



# Musgrove

**PETROLEUM CORPORATION**  
Clafin, Kansas

### NOTES

Company: Palmer Oil, Inc.

Lease: Willis 23-5

Field: Willis

Location: NE-NW-SE-NE (1600' FNL& 700' FEL)

Sec: 23 Twsp: 32S Rge: 37W

County: Stevens State: Kansas

KB: 3120' GL: 3107'

API #: 15-189-22825-00-00

Contractor: Duke Drilling Inc. (Rig #9)

Spud: 11/20/2013 Comp: 12/01/2013

RTD: 6500' LTD: 6475'

Mud Up: 4600' Type Mud: Chemical

Samples Saved From: 4700' to RTD

Drilling Time Kept From: 4100' to RTD

Samples Examined From: 4700' to RTD

Geological Supervision from: 4700' to RTD

Geologist on Well: Wyatt Urban

Surface Casing: 8 5/8@ 1700'

Electronic Surveys: Logged by Pioneer Energy Services, DIL, CNL/CDL, MEL

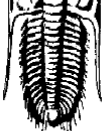
## PALMER OIL, INC. WELL COMPARISON SHEET

DRILLING WELL					COMPARISON WELL				COMPARISON WELL			
Palmer Oil, Willis 23-5 NE-NW-SE-NE					EOG RESOURCES-WILLIS 23-2 C-N2-SW-NE 23-32-37				EOG RESOURCES Willis 23-2 S2-NE-NE-SE 23-32S-37W			
23-32-37 3120 KB					3116 KB		Structural Relationship		3119 KB		Structural Relationship	
Formation	Sample	Sub-Sea	Log	Sub-Sea	Log	Sub-Sea	Sample	Log	Log	Sub-Sea	Sample	Log
Topeka										3119	-3119	
Heebner												
B. Heebner	4159	-1039			4162	-1046	7		4160	-1041	2	
Lansing	4288	-1168			4283	-1167	-1		4275	-1156	-12	
Marmaton	4948	-1828	4966	-1846	4962	-1846	18	0	4967	-1848	20	2
Cherokee	5150	-2030	5168	-2048					5167	-2048	18	0
Morrow	5645	-2525	5639	-2519	5630	-2514	-11	-5	5634	-2515	-10	-4
St. Gen	5970	-2850	5977	-2857								
St. Louis	6288	-3168	6298	-3178	6300	-3184	16	6	6293	-3174	6	-4
St. Louis B	6355	-3235	6361	-3235								
RTD	6500	-3380			6500				6500			
LTD	6475	-3355										



### DRILL STEM TEST REPORT

Palmer Oil, Willis 23-5, NE-NW-SE-NE, 23-32-37, 3120 KB



TESTING, INC

Palmer Oil  
3118 N Cummings Rd  
Garden City, Ks 67846  
ATTN: Wyatt Urdan

23-32-37 Stevens, Ks

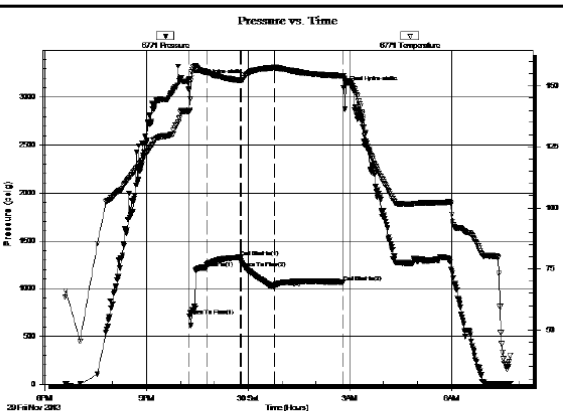
Willis # 23-5  
Job Ticket: 54666 DST#: 1  
Test Start: 2013.11.29 @ 18:36:02

GENERAL INFORMATION:

Formation: **St Louis**  
Deviated: No Whipstock: 0.00 ft (KB)  
Time Tool Opened: 22:16:02  
Time Test Ended: 08:05:02  
Test Type: Conventional Bottom Hole (Initial)  
Tester: Shane McBride  
Unit No: 55  
Interval: **6295.00 ft (KB) To 6375.00 ft (KB) (TVD)**  
Total Depth: 6375.00 ft (KB) (TVD)  
Reference Elevations: 3120.00 ft (KB)  
3109.00 ft (CF)  
Hole Diameter: 7.88 inches-Hole Condition: Poor  
KB to GR/CF: 11.00 ft

Serial #: **6771** Inside  
Press@RunDepth: 1010.90 psig @ 6296.00 ft (KB) Capacity: 8000.00 psig  
Start Date: 2013.11.29 End Date: 2013.11.30 Last Calib.: 2013.11.30  
Start Time: 18:36:02 End Time: 07:44:02 Time On Btm: 2013.11.29 @ 22:14:17  
Time Off Btm: 2013.11.30 @ 02:49:17

TEST COMMENT: Slide tool 40' to bottom B.O.B. @ open  
8" return blow  
B.O.B in 4 1/2 min.G.T.S. in 10 min to weak to gauge  
Bled off throughout shutin



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	3179.02	139.68	Initial Hydro-static
2	711.90	139.45	Open To Flow (1)
32	1215.72	155.67	Shut-h(1)
93	1328.64	152.18	End Shut-h(1)
93	1292.46	152.17	Open To Flow (2)
152	1010.90	157.51	Shut-h(2)
275	1069.89	154.10	End Shut-h(2)
275	3100.11	153.18	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
126.00	under circ sub g m c o 20g 35m 45o	0.62
2394.00	c g o 25g 75o (reversed out )	33.02
126.00	c g o 20g 80o (dumped )	1.77
0.00	gas to surface 10min on 2nd flow	0.00
0.00	to weak to gauge	0.00

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)
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ROCK TYPES

■ Lmst fw<7     ■ shale, gry     ■ shale, red  
■ Lmst fw7>     ■ Carbon Sh

ACCESSORIES

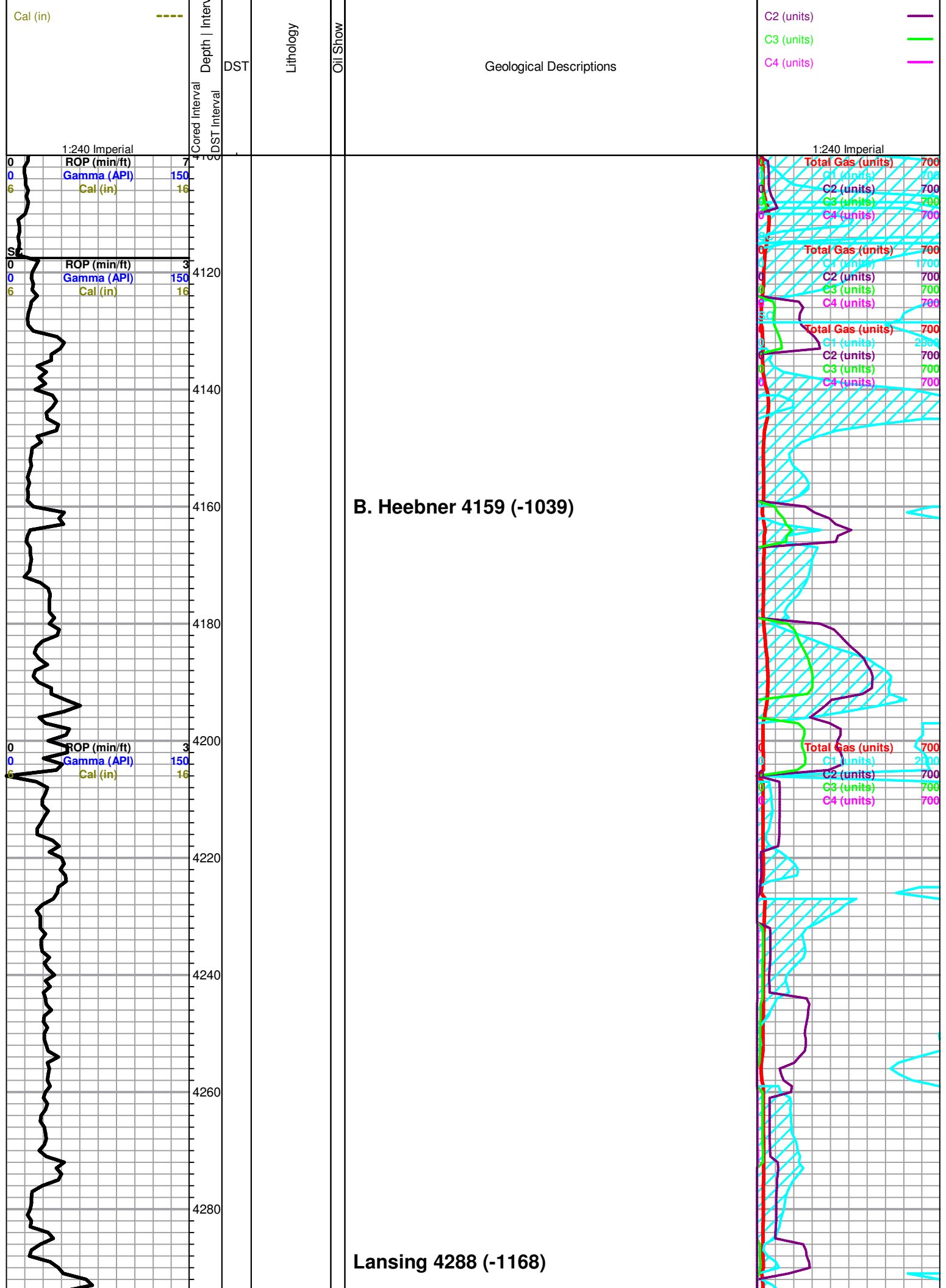
FOSSIL  
φ Oolite

OTHER SYMBOLS

**Oil Show**  
● Good Show  
● Fair Show  
● Poor Show  
○ Spotted or Trace  
○ Questionable Stn  
D Dead Oil Stn  
■ Fluorescence  
\* Gas

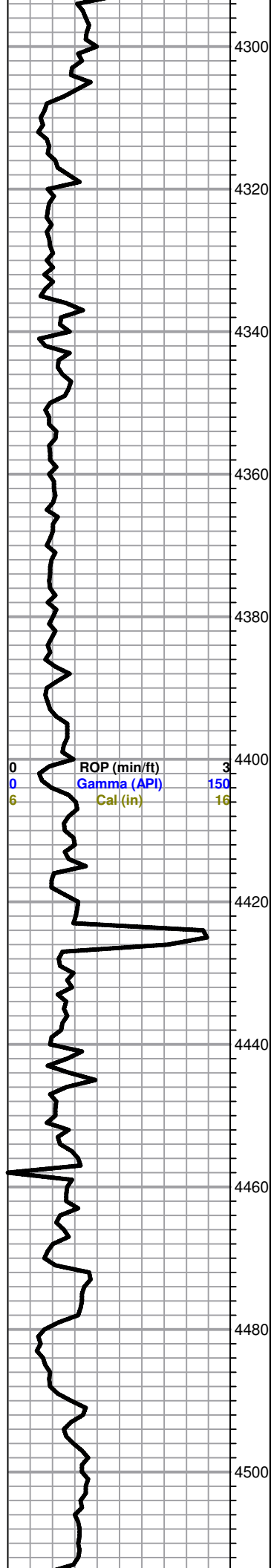
**DST**  
■ DST Int  
■ DST alt  
■ Core  
|| tail pipe

Curve Track #1	ROP (min/ft)	Gamma (API)	ra/s	TG, C1 - C5	Total Gas (units)	C1 (units)
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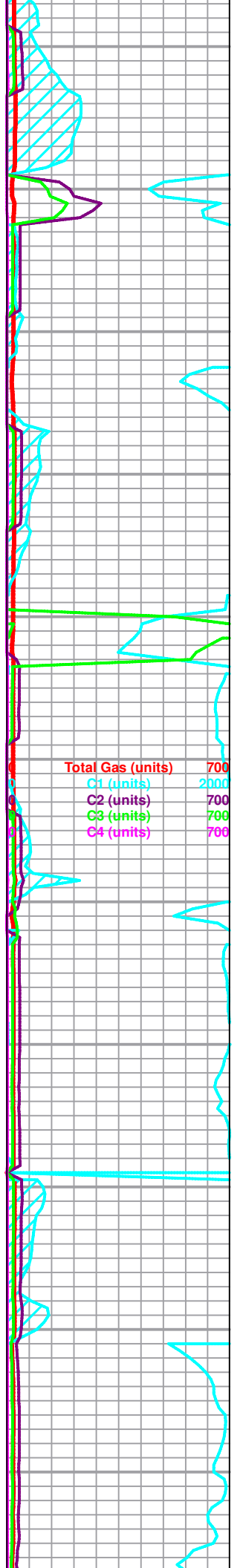


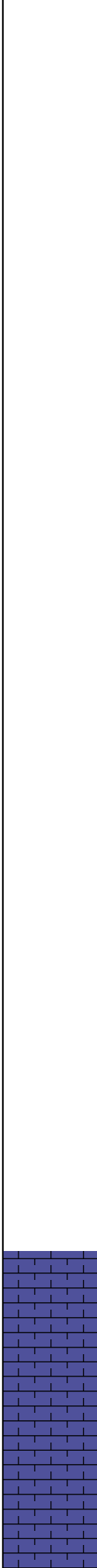
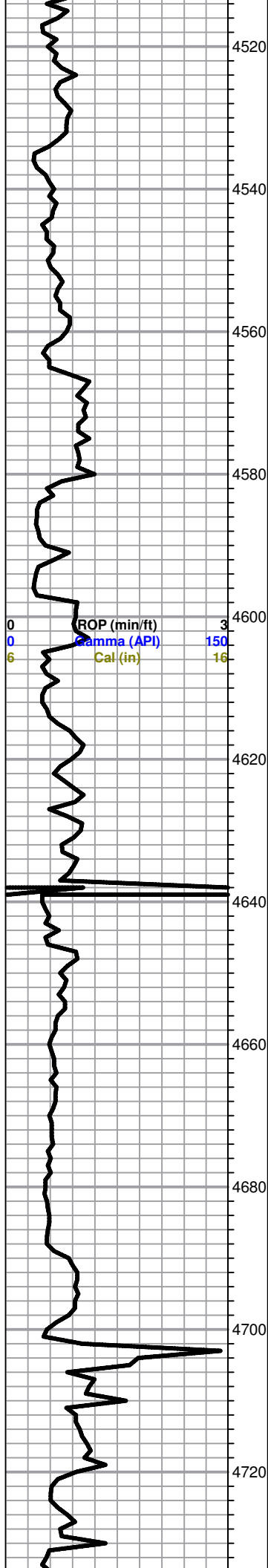
4300  
4320  
4340  
4360  
4380  
4400  
4420  
4440  
4460  
4480  
4500

ROP (min/ft) 3  
Gamma (API) 150  
Cal (in) 16



Total Gas (units) 700  
C1 (units) 2000  
C2 (units) 700  
C3 (units) 700  
C4 (units) 700

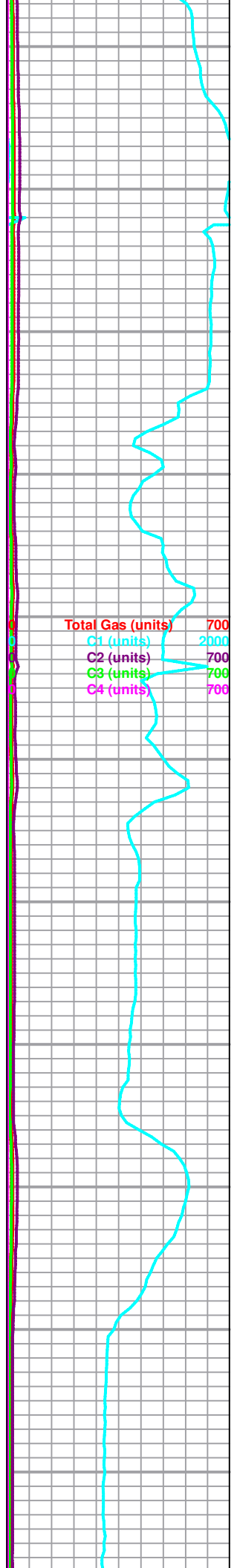




LS, cream to white, chalky, foss, poor visible porosity

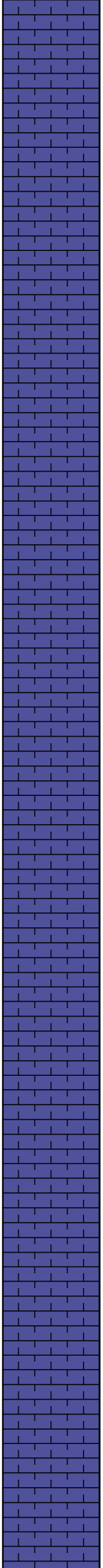
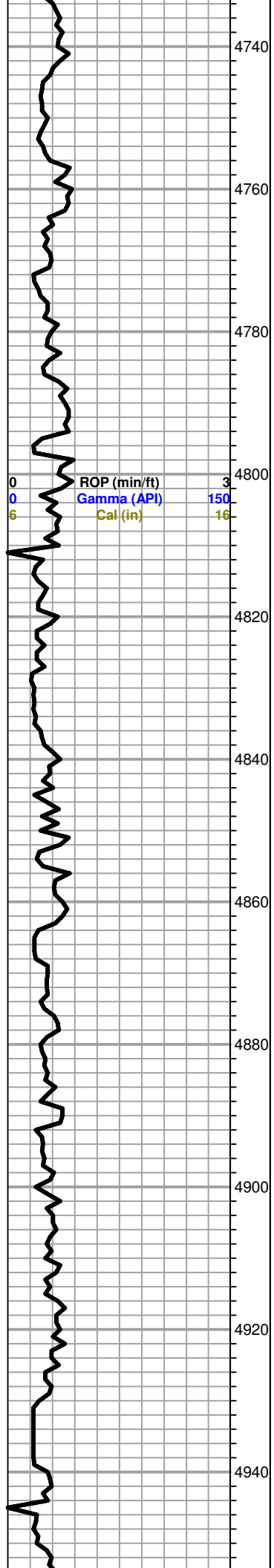
LS, cream to gray, mottled, chalky, foss, poorly developed ool in parts

LS, tan to gray, mottled, FXL, dense, foss, slightly chalky in parts



4740  
4760  
4780  
4800  
4820  
4840  
4860  
4880  
4900  
4920  
4940

ROP (min/ft) 3  
Gamma (API) 150  
Cal (in) 16



LS, gray, mottled, FXL, chalky, poor visible porosity, slightly chalky

LS, tan to gray, mottled, FXL, cherty, poor visible porosity

LS, cream to tan, mottled, FXL, slightly dol. trace gray shale

Black carb shale

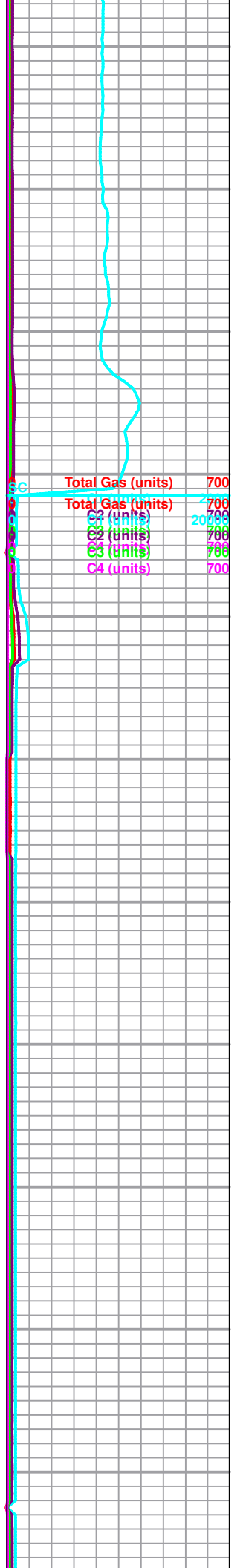
LS, tan to mottled, FXL, slightly cherty, poor visible porosity

LS, tan to brown, FXL, poor INXLN porosity, dense, no shows

LS, tan, ool, FXL, poorly developed, dense,

LS, cream to gray, mottled, FXL, chalky, dense, poor visible porosity

LS, cream to gray, dense, slightly cherty, poor visible porosity, ool in part



4960  
4980  
5000  
5020  
5040  
5060  
5080  
5100  
5120  
5140  
5160

**Marmaton 4966 (-1846)**

LS, tan to brown, FXL, dense, poor visible porosity, cherty

LS, tan FXL, dense, poor visible porosity, no shows

LS, A/A  
trace black, gray, maroon shales

LS, tan FXL, poor visible porosity, slightly chalky, few foss, no shows

LS, brown, gray, FXL, poor visible porosity, slightly cherty in parts, dense

Black Carb Shale

LS, cream to tan, chalky, few foss, poor scattered porosity

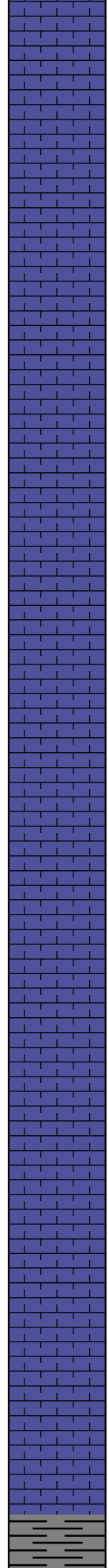
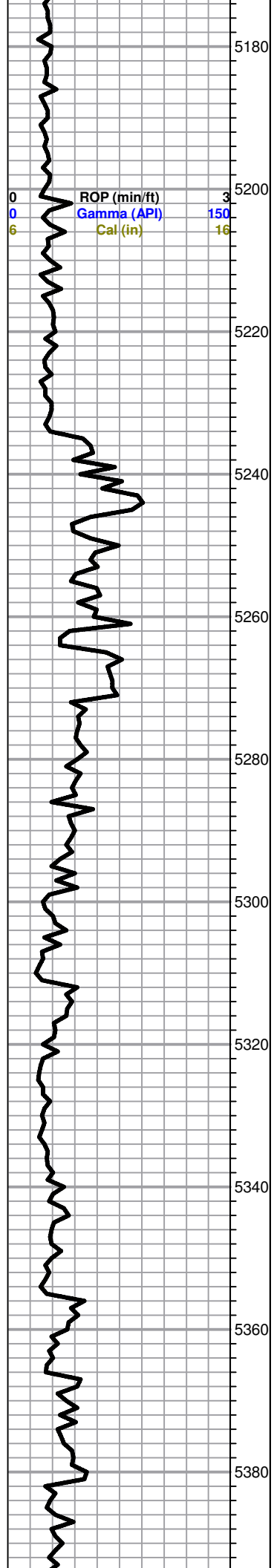
LS, A/A , Trace brown and gray shales

**Cherkoe 5168 (-2048)**

ROP (min/ft) 3  
Gamma (API) 150  
Cal (in) 16

Total Gas (units) 700  
C1 (units) 20000  
C2 (units) 700  
C3 (units) 700  
Total Gas (units) 7000  
C1 (units) 20000  
C2 (units) 7000  
C3 (units) 7000  
C4 (units) 7000

**Gas readings off chart due to oil put down hole**



Black Carb Shale

LS, tan and brown, FXL, Trace sh. gray to black, brick red, soft

LS., gray, FXL, slightly cherty, dense, poor visible porosity, trace gray to black sh.

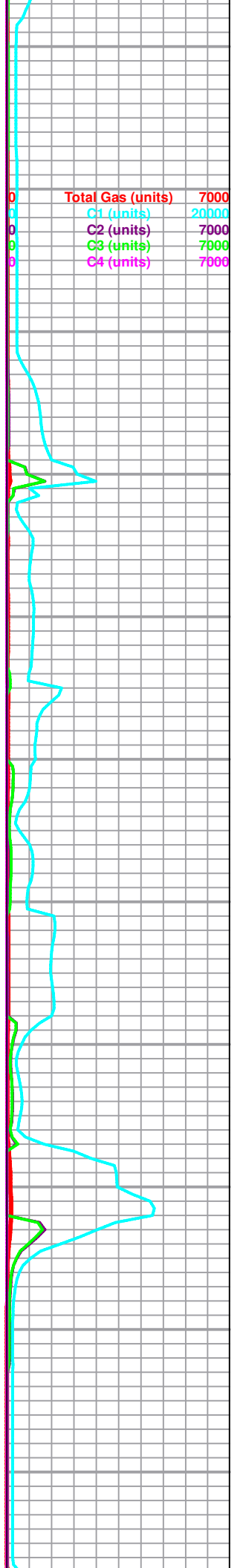
LS, gray, tan, FXL, sandy in parts, trace brown to black shale, silty

LS, gray to black, FXL, dense, poor visible porosity, slightly chalky

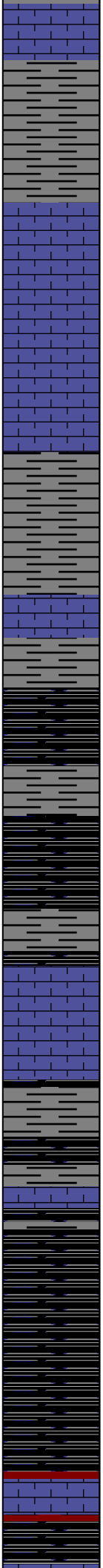
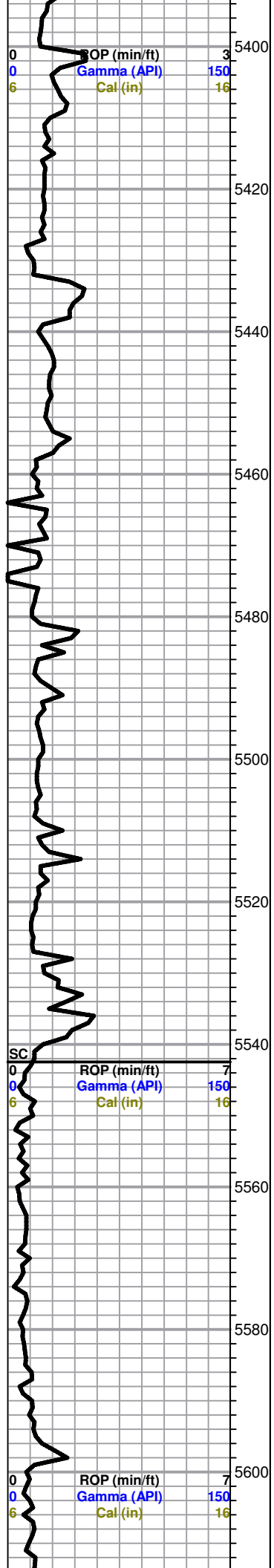
LS, cream to tan, FXL, poor visible porosity, Sh, green, black, gray

LS, tan to brown, FXL, dense, Sh, gray, silty soft

Sh, black, gray







Sh. black, gray

Sh. black, gray

Trc. LS, tan, FXL, cherty, poor vis porosity

Sh. black , gray

Sh. black carb

Sh. black carb and gray

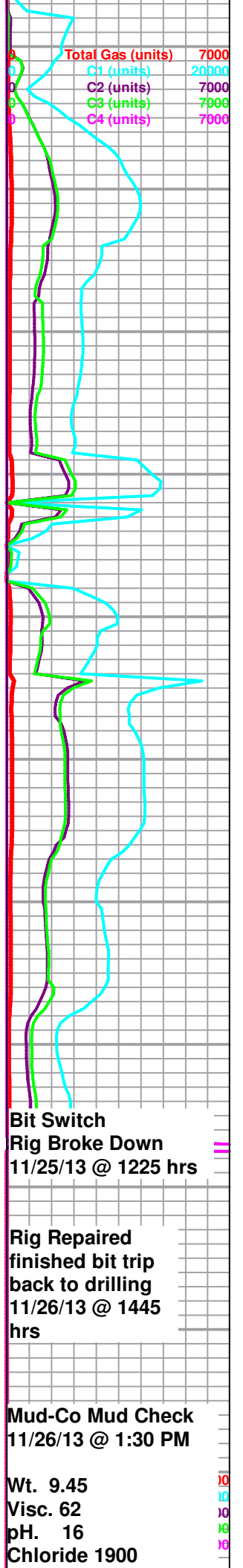
**Atoka 5528 (-2412)**

Sh. black carb

Sh. black - brick red, trace LS, Tan to brown, chalky

Sh. black carb

Trc. LS. cream to gray, chalky, few foss,  
Sh,black carb



**Bit Switch**

**Rig Broke Down**

11/25/13 @ 1225 hrs

**Rig Repaired**

**finished bit trip**

**back to drilling**

11/26/13 @ 1445 hrs

**Mud-Co Mud Check**

11/26/13 @ 1:30 PM

Wt. 9.45

Visc. 62

pH. 16

Chloride 1900

5620  
5640  
5660  
5680  
5700  
5720  
5740  
5760  
5780  
5800  
5820

LS, cream to gray, A/A,  
Sh. black carb

**Morrow 5639 (-2519)**

LS, A/A

Sh. Black Carb

LS, gray, FXL, chalky, few foss, slightly cherty, poor scattered porosity

Sh. Black carb, gray, brick red, greenish

Sh, black to gray

LS, gray to tan FXL, few foss, poor visible porosity, no shows

Sh. black to gray, soft in parts

Black carb shale soft

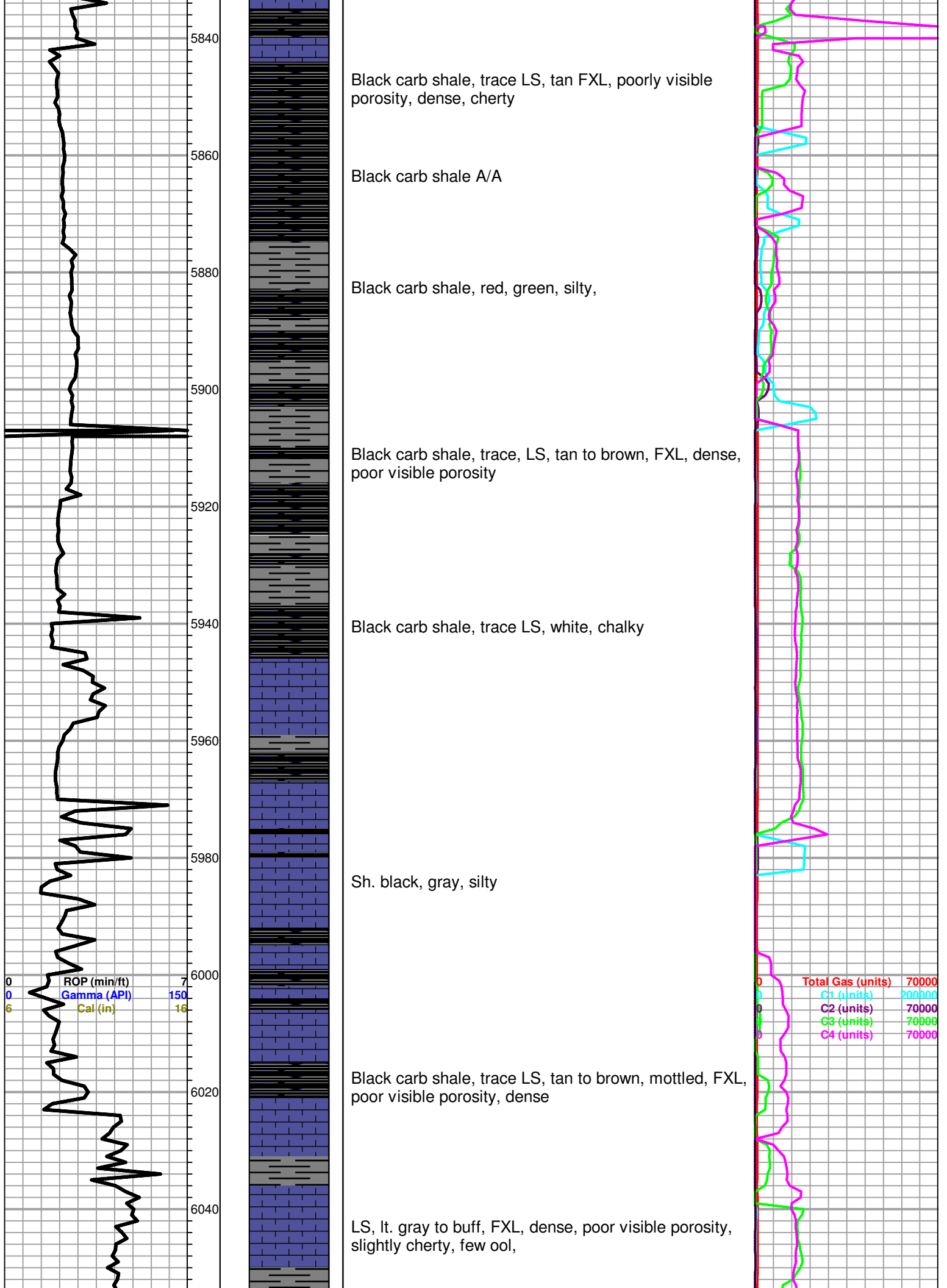
Sh. A/A, trc LS, tan poorly developed, chalky

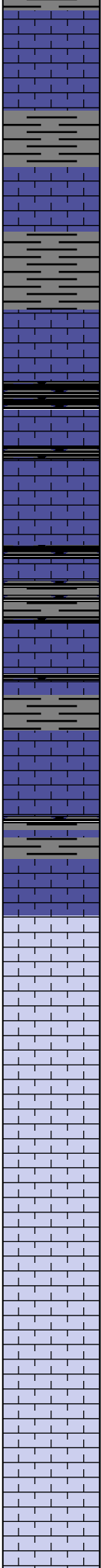
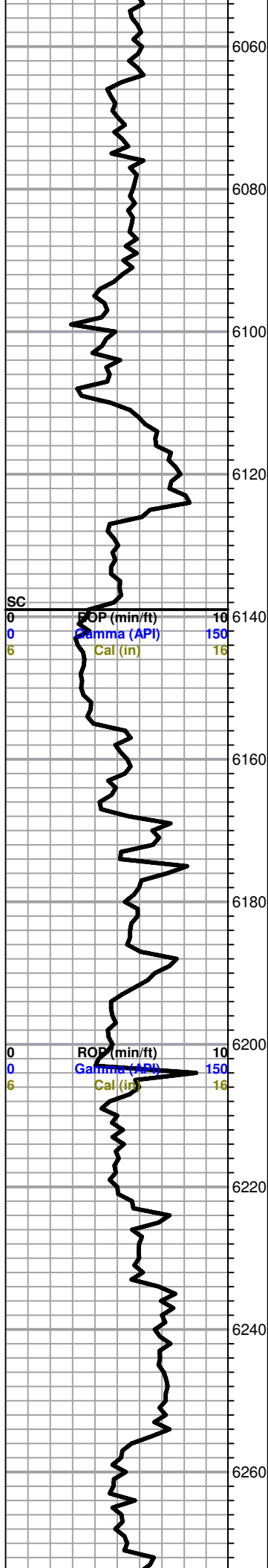
**Mud-Co Mud Check  
11/20/13 @ 9:10 AM**

**Wt. 9.2  
Visc. 50  
pH @ 9.0  
Chloride 1400 ppm  
LCM 1#**

ROP (min/ft) 7  
Gamma (API) 150  
Cal (in) 16

Total Gas (units) 70000  
C1 (units) 20000  
C2 (units) 70000  
C3 (units) 70000  
C4 (units) 70000





LS, tan to buff, chalky, gray, FXL dnse, ool, foss, cherty, poor visible porosity, dense

Sh. gray, silty,

LS, tan FXL, foss, dense, slightly cherty, poor visible porosity

LS, tan, gray, FXL. dense, poor visible porosity, few ool, poorly developed, chalky

LS, brown FXL, cherty, dense, poor visible porosity, no shows, trace black carb shale

LS, tan to gray, FXL, dense, poor scattered porosity, Trc shale, red, black, gray,

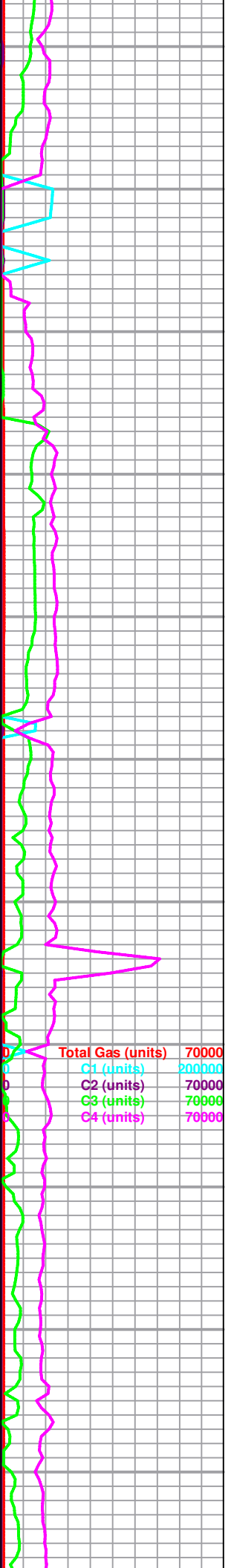
**Ste. Gen 6179 (-3059)**

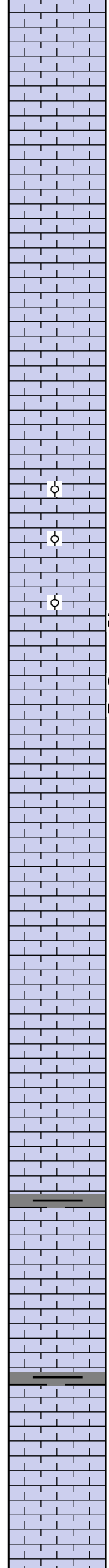
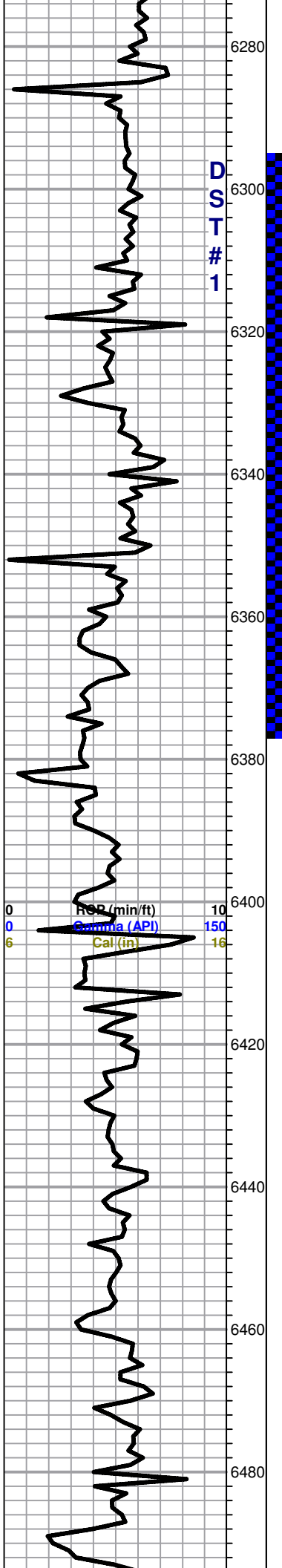
LS, tan FXL, dense, trace sand, tan to rose, F. grained well sorted, no flor. cut, no shows

LS, tan to rose, micro ool, friable, no shows

LS, A/A

LS, tan to rose, micro ool, friable, fair INXLN porosity, no shows





LS, tan, micro ool, triable, no shows

LS, A/A trace chert, orange, red, opaque,

**St. Louis 6298 (-3178)**

LS, tan, FXL, chalky, poorly developed, trace chert, orange, opaque

LS, cream to tan, chalky, ool, poorly developed, poor scattered porosity, no shows

LS, tan to cream, chalky, poorly developed ool, no shows

**St. Louis B 6361 (-3235)**

LS, tan, ool, fair scattered porosity, fair INXLN porosity, V. Lt. SFO, faint odor in freshly broken samples, fair flor. cut

LS, tan to gray, FXL, few ool, poorly developed, poor scattered porosity, Lt. flor. cut, cherty

LS, tan to gray , FXL, ool, foss, poorly visible porosity, trace black, maroon, shales.

LS, tan, chalky, few foss, poor scattered porosity, cherty in parts

Sh, black to gray, silty,

Ls, tan to cream, FXL, chalky, poorly developed ool, poor scattered porosity, no shows

