

OILFIELD RESEARCH LABORATORIES

536 NORTH HIGHLAND - CHANUTE, KANSAS 66720 - PHONE (316) 431-2650

June 14, 1982

Sterling Oil & Exploration, Inc.
8080 Ward Parkway
Kansas City, Missouri 64114

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Folks Lease, Well No. 1-82, located in Miami County, Kansas and submitted to our laboratory on June 8, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/dlb

5 c to Kansas City, Missouri

- REGISTERED ENGINEERS -

CORE ANALYSIS - WATER ANALYSIS - REPRESSURING ENGINEERING - SURVEYING & MAPPING - PROPERTY EVALUATION & OPERATION

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GENERAL INFORMATION & SUMMARY

Company Sterling Oil & Exploration, Inc. Lease Folks Well No. 1-82

Location _____

Section 35 Twp. 15S Rge. 21E County Miami State Kansas

Elevation, Feet

Name of Sand.....

Squirrel

Top of Core

683.0

Bottom of Core

695.0

Top of Sand

683.0

Bottom of Sand

692.0

Total Feet of Permeable Sand

8.0

Total Feet of Floodable Sand

1.7

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 5	5.5	5.5
10 - 20	0.8	6.3
20 - 50	1.7	8.0

Average Permeability Millidarcys

10.3

Average Percent Porosity

19.3

Average Percent Oil Saturation

32.2

Average Percent Water Saturation

31.7

Average Oil Content, Bbls./A. Ft.

492.

Total Oil Content, Bbls./Acre

3,938.

Average Percent Oil Recovery by Laboratory Flooding Tests

8.1

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.

161.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre

273.

Total Calculated Oil Recovery, Bbls./Acre

See "Calculated Recovery"
Section

The core was sampled and the samples sealed in plastic bags by a representative of the client. Fresh water mud was used as a drilling fluid.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
683.0 - 684.0	Grayish brown shaly sandstone.
684.0 - 685.0	Grayish brown very shaly sandstone.
685.0 - 685.5	Grayish brown shaly sandstone.
685.5 - 686.0	Grayish brown slightly calcareous shaly sandstone.
686.0 - 686.5	Grayish brown very shaly sandstone.
686.5 - 688.2	Brown sandstone.
688.2 - 690.0	Brown shaly sandstone.
690.0 - 690.8	Brown sandstone.
690.8 - 692.0	Grayish brown very shaly sandstone.
692.0 - 693.0	Gray shale with scattered brown sandstone partings.
693.0 - 695.0	Gray shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 273 barrels of oil per acre was obtained from 1.7 feet of sand. The weighted average percent oil saturation was reduced from 39.9 to 31.8, or represents an average recovery of 8.1 percent. The weighted average effective permeability of the samples is 0.65 millidarcys, while the average initial fluid production pressure is 32.5 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 9 samples tested, 2 produced water and oil. This indicates that approximately 22 percent of the sand represented by these samples is floodable pay sand.

CALCULATED RECOVERY

It would appear from a study of the core data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 730 barrels of oil per acre. This is an average recovery of 429 barrels per acre foot from 1.7 feet of floodable sand analyzed in this core.

These recovery values were calculated using the following data and assumptions:

Original formation volume factor, estimated	1.04
Reservoir water saturation, percent, estimated	20.0
Average porosity, percent	24.5
Oil saturation after flooding, percent	31.8
Performance factor, percent, estimated	50.0
Net floodable sand, feet	1.7

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Sterling Oil & Exploration, Inc. Lease Folks Well No. 1-82

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water	Total			Ft.	Cum. Ft.		
1	683.4	14.0	37	21	58	402	2.0	1.0	1.0	402	2.00
2	684.5	12.9	25	40	65	250	0.47	1.0	2.0	250	0.47
3	685.3	17.9	38	31	69	528	1.8	0.5	2.5	264	0.90
4	686.6	21.5	34	22	56	567	27.	0.7	3.2	397	18.90
5	687.5	26.6	44	20	64	908	47.	1.0	4.2	908	47.00
6	688.5	19.0	40	35	75	590	1.3	0.8	5.0	472	1.04
7	689.5	20.8	31	33	64	500	2.4	1.0	6.0	500	2.40
8	690.4	23.0	30	33	63	535	11.	0.8	6.8	428	8.80
9	691.5	18.9	18	45	63	264	0.50	1.2	8.0	317	0.60

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Sterling Oil & Exploration, Inc.		Lease	Folks	Well No.		1-82
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys		Permeability Capacity Ft. x Md.				
683.0 - 692.0	8.0	10.3		82.11				
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbl./Acre		
683.0 - 692.0	8.0	19.3	32.2	31.7	492	3,938		

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Sterling Oil & Exploration, Inc.			Lease			Folks			Well No. 1-82		
Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation		Volume of Water Recovered cc*	Effective Permeability Millidarcys**	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water			
1	683.4	14.4	36	402	0	0	36	27	0	Imp.	-
2	684.5	12.8	25	248	0	0	25	41	0	Imp.	-
3	685.3	17.4	39	526	0	0	39	32	0	Imp.	-
4	686.6	21.6	34	570	4	67	30	54	22	0.30	35
5	687.5	26.5	44	905	11	226	33	49	53	0.90	30
6	688.5	18.5	41	588	0	0	41	36	0	Imp.	-
7	689.5	21.1	30	491	0	0	30	35	0	Imp.	-
8	690.4	23.1	30	538	0	0	30	34	0	Imp.	-
9	691.5	18.8	18	263	0	0	18	49	0	Imp.	-

Notes: cc—cubic centimeter.

*—Volume of water recovered at the time of maximum oil recovery.

**—Determined by passing water through sample which still contains residual oil.

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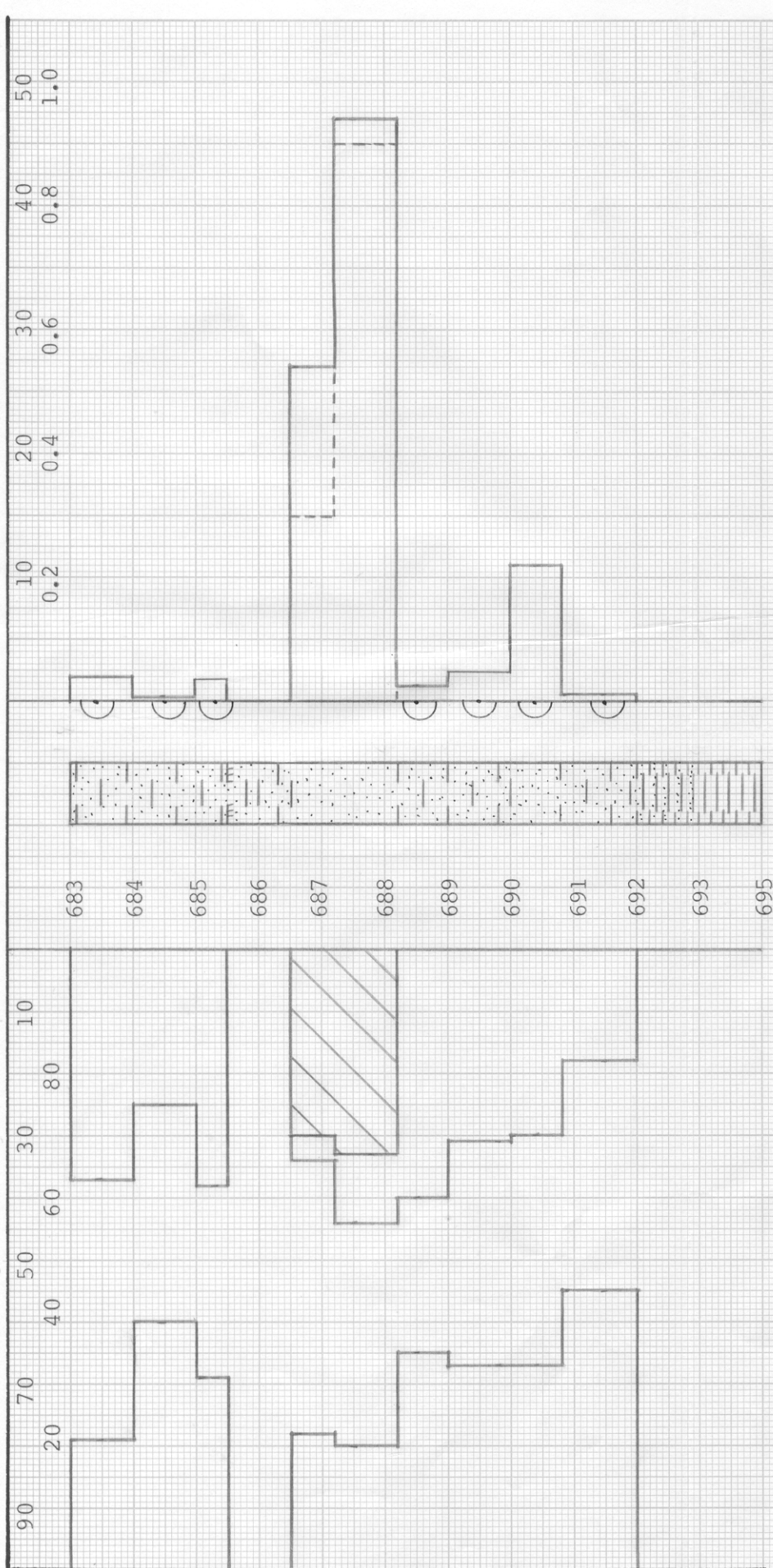
SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Sterling Oil & Exploration, Inc.	Lease	Folks	Well No.	1-82
Depth Interval, Feet	683.0 - 692.0				
Feet of Core Analyzed	1.7				
Average Percent Porosity	24.5				
Average Percent Original Oil Saturation	39.9				
Average Percent Oil Recovery	8.1				
Average Percent Residual Oil Saturation	31.8				
Average Percent Residual Water Saturation	51.1				
Average Percent Total Residual Fluid Saturation	82.9				
Average Original Oil Content, Bbls./A. Ft.	768.				
Average Oil Recovery, Bbls./A. Ft.	161.				
Average Residual Oil Content, Bbls./A. Ft.	607.				
Total Original Oil Content, Bbls./Acre	1,304.				
Total Oil Recovery, Bbls./Acre	273.				
Total Residual Oil Content, Bbls./Acre	1,031.				
Average Effective Permeability, Millidarcys	0.65				
Average Initial Fluid Production Pressure, p.s.i.	32.5				

NOTE: Only those samples which recovered oil were used in calculating the above averages.

WATER SAT., PERCENT → ——— OIL SAT., PERCENT ← ——— PERMEABILITY TO WATER, IN MILLIDARCYS



- KEY:
- SANDSTONE
 - SHALE
 - IMPERMEABLE TO WATER
 - SHALY SANDSTONE
 - SHALY CALCAREOUS SANDSTONE
 - SHALE WITH SANDSTONE PARTINGS
 - FLOODPOT RESIDUAL OIL SATURATION

STERLING OIL & EXPLORATION, INC.

FOLKS LEASE
WELL NO. 1-82
MIAMI COUNTY, KANSAS

KEY:



SANDSTONE



SHALE



IMPERMEABLE TO WATER



SHALY SANDSTONE



SHALY CALCAREOUS SANDSTONE



SHALE WITH SANDSTONE PARTINGS



FLOODPOT RESIDUAL OIL SATURATION

STERLING OIL & EXPLORATION, INC.

FOLKS LEASE

MIAMI COUNTY, KANSAS

WELL NO. 1-82

DEPTH INTERVAL,
FEET

FEET OF CORE
ANALYZED

AVERAGE
PERCENT
POROSITY

AVG. OIL
SATURATION
PERCENT

AVG. WATER
SATURATION
PERCENT

AVERAGE
PERMEABILITY,
MILLIDARCYS

CALCULATED
OIL RECOVERY
BBLs. / ACRE

683.0 - 692.0

8.0

19.3

32.2

31.7

10.3

730

(PRIMARY AND
WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
JUNE, 1982 PDC