CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
OKLAHOMA CITY, OKLAHOMA

REPLY TO
SUITE 133
400 SOUTH VERMONT
OKLAHOMA CITY, OKLA.
73108

June 15, 1979

Mesa Petroleum Company
P. O. Box 2009
Amarillo, Texas 79189

Attn: Mr. Les Carnes

Subject: Core Analysis Data
Moore No. 2-29 Well
Clark County, Kansas
CLI File 3402-9695

Gentlemen:

Cores taken in the subject well in the Morrow and Mississippian formations were received at the Oklahoma City laboratory for special analytical testing described on the procedure page.

The accompanying Coregraph presents the Surface Core-Gamma Log and binomially averaged core analysis data in graphical form to aid correlation with downhole electrical surveys.

Tabular presentation of the measured physical properties may be found on pages one and two of this report.

Data averages reflecting zone changes are presented on page four along with certain interpretive comments of interest.

Horizontal permeabilities were measured on one-inch diameter plugs drilled from the whole core samples within the analyzed interval to aid in determining the permeability reduction due to mud filtrate damage in the periphery of the whole core samples. These plug permeabilities are reported on page three of this report.

It is a pleasure to have this opportunity of serving you.

Very truly yours,

CORE LABORATORIES, INC.

J. Michael Edwards

J. Michael Edwards for
Dale E. Boyle, District Manager

DEB:JME:nm
2 cc - Addressee
2 cc - Mesa Petroleum Company
Attn: Mr. James Young
1616 Lincoln Blvd. - Suite 2800
Denver, Colorado 80264

Mesa Petroleum Company
Moore No. 2-29 Well
CLI File 3402-9695

Procedure Page

Handling and Analytical Procedures

Diamond coring equipment and water base mud were used to obtain 3.5 inch diameter cores between 5125 and 5170 feet.

The cores were preserved at the well site in a CO_2 atmosphere by CLI personnel.

The cores were transported to Oklahoma City by CLI personnel.

A Core-Gamma Log was recorded for downhole E-Log correlation.

Core analysis was made in the intervals requested on right cylinder full diameter samples.

Fluid removal was accomplished using vacuum retorts.

Porosity was determined by density balance method.

Air permeability in two horizontal directions and vertical direction measured without Klinkenberg correction.

Cores were slabbed for future geological study.

Temporary storage of cores and slabs in Oklahoma City laboratory awaiting additional instructions.

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

MESA PETROLEUM COMPANY
MOORE NO. 2-29 WELL

CLARK COUNTY, KANSAS

DATE: 6/6/79
FORMATION: AS NOTED
DRLG. FLUID: WATER BASE MUD
LOCATION:

FILE NO: 3402-9695
ENGINEER: BOYLE
ELEVATION:

* INDICATES PLUG PERM

WHOLE CORE ANALYSIS

MORROW FORMATION

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY PERCENT	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
1	5125.0-26.0	40.0	36.0	3.2	14.6	10.3	58.4	2.70	SD,PYR,SL/SHY
2	5126.0-27.0	287.0	276.0	118.0	15.1	12.2	59.9	2.71	SD,PYR
3	5127.0-28.0	310.0	273.0	137.0	19.3	12.9	58.7	2.66	SD
4	5128.0-29.0	355.0	345.0	139.0	18.8	12.0	60.4	2.65	SD
5	5129.0-30.0	587.0	562.0	273.0	21.1	9.3	68.1	2.66	SD,VF
6	5130.0-31.0	264.0	230.0	6.1	19.5	8.5	65.8	2.73	SD,PYR,VF
7	5131.0-32.0	498.0	447.0	181.0	18.0	8.0	65.7	2.65	SD,SL/PYR
8	5132.0-33.0	798.0	798.0	369.0	21.3	8.3	66.6	2.65	SD
9	5133.0-34.0	435.0	427.0	8.5	18.1	8.1	61.7	2.83	SD,PYR
10	5134.0-35.0	736.0	717.0	130.0	17.9	10.1	74.9	2.65	SD
11	5135.0-36.0	3296.0	549.0	1532.0	20.3	7.0	69.2	2.65	SD,VF
12	5136.0-37.0	561.0	561.0	338.0	20.9	7.5	68.1	2.66	SD
13	5137.0-38.0	313.0	313.0	277.0	17.8	9.1	60.7	2.65	SD,SL/PYR
14	5138.0-39.0	13.0	10.0	0.1	8.7	6.6	62.2	2.89	SD,PYR,SL/LMY
15	5139.0-40.0	239.0	214.0	292.0	17.0	12.2	56.2	2.66	SD,VF
16	5140.0-41.0	251.0	218.0	225.0	16.7	11.1	55.8	2.66	SD,SL/PYR,VF
17	5141.0-42.0	172.0	156.0	108.0	15.3	13.5	57.0	2.66	SD,SL/PYR,DOL
18	5142.0-43.0	66.0	62.0	4.1	9.6	9.0	50.9	2.66	SD,DOL
19	5143.0-44.0	44.0	40.0	3.5	10.3	10.3	56.6	2.66	SD,DOL
20	5144.0-45.0	212.0	207.0	98.0	16.2	10.3	58.4	2.71	SD,SL/PYR,DOL
21	5145.0-46.0	105.0	100.0	0.1	12.7	12.2	55.5	2.69	SD,DOL
22	5146.0-47.0	157.0	147.0	90.0	14.1	12.1	56.8	2.68	SD,DOL
23	5147.0-48.0	43.0	43.0	29.0	11.7	12.0	56.2	2.83	SD,PYR,DOL

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

MESA PETROLEUM COMPANY
MOORE NO. 2-29 WELL

DATE: 6/6/79
FORMATION: AS NOTED

FILE NO: 3402-9695
ENGINEER: BOYLE

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY PERCENT	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
24	5148.0-49.0	85.0	76.0	44.0	12.1	13.4	61.5	2.71	SD,PYR
25	5149.0-50.0	21.0	21.0	8.6	9.1	11.3	61.6	2.75	SD,SL/LMY,PYR
26	5150.0-51.0	0.6	0.6	1.0	5.3	8.3	50.9	2.71	SD
27	5151.0-52.0	2.3	2.0	1.2	7.3	11.8	43.9	2.71	SD
+ 28	5152.0-53.0	2.4	0.4	0.8	4.8	11.0	65.7	2.72	SD
	MISSISSIPPIAN FORMATION								
29	5153.0-54.0	*	<0.1	<0.1	2.8	11.4	72.4	2.68	SD
30	5154.0-55.0	1.3	<0.1	0.1	5.8	3.1	85.6	2.73	SD,SL/LMY,VF
31	5155.0-56.0	0.1	<0.1		2.0	0.0	84.1	2.88	DOL,VGY,PYR,VF
32	5156.0-57.0	0.3	0.1		2.7	0.0	81.3	2.94	DOL,VGY,PYR,VF
33	5157.0-58.0	<0.1	<0.1		2.2	0.0	79.6	2.87	LM,DOL,VGY,PYR,VF
34	5158.0-59.0	0.3	<0.1		3.6	3.0	82.0	2.71	LM,VGY,VF
+ 35	5159.0-60.0	19.0	18.0		10.8	10.2	51.3	2.71	LM,VGY,FEW SH STKS
36	5160.0-61.0	0.2	<0.1		3.2	3.5	85.6	2.70	LM,VGY,VF
37	5161.0-62.0	1.7	1.1		4.4	3.0	76.6	2.70	LM,VGY
38	5162.0-63.0	<0.1	<0.1		3.2	1.8	83.7	2.69	LM,FEW SH STKS
39	5163.0-64.0	<0.1	<0.1		2.8	1.1	77.8	2.70	LM,PP VGS,VF
40	5164.0-65.0	2.5	0.2		4.3	1.4	72.0	2.71	LM,PP VGS,VF
41	5165.0-66.0	14.0	4.7		5.0	1.6	67.9	2.70	LM,PP VGS,VF
42	5166.0-67.0	22.0	20.0		9.2	2.1	62.3	2.70	LM,PP VGS,VF
43	5167.0-68.0	0.6	0.6		5.7	0.0	79.4	2.71	LM,FEW SH STKS,VF
44	5168.0-69.0	<0.1	<0.1		4.2	0.0	82.0	2.71	LM,FEW SH STKS,VF
	5169.0-5170.0	LOST CORE							

\+ DENOTES HORIZONTAL CRACKS

Company MESA PETROLEUM COMPANY
Well MOORE NO. 2-29

Plug Permeability Data

Sample Number	Depth, Feet	Permeability, Millidarcies
1	5125-26	89
2	5126-27	145
3	5127-28	457
4	5128-29	361
5	5129-30	765
6	5130-31	890
7	5131-32	1078
8	5132-33	1483
9	5133-34	981
10	5134-35	962
11	5135-36	922
12	5136-37	920
13	5137-38	551
14	5138-39	1.8
15	5139-40	25
16	5140-41	608
17	5141-42	625
18	5142-43	53
19	5143-44	63
20	5144-45	354
21	5145-46	279
22	5146-47	434
23	5147-48	141
24	5148-49	240
25	5149-50	19
26	5150-51	0.2
27	5151-52	0.8
28	5152-53	0.4
29	5153-54	0.1
30	5154-55	0.2

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

CORE SUMMARY

Company MESA PETROLEUM COMPANY
Well MOORE NO. 2-29
Page 4 of 4 File 3402-9695

DEPTH FEET	PERMEABILITY, Md. MAXIMUM	90 DEGREES	VERTICAL	POROSITY PER CENT	SATURATION OIL	WATER	GRAIN DENSITY	PRODUCTIVITY	COMMENTS
25.0-38.0	652	426	270	18.7	9.5	64.5	2.68	Oil,high GOR	Good K&Ø
38.0-39.0	13	10	0.1	8.7	6.6	62.2	2.89	Oil,high GOR	Low K&Ø
39.0-50.0	126	117	82	13.2	11.6	57.0	2.70	Oil,high GOR	Good K&Ø
50.0-53.0	1.8	1.0	1.0	5.8	10.4	53.5	2.71	Oil,high GOR	Low K&Ø,low prod cap
53.0-55.0	1.3	<0.1	0.1	4.3	7.3	79.0	2.71	Oil/water trans	Low K&Ø
55.0-57.0	0.2	0.1		2.4	0.0	82.7	2.91	Nonprod	Very low K&Ø
57.0-67.0	6.0	4.4		4.9	2.8	73.9	2.72	Water	Low K&Ø
67.0-69.0	0.3	0.3		5.0	0.0	80.7	2.71	Water	Low K&Ø

2-29 Moore

Grain Size	Graded	Cement: Dol	Anh.	Calc.	Sorting: Well	Poor	Round: well	Sb Ang.	Ang.	Bedding: Low Angle	Horz	Sh partings	Chert	Pyrite	Sh. Pellet	Green Sh. Lam.	Smokey & White

5125 — UVF - UF / LM - UF   Tr ✓ ✓ ✓ ✓   Tr
— LVF - UF UC - LVC Changes across shale lam.   Calc Tr
— Graded + within SS. UC - UVL ✓ Tr   Tr {Slgr size change across shale stck fine ↑?
— UF - LM - LC   Tr   Green Clay pellet 2x4
— UF - LC ✓
5130 — UM Not graded
— UM - LL   No stain for dol. Acid reacts l. lile dol.
— Some UVC
— UM - UF ✓?   Tr
— UM - LC Sl ✓ ✓ Sl. stain   ✓ Massive   Tr Tr Tr
— LM - UM (tr UVC) ✓ Banded Pyrite cmt - 33.5 ✓   Massive ✓   Tr Tr (White - Tan ✓ Sh. lam.)
— UF - UM (M Pyrite
— UF - UM (Tr UVC) ✓ Banded Pyrite - 34.9 ✓
5135 — LM - UM ✓ orange-purple stain ✓   massive ✓ small scale massive " "   [vertical fracture   Tr Tr Sltr
— UF - UM
— LF - UM
— LM
— UF - UM
— UF - UM ✓ Banded Pyrite
— LF - UF (TrUVC) pellets Banded Pyrite   Large dk green sdy pellet 2X6MM
— Mudstone granules / LF - LVC   Massive   [vertical fracture healed w/calcite + clay (Brown)   Tr Tr
— LF - LM Tr
— LF - LC ✓ ✓ - Banded - ✓ ✓ in Bands
5140 — UF - LVC   ✓ slight by cemts   I Vert fract w/clay (Brn)
— UF - LC Spots   Tr Tr
— UF - UVC "
— UF - LC "   Tr Tr Tr
— UF - LC (Brn clay Pellet)
— UF - UM 3X6MM   ✓ by cmt
— LF - LM ✓ Banded ✓
— UF - UM ✓ Banded ✓   ✓ Tr
— LM - UM Spot
— LM - UM Soft clay Pebble 5MM Spot   ✓ Sl by cmt + Green Clay Lami   ✓ Sl tr ✓
5145 — UF - LVC Spot   ✓ green shale Lami
— LM - UM ✓✓ Band ✓   ✓✓ cmt
— UF - UM   ✓ Dense dol. cemt. s'in
— LM   ✓ SP ✓ at Base   ✓ grnsh. ✓ cemt calcite   Tr
— LF - UVC ✓ Tr ✓ Clay grans. dark - hard Tan - soft 15 3mm 2x4mm ← Mod Soft   ✓ cors. ✓ Clay Lam.   Tr
— LF - UVC   ✓ cmt
— UM - UVC   ✓ Shale green
— LF - UVC Clays AA (granules)   " Brn + interclasts
— LF - LVC ✓✓ Tr clay AA   ✓ cmt
5150 — LF - UVC Sl ✓ Tr   Horizontal vain of Anhydrite ✓ ✓ —
— UF - UVC ✓✓   Very tight MASSIVE   Vert. fract.
— SAME
— Chert Nodule ✓ Large pebble shale lam. just below 5154
— SS Congl w/pebbles of, well sorted, dol cmt, med grain SS &. Brown med xyl LS   [Vert fract. (tight)
St Louis 5155 — LS Congl w/pebble size cherts + Rounded Brown LS AA
5155.5 — LS ✓ fossil crinoids   ✓

— LS ✓ fossil. AA W/oolites white w/tan centers LVC - UC in size trace of moldy vuggy φ
5160
— LS ✓ fossil oolitic w/ PPT φ in matrix LS is grain supported
Porosity AA found in thin bands in the rest of the core
At 5164.5
5165.5
5166.8
5165

5169
5170

Called "Analysts"? Stain Purple = Dol, Unstain = Calc

Acid reacts most w/the white patches Generally

Angularity due to Qtz overgrowths in m... case

*~~The change in grain size across shale partings suggest slight coarsening upward~~

CORE LABORATORIES, INC. *Petroleum Reservoir Engineering*

COMPANY MESA PETROLEUM COMPANY FIELD _____ FILE 3402-9695

WELL MOORE NO. 2-29 COUNTY CLARK DATE 6/6/79

LOCATION _____ STATE KANSAS ELEV. _____

CORE-GAMMA CORRELATION

VERTICAL SCALE: 5" = 100'

TOTAL WATER 0000
PERCENT PORE SPACE
80 60 40 20 0

GAMMA RAY
RADIATION INCREASE →

PERMEABILITY ___
MILLIDARCYS
100.0 10.0 1.0 0.1

POROSITY ___
PERCENT
30 20 10

OIL SATURATION X
PERCENT PORE SI
0 0 20 40 60