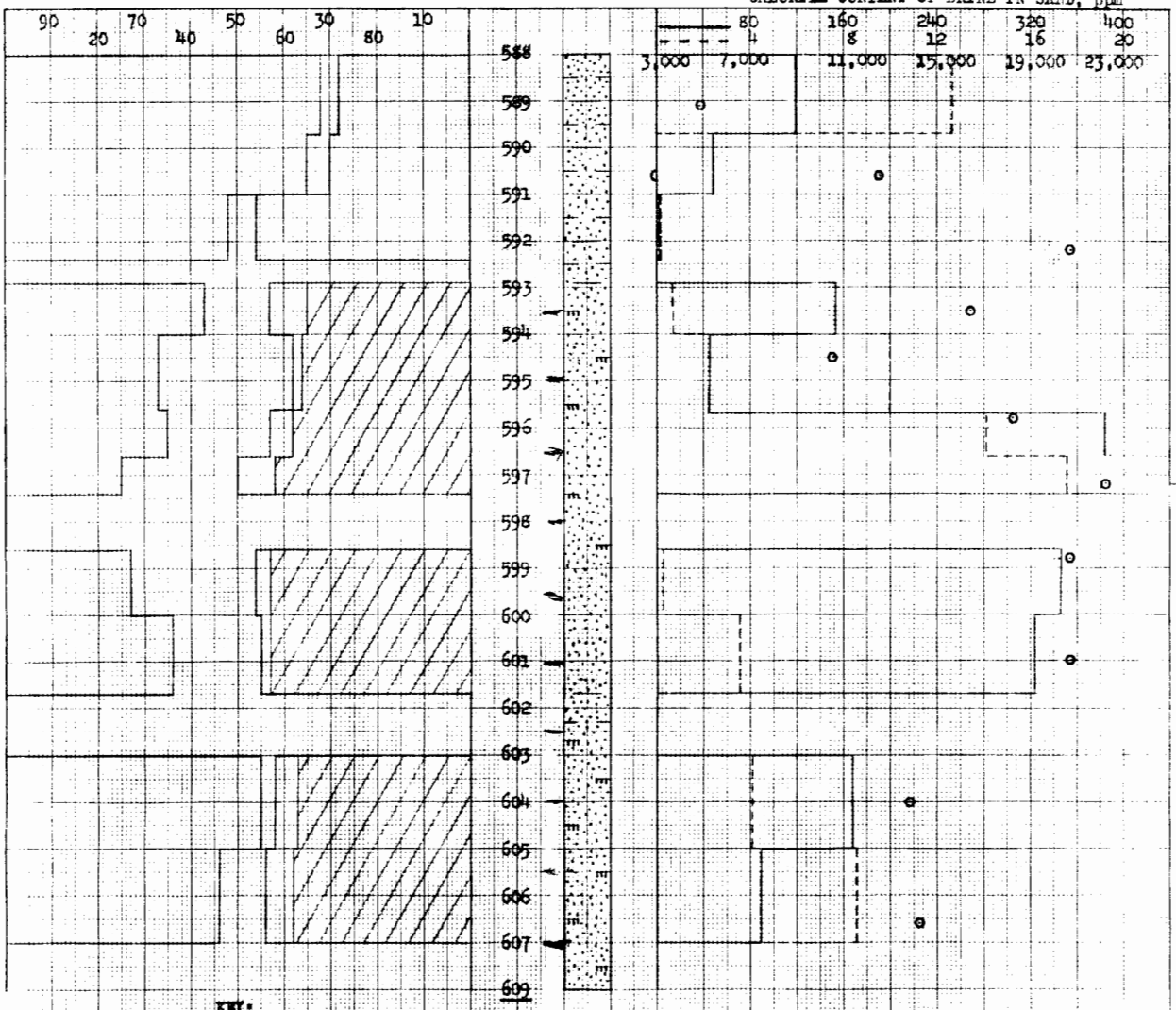
47 1512

WATER SAT., PERCENT → ← OIL SAT., PERCENT

PERMEABILITY, IN MILLIDARCYS

EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS

CHLORIDE CONTENT OF BRINE IN SAND, ppm



955

KEY:

- SANDSTONE
- SHALY SANDSTONE
- CALCAREOUS SANDSTONE
- FLOODPOT RESIDUAL OIL SATURATION
- IMPERMEABLE TO WATER

COMPTON INDUSTRIES

A & K LEASE WELL NO. 7 - C

BOURBON 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
583.0 - 592.4	4.4	18.5	34.3	60.8	60.5	
592.9 - 607.0	11.6	21.7	43.5	39.3	253.2	
583.0 - 607.0	16.0	20.8	40.9	45.2	200.2	3,740 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
JANUARY, 1950 HR

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

January 31, 1980

Compton Industries
P.O. Box 437
Moran, Kansas 66755

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the A & K Lease, Well No. 7-C, Bourbon County, Kansas, and submitted to our laboratory on January 2, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/tem
5 c to Moran, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Compton Industries Lease A & K Well No. 7-C

Location - Sw Sw SE by Ralph

Section 27 Twp. 23 Rge. 22 County Bourbon State Kansas

Elevation, Feet	-
Name of Sand	-
Top of Core	588.0
Bottom of Core	609.0
Top of Sand	588.0
Bottom of Sand (Tested)	607.0
Total Feet of Permeable Sand (Tested)	16.0
Total Feet of Floodable Sand (Tested)	11.6

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 5	1.4	1.4
5 - 100	4.9	6.3
100 - 200	4.8	11.1
300 - 400	4.1	15.2
900 - 1000	0.8	16.0

Average Permeability Millidarcys	200.2
Average Percent Porosity	20.8
Average Percent Oil Saturation	40.9
Average Percent Water Saturation	45.2
Average Oil Content, Bbls./A. Ft.	659.
Total Oil Content, Bbls./Acre	10,544.
Average Percent Oil Recovery by Laboratory Flooding Tests	4.6
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	76.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	885.
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
588.0 - 589.7	Light brown slightly shaly sandstone.
589.7 - 592.4	Brown slightly laminated shaly sandstone.
592.4 - 592.9	Light brown shaly sandstone.
592.9 - 595.6	Brown slightly calcareous sandstone.
595.6 - 597.4	Brown sandstone.
597.4 - 598.6	Brown slightly calcareous sandstone.
598.6 - 601.7	Dark brown sandstone.
601.7 - 602.3	Brown shaly sandstone.
602.3 - 609.0	Brown slightly calcareous sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 885 barrels of oil per acre was obtained from 11.6 feet of sand. The weighted average percent oil saturation was reduced from 43.1 to 38.5, or represents an average recovery of 4.6 percent. The weighted average effective permeability of the samples is 6.61 millidarcys, while the average initial fluid production pressure is 27.5 pounds per square inch (See Table V).

Please note that the coregraph now presents residual oil saturation instead of recovery, as in the past.

By observing the data given in Table IV, you will note that of the 11 samples tested, 8 produced water and oil, and 2 samples 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 3,740 barrels of oil per acre. This is an average recovery of 322 barrels per acre foot from 11.6 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.04
Reservoir water saturation, percent, estimated	20.0
Average porosity, percent	21.6
Oil saturation after flooding, percent	38.5
Performance factor, percent, estimated	50.0
Net floodable sand, feet	11.6

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Compton Industries Lease A & K Well No. 7-C

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	589.1	28.6	28	68	96	623	118.	1.7	1.7	1059	200.60
2	590.6	10.0	30	65	95	233	49.	1.3	3.0	303	63.70
3	592.2	14.0	46	48	94	500	1.2	1.4	4.4	700	1.68
4	593.5	21.3	43	43	86	711	153.	1.1	5.5	782	168.30
5	594.5	23.2	38	33	71	684	46.	1.6	7.1	1094	73.60
6	595.8	20.4	43	35	78	681	384.	1.0	8.1	681	384.00
7	597.2	24.3	50	25	75	943	955.	0.8	8.9	754	764.00
8	598.8	22.6	46	27	73	807	346.	1.4	10.3	1130	484.40
9	600.9	21.3	45	36	81	744	324.	1.7	12.0	1265	550.80
10	604.0	20.3	42	55	97	661	167.	2.0	14.0	1322	334.00
11	606.6	21.3	44	46	90	727	89.	2.0	16.0	1454	178.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Compton Industries Lease A & K Well No. 7-C

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
588.0 - 592.4	4.4	60.5	265.98
592.9 - 607.0	11.6	253.2	2937.10
588.0 - 607.0	16.0	200.2	3203.08

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
588.0 - 592.4	4.4	18.5	34.3	60.8	469	2,062
592.9 - 607.0	11.6	21.7	43.5	39.3	731	8,482
588.0 - 607.0	16.0	20.8	40.9	45.2	659	10,544

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Compton Industries **Lease** A & K **Well No.** 7-C

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	589.1	28.4	28	617	0	0	28	62	617	161	12.69	10
2	590.6	10.3	30	240	0	0	30	66	240	0	Imp.	-
3	592.2	14.2	46	507	0	0	46	50	507	10	0.15	40
4	593.5	21.0	43	701	8	130	35	63	571	43	0.67	35
5	594.5	23.1	38	681	2	36	36	56	645	180	10.00	30
6	595.8	20.8	43	694	5	81	38	56	613	232	14.14	20
7	597.2	24.4	50	946	8	151	42	43	795	295	17.56	15
8	598.8	22.6	46	807	3	53	43	43	754	26	0.22	40
9	600.9	21.5	45	751	2	33	43	48	718	184	3.52	30
10	604.0	20.0	42	652	5	78	37	60	574	271	4.12	30
11	606.6	21.1	44	720	6	98	38	60	622	383	8.58	20

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 Compton Industries Lease A & K Well No. 7-C

Depth Interval, Feet	592.9 - 607.0
Feet of Core Analyzed	11.6
Average Percent Porosity	21.6
Average Percent Original Oil Saturation	43.1
Average Percent Oil Recovery	4.6
Average Percent Residual Oil Saturation	38.5
Average Percent Residual Water Saturation	54.4
Average Percent Total Residual Fluid Saturation	92.9
Average Original Oil Content, Bbls./A. Ft.	729.
Average Oil Recovery, Bbls./A. Ft.	76.
Average Residual Oil Content, Bbls./A. Ft.	653.
Total Original Oil Content, Bbls./Acre	8,462.
Total Oil Recovery, Bbls./Acre	885.
Total Residual Oil Content, Bbls./Acre	7,577.
Average Effective Permeability, Millidarcys	6.61
Average Initial Fluid Production Pressure, p.s.i.	27.5

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

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RESULTS OF WATER DIFFERENTIATION TESTS

TABLE VI

Company Compton Industries Lease A & K Well No. 7-C

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Percent Water Saturation		
			Connate	Drilling & Foreign	Total
1	589.1	4,885			
2	590.6	12,587			
3	592.2	20,732			
4	593.5	16,446			
5	594.5	10,633			
6	595.8	18,207			
7	597.2	22,243			
8	598.8	20,700			
9	600.9	20,788			
10	604.0	13,821			
11	606.6	14,247			

Note: ppm — parts per million