CORE ANALYSIS REPORT

FOR

KEWANEE OIL COMPANY

KLINE NO. 3 WELL

HALLET FIELD

HODGEMAN COUNTY, KANSAS

CORE LAB

PETROLEUM RESERVOIR ENGINEERING

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

March 2, 1959

REPLY TO
707 MID-CONTINENT BLDG.
TULSA, OKLAHOMA

Kewanee Oil Company
P. O. Box 2093
Wichita, Kansas

Attention: Mr. H. S. Erskine

Subject: Core Analysis
Kline No. 3 Well
Hallet Field
Hodgeman County, Kansas

Gentlemen:

Mississippian lime analyzed from 4565 to 4580 feet is interpreted to be oil productive. Due to low permeability, formation in this zone from 4566.6 to 4571.6 feet is considered of minor importance and data therefrom have been excluded from further consideration in order to more accurately evaluate the better-developed zone. The ten productive feet considered have an average permeability of 88 millidarcys and a total observed natural productive capacity of 880 millidarcy-feet. Due to permeability variation, selective treatment probably will be desirable in order to establish greater initial flow rates and to achieve more uniform reservoir drainage. The weighted average porosity is 19.2 per cent and the estimated connate water saturation is 30 per cent of pore space. A small water cut from this interval is considered possible.

Recoverable oil estimates have been calculated for the Mississippian lime interval, 4565 to 4580 feet, using observed and estimated core analysis data for the ten productive feet considered in conjunction with estimated reservoir fluid characteristics considered applicable. These estimates are presented on page one of this report and are subject, in all respects, to the conditions outlined in the body of and in the footnotes to the summary page.

From 4592.0 to 4596.5 feet, Mississippian lime exhibits residual fluid saturations which are indicative of water production; however, due to low permeability, this zone probably is incapable of significant production.

Formation was recovered from the Kline No. 3 using diamond coring equipment and water base mud. Portions of the recovered formation were selected for analysis by an engineer of Core Laboratories, Inc. as directed by a representative of Kewanee Oil Company. These samples were quick-frozen to preserve fluid content and were transported to the Oklahoma City laboratory where analysis was performed by whole-core procedures using long segments of full-diameter core where possible. The analysis results have been shown in both tabular and graphical forms on the accompanying Coregraph.

Thank you for the opportunity to be of service.

Very truly yours,

Core Laboratories, Inc.

J. G. Evertson, Jr.,
District Manager

JGE:JDJ:jw

Form F-11B

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

CP-10-263

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Well Kline No. 3

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Mississippian Lime 4565.0-4580.0

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	15.0	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		49.0
FEET OF CORE INCLUDED IN AVERAGES	10.0	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(e)	30
AVERAGE PERMEABILITY: MILLIDARCYS Max.:	88	OIL GRAVITY: °API	(e)	30
AVERAGE PERMEABILITY: MILLIDARCYS 90°:	46			
PRODUCTIVE CAPACITY: MILLIDARCY-FEET Max.:	880	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	(e)	480
PRODUCTIVE CAPACITY: MILLIDARCY-FEET 90°:	401			
AVERAGE POROSITY: PER CENT	19.2	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	(e)	1.29
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	26.3	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		809

Calculated maximum solution gas drive recovery is 165 barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is 417 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.

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 profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.