OILFIELD RESEARCH LABORATORIES

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

September 18, 1978

Walter D. Wells, Jr., Inc.
7757 San Felipe Rd.
Suite 200
Houston, Texas 77063

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the E. E. Cation Lease, Well No. 2, Allen County, Kansas, and submitted to our laboratory on September 8, 1978.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman

Benjamin R. Pearman

BRP:cb

5 c to Houston, Texas
1 c to Chanute, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Walter D. Wells, Jr., Inc. Lease E. E. Cation Well No. 2

Location 500' EWL & 1445' NSL SW¼

Section 30 Twp. 26S Rge. 20E County Allen State Kansas

Name of Sand	Tucker
Top of Core	742.0
Bottom of Core	783.6
Top of Sand (Analyzed)	755.8
Bottom of Sand (Analyzed)	772.0
Total Feet of Permeable Sand (Analyzed)	14.8
Total Feet of Floodable Sand (Analyzed)	13.5

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
3 – 100	5.3	5.3
100 – 200	5.6	10.9
200 – 400	3.0	13.9
400 & Above	0.9	14.8

Average Permeability Millidarcys	173.9
Average Percent Porosity	19.4
Average Percent Oil Saturation	37.4
Average Percent Water Saturation	41.1
Average Oil Content, Bbls./A. Ft.	564.
Total Oil Content, Bbls./Acre	8,344.
Average Percent Oil Recovery by Laboratory Flooding Tests	7.4
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	112.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	1,513.
Total Calculated Oil Recovery, Bbls./Acre (Primary & Secondary)	4,600.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

The core was sampled and the samples sealed in plastic bags by a representative of the client.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
742.0 - 748.3	Gray sandstone.
748.3 - 750.8	Gray laminated sandy shale.
750.8 - 755.4	Gray shaly sandstone.
755.4 - 755.8	Gray sandy shale.
755.8 - 756.1	Light brown laminated shaly sandstone.
756.1 - 756.8	Gray sandy shale.
756.8 - 757.8	Brown laminated slightly shaly sandstone.
757.8 - 766.4	Brown sandstone.
766.4 - 767.1	Gray sandy shale.
767.1 - 772.0	Brown sandstone.
772.0 - 782.5	Light brown sandstone.
782.5 - 783.0	Gray carbonaceous conglomeratic sandstone.
783.0 - 783.6	Light brown sandstone.

SUMMARY

A study of the results of the laboratory tests indicates that efficient primary and secondary operations in the vicinity of this well should recover approximately 4,600 barrels of oil per acre. This is an average recovery of 341 barrels per acre

foot from the 13.5 feet of floodable pay sand analyzed in this core.

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

Original formation volume factor	1.04
Reservoir water saturation, percent	25.0
Average porosity, percent	19.6
Oil saturation after flooding, percent	31.3
Performance factor, percent	55.0
Net floodable pay sand, feet	13.5

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Walter D. Wells, Jr., Inc. Lease E. E. Cation Well No. 2

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	756.0	18.6	33	47	80	476	3.8	0.3	0.3	143	1.14
2	757.5	16.7	22	60	82	285	55.	1.0	1.3	285	55.00
3	758.5	21.1	41	29	70	671	110.	1.2	2.5	805	132.00
4	759.5	19.1	42	33	75	622	77.	1.0	3.5	622	77.00
5	760.5	21.6	35	28	63	587	63.	1.0	4.5	587	63.00
6	761.5	16.4	37	45	82	471	38.	1.0	5.5	471	38.00
7	762.5	19.1	37	38	75	548	163.	1.0	6.5	548	163.00
8	763.5	19.4	39	40	79	587	147.	1.0	7.5	587	147.00
9	764.7	19.3	38	42	80	569	119.	1.0	8.5	569	119.00
10	765.5	18.2	46	38	84	650	70.	1.0	9.5	650	70.00
11	766.3	20.4	41	41	82	649	178.	0.4	9.9	260	71.20
12	767.5	20.4	38	51	89	601	588.	0.9	10.8	541	529.20
13	768.3	19.5	40	41	81	605	336.	1.0	11.8	605	336.00
14	769.5	20.6	37	41	78	591	373.	1.0	12.8	591	373.00
15	770.5	19.4	34	47	81	512	218.	1.0	13.8	512	218.00
16	771.7	19.8	37	45	82	568	184.	1.0	14.8	568	184.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Walter D. Wells, Jr., Inc. Lease E. E. Cation Well No. 2

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
755.8 - 766.4	9.9	94.6	936.34
767.1 - 772.0	4.9	334.3	1640.20
755.8 - 772.0	14.8	173.9	2576.54

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
755.8 - 766.4	9.9	19.1	37.5	39.3	559	5,527
767.1 - 772.0	4.9	19.9	37.2	44.8	574	2,817
755.8 - 772.0	14.8	19.4	37.4	41.1	564	8,344

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Walter D. Wells, Jr., Inc. Lease E. E. Cation Well No. 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.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
1	756.0	18.1	34	477	0	0	34	51	477	0	Imp.	-
2	757.5	16.4	22	280	0	0	22	65	280	7	0.22	40
3	758.5	20.7	41	658	12	192	29	61	466	63	1.76	30
4	759.5	19.3	42	629	9	135	33	63	494	299	12.20	20
5	760.5	20.2	35	549	4	63	31	68	486	110	3.36	20
6	761.5	16.7	37	479	6	78	31	68	401	229	6.10	25
7	762.5	19.4	37	556	8	120	29	62	436	214	19.18	20
8	763.5	19.4	39	586	6	90	33	64	496	181	15.10	20
9	764.7	19.4	38	571	8	120	30	66	451	303	11.53	20
10	765.5	18.6	46	663	11	159	35	60	504	285	14.53	20
11	766.3	20.8	41	661	7	112	34	64	549	294	26.70	20
12	767.5	20.8	38	613	7	112	31	64	501	275	23.00	20
13	768.3	20.0	40	620	10	155	30	59	465	157	17.25	20
14	769.5	20.2	37	579	7	110	30	67	469	319	11.50	20
15	770.5	19.0	34	500	4	59	30	66	441	223	5.72	20
16	771.7	20.5	37	588	3	48	34	64	540	195	18.55	10

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 Walter D. Wells, Jr., Inc. Lease E. E. Cation Well No. 2

Depth Interval, Feet	755.8 - 766.4	767.1 - 772.0	755.8 - 772.0
Feet of Core Analyzed	8.6	4.9	13.5
Average Percent Porosity	19.3	20.1	19.6
Average Percent Original Oil Saturation	39.6	37.2	38.7
Average Percent Oil Recovery	8.1	6.2	7.4
Average Percent Residual Oil Saturation	31.5	31.0	31.3
Average Percent Residual Water Saturation	63.9	64.0	63.9
Average Percent Total Residual Fluid Saturation	95.4	95.0	95.2
Average Original Oil Content, Bbls./A. Ft.	591.	581.	588.
Average Oil Recovery, Bbls./A. Ft.	121.	97.	112.
Average Residual Oil Content, Bbls./A. Ft.	470.	484.	476.
Total Original Oil Content, Bbls./Acre	5,088.	2,839.	7,927.
Total Oil Recovery, Bbls./Acre	1,040.	473.	1,513.
Total Residual Oil Content, Bbls./Acre	4,048.	2,366.	6,414.
Average Effective Permeability, Millidarcys	11.03	15.06	12.50
Average Initial Fluid Production Pressure, p.s.i.	21.7	18.0	20.4

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