OILFIELD RESEARCH LABORATORIES

536 NORTH HIGHLAND - CHANUTE, KANSAS - PHONE HE1-2650

March 12, 1966

15-28-20E

Colorado Drilling Company
c/o Mr. Clyde G. Kissenger
2432 South Downing Street
Box 8878
Denver, Colorado

Gentlemen:

Enclosed herewith is the report of the analysis of the Rotary core taken from the Schumish (Babcock) Lease, Well No. 26, Neosho County, Kansas, and submitted to our laboratory on March 8, 1966.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Carl L. Pate

CLP:rf

5 c. - Chanute, Kansas

SCHUMISH (BABCOCK) 26

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Colorado Drilling Company Lease Schumish(Babcock) Well No. 26

Location 3780' EWL & 1815' NSL

Section 15 Twp. 28S Rge. 20E County Neosho State Kansas

Name of Sand	Bartlesville
Top of Core	484.0
Bottom of Core	495.0
Top of Sand (Cored)	484.0
Bottom of Sand	493.2
Total Feet of Permeable Sand	7.4
Total Feet of Floodable Sand	4.3

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 5	2.8	2.8
5 - 10	2.7	5.5
10 & above	1.9	7.4

Average Permeability Millidarcys	7.7
Average Percent Porosity	17.6
Average Percent Oil Saturation	43.1
Average Percent Water Saturation	28.1
Average Oil Content, Bbls./A. Ft.	588.
Total Oil Content, Bbls./Acre	4,348.
Average Percent Oil Recovery by Laboratory Flooding Tests	6.9
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	98.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	351.
Total Calculated Oil Recovery, Bbls./Acre (Primary & Secondary)	1,290.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

Water was used as a circulating fluid in the coring of the sand in this well. This well was drilled in a virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
484.0 - 485.0	Light brown, shaly sandstone.
485.0 - 485.2	Shale.
485.2 - 488.8	Brown, shaly sandstone.
488.8 - 490.4	Gray sandy limestone.
490.4 - 493.2	Brown to dark, slightly carbonaceous, shaly sandstone.
493.2 - 495.0	Shale.

Coring was started at a depth of 484.0 feet in light brown, shaly sandstone and completed at 495.0 feet in shale. This core shows a total of 7.4 feet of sandstone. For the most part, the pay is made up of brown, shaly sandstone.

PERMEABILITY

The weighted average permeability of the cored section is 7.7 millidarcys (See Table III). By observing the data given on the core-graph, it is noticeable that the sand has a somewhat irregular permeability profile. The permeability of the sand varies from 3.6 to a maximum of 15. millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a good weighted average percent oil saturation, namely, 43.1. The weighted average percent water saturation of the cored section is 28.1 (See Table III). This gives an over-

all weighted average total fluid saturation of 71.2 percent. This rather low total fluid saturation indicates some fluid was lost during coring which was probably oil.

The weighted average oil content of the cored section is 588 barrels per acre foot. The total oil content, as shown by this core, is 4,348 barrels per acre (See Table III).

LABORATORY FLOODING TESTS

The sand in this core did not respond very well to laboratory flooding tests, as a total recovery of 351 barrels of oil per acre was obtained from 3.6 feet of sand. The weighted average percent oil saturation was reduced from 42.7 to 35.8, or represents an average recovery of 6.9 percent. The weighted average effective permeability of the samples is 1.10 millidarcys, while the average initial fluid production pressure is 42.8 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 8 samples tested, 5 produced water and 4 oil. This indicates that approximately 50 percent of the sand represented by these samples is floodable pay sand. The tests also show that the sand is tight for its depth.

CONCLUSION

On the basis of the above data, we estimate that approximately 1,290 barrels of oil per acre can be recovered from the area represented by this core by efficient water-flooding provided the sand will take an ample volume of water satisfactorily. The following data and assumptions were used in calculating the above oil recovery value:

Original formation volume factor	1.04
Present formation volume factor	1.04
Irreducible water saturation, percent	22.0
Primary recovery, estimated, percent	None
Present oil saturation, percent	76.5
Average porosity, percent	17.6
Oil saturation after flooding, percent	35.8
Performance factor	0.55
Net floodable pay sand, feet	4.3

This core shows a rather thin sand section having a good oil saturation and a low water saturation and permeability.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Colorado Drilling Company Lease Schumisch (Babcock) Well No. 26

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	484.6	16.4	45	28	73	574	4.2	1.0	1.0	574	4.20
2	485.6	19.3	45	19	64	675	15.	0.9	1.9	608	13.50
3	486.6	15.1	41	36	77	481	5.1	1.0	2.9	481	5.10
4	487.6	18.9	40	23	63	588	6.5	1.0	3.9	588	6.50
5	488.6	19.1	36	20	56	535	9.0	0.7	4.6	374	6.30
6	490.6	17.6	46	29	75	630	3.6	0.7	5.3	441	2.52
7	491.6	17.8	45	33	78	624	14.	1.0	6.3	624	14.00
8	492.6	17.1	45	33	78	598	4.4	1.1	7.4	658	4.84
								Total		4,348	

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Colorado Drilling Company Lease Schumish(Babcock) Well No. 26

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
484.0 - 493.2	7.4	7.7	56.90

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
484.0 - 493.2	7.4	17.6	43.1	28.1	588	4,348

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Colorado Drilling Company Lease Schumisch (Babcock) Well No. 26

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	484.6	16.0	42	522	0	0	42	33	522	0	Imp.	-
2	485.6	19.2	45	671	12	179	33	59	492	118	3.43	40
3	486.6	15.6	41	496	2	24	39	52	472	5	0.245	50
4	487.6	18.5	40	575	7	101	33	55	474	14	0.337	40
5	488.6	18.6	35	505	0	0	35	55	505	9	0.245	50
6	490.6	17.2	46	614	7	93	39	55	521	21	0.408	40
7	491.6	17.5	42	570	0	0	42	39	570	0	Imp.	-
8	492.6	17.3	41	550	0	0	41	40	550	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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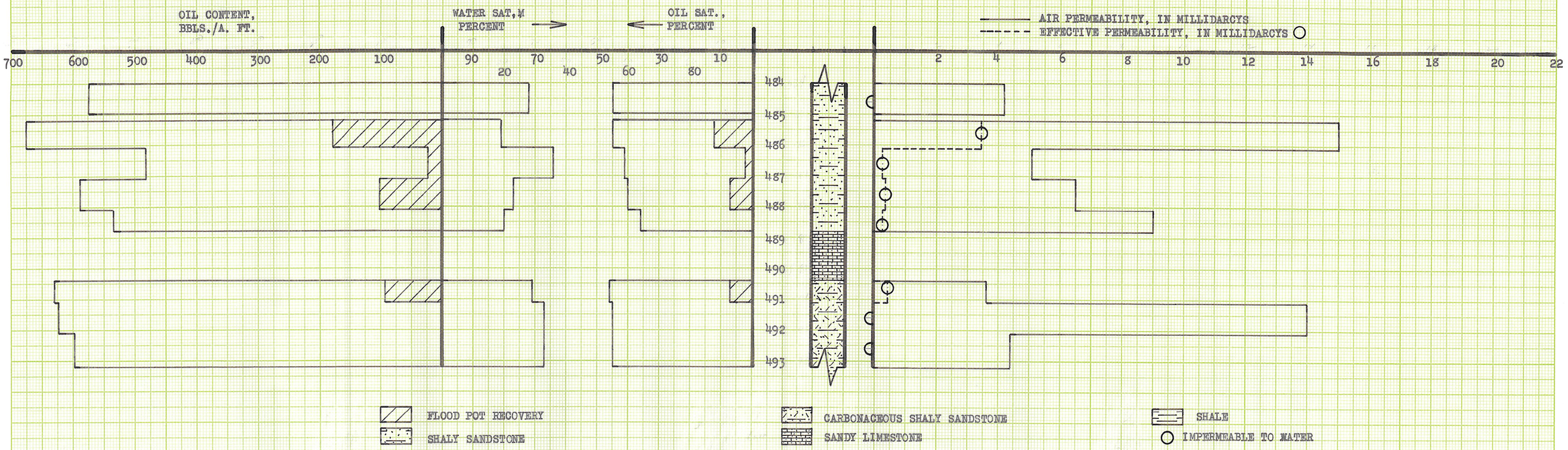
SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company Colorado Drilling Company Lease Schumish (Babcock) Well No. 26

Depth Interval, Feet	485.2 - 491.1
Feet of Core Analyzed	7.4
Average Percent Porosity	17.6
Average Percent Original Oil Saturation	42.7
Average Percent Oil Recovery	6.9
Average Percent Residual Oil Saturation	35.8
Average Percent Residual Water Saturation	55.2
Average Percent Total Residual Fluid Saturation	91.0
Average Original Oil Content, Bbls./A. Ft.	586.
Average Oil Recovery, Bbls./A. Ft.	98.
Average Residual Oil Content, Bbls./A. Ft.	488.
Total Original Oil Content, Bbls./Acre	2,105.
Total Oil Recovery, Bbls./Acre	351.
Total Residual Oil Content, Bbls./Acre	1,754.
Average Effective Permeability, Millidarcys	1.10
Average Initial Fluid Production Pressure, p.s.i.	42.8

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



COLORADO DRILLING COMPANY

SCHUMISH (BABCOCK) LEASE WELL NO. 26

NEOSHO COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE POROSITY, PERCENT	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVG. OIL CONTENT BBLS./A.FT.	TOTAL OIL CONTENT BBLS./ACRE	AVG. AIR PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY, BBLS./ACRE
484.0 - 493.2	7.4	17.6	43.1	28.1	588	4,348	7.7	1,290(Primary & Secondary)

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GHANUTE, KANSAS
MARCH, 1966

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6