OIL FIELD RESEARCH LABORATORIES
CHANUTE, KANSAS

E. Ware A-9

December 14, 1951

Oko Oil & Gas Company
Atlas Life Building
Tulsa, Oklahoma

Attention: Mr. T. F. Lawry

Gentlemen:

Enclosed herewith is the report of the partial analysis of the 3" Rotary core taken from your E. Ware Lease, Well No. A-9, Anderson County, Kansas, and submitted to our laboratory on December 6, 1951.

In calculating the recovery for the vicinity of this well, an allowance was made for oil lost during coring. It was assumed that the true water saturation of the sand is 38 percent and that the sand is not pressured up.

Very truly yours,

OIL FIELD RESEARCH LABORATORIES

Clayton A. Nattier

CAN:mm

c.c. to Mr. D. K. Auld
Garnett, Kansas

OKO OIL & GAS COMPANY

CORE ANALYSIS REPORT

E. WARE LEASE WELL NO. A-9

ANDERSON COUNTY, KANSAS

OIL FIELD RESEARCH LABORATORIES

CHANUTE, KANSAS

DECEMBER 14, 1951

Oil Field Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Ohio Oil & Gas Company Lease E. Ware Well No. A-9

Location NE¼

Section 13 Twp. 21S Rge. 20E County Anderson State Kansas

Name of Sand	Squirrel
Top of Core	790.00
Bottom of Core	839.50
Top of Sand	790.00
Bottom of Sand	829.25
Total Feet of Permeable Sand	21.70
Total Feet of Floodable Sand	21.30

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.

Average Effective Permeability Millidarcys	1.03
Average Percent Porosity	17.51
Average Percent Oil Saturation	34.89
Average Percent Water Saturation	-
Average Oil Content, Bbls./A. Ft.	478.
Total Oil Content, Bbls./Acre	12,646.
Average Percent Oil Recovery by Laboratory Flooding Tests	7.50
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	108.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	2,328.
Total Calculated Oil Recovery, Bbls./Acre	3,100
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	1180.0

OIL FIELD RESEARCH LABORATORIES
CHANUTE, KANSAS

LOG

Company Oko Oil & Gas Company Lease E. Ware Well No. A-9

Depth Interval, Feet	Description
790.00 - 791.05	Brown fine grained laminated micaceous shaley sandstone.
791.05 - 791.90	Finely laminated sandy shale.
791.90 - 792.20	Brown fine grained laminated micaceous shaley sandstone.
792.20 - 793.85	Finely laminated sandy shale.
793.85 - 794.95	Gray sandy shale.
794.95 - 795.55	Finely laminated sandy shale.
795.55 - 796.10	Brown fine grained finely laminated micaceous shaley sandstone.
796.10 - 796.35	Brown fine grained slightly laminated micaceous shaley sandstone.
796.35 - 799.25	Brown fine grained laminated micaceous shaley sandstone.
799.25 - 799.45	Finely laminated sandy shale.
799.45 - 799.60	Finely laminated shale and sandstone.
799.60 - 800.10	Brown fine grained slightly laminated micaceous shaley sandstone.
800.10 - 802.65	Brown fine grained laminated micaceous shaley sandstone.
802.65 - 803.05	Finely laminated sandy shale.
803.05 - 803.25	Brown fine grained laminated micaceous shaley sandstone.
803.25 - 803.85	Finely laminated sandy shale.
803.85 - 804.10	Brown fine grained laminated micaceous shaley sandstone.
804.10 - 804.70	Finely laminated sandy shale.
804.70 - 806.10	Brown fine grained laminated micaceous shaley sandstone.
806.10 - 806.40	Brown fine grained slightly laminated micaceous shaley sandstone.
806.40 - 806.75	Laminated sandstone and shale.
806.75 - 808.30	Brown fine grained laminated micaceous shaley sandstone.

808.30 - 808.50 - Finely laminated sandy shale.

808.50 - 809.00 - Brown fine grained micaceous sandstone.

809.00 - 809.30 - Gray sandy shale.

809.30 - 809.55 - Brown fine grained micaceous sandstone.

809.55 - 810.20 - Finely laminated sandstone and shale.

810.20 - 810.45 - Finely laminated shale and sandstone.

810.45 - 810.80 - Finely laminated sandstone and shale.

810.80 - 811.05 - Brown fine grained laminated micaceous shaley sandstone.

811.05 - 812.10 - Brown fine grained micaceous sandstone.

812.10 - 812.55 - Brown fine grained laminated micaceous shaley sandstone.

812.55 - 812.80 - Brown fine grained finely laminated micaceous shaley sandstone.

812.80 - 813.00 - Brown fine grained laminated micaceous shaley sandstone.

813.00 - 813.70 - Brown fine grained slightly laminated micaceous shaley sandstone.

813.70 - 813.90 - Brown fine grained laminated micaceous shaley sandstone.

813.90 - 815.00 - Loss.

815.00 - 815.40 - Brown fine grained micaceous sandstone.

815.40 - 815.80 - Finely laminated shale and sandstone.

815.80 - 815.95 - Finely laminated sandy shale.

815.95 - 816.25 - Laminated shale and sandstone.

816.25 - 816.40 - Brown fine grained laminated micaceous shaley sandstone.

816.40 - 817.85 - Finely laminated sandy shale.

817.85 - 818.85 - Brown fine grained laminated micaceous shaley sandstone.

818.85 - 819.10 - Brown fine grained slightly laminated micaceous shaley sandstone.

819.10 - 819.80 - Brown fine grained micaceous sandstone.

819.80 - 820.45 - Finely laminated sandy shale.

820.45 - 820.75 - Brown fine grained slightly laminated micaceous shaley sandstone.

820.75 - 820.95 - Finely laminated sandy shale.

820.95 - 821.40 - Finely laminated sandstone and shale.

821.40 - 821.75 - Brown fine grained laminated micaceous shaley sandstone.

821.75 - 822.05 - Finely laminated sandy shale.

822.05 - 822.90 - Brown fine grained micaceous sandstone.

822.90 - 823.15 - Brown fine grained laminated micaceous carbonaceous sandstone.

823.15 - 826.20 - Brown fine grained micaceous sandstone.

826.20 - 826.40 - Brown fine grained micaceous sandstone containing a shale inclusion.

826.40 - 826.85 - Brown fine grained micaceous sandstone.

826.85 - 827.15 - Brown fine grained laminated micaceous shaley sandstone.

827.15 - 828.00 - Brown fine grained laminated micaceous carbonaceous sandstone.

828.00 - 828.30 - Brown fine grained slightly laminated micaceous carbonaceous sandstone.

828.30 - 829.25 - Brown fine grained micaceous carbonaceous sandstone.

829.25 - 830.00 - Gray calcareous shale.

830.00 - 839.30 - According to log, black shale (Discarded at well).

Oil Field Research Laboratories

RESULTS OF SATURATION TESTS

TABLE III

Company Oko Oil & Gas Company Lease E. Ware Well No. A-9

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content, Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
1	790.90	15.6	27.4	-	-	332	1.05	1.05	348
2	791.80	11.8	30.8	-	-	282	0.85	1.90	240
3A	792.10	16.7	27.1	-	-	351	0.30	2.20	105
6	796.20	20.0	25.7	-	-	399	0.25	2.45	100
7	797.20	18.2	29.3	-	-	414	1.35	3.80	560
8	798.25	17.9	29.1	-	-	405	1.00	4.80	405
9	799.15	18.3	30.6	-	-	435	0.55	5.35	239
10	799.70	20.5	28.7	-	-	457	0.50	5.85	229
11	800.68	15.2	31.7	-	-	374	1.15	7.00	430
12	801.80	16.1	28.9	-	-	361	1.40	8.40	506
13	802.95	15.3	23.8	-	-	283	0.40	8.80	113
14	803.95	16.0	31.8	-	-	395	0.25	9.05	99
15	805.15	18.8	43.5	-	-	635	1.40	10.45	890
16	806.25	18.0	48.6	-	-	680	0.30	10.75	204
17	807.25	17.8	49.4	-	-	683	0.90	11.65	615
18	808.10	15.8	31.3	-	-	384	0.65	12.30	250
19	808.25	19.0	48.1	-	-	710	0.50	12.80	355
20	810.05	13.9	26.8	-	-	289	0.65	13.45	188
21	810.95	14.0	20.2	-	-	220	0.25	13.70	55

Oil Field Research Laboratories

RESULTS OF SATURATION TESTS

TABLE III

Company Oko Oil & Gas Company Lease E. Ware Well No. 4-9

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content, Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
22	811.95	18.6	55.4	-	-	800	1.05	14.75	840
23	812.70	15.6	26.3	-	-	319	0.25	15.00	80
24	813.12	19.8	51.8	-	-	796	0.35	15.35	279
25	813.60	17.6	47.5	-	-	648	0.35	15.70	227
26A	815.30	20.8	36.8	-	-	594	0.40	16.10	238
27	816.08	14.3	29.6	-	-	328	0.30	16.40	98
28A	816.35	14.0	17.2	-	-	187	0.15	16.55	28
29	817.40	14.7	33.7	-	-	385	0.85	17.40	327
30	818.20	18.2	34.7	-	-	490	1.00	18.40	490
31	818.98	18.5	32.0	-	-	460	0.25	18.65	115
32	819.65	22.0	33.8	-	-	577	0.70	19.35	404
33	820.60	18.5	48.6	-	-	698	0.30	19.65	209
34	821.53	16.1	32.4	-	-	405	0.35	20.00	142
35	822.16	21.0	33.6	-	-	548	0.40	20.40	219
36	822.78	20.5	31.2	-	-	496	0.45	20.85	224
37	823.45	18.4	28.6	-	-	409	0.70	21.55	286
38	824.28	18.6	28.0	-	-	404	0.75	22.30	303
39	824.90	18.4	30.6	-	-	437	0.65	22.95	284
40	825.60	19.4	31.6	-	-	476	0.95	23.90	452

Oil Field Research Laboratories

RESULTS OF SATURATION TESTS

TABLE III

Company Oko Oil & Gas Company Lease E. Ware Well No. A-9

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content, Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
41	826.65	19.1	41.2	-	-	610	0.45	24.35	274
42	827.30	19.7	36.4	-	-	557	0.85	25.20	474
43	828.15	16.6	42.4	-	-	546	0.30	25.50	164
44	828.75	16.0	47.3	-	-	587	0.95	26.45	558
							Total	- - - -	12,646

Note: "A" samples were taken from the core after it was received in the laboratory.

Oil Field Research Laboratories

SUMMARY OF SATURATION TESTS

TABLE IV

Company Oko Oil & Gas Company Lease E. Ware Well No. A-9

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
790.00 - 804.10	9.05	16.52	29.16	-	373	3,374
804.70 - 820.75	10.60	17.70	39.83	-	556	5,892
821.40 - 829.25	6.80	18.53	34.82	-	497	3,380
790.00 - 829.25	26.45	17.51	34.89	-	478	12,646

Oil Field Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE V

Company Oke Oil & Gas Company Lease E. Ware Well No. 2-9

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.
			Percent	Bbls./A. Ft.	Percent	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
34	821.55	16.1	32.4	405	0.0	0	32.4	59.3	405	0	Imp.	50
35	822.16	21.0	35.6	548	7.1	116	26.5	67.4	432	110	2.84	10
36	822.78	20.5	31.2	496	3.1	49	28.1	63.6	447	69	1.71	15
37	823.45	18.4	28.6	409	2.3	33	26.3	61.0	376	26	0.617	25
38	824.28	18.6	28.0	404	3.0	43	25.0	71.2	361	14	0.300	30
39	824.90	18.4	30.6	437	2.3	33	28.3	61.7	404	16	0.365	30
40	825.60	19.4	31.6	476	5.5	83	26.1	62.2	393	49	1.28	20
41	826.65	19.1	41.2	610	10.2	151	31.0	58.0	459	36	0.772	20
42	827.30	19.7	36.4	557	1.8	28	34.6	52.5	529	17	0.412	25
43	828.15	16.6	42.4	546	6.6	84	35.9	56.1	462	36	0.854	20
44	828.75	16.0	47.3	587	10.1	125	37.2	53.9	462	8	0.0974	30

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.
"A" - Sample was taken from core after it was received in the laboratory.

Oil Field Research Laboratories

RESULTS OF LABORATORY FLOODING TES

TABLE V

Company Oko Oil & Gas Company Lease E. Vero Well No. [illegible]

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.
			Percent	Bbls./A. Ft.	Percent	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
1	790.90	15.6	27.4	332	0.3	4	27.1	66.4	328	9	0.833	35
2	791.80	11.8	30.6	262	0.0	0	30.6	62.8	268	0	Imp.	50+
3A	792.10	16.7	27.1	331	0.5	6	26.6	64.0	345	18	0.833	30
6	796.20	20.0	25.7	399	2.8	45	22.9	76.3	356	205	5.22	10
7	797.20	18.2	29.3	414	3.4	49	25.9	68.7	366	26	0.799	25
8	798.25	17.9	29.1	405	2.5	35	26.6	70.2	370	21	0.595	35
9	799.15	16.3	30.6	435	2.3	33	28.3	69.3	402	48	0.854	20
10	799.70	20.3	28.7	457	2.8	45	25.9	69.0	412	39	1.88	20
11	800.68	15.2	31.7	374	0.0	0	31.7	66.6	374	0	Imp.	50+
12	801.60	16.1	28.9	361	0.2	2	28.7	68.6	359	8	0.300	40
13	802.95	15.3	25.9	285	0.0	0	25.8	67.5	283	0	Imp.	50+
14	803.95	16.0	31.8	393	2.7	34	29.1	67.4	361	0	0.0060	50
15	805.15	18.8	43.5	655	15.1	191	30.4	66.1	444	92	2.53	15
16	806.25	18.0	48.6	680	19.4	271	29.2	64.0	409	29	0.778	15
17	807.25	17.6	49.4	685	20.1	278	29.3	62.3	405	24	0.650	15
18	808.10	15.8	31.3	364	2.1	26	29.2	61.8	358	3	0.182	40
19	808.85	19.0	48.1	710	26.2	387	21.9	72.8	353	69	2.70	10
20	810.05	15.9	26.8	289	0.0	0	26.8	71.0	289	0	Imp.	30+
21	810.95	14.0	20.2	250	0.0	0	20.2	56.4	220	0	Imp.	50+
22	811.95	16.6	35.4	500	27.9	403	27.5	68.7	397	40	1.11	15
23	812.70	15.6	25.3	319	0.0	0	26.3	64.3	319	0	Imp.	50+
24	813.12	19.8	51.6	736	27.6	424	24.2	71.7	372	56	1.60	10
25	813.60	17.6	47.5	648	13.5	182	34.1	64.2	466	10	0.381	20
26A	815.30	20.8	38.8	594	8.3	134	28.5	66.7	460	75	2.18	25
27	816.08	14.3	29.6	328	1.3	14	28.3	68.0	314	2	0.148	45
28A	816.35	14.0	17.2	187	0.0	0	17.2	77.6	187	1	0.0495	50
29	817.40	14.7	53.7	385	0.0	0	53.7	60.4	385	0	Imp.	50+
30	818.20	18.2	54.7	490	8.8	40	31.9	63.6	450	48	0.980	15
31	818.98	18.5	52.0	460	1.9	28	30.1	63.2	432	35	0.389	20
32	819.65	22.0	33.8	577	7.1	121	26.7	70.3	456	159	3.39	10
33	820.60	18.5	48.6	598	15.2	216	33.4	60.7	480	2	1.03	25

Oil Field Research Laboratories

SUMMARY OF LABORATORY FLOODING TESTS

TABLE VI

Company Oko Oil & Gas Company Lease E. Ware Well No. A-9

Depth Interval Feet	790.00 - 804.10	804.70 - 820.75	822.05-829.25	790.00-829.25
Feet of Core Analyzed	6.65	8.45	6.45	21.55
Average Percent Porosity	17.43	18.53	18.67	18.23
Average Percent Original Oil Saturation	28.85	42.87	35.01	36.19
Average Percent Oil Recovery	1.80	13.86	5.04	7.50
Average Percent Residual Oil Saturation	27.05	29.01	29.97	28.69
Average Percent Residual Water Saturation	67.78	65.80	60.48	64.82
Average Percent Total Residual Fluid Saturation	94.83	94.81	90.45	93.51
Average Original Oil Content, Bbls./A. Ft.	389.	617.	502.	512.
Average Oil Recovery, Bbls./A. Ft.	25.	201.	71.	108.
Average Residual Oil Content, Bbls./A. Ft.	364.	416.	431.	404.
Total Original Oil Content, Bbls./Acre	2,592.	5,213.	3,238.	11,043.
Total Oil Recovery, Bbls./Acre	169.	1,700.	459.	2,328.
Total Residual Oil Content, Bbls./Acre	2,423.	3,513.	2,779.	8,715.
Average Effective Permeability, Millidarcys	0.737	1.44	0.785	1.03
Average Initial Fluid Production Pressure, p.s.i.	28.3	20.0	22.5	23.0

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