

OILFIELD RESEARCH LABORATORIES

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

June 14, 1982

McGinnis Enterprises, Inc.
R. R. #1, Box 9
Rantoul, Kansas 66079

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary cores taken from the McGinnis "G" Lease, Well No. 4, located in Franklin County, Kansas and submitted to our laboratory on June 7, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/dlb

5 c to Rantoul, Kansas

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GENERAL INFORMATION & SUMMARY

Company McGinnis Enterprises, Inc. Lease McGinnis "G" Well No. 4

Location _____

Section 28 Twp. 17S Rge. 21E County Franklin State Kansas

Elevation, Feet

	Lower Squirrel	Cattleman
Name of Sand.....		
Top of Core	615.0	660.0
Bottom of Core	620.2	669.2
Top of Sand	615.5	660.0
Bottom of Sand	620.2	* 668.5
Total Feet of Permeable Sand	2.4	8.3
Total Feet of Floodable Sand	1.6	7.3

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
<u>Lower Squirrel Sand</u>		
0 - 11	1.2	1.2
12 - 16	1.2	2.4
<u>Cattleman Sand</u>		
0 - 20	2.0	2.0
20 - 45	4.7	6.7
80 - 131	1.6	8.3

Average Permeability Millidarcys	11.2	41.7
Average Percent Porosity	20.7	22.5
Average Percent Oil Saturation	26.8	35.2
Average Percent Water Saturation	43.4	36.7
Average Oil Content, Bbls./A. Ft.	433.	614.
Total Oil Content, Bbls./Acre	1,257.	5,095.
Average Percent Oil Recovery by Laboratory Flooding Tests	3.8	6.0
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	63.	103.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	100.	754.
Total Calculated Oil Recovery, Bbls./Acre	See "Calculated Recovery"	

Section

The cores were 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>
	<u>LOWER SQUIRREL SAND</u>
615.0 - 615.5	Gray shale.
615.5 - 616.0	Alternate layers gray shale and brown sandstone.
616.0 - 616.7	Brown sandstone.
616.7 - 617.1	Grayish brown very shaly sandstone.
617.1 - 618.0	Brown sandstone with gray shale partings.
618.0 - 618.3	Grayish brown shaly sandstone.
618.3 - 619.7	Gray shale.
619.7 - 620.2	Grayish brown very shaly sandstone.
620.2 - 660.0	No core.
	<u>CATTLEMAN SAND</u>
660.0 - 664.0	Brown sandstone with scattered micaceous partings.
664.0 - 664.5	Brown slightly shaly sandstone with gray shale and micaceous partings.
664.5 - 666.2	Brown sandstone.
666.2 - 666.4	Grayish brown very shaly sandstone.
666.4 - 668.5	Brown sandstone.
668.5 - 669.2	Grayish brown very shaly sandstone.

LABORATORY FLOODING TESTSLOWER SQUIRREL SAND

The Lower Squirrel Sand in this core responded to laboratory flooding tests, as a total recovery of 100 barrels of oil per acre was obtained from 1.6 feet of sand. The weighted average percent oil saturation was reduced from 33.4 to 29.6, or represents an average recovery of 3.8 percent. The weighted average effective permeability of the samples is 0.74 millidarcys, while the average initial fluid production pressure is 30.0 pounds per square inch (See Table V.)

By observing the data given in Table IV, you will note that of the 5 samples tested, 2 produced water and oil. This indicates that approximately 40 percent of the sand represented by these samples is floodable pay sand.

CATTLEMAN SAND

The Cattleman Sand in this core responded to laboratory flooding tests, as a total recovery of 754 barrels of oil per acre was obtained from 7.3 feet of sand. The weighted average percent oil saturation was reduced from 36.4 to 30.4, or represents an average recovery of 6.0 percent. The weighted average effective permeability of the samples is 2.47 millidarcys, while the average initial fluid production pressure is 23.8 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 9 samples tested, 8 produced water and oil, and 1 produced water only. This indicates that approximately 89 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 430 barrels of oil per acre from the Lower Squirrel Sand and approximately 2,850 barrels of oil per acre from the Cattleman Sand. This is an average recovery of 269 barrels per acre foot from 1.6 feet of floodable sand from the Lower Squirrel Sand, and an average recovery of 390 barrels per acre foot from 7.3 feet of floodable sand from the Cattleman Sand.

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

	Lower Squirrel Sand	Cattleman Sand
Original formation volume factor (estimated)	1.04	1.05
Reservoir water saturation, percent, (estimated)	35.0	25.0
Average porosity, percent	21.1	22.3
Oil saturation after flooding, percent	29.6	30.4
Performance factor, percent (estimated)	50.0	55.0
Net floodable pay sand, feet	1.6	7.3

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company McGinniss Enterprises, Inc.

Lease McGinniss "G"

Well No. 4

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbbs. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water	Total			Ft.	Cum. Ft.		
1 2 3 4 5	615.6	21.7	21	33	54	LOWER SQUIRREL SAND	13. 15. 10. 3.1 Imp.	0.5	0.5	177	6.50
	616.4	22.0	35	43	78			0.7	1.2	418	10.50
	617.4	20.5	32	43	75			0.9	2.1	458	9.00
	618.2	18.3	25	50	75			0.3	2.4	107	0.93
	619.8	19.1	13	51	64			0.5	2.9	97	0.00
6 7 8 9 10 11 12 13 14	660.4	23.7	27	45	72	CATTLEMAN SAND	43. 43. 84. 23. 8.3 26. 130. 18. 17.	1.0	1.0	496	43.00
	661.5	22.6	36	41	77			1.0	2.0	631	43.00
	662.6	24.1	33	30	63			1.0	3.0	617	84.00
	663.5	22.4	32	46	78			1.0	4.0	556	23.00
	664.4	20.1	35	39	74			0.5	4.5	273	4.15
	665.6	22.4	43	29	72			1.7	6.2	1270	44.20
	666.5	22.9	32	39	71			0.6	6.8	341	78.00
	667.6	21.8	36	36	72			1.0	7.8	609	18.00
	668.4	21.0	37	29	66			0.5	8.3	302	8.50

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		McGinnis Enterprises, Inc.		Lease		McGinnis "G"		Well No.		4	
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.								
<u>LOWER SQUIRREL SAND</u>											
615.5 - 620.2	2.4	11.2	26.93								
<u>CATTLEMAN SAND</u>											
660.0 - 668.5	8.3	41.7	345.85								
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre						
<u>LOWER SQUIRREL SAND</u>											
615.5 - 620.2	2.9	20.7	26.8	43.4	433	1,257					
<u>CATTLEMAN SAND</u>											
660.0 - 668.5	8.3	22.5	35.2	36.7	614	5,095					

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company McGinnis Enterprises, Inc. Lease McGinnis "G" Well No. 4

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	615.6	21.6	21	352	0	0	21	34	0	Imp.	-
2	616.4	21.9	35	595	6	102	29	55	88	1.50	20
3	617.4	20.4	32	506	2	32	30	58	12	0.15	40
4	618.2	18.8	24	350	0	0	24	51	0	Imp.	-
5	619.8	19.4	13	196	0	0	13	52	0	Imp.	-
LOWER SQUIRREL SAND											
6	660.4	23.6	27	494	0	0	27	58	376	5.00	10
7	661.5	22.5	36	628	8	140	28	68	36	0.60	40
8	662.6	24.0	33	614	4	74	29	53	304	4.66	20
9	663.5	22.2	32	551	3	52	29	57	122	1.87	25
10	664.4	20.0	35	543	5	78	30	61	88	1.12	25
11	665.6	22.5	43	751	8	140	35	41	220	3.00	15
12	666.5	22.8	32	566	4	71	28	54	204	2.67	15
13	667.6	21.9	36	612	7	119	29	56	266	3.17	15
14	668.4	20.9	37	600	6	97	31	66	60	0.97	35
CATTLEMAN SAND											
6	660.4	23.6	27	494	0	0	27	58	376	5.00	10
7	661.5	22.5	36	628	8	140	28	68	36	0.60	40
8	662.6	24.0	33	614	4	74	29	53	304	4.66	20
9	663.5	22.2	32	551	3	52	29	57	122	1.87	25
10	664.4	20.0	35	543	5	78	30	61	88	1.12	25
11	665.6	22.5	43	751	8	140	35	41	220	3.00	15
12	666.5	22.8	32	566	4	71	28	54	204	2.67	15
13	667.6	21.9	36	612	7	119	29	56	266	3.17	15
14	668.4	20.9	37	600	6	97	31	66	60	0.97	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

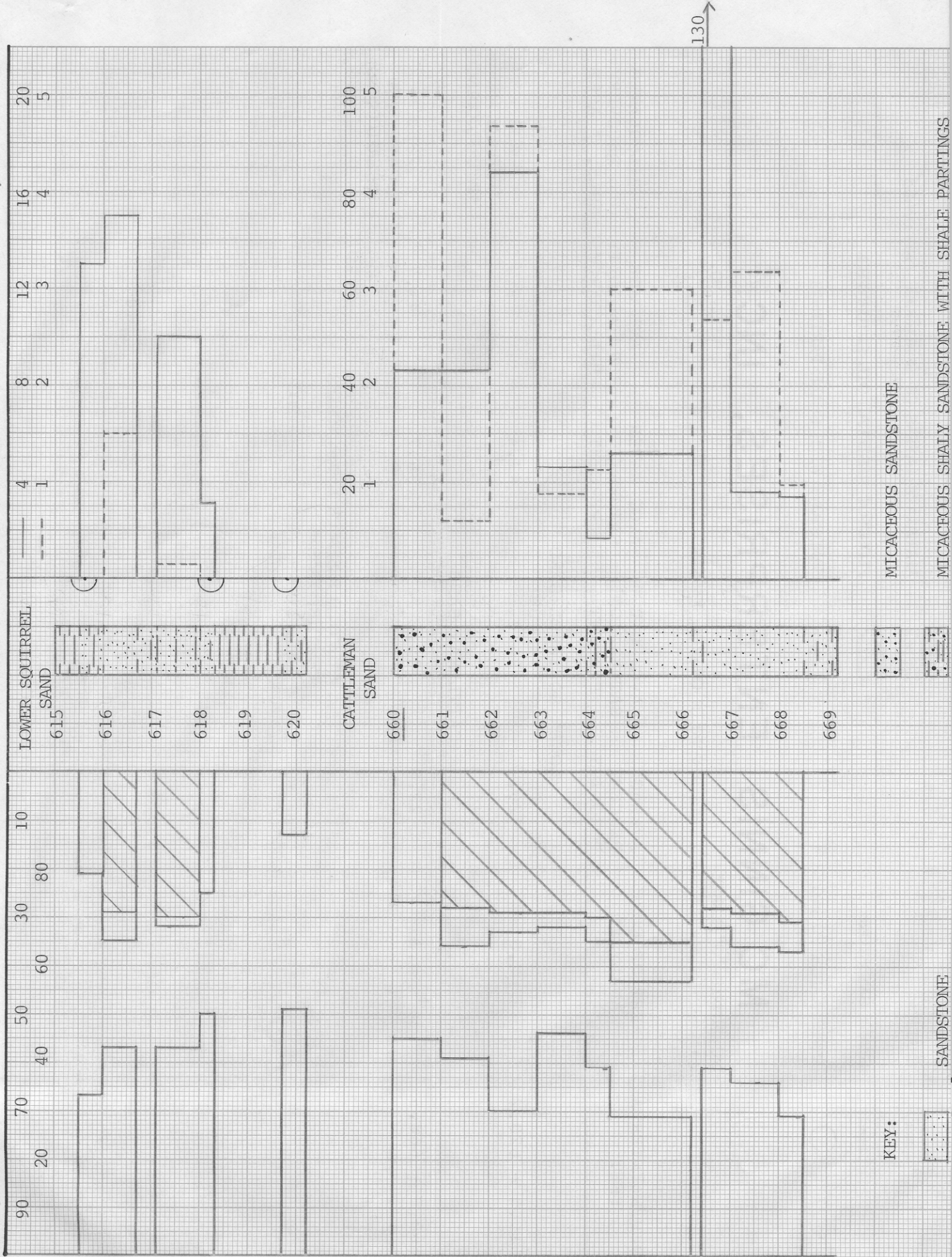
TABLE V

Company <u>McGinnis Enterprises, Inc.</u>		Lease <u>McGinnis "G"</u>		Well No. <u>4</u>	
		<u>LOWER SQUIRREL SAND</u>		<u>CATTLEMAN SAND</u>	
Depth Interval, Feet		615.5 - 620.2		660.0 - 668.5	
Feet of Core Analyzed		1.6		7.3	
Average Percent Porosity		21.1		22.3	
Average Percent Original Oil Saturation		33.4		36.4	
Average Percent Oil Recovery		3.8		6.0	
Average Percent Residual Oil Saturation		29.6		30.4	
Average Percent Residual Water Saturation		56.7		54.7	
Average Percent Total Residual Fluid Saturation		86.3		85.1	
Average Original Oil Content, Bbls./A. Ft.		546.		629.	
Average Oil Recovery, Bbls./A. Ft.		63.		103.	
Average Residual Oil Content, Bbls./A. Ft.		483.		526.	
Total Original Oil Content, Bbls./Acre		872.		4,595.	
Total Oil Recovery, Bbls./Acre		100.		754.	
Total Residual Oil Content, Bbls./Acre		772.		3,841.	
Average Effective Permeability, Millidarcys		0.74		2.47	
Average Initial Fluid Production Pressure, p.s.i.		30.0		23.8	

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

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

— PERMEABILITY, IN MILLIDARCYS
--- EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS



KEY:



SANDSTONE



SHALE



SHALY SANDSTONE



IMPERMEABLE TO WATER



MICACEOUS SANDSTONE



MICACEOUS SHALY SANDSTONE WITH SHALE PARTINGS



ALTERNATE LAYERS OF SANDSTONE AND SHALE



FLOODPOT RESIDUAL OIL SATURATION



SANDSTONE WITH SHALE PARTINGS

MC GINNIS ENTERPRISES, INC.

MC GINNIS "G" LEASE

WELL NO. 4

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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LOWER SQUIRREL SAND

615.5 - 620.2	2.9	20.7	26.8	43.4	11.2	430 (PRIMARY AND WATERFLOODING)
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CATTLEMAN SAND

660.0 - 668.5	8.3	22.5	35.2	36.7	41.7	2850 (PRIMARY AND WATERFLOODING)
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OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
JUNE, 1982 PDC