# CORE ANALYSIS REPORT

FOR

KANSAS LAND INVESTMENT, INC.
JOHNSON NO. 3 WELL
DOUGLAS COUNTY, KANSAS

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

September 25, 1985

REPLY TO
7304 EAST 38TH STREET
TULSA, OKLAHOMA
74145

Kansas Land Investment, Inc.
222 East Third
Ottawa, Kansas 66067

Attn: Mr. Jim Mietchen

Subject: Core Analysis Data
Johnson No. 3 Well
Douglas County, Kansas
CLI File 3408-850212

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.

Histograms of porosity and permeability in addition to a graph of permeability versus porosity may be found on pages three and four.

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

JME:jk

5 cc - Addressee

Kansas Land Investment, Inc.
Johnson No. 3 Well
CLI File 3408-850212

Procedure Page

Handling and Analytical Procedures

Diamond coring equipment and air were used to obtain 2-1/8 inch diameter cores between 699.0 and 710.5 feet.

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

The cores were transported to Tulsa by bus.

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 for a period of thirty days without additional charge.

# CORE LABORATORIES, INC.

*Petroleum Reservoir Engineering*

DALLAS, TEXAS

KANSAS LAND INVESTMENT, INC.
JOHNSON NO. 3 WELL

DOUGLAS COUNTY, KANSAS

DATE : 9-25-85
FORMATION : SQUIRREL SAND
DRLG. FLUID: AIR
LOCATION :

FILE NO. : 3408-850212
API NO. :
LABORATORY: TULSA, OKLAHOMA

## CONVENTIONAL PLUG ANALYSIS

| SAMPLE NUMBER | DEPTH FEET | PERM PLUG | FLD POR | OIL% POR | WTR% POR | DESCRIPTION |
|---|---|---|---|---|---|---|
| 1 | 699.0- 0.0 | 1.2 | 18.9 | 25.6 | 48.8 | SD FN GRN SL/CALC SLTY SHY MICA |
| 2 | 700.0- 1.0 | 3.3 | 20.4 | 34.2 | 37.5 | SD FN GRN SL/CALC SLTY SHY MICA |
| 3 | 701.0- 1.5 | 3.3 | 17.5 | 9.0 | 82.7 | SD FN GRN SL/CALC SLTY SHY MICA |
| | 701.5- 2.1 | | | | | SH |
| 4 | 702.1- 3.0 | 7.7 | 20.9 | 22.6 | 49.6 | SD FN GRN SL/CALC SHY MICA |
| 5 | 703.0- 4.0 | 2.3 | 19.5 | 28.9 | 50.7 | SD FN GRN V/SHY W/SH LAMS MICA |
| 6 | 704.0- 5.0 | 12. | 23.0 | 34.4 | 30.6 | SD FN GRN SL/CALC MICA |
| 7 | 705.0- 6.0 | 28. | 21.8 | 37.9 | 28.7 | SD FN GRN SL/CALC MICA PYR |
| 8 | 706.0- 7.0 | 45. | 21.4 | 41.0 | 29.5 | SD FN GRN SL/CALC MICA PYR |
| 9 | 707.0- 8.0 | 54. | 20.4 | 40.8 | 30.9 | SD FN GRN SL/CALC MICA |
| 10 | 708.0- 9.0 | 6.4 | 19.6 | 34.5 | 35.6 | SD FN GRN SH LAMS MICA |
| 11 | 709.0-10.0 | 25. | 22.4 | 32.8 | 36.7 | SD FN GRN SL/CALC SL/SHY MICA |
| 12 | 710.0-10.5 | 10. | 22.5 | 32.7 | 35.7 | SD FN GRN SH LAMS MICA |

$h = 6.5$

$\phi = 21.5$

$S_o = 36.6$

$S_w = 32.3$ (29)

$\bar{V} = .590$

KANSAS LAND INVESTMENT, INC. — DATE : 9-25-85 — FILE NO. : 3408-850212
JOHNSON NO. 3 WELL — FORMATION : SQUIRREL SAND — ANALYSTS : HUDSON

## *** CORE SUMMARY AND CALCULATED RECOVERABLE OIL ***

DEPTH INTERVAL: 702.1 TO 710.5

FEET OF CORE ANALYZED : 8.4 FEET OF CORE INCLUDED IN AVERAGES: 7.4

-- SAMPLES FALLING WITHIN THE FOLLOWING RANGES WERE AVERAGED --

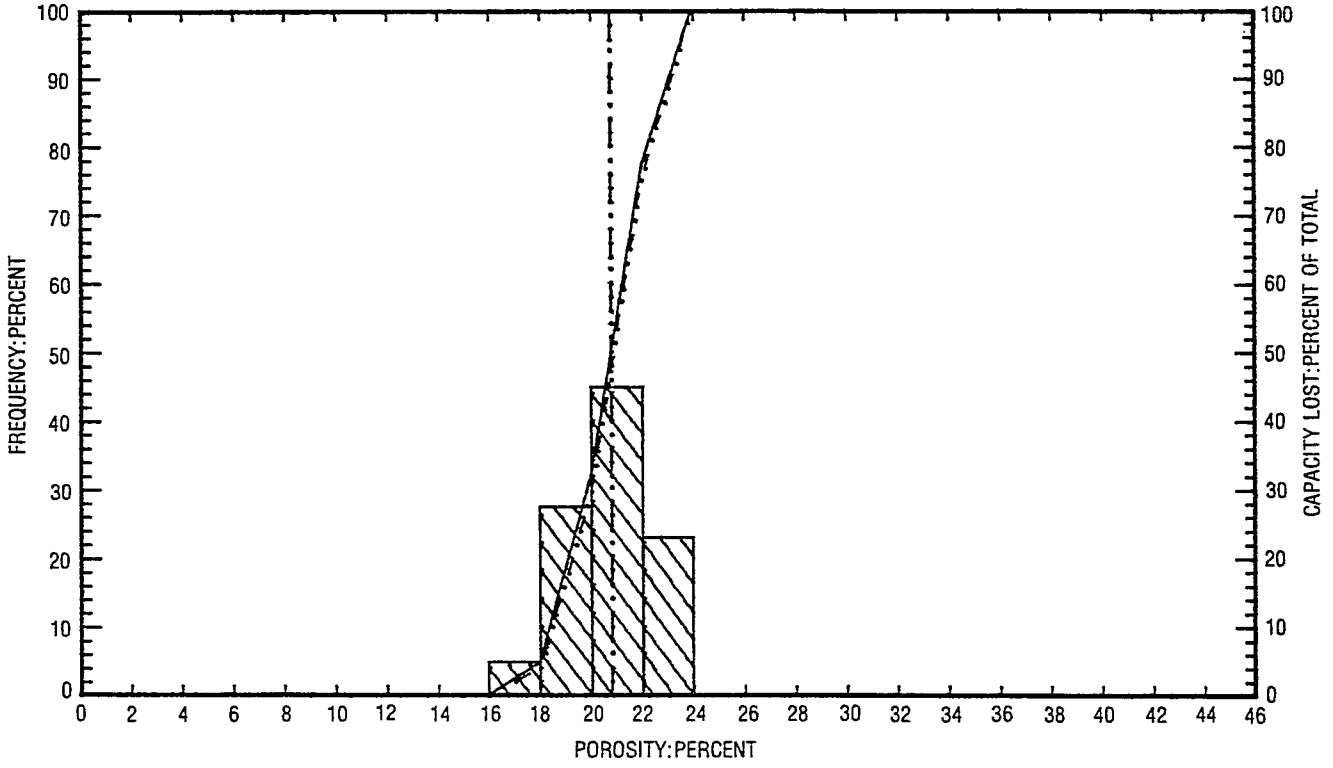
| | | | | |
|---|---|---|---|---|
| PERMEABILITY HORIZONTAL RANGE (MD.) | : | 5.0 | TO 60. | (UNCORRECTED FOR SLIPPAGE) |
| FLUID POROSITY RANGE (%) | : | 0.0 | TO 100.0 | |
| OIL SATURATION RANGE (%) | : | 20.0 | TO 50.0 | |
| WATER SATURATION RANGE (%) | : | 20.0 | TO 60.0 | |

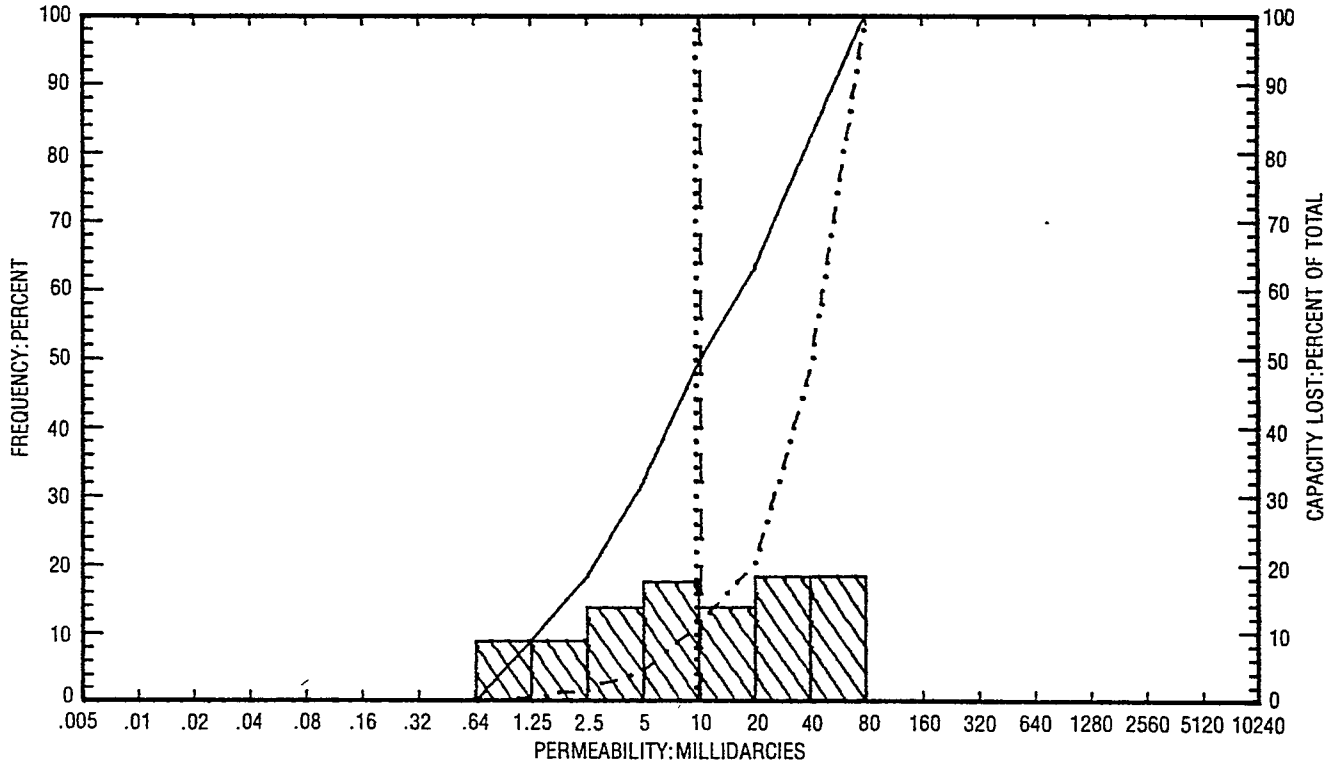
SHALE SAMPLES EXCLUDED FROM AVERAGES.

| | | | |
|---|---|---|---|
| AVERAGE PERMEABILITY (MILLIDARCIES) | | | |
| ARITHMETIC PERMEABILITY | : | 25. | |
| GEOMETRIC PERMEABILITY | : | 19. | |
| HARMONIC PERMEABILITY | : | 14. | |
| PRODUCTIVE CAPACITY (MILLIDARCY-FEET) | | | |
| ARITHMETIC CAPACITY | : | 182. | |
| GEOMETRIC CAPACITY | : | 138. | |
| HARMONIC CAPACITY | : | 105. | |
| AVERAGE POROSITY (PERCENT) | : | 21.4 | |
| AVERAGE RESIDUAL OIL SATURATION (PERCENT OF PORE SPACE) | : | 34.9 | |
| AVERAGE TOTAL WATER SATURATION (PERCENT OF PORE SPACE) | : | | 34.3 |
| AVERAGE CONNATE WATER SATURATION (PERCENT OF PORE SPACE) | : | (C) | 30.4 |
| OIL GRAVITY (API) | : | (E) | 30.0 |
| ORIGINAL SOLUTION GAS-OIL RATIO (CUBIC FEET PER BARREL) | : | (E) | 1. |
| ORIGINAL FORMATION VOLUME FACTOR (BBLS SATURATED OIL/STOCK-TANK BBL) | : | (C) | 1.05 |
| ORIGINAL STOCK-TANK OIL IN PLACE (BARRELS PER ACRE-FOOT) | : | (C) | 1103. |

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.

(C) CALCULATED (E) ESTIMATED (M) MEASURED (*) REFER TO ATTACHED LETTER.




## PERMEABILITY AND POROSITY HISTOGRAMS

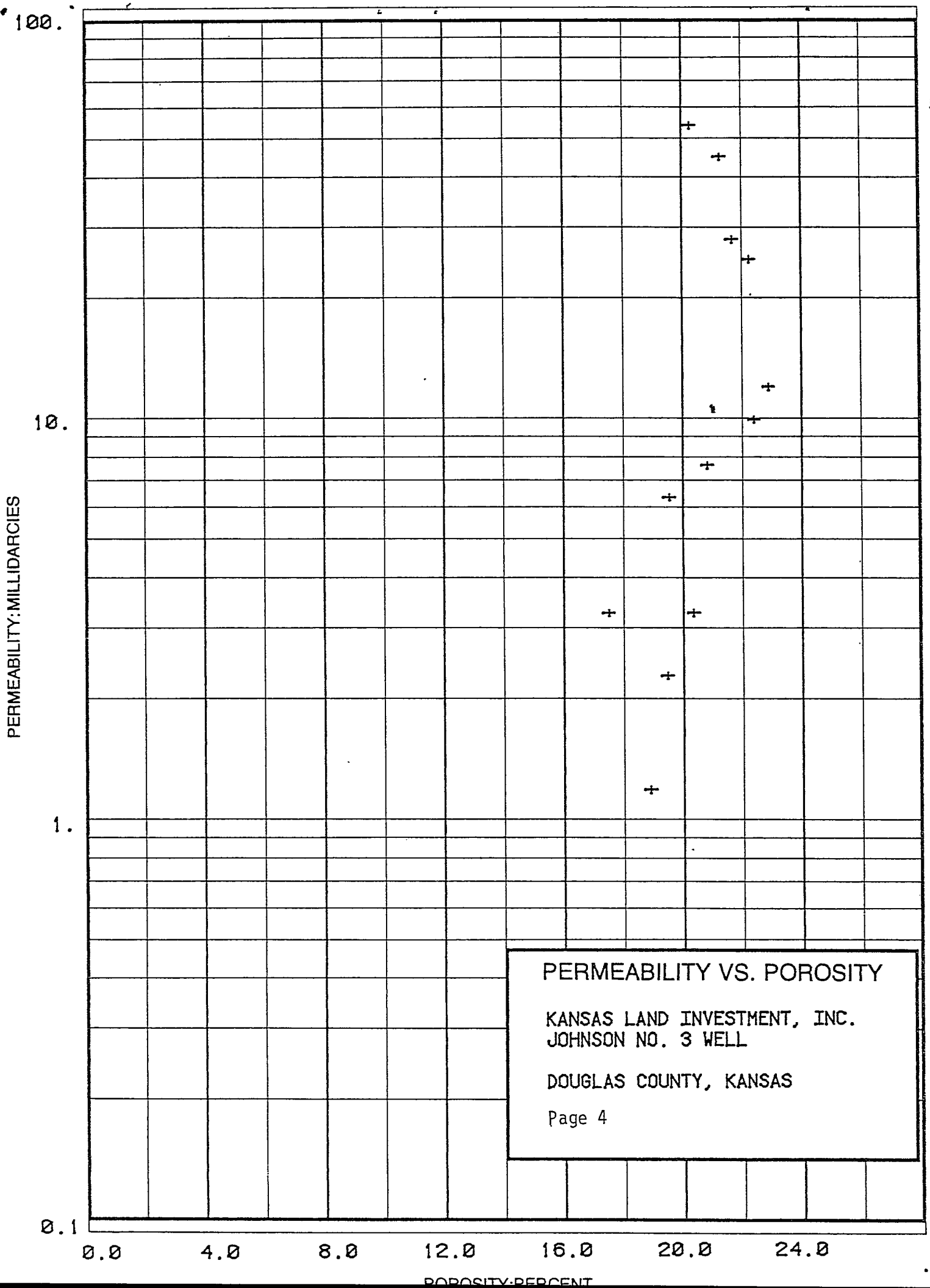


KANSAS LAND INVESTMENT, INC.
JOHNSON NO. 3 WELL

DOUGLAS COUNTY, KANSAS

**LEGEND**

| | |
|---|---|
| ARITHMETIC MEAN POROSITY | ..... |
| GEOMETRIC MEAN PERMEABILITY | ..... |
| MEDIAN VALUE | — — — |
| CUMULATIVE FREQUENCY | ——— |
| CUMULATIVE CAPACITY LOST | —·—·— |




## PERMEABILITY VS. POROSITY

KANSAS LAND INVESTMENT, INC.
JOHNSON NO. 3 WELL

DOUGLAS COUNTY, KANSAS

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

COMPANY KANSAS LAND INVESTMENT, INC. FILE NO. 3408-850212

WELL JOHNSON NO. 3 WELL DATE 9-25-85

FIELD ____ FORMATION SQUIRREL SAND ELEV. ____

COUNTY DOUGLAS COUNTY STATE KANSAS DRLG. FLD. AIR CORES ____

LOCATION ____

# CORRELATION COREGRAPH



*VERTICAL SCALE: 5" = 100'*

**Gamma Ray**
RADIATION INCREASE →

**Permeability** ____
MILLIDARCIES
1000 100 10 1

Depth Feet

**Porosity** ____
PERCENT
30 20 10 0

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

**Oil Saturation**
PERCENT PORE SPACE
0 20 40 60 80 10

650
700
750