

Robert L. Milford

PETROLEUM GEOLOGIST

Wichita, Kansas

GEOLOGISTS REPORT

DRILLING TIME AND SAMPLE LOG

OPERATOR: **Murfin Drilling Company, Inc.**
 LEASE: **Yrbas 'A' #41-25**
 LOC. SPOT: **N2 NE SW**
 LOC. FOOTAGE: **2,310' FSL 1,980' FWL**

SEC: **25** TWP: **4S** RNG: **31W**
 COUNTY: **Rauvins** STATE: **Kansas**
 API: **15-153-21129-00-00**

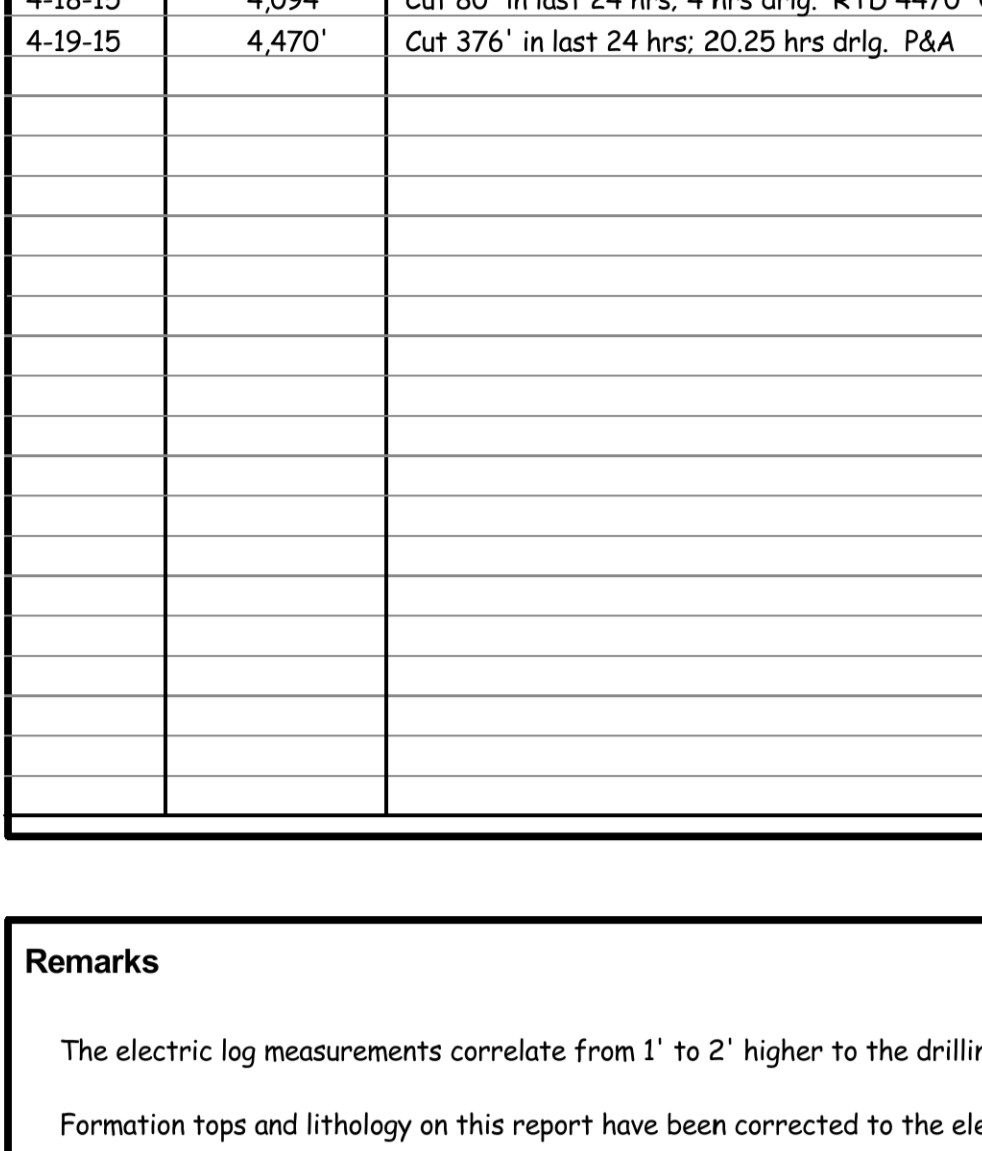
CONTRACTOR: **Murfin Drilling Co., Inc.** RIG NO.: **7**
 DRILLING STARTED: **4-13-2015** COMPLETED: **4-19-2015**
 MUD DISPLAYED: **3.166** MUD TYPE: **Chemical**
 DRILLING TIME/FEET FROM: **3.610'** TO: **RTD**
 SAMPLES SAVED FROM: **3.610'** TO: **RTD**
 SAMPLES EXAMINED FROM: **3.610'** TO: **RTD**
 GEOLOGICAL SUPERVISION FROM: **3.610'** TO: **RTD**

FORMATION NAME	TOP	LOG DATUM	SAMPLE TOP DATUM
Stone Corral	2,633'	+248	2,635' +246
Topeka	3,709'	-828	3,711' -830
Heebner	3,875'	-994	3,877' -996
Lansing	3,924'	-1043	3,926' -1045
Stark	4,090'	-1209	4,092' -1211
B/KC	4,136'	-1255	4,138' -1257
Pawnee	4,251'	-1370	4,252' -1371
Cherokee	4,336'	-1455	4,337' -1456
Mississippi	not on log		4,455' -1574
Total Depth	4,470'	-1589	4,470' -1589

ELEVATIONS
 KB: **2,881'**
 CL: **2,876'**

MEASUREMENTS FROM FACE
 CASING RECORD
 Conductor
 Surface: **8.5/8" @ 219'**
 w/ 200 sticks cement
 Production none

ELECTRICAL SURVEYS
 Pioneer Wireline
 Dual Induction Log
 Dual Compensated -



DATE	7:00 AM DEPTH	REMARKS
4-13-15	0'	Spud @ 2:30 pm. Plug down @ 6:00 pm. Drilled out plug @ 2:00 am on 4-14-15 w/ PDC bit
4-14-15	1,040'	Cut 1,040' in last 24 hrs. Cut 821' in 5 hrs w/ PDC bit. Bit trip @ 3576'
4-15-15	3,576'	Cut 2,536' in last 24 hrs; 18.75 hrs drlg. DST #1 @ 3960'
4-16-15	3,960'	Cut 384' in last 24 hrs; 15.75 hrs drlg. DST #2 @ 4014'
4-17-15	4,014'	Cut 54' in last 24 hrs; 2.5 hrs drlg. DST #3 @ 4094'
4-18-15	4,094'	Cut 80' in last 24 hrs; 4 hrs drlg. RTD 4470' @ 6:57 am on 4-19-15
4-19-15	4,470'	Cut 376' in last 24 hrs; 20.25 hrs drlg. P&A

Remarks

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

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

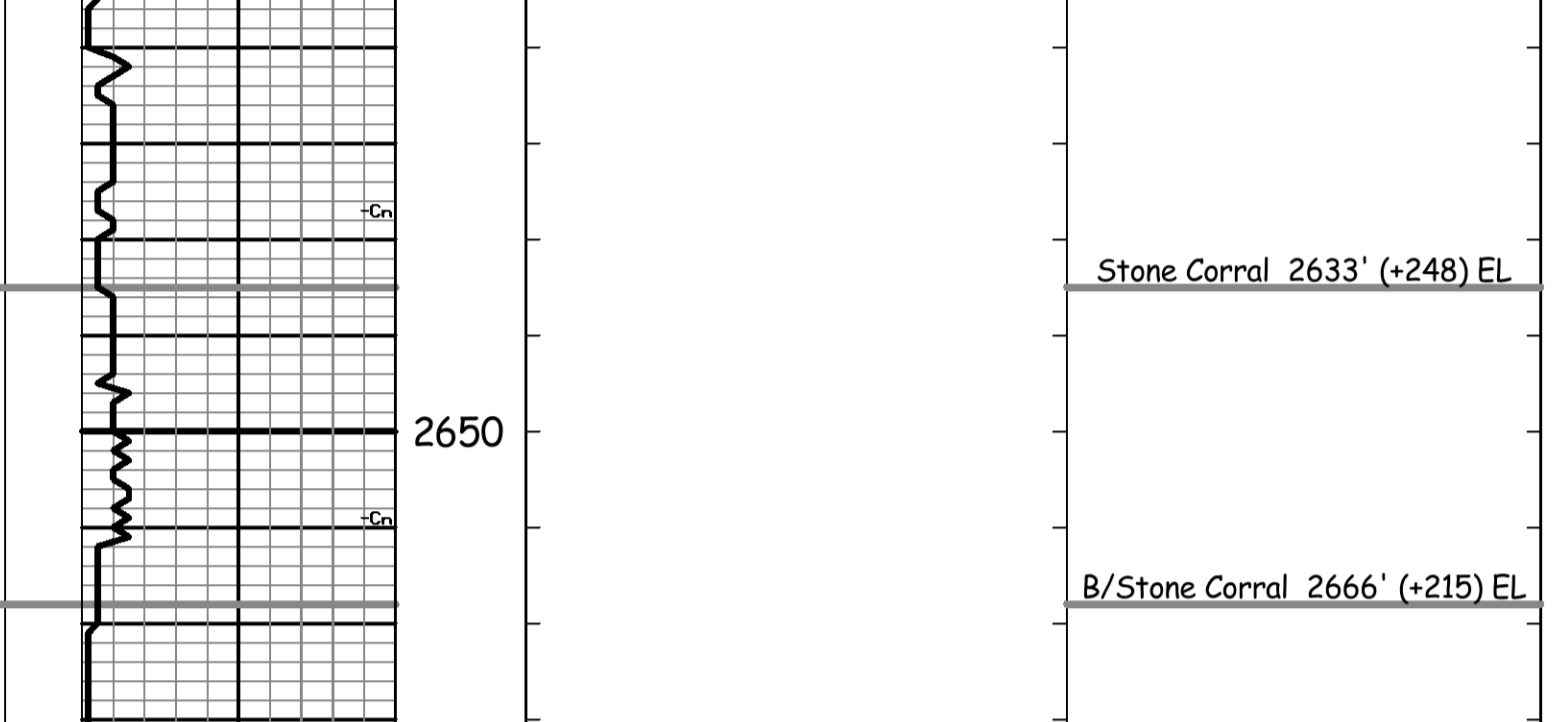
The drilling samples were deposited at the Kansas Geological Survey office in Wichita.

Respectfully submitted,

Robert L. Milford

Drill Stem Test Charts

Drill Stem Test by Trilobite Testing, Inc.



LITH	0	DRILL TIME (MIN/FT)	10	DEPTH	SAMPLE DESCRIPTIONS	REMARKS
				2600		Stone Corral 2633' (+248) EL
				2650		B/Stone Corral 2666' (+215) EL
				2700		

LITH	0	DRILL TIME (MIN/FT)	10	DEPTH	SAMPLE DESCRIPTIONS	REMARKS
				3600	LS: crm-gry, fxl, fos in prt, some blk inclusions, sub chky-prtly dns, pr por, NS LS: crm-lt gry, fxl, fos in prt, sub chky-prtly dns, pr por, NS Sh: lt gry (soft & gummy) & red-brn (some soft & gummy), some gry-grn LS: wh-tan, fxl, fos in prt, sub chky-prtly dns w/ some chky, pr por, NS	Call depth 3310' @ 1:23 am on 4-15-15 Mud displaced from 3166' to 3262' Bit trip at 3576'. Replaced PDC bit with button bit. Pipe Strap @ 3576': Strap short 0.24' Straight Hole Survey @ 3576': 1° Dev. Samples start 3610' @ 10:49 am on 4-15-15 Morgan Mud check @ 3612': 186 Vis, 8.7 Wt. 5.2 WL, 1,600 ppm Chl, 3# LCM
				3650	LS: red-brn & gry-grn LS: crm-tan, fxl, fos in prt, sub chky-prtly dns w/ some chky, pr por, NS Sh: red-brn (some soft & gummy, some sdy), some gry & grn	
				3700	LS: wh-tan, fxl, fos in prt, sub chky-prtly dns w/ some chky-vry chky, pr w/ tr fr-gd fos-vug por, NS Sh: red-brn, some gry-grn LS: wh-tan, fxl, sli fos, sub chky-prtly dns w/ some chky, pr por, NS Sh: red-brn (some soft & gummy), some gry Sh: red-brn (some soft & gummy), some gry-grn	Topeka 3709' (-828) EL
				3750	LS: wh-tan, fxl, sli fos, some shly (red-brn, mottled), sub chky-prtly dns w/ some chky-vry chky, pr por, NS LS: wh-lt gry, fxl, sli fos, chky-prtly dns w/ some vry chky, pr por, NS Sdy LS-Calc Sd: crm-lt gry, fxl, fn-vry fn grain sd, fri-semi brittle, pr vis por, NS Shly Sd-Sdy Sh: red-brn	
				3800	LS: red-brn (some sdy, some soft & gummy), some gry & grn LS: wh-crm, fxl, fos in prt, some calcite infill, chky-prtly dns, pr por, NS LS: wh-lt gry, fxl, fos in prt, sub chky-prtly dns w/ some chky-vry chky, pr por, NS LS: A.A. w/ dcns chky-vry chky, pr por, NS LS: crm-lt gry, fxl, fos in prt, sub chky-prtly dns w/ some chky, pr por, NS	
				3850	Sh: Blk Carb LS: tan-brn, fxl, fos, mostly prtly dns, pr por, NS Sh: gry w/ some grn (some soft & gummy) & some red-brn Sh: red-brn (some soft & gummy, some sdy) w/ some gry & grn	Heebner 3875' (-994) EL
				3900	LS: wh-crm, fxl, fos-ool in prt, sub chky-prtly dns, pr w/ tr fr intrprtcl por, scat med-drk brn sptd-patchy w/ tr sat stn, S-F5FO, no odor Sh: red-brn (some soft & gummy), some gry & grn	DST #1 3876'-3960' Tor-LKC 'B' zn IF: blow built to 0.25" FF: no blow back Rec: 10' Oil Spotted Mud (Spts 0, 100% M) IFP: 16-25#/30" ISIP: 1137#/60" FFP: 26-32#/60" FSIP: 1173#/90"
				3950	LS: crm, fxl, sli fos, sub chky-prtly dns, pr por, NS Sd: lt gry, fn-vry fn grain, calc, semi brittle, pr vis por, scat blk patchy-sat stn, SSFO, no odor LS: red-brn, gry, grn LS: crm, fxl, sli fos, sub chky-prtly dns, fr-gd vug por, scat med-drk brn & blk patchy-sub stn, S-F5FO, no odor Sh: red-brn, gry, grn LS: wh-lt gry, fxl, sli fos, chky-prtly dns w/ some vry chky, pr vis por, NS LS: crm-lt gry, fxl, fos in prt, sub chky-prtly dns, pr w/ tr fr fos-vug por, scat med-drk brn patchy-sub sat stn, SSFO, no odor Sh: red-brn, gry, grn LS: crm, fxl, fos in prt, sub chky-prtly dns, pr fos por, scat med-brn w/ some drk brn & blk sptd-sub sat stn, SSFO, no odor Sh: red-brn & gry-grn LS: wh-tan, fxl, sli fos, sli chky (crm-ool), vry chky-prtly dns, pr por, tr brn-blk sptd-patchy stn, NSFO, no odor LS: wh-lt gry, fxl, fos in prt, chky-prtly dns w/ some vry chky, pr vis por, NS Sh: Blk Carb (few pcs) LS: tan-brn, fxl, fos in prt, prtly dns, pr por, NS Sh: red-brn w/ some grn & gry	Ran 25 stand short trip prior to DST #1 Straight Hole Survey @ 3960': 0.75° Dev. Morgan Mud check @ 3960': 50 Vis, 8.9 Wt. 6.8 WL, 2,200 ppm Chl, 5# LCM (10:25 am, while TTH w/ DST)
				4000	LS: crm-lt gry, fxl, fos-ool in prt, sub chky-prtly dns, pr fr intrprtcl w/ some small vug por, scat lt-med brn patchy-sat stn, S-F5FO, fr odor Sh: red-brn, gry, grn LS: crm, fxl, fos in prt, sub chky-prtly dns, pr fos por, scat med-brn w/ some drk brn & blk sptd-sub sat stn, SSFO, no odor Sh: red-brn & gry-grn LS: wh-tan, fxl, sli fos, sli chky (crm-ool), vry chky-prtly dns, pr por, tr brn-blk sptd-patchy stn, NSFO, no odor LS: wh-lt gry, fxl, fos in prt, chky-prtly dns w/ some vry chky, pr vis por, NS Sh: Blk Carb (few pcs) LS: tan-brn, fxl, fos in prt, prtly dns, pr por, NS Sh: red-brn w/ some grn & gry	DST #2 3976'-4014' LKC 'E'-'G' zns IF: blow built to 6" IS: no blow back FF: blow built to 10" FS: no blow back Rec: 320' TOTAL FLUID: 5' WM (20% W, 80% M) 63' WM (50% W, 50% M) 181' MW (95% W, 5% M) Chl ppm: 62,000 DST: 2,200 Mud IFP: 18-101#/30" ISIP: 1100#/60" FFP: 106-118#/60" FSIP: 1087#/90"
				4050	LS: wh-crm, fxl, chky-prtly dns w/ some vry chky, pr por, rare med-drk brn sptd stn (cpl pcs w/ drk brn live stn), NSFO, no odor Sh: red-brn, gry, grn LS: crm-lt gry, fxl, fos in prt, sub chky-prtly dns, pr por, NS Sh: red-brn (some soft & gummy, some sdy) w/ some gry & grn Sh: A.A. LS: crm-lt gry, fxl, fos-ool in prt, sub chky-prtly dns, pr fr intrprtcl w/ some small vug por, scat lt-med brn patchy-sat stn, S-F5FO, fr odor Sh: red-brn, gry, grn Sh: red-brn (some soft & gummy, some sdy), w/ some gry-grn	DST #3 4022'-4094' LKC 'E'-'J' zns IF: blow built to 7" IS: no blow back FF: blow built to 3.5" FS: no blow back Rec: 355' TOTAL FLUID: 63' MW (65% W, 35% M) 189' MW (95% W, 5% M) 103' MW (60% W, 40% M) Chl ppm: 75,000 DST: 2,000 Mud IFP: 19-118#/30" ISIP: 1204#/60" FFP: 125-182#/60" FSIP: 1184#/90"
				4100	LS: wh-crm, fxl, chky-prtly dns w/ some vry chky, pr por, rare med-drk brn sptd stn (cpl pcs w/ drk brn live stn), NSFO, no odor Sh: red-brn, gry, grn LS: crm-lt gry, fxl, sli fos, sub chky-prtly dns w/ some chky, pr por, NS Calc Sh: lt gry & purple w/ Sh: red-brn, gry & grn LS: crm, fxl, sli fos, sub chky-prtly dns, pr por, NS Sh: red-brn (some soft & gummy, some sdy), some gry & grn Sh: A.A. LS: crm-lt gry, fxl, fos in prt, sub chky-prtly dns, pr por, NS w/ some Calc Sh-Shly LS: lt gry Sh: lt gry (soft & gummy), red-brn, gry-grn Sh: red-brn (some soft & gummy), some gry-grn	Morgan Mud check @ 4127': 60 Vis, 9.2 Wt. 7.2 WL, 2,900 ppm Chl, 5# LCM
				4150	LS: crm-lt gry, fxl, fos in prt, sub chky-prtly dns, pr por, NS LS: red-brn, some gry-grn LS: crm-med gry, fxl, sli fos, sub chky-prtly dns, pr por, NS LS: A.A. w/ some Calc Sh: lt-med gry Sh: red-brn, some gry & grn Sh: A.A. Sh: red-brn, some med gry Sh: red-brn & gry-grn	B/KC 4136' (-1255) EL
				4200	LS: wh-crm, fxl, fos-ool in prt, chky-prtly dns w/ some vry chky, pr w/ tr fr pin point por, NS Sh: lt gry-tan (soft & gummy) w/ some red-brn & gry-grn & some Calc Sh: gry Sh: red-brn & med-drk gry Sh: Blk Carb (tr amt) LS: brn, fxl, prtly dns, pr por, NS Sh: red-brn & med-drk gry LS: crm-tan, fxl, fos in prt, sub chky-prtly dns w/ some chky, pr por, NS LS: tan-gry, fxl, some shly, sub chky-prtly dns, pr por, NS Sh: lt gry (some soft & gummy) Sh: med-drk gry (some soft & gummy) w/ some red-brn (some soft & gummy)	No Circ sample caught at 4310'. Looked at 4300-10' sample, then decided to drill ahead
				4300	Sh: Blk Carb (tr amt) Sh: med-drk gry w/ some grn & red-brn LS: crm-tan, fxl, fos in prt, sub chky-prtly dns w/ some chky, pr por, NS Sh: Blk Carb (scat pcs) w/ Sh: gry, red-brn, grn	Cherokee 4336' (-1455) EL
				4350	LS: wh-tan, fxl, fos in prt, sub chky-prtly dns w/ some chky, pr por, NS LS: crm-tan, fxl, fos in prt, sub chky-prtly dns w/ some dns, pr por, NS Sh: gry, red-brn, grn Sh: A. A. w/ small amt of Sd: lt gry, fn-vry fn grain, sli calc, semi brittle, pr vis por, NS Sh: gry, red-brn, grn, w/ some Sdy Sh: red-brn, & some crs loose Sd grains, clr, sub rnd-sub ang	
				4400	Sh: red-brn, gry, grn w/ some red-brn & grn mottled & small amt of Sd: clr, fn-med grn, semi fri-brittle, pr-fr vis por, NS Sh: red-brn, gry, grn w/ some Sdy Sh: red-brn & grn, w/ small amt of Sd clusters & loose grains -A.A. Sh: red-brn (some soft & gummy, some sdy), gry-grn & tr yell, w/ some crs loose Sd grains, clr, sub rnd-sub ang Sh: red-brn (some sdy), some gry & grn Sh: A.A. w/ some red-brn & grn mottled, w/ some crs loose Sd grains, clr-yell, sub rnd-sub ang Sd: clr-wh, med grain, semi fri-brittle, pr-fr vis por, NS w/ some crs loose Sd grains A.A. & small amt of Ch: crm-yell, fresh & weathered, NS Sh: red-brn & grn (some mottled) w/ gry & yell Sh: wh-yell, fresh & weathered, some fos, some pin point-vug por, NS Ch: A.A.	Miss. 4455' (-1574) DT top of Miss. is below start of most log curves Ran 15 stand short trip @ 4470' after CF5
				4450	Sh: red-brn & grn (some mottled) w/ gry & yell Sh: wh-yell, fresh & weathered, some fos, some pin point-vug por, NS Ch: A.A.	L.T.D. 4470' (-1589) R.T.D. 4470' (-1589) Straight Hole Survey @ 4470': 0.75° Dev.