

GRAND MESA

OPERATING COMPANY

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

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

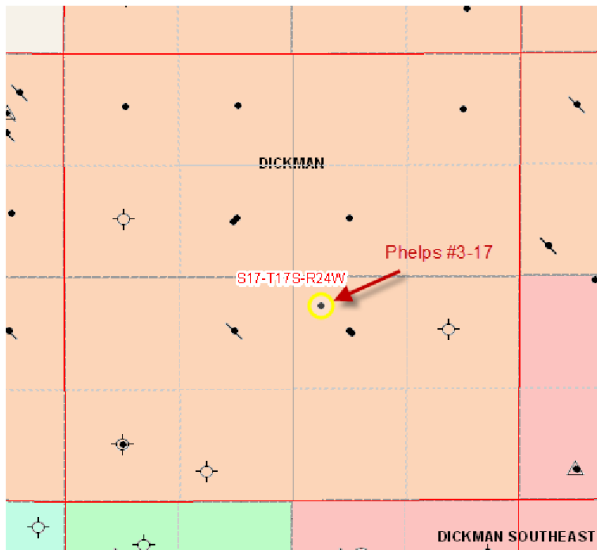
Scale 1:240 (5"=100') Imperial
Measured Depth Log

Well Name: PHELPS #3-17
Location: 2263' FSL, 2310' FEL, 17-17s-24w, NESS County, Kansas
License Number: API: 15-135-25336 Region: NESS County
Spud Date: 01/04/2012 Drilling Completed: 01/12/2012
Surface Coordinates: Lat: 38.5720329
Long: -100.000096
Bottom Hole Coordinates: Vertical hole
Ground Elevation (ft): 2461' K.B. Elevation (ft): 2466'
Logged Interval (ft): 3600' To: RTD Total Depth (ft): 4626'
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



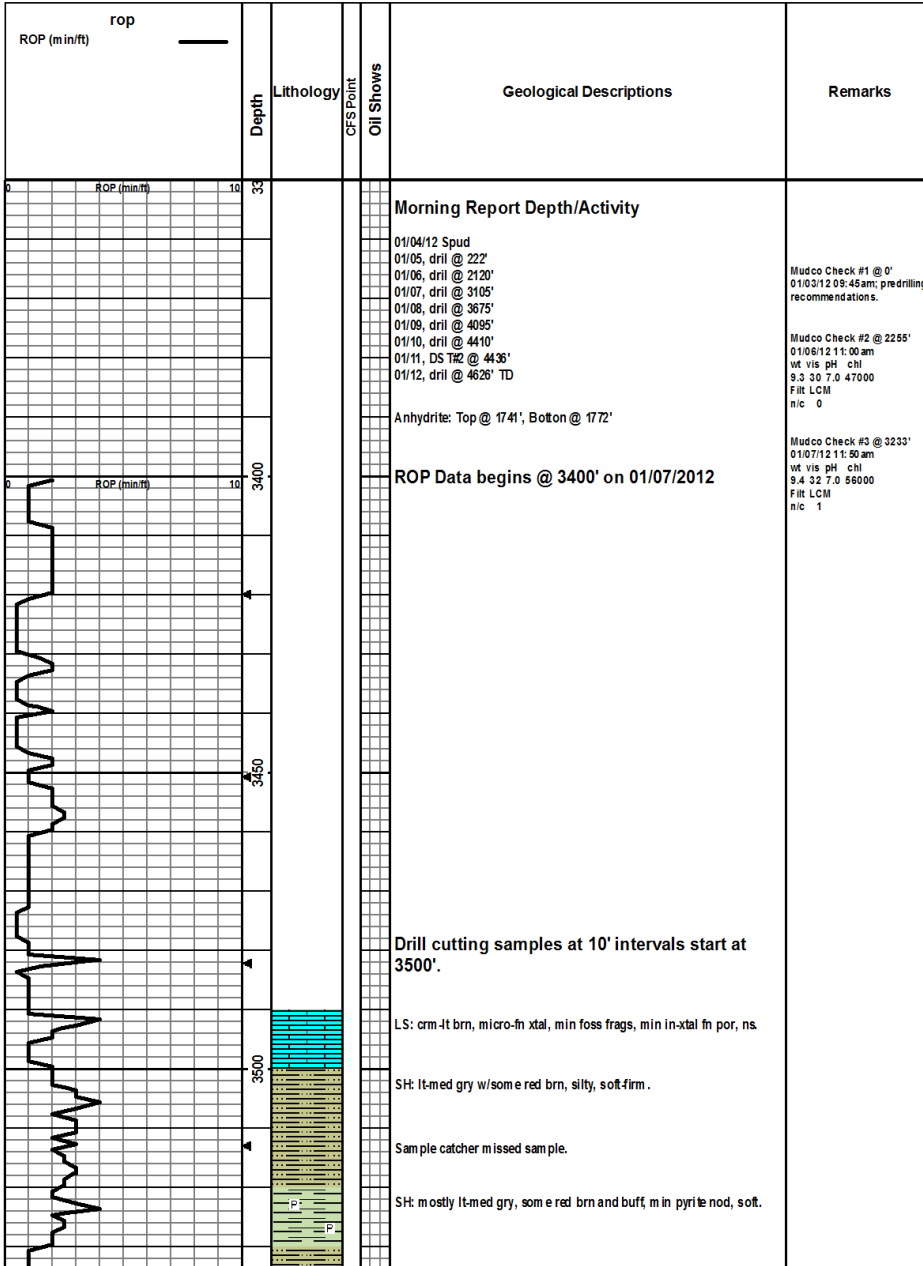
COMMENTS

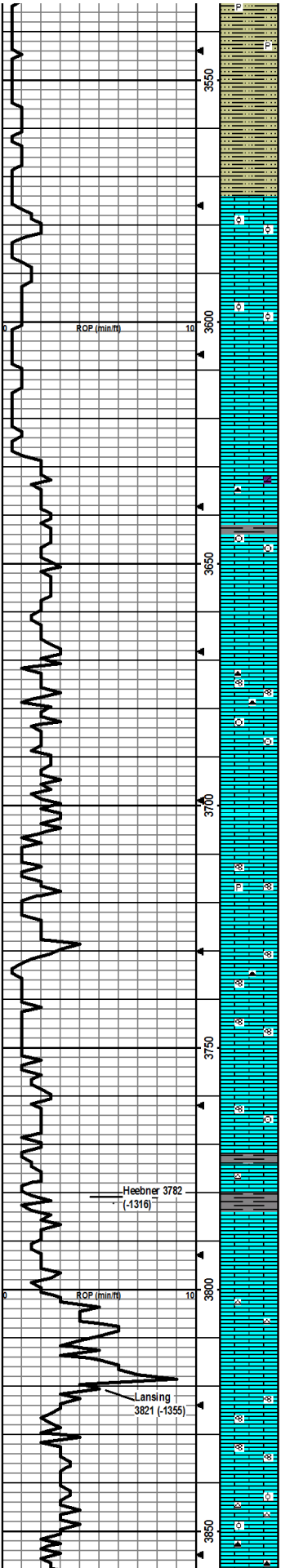
Contractor: Murfin Drilling Company Rig #24
Pusher: Tony Martin
Surface Casing: 8 5/8" set at 222' (KB) w/165sx concrete
Production Casing: Production casing (5 1/2") was installed to RTD.
Mud by: MudCo
DST's by: Tribolite Testing
Logs by: Superior Well Services (DIL, CN-CD, ML)
RTD= 4626'
LTD= 4631'

FORMATION TOPS

FORMATION	SAMPLE TOPS		LOG TOPS	
	Depth	Datum	Depth	Datum
Heebner Shale	3782'	-1316	3780'	-1314
Lansing	3821'	-1355	3820'	-1354

Stark Shale	4059'	-1593	4057'	-1591
Hushpuckney Shale	4095'	-1629	4088'	-1622
Marmaton	4161'	-1695	4158'	-1692
Excello Shale	4312'	-1846	4310'	-1844
Fort Scott	4349'	-1853	4316'	-1850
Mississippian	4313'	-1947	4406'	-1940
RTD	4626'	-2160		
LTD			4631'	-2165





SH: med gry/red brn, min amt out, silty, min pyrite nod, sort

Drilling fast - skipped sample.

SH: lt-med gry/red brn, silty, soft

Skipped sample.

LS: lt gry/lt brn, micro-fn xtal, ool nods, silty, some pcs w/good oo-castic vug por, ns.

Skipped sample.

LS: lt gry/crm-lt brn, micro-fn xtal, silty, ool, some pcs w/good oo-castic por, ns.

Skipped sample.

Skipped sample.

LS: lt gry/lt-med brn, micro-fn xtal, min foss frags, min pcs w/ppt-fn por, ns.

LS: med gry/ish brn - dk brn, micro-fn xtal, foss frags w/fusin, min dk gry/blk chert, min dk brn doio, min fn in-xtal por, ns

LS: crm-lt gry/ish brn, micro-fn xtal, foss frags w/min crin, few pcs med gry soft SH, min frac por, ns.

LS: lt gry/crm-lt brn, micro-fn xtal, foss frags, min frac por, ns.

LS: crm-med brn, micro-fn xtal, foss frags, silty, min frac por, ns.

LS: lt gry/crm-lt brn, micro-fn xtal, foss frags w/min fusin, gry chert, min frac por, ns.

LS: crm-med brn, micro-med xtal, foss frags/crin, stly pyritic, some soft chalky pcs, min frac por, ns

LS: lt gry/crm, micro-fn xtal, min foss frags, no vis por, ns

Same as above.

LS: lt-med gry/ish brn, micro-fn xtal, min foss frags/fusin, stly pyritic, min frac por, ns

LS: lt gry/ish brn, micro-fn xtal, min foss frags, min frac por, ns

LS: lt-med brn/ish gry, micro-med xtal, min foss frags/fusin, some lt gry chert, min frac por, ns.

LS: lt gry/crm-med brn, micro-fn xtal, foss frags/fusin, min in-xtal/frac por, ns.

LS: crm-lt gry/ish brn, micro-fn xtal, min foss frags, some lt gry chert, min frac por, ns.

LS: crm-med brn, micro-med xtal, foss frags/crin/fusin, min frac por, ns.

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

SH: blk, carb, firm, fissile.

LS: lt gry/ish brn, micro-fn xtal, min foss frag, no vis por, ns.

LS: crm-lt brn, micro-fn xtal, min foss frags, min frac por, ns.

LS: lt gry/crm-lt brn, micro-med xtal, min foss frags, some soft silty, min lt gry chert, no vis por, ns.

LS: crm/lt-med gry, micro-fn xtal, min foss frags/fusin, some wht soft chalky pcs, min frac por, ns.

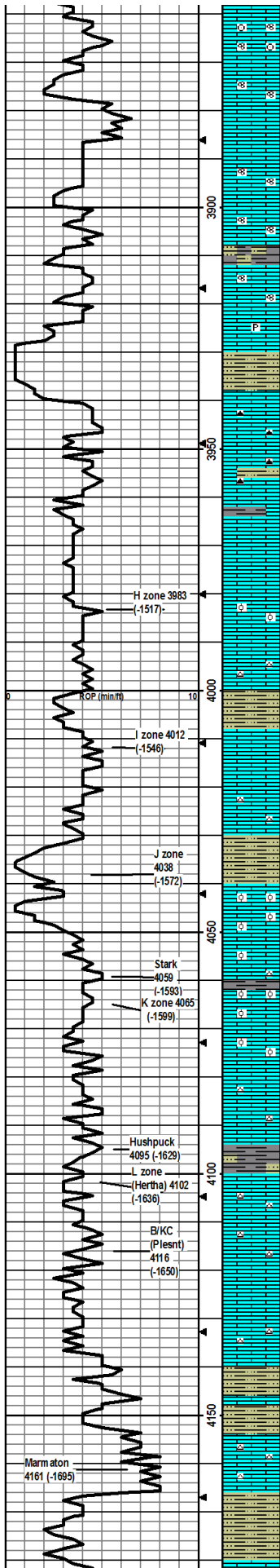
LS: lt greenish gry/crm-brn, micro-med xtal, foss frags/fusin, stly pyritic, min frac por, ns.

LS: lt-med gry/crm-med brn, micro-med xtal, foss frags/ool, some wht chert, min in-xtal/frac por, ns

LS: lt greenish gry/crm-dk brn, micro-med xtal, foss frags, some dk gry/blk chert, min frac por, ns.

Note: At 3628' FDC bit plugged. Ran sure-shot. Made bit trip and replaced with button rotary bit. Also strapped drill pipe - 1 ft short.

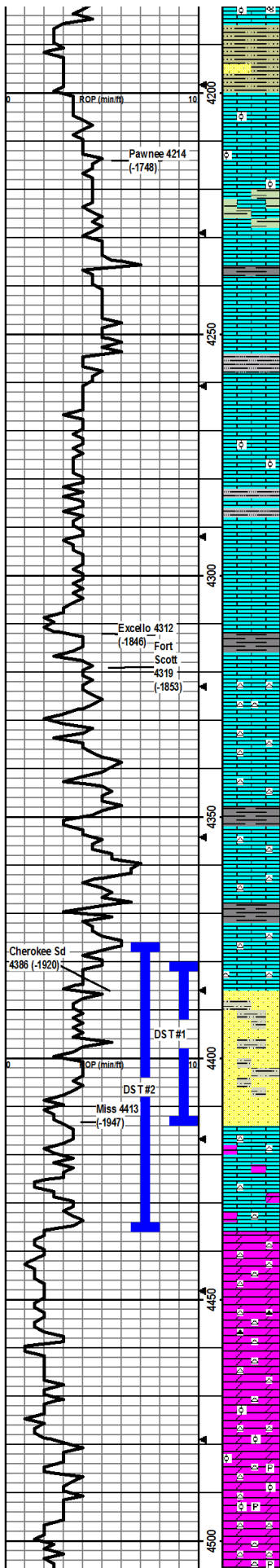
Mudco Check #4 @ 3784'
 01/08/12 11:30 am
 wt vis pH chl
 8.7 60 10.5 7200
 Filt LCM
 6.0 1



- LS: lt greenish gry/crm-dk brn, m micro-med xtal, foss frags/fusln/crin some pcs abund ool, m in in-xtal/frac por, ns.
- LS: crm-dk brn, m micro-med xtal, foss frags/fusln, some pyritic, min in-xtal/frac por, ns.
- LS: lt gry/crm-lt brn, m micro-fn xtal, foss frags, some lt gry chert, some med gry SH, no vis por, ns.
- LS: crm-lt brn, micro-fn xtal, foss frags/fusln, m in in-xtal/frac por, ns.
- LS: lt gry/crm-lt brn, m micro-med xtal, foss frags/fusln, in-xtal/frac por, ns.
- SH: med-dk gry, carb, soft-firm, fissile
- LS: crm-lt brn, micro-med xtal, foss frags/min fusln, some silty pcs, m in in-xtal/frac por, ns.
- LS: crm-brn, micro-med xtal, foss frags, min pyritic, m in in-xtal/frac por, ns.
- SH: med-dk gry/mustard yel, carb, silty, firm, fissile
- LS: crm-brn, micro-med xtal, foss frags, brn chert, min in-xtal/frac por, ns.
- LS: crm-dk brn, micro-med xtal, foss frags, some silty/chalky - crushes easily, some gry firm silty SH, m in brn chert, no vis por, ns.
- LS: crm-lt brn, micro-med xtal, foss frags, some gry-dk gry/blk and mustard yel firm silty SH, some fn in-xtal por, ns.
- LS same as above.
- LS: lt gry/crm-med brn, micro-med xtal, min foss frags w/some pcs of abund ool, mostly min frac por, ool pcs have good ool-castic por, ns.
- LS: crm-lt brn, micro-fn xtal, min foss frags, some wht-lt gry chert, no vis por, ns.
- SH: lt-dk gry/red-orange brn, silty, firm, fissile.
- LS: crm, micro-fn xtal, stly silty, no vis por, ns.
- LS: crm-lt brn, micro-fn xtal, min foss frags, wht-lt gry chert, no vis por, ns.
- SH: lt gry/lt greenish gry/med-dk gry/blk/red brn, silty, firm, fissile
- LS: crm-lt brn, micro-med xtal, abund ool, good vug ool-castic por, some wht soft chalky pcs, ns.
- LS: wht-crm, micro-fn xtal, min foss frags/ool, some wht chert, no vis por, ns.
- SH: med-dk gry/blk, carb, firm, fissile.
- LS: crm-lt brn, micro-med xtal, abund ool, some wht chalky pcs, good ool-castic vug por, ns.
- LS: lt gry/crm-lt brn, m micro-med xtal, min foss frags w/abund ool, good ool-castic por, ns.
- LS: lt gry/crm, m micro-fn xtal, silty, min wht chert, no vis por, ns.
- SH: med-dk gry/blk, carb, silty, firm, fissile
- LS: lt gry/crm, m micro-xtal, some silty, lt gry chert, no vis por, ns.
- LS: crm, micro-fn xtal, min foss frags, lt brn chert, no vis por, ns.
- LS: lt gry/crm, m micro-fn xtal, min foss frags, no vis por, ns.
- LS: crm/dk brn, m micro-med xtal, min foss frags, some silty/sandy, some wht-lt brn chert, min frac por, ns.
- SH: lt-dk gry/lt greenish gry/red brn, firm-hard, some silty, fissile
- LS: crm, micro-xtal, no vis por, ns.
- SH same as above.
- LS: lt gry/crm, m micro-xtal, some wht/lt brn chert, no vis por, ns.
- SH: lt greenish gry/lt-med gry/red brn, some v-silty, soft-firm, fissile.

Mudco Check #5 @ 4152'
 01/09/12 11:35 am
 wt vis pH chl
 9.2 52 10.0 6500
 FIR LCM
 6.4 1

LS: lt gry/crm, m micro-fn xtal, min foss frags, no vis por, ns.



LS: lt gry/med brn, some pcs med-grnd, min in-xtal por, ns.

SH: lt greenish gry/lt-dk gry/red brn, silty, firm.

SH same as above w/some dk gry v-f SS, hard but crushes moderately.

LS: crm-lt yel, micro-med xtal, some ool, some ool-castic por, ns.

LS: same as above.

LS/SH mix: SH is lt-dk gry/brn-red brn, soft-firm, carb, fissile; LS is crm-lt brn, micro-xtal, no vis por, ns.

LS as above w/SH; med-dk gry, carb, firm, brittle, fissile.

LS: crm/lt grysh brn, micro-xtal, no vis por, ns.

LS: crm-lt brn, micro-fn xtal, some foss frags, no vis por, ns.

SH: greenish gry/med-dk gry/red brn, firm, fissile.

LS: crm, micro-xtal, dense, no vis por, ns.

LS: wht/crm-brn, micro-med xtal, foss frags some pcs w/abund ool, min ool-castic por, ns.

LS/SH mix: SH is lt-med gry/red brn, silty, firm, fissile; LS is crm/lt gry, micro-med xtal, some pcs w/abund ool w/wug por, ns.

LS: lt-dk gry, micro-xtal, dense, no vis por, ns. Note: smpl is mostly SH.

LS: lt gry/crm, micro-fn xtal, silty which crushes easily, no vis por, ns.

SH: blk, carb, firm, fissile.

LS: lt gry/crm, micro-fn xtal, one pce w/gd vug por w/fo, gd odor, yel flor, sfo.

LS: crm, micro-xtal, some foss frags, abund lt brn chert, min fn in-xtal/frac por, gd odor, yel flor, slow yel cut, fo in sev'l pcs that crush easily, sfo.

Same as above.

LS: crm-lt brn, micro-fn xtal, sev ool nod, lt-med brn chert, silt pyritic, min frac por, no odor, ns.

SH: lt greenish gry/lt-med gry/dk brn, carb, soft-firm.

LS: crm-lt brn, micro-fn xtal, v-fn por, lt-med brn chert, gd odor, 8 pcs in tray w/fo, yel flor w/slow strm cut, gsfo.

LS: same as above w/4 pcs w/fo.

SH: lt green/med-dk gry/blk, firm, carb, fissile.

LS: crm-lt brn, micro-fn xtal, lt-med brn chert, fn in-xtal por, silt odor, yel flor, 4 pcs w/fo, gsfo.

SS: gry-dkgry, pred qrtz, v-f grnd, sr-wr, carb matrix, hard to crush, 10 pcs w/dk brn fo, gd odor, dull yel flor w/gd strm cut, gsfo.

SS as above. Approx 20 pcs w/fo in both 30min and 60m in sm pls. Appears to be less carb matrix, crushes a little easier than material above.

LS: lt gry/crm, micro-fn xtal, some lattice structure foss, some silty/sdy, some lt brn chert, some lt gry DOLO, gd fn-vug por, strg odor, yel flor, approx 25% of smpl tray w/vgso in both 30" and 60" smpls.

LS same as above w/vgso.

DOLO: lt grysh crm/crm, micro-fn xtal, some foss frags/lattice struct, lt gry/lt brn chert, fn-vug por, wk eff, strg odor, yel flor, approx 25% of tray w/vgso.

Same as above w/few pcs of dk gry/blk chert.

Decrease in the amt of pcs w/vuggy fo, est approx 15%.

DOLO: lt grysh crm/crm, micro-fn xtal, some pcs w/dk green m in, wht chert, few ool nodes, some wht chalky pcs, mostly min frac por, gd odor, less than 10% pcs w/fo vug por, gsfo.

Same as above w/decrease to 6 tray pcs w/vuggy fo, few dk brn pyritic pcs.

Same as above w/5 tray pcs w/vuggy por fo.

DOLO: wht/crm-lt brn, micro-fn xtal, some pyritic, increase in wht/lt gry chert, some wht chalky pcs, mostly dense w/6 tray pcs w/vuggy

Note: This Ft Scott top is a local pick and not equivalent to western Kansas.

DST1) 4380-4413
 30454560
 1st) BOB in 3 min, no BB.
 2nd) BOB in 7 min, no BB.
 IF P 20-50#
 ISIP 1096# FFP
 52-80# F SIP 1028#
 HP 2181-2129#
 Recvd: 50° O, 55' MCO, 60" HOCM.

Mudco Check #6 @ 4410'
 01/10/12 10:45am
 wt vis pH chl
 9.2 50 10.5 6000
 Filt LCM
 7.2 1

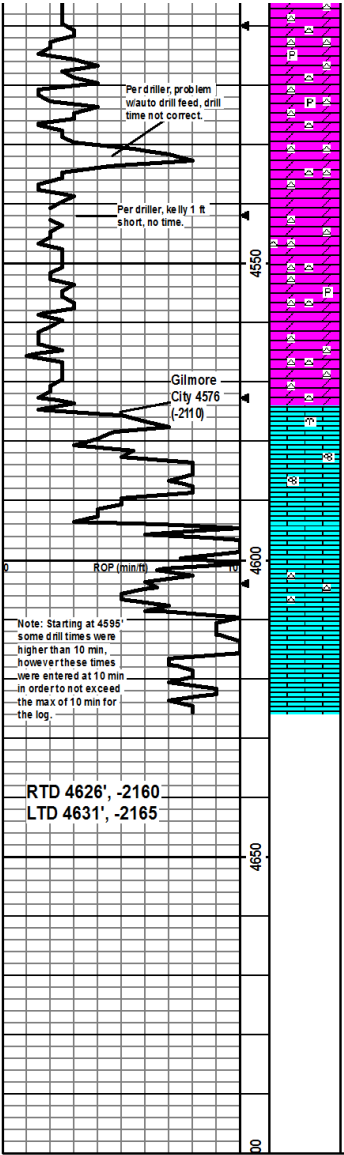
CFS @ 4413'
 30" 60"

CFS @ 4423'
 30" 60"

CFS @ 4436'
 30" 60"

Mudco Check #7 @ 4436'
 01/11/12 10:45am
 wt vis pH chl
 9.2 55 10.5 6400
 Filt LCM
 6.4 1

DST2) 4376-4436
 30454560
 1st) BOB in 3 min, no BB.
 2nd) BOB in 7 min, no BB.
 IF P 76-238#
 ISIP 1096# FFP
 242-389# F SIP
 1055#
 HP 2208-2113#
 Recvd: 285' GMCO, 155' MO, 250' GVMCO, 185' MW



por fo, gd odor, sfo.

3 vuggy pcs w/sfo. Abund wht/lt gry chert.

Same as above 5 vuggy pcs w/sfo.

DOLO: wht/lt gry/crm-med brn, micro-fn xtal, brn pcs are v-silty, wht chalky pcs, abund wht/lt gry chert, fn-vug por, odor, yel flor, few pcs w/fo.

DOLO: wht/lt-med gry/crm-med brn, micro-fn xtal, some vry silty pcs, wht chalky pcs, abund wht/lt brn chert, fn-vug por, slt odor, one pcs w/fo.

DOLO: wht/crm-lt brn, micro-fn xtal, some lattice struct foss, vry silty, abund wht chert, slt pyritic, fn-vug por, ns.

DOLO: wht/crm, micro-fn xtal, vry silty, abund wht chert, vf ppt por, ns.

LS: brn/dk gry, micro-fn xtal, min bryzn foss, silty, no vis por, ns.

LS: lt gry/brn, micro-med xtal, foss frags/fusln, frac por, ns.

LS: lt gryish crm, micro-fn xtal, min in-xtal/frag por, ns.

LS: lt gryish crm/crm/lt brn, micro-fn xtal, abund wht chert, min in-xtal/frac por, ns.

LS: crm-lt brn, micro-med xtal, abund ool, min in-xtal/frac por, ns.

TD at 4626

CFS @ 4626' 30" @ 60". Cir total of 1.5 hrs to clean hole.

RTD 4626', -2160
LTD 4631', -2165

4650
4600
4550