

# Robert D. Hendrix

Petroleum Geologist

## GEOLOGIST'S REPORT

DRILLING TIME AND SAMPLE LOG

COMPANY: **Murfin Drilling Co. Inc.**

LEASE: **Dellere #1-25**

FIELD: **Wildcat**

LOCATION: **700' Int. & 900' Int.**

SEC: **25** TWSP **45** RGE **31w**

COUNTY: **Rawlins** STATE: **Kansas**

CONTRACTOR: **Murfin Drilling Co. Rig #2**

SPUD: **3/24/2014** COMP: **4/2/2014**

RTD: **4:40** LTD: **4:50**

MUD UP: **3:40** TYPE MUD: **Chemical**

SAMPLES SAVED FROM: **3630 TO TD**

DRILLING TIME KEPT FROM: **3630 TO TD**

SAMPLES EXAMINED FROM: **3630 TO TD**

GEOLOGICAL SUPERVISION FROM: **3652**

GEOLOGIST ON WELL: **Robert D. Hendrix**

MEASUREMENTS ARE ALL FROM: **Kelly Bushing**

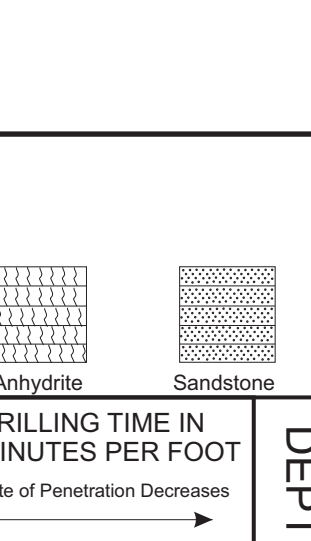
CASING: **CONDUTOR SURFACE 8.518" at 225' PRODUCTION 5.12" at 4534'**

ELEVATIONS: **KB 2910**

DF: **GL 2899**

API# 15-153-20997

| FORMATION TOPS | ELECTRIC LOG | SAMPLE       |
|----------------|--------------|--------------|
| Anhydrite      | 2650 (-251)  | 2660 (-250)  |
| Topeka         | 3731 (-821)  | 3733 (-823)  |
| Heebner Shale  | 3895 (-985)  | 3896 (-986)  |
| Lansing        | 3949 (-1039) | 3945 (-1035) |
| Stark Shale    | 4110 (-1200) | 4111 (-1201) |
| BKC            | 4158 (-1248) | 4157 (-1247) |
| Pawnee         | 4272 (-1362) | 4269 (-1359) |
| Cherokee Shale | 4358 (-1448) | 4359 (-1449) |
| Mississippian  | 4455 (-1545) | 4467 (-1557) |



REMARKS:

### LEGEND

|  |           |  |           |  |           |  |       |  |         |  |           |  |       |  |          |
|--|-----------|--|-----------|--|-----------|--|-------|--|---------|--|-----------|--|-------|--|----------|
|  | Anhydrite |  | Sandstone |  | Limestone |  | Shale |  | Carb Sh |  | Cherty LS |  | Chert |  | Dolomite |
|--|-----------|--|-----------|--|-----------|--|-------|--|---------|--|-----------|--|-------|--|----------|

| DEPTH | DRILLING TIME IN MINUTES PER FOOT | LITHOLOGY | SAMPLE DESCRIPTION  | REMARKS  |
|-------|-----------------------------------|-----------|---|--|
| 2630  |                                   |           |   |  |
| 2650  |                                   |           |   | <b>Anhydrite 2660 (+250)</b>   |
| 2700  |                                   |           |   | <b>Base Anhydrite 2693 (+217)</b>  |
| 3600  |                                   |           |   |  |
| 50    |                                   |           | Limestone: tan to gray, fxn, sl chalky, si fossiliferous, no vis por<br>Shale: red, brown, gray   |  |
| 50    |                                   |           | Limestone: tan to brown, fxn, granular, fossiliferous, no vis por<br>Limestone: tan to white, fxn, sl chalky, fossiliferous, no vis por<br>Shale: red, gray, black<br>Limestone: tan to white, fxn, sl cherty, fossiliferous, no vis por<br>Limestone: tan to white, fxn, chalky, granular, no vis por<br>Shale: gray, red, black   | Geologist on location at 3652' on 7:30 pm 3/26/2014  |
| 3700  |                                   |           | Limestone: tan to white, f-mxn, v-chalky, fossiliferous, no vis por<br>Shale: red, gray<br>Limestone: tan to gray, fxn, chalky, sl pyritic, fossiliferous, no vis por<br>Shale: red, gray<br>Shale: red, gray   |  |
| 50    |                                   |           | Limestone: lt gray to tan, fxn, chalky, granular, si fossiliferous, no vis por<br>Limestone: tan to white, fxn, chalky, granular, no vis por<br>Limestone: tan, fxn, chalky, silty, sandy, si fossiliferous, no vis por<br>Shale: red, gray, silty  | <b>Topeka 3733 (-823)</b>  |
| 3800  |                                   |           | Sandstone: white, glauconitic, fn gm, rnd, well sorted, semi-friable, calcareous, pr interxn por<br>Shale: red, muddy, soft<br>Limestone: tan, fxn, chalky, granular, si fossiliferous, no vis por  |  |
| 50    |                                   |           | Limestone: tan, f-mxn, chalky, si glauconitic, fossiliferous, no vis por<br>Limestone: brown to gray, f-mxn, chalky, fossiliferous, no vis por, ns<br>Shale: gray, green, red, black  |  |
| 50    |                                   |           | Limestone: tan, m-ixn, chalky, argillaceous, fossiliferous, no vis por<br>Shale: red, gray, green, black  |  |
| 50    |                                   |           | Limestone: white to tan, f-mxn, chalky, oolitic, fossiliferous, pr pp por<br>Shale: gray, red, black<br>Limestone: tan to white, f-mxn, v-chalky, oolitic, v-fossiliferous, pr interxn por, dark spotty stain, nfo, no odor<br>Limestone: tan to white, f-mxn, v-chalky, oolitic, fossiliferous, no vis por, ns<br>Shale: black carbonaceous<br>Limestone: brown to gray, fxn, fossiliferous, no vis por<br>Shale: gray, green, red<br>Shale: red, gray, green  | 8:00am, 3/27/2014<br><b>Heebner 3896 (-986)</b>  |
| 3900  |                                   |           | Limestone: tan to white, f-mxn, oolitic in part, fossiliferous, fr interxn por, 20% sample dark black stain, frsfo, faint odor<br>Shale: red, gray, green, black  | <b>Toronto 3929 (-1019)</b>  |
| 50    |                                   |           | Limestone: tan, f-mxn, chalky, fossiliferous, pr interxn por, 10% sample black sat stain, prsfo, faint odor<br>Shale: gray, green, soft, sandy<br>Shale: red, gray, black   | wt 9.2, vis. 56, lcm 5#<br>Morgan Mud, Dave Lines<br><b>Lansing 3945 (-1035)</b>   |
| 50    |                                   |           | Limestone: tan to gray, m-ixn, oolitic, fossiliferous, 20% sample gd vug por, black spotty to sat stain, gdsfo, gd odor<br>Shale: red, gray, brown, pyritic<br>Limestone: lt gray, fxn, sl chalky, dense, no vis por  | 8:00am, 3/28/2014<br>Strap: 0.48' short to board   |
| 4000  |                                   |           | Limestone: tan to white, fxn, chalky, sl pyritic, sl vug por, 1% sample pr spotty edge stain, sifsfo, no odor<br>Shale: gray, black, red, brown, silty<br>Limestone: tan to gray, f-mxn, sl chalky, fossiliferous, pr pp por, 1% sample lt spotty stain, sifsfo on break, no odor<br>Shale: red, gray, black<br>Limestone: white, mxn, oolitic, fossiliferous, pr interxn por, 7 pieces black spotty stain, nfo, no odor<br>Limestone: white to lt gray, fxn, sl chalky, oolitic, no vis por<br>Limestone: white to tan, fxn, chalky, cherty, si fossiliferous, no vis por, ns<br>Shale: brown, black, red<br>Limestone: gray, green, fxn, dense, fossiliferous, no vis por<br>Shale: red, gray   | wt 9.1, vis. 57, lcm 5#<br>Morgan Mud, Dave Lines<br><b>DST #1</b><br>3894-3980<br>30-60-60-90<br>1st open: built to 4 1/2"<br>1st shut in: no blow<br>2nd open: built to 8 1/4"<br>2nd shut in: 1/4" return<br>Rec:<br>140' gocm 10/40/50<br>hydro: 1885-1787 psi<br>ff: 16-43 psi<br>sfp: 1158-1117 psi<br>bht: 113°F                          |
| 50    |                                   |           | Limestone: white to tan, f-mxn, pyritic, oolitic, 5 pieces fr interxn por, lt sat stain, sifsfo on break, no odor<br>Limestone: white, fxn, dense, pyritic, no vis por, ns<br>Shale: gray, green, red, sandy  | 8:00am, 3/29/2014<br><b>DST #2</b><br>3998-4023<br>30-60-30-60<br>1st open: wk blow built to 1/4" then died back to surf<br>no returns<br>2nd open: no blow<br>Rec:<br>5' mud with oil spots<br>hydro: 1972-1931 psi<br>ff: 12-18 psi<br>sfp: 366-87 psi<br>bht: 115°F   |
| 4100  |                                   |           | Limestone: white to lt gray, fxn, chalky, si cherty, fossiliferous, pr interxn por, 10% sample lt spotty to sat stain, sifsfo, gd odor<br>Shale: gray, red, brown, black<br>Shale: red, gray, sandy, silty<br>Limestone: white to lt gray, f-mxn, pyritic, oolitic, 5 pieces fr interxn por, lt sat stain, sifsfo on break, no odor<br>Limestone: white, fxn, dense, pyritic, no vis por, ns<br>Shale: gray, green, red, sandy  | wt 9.1, vis. 57, lcm 5#<br>Morgan Mud, Cade Lines<br><b>DST #3</b><br>4046-4111<br>30-60-60-90<br>1st open: bob 2 1/2" min<br>1st shut in: bob 16 min<br>2nd open: bob immediately<br>2nd shut in: bob 14 min<br>Rec:<br>1290' fo<br>1700' gip<br>hydro: 2039-2028 psi<br>ff: 55-268 psi<br>sfp: 1312-1305 psi<br>bht: 125°F<br>gravity: 129°api |
| 50    |                                   |           | Limestone: gray, fxn, sl chalky, dense, no vis por<br>Shale: gray, red, black<br>Limestone: tan to white, m-ixn, oolitic, pisolitic, v-fossiliferous, fr interxn por, ns<br>Shale: gray, red, black<br>Limestone: white to tan, f-mxn, chalky, fossiliferous, no vis por<br>Shale: red, brown, gray, silty, sandy   | 8:00am, 3/30/2014<br><b>BKC 4157 (-1247)</b>   |
| 50    |                                   |           | Limestone: tan to gray, f-mxn, chalky, dense, fossiliferous, no vis por<br>Shale: red, gray, green, brown, black<br>Shale: brown, red, gray, silty<br>Shale: black, brown, gray, red  | wt 9.1, vis. 60, lcm 5#<br>Morgan Mud, Cade Lines  |
| 50    |                                   |           | Limestone: tan to white, f-mxn, chalky, oolitic in part, fossiliferous, no vis por<br>Limestone: tan to white, fxn, chalky, fossiliferous, no vis por<br>Shale: gray, green, red<br>Shale: black and carbonaceous<br>Limestone: tan to brown, f-mxn, chalky, oolitic, fossiliferous, no vis por<br>Shale: gray, silty<br>Shale: black and carbonaceous<br>Shale: black, gray<br>Limestone: brown to white, v-ixn, micro oolitic, dense, fossiliferous, no vis por, ns<br>Limestone: tan, fxn, sl chalky, dense, no vis por<br>Limestone: tan to white, fxn, dense, sl chalky, si fossiliferous, scattered sparry calcic inclusions, no vis por, ns<br>Shale: gray, red<br>Limestone: tan to white, fxn, sl chalky, dense, no vis por, ns<br>Shale: gray, black, red | <b>Pawnee 4269 (-1359)</b>   |
| 50    |                                   |           | Shale: gray, green, red, brown<br>Sandstone: white, lt, glauconitic, fn-vfn gm, rnd, mod sorted, semi-friable, calcareous, no vis por<br>Limestone: white to tan, fxn, sl chalky, si fossiliferous, no vis por<br>Sandstone: white, glauconitic, fn-md gm, rnd, mod sorted, semi-friable, calcareous, no vis por<br>Shale: red, gray, brown, silty<br>Sandstone: white, lt, fn gr, md, well sorted, hard, no vis por<br>Sandstone: white, lt, fn gr, md, well sorted, hard, no vis por<br>Shale: red, brown, gray, silty, sandy<br>Sandstone: white, sl glauconitic, fn gm, rnd, mod sorted, hard, no vis por<br>Shale: red, gray, sandy, silty   | 8:00am, 3/31/2014  |
| 50    |                                   |           | Chert: white, opaque, small amount tripolitic, 40% weathered, 60% fresh, no vis por<br>Chert: white to yellow, majority lt, mostly fresh, no vis por, ns<br>Limestone: tan to white, fxn, sl chalky, cherty, dense, no vis por, ns<br>Chert: white to yellow, majority vt, mostly fresh, no vis por, ns<br>Dolomite: white, fxn, chalky, cherty, pr interxn por<br>Dolomite: white, f-mxn, cherty, fr interxn por, ns   | <b>Cherokee Shale 4359 (-1449)</b>   |
| 50    |                                   |           |   | <b>Mississippian 4467 (-1557)</b>  |
| 50    |                                   |           |   | <b>RTD 4540 (-1630)</b>  |

Murfin Drilling Co Inc  
Dellere #1-25  
700' Int & 900' Int  
25-4-31w, Rawlins County, Kansas  
KB=2910', GL=2899'  
API: 15-153-20997

NOTE:  
Due to high winds the  
TOH for logs was delayed  
4 hours