

AMSTUTZ AND YATES, INC.

January 4, 1951

Mr. Maurice L. Brown
Shallow Water Refining Company
114 West Pine Street
Garden City, Kansas

Subject: Shallow Water - Gobleman "A" No. 8
C SW NE Sec. 34-21S-34W
Hunn Pool, Finney County, Kansas

Dear Maurice:

Herein is a geological report of the subject well.

Samples and drilling time were examined from 2500 to 4731 feet the rotary total depth. Five rotary diamond cores were taken from intervals within the Marmaton and Mississippian formations. The following formation tops were picked from sample and core data as referred to the rotary bushing datum.

Elevation: Ground level 2948
Derrick floor 2952
Rotary bushing 2955

Herrington	2502	453
Winfield	2560	395
Towanda	2618	337
Ft. Riley	2649	306
Base Florence	2736	219
Wreford	2793	162
Neva	2968	-13
Foraker	3048	-93
Advance	3086	-131
Pennsylvanian	3220	-265
Tarkio	3320	-365
Emporia	3359	-404
Topeka	3500	-545
Heebner	3751	-796
Lansing-Kansas City	3769	-814
Marmaton	4251	-1293
Mississippian	4629	-1674
Mississippi Line	4633	-1678
Total Depth	4731	-1776

The following sample and core descriptions are of the more porous and likely fluid bearing intervals wherein gas or oil could be anticipated.

Herrington

2513-2522 finely crystalline to slightly sandy and calcitic, streaks fair with some good crystalline and vugular porosity but in general poor porosity, no oil staining but has odor gas.

C 5 E
27-21-34W
1 A
Top of 4641

Lansing-Kansas City

- 3800-3812 finely crystalline to dense and cherty, very poor porosity, no staining
- 3816-3824 medium crystalline to dense, poor porosity, no staining
- 3845-3852 finely crystalline to dense, poor porosity, no staining
- 3858-3865 finely crystalline to slightly fossiliferous, very poor porosity, no staining
- 3901-3912 fine to medium crystalline, slightly fossiliferous, fair small vugular porosity, appears water bearing
- 3926-3940 finely crystalline to slightly dolomitic, very poor porosity, no staining
- 3956-3968 finely crystalline cherty and pyritic grading to finely crystalline and streaks oolitic with poor pin point and small vugular porosity and good oolitic streaks porosity, no oil staining, is definitely water bearing
- 3989-3999 streaks good oolitic porosity showing definite water staining
- 4005-4012 finely crystalline, poor vugular porosity, probably water bearing
- 4014-4018 oolitic with fair oolitic porosity, water bearing
- 4041-4049 finely crystalline cherty, streaks poor porosity, no staining
- 4051-4056 oolitic and coarsely crystalline, fair porosity, no staining
- 4085-4106 oolitic, good porosity, no staining, definitely water bearing
- 4134-4141 finely crystalline to marly, poor porosity, no staining
- 4151-4158 finely crystalline, poor porosity, no staining
- 4183-4188 oolitic to slightly dolomitic, good porosity, no staining, probably water bearing
- 4228-4232 oolitic, good porosity, no staining, probably water bearing

Marnaton

Core No. 1 4290-4309.7 Recovered 19.7 feet.

- 4300-4307 fossiliferous and oolitic, fair oolitic porosity, streaks of spotted bleeding oil staining, good odor gas. This interval appears tight and probably has high connate water content. Would have low fluid capacity
- 4307-4309 As above with traces of spotted faint staining oolitic and dolomitic, poor porosity, water staining
- 4368-4373 finely crystalline, poor porosity, water bearing
- 4376-4380 as above, slightly fossiliferous, probably water bearing

- 4401-4403 finely crystalline slightly oolitic, very poor porosity, trace faint staining
- 4409-4412 oolitic fair oolitic porosity, faint spotted leached staining, water bearing
- 4440-4450 oolitic and slightly cherty, good porosity, water bearing
- 4503-4509 impure finely crystalline, very poor porosity, no staining
- 4525-4531 oolitic, impure finely crystalline, streaks poor porosity, no staining, probably water bearing
- 4535-4542 fossiliferous, streaks poor to fair porosity, no staining

Mississippian

- Core No. 2 4610-4639 Recovered 29 feet
- 4633-4637.5 finely crystalline and oolitic, slightly fractured cherty. This streak poor porosity with trace faint staining at 4636
- 4637.5-4638.5 oolitic and finely crystalline, fair pin point and oolitic porosity - slightly spotted to fair uniform saturation. 100 percent soluble in 15% HCL
- Core No. 3 4639-4684 Recovered 45 feet ✓
- 4639-4640 streaks of oolitic and finely crystalline, poor crystalline porosity and thin vertical fractures with bleeding oil
- 4653-4655 finely crystalline to dense, very poor porosity, spotted very faint staining
- Core No. 4 4684 4716 Recovered 32 feet
- 4713-4715 coarsely crystalline dolomitic with spotted oolitic lime, fair to poor crystalline porosity with bleeding live oil staining and spotted salt water staining. Appears to have very little permeability
- Core No. 5 4716 4731 Recovered 15 feet
- 4716-4731 finely crystalline to slightly dolomitic lime showing gray slightly impure banding, no visible porosity, no staining

There were no shows of oil in the Lansing-Kansas City formation which were considered worthy of drill stem testing. Although the well is six feet higher structurally than Aeilts No. 3 the interval from 4053 to 4058 in Aeilts No. 3 was poorly developed and water bearing in Gobleman "A" No. 8.

The Marmaton formations is also six feet higher than found in Aeilts No. 3. The core of this formation from 4290 to 4309.7 revealed a fairly tight lime which does not appear to have commercial possibilities.

Except for one specimen of the core taken at 4305.5 the core analysis indicates very low permeabilities with low oil saturations. It is doubtful that a commercial well could be completed in this small interval.

The top of the Mississippian is ten feet lower than found in Acilts No. 3 and the Mississippian line one foot lower. The upper oil bearing interval, however, appears to be structurally higher by six feet with the better portion of the oil zone having been removed at the close of Mississippian time. The core from 4637.5 to 4638.5 had only fair reservoir characteristics. Because of this and the comparatively thin interval of staining it does not warrant commercial consideration.

The lower Mississippian interval from 4713 to 4715 is five feet higher structurally than the producing zones in Acilts Nos. 1 and 3. Reservoir characteristics, however, are much poorer as evidenced from visual inspection and core analysis. The presence of thin fractures, present a difficult evaluation of this zone, however, it does not appear commercial.

On the basis of the poor reservoir development of all potentially productive intervals of the Lansing-Kansas City, Marmaton and Mississippian formations coupled with their thin vertical extent we can only recommend that casing not be run and the well abandoned as a noncommercial well. If casing should be run, however, we recommend that casing be cemented at approximately 4683 feet with about 125 sacks. This is to insure about 100 feet of cement above the top of the Marmaton oil zone and to prevent damage to the casing from shooting the lower zone with nitro-glycerine. We recommend shooting with a charge of 8 quarts or 4 quarts per foot from 4713 to 4715 feet. There is the possibility of fracturing this zone sufficiently that an acid treatment of 1000 and retreatment of 3000 to 4000 gallons might open up a zone of greater permeability at some distance from the well bore. Although this could be effective the chances of obtaining satisfactory results and a commercial well are not good.

With casing cemented between the oil zones in the Mississippian completion in the upper zone should be made with Kone-shots and regular acid. If a treatment of 1000 gallons is effective a larger treatment of up to 5000 gallons could be considered. Testing of this zone should be isolated from that of the lower zone. The nature of the two Mississippian cones indicate that high pressures equivalent to the weight of the overburden will be required during acid treatment. For this reason we recommend that tubing be used for treatment of both zones.

Very truly yours,

AMSTUTZ AND YATES, INC.



R. A. Aukerman

AMSTUTZ AND YATES, INC.

DRILLING TIME LOG

The Shallow Water Refg. Co. - No. 8 Gobleman A
C SW NE Sec. 34-T21S-R34W, Finney Co., Ks.

<u>Depth</u>		<u>Drilling Time</u>	<u>Remarks</u>
<u>From</u>	<u>To</u>		
2400 to	2410	4-3-2-2-4-1-3-1-2-2	
	2420	3-1-7-3-3-2-3-2-2-3	
	2430	2-3-2-2-3-4-4-2-2-2	
	2440	3-2-3-3-4-2-3-1-2-3	
	2450	3-2-6-8-3-2-6-7-5-3	
	2460	2-2-3-3-3-4-7-6-5-3	
	2470	2-2-4-3-2-2-3-2-2-4	
	2480	7-6-5-4-3-3-3-2-4-4	
	2490	5-7-10-9-10-6-9-8-3-3	
	2500	3-2-4-5-3-5-4-3-4-3	
2500 to	2510	9-6-5-4-3-4-4-3-3-3	
	2520	4-4-4-3-2-3-3-3-3-4	
	2530	3-4-7-7-8-6-6-5-6-7	
	2540	7-7-8-9-8-6-7-5-7-8	
	2550	5-5-3-8-7-7-6-5-5-4	
	2560	5-6-6-4-5-5-5-5-6-5	
	2570	8-7-6-5-5-5-5-5-5-6	
	2580	8-8-7-7-9-8-12-10-7-8	
	2590	8-9-6-3-3-3-3-3-2-4	
	2600	4-4-3-3-4-3-4-4-6-6	
2600 to	2610	4-4-5-3-5-5-4-3-4-4	
	2620	4-3-5-5-4-3-4-4-3-3	
	2630	3-3-3-5-6-6-5-3-4-4	
	2640	3-3-3-2-3-3-4-5-4-4	
	2650	5-5-4-4-4-4-5-4-4-6	
	2660	6-8-6-6-5-6-5-6-4-5	
	2670	5-5-4-3-3-3-3-4-4-3	
	2680	3-3-5-4-3-3-3-3-3-3	
	2690	6-7-8-7-8-5-4-4-3-3	
	2700	3-3-3-3-4-3-3-3-3	
2700 to	2710	3-3-3-3-4-5-5-10-5-4	Trip 2708
	2720	6-4-5-4-5-4-4-4-2-4	
	2730	4-3-4-4-3-3-2-2-2-3	
	2740	4-4-3-2-2-2-3-4-4-4	
	2750	4-3-3-4-4-4-5-4-4-3	
	2760	4-3-3-4-3-4-4-3-4-5	
	2770	6-5-7-6-6-6-5-6-6-7	
	2780	6-4-4-5-7-6-9-4-5-5	
	2790	3-4-5-4-4-5-5-3-2-3	
	2800	3-2-4-4-6-5-5-4-4-5	
2800 to	2810	5-4-4-5-4-4-4-5-4-4	
	2820	7-7-5-4-4-4-6-8-8	
	2830	9-9-9-8-10-12-9-6-8-9	
	2840	7-8-10-8-8-9-11-12-11-13	Trip 2840
	2850	5-6-6-5-4-5-5-6-6-7	
	2860	6-5-5-5-6-6-7-6-5-5	

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<u>Depth</u>		<u>Drilling Time</u>	<u>Remarks</u>
<u>From</u>	<u>To</u>		
2860	to 2870	4-4-4-4-4-5-4-5-4-4	
	2880	3-4-4-4-5-3-4-5-6-5	
	2890	6-6-4-5-5-4-5-5-5-3	
	2900	5-5-6-4-5-4-4-5-4-4	
2900	to 2910	5-4-4-4-5-5-5-4-6-4	
	2920	4-6-6-5-5-5-6-6-6-7	
	2930	6-4-4-6-5-6-7-8-7-5	
	2940	5-5-4-5-6-5-3-4-4-5	
	2950	4-3-2-3-4-6-5-6-6-5	
	2960	6-5-7-7-6-7-6-7-7-6	
	2970	7-7-7-7-6-6-8-8-7-6	
	2980	6-6-5-5-6-6-6-7-6-5	
	2990	5-6-6-3-2-1-2-1-1-6	
	3000	8-10-8-8-9-10-11-10-9-9	
3000	to 3010	10-10-9-8-9-9-11-10-12-12	
	3020	11-8-11-17-7-6-5-5-4-4	Trip 3014
	3030	5-4-6-5-5-4-5-4-5-4	
	3040	5-6-7-5-5-5-5-4-3-3	
	3050	4-4-4-4-3-4-4-5-5-5	
	3060	5-6-6-6-6-8-7-7-7-7	
	3070	10-10-9-8-7-6-8-8-9-10	
	3080	9-10-11-11-10-12-10-9-10-11	
	3090	10-11-10-8-10-10-7-6-6-5	
	3100	4-5-7-6-8-8-6-6-8-9	
3100	to 3110	7-8-7-11-10-6-5-1-1-1	
	3120	4-4-4-4-5-4-4-6-6-5	
	3130	3-3-4-4-6-6-4-5-4-4	
	3140	9-8-9-11-16-6-6-6-7-6	Trip 3135
	3150	7-7-8-8-7-7-6-8-12-10	
	3160	8-8-10-9-6-5-5-5-6-8	
	3170	10-9-7-11-9-8-8-4-4-5	
	3180	6-4-4-4-5-8-11-12-9-11	
	3190	11-9-9-9-8-10-13-9-4-5	
	3200	5-5-4-3-5-10-10-7-5-3	
3200	to 3210	3-8-10-10-7-5-5-4-5-8	
	3220	7-10-10-9-8-8-7-8-8-8	
	3230	11-11-12-9-11-12-11-12-10-8	Trip 3235
	3240	12-12-11-12-11-16-16-20-6-3	
	3250	3-3-2-3-3-3-4-3-3-3	
	3260	3-3-4-4-3-4-4-4-5-3	
	3270	5-4-4-4-4-3-3-2-3-3	
	3280	3-3-2-3-3-4-4-6-4-4	
	3290	6-4-4-7-5-6-5-3-3-4	
	3300	4-3-2-3-4-6-3-2-3-4	
3300	to 3310	2-4-4-3-3-3-4-4-4-4	
	3320	4-5-3-4-4-4-5-4-3-6	
	3330	4-5-6-5-4-2-5-4-4-6	
	3340	5-5-6-7-7-6-5-4-5-7	
	3350	6-4-5-6-10-6-7-7-7-6	
	3360	5-6-5-7-5-6-6-7-6-8	

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<u>Depth</u>		<u>Drilling Time</u>	<u>Remarks</u>
<u>From</u>	<u>To</u>		
3360 to	3370	6-8-7-7-7-5-5-6-8-10	
	3380	7-8-7-5-6-6-5-5-2-2	
	3390	2-4-6-5-6-6-4-4-3-3	
	3400	5-6-5-4-4-5-5-4-4-4	
3400 to	3410	3-3-2-3-5-7-6-7-6-5	
	3420	5-5-7-7-6-5-5-4-3-3	
	3430	3-4-3-5-6-5-7-9-9-7	
	3440	7-9-8-7-8-8-6-5-7-8	
	3450	9-8-10-7-10-10-10-10-6	
	3460	5-3-2-3-3-6-9-13-12-8	
	3470	8-9-7-7-5-7-7-5-6-4	
	3480	4-2-2-5-8-10-10-9-9-8	
	3490	11-12-10-9-11-8-5-7-9-5	
	3500	4-6-3-1 $\frac{1}{2}$ -3 $\frac{1}{2}$ -5-7-6-5-7	Slightly rough 3493
3500 to	3510	9-11-15-4-4-4-4-2-1-1	
	3520	1-1-3-2-2-2-2-3-2-2	
	3530	3-3-7-6-4-3-4-4-4-4	
	3540	4-5-6-5-6-1-1-4-2-1 $\frac{1}{2}$	
	3550	2-1 $\frac{1}{2}$ -2-1-1-1 $\frac{1}{2}$ -1 $\frac{1}{2}$ -2-2-2	
	3560	3-4-6-6-7-7-6-6-6-6	
	3570	7-4-3-3-4-6-5-5-9-8	
	3580	5-3-3-2-3-4-4-6-4-4	
	3590	6-7-7-6-5-5-3-3-3-3	
	3600	3-5-8-9-8-6-6-6-7-5	
3600 to	3610	7-7-6-6-6-13-9-11-9-8	
	3620	10-10-10-10-8-8-12-8-5-4	
	3630	7-7-5-5-5-5-4-7-5-5	
	3640	6-6-6-6-5-6-5-5-7-6	
	3650	7-11-8-6-5-8-9-9-8-8	
	3660	9-9-9-10-9-6-10-11-11-11	
	3670	11-11-11-11-11-10-12-12-10-20	Trip 3670
	3680	16-6-6-6-5-8-3-2-1-3	
	3690	6-9-9-9-9-9-7-6-4-6	
	3700	5-5-4-5-5-4-4-4-5-6	
3700 to	3710	8-10-5-6-6-5-5-4-5-3	
	3720	3-5-6-6-6-6-6-5-5-6	
	3730	4-5-6-7-6-4-4-4-4-5	
	3740	4-6-6-7-6-7-7-6-7-8	
	3750	8-7-8-6-7-7-7-6-4-5	
	3760	5-4-4-3-4-5-5-5-5-4	
	3770	2-7-7-7-8-7-6-6-7-6	
	3780	6-7-9-7-6-6-7-6-7-7	
	3790	7-5-7-6-6-6-6-6-7-8	
	3800	10-13-10-8-6-7-6-8-11-11	
3800 to	3810	12-9-8-7-8-9-8-8-8-8	
	3820	8-10-10-11-11-13-10-9-6-6	
	3830	5-7-8-10-11-12-12-13-15-11	Trip 3830
	3840	8-7-8-7-6-6-7-7-9-13	
	3850	8-7-7-7-13-7-7-6-7-7	
	3860	9-11-11-11-10-10-11-6-6-7	
	3870	8-8-8-6-10-11-15-12-13-12	
	3880	17-8-13-16-17-18-16-11-16-15	

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<u>Depth</u>		<u>Drilling Time</u>	<u>Remarks</u>
<u>From</u>	<u>To</u>		
3880 to	3890	12-12-16-15-15-12-12-12-11-7	
	3900	7-6-6-9-5-9-11-13-12-13	
3900 to	3910	13-11-9-8-8-6-4-4-4-5	
	3920	6-9-10-8-9-11-12-9-12-11	
	3930	16-17-13-9-10-10-8-8-8-8	
	3940	10-12-11-11-8-8-8-7-9-9	
	3950	11-13-10-10-11-13-15-13-11-9	
	3960	10-6-7-7-5-2-3-2-3-2	Trip 3955
	3970	3-3-3-2-3-3-2-3-3-3	
	3980	3-2- $\frac{1}{2}$ - $\frac{1}{2}$ -2-1 $\frac{1}{2}$ -1 $\frac{1}{2}$ -1-4-6	
	3990	9-8-10-11-11-12-12-10-12-8	
	4000	6-7-9-5-6-5-4-5-8-10	
4000 to	4010	10-10-9-9-12-12-13-8-6-6	
	4020	5-5-7-9-7-6-5-7-7-5	
	4030	6-7-7-7-9-10-11-11-11-9	
	4040	10-9-12-15-18-17-15-18-15-16	
	4050	22-15-8-10-16-11-11-15-17-22	Circ. 1 hr. 4048
	4060	15-10-6-6-7-13-10-12-11-10	
	4070	10-10-11-11-10-12-11-11-10-11	
	4080	18-10-9-10-10-10-5-4-4-5	
	4090	7-2-10-10-8-3-2-3-1-2	
	4100	4-1-2- $\frac{1}{2}$ - $\frac{1}{2}$ -2-2-1- $\frac{1}{2}$ - $\frac{1}{2}$	
4100 to	4110	$\frac{1}{2}$ - $\frac{1}{2}$ - $\frac{1}{2}$ - $\frac{1}{2}$ - $\frac{1}{2}$ -10-13-7-7	
	4120	6-9-10-10-10-10-10-7-15	
	4130	16-16-13-9-11-10-13-9	
	4140	5-9-11-10-5-5-7-6-6-6	Trip 4121, strap drill pipe
	4150	6-9-11-13-9-10-10-11-12-10	4122=4124
	4160	13-7-9-9-9-9-10-9-11-16	
	4170	12-15-13-8-8-8-11-9-10-12	
	4180	11-10-12-10-13-13-7-11-9-7	
	4190	11-16-16-6-6-3-7-11-15-15	
	4200	13-11-11-11-11-13-13-15-17-15	
4200 to	4210	13-12-15-15-12-15-11-10-12-12	
	4220	13-12-12-13-12-12-12-11-9-10	
	4230	16-16-13-13-11-17-17-15-8-9	
	4240	7-7-13-12-15-15-18-12-15-15	
	4250	13-11-11-10-10-9-9-12-18-16	
	4260	15-17-17-13-11-13-17-16-16-12	
	4270	12-18-19-11-15-13-15-17-18-18	
	4280	17-11-11-21-15-10-20-15-12-13	
	4290	12-20-11-10-11-11-17-17-8-9	
	4300	23-22-20-49-38-61-57-29-26-51	Circ. 2 hrs. 4286 - Rough 4287-88
4300 to	4310	20-21-13-13-18-31-25-40-50	Circ. 2 hrs. 4290 Core #1
	4320	11-13-13-13-11-11-6-5-8-11	
	4330	8-12-9-13-7-8-5-9-10-10	
	4340	7-8-8-6-9-11-11-12-13-7	
	4350	6-7-6-5-9-11-12-13-15-11	
	4360	16-16-11-15-11-13-12-10-10-11	
	4370	10-11-10-10-16-13-10-11-5-7	
	4380	5-5-8-9-10-10-7-6-6-9	
	4390	11-12-13-10-11-12-11-10-11-9	
	4400	12-12-10-7-6-5-5-9-10-13	
4400 to	4410	8-5-7-8-11-13-16-15-8-4	

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<u>Depth</u>		<u>Drilling Time</u>	<u>Remarks</u>
<u>From</u>	<u>To</u>		
4410 to 4420		4-6-8-15-10-10-15-20-11-10	Trip 4418
4430		9-14-10-6-7-7-12-11-10-7	
4440		7-14-11-15-13-15-14-16-13-16	
4450		14-11-9-5-6-11-3-3-2-7	
4460		10-13-7-7-7-7-9-7-9-14	
4470		16-15-16-11-14-11-4-4-8-8	
4480		9-6-7-5-7-7-12-8-5-7	
4490		7-7-9-3-9-10-17-17-10-6	
4500		12-13-7-7-10-8-8-9-11-9	
4500 to 4510		7-12-12-8-7-5-4-5-10-12	Trip 4534
4520		7-10-14-12-10-12-17-12-14-14	
4530		17-15-17-16-20-17-10-13-16-11	
4540		17-21-19-16-18-11-13-7-10-12	
4550		11-13-16-10-16-15-15-15-16-13	
4560		12-12-14-14-19-13-14-9-18-15	
4570		18-17-15-16-11-12-16-19-18-15	
4580		15-12-17-18-19-17-13-14-17-18	
4590		17-11-13-15-15-14-21-26-20-19	
4600		20-23-20-16-19-19-12-19-19-19	
4600 to 4610		23-17-22-18-10-8-7-10-10-8	Circ. 2 hrs. @ 4609 Core #2 Core #3
4620		57-37-38-36-40-56-41-49-67-44	
4630		48-49-69-41-31-61-48-50-33-32	
4640		31-31-40-35-31-15-14-23-2hrs. 50 min.-37	Core #4 4685
4650		22-20-20-19-17-14-13-10-11-10	
4660		10-10-11-12-9-8-8-6-6-10	
4670		11-11-11-18-18-17-14-15-16-12	
4680		5-8-22-14-12-17-18-14-14-22	
4690		11-15-14-12-37-27-14-12-16-14	
4700		13-17-15-15-16-17-15-14-15-14	
4700 to 4710		13-15-13-17-17-19-16-18-21-20	Core #5 4717
4720		23-26-14-14-14-16-27-22-28-31	
4730		36-27-51-45-58-39-37-26-32-37	
4731		42	Total Depth 4731