

Alex Young Petroleum Geologist

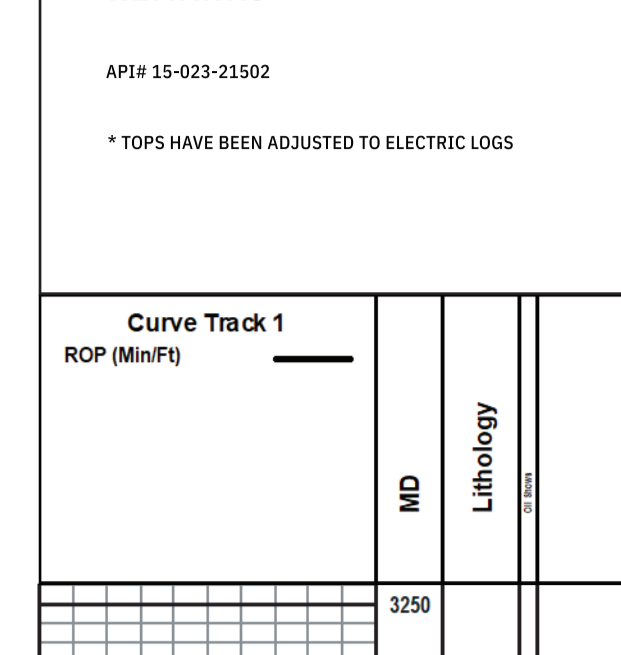
GEOLOGIST'S REPORT DRILLING TIME & SAMPLE LOG

COMPANY: **Murfin Drilling Co., Inc.**
 FIELD: **Wildcat**
 LEASE: **CWA F.#1-12**
 LOCATION: **1850' FSL & 330' FWL**
 SEC: **12** TMSP: **25** RGE: **37W**
 COUNTY: **Cherokee** STATE: **Kansas**

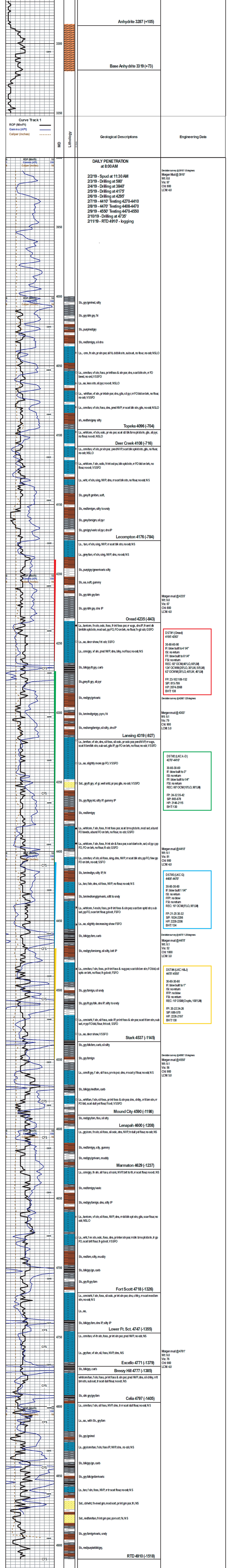
CONTRACTOR: **Murfin Drilling #3**
 SPUD: **02/02/19** COME: **02/11/19**
 RTD: **4910'** LTO: **4910'**
 MUD UP: **4010'** TYPE MUD: **Chemical**
 SAMPLES SAVED FROM: **4010'** TO: **RTD**
 DRILLING TIME KEPT FROM: **3200'** TO: **RTD**
 SAMPLES EXAMINED FROM: **4010'** TO: **RTD**
 GEOLOGICAL SUPERVISION FROM: **3910'**
 REFERENCE WELL: **MDCI - Means "B" #1-11**
 MEASUREMENTS FROM: **Kelly Bushing**
 CASTING RECORD
 CONDUCTOR: **n/a**
 SURFACE: **8-5/8" at 300'**
 PRODUCTION: **5-1/2" at 4905'**

ELEVATIONS
 ME: **3392'**
 DE: **n/a**
 EL: **3387'**

FORMATION NAME	SAMPLE	REF	TOP	DOWN	LOG	REF
Anyh/dite	3290	+2	3287	+305	+5	
Bimh/dite	3325	+67	3319	+73	+3	
Topeka	4104	-712	-6	4096	-704	-2
Oread	4246	-854	-6	4235	-843	+5
Lansing	4332	-940	-9	4319	-927	+4
Shirk	4552	-1160	-14	4537	-1145	+1
Mound City	4668	-1214	-14	4590	-1198	+2
Ft Scott	4738	-1346	-18	4718	-1326	+1
Excello	4798	-1406	-28	4771	-1379	-1
Celia	4820	-1428	-22	4797	-1405	+1
RTD	4910	-1518				



REMARKS
 API# 15-023-21502
 * TOPS HAVE BEEN ADJUSTED TO ELECTRIC LOGS



Geological Descriptions

Anhydrite 3287 (+105)

Base Anhydrite 3319 (+73)

Engineering Data

Deviation survey @3910: 15 degrees
 Morgan Mud @ 3910'
 Wt: 8.6
 Vis: 97
 Ch#: 800
 LCM 40

DAILY PENETRATION at 8:00 AM

2/2/19 - Spud at 11:30 AM
 2/3/19 - Drilling at 580'
 2/4/19 - Drilling at 3840'
 2/5/19 - Drilling at 4175'
 2/6/19 - Drilling at 4295'
 2/7/19 - 4410' Testing 4270-4410
 2/8/19 - 4470' Testing 4408-4470
 2/9/19 - 4550' Testing 4470-4550
 2/10/19 - Drilling at 4735'
 2/11/19 - RTD 4910' - logging

Geological Descriptions

Sh, gry/lm/red, silty

Sh, gry/dk gry, fi

Sh, purple/dgry

Sh, red/lm/gry, sil ds

LS., crm, fn xln, pr xln por, sil fi, ddbk/s tn, subs at, no flour, no odt, NSLO

Engineering Data

Topeka 4096 (-704)

LS., wh/crm, f xln, odc, pr odc, pr scat dt bk/lms p kld/s tn, gls, sil pyr, no flour, no odt, VSSFO

Deer Creek 4108 (-716)

LS., crm/tan, f xln, pr int xln por, pred NVP, scat blk spkld/s tn, gls, no flour, no odt, NSLO

Geological Descriptions

LS., aa, less stn, sil pyr, no odt; NSLO

LS., wh/crm, f xln, odc, fr int odt, blk spkld/s tn, no flour, no odt, VSSFO

LS., crm/tan, f xln, foss, pred NVP, ir scat blk str, gls, no odt; NSLO

sh, red/bm/grey silty

Engineering Data

Morgan mud @4235'
 Wt: 9.0
 Vis: 97
 Ch#: 800
 LCM 40

DST#1 (Oread) 4190'-4263'

30-60-60-90
 IF: blow built to 14 1/4"
 IS: no return
 FF: blow built to 8 1/4"
 FS: no return
 REC: 82' OCW(40%Q, 60%M)
 124' OCW(20%Q, 30%W, 50%M)
 62' OCW(20%Q, 40%W, 40%M)

FP: 23-102-109-152
 SIP: 815-799
 HP: 2074-2068
 BHT 138

Geological Descriptions

LS., tan, f xln, sing, NVP, ir scat blk str, no odt; NS

LS., grey/tan, f xln, sing, NVP, dns, no odt; NS

Sh, purple/gry/green/varic silty

Sh, aa, soft, gummy

Sh, gry/dk gry/lm

Sh, gry/dk gry, dns IP

Engineering Data

Morgan mud @4303'
 Wt: 9.1
 Vis: 79
 Ch#: 900
 LCM 3.0

DST#2 (LKCA-D) 4270'-4410'

30-60-30-60
 IF: blow built to 3"
 IS: no return
 FF: blow built to 14"
 FS: no return
 REC: 60' OCW(10%Q, 90%M)

FP: 24-3235-42
 SIP: 865-678
 HP: 2146-2115
 BHT 130

Geological Descriptions

LS., tan/crm, fn xln, odc, foss, fr int foss por, r vugs, dns IP, fr int dk blk/bk spkld/s tn, mod sat, pp FO, FO on blk, no flour, fr-gt odt; GSFO

LS., aa, decr show, fr odt; SSFO

LS., crm/gry, f xln, pred NVP, dns, blk, no flour, no odt; NS

Sh, blk/gry/lt gry, carb

Sh, grey/lt gry, sil pyr

Sh, red/gry/gr/varic

Sh, bm/ved/gry, pyr, fi

Sh, red/lm/gm/gry, sil silty, dns IP

Engineering Data

Morgan mud @4303'
 Wt: 9.1
 Vis: 79
 Ch#: 900
 LCM 3.0

DST#3 (LKC G) 4408'-4470'

30-60-30-60
 IF: blow built 1 1/4"
 IS: no return
 FF: no blow
 FS: no return
 REC: 10' OCW(5%Q, 95%M)

FP: 21-25 30-32
 SIP: 1024-2206
 HP: 2228-2206
 BHT 134

Geological Descriptions

LS., wh/crm, f xln, foss, fr int foss por, scat blk spkld/s tn, mod sat a hard FO beads, abund FO on blk, no flour, no odt; GSFO

LS., aa, slightly more pp FO, VSSFO

Sst., gry/lt gry, f g, well srt, pr por gls, no odt, VSSFO

Sh, gry/lt gry/lt, silty IP, gummy IP

Sh, red/lm/gry

LS., wh/crm, f xln, foss, fr int foss por, scat blk spkld/s tn, mod sat a hard FO beads, abund FO on blk, no flour, no odt; GSFO

LS., wh/crm, f xln, foss, fr int xln & foss por, scat blk/s tn, sat, sil pyr, pp FO, FO on blk, no flour, fr odt; GSFO

LS., crm/tan, f xln, sil foss, sing, dns, NVP, ir scat blk str, pp FO, few pp FO on blk, no odt; SSFO

Sh, bm/ved/gry, silty IP, fri

LS., tan, f xln, dns, sil foss, NVP, no flour, no odt; NS

Sh, bm/ved/gry/varic, silty to sndy

LS., wh/crm, f xln, foss, pr fr int foss & xln por, scat blk spkld/s tn, sub sat, pp FO, scat blk flour, g-dot, SSFO

LS., aa, slightly decreasing show FSFO

Sh, blk/gry/lm, carb

Sh, red/gry/lm/lmg, sil silty, bit IP

LS., crm/tan, f xln, foss, pr fr int foss & vug por, scat blk/bm str, FO blk oil spks on blk, no flour, fr-gdot, SSFO

Sh, gry/lm/gry, sil sndy

Sh, gry/lt gry/lt, dns IP, silty to sndy

LS., crm/whit, f xln, sil foss, odt; IP, print foss & xln por, scat blk/bm str, sub sat, r pp FO blk, flour, fr odt; SSFO

LS., aa, decr show; VSSFO

Engineering Data

Morgan mud @4410'
 Wt: 9.1
 Vis: 81
 Ch#: 900
 LCM 40

DST#4 (LKC H&J) 4470'-4550'

30-60-30-60
 IF: blow built to 1"
 IS: no return
 FF: no blow
 FS: no return
 REC: 10' OSW(5%Q, 100%M)

FP: 20-22 24-26
 SIP: 888-570
 HP: 2228-2197
 BHT 130

Geological Descriptions

LS., aa, decr show; VSSFO

Sh, gry/lt/bm, carb, sil silty

Sh, gry/lm/gm

LS., crm/lt gry, f xln, sil foss, pr vug por, dns, ir scat y/l flour, no odt; NS

Sh, blk/gry/red/bm, carb

LS., wh/crm, f xln, sil foss, pr int foss & xln por, dns, chily, r fr tm str, r FO blk, scat dull yel flour, fr odt; VSSFO

Engineering Data

Morgan mud @4550'
 Wt: 9.0
 Vis: 91
 Ch#: 900
 LCM 5.0

Mound City 4590 (-1198)

Sh, red/gry/lm, fss, sil silty

Lenapah 4600 (-1208)

LS., gry/lcm, fn xln, sil foss, sil odc, dns, NVP, tr dull yel flour, no odt; NS

Sh, red/lm/gry, silty, gummy

Sh, red/gry/gr/varic, muddy

Marmaton 4629 (-1237)

LS., crm/gry, fn xln, sil foss, sil odc, NVP, bit to fri, ir scat flour, no odt; NS

Sh, red/lm/gry/varic

Sh, red/gry/lm/gry, dns, silty IP

LS., tan/crm, f xln, sil foss, NVP, dns, rrd blk spkld/s tn, gls, scar flour, no odt; NSLO

LS., wh/crm, f xln, odc, foss, dns, pr int xln por, rrdk lms p kld/s tn, r pp FO, scat blk flour, fr-gdot; VSSFO

Sh, red/lm, silty, muddy

Sh, blk/gry/gr, carb

Sh, gry/lt gry/lm

Engineering Data

Morgan mud @4600: 15 degrees
 Morgan mud @4550'
 Wt: 9.0
 Vis: 91
 Ch#: 900
 LCM 5.0

Fort Scott 4718 (-1326)

LS., crm/whit, f xln, foss, sil odc, pr int xln por, dns, chily, r scat med bm str, no odt; NS

LS., aa,

Sh, blk/gry/lm, dns IP, silty IP

Lower Ft. Sct. 4747 (-1355)

LS., crm/tan, f xln, foss, pr int xln por, pred NVP, no odt; NS

LS., gry/tan, f xln, sil, foss, NVP, dns, NS

Excello 4771 (-1379)

Sh, blk/gry, carb

Breezy Hill 4777 (-1385)

wh/crm/tan, f xln, foss, print foss & xln por, pred NVP, dns, sil chily, r fr tm str, subsat, r scat dull flour, no odt; NS

Sh, dk gry/gry/lm

Engineering Data

Morgan mud @4761'
 Wt: 9.0
 Vis: 76
 Ch#: 900
 LCM 40

Celia 4797 (-1405)

LS., crm/tan, f xln, sil foss, NVP, dns, r r scat dull flour, no odt; NS

LS., aa, with Sh., gry/lm

Sh, gry/lt/red

LS., gry/lcm/tan, f xln, foss IP, NVP, dns, no odt; NS

Sh, blk/gry/gr, carb

Sh, gry/blk/gry/lm/varic

LS., tan, f xln, foss, NVP, r r scat flour, no odt; NS

Sst., cr/whit, fr-med gr, mod sort, print gm por, fri, NS

Sst., red/bm/tan, fr int gm por, por or fi, NS

Sh, gry/lm/gry/varic, sndy

Sh, red/purple/blk/gry,

RTD 4910 (-1518)