

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name Wells Ranch AA26-62-1HN

Location SEC25 T6N R63W

State COLORADO

County WELD

Country USA

Rig Number H&P 322

API Number 05-123-37567

Region DJ BASIN

Field WATTERBERG

Spud Date 11/7/2013

Drilling Completed 11/15/2013

Surface Coordinates 1637' FSL x 153' FWL

Bottom Hole Coordinates 330' FSL x 150' FWL

Ground Elevation 4792'

K.B. Elevation 4816'

Logged Interval 1000' **To** 11808'

Total Depth 11808'

Formation NIOBRARA C Chalk

Type of Drilling Fluid FW LSND

Operator

Company Noble Energy Inc

Address 1625 BROADWAY
DENVER, CO 80202
(303) 228-4000

Geologist

Name SARAH COMPTON

Company NOBLE ENERGY, INC.

Address 1625 BROADWAY
DENVER, CO 80202
(303) 228-4000

Other

COLUMBINE LOGGING, INC.

2385 S. LIPAN ST
DENVER, COLORADO 80223
(303) 289-7764

WELL SITE GEOLOGISTS

JOEY LUCE
MIKE GREENE

Rock Types

UNKNOWN	COAL	METAMORPHIC	SHALY SILTSTONE
ANHYDRITE	CONGLOMERATE	NO SAMPLE	SILTSTONE
BENTONITE	DOLOMITE	SALT	SILTY SHALE
BRECCIA	GRANITE	SALT- PEPPER SAND	TILL
CEMENT	GYPSUM	SANDSTONE	TUFF
CHALK	IGNEOUS	SHALE	WELDED TUFF
CHERT	LIMESTONE	SHALE COLORED	
CLAY CHOKER SAND	SIDERITE or LIMONITE	SHALE GRAY	
CLAYSTONE	MARLSTONE	SHALY SANDSTONE	

Accessories

Fossils

ALGAE
 AMPHIPORA
 BELEMNITE
 BIOCLASTIC
 BRACHIOPOD
 BRYOZOA
 CEPHALOPOD
 CORAL
 CRINOID
 ECHINOID
 FISH
 FORAMINIFERA

Fossil

GASTROPOD
 INOCERAMUS
 OOLITE
 OSTRACOD
 PELECYPOD
 PELLET
 PISOLITE
 PLANT REMAINS
 PLANT SPORES
 SCAPHOPOD
 STROMATOPOROID

Minerals

Anhydritic

ARGILLACEOUS
 ARGILLITE GRAIN
 BENTONITE
 BITUMENOUS SUBSTANCE
 BRECCIA FRAGMENTS
 CALCAREOUS
 CARBONACEOUS FLAKES
 CHTDK
 CHLT
 COAL - THIN BEDS
 DOLOMITIC
 FELDSPAR
 FERRUGINOUS PELLET

Ferruginous

GLAUCONITE
 GYPSIFEROUS
 HEAVY MINERAL
 KAOLIN
 MARLSTONE
 MINERAL CRYSTALS
 NODULES
 PHOSPHATE PELLETS
 PYRITE
 SALT CAST
 SANDY
 SILICEOUS
 SILTY

Tuffaceous

Stringer

ANHYDRITE STRINGER
 BENTONITE STRINGER
 COAL STRINGER
 DOLOMITE STRINGER
 GYPSUM STRINGER
 LIMESTONE STRINGER
 MARLSTONE (CALC) STRG
 MARLSTONE (DOL) STRG
 SANDSTONE STRINGER
 SHALE STRINGER
 SILTSTONE STRINGER

Other Symbols

Oil Show

DEAD
 EVEN
 QUESTIONABLE
 SPOTTED STAINING

Porosity

E EARTHY
 F FENESTRAL
 F FRACTURE
 X INTERCRYSTALLINE
 O INTEROOLITIC

Moldic

O ORGANIC
 P PINPOINT
 V VUGGY

Engineering

BIT
 CONNECTION (LEFT)
 CONNECTION (RIGHT)
 CONNECTION GAS
 CORE - LOST
 CORE - RECOVERED
 DST INTERVAL

Fault

FORMATION TOP
 GAS SHOW
 MN DEPTH
 NORMAL FAULT
 OIL SHOW
 OVERTURNED STRATA
 REVERSE FAULT
 SIDEWALL CORE (LEFT)
 SIDEWALL CORE (RIGHT)
 SLIDE
 SURVEY
 TRIP GAS

Wireline tested - left

WIRELINE TESTED - RT

Rounding

A ANGULAR
 R ROUNDED
 S SUBANG
 r SUBRND

Textures

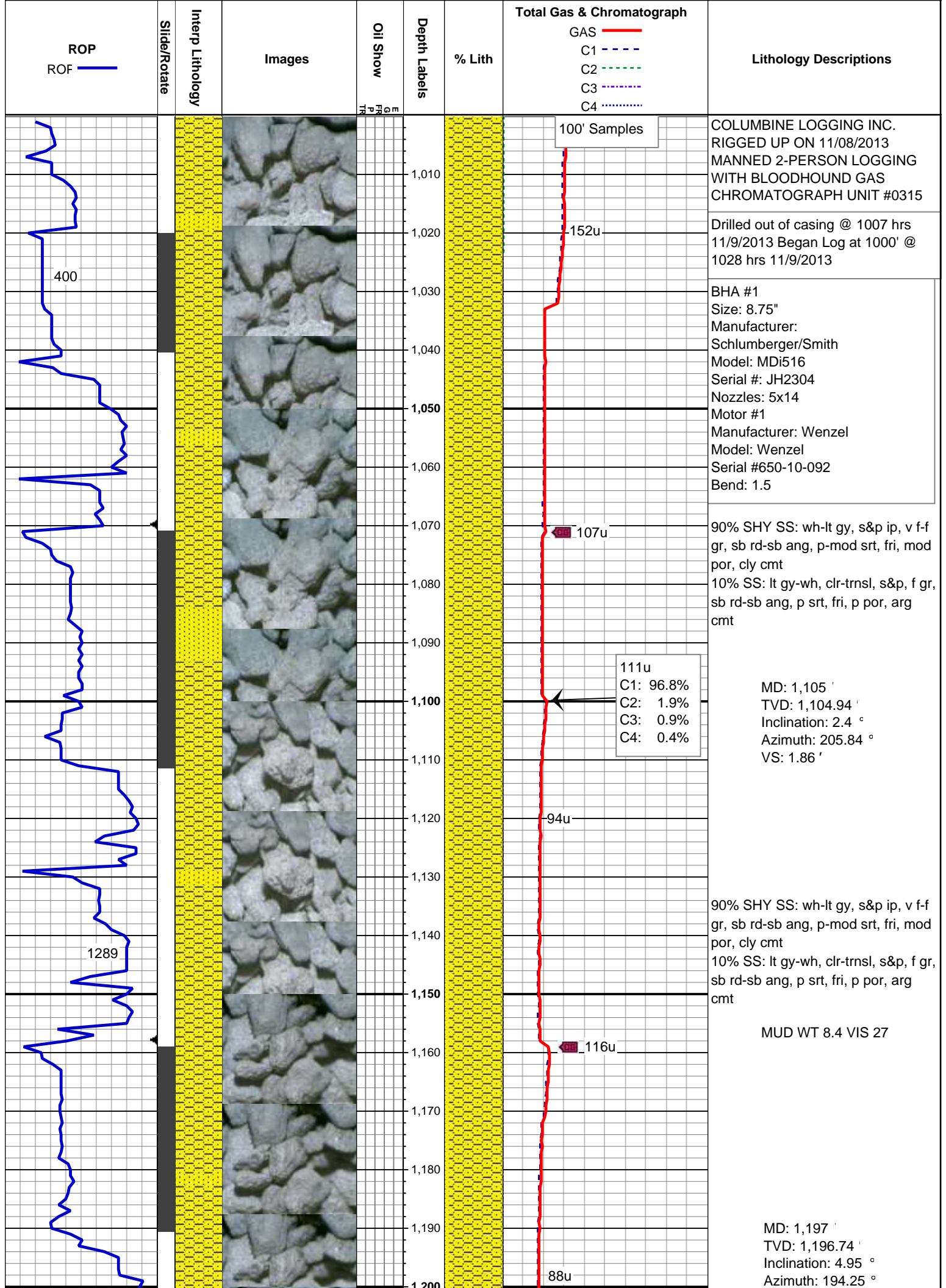
B BOUNDSTONE
 C CHALKY
 CX CRYPTOXLN

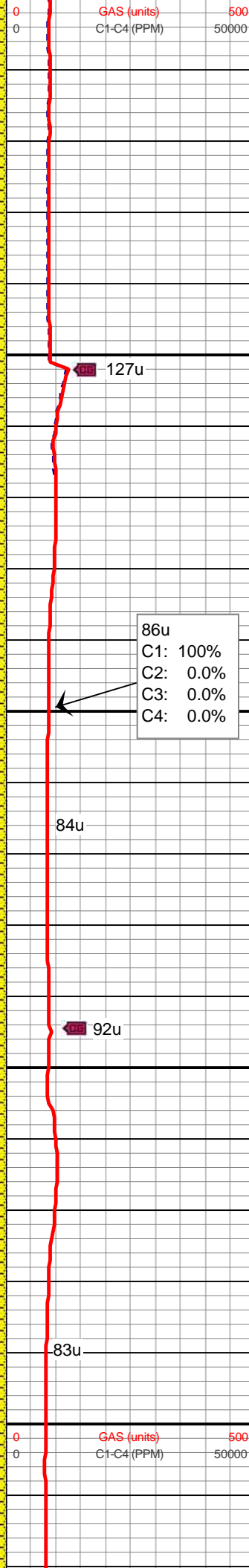
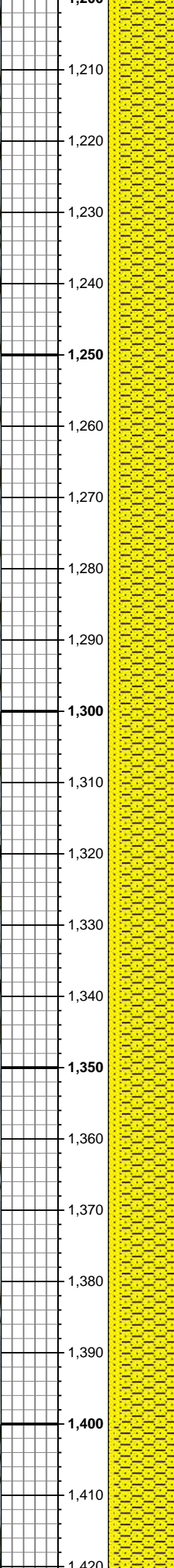
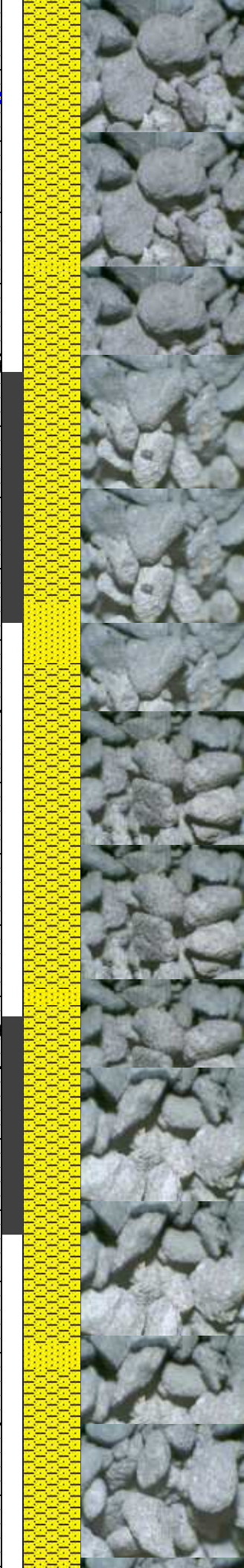
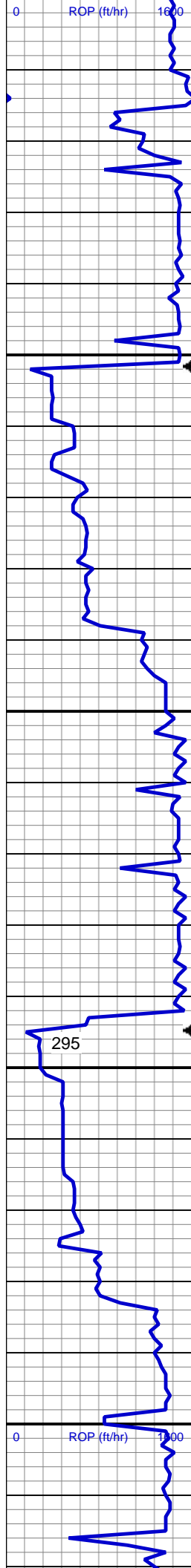
E earthy

FX FINELYXLN
 GS GRAINSTONE
 L LITHOGRAPHIC
 MX MICROXLN
 MS MUDSTONE
 PS PACKSTONE
 WS WACKESTONE

Sorting

M MODERATE
 P POOR
 W WELL





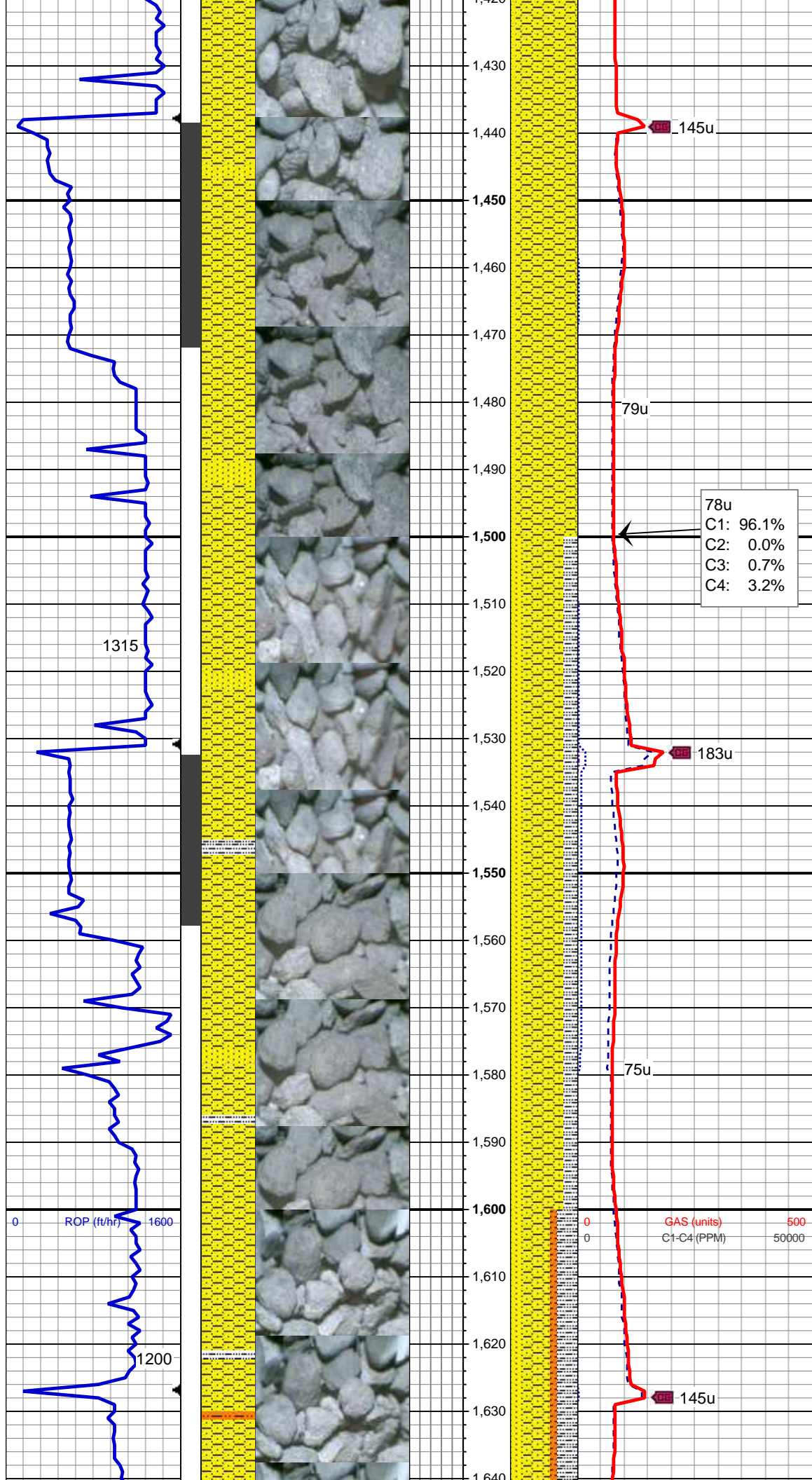
VS: 4.99'

85% SHY SS: wh-lt gy, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
15% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt

MD: 1,291'
TVD: 1,290.13'
Inclination: 8°
Azimuth: 191.71°
VS: 9.78'

80% SHY SS: wh-lt gy, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
20% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt

MD: 1,384'
TVD: 1,381.91'
Inclination: 10.55°
Azimuth: 186.82°
VS: 15.66'



85% SHY SS: wh-lt gy, s&p ip, v f-f
gr, sb rd-sb ang, p-mod srt, fri, mod
por, cly cmt
15% SS: lt gy-wh, clr-trnsl, s&p, f gr,
sb rd-sb ang, p srt, fri, p por, arg
cmt

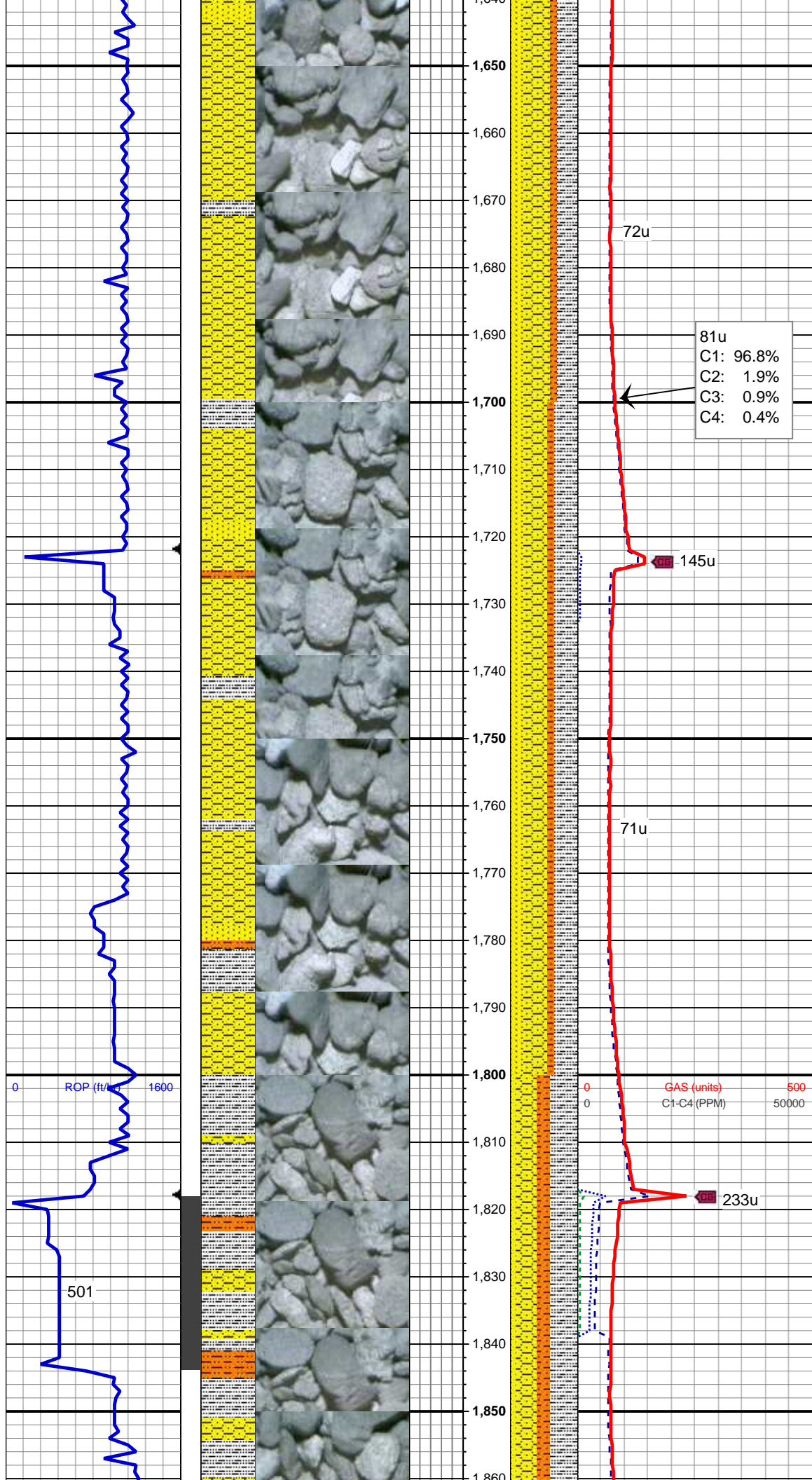
MD: 1,477 '
TVD: 1,472.81 '
Inclination: 13.8 °
Azimuth: 187.56 °
VS: 22.82 '

78u
C1: 96.1%
C2: 0.0%
C3: 0.7%
C4: 3.2%

60% SHY SS: wh-lt gy, s&p ip, v f-f
gr, sb rd-sb ang, p-mod srt, fri, mod
por, cly cmt
20% SS: lt gy-wh, clr-trnsl, s&p, f gr,
sb rd-sb ang, p srt, fri, p por, arg
cmt
20% SLTY SH: med-dk gy, occ gy
brn, frm-sl sft, rthy-sl slty, tr sltst

MD: 1,572 '
TVD: 1,564.8 '
Inclination: 15.11 °
Azimuth: 182.5 °
VS: 30.58 '

40% SHY SS: wh-lt gy, s&p ip, v f-f
gr, sb rd-sb ang, p-mod srt, fri, mod
por, cly cmt
20% SS: lt gy-wh, clr-trnsl, s&p, f gr,



sb rd-sb ang, p srt, fri, p por, arg
cmt
30% SLTY SH: med-dk gy, occ gy
brn, frm-sl sft, rthy-sl slty, tr sltst
10% SHY SLTST: lt gy, brn, sft-fri,
sb blk-ylky, wxy tex, tr pyr

MD: 1,667 '
TVD: 1,656.59 '
Inclination: 14.79 °
Azimuth: 182.35 °
VS: 37.58 '

81u
C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%

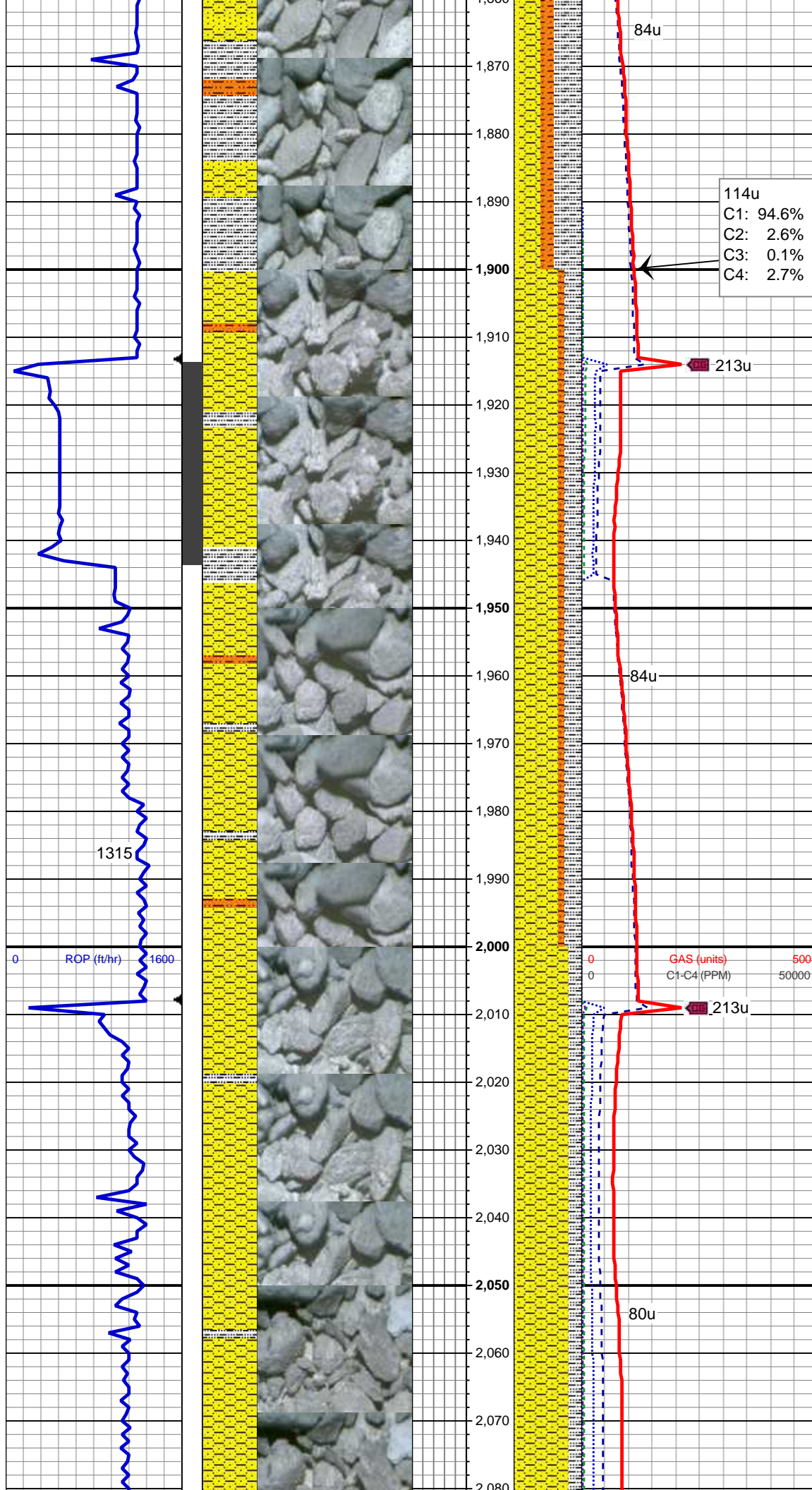
35% SHY SS: wh-lt gy, s&p ip, v f-f
gr, sb rd-sb ang, p-mod srt, fri, mod
por, cly cmt
35% SLTY SH: med-dk gy, occ gy
brn, frm-sl sft, rthy-sl slty,
20% SS: lt gy-wh, clr-trnsl, s&p, f gr,
sb rd-sb ang, p srt, fri, p por, arg
cmt
10% SHY SLTST: lt gy, brn, sft-fri,
sb blk-ylky, wxy tex, tr pyr

MD: 1,761 '
TVD: 1,747.69 '
Inclination: 13.71 °
Azimuth: 180.99 °
VS: 43.91 '

0 500
0 50000
GAS-(units)
C1-C4 (PPM)

MUD WT 8.5 VIS 28

MD: 1,856 '
TVD: 1,839.86 '
Inclination: 14.34 °
Azimuth: 182.12 °
VS: 50.17 '



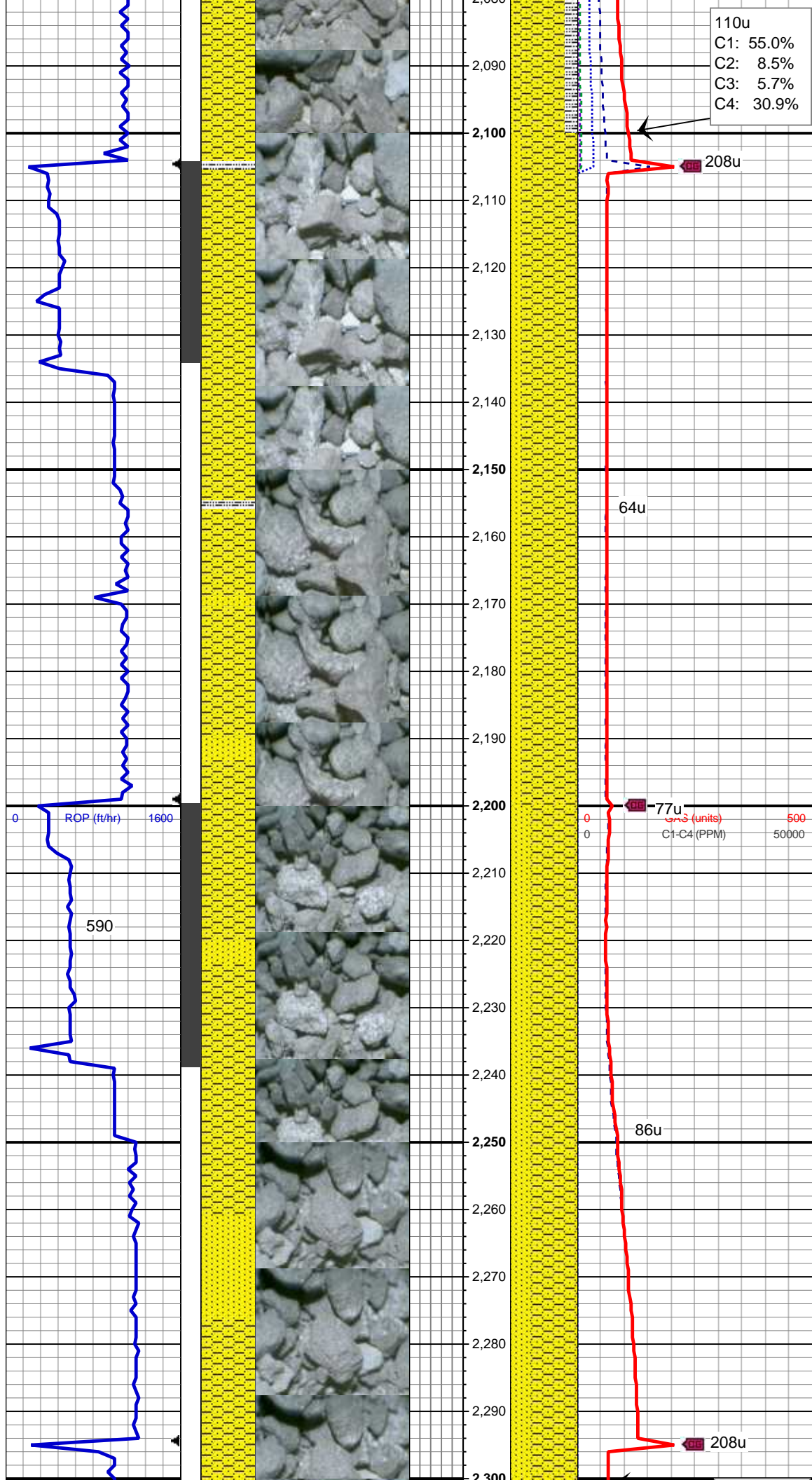
40% SLTY SH: med-dk gy, occ gy
brn, frm-sl sft, rthy-sl slty,
30% SHY SS: wh-lt gy, s&p ip, v f-f
gr, sb rd-sb ang, p-mod srt, fri, mod
por, cly cmt
20% SHY SLTST: lt gy, brn, sft-fri,
sb blkly-blky, wxy tex
10% SS: lt gy-wh, clr-trnsl, s&p, f gr,
sb rd-sb ang, p srt, fri, p por, arg
cmt, tr pyr

MD: 1,951 '
TVD: 1,931.82 '
Inclination: 14.75 °
Azimuth: 184.61 °
VS: 57.37 '

65% SHY SS: wh-lt gy, s&p ip, v f-f
gr, sb rd-sb ang, p-mod srt, fri, mod
por, cly cmt
25% SLTY SH: med-dk gy, occ gy
brn, frm-sl sft, rthy-sl slty,
10% SHY SLTST: lt gy, brn, sft-fri,
sb blkly-blky, wxy tex, tr pyr

MD: 2,046 '
TVD: 2,023.96 '
Inclination: 13.41 °
Azimuth: 184.41 °
VS: 64.78 '

75% SHY SS: wh-lt gy, s&p ip, v f-f
gr, sb rd-sb ang, p-mod srt, fri, mod
por, cly cmt, tr sd, intbd ip wi sh
20% SLTY SH: med-dk gy, occ gy
brn, frm-sl sft, rthy-sl slty
5% SS: lt gy-wh, clr-trnsl, s&p, f gr,
sb rd-sb ang, p srt, fri, p por, arg
cmt



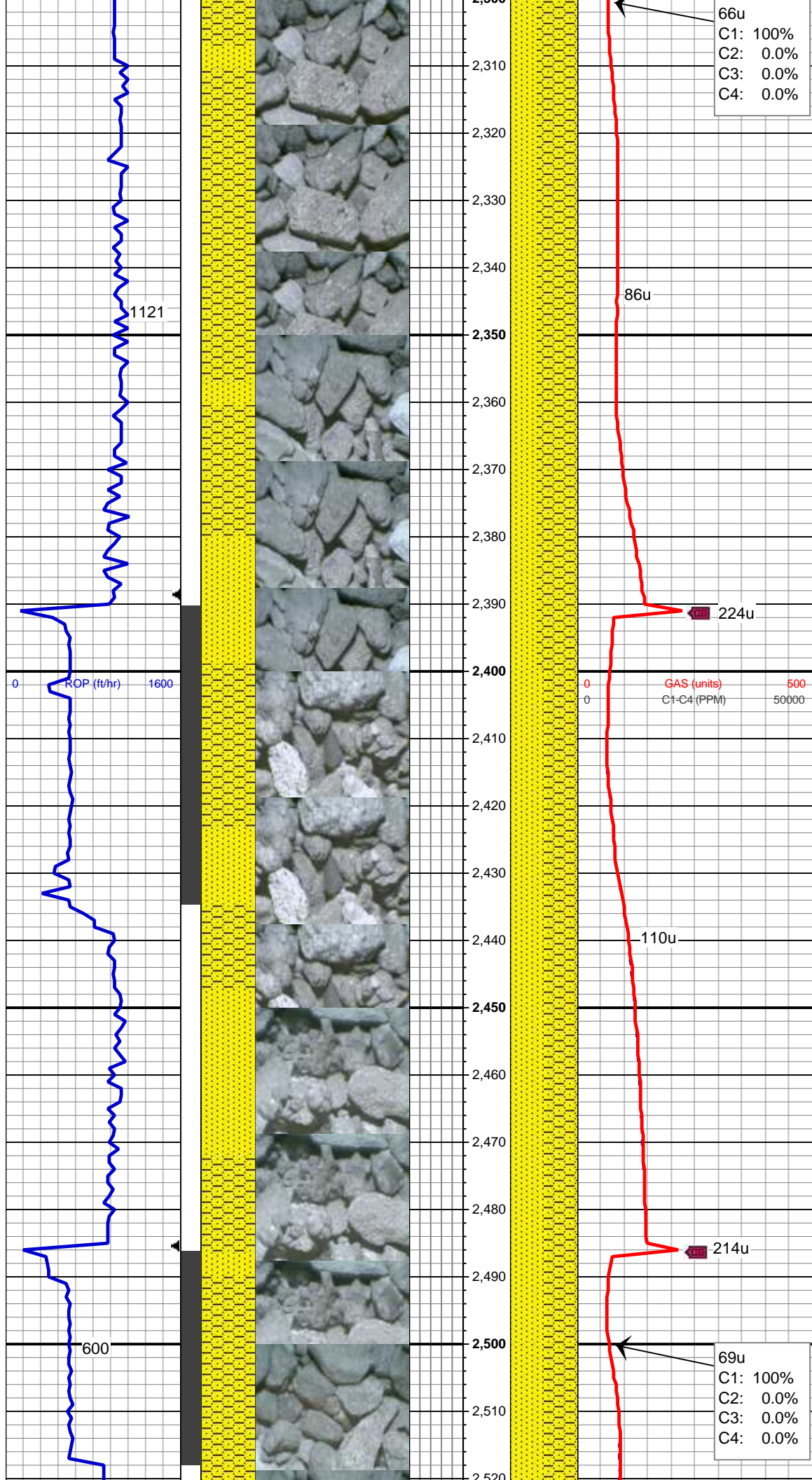
MD: 2,141 '
TVD: 2,116.59 '
Inclination: 12.28 °
Azimuth: 177.97 °
VS: 70.42 '

85% SHY SS: wh-lt gy, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
15% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt

MUD WT 8.8 VIS 28

MD: 2,236 '
TVD: 2,209.11 '
Inclination: 13.96 °
Azimuth: 183.41 °
VS: 76.01 '

70% SHY SS: lt-med gy, occ wh, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
30% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt, intbd ip wi shy ss



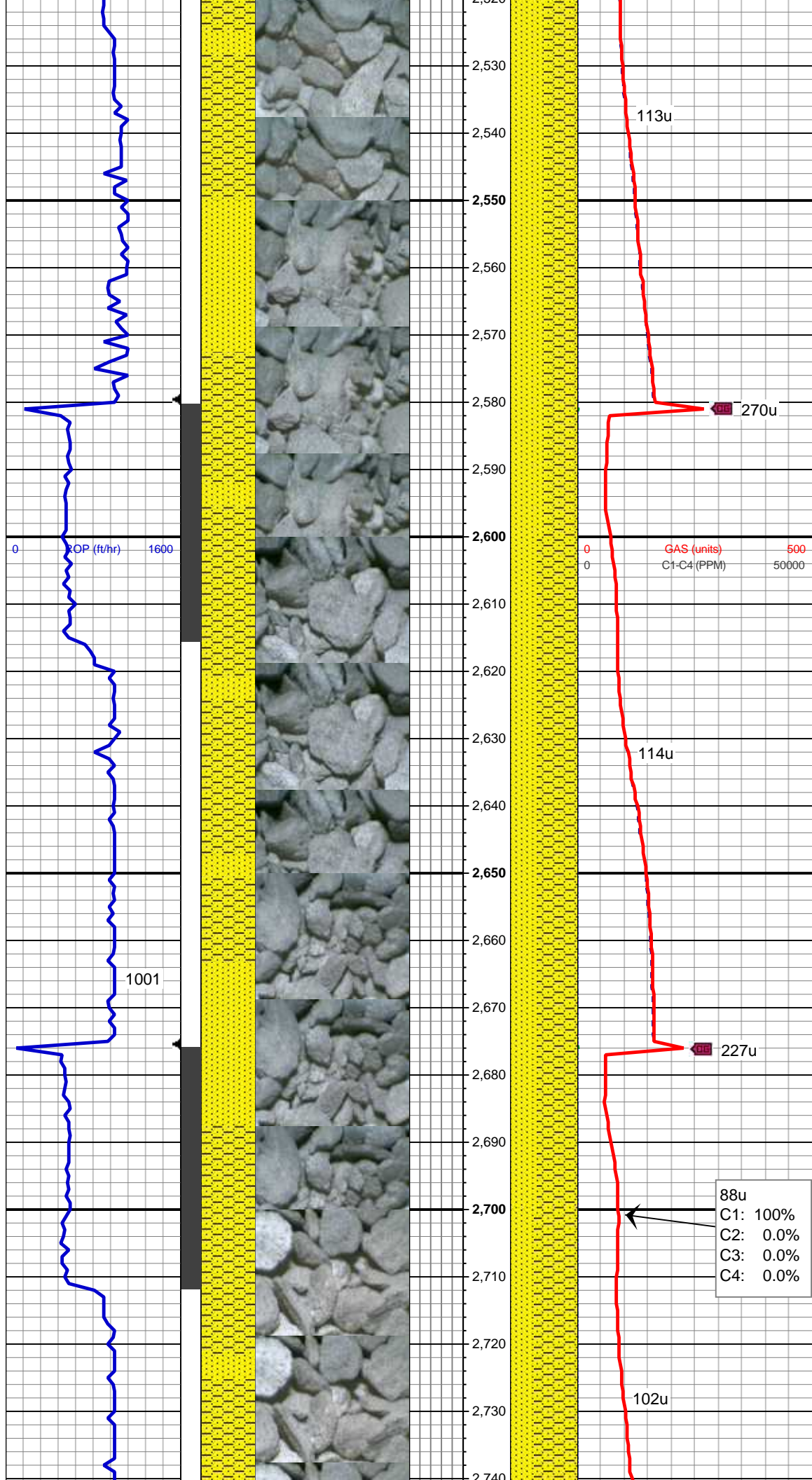
MD: 2,330 '
TVD: 2,300.72 '
Inclination: 11.93 °
Azimuth: 182.88 °
VS: 82.29 '

60% SHY SS: lt-med gy, occ wh, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
40% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt, intbd ip wi shy ss

MD: 2,425 '
TVD: 2,393.56 '
Inclination: 12.6 °
Azimuth: 176.24 °
VS: 87.05 '

50% SHY SS: lt-med gy, occ wh, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
50% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt, intbd ip wi shy ss

MD: 2,520 '
TVD: 2,486.25 '



Inclination: 12.72 °
Azimuth: 177.79 °
VS: 91.1 '

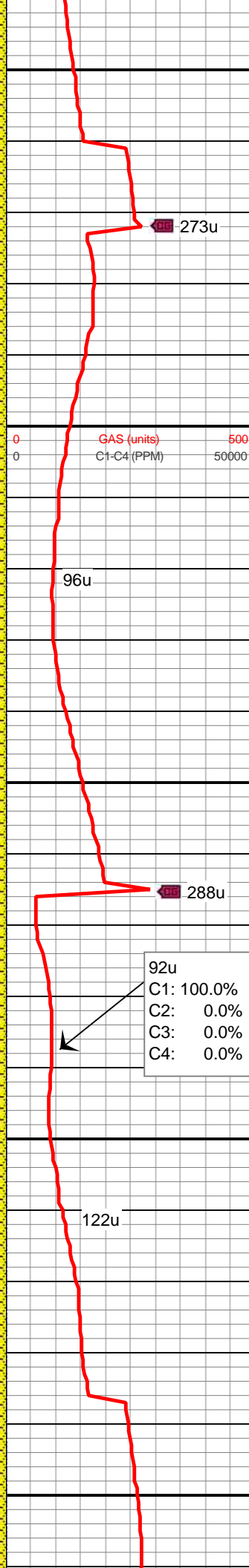
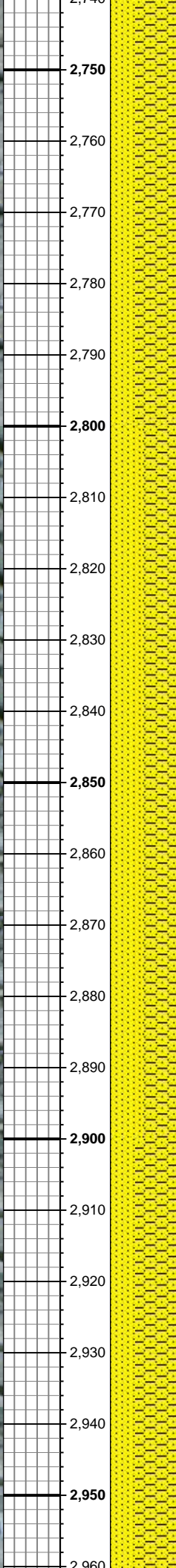
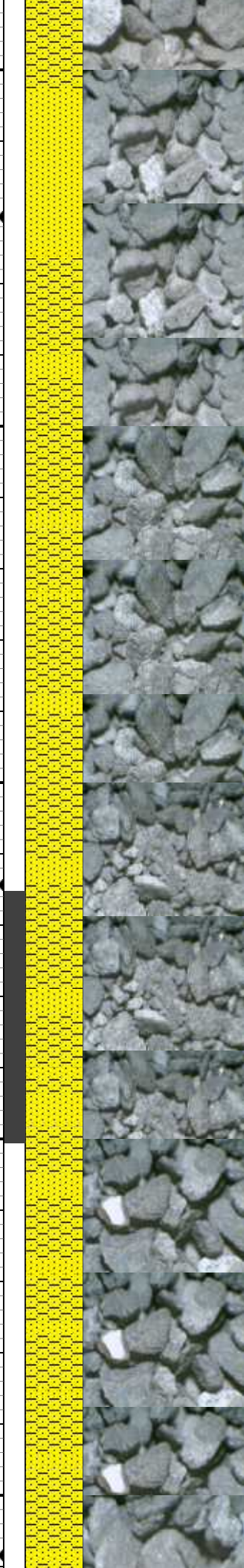
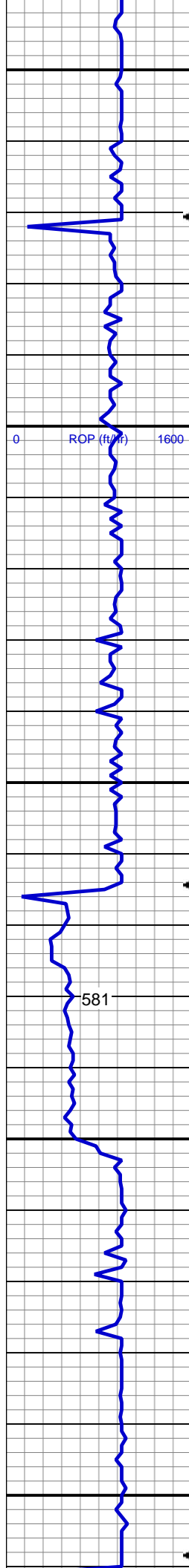
50% SHY SS: lt-med gy, occ wh, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
50% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt, intbd ip wi shy ss

MD: 2,615 '
TVD: 2,578.8 '
Inclination: 13.32 °
Azimuth: 175.16 °
VS: 95.05 '

60% SHY SS: lt-med gy, occ wh, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
40% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt

88u
C1: 100%
C2: 0.0%
C3: 0.0%
C4: 0.0%

MD: 2,710 '
TVD: 2,671.15 '
Inclination: 13.85 °
Azimuth: 180.95 °
VS: 99.8 '



60% SHY SS: lt-med gy, occ wh, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
40% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt

MD: 2,805 '
TVD: 2,763.63 '
Inclination: 12.61 °
Azimuth: 181.32 °
VS: 105.54 '

55% SHY SS: lt-med gy, occ wh, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
45% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt

MD: 2,900 '
TVD: 2,856.09 '
Inclination: 13.92 °
Azimuth: 182.49 °
VS: 111.59 '

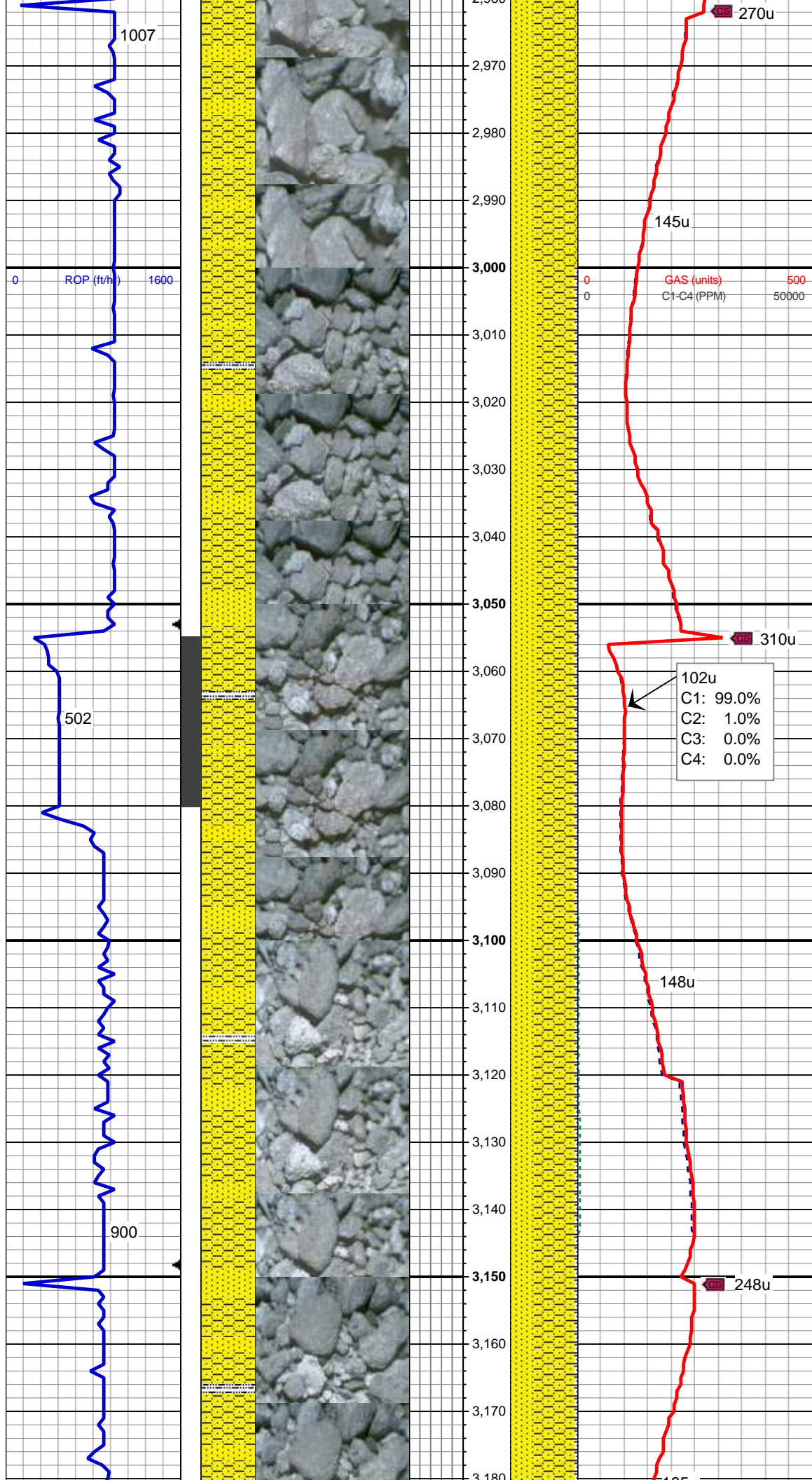
65% SHY SS: lt-med gy, occ wh, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
35% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt

GAS (units)
C1-C4 (PPM)

0 500
0 50000

92u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

581



MD: 2,995 '
TVD: 2,948.33 '
Inclination: 13.77 °
Azimuth: 177.98 °
VS: 117.25 '

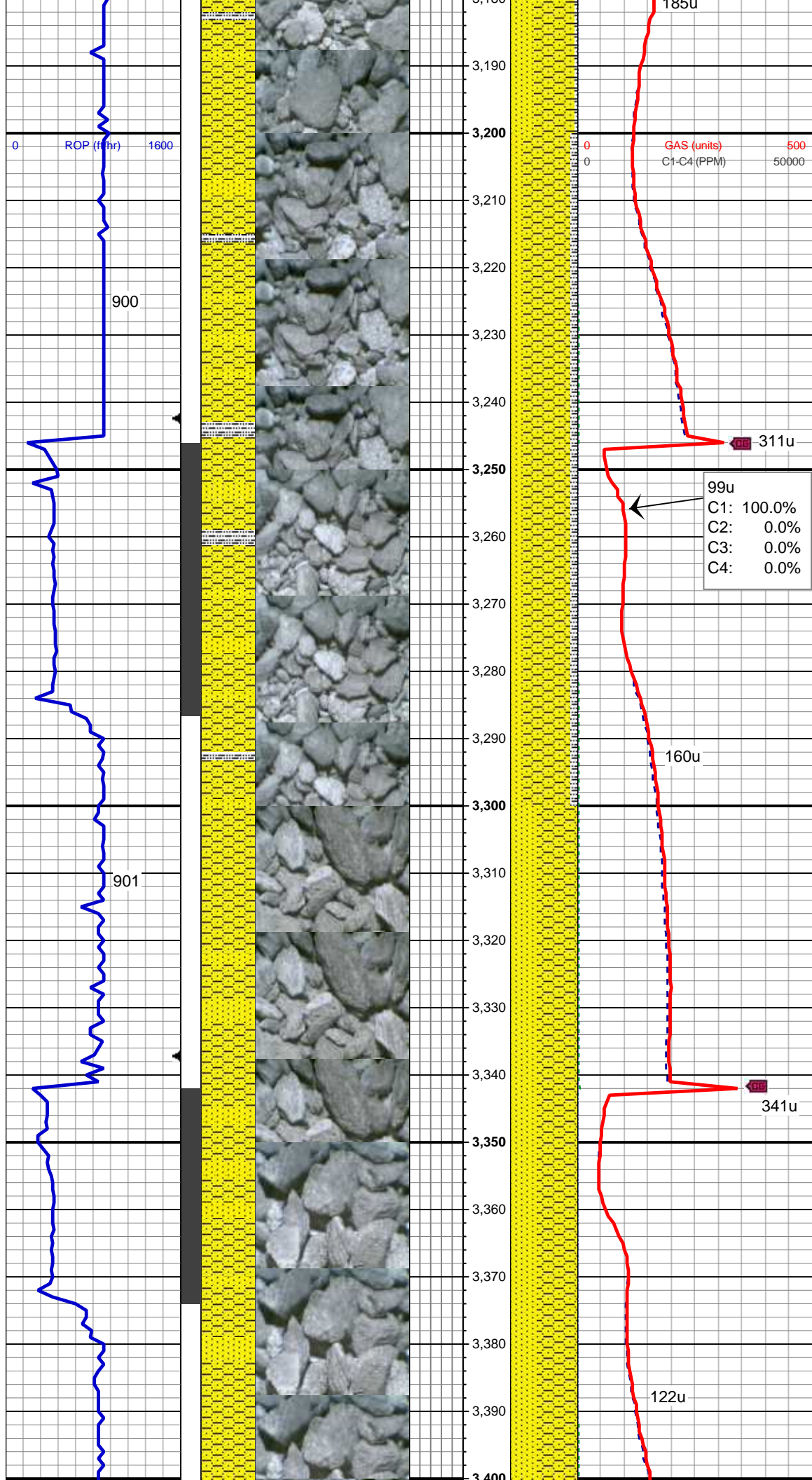
55% SHY SS: wh - lt gy, s&p ip, v f-f
gr, sb rd- sb ang, mod srt, fri, mod
por, arg cmt
40% SS: lt gy - wh, s&p, f gr, sb
rd-sb ang, p-mod srt, fri, p por, arg
cmt
5% SLTY SH: med-dk gy, occ gy
brn, frm-sl sft, rthy-sl slty

MD: 3,090 '
TVD: 3,040.63 '
Inclination: 13.67 °
Azimuth: 186.05 °
VS: 123.52 '

MUD WT 9.0+ VIS 29

60% SHY SS: wh - lt gy, s&p ip, v f-f
gr, sb rd- sb ang, mod srt, fri, arg
cmt
35% SS: lt gy - wh, s&p, f gr, sb
rd-sb ang, p-mod srt, fri, arg cmt
5% SLTY SH: med-dk gy, occ gy
brn, frm-sl sft, rthy-sl slty

MD: 3,184 '



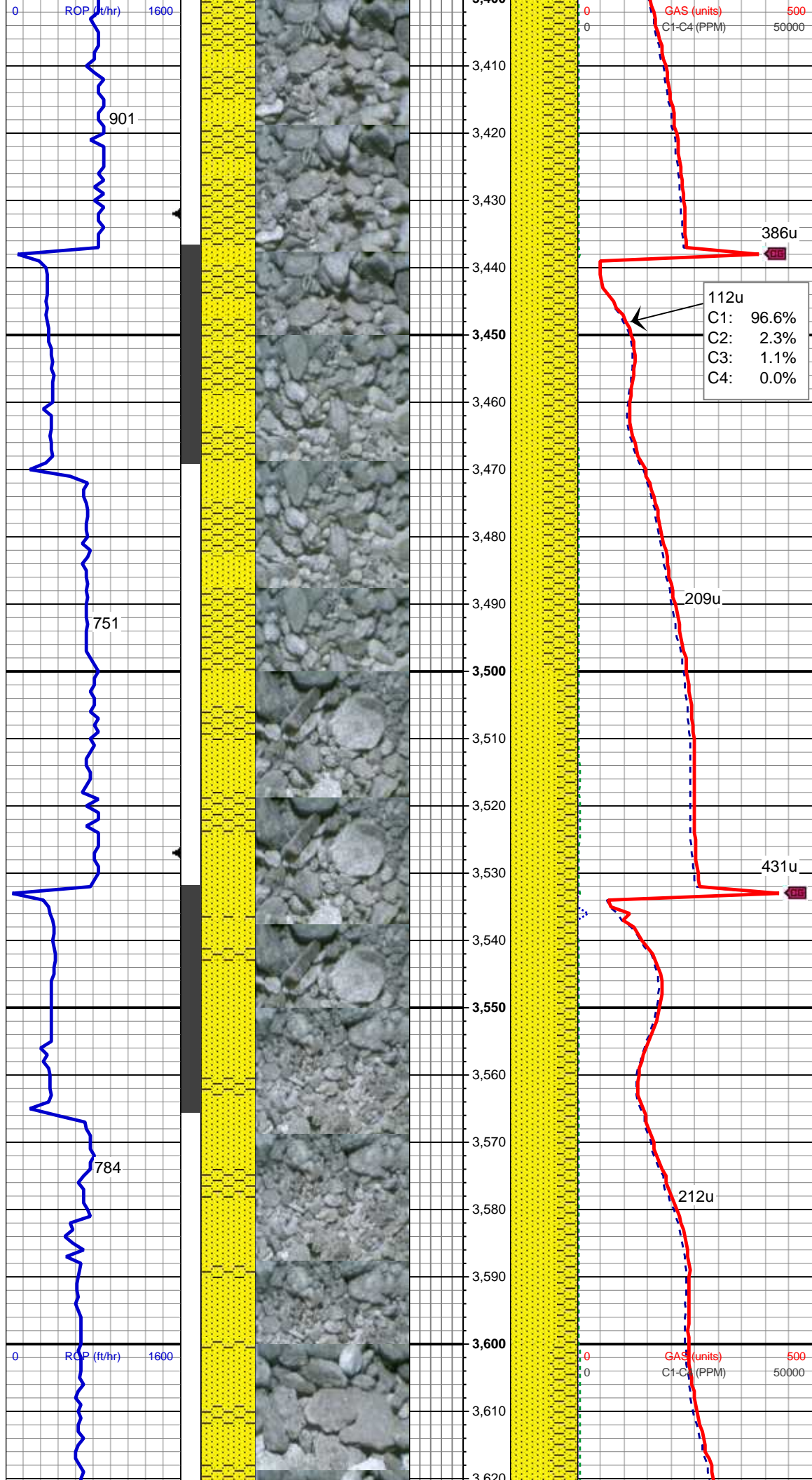
TVD: 3,132.38 '
Inclination: 11.42 °
Azimuth: 185.19 °
VS: 130.45 '

70% SHY SS: lt-med gy, occ wh, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
20% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri
10% SLTY SH: med-dk gy, occ gy brn, frm-sl sft, rthy-sl slty

MD: 3,279 '
TVD: 3,225.31 '
Inclination: 12.53 °
Azimuth: 180.59 °
VS: 136.2 '

60% SHY SS: lt-med gy, occ wh, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
40% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri

MD: 3,374 '
TVD: 3,318.11 '
Inclination: 12.22 °
Azimuth: 186.38 °
VS: 142.36 '

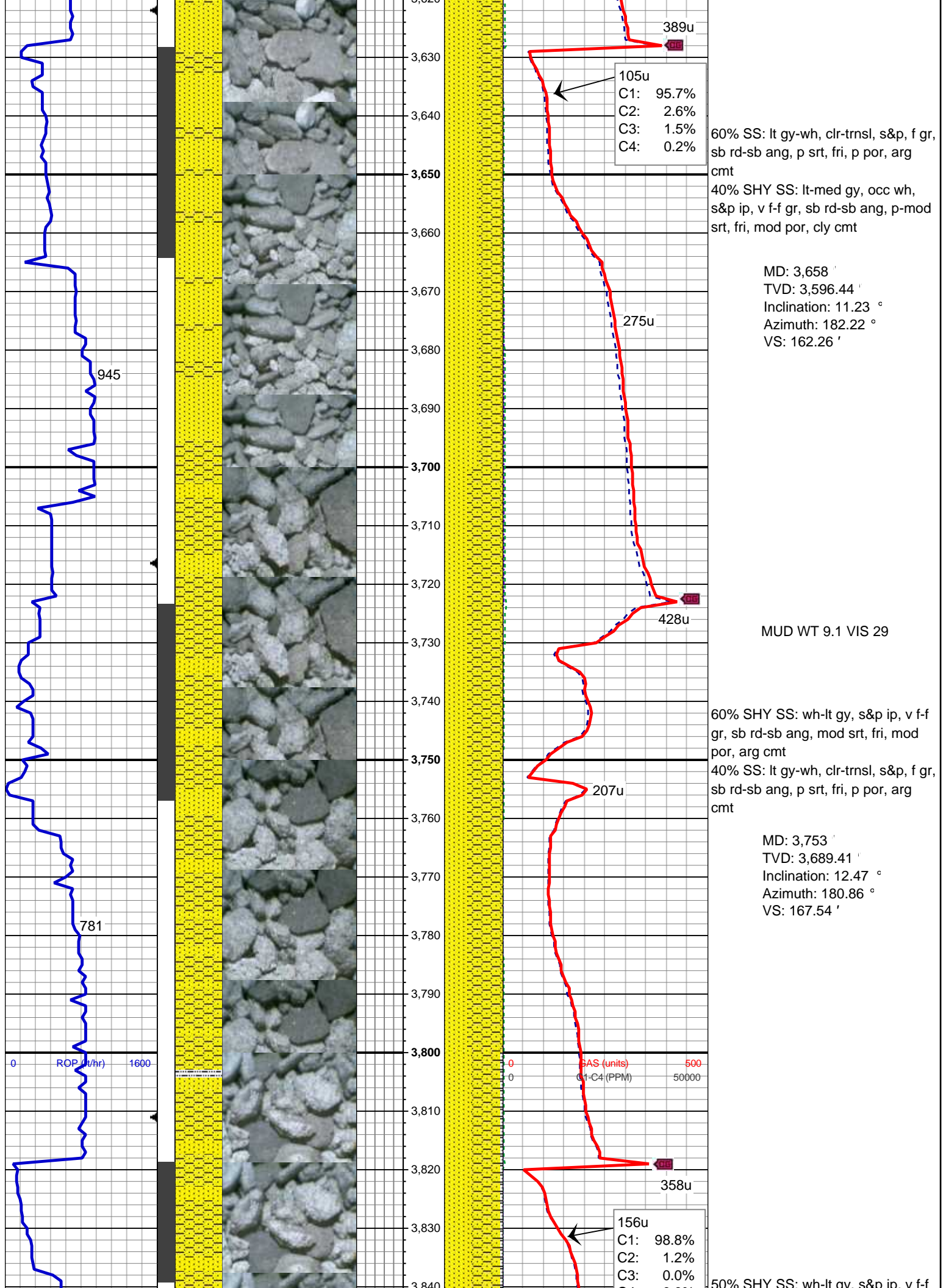


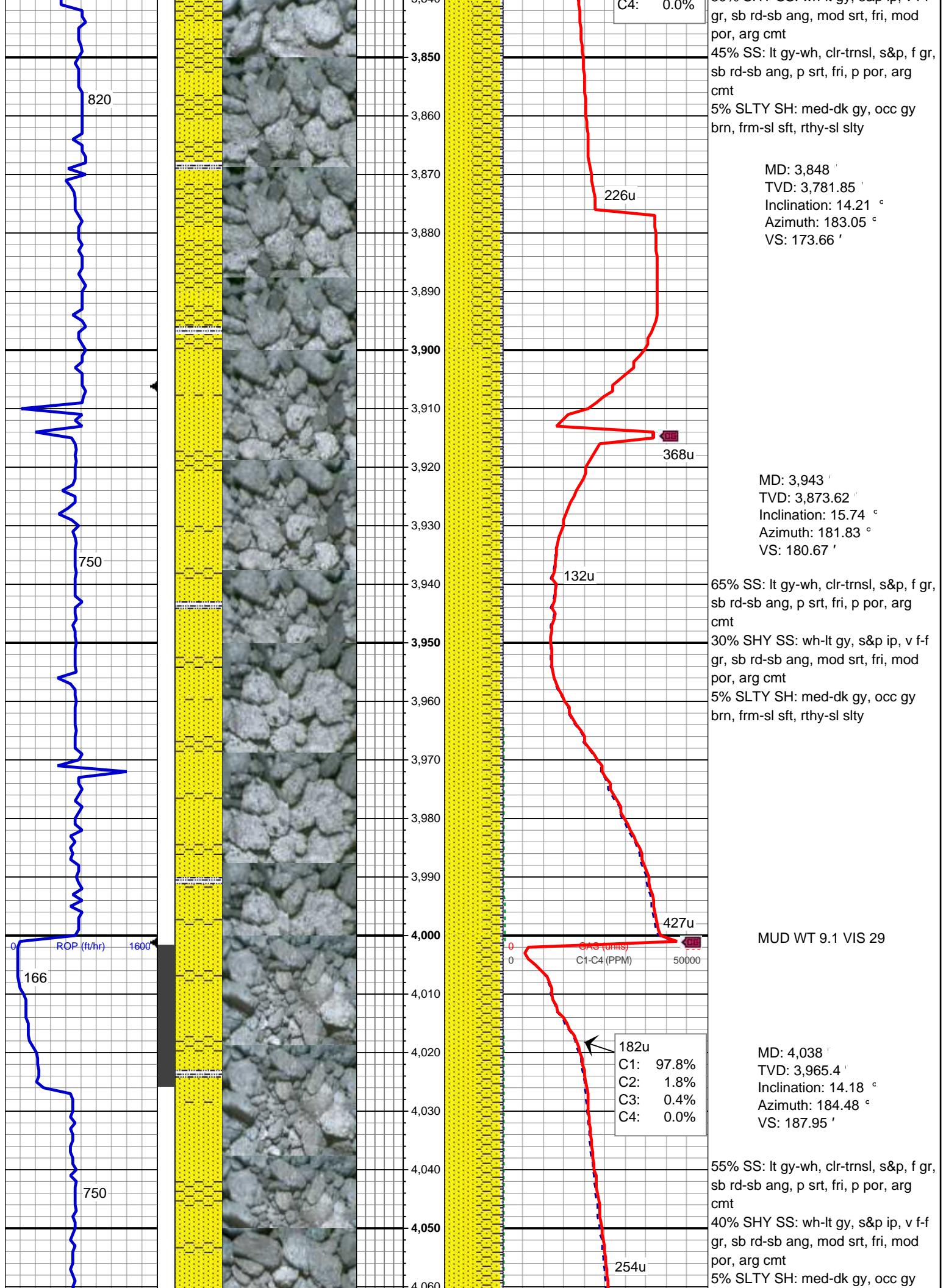
50% SHY SS: lt-med gy, occ wh, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt
50% SS: lt gy-wh, clr-trns, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt

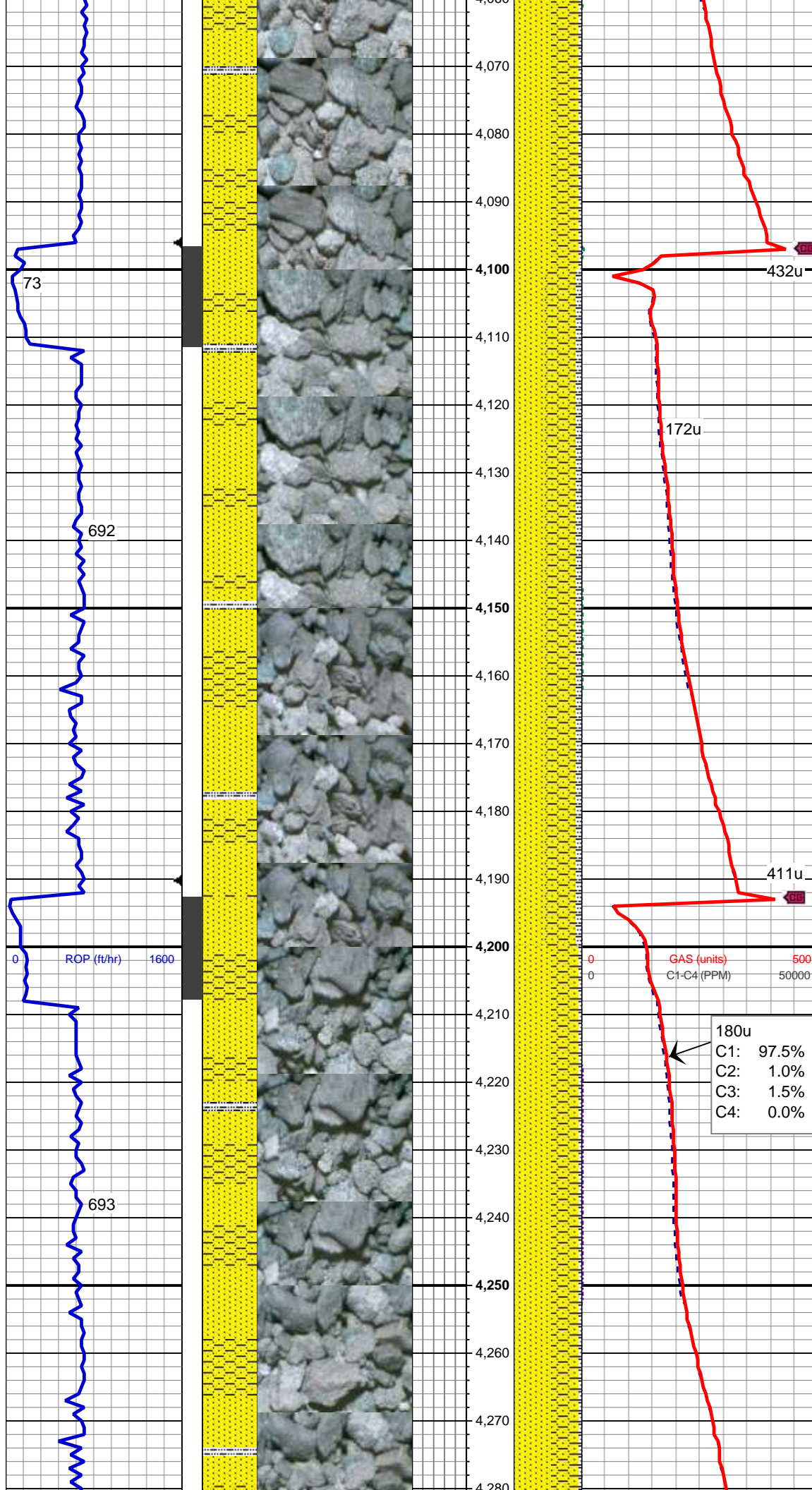
MD: 3,469 '
TVD: 3,411.02 '
Inclination: 11.89 °
Azimuth: 186.89 °
VS: 149.41 '

70% SS: lt gy-wh, clr-trns, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt
30% SHY SS: lt-med gy, occ wh, s&p ip, v f-f gr, sb rd-sb ang, p-mod srt, fri, mod por, cly cmt

MD: 3,564 '
TVD: 3,504.17 '
Inclination: 10.77 °
Azimuth: 188.25 °
VS: 156.32 '







brn, frm-sl sft, rthy-sl slty

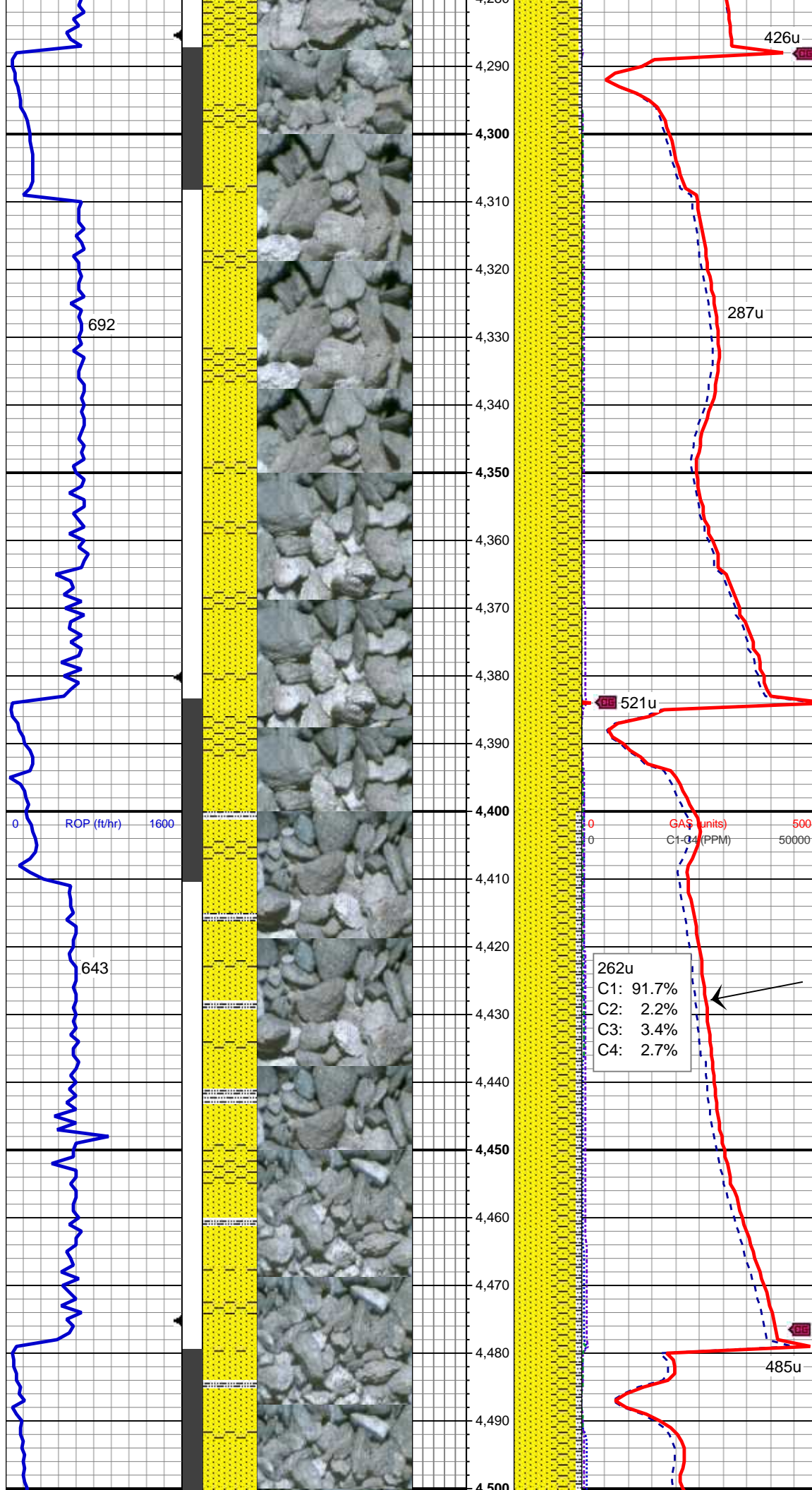
MUD WT 9.1+ VIS 30

MD: 4,132 '
TVD: 4,056.93 '
Inclination: 12.13 °
Azimuth: 181.92 °
VS: 194.38 '

45% SHY SS: wh-lt gy, s&p ip, v f-f gr, sb rd-sb ang, mod srt, fri, mod por, arg cmt
45% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt
10% SLTY SH: med-dk gy, occ gy brn, frm-sl sft, rthy-sl slty

MD: 4,227 '
TVD: 4,149.86 '
Inclination: 11.82 °
Azimuth: 181.12 °
VS: 199.71 '

55% SS: lt gy-wh, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt
40% SHY SS: wh-lt gy, s&p ip, v f-f gr, sb rd-sb ang, mod srt, fri, mod por, arg cmt
5% SLTY SH: med-dk gy, occ gy brn, frm-sl sft, rthy-sl slty



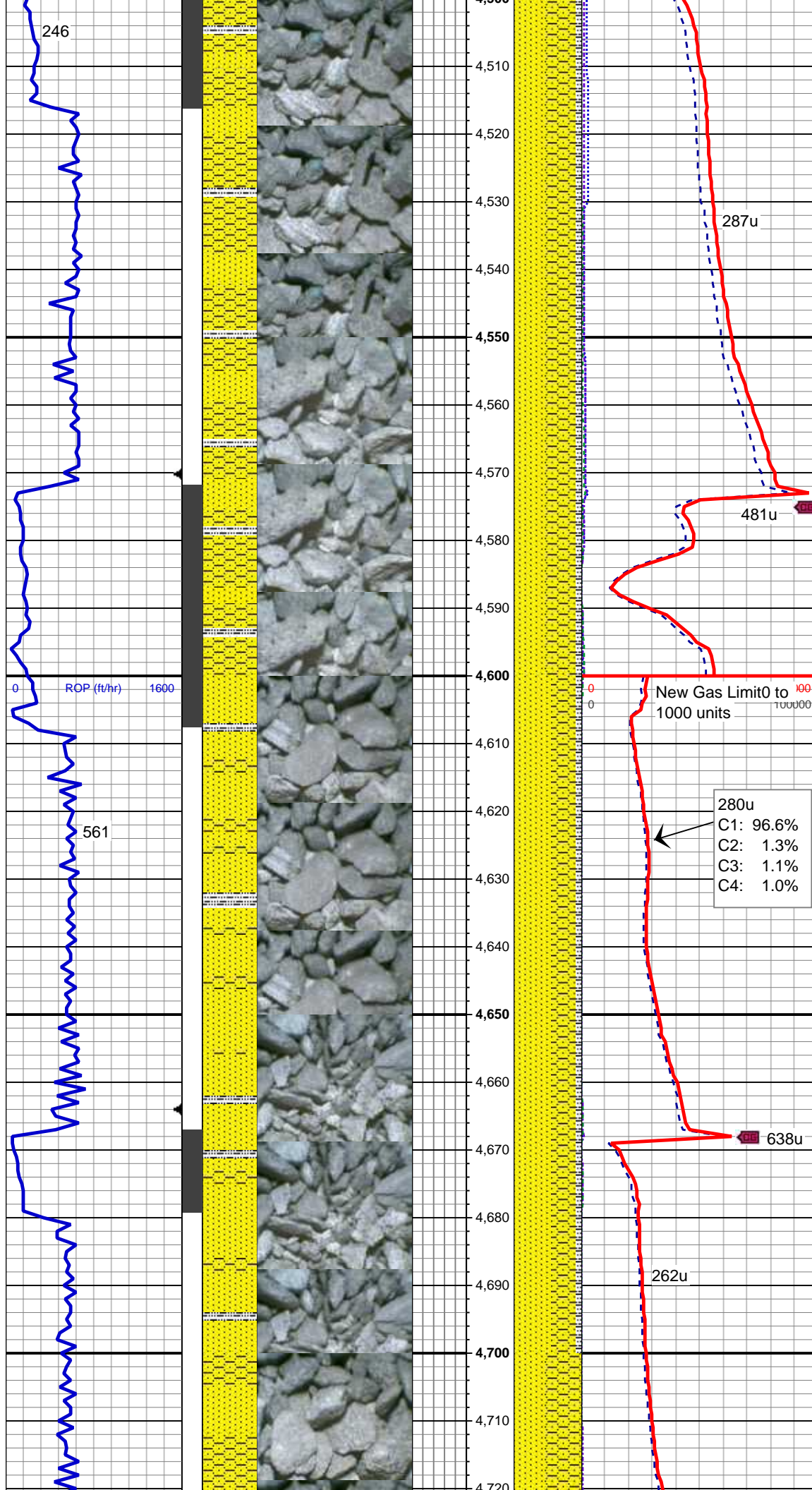
MD: 4,322 '
TVD: 4,242.91 '
Inclination: 11.46 °
Azimuth: 181.95 °
VS: 204.91 '

55% SS: lt gy-wh, clr-trnsl, s&p, f gr,
sb rd-sb ang, p srt, fri, p por, arg
cmt
45% SHY SS: wh-lt gy, s&p ip, v f-f
gr, sb rd-sb ang, mod srt, fri, mod
por, arg cmt

MUD WT 9.1+ VIS 29

MD: 4,417 '
TVD: 4,336.15 '
Inclination: 10.63 °
Azimuth: 182.46 °
VS: 210.04 '

55% SS: lt gy-wh, clr-trnsl, s&p, f gr,
sb rd-sb ang, p srt, fri, p por, arg
cmt
35% SHY SS: wh-lt gy, s&p ip, v f-f
gr, sb rd-sb ang, mod srt, fri, mod
por, arg cmt
10% SLTY SH: med-dk gy, occ gy
brn, frm-sl sft, rthy-sl slty



MD: 4,512 '
TVD: 4,429.43 '
Inclination: 11.22 °
Azimuth: 189.18 °
VS: 216.22 '

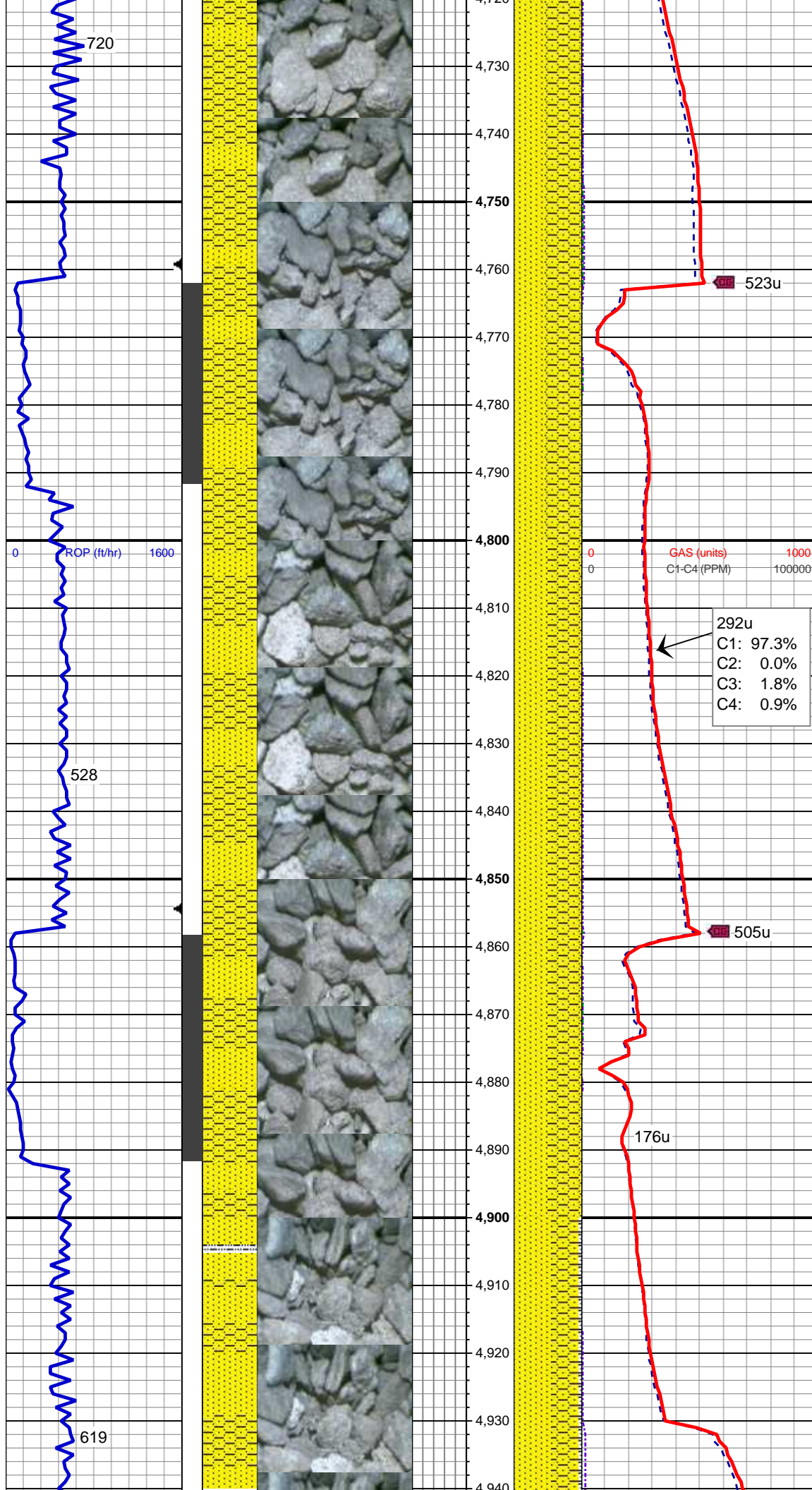
45% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt
45% SHY SS: wh-lt gy, v f-f gr, sb rd-sb ang, mod srt, fri, mod por, arg cmt
10% SLTY SH: med-dk gy, occ gy brn, frm-sl sft, rthy-sl slty, intbd ip wi ss

MD: 4,606 '
TVD: 4,521.46 '
Inclination: 12.28 °
Azimuth: 185.15 °
VS: 223.15 '

280u
C1: 96.6%
C2: 1.3%
C3: 1.1%
C4: 1.0%

55% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, arg cmt
35% SHY SS: wh-lt gy, s&p ip, v f-f gr, sb rd-sb ang, mod srt, fri, mod por, arg cmt
10% SLTY SH: med-dk gy, occ gy brn, frm-sl sft, rthy-sl slty, intbd ip wi ss

MD: 4,701 '
TVD: 4,614.63 '
Inclination: 10.23 °
Azimuth: 183.93 °
VS: 229.12 '



55% SHY SS: wh-lt gy, s&p ip, v f-f
gr, sb rd-sb ang, mod srt, mod por,
arg cmt
45% SS: lt gy-wh, s&p, f gr, sb rd-sb
ang, p srt, fri, p por, arg cmt

MUD WT 9.1 VIS 28

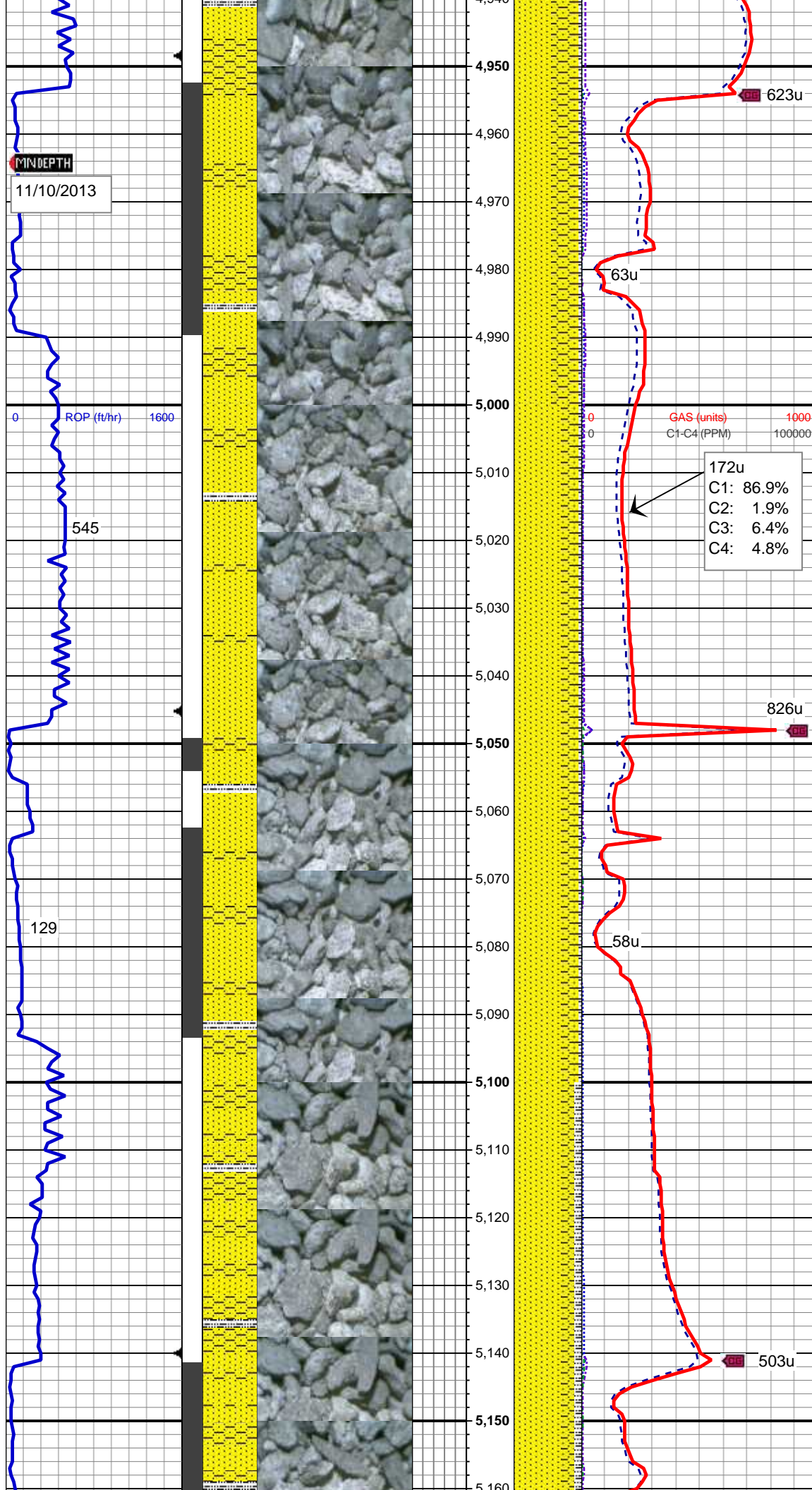
MD: 4,796 '
TVD: 4,708.14 '
Inclination: 10.1 °
Azimuth: 184.44 °
VS: 234.41 '

292u
C1: 97.3%
C2: 0.0%
C3: 1.8%
C4: 0.9%

50% SHY SS: wh-lt gy, s&p ip, v f-f
gr, sb rd-sb ang, mod srt, fri, mod
por, arg cmt
50% SS: lt gy-wh, clr-trnsl, s&p, f gr,
sb rd-sb ang, p srt, fri, p por, arg
cmt

MD: 4,891 '
TVD: 4,801.69 '
Inclination: 9.98 °
Azimuth: 176.46 °
VS: 238.59 '

55% SS: lt gy-wh, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt



55% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt
40% SHY SS: wh-lt gy, s&p ip, v f-f gr, sb rd-sb ang, mod srt, fri, mod por, arg cmt
5% SLTY SH: med-dk gy, occ gy brn, frm-sl sft, rthy-sl slty

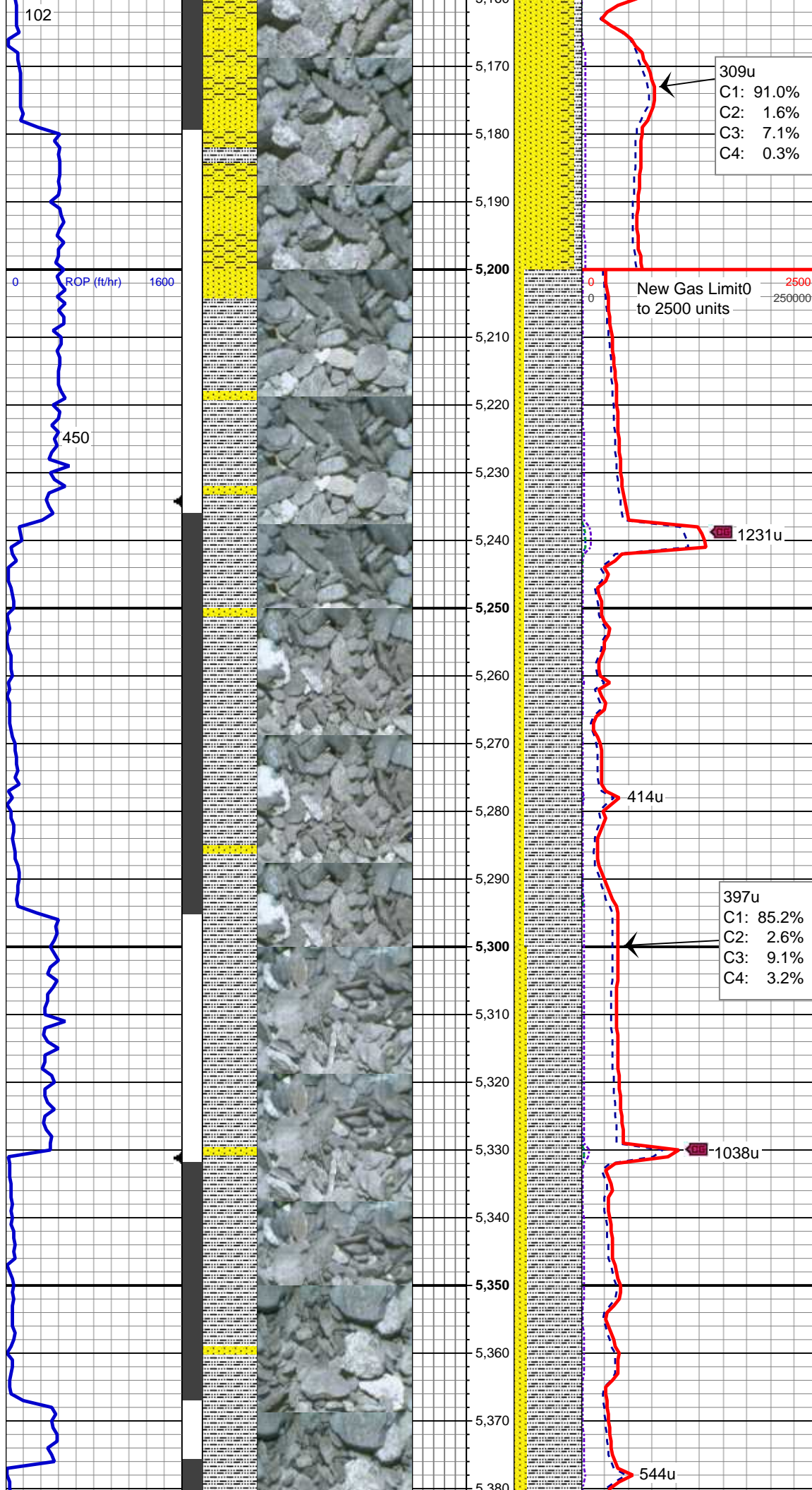
MD: 4,987 '
TVD: 4,896.3 '
Inclination: 9.54 °
Azimuth: 176.24 °
VS: 241.57 '

70% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt
25% SHY SS: wh-lt gy, s&p ip, v f-f gr, sb rd-sb ang, mod srt, fri, mod por, arg cmt
5% SLTY SH: med-dk gy, occ gy brn, frm-sl sft, rthy-sl slty

MD: 5,082 '
TVD: 4,989.9 '
Inclination: 10.11 °
Azimuth: 178.06 °
VS: 244.76 '

MUD WT 8.9+ VIS 29

70% SS: lt gy-wh, clr-trnsl, s&p, f gr, sb rd-sb ang, p srt, fri, p por, arg cmt
20% SHY SS: wh-lt gy, s&p ip, v f-f gr, sb rd-sb ang, mod srt, fri, mod por, arg cmt
10% SLTY SH: med-dk gy, gy



brn-blk ip, frm-sl sft, rthy-sl slty tex

MD: 5,176 '
TVD: 5,082.56 '
Inclination: 9.32 °
Azimuth: 188.08 °
VS: 249.4 '

MUD WT 8.8+ VIS 28

85% SLTY SH: lt-med gy, dk gy-gy
brn, frm-sft, fri-brit, sb plty-blky,
rthy-sl slty tex
15% SS: lt gy-wh, clr-trnsl, s&p, f gr,
sb rd-sb ang, p srt, fri, p por, arg
cmt

MUD WT 8.9 VIS 28

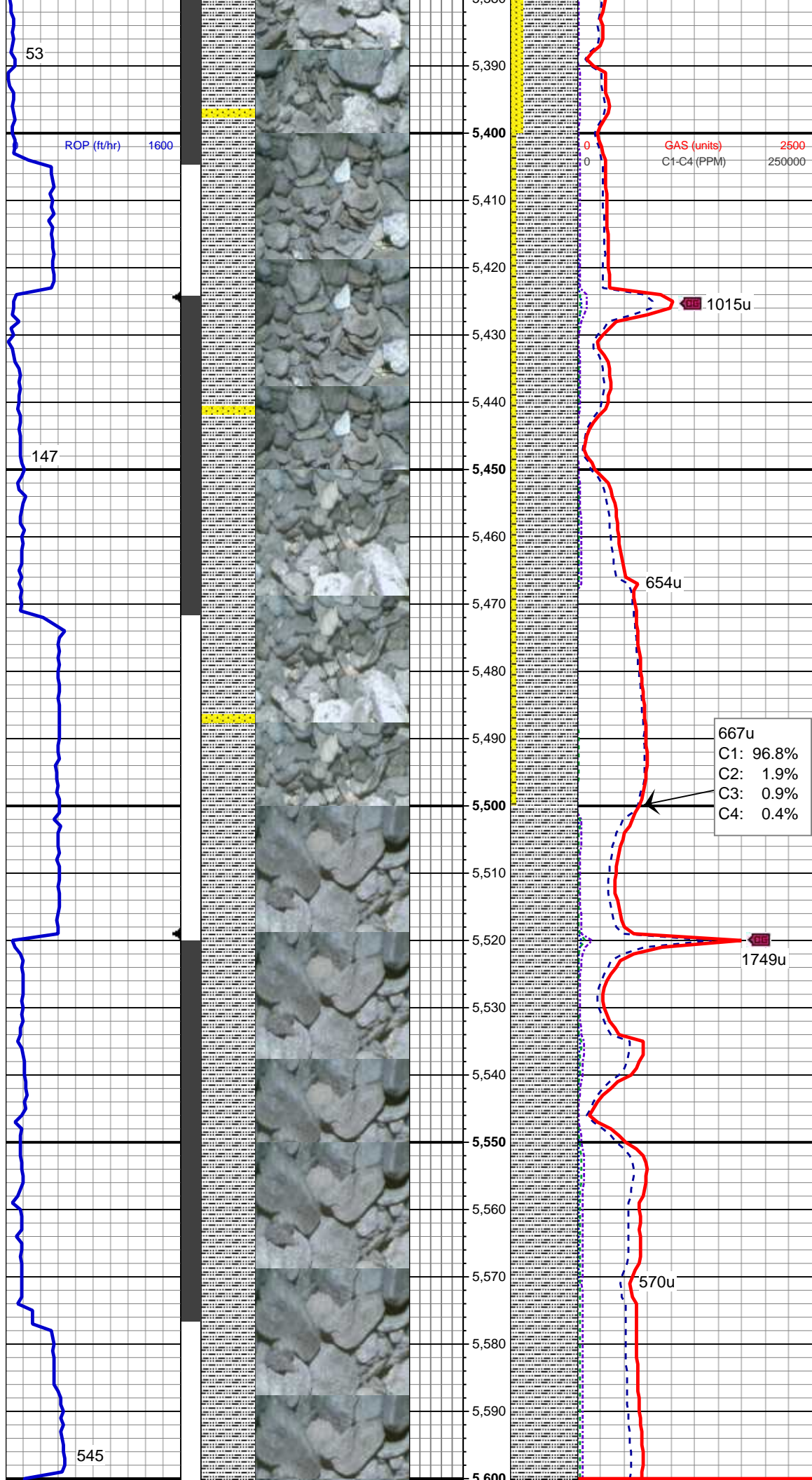
MD: 5,271 '
TVD: 5,176.43 '
Inclination: 8.41 °
Azimuth: 183.9 °
VS: 254.47 '

MUD WT 8.8 VIS 28

80% SLTY SH: lt-med gy, dk gy-gy
brn, frm-sft, fri-brit, sb plty-blky,
rthy-sl slty tex, sl calc
20% SS: lt gy-wh, clr-trnsl, s&p, f gr,
sb rd-sb ang, p srt, fri, p por, arg
cmt

MD: 5,365 '
TVD: 5,269.33 '
Inclination: 9.14 °
Azimuth: 180.33 °
VS: 252.10 '

VS: 258.48'



90% SLTY SH: lt-med gy, dk gy-gy
brn, frm-sft, fri-brit, sb plty-blky,
rthy-sl slty tex, sl calc
10% SHY SS: wh-lt gy, med gy, s&p
ip, v f-f gr, sb rd-sb ang, mod srt, fri,
mod por, arg cmt, tr pyr

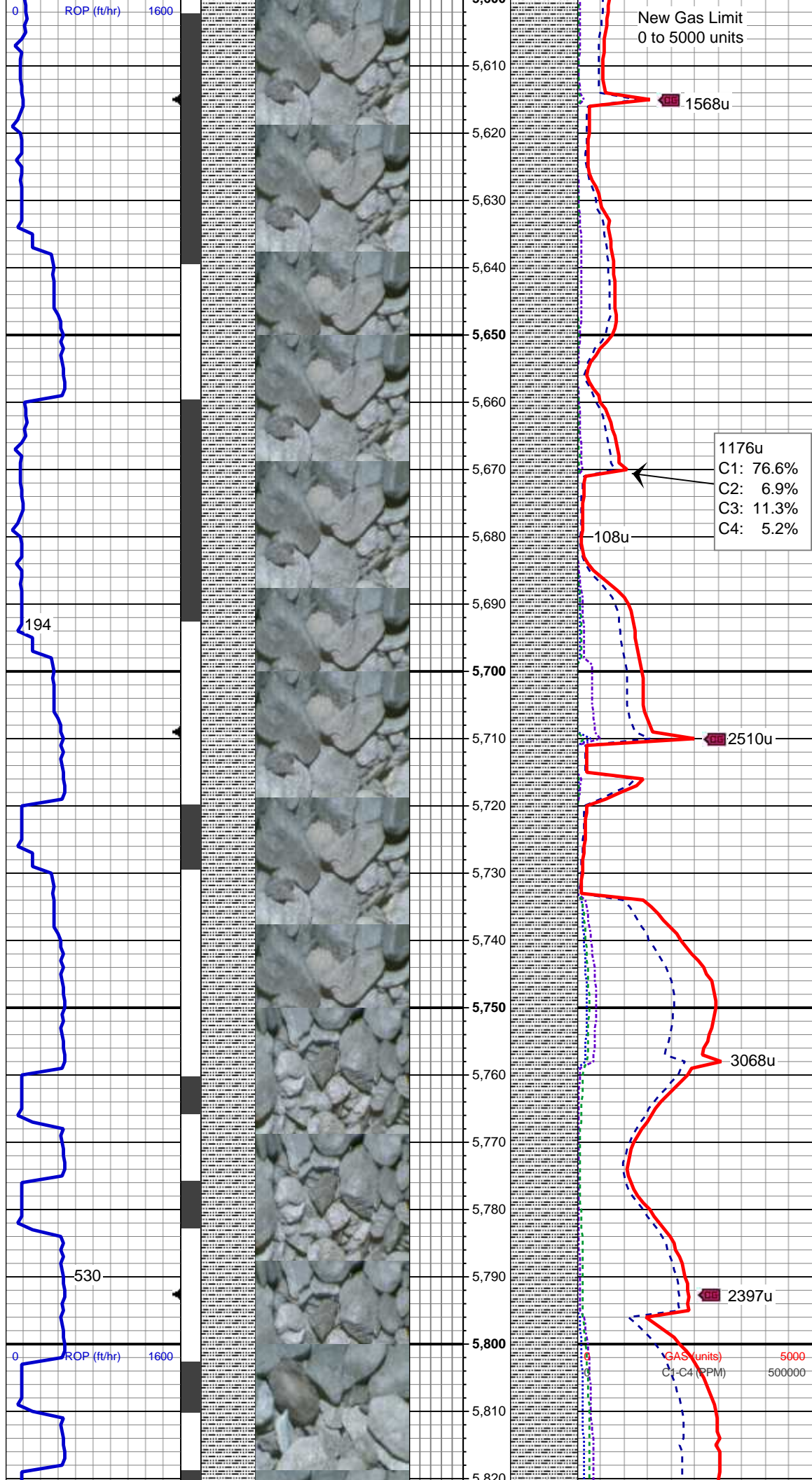
MD: 5,461'
TVD: 5,364.12'
Inclination: 9.03°
Azimuth: 182.69°
VS: 262.58'

MUD WT 8.8 VIS 28

667u
C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%

MD: 5,556'
TVD: 5,458.2'
Inclination: 6.91°
Azimuth: 181.67°
VS: 266.31'

100% SLTY SH: lt-med gy, dk gy-gy
brn, frm-sft, fri-brit, sb plty-blky,
rthy-sl slty tex, sl calc, tr sd



MD: 5,651 '
TVD: 5,552.64 '
Inclination: 5.49 °
Azimuth: 174.76 °
VS: 268.58 '

100% SLTY SH: lt-med gy, dk gy-gy
brn, frm-sft, fri-brit, sb plty-blky,
rthy-sl slty tex, sl calc, rr sd

TOOH for Directional BHA
5709' MD @ 07:52 MST on
11/10/13

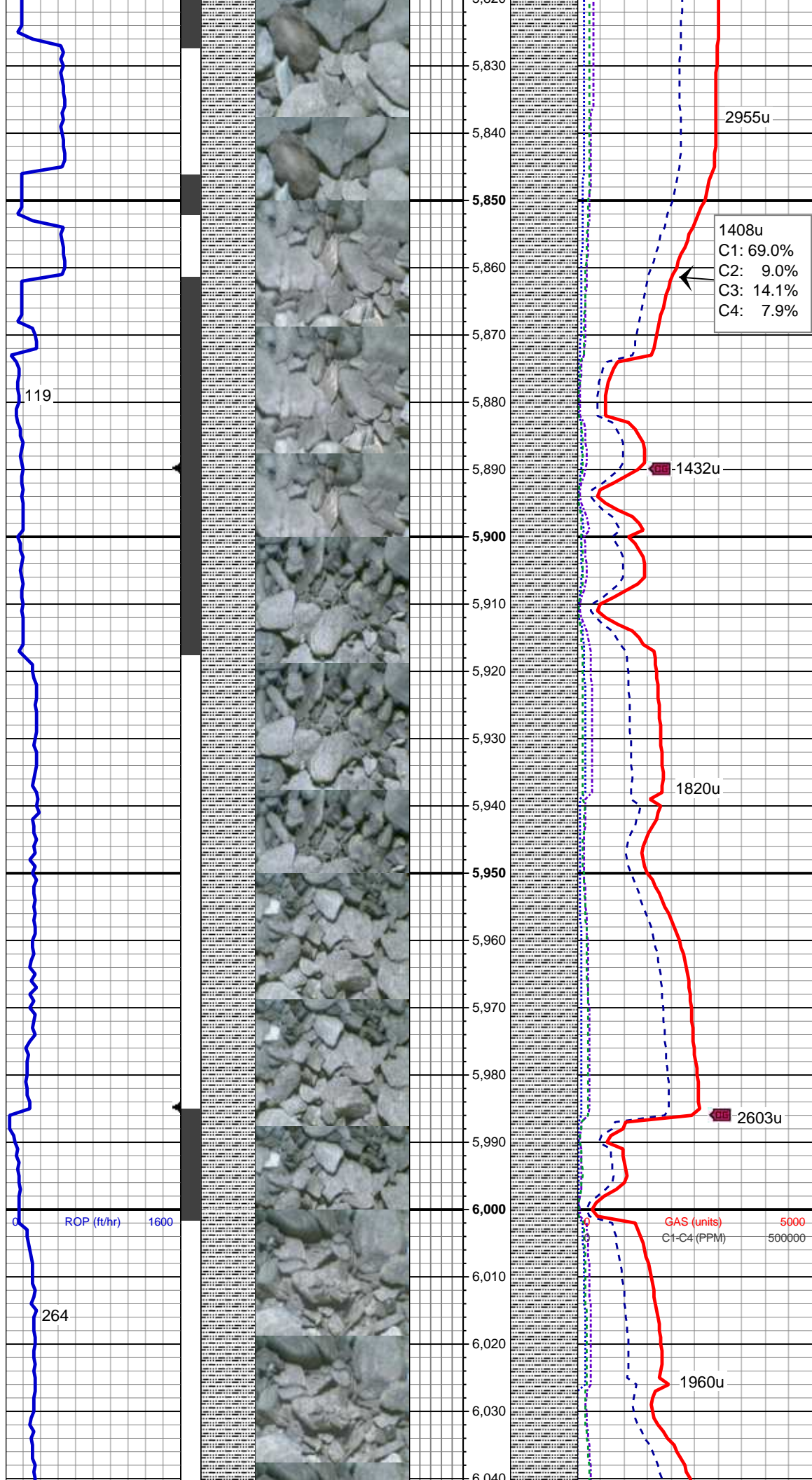
Drilling Resumed @
16:07 MST on 11/10/13

MD: 5,738 '
TVD: 5,638.99 '
Inclination: 8.46 °
Azimuth: 177.13 °
VS: 270.48 '

100% SLTY SH: lt-med gy, dk gy-gy
brn, frm-sft, fri-brit, sb plty-blky,
rthy-sl slty tex, sl calc, rr sd

MUD WT 8.9 VIS 29

BHA #2
Size: 8.75"
Manufacturer:
Schlumberger/Smith
Model: SDi611
Serial #: JH2299
Nozzles: 6x14
Motor #2
Manufacturer: Sperry Drilling
Model: Sperry Drilling
Serial #675-1051
Bend: 2.0



MD: 5,833 '
TVD: 5,732.9 '
Inclination: 8.93 °
Azimuth: 188.58 °
VS: 274.71 '

100% SLTY SH: lt-med gy, dk gy-gy
brn, frm-sft, fri-brit, sb plty-blky,
rthy-sl slty tex, sl calc, rr sd

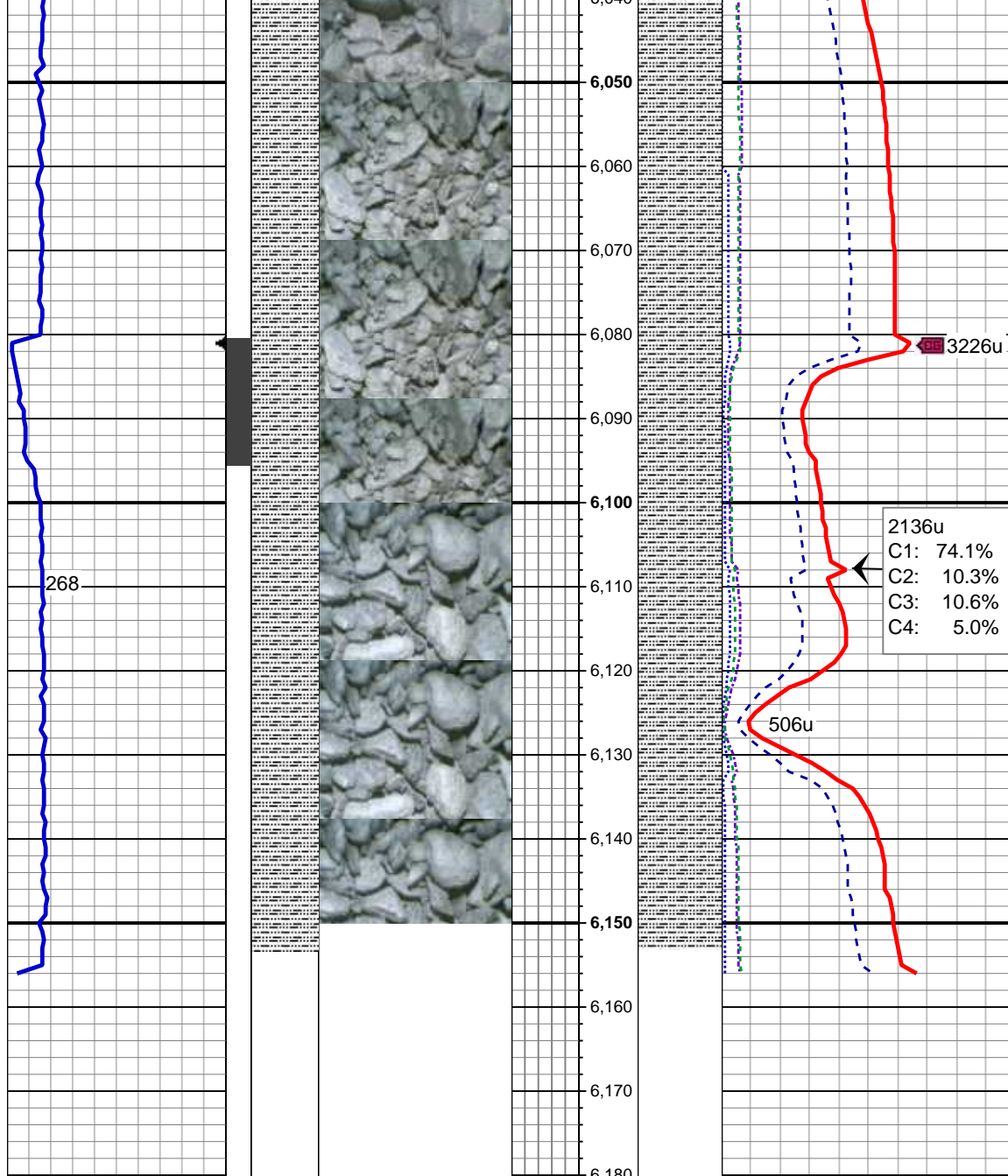
MUD WT 9.1 VIS 32

MD: 5,928 '
TVD: 5,826.53 '
Inclination: 10.64 °
Azimuth: 175.52 °
VS: 279.04 '

100% SLTY SH: lt-med gy, dk gy-gy
brn, frm-sft, fri-brit, sb plty-blky,
rthy-sl slty tex, sl calc, rr sd

MUD WT 9.45 VIS 35

MD: 6,023 '
TVD: 5,919.87 '
Inclination: 10.81 °
Azimuth: 173.56 °
VS: 281.72 '



100% SLTY SH: lt-med gy, dk gy-gy
brn, frm-sft, fri-brit, sb plty-blky,
rthy-sl slty tex, sl calc, rr sd