

Robert L. Milford

PETROLEUM GEOLOGIST

Wichita, Kansas

GEOLOGISTS' REPORT

DRILLING TIME AND SAMPLE LOG

OPERATOR **Murfin Drilling Company, Inc.**
 LEASE **Gottschalk #1-28**
 LOC. SPOT **5'S & 60'E of C NE NW NW**

LOC. FOOTAGE **335' FNL 1,050' FWL**
 SEC. **28** TWPSP **14S** RANG **18W**
 COUNTY **Ellis** STATE **Kansas**

API **15-051-26496-00-00**
 CONTRACTOR **Murfin Drilling Co., Inc.** RIG NO. **16**
 DRILLING STARTED **3-19-2013** COMPLETED **3-26-2013**
 MUD DISPLACED **2,670'** MUD TYPE **Chemical**
 DRILLING TIME KEPT FROM **2,940** TO **RTD**
 SAMPLES SAVED FROM **2,940** TO **RTD**
 SAMPLES EXAMINED FROM **2,940** TO **RTD**
 GEOLOGICAL SUPERVISION FROM **2,775'** TO **RTD**

MEASUREMENTS FROM
CASING RECORD
 Conductor
 Surface **8.5/8" @ 220'**
 w/ 165 sacks cement
 Production none

ELECTRICAL SURVEYS
 Pioneer Wireline
 Dual Induction Log
 Dual Compensated -

Porosity Log
 Microresistivity Log
 Borehole Compensated-
 Sonic Log

FORMATION NAME	LOG TOP	DATUM	SAMPLE TOP	DATUM
Stone Corral	1,273'	+786'	1,275'	+784'
Base Stone Corral	1,316'	+743'	1,317'	+742'
Topeka	3,091'	-992'	3,092'	-993'
Heebner	3,308'	-1249'	3,309'	-1250'
Toronto	3,328'	-1269'	3,329'	-1270'
Lansing	3,356'	-1297'	3,357'	-1298'
Stark	3,544'	-1485'	3,545'	-1486'
B/KC	3,589'	-1530'	3,590'	-1531'
Arbuckle	3,693'	-1634'	3,693'	-1634'
Total Depth	3,756'	-1697'	3,755'	-1696'



DATE	7:00 AM DEPTH	REMARKS
3-19-13	0'	Spud @ 4:00 pm. Plug down @ 8:15 pm. Drilled out plug @ 4:15 am on 3-20-13
3-20-13	400'	Cut 400' in last 24 hrs. Dev. 0.5° @ 2226'
3-21-13	2,290'	Cut 1,890' in last 24 hrs; 21.75 hrs drlg.
3-22-13	3,210'	Cut 920' in last 24 hrs; 21 hrs drlg. DST #1 @ 3393'
3-23-13	3,420'	Cut 210' in last 24 hrs; 8 hrs drlg. DST #2 @ 3445', DST #3 @ 3567'
3-24-13	3,567'	Cut 147' in last 24 hrs; 7 hrs drlg. DST #4 @ 3694'
3-25-13	3,694'	Cut 127' in last 24 hrs; 4.5 hrs drlg. DST #5 @ 3704', RTD 3755' @ 2:44 am 3-26-13
3-26-13	3,755'	Cut 61' in last 24 hrs; 2 hrs drlg. P&A

Remarks

The electric log measurements correlate from even to 2' higher to the drilling measurements.

Formation tops and lithology on this report have been corrected to the electric log.

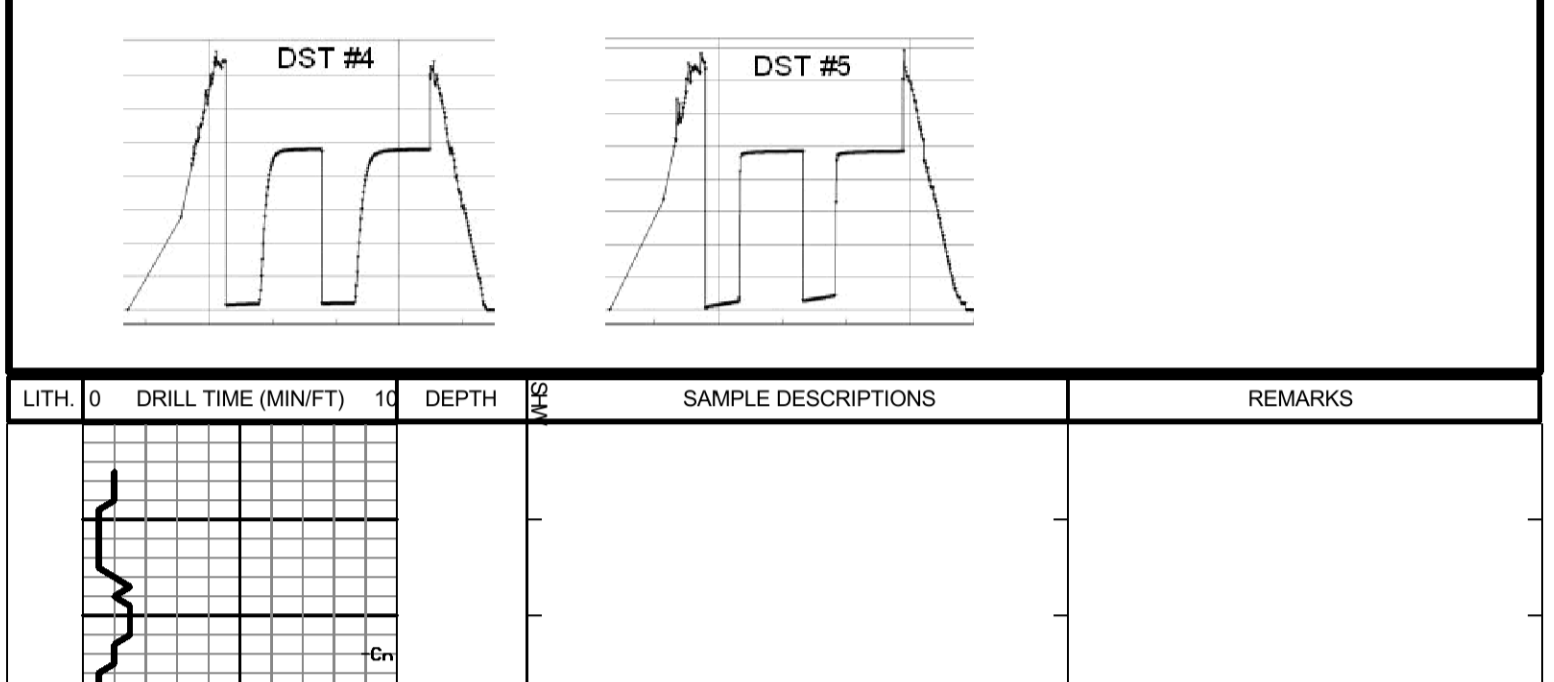
The drilling samples were deposited at the Kansas Geological Survey office in Wichita.

Respectfully submitted,

Robert L. Milford

Drill Stem Test Charts

Drill Stem Test by Trilobite Testing, Inc.



LITH.	DRILL TIME (MIN/FT)	DEPTH	SAMPLE DESCRIPTIONS	REMARKS
		1250'		Stone Corral 1273' (+786) EL
		1300'		B/Stone Corral 1316' (+743) EL

LITH.	DRILL TIME (MIN/FT)	DEPTH	SAMPLE DESCRIPTIONS	REMARKS
		2950'	Sh: lt-drk gry, some grn, some soft & gummy LS: crm-brn, fxl, fos in prt, some shly, sub chky-prtly dns, pr por, NS Sh: lt-drk gry, some grn, some soft & gummy LS: crm-brn, fxl, fos in prt, sub chky-prtly dns, pr por, NS	Mud displaced from 2670' to 2702' Call depth 2640' @ 3:39 pm on 3-21-13 Samples start 2940' @ 11:00 pm on 3-21-13
		3000'	Sh: lt gry-lt grn, some soft & gummy, some med-drk gry LS: crm-brn, fxl, sli fos, some shly, sub chky-prtly dns, pr por, NS Sh: lt-med gry, some grn LS: A.A. Sh: lt-med gry, some soft & gummy	
		3050'	Sh: mstly med gry, some silty & sli calc, some soft & gummy Sh: A.A. LS: tan-brn, fxl, sli fos, some shly, sub chky-prtly dns, pr por, NS LS: A.A.	Topeka 3051' (-992) EL
		3100'	LS: crm-brn, fxl, fos in prt, some shly, sub chky-prtly dns w/ some chky, pr por, NS LS: A.A. LS: crm-tan, fxl, ool (vry small) in prt, sub chky-prtly dns w/ some chky, some pin point-moldic por, NS LS: crm-brn, fxl, fos in prt, some blk mineralization, sub chky-prtly dns w/ some chky, pr por, NS	
		3150'	LS: crm-brn, fxl, sli fos, some shly, chky-prtly dns w/ some vry chky, pr por, NS LS: wh-brn, fxl, sli fos, vry chky-prtly dns, pr por, NS Sh: Blk Carb Sh: gry LS: crm-brn, fxl, fos in prt, vry chky-prtly dns, pr por, NS LS: wh-brn (mstly tan), fxl, fos in prt, vry chky-dns, some pin point-moldic por, NS LS: A.A., pr por, NS	Mud Co/Service Mud check @ 3127': 70-Vis 8.9 Wt, 6.4 WL, Chl 1,200 ppm, 1# LCM
		3200'	Sh: gry LS: crm-brn, fxl, fos in prt, sub chky-dns w/ some chky, pr por, NS Sh: Blk Carb LS: A.A., incrs tan-brn, pr por, NS LS: crm-brn, fxl, fos in prt, sub chky-prtly dns w/ some chky-vry chky, pr por, NS LS: A.A., some w/ blk mineralization, pr por, NS	DST #1 3257'-3393' Oread-LKC 'B' zn IF: BOB in 4" ISI: 1.5" blow back FF: BOB in 3" FSI: 6" blow back Rec: 819' 6IP & 315' TOTAL FLUID: 189' GOCM (30% G, 20% O, 50% M) 126' SOCGWM (10% G, 10% O, 10% W, 70% M) Chl ppm: 31,000 DST: 1,200 Mud IFP: 80-144#/30" ISIP: 1144#/60" FFP: 162-188#/30" FSIP: 1154#/90"
		3250'	LS: crm-brn, fxl, fos in prt, sub chky-prtly dns w/ some chky-vry chky, pr por, NS LS: A.A., some w/ blk mineralization, pr por, NS LS: crm-brn, fxl, fos in prt, tr cht, sub chky-prtly dns w/ some chky-vry chky, pr fos por, vry scat mstly lt brn sub sat w/ tr drk brn sptd-sub sat w/ SSFO, sli odor LS: A.A., w/ some pin point-vry small moldic por, scat lt-vry lt brn sub sat w/ tr sat stn, cpl pcs w/ SSFO, sli odor in cup & fr odor on brk LS: crm-brn, fxl, fos in prt, sli chty, sub chky-prtly dns w/ some chky, scat lt-vry lt brn sub sat w/ tr sat stn, small amt w/ SSFO, sli-fr odor LS: crm-tan, fxl, sli fos, sub chky-prtly dns, pr por, NS Sh: Blk Carb LS: crm-tan, fxl, sli fos, mstly prtly dns, pr por, NS Sh: gry & grn	Note: odor carried in samples through the 3393' circulation samples
		3300'	LS: crm-tan, fxl, sli fos, sub chky-prtly dns w/ some chky, pr fos & rare vulg por, vry scat lt-drk brn sptd-sub sat, 1 pc w/ SSFO (pin point beads), sli odor (see Remarks)	DST #2 3391'-3445' LKC 'D'-F' zns IF: blow built to 2.75" ISI: surface blow FF: blow built to 2.25" FSI: no blow back Rec: 20' VSOCGM (3% G, 2% O, 95% M) IFP: 59-53#/30" ISIP: 551#/60" FFP: 42-47#/60" FSIP: 451#/90"
		3350'	Sh: gry, grn, red-brn, some lt grn, soft & gummy LS: crm-tan, fxl, sli fos, sub chky-prtly dns, pr por, rare lt brn sptd-sub sat stn, NSFO, sli odor (see Remarks) LS: crm-gry, fxl, sli fos, some blk mineralization, some mottled, sub chky-vry chky, pr por, NS LS: crm-tan, fxl, sli fos-ool, sub chky-prtly dns, pr fos & rare moldic por, scat blk mstly sptd-spkid stn & tr brn-blk sub sat stn, SSFO, sli odor LS: crm-tan, fxl, ool-fos in prt, sub chky-prtly dns, pr w/ tr fr intrprt-vug por, scat lt brn sptd-sub sat & tr sat stn w/ some drk brn patchy stn, SSFO, vry fnt odor LS: crm, fxl, fos in prt, sub chky-prtly dns, pr w/ fr frms-vug por, scat lt brn sptd-sub sat stn, S-FSFO, fnt odor on brk LS: crm, fxl, ool-fos in prt, chty (wh-tan), sub chky-prtly dns w/ some chky-vry chky, fr w/ some gd intrprt-vug & tr moldic por, scat lt brn sptd-sub sat stn, FSFO, fnt odor LS: crm-tan, fxl, ool-fos in prt, sub chky-prtly dns, pr-fr intrprt por, tr lt-drk brn sptd-sub sat stn, NSFO, no odor LS: wh-tan, fxl, sli fos-ool, chty (wh), sub chky-prtly dns w/ some chky-vry chky, some pr-fr intrprt por, tr lt-drk brn sptd stn, NSFO, no odor Sh: med-drk gry LS: lt brn, fxl, prtly dns, pr por, NS LS: crm, fxl, sli fos, sli chty (wh-tan), sub chky-prtly dns, pr por, vry scat med-drk sptd-patchy dead stn, w/ few pcs lt brn sub sat live stn, NSFO, no odor	DST #3 3473'-3567' LKC 'H'-K' zns IF: blow built to 2" FF: LWC 'H'-K' zns Rec: 20' Mud w/ scum of oil (100% M) IFP: 59-53#/30" ISIP: 551#/60" FFP: 55-58#/30" FSIP: 377#/60"
		3400'	LS: wh-tan, fxl, ool in prt, sli chty (tan), sub chky-prtly dns w/ some chky-vry chky, some pr-fr dvp moldic-vug por, scat brn-blk sptd-sub sat stn, FSFO (some thick-hvy beads), fnt odor Sh: gry LS: wh-tan, fxl, ool in prt, sub chky-prtly dns w/ some chky-vry chky, some pr-fr dvp moldic por, vry scat blk w/ tr brn patchy-sub sat stn, S-FSFO (some thick-hvy beads), no odor LS: wh-tan, fxl, sub chky-prtly dns w/ some chky-vry chky, rare pr dvp moldic por, NS LS: wh-tan, fxl, fos-ool in prt, chky-prtly dns w/ some chky-vry chky, pr intrprt por, rare brn-blk sptd stn, NSFO, no odor LS: A.A. Sh: gry & red-brn, some grn LS: wh-tan, fxl, sli fos, sub chky-prtly dns w/ some chky-vry chky, pr por, NS Sh: gry & red-brn, some grn LS: wh-tan, fxl, ool in prt, sli chty (tan-org, fresh), sub chky-prtly dns w/ some chky-vry chky, pr por, NS Chty LS: crm-tan, fxl, sub chky-prtly dns w/ some chky-vry chky, tr pyr, prtly dns, (wh, fresh, some semi trans), tr pyr, prtly dns, pr-fr w/ tr gd, intrxln por, rare brn-blk mstly sptd stn, NSFO, no odor Sh: red-brn, some soft & gummy, some sdy, w/ gry & tr grn, & trace cht: yell Sh: red-brn w/ gry & grn, w/ some cht: yell & reddish-org, mstly fresh, NS, & trace Sd: clr-crm, fr-med grain, fri, pr vis por, med-drk brn sub sat-sub stn, VSSFO (pin point beads), no odor Sd: clr-crm, fr-grain, fri-brtl, calc, pr vis por, med-brn-blk sub sat stn, SSFO (mstly p-p to small beads), no odor, w/ Sh: mstly red-brn Sh: red-brn, w/ tr Sd: A.A., SSFO, no odor Chit: clr-yell, ool, tr brn-bk sptd dead stn & tr Sd: clr-crm, fr-med grain, fri, pr vis por, NS Chit & Sd: A.A., w/ Sd: crm-lt gry, fr-crs xln, prtly dns, pr-fr intrxln por, scat med-brn-bk sptd-sub sat stn, SSFO (some thick-hvy beads), no odor Dol: wh-lt gry, fr-crs xln, sli pyr, rare glauc, prtly dns, pr-fr intrxln por, scat blk mstly sptd-spkid stn & tr brn-bk sub sat stn, SSFO (pin point small beads), no odor, barren por Dol: wh-lt gry, fr-med w/ some crs xln, sli chty (wh, fresh, some semi trans), tr pyr, prtly dns, pr-fr w/ tr gd, intrxln por, rare brn-blk mstly sptd stn, NSFO, no odor Dol: A.A., sli chty, pr-fr intrxln por, rare stn, NSFO, no odor	DST #4 3630'-3694' Pawnee-Arbuckle IF: blow built to 2.5" ISI: surface blow FF: blow built to 0.25" Rec: 35' MW w/ oil spots IFP: 28-45#/30" ISIP: 1180#/60" FFP: 46-50#/30" FSIP: 1199#/60"
		3450'	LS: wh-tan, fxl, ool in prt, sub chky-prtly dns w/ some chky-vry chky, some pr-fr dvp moldic-vug por, scat brn-blk sptd-sub sat stn, FSFO (some thick-hvy beads), fnt odor Sh: med-drk gry LS: lt brn, fxl, prtly dns, pr por, NS LS: crm, fxl, sli fos, sli chty (wh-tan), sub chky-prtly dns, pr por, vry scat med-drk sptd-patchy dead stn, w/ few pcs lt brn sub sat live stn, NSFO, no odor LS: crm-tan, fxl, ool in prt, sub chky-prtly dns, pr w/ some fr-gd moldic-vug por, vry scat lt-drk brn sptd-sub sat w/ tr sat stn, SSFO, fnt odor LS: wh-tan, fxl, ool in prt, sli chty (tan), sub chky-prtly dns w/ some chky-vry chky, some pr-fr dvp moldic-vug por, scat brn-blk sptd-sub sat stn, FSFO (some thick-hvy beads), fnt odor Sh: gry LS: wh-tan, fxl, ool in prt, sub chky-prtly dns w/ some chky-vry chky, some pr-fr dvp moldic por, vry scat blk w/ tr brn patchy-sub sat stn, S-FSFO (some thick-hvy beads), no odor LS: wh-tan, fxl, sub chky-prtly dns w/ some chky-vry chky, rare pr dvp moldic por, NS LS: wh-tan, fxl, fos-ool in prt, chky-prtly dns w/ some chky-vry chky, pr intrprt por, rare brn-blk sptd stn, NSFO, no odor LS: A.A. Sh: gry & red-brn, some grn LS: wh-tan, fxl, sli fos, sub chky-prtly dns w/ some chky-vry chky, pr por, NS Sh: gry & red-brn, some grn LS: wh-tan, fxl, ool in prt, sli chty (tan-org, fresh), sub chky-prtly dns w/ some chky-vry chky, pr por, NS Chty LS: crm-tan, fxl, sub chky-prtly dns w/ some chky-vry chky, tr pyr, prtly dns, (wh, fresh, some semi trans), tr pyr, prtly dns, pr-fr w/ tr gd, intrxln por, rare brn-blk mstly sptd stn, NSFO, no odor Dol: wh-lt gry, fr-med w/ some crs xln, sli pyr, tr cht, prtly dns, pr-fr w/ some gd intrxln por, rare blk sptd stn, NSFO, no odor	DST #5 3694'-3704' Arbuckle IF: BOB in 20" ISI: surface blow back FF: BOB in 23.5" FSI: no blow back Rec: 220' TOTAL FLUID 94' WM (45% W, 55% M) 126' MW (90% W, 10% M) Chl ppm: 30,000 DST: 1,500 Mud IFP: 14-64#/30" ISIP: 1203#/60" FFP: 68-109#/30" FSIP: 1209#/60"
		3500'	LS: wh-tan, fxl, fos-ool in prt, chky-prtly dns w/ some chky-vry chky, pr intrprt por, rare brn-blk sptd stn, NSFO, no odor LS: A.A. Sh: gry & red-brn, some grn LS: wh-tan, fxl, sli fos, sub chky-prtly dns w/ some chky-vry chky, pr por, NS Sh: gry & red-brn, some grn LS: wh-tan, fxl, ool in prt, sli chty (tan-org, fresh), sub chky-prtly dns w/ some chky-vry chky, pr por, NS Chty LS: crm-tan, fxl, sub chky-prtly dns w/ some chky-vry chky, tr pyr, prtly dns, (wh, fresh, some semi trans), tr pyr, prtly dns, pr-fr w/ tr gd, intrxln por, rare brn-blk mstly sptd stn, NSFO, no odor Dol: wh-lt gry, fr-med w/ some crs xln, sli pyr, tr cht, prtly dns, pr-fr w/ some gd intrxln por, rare blk sptd stn, NSFO, no odor	Mud Co/Service Mud check @ 3554': 51 Vis 9.1 Wt, 7.4 WL, Chl 1,300 ppm, 1# LCM
		3550'	LS: wh-tan, fxl, fos-ool in prt, chky-prtly dns w/ some chky-vry chky, pr intrprt por, rare brn-blk sptd stn, NSFO, no odor LS: A.A. Sh: gry & red-brn, some grn LS: wh-tan, fxl, sli fos, sub chky-prtly dns w/ some chky-vry chky, pr por, NS Sh: gry & red-brn, some grn LS: wh-tan, fxl, ool in prt, sli chty (tan-org, fresh), sub chky-prtly dns w/ some chky-vry chky, pr por, NS Chty LS: crm-tan, fxl, sub chky-prtly dns w/ some chky-vry chky, tr pyr, prtly dns, (wh, fresh, some semi trans), tr pyr, prtly dns, pr-fr w/ tr gd, intrxln por, rare brn-blk mstly sptd stn, NSFO, no odor Dol: wh-lt gry, fr-med w/ some crs xln, sli pyr, tr cht, prtly dns, pr-fr w/ some gd intrxln por, rare blk sptd stn, NSFO, no odor	Mud Co/Service Mud check @ 3694': 56 Vis 9.3 Wt, 7.6 WL, Chl 1,500 ppm, 2# LCM DST #5 3694'-3704' Arbuckle IF: BOB in 20" ISI: surface blow back FF: BOB in 23.5" FSI: no blow back Rec: 220' TOTAL FLUID 94' WM (45% W, 55% M) 126' MW (90% W, 10% M) Chl ppm: 30,000 DST: 1,500 Mud IFP: 14-64#/30" ISIP: 1203#/60" FFP: 68-109#/30" FSIP: 1209#/60"
		3600'	LS: wh-tan, fxl, fos-ool in prt, chky-prtly dns w/ some chky-vry chky, pr intrprt por, rare brn-blk sptd stn, NSFO, no odor LS: A.A. Sh: gry & red-brn, some grn LS: wh-tan, fxl, sli fos, sub chky-prtly dns w/ some chky-vry chky, pr por, NS Sh: gry & red-brn, some grn LS: wh-tan, fxl, ool in prt, sli chty (tan-org, fresh), sub chky-prtly dns w/ some chky-vry chky, pr por, NS Chty LS: crm-tan, fxl, sub chky-prtly dns w/ some chky-vry chky, tr pyr, prtly dns, (wh, fresh, some semi trans), tr pyr, prtly dns, pr-fr w/ tr gd, intrxln por, rare brn-blk mstly sptd stn, NSFO, no odor Dol: wh-lt gry, fr-med w/ some crs xln, sli pyr, tr cht, prtly dns, pr-fr w/ some gd intrxln por, rare blk sptd stn, NSFO, no odor	Mud Co/Service Mud check @ 3755': 53 Vis 9.3 Wt, 7.8 WL, Chl 1,500 ppm, 2# LCM
		3650'	LS: wh-tan, fxl, fos-ool in prt, chky-prtly dns w/ some chky-vry chky, pr intrprt por, rare brn-blk sptd stn, NSFO, no odor LS: A.A. Sh: gry & red-brn, some grn LS: wh-tan, fxl, sli fos, sub chky-prtly dns w/ some chky-vry chky, pr por, NS Sh: gry & red-brn, some grn LS: wh-tan, fxl, ool in prt, sli chty (tan-org, fresh), sub chky-prtly dns w/ some chky-vry chky, pr por, NS Chty LS: crm-tan, fxl, sub chky-prtly dns w/ some chky-vry chky, tr pyr, prtly dns, (wh, fresh, some semi trans), tr pyr, prtly dns, pr-fr w/ tr gd, intrxln por, rare brn-blk mstly sptd stn, NSFO, no odor Dol: wh-lt gry, fr-med w/ some crs xln, sli pyr, tr cht, prtly dns, pr-fr w/ some gd intrxln por, rare blk sptd stn, NSFO, no odor	R.T.D. 3755' (-1696) L.T.D. 3756' (-1697) Straight Hole Survey @ 3755': 1° Dev.
		3700'	LS: wh-tan, fxl, fos-ool in prt, chky-prtly dns w/ some chky-vry chky, pr intrprt por, rare brn-blk sptd stn, NSFO, no odor LS: A.A. Sh: gry & red-brn, some grn LS: wh-tan, fxl, sli fos, sub chky-prtly dns w/ some chky-vry chky, pr por, NS Sh: gry & red-brn, some grn LS: wh-tan, fxl, ool in prt, sli chty (tan-org, fresh), sub chky-prtly dns w/ some chky-vry chky, pr por, NS Chty LS: crm-tan, fxl, sub chky-prtly dns w/ some chky-vry chky, tr pyr, prtly dns, (wh, fresh, some semi trans), tr pyr, prtly dns, pr-fr w/ tr gd, intrxln por, rare brn-blk mstly sptd stn, NSFO, no odor Dol: wh-lt gry, fr-med w/ some crs xln, sli pyr, tr cht, prtly dns, pr-fr w/ some gd intrxln por, rare blk sptd stn, NSFO, no odor	
		3750'	LS: wh-tan, fxl, fos-ool in prt, chky-prtly dns w/ some chky-vry chky, pr intrprt por, rare brn-blk sptd stn, NSFO, no odor LS: A.A. Sh: gry & red-brn, some grn LS: wh-tan, fxl, sli fos, sub chky-prtly dns w/ some chky-vry chky, pr por, NS Sh: gry & red-brn, some grn LS: wh-tan, fxl, ool in prt, sli chty (tan-org, fresh), sub chky-prtly dns w/ some chky-vry chky, pr por, NS Chty LS: crm-tan, fxl, sub chky-prtly dns w/ some chky-vry chky, tr pyr, prtly dns, (wh, fresh, some semi trans), tr pyr, prtly dns, pr-fr w/ tr gd, intrxln por, rare brn-blk mstly sptd stn, NSFO, no odor Dol: wh-lt gry, fr-med w/ some crs xln, sli pyr, tr cht, prtly dns, pr-fr w/ some gd intrxln por, rare blk sptd stn, NSFO, no odor	