OILFIELD RESEARCH LABORATORIES

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December 26, 1978

P & W Joint Venture
Box 215
R.R. #1
Wellsville, Kansas 66092

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Speiker Lease, Well No. 2-78, Neosho County, Kansas, and submitted to our laboratory on December 19, 1978.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman

Benjamin R. Pearman

SAM:km
4 c to Wellsville, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company P & W Joint Venture Lease Speiker Well No. 2-78

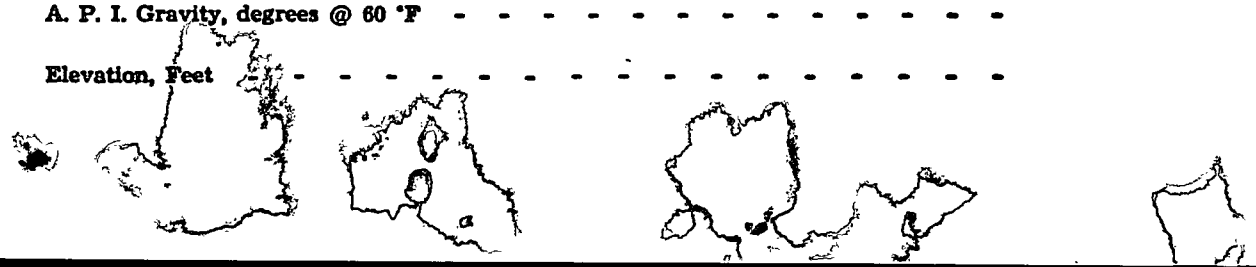
Location 1930' EWL & 200' SNL

Section 20 Twp. 28S Rge. 18E County Neosho State Kansas

Name of Sand	Bartlesville
Top of Core	787.0
Bottom of Core	807.0
Top of Sand	787.0
Bottom of Sand	807.0
Total Feet of Permeable Sand	18.3
Total Feet of Floodable Sand	13.7

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 20	8.0	8.0
20 - 40	6.3	14.3
40 - 100	3.0	17.3
100 & Above	1.0	18.3

Average Permeability Millidarcys	36.0
Average Percent Porosity	17.7
Average Percent Oil Saturation	29.6
Average Percent Water Saturation	51.8
Average Oil Content, Bbls./A. Ft.	412.
Total Oil Content, Bbls./Acre	7,531.
Average Percent Oil Recovery by Laboratory Flooding Tests	3.5
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	52.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	714.
Total Calculated Oil Recovery, Bbls./Acre (Primary & Waterflooding)	3,750.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	



The core was reported to be from non-virgin territory. The core was sampled and the samples sealed in plastic bags by a representative of Oilfield Research Laboratories. The drilling fluid consisted of fresh water mud.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
787.0 - 788.0	Light brown and gray laminated shaly sandstone.
788.0 - 789.0	Light brown slightly shaly sandstone.
789.0 - 789.8	Gray shale.
789.8 - 791.6	Light brown slightly shaly sandstone.
791.6 - 792.0	Gray shale.
792.0 - 793.8	Brown sandstone.
793.8 - 794.3	Gray shale.
794.3 - 799.0	Brown sandstone.
799.0 - 807.0	Light brown slightly shaly sandstone.

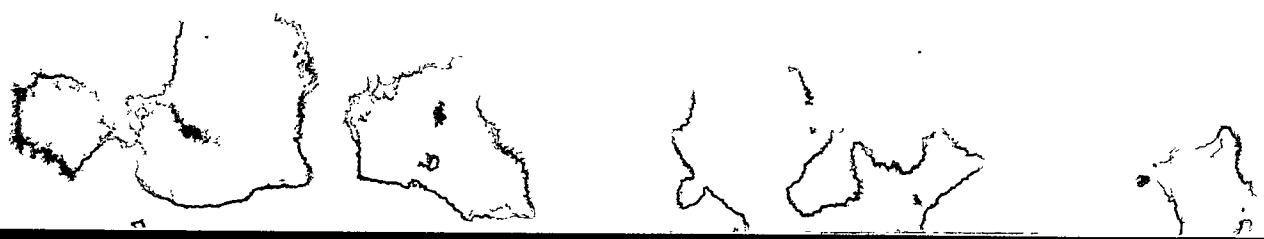
SUMMARY

It appears from a study of the data, that efficient primary and waterflooding operations in the vicinity of this well should recover approximately 3,750 barrels of oil per acre. This is an average recovery of 274 barrels per acre foot from 13.7 feet of floodable sand analyzed in this core.

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

Original formation volume factor	1.05
Reservoir water saturation, percent	30.0
Average porosity, percent	18.5

Oil saturation after flooding, percent	28.5
Performance factor, percent	50.0
Net floodable pay sand, feet	13.7



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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company P & W Joint Venture Lease Speiker Well No. 2-78

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	787.5	16.1	22	57	79	275	5.8	1.0	1.0	275	5.80
2	788.5	17.2	29	47	76	387	19.	1.0	2.0	387	19.00
3	790.5	17.6	29	47	76	396	22.	1.2	3.2	475	26.40
4	791.5	12.2	17	67	84	161	23.	0.6	3.8	97	13.80
5	792.5	16.8	32	51	83	417	95.	1.0	4.8	417	95.00
6	793.5	16.6	30	53	83	386	26.	0.8	5.6	309	20.80
7	794.5	17.1	35	48	83	465	21.	0.7	6.3	326	14.70
8	795.5	20.1	39	43	82	608	16.	1.0	7.3	608	16.00
9	796.5	21.3	34	45	79	562	68.	1.0	8.3	562	68.00
10	797.5	19.6	31	47	78	471	80.	1.0	9.3	471	80.00
11	798.5	19.1	32	58	90	475	37.	1.0	10.3	475	37.00
12	799.5	14.0	17	68	85	185	21.	1.0	11.3	185	21.00
13	800.6	20.1	31	51	82	484	16.	1.0	12.3	484	16.00
14	801.5	19.2	19	60	79	283	20.	1.0	13.3	283	20.00
15	802.5	17.2	29	55	84	387	31.	1.0	14.3	387	31.00
16	803.5	17.7	37	44	81	508	18.	1.0	15.3	508	18.00
17	804.5	19.0	32	45	77	472	135.	1.0	16.3	472	135.00
18	805.5	16.8	30	50	80	391	18.	1.0	17.3	391	18.00
19	806.5	15.9	34	54	88	419	4.0	1.0	18.3	419	4.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company P & W Joint Venture Lease Speiker Well No. 2-78

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
787.0 - 799.0	10.3	38.6	396.50
799.0 - 807.0	8.0	32.9	263.00
787.0 - 807.0	18.3	36.0	659.50

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 Bbls./Acre
787.0 - 799.0	10.3	17.9	30.3	50.5	427	4,402
799.0 - 807.0	8.0	17.5	28.6	53.4	391	3,129
787.0 - 807.0	18.3	17.7	29.6	51.8	412	7,531

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company P & W Joint Venture Lease Speiker Well No. 2-78

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	Bbls./A. Ft.			
1	787.5	16.6	22	284	0	0	22	73	284	135	2.57	20
2	788.5	17.7	29	399	2	28	27	68	371	434	7.04	20
3	790.5	17.1	29	385	2	27	27	67	358	58	0.88	25
4	791.5	12.7	17	168	0	0	17	73	168	24	0.51	30
5	792.5	17.3	32	430	4	54	28	78	376	312	18.43	20
6	793.5	17.1	30	398	3	40	27	69	358	422	7.33	20
7	794.5	17.4	35	472	2	27	33	63	445	9	0.15	35
8	795.5	19.9	39	603	9	140	30	65	463	109	1.98	20
9	796.5	21.3	34	562	5	83	29	69	479	230	10.53	20
10	797.5	19.7	31	474	4	61	27	65	413	55	1.25	20
11	798.5	19.4	32	482	3	46	29	67	436	405	6.45	25
12	799.5	14.5	19	214	0	0	19	80	214	9	0.22	35
13	800.6	19.6	31	472	4	61	27	68	411	167	2.93	20
14	801.5	18.9	21	308	0	0	21	78	308	23	0.44	30
15	802.5	17.7	29	399	3	42	26	71	357	62	1.03	25
16	803.5	17.9	37	514	2	28	35	60	486	29	0.59	30
17	804.5	19.5	32	484	4	61	28	67	423	241	14.45	20
18	805.5	17.1	30	398	2	27	28	68	371	65	1.32	25
19	806.5	15.4	34	407	0	0	34	58	407	23	0.44	30

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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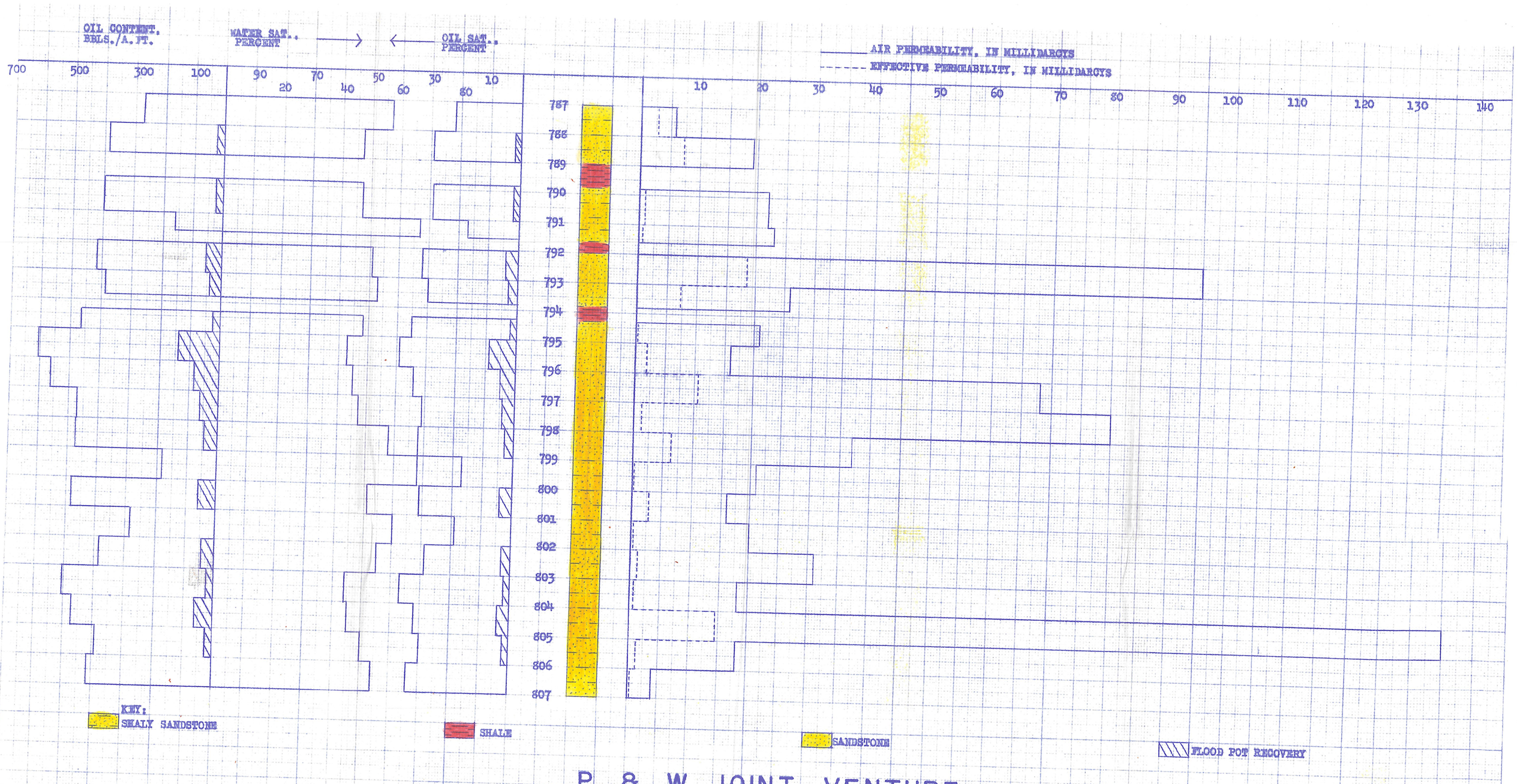
SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company P & W Joint Venture Lease Speiker Well No. 2-78

Depth Interval, Feet	787.0 - 799.0	799.0 - 807.0	787.0 - 807.0
Feet of Core Analyzed	8.7	5.0	13.7
Average Percent Porosity	18.6	18.4	18.5
Average Percent Original Oil Saturation	32.2	31.8	32.0
Average Percent Oil Recovery	3.8	3.0	3.5
Average Percent Residual Oil Saturation	28.4	28.8	28.5
Average Percent Residual Water Saturation	68.0	66.8	67.6
Average Percent Total Residual Fluid Saturation	96.4	95.6	96.1
Average Original Oil Content, Bbls./A. Ft.	467.	454.	462.
Average Oil Recovery, Bbls./A. Ft.	57.	44.	52.
Average Residual Oil Content, Bbls./A. Ft.	410.	410.	410.
Total Original Oil Content, Bbls./Acre	4,061.	2,267.	6,328.
Total Oil Recovery, Bbls./Acre	495.	219.	714.
Total Residual Oil Content, Bbls./Acre	3,566.	2,048.	5,614.
Average Effective Permeability, Millidarcys	6.06	4.06	5.33
Average Initial Fluid Production Pressure, p.s.i.	22.8	24.0	23.2

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



P & W JOINT VENTURE

SPEIKER LEASE — WELL NO. 2-78

NEOSHO COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVG. OIL CONTENT BBLS./A.FT.	TOTAL OIL CONTENT BBLS./ACRE	AVG. AIR PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY, BBLS./ACRE
787.0 - 799.0	10.3	17.9	30.3	50.5	427	4,402	38.6	
799.0 - 807.0	8.0	17.5	28.6	53.4	391	3,129	32.9	
787.0 - 807.0	18.3	17.7	29.6	51.8	412	7,531	36.0	3,750 (PRIMARY & WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
DECEMBER, 1978.