

LOG created using LPLOT VH Version 3.0, May 15, 2013, Copyright (C) 1999-2009 Pason Systems Corp.

**OPERATOR:** NOBLE ENERGY INC.  
**WELL:** COOK STATE LD36-78HN  
**LOCATION:** SEC 36 T9N R58W  
**COUNTY:** WELD  
**STATE:** COLORADO  
**SPOT:** 250' FNL, 660' FWL  
**ELEVATION:** GL: 4,744' KB: 4,768'  
**FIELD:** WILDCAT  
**SPUD DATE:** 5/6/2013  
**TD DATE:** 5/12/2013  
**DATES LOGGED:** 5/7/2013 - 5/12/2013  
**DEPTHS LOGGED:** 1000' - 9975'  
**LOGGERS:** JOHN T. READY, ANTHONY COX  
**DRILLING FLUID:** WATER, MUD, POLY  
**DRILLING RIG:** H&P 322  
**API:** 05-123-36952  
**LOG TYPE:** VERTICAL  
**SCALE:** 1:240 (5 inches per 100 feet)  
**REMARKS:** WELLSITE GEOLOGICAL SERVICES PROVIDED BY COLUMBINE LOGGING INC.

### LITHOLOGIES



Sandstone



Shaly Sandstone



Shaly Siltstone



Siltstone



Silty Shale

### ENGINEERING SYMBOLS



Connection



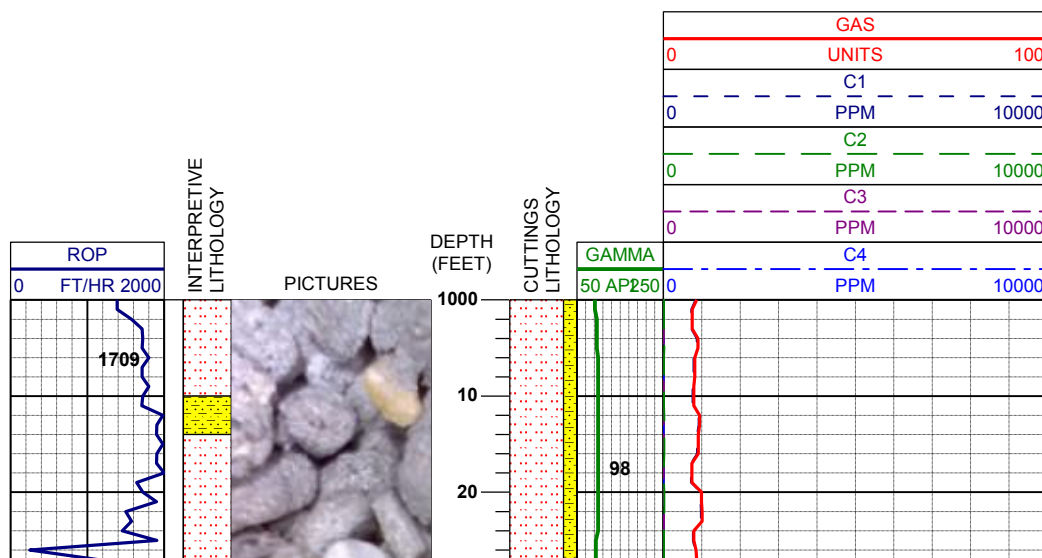
Connection Gas



Arrow



Arrow

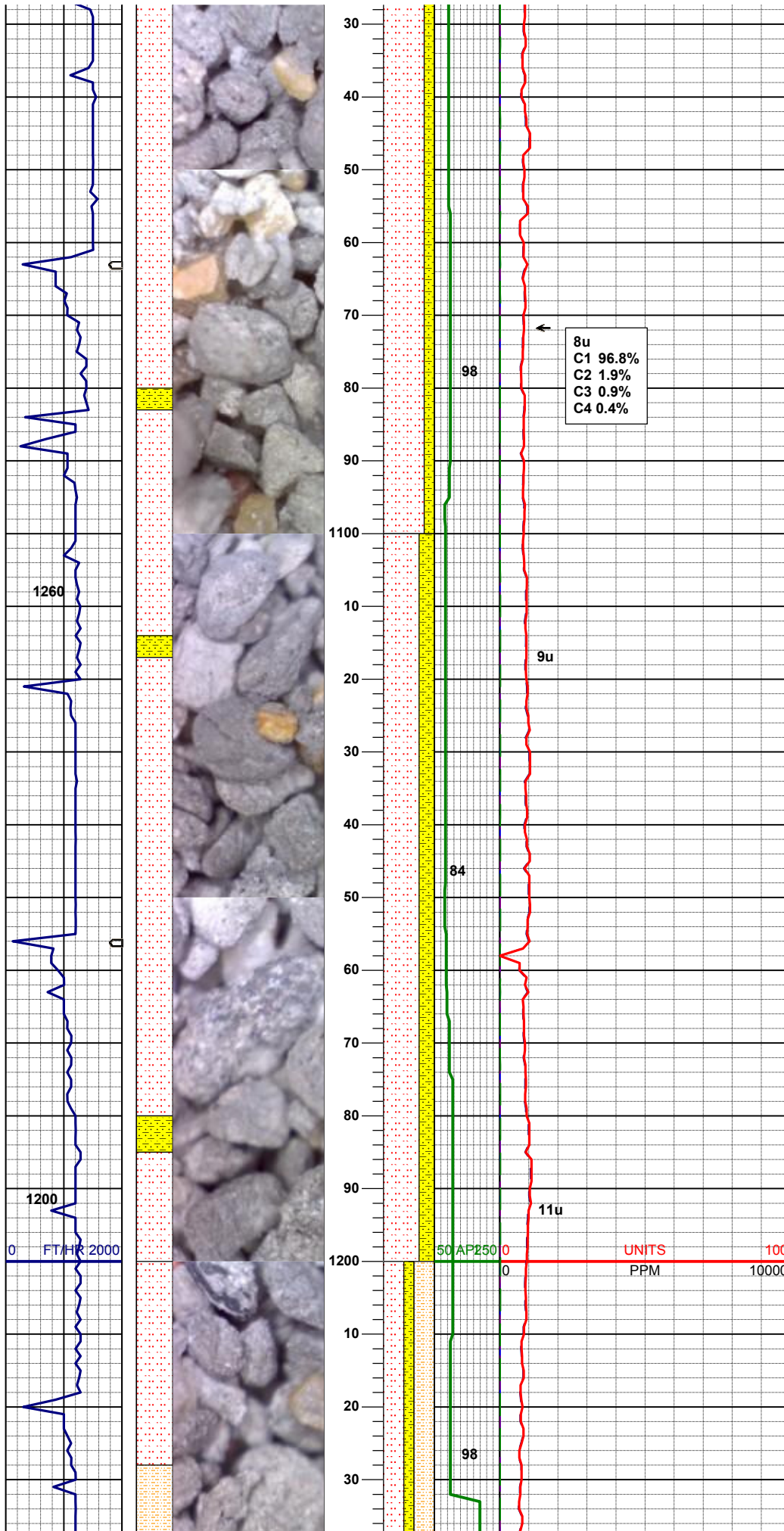


### LITHOLOGY DESCRIPTION

**COLUMBINE LOGGING INC.**  
**RIGGED UP ON 5/7/2013**  
**MANNED 2-PERSON LOGGING**  
**WITH BLOODHOUND GAS**  
**CHROMATOGRAPH UNIT #0160**

**Drilled out of Surface Casing**  
**BHA #1 04:52 HRS ON 5/8/2013**

**MD 1007'**  
**INC 0.51**  
**APR 22 2014**

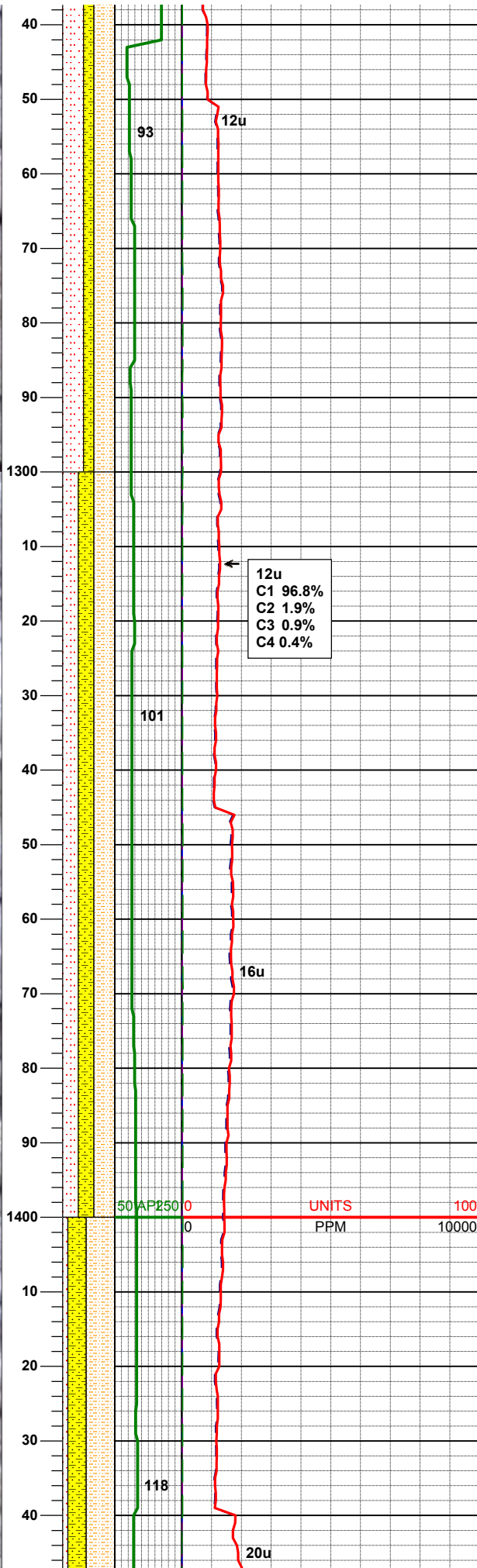
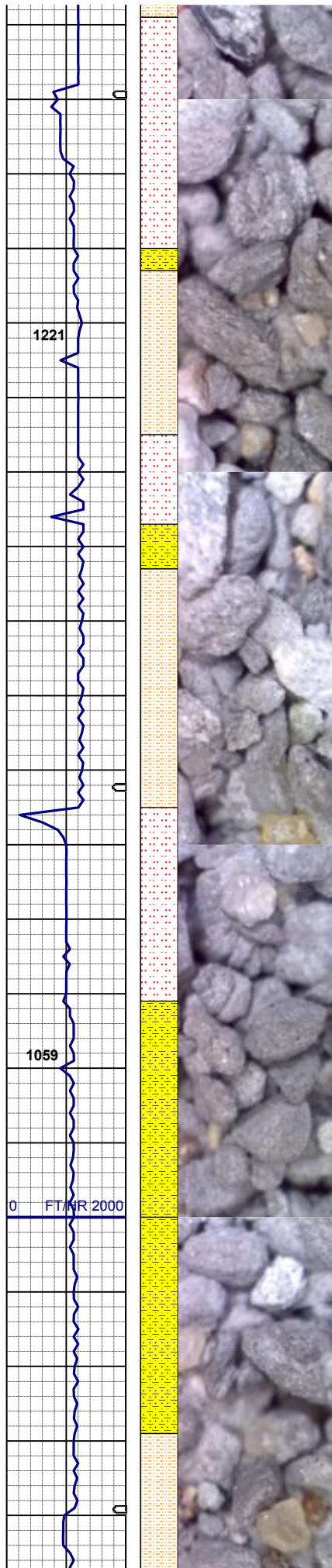


80% SLTST: ltgy, sft- fri, sbblky- sl sbplty, aren  
- slty tex, tr biot rr glau incl  
20% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, rr biot, sme  
glau ; sme dk gy cly

**BHA #1**  
**Bit: 8.750"**  
**Manufacturer: Schlumberger/Smith**  
**Model: MDi516**  
**Serial Number: JG2061**  
**Nozzles: 5x14**  
  
**Motor: 6.500"**  
**Manufacturer: Wenzel**  
**Serial Number: 650-10-152**  
**Bend: 1.50**

70% SLTST: ltgy, sft- fri, sbblky- sl sbplty, aren  
- slty tex, tr biot rr glau incl  
30% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, rr biot, sme  
glau ; sme dk gy cly

**MD 1203'**  
**INC 0.46**  
**AZM 348.09**



40% SHYSLTST: ltgy, sft- fri, sbblky- sl sbplty, aren- slty tex, tr biot incl  
40% SLTST: ltgy, sft- fri, sbblky- sl sbplty, aren- slty tex, tr biot rr glau incl  
20% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang, mod srt, firm- fri, p por, arg cmt, rr biot, sme glau ; sme dk gy cly

12u  
C1 96.8%  
C2 1.9%  
C3 0.9%  
C4 0.4%

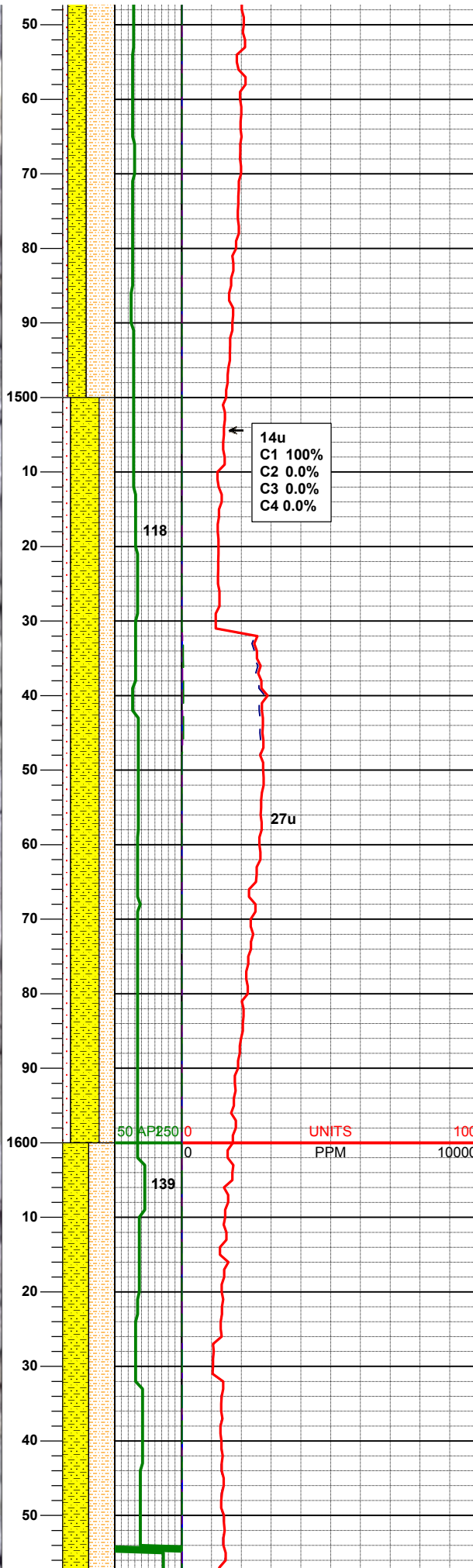
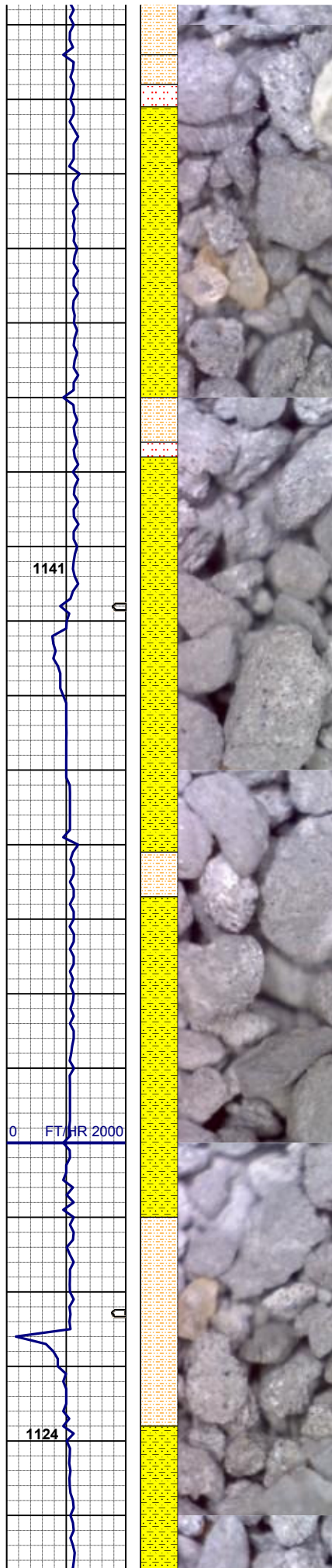
40% SHYSLTST: ltgy, sft- fri, sbblky- sl sbplty, aren- slty tex, tr biot incl  
30% SLTST: ltgy, sft- fri, sbblky- sl sbplty, aren- slty tex, tr biot rr glau incl  
30% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang, mod srt, firm- fri, p por, arg cmt, rr biot, sme glau ; sme dk gy cly

MD 1379'  
INC 0.45  
AZM 12.03

UNITS  
PPM  
100  
10000

55% SHYSLTST: ltgy, sft- fri, sbblky- sl sbplty, aren- slty tex, tr biot incl  
35% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang





50% SHYSS: ltgy- tr s&p, vf-fgr, sbdr - sbang,  
mod srt, firm- fri, p por, arg cmt, rr biot, sme  
glau  
10% SLTST: ltgy, sft- fri, sbblky- sl sbply, aren  
- slty tex, tr biot rr glau incl ; sme dk gy cly

**MD 1472'**  
**INC 0.35**  
**AZM 354.73**

14u  
C1 100%  
C2 0.0%  
C3 0.0%  
C4 0.0%

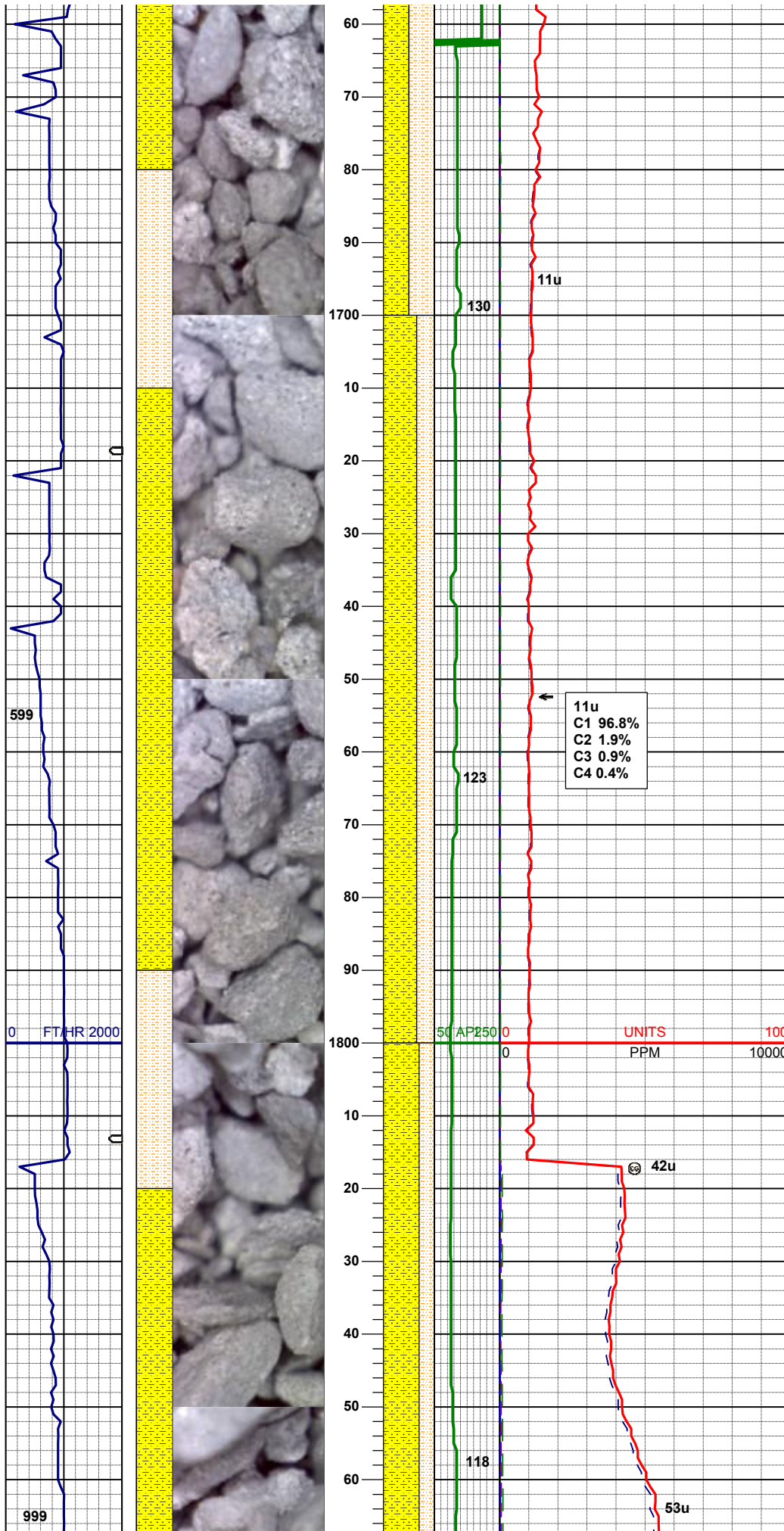
118

27u

55% SHYSLTST: ltgy, sft- fri, sbblky- sl sbply,  
aren- slty tex, tr biot incl  
30% SHYSS: ltgy- tr s&p, vf-fgr, sbdr - sbang,  
mod srt, firm- fri, p por, arg cmt, rr biot, sme  
glau  
15% SLTST: ltgy, sft- fri, sbblky- sl sbply, aren  
- slty tex, tr biot rr glau incl ; sme dk gy cly

**MD 1567'**  
**INC 0.36**  
**AZM 38.04**

50% SHYSLTST: ltgy, sft- fri, sbblky- sl sbply,  
aren- slty tex, tr biot incl  
50% SHYSS: ltgy- tr s&p, vf-fgr, sbdr - sbang,  
mod srt, firm- fri, p por, arg cmt, rr biot, sme  
glau ; abnt dk gy cly



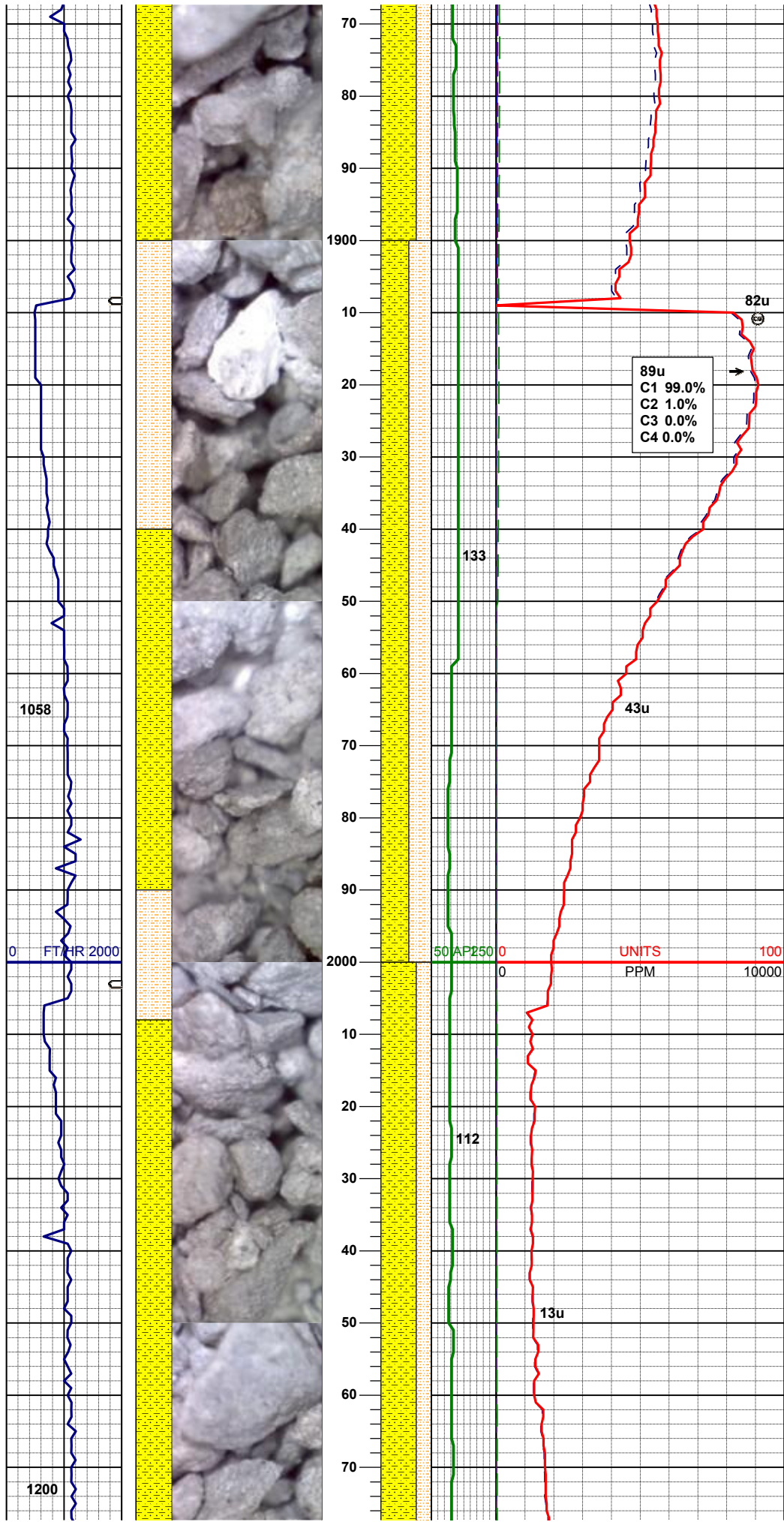
MD 1662'  
INC 0.56  
AZM 79.70

65% SHYSLTST: ltgy, sft- fri, sbbiky- sl sbplty,  
aren- slty tex, sme biot incl  
35% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau ;  
abnt dk gy cly

MD 1757'  
INC 0.50  
AZM 86.62

70% SHYSLTST: ltgy, sft- fri, sbbiky- sl sbplty,  
aren- slty tex, sme biot incl  
30% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau ;  
abnt dk gy cly

MD 1852'  
INC 0.86  
AZM 76.57



MD 1946'  
INC 0.31  
AZM 14.04

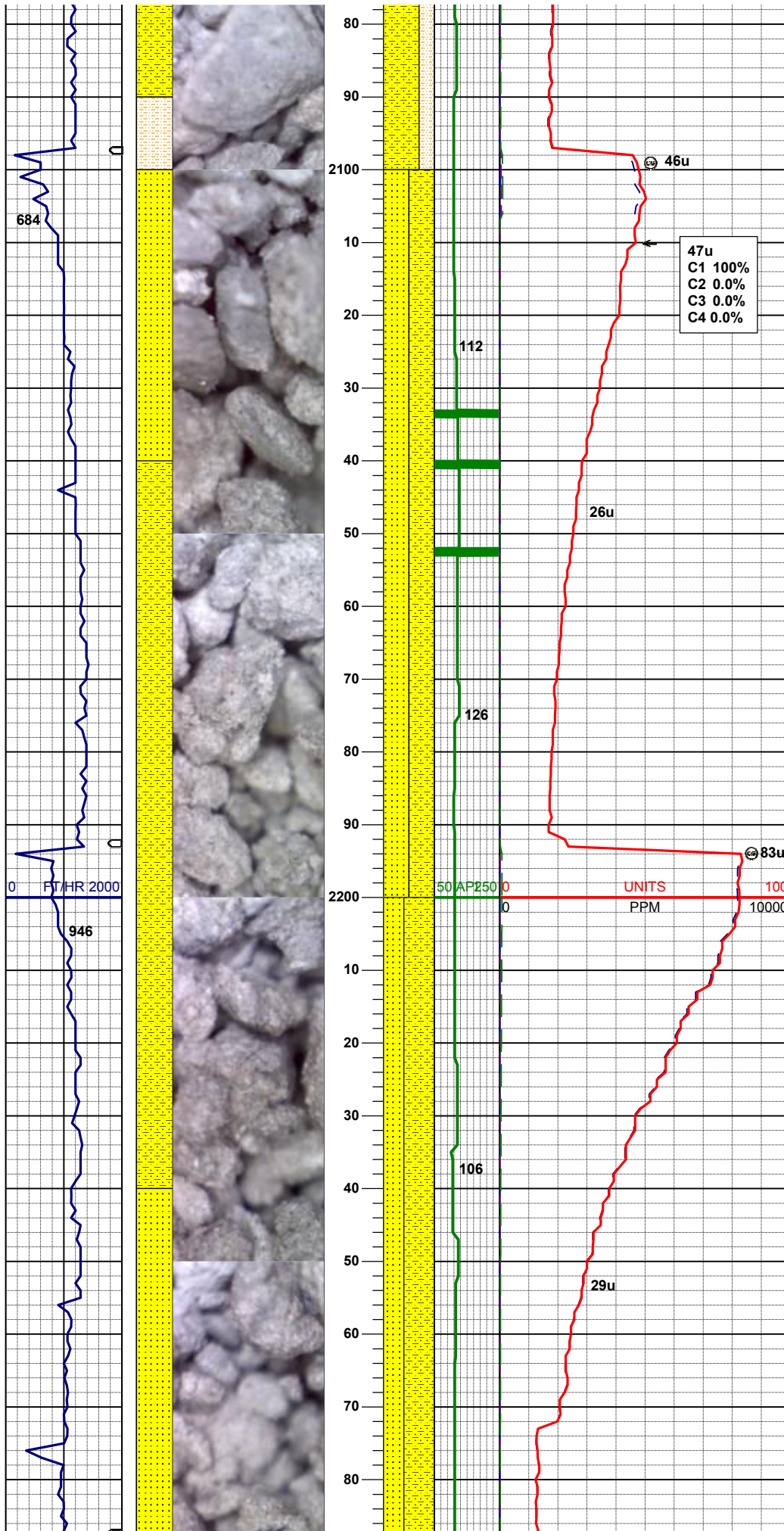
55% SHYSLTST: ltgy, sft- fri, sbblky- sl sbply,  
aren- slty tex, sme biot incl  
45% SHYSS: ltgy- tr s&p, vf-fgr, sbdr - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau ;  
abnt dk gy cly

MUD WT 8.6 VIS 29

MD 2041'  
INC 0.26  
AZM 315.09

70% SHYSLTST: ltgy, sft- fri, sbblky- sl sbply,  
aren- slty tex, sme biot incl  
30% SHYSS: ltgy- tr s&p, vf-fgr, sbdr - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau ;  
abnt dk gy cly



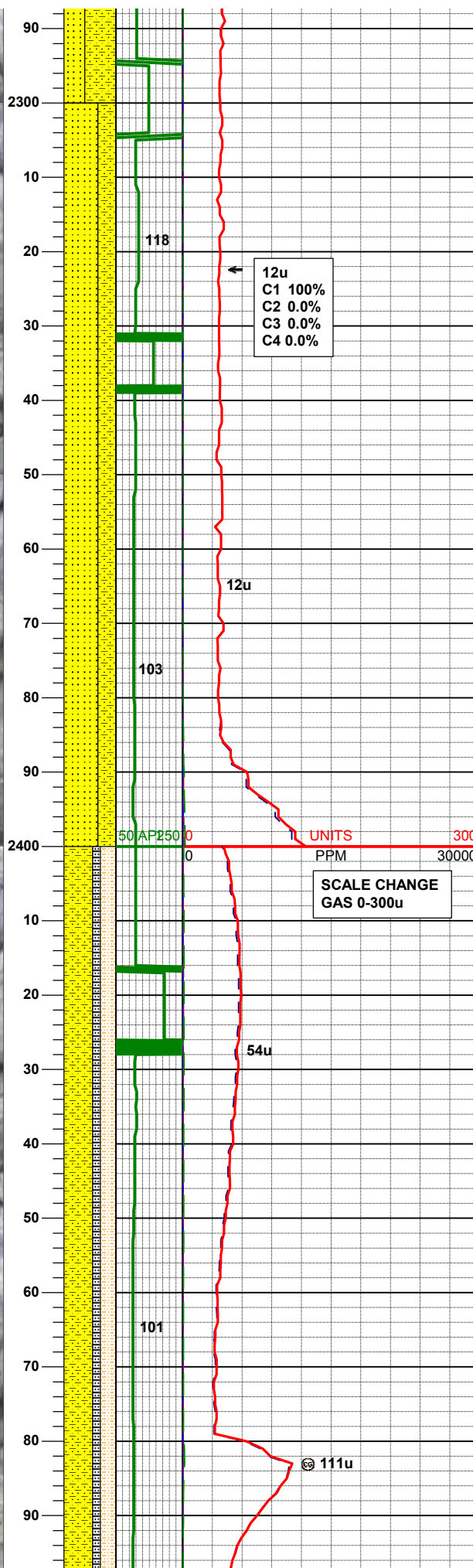
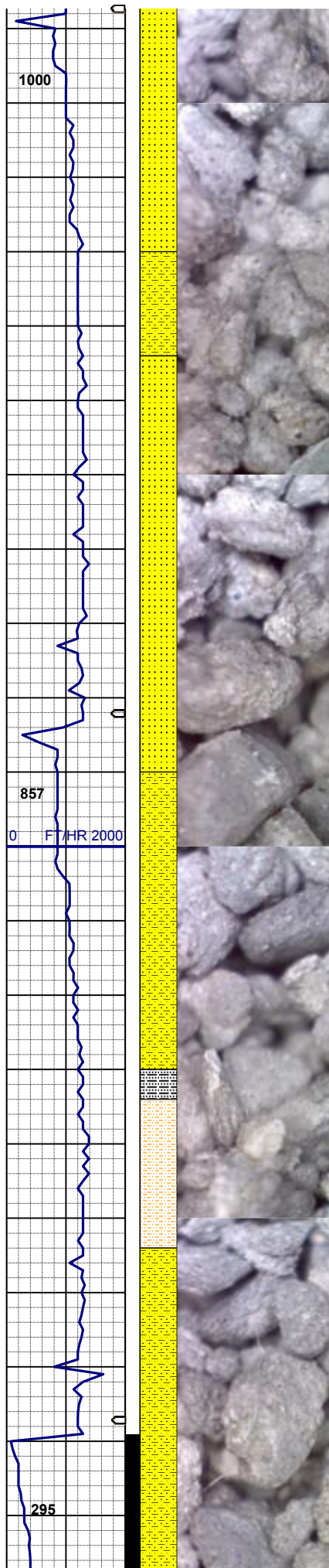


MD 2136'  
INC 0.43  
AZM 253.19

50% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau  
50% SS: wh-op occ lt gy, s&p, fgr, sbrd-sbang,  
mod w srt, firm, brit ; abnt dk gy cly

MD 2231'  
INC 0.89  
AZM 236.48

60% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau  
40% SS: wh-op occ lt gy, s&p, fgr, sbrd-sbang,  
mod w srt, firm, brit ; abnt dk gy cly



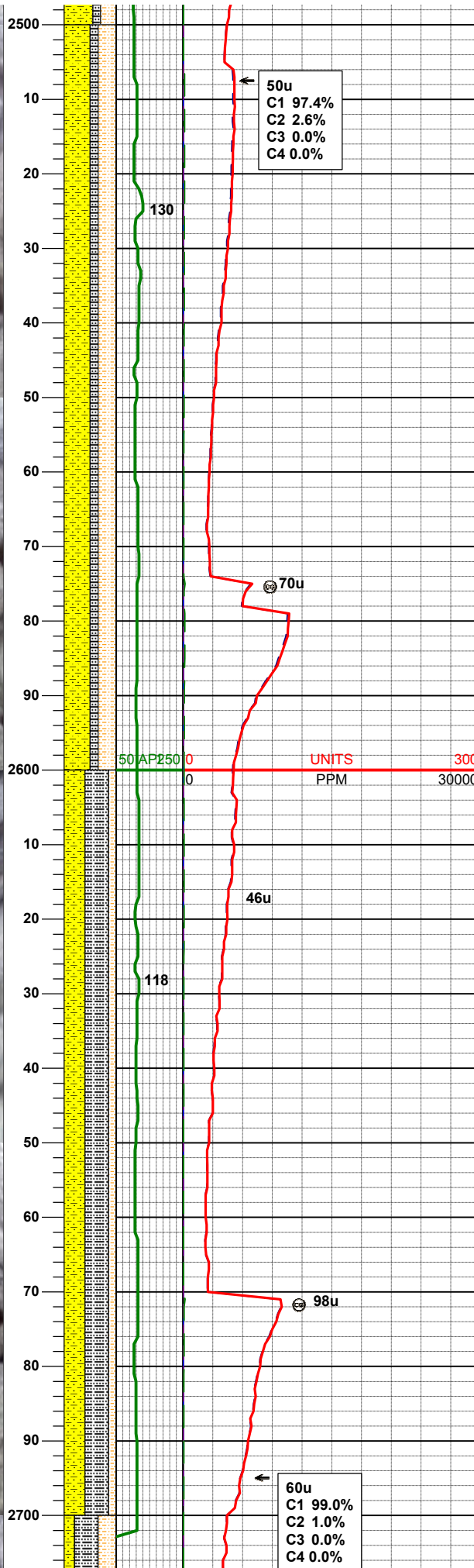
MD 2326'  
INC 0.71  
AZM 223.94

65% SS: wh-op occ lt gy, s&p, fgr, sbrd-sbang,  
mod w srt, firm, brit  
35% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt ; abnt dk gy cly

MD 2421'  
INC 0.48  
AZM 190.81

55% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt ; abnt dk gy cly  
30% SHYSLTST: ltgy, sft- fri, sbblky- sl sbply,  
aren- slty tex, sme biot incl  
15% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbblky - sbply, rthy sl slty tex





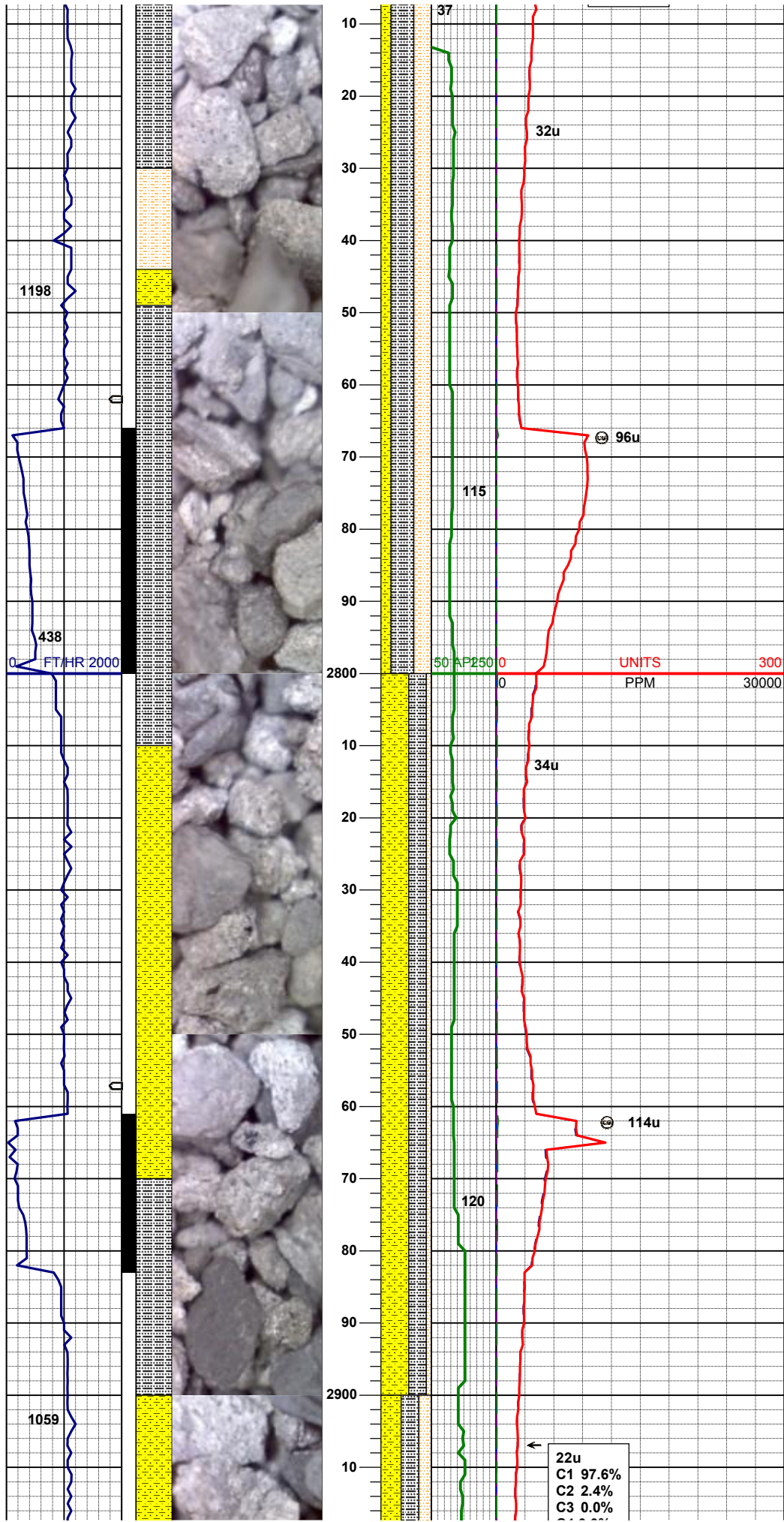
MD 2516'  
INC 1.78  
AZM 21.84

55% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt  
35% SHYSLTST: ltgy, sft- fri, sbblky- sl sbply,  
aren- slty tex, rr biot incl  
10% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbblky - sbply, rthy sl slty tex

MD 2611'  
INC 3.57  
AZM 359.21

45% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbblky - sbply, rthy sl slty tex  
40% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt  
15% SHYSLTST: ltgy, sft- fri, sbblky- sl sbply,  
aren- slty tex, rr biot incl

MD 2706'  
INC 5.11  
AZM 354.14



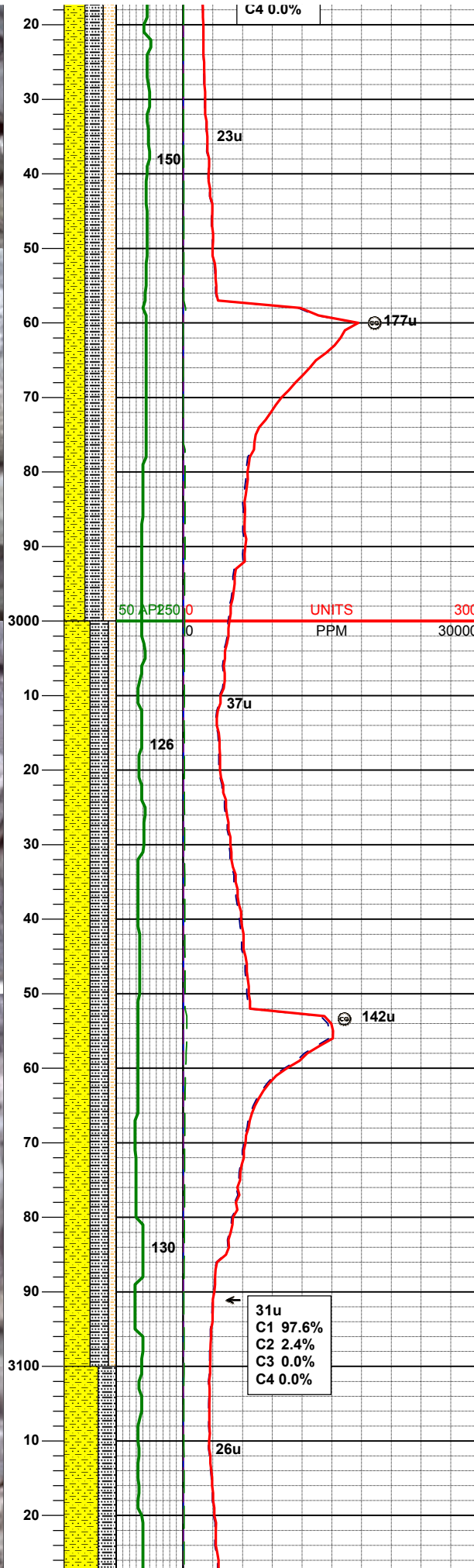
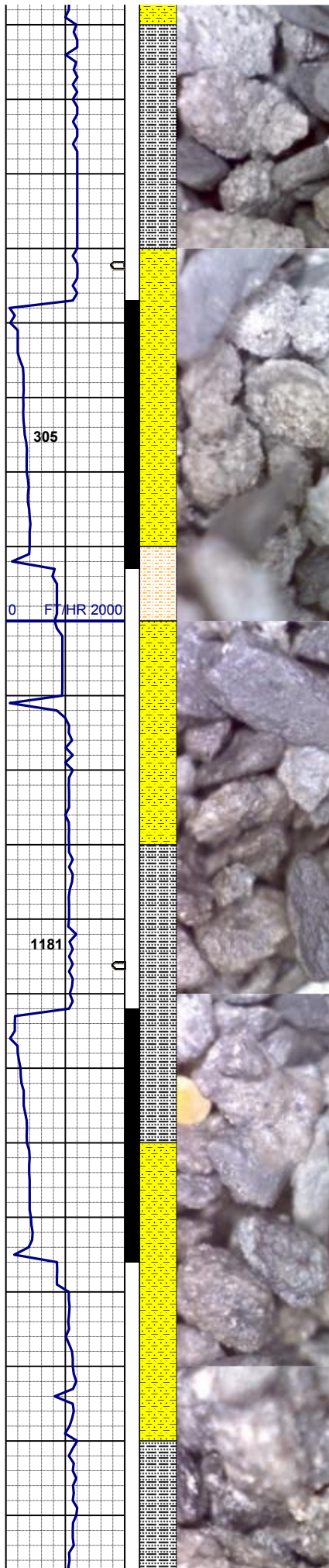
MUD WT 8.6 VIS 29

45% SILTY SH: m gy-mgybrn occ v dk gy, firm - sft , sbblky - sbppty, rthy sl slty tex  
35% SHYSLTST: ltgy, sft- fri, sbblky- sl sbppty, aren- slty tex, rr biot incl  
20% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang, mod srt, firm- fri, p por, arg cmt

MD 2801'  
INC 7.58  
AZM 354.80

55% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang, mod srt, firm- fri, p por, arg cmt  
35% SILTY SH: m gy-mgybrn occ v dk gy, firm - sft , sbblky - sbppty, rthy sl slty tex  
10% SHYSLTST: ltgy, sft- fri, sbblky- sl sbppty, aren- slty tex, rr biot incl

MD 2896'  
INC 7.61  
AZM 356.07



40% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt  
35% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbblky - sbplty, rthy sl slty tex  
20% SHYSLTST: ltgy, sft- fri, sbblky- sl sbplty,  
aren- slty tex, rr biot incl

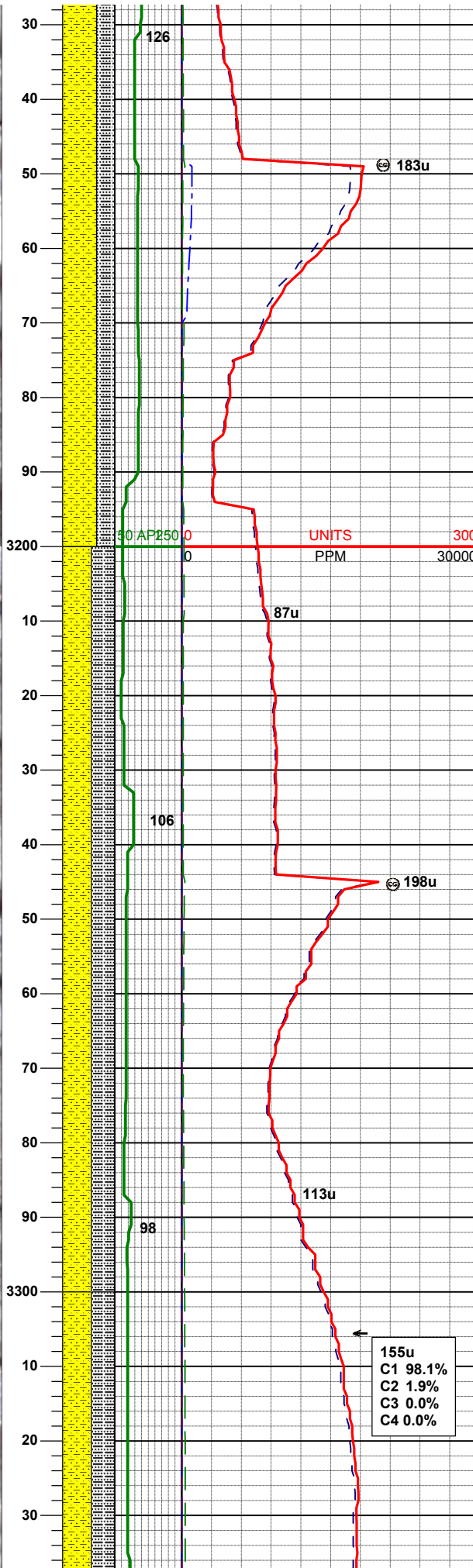
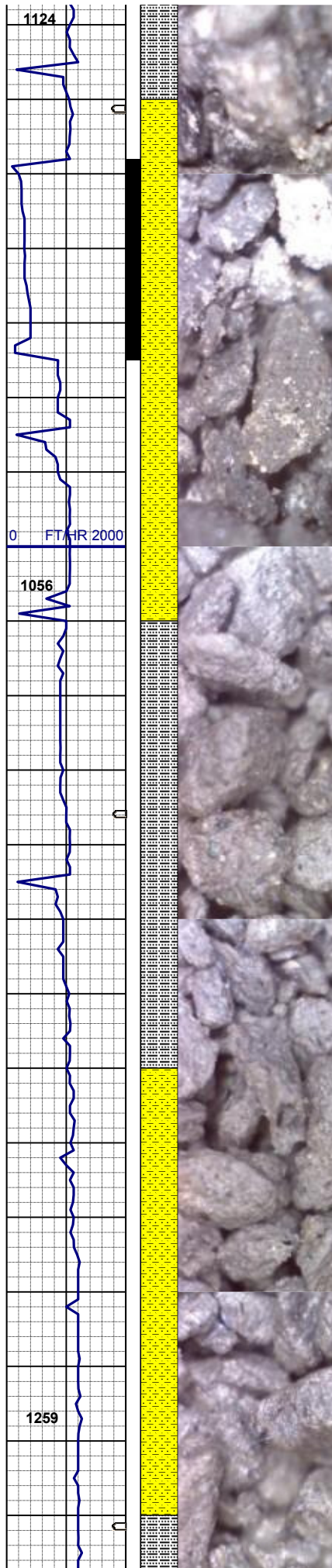
MD 2990'  
INC 9.56  
AZM 3.58

50% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt  
35% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbblky - sbplty, rthy sl slty tex  
15% SHYSLTST: ltgy, sft- fri, sbblky- sl sbplty,  
aren- slty tex, rr biot incl

MD 3085'  
INC 11.08  
AZM 0.40

31u  
C1 97.6%  
C2 2.4%  
C3 0.0%  
C4 0.0%





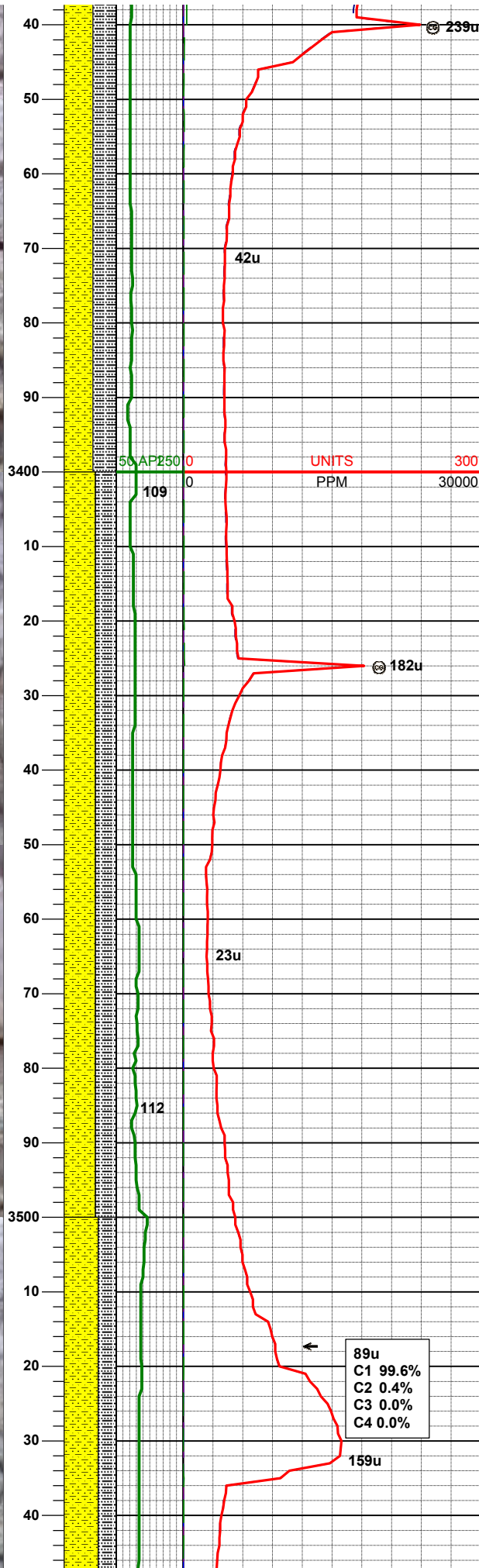
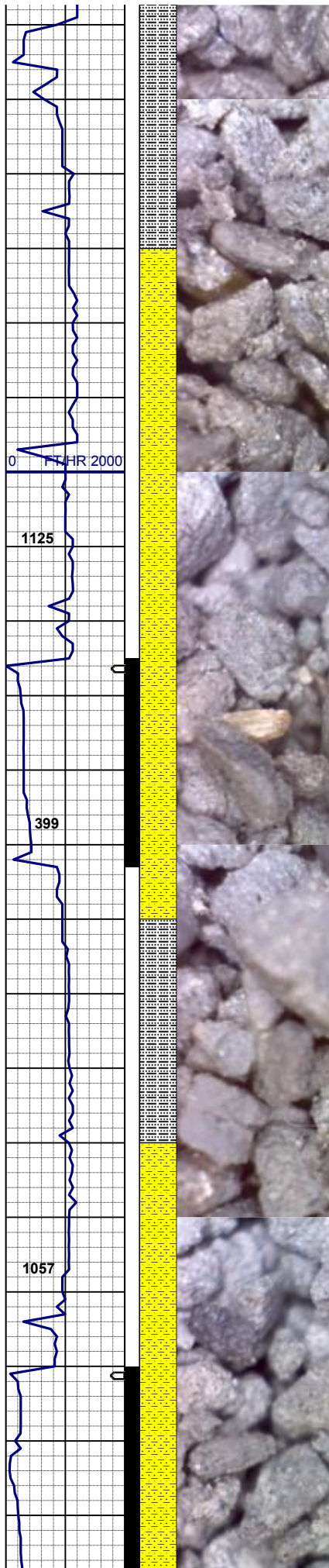
65% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau, rr  
biot  
35% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbblky - sbply, rthy sl slty tex

MD 3180'  
INC 12.36  
AZM 3.74

MUD WT 8.9 VIS 30

55% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau, rr  
biot  
45% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbblky - sbply, rthy sl slty tex

MD 3275'  
INC 13.15  
AZM 6.19



55% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau, rr  
biot  
45% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbbiky - sbply, rthy sl slty tex

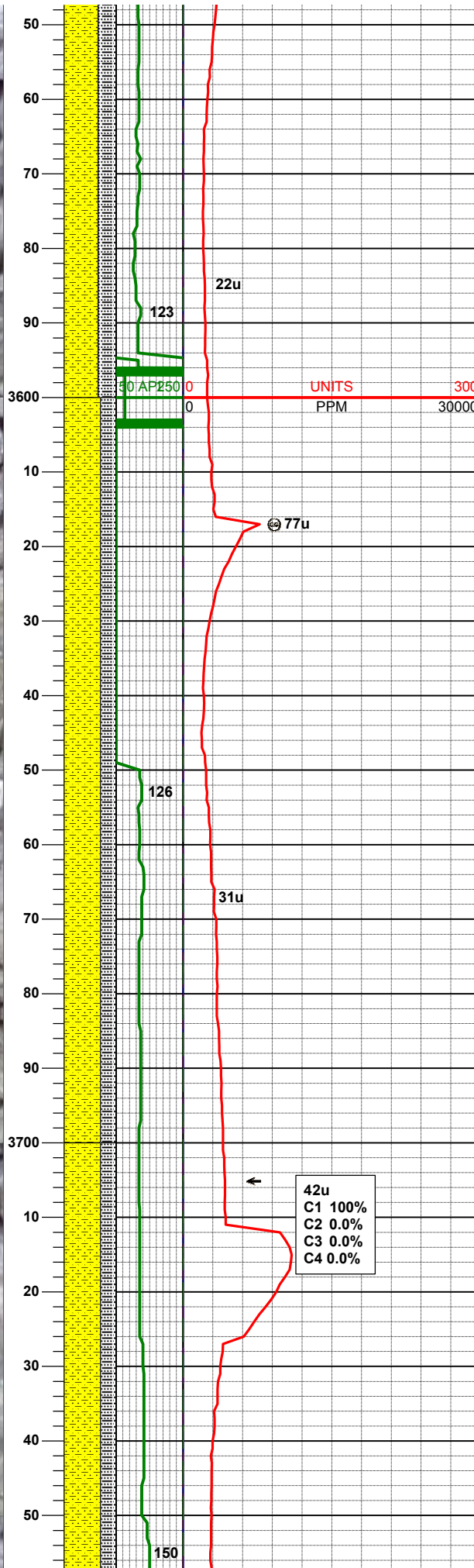
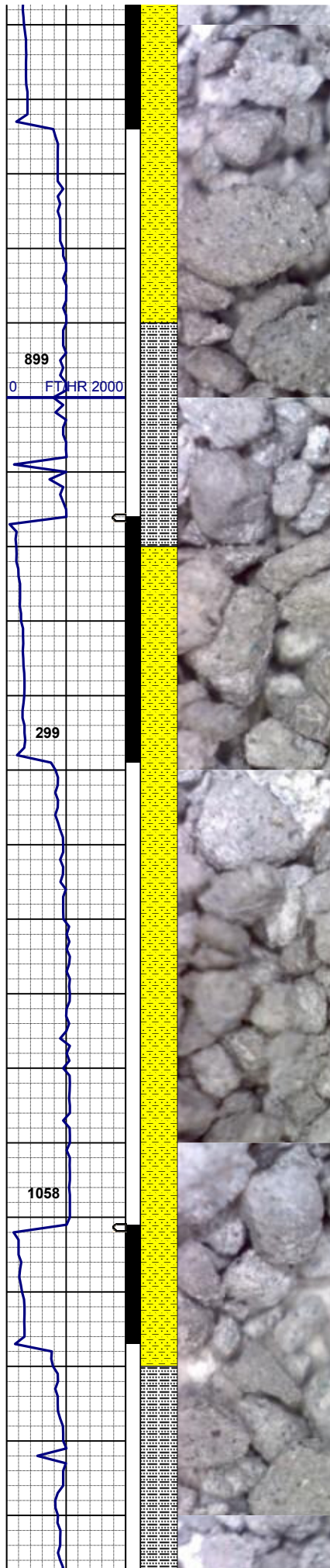
MD 3370'  
INC 12.67  
AZM 7.85

55% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau, sme  
biot  
45% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbbiky - sbply, rthy sl slty tex

MD 3465'  
INC 11.26  
AZM 6.10

MUD WT 8.8 VIS 29

65% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau, sme



biot  
35% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbbiky - sbply, rthy sl slty tex

MD 3560'  
INC 8.90  
AZM 349.87

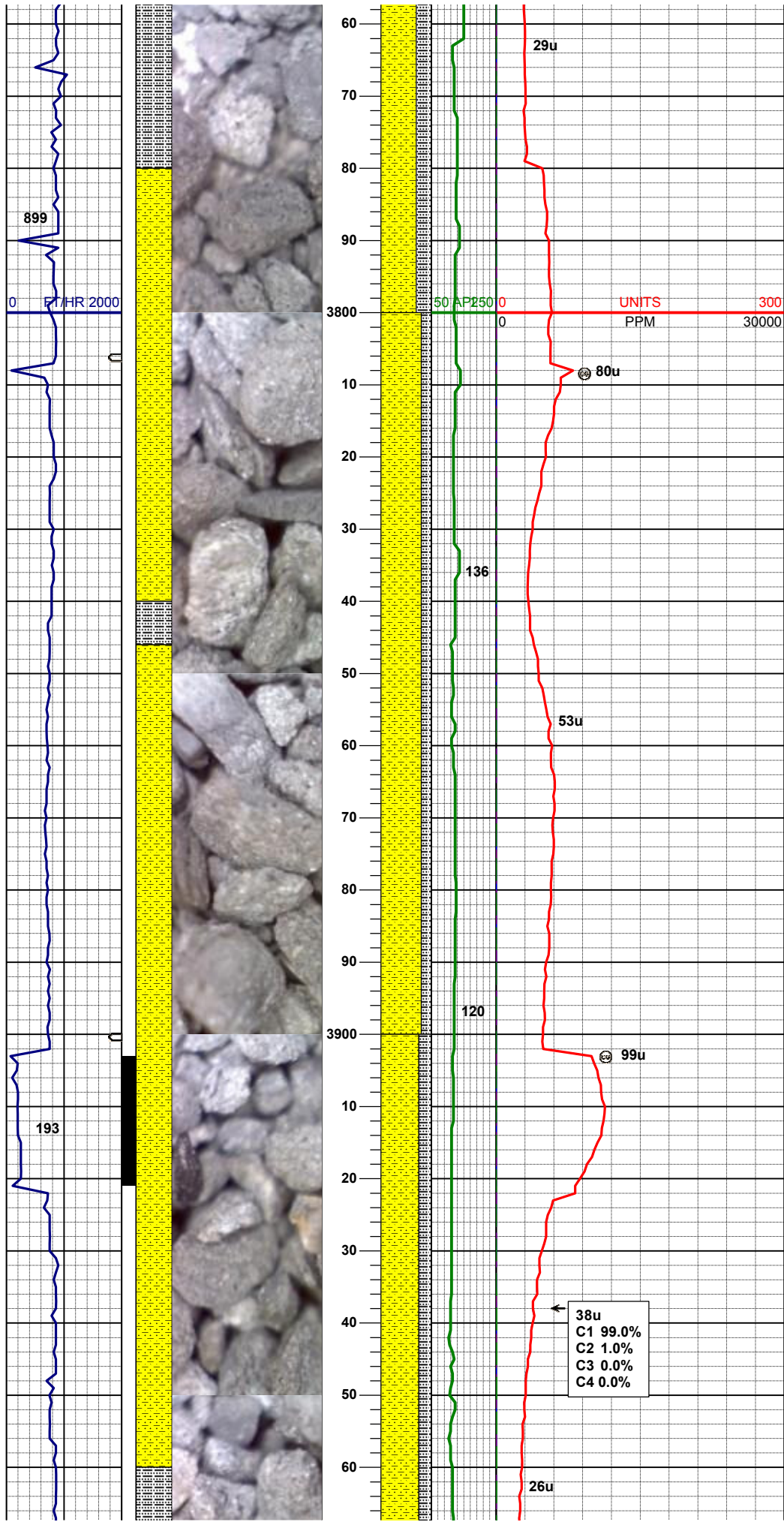
70% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau  
30% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbbiky - sbply, rthy sl slty tex

MD 3655'  
INC 5.01  
AZM 340.70

70% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau  
30% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbbiky - sbply, rthy sl slty tex

MD 3750'





MD 3733  
INC 2.97  
AZM 326.59

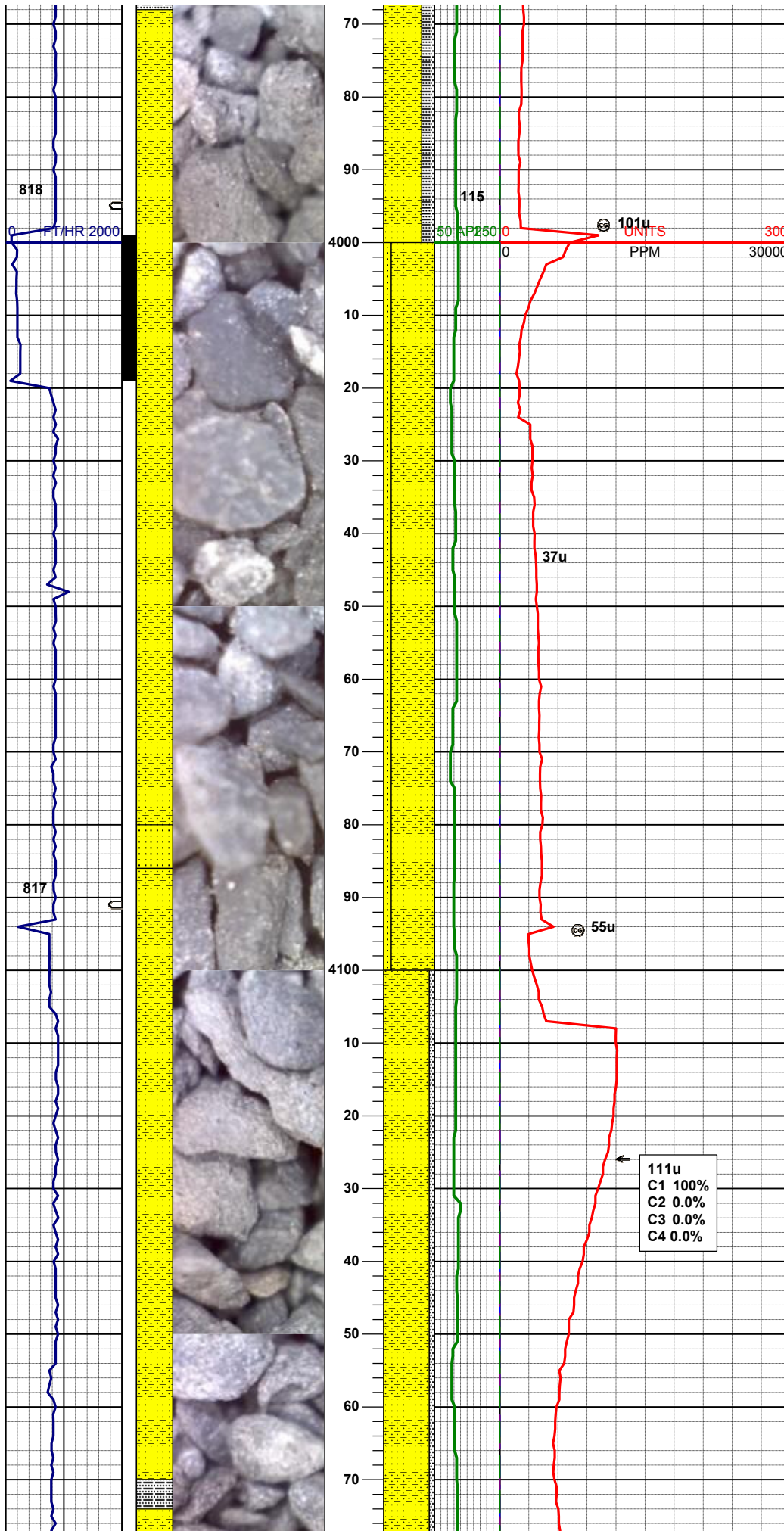
MD 3844'  
INC 2.72  
AZM 318.57

80% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt, sme glau  
20% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbblky - sbplty, rthy sl slty tex

MUD WT 8.9 VIS 30

MD 3939'  
INC 1.54  
AZM 317.19

75% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt,  
25% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbblky - sbplty, rthy sl slty tex

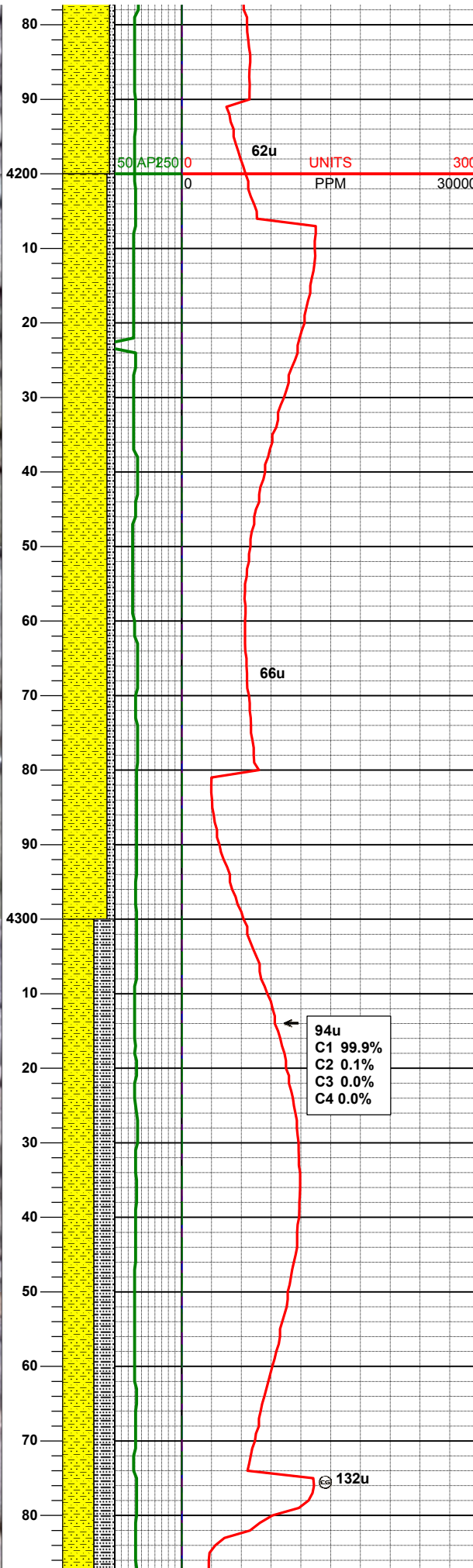
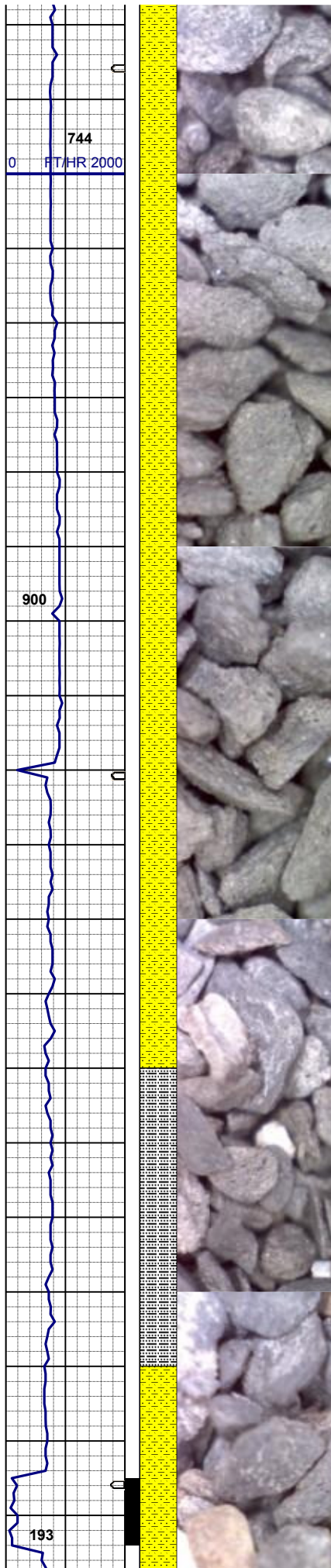


MD 4034'  
INC 0.99  
AZM 39.64

85% SHYSS: ltgy, vf-fgr, sbrd - sbang, mod srt,  
firm- fri, v por, arg cmt  
15% SS: wh-op occ lt gy, s&p occ obrn, m  
gr,brit - firm, sbrd-sbang, p srt, v uncon, abnt  
glau incl

MD 4129'  
INC 0.80  
AZM 61.30

90% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang,  
mod srt, firm- fri, p por, arg cmt,  
10% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbblky - sbply, rthy sl slty tex



MUD WT 8.9 VIS 29

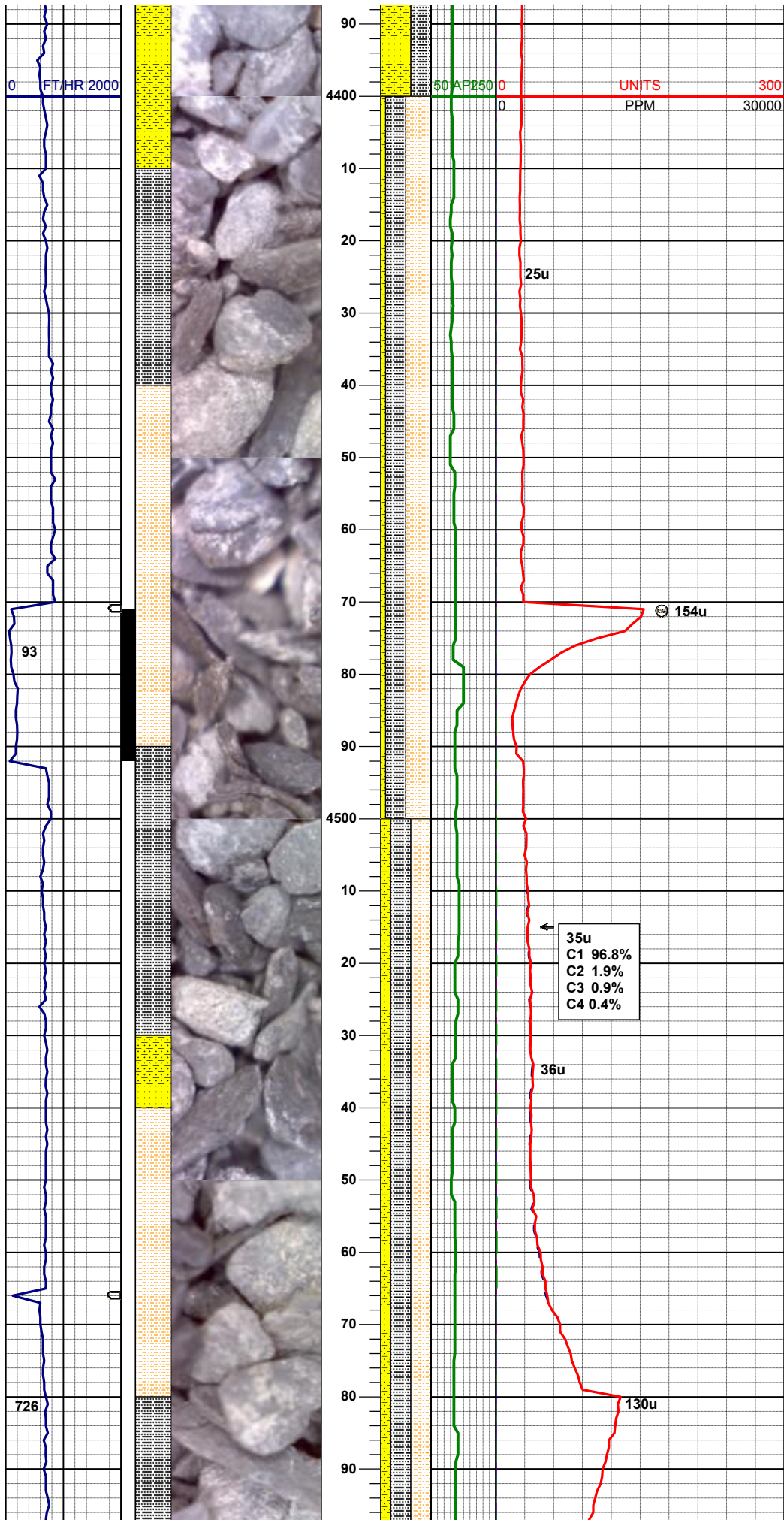
MD 4224'  
INC 0.94  
AZM 73.95

85% SHYSS: ltgy- tr s&p, vf-fgr, sbrd - sbang, mod srt, firm- fri, p por, arg cmt, 15% SILTY SH: m gy-mgybrn occ v dk gy, firm - sft, sbbly - sbply, rthy sl slty tex

MD 4319'  
INC 1.09  
AZM 65.14

60% SHYSS: ltgy, vf-fgr, sbrd - sbang, mod srt, firm- fri, v por, arg cmt 40% SHALY SLTST: gy-dk gy, sme lt gy, sft-firm - hd, sbbly- sl sbply, aren- slty tex





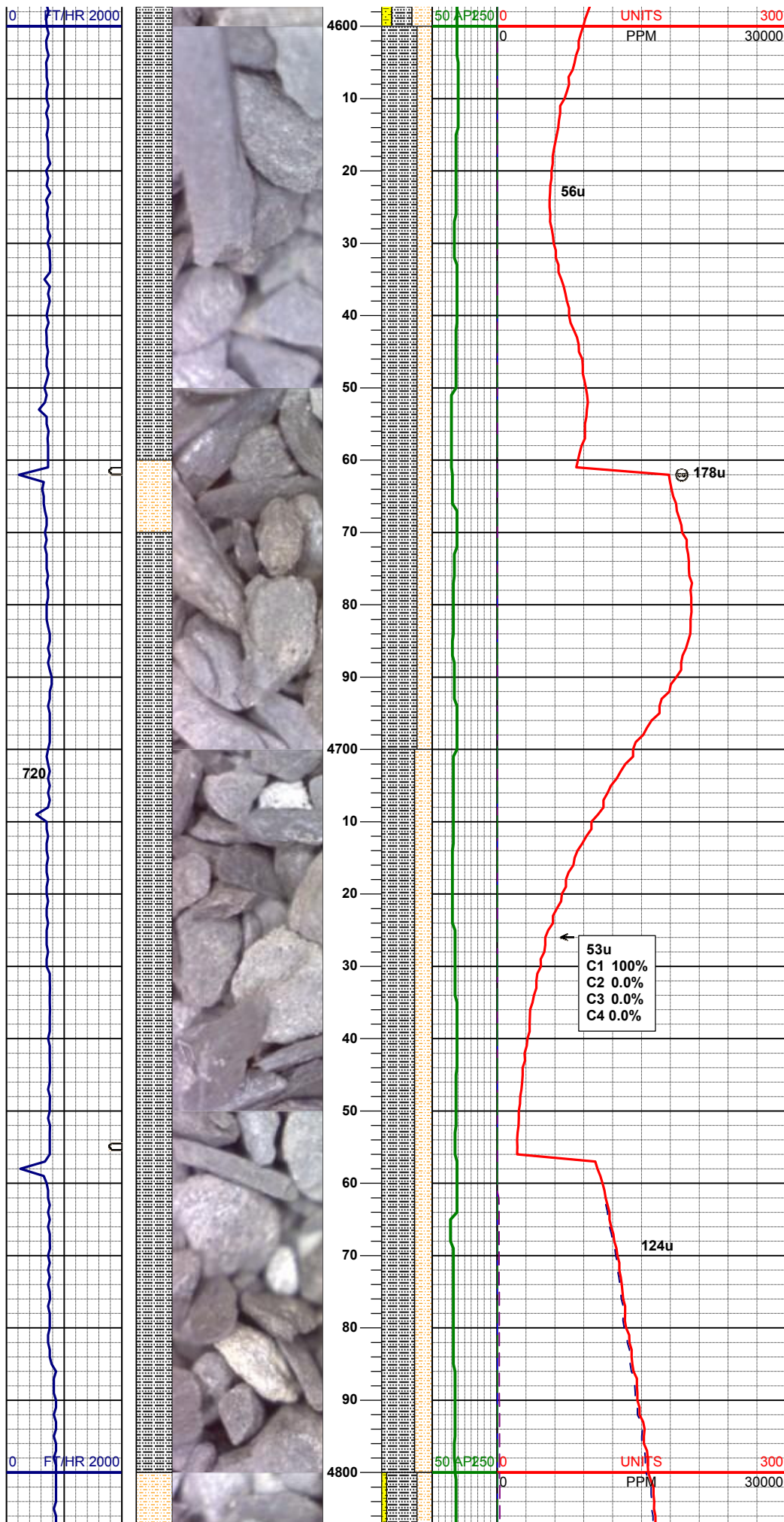
MD 4414'  
INC 1.49  
AZM 61.91

50% SHALY SLTST: mgy occ m gybrn, sft-  
firm - hd, sbbiky- sl sbply, aren- slty tex  
40% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbbiky - sbply, rthy sl slty tex  
10%SHYSS: ltgy, vf-fgr, sbrd - sbang, mod srt,  
firm- fri, v por, arg cmt, occ c glau incl

MD 4508'  
INC 1.13  
AZM 176.43

35u  
C1 96.8%  
C2 1.9%  
C3 0.9%  
C4 0.4%

40% SHALY SLTST: mgy occ m gybrn, sft-  
firm - hd, sbbiky- sl sbply, aren- slty tex  
40% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbbiky - sbply, rthy sl slty tex  
20%SHYSS: ltgy, vf-fgr, sbrd - sbang, mod srt,  
firm- fri, v por, arg cmt, occ c glau incl



MD 4603'  
INC 1.05  
AZM 190.54

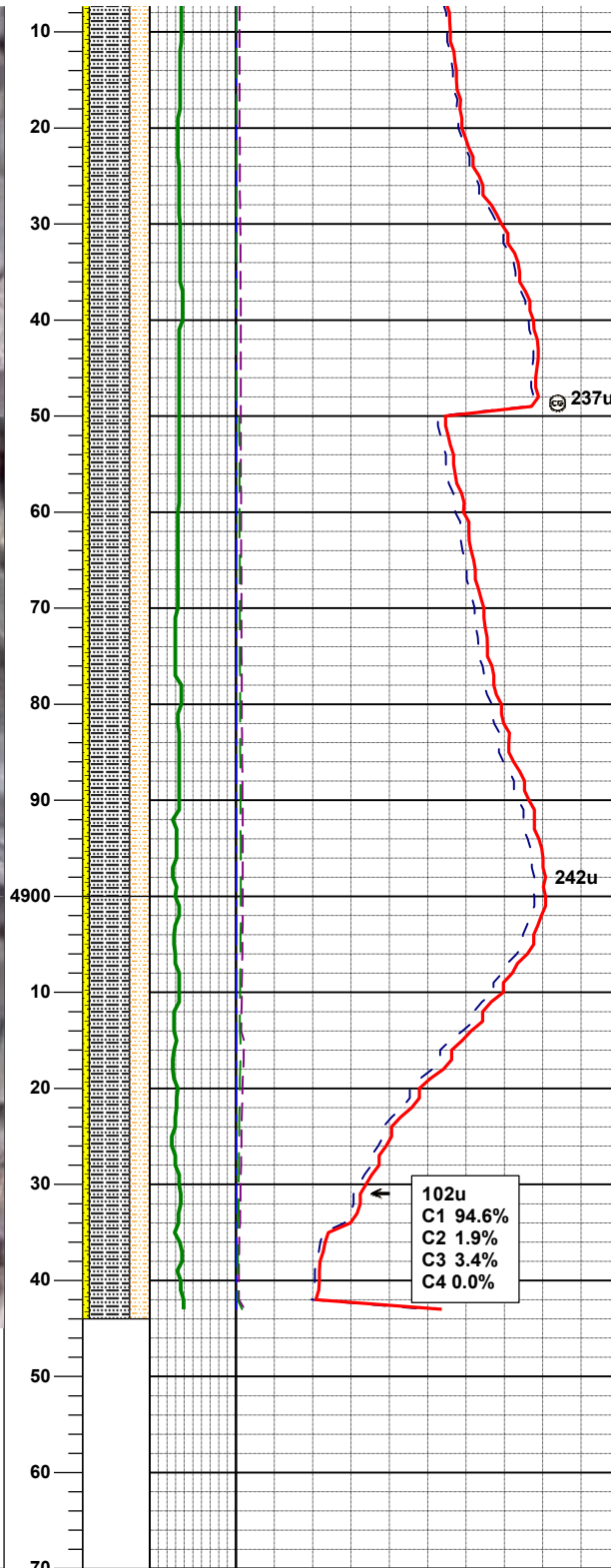
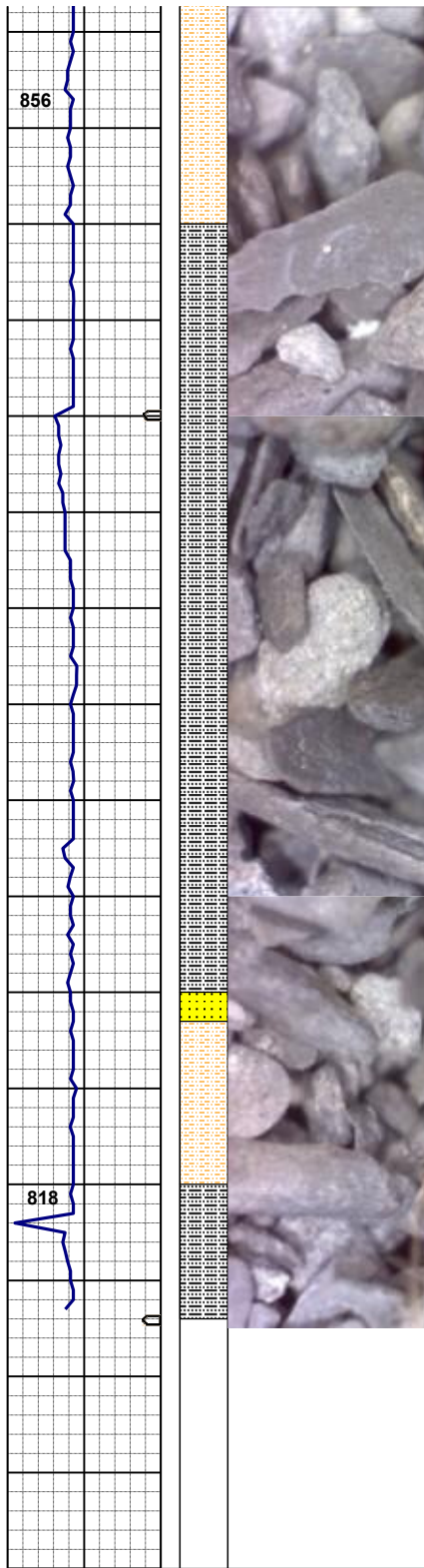
70% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft, sbbly - sbply, rthy sl sily tex  
30% SHALY SLTST: mgy occ m gybrn, sft-  
firm - hd, sbbly- sl sbply, aren- sily tex

MD 4698'  
INC 0.74  
AZM 221.98

53u
C1 100%
C2 0.0%
C3 0.0%
C4 0.0%

65% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft, sbblky - sbplty, rthy sl sily tex  
35% SHALY SLTST: mgy occ m gybrn, sft-  
firm - hd, sbblky- sl sbplty, aren- sily tex

MD 4793'  
INC 0.25  
AZM 203.18



MUD WT 8.8 VIS 30

MD 4888'  
INC 0.60  
AZM 229.76

60% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbbiky - sbpity, rthy sl slty tex  
30% SHALY SLTST: mgy occ m gybrn, sft-  
firm - hd, sbbiky- sl sbpity, aren- slty tex  
10%SHYSS: ltgy, vf-fgr, sbrd - sbang, mod srt,  
firm- fri, v por, arg cmt, occ c glau incl

60% SILTY SH: m gy-mgybrn occ v dk gy, firm -  
sft , sbbiky - sbpity, rthy sl slty tex  
30% SHALY SLTST: mgy occ m gybrn, sft-  
firm - hd, sbbiky- sl sbpity, aren- slty tex  
10%SHYSS: ltgy, vf-fgr, sbrd - sbang, mod srt,  
firm- fri, v por, arg cmt, occ c glau incl

TOOH @ 4943' MD For Tools  
19:10 HRS 05/08/2013

Log Continues on  
Cook State LD36-78HN(HORZ).lplot

Thank you for choosing  
Columbine Logging Inc.