

OILFIELD RESEARCH LABORATORIES

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

February 26, 1982

Rader Exploration Company
R R # 1
Eudora, Kansas 66025

Gentlemen:

At your request on February 25, 1982, the following are the results of vertical permeability tests run on the rotary core taken from the Shoemaker Lease, Well No. 2-W, located in Franklin County, Kansas and submitted to our laboratory on February 16, 1982:

<u>Sample No.</u>	<u>Depth Feet</u>	<u>Permeability Millidarcys</u>
1	645.6	4.9
2	647.6	28.
3	649.6	18.
4	651.5	22.
5	653.6	14.
6	655.6	56.
7	657.7	17.
8	659.5	21.
9	661.5	62.
10	663.5	13.

Your business is greatly appreciated.

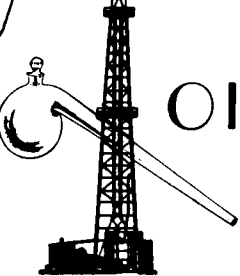
Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

5 c to Eudora, Kansas



OILFIELD RESEARCH LABORATORIES

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

February 20, 1982

Rader Exploration Company
Rural Route #1
Eudora, Kansas 66025

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Shoemaker Lease, Well No. 2-W, located in Franklin County, Kansas, and submitted to our laboratory on February 16, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/tem

5 c to Eudora, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Rader Exploration Company Lease Shoemaker Well No. 2-W
 Location -
 Section 8 Twp. 16S Rge. 21E County Franklin State Kansas

Elevation, Feet

Name of Sand.....

Squirrel

Top of Core

644.0

Bottom of Core

664.5

Top of Sand

644.0

Bottom of Sand

664.5

Total Feet of Permeable Sand

20.5

Total Feet of Floodable Sand

20.5

Distribution of Permeable Sand: Permeability Range Millidarcys

Feet

Cum. Ft.

4 - 10

4.1

4.1

18 - 51

9.2

13.3

60 - 100

5.2

18.5

135 - 146

2.0

20.5

Average Permeability Millidarcys

49.0

Average Percent Porosity

21.6

Average Percent Oil Saturation

43.6

Average Percent Water Saturation

34.2

Average Oil Content, Bbls./A. Ft.

735.

Total Oil Content, Bbls./Acre

15,058.

Average Percent Oil Recovery by Laboratory Flooding Tests

14.5

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

247.

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

5,057.

Total Calculated Oil Recovery, Bbls./Acre

See "Calculated Recovery" Section

OILFIELD RESEARCH LABORATORIES

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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. The core was reported to be from a virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
644.0 - 647.0	Light brown slightly shaly sandstone containing a vertical fracture.
647.0 - 649.9	Light brown sandstone.
649.9 - 652.0	Brown sandstone.
652.0 - 653.1	Brown shaly sandstone.
653.1 - 664.5	Brown sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 5,057 barrels of oil per acre was obtained from 20.5 feet of sand. The weighted average percent oil saturation was reduced from 43.6 to 29.1, or represents an average recovery of 14.5 percent. The weighted average effective permeability of the samples is 4.88 millidarcys, while the average initial fluid production pressure is 21.0 pounds per square inch (See Table V).

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By observing the data given in Table IV, you will note that of the 21 samples tested, 21 produced water and oil. This indicates that 100 percent of the sand represented by these samples is floodable pay sand. The tests also indicate a comparatively uniform permeability profile.

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 8,100 barrels of oil per acre. This is an average recovery of 395 barrels per acre foot from 20.5 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.05
Reservoir water saturation, percent, estimated	20.0
Average porosity, percent	21.6
Oil saturation after flooding, percent	29.1
Performance factor, percent, estimated	50.0
Net floodable sand, feet	20.5

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Rader Exploration Company Lease Shoemaker Well No. 2-W

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	644.6	21.9	33	43	76	561	7.5	1.0	1.0	561	7.50
2	645.6	20.8	27	44	71	436	8.3	1.0	2.0	436	8.30
3	646.5	19.1	35	43	78	519	4.7	1.0	3.0	519	4.70
4	647.6	19.8	30	52	82	461	36.	1.0	4.0	461	36.00
5	648.5	22.7	50	40	90	881	19.	1.0	5.0	881	19.00
6	649.6	21.6	38	46	84	637	44.	0.9	5.9	573	39.60
7	650.5	23.7	59	30	89	1085	96.	1.1	7.0	1194	105.60
8	651.5	22.8	43	33	76	761	60.	1.0	8.0	761	60.00
9	652.5	19.9	48	36	84	741	4.1	1.1	9.1	815	4.51
10	653.6	20.7	50	28	78	803	22.	1.0	10.1	803	22.00
11	654.5	21.2	51	27	78	839	22.	1.0	11.1	839	22.00
12	655.6	21.3	53	29	82	876	44.	1.2	12.3	1051	52.80
13	656.6	21.6	49	27	76	821	50.	1.0	13.3	821	50.00
14	657.7	23.8	48	24	72	886	145.	1.0	14.3	886	145.00
15	658.4	20.9	44	32	76	713	49.	1.0	15.3	713	49.00
16	659.5	22.8	41	27	68	725	137.	1.0	16.3	725	137.00
17	660.6	21.8	46	30	76	778	62.	1.0	17.3	778	62.00
18	661.5	22.9	44	23	67	782	92.	1.0	18.3	782	92.00
19	662.4	20.5	38	42	80	604	18.	1.1	19.4	664	19.80
20	663.5	21.9	41	30	71	697	62.	0.6	20.0	418	37.20
21	664.4	22.7	43	31	74	754	62.	0.5	20.5	377	31.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Rader Exploration Company	Lease	Shoemaker	Well No.	2-W		
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	Total Oil Content Bbls./Acre
644.0 - 649.9	5.9	21.0	35.5	44.6	19.5	115.10	3,431
649.9 - 664.5	14.6	21.9	46.9	30.0	61.0	889.91	1,1627
664.0 - 664.5	20.5	21.6	43.6	34.2	49.0	1005.01	1,5058

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company		Rader Exploration Company		Lease		Shoemaker		Well No.		2-W	
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	644.6	21.8	33	558	2	34	31	53	10	0.15	40
2	645.6	20.9	27	438	2	32	25	66	26	0.45	40
3	646.5	19.3	35	524	3	45	32	57	84	1.65	30
4	647.6	19.8	30	461	3	46	27	69	112	2.17	25
5	648.5	22.6	50	877	14	245	36	58	62	1.27	30
6	649.6	21.6	38	637	13	218	25	70	352	6.90	20
7	650.5	23.6	59	1080	31	568	28	68	338	9.33	15
8	651.5	22.7	43	757	16	282	27	67	288	7.05	10
9	652.5	19.8	48	737	12	184	36	60	35	0.50	40
10	653.6	20.8	50	807	23	371	27	69	210	4.05	15
11	654.5	21.3	51	843	22	364	29	65	282	8.83	10
12	655.6	21.4	53	880	23	382	30	65	346	10.99	10
13	656.6	21.7	49	825	14	236	35	60	40	0.75	25
14	657.7	23.7	48	883	21	386	27	69	366	7.50	15
15	658.4	20.8	44	710	17	274	27	70	82	1.57	20
16	659.5	22.7	41	722	14	247	27	70	260	7.50	10
17	660.6	21.7	46	774	18	303	28	68	46	0.97	20
18	661.5	23.0	44	785	16	285	28	65	292	8.66	10
19	662.4	20.6	38	607	10	160	28	55	106	1.95	20
20	663.5	22.0	41	700	14	239	27	54	400	17.61	15
21	664.4	22.9	43	764	12	213	31	63	330	9.00	20

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.

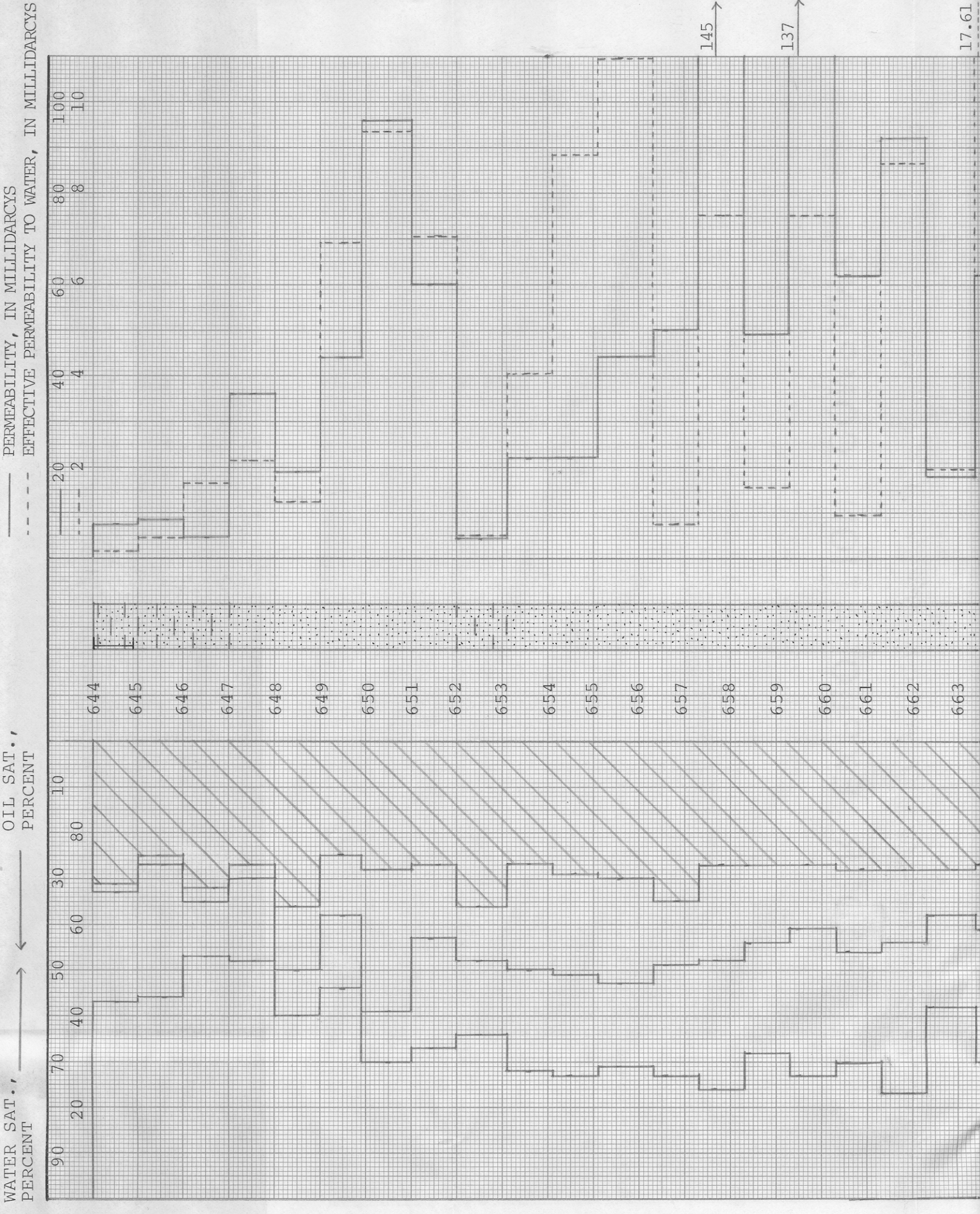
Oilfield Research Laboratories

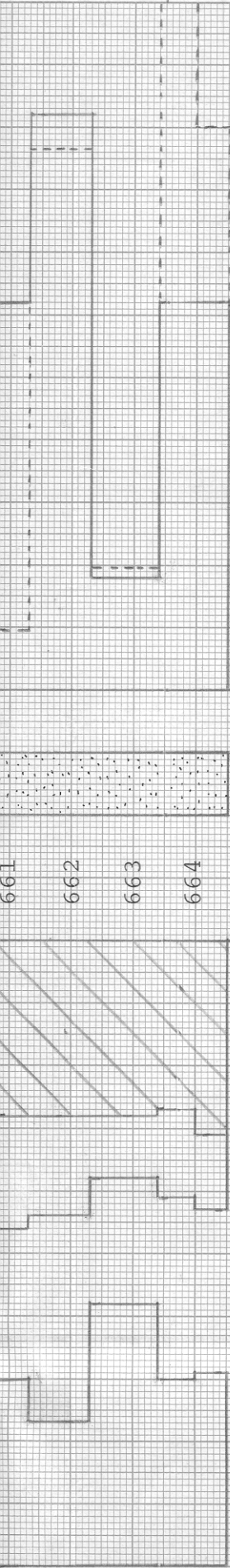
SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Rader Exploration Company	Lease	Shoemaker	Well No. 2-W
Depth Interval, Feet	644.0 - 649.9	649.9 - 664.5	644.0 - 664.5	
Feet of Core Analyzed	5.9	14.6	20.5	
Average Percent Porosity	21.0	21.9	21.6	
Average Percent Original Oil Saturation	35.5	46.9	43.6	
Average Percent Oil Recovery	6.1	17.9	14.5	
Average Percent Residual Oil Saturation	29.4	29.0	29.1	
Average Percent Residual Water Saturation	62.0	64.8	64.0	
Average Percent Total Residual Fluid Saturation	91.4	93.8	93.1	
Average Original Oil Content, Bbls./A. Ft.	581.	796.	735.	
Average Oil Recovery, Bbls./A. Ft.	101.	305.	247.	
Average Residual Oil Content, Bbls./A. Ft.	480.	491.	488.	
Total Original Oil Content, Bbls./Acre	3,431.	11,631.	15,062.	
Total Oil Recovery, Bbls./Acre	598.	4,459.	5,057.	
Total Residual Oil Content, Bbls./Acre	2,833.	7,172.	10,005.	
Average Effective Permeability, Millidarcys	2.02	6.03	4.88	
Average Initial Fluid Production Pressure, p.s.i.	30.8	17.0	21.0	

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





17.61

KEY:



SANDSTONE



SHALY SANDSTONE



FORMATION CONTAINING A VERTICAL FRACTURE



FLOODPOT RESIDUAL OIL SATURATION

RADER EXPLORATION COMPANY

SHOEMAKER LEASE

FRANKLIN COUNTY, KANSAS

WELL NO. 2-W

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCS	CALCULATED OIL RECOVERY BBLs. / ACRE
644.0 - 649.9	5.9	21.0	35.5	44.6	19.5	
649.9 - 664.5	14.6	21.9	46.9	30.0	61.0	
664.0 - 664.5	20.5	21.6	43.6	34.2	49.0	8,100 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
FEBRUARY, 1982

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