# Woolsey Operating Company, LLC

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

| | |
|---|---|
| **Well Name:** Luthi GU #4 | |
| **Location:** NE NE SE | |
| **License Number:** API: 15-007-23680-00-00 | **Region:** Barber County, Kansas |
| **Spud Date:** April 12, 2011 | **Drilling Completed:** April 20, 2011 |
| **Surface Coordinates:** 2310' FSL, 330' FEL Section 36-Twp 33 South - Rge 11 West | |
| Kochia Pool | |
| **Bottom Hole Coordinates:** Vertical Hole | |
| **Ground Elevation (ft):** 1448 | **K.B. Elevation (ft):** 1457 |
| **Logged Interval (ft):** 4000 **To:** 5125 | **Total Depth (ft):** 5125 |
| **Formation:** McLish Shale | |
| **Type of Drilling Fluid:** Chemical Mud, Displace at 3400' | |

## OPERATOR

**Company:** Woolsey Operating Company,LLC
**Address:** 125 N. Market, Suite 1000
Wichita, KS 67202

## GEOLOGIST

**Name:** W. Scott Alberg
**Company:** Alberg Petroleum, LLC
**Address:** 609 Meadowlark Lane
Pratt, Kansas 67124

# FORMATION TOPS

| | SAMPLE TOPS | LOG TOPS |
|---|---|---|
| HUSHPUCKNEY SHALE | 4374(-2917) | 4370(-2813) |
| B/KC | 4429(-2972) | 4425(-2967) |
| PAWNEE | 4515(-3058) | 4511(-3054) |
| CHEROKEE GROUP | 4561(-3104) | 4560(-3103) |
| CHEROKEE SAND | 4586(-3128) | 4585(-3128) |
| MISSISSIPPIAN | 4592(-3135) | 4590(-3133) |
| KINDERHOOK SHALE | 4818(-3361) | 4816(-3359) |
| WOODFORD SHALE | 4900(-3443) | 4895(-3438) |
| VIOLA | 4938(-3481) | 4936(-3479) |
| SIMPSON GROUP | 5029(-3572) | 5024(-3567) |
| SIMPSON SAND | 5040(-3583) | 5038(-3581) |
| MCLISH SHALE | 5090(-3633) | 5090(-3633) |
| RTD | 5125(-3668) | |
| LTD | | 5122(-3665) |

Pipe Strap at 4512' indicated board depth was 26' long to pipe strap. Tops above 4512' are corrected estimations of true horizon depths.

# COMMENTS

Surface Casing: Set 5 joints 10 3/4" at 211' with 240 sxs Class A, 2% gel, 3% cc, plug down at 11:30 p.m. on April 12, 2011.  Cement did Circulate.
Production Casing:
Deviation Surveys: 1/4- 215',1/4-1214', 1/4-1721', 3/4-2227, 3/4-2736', 1-3213', 1/4-3720', 1/2-3816', 1/2-3975. 1-4133',1-4512', 1 1/2-5125'.
Contractor  Bit Record:

        1- 14 3/4" out at 215'.
        2- 7 7/8" out at  4512'
        3- 7 7/8" out at  5125'.

Gas Detector: Woolsey Operating Company, Trailer #2
Mud System: Mud Co, Brad Bortz, Engineer
DSTs: Superior Testers
Logged by Superior Well Services
LTD - 5122'
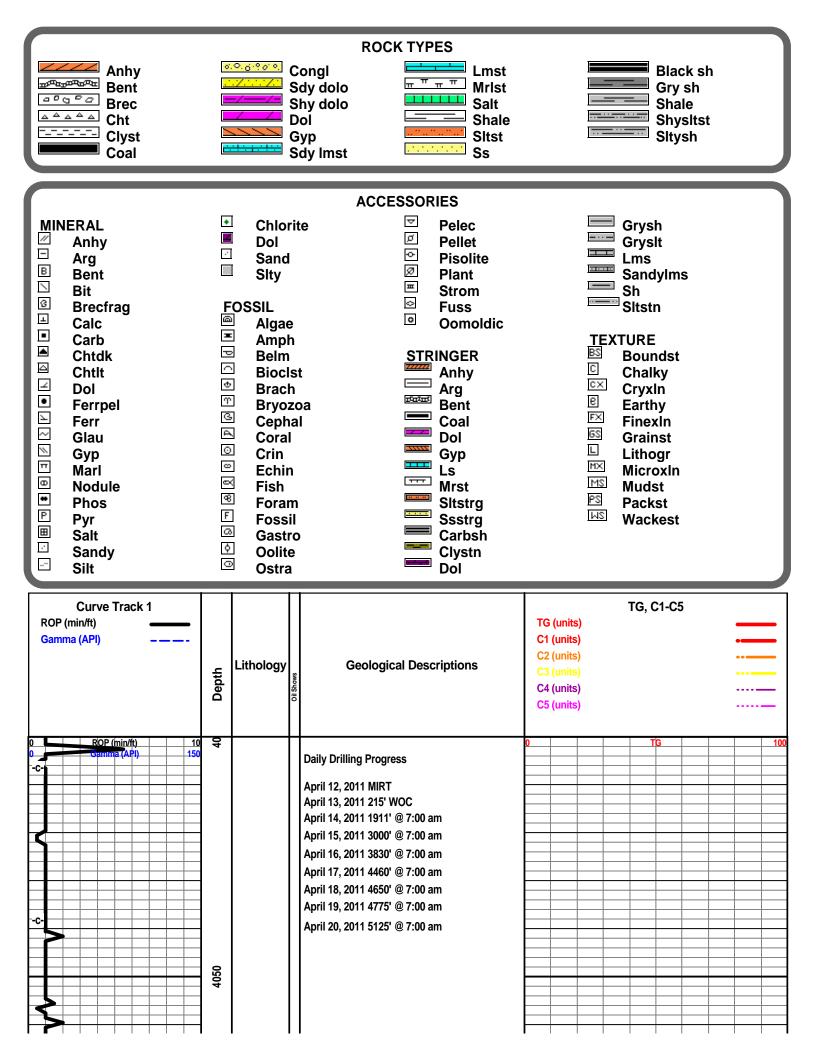
# DSTs
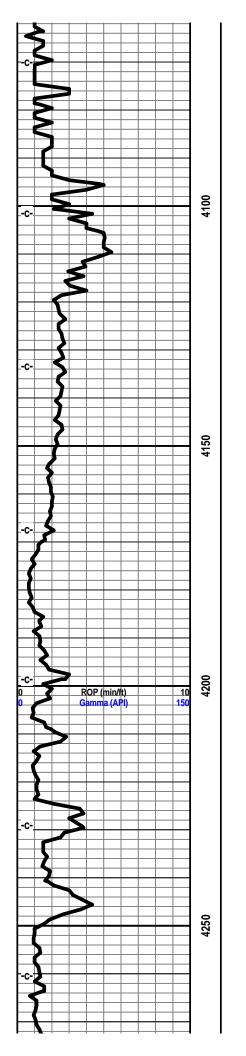
DST #1 4534 to 4650' Times 30-60-60-120
IF-Strong blow BOB in 13 minutes, no blow back
FF-Strong blow BOB 2 minutes, no blow back.
IHP  2290   FHP 2164
IFP 94-99   FFP 101-111
ISIP 458    FSIP 554
Recovery, 80' Drilling Mud, slight show of oil in tools.
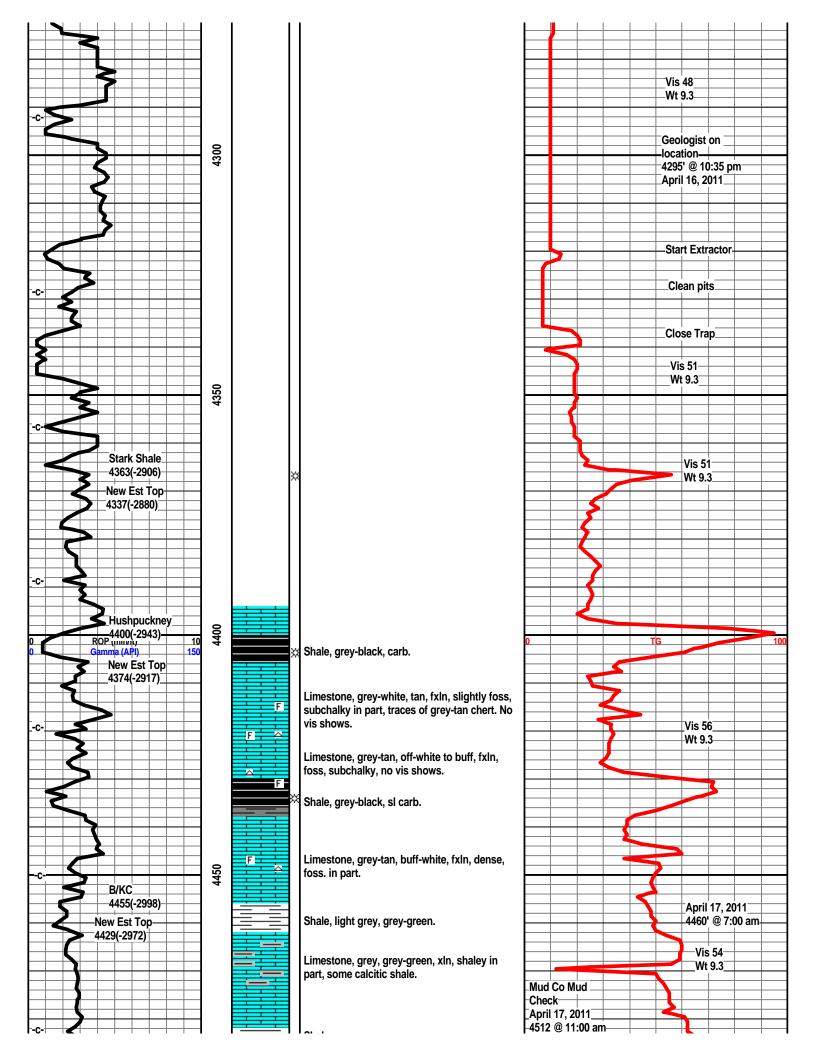
# CREWS
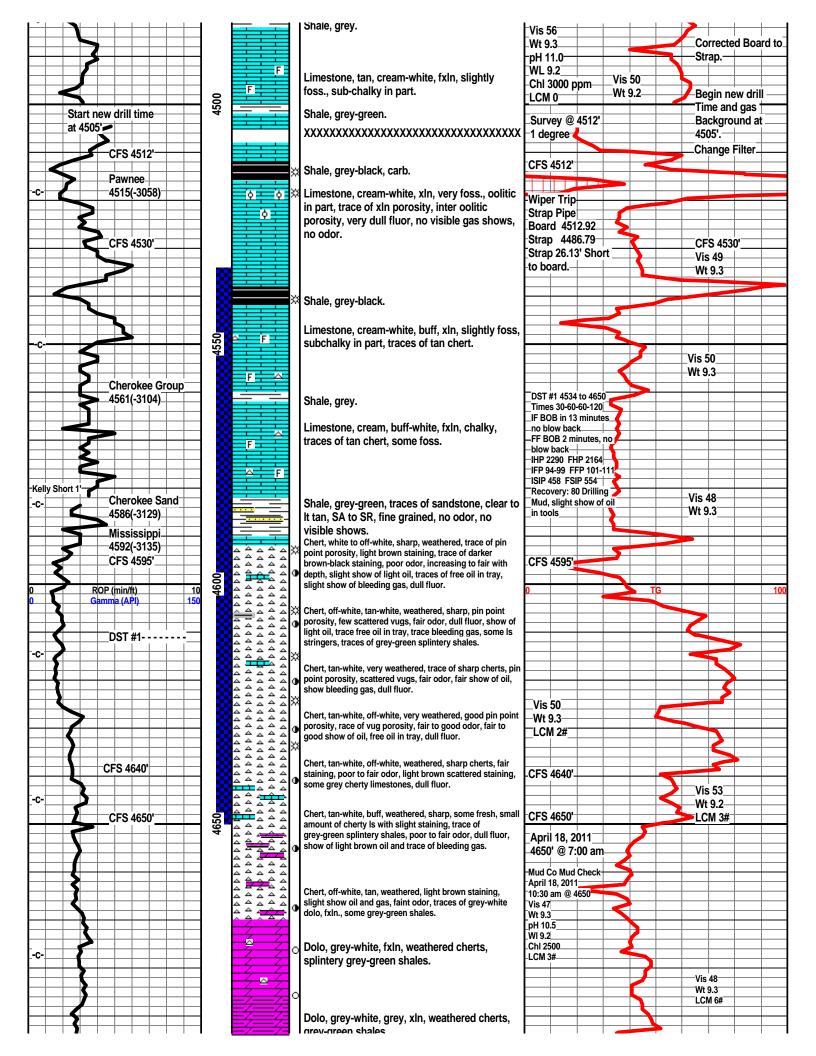
H2 Drilling Rig #3
Tool Pusher - Randy Smith
Drillers - Gary Axtell
      Luis Marquez
      Cain Charles

## ROCK TYPES

| Pattern | Name |
|---|---|
| | Anhy |
| | Bent |
| | Brec |
| | Cht |
| | Clyst |
| | Coal |
| | Congl |
| | Sdy dolo |
| | Shy dolo |
| | Dol |
| | Gyp |
| | Sdy lmst |
| | Lmst |
| | Mrlst |
| | Salt |
| | Shale |
| | Sltst |
| | Ss |
| | Black sh |
| | Gry sh |
| | Shale |
| | Shysltst |
| | Sltysh |

## ACCESSORIES

### MINERAL
Anhy
Arg
Bent
Bit
Brecfrag
Calc
Carb
Chtdk
Chtlt
Dol
Ferrpel
Ferr
Glau
Gyp
Marl
Nodule
Phos
Pyr
Salt
Sandy
Silt

Chlorite
Dol
Sand
Slty

### FOSSIL
Algae
Amph
Belm
Bioclst
Brach
Bryozoa
Cephal
Coral
Crin
Echin
Fish
Foram
Fossil
Gastro
Oolite
Ostra

Pelec
Pellet
Pisolite
Plant
Strom
Fuss
Oomoldic

### STRINGER
Anhy
Arg
Bent
Coal
Dol
Gyp
Ls
Mrst
Sltstrg
Ssstrg
Carbsh
Clystn
Dol

Grysh
Gryslt
Lms
Sandylms
Sh
Sltstn

### TEXTURE
BS Boundst
C Chalky
CX Cryxln
B Earthy
FX Finexln
GS Grainst
L Lithogr
MX Microxln
MS Mudst
PS Packst
WS Wackest

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| Curve Track 1 | | Depth | Lithology | Oil Shows | Geological Descriptions | TG, C1-C5 |
|---|---|---|---|---|---|---|
| ROP (min/ft) | ——— | | | | | TG (units) |
| Gamma (API) | – – – | | | | | C1 (units) |
| | | | | | | C2 (units) |
| | | | | | | C3 (units) |
| | | | | | | C4 (units) |
| | | | | | | C5 (units) |

| ROP (min/ft) 0 ... 10 | | | | |
| Gamma (API) 0 ... 150 | | | | TG 0 ... 100 |

-C-

-C-

Depth: 40 ... 4050

Daily Drilling Progress

April 12, 2011 MIRT
April 13, 2011 215' WOC
April 14, 2011 1911' @ 7:00 am
April 15, 2011 3000' @ 7:00 am
April 16, 2011 3830' @ 7:00 am
April 17, 2011 4460' @ 7:00 am
April 18, 2011 4650' @ 7:00 am
April 19, 2011 4775' @ 7:00 am
April 20, 2011 5125' @ 7:00 am

Depth markers: 4100, 4150, 4200, 4250

Track 1 scales:
- ROP (min/ft): 0 — 10
- Gamma (API): 0 — 150

Track 3 scales:
- TG: 0 — 100

Annotations:
Survey 4133'
1 degree

Vis 50
Wt 9.1

Vis 48
Wt 9.1

## Track 1 (ROP / Gamma)

-c-

-c-

-c-

Stark Shale
4363(-2906)

New Est Top
4337(-2880)

-c-

-c-

Hushpuckney
4400(-2943)

| 0 | ROP (mm/hr) | 10 |
| 0 | Gamma (API) | 150 |

New Est Top
4374(-2917)

-c-

-c-

B/KC
4455(-2998)

New Est Top
4429(-2972)

-c-

## Depth Track

4300

4350

4400

4450

## Lithology / Descriptions

Shale, grey-black, carb.

Limestone, grey-white, tan, fxln, slightly foss, subchalky in part, traces of grey-tan chert. No vis shows.

Limestone, grey-tan, off-white to buff, fxln, foss, subchalky, no vis shows.

Shale, grey-black, sl carb.

Limestone, grey-tan, buff-white, fxln, dense, foss. in part.

Shale, light grey, grey-green.

Limestone, grey, grey-green, xln, shaley in part, some calcitic shale.

## Track 3 (Total Gas / Mud)

Vis 48
Wt 9.3

Geologist on location
4295' @ 10:35 pm
April 16, 2011

Start Extractor

Clean pits

Close Trap

Vis 51
Wt 9.3

Vis 51
Wt 9.3

| 0 | TG | 100 |

Vis 56
Wt 9.3

April 17, 2011
4460' @ 7:00 am

Vis 54
Wt 9.3

Mud Co Mud Check
April 17, 2011
4512 @ 11:00 am

## Left Column (ROP/Gamma track)

Start new drill time
at 4505'

CFS 4512'

Pawnee
4515(-3058)

-C-

CFS 4530'

-C-

Cherokee Group
4561(-3104)

Kelly Short 1'

-C-

Cherokee Sand
4586(-3129)

Mississippi
4592(-3135)

CFS 4595'

0      ROP (min/ft)     10
0      Gamma (API)    150

DST #1- - - - - - -

-C-

CFS 4640'

-C-

CFS 4650'

-C-

Depth markers: 4500, 4550, 4600, 4650

## Center Column (Lithology descriptions)

Shale, grey.

Limestone, tan, cream-white, fxln, slightly foss., sub-chalky in part.

Shale, grey-green.

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Shale, grey-black, carb.

Limestone, cream-white, xln, very foss., oolitic in part, trace of xln porosity, inter oolitic porosity, very dull fluor, no visible gas shows, no odor.

Shale, grey-black.

Limestone, cream-white, buff, xln, slightly foss, subchalky in part, traces of tan chert.

Shale, grey.

Limestone, cream, buff-white, fxln, chalky, traces of tan chert, some foss.

Shale, grey-green, traces of sandstone, clear to lt tan, SA to SR, fine grained, no odor, no visible shows.

Chert, white to off-white, sharp, weathered, trace of pin point porosity, light brown staining, trace of darker brown-black staining, poor odor, increasing to fair with depth, slight show of light oil, traces of free oil in tray, slight show of bleeding gas, dull fluor.

Chert, off-white, tan-white, weathered, sharp, pin point porosity, few scattered vugs, fair odor, dull fluor, show of light oil, trace free oil in tray, trace bleeding gas, some ls stringers, traces of grey-green splintery shales.

Chert, tan-white, very weathered, trace of sharp cherts, pin point porosity, scattered vugs, fair odor, fair show of oil, show bleeding gas, dull fluor.

Chert, tan-white, off-white, very weathered, good pin point porosity, race of vug porosity, fair to good odor, fair to good show of oil, free oil in tray, dull fluor.

Chert, tan-white, off-white, weathered, sharp cherts, fair staining, poor to fair odor, light brown scattered staining, some grey cherty limestones, dull fluor.

Chert, tan-white, buff, weathered, sharp, some fresh, small amount of cherty ls with slight staining, trace of grey-green splintery shales, poor to fair odor, dull fluor, show of light brown oil and trace of bleeding gas.

Chert, off-white, tan, weathered, light brown staining, slight show oil and gas, faint odor, traces of grey-white dolo, fxln., some grey-green shales.

Dolo, grey-white, fxln, weathered cherts, splintery grey-green shales.

Dolo, grey-white, grey, xln, weathered cherts, grey-green shales.

## Right Column (Mud/Gas track)

Vis 56
Wt 9.3
pH 11.0
WL 9.2
Chl 3000 ppm
LCM 0

Corrected Board to Strap.

Vis 50
Wt 9.2

Begin new drill Time and gas Background at 4505'.

Change Filter

Survey @ 4512'
1 degree

CFS 4512'

Wiper Trip
Strap Pipe
Board 4512.92
Strap 4486.79
Strap 26.13' Short to board.

CFS 4530'
Vis 49
Wt 9.3

Vis 50
Wt 9.3

DST #1 4534 to 4650
Times 30-60-60-120
IF BOB in 13 minutes
no blow back
FF BOB 2 minutes, no blow back
IHP 2290 FHP 2164
IFP 94-99 FFP 101-111
ISIP 458 FSIP 554
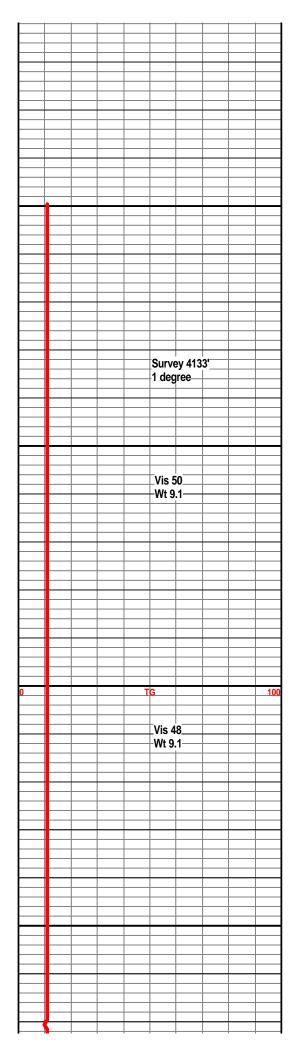Recovery: 80 Drilling Mud, slight show of oil in tools

Vis 48
Wt 9.3

CFS 4595'

0      TG     100

Vis 50
Wt 9.3
LCM 2#

CFS 4640'

Vis 53
Wt 9.2
LCM 3#

CFS 4650'

April 18, 2011
4650' @ 7:00 am

Mud Co Mud Check
April 18, 2011
10:30 am @ 4650
Vis 47
Wt 9.3
pH 10.5
Wl 9.2
Chl 2500
LCM 3#

Vis 48
Wt 9.3
LCM 6#

grey green shales.

Dolo, grey-white, xln, shaley in part, traces of weathered and fresh cherts.

Dolo, grey-white, xln, weathered cherts, fresh cherts, increasing amounts of grey-green splintery shales.

Dolo, grey, xln, grey-green shales, fresh cherts, some weathered cherts.

Dolo, grey-white, xln, shaley in part, traces of fresh chert

Dolol. grey-white, xln, traces of tan-white limestone, cherty in part, some grey-green shales.

Shale, grey-green.

Limestone, cream-white, fxln, sub-chalky, dense, trace of foss.

Shale, dark grey.

Shale, dark grey-green.

Shale, dark grey-green, firm.

Shale, dark grey-green, traces of pyrite.

**Kinderhook**
4818(-3361)

**Woodford Shale**
4900(-3443)

4700
4750
4800
4850
4900

-C-
-C-
-C-
-C-
-C-
-C-
-C-
-C-

ROP (min/ft)    10
Gamma (API)    150

0    TG    100

Vis 59
Wt 9.3
LCM

Vis 58
Wt 9.2
LCM 7#

April 19, 2011
4775' @ 7;00 am

Vis 53
Wt 9.3+
LCM 7#

Mud Co Mud Check
April 19, 2011
4809' @ 9:45 am
Vis 52
Wt 9.3+
ph 10.0
WL 9.2
Chl 3000
LCM 7#

Clean out hose on extractor

Vis 56
Wt 9.3
LCM 7#

P
P

**Left track (log scales and formation tops):**

-C-

Viola
4938(-3481)

CFS 4940'

-C-

-C-

0     ROP (min/ft)    10
0     Gamma (API)    150

-C-

Simpson Group
5029(-3572)

Simpson Sand
5040(-3583)

-C-

CFS 5060'

Wilcox 'C'
5060(-3603)

-C-

McLish Shale
5090(-3633)

**Depth track:**

4950

5000

5050

5100

**Lithology descriptions:**

P

Shale, grey-black, carb.

Shale, grey-black, carb.

Shale, grey-black, some coffee brown, carb.

P — Traces of sand with imbedded pyrite, no vis shows.

Limestone, dolomitic, grey-white to off-white, xln, foss in part, subchalky in part, trace of chert.

Limestone, cream-white to tan, fxln, granular, slightly dolo in part, foss., subchalky, traces of tan cherts.

Limestone, tan-white, granular, xln, slightly foss, tan cherts.

Limestone, tan, tan-white, granular, few black flakes imbedded, tan cherts, subchalky in part, slightly dolomitic.

Limestone, tan-white, dolomitic, xln cherty.

Limestone, tan-white, dolomitic, granular, cherty.

Shale, green, apple green, firm, waxey, trace of pyrite.

Sandstone, grey-white, some greens towards top, SA to SR, some dolomitic cementation, traces of some friable, fair sorting, no visible shows.

Sandstone, cler to grey-white, some frosted qtz grains, good sorting, fine grained, friable in part, no visible shows.

P — Sandstone, clear to grey-white, frosted qtz grains, SA to SR, fair sorting, good cementation, friable in part, gluac, no visible shows.

P — Sandstone, grey-white to clear, froted, well cemented, traces of pyrite, glauc, no visible shows.

Shale, green, dark green.

Sandstone, grey-white, SA to SR, fair sorting, friable, no visible shows.

**Right track (mud properties, TG curve):**

Vis 55
Wt 9.3
LCM 6#

CFS 4940'

Vis 54
Wt 9.3
LCM 7#

Vis 52
Wt 9.3
LCM 7#

0     TG    100

Vis 52
Wt 9.3
LCM 7#

Vis 52
Wt 9.3
LCM 7#

CFS 5060'

Vis 52

-C-

RTD 5125'

LTD 5122'

5150

00

Shale, dark green, firm, traces of pyrite.

-P-

RTD 5125'

LTD 5122'

April 20, 2011
5125' @ 7:00 am

Survey @ 5125'
1 1/2 degree

Vis 56
Wt 9.2
LCM 6#

Mud Cp Mud
Check
April 20, 2011
5125' @ 8:35 am
Vis 49
Wt 9.2
pH 9.0
WL 9,2
Chl 5000
LCM 8#