

# Robert L. Milford

PETROLEUM GEOLOGIST  
Wichita, Kansas

**GEOLOGISTS REPORT**  
DRILLING TIME AND SAMPLE LOG

OPERATOR: **Murfin Drilling Company, Inc.**  
LEASE: **Gilbert #1-27**  
LOC. SPOT: **10'S & 10' W of NW/NE SE**

LOC. FOOTAGE: **2,300' FSL 1,000' FEL**  
SEC: **27** TWP: **4S** RNG: **31W**  
COUNTY: **Rovills** STATE: **Kansas**  
API: **15-153-20916-00-00**

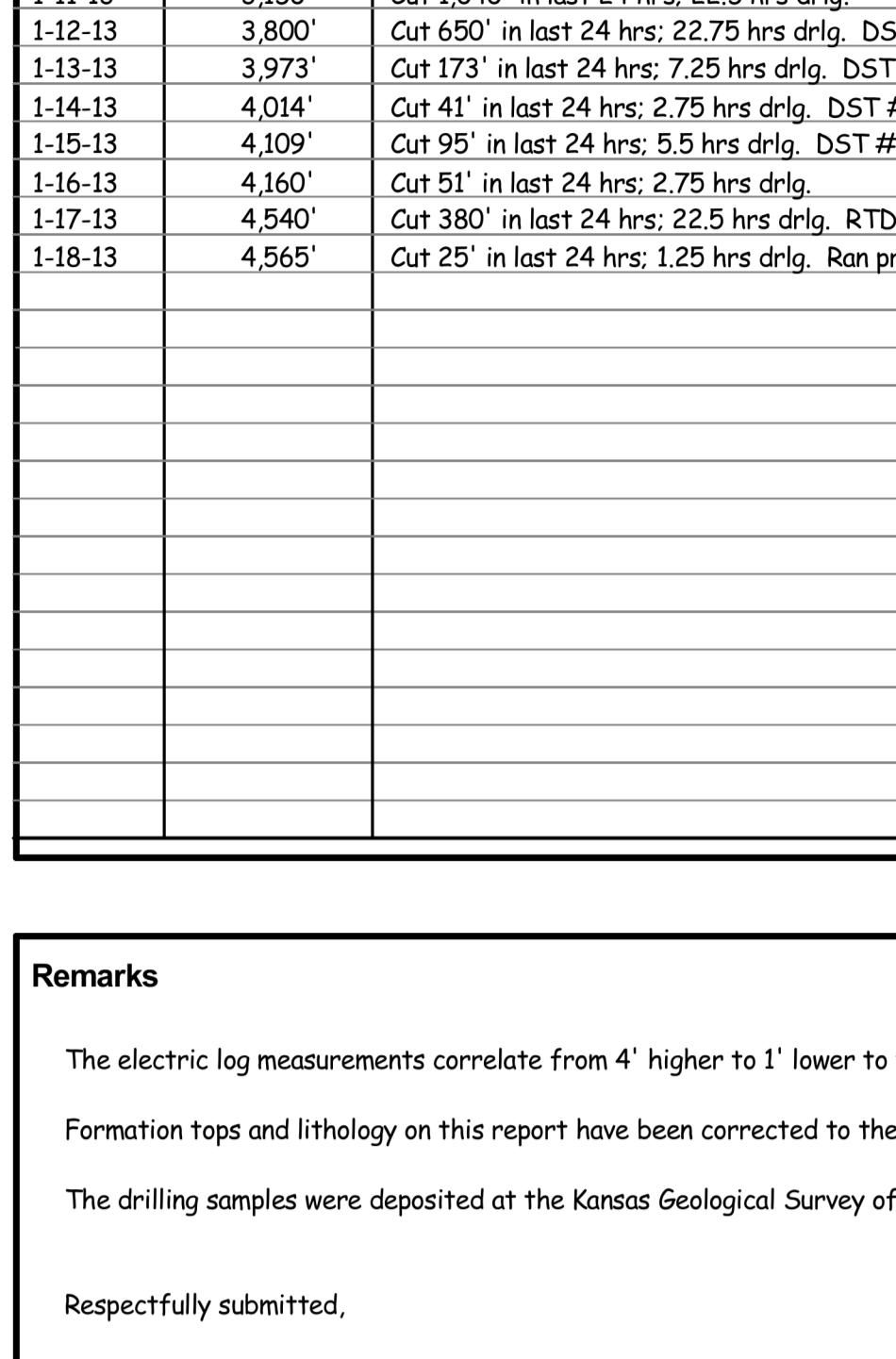
CONTRACTOR: **Murfin Drilling Co., Inc.** RIG NO.: **8**  
DRILLING STARTED: **1-8-2013** COMPLETED: **1-17-2013**  
MUD DISPLACED: **3,179'** MUD TYPE: **Chemical**  
DRILLING TIME KEPT FROM: **3,640'** TO: **RTD**  
SAMPLES SAVED FROM: **3,640'** TO: **RTD**  
SAMPLES EXAMINED FROM: **3,640'** TO: **RTD**  
GEOLOGICAL SUPERVISION FROM: **3,628'** TO: **RTD**

FORMATION NAME: **TOP LOG** SAMPLE DATUM: **TOP DATUM**

FORMATION NAME	TOP	LOG	SAMPLE DATUM	TOP DATUM
Stone Corral	2,659'	+255	2,663'	+251
Lopeka	3,722'	-808	3,722'	-808
Hebner	3,889'	-975	3,888'	-974
Lansing	3,938'	-1024	3,937'	-1023
Stark	4,105'	-1191	4,105'	-1191
B/KC	4,153'	-1239	4,153'	-1239
Pawnee	4,266'	-1352	4,266'	-1352
Cherokee	4,351'	-1437	4,350'	-1436
Mississippi	4,466'	-1552	4,465'	-1551
Total Depth	4,565'	-1651	4,565'	-1651

**ELEVATIONS**  
KB: **2,914'**  
GL: **2,909'**

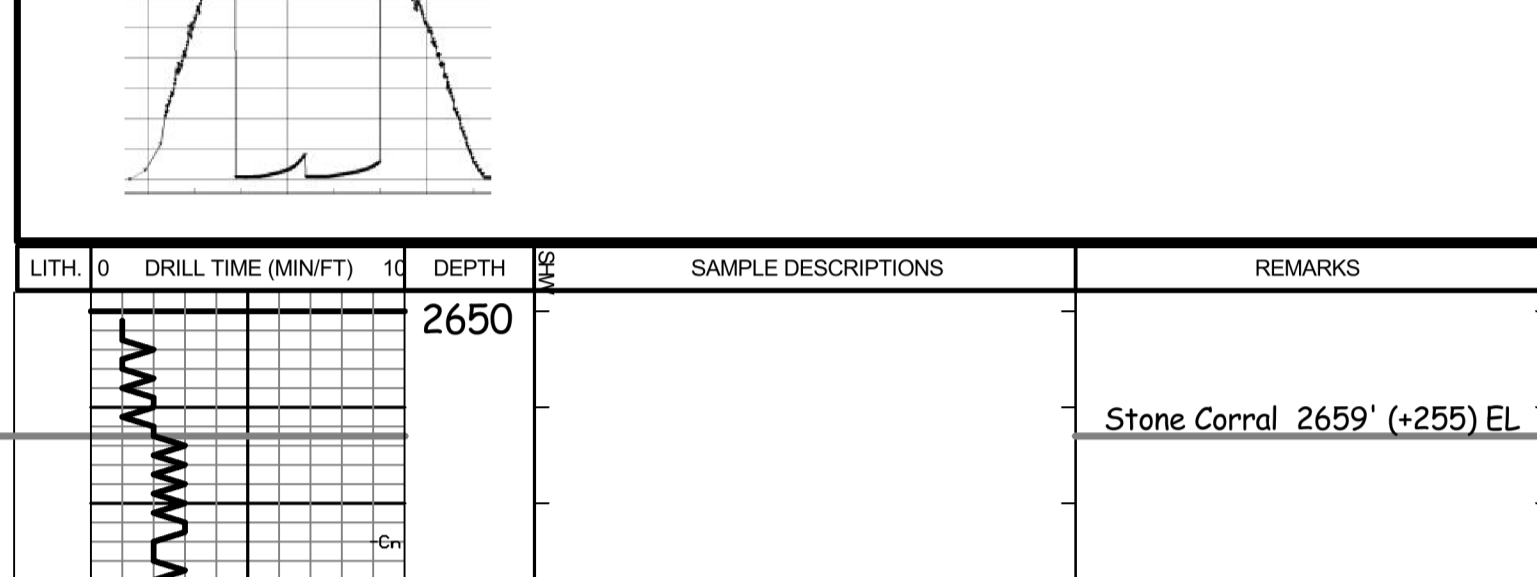
**CASING RECORD**  
Conductor:  
Surface: **8.5/8" @ 217'**  
w/ 190 sacks cement  
Production: **5.1/2" @ 4953'**  
w/ 175 sacks cement



DATE	7:00 AM DEPTH	REMARKS
1-8-13	0'	Spud @ 4:30 pm. Plug down @ 9:00 pm. Started drilling out plug @ 5:00 am on 1-9-13
1-9-13	320'	Cut 320' in last 24 hrs.
1-10-13	2,110'	Cut 1,790' in last 24 hrs; 22.75 hrs drlg.
1-11-13	3,150'	Cut 1,040' in last 24 hrs; 22.5 hrs drlg.
1-12-13	3,800'	Cut 650' in last 24 hrs; 22.75 hrs drlg. DST #1 @ 3973'
1-13-13	3,973'	Cut 173' in last 24 hrs; 7.25 hrs drlg. DST #2 @ 4014'
1-14-13	4,014'	Cut 41' in last 24 hrs; 2.75 hrs drlg. DST #3 @ 4109'
1-15-13	4,109'	Cut 95' in last 24 hrs; 5.5 hrs drlg. DST #4 @ 4160'
1-16-13	4,160'	Cut 51' in last 24 hrs; 2.75 hrs drlg.
1-17-13	4,540'	Cut 380' in last 24 hrs; 22.5 hrs drlg. RTD 4565' @ 8:17 am
1-18-13	4,565'	Cut 25' in last 24 hrs; 1.25 hrs drlg. Ran production casing.

**Remarks**  
The electric log measurements correlate from 4' 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
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2650' Stone Corral 2659' (+255) EL

B/Stone Corral 2691' (+223) EL

3650' Topeka 3722' (-808) EL

3750' Toronto 3922' (-1008) EL

3850' Hebner 3889' (-975) EL

3900' Lansing 3938' (-1024) EL

3950' Stark 4105' (-1191) EL

4000' B/KC 4153' (-1239) EL

4050' Pawnee 4266' (-1352) EL

4100' Cherokee 4351' (-1437) EL

4150' Miss. 4466' (-1552) EL

4200' L.T.D. 4565' (-1651)

4250' R.T.D. 4565' (-1651)

4300' Straight Hole Survey @ 4565': 1.5' Dev.

4350' Ran 12 stand short trip @ TD, prior to running electric logs

4400' Morgan Mud check @ 4239': 69 Vis, 9.3 Wt, 6.4 WL, 3,000 ppm Chl, 6# LCM

4450' Morgan Mud check @ 4044': 58 Vis, 9.0 Wt, 6.0 WL, 3,300 ppm Chl, 6# LCM

4500' Morgan Mud check @ 3932': 64 Vis, 9.0 Wt, 5.6 WL, 1,000 ppm Chl, 8# LCM

4550' Morgan Mud check @ 3435': 85 Vis, 8.6 Wt, 5.2 WL, 700 ppm Chl, 9# LCM

4600' DST #1 3887'-3973' Toronto-LKC 'B' zns  
IF: BOB in 2" ISI: 2" blow back  
FF: BOB in 1.5" ISI: 5" blow back  
Rec: 1,826' TOTAL FLUID:  
Dumped 45' Oil (100% O). Reversed out 1,533' fluid & recovered 5 bbls of the 21.5 bbls total fluid. Smpls every 5 min. Smpls @ 15 min = (10% G, 40% O, 30% W, 20% M), Smpl @ 20 min = (20% O, 70% W, 10% M), Smpl @ 25 min = (8% O, 90% W, 2% M). Dumped 248' Oil Spd MW (5% O, 85% W, 10% M) below circ sub.  
Oil Gravity 23.6° API  
Chl ppm: 90,000 DST: 1,000 Mud  
IFP: 81-426#/30" ISIP: 1261#/60"  
FFP: 449-823#/60" FSIP: 1253#/90"

4650' DST #2 3987'-4014' LKC 'E'-'F' zns  
IF: BOB in 5.5"  
TSE: blow back built to 4"  
FF: BOB in 5"  
FST: weak surface blow built to 5", died back to 1"  
Rec: 744' GIP & 313' TOTAL FLUID:  
127' GO (40% G, 60% O)  
186' WGOOM (28% G, 30% O, 2% W, 40% M)  
Oil Gravity 38° API  
IFP: 30-89#/30" ISIP: 1303#/60"  
FFP: 109-148#/60" FSIP: 1332#/90"

4700' Ran 28 stand short trip prior to DST #1  
Pipe Strap @ 3973': Strap long 0.65'  
Straight Hole Survey @ 3973': 0.5° Dev.  
Morgan Mud check @ 3973': 59 Vis, 9.2 Wt, 6.0 WL, 1,900 ppm Chl, 6# LCM

4750' DST #3 4036'-4109' LKC 'H'-'J' zns  
IF: blow built to 0.25"  
FF: weak surface blow died in 10 min.  
Rec: 1' Mud (100% M)  
IFP: 18-19#/30" ISIP: 198#/60"  
FFP: 19-21#/30" FSIP: 35#/60"

4800' Morgan Mud check @ 4109': 58 Vis, 9.2 Wt, 6.0 WL, 3,000 ppm Chl, 6# LCM

4850' DST #4 4103'-4160' LKC 'K'-'L' zns  
IF: surface blow FF: no blow  
Rec: 5' Oil Spotted Mud (100% M)  
IFP: 20-22#/30" ISIP: 198#/60"  
FFP: 22-22#/30" FSIP: 139#/60"

4900' Morgan Mud check @ 4239': 69 Vis, 9.3 Wt, 6.4 WL, 3,000 ppm Chl, 6# LCM

4950' Morgan Mud check @ 4044': 58 Vis, 9.0 Wt, 6.0 WL, 3,300 ppm Chl, 6# LCM

5000' Morgan Mud check @ 3932': 64 Vis, 9.0 Wt, 5.6 WL, 1,000 ppm Chl, 8# LCM

5050' Morgan Mud check @ 3435': 85 Vis, 8.6 Wt, 5.2 WL, 700 ppm Chl, 9# LCM

5100' Ran 12 stand short trip @ TD, prior to running electric logs

5150' Morgan Mud check @ 4239': 69 Vis, 9.3 Wt, 6.4 WL, 3,000 ppm Chl, 6# LCM

5200' Morgan Mud check @ 4044': 58 Vis, 9.0 Wt, 6.0 WL, 3,300 ppm Chl, 6# LCM

5250' Morgan Mud check @ 3932': 64 Vis, 9.0 Wt, 5.6 WL, 1,000 ppm Chl, 8# LCM

5300' Morgan Mud check @ 3435': 85 Vis, 8.6 Wt, 5.2 WL, 700 ppm Chl, 9# LCM

5350' Ran 12 stand short trip @ TD, prior to running electric logs

5400' Morgan Mud check @ 4239': 69 Vis, 9.3 Wt, 6.4 WL, 3,000 ppm Chl, 6# LCM

5450' Morgan Mud check @ 4044': 58 Vis, 9.0 Wt, 6.0 WL, 3,300 ppm Chl, 6# LCM

5500' Morgan Mud check @ 3932': 64 Vis, 9.0 Wt, 5.6 WL, 1,000 ppm Chl, 8# LCM

5550' Morgan Mud check @ 3435': 85 Vis, 8.6 Wt, 5.2 WL, 700 ppm Chl, 9# LCM

5600' Ran 12 stand short trip @ TD, prior to running electric logs

5650' Morgan Mud check @ 4239': 69 Vis, 9.3 Wt, 6.4 WL, 3,000 ppm Chl, 6# LCM

5700' Morgan Mud check @ 4044': 58 Vis, 9.0 Wt, 6.0 WL, 3,300 ppm Chl, 6# LCM

5750' Morgan Mud check @ 3932': 64 Vis, 9.0 Wt, 5.6 WL, 1,000 ppm Chl, 8# LCM

5800' Morgan Mud check @ 3435': 85 Vis, 8.6 Wt, 5.2 WL, 700 ppm Chl, 9# LCM

5850' Ran 12 stand short trip @ TD, prior to running electric logs

5900' Morgan Mud check @ 4239': 69 Vis, 9.3 Wt, 6.4 WL, 3,000 ppm Chl, 6# LCM

5950' Morgan Mud check @ 4044': 58 Vis, 9.0 Wt, 6.0 WL, 3,300 ppm Chl, 6# LCM

6000' Morgan Mud check @ 3932': 64 Vis, 9.0 Wt, 5.6 WL, 1,000 ppm Chl, 8# LCM

6050' Morgan Mud check @ 3435': 85 Vis, 8.6 Wt, 5.2 WL, 700 ppm Chl, 9# LCM

6100' Ran 12 stand short trip @ TD, prior to running electric logs

6150' Morgan Mud check @ 4239': 69 Vis, 9.3 Wt, 6.4 WL, 3,000 ppm Chl, 6# LCM

6200' Morgan Mud check @ 4044': 58 Vis, 9.0 Wt, 6.0 WL, 3,300 ppm Chl, 6# LCM

6250' Morgan Mud check @ 3932': 64 Vis, 9.0 Wt, 5.6 WL, 1,000 ppm Chl, 8# LCM

6300' Morgan Mud check @ 3435': 85 Vis, 8.6 Wt, 5.2 WL, 700 ppm Chl, 9# LCM

6350' Ran 12 stand short trip @ TD, prior to running electric logs

6400' Morgan Mud check @ 4239': 69 Vis, 9.3 Wt, 6.4 WL, 3,000 ppm Chl, 6# LCM

6450' Morgan Mud check @ 4044': 58 Vis, 9.0 Wt, 6.0 WL, 3,300 ppm Chl, 6# LCM

6500' Morgan Mud check @ 3932': 64 Vis, 9.0 Wt, 5.6 WL, 1,000 ppm Chl, 8# LCM

6550' Morgan Mud check @ 3435': 85 Vis, 8.6 Wt, 5.2 WL, 700 ppm Chl, 9# LCM

6600' Ran 12 stand short trip @ TD, prior to running electric logs

6650' Morgan Mud check @ 4239': 69 Vis, 9.3 Wt, 6.4 WL, 3,000 ppm Chl, 6# LCM

6700' Morgan Mud check @ 4044': 58 Vis, 9.0 Wt, 6.0 WL, 3,300 ppm Chl, 6# LCM

6750' Morgan Mud check @ 3932': 64 Vis, 9.0 Wt, 5.6 WL, 1,000 ppm Chl, 8# LCM

6800' Morgan Mud check @ 3435': 85 Vis, 8.6 Wt, 5.2 WL, 700 ppm Chl, 9# LCM

6850' Ran 12 stand short trip @ TD, prior to running electric logs

6900' Morgan Mud check @ 4239': 69 Vis, 9.3 Wt, 6.4 WL, 3,000 ppm Chl, 6# LCM

6950' Morgan Mud check @ 4044': 58 Vis, 9.0 Wt, 6.0 WL, 3,300 ppm Chl, 6# LCM

7000' Morgan Mud check @ 3932': 64 Vis, 9.0 Wt, 5.6 WL, 1,000 ppm Chl, 8# LCM