

Robert L. Milford

PETROLEUM GEOLOGIST
Wichita, Kansas

GEOLOGISTS' REPORT

DRILLING TIME AND SAMPLE LOG

OPERATOR: Murfin Drilling Company, Inc.
LEASE: Phillips 'A' #1-22
LOC. SPOT: 150 S & 150 W of NE SW NE

LOC. FOOTAGE: 1800' FNL 1800' FEL

SEC. 22 TWP. 4S R. 30W

COUNTY: Decatur STATE: Kansas

API: 15-039-2161-00-00

CONTRACTOR: Murfin Drilling Co., Inc. REG. NO. 3
DRILLING STARTED: 10-9-2012 COMPLETED: 10-19-2012
MUD DISPLACED: 2,988' MUD TYPE: Chemical

DRILLING TIME KEPT FROM: 3:00' TO: RTD
SAMPLES SAVED FROM: 3:00' TO: RTD
SAMPLES EXAMINED FROM: 3:00' TO: RTD
GEOLOGICAL SUPERVISION FROM: 3:425' TO: RTD

FORMATION NAME: TOP LOG DATE/TIME: TOP SAMPLE DATE/TIME

Stone Corral 2,528' +215 2,529' -214
Topeka 3,614' -871 3,614' -871
Heebner 3,782' -1039 3,782' -1039
B/KC 4,032' -1289 4,032' -1289
Pawnee 4,150' -1407 4,150' -1407
Cherokee 4,229' -1486 4,229' -1486
Mississippi 4,388' -1615 4,388' -1615
Arbuckle 4,424' -1681 4,424' -1681
Total Depth 4,451' -1708 4,450' -1707

MEASUREMENTS FROM CASING RECORD
Conductor
Surface 8.58" @ 221'
Production 5.17" @ 4438'

ELECTRICAL SURVEYS
Pioneer Wireline
Dual Induction Log
Dual Compensated -

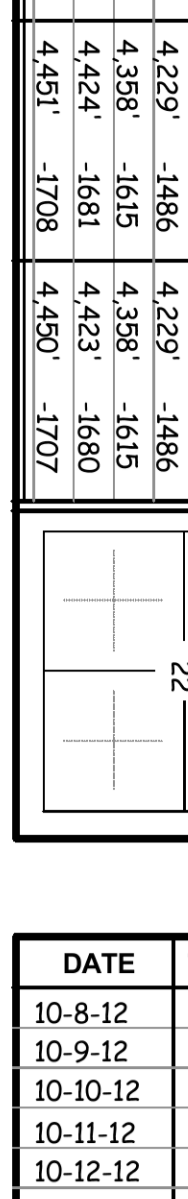
Porosity Log
Microresistivity Log
Borehole Compensated-

Sonic Log

22

2,743'

2,738'



DATE	7:00 AM DEPTH	REMARKS
10-8-12	0'	Spud @ 5:15 pm. Plug down @ 9:15 pm. Dev.: 0.3° @ 221'
10-9-12	221'	Cut 221' in last 24 hrs. Drill out plug @ 7:00 am. Dev.: 0.4° @ 806', 0.0° @ 1367'
10-10-12	1,690'	Cut 1,469' in last 24 hrs; 20.75 hrs drlg. 0.3° @ 2302'
10-11-12	2,540'	Cut 850' in last 24 hrs; 22 hrs drlg.
10-12-12	3,310'	Cut 770' in last 24 hrs; 22.25 hrs drlg. DST #1 @ 3850'
10-13-12	3,850'	Cut 540' in last 24 hrs; 20.75 hrs drlg. DST #2 @ 3866'
10-14-12	3,866'	Cut 16' in last 24 hrs; 0.75 hrs drlg. DST #3 @ 3903'
10-15-12	3,920'	Cut 54' in last 24 hrs; 3 hrs drlg. DST #4 @ 3952', DST #5 @ 4016'
10-16-12	4,016'	Cut 96' in last 24 hrs; 6.5 hrs drlg.
10-17-12	4,185'	Cut 169' in last 24 hrs; 13.5 hrs drlg. DST #6 @ 4252'
10-18-12	4,315'	Cut 130' in last 24 hrs; 7.75 hrs drlg. RTD 4450' @ 1:40 pm
10-19-12	4,450'	Cut 135' in last 24 hrs; 6.5 hrs drlg. Ran production casing

Remarks

The electric log measurements correlate from 2' higher to 1' lower to the drilling measurements.

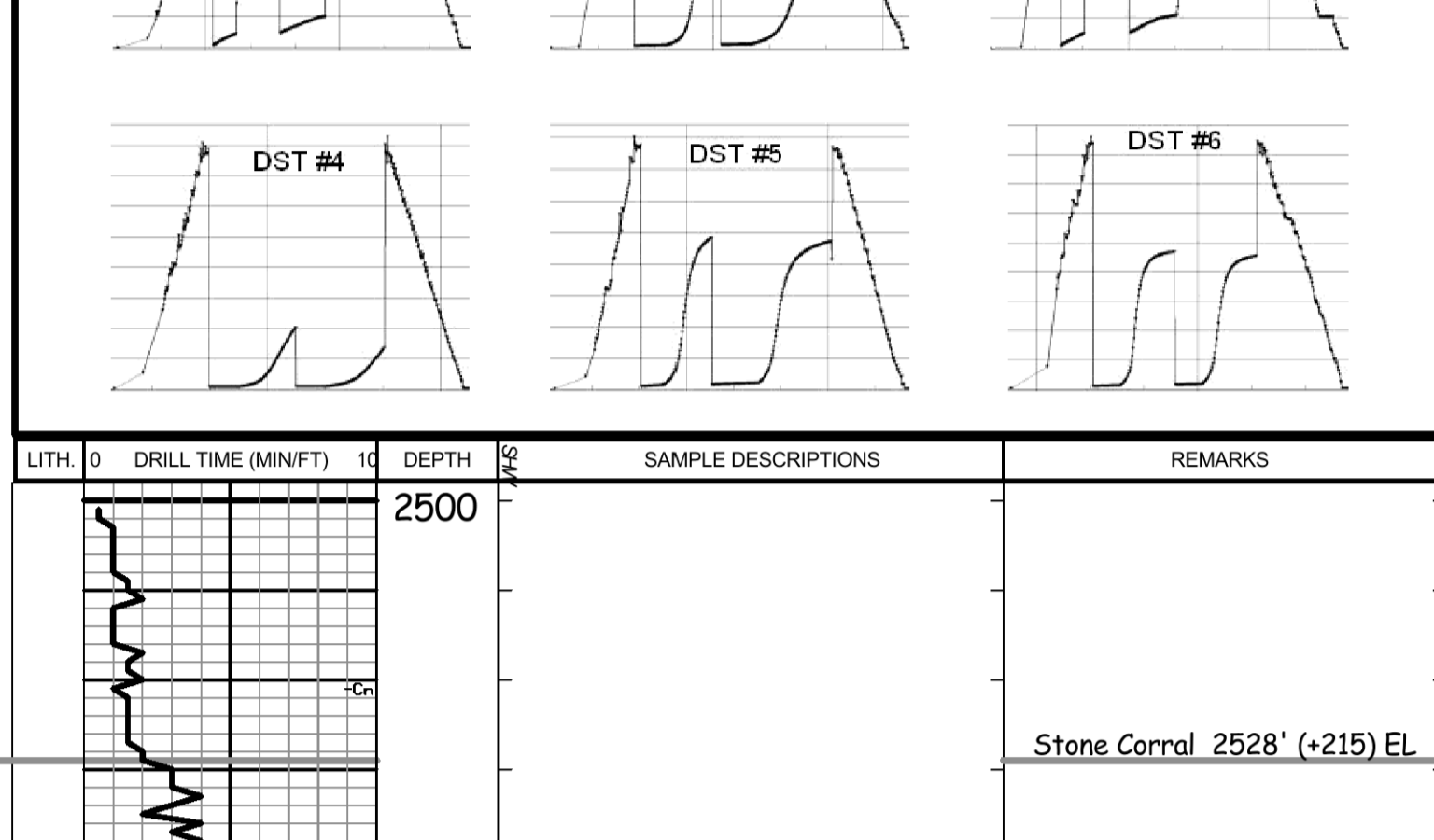
Formation tops and lithology on this report have been corrected to the electric log.

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	SAMPLE DESCRIPTIONS	REMARKS
		2500		Stone Corral 2528' (+215) EL
		2560		B/Stone Corral 2560' (+183) EL

		3500	LS: crm-gry, fxl, fos-ool in prt, sub chky-prty dns w/ some chky, pr por, NS Sh: lt-drk gry, some red-brn, gry, gm	Morgan Mud check @ 3319': 62 Vis, 8.7 Wt, 5.2 WL, 700 ppm Chl, 2# LCM
		3550	LS: crm-lt gry, fxl, fos-ool in prt, some shly, sub chky-prty dns w/ some chky, pr por, NS Sh: red-brn & gry, some gm & brn	
		3600	LS: crm-med gry, fxl, shly in prt, some fos, sub chky-prty dns, pr por, NS Sh: red-brn, gry, gm, w/ some Calc Sh: red-brn & purple	
		3650	LS: crm, fxl, fos, sub chky-prty dns, pr por, NS, w/ some Shly LS: A.A.	
		3700	LS: crm-lt gry, fxl, fos in prt, some sli shly, sub chky-prty dns, pr por, NS Sh: red-brn & brick red, some soft & gummy	
		3750	LS: Dol: wh-lt gry, fxl, fos in prt, tr cht (wh), sub chky-prty dns w/ some chky-vry chky, pr w/ tr fr fos-vug por, NS LS: crm-lt gry, fxl, fos in prt, some sli shly, sub chky-prty dns, pr por, NS Sh: red-brn, some gm	
		3800	LS: crm-lt gry, fxl, sli fos, sub chky-prty dns, pr por, NS Calc Sd: crm-lt gry, fn-vry fn grain, some shly, semi fri-brittle, pr vis por, NS Sh: red-brn, some gry & gm, w/ some Sd Sh: red-brn	
		3850	LS: wh-lt gry, fxl, vry fos, chky-prty dns w/ some vry chky, pr w/ tr fr fos por, NS LS: wh-crm, fxl, fos in prt, chky-prty dns w/ some vry chky, pr por, NS LS: A.A., mstly sub chky-prty dns, pr por, NS	DST #1 3818'-3850' LKC 'A' zn IF: blow built to 7.5" ISI: no blow back FF: BOB in 58" FSI: no blow back Recovery: 495' TOTAL FLUID 70' Mud (100%) 185' MW (90% W, 10% M) 240' MW (95% W, 5% M) IFF: 21-111#/30' ISIP: 1289#/60' FFP: 116-146#/60' FSIP: 1283#/60'
		3900	Sh: Black Carb LS: tan, fxl, fos, sub chk-prt dns, pr por, NS Sh: gry & red-brn, w/ small amt Sd: gry, fn-vry fn grain, shly, sli calc, mstly brittle, pr vis por, NS LS: crm-tan, fxl, fos, sub chky-prty dns, pr por, NS Sh: red-brn, gm, gry	DST #2 3842'-3866' LKC 'B' zn IF: blow built to 7.5" FF: no blow back Recovery: 20' TOTAL FLUID 1' Free Oil (100% O) 19' OCM (5% O, 95% M) IFF: 19-26#/30' ISIP: 964#/60' FFP: 31-34#/30' FSIP: 745#/60'
		3950	LS: crm, fxl, fos, sub chky-prty dns, pr por, NS Sh: red-brn, gm, gry	DST #3 3879'-3903' LKC 'F' zn IF: blow built to 9.75" ISI: no blow back FF: BOB in 45" FSI: no blow back Recovery: 425' TOTAL FLUID 220' MW (70% W, 30% M) 300' MW (95% W, 5% M) 5' Mud (heavy) (100% M) Chl ppm: 60,000 DST: 1,500 Mud IFF: 127-267#/60' ISIP: 1280#/90' FFP: 127-267#/60' FSIP: 1280#/90'
		4000	LS: crm, fxl, ool (small), sub chky-prty dns, pr fr intrprt por, gd amt blk sub sat-sat stn, gd thick-hvy live oil stn, SSFO, no odor Sh: red-brn & gm, some gry & brn LS: crm, fxl, ool-fos in prt, sub chky-prty dns, pr w/ tr fr intrprt por, scat drk brn-bk spdt-sub sat w/ tr sat stn, S-FSFO, no odor LS: crm-lt gry, fxl, fos-ool in prt, sli chty (crm-tan, ool-fos), chky-prty dns w/ some vry chky, pr intrprt por, vry scat brn-bk spdt-sub sat stn, SSFO, no odor LS: tan, fxl, fos, prty dns, pr por, NS	Morgan Mud check @ 3903': 51 Vis, 9.3 Wt, 5.6 WL, 1,500 ppm Chl, 15# LCM
		4050	LS: wh-crm, fxl, fos in prt, sli chty, chk-prt dns w/ some vry chky, pr w/ tr fr intrprt por, scat lt-drk brn spdt-sub sat stn, S-FSFO, no odor Sh: red-brn, some soft & gummy, some gm, gry LS: crm, fxl, fos in prt, sub chky-prty dns, pr por, NS Sh: red-brn, gm, gry	DST #4 3919'-3952' LKC 'H' zn IF: surface blow throughout: FF: no blow Rec. 5' Oil Spotted Mud (100% M) IFF: 20-22#/30' ISIP: 506#/60' FFP: 23-43#/30' FSIP: 339#/60'
		4100	LS: wh-crm, fxl, fos in prt, vry chky-prty dns, pr por, NS Sh: red-brn, soft & gummy in prt, some gry & gm Sh: red-brn, gry, gm, some brn	Morgan Mud check @ 3952': 56 Vis, 9.2 Wt, 5.6 WL, 1,500 ppm Chl, 2# LCM
		4150	LS: wh-lt gry, fxl, sli fos, sub chky-prty dns, pr por, NS Calc Sd: crm-lt gry, fn-vry fn grain, sli calc, soft-brittle, pr vis por, NS Sh: red-brn, gry, gm, some Calc Sh: lt purple	DST #5 3947'-4016' LKC 'J'-'K' zn IF: blow built to 2.5" FF: no blow back Recovery: 90' TOTAL FLUID 1' Free Oil (100% O) 89' OCM (50% O, 50% M) IFF: 22-37#/30' ISIP: 1205#/60' FFP: 34-53#/60' FSIP: 1178#/90'
		4200	LS: crm-lt gry, fxl, fos-ool in prt, some sli shly, sub chky-prty dns, pr por, NS Sh: red-brn, gry, gm, brn, w/ some Calc Sh: purple	Morgan Mud check @ 4016': 57 Vis, 9.0 Wt, 5.2 WL, 1,400 ppm Chl, 2# LCM
		4250	LS: crm-lt gry, fxl, fos-ool in prt, chky-prty dns, pr por, NS Sh: red-brn, gry, gm, brn, w/ some Calc Sh: purple Sh: A.A. w/ small amt of Sd: med gry, fn-vry fn grain, shly, sli glauc, semi fri, pr vis por, NS Sh: red-brn & gry, some drk gry, gm, brn, w/ tr Black Carb Sh	DST #6 4225'-4225' Cherokee Sand IF: blow built to 1.75" FF: no blow Recovery: 60' TOTAL FLUID 10' Free Oil (100% O) 50' OCM (40% O, 60% M) IFF: 21-31#/30' ISIP: 1173#/60' FFP: 39-43#/30' FSIP: 1135#/60'
		4300	LS: crm-tan, fxl, ool-fos in prt, some w/ brn-bk mineralization, sub chky-prty dns w/ some chky, pr por, NS Sh: mstly red-brn & gry, some Calc Sh: lt purple Sh: gm, red-brn, gry, w/ tr tr Blk Carb, & some Calc Sh: lt gry-lt purple	Morgan Mud check @ 4326': 69 Vis, 9.1 Wt, 4.8 WL, 1,000 ppm Chl, 3# LCM
		4350	LS: wh-lt gry, fxl, ool-fos in prt, chky-prty dns, pr intrprt por, NS Shly LS: lt-med gry, fxl, prty dns-gritty, pr por, NS, intermixed w/ Calc Sh: lt-med gry Shly LS: A.A., w/ incrs Calc Sh: lt-med gry, & some Sh: gry, gm, red-brn	Ran 8 stand short trip prior DST #6 Cherokee 4170' (-1427) EL
		4400	Sh: drk gry w/ some Black Carb Shly LS-Calc Sh: lt-med gry Sh: lt-med gry, gm, red-brn, brn LS: wh-tan, fxl, ool-fos, chky-prty dns, pr por, NS Sh: gry, gm, red-brn	DST #6 4225'-4225' Cherokee Sand IF: blow built to 1.25" FF: no blow Recovery: 60' TOTAL FLUID 10' Free Oil (100% O) 50' OCM (40% O, 60% M) IFF: 21-31#/30' ISIP: 1173#/60' FFP: 39-43#/30' FSIP: 1135#/60'
		4450	LS: crm-tan, fxl, sub chky-prty dns, pr por, NS Sh: red-brn, gm, gry Sh: red-brn, gm, gry, intermixed w/ some Sd: clr, med-crs grains, rmd-sub ang, fri-brittle, pr fr por, NS, & loose clr grains, sub rmd-sub ang, NS Sh: red-brn, tr soft & gummy, w/ gry & gm, w/ small amt of Sd: A.A. Sh: red-brn, gry, gm, intermixed some w/ Sd: clr-wh, fn-med grain, sli calc, semi fri-semi brittle, pr vis por, NS Sdy LS-Calc Sd: crm, fxl, fn-med grain, shly in prt (red-brn), sub chky-prty dns, pr por, NS Sh: red-brn, soft & gummy in prt, w/ gry & gm, w/ small amt of Sd, clr, med grain, sli calc, semi brittle, pr vis por, NS Sh: A.A., w/ small amt of loose Sd grains, clr, sub rmd-sub ang, NS Sh: red-brn, dcrs soft & gummy, w/ gm, gry, yell, some mottled, some sdy Sh: red-brn, gm, purple, gry, some crm, soft & gummy, intermixed w/ some Sd: crm, fn-med grain, semi fri-brittle, pr vis por, NS, w/ some loose grains, clr-yell, crs, sub rmd-sub ang, NS Sh: red-brn, gm, yell, purple, intermixed w/ Sd: clr-wh, fn-med grain, semi fri-semi brittle, pr vis por, NS Chert: A.A., fresh, mstly wh-crm, some pink fresh, dcrs yell, NS LS: crm, fxl, chty (wh-crm, fresh), chky-prty dns, pr por, NS LS: crm, fxl, some shly (red-brn, mottled), chky-prty dns, pr por, NS & Chert: wh-yell, fresh-sli weathered, pr vis por, NS LS: crm, fxl, some yell mottled, chky-prty dns, chty (wh-yell, fresh, some trans), pr por, NS Dol: crm-lt gry, fxl, some sli suc, sub chky-prty dns, sli chty, some pr-fr pin point por, NS Dol: A.A., w/ some fr-gd vug por, NS Dol: A.A., some chky, NS	Morgan Mud check @ 4450': 118' Dev. R.T.D. 4450' (-1707) L.T.D. 4451' (-1708) Straight Hole Survey @ 4450': 1.1° Dev.