

Robert D. Hendrix

Petroleum Geologist

GEOLOGIST'S REPORT

DRILLING TIME AND SAMPLE LOG

COMPANY **Murfin Drilling Co., Inc.**

LEASE **Wilkinson Trust #1-16**

FIELD **Widewater**

LOCATION **1320Tnl & 890Tfwl**

SFC **16-TWSP 2-ROE 36**

COUNTRY **Rawlins Drilling Co., Inc. Rig #2**

CONTRACTOR **Murfin Drilling Co., Inc. Rig #2**

SPUD **1/21/2014** COMP **2/12/2014**

R/D **50757'** LIT.D. **5078'**

MUD UP **3487'** TYPE MUD **(Chemical)**

SAMPLES SAVED FROM **3640' TO 1D**

DRILLING TIME KEPT FROM **3640' TO 1D**

SAMPLES EXAMINED FROM **3640' TO 1D**

GEOLOGICAL SUPERVISION FROM **3402'**

GEOLOGIST ON WELL **Robert D. Hendrix**

FORMATION TOPS **ELECTRIC LOG**

ANhydrite **3542' (+106)** **3298' (+109)**

Neva **3734' (-386)** **3732' (-384)**

Topoka **4071' (-728)** **4077' (-728)**

Heebner **4242' (-494)** **4240' (-492)**

Lansing **4289' (-445)** **4294' (-446)**

BKC **4516' (-188)** **4515' (-187)**

Stark Shale **4565' (+217)** **4563' (+215)**

Cherokee Shale **4721' (+423)** **4725' (+419)**

Mississippian **4897' (+648)** **4875' (+627)**

MEASUREMENTS ARE ALL From **Kelley Bushing**

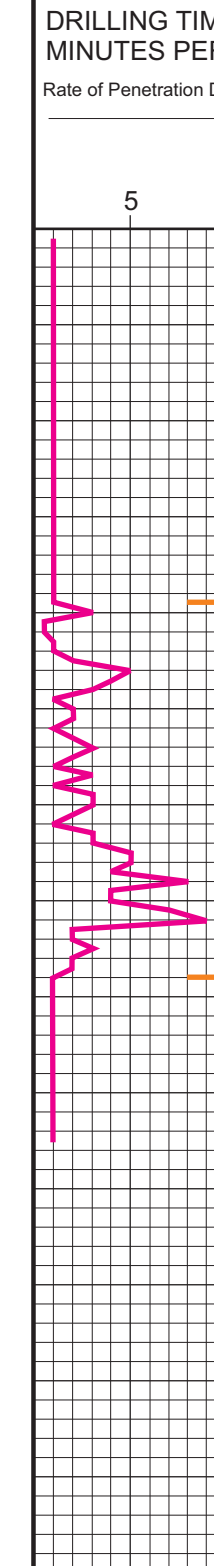
CASINGS

CONDUCTION SURFACE **8.53" @ 350'**

PRODUCTION **5.12" @ 3070'**

ELEVATIONS **K8 3348'**

DF **GL 3343'**



REMARKS:

LEGEND



DEPTH	LITHOLOGY	SAMPLE DESCRIPTION	REMARKS
3200	Anhydrite		Anhydrite 3239 (+109)
50	Sandstone		Base Anhydrite 3278 (+70)
3600			Geologist on location 3402' at 4:18 am 1/24/2014
50		Shale/sandstone: red, some gray, silty, v-sandy, vfn-fn gr, pry sorted, subang, friable, calcareously cemented, no vis por	wt 8.6, vis. 80, lcm 2# Morgan Mud, Cade Lines
50		Sandstone: white to lt gray, vfn-fn gr, pry sorted, subang, semi-friable, calcareously cemented, no vis por	
50		Shale: red, gray, brown, silty, v-sandy, limey in part	
3700			Neva 3732 (-384)
50		Limestone: white, mxn, sl chalky, oolitic in part, fossiliferous, sl interxn por, ns	
50		Shale: red, gray, green, waxy, silty	
50		Shale: red, brown, silty, sandy	
50		Sandstone: gray to white, biotitic, lngm, submd, mod sorted, calcareous, no vis por	
50		Shale: red, brown, silty, sandy	
50		Limestone: gray to tan, fxn, cherty, fossiliferous, no vis por, ns	
50		Shale: red, brown, gray, silty	
50		Shale: red, brown, gray, silty	
50		Limestone/dolomitic: tan to white, f-mxn, sl cherty, granular in part, fossiliferous, no vis por, black dead oil stain, nfo, no odor	
50		Limestone/dolomitic: tan, fxn, granular, sl fossiliferous, no vis por, ns	
50		Shale: gray, green, silty	
50		Limestone: tan, fxn, sl chalky, granular, fossiliferous, no vis por	
50		Shale: gray, green, silty	
50		Shale: gray, red, black	
50		Limestone: tan to white, fxn, sl cherty, granular, no vis por	
50		Shale: gray, brown, red, silty	
50		Shale: red, gray, silty	
50		Limestone: tan to white, fxn, granular, sl cherty, fossiliferous, no vis por	
50		Shale: red, gray, silty	
50		Limestone: gray to brown, fxn, sl fossiliferous, no vis por	
50		Shale: red, gray, silty	
50		Limestone: white, m-fxn, v-fossiliferous, fr interxn por, gd black asphaltic stain, frso (v-heavy), no odor	Stotler 4002 (-654)
50		Limestone: white, m-fxn, v-fossiliferous, fr interxn por, gd black asphaltic stain, slso (v-heavy), no odor	DST #1 4003-4070 30-60-60-90 1st open: 1/4" blow built to 1" 2nd open: surface return started at 10min no build Rec: 10' mud hydro: 1900-1890 psi lf: 15-17 psi ff: 19-22 psi sip: 971-855 psi bht: 127° F
50		Shale: gray, red, silty	
50		Limestone: white, m-fxn, sl chalky, oolitic, v-fossiliferous, fr interxn por, gd lt to black sat stain, (heavy), no odor	8:00am, 1/25/2014 wt 9.2, vis. 88, lcm 1# Morgan Mud, Cade Lines Pipe Strap on first test is 0.77" long to board
50		Limestone: white, m-fxn, sl chalky, pyritic, oolitic in part, v-fossiliferous, pr interxn por, gd lt to dark sat stain, frso (heavy), no odor	Topoka 4077 (-729)
50		Limestone: white, f-mxn, sl chalky, pyritic, oolitic, fossiliferous, no vis por, spotty black asphaltic stain, nfo, no odor	DST #2 4158-4215 30-60-60-90 1st open: bob 8 min 2nd open: bob 12 min no returns Rec: 30' osmw 40/60 320' ww 50/50 186' ocmw 5/20/75 501' mw 5/95 5' mud hydro: 2007-1990 psi lf: 33-28 psi ff: 229-462 psi sip: 1222-1219 psi bht: 146° F chl: 44000 ppm
50		Shale: gray, red, purple, silty	
50		Shale: gray, silty	
50		Limestone: white, f-mxn, fossiliferous, no vis por, ns	Oread 4198 (-850)
50		Limestone: white, f-mxn, fossiliferous, fr interxn por, pr pp por, gd dark sat stain, gufso, faint odor	
50		Limestone: white, f-mxn, chalky, sl pyritic, fossiliferous, fr interxn por, pr dark spotty stain, nfo	wt 9.1, vis. 55, lcm 2# Morgan Mud, Cade Lines
50		Shale: red, gray, brown, black	
50		Limestone: white to lt gray, fxn, chalky, dense, sl pyritic, sl fossiliferous, no vis por, ns	Heebner 4240 (-892)
50		Shale: black, gray, brown, silty	
50		Limestone: lt gray, f-mxn, chalky, granular, sandy, no vis por, ns	DST #3 4234-4315 30-60-30-60 1st open: tool slid 5' 2nd open: built to 1/4" then died back to surface 2nd open: no blow no returns Rec: 10' osm hydro: 2092-2046 psi lf: 19-22 psi ff: 23-24 psi sip: 511-312 psi bht: 132° F
50		Shale: red, gray, brown, black	
50		Limestone: tan to white, f-mxn, oolitic, fossiliferous, fr calcareous por, gd dark sat stain, faint odor	Lansing 4294 (-946)
50		Limestone: tan, fxn, dense, fossiliferous, no vis por	repair to rotary chain 8:00am, 1/27/2014 wt 9.3, vis. 52, lcm 2# Morgan Mud, Cade Lines
50		Shale: good odor	
50		Limestone: tan, fxn, dense, sl fossiliferous, no vis por	
50		Shale: gray, red	
50		Sandstone: lt gray, lngm, mod sorted, submd, sl biotitic, calcareous, no vis por, dead oil stain	DST #4 4318-4375 30-60-60-90 1st open: bob 11 min 2nd open: bob 22 min 2nd close: no return Rec: 40' free oil 125' ocw 40/60 64' ocwm 10/30/60 125' ocwm 10/40/90 186' ocwm 5/20/75 hydro: 2118-2089 psi lf: 20-137 psi ff: 146-254 psi sip: 1234-1226 psi bht: 145° F gravelly: 26° api chl: 39000 ppm nw: 0.2 @ 68° F
50		Limestone: tan, fxn, dense, fossiliferous, no vis por	
50		Limestone: white, f-mxn, sl chalky, fossiliferous, no vis por, 2 pieces lt spotty stain, frso	
50		Limestone: white, f-mxn, sl chalky, fossiliferous, no vis por, 10% sample lt spotty to sat stain, slso, no odor	
50		Limestone: white, f-mxn, sl chalky, fossiliferous, pyritic, mostly dense, no vis por several pieces black spotty to sat stain, slso (heavy), faint odor	
50		Shale: gray, red, black	
50		Limestone: tan, fxn, dense, granular, no vis por, ns	
50		Shale: gray, red, silty	
50		Limestone: white to tan, f-mxn, sl chalky, oolitic, fossiliferous, pr calcareous por	
50		Limestone: white to tan, f-mxn, sl chalky, oolitic in part, sl fossiliferous, no vis por, 2% sample black spotty stain, nfo, no odor	
50		Shale: gray red, brown, silty, blocky	
50		Limestone: white to lt gray, fxn, sl chalky, fossiliferous, no vis por, 2 pieces lt spotty stain, v-sfso on break, no odor	
50		Limestone: white to lt gray, fxn, sl chalky, fossiliferous, no vis por, 10% sample lt spotty to sat stain, slso, no odor	
50		Shale: gray, red, silty	
50		Limestone: tan to white, f-mxn, pyritic, sl fossiliferous, sl interxn por, 10% sample lt sat stain, slso, no odor	
50		Shale: gray, red, silty	
50		Limestone: white, f-mxn, sl chalky, pyritic, oolitic in part, fossiliferous, sl cherty, pr interxn por, lt sat stain, frso, no odor	
50		Shale: gray, red, dark, red	
50		Shale: gray light to dark, red	
50		Limestone: white to lt gray, fxn, sl chalky, fossiliferous, no vis por, 3 pieces lt sat stain, v-sfso on break, no odor	Stark 4515 (-1167)
50		Limestone: white to lt gray, fxn, sl chalky, fossiliferous, no vis por, 2 pieces with dead spotty oil stain, nfo, no odor	wt 9.1, vis. 53, lcm 2# Morgan Mud, Cade Lines
50		Limestone: white, f-mxn, sl chalky, fossiliferous, no vis por	
50		Shale: gray, blocky, silty	
50		Limestone: white to gray, fxn, v-chalky, dense, sl fossiliferous, no vis por	BKC 4563 (-1215)
50		Shale: gray, green, red, brown, sl sandy	
50		Limestone: tan, fxn, chalky, dense, sl fossiliferous, no vis por	
50		Shale: gray, red, silty	
50		Limestone: tan, fxn, chalky, dense, sl fossiliferous, no vis por	
50		Shale: gray, green, red, brown, silty	
50		Limestone: gray to white, fxn, dense, no vis por	
50		Shale: gray, red, silty	
50		Shale: gray dark to light, red	
50		Limestone: white, f-mxn, chalky, oolitic, sl cherty, slso in break, no odor	Pawnee 4694 (-1346)
50		Limestone: white, f-mxn, chalky, granular, fr interxn por, ns	
50		Shale: dark gray, gray, red, silty	
50		Limestone: gray to brown, v-fxn, dense, no vis por, ns	
50		Shale: black carbonaceous, gray, red, silty	
50		Limestone: tan to brown, fxn, dense, pyritic, no vis por	
50		Limestone: white to tan, fxn, sl chalky, oolitic in part fossiliferous, no vis por	
50		Shale: black carbonaceous, gray, red, silty	
50		Limestone: tan, fxn, sl chalky, dense, hard, no vis por	
50		Limestone: tan, fxn, sl chalky, dense, granular in part, sl fossiliferous, no vis por	
50		Limestone: tan to brown, fxn, dense, hard, no vis por	
50		Shale: gray, green, red, silty	
50		Limestone: gray to tan, fxn, sl chalky, dense, fossiliferous, no vis por	
50		Shale: gray, red, silty	
50		Shale: gray, green, red, silty, sandy	
50		Shale: gray, green, red, silty, sandy	
50		Sandstone: white, fr-mdgm, sub md, mod sorted, calcareous, friable, no vis por, ns	
50		Shale: gray, purple, red, silty	
50		Limestone: tan to white, fxn, chalky, sl fossiliferous, no vis por	
50		Shale: gray, green, red, silty	
50		Sandstone: lt green, lt, fr-coarse gm, sub md, mod sorted, argillaceous, friable, no vis por, several pieces dark sat stain, nfo, no odor	
50		Shale: gray, green, red, yellow	
50		Limestone: tan, fxn, chalky, dense, no vis por	
50		Shale: red, brown, silty, sandy	
50		Shale: red, green, gray, silty, sandy	
50		Limestone: tan, fxn, chalky, dense, fossiliferous, no vis por	
50		Shale: red, green, gray, black, brown, purple	
50		Sandstone: clear, lt, v-coarse individual grains sub md to sub ang, poorly sorted, ns	
50		Shale: red, green, gray, black, brown, purple	
50		Sandstone: clear, lt, fr-md gm, sub md, fr intergranular por, ns	Mississippian 4975 (-1627)
50		Sandstone: clear to brown, fr, gm, sub md, mod sorted, argillaceous in part, glauconitic, pyritic, friable, fr intergranular por, ns	
50		Shale: gray, red, black, brown, purple, yellow	
5000		chert: white to gray, mostly opaque, weathered in part, no vis por, ns	
50		Dolomite: tan to white, fxn, sl cherty, granular, pr interxn por, ns	
50		Dolomite: tan, fxn, chalky, granular, fr interxn por, ns	
50		Shale: gray, black, brown	
50		Dolomite: tan, fxn, chalky, sl cherty, granular, pyritic, fr interxn por, ns	
50		Dolomite: tan, fxn, v-cherty, granular, pr vlg por, ns	
50		Limestone: brown, crypto-fxn, dense, no vis por	
50		Limestone: brown to tan, f-mxn, oolitic, fossiliferous, no vis por, ns	
50		Limestone: brown to tan, v-fxn, dense, no vis por	RTD 5075 (-1727)
50		Shale: red, green, gray, black, brown, purple	8:00am, 2/1/2014 Geologist off location at 11:30am, 2/1/2014