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

October 15, 1981

Blackhawk Oil Company, Inc.
15 North Highland
Chanute, Kansas 66720

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary cores taken from the Campbell Lease, Well No. 16, located in Wilson County, Kansas and submitted to our laboratory on October 1, 1981.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

5 c to Chanute, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Blackhawk Oil Company, Inc. Lease Campbell Well No. 16

Location 880' S of N Line and 870' E of W Line NW¼

Section 36 Twp. 27S Rge. 16E County Wilson State Kansas

	Upper Squirrel	Upper Bartlesville
Elevation, Feet		
Name of Sand		
Top of Core	853.0	990.0
Bottom of Core	862.0	998.3
Top of Sand	853.0	990.0
Bottom of Sand	862.0	998.3
Total Feet of Permeable Sand	8.6	8.3
Total Feet of Floodable Sand	0.	1.0

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
	UPPER SQUIRREL SAND	
0 - 1	2.8	2.8
1 - 5	4.1	6.9
5 - 7	1.7	8.6
	UPPER BARTLESVILLE SAND	
0 - 2	3.0	3.0
3 - 5	2.0	5.0
5 - 9	3.3	8.3

Average Permeability Millidarcys	2.1	4.0
Average Percent Porosity	14.8	15.4
Average Percent Oil Saturation	44.5	37.2
Average Percent Water Saturation	39.4	38.6
Average Oil Content, Bbls./A. Ft.	512.	437.
Total Oil Content, Bbls./Acre	4,399.	3,624.
Average Percent Oil Recovery by Laboratory Flooding Tests	0.	5.0
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	0.	34.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	0.	34.
Total Calculated Oil Recovery, Bbls./Acre	0.	See "Cal. Rec." Section

The core was sampled and the samples sealed in plastic bags by a representative of the client. Salt water mud was used as a drilling fluid.

In as much as only the Upper Bartlesville sand responded to flooding susceptibility tests, a calculated recovery is given for only the Upper Bartlesville sand.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
	UPPER SQUIRREL SAND
853.0 - 856.7	Grayish brown slightly shaly sandstone.
856.7 - 857.5	Grayish light brown very shaly sandstone.
857.5 - 857.9	Gray shale.
857.9 - 862.0	Grayish light brown shaly sandstone.
	UPPER BARTLESVILLE SAND
990.0 - 995.8	Grayish light brown shaly sandstone.
995.8 - 998.3	Grayish brown shaly sandstone.

LABORATORY FLOODING TESTS

UPPER BARTLESVILLE SAND

The Upper Bartlesville sand in this core responded to laboratory flooding tests, as a total recovery of 34 barrels of oil per acre was obtained from 1.0 feet of sand. The weighted average percent oil saturation was reduced from 52.0 to 47.0, or represents an average recovery of 5.0 percent. The weighted average effective permeability

of the samples is 0.97 millidarcys, while the average initial fluid production pressure is 35.0 pounds per square inch (See Table V).

CALCULATED RECOVERY

UPPER BARTLESVILLE SAND

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 150 barrels of oil per acre. This is an average recovery of 150 barrels per acre foot from 1.0 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	25.0
Average porosity, percent	14.8
Oil saturation after flooding, percent	47.0
Performance factor, percent, estimated	55.0
Net floodable sand, feet	1.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Blackhawk Oil Company, Inc. Lease Campbell Well No. 16

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.		
						UPPER SQUIRREL SAND					
1	853.5	8.5	47	41	88	310	0.68	1.0	1.0	310	0.68
2	854.6	18.5	55	35	90	789	1.8	1.0	2.0	789	1.80
3	855.6	16.6	56	17	73	721	5.0	1.0	3.0	721	5.00
4	856.5	17.0	18	57	75	237	6.9	0.7	3.7	166	4.83
5	857.3	12.8	57	40	97	566	0.41	0.8	4.5	453	0.33
6	858.4	15.8	47	36	83	576	1.4	1.1	5.6	634	1.54
7	859.4	16.2	41	39	80	515	1.5	1.0	6.6	515	1.50
8	860.4	14.0	28	48	76	304	1.3	1.0	7.6	304	1.30
9	861.6	14.2	46	47	93	507	0.90	1.0	8.6	507	0.90
						UPPER BARTLESVILLE SAND					
10	990.6	16.7	60	35	95	777	3.5	1.0	1.0	777	3.50
11	991.5	15.1	35	54	89	410	6.1	1.0	2.0	410	6.10
12	992.6	15.3	29	34	63	344	3.0	1.0	3.0	344	3.00
13	993.5	14.5	29	46	75	326	1.5	1.0	4.0	326	1.50
14	994.4	16.1	33	35	68	412	5.9	0.8	4.8	330	4.72
15	995.5	14.7	52	25	77	593	1.6	1.0	5.8	593	1.60
16	996.4	16.1	35	29	64	437	8.3	1.5	7.3	656	12.45
17	997.7	14.4	25	55	80	279	0.18	1.0	8.3	279	0.18

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Blackhawk Oil Company, Inc. Lease Campbell Well No. 16

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
	UPPER SQUIRREL SAND		
853.0 - 862.0	8.6	2.1	17.88
	UPPER BARTLESVILLE SAND		
990.0 - 998.3	8.3	4.0	33.05

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
			UPPER SQUIRREL SAND			
853.0 - 862.0	8.6	14.8	44.5	39.4	512	4,399
			UPPER BARTLESVILLE SAND			
990.0 - 998.3	8.3	15.4	37.2	38.6	437	3,624

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Blackhawk Oil Company, Inc. Lease Campbell Well No. 16

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.			
					UPPER SQUIRREL SAND							
1	853.5	8.6	47	314	0	0	47	42	314	0	Imp.	-
2	854.6	18.4	55	785	0	0	55	36	785	0	Imp.	-
3	855.6	17.0	55	725	0	0	55	18	725	0	Imp.	-
4	856.5	17.1	18	239	0	0	18	59	239	40	0.60	35
5	857.3	12.9	57	570	0	0	57	40	570	0	Imp.	-
6	858.4	15.9	47	580	0	0	47	37	580	0	Imp.	-
7	859.4	16.1	41	512	0	0	41	40	512	0	Imp.	-
8	860.4	14.1	28	306	0	0	28	49	306	0	Imp.	-
9	861.6	14.3	46	510	0	0	46	48	510	0	Imp.	-
					UPPER BARTLESVILLE SAND							
10	990.6	16.6	60	773	0	0	60	36	773	0	Imp.	-
11	991.5	15.6	34	411	0	0	34	56	411	0	Imp.	-
12	992.6	15.4	29	346	0	0	29	35	346	0	Imp.	-
13	993.5	14.6	29	328	0	0	29	47	328	14	0.22	50
14	994.4	15.6	34	411	0	0	34	42	411	0	Imp.	-
15	995.5	14.8	52	597	5	34	47	31	563	54	0.97	35
16	996.4	16.0	35	434	0	0	35	30	434	0	Imp.	-
17	997.7	14.5	25	281	0	0	25	56	281	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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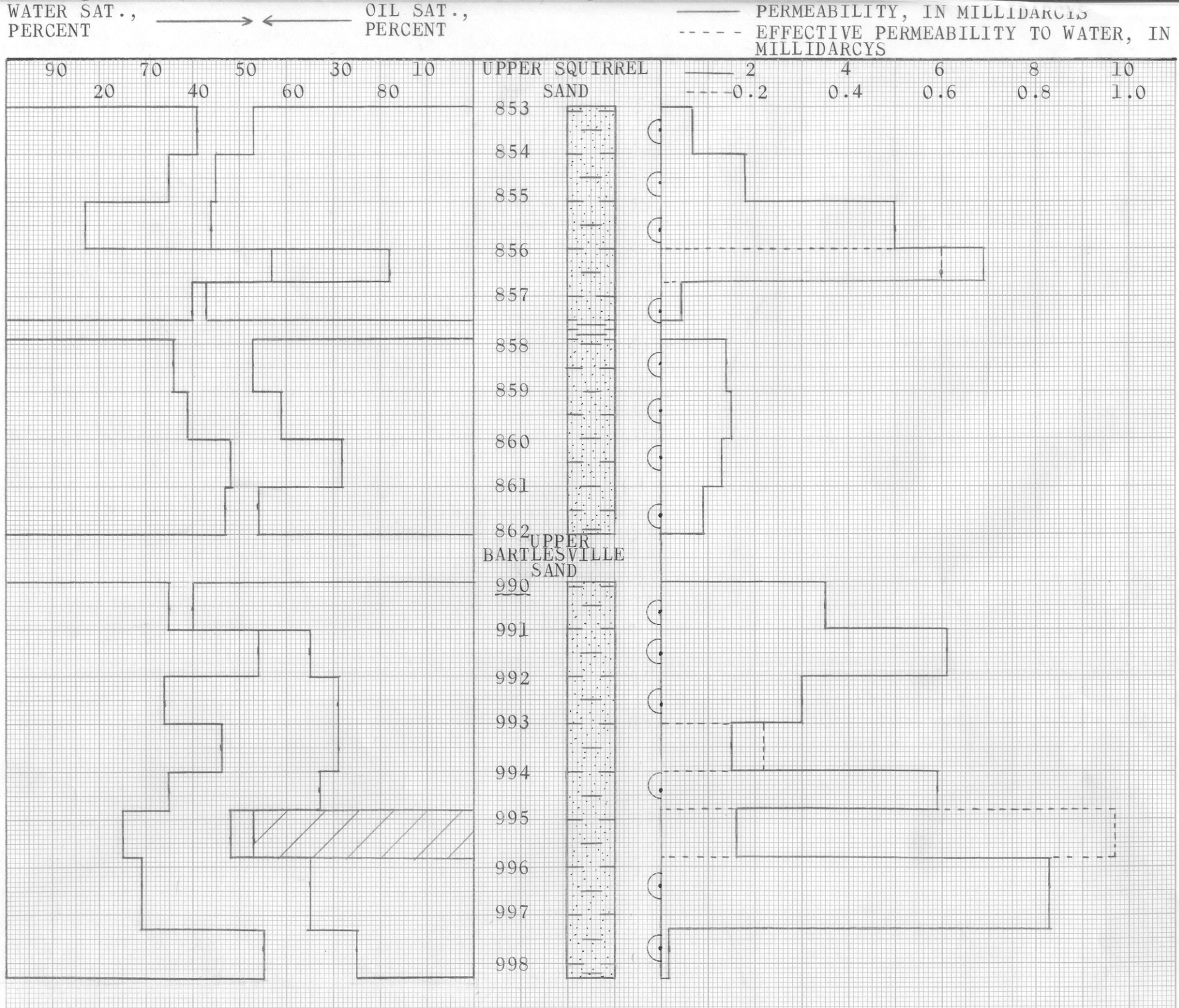
SUMMARY OF LABORATORY FLOODING TESTS

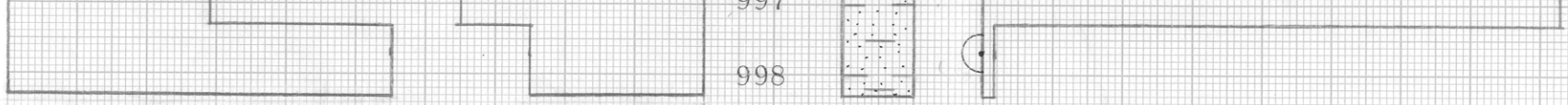
TABLE V

Company Blackhawk Oil Company, Inc. Lease Campbell Well No. 16

	UPPER BARTLESVILLE SAND
Depth Interval, Feet	990.0 - 998.3
Feet of Core Analyzed	1.0
Average Percent Porosity	14.8
Average Percent Original Oil Saturation	52.0
Average Percent Oil Recovery	5.0
Average Percent Residual Oil Saturation	47.0
Average Percent Residual Water Saturation	31.0
Average Percent Total Residual Fluid Saturation	78.0
Average Original Oil Content, Bbls./A. Ft.	597.
Average Oil Recovery, Bbls./A. Ft.	34.
Average Residual Oil Content, Bbls./A. Ft.	563.
Total Original Oil Content, Bbls./Acre	597.
Total Oil Recovery, Bbls./Acre	34.
Total Residual Oil Content, Bbls./Acre	563.
Average Effective Permeability, Millidarcys	0.97
Average Initial Fluid Production Pressure, p.s.i.	35.0

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
2 4 6 8 10
0.2 0.4 0.6 0.8 1.0
UPPER SQUIRREL SAND
853
854
855
856
857
858
859
860
861
862
UPPER BARTLESVILLE SAND
990
991
992
993
994
995
996
997
998



KEY:

SHALE

SHALY SANDSTONE

FLOODPOT RESIDUAL OIL SATURATION

IMPERMEABLE TO WATER

BLACKHAWK OIL COMPANY

CAMPBELL LEASE WELL NO. 16

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
		UPPER SQUIRREL SAND				
853.0 - 862.0	8.6	14.8	44.5	39.4	2.1	-
		UPPER BARTLESVILLE SAND				
990.0 - 998.3	8.3	15.4	37.2	38.6	4.0	150 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
OCTOBER, 1981