

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Heartland State G25-73-1HN

**Location** Sec. 25 T4N R65W

**State** Colorado

**County** Weld

**Country** USA

**Rig Number** PD 829

**API Number** 05-123-39551

**AFE #** 200364

**Region** DJ Basin

**Field** Wattenberg

**Spud Date** 9/21/2014

**Drilling Completed** 10/1/2014

**Surface Coordinates** 282 FEL ; 739 FEL  
40.27673 ; -104.60499

**Bottom Hole Coordinates** 75 FNL ; 990 FEL  
40.30492 ; -104.60568

**Ground Elevation** 4835'

**K.B. Elevation** 4851'

**Logged Interval** 711' **To** 6221'

**Total Depth** 16867'

**Formation** Niobrara C Chalk

**Type of Drilling Fluid** FW LSND

## Operator

**Company** NOBLE ENERGY INC.

**Address** 1625 BROADWAY  
DENVER, CO 80202

## Geologist

**Name** Holly Duncan

**Company** Noble Energy, Inc.

**Address** 1625 BROADWAY  
DENVER, CO 80202

# Other

Columbine Logging, Inc.

2385 S. Lipan St.  
Denver, CO 80223

Well site Geologists

Ryan Shilling  
Eric Bernardo

## Rock Types

|                 |                      |                   |                 |
|-----------------|----------------------|-------------------|-----------------|
| UNKNOWN         | COAL                 | MARLSTONE         | SHALY SANDSTONE |
| ANHYDRITE       | CONGLOMERATE         | METAMORPHIC       | SHALY SILTSTONE |
| BENTONITE       | DOLOMITE             | NO SAMPLE         | SILTSTONE       |
| BRECCIA         | DOLOMITIC LIMESTONE  | SALT              | SILTY SHALE     |
| CEMENT          | GRANITE              | SALT- PEPPER SAND | TILL            |
| CHALK           | GYPHUM               | SANDSTONE         | TUFF            |
| CHERT           | IGNEOUS              | SHALE             | WELDED TUFF     |
| CLAY CHOKE SAND | LIMESTONE            | SHALE COLORED     |                 |
| CLAYSTONE       | SIDERITE or LIMONITE | SHALE GRAY        |                 |

## 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 PELLET

FERRUGINOUS

GLAUCONITE

GYPHIFEROUS

HEAVY MINERAL

KAOLIN

MARLSTONE

MICACEOUS

MINERAL CRYSTALS

NODULES

PHOSPHATE PELLETS

PYRITE

SALT CAST

SANDY

SILICEOUS

SILTY

TUFFACEOUS

ANHYDRITE STRINGER

BENTONITE STRINGER

COAL STRINGER

DOLOMITE STRINGER

GYPHUM STRINGER

LIMESTONE STRINGER

MARLSTONE (CALC) STRG

MARLSTONE (DOL) STRG

SANDSTONE STRINGER

SHALE STRINGER

SILTSTONE STRINGER

### Stringer

## Other Symbols

### Oil Show

DEAD

EVEN

QUESTIONABLE

SPOTTED STAINING

### Porosity

EARTHY

FENESTRAL

FRACTURE

INTERCRYSTALLINE

INTEROOLITIC

MOLDIC

ORGANIC

PINPOINT

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 (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

EARTHY

FNELYXLN

GRAINSTONE

LITHOGRAPHIC

MICROXLN

MUDSTONE

PACKSTONE

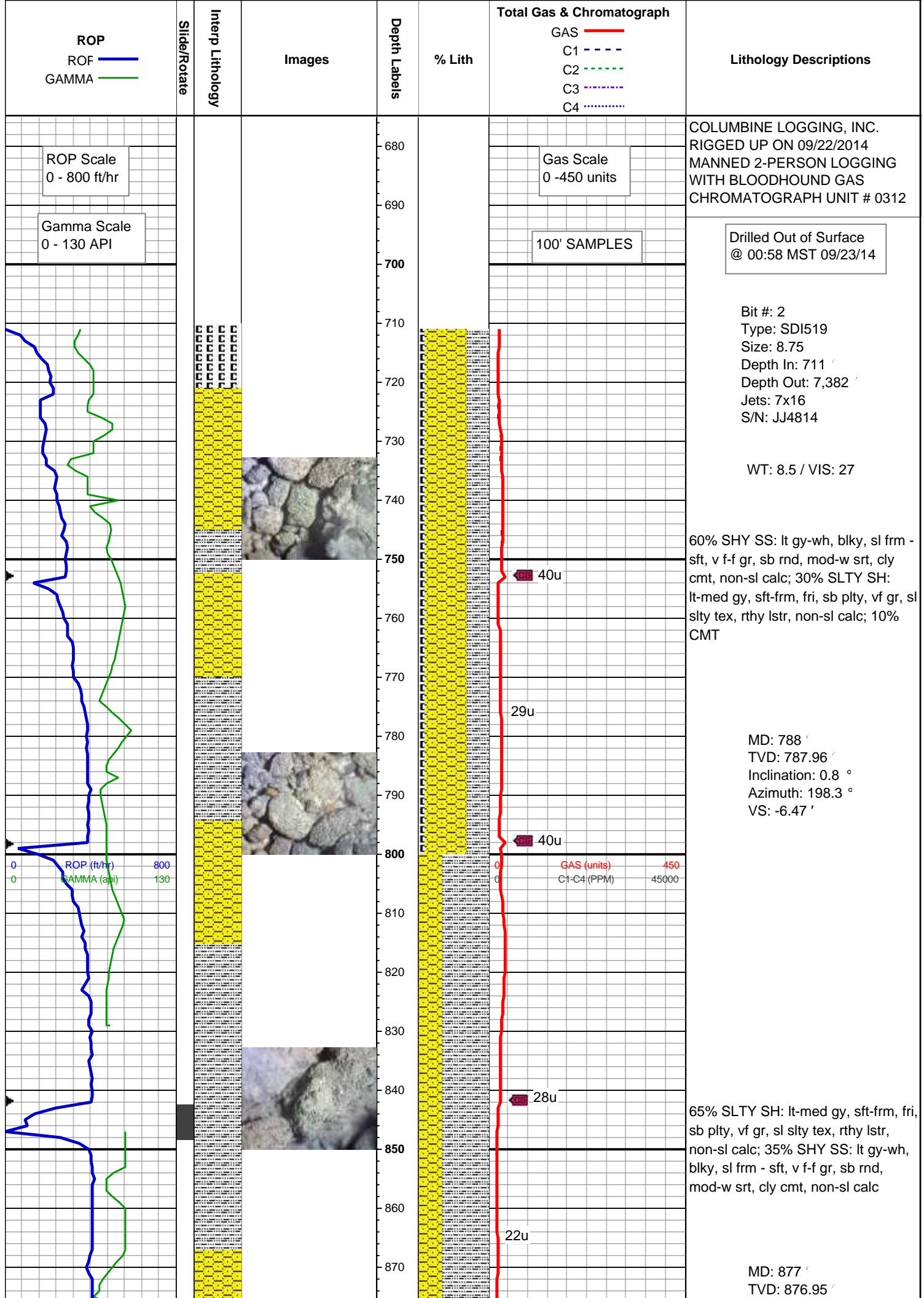
WACKESTONE

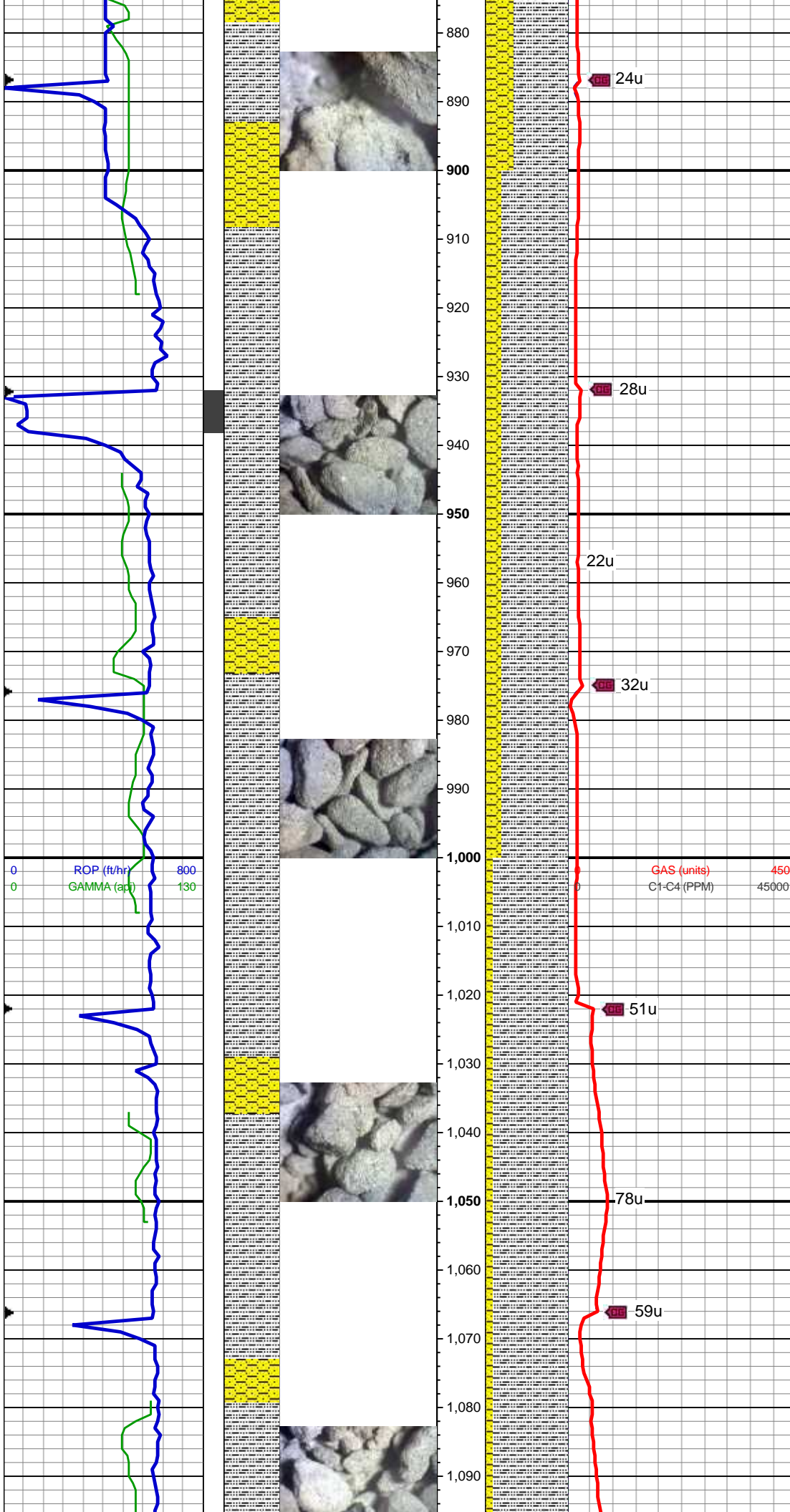
### Sorting

MODERATE

POOR

WELL





Inclination: 1.1 °  
Azimuth: 154.3 °  
VS: -7.83 '

WT: 8.5 / VIS: 27

80% SLTY SH: lt-med gy, sft frm, fri,  
sb plty, vf gr, sl slty tex, rthy lstr,  
non-sl calc; 20% SHY SS: lt gy-wh,  
blky, sl frm - sft, v f-f gr, sb rnd,  
mod-w srt, cly cmt, non-sl calc

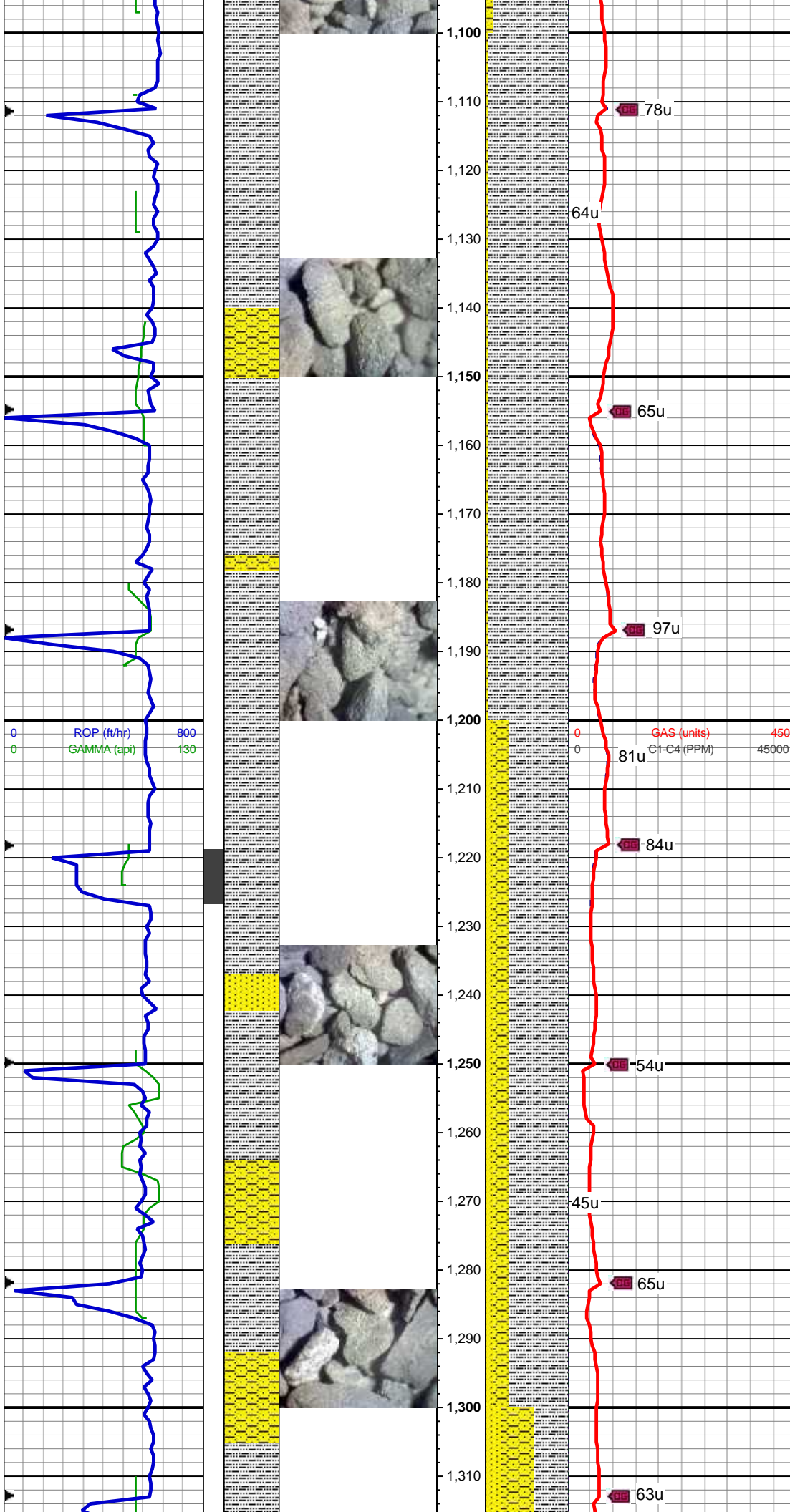
MD: 967 '  
TVD: 966.94 '  
Inclination: 0.7 °  
Azimuth: 87.5 °  
VS: -8.61 '

GAS (units) 450  
C1-C4 (PPM) 45000

90% SLTY SH: lt-med gy, sft frm, fri,  
sb plty, vf gr, sl slty tex, rthy lstr,  
non-sl calc; 10% SHY SS: lt gy-wh,  
blky, sl frm - sft, v f-f gr, sb rnd,  
mod-w srt, cly cmt, non-sl calc

MD: 1,056 '  
TVD: 1,055.94 '  
Inclination: 0.7 °  
Azimuth: 63 °  
VS: -8.37 '





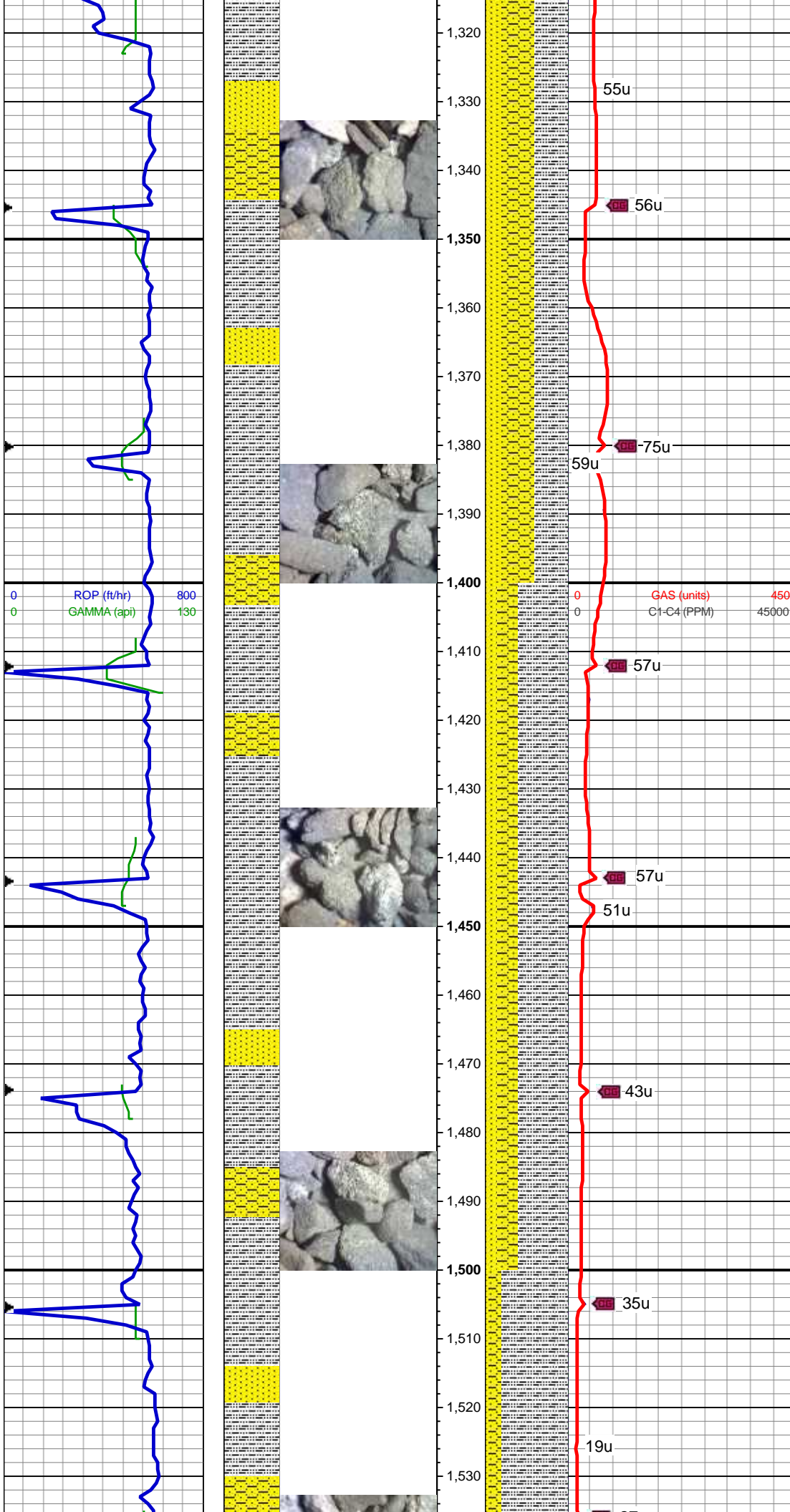
WT: 8.5 / VIS: 27

95% SLTY SH: lt-med gy, sft frm, fri, sb pty, vf gr, sl slty tex, rthy lstr, non-sl calc; 5% SHY SS: lt gy-wh, blk, sl frm - sft, v f-f gr, sb rnd, mod-w srt, cly cmt, non-sl calc

MD: 1,164 '  
TVD: 1,163.92 '  
Inclination: 1 °  
Azimuth: 57.6 °  
VS: -7.61 '

70% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb pty-blky, vf gr, slty tex, sl calc; 20% SHY SS: wh-lt gy, blk, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc; 10% SS: wh-lt gy, s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc

MD: 1,259 '  
TVD: 1,258.91 '  
Inclination: 1 °  
Azimuth: 48 °  
VS: -6.65 '



WT: 8.5 / VIS: 27

40% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 40% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc; 20% SS: wh-lt gy, s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc

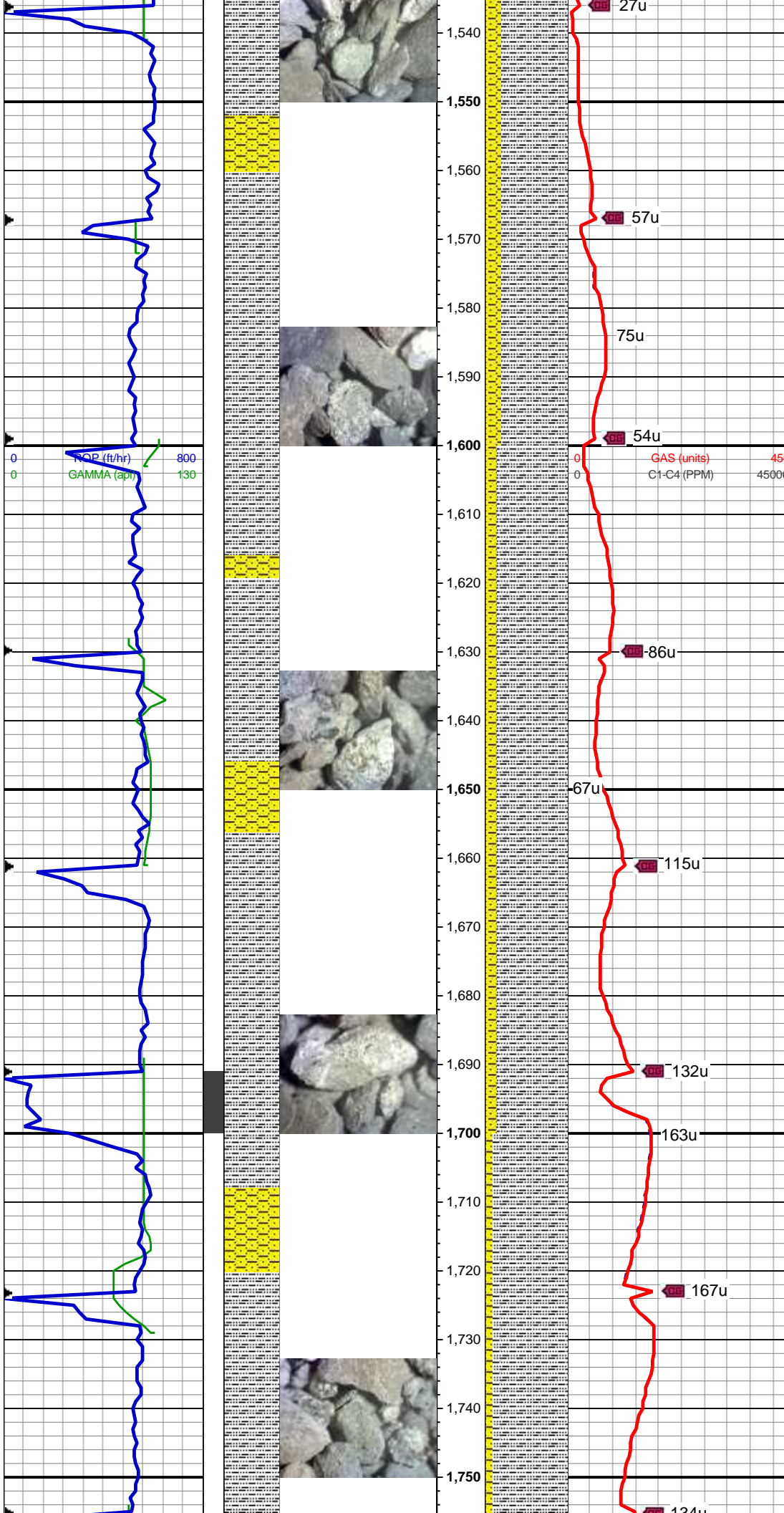
MD: 1,358 '  
TVD: 1,357.9 '  
Inclination: 1 °  
Azimuth: 36.7 °  
VS: -5.41 '

MD: 1,450 '  
TVD: 1,449.88 '  
Inclination: 1.1 °  
Azimuth: 13.2 °  
VS: -3.93 '

60% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 25% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc; 15% SS: wh-lt gy, s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc

MD: 1,545 '  
TVD: 1,544.86 '  
Inclination: 1.3 °  
Azimuth: 22.4 °  
VS: -2.06 '





80% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 15% SHY SS: wh-lt gy, blk, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc; 5% SS: wh-lt gy, s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc

WT: 8.5 / VIS: 27

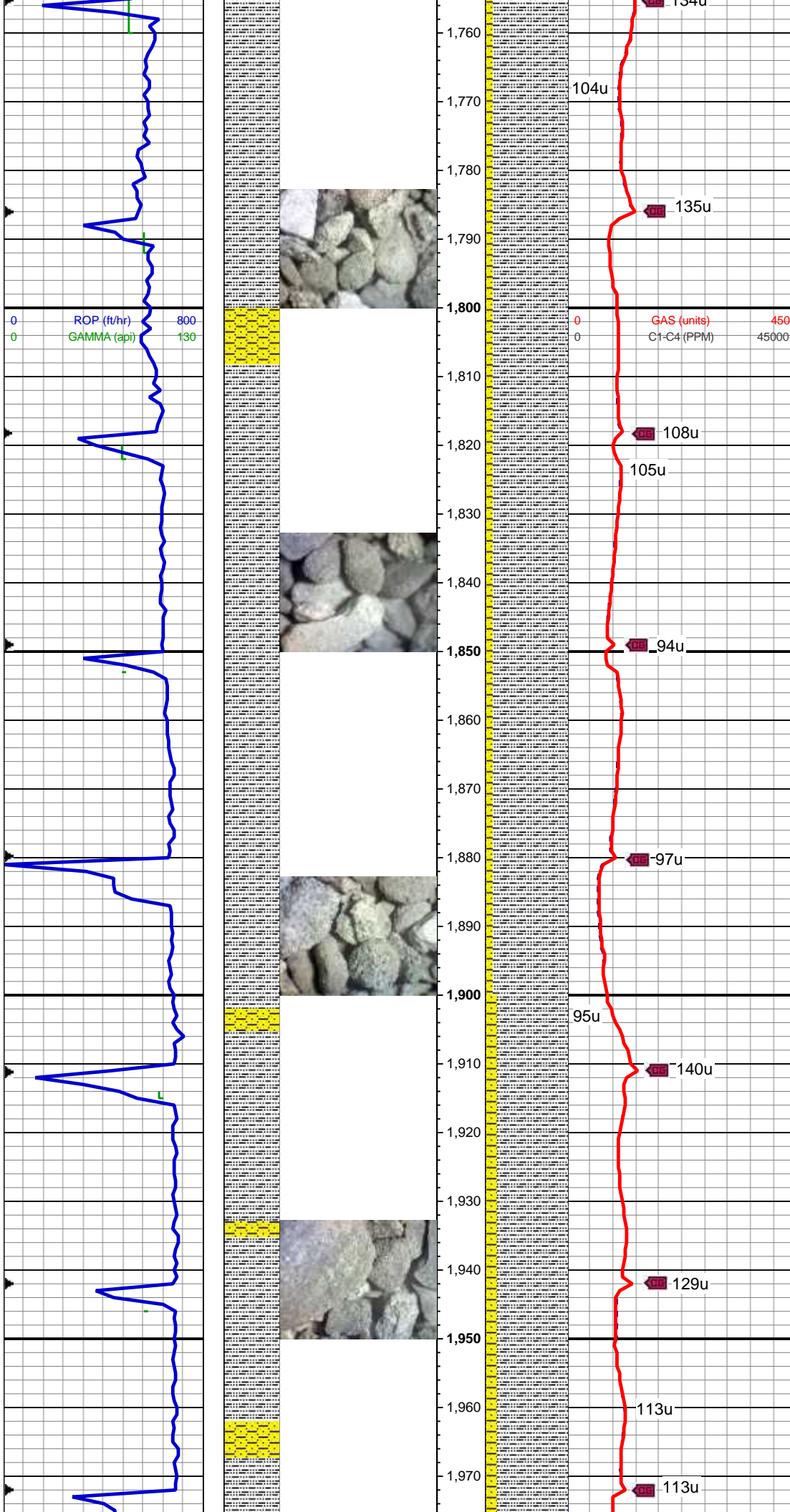
MD: 1,637 '  
TVD: 1,636.84 '  
Inclination: 1.1 °  
Azimuth: 45.1 °  
VS: -0.5 '

85% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 10% SHY SS: wh-lt gy, blk, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc; 5% SS: wh-lt gy, s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc

MD: 1,731 '  
TVD: 1,730.83 '  
Inclination: 1.3 °  
Azimuth: 298.2 °  
VS: 0.64 '

90% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 10% SHY SS: wh-lt gy, blk, frm, v f-f gr, sb rnd-ang, mod-w srt,

cl sup, cly cmt, non calc, tr ss



MD: 1,823 '  
TVD: 1,822.8 '  
Inclination: 1.5 °  
Azimuth: 296 °  
VS: 1.72 '

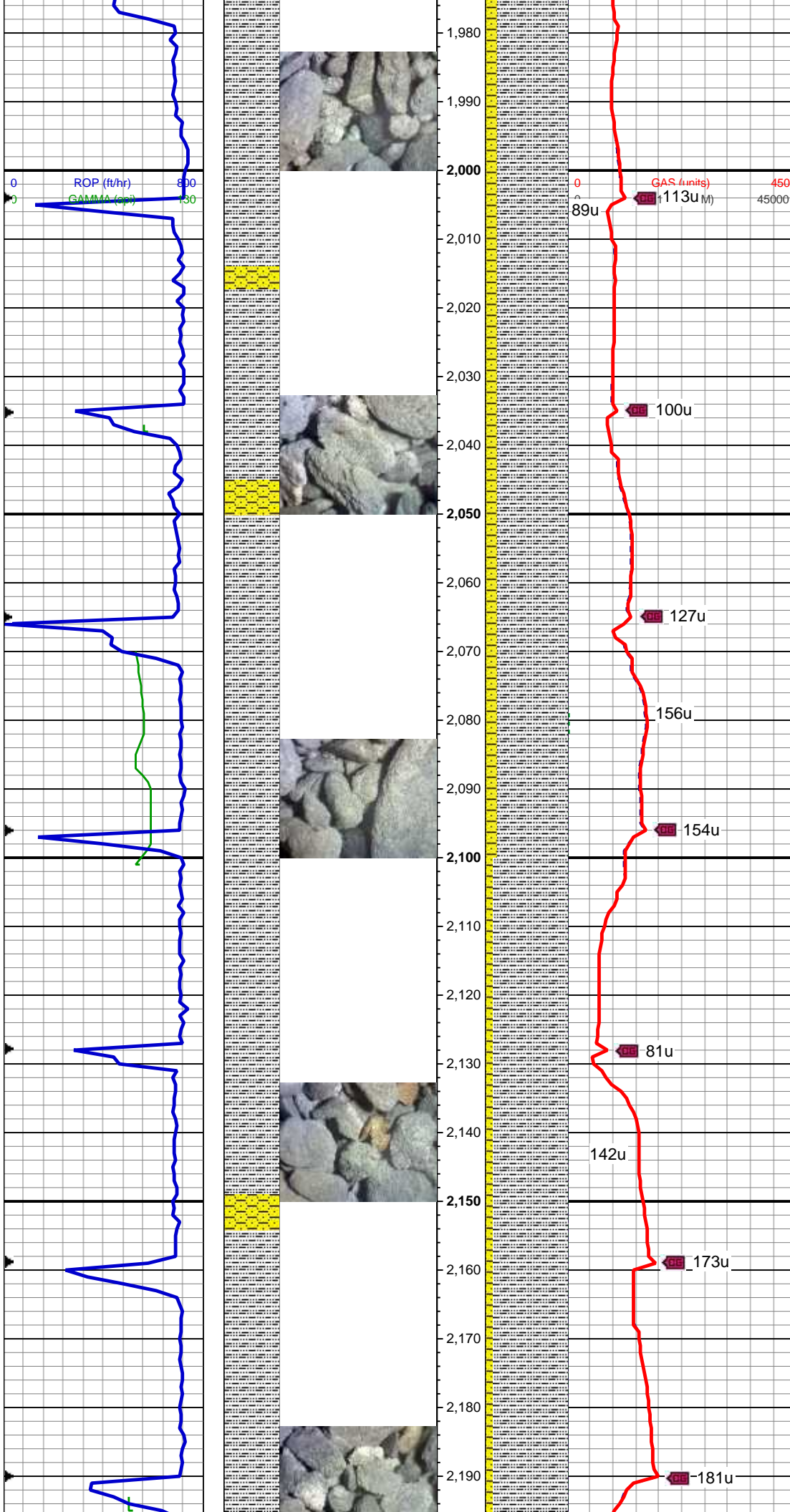
WT: 8.5 / VIS: 27

90% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 10% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc, tr ss

MD: 1,917 '  
TVD: 1,916.76 '  
Inclination: 1.7 °  
Azimuth: 308.6 °  
VS: 3.2 '

85% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 15% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc, tr ss





MD: 2,009 '  
TVD: 2,008.73 '  
Inclination: 1.6 °  
Azimuth: 296 °  
VS: 4.67 '

WT: 8.5 / VIS: 27

85% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 15% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc, tr ss

MD: 2,103 '  
TVD: 2,102.7 '  
Inclination: 1.2 °  
Azimuth: 283.6 °  
VS: 5.54 '

90% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 10% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc, tr ss

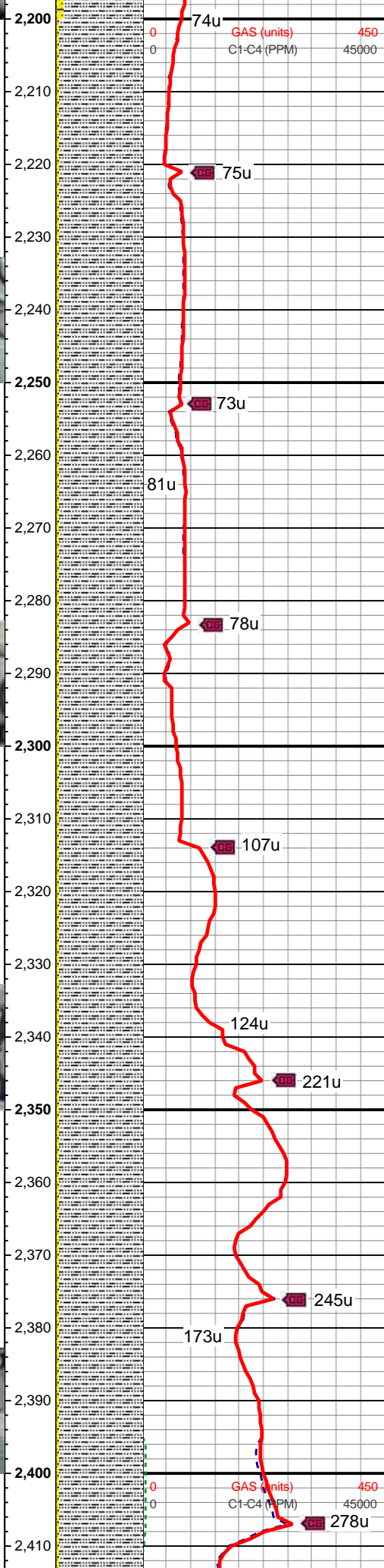
MD: 2,196 '  
TVD: 2,195.93 '  
Inclination: 1.2 °  
Azimuth: 283.6 °  
VS: 5.54 '

ROP (ft/hr) 800  
GAMMA (api) 130

ROP (ft/hr) 800  
GAMMA (api) 130

ROP (ft/hr) 800  
GAMMA (api) 130

ROP (ft/hr) 800  
GAMMA (api) 130



TVD: 2,195.69  
Inclination: 0.5 °  
Azimuth: 233.6 °  
VS: 5.57 '

WT: 8.5 / VIS: 27

95% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 5% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc

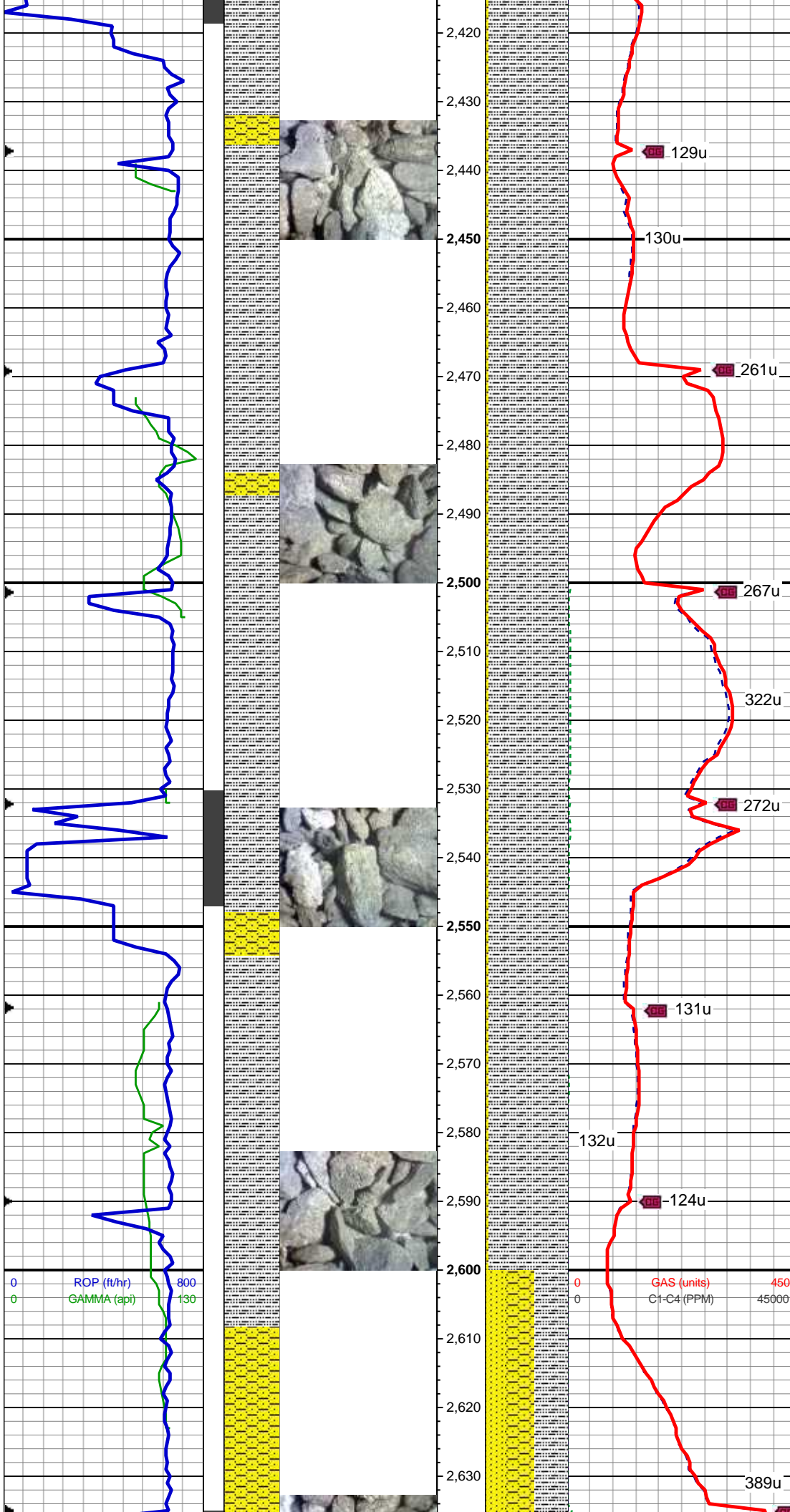
MD: 2,289 '  
TVD: 2,288.69 '  
Inclination: 0.2 °  
Azimuth: 267.7 °  
VS: 5.33 '

95% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 5% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc

MD: 2,380 '  
TVD: 2,379.69 '  
Inclination: 0.4 °  
Azimuth: 327.2 °  
VS: 5.6 '

WT: 8.5 / VIS: 27





95% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 5% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc

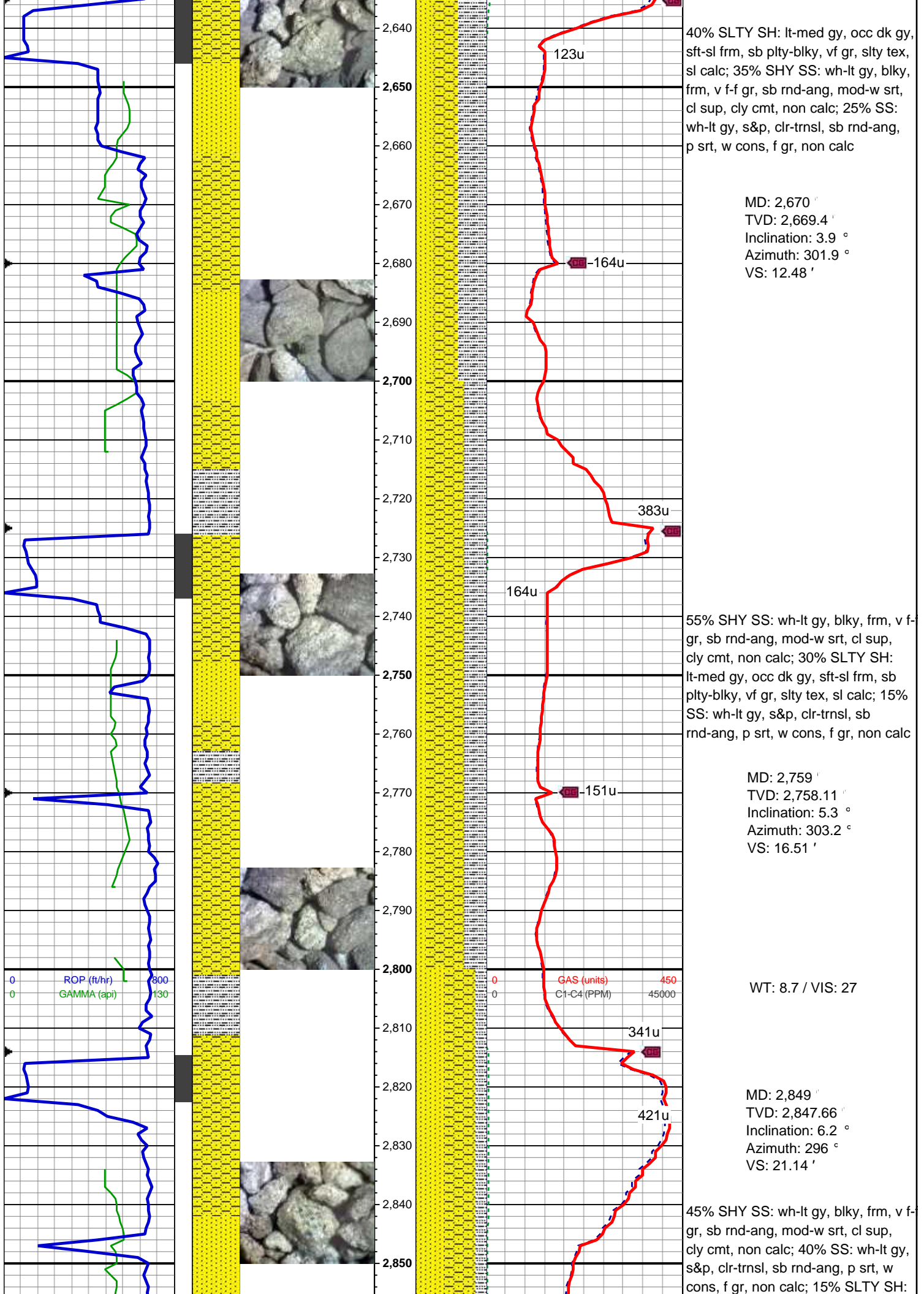
MD: 2,474 '  
TVD: 2,473.66 '  
Inclination: 1.9 °  
Azimuth: 305.3 °  
VS: 6.82 '

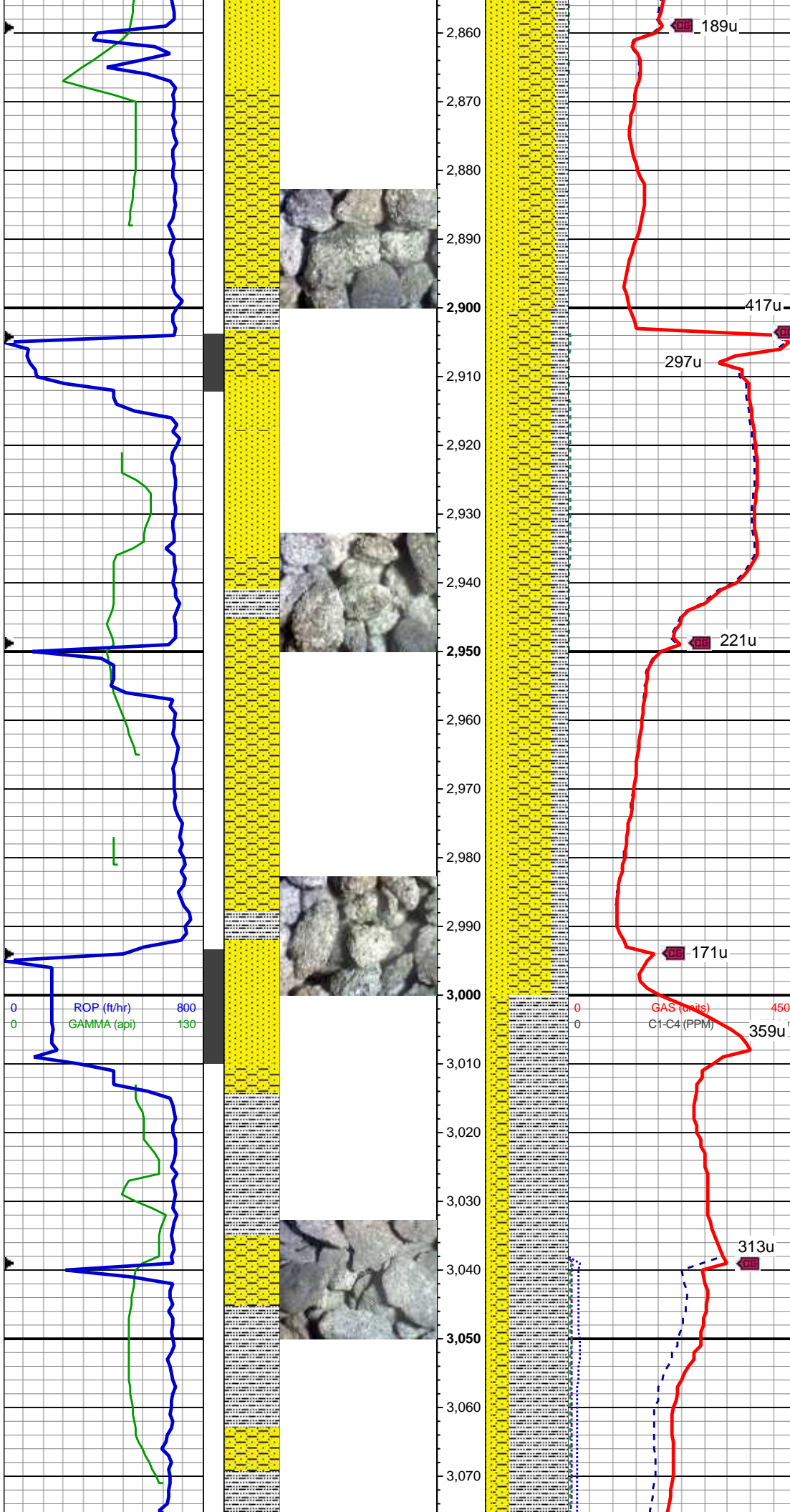
95% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 5% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc

MD: 2,580 '  
TVD: 2,579.57 '  
Inclination: 3 °  
Azimuth: 303 °  
VS: 9.45 '

WT: 8.5 / VIS: 27







lt-med gy, occ dk gy, sft-sl frm, sb  
plty-blky, vf gr, slty tex, sl calc

MD: 2,938 '  
TVD: 2,936.11 '  
Inclination: 6.6 °  
Azimuth: 289.6 °  
VS: 25.22 '

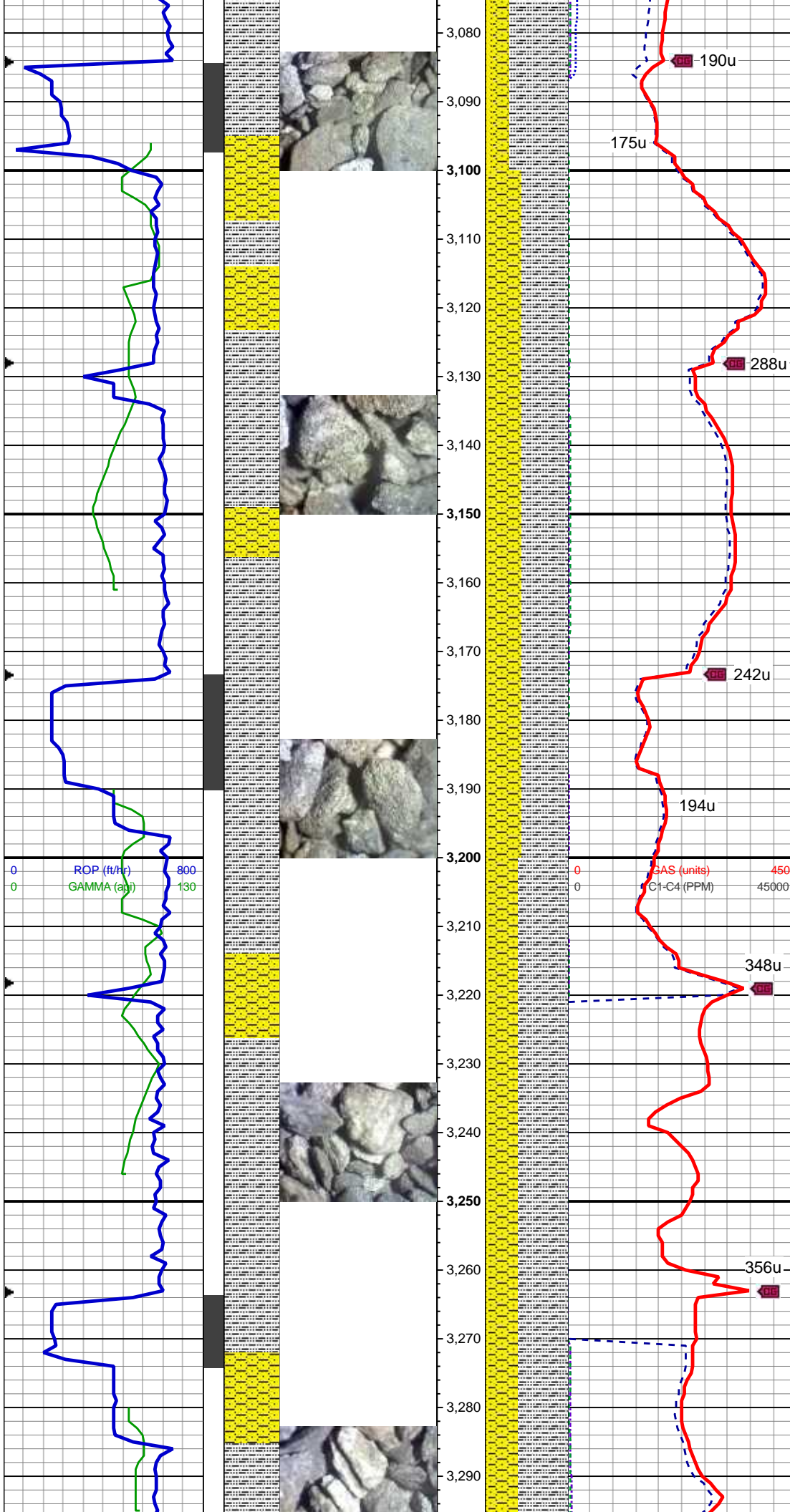
50% SHY SS: wh-lt gy, blk, frm, v f-  
gr, sb rnd-ang, mod-w srt, cl sup,  
cly cmt, non calc; 30% SS: wh-lt gy,  
s&p, clr-trnsl, sb rnd-ang, p srt, w  
cons, f gr, non calc; 20% SLTY SH:  
lt-med gy, occ dk gy, sft-sl frm, sb  
plty-blky, vf gr, slty tex, sl calc

WT: 8.7 / VIS: 27

MD: 3,028 '  
TVD: 3,025.46 '  
Inclination: 7.2 °  
Azimuth: 280.8 °  
VS: 28.31 '

70% SLTY SH: lt-med gy, occ dk gy,  
sft-sl frm, sb plty-blky, vf gr, slty tex,  
sl calc; 20% SHY SS: wh-lt gy, blk,  
frm, v f-f gr, sb rnd-ang, mod-w srt,  
cl sup, cly cmt, non calc; 10% SS:  
wh-lt gy, s&p, clr-trnsl, sb rnd-ang,  
p srt, w cons, f gr, non calc





MD: 3,118 '  
TVD: 3,114.74 '  
Inclination: 7.3 °  
Azimuth: 283.1 °  
VS: 30.98 '

55% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 45% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc; 5% SS: wh-lt gy, s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc

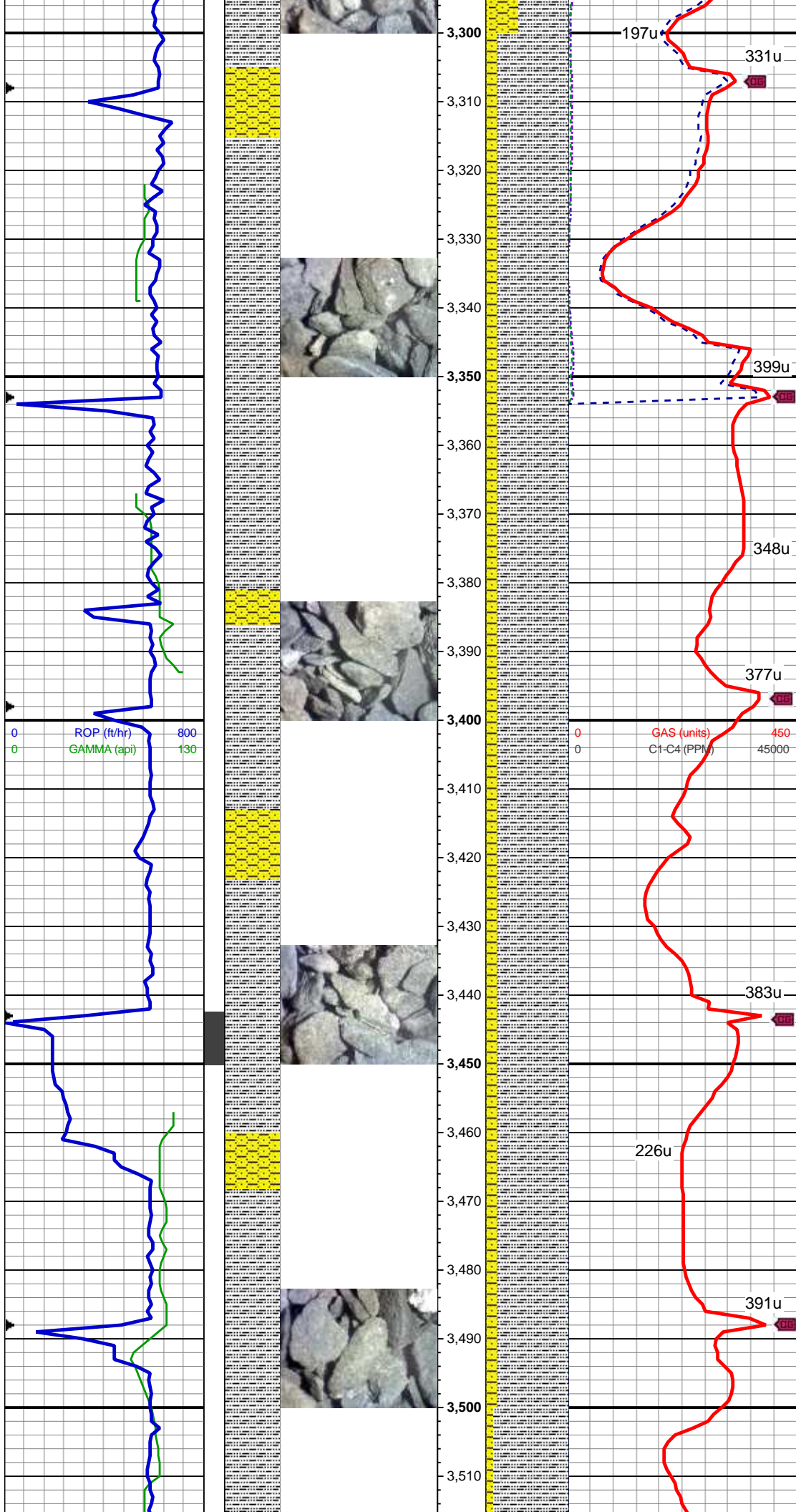
MD: 3,207 '  
TVD: 3,202.85 '  
Inclination: 8.9 °  
Azimuth: 287.2 °  
VS: 34.65 '

WT: 8.75 / VIS: 27

60% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 35% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc; 5% SS: wh-lt gy, s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc

MD: 3,297 '  
TVD: 3,291.81 '





Inclination: 8.5 °  
Azimuth: 282.8 °  
VS: 38.56 '

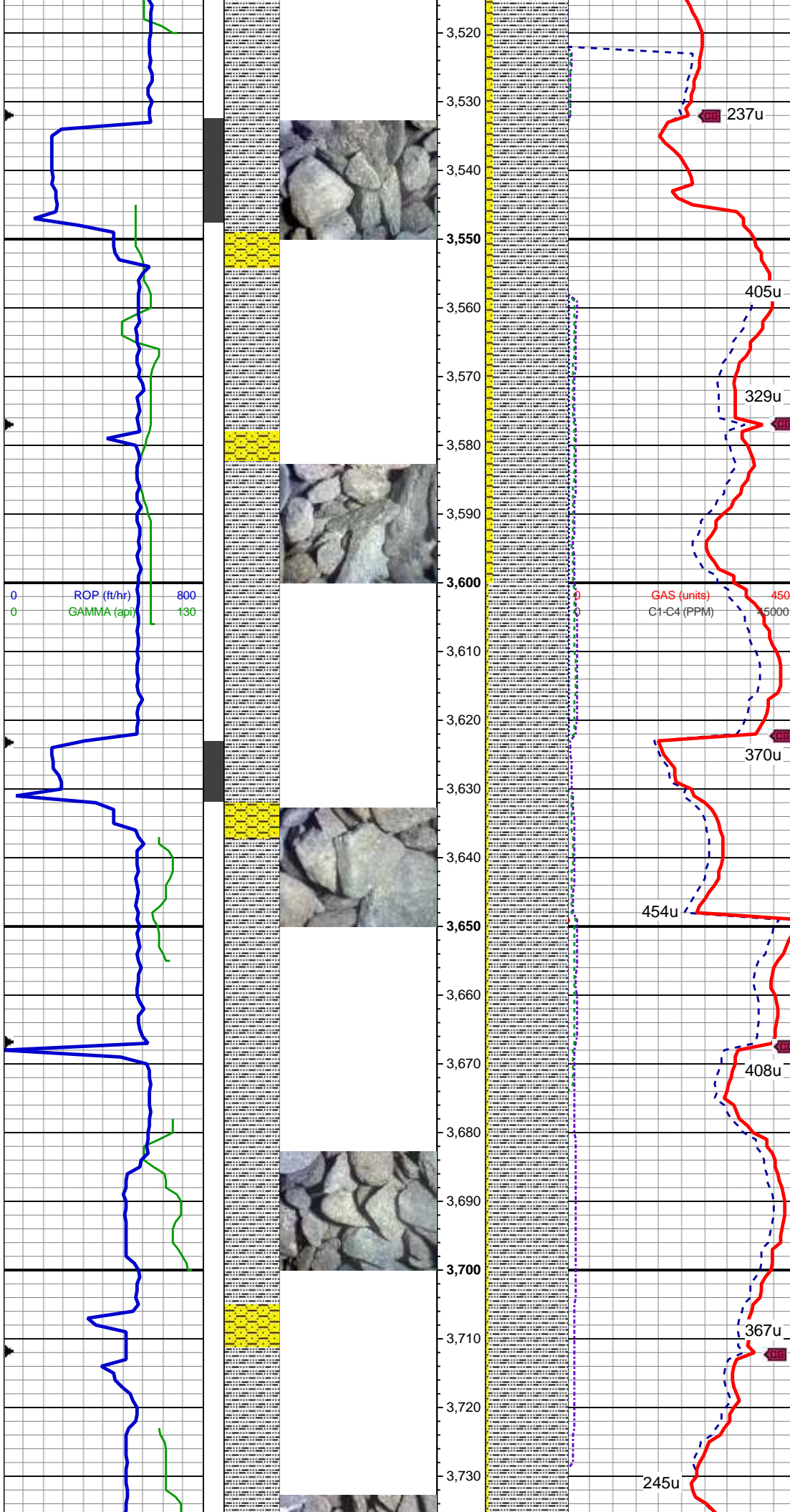
85% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 15% SHY SS: wh-lt gy, blk, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc

MD: 3,386 '  
TVD: 3,380.04 '  
Inclination: 6.6 °  
Azimuth: 277 °  
VS: 40.97 '

WT: 8.5 / VIS: 27

85% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 15% SHY SS: wh-lt gy, blk, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc

MD: 3,476 '  
TVD: 3,469.51 '  
Inclination: 5.8 °  
Azimuth: 284.4 °  
VS: 42.98 '



90% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 10% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc

MD: 3,566 '  
TVD: 3,558.94 '  
Inclination: 7.1 °  
Azimuth: 289 °  
VS: 46.2 '

WT: 8.6 / VIS: 27

95% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 5% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc

MD: 3,656 '  
TVD: 3,648.18 '  
Inclination: 7.8 °  
Azimuth: 291.2 °  
VS: 50.53 '

MD: 3,745 '  
TVD: 3,736.44 '  
Inclination: 7 °  
Azimuth: 284.8 °  
VS: 51.11 '



VS: 54.41'

95% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 5% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc

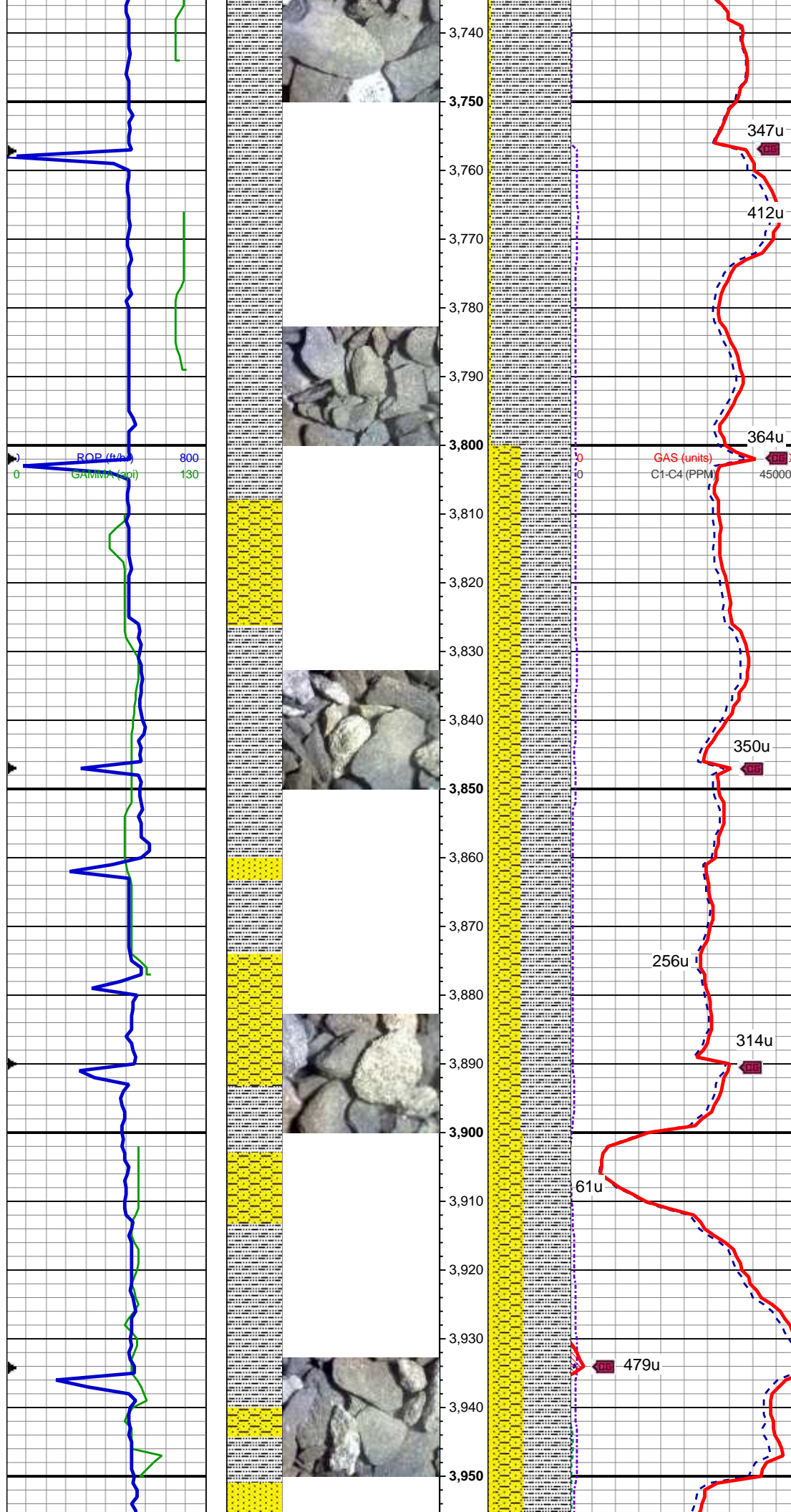
MD: 3,835'  
TVD: 3,825.83'  
Inclination: 6.4°  
Azimuth: 280°  
VS: 56.98'

WT: 8.6 / VIS: 27

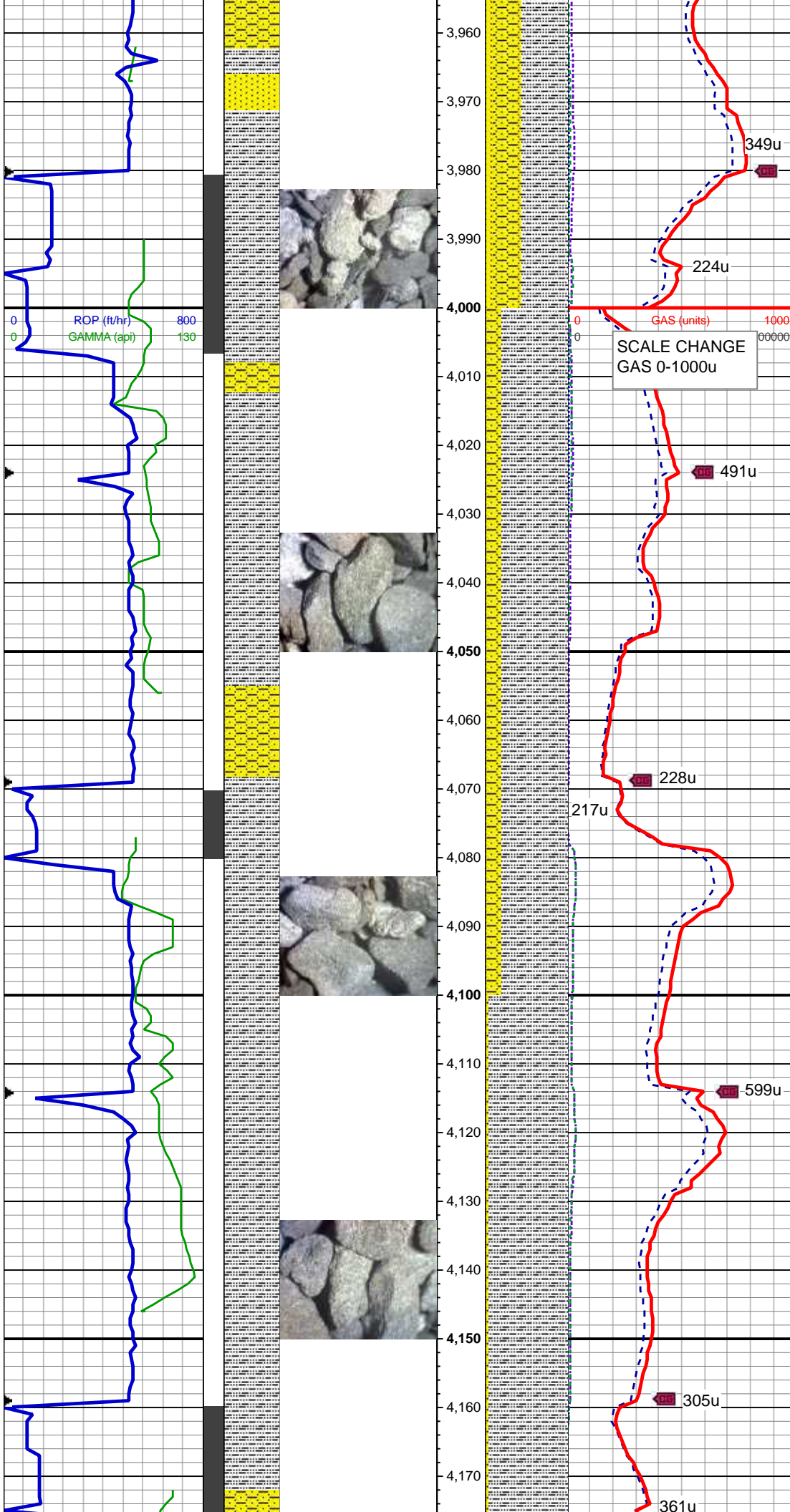
60% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 30% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc; 10% SS: wh-lt gy, s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc

MD: 3,924'  
TVD: 3,914.29'  
Inclination: 6.2°  
Azimuth: 279.3°  
VS: 54.42'

55% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 35% SHY SS: wh-lt gy, blkly, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc; 10% SS:







wh-lt gy, s&p, clr-trnsl, sb rnd-ang,  
p srt, w cons, f gr, non calc

WT: 8.6 / VIS: 27

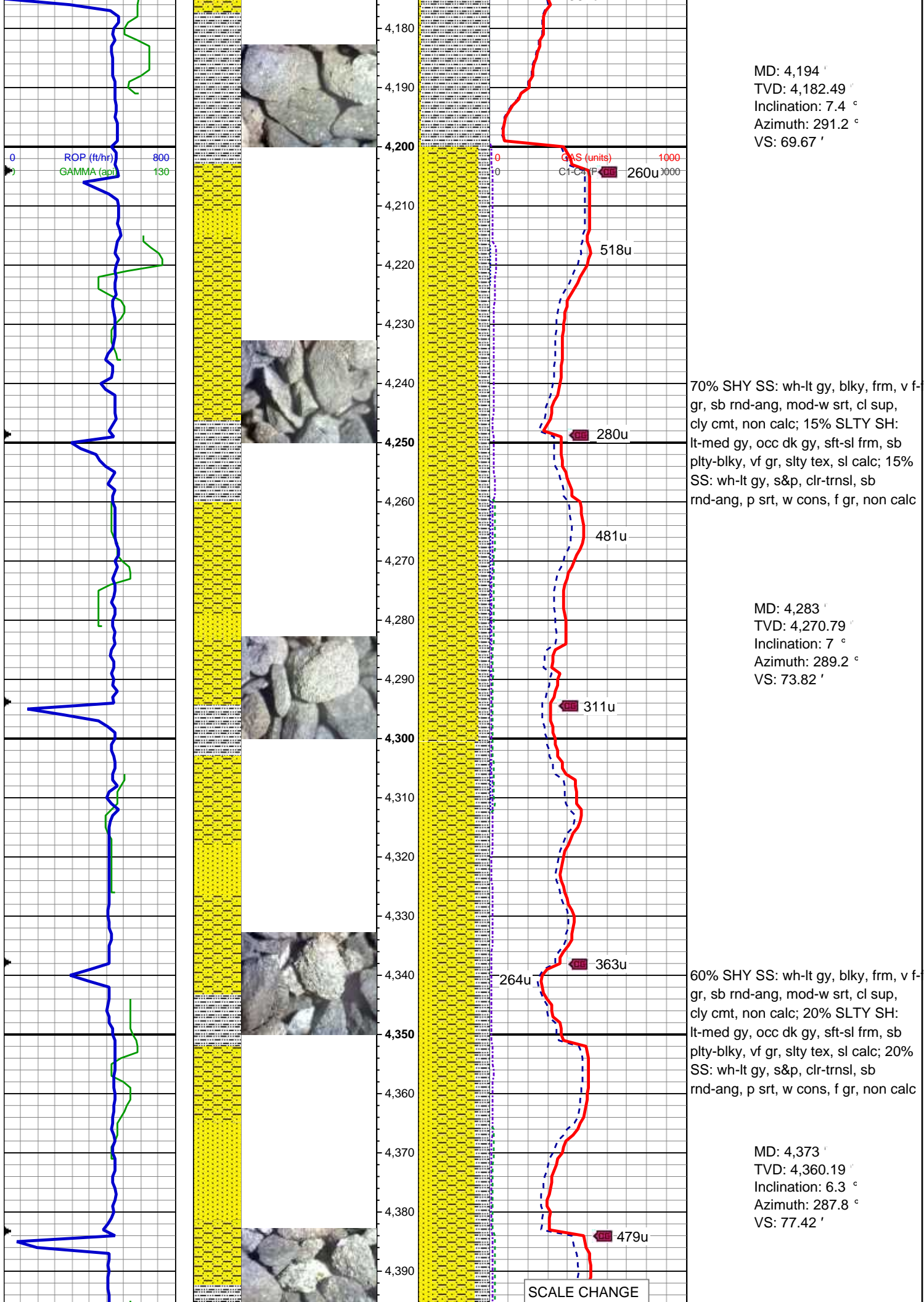
MD: 4,014 '  
TVD: 4,003.78 '  
Inclination: 6 °  
Azimuth: 290.4 °  
VS: 61.61 '

80% SLTY SH: lt-med gy, occ dk gy,  
sft-sl frm, sb plty-blky, vf gr, slty tex,  
sl calc; 20% SHY SS: wh-lt gy, blkly,  
frm, v f-f gr, sb rnd-ang, mod-w srt,  
cl sup, cly cmt, non calc

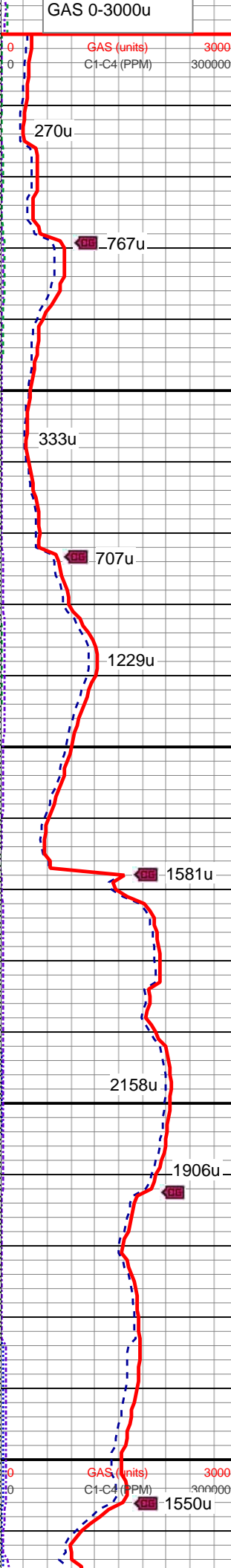
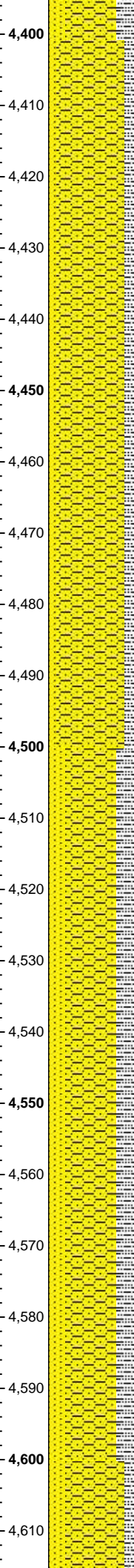
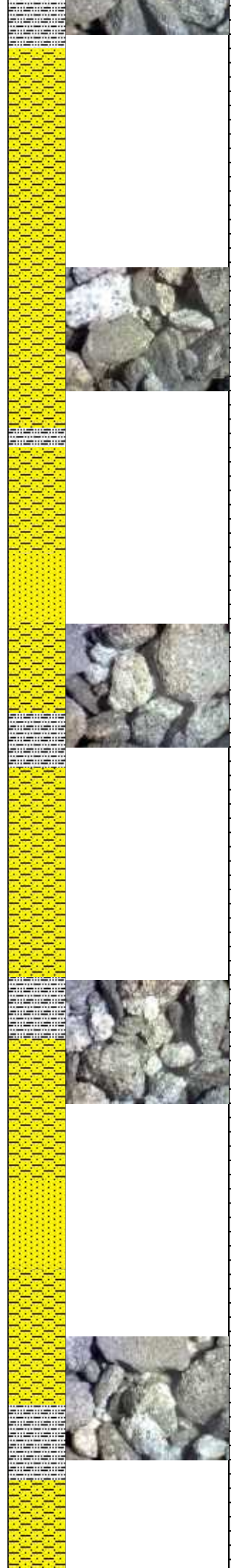
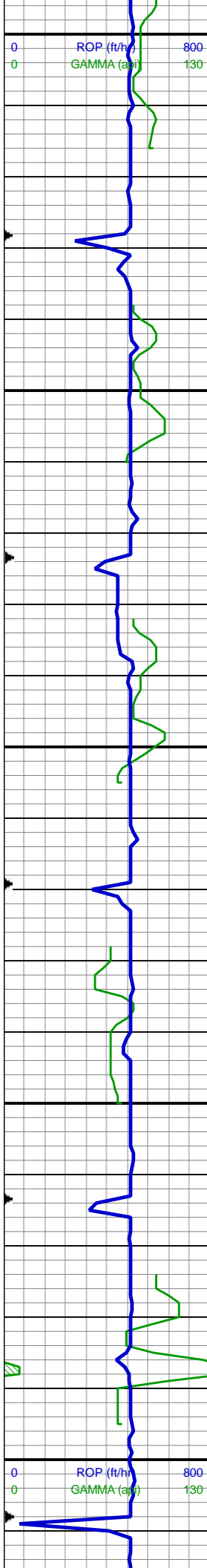
WT IN: 8.7, OUT: 8.7 / VIS: 27

MD: 4,104 '  
TVD: 4,093.2 '  
Inclination: 7 °  
Azimuth: 290 °  
VS: 65.39 '

95% SLTY SH: lt-med gy, occ dk gy,  
sft-sl frm, sb plty-blky, vf gr, slty tex,  
sl calc; 5% SHY SS: wh-lt gy, blkly,  
frm, v f-f gr, sb rnd-ang, mod-w srt,  
cl sup, cly cmt, non calc







WT IN: 8.6, OUT: 8.6 / VIS: 27

80% SHY SS: wh-lt gy, blk, frm, v f-gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc; 10% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 10% SS: wh-lt gy, s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc

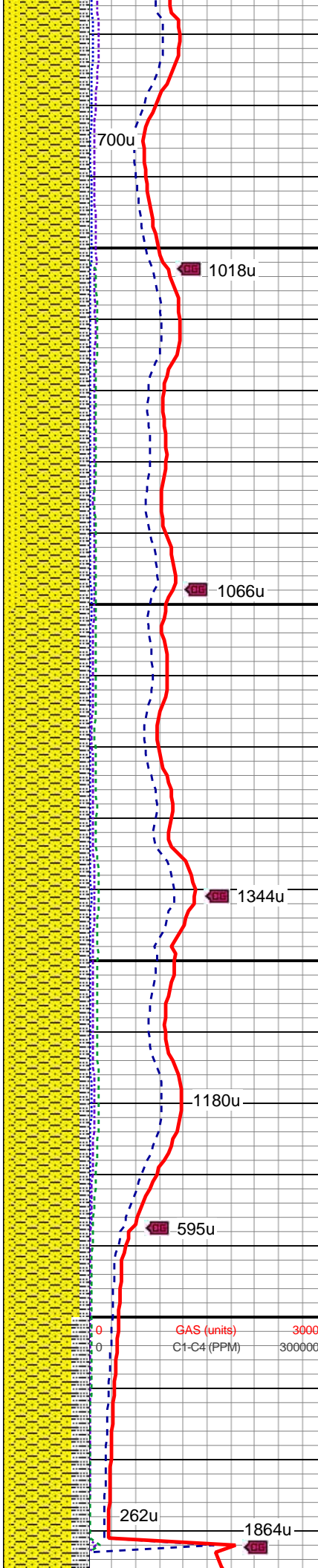
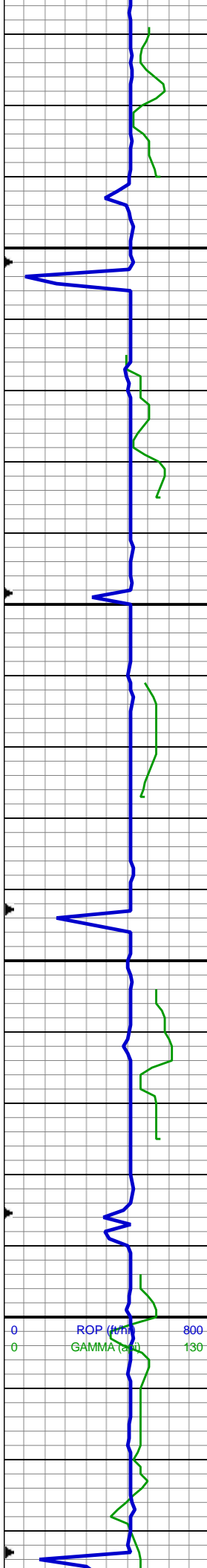
MD: 4,463 '  
TVD: 4,449.66 '  
Inclination: 6.1 °  
Azimuth: 282.6 °  
VS: 80.24 '

MD: 4,552 '  
TVD: 4,538.18 '  
Inclination: 5.8 °  
Azimuth: 282.5 °  
VS: 82.51 '

60% SHY SS: wh-lt gy, blk, frm, v f-gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc; 20% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 20% SS: wh-lt gy, s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc

MD: 4,642 '  
TVD: 4,627.30 '





TVD: 4,627.73  
Inclination: 5.7 °  
Azimuth: 281.4 °  
VS: 84.63 '

WT IN: 8.5, OUT: 8.5 / VIS: 27

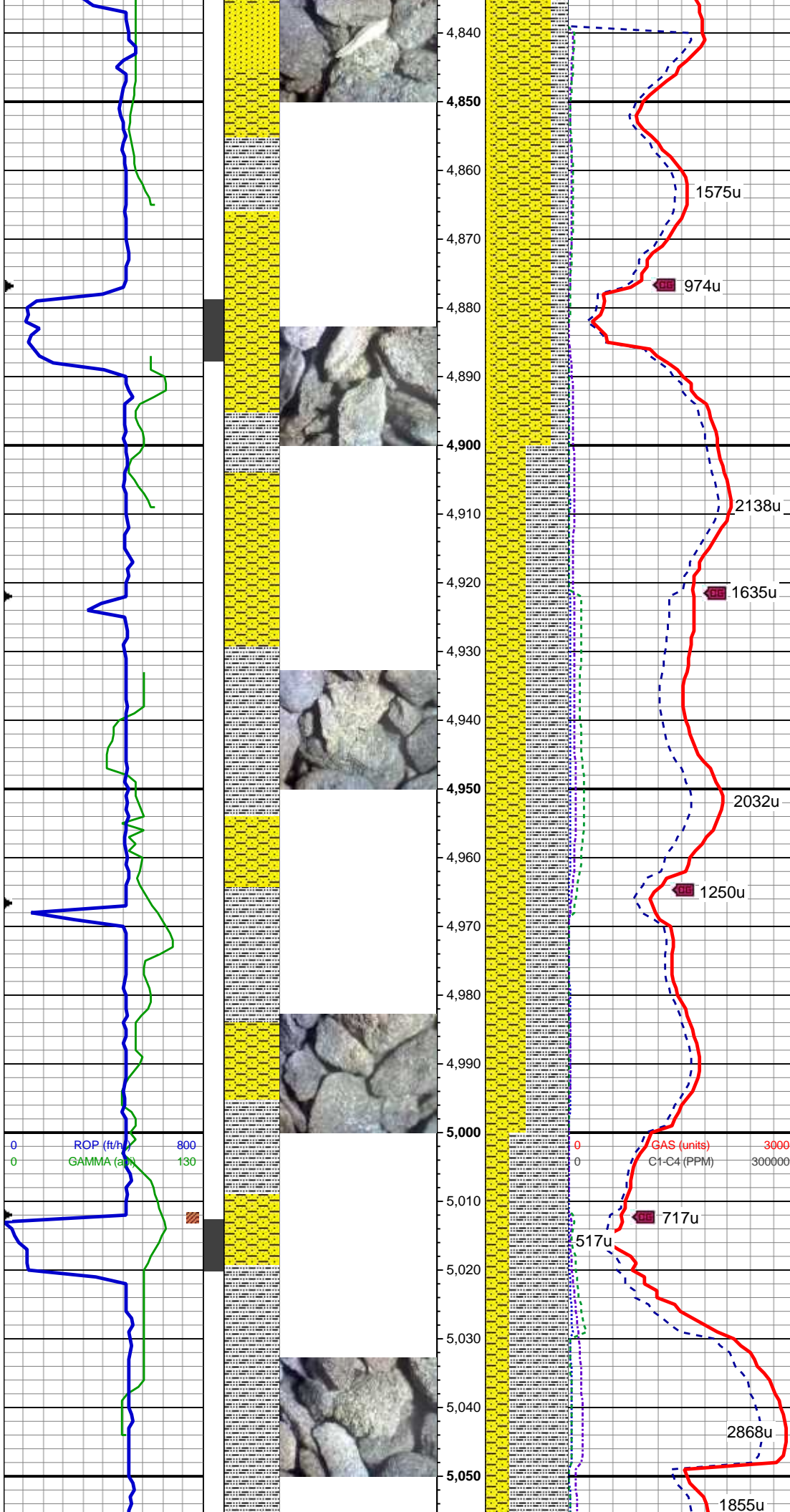
70% SHY SS: wh-lt gy, blk, frm, v f-  
gr, sb rnd-ang, mod-w srt, cl sup,  
cly cmt, non calc; 20% SS: wh-lt gy,  
s&p, clr-trnsl, sb rnd-ang, p srt, w  
cons, f gr, non calc; 10% SLTY SH:  
lt-med gy, occ dk gy, sft-sl frm, sb  
plty-blky, vf gr, slty tex, sl calc

MD: 4,732 '  
TVD: 4,717.31 '  
Inclination: 5.3 °  
Azimuth: 275.4 °  
VS: 86.15 '

80% SHY SS: wh-lt gy, blk, frm, v f-  
gr, sb rnd-ang, mod-w srt, cl sup,  
cly cmt, non calc; 10% SS: wh-lt gy,  
s&p, clr-trnsl, sb rnd-ang, p srt, w  
cons, f gr, non calc; 10% SLTY SH:  
lt-med gy, occ dk gy, sft-sl frm, sb  
plty-blky, vf gr, slty tex, sl calc

WT IN: 8.5, OUT: 8.5 / VIS: 27

MD: 4,821 '  
TVD: 4,805.98 '  
Inclination: 4.6 °  
Azimuth: 265.3 °  
VS: 86.46 '



70% SHY SS: wh-lt gy, blk, frm, v f-gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc; 20% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb pty-blky, vf gr, slty tex, sl calc; 10% SS: wh-lt gy, s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc

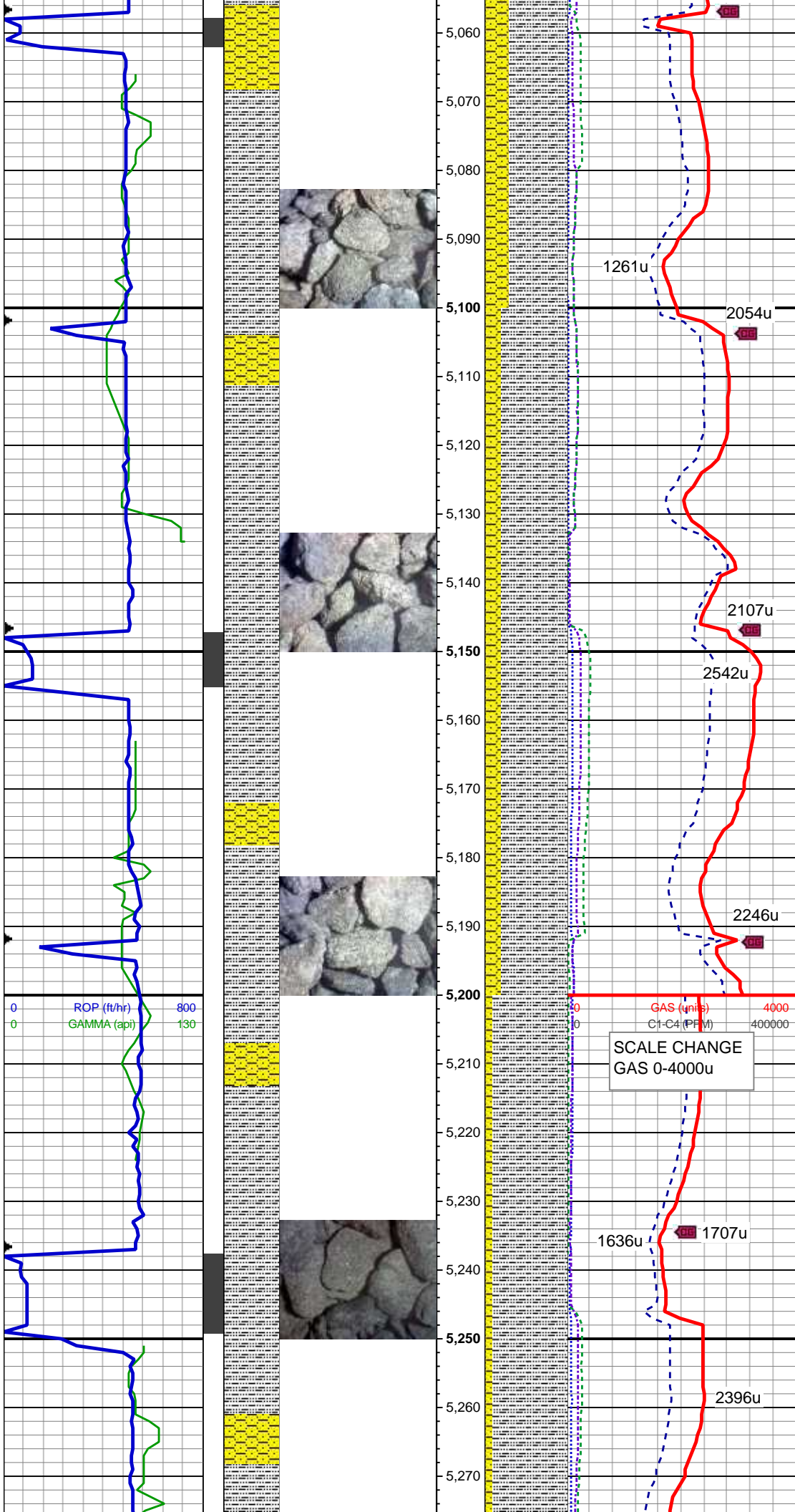
MD: 4,911 '  
TVD: 4,895.69 '  
Inclination: 4.6 °  
Azimuth: 259.5 °  
VS: 85.71 '

50% SHY SS: wh-lt gy, blk, frm, v f-gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc; 50% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb pty-blky, vf gr, slty tex, sl calc

MD: 5,001 '  
TVD: 4,985.44 '  
Inclination: 4 °  
Azimuth: 264 °  
VS: 84.92 '

70% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb pty-blky, vf gr, slty tex, sl calc; 30% SHY SS: wh-lt gy, blk, frm, v f-f gr, sb rnd-ang, mod-w srt,





cl sup, cly cmt, non calc

MD: 5,090 '  
TVD: 5,074.27 '  
Inclination: 3 °  
Azimuth: 263.9 °  
VS: 84.5 '

80% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 20% SHY SS: wh-lt gy, blk, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc

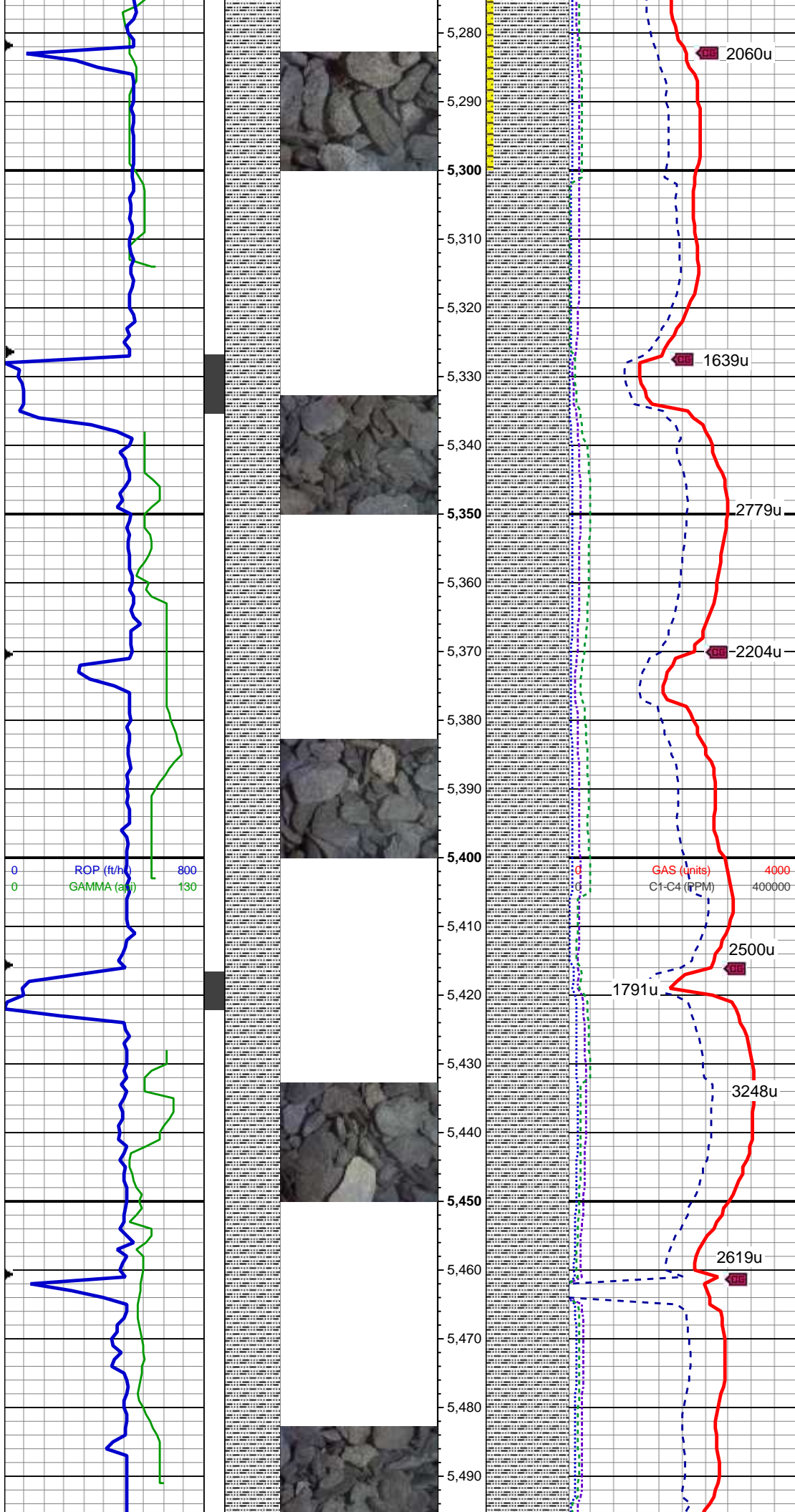
MD: 5,180 '  
TVD: 5,164.18 '  
Inclination: 2.3 °  
Azimuth: 284.7 °  
VS: 84.83 '

90% SLTY SH: lt-med gy, occ dk gy, sft-sl frm, sb plty-blky, vf gr, slty tex, sl calc; 10% SHY SS: wh-lt gy, blk, frm, v f-f gr, sb rnd-ang, mod-w srt, cl sup, cly cmt, non calc

MD: 5,270 '  
TVD: 5,254.14 '  
Inclination: 1.1 °  
Azimuth: 227.6 °



VS: 84.77'

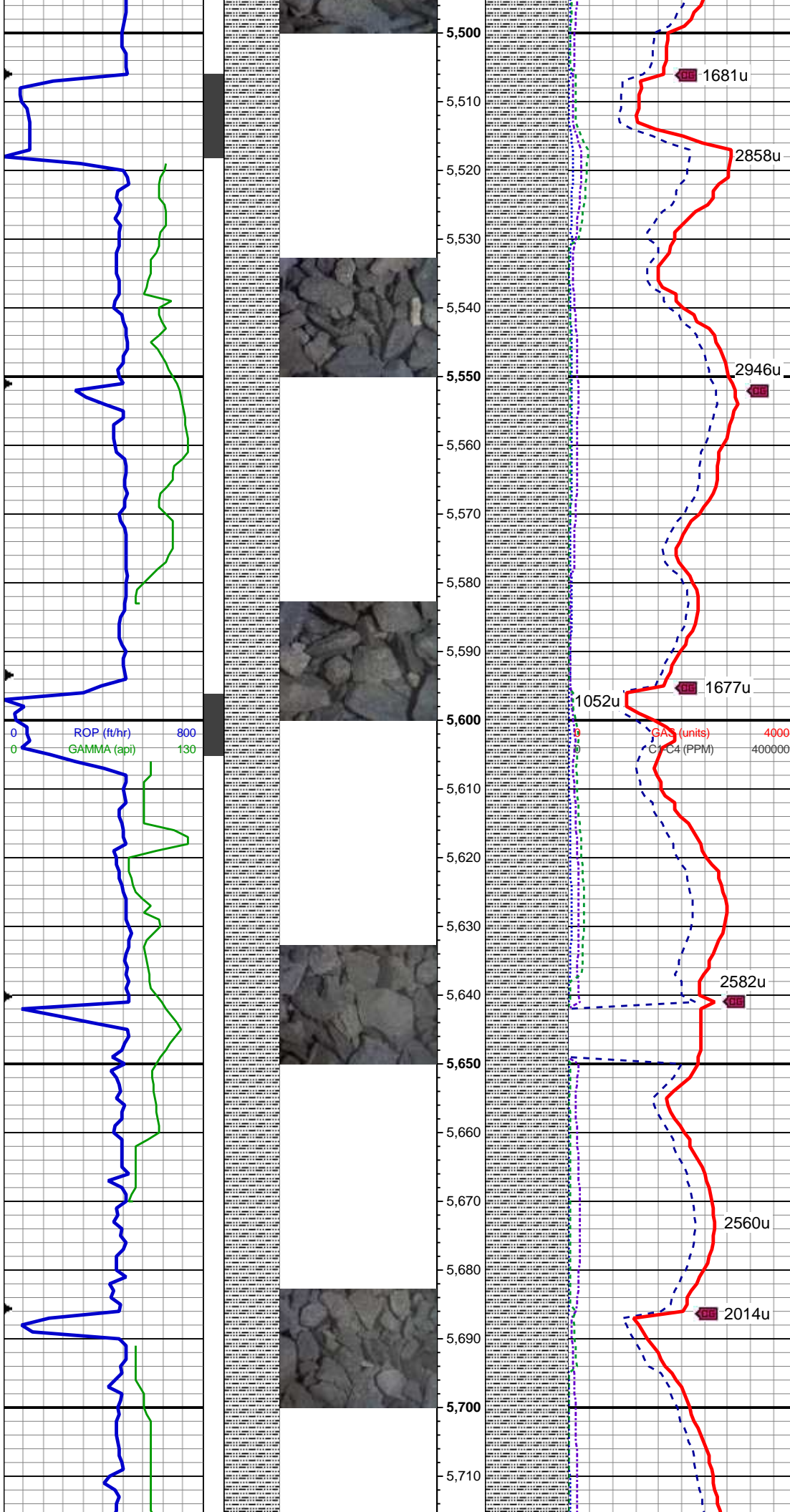


100% SLTY SH: lt-med gy, occ dk gy, gybrn, sft-sl frm, sb plty-blky, vf gr, mod slty tex, sl calc

MD: 5,359'  
TVD: 5,343.12'  
Inclination: 1.5°  
Azimuth: 162.4°  
VS: 83.1'

100% SLTY SH: lt-med gy, occ dk gy, gybrn, sft-sl frm, sb plty-blky, vf gr, mod slty tex, sl calc

MD: 5,449'  
TVD: 5,433.08'  
Inclination: 2.1°  
Azimuth: 153.9°  
VS: 80.46'



WT: 8.6 / VIS: 28

MD: 5,538 '  
TVD: 5,522.04 '  
Inclination: 1.5 °  
Azimuth: 106.1 °  
VS: 78.62 '

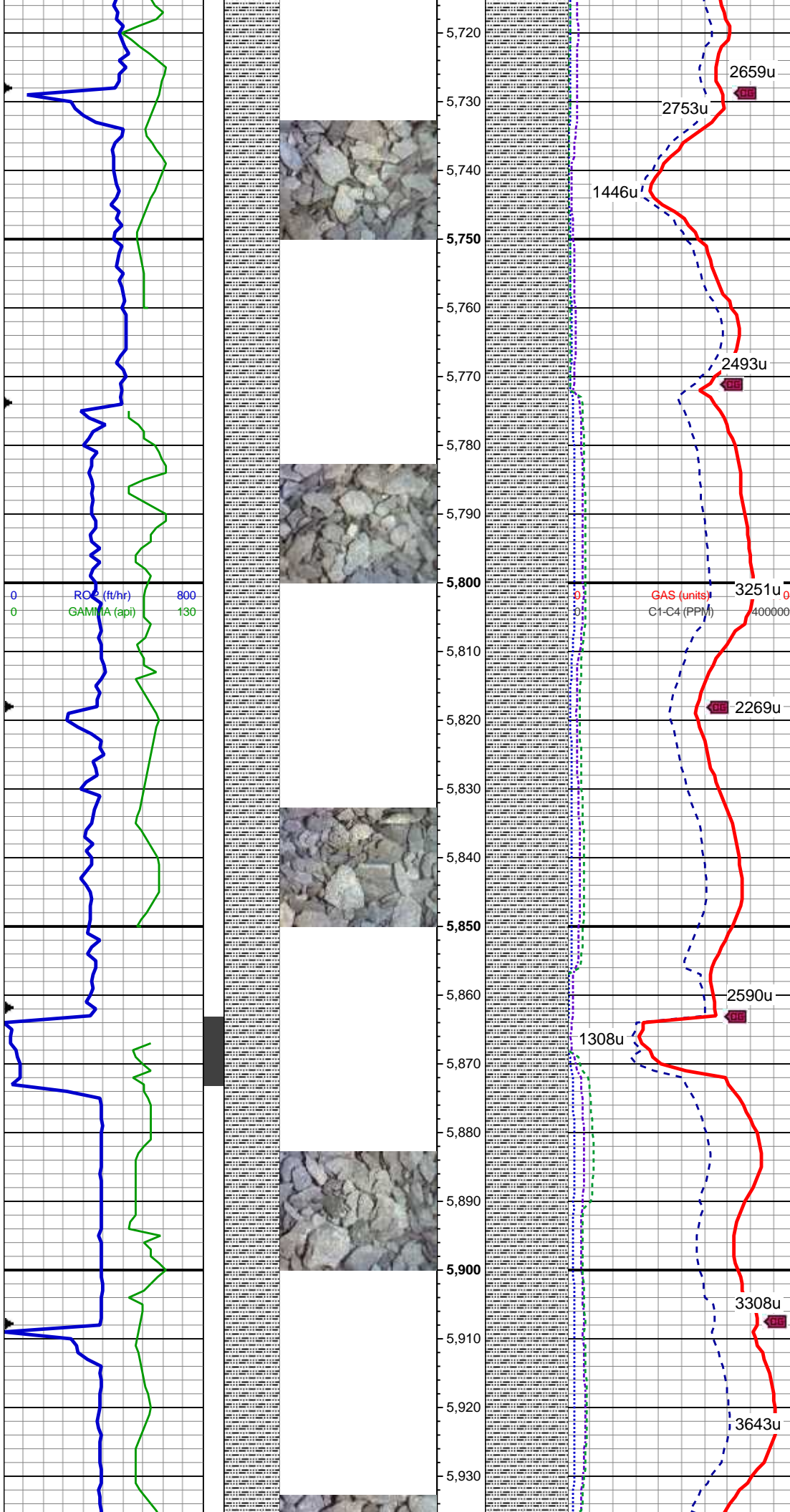
100% SLTY SH: lt-med gy, occ dk  
gy, gybrn, sft-sl frm, sb plty-blky, vf  
gr, mod slty tex, sl calc

MD: 5,628 '  
TVD: 5,612 '  
Inclination: 1.8 °  
Azimuth: 118.7 °  
VS: 77.55 '

100% SLTY SH: lt-med gy, occ dk  
gy, gybrn, sft-sl frm, sb plty-blky, vf  
gr, mod slty tex, sl calc

WT: 8.7 / VIS: 29





MD: 5,718 '  
TVD: 5,701.97 '  
Inclination: 1.1 °  
Azimuth: 136.6 °  
VS: 76.19 '

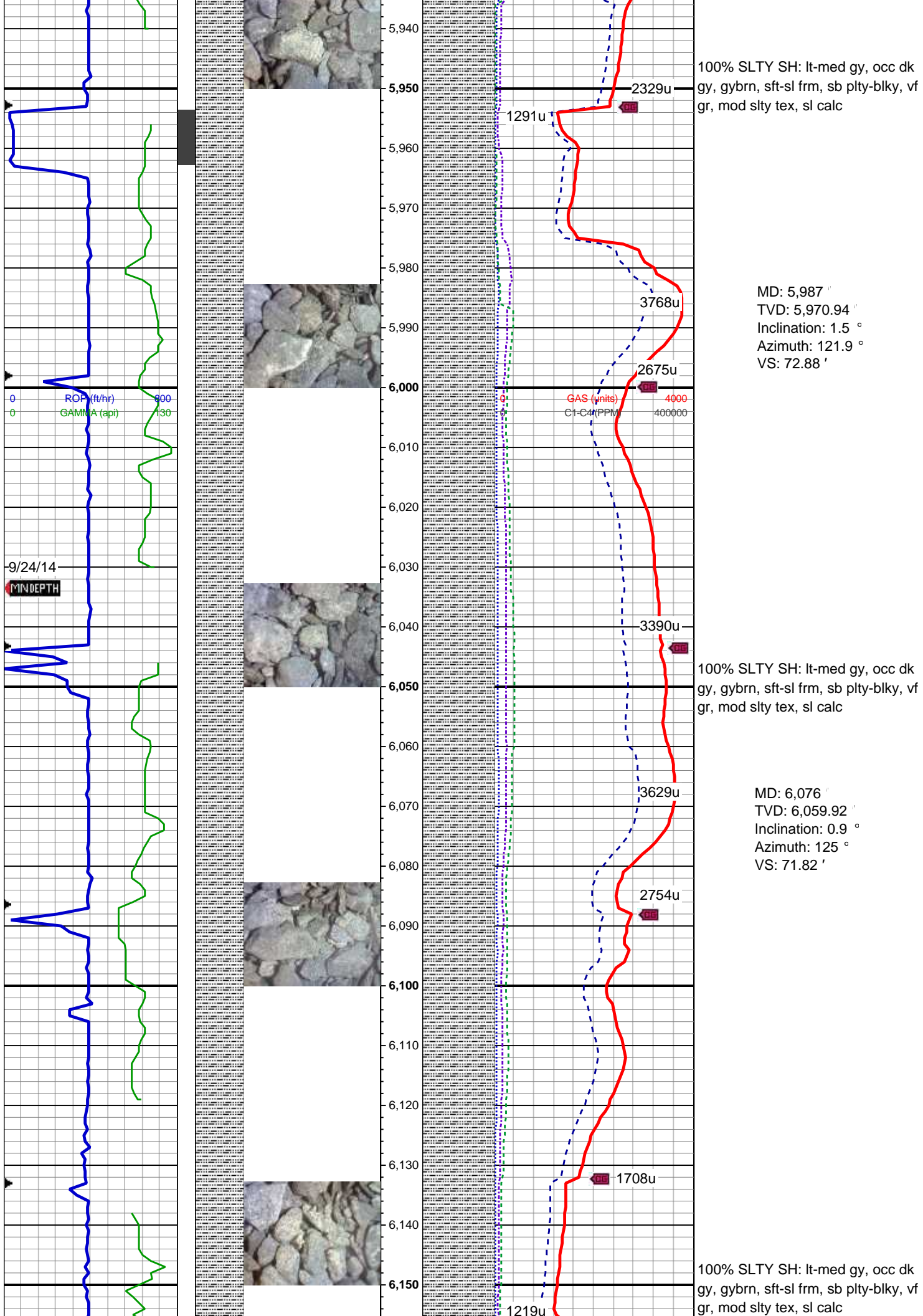
100% SLTY SH: lt-med gy, occ dk gy, gybrn, sft-sl frm, sb plty-blky, vf gr, mod slty tex, sl calc

MD: 5,807 '  
TVD: 5,790.96 '  
Inclination: 0.5 °  
Azimuth: 140.6 °  
VS: 75.25 '

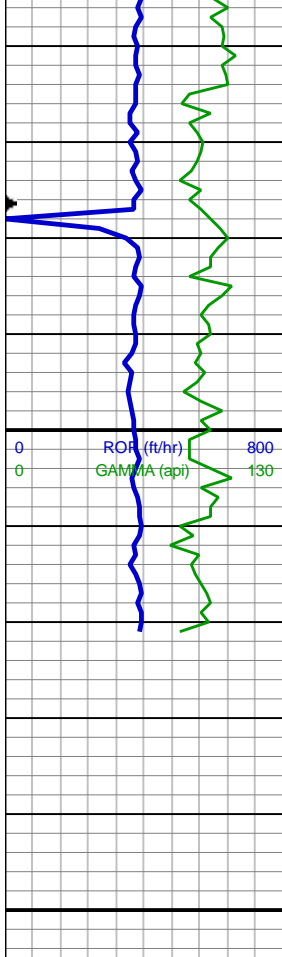
WT: 8.7 / VIS: 30

100% SLTY SH: lt-med gy, occ dk gy, gybrn, sft-sl frm, sb plty-blky, vf gr, mod slty tex, sl calc

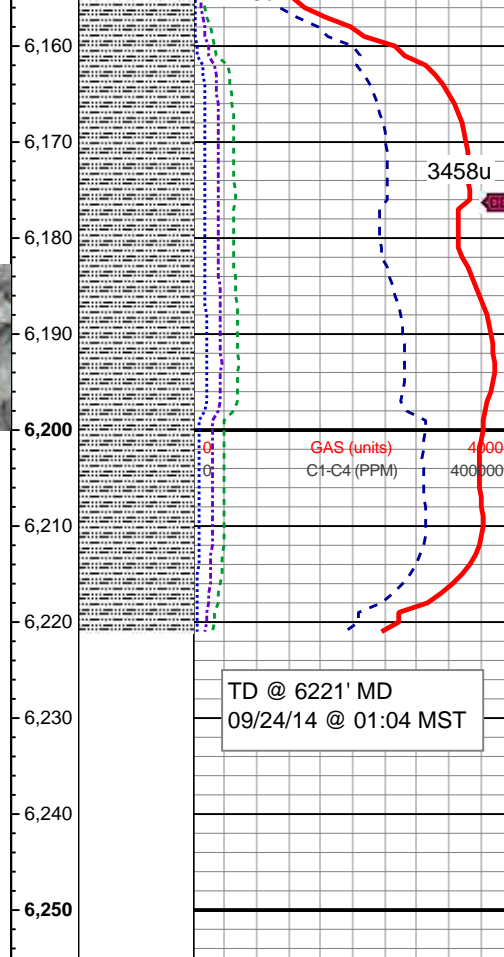
MD: 5,897 '  
TVD: 5,880.96 '  
Inclination: 0.9 °  
Azimuth: 172.3 °  
VS: 74.23 '







MD: 6,166 '  
TVD: 6,149.91 '  
Inclination: 0.3 °  
Azimuth: 57 °  
VS: 71.52 '



MD: 6,166 '  
TVD: 6,149.91 '  
Inclination: 0.3 °  
Azimuth: 57 °  
VS: 71.52 '

MD: 6,211 '  
TVD: 6,194.91 '  
Inclination: 0.5 °  
Azimuth: 19.9 °  
VS: 71.76 '

WT: 9.0 / VIS: 37

Log Continues on Heartland State  
G25-73-1HN\_Horizontal

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