Robert D. Hendrix
Petroleum Geologist

GEOLOGIST'S REPORT
DRILLING TIME AND SAMPLE LOG

COMPANY: Murfin Drilling Co. Inc.
LEASE: Kruto #3-29
FIELD: Anderson NE
LOCATION: 2450' fnl & 2055' fwl
SEC: 29 TWSP: 10s RGE: 34w
COUNTY: Thomas STATE: Kansas
CONTRACTOR: Murfin Drilling Co. Rig #22
SPUD: 11/8/2014 COMP: 11/16/2014
RTD: 4864' LTD: 4870'
MUD UP: 3197' TYPE MUD: chemical

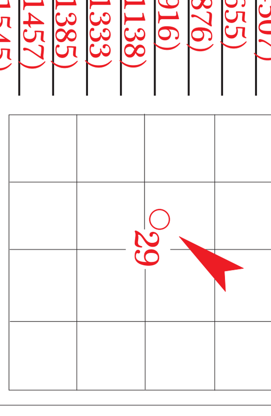
ELEVATIONS
KB: 3219'
DF:
GL: 3208'
Measurements Are All From: Kelly Bushing

CASING
CONDUCTOR:
SURFACE: 8-5/8" at 270'
PRODUCTION: 5 1/2" @ 4864'

SAMPLES SAVED FROM 3780' TO TD
DRILLING TIME KEPT FROM 3780' TO TD
SAMPLES EXAMINED FROM 3780' TO TD
GEOLOGICAL SUPERVISION FROM 3785'
GEOLOGIST ON WELL: Robert D. Hendrix

ELECTRICAL SURVEYS: Porosity, Micro, Induction, Sonic

FORMATION TOPS	ELECTRIC LOG	SAMPLE
Anhydrite	2712 (+507)	2712 (+507)
Topeka	3881 (-662)	3874 (-655)
Heebner Shale	4098 (-876)	4095 (-876)
Lansing	4137 (-918)	4135 (-916)
Stark Shale	4360 (-1141)	4357 (-1138)
Pawnee	4554 (-1335)	4552 (-1333)
Ft Scott	4608 (-1389)	4604 (-1385)
Johnson Zone	4684 (-1465)	4676 (-1457)
Mississippi	4768 (-1549)	4764 (-1545)



API# 15-193-20940

REMARKS:

LEGEND: Anhydrite, Sandstone, Limestone, Shale, Carb Sh, Cherty LS, Chert, Dolomite

DRILLING TIME IN MINUTES PER FOOT (Rate of Penetration Decreases →; 5, 10, 15) | DEPTH | LITHOLOGY | Drill Stem Tests | Oil Shows (Ex-Pr) | SAMPLE DESCRIPTION | REMARKS

3800

Shale: red, gray
Limestone: tan, fxln, sl chalky, granular, fossiliferous, no vis por
Limestone: tan, f-mxln, sl chalky, oolitic, fossiliferous, pr oolimoldic por
Shale: red, gray
Limestone: tan to white, fxln, sl chalky, granular, sl fossiliferous, no vis por
Shale: gray, sl red
Limestone: brown, fxln, sl chalky, granular, fossiliferous, no vis por
Shale: gray, red
Limestone: tan to white, fxln, chalky, sl oolitic, fossiliferous, no vis por
Shale: red, gray

Remarks: Geologist on location at 8:30 pm 11/10/2014

Topeka 3874 (-655)

Limestone: tan to white, fxln, sl chalky, sl fossiliferous, no vis por
Limestone: tan to white, fxln, chalky, sl fossiliferous, no vis por

3900

Shale: gray, red, black
Limestone: tan, fxln, granular, no vis por
Limestone: lt gray to tan, fxln, sl chalky, granular, sl fossiliferous, no vis por
Shale: gray, red, black
Limestone: tan, fxln, v-chalky, granular, no vis por
Shale: gray, red, black
Limestone: tan, fxln, chalky, fossiliferous, no vis por
Limestone: tan to white, f-mxln, chalky, oolitic in part, fossiliferous, pr interxln por, ns
Shale: black, red, gray, green
Limestone: tan to brown, f-mxln, chalky, v-fossiliferous, no vis por

4000

Shale: red, gray
Limestone: tan, fxln, chalky, granular, fossiliferous, no vis por
Shale: red, gray, green
Limestone: tan to lt gray, f-mxln, chalky, fossiliferous, pr pp por, ns
Shale: black, gray, red
Limestone: brown to tan, fxln, sl chalky, fossiliferous, no vis por
Shale: gray, red, black
Limestone: white to tan, f-mxln, chalky, granular, sl fossiliferous, no vis por

Remarks: 8:00am, 11/11/2014

Limestone: tan to white, f-mxln, chalky, oolitic in part, fossiliferous, no vis por

Heebner 4095 (-876)

4100

Shale: black carbonaceous, gray
Shale: gray, red, brown, black

Remarks: wt 9.3, vis. 50, lcm 3# Morgan Mud, Dave Lines

Limestone: white to tan, f-mxln, chalky, oolitic in part, fossiliferous, fr interxln por, 3 pieces black spotty stain, nfo, no odor

CFS

Lansing 4135 (-916)

Shale: gray, black, red
Limestone: white to tan, fxln, chalky, sl granular, fossiliferous, pr interxln por, ns
Shale: gray, black, red
Limestone: tan, fxln, sl chalky, sl fossiliferous, no vis por, 4 pieces dark stain, slsfo on break, no odor
Shale: gray, green, red
Limestone: tan, f-mxln, sl chalky, sl cherty, oolitic in part, fossiliferous, 6 pieces fr ooicastic por (mostly barren), gd dark sat stain, slsfo on break, no odor

4200

Dolomite: tan, fxln, sucrosic, sl fossiliferous, no vis por, ns
Shale: gray, green
Shale: gray, green
Limestone: tan, flxln, fossiliferous, 1% sample, fr interxln por, gd dark spottty to sat stain, prsfo (dark), faint odor

CFS

Limestone: tan to lt gray, f-mxln, chalky ,fossiliferous, fr pp por, 4 pieces black spotty stain, nfo, no odor
Shale: gray, green, red, black
Limestone: white, fxln, dense, sl oolitic, sl fossiliferous, no vis por, ns
Limestone: tan to white, fxln, sl cherty, dense, fossiliferous, no vis por
Limestone: tan to lt gray, fxln, sl chalky, oolitic, fossiliferous, pr vug por, ns
Shale: black carbonaceous, gray
Limestone: tan to brown, fxln, dense, hard, fossiliferous, no vis por, ns
Shale: gray, green, red, black
Limestone: tan, fxln, sl chalky, fossiliferous, 1% sample, fr pp to vug por, gd dark spotty to sat stain, slsfo, faint odor

4300

CFS

Shale: gray, red
Shale: red, gray, black

CFS

Limestone: tan to ly gray, f-mxln, oolitic in part, fossiliferous, pr interxln por, ns
Shale: black, brown, red, gray
Limestone: white to tan, fxln, sl chalky, oolitic, v- fossiliferous, fr vug por, 1% sample dark sat stain, slsfo, faint odor
Limestone: tan to white, fxln, sl chalky, oolitic in part, v-fossiliferous, pr oolicastic por, 8 pieces dark sat stain, slsfo, no odor

CFS

Stark 4357 (-1138)

DST 1

Shale: black carbonaceous
Shale: black, brown, red, gray
Limestone: brown, lxln, dense, fossiliferous, no vis por
Limestone: tan to white, f-mxln, oolitic, sl cherty, sl interxln por, 1% sample lt sat stain, slsfo on break, good odor

CFS

Remarks: 8:00am,11/12/2014
wt 9.2, vis. 56, lcm 4#
Morgan Mud, Dave Lines
Strap: 4.26' long to board

DST #1
4353-4380
30-60-30-60
1st open: bob 22 min
1st shut in: return built to 1"
2nd open: bob 25 min
2nd shut in: return built to 3"
Rec:
155' go 20/80
124' mcw 40/60
186' mcw 10/90
hydro: 2287-2234 psi
If: 28-127 psi
ff: 138-212 psi
sip: 918-904 psi
bht: 124°F
gravity: 34° api
chl: 50,000 ppm
rw: 0.32 @ 33°F

Shale: black carbonaceous

4400

Limestone: tan to white, fxln, dense, fossiliferous, no vis por
Limestone: tan to white, f-mxln, sl chalky, fossiliferous, fr interxln por
Shale: gray, green, red
Limestone: tan to brown, fxln, fossiliferous, no vis por
Shale: brown, gray, red, black
Limestone: white, fxln, sl chalky, sl cherty, granular, no vis por
Limestone: white to tan, fxln, granular in part, mostly dense, no vis por
Shale: red, gray, brown
Limestone: tan to brown, f-mxln, sl oolitic,, pr oolicasstic por, ns
Shale: brown, gray, red, black

DST #2
4577-4603
MISRUN tool slid 6' and in the process it opened before seating contaminating the test
15-15
1st open: no blow
Rec:
293' drilling mud
hydro: 2473-2464 psi
If: 161-128 psi
sip: 163 psi
bht: 117°F

Limestone: tan, fxln, chalky, dense, sl fossiliferous, no vis por
Shale: brown, gray, red, black
Limestone: white to tan, fxln, dense, sl fossiliferous, 1 piece black surface stain, nfo, no odor, no vis por

4500

Shale: black, gray, red
Limestone: tan, fxln, dense, no vis por

Remarks: 8:00am, 11/13/2014

Shale: gray, brown, red, green,

Remarks: wt 9.5, vis. 57, lcm 2# Morgan Mud, Dave Lines

Limestone: white, fxln, soft. silty, no vis por
Shale: gray, brown, red, green,
Limestone: white, fxln, soft. silty, no vis por
Shale: brown, gray, red

Pawnee 4552 (-1333)

Limestone: tan, fxln, mostly dense, sl fossiliferous, no vis por

DST #3
4569- 4603
30-60-30-60
1st open: 1/4" blow died in 8 min
2nd open: no blow
no returns
Rec:
5' mud
hydro: 2498-2366 psi
If: 20-20 psi
ff: 20-21 psi
sip: 112-63 psi
bht: 116°F

Limestone: tan to white, f-mxln, sl chalky, oolitic in part, no vis por

DST 2, DST 3

Shale: black, carbonaceous
Shale: gray, brown, red
Limestone: tan to brown, fxln, cherty, sl pyritic,sl fossiliferous, 4 pieces sl pp por, lt sat stain, nfo, faint odor

4600

CFS

Shale: black, carbonaceous

Remarks: 8:00am, 11/14/2014
wt 9.5, vis. 63, lcm 2#
Morgan Mud, Dave Lines

Limestone: tan to brown, fxln, sl fossiliferous, dense, no vis por
Shale: black, gray, brown

Ft Scott 4604 (-1385)

Limestone: white to tan, fxln, sl cherty, oolitic in part, fossiliferous, no vis por, ns

CFS

Cherokee Shale 4633 (-1436)

Shale: black, carbonaceous
Limestone: tan to brown, fxln, dense, fossiliferous, no vis por
Shale: black, gray, brown
Limestone: tan, f-mxln, sl fossiliferous, no vis por

CFS

Shale: gray, black, red
Limestone: tan to white, fxln, dense, oolitic in part, no vis por
Shale: gray, red

DST 4

Shale: red, gray/green, black

Johnson Zone 4676 (-1457)

E-LOG

Limestone: tan to white, fxln, cherty, sl fossiliferous, no vis por, no stain, nfo, faint odor
Limestone: tan to white, fxln, sl chalky, cherty, sl oolitic, sl fossiliferous, 10 pieces sl pp to vug por, lt sat stain, slsfo, faint odor

CFS

4700

Remarks: 8:00am, 11/15/2014
wt 9.4, vis. 56, lcm 2#
Morgan Mud, Dave Lines

DST #4
4654-4698
30-60-60-90
1st open: build to 3 1/2"
1st close: no return
2nd open: built to 7"
2nd close: no return
Rec:
60' oil
60' ocm 30/70
310' gip
hydro: 2446-2477 psi
If: 26-39 psi
ff: 41-63 psi
sip: 272-265 psi
bht: 122°F
gravity: 24° api

Limestone: tan, f-mxln, sl fossiliferous, no vis por
Limestone: tan to white, fxln, sl fossiliferous, dense, no vis por
Shale: red, gray, green, black
Limestone: tan to white, f-mxln, sl oolitic, sl fossiliferous, mostly dense, 4 pieces sl vug por, lt sat stain, nfo, no odor
Shale: red, gray, yellow, black, sandy in part
Sandstone: white to gray, fn grn, sub rnd, well sorted, friable, no vis por, ns

Mississippian 4764 (-1545)

Limestone: white to tan, fxln, sl chalky, cherty, oolitic, granular, no vis por
Limestone: tan, f-mxln, sl chalky, cherty, oolitic, no vis por, ns
Limestone: tan to white, f-mxln, chalky, cherty, sandy in part, pr pp por, ns
Shale: gray, yellow, black, sl sandy

4800

Limestone (dolomitic in part): tan to gray, fxln, sl chalky, dense, hard, sl fossiliferous, no vis por
Limestone: tan, fxln, chalky, dense, hard, no vis por
Limestone (dolomitic in part): tan, fxln, sl chalky, granular, pr interxln por, ns
Limestone: tan, f-mxln, sl chalky, oolitic, no vis por, ns

4900

Remarks: Geologist off location at 2:30pm, 11/16/2014

Murfin Drilling Co Inc
Kruto #3-29
2450'fnl & 2055'fwl
29-10-34w, Thomas County, Kansas
KB=3208', GL=3219'
API: 15-193-20940