Lplot VH

pason

LOG created using LPLOT VH Version 3.0, July 16, 2013, Copyright (C) 1999-2009 Pason Systems Corp.

OPERATOR:	**NOBLE ENERGY INC**
WELL:	**ROHN STATE LD04-66HN**
LOCATION:	**SEC 4T9N R58W**
COUNTY:	**WELD**
STATE:	**COLORADO**
SPOT:	**1787' FNL, 480' FEL**
ELEVATION:	**4706' GL; 4730' KB**
FIELD:	**WILDCAT**
SPUD DATE:	**07/11/2013**
TD DATE:	**07/1/013**
DATES LOGGED:	**07/11/2013 - 07/12/2013**
DEPTHS LOGGED:	**1200' - 4931' MD**
LOGGERS:	**LAURA KELLOGG; CONOR PESICKA**
DRILLING FLUID:	**LSND**
DRILLING RIG:	**H&P 273**
API:	**05-123-37481**
LOG TYPE:	**VERTICAL**
SCALE:	**1:240 (5 inches per 100 feet)**
REMARKS:	**WELLSITE GEOLOGICAL SERVICES PROVIDED BY COLUMBINE LOGGING INC.**

LITHOLOGIES
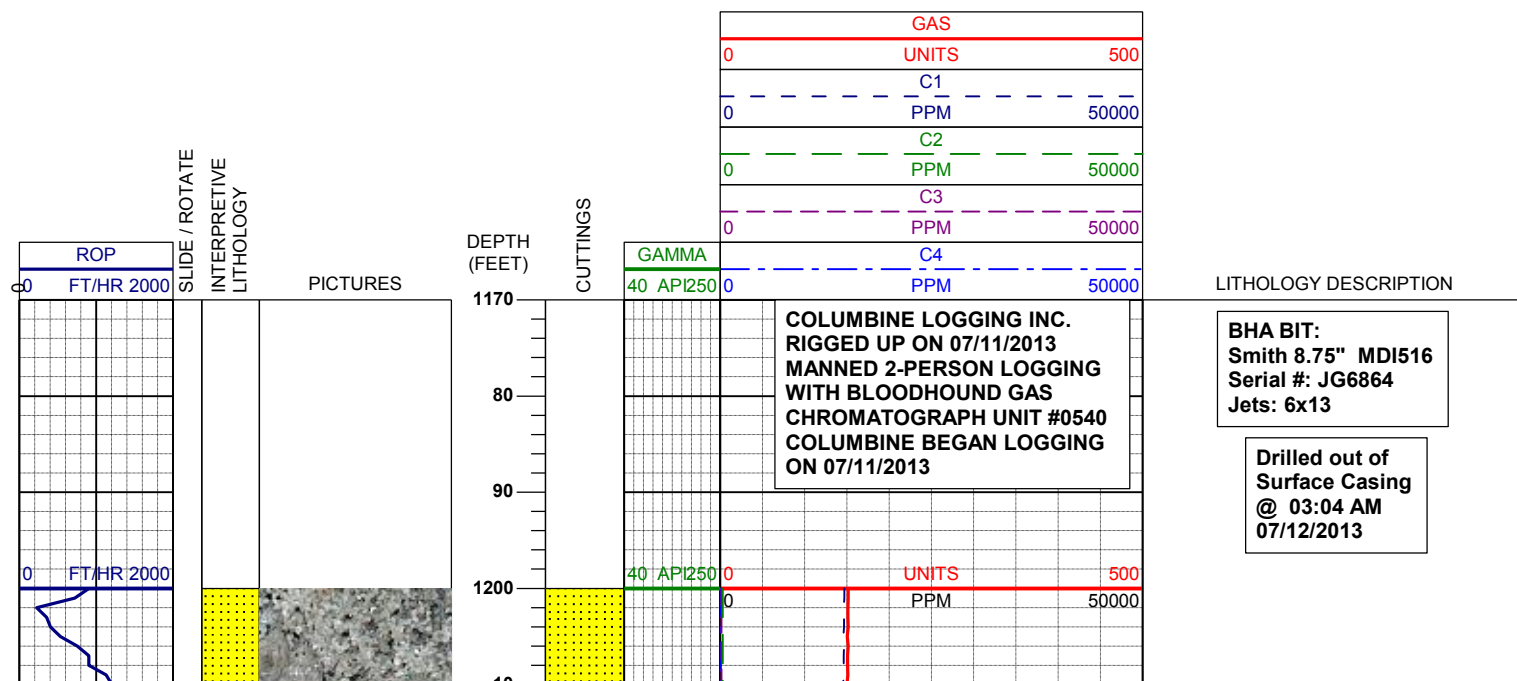
Sandstone   Shaly Sandstone   Silty Shale

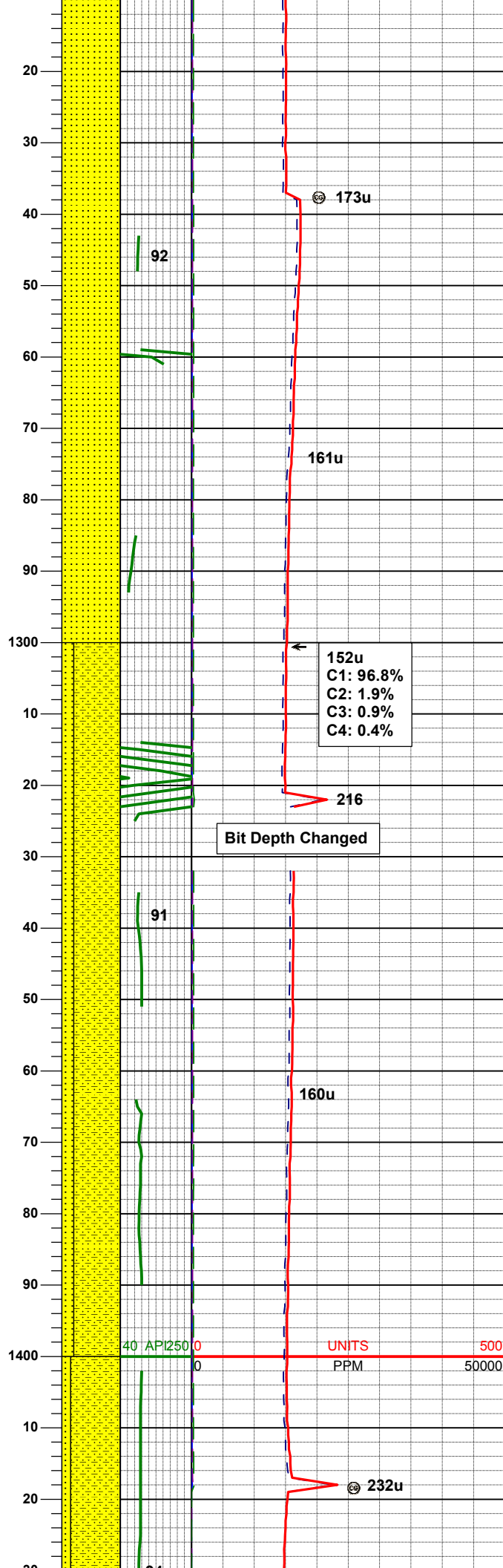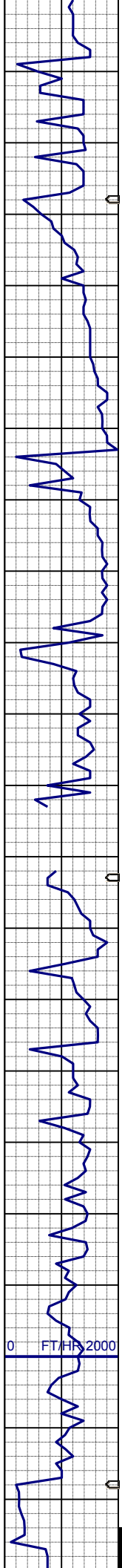## ENGINEERING SYMBOLS

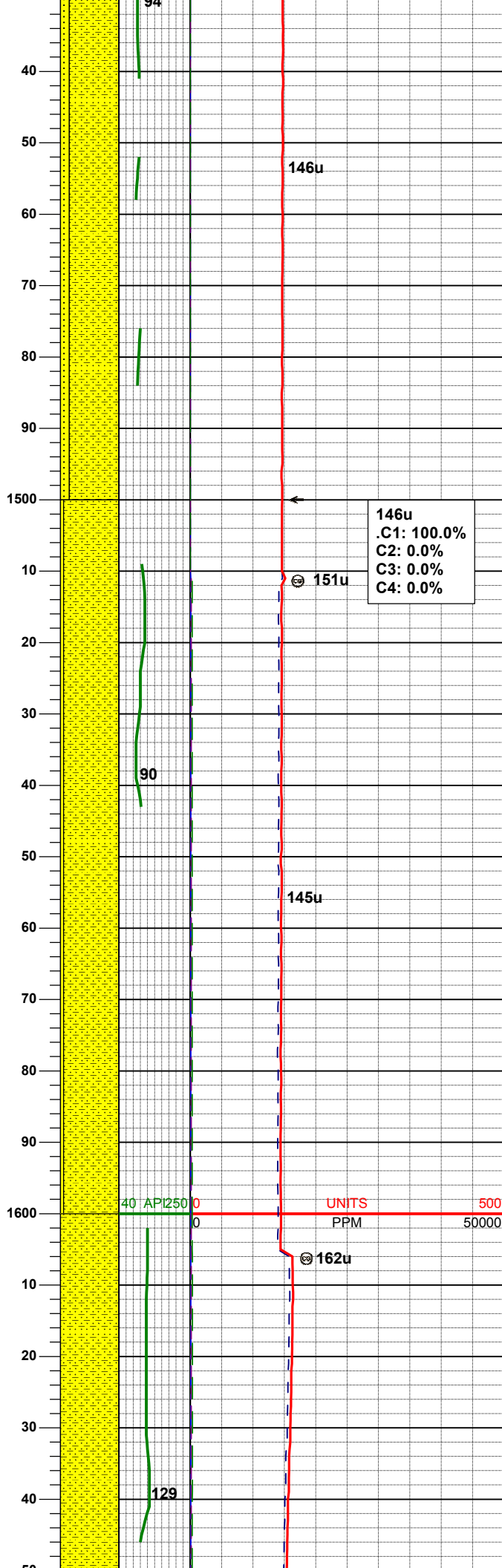Connection   Connection Gas   Arrow

ROP	SLIDE / ROTATE	INTERPRETIVE LITHOLOGY	PICTURES	DEPTH (FEET)	CUTTINGS	GAMMA	GAS	C1	C2	C3	C4	LITHOLOGY DESCRIPTION
0 FT/HR 2000						40 API 250	0 UNITS 500	0 PPM 50000	0 PPM 50000	0 PPM 50000	0 PPM 50000	

1170

COLUMBINE LOGGING INC. RIGGED UP ON 07/11/2013 MANNED 2-PERSON LOGGING WITH BLOODHOUND GAS CHROMATOGRAPH UNIT #0540 COLUMBINE BEGAN LOGGING ON 07/11/2013

BHA BIT:
Smith 8.75" MDI516
Serial #: JG6864
Jets: 6x13

80

90

Drilled out of Surface Casing @ 03:04 AM 07/12/2013

1200

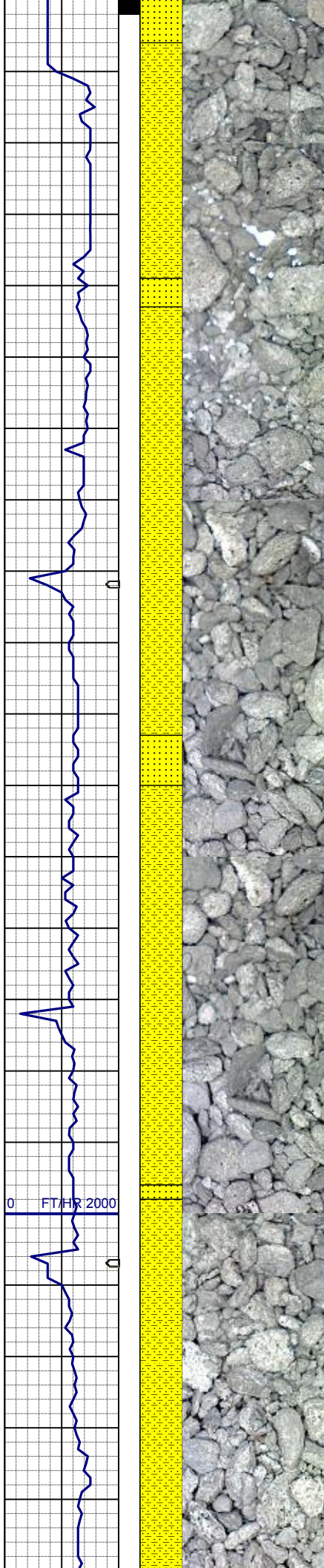| 0 FT/HR 2000 | | | | 1200 | | 40 API 250 | 0 UNITS 500 | 0 PPM 50000 | | | | |

SS: wh-ltgy-trnsl, sbang, fgr, psrt, wrndd, uncons, arg cmt, occ glau, tr lit frag

173u

92

161u

MD   1281'
INC   1.0°
AZM   354.0°
TVD 1280.93'

152u
C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%

216

Bit Depth Changed

91

SHYSS: ltgy-gy, s&p ip, sbang, vfgr, p ind, psrt, wrndd, arg cmt, tr glau
SS: wh-ltgy-trnsl, sbang-ang, fgr, psrt, wrndd, hi por, arg cmt, occ glau, tr lit frag

160u

0   FT/HR 2000

40 API 250 0   UNITS   500
0   PPM   50000

232u

WT IN 8.50/ OUT 8.50
VIS IN 26/ OUT 26

SHYSS: ltgy-gy, s&p ip, sbang, vfgr, p ind, psrt, wrndd, arg cmt, tr glau
SS: s&p ip, wh-ltgy-trnsl, sbang-ang, fgr, psrt, wrndd, hi por, arg cmt, occ glau, tr lit frag

146u

94

40

50

60

70

80

90

1500

10

20

30

90

40

50

145u

60

70

80

90

1600

40 API250 0   UNITS   500
              0   PPM   50000

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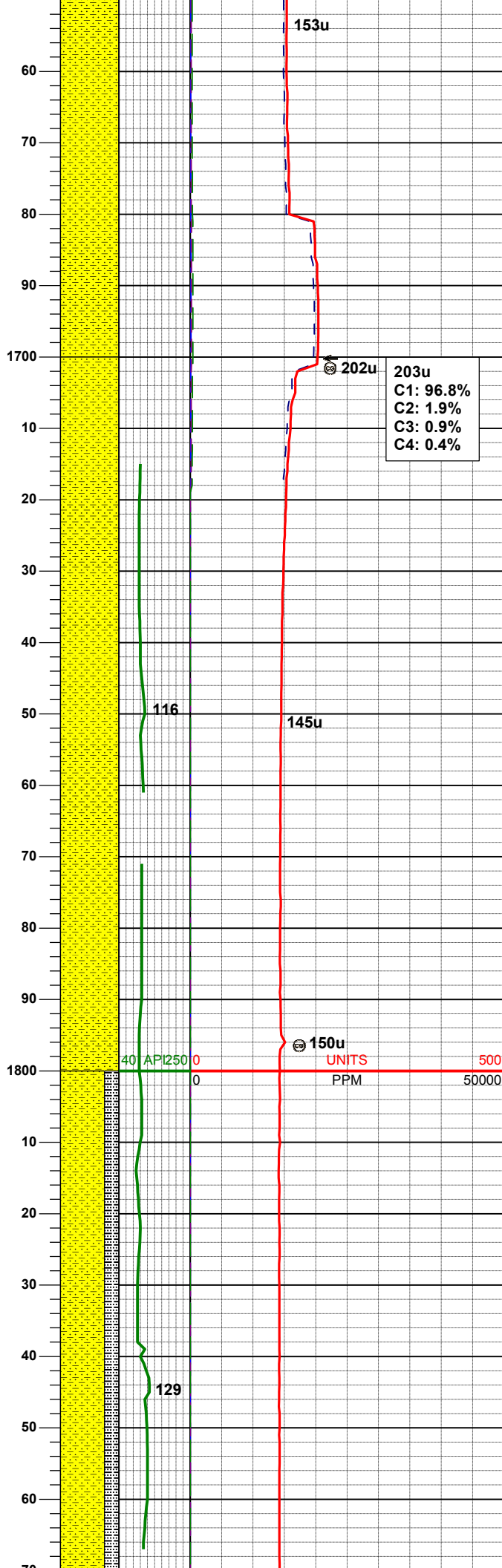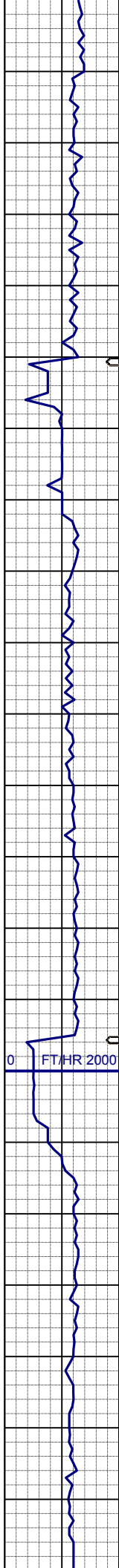.C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

⊚ 151u

SHYSS: ltgy-gy, s&p ip, sbang, vfgr, p ind, psrt, wrndd, arg cmt, tr glau
SS: s&p ip, wh-ltgy-trnsl, sbang-ang, fgr, psrt, wrndd, hi por, arg cmt, tr glau, tr lit frag

MD	1562'
INC	0.8°
AZM	170.8°
TVD	1561.92'

⊚162u

10

20

129

30

40

SHYSS: ltgy-gy, s&p ip, sbang, vfgr, p ind, psrt, wrndd, arg cmt, tr glau, tr lit

0   FT/HR 2000

153u

60

70

80

90

1700

202u | 203u
C1: 96.8%
C2: 1.9%
C3: 0.9%
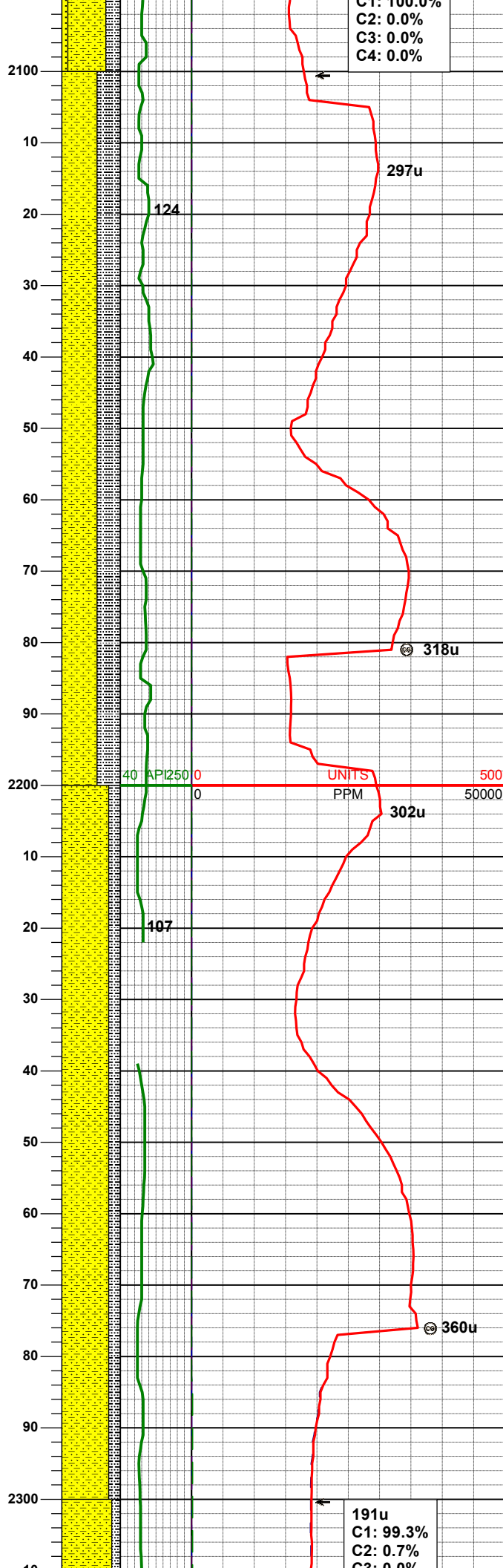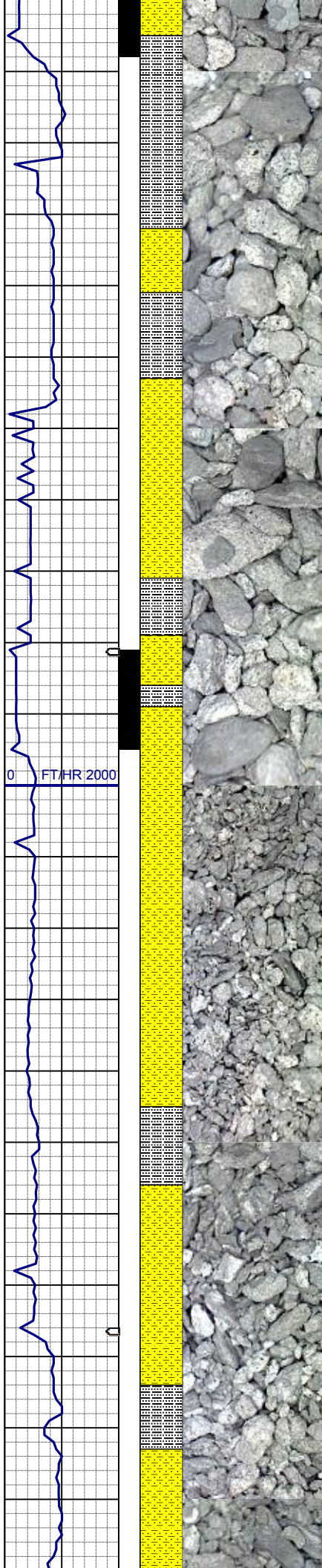**C4: 0.4%**

10

20

30

40

MD	1752'
INC	1.3°
AZM	148.3°
TVD	1751.89'

SHYSS: ltgy-gy, s&p ip, sbang, vfgr, p ind, psrt, wrndd, arg cmt, tr glau. tr lit frag

116 | 145u

50

60

70

80

90

150u

| 0 | FT/HR | 2000 |

| 40 | API | 250 | 0 | | UNITS | | 500 |
| | | | 0 | | PPM | | 50000 |

WT IN 8.50/ OUT 8.50
VIS IN 26/ OUT 26

1800

10

20

30

40

MD	1847'
INC	1.3°
AZM	139.4°
TVD	1846.87'

129

50

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

60

291u

140u
C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%

1900

103

276u

427u

40 API 250	0	UNITS	500
	0	PPM	50000

0 FT/HR 2000

2000

107

165u

182u

179u

MD 1941'
INC 2.8°
AZM 123.9°
TVD 1940.80'

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

MD 2036'
INC 4.0°
AZM 126.2°
TVD 2035.64'

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

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

2100

10

297u

20   124

30

MD	2131'
INC	5.2°
AZM	133.6°
TVD	2130.33'

40

50

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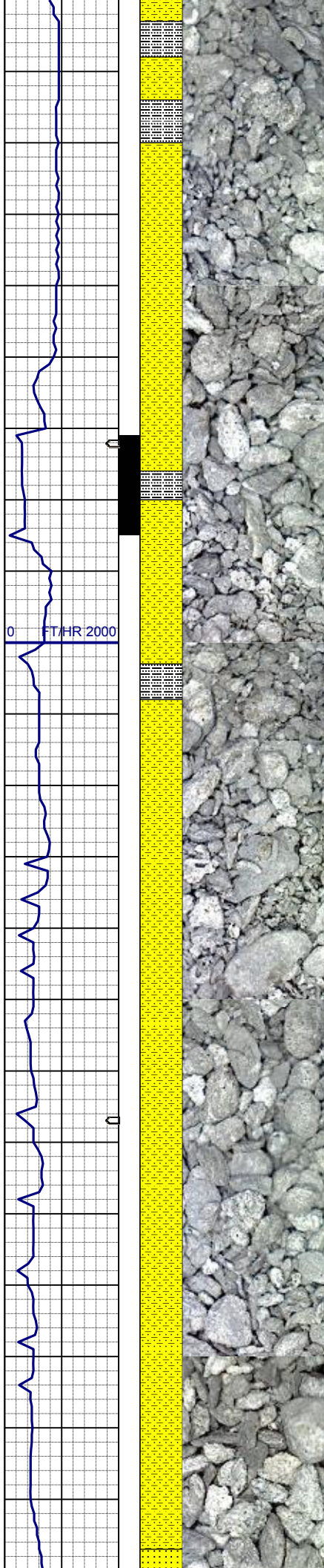SLTYSH: ltgy-gy, sbblky-sbplty, sft, gt -sdy tex, arg cmt

60

70

80   318u

90

0 FT/HR 2000   40 API250 0   UNITS   500   **WT IN 8.40/ OUT 8.40**
2200   0   PPM   50000   **VIS IN 28/ OUT 28**

302u

10

20   107

MD	2226'
INC	6.5°
AZM	141.3°
TVD	2224.83'

30

40

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

50

60

70

360u

80

90

2300

191u
C1: 99.3%
C2: 0.7%
C3: 0.0%
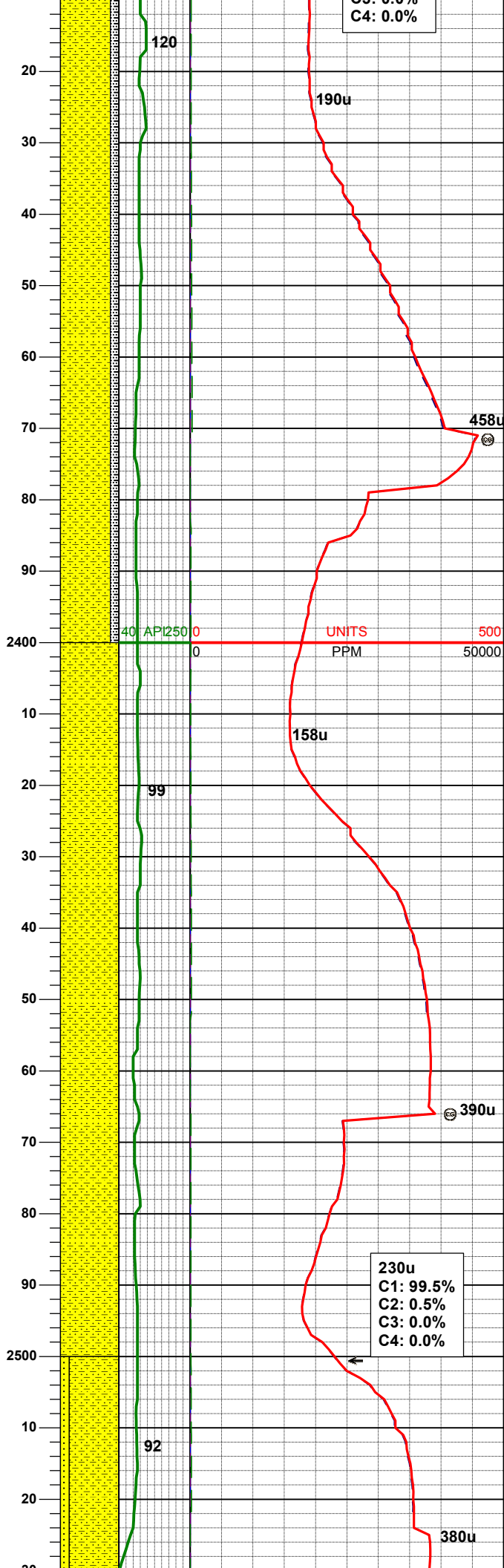
MD 2321'
INC 5.6°
AZM 143.1°
TVD 2319.30'

C4: 0.0%

120
20
190u
30
40

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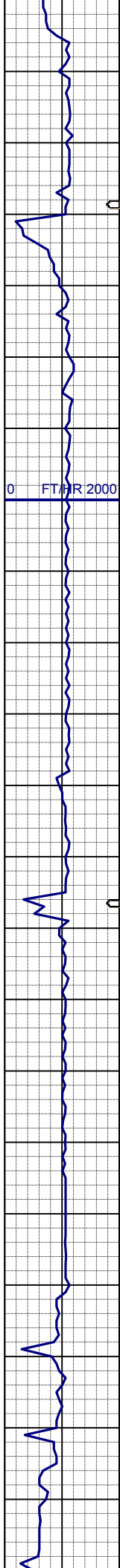SLTYSH: ltgy-gy, sbblky-sbplty, sft, gt -sdy tex, arg cmt

50
60
70
458u
80
90

0 FT/HR 2000
40 API 250 0 UNITS 500
0 PPM 50000

2400
10
158u
20
99
30
40

MD 2416'
INC 7.0°
AZM 150.4°
TVD 2413.73'

50

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc

60
390u
70
80
90

230u
C1: 99.5%
C2: 0.5%
C3: 0.0%
C4: 0.0%

2500
10
92
20

MD 2510'
INC 7.5°
AZM 151.3°
TVD 2506.98'
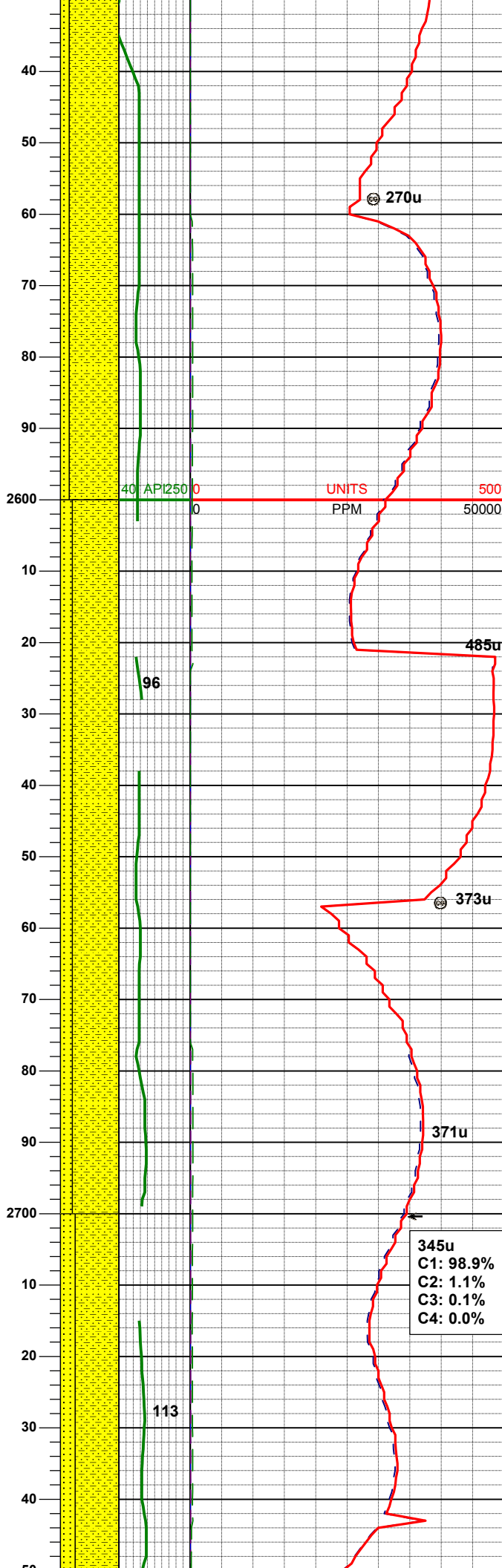
380u

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, tr glau

270u

485u

96

373u

371u

WT IN 8.40/ OUT 8.40
VIS IN 28/ OUT 28
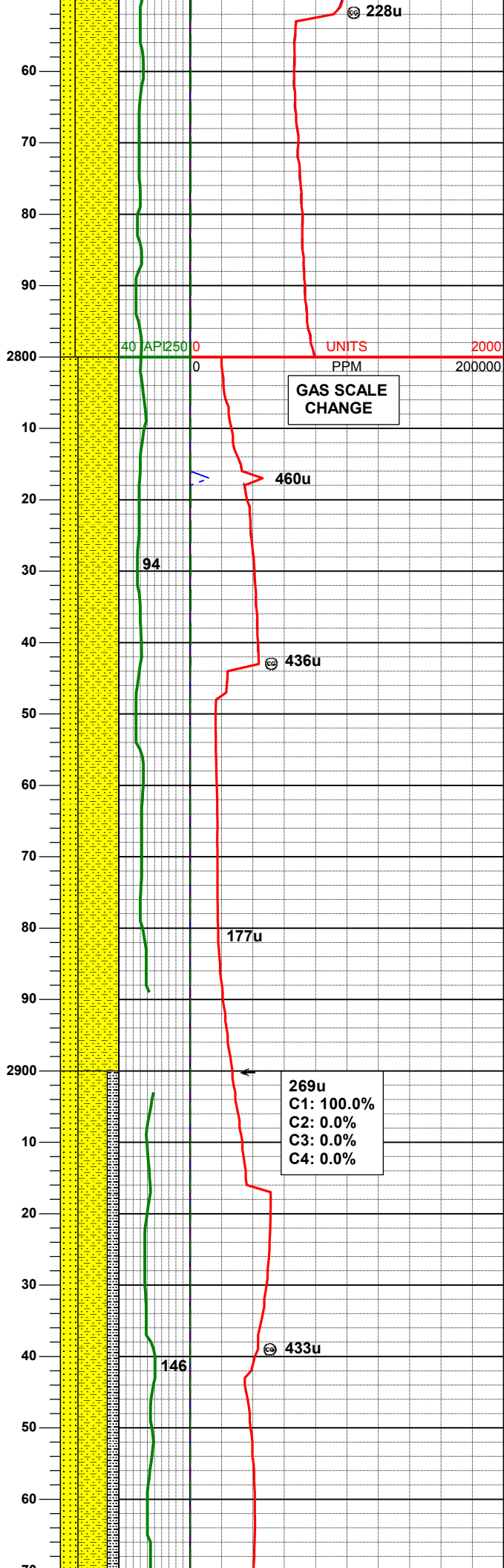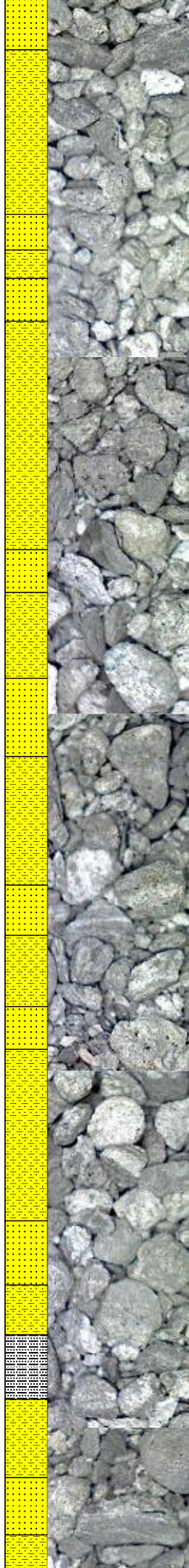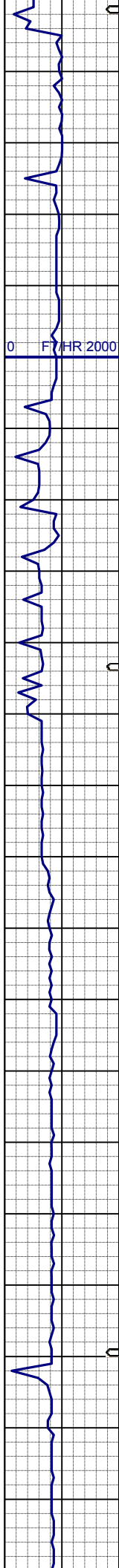
MD	2605
INC	7.6°
AZM	151.2°
TVD	2601.15'

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, tr glau

MD	2700'
INC	7.3°
AZM	149.6°
TVD	2695.35'

345u
C1: 98.9%
C2: 1.1%
C3: 0.1%
C4: 0.0%

113

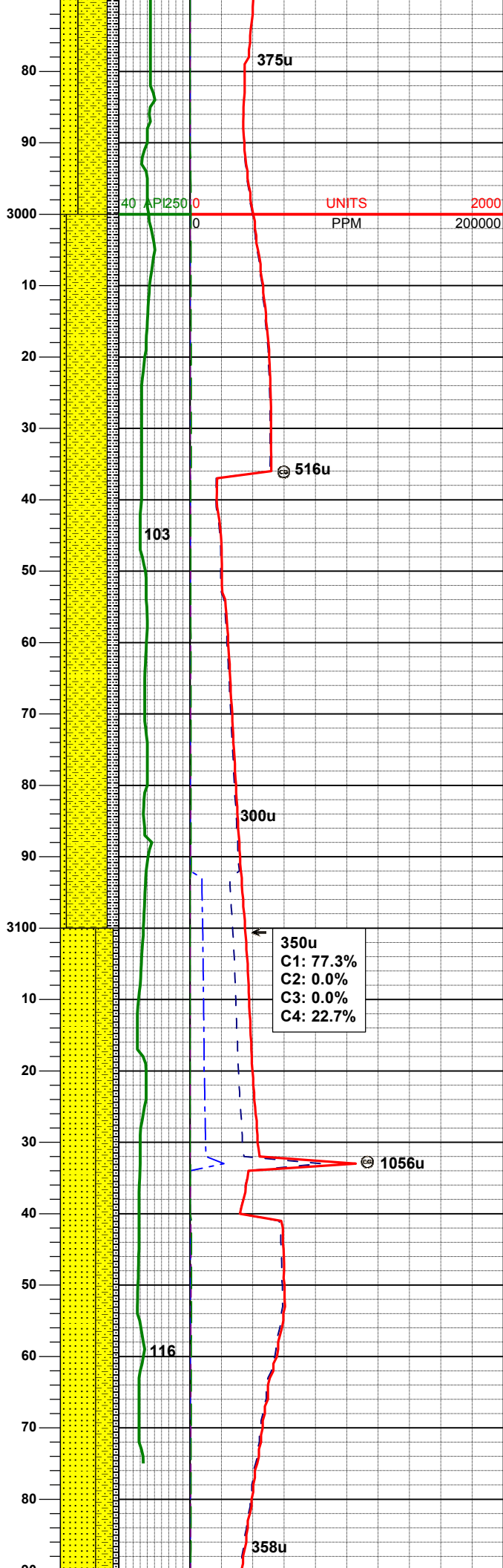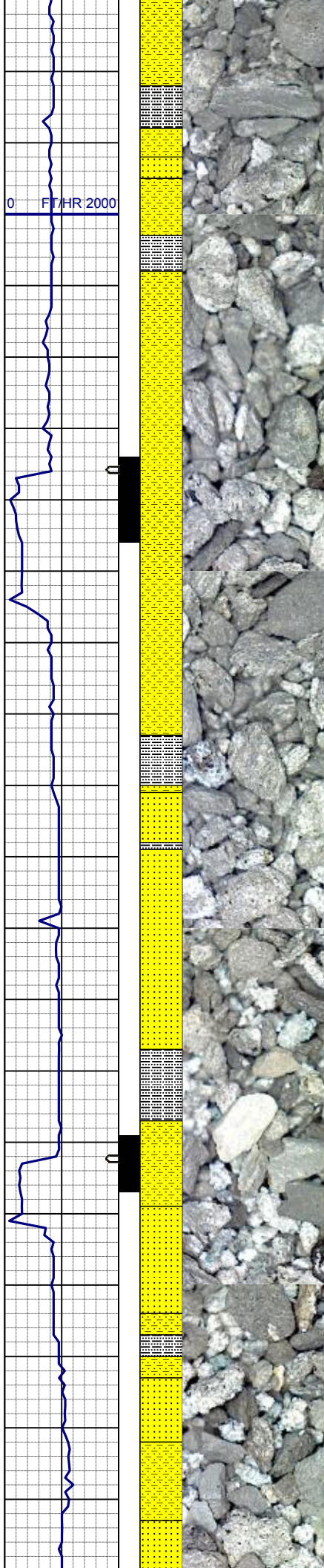SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, arg cmt, sl calc

0 FT/HR 2000

40 API 250

0 UNITS 500

0 PPM 50000

This is a mud log / well log display with the following readable text:

Left track (ROP):
- 0 FT/HR 2000

Depth scale (center):
60, 70, 80, 90, 2800, 10, 20, 30, 40, 50, 60, 70, 80, 90, 2900, 10, 20, 30, 40, 50, 60

Gamma ray / Gas tracks scales:
- 40 API 250
- 0 UNITS 2000
- 0 PPM 200000

Gas readings / annotations:
- ⊙ 228u
- 460u
- 94
- ⊙ 436u
- 177u
- 269u
  C1: 100.0%
  C2: 0.0%
  C3: 0.0%
  C4: 0.0%
- ⊙ 433u
- 146

GAS SCALE CHANGE

Directional survey boxes:

MD	2795'
INC	6.2°
AZM	148.2°
TVD	2789.69'

MD	2890'
INC	6.0°
AZM	144.6°
TVD	2884.15'

Lithology descriptions (right margin):

calc
SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, tr lit frag, tr glau

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, occ glau

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, occ glau
SLTYSH: ltgy-gy, sbblky-sbplty, sft, gt-sdy tex, arg cmt

Depth track (feet):
80, 90, 3000, 10, 20, 30, 40, 50, 60, 70, 80, 90, 3100, 10, 20, 30, 40, 50, 60, 70, 80

Rate of penetration track:
0 FT/HR 2000

Gas / gamma ray track:
40 API 250
0 UNITS 2000
0 PPM 200000

Curve annotations:
- 375u
- 516u
- 103
- 300u
- 350u
  - C1: 77.3%
  - C2: 0.0%
  - C3: 0.0%
  - C4: 22.7%
- 1056u
- 116
- 358u

Survey boxes:

MD	2984'
INC	5.2°
AZM	139.0°
TVD	2977.71'

WT IN 8.40/ OUT 8.40
VIS IN 28/ OUT 28

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

MD	3079'
INC	6.2°
AZM	147.3°
TVD	3072.24'

SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, tr 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, sbblky-sbplty, sft, gt-sdy tex, arg cmt

MD	3174'
INC	7.7°
AZM	147.3°
TVD	3166.54'

Track headers:
- 0 FT/HR 2000
- 40 API 250 0 UNITS 2000
- 0 PPM 200000

Depth marks: 3200, 10, 20, 30, 40, 50, 60, 70, 80, 90, 3300, 10, 20, 30, 40, 50, 60, 70, 80, 90, 3400

Annotations:
- ⊕ 745u
- 73
- 753u
- 418u
  C1: 100.0%
  C2: 0.0%
  C3: 0.0%
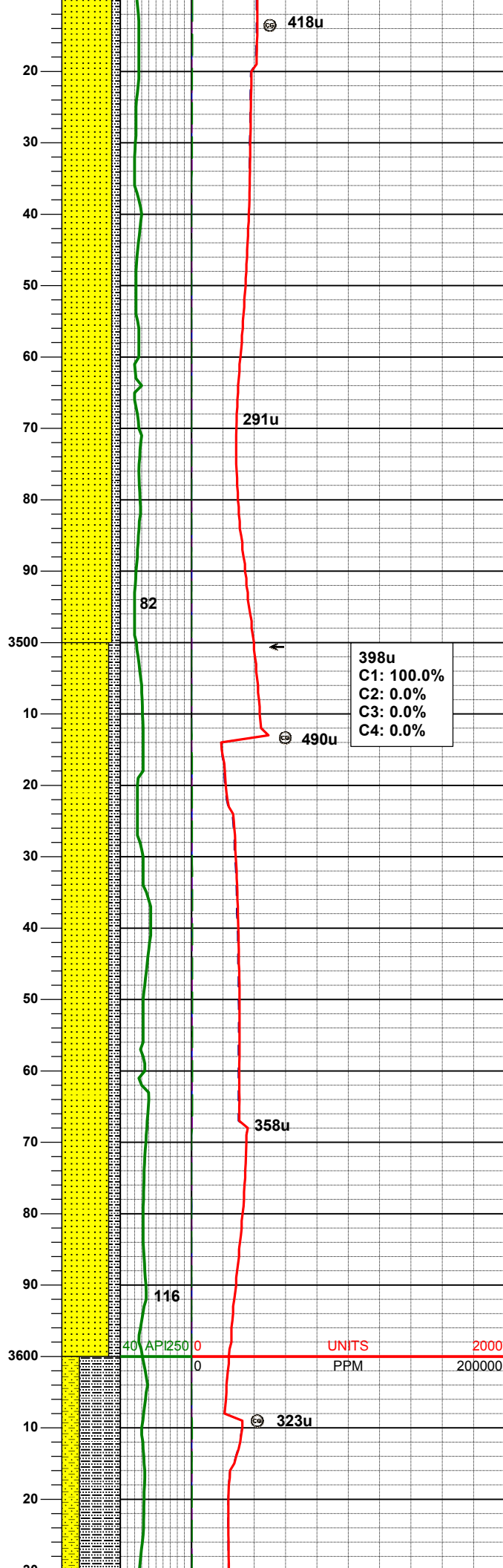 C4: 0.0%
- ⊕ 619u
- 465u
- 91

SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, tr lit frag, abnt glau
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc

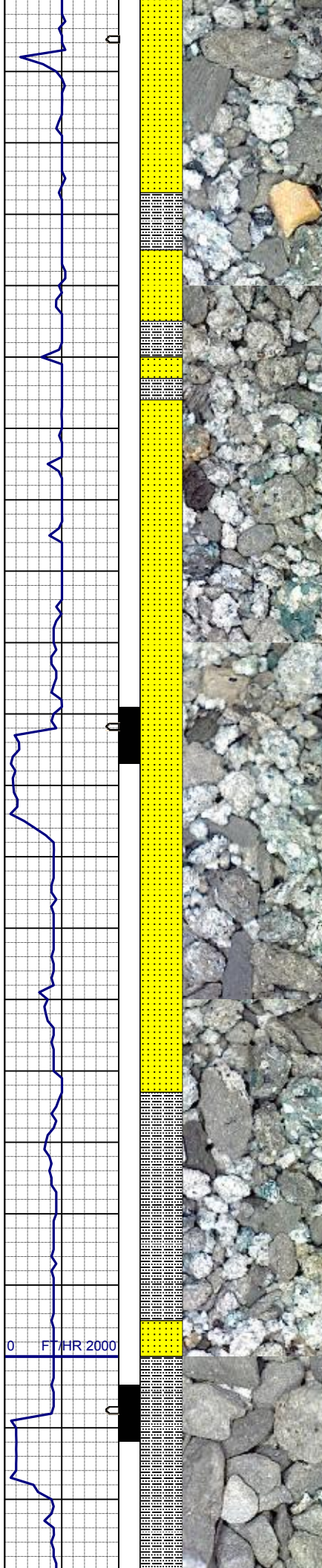| MD	3269'
INC	8.0°
AZM	148.7°
TVD	3260.65'

SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, tr 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, sbblky-sbplty, sft, gt-sdy tex, arg cmt

MD	3364'
INC	8.4°
AZM	148.2°
TVD	3354.67'

0 FT/HR 2000

40 API 250 0 UNITS 2000
0 PPM 200000

418u

291u

82

398u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

490u

358u

116

323u

SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, tr lit frag, abnt glau
SLTYSH: ltgy-gy, sbblky-sbplty, sft, gt -sdy tex, arg cmt

MD	3459'
INC	9.5°
AZM	148.3°
TVD	3448.52'

WT IN 8.50/ OUT 8.50
VIS IN 28/ OUT 28

SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, tr lit frag, abnt glau
SLTYSH: ltgy-gy, sbblky-sbplty, sft, gt -sdy tex, arg cmt
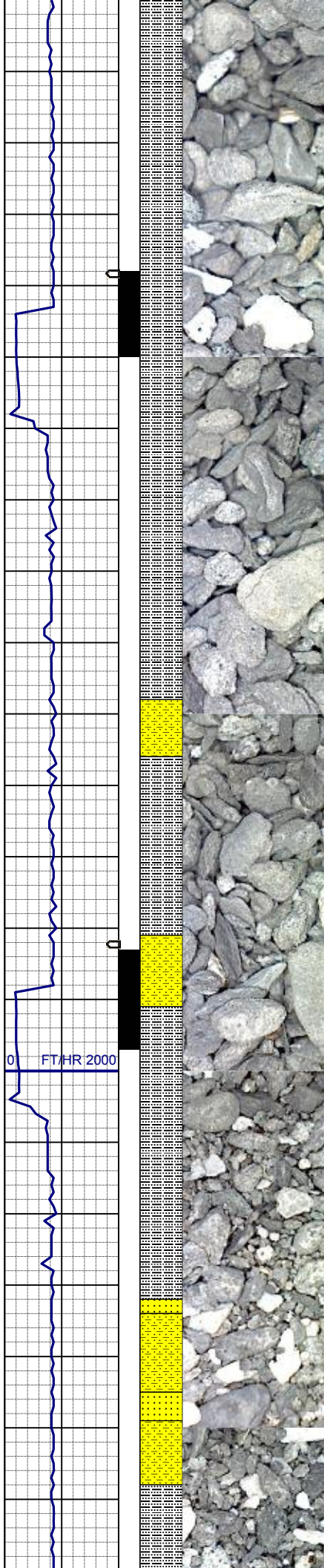
MD	3554'
INC	9.4°
AZM	141.0°
TVD	3542.20'

WT IN 8.40/ OUT 8.40
VIS IN 28/ OUT 28

0   FT/HR   2000

40   API   250

0   UNITS   2000

0   PPM   200000

40

50

60

70

314u

80

90

3700

112

215u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

349u

10

20

30

40

50

203u

60

70

80

90

103

40 API 250 | 0

527u UNITS 2000

0 PPM 200000

3800

10

20

30

230u

40

MD	3649'
INC	8.2°
AZM	147.1°
TVD	3636.08'

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

MD	3743'
INC	7.9°
AZM	148.2°
TVD	3729.16'

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

WT IN 8.40/ OUT 8.50
VIS IN 28/ OUT 28

MD	3838'
INC	6.3°
AZM	135.2°
TVD	3823.43'

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

0 FT/HR 2000

-sdy tex, arg cmt

60

70

80

⊚ **500u**

90

3900

116

← **312u**
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

10

20

MD	3933'
INC	5.3°
AZM	121.1°
TVD	3917.95'

30

337u

40

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

50

60

70

80

⊚ **576u**

90

99

40	API	250	0	UNITS	2000

0   PPM   200000

4000

10

20

MD	4028'
INC	4.6°
AZM	97.4°
TVD	4012.61'

30

295u

40

SLTYSH: ltgy-gy, sbblky-sbplty, sft, gt
-sdy 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,
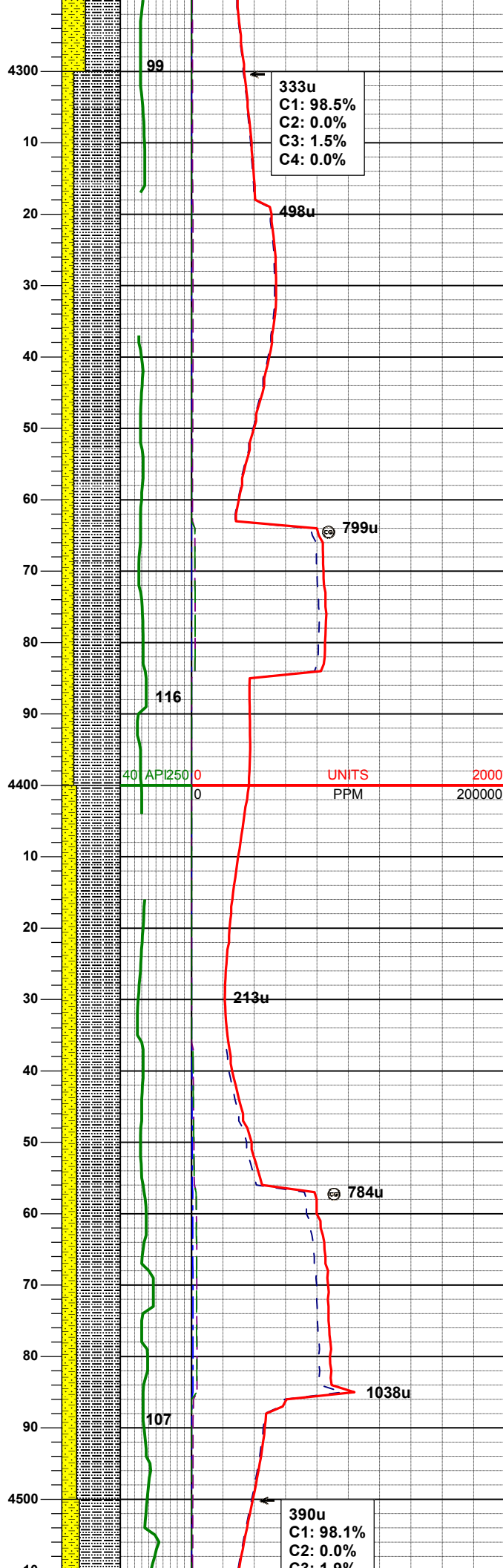wrndd, arg cmt, tr lit frag, abnt glau

50

60

0   FT/HR   2000

844u

112

4100

378u
C1: 95.0%
C2: 2.5%
C3: 2.0%
C4: 0.5%

10

20

365u

30

40
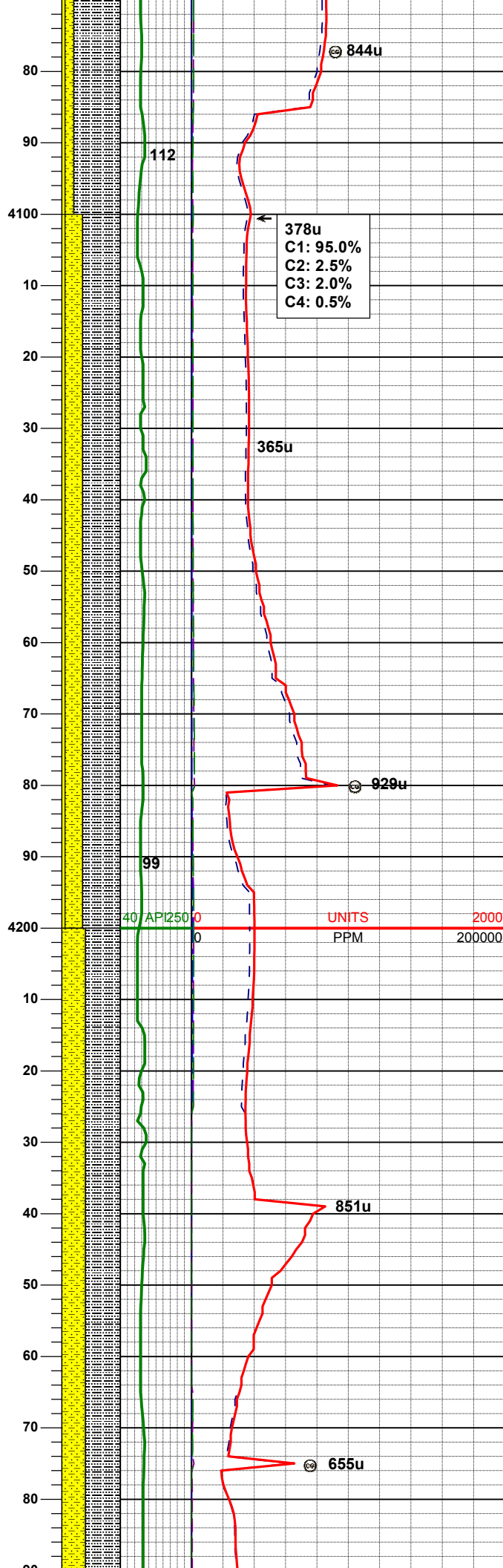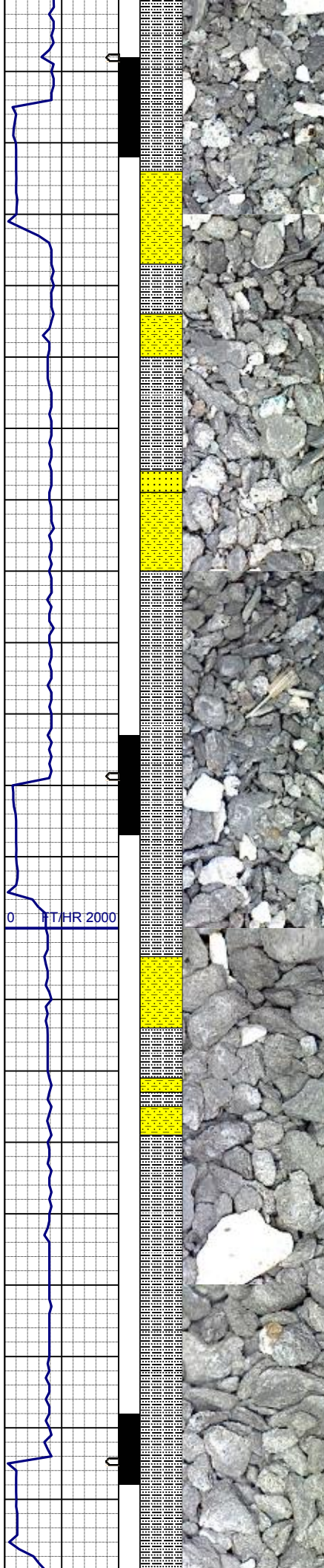
MD	4123'
INC	2.7°
AZM	86.5°
TVD	4107.41'

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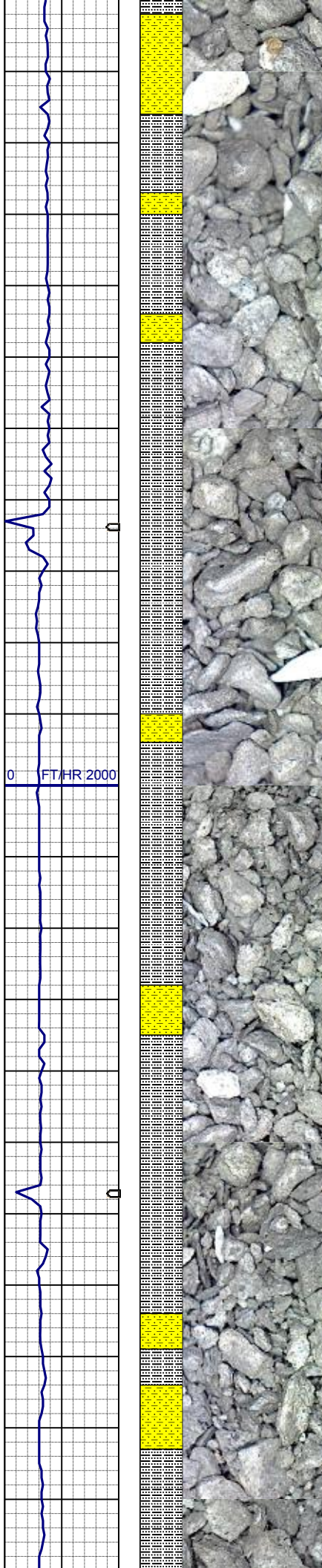SS: ltgy-gy-trnsl, sbang-ang, fgr, psrt, wrndd, arg cmt, tr lit frag, abnt glau

50

60

70

929u

80

WT IN 8.40/ OUT 8.40
VIS IN 28/ OUT 28

90

99

0   FT/HR 2000

4200

40 API 250   0   UNITS   2000
        0   PPM   200000

10

MD	4218'
INC	1.3°
AZM	63.1°
TVD	4202.35'

20

30

40

851u

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

50

60

70

655u

80

Depth track (left, ft):
4300, 10, 20, 30, 40, 50, 60, 70, 80, 90, 4400, 10, 20, 30, 40, 50, 60, 70, 80, 90, 4500

ROP track scale: 0 FT/HR 2000

Gamma Ray / Gas scale: 40 API 250 | 0 UNITS 2000 | 0 PPM 200000

Gas readings and annotations:

99

333u
C1: 98.5%
C2: 0.0%
C3: 1.5%
C4: 0.0%

498u

799u

116

213u

784u

1038u

107

390u
C1: 98.1%
C2: 0.0%
C3: 1.9%

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

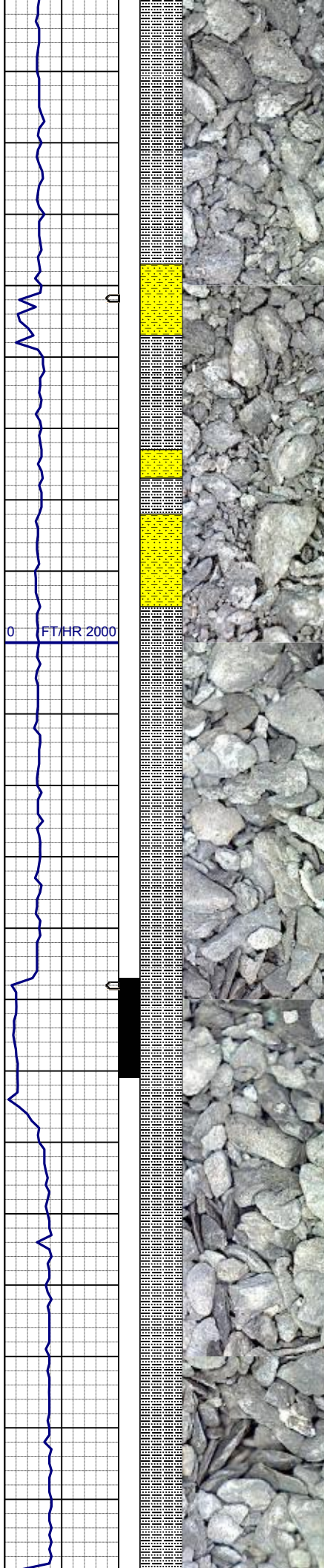SLTYSH: ltgy-gy, sbblky-sbplty, sft, gt-sdy tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc

MD	4312'
INC	0.1°
AZM	343.6°
TVD	4296.34'

MD	4407'
INC	1.1°
AZM	252.8°
TVD	4391.34'

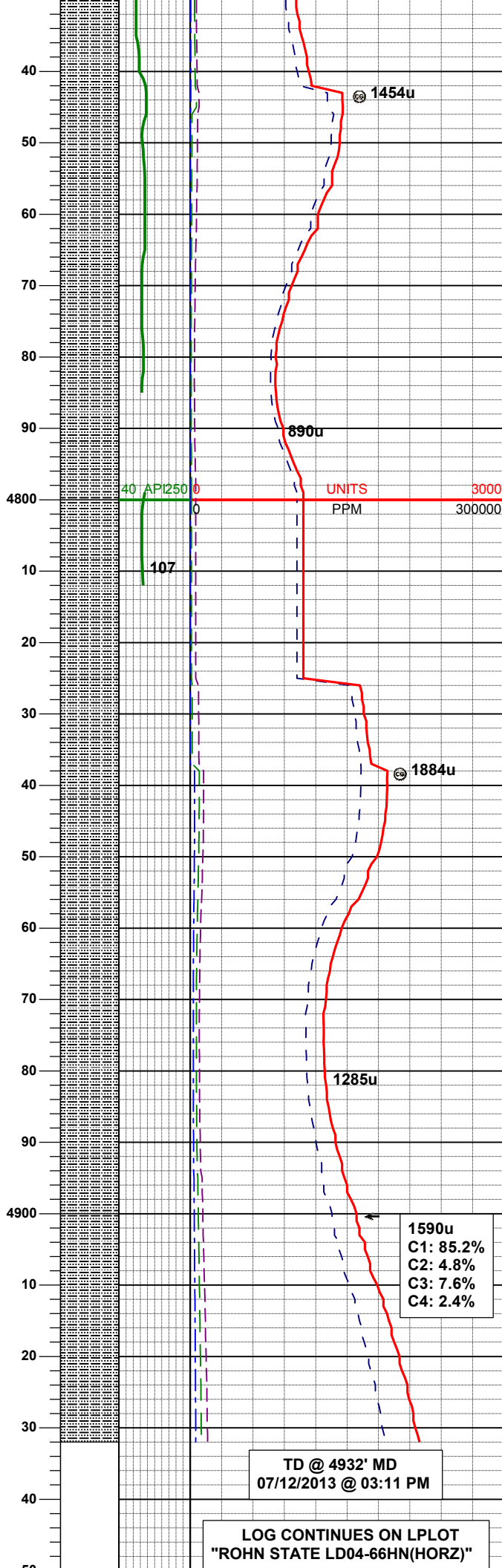| MD	4502'
INC	2.2°
AZM	243.1°
TVD	4486.30'
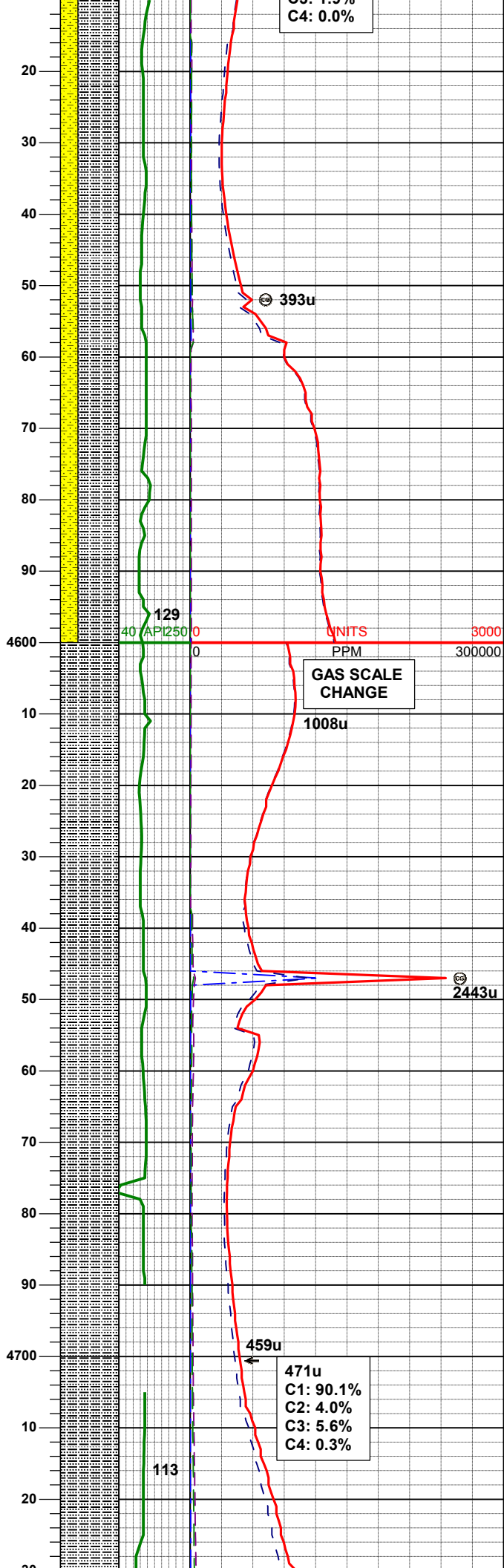
C4: 0.0%

20

30

40
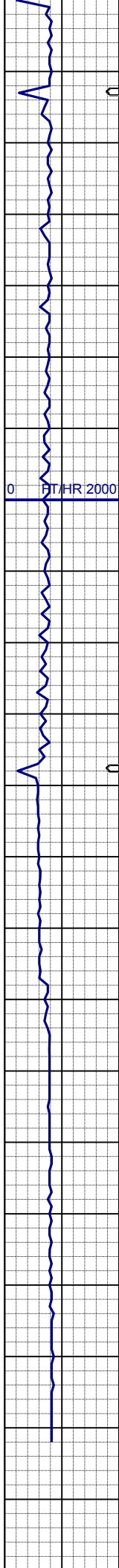
SLTYSH: ltgy-gy, sbblky-sbplty, sft, gt-sdy tex, arg cmt
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, psrt, wrndd, abnt cly, arg cmt, sl calc

50 ⊕ 393u

60

70

80

90

0 FT/HR 2000

129

40 API 250 0 UNITS 3000

4600 0 PPM 300000

MD   4597'
INC   1.8°
AZM   234.5°
TVD   4581.24'

GAS SCALE CHANGE

10 1008u

20

30

40

⊕ 2443u   SLTYSH: ltgy-gy, sbblky-sbplty, sft, gt-sdy tex, arg cmt

50

60

70

80

90

MD   4691'
INC   0.4°
AZM   45.2°
TVD   4675.23'

4700 459u

471u
C1: 90.1%
C2: 4.0%
C3: 5.6%
C4: 0.3%

10

113

20

WT IN 8.80/ OUT 8.80
VIS IN 29/ OUT 29

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

1454u

890u

MD 4786'
INC 0.3°
AZM 27.4°
TVD 4770.22'

40 API 250 | 0 UNITS 3000
0 | PPM 300000

107

1884u

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

1285u

1590u
C1: 85.2%
C2: 4.8%
C3: 7.6%
C4: 2.4%

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

0 FT/HR 2000

TD @ 4932' MD
07/12/2013 @ 03:11 PM

LOG CONTINUES ON LPLOT
"ROHN STATE LD04-66HN(HORZ)"

60

70