

CORE ANALYSIS REPORT

FOR

KANSAS LAND INVESTMENT, INC.
WOODHEAD NO. 5 WELL
DOUGLAS COUNTY, KANSAS

✓

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering

TULSA OKLAHOMA

May 1, 1984

REPLY TO
7304 EAST 38TH STREET
TULSA OKLAHOMA
74145

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

Attn: Mr. Jim Mtechem

Subject: Core Analysis Data
Woodhead No. 5 Well
Douglas County, Kansas
CLI File 3408-840074

Gentlemen:

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

The accompanying Coregraph presents 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 of this report.

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

Core analysis data on the cored interval between 687.0 and 696.0 feet exhibits good porosity and fair matrix permeability development. This 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.

G. Michael Edwards
District Manager

JME:MCH:jeh

4 cc-Addressee

Kansas Land Investment, Inc.
Woodhead No. 5 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 687.0 and 696.2 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

KANSAS LAND INVESTMENT, INC.
 WOODHEAD NO. 5 WELL
 DOUGLAS COUNTY, KANSAS

DATE: 4-30-84
 FORMATION: SQUIRREL SAND
 DRLG. FLUID:
 LOCATION:

FILE NO: 3408-840074
 ENGINEER: HUDSON
 ELEVATION:

SMP. NO.	DEPTH	PERM. TO AIR MD. PLUG	POROSITY PERCENT	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
ROUTINE PLUG SUMMATION OF FLUIDS							
1	687.0-88.0	32.0	19.0	26.3	43.7		SD, SL/CALC, MICA
2	688.0-89.0	5.3	17.8	28.1	44.4		SD, SLTY, SL/CALC, MICA
3	689.0-90.0	32.0	20.1	31.8	34.8		SD, SL/CALC, MICA
4	690.0-91.0	26.0	20.7	36.2	33.8		SD, SL/CALC, MICA
5	691.0-92.0	43.0	22.5	35.6	32.4		SD, SL/CALC, MICA
6	692.0-93.0	16.0	22.5	33.3	36.4		SD, SL/CALC, MICA
7	693.0-94.0	0.5	18.9	33.9	42.9		SD, SLTY, SL/CALC, MICA
8	694.0-95.0	14.0	19.3	39.4	34.7		SD, SL/CALC, SH/LAM, MI
9	695.0-96.0	6.4	12.1	16.5	64.5		SD, SL/CALC, W/SH LAMS
	695.0-96.0						MICA
	696.0-96.2		11.7	33.8	86.0		SHALE

33

$V_A = .32$
 $N_D = .77$
 .61
 .39

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering
DALLAS, TEXAS

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Well WOODHEAD NO. 5

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: SQUIRREL SAND 687-96.2

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	9	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	40.6
FEET OF CORE INCLUDED IN AVERAGES	8	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	36.0 (E)
AVERAGE PERMEABILITY: MILLIDARCYS	21.8	OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCYS-FEET	174.7	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT	19.3	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	1.05 (C)
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	30.9	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	966

Calculated maximum solution gas drive recovery is 135(e)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: MILLIDARCYS- 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.

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc., and its officers and employees assume no responsibility and make no warranty or representation as to the productivity, proper operation or maintainability of any oil, gas or other material well or sand in connection with which such report is used or relied upon.

COMPANY: KANSAS LAND INVESTMENT, INC.

WELL: WOODHEAD NO. 5

COUNTY, STATE: DOUGLAS COUNTY, KANSAS

CLI FILE NO: 3408-840074

CALCULATED STOCK TANK BARRELS PER ACRE FOOT, IN PLACE, FROM THE SUBJECT
WELL ARE LISTED BELOW.

<u>DEPTH</u>	<u>STOCK-TANK/ACRE-FOOT</u>
687-88	790
688-89	731
689-90	968
690-91	1012
691-92	1124
692-93	1057
693-94	797
694-95	931
695-96	317

