

GEOLOGISTS' REPORT

OPERATOR **MURFIN DRILLING COMP. INC.**
 LEASE **STEC #1-23**
 WELL **660' FNL 660' FWL**

LOCATION **660' FNL 660' FWL**
 SEC. **23** TWPSP. **1S** RGE. **37W**
 COUNTY **CHEYENNE** STATE **KANSAS**

FIELD **WILDCAT**
 CONTRACTOR **MURFIN DRILLING CO. INC**
 COMMENCED **APRIL 5, 2014** COMPLETED **APRIL 16, 2014**
 MUD DISPLACED **3400** MUD TYPE **CHEMICAL**
 DRILLING TIME (KEPT FROM) **3470** TO **4720**
 SAMPLES SAVED FROM **3470** TO **4720**
 SAMPLES EXAMINED FROM **3470** TO **4720**

CONDUCTOR **CASING RECORD**
 SURFACE **8 5/8" @ 225'**
 PRODUCTION

GEOLOGICAL SUPERVISION FROM **3550** TO **4720**
 GEOLOGIST ON WELL **STEPHEN J MILLER**

ELECTRICAL SURVEYS:
 DUAL INDUCTION
 COMP NEU-DEN
 SONIC LOG

FORMATION NAME LOG TOP DATUM TOP DATUM SAMPLER TOP DATUM
 ANHYDRITE 3121 +53 3125 +49
 NEVA 3148 +26 3150 +24
 TOPEKA 3199 -745 3884 -750
 LANSING 3130 -956 4135 -961
 STARK SHALE 4348 -1174 4354 -1180
 B/ KANSAS CITY 4406 -1232 4407 -1233
 PAWNEE LIME 4533 -1357 4532 -1358
 CHEROKEE SHALE 4613 -1439 4616 -1442
 CHEFONKEE SHALE 4718 -1544 4720 -1546

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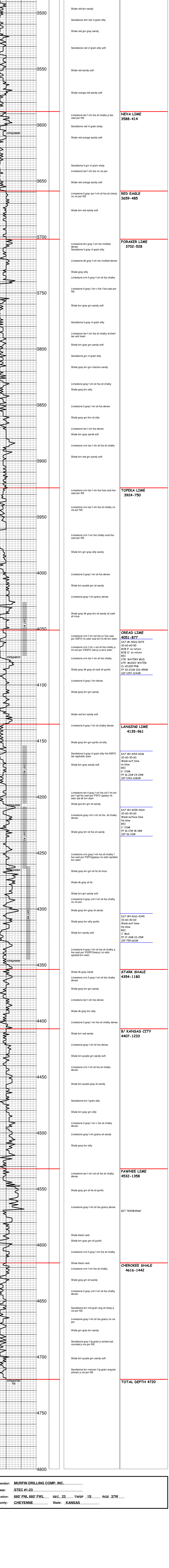
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REMARKS

API 15-023-21388
 Drilling Fluids: MORGAN MUD
 Drill Stem Testing: TRILOBITE TESTERS
 Gas Trailer: NONE
 Reserve Pit Chlorides: 700 PPM

DRILL TIME (MIN/FT)	DEPTH	SAMPLE DESCRIPTIONS	REMARKS
	3400	Sandstone red vf grain silty	
	3450	Shale red brn sandy	
	3500	Sandstone wht red vf grain silty	
	3550	Shale red gm gray sandy	
	3600	Sandstone red vf grain silty soft	
	3650	Shale red sandy soft	
	3650	Shale orange red sandy soft	
	3650	Limestone tan f-xln fos sil chalky p fos-cast por NS	NEVA LIME 3588-414
	3650	Sandstone red vf grain shaly	
	3650	Shale red orange sandy soft	
	3650	Sandstone lt gm vf grain shaly	
	3650	Limestone tan f-xln fos no vis por	
	3650	Shale red orange sandy soft	
	3700	Limestone lt gray tan f-xln sil fos sil cherty no vis por NS	RED EAGLE 3659-485
	3700	Shale brn red sandy soft	
	3700	Limestone brn gray f-xln fos mottled dense	FORAKER LIME 3702-528
	3700	Sandstone lt gray vf grain silty	
	3700	Limestone dk gray f-xln fos mottled dense	
	3700	Shale gray silty	
	3700	Limestone crm lt gray f-xln sil fos chalky	
	3700	Limestone lt gray f-xln v fos f fos-cast por NS	
	3700	Shale brn gray grn sandy soft	
	3700	Sandstone lt gray vf grain silty	
	3700	Limestone tan f-xln fos sil chalky w/chert tan wht fresh	
	3700	Shale brn gray grn sandy soft	
	3700	Sandstone grn vf grain silty	
	3700	Shale gray brn grn maroon sandy	
	3700	Limestone gray f-xln sil fos sil chalky	
	3700	Shale gray brn silty	
	3700	Limestone lt gray f-xln sil fos dense	
	3700	Shale gray grn brn sil silty	
	3700	Limestone tan f-xln fos dense	
	3700	Shale brn gray sandt soft	
	3700	Limestone crm tan f-xln sil fos sil chalky	
	3700	Shale brn red gm sandy soft	
	3700	Limestone crm tan f-xln fos fusc scat fos-cast por NS	TOPEKA LIME 3924-750
	3700	Limestone crm tan f-xln fos sil chalky no vis por NS	
	3700	Limestone crm f-xln fos chalky scat fos-cast por NS	
	3700	Shale brn gm gray silty sandy	
	3700	Limestone lt gray f-xln sil fos dense	
	3700	Shale brn purple gm sil sandy	
	3700	Limestone gray f-xln grainy dense	
	3700	Shale gray dk gray brn sil sandy sil carb sil mica	
	3700	Limestone crm f-xln ool fos p-f fos-cast por SSFO no odor scat brn to dk brn stain	OREAD LIME 4051-877
	3700	Limestone crm f-xln v ool sil fos chalky p int-ool por VSSFO (larry) p larry stain	DST #1 4026-4074 30-60-60-90 BOB 9' no return BOB 11' no return REC 6' OSM FP 16-17# 226-455# SIP 1257-1243#
	3700	Limestone crm tan f-xln sil fos chalky	
	3700	Shale gray dk gray sil carb sil pyritic	
	3700	Limestone lt gray f-xln dense	
	3700	Shale gray brn grn sandy	
	3700	Shale red brn sandy soft	
	3700	Limestone lt gray f-xln sil chalky dense	LANSING LIME 4135-961
	3700	Shale gray brn gm pyritic sil silty	
	3700	Sandstone lt gray vf grain silty fria NSFO fair asphaltic stain	DST #2 4154-4206 30-60-30-60 Weak surf blow no blow REC 6' OSM FP 17-20# 22-25# SIP 1253-1282#
	3700	Shale brn gray sandy soft	
	3700	Limestone tan lt gray f-xln fos ool f int-ool por f-gd fos cast por FSFO (gassy) sil odor sat dk brn stain	DST #3 4209-4264 30-60-30-60 Weak surface blow No blow REC 3' Mud FP 16-17# 18-18# SIP 36-33#
	3700	Shale gra brn gm sil sandy	
	3700	Limestone gray crm f-xln sil fos sil chalky dense	
	3700	Shale gray brn sil fos sil sandy	
	3700	Limestone crm gray f-xln fos sil chalky f fos-cast por FSFO(gassy) no odor spotted brn stain	
	3700	Shale gray brn grn sil sil mica	
	3700	Shale dk gray sil sil	
	3700	Shale brn gm sandy soft	
	3700	Limestone lt gray crm f-xln sil fos chalky no vis por	
	3700	Shale gray brn gray sil sandy	
	3700	Shale gray brn silty pyritic	
	3700	Shale brn sandy soft	
	3700	Limestone lt gray f-xln sil fos sil chalky p fos-cast por VSSFO(waxy) no odor spotted brn stain	DST #4 4262-4345 30-60-30-60 Weak surf blow No blow REC 3' Mud FP 17-20# 22-25# SIP 755-661#
	3700	Shale dk gray careb	STARK SHALE 4354-1180
	3700	Limestone crm lt gray f-xln sil fos chalky dense	
	3700	Shale gray brn grn sandy	
	3700	Limestone tan f-xln fos dense	
	3700	Shale dk gray brn silty	
	3700	Limestone lt gray f-xln fos sil chalky dense	
	3700	Shale brn red sandy	B/ KANSAS CITY 4407-1233
	3700	Limestone gray f-xln sil fos dense	
	3700	Shale brn purple gm sandy soft	
	3700	Limestone crm f-xln sil fos sil chalky dense	
	3700	Shale brn purple gray sil sandy	
	3700	Sandstone brn f grain silty	
	3700	Shale brn gray grn silty	
	3700	Limestone lt gray f-xln v fos sil chalky dense	
	3700	Limestone gray f-xln grainy sil sandy	
	3700	Shale gray brn silty	
	3700	Limestone tan f-xln ool sil fos sil chalky dense	PAWNEE LIME 4532-1358
	3700	Shale gray grn sil sil pyritic	
	3700	Limestone gray f-xln sil fos grainy dense	BIT TRIP#4568'
	3700	Shale black carb	
	3700	Shale brn gray grn sil pyritic	
	3700	Limestone crm lt gray f-xln sil fos sil chalky	
	3700	Shale black carb	CHEROKEE SHALE 4616-1442
	3700	Limestone crm f-xln fos sil chalky	
	3700	Shale gray grn sil sandy	
	3700	Limestone lt gray crm f-xln sil fos chalky dense	
	3700	Sandstone brn md grain ang sil shaly p vis por NS	
	3700	Limestone gray f-xln sil fos grainy no vis por	
	3700	Shale gm gray brn sandy	
	3700	Sandstone gray f-lg grain p sorted sub rounded p vis por NS	
	3700	Shale brn purple gm sandy soft	
	3700	Sandstone brn maroon f-lg grain angular arkosic p vis por NS	TOTAL DEPTH 4720



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