

2622-14E  
Burke O-1



# OILFIELD RESEARCH LABORATORIES

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

October 23, 1968

Russell Operating Company  
614 Adolphus Tower  
Dallas, Texas 75202

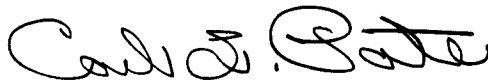
Gentlemen:

Enclosed herewith is the report of the analysis of the Rotary core taken from the Burke Lease, Well No. O-1, Anderson County, Kansas, and submitted to our laboratory on October 19, 1968.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Carl L. Pate

CLP:bl

2 c. - Dallas, Texas  
2 c. - Houston, Texas  
1 c. - Chanute, Kansas  
1 c. - Iola, Kansas

- REGISTERED ENGINEERS -

CORE ANALYSIS - WATER ANALYSIS - REPRESSURING ENGINEERING - SURVEYING & MAPPING - PROPERTY EVALUATION & OPERATION

# Oilfield Research Laboratories

## GENERAL INFORMATION & SUMMARY

Company Russell Operating Company Lease Burke Well No. 0-1

Location 1,625' FNL & 275' FWL, NW $\frac{1}{4}$

Section 26 Twp. 22S Rge. 19E County Anderson State Kansas

Name of Sand	-	Squirrel
Top of Core	-	796.0
Bottom of Core	-	813.1
Permeable		
Top of Sand	-	798.6
Permeable		
Bottom of Sand	-	808.6
Total Feet of Permeable Sand	-	7.6
Total Feet of Floodable Sand	-	1.5

**Distribution of Permeable Sand:**

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 3	4.0	4.0
3 - 10	2.1	6.1
10 & above	1.5	7.6

Average Permeability Millidarcys	-	6.0
Average Percent Porosity	-	14.4
Average Percent Oil Saturation	-	39.2
Average Percent Water Saturation	-	46.1
Average Oil Content, Bbls./A. Ft.	-	442.
Total Oil Content, Bbls./Acre	-	6,638.
Average Percent Oil Recovery by Laboratory Flooding Tests	-	22.8
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	-	354.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	-	531.
(Primary & Secondary)		
Total Calculated Oil Recovery, Bbls./Acre	-	578.
Packer Setting, Feet	-	
Viscosity, Centipoises @	-	
A. P. I. Gravity, degrees @ 60 °F	-	
Elevation, Feet	-	

A fresh water mud was used as a circulating fluid in the coring of the sand in this well. This well was drilled in a semi-virgin area. The core was sampled and submitted to our laboratory 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>
796.0 - 797.0	Gray sandy shale.
797.0 - 804.0	Grayish light brown laminated shaly slightly calcareous sandstone.
804.0 - 805.5	Brown fine grained micaceous slightly shaly sandstone.
805.5 - 812.0	Grayish light brown laminated shaly sandstone.
812.0 - 813.1	Gray sandy shale.

Coring was started at a depth of 796.0 feet in gray sandy shale and completed at 813.1 feet in the same type of material. This core shows a total of 15.0 feet of sandstone. The pay is made up of brown fine grained micaceous slightly shaly sandstone.

#### PERMEABILITY

For the sake of distribution, the core was divided into two sections. The weighted average permeability of the upper and lower sections is 2.5 and 8.3 millidarcys respectively; the overall average being 6.0 (See Table III). By observing the data given on the coregraph, it is noticeable that the sand has a very irregular permeability profile. The permeability of the sand varies from impermeable to a maximum of 23.0 millidarcys.

#### PERCENT SATURATION & OIL CONTENT

The sand in this core shows a fairly good weighted average percent oil

saturation, namely, 39.2. The weighted average percent oil saturation of the upper and lower sections is 38.1 & 40.2 respectively. The weighted average percent water saturation of the upper and lower sections is 47.9 and 45.5 respectively; the overall average being 46.1 (See Table III). This gives an overall weighted average total fluid saturation of 85.3 percent.

The weighted average oil content of the upper and lower sections is 345 and 528 barrels per acre foot respectively; the overall average being 442. The total oil content, as shown by this core, is 6,638 barrels per acre (See Table III).

#### LABORATORY FLOODING TESTS

Some of the sand in this core responded very well to laboratory flooding tests, as a total recovery of 531. barrels of oil per acre was obtained from 1.5 feet of sand. The weighted average percent oil saturation was reduced from 54.0 to 31.2, or represents an average recovery of 22.8 percent. The weighted average effective permeability of the samples is 0.72 millidarcys, while the average initial fluid production pressure is 30.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 14 samples tested, 2 produced water and oil. This indicates that approximately 14 percent of the sand represented by these samples is floodable pay sand.

#### CONCLUSION

On the basis of the above data, we estimate that approximately 568 barrels of oil per acre or an average of 379 barrels per acre foot can

be recovered from the area, represented by this core, by efficient primary and waterflood operations. The following data and assumptions were used in calculating the above oil recovery value:

Original formation volume factor	1.06
Irreducible water saturation, percent	16.0
Primary recovery, estimated, percent	None
Average porosity, percent	20.3
Oil saturation after flooding, percent	31.2
Performance factor, percent	50.0
Net floodable pay sand, feet	1.5

This core shows a shaly sand section having a fairly good oil saturation, a moderate water saturation, and a low permeability and porosity. Apparently this well was drilled near the edge of the trend.

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**RESULTS OF SATURATION & PERMEABILITY TESTS**

**TABLE 1-B**

Company Russell Operating Company Lease Burke Well No. 0-1

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	798.1	9.9	44	53	97	338	Imp.	1.6	1.6	541	0.00
2	799.1	11.3	36	60	96	316	1.2	1.0	2.6	316	1.20
3	800.1	8.9	32	47	79	221	2.7	1.0	3.6	221	2.70
4	801.1	10.8	49	46	95	411	3.6	1.0	4.6	411	3.60
5	802.1	12.9	33	37	70	330	Imp.	1.0	5.6	330	0.00
6	803.1	16.7	33	43	76	427	Imp.	1.4	7.0	598	0.00
7	804.1	20.0	57	23	80	884	14.	0.6	7.6	530	8.40
8	805.1	20.6	52	20	72	831	23.	0.9	8.5	748	20.70
9	806.1	17.7	48	32	80	659	5.0	1.1	9.6	725	5.50
10	807.1	15.7	37	47	84	451	2.5	1.0	10.6	451	2.50
11	808.1	15.1	31	52	83	363	1.0	1.0	11.6	363	1.00
12	809.1	14.4	30	60	90	335	Imp.	1.0	12.6	335	0.00
13	810.1	16.2	38	58	96	478	Imp.	1.0	13.6	478	0.00
14	811.1	14.7	37	57	94	422	Imp.	1.4	15.0	591	0.00

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## RESULTS OF LABORATORY FLOODING TESTS

### TABLE IV

Company Russell Operating Company Lease Burke Well No. 0-1

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	798.1	10.2	41	324	0	0	41	57	324	0	Imp.	-
2	799.1	11.0	34	290	0	0	34	64	290	0	Imp.	-
3	800.1	9.3	29	209	0	0	29	52	209	0	Imp.	-
4	801.1	10.5	46	375	0	0	46	51	375	0	Imp.	-
5	802.1	12.5	31	301	0	0	31	45	301	0	Imp.	-
6	803.1	16.3	30	379	0	0	30	52	379	0	Imp.	-
7	804.1	19.6	57	867	24	365	33	64	502	29	0.52	30
8	805.1	20.3	52	820	22	347	30	65	473	59	0.86	30
9	806.1	17.3	45	604	0	0	45	40	604	0	Imp.	-
10	807.1	16.0	35	435	0	0	35	54	435	0	Imp.	-
11	808.1	14.7	33	377	0	0	33	54	377	0	Imp.	-
12	809.1	14.1	31	339	0	0	31	63	339	0	Imp.	-
13	810.1	15.8	35	429	0	0	35	63	429	0	Imp.	-
14	811.1	15.0	34	396	0	0	34	62	396	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	Russell Operating Company	Lease	Burke	Well No.	0-1
Depth Interval, Feet	797.0 - 812.0				
Feet of Core Analyzed	1.5				
Average Percent Porosity	20.1				
Average Percent Original Oil Saturation	54.0				
Average Percent Oil Recovery	22.8				
Average Percent Residual Oil Saturation	31.2				
Average Percent Residual Water Saturation	64.6				
Average Percent Total Residual Fluid Saturation	95.8				
Average Original Oil Content, Bbls./A. Ft.	839.				
Average Oil Recovery, Bbls./A. Ft.	354.				
Average Residual Oil Content, Bbls./A. Ft.	485.				
Total Original Oil Content, Bbls./Acre	1,258.				
Total Oil Recovery, Bbls./Acre	531.				
Total Residual Oil Content, Bbls./Acre	727.				
Average Effective Permeability, Millidarcys	0.72				
Average Initial Fluid Production Pressure, p.s.i.	30.0				

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