

CORE ANALYSIS REPORT
FOR
KEWANEE OIL COMPANY
RED NO. 2 WELL
HALLET FIELD
HODGEMAN COUNTY, KANSAS



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

April 9, 1959

REPLY TO
707 MID-CONTINENT BLDG.
TULSA, OKLAHOMA

Kewanee Oil Company
Box 2093
Wichita, Kansas

Attention: Mr. H. S. Erskine

Subject: Core Analysis
Red No. 2 Well
Hallet Field
Hodgeman County, Kansas

Gentlemen:

Mississippian dolomite is characterized at analyzed points between the depths of 4600 and 4622 feet by residual fluid saturations which indicate oil production. The moderately erratic residual fluid saturations observed below 4617 feet may indicate the possibility of small water cuts. The 15 analyzed feet in the interval have a weighted average permeability of 16 millidarcys and a total observed natural productive capacity of 241 millidarcy-feet, indicating that effective treatment probably will be required to establish sustained satisfactory rates of flow. The weighted average porosity is 16.1 per cent and the connate water saturation as estimated from capillary pressure data available for this field averages 30 per cent of pore space. Since coring was begun in oil productive formation at 4600 feet, it is considered probable that additional productive capacity exists above that point. Should such be the case, the economic value of this section will be greater.

Estimates of recoverable oil have been calculated for the interval, 4600 to 4622 feet, using observed and estimated core analysis data for the 15 analyzed feet in conjunction with estimated original reservoir fluid characteristics considered applicable. The maximum solution gas drive recovery is calculated to be 171 barrels per acre-foot, assuming that production is started at original reservoir pressure and

is continued until such pressure declines to zero psig. The theoretical maximum ultimate recovery by water drive is calculated to be 497 barrels per acre-foot, assuming complete maintenance of original reservoir pressure, 100 per cent vertical and areal sweepage and continuation of production to 100 per cent water cut. Necessarily, past production attributable to this zone must be deducted in order to arrive at the now remaining theoretical recoverable reserves. To economic abandonment conditions, the oil recovery by either of the production mechanisms considered will fall short of the theoretical estimate, the amount of the difference being governed by reservoir characteristics and by limiting factors, such as economic limits on oil production rates, gas-oil ratios, or water-oil ratios. Calculations to determine the effects of these and other factors are beyond the scope of a core analysis report, but may be undertaken during the course of a comprehensive engineering study in which consideration is given to over-all reservoir data and economic factors.

The sample analyzed at 4631 to 4633 feet exhibits significant residual oil saturation; however, the total water saturation is relatively high, indicating the possibility of water production. This isolated section is considered of minor productive significance.

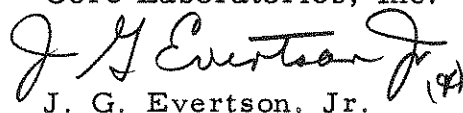
From 4655 to 4666 feet, Mississippian dolomite is characterized by relatively low and erratic residual oil saturations in association with unfavorably high total water saturations, conditions which are considered indicative of possible water production.

Formation was recovered from the Red No. 2 using diamond coring equipment and water base mud. Samples of recovered formation were selected for analysis as directed by a representative of Kewanee Oil Company, 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

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

CP-10-297 TMI

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Well Red No. 2

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Mississippian Dolomite 4600.0-4622.0

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	22.0	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	59.1
FEET OF CORE INCLUDED IN AVERAGES	15.0	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(e) 30
AVERAGE PERMEABILITY: MILLIDARCY	Max.: 16 90°: 15	OIL GRAVITY: °API	(e) 38
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max.: 241 90°: 161	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	(e) 480
AVERAGE POROSITY: PER CENT	16.1	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	(e) 1.29
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	23.4	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	678

Calculated maximum solution gas drive recovery is 171 barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is 497 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: MILLIDARCY		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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