

CORE ANALYSIS REPORT
FOR
KEWANEE OIL COMPANY
LARKIN NO. 5 WELL
HALLET FIELD
HODGEMAN COUNTY, KANSAS



CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

April 12, 1957

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

Attention: Mr. Paul G. Arnold

Subject: Core Analysis
Larkin No. 5 Well
Hallet Field
Hodgeman County, Kansas

Gentlemen:

Diamond coring equipment and water base mud were used to core the interval from 4586 to 4676 feet in the Larkin No. 5. Representatives of Kewanee Oil Company and of Core Laboratories, Inc. selected and quick-froze samples from various sections from the core, as denoted by appropriate remarks on the Completion Coregraph, and these samples were analyzed in the Oklahoma City laboratory. The analysis was made, where possible, by whole-core procedures using long segments of full-diameter core, and the results are presented in this report. At numerous points in the interval, the formation was unsuitable for whole-core permeability determinations, and an asterisk is shown after the permeability value where this condition occurred.

Basal Pennsylvanian conglomerate from 4591.0 to 4592.3 feet has favorable residual oil and total water saturations, but may be of inadequate productive thickness. It should be noted that conglomerate was logged from 4586.0 to 4593.5 feet, but that only one sample was selected for analysis.

Formation from 4603.6 to 4611.9 feet in the Mississippian dolomite is non-productive due to extremely low permeability and porosity.

From 4611.9 to 4626.0 feet, Mississippian dolomite is interpreted to be oil productive. However, the permeability throughout this interval is

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comparatively low, ranging from less than 0.1 to 38 millidarcys and averaging 11 millidarcys for the 12.6 feet of formation in the interval considered capable of production after treatment. Since the observed productive capacity is only 139 millidarcy-feet, favorable response to treatment will be necessary for commercial rates of fluid flow. The average porosity of the 12.6 feet of formation considered capable of production after treatment in this zone is 12.7 per cent, and the empirically calculated connate water saturation is 54.9 per cent of pore space.

Estimates of recoverable oil have been calculated for this zone using the observed core analysis data from the 12.6 feet of formation under discussion, together with estimated reservoir fluid characteristics considered applicable. These estimates are presented on page one of the report, and are subject to the conditions set forth in the body of and in the footnotes to the summary page.

Mississippian formation from 4626.0 to 4642.2 feet is characterized by residual oil and total water saturations indicating that oil production will be obtained, but only at significant initial water cuts. The zone is characterized by very low permeability, having an average permeability of 1.0 millidarcy for the 16.2 feet of formation in the zone. The porosity also is comparatively low, averaging 9.9 per cent, and the empirically calculated connate water saturation is 73.2 per cent of pore space. The zone is considered to have doubtful commercial possibilities due to the low productive capacity and to the comparatively high total water saturations which suggest the initial water cut mentioned previously. For this reason, recoverable oil estimates are withheld for the zone.

From 4651.0 to 4656.4 feet, the Mississippian dolomite formation is non-productive.

Thank you for the opportunity to be of service to you.

Very truly yours,

Core Laboratories, Inc.



J. W. Barbour, Jr.,
District Manager

JWB:TLK:ds

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Well Larkin No. 5

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL:		Mississippian 4611.9-4626.0	
FEET OF CORE RECOVERED FROM ABOVE INTERVAL	14.1	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	54.9
FEET OF CORE INCLUDED IN AVERAGES	12.6	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c) 54.9
AVERAGE PERMEABILITY: MILLIDARCYS	Max.: 11 90°.: 3.4	OIL GRAVITY: °API	(e) 38
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max.: 139 90°.: 43	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	(e) 480
AVERAGE POROSITY: PER CENT	12.7	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	(e) 1.29
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	23.2	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	344

Calculated maximum solution gas drive recovery is 86 barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is 116 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:		Mississippian 4626.0-4642.2	
FEET OF CORE RECOVERED FROM ABOVE INTERVAL	16.2	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	73.2
FEET OF CORE INCLUDED IN AVERAGES	16.2	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c) 73.2
AVERAGE PERMEABILITY: MILLIDARCYS	Max.: 1.0 90°.: 0.4	OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max.: 16 90°.: 6.5	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT	9.9	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	9.2	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 profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.