

# Robert L. Milford

PETROLEUM GEOLOGIST  
Wichita, Kansas

## GEOLOGISTS REPORT

DRILLING TIME AND SAMPLE LOG

OPERATOR: **Murfin Drilling Company, Inc.**  
 LEASE: **Schmidt-Vap #3-26**  
 LOC. SPOT: **C 52 SE SW**  
 LOC. FOOTAGE: **330' FSL 1,980' FWL**

SEC: **26** TWP: **4S** RNG: **31W**  
 COUNTY: **Rauvins** STATE: **Kansas**  
 API: **15-153-21118-00-00**

CONTRACTOR: **Murfin Drilling Co., Inc.** RIG NO.: **7**  
 DRILLING STARTED: **3-18-15** COMPLETED: **3-25-15**  
 MUD DISPLAYED: **3,200'** MUD TYPE: **Chemical**  
 DRILLING TIME (MERT) FROM: **3,600'** TO: **RTD**  
 SAMPLES SAVED FROM: **3,600'** TO: **RTD**  
 SAMPLES EXAMINED FROM: **3,600'** TO: **RTD**  
 GEOLOGICAL SUPERVISION FROM: **3,600'** TO: **RTD**

FORMATION NAME	LOG DATUM	SAMPLE DATUM
Stone Corral	2,635' +264	2,633' +266
Topeka	3,702' -803	3,702' -803
Heebner	3,866' -967	3,867' -968
Lansing	3,918' -1019	3,919' -1020
Stark	4,082' -1183	4,082' -1183
B/KC	4,128' -1229	4,128' -1229
Pawnee	4,240' -1341	4,240' -1341
Cherokee	4,330' -1431	4,330' -1431
Mississippi	not on log	4,457' -1558
Total Depth	4,465'	4,465' -1566

ELEVATIONS  
 KB: **2,899'**  
 GL: **2,894'**

CASING RECORD  
 Conductor:  
 Surface: **8.5/8" @ 219'**  
 w/ 200 sacks cement  
 Production: **5.1/2" @ 4462'**  
 w/ 500 sacks cement

ELECTRICAL SURVEYS  
 Flowmeter Wireline:  
 Dual Induction Log  
 Dual Compensated -

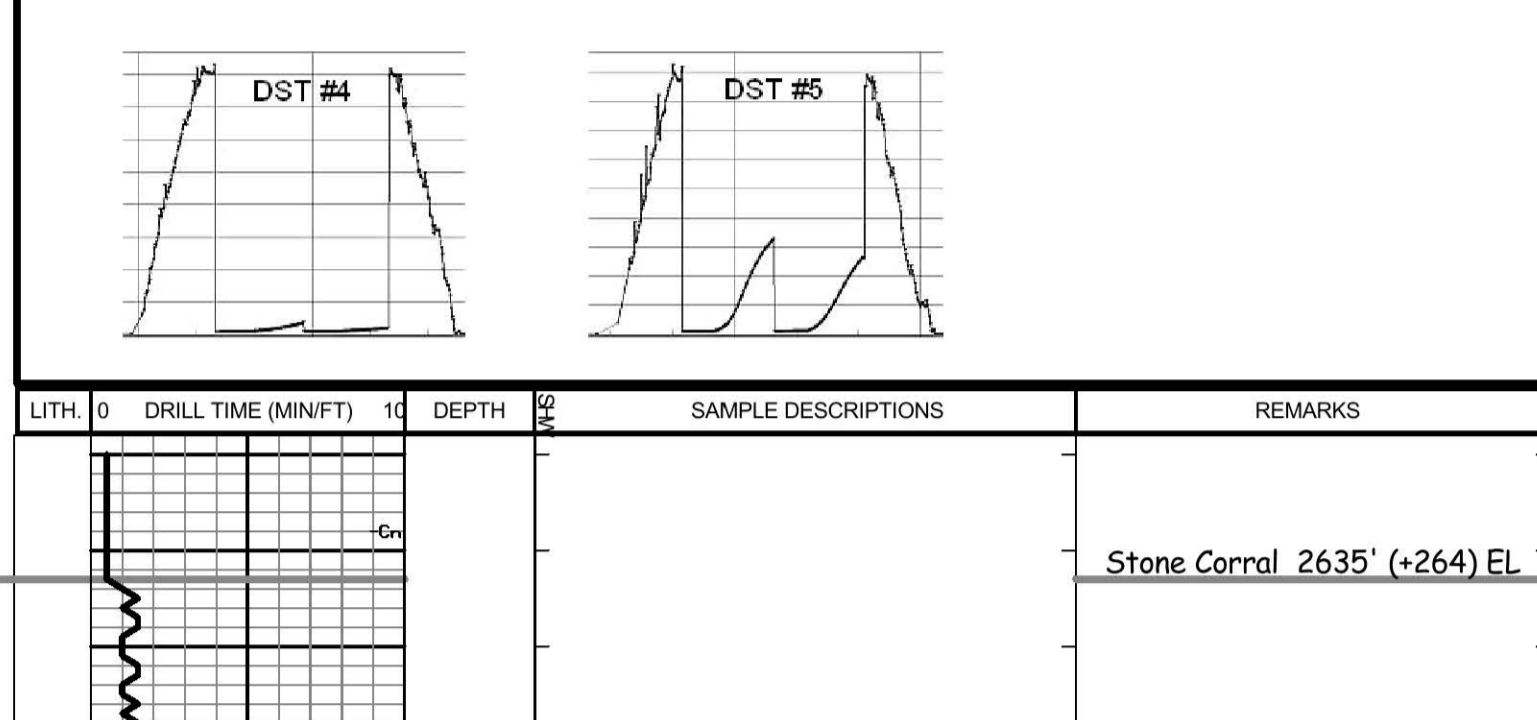
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Total Depth	4,465'	4,465' -1566

DATE	7:00 AM DEPTH	REMARKS
3-18-15	0'	Spud @ 1:45 pm. Plug down @ 5:30 pm. Drilled out plug @ 1:30 am on 3-19-15 w/ PDC bit
3-19-15	1,000'	Cut 1,000' in last 24 hrs. Cut 781' in 5.5 hrs w/ PDC bit. Bit trip @ 3546' (ran button bit)
3-20-15	3,600'	Cut 2,600' in last 24 hrs; 18 hrs drlg (16 hrs w/ PDC bit). DST #1 @ 3953'
3-21-15	3,953'	Cut 353' in last 24 hrs; 11.5 hrs drlg. DST #2 @ 4020'
3-22-15	4,020'	Cut 67' in last 24 hrs; 3 hrs drlg. DST #3 @ 4085'
3-23-15	4,115'	Cut 95' in last 24 hrs; 5 hrs drlg. DST #4 @ 4139'
3-24-15	4,300'	Cut 185' in last 24 hrs; 11.25 hrs drlg. DST #5 @ 4364'. RTD 4465' @ 1:56 am 3-25-15
3-25-15	4,465'	Cut 165' in last 24 hrs; 1.5 hrs drlg. Ran production casing.

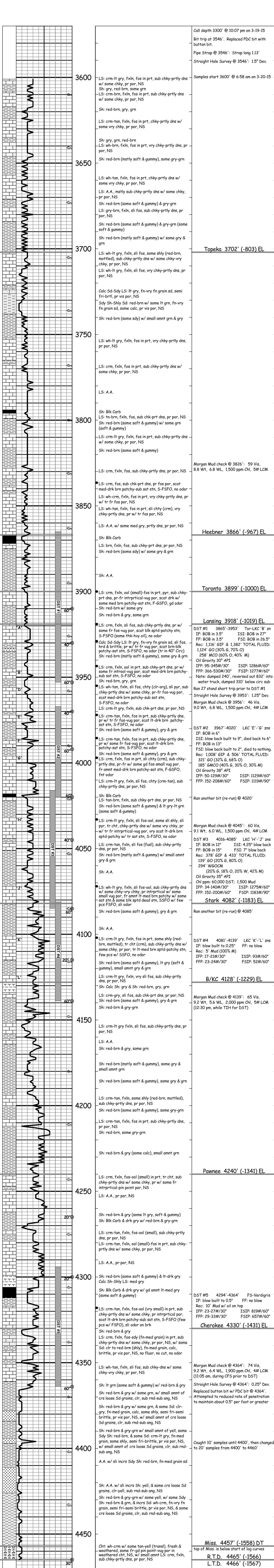
Remarks  
 The electric log measurements correlate from 1' higher to 2' lower to the drilling measurements.  
 Formation tops and lithology on this report have been corrected to the electric log.  
 The drilling samples were deposited at the Kansas Geological Survey office in Wichita.  
 Respectfully submitted,  
 Robert L. Milford

### Drill Stem Test Charts

Drill Stem Test by **Trilobite Testing, Inc.**



LITH	0	DRILL TIME (MIN/FT)	10	DEPTH	20	SAMPLE DESCRIPTIONS	REMARKS
				2650			Stone Corral 2635' (+264) EL
				2700			B/Stone Corral 2670' (+229) EL



Call depth 3300' @ 10:07 pm on 3-19-15  
 Bit trip at 3546'. Replaced PDC bit with button bit.  
 Pipe Strap at 3546': Strap long 1.13'  
 Straight Hole Survey @ 3546': 1.5" Dev.  
 Samples start 3600' @ 6:58 am on 3-20-15  
 Morgan Mud check @ 3826': 59 Vis, 8.8 Wt, 6.8 WL, 1,500 ppm Chl, 5# LCM  
 Heebner 3866' (-967) EL  
 Toronto 3899' (-1000) EL  
 Lansing 3918' (-1019) EL  
 DST #1 3865'-3953' Tor-LKC 'B' zns  
 IF: BOB in 35' ISI: BOB in 27'  
 FF: BOB in 35'  
 Rec: 1.116' GIP & 1.382' TOTAL FLUID:  
 1.124' GO (30% G, 70% O)  
 258' MCO (40% G, 60% M)  
 Oil Gravity 30° API  
 IFF: 95-345#/30' ISIP: 1286#/60'  
 FFP: 366-530#/30' FSIP: 1277#/60'  
 Note: dumped 240', reversed out 832' into water tank, dumped 310' below circ sub  
 Ran 27 stand short trip prior to DST #1  
 Straight Hole Survey @ 3953': 1.25" Dev.  
 Morgan Mud check @ 3956': 46 Vis, 9.0 Wt, 6.8 WL, 1,500 ppm Chl, 4# LCM  
 DST #2 3967'-4020' LKC 'E' 'G' zns  
 IF: blow built to 0.5"  
 FF: BOB in 13'  
 Rec: 1.008' GIP & 433' TOTAL FLUID:  
 321' GO (20% G, 80% O)  
 185' MCO (40% G, 60% M)  
 Oil Gravity 38° API  
 IFF: 150-129#/30' ISIP: 1129#/60'  
 FFP: 152-208#/60' FSIP: 1119#/90'  
 Ran another bit (re-run) @ 4020'  
 Morgan Mud check @ 4045': 60 Vis, 9.1 Wt, 6.0 WL, 1,500 ppm Chl, 4# LCM  
 DST #3 4016-4085' LKC 'H' 'J' zns  
 IF: BOB in 12" ISI: 4.25' blow back  
 FF: BOB in 15"  
 Rec: 3.78' GIP & 433' TOTAL FLUID:  
 139' GO (20% G, 80% O)  
 294' WGO  
 (20% G, 18% O, 20% W, 42% M)  
 Oil Gravity 35° API  
 Chl ppm: 60,000 DST: 1,500 Mud  
 IFF: 34-140#/30' ISIP: 1275#/60'  
 FFP: 152-200#/60' FSIP: 1183#/90'  
 Stark 4082' (-1183) EL  
 Ran another bit (re-run) @ 4085'  
 DST #4 4081'-4139' LKC 'K' 'L' zns  
 IF: blow built to 0.25"  
 Rec: 5' Mud (100% M)  
 IFF: 17-21#/30' ISIP: 93#/60'  
 FFP: 23-34#/30' FSIP: 52#/60'  
 B/KC 4128' (-1229) EL  
 Morgan Mud check @ 4139': 65 Vis, 9.2 Wt, 5.6 WL, 1,900 ppm Chl, 5# LCM (12:30 pm, while TIH for DST)  
 Pawnee 4240' (-1341) EL  
 DST #5 4294'-4364' FS-Verdigris  
 IF: blow built to 0.5"  
 Rec: 10' Mud w/ oil on top  
 IFF: 23-27#/30' ISIP: 819#/60'  
 FFP: 29-33#/30' FSIP: 657#/60'  
 Cherokee 4330' (-1431) EL  
 Morgan Mud check @ 4364': 74 Vis, 9.2 Wt, 6.4 WL, 1,900 ppm Chl, 4# LCM (11:05 am, during CFS prior to DST)  
 Straight Hole Survey @ 4364': 0.25" Dev.  
 Replaced button bit w/ PDC bit @ 4364'. Attempted to reduced rate of penetration to maintain about 0.5" per foot or greater  
 Caught 10' samples until 4400', then changed to 20' samples from 4400' to 4460'  
 Miss. 4457' (-1558) DT  
 top of Miss. is below start of log curves  
 R.T.D. 4465' (-1566)  
 L.T.D. 4466' (-1567)  
 Ran 5 stand short trip @ 4465': 0.75" Dev.