEL SE¼

Section 11 Twp. 28S Rge. 15E County Wilson State Kansas

Name of Sand	Bartlesville
Top of Core	1025.0
Bottom of Core	1040.0
Top of Sand	1025.0
Bottom of Sand	1039.4
Total Feet of Permeable Sand	13.1
Total Feet of Floodable Sand	9.7

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 – 10	6.3	6.3
10 – 20	4.8	11.1
20 – 40	2.0	13.1

Average Permeability Millidarcys	12.8
Average Percent Porosity	15.5
Average Percent Oil Saturation	43.2
Average Percent Water Saturation	35.8
Average Oil Content, Bbls./A. Ft.	504.
Total Oil Content, Bbls./Acre	7,159.
Average Percent Oil Recovery by Laboratory Flooding Tests	15.1
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	170.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	1,652.
Total Calculated Oil Recovery, Bbls./Acre	See "Calculated Recovery" Section
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

The core was sampled and the samples sealed in plastic bags by a representative of the client. Fresh water mud was used as a drilling fluid. The core was reported to be from a virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
1025.0 - 1026.1	Brown slightly shaly sandstone.
1026.1 - 1026.3	Gray shale.
1026.3 - 1031.0	Brown and gray laminated sandstone and shale.
1031.0 - 1038.3	Brown slightly shaly sandstone.
1038.3 - 1039.4	Dark carbonaceous sandstone.
1039.4 - 1040.0	Gray shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 1,652 barrels of oil per acre was obtained from 9.7 feet of sand. The weighted average percent oil saturation was reduced from 46.4 to 31.3, or represents an average recovery of 15.1 percent. The weighted average effective permeability of the samples is 0.44 millidarcys, while the average initial fluid production pressure is 21.1 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 15 samples tested, 9 produced water and oil, and 1 sample produced water only. This indicates that approximately 60 percent of the sand represented by these samples is floodable pay sand.

CALCULATED RECOVERY

It would appear from a study of the data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 2,470 barrels of oil per acre. This is an average recovery of 255 barrels per acre foot from 9.7 feet of floodable sand analyzed in this core.

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

Original formation volume factor	1.07
Reservoir water saturation, percent	20.0
Average porosity, percent	15.1
Oil saturation after flooding, percent	31.3
Performance factor, percent	50.0
Net floodable pay sand, feet	9.7

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Akandas, Inc. Lease Brazil Well No. 6

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	1025.2	19.9	22	47	69	340	9.9	0.5	0.5	170	4.95
2	1026.0	18.1	38	31	69	534	10.	0.6	1.1	320	6.00
3	1027.2	16.5	43	37	80	550	2.7	1.2	2.3	660	3.24
4	1028.4	16.9	40	40	80	524	20.	1.5	3.8	786	30.00
5	1029.3	10.3	53	42	95	424	9.6	1.0	4.8	424	9.60
6	1030.5	9.9	42	53	95	323	0.32	1.0	5.8	323	0.32
7	1031.3	12.9	74	21	95	741	22.	1.0	6.8	741	22.00
8	1032.5	19.3	43	24	67	644	35.	1.0	7.8	644	35.00
9	1033.4	14.3	47	27	74	521	4.1	1.0	8.8	521	4.10
10	1034.4	18.6	38	30	68	548	14.	1.0	9.8	548	14.00
11	1035.4	17.5	40	32	72	543	14.	1.0	10.8	543	14.00
12	1036.4	11.5	49	46	95	437	8.5	1.0	11.8	437	8.50
13	1037.2	16.8	36	39	75	469	12.	1.3	13.1	610	15.60
14	1038.5	16.1	27	44	71	337	Imp.	0.5	13.6	169	0.00
15	1039.3	15.7	36	23	59	439	Imp.	0.6	14.2	263	0.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Akandas, Inc. Lease Brazil Well No. 6

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
1025.0 - 1031.0	5.8	9.3	54.11
1031.0 - 1039.4	7.3	15.5	113.20
1025.0 - 1039.4	13.1	12.8	167.31

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
1025.0 - 1031.0	5.8	14.9	41.4	41.6	463	2,683
1031.0 - 1039.4	8.4	15.9	44.4	31.7	533	4,476
1025.0 - 1039.4	14.2	15.5	43.2	35.8	504	7,159

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Akandas, Inc. Lease Brazil Well No. 6

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	1025.2	19.7	21	321	0	0	21	72	321	10	0.22	40
2	1026.0	17.9	38	528	0	0	38	46	528	0	Imp.	–
3	1027.2	16.1	43	537	13	162	30	65	375	3	0.22	30
4	1028.4	17.3	40	537	12	161	28	57	376	49	1.20	10
5	1029.3	10.8	53	444	18	151	35	54	293	5	0.15	20
6	1030.5	10.4	42	339	9	73	33	61	266	17	0.37	20
7	1031.3	13.4	74	769	42	437	32	58	332	8	0.15	20
8	1032.5	19.3	43	644	12	180	31	57	464	24	0.60	20
9	1033.4	14.3	47	521	0	0	47	38	521	0	Imp.	–
10	1034.4	18.2	38	537	8	113	30	45	424	5	0.15	25
11	1035.4	17.5	40	543	9	122	31	54	421	3	0.22	25
12	1036.4	12.0	49	456	15	140	34	46	316	24	0.60	20
13	1037.2	16.4	37	471	0	0	37	52	471	0	Imp.	–
14	1038.5	16.0	27	335	0	0	27	60	335	0	Imp.	–
15	1039.3	15.7	36	438	0	0	36	42	438	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 Akandas, Inc. Lease Brazil Well No. 6

Depth Interval, Feet	1025.0 - 1031.0	1031.0 - 1039.4	1025.0 - 1039.4
Feet of Core Analyzed	4.7	5.0	9.7
Average Percent Porosity	14.1	16.1	15.1
Average Percent Original Oil Saturation	44.0	48.8	46.4
Average Percent Oil Recovery	12.9	17.2	15.1
Average Percent Residual Oil Saturation	31.1	31.6	31.3
Average Percent Residual Water Saturation	59.3	52.0	55.5
Average Percent Total Residual Fluid Saturation	90.4	83.6	86.8
Average Original Oil Content, Bbls./A. Ft.	475.	589.	534.
Average Oil Recovery, Bbls./A. Ft.	140.	198.	170.
Average Residual Oil Content, Bbls./A. Ft.	335.	391.	364.
Total Original Oil Content, Bbls./Acre	2,233.	2,949.	5,182.
Total Oil Recovery, Bbls./Acre	660.	992.	1,652.
Total Residual Oil Content, Bbls./Acre	1,573.	1,957.	3,530.
Average Effective Permeability, Millidarcys	0.55	0.34	0.44
Average Initial Fluid Production Pressure, p.s.i.	20.0	22.0	21.1

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