CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS 1, TEXAS

November 3, 1961

REPLY TO
4010 N. YOUNGS BLVD.
P. O. BOX 7128
OKLAHOMA CITY, OKLA.

Continental Oil Company
335 West Lewis
Wichita, Kansas

Attention: Mr. R. C. Busby

Subject: Core Analysis
Brehm No. 1 Well
Wildcat Field
Pratt County, Kansas
CLI File No. CP-10-742

Gentlemen:

A portion of the Arbuckle formation was diamond cored in the Brehm No. 1 Well. Samples were selected by an engineer of Core Laboratories, Inc., for analysis. The measured data is presented in tabular and graphical form on the Coregraph.

INTERVAL, FEET	REMARKS AND INTERPRETATION
4363-4379	Crystalline dolomite with best permeability in upper portion. Residual fluid saturations are indicative of gas production with some oil cuts. Sufficient permeability exists between 4364 to 4370 feet to furnish natural flow rates.
4379-4384	Very shaly dolomite - no productive significance.
4384-4393	Crystalline dolomite has low permeability. Residual fluid saturations are indicative of oil productivity. Acid treatment needed to establish production from this interval.
4393-4399	Very shaly dolomite - no productive significance.
4399-4410	Crystalline dolomite with samll vugs. Oil productive - sufficient permeability exists to permit natural flow rates of production.
4410-4415	Dense shaly dolomite - no productive significance.
4415-4431	Dolomite with vugs and large vertical fractures. Oil productive - low matrix permeability, but obvious productive capacity furnished by large open fractures.

We are please to have been of service to you.

Yours very truly,

J. G. Evertson, Jr.
District Manager

JGE:db

CC 310

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

Well Brehm No. 1

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Arbuckle 4363 - 4379

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	16	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	38.2
FEET OF CORE INCLUDED IN AVERAGES	15	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	
AVERAGE PERMEABILITY: MILLIDARCYS	93 ?	OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	1394	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT	17.1	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	8.5	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: Arbuckle 4384 - 4393

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	9	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		32.1
FEET OF CORE INCLUDED IN AVERAGES	6	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(e)	25
AVERAGE PERMEABILITY: MILLIDARCYS	0.8	OIL GRAVITY: °API	(e)	35
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	4.6	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL		
AVERAGE POROSITY: PER CENT	11.5	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	(e)	1.27
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	18.8	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		527

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.

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Arbuckle 4399 - 4410

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	11		AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	30.2
FEET OF CORE INCLUDED IN AVERAGES	11		AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(e) 25
AVERAGE PERMEABILITY: MILLIDARCYS	365 ?		OIL GRAVITY: °API	(e) 35
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	4010		ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT	13.0		ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	(e) 1.27
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	14.0		CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	595

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: Arbuckle 4415 - 4431

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	16		AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	34.1
FEET OF CORE INCLUDED IN AVERAGES	11		AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(e) 25
AVERAGE PERMEABILITY: MILLIDARCYS	4.3 ?		OIL GRAVITY: °API	(e) 35
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	47		ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT	9.4		ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	(e) 1.27
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	14.7		CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	430

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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COMPANY CONTINENTAL OIL COMPANY — DATE ON 10-14-61 — FILE NO. CP10-742 FC

WELL BREHM NO. 1 — DATE OFF 10-19-61 — ENGRS. BOYLE

FIELD WILDCAT B — FORMATION ARBUCKLE — ELEV. 1945 DF

COUNTY PRATT — STATE KANSAS — DRLG. FLD. WATER BASE MUD — CORES DIAMOND

LOCATION SW-SE-SW SEC 23-28S-13W — REMARKS CLI SAMPLED

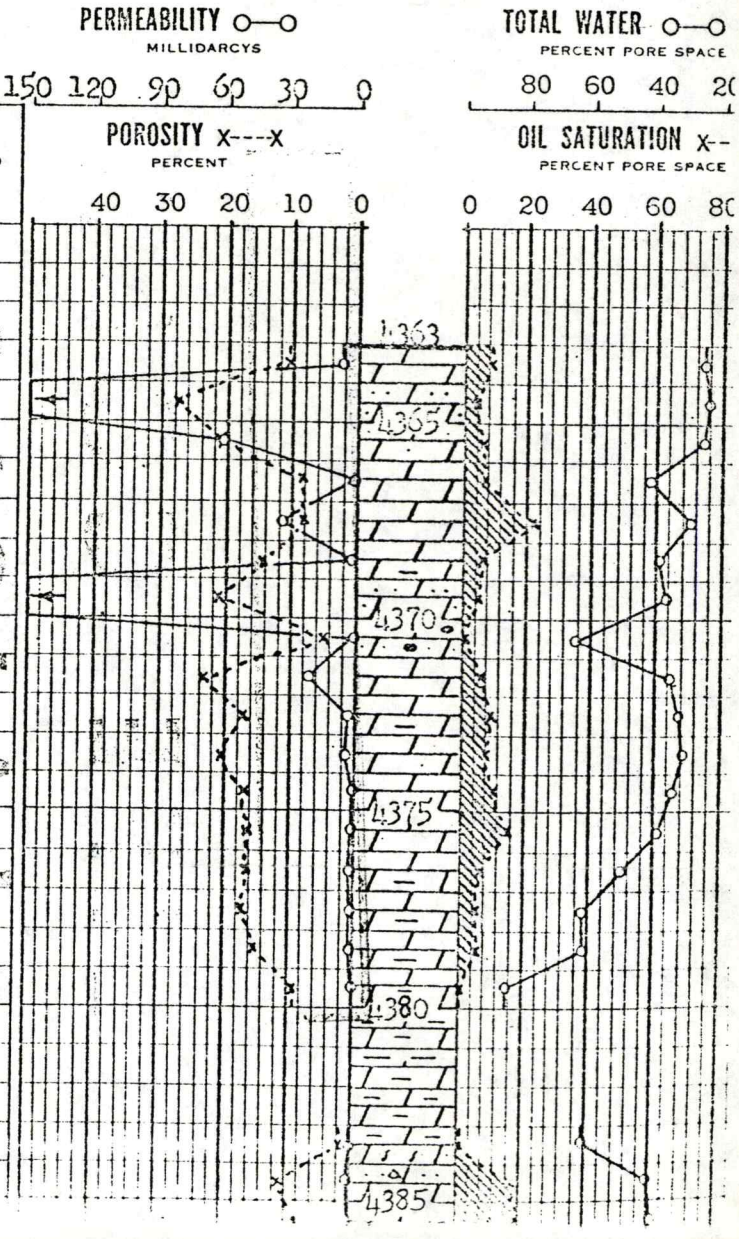
SAND LIMESTONE CONGLOMERATE CHERT

SHALE DOLOMITE

TABULAR DATA and INTERPRETATION

SAMPLE NUMBER	DEPTH FEET	PERM. MD.	POROSITY %	RESIDUAL SATURATION % PORE SPACE			PROD
				OIL	TOTAL WATER		
	4390-91 no Sox						
1	4363-64	7.2	10.6	8.5	26.4		
2	64-65	1030	27.9	3.6	24.4		
3	65-66	62	21.2	6.6	26.4		
4	66-67	0.2	8.5	7.1	42.4		
5	67-68	35	8.2	22.0	30.5		
6	68-69	1.6	14.2	6.3	39.4		
7	69-70	227	21.6	4.6	37.5		
8	70-71	<0.1	5.4	tr	65.0		
9	71-72	21	23.3	6.3	35.4		
10	72-73	3.3	17.7	9.6	32.8		
11	73-74	4.0	20.1	8.0	31.4		
12	74-75	1.0	17.0	11.2	34.7		
13	75-76	1.0	16.4	15.9	39.0		
14	76-77	0.7	16.6	6.6	50.0		
15	77-78	0.1	17.5	5.1	61.6		
16	78-79	0.2	15.7	5.7	61.8		
17	79-80	<0.1	9.6	0.0	86.5		
						23/0	
18	83-84	<0.1	1.8	tr	61.0		
19	84-85	1.0	11.4	18.4	40.4		

COMPLETION COREGRAPH



18	84-85	<0.1	1.8	tr	61.0
19	85-86	1.0	11.4	18.4	40.4
20	86-88	1.0	8.1	19.8	39.5
21	88-87	<0.1	5.7	15.8	42.1
22	88-89	<0.1	6.5	15.4	67.6
23	89-90	0.4	10.1	17.3	20.8
24	90-91	1.9	14.9	15.4	16.1
25	91-92	0.2	14.3	23.3	32.9
26	92-93	0.1	10.2	17.6	43.2
27	93-94	<0.1	6.2	0.0	77.5
28	98-99	<0.1	5.7	0.0	36.0
29	99-00	105	11.3	18.6	18.6
30	4400-01	3700	15.6	12.2	22.4
31	01-02	88	13.8	12.3	28.2
32	02-03	7.6	16.3	14.1	32.5
33	03-04	10	15.4	12.3	36.3
34	04-05	15	15.1	12.6	35.0
35	05-06	0.3	8.3	15.7	18.2
36	06-07	79	14.4	13.2	31.3
37	07-08	0.1	10.1	13.0	46.5
38	08-09	4.4	12.1	14.9	34.0
39	09-10	1.0	10.3	14.6	29.2
40	10-11	<0.1	5.6	0.0	80.5
41	11-12	<0.1	3.5	0.0	77.0
42	12-13	<0.1	4.2	0.0	61.0
43	13-14	<0.1	5.5	0.0	84.0
44	14-15	<0.1	1.9	tr	58.0
45	15-16	0.1	7.8	12.3	27.0
46	16-17	0.4	11.5	8.7	70.5
47	17-18	0.3	10.0	13.0	35.0
48	18-19	0.5	12.4	13.7	32.3
49	19-20	0.1	10.1	9.9	34.6
50	20-21	<0.1	4.0	12.5	55.0
51	21-22	0.5	7.6	17.1	27.7
52	22-23	0.1	5.0	22.0	32.0
53	23-24	<0.1	3.2	9.4	50.0
54	24-25	<0.1	4.9	22.4	49.0
55	25-26	0.2	9.6	13.6	20.3
56	26-27	37	11.7	13.0	30.3
57	27-28	3.1	3.1	19.8	32.2
58	28-29	0.1	9.7	13.4	32.0
59	29-30	<0.1	7.0	15.7	50.0
60	30-31	<0.1	6.9	14.5	33.3