

Robert L. Milford

PETROLEUM GEOLOGIST
Wichita, Kansas

GEOLOGISTS' REPORT

DRILLING TIME AND SAMPLE LOG

OPERATOR: **Murfin Drilling Company, Inc.**
LEASE: **HMZ #4-29**
LOC SPOT: **155 S & 105 E of E3 SE NW**

LOC FOOTAGE: **2,135' FNL 2,415' FWL**
SEC: **29 T1SP 1S** RING: **36W**
COUNTY: **RdWlms** STATE: **Kans5**

API: **15-153-20948-00-00**
CONTRACTOR: **Murfin Drilling Co., Inc.** RIG NO: **8**
DRILLING STARTED: **12-10-2013** COMPLETED: **12-19-2013**
MUD DISPLACED: **3,387'** MUD TYPE: **Chemical**

DRILLING TIME KEPT FROM: **3:57:01** TO: **RTD**
SAMPLES SAVED FROM: **3:57:01** TO: **RTD**
SAMPLES EXAMINED FROM: **3:57:01** TO: **RTD**
GEOLOGICAL SUPERVISION FROM: **3:57:01** TO: **RTD**

PRODUCTION: **5.1/2" @ 4773'**
W/ 230 sacks cement
SURFACE: **8.5/8" @ 254'**
W/ 230 sacks cement

CASING RECORD
Candidate:
ELEVATIONS
KB: **3,292'**
MSL: **3,287'**

ELECTRICAL SURVEYS
Pioneer Wireline:
Dial Induction Log
Dial Compensated -
Porosity Log
Microresistivity Log
Borehole Compensated -
Sonic Log

FORMATION NAME	LOG TOP DATUM	SAMPLE TOP DATUM
Stone Corral	3184' +108	3186' +106
Neva	3666' -374	3666' -374
Forker	3779' -487	3779' -487
Topeka	3999' -707	3999' -707
admsing	4213' -921	4213' -921
Stark	4428' -1136	4428' -1136
B/KC	4480' -1188	4480' -1188
Pawnee	4604' -1312	4604' -1312
Cherokee	4681' -1389	4681' -1389
Total Depth	4,775' -1484	4,775' -1483

DATE	7:00 AM DEPTH	REMARKS
12-10-13	0'	Spud @ 9:00 am. Plug down @ 4:00 pm. Drilled out plug @ 12:00 am on 12-11 w/ PDC bit
12-11-13	975'	Cut 975' in last 24 hrs. Lost 60 bbl @ 1853' & 40 bbl @ 2580'. Slow returns @ 2605'
12-12-13	3,180'	Cut 2,205' in last 24 hrs; 22 hrs drlg. Bit trip @ 3402' (ran button bit)
12-13-13	3,720'	Cut 540' in last 24 hrs; 16 hrs drlg. DST #1 @ 3980'
12-14-13	3,980'	Cut 260' in last 24 hrs; 8.75 hrs drlg. DST #2 @ 4290'
12-15-13	4,290'	Cut 310' in last 24 hrs; 11.5 hrs drlg. DST #3 @ 4395'
12-16-13	4,395'	Cut 105' in last 24 hrs; 5.25 hrs drlg. DST #4 @ 4432'
12-17-13	4,432'	Cut 37' in last 24 hrs; 1.75 hrs drlg.
12-18-13	4,620'	Cut 188' in last 24 hrs; 10.25 hrs drlg. DST #5 @ 4714'
12-19-13	4,750'	Cut 130' in last 24 hrs; 6.5 hrs drlg. RTD 4775' @ 8:00 am
12-20-13	4,775'	Cut 25' in last 24 hrs; 1 hr drlg. Ran production casing.

Remarks

The electric log measurements correlate from 2' higher to 1' lower to the drilling measurements.

Formation tops and lithology on this report have been connected to the electric log.

The drilling samples were deposited at the Kansas Geological Survey office in Wichita.

Respectfully submitted,

Robert L. Milford

