OPERATOR:	**NOBLE ENERGY INC**
WELL:	**ROHN STATE LD04-65-1HN**
LOCATION:	**SEC 4 T9N R58W**
COUNTY:	**WELD**
STATE:	**COLORADO**
SPOT:	**2064' FSL, 480' FEL**
ELEVATION:	**4704' GL; 4728' KB**
FIELD:	**WILDCAT**
SPUD DATE:	**08/02/2013**
TD DATE:	**08/04/2013**
DATES LOGGED:	**08/03/2013 - 08/04/2013**
DEPTHS LOGGED:	**1200' - 4866' MD**
LOGGERS:	**LAURA KELLOGG; CONOR PESICKA**
DRILLING FLUID:	**LSND**
DRILLING RIG:	**H&P 273**
API:	**05-123-37451**
LOG TYPE:	**VERTICAL**
SCALE:	**1:240 (5 inches per 100 feet)**
REMARKS:	**WELLSITE GEOLOGICAL SERVICES PROVIDED BY COLUMBINE LOGGING INC.**

LITHOLOGIES

Sandstone	Shaly Sandstone	Silty Shale

ENGINEERING SYMBOLS

Connection	Connection Gas	Arrow	Midnight Depth

				GAS		
				0 UNITS 1000		
				C1		
				0 PPM 100000		
				C2		
				0 PPM 100000		
				C3		
				0 PPM 100000		
ROP	SLIDE / ROTATE	INTERPRETIVE LITHOLOGY	PICTURES	DEPTH (FEET)	CUTTINGS	GAMMA	C4	LITHOLOGY DESCRIPTION
0 FT/HR 2000				1170		40 API 250	0 PPM 100000	
				80			COLUMBINE LOGGING INC. RIGGED UP ON 08/03/2013 MANNED 2-PERSON LOGGING WITH BLOODHOUND GAS CHROMATOGRAPH UNIT #0540 COLUMBINE BEGAN LOGGING ON 08/03/2013	BHA BIT: Smith 8.75" MDI516 Serial #: JG6864 Jets: 5X11
				90				Drilled out of Surface Casing @ 10:30 PM 08/03/2013
0 FT/HR 2000				1200		40 API 250	0 UNITS 1000 / 0 PPM 100000	

Depth track (left curve): 0 FT/HR 2000

Gas track scales: 40 API 250 | 0 ... UNITS ... 1000 | 0 ... PPM ... 100000

Gas shows / readings:
- 117u
- 130u
- 124u
  - C1: 96.8%
  - C2: 1.9%
  - C3: 0.9%
  - C4: 0.4%
- 187u
- 127u
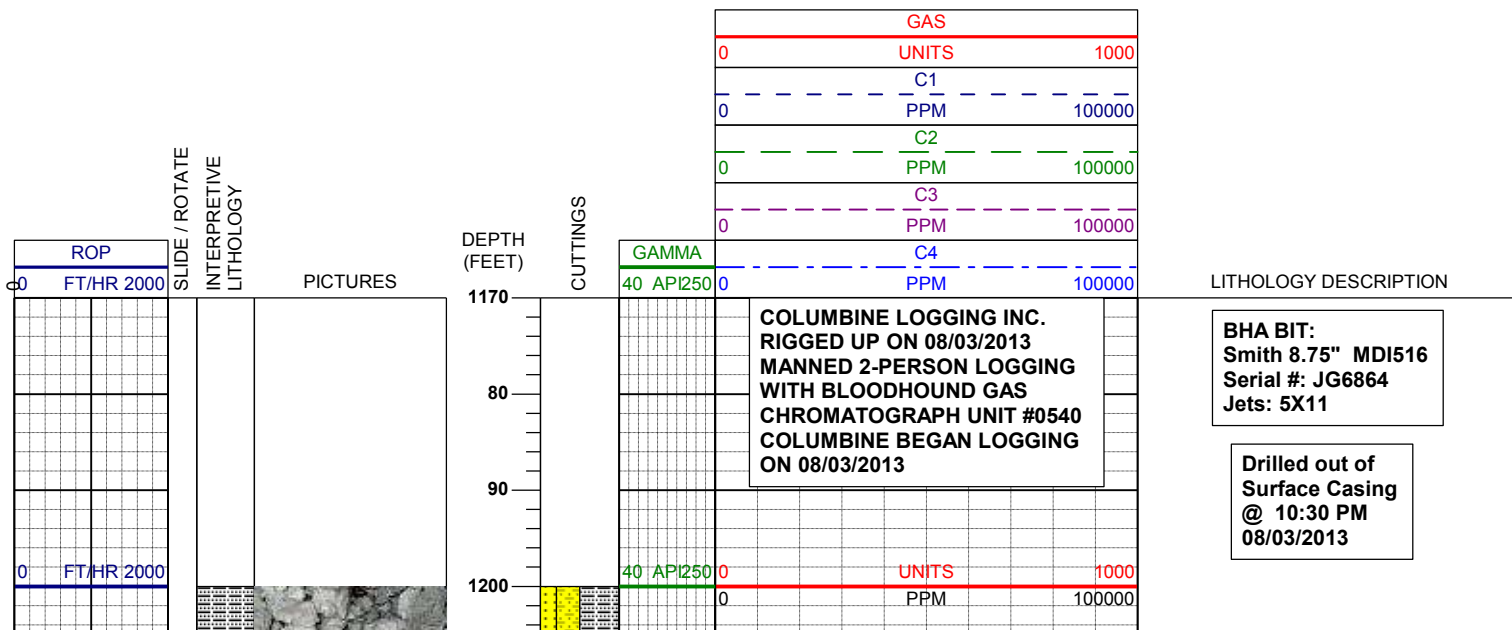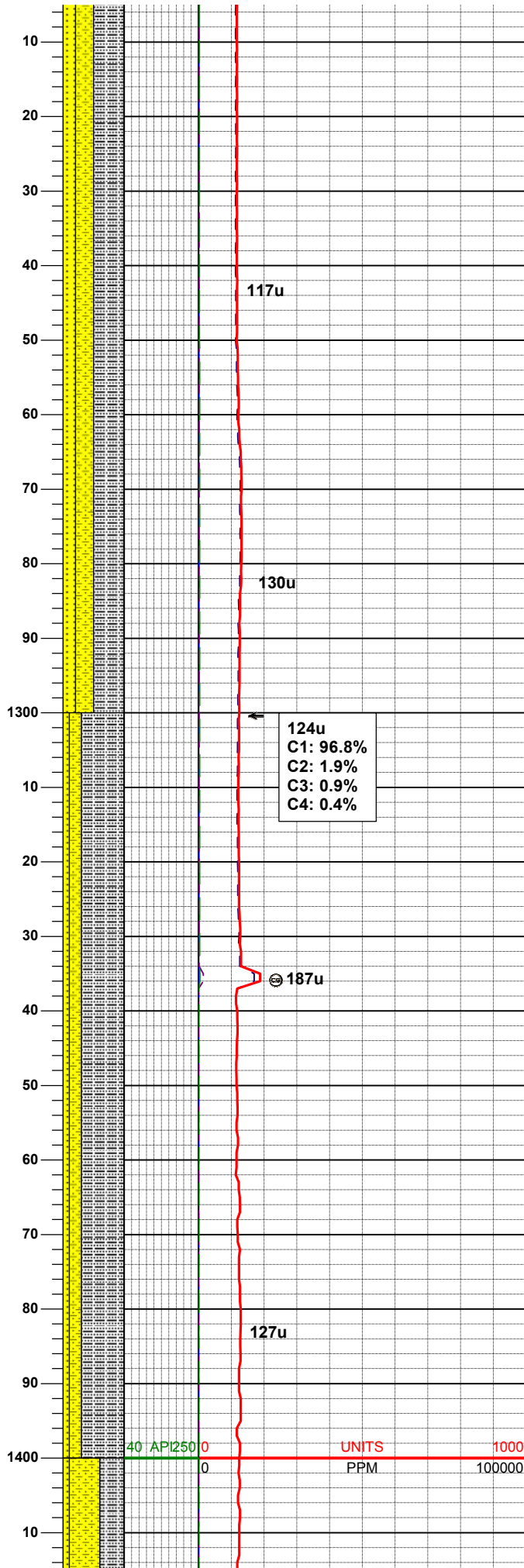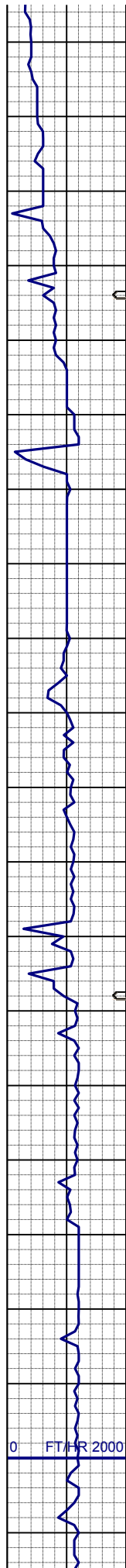
SLTYSH: ltgy-gy, sbplty-sbblky, v sft, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc
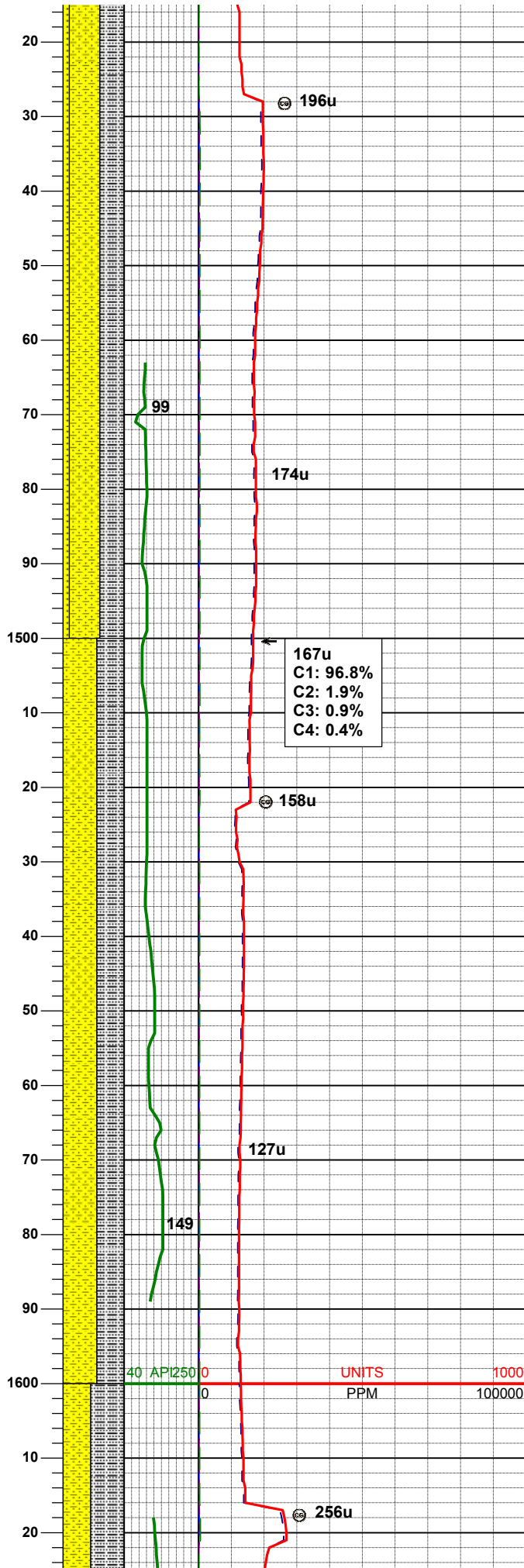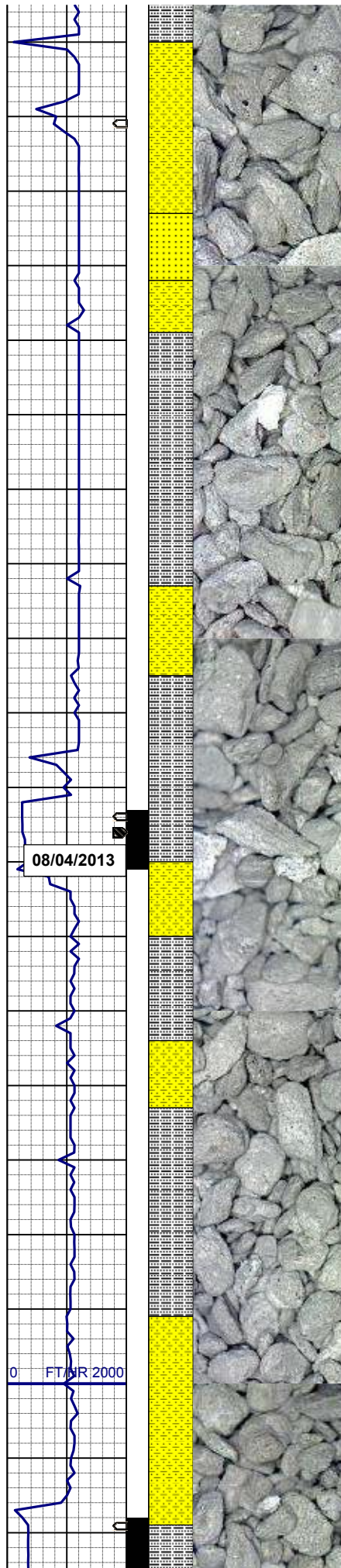SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, tr lit frag, sme glau

MD   1282'
INC   0.2°
AZM   326.6°
TVD   1281.98'

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc
SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, tr lit frag, sme glau

MD   1375'
INC   0.1°
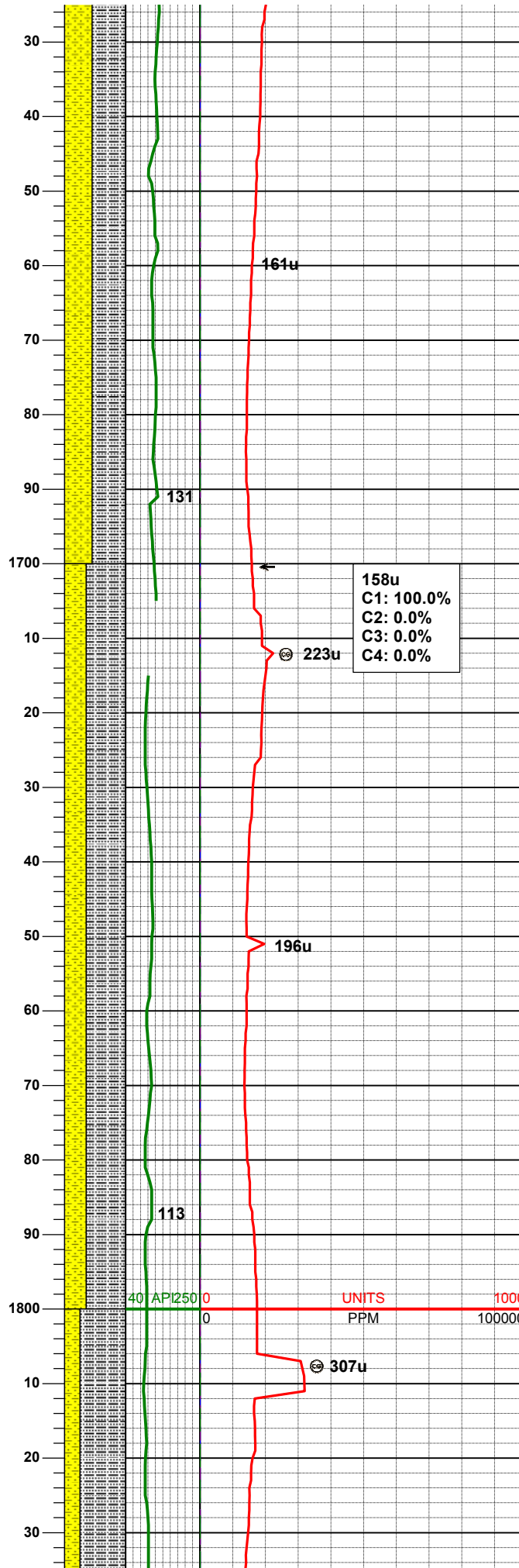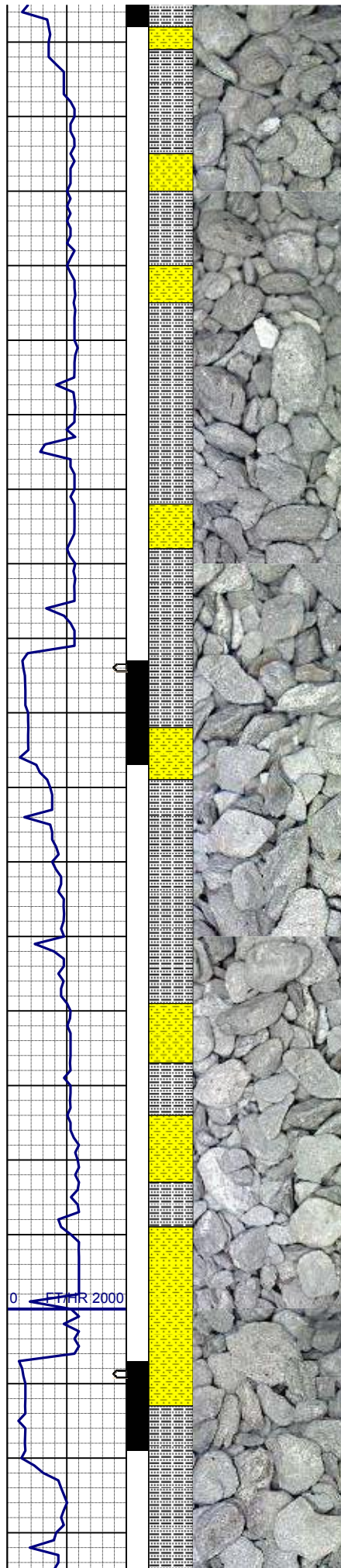AZM   18.5°
TVD   1374.98'

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc
SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, tr lit frag, sme glau

MD	1468'
INC	0.2°
AZM	91.4°
TVD	1467.98'

196u

99

174u

167u
C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%

158u

WT IN 8.45/ OUT 8.45
VIS IN 37/ OUT 37

08/04/2013

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc
SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt

127u

MD	1563'
INC	1.7°
AZM	69.1°
TVD	1562.96'

149

0   FT/HR 2000

40 API250 0   UNITS   1000
              0   PPM   100000

256u

SLTYSH: ltgy-gy, sbplty-sbblky, v sft,
gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri,
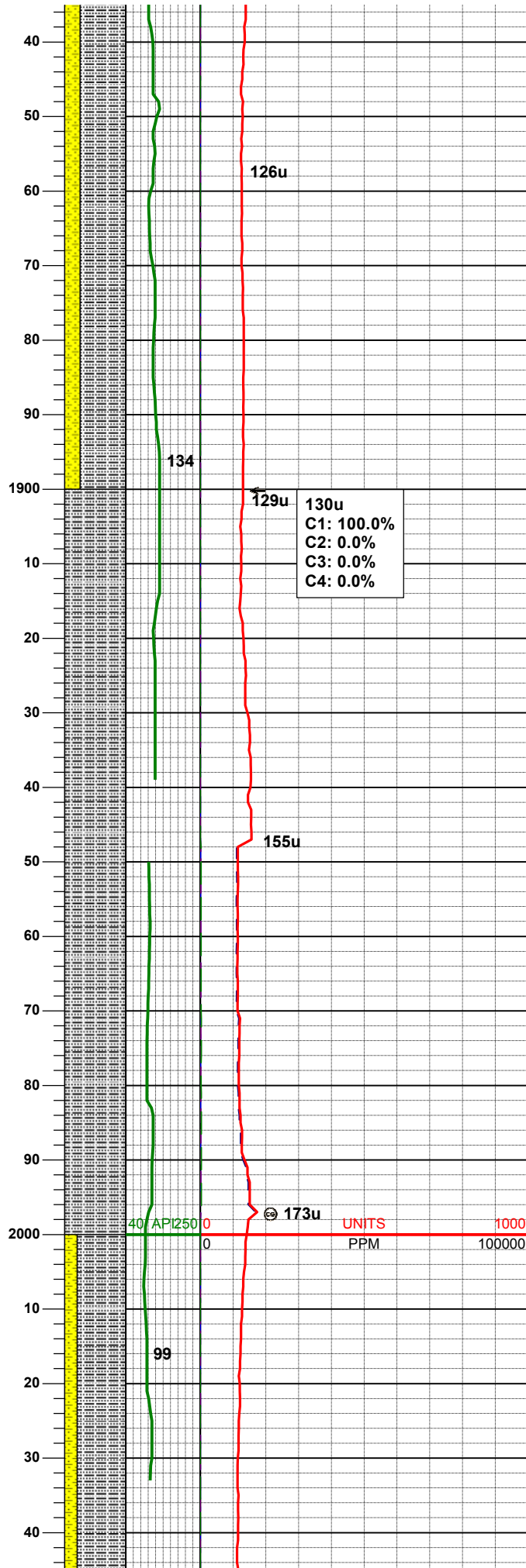vfgr, psrt, wrndd, abnt cly, arg cmt, sl
calc

MD	1658'
INC	2.6°
AZM	68.6°
TVD	1657.89'

161u

131

158u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

223u

WT IN 8.40/ OUT 8.40
VIS IN 25/ OUT 25

SLTYSH: ltgy-gy, sbplty-sbblky, v sft,
gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri,
vfgr, psrt, wrndd, abnt cly, arg cmt, sl
calc

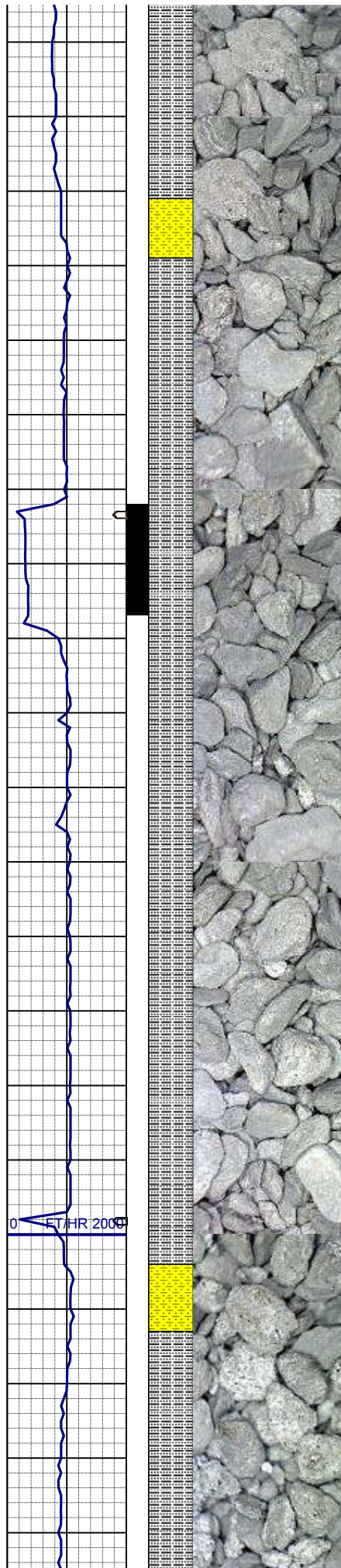| MD	1752'
INC	3.8°
AZM	44.5°
TVD	1751.75'

196u

113

0   FT/HR 2000

40 API 250   0   UNITS   1000
                  0   PPM   100000
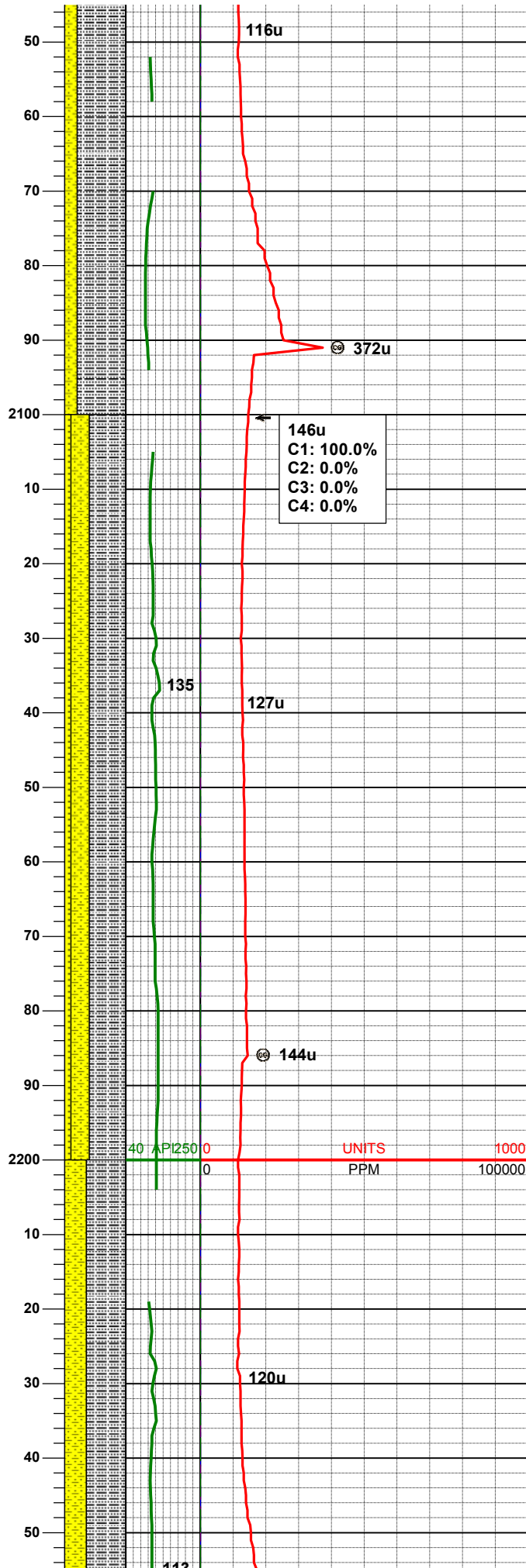
307u

MD	1847'
INC	5.0°

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc

126u

134

129u 130u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

155u

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt

173u

0 FT/HR 2000
40 API 250   0 UNITS 1000
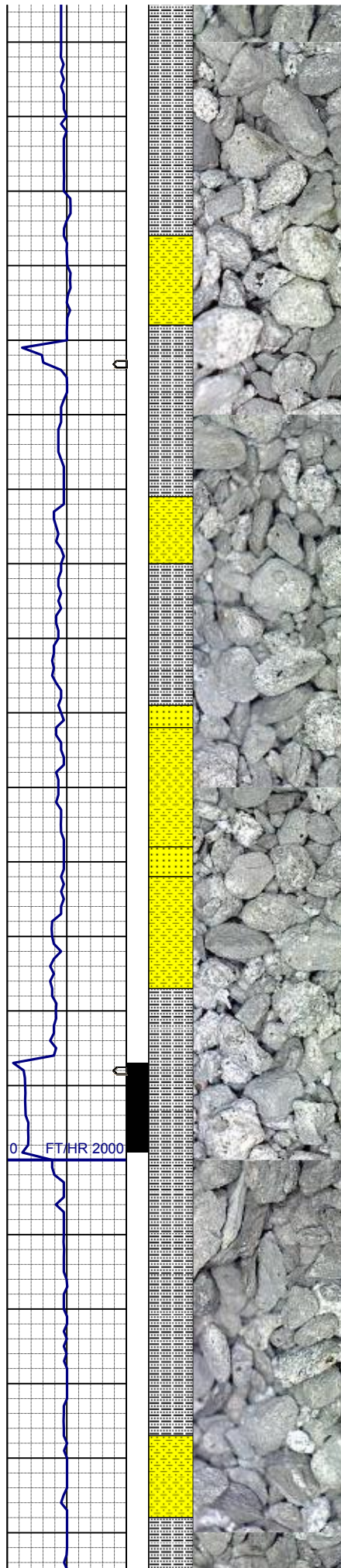0 PPM 100000

99

SLTYSH: ltgy-gy, sbplty-sbblky, v sft

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc

116u

WT IN 10.30/ OUT10.30
VIS IN 26/ OUT 26

372u

146u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

MD	2132'
INC	5.7°
AZM	35.5°
TVD	2129.89'

135

127u

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc
SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, occ lit frag, tr glau

144u

0   FT/HR 2000

40 API 250   0   UNITS   1000
              0   PPM   100000

120u

MD	2226'
INC	6.1°
AZM	36.4°
TVD	2223.30'

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
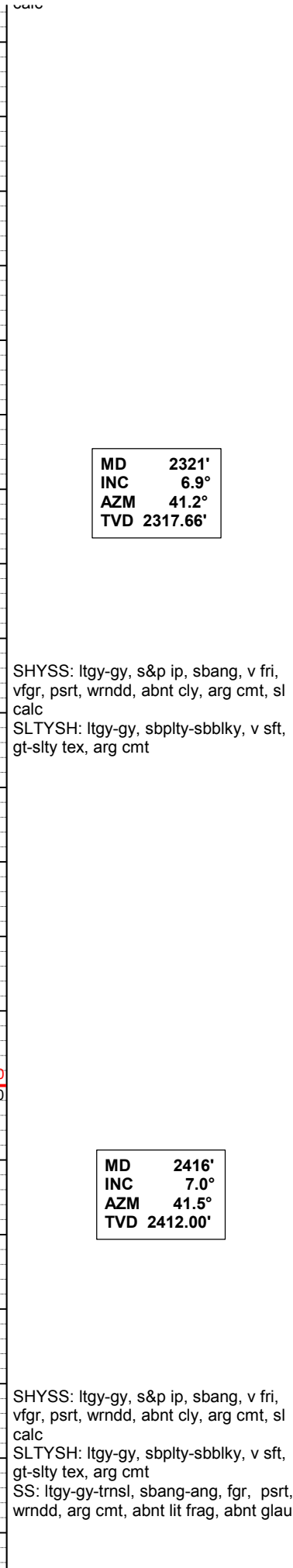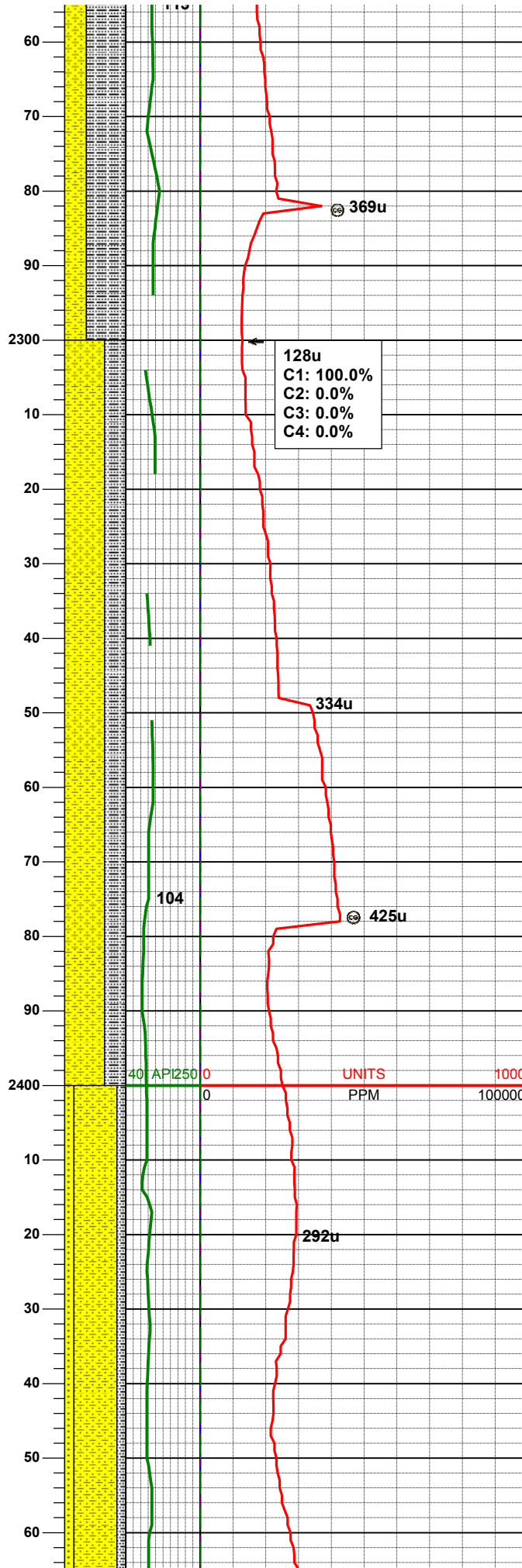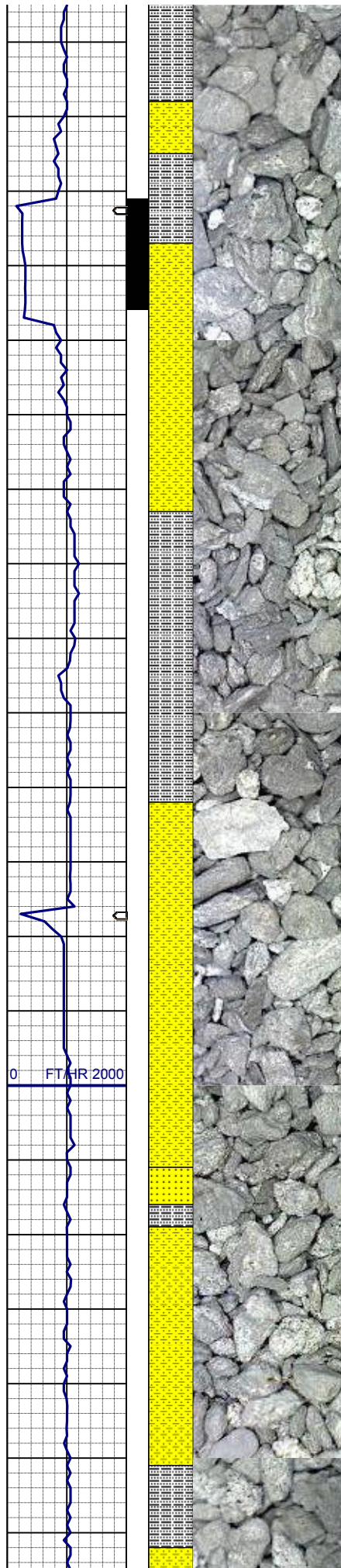SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc

113

Depth Track (center, left of curves)

60
70
80
90
2300
10
20
30
40
50
60
70
80
90
2400
10
20
30
40
50
60

Annotations

⊚ **369u**

128u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

334u

104

⊚ **425u**

292u

Curve scales

0   FT/HR   2000

40   API 250   0   UNITS   1000

0   PPM   100000

Survey boxes

MD	2321'
INC	6.9°
AZM	41.2°
TVD	2317.66'

MD	2416'
INC	7.0°
AZM	41.5°
TVD	2412.00'

Lithology descriptions

calc

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc
SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc
SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, abnt lit frag, abnt glau

70

80

117

90

2500

160u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

10

135u

20

30

40

50

60

428u

70

80

90

113

2600

10

141u

20

30

40

50

60

412u

70

387u

412u

MD	2511'
INC	7.3°
AZM	39.1°
TVD	2506.26'

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc
SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, abnt lit frag, abnt glau

MD	2605'
INC	7.1°
AZM	39.4°
TVD	2599.52'

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
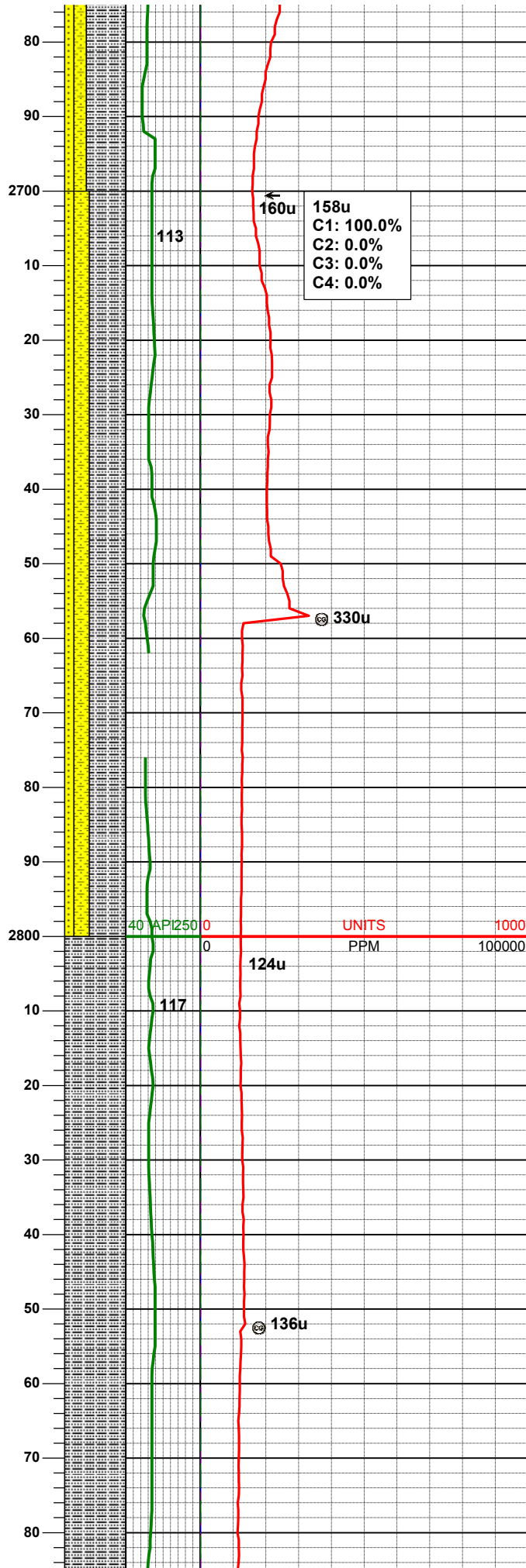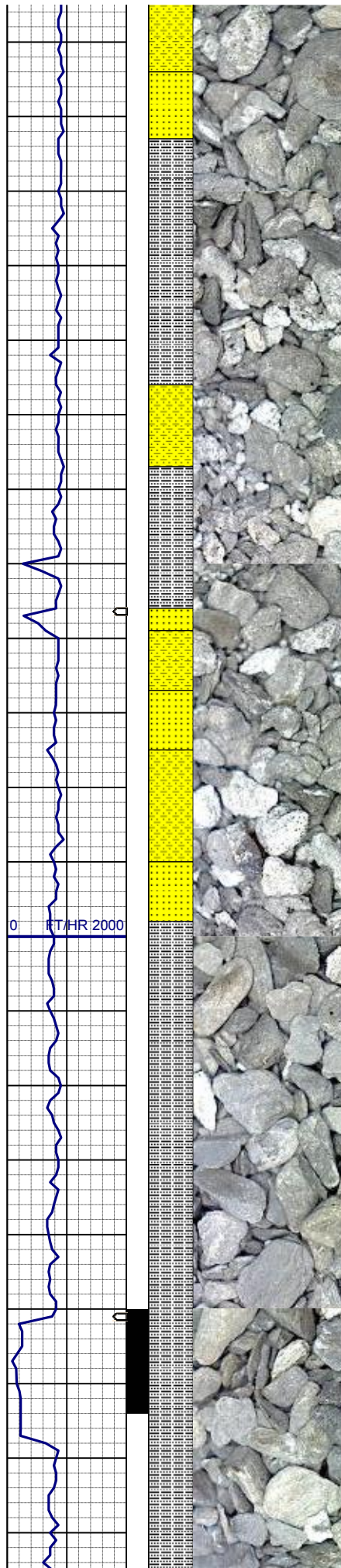SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc
SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, abnt lit frag, abnt glau

0 FT/HR 2000

40 API 250   0   UNITS   1000

0   PPM   100000

160u

158u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

113

330u

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc
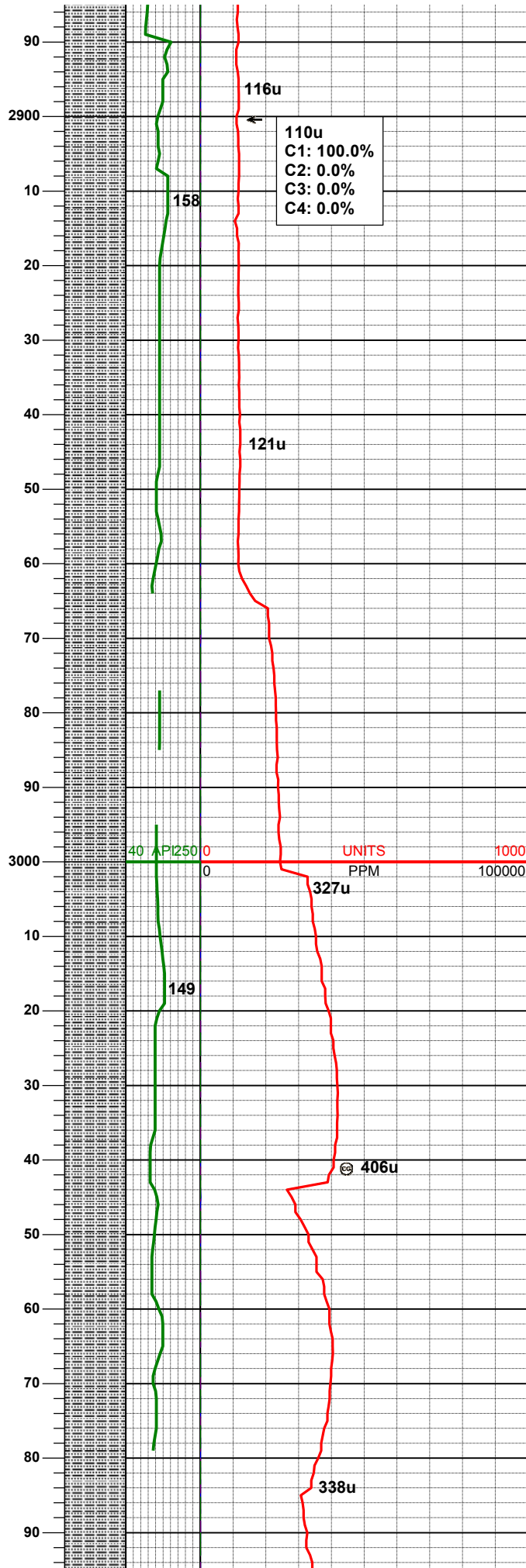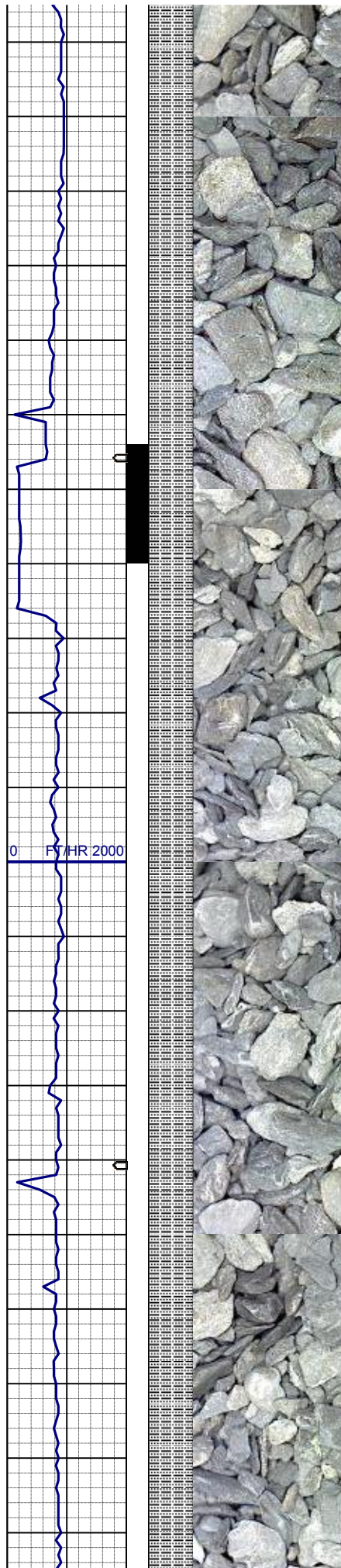SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, abnt lit frag, abnt glau

MD	2700'
INC	6.8°
AZM	38.2°
TVD	2693.87'

MD	2795'
INC	6.2°
AZM	38.3°
TVD	2788.21'

0   RT/HR   2000

40   API   250   0   UNITS   1000
                  0   PPM   100000

124u

117

136u

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt

MD	2889'

MD   2869'
INC   6.2°
AZM   37.8°
TVD 2881.66'

116u

110u
C1: 100.0%
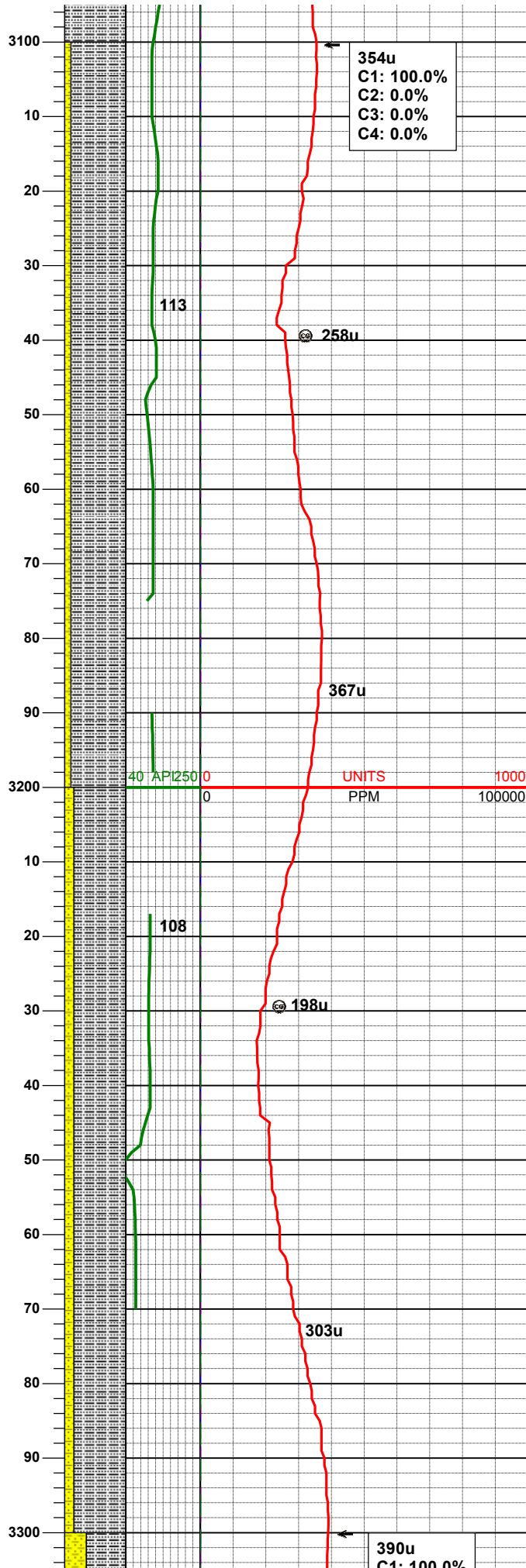C2: 0.0%
C3: 0.0%
C4: 0.0%

158

WT IN 8.30/ OUT8.30
VIS IN 26/ OUT 26

121u

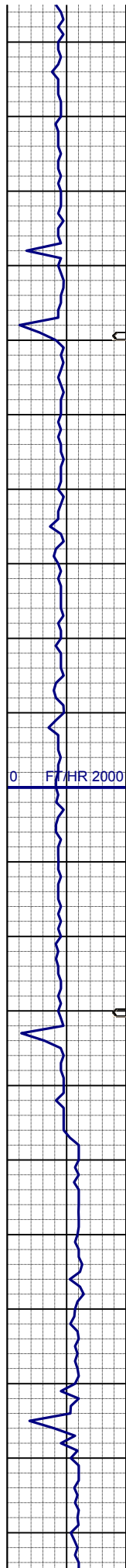SLTYSH: ltgy-gy, sbplty-sbblky, v sft,
gt-slty tex, arg cmt

MD   2984'
INC   7.2°
AZM   28.7°
TVD 2976.01'

0   FT/HR 2000   40 API250 0   UNITS   1000
                                     0   PPM   100000

327u

149

406u

SLTYSH: ltgy-gy, sbplty-sbblky, v sft,
gt-slty tex, arg cmt

MD   3079'
INC   6.2°
AZM   24.8°
TVD 3070.36'

338u

354u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

113

⊙ **258u**

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc

MD	3174'
INC	6.6°
AZM	23.4°
TVD	3164.73'

367u

0	FT/HR 2000

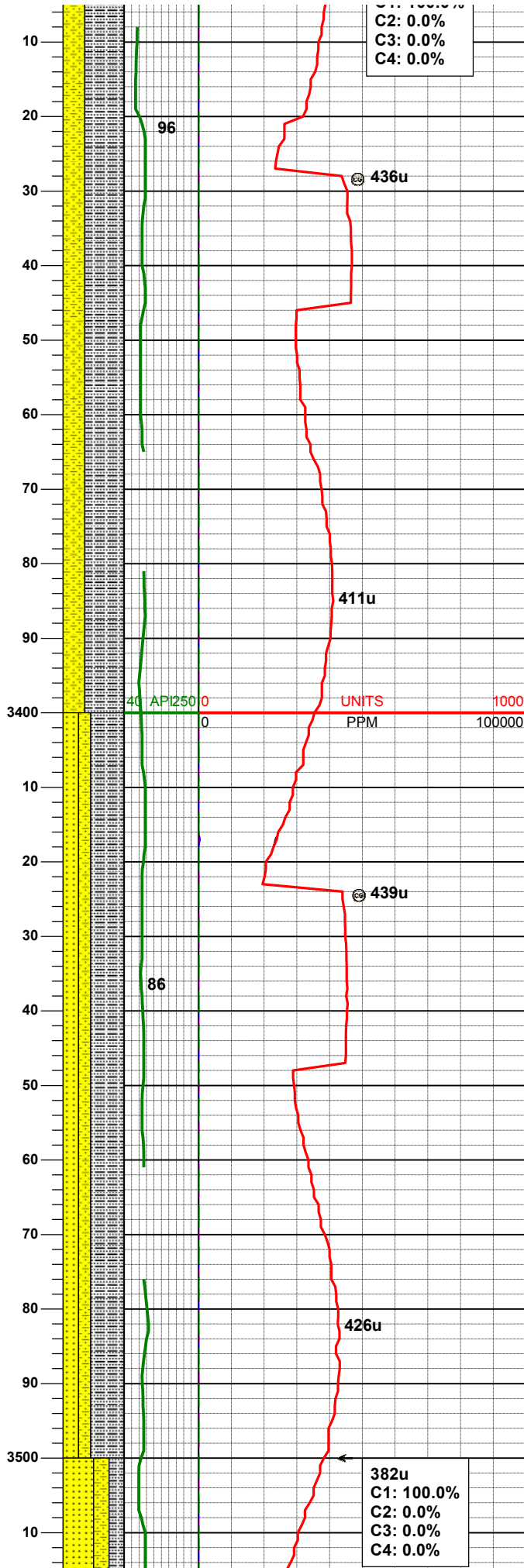| 40	API250	0	UNITS	1000
		0	PPM	100000

108

⊙ **198u**

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc

MD	3269'
INC	6.9°
AZM	25.0°
TVD	3259.07'

303u

390u
C1: 100.0%

C2: 0.0%
C3: 0.0%
C4: 0.0%

96

436u

411u

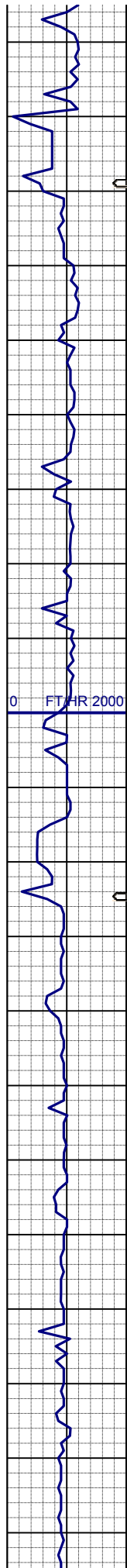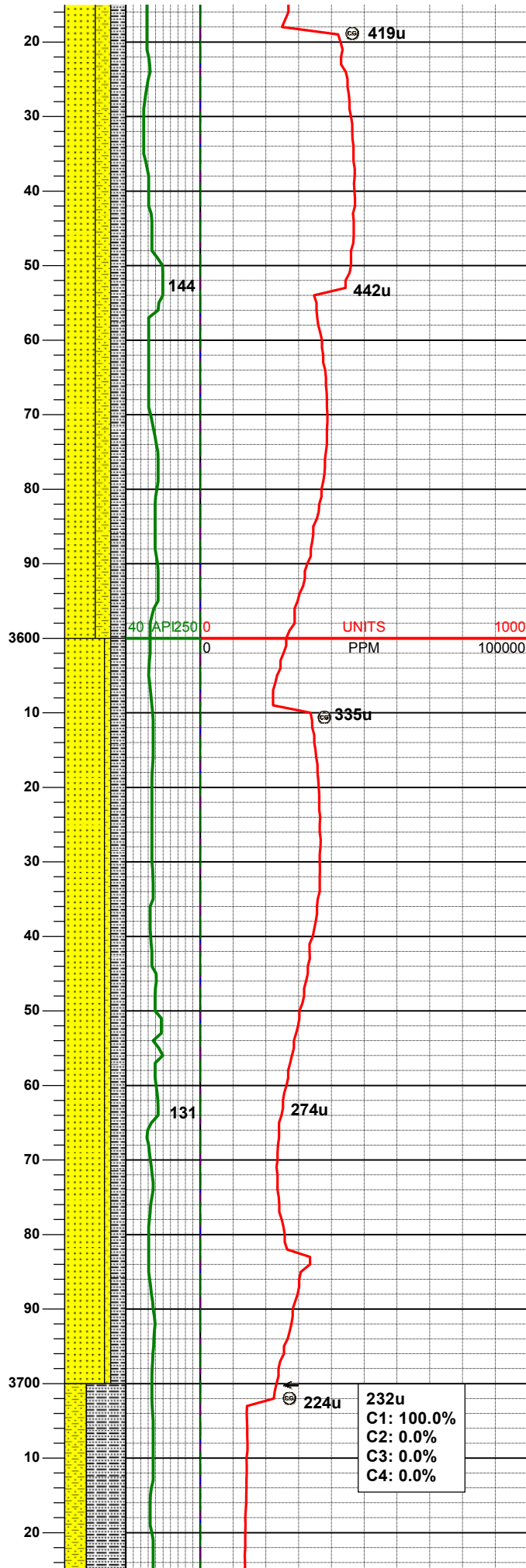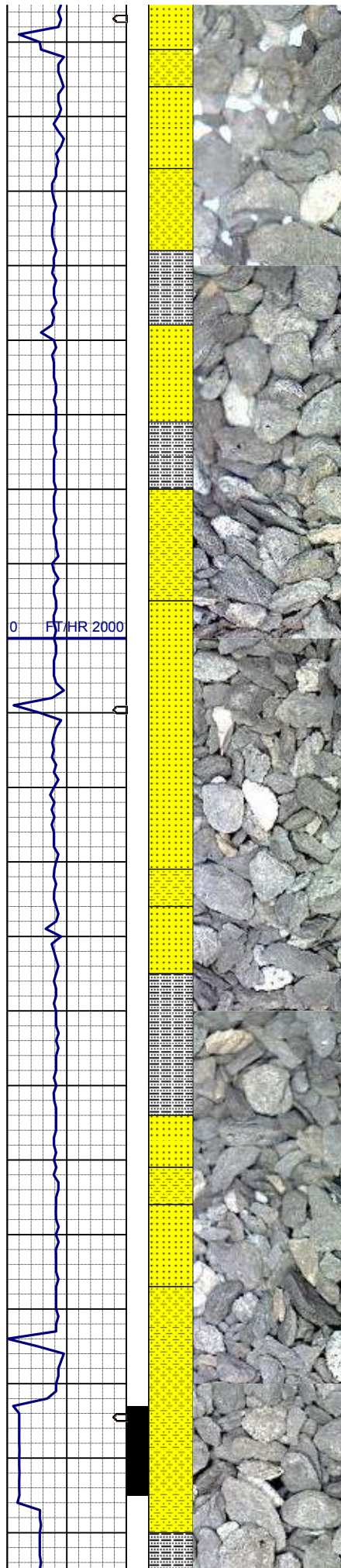SLTYSH: ltgy-gy, sbplty-sbblky, v sft,
gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri,
vfgr, psrt, wrndd, abnt cly, arg cmt, sl
calc

MD	3364'
INC	7.5°
AZM	24.8°
TVD	3353.32'

0   FT/HR 2000

40 API250 0   UNITS   1000
              0   PPM   100000

439u

86

SLTYSH: ltgy-gy, sbplty-sbblky, v sft,
gt-slty tex, arg cmt
SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt,
wrndd, arg cmt, abnt lit frag, abnt glau
SHYSS: ltgy-gy, s&p ip, sbang, v fri,
vfgr, psrt, wrndd, abnt cly, arg cmt, sl
calc

MD	3459'
INC	7.9°
AZM	24.8°
TVD	3447.47'

426u

382u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

0 FT/HR 2000

40 API 250 0 UNITS 1000
0 PPM 100000

419u

442u

144

335u

274u

131

224u

232u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

20
30
40
50
60
70
80
90
3600
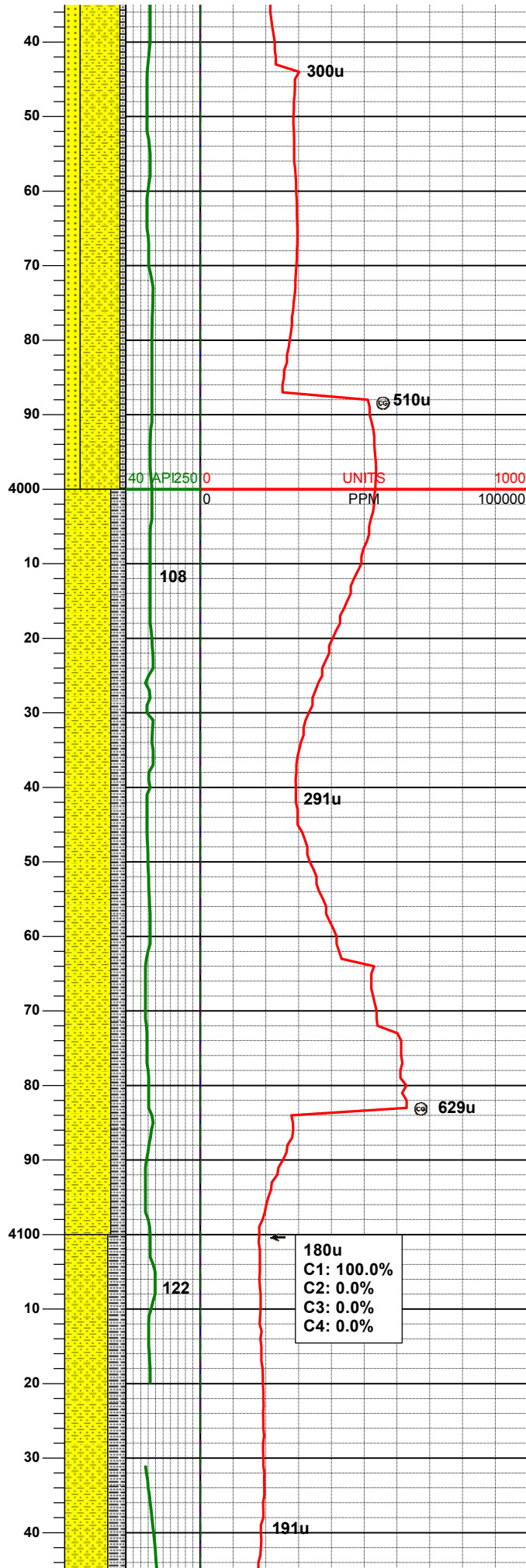10
20
30
40
50
60
70
80
90
3700
10
20

SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt,
wrndd, arg cmt, abnt lit frag, abnt glau
SHYSS: ltgy-gy, s&p ip, sbang, v fri,
vfgr, psrt, wrndd, abnt cly, arg cmt, sl
calc
SLTYSH: ltgy-gy, sbplty-sbblky, v sft,
gt-slty tex, arg cmt

MD	3553'
INC	8.0°
AZM	23.8°
TVD	3540.56'

SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt,
wrndd, arg cmt, abnt lit frag, abnt glau
SLTYSH: ltgy-gy, sbplty-sbblky, v sft,
gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri,
vfgr, psrt, wrndd, abnt cly, arg cmt, sl
calc

MD	3648'
INC	7.4°
AZM	19.4°
TVD	3634.71'

Depth track (left, log):
30, 40, 50, 60, 70, 80, 90, 3800, 10, 20, 30, 40, 50, 60, 70, 80, 90, 3900, 10, 20, 30

Rate of penetration track: 0 FT/HR 2000

Gas/log track:
40 API 250 — 0 UNITS 1000 — 0 PPM 100000

Gas readings / annotations:
- 132u
- 126
- 152u
- 132u
- 495u
- 112
- 195u
- C1: 100.0%
- C2: 0.0%
- C3: 0.0%
- C4: 0.0%

Survey boxes:

MD	3743'
INC	5.2°
AZM	24.5°
TVD	3729.13'

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc

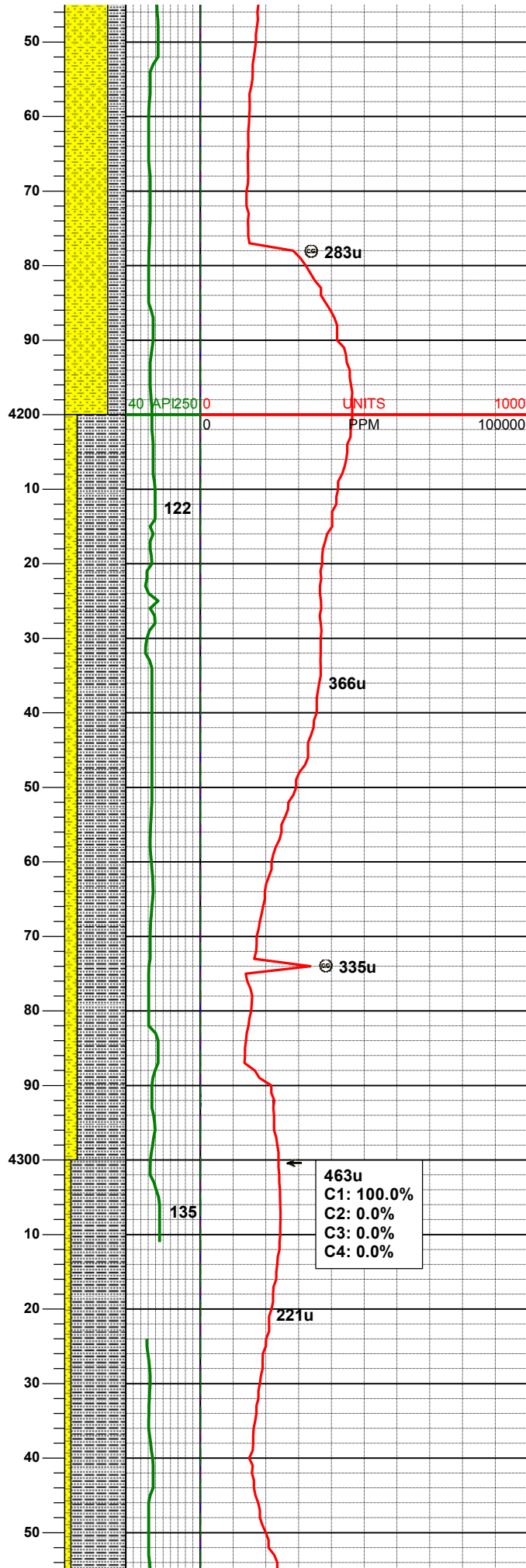| MD	3838'
INC	4.9°
AZM	42.2°
TVD	3823.77'

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc
SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, abnt lit frag, abnt glau
SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt

WT IN 8.40/ OUT8.40
VIS IN 25/ OUT 25

MD	3933'
INC	5.5°
AZM	42.2°
TVD	3918.37'

Depth track (center):
- 40
- 50
- 60
- 70
- 80
- 90
- 4000
- 10
- 20
- 30
- 40
- 50
- 60
- 70
- 80
- 90
- 4100
- 10
- 20
- 30
- 40

Rate of penetration track: 0   FT/HR   2000

Gamma ray scale: 40 API 250

Gas scale: 0   UNITS   1000 / 0   PPM   100000

Gas readings (red): 300u, 510u, 291u, 629u, 180u, 191u

Gamma ray readings (green): 108, 122

Annotation box:
180u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%
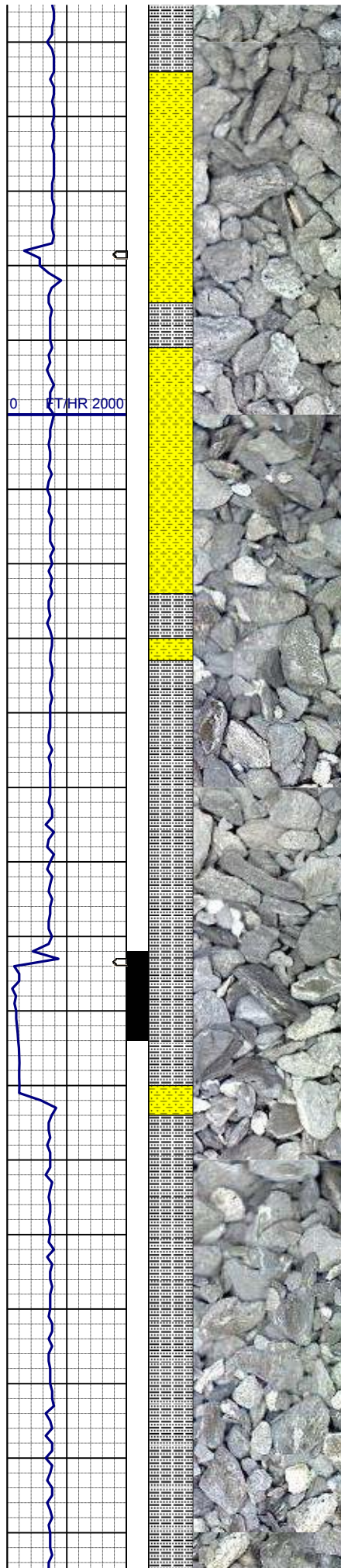
Lithology descriptions (right):

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc
SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, abnt lit frag, abnt glau
SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt
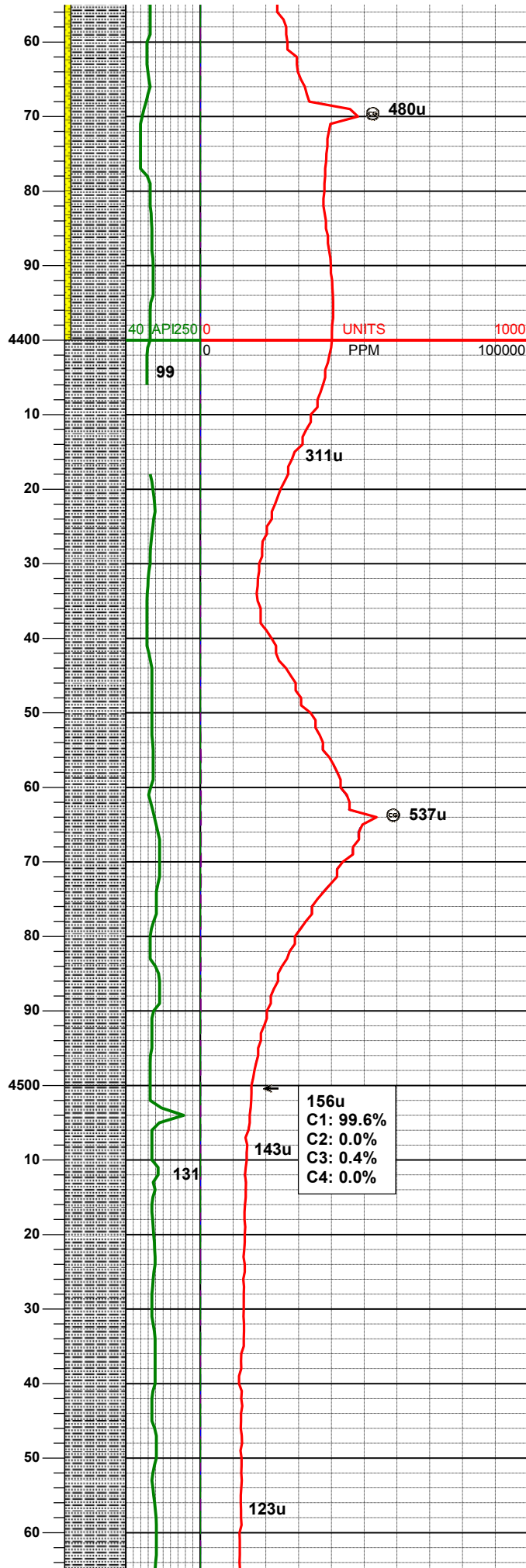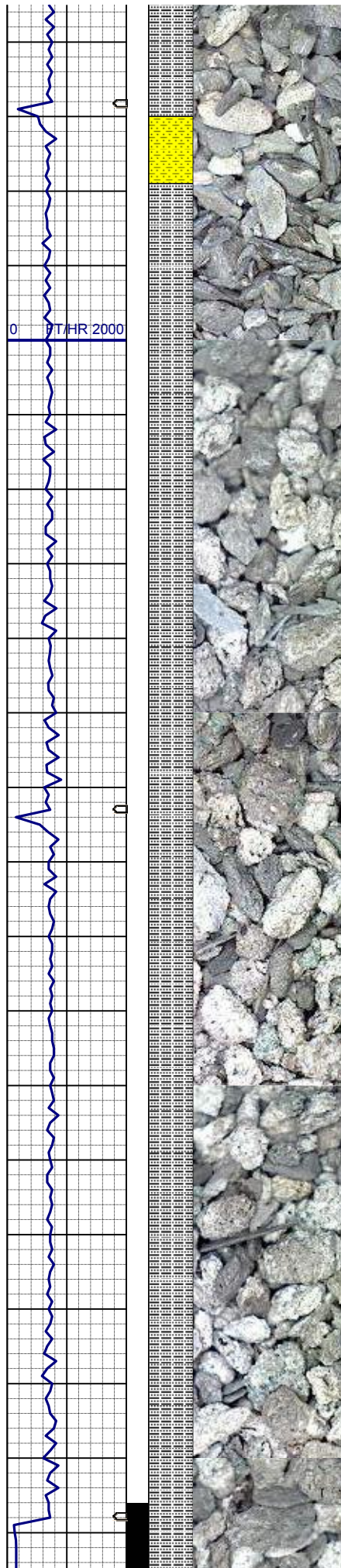
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc
SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt

SHYSS: ltgy-gy, s&p ip, sbang, v fri

Survey boxes (right):

MD	4027'
INC	4.7°
AZM	39.4°
TVD	4012.00'

MD	4122'
INC	5.2°
AZM	43.3°
TVD	4106.65'

50

60

70

80 ⊕ 283u

90

4200 | 40 API 250 | 0 UNITS 1000

0 FT/HR 2000 | 0 PPM 100000

122

10

20

30 366u

40

MD	4217'
INC	5.5°
AZM	26.6°
TVD	4201.24'

SLTYSH: ltgy-gy, sbplty-sbblky, v sft,
gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri,
vfgr, psrt, wrndd, abnt cly, arg cmt, sl
calc

50

60

70

⊕ 335u

80

90

4300

463u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

135

10

MD	4312'
INC	3.1°
AZM	9.7°
TVD	4295.97'

20 221u

30

40

SLTYSH: ltgy-gy, sbplty-sbblky, v sft,
gt-slty tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri,
vfgr, psrt, wrndd, abnt cly, arg cmt, sl
calc

50

Log depth track labels and annotations:

- 0 T/HR 2000
- 60
- 70 ⊙ 480u
- 80
- 90
- 4400 40 API250 0 UNITS 1000
- 0 PPM 100000
- 99
- 10
- 311u
- 20
- 30
- 40
- 50
- 60
- ⊙ 537u
- 70
- 80
- 90
- 4500
- 156u
- C1: 99.6%
- C2: 0.0%
- C3: 0.4%
- C4: 0.0%
- 143u
- 131
- 10
- 20
- 30
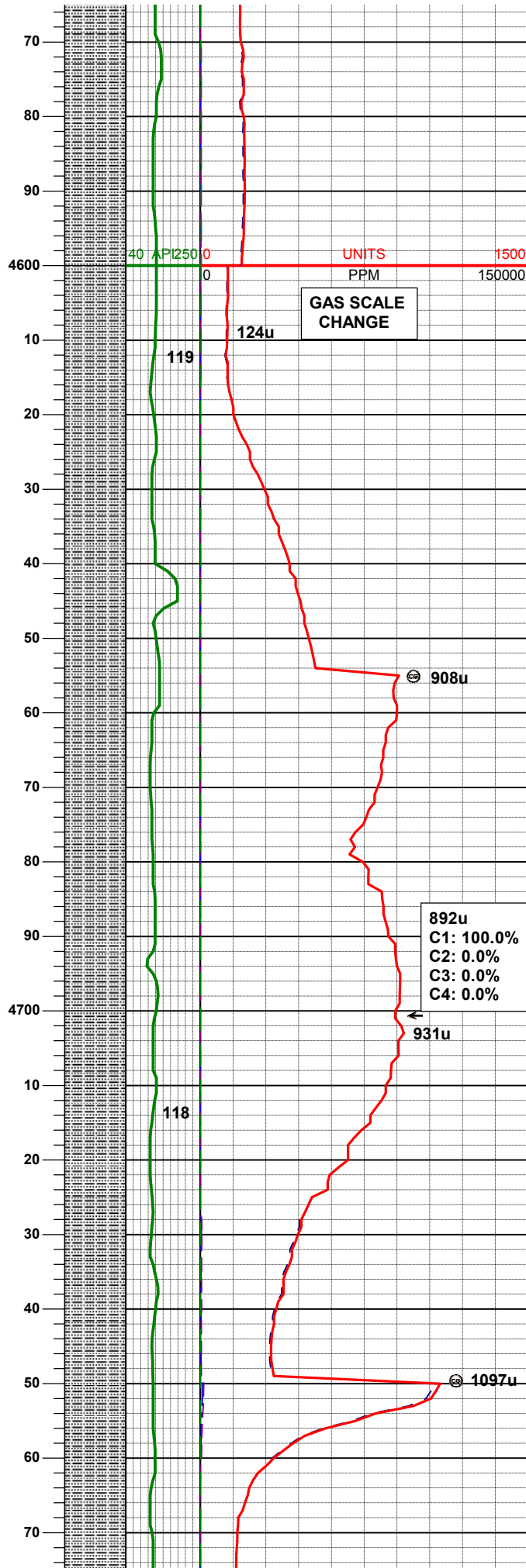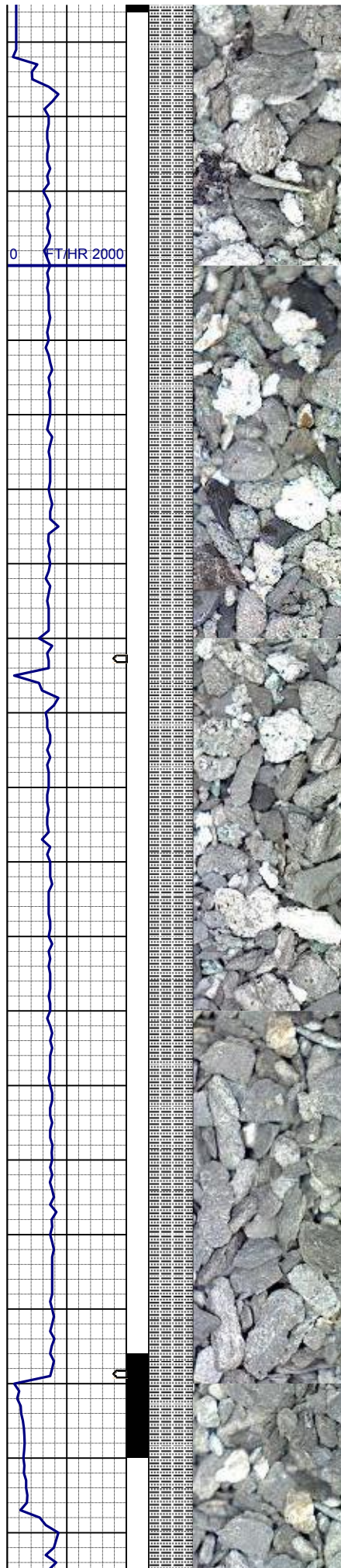- 40
- 50
- 123u
- 60

calc

MD   4407'
INC   1.8°
AZM   1.8°
TVD 4390.88'

WT IN 8.80/ OUT8.80
VIS IN 32/ OUT 32

SLTYSH: ltgy-gy, sbplty-sbblky, v sft,
gt-slty tex, arg cmt

MD   4501'
INC   1.8°
AZM   330.1°
TVD 4484.84'

SLTYSH: ltgy-gy, sbplty-sbblky, v sft,
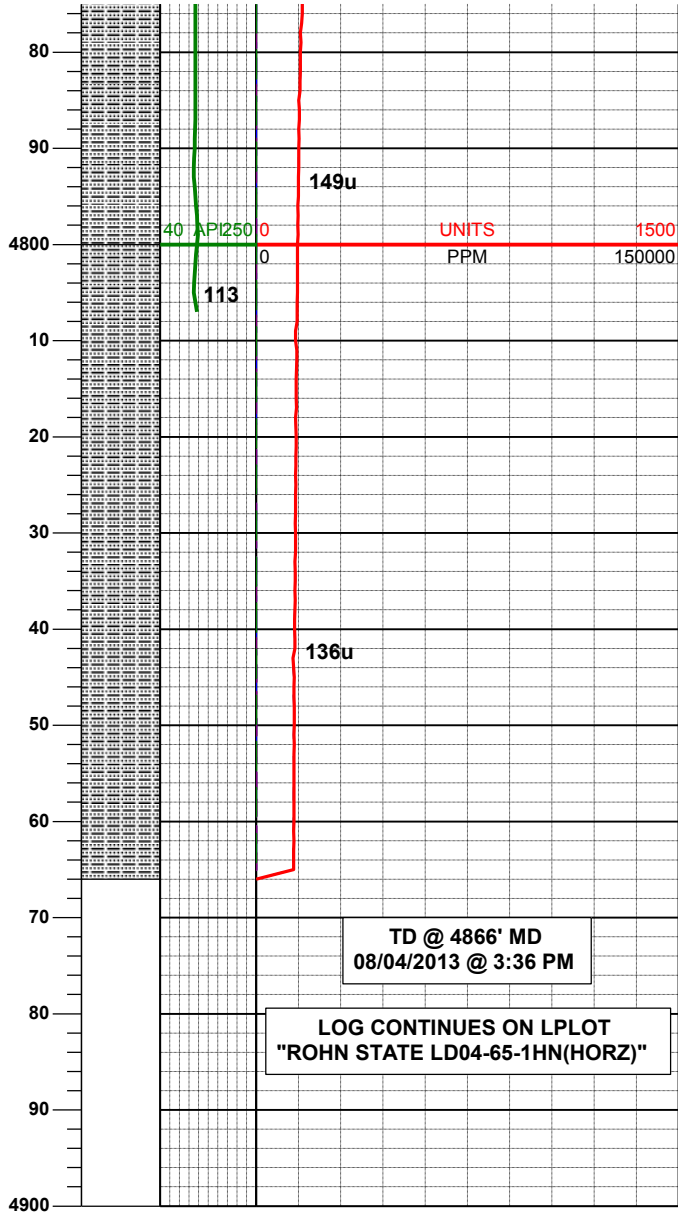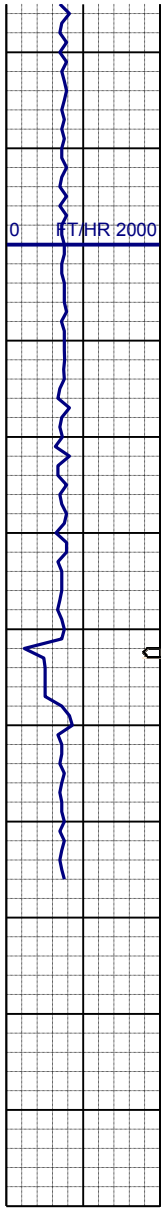gt-slty tex, arg cmt

Track 1 (ROP): 0 FT/HR 2000

Depth track values: 70, 80, 90, 4600, 10, 20, 30, 40, 50, 60, 70, 80, 90, 4700, 10, 20, 30, 40, 50, 60, 70

Gamma Ray: 40 API 250

Gas: 0 UNITS 1500
0 PPM 150000

GAS SCALE CHANGE

124u

119

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt

908u

892u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

931u

118

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt

1097u

MD	4596'
INC	1.0°
AZM	39.9°
TVD	4579.81'

MD	4691'
INC	2.1°
AZM	45.4°
TVD	4674.78'

0 FT/HR 2000

80

90

4800

10

20

30

40

50

60

70

80

90

4900

40 API 250

113

0 UNITS 1500
0 PPM 150000

149u

136u

SLTYSH: ltgy-gy, sbplty-sbblky, v sft, gt-slty tex, arg cmt

TD @ 4866' MD
08/04/2013 @ 3:36 PM

LOG CONTINUES ON LPLOT
"ROHN STATE LD04-65-1HN(HORZ)"