

OILFIELD RESEARCH LABORATORIES

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

March 5, 1982

Centurion Mineral & Petroleum Resources
9667 Firdale Avenue
Edmonds, Washington 98020

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Bartlett Lease, Well No. 9, located in Allen County, Kansas and submitted to our laboratory on March 2, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

4 c to Edmonds, Washington
1 c to Caney, Kansas

- REGISTERED ENGINEERS -

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

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Centurion Mineral & Petroleum Resources Lease Bartlett Well No. 9

Location _____
 Section 34 Twp. 24S Rge. 21E County Allen State Kansas

Elevation, Feet

Name of Sand..... Bartlesville

Top of Core 690.0

Bottom of Core 708.8

Top of Sand 690.0

Bottom of Sand 700.1

Total Feet of Permeable Sand 10.1

Total Feet of Floodable Sand 10.1

Distribution of Permeable Sand: Permeability Range Millidarcys

Feet

Cum. Ft.

13 - 33

4.0

4.0

60 - 100

3.1

7.1

100 - 146

3.0

10.1

Average Permeability Millidarcys 69.7

Average Percent Porosity 19.0

Average Percent Oil Saturation 41.7

Average Percent Water Saturation 43.0

Average Oil Content, Bbls./A. Ft. 614.0

Total Oil Content, Bbls./Acre 6,206.

Average Percent Oil Recovery by Laboratory Flooding Tests 11.7

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. 175.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre 1,770.

Total Calculated Oil Recovery, Bbls./Acre See "Calculated Recovery"
Section

The core was sampled by a representative of Oilfield Research Laboratories. Fresh water mud was used as a drilling fluid. The core was reported to be from a non-virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
690.0 - 692.7	Brown sandstone with scattered fine coal partings.
692.7 - 700.1	Brown sandstone.
700.1 - 701.3	Coal.
701.3 - 707.4	Gray shale.
707.4 - 708.4	Light gray slightly sandy shale.
708.4 - 708.8	Gray slightly calcareous slightly sandy shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 1,770 barrels of oil per acre was obtained from 10.1 feet of sand. The weighted average percent oil saturation was reduced from 41.7 to 30.0, or represents an average recovery of 11.7 percent. The weighted average effective permeability of the samples is 8.74 millidarcys, while the average initial fluid production pressure is 19.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 10 samples tested, 10 produced water and oil. This indicates that 100 percent of the sand represented by these samples is floodable pay sand.

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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 2,610 barrels of oil per acre. This is an average recovery of 259 barrels per acre foot from 10.1 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	35.0
Average porosity, percent	19.0
Oil saturation after flooding, percent	30.0
Performance factor, percent, estimated	55.0
Net floodable sand, feet	10.1

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Centurion Mineral & Petroleum Resources Lease Bartlett 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	690.5	17.2	37	47	84	23.	1.0	1.0	494	23.00
2	691.6	18.3	41	44	85	25.	1.0	2.0	582	25.00
3	692.6	21.4	42	36	78	83.	0.7	2.7	488	58.10
4	693.6	19.1	36	41	77	101.	1.0	3.7	533	101.00
5	694.5	14.9	46	48	94	13.	1.0	4.7	532	13.00
6	695.6	19.0	45	48	93	99.	1.0	5.7	663	99.00
7	696.4	20.6	49	36	85	121.	1.0	6.7	783	121.00
8	697.4	19.9	48	44	92	145.	1.0	7.7	741	145.00
9	698.5	19.5	37	44	81	32.	1.0	8.7	560	32.00
10	699.6	20.1	38	41	79	62.	1.4	10.1	830	86.80

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Centurion Mineral & Petroleum Resources		Lease	Bartlett	Well No.	9
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.				
690.0 - 700.1	10.1	69.7	703.90				
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 Bbbs./Acre	
690.0 - 700.1	10.1	19.0	41.7	43.0	614	6,206	

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Centurion Mineral & Petroleum Resources Lease Bartlett 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	690.5	17.1	37	491	10	133	27	68	212	3.60	25
2	691.6	18.4	41	585	13	186	28	58	434	11.55	15
3	692.6	21.3	42	694	13	215	29	54	342	14.24	15
4	693.6	19.3	36	539	7	105	29	64	340	7.12	15
5	694.5	15.0	46	535	8	93	38	56	130	2.02	25
6	695.6	19.1	45	667	15	222	30	63	372	14.05	15
7	696.4	20.5	49	779	20	318	29	63	384	14.62	15
8	697.4	20.0	48	745	17	264	31	61	364	14.24	15
9	698.5	19.7	37	565	11	168	26	67	396	10.50	15
10	699.6	20.0	38	590	6	93	32	54	28	0.45	35

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

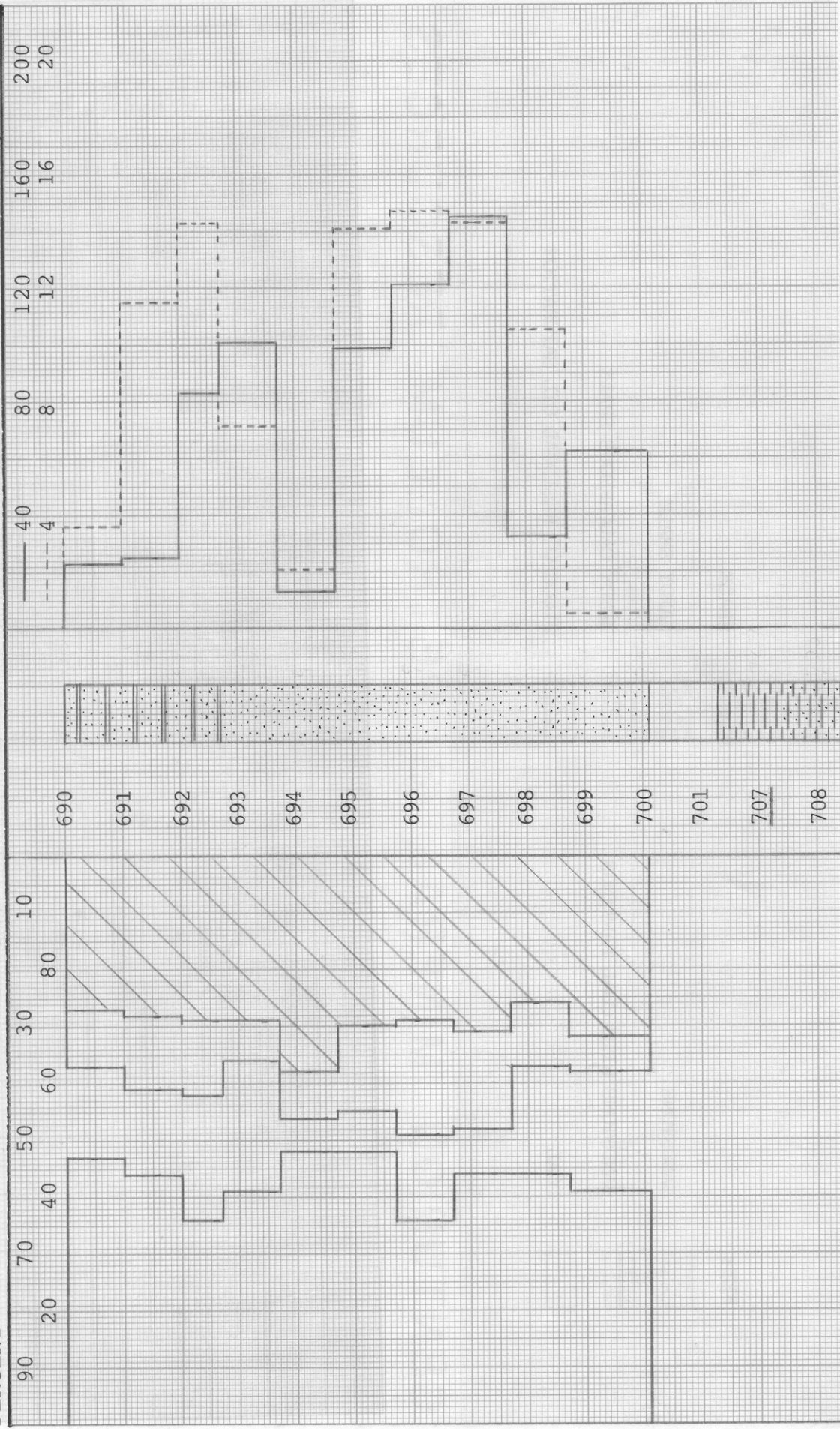
TABLE V

Company	Centurion Mineral & Petroleum Resources	Lease	Bartlett	Well No.
		690.0 - 700.1		9
Depth Interval, Feet				
Feet of Core Analyzed		10.1		
Average Percent Porosity		19.0		
Average Percent Original Oil Saturation		41.7		
Average Percent Oil Recovery		11.7		
Average Percent Residual Oil Saturation		30.0		
Average Percent Residual Water Saturation		60.7		
Average Percent Total Residual Fluid Saturation		90.7		
Average Original Oil Content, Bbls./A. Ft.		615.		
Average Oil Recovery, Bbls./A. Ft.		175.		
Average Residual Oil Content, Bbls./A. Ft.		440.		
Total Original Oil Content, Bbls./Acre		6,218.		
Total Oil Recovery, Bbls./Acre		1,770.		
Total Residual Oil Content, Bbls./Acre		4,448.		
Average Effective Permeability, Millidarcys		8.74		
Average Initial Fluid Production Pressure, p.s.i.		19.0		

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

WATER SAT., PERCENT → ← OIL SAT., PERCENT

PERMEABILITY, IN MILLIDARCY
EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCY



KEY:



SANDSTONE



SANDSTONE WITH COAL PARTINGS



COAL



SHALE



SANDY SHALE



SANDY CALCAREOUS SHALE



FLOODPOT RESIDUAL OIL SATURATION

CENTURION MINERAL & PETROLEUM RESOURCES

BARTLETT LEASE

WELL NO. 9

ALLEN 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
690.0 - 700.1	10.1	19.0	41.7	43.0	69.7	2610 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
MARCH, 1982

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