

# OILFIELD RESEARCH LABORATORIES

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August 5, 1982

Andercan Energy Corporation  
227½ South Main  
P.O. Box 108  
Ottawa, Kansas 66067

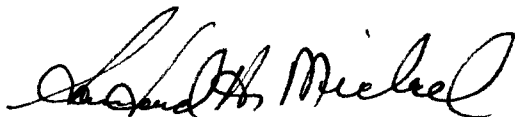
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Black Lease, Well No. C-4, located in Miami County, Kansas and submitted to our laboratory on July 29, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Sanford A. Michel

SAM/dlb

5 c to Ottawa, Kansas

**Oilfield Research Laboratories**  
**GENERAL INFORMATION & SUMMARY**

Company Andercan Energy Corp. Lease Black Well No. C-4

Location \_\_\_\_\_

Section 14 Twp. 17S Rge. 21E County Miami State Kansas

Elevation, Feet .....	
Name of Sand .....	Peru
Top of Core .....	468.0
Bottom of Core .....	479.8
Top of Sand ..... (Tested) .....	468.5
Bottom of Sand .....	479.8
Total Feet of Permeable Sand .....	10.3
Total Feet of Floodable Sand .....	8.0

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
9 - 20	2.5	2.5
20 - 40	3.8	6.3
40 - 81	4.0	10.3

Average Permeability Millidarcys .....	36.8
Average Percent Porosity .....	19.0
Average Percent Oil Saturation .....	32.0
Average Percent Water Saturation.....	50.2
Average Oil Content, Bbls./A. Ft.....	467.
Total Oil Content, Bbls./Acre.....	4,811.
Average Percent Oil Recovery by Laboratory Flooding Tests.....	6.6
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. ....	96.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre .....	771.
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.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
468.0 - 468.5	Grayish brown very shaly sandstone.
468.5 - 469.0	Light brown slightly calcareous slightly shaly sandstone.
469.0 - 473.0	Brown slightly calcareous sandstone.
473.0 - 474.0	Light gray limestone.
474.0 - 479.0	Brown slightly calcareous sandstone.
479.0 - 479.8	Light brown slightly calcareous sandstone with fine gray shale partings.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 771 barrels of oil per acre was obtained from 8.0 feet of sand. The weighted average percent oil saturation was reduced from 35.5 to 28.9, or represents an average recovery of 6.6 percent. The weighted average effective permeability of the samples is 1.59 millidarycs, while the average initial fluid production pressure is 26.3 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 11 samples tested, 8 produced water and oil, and 2 produced water only. This indicates that approximately 73 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 2,440 barrels of oil per acre. This is an average recovery of 305 barrels per acre foot from 8.0 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.05
Reservoir water saturation, percent, estimated	30.0
Average porosity, percent	18.6
Oil saturation after flooding, percent.	28.9
Performance factor, percent, estimated	55.0
Net floodable sand, feet	8.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Andercan Energy Corporation Lease Black

Well No. C-4

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	468.6	20.9	12	57	69	195	9.4	0.5	0.5	98	4.70
2	469.6	18.3	30	31	61	426	25.	1.0	1.5	426	25.00
3	470.5	18.8	38	46	84	554	47.	1.0	2.5	554	47.00
4	471.5	20.1	37	44	81	577	62.	1.0	3.5	577	62.00
5	472.5	19.3	38	55	93	569	36.	1.0	4.5	569	36.00
6	474.5	16.4	33	65	98	420	35.	1.0	5.5	420	35.00
7	475.6	19.2	35	50	85	521	80.	1.0	6.5	521	80.00
8	476.5	20.8	30	53	83	484	40.	1.0	7.5	484	40.00
9	477.4	16.1	43	45	88	537	17.	1.0	8.5	537	17.00
10	478.5	20.4	26	52	78	412	16.	1.0	9.5	412	16.00
11	479.4	20.2	17	60	77	266	20.	0.8	10.3	213	16.00

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## SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Lease	Well No.	C-4
Andercan Energy Corp.	Black		
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
468.5 - 479.8	10.3	36.8	378.70
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Oil Saturation	Average Percent Water Saturation
468.5 - 479.8	10.3	32.0	50.2
		Average Percent Porosity	Average Oil Content Bbl./A. Ft.
		19.0	467
			Total Oil Content Bbls./Acre
			4,811

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Andercan Energy Corp. Lease Black Well No. C-4

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	468.6	20.7	12	193	0	0	12	56	193	0	Imp.	-
2	469.6	18.2	30	424	3	42	27	64	382	24	0.33	35
3	470.5	18.9	38	557	14	205	24	67	352	414	6.15	20
4	471.5	20.0	37	574	7	109	30	64	465	140	2.32	20
5	472.5	19.2	38	566	10	149	28	65	417	30	0.45	25
6	474.5	16.2	33	415	4	50	29	63	365	60	0.82	25
7	475.6	19.3	35	524	6	90	29	64	434	88	1.35	25
8	476.5	20.7	30	482	4	64	26	64	418	80	1.12	25
9	477.4	16.0	43	534	5	62	38	51	472	16	0.15	35
10	478.5	20.2	26	407	0	0	26	60	407	18	0.37	35
11	479.4	19.9	17	262	0	0	17	61	262	22	0.33	30

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.

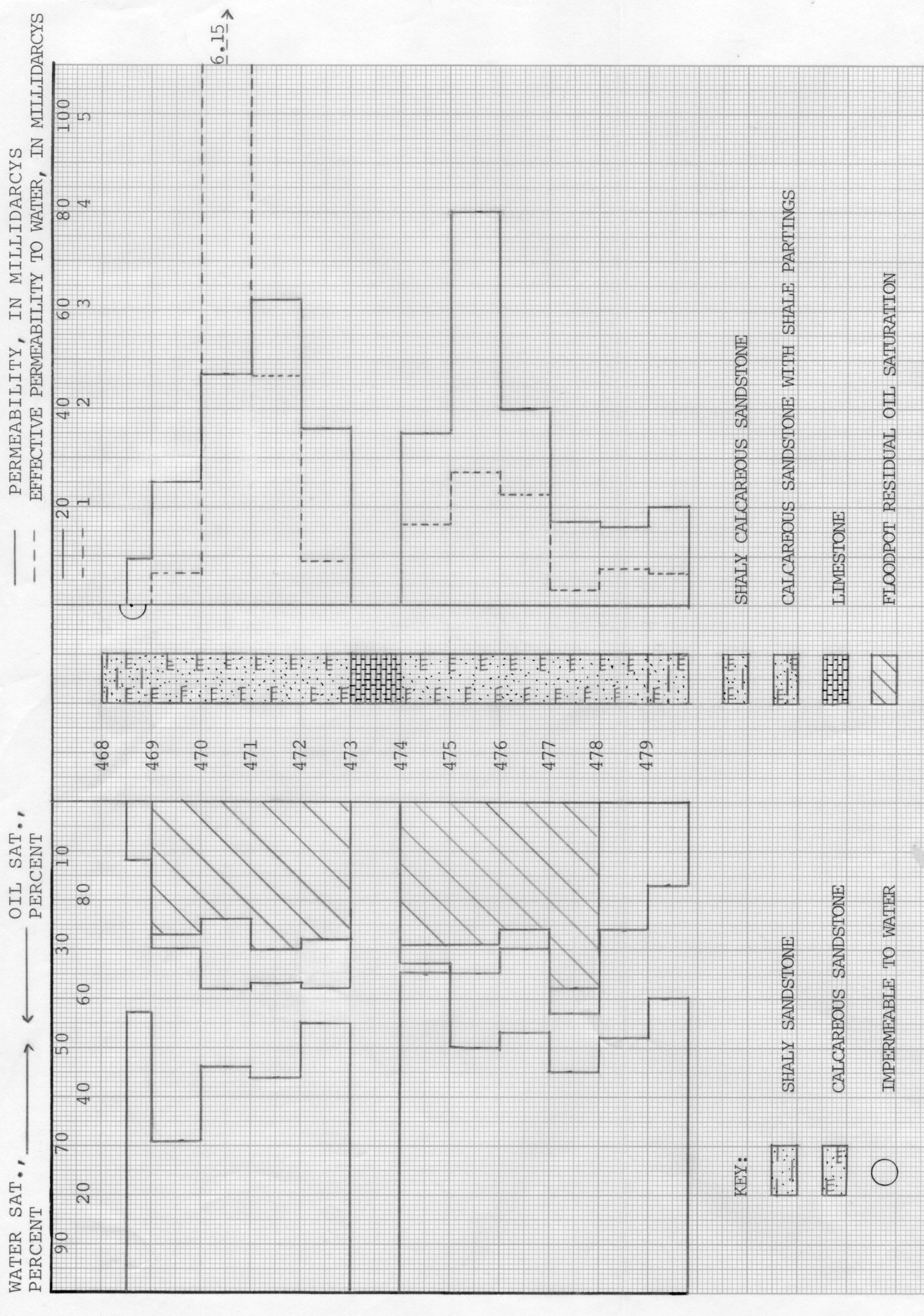
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## SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company <u>Andercan Black Corporation</u>	Lease <u>Black</u>	Well No. <u>C-4</u>
Depth Interval, Feet	<u>468.5 - 479.8</u>	
Feet of Core Analyzed	<u>8.0</u>	
Average Percent Porosity	<u>18.6</u>	
Average Percent Original Oil Saturation	<u>35.5</u>	
Average Percent Oil Recovery	<u>6.6</u>	
Average Percent Residual Oil Saturation	<u>28.9</u>	
Average Percent Residual Water Saturation	<u>62.8</u>	
Average Percent Total Residual Fluid Saturation	<u>91.7</u>	
Average Original Oil Content, Bbls./A. Ft.	<u>509.</u>	
Average Oil Recovery, Bbls./A. Ft.	<u>96.</u>	
Average Residual Oil Content, Bbls./A. Ft.	<u>413.</u>	
Total Original Oil Content, Bbls./Acre	<u>4,076.</u>	
Total Oil Recovery, Bbls./Acre	<u>771.</u>	
Total Residual Oil Content, Bbls./Acre	<u>3,305.</u>	
Average Effective Permeability, Millidarcys	<u>1.59</u>	
Average Initial Fluid Production Pressure, p.s.i.	<u>26.3</u>	

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



# ANDERCAN ENERGY CORPORATION

BLACK LEASE

WELL NO. C-4

MIAMI COUNTY, KANSAS

DEPTH INTERVAL FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCS	CALCULATED OIL RECOVERY BBLs. / ACRE
468.5 - 479.8	10.3	19.0	32.0	50.2	36.8	2440 (PRIMARY AND WATERFLOODING)

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 CHANUTE, KANSAS  
 AUGUST, 1982 PDC