

CORE ANALYSIS REPORT

FOR

KANSAS LAND INVESTMENT, INC.
WOODHEAD NO. 12 WELL
DOUGLAS COUNTY, KANSAS

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
TULSA OKLAHOMA

May 16, 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. 12 Well
Douglas County, Kansas
CLI File 3408-840092

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 672.0 and 682.0 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
J. Michael Edwards (jeh)
District Manager

JME:MCH:jeh
5 cc - Addressee

Kansas Land Investment, Inc.
Woodhead No. 12 Well
CLI File 3408-840092

Procedure Page

Handling and Analytical Procedures

Diamond coring equipment and air were used to obtain 2 1/8-inch diameter cores between 672.0 and 682.0 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

KANSAS LAND INVESTMENT, INC.
 WOODHEAD NO. 12 WELL
 DOUGLAS COUNTY, KANSAS

DATE: 5-16-84
 FORMATION: SQUIRREL SAND
 DRLG. FLUID: AIR
 LOCATION:

FILE NO: 3408-840092
 ENGINEER: HUDSON
 ELEVATION:

SMP. NO.	DEPTH	PERM. TO AIR MD. PLUG	POROSITY PERCENT	FLUID OIL	SATS. WTR.	STB/AF	DESCRIPTION
1	672.0-73.0	11.0	20.4	32.1	38.7	925	SD, LMY, MIC, PYR
2	673.0-74.0	38.0	22.6	36.1	32.2	1130	SD, LMY, MIC, PYR
3	674.0-75.0	31.0	22.0	34.8	35.8	1044	SD, LMY, MIC, PYR
4	675.0-76.0	13.0	22.0	34.0	38.1	1004	SD, LMY, MIC, SHY, PYR
5	676.0-77.0	29.0	21.4	35.6	32.4	1068	SD, LMY, MIC, SHY, PYR
6	677.0-78.0	25.0	21.3	35.5	36.6	997	SD, LMY, MIC, PYR
7	678.0-79.0	42.0	21.0	40.1	30.3	1082	SD, LMY, MIC, PYR
8	679.0-80.0	47.0	20.9	39.1	30.4	1073	SD, LMY, MIC
9	680.0-81.0	37.0	21.6	38.5	32.3	1083	SD, LMY, MIC, PYR
10	681.0-82.0	3.2	20.5	33.2	36.5	962	SD, SLTY, LMY, MIC, SHY

ROUTINE PLUG SUMMATION OF FLUIDS

11.0
 38.0
 31.0
 13.0
 29.0
 25.0
 42.0
 47.0
 37.0
 3.2

21.5
 36.2
 34.1
 30.1

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CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

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Well WOODHEAD NO. 12

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: SQUIRREL SAND 672.0-682.0			
FEET OF CORE RECOVERED FROM ABOVE INTERVAL	10	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	34.3
FEET OF CORE INCLUDED IN AVERAGES	10	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	30.0 (e)
AVERAGE PERMEABILITY: MILLIDARCYS	27.6	OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	276	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT	21.4	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	1.05 (c)
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	35.9	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	1037

Calculated maximum solution gas drive recovery is 145(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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COMPANY KANSAS LAND INVESTMENT, INC. FILE NO. 3408-340092
 WELL WOODHEAD NO. 12 DATE 5-16-84
 FIELD _____ FORMATION SQUIRREL SAND ELEV. _____
 COUNTY DOUGLAS STATE KANSAS DRLG. FLD. AIR 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
 1000 100 10 1

Porosity _____
 PERCENT
 30 20 10 0

Depth
 Feet

700

750

