CORE ANALYSIS REPORT

FOR

A. D. ALLISON & COMPANY

HEATHERINGTON NO. 3 WELL

EL DORADO FIELD

BUTLER COUNTY, KANSAS

CORE LAB

PETROLEUM RESERVOIR ENGINEERING

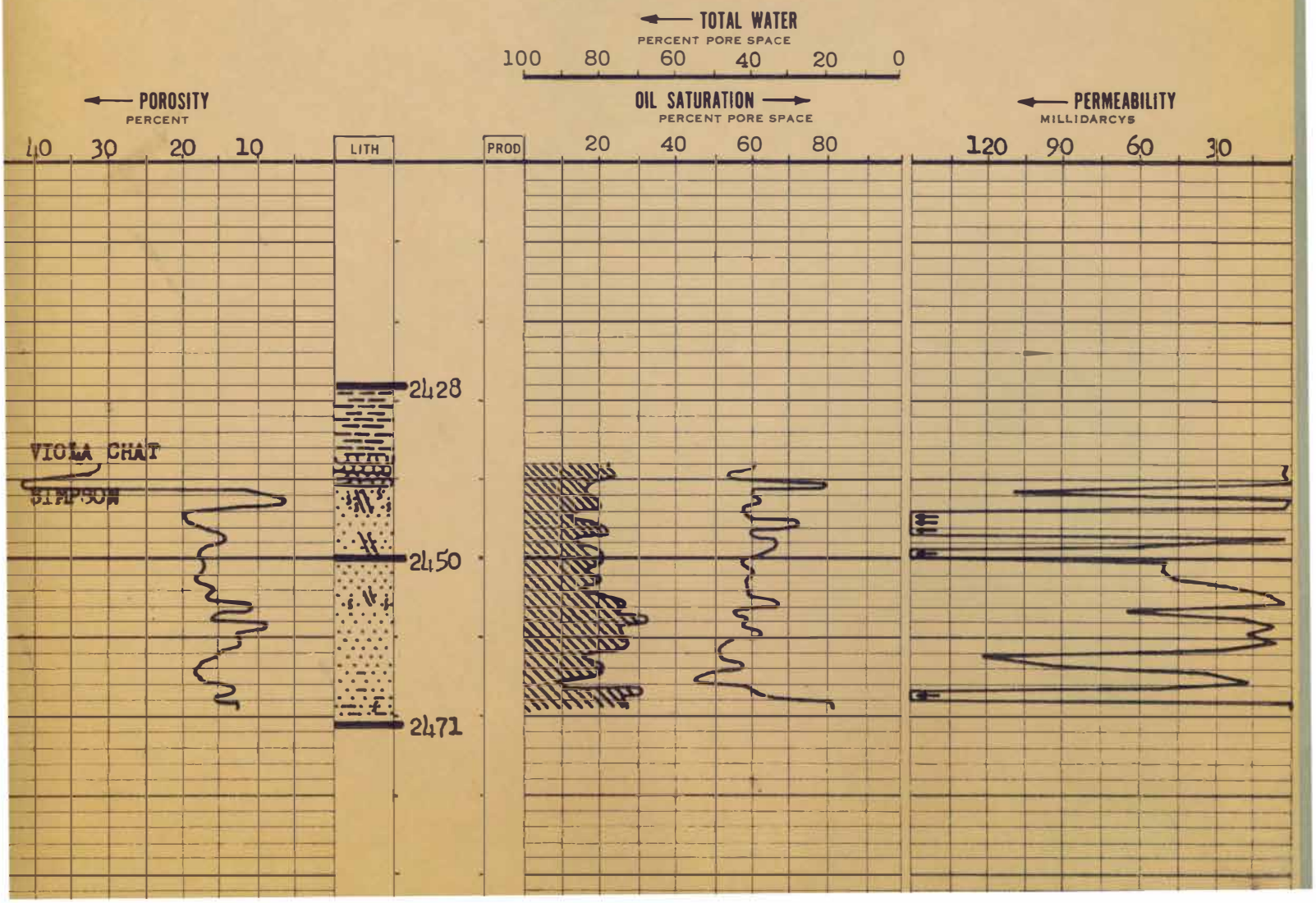
CORE LABORATORIES, INC. *Petroleum Reservoir Engineering*

MPANY	A. D. ALLISON & COMPANY	DATE ON	10-28-58	FILE NO.	CP-10-175 EC
LL	HEATHERINGTON NO. 3	DATE OFF	10-28-58	ENGRS.	EASTERWOOD
LD	EL DORADO	FORMATION	AS NOTED	ELEV.	1319' RB
UNTY	BUTLER STATE KANSAS	DRLG. FLD.	WATER BASE MUD	CORES	DIAMOND
CATION	NW SW SE SEC 15-26S-4E	REMARKS	SAMPLED BY CLI AS DIRECTED		

COMPLETION COREGRAPH

SAND SHALE LIMESTONE DOLOMITE CONGLOMERATE QUARTZITE CHERT

VERTICAL SCALE: 5" = 100'



CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

November 5, 1958

REPLY TO
707 MID-CONTINENT BLDG.
TULSA, OKLAHOMA

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

Subject: Core Analysis
Heatherington No. 3 Well
El Dorado Field
Butler County, Kansas

Gentlemen:

Diamond coring equipment and water base mud were used to core the interval, 2428 to 2471 feet, in the Heatherington No. 3. 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 graphical form on the accompanying Completion Coregraph and in tabular form on page one.

Viola Chat analyzed from 2438 to 2441 feet exhibits residual fluid saturations which are considered to be favorable to oil production. However, due to the somewhat low permeability of this zone and its limited extent, it is considered of minor productive importance in this well. A summary of average core analysis data for the three feet in this zone is presented on page two.

Simpson formation from 2441 to 2469 feet is interpreted to be capable of oil production. Due to low permeability and porosity, formation in this zone at 2442 to 2443 and 2468 to 2469 feet is considered of little productive significance and data therefrom have been excluded from further consideration. The 26 productive feet have an average permeability of 77 millidarcys and a total observed natural productive capacity of 2002 millidarcy-feet, probably adequate to support satisfactory rates of flow

prior to major treatment. The average porosity is 15.3 per cent and the average connate water saturation, as estimated from capillary pressure data available for this field, is 27 per cent of pore space.

Recoverable oil estimates have been calculated for the Simpson formation interval, 2441 to 2469 feet, using observed and estimated core analysis data for the 26 productive feet considered in conjunction with 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.

Thank you for the opportunity to be of service.

Very truly yours,

Core Laboratories, Inc.

J. G. Evertson, Jr.,
District Manager

JGE:JDJ:jg
7 cc. - Addressee
1 cc. - Mr. Delbert Costa
Wichita, Kansas

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

CORE ANALYSIS RESULTS

Company A. D. Allison & Company | Formation Simpson | File CP-10-175 FC
Well Heatherington No. 3 | Core Type Diamond | Date Report 11-5-58
Field El Dorado | Drilling Fluid Water Base Mud | Analysts DWE-THC
County Butler | State Kansas | Elev. 1319'RB | Location NW SW SE Sec. 15-26S-4E

Lithological Abbreviations

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

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS	POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE OIL	RESIDUAL SATURATION PER CENT PORE TOTAL WATER	SAMPLE DESCRIPTION AND REMARKS
	2428-37					Sh
	37-38					Chat
1	38-39	1.9	32.2	22.7	39.8	Chat
2	39-40	2.7	35.4	24.0	47.2	Chat
3	40-41	0.6	43.6	18.6	20.1	Chat
4	41-42	110	11.2	17.8	40.1	Sd, med grn, sl/qtz, vert frac
5	42-43	0.1	6.1	19.7	37.7	Sd, med grn, v/qtz, vert frac
6	43-44	3.4	12.4	20.2	41.9	Sd, med grn, v/qtz, vert frac
7	44-45	279	19.7	16.7	40.2	Sd, med grn, fri
8	45-46	230	18.4	18.5	27.2	Sd, med grn, fri
9	46-47	164	16.4	21.9	40.3	Sd, med grn, fri
10	47-48	3.5	14.0	13.6	33.6	Sd, med grn, fri w/vert frac
11	48-49	59	16.8	17.2	33.3	Sd, med grn, fri w/vert frac
12	49-50	218	17.7	20.9	37.3	Sd, med grn, fri w/vert frac
13	50-51	50	16.8	20.8	42.9	Sd, med grn, fri w/vert frac
14	51-52	52	17.2	16.9	40.1	Sd, med grn, fri
15	52-53	46	18.0	20.6	41.2	Sd, med grn, fri
16	53-54	25	15.8	15.8	40.5	Sd, med grn, fri
17	54-55	7.2	16.8	20.9	40.4	Sd, med grn, fri w/vert frac
18	55-56	2.4	11.1	27.1	32.4	Sd, qtz
19	56-57	69	14.6	25.4	44.5	Sd,
20	57-58	18	15.9	32.0	40.9	Sd,
21	58-59	6.3	8.4	25.0	42.8	Sd, v/pyr
22	59-60	17	12.8	25.7	37.5	Sd
23	60-61	6.5	12.4	27.4	46.7	Sd
24	61-62	28	14.7	25.8	49.0	Sd
25	62-63	121	15.1	15.9	47.7	Sd, fri
26	63-64	100	17.2	20.3	41.8	Sd, fri
27	64-65	36	18.3	20.2	50.3	Sd, sl/shy
28	65-66	17	17.2	9.3	56.4	Sd, sl/shy
29	66-67	53	13.8	30.4	40.5	Sd, sl/shy
30	67-68	275	15.4	26.6	37.0	Sd, sl/shy
31	68-69	0.2	12.8	27.4	18.7	Sd, shy, sl/qtz
	2469-71					Sd, v/shy w/vert sd incl

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Viola Chat 2438.0-2441.0

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	3.0	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	35.7
FEET OF CORE INCLUDED IN AVERAGES	3.0	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	
AVERAGE PERMEABILITY: MILLIDARCYS	1.7	OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	5.1	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT	36.9	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	21.9	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.*)

FORMATION NAME AND DEPTH INTERVAL: Simpson 2441.0-2469.0

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	28.0	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		41.0
FEET OF CORE INCLUDED IN AVERAGES	26.0	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(e)	27
AVERAGE PERMEABILITY: MILLIDARCYS	77	OIL GRAVITY: °API	(e)	39
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	2002	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	(e)	160
AVERAGE POROSITY: PER CENT	15.3	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	(e)	1.14
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	21.3	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		760

Calculated maximum solution gas drive recovery is 186 barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is 507 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.