

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name Rohn State LD03-66-1HN

Location SENE SEC 4 T9N R58W

State COLORADO

County WELD

Country USA

Rig Number H&P 273

API Number 05-123-37458

Region DJ BASIN

Field WILDCAT

Spud Date 8/25/2014

Drilling Completed 8/29/2014

Surface Coordinates 1825' FNL; 330' FEL

Ground Elevation 4,705'

K.B. Elevation 4729'

Logged Interval 1224' **To** 4992'

Total Depth 4992'

Formation NIOBRARA

Type of Drilling Fl... LSND

Operator

Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202

Geologist

Name RENEE CLACKER

Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202

Rock Types

UNKNOWN
CHALK
MARLSTONE

CEMENT
CHERT
CLAY CHOKE SAND

IGNEOUS
LIMESTONE
SIDERITE or LIMONITE

SHALE GRAY
SHALY SILTSTONE
SILTSTONE

SANDSTONE
 SHALY SANDSTONE
 SILTY SHALE
 ANHYDRITE
 BENTONITE
 BRECCIA

CLAYSTONE
 COAL
 CONGLOMERATE
 DOLOMITE
 GRANITE
 GYPSUM

METAMORPHIC
 NO SAMPLE
 SALT
 SALT- PEPPER SAND
 SHALE
 SHALE COLORED

TILL
 TUFF
 WELDED TUFF

Accessories

Fossils

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

Fossils

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
 S SUBANG
 r SUBRND

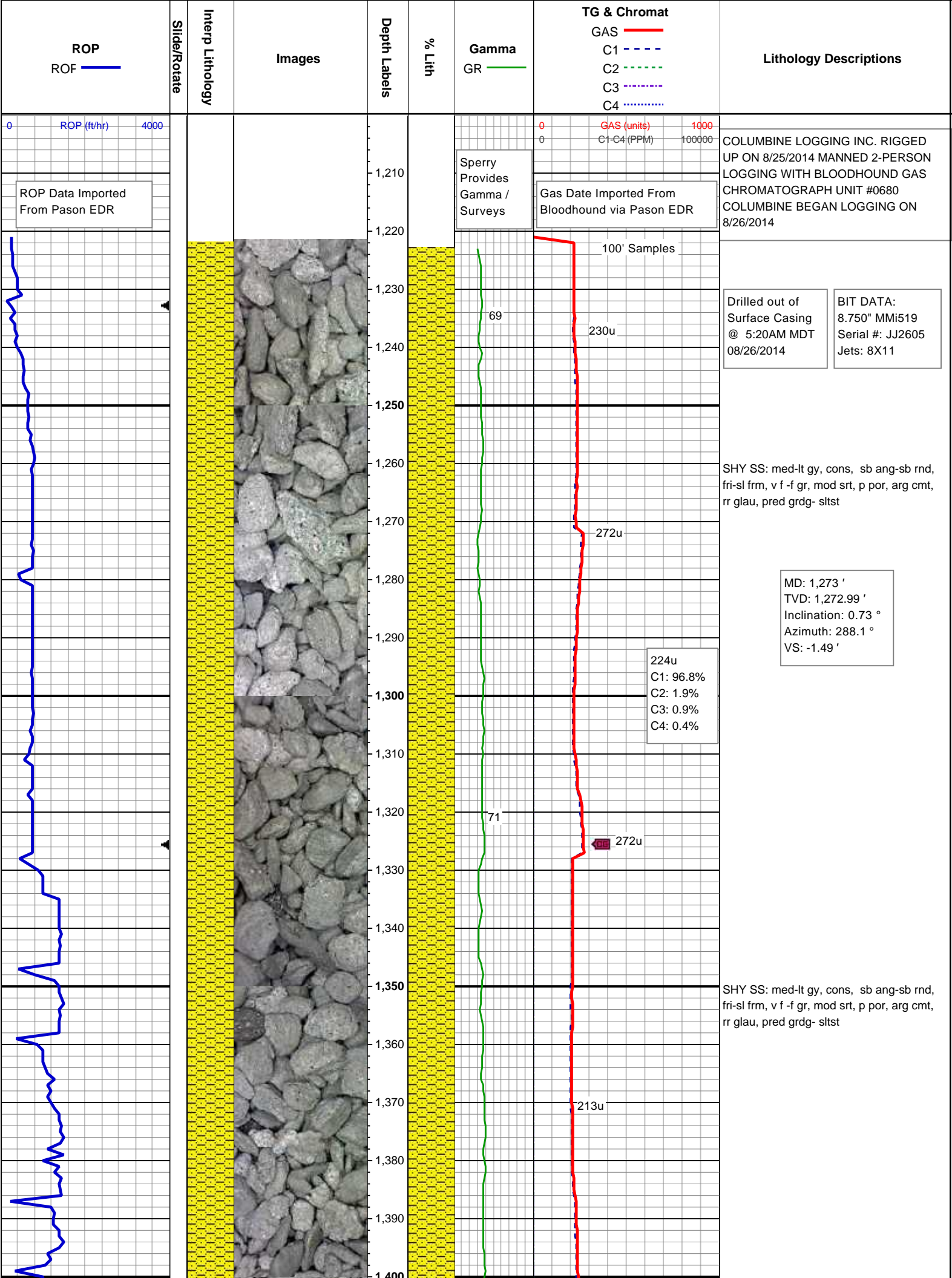
Textures

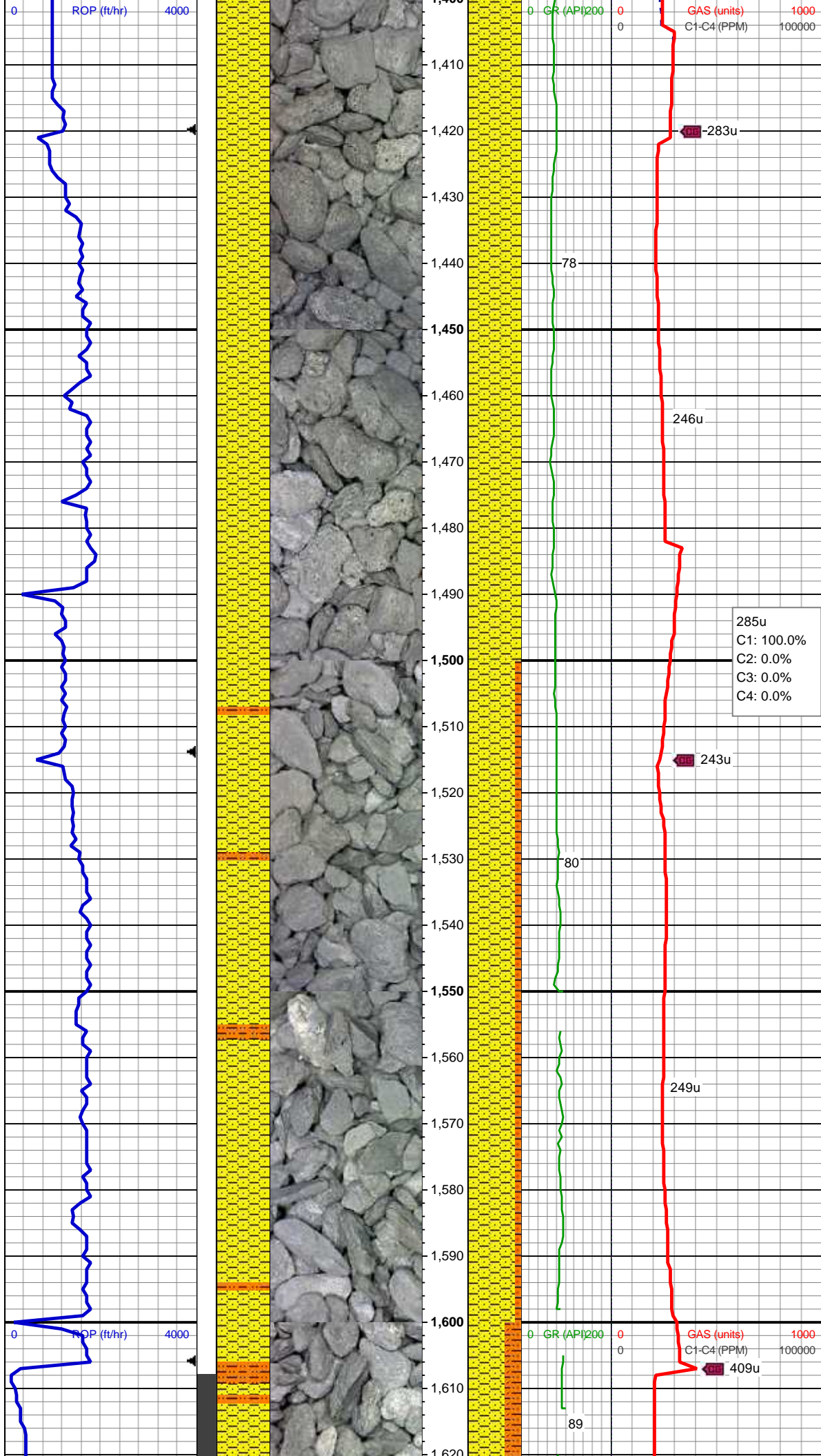
B BOUNDSTONE
 C CHALKY
 CX CRYPTOXLN

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

Sorting

M MODERATE
 P POOR
 W WELL





MD: 1,458 '
TVD: 1,457.97 '
Inclination: 0.74 °
Azimuth: 288.73 °
VS: -3.8 '

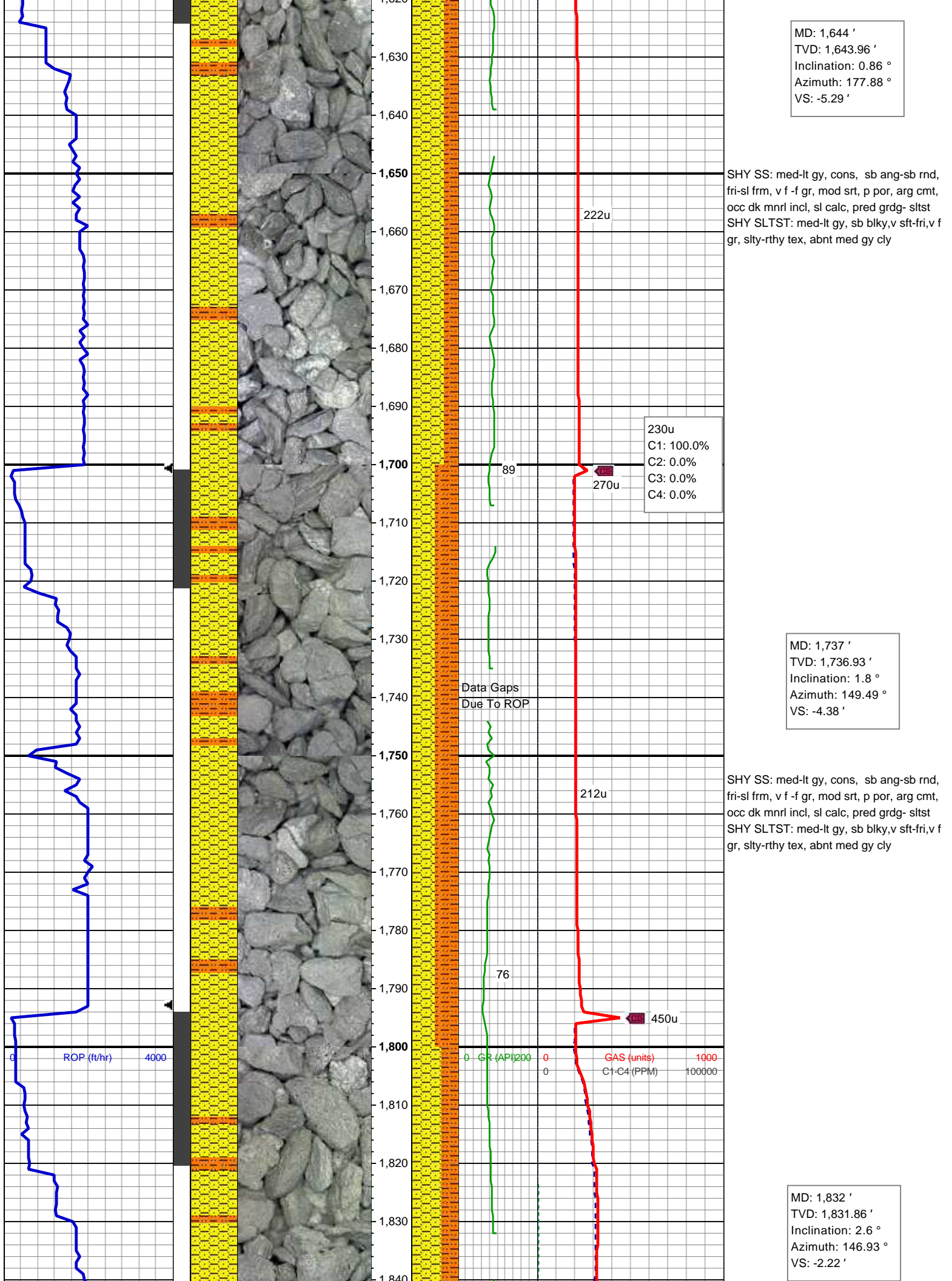
SHY SS: med-lt gy, cons, sb ang-sb rnd, fri-sl frm, v f -f gr, mod srt, p por, arg cmt, rr glau, pred grdg- sltst

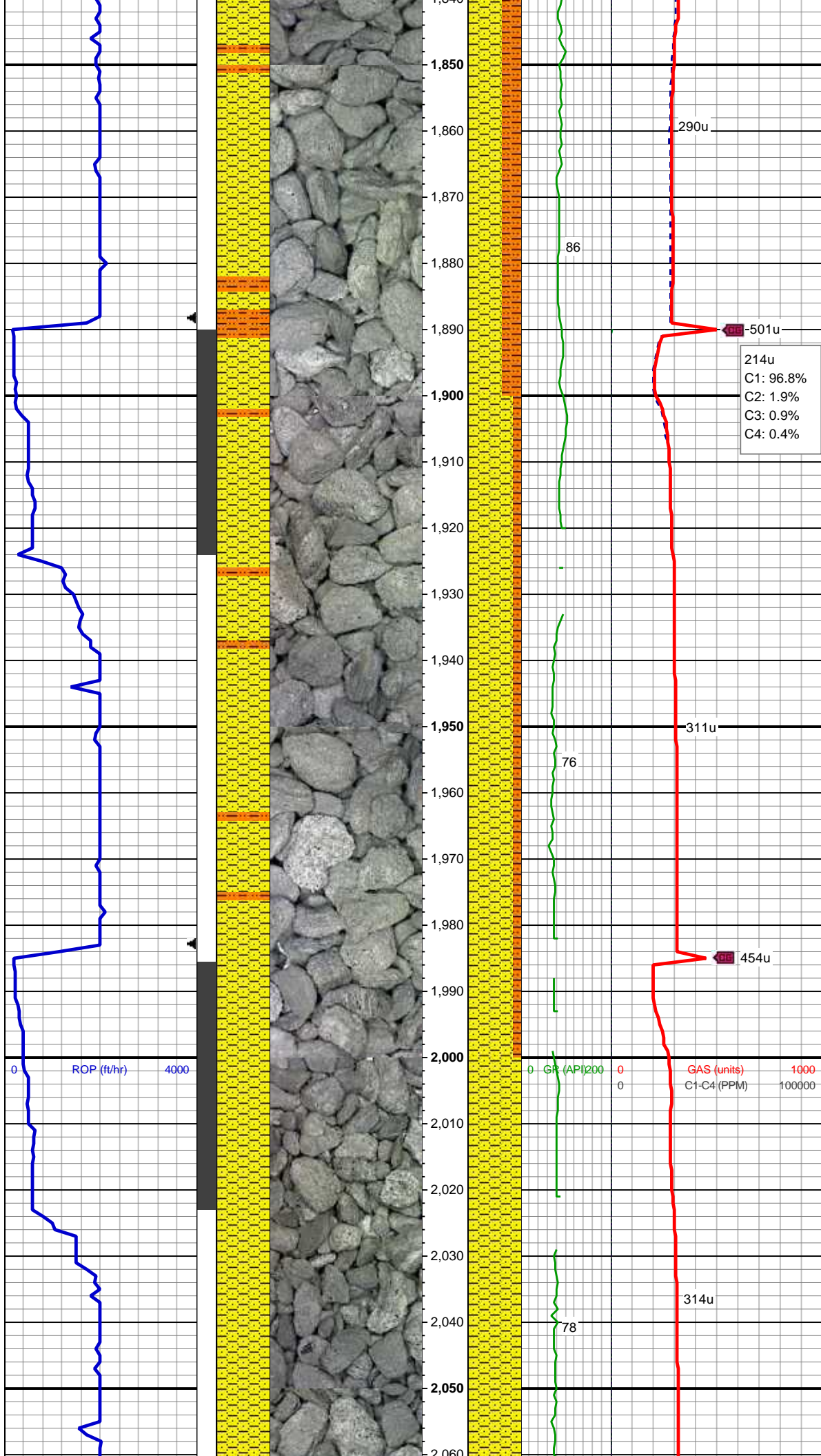
285u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

SHY SS: med-lt gy, cons, sb ang-sb rnd, fri-sl frm, v f -f gr, mod srt, p por, arg cmt, rr glau, pred grdg- sltst

SHY SLTST: med-lt gy, sb blkly, v sft-fri, v f gr, slty-rthy tex, abnt med gy cly

MD: 1,551 '
TVD: 1,550.96 '
Inclination: 0.61 °
Azimuth: 281.62 °
VS: -4.88 '





SHY SS: med-lt gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
occ dk mnrl incl, sl calc, pred grdg- sltst
SHY SLTST: med-lt gy, sb blkgy,v sft-fri,v f
gr, slty-rthy tex, abnt med gy cly

MD: 1,926 '
TVD: 1,925.69 '
Inclination: 4.36 °
Azimuth: 151.45 °
VS: 1.02 '

SHY SS: med-lt gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
rr glau, occ grdg- sltst
SHY SLTST: med-lt gy, sb blkgy,v sft-fri,v f
gr, slty-rthy tex, abnt med gy cly

MD: 2,021 '
TVD: 2,020.29 '
Inclination: 6.09 °
Azimuth: 152.96 °
VS: 5.6 '

SHY SS: med-lt gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
rr glau, sl calc, occ grdg- sltst, abnt med
gy cly

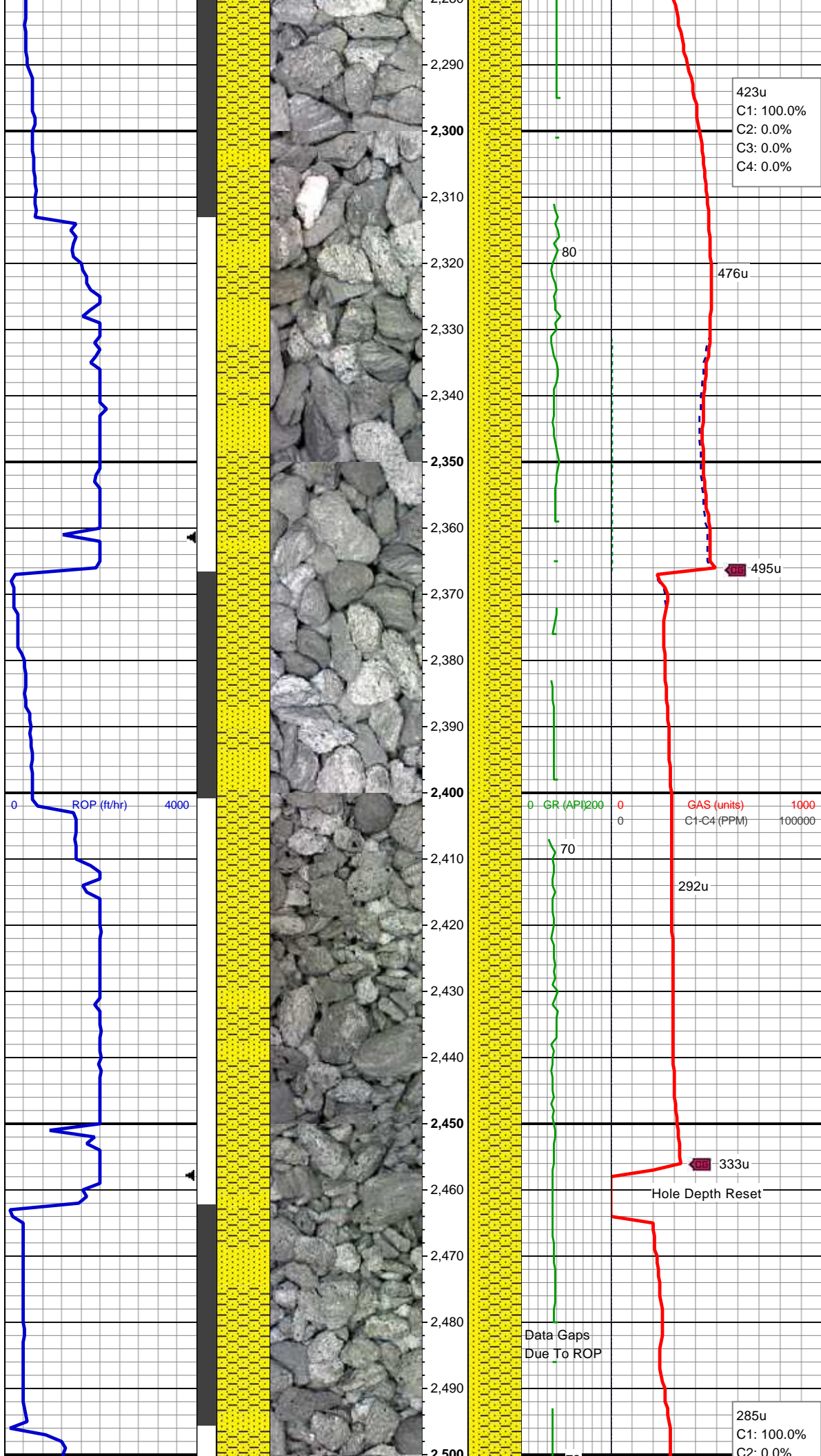


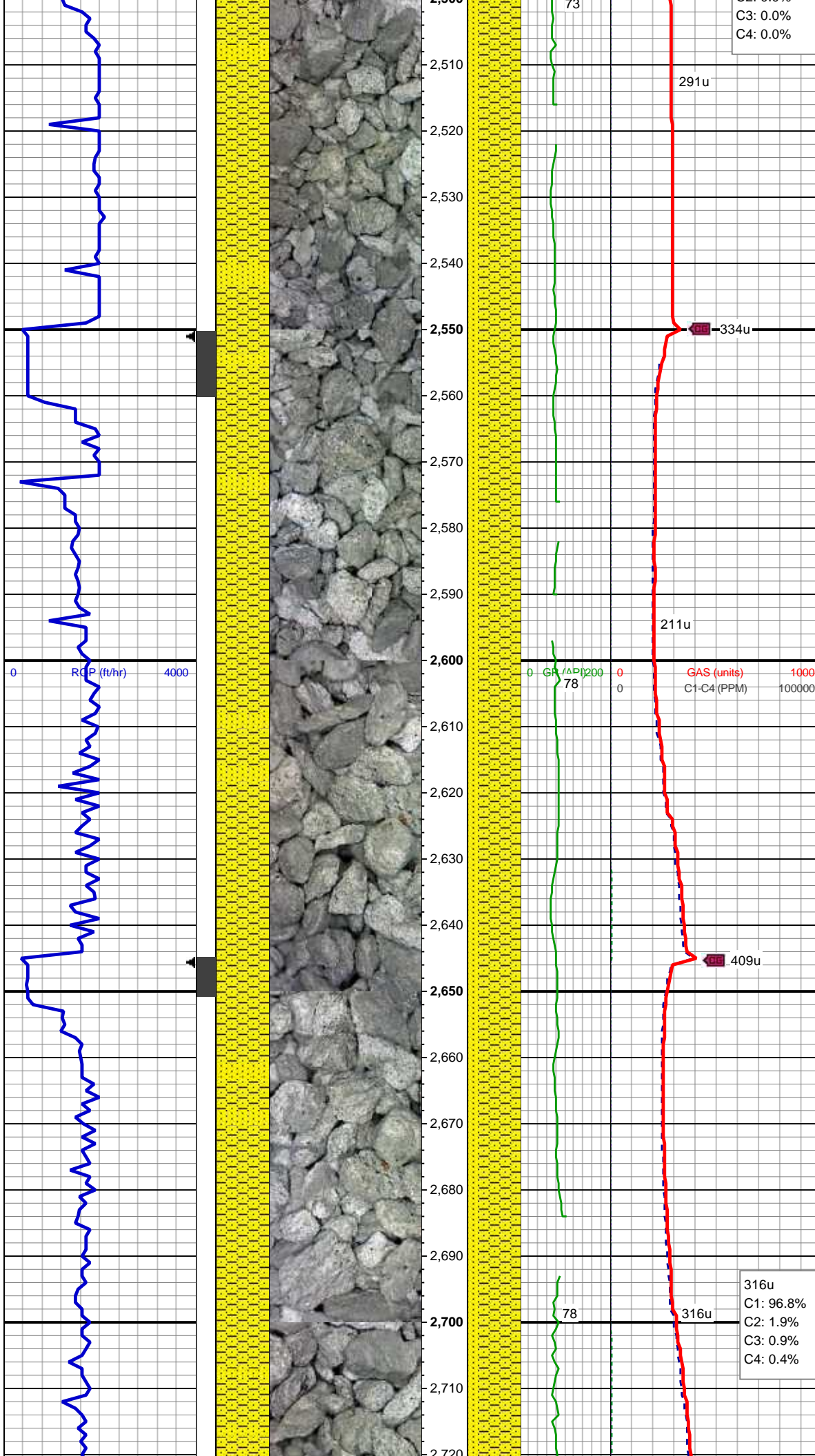
MD: 2,116 '
TVD: 2,114.56 '
Inclination: 8.08 °
Azimuth: 151.1 °
VS: 11.88 '

SHY SS: med-lt gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
rr glau, decr cly

MD: 2,210 '
TVD: 2,207.44 '
Inclination: 9.6 °
Azimuth: 150.29 °
VS: 19.89 '

SHY SS: med-lt gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
rr glau, bdd wi ss
SS: wh wi occ grdg - lt gy, sb ang- sb rnd,
predy cons, frm clus, f gr, tr glau, sl calc





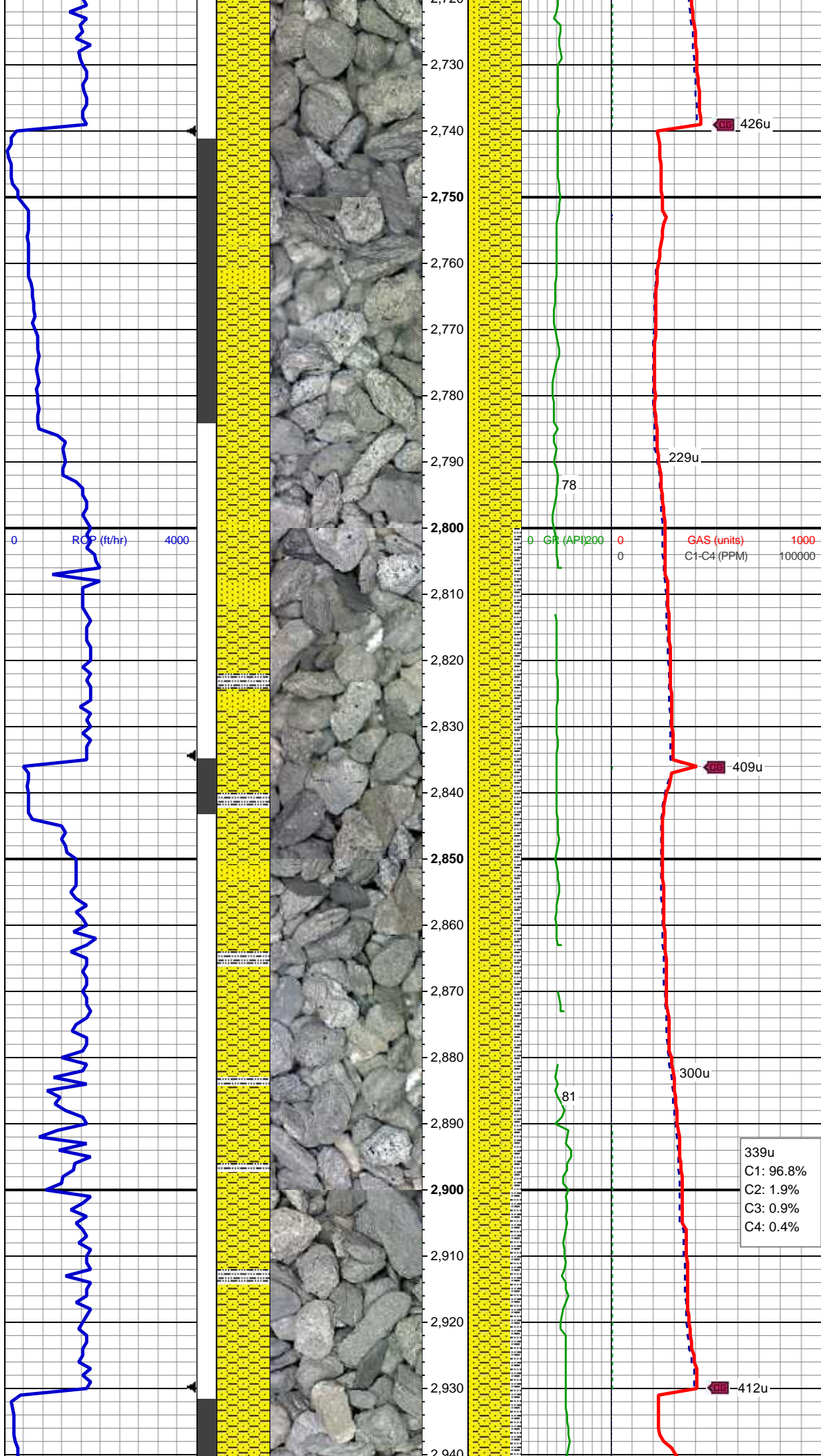
SHY SS: med-lt gy, cons, sb ang-sb rnd, fri-sl frm, v f -f gr, mod srt, p por, arg cmt, rr glau, bdd wi ss
SS: wh wi occ grdg - lt gy, sb ang- sb rnd, predy cons, frm clus, f gr, tr glau, sl calc

MD: 2,589 '
TVD: 2,578.33 '
Inclination: 13.07 °
Azimuth: 153.24 °
VS: 61.16 '

SHY SS: med-lt gy, cons, sb ang-sb rnd, fri-sl frm, v f -f gr, mod srt, p por, arg cmt, rr glau, bdd wi ss
SS: wh wi occ grdg - lt gy, sb ang- sb rnd, predy cons, frm clus, f gr, tr glau, sl calc

MD: 2,684 '
TVD: 2,671.07 '
Inclination: 11.95 °
Azimuth: 152.3 °
VS: 71.92 '

316u
C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%



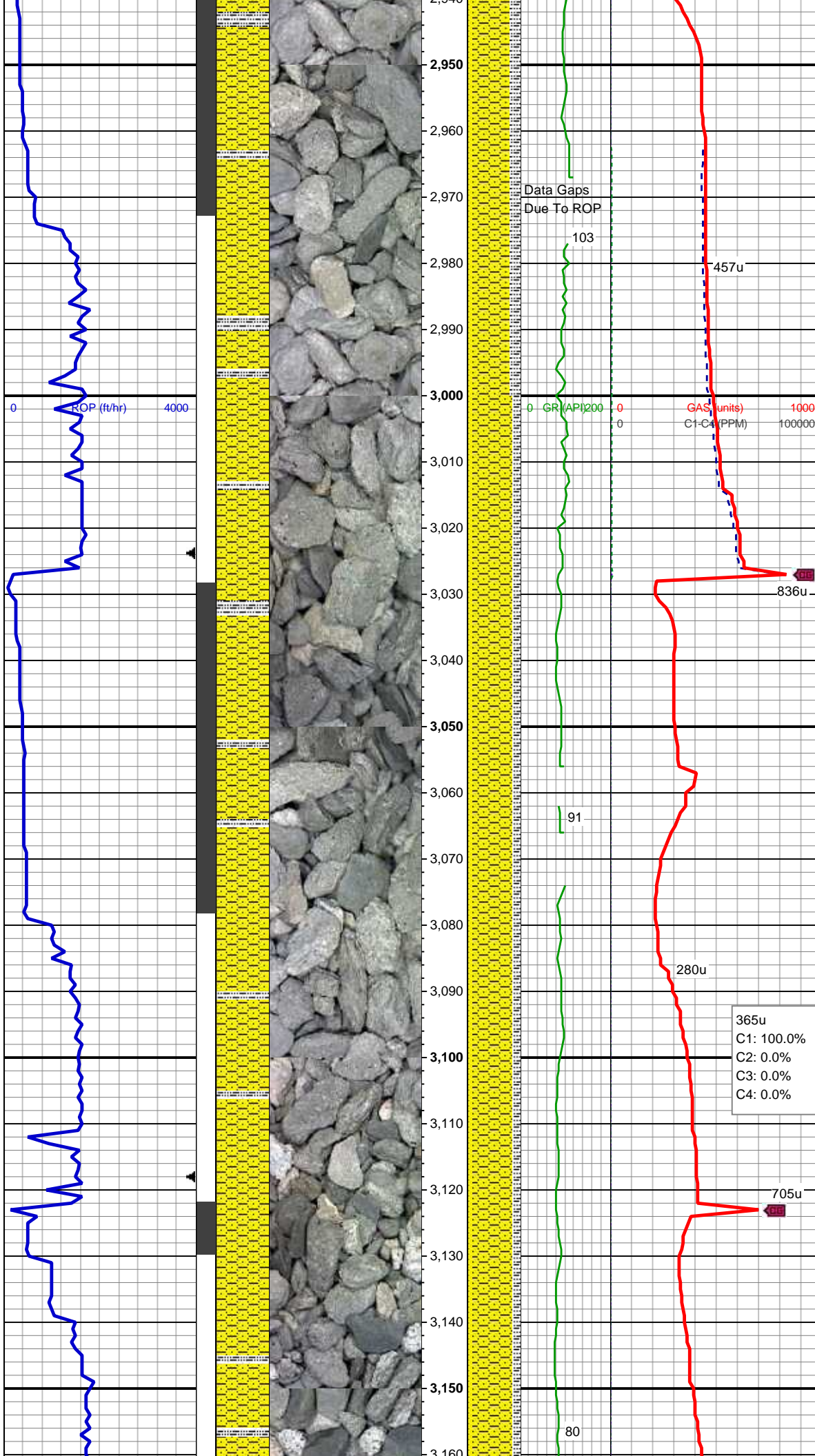
SHY SS: med-lt gy, cons, sb ang-sb rnd, fri-sl frm, v f -f gr, mod srt, p por, arg cmt, rr glau, bdd wi ss
SS: wh wi occ grdg - lt gy, sb ang- sb rnd, predy cons, frm clus, f gr, tr glau, sl calc

MD: 2,779 '
TVD: 2,763.79 '
Inclination: 13.19 °
Azimuth: 156.2 °
VS: 82.25 '

SHY SS: med-lt gy, cons, sb ang-sb rnd, fri-sl frm, v f -f gr, mod srt, p por, arg cmt, rr glau, bdd wi ss
SS: wh wi occ grdg - lt gy, sb ang- sb rnd, predy cons, frm clus, f gr, tr glau, sl calc
SLTY SH: gy-dk gy, sb blk- sb ply, sft-sl frm, slty - rthy tex

MD: 2,873 '
TVD: 2,855.63 '
Inclination: 11.41 °
Azimuth: 156.23 °
VS: 91.68 '

339u
C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%



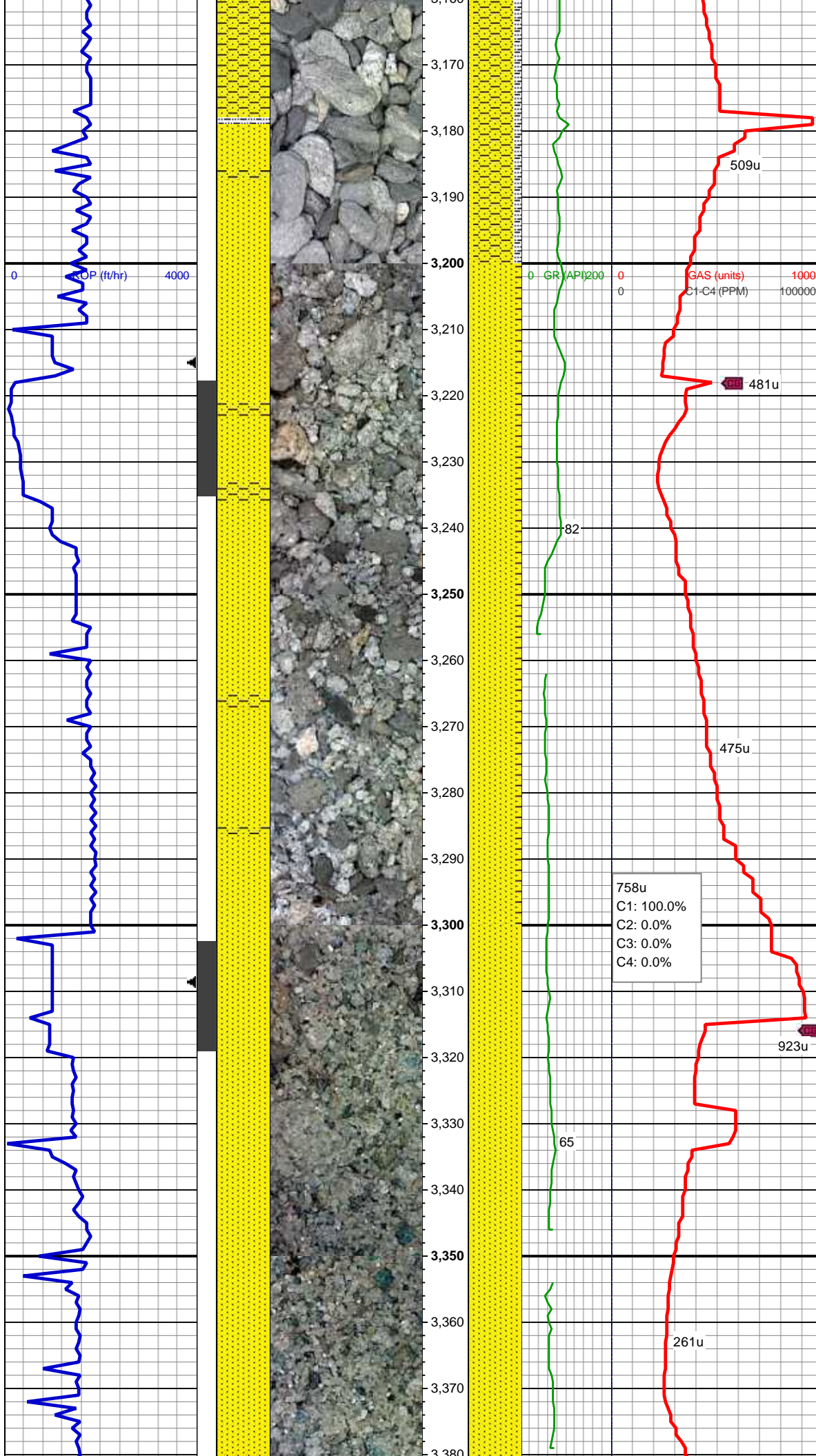
SHY SS: med-lt gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
rr glau, bdd wi ss
SS: wh wi occ grdg - lt gy, sb ang- sb rnd,
predy cons, frm clus, f gr, tr glau, sl calc
SLTY SH: gy-dk gy, sb blk- sb plty, sft-sl
frm, slty - rthy tex

MD: 2,968 '
TVD: 2,948.68 '
Inclination: 11.85 °
Azimuth: 161.22 °
VS: 99.94 '

SHY SS: med-lt gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
rr glau, bdd wi ss
SS: wh wi occ grdg - lt gy, sb ang- sb rnd,
predy cons, frm clus, f gr, tr glau, sl calc
SLTY SH: gy-dk gy, sb blk- sb plty, sft-sl
frm, slty - rthy tex

MD: 3,063 '
TVD: 3,041.35 '
Inclination: 13.57 °
Azimuth: 163.71 °
VS: 107.69 '

SHY SS: med-lt gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
rr glau, bdd wi ss
SS: wh wi occ grdg - lt gy, sb ang- sb rnd,
predy cons, frm clus, f gr, tr glau, sl calc
SLTY SH: gy-dk gy, sb blk- sb plty, sft-sl
frm, slty - rthy tex



MD: 3,158 '
TVD: 3,133.54 '
Inclination: 14.36 °
Azimuth: 163.37 °
VS: 115.83 '

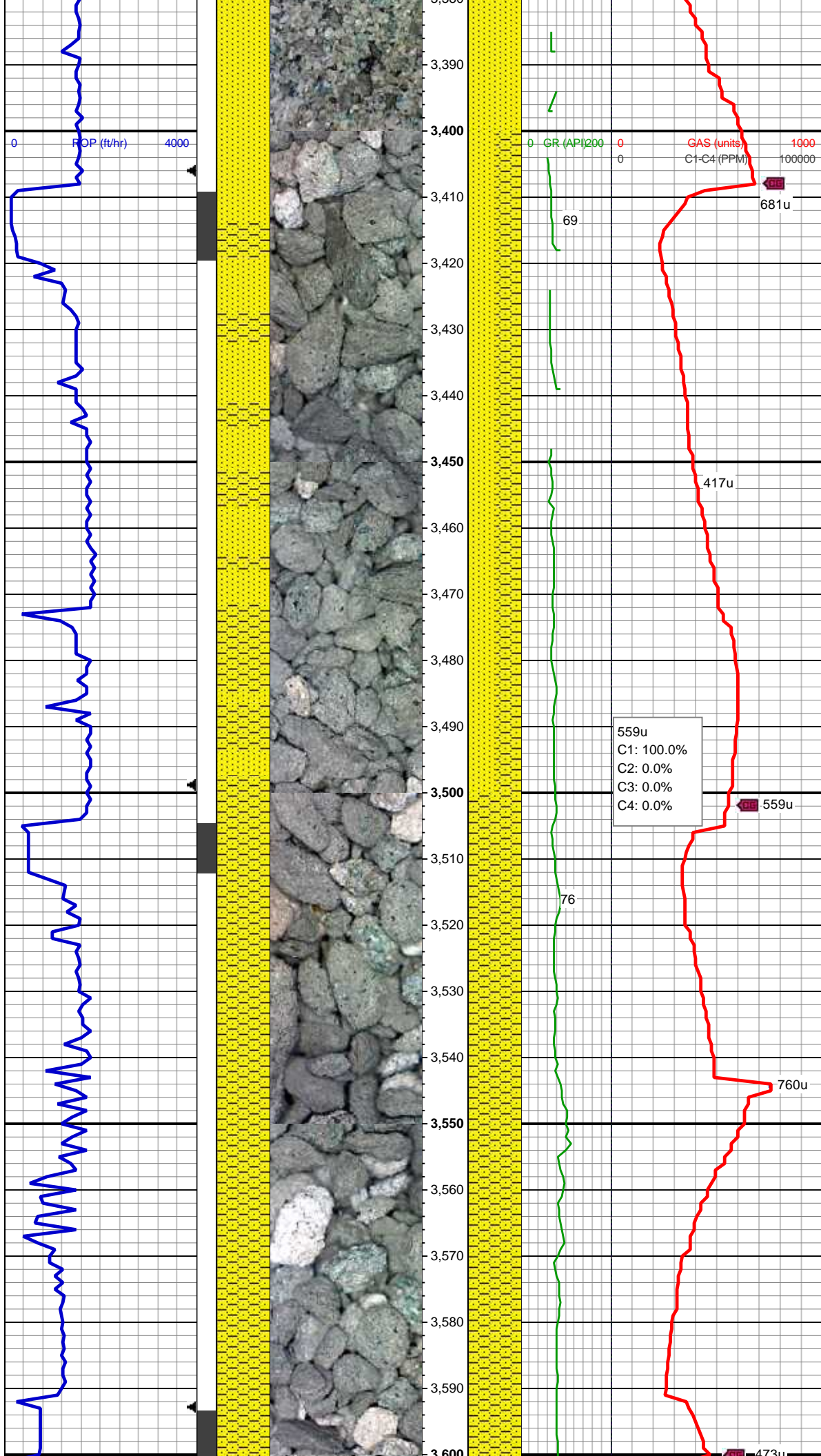
SS: 90% uncons op-clr-wh, 10% cons
wh-med gy, rnd - sb ang, predy f gr wi occ
med -v f gr qtz, mod srt, g por, sl calc,
abnt glau
SHY SS: med-lt gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt

MD: 3,253 '
TVD: 3,225.78 '
Inclination: 13.37 °
Azimuth: 160.34 °
VS: 124.52 '

758u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

MD: 3,347 '
TVD: 3,317.14 '
Inclination: 13.85 °
Azimuth: 160.01 °
VS: 133.57 '

SS: 90% uncons op-clr-wh, 10% cons
wh-med gy, rnd - sb ang, predy f gr wi occ
med -v f gr qtz, mod srt, g por, sl calc,
abnt glau

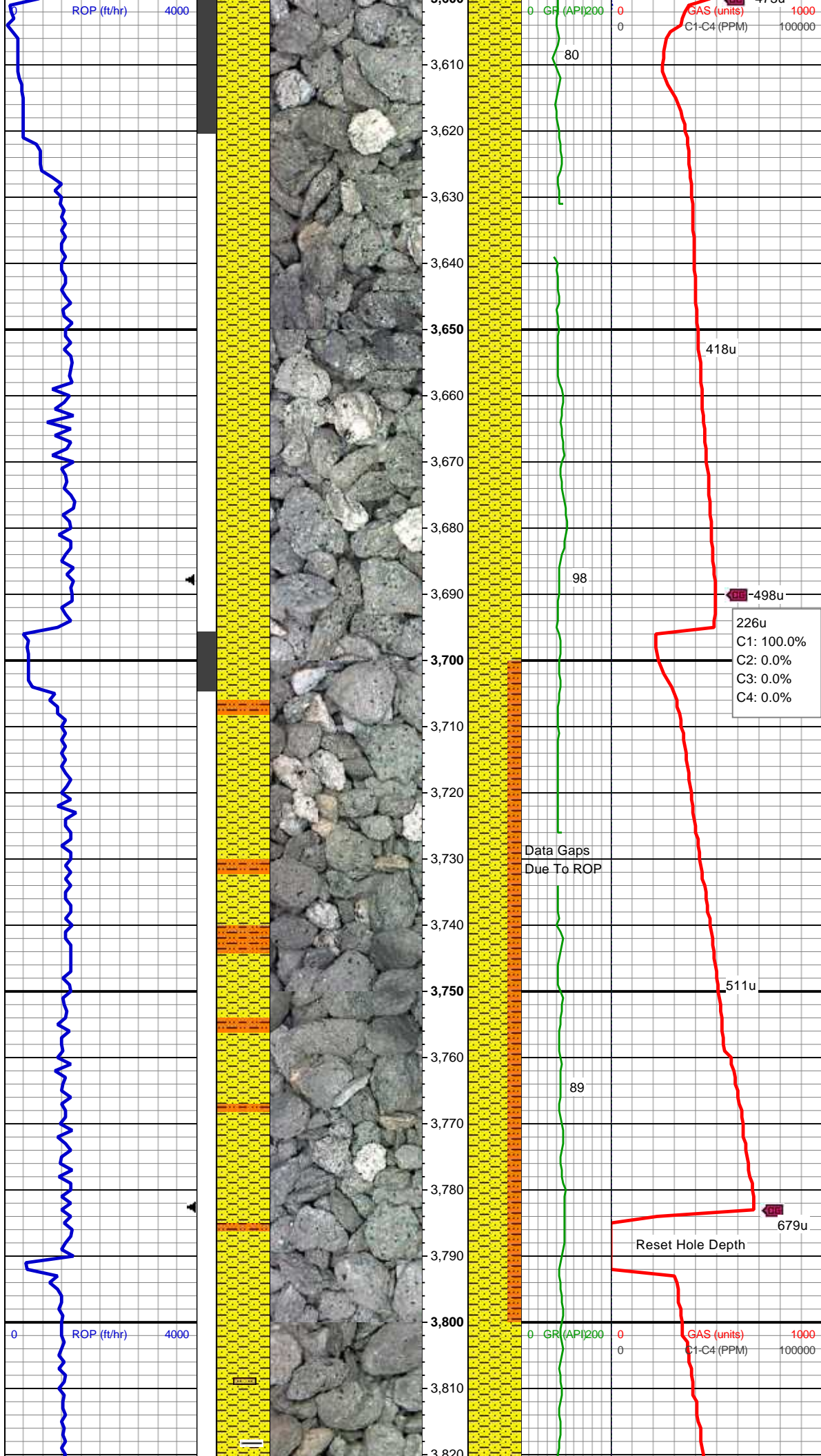


MD: 3,442 '
TVD: 3,409.42 '
Inclination: 13.6 °
Azimuth: 157.54 °
VS: 143.28 '

SS: 75% uncons op-clr-wh, 25% cons
med gy, rnd - sb ang, predy f gr wi occ
med -v f gr qtz, mod srt, g por, sl calc,
occ glau, grdg - shy ss
SHY SS: med-lt gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
abnt glau; rr xl cal

MD: 3,537 '
TVD: 3,501.67 '
Inclination: 14.06 °
Azimuth: 156.47 °
VS: 153.71 '

SHY SS: med gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
abnt glau incl, occ wh cons ss



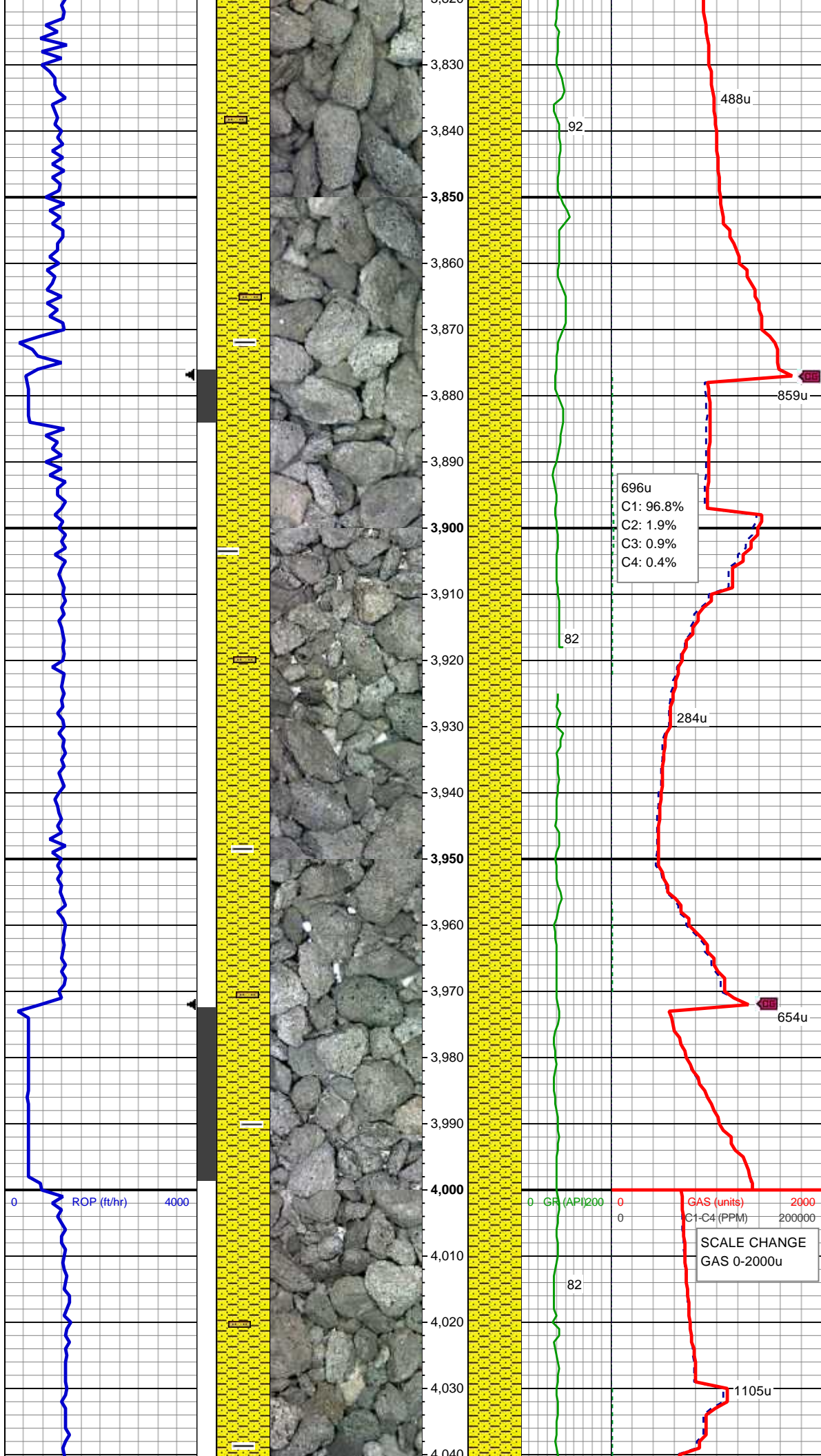
MD: 3,632 '
TVD: 3,594.29 '
Inclination: 11.63 °
Azimuth: 157.46 °
VS: 163.43 '

SHY SS: med gy, cons, sb ang-sb rnd, fri-sl frm, v f -f gr, mod srt, p por, arg cmt, abnt glau incl, occ wh cons ss

MD: 3,727 '
TVD: 3,687.55 '
Inclination: 10.29 °
Azimuth: 155.6 °
VS: 171.83 '

SHY SS: med gy, cons, sb ang-sb rnd, fri-sl frm, v f -f gr, mod srt, p por, arg cmt, abnt glau incl, occ wh cons ss
SHY SLTST: med-lt gy, sb blkly, v sft-fri, v f gr, slty-rthy tex

MD: 3,822 '
TVD: 3,781.31 '



TVD: 3,761.51 '
Inclination: 8.25 °
Azimuth: 152.91 °
VS: 179.46 '

SHY SS: med gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
rr-occ glau incl; tr blk sh, tr brn sltst

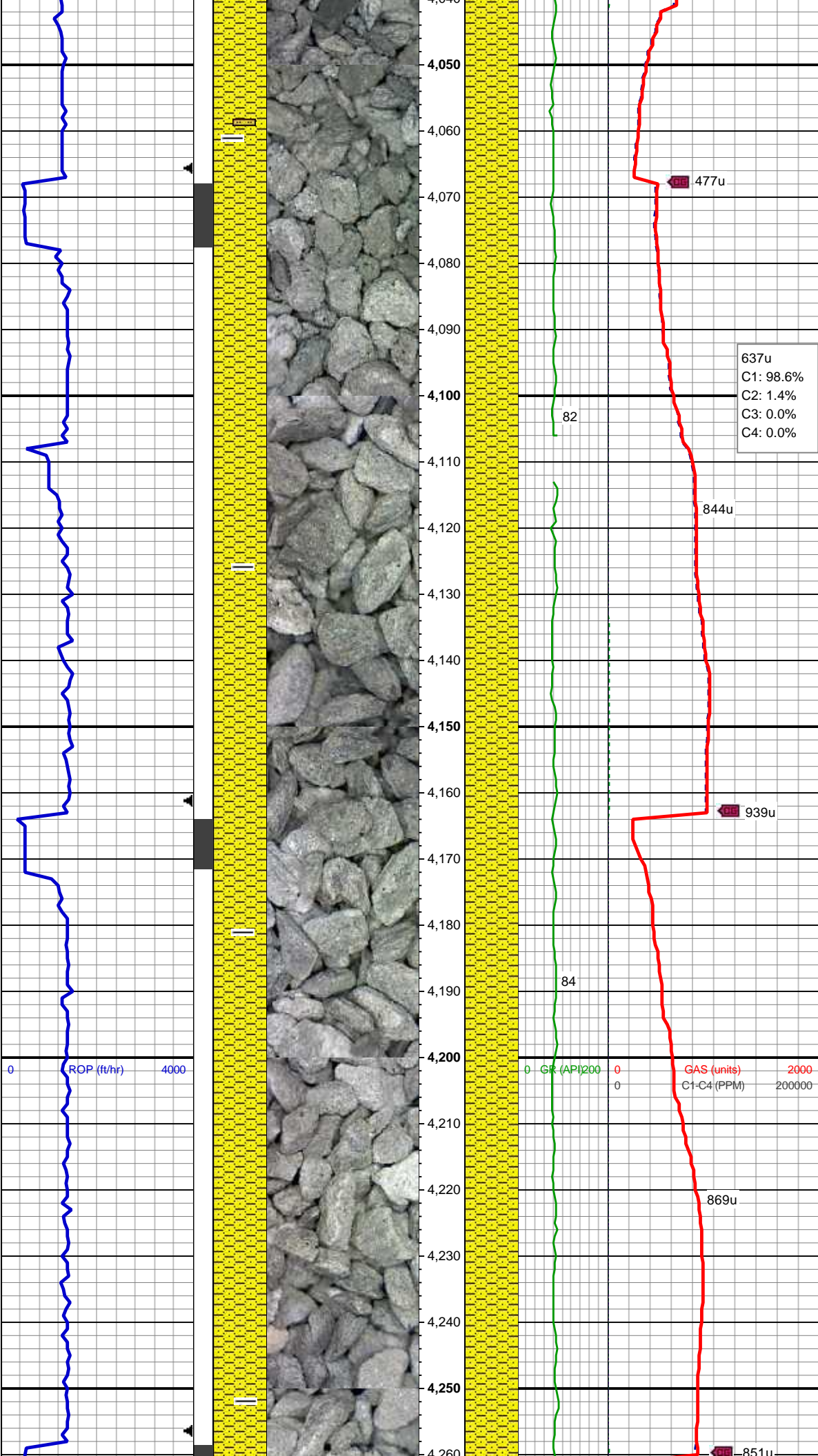
MUD WT 8.65 VIS 28

MD: 3,916 '
TVD: 3,874.39 '
Inclination: 7.77 °
Azimuth: 151.49 °
VS: 186.43 '

SHY SS: med gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
rr-occ glau incl; tr blk sh, tr brn sltst

MD: 4,010 '
TVD: 3,967.63 '
Inclination: 6.8 °
Azimuth: 149.35 °
VS: 193.06 '

Mud Report 8/26/2014 PM
WT 8.6 pH 7.9
Vis 28 Chlorides 200
YP 1 Hardness 80



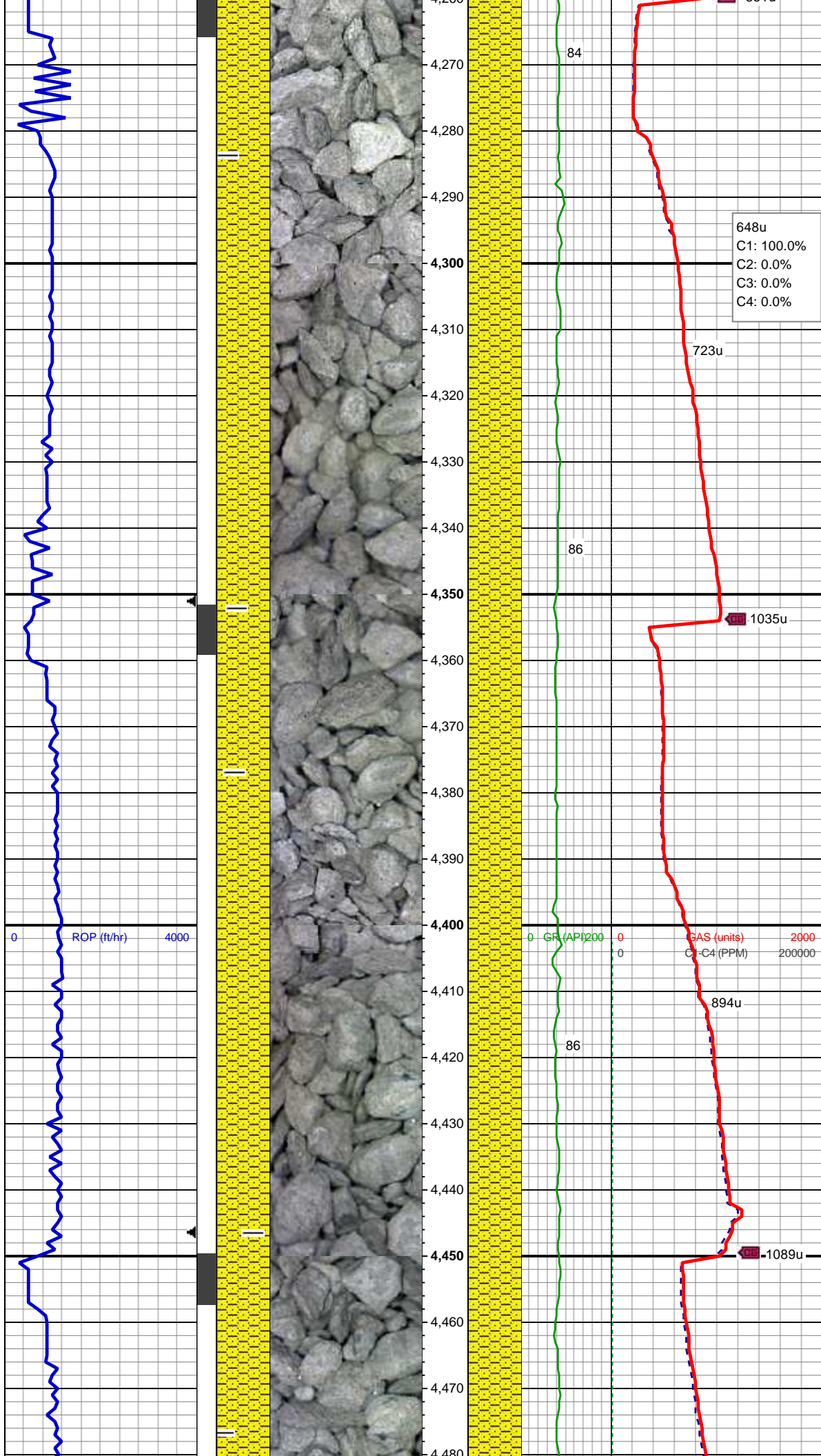
SHY SS: med gy, cons, sb ang-sb rnd, fri-sl frm, v f -f gr, mod srt, p por, arg cmt, rr-occ glau incl, rr xl cal; tr blk sh, tr brn sltst

MD: 4,105 '
TVD: 4,062.06 '
Inclination: 5.79 °
Azimuth: 146.09 °
VS: 199.25 '

SHY SS: med gy, cons, sb ang-sb rnd, fri-sl frm, v f -f gr, mod srt, p por, arg cmt, occ grdg - sltst ; tr blk sh

MD: 4,200 '
TVD: 4,156.68 '
Inclination: 4.48 °
Azimuth: 144.18 °
VS: 204.61 '

SHY SS: med gy, cons, sb ang-sb rnd, fri-sl frm, v f -f gr, mod srt, p por, arg cmt, occ arda - sltst ; tr blk sh



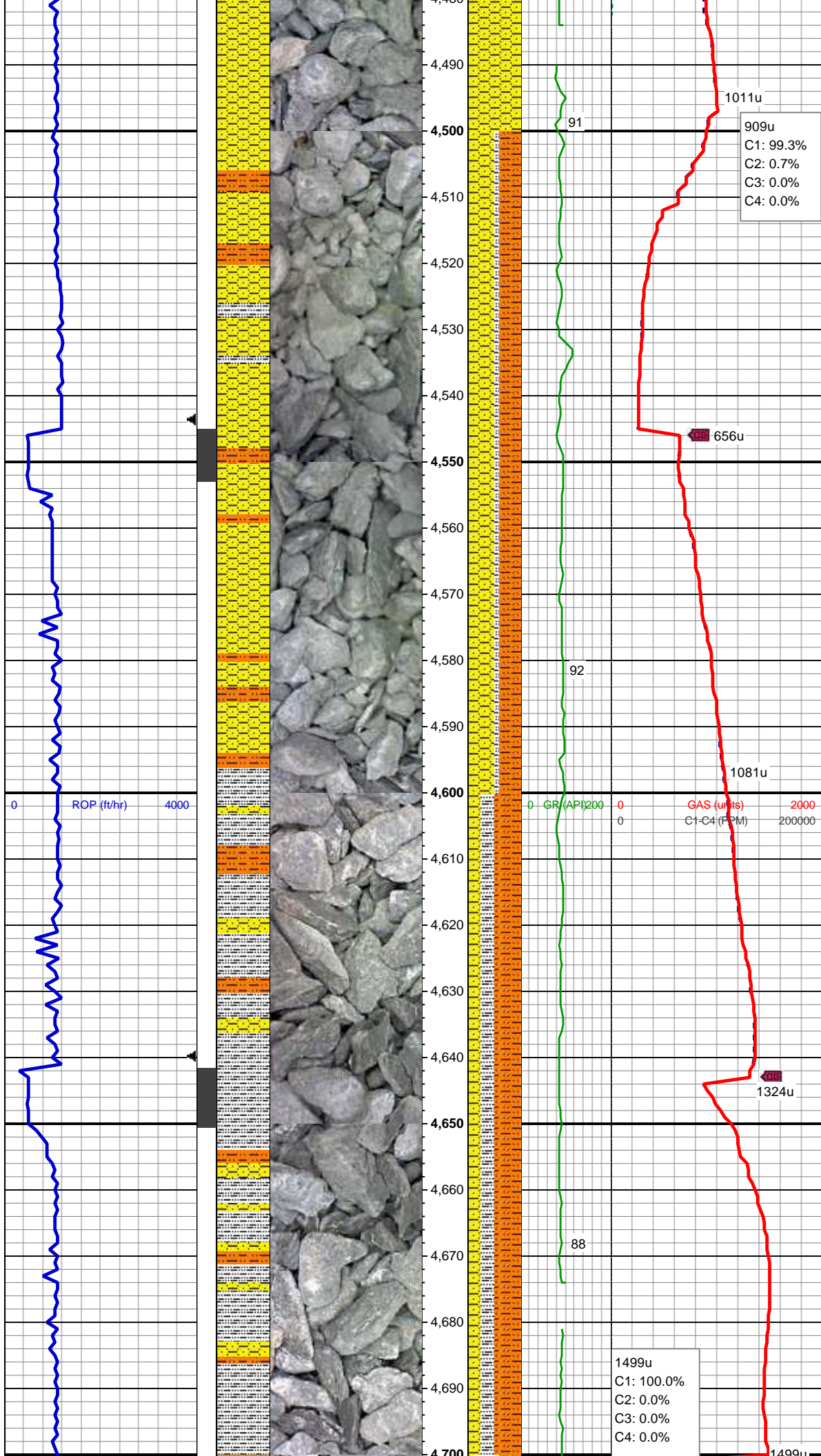
MD: 4,295 '
TVD: 4,251.45 '
Inclination: 3.38 °
Azimuth: 141.76 °
VS: 208.9 '

SHY SS: med gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
occ grd - sltst ; tr blk sh

MD: 4,389 '
TVD: 4,345.33 '
Inclination: 2.47 °
Azimuth: 138.31 °
VS: 212.23 '

SHY SS: med gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt,
aren, occ grd - sltst ; tr blk sh

MD: 4,484 '



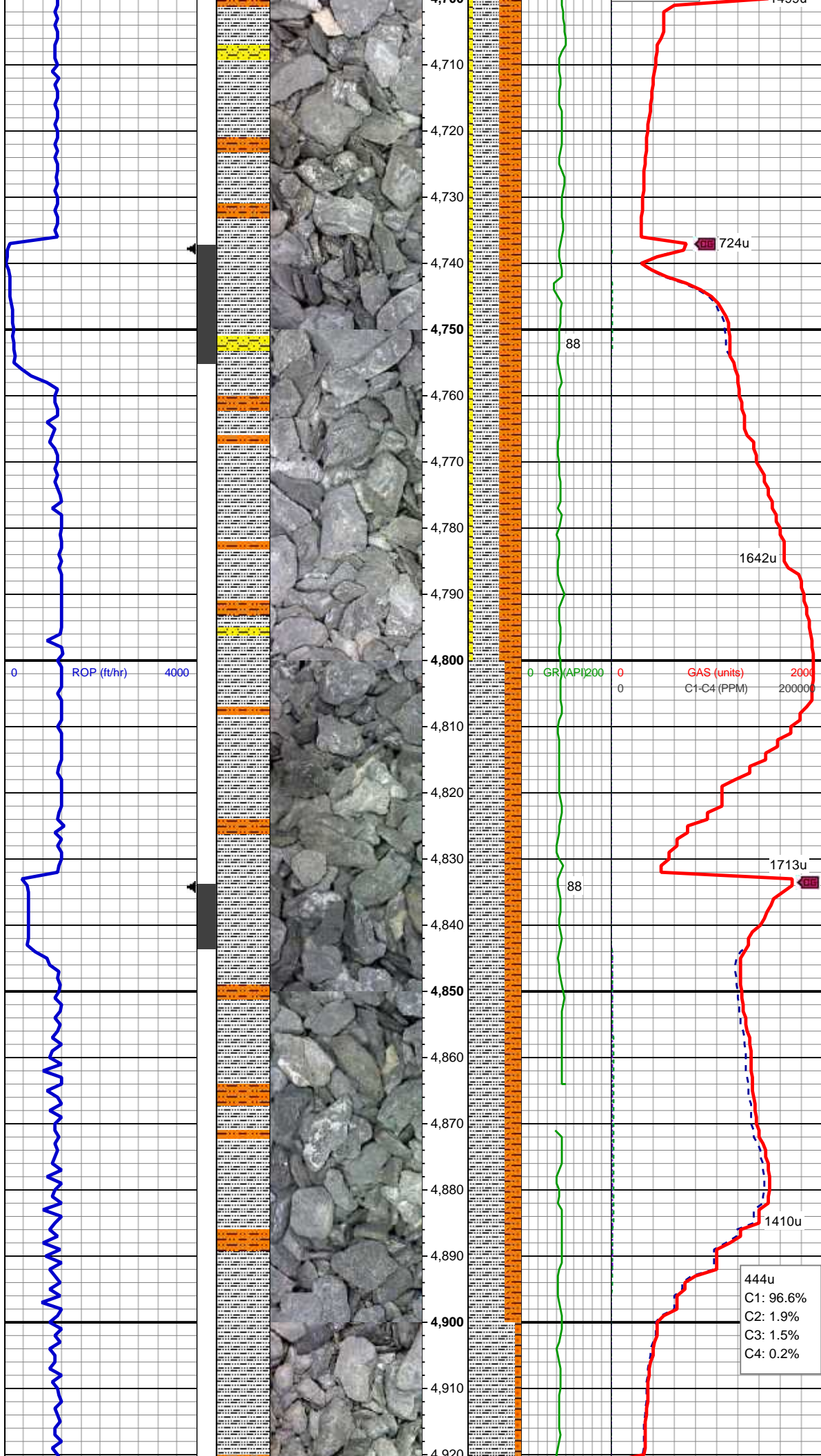
MD: 4,484 '
TVD: 4,440.26 '
Inclination: 1.97 °
Azimuth: 150.42 °
VS: 214.62 '

SHY SS: med gy, cons, sb ang-sb rnd, fri-sl frm, v f -f gr, mod srt, p por, arg cmt
SHY SLTST: med-lt gy, sb blkly,v sft-fri,v f gr, slty-rthy tex
SLTY SH: lt gy-med gy, sb blkly-sb plty, sl sft-frm occ hd, slty tex

MD: 4,579 '
TVD: 4,535.19 '
Inclination: 2.29 °
Azimuth: 156.67 °
VS: 216.41 '

SHY SS: med gy, cons, sb ang-sb rnd, fri-sl frm, v f -f gr, mod srt, p por, arg cmt
SHY SLTST: med-lt gy, sb blkly,v sft-fri,v f gr, slty-rthy tex
SLTY SH: lt gy-med gy, sb blkly-sb plty, sl sft-frm occ hd, slty tex

MD: 4,674 '
TVD: 4,630.12 '
Inclination: 2.24 °
Azimuth: 157.14 °
VS: 218.14 '



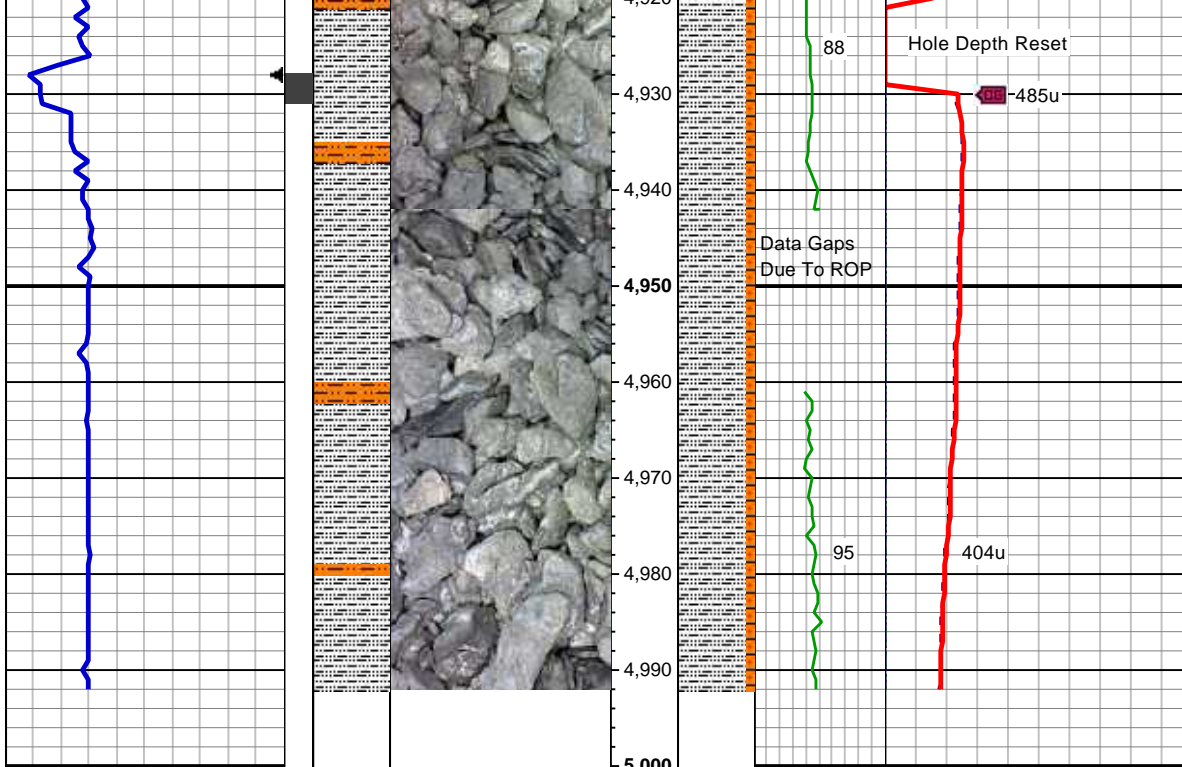
SLTY SH: lt gy-med gy, sb blkly-sb plty, sl
sft frm occ hd, slty tex
SHY SLTST: med-lt gy, sb blkly,v sft-fri,v f
gr, slty-rthy tex
SHY SS: med gy, cons, sb ang-sb rnd,
fri-sl frm, v f -f gr, mod srt, p por, arg cmt

MD: 4,769 '
TVD: 4,725.07 '
Inclination: 1.18 °
Azimuth: 155.62 °
VS: 219.46 '

SLTY SH: lt gy-med gy, sb blkly-sb plty, sl
sft frm occ hd, slty tex
SHY SLTST: med-lt gy, sb blkly,v sft-fri,v f
gr, slty-rthy tex

MD: 4,863 '
TVD: 4,819.05 '
Inclination: 1.14 °
Azimuth: 148.67 °
VS: 220.47 '

MUD WT 9.55 VIS 31



MD: 4,936 '
TVD: 4,892.04 '
Inclination: 0.89 °
Azimuth: 143.39 °
VS: 221.27 '

SLTY SH: lt gy-med gy, sb blk-y-sb plty, sl
sft-frn occ hd, slty tex
SHY SLTST: med-lt gy, sb blk-y,v sft-fri,v f
gr, slty-rthy tex

TD Vertical 4992'MD
2:45PM MDT 8/26/14
TOOH For Tools

Mudlog Continues on "Rohn State
LD03-66-1HN HORZ.Mplot"