

OILFIELD RESEARCH LABORATORIES

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

December 9, 1982

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

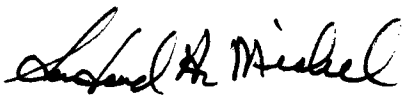
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Zodark Lease, Well No. 9, located in Franklin County, Kansas and submitted to our laboratory on December 7, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Sanford A. Michel

SAM/rmc

5 c to Kansas City, Missouri

- REGISTERED ENGINEERS -

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

Oilfield Research Laboratories
GENERAL INFORMATION & SUMMARY

Company Sterling Oil & Exploration, Inc. Lease Zodark Well No. 9
 Location _____
 Section 29 Twp. 15S Rge. 21E County Franklin State Kansas

Elevation, Feet

Name of Sand.....	Squirrel
Top of Core	781.0
Bottom of Core	792.1
Top of Sand	781.0
Bottom of Sand	792.1
Total Feet of Permeable Sand	7.9
Total Feet of Floodable Sand	6.6

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 10	2.3	2.3
10 - 16	3.0	5.3
22 - 37	2.2	7.5
75 - 79	0.4	7.9

Average Permeability Millidarcys	18.8
Average Percent Porosity	18.7
Average Percent Oil Saturation	43.7
Average Percent Water Saturation.....	39.0
Average Oil Content, Bbls./A. Ft.	651.
Total Oil Content, Bbls./Acre.....	5,275.
Average Percent Oil Recovery by Laboratory Flooding Tests.....	15.2
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	230.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	1,516.
Total Calculated Oil Recovery, Bbls./Acre.....	See "Calculated Recovery"

Section

-2-

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>
781.0 - 781.4	Brown sandstone.
781.4 - 782.0	Gray and brown laminated shale and sandstone.
782.0 - 785.0	Brown sandstone.
785.0 - 786.0	Brown slightly shaly sandstone with scattered gray shale partings.
786.0 - 787.0	Brown sandstone.
787.0 - 788.0	Brown sandstone with scattered fine gray shale partings.
788.0 - 788.5	Gray shale.
788.5 - 788.7	Brown sandstone.
788.7 - 789.4	Gray sandy shale.
789.4 - 789.6	Grayish brown very shaly sandstone.
789.6 - 790.0	Gray sandy shale.
790.0 - 791.0	Grayish brown very shaly sandstone.
791.0 - 791.4	Gray sandy shale.
791.4 - 791.7	Grayish brown shaly sandstone.
791.7 - 792.1	Gray sandy shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 1,516 barrels of oil per acre was obtained from 6.6 feet of sand. The weighted average percent oil saturation was reduced from 50.1 to 34.9, or represents an average recovery of 15.2 percent. The weighted average effective permeability of the samples is 0.66 millidarcys, while the average initial fluid production pressure is 29.4 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 11 samples tested, 8 produced water and oil. This indicates that approximately 73 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 2,250 barrels of oil per acre. This is an average recovery of 341 barrels per acre foot from 6.6 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.06
Reservoir water saturation, percent, estimated	20.0
Average porosity, percent	19.7
Oil saturation after flooding, percent	34.9
Performance factor, percent, estimated	55.0
Net floodable sand, feet	6.6

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company		Sterling Oil & Exploration, Inc.			Lease		Zodark		Well No.		9	
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	781.3	20.6	43	35	78	687	78.	0.4	0.4	275	31.20	
2	782.5	20.1	52	27	79	811	22.	1.0	1.4	811	22.00	
3	783.5	18.7	48	35	83	696	15.	1.0	2.4	696	15.00	
4	784.6	21.9	49	22	71	833	36.	1.0	3.4	833	36.00	
5	785.6	17.6	59	28	87	806	9.4	1.0	4.4	806	9.40	
6	786.5	18.8	62	28	90	904	13.	1.0	5.4	904	13.00	
7	787.6	20.1	35	40	75	546	15.	1.0	6.4	546	15.00	
8	788.6	21.2	41	31	72	674	32.	0.2	6.6	135	6.40	
9	789.5	12.6	23	71	94	225	Imp.	0.2	6.8	45	0.00	
10	790.5	15.1	17	77	94	199	0.24	1.0	7.8	199	0.24	
11	791.6	15.3	7	81	88	83	1.4	0.3	8.1	25	0.42	

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Sterling Oil & Exploration, Inc.		Lease	Zodark	Well No.	
Depth Interval, Feet		Feet of Core Analyzed		Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
781.0 - 787.0		5.4		23.4	126.60		
787.0 - 791.7		2.5		8.8	22.06		
781.0 - 791.7		7.9		18.8	148.66		

Depth Interval, Feet		Feet of Core Analyzed		Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbbl./Acre
781.0 - 787.0		5.4		53.2	28.5	801	4,325
787.0 - 791.7		2.7		24.8	59.9	352	950
781.0 - 791.7		8.1		43.7	39.0	651	5,275

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Sterling Oil & Exploration, Inc. Lease Zodark Well No. 9

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	781.3	20.7	43	691	8	128	35	55	76	1.05	25
2	782.5	20.0	52	807	14	217	38	58	28	0.37	30
3	783.5	18.8	48	700	12	175	36	62	20	0.33	35
4	784.6	21.9	49	833	20	340	29	67	88	1.42	20
5	785.6	17.7	59	810	19	261	40	56	8	0.15	30
6	786.5	18.9	62	909	27	396	35	59	96	1.42	15
7	787.6	20.2	35	548	4	63	31	63	12	0.15	40
8	788.6	21.1	41	671	4	65	37	62	22	0.33	40
9	789.5	13.1	22	224	0	0	22	72	0	Imp.	-
10	790.5	15.6	16	194	0	0	16	78	0	Imp.	-
11	791.6	15.5	7	84	0	0	7	82	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.

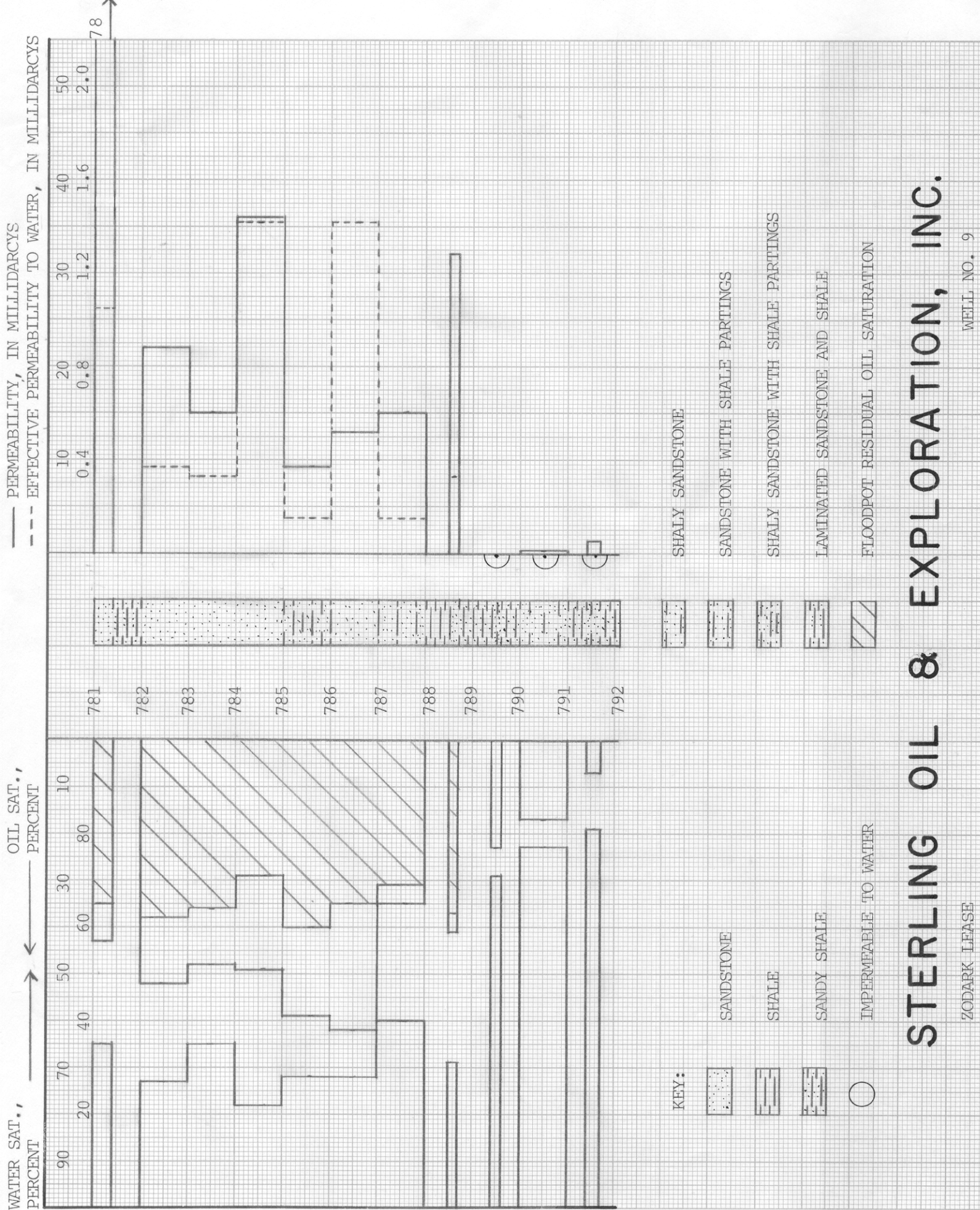
Oilfield Research Laboratories

SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Sterling Oil & Exploration, Inc.	Lease	Zodark	Well No.	9
Depth Interval, Feet	781.0 - 787.0	787.0 - 791.7	781.0 - 791.7		
Feet of Core Analyzed	5.4	1.2	6.6		
Average Percent Porosity	19.6	20.3	19.7		
Average Percent Original Oil Saturation	53.2	36.0	50.1		
Average Percent Oil Recovery	17.6	4.0	15.2		
Average Percent Residual Oil Saturation	35.6	32.0	34.9		
Average Percent Residual Water Saturation	60.0	62.8	60.5		
Average Percent Total Residual Fluid Saturation	95.6	94.8	95.4		
Average Original Oil Content, Bbls./A. Ft.	803.	568.	760.		
Average Oil Recovery, Bbls./A. Ft.	267.	63.	230.		
Average Residual Oil Content, Bbls./A. Ft.	536.	505.	530.		
Total Original Oil Content, Bbls./Acre	4,335.	682.	5,017.		
Total Oil Recovery, Bbls./Acre	1,440.	76.	1,516.		
Total Residual Oil Content, Bbls./Acre	2,895.	606.	3,501.		
Average Effective Permeability, Millidarcys	0.761	0.183	0.656		
Average Initial Fluid Production Pressure, p.s.i.	25.8	40.0	29.4		

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



STERLING OIL & EXPLORATION, INC.

WELL NO. 9

FRANKLIN COUNTY KANSAS

ZODARK LEASE

STERLING OIL & EXPLORATION, INC.

ZODARK LEASE

WELL NO. 9

FRANKLIN COUNTY, KANSAS

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
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781.0 - 787.0

5.4

19.5

53.2

28.5

23.4

787.0 - 791.7

2.7

17.2

24.8

59.9

8.8

781.0 - 791.7

8.1

18.7

43.7

39.0

18.8

2250

(PRIMARY AND

WATERFLOODING)

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CHANUTE, KANSAS