

GEOLOGICAL REPORT

Larry A. Nicholson

1S RGE 36W
STATE Kansas
ng Company, Inc. Rig # 2
COMP _____
15 LTD 4776

100

COMPANY & WELL Murfin Drilling Co. John 'A' #1-24		<h1>GEOLOGICAL REPORT</h1> <h2>Larry A. Nicholson</h2>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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		<p>COMPANY <u>Murfin Drilling Company, Inc.</u> API # <u>15-153-21141</u> FIELD <u>Darkwing Southwest</u> LEASE <u>John 'A'</u> WELL # <u>#1-24</u> LOCATION <u>S2 SE NE SW</u> SURVEY <u>1380' FSL 2310' FWL</u> SECTION <u>24</u> TWP <u>1S</u> RGE <u>36W</u> COUNTY <u>Rawlins</u> STATE <u>Kansas</u></p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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		<p>CONTRACTOR <u>Murfin Drilling Company, Inc. Rig # 2</u> SPUD <u>5:30 pm 6-10-15</u> COMP _____ RTD <u>4776 11:43am 06-17-15</u> LTD <u>4776</u> MUD UP AT <u>3260</u> MUD TYPE <u>Chemical, Morgan Mud</u></p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		<p>ELEVATIONS K.B. <u>3264</u> D.F. _____ G.L. <u>3253</u> All measurements from K.B. <u>3264</u></p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		<p>SAMPLES SAVED FROM <u>3600</u> TO <u>RTD</u> DRILLING TIME FROM <u>3600</u> TO <u>RTD</u> SAMPLES EXAMINED FROM <u>3600</u> TO <u>RTD</u> GEOLOGICAL SUPERVISION FROM <u>3600</u> TO <u>RTD</u> WELLSITE GEOLOGIST <u>LARRY A. NICHOLSON</u></p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		<p>CASING RECORD Conductor _____ of _____ w/ _____ sx Surface <u>268</u> of <u>8 5/8 23#</u> w/ <u>185</u> sx Production _____ of _____ w/ _____ sx</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		<p>ELECTRICAL SURVEYS Pioneer, Den, Neu, Dual, Micro, Sonic</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
<h3>FORMATION TOPS & STRUCTURAL POSITION</h3> <table border="1"> <thead> <tr> <th rowspan="2">FORMATION</th> <th rowspan="2">SAMPLE TOPS</th> <th rowspan="2">SUBSEA DATUM</th> <th rowspan="2">ELEC LOG TOPS</th> <th rowspan="2">SUBSEA DATUM</th> <th colspan="2">REFERENCE WELL</th> <th rowspan="2"></th> </tr> <tr> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>Anhydrite</td> <td>3172</td> <td>+92</td> <td>3172</td> <td>+92</td> <td>3158</td> <td>+97</td> <td>-5</td> </tr> <tr> <td>B/Anhydrite</td> <td>3202</td> <td>+62</td> <td>3202</td> <td>+62</td> <td>3190</td> <td>+65</td> <td>-3</td> </tr> <tr> <td>Neva</td> <td>3664</td> <td>-400</td> <td>3664</td> <td>-400</td> <td>3653</td> <td>-398</td> <td>-2</td> </tr> <tr> <td>Foraker</td> <td>3808</td> <td>-544</td> <td>3808</td> <td>-544</td> <td>3794</td> <td>-539</td> <td>-5</td> </tr> <tr> <td>Topeka</td> <td>3992</td> <td>-728</td> <td>3992</td> <td>-728</td> <td>3976</td> <td>-721</td> <td>-7</td> </tr> <tr> <td>Oread</td> <td>4106</td> <td>-842</td> <td>4106</td> <td>-842</td> <td>4094</td> <td>-839</td> <td>-3</td> </tr> <tr> <td>Lansing</td> <td>4210</td> <td>-946</td> <td>4210</td> <td>-946</td> <td>4200</td> <td>-945</td> <td>-1</td> </tr> <tr> <td>Stark Sh</td> <td>4426</td> <td>-1162</td> <td>4426</td> <td>-1162</td> <td>4410</td> <td>-1155</td> <td>-7</td> </tr> <tr> <td>BKC</td> <td>4474</td> <td>-1210</td> <td>4474</td> <td>-1210</td> <td>4456</td> <td>-1201</td> <td>-9</td> </tr> <tr> <td>Pawnee</td> <td>4600</td> <td>-1336</td> <td>4600</td> <td>-1336</td> <td>4580</td> <td>-1325</td> <td>-11</td> </tr> <tr> <td>Cherokee Sh</td> <td>4680</td> <td>-1416</td> <td>4680</td> <td>-1416</td> <td>4663</td> <td>-1408</td> <td>-8</td> </tr> <tr> <td>RTD</td> <td>4776</td> <td>-1512</td> <td>4776</td> <td>-1512</td> <td>4780</td> <td>-1525</td> <td></td> </tr> <tr> <td>LTD</td> <td>4776</td> <td>-1512</td> <td>4776</td> <td>-1512</td> <td>4781</td> <td>-1526</td> <td></td> </tr> </tbody> </table>								FORMATION	SAMPLE TOPS	SUBSEA DATUM	ELEC LOG TOPS	SUBSEA DATUM	REFERENCE WELL			A	B	Anhydrite	3172	+92	3172	+92	3158	+97	-5	B/Anhydrite	3202	+62	3202	+62	3190	+65	-3	Neva	3664	-400	3664	-400	3653	-398	-2	Foraker	3808	-544	3808	-544	3794	-539	-5	Topeka	3992	-728	3992	-728	3976	-721	-7	Oread	4106	-842	4106	-842	4094	-839	-3	Lansing	4210	-946	4210	-946	4200	-945	-1	Stark Sh	4426	-1162	4426	-1162	4410	-1155	-7	BKC	4474	-1210	4474	-1210	4456	-1201	-9	Pawnee	4600	-1336	4600	-1336	4580	-1325	-11	Cherokee Sh	4680	-1416	4680	-1416	4663	-1408	-8	RTD	4776	-1512	4776	-1512	4780	-1525		LTD	4776	-1512	4776	-1512	4781	-1526																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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<p>REFERENCE WELLS A: <u>Murfin Drilling Burk Trust 'J' #1-25, 610' FNL 1590' FEL, Sec 25 T1S R36W KB 3255'</u> B: ..</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
<p>REMARKS & RECOMMENDATIONS: <i>Based on sample shows and dst results in the Lansing J zone, 5 1/2" csg was set.</i></p> <p>*Note Rig and Loggers are on same depth. Good job by all.</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
<p>LAN 7/92, Modified 5/05, 11/11, 4/12 Hanover, KS 66945 1inch = 25.4mm 8.5 x 97.5 216 mm x 2460 mm</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
<h3>LEGEND</h3> <table border="1"> <tr> <td>Limestone</td> <td>Ool Limestone</td> <td>Dolomite</td> <td>Chert</td> <td>Shale</td> <td>Carbonaceous Shale</td> <td>Salt</td> <td>Sandstone</td> <td>Anhydrite</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>								Limestone	Ool Limestone	Dolomite	Chert	Shale	Carbonaceous Shale	Salt	Sandstone	Anhydrite																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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<table border="1"> <thead> <tr> <th colspan="2">GAMMA RAY / SP</th> <th rowspan="2">DEPTH</th> <th rowspan="2">LITHOLOGY</th> <th colspan="2">SAMPLE DESCRIPTIONS</th> <th rowspan="2">REMARKS</th> </tr> <tr> <th>Gas Units</th> <th>PE</th> <th>lag</th> <th>Density</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2</td> <td>4</td> <td>6</td> <td>8</td> <td>10</td> <td>20</td> <td>40</td> <td>65</td> <td>PE</td> <td>150</td> <td>100</td> <td>50</td> <td>0</td> <td>5</td> </tr> <tr> <td colspan="13">DRILLING TIME IN MINUTES Rate of Penetration Increases</td> </tr> <tr> <td colspan="13">PER FOOT</td> </tr> <tr> <td colspan="13">CALIPER 5" 10" 15" 20" 25" 16 in</td> </tr> <tr> <td colspan="13">Mud up 3260'</td> </tr> <tr> <td colspan="13">bit change 3513'</td> </tr> <tr> <td colspan="13">3600</td> </tr> <tr> <td colspan="13">3600</td> </tr> <tr> <td colspan="13">3610 wt lcm</td> </tr> <tr> <td colspan="13">3620 Vis 65 wt 9.1 6.0#</td> </tr> <tr> <td colspan="13">3630</td> </tr> <tr> <td colspan="13">3640 Vis 64 wt 9.1 7.0#</td> </tr> <tr> <td colspan="13">3650</td> </tr> <tr> <td colspan="13">3660</td> </tr> <tr> <td colspan="13">3670</td> </tr> <tr> <td colspan="13">3680</td> </tr> <tr> <td colspan="13">3690</td> </tr> <tr> <td colspan="13">3700</td> </tr> <tr> <td colspan="13">3710</td> </tr> <tr> <td colspan="13">3720 Vis 65 wt 9.1 8.0#</td> </tr> <tr> <td colspan="13">3730</td> </tr> <tr> <td colspan="13">Neva 3664 (-400)</td> </tr> <tr> <td colspan="13">Sh, brn org, vsft clay, silty, trc sndstn</td> </tr> <tr> <td colspan="13">Sh, brn org silty, wht vfn sd, trc md gry, grn gry wxy</td> </tr> <tr> <td colspan="13">Sh, brn org silty, wht vfn sd, trc md gry, ls, trc, lt gry, dull, dns, n sho</td> </tr> <tr> <td colspan="13">Sh, brn org silty vsft, wht vfn sd w/pyrite, trc md gry</td> </tr> <tr> <td colspan="13">ls, trc, lt gry, vfn xln, chlky, n sho</td> </tr> <tr> <td colspan="13">Sh, brn org silty vsft, wht vfn sd w/pyrite, trc md gry</td> </tr> <tr> <td colspan="13">ls, trc, lt gry, vfn xln, chlky, n sho</td> </tr> <tr> <td colspan="13">Sh, md gry, brn org silty vsft, md gry</td> </tr> <tr> <td colspan="13">Sh, md gry, brn org silty vsft, trc md gry, lt aqua gry silty, ls, lt gry crm, dull, n sho</td> </tr> <tr> <td colspan="13">Ls, wht, bioclastic, spary calc intra clastic cmt, pr por, n stn, odor, n sho</td> </tr> <tr> <td colspan="13">Ls, wht, ool & bioclastic, spary calc intra clastic cmt, pr por, 15% dull, dns, n stn, odor, n sho</td> </tr> <tr> <td colspan="13">Sh, brn org silty, lt brn vsft, ls, wht lt gry, vfn-micro xln, fossilif, dns, n stn, n odor, n sho</td> </tr> <tr> <td colspan="13">Sh, brn org silty, lt brn vsft, ls, wht lt gry, vfn-micro xln, fossilif, dns, n stn, n odor, n sho</td> </tr> <tr> <td colspan="13">Sh, brn org silty, lt brn vsft, ls, wht lt gry, vfn-micro xln, fossilif, dns, n stn, n odor, n sho</td> </tr> <tr> <td colspan="13">Sdy Sh, lt brn, silty-vfn grn, sli calc, well srt, vsft gummy, pr por, n odor, n sho</td> </tr> <tr> <td colspan="13">Mud Check 2 at 3,513' vis: 59 wt: 8.8 Chlor: 700 LCM: 10.0# Ph: 12.0 WL: 6.0</td> </tr> <tr> <td colspan="13">Spud 05:30 PM..06-10-2015 RTD 08:00 AM 06-17-2015</td> </tr> <tr> <td colspan="13">"BIT RECORD"</td> </tr> <tr> <td colspan="13">Surface Bit : Smith RAD503, 12-1/4, RR #RTFDSTC out at 268' Bit No.2, PDC, HTC DP506, 7-7/8" #715580 15-15-15 in at 311- out at 3245" Bit No.3, HTC GX20C, 7-7/8", #5251934, in at 3245 - out at 0000"</td> </tr> <tr> <td colspan="13">"VERTICAL SURVEYS"</td> </tr> <tr> <td colspan="13">1/2° @ 266' 0/0° @ 0000' 3/4° @ 3513' 0/0° @ 0000' 1/2° @ 4284' 3/4° @ 4776'</td> </tr> <tr> <td colspan="13">"PUMP DATA"</td> </tr> <tr> <td colspan="13">Emsco D-325 Stroke 14", Liner 6" Emsco D-300 Stroke 14", Liner 6"</td> </tr> <tr> <td colspan="13">"DAILY REPORT"</td> </tr> <tr> <td colspan="13">06-10-2015 - 5:30 PM Spud Drlg to 12 1/4" to 268'</td> </tr> <tr> <td colspan="13">Set 8-5/8" 6 jts 23# set @ 266' 185 sx A Comm 3%CC, Allied circ 5 bbls to pits</td> </tr> <tr> <td colspan="13">Plug down 10:00 PM 06-10-15</td> </tr> <tr> <td colspan="13">Drlg plug 6:00 AM 06-11-15</td> </tr> <tr> <td colspan="13">06-12-2015 - 7:00 AM Change bit @ 3513'</td> </tr> <tr> <td colspan="13">06-13-2015 - 7:00 AM Circ @ 3,940'</td> </tr> <tr> <td colspan="13">06-14-2015 - 7:00 AM Dst #1 @ 4,284'</td> </tr> <tr> <td colspan="13">06-15-2015 - 7:00 AM Dst #2 @ 4,350'</td> </tr> <tr> <td colspan="13">06-16-2015 - 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