Robert D. Hendrix
Petroleum Geologist

GEOLOGIST'S REPORT
DRILLING TIME AND SAMPLE LOG

LEASE	Schulze Unit #1-11	COUNTY	Norton County, KS
LOCATION	450'FNL & 2500'FEL	SEC.	11 TWSP. 2 S. RGE. 24 W.
ELEVATION	KB 2327 GL 2316	DF	GL 2316
CONTRACTOR	Murfin Drilling Co. LTD	RIG #	21
SPUD	8/20/12	COMP.	8/27/12
TOTAL DEPTH	3800'	PBTD	
TYPE MUD	Chemical		
CASING	8 5/8" @ 221' w/ 150 sx cmt		
	4 1/2" @ 3800' w/ 175 sx cmt		
	Perf. 3700-3704		
	Perf. 3707-3710		
	Perf. 3713-3716		
	Perf. 3719-3722		
	Perf. 3725-3728		
	Perf. 3731-3734		
	Perf. 3737-3740		
	Perf. 3743-3746		
	Perf. 3749-3752		
	Perf. 3755-3758		
	Perf. 3761-3764		
	Perf. 3767-3770		
	Perf. 3773-3776		
	Perf. 3779-3782		
	Perf. 3785-3788		
	Perf. 3791-3794		
	Perf. 3797-3800		
SURVEYS	221' 0.25° 2700' 0.75° 3800' 0.50°		
GEOLOGICAL SUPERVISION FROM	3700' to R.T.D.		
SAMPLES SAVED FROM	3700' to R.T.D.		
SAMPLES EXAMINED FROM	3700' to R.T.D.		
DRILLING TIME RECORDED FROM	3700' to R.T.D.		
DRILL STEM TESTS	None		
CORES	None		
ELECTRICAL SURVEYS	Murfin Drilling Co.		

FORMATION TOPS	ELECTRIC LOG	SAMPLE
Anhydrite	2055 (+466)	2054 (+467)
Base Anhydrite	2085 (+436)	2084 (+437)
Neva	2880 (-359)	2879 (-358)
Red Eagle	2944 (-429)	2943 (-428)
Foraker	3001 (-480)	3000 (-479)
Stotler	3152 (-631)	3151 (-630)
Topeka	3282 (-761)	3281 (-760)
Heebner	3455 (-934)	3454 (-933)
Toronto	3487 (-966)	3486 (-965)
Lansing	3500 (-979)	3499 (-978)
Stark	3644 (-1123)	3643 (-1122)
Arbuckle	3720 (-1199)	3719 (-1198)
Granite wash	3757 (-1236)	3756 (-1235)
Granite	3800 (-1279)	3799 (-1278)

REMARKS

LEGEND

DRILLING TIME IN MINUTES PER FOOT
Rate of Penetration Decreases
5 10 15

DEPTH

LITHOLOGY

Oil Show Tests

Oil Shows

Gas Shows

Cuttings Cuttings Cuttings Core Core

SAMPLE DESCRIPTION

REMARKS

2050 2055 2060 2065 2070 2075 2080 2085 2090 2095 2100 2105 2110 2115 2120 2125 2130 2135 2140 2145 2150 2155 2160 2165 2170 2175 2180 2185 2190 2195 2200 2205 2210 2215 2220 2225 2230 2235 2240 2245 2250 2255 2260 2265 2270 2275 2280 2285 2290 2295 2300 2305 2310 2315 2320 2325 2330 2335 2340 2345 2350 2355 2360 2365 2370 2375 2380 2385 2390 2395 2400 2405 2410 2415 2420 2425 2430 2435 2440 2445 2450 2455 2460 2465 2470 2475 2480 2485 2490 2495 2500 2505 2510 2515 2520 2525 2530 2535 2540 2545 2550 2555 2560 2565 2570 2575 2580 2585 2590 2595 2600 2605 2610 2615 2620 2625 2630 2635 2640 2645 2650 2655 2660 2665 2670 2675 2680 2685 2690 2695 2700 2705 2710 2715 2720 2725 2730 2735 2740 2745 2750 2755 2760 2765 2770 2775 2780 2785 2790 2795 2800 2805 2810 2815 2820 2825 2830 2835 2840 2845 2850 2855 2860 2865 2870 2875 2880 2885 2890 2895 2900 2905 2910 2915 2920 2925 2930 2935 2940 2945 2950 2955 2960 2965 2970 2975 2980 2985 2990 2995 3000 3005 3010 3015 3020 3025 3030 3035 3040 3045 3050 3055 3060 3065 3070 3075 3080 3085 3090 3095 3100 3105 3110 3115 3120 3125 3130 3135 3140 3145 3150 3155 3160 3165 3170 3175 3180 3185 3190 3195 3200 3205 3210 3215 3220 3225 3230 3235 3240 3245 3250 3255 3260 3265 3270 3275 3280 3285 3290 3295 3300 3305 3310 3315 3320 3325 3330 3335 3340 3345 3350 3355 3360 3365 3370 3375 3380 3385 3390 3395 3400 3405 3410 3415 3420 3425 3430 3435 3440 3445 3450 3455 3460 3465 3470 3475 3480 3485 3490 3495 3500 3505 3510 3515 3520 3525 3530 3535 3540 3545 3550 3555 3560 3565 3570 3575 3580 3585 3590 3595 3600 3605 3610 3615 3620 3625 3630 3635 3640 3645 3650 3655 3660 3665 3670 3675 3680 3685 3690 3695 3700 3705 3710 3715 3720 3725 3730 3735 3740 3745 3750 3755 3760 3765 3770 3775 3780 3785 3790 3795 3800

Anhydrite 2055 (+466)

Base Anhydrite 2085 (+436)

Shale: red

Shale: red, gray, muddy

Shale: red, muddy, silty, sandy

Limestone: tan f-xln, soft, no vis por

Sandstone: white, fr gr, sub rnd, well/cmtd, friable, no vis por

Shale: red, silty, muddy

Dolomite: tan to brown, f-xln, sandy, no vis por

Shale: red

Mudstone: gray, dense, blocky
Full of black mineralized inclusions

Shale: gray, white

Neva 2880 (-359)

Limestone: white, f-mxln, chalky, sandy, w fossiliferous, w interxln por, no fluorescence

Shale: red, gray

Limestone: white, f-xln, chalky fossiliferous, no vis por, no fluorescence

Shale: red, gray

Limestone: white to tan, f-xln, chalky fossiliferous, no vis por, no fluorescence

Shale: red, gray

Shale: gray, red, black

Red Eagle 2944 (-429)

Limestone: tan, f-mxln, chalky, fossiliferous, no vis por, no fluorescence
Shale: gray, red, f-xln, chalky, w cherty, w fossiliferous, no vis por, no fluorescence

Shale: gray, silty, cherty

Siltstone: gray, fossiliferous

Shale: gray to white, muddy, fossiliferous

Geologist on site at 6:15 pm, 1/25/2012, at 3000'

Foraker 3001(-480)

Limestone: white, f-xln, chalky, soft fossiliferous, no vis por

Shale: gray, muddy

Limestone: tan to brown, dolomitic, granular, f-xln, no vis por
Limestone: tan to gray, f-xln, fossiliferous, chalky, no vis por, no fluorescence

Limestone: tan, f-xln, sandy, no vis por

Shale: gray

Limestone: tan to white, m-lxln, chalky, fossiliferous, no vis por, no fluorescence

Shale: gray, red

Limestone: tan, f-xln, sandy, no vis por

Shale: gray, sandy

Limestone: tan to gray, f-xln, no vis por

Shale: gray, red

Stotler 3152 (-631)

Limestone: tan f-xln, fossiliferous, no vis por, no fluorescence

Dolomite: tan, f-xln, hard, no vis por

Siltstone: Gray, hard, no vis por

Limestone: gray, f-xln, chalky, fossiliferous, no vis por
Shale: gray

Limestone: gray, f-xln, chalky, fossiliferous, no vis por

Shale: gray, red, silty

Limestone: tan to gray, f-xln, chalky, fossiliferous, no vis por

Shale: gray

Limestone: white to tan, f-xln, chalky, granular, no vis por, no fluorescence

Shale: dark gray

Limestone: tan, f-mxln, chalky, fossiliferous, no vis por, no fluorescence
Shale: gray

Limestone: tan, f-xln, chalky, fossiliferous, no vis por, no fluorescence
Shale: gray, black, red

Topeka 3282 (-761)

Limestone: tan to gray, f-mxln, chalky, w fossiliferous, no vis por, no fluorescence

Shale: gray, pyritic

Limestone, white, f-xln, chalky, w granular, w glauconitic, no vis por

Shale: gray

Limestone: tan to white, f-xln, chalky, w fossiliferous, no vis por

Shale: gray, red

Shale: gray, red, muddy

Limestone: white, f-xln, v-chalky, no vis por

Shale: gray, red

Limestone: tan, f-mxln, v-chalky, fossiliferous, no vis por, no fluorescence

Limestone: tan, f-xln, chalky, cherty, no vis por
Limestone: tan, f-xln, chalky, cherty, w pyr por, no fluorescence

Shale: gray, red

Limestone: white, f-xln, chalky, no vis por

Shale: gray, red

Limestone: tan, f-xln, chalky, cherty, fossiliferous, w pyr, no vis por, no fluorescence

Shale: gray, red

Limestone: white to tan, f-xln, chalky fossiliferous, glauconitic, no vis por, no fluorescence

Shale: dark gray, red

Limestone: white to tan, f-xln, v-chalky, fossiliferous, no vis por, no fluorescence

Limestone: white, f-xln, v-chalky, w cherty, w glauconitic, fossiliferous, no vis por, no fluorescence

Heebner 3455 (-934)

Shale: black carbonaceous
Limestone: white, f-xln, v-chalky, fossiliferous, no vis por, no fluorescence

—8:00 am, 1/25/2012
WI 5.1, Vis 61, LCM 0.
Morgan Mud, Dave Lines

Shale: red, gray

Shale: red, gray, muddy

Toronto 3487 (-966)

Limestone: white to tan, f-xln, v-chalky, fossiliferous, no vis por, no fluorescence

Shale: red, gray, black

Lansing 3500 (-979)

Limestone: white, f-xln, v-chalky, fossiliferous, no vis por, no fluorescence

Shale: red, gray, black

Shale: red, lt. sandy

Limestone: white, f-xln, chalky, w cherty, w fossiliferous, no vis por, no fluorescence, w oolds on break, no odor, dull yellow fluorescence, slow streaming cut

—8:00 am, 1/26/2012
WI 9.0, Vis 60, LCM 0.
Morgan Mud, Dave Lines
Drop 1.0 Deg

Shale: red, gray

Limestone: white, f-mxln, chalky, w cherty, w fossiliferous, oolitic in part, no vis por, no fluorescence

Shale: red, gray

Limestone: white, f-xln, chalky, w cherty, w fossiliferous, oolitic in part, no vis por, w oolds on break, no odor, dull yellow fluorescence, slow streaming cut

Limestone: white to tan, m-xln, chalky, oolitic, fr oolmoldic por, gd spl stain, w oolds on break, no odor, dull yellow fluorescence, slow streaming cut

Shale: red, gray

Limestone: tan to brown, f-xln, chalky, fossiliferous, no vis por

Shale: red, gray

Limestone: white, f-xln, chalky, fossiliferous, w interxln por, w oolds on break, no odor, dull yellow fluorescence

Shale: red, gray

Limestone: white, f-xln, chalky, w pyritic, w interxln por, w pieces, spotty dark stain, oolds on break, no odor, dull yellow fluorescence

Limestone: white, f-xln, chalky, no vis por

Shale: red, gray

Limestone: white, m-xln, chalky, oolitic, fr oolicastic por, no show, no fluorescence

—8:00 am, 1/29/2012
WI 9.3, Vis 60, LCM trace.
Morgan Mud, Dave Lines

Shale: red, gray

Limestone: white, m-xln, chalky, oolitic, fossiliferous, no vis por

Shale: red, muddy

Stark 3644 (-1123)

Shale: gray, black

Limestone: white, f-xln, chalky, w pyritic, w interxln por, w pieces, spotty dark stain, oolds on break, no odor, dull yellow fluorescence

Limestone: white, f-xln, chalky, no vis por

Shale: red, gray

—8:00 am, 1/30/2012
WI 9.2, Vis 60, LCM trace.
Morgan Mud, Dave Lines

BKC 3690 (-1169)

Limestone: white, m-xln, chalky, oolitic, fossiliferous, no vis por

Shale: red, muddy

Arbuckle 3720 (-1199)

Dolomite: white to brown, f-mxln, granular, v rhombic, sl pyritic, hard, sl interxln por, w pieces, spotty dark stain, oolds on break, no odor, dull yellow fluorescence, sl streaming cut

—8:00 am, 1/30/2012

Limestone: white, to brown, f-mxln, granular, chalky, hard, no vis por, no odor, dull yellow fluorescence

WI 9.3, Vis 61, LCM 2ft.
Morgan Mud, Dave Lines

Granite wash 3757 (-1236)

Sandstone: white, green, red to tan, angular to subang, gr sorted, biotitic, glauconitic, pr intergranular por, no show

DST #5
3706-3730
30-60-30-60
Tot open: weak surface blow
2nd open: no blow
Recovery:
0 mud
Hydro: 1895-18148
IF: 17-138
FF: 20-218
SIP: 1031-1031
BHT 94.7

Granite: white, red, feldspathic, f-gg pm, angular, biotitic, pyritic, no vis por

Granite 3800 (-1279)

Geologist on site 11:00am, 1/31/2012

DST #6
3734-3760
30-60-30-60
Tot open: weak surface blow
2nd open: no blow
Recovery:
0 mud
Hydro: 1895-18148
IF: 17-138
FF: 20-218
SIP: 1031-1031
BHT 94.7

DST #7
3774-3800
30-60-30-60
Tot open: BOB 6 min
2nd open: BOB 28 min
Recovery:
250' w/cm 50/50
990' mw 50/5
Hydro: 1895-18148
IF: 57-208
FF: 62-218
SIP: 1031-1031
BHT 94.7

DST #1
3311-3340
30-60-30-60
Tot open: weak blow surface
2nd open: weak blow
Recovery:
0 mud
Hydro: 1823-17808
IF: 15-108
FF: 15-118
SIP: 623-4219
BHT 91.2°

DST #2
3357-3374
30-60-30-60
Tot open: weak blow surface
2nd open: no blow
Recovery:
0 mud
Hydro: 1823-17808
IF: 15-108
FF: 15-118
SIP: 623-4219
BHT 92.2°

DST #3
3571-3590
30-60-30-60
Tot open: weak blow built to 1 3/4"
2nd open: weak blow after 5min
Recovery: 180ft. 7
Hydro: 1895-18148
IF: 20-128
FF: 30-138
SIP: 1031-2028
BHT 94.4°, CHL 24,000ppm

DST #4
3595-3640
30-60-30-60
Tot open: weak blow died 25 min
2nd open: no blow
Recovery:
0 mud
Hydro: 1790-18994
IF: 87-208
FF: 97-218
SIP: 39-918
BHT 91.6°

DST #5
3706-3730
30-60-30-60
Tot open: weak surface blow
2nd open: no blow
Recovery:
0 mud
Hydro: 1895-18148
IF: 17-138
FF: 20-218
SIP: 1031-1031
BHT 94.7

Murfin Drilling Co. Inc.
Schulze Unit #1-11
550, FNL & 2500, FWL, Sec 11-T25-R24W
Norton Co., Kansas
GL: 2316', KB: 2327'