1552

33-21-24W

KML

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

November 13, 1972

REPLY TO
8 N. W. 42ND ST.
OKLAHOMA CITY, OKLA.
73118

1

Oasis Petroleum, Inc.
800 Sutton Place
Wichita, Kansas 67202

Attn: Mr. E. G. McNeil

Subject: Core Analysis Data
Deutsch No. 4 Well (becomes Bindley WF Unit #205 in 2007)
Bindley Field
Hodgeman County, Kansas
CLI File No. CP-1-7677

Gentlemen:

Three and one-half inch diameter diamond cores from the interval 4636 to 4689 feet were examined at the surface of the Deutsch No. 4 well-site. The recovered formation was preserved at the well-site and later shipped to the Oklahoma City Laboratory where the accompanying physical measurements and the accompanying Core-Gamma Surface Log were determined and recorded.

Oil productive dolomite exists within the interval 4643.5 to 4670 feet with the best permeability and porosity development being present in the basal portion of the interval. Oil-water transition is thought to exist below 4670 feet.

Average core analysis data along with calculated oil in place values are presented on page four of this report.

We appreciate this opportunity of serving you and remain ready to serve your needs in formation or reservoir analysis.

Very truly yours,

CORE LABORATORIES, INC.

Dale E. Boyle

Dale E. Boyle
Oklahoma City Laboratory Manager

DEB:es

6 cc - Addressee

1552 33-21-24W Bindley WF Unit 205

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

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CORE ANALYSIS RESULTS

Company OASIS PETROLEUM, INC. Formation MISSISSIPPIAN File CP-1-7677
Well DEUTSCH NO. 4 Core Type DIAMOND 3 1/2" Date Report 11-6-72
Field BINDLEY Drilling Fluid WATER BASE MUD Analysts BOYLE
County HODGEMAN State KANSAS Elev. 2444' KB Location SE SE SEC. 33-21S-24W

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		SAMPLE DESCRIPTION AND REMARKS
		PERM. MAX.	PERM. 90°		OIL	TOTAL WATER	
	WHOLE-CORE ANALYSIS - Corrected Data						
1	4636.0-37.0	0.3	0.3	5.7	0.0	81.0	Dol,sl/shy,vert frac
2	37.0-38.0		<0.1*	9.9	Tr	93.3	Dol,sl/shy,vert frac
3	38.0-39.0	<0.1	<0.1	8.5	13.3	63.3	Dol,sl/shy,vert frac
4	39.0-40.0		<0.1*	5.8	12.7	46.0	Dol,sl/shy,vert frac
5	40.0-41.0	1.2	0.3	6.5	0.0	87.5	Dol,shy,vert frac
	41.0-42.0						Sh
6	42.0-43.0	<0.1	<0.1	3.6	11.9	57.1	Dol,pp vugs
	43.0-43.5						Sh
7	43.5-44.0	4.4	4.4	17.3	29.3	28.3	Dol,pp vugs
8	44.0-45.0	12	12	21.5	32.8	27.9	Dol,pp vugs
9	45.0-46.0		<0.1*	9.0	27.8	44.8	Dol
10	46.0-47.0	18	16	17.8	27.3	34.7	Dol,shy
11	47.0-48.0	3.5	3.5	13.6	28.7	32.3	Dol,pp vugs
12	48.0-49.0		0.2*	11.0	21.9	63.0	Dol,shy
13	49.0-50.0	<0.1	<0.1	8.1	22.8	59.6	Dol,pp vugs
	50.0-50.3						Dol,dse,shy
14	50.3-50.7	608	290	10.9	13.3	57.8	Cong,quartzitic
	50.7-51.0						Dol,dse
15	51.0-52.0	<0.1	<0.1	8.0	0.0	80.7	Dol,sl/shy
16	52.0-53.0		<0.1*	6.0	0.0	81.2	Dol,sl/shy
17	53.0-54.0		0.3*	13.7	16.3	60.8	Dol,sl/shy,vert frac
18	54.0-55.0		15 *	15.2	16.1	39.1	Dol,vuggy,vert frac
19	55.0-56.0						Lost core
19	56.0-57.0	<0.1	<0.1	9.5	15.8	68.2	Dol,sl/shy,pp vugs,vert frac
20	57.0-58.0	4.2	2.2	15.4	20.6	50.3	Dol,vuggy
21	58.0-59.0	11	9.1	16.1	24.7	40.8	Dol,vuggy
22	59.0-60.0	173	14	17.8	22.7	41.1	Dol,vuggy,vert frac
23	60.0-61.0	111	37	18.7	18.3	53.4	Dol,vuggy,vert frac
24	61.0-62.0	<0.1	<0.1	11.5	10.6	72.9	Dol
25	62.0-63.0		<0.1*	14.8	0.0	86.4	Dol,pp vugs,vert frac
26	63.0-64.0	<0.1	<0.1	13.4	0.8	86.0	Dol,few pp vugs
27	64.0-65.0	1.1	1.1	12.9	17.3	59.1	Dol,pp vugs
28	65.0-66.0	30	26	19.7	25.2	35.7	Dol,pp vugs
29	66.0-67.0	31	24	20.1	21.6	45.2	Dol,pp vugs
30	67.0-68.0	51	36	20.4	27.8	40.2	Dol,vuggy
31	68.0-69.0	29	26	20.4	28.7	35.6	Dol,vuggy
32	69.0-70.0	12	12	18.2	25.7	45.3	Dol,vuggy
33	70.0-71.0	0.4	0.3	9.3	Tr	86.3	Dol,w/sh partings
34	71.0-72.0	0.4	0.2	15.7	3.1	88.5	Dol,pp vugs
35	4672.0-73.0	7.7	7.5	16.6	2.8	75.9	Dol,pp vugs

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

File CP-1-7677 Page No. 2
Well DEUTSCH NO. 4

CORE ANALYSIS RESULTS

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS MAX.	90°	POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE OIL	TOTAL WATER	SAMPLE DESCRIPTION AND REMARKS
36	4673.0-74.0	6.8	6.3	15.2	9.1	55.3	Dol,pp vugs
37	74.0-75.0	13	9.7	16.0	8.8	51.5	Dol,pp vugs
38	75.0-76.0		1.1*	11.9	9.0	57.7	Dol,pp vugs
39	76.0-77.0	12	12	16.6	13.0	46.3	Dol,pp vugs
40	77.0-78.0	0.2	<0.1	12.2	0.0	87.3	Dol
41	78.0-79.0	0.8	0.2	17.4	0.9	81.7	Dol,w/few pp vugs
42	79.0-80.0	1.6	0.8	17.2	1.4	83.4	Dol
43	80.0-81.0	0.3	0.2	16.5	0.8	86.3	Dol
44	81.0-82.0	0.7	0.6	18.6	1.4	85.9	Dol
45	82.0-83.0	2.5	2.4	15.9	0.8	76.6	Dol,pp vugs
46	83.0-84.0	0.4	0.1	11.7	1.1	85.1	Dol
47	84.0-85.0	<0.1	<0.1	14.0	1.3	86.1	Dol,w/few pp vugs
48	85.0-86.0	0.6	0.5	15.8	1.4	82.9	Dol
49	86.0-87.0		1.1*	16.8	0.9	80.5	Dol,w/lg cht incl
50	87.0-88.0	0.2	0.1	20.6	1.1	88.3	Dol
	4688.0-89.0						Lost core

* DENOTES PLUG PERMEABILITY

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CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Mississippian - 4643.5 to 4670.0 feet

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		26.5	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	45.7
FEET OF CORE INCLUDED IN AVERAGES		20	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	35
AVERAGE PERMEABILITY: MILLIDARCYS	Max. 90°	56 18	OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET		1,120	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT		15.6	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	1.03
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		23.1	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	764

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:

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: MILLIDARCYS		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.

CORE ANALYSIS RESULTS

SAMPLE NUMBER	DEPTH FEET	GRAIN DENSITY	POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE		SAMPLE DESCRIPTION AND REMARKS
				OIL	TOTAL WATER	
7		2.86				
8		2.86				
10		2.87				
11		2.87				
18		2.86				
20		2.85				
21		2.86				
22		2.86				
23		2.85				
28		2.86				
29		2.85				
30		2.86				
31		2.86				
39		2.83				

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COMPANY	OASIS PETROLEUM, INC.	FIELD	BINDLEY	FILE	CP-1-7677
WELL	DEUTSCH NO. 4	COUNTY	HODGEMAN	DATE	11-6-72
LOCATION	SE SE SEC. 33-21S-24W	STATE	KANSAS	ELEV.	2444' KB

CORE-GAMMA CORRELATION

VERTICAL SCALE: 5" = 100'

CORE-GAMMA SURFACE LOG
(PATENT APPLIED FOR)

GAMMA RAY
RADIATION INCREASE →

COREGRAPH

TOTAL WATER
PERCENT TOTAL WATER
80 60 40 20

PERMEABILITY
MILLIDARCYS
100 50 10 5 1

POROSITY
PERCENT
20 10

OIL SATURATION
PERCENT PORE SPACE
0 20 40 60 80