OILFIELD RESEARCH LABORATORIES

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

May 6, 1981

Akandas, Inc.
% John Mears
1102 West First
Chanute, Kansas 66720

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Brazil Lease, Well No. 17, located in Wilson County, Kansas and submitted to our laboratory on April 23, 1981.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/mkf

5 c to Chanute, Ks.

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GENERAL INFORMATION & SUMMARY

Company Akandas, Inc. Lease Brazil Well No. 17

Location

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

Elevation, Feet	
Name of Sand	UPPER BARTLESVILLE
Top of Core	1008.0
Bottom of Core	1020.4
Top of Sand	1008.0
Bottom of Sand (Tested)	1017.7
Total Feet of Permeable Sand	9.3
Total Feet of Floodable Sand	6.0

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 8	3.3	3.3
15 - 20	1.5	4.8
60 - 85	3.0	7.8
190 - 200	1.5	9.3

Average Permeability Millidarcys	59.8
Average Percent Porosity	19.2
Average Percent Oil Saturation	46.0
Average Percent Water Saturation	18.3
Average Oil Content, Bbls./A. Ft.	696.
Total Oil Content, Bbls./Acre	6,476.
Average Percent Oil Recovery by Laboratory Flooding Tests	9.4
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	162.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	971.
Total Calculated Oil Recovery, Bbls./Acre	See "Calculated Recovery" Section

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.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
1008.0 - 1010.3	Grayish light brown shaly sandstone.
1010.3 - 1011.7	Grayish light brown sandy shale.
1011.7 - 1017.7	Dark brown carbonaceous sandstone.
1017.7 - 1020.4	Grayish light brown shaly sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 971 barrels of oil per acre was obtained from 6.0 feet of sand. The weighted average percent oil saturation was reduced from 47.6 to 38.2, or represents an average recovery of 9.4 percent. The weighted average effective permeability of the samples is 12.69 millidarcys, while the average initial fluid production pressure is 22.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 9 samples tested, 5 produced water and oil. This indicates that approximately 56 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 2400 barrels of oil per acre. This is an average recovery of 400 barrels per acre foot from 6.0 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.06
Reservoir water saturation, percent, estimated	10.0
Average porosity, percent	22.1
Oil saturation after flooding, percent	38.2
Performance factor, percent, estimated	50.0
Net floodable sand, feet	6.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Akandas, Inc. Lease Brazil Well No. 17

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	1008.4	14.7	71	6	77	810	2.0	1.0	1.0	810	2.00
2	1009.5	14.8	38	35	73	436	6.6	0.9	1.9	392	5.94
3	1010.3	10.1	28	56	84	219	0.41	0.4	2.3	88	0.16
4	1012.5	19.5	49	24	73	741	63.	1.0	3.3	741	63.00
5	1013.5	23.5	50	12	62	912	84.	1.0	4.3	912	84.00
6	1014.4	21.9	44	20	64	748	79.	1.0	5.3	748	79.00
7	1015.5	24.5	47	13	60	893	195.	1.5	6.8	1340	292.50
8	1016.8	20.9	48	17	65	778	19.	1.5	8.3	1167	28.50
9	1018.3	13.8	26	9	35	278	0.60	1.0	9.3	278	0.60

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Akandas, Inc. Lease Brazil Well No. 17

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
1008.0 - 1010.3	2.3	3.5	8.10
1011.7 - 1018.7	7.0	78.2	547.60
1008.0 - 1018.7	9.3	59.8	555.70

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
1008.0 - 1010.3	2.3	13.9	50.6	26.0	561	1,290
1011.7 - 1018.7	7.0	21.0	44.5	15.7	741	5,186
1008.0 - 1018.7	9.3	19.2	46.0	18.3	696	6,476

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Akandas, Inc. Lease Brazil Well No. 17

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	1008.4	14.8	70	804	0	0	70	7	804	0	Imp.	-
2	1009.5	14.4	39	436	0	0	39	36	436	0	Imp.	-
3	1010.3	10.1	28	219	0	0	28	57	219	0	Imp.	-
4	1012.5	19.4	49	737	11	166	38	54	571	179	4.20	25
5	1013.5	23.5	50	912	16	292	34	50	620	268	19.92	20
6	1014.4	21.7	44	741	10	168	34	53	573	226	6.83	25
7	1015.5	24.3	47	886	7	132	40	51	754	372	28.92	15
8	1016.8	21.0	48	782	6	98	42	38	684	54	1.20	25
9	1018.3	14.1	25	273	0	0	25	11	273	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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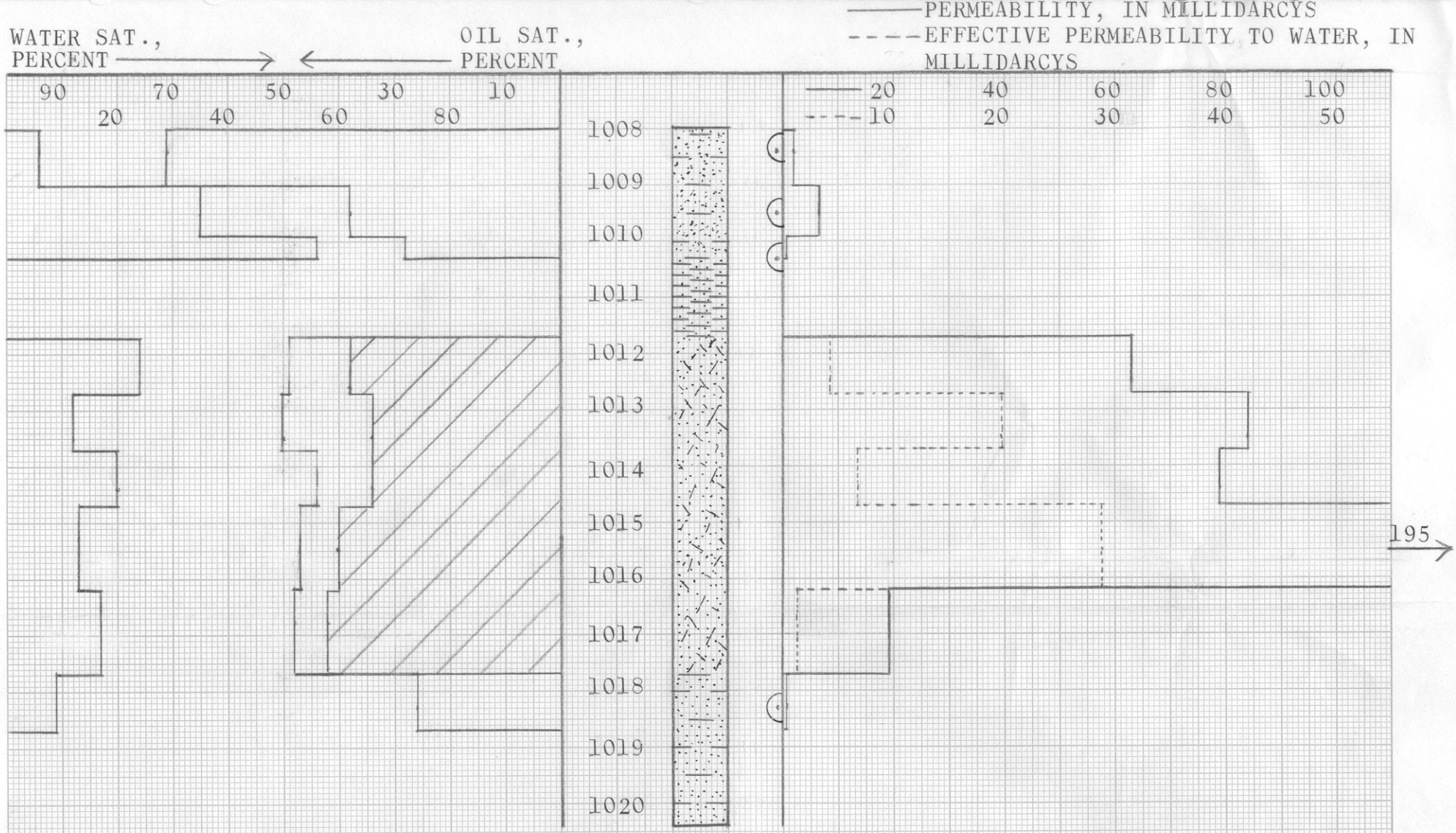
SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company Akandas, Inc. Lease Brazil Well No. 17

Depth Interval, Feet	1008.0 - 1018.7
Feet of Core Analyzed	6.0
Average Percent Porosity	22.1
Average Percent Original Oil Saturation	47.6
Average Percent Oil Recovery	9.4
Average Percent Residual Oil Saturation	38.2
Average Percent Residual Water Saturation	48.4
Average Percent Total Residual Fluid Saturation	86.6
Average Original Oil Content, Bbls./A. Ft.	816.
Average Oil Recovery, Bbls./A. Ft.	162.
Average Residual Oil Content, Bbls./A. Ft.	654.
Total Original Oil Content, Bbls./Acre	4,892.
Total Oil Recovery, Bbls./Acre	971.
Total Residual Oil Content, Bbls./Acre	3,921.
Average Effective Permeability, Millidarcys	12.69
Average Initial Fluid Production Pressure, p.s.i.	22.0

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



KEY:

- CARBONACEOUS SANDSTONE
- FLOODPOT RESIDUAL OIL SATURATION
- SANDY SHALE
- SHALY SANDSTONE
- IMPERMEABLE TO WATER

AKANDAS, INCORPORATED

BRAZIL LEASE

WELL NO. 17

 FLOODPOT RESIDUAL OIL SATURATION ◯ IMPERMEABLE TO WATER

AKANDAS, INCORPORATED

BRAZIL LEASE WELL NO. 17

WILSON 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
1008.0 - 1010.3	2.3	13.9	50.6	26.0	3.5	
1011.7 - 1018.7	7.0	21.0	44.5	15.7	78.2	
1008.0 - 1018.7	9.3	19.2	46.0	18.3	59.8	2400 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
MAY, 1981

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