Robert D. Hendrix
Petroleum Geologist

GEOLOGIST'S REPORT
DRILLING TIME AND SAMPLE LOG

COMPANY Murfin Drilling Co. Inc
LEASE Sowers A #1-19
FIELD Wildcat
LOCATION 330'fsl & 330'fel
SEC 19 TWSP 2s RGE 38w
COUNTY Cheyenne STATE KS
CONTRACTOR Murfin Drilling Co. Inc. Rig #3
SPUD 7/9/2019 COMP 7/22/2019
RTD 5200' LTD 5201'
MUD UP 3600 TYPE MUD Chemical
SAMPLES SAVED FROM 4020' TO 5200'
DRILLING TIME KEPT FROM 4020' TO 5200'
SAMPLES EXAMINED FROM 4020' TO 5200'
GEOLOGICAL SUPERVISION FROM 3950'
GEOLOGIST ON WELL Robert D. Hendrix

ELEVATIONS
KB 3440'
DF
GL 3435'
Measurements Are All From Kelly Bushing

CASING
CONDUCTOR
SURFACE 8-5/8" @ 369'
PRODUCTION

ELECTRICAL SURVEYS
Comp Porosity, Dual Induction, Microlog, Sonic Log

FORMATION TOPS	ELECTRIC LOG	SAMPLE
Anhydrite	3335 (+105)	3329 (+111)
Topeka	4141 (-701)	4133 (-693)
Oread	4280 (-840)	4266 (-826)
Lansing	4352 (-912)	4347 (-907)
Stark Shale	4590 (-1180)	4578 (-1138)
Mound City	4650 (-1210)	4622 (-1182)
Ft Scott	4786 (-1346)	4755 (-1315)
Oakley	4865 (-1425)	4829 (-1389)
Mississippi	5144 (-1704)	5133 (-1693)

19

API# 15-023-21519

REMARKS: *All shows were tested and negative results from the DST's. The decision was made to condemn of this well. This Geologists Report was adjusted to the Electric Log's.*

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

DRILLING TIME IN MINUTES PER FOOT — Rate of Penetration Decreases | DEPTH | LITHOLOGY | GAS UNIT | SAMPLE DESCRIPTION | REMARKS

SAMPLE DESCRIPTION / REMARKS

Anhydrite 3329 (+111)

Base Anhydrite 3364 (+76)

Geologist on location 3950' at 11:31 am 7/13/2019. Bit Trip at 3900' to change from PDC to button. Strap out of hole was 0.57' long to board.

Shale: red, sl gray, silty

Limestone: lt gray to white, mxln, fossiliferous, no vis por

Limestone: lt tan to white, fxln, granular, dense, no vis por

Shale: gray, silty

Limestone: gray to white, mxln, sl chalky, v-fossiliferous, no vis por

Shale: red, gray, silty

Shale: red, gray, silty

Limestone: lt gray to tan, m-lxln, fossiliferous, pellatoidal, sl chalky, granular in part, sl interxln por, abundant black gilsonite throughout, nfo, no odor

Limestone: tan to white, f-mxln, dense, v-fossiliferous, no vis por

Shale: gray, hard, blocky, red, silty

Limestone: white to lt gray, f-mxln, sl chalky, oolitic, fossiliferous, no vis por, black mostly spotty to saturated stain, nfo, faint odor

Shale: gray, red, green, silty

Limestone: white to lt gray, f-mxln, sl chalky, oolitic, fossiliferous, no vis por, black mostly spotty to saturated stain, nfo, faint odor

Shale: red, gray, green, silty

Topeka (sample top) 4133 (-693)

Topeka (log Top) 4141 (-701)

Limestone: white to gray, f-lxln, sl chalky, sl pyritic, oolitic, fossiliferous, 15% sample pr pp por, black spotty to saturated stain, a few thick heavy tarry drops on break, faint odor

Shale: gray, red, silty

Limestone: white, f-mxln, sl chalky, oolitic, fossiliferous, pr pp por, black spotty to stain, v-slsfo, faint odor

Sandstone: tan to green, fn-gr, rounded, well sorted, calcareous cement, pr pp por, ns

Shale: gray, red, sandy, silty

Limestone: tan to white, fxln, fossiliferous, granular, no vis por

DST #1
4225-4306
30-60-30-60
1st open: blow built to 1", died back to surface
2nd open: no blow
no returns
Rec:
5' mud
hydro: 2059-2009 psi
If: 17-18 psi
ff: 18-19 psi
sip: 108-84 psi
bht:142° F

Shale: red, gray, brown, silty, sandy

Limestone: tan to white, fxln, sl chalky, granular, oolitic, fossiliferous, 3% sample black pr pp por, spotted stain, nfo, no odor

Shale: red, gray, silty

Shale: red, gray, purple, silty

8:00am, 7/14/2019

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

Shale: red, gray, green, silty

Shale: red, brown, purple, gray, silty

Oread (sample top) 4266 (-826)

wt 8.9, vis. 58, lcm 4# Morgan Mud, Cade Lines

Oread (log Top) 4280 (-840)

Limestone: tan to white, f-mxln, sl chalky, granular, sl fossiliferous, 5% sample pr pp por, dark spotty to sat stain, slsfo on break, no odor

Limestone: tan, fxln, pyritic, dense, no vis por

DST #2
4308-4375
30-60-30-60
1st open: blow built to 2"
2nd open: weak blow built to 1"
Rec:
210' slocm 3/97
hydro: 2213-2148 psi
If: 34-75 psi
ff: 78-103 psi
sip: 1195-1111 psi
bht: 144° F

Limestone: tan to white, f-mxln, sl chalky, granular, sl fossiliferous, pr pp por, float from the show above,

8:00am, 7/15/2019

Shale: dark to lt gray, red, green, silty, blocky

Sandstone: tan to white, argillaceous, fn grn, well sorted, sub rnd to rnd, calcareous, dark sat stain, nfo, no odor, fr intergranular por

Shale: dark to lt gray, red, green, silty, sandy

Lansing (sample top) 4347 (-907)

Lansing (log Top) 4352 (-912)

Limestone: white to tan, f-mxln, chalky, oolitic, sl fossiliferous, sl pyritic, 20% sample fr oolicastic por, gd black spotty to sat stain, fr amt of gilsonite, prsfo (black), fr odor

Limestone: tan, fxln, dense, oolitic, no vis por

wt 9.0, vis. 60, lcm 4# Morgan Mud, Cade Lines

Shale: gray, red, silty, sandy

Sandstone: gray, t/t, argillaceous, fn grn, well sorted, sub rnd to rnd, calcareous, black dead oil sat stain, nfo, no odor no vis por

Shale: gray, red, silty

DST #3
4371-4460
30-60-30-60
1st open: bob 2 min
2nd open: bob 3 min
no returns
Rec:
630' mcw 40/60
1750' mcw 5/95
120' mcw 45/55
2500' total
hydro: 2213-2108 psi
If: 155-777 psi
ff: 769-1125 psi
sip: 1296-1295 psi
bht: 154° F
chlorides: 23,000ppm

Limestone: white, m-lxln, chalky, oolitic, fossiliferous, pyritic, 30% sample pr interxln por, dark streaky sat stain, slsfo on break, faint odor

Shale: gray, green

Limestone: white to tan, f-mxln, sl chalky, oolitic in part, fossiliferous, pyritic, 10% sample pr pp to interxln por, dark spotty to sat stain, slsfo (more on break), no odor

Shale: gray, red, green

8:00am, 7/16/2019
wt 9.1, vis. 66, lcm 3#
Morgan Mud, Cade Lines

Limestone: white, fxln, sl chalky, granular, 10% sample pr pp por, scattered pr spotty stain, nfo, no odor

Limestone: white to tan, fxln, dense, no vis por

DST #4
4495-4584
30-60-30-60
1st open: tool slid 5' blow built to 2 1/2" died back to 1"
2nd open: no blow
no returns
Rec:
65' mud 3/97
hydro: 2191-2181 psi
If: 51-52 psi
ff: 51-53 psi
sip: 501-393 psi
bht: 143° F

Shale: gray, red, green, silty

Shale: red, gray, soft, silty

Limestone: white to tan, f-mxln, oolitic, fossiliferous, 5% sample pr interxln por, dark sat stain, some gilsonite, slsfo on break, no odor

Limestone: white to tan, fxln, dense, sl fossiliferous, sparry clacite fill, no vis por, dark scattered spotty to sat stain, nfo , no odor

8:00am, 7/17/2019

Shale: red, dark to lt gray, green, blocky, silty

Lansing (sample top) 4578 (-1138)

wt 9.0, vis. 57, lcm 4# Morgan Mud, Cade Lines

Limestone: gray, fxln, oolitic at top, sl chalky, sl fossiliferous, mostly dense, few pieces no vis por, with sat dark stain, nfo, no odor

Stark Shale (log Top) 4590 (-1150)

Shale: gray lt to dark, red, green, silty

Shale: red, gray, soft, sandy, silty

Limestone: white, mxln, v-oolitic, sl pp por

Mound City (sample top) 4622 (-1182)

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

Shale: gray light & dark, green, red

Limestone: lt gray, fxln, sl chalky, dense, argillaceous in part, sl fossiliferous, no vis por

Mound City (log Top) 4650 (-1210)

Shale: gray lt to dark, red, green, silty

Limestone: tan, vf-xln, fossiliferous, no vis por

Shale: red, black, gray, silty

Limestone: tan to gray, vf-xln, dense, sl fossiliferous, argillaceous in part, no vis por

8:00am, 7/18/2019

Shale: gray, brown, red, green, silty, sandy

Shale: gray, brown, red, green, silty, sandy

Shale: red, brown, soft, silty, sandy

Shale: red, brown, silty, sandy

wt 9.1, vis. 55, lcm 4# Morgan Mud, Cade Lines

Limestone: gray to brown, fxln, dense, oolitic in part, no vis por

Shale: gray, red/brown, green, silty, sandy

Shale: dark to lt gray, black, green, red, brown, silty, hard

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

Ft Scott (sample top) 4755 (-1315)

Siltstone: gray, fxln, silty, blocky, no vis por

Shale: gray, blocky, silty

Shale: gray, black, green, silty

Ft. Scott (log Top) 4786 (-1346)

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

DST #5
4719-4862
30-60-30-60
1st open: blow built to 1/4" then died at 28 min
2nd open: no blow
no returns
Rec:
5' mud
hydro: 2322-2269 psi
If: 19-22 psi
ff: 23-25 psi
sip: 759-681 psi
bht: 146° F

Shale: dark to lt gray, green, brown, silty, hard

Limestone: white to tan, fxln, cherty, oolitic, pyritic, fossiliferous, no vis por

Shale: black carbonaceous

Shale: gray, red/brown, silty

Limestone: white to tan, fxln, cherty, pyritic, fossiliferous, dense, no vis por, ns

Oakley (sample top) 4829 (-1389)

Shale: black carbonaceous, gray, green

Limestone: white to tan some gray, fxln, cherty, oolitic, pyritic, fossiliferous, no vis por, ns

8:00am, 7/19/2019
wt 9.1, vis. 69, lcm 4#
Morgan Mud, Cade Lines

Limestone: white to tan, fxln, cherty, dense, pyritic, oolitic, fossiliferous, no vis por, ns

Oakley (log Top) 4865 (-1425)

Shale: gray dark to lt, red, brown, silty

Limestone: tan to brown, f-mxln, oolitic, pyritic, dense, sl fossiliferous, no vis por

Shale: gray, red, brown, silty

Limestone: tan to white, fxln, dense, sandy, cherty, fossiliferous, no vis por

Limestone: tan to white, fxln, dense, sandy, cherty, fossiliferous, no vis por

Shale: gray, red, brown, silty

Limestone: tan to brown, fxln, cherty, fossiliferous, no vis por

Shale: red, gray, green, silty, sandy

Sandstone: white, t/t, md-lg gr, sub ang, mod sorted, calcareous cement, no vis por

Shale: red, gray, silty

Limestone: white, fxln, chalky, fossiliferous, no vis por

Shale: gray, red, green, sandy

Chert, yellow, fresh

8:00am, 7/20/2019

Sandstone: red/brown some white, t/t, fn gr, sub rnd, mod sorted, calcareous cement, no vis por

Shale: gray, red, green, sandy

Sandstone: red/brown some white, t/t, fn gr, sub rnd, mod sorted, calcareous cement, no vis por

Shale: gray, red, green, sandy

Shale: gray, red, gray, sandy, silty

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

Sandstone: white, t/t, fn-md gr, sub rnd, mod sorted, friable, calcareous cement, no vis por

Shale: red, gray, green, sandy

Sandstone: red/brown, t/t, md gr, sub ang, mod sorted, calcareous cement, no vis por

Sandstone: AA with

Shale: red gray green

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

Limestone: brown, fxln, dense, fossiliferous, no vis por

Shale: gray, dark green, red, black

Shale: gray, dark green, red, brown, black hard, sandy in part

Shale: gray, dark green, red, brown, black hard, sandy in part

Shale: gray, black, blocky, silty

Shale: gray, black, blocky, silty

Sandstone: white to red, fn gr, sub rnd, mod sorted, friable, calcareous cement, no vis por

Shale: gray, black, blocky, silty, pyrite

Mississippian (sample top) 5133 (-1693)

Chert: white, yellow, opaque, fresh, no vis por

wt 9.4, vis. 59, lcm 4# Morgan Mud, Cade Lines

Mississippian (log Top) 5144 (-1704)

Limestone: tan, f-mxln, cherty, oolitic, no vis por

Dolomite: gray, fxln, granular, no vis por

Dolomite: gray, fxln, granular, no vis por

Dolomite: white, fxln, granular, chalky' cherty, pyritic, no vis por

RTD 5200 (-1760)

Geologist off location at 5:45am, 7/21/2019

Murfin Drilling Co Inc
Sowers A #1-19
330'fsl & 330'fel
19-2-38w, Cheyenne County, Kansas
KB=3440', GL=3435'
API: 15-023-21519