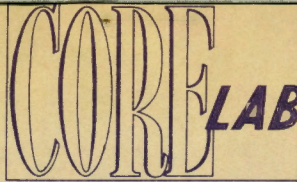


CORE ANALYSIS REPORT
FOR
A. D. ALLISON & COMPANY
HEATHERINGTON NO. 4 WELL
EL DORADO FIELD
BUTLER COUNTY, KANSAS



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

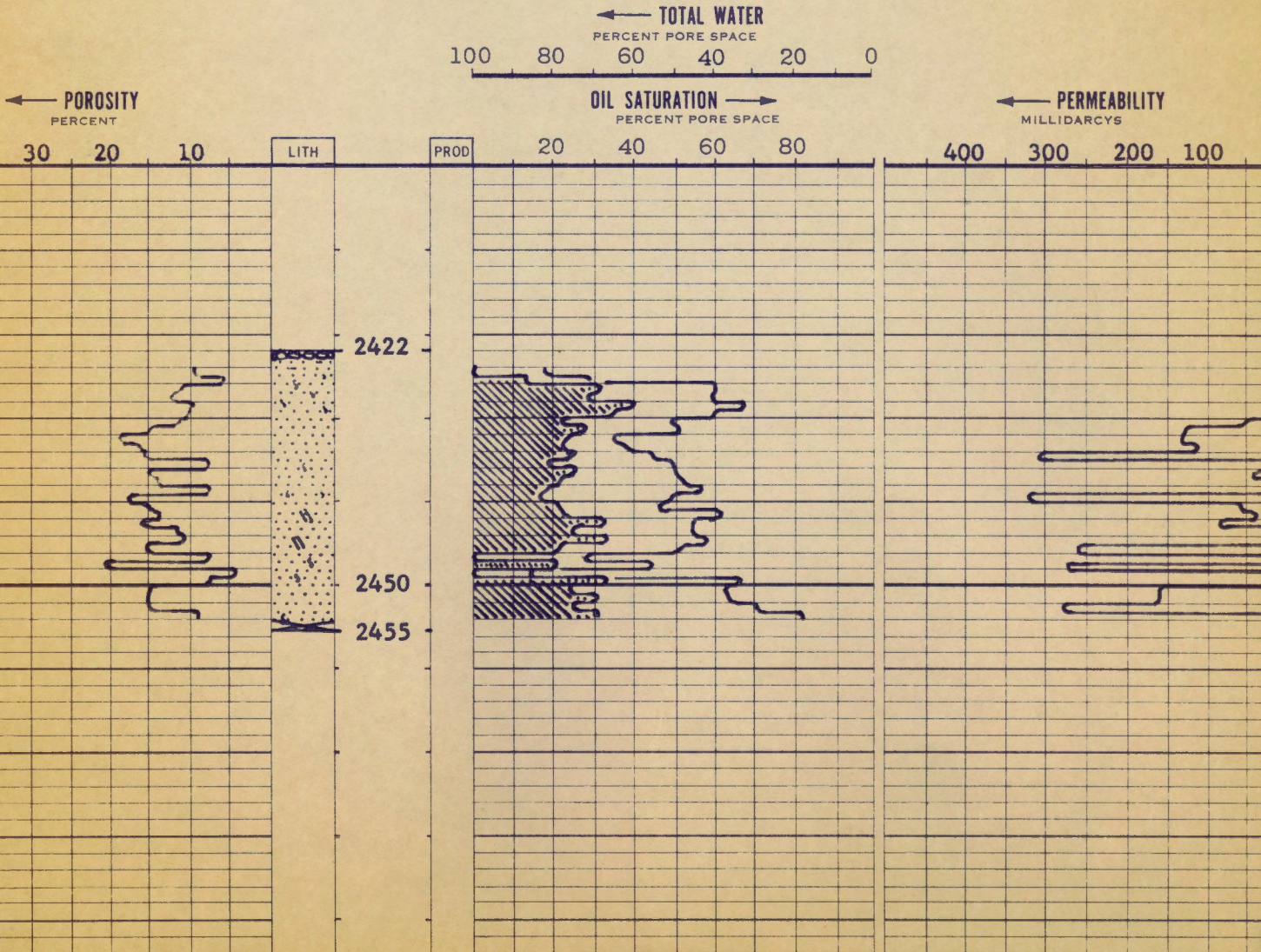
COMPANY A. D. ALLISON & COMPANY DATE ON 11/9/58 FILE NO. CP-10-188 FC
 WELL HEATHERINGTON NO. 4 DATE OFF 11/9/58 ENGRS. THC, DEB
 FIELD EL DORADO FORMATION SIMPSON ELEV. 1324' RB
 COUNTY BUTLER STATE KANSAS DRLG. FLD. WATER BASE MUD CORES DIAMOND
 LOCATION NE SW SE SEC 15-26S-4E REMARKS SAMPLED BY CLI ENGINEER AS DIRECTED BY REPRESENTATIVE OF CLIENT.

COMPLETION COREGRAPH

These analyses, opinions or interpretations are based on observations and material 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 representations 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.

SAND		LIMESTONE		CONGLOMERATE		CHERT	
SHALE		DOLOMITE		QUARTZITE		VERTICAL FRACTURES	

VERTICAL SCALE: 5" = 100'



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

November 19, 1958

REPLY TO
707 MID-CONTINENT BLDG.
TULSA, OKLAHOMA

A. D. Allison & Company
3212 East Kellogg
Wichita, Kansas

Attention: Mr. Jim Allison

Subject: Core Analysis
Heatherington No. 4 Well
El Dorado Field
Butler County, Kansas

Gentlemen:

Diamond coring equipment and water base mud were used to core the interval, 2422 to 2455 feet, in the Heatherington No. 4. An engineer of Core Laboratories, Inc. selected samples of recovered formation for analysis as directed by a representative of A. D. Allison & Company. These samples were quick-frozen to preserve fluid content and were transported to the Wichita laboratory. The results of the analysis are shown in tabular form on page one and in graphical form on the accompanying Completion Coregraph.

Simpson formation analyzed from 2424 to 2426 feet exhibits an absence of measurable permeability and is considered to be nonproductive.

From 2426 to 2454 feet, Simpson formation is interpreted to be capable of oil production. Formation within this interval at the following points is considered to be essentially nonproductive due to low permeability and porosity and data therefrom have been excluded from further consideration: 2435 to 2436, 2438 to 2439, 2446 to 2447 and 2448 to 2449 feet. The 24 productive feet have an average permeability of 104 millidarcys and a total observed natural productive capacity of 2496 millidarcy-feet, probably adequate to support satisfactory rates of flow without the necessity for a major treatment. The average porosity is 13.7 per cent and the

A. D. Allison & Company
Heatherington No. 4 Well

Page Two

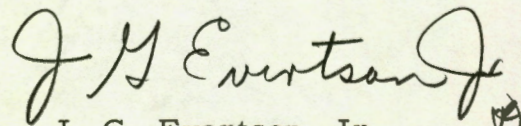
average connate water saturation, as estimated from capillary pressure data available for this field, is 22 per cent of pore space.

Recoverable oil estimates have been calculated for the Simpson formation interval, 2426 to 2454 feet, using observed and estimated core analysis data for the 24 productive feet and estimated reservoir fluid characteristics considered applicable. These estimates are presented on page two of this report and are subject, in all respects, to the conditions set forth in the body of and in the footnotes to the summary page. Please observe that the oil recoveries presented in this report are theoretical maximum values which have not been discounted for previous production or for the various economic limiting factors effecting ultimate recovery.

Thank you for the opportunity to be of service.

Very truly yours,

Core Laboratories, Inc.

A handwritten signature in cursive script that reads "J. G. Evertson, Jr." with a small mark to the right of the name.

J. G. Evertson, Jr.,
District Manager

JGE:JDJ:jg

7 cc. - Addressee

CORE ANALYSIS RESULTS

Company A. D. Allison & Company Formation Simpson File CP-10-188 FC
 Well Heatherington No. 4 Core Type Diamond Date Report 11-19-58
 Field El Dorado Drilling Fluid Water Base Mud Analysts THC-DEB
 County Butler State Kansas Elev. 1324'RB Location NE SW SE Sec. 15-26S-4E

Lithological Abbreviations

SAND - SD DOLOMITE - DOL ANHYDRITE - ANHY SANDY - SDY FINE - FN CRYSTALLINE - XLN BROWN - BRN FRACTURED - FRAC SLIGHTLY - SL/
 SHALE - SH CHERT - CH CONGLOMERATE - CONG SHALY - SHY MEDIUM - MED GRAIN - GRN GRAY - GY LAMINATION - LAM VERY - V/
 LIME - LM GYPSUM - GYP FOSSILIFEROUS - FOSS LIMY - LMY COARSE - CSE GRANULAR - GRNL VUGGY - VGY STYLOLITIC - STY WITH - W/

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS	POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE		SAMPLE DESCRIPTION AND REMARKS
				OIL	TOTAL WATER	
	2422-23					Chat
	23-24					Sd, sl/shy
1	24-25	<0.1	9.2	0.0	82.6	Sd, sl/shy, pyr
2	25-26	<0.1	6.1	13.1	72.1	Sd, fn grn, sl/qtz
3	26-27	1.1	10.8	31.3	39.8	Sd, fn grn, brn, sl/qtz
4	27-28	16	11.9	28.6	41.2	Sd, fn grn, brn, sl/qtz
5	28-29	2.9	9.3	39.8	32.3	Sd, fn grn, brn, qtz
6	29-30	0.8	10.1	34.7	39.6	Sd, fn grn, brn, qtz
7	30-31	52	11.3	22.1	51.3	Sd, fn grn, brn
8	31-32	130	14.4	27.8	49.3	Sd, fn grn, brn, fri
9	32-33	133	18.7	23.5	64.7	Sd, fn grn, brn, fri
10	33-34	117	16.4	22.6	61.1	Sd, fn grn, brn, fri
11	34-35	310	15.6	25.6	54.5	Sd, fn grn, brn, fri
12	35-36	0.1	7.9	19.0	50.6	Sd, v/qtz, hd
13	36-37	43	14.8	25.7	50.0	Sd, fn grn, brn
14	37-38	27	13.8	21.7	48.5	Sd, fn grn, brn
15	38-39	2.0	7.9	19.0	44.3	Sd, qtz
16	39-40	370	17.2	16.9	50.6	Sd, fn grn, brn, fri
17	40-41	59	14.5	20.7	53.8	Sd, fn grn, brn, fri
18	41-42	38	13.4	21.6	38.0	Sd, fn grn, brn, vert frac
19	42-43	80	15.4	33.4	46.1	Sd, fn grn, brn, fri
20	43-44	15	12.0	25.1	46.7	Sd, fn grn, brn
21	44-45	11	11.1	34.2	42.3	Sd, fn grn, brn, vert frac
22	45-46	260	15.2	21.7	49.4	Sd, fn grn, brn, fri
23	46-47	<0.1	7.4	Trace	73.0	Sd, qtz, white w/specks of show
24	47-48	227	21.4	21.0	55.1	Sd, fn grn, brn, fri
25	48-49	<0.1	3.6	0.0	86.1	Sd, qtz, white, shy, no show
26	49-50	2.6	7.6	34.3	32.9	Sd, fn grn, brn
27	50-51	164	14.6	24.0	38.4	Sd, fn grn, brn, fri
28	51-52	164	15.2	30.9	36.8	Sd, fn grn, brn, fri
29	52-53	278	15.1	24.5	29.8	Sd, fn grn, brn, fri
30	53-54	2.3	8.4	31.0	17.9	Sd, fn grn, qtz
	2454-55					Lost Core

26 [2505.8 / 96.4]
 26 [344.0 / 13.2]
 26 [680.7 / 26.2]
 24 [1165.0 / 44.8]

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CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

Page 2 of 2 File CP-10-188 FC
Well Heatherington No. 4

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Simpson 2426.0-2454.0

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	28.0	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	44.6
FEET OF CORE INCLUDED IN AVERAGES	24.0	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(e) 22
AVERAGE PERMEABILITY: MILLIDARCY	104	OIL GRAVITY: °API	(e) 39
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	2496	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	(e) 160
AVERAGE POROSITY: PER CENT	13.7	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	(e) 1.14
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	26.8	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	727

Calculated maximum solution gas drive recovery is 163 barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is 444 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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