

**CORE ANALYSIS REPORT**

**FOR**

**KANSAS LAND INVESTMENT, INC.  
WOODHEAD NO. 37 WELL  
DOUGLAS COUNTY, KANSAS**

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

January 14, 1985

REPLY TO  
7304 EAST 38TH STREET  
TULSA, OKLAHOMA  
74145

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

Attn: Mr. Jim Mietchen

Subject: Core Analysis Data  
Woodhead No. 37  
Douglas County, Kansas  
CLI File 3408-850002

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.

Core analysis data from the cored interval 704.0 and 716.0 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 *JME*  
District Manager

JME:MCH:jeh  
5 cc: Addressee

Kansas Land Investment, Inc.  
Woodhead No. 37 Well  
CLI File 3408-850002

**Procedure Page**

**Handling and Analytical Procedures**

Diamond coring equipment was used to obtain 2 1/8-inch diameter cores between 704.0 and 716.5 feet.

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

The core was transported to Tulsa by motor freight.

Plug analysis was made in intervals requested.

Fluid removal was accomplished by 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. 37 WELL  
 DOUGLAS COUNTY, KANSAS

DATE: 1-14-85  
 FORMATION: SQUIRREL SAND  
 DRUG. FLUID:  
 LOCATION:

FILE NO: 3408-850002  
 ENGINEER: HUDSON  
 ELEVATION:

SMP. NO.	DEPTH	PERM. TO AIR MD. PLUG	POROSITY PERCENT	FLUID SATS. OIL	WTR.	STB/AF	DESCRIPTION
ROUTINE PLUG SUMMATION OF FLUIDS							
1	704.0-05.0	29.0	20.1	31.7	37.4	939	SD, SL/CALC, MICA SH, SL/SDY
2	705.0-07.0						
3	707.0-08.0	4.1	17.0	16.2	70.6	373	SD, SLTY, SH/LAMS, MICA
4	708.0-09.0	5.1	17.8	24.0	53.3	620	SD, SLTY, SH/LAMS, MICA
5	709.0-10.0	55.0	21.1	38.5	29.9	1104	SD, SL/CALC, MICA
6	710.0-11.0	42.0	19.7	39.3	32.4	992	SD, SL/CALC, MICA
7	711.0-11.7	19.0	20.3	29.3	42.9	866	SD, CALC, SL/SHY, MICA LM
8	711.7-12.0						
9	712.0-13.0	2.9	17.9	19.5	58.6	553	SD, SLTY, CALC, SHY, MICA
10	713.0-14.0	7.8	17.6	24.4	54.1	603	SD, SLTY, CALC, SHY, MICA
11	714.0-15.0	154.0	20.3	32.5	38.1	938	SD, SL/CALC, MICA
12	715.0-16.0	0.6	18.0	18.7	62.7	500	SD, SHY, W/SH-LAMS, MICA SH, SL/SDY
13	716.0-16.5						

34.6

20.2

4.7

Σ = 91

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Petroleum Reservoir Engineering

DALLAS, TEXAS

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Well WOODHEAD NO. 27

## CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: SQUIRREL SAND 704.0-716.5			
FEET OF CORE RECOVERED FROM ABOVE INTERVAL	12.5	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	46.4
FEET OF CORE INCLUDED IN AVERAGES	9	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	41.0 (e)
AVERAGE PERMEABILITY: MILLIDARCYB	35.4	OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	319	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT	19.2	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	1.05 (c)
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	8.4	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	776

Calculated maximum solution gas drive recovery is 109(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: MILLIDARCYB		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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*Petroleum Reservoir Engineering*

COMPANY KANSAS LAND INVESTMENT, INC. FILE NO. 2408-850002  
 WELL WOODHEAD NO. 37 DATE 1-14-85  
 FIELD \_\_\_\_\_ FORMATION SOUTREE SAND ELEV. \_\_\_\_\_  
 COUNTY DOUGLAS STATE KANSAS DRLG. FLD. \_\_\_\_\_ CORES \_\_\_\_\_  
 LOCATION \_\_\_\_\_

# CORRELATION COREGRAPH

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VERTICAL SCALE: 5" = 100'

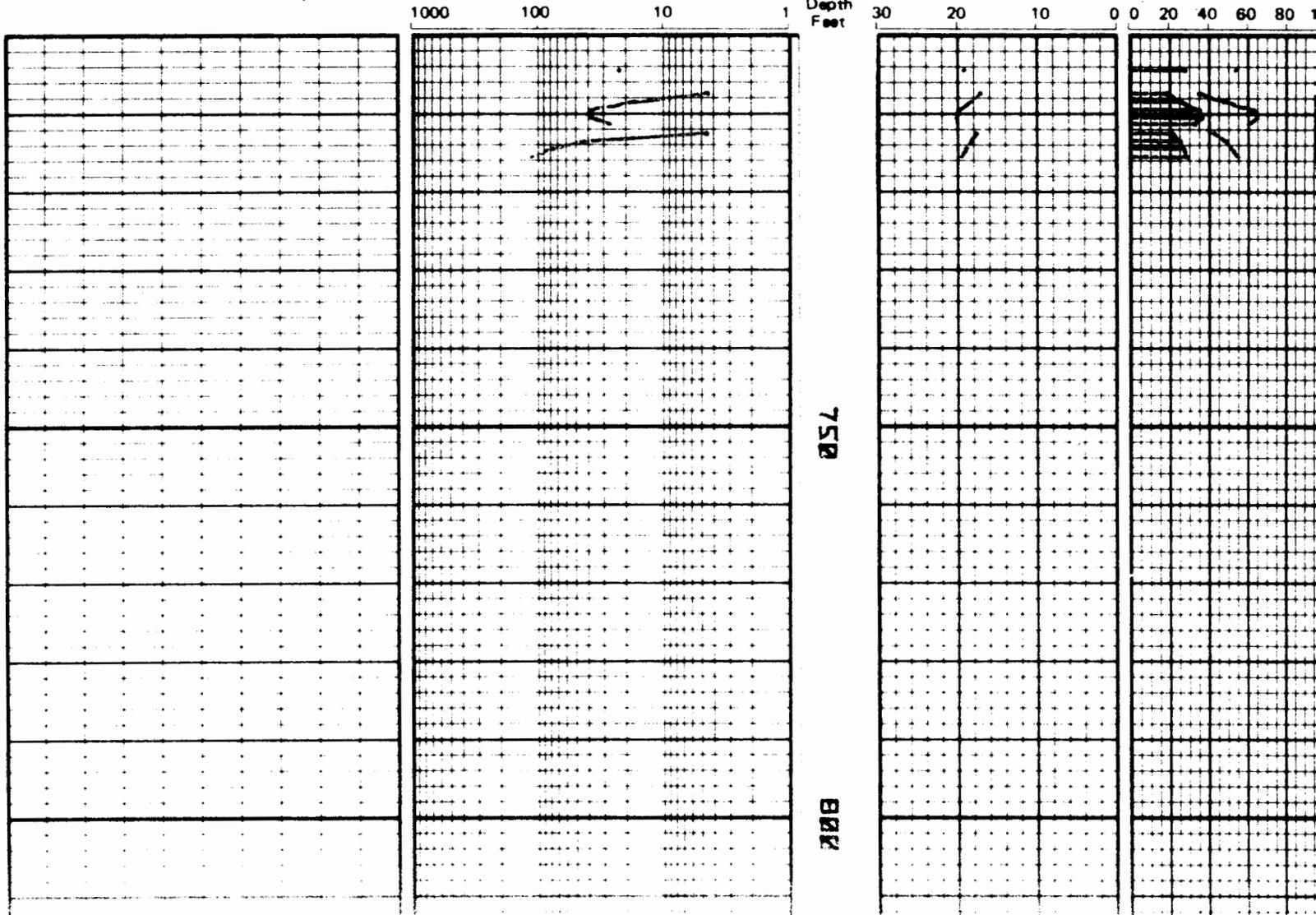
**Total Water** \_\_\_\_\_  
 PERCENT PORE SPAC  
 100 80 60 40 20

**Oil Saturation** \_\_\_\_\_  
 PERCENT PORE SPAC  
 0 20 40 60 80 100

**Gamma Ray**  
 RADIATION INCREASE →

**Permeability** \_\_\_\_\_  
 MILLIDARCIES

**Porosity** \_\_\_\_\_  
 PERCENT



750

200