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PETROLEUM GEOLOGIST
Wichita, Kansas

GEOLOGIST'S REPORT

DRILLING TIME AND SAMPLE LOG

OPERATOR **Murfin Drilling Company, Inc.**
LEASE **Dworing #1-6**

LOC SPOT **160' S & 160' E of N2 NE SW**
LOC FOOTAGE **2,150 FSL 2,140 FWL**

SEC. **6** TWPSP **15** RANG **35W**
COUNTY **Rawlins** STATE **Kansas**

API **15-153-20981-00-00**
CONTRACTOR **Murfin Drilling Co., Inc.** REG NO. **8**
DRILLING STARTED **2-3-2014** COMPLETED **2-14-2014**
MUD DISPLACED **3,379** MUD TYPE **Chemical**
DRILLING TIME KEPT FROM **3,990** TO RTD
SAMPLES SAVED FROM **3,990** TO RTD
SAMPLES EXAMINED FROM **3,990** TO RTD
GEOLOGICAL SUPERVISION FROM **3,490'** TO RTD

Surface **8.5/8" @ 298'**
w/ 220 sacks cement
Production **5-1/2" @ 4493'**
w/ 450 sacks cement

ELCTRICIAL SURVEYS:
Dial Induction Log
Dial Compensated -
Porosity Log
Microresistivity Log

MEASUREMENTS:
CASINO RECORD
Conductor

ELEVATIONS
KB **3,169'**
GL **3,164'**

FORMATION NAME	LOG TOP DATUM	SAMPLE TOP DATUM
Stone Corral	3,100' +69	3,100' +69
Base Stone Corral	3,132' +37	3,132' +37
Neva	3,593' -424	3,595' -426
Foraker	3,705' -536	3,707' -538
Topoka	3,915' -746	3,916' -747
Oread	4,026' -857	4,027' -858
Lansing	4,134' -965	4,134' -965
Stark	4,347' -1178	4,347' -1178
B/C	4,398' -1229	4,398' -1229
Total Depth	4,500' -1331	4,500' -1331

DATE	7:00 AM DEPTH	REMARKS
2-3-14	0'	Spud @ 8:45 pm. Plug down @ 5:45 am on 2-4-14. Dev.: 0.5" @ 258'
2-4-14	258'	Cut 258' in last 24 hrs. Drilled out plug @ 1:45 pm. Shut down for weather @ 288'
2-5-14	288'	Cut 30' in last 24 hrs. 0.5 hrs drlg. Shut down for weather
2-6-14	288'	Cut 0' in last 24 hrs. Shut down for weather
2-7-14	288'	Cut 0' in last 24 hrs. Shut down for weather
2-8-14	288'	Cut 0' in last 24 hrs. Started drilling @ 12:00 pm w/ PDC bit.
2-9-14	2,060'	Cut 1,772' in last 24 hrs; 17 hrs drlg. Bit trip @ 3331' (PDC bit went bad, ran button bit)
2-10-14	3,363'	Cut 1,303' in last 24 hrs; 17.5 hrs drlg.
2-11-14	3,920'	Cut 557' in last 24 hrs; 21.5 hrs drlg. DST #1 @ 4198'
2-12-14	4,198'	Cut 278' in last 24 hrs; 13.25 hrs drlg. DST #2 @ 4298'
2-13-14	4,298'	Cut 100' in last 24 hrs; 4.5 hrs drlg. DST #3 @ 4385'
2-14-14	4,385'	Cut 87' in last 24 hrs; 4 hrs drlg. RTD 4500' @ 8:12 pm
2-15-14	4,500'	Cut 115' in last 24 hrs; 6 hrs drlg. Ran production casing.

Remarks

The electric log measurements correlate from even to 2' higher to the drilling measurements.

Formation tops and lithology on this report have been corrected to the electric log.

The drilling samples were deposited at the Kansas Geological Survey office in Wichita.

Respectfully submitted,

Robert L. Milford

Drill Stem Test Charts



LITH	DRILL TIME (MIN/FT)	DEPTH (ft)	SAMPLE DESCRIPTIONS	REMARKS
		3100		Stone Corral 3100' (+69) EL
		3150		B/Stone Corral 3132' (+37) EL

DEPTH (ft)	SAMPLE DESCRIPTIONS	REMARKS
3500	Sdy Sh: red-brn, fn-vry fn grain sd, some soft & gummy, w/ some Sd: crm-lt gry, fn-vry fn grain, sli calc, semi fri-brittle, pr vis por, NS	Call depth 3200' @ 10:26 pm on 2-9-14 Mud displaced from 3379' to 3395' Morgan Mud check @ 3395': 110 Vis, 8.6 Wt, 6.0 WL, 600 ppm Chl, 6# LCM Samples start 3490' @ 12:21 pm on 2-10-14
3550	Sdy Sh: red-brn, w/ Sd: crm-lt gry, fn-vry fn grain, vry sli calc, semi fri-brittle, pr vis por, NS	
3600	Sdy Sh: red-brn, some soft & gummy, w/ some Sd: A.A., pr vis por, NS	
3650	Sdy Sh: red-brn, some soft & gummy, w/ small amt of Sd: A.A., pr vis por, NS	
3700	Sdy Sh: red-brn, soft & gummy in prt, w/ tr Sh: grn & gry, & small amt of Sd: lt gry-lt grn, fn-vry fn grain, shly in prt, calc, mstly soft w/ some semi brittle, pr vis por, NS	
3750	LS: wh-lt gry, fxln, fos, sub chky-prtly dns w/ some chky-vry chky, pr fos por, NS	
3800	Sdy Sh: red-brn, soft & gummy	
3850	Sdy Sh: A.A. w/ small amt of Shly Sd: lt gry, fn-vry fn grain, calc, soft, pr vis por, NS	
3900	Sdy Sh: red-brn, soft & gummy in prt	
3950	LS: crm-lt gry, fxln, fos in prt, sli chty (crm-org), sub chky-prtly dns w/ some chky, pr por, NS	
4000	Sdy Sh: red-brn, soft & gummy in prt	
4050	Sdy Sh: A.A.	
4100	LS: crm-lt gry, fxln, sub chky-prtly dns, pr por, NS	
4150	LS: crm-lt gry, fxln, sub chky-prtly dns, pr por, NS	
4200	LS: crm-lt gry, fxln, fos in prt, sub chky-prtly dns, pr por, NS	
4250	LS: wh-tan, fxln, fos in prt, some sli shly, sub chky-prtly dns w/ some chky-vry chky, pr por, NS	
4300	Dal: crm-tan, fxln, sub chky-prtly dns, fr w/ some gd pin point-small vulg por, NS	
4350	Sh: red-brn, w/ some grn	
4400	Sh: A.A.	
4450	LS: crm-lt gry, fxln, sub chky-prtly dns, pr por, NS	
4500	Sh: red-brn, some soft & gummy, w/ some gry & grn	
4550	LS: crm-lt gry, fxln, fos-ool in prt, sub chky-prtly dns, pr por, NS	
4600	Sh: red-brn, soft & gummy in prt, w/ some gry-grn	
4650	LS: crm-lt gry, fxln, fos in prt, sub chky-prtly dns, pr por, NS	
4700	Sh: red-brn & gry-grn	
4750	LS: crm-lt gry, fxln, fos in prt, some shly (red-brn, mottled), sub chky-prtly dns, pr por, NS	
4800	LS: wh-tan, fxln, fos in prt, sub chky-prtly dns w/ some chky-vry chky, pr por, vry scat dead brn-blk sptd stn, NSFO, no odor	
4850	Sh: red-brn, soft & gummy in prt, some sdy, some gry-grn	
4900	Sh: A.A.	
4950	LS: crm-lt gry, fxln, fos in prt, some shly (red-brn, mottled), sub chky-prtly dns w/ some chky, pr por, NS	
5000	Calc Sh: lt red-brn & lt purple	
5050	Sh: red-brn, some soft & gummy	
5100	Sh: red-brn, soft & gummy in prt, some gry	
5150	Sh: A.A. w/ some drk gry & grn	
5200	LS: wh-lt gry, fxln, sli fos, sub chky-prtly dns w/ some chky-vry chky, pr por, tr blk tarry-asp sptd stn, NSFO, no odor	
5250	LS: wh-lt gry, fxln, sub chky-prtly dns w/ some chky, pr por, NS	
5300	LS: lt gry-tan, fxln, sli shly in prt, sub chky-prtly dns, pr por, NS	
5350	LS: gry-tan, fxln, chty (lt brn), sli shly in prt, sub chky-prtly dns, 2 pcs w/ blk tarry-asp sptd stn (look like cavings), NSFO, sli odor	
5400	Shly LS: gry, fxln, sli gritty-prtly dns, pr por, NS, w/ Calc Sh: lt-med drk gry	
5450	Calc Sh: A.A. w/ some drk gry	
5500	LS: crm-tan, fxln, sub chky-prtly dns, pr por, tr med brn sptd stn, NSFO, no odor	
5550	Sd: lt gry, fn-vry fn grain, calc, sli pyr, some shly, soft-brittle, pr vis por, tr lt brn sat stn, VS live oil stn, NSFO, yell flur, fr cut, no odor	
5600	Sh: lt gry, mstly soft & gummy	
5650	Sh: red-brn, soft & gummy in prt, w/ some gry & grn	
5700	LS: crm-tan, fxln, shly in prt, sub chky-dns w/ some chky, pr por, scat dead med-drk brn sptd-patchy & edge stn, NSFO, no odor	
5750	LS: A.A. w/ tr pr vsf por, & tr drk brn-blk sptd stn, cpl pcs w/ VSSFO, no odor	
5800	Sd: lt gry-lt grn, fn-vry fn grain, sli calc, semi fri-brittle, pr vis por, scat dead blk sptd-sub sat stn, NSFO, no odor	
5850	Sh: red-brn, mstly soft & gummy	
5900	Sh: A.A.	
5950	LS: crm-tan, fxln, fos-ool in prt, sub chky-prtly dns, fr-gd intrprtial-vug por, scat drk brn-blk patchy-sat stn, FSFO (some bleeding), no odor	
6000	LS: crm-lt gry, fxln, sub chky-prtly dns, pr por, NS	
6050	Sh: red-brn, w/ some gry & grn	
6100	LS: crm-lt gry, fxln, fos, sub chky-prtly dns, pr por, NS	
6150	Sh: red-brn, mstly soft & gummy, w/ some gry	
6200	Sh: red-brn, mstly soft & gummy, some gry & grn	
6250	LS: crm-tan, fxln, fos-ool in prt, sub chky-prtly dns w/ some chky-vry chky, pr w/ tr fr intrprtial por, scat lt-drk brn sptd-sub sat stn, S-FSFO (some bleeding), no odor	
6300	Calc Sh: lt-med gry	
6350	Calc Sh: A.A. w/ some lt brn & red-brn,	
6400	Sh: red-brn	
6450	LS: crm-tan, fxln, fos in prt, sub chky-prtly dns, pr por, scat blk sptd-sat stn, NSFO, no odor	
6500	Sh: red-brn & lt gry	
6550	LS: crm-lt gry, fxln, fos-ool, sub chky-prtly dns, pr por, NS	
6600	Sh: red-brn, w/ some gry, grn & brn	
6650	Sh: red-brn, soft & gummy in prt	
6700	LS: wh-crm, fxln, fos-ool in prt, tr calcite, chky-prtly dns w/ some vry chky, pr w/ tr fr intrprtial & pin point, NSFO, no odor, tr barren pin point por	
6750	Sh: red-brn & gry-grn, w/ some lt gry, soft & gummy, w/ some Shly LS: gry, fxln, gritty-prtly dns, pr por, NS	
6800	Sh: red-brn, soft & gummy in prt, some sdy, w/ some gry-grn	
6850	LS: wh-lt gry, fxln, fos-ool, sub chky-prtly dns w/ some chky-vry chky, pr por, NS	
6900	Sh: red-brn, some soft & gummy	
6950	Sh: red-brn w/ some gry, grn & brn	
7000	LS: wh-tan, fxln, fos-ool, sub chky-prtly dns w/ some chky, pr por, NS	
7050	Sh: red-brn & gry	
7100	LS: crm-gry, fxln, fos in prt, sub chky-prtly dns, pr por, NS	
7150	Sh: red-brn, soft & gummy in prt, w/ some gry & grn	
7200	Sh: red-brn, w/ some gry	
7250	Sh: red-brn, some soft & gummy, w/ some gry	
7300	Sh: red-brn, w/ some gry & grn	
7350	Sh: red-brn, some soft & gummy, w/ some gry-grn	
7400	LS: crm-lt gry, fxln, sli fos, sub chky-prtly dns, pr por, NS	
7450	LS: crm-lt gry, fxln, sli fos, sub chky-prtly dns, pr por, NS	
7500	LS: crm-lt gry, fxln, sli fos, sub chky-prtly dns, pr por, NS	

Ran 20 stand short trip prior to DST #1
Pipe Strap @ 4198': Strap long 7.07'
Straight Hole Survey @ 4198': 0.5" Dev.
Morgan Mud check @ 4198': 40 Vis, 9.2 Wt, 7.2 WL, 500 ppm Chl, 2# LCM
Ran another bit @ 4198'

DST #1 4143'-4198' Lans 'lwr A'-'D'
IF: blow built to 6" ISI: no blow back
FF: blow built to 2.5" FSI: no blow back
Recovery: 320' TOTAL FLUID:
131' OSWM (spots 0, 40% W, 60% M)
189' OSWM (spots 0, 90% W, 10% M)
Chl ppm: 81,000 DST: 600 Mud
IFP: 59-116#/30" ISIP: 1155#/60"
FFP: 118-163#/60" FSIP: 1074#/90"
Note: Hit bridge 10' off bottom, Tool opened, unset tool, then reset tool.

Ran 7 stand short trip @ TD, prior to CFS
L.T.D. 4500' (-1331)
R.T.D. 4500' (-1331)
Straight Hole Survey @ 4500': 1" Dev.