

# GRAND MESA

# OPERATING COMPANY

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

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

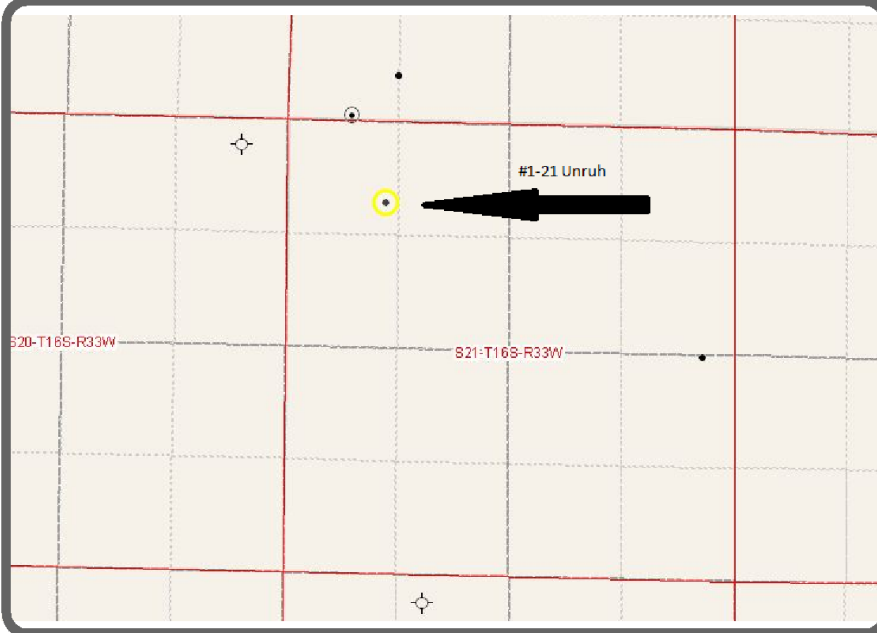
Scale 1:240 (5"=100') Imperial  
Measured Depth Log

Well Name: #1-21 Unruh  
Location: 975' FNL, 1172' FWL, 21-16s-33w, Scott County, Kansas  
License Number: API: 15-171-20840 Region: Scott County  
Spud Date: 10/15/2011 Drilling Completed: 10/25/2011  
Surface Coordinates: Lat: 38.6534438  
Long: -100.9767432  
Bottom Hole Vertical hole  
Coordinates:  
Ground Elevation (ft): 3077' K.B. Elevation (ft): 3082'  
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: John Goldsmith  
Company: John Goldsmith Wellsite Service  
Address: 322 Greenwood Ct.  
Cheney, KS 67025  
316-640-0236



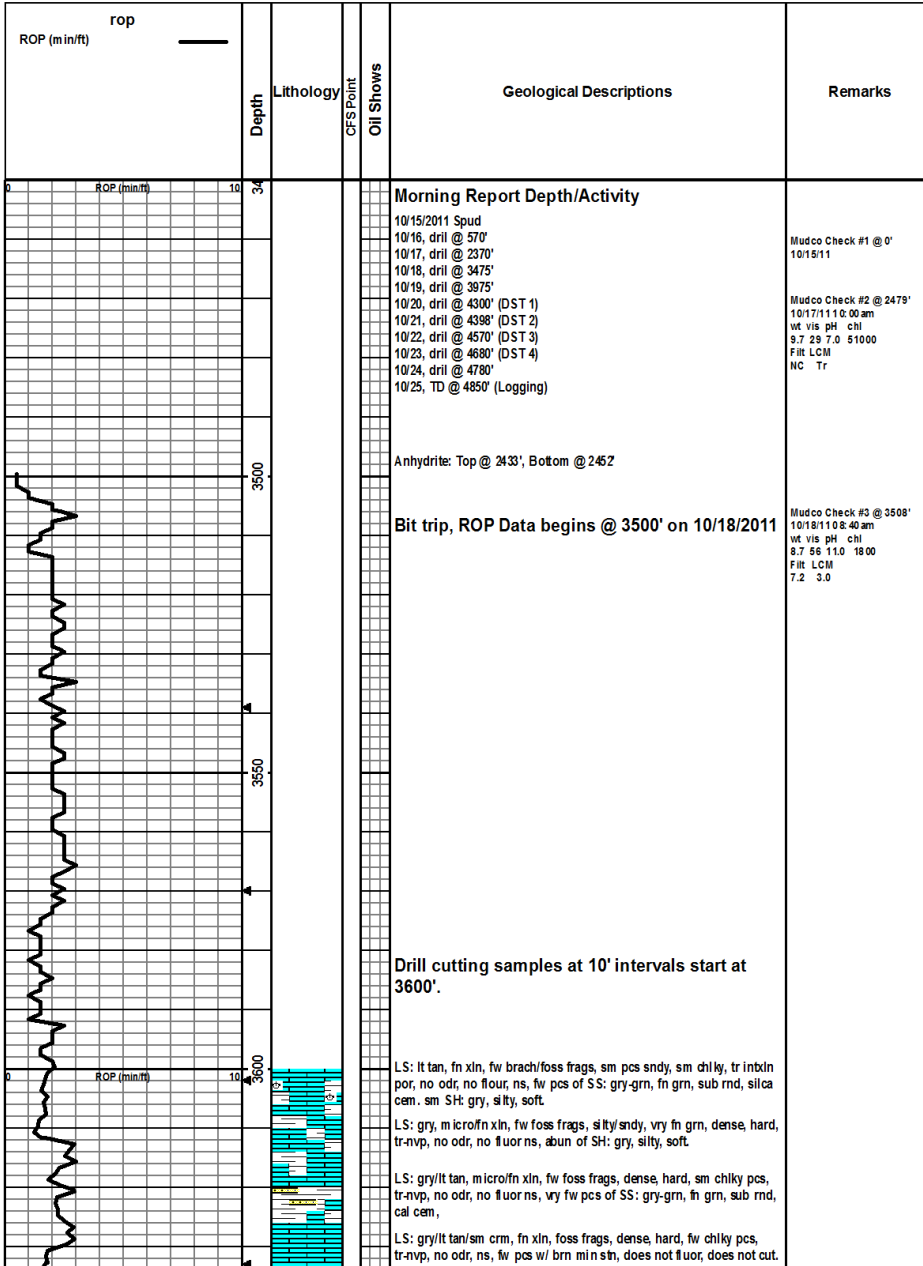
## COMMENTS

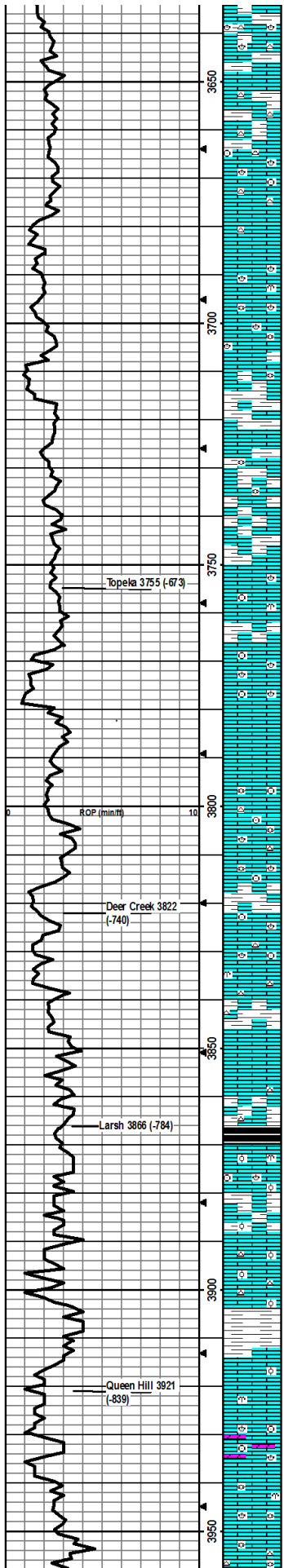
Contractor: Murfin Drilling Company Rig #24  
Pusher: Tony Martin  
Surface Casing: 8 5/8" set at 234' w/175sx  
Production Casing: Plugged to RTD  
Mud by: MudCo  
DST's by: Tribolite Testing  
Logs by: Weatherford (DIL, CN-CD, ML)  
RTD=4850'  
LTD=4850'

## FORMATION TOPS

FORMATION	SAMPLE TOPS		LOG TOPS	
	Depth	Datum	Depth	Datum
Queen Hill	3921'	-839	3921'	-839
Heebner Shale	3983'	-901	3983'	-901

Toronto	4005'	-923	4005'	-923
Lansing	4029'	-947	4028'	-946
Muncie Creek Shale	4200'	-1118	4200'	-1118
Stark Shale	4291'	-1209	4290'	-1208
Hushpuckney Shale	4340'	-1258	4339'	-1257
Marmaton	4411'	-1329	4411'	-1329
Upper Fort Scott	4522'	-1440	4522'	-1440
Little Osage Shale	4546'	-1464	4545'	-1463
Excello Shale	4561'	-1479	4561'	-1479
Johnson Zone	4634'	-1552	4634'	-1552
Morrow	4703'	-1621	4703'	-1621
Mississippian	4741'	-1659	4741'	-1659
RTD	4850'	-1768		
LTD			4850'	-1768





LS: crm/lt tan, micro xln, foss frags/brach, dense, brittle, fw chalky, tr-nvp, no cup odr, no fluor, ns, sm Chert: brn, tan, fw SH: gry-grn, silty, fissile, soft.

Much as above, fw more pcs of gry, dense, hard, LS.

LS: lt tan/gry, micro-fn xln, fw foss frags, dense, hard, fw chily pcs, tr-nvp, no cup odr, no fluor, ns, fw Chert: wht-opaque, sm SH: gry/drck gry, fissile, med crush, sm carb.

LS: lt tan/gry, fn xln, foss frags/crin/brach, dense, brittle, fw pcs chiky, tr-nvp, no cup odr, no fluor, ns, fw Chert: brn, foss, fw pcs pyrite.

LS: crm/lt tan, micro xln, foss frags/various, sm ool, dense, brittle, tr-nvp, no cup odr, no fluor, ns, sm Chert: grysh.

LS: crm/lt tan, micro xln, foss frags, dense, brittle, sm chiky, tr-nvp, no cup odr, no fluor, ns, sm grn-gry, fn xln, dense, hard.

LS: crm/lt tan, micro xln, foss var/crin/brach, dense, brittle, sm chiky, tr-nvp in most, fw w/ fr intfoss por, no cup odr, no fluor, ns.

LS: crm/lt tan/sm gray, micro-fn xln, foss frags/fuss/brach, dense, sm chiky, tr-nvp, no cup odr, sm drk min stn, does not cut, fw pcs of SS: gry, fn grn, sub rnd, cal cem.

LS: gry/lt tan, fn xln, fw foss frags, dense, hard, fw pcs of chlk, tr-nvp, no cup odr, ns, svrl pcs of SS: gry/lt brn, fn grn, sub rnd, sil cem, pyritic, med crush.

LS: gry, fn xln, dense, hard, fw chiky pcs, tr-nvp, no cup odr, ns, sm SH: gry, silty, fissile, med crush.

LS: gry/lt tan, sm mot, fn-med xln, dense, hard, sm chiky, fw foss frags, tr-nvp, no cup odr, ns, vry fw pcs SH: gry/blu/grn, silty, med crush.

Much of the same as above.

LS: lt tan/gry, sm chiky and mot, micro-fn xln, dense, vry fw foss frags, tr-nvp, no cup odr, ns, sm SH: gry, fissile, fw Chert: gry.

LS: gry/lt tan, fn xln, mot, foss var, dense, hard, tr-nvp, no cup odr, no fluor, ns.

LS: crm/lt tan, micro-fn xln, sm chalky, tr-nvp, no cup odr, no fluor, ns, sm SH: gry/drck gray.

LS: gry/lt tan, fn xln, dense, hard, sm abund foss brach/crin/frags, tr-nvp, no cup odr, no fluor, ns.

LS: crm/lt tan, micro-fn xln, dense, brittle, foss var/brach/crin, tr-nvp, no cup odr, no fluor, ns.

LS: gry/lt tan, micro-fn xln, dense, sm hard, sm chiky, fw foss frags, tr-nvp, no cup odr, no fluor, ns.

LS: lt tan/gry, micro-fn xln, foss fusc/crin/frags, mot, tied, tr-nvp, no cup odr, no fluor, ns, sm Chert: wht-opaque, foss frags.

LS: lt tan/gry, fn xln, foss frags/fuss/var, sm sndy, vfn grns, tr-nvp, no cup odr, no fluor, ns, sm Chert: gry/lt brn.

LS: lt tan, micro-fn xln, foss crin/brach/frags, sm chiky, tr-nvp, no cup odr, no fluor, ns, fw SH: gry, silty, fissile, med crush.

LS: lt tan, fn-med xln, foss brach/crin, tr intfoss por, no cup odr, no fluor, ns, sm Chert: lt brn.

LS: lt tan, fn-med xln, dense, fw foss frags, fw pcs v foss, tr-intdn por, no cup odr, no fluor, ns, fw Chert: lt brn, sm SH: drk gry.

LS: lt tan, fn-med xln, dense, sm foss var, tr intdn por, no cup odr, no fluor, ns, sm SH: drk gry/blk, sm carb.

LS: lt tan/gry, micro-fn xln, dense, brittle, no cup odr, no fluor, ns.

LS: lt tan, fn-med xln, dense, sm foss brach/var, tr-nvp, no cup odr, no fluor, ns, fw pcs Chert: gry, trans, foss, sm SH: red-brn/gry, silty, soft.

LS: lt tan, fn-med xln, foss brach/crin/var, fw ool, dense, brittle, sm chiky, tr intfoss por, no cup odr, no fluor, ns, sm SH: gry/drck gry, silty.

Much of the same as above, much more SH: gry/drck gry, silty, fissile, soft-med crush.

LS: crm/lt tan, fn-med xln, foss fusc/crin/frags, sm sndy, vfn grns, sm chiky, tr intfoss por, no cup odr, no fluor, ns, fw Chert: gry/lt brn, trans.

SH: red-brn/gry, sm silty, fissile, soft-med crush.

LS: crm/lt tan, fn-med xln, foss fusc/crin/var, sm ool, tr intfoss/ool por, no cup odr, no fluor, ns, abund SH: gry-grn, silty, soft.

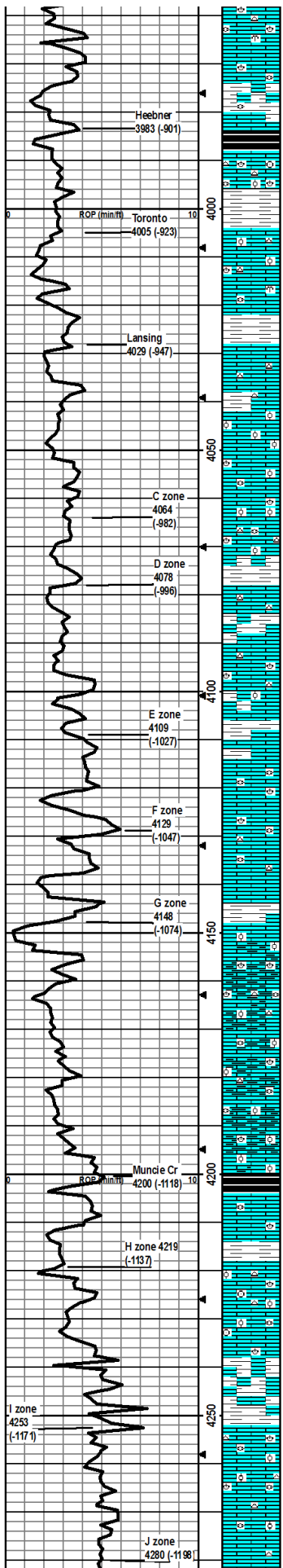
LS: crm/lt tan, fn xln, fw foss frags, tr-nvp, no cup odr, no fluor, ns.

LS: crm/lt tan, fn xln, foss crin/brach/var, dense, tr vug por, no cup odr, slight m in stn, does not fluor, ns, 1-2 pcs of DOL: gry/lt tan, fn xln, dense.

LS: crm/lt tan, fn-med xln, foss frags/var/fuss, brittle, sm sndy, vfn grns, sm chiky, tr intdn por, no cup odr, no fluor, ns, sm SH: red-brn/gry, silty, soft.

LS: crm/lt tan, micro-fn xln, foss frags/fuss/var, dense, hard, sm gritty/sndy, vfn grns, sm chiky, tr-nvp, no cup odr, no fluor, ns.

LS: crm/lt tan/sm gray, micro-fn xln, foss fusc/brach/frags, dense, hard.



sm dkly, vry fw gritty, tr-nvp, no cup odr, no fluor, ns, sm Chert gry/lt brn, foss.

LS: crm/lt tan, micro-fn xln, foss frags/fuss/var, dense, sm hard, sm chiky, tr inxln/intfoss por, no cup odr, no fluor, ns, sm SH: gry/red-brn, silty, soft

LS: crm/lt tan, fn xln, foss frags/var, fw chl k, tr-nvp, no cup odr, slight drk m in stn on edges, does not cut, does not fluor, nsfo, SH: gry-grn, silty soft.

LS: crm/lt tan, fn-med xln, foss brach/crin/fuss, sm ool, fw chl k, tr-nvp, no cup odr, ns, sm Chert: gry/lt brn, trans, abund SH: gray/bl k, sm carb, soft, fissile.

SH: gry/dr k gry/red-brn, silty, no cup odr, ns.

LS: crm/lt tan, fn xln, foss frags/var, fw ool, sm dk tr inxln por/tr vug por, scat dul yel fluor, vry slw cut pale blu, vsfso, 1-2 pcs/tray.

LS: crm/lt tan, micro xln, fw foss frags, sm chl k, tr-nvp/pr vug por, vry slight cup odr, dul yel fluor in fw pcs, fw vugs filled w/ fo, cuts pal blu, sm SH: gry-grn, silty, soft.

SH: gry-grn, silty, fissile med crush. LS: crm/lt tan, micro-fn xln, foss frags, dense, sm chl k, rare ppt inxln por, no odr, ns.

LS: crm/lt tan, micro-fn xln, sm foss, sm chl k, rare tr inxln por, no cup odr, ns, fw Chert wht-opaque, abund SH: gry/grn/red-brn, silty, med crush.

LS: crm/lt tan, fn xln, profus ool, fr int ool por, no cup odr, ss of dead tary oil, slow cut pal blu, min scat flour, sm SH: gray/red-brn, silty, fissile, med crush.

LS: lt tan, micro-fn xln, sm var foss, fw ool, no cup odr, ns, sm SH: gry-grn/red-brn, silty, med-fm crush.

LS: lt tan, fn xln, foss fusts/brach/frags, sm ool, fr ppt inxln/rare intfoss por, no cup odr, dul yel fluor, stream cuts pal blu, sso, sm SH: gry/grn, silty, fissile med crush.

LS: fw pcs much as above, predmtly SH: gry/grn/red-brn, silty med crush, tr-nvp, no cup odr, 4-5 pcs w/ sso in 30", 1-2 pcs in 60" sm pl, dul yel fluor, stream cut pal blu, sso.

SH: gry-grn, silty, soft

LS: crm/lt tan, fn xln, dense, brittle, chiky, tr ppt rare vug por, no cup odr, ns.

LS: crm, fn xln, dense, brittle, foss brach/var, sm chalk, tr ppt rare vug por, no cup odr, ns, abund SH: gry/grn, silty, fissile, med crush.

LS: crm, fn xln, dense, foss crin/fuss/frags, rare vug por in 2nd rexln and frac, drk m in stn, in the cracks, does not fluor, does not cut, nsfo, abund SH: gry/grn/red-brn, fissile, med crush.

LS: crm, fn xln, dense, sm foss fusts/frags/brach, fr-gd inxln por/tr small vug por, fr hydrocarb odr, gd cup odr, dul yel-gld fluor, cut pal blu, sso, 4-5 pcs in the 30" smpl, 2-3 pcs in the 60" smpl, 60" smpl abund SH: gry-grn, fissile, med crush.

LS: crm/lt tan, fn xln, foss var, ool, tr-nvp, vs cup odr, 1-2 pcs LS: crm/wht, micro xln, foss, ool, fr intfoss por, w/ sso, slight cup odr, dul yel/gld fluor, stream cut pal blu. 5-6 pcs in the stop smpl, 2-3 pcs in 30" smpl, sm Chert: wht-opaque, abund SH: gry/grn/bluish, fissile, silty, soft-med crush.

LS: crm/lt tan, micro-fn xln, foss fusts/brach/frags, sm ool, dense, brittle, sm chl k, tr-nvp, no cup odr, ns, fw Chert: gry-opaque, foss, abund SH: gry, fissile med crush.

LS: gry/lt tan, micro-fn xln, foss var, fw ool, dense, hard, tr-nvp, no cup odr, ns, sm SH: gry, fissile, silty, med crush.

LS: gry, micro-fn xln, fw foss frags, dense, hard, tr-nvp, no cup odr, ns, abund SH: gry/red-brn, silty, soft.

LS: gry/lt tan, micro-fn xln, vry fw foss frags, ool, dense, hard, fr intool por, no cup odr, ns, sm SH: gry, silty soft.

LS: gry/lt tan, fn xln, sm foss frags, vry ool, dense, hard, fr-gd intool por, no cup odr, ns, sm SH: gry/grn, fissile, med crush.

SH: gry/dr k gry/bl k, fissile, carb, med crush.

LS: lt tan/gry, fn xln, fw foss frags, dense, brittle, sm chl k, tr-nvp, no cup odr, ns, sm SH: gry/red-brn, silty, med crush.

SH: gry/red-brn, soft silty, LS: lt tan, fn-med xln, foss crin/brach/frags, fw chl k pcs, tr-nvp, no cup odr, slight drk m in stn on fw pcs, does not cut, does not fluor, nsfo.

LS: lt tan/gry, fn xln, foss crin/brach/frags, ool, hard, brittle fr rare intool por/ppt inxln por, v slight cup odr, vsfso, dul yel fluor, slow cut, dul yel fluor, abund of SH: gry/red-brn, silty, fissile, soft.

LS: lt tan/gry, fn xln, sm ool, fw chl k, tr-fr intool por, no cup odr, vsfso, 1-2 pcs/tray, w/ tr ppt por, may be from up hole, slow cut, dul yel fluor, abund of SH: gry/red-brn, silty, fissile, soft.

SH: gry/red-brn, silty, soft

LS: lt tan, fn xln, foss brach/fuss/frags, sm ool, fw chl k, tr inxln por/rare fr intool por, no cup odr, ns, sm Chert: wht-opaque, sharp, sm SH: gry/grn/red-brn, silty, fissile med crush.

LS: lt tan, fn xln, foss brach/fuss, fw ool, fw chl k, pr-fr inxln por/rare intfoss por, vry slight cup odr, scat dul yel fluor, vsfso in foss cast and in frac planes, stream cuts pal blu, sm Chert: wht-opaque, sharp, foss.

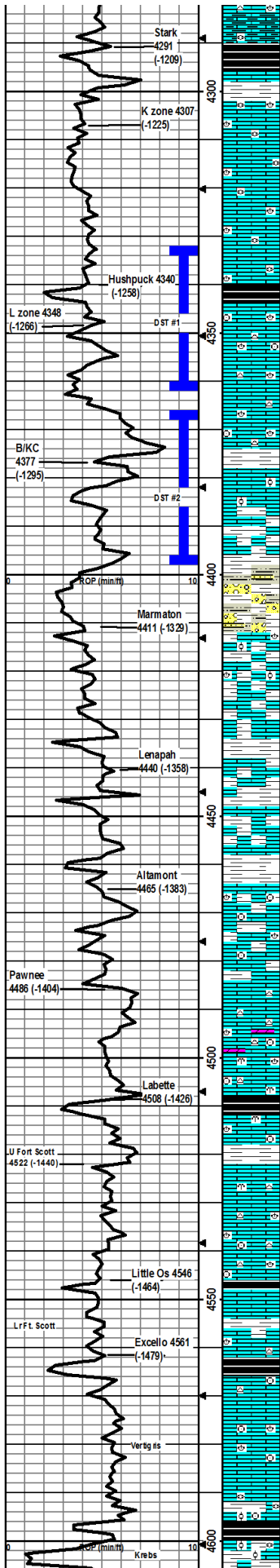
Much as the same above, 1 pc of LS: crm, fn xln, tr ppt inxln por/rare vug por, sso, dul yel fluor, cut pal blu, most likely from up hole,

Mudco Check #4 @ 4020'  
10/19/11 10:05 am  
wt vis pH chl  
9.0 51 10.5 4000  
FIR LCM  
7.2 2

CFS @ 4082'  
30"/60"

CFS @ 4127'  
30"/60"

CFS @ 4147'  
30"



abund of SH: gry/red-brn, silty, fissile, med crush.

LS: crm/lt tan, fn xln, foss brach/fuss/var, tr-nvp, no cup odr, ns, abund SH: gry/grn/red-brn, fissile, soft-med crush.

SH: gry/drk gry/blk, sm carb, silty, med crush, fissile

LS: gry/lt tan, fn-med xln, fw foss brach/frags, vry chiky, brittle, fr int xln por/fr vug por, dul yel fluor, sso in vugs, stream cut pal blu, slight cup odr, 3-4 pcs/tray, fr stns in intxn por, tobles out to fr vugs well when crushed in water; fw Chert: wnt-opaque, sm SH: gry, silty, sort.

LS: crm/lt tan, fn xln, foss brach/fuss/var, sm chik, fr-gd int os sp or, slight cup odr, scat dul yel fluor, fw pcs drk sps of de sd, slw cut pal blu, fw pcs Chert: wnt-opaque, foss, sm SH: gry/drk gry/red-brn, med crush fissile.

LS: gry/lt tan, fn xln, dense, hard, tr-nvp, no cup odr, 1-2 pcs crm/lt tan, foss, fr-gd vug por, dul yel fluor, cut pal blu, sso, possibly from up hole.

SH: blk/gry, silty, med crush, carb.

LS: lt tan/gry, fn xln, foss brach/crin/frags, brittle, pr intxn por/sm fr-gd vug por in secd rxln, dul yel fluor, stream cut pal blu, gd cup odr, gsb, slight cup odr in 30" sm pl, good fo in frac planes on crush, 60" smpl had a fw less pcs than the 30" smpl.

LS: gry/lt tan, fn xln, fw foss var, dnese, hard, tr-nvp, no cup odr, ns, fw Chert: gry.

LS: gry/lt tan, fn-med xln, fw foss brach/var/frags, dense, sm chikhard, tr-nvp, no cup odr, 1-2 pcs w/ drk min stn, no fluor, no cut, nsfo, fw Chert: gry.

LS: lt tan, fn xln, foss, dense, med crush, tr-nvp, no cup odr, ns, abund SH: gry-grn, silty, easy-med crush.

LS: crm/lt tan, fn-med xln, ool, fr-gd intxn por/fr intxn por, easy-med crush, gd cup odr, gd yel/gold fluor, stream cut pal blu, svrl pcs in stop smpl, svrl pcs in 30" smpl, less in 60" smpl w/ abund of SH: gry/drk gry/red-brn, silty, fissile, med crush.

Silts to: gry, vfn grn, arg, tr-nvp, fw pcs of SS: blu-gry, fn grn, sub rnd, arg, cal cem, abund of SH: gry/drk gry/red-brn, silty, med crush, no cup odr, ns.

LS: lt tan/gry, micro-fn xln, sm foss brach/var, fw ool, tr-nvp, abund SH: gry/grn/red-brn, fissile, med crush, no cup odr, ns.

SH: gry/drk gry/red-brn, silty, easy-med crush, fw SS: lt blu-gry, vfn grn, arg, maybe from up hole, tr-nvp, no cup odr, ns.

Much of the same as above, fw LS: lt tan, micro-fn xln, dense, hard, rare ppt-intxn por, no cup odr, ns.

LS: lt tan/gry, fn xln, dense, hard, rare foss, sm 2nd rxln, tr-nvp/rare intxn por in 2nd rxln, abund SH: gry/red, silty, fissile, med crush, no cup odr, ns.

LS: gry/lt tan, fn xln, rare foss, dense, hard, sm chik, tr intxn por, sm drk m in stn, no fluor, no cut, abund SH: gry-grn/red, silty, soft-med crush, no cup odr, nsfo

LS: crm/lt tan, fn xln, foss crin/brach/frags, dense, rare ppt intxn por/sm vug por, dul yel fluor, stream cut pal blu, abund SH: gry/red, silty, med crush, no cup odr, vsso, 2-3 pcs in 4480' smpl, 3-4 in 30" smpl.

LS: crm/lt tan, micro xln, dense, hard, tr-nvp, fw Chert: brn, trans, no cup odr, ns.

LS: crm/lt tan, fn xln, foss crin/brach/var, dense, hard, tr ppt intxn por, scat dul yel fluor, slw cut pal blu, vsso, hard to brk out of por, no cup odr, sm Chert gry, sharp, fw pcs DOL: lt tan, fn xln, dense, pr intxn por.

LS: gry/lt tan, fn xln, fw foss frags, dense, sm hard, tr-nvp, abund of SH: gry/drk gry/blk, fissile, sm carb, med crush, no cup odr, ns.

LS: lt tan/gry, fn xln, foss, ool, tr intxn por, mostly SH: gry/grn/red-brn, silty, fissile, med crush, sm Silts to gry, vfn grn, arg, no cup odr, ns.

LS: crm/lt tan, fn xln, sm foss, dense, sm chik, tr-nvp, fw drk min stns on facies, no fluor, no cut, no cup odr, ns.

LS: lt tan, fn xln, foss brach/var, dense, hard, tr-nvp, fw Chert: why-opaque, sharp, no cup odr, ns.

LS: lt tan/gry, fn-med xln, foss crin/brach/frags, sm chik, tr intxn por, abund of SH: gry/drk gry/blk, sm carb, fissile, med crush, no cup odr, ns.

LS: crm/lt tan, micro-fn xln, foss crin/frags, dense, hard, sm chik, tr intxn por, no cup odr, speckl dul yel fluor, slw cut pal blu, vsso, 2-3 pcs/tray, no cup odr, sm SH: gry/drk gry, silty, easy-med crush.

LS: lt tan, m of, fn xln, foss brach/crin/frags, ool, dense, hard, tr-nvp, sm Chert gry, trans, sm SH: gry/drk gry/blk, med crush, fissile, sm carb, no cup odr, ns.

LS: lt tan, fn xln, foss frags, ool, ppt intxn por, sm chik, vsso in svrl pcs, scat yel fluor, slw cut pal blu, no cup odr, sm Chert: gry, foss, smpls are vry small.

LS: gry/lt tan, fn xln, foss brach/frags, tr-rare intxn por, dense, hard, fw chik, sm SH: gry/red-brn, silty, fissile, med crush, no cup odr, ns.

LS: lt/gry, fn xln, foss brach/crin/var, ool, dense, hard, tr-nvp, abund SH: gry/blk, silty, fissile, med carb.

Mostly SH: gry/red-brn, silty, easy-med crush.

Mudco Check #5 @ 4323'  
10/20/11 08:45 am  
wt vis pH chl  
9.2 56 10.5 3600  
Filt LCM  
8.0 2

**DST1) 4332-4361**

3030/3030  
1st) Weak surface blow  
2nd) No Blow  
IFP 14-19#  
ISIP 1119#  
FFP 18-19# F SIP  
1127#  
HP 2146-2110#  
Recvd: 1' of Mud

CFS @ 4361'  
30"60"

**DST2) 4365-4398**

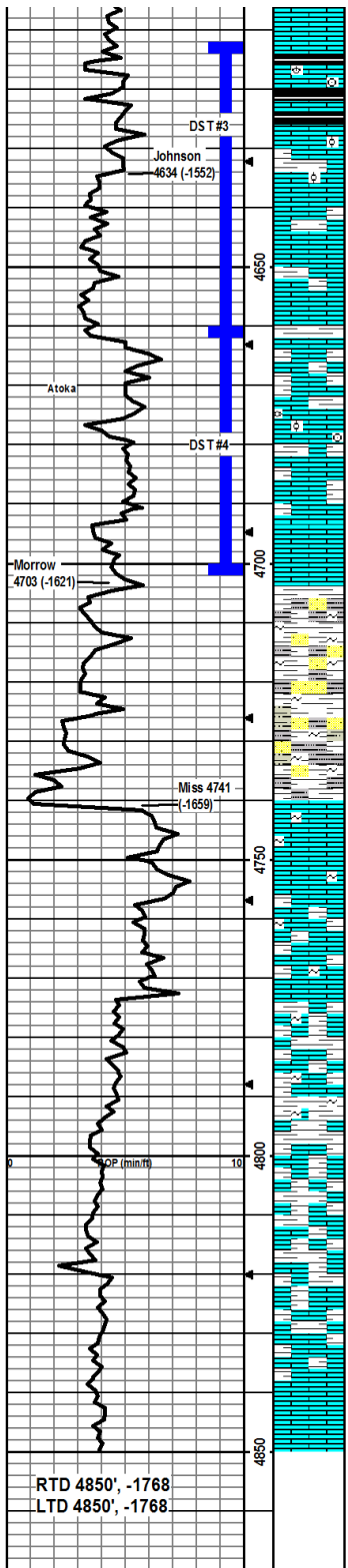
3030/3030  
1st) Wk surface built to 14"  
2nd) No Blow  
IFP 15-17#  
ISIP 344# F SIP  
FFP 17-14#  
393#  
HP 2152-2076#  
Recvd: 1' of Mud

CFS @ 4398'  
30"60"

Mudco Check #6 @ 4398'  
10/21/11 10:50 am  
wt vis pH chl  
9.3 49 9.5 5800  
Filt LCM  
8.0 2

CFS @ 4483'  
30"

Mudco Check #7 @ 4569'  
10/22/11 07:30 am  
wt vis pH chl  
9.3 50 10.0 7000  
Filt LCM  
8.0 2



LS: gry, fn xln, dense, hard, tr-nvp, no cup odr, ns.

SH: drk gry/blk, carb, fissile.

LS: crm/lt tan, micro-fn xln, vry foss brach/crin/frags, ool, dense, hard, tr ppt-inbxdn por, sm SH drk gry/blk, carb, fissile, no cup odr, ns.

LS: crm/lt tan, fn xln, foss, sm ool, dense, tr-fr inbxdn por, s sfo, 5-6 pcs/tray, dul yel/gold fluor, stream cut pal blu, vsight cup odr, sm SH: gry/red-brn, silty, sm fissile, easy med crush.

LS: crm/lt tan, fn-med xln, uniform, rare fr wug/fr inbxdn por, fw frac facies, frsfo, svrl pcs/tray, dul yel fluor, stream cut pal blu, vsight cup odr, sm SH: gry/red-brn, sm fissile, fw silty, med crush.

LS: crm/lt tan, fn xln, fr inbxdn por, rare frac facies, frsfo, svrl pcs/tray in 30" smpl, less in the 60" smpl, dul yel/gold fluor, stream cut pal blu, slght-fr cup odr, fw SH: gry/red-brn, sm fissile, fw silty, med crush.

LS: lt tan, fn xln, fw foss crin/frags, tr-nvp, mostly SH: gry/red/brn, fissile, med crush, no cup odr, ns.

LS: crm/lt tan, fn xln, fw foss fust/crin, tr-pr inbxdn por/rare vug por w/ 2nd rexdn, vsfo, 4-5 pcs/tray, scat dul yel fluor, stream cut pal blu, v slght cup odr, abund SH gry/drk gry, fissile, med crush.

LS: gry/lt tan, fn-med xln, fw foss crin/frags, sm ool, pr inbxdn por, vsfo, 3-4 pcs/tray, dul yel fluor, slw cut pal blu, no cup odr, abund SH: gry/grn, fissile, sm silty, med crush.

LS: gry/lt tan, fn xln, sm platy, foss, ool, pr intx por, vsfo, 2-3 pcs/tray in 30" smpl, scat dul yel fluor, slw cut pal blu, v slght cup odr, sm SH: gry/red-brn/fw blk fissile, sm carb, med crush.

60" only 1-2 pcs, probably from above, mostly LS: crm/lt tan, dense, foss, tr-nvp, no cup odr, ns

SH: gry/blu-grn/olive, silty, soft, sm glauc, sm waxy, Sltstn: brn, vfn grn, soft, SS: blu-grn-gry, fn grn, sub rmd, wdl strtd, sil cem, glauc, tr-nvp, no cup odr, ns.

SH: gry/blu-grn/olive, silty, easy-med crush, glauc, sm waxy, Sltstn: gry/purpl/brn, vfn grn, soft, SS: blu-gry, fn-grs grn, sub rmd, med strtd, sil cem, arg, glauc, tr-nvp, no cup odr, nsfo on crush in water.

Sltstn: gry/blu, vfn grn, v soft arg, sm SH: gry/olive, silty, soft fissile, fw SS: blu-gry, fn grn, sub rmd, med strtd, sil cem, arg, glauc, tr-nvp, nsfo on crush in water, no cup odr.

SH: gry/olive, silty, soft fissile, sm Sltstn: gry/blu, vfn grn, v soft arg, v fw SS: blu-gry, fn grn, sub rmd, wdl strtd, sil cem, sm arg, glauc, tr-nvp, nsfo on crush in water, no cup odr.

LS: wht, fn xln, v sandy, grainy, fn grns, sm glauc, med crush, sm LS: lt tan, micro xln, dense, brittle, tr-nvp, no cup odr, no fluor, ns.

LS: wht, fn xln, v sandy, grainy, fn grns, sm crs grn, sm glauc, med crush, brittle, tr-nvp, no cup odr, ns.

LS: wht, fn xln, v sandy, grainy, fn grns, sm crs grn, sm glauc, med crush, brittle, tr-nvp, abund SH: gry/olive, fissile, med crush, no cup odr, no fluor, ns.

LS: much as above, SH: gry/blk, fissile med crush, less olive, sm carb, no cup odr, no fluor, ns.

SH: gry/blu-grn/blk, silty, fissile, med crush, fw carb, sm LS: wht, fn xln, v sandy, fn grns, sm crs grns, sm glauc, med crush, brittle, tr-nvp, fw LS: lt tan, micro xln, foss, dense, hard, tr-nvp, no cup odr, ns.

SH: gry/blu-grn/red-brn, silty, fissile, easy-med crush, sm glauc, v fw LS: wht, fn xln, sandy, fn grns, glauc, med crush, tr-nvp, no cup odr, ns.

SH: gry/blu-grn/red/brn, fissile, med crush, sm glauc, fw LS: wht, fn xln, sandy, fn grns, glauc, brittle med crush, tr-nvp, no cup odr, ns.

SH: gry/blu-grn/brn, fissile, med crush, fw SH: org-red, silty, soft, sm LS: wht, fn xln, sandy, fn grns, dense, hard, tr-nvp, no cup odr, ns.

SH: gry/blu-grn/brn/red, soft, med crush, sm LS: wht, fn xln, sandy, fn grns, dense, hard, tr-nvp, fw Sltstn: red-brn, vfn grn, easy crush, soft, no cup odr, ns.

Much of the same as above.

LS: wht, fn xln, sandy, fn grns, fw chalky, fw foss, dense, tr-nvp, abund SH: gry/blu-grn/brn/red, fissile, med crush, no cup odr, ns.

**DST3) 4612-4662**

3030/3030  
1st) Wk surface built to 14"  
2nd) No blow  
IP 117-19#  
ISIP 36#  
FFP 19-21# FSHIP 28#  
HP 2290-2267#  
Recvd: 1' of Mud

CFS @ 4662'  
30"/60"

**DST4) 4662-4702**

3030/3030  
1st) Wk surface built to 14"  
2nd) No blow  
IP 117-19#  
ISIP 36#  
FFP 19-21# FSHIP 28#  
HP 2290-2267#  
Recvd: 1' of Mud

Mudco Check #8 @ 4700'  
10/23/11 09:00 am  
wt vis pH chl  
9.4 54 10.0 7000  
FIT LCM  
8.8 1

CFS @ 4742'  
30"/60"

Mudco Check #8 @ 4784'  
10/24/11 07:50 am  
wt vis pH chl  
9.2 50 10.5 7000  
FIT LCM  
8.8 2

CFS @ 4850'  
30"

RTD 4850', -1768  
LTD 4850', -1768