

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name Castro Federal LD15-75-1HN (Vert)

Location NWNE SEC 15 T9N R58W

State COLORADO

County WELD

Country USA

Rig Number H&P 326

API Number 05-123-37484

Region DJ BASIN

Field WILDCAT

Spud Date 1/7/2014

Drilling Completed 1/14/2014

Surface Coordinates SEC 15 T9N R58W
556' FNL 2247' FEL

Bottom Hole Coordinates SEC 15 T9N R58W
660' FSL 2310' FEL

Ground Elevation 4706'

K.B. Elevation 4736'

Logged Interval 1300' **To** 10055'

Total Depth 10055'

Formation NIOBRARA C CHALK

Type of Drilling Fluid 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

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 |

F FOSSIL

| |
|----------------|
| GASTROPOD |
| INOCERAMUS |
| LOOLITE |
| 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 |
| INTEROOLITIC |

MOLDIC

| |
|------------|
| 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 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

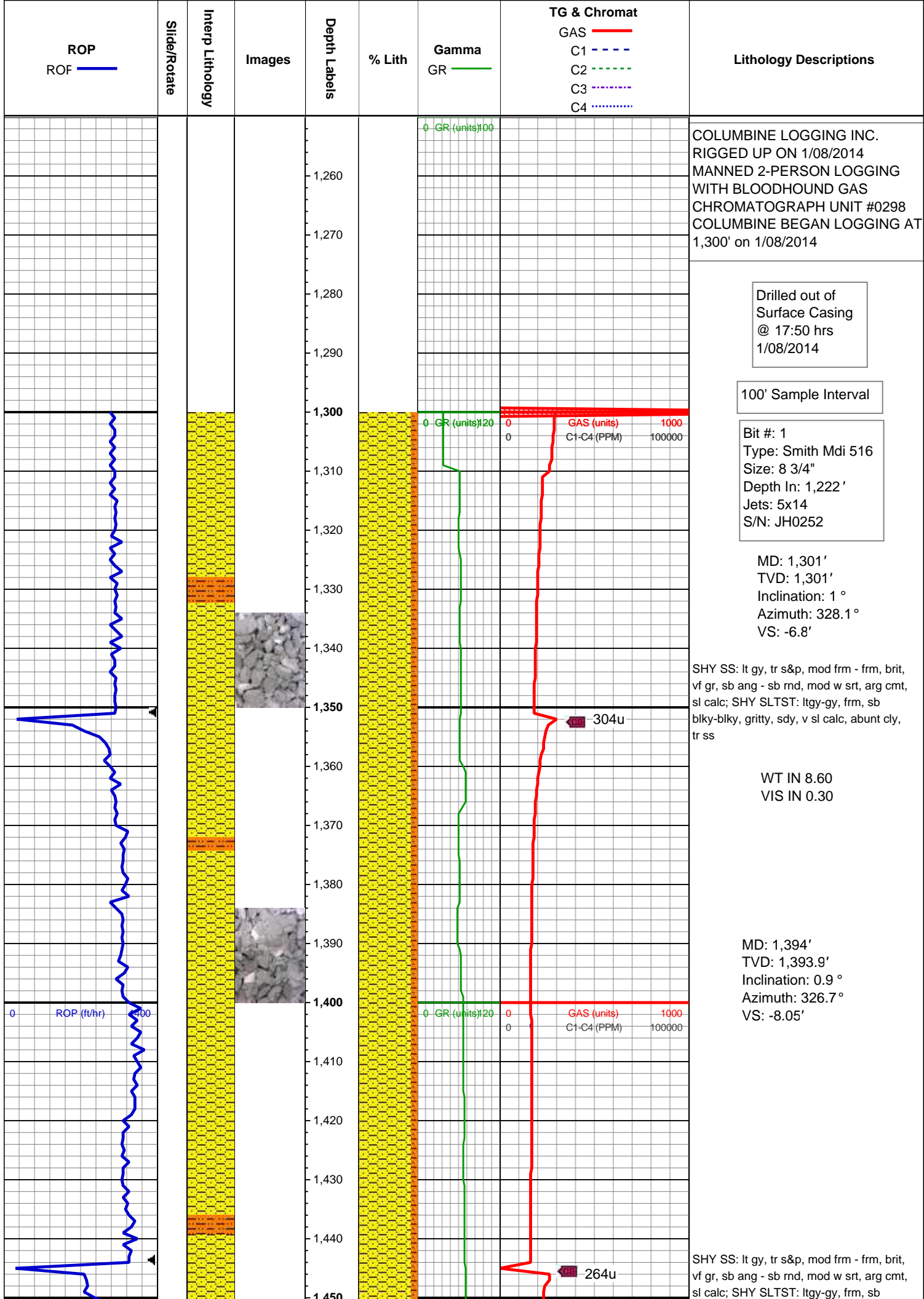
| |
|------------|
| BOUNDSTONE |
| CHALKY |
| CRYPTOXLN |

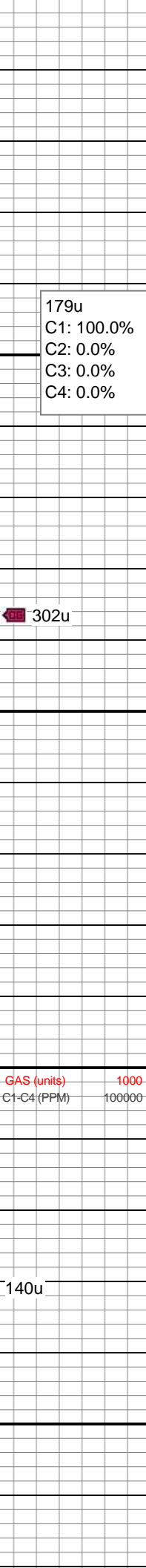
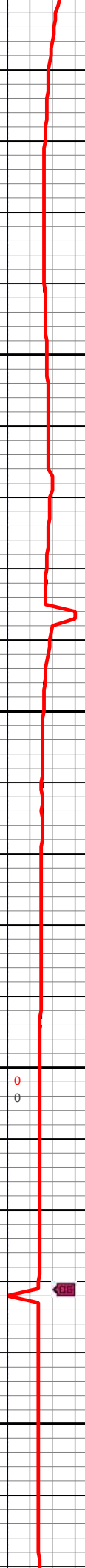
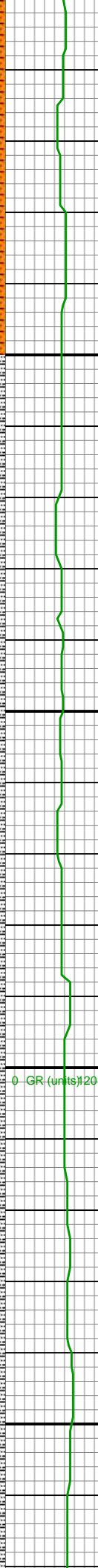
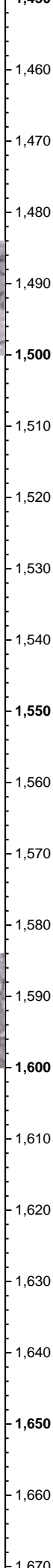
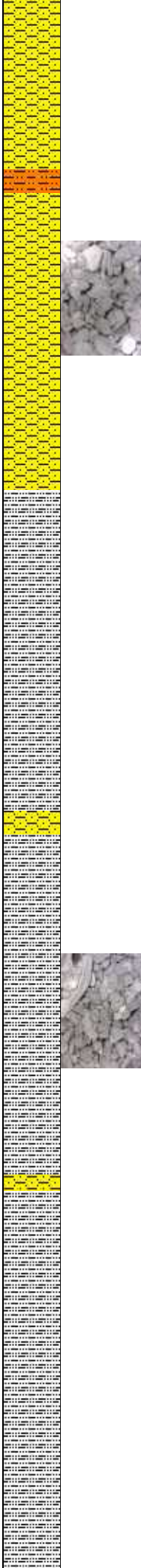
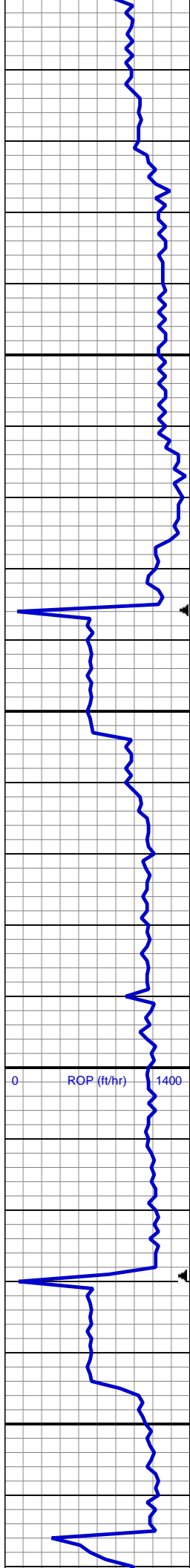
E EARTHY

| |
|----------------|
| FINELYXLN |
| GRAINSTONE |
| L LITHOGRAPHIC |
| MX MICROXLN |
| MS MUDSTONE |
| PS PACKSTONE |
| WS WACKESTONE |

Sorting

| |
|------------|
| M MODERATE |
| P POOR |
| W WELL |





blky-blky, gritty, sdy, v sl calc, abnt cly, tr ss

MD: 1,487'
TVD: 1,486.9'
Inclination: 1 °
Azimuth: 324.8 °
VS: -9.34'

SLTY SH: lt - med gy, mod frm, sft, sb
pity- sb blky, arg cmt; SHY SS: lt gy, tr
s&p, mod frm - frm, brit, vf gr, sb ang - sb
rnd, mod w srt, arg cmt, sl calc, abnt cly

MD: 1,580'
TVD: 1,579.91'
Inclination: 0.9 °
Azimuth: 325.7 °
VS: -8.36'

MD: 1,672'
TVD: 1,671.9'
Inclination: 0.9 °

Inclination: 0.9
Azimuth: 345.4°
VS: -8.95'

136u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

SLTY SH: lt - med gy, mod frm, sft, sb
plty- sb blkly, arg cmt; SHY SS: lt gy, tr
s&p, mod frm - frm, brit, vf gr, sb ang - sb
rnd, mod w srt, arg cmt, sl calc, SHY
SLTST: ltgy-gy, frm, sb blkly-blky, gritty,
sdy, v sl calc, abnt cly

WT IN 8.60
VIS IN 30.0

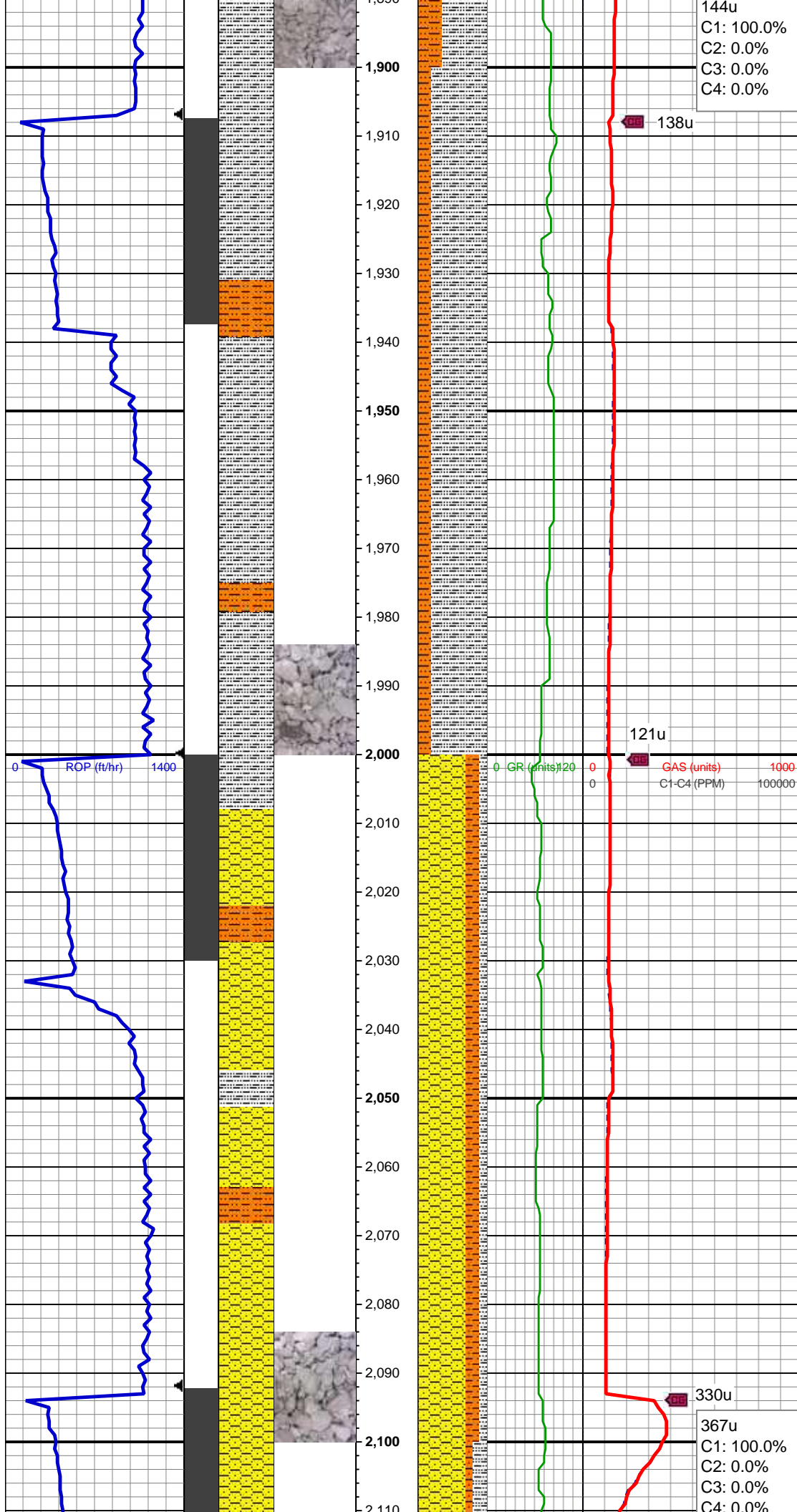
MD: 1,765'
TVD: 1,764.89'
Inclination: 0.7 °
Azimuth: 356.6°
VS: -9.17'

GR (units) 120 0 GAS (units) 1000
C1-C4 (PPM) 100000

145u

SLTY SH: lt - med gy, mod frm, sft, sb
plty- sb blkly, arg cmt; SHY SLTST:
ltgy-gy, frm, sb blkly-blky, gritty, sdy, v sl
calc, abnt cly

MD: 1,858'
TVD: 1,857.87'
Inclination: 2 °
Azimuth: 344.8°
VS: -9.63'



144u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

138u

SLTY SH: lt - med gy, mod frm, sft, sb
plty- sb blkly, arg cmt; SHY SLTST:
ltgy-gy, frm, sb blkly-blky, gritty, sdy, v sl
calc, abnt cly, tr shy ss

MD: 1,951'
TVD: 1,950.73'
Inclination: 4 °
Azimuth: 347.8 °
VS: -20.12'

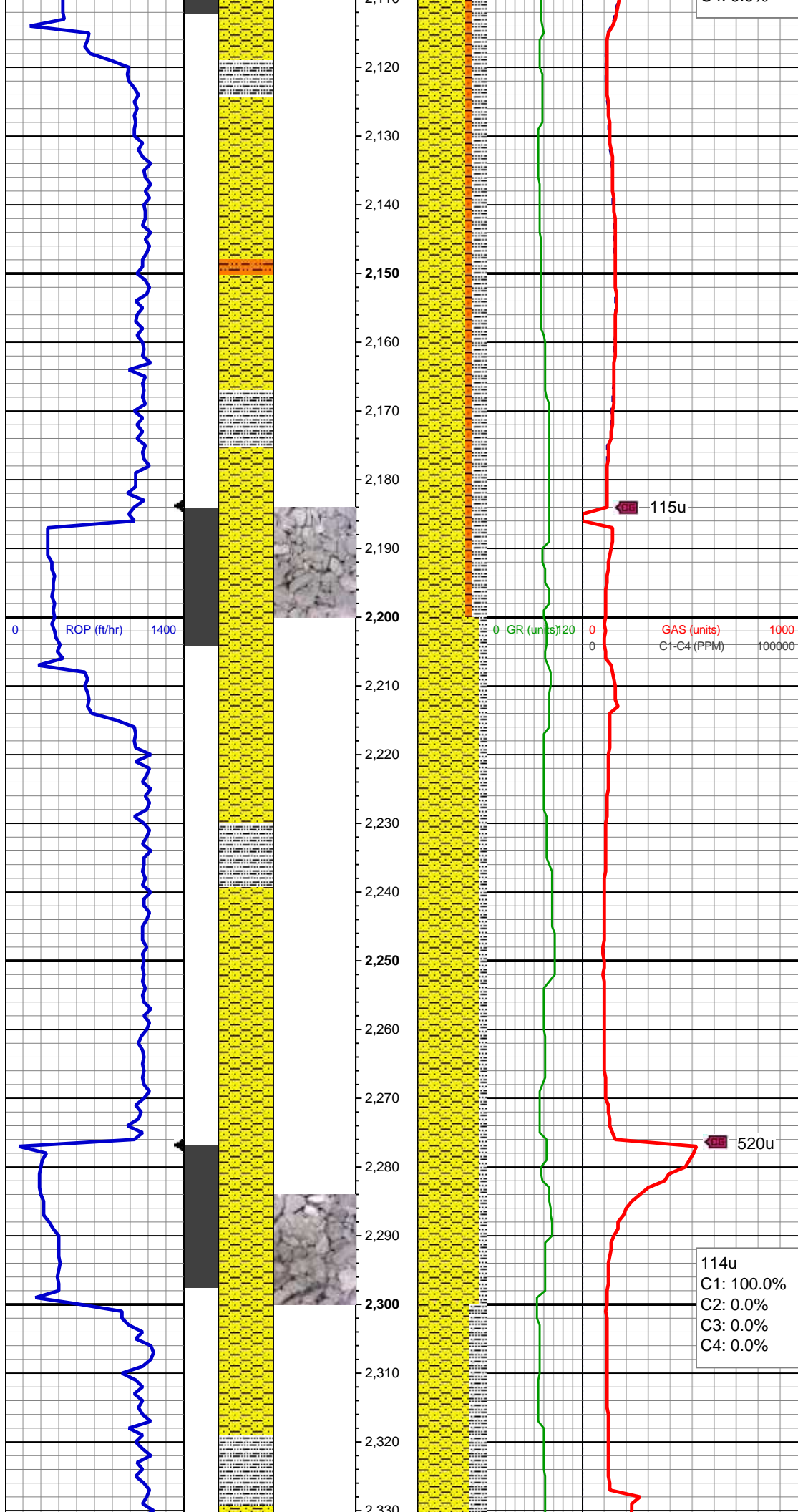
121u

0 GR (units) 120 0 GAS (units) 1000
0 C1-C4 (PPM) 100000

MD: 2,043'
TVD: 2,042.39'
Inclination: 5.9 °
Azimuth: 356.1 °
VS: -27.99'

SLTY SH: lt - med gy, mod frm, sft, sb
plty- sb blkly, arg cmt; SHY SS: lt gy, tr
s&p, mod frm - frm, brit, vf gr, sb ang - sb
rnd, mod w srt, arg cmt, sl calc, SHY
SLTST: ltgy-gy, frm, sb blkly-blky, gritty,
sdy, v sl calc, abnt cly

330u
367u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%



MD: 2,135'
TVD: 2,133.79'
Inclination: 7.1 °
Azimuth: 359.2°
VS: -38.4'

SLTY SH: lt - med gy, mod frm, sft, sb
plty- sb blkly, arg cmt; SHY SS: lt gy, tr
s&p, mod frm - frm, brit, vf gr, sb ang - sb
rnd, mod w srt, arg cmt, sl calc, SHY
SLTST: ltgy-gy, frm, sb blkly-blky, gritty,
sdy, v sl calc, abnt cly

115u

0 ROP (ft/hr) 1400

0 GR (units) 120 0 GAS (units) 1000
0 C1-C4 (PPM) 100000

MD: 2,228'
TVD: 2,225.99'
Inclination: 8 °
Azimuth: 359.6°
VS: -50.62'

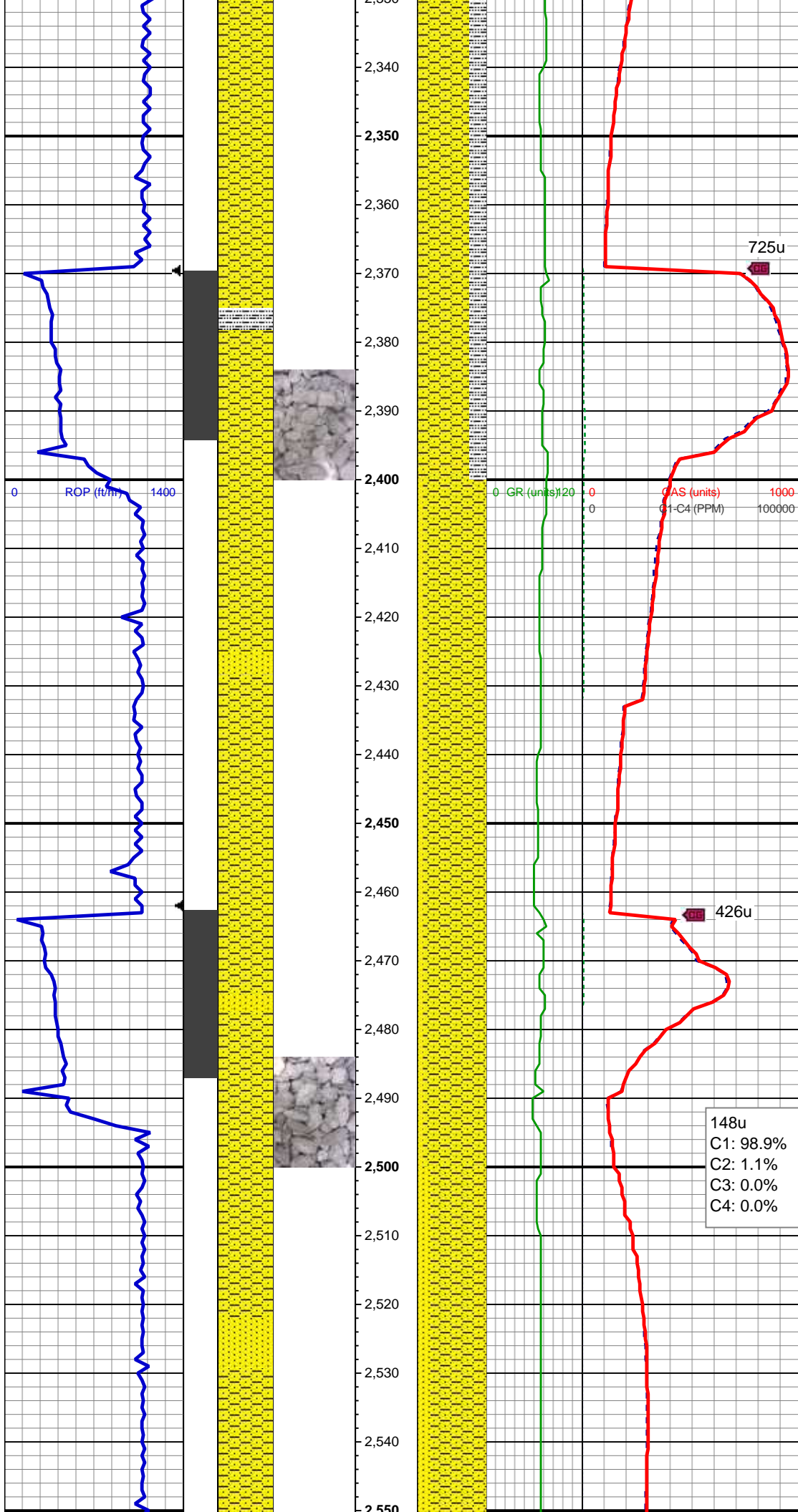
SHY SS: lt gy, tr s&p, mod frm - frm, brit,
vf gr, sb ang - sb rnd, mod w srt, arg cmt,
sl calc, SLTY SH: lt - med gy, mod frm,
sft, sb plty- sb blkly, arg cmt

520u

114u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

WT IN 8.65
VIS IN 0.30

MD: 2,320'
TVD: 2,317'
Inclination: 8.8 °



Azimuth: 354 °
VS: -64.03'

SHY SS: lt gy, tr s&p, mod frm - frm, brit,
vf gr, sb ang - sb rnd, mod w srt, arg cmt,
sl calc, SLTY SH: lt - med gy, mod frm,
sft, sb plty- sb blkly, arg cmt

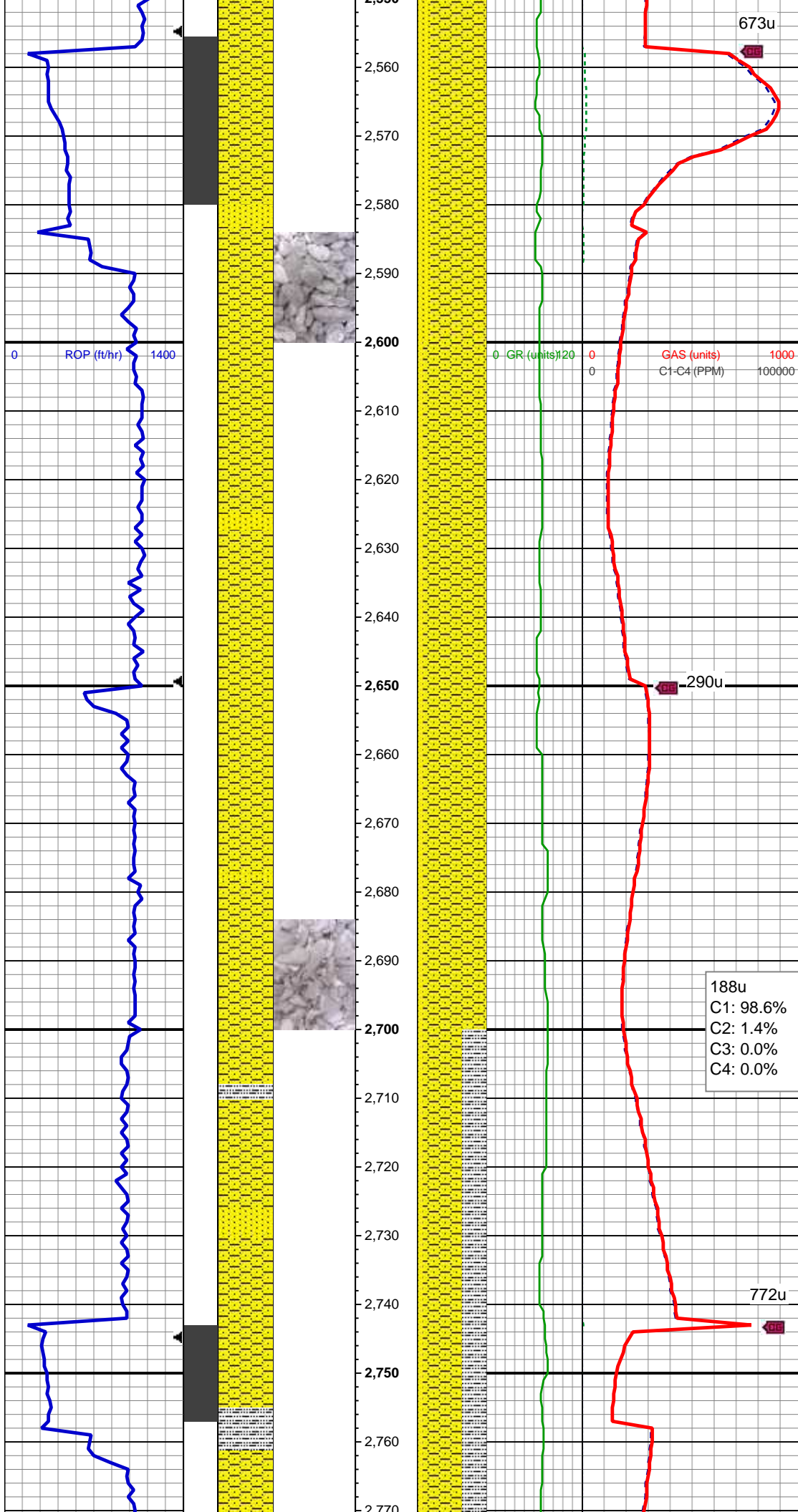
MD: 2,413'
TVD: 2,408.75'
Inclination: 10 °
Azimuth: 352.6 °
VS: -79.15'

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

MD: 2,506'
TVD: 2,500.09'
Inclination: 11.7 °
Azimuth: 352 °
VS: -96.55'

WT IN 8.85
VIS IN 0.28

SHY SS: lt gy, tr s&p, mod frm - frm, brit,
vf gr, sb ang - sb rnd, mod w srt, arg cmt,
sl calc, SS: off wh -av. s&p, sft, brit. vf -f



gr, sb ang - sb rnd, mod srt,calc, occ glau

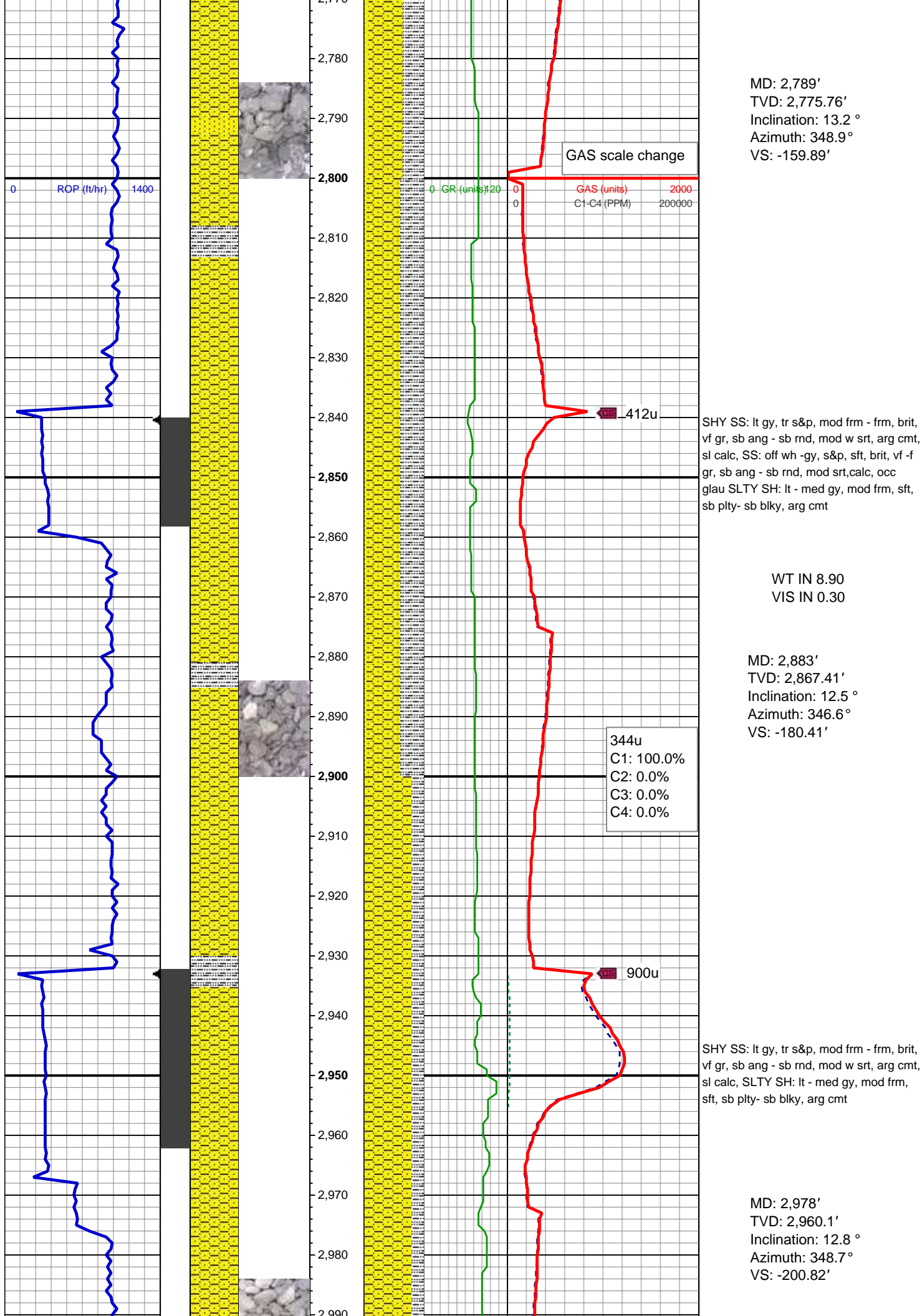
MD: 2,599'
TVD: 2,590.86'
Inclination: 13.4 °
Azimuth: 351.9 °
VS: -116.61'

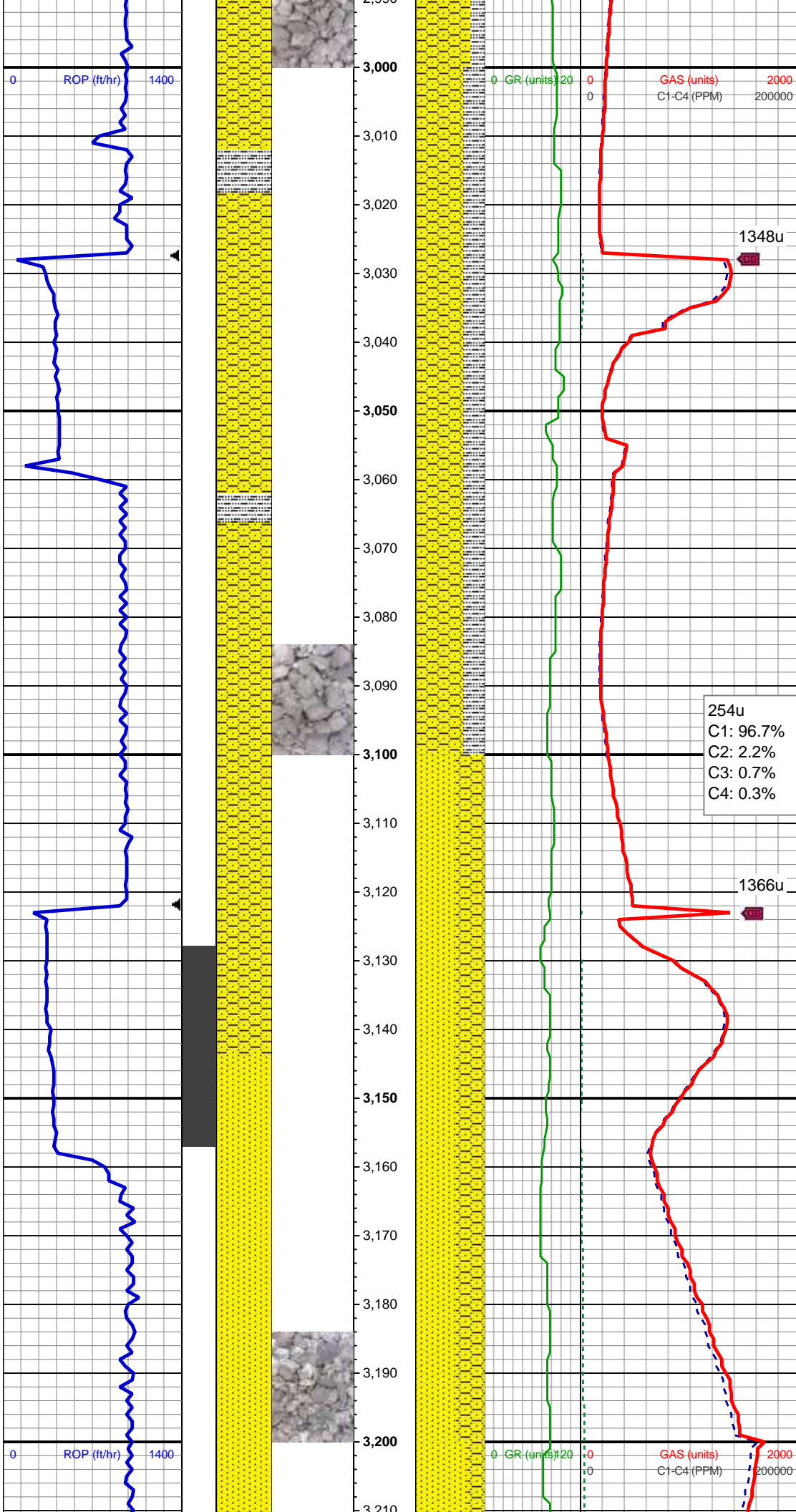
SHY SS: lt gy, tr s&p, mod frm - frm, brit, vf gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc, SS: off wh -gy, s&p, sft, brit, vf -f gr, sb ang - sb rnd, mod srt,calc, occ glau

188u
C1: 98.6%
C2: 1.4%
C3: 0.0%
C4: 0.0%

MD: 2,694'
TVD: 2,683.29'
Inclination: 13.3 °
Azimuth: 351.1 °
VS: -138.37'

SHY SS: lt gy, tr s&p, mod frm - frm, brit, vf gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc, SS: off wh -gy, s&p, sft, brit, vf -f gr, sb ang - sb rnd, mod srt,calc, occ glau SLTY SH: lt - med gy, mod frm, sft, sb ply- sb blkly, arg cmt





WT IN 8.90
VIS IN 0.30

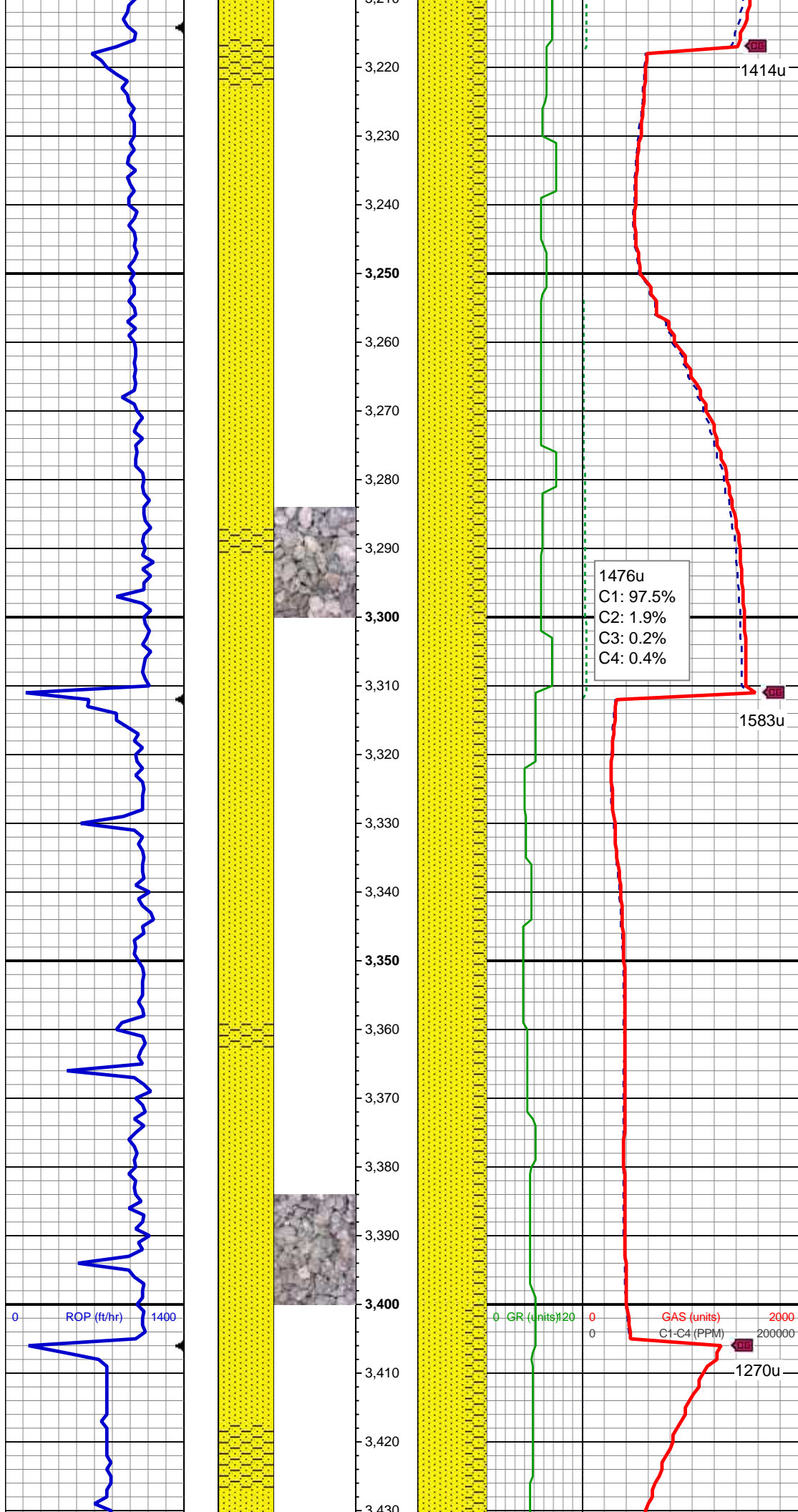
SHY SS: lt gy, tr s&p, mod frm - frm, brit,
vf gr, sb ang - sb rnd, mod w srt, arg cmt,
sl calc, SLTY SH: lt - med gy, mod frm,
sft, sb plty- sb blkly, arg cmt

MD: 3,073'
TVD: 3,052.63'
Inclination: 13.4 °
Azimuth: 352.6 °
VS: -222.13'

254u
C1: 96.7%
C2: 2.2%
C3: 0.7%
C4: 0.3%

SS: off wh -gy, clr, s&p, sft, brit, vf -f gr, sb
ang - sb rnd, mod srt, calc, com glau SHY
SS: lt gy, tr s&p, mod frm - frm, brit, vf gr,
sb ang - sb rnd, mod w srt, arg cmt, sl
calc,

MD: 3,167'
TVD: 3,143.74'
Inclination: 15.1 °
Azimuth: 351.7 °
VS: -245.11'



SS: off wh -gy, clr, s&p, sft, brit, vf -f gr, sb
ang - sb rnd, mod srt,calc, com glau SHY
SS: lt gy, tr s&p, mod frm - frm, brit, vf gr,
sb ang - sb rnd, mod w srt, arg cmt, sl
calc,

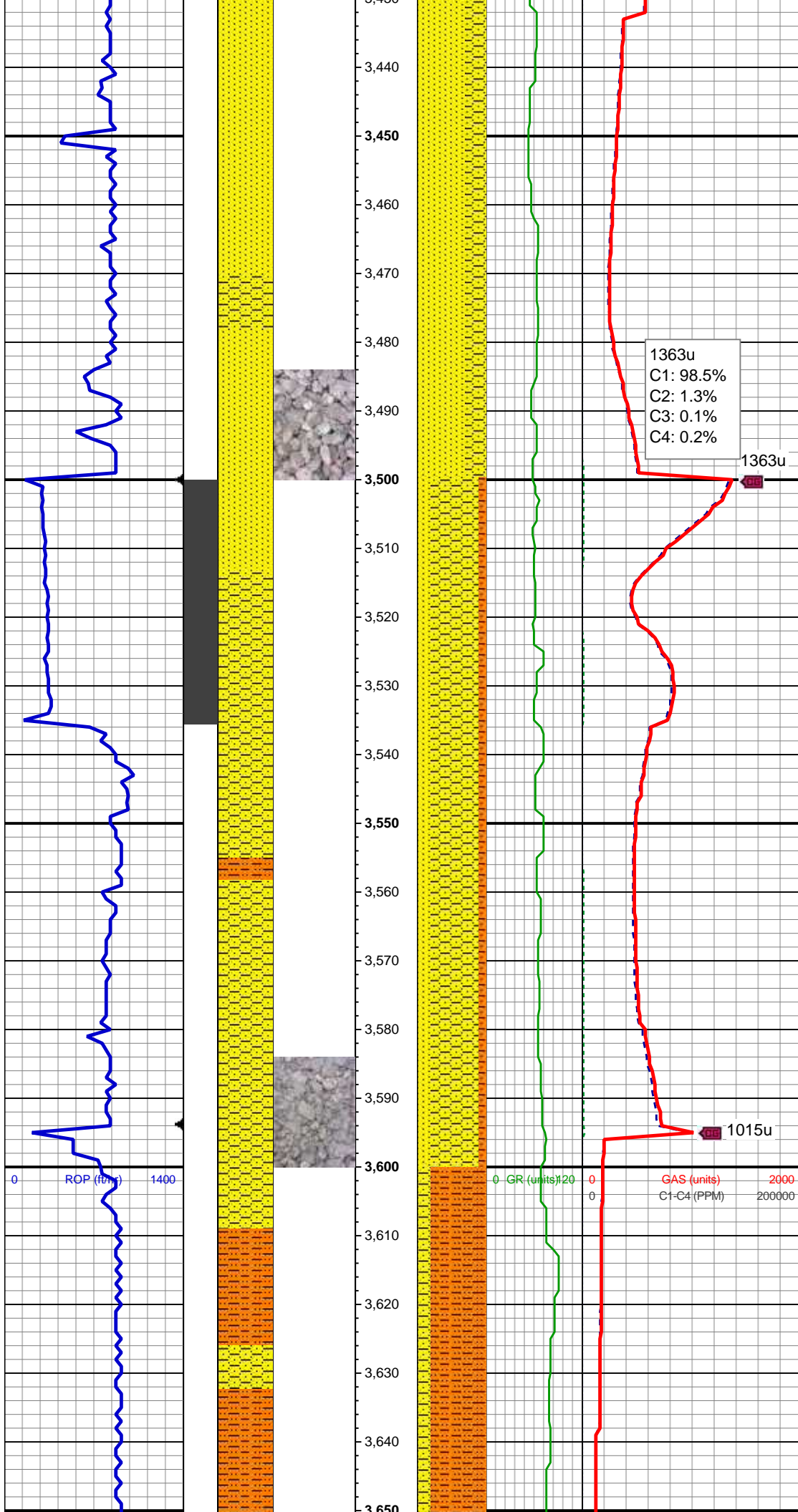
MD: 3,262'
TVD: 3,235.39'
Inclination: 15.4 °
Azimuth: 350.6 °
VS: -269.88'

SS: off wh -gy, clr, s&p, sft, brit, vf -f gr, sb
ang - sb rnd, mod srt,calc, com glau SHY
SS: lt gy, tr s&p, mod frm - frm, brit, vf gr,
sb ang - sb rnd, mod w srt, arg cmt, sl
calc,

MD: 3,356'
TVD: 3,325.84'
Inclination: 16.2 °
Azimuth: 351 °
VS: -295.23'

WT IN 8.90
VIS IN 0.32

MD: 3,451'
TVD: 3,416.82'



TVD: 3,416.83'
Inclination: 17.2 °
Azimuth: 351.5 °
VS: -322.3'

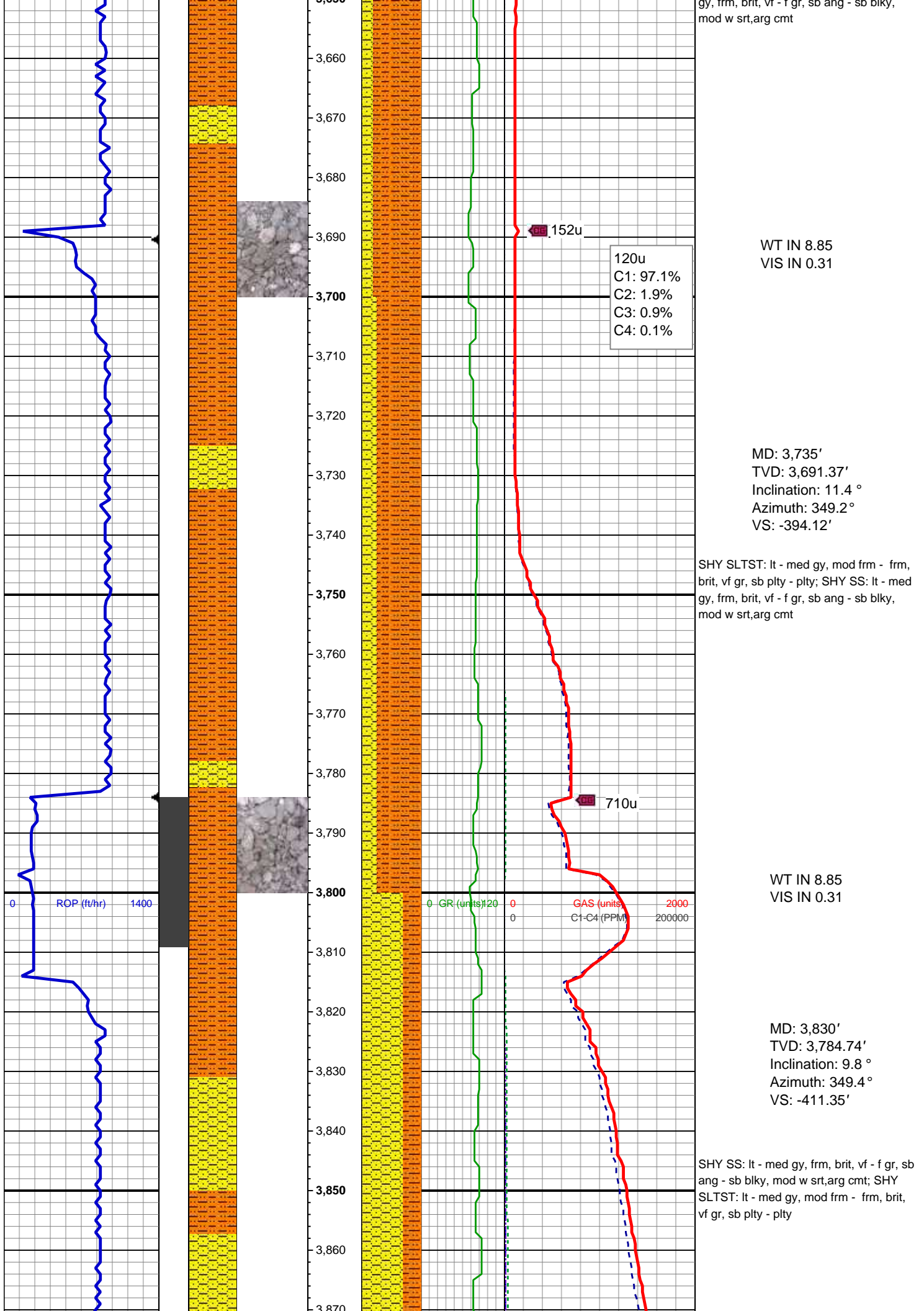
SS: off wh -gy, clr, s&p, sft, brit, vf -f gr, sb ang - sb rnd, mod srt,calc, com glau SHY
SS: lt gy, tr s&p, mod frm - frm, brit, vf gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc

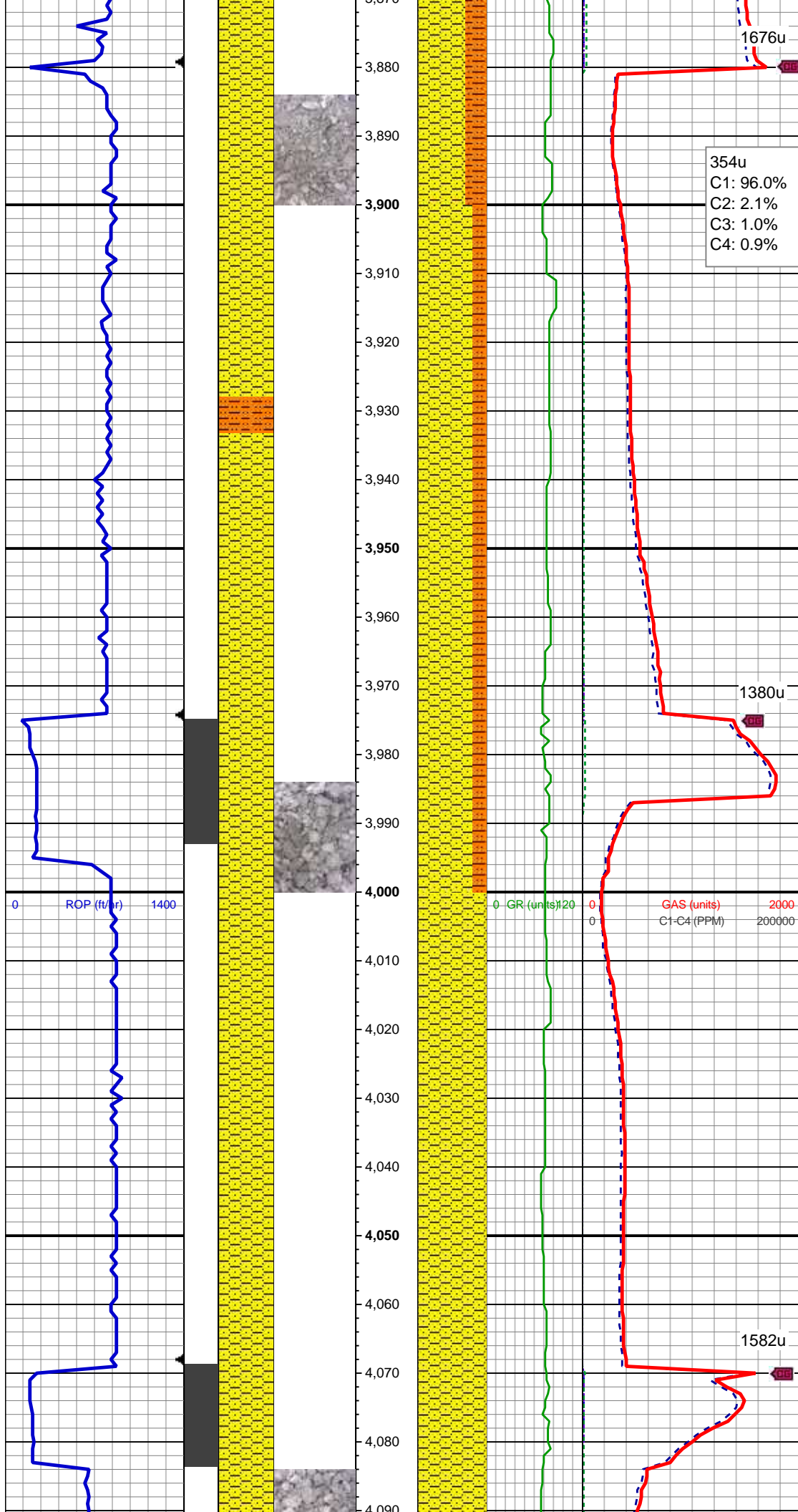
MD: 3,545'
TVD: 3,507.05'
Inclination: 15.4 °
Azimuth: 352.7 °
VS: -348.5'

SHY SS: lt gy, tr s&p, mod frm - frm, brit, vf gr, sb ang - sb rnd, mod w srt, arg cmt, sl calc; SS: off wh -gy, clr, s&p, sft, brit, vf -f gr, sb ang - sb rnd, mod srt,calc, com glau; SHY SLTST: lt - med gy, mod frm - frm, brit, vf gr, sb plty - plty

MD: 3,640'
TVD: 3,598.81'
Inclination: 14.6 °
Azimuth: 352.6 °
VS: -372.95'

SHY SLTST: lt - med gy, mod frm - frm, brit, vf gr, sb plty - plty; SHY SS: lt - med



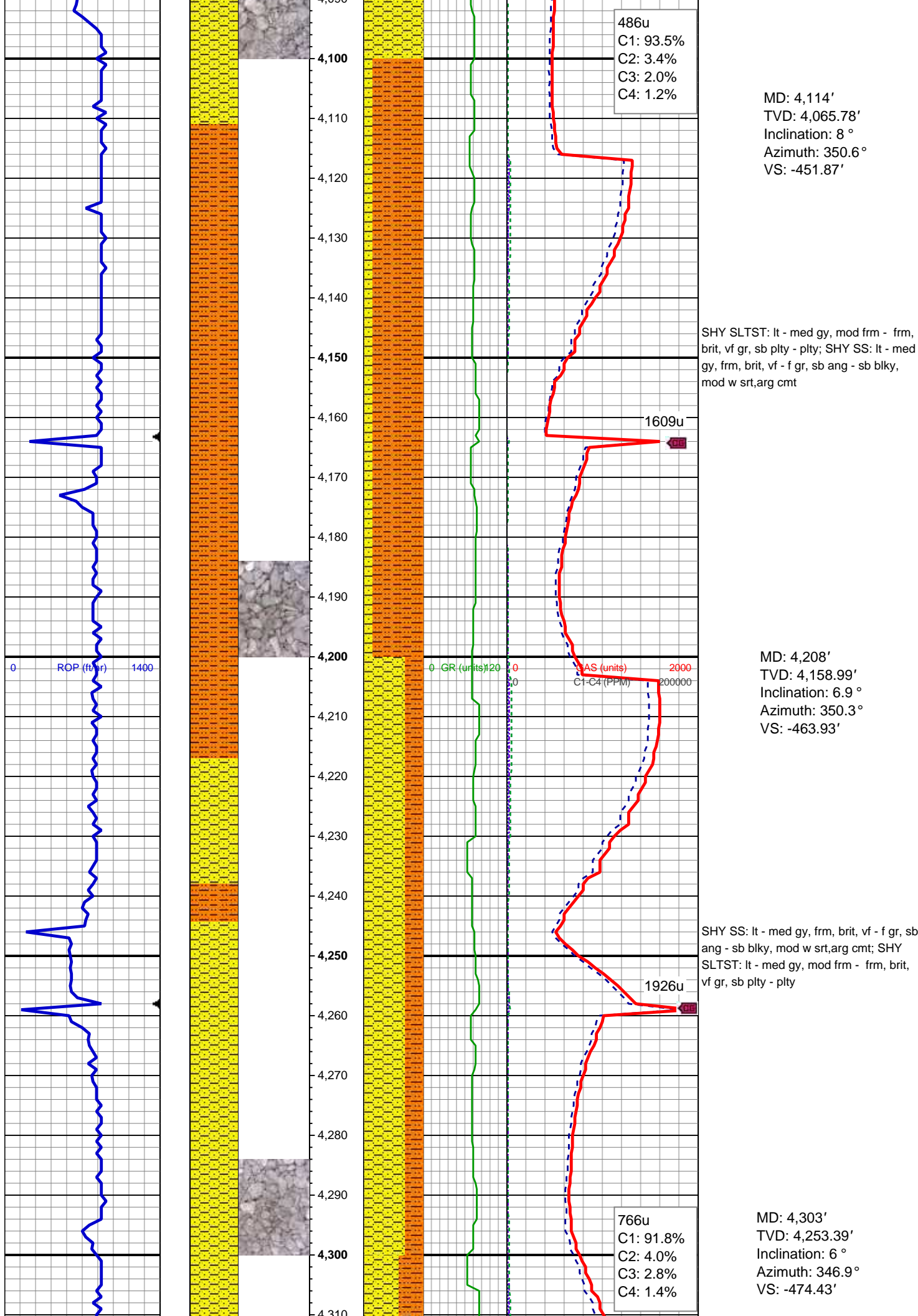


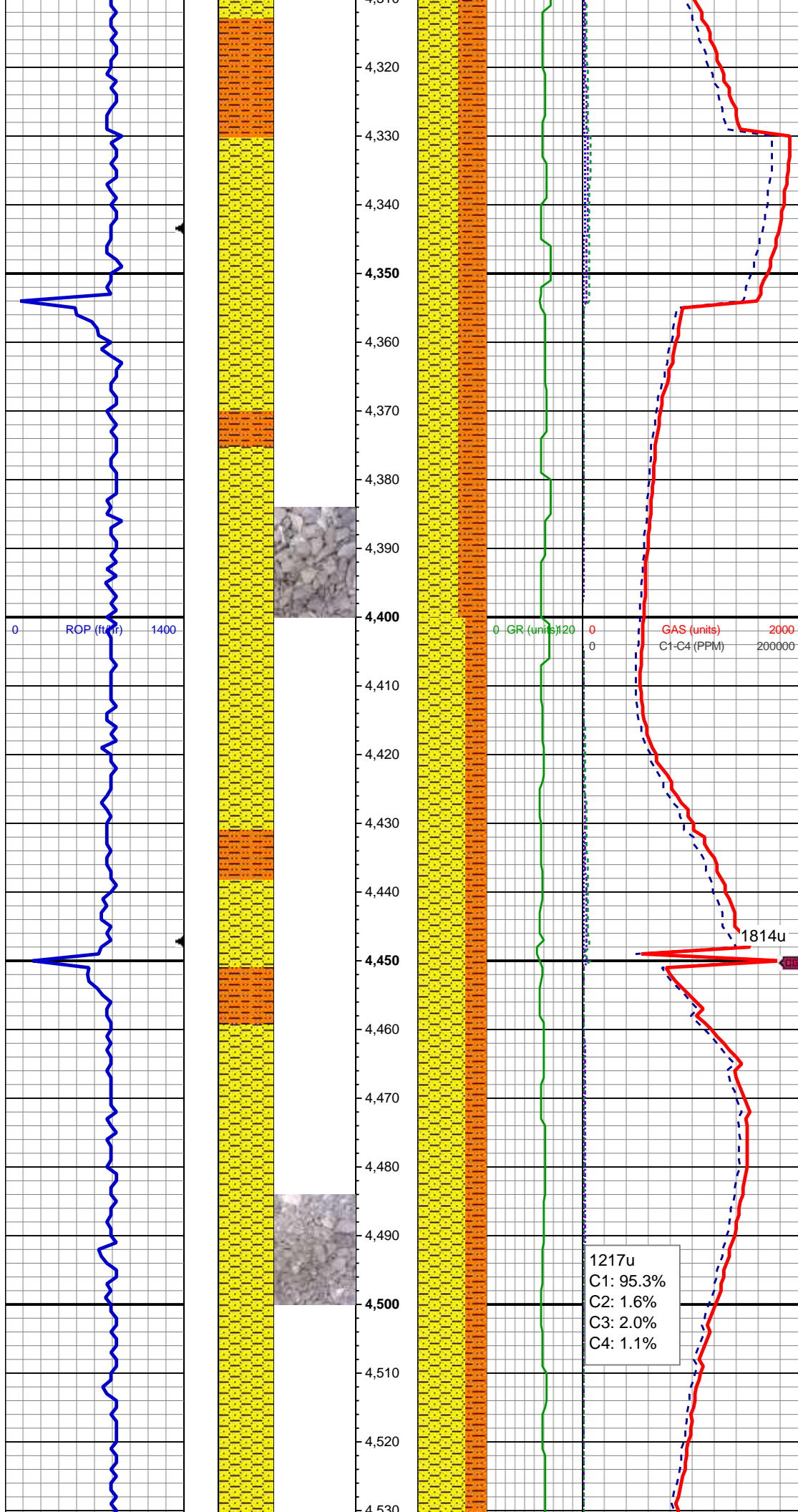
MD: 3,924'
TVD: 3,877.63'
Inclination: 7.8 °
Azimuth: 354 °
VS: -425.61'

SHY SS: lt - med gy, frm, brit, vf - f gr, sb
ang - sb blk, mod w srt, arg cmt; SHY
SLTST: lt - med gy, mod frm - frm, brit,
vf gr, sb plty - plty

MD: 4,019'
TVD: 3,971.72'
Inclination: 8.1 °
Azimuth: 352 °
VS: -438.68'

SHY SS: lt - med gy, frm, brit, vf - f gr, sb
ang - sb blk, mod w srt, arg cmt





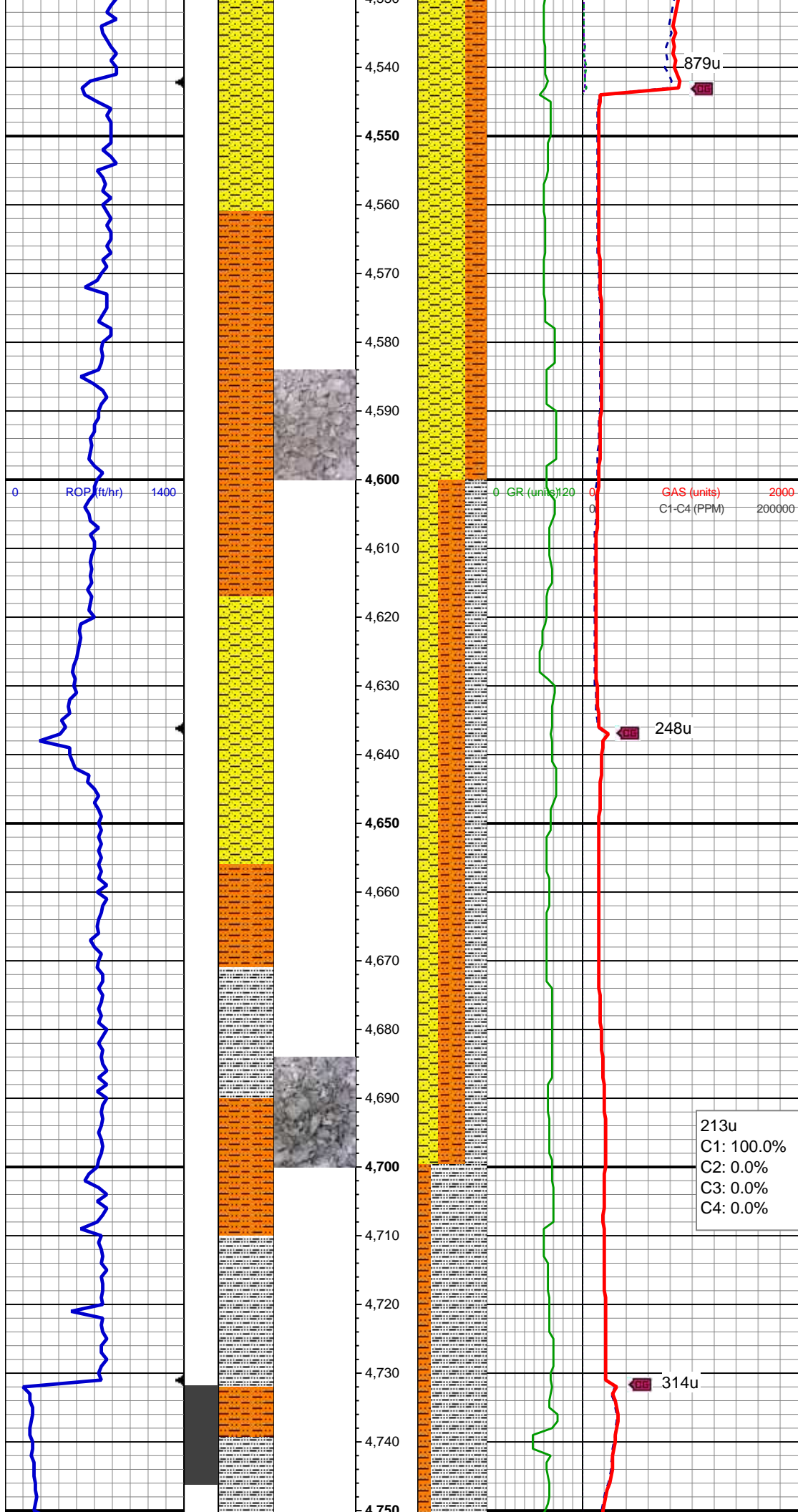
SHY SS: lt - med gy, frm, brit, vf - f gr, sb
ang - sb blk, mod w srt, arg cmt; SHY
SLTST: lt - med gy, mod frm - frm, brit,
vf gr, sb plty - plty

MD: 4,398'
TVD: 4,347.95'
Inclination: 5 °
Azimuth: 337.8 °
VS: -483.16'

SHY SS: lt - med gy, frm, brit, vf - f gr, sb
ang - sb blk, mod w srt, arg cmt; SHY
SLTST: lt - med gy, mod frm - frm, brit,
vf gr, sb plty - plty

MD: 4,492'
TVD: 4,441.63'
Inclination: 4.6 °
Azimuth: 321.8 °
VS: -490'

1217u
C1: 95.3%
C2: 1.6%
C3: 2.0%
C4: 1.1%



SHY SS: lt - med gy, frm, brit, vf - f gr, sb ang - sb blk, mod w srt, arg cmt; SHY SLTST: lt - med gy, mod frm - frm, brit, vf gr, sb plty - plty

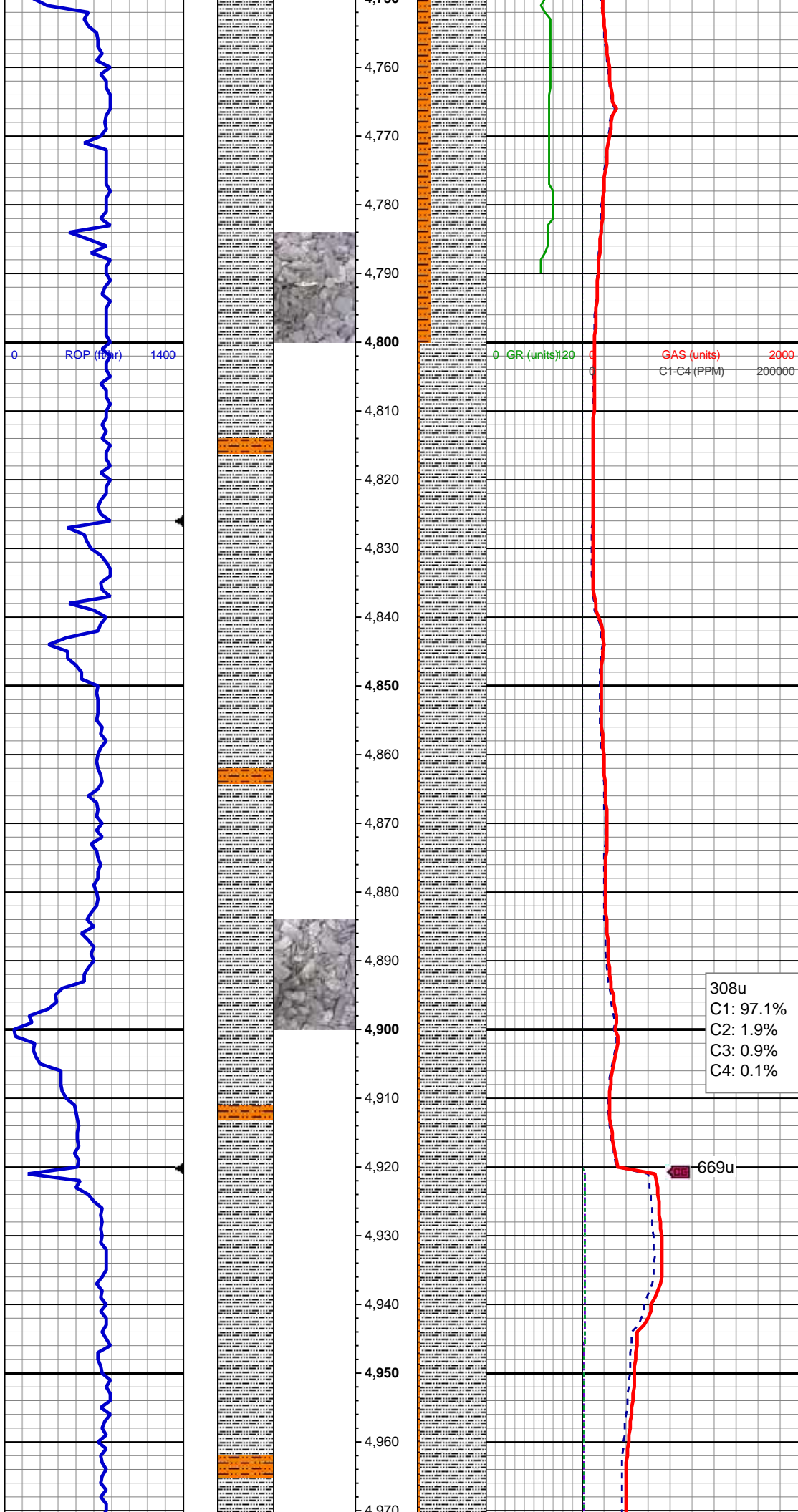
MD: 4,587'
TVD: 4,536.38'
Inclination: 3.7 °
Azimuth: 320.2 °
VS: -495.44'

SHY SLTST: lt - med gy, mod frm, brit, vf gr, sb ang - sb plty, arg cmt; SLTY SH: lt - med gy, sme dk gy, mod frm, brit, vf gr, sb ang - sb plty, arg cmt; SHY SS: lt - med gy, frm, brit, vf - f gr, sb ang - sb blk, mod w srt, arg cm

MD: 4,682'
TVD: 4,631.22'
Inclination: 2.9 °
Azimuth: 317.8 °
VS: -499.65'

213u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

SLTY SH: lt - med gy, sme dk gy, mod frm, brit, vf gr, sb ang - sb plty, arg cmt; tr shv ss, sl calc in: SHY SLTST: lt - med



shy ss, sl calc ip; SHY SLTST: lt - med
gy, mod frm, brit, vf gr, sb ang - sb plty,
arg cmt

MD: 4,777'
TVD: 4,726.16'
Inclination: 1.1 °
Azimuth: 289.8 °
VS: -501.8'

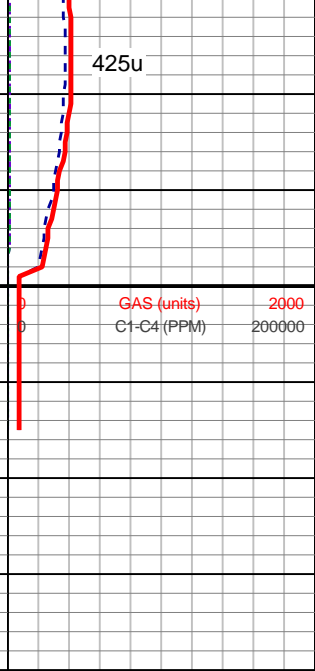
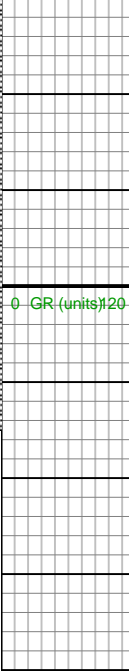
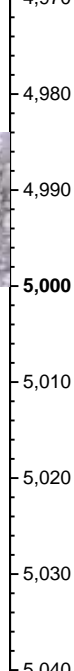
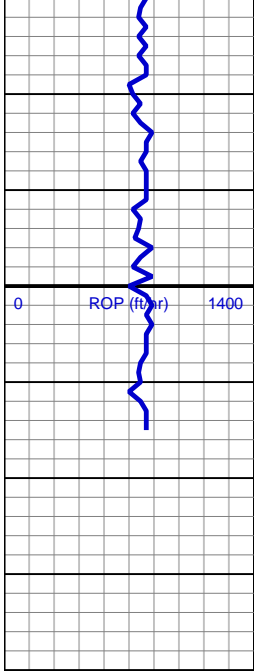
0 GR (units) 120 0 GAS (units) 2000
C1-C4 (PPM) 200000

SLTY SH: lt - med gy, sme dk gy, mod
frm, brit, vf gr, sb ang - sb plty, arg cmt; tr
shy ss, sl calc ip; SHY SLTST: lt - med
gy, mod frm, brit, vf gr, sb ang - sb plty,
arg cmt

308u
C1: 97.1%
C2: 1.9%
C3: 0.9%
C4: 0.1%

669u

SLTY SH: lt - med gy, sme dk gy, mod
frm, brit, vf gr, sb ang - sb plty, arg cmt; tr
shy ss, sl calc ip; SHY SLTST: lt - med
gy, mod frm, brit, vf gr, sb ang - sb plty,
arg cmt



425u

TD @ 5015' MD
01/09/2014 @ 15:30 hrs

TOOH FOR BHA #2
LOG CONTINUES ON MPlot
"CASTOR FEDERAL
LD15-75-1HN_HORIZ"

Thank you for choosing
Columbine Logging Inc.