11-35-30W

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February 24, 1970

GEOLOGICAL WELL REPORT
William Gruenerwald & Associates, Inc.
#4 Adams, C SE NW Section 11-T35S-R30W
Adams Ranch Area, Meade County, Kansas
Contractor: Leben Drilling, Inc.
Spud: February 4, 1970
8 5/8" Surface Casing @ 1465'
5 1/2" Production Casing @ 6260'
Rotary Completion: February 22, 1970
Total Depth 6260' (Rotary) 6258' (E.Log)

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Gentlemen:

Listed below are the pertinent geological tops, an evaluation of the porosities below the top of the Morrow Section and a description of a diamond core cut in the St. Louis. No drill stem tests were taken. The hole was logged electrically before being cased, electric log data included herein.

I arrived at the location at a depth of 5810' and witnessed the drilling from that point to TD 6260'. Samples were examined from 5700 - 6260' TD.

Enclosed herewith is a copy of the plotted drilling time which also includes lithology, porous zones, tops and other pertinent data.

ELECTRIC LOG TOPS

ELEVATION	2450 KB (2442 Corr.)	Reran elev. 3-13-70 2433 Gr 2442 KB
HEEBNER	4248 (-1798)	-1806
TORONTO	4308 (-1858)	-1866
LANSING-KANSAS CITY	4411 (-1961)	-1969
HODGES ZONE	4930 (-2480)	-2488
CHEROKEE	5309 (-2859)	-2867
ATOKA	5506 (-3056)	-3064
MORROW SHALE	5698 (-3248)	(-3256)

T. G. WRIGHT DONATION

1995

MORROW SAND 5728 (-3278) (-3286)

5728-40 Sandstone, coarse, irregular, loose grains, in part loosely lime-cemented. No oil staining.

NOTE: The electric log zone of interest 5783-98 is probably a sandy limestone section but is not recognized in samples.

MISSISSIPPIAN CHESTER 5800 (-3350) -3358

5933-39 Sandstone, fine, clean, clustered, calcareous, poor porosity, well oil stained.

STE. GENEVIEVE 5098 (-3648) -3548 -3556

ST. LOUIS 6088 (-3638) (-3646)

6097-6118 Limestone, tan, crystalline, in part fossiliferous and obscurely oolitic to chalky, scattered visible porosity, minor oil staining.

6154-60 & 6163-66 Limestone, tan crystalline to oolitic, scattered minor porosity and oil staining.

(see diamond core below for lithology 6170-6220)

6241-45 & 6248-51 Limestone, white microcrystalline, slightly cherty, minor porosity, no show.

TOTAL DEPTH: 6260 (Rotary) 6258 (E. Log)

DIAMOND CORE #1

6170-6220 100% recovery

6170-72 Limestone, buff, hard, dense, scattered oolites

6172-75 Limestone, tan, dense oolitic, except for streaks of cavernous and interoolitic porosity, well oil stained, good odor. Some vertical fracturing carrying live oil.

6175-76 Limestone, tan, coarsely oolitic and fossiliferous, streaks of interoolitic porosity, oil stained

6176-77 Limestone as directly above but porosity and oil saturation considerably better.

6177-79 1/2	Limestone completely composed of coarse oolites and fossil fragments. Streaks of porosity and oil staining. Bottom 6" particularly good porosity and oil saturation.
6179 1/2 - 80	Dense, tan, limestone, fractured with oil bleeding.
6180-91	Dense, hard, tan-gray limestone. Minor streaks of oil staining 6188-89.
6191-95 1/2	Limestone, tan, crystalline, very fossiliferous. Good cavernous porosity, good saturation. Inclusions of coarse calcite crystals 6193-95 1/2.
6195 1/2 -96	Limestone, light gray, calcitic, barren.
6196-99 1/2	Limestone, tan-gray, fossiliferous as above, less porous but streaked oil staining in fractures and thin porous streaks.
6199 1/2 -6200	Limestone, blue-gray, hard, dense.
6200-01	Hard, dense light gray limestone, minor porosity and vertical fractures carrying live oil.
6201-02	Limestone, gray, calcitic, fossiliferous, thin zones of porosity carrying oil.
6202-05	Limestone, tan, finely crystalline, completely oolitic, low porosity but carrying oil stains in part in fractures.
6205-06	Limestone, buff-gray, hard, dense, calcite inclusions.
6206-10	Limestone, light gray, hard, dense.
6210-15	Limestone, buff to light gray, dense, scattered fossils (brachs) and included calcite.
6215-20	Limestone, tan, extremely fossiliferous and calcitic, good, even, fine porosity, appears lightly oil stained. Much lighter color than staining above, possibly high gravity.

Conclusions and Recommendations

This well is only 10 feet lower structurally on the top of the St. Louis than your #3 well one location north. This is considered normal. Reservoir-wise the #4 well appears to carry considerably more potential pay section in the St. Louis than the #3. This is borne out on core and electric log evidence. It would appear that a new zone has developed in the upper St. Louis section 6097-6118, and a lower zone 6215-21 which is not recognized in your #3 well. The intervening porous section

is considered to be your normal "pay section". It is recommended that the zone 6215-21 be tested initially individually for evaluation, which should be followed by individual testing of the upper zone 6097-6118. After individual testing of these two zones the intervening zones should be perforated and tested.

A sand section in the Morrow, which has been in evidence in other wells in the area, but better developed here 5728-40, is considered a potential gas pay and should ultimately be tested. Another Morrow section 5783-98 should also be given consideration for testing through casing.

It was recommended that the hole be cased to test the above described zones.

Yours very truly,

T. G. Wright

TGW:wlr

BIT RECORD

Hughes	Retrip	0-1255
Hughes	Retrip	1255-1465
Smith	DTJ	1465-2347
Smith	V_2J	2347-2777
Smith	V_2J	2777-3125
Smith	V_2J	3125-3650
Smith	V_1J	3650-4353
Smith	V_2HJ	4353-4692
Smith	SS_4J	4692-5446
Smith	L_4	5446-5657
Smith	L_4J	5657-5796
Smith	L_4J	5796-5944
Smith	SS_4J	5944-6059
Smith	L_4	6059-6170
Smith	L_4	6170-6260 TD

DRILLING PROGRESS

2-4	Spud
2-5	1465 WOC
2-6	2347
2-7	2885
2-8	3430
2-9	3979
2-10	4639
2-11	4848
2-12	5092
2-13	5313
2-14	5490
2-15	5744
2-16	5931
2-17	6026
2-18	6120
2-19	6181 Coring
2-20	6220 Pull Core
2-21	6260 TD Logging
2-22	6260 TD WOC 5 1/2"

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

CORE ANALYSIS RESULTS

Company WM. GRUENERWALD & ASSO. Formation ST. LOUIS File CP-1-7167
Well ADAMS NO. 4 Core Type DIAMOND Date Report 2-23-70
Field ADAMS RANCH Drilling Fluid Analysts BOYLE
County MEADE State KANSAS Elev. 2450'KB Location C SE NW SECTION 11-35S-30W

Lithological Abbreviations

SAND-SD, SHALE-SH, LIME-LM, DOLOMITE-DOL, CHERT-CH, GYPSUM-GYP, ANHYDRITE-ANHY, CONGLOMERATE-CONG, FOSSILIFEROUS-FOSS, SANDY-SDY, SHALY-SHY, LIMY-LMY, FINE-FN, MEDIUM-MED, COARSE-CSE, CRYSTALLINE-XLN, GRAIN-GRN, GRANULAR-GRNL, BROWN-BRN, GRAY-GY, VUGGY-VGY, FRACTURED-FRAC, LAMINATION-LAM, STYLOLITIC-STY, SLIGHTLY-SL/, VERY-V/, WITH-W/

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS MAX.	90°	POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE OIL	TOTAL WATER	SAMPLE DESCRIPTION AND REMARKS
	WHOLE CORE ANALYSIS						
1	6173.0-74.5	0.4	0.4	5.1	7.8	41.7	Lm, pp vugs
2	74.5-76.1	0.3	0.2	3.9	7.6	49.5	Lm, few pp vugs, sty
3	76.1-77.8	5.8	5.1	9.3	8.5	39.9	Lm, pp vugs, oolitic, foss
4	77.8-79.0	6.2	1.6	7.7	13.6	38.8	Lm, pp vugs, vert frac, foss
5	79.0-80.6	2.5	1.7	5.2	8.2	39.5	Lm, dns
6	80.6-82.0	4.4	0.1	1.8	6.7	68.6	Lm, vert frac, dns, sl/foss, oolitic
	82.0-91.0						Not submitted
7	91.0-92.1	0.1	<0.1	1.5	9.0	57.7	Lm, dns
8	92.1-93.6	58	55	10.9	12.7	29.2	Lm, pp vugs, foss
9	93.6-95.0	45	37	8.1	12.7	32.4	Lm, pp vugs, foss
10	95.0-95.8	3.8	2.8	5.9	8.7	28.4	Lm, pp vugs, foss
11	95.8-96.7	0.4	0.1	2.3	8.7	55.6	Lm, vert frac, dns, foss
12	96.7-98.4	3.5	2.9	5.5	11.7	31.2	Lm, pp vugs, foss
13	6198.4-00.1	0.6	0.3	3.2	12.7	35.1	Lm, pp vugs, vert frac, foss
14	6200.1-02.0	1.5	0.7	5.4	8.6	31.8	Lm, pp vugs, vert frac, foss
15	02.0-03.0	2.5	0.5	6.8	13.8	32.5	Lm, pp vugs, foss
16	03.0-04.5	1.6	1.6	7.4	13.2	39.3	Lm, few pp vugs, vert frac, oolitic
17	04.5-06.0	0.3	0.2	4.0	9.8	47.2	Lm, dns, oolitic
	06.0-15.8						Not submitted
18	15.8-17.0	30	30	10.7	5.5	24.4	Lm, foss, oolitic
19	17.0-18.5	44	44	11.2	5.9	25.8	Lm, pp vugs, foss, oolitic
20	18.5-20.0	6.7	5.8	8.6	4.5	28.2	Lm, pp vugs, foss, oolitic
21	6220.0-21.0	4.7	4.5	6.9	5.0	28.2	Lm, pp vugs, foss, oolitic

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