

CORE ANALYSIS REPORT

FOR

KANSAS LAND INVESTMENT, INC.
WOODHEAD NO. 13 WELL
DOUGLAS COUNTY, KANSAS

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering

TULSA, OKLAHOMA

June 4, 1984

REPLY TO
7304 EAST 38TH STREET
TULSA, OKLAHOMA
74145

Kansas Land Investment, Inc.
222 E. 4th.
Ottawa, Kansas 66067

Attn: Mr. Jim Meitchum

Subject: Core Analysis Data
Woodhead No. 13 Well
Douglas County, Kansas
CLI File 3408-840095

Gentlemen:

Cores taken in the subject well in the Squirrel Sand formation were received in the Tulsa laboratory for special analytical testing described on the Procedure Page.

The accompanying Coregraph presents the binomially averaged core analysis data in graphical form to aid correlation with downhole electrical surveys.

Tabular presentation of the measured physical properties may be found on page one.

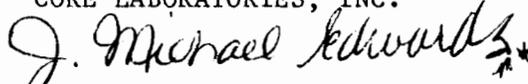
Empirical estimates of stock tank oil in place may be found on page two of this report.

Core analysis data from the cored interval between 775.0 and 786.0 feet exhibits good porosity and matrix permeability development. This Squirrel zone should be oil productive after formation treatment.

It is a pleasure to have this opportunity of serving you.

Very truly yours,

CORE LABORATORIES, INC.



J. Michael Edwards
District Manager

JME:MCH:jeh
5 cc - Addressee

Kansas Land Investment, Inc.
Woodhead No. 13 Well
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Procedure Page

Handling and Analytical Procedures

Diamond coring equipment and air were used to obtain 2 1/8-inch diameter cores between 775.0 and 786.0 feet.

The cores were preserved at the well site in plastic bags by client representative.

The cores were transported to Tulsa by motor freight.

Plug analysis was made in intervals requested.

Fluid removal was accomplished using high temperature retorts.

Porosity was determined by summation of fluids technique.

Horizontal air permeability on plugs measured without Klinkenberg correction.

Temporary storage of cores in Tulsa laboratory awaiting additional instructions.

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering

DALLAS, TEXAS

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KANSAS LAND INVESTMENT, INC.
 WOODHEAD NO. 13 WELL
 DOUGLAS COUNTY, KANSAS

DATE: 5-29-84
 FORMATION: SQUIRREL SAND
 DRLG. FLUID: _____
 LOCATION: _____

FILE NO: 3408-840095
 ENGINEER: HUDSON
 ELEVATION: _____

SMP. NO.	DEPTH	PERM. TO AIR MD. PLUG	POROSITY PERCENT	FLUID OIL	SATS. WTR.	STB/ AF	DESCRIPTION
1	775.0-76.0	1.3	17.3	21.9	50.7	629	SD, SLTY, CALC, MICA
2	776.0-77.0	1.4	10.7	24.4	28.8	561	SD, SLTY, CALC, SHY, MIC
3	777.0-78.0	<0.1	5.9	15.5	70.6	129	LM, SHY
4	778.0-79.0	3.9	13.2	6.6	78.9	206	SD, SHY, MICA
5	779.0-80.0	0.1	15.8	13.3	65.7	399	SD, SLTY, CALC, MICA, SH
6	780.0-81.0	2.3	17.6	27.2	49.0	663	SD, SLTY, CALC, MICA
7	781.0-82.0	2.3	18.8	24.5	42.9	793	SD, SLTY, CALC, SHY, MIC
8	782.0-83.0	13.0	16.4	16.5	60.0	485	SD, CALC, MICA
9	783.0-84.0	5.0	14.7	32.2	54.2	497	SD, SLTY, CALC, MICA
10	784.0-85.0	13.0	17.4	10.0	54.6	585	SD, SHY, MICA
11	785.0-86.0	1.9	14.8	7.6	77.3	248	SD, SLTY, SHY, MICA

ROUTINE PLUG SUMMATION OF FLUIDS

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Petroleum Reservoir Engineering

DALLAS, TEXAS

Page 2 of 2 File 3408-840095

Well WOODHEAD NO. 13

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: SQUIRREL SAND 775.0-786.0			
FEET OF CORE RECOVERED FROM ABOVE INTERVAL	11	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	56.2
FEET OF CORE INCLUDED IN AVERAGES	10	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	51.0 (e)
AVERAGE PERMEABILITY: MILLIDARCYS	4.4	OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	44.2	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT	15.7	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	1.05 (c)
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	18.4	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	507

Calculated maximum solution gas drive recovery is _____ barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is _____ barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. *(Please refer to footnotes for further discussion of recovery estimates.)*

FORMATION NAME AND DEPTH INTERVAL:			
FEET OF CORE RECOVERED FROM ABOVE INTERVAL		AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	
FEET OF CORE INCLUDED IN AVERAGES		AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	
AVERAGE PERMEABILITY: MILLIDARCYS		OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET		ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT		ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	

Calculated maximum solution gas drive recovery is _____ barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is _____ barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. *(Please refer to footnotes for further discussion of recovery estimates.)*

(c) Calculated (e) Estimated (m) Measured (*) Refer to attached letter.

These recovery estimates represent theoretical maximum values for solution gas and water drive. They assume that production is started at original reservoir pressure; i.e., no account is taken of production to date or of prior drainage to other areas. The effects of factors tending to reduce actual ultimate recovery, such as economic limits on oil production rates, gas-oil ratios, or water-oil ratios, have not been taken into account. Neither have factors been considered which may result in actual recovery intermediate between solution gas and complete water drive recoveries, such as gas cap expansion, gravity drainage, or partial water drive. Detailed predictions of ultimate oil recovery to specific abandonment conditions may be made in an engineering study in which consideration is given to overall reservoir characteristics and economic factors.

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CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

COMPANY KANSAS LAND INVESTMENT, INC. FILE NO. 3408-840095
 WELL WOODHEAD NO. 13 DATE 5-29-84
 FIELD _____ FORMATION SQUIRREL SAND ELEV. _____
 COUNTY DOUGLAS STATE KANSAS DRLG. FLD. _____ CORES _____
 LOCATION _____

CORRELATION COREGRAPH

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VERTICAL SCALE: 5" = 100'

Total Water _____
 PERCENT PORE SPACE
 100 80 60 40 20 0

Oil Saturation _____
 PERCENT PORE SPACE
 0 20 40 60 80 100

Gamma Ray
 RADIATION INCREASE →

Permeability _____
 MILLIDARCIES

Porosity _____
 PERCENT

1000 100 10 1
 Depth Feet

30 20 10 0 0 20 40 60 80 100

