

OILFIELD RESEARCH LABORATORIES

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

March 3, 1980

P & H Oil Company
P.O. Box 234
Chanute, Kansas 66720

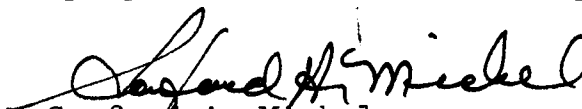
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Wilson Lease, Well No. 0-2 Allen County, Kansas, and submitted to our laboratory on February 18, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Sanford A. Michel

SAM/tem
4 c to Chanute, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company P & H Oil Company Lease Wilson Well No. 0-2

Location -

Section 29 Twp. 26S Rge. 18E County Allen State Kansas

Elevation, Feet - - - - -

Name of Sand - - - - - Bartlesville

Top of Core - - - - - 750.0

Bottom of Core - - - - - 790.5

Top of Sand - - - - - 750.0

Bottom of Sand - - - - - 777.9

Total Feet of Permeable Sand - - - - - 17.9

Total Feet of Floodable Sand - - - - - 6.4

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 10	7.3	7.3
10 - 20	4.7	12.0
20 - 40	3.9	15.9
40 - 60	1.0	16.9
60 - 80	1.0	17.9

Average Permeability Millidarcys - - - - - 18.8

Average Percent Porosity - - - - - 15.4

Average Percent Oil Saturation - - - - - 33.8

Average Percent Water Saturation - - - - - 50.1

Average Oil Content, Bbls./A. Ft. - - - - - 410.

Total Oil Content, Bbls./Acre - - - - - 8,004.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 2.4

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 34.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 218.

Total Calculated Oil Recovery, Bbls./Acre - - - - -

See "Calculated
Recovery" Section.

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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:

<u>Depth Interval, Feet</u>	<u>Description</u>
750.0 - 751.8	Brown sandstone.
751.8 - 753.4	Brown and gray laminated sandstone and shale.
753.4 - 754.0	Brown sandstone.
754.0 - 754.5	Brown slightly shaly sandstone.
754.5 - 756.3	Brown and gray laminated sandstone and shale.
756.3 - 758.2	Brown sandstone.
758.2 - 759.3	Grayish brown sandy shale.
759.3 - 761.5	Brown sandstone.
761.5 - 765.2	Brown and gray laminated sandstone and shale.
765.2 - 768.6	Dark brown sandstone.
768.6 - 770.0	Brownish gray shaly sandstone.
770.0 - 770.7	Brown sandstone.
770.7 - 775.0	Brown and gray laminated sandstone and shale.
775.0 - 777.0	Brownish gray sandy shale.
777.0 - 777.9	Grayish brown shaly sandstone.
777.9 - 780.0	Gray sandy shale.
780.0 - 780.5	Coal.
780.5 - 790.5	Gray shale.

-3-

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests as a total recovery of 218 barrels of oil per acre was obtained from 6.4 feet of sand. The weighted average percent oil saturation was reduced from 36.6 to 34.2, or represents an average recovery of 2.4 percent. The weighted average effective permeability of the samples is 2.85 millidarcys, while the average initial fluid production pressure is 28.8 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 21 samples tested, 8 produced water and oil, and 4 samples produced water only. This indicates that approximately 38 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 1,330 barrels of oil per acre. This is an average recovery of 208 barrels per acre foot from 6.4 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	18.3
Oil saturation after flooding, percent	34.1
Performance factor, percent, estimated	45.0
Net floodable sand, feet	6.4

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company P & H Oil Company Lease Wilson Well No. 0-2

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbbs. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water	Total			Ft.	Cum. Ft.		
1	750.5	19.1	35	43	78	519	62.	1.0	1.0	519	62.00
2	751.5	18.5	35	41	76	502	26.	0.8	1.8	402	20.80
3	752.5	9.5	19	79	98	140	Imp.	1.6	3.4	224	0.00
4	753.6	16.9	33	48	81	433	14.	0.6	4.0	260	8.40
5	754.4	18.1	32	48	80	449	9.9	0.5	4.5	225	4.95
6	756.5	19.9	31	42	73	479	39.	0.9	5.4	431	35.10
7	757.4	18.7	29	48	77	421	35.	1.0	6.4	421	35.00
8	759.5	17.7	36	38	74	494	12.	1.0	7.4	494	12.00
9	760.5	16.9	39	46	85	511	20.	0.7	8.1	358	14.00
10	761.4	18.6	36	45	81	520	31.	0.5	8.6	260	15.50
11	762.4	10.7	35	60	95	291	3.5	1.5	10.1	437	5.25
12	763.5	16.4	38	49	87	484	4.9	1.0	11.1	484	4.90
13	765.4	12.6	28	65	93	274	13.	0.8	11.9	219	10.40
14	766.5	18.7	43	34	77	624	20.	1.0	12.9	624	20.00
15	767.4	16.1	39	40	79	487	43.	1.0	13.9	487	43.00
16	768.5	17.3	31	47	78	416	19.	0.6	14.5	250	11.40
17	769.5	16.1	30	51	81	375	7.5	1.4	15.9	525	10.50
18	770.5	18.2	35	40	75	494	31.	0.7	16.6	346	21.70
19	772.5	10.5	33	65	98	269	0.20	1.0	17.6	269	0.20
20	773.5	10.4	42	50	92	340	0.51	1.0	18.6	340	0.51
21	777.8	15.0	41	40	81	477	0.60	0.9	19.5	429	0.54

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		P & H Oil Company		Lease	Wilson	Well No.	0-2
Depth Interval, Feet	Feet of Core Analyzed	Average Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre	
750.0 - 768.0	13.9	15.9	33.3	50.3	421	5,845	
768.0 - 777.9	5.6	14.3	35.2	49.8	386	2,159	
750.0 - 777.9	19.5	15.4	33.8	50.1	410	8,004	

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
750.0 - 768.0	12.3	23.7	291.30
768.0 - 777.9	5.6	8.0	44.85
750.0 - 777.9	17.9	18.8	336.15

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company				P & H Oil Company				Lease				Wilson				Well No.		O-2	
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.								
			%	Bbbs./A. Ft.	%	Bbbs./A. Ft.	% Oil	% Water											
1	750.5	19.5	35	529	2	30	33	65	352	10.83	10								
2	751.5	18.5	35	502	2	29	33	64	54	0.75	35								
3	752.5	10.0	18	140	0	0	18	80	0	Imp.	-								
4	753.6	16.9	33	433	0	0	33	65	18	0.22	45								
5	754.4	17.7	32	439	2	27	30	68	28	0.37	35								
6	756.5	19.5	31	469	2	30	29	68	121	2.32	25								
7	757.4	19.0	29	427	0	0	29	66	88	1.65	25								
8	759.5	18.2	34	480	0	0	34	61	0	Imp.	-								
9	760.5	17.3	39	523	3	40	36	60	19	0.52	35								
10	761.4	18.6	36	519	2	29	34	64	71	1.50	30								
11	762.4	11.2	34	295	0	0	34	63	0	Imp.	-								
12	763.5	16.0	39	484	0	0	39	59	0	Imp.	-								
13	765.4	13.0	28	282	0	0	28	70	0	Imp.	-								
14	766.5	18.5	43	617	4	57	39	58	59	1.05	35								
15	767.4	16.4	39	496	2	25	37	60	140	2.40	25								
16	768.5	17.3	31	416	0	0	31	62	8	0.22	50								
17	769.5	16.2	30	377	0	0	30	61	6	0.15	50								
18	770.5	17.8	37	511	0	0	37	56	0	Imp.	-								
19	772.5	10.5	33	269	0	0	33	65	0	Imp.	-								
20	773.5	10.9	41	347	0	0	41	53	0	Imp.	-								
21	777.8	14.9	41	474	0	0	41	43	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

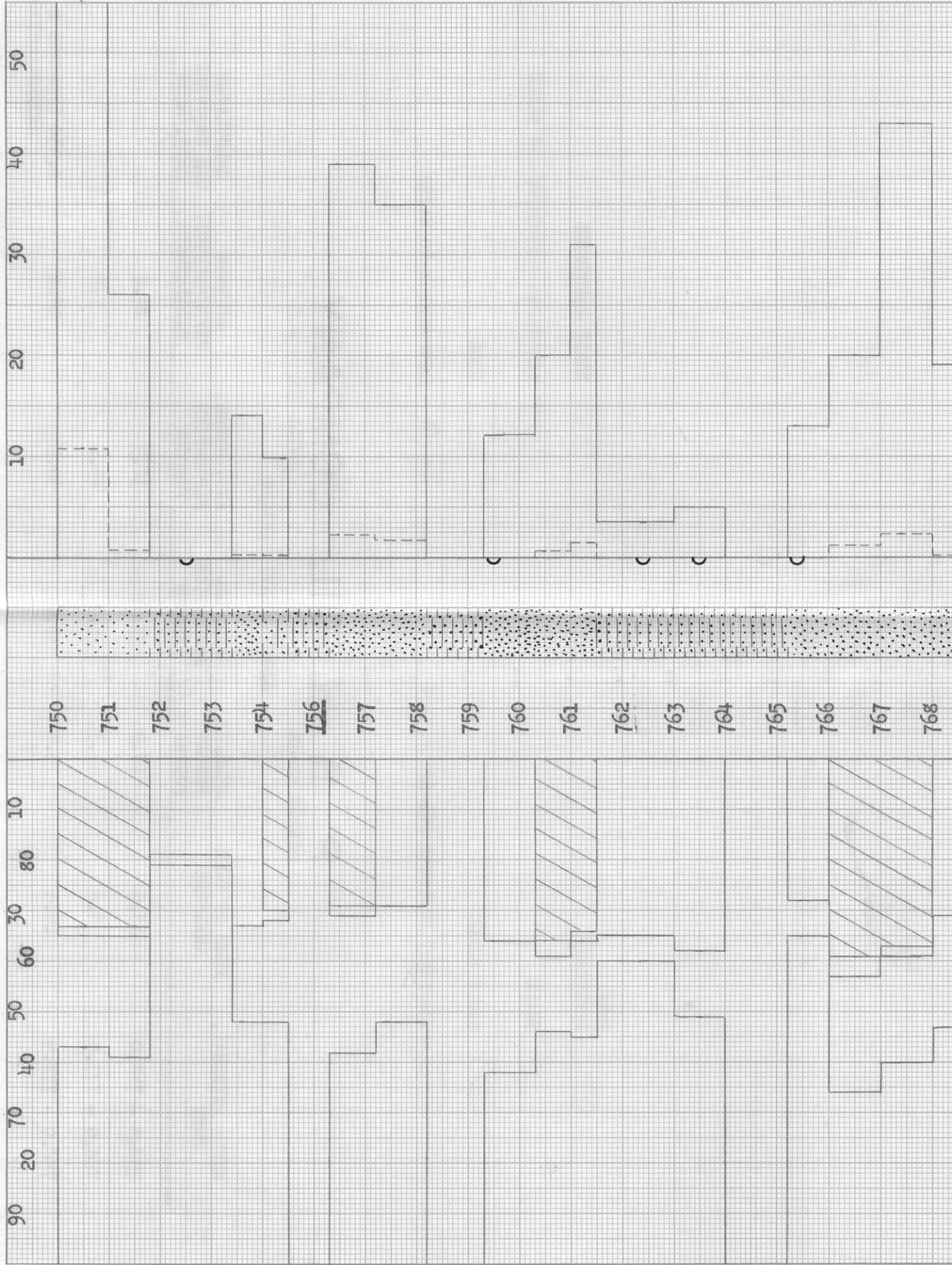
Company	P & H Oil Company	Lease	Wilson	Well No.	0-2
Depth Interval, Feet	750.0 - 768.0				
Feet of Core Analyzed	6.4				
Average Percent Porosity	18.3				
Average Percent Original Oil Saturation	36.6				
Average Percent Oil Recovery	2.4				
Average Percent Residual Oil Saturation	34.2				
Average Percent Residual Water Saturation	63.0				
Average Percent Total Residual Fluid Saturation	97.2				
Average Original Oil Content, Bbls./A. Ft.	517.				
Average Oil Recovery, Bbls./A. Ft.	34.				
Average Residual Oil Content, Bbls./A. Ft.	483.				
Total Original Oil Content, Bbls./Acre	3,311.				
Total Oil Recovery, Bbls./Acre	218.				
Total Residual Oil Content, Bbls./Acre	3,093.				
Average Effective Permeability, Millidarcys	2.85				
Average Initial Fluid Production Pressure, p.s.i.	28.8				

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

WATER SAT., PERCENT ———→

OIL SAT., PERCENT ———→

PERMEABILITY, IN MILLIDARCS
EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCS



772
773
774
775
776
777
778
779
780
781

KEY:

SANDSTONE

SHALE

SANDY SHALE

FLOODPOT RESIDUAL OIL SATURATION

SHALY SANDSTONE

LAMINATED SANDSTONE AND SHALE

COAL

○ IMPERMEABLE TO WATER

P & H OIL COMPANY

WILSON LEASE

WELL NO. 0 - 2

ALLEN COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE POROSITY PERCENT	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCY'S	CALCULATED OIL RECOVERY BBL'S./ACRE
750.0 - 768.0	13.9	15.9	33.3	50.3	23.7	
768.0 - 777.9	5.6	14.3	35.2	49.8	8.0	
750.0 - 777.9	19.5	15.4	33.8	50.1	18.8	1,330 (PRIMARY & WATERFLOODING)

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CHANUTE, KANSAS