

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name Romero PC G10-79HN

Location Sec 3, T4N, R65W

State COLORADO

County WELD

Country USA

Rig Number H&P #326

API Number 05-123-34018

AFE # 133212

Region DJ Basin

Field Wattenberg

Spud Date 3/20/2014

Drilling Completed 3/30/2014

Surface Coordinates 40° 20' 32.496 N
104° 39' 27.900 W
Sec 3, T4N, R65W
2235' FNL, 273' FWL

Bottom Hole Coordinates Sec 10, T4N, R65W
75' FWL, 1855' FSL

Ground Elevation 4,670.0

K.B. Elevation 4700'

Logged Interval 800' **To** 6,115'

Total Depth 12,992'

Formation Niobrara

Type of Drilling Fluid Water based LSND

Operator

Company Noble Energy Inc

Geologist

Name Terry Acomb, Michael Rooks

Company Columbine Logging

Rock Types

UNKNOWN
ANHYDRITE

COAL
CONGLOMERATE

METAMORPHIC
NOSAMPLE

SHALY SILTSTONE
SILTSTONE

BENTONITE
 BRECCIA
 CEMENT
 CHALK
 CHERT
 CLAY CHOKE SAND
 CLAYSTONE

DOLOMITE
 GRANITE
 GYPSUM
 IGNEOUS
 LIMESTONE
 SIDERITE or LIMONITE
 MARLSTONE

SALT
 SALT-PEPPER SAND
 SANDSTONE
 SHALE
 SHALECOLORED
 SHALE GRAY
 SHALYSANDSTONE

SILTY SHALE
 TILL
 TUFF
 WELDED TUFF

Accessories

Fossils

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

F 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
 CHTLT
 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
 B SUBANG
 r SUBRND

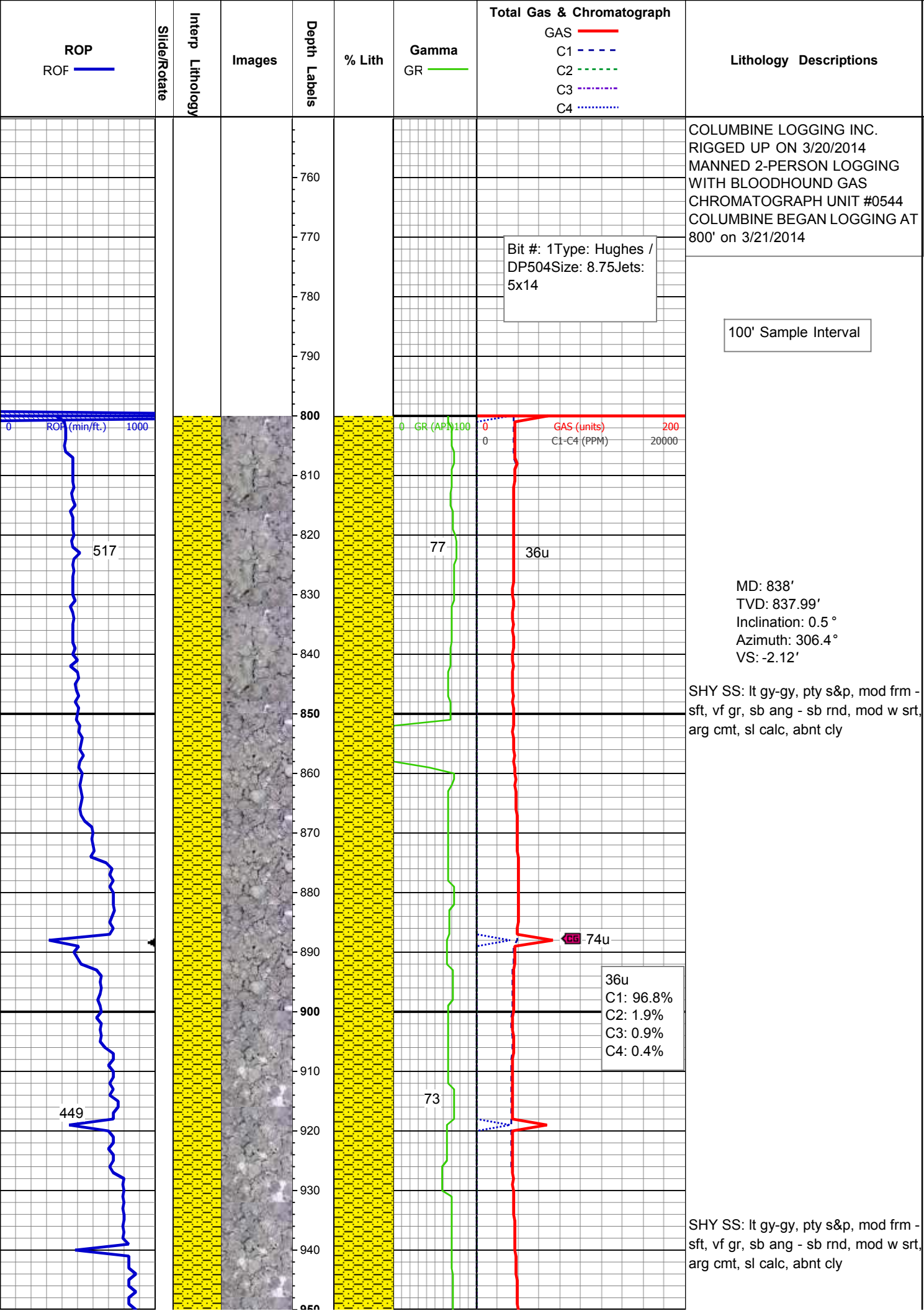
Textures

B BOUNDSTONE
 C CHALKY
 C CRYPTOXLN

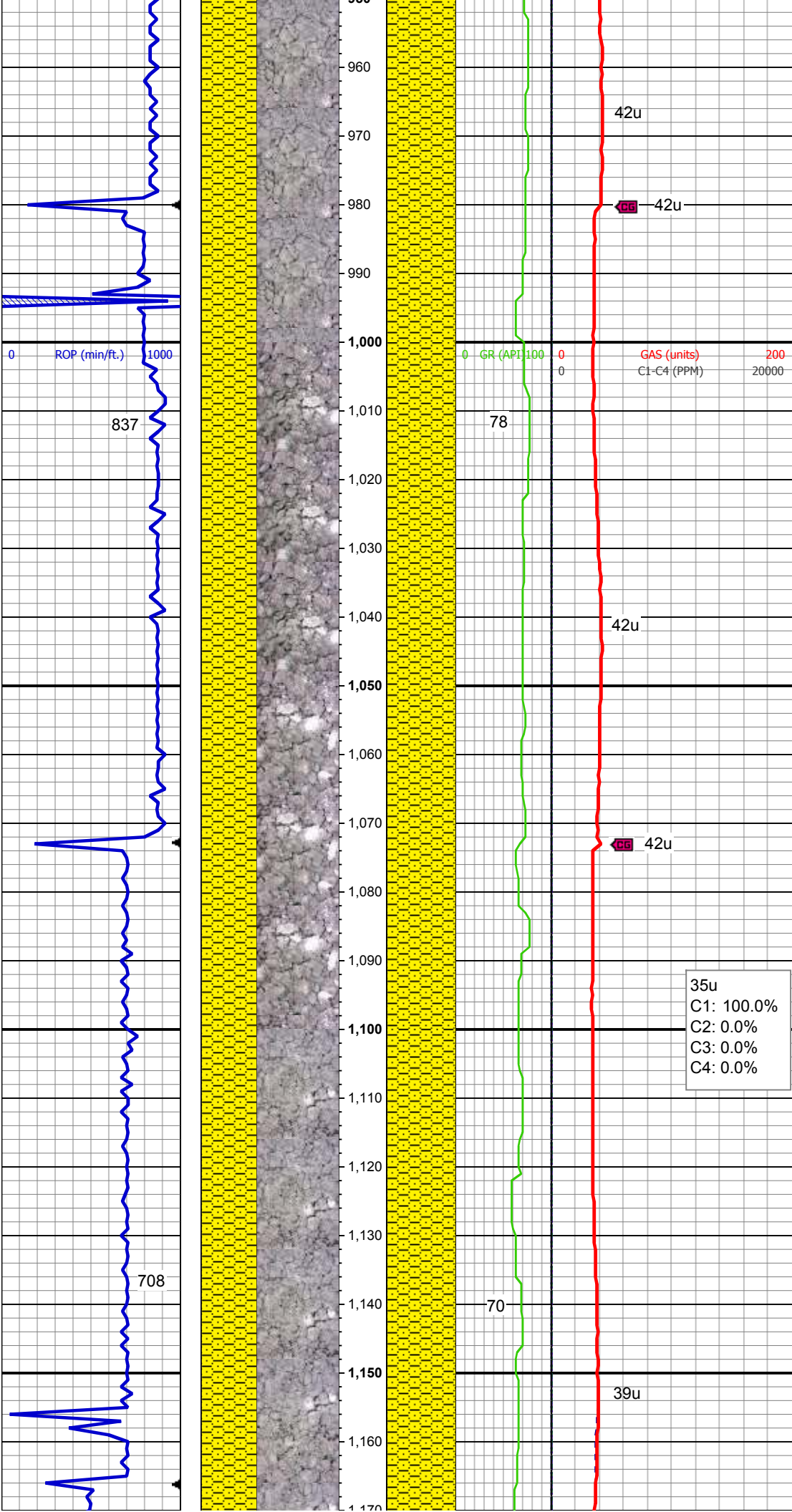
E EARTHY
 F FINELYXLN
 G GRAINSTONE
 L LITHOGRAPHIC
 M MICROXLN
 M MUDSTONE
 P PACKSTONE
 W WACKESTONE

Sorting

M MODERATE
 P POOR
 W WELL



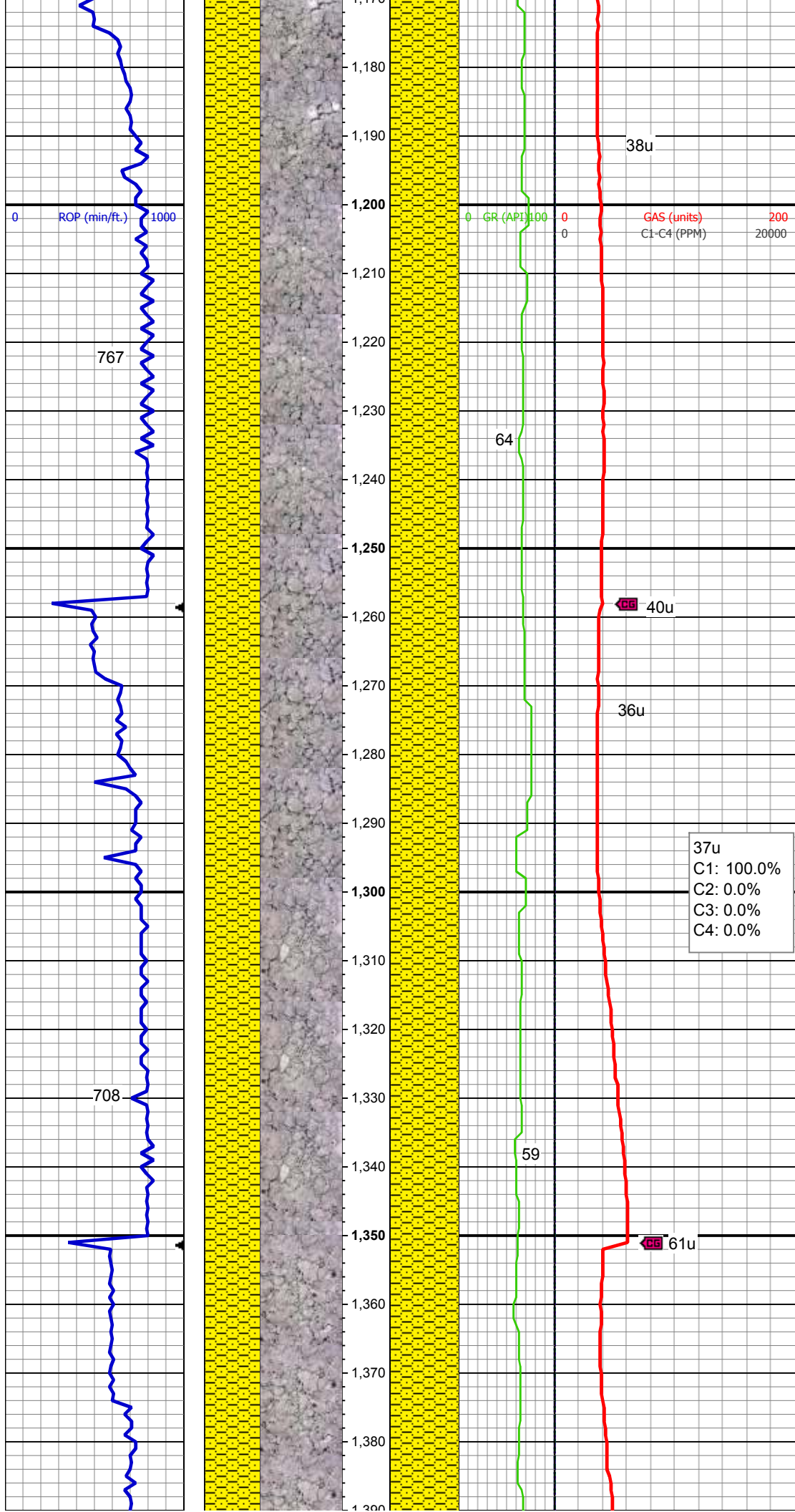
Mud Wt: 8.60 / 34 Vis



SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc, abnt cly

MD: 1,116'
TVD: 1,115.97'
Inclination: 0.8°
Azimuth: 311.3°
VS: -4.08'

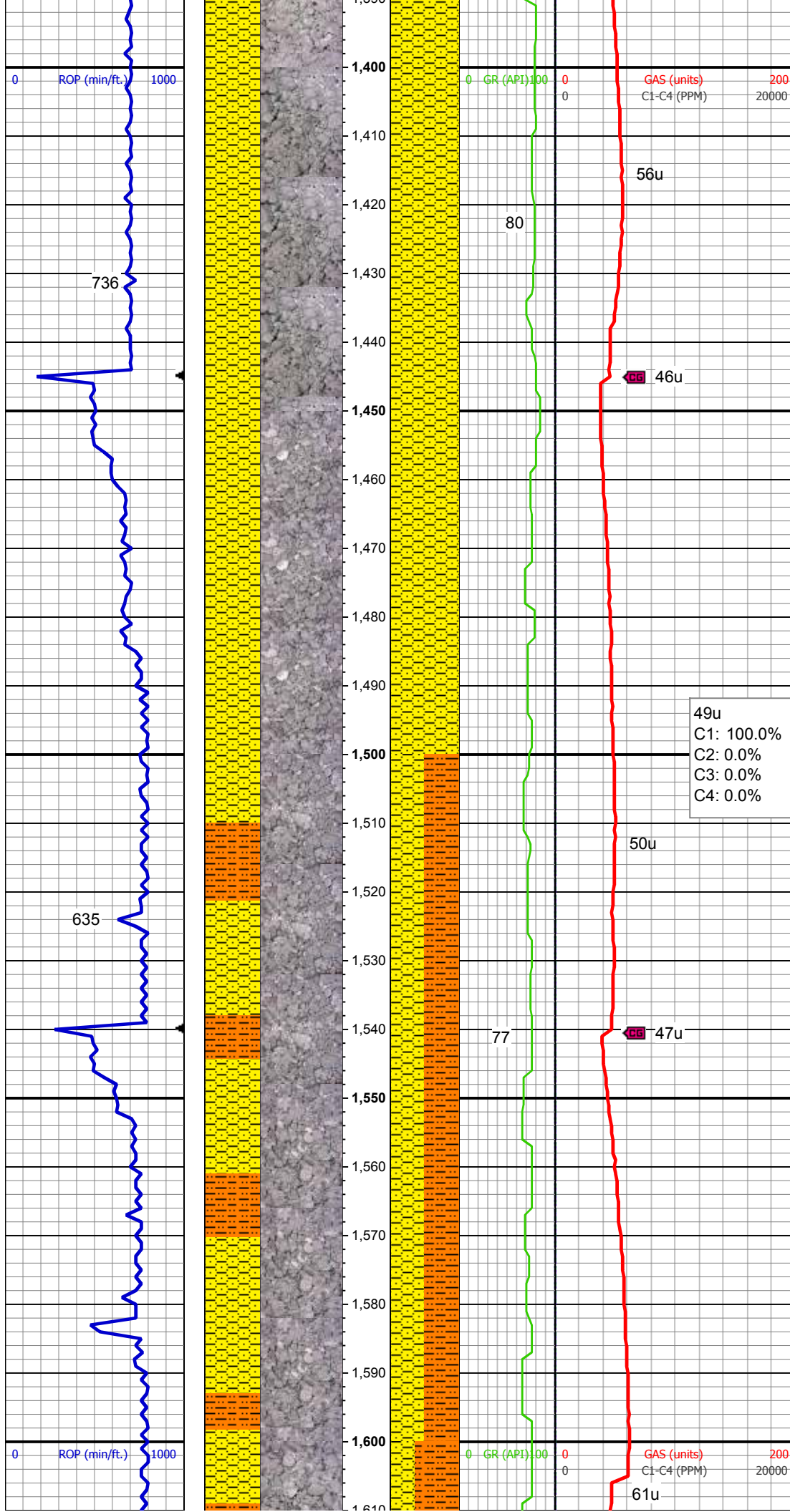
SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc, abnt cly



Mud Wt: 8.60 / 35 Vis

SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc, abnt cly

SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc, occ slty, abnt cly



MD: 1,395'
TVD: 1,394.95'
Inclination: 0.6 °
Azimuth: 339.4 °
VS: -6.7'

SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc, occ slty, abnt cly

49u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc; SHY SLTST: med
gy, frm, sb blkly-blky, gritty, occ sdy,
sl calc, abnt cly

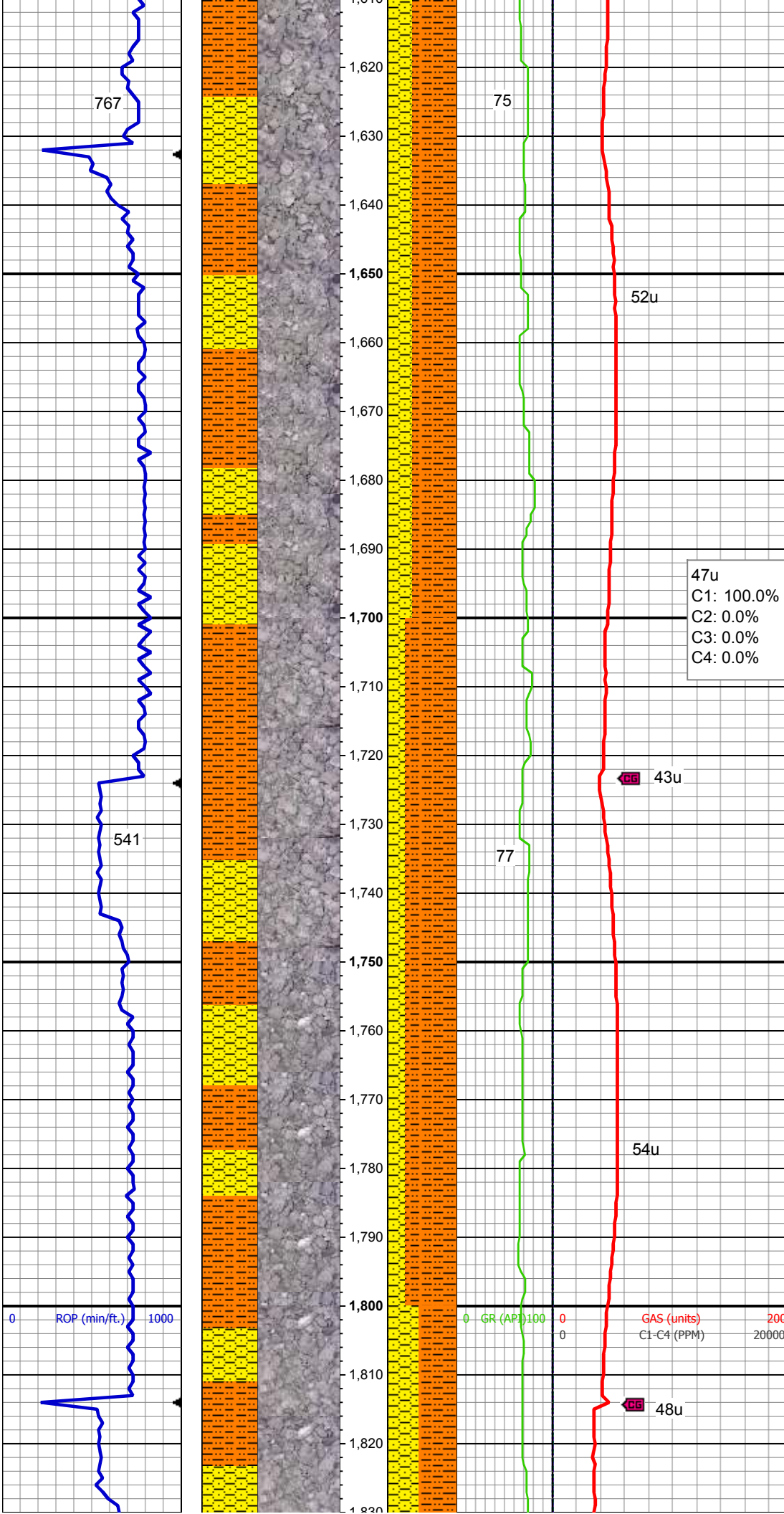
Mud Wt: 8.70 / 35 Vis

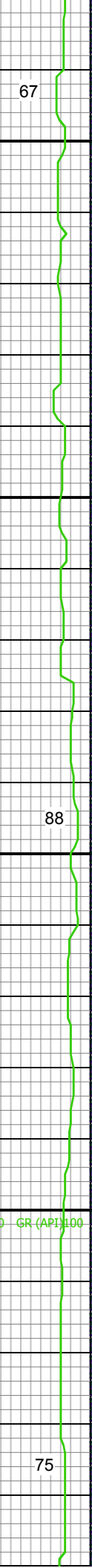
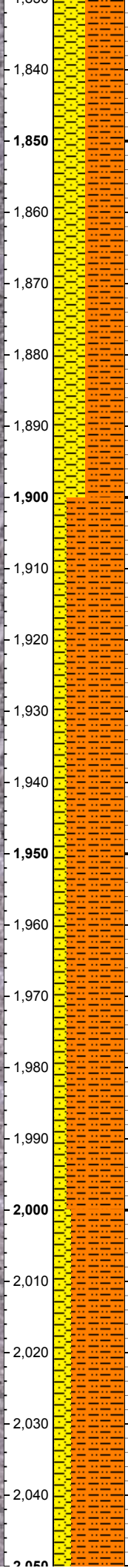
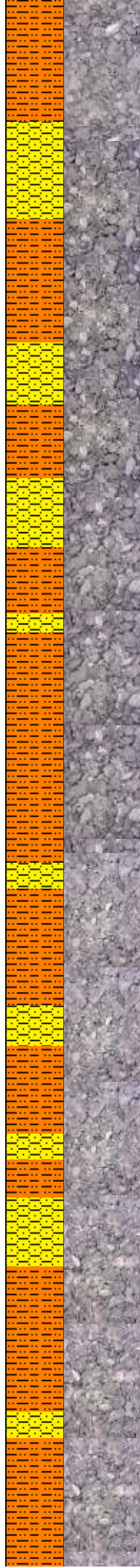
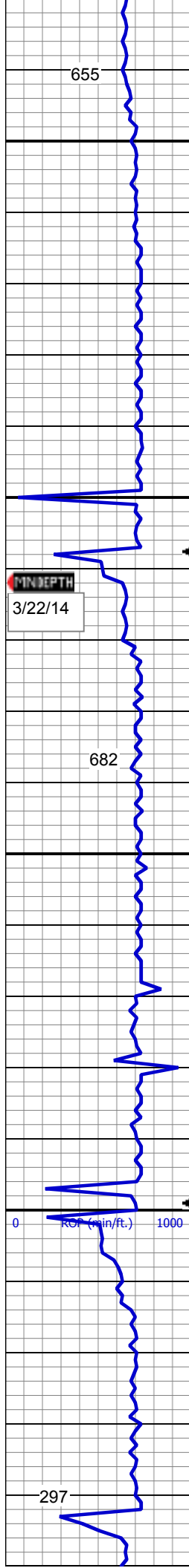
SHY SLTST: med gy, frm, sb
blky-blky, gritty, occ sdy, sl calc,
abnt cly; SHY SS: lt gy-gy, pty s&p,
mod frm - sft, vf gr, sb ang - sb rnd,
mod w srt, arg cmt, sl calc

MD: 1,673'
TVD: 1,672.95'
Inclination: 0.1 °
Azimuth: 270 °
VS: -8.05'

47u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

SHY SLTST: med gy, frm, sb
blky-blky, gritty, occ sdy, sl calc,
abnt cly; SHY SS: lt gy-gy, pty s&p,
mod frm - sft, vf gr, sb ang - sb rnd,
mod w srt, arg cmt, sl calc



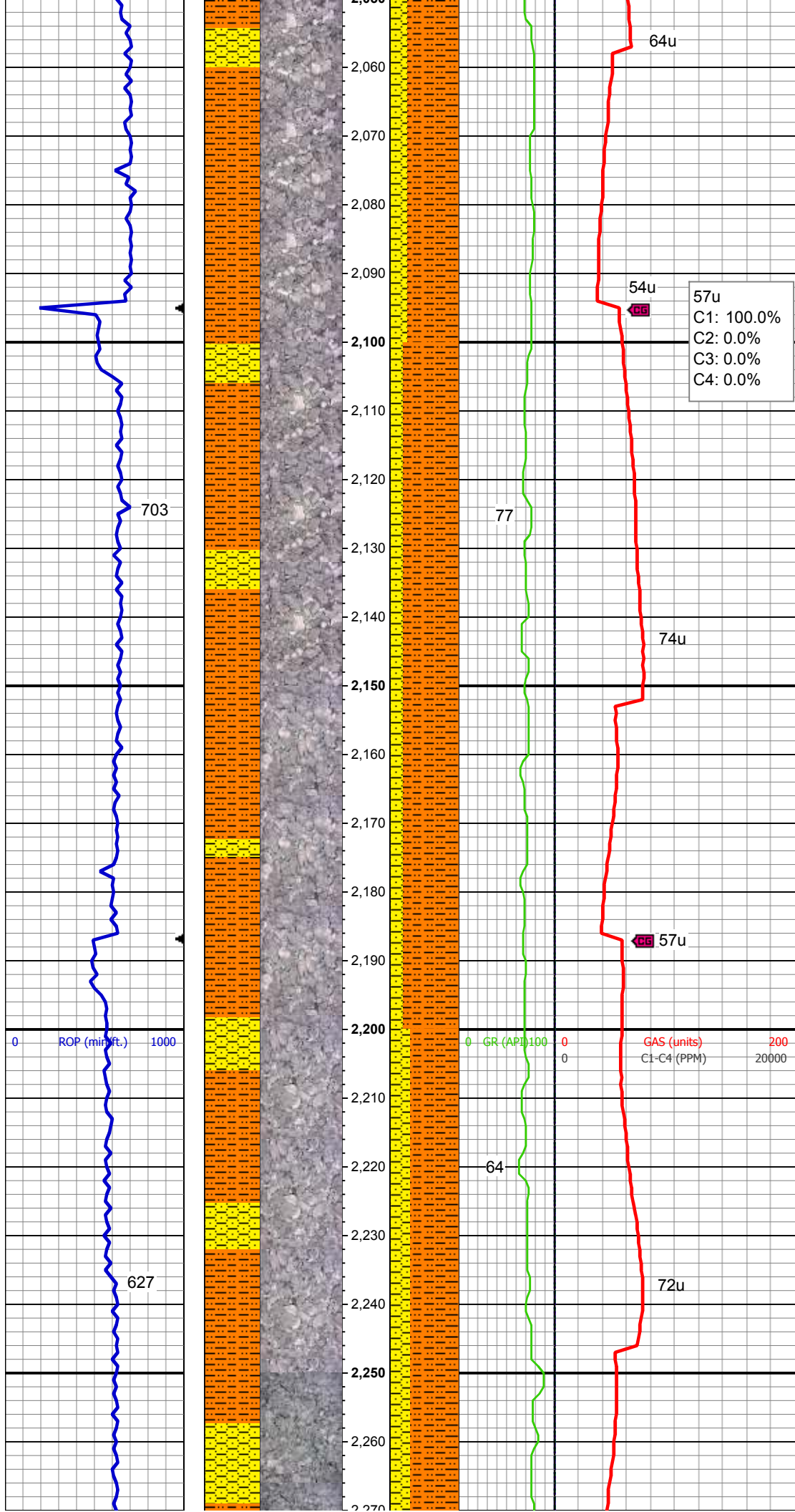


SHY SLTST: med gy, frm, sb
blky-blky, gritty, occ sdy, sl calc,
abnt cly; SHY SS: lt gy-gy, pty s&p,
mod frm - sft, vf gr, sb ang - sb rnd,
mod w srt, arg cmt, sl calc

SHY SLTST: med gy, frm, sb
blky-blky, gritty, occ sdy, sl calc,
abnt cly; SHY SS: lt gy-gy, pty s&p,
mod frm - sft, vf gr, sb ang - sb rnd,
mod w srt, arg cmt, sl calc

MD: 1,951'
TVD: 1,950.94'
Inclination: 0.6 °
Azimuth: 7.5°
VS: -9.49'

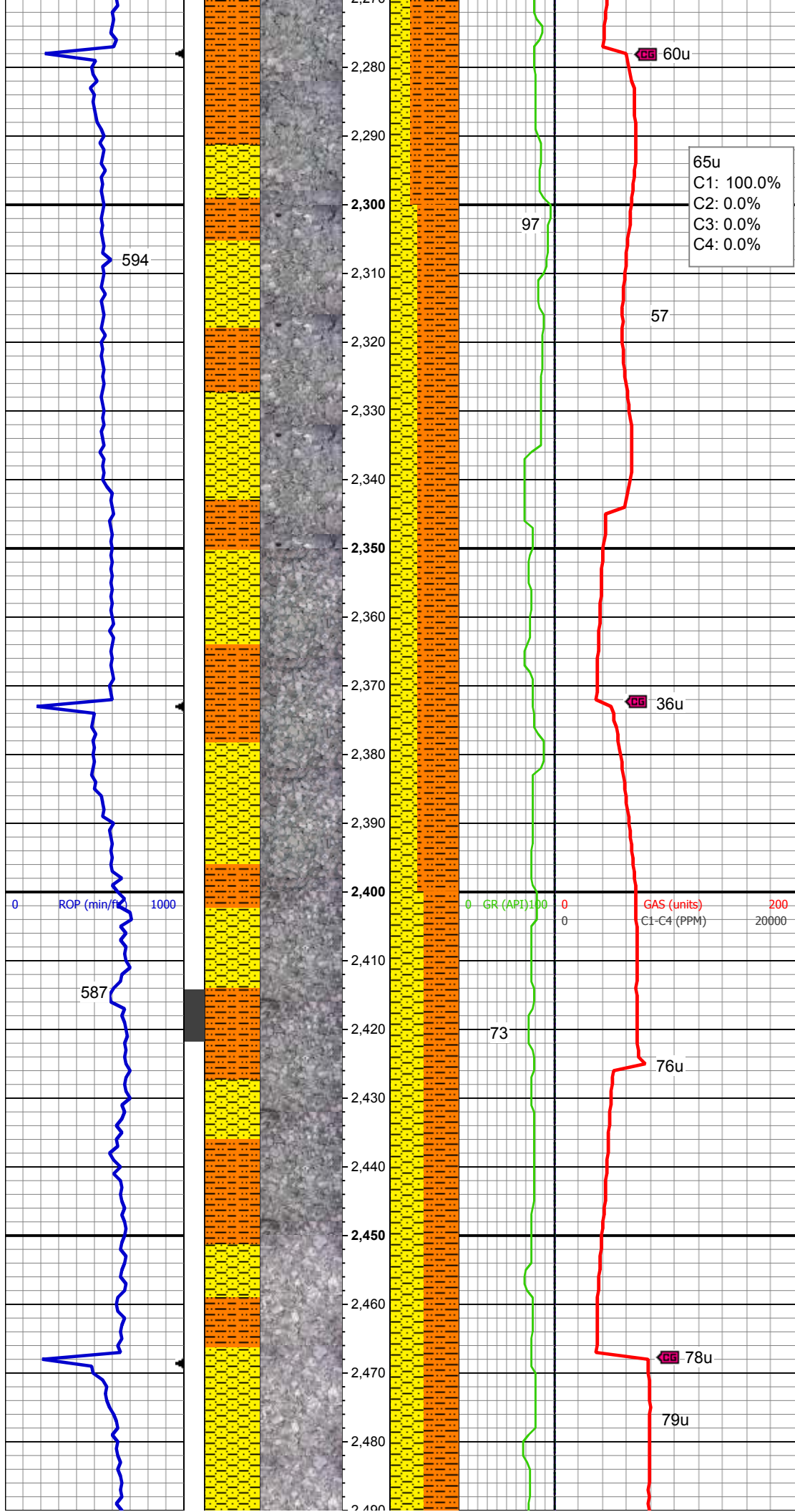
SHY SLTST: med gy, frm, sb
blky-blky, gritty, occ sdy, sl calc,
abnt cly; SHY SS: lt gy-gy, pty s&p,
mod frm - sft, vf gr, sb ang - sb rnd,
mod w srt, arg cmt, sl calc



SHY SLTST: med gy, frm, sb
blky-blky, gritty, occ sdy, sl calc,
abnt cly; SHY SS: lt gy-gy, pty s&p,
mod frm - sft, vf gr, sb ang - sb rnd,
mod w srt, arg cmt, sl calc

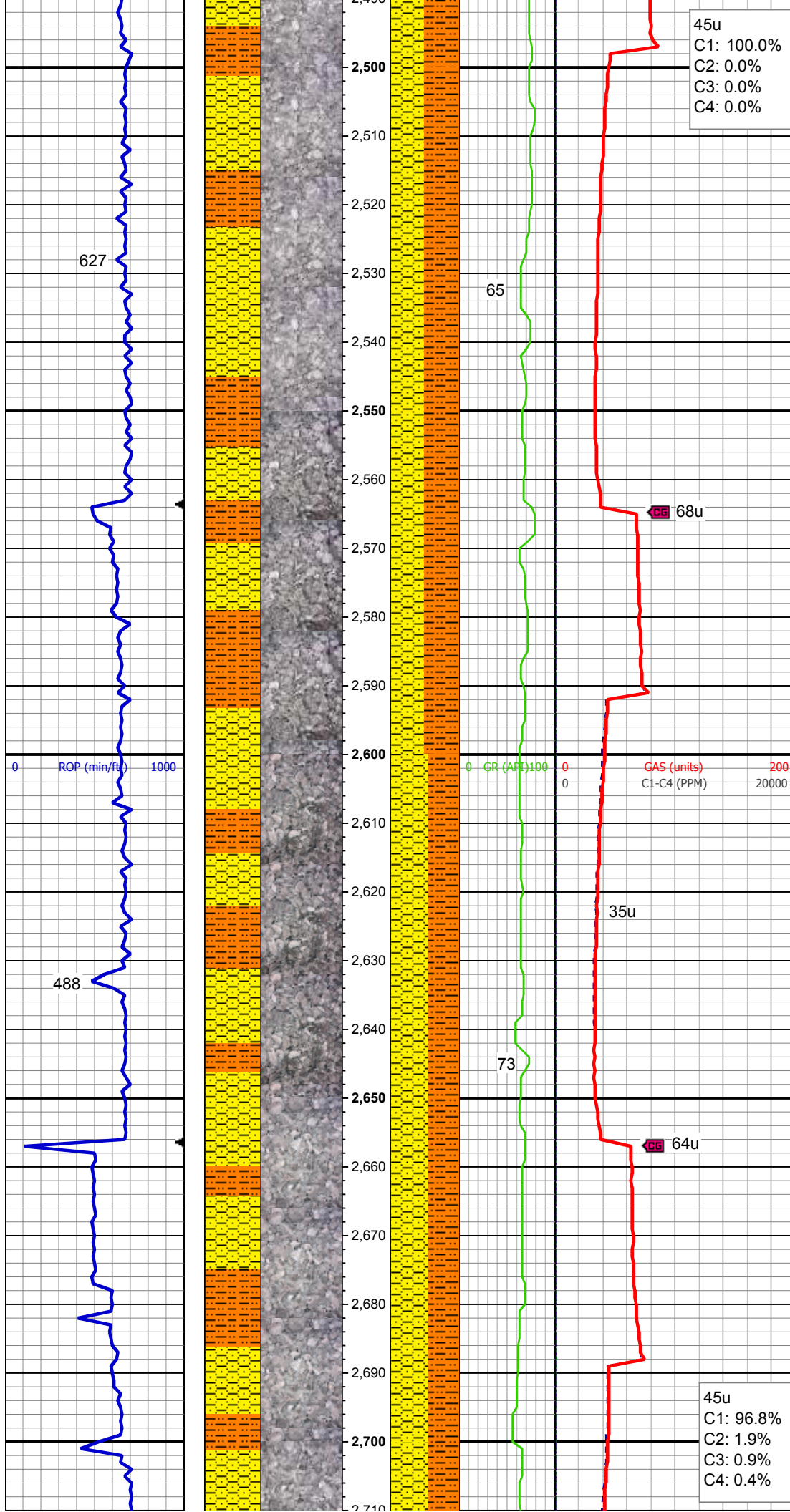
MD: 2,229'
TVD: 2,228.93'
Inclination: 0.3 °
Azimuth: 280.7°
VS: -11.06'

SHY SLTST: med gy, frm, sb
blky-blky, gritty, occ sdy, sl calc,
abnt cly; SHY SS: lt gy-gy, pty s&p,
mod frm - sft, vf gr, sb ang - sb rnd,
mod w srt, arg cmt, sl calc



SHY SLTST: med gy, frm, sb
blky-blky, gritty, occ sdy, sl calc,
abnt cly; SHY SS: lt gy-gy, pty s&p,
mod frm - sft, vf gr, sb ang - sb rnd,
mod w srt, arg cmt, sl calc

SHY SLTST: med gy, frm, sb
blky-blky, gritty, occ sdy, sl calc,
abnt cly; SHY SS: lt gy-gy, pty s&p,
mod frm - sft, vf gr, sb ang - sb rnd,
mod w srt, arg cmt, sl calc

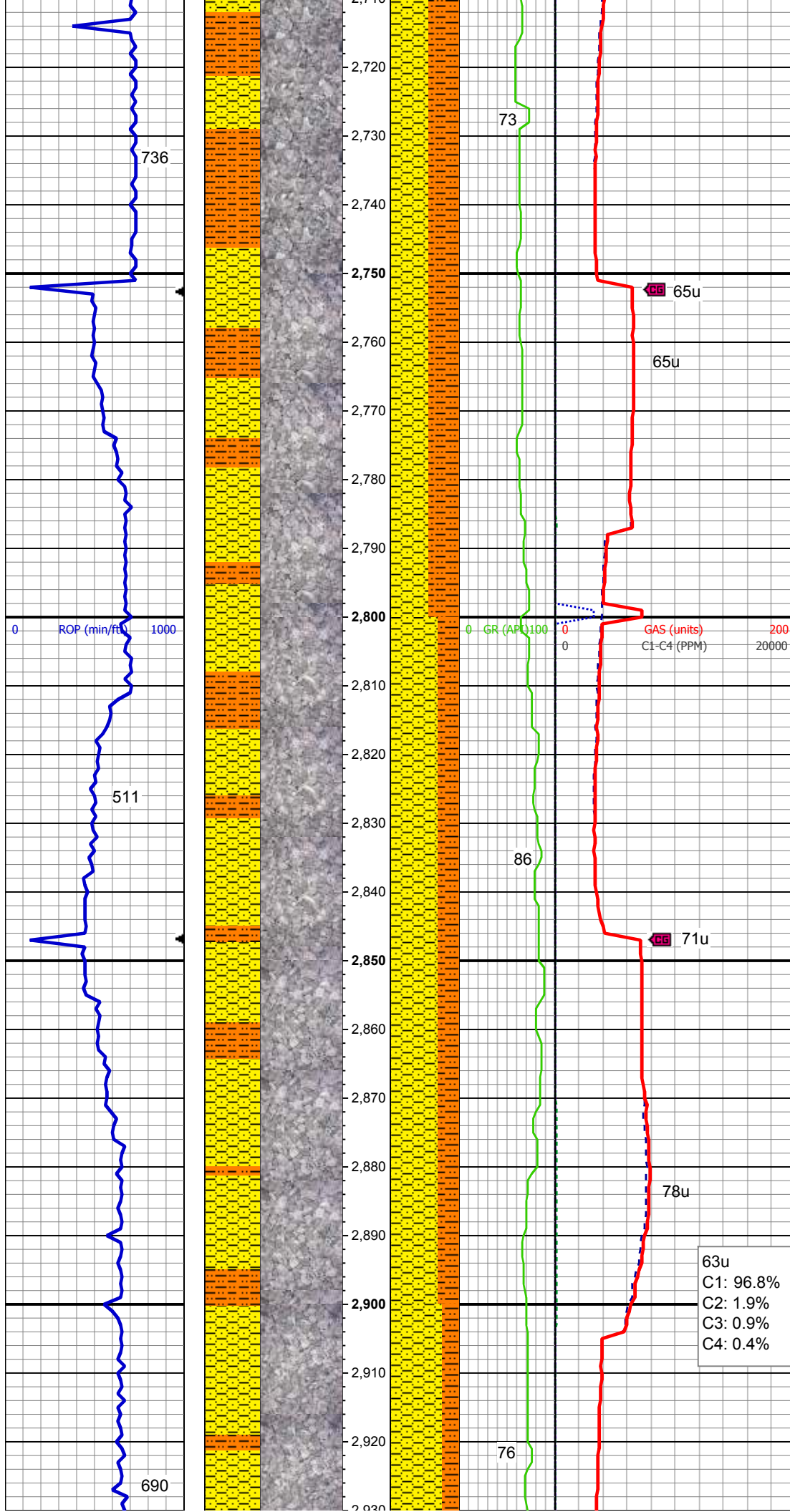


MD: 2,513'
TVD: 2,512.92'
Inclination: 0.9°
Azimuth: 258.2°
VS: -10.7'

SHY SLTST: med gy, frm, sb
blky-blky, gritty, occ sdy, sl calc,
abnt cly; SHY SS: lt gy-gy, pty s&p,
mod frm - sft, vf gr, sb ang - sb rnd,
mod w srt, arg cmt, sl calc

Mud Wt: 8.85 / 41 Vis

SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc; SHY SLTST: med
gy, frm, sb blky-blky, gritty, occ sdy,
sl calc, abnt cly

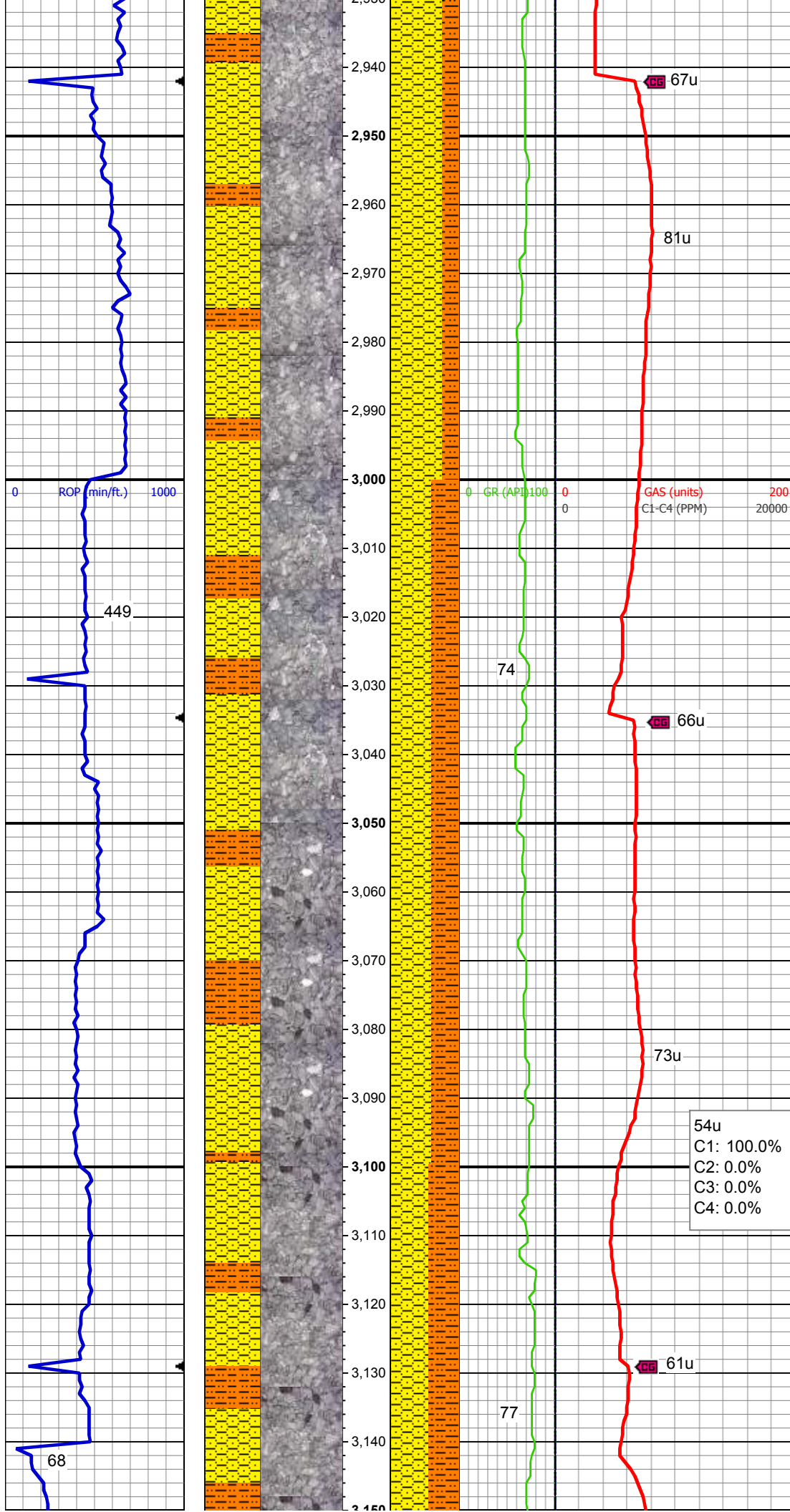


SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc; SHY SLTST: med gy, frm, sb blk-y-blky, gritty, occ sdy, sl calc, abnt cly

MD: 2,796'
TVD: 2,795.86'
Inclination: 1.4 °
Azimuth: 266.8°
VS: -9.95'

SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc; SHY SLTST: med gy, frm, sb blk-y-blky, gritty, occ sdy, sl calc, abnt cly

SHY SS: lt gy-gy, pty s&p, mod frm -

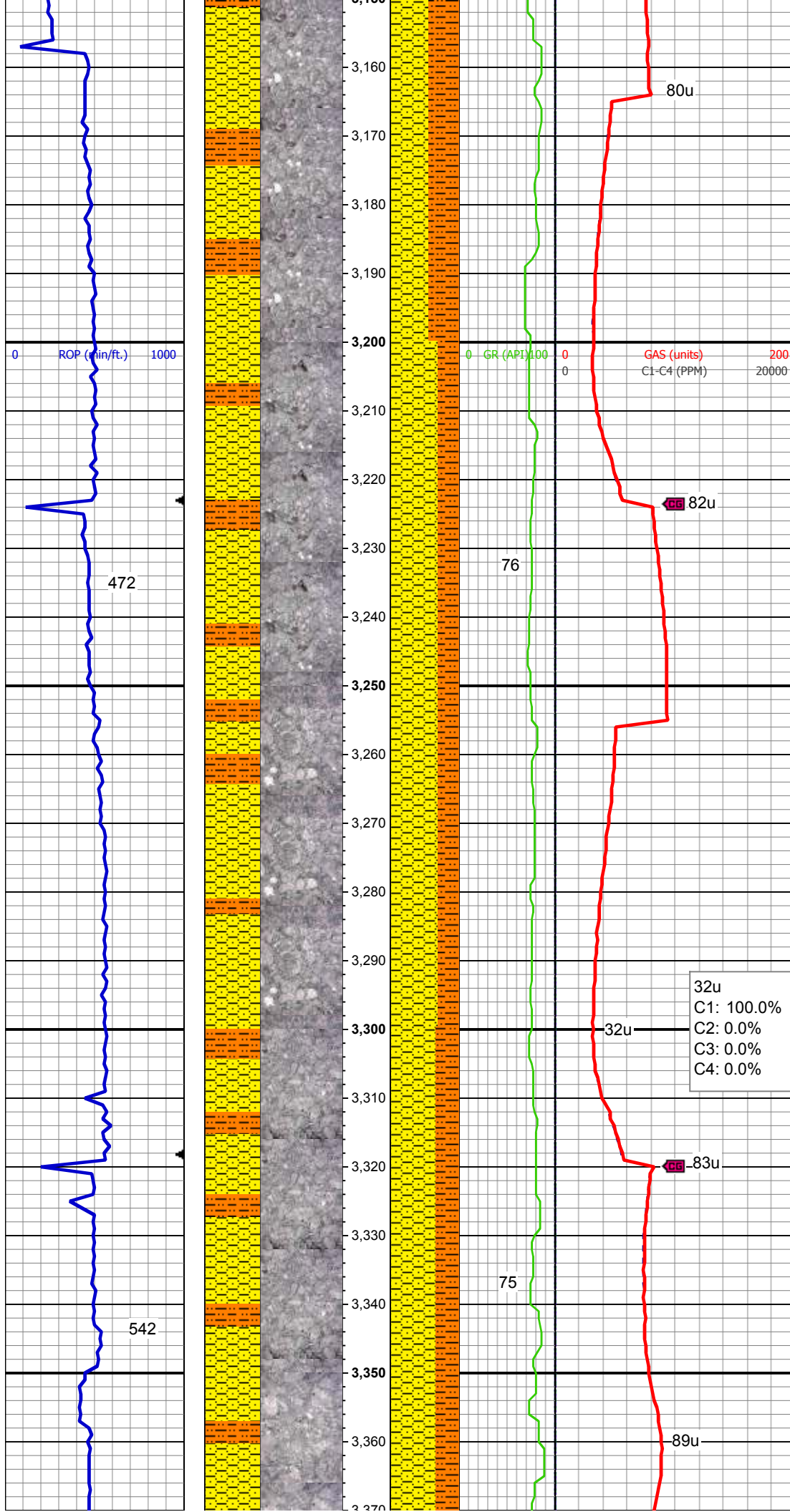


SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc; SHY SLTST: med
gy, frm, sb blkly-blky, gritty, occ sdy,
sl calc, abnt cly

SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc; SHY SLTST: med
gy, frm, sb blkly-blky, gritty, occ sdy,
sl calc, abnt cly

MD: 3,080'
TVD: 3,079.74'
Inclination: 1.9 °
Azimuth: 252.4 °
VS: -8.21'

SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt,



arg cmt, sl calc; SHY SLTST: med
gy, frm, sb blkly-blky, gritty, occ sdy,
sl calc, abnt cly

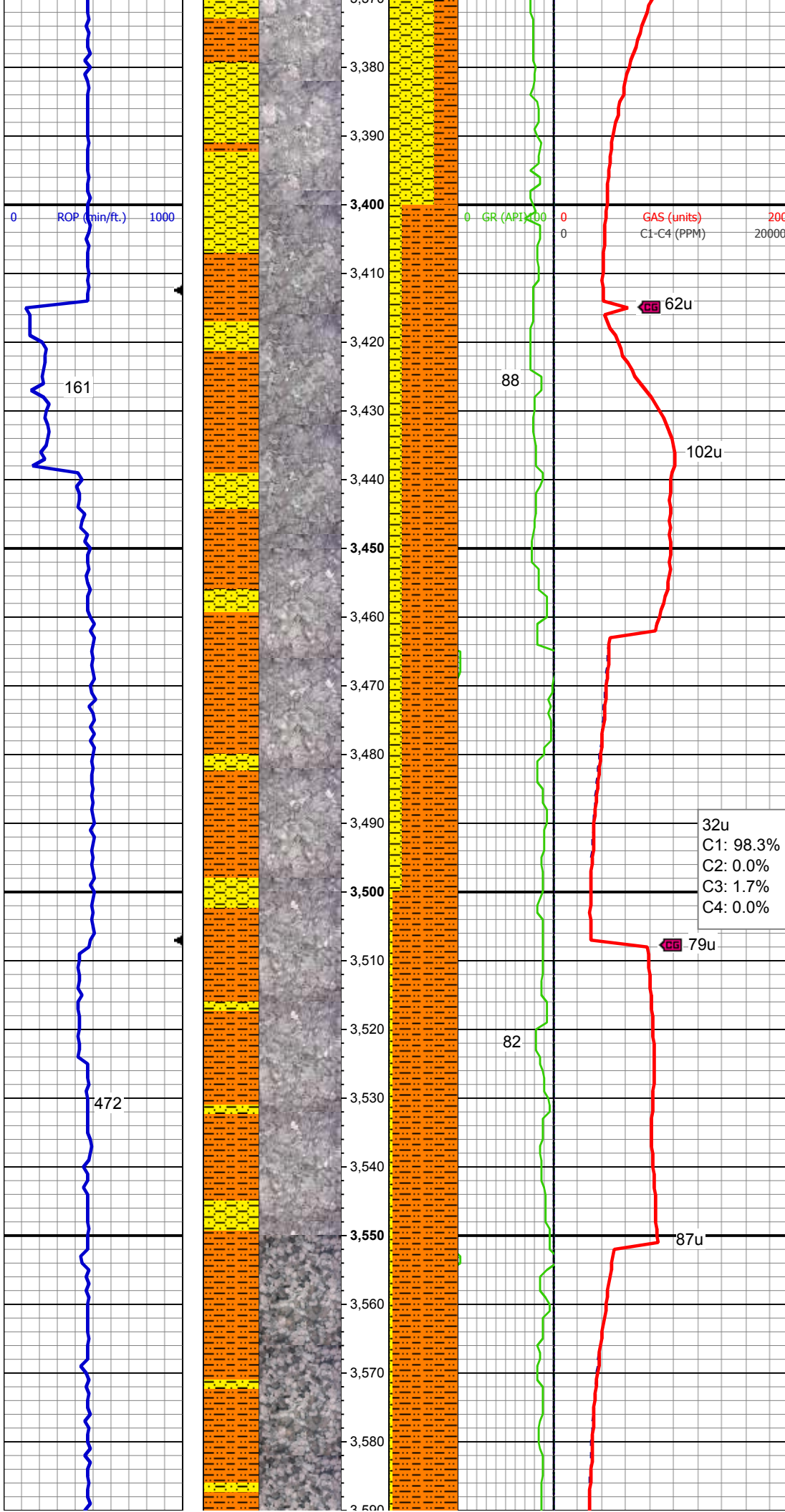
SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc; SHY SLTST: med
gy, frm, sb blkly-blky, gritty, occ sdy,
sl calc, abnt cly

SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc; SHY SLTST: med
gy, frm, sb blkly-blky, gritty, occ sdy,
sl calc, abnt cly

MD: 3,363'
TVD: 3,362.65'
Inclination: 0.9°
Azimuth: 340.2°

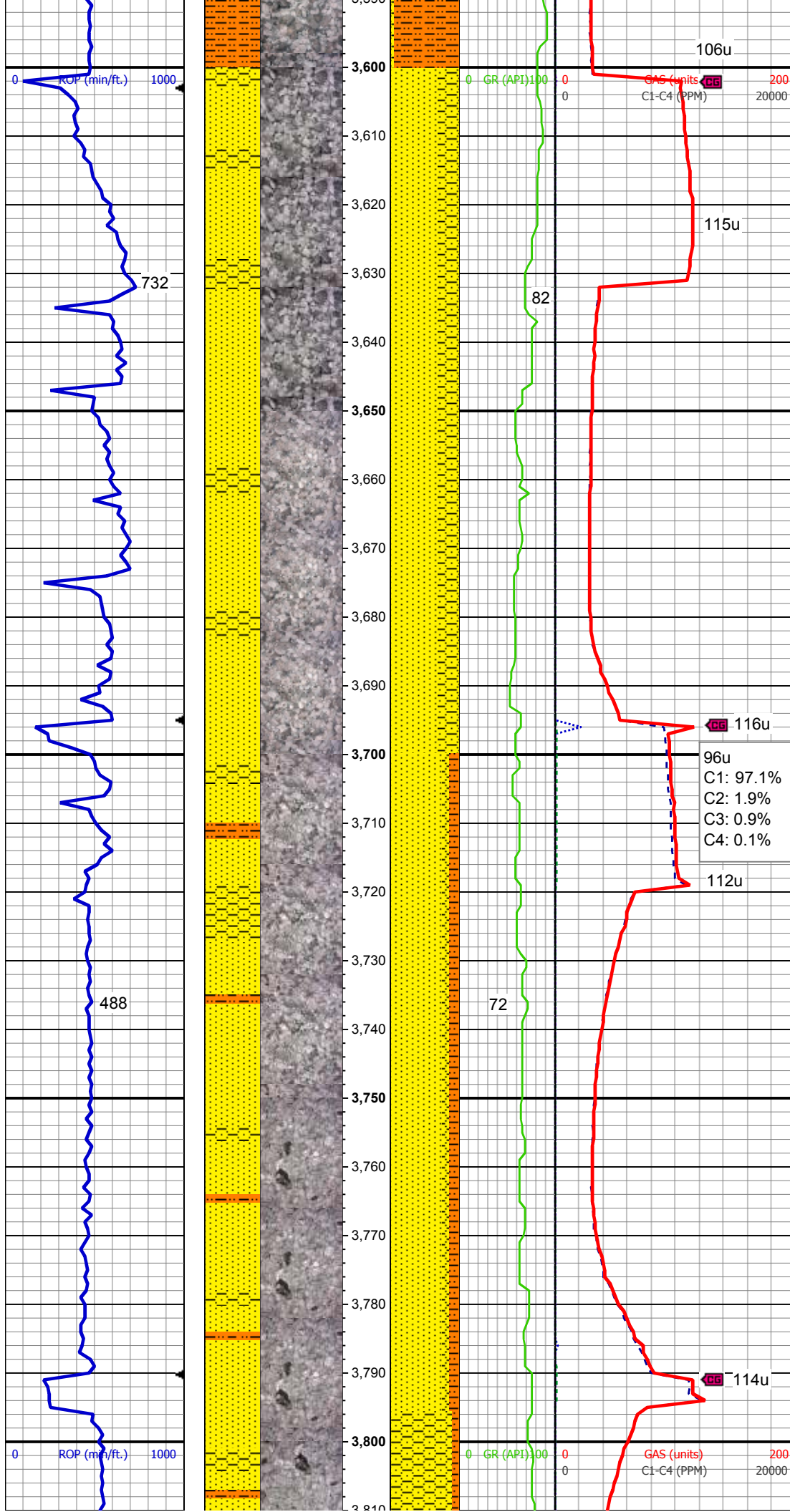
Azimuth: 240.3
VS: -5.58'

Mud Wt: 9.00 / 42 Vis



SHY SLTST: med gy, frm, sb
blky-blky, gritty, occ sdy, sl calc,
abnt cly; SHY SS: lt gy-gy, pty s&p,
mod frm - sft, vf gr, sb ang - sb rnd,
mod w srt, arg cmt, sl calc

SHY SLTST: lt gy-gy, frm, sb
blky-blky, gritty, sdy, sl calc, tr ss;
SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc

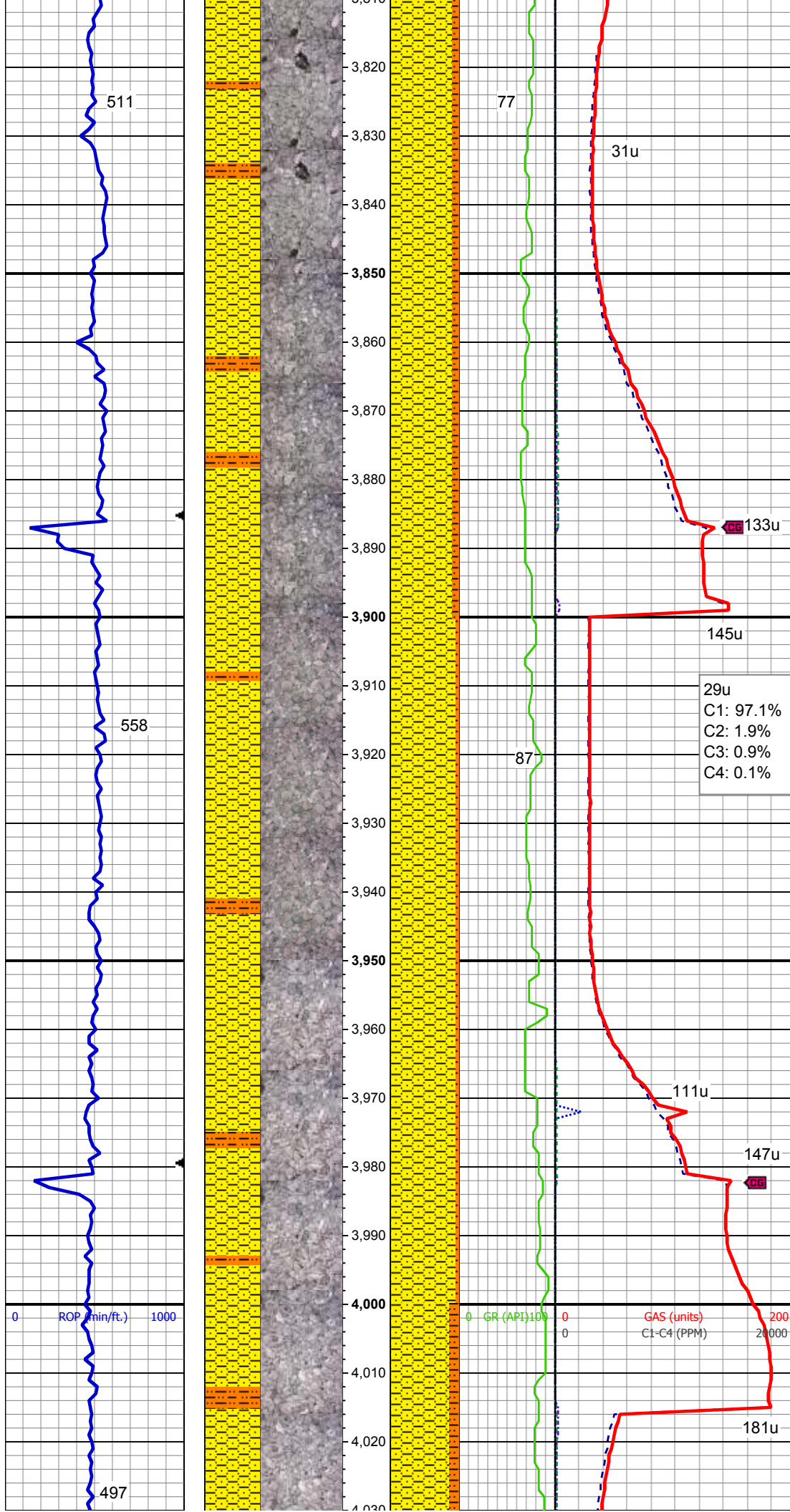


SS: It gy, off wh, s&p, vf-f grn, sb rd-db ang, mod w srt, frm-friable, glau, mod calc SHY SS: It gy-gy, pty s&p, mod frm - sft, vf gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc

Mud Wt: 9.10 / 42 Vis

96u
C1: 97.1%
C2: 1.9%
C3: 0.9%
C4: 0.1%

SS: It gy, off wh, s&p, vf-f grn, sb rd-db ang, mod w srt, frm-friable, glau, mod calc; SHY SLTST: It gy-gy, frm, sb blkly-blky, gritty, sdy, sl calc; SHY SS: It gy-gy, pty s&p, mod frm - sft, vf gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc

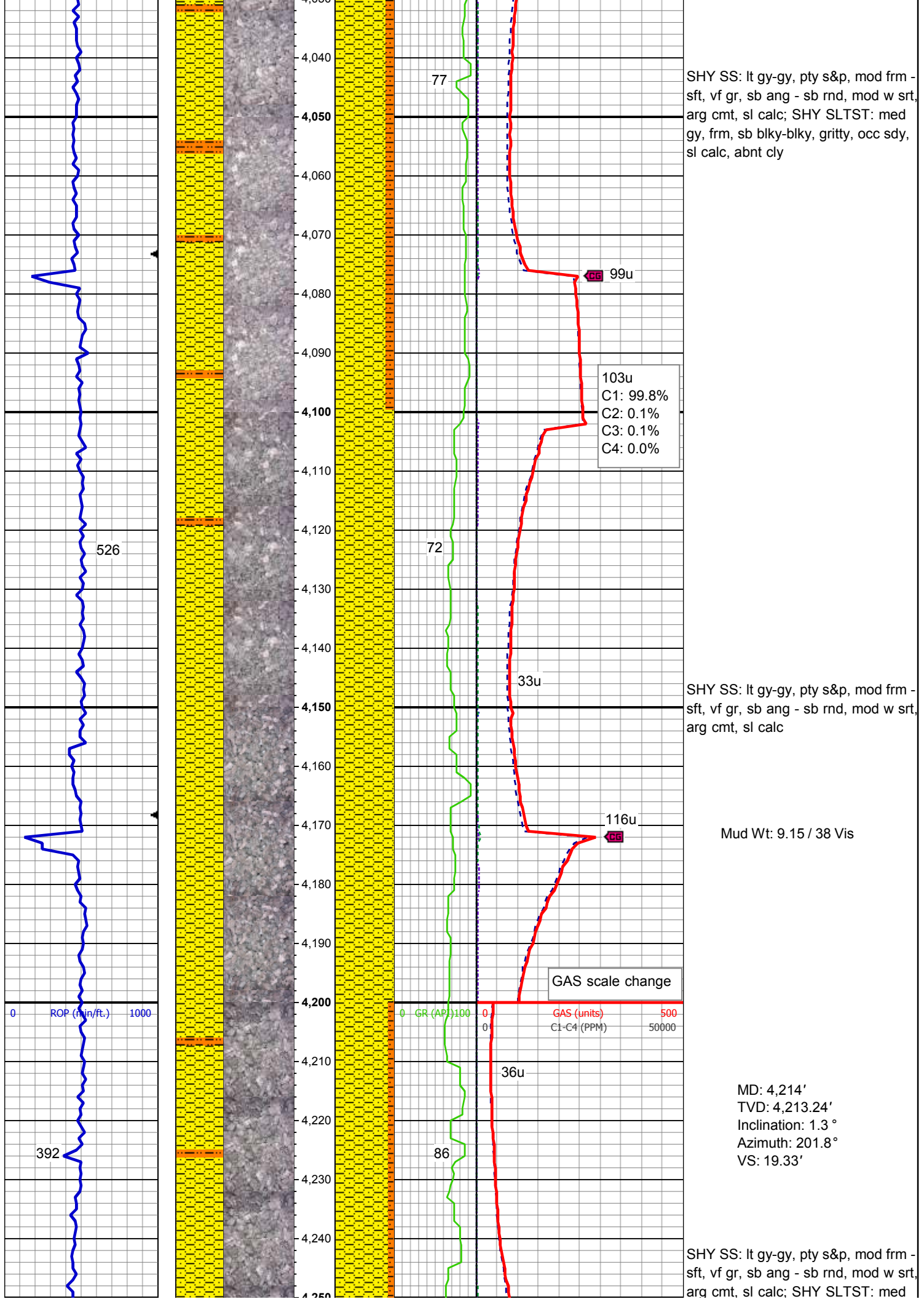


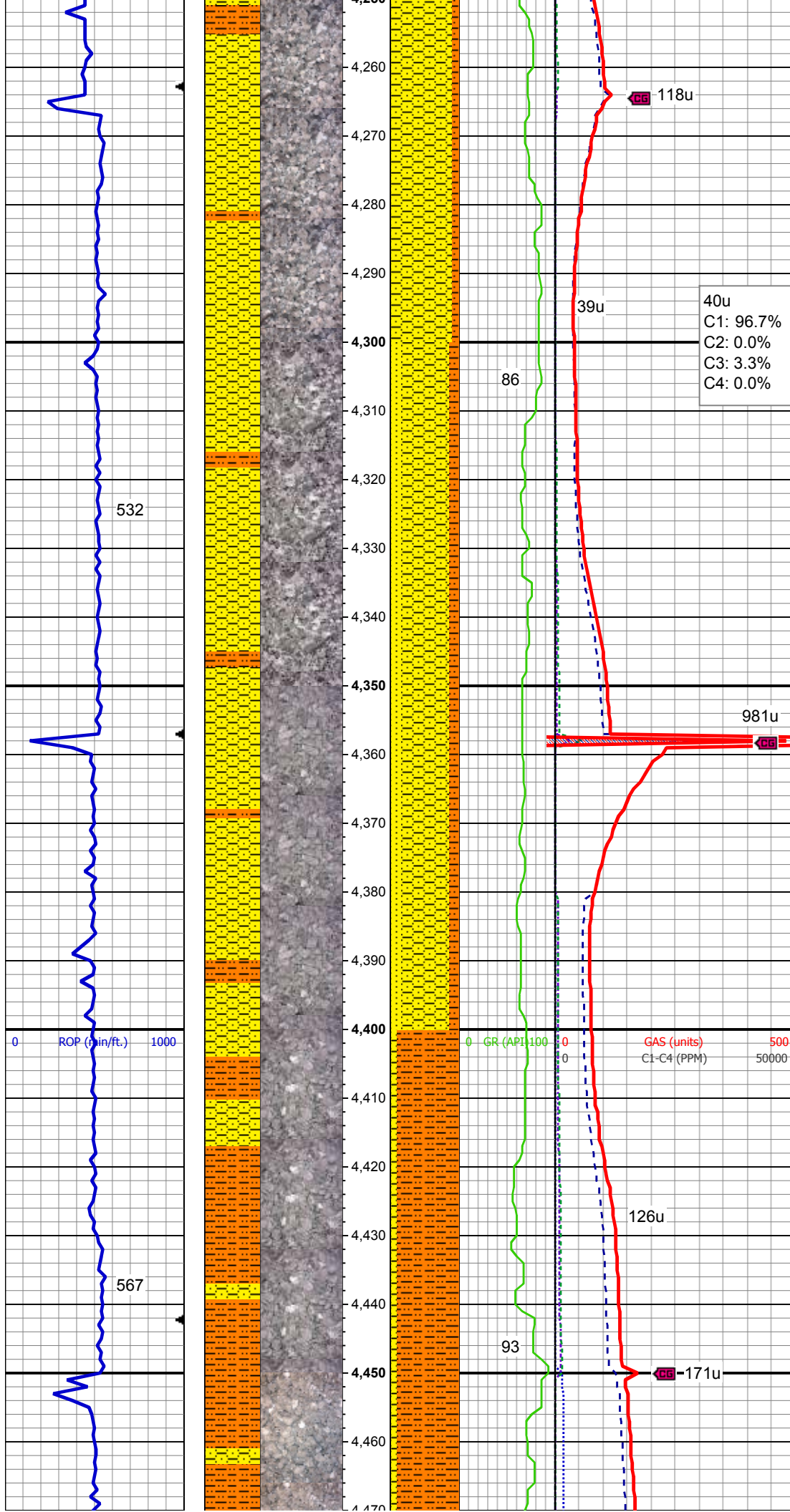
SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc; SHY SLTST: med gy, frm, sb blkly-blky, gritty, occ sdy, sl calc, abnt cly

MD: 3,930'
TVD: 3,929.39'
Inclination: 2.4 °
Azimuth: 183.1 °
VS: 10.37'

SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc; SHY SLTST: med gy, frm, sb blkly-blky, gritty, occ sdy, sl calc, abnt cly

Mud Wt: 9.05 / 37 Vis



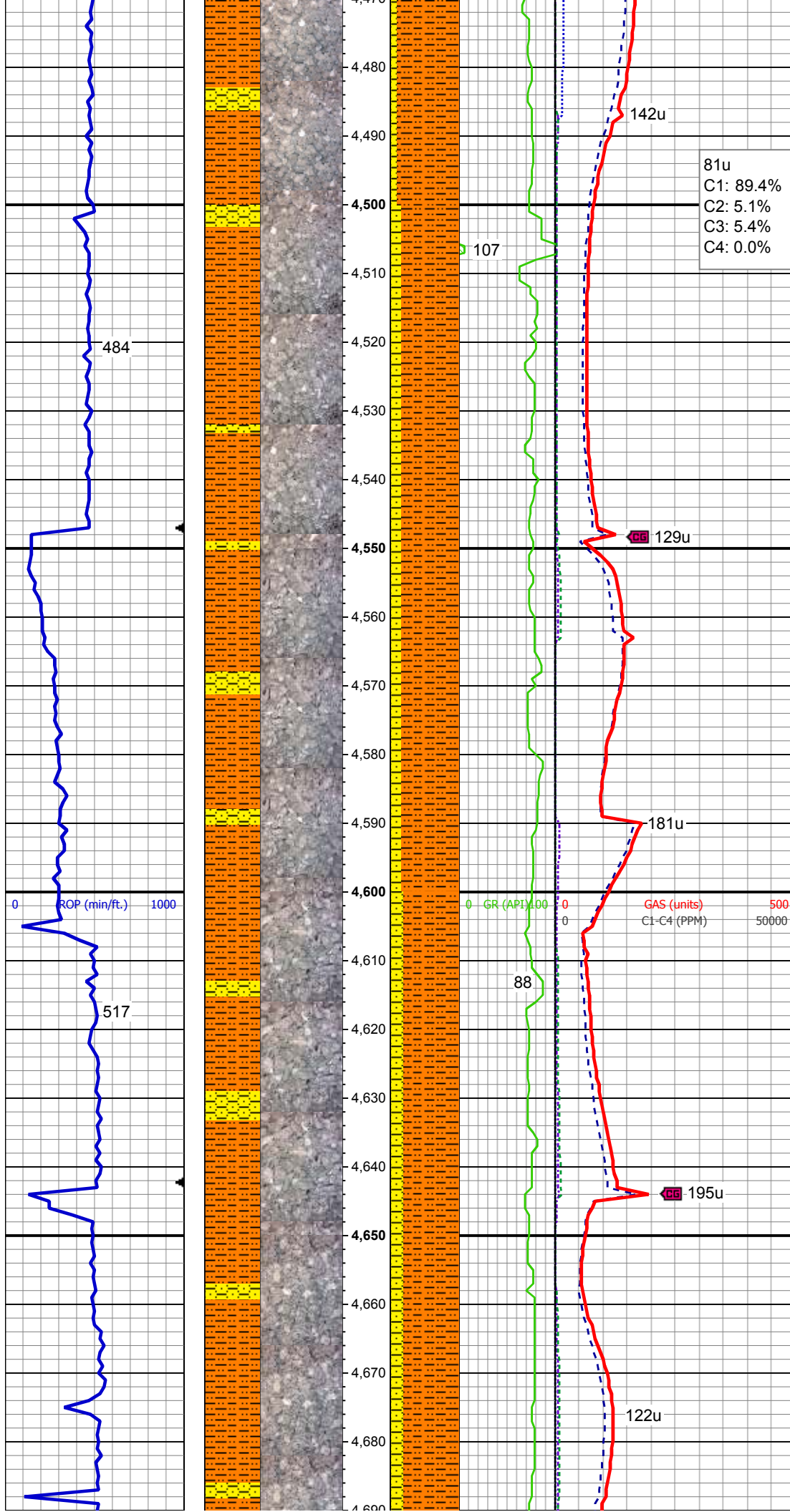


gy, frm, sb blk-y-blky, grtty, occ sdy,
sl calc, abnt cly

SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt,
arg cmt, sl calc; SS: lt gy, off wh,
s&p, vf-f grn, sb rd-db ang, mod w
srt, frm-friable, glau, mod calc; SHY
SLTST: lt gy-gy, frm, sb blk-y-blky,
grtty, sdy, sl calc

Mud Wt: 9.20 / 40 Vis

SHY SLTST: gy-dk gy, frm, sb
blk-y-blky, grtty, sdy, sl calc; SHY
SS: lt gy-gy, pty s&p, mod frm - sft, vf
gr, sb ang - sb rnd, mod w srt, arg
cmt, sl calc



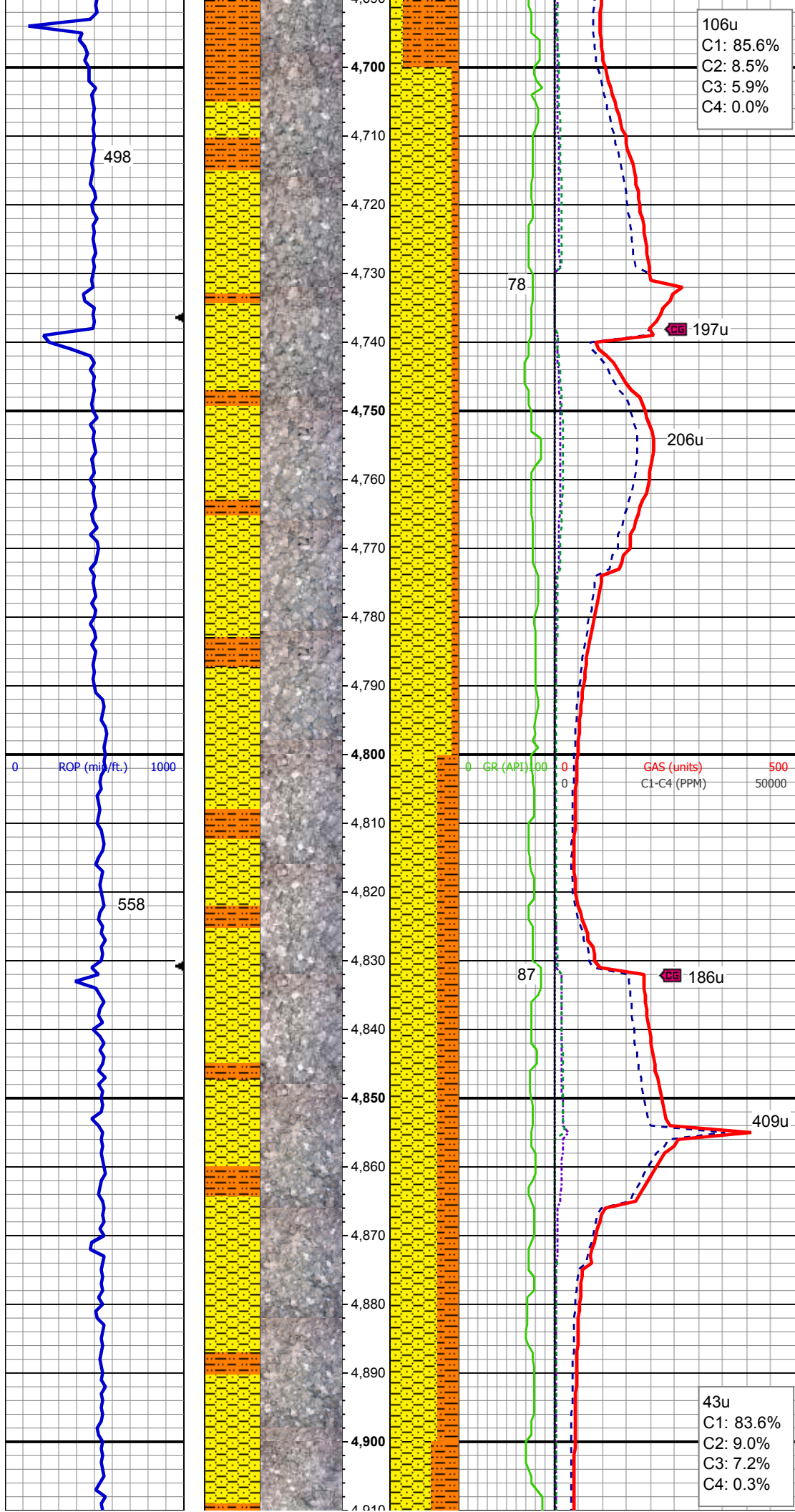
MD: 4,498'
TVD: 4,497.18'
Inclination: 1.2 °
Azimuth: 233.1 °
VS: 24.16'

SHY SLTST: gy-dk gy, frm, sb
blky-blky, gritty, sdy, sl calc; SHY
SS: lt gy-gy, pty s&p, mod frm - sft, v
gr, sb ang - sb rnd, mod w srt, arg
cmt, sl calc

MD: 4,593'
TVD: 4,592.16'
Inclination: 1.9 °
Azimuth: 76.1 °
VS: 24.37'

Mud Wt: 9.40 / 39 Vis

SHY SLTST: gy-dk gy, frm, sb
blky-blky, gritty, sdy, sl calc; SHY
SS: lt gy-gy, pty s&p, mod frm - sft, v
gr, sb ang - sb rnd, mod w srt, arg
cmt, sl calc



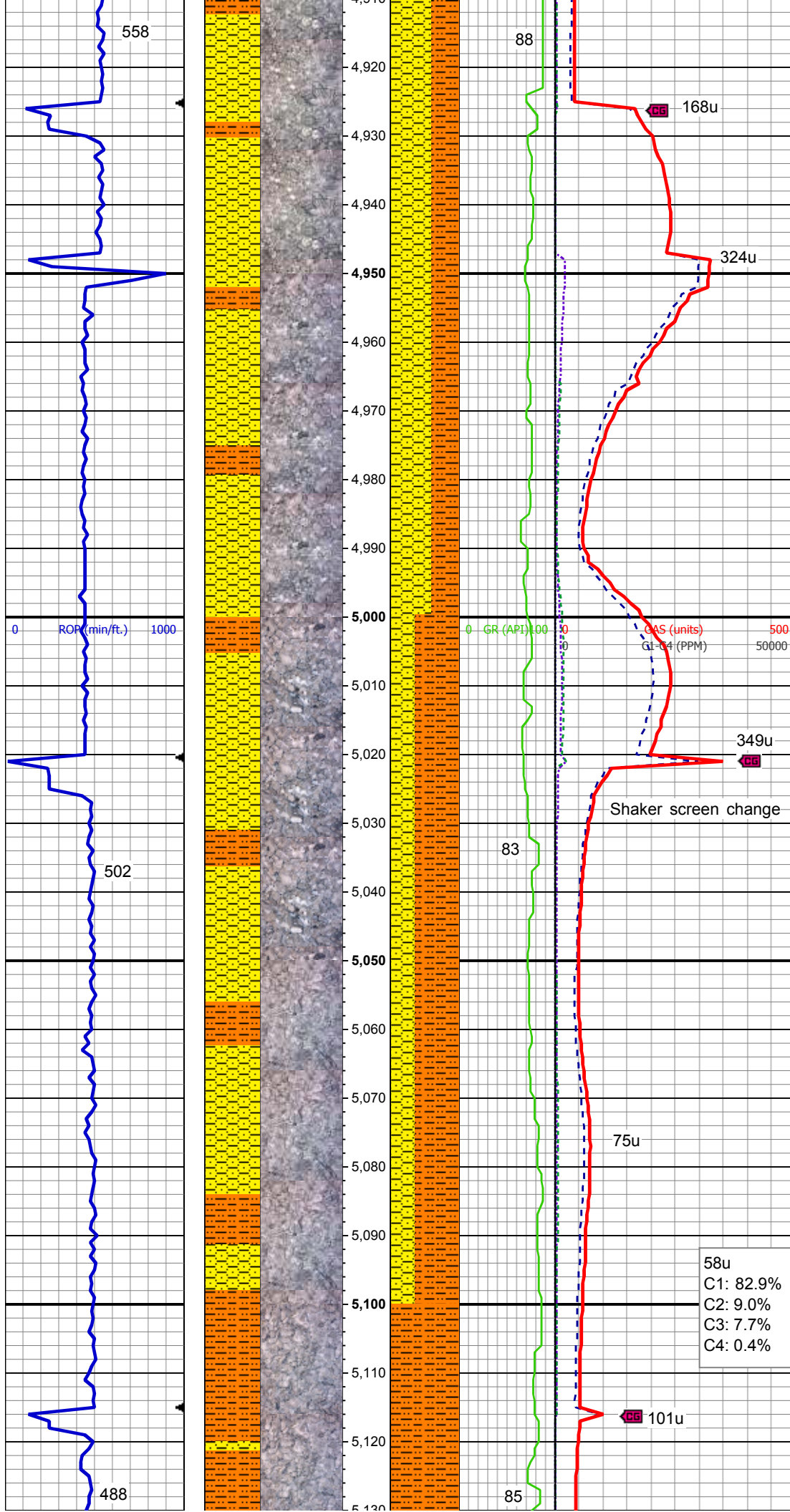
106u
C1: 85.6%
C2: 8.5%
C3: 5.9%
C4: 0.0%

SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt;
SHY SLTST: gy-dk gy, frm, sb
blky-blky, gritty, sdy, sl calc, arg cmt,
sl calc

Mud Wt: 9.40 / 37 Vis
MD: 4,782'
TVD: 4,781.06'
Inclination: 1.9 °
Azimuth: 46.4 °
VS: 21.37'

SHY SS: lt gy-gy, pty s&p, mod frm -
sft, vf gr, sb ang - sb rnd, mod w srt;
SHY SLTST: gy-dk gy, frm, sb
blky-blky, gritty, sdy, sl calc, arg cmt,
sl calc

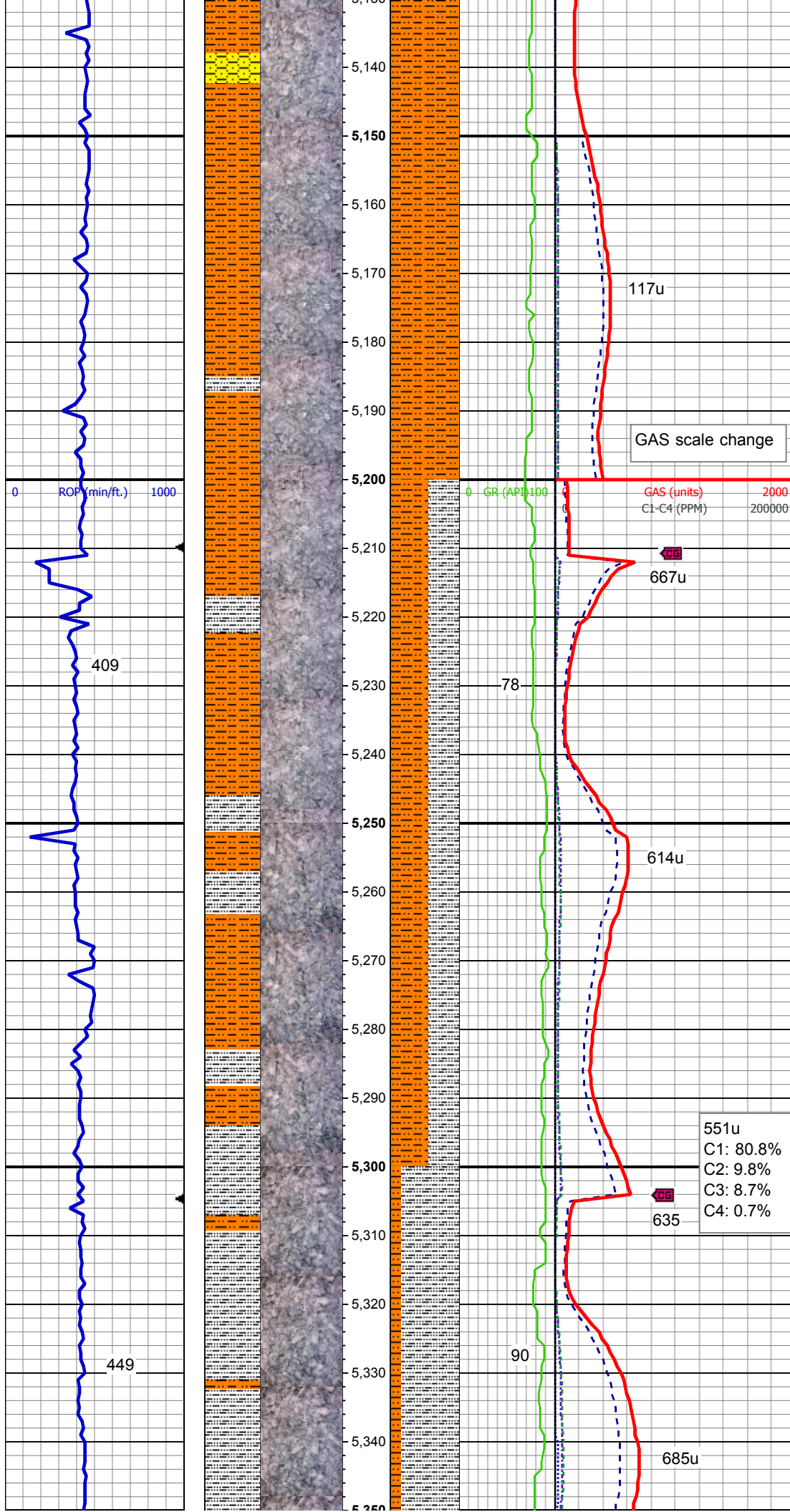
43u
C1: 83.6%
C2: 9.0%
C3: 7.2%
C4: 0.3%



SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr, sb ang - sb rnd, mod w srt;
SHY SLTST: gy-dk gy, frm, sb blkly-blky, gritty, sdy, sl calc, arg cmt, sl calc, tr ss

MD: 4,971'
TVD: 4,969.95'
Inclination: 2.1 °
Azimuth: 38.1 °
VS: 16.41'

SHY SLTST: gy-dk gy, frm, sb blkly-blky, gritty, sdy, sl calc, arg cmt, sl calc; SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr, sb ang - sb rnd, mod w srt, tr ss

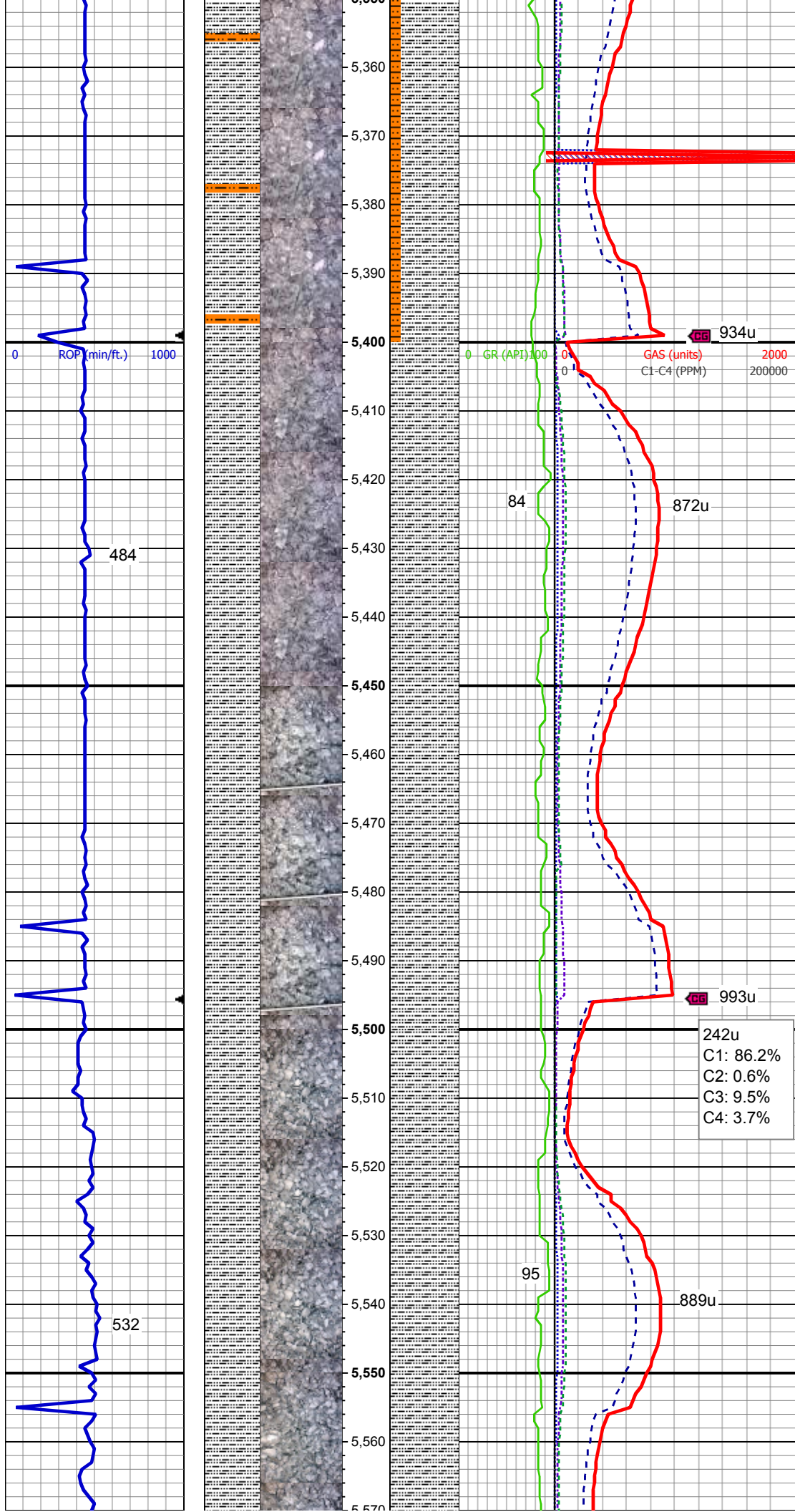


SHY SLTST: gy-dk gy, frm, sb
blky-blky, gritty, sdy, sl calc, arg cmt,
sl calc

SLTY SH: lt gy-gy, mod sft-frm, sb
blky-sb pty, sdy rthy tex, sl calc;
SHY SLTST: lt gy-gy, pty s&p, mod
frm - sft, vf gr, sb ang - sb rnd, mod
w srt, arg cmt, sl calc

MD: 5,255'
TVD: 5,253.73'
Inclination: 2.4 °
Azimuth: 45.3 °
VS: 8.01'

SLTY SH: lt gy-gy, mod sft-frm, sb
blky-sb pty, sdy rthy tex, sl calc;
SHY SLTST: lt gy-gy, pty s&p, mod
frm - sft, vf gr, sb ang - sb rnd, mod
w srt, arg cmt, sl calc



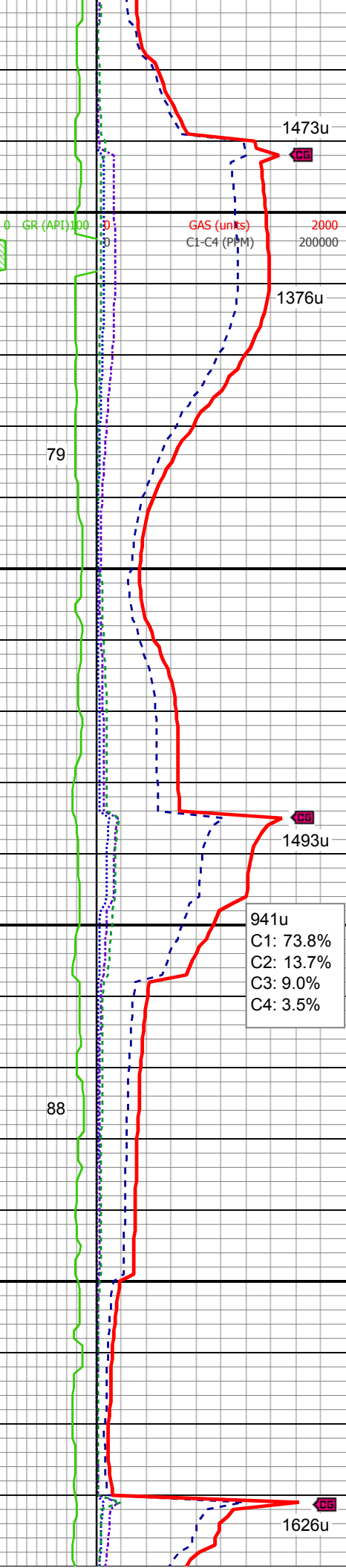
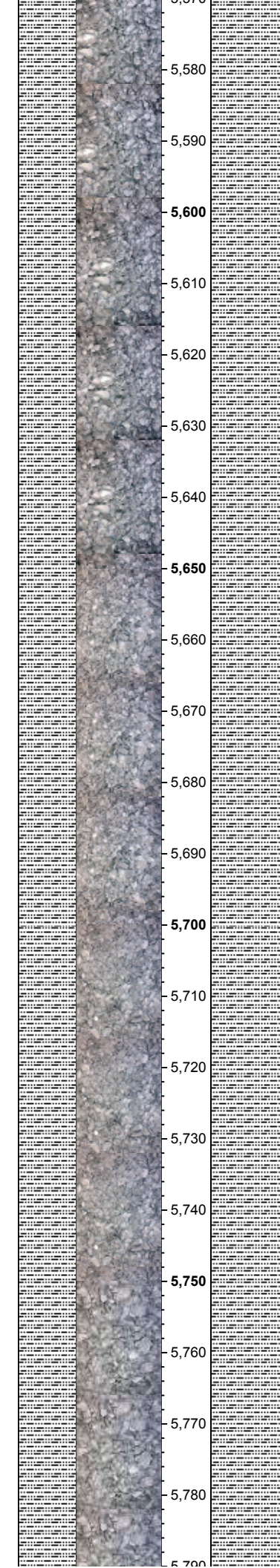
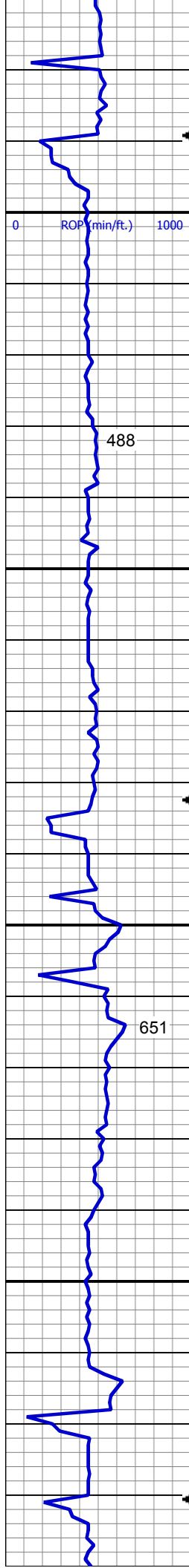
Mud Wt: 9.40 / 42 Vis

SLTY SH: It gy-gy, mod sft-frm, sb blk-y-sb plty, rthy tex, sl calc, tr - occ slty, tr SHYSLTST

242u
C1: 86.2%
C2: 0.6%
C3: 9.5%
C4: 3.7%

SLTY SH: It gy-gy, mod sft-frm, sb blk-y-sb plty, rthy tex, sl calc, tr - occ slty, tr SHYSLTST

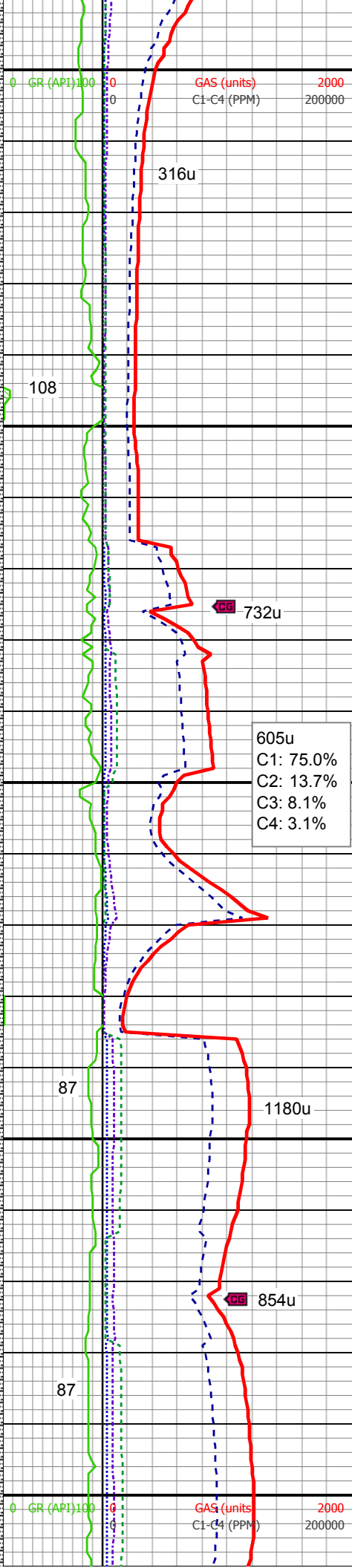
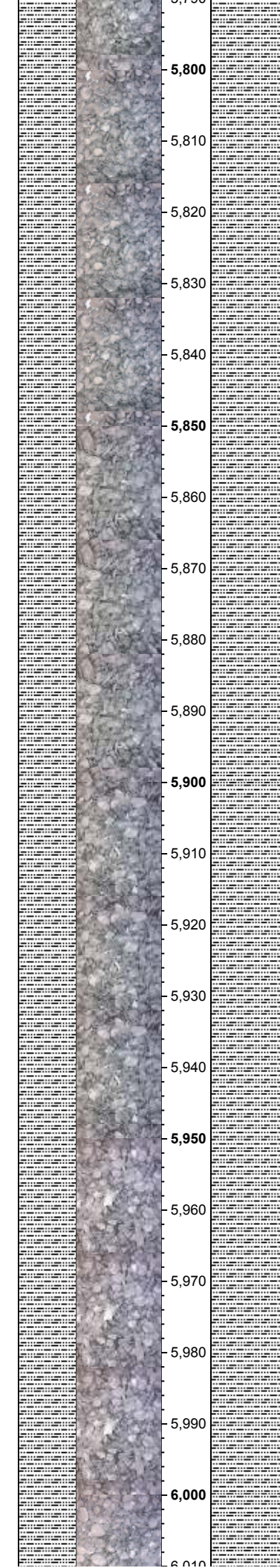
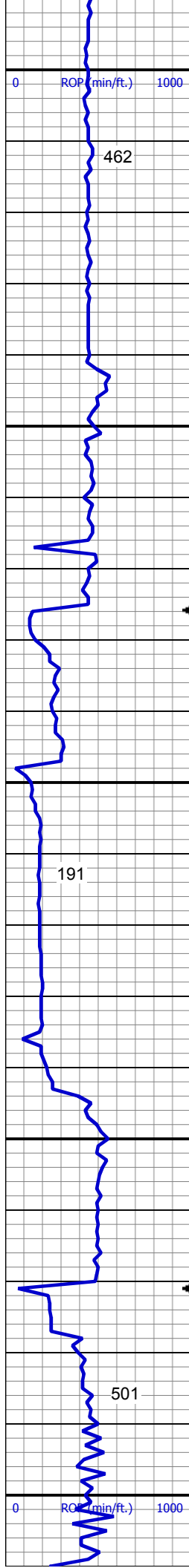
MD: 5,539'
TVD: 5,537'
Inclination: 2.7 °
Azimuth: 48.7 °
VS: -12.63'



Mud Wt: 9.40 / 40 Vis

SLTY SH: lt gy-gy, mod sft frm, sb
blky-sb plty, rthy tex, sl calc, tr - occ
silty, tr SHYSLTST

SLTY SH: lt gy-gy, mod sft frm, sb
blky-sb plty, rthy tex, sl calc, tr - occ
silty, tr SHYSLTST

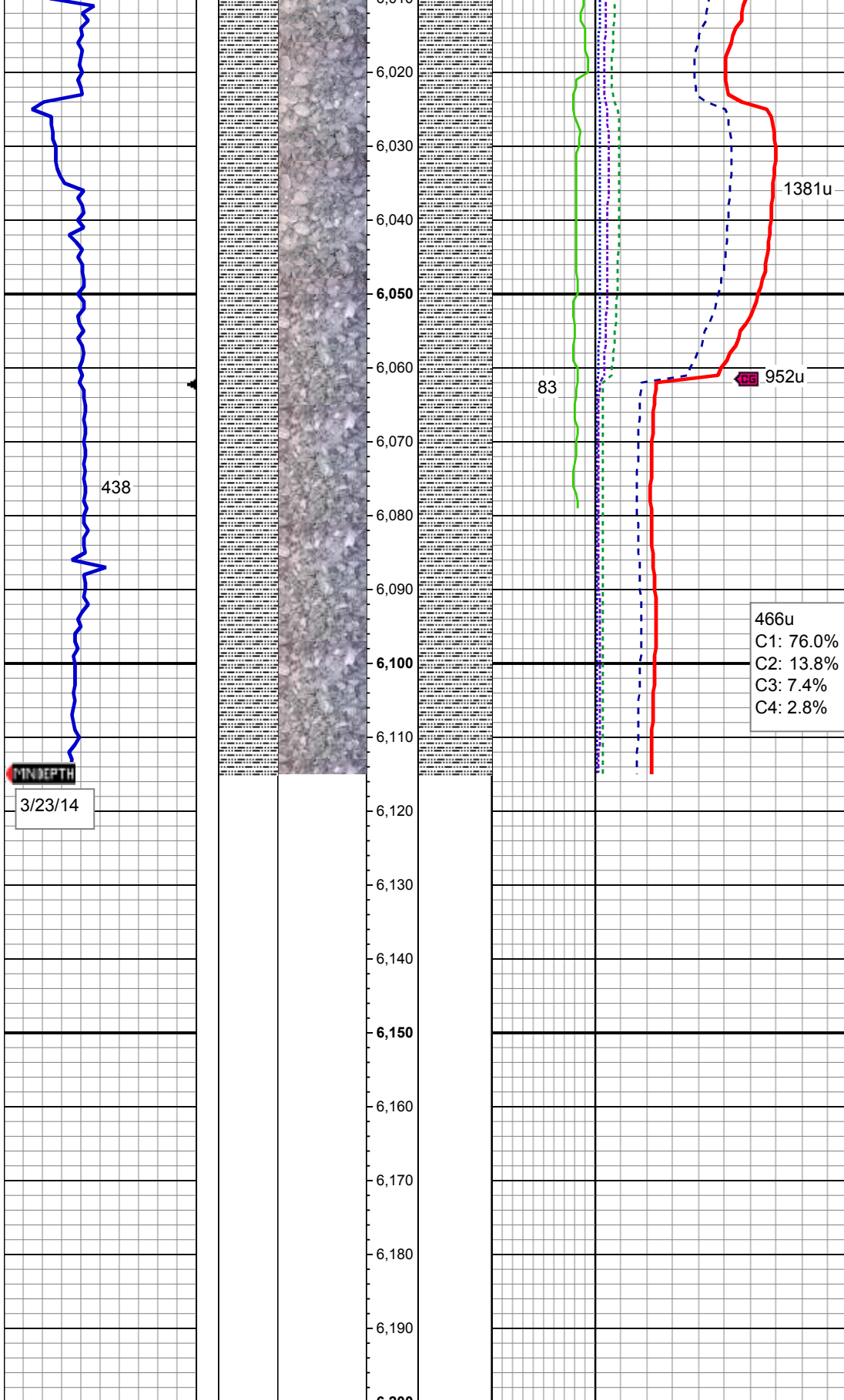


MD: 5,823'
TVD: 5,820.99'
Inclination: 3.8°
Azimuth: 46.7°
VS: -0.75'

SLTY SH: lt gy-gy, mod sft frm, sb
blky-sb plty, rthy tex, sl calc, tr - occ
silty

MD: 5,917'
TVD: 5,915'
Inclination: 1.8°
Azimuth: 93.7°
VS: 2.99'

SLTY SH: lt gy-gy, mod sft frm, sb
blky-sb plty, rthy tex, sl calc, tr - occ
silty



SLTY SH: lt gy-gy, mod sft frm, sb
blky-sb plty, rthy tex, sl calc, tr - occ
silty

MD: 6,066'
TVD: 6,063.83'
Inclination: 1.2°
Azimuth: 132.3°
VS: 6.48'

TOOH FOR BHA #2
LOG CONTINUES ON MPlot
"Romero PC
G10-79HN(Horz)"