API #15-051-26522

Saman Sharifaie
Petroleum Geologist

GEOLOGIST'S REPORT
DRILLING TIME AND SAMPLE LOG

COMPANY: Murfin Drilling Co., Inc.
LEASE: Rankin #1-33
FIELD: Rankin
LOCATION: 330' FSL & 2050' FEL
SEC 33 TWSP 13S RGE 20W
COUNTY Ellis STATE Kansas
CONTRACTOR Murfin Drilling #16
SPUD 05/05/13 COMP 05/14/13
RTD 4060' LTD 4059'
MUD UP 2928' TYPE MUD Chemical
SAMPLES SAVED FROM 3200' TO RTD
DRILLING TIME KEPT FROM 3200' TO RTD
SAMPLES EXAMINED FROM 3200' TO RTD
GEOLOGICAL SUPERVISION FROM 2900'
REFERENCE WELL Chief Drilling, Rankin #2-33

ELEVATIONS
KB 2303'
DF
GL 2298'
Measurements Are All From Kelly Bushing

CASING
CONDUCTOR
SURFACE 8-5/8" at 217'
PRODUCTION NA

ELECTRICAL SURVEYS
CND; DIL; MEL; Sonic
Pioneer Wireline

Formation	Sample Tops	E-log Tops	Struct Pos.
Anhydrite	1619 (+684)	1608 (+695)	+14
Base Anhydrite	1657 (+646)	1654 (+649)	+12
Topeka	3290 (-987)	3288 (-985)	+11
LeCompton	3416 (-1113)	3417 (-1114)	+9
Heebner	3538 (-1235)	3536 (-1233)	+8
Toronto	3558 (-1255)	3558 (-1255)	+6
Lansing	3577 (-1274)	3574 (-1271)	+9
BKC	3832 (-1529)	3830 (-1527)	+8
Arbuckle	3956 (-1653)	3956 (-1653)	-6

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REMARKS Due to very fair shows of oil in multiple pay zones and negative DST results, it is recommended and agreed upon by all parties that this well shall be plugged and abandoned.

Respectfully Submitted,

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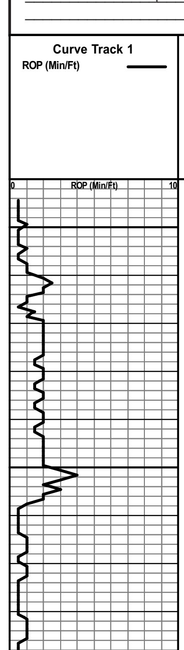
*Tops have been adjusted to electric logs

Curve Track 1
ROP (Min/Ft)

Depth	Lithology	Oil Shows	Geological Descriptions	Engineering Data



Stone Corral 1608 (+695)

Base Stone Corral 1654 (+649)

Curve Track 1
ROP (Min/Ft)
Gamma (API)
Caliper (inches)

Depth	Lithology	Oil Shows	Geological Descriptions	Engineering Data

DAILY PENETRATION
@ 7:00 AM
05/05/13 - Spudded at 2:30 PM
05/06/13 - Drilling at 610'
05/07/13 - Drilling at 2415'
05/08/13 - Drilling at 3177'
05/09/13 - Testing at 3375'
05/10/13 - Drilling at 3615'
05/11/13 - Testing at 3668'
05/12/13 - Testing at 3804'
05/13/13 - Testing at 3930'
05/14/13 - Testing at 3976'

Ls., tan/brn/crm, f xln, mott IP, foss, calc IP, dnse, blky, pr intfoss & xln por, Tr Chk, n/s

Sh., dk gry/gry/gn

Ls., tan/brn/lt gry, sing, f xln, Tr Ool por, brec w foss IP, dnse, blky, Tr pyr, scat Chk, n/s

Ls., a.a, calc

Sh., gry, slty

Sh., gry/dk gry, slty

Topeka 3288 (-985)

Ls., crm/brn, sing, f xln, foss, frac, blky, dnse, pr vis por, calc, n/s

Ls., crm/tan, vf xln, foss, ang, hd, calc, brec IP, pr por, scat Chk, n/s

Ls., crm/brn/lt gry, sing to sli mott, f xln, foss IP, dnse, hd, sbang, rr dd O stn, no odr, NSLO

Sh., gry, slty IP, abund Chk

Ls., tan, sing, f xln, foss IP, pr intxln por, hd to sli fri, chky IP, scat pp FO, lt sat, rr G Bubl, fnt odr, pr SLFO

Ls., crm/tan/lt gry, f to m xln, foss IP, fr to gd intxln & micr Ool por, lt sat, Tr wht Cht, chky, fri, abund slw bld pp FO, rr G Bubl, ti, gd cut, gd odr, fr to gd Shw

DST #1
(Topeka, Deer Creek)
3324'-3375'
30-60-60-90
IF: Strong, BOB in 4.5 mins
FF: BOB in 5.5 mins
Rec: 787' MW (10%M, 90%W), 78' MW w/ scum of oil (30%M, 70%W), 29' SOCGMW (10%G, 5%O, 10%M, 75%W), 1' FO (100%O)
IFP: 52 - 222
FFP: 229 - 467
ISIP: 1019
FSIP: 1014
IHP: 1624
FHP: 1598
BHT: 109

Deer Creek 3352 (-1049)

Ls., tan/brn/gry, mott IP, f xln, foss IP, dnse, calc, fri to hd IP, pr intxln por, rr pp FO, ti, scat brn stn, brec, scat Chk, Tr Cht, sli cut, v fnt odr, v pr Shw

Ls., crm/tan, sing, f to m xln, foss IP, pr intxln & foss por, fri to hd IP, sub-chky to chky, rr pp FO, lt sat, v fnt odr, pr SLFO

Mudco @ 3375'
Wt: 8.9
Vis: 56
Wl: 7.2
Chl: 1,400
LCM: 2#

Deviation Survey @ 3375': 1 deg

Ls., brn, mott IP, f xln, foss IP, pr vis por, blky, dnse, hd, sli calc, sli chky, scat brn dd O strks, Tr crm/gry Cht, no odr, NSLO

Ls., tan, mott IP, m xln, intxln por, fri, foss IP, chty, chky IP, abund brn dd O spks, no odr, NSLO

DST #2
(LeCompton)
3406'-3460'
30-60-30-60
IF: Weak, built to 1"
FF: Weak surface blow
Rec: 10' M w/ oil spots (100%M)
IFP: 32 - 45
FFP: 40 - 48
ISIP: 1116
FSIP: 1064
IHP: 1662
FHP: 1638
BHT: 106

Sh., blk carb/gry/varic, Tr pyr

LeCompton 3417 (-1114)

Ls., crm, sing, vf xln, dnse, hd, ang, NVP, n/s

Ls., crm, sing, f xln, foss IP, dnse, vug & micr Ool surf por, dnse, sbang, calc IP, abund gry Cht, pt LO sat, sli cut, Tr irid, rr G Bubl, ti, NSFO

Ls., a.a, sli chky, rr intxln incl w LO stn, Tr pp FO, Tr gils, pr Shw LFO

Sh., gry/dk gry

Ls., a.a, NSFO, decr LO Shw, v fnt odr

Sh., blk carb/gry/org

Oread 3470 (-1167)

DST #3
(Toronto, LKC A-B)
3551'-3625'
30-60-60-90
IF: BOB in 27 mins
FF: BOB in 6.5 mins
Rec: 356' GIP, 116' HOCGM (40%G, 30%O, 30%M)
IFP: 35 - 52
FFP: 44 - 76
ISIP: 822
FSIP: 699
IHP: 1787
FHP: 1690
BHT: 110

Ls., crm/lt gry/tan, f xln, foss IP, pr intxln por, scat brn dd O spks, Tr Cht, chky IP, no odr, NSLO

Ls., a.a, chky

Ls., tan, sing, f to m xln, fr intxln por, fri IP, pred dnse/hd, shly, rr pt LO stn, Tr pp FO, Tr irid, no odr, v pr Shw

DST #4
(LKC D,E,F)
3620'-3668'
30-60-30-60
IF: Strong, BOB in 3.5 mins, weak surf BB, built to 1.5"
FF: Good blow, BOB in 5.5 mins, good BB, BOB in 44.5 mins
Rec: 588' GIP, 325' MW (5%M, 95%W), 189' SOCWM (10%O, 15%W, 75%M), 63' GSYO (20%G, 80%O)
IFP: 41 - 181
FFP: 190 - 283
ISIP: 600
FSIP: 600
IHP: 1810
FHP: 1704
BHT: 117

Sh., gry/dk gry/org

Sh., gry/org, mica

Sh., gry/varic

Heebner 3536 (-1233)

Sh., blk carb

Sh., varic/blk/org, mica IP

Toronto 3558 (-1255)

Ls., crm/tan, sing, vf to f xln, Tr foss, pr por, hd to chky IP, Tr Cht, dnse, calc IP, sbang, Tr brn dd O stn, rr sub-sat LO spks, Tr irid, no odr, v pr Shw

Lansing 3574 (-1271)

Ls., crm/tan, m xln, Ool, intxln & vug por, dnse, sli fri, chky IP, sli calc, ti, xln incl w lt brn LO stn, sub-sat, rr bld FO, Tr G Bubl, no odr, v pr Shw

Mudco @ 3598'
Wt: 9.2
Vis: 54
Wl: 7.6
Chl: 2,700
LCM: 2#

Ls., a.a, v fnt odr, incr Sh

Sh., gry/blk/rd, mica IP

Ls., crm/tan, m xln, foss, intxln & vug por, dnse, sli fri, sli calc, ti, xln incl w blk LO stn, gils IP, sub-sat, fnt odr, NSFO

Ls., a.a, hd to sub-chky IP, Tr Cht, Tr irid, fnt odr

DST #5
(LKC I,J,K)
3719'-3804'
*Missrun (Seepage, misdiagnosed as a packer failure)

Sh., gry/org/gn

Ls., lt gry/crm/tan, mott IP, f xln, foss, dnse, fri, blky, fr intxln & foss por, rr pt LO stn, sub-sat, scat wht Cht w pt LO stn, chky, glauc IP, calc, abund G Bubl, fnt odr, pr Shw LO, NSFO

Sh., varic

Ls., crm, f to m xln, foss, intfoss & vug por, xln incl w brn LO stn, lt to mod sat, chky, Tr pyr, abund G Bubl, sli irid, sli cut fluor, gd odr, fr Shw LO, NSFO

Ls., crm/brn, f xln, foss, Ool, intfoss & xln por, sli calc, chky, Tr Cht, brn LO stn, lt sat, rr pcs w mod-hvy sat, Tr irid, scat G Bubl, gd odr, gd cut, fr to gd Shw LO, NSFO

Pipe Strap @ 3668': 0.17' Long to Board

Mudco @ 3668'
Wt: 9.2
Vis: 56
Wl: 7.6
Chl: 2,700
LCM: 2#

Ls., wht/crm, sing, vf xln, rr foss, rr vug por, dnse, hd to sub-chky, Tr brn stn, surf strks, rr pcs w slw bld FO, v fnt odr, SSFO

Ls., wht/crm, sing, f xln, foss IP, pr vis por, dnse, blky IP, calc IP, sbang, sub-chky, n/s

DST #6
(LKC J,K)
3746'-3804'
30-60-60-90
IF: Weak, built to 4.75"
FF: Weak, built to 2.5"
Rec: 31' GIP, 62' SOCM (5%O, 95%M), 4' HOCM (25%O, 75%M), 1' FO (100%O)
IFP: 54 - 59
FFP: 61 - 83
ISIP: 423
FSIP: 260
IHP: 1920
FHP: 1817
BHT: 116

Sh., gry/blk carb/varic

Ls., crm, sing, f xln, foss IP, Tr Ooc por, dnse, hd, rr pcs w slw bld G Bubl, splin blk stn, ti, Tr infoss brn stn, gils IP, Tr pp FO, no odr, SSFO

Ls., a.a, Tr brn Cht, glauc IP, rr intxln surf stn, Tr irid, v pr Shw LO, NSFO

Sh., gry/rd

Ls., crm, sing, f to m xln, foss IP, calc IP, scat brn Cht, Tr intfoss por, rr xln vugs w LO stn, dnse, sli fri to chky, v fnt odr, NSFO

Ls., a.a, rr pt LO sat, glauc IP

Sh., rd/gry

Ls., crm/brn, f xln, pr vis por, calc IP, Tr pyr, fri IP, Tr glauc, rr pcs w pt LO sat, brn intxln stn, gils, Tr irid, v fnt odr, pr Shw LO, NSFO

Sh., gry/blk carb

Ls., crm, sing, f xln, foss, Ool por, abund intfoss stn, lt sat, scat G Bubl, Tr irid, rr bld FO, chky, fnt odr, fr Shw LO, SSFO

Ls., a.a, rr pp FO

Ls., crm, sing, f xln, foss, Ool por, abund intfoss stn, Tr intxln surf stn, lt sat, rr G Bubl, Tr irid, rr bld pp FO, fri to chky, fnt odr, fr Shw LO, SSFO

Sh., gry/blk/varic

Mudco @ 3804'
Wt: 9.3
Vis: 52
Wl: 7.6
Chl: 2,900
LCM: 2#

Ls., crm/tan, sing, f xln, foss IP, pr Ool por, rr intfoss brn sptd stn, dnse, pred blky, hd, v chky, no odr, NSFO

Sh., gry/varic

Ls., a.a, n/s

BKC 3830 (-1527)

DST #7
(Cong Sd)
3900'-3930'
30-60-60-90
IF: Fair, built to 4.75"
FF: Fair, built to 4"
Rec: 62' HOCM (40%O, 60%M), 21' MCO (35%M, 65%O), 10' FO (100%O)
IFP: 32 - 29
FFP: 41 - 50
ISIP: 738
FSIP: 532
IHP: 1990
FHP: 1887
BHT: 116

Sh., gry/rd/varic, slty

Ls., tan, sing, f xln, dnse, hd, blky, chky, ang, n/s

Sh., gry/varic

Ls., crm/tan, sing, f xln, foss IP, pr intxln por, dnse, calc IP, hd to sub-chky, abund Chk, blky, n/s

Sh., gry/rd/gn

Ls., a.a, decr Chk

DST #8
(Cong Sd)
3930'-3946'
30-60-30-60
IF: Weak, built to 0.25"
FF: No blow
Rec: 35' M w/ scum of oil (100%M)
IFP: 18 - 27
FFP: 31 - 34
ISIP: 583
FSIP: 466
IHP: 2032
FHP: 1872
BHT: 114

Ls., tan/crm, sing, vf to f xln, sli foss, pr vis por, dnse, blky IP, chky, scat Cht w rr brn stn, v fnt odr, NSFO

Sh., blk carb/gry

Sst., clr, f to m gr, pr srtd, fri, cmtd w Chk, gd intgran por, cong IP, Tr Cht, chky, abund brn sptd stn, scat G Bubl, lt to hvy LO sat, gd bld pp FO, irid OCW, gd cut, fluor, gd odr, gd Shw LFO

Mudco @ 3930'
Wt: 9.3
Vis: 58
Wl: 7.2
Chl: 3,200
LCM: 2#

Cht., clr/tan/org, sli wthd, foss, fr micr Ool por, lt brn stn, lt pt sat, fnt odr, NSFO

Sst., clr/crm/wht, m to lg gr, mod srtd, intgran por, sli dnse, v hd, sucr, dol IP, hvy O sat, Tr slw bld FO, irid OCW, gd cut, Tr yel fluor, fr to gd odr, pred Sh, FSFO

Sh., gry/rd

Arbuckle 3956 (-1653)

Mudco @ 3976'
Wt: 9.3
Vis: 52
Wl: 7.8
Chl: 3,100
LCM: 2#

Sst., clr, f to m gr, mod srtd, fri, sub-rndd, cmtd w Chk IP, cong IP, gd intgran por, hd, abund brn sptd stn, scat G Bubl, ti, lt LO sat, rr bld FO, Tr irid, fr cut, fr to gd odr, fr Shw LO, SSFO

Dol., crm/tan, m xln, fr intxln por, calc IP, spkld brn stn, Tr pp FO bld, pt sat, abund Sst a.a, gd odr, fr Shw LO, NSFO

DST #9
(Arbuckle)
3944'-3976'
30-60-30-60
IF: BOB in 2 mins
FF: BOB in 1.5 mins
Rec: 2394' W (100%W), 189' WM (20%W, 80%M)
IFP: 503 - 1052
FFP: 1067 - 1180
ISIP: 1190
FSIP: 1192
IHP: 1982
FHP: 1809
BHT: 124

Dol., tan, m xln, fr por, Tr spkld stn, pt intxln sat, calc IP, scat clr Sd, NSFO

Sst., clr, f to m gr, mod srtd, smtd w Chk IP, sub rndd, scat Dol a.a, Tr brn spkld stn, Tr fluor, scat qtz, fnt odr, NSFO

Sh., varic

Dol., a.a

Sst., a.a, decr stn

Sh., rd/gry/gn

RTD 4060 (-1757)

Deviation Survey @ 4060': 1 deg