

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

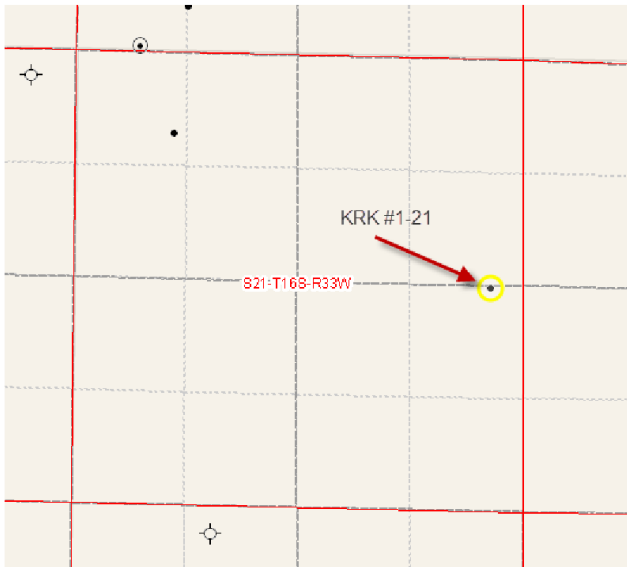
Well Name: KRK #1-21
 Location: 2589' FSL, 353' FEL, 21-16s-33w, Scott County, Kansas
 License Number: API: 15-171-20839 Region: Scott County
 Spud Date: 10/13/2011 Drilling Completed: 10/20/2011
 Surface Coordinates: Lat: 38.8818173
 Long: -100.7902181
 Bottom Hole Coordinates: Vertical hole

Ground Elevation (ft): 3065' K.B. Elevation (ft): 3076'
 Logged Interval (ft): 3600' To: RTD Total Depth (ft): 4850'
 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



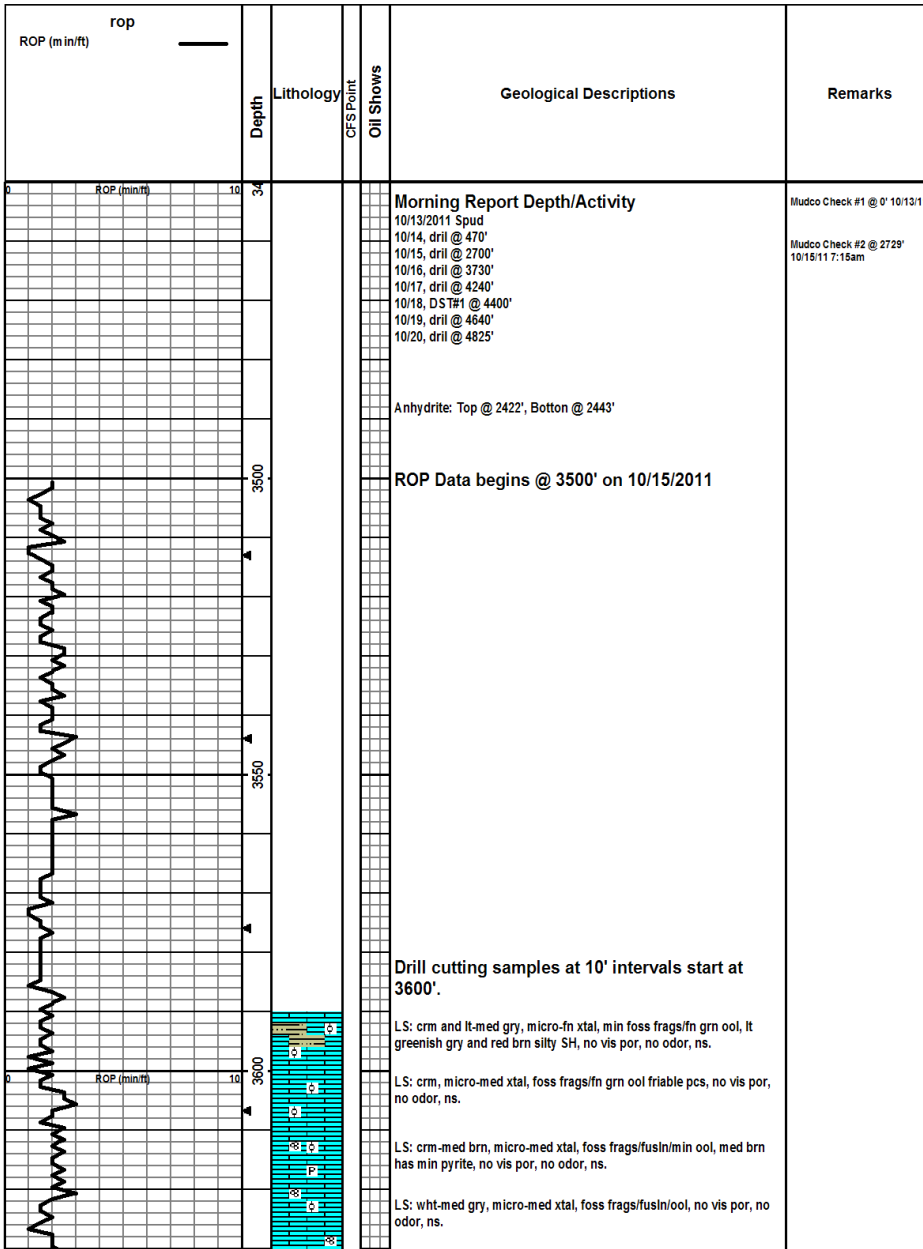
COMMENTS

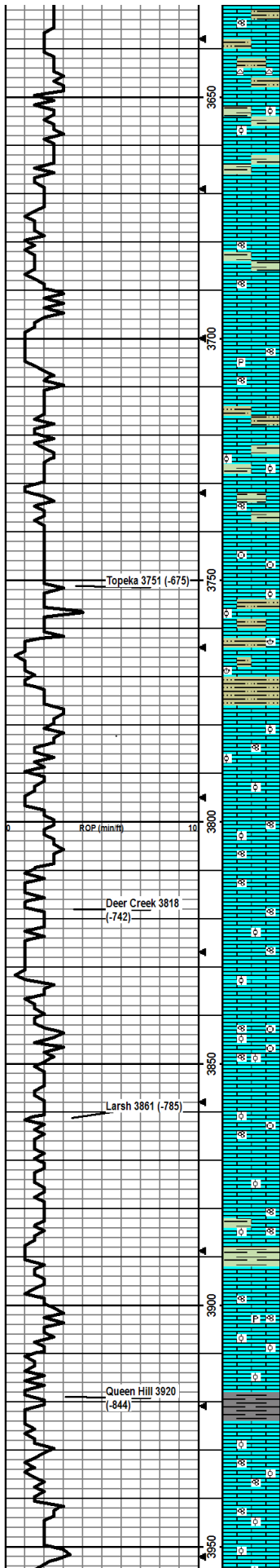
Contractor: Murfin Drilling Company Rig #22
 Pusher: Kelly Wilson
 Surface Casing: 8 5/8" set at 225' w/165sx
 Production Casing: Production casing was not installed and the hole was plugged and abandoned based on field observations of drill cuttings and DST tests.
 Mud by: MudCo
 DST's by: Trilobite Testing
 Logs by: Superior (DIL, CN-CD, ML)
 RTD= 4850'
 LTD= 4854'

FORMATION TOPS

FORMATION	SAMPLE TOPS		LOG TOPS	
	Depth	Datum	Depth	Datum
Queen Hill	3920'	-844	3921'	-845

Heebner Shale	3981'	-905	3984'	-908
Toronto	4003'	-927	4004'	-928
Lansing	4023'	-947	4022'	-946
Muncie Creek Shale	4211'	-1135	4211'	-1135
Stark Shale	4300'	-1224	4303'	-1227
Hushpuckney Shale	4345'	-1269	4348'	-1272
Marmaton	4421'	-1345	4420'	-1344
Upper Fort Scott	4522'	-1446	4526'	-1450
Little Osage Shale	4545'	-1469	4546'	-1470
Excello Shale	4561'	-1485	4563'	-1487
Johnson Zone	4631'	-1555	4630'	-1554
Morrow	4699'	-1623	4698'	-1622
Mississippian	4750'	-1674	4751'	-1675
RTD	4850'	-1774		
LTD			4854'	-1778





LS: crm-lt gryish brn, micro-med xtal, foss frags/fusin, silty/sndy, some lt greenish to dk gry silty SH, no vis por, no odor, ns.

Same as above w/min lt gry chert.

LS: crm-med gryish brn, micro-fn xtal, foss frags/min ool, silty/sndy, lt-dk gry SH, no vis por, no odor, ns.

LS: crm-med brnsh gry, micro-med xtal, foss frags, lt-dk gry SH, no vis por, no odor, ns.

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

LS: crm-lt gry, micro-med xtal, foss frags/fusin, lt-med gry silty SH, no vis por, no odor, ns.

LS: med gryish brn, fn-med xtal, foss frags, no vis por, no odor, ns.

LS: crm-lt brn and lt gry, micro-med xtal, foss frags/fusin, silty/sndy, min pyrite, min ppt-fn por, no odor, ns.

LS: med brnsh gry, micro-med xtal, foss frags, silty/sndy, med gry silty SH, no vis por, no odor, ns.

LS: wht-crm w/med brnsh gry, micro-fn xtal, foss frags/fn grnd ool, some red brn and med gry SH, ppt-fn por, no odor, ns.

LS: crm-lt gryish brn, micro-med xtal, foss frags/fusin/fn-cors grn ool, red brn and med gry silty SH, min ppt por, no odor, ns.

LS: med gry, micro-med xal, foss frags/crin, silty, min ppt por, no odor, ns.

LS: gryish crm-lt brn, micro-med xtal, foss frags/ool, ool pcs friable, med greenish gry silty SH, no vis por, no odor, ns.

LS: lt-med gry and brn, micro-fn xtal, foss frags/brack/ool, red brn and med gry silty SH, no vis por, no odor, ns.

SH: med-dk greenish gry and gry, some red brn w/in green mottling, some vry silty, soft-firm and brittle.

LS: crm and med brnsh gry, micro-fn xtal, foss frags/fusin/fn grnd ool, no vis por, no odor, ns.

LS: wht-crm and gryish crm, micro-fn xtal, foss frags/fn grnd ool-silty, some wht chalky pcs, no vis por, no odor, ns.

LS: wht-crm and lt gryish brn, micro-med xtal, foss frags/fusin/ool-silty/sandy, min wht chalky pcs, no vis por, no odor, ns.

LS: crm-lt gry, micro-fn xtal, foss frags/fusin, silty, no vis por, no odor, ns.

LS: crm-med gryish brn, micro-med xtal, foss frags/fusin/ool-silty, no vis por, no odor, ns.

LS: crm, micro-fn xtal, vry fn ool/silty, hard but friable, no vis por, no odor, ns.

LS: crm, micro-fn xtal, foss frags/crin/fusin/vry fn grnd ool/silty, no vis por, no odor, ns.

Same as above w/no crin or fusin.

LS: crm-lt brn, micro-fn xtal, foss frags/crin/fusin/vry fn grnd ool/silty, no vis por, no odor, ns.

LS: crm-lt gryish brn, micro-fn xtal, min foss frags, some pcs w/abund fn grnd ool/silt, no vis por, no odor, ns.

LS: crm-lt gryish brn, micro-med xtal, foss frags/fusin/min ool, lt greenish gry-dk gry silty SH, no vis por, no odor, ns.

SH: red brn/lt greenish gry/med-dk gry, silty, soft-brittle and fissile.

LS: wht-crm w/lt gry, micro-med xtal, foss frags/fusin/abund fn grnd ool, min pyrite, no vis por, no odor, ns.

LS: lt-med gry, micro-fn xtal, foss frags/fn grnd ool/silty, no vis por, no odor, ns.

SH: med-dk gry/bik w/some red brn, soft-firm, some fissile.

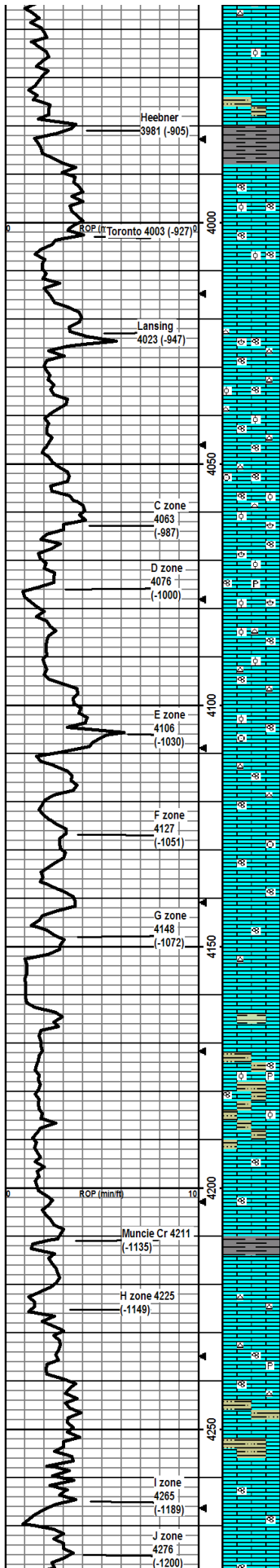
LS: lt-med brn, micro-fn xtal, min foss frags/fn grnd ool, no vis por, no odor, ns.

LS: wht/crm/lt brnsh gry, micro-fn xtal, foss frags/fusin/fn grnd ool, some wht chalky pcs, no vis por, no odor, ns.

Same as above.

LS: wht-crm, micro-fn xtal, foss frags/fn grnd ool/silty, min wht chert,

Mudco Check #3 @ 3746'
 10/16/11 8:15am
 wt vis pH chl
 9.0 59 10.0 5400
 Filt LCM
 8.8 3



no vis por, no odor, ns.

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

LS: wht/crm/lt brn, micro-fn xtal, foss frags, silty, lt-dk gry silty SH, no vis por, no odor, ns.

SH: dk gry-blk, slit cal, firm, fissile.

LS: crm-lt gry, micro-fn xtal, foss frags/brac/fusln/fn grnd ool, ppt-fn por, slit crush odor, 4 pcs w/dk brn tar oil, slit stream cut when crushed, slit flor, ssfo.

LS: lt gryish brn, micro-fn xtal, foss frags/fusln/fn grnd ool/silty, ppt-fn por, no odor, slit flor, several pcs w/dk brn tar oil, gd stream cut, gd flor, ssfo.

LS: wht-crm/lt gry, micro-fn xtal, foss frags, ppt-fn por, no odor, 1 pce w/fo, no flor, vsfso.

LS: wht-crm, micro-fn xtal, wht chert, foss frags/brac/fusln, ppt-fn por, no odor, 1 pce w/fo in vug por, no flor, ssfo.

LS: crm-lt brn and gry, micro-med xtal, wht chert, foss frags/fusln/med grnd ool, ppt-fn por, no odor, 2 pcs w/fo, no flor, ssfo.

LS: crm, micro-med xtal, wht chert, foss frags/fusln/fn-med grnd ool, min ppt-fn por, no odor, ns.

LS: wht-crm, micro-med xtal, wht chert, wht chalky pcs, foss frags/crin/fusln/ool, min ppt-fn por, no odor, ns.

LS: crm, micro-fn xtal, wht chalky pcs, min pyrite, foss frags/fusln/brac/ool, min ppt por, no odor, ns.

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

LS: crm, micro-fn xtal, min pyrite, min wht chert, foss frags/fusln/ool, min ppt por, no odor, ns.

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

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

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

LS: crm, micro-fn xtal, foss frags/fusln/min crin, silty pcs easily crushed, min ppt in-xtal por, no odor, ns.

LS: crm-lt brn, micro-fn xtal, foss frags/fusln, silty pcs easily crushed, min ppt-fn in-xtal por, no odor, 1 pce w/brn oil staining, streaming cut, no flor, vsfso.

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

LS: crm-lt brn, micro-fn xtal, foss frags, min wht chert, silty pcs easily crushed, min ppt por, no odor, ns.

LS: crm-lt brn, micro-med xtal, few foss frags, few silty pcs, few green and gry silty SH, min ppt in-xtal por, no odor, ns.

LS: crm, micro-med xtal, foss frags/fusln/few ool, min pyrite, min ppt-fn por, no odor, ns.

Same as above w/red brn/med greenish gry/med-dk gry, silty SH.

LS: crm-lt brn, micro-med xtal, foss frags/fusln, ppt-fn por, no odor, 2 pcs w/fo, stream cut, dull flor, vsfso.

LS: wht/crm-lt brn, micro-med xtal, foss frags/fusln, ppt-fn por, slit crush odor, 1 pce w/fo, dull flor, vsfso.

SH: med greenish gry/med-dk gry/blk and red brn, some silty, soft to firm and fissile.

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

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

LS: crm-med brn, micro-fn xtal, min wht chert, med greenish gry/dk gry/red brn silty SH, foss frags/fusln, min ppt por, no odor, ns.

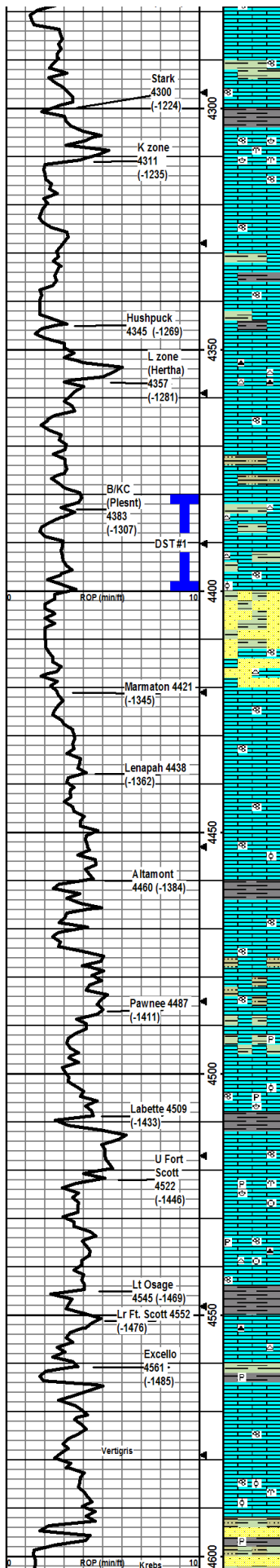
LS: crm, micro-fn xtal, increase in SH - greenish gry/dk gry-blk/red brn, foss frags, no vis por, no odor, ns.

LS: crm-lt gryish brn, micro-fn xtal, foss frags/fusln, min fn por, slit crush odor, several pcs w/fo, dull flor/streaming cut, ssfo.

LS: crm-lt brn, micro-fn xtal, foss frags/fusln, min fn por, slit crush odor, 4 pcs in pcs 20" and 60" sample w/fo, dull flor/streaming cut, ssfo.

CFS @ 4073'
30" 60"

Mudco Check #4 @ 4256'
10/17/11 10:50am
M VIS pH CHL
9.1 57 10.0 4700
FIT LCM
9.6 2



color, 1 pce in ea 30' and 60' smpls w/ro, cut not streaming cut, sfo.

LS: crm-lt brn w/min lt gry, micro-med xtal, some greenish gry/med-dk gry/blk SH, foss frags/fusin, min ppt por, no vis por, no odor, ns.

SH: blk, firm, fissile, gas bubbles.

LS: crm-lt brn, micro-med xtal, foss frags/brac/fusin/bryz, mostly ppt-fn por w/one pce of vug por w/fo in 4321 stop smpl, slt crush odor, flor, sfo.

LS: crm-med brn, micro-med xtal, foss frags/fusin, ppt-fn in-xtal and frac por, no odor, ns.

LS: crm-lt brn and gry, micro-fn xtal, foss frags/fusin, mostly no por w/min ppt-fn in-xtal por, no odor, ns.

LS: crm-lt brn, micro-med xtal, foss frags/fusin, some greenish gry/gry/dk gry/red brn silty SH, no vis por, no odor, ns.

LS: wht/crm/med brn, micro-med xtal, foss frags/fusin, few pcs of blk SH, min ppt por, no odor, ns.

LS: crm-med brn, micro-fn xtal, abund red brn/greenish gry/dk gry/blk SH in 30" smpl, foss frags, mostly min ppt por w/1 pce in 60" smpl w/gd vug por, no odor, ns.

LS: crm-dk brn, micro-med xtal, wht/gry/dk brn chert, foss frags, no vis por, slt crushed odor but ns, no oil flor, 1 pce in 60" smpl of poss dk brn tar oil but no flor or cut, nfo.

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

LS: crm-med brn, micro-med xtal, greenish gry/gry/red brn silty SH, foss frags, min ppt in-xtal por, no odor, ns.

LS: crm-lt brn, micro-med xtal, wht/brn chert, greenish gry/gry SH, min foss frags, min ppt in-xtal por, no odor, ns.

LS: wht-lt gryish brn, micro-fn xtal, min wht chert, some greenish gry/gry SH, min foss frags/fusin/min ool, min ppt por, no odor, ns.

SS/SH mix: ss is lt gry/green, mostly quartz, v/w/coarser grns, sa-sr, not sorted; SH is lt-med gry/greenish gry, soft; no odor, ns.

SS/LS mix: ss is as above w/wht vfg pcs; ls is crm-lt brn, micro-fn xtal, min wht chert, silty, foss frags/fusin, min ppt in-xtal por, no odor, ns.

LS: crm-med brn, micro-med xtal, silty-crushes easily, foss frags/fusin, min ppt por, no odor, ns.

LS: crm-lt brn, micro-fn xtal, min silty pcs, wht chalky pcs, foss frags/fusin, min ppt in-xtal por, no odor, ns.

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

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

SH: gryish green/dk gry/blk, some vsilty, soft-firm and brittle.

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

LS: crm-lt brn, micro-fn xtal, greenish gry and gry silty SH, foss frags/fusin, min ppt por, no odor, ns.

LS/SH same as above.

LS: wht/crm/lt gry, micro-fn xtal, min pyrite, greenish gry-dk gry SH, min foss frags, min ppt por, no odor, ns.

LS: crm-dk brn, micro-med xtal, min pyrite, foss frags/fusin/brac/ool, min ppt por, no odor, ns.

SH: blk, carb, firm, fissile.

LS: wht-lt brn, micro-fn xtal, foss frags/fusin, min ppt por, no odor, ns.

LS: crm/lt gry, micro-med xtal, some pyrite, foss frags/crin/brac/bryz, ppt-fn vug por, slt crush odor, 1 pce w/fo when crushed, flor w/slow stream cut, sfo.

LS: gry/crm/med brn, micro-med xtal, min pyrite, wht/gry/blk chert, foss frags/crin/fusin, ppt por, no odor, ns.

SH: dk gry/blk, firm, fissile.

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

SH: greenish gry/dk gry/blk, min pyrite, firm, fissile.

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

LS: wht/crm, micro-fn xtal, min foss frags/fusin, ppt-fn por, slt crush odor, yel flor, 1 pce w/fo, sfo.

LS: crm-lt brn, micro-fn xtal, foss frags/fusin/bryz/fn grd ool-silty, ppt-fn por, slt crush odor, 1 pce w/fo, no flor but gd stream cut, sfo.

SH SS mix: SH is red brn/greenish gry/med-dk gry/blk, some vry silty, some pyrite, soft to firm and fissile; SS is lt gry/brn, v/g rnd, friable.

CFS @ 4285'
30"/60"

CFS @ 4321'
30"/60"

CFS @ 4350'
30"/60"

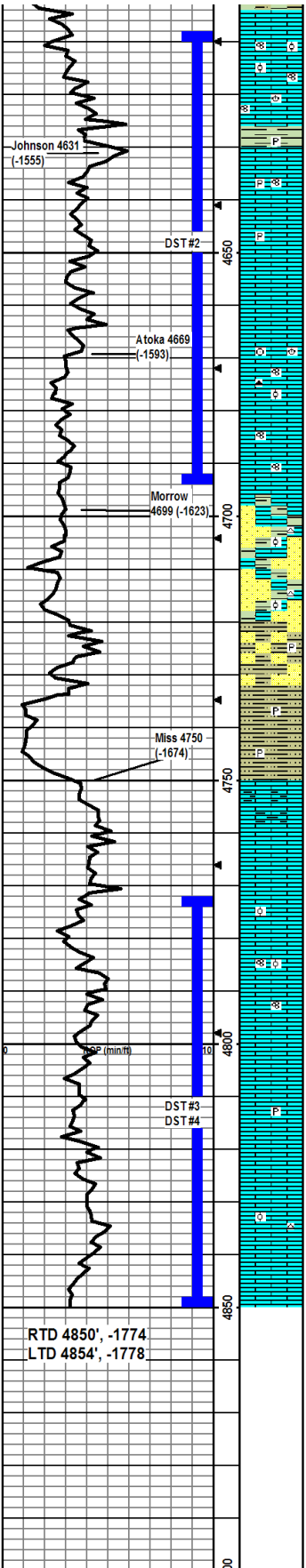
CFS @ 4359'
30"/60"

DST1) 4380-4400
4560/4560
1st) Weak SB built to 2.25", no BB
2nd) Weak SB built to 1", no BB
IFP 24-80#
ISIP 1168# FFP
88-132# F SIP 1143#
HP 2357-2028#
Recvd: 70' WCM, 175' MCW

CFS @ 4400'
30"/60"

Mudco Check #5 @ 4400'
10/18/11 5:30am
wt vis pH ch
9.4 64 9.5 5400
Filt LCM
10.4 2

NOTE:
When making short trip prior to DST driller noticed very strong gas odor several times when breaking pipe connections.



LS: crm-med brn/lt gry, micro-fn xtal, min foss frags/fusln/vf grnd ool, min ppt por, no odor, ns.

Same as above.

LS: wht-med brn, micro-med xtal, min foss frags/fusln/brac, min ppt por, no odor, ns.

SH: flood of red brn/greenish gry/med gry, some pyrite, some vry silty.

LS: wht-crm, micro-med xtal, min pyrite, foss frags/fusln, min ppt por, no odor, ns.

LS: crm-med brn, micro-fn xtal, min pyrite, few foss frags, min ppt por, no odor, ns.

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

LS: crm/lt gry, micro-fn xtal, some wht chalky pcs, foss frags/crin/fusln/brac, min ppt-frac por, no odor, ns.

LS: crm-lt brn, micro-fn xtal, lt brn chert, some wht chalky pcs, foss frags/grnd ool, ool pcs are chalky, min por, no odor, ns.

LS: crm/lt brn/lt gry, micro-fn xtal, min foss frags/fusln/sev pcs w/lattice struc, min ppt frac por, no odor, ns.

Same as above: 1 pcs in 60" smpl w/fo, would not stream until crushed.

4710' sample appears to be trash w/mix of LS/SH w/coarse sand sized quartz grains, no odor, ns.

LS/SH/SS mix: LS is wntorm-brn/lt gry, micro-fn xtal, min foss frags/fusln w/some ool pcs, wht chert, min ppt por; SH is red-rust brn/greenish gry-dk gry, soft to firm and fissile, some pyrite; SS is wht/gryish green/rust brn, vf grnd, some loose w-rnd coarse grnd quartz; no odor, ns.

Same as above.

SH/SS mix: SH is red brn/greenish gry/dk gry, some pcs vry silty, some pyrite, soft to firm and fissile; SS is wht/med greenish gry, vf grnd, some loose coarse grnd quartz; no odor, ns.

SH: red brn, olive, greenish gry, lt-dk gry, some pcs vry silty, some pyrite, some LS nodules, soft-firm and fissile.

Same as above w/some mustard yel mottling in greenish gry pcs.

LS: lt gry, micro xtal, some foss frags, vry argillaceous, no vis por, no odor, ns.

LS: crm, micro xtal, no foss, dense w/no vis por, no odor, ns.

LS: crm/lt gry/med brn, micro-fn xtal, crm is ool and easily crushed, lt gry is hard w/no foss or vis por, med brn is hard w/ foss frags, no odor, ns.

LS: crm, micro-fn xtal, foss frags/fusln/ool, min in-xtal por, no odor, ns.

LS: crm-med gryish brn, micro-fn xtal, foss fusln, grainy, no vis por, no odor, ns.

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

LS: crm w/dk brn inclusion, micro xtal, min pyrite, no vis por, no odor, ns.

LS: crm/dk brn, micro xtal, no vis por, no odor, ns.

LS: crm/lt brn, micro-fn xtal, min chert, crm pcs have vfg ool and crushes easily, lt brn pcs are dense and hard w/some frac por, no odor, ns.

LS: crm/lt brn, crm pcs are grainy and crush easily, lt brn pcs are micro xtal and dense, no vis por, no odor, ns.

DST2) 4608-4695

30/16/15/15
1st) Weak SB died in 12.5 min, no BB
2nd) No blow, no BB
IFP 53-56#
ISIP 249# FFP
59-56# F SIP 235#
HP 2463-2207#
Recvd: 61' mud w/few oil spots in tool

CFS @ 4665'
30"

Mudco Check #6 @ 4695'
10/19/11 11:10am
wt vis pH chl
9.6 55 9.5 7000
FIL LCM
8.8 1

CFS @ 4695'
30"/60"

4650'-4700': not enough sample for dry sample collection.

DST3) 4772-4850

DST #3 failed due to a hole in a drill stem pipe.

DST4) 4772-4850

30/15/15/15
1st) Weak SB died in 15 min, no BB
2nd) No blow, no BB
IFP 24-27#
ISIP 57# FFP 30-26#
F SIP 71#
HP 2543-2304#
Recvd: 10' mud

Mudco Check #7 @ 4850'
10/20/11 9:00am
wt vis pH chl
9.4 55 10.5 6500
FIL LCM
8.8 2

CFS @ 4850'
30"/60"

RTD 4850', -1774
LTD 4854', -1778