

OILFIELD RESEARCH LABORATORIES

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

April 24, 1974

3-24-18E

Clinkenbeard 14

Carmel Energy, Inc.
Suite 400
9235 Katy Freeway
Houston, Texas 77024

Gentlemen:

Enclosed herewith are the results of tests run on the Rotary core taken from the Clinkenbeard Lease, Well No. 14, Allen County, Kansas, and submitted to our laboratory on April 18, 1974.

On the basis of the core analyses, we estimate that the total volume of oil in place is 1,338 barrels per acre foot. The following factors and assumptions were used in calculating the above figure:

Estimated primary recovery, percent	6
Porosity, percent	24
Irreducible water saturation, percent	19
Formation volume factor	1.04

This core was sampled and the samples sealed in plastic bags by a representative of Oilfield Research Laboratories.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Carl L. Pate
Carl L. Pate

CLP:bl
9 c to Houston, Texas
2 c to Layton Oil Company
Independence, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Carmel Energy, Inc. Lease Clinkenbeard Well No. 14

Location 885' WEL & 500' NSL, SE $\frac{1}{4}$

Section 3 Twp. 24S Rge. 18E County Allen State Kansas

Name of Sand - - - - - Bartlesville

Top of Core - - - - - 862.0

Bottom of Core - - - - - 883.3

Top of ^{Oil}/_{Sand} - - - - - 866.8

Bottom of Sand (Cored) - - - - - 883.3

Total Feet of Permeable Sand - (Analyzed) - - - - - 16.5

Total Feet of Floodable Sand - - - - -

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 500	4.2	4.2
500 - 700	3.5	7.7
700 - 800	3.0	10.7
800 - 900	3.8	14.5
900 & above	2.0	16.5

Average Permeability Millidarcys - - - - - 698.3

Average Percent Porosity - - - - - 24.0

Average Percent Oil Saturation - - - - - 43.3

Average Percent Water Saturation - - - - - 19.3

Average Oil Content, Bbls./A. Ft. - - - - - 809.

Total Oil Content, Bbls./Acre - - - - - 12,858.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - -

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - -

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - -

Total Calculated Oil Recovery, Bbls./Acre - - - - -

Packer Setting, Feet - - - - -

Viscosity, Centipoises @ - - - - -

A. P. I. Gravity, degrees @ 60 °F - - - - -

Elevation, Feet - - - - -

Note: The above averages are for the oil sand (866.8 to 883.3 feet)

-LOG-

Company Carmel Energy, Inc. Lease Clinkenbeard Well No. 14

<u>Depth Interval;</u> <u>Feet</u>	<u>Description</u>
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862.0 - 864.4 - Gray sandy shale.

864.4 - 866.8 - Brownish gray very shaly sandstone.

866.8 - 867.5 - Hard brown slightly calcareous sandstone.

867.5 - 872.0 - Soft dark brown sandstone.

872.0 - 872.1 - Brown shaly sandstone.

872.1 - 883.3 - Dark brown sandstone.

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RESULTS OF PERMEABILITY AND POROSITY TESTS
TABLE I A

Company Carmel Energy, Inc. Lease Clinkenbeard Well No. 14

VERTICAL PERMEABILITY TESTS

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.	Percent Porosity
			Ft.	Cum. Ft.		
1	864.5	Imp.	0.6	0.6	0.00	
2	865.5	Imp.	1.0	1.6	0.00	
3	866.3	0.52	0.8	2.4	0.42	
4	867.6	470.	0.5	2.9	235.00	
5	868.5	370.	1.0	3.9	370.00	
6	869.5	1,170.	1.0	4.9	1,170.00	
7	870.6	1,021.	1.0	5.9	1,021.00	
8	871.5	695.	1.0	6.9	695.00	
9	872.7	397.	0.9	7.8	357.30	
10	873.5	1,152.	1.0	8.8	1,152.00	
11	874.4	470.	1.0	9.8	470.00	
12	875.2	687.	1.0	10.8	687.00	
13	876.4	147.	1.0	11.8	147.00	
14	877.5	815.	1.0	12.8	815.00	
15	878.5	886.	1.0	13.8	886.00	
16	879.6	794.	1.0	14.8	794.00	
17	880.5	489.	1.0	15.8	489.00	
18	881.4	485.	1.0	16.8	485.00	
19	882.4	874.	0.8	17.6	699.20	
20	883.2	453.	0.5	18.1	226.50	

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Carmel Energy, Inc. Lease Clinkenbeard Well No. 14

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			Ft.	Cum. Ft.		
1	864.5	8.5	4	84	26.	Imp.	0.6	0.6	16	0.00
2	865.5	13.9	2	72	22	Imp.	1.0	1.6	22	0.00
3	866.3	13.4	2	86	21	0.74	0.8	2.4	17	0.59
4	867.4	12.6	45	33	441	-	0.7	3.1	309	-
P-4	867.6	-	-	-	-	406.	0.5	3.6	-	203.00
5	868.5	25.4	31	29	612	610.	1.0	4.6	612	610.00
6	869.5	27.8	41	22	886	1,530.	1.0	5.6	886	1530.00
7	870.6	23.6	38	28	786	700.	1.0	6.6	786	700.00
8	871.5	25.6	35	26	700	710.	1.0	7.6	700	710.00
9	872.7	23.6	44	23	807	273.	0.9	8.5	726	245.70
10	873.5	27.3	38	21	806	955.	1.0	9.5	806	955.00
11	874.4	24.9	41	23	794	643.	1.0	10.5	794	643.00
12	875.2	23.7	40	19	737	710.	1.0	11.5	737	710.00
13	876.4	25.9	43	23	865	262.	1.0	12.5	865	262.00
14	877.5	25.5	53	11	1,050	815.	1.0	13.5	1,050	815.00
15	878.5	25.5	43	19	852	848.	1.0	14.5	852	848.00
16	879.6	23.8	49	7	906	804.	1.0	15.5	906	804.00
17	880.5	23.5	52	8	950	452.	1.0	16.5	950	452.00
18	881.4	21.4	47	12	784	555.	1.0	17.5	784	555.00
19	882.4	22.1	50	13	860	815.	0.8	18.3	688	652.00
20	883.2	19.4	54	10	814	536.	0.5	18.8	407	268.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company <u>Carmel Energy, Inc.</u>		Lease <u>Clinkenbeard</u>		Well No. <u>14</u>	
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	Average Vertical Permeability, Millidarcys	Total Oil Content Bbls./Acre
864.4 - 866.8	0.8	0.74	0.59	0.52	55
867.5 - 883.3	15.7	698.3	10,962.70	681.5	12,858
864.4 - 883.3	16.5	664.4	10,963.29		12,913

Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.
864.4 - 866.8	2.4	12.4	79.7	23
866.8 - 883.3	15.9	24.0	19.3	809
864.4 - 883.3	18.3	22.5	27.3	706

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RESULTS OF WATER DIFFERENTIATION TESTS

TABLE VI

Company Carmel Energy, Inc. Lease Clinkenbeard Well No. 14

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Percent Water Saturation		Total
			Connate	Drilling & Foreign	
1	864.5	23,900			
2	865.5	28,835			
3	866.3	27,600			
4	867.4	44,200			
5	868.5	9,578			
6	869.5	10,469			
7	870.6	9,387			
8	871.5	8,500			
9	872.7	15,756			
10	873.5	14,350			
11	874.4	20,338			
12	875.2	12,826			
13	876.4	11,887			
14	877.5	14,600			
15	878.5	17,000			
16	879.6	9,212			
17	880.5	15,030			
18	881.4	17,023			
19	882.4	21,464			
20	883.2	15,756			

Note: ppm — parts per million

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SUMMARY OF WATER DIFFERENTIATION TESTS

TABLE VII

Company Carmel Energy, Inc. Lease Clinkerbeard Well No. 14

Depth Interval, Feet	Chloride Content of Brine in Sand, ppm	Average Percent Connate Water	Average Percent Drilling & Foreign Water
864.4 - 866.8	27,190		
866.8 - 883.3	15,118		
864.4 - 883.3	16,701		

Note: ppm — parts per million.

OIL CONTENT,
BBL./A. FT.

WATER SAT.,
PERCENT

OIL SAT.,
PERCENT

800

600

400

200

90

20

70

40

50

60

30

80

10

1050

KEY:



SANDSTONE

DEPTH INTERVAL,
FEET

FEET OF CORE
ANALYZED

864.4 - 866.8

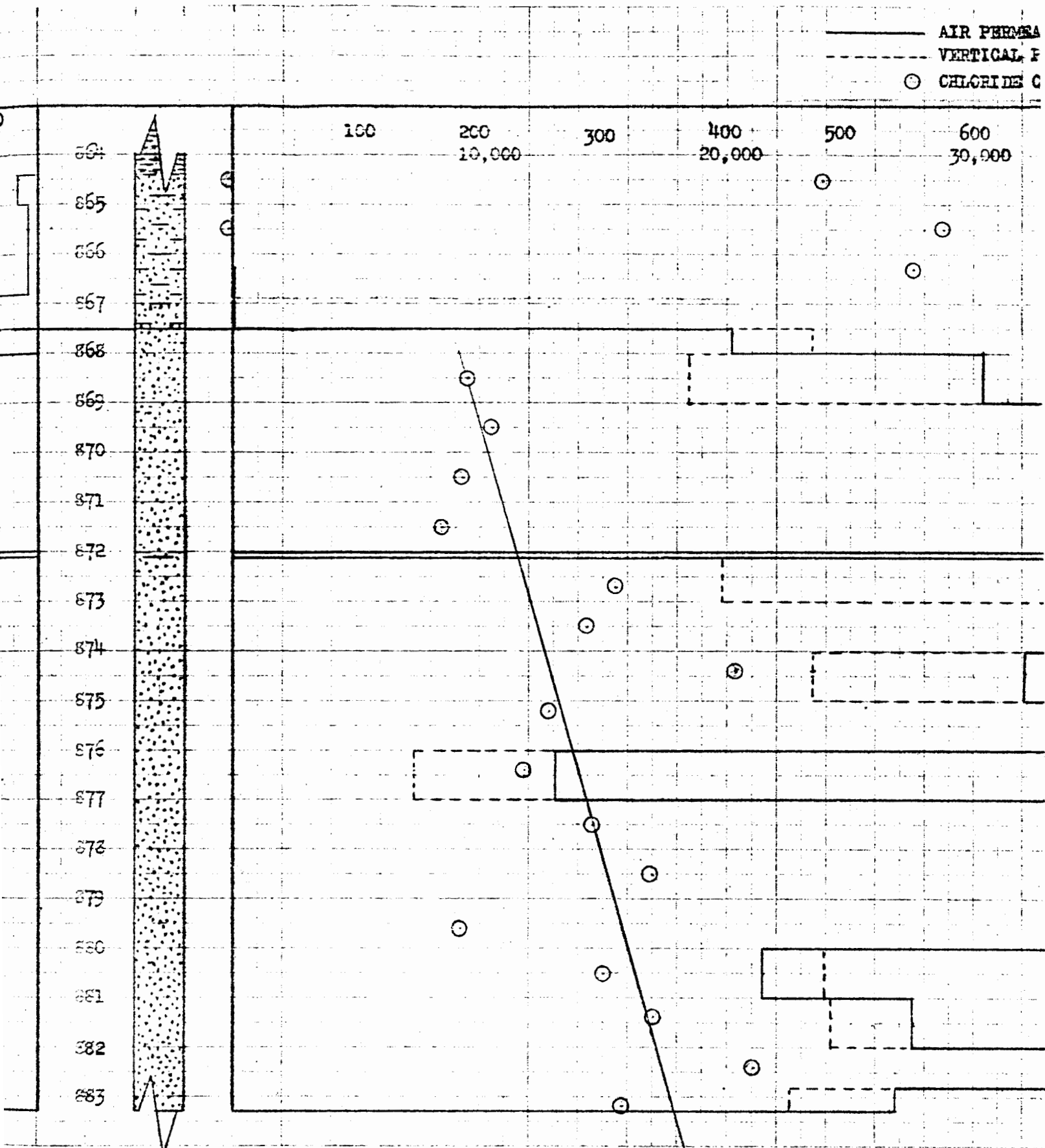
2.4

866.8 - 883.3

15.9

864.4 - 883.3

18.3



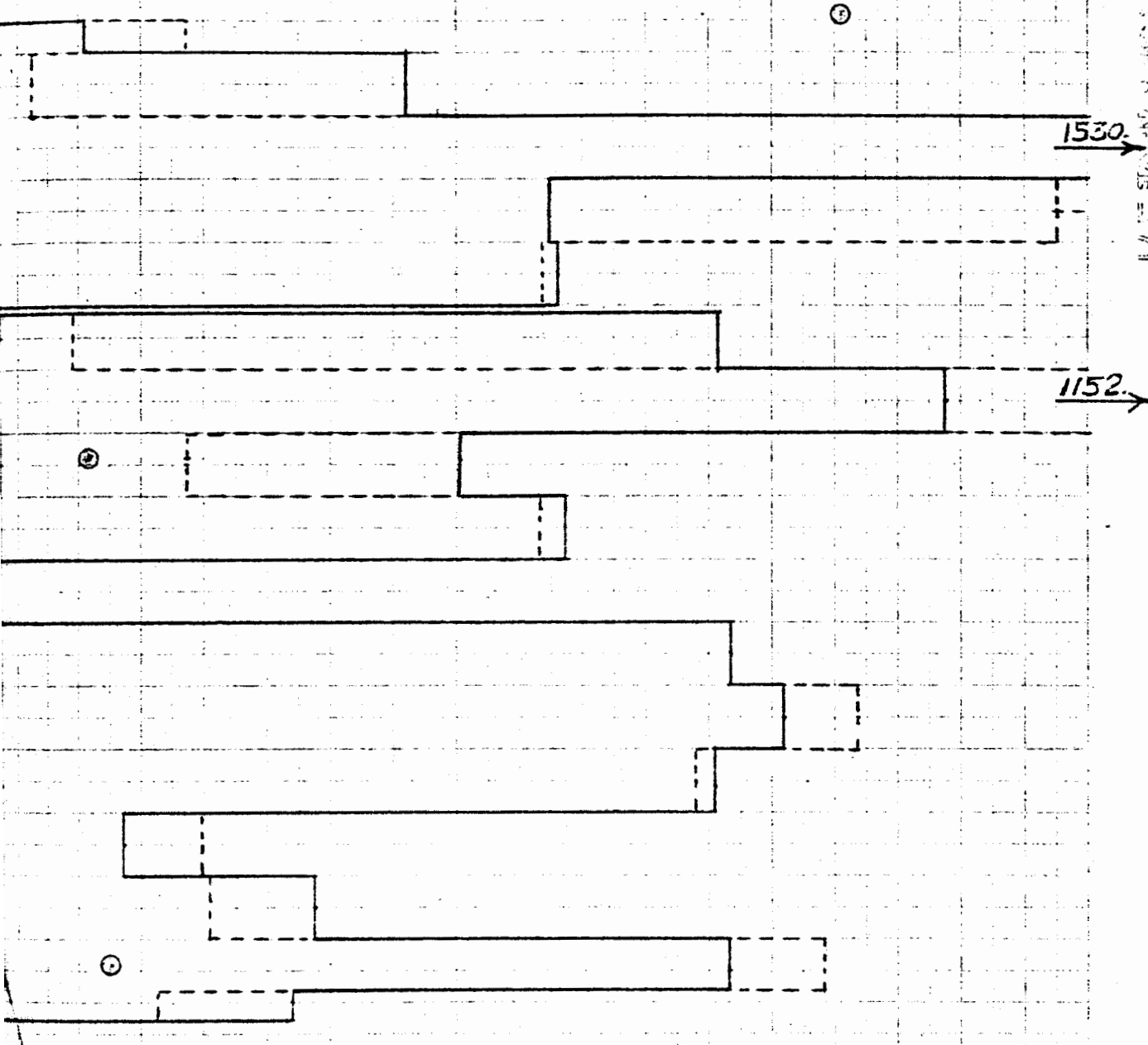
SEALY SANDSTONE

CARMEL ENERGY, INC.
 CLINKENBEARD LEASE WELL NO. 14
 ALLEN COUNTY, KANSAS

AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVG. OIL CONTENT BBL./A. FT.	TOTAL OIL CONTENT BBL./ACRE	AVG. AIR PERMEABILITY, MILLIDARCS	AVG. VERTICAL PERMEABILITY, MILLIDARCS
12.4	2.5	79.7	23	55	0.74	0.52
24.0	43.3	19.3	809	12,858	692.3	681.5
22.5	35.0	27.3	706	12,913	624.4	

AIR PERMEABILITY, IN MILLIDARCYs
 VERTICAL PERMEABILITY, IN MILLIDARCYs
 ⊙ CALCEIDE CONTENT OF BRINE IN SAND, ppm

400 500 600 700 800 900 1,000
 20,000 30,000 40,000 50,000



KIEFFER STANDARD LOGS
 MADE IN U.S.A.

LOG CALCREOUS SANDSTONE
 ⊙ IMPROVABLE TO AIR

AVG. AIR PERMEABILITY, MILLIDARCYs
 AVG. VERTICAL PERMEABILITY, MILLIDARCYs

0.74 0.52
 698.3 681.5
 684.4

OILFIELD RESEARCH LABORATORIES
 CHANUTE, KANSAS
 APRIL, 1974.

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 MADE IN U.S.A.