

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

February 25, 1970

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

Wm. Gruenerwald & Associates  
P. O. Box 909  
Colorado Springs, Colorado 80900

Attn: Mr. William Gruenerwald

Subject: Core Analysis  
Adams No. 4 Well  
Adams Ranch Field  
Meade County, Kansas  
CLI File No. CP-1-7167

Gentlemen:

The St. Louis Formation was diamond cored in the subject well from 6170 to 6221 feet. The recovered formation was preserved at the well-site and transported to the Oklahoma City Laboratory for whole core analysis. The analysis results are presented in graphical and tabular form on the accompanying Coregraph.

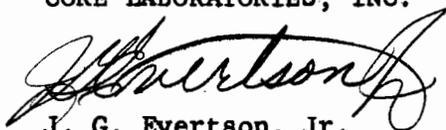
The intervals analyzed from 6173 to 6221 feet has saturation data normally associated with oil productivity. Poor permeability and porosity development suggests a formation treatment is needed to acquire and sustain desired flow rates.

Average core analysis data and estimates of recoverable oil are presented on the core summary page of this report.

Thank you for this opportunity to be of service.

Yours very truly,

CORE LABORATORIES, INC.



J. G. Evertson, Jr.  
District Manager

JGE:sh

5cc: Addressee

1cc: Mr. T. G. Wright  
805 Wichita Plaza  
Wichita, Kansas 67202

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

Page 1 of 1 File CP-1-7167  
 Well Adams No. 4

**CORE SUMMARY AND CALCULATED RECOVERABLE OIL**

<b>FORMATION NAME AND DEPTH INTERVAL:</b> St. Louis 6173-6221			
<b>FEET OF CORE RECOVERED FROM ABOVE INTERVAL</b>	48	<b>AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE</b>	38.2
<b>FEET OF CORE INCLUDED IN AVERAGES</b>	29.2	<b>AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE</b>	(e) 30
<b>AVERAGE PERMEABILITY: MILLIDARCYB</b>	MAX. 90° 11 9.5	<b>OIL GRAVITY: °API</b>	(e) 38°
<b>PRODUCTIVE CAPACITY: MILLIDARCY-FEET</b>	321	<b>ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL</b>	
<b>AVERAGE POROSITY: PER CENT</b>	6.3	<b>ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL</b>	(e) 1.43
<b>AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE</b>	9.3	<b>CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT</b>	239

Calculated maximum solution gas drive recovery is 59 barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is 194 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.)

<b>FORMATION NAME AND DEPTH INTERVAL:</b>			
<b>FEET OF CORE RECOVERED FROM ABOVE INTERVAL</b>		<b>AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE</b>	
<b>FEET OF CORE INCLUDED IN AVERAGES</b>		<b>AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE</b>	
<b>AVERAGE PERMEABILITY: MILLIDARCYB</b>		<b>OIL GRAVITY: °API</b>	
<b>PRODUCTIVE CAPACITY: MILLIDARCY-FEET</b>		<b>ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL</b>	
<b>AVERAGE POROSITY: PER CENT</b>		<b>ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL</b>	
<b>AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE</b>		<b>CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT</b>	

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.*

These analyses, opinions or interpretations are based on observations and materials 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 representation as to the productivity, proper operation, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.



**CORE LABORATORIES, INC.**

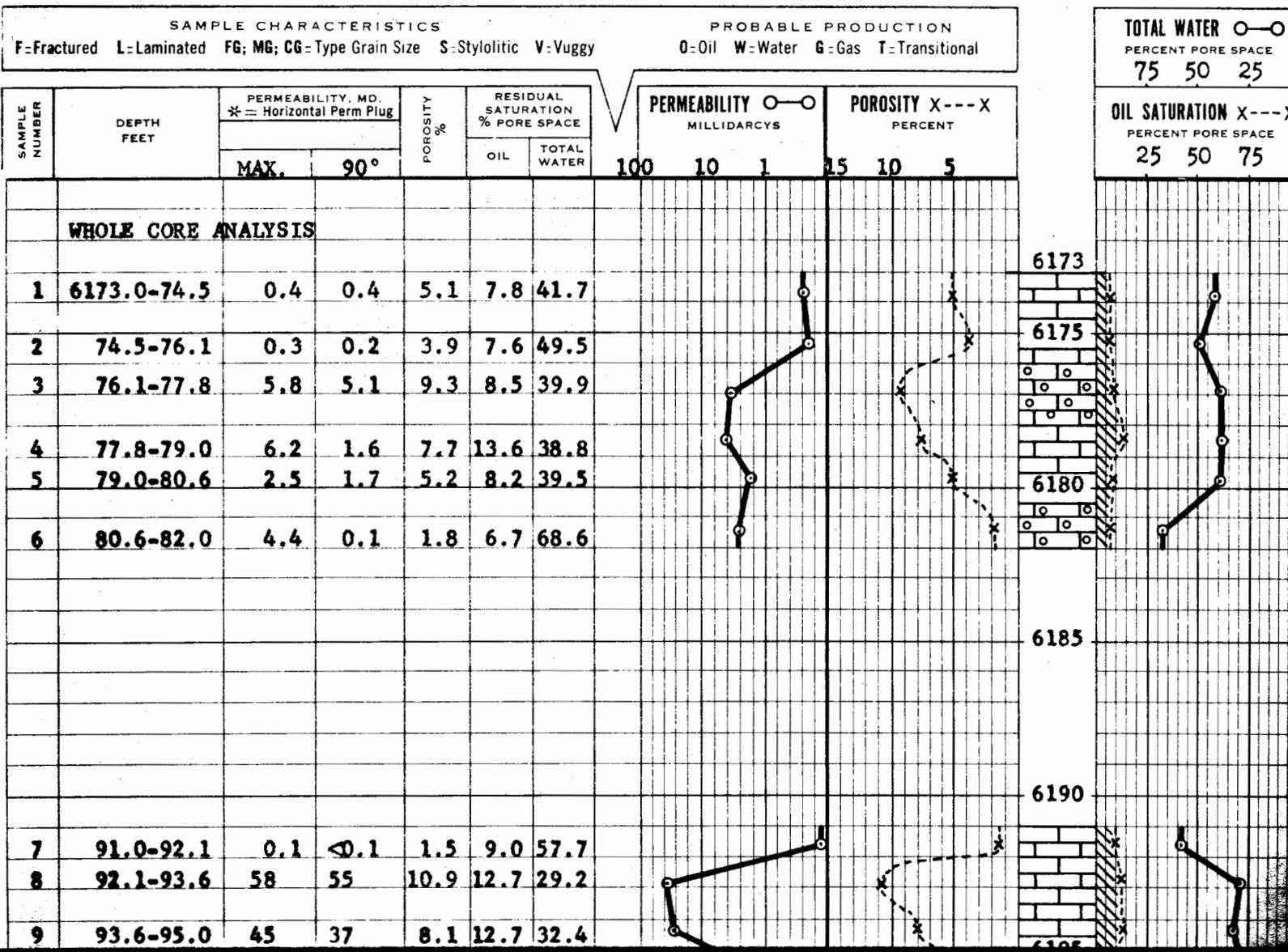
*Petroleum Reservoir Engineering*

COMPANY WM. GRUENERWALD & ASSOCIATES FILE NO. CP-1-7167  
 WELL ADAMS NO. 4 DATE 2-25-70 ENGRS. BOYLE  
 FIELD ADAMS RANCH FORMATION ST. LOUIS ELEV. 2450' KB  
 COUNTY MEADE STATE KANSAS DRLG. FLD. \_\_\_\_\_ CORES DIAMOND  
 LOCATION C SE NW SECTION 11-35S-30W REMARKS \_\_\_\_\_

# 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 profitability 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		ANHYDRITE	
SHALE		DOLOMITE		OOLITES					



DEPTH FEET	PERMEABILITY, MD. * = Horizontal Perm Plug		POROSITY %	RESIDUAL SATURATION % PORE SPACE		PERMEABILITY MILLIDARCY	POROSITY X---X PERCENT			OIL SATURATION X---X PERCENT PORE SPACE					
	MAX.	90°		OIL	TOTAL WATER		100	10	1	5	10	5	25	50	75
<b>WELL CORE ANALYSIS</b>															
6173.0-74.5	0.4	0.4	5.1	7.8	41.7										
74.5-76.1	0.3	0.2	3.9	7.6	49.5										
76.1-77.8	5.8	5.1	9.3	8.5	39.9										
77.8-79.0	6.2	1.6	7.7	13.6	38.8										
79.0-80.6	2.5	1.7	5.2	8.2	39.5										
80.6-82.0	4.4	0.1	1.8	6.7	68.6										
91.0-92.1	0.1	0.1	1.5	9.0	57.7										
92.1-93.6	58	55	10.9	12.7	29.2										
93.6-95.0	45	37	8.1	12.7	32.4										
10 95.0-95.8	3.8	2.8	5.9	8.7	28.4										
11 95.8-96.7	0.4	0.1	2.3	8.7	55.6										
12 96.7-98.4	3.5	2.9	5.5	11.7	31.2										
13 98.4-00.1	0.6	0.3	3.2	12.7	35.1										
14 6200.1-02.0	1.5	0.7	5.4	8.6	31.8										
15 02.0-03.0	2.5	0.5	6.8	13.8	32.5										
16 03.0-04.5	1.6	1.6	7.4	13.2	39.3										
17 04.5-06.0	0.3	0.2	4.0	9.8	47.2										
18 15.8-17.0	30	30	10.7	5.5	24.4										
19 17.0-18.5	44	44	11.2	5.9	25.8										
20 18.5-20.0	6.7	5.8	8.6	4.5	28.2										
21 6220.0-21.0	4.7	4.5	6.9	5.0	28.2										

6173  
6175  
6180  
6185  
6190  
6195  
6200  
6205  
6210  
6215  
6220  
6221

