CORE ANALYSIS REPORT

FOR

BARRON KIDD

BAXTER NO. CW-1 or *14*

CHURCH DISTRICT FIELD

WETZEL COUNTY, WEST VIRGINIA

JAMES A. LEWIS ENGINEERING, INC.
Petroleum Reservoir Analysts
DALLAS 1, TEXAS   EVANSVILLE 8, IND.

JAMES A. LEWIS ENGINEERING, INC.

COMPANY	BARRON KIDD	DATE CORED	AUGUST 21, 1954	FILE NO. H-41
WELL	SANTER NO. CW-1	DATE REPORT	AUGUST 24, 1954	ENGRS. C-G-L
FIELD	CHURCH DISTRICT	FORMATION	MAXSON	ELEV. 1128
COUNTY	WETZEL STATE W. VA.	DRLG. FLUID	WATER BASE MUD	CORES B.C.T.
LOCATION		REMARKS		

CORE ANALYSIS REPORT

SAND ☐   LIME ☐   CONGLOMERATE ☐   ☐
SHALE ☐   DOLOMITE ☐   OOLITIC LIME ☐   ☐

PERMEABILITY ○—○   TOTAL WATER ○—○
MILLIDARCYS   PERCENT PORE SPACE
500 400 300 200 100 0   0 20 40 60 80

POROSITY X--X   OIL SATURATION X--X
PERCENT   PERCENT PORE SPACE

SAMPLE NUMBER	DEPTH FEET	PERMEAB. MILLIDARCYS	POROSITY %	RESIDUAL LIQUID SATURATION % PORE SPACE OIL	RESIDUAL LIQUID SATURATION % PORE SPACE TOTAL WATER	REMARKS
1	2085.5	8.2	11.5	10.4	30.5	OIL*
2	2086.5	16.	13.8	12.5	15.3	OIL*
3	2087.5	15.	10.2	3.7	32.3	*
4	2088.5	47.	12.2	3.3	26.3	OIL*
5	2089.5	4.9	6.5	12.3	3.3	OIL*
6	2090.5	4.5	11.3	12.3	21.5	OIL*
7	2091.5	14.	16.	15.6	28.5	OIL*
8	2092.5	5.1	12.3	3.9	19.3	OIL*
9	2093.5	4.8	10.9	8.3	24.1	OIL*
10	2094.5	5.2	13.1	10.7	11.8	OIL*
11	2095.5	0.7	10.3	17.5	20.4	*
12	2096.5	11.	9.9	13.3	17.4	OIL
13	2097.5	3.4	11.7	10.3	31.2	*
14	2098.5	42.	11.3	10.6	16.8	OIL
15	2099.5	24.	10.5	11.4	21.9	OIL
16	2100.5	7.2	10.4	8.7	21.1	OIL*
17	2101.5	7.8	12.1	15.9	12.9	OIL
18	2104.5	12.	10.3	16.4	22.7	OIL
19	2105.5	7.5	14.5	11.7	15.9	OIL
20	2106.5	20.	11.7	14.5	16.2	OIL
21	2107.5	21.	12.4	13.7	20.2	OIL
22	2108.5	52.	12.0	13.2	22.5	OIL
23	2109.5	43	10.6	12.7	14.2	OIL

#	Depth	Perm				Description
		4.2	13.1	10.7	13.8	OIL*
	2095.5	0.7	10.3	17.5	20.4	*
	2096.5	11.	9.0	13.3	17.	OIL
13	2097.5	3.4	11.7	10.3	31.5	*
14	2098.5	16.	11.3	10.6	16.8	OIL
15	2099.5	24.	10.	11.4	21.9	OIL
16	2100.5	7.2	10.4	8.7	21.1	OIL*
17	2101.5	7.8	12.1	15.9	19.8	OIL
18	2104.5	12.	12.3	16.2	22.7	OIL
19	2105.5	7.5	14.5	11.7	15.9	OIL
10	2106.5	20.	11.7	14.5	16.2	OIL
11	2107.5	21.	12.4	13.7	20.2	OIL
12	2108.5	52.	12.0	19.2	22.5	OIL
13	2109.5	43.	10.6	21.7	14.2	OIL
14	2113.5	43.	11.5	21.8	13.9	OIL
15	2114.5	60.	14.9	14.7	22.4	OIL
16	2115.5	98.	15.0	16.7	17.3	OIL
17	2116.5					
18	2117.5					OIL
	2118.5	69.	14.6	18.5	19.2	OIL
	2119.5	53.	13.3	21.3	12.8	OIL
	2120.5	53.	13.4	20.9	19.4	OIL
	2121.5	76.	12.4	21.7	18.6	OIL
	2122.5	63.	16.9	17.7	23.1	OIL
	2123.5	29.	11.6	19.8	21.5	OIL
	2124.5	16.	12.4	18.6	19.4	OIL
	2125.5	88.	12.4	22.6	13.0	OIL
	2126.5	90.	12.7	22.1	16.5	OIL
	2127.5	76.	11.8	15.3	16.1	OIL
	2128.5	74.	11.6	19.8	16.4	OIL
	2129.5	73.	13.1	21.3	16.0	OIL
	2130.5	53.	10.7	21.5	14.0	OIL
	2131.5	36.	9.4	15.9	12.7	OIL

Annotations at right: 2095, 2100, 2105, 2110, 2120, 42.5° API, 2125, 2130, 2133
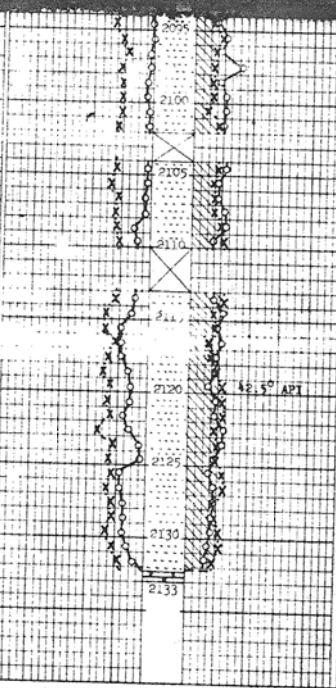
CORE SUMMARY

FORMATION	DEPTH, FEET	FEET CORE RECOVERED PRODUCTIVE	AVERAGE PERMEABILITY MD	AVERAGE POROSITY %	AVERAGE LIQUID SATURATION %	
					OIL	WATER
MAXSON	2085 - 2096	9.	11.8	11.9	11.3	23.4
MAXSON	2096 - 2132	30.	48.	12.3	17.0	18.0

Barron Kidd
P. O. Box 788
Paintsville, Kentucky

Attention: Mr. Sam J. Morris, Jr.

Subject: Core Analysis

Santee No. CW-1
Church District Field
Wetzel County, West Virginia

Gentlemen:

The Maxson Sand was cored in subject well from 2085 to 2132 feet. The formation representing the interval from 2085 to 2102 feet contained numerous streaks of very slightly saturated sand throughout, and thus the reason for the erratic fluid saturations resulting in the analysis. The sand representing the complete cored interval is described as a hard, fine to medium grain sand and well cemented. Although the sand from visual observation looks to be limy, acid tests prove there is very little solubility of the cementing material. These Baker Cable Tool cores were rather brittle when broken up in the laboratory, but when the diamond drill head was used to obtain permeability plugs, the cores were hard to drill indicating that the sand was well cemented. Because the sand is well cemented and also due to the grain size distribution, this formation is characterized by having good permeability but only fair porosity.

Nine core samples representing the interval from 2085 to 2096 feet have the following average core analysis results:

11'

        Average permeability, 11.8 millidarcys.
        Average porosity, 11.9 per cent.
        Average residual oil saturation, 11.3 per cent of pore space.
        Average total water saturation, 23.4 per cent of pore space.

Due to the erratic physical characteristics, no reserves are assigned to the upper portion of the Maxson Sand section.

The interval cored from 2096 to 2132 feet is interpreted to be oil productive. Core analysis results for thirty feet of permeable sand representing this interval show the following average characteristics:

33'

        Average permeability, 48 millidarcys.
        Average porosity, 12.3 per cent.
        Average residual oil saturation, 17.0 per cent of pore space.
        Average total water saturation, 18.0 per cent of pore space.

The calculated water injection rate for this oil column is 350 barrels per day under a sustained differential pressure of 1500 psi, which represents a surface pressure of 600 psi and a hydrostatic pressure of 900 psi. The calculated recovery by water flooding this oil column is 7,000 barrels per acre to a high produced water cut.

A sample of the produced oil from this formation has the following gravity and viscosity measurements:

> Gravity, 42.5° API at 60° F.
> Viscosity, 7.3 centipoises at approximate bottom hole temperature
> of 86° F.

It is noted that this produced oil is a paraffin base oil and when subjected to rather low temperatures, it immediately becomes solidified as a paraffin. It is believed that this characteristic of the oil has increased the viscosity measurement to be approximately twice the value which is normal for this type of oil.

Chloride Determinations for several samples taken at intervals throughout the complete zone are included in the report.

Analysis data are given in the report for each foot of recovered core.

> Very truly yours,
>
> JAMES A. LEWIS ENGINEERING, INC.
>
> H. J. Langley

HJL:vm

Encl.

JAMES A. LEWIS ENGINEERING, INC.
DALLAS

Company __BARRON IDD__   Date Report __AUGUST 21, 1954__   Page __4__ of __

Well __SARTEE NO. C 1__   Core __B.C.T.__   File __X-41__

Field __CHURCH DISTRICT__   Formation __MAXSON__   Analysts __C.HoL.__

County __WETLER.__   State __W. VIRGINIA__   Elevation __   Coregraph __

Location __   Remarks __

OFF LOCATION CORE ANALYSIS RESULTS
(Figures in parentheses refer to footnote remarks)

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS	POROSITY PER CENT	RESIDUAL SATURATION OIL % VOLUME % PORE	RESIDUAL SATURATION TOTAL WATER % PORE	PROBABLE PRODUCTION	CHLORIDE PPM	REMARKS
1	2085.5						22,200	
3	2087.5						25,900	
6	2090.5						50,200	
9	2093.5						33,100	
12	2096.5						54,800	
15	2099.5						52,300	
18	2104.5						30,300	
21	2107.5						33,600	
24	2113.5						26,700	
27	2116.5						10,700	
30	2119.5						14,750	
33	2122.5						10,625	
36	2125.5						20,900	
39	2128.5						13,750	
42	2131.5						22,100	

DEPTH	SAMPLE NO.	PERM. MD.	POROSITY %	OIL SAT.%	WATER SAT.%
2085 957	1	8.9	11.5	10.4	30.5
86 958	2	16.	13.8	12.3	15.3
87 959	3	15.	10.2	3.9	32.3
88 960	4	47.	12.9	9.3	26.3
89 961	5	4.2	9.6	12.5	31.3
2090 962	6	4.8	11.3	13.3	21.5
91 963	7	14.	10.9	15.6	28.5
92 964	8	5.1	13.4	9.0	19.4
93 965	9	4.4	10.8	8.3	24.1
94 966	10	2.2	13.1	10.7	13.8
95 967	11	0.7	10.3	17.5	26.4
96 968	12	11.	9.0	13.3	17.8
97 969	13	3.4	11.7	10.3	31.5
98 970	14	16.	11.3	10.6	16.8
99 971	15	24.	10.5	11.4	21.9
2100 972	16	7.2	10.4	8.7	21.1
01 973	17	7.8	12.1	15.9	19.8
04 974	18	12.	12.3	15.2	22.7
05 975	19	7.5	14.5	11.7	15.9
06 976	20	23.	11.7	14.5	16.2
07 977	21	21.	12.4	13.7	21.2
08 978	22	52.	12.0	19.2	22.5
09 979	23	13.	10.6	21.7	14.2
13 980	24	45.	11.5	21.8	13.9
14 981	25	60.	11.9	14.7	22.1
15 982	26	98.	15.0	15.7	11.3
16 983	27	82.	10.9	11.3	21.1
17 984	28	88.	13.1	13.0	18.3
18 985	29	69.	14.6	15.5	15.2
19 986	30	53.	13.3	21.3	12.8
20 987	31	53.	13.4	20.9	17.4
21 988	32	76.	12.4	21.7	18.6
22 989	33	63.	10.9	17.7	23.1
23 990	34	29.	11.6	19.8	21.5
24 991	35	16.	12.4	18.6	19.4
25 992	36	88.	12.4	22.6	13.0
26 993	37	90.	12.7	22.1	16.5
27 994	38	76.	11.8	15.3	16.1
28 1000	39	74.	11.6	19.8	16.4
29 1001	40	73.	13.1	21.3	15.0
30 1002	41	53.	10.7	21.5	1.0
2131 1003	42	35.	9.4	15.9	12.7
17 feet total		191.7	192.8	193.0	492.3
Avg. 17 feet		11.71	11.34	11.35	28.94
25 feet total		137.7	315.2	441.2	443.1
Avg. 25 feet		55.08	12.60	17.6%	17.72
TOTALS					
42 feet core		157.6	5 .0	634.2	935.4
47 feet interval		37.52	.09	15.10	22.27

Gr. 42.5% API
Vis. 7.3 c. @ 8 F

SANTEE #12-14

SAMPLE	P. P. M. CHLORIDES
1	22200
3	25900
6	50200
9	33100
12	54800
15	52300
18	30300
21	33600
24	26700
27	10700
30	14750
33	10625
36	30900
39	13750
42	22100

Thickness------Min. 28 feet; max. 47 feet
Avg.: Por. %----12.09%
  Perm. wd.-11.71 and 5508
  Oil sat.-11.35 and 1764
  H2O sat.--26.94 and 17.72

Reservoir Vol. = 7758 x .1209 = 937.9 Bbls. void/acre ft.

  Conate H2O= (937.9 x 25%) = 234 B/acre ft.
  Res. oil = (937.9 x 17.65) = 165 B/acre ft.
  Total primary = Est.(w/gas inj.) = 150 B/acre ft.
          549 B/acre ft.

Res. B/acre ft.(937.9-549) x 758 = 753 218.5

Min. 5462 Bbls./avg. for 25 ft.

Primary should be counted to 170 B/acre
which would give better than 6000 B
      per acre