

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Colt A13-638

**Location** SWSW 17 6N 63W

**State** COLORADO

**County** WELD

**Country** USA

**Rig Number** H&P #273

**API Number** 05-123-40919

**Field** WATTENBERG

**Region** DJ BASIN

**Drilling Completed** 4/10/2015

**Spud Date** 4/6/2015

**Surface Coordinates** LAT: 40.48205  
LONG: -104.4688  
1165' FSL  
424' FWL

**Bottom Hole Coordinates** PROJECTED:  
1855' FSL  
1740' FEL

**Ground Elevation** 4672'

**K.B. Elevation** 4696'

**Logged Interval** 1000' To 13377'

**Total Depth** 13377'

**Formation** CODELL SANDSTONE

**Type of Drilling Fluid** H2O, KCL, LSND

## Other Symbols

### Oil Show

- DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

### Porosity

- E EARTHY
- F FENESTRAL
- F FRACTURE
- INTERCRYSTALLINE
- INTEROOLITIC
- MOLDIC

ORGANIC

P PINPOINT

V VUGGY

### Engineering

- BIT CHANGE
- CONNECTION (LEFT)
- CONNECTION (RIGHT)
- CONNECTION GAS
- TRIP GAS
- DOWN TIME GAS
- CORE - LOST
- CORE - RECOVERED
- DST INTERVAL

FAULT

FORMATION TOP

GAS SHOW

OIL SHOW

MN DEPTH MN DEPTH

MN DEPTH MN DEPTH (RIGHT)

NORMAL FAULT

OVERTURNED STRATA

REVERSE FAULT

CASING

SIDEWALL CORE (LEFT)

SIDEWALL CORE (RIGHT)

SLIDE

SURVEY

DRILL STEM TEST

WIRELINE TESTED - LEFT

WIRELINE TESTED - RT

### Rounding

- ANGULAR
- ROUNDED
- SUBANG
- SUBRND

### Textures

- BOUNDSTONE
- CHALKY
- CRYPTOXLN

E EARTHY

FINELYXLN

GRAINSTONE

L LITHOGRAPHIC

MX MICROXLN

MS MUDSTONE

PS PACKSTONE








WS WACKSTONE

### Sorting

- M MODERATE
- P POOR
- W WELL

## 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  
 GLAUCONITE  
 GYPSIFEROUS

 FERRUGINOUS PELLET

 HEAVY MINERAL

 KAOLIN

 MARCASITE

 MARLSTONE

 MICACEOUS

 MINERAL CRYSTALS





 NODULES

 PHOSPHATE PELLETS

 PYRITE

 SALT CAST










 SANDY










 SIDERITE  
 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

## Rock Types

 UNKNOWN  
 ANHYDRITE  
 BENTONITE  
 BRECCIA  
 CEMENT  
 CHALK  
 CHERT  
 CLAY CHOKE SAND  
 CLAYSTONE

 COAL  
 CONGLOMERATE  
 DOLOMITE  
 DOLOMITIC LIMESTONE  
 GRANITE  
 GYPSUM  
 IGNEOUS  
 LIMESTONE  
 SIDERITE or LIMONITE

 MARLSTONE  
 METAMORPHIC  
 NO SAMPLE  
 SALT  
 SALT- PEPPER SAND  
 SANDSTONE  
 SHALE  
 SHALE COLORED  
 SHALE GRAY

 SHALY SANDSTONE  
 SHALY SILTSTONE  
 SILTSTONE  
 SILTY SHALE  
 TILL  
 TUFF  
 WELDED TUFF

## Operator

**Company** NOBLE ENERGY, INC.

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










## Geologist

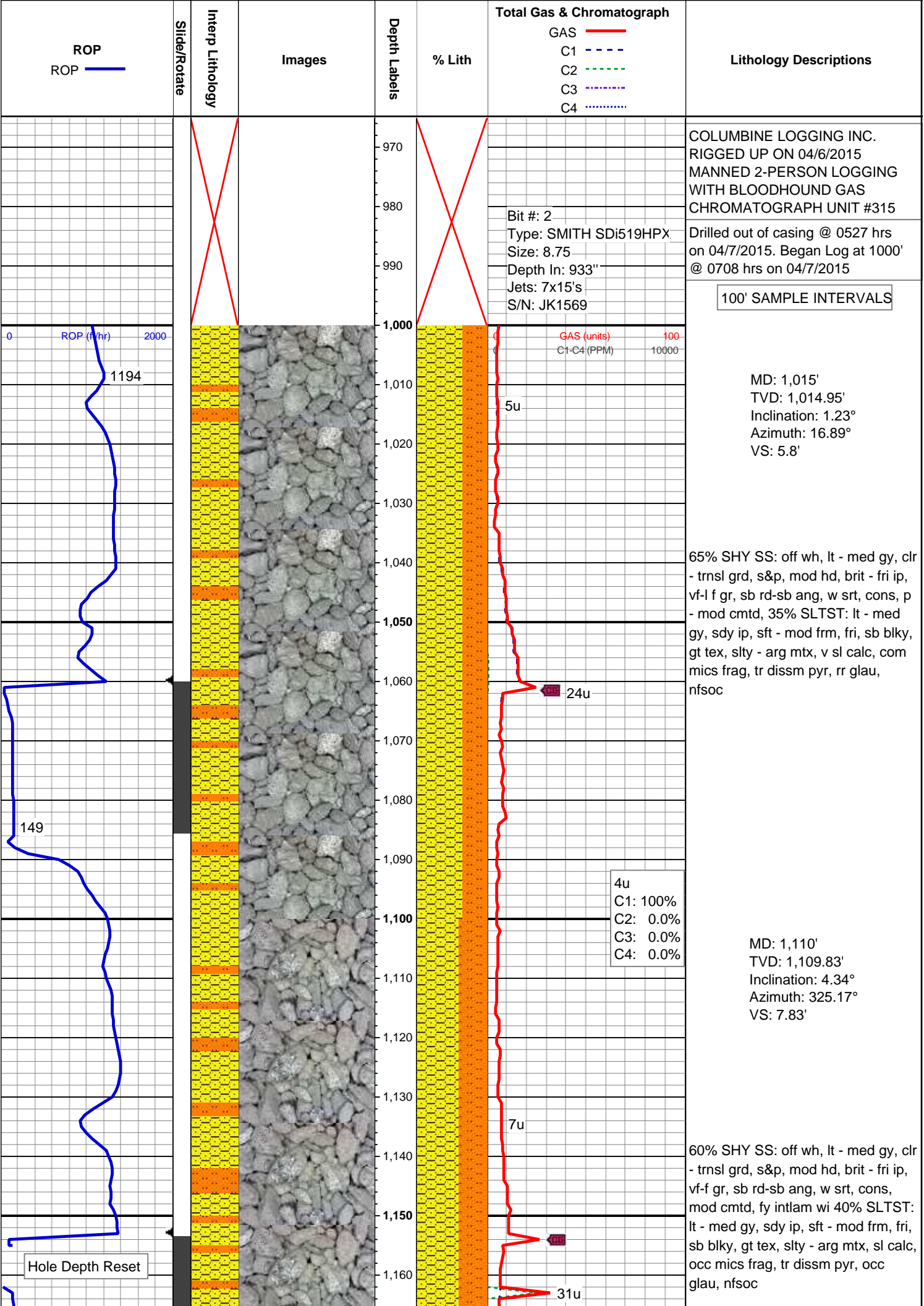
**Name** MICHAEL ANDERSON, IRENE KADEL-HARDER

**Company** COLUMBINE LOGGING, INC.

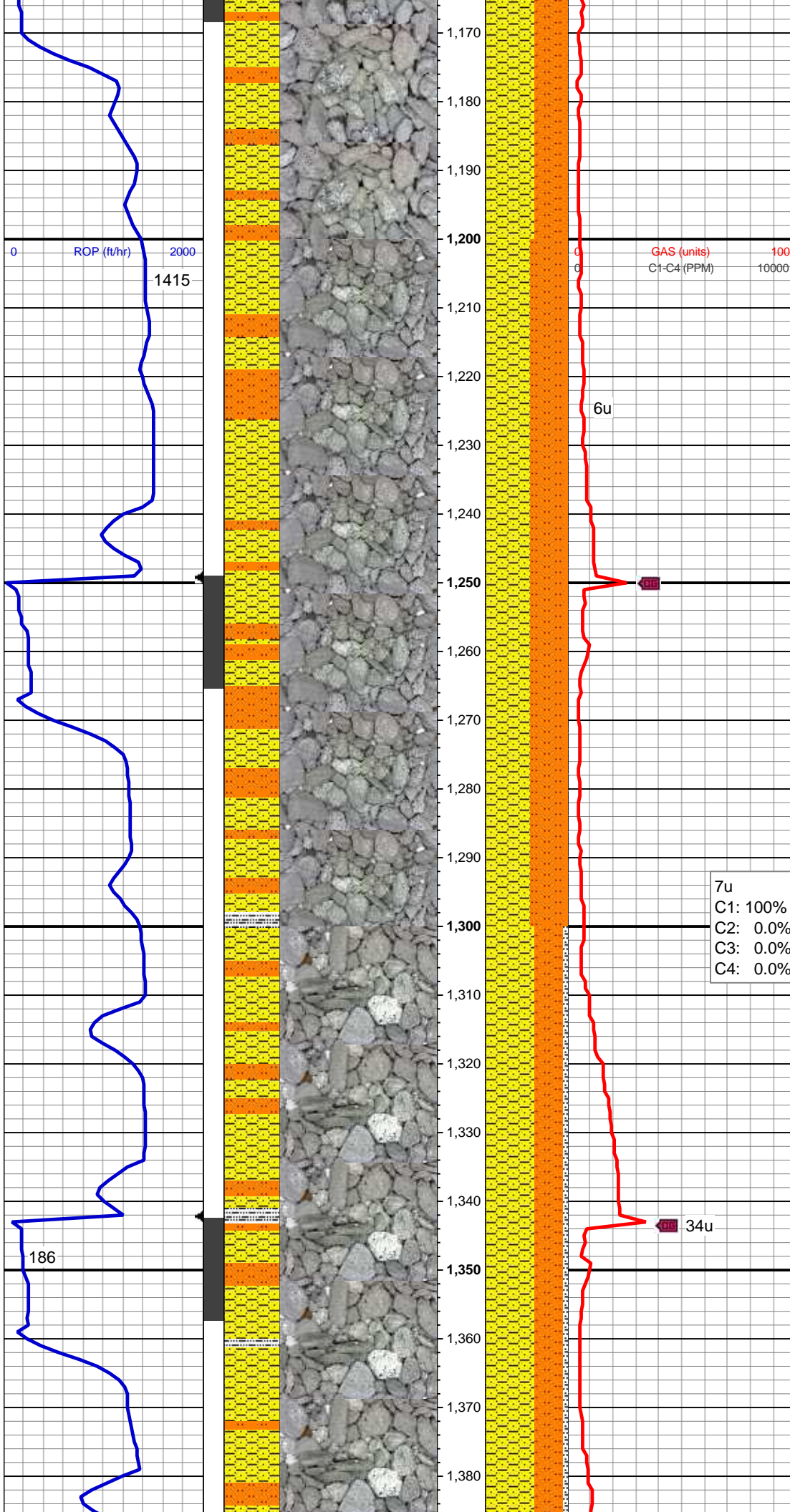
**Address** 602 S. LIPAN ST  
DENVER, COLORADO 80223  
(303) 289-7764

## Zone Color Coding

 Oil  
 Condensate  
 Gas  
 Note  
 Core  
 Pressure  
 Error  
 Water  
 Seal







MD: 1,202'  
TVD: 1,201.44'  
Inclination: 6.24°  
Azimuth: 324.1°  
VS: 13.22'

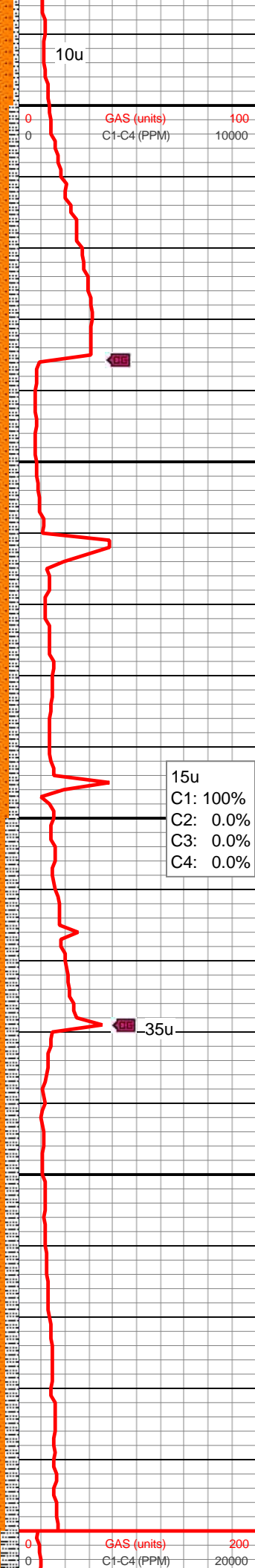
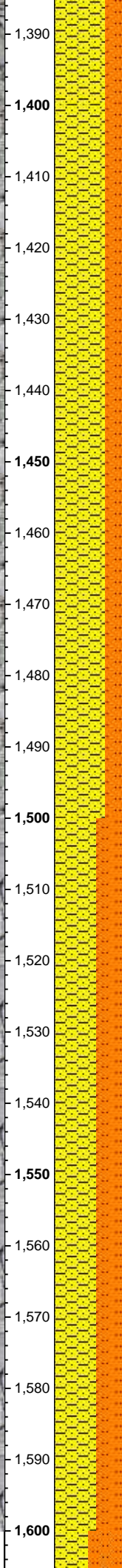
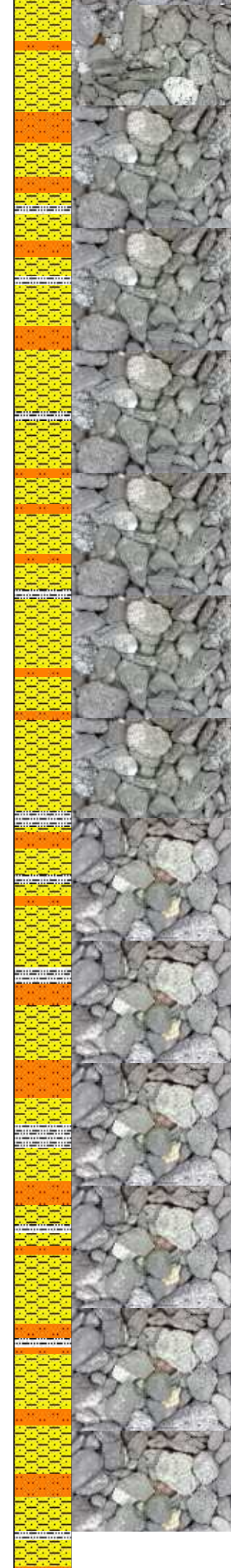
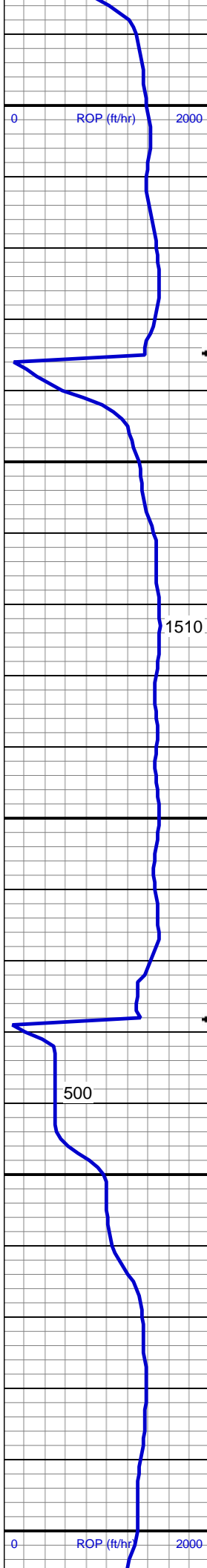
55% SHY SS: off wh, lt - med gy, clr  
- trnsl grd, s&p, mod hd, brit - fri ip,  
vf-f gr, sb rd-sb ang, w srt, cons,  
mod cmdt, fy intlam wi 45% SLTST:  
lt - med gy, sdy ip, sft - mod frm, fri,  
sb blk, gt tex, slty - arg mtx, sl calc,  
occ mics frag, tr dissd pyr, occ  
glau, nfsoc

MD: 1,294'  
TVD: 1,292.67'  
Inclination: 8.56°  
Azimuth: 324.16°  
VS: 20.81'

7u
C1: 100%
C2: 0.0%
C3: 0.0%
C4: 0.0%

60% SHY SS: off wh, lt - med gy, clr  
- trnsl grd, s&p, mod sft - mod hd,  
brit - fri ip, vf-f gr, sb rd-sb ang, w  
srt, cons, mod cmdt, fy intlam wi  
35% SLTST: lt - med gy, sdy ip, sft -  
mod frm, fri, sb blk, gt tex, slty - arg  
mtx, sl calc, 5% slty sh, occ mics  
frag, tr dissd pyr, occ glau, nfsoc

MD: 1,387'  
TVD: 1,384.36'



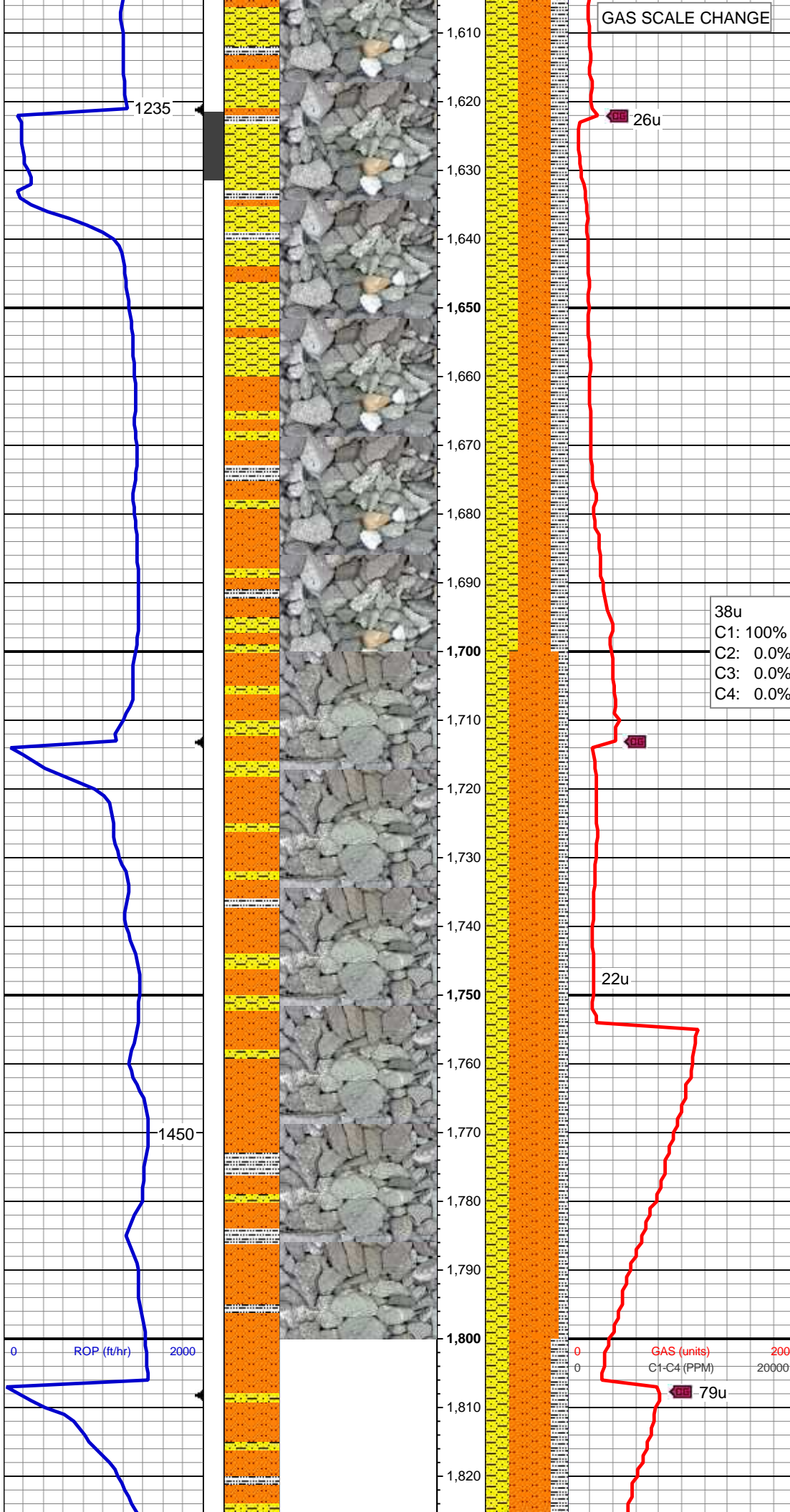
Inclination: 10.65°  
Azimuth: 323.66°  
VS: 30.81'

60% SHY SS: off wh, lt - med gy, clr - trnsl grd, s&p, mod sft - mod hd, brit - fri ip, vf-f gr, sb rd-sb ang, w srt, cons, mod cmt, 30% SLTST: lt - med gy, sdy ip, sft - mod frm, fri, sb blk, gt tex, slty - arg mt, sl - mod calc, 10% slty sh, occ mics frag, rr diss pyr, tr glau, v dul orng ss flor, nsoc

50% SHY SS: off wh, lt - med gy, clr - trnsl grd, s&p, mod sft - mod hd, brit - fri ip, vf-f gr, sb rd-sb ang, w srt, cons, mod cmt, 35% SLTST: lt - med gy, sdy ip, sft - mod frm, fri, sb blk, gt tex, slty - arg mt, sl - mod calc, 15% SLTY SH: med - dk gy, frm, brit, sb plty - sb blk, sb wxy - sl gt tex, arg - slty mt, occ mics frag, rr diss pyr, v dul orng - sl yel gn ss flor, nsoc

MD: 1,572'  
TVD: 1,566.39'  
Inclination: 9.89°  
Azimuth: 319.43°  
VS: 53.02'





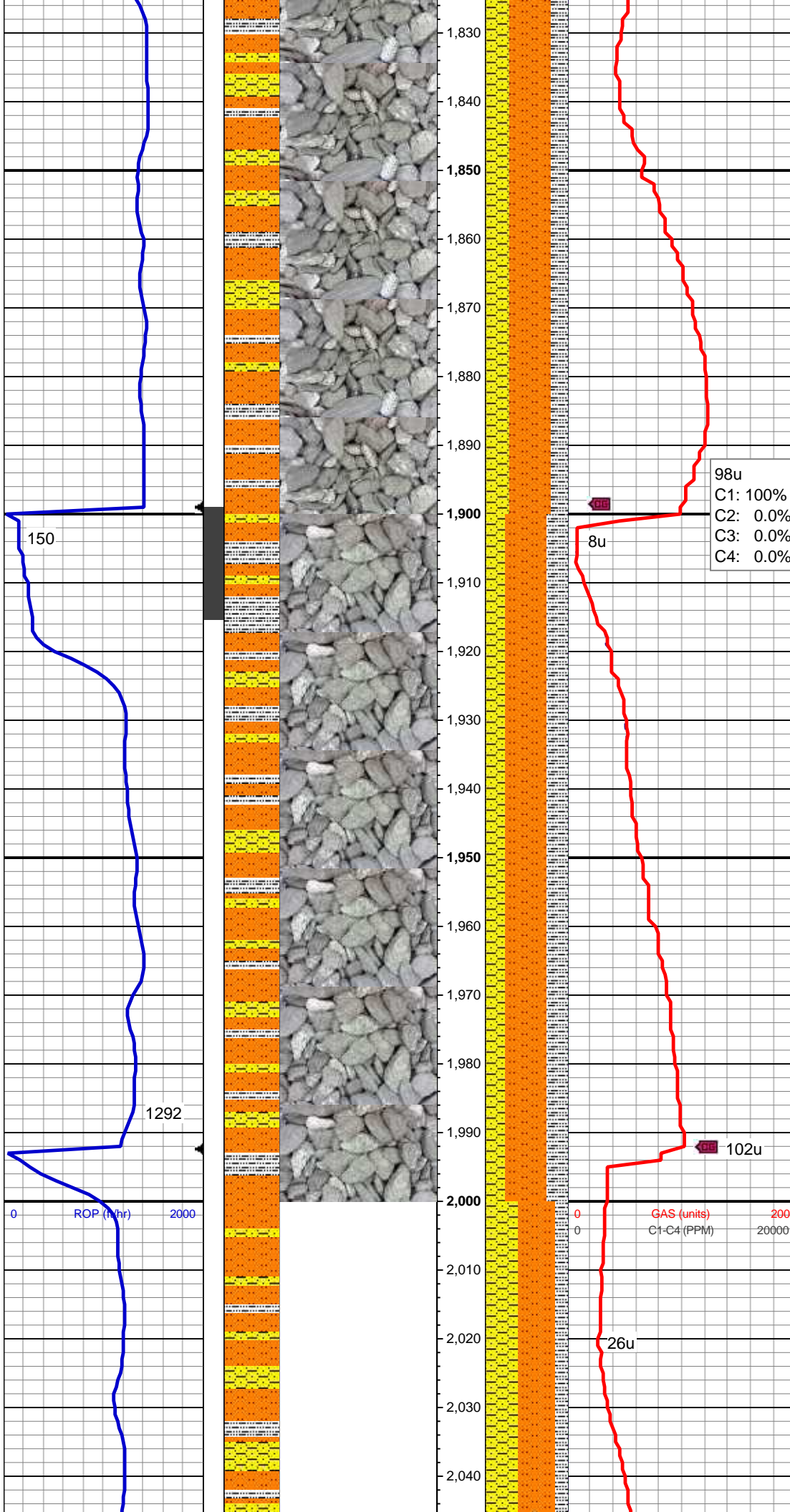
40% SHY SS: off wh, lt - med gy, clr - trns l grd, s&p, mod sft - mod hd, brit - fri ip, vf-f gr, sb rd-sb ang, w srt, cons, mod cmtd, 40% SLTST: lt - med gy, sdy ip, sft - mod frm, fri, sb blk, gt tex, slty - arg mt, sl - mod calc, 20% SLTY SH: med - dk gy, frm, brit, sb plty - sb blk, sb wxy - sl gt tex, arg - slty mt, occ mics frag, rr diss m pyr, v dul orng ss flor, nsoc

MD: 1,664'  
TVD: 1,656.96'  
Inclination: 10.41°  
Azimuth: 324.08°  
VS: 63.9'

38u  
C1: 100%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

60% SLTST: med gy, sdy ip, mod frm, sb blk, gt tex, slty - arg mt, 30% SHY SS: off wh, lt - med gy, clr - trns l grd, s&p, mod - v hd, brit, vf-f gr, sb rd-sb ang, w srt, cons, mod cmtd, sl calc, 10% SLTY SH, tr glau, tr mics frag, rr diss m pyr, nfsoc

MD: 1,848'  
TVD: 1,838.28'



Inclination: 9.14°  
Azimuth: 319.97°  
VS: 84.72'

50% SLTST: med gy, sdy ip, mod  
frm, sb blk, gt tex, slty - arg mtx,  
30% SHY SS: off wh, lt - med gy, clr  
- trnsl grd, s&p, mod - v hd, brit, vf-f  
gr, sb rd-sb ang, w srt, cons, mod  
cmt, sl calc, 20% SLTY SH: med -  
dk gy, frm, brit, sb plty - sb blk, sb  
wxy - sl gt tex, arg - slty mtx, tr glau,  
tr mics frag, rr diss, pyr, nfsoc

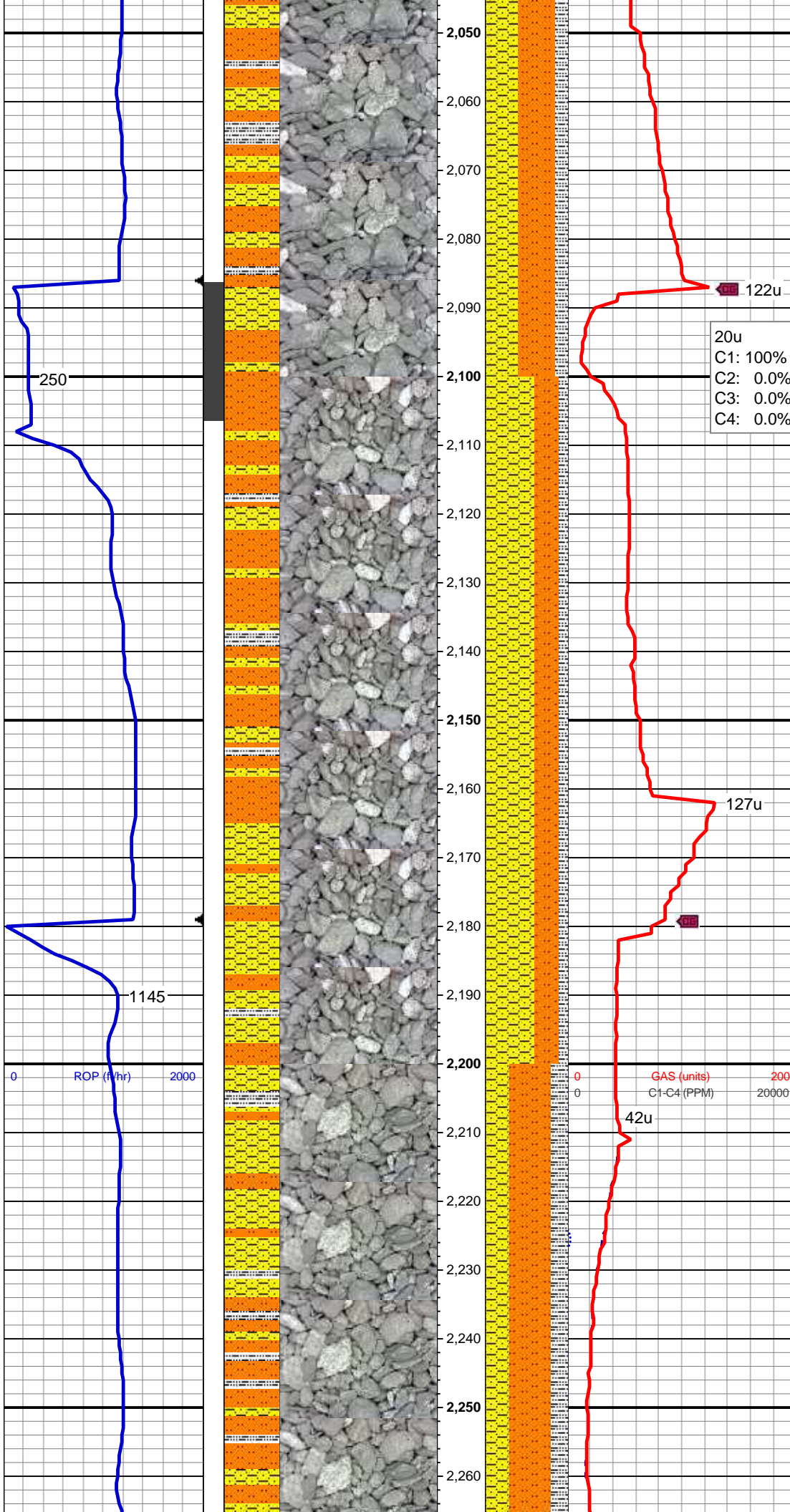
MD: 1,941'  
TVD: 1,929.93'  
Inclination: 10.47°  
Azimuth: 327.58°  
VS: 94.87'

50% SLTST: med gy, sdy ip, mod  
frm, sb blk, gt tex, slty - arg mtx,  
25% SHY SS: off wh, lt - med gy, clr  
- trnsl grd, s&p, mod - v hd, brit, vf-f  
gr, sb rd-sb ang, w srt, cons, mod  
cmt, sl calc, 25% SLTY SH: med -  
dk gy, frm, brit, sb plty - sb blk, sb  
wxy - sl gt tex, arg - slty mtx, tr glau,  
tr mics frag, rr diss, pyr, nfsoc

MD: 2,034'  
TVD: 2,021.48'  
Inclination: 9.76°  
Azimuth: 326.27°  
VS: 104.71'

45% SLTST: med gy, sdy ip, mod  
frm, sb blk, gt tex, slty - arg mtx,  
40% SHY SS: off wh, lt - med gy, clr





- trnsl grd, s&p ip, mod - v hd, brit, vf-f gr, sb rd-sb ang, w srt, cons, mod cmt, sl calc, 15% SLTY SH: med - dk gy, mod frm, brit, sb plty - sb blk, sb wxy - sl gt tex, arg - slty mtx, tr glau, tr mics frag, rr diss pyr, rr dul orng ss flor, nsoc

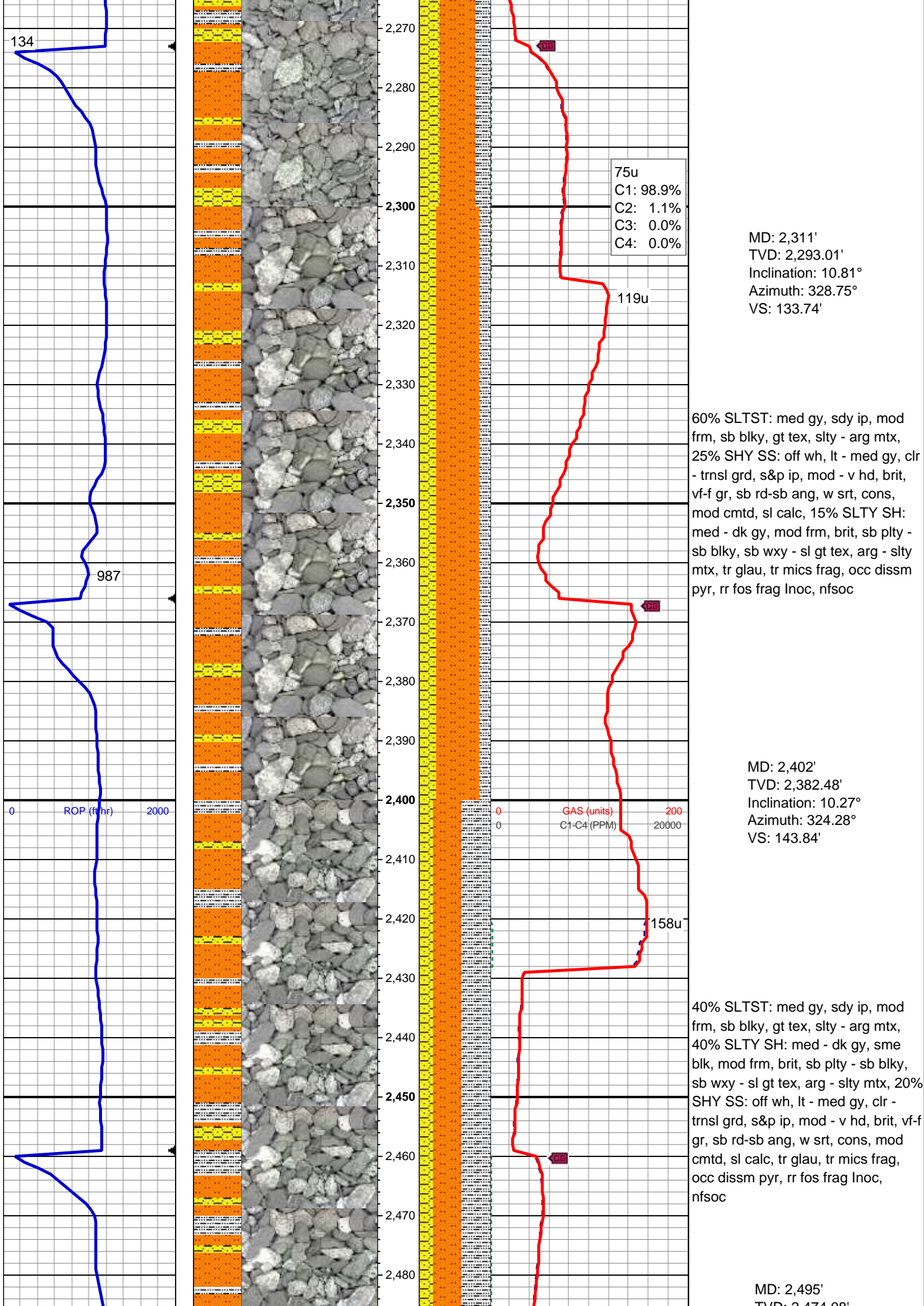
MD: 2,126'  
TVD: 2,111.78'  
Inclination: 12.28°  
Azimuth: 334.45°  
VS: 114.3'

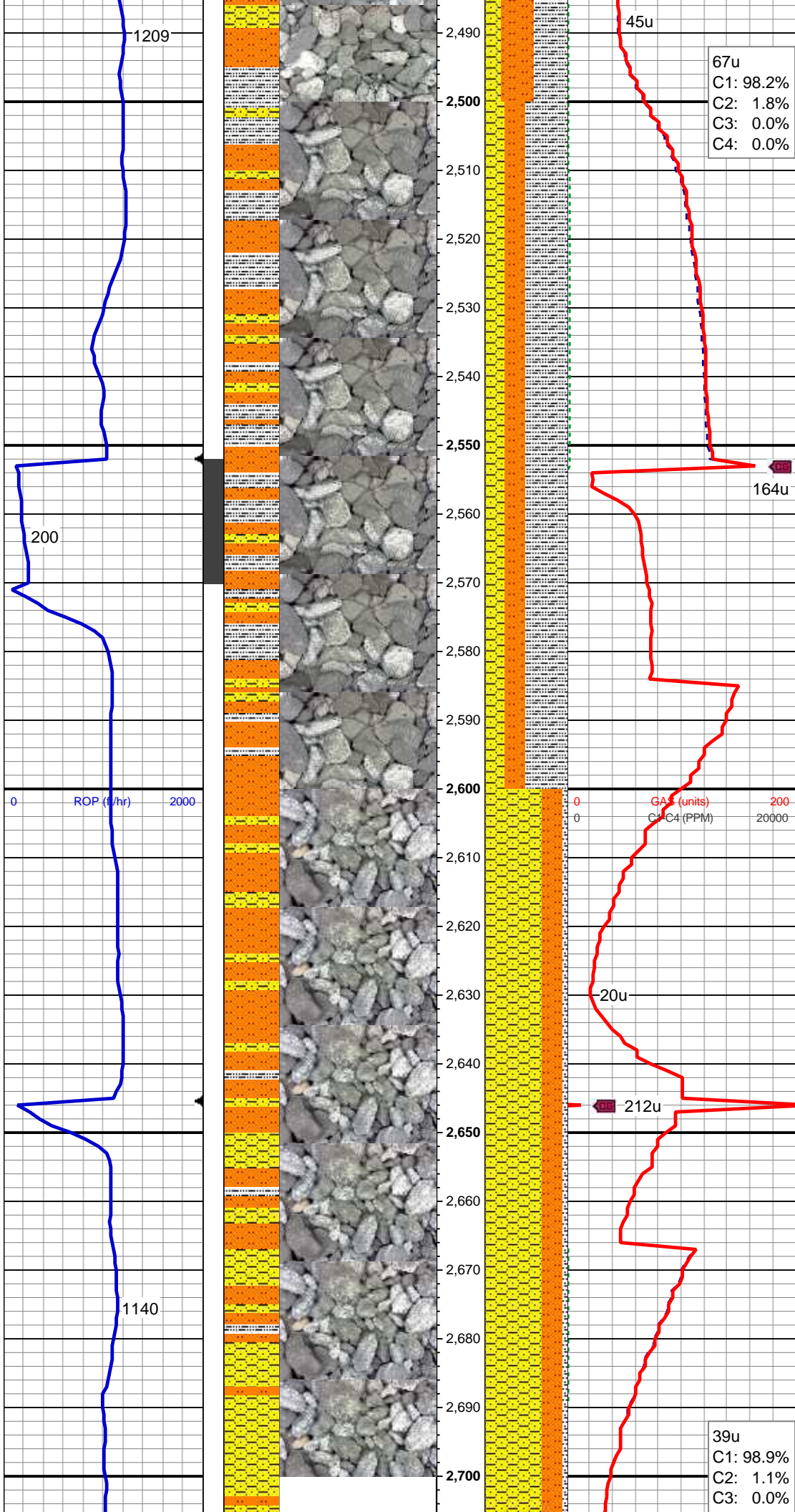
60% SHY SS: off wh, lt - med gy, clr - trnsl grd, s&p ip, mod - v hd, brit, vf-f gr, sb rd-sb ang, w srt, cons, mod cmt, sl calc, 30% SLTST: med gy, sdy ip, mod frm, sb blk, gt tex, slty - arg mtx, 10% SLTY SH, tr glau, tr mics frag, rr diss pyr, rr fos frag Inoc, nfsoc

MD: 2,219'  
TVD: 2,202.77'  
Inclination: 11.61°  
Azimuth: 333.02°  
VS: 123.99'

50% SLTST: med gy, sdy ip, mod frm, sb blk, gt tex, slty - arg mtx, 30% SHY SS: off wh, lt - med gy, clr - trnsl grd, s&p ip, mod - v hd, brit, vf-f gr, sb rd-sb ang, w srt, cons, mod cmt, sl calc, 20% SLTY SH: med - dk gy, mod frm, brit, sb plty - sb blk, sb wxy - sl gt tex, arg - slty mtx, tr glau, tr mics frag, rr diss pyr, rr fos frag Inoc, nfsoc







TVD: 2,474.08'  
Inclination: 9.6°  
Azimuth: 320.64°  
VS: 154.46'

67u  
C1: 98.2%  
C2: 1.8%  
C3: 0.0%  
C4: 0.0%

50% SLTY SH: med - dk gy, sme blk, mod frm, brit, sb plty - sb blk, sb wxy - sl gt tex, arg - slty mtx, 25% SLTST: med gy, sdy ip, mod frm, sb blk, gt tex, slty - arg mtx, 25% SHY SS: off wh, lt - med gy, clr - trns grd, s&p ip, mod - v hd, brit, vf-f gr, sb rd-sb ang, w srt, cons, mod cmt, sl calc, tr glau, tr mics frag, occ diss pyr, rr fos frag Inoc, nfsoc

MD: 2,587'  
TVD: 2,564.48'  
Inclination: 11.83°  
Azimuth: 326.58°  
VS: 165.46'

Begin 200' Sample Interval

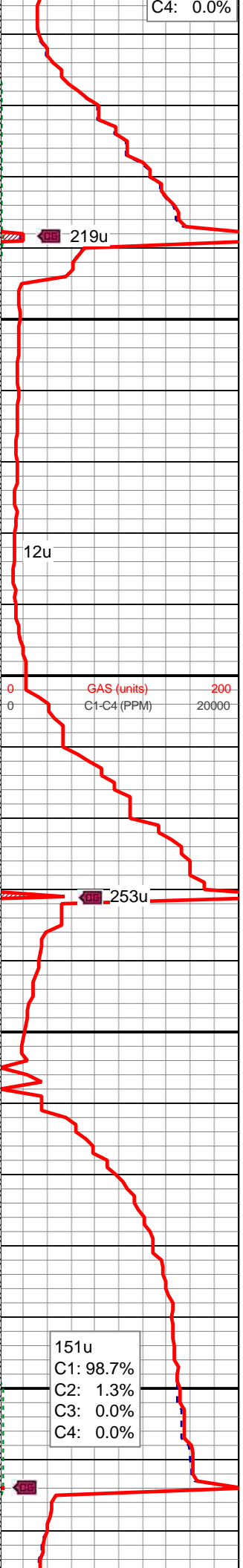
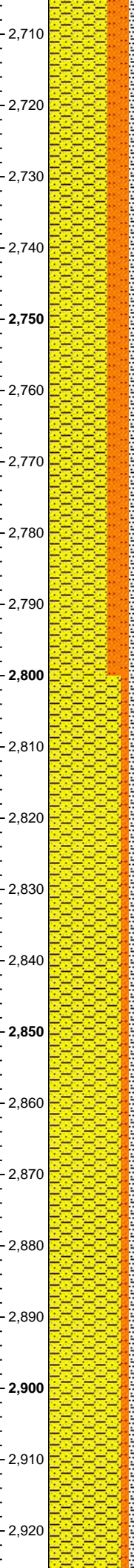
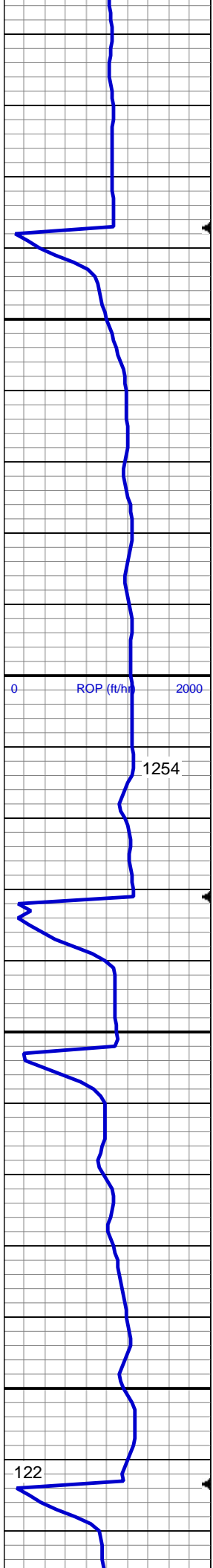
GAS (units)  
C1-C4 (PPM)

MD: 2,680'  
TVD: 2,655.56'  
Inclination: 11.45°  
Azimuth: 326.27°  
VS: 176.9'

70% SHY SS: wht - offwht, lt - med gy, clr - trns grd, s&p ip, mod - v hd, brit, vf-l med grd, sb rd-sb ang, p - mod srt, cons, w cmt, 25% SLTST: med gy, lt gy brn, sdy ip, mod frm, fri ip, sb blk, gt tex, slty - arg mtx, sl - mod blk, 5% SLTY SH, mod blk, 5%

39u  
C1: 98.9%  
C2: 1.1%  
C3: 0.0%





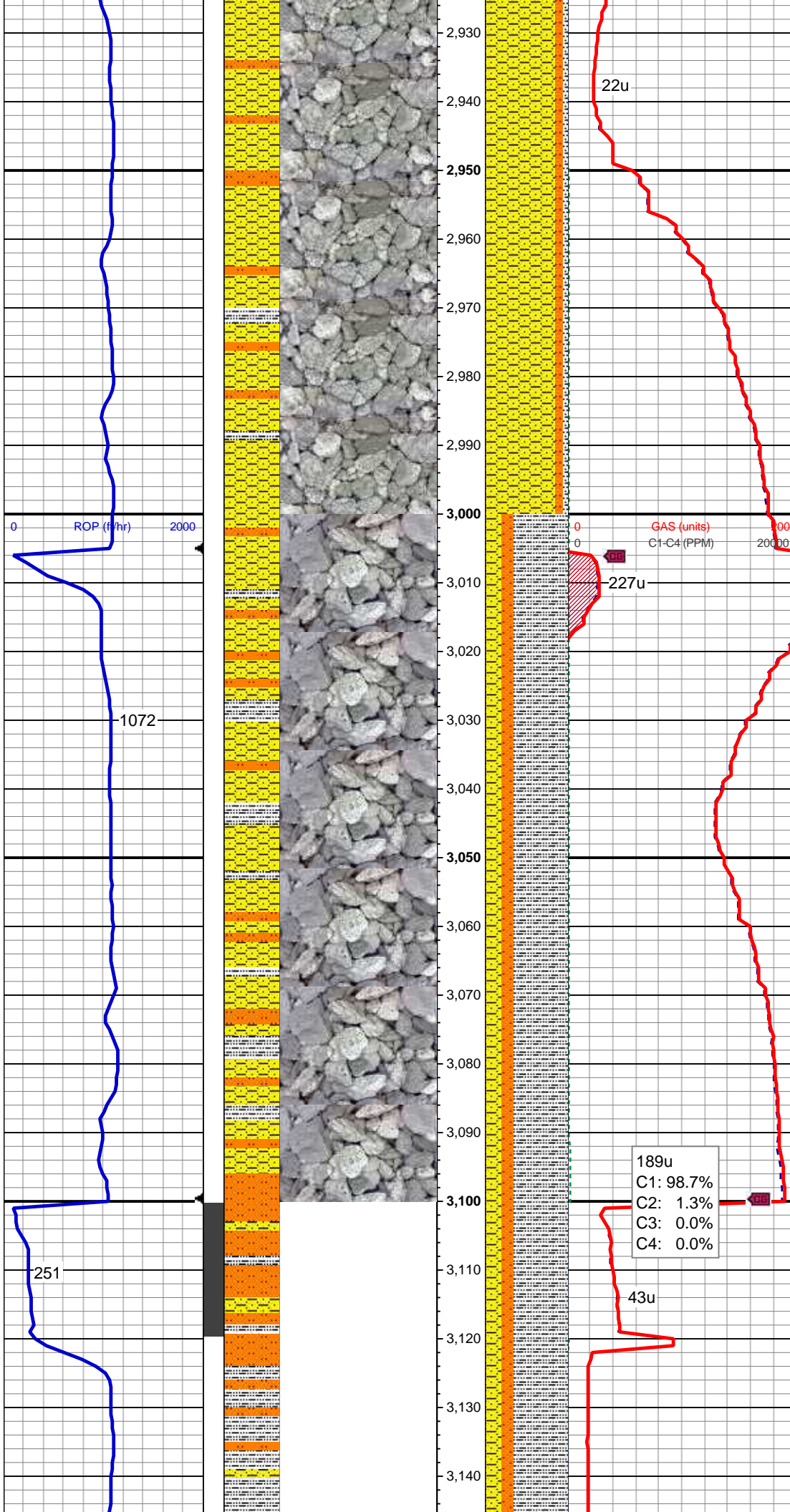
C4: 0.0% mod calc, 5% SLTY SH, occ glau, tr mics frag, tr dissim pyr, rr fos frag Inoc, nfsoc

MD: 2,772'  
TVD: 2,745.82'  
Inclination: 10.88°  
Azimuth: 323.47°  
VS: 188.13'

MD: 2,863'  
TVD: 2,835.21'  
Inclination: 10.76°  
Azimuth: 320.13°  
VS: 199.59'

85% SHY SS: wht - offwht, lt - med gy, clr - trnsl grd, s&p ip, mod - v hd, brit - fri ip, pred vf-u f grd, occ l med grd, sb rd-sb ang, mod srt, cons, w cmtd, 10% SLTST, 5% SLTY SH, occ glau, occ mics frag, cut con by asph, nfsoc

MUD WT 8.5 VIS 27



MD: 2,956'  
TVD: 2,926.64'  
Inclination: 10.3°  
Azimuth: 317.94°  
VS: 211.59'

MD: 3,051'  
TVD: 3,020.12'  
Inclination: 10.25°  
Azimuth: 316.13°  
VS: 223.98'

65% SLTY SH: med - dk gy, blk, mod - v frm, brit, sb plty - sb blk, sb wxy - sl gt tex, arg - slty mtz, 20% SHY SS: wht - offwht, lt - med gy, clr - trns l grd, s&p ip, mod - v hd, brit - fri ip, vf-u f grd, sb rd-sb ang, mod - w srt, cons, w cmtd, 15% SLTST: lt - med gy, lt gy brn, sdy ip, mod frm, fri ip, sb blk, gt tex, slty - arg mtz, v sl calc, occ mics frag, tr fos frag Inoc, v dul orgn ss flor, cut con by asph, nsoc

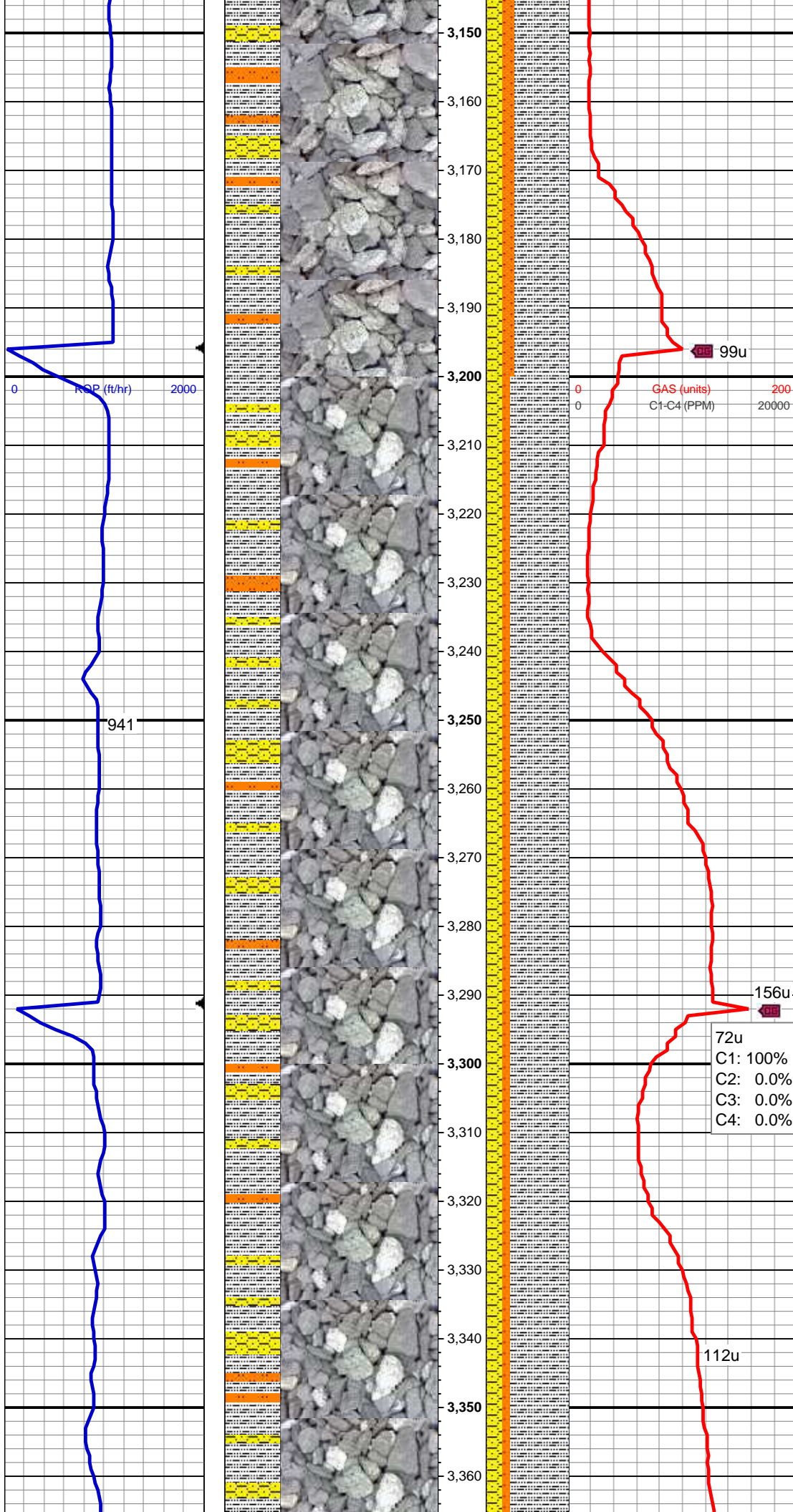
MD: 3,146'  
TVD: 3,113.36'

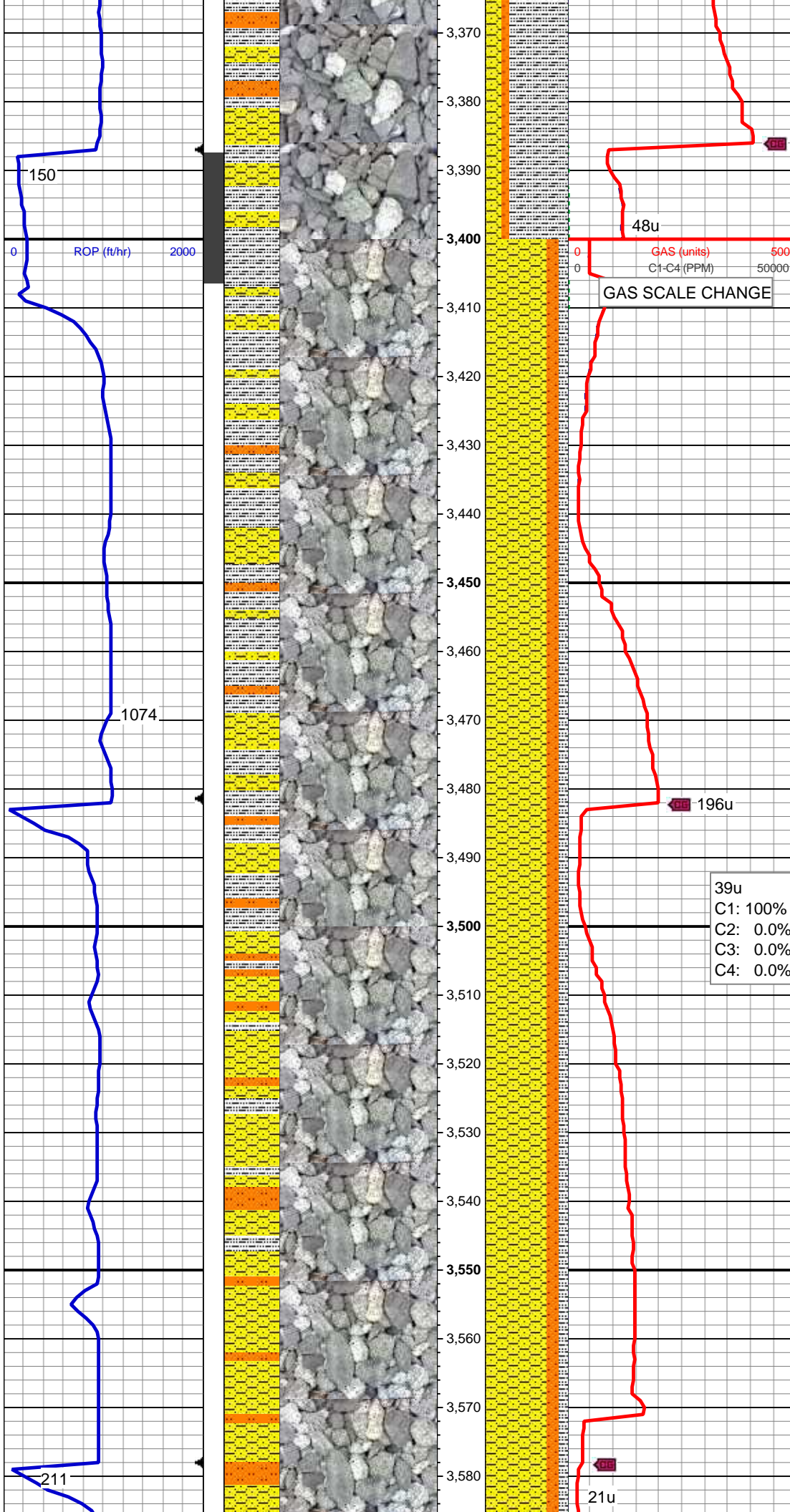


MD: 3,240'  
TVD: 3,205.48'  
Inclination: 11.15°  
Azimuth: 319.92°  
VS: 248.73'

70% SLTY SH: med - dk gy, sme  
blk, mod - v frm, brit, sb plty - sb  
blky, sb wxy - sl gt tex, arg - slty mtx,  
20% SHY SS: wht - offwht, lt - med  
gy, clr - trnsf grd, s&p ip, mod - v hd,  
brit - fri ip, vf-u f grd, sb rd-sb ang,  
mod - w srt, cons, w cmted, sl calc,  
10% SLTST, rr mics frag, rr glau, tr  
dissm pyr, cut con by asph, nfsoc

MD: 3,335'  
TVD: 3,298.79'  
Inclination: 10.54°  
Azimuth: 317.63°  
VS: 261.41'





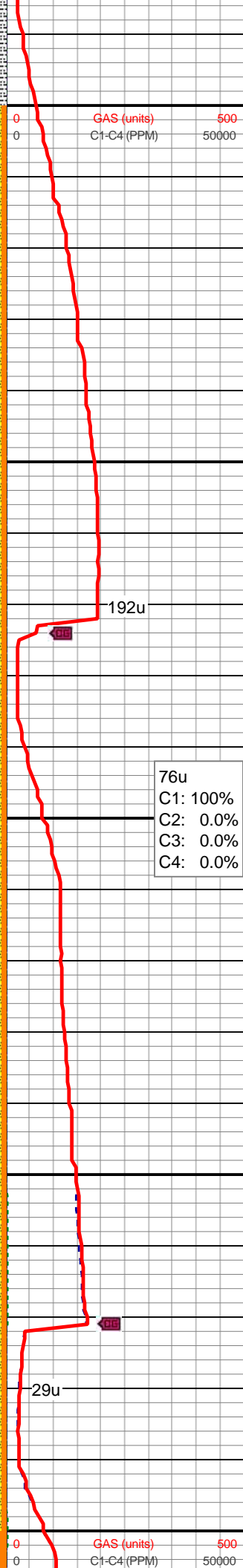
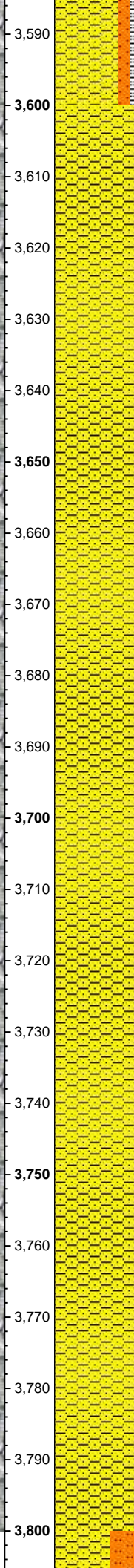
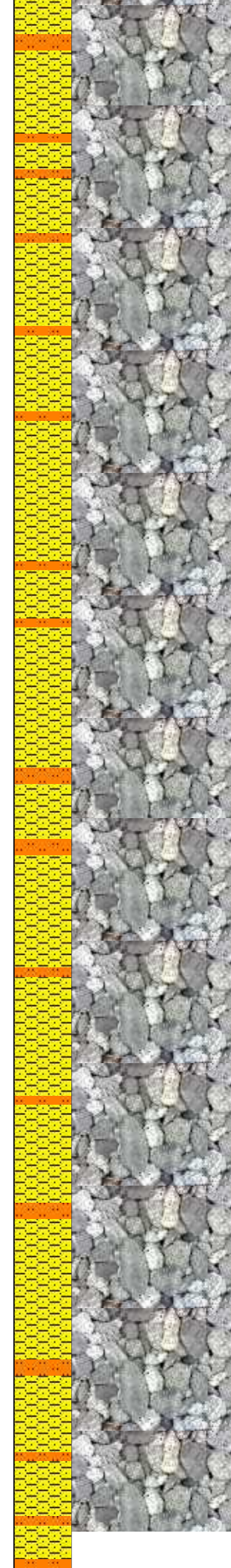
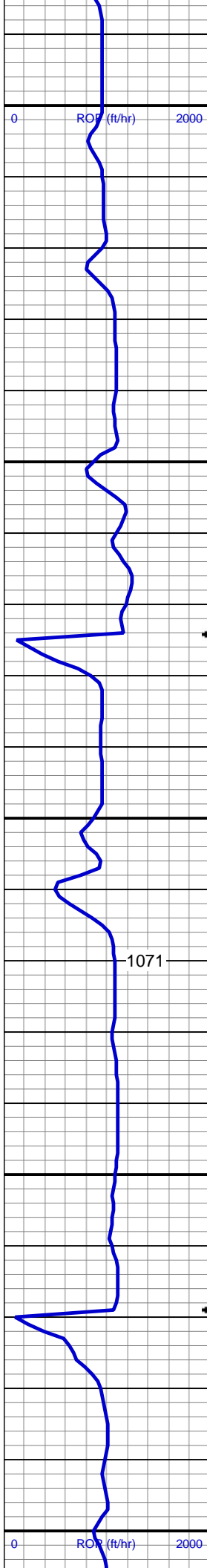
MD: 3,430'  
TVD: 3,392.24'  
Inclination: 10.25°  
Azimuth: 332.66°  
VS: 272.09'

75% SHY SS: wht - offwht, lt - med gy, clr - trns l grd, s&p ip, mod - v hd, brit - fri ip, l-u f grd, occ med grd sd, sb rd-sb ang, mod srt, cons, mod - w cmt, 15% SLTST: lt - med gy, lt gy brn ip, sdy ip, mod frm, fri ip, sb blk, gt tex, slty - arg mtx, sl calc, 10% SLTY SH, rr mics frag, rr glau, tr diss m pyr, cut con by asph, nfsoc

39u  
C1: 100%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

MD: 3,525'  
TVD: 3,485.87'  
Inclination: 9.29°  
Azimuth: 328.99°  
VS: 280.88'





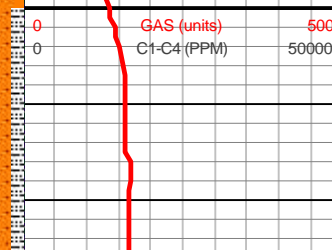
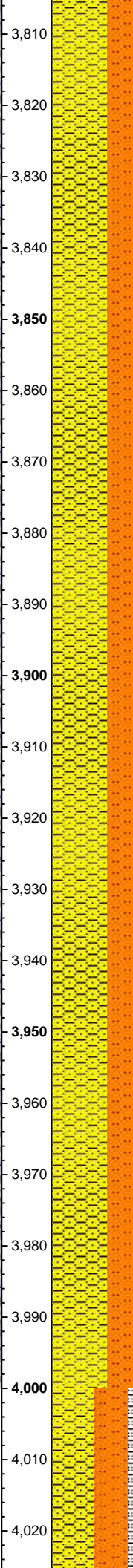
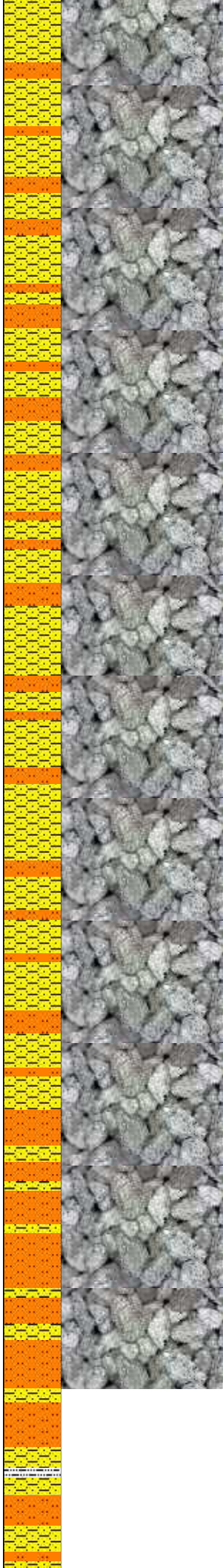
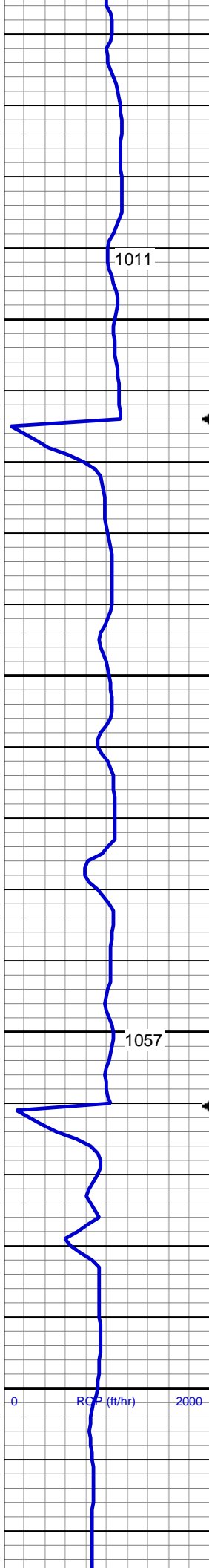
MD: 3,620'  
TVD: 3,579.61'  
Inclination: 9.36°  
Azimuth: 328.74°  
VS: 289.74'

76u  
C1: 100%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

95% SHY SS: wht - offwht, lt gy, clr - trnsl grd, s&p ip, mod - v hd, brit - fri ip, l f - med grd, sb rd-sb ang, mod srt, cons, mod - w cmt, sl - mod calc ip, 5% SLTST, com glau, tr mics frag, tr diss pyr, occ ss stdn brn - orng wi dd o, cut con by asph, nfoc

MD: 3,715'  
TVD: 3,673.32'  
Inclination: 9.58°  
Azimuth: 328.32°  
VS: 298.81'

MD: 3,810'



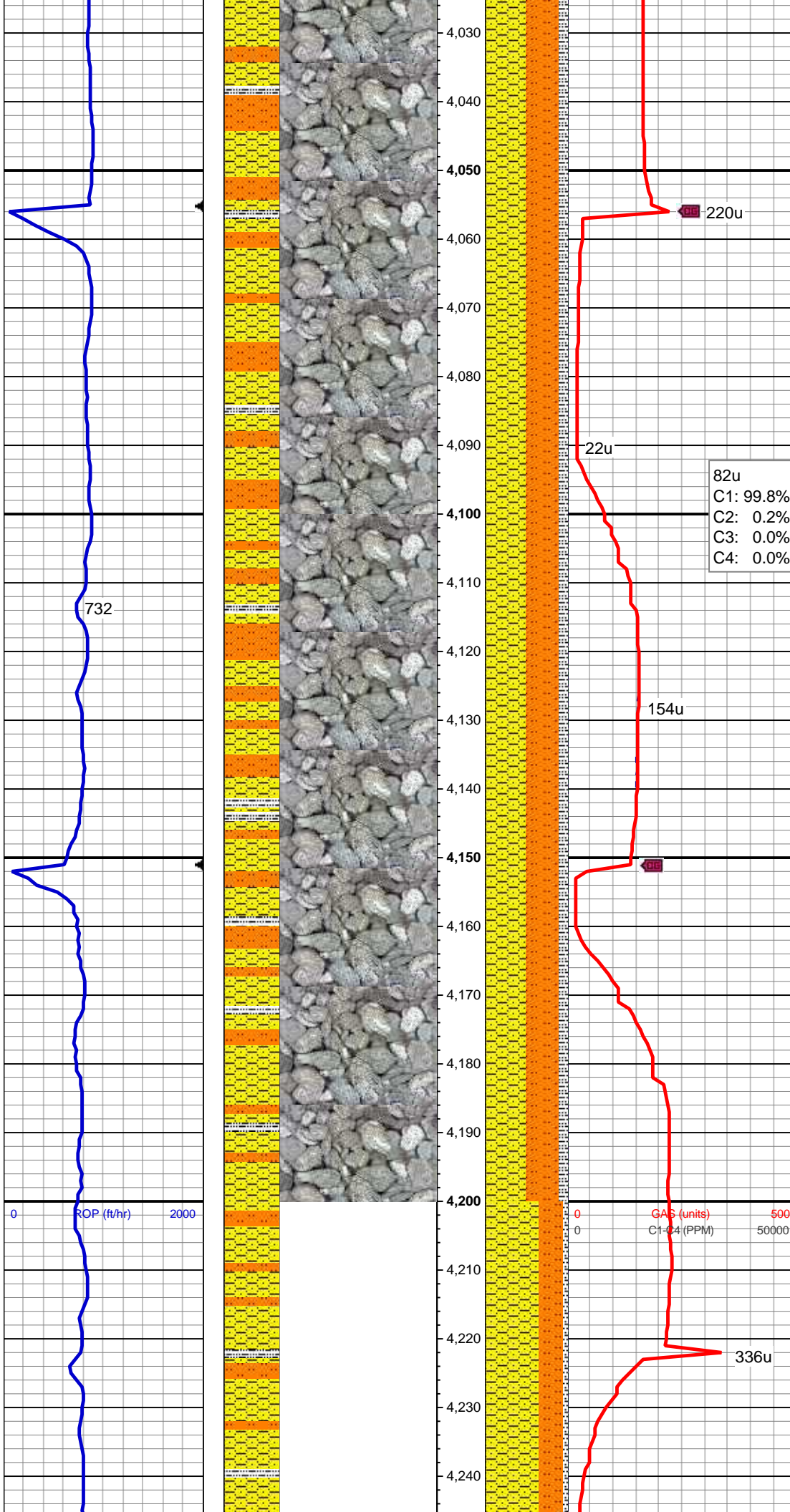
TVD: 3,766.95'  
Inclination: 9.9°  
Azimuth: 325.53°  
VS: 308.5'

65% SHY SS: wht - offwht, lt gy, lt - med brn, clr - trnsl grd ip, s&p ip, mod hd, brit - fri ip, vf-u f grd, sb rd-sb ang, mod srt, cons, mod cmtd, sl calc, 35% SLTST: lt - med gy, lt gy brn ip, sdy ip, mod frm, fri ip, sb blk, gt tex, slty - arg mt, rr glau, tr mics frag, tr dissm & clus pyr, cut con by asph, nfsoc

MD: 3,904'  
TVD: 3,859.51'  
Inclination: 10.15°  
Azimuth: 326.15°  
VS: 318.61'

MD: 3,999'  
TVD: 3,953.01'  
Inclination: 10.26°  
Azimuth: 323.14°  
VS: 329.27'

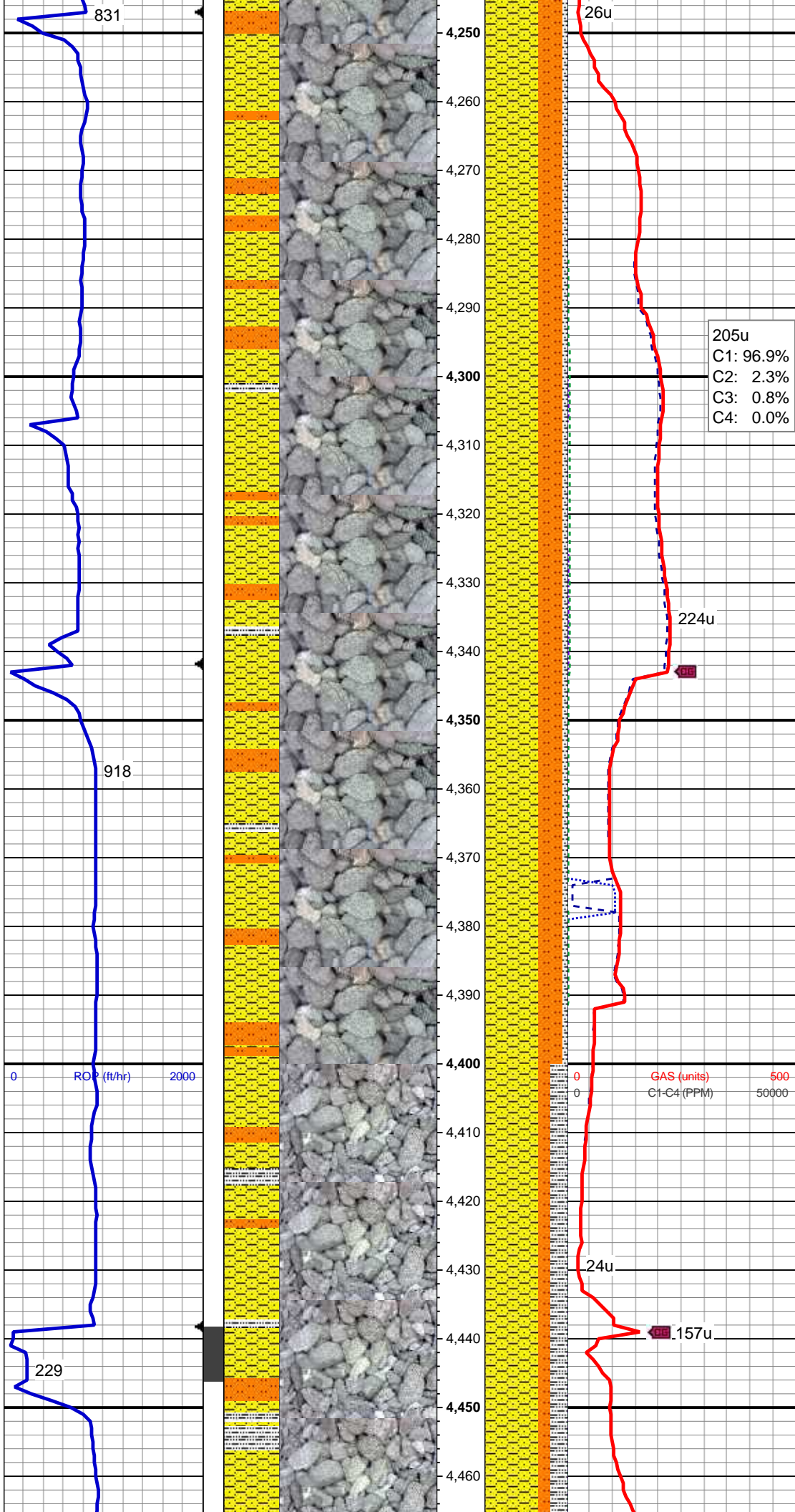




MD: 4,094'  
TVD: 4,046.52'  
Inclination: 10.03°  
Azimuth: 322.91°  
VS: 426.39'

50% SHY SS: lt - med gy, tr offwht -  
lt gy, clr - trnsl grd ip, s&p ip, mod -  
v hd, brit - fri ip, vf-u f grd, sb rd-sb  
ang, mod srt, cons, mod cmted, 40%  
SLTST: lt - med gy, lt gy brn ip, sdy  
ip, mod frm, fri ip, sb blk, gt tex, slty  
- arg mtx, sl calc, 10% SLTY SH,  
com glau, com fos frag Inoc, occ  
dissm & clus pyr, dul orng mnrl flor,  
cut con by asph, nsoc

MD: 4,189'  
TVD: 4,140.1'  
Inclination: 9.8°  
Azimuth: 320.88°  
VS: 439.26'



MD: 4,284'  
TVD: 4,233.76'  
Inclination: 9.5°  
Azimuth: 319.84°  
VS: 451.52'

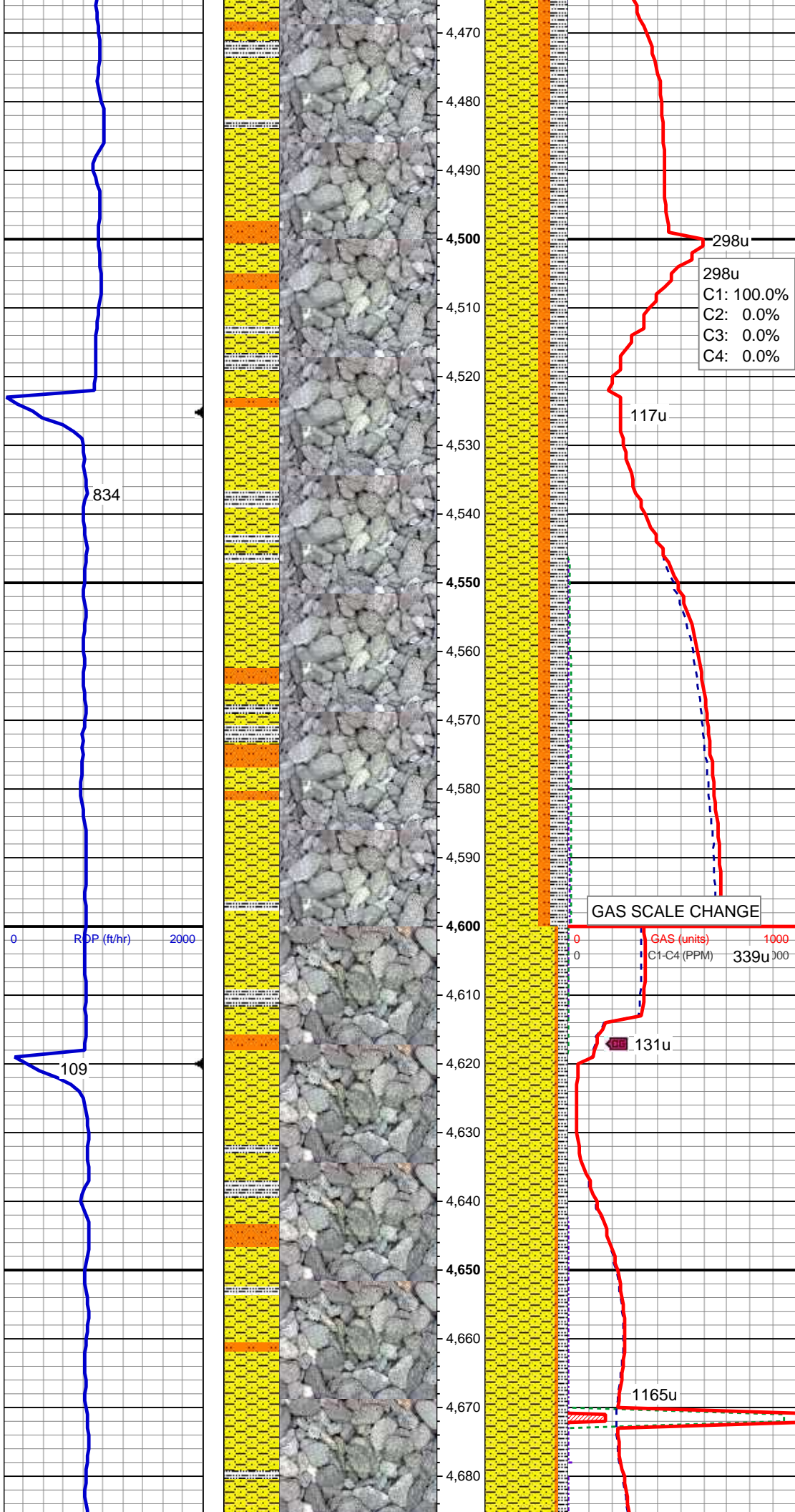
65% SHY SS: wht - offwht, lt gy, clr - trnsl gr, s&p ip, hd, brit, vf-u f grd, sb rd-sb ang, mod srt, cons, mod cmted, fy intlam ip wi 30% SLTST: med gy, lt gy brn ip, sdy ip, mod frm, fri ip, sb blkly, gt tex, slty - arg mtx, sl calc, 5% SLTY SH, tr glau, tr dissm pyr, occ mics frag, nfsoc

205u  
C1: 96.9%  
C2: 2.3%  
C3: 0.8%  
C4: 0.0%

MD: 4,379'  
TVD: 4,327.51'  
Inclination: 9.11°  
Azimuth: 320.31°  
VS: 463.3'

GAS (units)  
C1-C4 (PPM)





MD: 4,474'  
TVD: 4,421.06'  
Inclination: 10.94°  
Azimuth: 331.06°  
VS: 476.98'

65% SHY SS: wht - offwht, lt gy, clr -  
trnsl gr, s&p ip, hd- brit, vf-u f grd,  
sb rd-sb ang, mod srt, cons, mod  
calc, mod cmted, fy intlam ip wi 15%  
SLTST: med gy, lt gy brn ip, sdy ip,  
mod frm, fri ip, sb blk, gt tex, slty -  
arg mtx, sl calc, 20% SLTY SH:  
med gy, s&p vf-f ss gr ip, frm-brit,  
pty - sb blk, sb wxy - sl gt tex, arg -  
slty mtx, sl calc, tr diss pyr, occ  
mics frag, sl tr flor cut, fnt dul thn  
bl-wh ring, no flor or stn

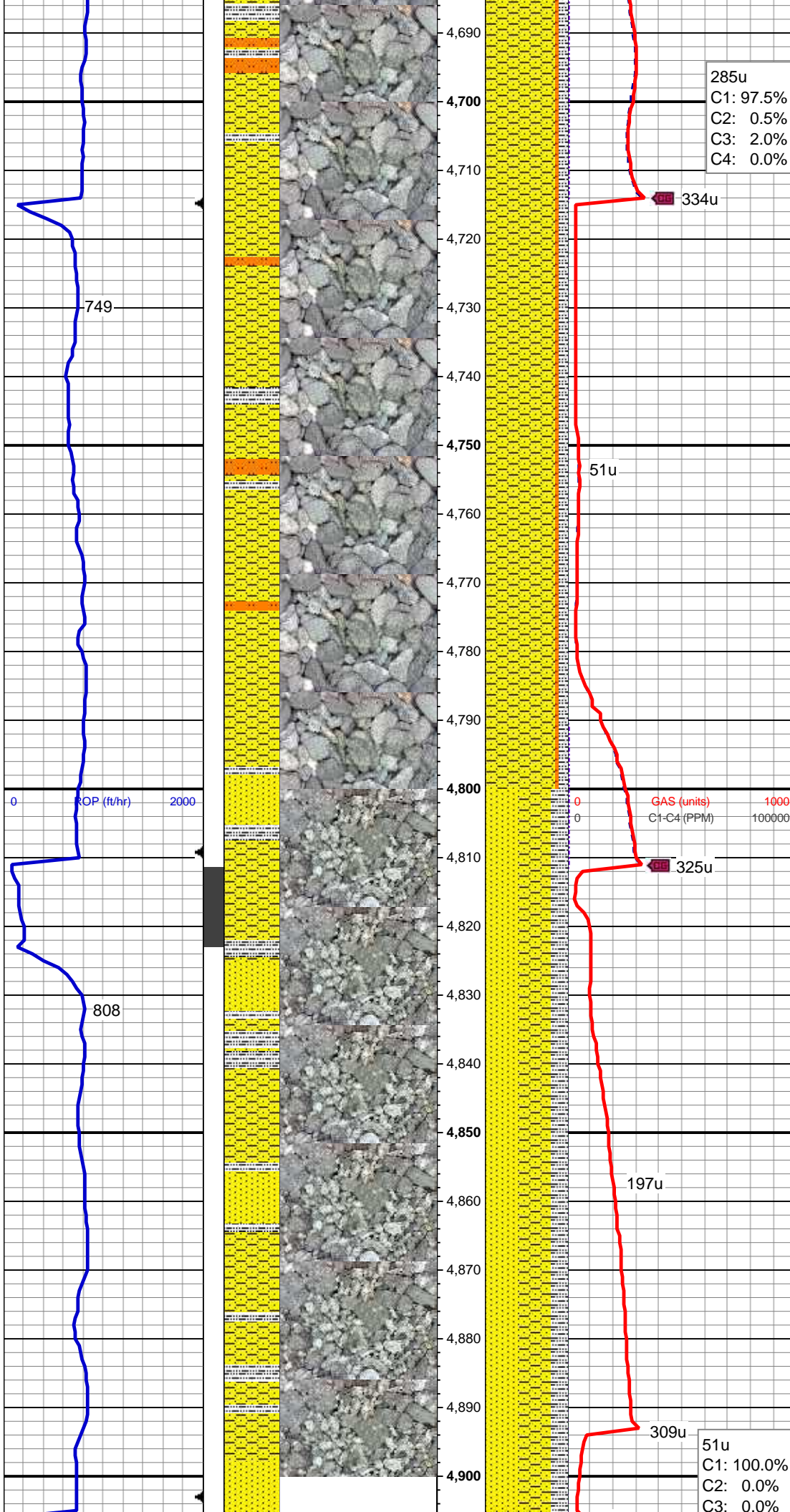
GAS SCALE CHANGE

GAS (units)  
C1-C4 (PPM)

131u

1165u

MD: 4,663'  
TVD: 4,606.96'  
Inclination: 9.84°  
Azimuth: 328.46°  
VS: 506.44'



85% SHY SS: wht - offwht, lt gy, clr - trnsl gr, s&p ip, hd- brit, vf-u f grd, sb rd-sb ang, mod srt, cons, mod calc, mod cmtd, scat dk gn med gr sb ang glauc, fy intlam ip wi 5% SLTST; 10% SLTY SH: med-dk gy, s&p vf-f ss gr ip, frm-brit, plty - sb blk, sb wxy - sl gt tex, slty mtz; tr diss m pyr, sl tr flr cut, fnt thn dul bl-wh ring, no flr or stn

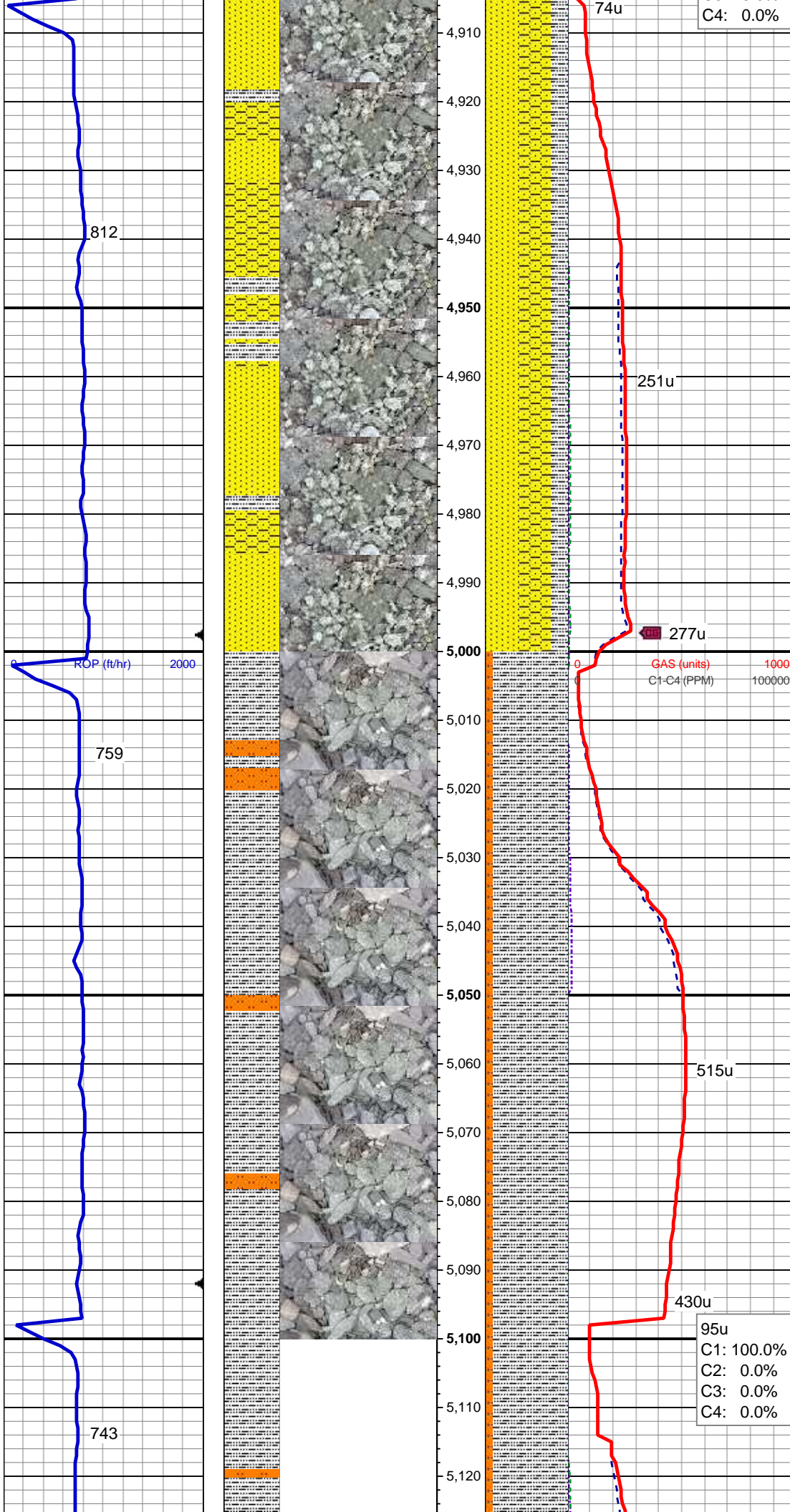
MD: 4,758'  
TVD: 4,700.63'  
Inclination: 9.4°  
Azimuth: 328.84°  
VS: 520'

MUD WT: 8.4 VIS: 27

MD: 4,852'  
TVD: 4,793.16'  
Inclination: 10.83°  
Azimuth: 325.5°  
VS: 533.84'

40% SHY SS: wht - offwht, lt gy, clr - trnsl gr, s&p ip, hd- brit, vf-u f grd, sb rd-sb ang, mod srt, cons, mod calc, mod cmtd, tr dk gn med gr sb ang glauc; 40% SS: wh-off wh, clr-trnsl gr, rr s&p, vf-f grd, sb rd-sb



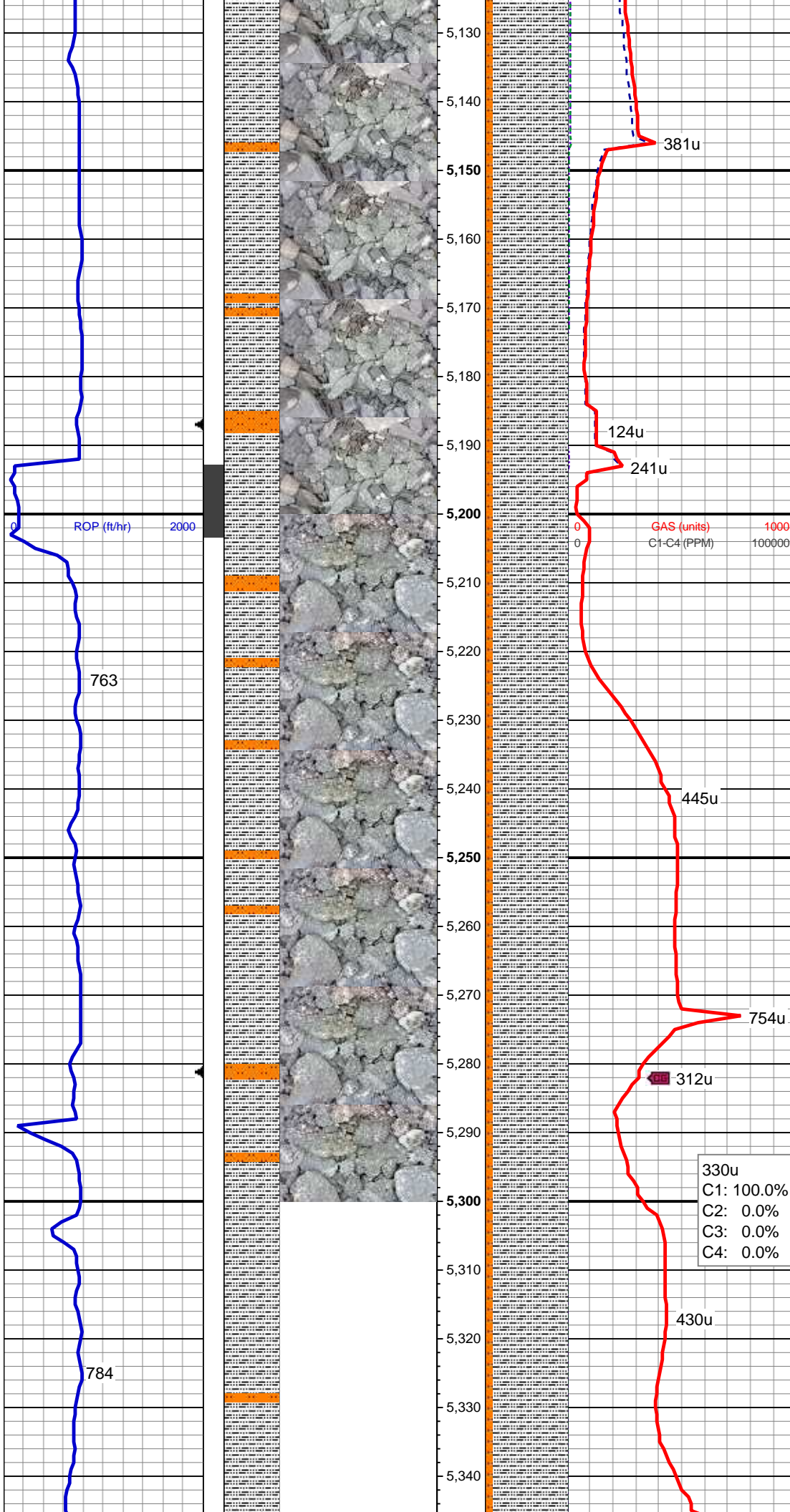


ang, w srt, pred cons, mod calc;  
20% SLTY SH: lt-dk gy, s&p vf-f ss  
gr ip, frm-brit, plty - sb blkly, sb wxy -  
sl gt tex, slty mtz; tr diss pyr, sl tr  
flor cut, no flor or stn

MD: 4,946'  
TVD: 4,885.61'  
Inclination: 10.03°  
Azimuth: 326.35°  
VS: 547.94'

MD: 5,041'  
TVD: 4,979.22'  
Inclination: 9.6°  
Azimuth: 323.29°  
VS: 561.17'

90% SLTY SH: med-dk gy, rr s&p  
vf-f ss gr, frm-brit, plty - sb blkly, sb  
wxy - sl gt tex, slty mtz, tr pyr; 10%  
SLTST: med gy- lt gy brn, mod frm,  
fri ip, sb blkly, gt tex, slty mtz, sl calc;  
tr bent; sl tr flor cut, fnt thn dul bl-wh  
ring, no flor or stn



MD: 5,135'  
TVD: 5,071.97'  
Inclination: 9.13°  
Azimuth: 322.18°  
VS: 573.35'

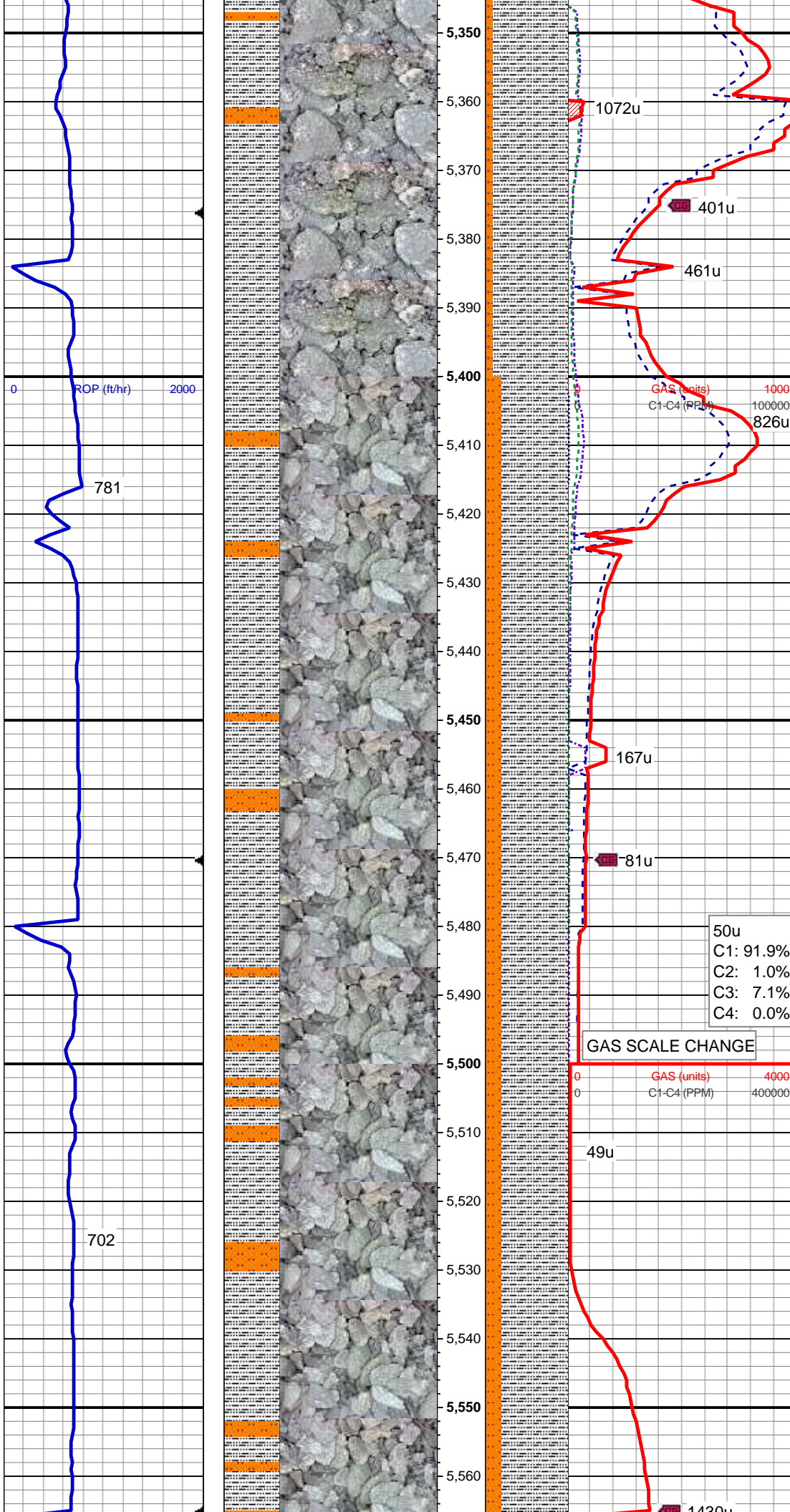
MD: 5,230'  
TVD: 5,165.64'  
Inclination: 10.07°  
Azimuth: 319.51°  
VS: 585.62'

90% SLTY SH: med-dk gy, rr s&p  
vf-f ss gr, frm-brit, plty - sb blkly, sb  
wxy - sl gt tex, slty mtz, tr pyr; 10%  
SLTST: med gy- lt gy brn, mod frm,  
fri ip, sb blkly, gt tex, slty mtz, sl calc;  
tr bent; sl tr flr cut, fnt thn dul bl-wh  
ring, no flr or strn

330u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

MD: 5,325'  
TVD: 5,259.29'  
Inclination: 9.22°  
Azimuth: 317.01°  
VS: 597.5'

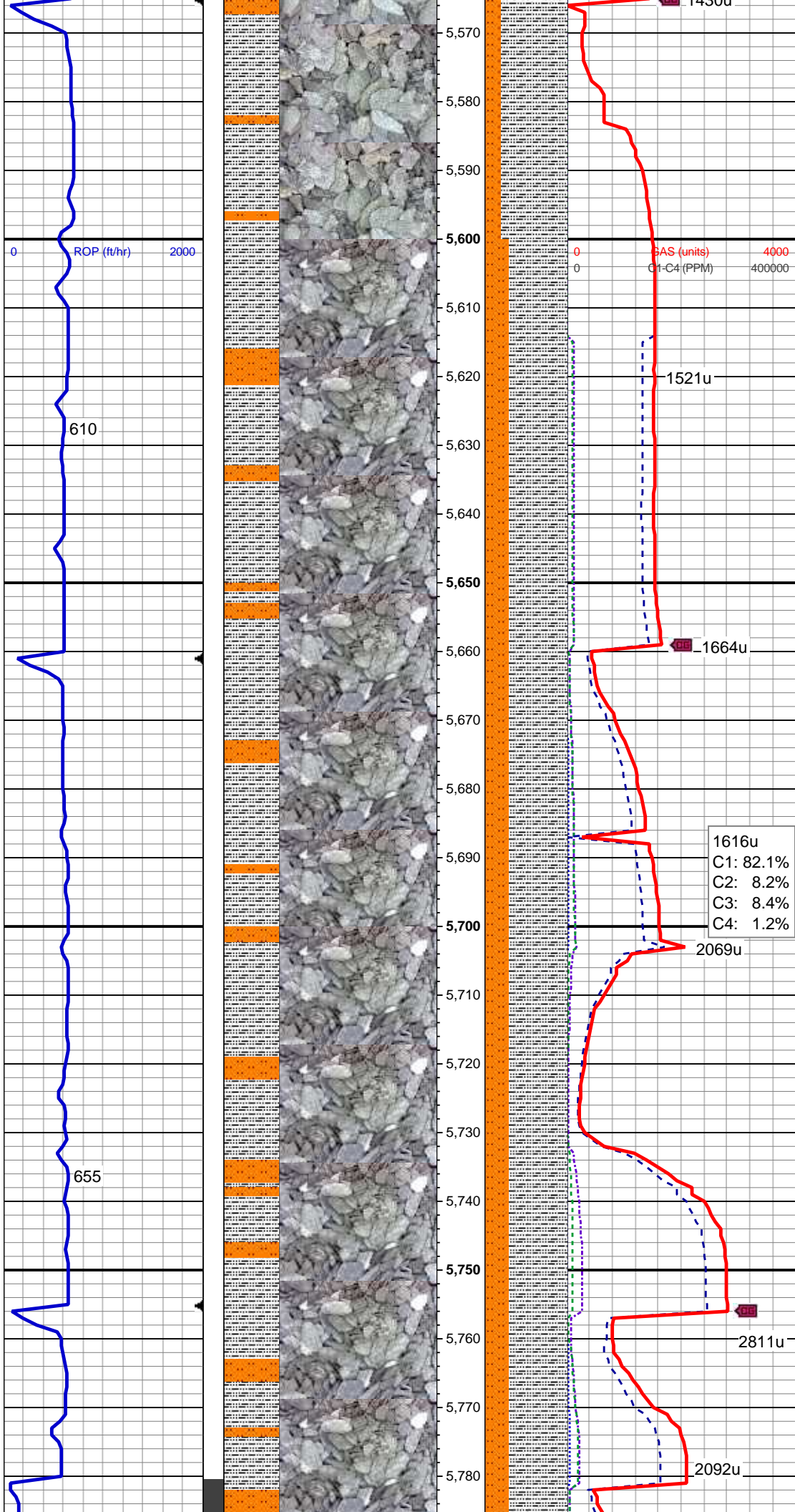




MD: 5,419'  
TVD: 5,352.17'  
Inclination: 8.51°  
Azimuth: 315.19°  
VS: 607.95'

80% SLTY SH: med-dk gy, rr s&p  
vf-f ss gr, frm-brit, plty - sb blkly, sb  
wxy - sl gt tex, slty mtx, sl calc, rr pyr  
20% SLTST: med gy- lt gy brn, mod  
frm, fri ip, sb blkly, gt tex, slty mtx,  
mod calc; rr bent; sl tr flor cut, fnt  
thn dul bl-wh ring, no flor or stn

MD: 5,514'  
TVD: 5,446.24'  
Inclination: 7.52°  
Azimuth: 314.53°  
VS: 617.29'



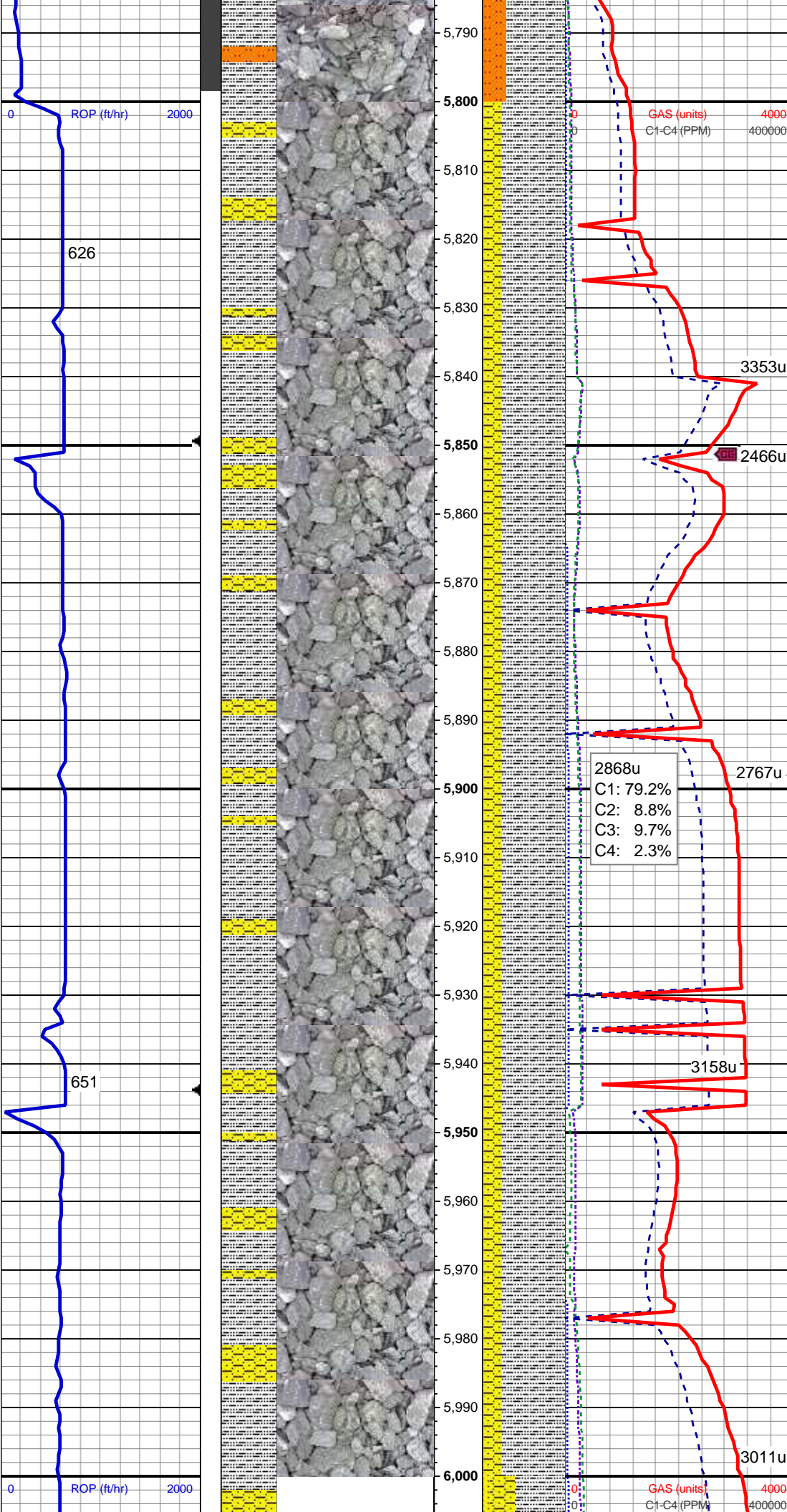
MD: 5,609'  
TVD: 5,540.5'  
Inclination: 6.79°  
Azimuth: 315.03°  
VS: 625.62'

MD: 5,703'  
TVD: 5,633.87'  
Inclination: 6.45°  
Azimuth: 312.97°  
VS: 633.15'

70% SLTY SH: med-dk gy, rr s&p  
vf-f ss gr, frm-brit, plty - sb blk, sb  
wxy - sl gt tex, slty mt, sl calc; 30%  
SLTST: med gy- lt gy brn, mod frm,  
fri ip, sb blk, gt tex, slty mt, mod  
calc; rr bent; tr flr cut, fnt thn dul  
bl-wh ring, no flr or stn

MUD WT: 9.5 VIS: 30

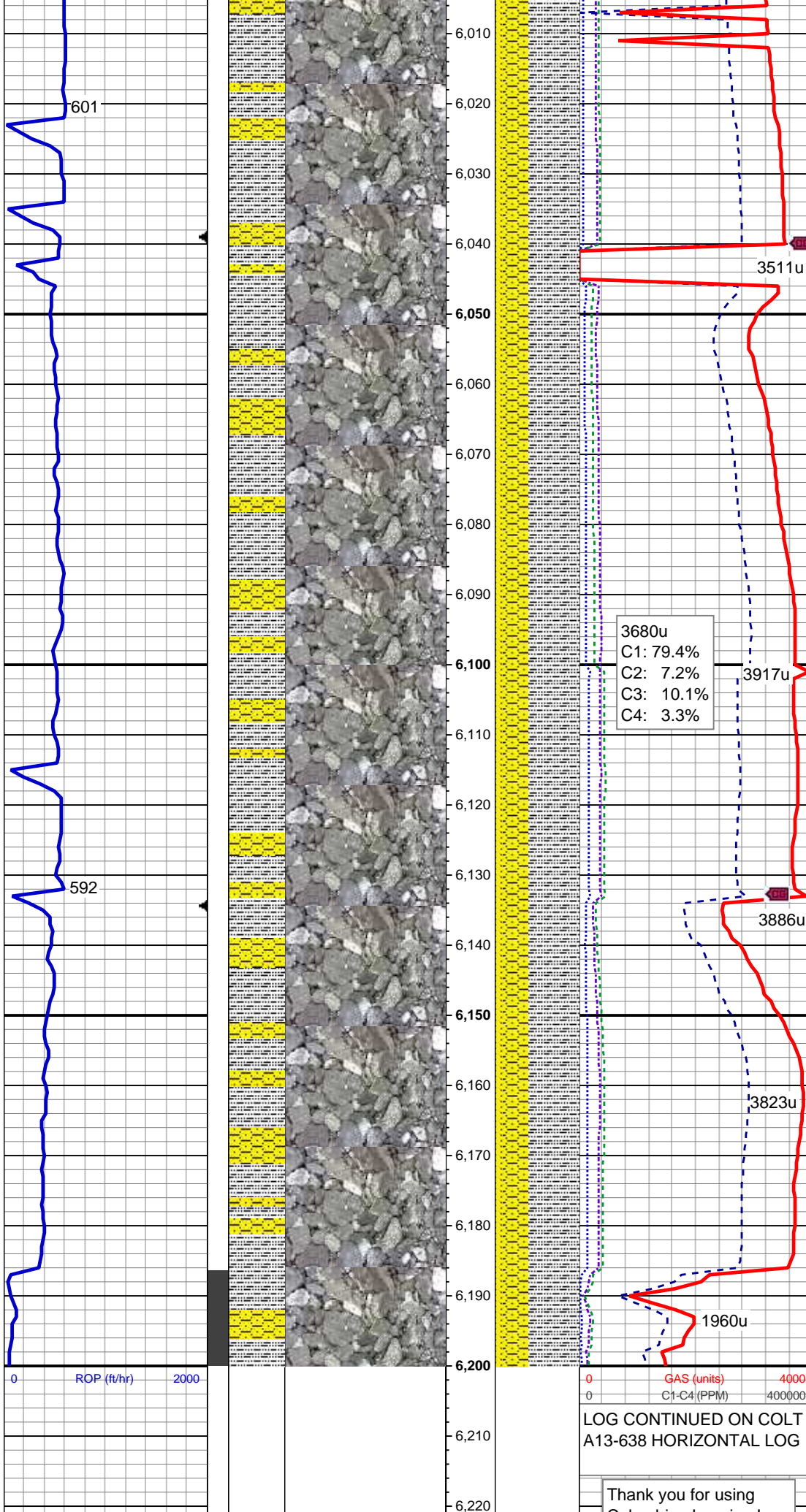




MD: 5,798'  
TVD: 5,728.51'  
Inclination: 3.45°  
Azimuth: 318.94°  
VS: 638.95'

MD: 5,893'  
TVD: 5,823.37'  
Inclination: 2.79°  
Azimuth: 317.76°  
VS: 642.82'

75% SLTY SH: med-dk gy, rr s&p  
vf-f ss gr, frm-brit, plty - sb blkly, sb  
wxy - sl gt tex, slty mtx, sl calc; 25%  
SHY SS: wht - offwht, lt gy, clr - trnsl  
gr, s&p ip, hd- brit, vf-u f grd, sb  
rd-sb ang, mod srt, pred cons, mod  
calc, mod cmtd, rr dk gn f gr sb ang  
glauc; rr bent, rr pyr; sl tr flor cut, fnt  
thn dul bl-wh ring, no flor or stn



MD: 6,083'  
TVD: 6,013.14'  
Inclination: 2.87°  
Azimuth: 314.7°  
VS: 649.58'

SLTY SH: med-dk gy, rr s&p vf-f ss gr, frm-brit, plty - sb blkly, sb wxy - sl gt tex, slty mtx, sl calc; SHY SS: wht - offwht, lt gy, clr - trnsl gr, s&p ip, hd- brit, vf-u f grd, sb rd-sb ang, mod srt, pred cons, mod calc, mod cmtd; SS: wh-off wh, clr-trnsl gr, rr s&p, vf-f gr, sb rd-sb ang, w srt, cons, sl calc; fr dul bl-wh stmg flor cut, thn bri bl-wh ring, no flor or strn

MUD WT: 9.6 VIS: 40

Begin Build Section @ 6186' MD

MUD WT: 9.8 VIS: 40

LOG CONTINUED ON COLT A13-638 HORIZONTAL LOG

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115