

# OILFIELD RESEARCH LABORATORIES

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October 23, 1980

James E. Russell Petroleum, Inc.  
P. O. Box 2618  
Abilene, Texas 79604

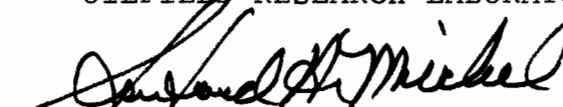
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary cores taken from the Unit #1, Albright (Peine) Lease, Well No. 0-10, located in Anderson County, Kansas and submitted to our laboratory on September 27, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

  
Sanford A. Michel

SAM/ks

3 c to Abilene, Texas  
2 c to Chanute, Kansas

# Oilfield Research Laboratories

## GENERAL INFORMATION & SUMMARY

James E. Russell Unit #1,  
 Company Petroleum, Inc. Lease Albright (Peine) Well No. 0-10  
 Location 2160' SNL & 500' EWL - SE $\frac{1}{4}$   
 Section 28 Twp. 22S Rge. 19 E County Anderson State Kansas

Elevation, Feet - Datum: Mean Sea Level (G.L.) - -

	1086.2	
Name of Sand - - - - -	Peru	Squirrel
Top of Core - - - - -	637.0	762.0
Bottom of Core - - - - -	657.5	782.0
Top of Sand - - - - - (Analyzed) - - - - -	637.0	762.0
Bottom of Sand - - - - -	643.7	780.6
Total Feet of Permeable Sand - - - - -	5.5	13.8
Total Feet of Floodable Sand - - - - -	3.4	11.7

Distribution of Permeable Sand:  
Permeability Range  
Millidarcys

	Feet	Cum. Ft.
<u>PERU SAND</u>		
2 - 11	4.6	4.6
11 & Above	0.9	5.5
<u>SQUIRREL SAND</u>		
0 - 2	4.1	4.1
6 - 85	5.0	9.1
85 & Above	4.7	13.8
Average Permeability Millidarcys - - - - -		16.0
Average Percent Porosity - - - - -		14.1
Average Percent Oil Saturation - - - - -		37.8
Average Percent Water Saturation - - - - -		46.1
Average Oil Content, Bbls./A. Ft. - - - - -		413.
Total Oil Content, Bbls./Acre - - - - -		2762.
Average Percent Oil Recovery by Laboratory Flooding Tests - - - - -		9.3
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - -		101.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - -		345.
Total Calculated Oil Recovery, Bbls./Acre - - - - -		2838.

See "Calculated Recovery" Section

Fresh water mud was used as the circulating fluid while taking these cores. The cores were sampled by a representative of Oilfield Research Laboratories. The well was drilled in non-virgin territory.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
	<u>PERU SAND</u>
637.0 - 638.2	Sandstone, light brown, laminated slightly calcareous. First oil show at 637.0.
638.2 - 639.1	Sandstone, light brown, slightly shaly, laminated, calcareous.
639.1 - 640.3	Sandstone, hard, grayish light brown, shaly, cal- careous.
640.3 - 642.3	Sandstone, brown, slightly calcareous.
642.3 - 642.8	Sandstone, light brown, calcareous shaly.
642.8 - 643.7	Sandstone, brown, slightly calcareous.
643.7 - 657.5	Shale, gray sandy.
	<u>SQUIRREL SAND</u>
762.0 - 765.3	Sandstone, grayish brown, laminated, very shaly. First oil show at 762.0.
765.3 - 773.7	Sandstone, dark brown, slightly calcareous.
773.7 - 779.1	Sandstone, brown, laminated, shaly.
779.1 - 780.6	Sandstone, grayish light brown, very shaly.
780.6 - 782.0	Shale, gray, sandy.

LABORATORY FLOODING TESTS

The sands in these cores responded to laboratory flooding tests. The weighted average percent oil saturation was reduced from 49.4 to 40.1 and from 44.8 to 28.8, representing average recoveries of 9.3 and 16.0 percent for the Peru and Squirrel sands respectively. The weighted average effective permeabilities of the sands are 1.61 and 17.2 millidarcys respectively.

CALCULATED RECOVERY

A study of the results of the laboratory indicate that efficient primary and waterflooding operations in the vicinity of this well should recover approximately 650 and 3300 barrels of oil per acre from the Peru and Squirrel sands respectively. These are average recoveries of 190 and 282 barrels per acre foot from 3.4 and 11.7 feet of floodable sand analyzed in these cores.

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

	<u>Peru</u>	<u>Squirrel</u>
Original formation volume factor, estimated	1.04	1.05
Reservoir water saturation, percent, estimated	25.0	30.0
Average porosity, percent	13.9	19.2
Oil saturation after flooding, percent	40.1	28.8
Performance factor, percent, estimated	55.0	50.0
Net floodable pay sand, feet	3.4	11.7

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE I-B

Company James E. Russell Petroleum, Inc. Lease Unit #1, Albright (Peine)

Well No. 0-10

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	637.5	19.6	23	55	78	PERU SAND	11.	1.2	420	13.20	
2	638.5	17.3	32	64	96	350	9.0	0.9	387	8.10	
3	639.5	6.9	23	67	90	123	Imp.	1.2	148	0.00	
4	640.5	14.0	52	29	81	565	10.	4.3	565	10.00	
5	641.5	13.9	38	25	63	410	9.4	1.0	410	9.40	
6	642.5	9.0	56	39	96	391	2.5	0.5	196	1.25	
7	643.5	16.3	56	35	91	708	51.	0.9	636	45.90	
<u>SQUIRREL SAND</u>											
8	762.5	17.0	47	38	85	620	Imp.	1.0	620	0.00	
9	763.5	15.0	30	61	91	349	Imp.	1.0	349	0.00	
10	764.5	15.6	18	76	94	218	Imp.	1.3	284	0.00	
11	765.5	16.8	44	49	93	574	384.	0.7	401	268.80	
12	766.5	21.6	56	35	91	938	130.	1.0	938	130.00	
13	767.5	18.6	56	34	90	808	20.	1.0	808	20.00	
14	768.5	17.5	59	36	95	801	199.	1.0	801	199.00	
15	769.5	21.3	37	52	89	611	84.	1.0	611	84.00	
16	770.5	20.1	44	53	97	686	195.	1.0	686	195.00	
17	771.5	23.1	37	59	96	663	324.	1.0	663	324.00	
18	772.5	21.6	32	60	92	536	40.	1.0	536	40.00	
19	773.5	18.2	46	42	88	650	12.	0.7	455	8.40	
20	774.5	13.3	36	55	91	371	6.2	1.3	483	8.06	
21	775.5	19.7	49	46	95	749	1.7	1.0	749	1.70	
22	776.5	17.8	44	47	91	608	1.0	1.0	608	1.00	
23	777.5	14.9	60	33	93	694	0.71	1.0	694	0.71	
24	778.5	13.3	31	60	91	320	1.1	1.1	352	1.21	
25	779.5	12.8	22	65	87	219	Imp.	1.0	219	0.00	
26	780.5	8.8	21	71	92	143	Imp.	0.5	72	0.00	

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## SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Inc. Lease Unit #1, Albright (Peine) Well No. 0-10

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
<u>PERU SAND</u>						
637.0 - 643.7	5.5			16.0	87.85	
<u>SQUIRREL SAND</u>						
762.0 - 777.0	11.7			109.4	1279.96	
777.0 - 780.6	2.1			0.91	1.92	
762.0 - 780.6	13.8			92.9	1281.88	
<u>PERU SAND</u>						
637.0 - 643.7	6.7	14.1	37.8	46.1	413	2,762
<u>SQUIRREL SAND</u>						
762.0 - 777.0	15.0	18.3	41.6	49.4	599	8,992
777.0 - 780.6	3.6	13.0	35.2	55.5	371	1,337
762.0 - 780.6	18.6	17.3	40.4	50.6	555	10,329

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## RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Inc. Lease Unit #1, Albright (Peine) Well No. 0-10

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	637.5	20.0	24	372	0	0	24	69	372	126	2.40	25
2	638.5	17.8	32	442	0	0	32	66	442	174	3.06	25
3	639.5	7.0	24	130	0	0	24	69	130	0	Imp.	-
4	640.5	14.3	52	577	10	111	42	55	466	57	0.75	25
5	641.5	13.7	38	404	3	32	35	63	372	178	3.75	25
6	642.5	8.6	56	374	12	80	44	55	294	34	0.60	35
7	643.5	16.6	56	721	14	180	42	52	541	51	0.75	25
<u>SQUIRREL SAND</u>												
8	762.5	17.2	46	614	0	0	46	40	614	0	Imp.	-
9	763.5	15.0	30	349	0	0	30	63	349	0	Imp.	-
10	764.5	15.3	21	249	0	0	21	78	249	0	Imp.	-
11	765.5	17.3	44	591	20	268	24	73	323	202	6.18	10
12	766.5	21.4	56	930	28	465	28	70	465	412	42.00	10
13	767.5	18.8	56	816	28	408	28	69	408	155	3.45	20
14	768.5	18.0	59	824	25	349	34	61	475	362	35.10	10
15	769.5	21.4	37	614	9	149	28	66	465	250	22.20	10
16	770.5	20.4	44	696	13	206	31	67	490	334	36.00	10
17	771.5	23.5	37	675	14	255	23	71	420	278	39.40	10
18	772.5	21.3	32	529	6	99	26	67	430	300	11.44	10
19	773.5	18.6	46	664	18	260	28	70	404	202	3.90	25
20	774.5	13.8	36	385	3	32	33	60	353	129	3.00	25
21	775.5	19.7	49	749	20	306	29	61	443	112	0.15	25
22	776.5	17.4	44	594	14	189	30	59	405	8	0.23	25
23	777.5	14.6	61	691	0	0	61	35	691	0	Imp.	-
24	778.5	13.3	30	310	0	0	30	62	310	0	Imp.	-
25	779.5	12.5	25	242	0	0	25	67	242	0	Imp.	-
26	780.5	9.0	21	147	0	0	21	75	147	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	James E. Russell Petroleum, Inc.	Unit #1, Lease Albright (Peine)	Well No. 0-10
Depth Interval, Feet	PERU SAND 637.0 - 643.7	SQUIRREL SAND 762.0 - 780.6	
Feet of Core Analyzed	3.4		11.7
Average Percent Porosity	13.9		19.2
Average Percent Original Oil Saturation	49.4		44.8
Average Percent Oil Recovery	9.3		16.0
Average Percent Residual Oil Saturation	40.1		28.8
Average Percent Residual Water Saturation	56.5		65.7
Average Percent Total Residual Fluid Saturation	96.6		94.5
Average Original Oil Content, Bbls./A. Ft.	535.		667.
Average Oil Recovery, Bbls./A. Ft.	101.		242.
Average Residual Oil Content, Bbls./A. Ft.	434.		425.
Total Original Oil Content, Bbls./Acre	1817.		7806.
Total Oil Recovery, Bbls./Acre	345.		2838.
Total Residual Oil Content, Bbls./Acre	1472.		4968.
Average Effective Permeability, Millidarcys	1.61		17.2

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