OPERATOR:	**NOBLE ENERGY INC**
WELL:	**ROHN STATE LD09-63HN**
LOCATION:	**SESE SEC 9 T9N R58W**
COUNTY:	**WELD**
STATE:	**COLORADO**
SPOT:	**885' FSL; 480' FEL**
ELEVATION:	**4716' GL; 4740' KB**
FIELD:	**WILDCAT**
SPUD DATE:	**11/07/2013**
TD DATE:	**11/09/2013**
DATES LOGGED:	**11/08/2013 - 11/10/2013**
DEPTHS LOGGED:	**1256' - 4918' MD**
LOGGERS:	**LAURA KELLOGG; CONOR PESICKA**
DRILLING FLUID:	**LSND**
DRILLING RIG:	**H&P 273**
API:	**05-123-37543**
LOG TYPE:	**VERTICAL**
SCALE:	**1:240 (5 inches per 100 feet)**
REMARKS:	**WELLSITE GEOLOGIC SERVICES PROVIDED BY COLUMBINE LOGGING INC.**

LITHOLOGIES

Sandstone	Shaly Sandstone	Silty Shale

ENGINEERING SYMBOLS

Connection	Connection Gas	Arrow	Midnight Depth

ROP	SLIDE / ROTATE	INTERPRETIVE LITHOLOGY	PICTURES	DEPTH (FEET)	CUTTINGS	GAMMA	GAS / C1 / C2 / C3 / C4	LITHOLOGY DESCRIPTION

GAS
0 UNITS 500
C1
0 PPM 50000
C2
0 PPM 50000
C3
0 PPM 50000
C4
0 PPM 50000

ROP
0 FT/HR 2000

DEPTH (FEET)

GAMMA
40 API 250

1220

30

40

50

COLUMBINE LOGGING INC.
RIGGED UP ON 11/08/2013
MANNED 2-PERSON LOGGING
WITH BLOODHOUND GAS
CHROMATOGRAPH UNIT #0540
COLUMBINE BEGAN LOGGING
ON 11/08/2013

BHA BIT:
HUGHES 8.75" DP 504
Serial #: 7038501
Jets: 6x12

Drilled out of
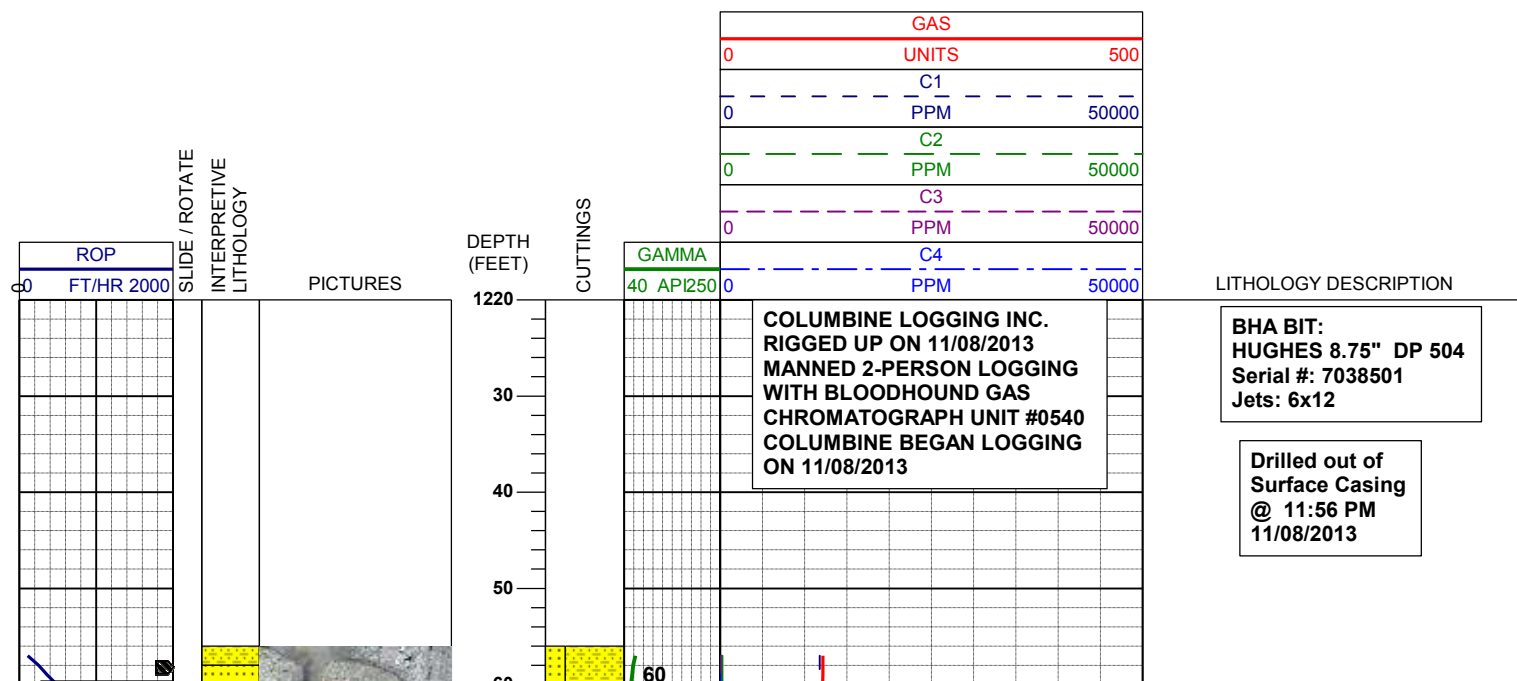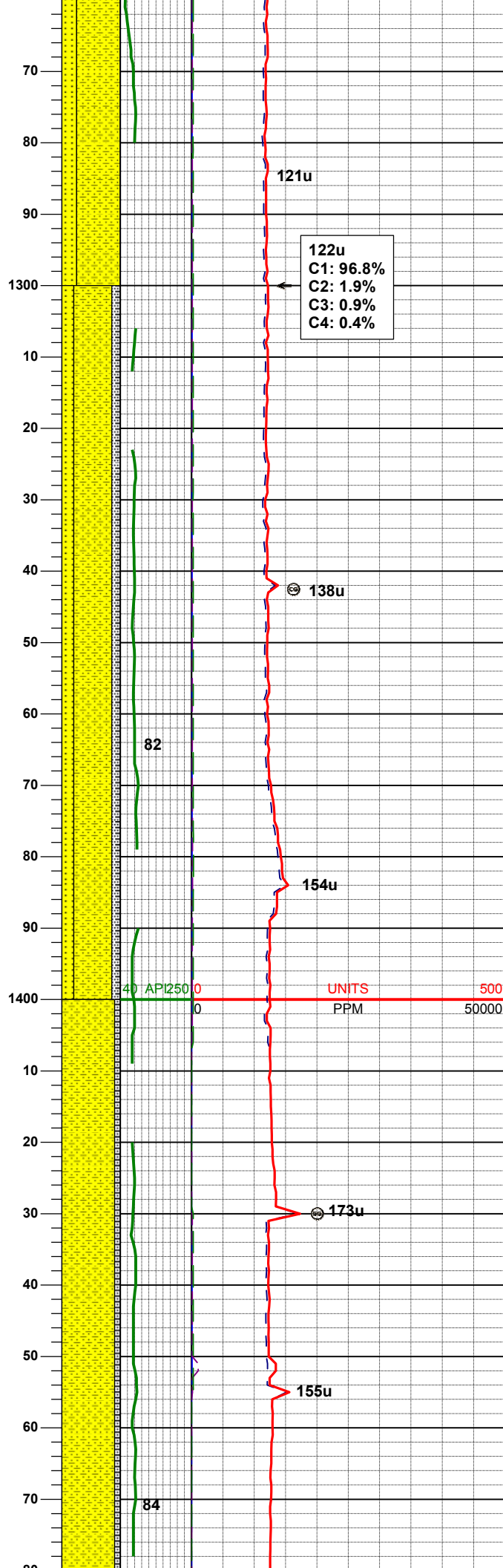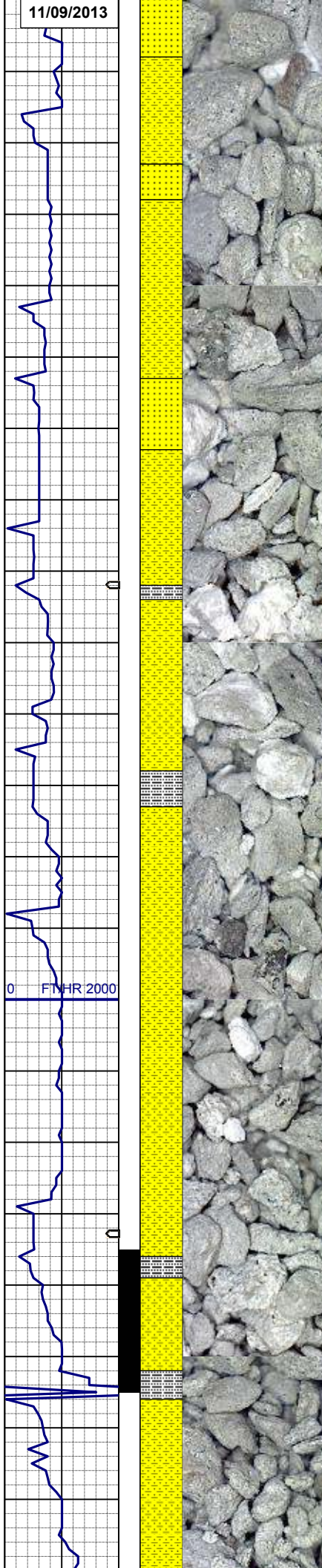Surface Casing
@ 11:56 PM
11/08/2013

60

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, vpsrt, smwtrndd, abnt cly, arg cmt, tr lt lit frag
SS: ltgy-trnsl, sbang-ang, v fri, fgr, v psrt, prndd, arg cmt, abnt glau

| MD	1282'
INC	0.9°
AZM	263.0°
TVD	1281.96'

121u

122u
C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%

138u

82

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, modsrt, wrndd, abnt cly, arg cmt
SS: ltgy-trnsl, sme op, sbang-ang, v fri, fgr, v psrt, prndd, mod por, arg cmt, abnt glau
SLTYSH: ltgy-gy, sbblky-sbplty, v sft, gt-sdy tex, arg cmt

MD	1375'
INC	1.2°
AZM	263.0°
TVD	1374.95'

154u

0   FT/HR 2000

40 API 250   0   UNITS   500
                0   PPM   50000

173u

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

155u

84

MD	1468'
INC	0.9°
AZM	281.4°
TVD	1467.92'
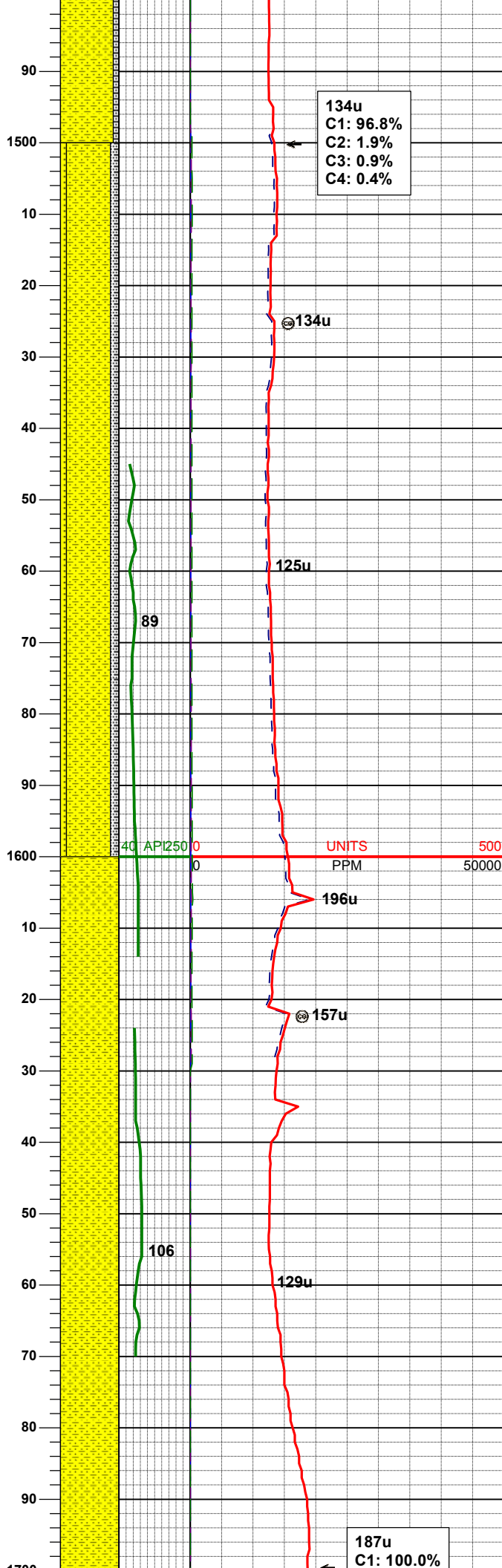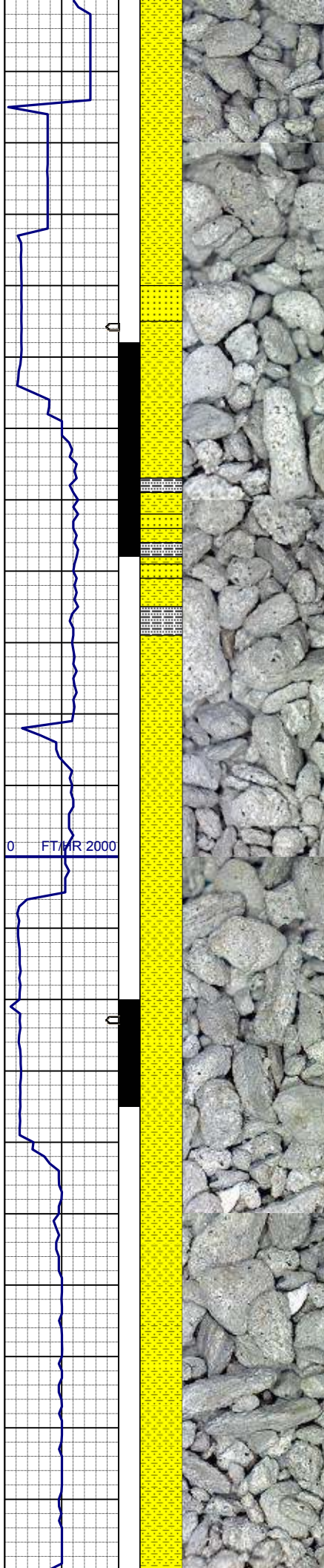
134u
C1: 96.8%
C2: 1.9%
C3: 0.9%
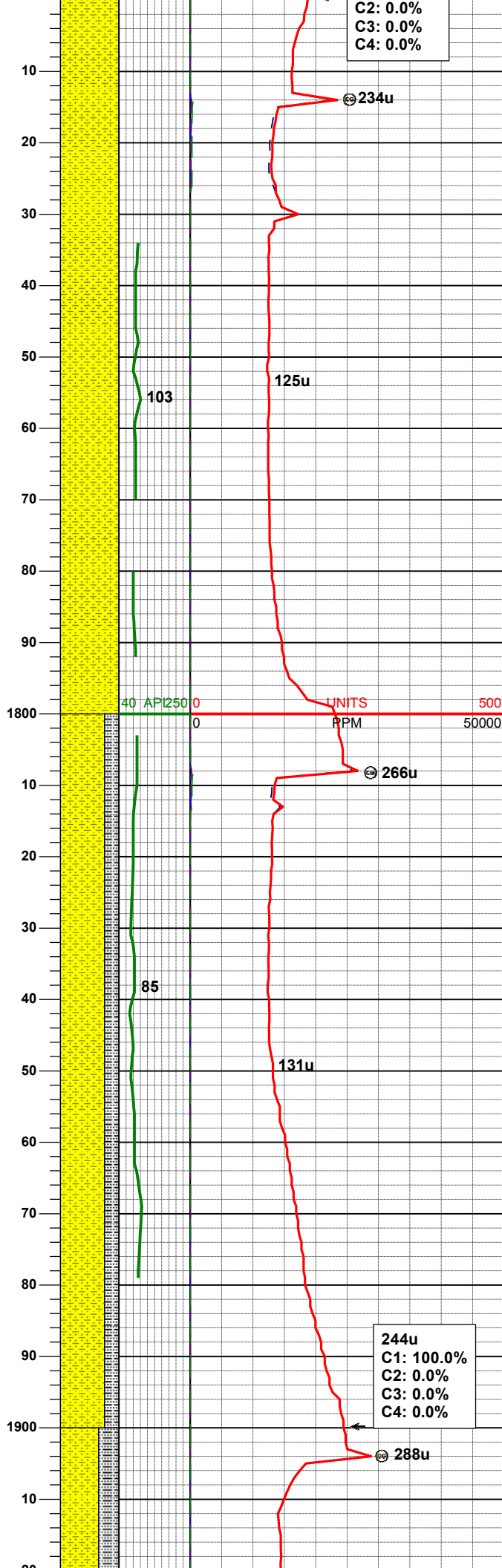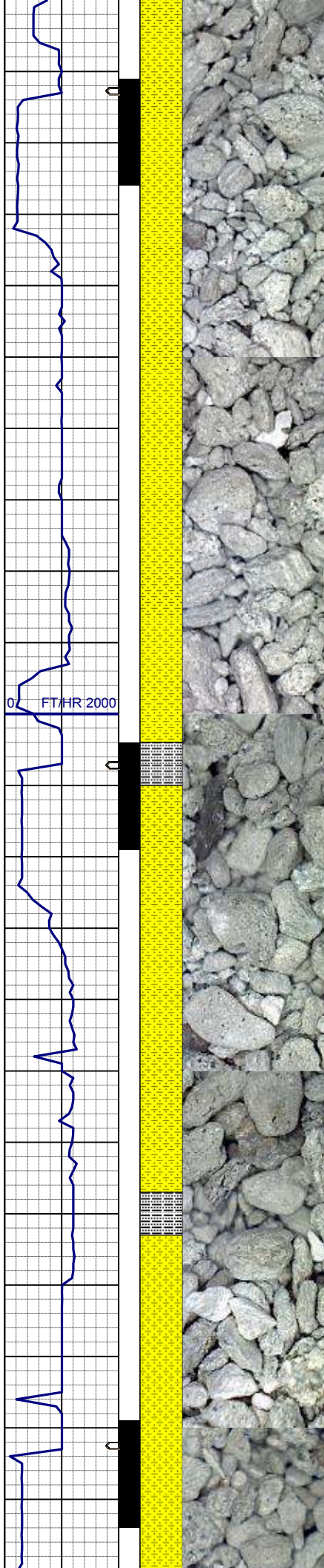**C4: 0.4%**

⊕**134u**

125u

89

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, modsrt, wrndd, abnt cly, arg cmt
SLTYSH: ltgy-gy, sbblky-sbplty, v sft, gt-sdy tex, arg cmt
SS: ltgy-trnsl, sbang-ang, v fri, fgr, v psrt, prndd, mod por, arg cmt, occ glau

MD	1560'
INC	2.4°
AZM	26.7°
TVD	1559.90'

0	FT/HR	2000

40	API	250	0		UNITS	500
			0		PPM	50000

196u

⊕**157u**

106

129u

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

MD	1651'
INC	4.1°
AZM	19.0°
TVD	1650.75'

187u
C1: 100.0%

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

234u

103

125u

MD 1744'
INC 5.7°
AZM 20.4°
TVD 1743.40'

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

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

266u

85

131u

MD 1839'
INC 7.3°
AZM 22.5°
TVD 1837.79'

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

244u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

288u

MD 1934'
INC 8.8°
AZM 17.8°
TVD 1931.85'

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

103

138u

189u

40 API 250 | 0 UNITS 500
0 PPM 50000

0 FT/HR 2000

82

147u

MD 2029'
INC 10.2°
AZM 23.7°
TVD 2025.55'

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, modsrt, wrndd, abnt cly, arg cmt
SS: ltgy-trnsl, sbang-ang, v fri, fgr, v psrt, prndd, mod por, arg cmt, occ glau

243u

159u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

MD 2123'
INC 11.4°
AZM 21.1°
TVD 2117.88'

125u

This is a well log (mud log) page showing depth tracks, lithology, and gas/chromatograph data.

Depth and Measurement Annotations

- 50
- 60
- 70
- 80
- 90
- 2200
- 10
- 20
- 30
- 40
- 50
- 60
- 70
- 80
- 90
- 2300
- 10
- 20
- 30
- 40
- 50

Track Scales

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

Gas/Curve Annotations

- 99
- 275u
- 174u
- 106
- 326u
- 128u
  - C1: 100.0%
  - C2: 0.0%
  - C3: 0.0%
  - C4: 0.0%
- 89
- 189u

Right Column Notes

WT IN 8.40+/ OUT 8.40+
VIS IN 27/ OUT 27

MD	2218'
INC	10.9°
AZM	21.1°
TVD	2211.09'

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, modsrt, wrndd, abnt cly, arg cmt
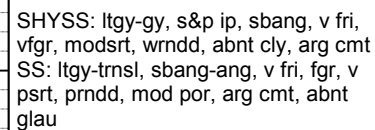SS: ltgy-trnsl, sbang-ang, v fri, fgr, v psrt, prndd, mod por, arg cmt, abnt glau
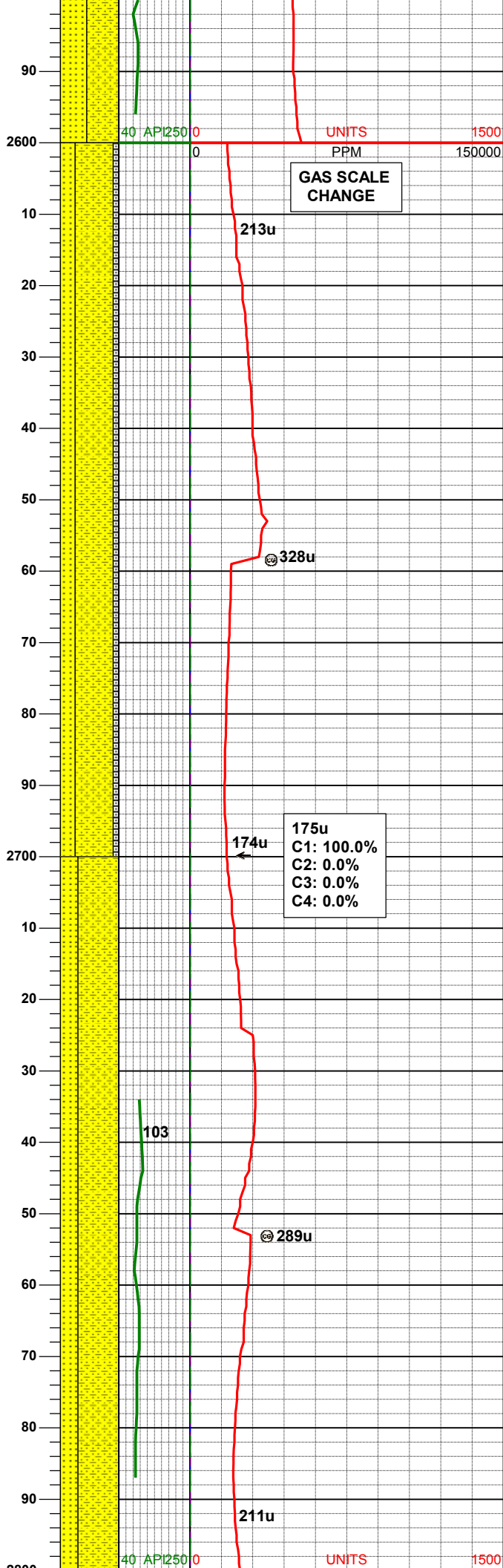
SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, modsrt, wrndd, abnt cly, arg cmt
SS: ltgy-trnsl, sbang-ang, v fri, fgr, v psrt, prndd, mod por, arg cmt, occ glau
SLTYSH: ltgy-gy, sbblky-sbplty, v sft, gt-sdy tex, arg cmt

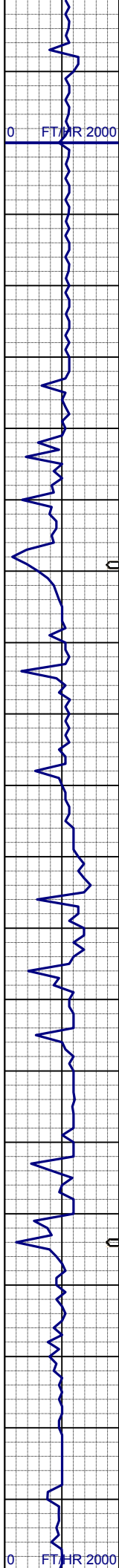| MD | 2313' |
INC	12.1°
AZM	18.6°
TVD	2304.18'

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, modsrt, wrndd, abnt cly, arg cmt
SS: ltgy-trnsl, sbang-ang, v fri, fgr, v psrt, prndd, mod por, arg cmt, abnt glau

Track 1 (left)

0   FT/HR   2000

Depth / Curve Track

70

80

90

2400

10

20   164u

30

40

50

60

70

80

90

2500

10   201u

20

30

40

50

60

70

80

Gamma Ray / Gas scales

40   API   250

0   UNITS   500

0   PPM   50000

Annotations on gas curve

⊕ 246u

85

⊛ 285u

82

148u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

103

⊛ 363u

Survey box 1

MD	2408'
INC	12.1°
AZM	18.3°
TVD	2397.07'

Lithology description 1

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, modsrt, wrndd, abnt cly, arg cmt
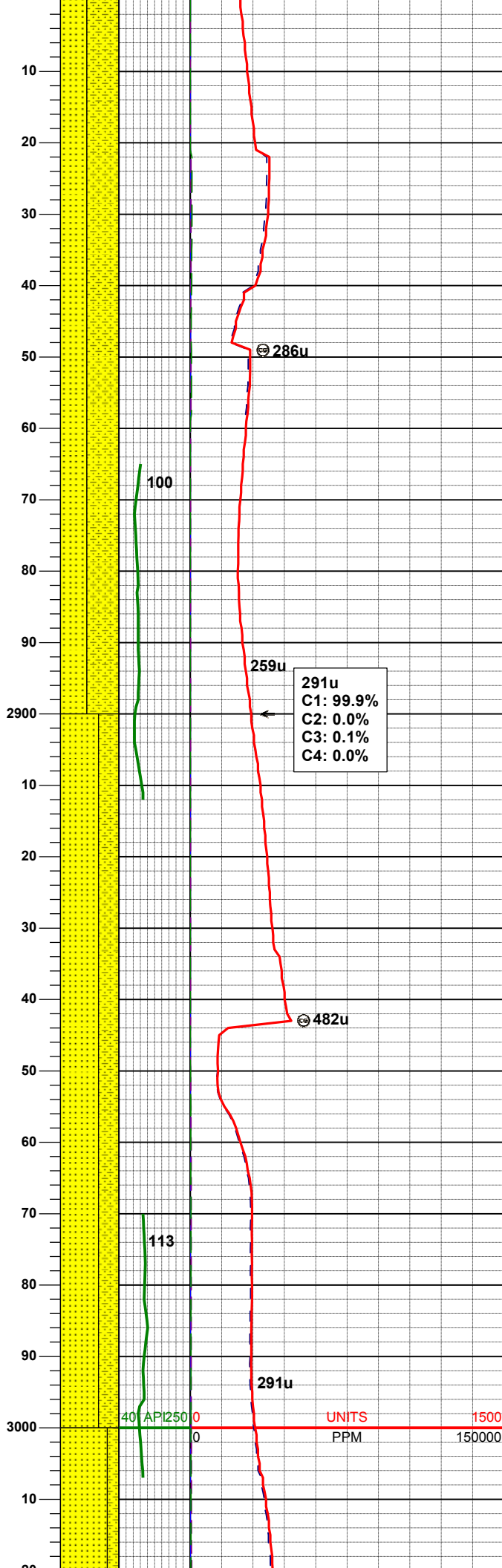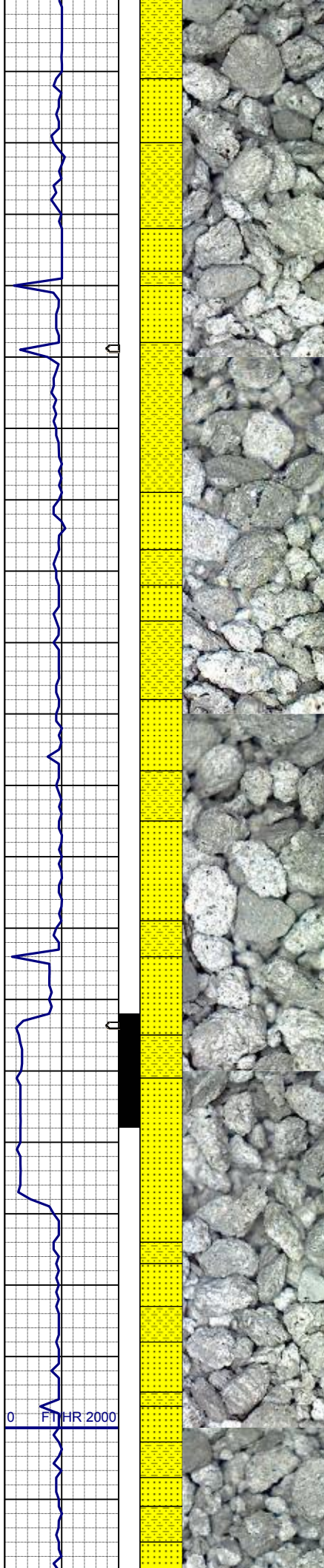SS: ltgy-trnsl, sbang-ang, v fri, fgr, v psrt, prndd, mod por, arg cmt, abnt glau

Survey box 2

MD	2503'
INC	12.0°
AZM	18.1°
TVD	2489.98'

Lithology description 2

SHYSS: ltgy-gy, s&p ip, sbang, v fri, vfgr, modsrt, wrndd, tr cly, arg cmt
SS: ltgy-trnsl, sbang-ang, v fri, fgr, v psrt, prndd, mod por, arg cmt, abnt glau

Depth Track (center, ft)

2600, 90, 10, 20, 30, 40, 50, 60, 70, 80, 90, 2700, 10, 20, 30, 40, 50, 60, 70, 80, 90

Left track (ROP)

0 — FT/HR — 2000

Gas track

40 — API — 250 | 0 — UNITS — 1500
0 — PPM — 150000

GAS SCALE CHANGE

213u

⊚328u

175u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

174u

103

⊚289u

211u

40 — API — 250 | 0 — UNITS — 1500

0 — FT/HR — 2000

Survey data boxes

MD	2598'
INC	11.8°
AZM	17.9°
TVD	2582.94'

MD	2693'
INC	11.5°
AZM	17.9°
TVD	2675.98'

MD	2787'
INC	11.2°
AZM	17.6°
TVD	2768.14'

Lithology descriptions

SHYSS: ltgy-gy, s&p ip, sbang, v fri,
vfgr, modsrt, wrndd, abnt cly, arg cmt
SS: ltgy-trnsl, s&p ip, sbang-ang, v fri,
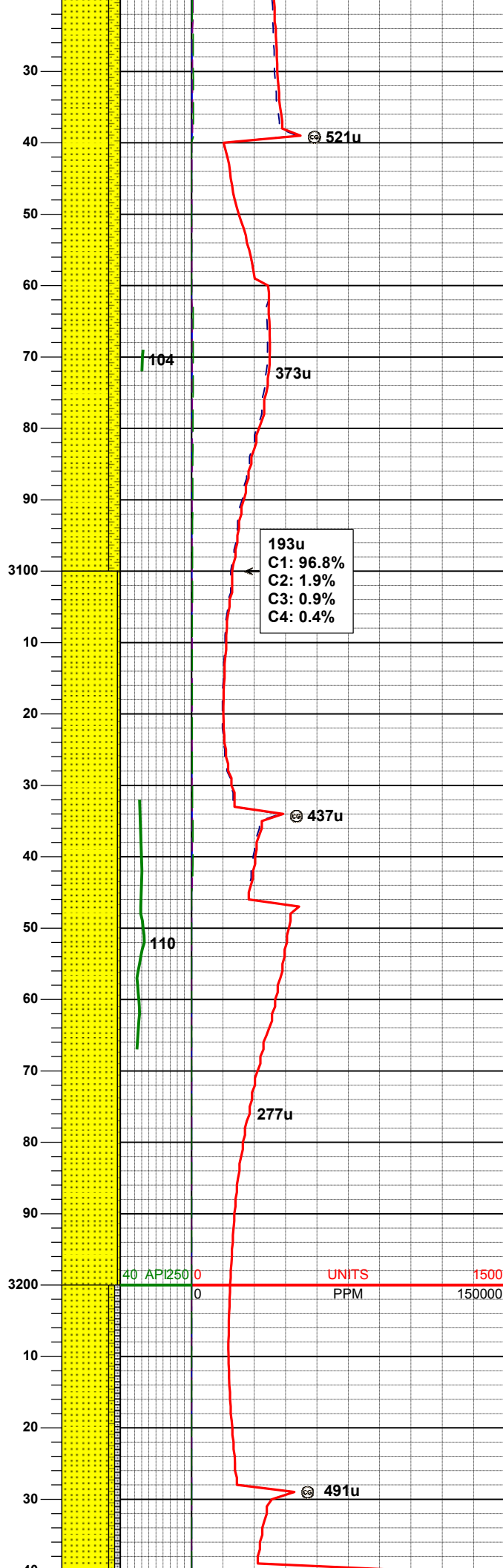fgr, v psrt, prndd, mod por, arg cmt,
abnt glau, abnt lith frag,
SLTYSH: ltgy-gy, sbblky-sbplty, v sft,
gt-sdy tex, arg cmt

SHYSS: ltgy-gy, s&p ip, sbang, v fri,
vfgr, modsrt, wrndd, abnt cly, arg cmt
SS: ltgy-trnsl, s&p ip, sbang-ang, v fri,
fgr, v psrt, prndd, mod por, arg cmt,
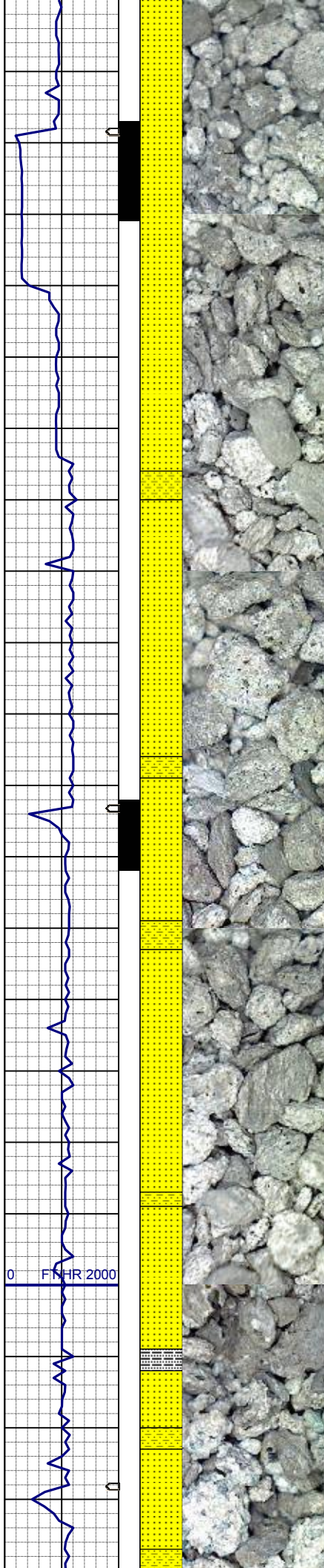abnt glau, abnt lith frag

SHYSS: ltgy-gy, s&p ip, sbang, v fri,
vfgr, modsrt, wrndd, abnt cly, arg cmt
SS: ltgy-trnsl, s&p ip, sbang-ang, v fri,
fgr, v psrt, prndd, mod por, arg cmt,
abnt glau, abnt lith frag

286u

100

259u

291u
C1: 99.9%
C2: 0.0%
C3: 0.1%
C4: 0.0%

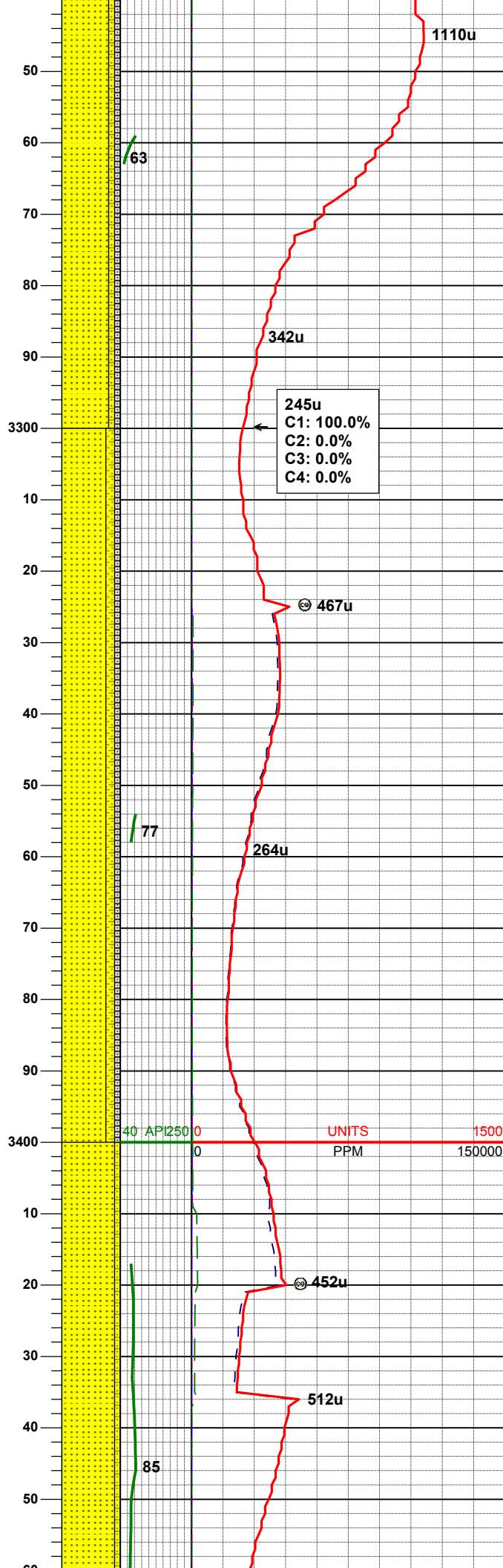| MD	2882'
INC	10.2°
AZM	17.0°
TVD	2861.49'

482u

SS: ltgy-trnsl, s&p ip, sbang-ang, v fri,
fgr, v psrt, prndd, mod por, arg cmt,
abnt glau, abnt lith frag, tr uncons
SHYSS: ltgy-gy, s&p ip, sbang, v fri,
vfgr, modsrt, wrndd, abnt cly, arg cmt

113

291u

MD	2977'
INC	10.4°
AZM	21.6°
TVD	2954.96'

0   FT/HR 2000

40 API 250   0   UNITS   1500
            0   PPM   150000

WT IN 8.50+/ OUT 8.50+
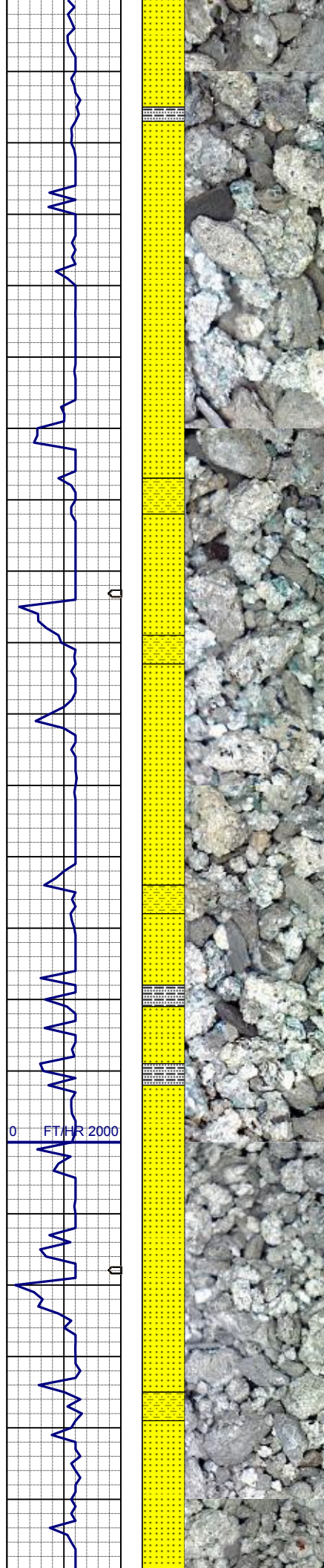VIS IN 27/ OUT 27

30

40 ⊕ 521u

SS: ltgy-trnsl, s&p ip, sbang-ang, v fri,
fgr, v psrt, prndd, mod por, arg cmt,
abnt glau, abnt lith frag, tr uncons
SHYSS: ltgy-gy, s&p ip, sbang, v fri,
vfgr, modsrt, wrndd, abnt cly, arg cmt

50

60

70 104   373u

80

90

193u
C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%

3100

MD	3072'
INC	11.9°
AZM	20.7°
TVD	3048.16'

10

20

30   ⊕ 437u

40

SS: ltgy-trnsl, s&p ip, sbang-ang, v fri,
fgr, v psrt, prndd, mod por, arg cmt,
abnt glau, abnt dk lith frag, tr uncons
SHYSS: ltgy-gy, sbang, v fri, vfgr,
modsrt, wrndd, abnt cly, arg cmt

50

110

60

70

277u

80

90

MD	3167'
INC	12.1°
AZM	20.6°
TVD	3141.09'

0   FTHR 2000

40 API 250 0   UNITS   1500
3200
             0   PPM   150000

10

20

30   ⊕ 491u

SS: ltgy-trnsl, s&p ip, sbang-ang, v fri,
fgr, v psrt, prndd, mod por, arg cmt,
abnt glau, abnt dk lith frag, tr uncons
SHYSS: ltgy-gy, s&p ip, sbang, v fri,
vfgr, modsrt, wrndd, abnt cly, arg cmt
SLTYSH: ltgy-gy, sbblky-sbplty, v sft,
gt-sdy tex, arg cmt

MD	3262'
INC	12.3°
AZM	19.2°
TVD	3233.94'

1110u

63

342u

245u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

467u

SS: ltgy-trnsl, s&p ip, sbang-ang, v fri,
fgr, v psrt, prndd, mod por, arg cmt,
abnt glau, abnt dk lith frag, tr dism
pyr, tr uncons
SHYSS: ltgy-gy, sbang, v fri, vfgr,
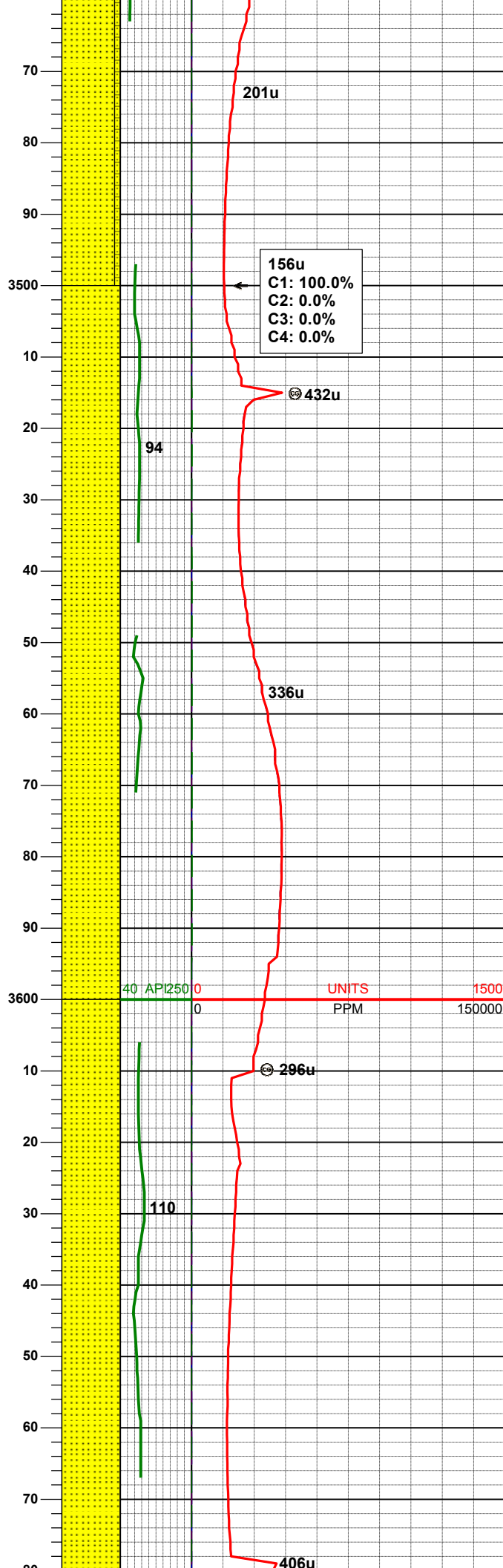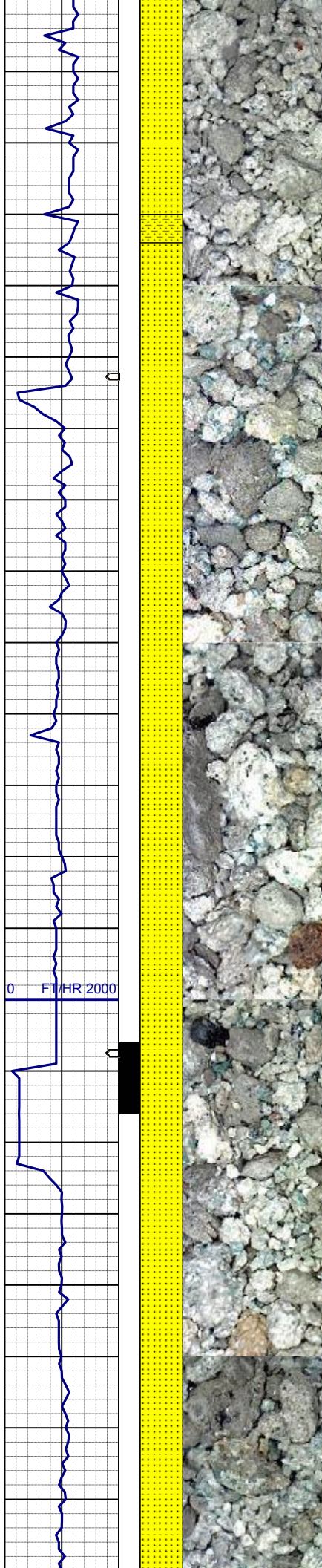modsrt, wrndd, abnt cly, arg cmt
SLTYSH: ltgy-gy, sbblky-sbplty, v sft,
gt-sdy tex, arg cmt

MD	3357'
INC	12.3°
AZM	18.3°
TVD	3326.76'

77

264u

0   FT/HR   2000

40 API 250   0   UNITS   1500
              0   PPM   150000

452u

512u

85

MD	3451'
INC	12.3°
AZM	16.3°
TVD	3418.60'

SS: ltgy-trnsl, s&p ip, sbang-ang, v fri,
fgr, v psrt, prndd, mod por, arg cmt,
abnt glau, abnt dk lith frag, uncons
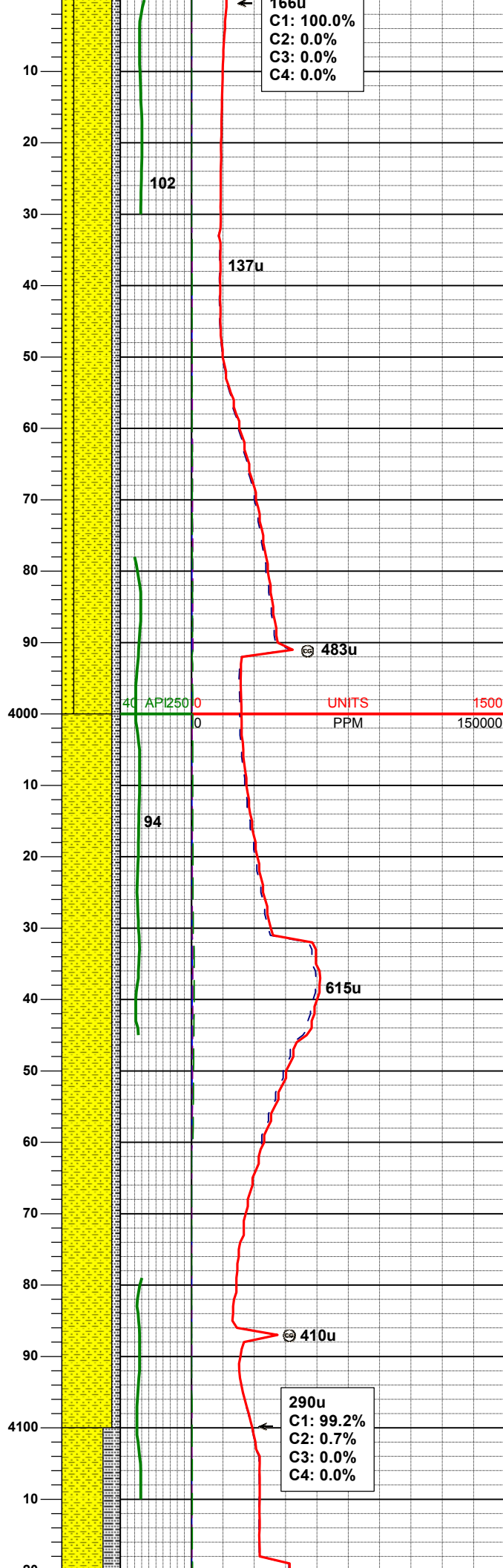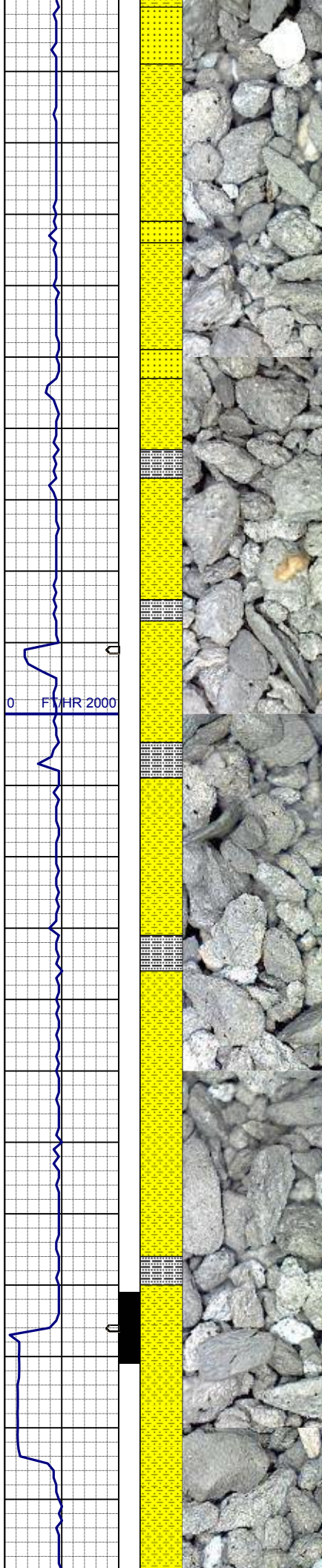SHYSS: ltgy-gy, sbang, v fri, vfgr,
modsrt, wrndd, abnt cly, arg cmt

201u

156u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

432u

94

336u

296u

110

406u

70
80
90
3500
10
20
30
40
50
60
70
80
90
3600
10
20
30
40
50
60
70

0 FT/HR 2000

40 API 250 0   UNITS   1500
0   PPM   150000

WT IN 8.60+/ OUT 9.00
VIS IN 26/ OUT 26

MD	3546'
INC	12.6°
AZM	16.5°
TVD	3511.37'

SS: ltgy-trnsl, s&p ip, sbang-ang, v fri, fgr, v psrt, prndd, mod por, arg cmt, abnt glau, abnt dk lith frag, tr dism pyr, tr mica, uncons

MD	3641'
INC	10.5°
AZM	14.8°
TVD	3604.44'

SS: ltgy-trnsl, s&p ip, sbang-ang, v fri, fgr, v psrt, prndd, mod por, arg cmt, abnt glau, abnt dk lith frag, uncons

240u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

3700

90

255u

10

20

30

103

40

139u

50

60

70

80

90

0   FT/HR 2000

3800

40 API250 0   UNITS   1500
0   PPM   150000
456u

10

20

30

103

40

149u

50

60

70

80

90

753u

MD	3736'
INC	8.7°
AZM	22.5°
TVD	3698.11'
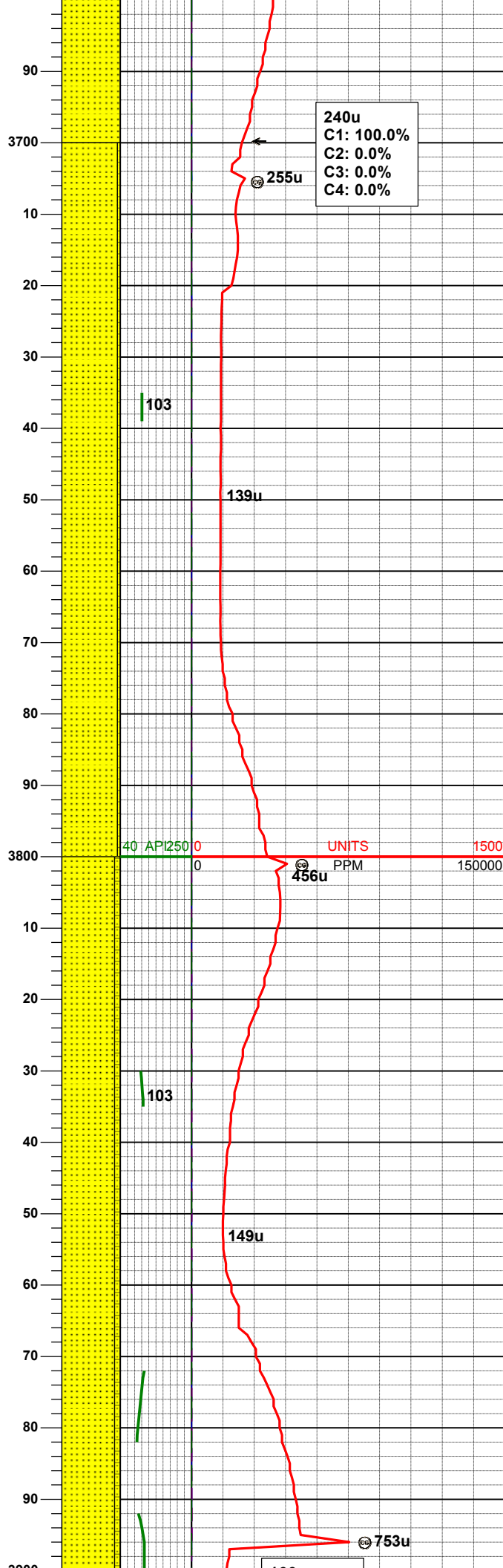
SS: ltgy-trnsl, s&p ip, sbang-ang, v fri,
fgr, v psrt, prndd, mod por, arg cmt,
abnt glau, abnt dk lith frag, tr pyr,
uncons
SHYSS: ltgy-gy, sbang, v fri, vfgr,
modsrt, wrndd, abnt cly, arg cmt

MD	3831'
INC	7.5°
AZM	22.9°
TVD	3792.16'

SS: ltgy-trnsl, s&p ip, sbang-ang, v fri,
fgr, v psrt, prndd, mod por, arg cmt,
abnt glau, abnt dk lith frag, uncons
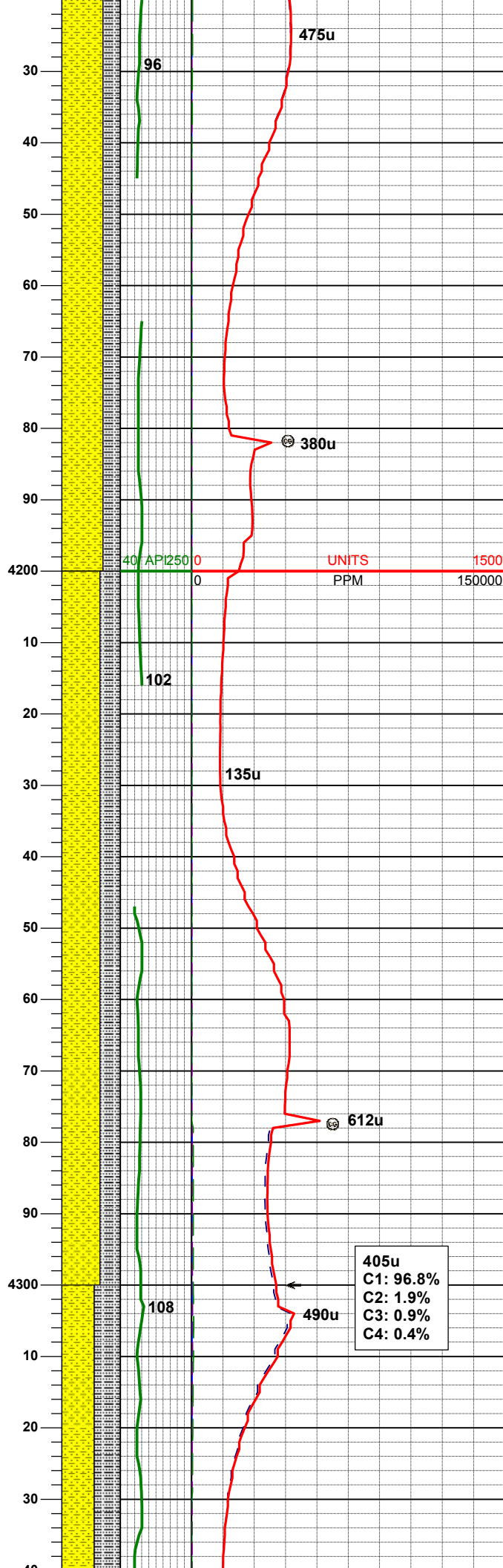SHYSS: ltgy-gy, sbang, v fri, vfgr,
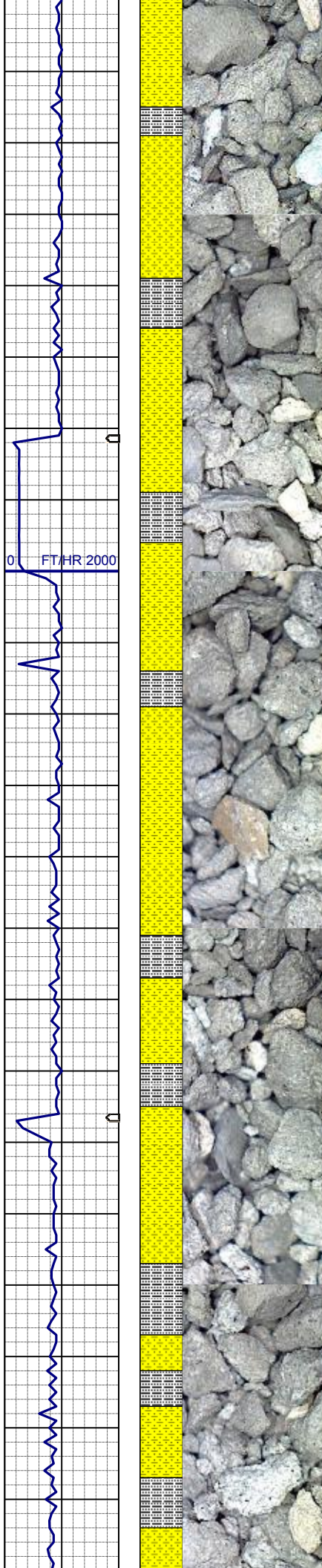modsrt, wrndd, abnt cly, arg cmt

166u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

102

137u

483u

94

615u

410u

290u
C1: 99.2%
C2: 0.7%
C3: 0.0%
C4: 0.0%

0   FT/HR   2000

40   API   250   0   UNITS   1500
0   PPM   150000

MD	3926'
INC	6.9°
AZM	24.4°
TVD	3886.41'

SHYSS: ltgy-gy, sbang, v fri, vfgr,
modsrt, wrndd, abnt cly, arg cmt
SS: ltgy-trnsl, s&p ip, sbang-ang, v fri,
fgr, v psrt, prndd, mod por, arg cmt,
abnt glau, abnt dk lith frag, uncons
SLTYSH: ltgy-gy, sbblky-sbplty, v sft,
gt-sdy tex, arg cmt

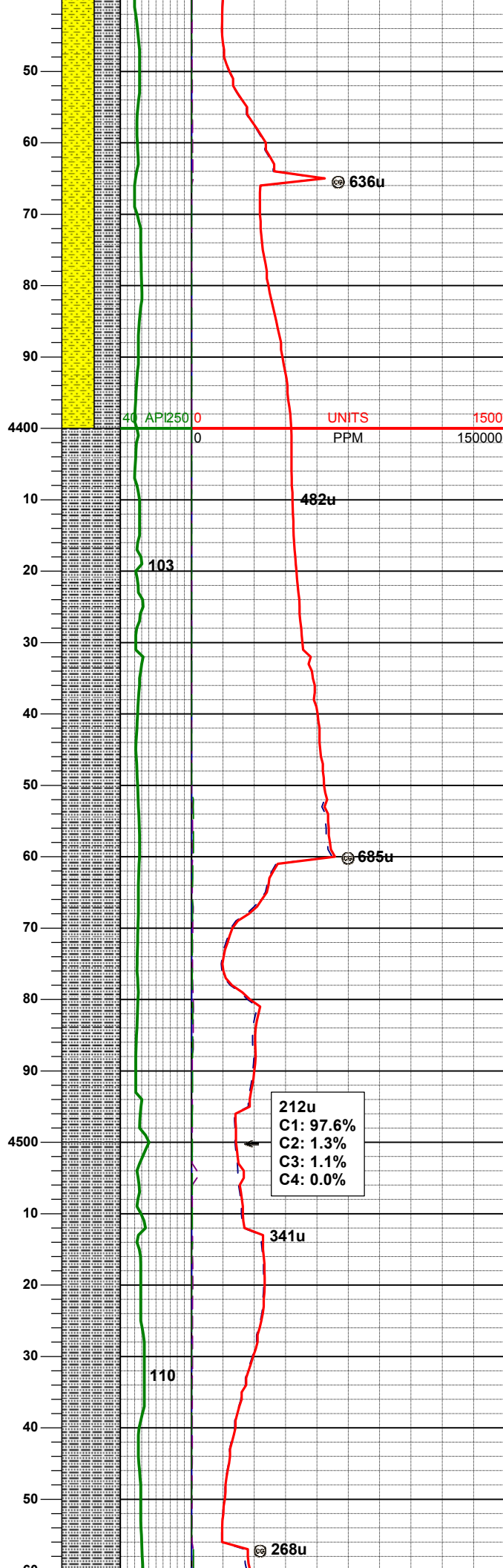| MD	4021'
INC	6.2°
AZM	25.7°
TVD	3980.79'

SHYSS: ltgy-gy, sbang, v fri, vfgr,
modsrt, wrndd, abnt cly, arg cmt
SLTYSH: ltgy-gy, sbblky-sbplty, v sft,
gt-sdy tex, arg cmt

MD	4115'
INC	4.8°
AZM	17.0°
TVD	4074.36'

Depth track (center)
30
40
50
60
70
80
90
4200
10
20
30
40
50
60
70
80
90
4300
10
20
30

Gas/Curves track
475u

96

380u

40 API250 0 UNITS 1500
0 PPM 150000

102

135u

612u

405u
C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%

490u

108

ROP track (left)
0 FT/HR 2000

Lithology descriptions (right)
SHYSS: ltgy-gy, sbang, v fri, vfgr, modsrt, wrndd, abnt cly, arg cmt
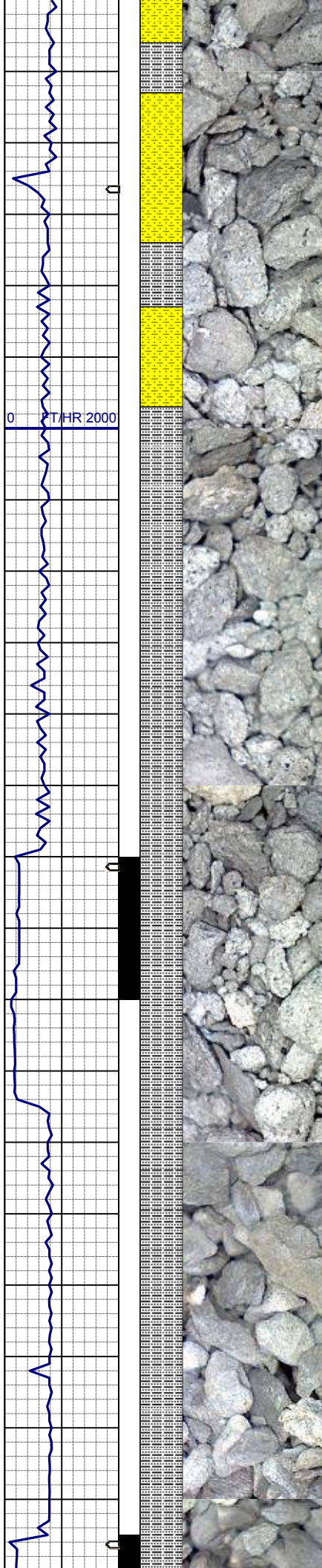SLTYSH: ltgy-gy, sbblky-sbplty, v sft, gt-sdy tex, arg cmt

SHYSS: ltgy-gy, sbang, v fri, vfgr, modsrt, wrndd, abnt cly, arg cmt
SLTYSH: ltgy-gy, sbblky-sbplty, v sft, gt-sdy tex, arg cmt

Survey boxes (right)
MD	4210'
INC	1.8°
AZM	16.7°
TVD	4169.19'

MD	4305'
INC	1.8°
AZM	17.6°
TVD	4264.14'

SHYSS: ltgy-gy, sbang, v fri, vfgr,
modsrt, wrndd, abnt cly, arg cmt
SLTYSH: ltgy-gy, sbblky-sbplty, v sft -
sft, gt-sdy tex, arg cmt

0   FT/HR 2000
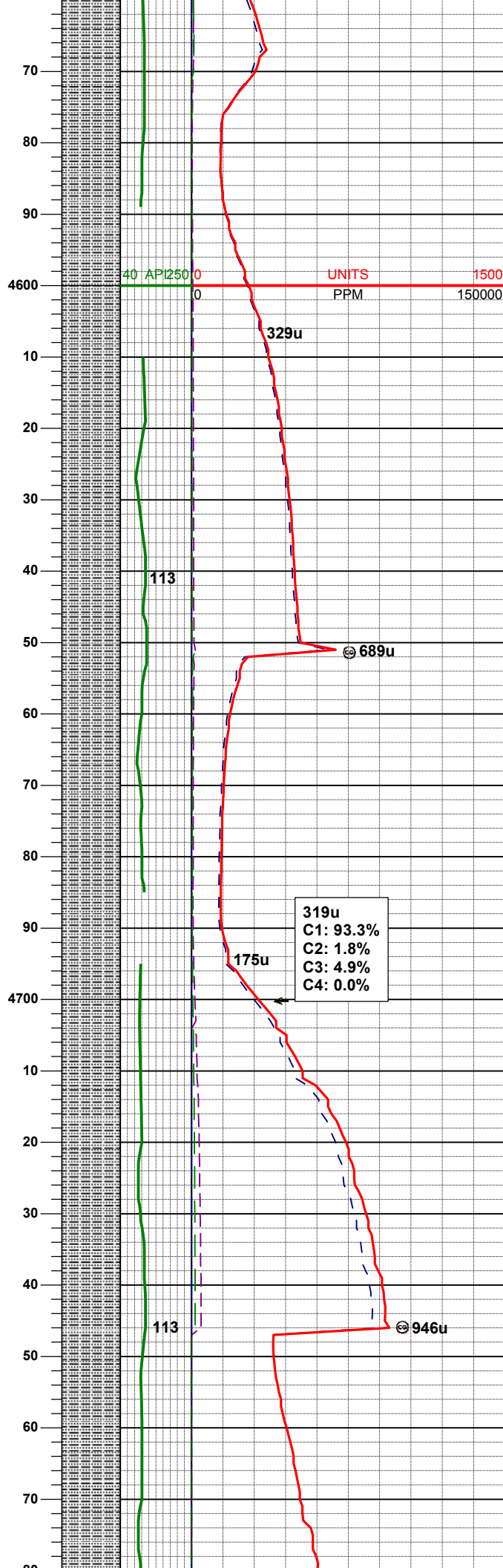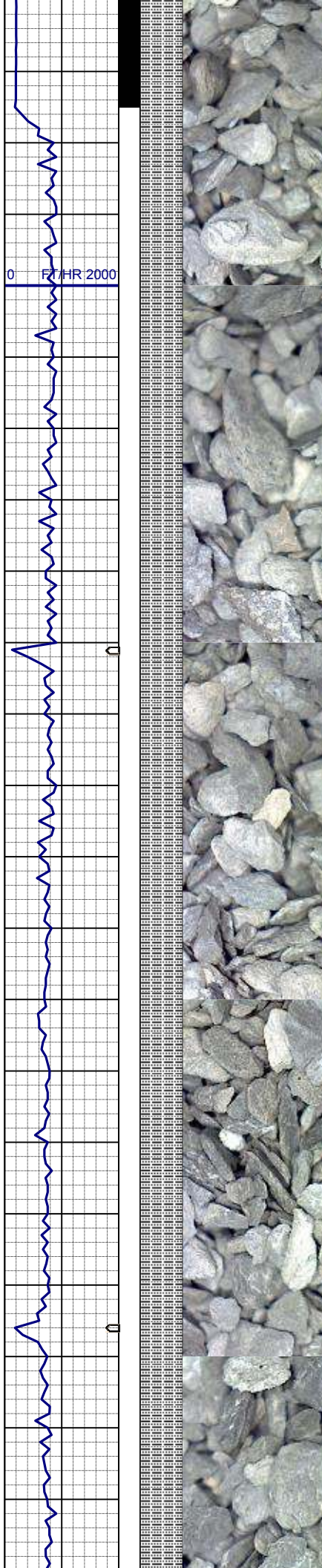
50

60

⊚ 636u

70

80

90

40 API 250   0   UNITS   1500
4400   0   PPM   150000

10   482u

20   103

30

40

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

50

60   ⊚ 685u

70

80

90

212u
C1: 97.6%
4500   ◄   C2: 1.3%
C3: 1.1%
C4: 0.0%

10

341u

20

30   110

40

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

50

⊚ 268u

60

MD	4400'
INC	1.8°
AZM	8.6°
TVD	4395.10'

WT IN 9.00/ OUT 9.00
VIS IN 35/ OUT 35

MD	4495'
INC	3.2°
AZM	340.3°
TVD	4454.01'

0   FT/HR   2000

70

80

90

4600

10

20

30

40

50

60

70

80

90

4700

10

20

30

40

50

60

70

40   API   250   0   UNITS   1500
              0   PPM   150000

329u

113

☺ 689u

319u
C1: 93.3%
C2: 1.8%
C3: 4.9%
C4: 0.0%

175u

113   ☺ 946u

MD	4590'
INC	1.8°
AZM	298.3°
TVD	4548.92'

SLTYSH: ltgy-gy, lt blk-blk, sbblky-sbplty, v sft - mod firm, gt-sdy tex, arg cmt

MD	4685'
INC	1.2°
AZM	317.5°
TVD	4643.89'

WT IN 9.10+/ OUT 9.10+
VIS IN 36/ OUT 36

SLTYSH: ltgy-gy, lt blk-blk, sbblky-sbplty, v sft - mod firm, gt-sdy tex, arg cmt

MD	4780'
INC	0.5°

90

641u

4800

40 API 250

UNITS 1500

0 PPM 150000

10

20

30

@433u

40

50
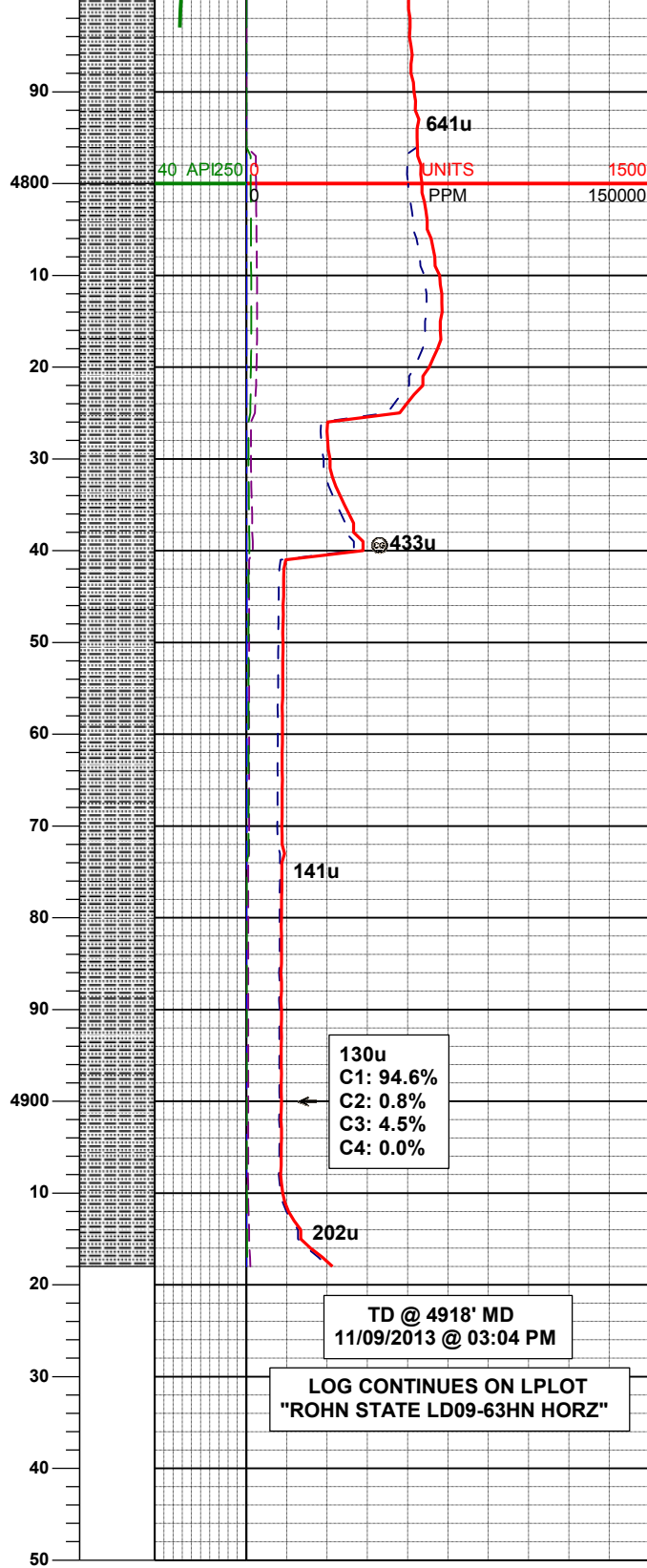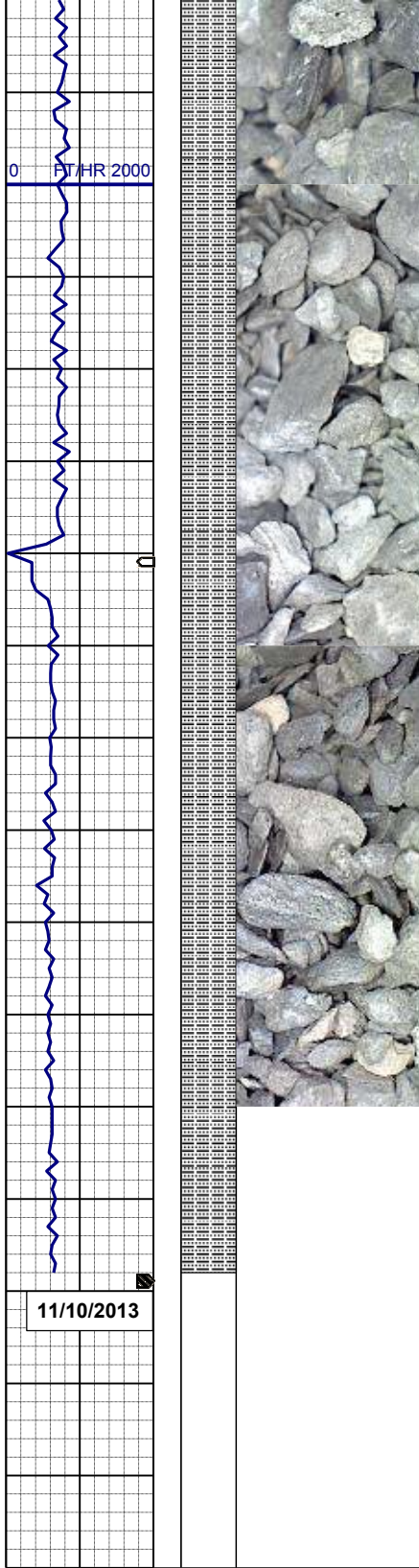
SLTYSH: ltgy-gy, lt blk, sbblky-sbplty,
v sft - mod firm, gt-sdy tex, arg cmt

60

70

141u

80

90

130u
C1: 94.6%
C2: 0.8%
C3: 4.5%
C4: 0.0%

4900

WT IN 9.20+/ OUT 9.20+
VIS IN 36/ OUT 36

10

202u

20

TD @ 4918' MD
11/09/2013 @ 03:04 PM

30

LOG CONTINUES ON LPLOT
"ROHN STATE LD09-63HN HORZ"

40

50

0 FT/HR 2000

11/10/2013