

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Rohn State LD10-67HN VERT

**Location** Sec. 9, T9N, R58W

**State** COLORADO

**County** WELD

**Country** USA

**Rig Number** H&P 326

**API Number** 05-123-37618

**Field** WILDCAT

**Region** DJ BASIN

**Drilling Completed** 9/23/2014

**Spud Date** 9/17/2014

**Surface Coordinates** 1650 FNL, 330 FEL  
Lat/Long: 40.76863/-103.86114

**Bottom Hole Coordinates** Sec: 10 Twp: 9N 58W  
1320 FFNLL 660 FFELL

**Ground Elevation** 4,730'

**K.B. Elevation** 4,760'

**Logged Interval** 1210' **To** 9637'

**Total Depth** 9637'

**Formation** NIOBRARA A MARL

**Type of Drilling Fluid** LSND

## 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

CONNECTION GAS (RIGHT)

CORE - LOST

CORE - RECOVERED

DST INTERVAL

FAULT

FORMATION TOP

GAS SHOW

MIN 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
- F FINELYXLN
- GRAINSTONE

L LITHOGRAPHIC

MX MICROXLN

MS MUDSTONE

PS PACKSTONE

WS WACKSTONE

### Sorting

- M MODERATE
- P POOR
- W WELL

## Zone Color Coding

- Oil
- Condensate
- Gas
- Note
- Core
- Pressure
- Error
- Water
- Seal

## Accessories

### Fossils

- ALGAE
- AMPHIPORA

F FOSSIL

GASTROPOD

INOCERAMUS

OOLITE

ANHYDRITIC

ARGILLACEOUS

ARGILLITE GRAIN

BENTONITE

FERRUGINOUS

GLAUCONITE

GYPSIFEROUS

HEAVY MINERAL

TUFFACEOUS

### Stringer

ANHYDRITE STRINGER

BELEMNITE  
BIOCLASTIC  
BRACHIOPOD  
BRYOZOA  
CEPHALOPOD  
CORAL  
CRINOID  
ECHINOID  
FISH  
FORAMINIFERA

OSTRACOD  
PELECYPOD  
PELLET  
PISOLITE  
PLANT REMAINS  
PLANT SPORES  
SCAPHOPOD  
STROMATOPOROID

## Minerals

BITUMENOUS SUBSTANCE  
BRECCIA FRAGMENTS  
CALCAREOUS  
CARBONACEOUS FLAKES  
CHTDK  
CHTLT  
COAL - THIN BEDS  
DOLOMITIC  
FELDSPAR  
FERRUGINOUS PELLET

KAOLIN  
MARLSTONE  
MINERAL CRYSTALS  
NODULES  
PHOSPHATE PELLETS  
PYRITE  
SALT CAST  
SANDY  
SILICEOUS  
SILTY

BENTONITE STRINGER  
COAL STRINGER  
DOLOMITE STRINGER  
GYPSUM STRINGER  
LIMESTONE STRINGER  
MARLSTONE (CALC) STRG  
MARLSTONE (DOL) STRG  
SANDSTONE STRINGER  
SHALE STRINGER  
SILTSTONE STRINGER

## Rock Types

SANDSTONE  
SHALY SANDSTONE  
SHALY SILTSTONE  
SILTY SHALE  
UNKNOWN  
ANHYDRITE  
BENTONITE  
BRECCIA  
CEMENT

CHALK  
CHERT  
CLAY CHOKE SAND  
CLAYSTONE  
COAL  
CONGLOMERATE  
DOLOMITE  
GRANITE  
GYPSUM

IGNEOUS  
LIMESTONE  
SIDERITE or LIMONITE  
MARLSTONE  
METAMORPHIC  
NO SAMPLE  
SALT  
SALT- PEPPER SAND  
SHALE

SHALE COLORED  
SHALE GRAY  
SILTSTONE  
TILL  
TUFF  
WELDED TUFF

## Operator

**Company** Noble Energy Inc

**Address** 1625 Broadway Suite 2200  
Denver, CO 80202

## Geologist

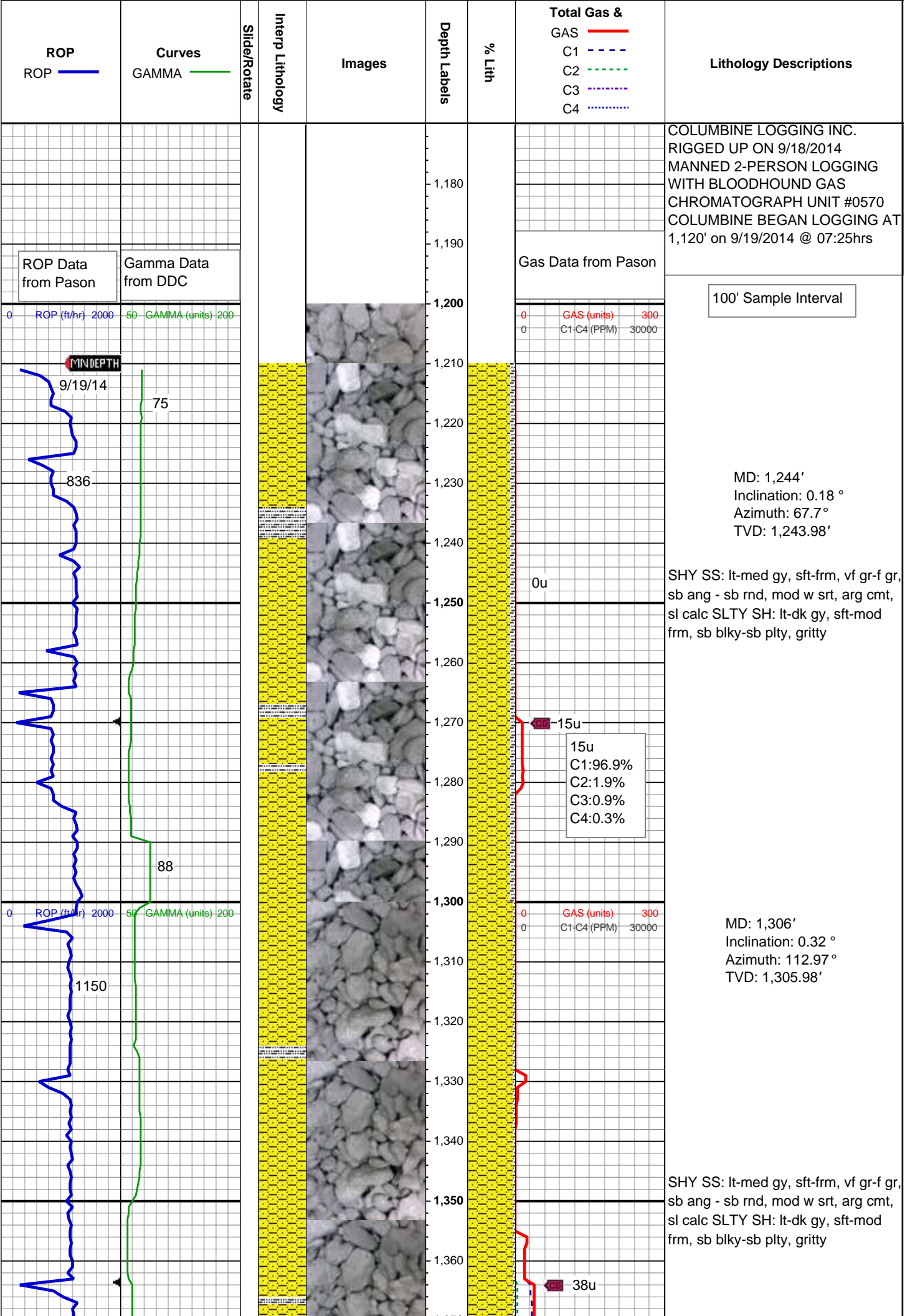
**Name** Evan Howell

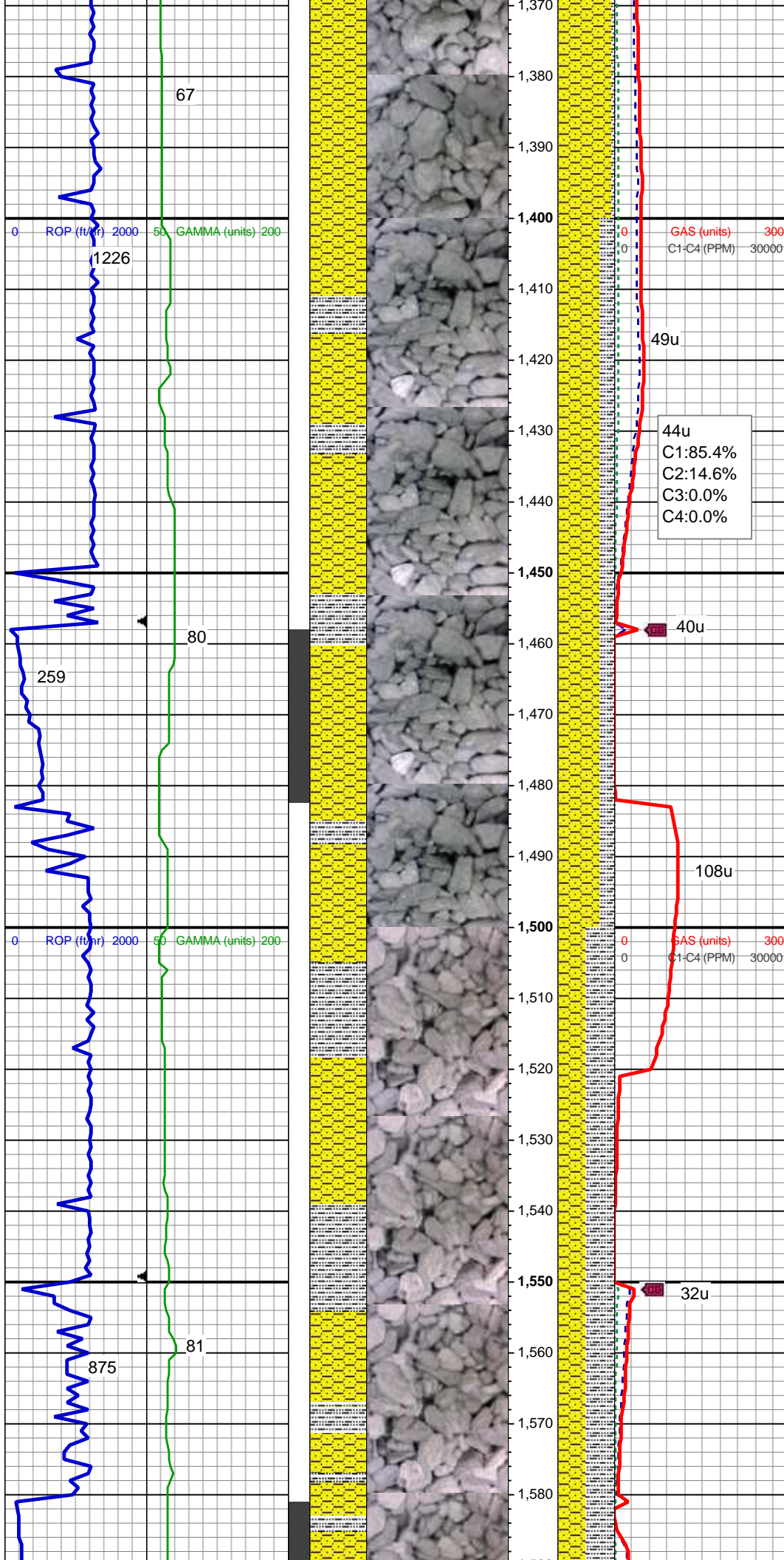
**Company** Noble Energy Inc.

**Address** 1625 Broadway Suite 2200  
Denver, CO 80202

## Other

**COLUMBINE LOGGING INC. MIKE KERSCHEN**





MD: 1,400'  
Inclination: 0.31 °  
Azimuth: 31.3 °  
TVD: 1,399.98'

SHY SS: lt-med gy, sft-frm, vf gr-f gr,  
sb ang - sb rnd, mod w srt, arg cmt,  
sl calc SLTY SH: lt-dk gy, sft-mod  
frm, sb blk-y-sb plty, gritty

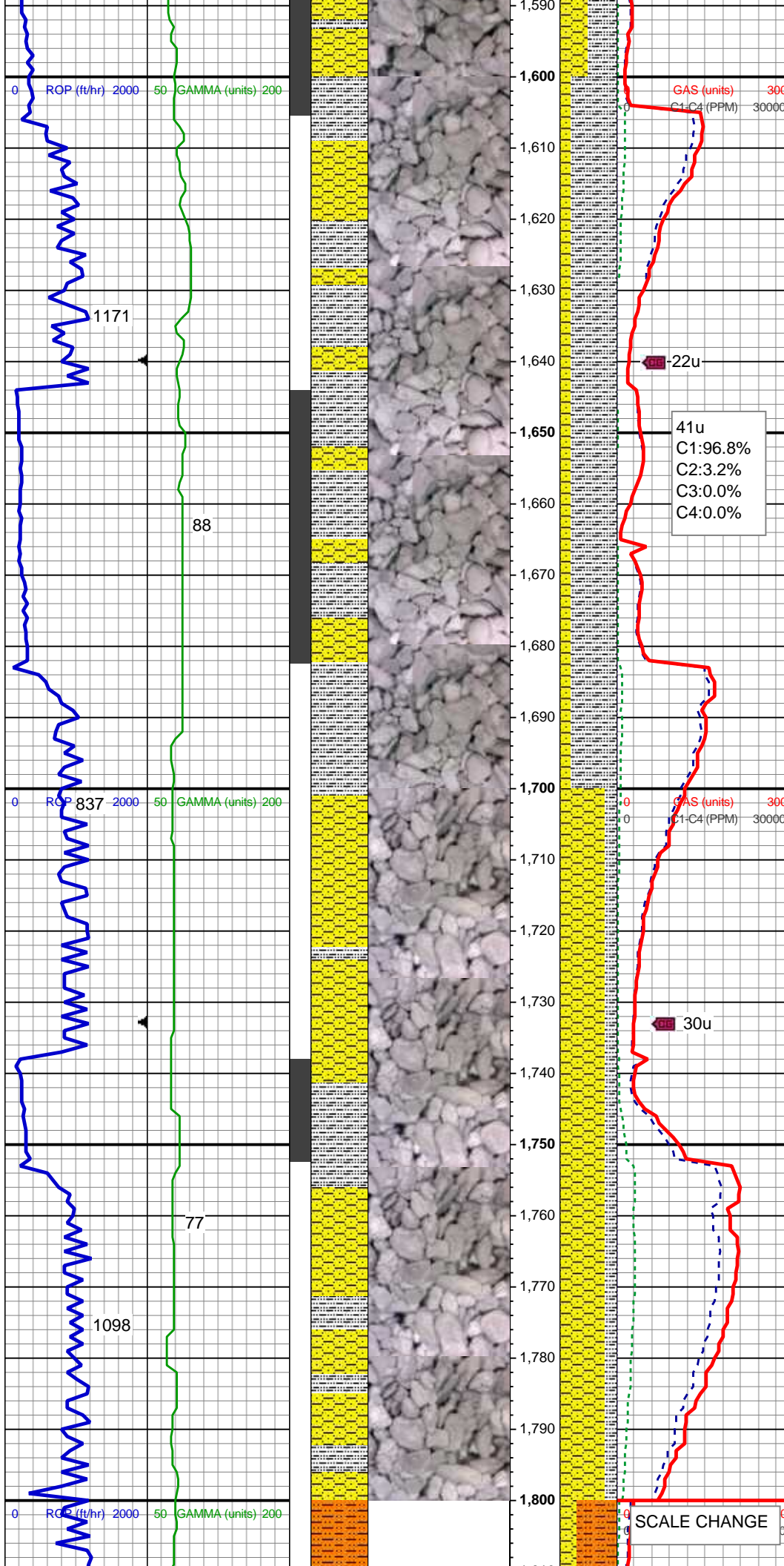
MD: 1,492'  
Inclination: 4.41 °  
Azimuth: 196.41 °  
TVD: 1,491.9'

SHY SS: lt-med gy, sft-frm, vf gr-f gr,  
sb ang - sb rnd, mod w srt, arg cmt,  
sl calc SLTY SH: lt-dk gy, sft-mod  
frm, sb blk-y-sb plty, gritty

Mud Wt: 8.70 /29 Vis

MD: 1,584'





MD: 1,584'  
Inclination: 6.05 °  
Azimuth: 191.6 °  
TVD: 1,583.51'

MD: 1,609'  
Inclination: 7.9 °  
Azimuth: 191.22 °  
TVD: 1,608.33'

SLTY SH: lt-dk gy, sft-mod frm, sb  
blky-sb plty, gritty SHY SS: lt-med  
gy, sft-frm, vf gr-f gr, sb ang - sb rnd,  
mod w srt, arg cmt, sl calc

TOOH for BHA  
@ 1665' MD

Resumed Drilling 9/19/14 @  
13:30 hrs

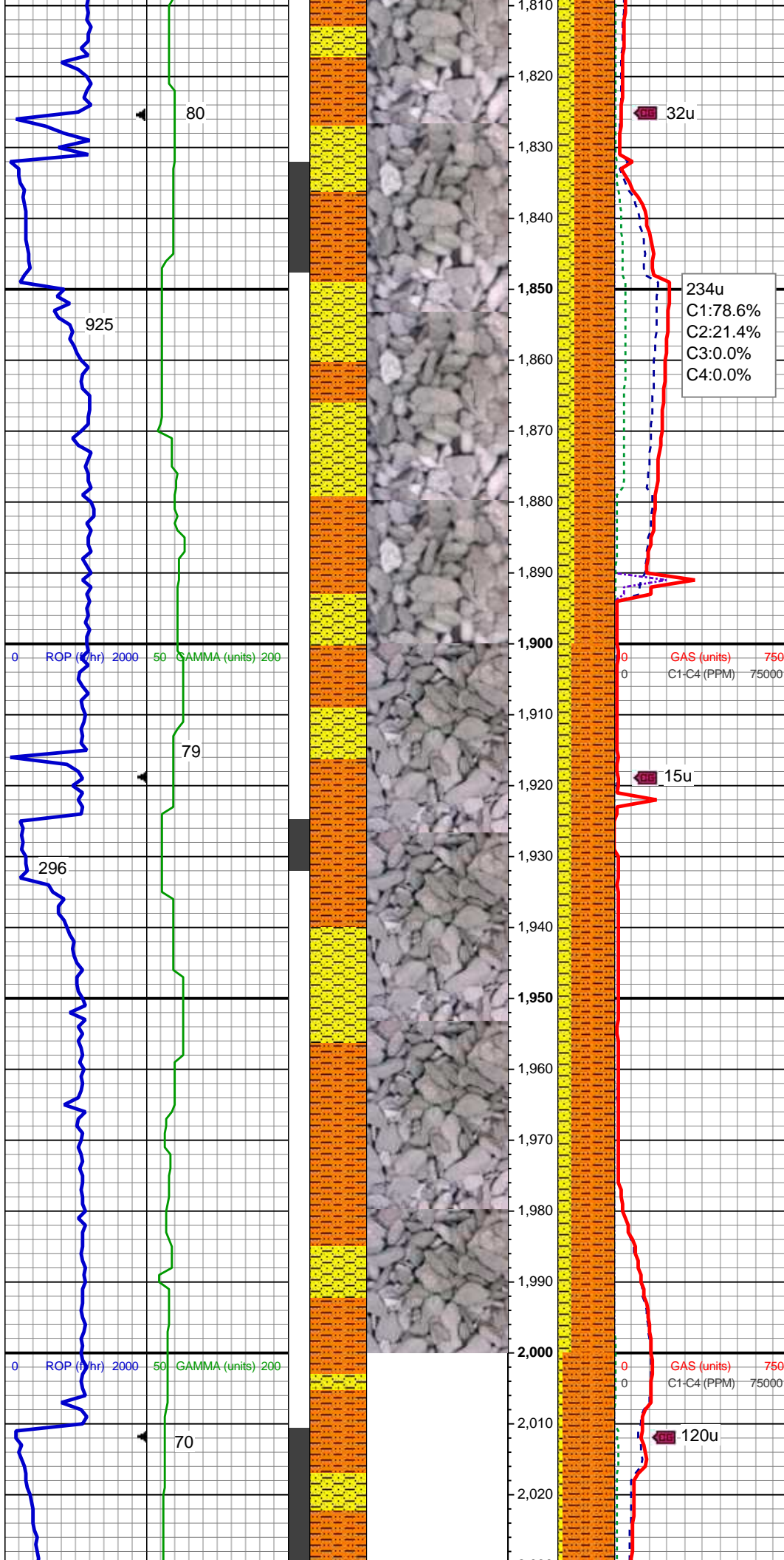
MD: 1,677'  
Inclination: 7.09 °  
Azimuth: 195.1 °  
TVD: 1,675.74'

Mud Wt: 8.55 /26 Vis

SHY SS: lt-med gy, sft-frm, vf gr-f gr,  
sb ang - sb rnd, mod w srt, arg cmt,  
sl calc SLTY SH: lt-dk gy, sft-mod  
frm, sb blky-sb plty, gritty

MD: 1,770'  
Inclination: 4.49 °  
Azimuth: 175.96 °  
TVD: 1,768.27'

Mud Wt: 8.70 /26 Vis



SHY SLTST: lt - med gy, frm - hd, brit, sb rd - sb blk, slty - grty tex, v s calc

SHY SS: wh - lt gy, fros - trns, s&p, vfg, mod hd wi brit clus, sb ang - sb rd, calc cmt

MD: 1,863'  
Inclination: 1.68 °  
Azimuth: 175.7 °  
TVD: 1,861.13'

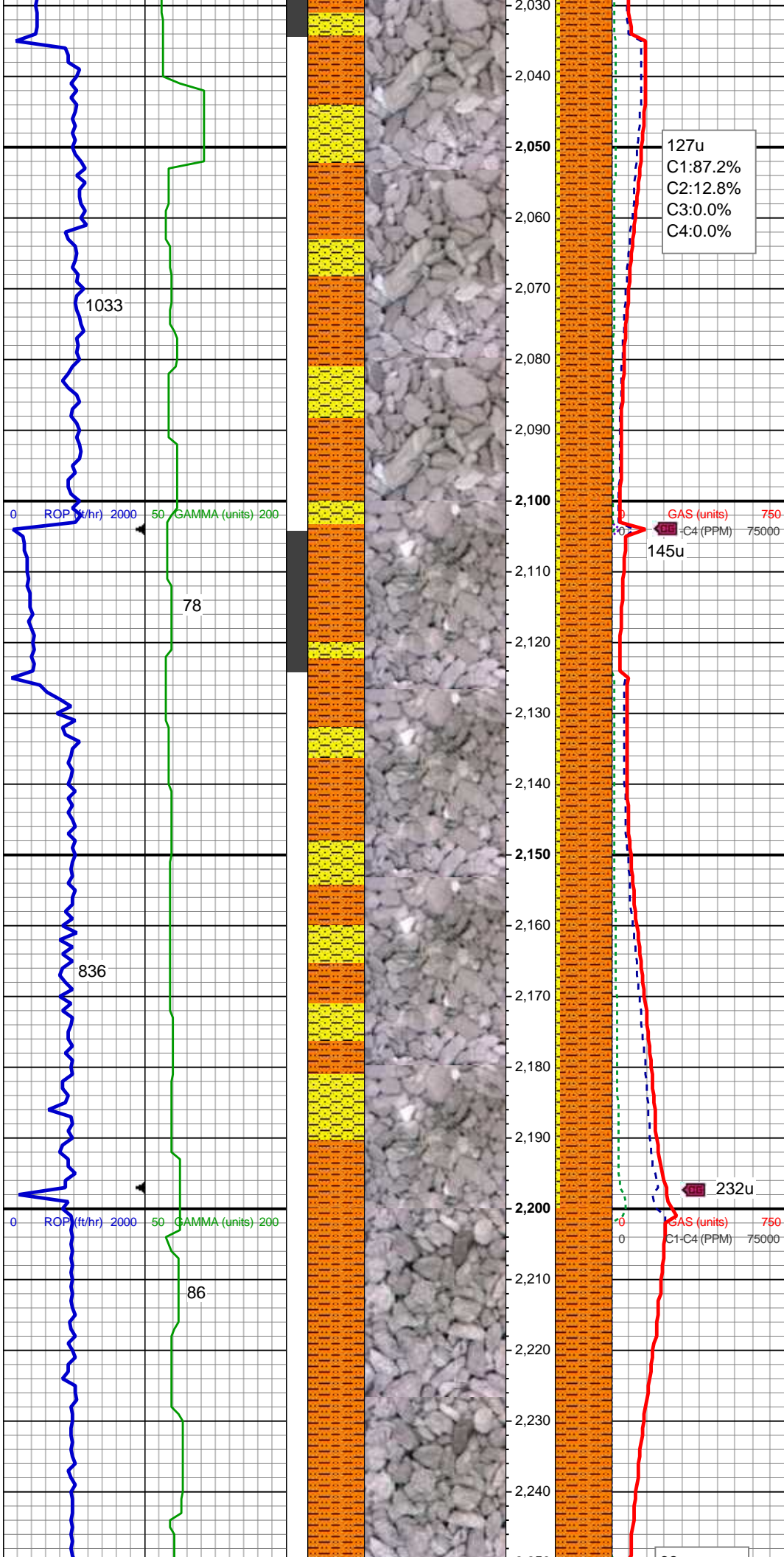
SHY SLTST: lt - med gy, frm - hd, brit, sb rd - sb blk, slty - grty tex, v s calc

SHY SS: wh - lt gy, fros - trns, s&p, vfg, mod hd wi brit clus, sb ang - sb rd, calc cmt

MD: 1,956'  
Inclination: 0.03 °  
Azimuth: 204.33 °  
TVD: 1,954.11'

MD: 2,048'





Inclination: 3.13 °  
Azimuth: 73.37 °  
TVD: 2,046.07'

SHY SLTST: lt - med gy, frm - mod  
hd, brit, sb rd - sb blk, slty - grty tex,  
v sl calc  
SHY SS: wh - lt gy, fros - trns, s&p,  
vfg, mod hd wi brit clus, sb ang - sb  
rd, calc cmt

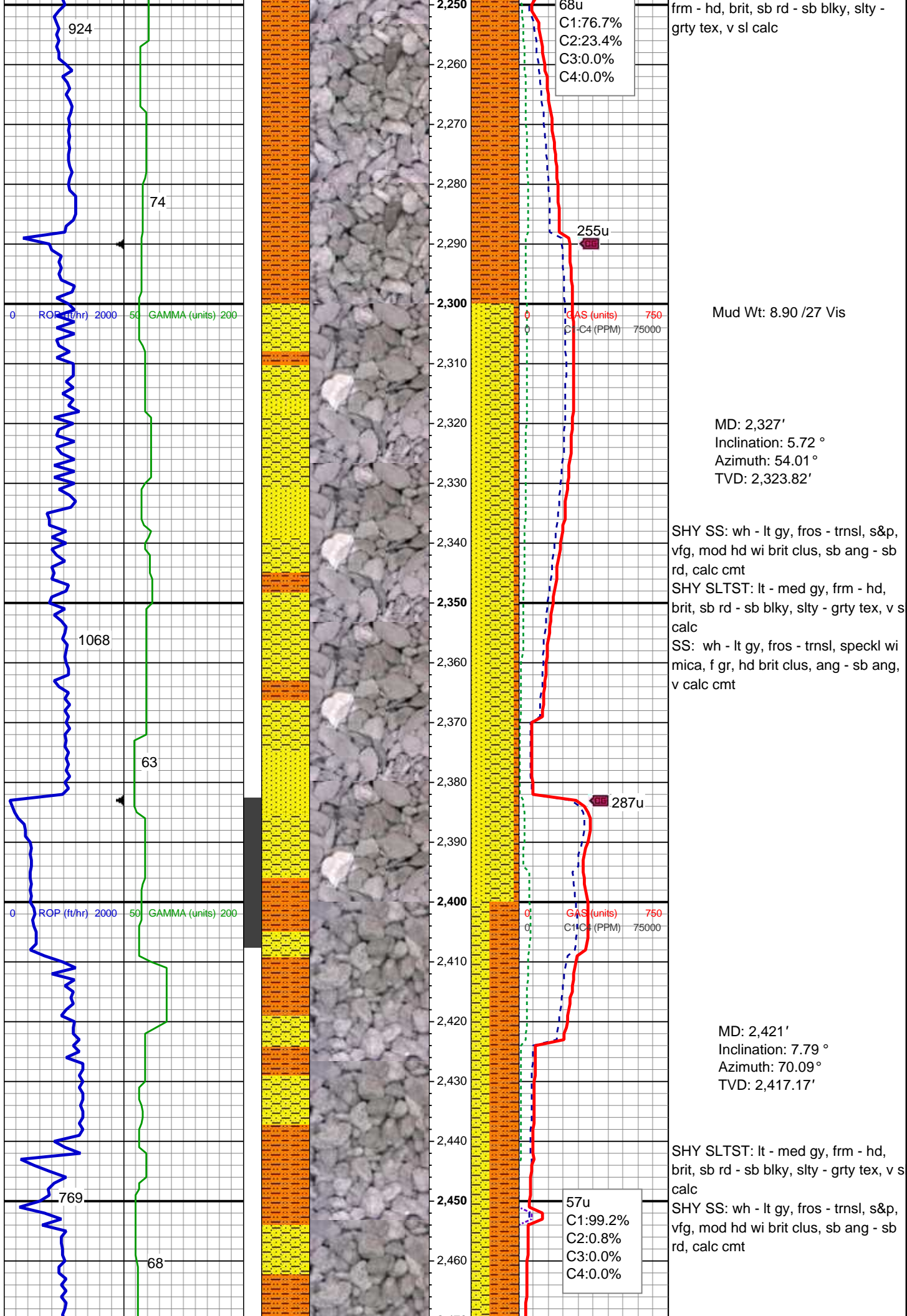
Mud Wt: 8.75 /27 Vis

MD: 2,141'  
Inclination: 6.03 °  
Azimuth: 61.72 °  
TVD: 2,138.76'

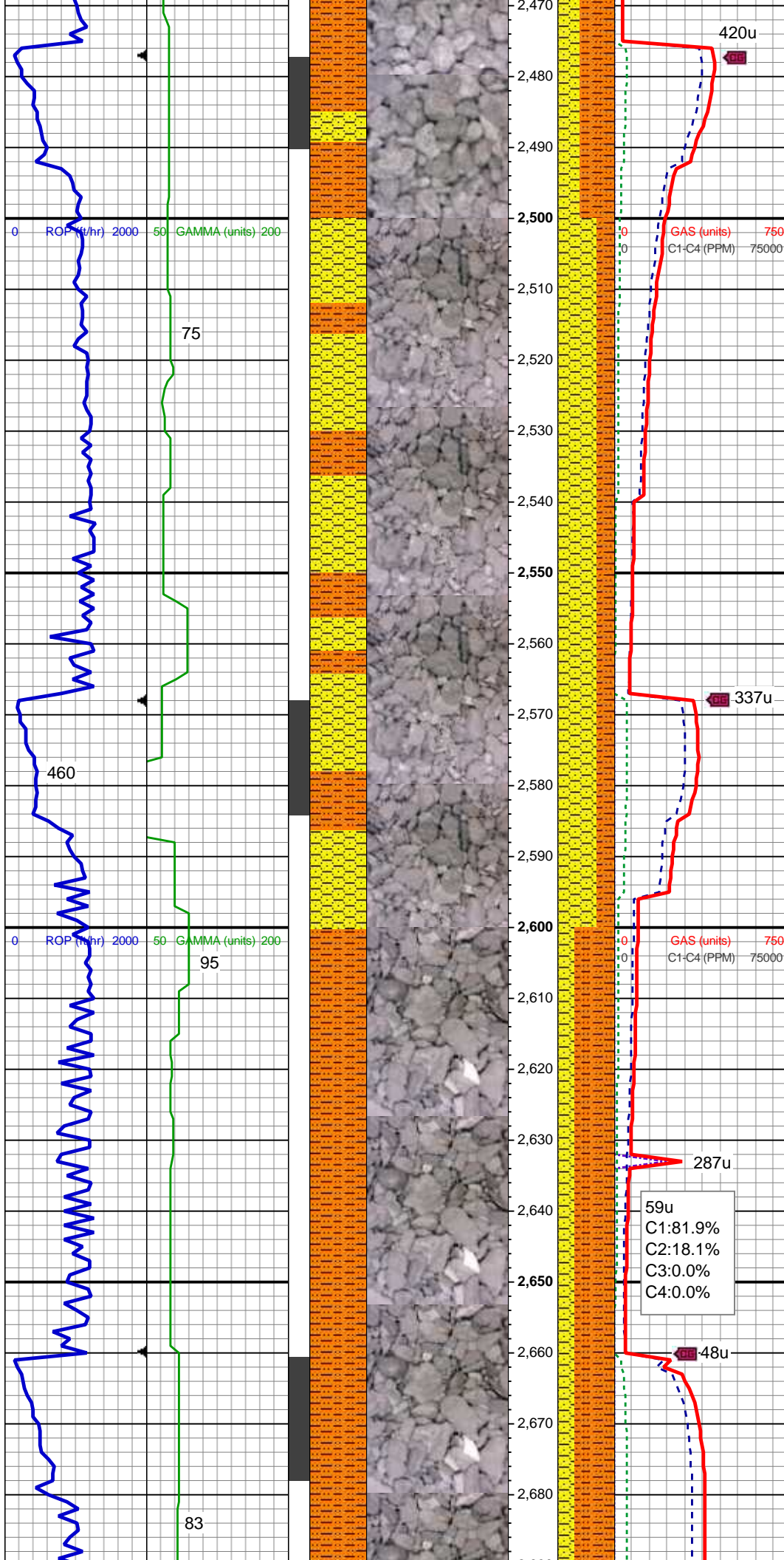
SHY SLTST: lt - med gy, occ dk gy,  
frm - hd, brit, sb rd - sb blk, slty -  
grty tex, v sl calc  
SHY SS: wh - lt gy, fros - trns, s&p,  
vfg, mod hd wi brit clus, sb ang - sb  
rd, calc cmt

MD: 2,234'  
Inclination: 5.7 °  
Azimuth: 53.44 °  
TVD: 2,231.28'

SHY SLTST: lt - med gy, occ dk gy,







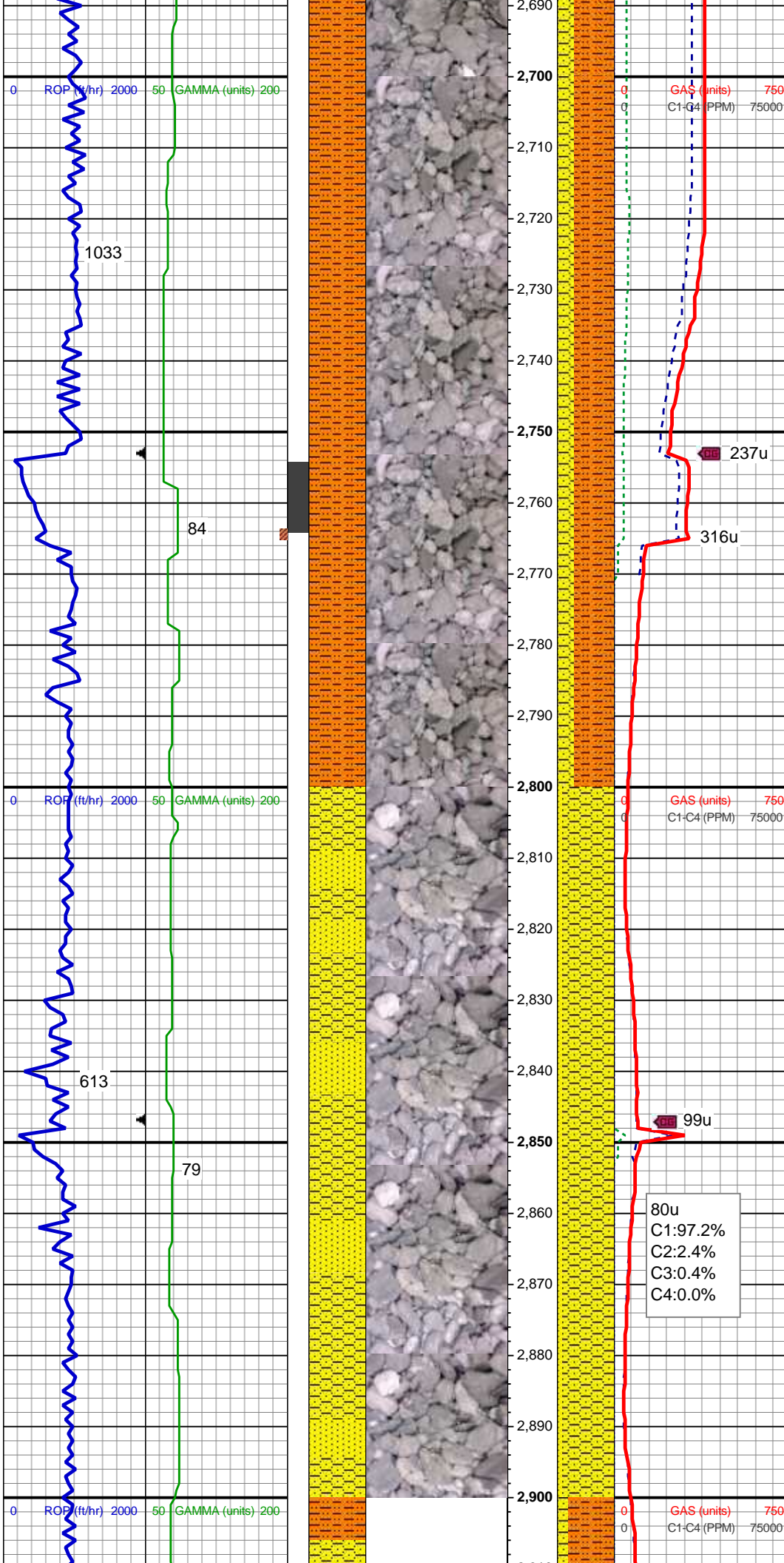
MD: 2,512'  
Inclination: 9.9 °  
Azimuth: 7.5 °  
TVD: 2,507.27'

SHY SS: wh - lt gy, fros - trns, s&p, vfg, mod hd wi brit clus, sb ang - sb rd, calc cmt  
SHY SLTST: lt - med gy, frm - hd, brit, sb rd - sb blk, slty - grty tex, v s calc

MD: 2,604'  
Inclination: 12.15 °  
Azimuth: 73.56 °  
TVD: 2,597.39'

Mud Wt: 9.00 /29 Vis

SHY SLTST: lt - med gy, frm - hd, brit, sb rd - sb blk, slty - grty tex, v s calc  
SHY SS: wh - lt gy, fros - trns, s&p, vfg, mod hd wi brit clus, sb ang - sb rd, calc cmt



MD: 2,696'  
Inclination: 14.99 °  
Azimuth: 69.04 °  
TVD: 2,686.81'

SHY SLTST: lt - med gy, frm - hd,  
brit, sb rd - sb blk, slty - grty tex, v s  
calc  
SHY SS: wh - lt gy, fros - trns, s&p,  
vfg, mod hd wi brit clus, sb ang - sb  
rd, calc cmt

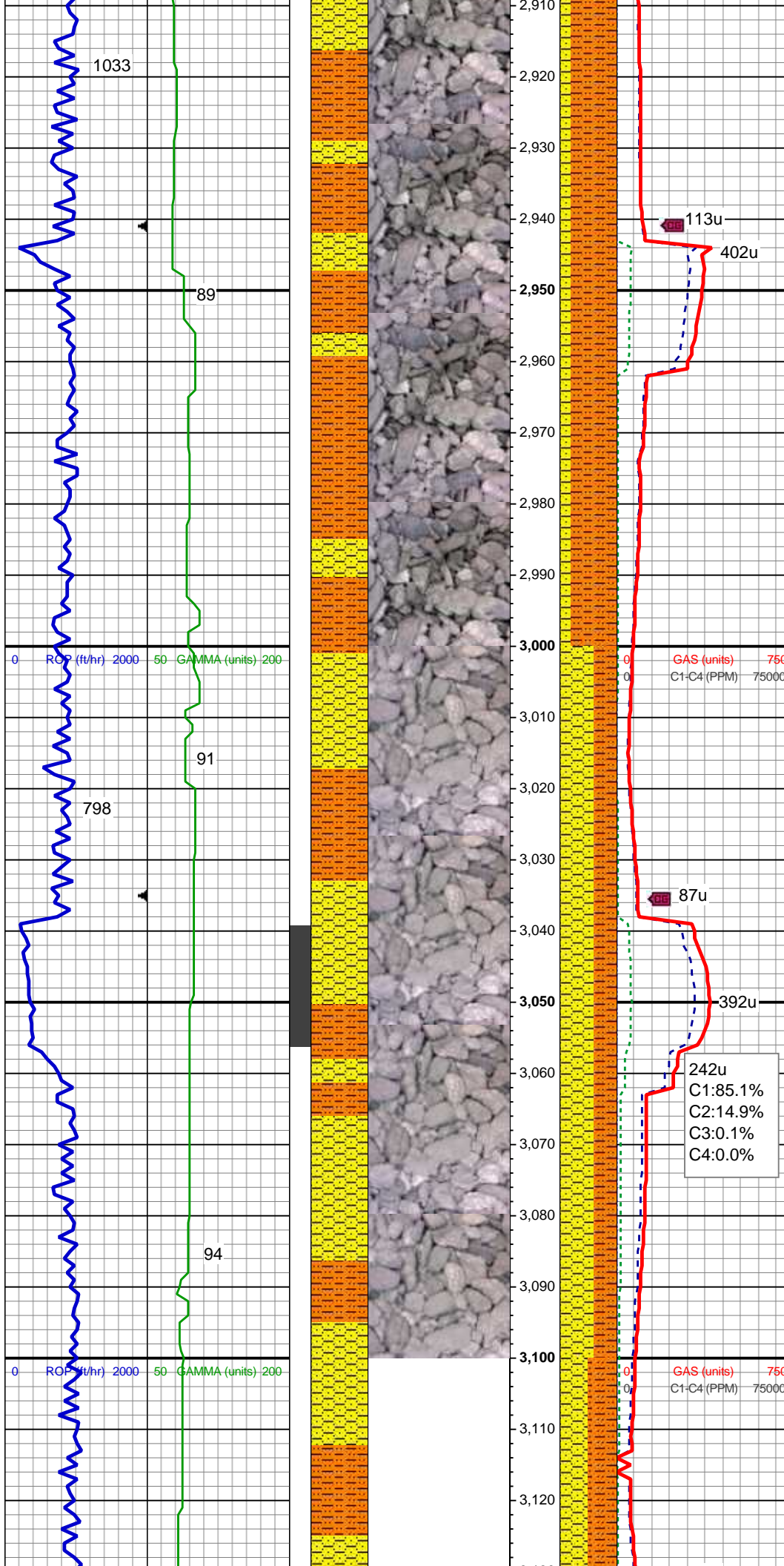
MD: 2,791'  
Inclination: 16.48 °  
Azimuth: 65.74 °  
TVD: 2,778.25'

SHY SS: wh - lt gy, fros - trns, s&p,  
vfg, mod hd wi brit clus, sb ang - sb  
rd, calc cmt  
SS: wh - lt gy, fros - trns, speckl wi  
mica, f gr, hd brit clus, ang - sb ang,  
v calc cmt

MD: 2,885'  
Inclination: 15.99 °  
Azimuth: 64.25 °  
TVD: 2,868.5'

80u  
C1:97.2%  
C2:2.4%  
C3:0.4%  
C4:0.0%





Mud Wt: 8.95 /30 Vis

SHY SLTST: lt - med gy, frm - hd,  
brit, sb rd - sb blk, slty - grty tex, v s  
calc

SHY SS: wh - lt gy, fros - trns, s&p,  
vfg, mod hd wi brit clus, sb ang - sb  
rd, calc cmt

MD: 2,980'

Inclination: 14.68 °

Azimuth: 62.25 °

TVD: 2,960.12'

GAS (units) 750  
C1-C4 (PPM) 75000

87u

SHY SLTST: lt - med gy, frm - hd,  
brit, sb rd - sb blk, slty - grty tex, v s  
calc

SHY SS: wh - lt gy, fros - trns, s&p,  
vfg, mod hd wi brit clus, sb ang - sb  
rd, calc cmt

242u  
C1:85.1%  
C2:14.9%  
C3:0.1%  
C4:0.0%

MD: 3,074'

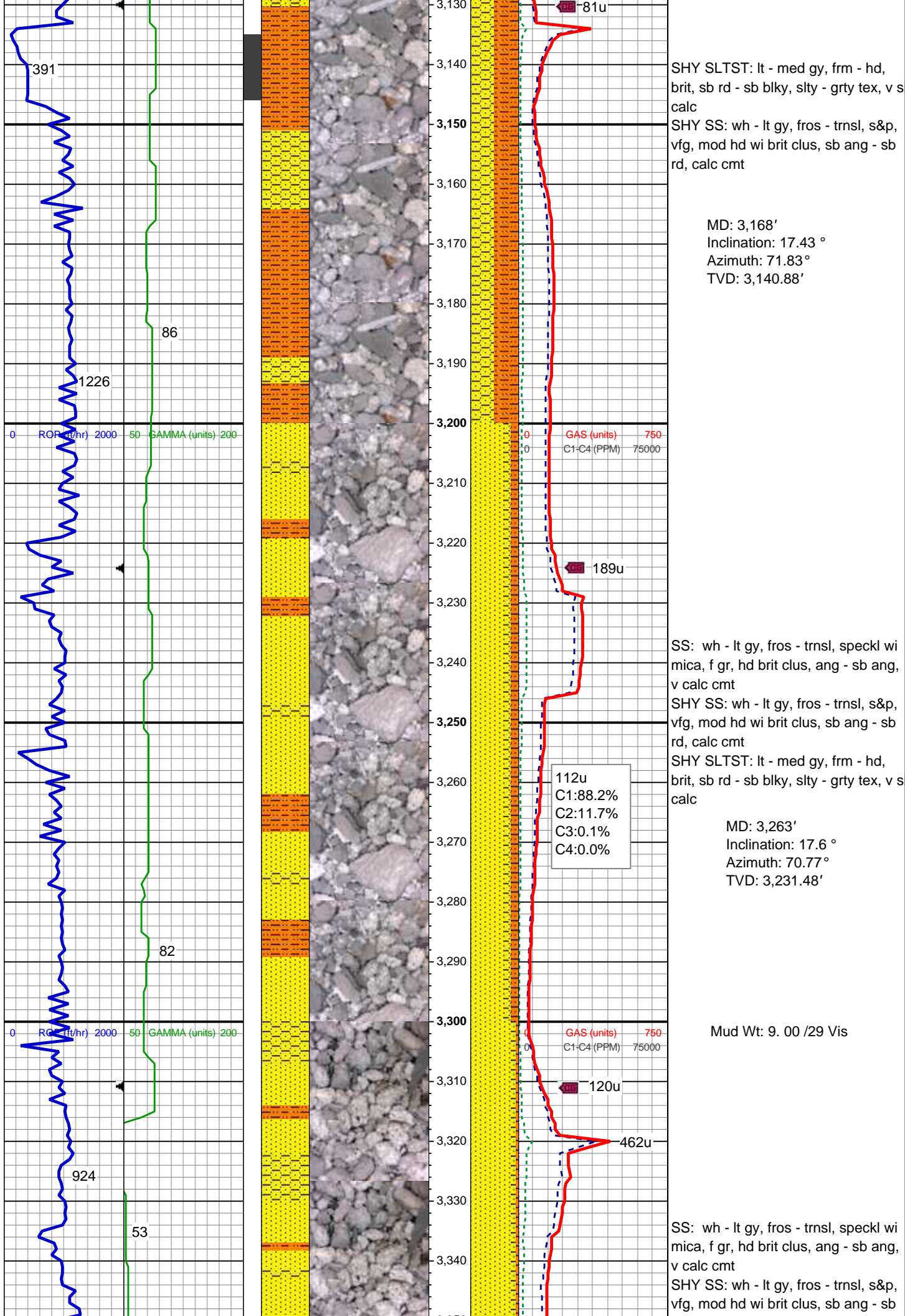
Inclination: 15.82 °

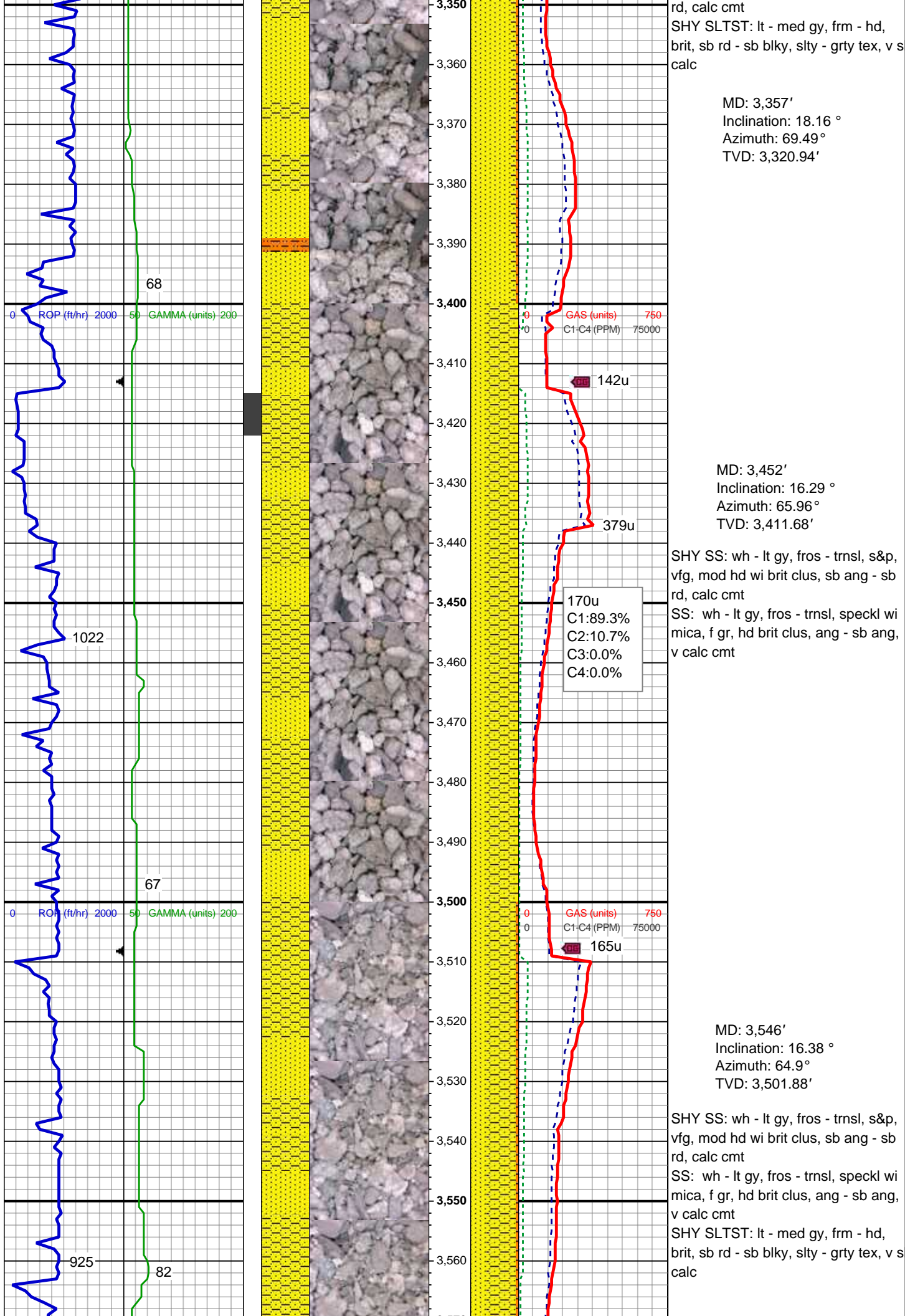
Azimuth: 66.26 °

TVD: 3,050.81'

GAS (units) 750  
C1-C4 (PPM) 75000



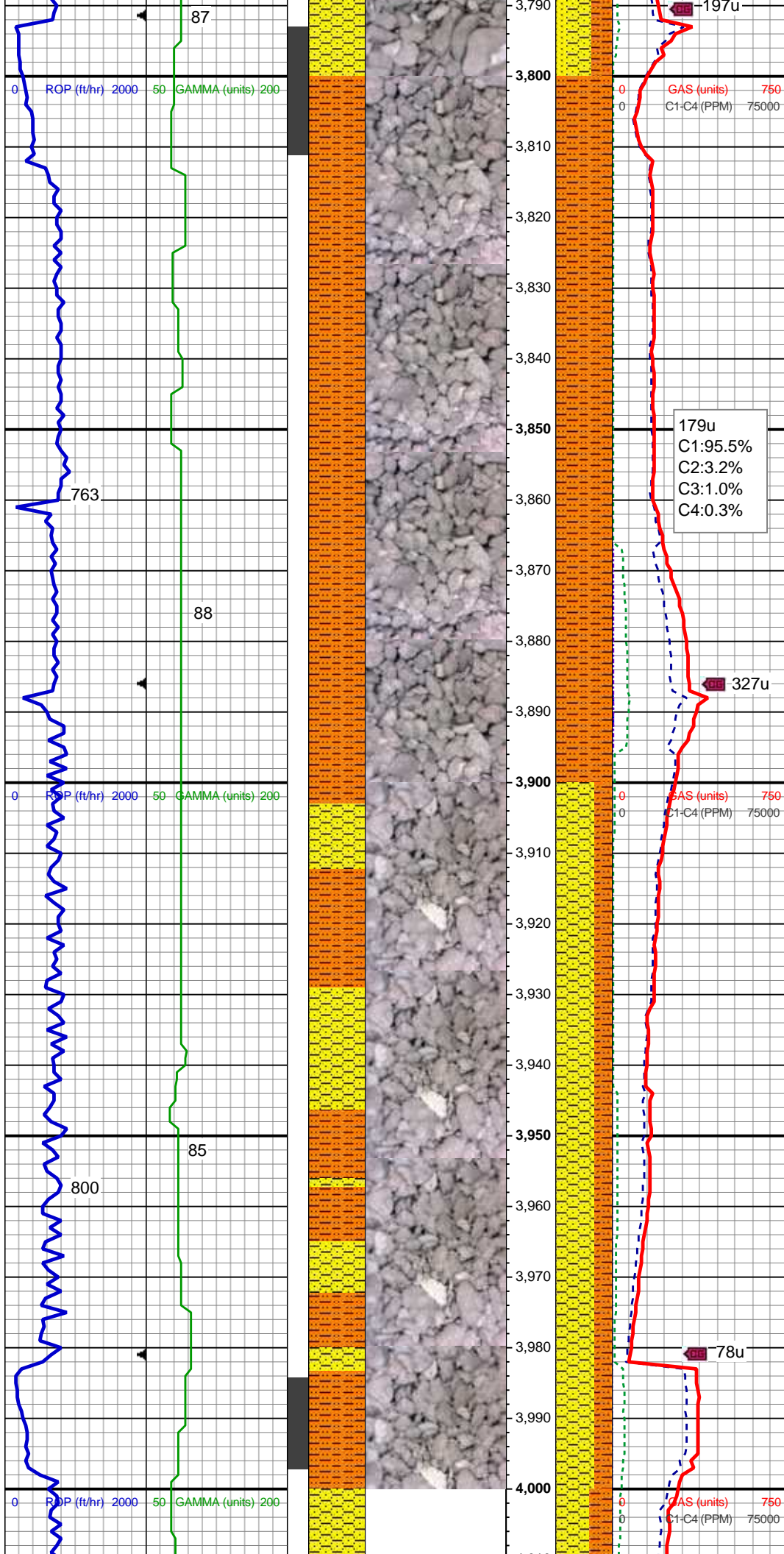












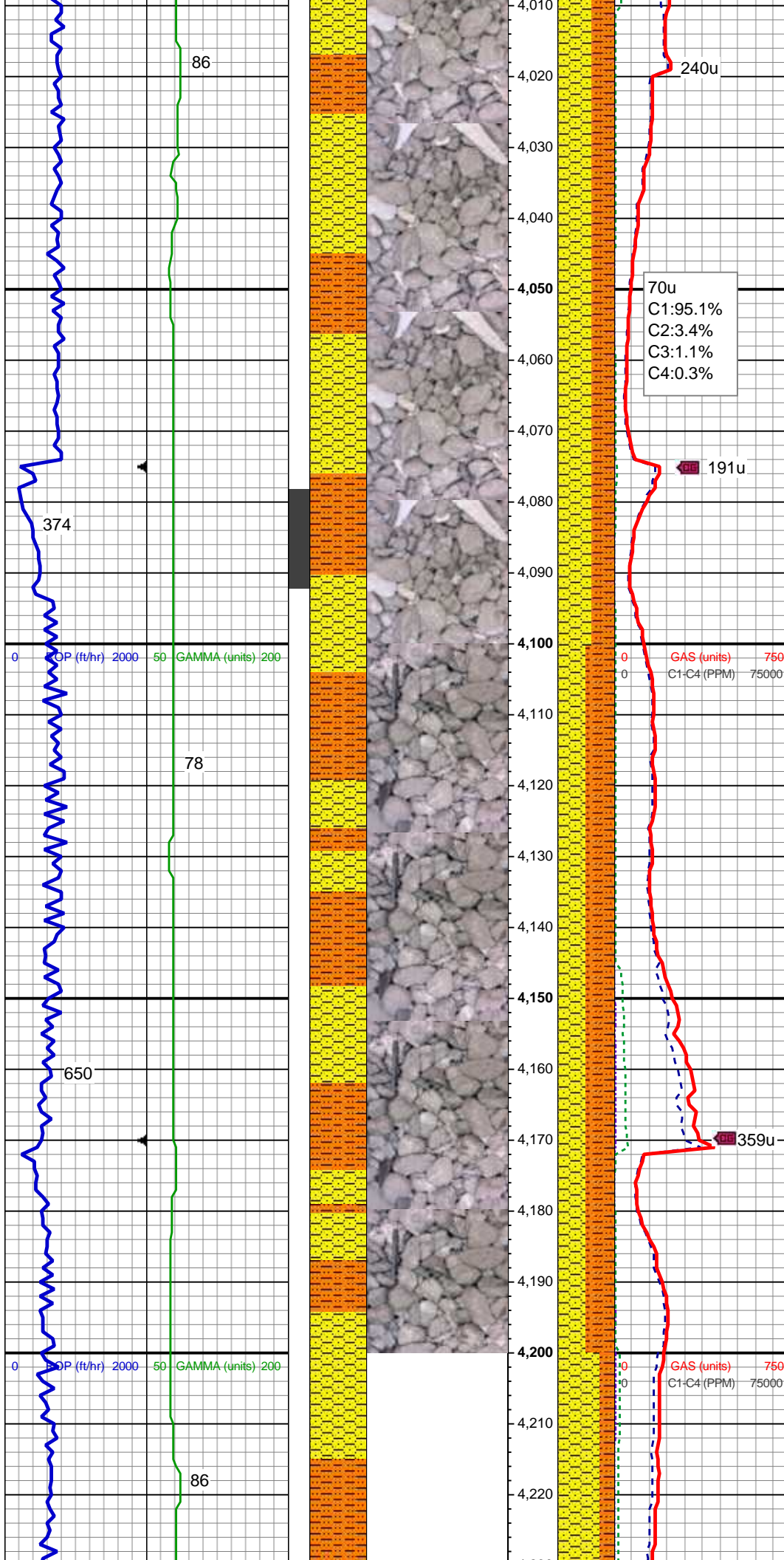
Mud Wt: 9.00 /29 Vis

MD: 3,830'  
Inclination: 15.61 °  
Azimuth: 76.61 °  
TVD: 3,775.86'

SHY SLTST: lt - med gy, frm - hd,  
brit, sb rd - sb blk, slty - grty tex, v s  
calc

MD: 3,924'  
Inclination: 14.89 °  
Azimuth: 76.07 °  
TVD: 3,866.55'

SHY SS: wh - lt gy, fros - trns, s&p,  
vfg, mod hd wi brit clus, sb ang - sb  
rd, calc cmt  
SHY SLTST: lt - med gy, frm - hd,  
brit, sb rd - sb blk, slty - grty tex, v s  
calc



MD: 4,019'  
Inclination: 14.67 °  
Azimuth: 70.73 °  
TVD: 3,958.41'

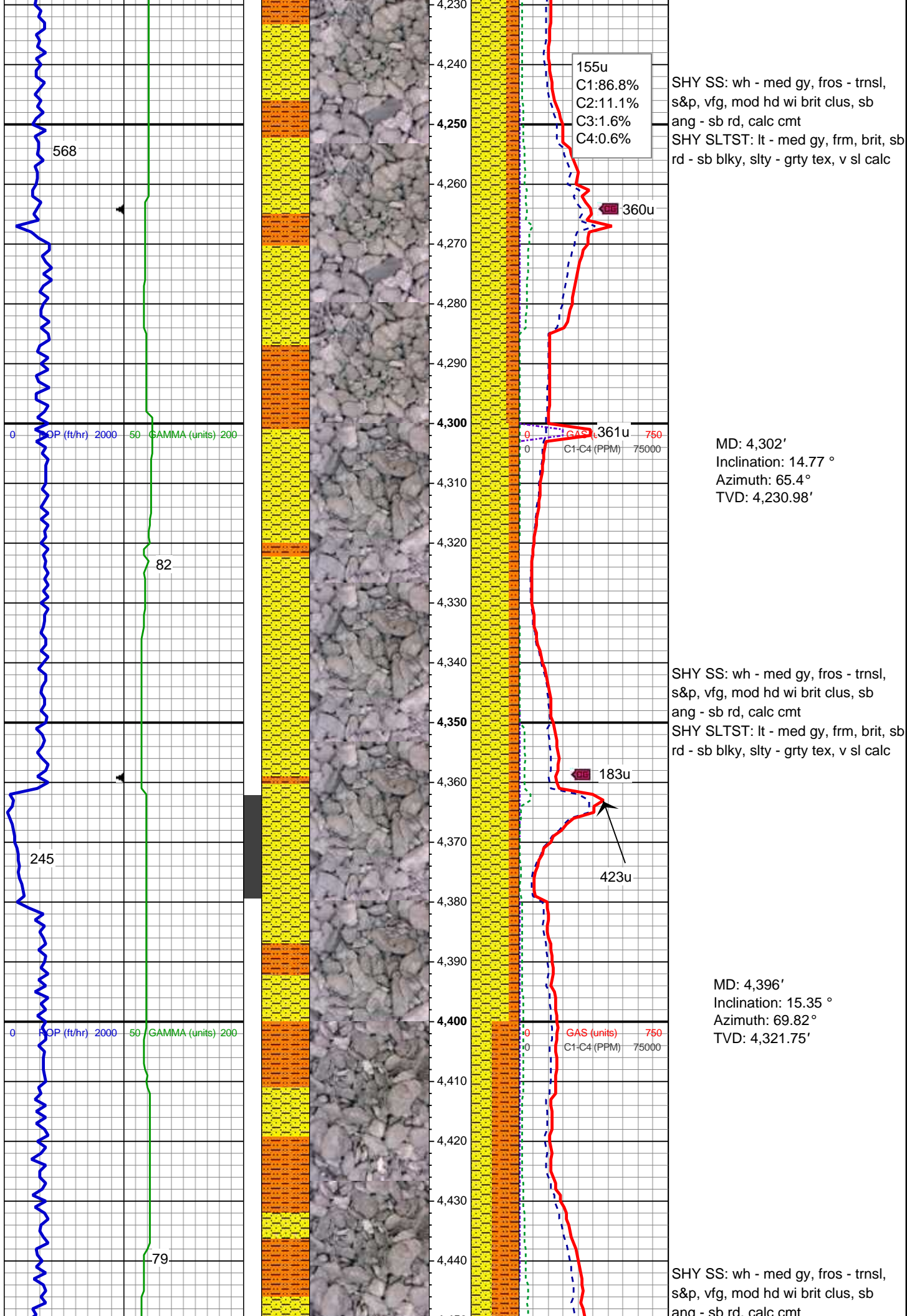
SHY SS: wh - lt gy, fros - trns, s&p, vfg, mod hd wi brit clus, sb ang - sb rd, calc cmt  
SHY SLTST: lt - med gy, frm - hd, brit, sb rd - sb blk, slty - grty tex, v s calc

MD: 4,114'  
Inclination: 16.27 °  
Azimuth: 68.5 °  
TVD: 4,049.97'

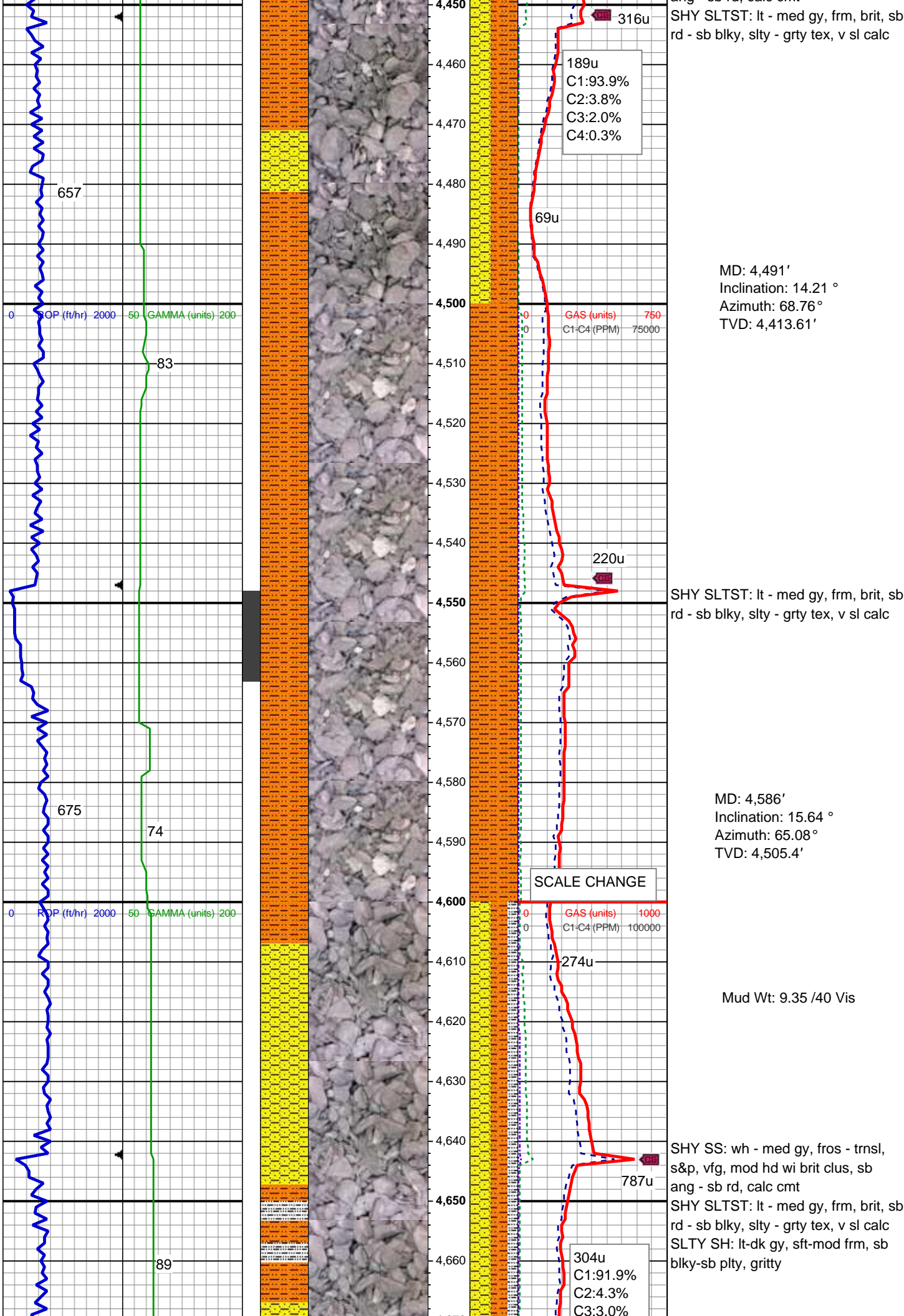
SHY SS: wh - med gy, fros - trns, s&p, vfg, mod hd wi brit clus, sb ang - sb rd, calc cmt  
SHY SLTST: lt - med gy, frm, brit, sb rd - sb blk, slty - grty tex, v sl calc

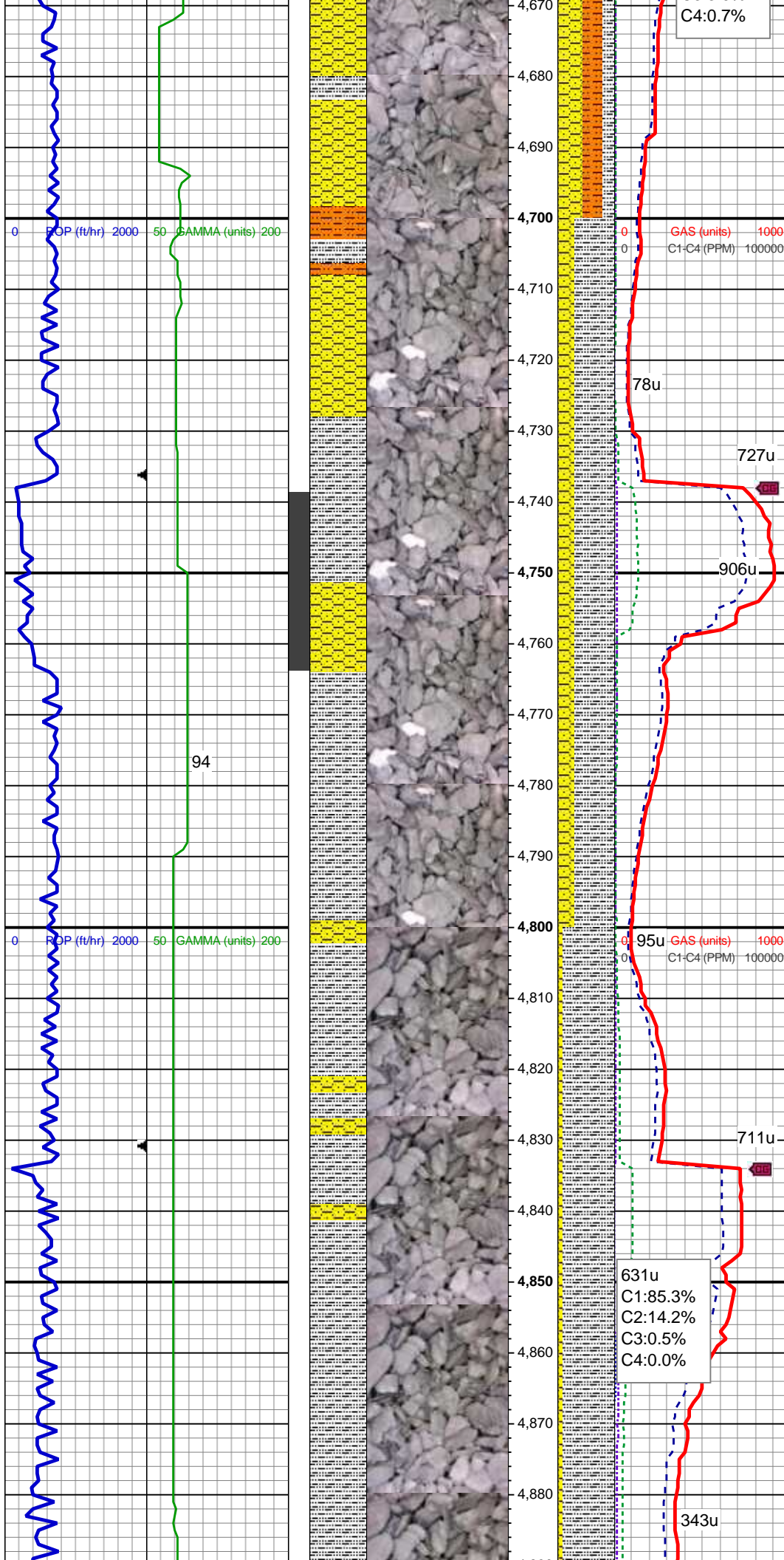
MD: 4,208'  
Inclination: 15.82 °  
Azimuth: 66.73 °  
TVD: 4,140.31'











MD: 4,680'  
Inclination: 14.24 °  
Azimuth: 63.31 °  
TVD: 4,596.22'

SHY SS: wh - med gy, fros - trnsl, s&p, vfg, mod hd wi brit clus, sb ang - sb rd, calc cmt  
SLTY SH: lt-dk gy, sft-mod frm, sb blkly-sb plty, gritty

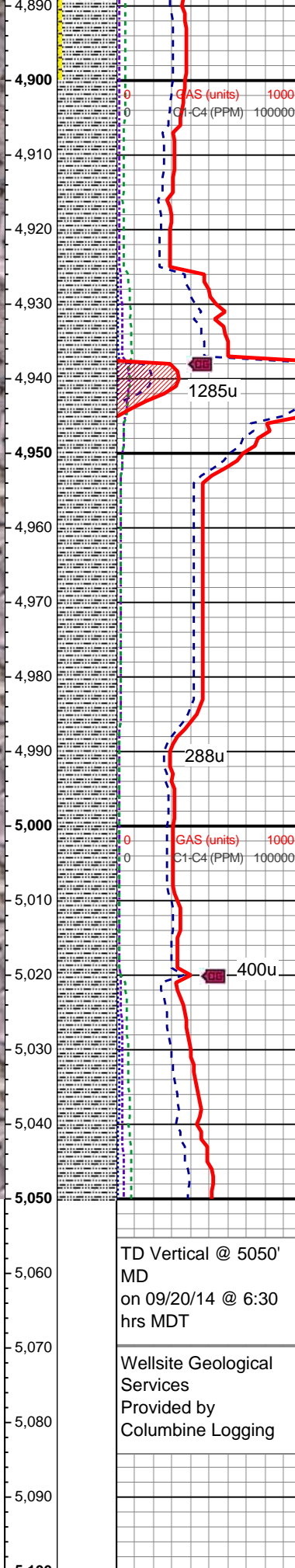
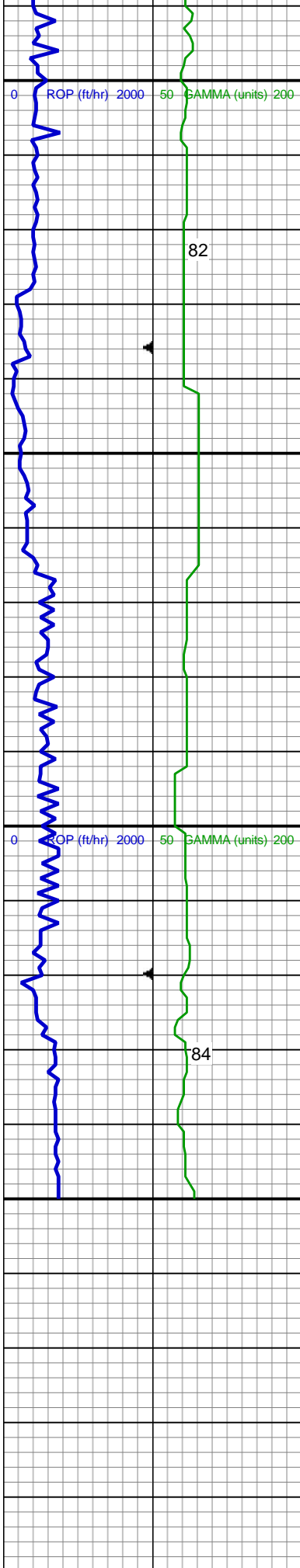
MD: 4,775'  
Inclination: 15.54 °  
Azimuth: 66.89 °  
TVD: 4,688.03'

Mud Wt: 9.35 /40 Vis

SLTY SH: lt-dk gy, sft-mod frm, sb blkly-sb plty, gritty SHY SS: wh - med gy, fros - trnsl, s&p, vfg, mod hd wi brit clus, sb ang - sb rd, calc cmt

MD: 4,869'  
Inclination: 14.24 °  
Azimuth: 65.67 °  
TVD: 4,778.87'





SLTY SH: lt-dk gy, sft-mod frm, sb  
blky-sb plty, gritty

MD: 4,964'  
Inclination: 16.51 °  
Azimuth: 71.98 °  
TVD: 4,870.47'

See Corresponding Horizontal Log  
Rohn State LD10-67HN HORZ