

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name Rohn State LD09-68-1HN(VERT)

Location NENE SEC 9, T9N, R58W

State COLORADO

County WELD

Country USA

Rig Number H&P 326

API Number 05-123-37547

Region DJ BASIN

Field WILDCAT

Spud Date 9/24/2013

Drilling Completed 9/26/2013

Surface Coordinates 935' FNL, 480' FEL

Bottom Hole Coordinates 330' FNL, 75' FEL

Ground Elevation 4739'

K.B. Elevation 4769'

Logged Interval 1300' **To** 4889'

Total Depth 4889'

Formation NIOBRARA A CHALK/MARL

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

Other

ANDREA ZUREMA

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

Fossils

FOSSIL
GASTROPOD
INOCERAMUS
OOLITE
OSTRACOD
PELECYPOD
PELLET
PISOLITE
PLANT REMAINS
PLANT SPORES
SCAPHOPOD
STROMATOPOROID

Minerals

Minerals

ANHYDRITIC
ARGILLACEOUS
ARGILLITE GRAIN
BENTONITE
BITUMENOUS SUBSTANCE
BRECCIA FRAGMENTS
CALCAREOUS
CARBONACEOUS FLAKES
CHTDK
CHTLT
COAL - THIN BEDS
DOLOMITIC
FELDSPAR
FERRUGINOUS PELLET

Minerals

FERRUGINOUS
GLAUCONITE
GYPSIFEROUS
HEAVY MINERAL
KAOLIN
MARLSTONE
MINERAL CRYSTALS
NODULES
PHOSPHATE PELLETS
PYRITE
SALT CAST
SANDY
SILICEOUS
SILTY

Minerals

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

Oil Show

MOLDIC
ORGANIC
PINPOINT
VUGGY

Engineering

BIT
CONNECTION (LEFT)
CONNECTION (RIGHT)
CONNECTION GAS
CORE - LOST
CORE - RECOVERED
DST INTERVAL

Other Symbols

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

Other Symbols

WIRELINE TESTED - LEFT
WIRELINE TESTED - RT

Rounding

ANGULAR
ROUNDED
SUBANG
SUBRND

Textures

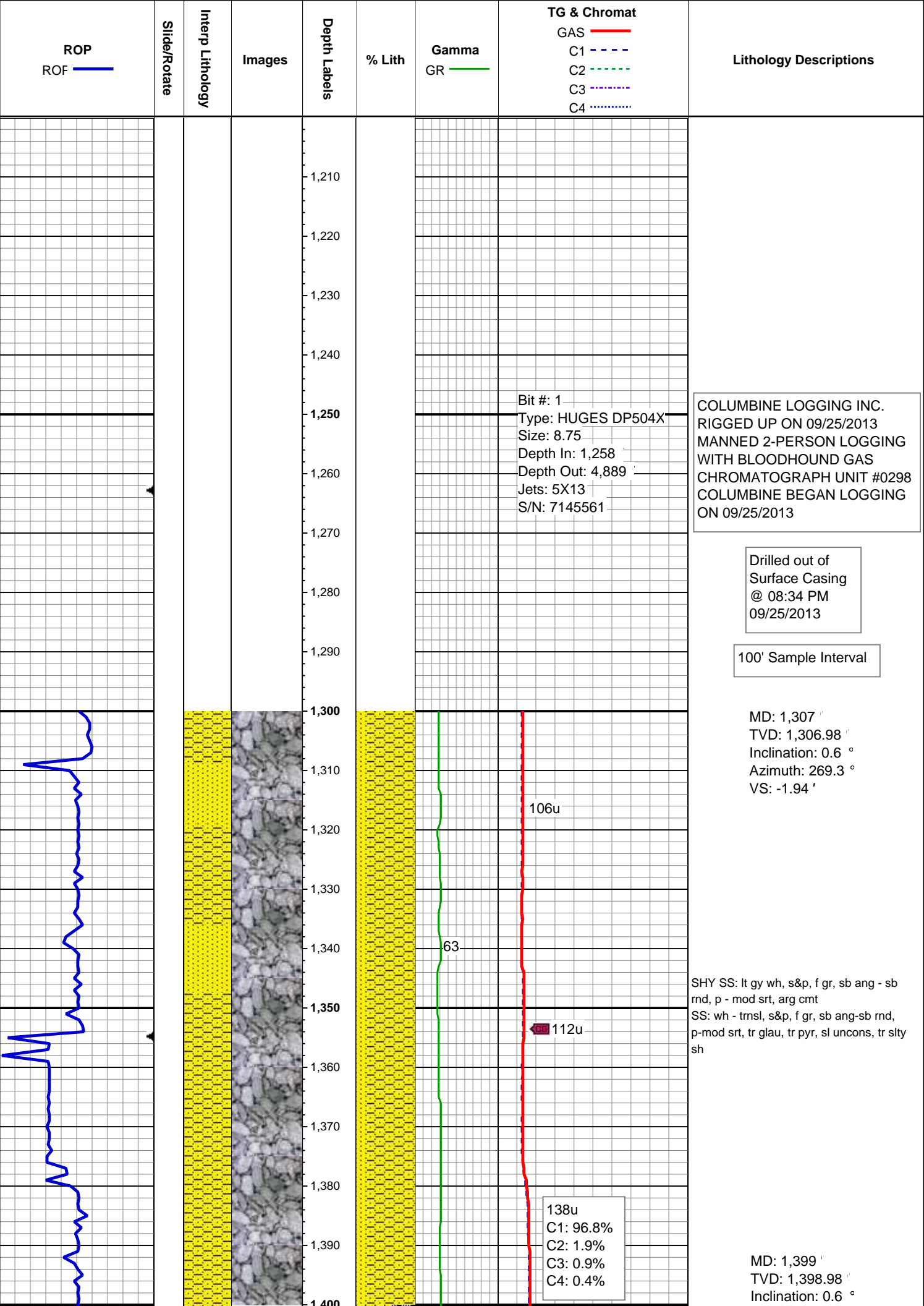
BOUNDSTONE
CHALKY
CRYPTOXLN

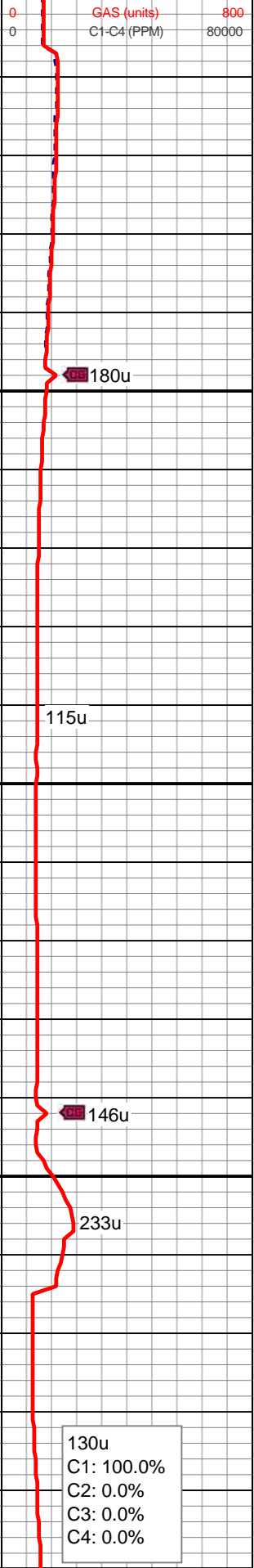
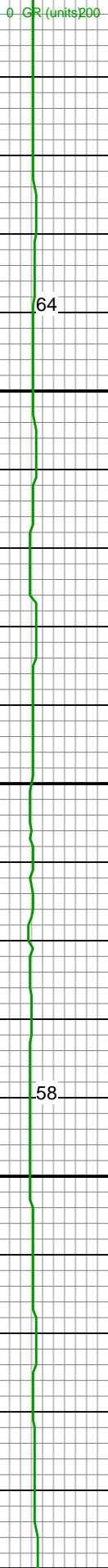
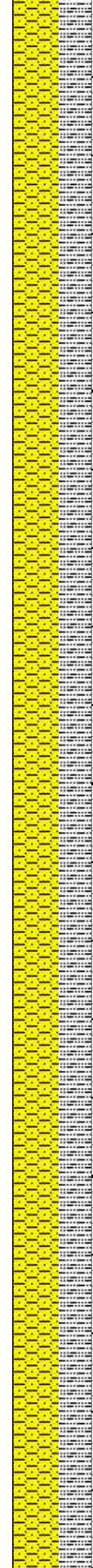
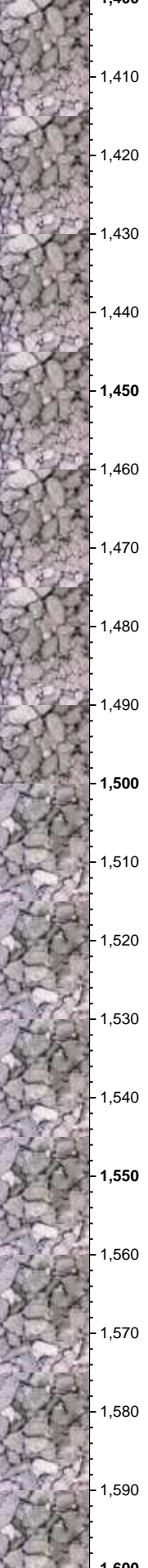
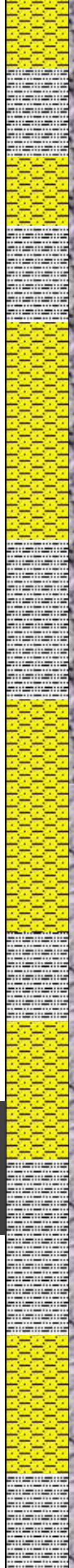
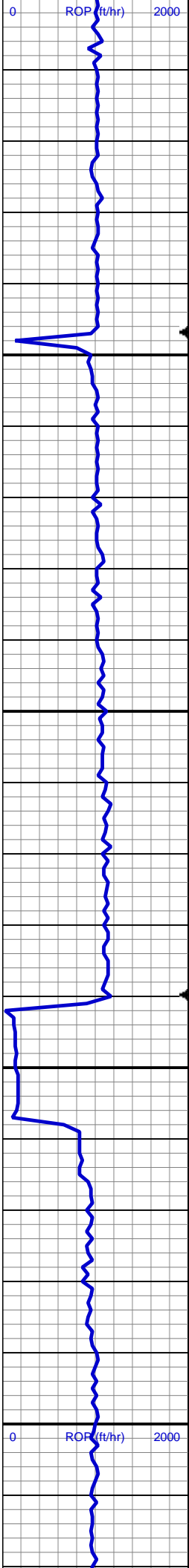
Other Symbols

EARTHY
FINELYXLN
GRAINSTONE
LITHOGRAPHIC
MICROXLN
MUDSTONE
PACKSTONE
WACKESTONE

Sorting

MODERATE
POOR
WELL





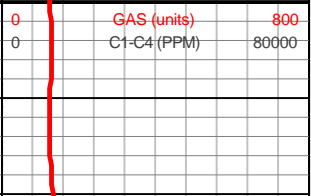
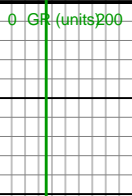
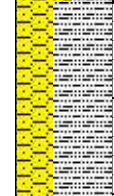
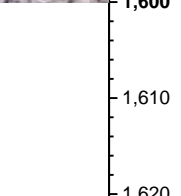
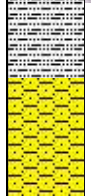
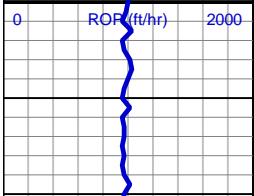
Azimuth: 272.3 °
VS: -0.98 '

SHY SS: lt gy wh, s&p, f gr, sb ang - sb
rnd, p - mod srt, arg cmt
SLTY SH: lt-med gy, sft - mod frm, sb
blky, occ plty, arg-rthy mtx, non calc

MD: 1,492 '
TVD: 1,491.97 '
Inclination: 0.5 °
Azimuth: 281.6 °
VS: -0.1 '

SHY SS: lt gy wh, s&p, f gr, sb ang - sb
rnd, p - mod srt, arg cmt
SLTY SH: lt-med gy, sft - mod frm, sb
blky, occ plty, arg-rthy mtx, non calc

MD: 1,586 '
TVD: 1,585.97 '
Inclination: 0.8 °
Azimuth: 132.7 °
VS: -0.16 '



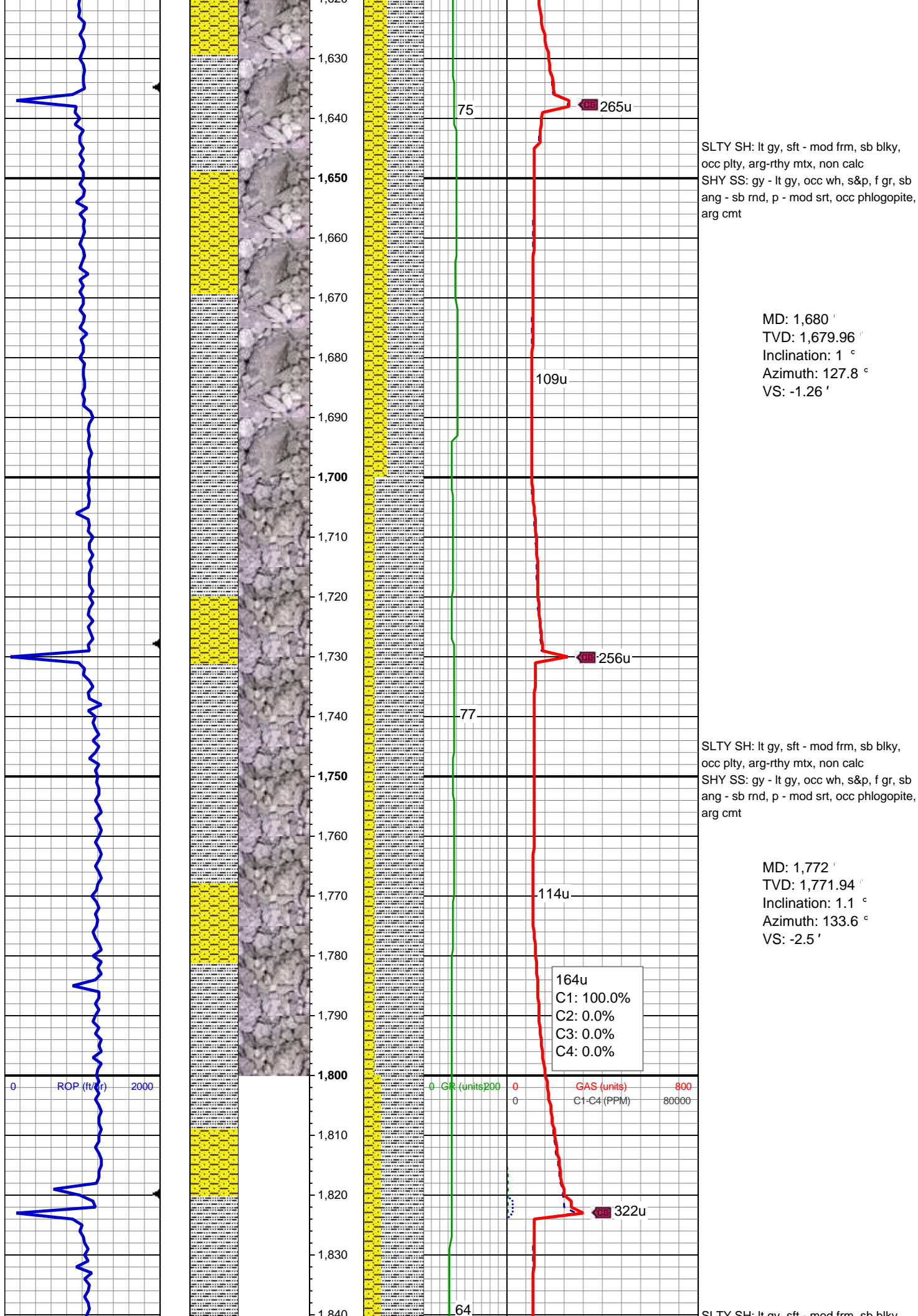
Azimuth: 272.3 °
VS: -0.98 '

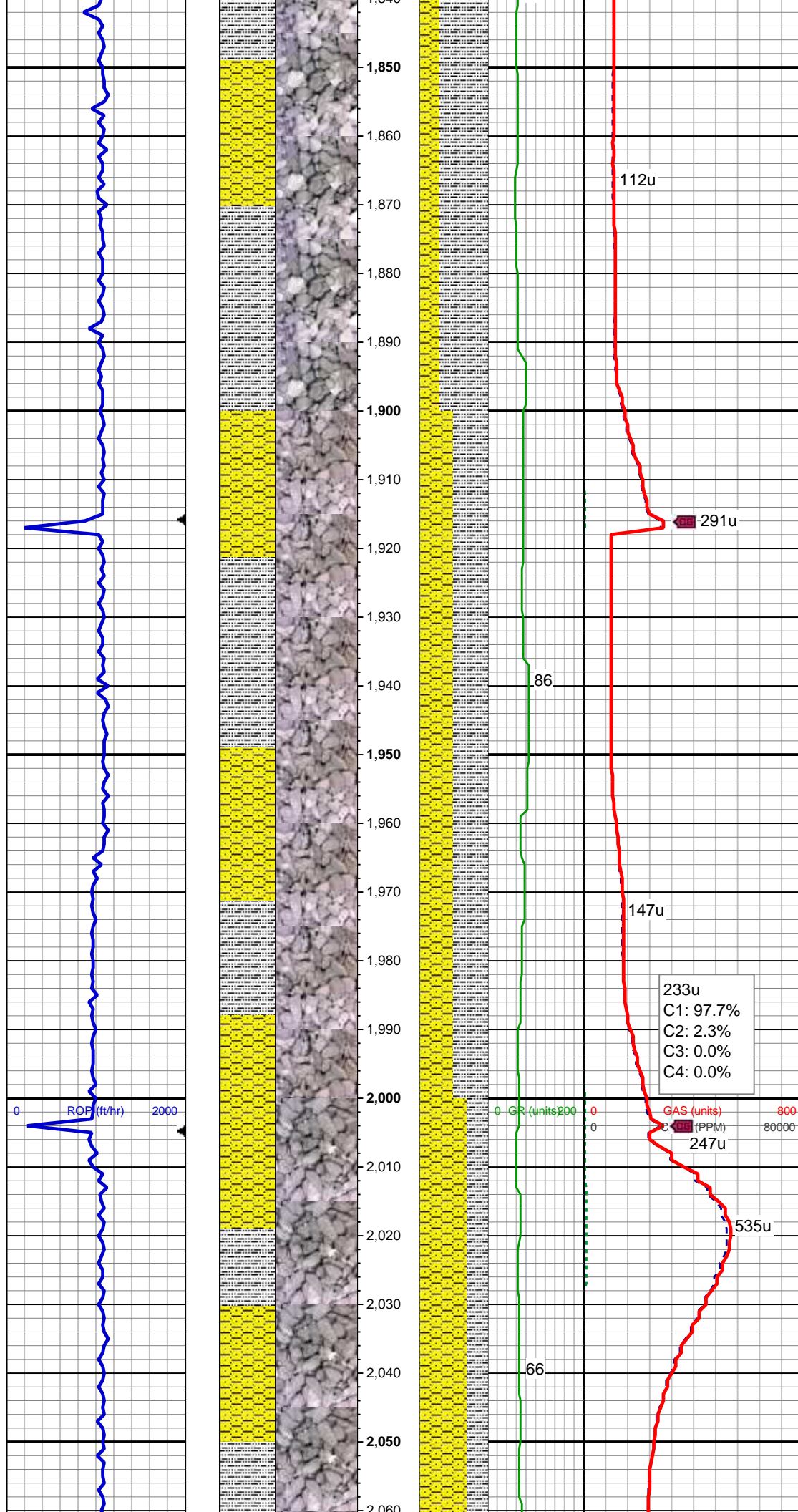
SHY SS: lt gy wh, s&p, f gr, sb ang - sb
rnd, p - mod srt, arg cmt
SLTY SH: lt-med gy, sft - mod frm, sb
blky, occ plty, arg-rthy mtx, non calc

MD: 1,492 '
TVD: 1,491.97 '
Inclination: 0.5 °
Azimuth: 281.6 °
VS: -0.1 '

SHY SS: lt gy wh, s&p, f gr, sb ang - sb
rnd, p - mod srt, arg cmt
SLTY SH: lt-med gy, sft - mod frm, sb
blky, occ plty, arg-rthy mtx, non calc

MD: 1,586 '
TVD: 1,585.97 '
Inclination: 0.8 °
Azimuth: 132.7 °
VS: -0.16 '





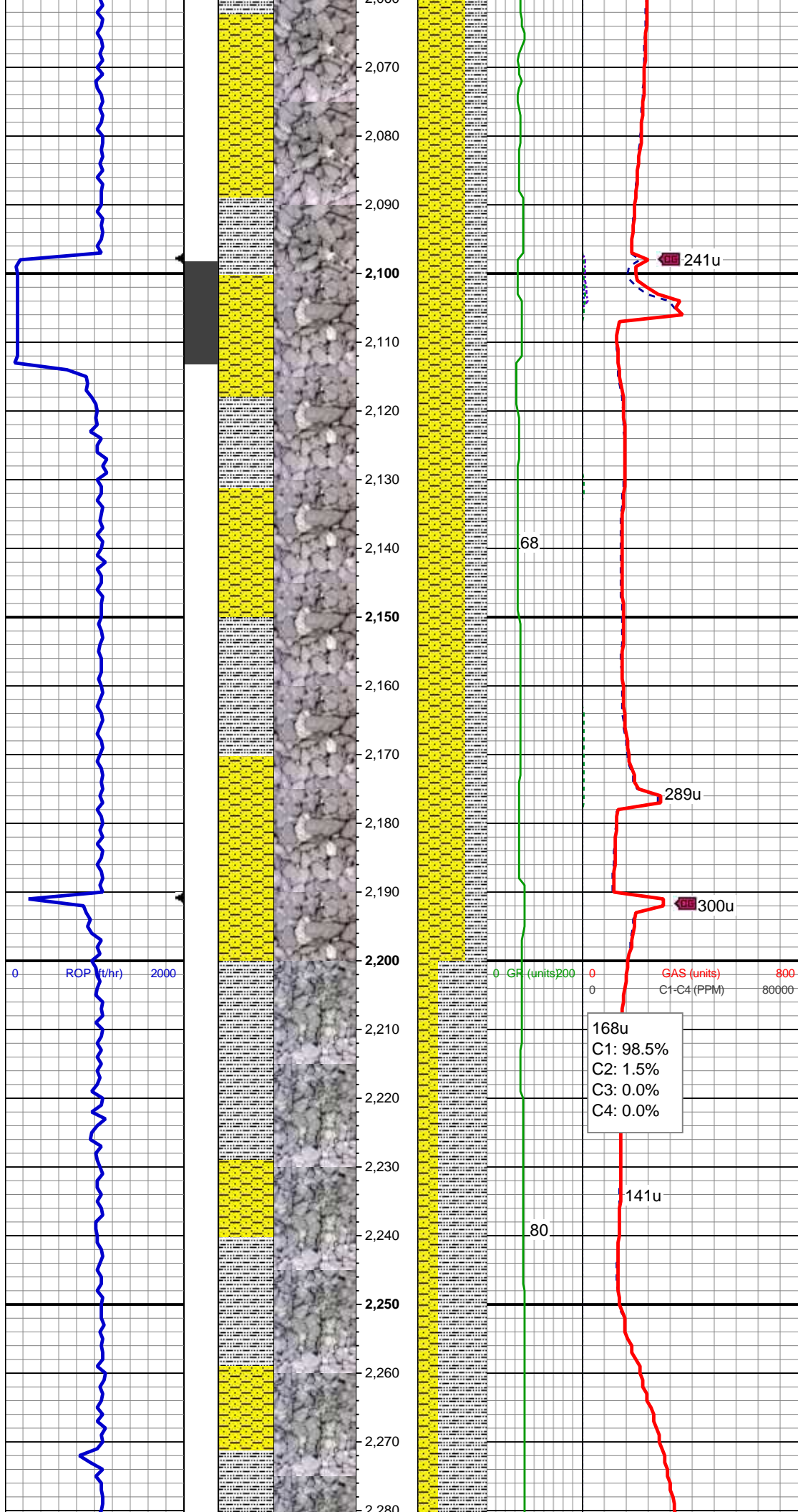
SLTY SH: lt gy, sft - mod frm, sb blk, occ pty, arg-rthy mtx, non calc
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb ang - sb rnd, p - mod srt, occ phlogopite, arg cmt

MD: 1,864 '
TVD: 1,863.93 '
Inclination: 1.1 °
Azimuth: 139.2 °
VS: -3.67 '

SLTY SH: lt gy, sft - mod frm, sb blk, occ pty, arg-rthy mtx, non calc
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb ang - sb rnd, p - mod srt, occ phlogopite, arg cmt

MD: 1,957 '
TVD: 1,956.9 '
Inclination: 1.3 °
Azimuth: 138.3 °
VS: -4.91 '

MD: 2,049 '
TVD: 2,048.88 '
Inclination: 1.6 °
Azimuth: 140.8 °
VS: -6.36 '

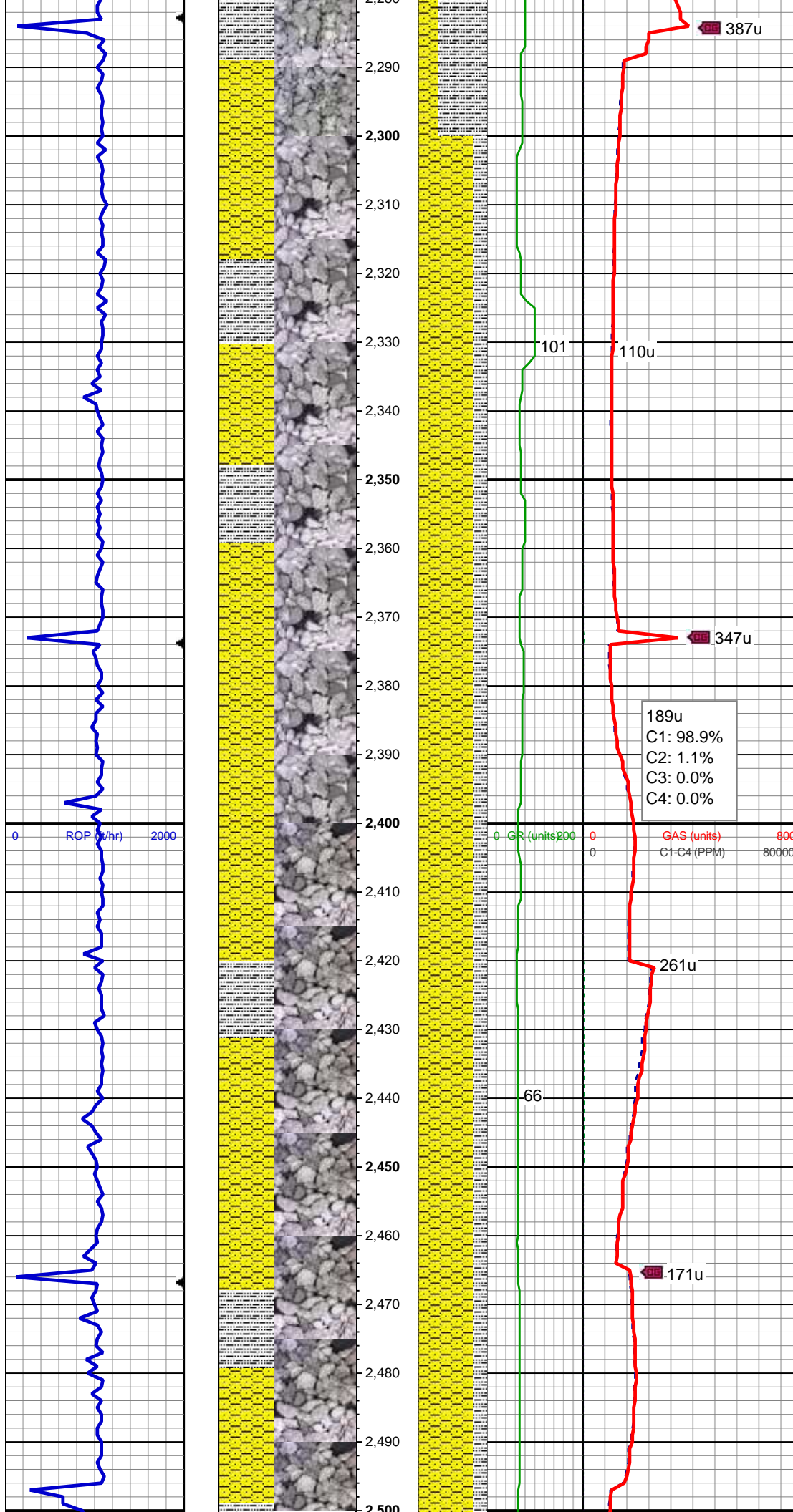


SHY SS: lt gy wh, s&p, f gr, sb ang - sb
rnd, p - mod srt, arg cmt
SLTY SH: lt-med gy, sft - mod frm, sb
blky, occ plty, arg-rthy mtx, non calc

MD: 2,142 '
TVD: 2,141.86 '
Inclination: 0.2 °
Azimuth: 125.5 °
VS: -7.27 '

SHY SS: lt gy wh, s&p, f gr, sb ang - sb
rnd, p - mod srt, arg cmt
SLTY SH: lt-med gy, sft - mod frm, sb
blky, occ plty, arg-rthy mtx, non calc

SLTY SH: lt gy, sft - mod frm, sb blky,
occ plty, arg-rthy mtx, non calc
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, occ phlogopite,
arg cmt



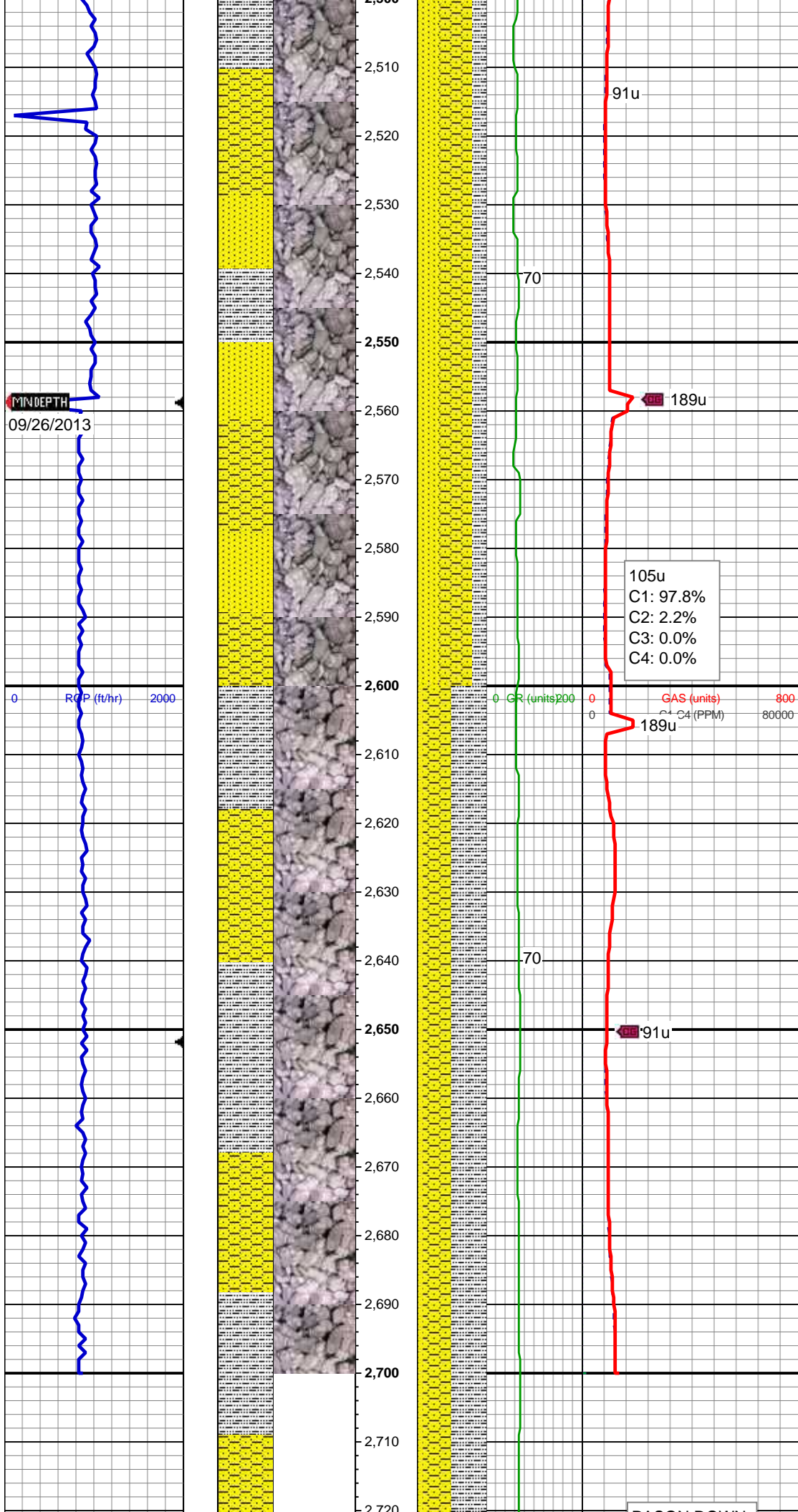
MD: 2,326 '
TVD: 2,325.86 '
Inclination: 0.5 °
Azimuth: 54.1 °
VS: -8.2 '

SHY SS: lt gy wh, s&p, f gr, sb ang - sb
rnd, p - mod srt, arg cmt
SLTY SH: lt-med gy, sft - mod frm, sb
blky, occ plty, arg-rthy mtx, non calc

189u
C1: 98.9%
C2: 1.1%
C3: 0.0%
C4: 0.0%

GR (units) 200 0 0 800
GAS (units)
C1-C4 (PPM) 80000

SHY SS: lt gy wh, s&p, f gr, sb ang - sb
rnd, p - mod srt, arg cmt
SLTY SH: lt-med gy, sft - mod frm, sb
blky, occ plty, arg-rthy mtx, non calc

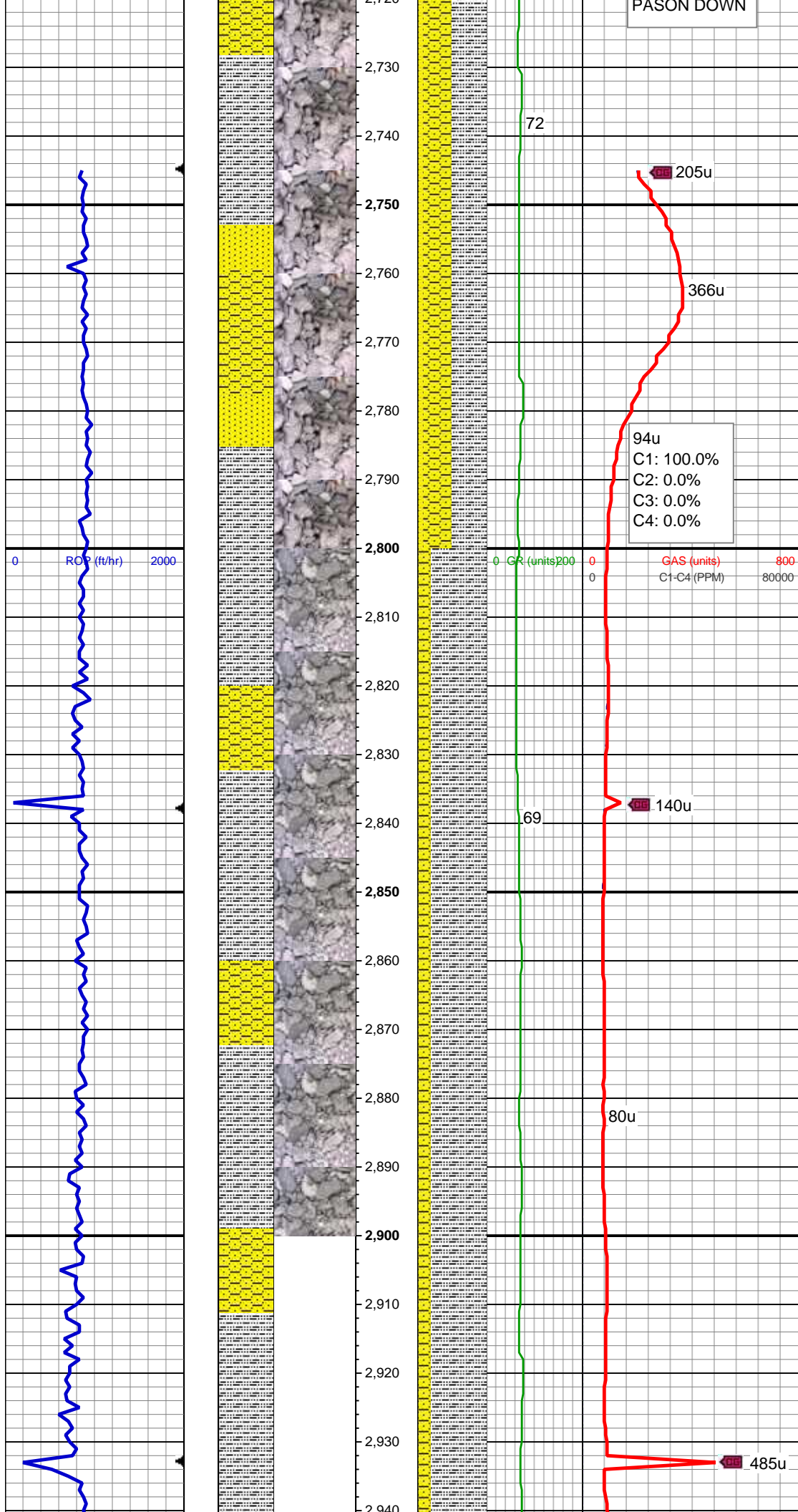


MD: 2,511 '
TVD: 2,510.85 '
Inclination: 0.5 °
Azimuth: 65.4 °
VS: -9.61 '

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt
SS: wh - trnsl, s&p, f gr, sb ang - sb rnd, p
- mod srt, tr glau, arg cmt
SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc

SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt
SS: wh - trnsl, s&p, f gr, sb ang - sb rnd, p
- mod srt, tr glau, arg cmt

MD: 2,697 '
TVD: 2,696.85 '
Inclination: 0.4 °
Azimuth: 61.3 °
VS: -10.94 '

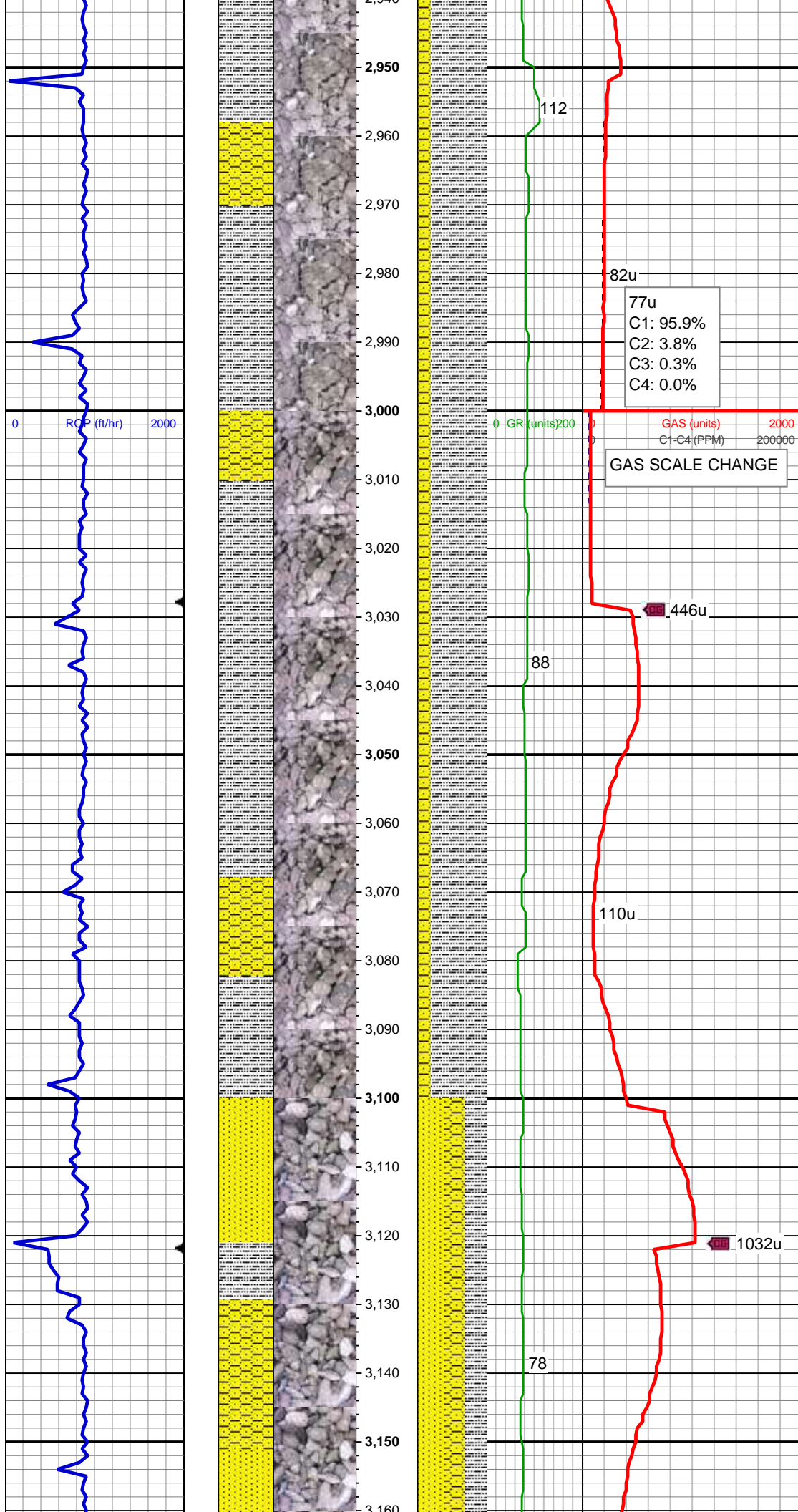


PASON DOWN

SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt
SS: wh - trnsl, s&p, f gr, sb ang - sb rnd, p
- mod srt, tr glau, arg cmt

SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt, tr ss

MD: 2,884 '
TVD: 2,883.84 '
Inclination: 0.4 °
Azimuth: 68.4 °
VS: -12.13 '

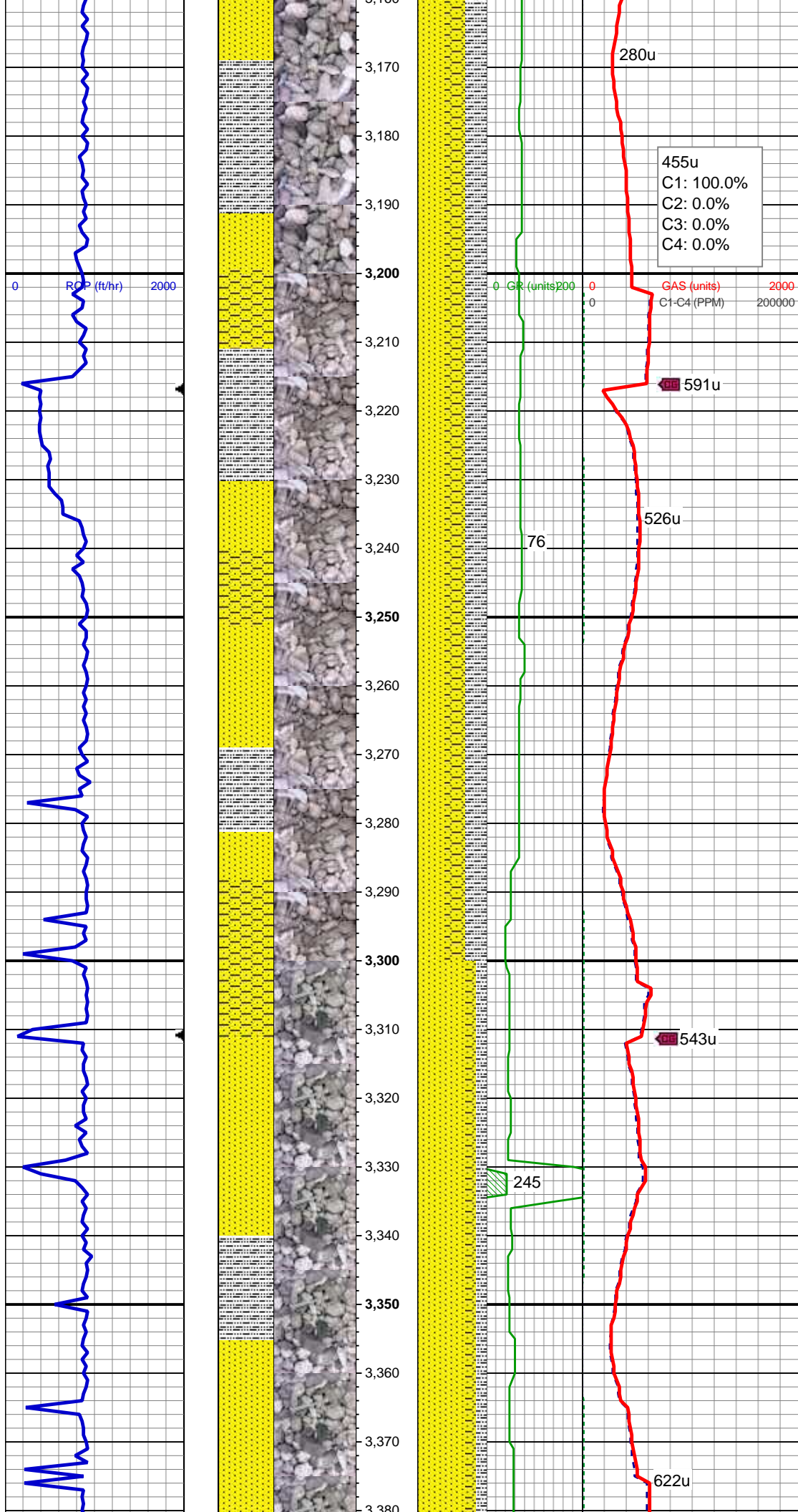


SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt, tr ss

SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt, tr ss

MD: 3,073 '
TVD: 3,072.83 '
Inclination: 0.6 °
Azimuth: 29 °
VS: -13.26 '

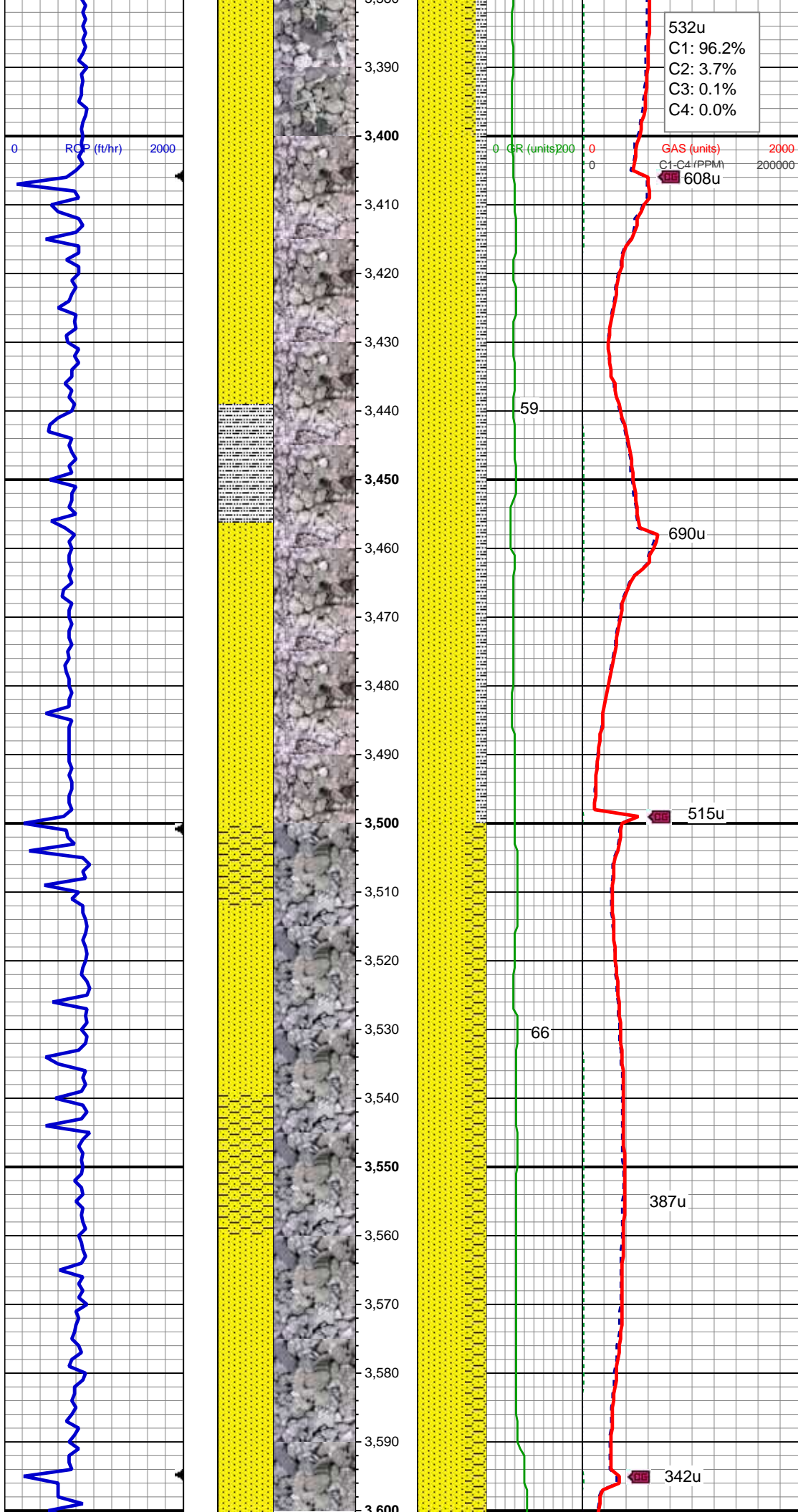
SS: lt gy - wh trns, s&p, f gr, sb ang - sb
rnd, p - mod srt, tr glau, arg cmt
SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt



SS: lt gy - wh trns, s&p, f gr, sb ang - sb
rnd, p - mod srt, tr glau, arg cmt
SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mt, shy tex, non
calc
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt

MD: 3,263 '
TVD: 3,262.82 '
Inclination: 0.9 °
Azimuth: 37.4 °
VS: -14.72 '

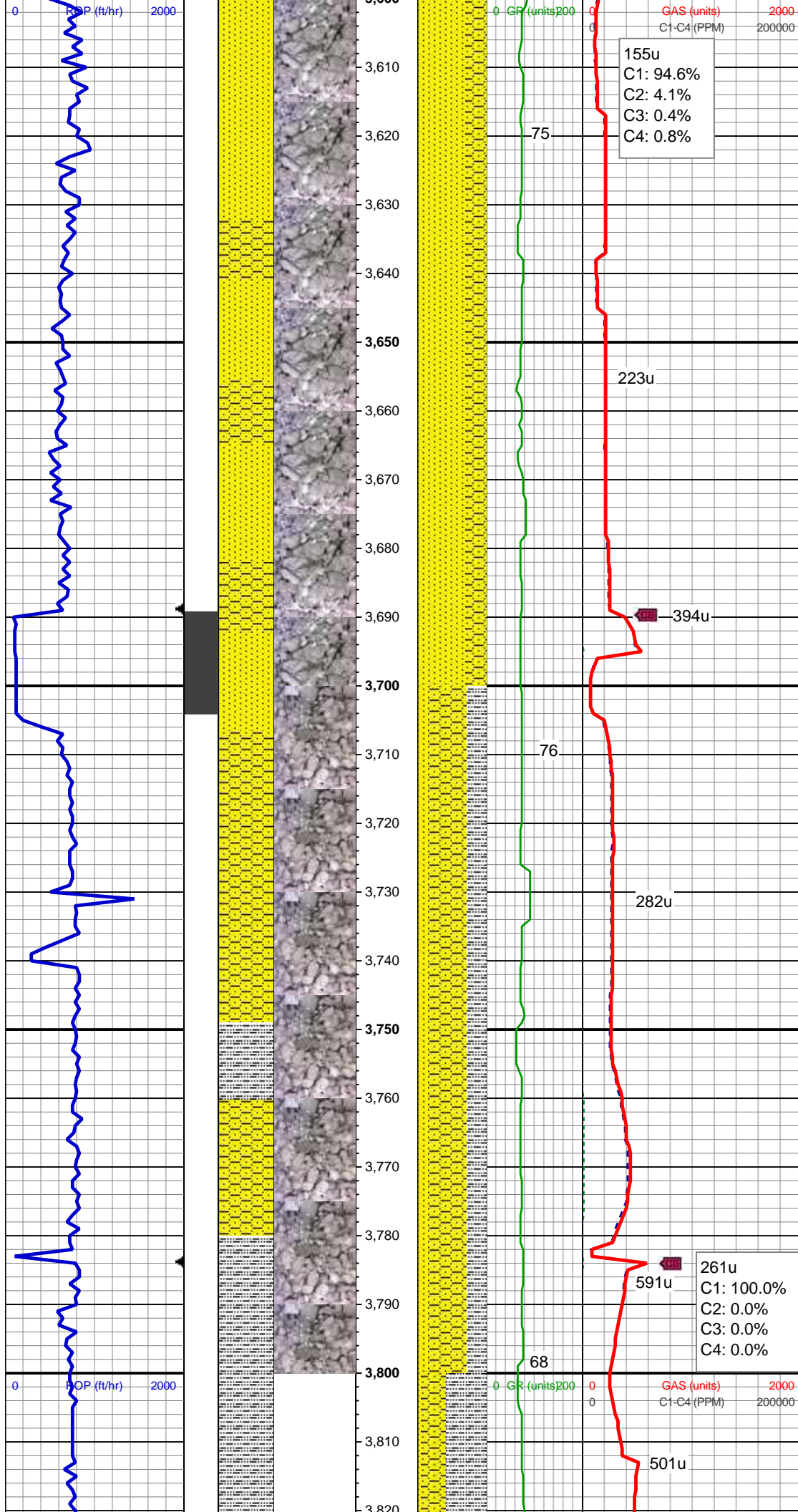
SS: lt gy - wh trns, s&p, f gr, sb ang - sb
rnd, p - mod srt, tr glau, arg cmt
SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mt, shy tex, non
calc
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt



MD: 3,452 '
TVD: 3,451.78 '
Inclination: 1.3 °
Azimuth: 18.6 °
VS: -16.41 '

SS: lt gy - wh trnsi, s&p, f gr, sb ang - sb
rnd, p - mod srt, tr glau, arg cmt
SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc

SS: lt gy - wh trnsi, s&p, f gr, sb ang - sb
rnd, p - mod srt, tr glau, arg cmt
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt

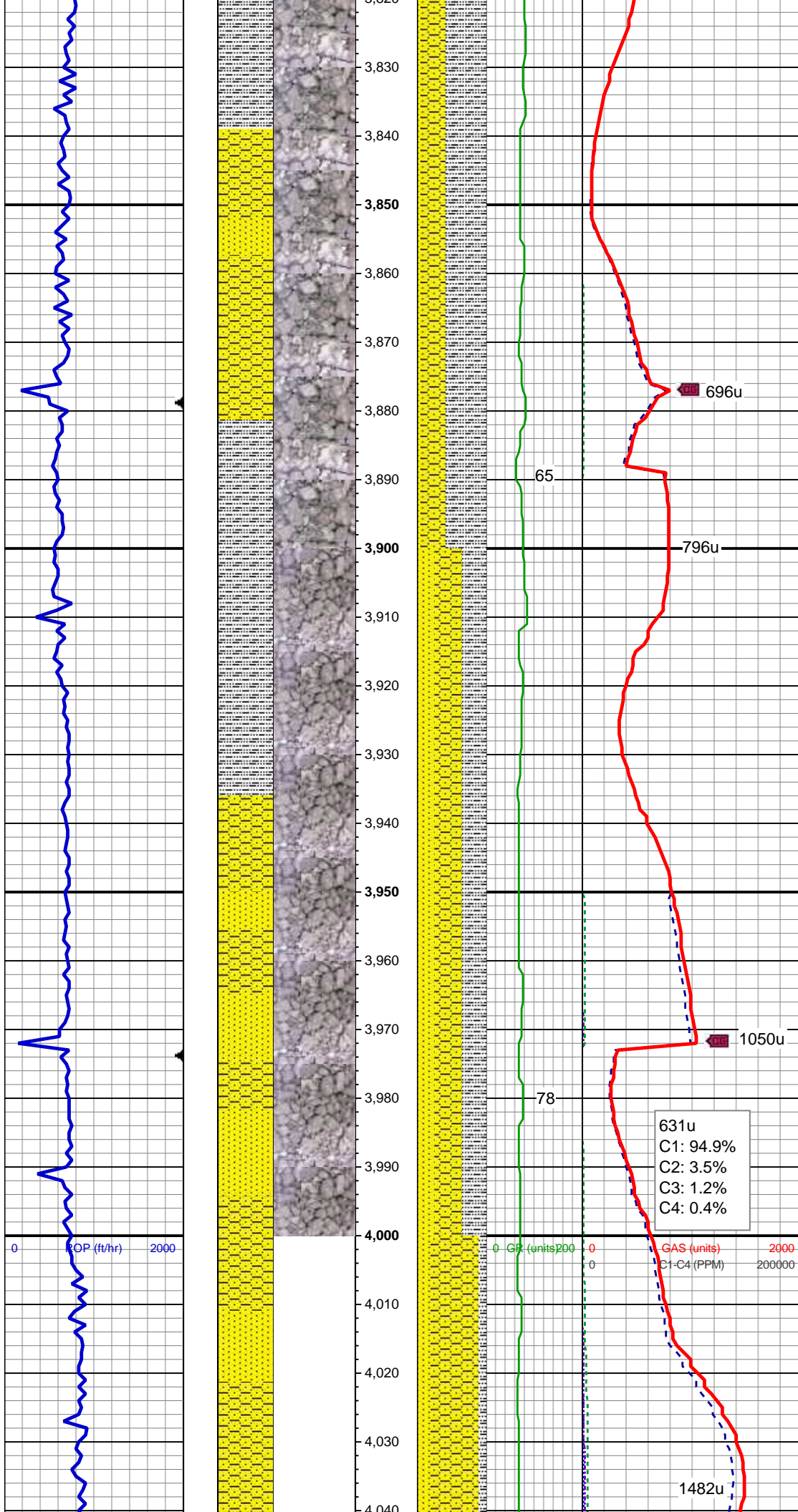


MD: 3,641 '
TVD: 3,640.73 '
Inclination: 1.3 °
Azimuth: 21.4 °
VS: -18 '

SS: lt gy - wh trnsl, s&p, f gr, sb ang - sb
rnd, p - mod srt, occ glau, occ unconc,
arg cmt
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt

WT IN 8.85/ OUT 8.85
VIS IN 31/ OUT 31

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt
SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc
SS: lt gy - wh trnsl, s&p, f gr, sb ang - sb
rnd, p - mod srt, tr glau, tr unconc, arg
cmt

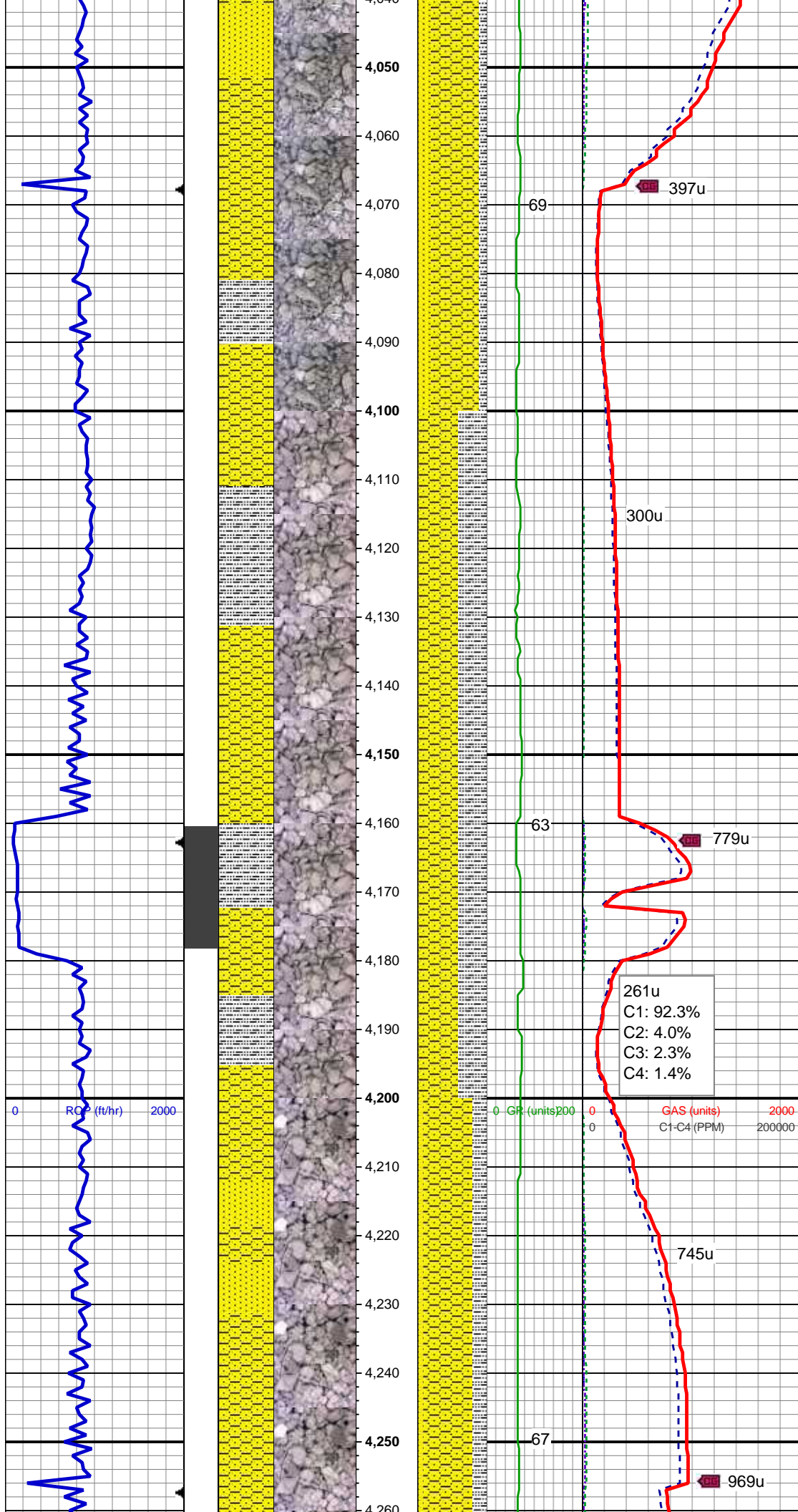


MD: 3,830 '
TVD: 3,829.71 '
Inclination: 0.6 °
Azimuth: 309.7 °
VS: -18.11 '

SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt
SS: lt gy - wh trnsf, s&p, f gr, sb ang - sb
rnd, p - mod srt, tr glau, arg cmt

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt
SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc
SS: lt gy - wh trnsf, s&p, f gr, sb ang - sb
rnd, p - mod srt, tr glau, arg cmt

MD: 4,019 '
TVD: 4,018.69 '
Inclination: 1.2 °
Azimuth: 313.6 °
VS: -15.98 '

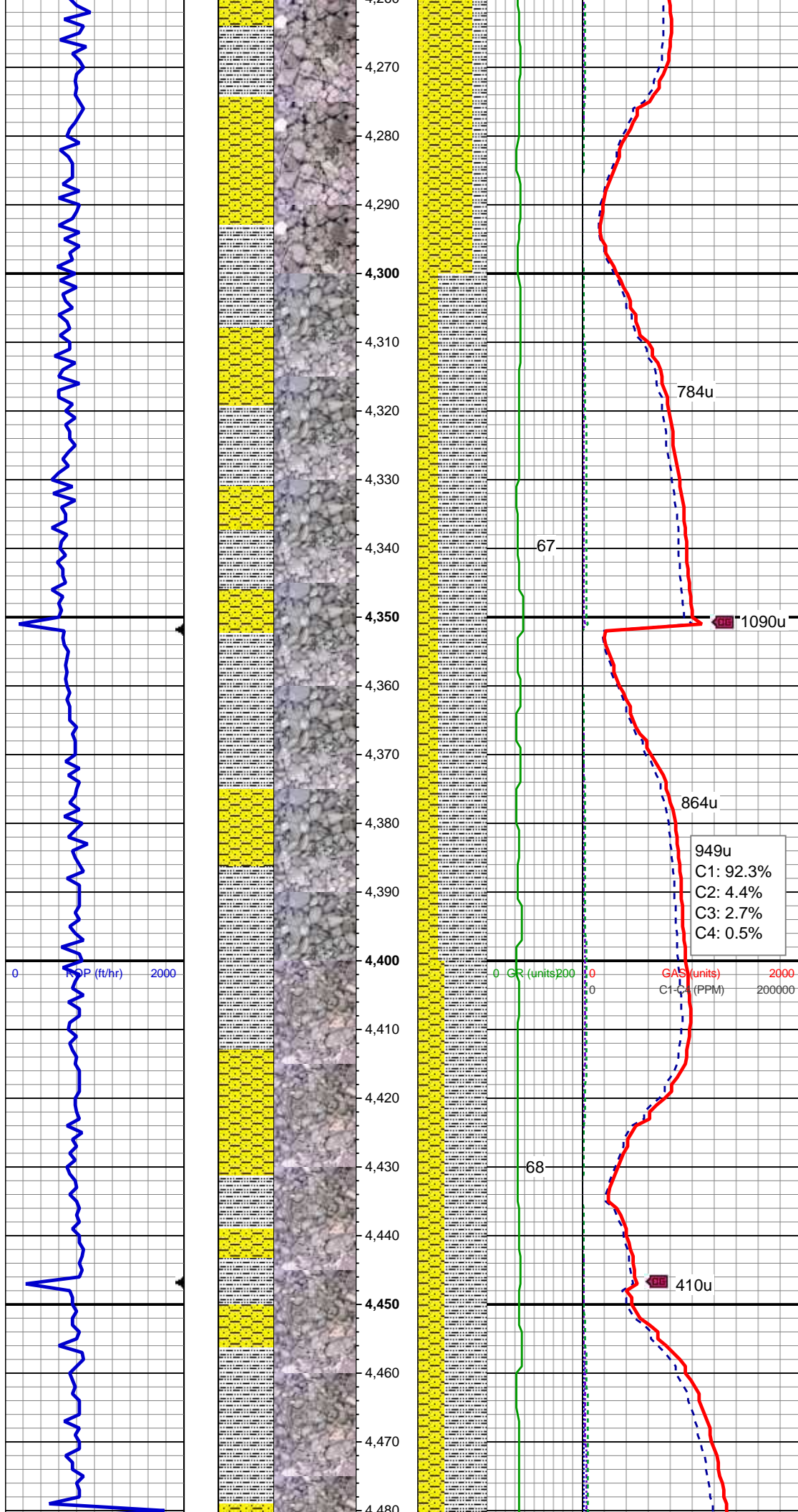


SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt
SS: lt gy - wh trns, s&p, f gr, sb ang - sb
rnd, p - mod srt, tr glau, arg cmt
SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt
SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc, tr ss

MD: 4,209 '
TVD: 4,208.67 '
Inclination: 0.5 °
Azimuth: 205.8 °
VS: -14.2 '

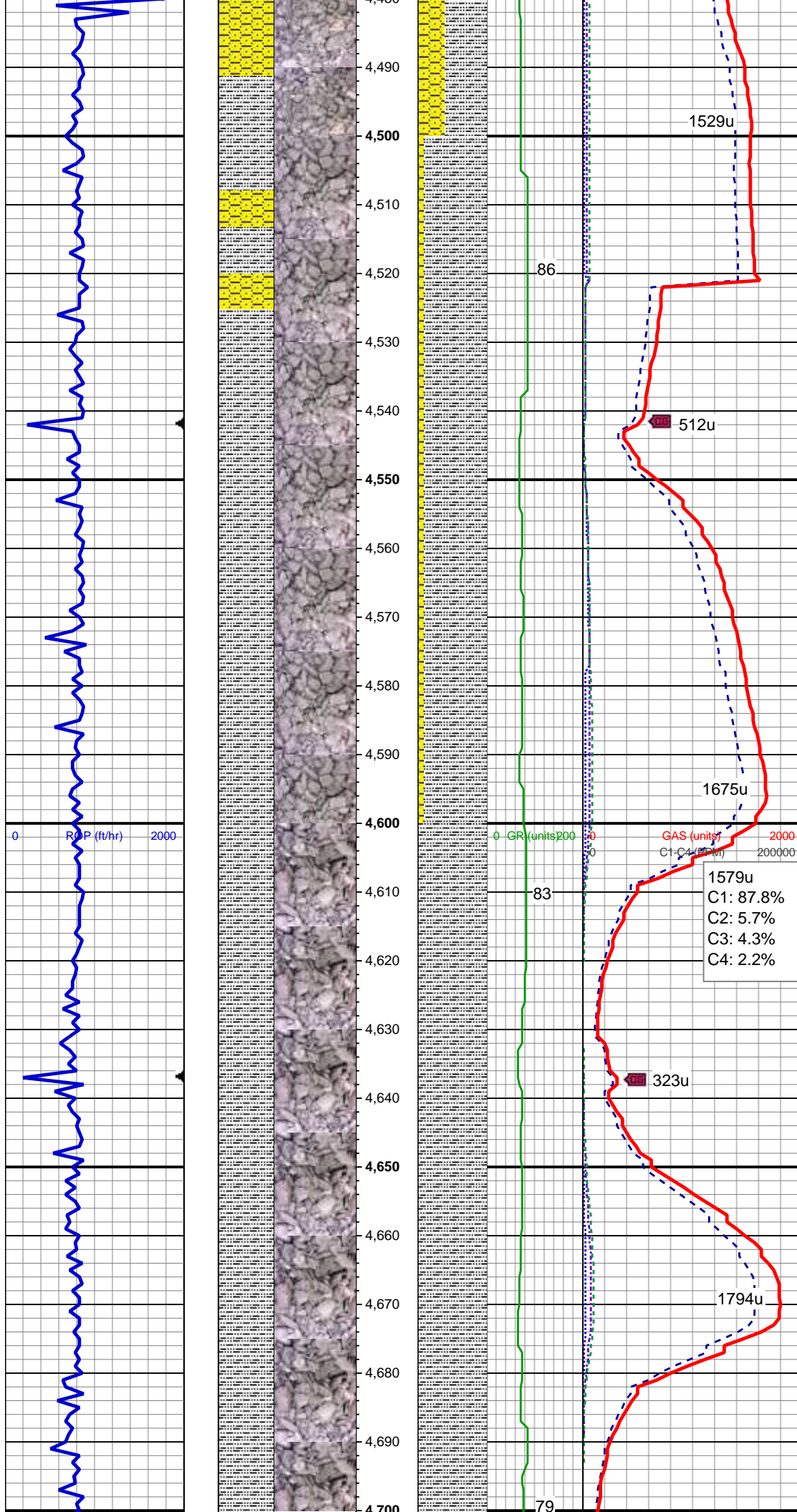
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt
SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc
SS: lt gy - wh trns, s&p, f gr, sb ang - sb
rnd, p - mod srt, tr glau, arg cmt



SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc, tr ss
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt

MD: 4,399 '
TVD: 4,398.67 '
Inclination: 0.6 °
Azimuth: 203.2 °
VS: -13.4 '

SLTY SH: lt gy - gy, mod sft - mod frm, sb
blky - sb plty, arg - rthy mtx, shy tex, non
calc
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb
ang - sb rnd, p - mod srt, arg cmt



SLTY SH: lt gy - gy, mod sft - mod frm, sb blkly - sb plty, arg - rthy mtx, shy tex, non calc

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb ang - sb rnd, p - mod srt, arg cmt

MD: 4,588'

TVD: 4,587.66'

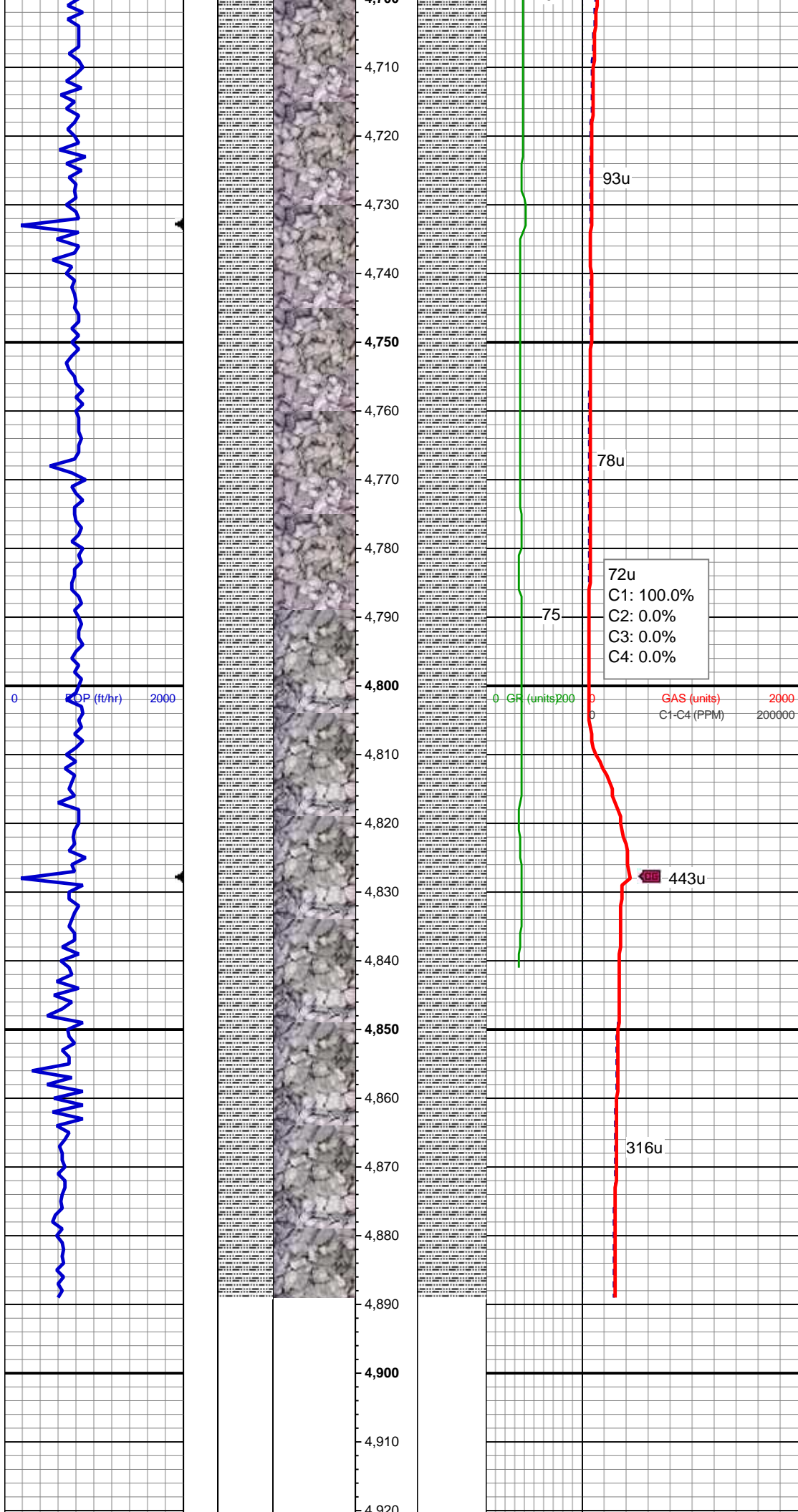
Inclination: 0.7°

Azimuth: 315.9°

VS: -12.2'

1579u
C1: 87.8%
C2: 5.7%
C3: 4.3%
C4: 2.2%

SLTY SH: lt gy - gy, occ dk gy, mod sft - mod frm, sb blkly - sb plty, arg - rthy mtx, shy tex, non calc, tr shy ss



SLTY SH: lt gy - gy, occ dk gy, mod sft -
mod frm, sb blkly - sb plty, arg - rthy mtx,
shy tex, non calc, tr shy ss

MD: 4,778 '
TVD: 4,777.64 '
Inclination: 0.9 °
Azimuth: 308.5 °
VS: -10.28 '

WT IN 9.10/ OUT 9.10
VIS IN 45/ OUT 45

MD: 4,841 '
TVD: 4,840.63 '
Inclination: 1.2 °
Azimuth: 311.7 °
VS: -9.43 '

SLTY SH: lt gy - gy, occ dk gy, mod sft -
mod frm, sb blkly - sb plty, arg - rthy mtx,
shy tex, non calc, tr shy ss

TD @ 4889' MD
09/26/2013 @ 05:59 AM

TOOH FOR CURVE BHA
LOG CONTINUES ON MPLLOT
"ROHN STATE LD09-68-1HN(HORZ)"

Thank you for choosing
Columbine Logging Inc.

