

**GRAND MESA OPERATING COMPANY**

(316) 265-3000  
FAX: (316) 265-3455

1700 N. WATERFRONT PARKWAY  
BLDG. 600  
WICHITA, KANSAS 67208-5514

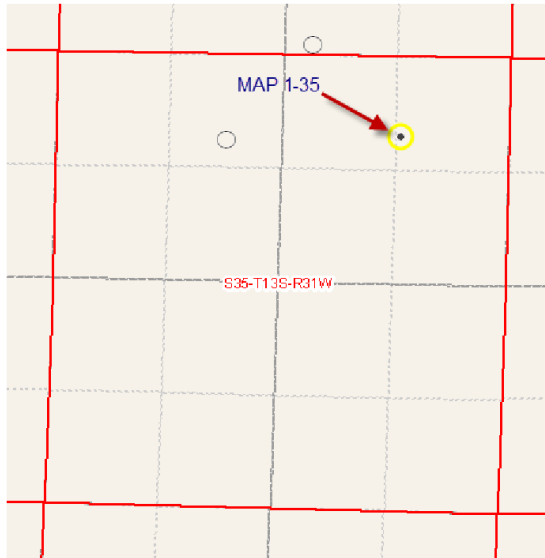
Scale 1:240 (5"=100') Imperial  
Measured Depth Log

Well Name: MAP 1-35  
 Location: 946' FNL, 1261' FEL, 35-13s-31w, Gove County, Kansas  
 License Number: API: 15-063-22081      Region: Gove County  
 Spud Date: 01/23/2013      Drilling Completed: 02/01/2013  
 Surface Coordinates: Lat: 38.8856016  
 Long: -100.7279016  
 Bottom Hole Coordinates: Vertical hole  
 Ground Elevation (ft): 2806'      K.B. Elevation (ft): 2811'  
 Logged Interval (ft): 3800' To: RTD      Total Depth (ft): 4570'  
 Formation: Mississippian at RTD  
 Type of Drilling Fluid: Chemical

Printed by MUD.LOG from WellSight Systems 1-800-447-1534 www.WellSight.com

**GEOLOGIST**

Name: Kent R. Matson  
 Company: Matson Geological Services, LLC  
 Address: 33300 W. 15th Street S.  
 Garden Plain, Kansas 67050  
 316-644-1975



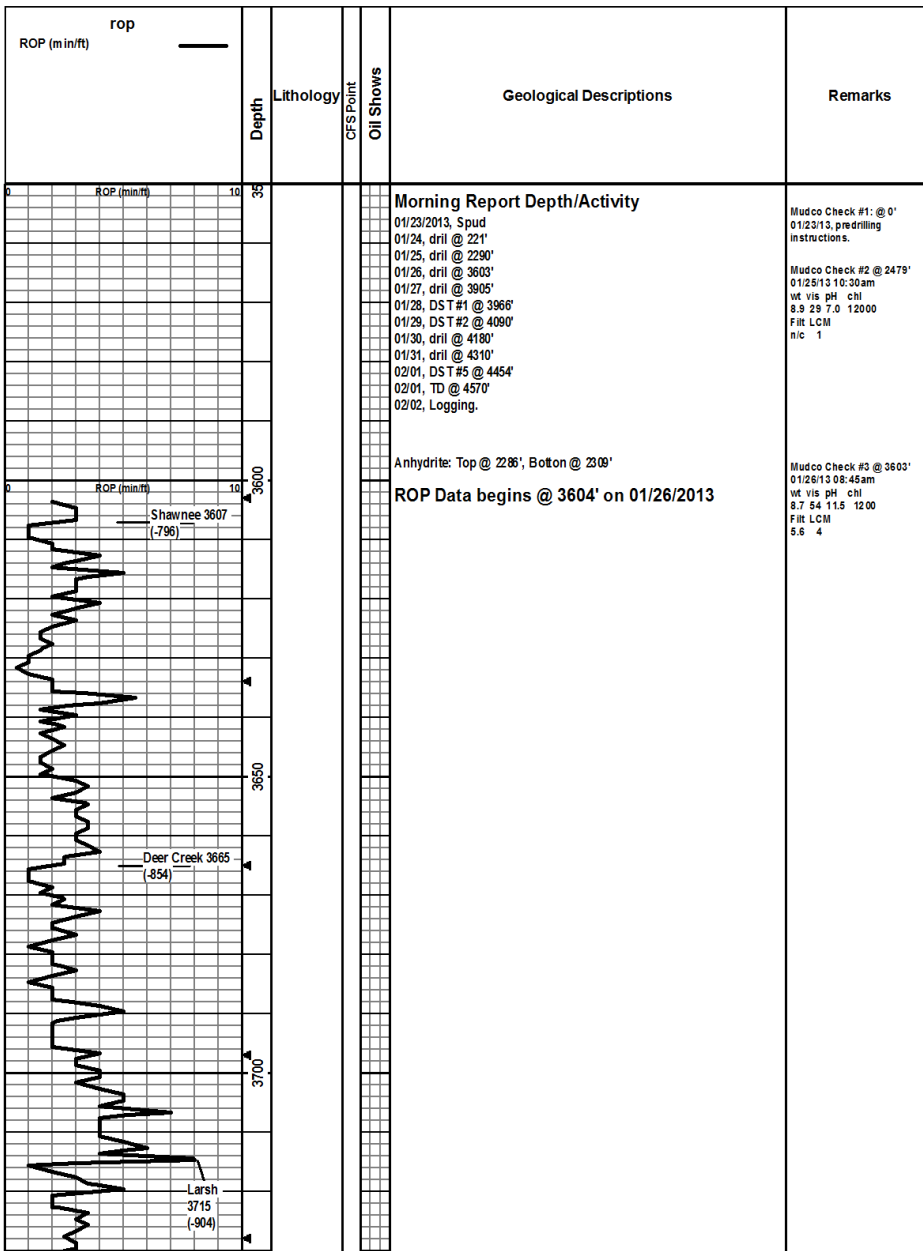
**COMMENTS**

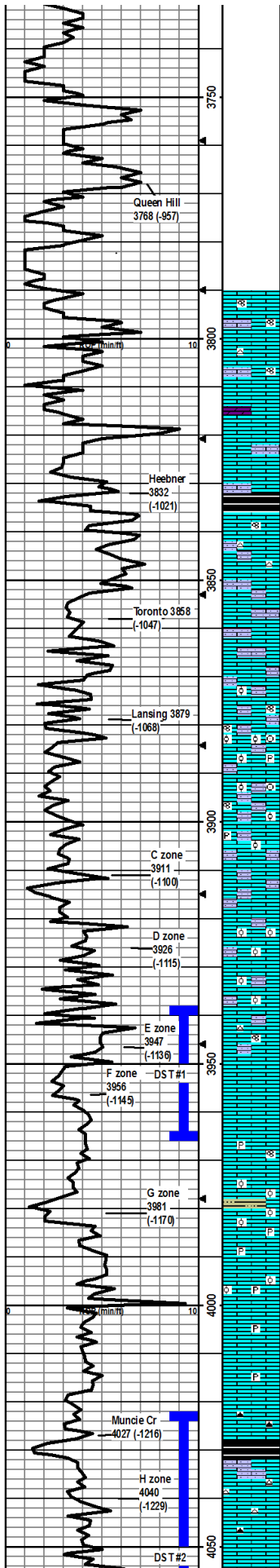
Contractor: Murfin Drilling Company Rig #24  
 Pusher: Tony Martin  
 Surface Casing: 8 5/8" set at 221' (KB) w/175sx  
 Production Casing: Production casing (5.5") was installed to RTD, based on field observations of drill cuttings, DST results and electric log evaluation.  
 Mud by: MudCo  
 DST's by: Diamond Testing  
 Logs by: Weatherford (DIL, CN-CD, ML, Sonic)  
 RTD = 4570'  
 LTD = 4570'

**FORMATION TOPS**

FORMATION	SAMPLE TOPS		LOG TOPS	
	Depth	Datum	Depth	Datum
Queen Hill	3768'	-957	3770'	-959

Heebner Shale	3832'	-1021	3833'	-1022
Toronto	3858'	-1047	3857'	-1046
Lansing	3879'	-1068	3879'	-1068
Muncie Creek Shale	4027'	-1216	4029'	-1218
Stark Shale	4111'	-1300	4113'	-1302
Hushpuckney Shale	4148'	-1337	4150'	-1339
Marmaton	4211'	-1400	4212'	-1401
Upper Fort Scott	4315'	-1504	4316'	-1505
Little Osage Shale	4336'	-1525	4337'	-1526
Excello Shale	4362'	-1551	4362'	-1551
Johnson Zone	4440'	-1629	4440'	-1629
Morrow	4455'	-1644	4456'	-1645
Mississippian	4469'	-1658	4469'	-1658
RTD	4570'	-1759		
LTD			4570'	-1759





Drill cutting samples at 10' intervals start at 3800'.

LS: crm/lt gry, micro-med xtal, foss frags/fusin, vry sndy, some chalky, ppt in-xtal por w/min frac por, no odor, ns.

LS: crm, micro-med xtal, foss frags/fusin, vry silty/sndy, some wht chalk, min wht chert, min ppt in-xtal/frac por, no odor, ns.

LS: grysh brn w/dk gry inclus, micro-med xtal, foss frags, min frac por, no odor, ns. Some crm Dolo.

LS: crm/lt brn/lt gry, micro-fn xtal, vry stly/sndy, foss frags, min frac por, no odor, ns.

SH: blk, carb, firm, fissile  
LS: crm/lt brn/lt grysh brn, micro-med xtal, foss frags/fusin, some vry silty/sndy, min frac por, no odor, ns.

LS: crm/lt brn/lt gry, micro-med xtal, foss frags, some vry silty/sndy, wht chert, some ppt in-xtal/frac por, no odor, ns.

LS: crm, micro-med xtal, foss frags, vry sndy, some ppt-fn in-xtal por, no odor, ns.

LS: same as above w/crm-lt gry.

LS: crm/lt brn/lt gry, micro-med xtal, foss frags/fusin/ool, silty, ppt-fn in-xtal/oo-castn/frac por, no odor, ns.

LS: crm/lt gry, micro-med xtal, foss frags/grn/fusin/abund ool, pyritic, some soft wht chalk, some vry sndy, some ppt-med in-xtal/oo-castic por, no odor, ns.

LS: same as above w/less ool, bracs present, no pyrite.

LS: crm, micro-med xtal, foss frags w/some abund ool, some wht soft chalk, some vry sndy, some pyritic, ppt-fn in-xtal por, no odor, ns.

LS: crm/lt brn/lt gry, micro-med xtal w/some 2ndry xtal, foss frags/fusin/ool, some sndy, ppt-fn in-xtal por, no odor, ns.

LS: crm/lt brn/lt gry, micro-med xtal, foss frags/ some abund ool pcs, stly sndy, min ppt in-xtal por, no odor, ns.

LS: crm/lt brn/lt gry/lt grnsh gry, micro-med xtal, foss frags/some ool pcs, some sndy, some chalky, min ppt in-xtal/frac por, no odor, ns.

LS: crm/lt brn, micro-fn xtal, foss frags/fusin, some silty, some wht/lt gry chert, 2 pcs in 30 min and 3 pcs in 60 min in smpls w/ppt in-xtal por w/fo, yel flourcut, no crush odor, ssfo.

LS: crm/lt brn, micro-med xtal w/some gd 2ndry xtal, foss frags, 8 pcs w/ppt-coarse in-xtal por w/fo, crush odor, yel flourcut ssfo.

LS: same as above in 30 min and 60 min smpls, however poor smpl quality, 3 pcs in 30 min and 1 pcs in 60 min smpls w/ppt-coarse por w/fo, silt cup odor, yel flourcut, ssfo.

LS: crm/lt gry, micro-fn xtal, min foss frags/lt silty, some pyritic, some soft wht chalky pcs, min frac por, no odor, ns.

LS: crm/lt gry, micro-med xtal, foss frags/some abund ool pcs, some pyritic, some wht chalky pcs, ool pcs have m-c-oo-castic por/min frac por, no odor, ns. Some med-dk gry/grnsh gry, silty, firm SH.

LS: crm/lt gry/lt brn, micro-med xtal w/some 2ndry xtal, min foss frags/some abund dense ool, pyritic, some wht chalky pcs, min ppt in-xtal/frac por, no odor, ns.

LS: crm/lt gry, micro-med xtal, min foss frags w/some abund ool pcs, pyritic, some fn-med oo-castic por, no odor, ns.

LS: crm/lt-med gry w/min dk gry, micro-med xtal, min foss frags, some pyritic, no vis por, no odor, ns.

LS: same as above, no odor, ns.

LS: crm/lt-med brn/gry, micro-med xtal, min foss frags, dk brn chert, some frac por, no odor, ns.

SH: blk, carb, firm, fissile.

LS: lt-med brn, micro-med xtal, some grainy/sndy, min foss frags, lt brn/gry chert, min ppt in-xtal/frac por, no odor, ns.

LS: crm/lt brn, micro-med xtal, min foss frags, lt gry/dk brn chert, pyritic, mostly dense w/1 pcs ppt in-xtal por w/fo, no crush odor, yel flourcut but had to crush, ssfo.

Mudco Check #4 @ 3915'  
012713 09:00am  
wt vis pH chl  
9.0 54 11.0 1500  
FIT LCM  
6.2 4

CFS @ 3915'  
30"60"

DST1) 3938-3966

E & F Zones  
30456090  
1st) Surface blow built to 2", no BB.  
2nd) Surface blow built to 1.5", no BB.  
IFP 9-23#  
ISIP 1107#  
FFP 25-41#  
FSP 1141#  
HP 1890-1884#  
Rev'd: 30" GIP, 3" O, 60"  
SOCM (3% O).

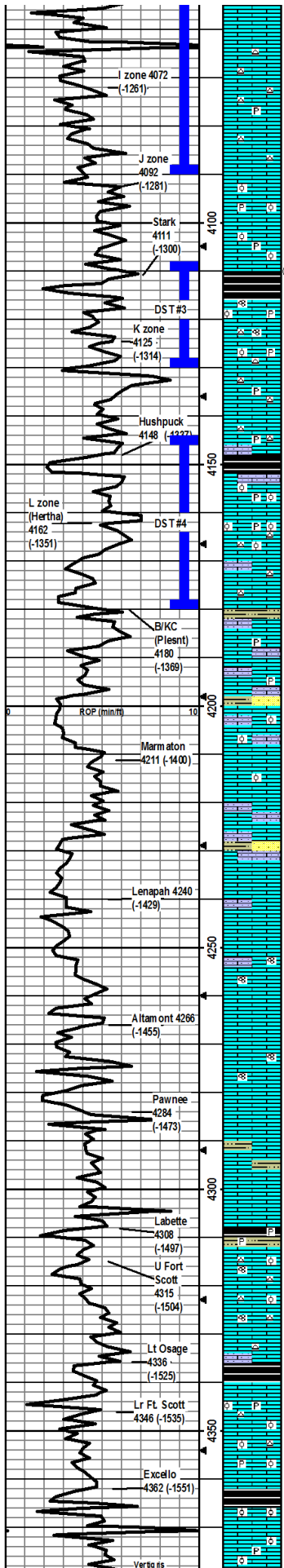
CFS @ 3952'  
30"60"

CFS @ 3966'  
30"60"

Mudco Check #5 @ 4001'  
012813 11:00am  
wt vis pH chl  
9.0 47 11.5 1400  
FIT LCM  
5.8 4

DST2) 4022-409

H & I Zones  
30456090  
1st) Surface blow built to 3", no BB.



no sample correct.

LS: crm/lt brn, micro-fn xtal, min foss frags, pyritic, wht/lt gry/orange chert, min frac por, no odor, ns.

LS: crm/lt brn, micro-fn xtal, min foss frags, stly pyritic, wht chert, 9 pcs w/ppt-coarse in-xtal por w/sfo, yel floor/out, slit cup odor, gsfo.

LS: crm/lt brn, micro-fn xtal, min foss frags, wht/lt brn chert, 4 pcs in 30 min and 6 in 60 min smpls w/ppt-fn in-xtal por w/sfo, slit crush odor, yel floor/out, sfo.

LS: crm/lt brn/lt gry, micro-med xtal, foss frags w/ ool pcs, some chalky pcs, pyritic, some ppt-coarse in-xtal/frac por, no odor, ns.

LS: crm/lt gry/lt brn, micro-med xtal some 2ndry xtal, foss frags/some ool pcs, stly pyritic, some stly chalky, m in frac por, no odor, ns.

SH: dk gry/blk, carb, firm, fissile.

LS: crmit brn/lt med gry, micro-med xtal, foss frags/fusino ool, stly pyritic, 67 pcs w/ppt-coarse in-xtal por w/sfo, strg cup odor, yel floor/out, ygs lb.

LS: crmit-med brn/med-dk gry, micro-med xtal, foss frags/fusino ool, wht-lt gry chert, pyritic, 9 pcs in 30 min and 10 pcs in 60 min smpls w/ppt-coarse in-xtal/ool-coarse por w/sfo, gd odor, yel floor/out, ygs lb.

LS: crm/lt brn/lt gry, micro-fn xtal, m in foss frags, some pyritic, lt gry/brn chert, no vis por, no odor, ns.

LS: crm/lt-med brn/lt gry, micro-med xtal w/some gd 2ndry xtal, foss frags, pyritic, lt gry chert, some vry sndy, min ppt in-xtal por, no odor, ns.

SH: dk gry/blk, carb, firm-hard, fissile.

LS: lt-med brn/lt-med gry, micro-med xtal, foss frags/some ool, pyritic, some vry sndy, some frac por, no odor, ns.

LS: lt-dk brn/lt-med gry, micro-med xtal, foss frags/abund ool pcs, pyritic, some vry sndy, some gry chert, min frac por, no odor, ns.

LS: crm/lt brn/lt gry, micro-med xtal, foss frags, some sndy, lt-med gry chert, 2 pcs in 30 min 2 pcs in 60 min smpls w/ppt-coarse in-xtal por w/sfo, gd cup odor, yel floor/out, sfo.

LS: lt gry/lt brn, micro-med xtal w/some 2ndry xtal, foss frags, pyritic, some chalky, vry sndy, lt-med gry vry silty soft-firm SH, min frac por, no odor, ns.

LS: lt brn, micro-med xtal, some vry silty/sndy, some pyritic, min foss frags, min in-xtal/frac por, flood of lt-med gry silty SH w/some vff siltsbn, no odor, ns.

LS: crm/lt-med brn, micro-med xtal, foss frags/ool, some vry sndy, some chalky, frac por, no odor, ns.

LS: crm/lt brn, micro-med xtal, min foss frags/ool, some wht chalky pcs, min frac por, no odor, ns.

LS: crm/lt brn, micro-med xtal, min foss frags, vry sndy, min in-xtal/frac por, some lt-med gry/gnish gry/red brn silty SH w/lt gry siltsbn, no odor, ns.

LS: lt brn, micro-fn xtal, min foss frags, some stly sndy, min frac por, no odor, ns.

LS: crm/lt-med brn, micro-fn xtal, min foss frags, some stly sndy, min frac por, no odor, ns.

LS: crm/lt gry/lt brn w/red brn mottling, micro-med w/some coarse xtal/some 2ndry xtal, some sndy, foss frags/fusln, min in-xtal/frac por, no odor, ns.

LS: crm/lt brn, micro-med xtal w/some 2ndry xtal, min foss frags, min frac por, no odor, ns.

LS: crm/lt brn, fn-coarse xtal w/2ndry xtal, foss frags/fusln, frac por, no odor, ns.

LS: crm/lt-med brn, micro-med xtal, foss frags, frac por, no odor, ns.

LS: lt brn, micro-fn xtal w/coarse 2ndry xtal, m in foss frags, frac por, no odor, ns. Flood of med-dk gry/red brn silty soft-firm SH.

LS: lt gry/lt brn, micro-med xtal w/some 2ndry xtal, min foss frags, some sndy, m in frac por, no odor, ns.

SH: med-dk gry/blk, carb, silty, pyritic, firm-hard, fissile.

LS: crmit brn, micro-med xtal, foss frags/fusino dense ool pcs, abund wht/lt gry/lt brn chert, mostly dense w/1 pce w/ppt-fn in-xtal por w/sfo, slit crush odor, yel floor/out, sfo.

LS: same as above w/1 pce w/ppt-coarse in-xtal/ool por w/sfo, slit crush odor, yel floor/out, sfo.

LS: crm/lt brn, micro-med xtal, foss frags, some lt gry/lt brn chert, some stly sndy, min frac por, no odor, ns.

SH: dk gry/blk, silty, carb, firm-hard, fissile.

LS: crm/lt brn, micro-med xtal w/some 2ndry xtal, min foss frags w/some dense ool pcs, stly pyritic, min wht/lt gry chert, m in ppt in-xtal/frac por, no odor, ns.

LS: same as above w/some wht chalky pcs, no odor in 30 min smpl and slit crush odor in 60 min smpl, ns.

SH: dk gry/blk, some vry silty pcs, carb, firm-hard, fissile.

LS: crmit-med brn/lt gry, micro-med xtal w/2ndry xtal, min foss frags w/abund ool pcs, min ppt in-xtal/frac por, no odor, ns.

LS: lt-med brn, micro-med xtal, some foss frags/dense ool, stly pyritic, min frac por, no odor, ns.

2nd) No blow built to 1/2", no BB.

IFP 15-31#  
ISIP 1016#  
FFP 35-51#  
FSP 1041#  
HP 1945-1945#  
Recvd: 70' OSM (1% O).

CFS @ 4090'  
30°/60'

Mudco Check #6 @ 4105'  
01/29/13 09:00am  
wt vis pH chl  
9.2 54 10.5 1200  
FIL LCM  
6.0 5

CFS @ 4110'  
30°/60'

CFS @ 4130'  
30°/60'

**DST3) 4108-4130 K-Zone**  
NOTE: Low levels H2S Gas.  
3045/3030  
1st) Surface blow built to 1.25", no BB.  
2nd) no blow, no BB.  
IFP 9-11#  
ISIP 721#  
FFP 11-11#  
FSP 470#  
HP 1975-1973#  
Recvd: 3' mud.  
NOTE: Low levels H2S Gas.

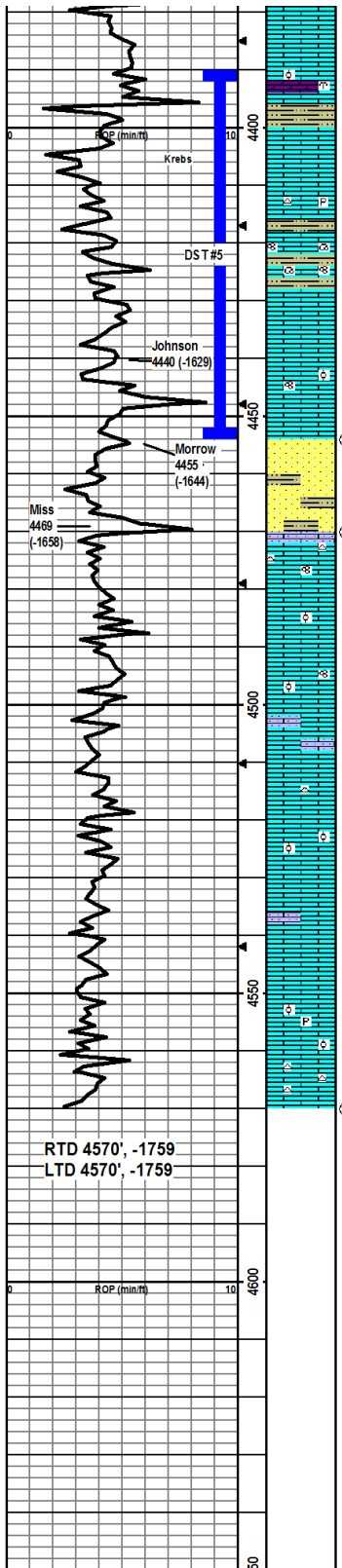
CFS @ 4180'  
30°/60'

Mudco Check #7 @ 4180'  
01/30/13 09:20am  
wt vis pH chl  
9.3 58 10.0 1200  
FIL LCM  
7.2 4

**DST4) 4144-4180 L-Zone**  
3045/6090  
1st) Surface blow built to 1.75", no BB.  
2nd) surface blow built to 1.25", no BB.  
IFP 10-18#  
ISIP 1090#  
FFP 18-28#  
FSP 1078#  
HP 1977-1976#  
Recvd: 20' mud.

Mudco Check #8 @ 4325'  
01/31/13 09:10am  
wt vis pH chl  
9.3 52 10.0 1300  
FIL LCM  
6.8 6

CFS @ 4360'  
30°/60'



LS: crm/lt-med brn/lt gry, micro-fn xtal, foss frags, m in frac por, no odor, ns.

LS: crm/lt-med brn/lt gry, micro-med xtal, foss frags/brn/zl/some dense ool pcs ool, lt gry Dolo, frac por, no odor, ns.

SH: lt-dk gry/red brn, vry silty, some silt stn, soft-brn sily carb, fls sil.

LS: crm/lt-med brn/lt gry, micro-fn xtal, min foss frags, min frac por, no odor, ns.

LS: crm/lt brn/lt gry, micro-fn xtal, m in foss frags, sily pyritic, some lt gry chert, min frac por, no odor, ns.

SH: lt-dk gry/gmish gry/med-dk brn, vry silty, sily carb, some lt gry silt stn, fim.

LS: crm/lt brn, micro-med xtal, foss frags/gas/fusin, min ppt in-xtal por, no odor, ns.

SH as above.

LS: crm/lt brn, micro-fn xtal, some foss frags, 25 pcs w/ppt-fn w/some med in-xtal por, silt cup odor, yel floricut, gsfo.

LS: crm/lt-med brn, micro-med xtal, foss frags/fusin w/dense ool, 9 pcs in stop smpl w/ppt-crs in-xtal por, crush odor, oil is lt brn, sfo.

LS: same as above w/24 pcs in 30 min and 9 pcs in 60 min smpls w/ppt-med in-xtal por, crush odor, oil is thick blk tar consistency.

SS (quartzarenite): wht, vf-f, sr-wr, hard, friable

SH/SS mix: SH is gmish gry/lt-dk gry/red brn/maroon, vry silty, soft-fim, ns; SS is wht wired brn inclusions/lt gry/gmish gry, pred qtz carb matrix, v-f-f, s-f-w, hard, friable, no odor, ns.

LS: crm/lt brn, micro-med xtal, some foss frags/fusin, some orange brn chert, some vry sndy, min frac por, no odor, ns.

LS: crm/lt brn/lt yel brn, micro-fn xtal, min foss frags/m in dense ool pcs, min frac por, no odor, ns.

LS: crm/lt yel brn, micro-med xtal, foss frags/fusin/m in dense ool pcs, min frac por, no odor, ns.

LS: crm/lt brn, micro-fn xtal, min foss frags, some vry sndy pcs, min frac por w/1 pce ppt-coarse in-xtal por w/sfo (Poss float thru pcs??), no odor, sfo.

LS: crm/lt gry, micro-fn xtal, m in foss frags, m in wht chert, no vis por, no odor, ns.

LS: crm, micro-med xtal, foss frags/some dense ool pcs, grainy, no vis por, no odor, ns.

LS: crm, micro-fn xtal, min foss frags, some sndy, min frac por, no odor, ns.

LS: crm/lt gry, micro-fn xtal w/some 2ndry xtal, min foss frags, min frac por, no odor, ns.

LS: crm/lt gry/lt brn w/dk brn inclusions, micro-med xtal, foss frags w/some abund dense ool pcs, some pyritic, m in frac por, no odor, ns.

LS: crm/lt brn, micro-fn xtal, min foss frags, abund wht/opaque chert, min frac por, no odor, ns.

**DST5) 4390-4454**

**Johnson**  
 3045/60/90  
 1st) Strg blow built to BOB in 7 min, 1" BB.  
 2nd) Strg blow built to BOB in 5 min, 8" BB.  
 IF P 15-84#  
 ISPP 1017#  
 FFP 87-141#  
 F SP 1012#  
 HP 2111-2090#  
 Recvd: 1200' GIP, 40' GCO,  
 190' GCMO (55% oil), 120'  
 HGCMO (40% oil).

CFS @ 4454'  
 30"/60"

Mudco Check #9 @ 4454'  
 02/01/13 10:00am  
 wt vis pH chl  
 9.3 56 10.5 1400  
 Filt LCM  
 6.4 6

CFS @ 4470'  
 30"/60"

CFS @ 4570', 30"/60".  
 Cir 1.5 hrs total to clean hole.

RTD 4570', -1759  
 LTD 4570', -1759