

CORE ANALYSIS REPORT

FOR

KANSAS LAND INVESTMENT, INC.  
WOODHEAD NO. 16 WELL  
DOUGLAS COUNTY, KANSAS

CORE LABORATORIES, INC.  
*Petroleum Reservoir Engineering*  
TULSA, OKLAHOMA

REPLY TO  
7304 EAST 38TH STREET  
TULSA, OKLAHOMA  
74145

July 25, 1984

Kansas Land Investment, Inc.  
222 E. 3rd.  
Ottawa, Kansas 66067

Attn: Mr. Jim Meitchum

Subject: Core Analysis Data  
Woodhead No. 16  
Douglas County, Kansas  
CLI File 3408-840171

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 of this report.

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 692.0 and 699.0 feet exhibits good porosity and fair 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*

J. Michael Edwards  
District Manager

MT

JME:MCH:jeh  
5 cc: Addressee

Kansas Land Investment, Inc.  
Woodhead No. 16 Well  
CLI File 3408-840171

Procedure Page

Handling and Analytical Procedures

Diamond coring equipment and air were used to obtain 2-1/8-inch diameter cores between 692.0 and 701.0 feet.

The cores were preserved in plastic bags at the well site 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. 16 WELL  
 DOUGLAS COUNTY, KANSAS

DATE: 7-25-84  
 FORMATION: SQUIRREL SAND  
 DRLG. FLUID:  
 LOCATION:

FILE NO: 3408-840171  
 ENGINEER: HUDSON  
 ELEVATION:

SMP. NO.	DEPTH	PERM. TO AIR MD. PLUG	POROSITY PERCENT	FLUID OIL	SATS. WTR.	STB/AF	DESCRIPTION
1	692.0-93.0	33.0	21.0	25.7	39.1	953	SD,SL/CALC,MICA
2	693.0-94.0	29.0	20.8	30.2	35.6	1000	SD,SL/CALC,MICA
3	694.0-95.0	8.0	22.0	33.8	33.8	1084	FN-GRN SD,SLTY,CALC,
4	695.0-96.0	13.0	20.5	36.3	36.3	976	SD,SL/CALC,SHY,MICA
5	696.0-97.0	39.0	20.7	33.1	35.3	997	SD,SL/CALC,SHY,MICA
6	697.0-98.0	6.3	23.1	32.1	35.0	1120	SD,SL/SLTY,SHY,CAL,M
7	698.0-99.0	31.0	20.4	39.7	31.7	1036	SD,SL/CALC,MICA
	699.0-01.0						SHALE,SD/LAMS

ROUTINE PLUG SUMMATION OF FLUIDS

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*Petroleum Reservoir Engineering*

DALLAS, TEXAS

Page 2 of 2 File 3408-840171

Well WOODHEAD NO. 16

**CORE SUMMARY AND CALCULATED RECOVERABLE OIL**

**FORMATION NAME AND DEPTH INTERVAL:** SQUIRREL SAND 692.0-699.0

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	7	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	35.3
FEET OF CORE INCLUDED IN AVERAGES	7	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	30.0 (e)
AVERAGE PERMEABILITY: MILLIDARCYS	22.8	OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	159	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT	21.2	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	1.05 (c)
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	33.0	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	1024

Calculated maximum solution gas drive recovery is 143(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: 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. 3408-84017E  
WOODHEAD NO. 16 DATE 7-25-84  
 FIELD \_\_\_\_\_ FORMATION SCOTTBRI ELEV. \_\_\_\_\_  
 COUNTY DOUGLAS STATE KANSAS DRLG. FLD. \_\_\_\_\_ CORES \_\_\_\_\_  
 LOCATION \_\_\_\_\_

# CORRELATION COREGRAPH

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VERTICAL SCALE: 5" = 100'

**Gamma Ray**  
RADIATION INCREASE →

**Permeability**  
MILLIDARCIES

**Porosity**  
PERCENT

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

**Oil Saturation**  
PERCENT PORE SPACE

