

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name RICO LC29-76-1HNA(VERT)

Location SEC 29, T9N, R59W

State COLORADO

County WELD

Country USA

Rig Number H&P 326

API Number 05-123-38776

Region DJ BASIN

Field WILDCAT

Spud Date 5/9/2014

Drilling Completed 5/18/2014

Surface Coordinates SESW, SEC 29, T9N, R59W
40.71492 -104.00408

Ground Elevation 4878'

K.B. Elevation 4908'

Logged Interval 631' **To** 5366'

Total Depth 15506'

Formation NIOBRARA, A MARL

Type of Drilling Fl... LSND

Operator

Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202

Geologist

Name EVAN HOWELL

Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202

Other

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 CHOKE 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
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

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

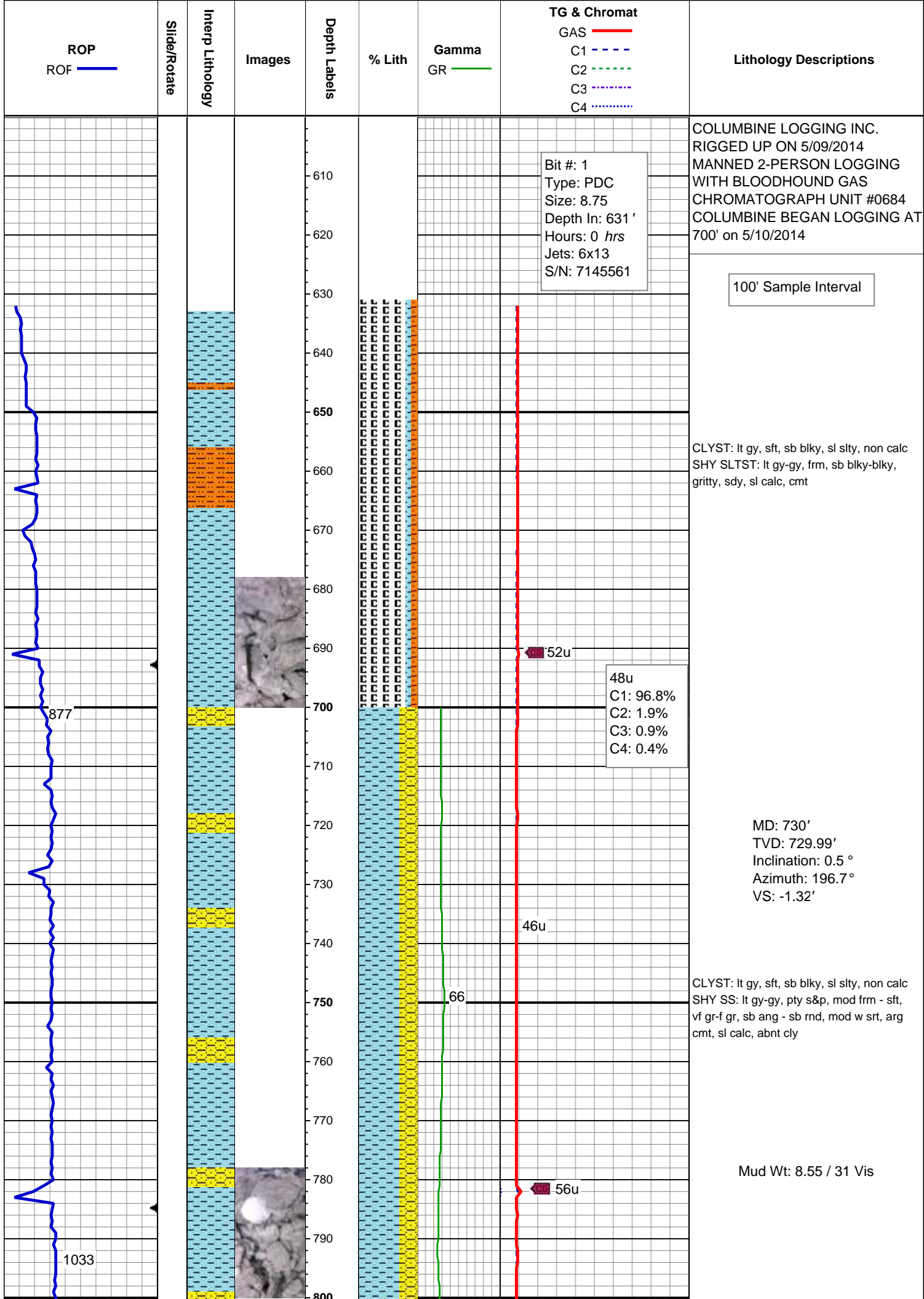
BOUNDSTONE
CHALKY
CRYPTOXLN

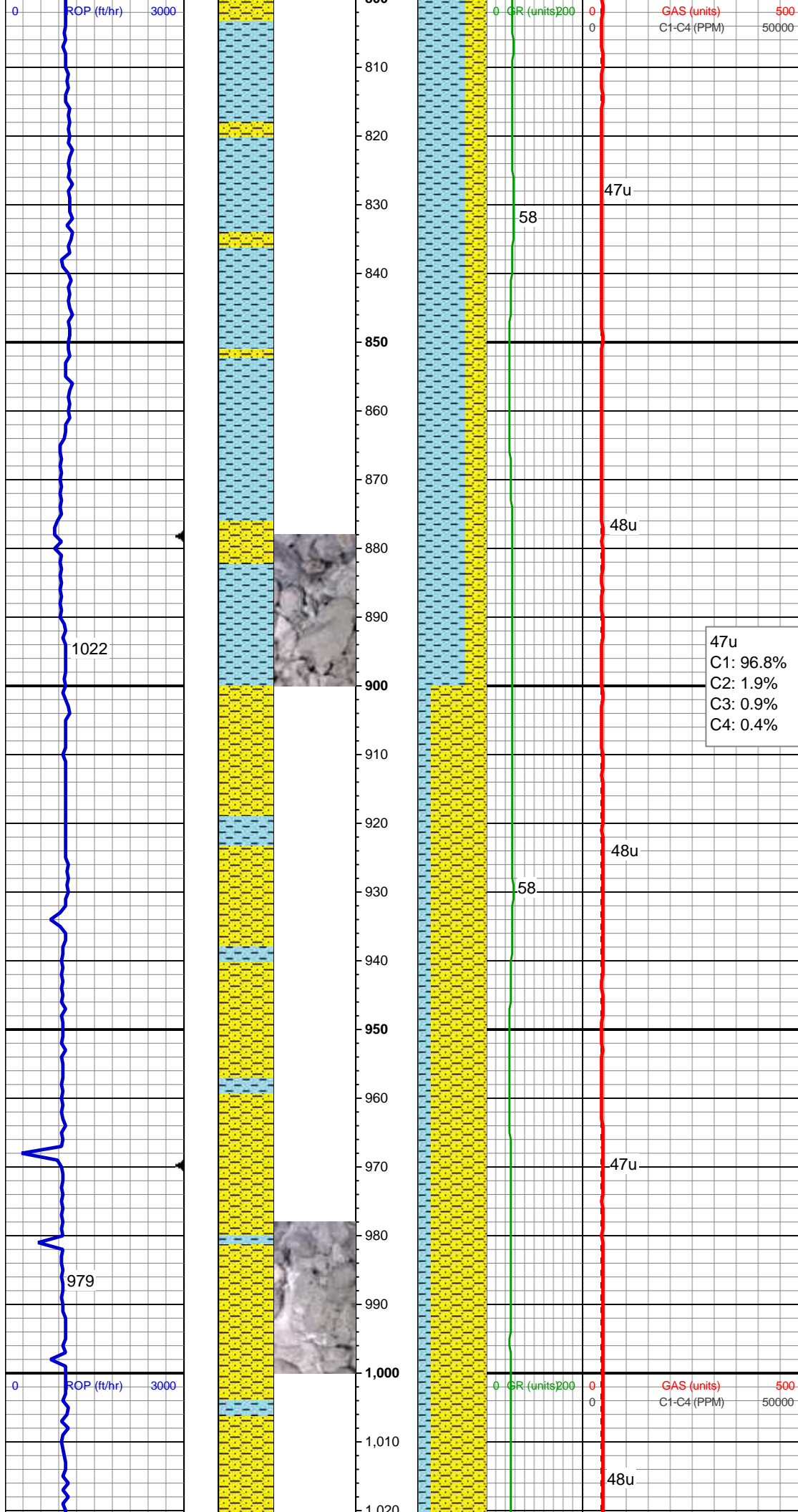
E EARTHY

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

Sorting

MODERATE
POOR
WELL





MD: 823'
TVD: 822.98'
Inclination: 0.8 °
Azimuth: 191.2 °
VS: -2.34'

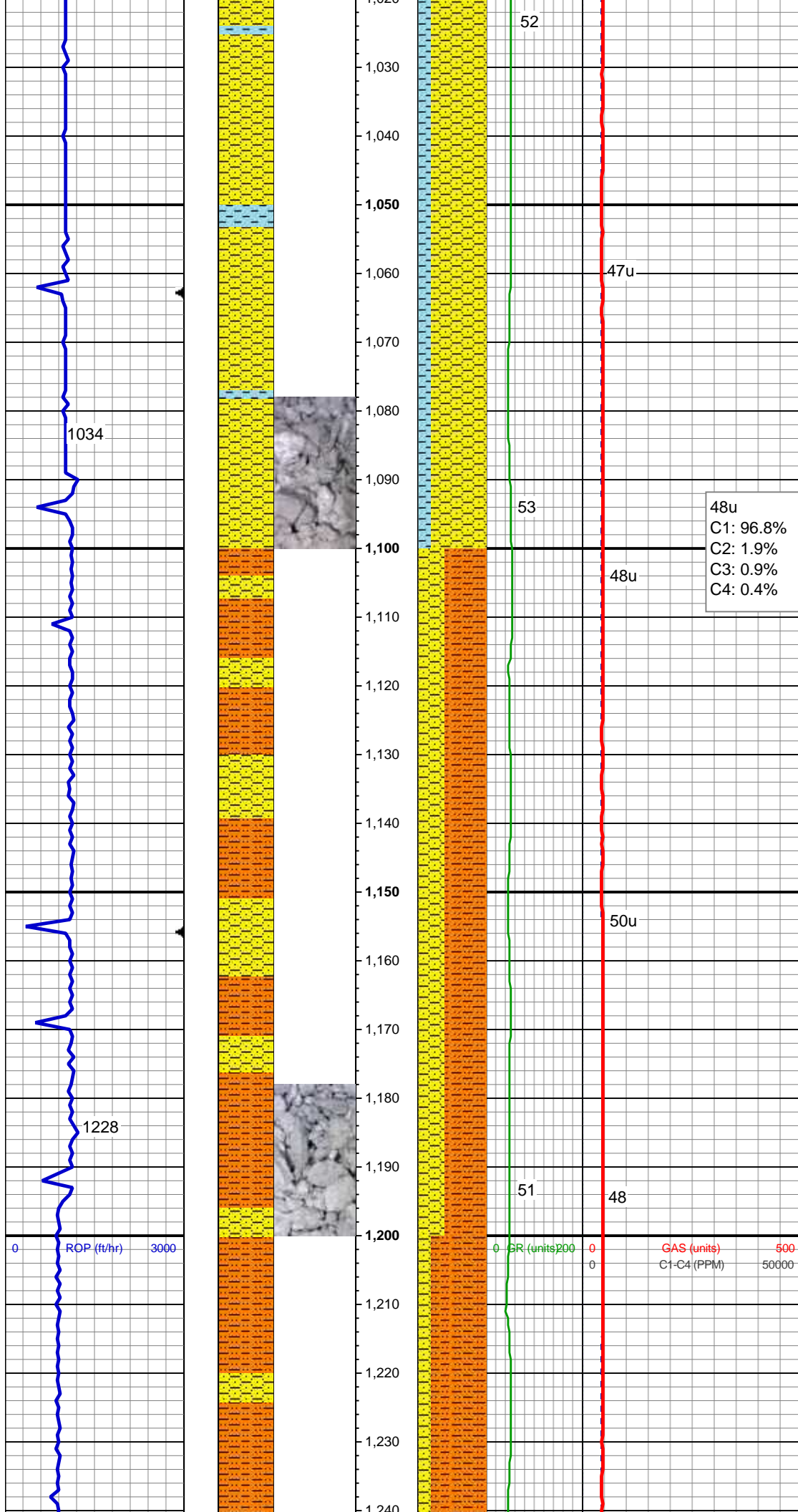
CLYST: lt gy, sft, sb blk, sl slty, non calc
SHY SS: lt gy-gy, pty s&p, mod frm - sft,
vf gr-f gr, sb ang - sb rnd, mod w srt, arg
cmt, sl calc, abnt cly

MD: 915'
TVD: 914.97'
Inclination: 0.8 °
Azimuth: 199.9 °
VS: -3.58'

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

Mud Wt: 8.50 / 30 Vis

MD: 1,009'
TVD: 1,008.96'
Inclination: 1 °
Azimuth: 196.9 °
VS: -4.99'



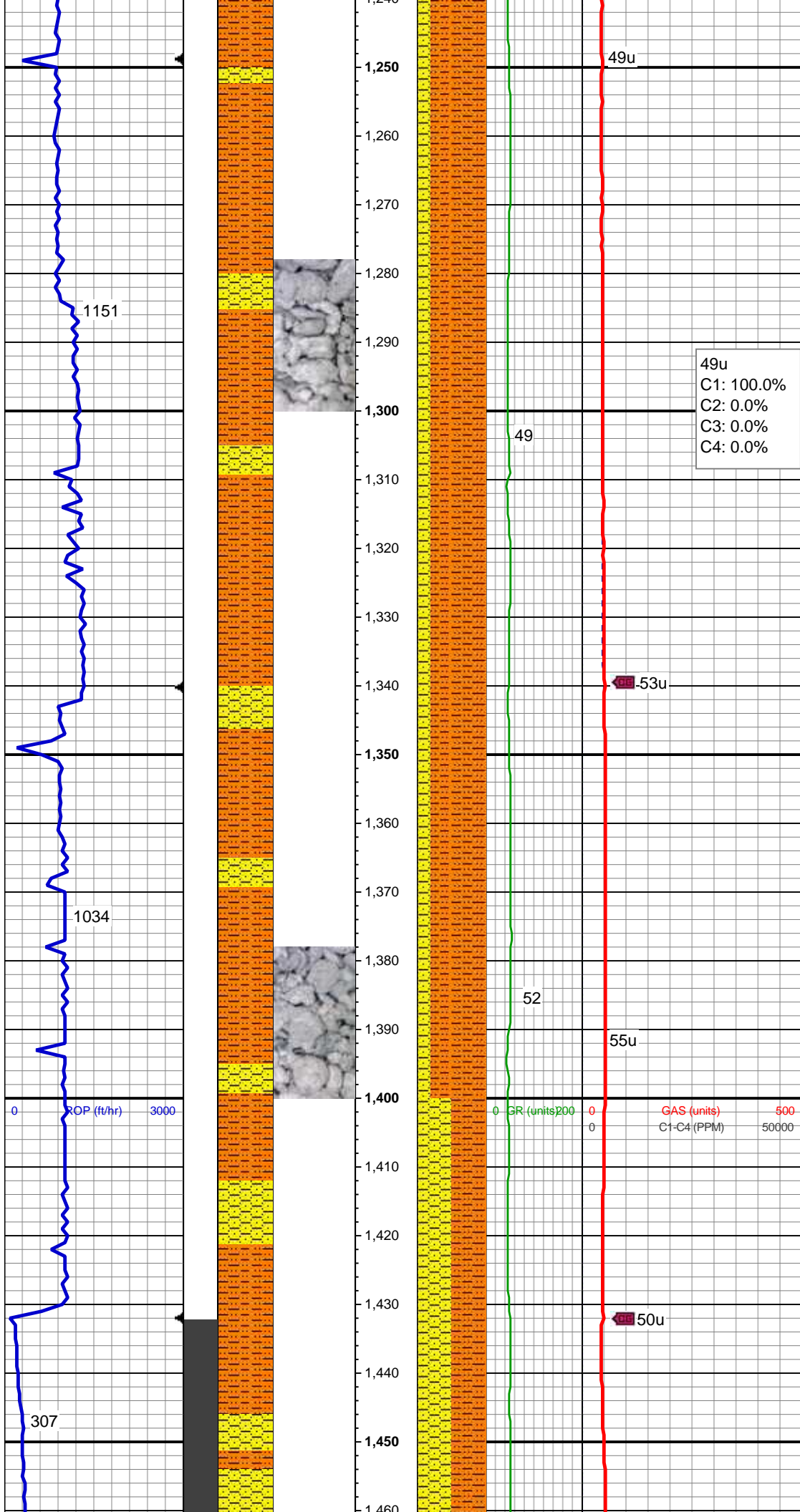
SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc, CLYST: lt gy, sft, sb blk, sl slty, non calc, abnt cly

MD: 1,102'
TVD: 1,101.95'
Inclination: 0.9 °
Azimuth: 186.9 °
VS: -6.49'

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

MD: 1,194'
TVD: 1,193.94'
Inclination: 0.6 °
Azimuth: 191.9 °
VS: -7.68'

Mud Wt: 8.50 / 30 Vis



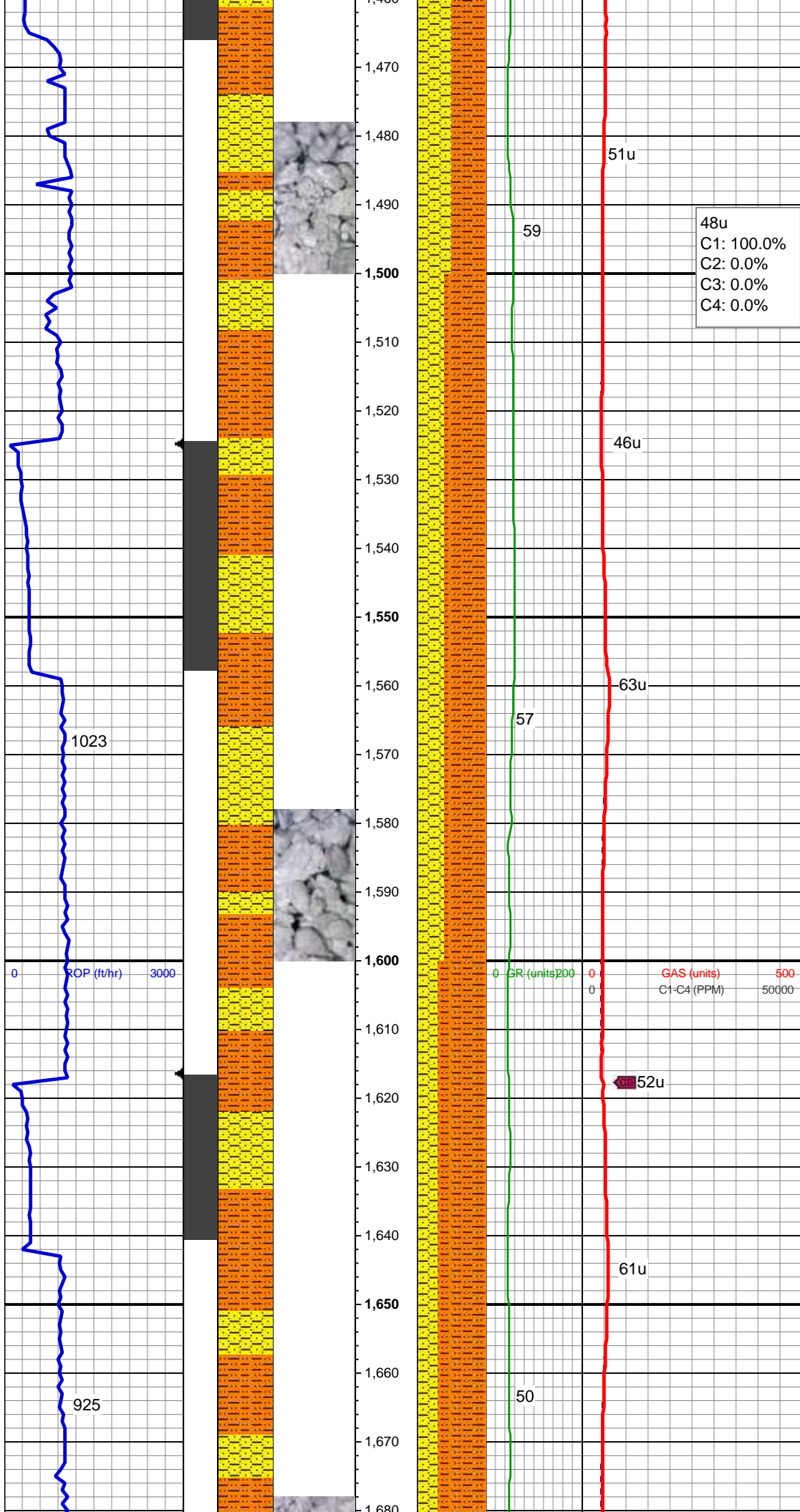
SHY SLTST: lt gy-gy, frm, sb blkly-blky, gritty, sdy, sl calc, imbd carb flks, abnt cly SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc

MD: 1,286'
TVD: 1,285.94'
Inclination: 0.6 °
Azimuth: 197.6°
VS: -8.62'

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

MD: 1,378'
TVD: 1,377.93'
Inclination: 0.8 °
Azimuth: 195.1°
VS: -9.7'

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



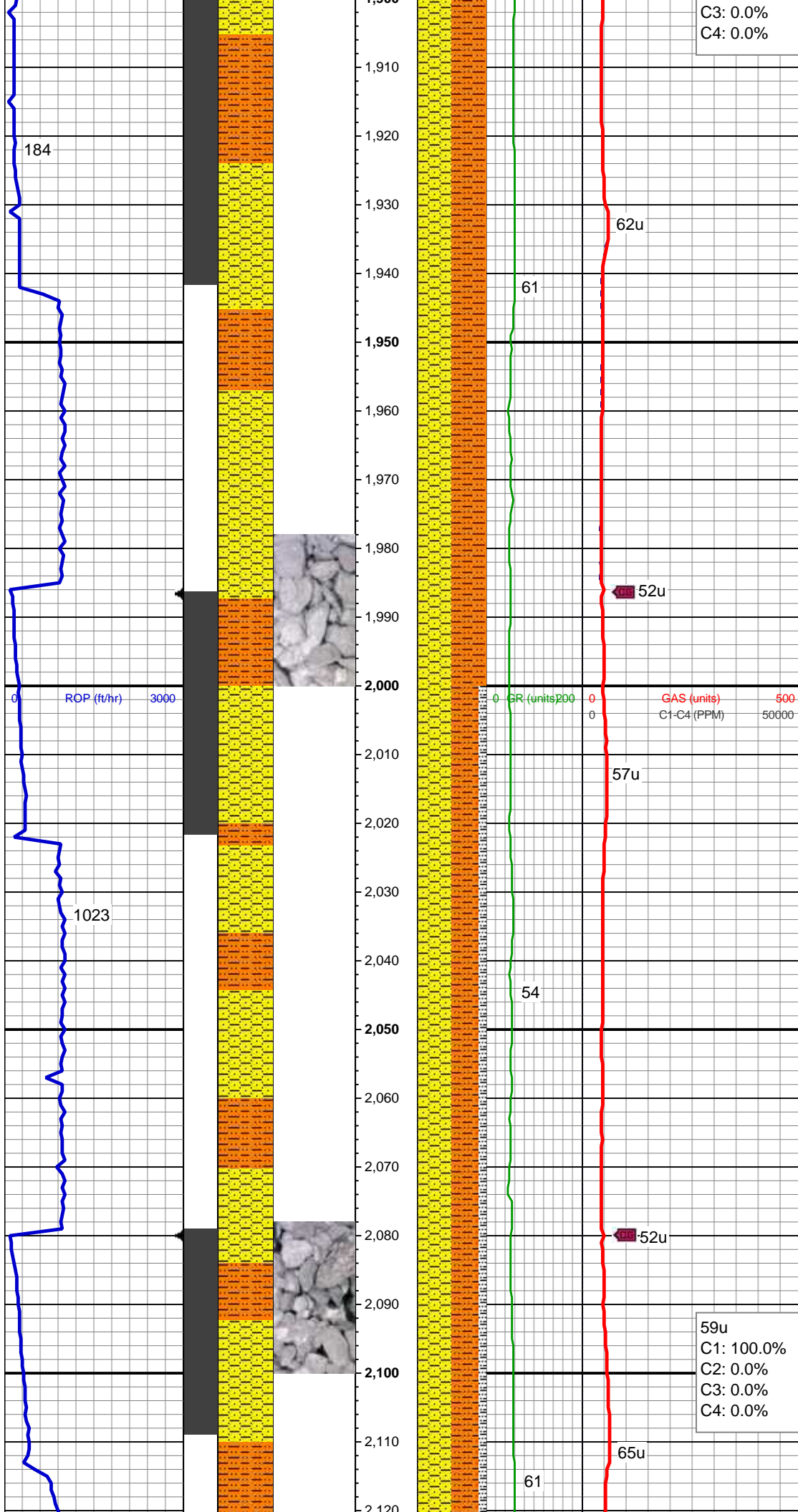
SHY SLTST: lt gy-gy, frm, sb blkly-blky, gritty, sdy, sl calc, imbd carb flks, abnt cly SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, glau, arg cmt, sl calc

MD: 1,562'
TVD: 1,561.76'
Inclination: 4.1 °
Azimuth: 128.3 °
VS: -15.22'

Mud Wt: 8.45 / 31 Vis

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

MD: 1,654'
TVD: 1,653.44'
Inclination: 5.5 °
Azimuth: 115.2 °
VS: -19.07'



C3: 0.0%
C4: 0.0%

MD: 1,932'
TVD: 1,929.77'
Inclination: 7.1 °
Azimuth: 110.7 °
VS: -29.91'

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



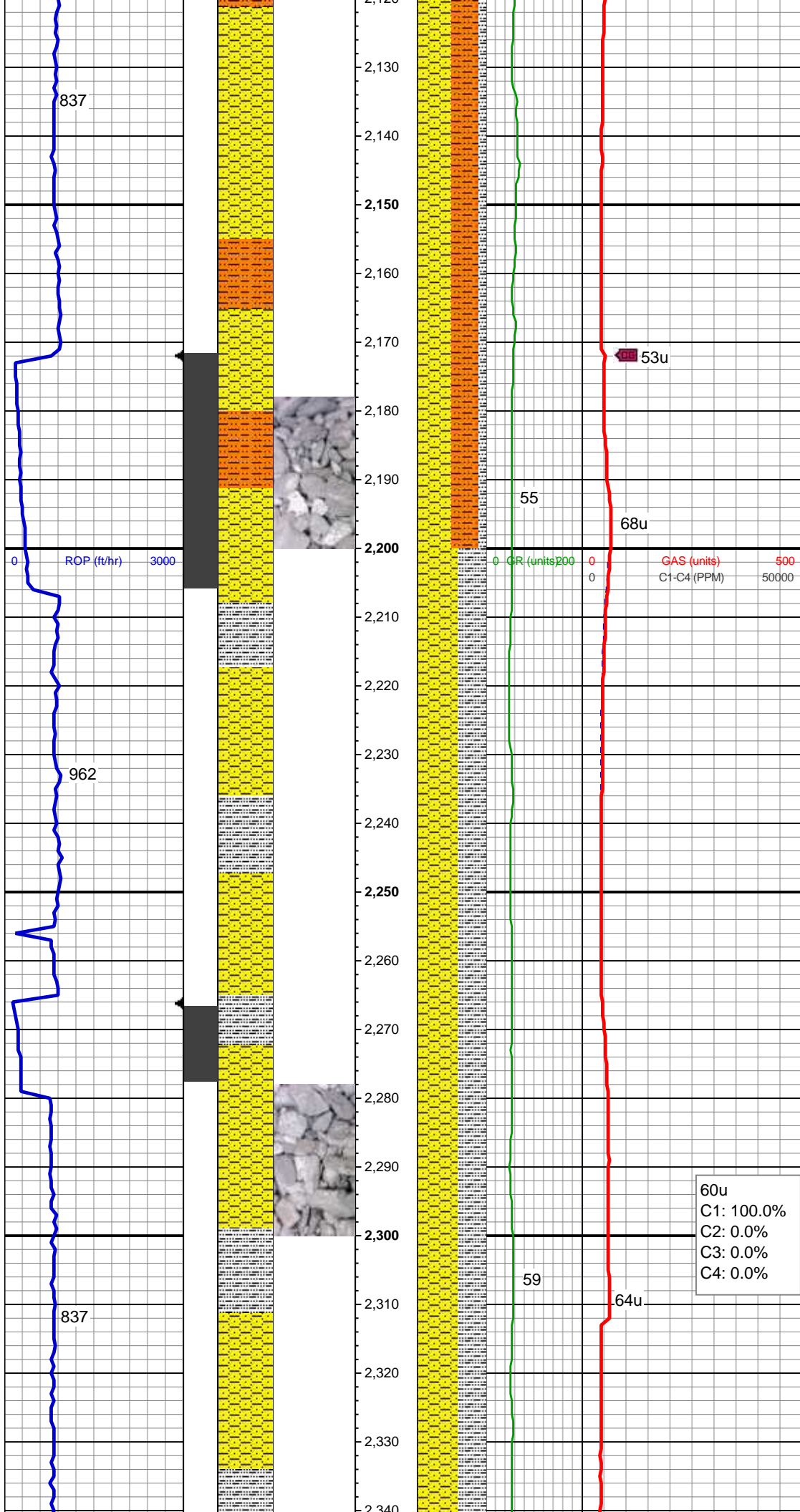
MD: 2,025'
TVD: 2,021.82'
Inclination: 9.3 °
Azimuth: 108.6 °
VS: -34.22'

SHY SLTST: lt gy-gy, frm, sb blkly-blky, gritty, sdy, sl calc, imbd carb flks, abnt cly SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, glau, arg cmt, sl calc SLTY SH: lt gy-gy, mod sft-frm, sub blkly-sub pty, sandy rthy tex, pyr, sl calc



59u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

MD: 2,118'
TVD: 2,113.39'
Inclination: 10.8 °
Azimuth: 107.2 °



VS: -39.04'

SHY SLTST: lt gy-gy, frm, sb blkly-blky, gritty, sdy, sl calc, imbd carb flks, abnt cly SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, glau, arg cmt, sl calc SLTY SH: lt gy-gy, mod sft-frm, sub blkly-sub plty, sandy rthy tex, pyr, sl calc

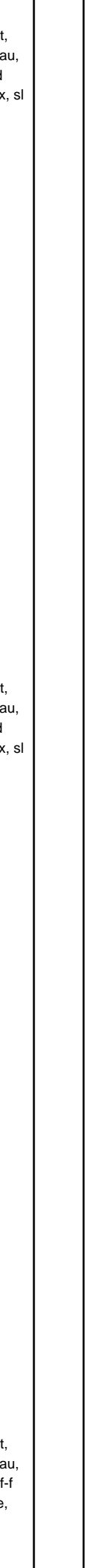
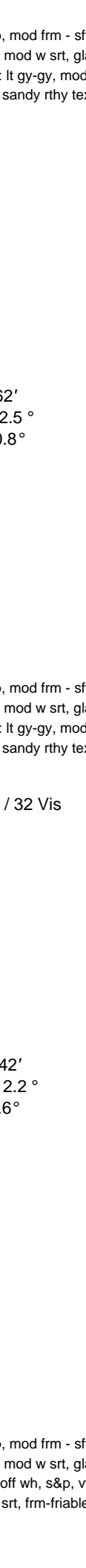
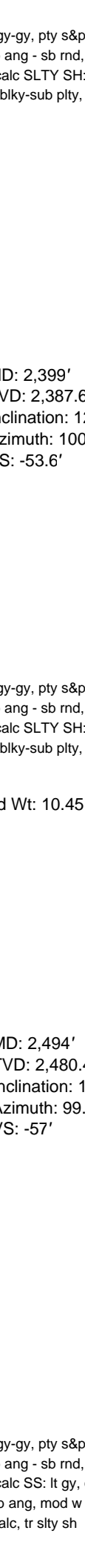
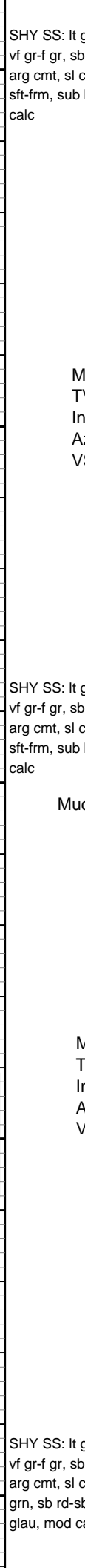
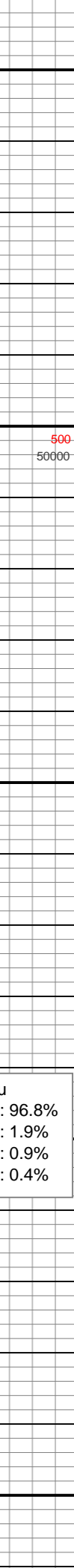
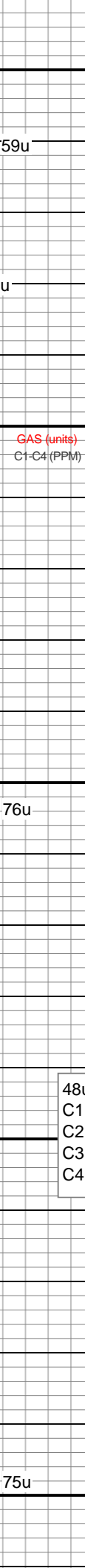
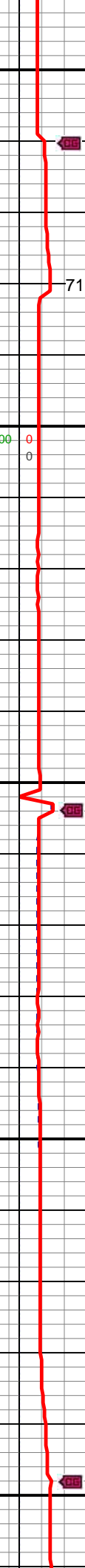
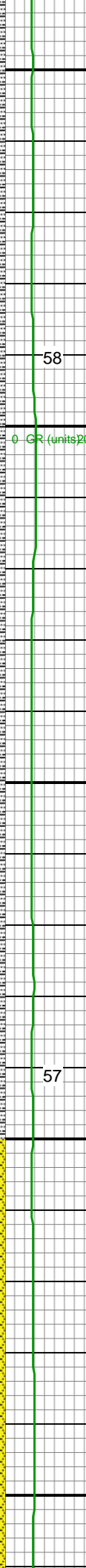
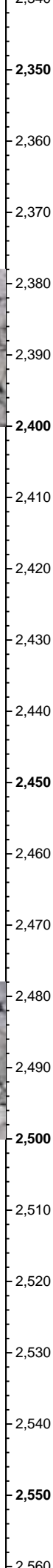
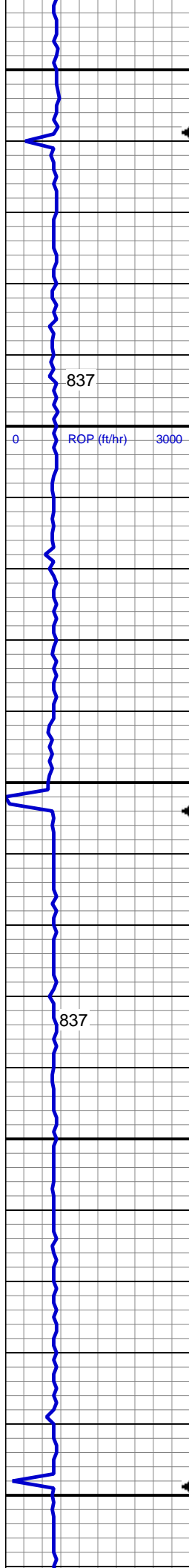
Mud Wt: 8.45 / 32 Vis

MD: 2,211'
TVD: 2,204.44'
Inclination: 12.7 °
Azimuth: 107.7 °
VS: -44.54'

SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, glau, arg cmt, sl calc SLTY SH: lt gy-gy, mod sft-frm, sub blkly-sub plty, sandy rthy tex, sl calc

MD: 2,305'
TVD: 2,296.01'
Inclination: 13.4 °
Azimuth: 101.7 °
VS: -49.69'

60u
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-f gr, sb ang - sb rnd, mod w srt, glau, arg cmt, sl calc SLTY SH: lt gy-gy, mod sft-frm, sub blkly-sub plty, sandy rthy tex, sl calc

MD: 2,399'
TVD: 2,387.62'
Inclination: 12.5 °
Azimuth: 100.8 °
VS: -53.6'

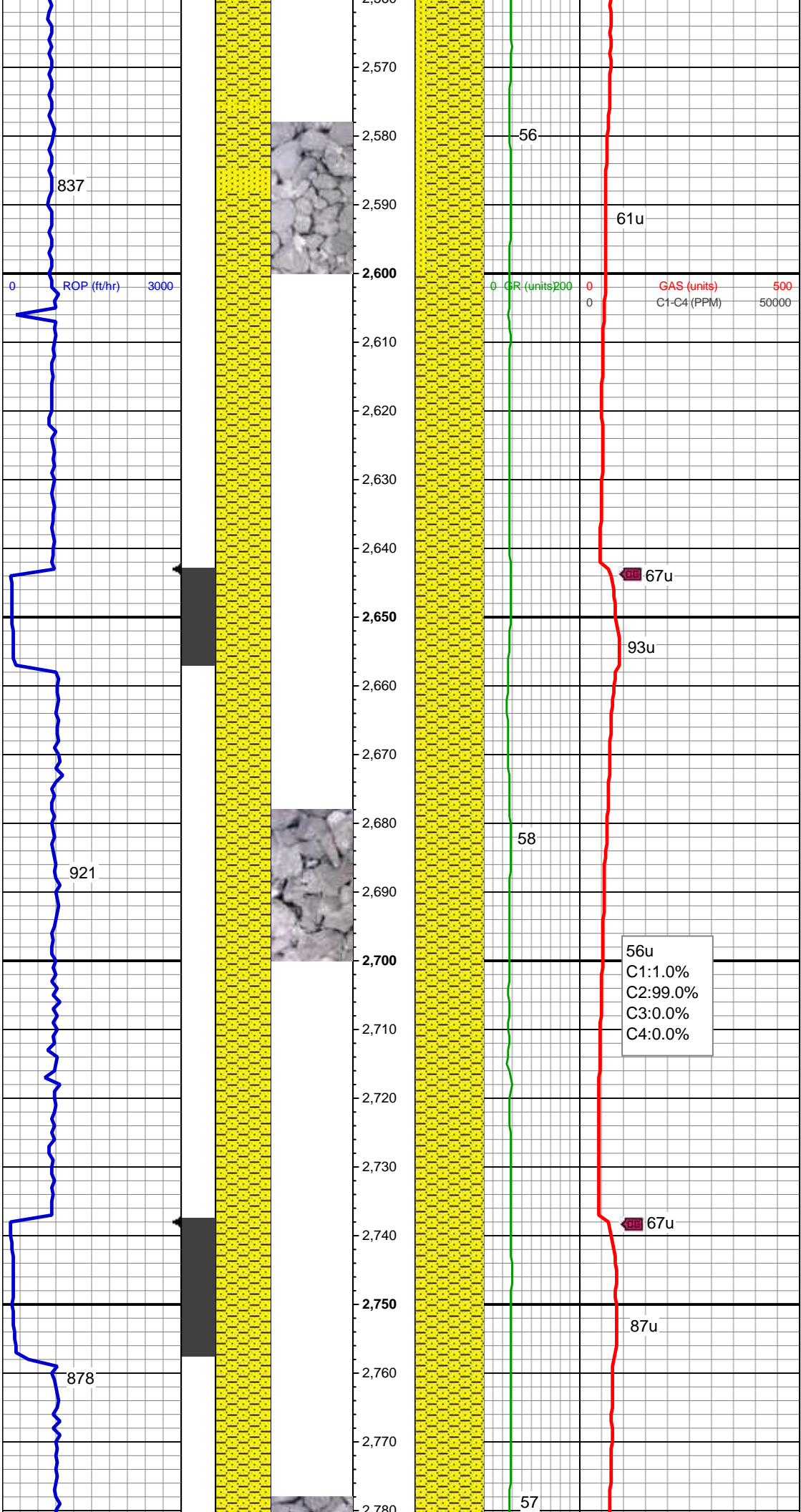
SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, glau, arg cmt, sl calc SLTY SH: lt gy-gy, mod sft-frm, sub blkly-sub plty, sandy rthy tex, sl calc

Mud Wt: 10.45 / 32 Vis

MD: 2,494'
TVD: 2,480.42'
Inclination: 12.2 °
Azimuth: 99.6 °
VS: -57'

48u
C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%

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



MD: 2,589'
TVD: 2,573.41'
Inclination: 11.4 °
Azimuth: 98.4 °
VS: -59.85'

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

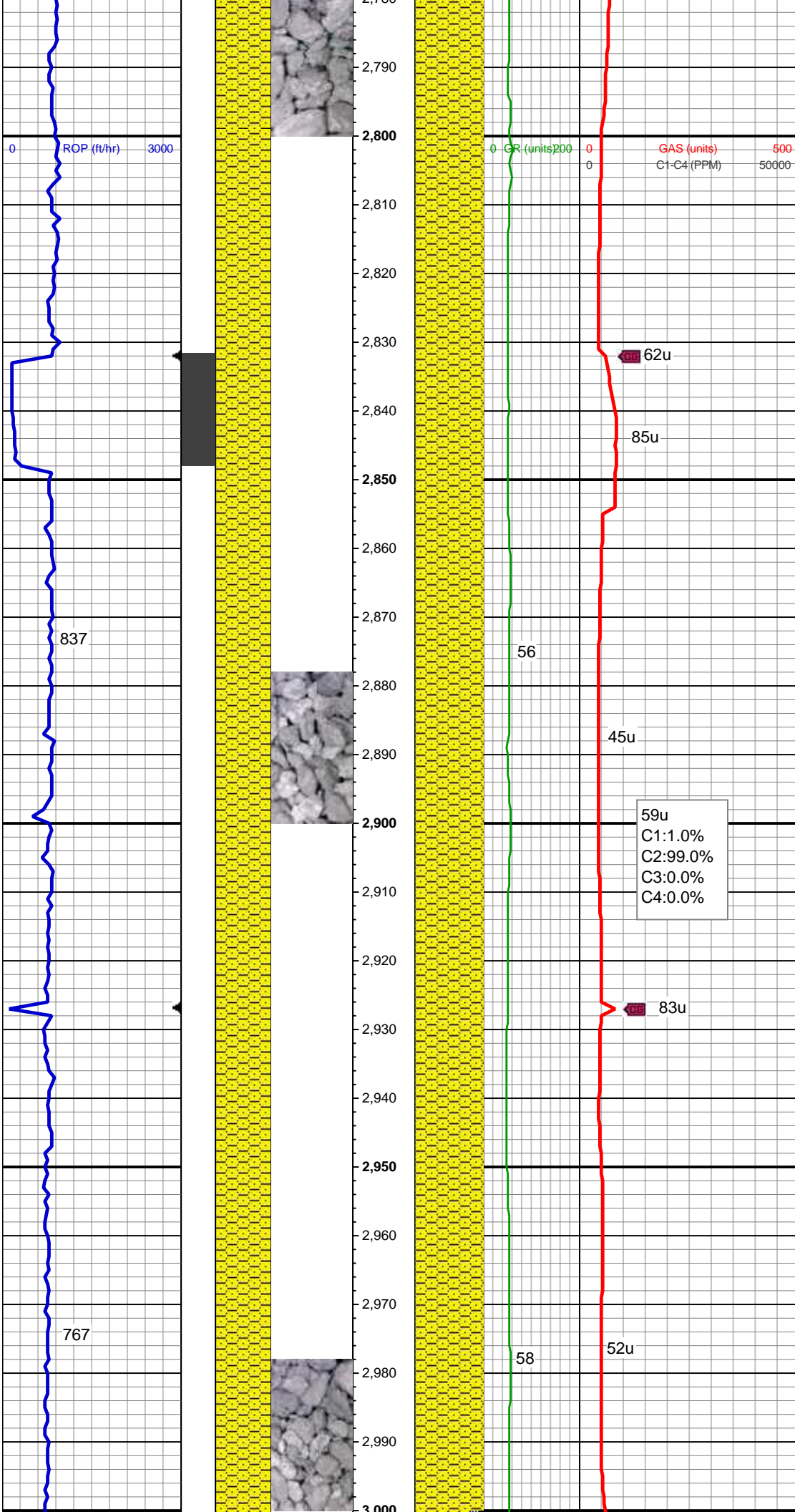
MD: 2,683'
TVD: 2,665.54'
Inclination: 11.5 °
Azimuth: 101.7 °
VS: -62.93'

Mud Wt: 8.85/ 31 Vis

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

MD: 2,778'
TVD: 2,758.74'
Inclination: 10.9 °

Azimuth: 107.5°
VS: -67.37'



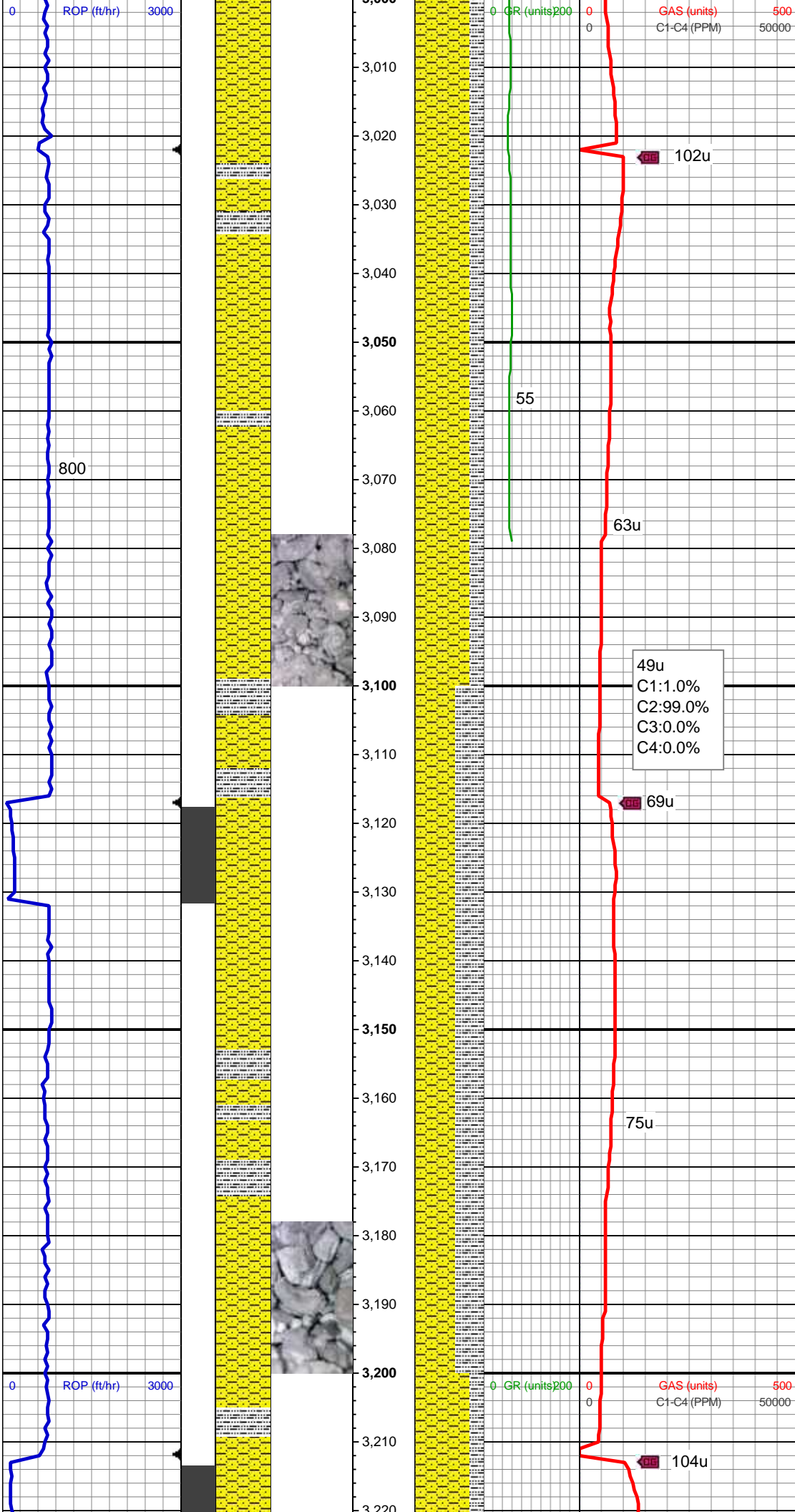
SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, glau, arg cmt, sl calc, tr ss

MD: 2,873'
TVD: 2,851.86'
Inclination: 11.9 °
Azimuth: 107.3 °
VS: -72.81'

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

MD: 2,967'
TVD: 2,943.94'
Inclination: 11.3 °
Azimuth: 104.7 °
VS: -77.85'

Mud Wt: 8.90/ 33 Vis



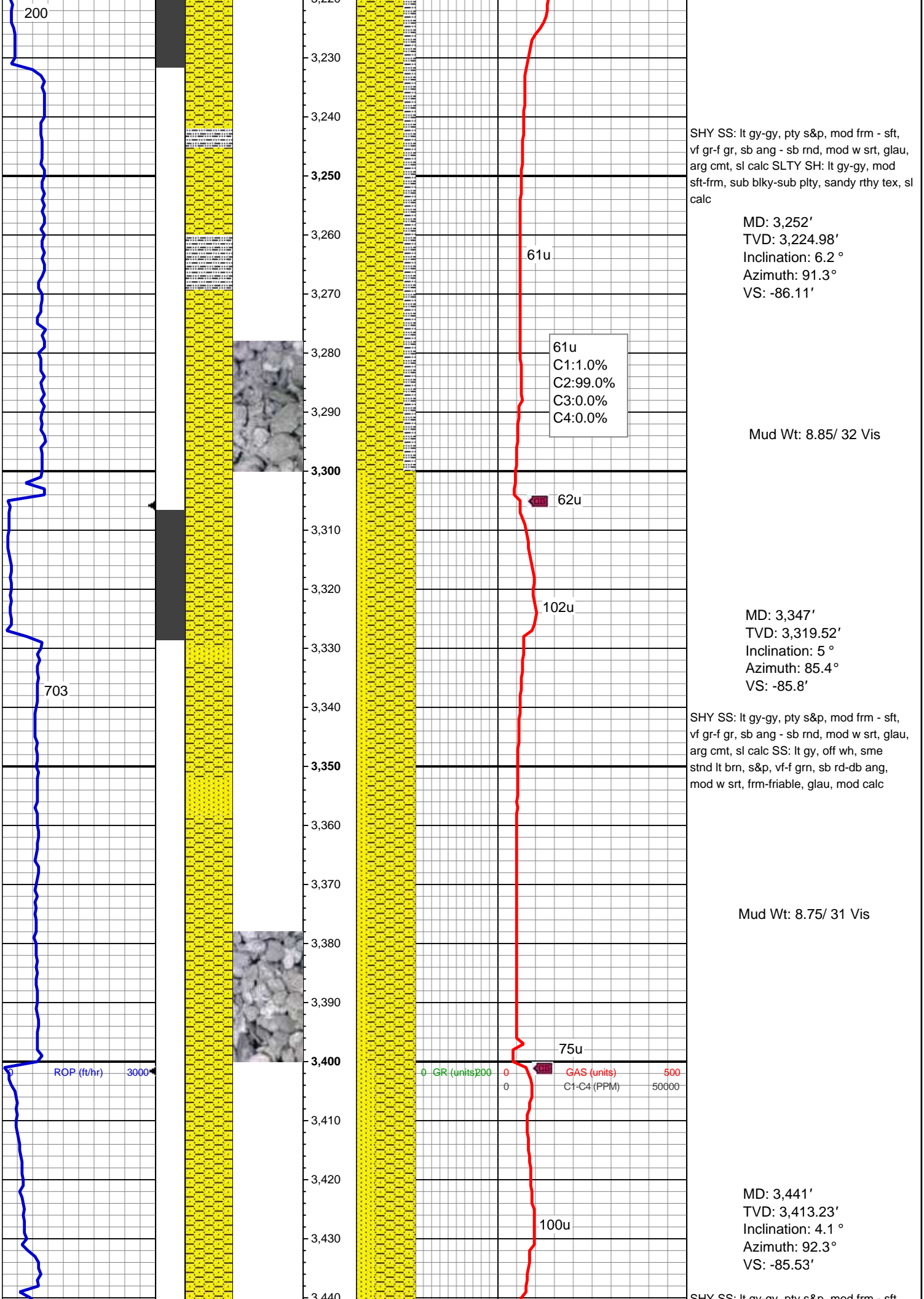
SHY SS: lt gy-gy, pty s&p, mod frm - sft,
vf gr-f gr, sb ang - sb rnd, mod w srt, glau,
arg cmt, sl calc SLTY SH: lt gy-gy, mod
sft-frm, sub blkly-sub pty, sandy rthy tex, sl
calc

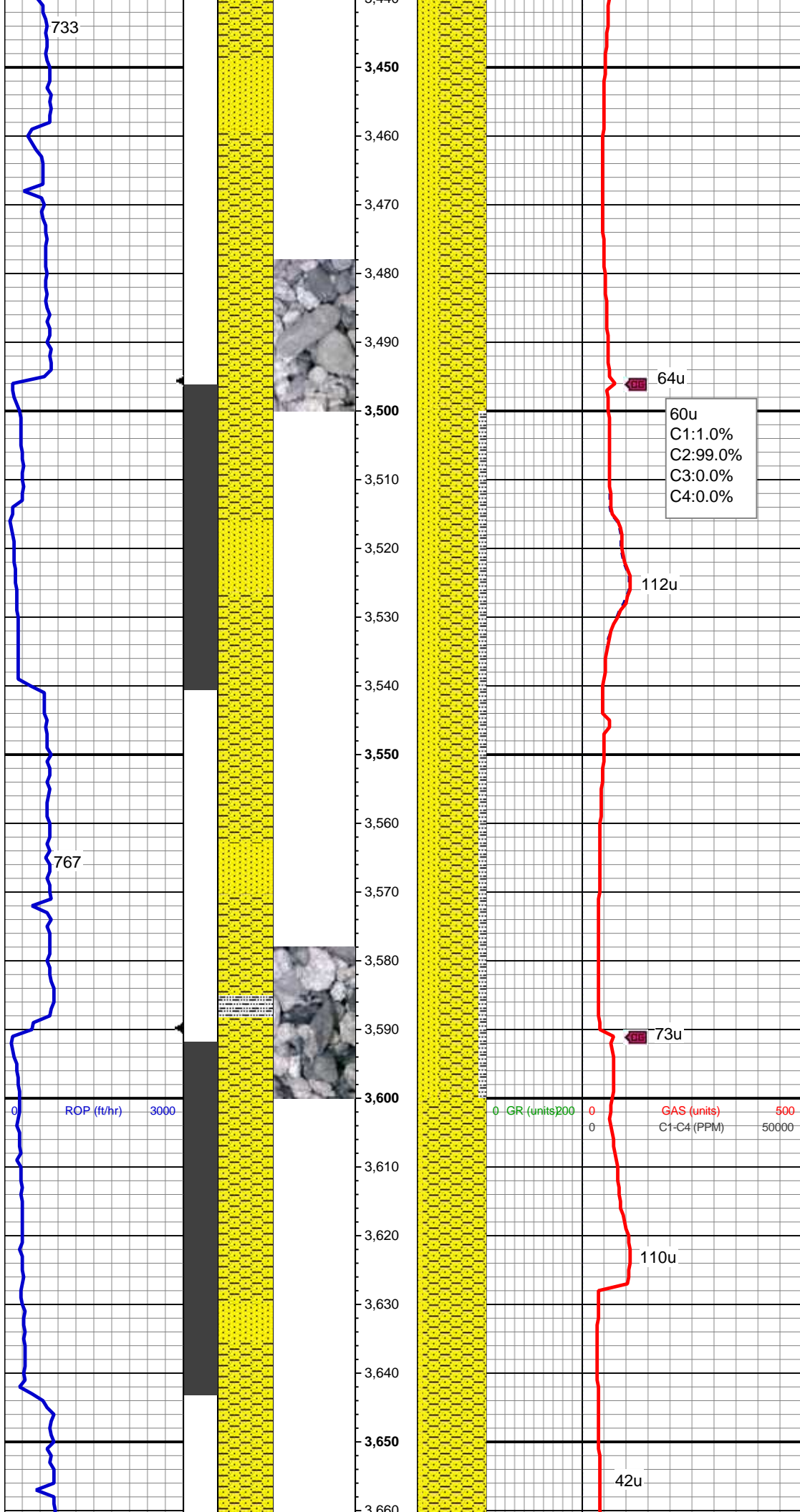
MD: 3,062'
TVD: 3,037.2'
Inclination: 10.7 °
Azimuth: 104.1 °
VS: -82.18'

SHY SS: lt gy-gy, pty s&p, mod frm - sft,
vf gr-f gr, sb ang - sb rnd, mod w srt, glau,
arg cmt, sl calc SLTY SH: lt gy-gy, mod
sft-frm, sub blkly-sub pty, sandy rthy tex, sl
calc

MD: 3,157'
TVD: 3,130.81'
Inclination: 8.9 °
Azimuth: 97.6 °
VS: -85.14'

Mud Wt: 8.90/ 33 Vis





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

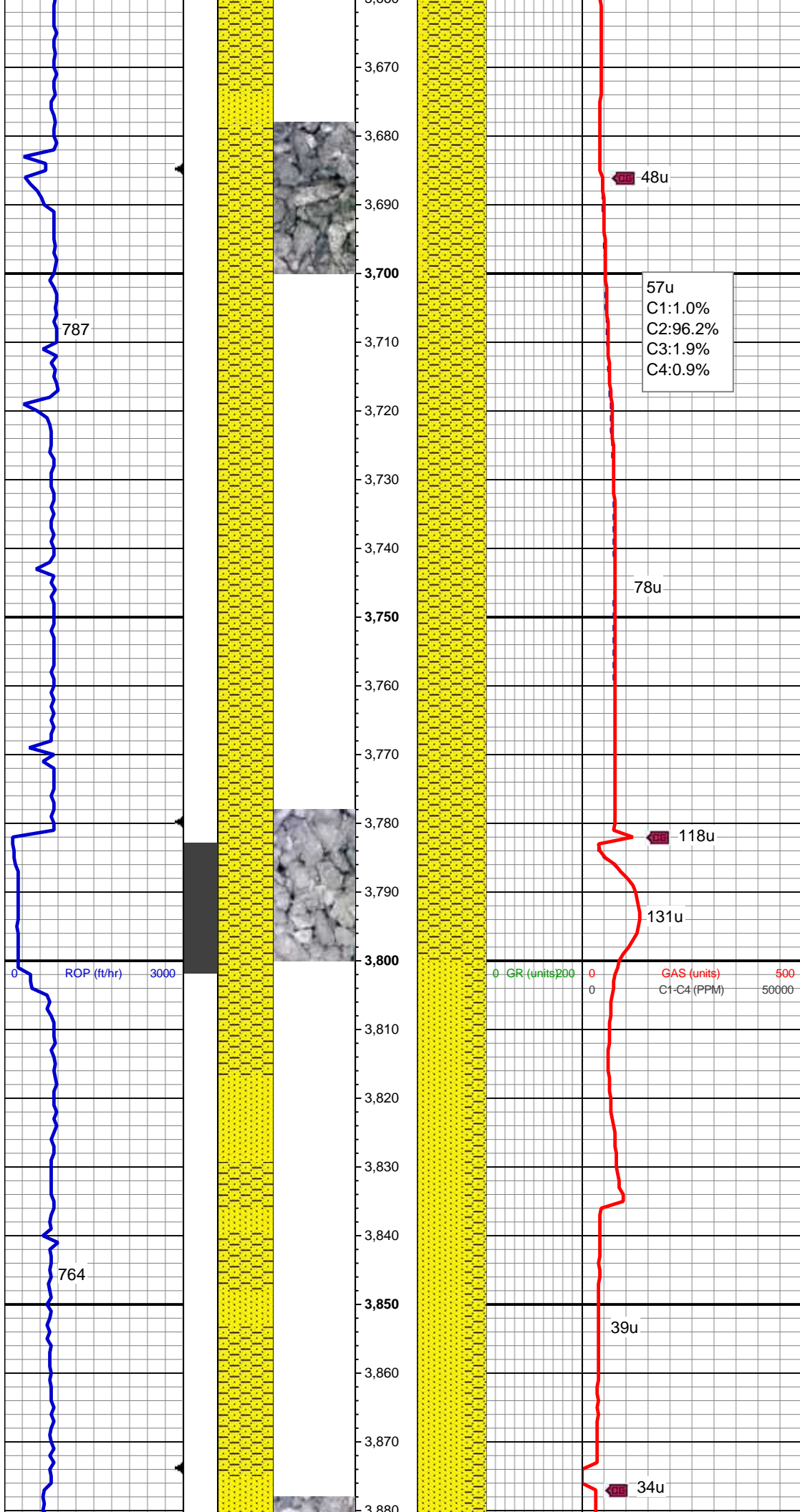
Mud Wt: 8.70/ 30 Vis

MD: 3,536'
TVD: 3,508.03'
Inclination: 3.2 °
Azimuth: 90.2 °
VS: -85.62'

SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, glau, arg cmt, sl calc SS: lt gy, off wh, sme stnd lt brn, s&p, vf-f grn, sb rd-db ang, mod w srt, frm-friable, glau, mod calc SLTY SH: lt gy-gy, mod sft-frm, sub blk-sub plty, sandy rthy tex, sl calc

MD: 3,630'
TVD: 3,601.95'
Inclination: 1.5 °
Azimuth: 121.8 °
VS: -86.24'

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



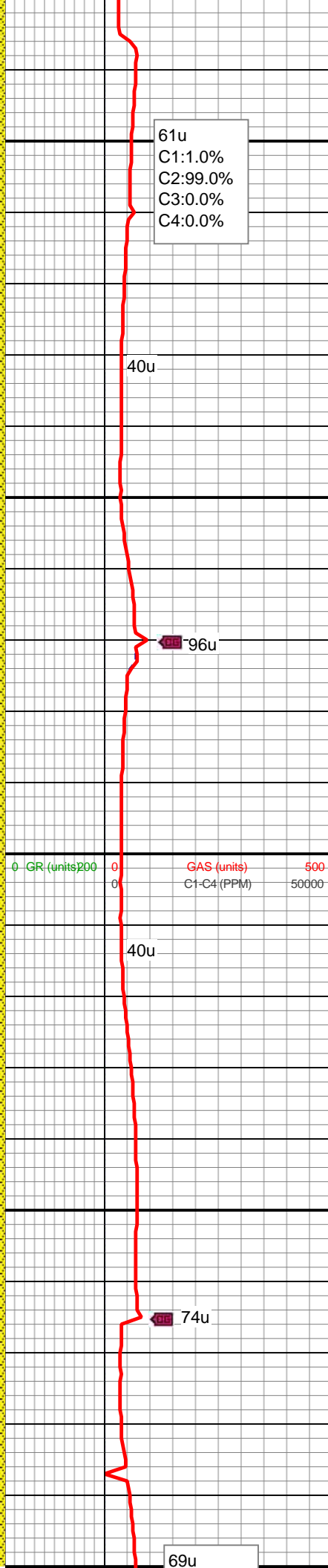
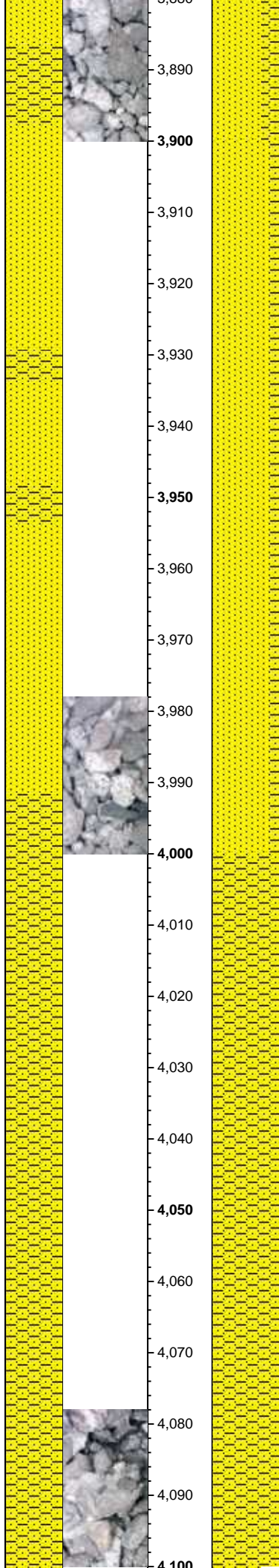
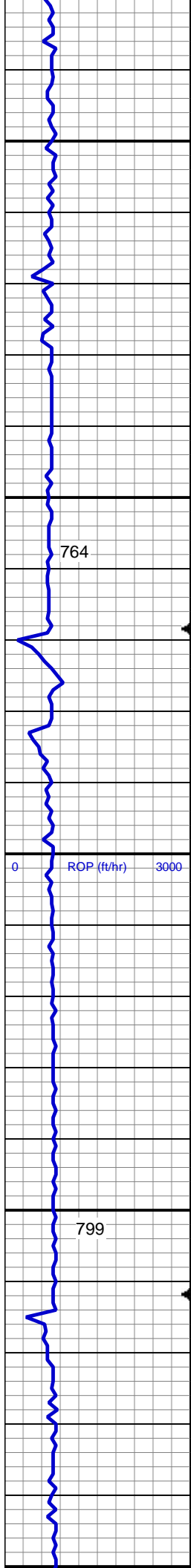
MD: 3,725'
TVD: 3,696.93'
Inclination: 1.3 °
Azimuth: 127.6°
VS: -87.53'

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

MD: 3,819'
TVD: 3,790.92'
Inclination: 0.6 °
Azimuth: 230.7°
VS: -88.49'

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

Mud Wt: 8.75/ 30 Vis



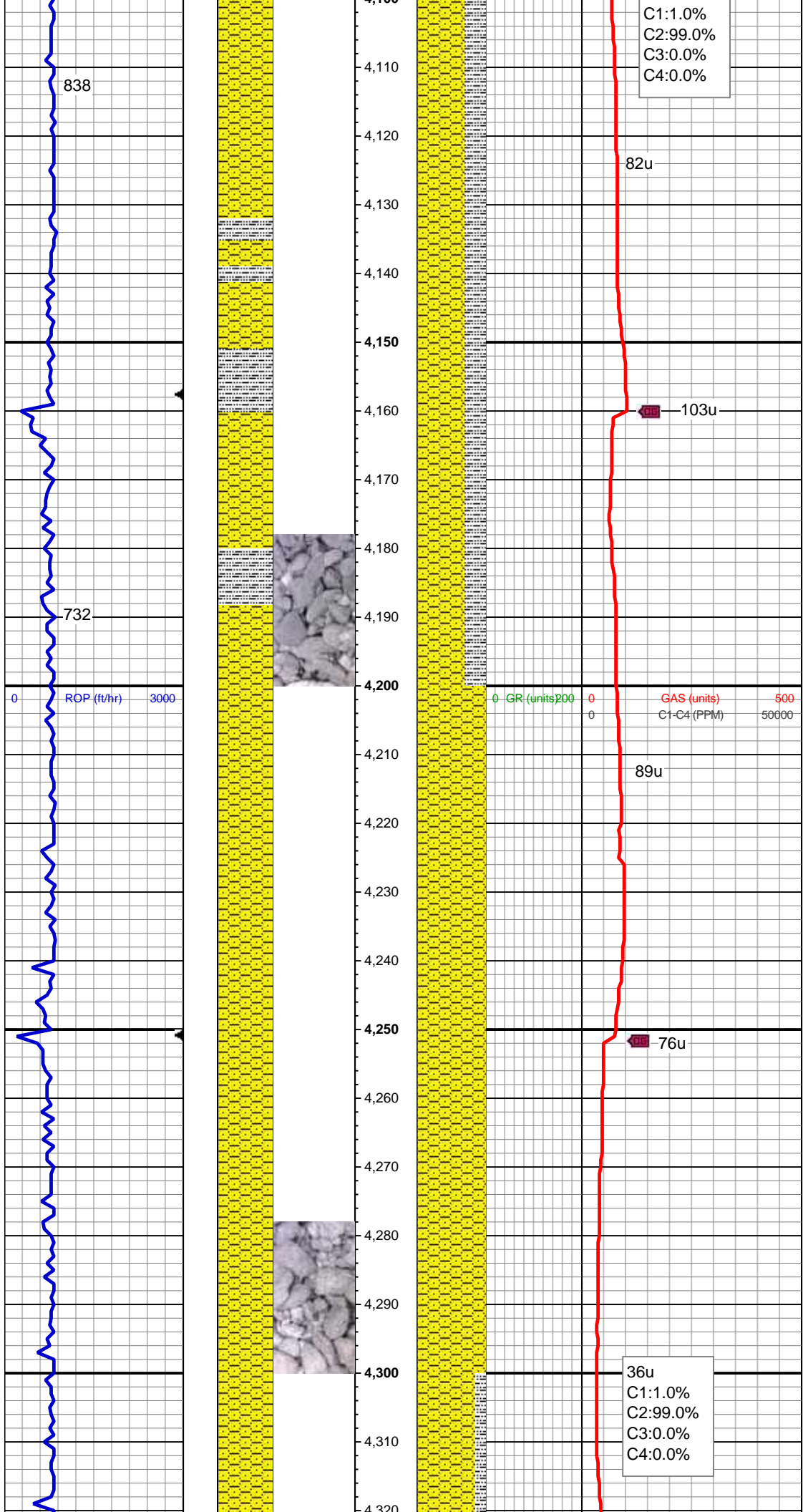
MD: 3,914'
TVD: 3,885.91'
Inclination: 1 °
Azimuth: 242.3°
VS: -89.2'

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

MD: 4,008'
TVD: 3,979.9'
Inclination: 0.7 °
Azimuth: 248.3°
VS: -89.81'

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

MD: 4,102'
TVD: 4,073.89'



C1:1.0%
C2:99.0%
C3:0.0%
C4:0.0%

Inclination: 0.4 °
Azimuth: 229.4 °
VS: -90.24'

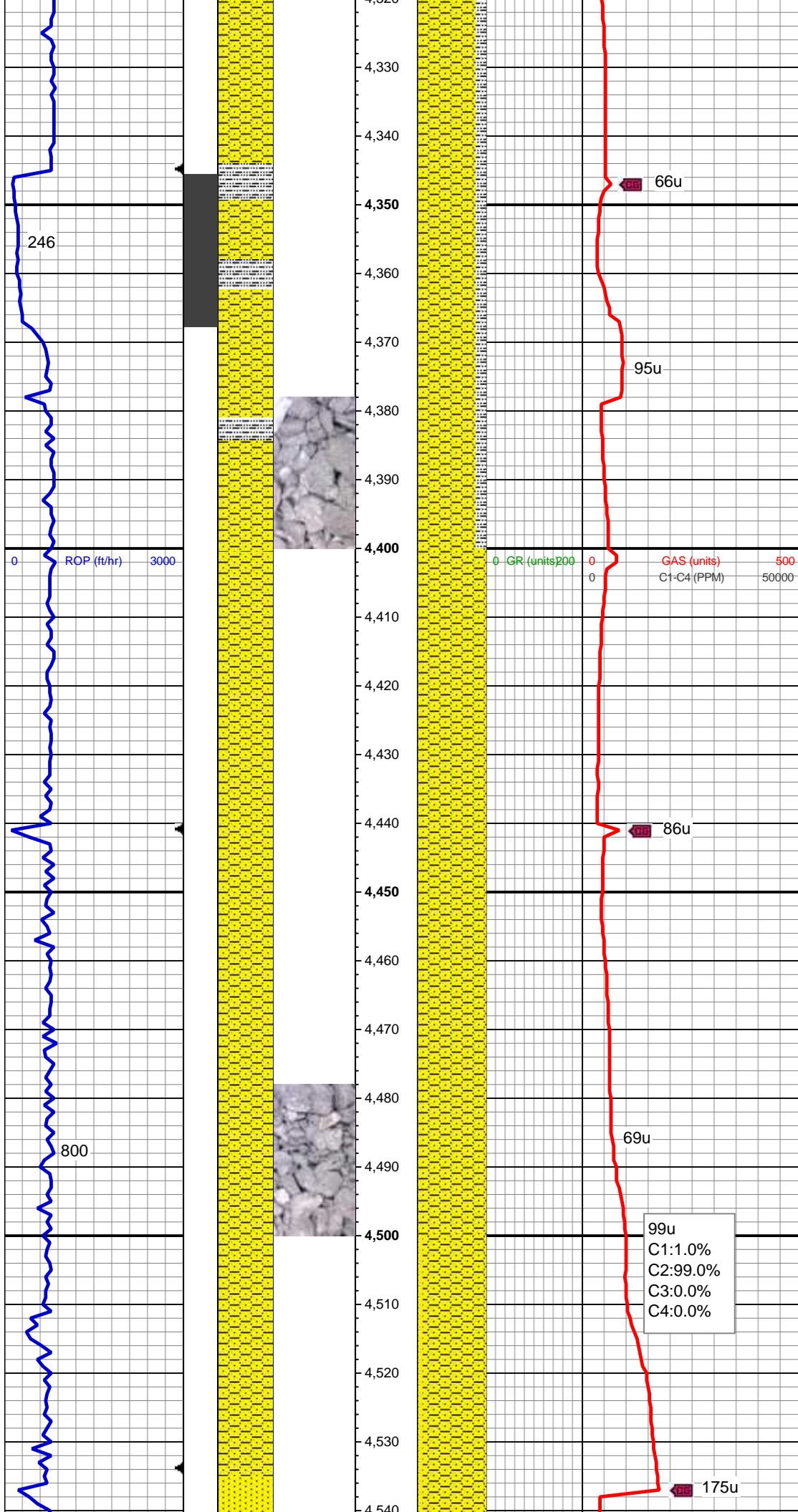
SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, glau, arg cmt, sl calc
SLTY SH: lt gy-gy, mod sft-frm, sub blk-sub pty, sandy rthy tex, sl calc

MD: 4,197'
TVD: 4,168.89'
Inclination: 0.3 °
Azimuth: 295 °
VS: -90.36'

SLTY SH: lt gy-gy, mod sft-frm, sub blk-sub pty, sandy rthy tex, sl calc

MD: 4,291'
TVD: 4,262.89'
Inclination: 0.5 °
Azimuth: 98.4 °
VS: -90.31'

36u
C1:1.0%
C2:99.0%
C3:0.0%
C4:0.0%



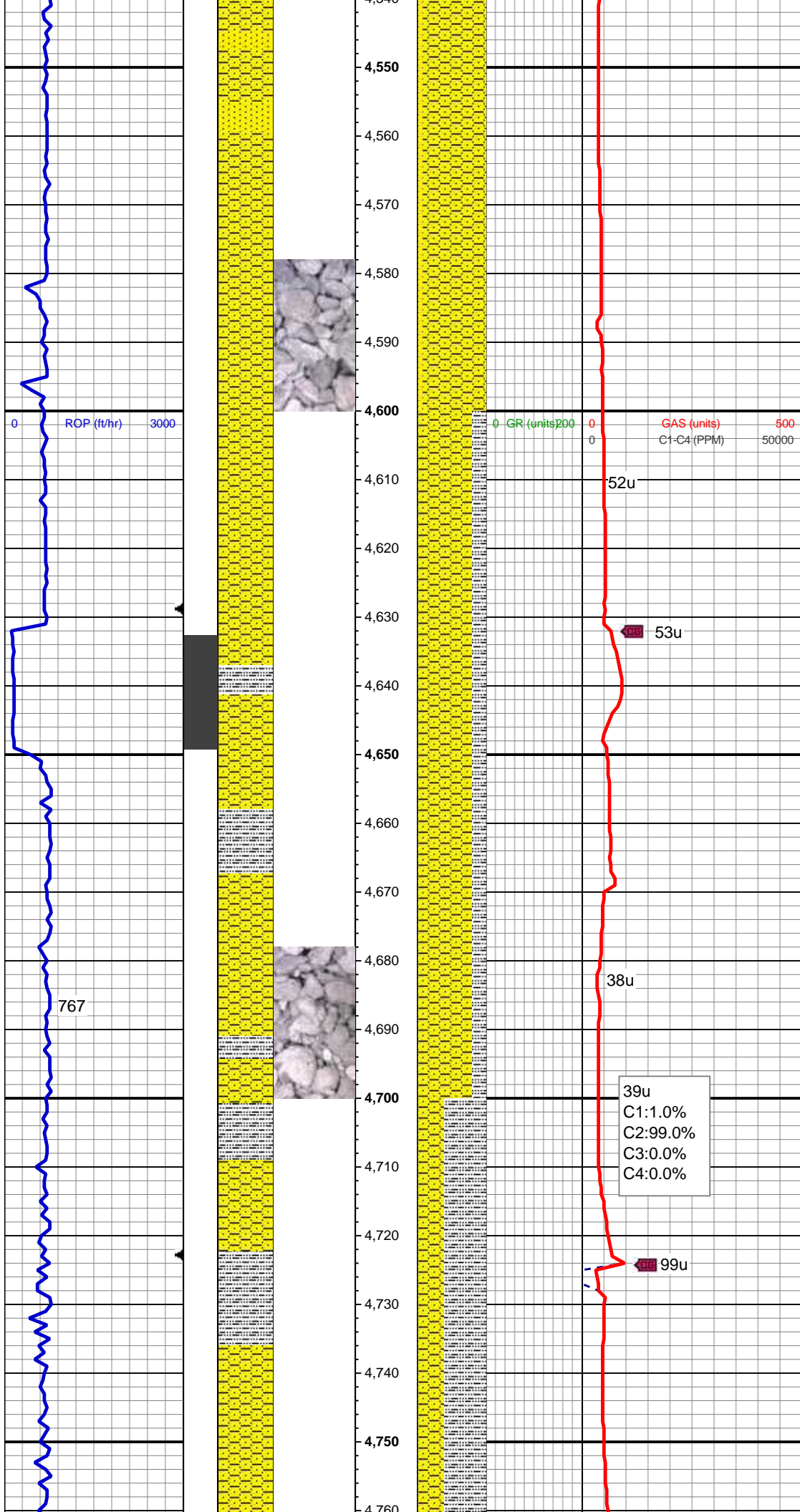
SHY SS: lt gy-gy, pty s&p, mod frm - sft,
vf gr-f gr, sb ang - sb rnd, mod w srt, glau,
arg cmt, sl calc SLTY SH: lt gy-gy, mod
sft-frm, sub blk-sub pty, sandy rthy tex, sl
calc

MD: 4,386'
TVD: 4,357.89'
Inclination: 1.1 °
Azimuth: 276.4 °
VS: -90.28'

SLTY SH: lt gy-gy, mod sft-frm, sub
blk-sub pty, sandy rthy tex, sl calc

MD: 4,480'
TVD: 4,451.86'
Inclination: 1.8 °
Azimuth: 264.1 °
VS: -90.35'

99u
C1:1.0%
C2:99.0%
C3:0.0%
C4:0.0%

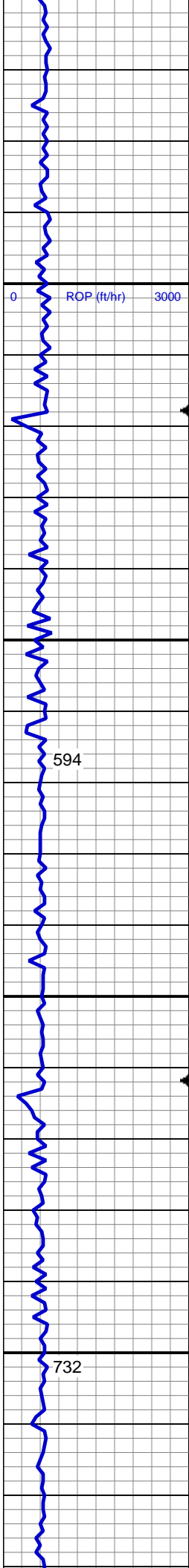


SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, glau, arg cmt, sl calc SS: lt gy, off wh, sme stnd lt brn, s&p, vf-f grn, sb rd-db ang, mod w srt, frm-friable, glau, mod calc

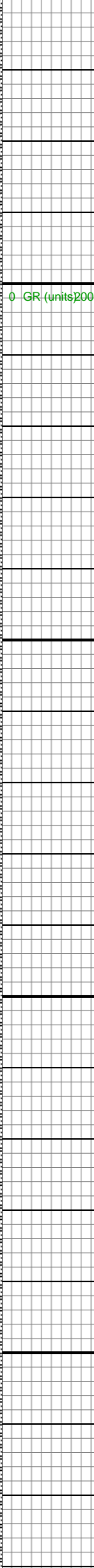
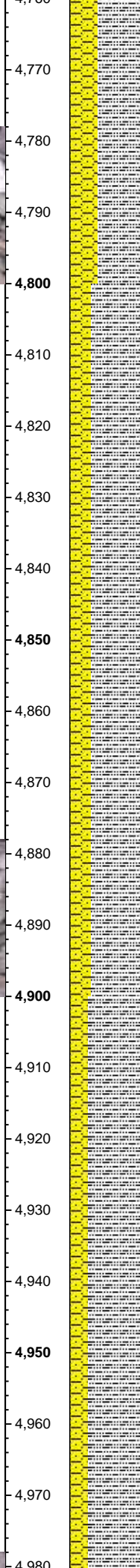
Mud Wt: 8.75/ 32 Vis

SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, glau, arg cmt, sl calc SLTY SH: lt gy-gy, mod sft-frm, sub blk-sub pty, sandy rthy tex, sl calc

SLTY SH: lt gy-gy, mod sft-frm, sub blk-sub pty, sandy rthy tex, sl calc SHY SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, glau, arg cmt, sl calc



MD: 4,764'
TVD: 4,735.72'
Inclination: 2 °
Azimuth: 230.8 °
VS: -92.9'



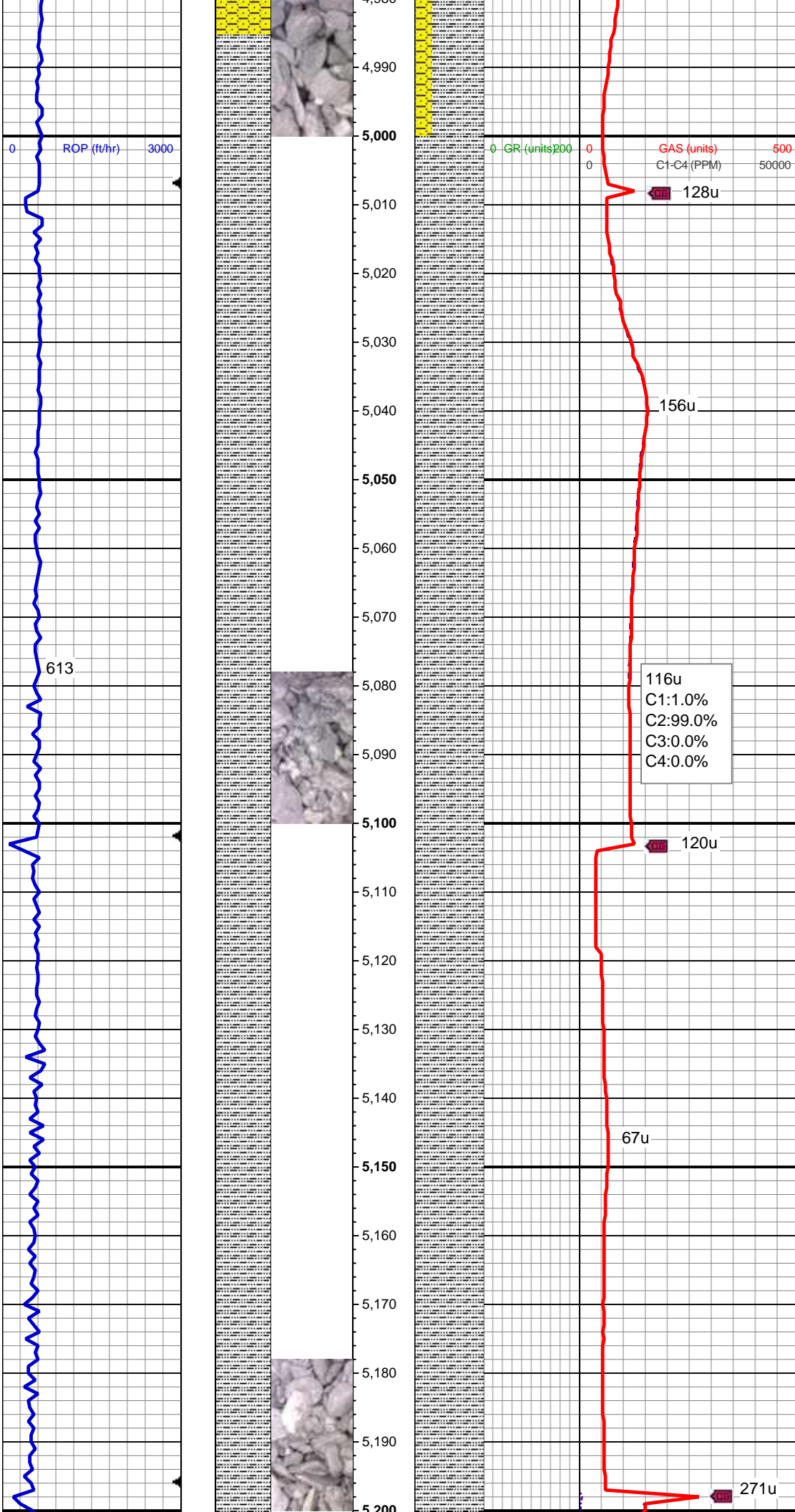
MD: 4,858'
TVD: 4,829.66'
Inclination: 1.9 °
Azimuth: 220.1 °
VS: -95.15'

SLTY SH: lt gy-gy, mod sft frm, sub blkly-sub plty, sandy rthy tex, sl calc SHY
SS: lt gy-gy, pty s&p, mod frm - sft, vf gr-f gr, sb ang - sb rnd, mod w srt, glau, arg cmt, sl calc

Mud Wt: 8.95/ 34 Vis

MD: 4,953'
TVD: 4,924.63'
Inclination: 1.4 °
Azimuth: 220.1 °
VS: -95.15'

Azimuth: 193.2°
VS: -97.49'



MD: 5,047'
TVD: 5,018.61'
Inclination: 1 °
Azimuth: 199.5°
VS: -99.39'

SLTY SH: lt gy-gy, mod sft frm, sub
bkly-sub pty, sandy rthy tex, sl calc, tr shy
ss

MD: 5,142'
TVD: 5,113.59'
Inclination: 0.7 °
Azimuth: 199.9°
VS: -100.72'

SLTY SH: lt gy-gy, mod sft frm, sub
bkly-sub pty, sandy rthy tex, sl calc, tr shy
ss

