

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name AA26-65HN

Location Section 25, Township 6 North.Range 63 West

State Colorado

County Weld

Country USA

Rig Number H&P 322

API Number 0512337568

Region Wells Ranch/DJ Basin

Field Wattenberg

Spud Date 9/19/2013

Logged Interval 1000'

Formation TEEPEE BUTTES; Niobrara C Chalk

Type of Drilling Fluid Water;Mud;Poly

Operator

Company Noble Energy Inc

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

Geologist

Name John Ready;Mike Greene

Company Columbine Logging Inc.

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

Rock Types

? UNKNOWN

ANHYDRITE
BENTONITE
BRECCIA
CEMENT

COAL

CONGLOMERATE
DOLOMITE
GRANITE
GYPSUM

METAMORPHIC

NOSAMPLE
SALT
SALT-PEPPER SAND
SANDSTONE

SHALY SILTSTONE

SILTSTONE
SILTY SHALE
TILL
TUFF

CHALK
CHERT
CLAY CHOKE SAND
CLAYSTONE

IGNEOUS
LIMESTONE
SIDERITE or LIMONITE
MARLSTONE

SHALE
SHALECOLORED
SHALE GRAY
SHALYSANDSTONE

WELDED TUFF

Accessories

Fossils

ALGAE
AMPHIPORA
BELEMNITE
BIOCLASTIC
BRACHIOPOD
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
HEAVYMINERAL
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
FENESTRAL
FRACTURE
INTERCRYSTALLINE
INTEROOLITIC

MOLDIC
ORGANIC
PINPOINT
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

ANGULAR
ROUNDED
SUBANG
SUBRND

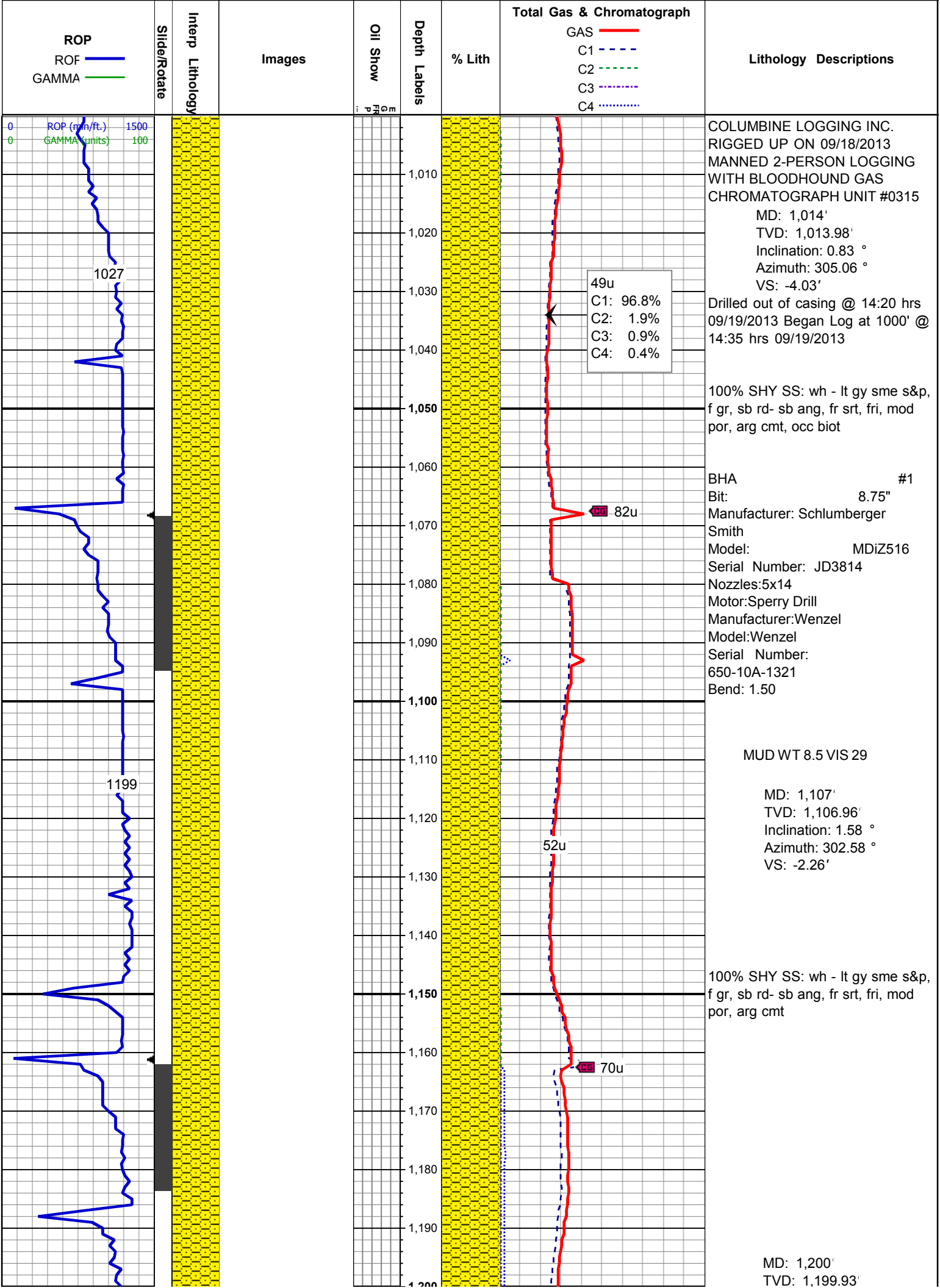
Textures

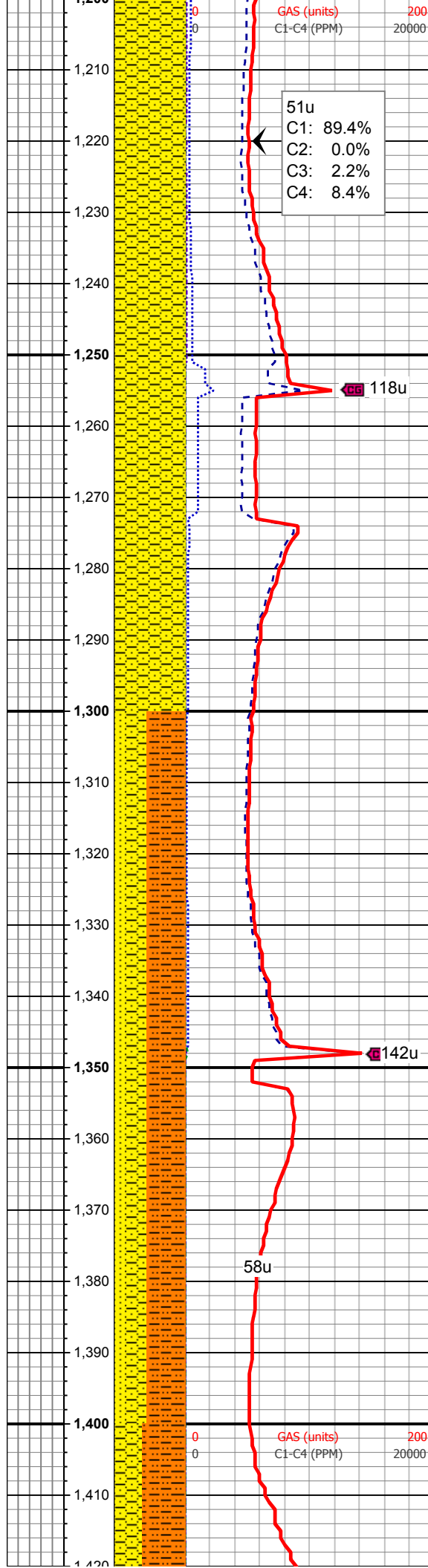
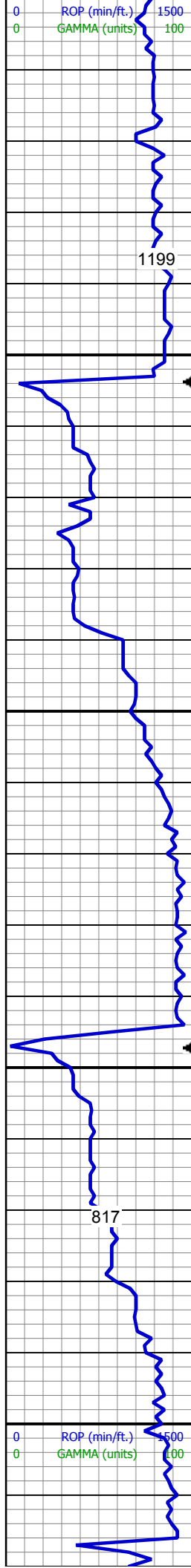
BOUNDSTONE
CHALKY
CRYPTOXLN

E EARTHY
FINELYXLN
GRAINSTONE
L LITHOGRAPHIC
MICROXLN
MUDSTONE
PACKSTONE
WACKESTONE

Sorting

MODERATE
POOR
WELL





Inclination: 1.44 °
Azimuth: 331.78 °
VS: -0.4'

100% SHY SS: wh - lt gy sme s&p,
f gr, sb rd- sb ang, fr srt, fri, mod
por, arg cmt

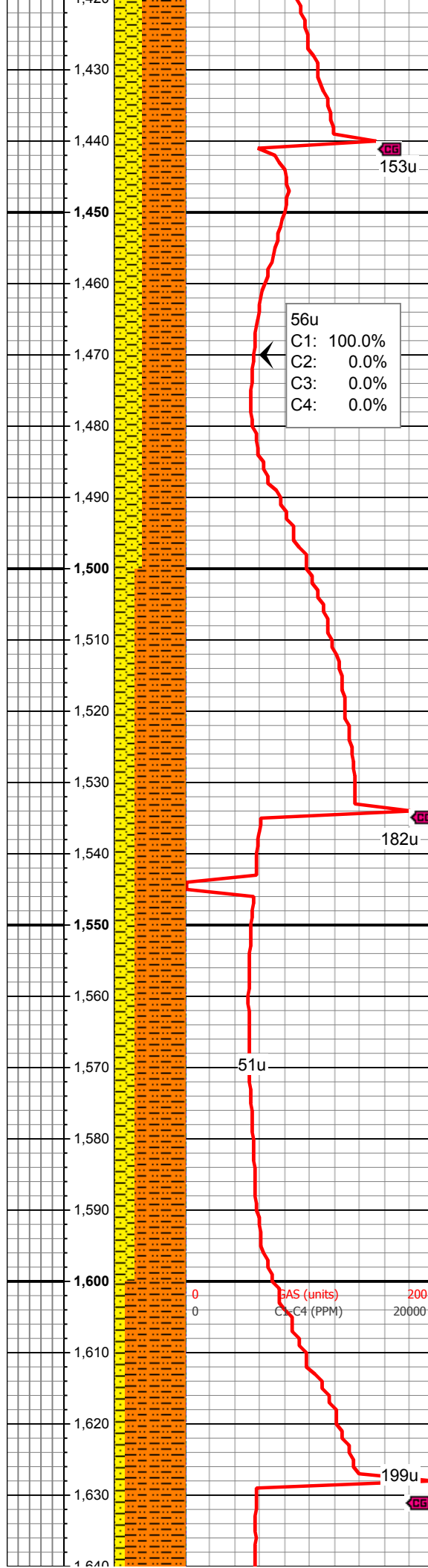
MD: 1,293'
TVD: 1,292.81'
Inclination: 4.3 °
Azimuth: 315.98 °
VS: 3.06'

MUD WT 8.6 VIS 29

55% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
30% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, occ biot
15% SS: lt gy - wh, sme s&p, f gr,
sbrd-sbang, mod srt, fri, p por, arg
cmt

MD: 1,386'
TVD: 1,385.28'
Inclination: 7.77 °
Azimuth: 312.74 °
VS: 11.02'

MUD WT 8.6 VIS 29

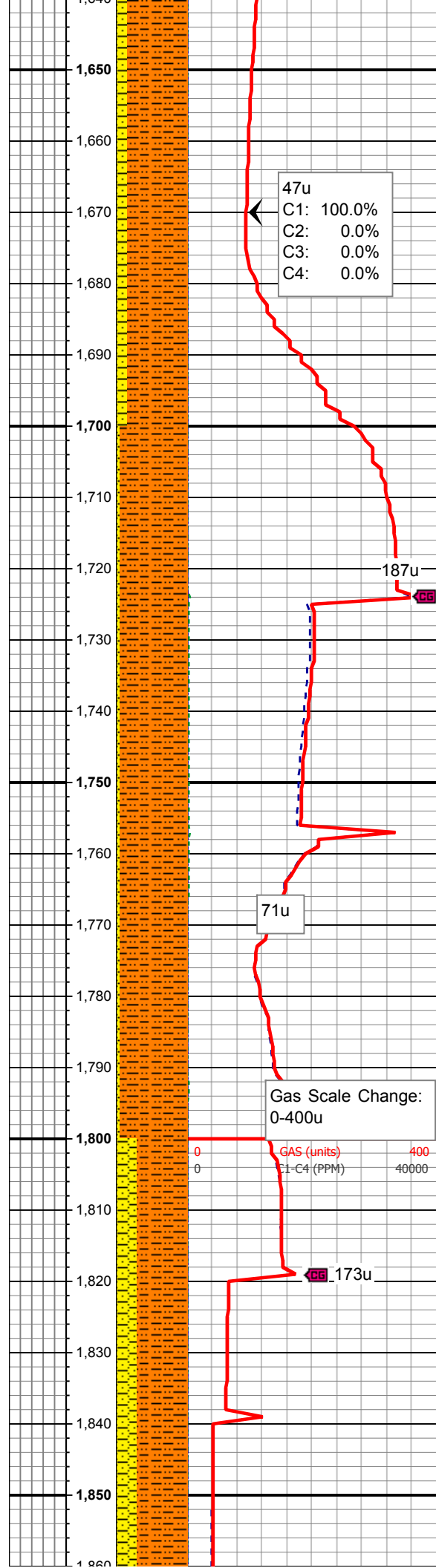
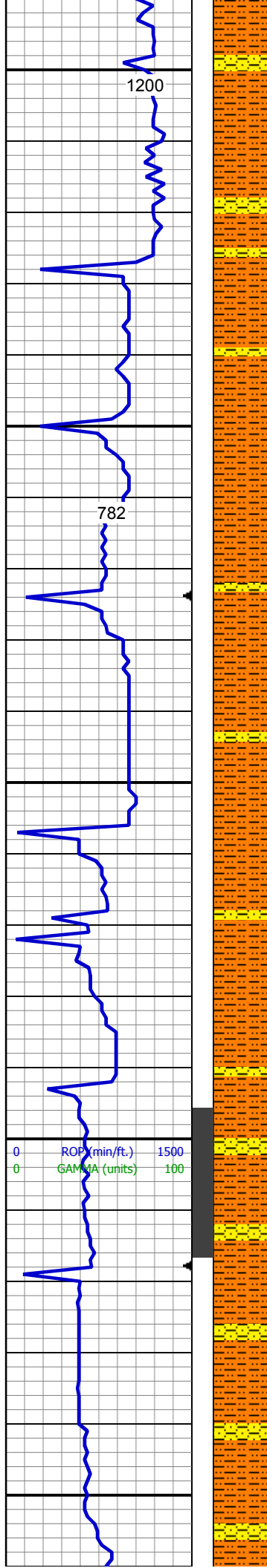


60% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
40% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, occ biot

MD: 1,479'
TVD: 1,477'
Inclination: 11.16 °
Azimuth: 316.5 °
VS: 23.29'

70% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
30% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, occ biot

MD: 1,575'
TVD: 1,571.1'
Inclination: 11.71 °
Azimuth: 321.2 °
VS: 37.75'



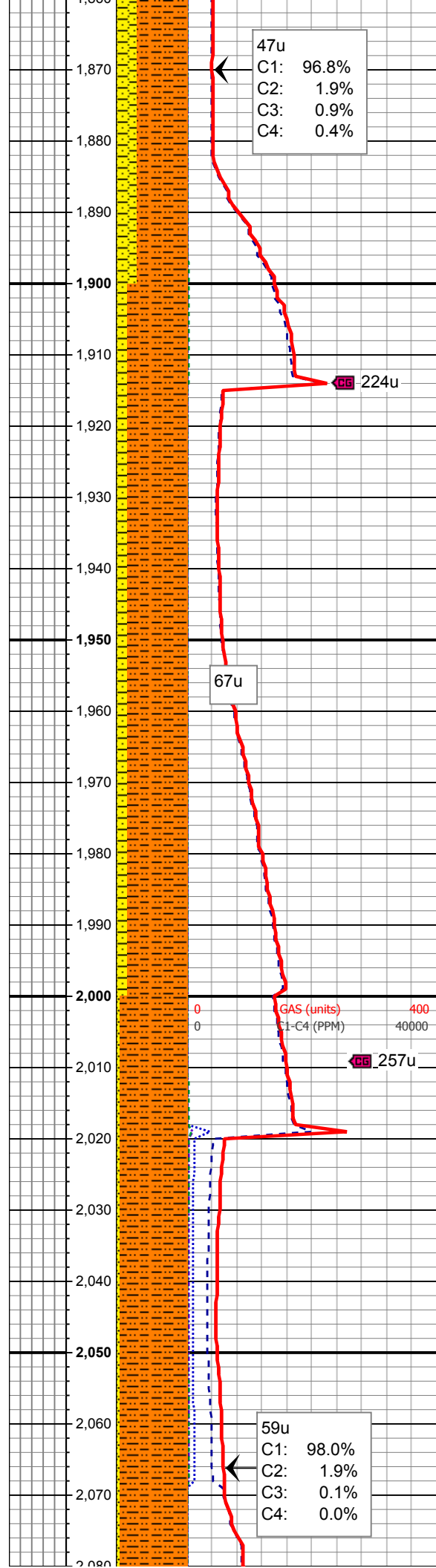
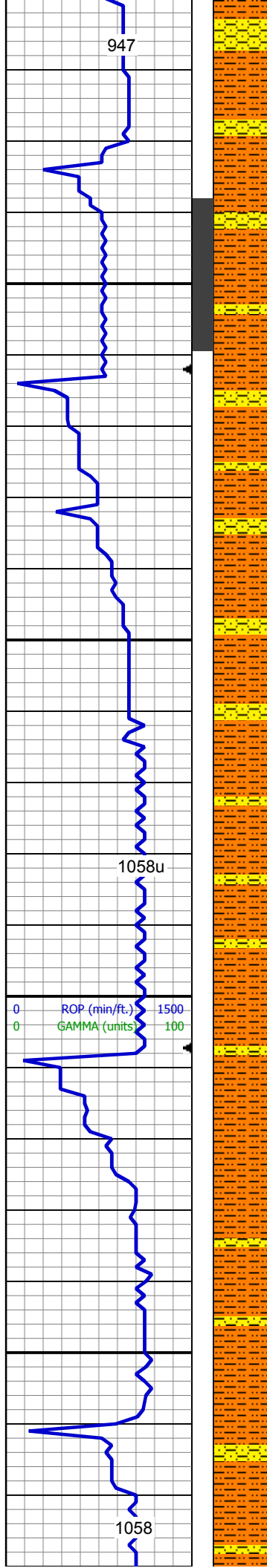
85% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
15% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

MD: 1,670'
TVD: 1,664.03'
Inclination: 12.22 °
Azimuth: 323.7 °
VS: 51.89'

95% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
5% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

MD: 1,764'
TVD: 1,756.06'
Inclination: 11.29 °
Azimuth: 322.64 °
VS: 65.48'

70% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
30% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, occ biot



MD: 1,859'
TVD: 1,849.41'
Inclination: 10.11 °
Azimuth: 323.21 °
VS: 78.06'

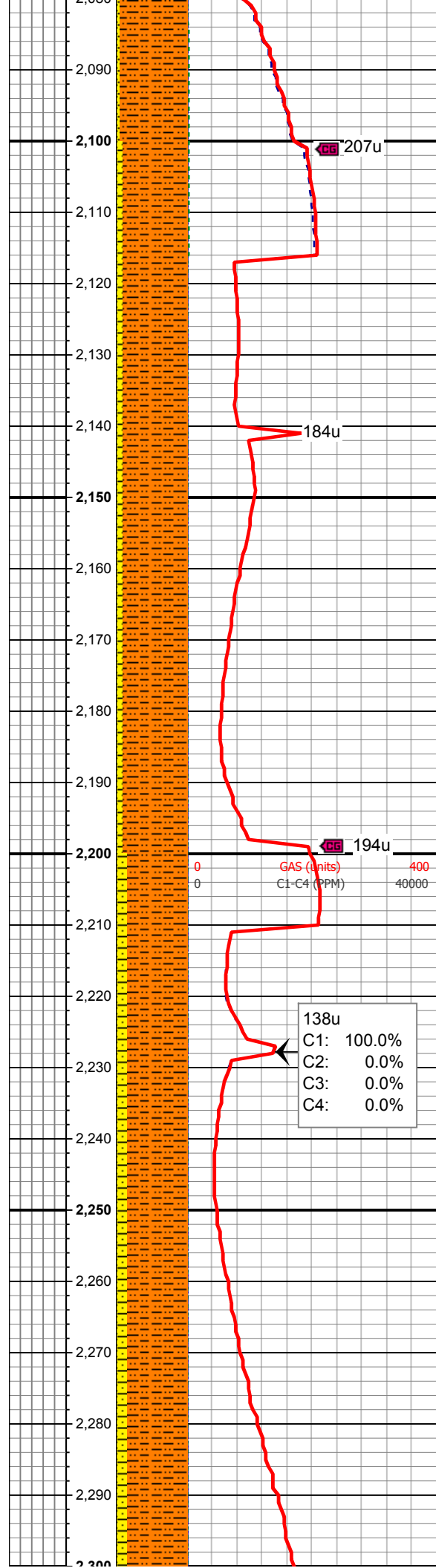
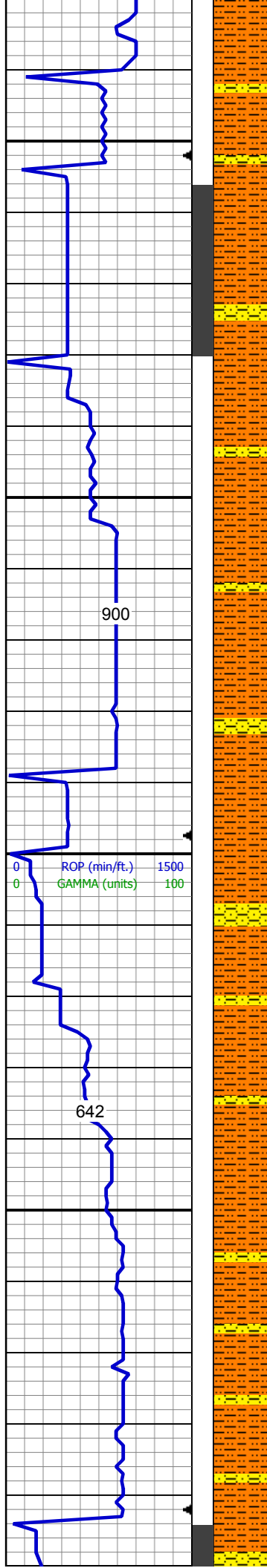
MUD WT 8.7 VIS 29

85% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
15% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

MD: 1,954'
TVD: 1,942.75'
Inclination: 11.36 °
Azimuth: 314.24 °
VS: 91.57'

MD: 2,048'
TVD: 2,035.02'
Inclination: 10.62 °
Azimuth: 314 °
VS: 106.11'

95% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
5% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por



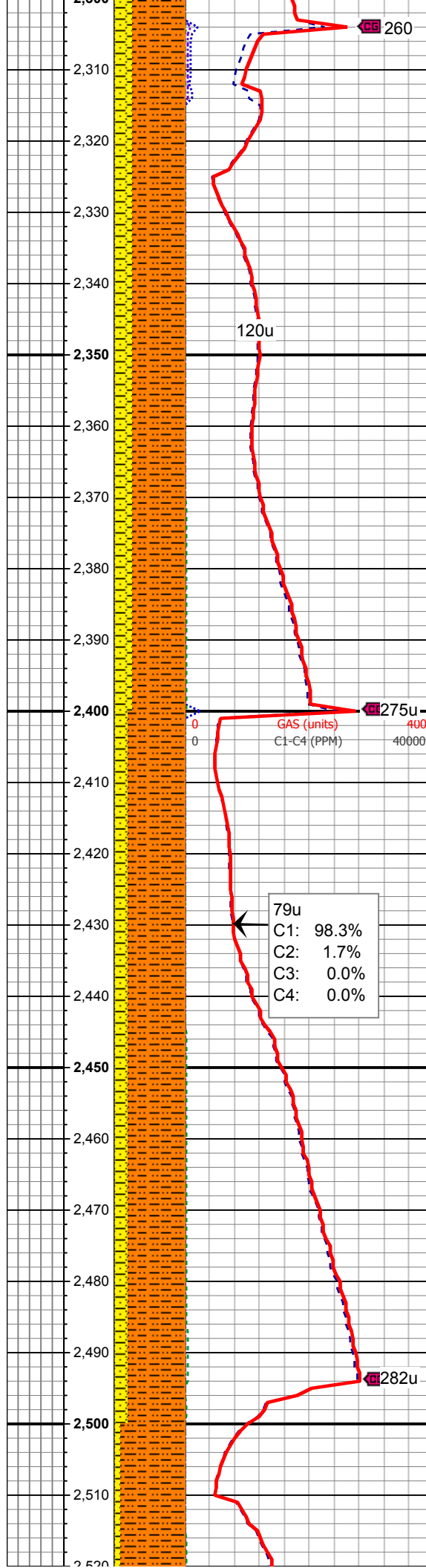
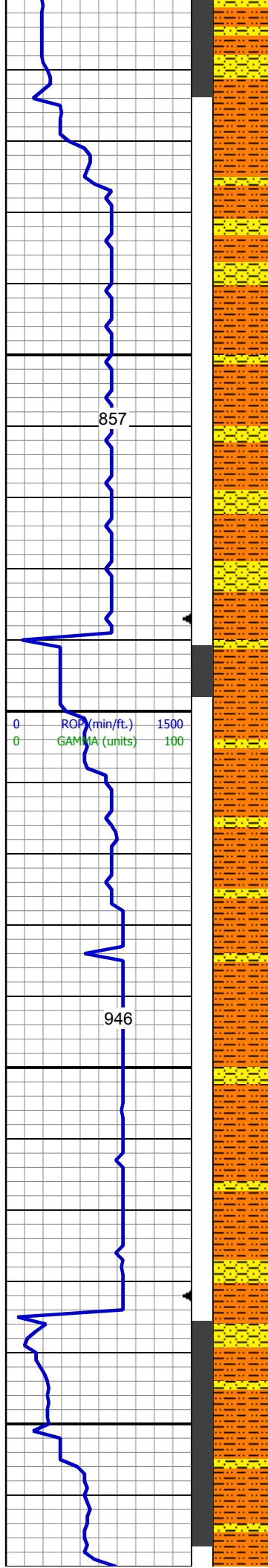
MD: 2,143'
TVD: 2,128.57'
Inclination: 9.43 °
Azimuth: 309.93 °
VS: 119.86'

90% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
10% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

MD: 2,238'
TVD: 2,222.24'
Inclination: 9.79 °
Azimuth: 314.78 °
VS: 132.99'

85% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
15% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, sme scat biot

138u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%



MD: 2,332'
TVD: 2,314.82'
Inclination: 10.21 °
Azimuth: 322.92 °
VS: 145.36'

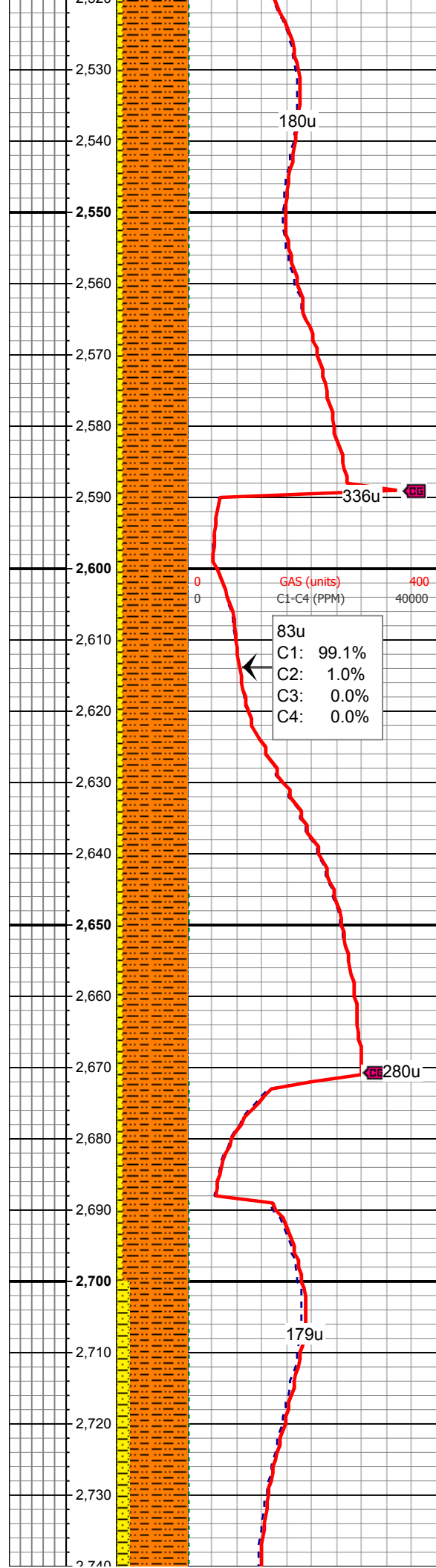
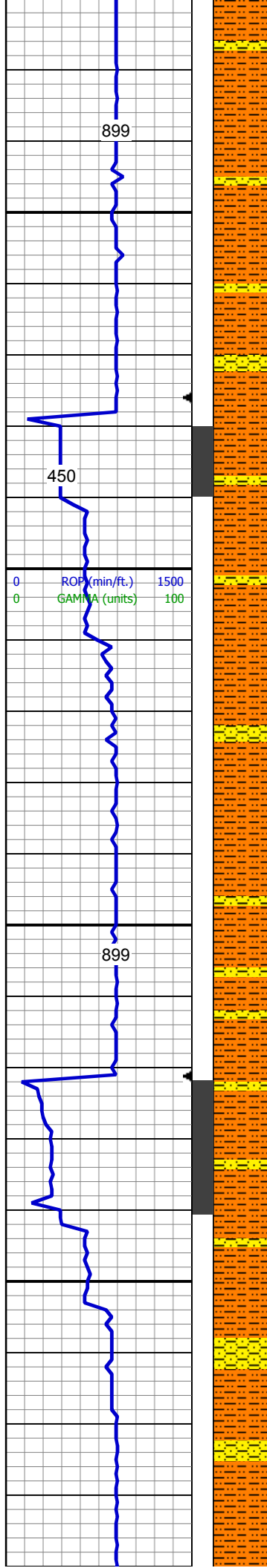
MUD WT 8.5 VIS 28

75% SHY SLTST: lt gy, sme dk gy,
sft-fri, sb blk - blk, aren - slty tex
25% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

MD: 2,427'
TVD: 2,408.48'
Inclination: 9.09 °
Azimuth: 321.29 °
VS: 156.86'

80% SHY SLTST: lt gy, sft-fri, sb
blk - blk, aren - slty tex
20% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, sme biot

MD: 2,522'
TVD: 2,502.12'



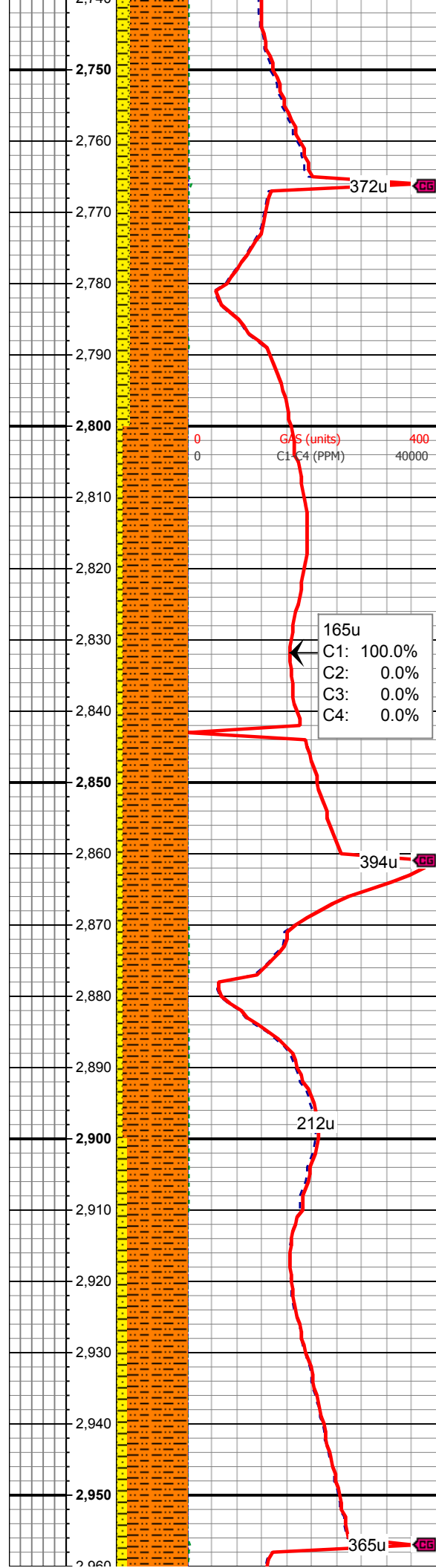
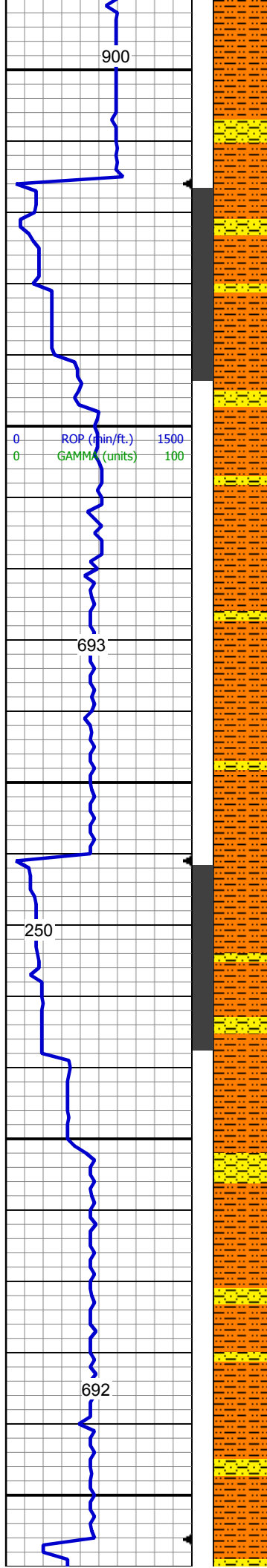
Inclination: 10.3 °
Azimuth: 321.97 °
VS: 168.51'

90% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
10% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, sme biot

MD: 2,617'
TVD: 2,595.7'
Inclination: 9.54 °
Azimuth: 321.91 °
VS: 180.37'

90% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
10% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, sme biot

MD: 2,712'
TVD: 2,689.32'
Inclination: 10.02 °
Azimuth: 318.41 °
VS: 192.41'



80% SHY SLTST: lt gy, sme dk gry,
sft-fri, sb blkly - blkly, aren - slty tex
20% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, scat biot

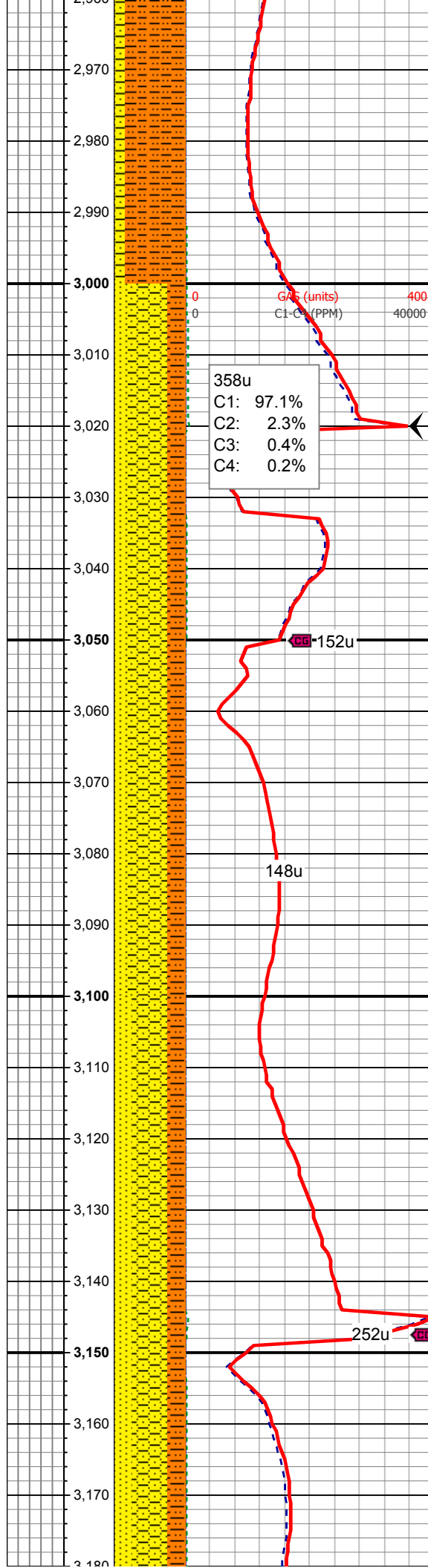
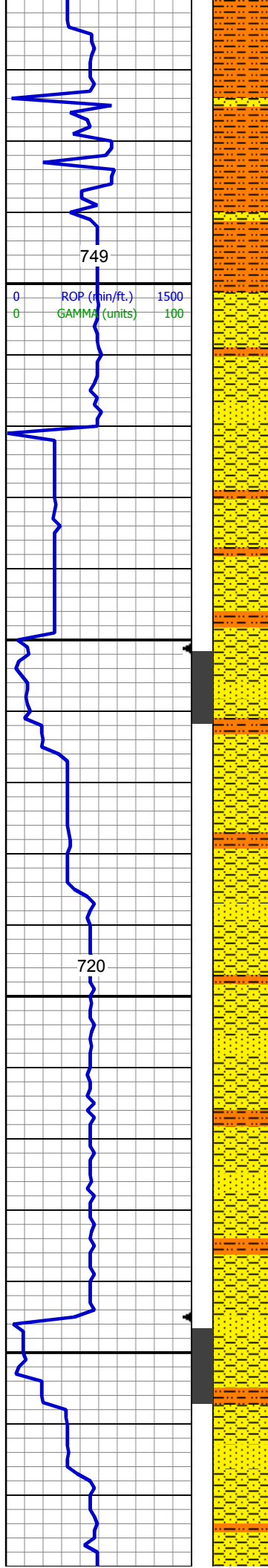
MD: 2,807'
TVD: 2,782.9'
Inclination: 9.8 °
Azimuth: 315.07 °
VS: 205.23'

90% SHY SLTST: lt gy, sme dk gry,
sft-fri, sb blkly - blkly, aren - slty tex
10% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, scat biot

MD: 2,901'
TVD: 2,875.44'
Inclination: 10.42 °
Azimuth: 318.32 °
VS: 218.17'

MUD WT 8.6 VIS 29

85% SHY SLTST: lt gy, sft-fri, sb
blkly - blkly, aren - slty tex
15% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, sme biot

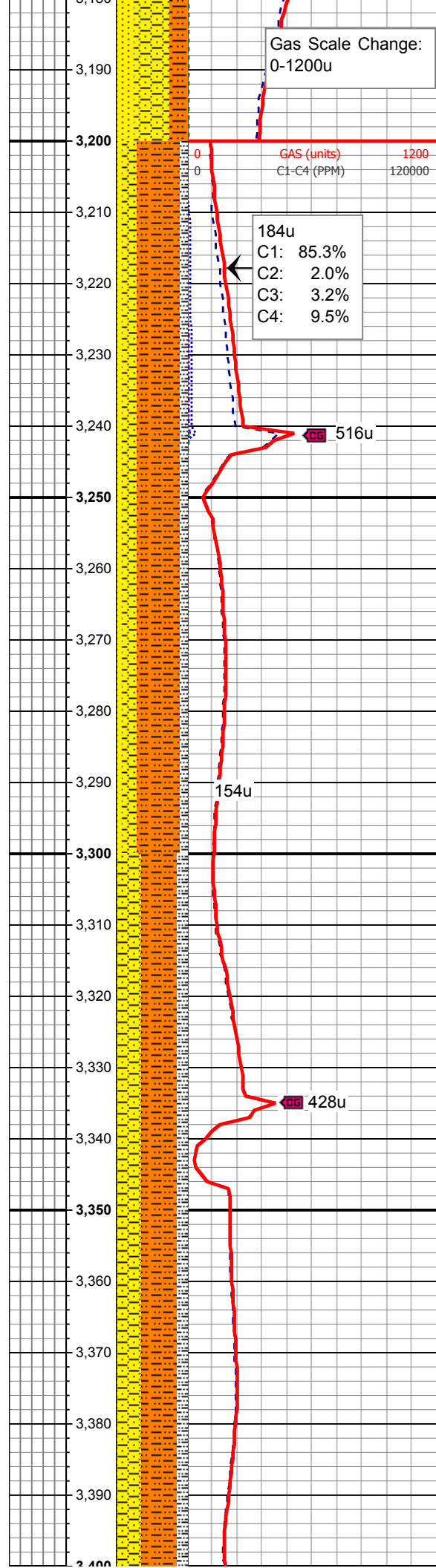
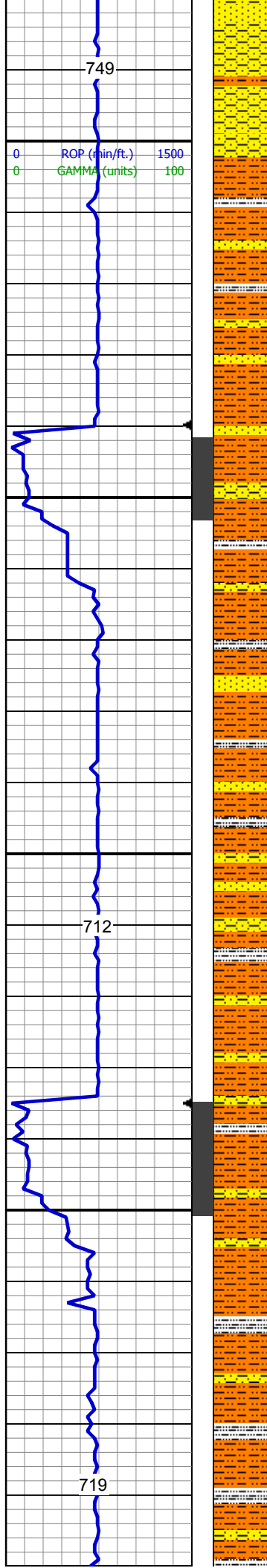


MD: 2,997'
TVD: 2,969.74'
Inclination: 11.16 °
Azimuth: 318.1 °
VS: 231.98'

55% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
25% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
20% SS: lt gy - wh, sme s&p, f gr,
sbrd-sbang, mod srt, fri, p por, arg
cmt

MD: 3,092'
TVD: 3,063.05'
Inclination: 10.51 °
Azimuth: 316.79 °
VS: 245.84'

50% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
25% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
25% SS: lt gy - wh, sme s&p, f gr,
sbrd-sbang, mod srt, fri, p por, arg
cmt



MD: 3,186'
TVD: 3,155.72'
Inclination: 8.74 °
Azimuth: 317.87 °
VS: 258.08'

MUD WT 8.7 VIS 29

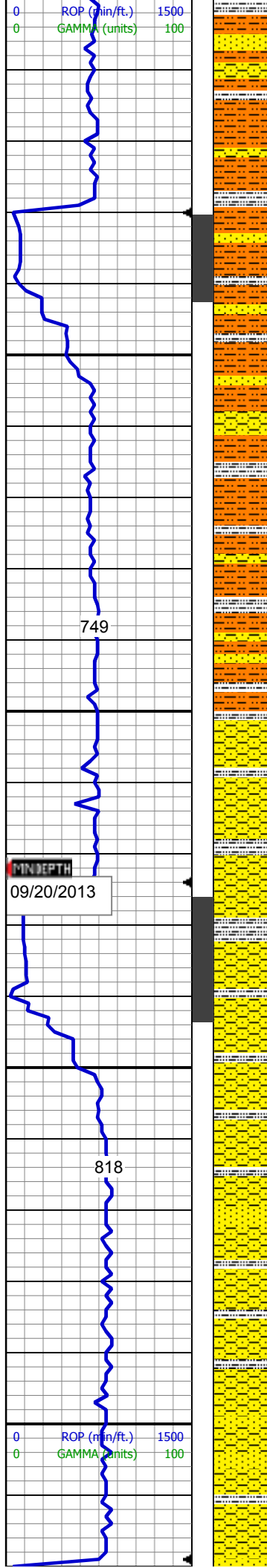
60% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
20% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
10% SS: lt gy - wh, sme s&p, f gr,
sbrd-sbang, mod srt, fri, p por,arg
cmt
10% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty

MD: 3,281'
TVD: 3,249.6'
Inclination: 8.83 °
Azimuth: 317.28 °
VS: 269.33'

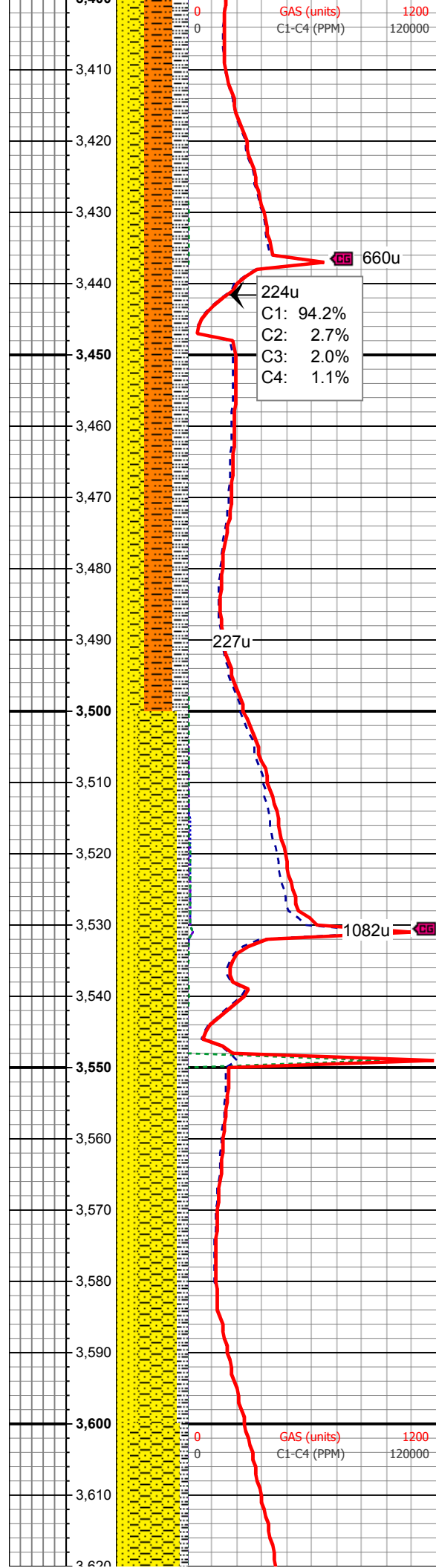
50% SH:SLTST: lt gy, sft-fri, sb blky
- blky, aren - slty tex
35% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
15% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty

MD: 3,376'
TVD: 3,343.56'
Inclination: 8.18 °
Azimuth: 314.34 °
VS: 280.48'

ROP (min/ft.) 1500
GAMMA (units) 100



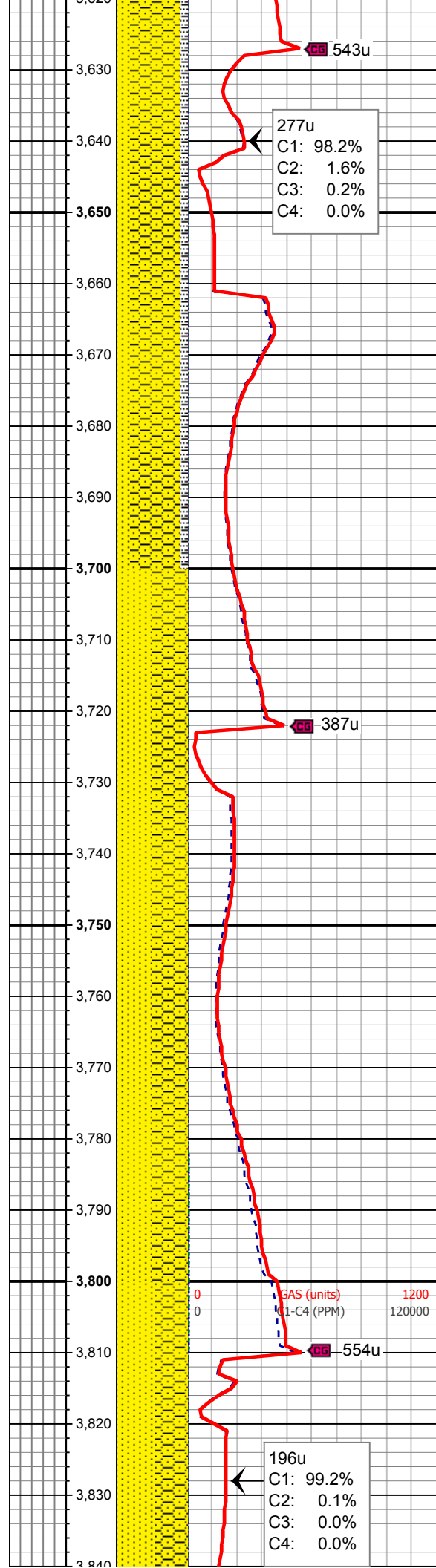
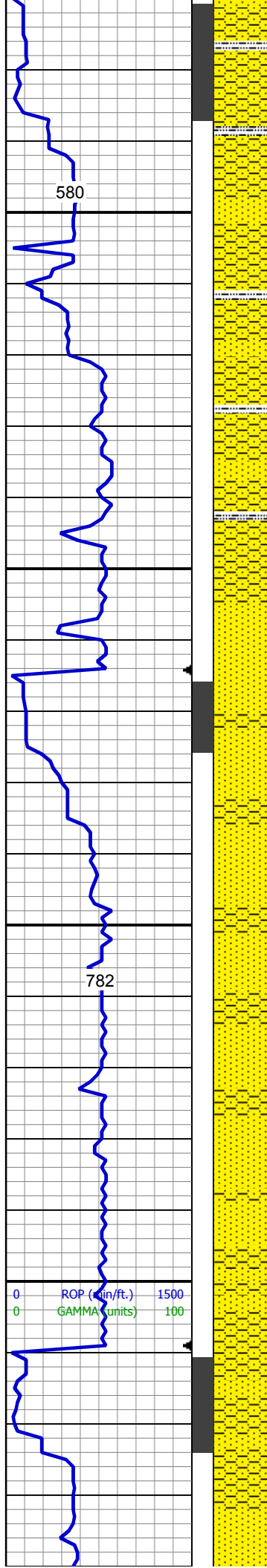
ROP (min/ft.) 1500
GAMMA (units) 100



224u
C1: 94.2%
C2: 2.7%
C3: 2.0%
C4: 1.1%

40% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
20% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
20% SS: lt gy - wh, sme s&p, f gr,
sbrd-sbang, mod srt, fri, p por, arg
cmt
20% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty

55% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por
30% SS: lt gy - wh, sme s&p, f gr,
sbrd-sbang, mod srt, fri, p por, arg
cmt
15% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty



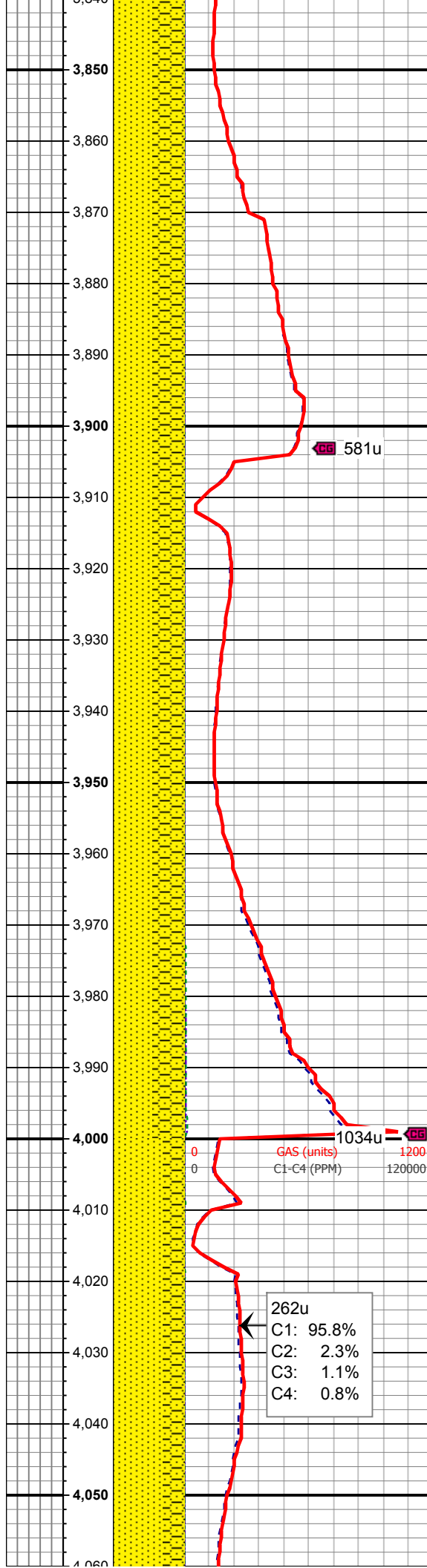
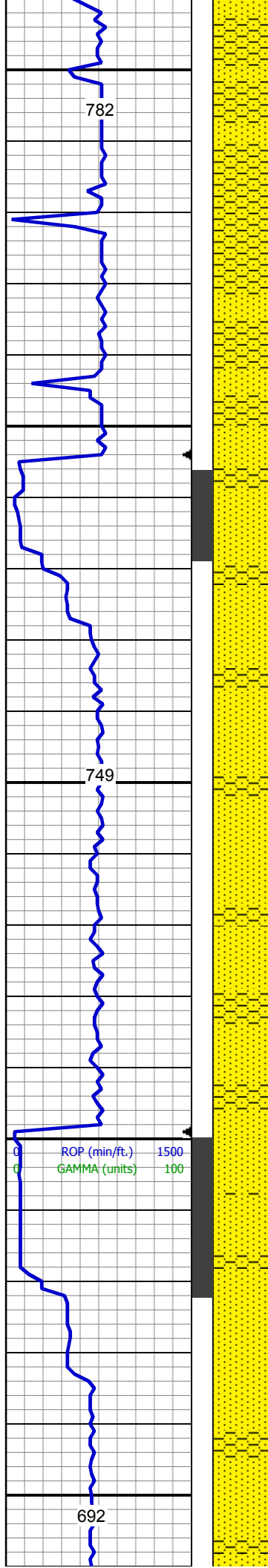
70% SHY SS: wh - lt gy sme s&p, f gr, sb rd- sb ang, fr srt, fri, mod por, arg cmt
20% SS: lt gy - wh, sme s&p, f gr, sbrd-sbang, mod srt, fri, p por
10% SILTY SH: m-dk gy occ gy brn, firm-sl sft, rthy-sl slty

MUD WT 8.8 VIS 29

50% SHY SS: wh - lt gy sme s&p, f gr, sb rd- sb ang, fr srt, fri, mod por, arg cmt
50% SS: lt gy - wh, sme s&p, f gr, sbrd-sbang, mod srt, fri, p por, arg cmt

277u
C1: 98.2%
C2: 1.6%
C3: 0.2%
C4: 0.0%

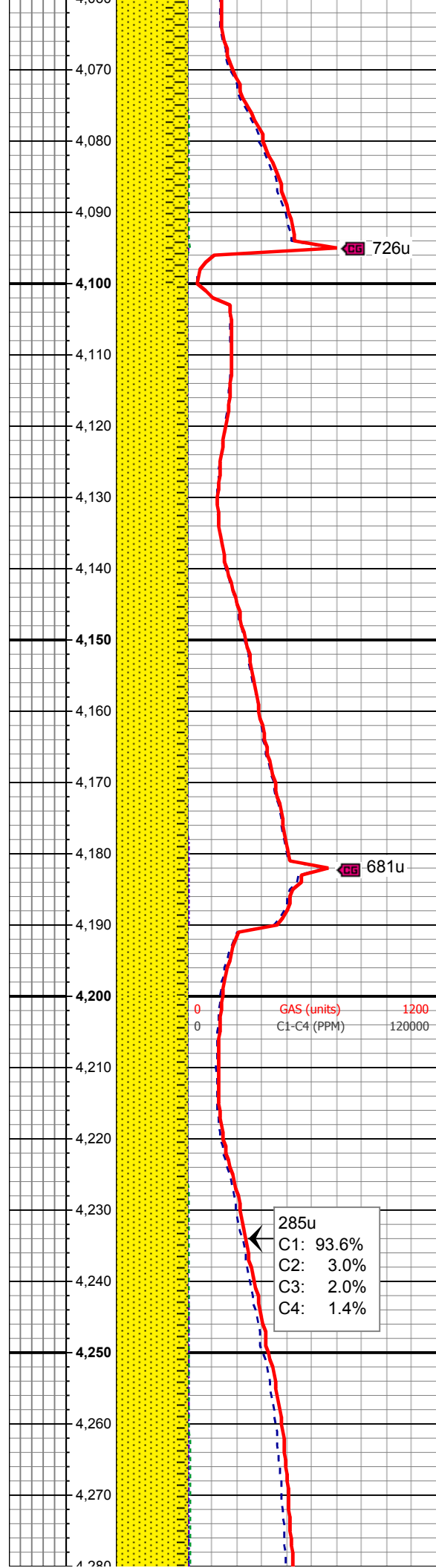
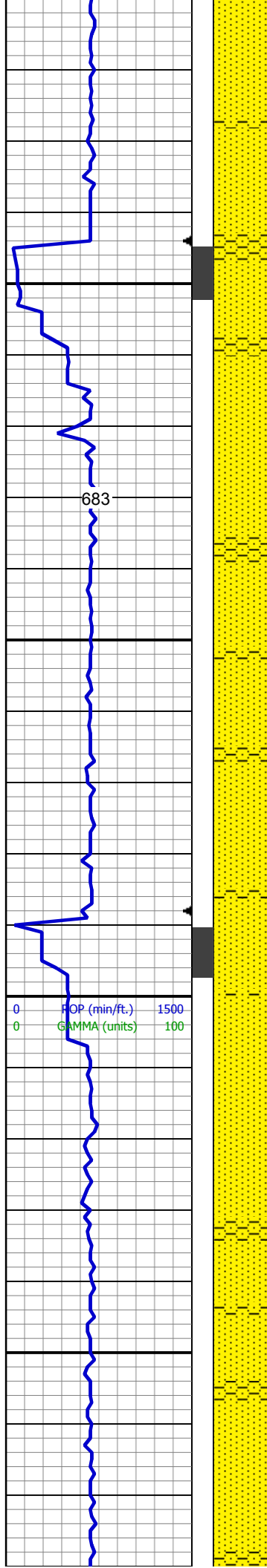
196u
C1: 99.2%
C2: 0.1%
C3: 0.0%
C4: 0.0%



55% SS: lt gy - wh, sme s&p, f gr, sbrd-sbang, mod srt, fri, p por,arg cmt
45% SHY SS: wh - lt gy sme s&p, f gr, sb rd- sb ang, fr srt, fri, mod por, arg cmt, occ biot

55% SS: lt gy - wh, sme s&p, f gr, sbrd-sbang, mod srt, fri, p por,arg cmt
45% SHY SS: wh - lt gy sme s&p, f gr, sb rd- sb ang, fr srt, fri, mod por, arg cmt, occ biot

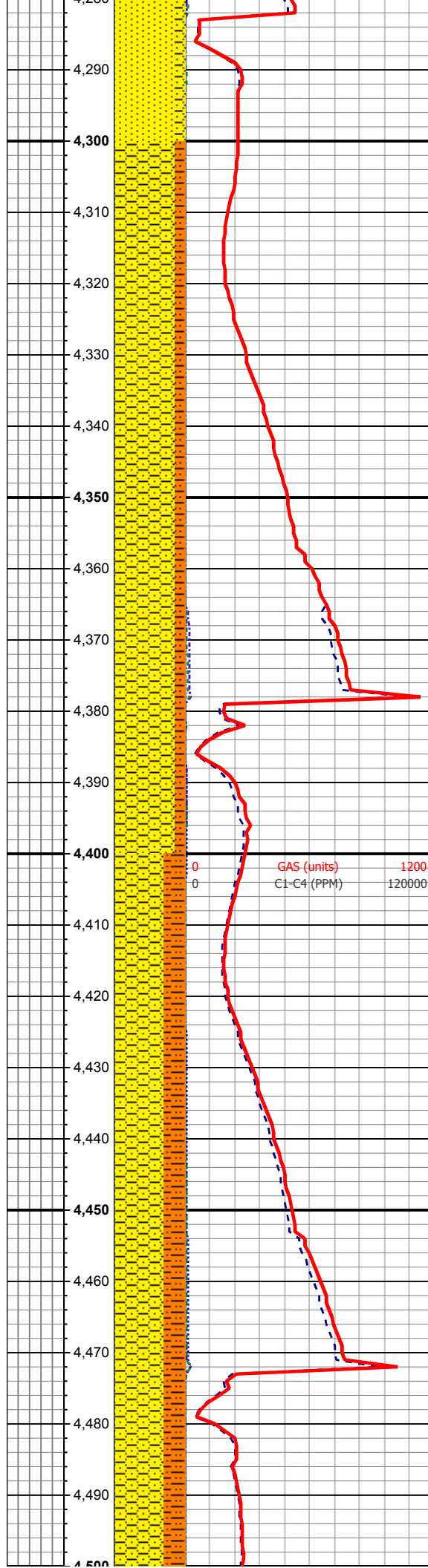
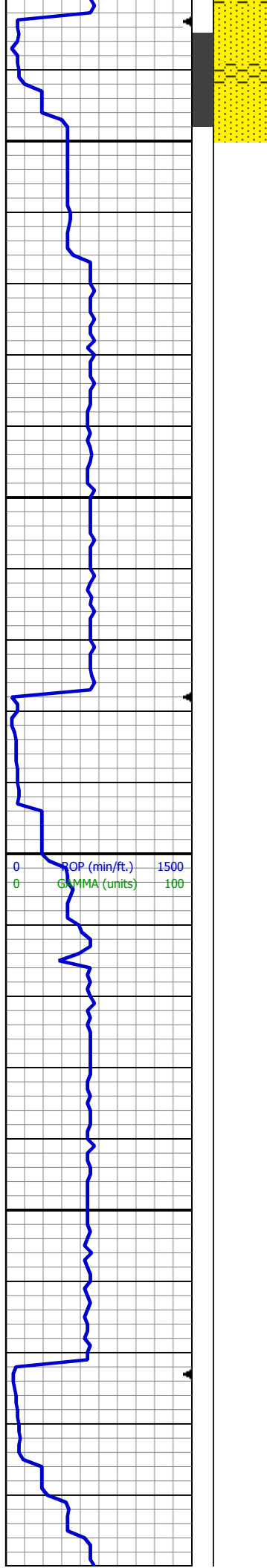
70% SS: lt gy - wh, sme s&p, f gr, sbrd-sbang, mod srt, fri, p por,arg cmt
30% SHY SS: wh - lt gy sme s&p, f gr, sb rd- sb ang, fr srt, fri, mod por, arg cmt, occ biot



MUD WT 8.8 VIS 29

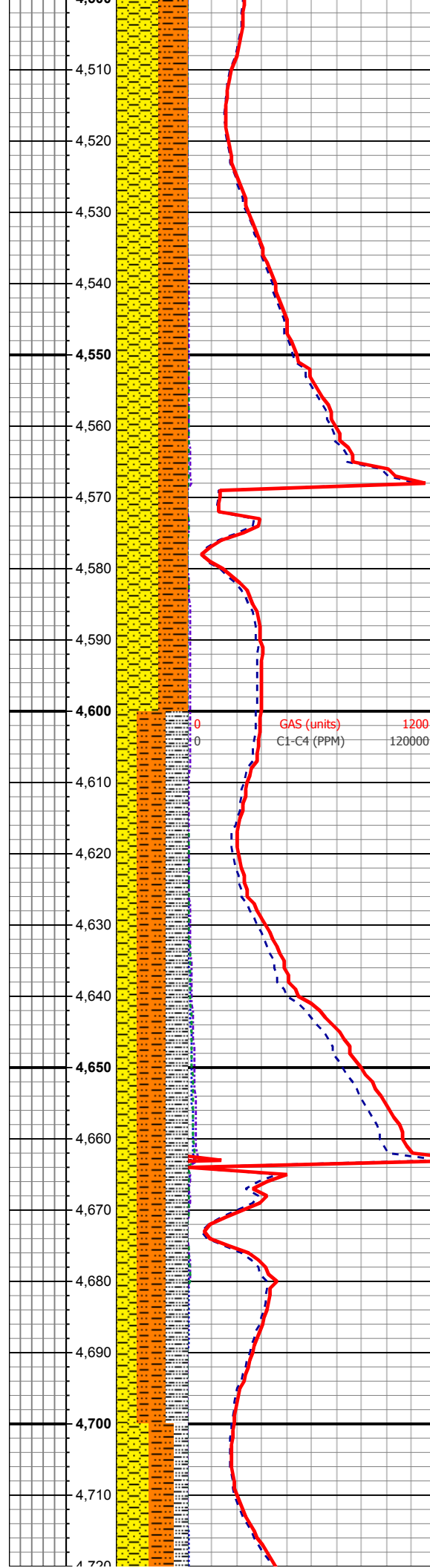
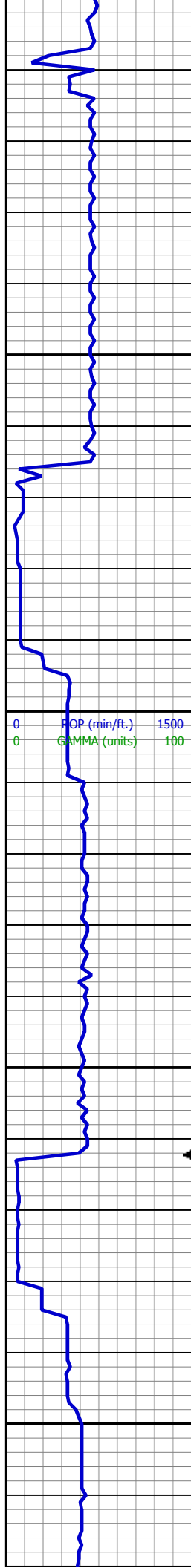
85% SS: lt gy - wh, sme s&p, f gr, sbrd-sbang, mod srt, fri, p por,arg cmt
15% SHY SS: wh - lt gy sme s&p, f gr, sb rd- sb ang, fr srt, fri, mod por, arg cmt, occ biot

85% SS: lt gy - wh, sme s&p, f gr, sbrd-sbang, mod srt, fri, p por,arg cmt
15% SHY SS: wh - lt gy sme s&p, f gr, sb rd- sb ang, fr srt, fri, mod por, arg cmt, occ biot



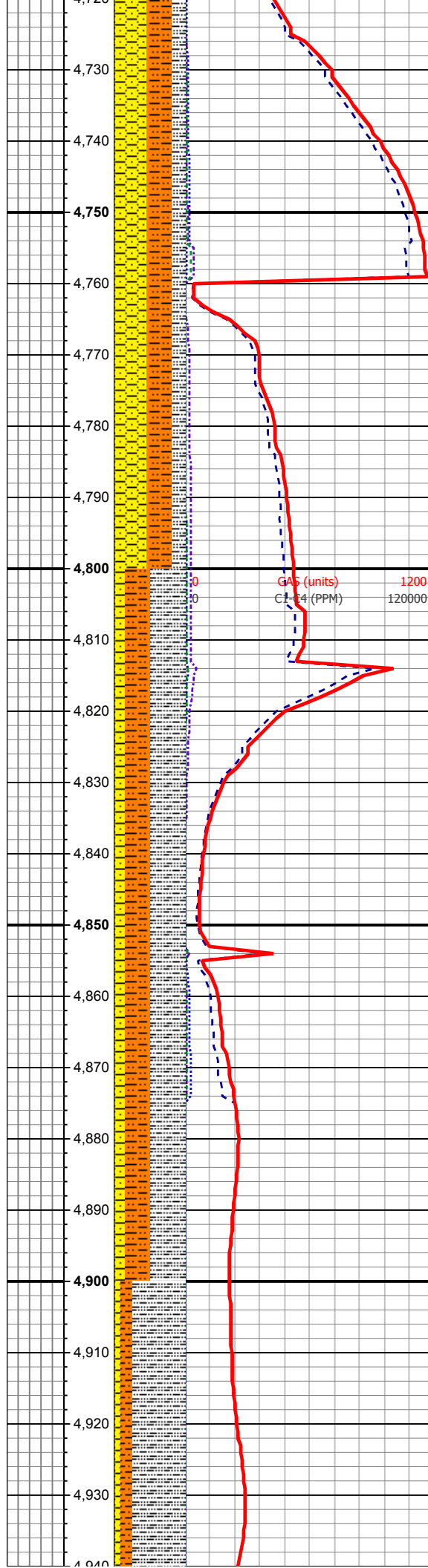
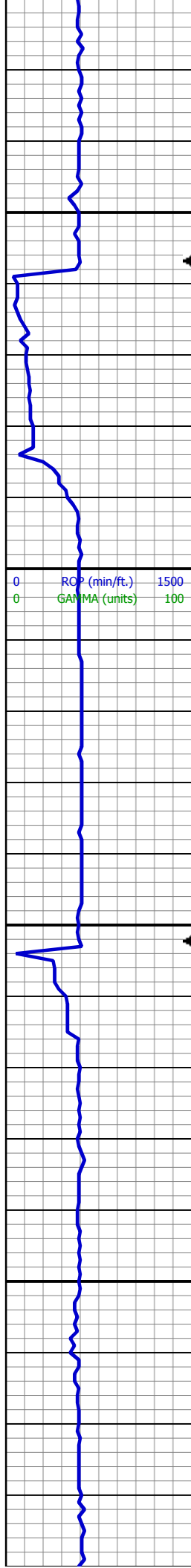
85% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, occ biot
15% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex

70% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, occ biot
30% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex



60% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, occ biot
40% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex

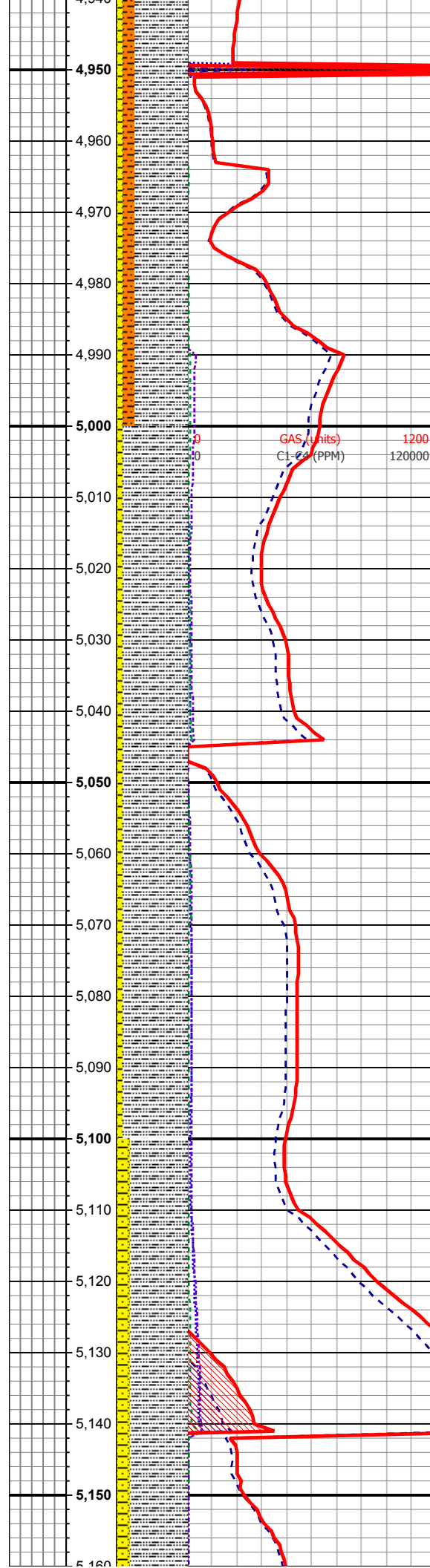
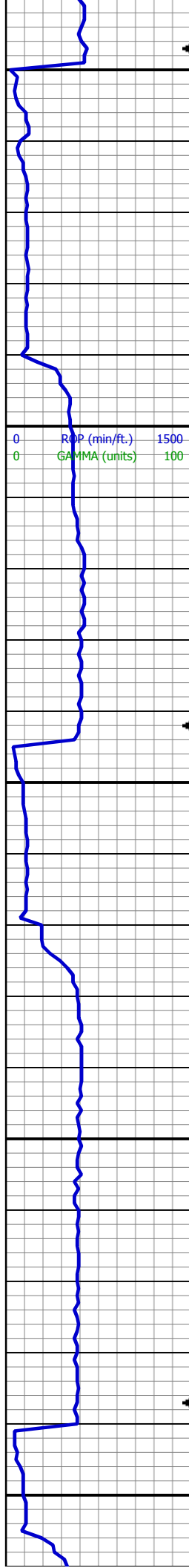
40% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
30% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
30% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty



45% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
35% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
20% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty

50% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty
35% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
15% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

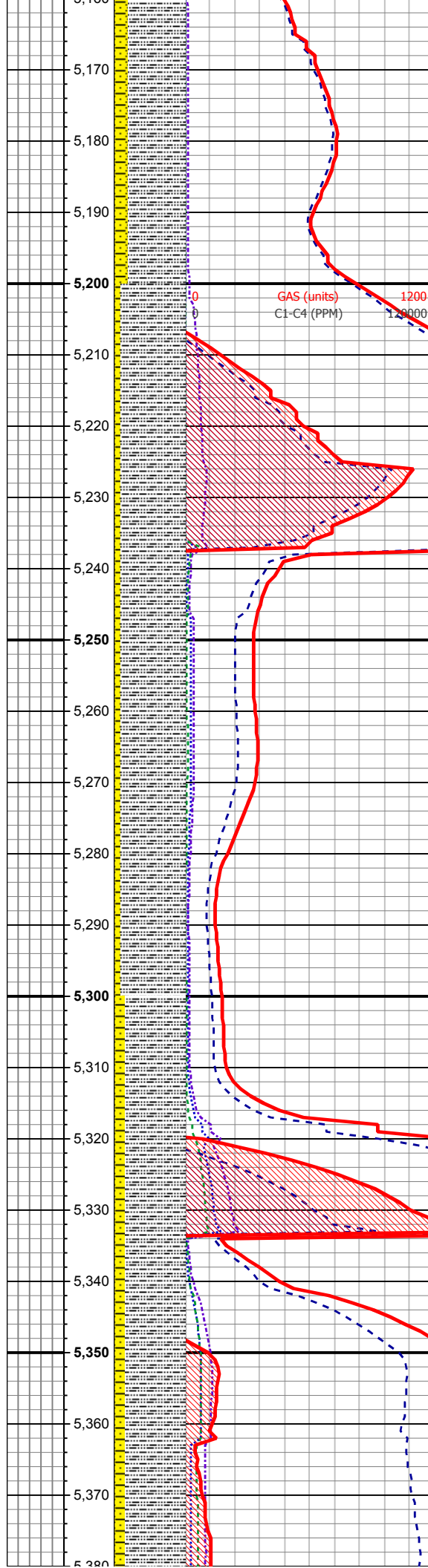
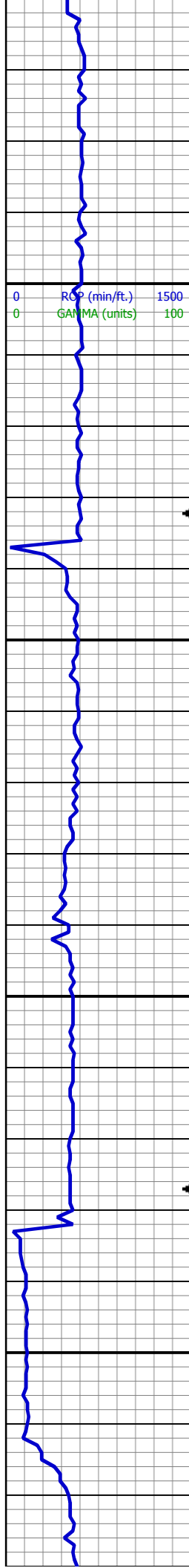
75% SILTY SH: m-dk gy occ gy brn,



75% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty
15% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
10% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

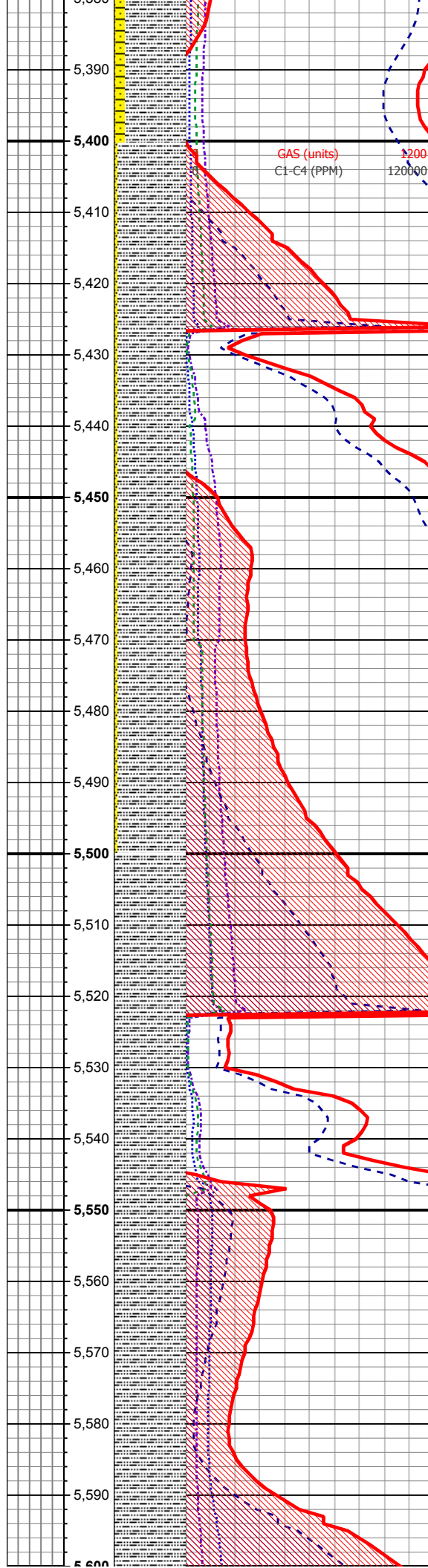
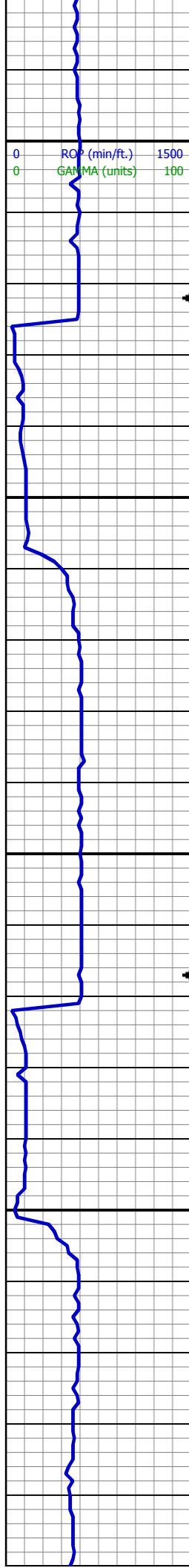
90% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty
10% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

80% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty
20% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt



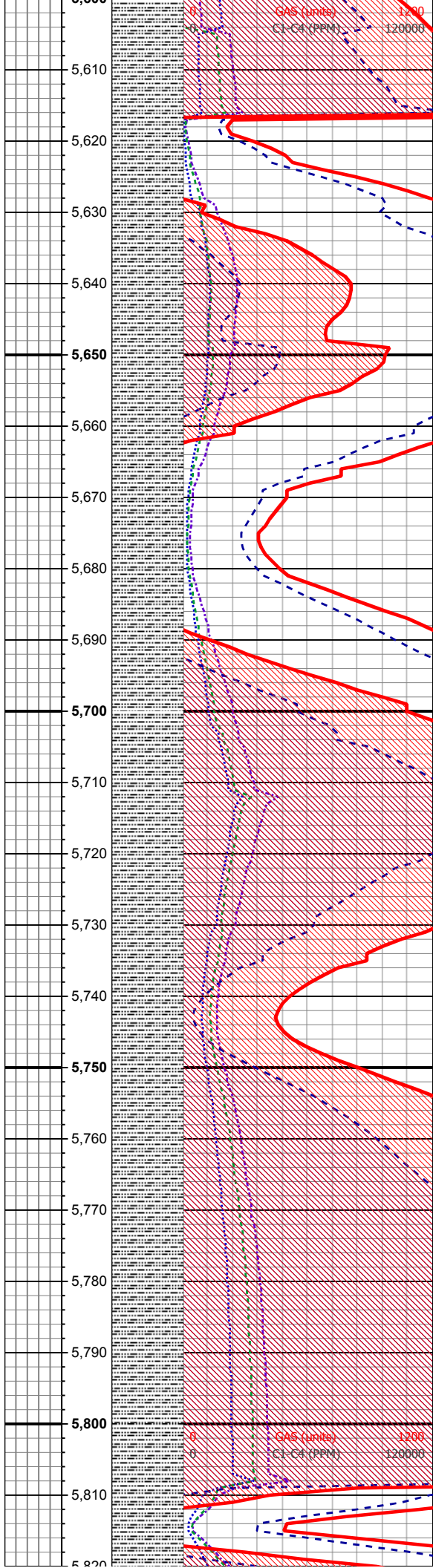
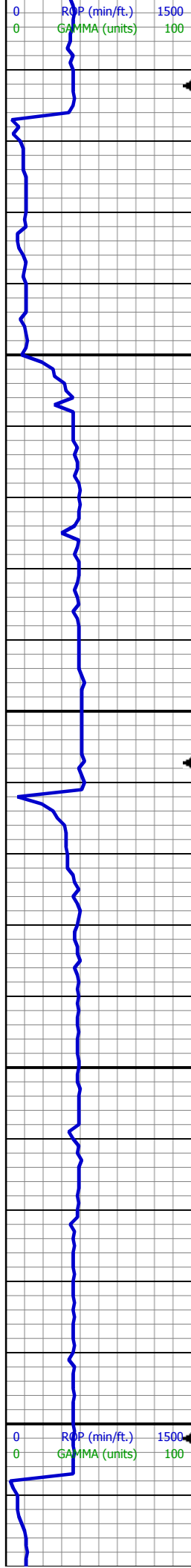
90% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty
10% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

85% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty
15% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt



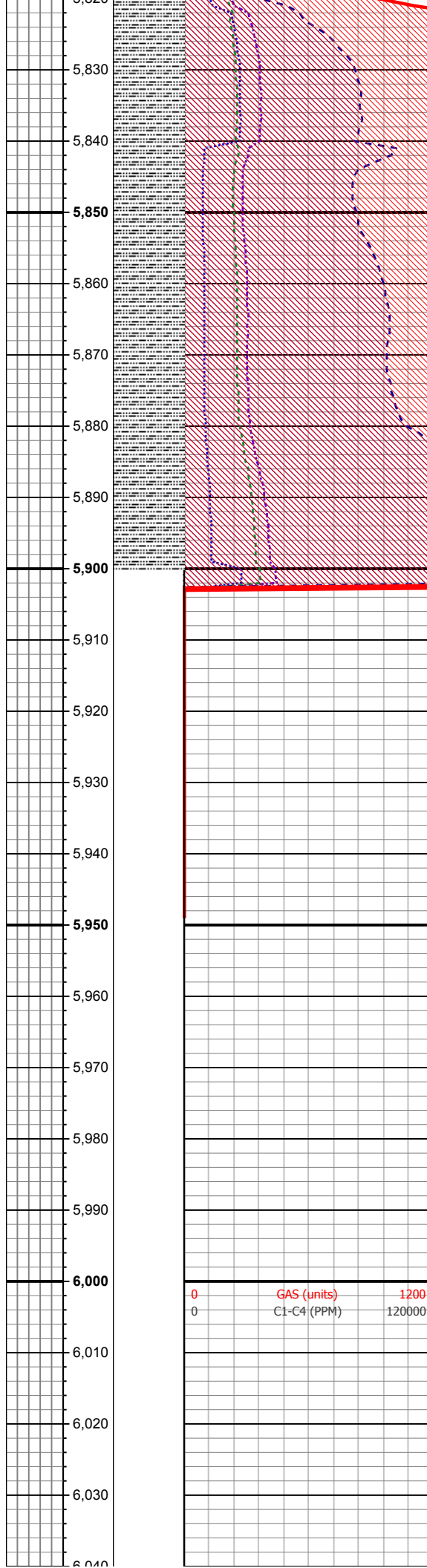
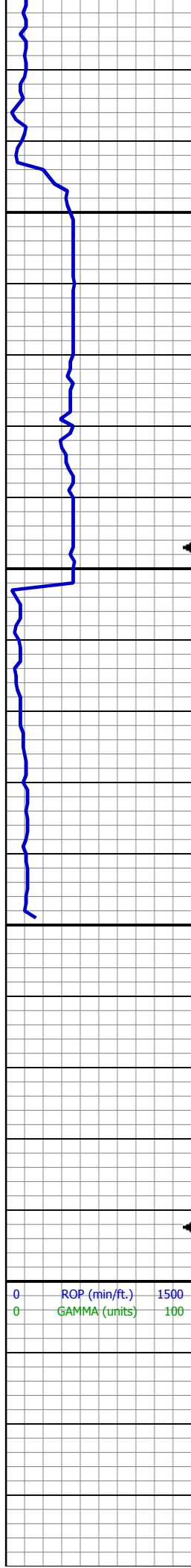
95% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty
5% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

100% SILTY SH: m-dk gy occ gy
brn, firm-sl sft, rthy-sl slty, sl calc



100% SILTY SH: m-dk gy occ gy
brn, firm-sl sft, rthy-sl slty, sl calc

100% SILTY SH: m-dk gy occ gy
brn, firm-sl sft, rthy-sl slty, sl calc



100% SILTY SH: m-dk gy occ gy
brn, firm-sl sft, rthy-sl slty, sl calc

0 GAS (units) 1200
0 C1-C4 (PPM) 120000

