

# GRAND MESA OPERATING COMPANY

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

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

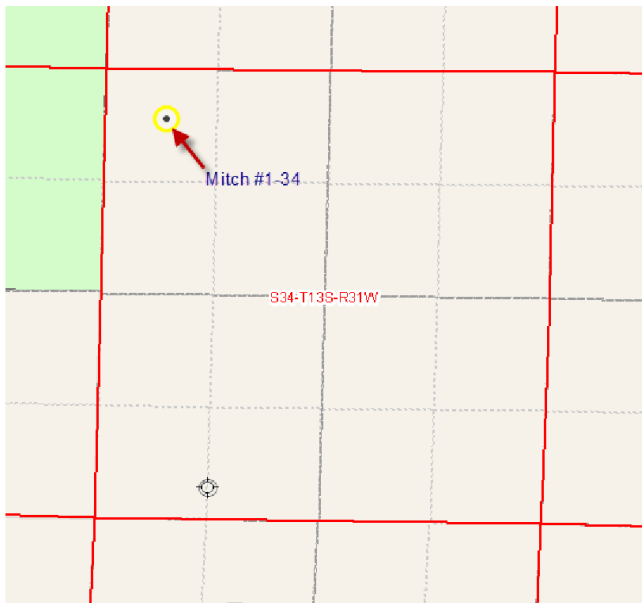
Scale 1:240 (5"=100') Imperial  
Measured Depth Log

Well Name: Mitch #1-34  
 Location: 613' FNL, 743' FWL, 34-13s-31w, Gove County, Kansas  
 License Number: API: 15-063-22002      Region: Gove County  
 Spud Date: 08/31/2012      Drilling Completed: 09/09/2012  
 Surface Coordinates: Lat: 38.8940218  
    Long: -100.7438924  
 Bottom Hole Coordinates: Vertical hole  
 Ground Elevation (ft): 2839'      K.B. Elevation (ft): 2844'  
 Logged Interval (ft): 3800' To: RTD      Total Depth (ft): 4625'  
 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



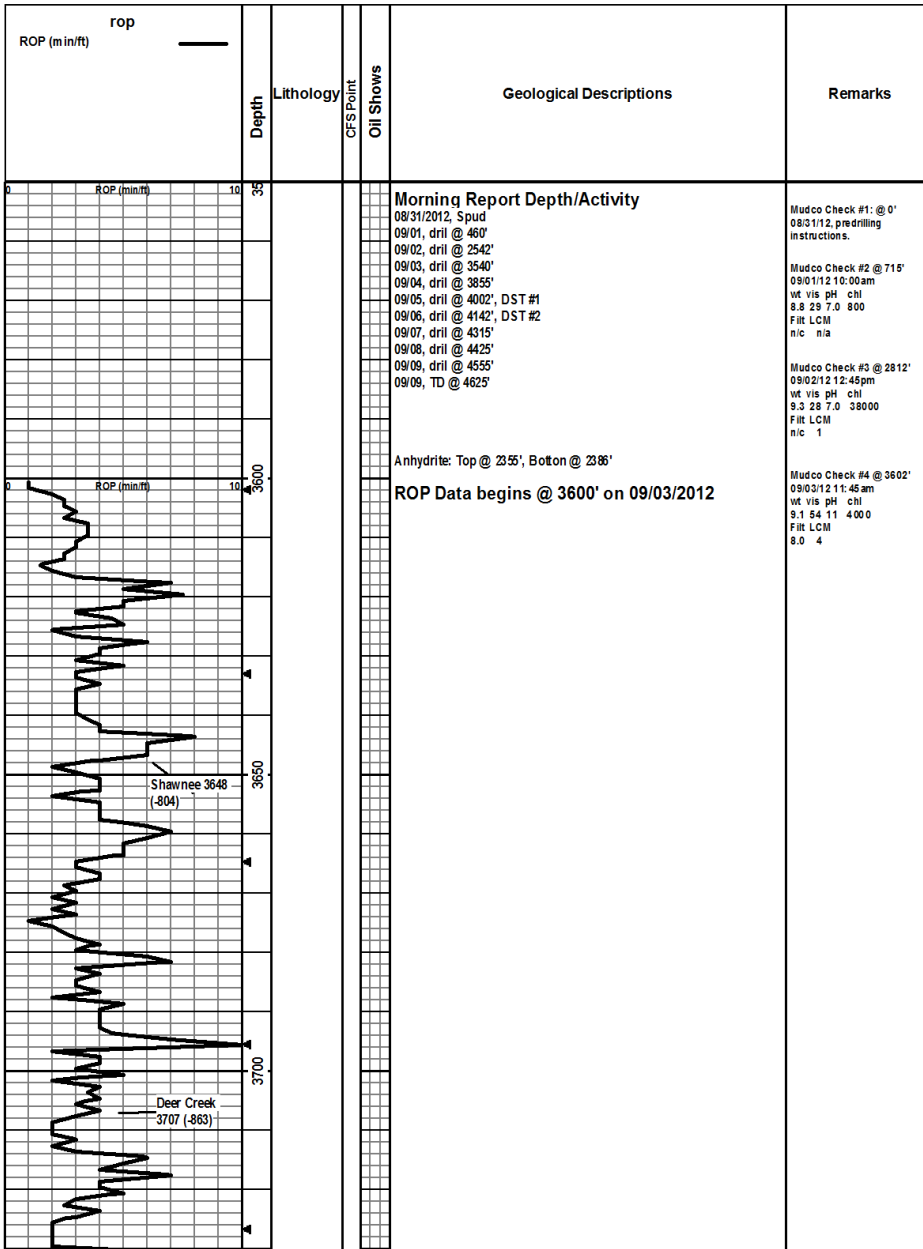
## COMMENTS

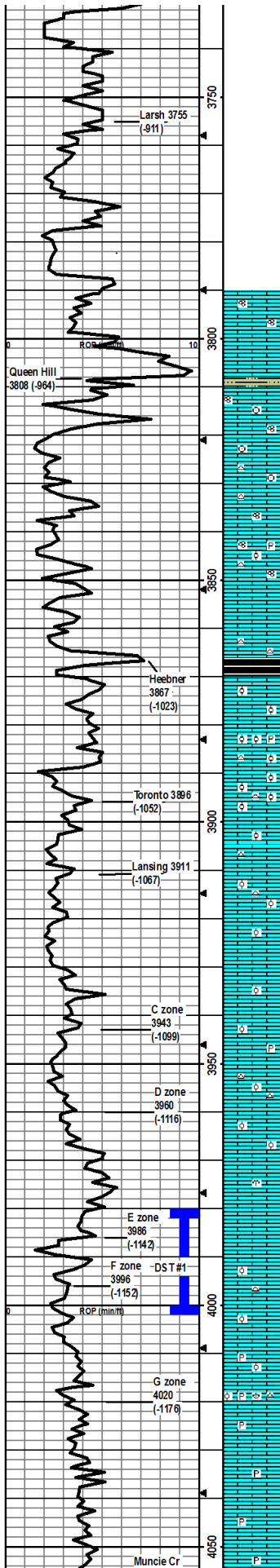
Contractor: Murfin Drilling Company Rig #24  
 Pusher: Tony Martin  
 Surface Casing: 8 5/8" set at 219' (KB) w/165sx  
 Production Casing: Production casing (5.5") was installed to RTD, based on field observations of drill cuttings, DST results and electric log evaluation.  
 Mud by: MudCo  
 DST's by: Diamond Testing  
 Logs by: Weatherford (DIL, CN-CD, ML, Sonic)  
 RTD = 4625'  
 LTD = 4625'

## FORMATION TOPS

FORMATION	SAMPLE TOPS		LOG TOPS	
	Depth	Datum	Depth	Datum
Queen Hill	3808'	-964	3808'	-964

Heebner Shale	3867'	-1023	3868'	-1024
Toronto	3896'	-1052	3896'	-1052
Lansing	3911'	-1067	3911'	-1067
Muncie Creek Shale	4059'	-1215	4061'	-1217
Stark Shale	4149'	-1305	4150'	-1306
Hushpuckney Shale	4184'	-1340	4186'	-1342
Marmaton	4254'	-1410	4254'	-1410
Upper Fort Scott	4352'	-1508	4352'	-1508
Little Osage Shale	4372'	-1528	4373'	-1529
Excello Shale	4398'	-1554	4399'	-1555
Johnson Zone	4472'	-1628	4472'	-1628
Morrow	4496'	-1652	4493'	-1649
Mississippian	4524'	-1680	4525'	-1681
RTD	4625'	-1781		
LTD			4625'	-1781





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

LS: crm/lt brn/lt gry, micro-med xtal, foss frags/fusn, vry sdy, ppt-fn in-xtal por, ns.

LS: crm/lt gry-gry, micro-med xtal, foss frags vry sdy, ppt-fn in-xtal por, ns.

SH: lt-dk gry, vry silty, soft.

LS: crm/lt brn/gry, micro-med xtal, foss frags/fusn/crin, some vry sdy, some ppt-fn in-xtal por, ns.

LS: crm/lt brn/lt gry, micro-med xtal, foss frags/crin, min wht chert, min sdy pcs, some ppt-fn in-xtal por, ns.

LS: crm/lt brn/gry, micro-med xtal, foss frags/fusn, min wht chert, some vry sdy pcs, some ppt-fn in-xtal por, ns.

LS: crm/lt brn/lt gry, micro-med xtal, foss frags/fusn/min fn ool, stly pyritic, some vry sdy, min ppt-fn in-xtal por, ns.

LS: crm/brn/gryish brn, micro-med xtal, foss frags, some vry sdy, min ppt-fn in-xtal por, ns.

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

SH: dk gry-blk, stly carb, firm, fissile.

LS: crm/lt gryish crm/lt brn/lt gry, micro-fn xtal, foss frags/min ool, some vry sdy, min frac por, ns.

LS: crm/lt brn/lt gry, micro-med xtal, foss frags/some abund ool pcs, some vry sdy, stly pyritic, min wht chert, min in-xtal frac por, ns.

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

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

LS: crm/lt brn/lt gry, micro-fn xtal, min foss frags/some ool pcs, some wht chert, some wht chalky pcs, some ppt-fn in-xtal/ool por, ns.

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

LS: crm/lt brn, micro-med xtal, some foss frags/ool, some vry sdy, min in-xtal por, ns.

LS: crm/lt gry, micro-med xtal, foss frags/min ool, some wht chert, min pyritic, min ppt-fn in-xtal por, ns.

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

LS: crm/lt brn, micro-fn xtal, foss frags/some ool, vry sdy, min ppt-fn in-xtal por, frac por, no odor, ns.

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

LS: crm/lt brn, micro-fn xtal, min foss frags, ppt-med por, 28 pcs sfo in 4000' stop smpl, some chalky pcs, strg odor, yel flor/cut, chalky pcs cut when crushed, gsf.

LS: crm/lt brn, micro-med xtal, foss frags/ool, min lt brn chert, 21 pcs in 30 min smpl and 19 pcs in 60 min w/sfo, some chalky pcs, ppt-fn in-xtal por, strg odor, yel flor/cut, chalky pcs cut when crushed, gsf.

LS: crm/lt brn, micro-med xtal, min foss frags w/some ool, some wht chalky pcs, 2 ool pcs w/sfo, min frac/in-ool por, sit cups like odor, yel flor/cut, s sfo.

LS: wht/crm/lt brn, micro-fn xtal, stly pyritic, min foss frags/2 ool pcs w/sfo in 30 min smpl and ns in 60 min, mostly dense w/min frac/in-ool por; sit cups like odor, yel flor/cut, s sfo.

LS: crm/lt brn, micro-med xtal, min foss frags/brn/ool, grainy, pyritic, min wht chert, min frac por/w one pcs fn por w/sfo, yel flor/cut, crush odor, vs sfo.

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

LS: crm/lt gry, micro-fn xtal, min foss frags, stly pyritic, some grainy pcs, min frac por, no odor, ns.

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

LS: crm/lt gry, micro-fn xtal, min foss frags, stly pyritic, dense w/min frac por, no odor, ns.

Mudco Check #5 @ 3950'  
09/04/12 01:15pm  
wt vis pH chl  
9.2 54 9.5 7000  
Filt LCM  
8.0 3

CFS @ 3950'  
30"60"

CFS @ 3968'  
30"

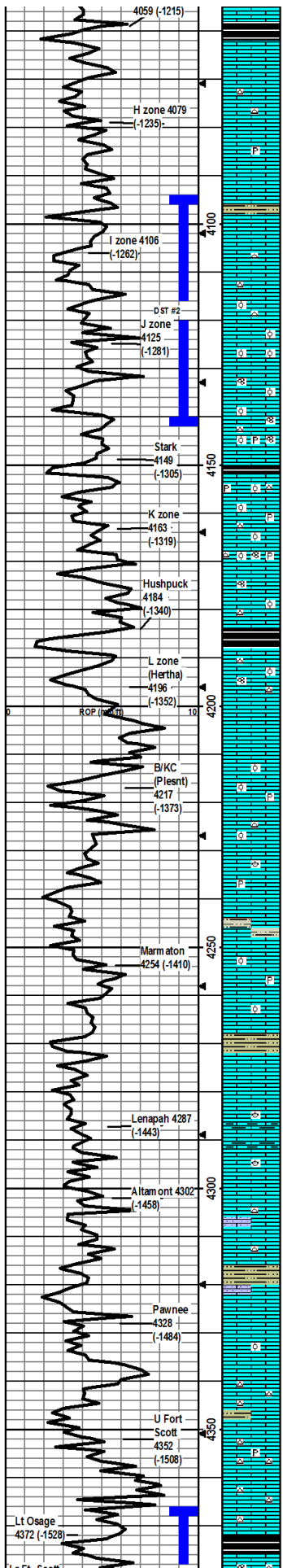
**DST1) 3980-4002**

**E-Zone**  
30456090  
1st) Weak surface blow built to 4.75", no BB.  
2nd) Weak surface blow built to 11", no BB.  
IF P 9-31#  
ISIP 920#  
FFP 32-58#  
F SP 920#  
HP 1893-1883#  
Rev'd: 18' GIP, 95' CO, 40' SGC MO.

CFS @ 4002'  
30"60"

CFS @ 4015'  
30"60"

Mudco Check #6 @ 4015'  
09/05/12 12:00pm  
wt vis pH chl  
9.2 67 9.5 6000  
Filt LCM  
8.0 2



SH: blk, carb, firm, fissile.

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

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

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

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

SH: lt gry, soft some carb, vry silty.

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

LS: crm/lt-med brn, micro-fn xtal, min foss frags, 5 wht chalky pcs w/sfo when crushed in 30 min smpl, ns in 60 min smpl, some wht chert, min frac por, yd flori/cut when crushed, sfo.

LS: crm, micro-med xtal, foss frags/abund ool, some wht chert, 10 pcs w/ppt-med in-ool por, stt crush odor, yel flori/cut, gsfo.

LS: crmit brn/lt gry, micro-med xtal, foss frags/abund ool, 11 pcs w/ppt-med in-ool por, stt crush odor, yel flori/cut, gsfo.

LS: crm/lt gry, micro-med xtal, foss frags/fusin/ool, 8 pcs in 30 min smpl and 4 pcs in 60 min w/ppt-med in-ool por, stt crush odor, yel flori/cut, gsfo.

LS: crmit brn/lt gry, micro-med xtal, foss frags/fusin/ool, wht chert, stly pyritic, mostly dense w/min ppt-fn in-xtal por, 2 pcs w/sfo, no odor, yel flori/cut, s/sfo.

SH: dk gry/blk, carb, gas bubbles when broken, firm, fissile.

LS: crm/lt gry/lt-med brn, micro-med xtal, foss frags/ool, some wht/crm/lt gry chert, min pyritic, min frac por w/2 ool pcs in 30 min smpl of fn in-ool por, yd flori/cut, no odor, s/sfo.

LS: crmit gry/lt-med brn, micro-med xtal, foss frags/min fusin/ool, wht chert, wht chalky pcs, stly pyritic, min frac por, no odor, ns.

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

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

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

LS: lt grysh brn/lt-dk brn, micro-fn xtal, foss frags, min frac por, no odor, ns.

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

LS: crm/lt gry/lt-med brn, micro-fn xtal, min foss frags, min lt gry chert, min frac por, 1 ool pce w/min in-ool por w/sfo (poss from above), no odor, ns.

LS: crm/lt gry, micro-fn xtal, some vry silty, min foss frags/brac, stly pyritic, min fn in-xtal/frac por, no odor, ns.

LS/SS mix: LS is crm/lt gry, micro-fn xtal, some vry silty, min foss frags, min ppt in-xtal por; SS is gry/red brn, v-f, ws, qtz, carb matrix, hard, friable, no odor, ns.

LS: crm, micro-fn xtal, stly pyritic, min foss frags/min dense ool pcs, min frac por, no odor, ns.

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

SH: lt-med gry/red brn, vry silty, soft-firm, carb.

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

LS: crm/lt gry/yel brn, fn-coarse, foss frags/brac, some sndy, some w/yel SH inclusions, min frac por, no odor, ns.

Same as above w/some wht chalky pcs.

LS: crm/lt brn/lt gry w/red brn mottling, fn-med xtal, min foss frags, some vry sndy, min lt gry chert, min frac por, no odor, ns.

LS: crm/lt brn/lt gry, micro-fn xtal, some vry sndy, min wht/lt brn chert, min frac por, no odor, ns.

SH: lt greenish gry/gry, some vry silty, soft-firm.

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

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

LS: crm, micro xtal, wht/lt gry chert, min frac por, some lt-dk gry firm SH some vry silty, no odor, ns.

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

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

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

LS: lt-med brn, micro-med xtal, foss frags/fusin, some lt brn chert, stly

**DST2) 4094-4142  
I & J Zones**

30456090  
1st) Weak surface blow built to 3", no BB.  
2nd) Weak surface blow after 13 min built to 3.5", no BB.  
IFP 10-51#  
ISIP 1144#  
FFP 54-87#  
FSP 1138#  
HP 1934-1927#  
Recvd: 45" HWCM, 120" MCW

CFS @ 411' 30" 60"

Mudco Check #7 @ 4142'  
09/06/12 09:00am  
wt vis pH chl  
9.2 5.7 10.5 4000  
FIL LCM  
8.0 3

CFS @ 4142' 30" 60"

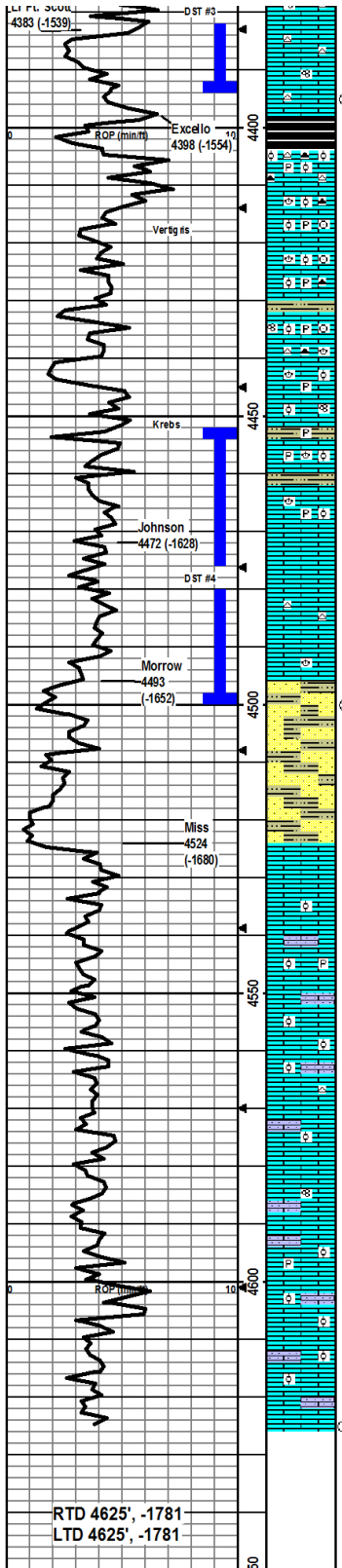
CFS @ 4167' 30" 60"

CFS @ 4215' 30" 60"

Mudco Check #8 @ 4304'  
09/07/12 06:20am  
wt vis pH chl  
9.2 4.9 11.0 9000  
FIL LCM  
7.6 3

**DST3) 4366-4395  
Lr Ft Scott**

30456090  
1st) Weak surface blow built to 5.25", no BB.  
2nd) Weak surface blow built to 11", no BB.  
IFP 9-40#  
ISIP 981#  
FFP 41-65#  
FSP 888#  
HP 2055-2052#



pyritic, min frac por, no odor, ns.

LS: crm/lt-med brn, micro-med xtal, foss frags/fusln, abund wht/lt gry chert, 3 pcs in stop smpl w/ppt-fr por w/sfo, 29 pcs in 30 min smpl and 18 pcs in 60 min w/ppt-med por w/sfo, yel flor/cut, sit cup odor in stop, strg cup odor in 30 and 60 min, vgsfo.

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

LS: crm/lt-med brn, micro-med xtal, foss frags/abund ool, abund wht/brn pyritic ool chert, no vis por, no odor, ns.

LS: lt-med brn/gry, micro-med xtal, foss frags/crin/brac/ool, stly pyritic, brn chert, some chalky ool pcs easily crushed, min frac por, no odor, ns.

LS: same as above.

SH: lt-dk gry, some vry silty, soft-firm fissile, stly carb.

LS: crm/lt-dk brn/gry, micro-med xtal, foss frags/brac/min ool, ltgry/ool brn chert, stly pyritic, min frac por, no odor, ns.

LS: lt gry/lt-med brn, micro-med xtal, some foss frags/brac/fusln/ool, stly pyritic, some wht chalky pcs, min frac por, sit cup odor (poss from above), ns.

SH: lt-dk gry, some vry silty, stly carb, some pyritic, soft-firm.

LS: crm/lt-med brn/gry, micro-med xtal, foss frags/brac/ool, some silty/sndy, some pyritic, min in-xtal frac por, no odor, ns.

SH: greenish gry/lt-med gry, vry silty, carb, soft.

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

LS: crm/lt brn, micro-med xtal, foss frags, ppt-med w/some vug por, strg cup odor, 33 pcs sfo, yel flor/cut, vgsfo.

LS: crm/lt gry/lt-med brn, micro-med xtal, foss frags, stly pyritic, some wht chert, some chalky, ppt-med w/some vug por, strg cup odor, 31 pcs sfo, yel flor/cut, vgsfo.

LS: crm/lt brn, micro-med xtal, min foss frags/brac, min wht chalky pcs, ppt-med w/some vug por; strg cup odor in 30 and 60 min smpls, 11 pcs in 30 min smpl 12 pcs in 60 min smpl w/sfo, yel flor/cut, vgsfo.

SH/SS mix: SH is greenish gry/lt-dk gry/mustard yel, some vry silty, soft-firm, ns; SS is wht/gry/brn, pred qtz, vf-f, sr-wr, arg, firm but friable, ns.

SH/SS mix: SH is greenish gry/maroon gry/lt-dk gry/mustard yel, some vry silty, soft-firm; SS is wht sugar/lt gry/red brn, pred qtz w/carb matrix, vf-f, sr-wr, soft-hard, friable, no odor, ns.

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

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

LS: lt brn/lt gry, micro-fn xtal, min fn ool, some sndy w/vf-med qtz, stly pyritic, some chalky pcs, no vis por, no odor, ns.

LS: crm/lt brn, some micro-xtal/some micro-med xtal, some gd 2dry xtal, some abund fn ool pcs, some vry sndy w/fn-c qtz, no vis por, no odor, ns.

LS: crm/lt brn, micro-med xtal, some w/fn-med ool, some vf sandy pcs, min ltbrn/orange chert, min frac por, no odor, ns.

LS: crm/lt brn, micro-med xtal, some fn-med ool pcs, some vry sndy, min frac por, no odor, ns.

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

LS: wht/crm/lt-med brn, micro-med xtal, min fn ool, some vry sndy, stly pyritic, min frac por, no odor, ns.

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

LS: crm/lt gryish crm/lt-med brn, micro-med xtal, some fn-med ool, vry sndy, min frac por, no odor, ns.

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

Recvd: 160' GIP,  
80' MO (56% O), 60' MCO  
(90% O).

CFS @ 4395'  
30°/60°

Mudco Check #9 @ 4440'  
09/08/12 08:00am  
wt vis pH chl  
9.2 55 11.0 4400  
F# LCM  
8.0 3

**DST6) 4451-4500**  
**Johnson**  
3045/4550  
1st) Strg blow built to BOB in  
2 min, BOB BB in 10 min.  
2nd) Strg blow built to BOB in  
2.25 min, BOB BB in 11 min.  
IFP 112-562#  
ISIP 1144#  
FFP 575-908#  
FSP 1097#  
HP 2123-2120#  
Recvd: 1530' GIP, 2930' COO,  
120' G&MCO.

CFS @ 4500'  
30°/60°

Mudco Check #10 @ 4557'  
09/09/12 07:30am  
wt vis pH chl  
9.0 55 10.5 5000  
F# LCM  
7.2 3

CFS @ 4625', 30°/60°,  
Cir 1.5 hrs total to clean hole.

RTD 4625', -1781  
LTD 4625', -1781