LOG created using LPLOT VH Version 3.0, June 04, 2013, Copyright (C) 1999-2009 Pason Systems Corp.

OPERATOR:	**NOBLE ENERGY INC**
WELL:	**SHABLE USX PC AB11-63-1HNL**
LOCATION:	**SEC11 T7N R64W**
COUNTY:	**WELD**
STATE:	**COLORADO**
SPOT:	**698' FSL, 250' FWL**
ELEVATION:	**4818'GL, 4834'KB**
FIELD:	**WATTENBERG**
SPUD DATE:	**5/20/13**
TD DATE:	**6/2/13**
DATES LOGGED:	**5/21/13 - 6/2/13**
DEPTHS LOGGED:	**802'- 16399'**
GEOLOGISTS:	**GARY MYERS, TED STOCKWELL**
DRILLING FLUID:	**LSND**
DRILLING RIG:	**PRECISION 828**
API:	**05-123-36701**
LOG TYPE:	**VERTICAL**
SCALE:	**1:240 (5 inches per 100 feet)**
REMARKS:	**WELLSITE GEOLOGICAL SERVICES PROVIDED BY COLUMBINE LOGGING, INC.**

LOG CONTINUES ON FILE: Shable USX PC AB11-63-1HNL Horiz.lplot
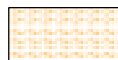

LITHOLOGIES
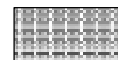
Sandstone   Shaly Sandstone   Shaly Siltstone   Silty Shale
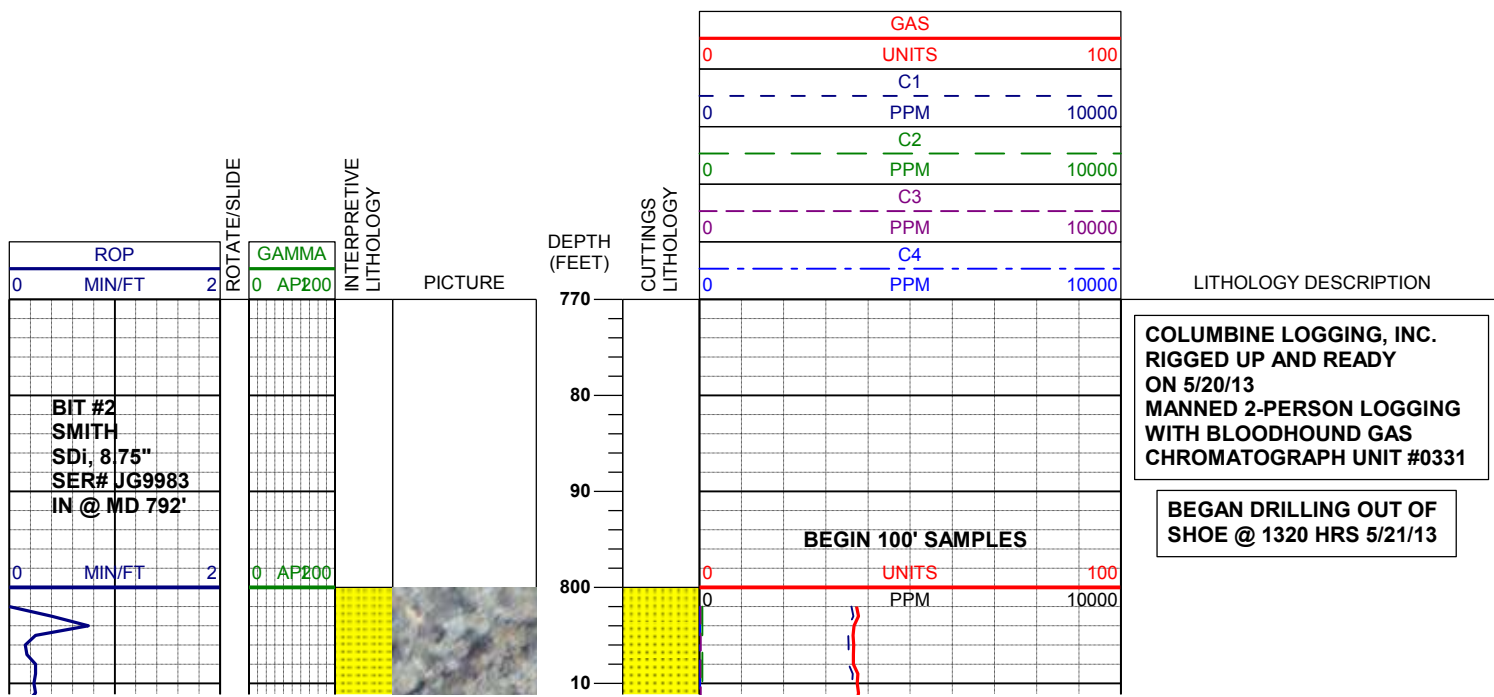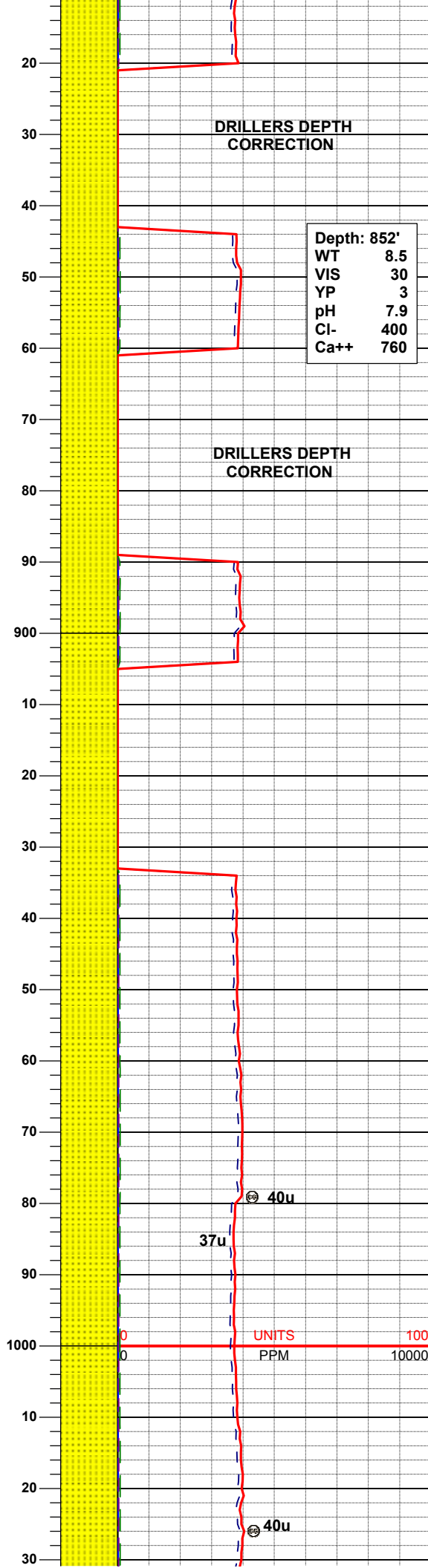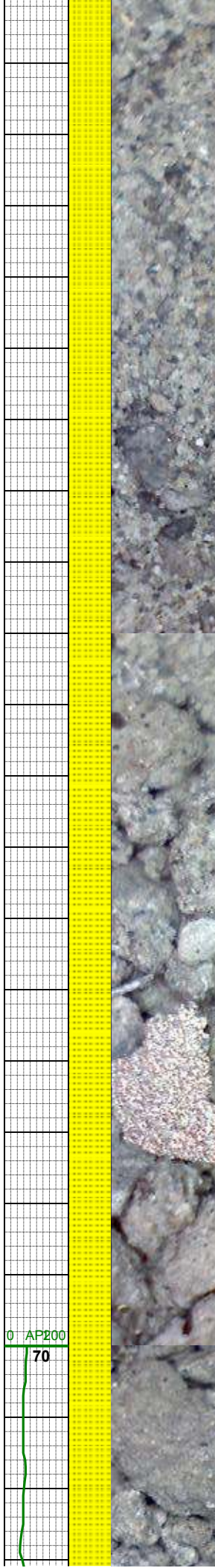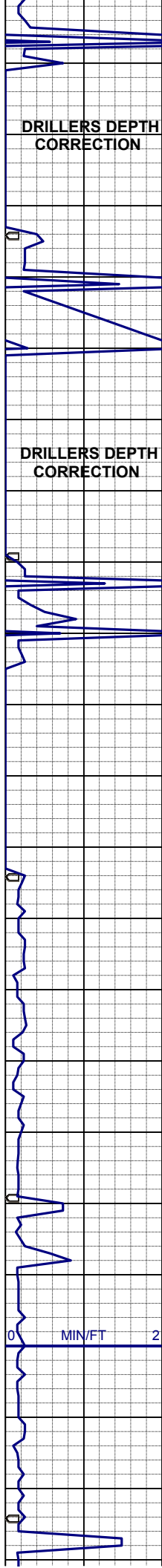
ENGINEERING SYMBOLS

Connection   Connection Gas   Midnight Depth

ROP	ROTATE/SLIDE	GAMMA	INTERPRETIVE LITHOLOGY	PICTURE	DEPTH (FEET)	CUTTINGS LITHOLOGY	GAS	LITHOLOGY DESCRIPTION

GAS
0 — UNITS — 100
C1
0 — PPM — 10000
C2
0 — PPM — 10000
C3
0 — PPM — 10000
C4
0 — PPM — 10000

ROP: 0 MIN/FT 2
GAMMA: 0 API 200

BIT #2
SMITH
SDi, 8.75"
SER# JG9983
IN @ MD 792'

770
80
90
800
10

0 MIN/FT 2
0 API 200

BEGIN 100' SAMPLES

0 UNITS 100
0 PPM 10000

**COLUMBINE LOGGING, INC.
RIGGED UP AND READY
ON 5/20/13
MANNED 2-PERSON LOGGING
WITH BLOODHOUND GAS
CHROMATOGRAPH UNIT #0331**

**BEGAN DRILLING OUT OF
SHOE @ 1320 HRS 5/21/13**

DRILLERS DEPTH
CORRECTION

Depth: 852'	
WT	8.5
VIS	30
YP	3
pH	7.9
Cl-	400
Ca++	760

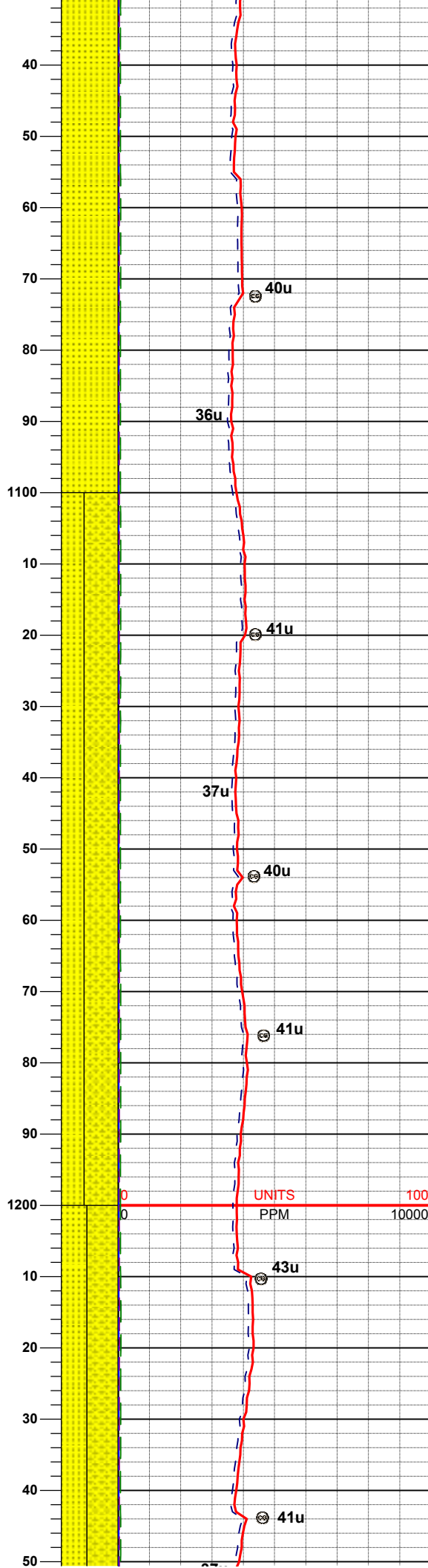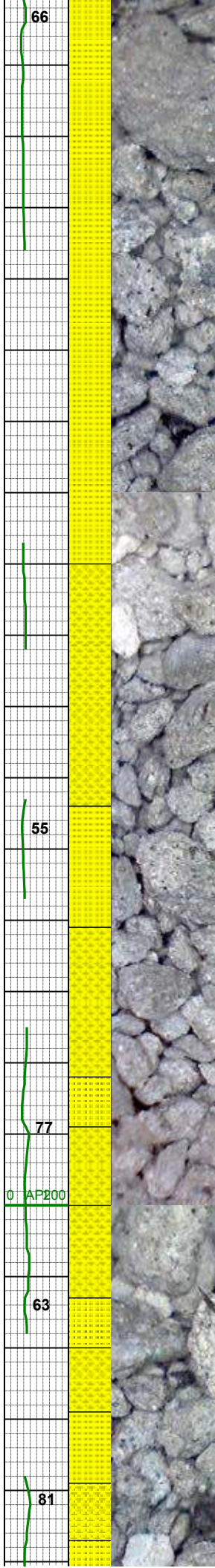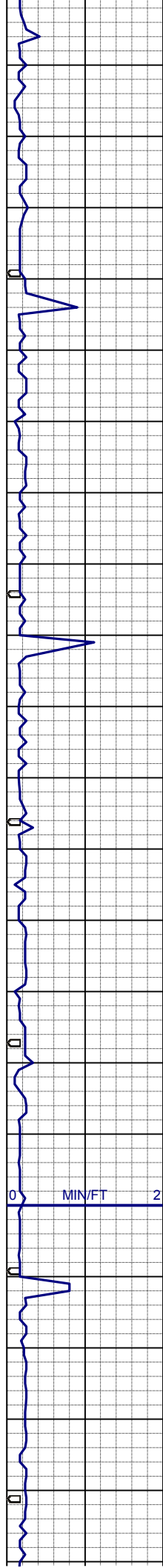DRILLERS DEPTH
CORRECTION

MD   838'
INC   0.6°
AZI   301.1°
TVD   838.0'
WT 8.6 / VIS 34

SS: wh- vltgy, sme bf, clr- trnsl, m-fgr,
pred sft, blky-sbblky, w srt, p cmt, sil-
slarg mtx, mod calc, slmica

MD   928'
INC   1.5°
AZI   297.0°
TVD   928.0'

SS: wh- vltgy, sme bf, clr- trnsl, m-fgr,
sft- sl firm, blky-sbblky, w srt, p cmt,
sil- slarg mtx, mod calc, slmica, tr glau

40u

37u

0	MIN/FT	2

| 0 | AP200 | |
| 70 | | |

0	UNITS	100
0	PPM	10000

40u

MD   1018'
INC   1.2°
AZI   327.4°
TVD   1018.0'

40u

SS: wh- ltgy, sme bf, clr- trnsl, m-fgr,
sft- sl firm, blky-sbblky, w srt, p cmt,
sil- slarg mtx, mod calc, slmica, tr glau

MD   1095'
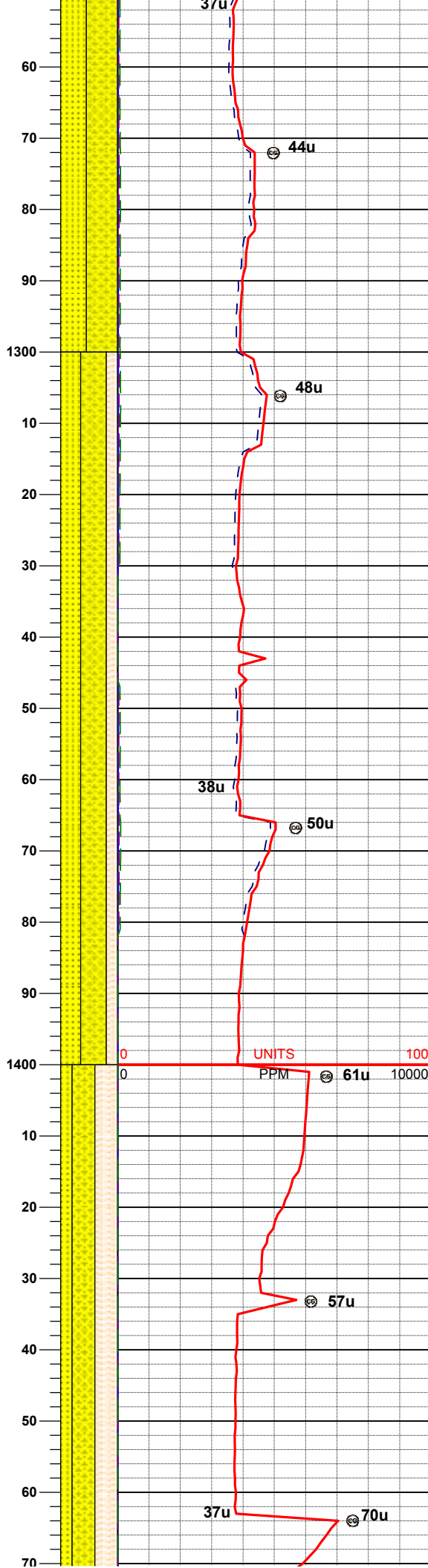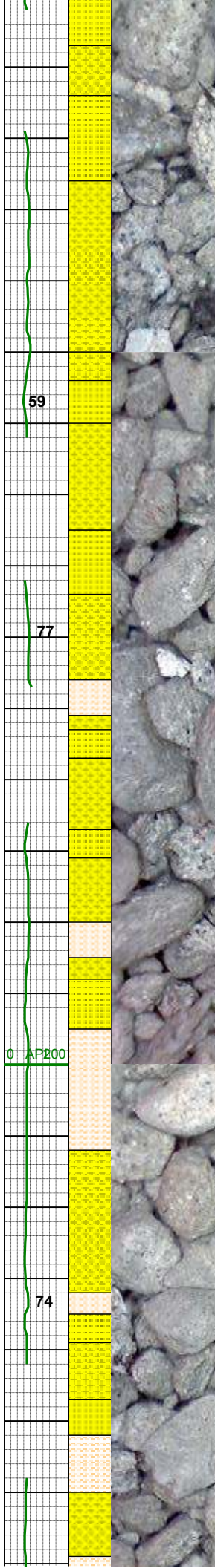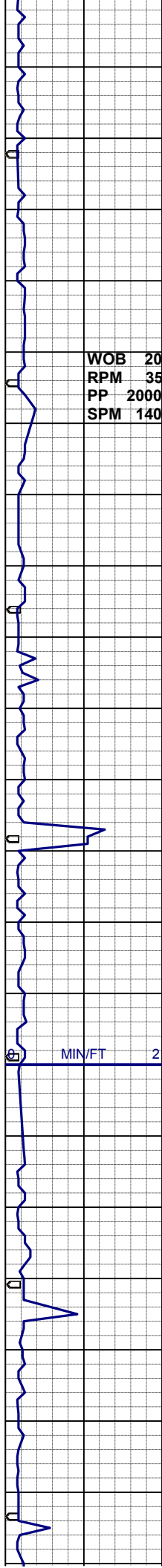INC   1.1°
AZI   332.5°
TVD   1094.9'

SS: wh- ltgy, sme bf, clr- trnsl, m-fgr,
sft- sl firm, blky-sbblky, w srt, p cmt,
sil- slarg mtx, mod calc, slmica, tr
glau, grdg- SHYSS: ltgy-mgy, trnsl-
op, sft-firm, sbblky-sbplty, mod srt, sil-
arg mtx, sl calc

MD   1190'
INC   0.5°
AZI   194.5°
TVD   1189.9'

SS: wh- ltgy, sme bf, clr- trnsl, m-fgr,
sft- sl firm, blky-sbblky, w srt, p cmt,

66

55

77

63

81

40u
36u
41u
37u
40u
41u
43u
41u

0   MIN/FT   2
0   AP200
0   UNITS   100
0   PPM   10000

sil- slarg mtx, mod calc, slmica, tr
glau, grdg- SHYSS: ltgy-mgy, trnsl-
op, sft-firm, sbblky-sbplty, mod srt, sil-
arg mtx, sl calc

37u

60
70

44u

80

MD   1285'
INC   1.0°
AZI   144.3°
TVD 1284.9'

90

1300

48u

WOB   20
RPM   35
PP   2000
SPM 140

59

10
20
30

77

40

SHYSLTST: lt-dkgy, sft-firm, f-vfgr,
sbblky-sbplty, modsrt, arg mtx, slcalc
SS: wh- ltgy, sme bf, clr- trnsl, m-fgr,
sft- sl firm, blky-sbblky, w srt, p cmt,
sil- slarg mtx, mod calc, slmica, tr
glau, grdg- SHYSS: ltgy-mgy, trnsl-
op, sft-firm, sbblky-sbplty, mod srt, sil-
arg mtx, sl calc

50

60

38u

50u

70

MD   1380'
INC   1.0°
AZI   109.6°
TVD 1379.9'

80
90

0 MIN/FT   2   0 AP100

1400

0   UNITS   100

0   PPM   10000

61u

10

20

74

30

57u

40

SHYSLTST: lt-dkgy, sft-firm, f-vfgr,
sbblky-sbplty, modsrt, arg mtx, slcalc
SS: wh- ltgy, sme bf, clr- trnsl, m-fgr,
sft- sl firm, blky-sbblky, w srt, p cmt,
sil- slarg mtx, mod calc, slmica, tr
glau, grdg- SHYSS: ltgy-mgy, trnsl-
op, sft-firm, sbblky-sbplty, mod srt, sil-
arg mtx, sl calc

50

60

37u   70u

70
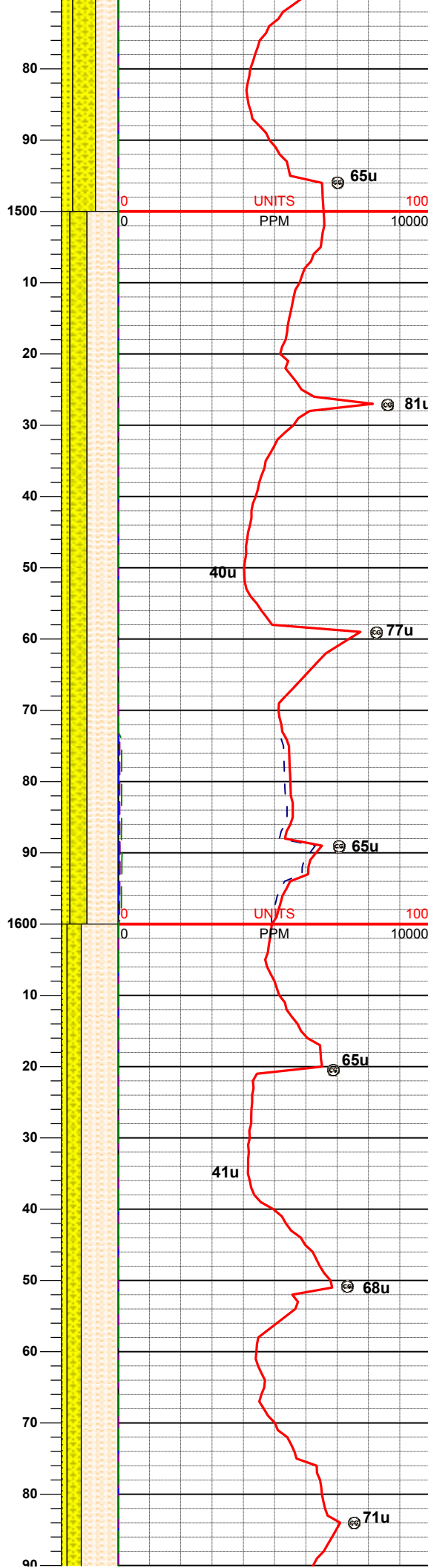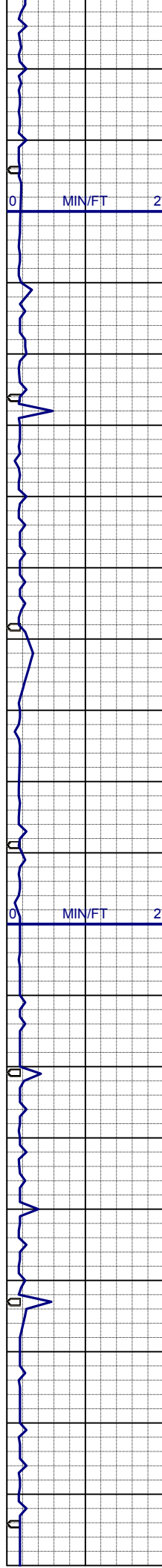
MD   1475'

WT 8.4 / VIS 28

SHYSLTST: lt-modgy, occ dkgy, sft-
firm, f-vfgr, sbblky-sbplty, modsrt, arg
mtx, slcalc
SS: wh- ltgy, sme bf, clr- trnsl, m-fgr,
sft- sl firm, blky-sbblky, w srt, p cmt,
sil- slarg mtx, mod calc, slmica, tr
glau, grdg- SHYSS: ltgy-mgy, trnsl-
op, sft-firm, sbblky-sbplty, mod srt, sil-
arg mtx, sl calc

MD   1569'
INC   1.2°
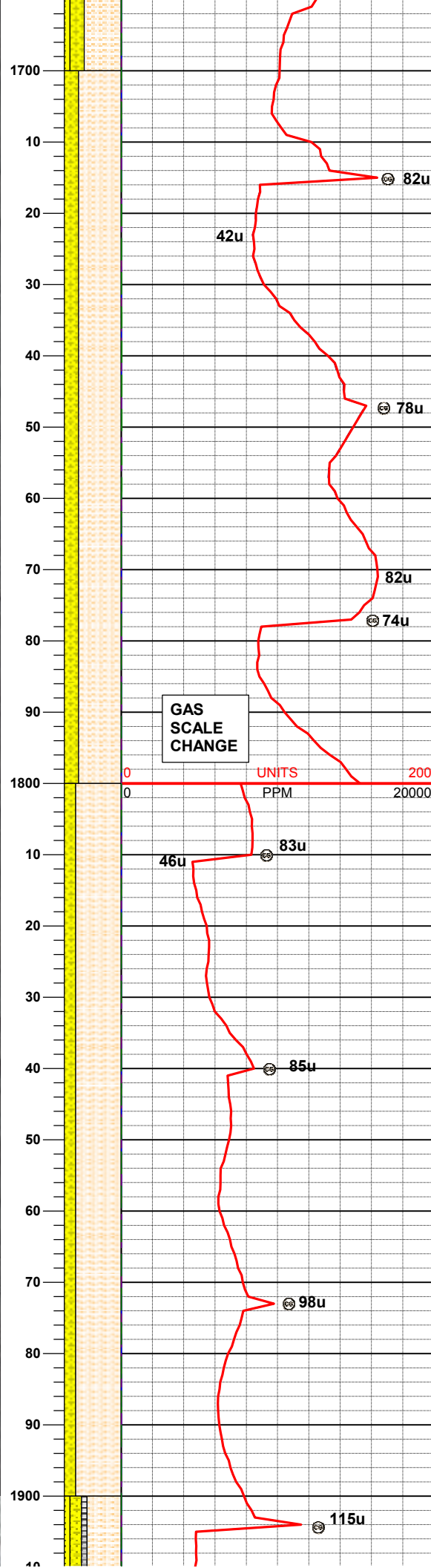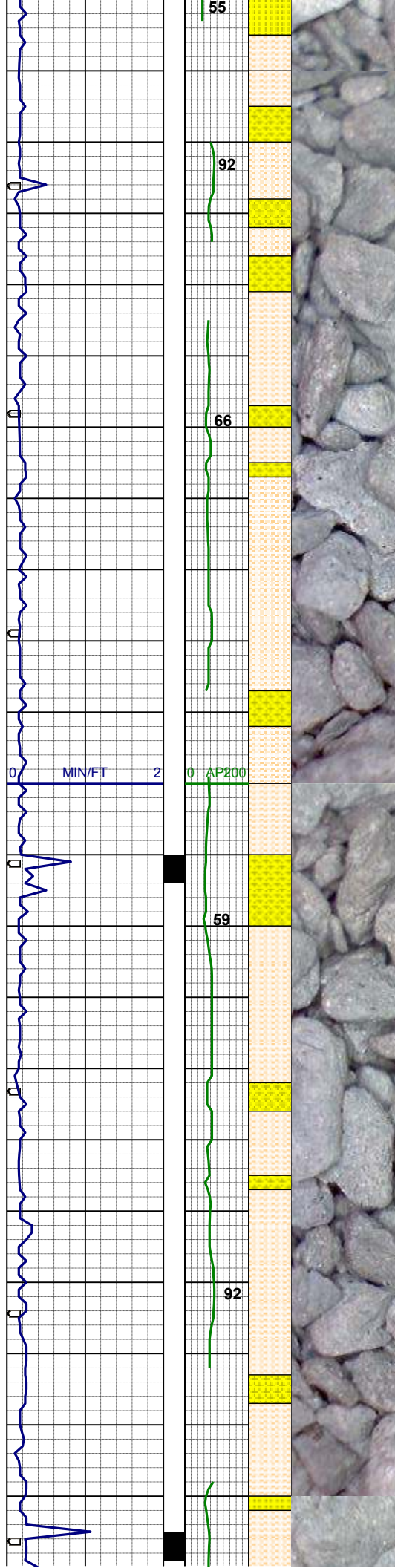AZI   99.1°
TVD   1568.9'

SHYSLTST: lt-modgy, occ dkgy, sft-
firm, f-vfgr, sbblky-sbplty, modsrt, arg
mtx, slcalc
SS: wh- ltgy, sme bf, clr- trnsl, m-fgr,
sft- sl firm, blky-sbblky, w srt, p cmt,
sil- slarg mtx, mod calc, slmica, tr
glau, grdg- SHYSS: ltgy-mgy, trnsl-
op, sft-firm, sbblky-sbplty, mod srt, sil-
arg mtx, sl calc

MD   1664'
INC   0.9°
AZI   88.0°
TVD   1663.9'

Log curve labels:
- MIN/FT 0 ... 2
- 0 AP200
- UNITS 0 ... 100
- PPM 0 ... 10000

Track values: 52, 55, 70, 81

Gas readings: 65u, 81u, 40u, 77u, 65u, 65u, 41u, 68u, 71u

Track 1 (MIN/FT)

0 | MIN/FT | 2

Track 2 (AP200)

0 | AP200

55
92
66

59
92

Depth Track

1700
10
20
30
40
50
60
70
80
90
1800
10
20
30
40
50
60
70
80
90
1900

Gas Track (UNITS / PPM)

0 | UNITS | 200
0 | PPM | 20000

82u
42u
78u
82u
74u

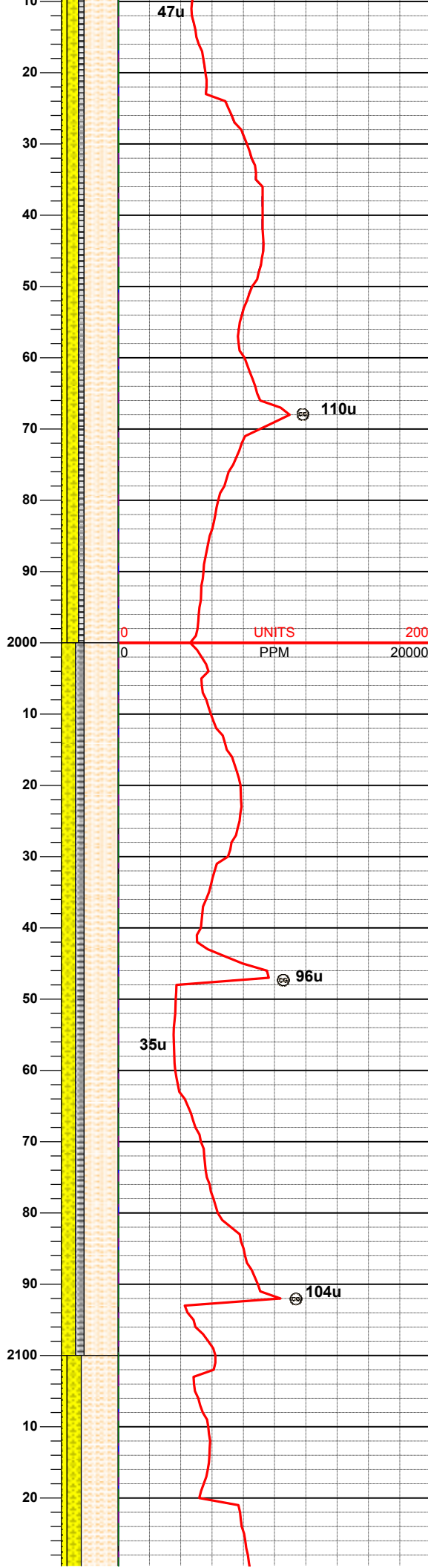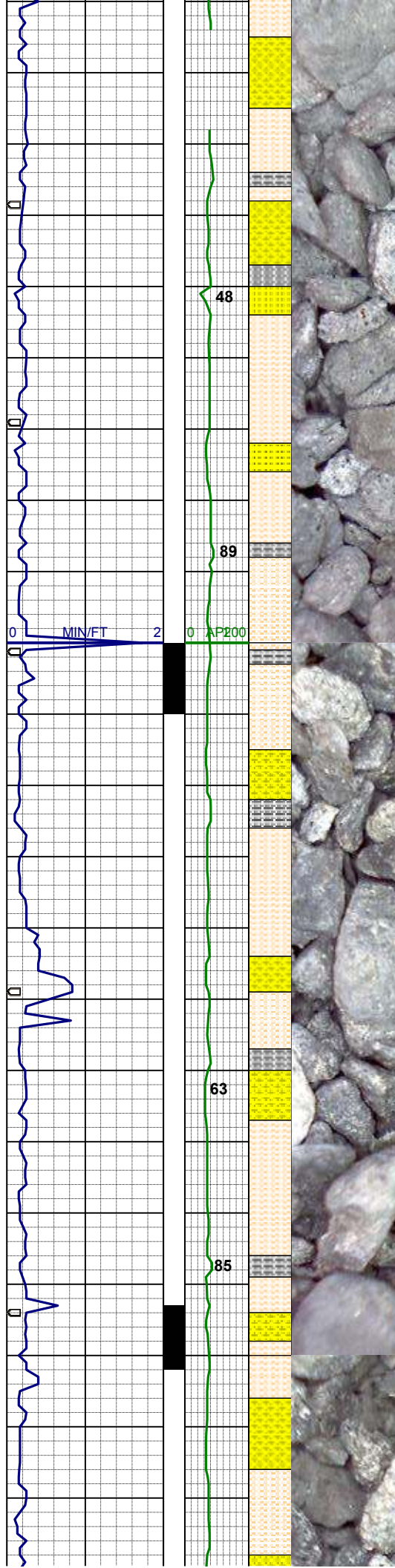**GAS SCALE CHANGE**

83u
46u
85u
98u
115u

Descriptions

SHYSLTST: lt-modgy, occ dkgy, sft-firm, f-vfgr, sbblky-sbplty, modsrt, arg mtx, slcalc, grdg-sltysh
SHYSS: ltgy-mgy, trnsl- op, sft-firm, sbblky-sbplty, mod srt, sil-arg mtx, tr glauc, sl calc

MD	1759'
INC	0.7°
AZI	82.8°
TVD	1758.9'

SHYSLTST: tan-lt-modgy, occ dkgy, sft-firm, f-vfgr, sbblky-sbplty, modsrt, arg mtx, slcalc, grdg-sltysh
SHYSS: ltgy-mgy, trnsl- op, sft-firm, sbblky-sbplty, mod srt, sil-arg mtx, tr glauc, sl calc

MD	1854'
INC	1.3°
AZI	7.2°
TVD	1853.8'

WT 8.4 / VIS 29

47u

SHYSLTST: tan-lt-modgy, occ dkgy, sft-firm, f-vfgr, sbblky-sbplty, modsrt, arg mtx, slcalc, grdg-sltysh
SHYSS: ltgy-mgy, trnsl- op, sft-firm, sbblky-sbplty, mod srt, sil-arg mtx, tr glauc, sl calc
SS: wh- ltgy, sme bf, clr- trnsl, m-fgr, sft- sl firm, blky-sbblky, w srt, p cmt, sil- slarg mtx, mod calc, slmica, tr glau
SLTYSH: mgy-dkgy, sft-firm, f-vfgr, sbplty-plty, wsrt, sl calc

MD	1949'
INC	2.2°
AZI	345.7°
TVD	1948.8'

48

110u

89

0 MIN/FT 2   0 API 200   0 UNITS 200
                             0 PPM 20000

96u

MD	2042'
INC	1.5°
AZI	358.0°
TVD	2041.8'

SHYSLTST: tan-lt-modgy, occ dkgy, sft-firm, f-vfgr, sbblky-sbplty, modsrt, arg mtx, slcalc
SHYSS: ltgy-mgy, trnsl- op, sft-firm, sbblky-sbplty, mod srt, sil-arg mtx, tr glauc, sl calc, grdg-ss, tr ss
SLTYSH: mgy-dkgy, sft-firm, f-vfgr, sbplty-plty, wsrt, sl calc

WT 8.4 / VIS 30
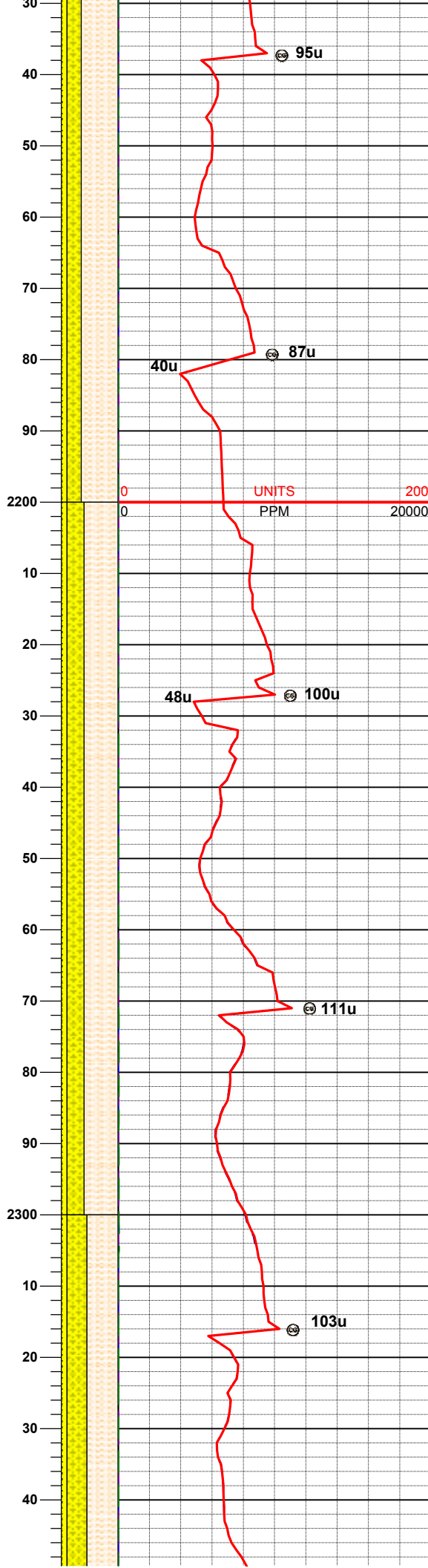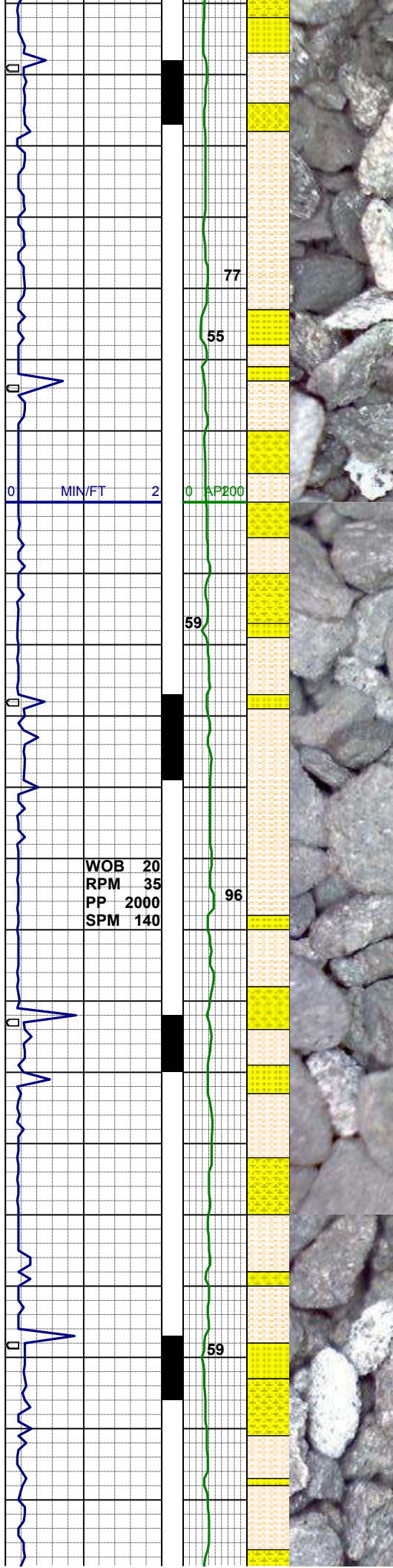
35u

63

85

104u

MD   2132'

⊕ 95u

SHYSLTST: tan-lt-modgy, tr dkgy, sft-
firm, f-vfgr, sbblky-sbplty, modsrt, arg
mtx, sdy ip, slcalc, grdg-sltysh
SHYSS: ltgy-mgy, trnsl- op, sft-firm,
sbblky-sbplty, mod srt, sil-arg mtx, tr
glauc, sl calc
SS: wh- ltgy, sme bf, clr- trnsl, m-fgr,
sft- sl firm, blky-sbblky, w srt, p cmt,
sil- slarg mtx, mod calc, slmica, tr glau

77

55

40u   ⊕ 87u

0   MIN/FT   2   0 AP200

| 0 | UNITS | 200 |
| 0 | PPM | 20000 |

2200

59

MD 2222'
INC 3.0°
AZI 23.7°
TVD 2221.6'
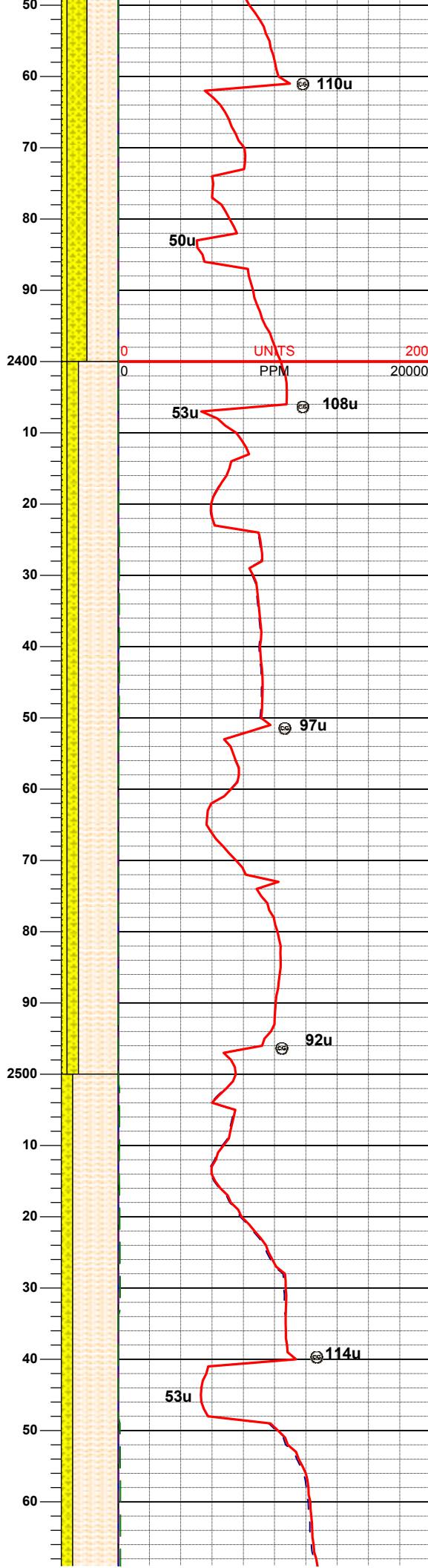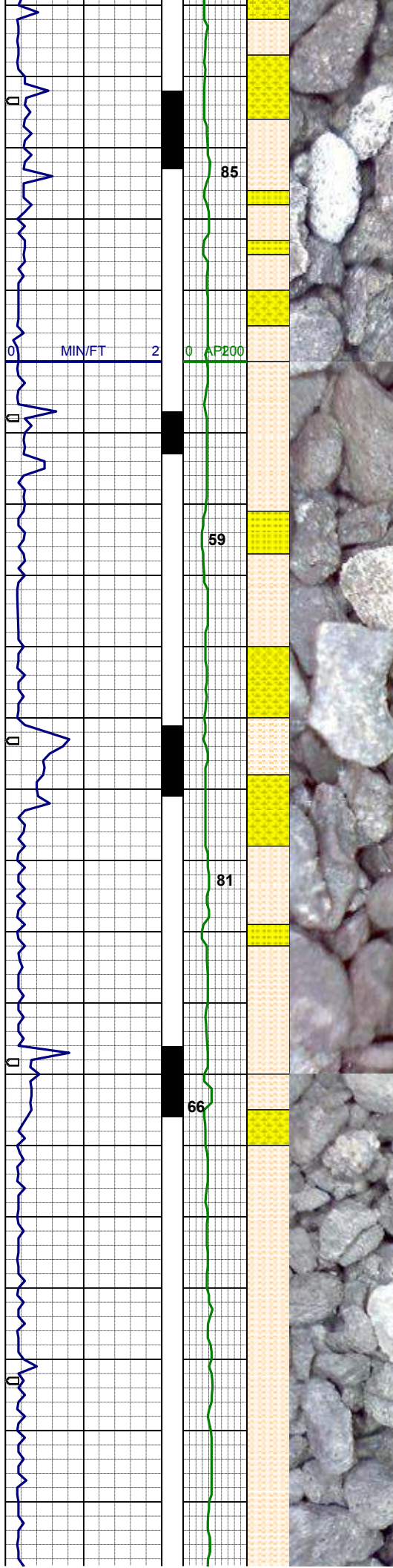
WT 8.45 / VIS 30

48u   ⊕ 100u

WOB 20
RPM 35
PP 2000
SPM 140

96

SHYSLTST: tan-lt-modgy, tr dkgy, sft-
firm, f-vfgr, sbblky-sbplty, modsrt, arg
mtx, sdy ip, slcalc, grdg-sltysh
SHYSS: ltgy-mgy, trnsl- op, sft-firm,
sbblky-sbplty, mod srt, sil-arg mtx, tr
glauc, sl calc
SS: wh- ltgy, sme bf, clr- trnsl, m-fgr,
sft- sl firm, blky-sbblky, w srt, p cmt,
sil- slarg mtx, mod calc, slmica, tr glau

⊕ 111u

2300

MD 2312'
INC 4.1°
AZI 34.2°
TVD 2311.4'

⊕ 103u

59

SHYSLTST: tan-lt-modgy, tr dkgy, sft-
firm, f-vfgr, sbblky-sbplty, modsrt, arg
mtx, sdy ip, slcalc, grdg-sltysh
SHYSS: ltgy-mgy, trnsl- op, sft-firm,

Depth Track (left scale)
- 50
- 60
- 70
- 80
- 90
- 2400
- 10
- 20
- 30
- 40
- 50
- 60
- 70
- 80
- 90
- 2500
- 10
- 20
- 30
- 40
- 50
- 60

Track headers
- 0   MIN/FT   2
- 0   API   200
- 0   UNITS   200
- 0   PPM   20000

Curve values (green API)
- 85
- 59
- 81
- 66

Gas show annotations (red)
- 110u
- 50u
- 53u   108u
- 97u
- 92u
- 114u
- 53u

Right column lithology descriptions

sbblky-sbplty, mod srt, sil-arg mtx, tr
glauc, sl calc
SS: wh- ltgy, sme bf, clr- trnsl, m-fgr,
sft- sl firm, blky-sbblky, w srt, p cmt,
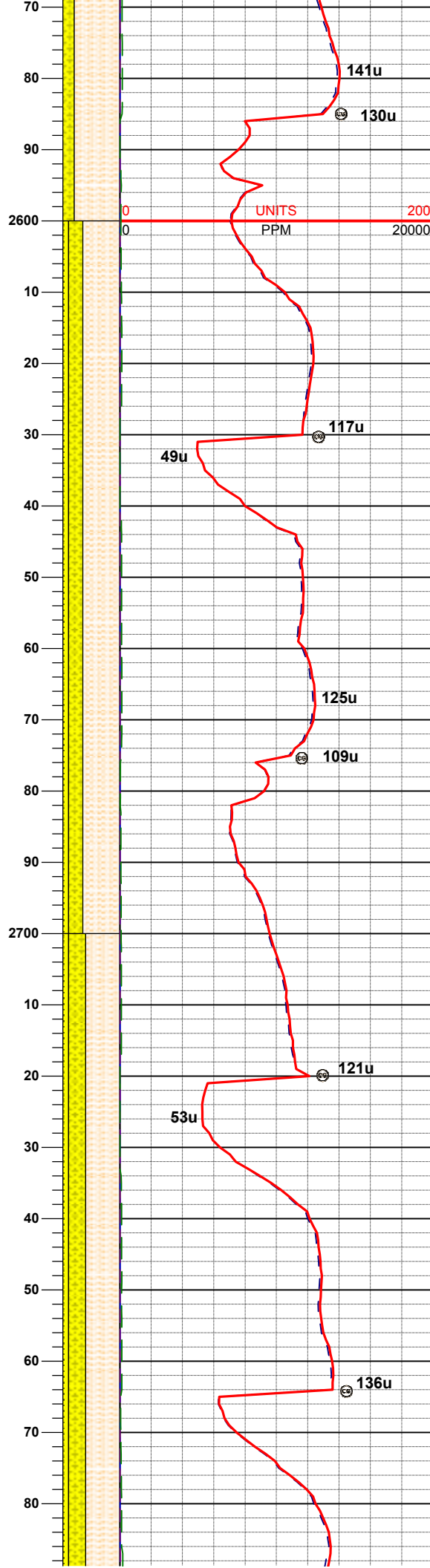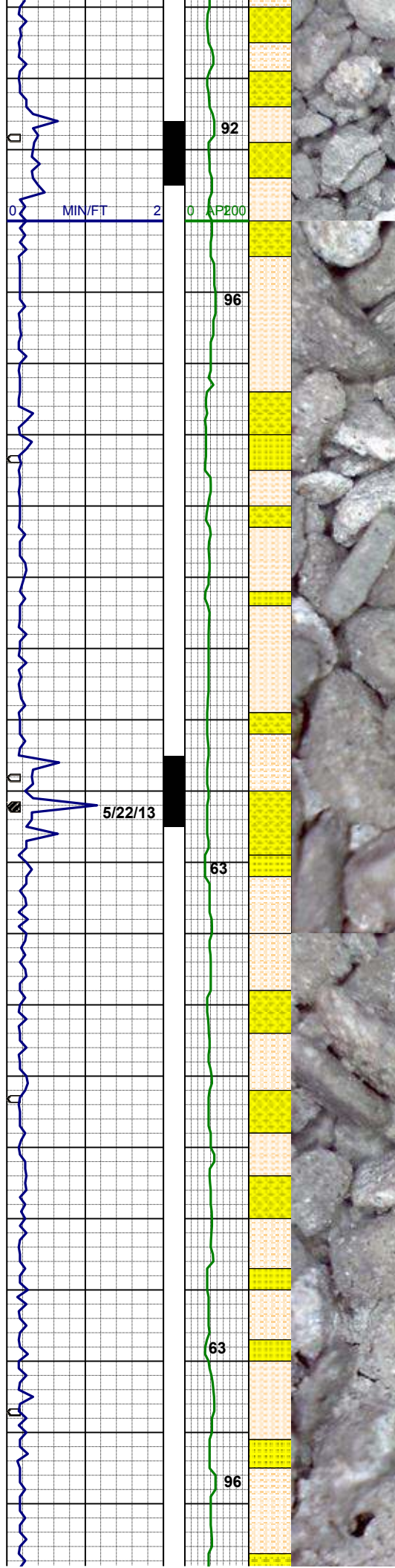sil- slarg mtx, mod calc, slmica, tr glau

MD   2402'
INC   7.3°
AZI   37.6°
TVD   2401.0'

WT 8.65 / VIS 29

SHYSLTST: tan-lt-modgy, tr dkgy, sft-
firm, f-vfgr, sbblky-sbplty, modsrt, arg
mtx, sdy ip, slcalc, grdg-sltysh
SHYSS: ltgy-mgy, trnsl- op, sft-firm,
sbblky-sbplty, mod srt, sil-arg mtx, tr
glauc, sl calc
SS: wh- ltgy, sme bf, clr- trnsl, m-fgr,
sft- sl firm, blky-sbblky, w srt, p cmt,
sil- slarg mtx, mod calc, slmica, tr glau

MD   2491'
INC   8.2°
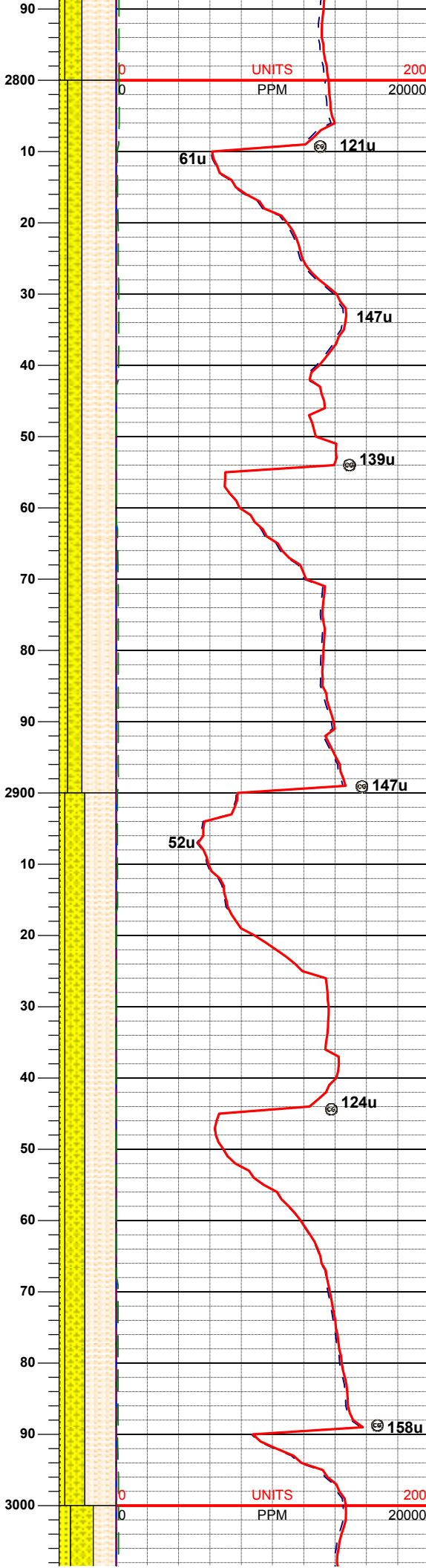**AZI   22.8°**
TVD   2489.2'

SHYSLTST: tan-lt-modgy, occ dkgy,
sft-firm, f-vfgr, sbblky-sbplty, modsrt,
arg mtx, sdy ip, slcalc, grdg-sltysh,
occ sltysh
SHYSS: ltgy-mgy, trnsl- op, sft-firm,
sbblky-sbplty, mod srt, sil-arg mtx, tr
glauc, sl calc

Track 1 (left)

0   MIN/FT   2

5/22/13

Track 2

0   AP   200

92

96

63

5/22/13

63

96

Depth / Gas Track

70
80 — 141u
130u
90
2600
0   UNITS   200
0   PPM   20000
10
20
30 — 117u
49u
40
50
60
70 — 125u
80 — 109u
90
2700
10
20 — 121u
53u
30
40
50
60
136u
70
80

Right column annotations

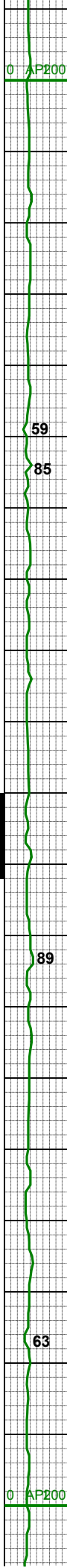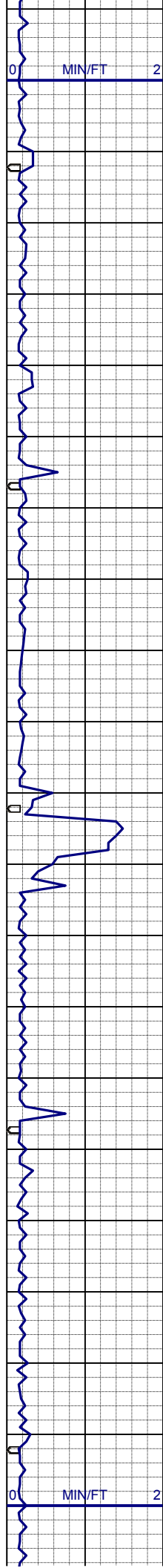MD   2581'
INC   8.5°
AZI   13.3°
TVD   2578.2'

SHYSLTST: tan-lt-modgy, occ dkgy, sft-firm, f-vfgr, sbblky-sbplty, modsrt, arg mtx, sdy ip, slcalc, grdg-sltysh, occ sltysh
SHYSS: ltgy-mgy, trnsl- op, sft-firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc
SS: wh- ltgy, sme bf, clr- trnsl, m-fgr, sft- sl firm, blky-sbblky, mod srt, sil-slarg mtx, sl calc

MD   2671'
INC   9.0°
AZI   0.7°
TVD   2667.2'

SHYSLTST: tan-lt-modgy, occ dkgy, sft-firm, f-vfgr, sbblky-sbplty, modsrt, arg mtx, sdy ip, slcalc, grdg-sltysh, occ sltysh
SHYSS: ltgy-mgy, trnsl- op, sft-firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc
SS: wh- ltgy, sme bf, clr- trnsl, m-fgr, sft- sl firm, blky-sbblky, mod srt, sil-slarg mtx, sl calc

MD   2761'
INC   8.4°
AZI   351.2°
TVD   2756.1'

Track 1 (left): MIN/FT 0 — 2

Track 2: 0 AP200, values: 59, 85, 89, 63

Depth scale: 2800, 10, 20, 30, 40, 50, 60, 70, 80, 90, 2900, 10, 20, 30, 40, 50, 60, 70, 80, 90, 3000

Gas/chromatograph track: UNITS 0 — 200, PPM 0 — 20000

Gas peak labels:
- 121u
- 61u
- 147u
- 139u
- 147u
- 52u
- 124u
- 158u

WT 8.6 / VIS 31

MD   2851'
INC   8.4°
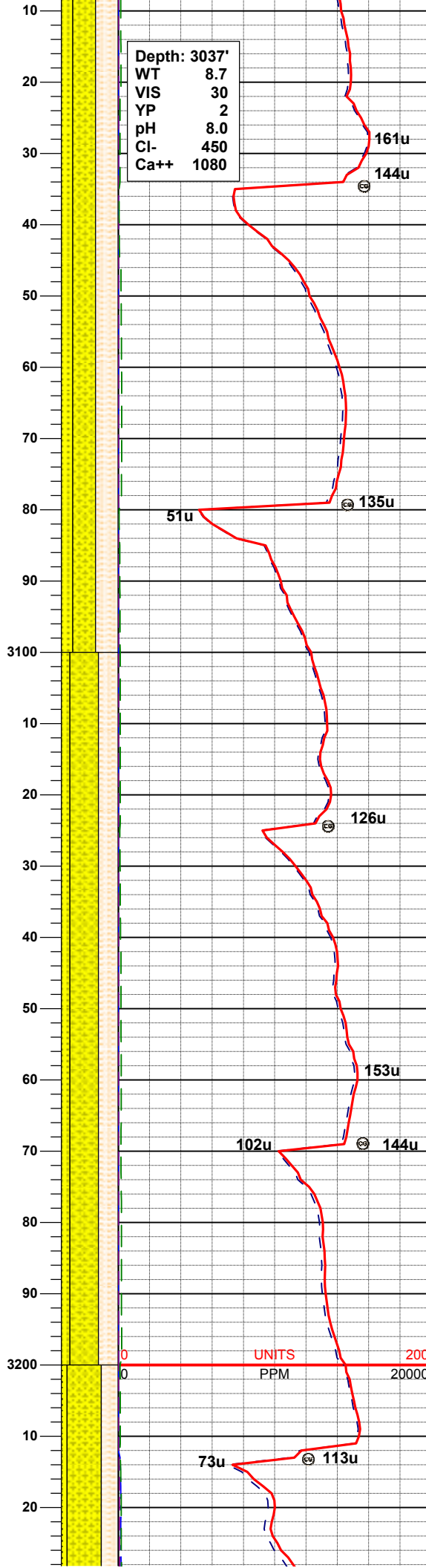**AZI   347.0°**
TVD   2845.2'

SHYSLTST: tan-lt-modgy, occ dkgy, sft-firm, f-vfgr, sbblky-sbplty, modsrt, arg mtx, sdy ip, slcalc, grdg-sltysh, occ sltysh

SHYSS: ltgy-mgy, trnsl- op, sft-firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc

SS: wh- ltgy, clr- trnsl, m-fgr, sft- sl firm, blky-sbblky, mod srt, sil- slarg mtx, sl calc

MD   2941'
INC   7.4°
AZI   340.1°
TVD   2934.3'

SHYSLTST: tan-lt-modgy, occ dkgy, sft-firm, f-vfgr, sbblky-sbplty, modsrt, arg mtx, sdy ip, slcalc, grdg-sltysh, occ sltysh

SHYSS: ltgy-mgy, trnsl- op, sft-firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc

SS: wh- ltgy, clr- trnsl, m-fgr, sft- sl firm, blky-sbblky, mod srt, sil- slarg mtx, sl calc
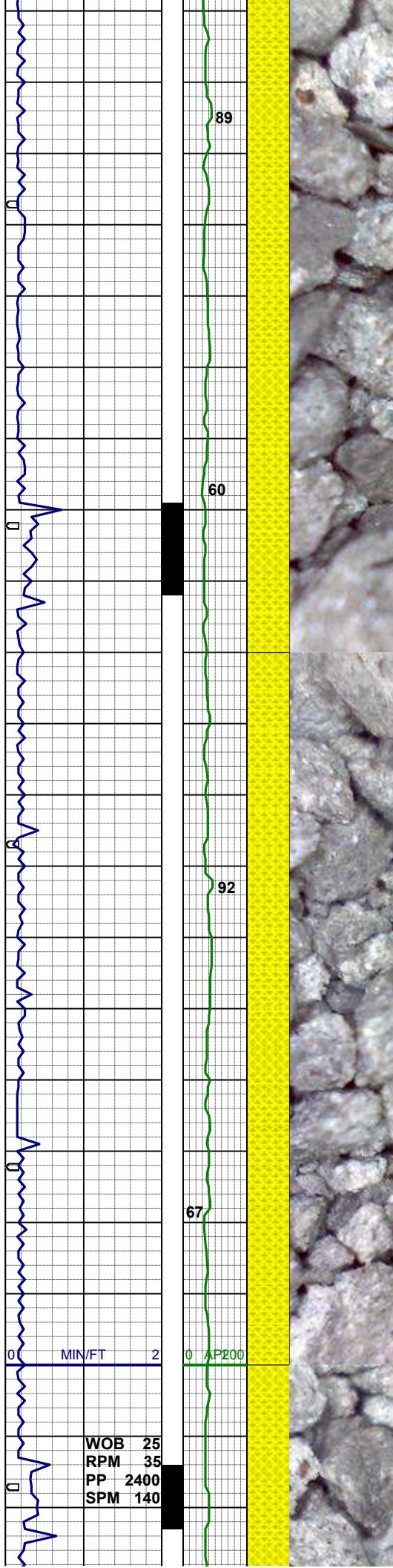
Depth: 3037'

WT	8.7
VIS	30
YP	2
pH	8.0
Cl-	450
Ca++	1080

89

60

92

67

161u

144u

135u

51u

126u

153u

102u   144u

73u   113u

MD 3030'
INC 6.9°
AZI 337.5°
TVD 3022.6'

SHYSLTST: tan-lt-modgy, occ dkgy, sft-firm, f-vfgr, sbblky-sbplty, modsrt, arg mtx, sdy ip, slcalc, grdg-sltysh, occ sltysh

SHYSS: ltgy-mgy, trnsl- op, sft-firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc

SS: wh- ltgy, clr- trnsl, m-fgr, sft- sl firm, blky-sbblky, mod srt, sil- slarg mtx, sl calc, mica, tr glau
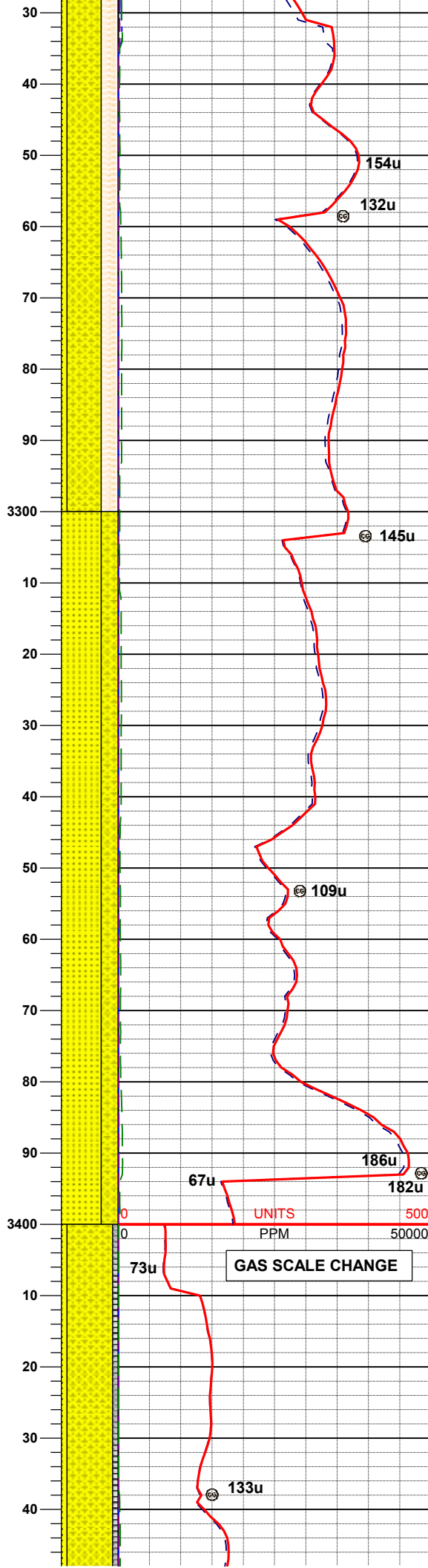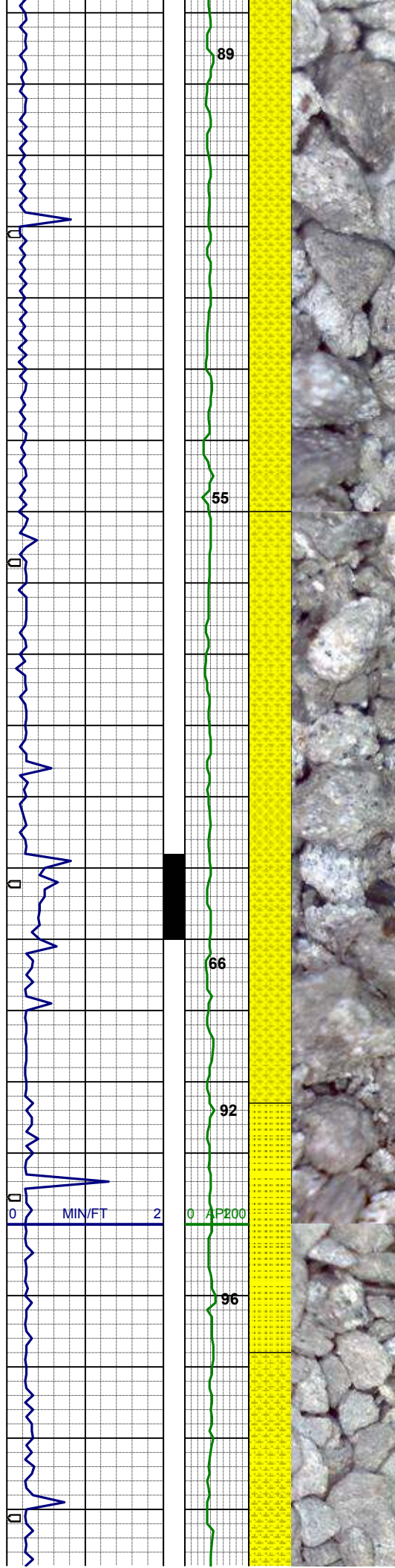
MD 3120'
INC 6.6°
AZI 353.3°
TVD 3112.0'

SHYSS: ltgy-mgy, trnsl- op, sft-firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc

SHYSLTST: tan-lt-modgy, occ dkgy, sft-firm, f-vfgr, sbblky-sbplty, modsrt, arg mtx, sdy ip, slcalc, grdg-sltysh, occ sltysh

SS: wh- ltgy, clr- trnsl, m-fgr, sft- sl firm, blky-sbblky, mod srt, sil- slarg mtx, sl calc, mica, tr glau

MD 3210'
INC 6.1°
AZI 348.4°
TVD 3201.5'

0   MIN/FT   2

0   AP200

0   UNITS   200
0   PPM   20000

WOB 25
RPM 35
PP 2400
SPM 140

Track 1 (MIN/FT): values along curve

89

55

66

92

96

0 MIN/FT 2
0 API 100

Depth track (left log section):
30
40
50
60
70
80
90
3300
10
20
30
40
50
60
70
80
90
3400
10
20
30
40

Gas / Units track (red curve):

SHYSS: ltgy-mgy, trnsl- op, sft-firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc

SHYSLTST: tan-lt-modgy, occ dkgy, sft-firm, f-vfgr, sbblky-sbplty, modsrt, arg mtx, sdy ip, slcalc, grdg-sltysh, occ sltysh

SS: wh- ltgy, clr- trnsl, m-fgr, sft- sl firm, blky-sbblky, mod srt, sil- slarg mtx, sl calc, mica, tr glau

154u

132u

145u

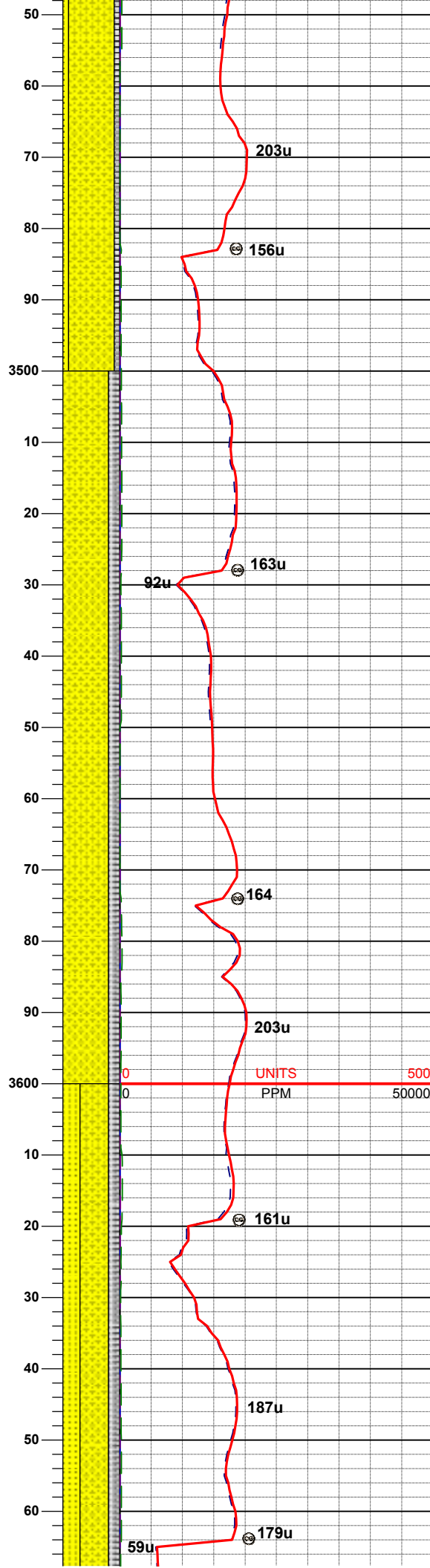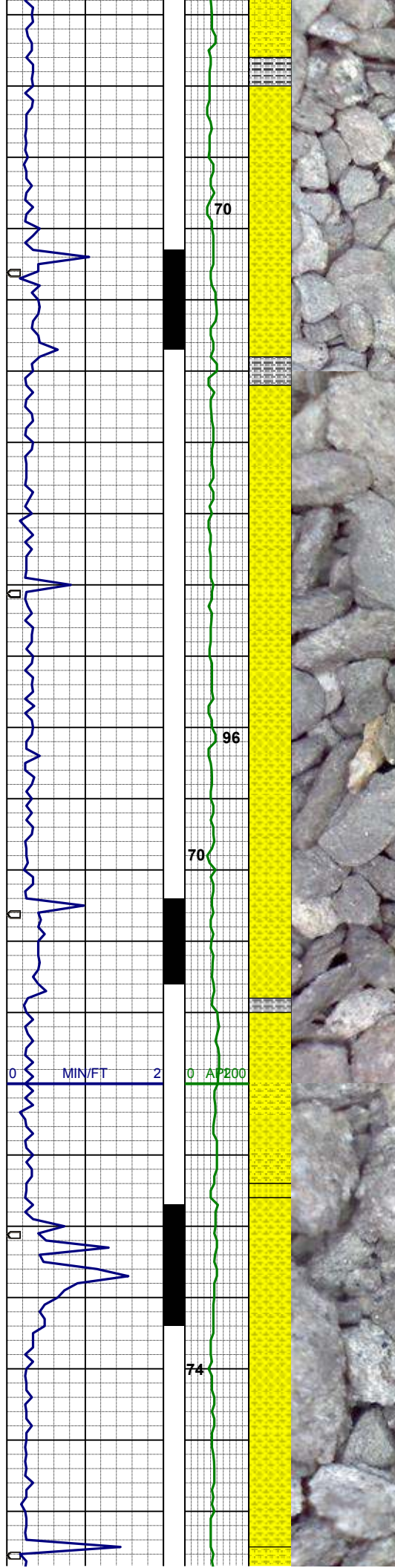| MD | 3300' |
INC	6.5°
AZI	337.8°
TVD	3290.9'

109u

SS: wh- ltgy, clr- trnsl- op, m-fgr, firm, sbblky, mod srt, mod cmt, sil- arg mtx, mod calc, grdg- SHYSS: ltgy-mgy, trnsl- op, mod firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc, tr pyr, sl mica

186u

67u

182u

MD	3390'
INC	7.1°
AZI	342.9°
TVD	3380.3'

WT 8.7 / VIS 30

0 UNITS 500
0 PPM 50000

GAS SCALE CHANGE

73u

133u

SHYSS: ltgy-mgy, trnsl- op, mod firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc, grdg- sltysh

SS: ltgy, clr- trnsl- op, m-fgr, firm, sbblky, mod srt, mod cmt, sil- arg mtx,

sbblky, mod srt, mod cmt, sil-arg mtx,
mod calc

50

60

70 — 203u

70

80 — ⊙ 156u

90

MD   3480'
INC   5.2°
AZI   345.5°
TVD   3469.8'

3500

WT 8.55 / VIS 32

96

10

20

163u
92u — ⊙

30

40

SHYSS: ltgy-mgy, trnsl- op, mod firm,
sbblky-sbplty, mod srt, sil-arg mtx, sl
calc, grdg- sltysh

50

70

60

MD   3570'
INC   4.7°
AZI   355.9°
TVD   3559.4'

70 — ⊙ 164

80

90 — 203u

0   MIN/FT   2   0 API 200   3600   0   UNITS   500
                                        0   PPM   50000

10

161u
20 — ⊙

30

74

40

SHYSS: ltgy-mgy, occ dkgy, trnsl- op,
mod firm, sbblky-sbplty, mod srt, sil-
arg mtx, sl calc, tr pyr clus, grdg-
sltysh
SS: ltgy, clr- trnsl- op, m-fgr, firm,
sbblky, mod srt, mod cmt, sil- arg mtx,
mod calc

187u

50

MD   3659'
INC   6.3°
AZI   351.0°
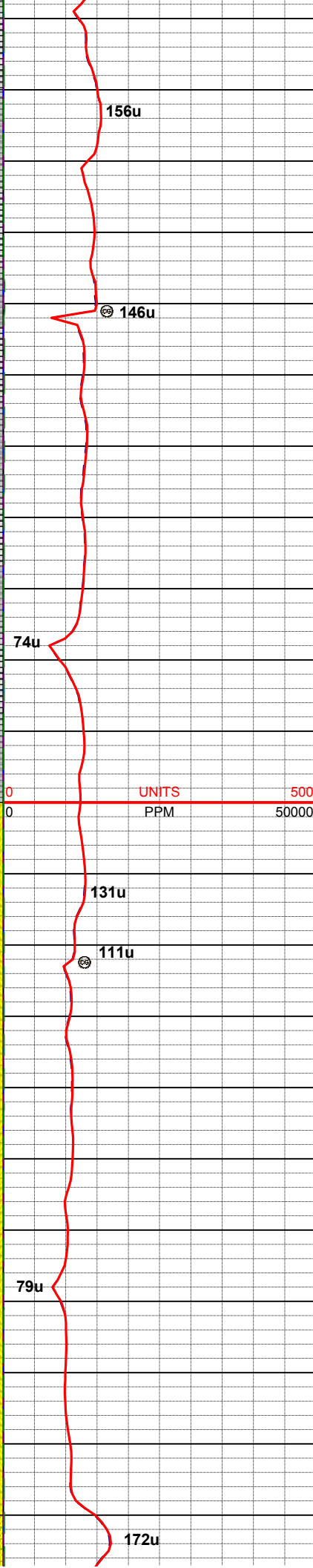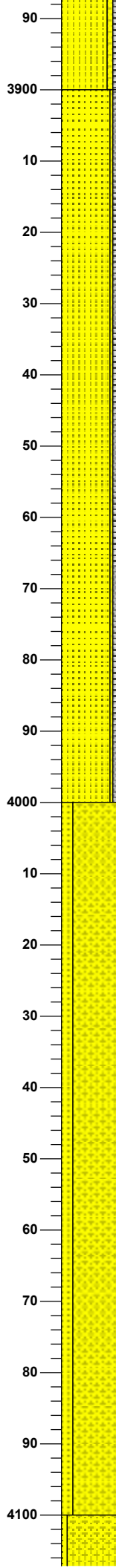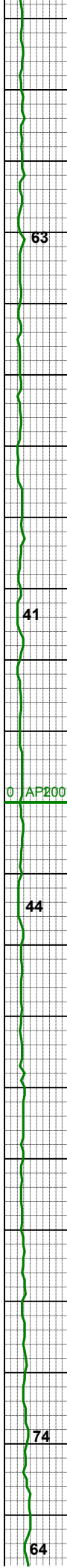TVD   3648.0'
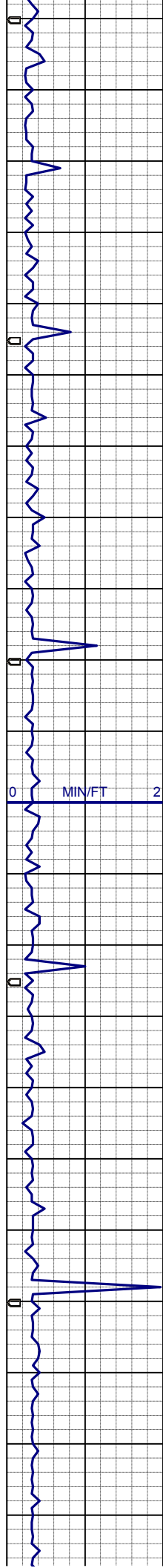
60

179u
⊙

59u

WT 8.6 / VIS 32
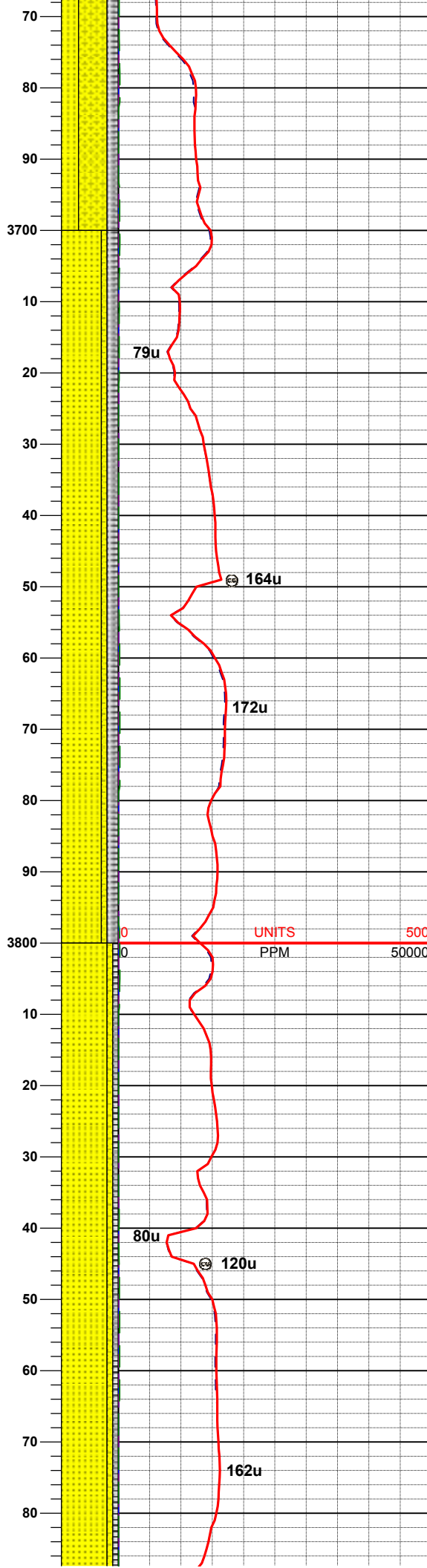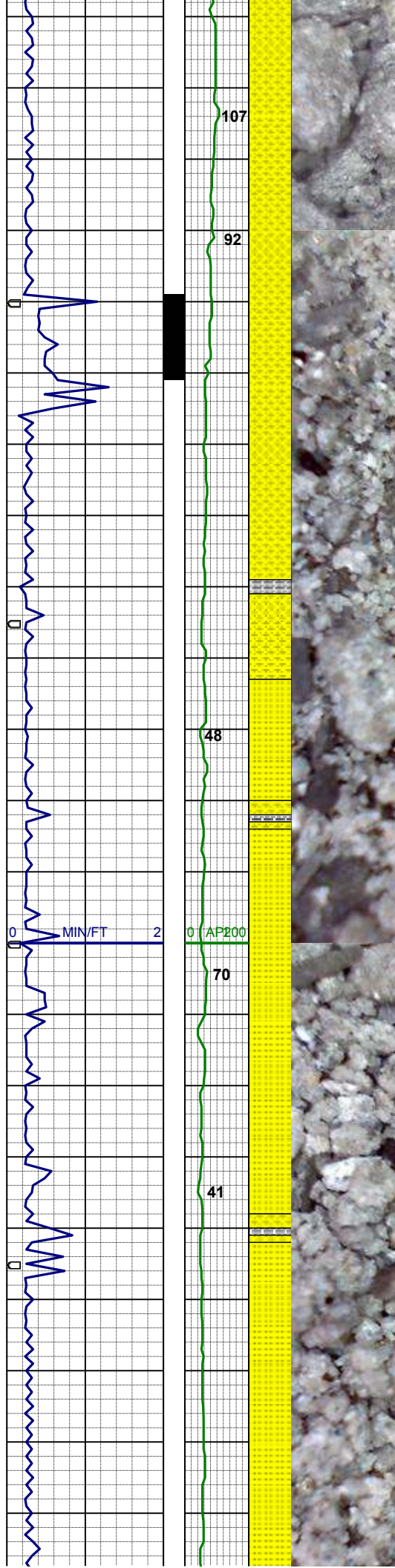
SS: wh- ltgy, clr- trns, m-fgr, lse,
sbblky, w srt, p cmt, pred sil mtx, mod
calc, occ glau
SLTYSH: m- dkgy, pred sbplty, firm,
gt tex, sl calc, sdy ip, grdg- shyss

MD	3749'
INC	7.4°
AZI	352.4°
TVD	3737.4'

SS: wh- ltgy, s&p, clr- trns, m-fgr, lse
ip, sbblky, w srt, p cmt, pred sil mtx,
mod calc, occ glau
SLTYSH: m- dkgy, pred sbplty, firm,
gt tex, sl calc, sdy ip, grdg- shyss

MD	3839'
INC	7.6°
AZI	355.4°
TVD	3826.6'

Track labels: 107, 92, 48, 70, 41

Gas labels: 79u, 164u, 172u, 80u, 120u, 162u

0 MIN/FT 2
0 API 200
0 UNITS 500
0 PPM 50000

Track 1 (left, blue curve):
0   MIN/FT   2

Track 2 (green curve):
0   API   200

Green curve values: 63, 41, 44, 74, 64

Track (red gas curve):
0   UNITS   500
0   PPM   50000

Depth scale: 3900, 10, 20, 30, 40, 50, 60, 70, 80, 90, 4000, 10, 20, 30, 40, 50, 60, 70, 80, 90, 4100

Top scale: 90

Gas readings: 156u, 146u, 74u, 131u, 111u, 79u, 172u

MD   3929'
INC   7.8°
AZI   355.4°
TVD   3915.8'

WT 8.6 / VIS 32

SS: wh- ltgy, s&p, clr- trns, m-fgr, lse ip, sbblky, w srt, p cmt, pred sil mtx, mod calc, occ glau
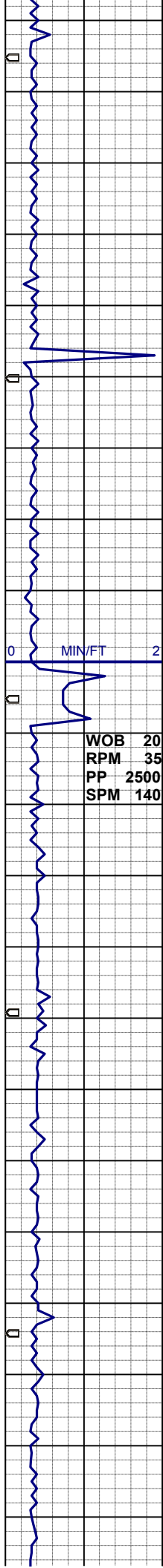SLTYSH: m- dkgy, pred sbplty, firm, gt tex, sl calc, sdy ip, grdg- shyss

MD   4019'
INC   8.3°
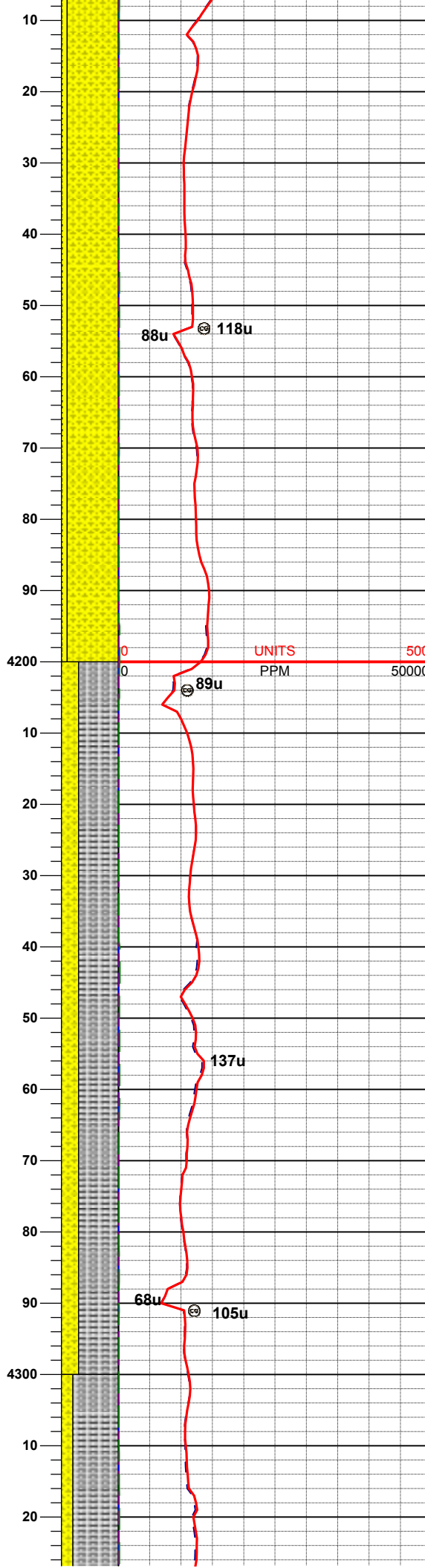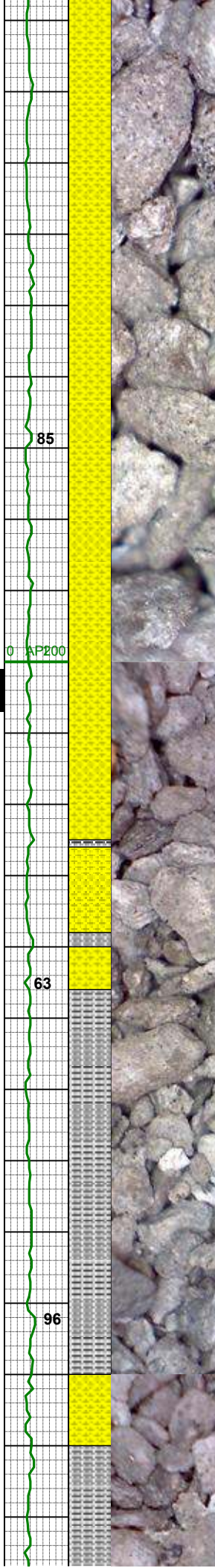**AZI   351.9°**
TVD   4004.9'

SHYSS: mgy, occ dkgy, trnsl- op, mod firm, sbblky-sbplty, mod srt, sil- arg mtx, sl calc, grdg- sltysh
SS: lt- mgy, clr- trnsl- op, m-fgr, firm, sbblky, mod srt, mod cmt, sil- arg mtx, sl calc
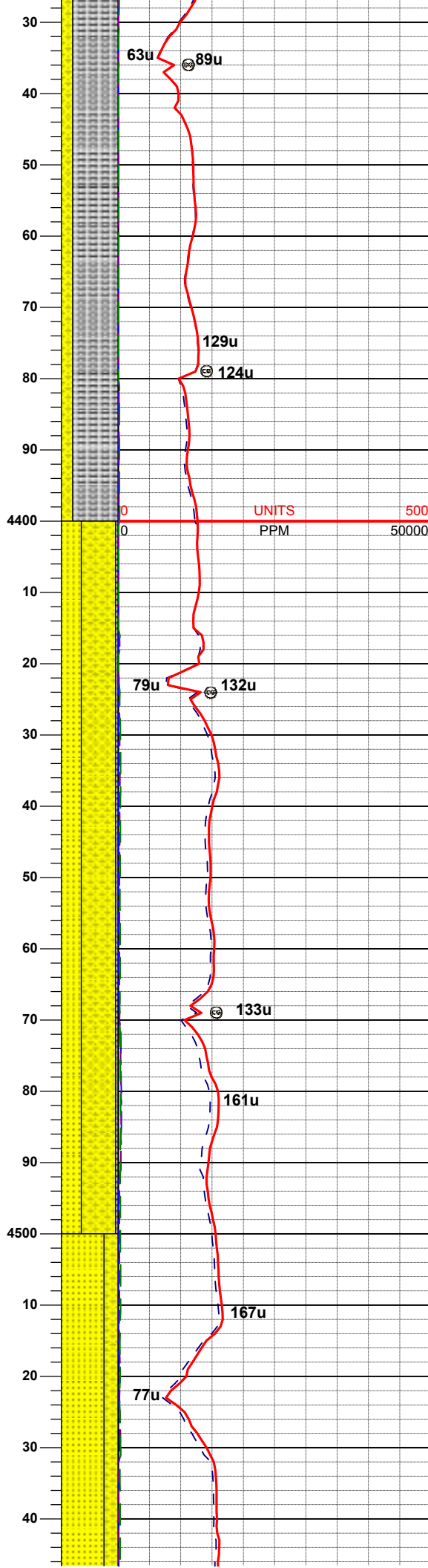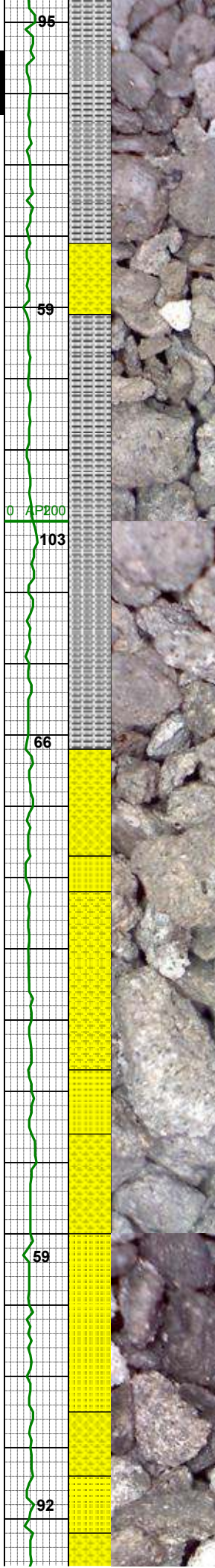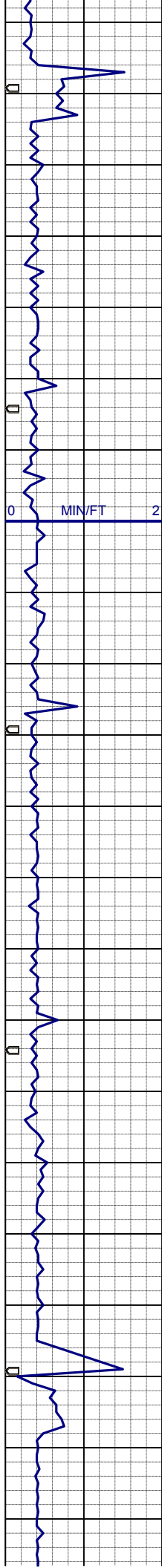
WT 8.6 / VIS 32

MD   4109'
INC   8.3°

SHYSS: mgy, occ dkgy, trnsl- op, mod firm, sbblky-sbplty, mod srt, sil- arg mtx, sl calc, grdg- sltysh
SS: lt- mgy, clr- trnsl- op, m-fgr, firm, sbblky, mod srt, mod cmt, sil- arg mtx, sl calc

MD 4198'
INC 7.4°
AZI 350.1°
TVD 4182.1'

WT 8.65 / VIS 31

SLTYSH: lt-mgy, sbplty-sbblky, sft- mfirm, gt txt, sdy ip, sl calc, grdg- shyss

MD 4288'
INC 6.5°
AZI 349.2°
TVD 4271.5'

WOB 20
RPM 35
PP 2500
SPM 140

0 MIN/FT 2
0 AP 200
0 UNITS 500
0 PPM 50000

88u 118u
89u
137u
68u 105u

85
63
96

10
20
30
40
50
60
70
80
90
4200
10
20
30
40
50
60
70
80
90
4300
10
20

Track headers: 0 MIN/FT 2 · 0 API 200 · 0 UNITS 500 · 0 PPM 50000

Gamma values: 95, 59, 103, 66, 59, 92

Gas shows: 63u, 89u, 129u, 124u, 79u, 132u, 133u, 161u, 167u, 77u

Depths: 30, 40, 50, 60, 70, 80, 90, 4400, 10, 20, 30, 40, 50, 60, 70, 80, 90, 4500, 10, 20, 30, 40

WT 8.6 / VIS 31

SLTYSH: lt-mgy, sbplty-sbblky, sft-mfirm, gt txt, sdy ip, sl calc, grdg-shyss

MD   4378'
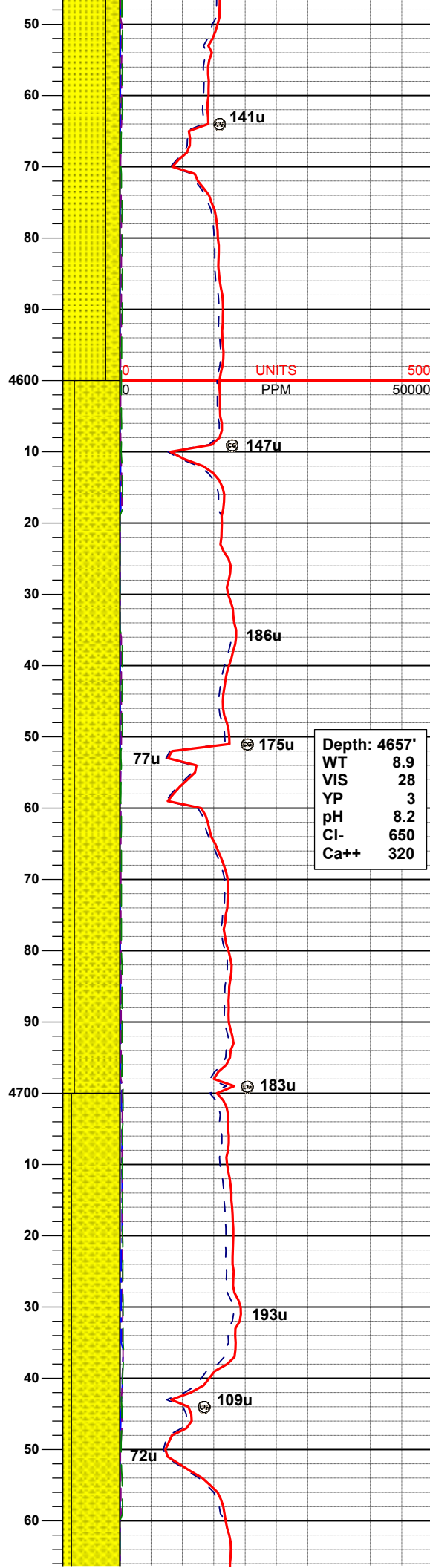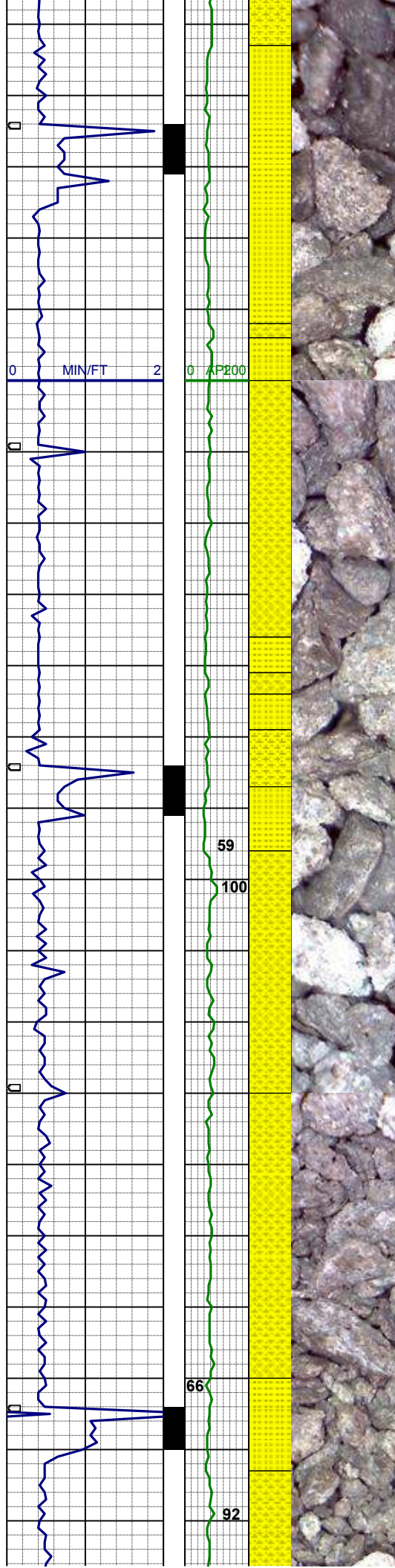INC   4.7°
AZI   5.2°
TVD   4361.0'

SHYSS: mgy, occ dkgy, trnsl- op, mod firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc, grdg- sltysh
SS: mgy, clr- trnsl- op, m-fgr, firm, sbblky, mod srt, mod cmt, sil- arg mtx, sl calc

MD   4468'
INC   4.4°
AZI   0.8°
TVD   4450.8'

WT 8.6 / VIS 31

SS: - SHYSS: wh- mgy, s&p ip, clr-trnsl- op, m-fgr, occ vfgr, m firm

Top depth markers (left track, MIN/FT 0–2): depth scale 50, 60, 70, 80, 90, 4600, 10, 20, 30, 40, 50, 60, 70, 80, 90, 4700, 10, 20, 30, 40, 50, 60

Left curve scale: 0 MIN/FT 2

Green curve scale: 0 AP200

Green curve values: 59, 100, 66, 92

Gas/units track:
- 0 UNITS 500
- 0 PPM 50000

Gas shows:
- 141u
- 147u
- 186u
- 175u
- 77u
- 183u
- 193u
- 109u
- 72u

Top right (partial): trnsl- op, m-fgr, occ vlgr, m firm, sbblky- sbplty, mod srt, mod cmt, sil-arg mtx, slty, shy, sl calc

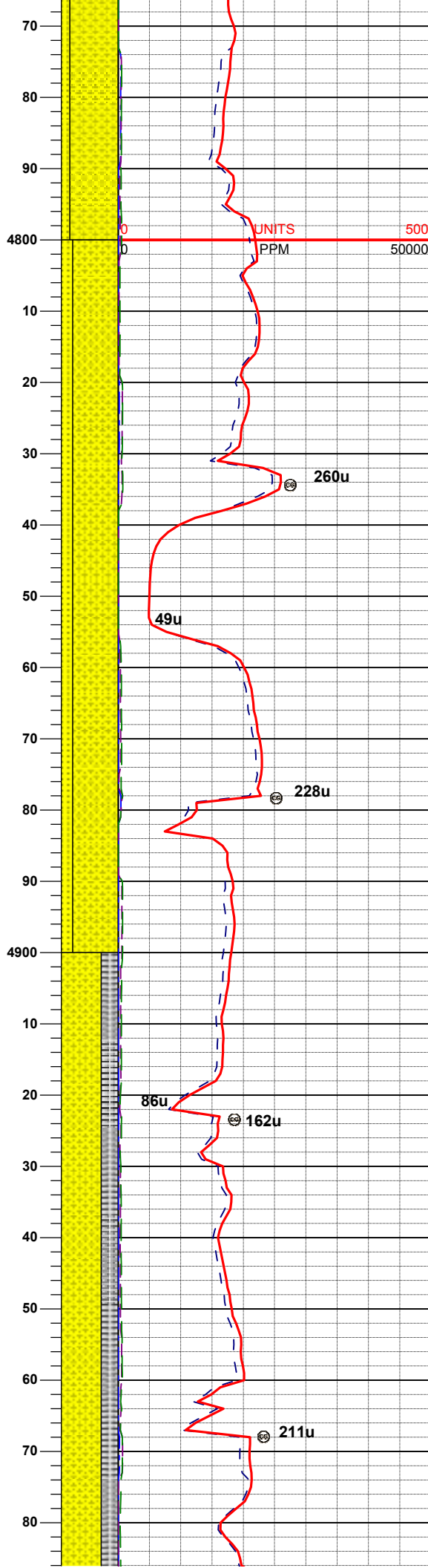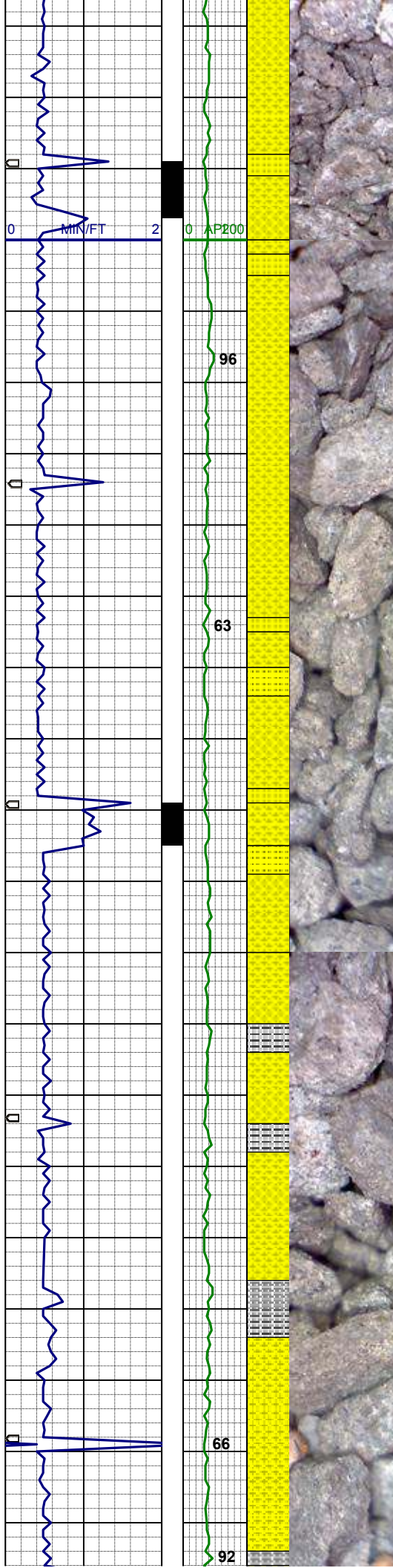**MD 4558'**
INC 4.0°
AZI 356.6°
TVD 4540.5'

MD 4648'
INC 3.3°
AZI 347.8°
TVD 4630.3'

Depth: 4657'	
WT	8.9
VIS	28
YP	3
pH	8.2
Cl-	650
Ca++	320

SHYSS: mgy, occ dkgy, trnsl- op, mod firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc, occ calc frag, tr pyr, grdg- sltysh

SS: wh- mgy, s&p ip, clr- trnsl- op, m-fgr, mod firm, sbblky, mod srt, mod cmt, sil- arg mtx, sl calc, tr glau

WT 8.6 / VIS 30

MD 4738'
INC 2.0°
AZI 348.4°
TVD 4720.2'

SHYSS: tan-mgy, occ dkgy, trnsl- op, f-vfgr, mod firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc, grdg- shysltst, tr sltysh

SS: wh- mgy, s&p ip, clr- trnsl- op, m-fgr, mod firm, sbblky, mod srt, mod cmt, sil- arg mtx, sl calc, tr glau

| 0 MIN/FT 2 | 0 API 200 | | | 70 |
| 80 |
| 90 |
| 4800 |
| 10 |
| 20 |
| 96 | 30 |
| 40 |
| 50 |
| 63 | 60 |
| 70 |
| 80 |
| 90 |
| 4900 |
| 10 |
| 20 |
| 30 |
| 40 |
| 50 |
| 66 | 60 |
| 70 |
| 80 |
| 92 |

UNITS
0   PPM   500
0   50000

260u

49u

228u

86u

162u

211u

MD   4828'
INC   1.2°
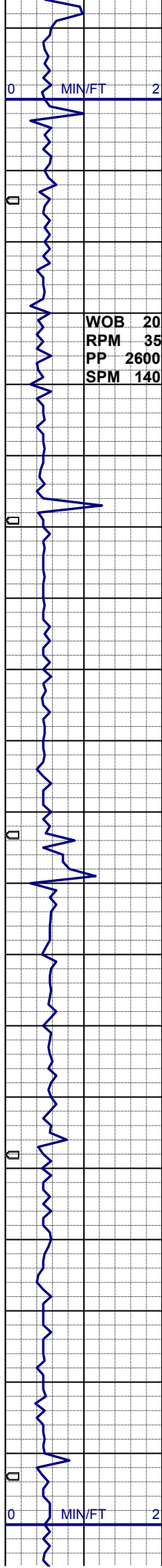**AZI   325.3°**
TVD   4810.2'

SHYSS: tan-mgy, occ dkgy, trnsl- op, f-vfgr, mod firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc, grdg- shysltst, tr sltysh, tr fos frag
SS: wh- mgy, s&p ip, clr- trnsl- op, m-fgr, mod firm, sbblky, mod srt, mod cmt, sil- arg mtx, sl calc, tr glau
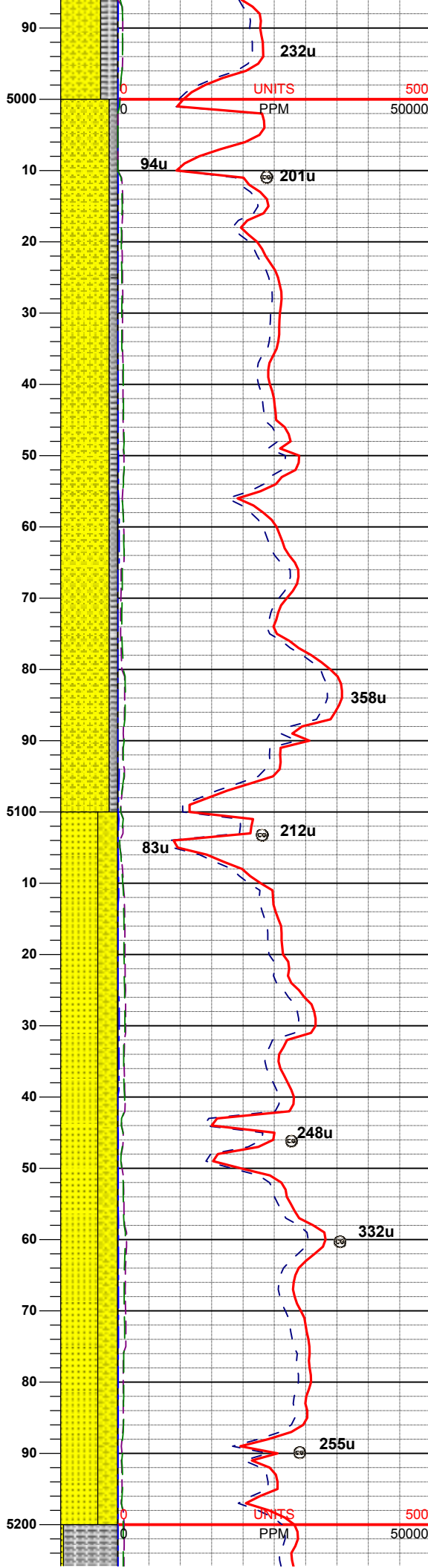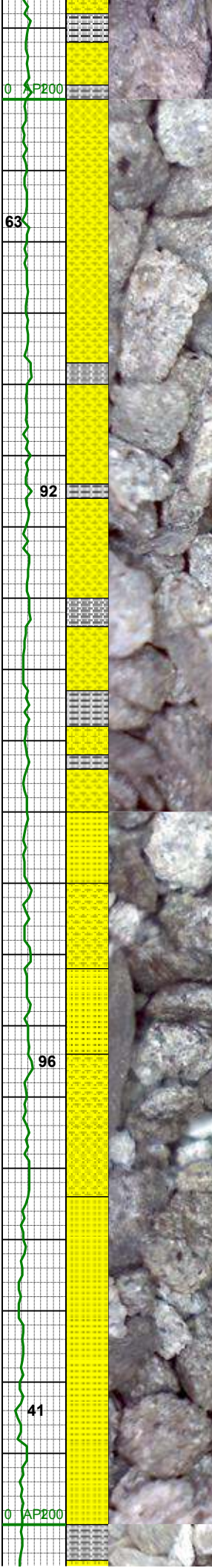
WT 8.8 / VIS 31

MD   4917'
INC   0.6°
AZI   73.6°
TVD   4899.2'

SHYSS: tan-mgy, occ dkgy, trnsl- op, f-vfgr, mod firm, sbblky-sbplty, mod srt, sil-arg mtx, sl calc, tr shysltst, tr fos frag, tr wh ss
SLTYSH: lt-mgy, sbplty-sbblky, tr plty, sft- mfirm, gt txt, occ sdy ip, sl calc, grdg- shysltst

Track 1 (MIN/FT)

0	MIN/FT	2

WOB 20
RPM 35
PP 2600
SPM 140

0 MIN/FT 2

Track 2

0 AP200

63

92

96

41

0 AP200

Depth / Gas Track (PPM / UNITS)

0 UNITS 500
0 PPM 50000

232u

5000

94u
201u

5100
83u 212u

248u

332u

255u

5200
0 UNITS 500
0 PPM 50000

Right column

MD 5007'
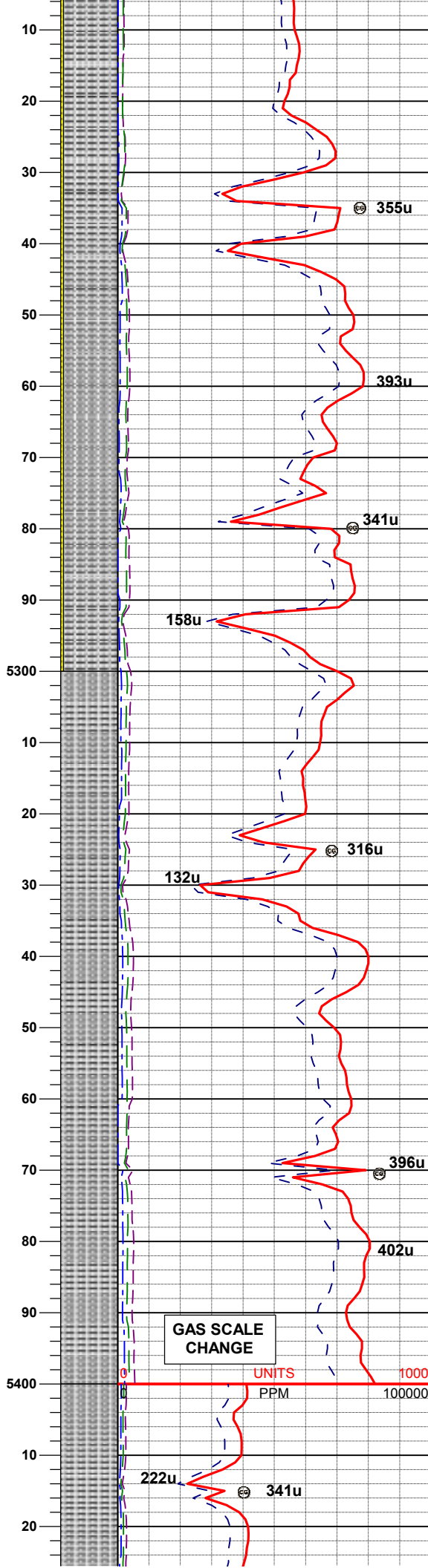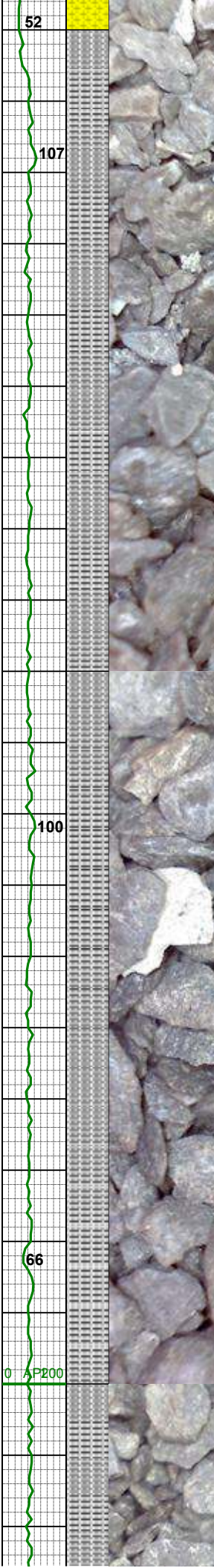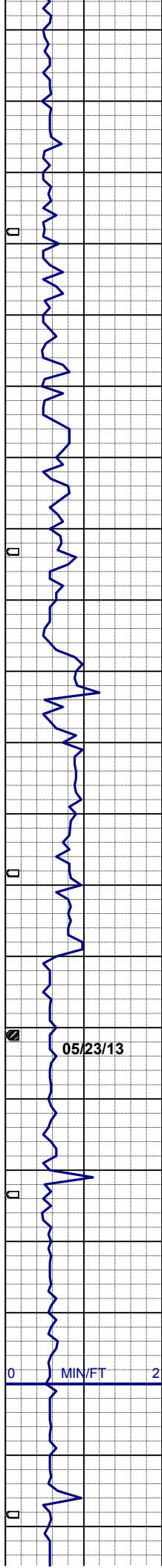INC 0.2°
AZI 57.1°
TVD 4989.2'

WT 8.8 / VIS 32

SHYSS: tan-mgy, occ dkgy, trnsl- op,
f-vfgr, mod firm, sbblky-sbplty, mod
srt, sil-arg mtx, sl calc, tr shysltst, tr
fos frag, tr wh ss
SLTYSH: lt-mgy, sbplty-sbblky, tr plty,
sft- mfirm, gt txt, occ sdy ip, sl calc,
grdg- shysltst

MD 5097'
INC 0.3°
AZI 333.6°
TVD 5079.2'

SS: wh- ltgy, clr- trnsl- op, m-fgr, mod
firm, blky-sbblky, mod srt, mod cmt,
sil- arg mtx, sl calc, tr glau
SHYSS: tan-mgy, occ dkgy, trnsl- op,
f-vfgr, mod firm, sbblky-sbplty, mod
srt, sil-arg mtx, sl calc, grdg-shysltst,
tr glau

WT 8.85 / VIS 31

MD 5187'
INC 0.4°
AZI 312.3°
TVD 5169.2'

52

107

100

05/23/13

66

0   MIN/FT   2

0 APIZOO

10

20

30

40

50

60

70

80

90

5300

10

20

30

40

50

60

70

80

90

5400

10

20

⊚ **355u**

393u

⊚ **341u**

158u

⊚ **316u**

132u

396u ⊚

402u

222u

⊚ **341u**

GAS SCALE
CHANGE

0   UNITS   1000
           PPM   100000

SLTYSH: lt-mgy, sbplty-sbblky, tr plty,
sft- mfirm, gt txt, tr sdy ip, sl calc, grdg
- shysltst, tr pyr
SS: wh- ltgy, clr- trnsl- op, m-fgr, mod
firm, blky-sbblky, mod srt, mod cmt,
sil- arg mtx, sl calc, tr glau

MD	5277'
INC	0.1°
AZI	273.1°
TVD	5259.2'

WT 8.9 / VIS 32

SLTYSH: lt-mgy, tr tan, sbplty-sbblky,
tr plty, sft- mfirm, gt txt, tr sdy ip, sl
calc, grdg- shysltst, tr pyr, tr shyss

MD	5366'
INC	0.2°
AZI	171.3°
TVD	5348.2'

102

74

30

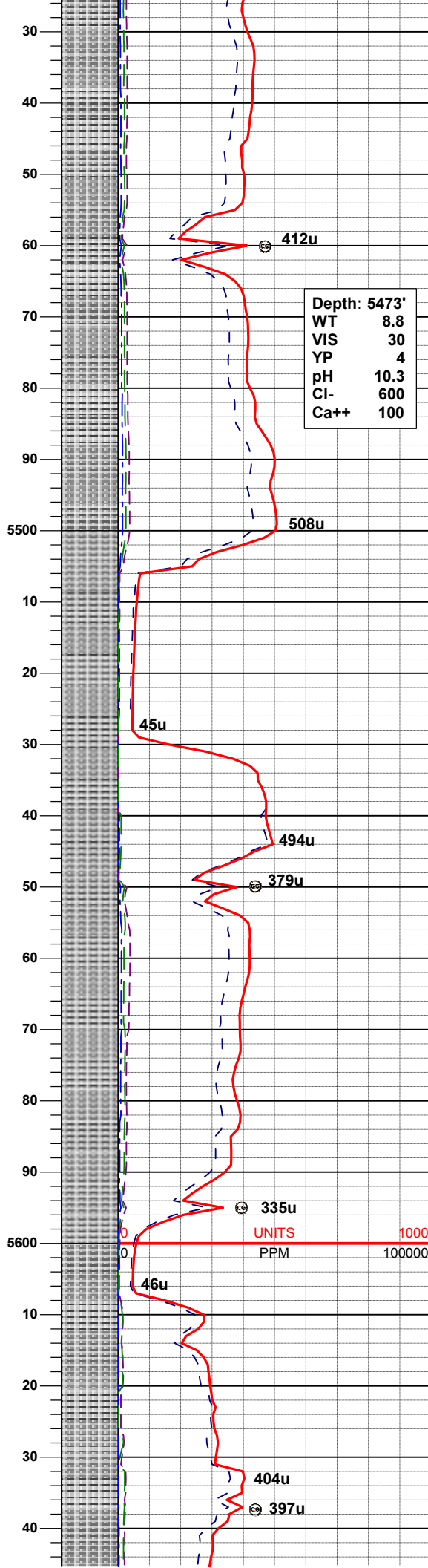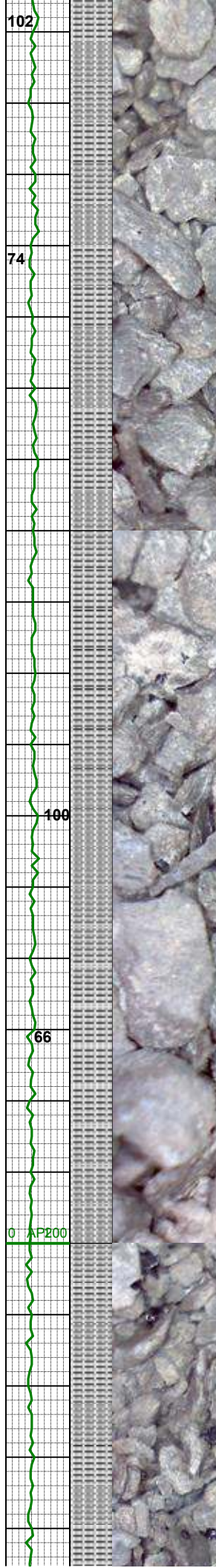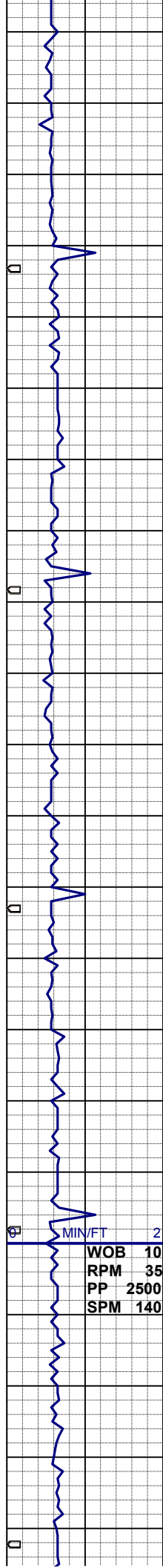**40**

SLTYSH: lt-mgy, tr tan, sbplty-sbblky, tr plty, sft- mfirm, gt txt, tr sdy ip, sl calc, grdg- shysltst, tr pyr, tr fos frag, tr shyss

MD	5456'
INC	0.4°
AZI	175.9°
TVD	5438.2'

50

60 ⊕ 412u

Depth: 5473'	
WT	8.8
VIS	30
YP	4
pH	10.3
Cl-	600
Ca++	100

70

80

90

5500 508u

10

20

30 45u

100

40

494u

50 ⊕ 379u

MD	5546'
INC	0.4°
AZI	148.8°
TVD	5528.2'

SLTYSH: lt-mgy, tr tan, sbplty-sbblky, tr plty, sft- mfirm, gt txt, tr sdy ip, sl calc, grdg- shysltst, tr pyr, tr fos frag, tr shyss

60

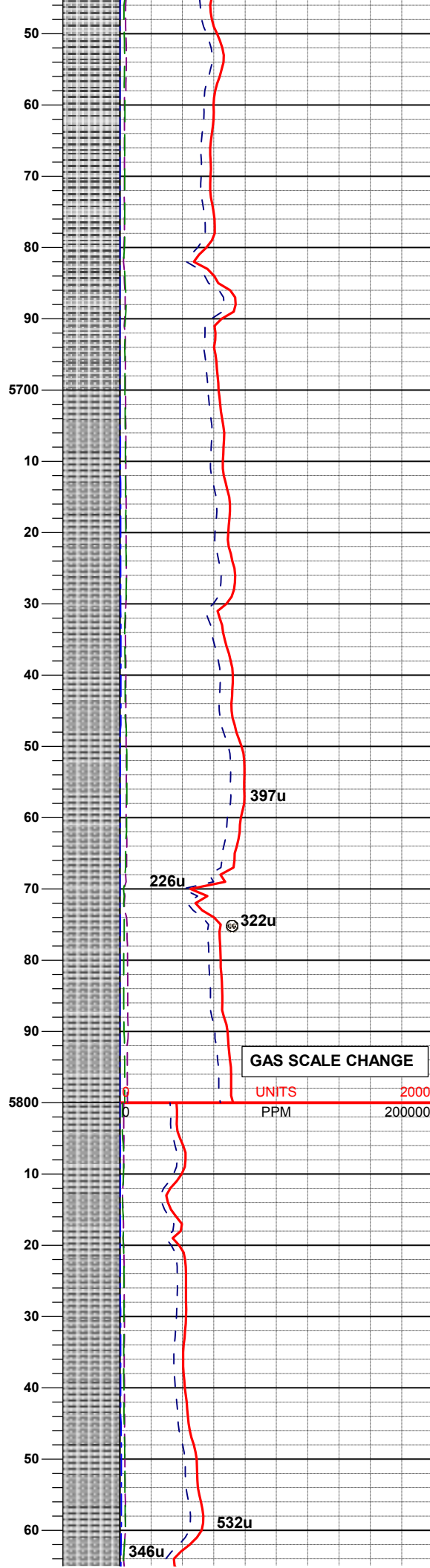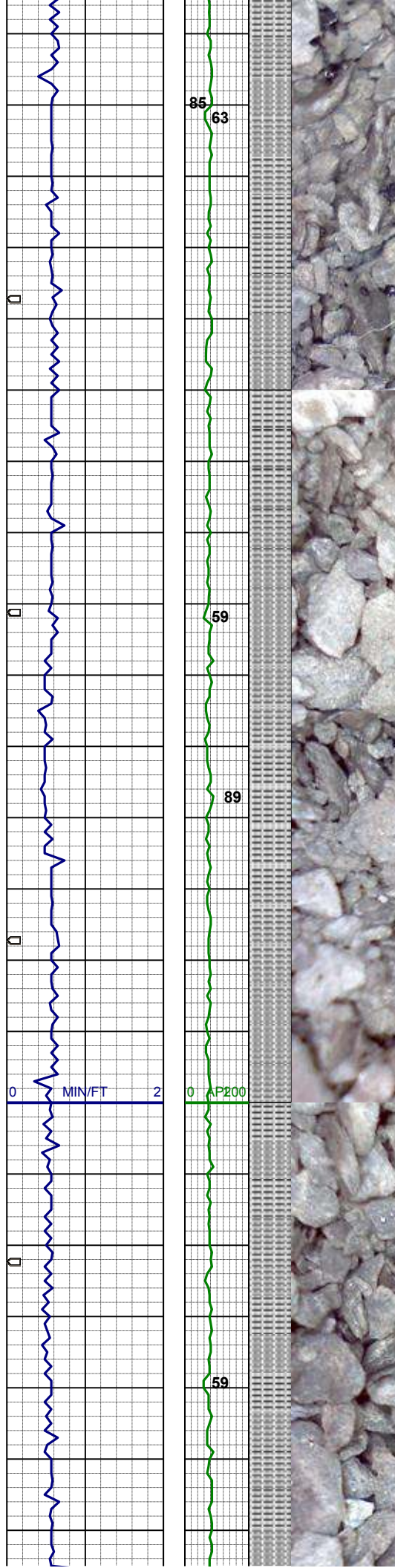**66**

70

80

90

⊕ 335u

5600 UNITS 1000

MIN/FT 2   0 AP 200   0 PPM 100000

WOB	10
RPM	35
PP	2500
SPM	140

46u

10

20

30

404u

40 ⊕ 397u

MD	5636'
INC	0.5°
AZI	156.2°
TVD	5618.2'

SLTYSH: lt-mgy- gybrn, occ dk gy
sbplty-sbblky, tr plty, sft- mfirm, gt txt,
tr sdy ip, sl calc, grdg- shyss

WT 8.8 / VIS 37

MD   5726'
INC   0.4°
AZI   180.3°
TVD   5708.2'

SLTYSH: lt-mgy- gybrn, occ dk gy
sbplty-sbblky, tr plty, sft- mfirm, gt txt,
tr sdy ip, sl calc, grdg- shyss

397u

226u

322u

GAS SCALE CHANGE

| 0 | UNITS | 2000 |
| 0 | PPM | 200000 |

MD   5816'
INC   0.5°
AZI   198.4°
TVD   5798.2'

SLTYSH: lt-mgy- gybrn, occ dk gy
sbplty-sbblky, tr plty, sft- mfirm, gt txt,
tr sdy ip, sl calc, grdg- shyss

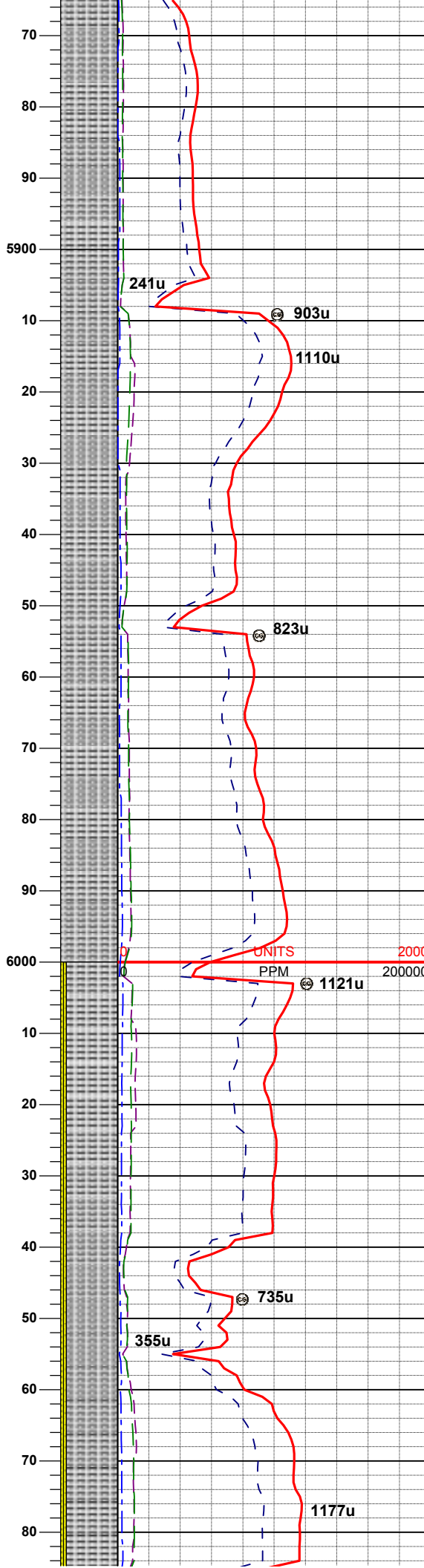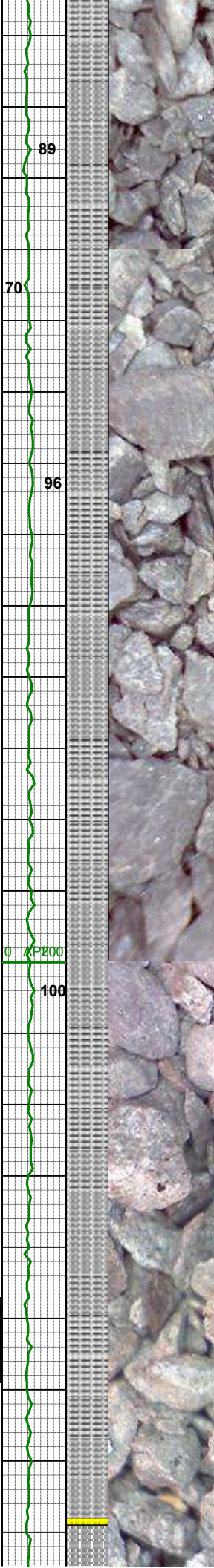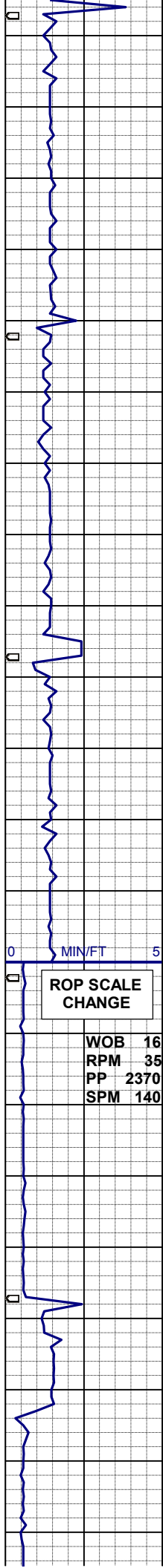**WT 8.95 / VIS 41**

532u

346u

0 MIN/FT 2

0 API 200

85
63

59

89

59

50
60
70
80
90
5700
10
20
30
40
50
60
70
80
90
5800
10
20
30
40
50
60

ROP SCALE
CHANGE

WOB   16
RPM   35
PP   2370
SPM   140

0   MIN/FT   5

0   XP200

89

70

96

100

70

80

90

5900

10

20

30

40

50

60

70

80

90

6000

10

20

30

40

50

60

70

80

241u

903u

1110u

823u

1121u

735u

355u

1177u

0   UNITS   2000
PPM   200000

MD   5906'
INC   0.7°
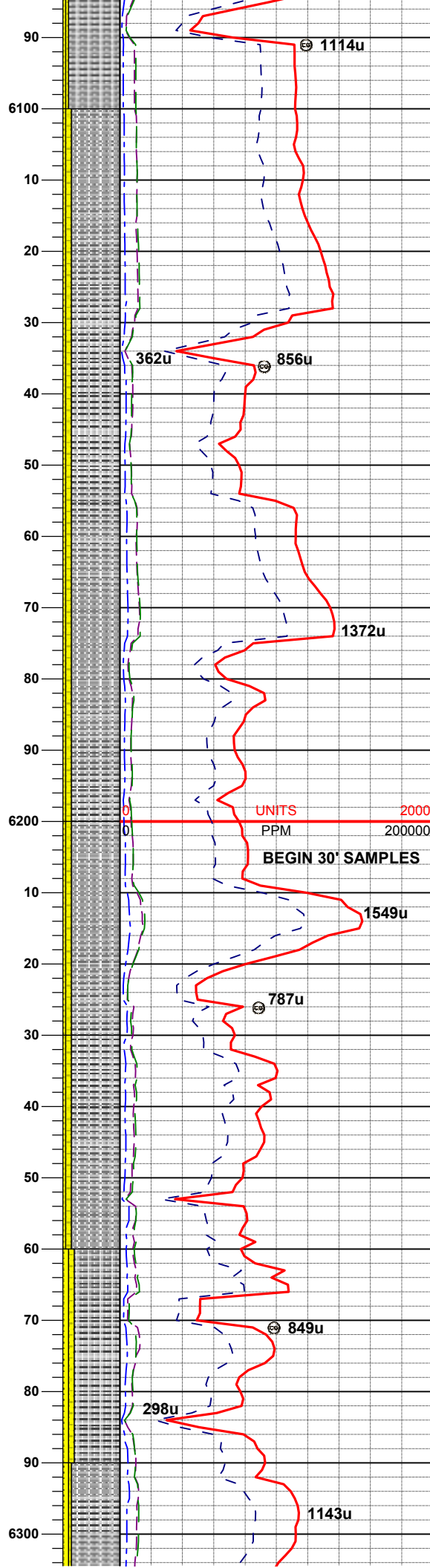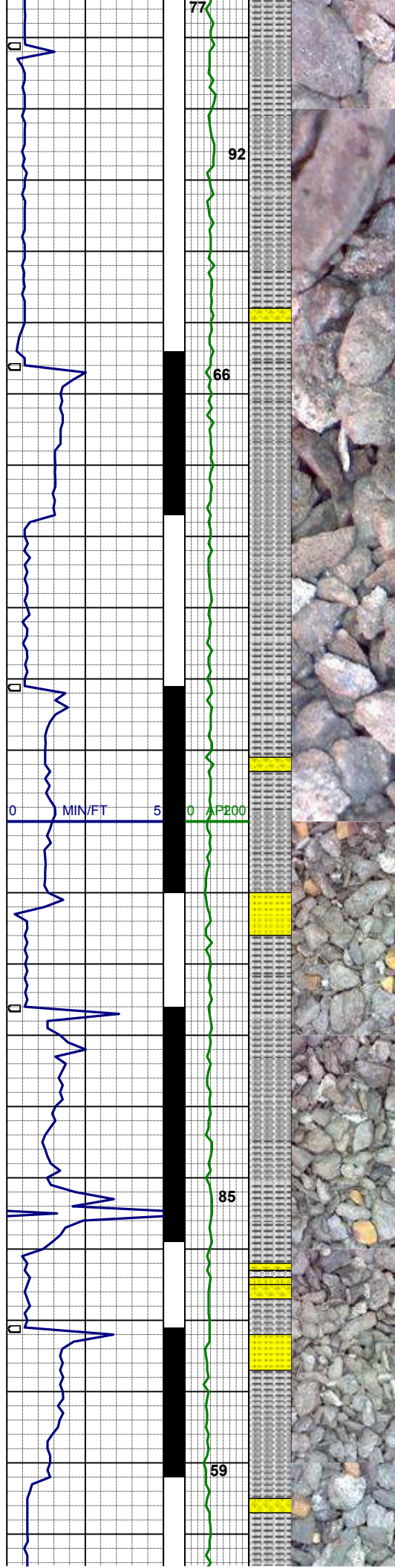AZI   205.8°
TVD   5888.2'

WT 9.4 / VIS 41

SLTYSH: lt-mgy- gybrn, occ dk gy
sbplty-sbblky, tr plty, sft- mfirm, gt txt,
tr sdy ip, sl calc, grdg- shyss

MD   5996'
INC   0.9°
AZI   213.0°
TVD   5978.2'

SLTYSH: lt-mgy- gybrn, occ dk gy
sbplty-sbblky, tr plty, sft- mfirm, gt txt,
tr sdy ip, sl calc, grdg- shyss, occ wh-
ltgy s&p fgr ss

WT 9.75 / VIS 40

MD   6085'
INC   0.8°

Right margin annotations (top to bottom):

AZI 116.3°
TVD 6067.1'

SLTYSH: lt-mgy- gybrn, occ dk gy sbplty-sbblky, tr plty, sft- mfirm, gt txt, tr sdy ip, sl calc, grdg- shyss, occ wh-ltgy s&p fgr ss

WT 9.6 / VIS 40

MD 6175'
INC 4.4°
AZI 81.0°
TVD 6157.0'

SLTYSH: lt-mgy- gybrn, occ dk gy sbplty-sbblky, tr plty, sft- mfirm, gt txt, tr sdy ip, sl calc, grdg- shyss, occ wh-ltgy s&p fgr ss

MD 6220'
INC 8.3°
AZI 77.3°
TVD 6201.8'

SLTYSH: lt-mgy- gybrn, occ dk gy sbplty-sbblky, tr plty, sft- mfirm, gt txt, tr sdy ip, sl calc, grdg- shyss, occ wh-ltgy s&p fgr ss
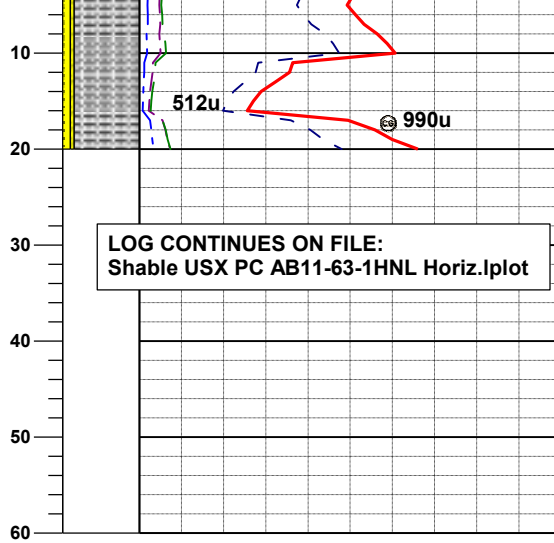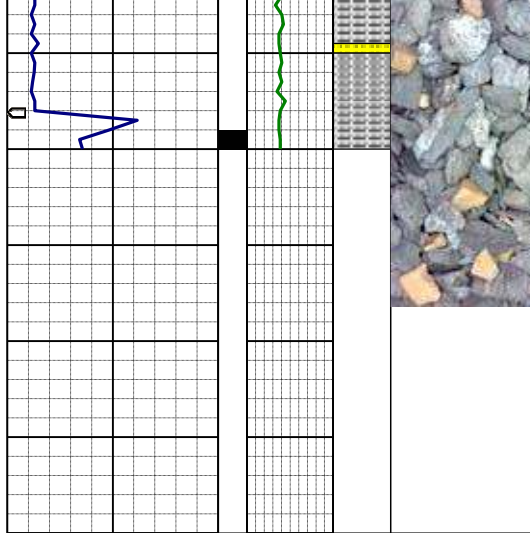
WT 9.7 / VIS 39

MD 6265'
INC 12.5°
AZI 82.0°
TVD 6246.0'

SLTYSH: lt-mgy- gybrn, occ dk gy sbplty-sbblky, tr plty, sft- mfirm, gt txt, tr sdy ip, sl calc, grdg- shyss, occ wh-ltgy s&p fgr ss

SLTYSH: lt-mgy- gybrn, occ dk gy sbplty-sbblky, tr plty, sft- mfirm, gt txt, tr sdy ip, sl calc, grdg- shyss, occ wh-ltgy s&p fgr ss

Track / curve labels:

77
92
66
85
59

Gas show values:
1114u
362u   856u
1372u
1549u
787u
849u
298u
1143u

BEGIN 30' SAMPLES

Track scales:
0 MIN/FT 5
0 AP 200
0 UNITS 2000
0 PPM 200000

Depth markers: 90, 6100, 10, 20, 30, 40, 50, 60, 70, 80, 90, 6200, 10, 20, 30, 40, 50, 60, 70, 80, 90, 6300

			MD	6310'
			INC	15.8°
			AZI	79.8°
			TVD	6286.6'

512u

⊕ 990u

LOG CONTINUES ON FILE:
Shable USX PC AB11-63-1HNL Horiz.lplot

THANK YOU FOR CHOOSING
COLUMBINE LOGGING, INC.