

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Lilli Federal LG13-02

**Location** NWNE SEC 13, T8N, R59W

**State** COLORADO

**County** WELD

**Country** USA

**Rig Number** H&P 330

**API Number** 05-123-39883

**Field** LILLI - #49970

**Region** DJ BASIN

**Drilling Completed** 9/9/2014

**Spud Date** 9/7/2014

**Surface Coordinates** 620' FNL, 1740' FEL

**Bottom Hole Coordinates** 17.23' FNL, 12.06' FWL

**Ground Elevation** 4705'

**K.B. Elevation** 4735'

**Logged Interval** 1300' To 6750'

**Total Depth** 6750'

**Formation** J-SAND

**Type of Drilling Fluid** LSND

## Other Symbols

### Oil Show

- DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

### Porosity

- E EARTHY
- F FENESTRAL
- F FRACTURE
- X INTERCRYSTALLINE
- Q 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

MINDEPTH 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

FINELYXLN

GRAINSTONE

L LITHOGRAPHIC

MX MICROXLN

MS MUDSTONE

PS PACKSTONE

WS WACKESTONE

### Rounding

ANGULAR

ROUNDED

SUBANG

SUBRND

BOUNDSTONE

CHALKY

CRYPTOXLN

CRYSTALS

CRYSTALS

CRYSTALS

CRYSTALS

CRYSTALS

CRYSTALS

CRYSTALS

E EARTHY

FINELYXLN

GRAINSTONE

L LITHOGRAPHIC

MX MICROXLN

MS MUDSTONE

PS PACKSTONE

WS WACKESTONE

### Textures

BOUNDSTONE

CHALKY

CRYPTOXLN

CRYSTALS

CRYSTALS

CRYSTALS

CRYSTALS

CRYSTALS

CRYSTALS

CRYSTALS

CRYSTALS

CRYSTALS

CRYSTALS

CRYSTALS

### Sorting

MODERATE

POOR

WELL

## Zone Color Coding

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

## Accessories

### Fossils

- ALGAE
- AMPHIPORA
- BELEMNITE
- BIOCLASTIC
- BRACHIOPOD

F FOSSIL

GASTROPOD

INOCERAMUS

OOLITE

OSTRACOD

PELECYPOD

PELLET

ANHYDRITIC

ARGILLACEOUS

ARGILLITE GRAIN

BENTONITE

BITUMENOUS SUBSTANCE

BRECCIA FRAGMENTS

CAL CAREOUS

FERRUGINOUS

GLAUCONITE

GYPSIFEROUS

HEAVY MINERAL

KAOLIN

MARLSTONE

MINERAL CRYSTALS

TUFFACEOUS

### Stringer

- ANHYDRITE STRINGER
- BENTONITE STRINGER
- COAL STRINGER
- DOLOMITE STRINGER

↑ BRYOZOA  
🐙 CEPHALOPOD  
🪸 CORAL  
🪼 CRINOID  
🐚 ECHINOID  
🐟 FISH  
🔍 FORAMINIFERA

🔍 PISOLITE  
🌿 PLANT REMAINS  
🍄 PLANT SPORES  
🦎 SCAPHOPOD  
🪨 STROMATOPOROID

## Minerals

■ CARBONACEOUS FLAKES  
⚙️ CHTDK  
⚙️ CHTLT  
— COAL - THIN BEDS  
🔪 DOLOMITIC  
+ FELDSPAR  
● FERRUGINOUS PELLET

🔍 NODULES  
● PHOSPHATE PELLETS  
🔍 PYRITE  
🔍 SALT CAST  
🔍 SANDY  
🔍 SILICEOUS  
🔍 SILTY

🔍 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  
🔍 GRANITE  
🔍 GYPSUM  
🔍 IGNEOUS  
🔍 LIMESTONE  
🔍 SIDERITE or LIMONITE  
🔍 MARLSTONE

🔍 METAMORPHIC  
X X X X X 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 Suite 2200  
Denver, CO 80202

## Geologist

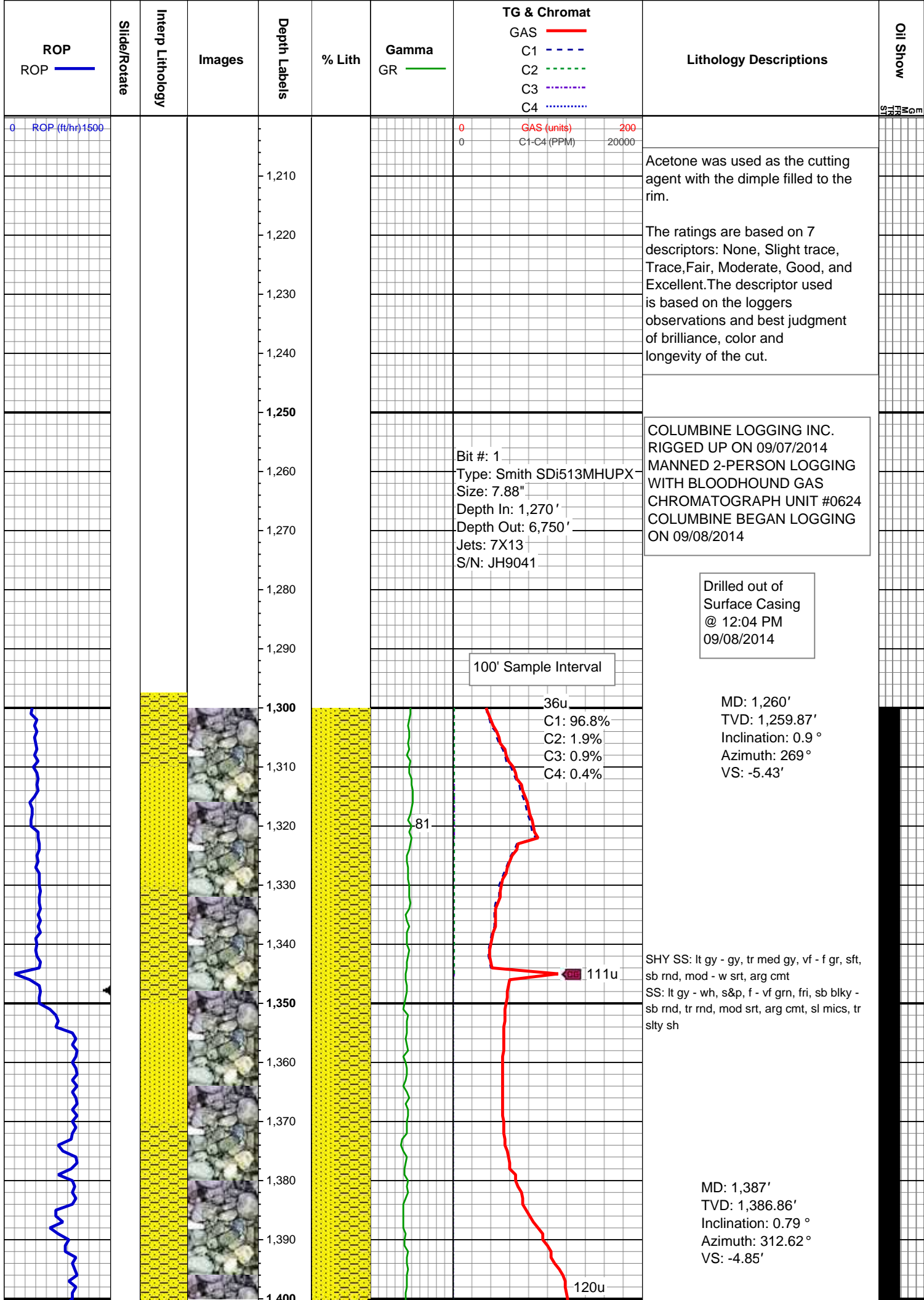
**Name** RENEE CLACKLER

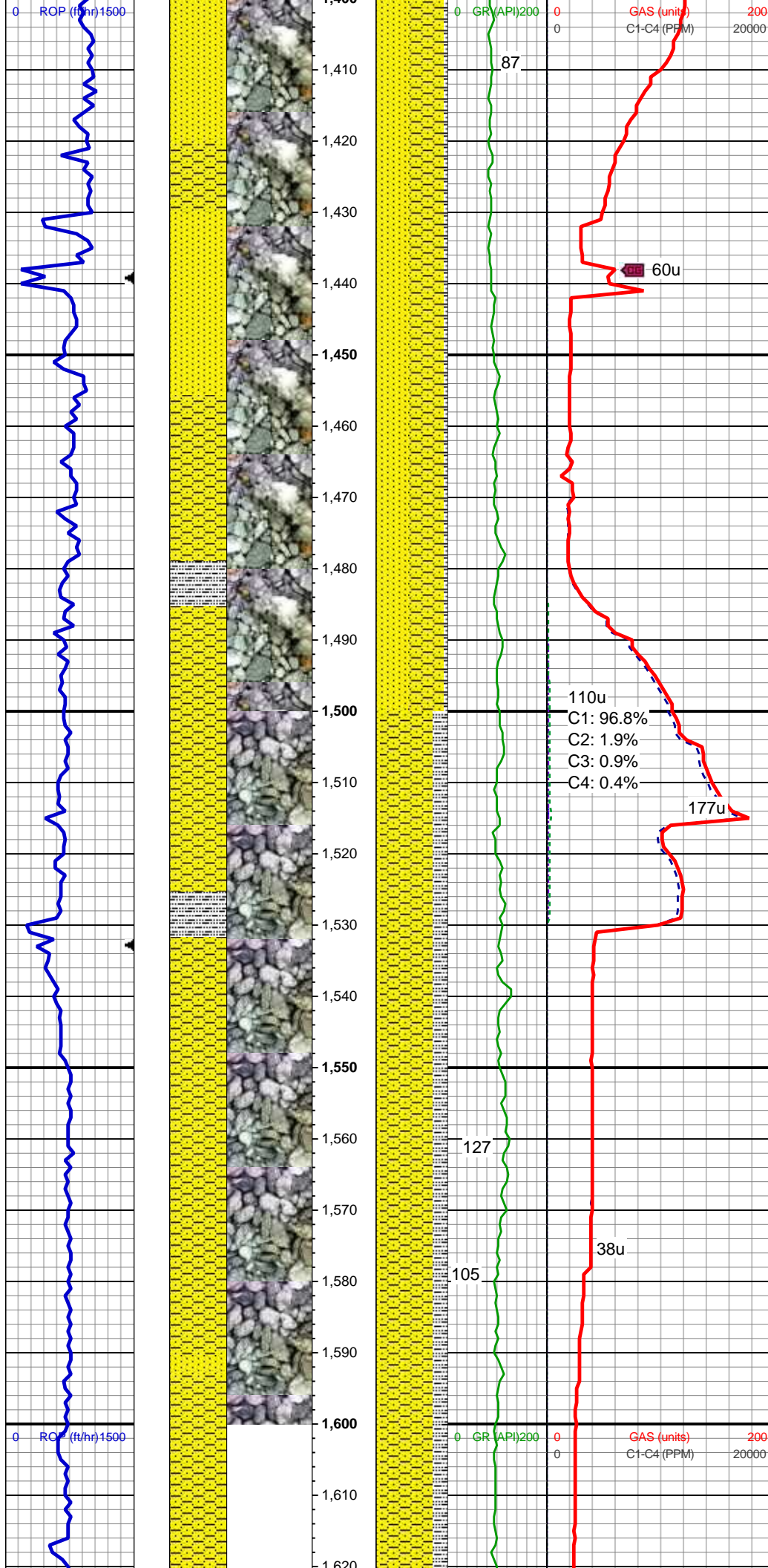
**Company** NOBLE ENERGY INC.

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

## Other

**WELL SITE GEOLOGIST** ANDREA ZUIDEMA  
JERED KARR





SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, mod - w srt, arg cmt  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blkly -  
sb rnd, tr rnd, mod srt, arg cmt  
SLTY SH: med - dk gy, sft, sb blkly - sb  
ply, arg - rthy mtx, non calc

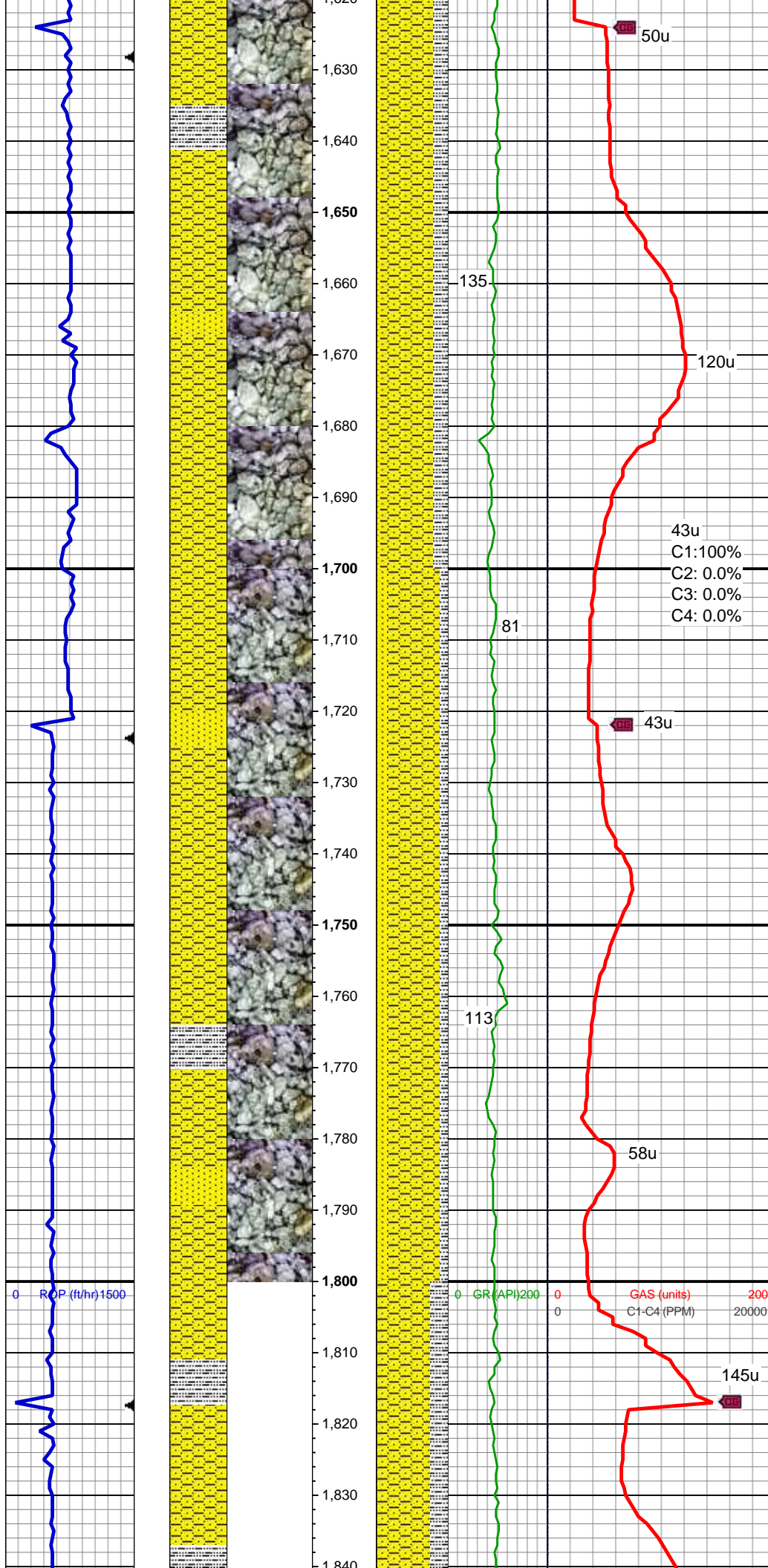
MUD WT 8.50 VIS 36

MD: 1,481'  
TVD: 1,480.85'  
Inclination: 0.79 °  
Azimuth: 306.16 °  
VS: -4.03'

SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blkly -  
sb plty, arg - rthy mtX, non calc  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blkly -  
sb rnd, tr rnd, mod srt, arg cmt

MD: 1,576'  
TVD: 1,575.84'  
Inclination: 0.88 °  
Azimuth: 317.12 °  
VS: -3.11'





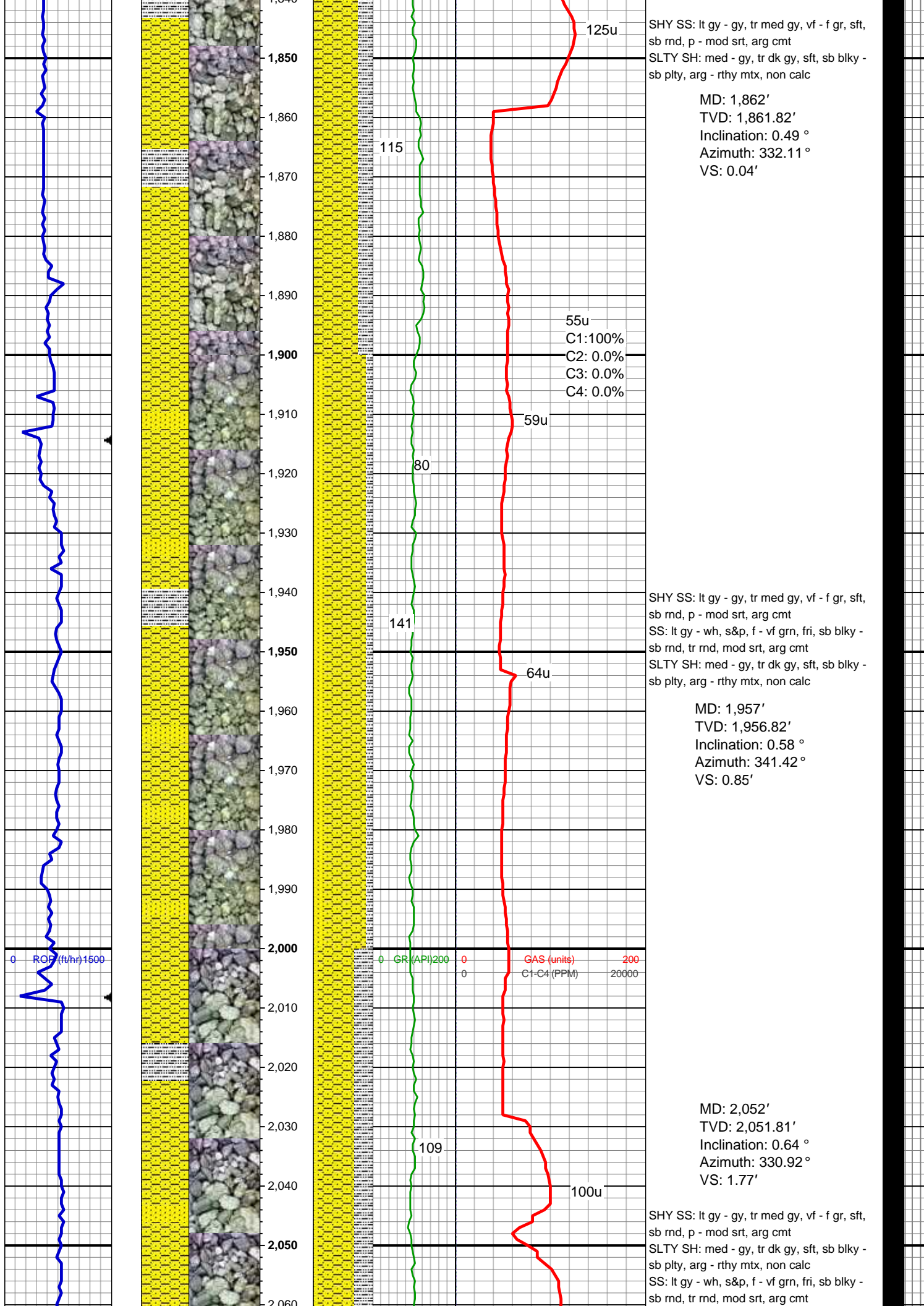
SHY SS: lt gy - gy, tr med gy, vf - f gr, sft, sb rnd, p - mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blk - sb plty, arg - rthy mtx, non calc  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blk - sb rnd, tr rnd, mod srt, arg cmt

MD: 1,671'  
TVD: 1,670.83'  
Inclination: 0.75 °  
Azimuth: 341.13 °  
VS: -1.99'

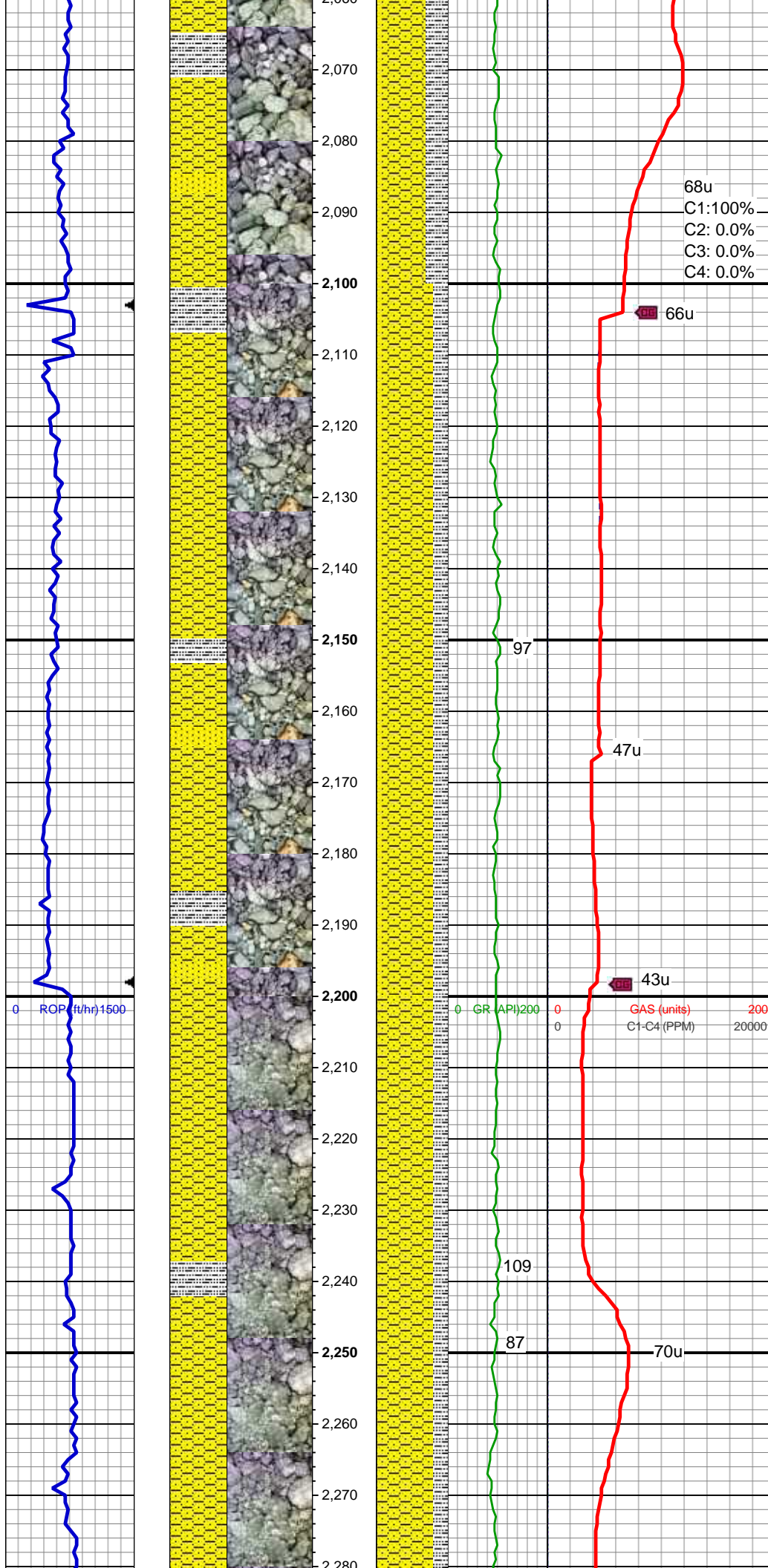
43u  
C1: 100%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

SHY SS: lt gy - gy, tr med gy, vf - f gr, sft, sb rnd, p - mod srt, arg cmt  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blk - sb rnd, tr rnd, mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blk - sb plty, arg - rthy mtx, non calc

MD: 1,767'  
TVD: 1,766.82'  
Inclination: 0.7 °  
Azimuth: 338.42 °  
VS: -0.85'





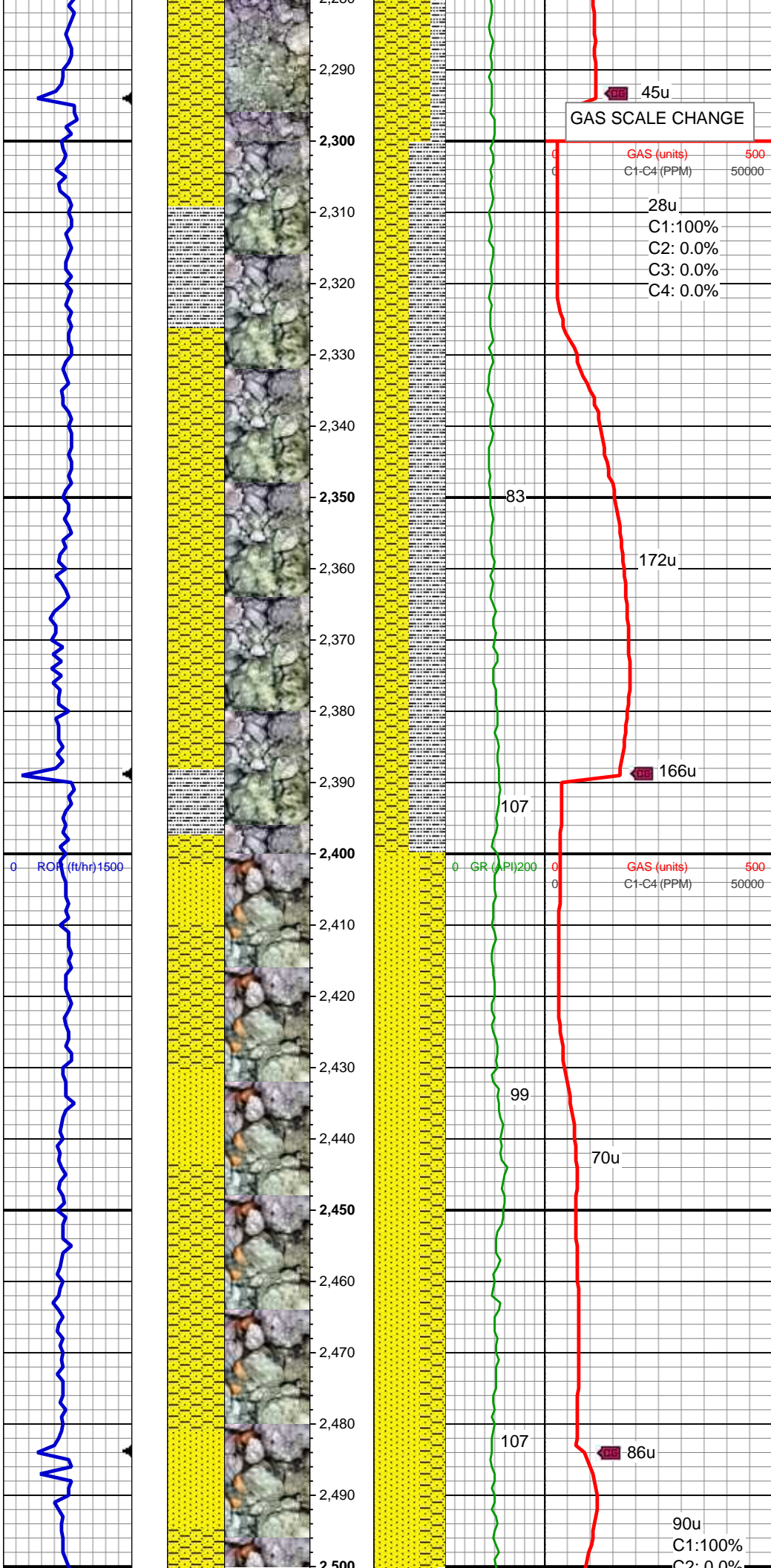


MD: 2,148'  
TVD: 2,147.8'  
Inclination: 0.6 °  
Azimuth: 330.97 °  
VS: 2.68'

SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blk -  
sb plty, arg - rthy mt, non calc  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blk -  
sb rnd, tr rnd, mod srt, arg cmt

MD: 2,243'  
TVD: 2,242.8'  
Inclination: 0.75 °  
Azimuth: 313.43 °  
VS: 3.55'

SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blk -  
sb plty, arg - rthy mt, non calc



MUD WT 8.60 VIS 36

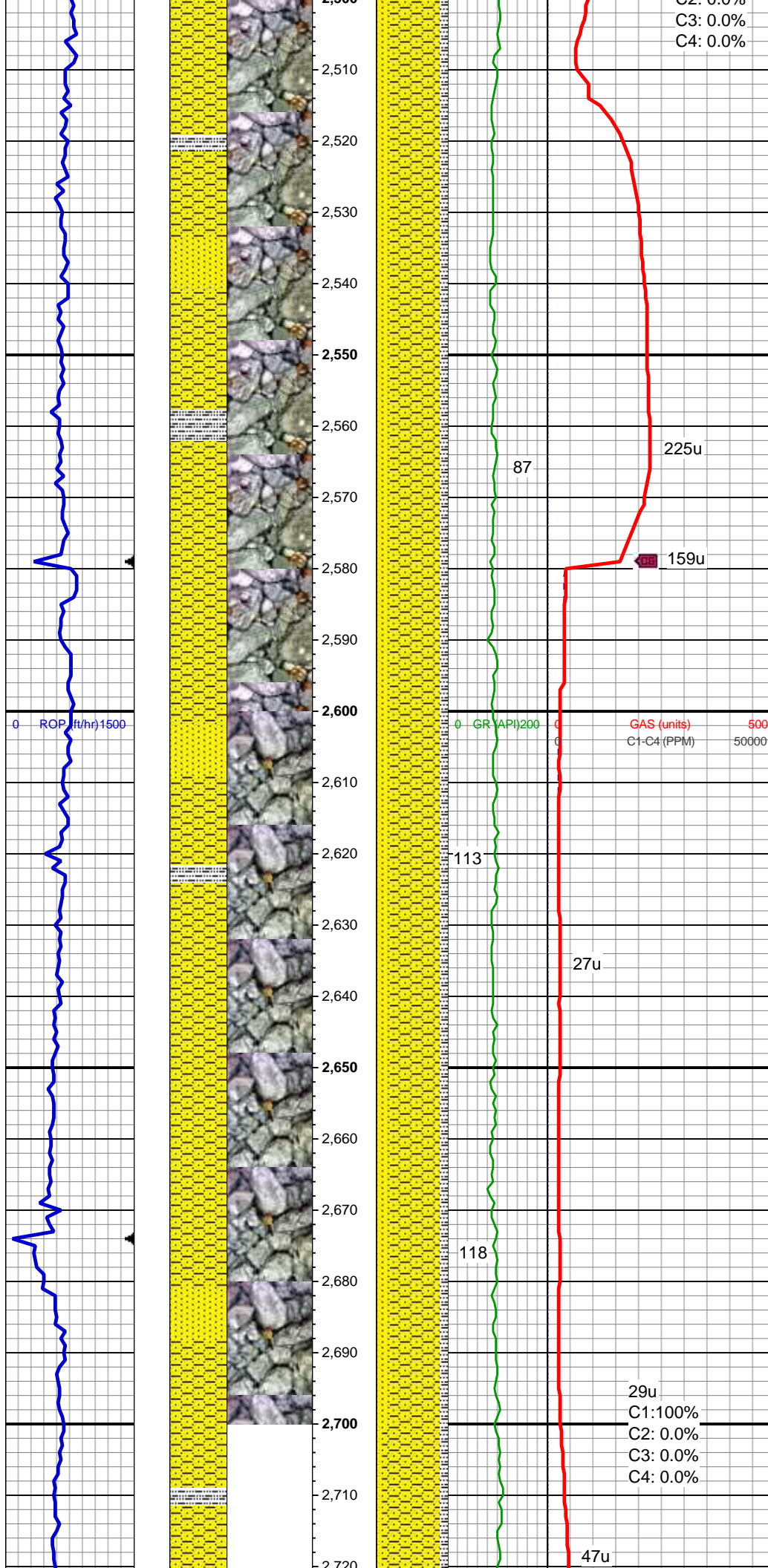
MD: 2,338'  
TVD: 2,337.79'  
Inclination: 0.69 °  
Azimuth: 333.99 °  
VS: 4.49'

SHY SS: lt gy - gy, tr med gy, vf - f gr, sft, sb rnd, p - mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blk - sb plty, arg - rthy mtx, non calc

MD: 2,433'  
TVD: 2,432.78'  
Inclination: 0.65 °  
Azimuth: 324.24 °  
VS: 5.44'

SS: lt gy - wh, s&p, f - vf grn, fri, sb blk - sb rnd, tr rnd, mod srt, arg cmt  
SHY SS: lt gy - gy, tr med gy, vf - f gr, sft, sb rnd, p - mod srt, arg cmt





MD: 2,528'  
TVD: 2,527.78'  
Inclination: 0.62 °  
Azimuth: 325.93 °  
VS: 6.3'

SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blkly -  
sb rnd, tr rnd, mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blkly -  
sb plty, arg - rthy mtx, non calc

MD: 2,623'  
TVD: 2,622.77'  
Inclination: 0.59 °  
Azimuth: 332.77 °  
VS: 7.16'

SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blkly -  
sb rnd, tr rnd, mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blkly -  
sb plty, arg - rthy mtx, non calc

MD: 2,718'  
TVD: 2,717.77'  
Inclination: 0.56 °  
Azimuth: 325.93 °  
VS: 6.3'

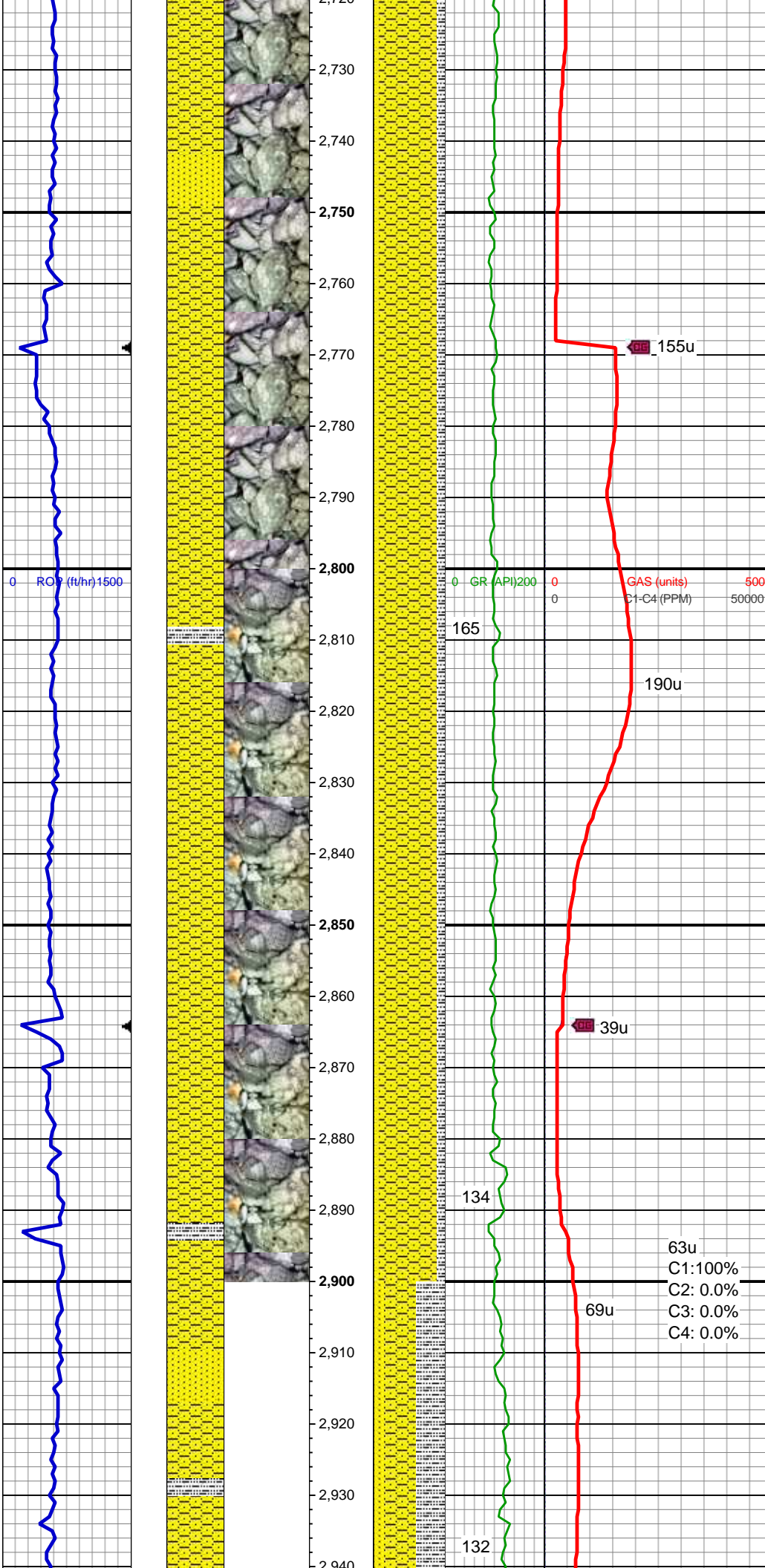
Azimuth: 320.53°  
VS: 7.95'

SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blkly -  
sb rnd, tr rnd, mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blkly -  
sb plty, arg - rthy mtx, non calc

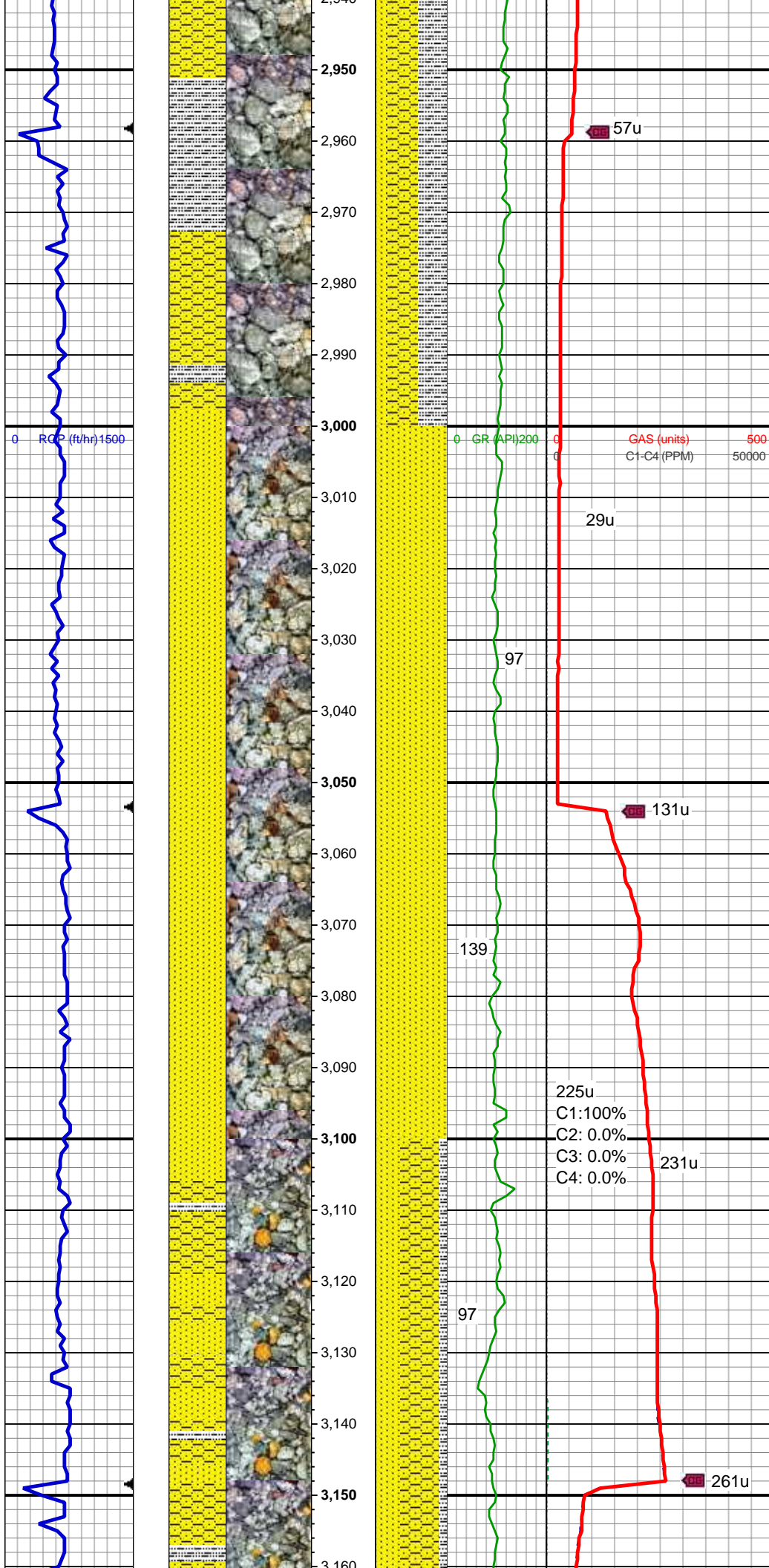
MD: 2,814'  
TVD: 2,813.76'  
Inclination: 0.78°  
Azimuth: 304.83°  
VS: 8.68'

SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blkly -  
sb rnd, tr rnd, mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blkly -  
sb plty, arg - rthy mtx, non calc

MD: 2,908'  
TVD: 2,907.75'  
Inclination: 0.94°  
Azimuth: 314.61°  
VS: 9.6'







SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blkly -  
sb plty, arg - rthy mtx, non calc  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blkly -  
sb rnd, tr rnd, mod srt, arg cmt

MUD WT 8.70 VIS 47

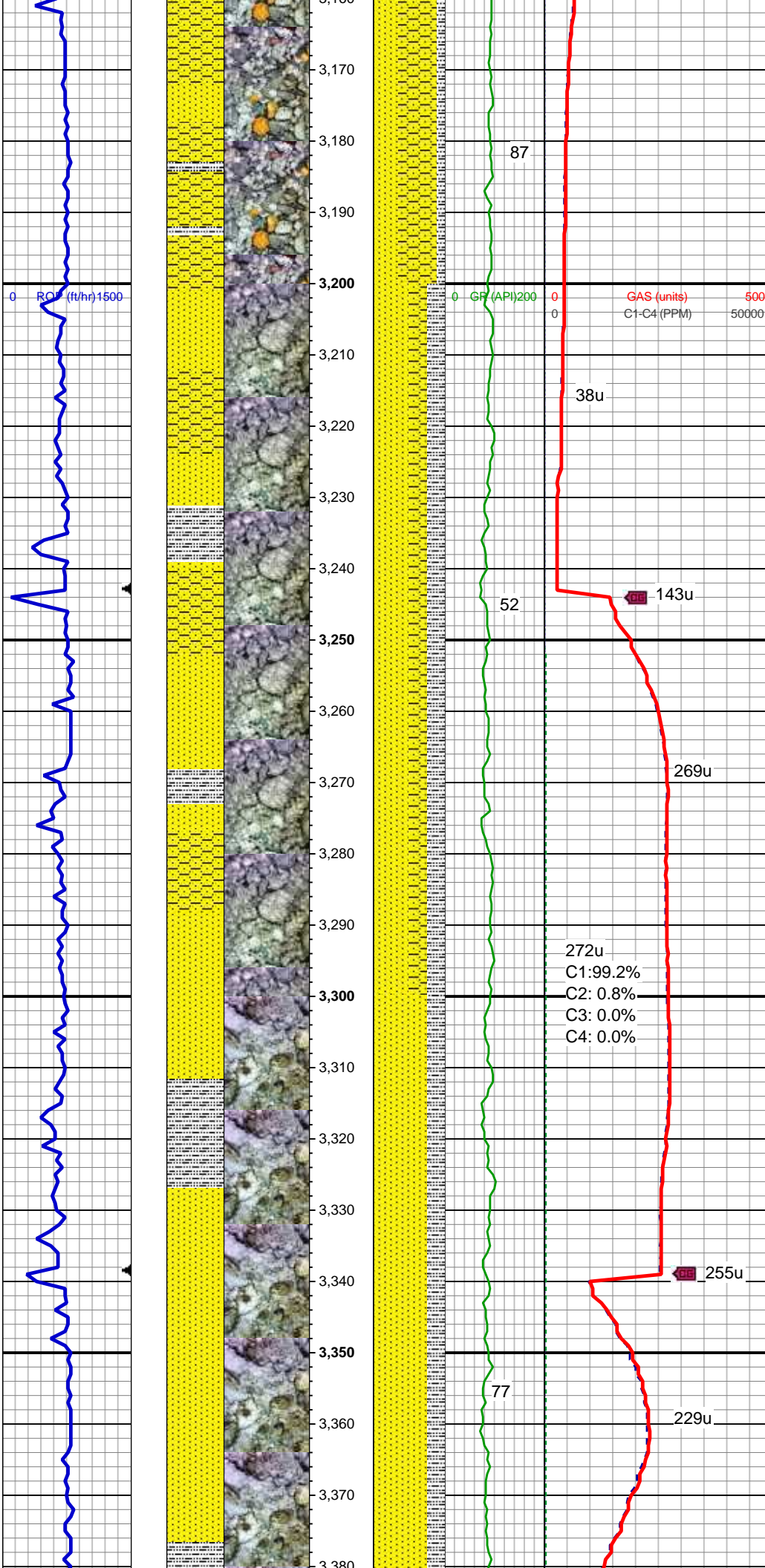
MD: 3,003'  
TVD: 3,002.74'  
Inclination: 1.07 °  
Azimuth: 303.24 °  
VS: 10.63'

SS: lt gy - wh, s&p, med- vf grn, fri, sb  
blkly - sb rnd, tr rnd, mod srt, p por, arg cmt

MD: 3,099'  
TVD: 3,098.72'  
Inclination: 1 °  
Azimuth: 307.35 °  
VS: 11.63'

SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blkly -  
sb rnd, tr rnd, mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blkly -  
sb plty, arg - rthy mtx, non calc





MD: 3,194'  
TVD: 3,193.71'  
Inclination: 0.89 °  
Azimuth: 319.8 °  
VS: 12.7'

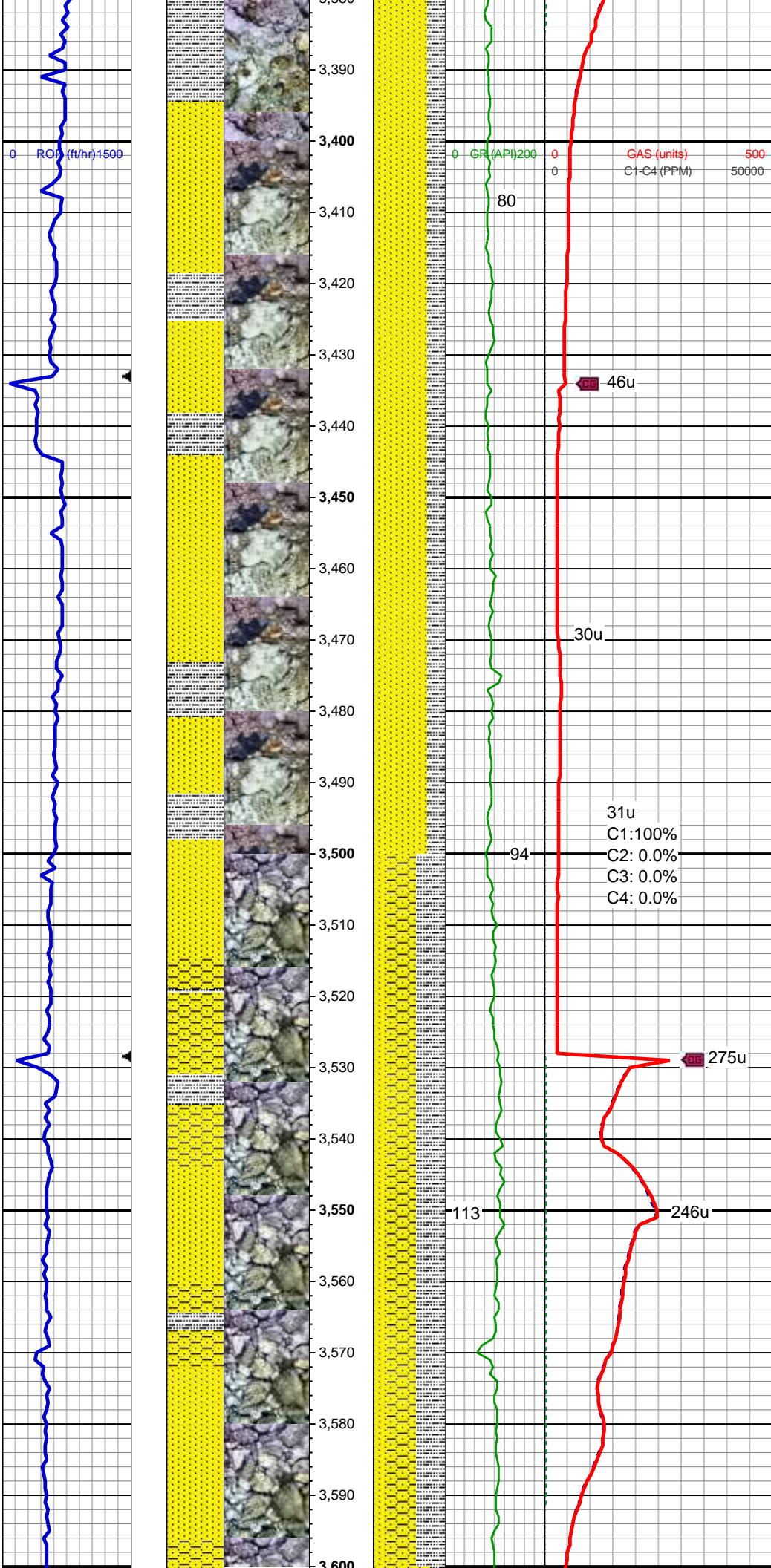
MUD WT 8.60 VIS 50

SS: lt gy - wh, s&p, f - vf grn, fri, sb blk -  
sb rnd, tr rnd, mod srt, arg cmt  
SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blk -  
sb plty, arg - rthy mtx, non calc

MD: 3,289'  
TVD: 3,288.7'  
Inclination: 0.78 °  
Azimuth: 308.37 °  
VS: 13.67'

SS: lt gy - wh, s&p, med - vf grn, fri, sb  
blk - sb rnd, tr rnd, mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blk -  
sb plty, arg - rthy mtx, non calc

MD: 3,384'  
TVD: 3,383.69'



Inclination: 0.71 °  
Azimuth: 323.34 °  
VS: 14.55'

SS: lt gy - wh, s&p, med - vf grn, fri, sb  
blky - sb rnd, tr rnd, mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blky -  
sb plty, arg - rthy mtz, non calc

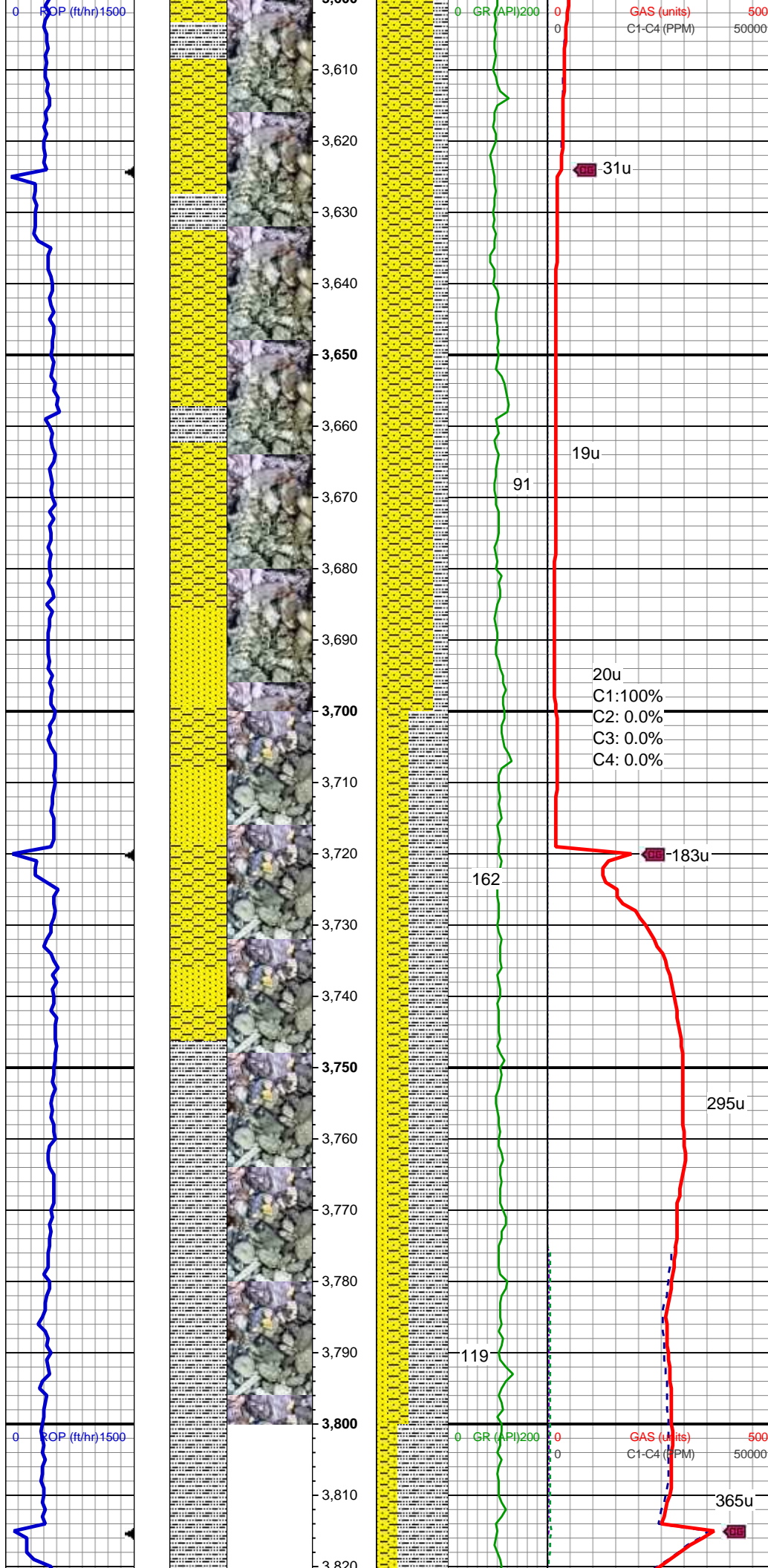
MD: 3,479'  
TVD: 3,478.68'  
Inclination: 0.9 °  
Azimuth: 331.07 °  
VS: 15.67'

31u  
C1:100%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blky -  
sb plty, arg - rthy mtz, non calc  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blky -  
sb rnd, tr rnd, mod srt, arg cmt

MD: 3,574'  
TVD: 3,573.67'  
Inclination: 0.89 °  
Azimuth: 328.42 °  
VS: 16.96'





SHY SS: lt gy - gy, tr med gy, vf - f gr, sft, sb rnd, p - mod srt, arg cmt  
SLTY SH: med - gy, tr dk gy, sft, sb blkly - sb plty, arg - rthy mtx, non calc  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blkly - sb rnd, tr rnd, mod srt, arg cmt

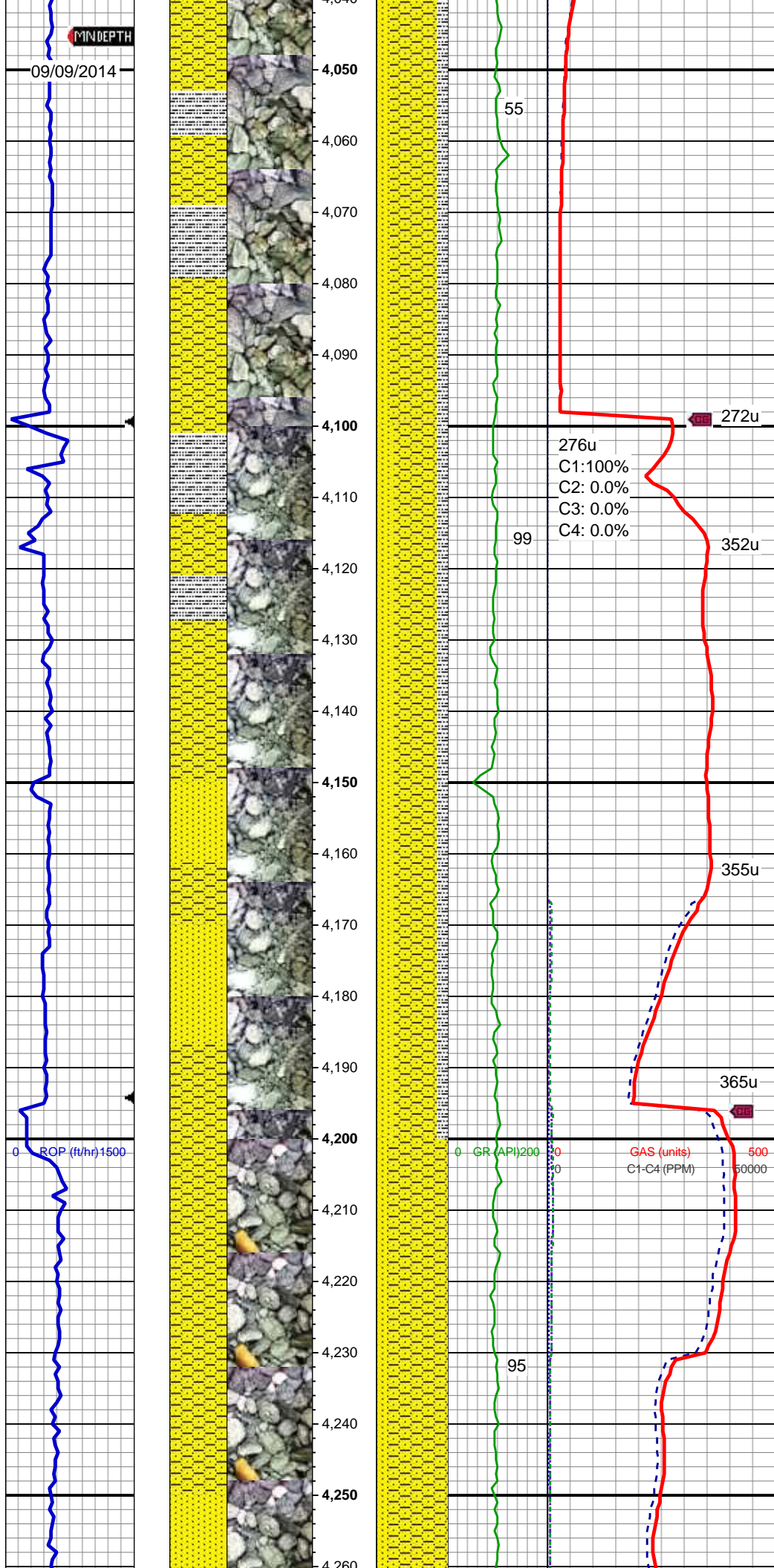
MD: 3,669'  
TVD: 3,668.66'  
Inclination: 0.78 °  
Azimuth: 327.92 °  
VS: 18.13'

SLTY SH: med - dk gy, sft, plty - sb plty, arg - rthy mtx, non calc  
SHY SS: lt gy - gy, tr med gy, vf - f gr, sft, sb rnd, p - mod srt, arg cmt  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blkly - sb rnd, tr rnd, mod srt, arg cmt

MD: 3,764'  
TVD: 3,763.65'  
Inclination: 1.17 °  
Azimuth: 344.84 °  
VS: 19.62'







SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blk -  
sb rnd, tr rnd, mod srt, arg cmt  
SLTY SH: med - dk gy, sft, plty - sb plty,  
arg - rthy mtx, non calc

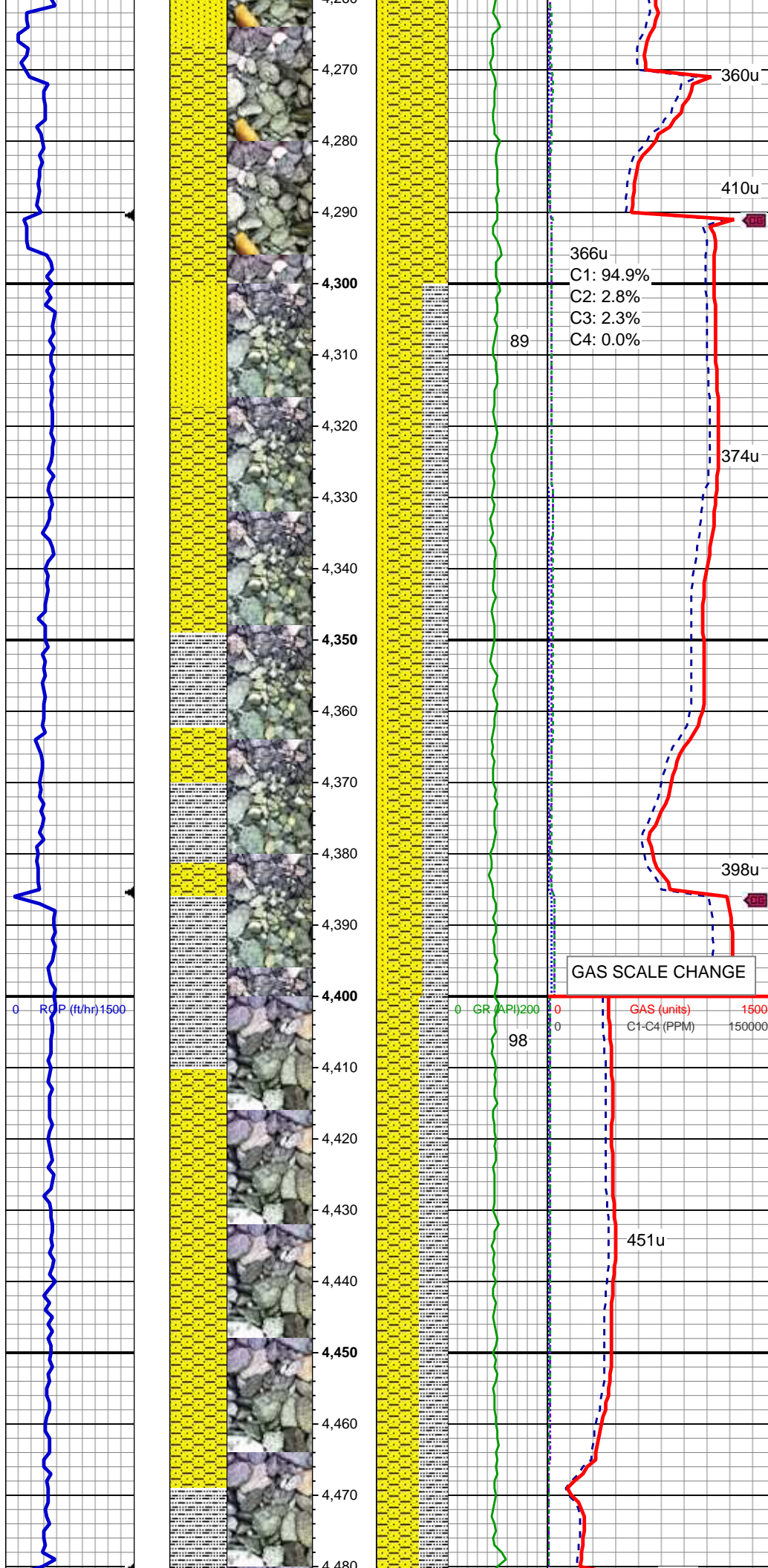
MD: 4,145'  
TVD: 4,144.6'  
Inclination: 0.62 °  
Azimuth: 101.26 °  
VS: 23.59'

SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blk -  
sb rnd, tr rnd, mod srt, arg cmt  
SLTY SH: med - dk gy, sft, plty - sb plty,  
arg - rthy mtx, non calc

MD: 4,240'  
TVD: 4,239.59'  
Inclination: 1.13 °  
Azimuth: 71.34 °  
VS: 23.79'

SHY SS: lt gy - gy, tr med gy, vf - f gr, sft,  
sb rnd, p - mod srt, arg cmt  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blk -  
sb rnd, tr rnd, mod srt, arg cmt





MD: 4,335'  
TVD: 4,334.57'  
Inclination: 1.34 °  
Azimuth: 63.06 °  
VS: 24.59'

SHY SS: lt gy - gy, tr pk, vf - f gr, sft, sb  
rnd, p - mod srt, arg cmt  
SLTY SH: med - dk gy, sft, plty - sb plty,  
arg - rthy mtx, non calc  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blkly -  
sb rnd, tr rnd, mod srt, arg cmt

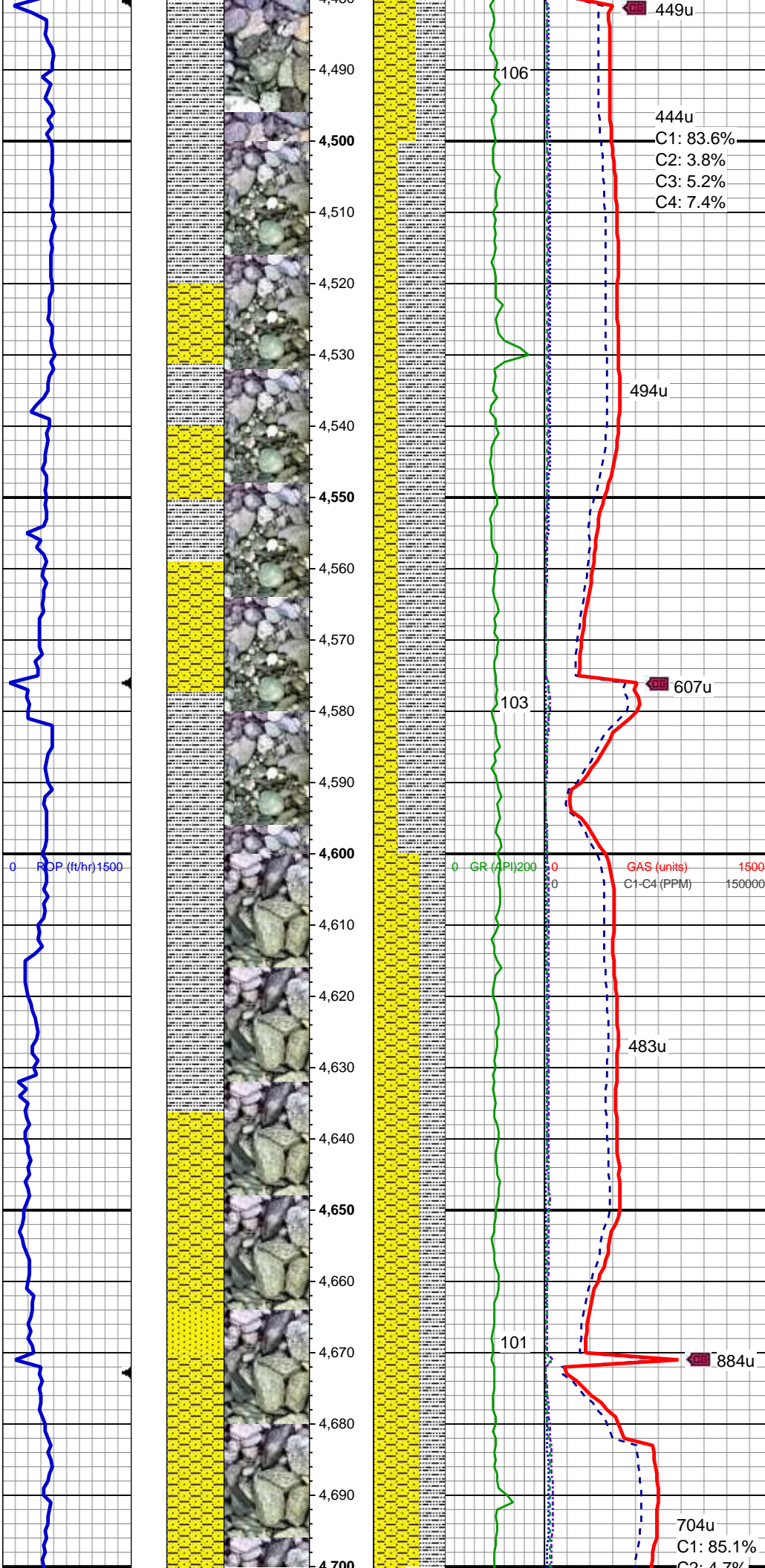
GAS SCALE CHANGE

GAS (units)  
C1-C4 (PPM)

MD: 4,430'  
TVD: 4,429.55'  
Inclination: 1.18 °  
Azimuth: 65.59 °  
VS: 25.5'

SHY SS: lt gy - gy, tr pk, vf - f gr, sft, sb  
rnd, p - mod srt, arg cmt, tr bent  
SLTY SH: med - dk gy, sft, plty - sb plty,  
arg - rthy mtx, non calc





MD: 4,525'  
TVD: 4,524.52'  
Inclination: 1.45 °  
Azimuth: 81.22 °  
VS: 26.09'

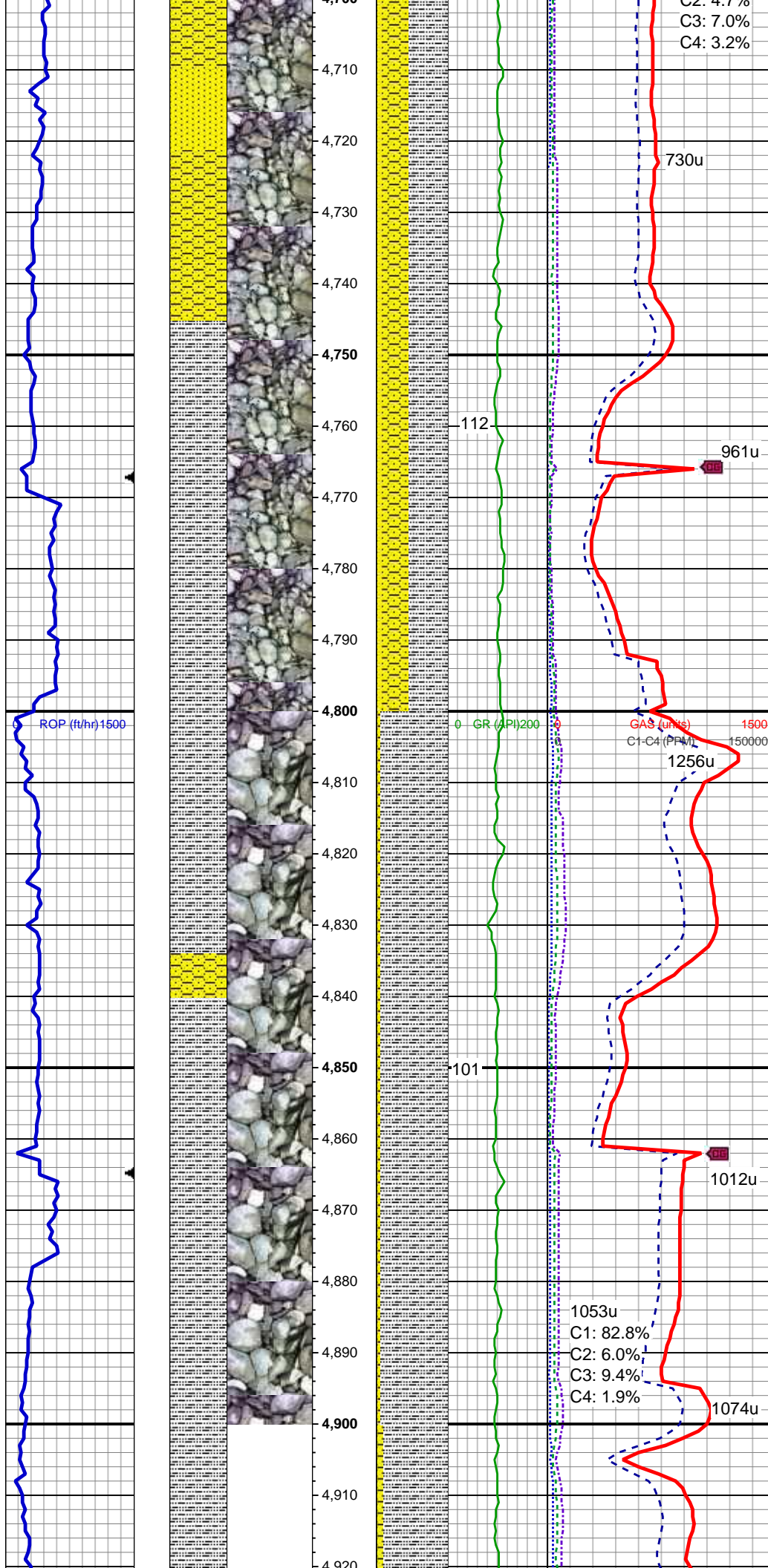
SLTY SH: med - dk gy, sft, plty - sb plty,  
arg - rthy mtx, non calc, tr bent, rr inoc  
SHY SS: lt gy - gy, tr pk, vf - f gr, sft, sb  
rnd, p - mod srt, arg cmt

MUD WT 9.20 VIS 51

MD: 4,620'  
TVD: 4,619.49'  
Inclination: 1.4 °  
Azimuth: 81.99 °  
VS: 26.43'

SHY SS: lt gy - gy, vf - f gr, sft, sb rnd, p -  
mod srt, arg cmt  
SLTY SH: med - dk gy, occ lt brn, sft, plty  
- sb plty, arg - rthy mtx, non calc  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blk -  
sb rnd, tr rnd, mod srt, sl mics, tr pyr, arg  
cmt

704u  
C1: 85.1%  
C2: 1.7%



MD: 4,715'  
TVD: 4,714.47'  
Inclination: 1.22 °  
Azimuth: 86.45 °  
VS: 26.66'

SLTY SH: med - dk gy, occ lt brn, sft, plty  
- sb plty, arg - rthy mtx, non calc  
SHY SS: lt gy - gy, vf - f gr, sft, sb rnd, p -  
mod srt, arg cmt  
SS: lt gy - wh, s&p, f - vf grn, fri, sb blkly -  
sb rnd, tr rnd, mod srt, sl mics, tr pyr, arg  
cmt

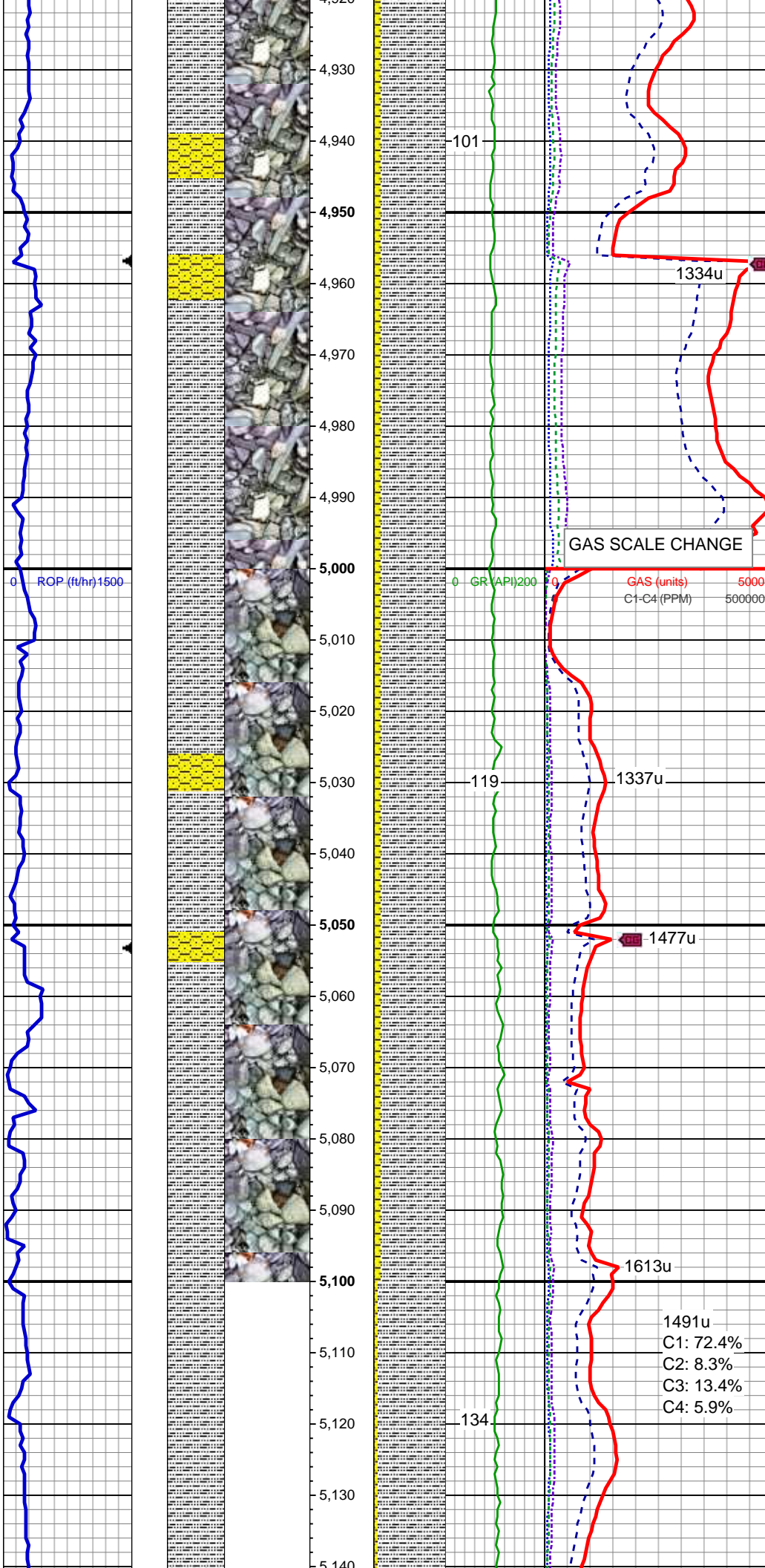
MUD WT 9.30 VIS 52

MD: 4,810'  
TVD: 4,809.45'  
Inclination: 1.03 °  
Azimuth: 98.04 °  
VS: 26.6'

SLTY SH: med - dk gy, occ lt gy, sft, plty  
- sb plty, arg - rthy mtx, tr dissim pyr, non  
calc  
SHY SS: lt gy - gy, vf - f gr, sft, sb rnd, p -  
mod srt, sl mics, arg cmt, tr ss

MD: 4,905'  
TVD: 4,904.44'  
Inclination: 0.84 °  
Azimuth: 95.35 °  
VS: 26.42'





MUD WT 9.40 VIS 58

SLTY SH: med - dk gy, occ lt gy, sft, plty  
- sb plty, arg - rthy mtx, tr dissd pyr, non  
calc

SHY SS: lt gy - gy, vf - f gr, sft, sb rnd, p -  
mod srt, sl mics, arg cmt, tr ss

MD: 5,000'  
TVD: 4,999.43'  
Inclination: 0.88 °  
Azimuth: 103.67 °  
VS: 26.18'

MUD WT 9.40 VIS 51

SLTY SH: med - dk gy, occ lt gy, sft, plty  
- sb plty, arg - rthy mtx, tr dissd pyr, non  
calc

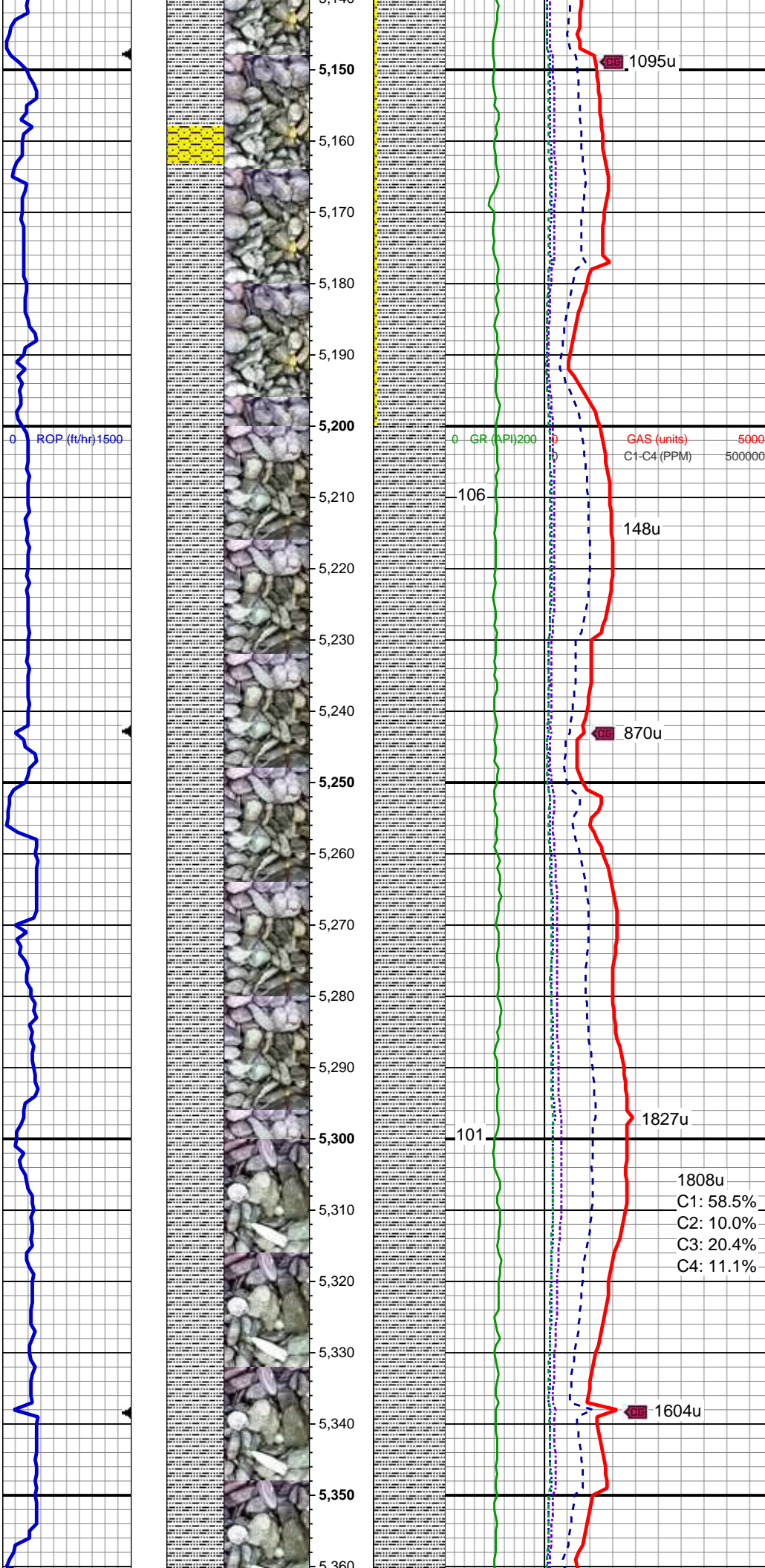
SHY SS: lt gy - gy, vf - f gr, sft, sb rnd, p -  
mod srt, sl mics, arg cmt, tr ss

MD: 5,095'  
TVD: 5,094.42'  
Inclination: 0.8 °  
Azimuth: 104.23 °  
VS: 25.84'

MUD WT 9.40 VIS 48

1491u  
C1: 72.4%  
C2: 8.3%  
C3: 13.4%  
C4: 5.9%





SLTY SH: med - dk gy, occ lt gy, sft, plty  
- sb plty, arg - rthy mtx, tr dissim pyr, non  
calc  
SHY SS: lt gy - med gy, vf - f gr, sft, sb  
rnd, p - mod srt, sl mics, arg cmt, tr ss

MD: 5,191'  
TVD: 5,190.41'  
Inclination: 0.68 °  
Azimuth: 104.11 °  
VS: 25.54'

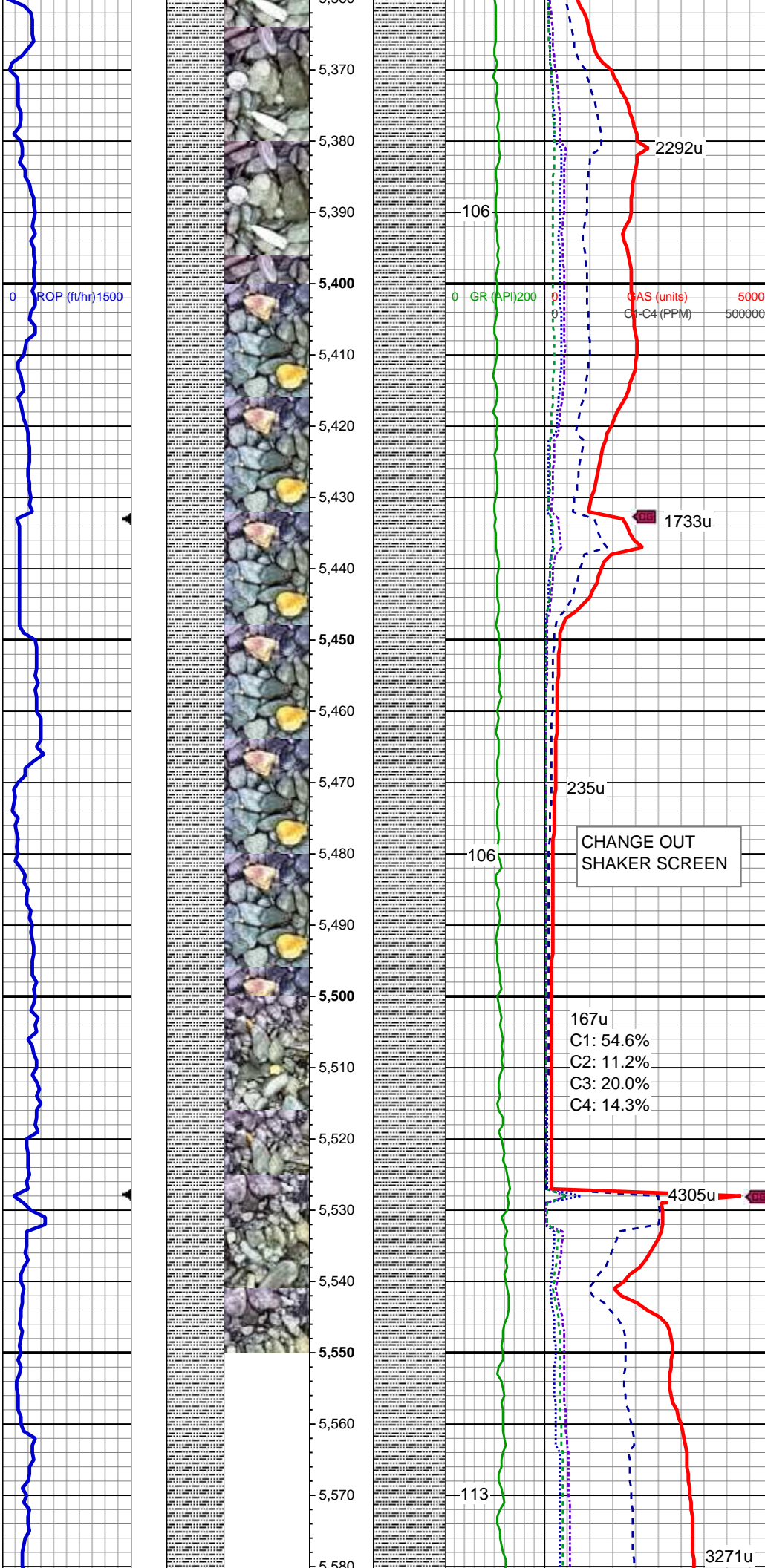
MUD WT 9.40 VIS 47

SLTY SH: med - dk gy, occ lt gy, sft, plty  
- sb plty, arg - rthy mtx, tr dissim pyr, non  
calc, tr shy ss

MD: 5,286'  
TVD: 5,285.41'  
Inclination: 0.25 °  
Azimuth: 125.64 °  
VS: 25.28'

1808u  
C1: 58.5%  
C2: 10.0%  
C3: 20.4%  
C4: 11.1%

SLTY SH: med - dk gy, occ lt gy, sft, plty  
- sb plty, arg - rthy mtx, tr dissim pyr, non  
calc, tr shy ss



MD: 5,381'  
TVD: 5,380.4'  
Inclination: 0.12 °  
Azimuth: 141.87 °  
VS: 25.08'

MUD WT 9.40 VIS 44

SLTY SH: med - dk gy, occ lt gy, sft, plty  
- sb plty, arg - rthy mtx, tr dissim pyr, non  
calc, tr shy ss

MD: 5,476'  
TVD: 5,475.4'  
Inclination: 0.15 °  
Azimuth: 124.37 °  
VS: 24.93'

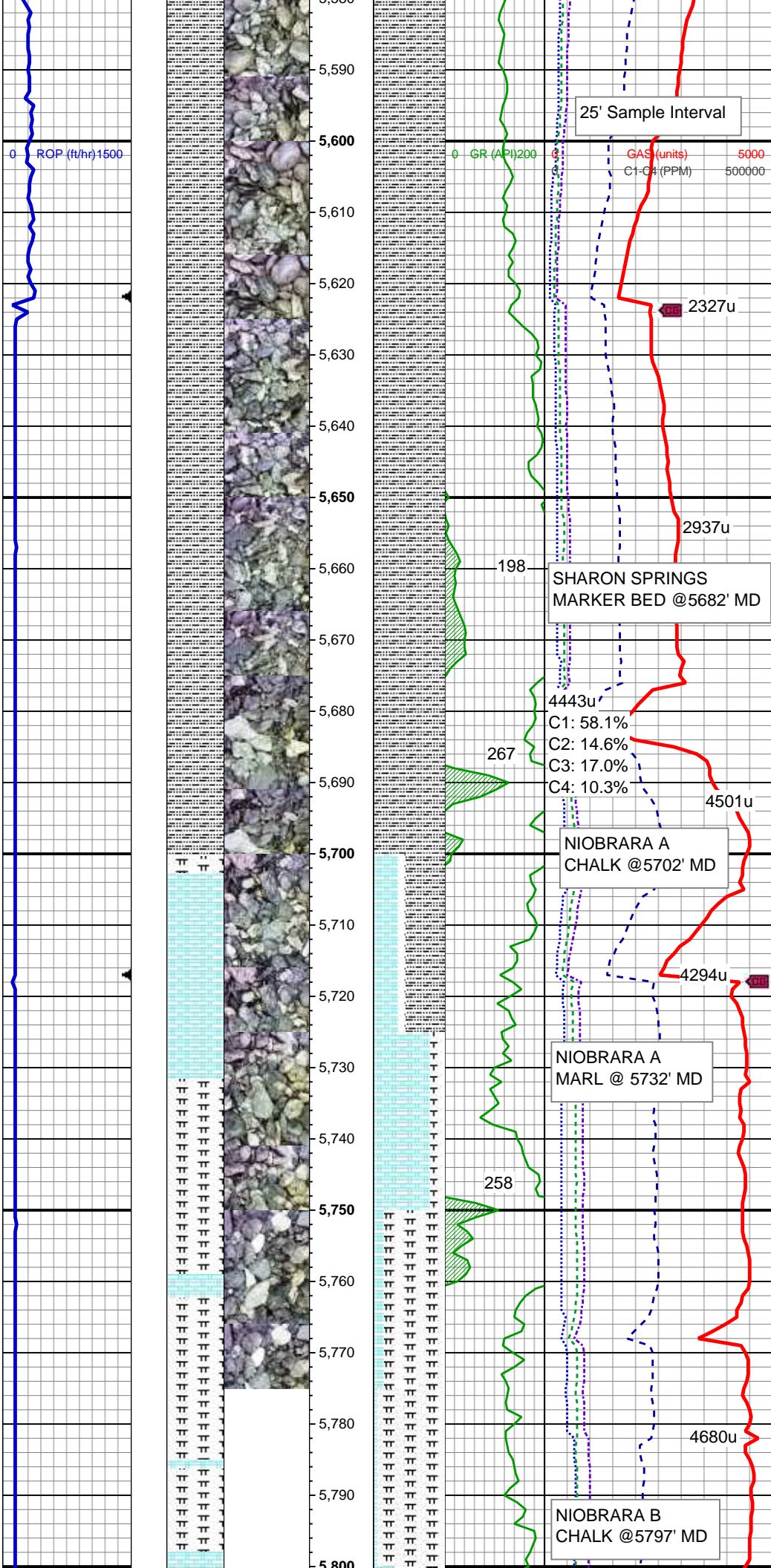
CHANGE OUT  
SHAKER SCREEN

167u  
C1: 54.6%  
C2: 11.2%  
C3: 20.0%  
C4: 14.3%

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

MD: 5,571'  
TVD: 5,570.4'  
Inclination: 0.29 °  
Azimuth: 195.51 °  
VS: 24.62'





SLTY SH: med - dk gy, occ lt gy, sft, pty  
- sb pty, rthy mtx, occ arg mtx, non calc,  
tr shy ss

MUD WT 9.45 VIS 44

MD: 5,666'  
TVD: 5,665.4'  
Inclination: 0.35 °  
Azimuth: 208.28 °  
VS: 24.13'

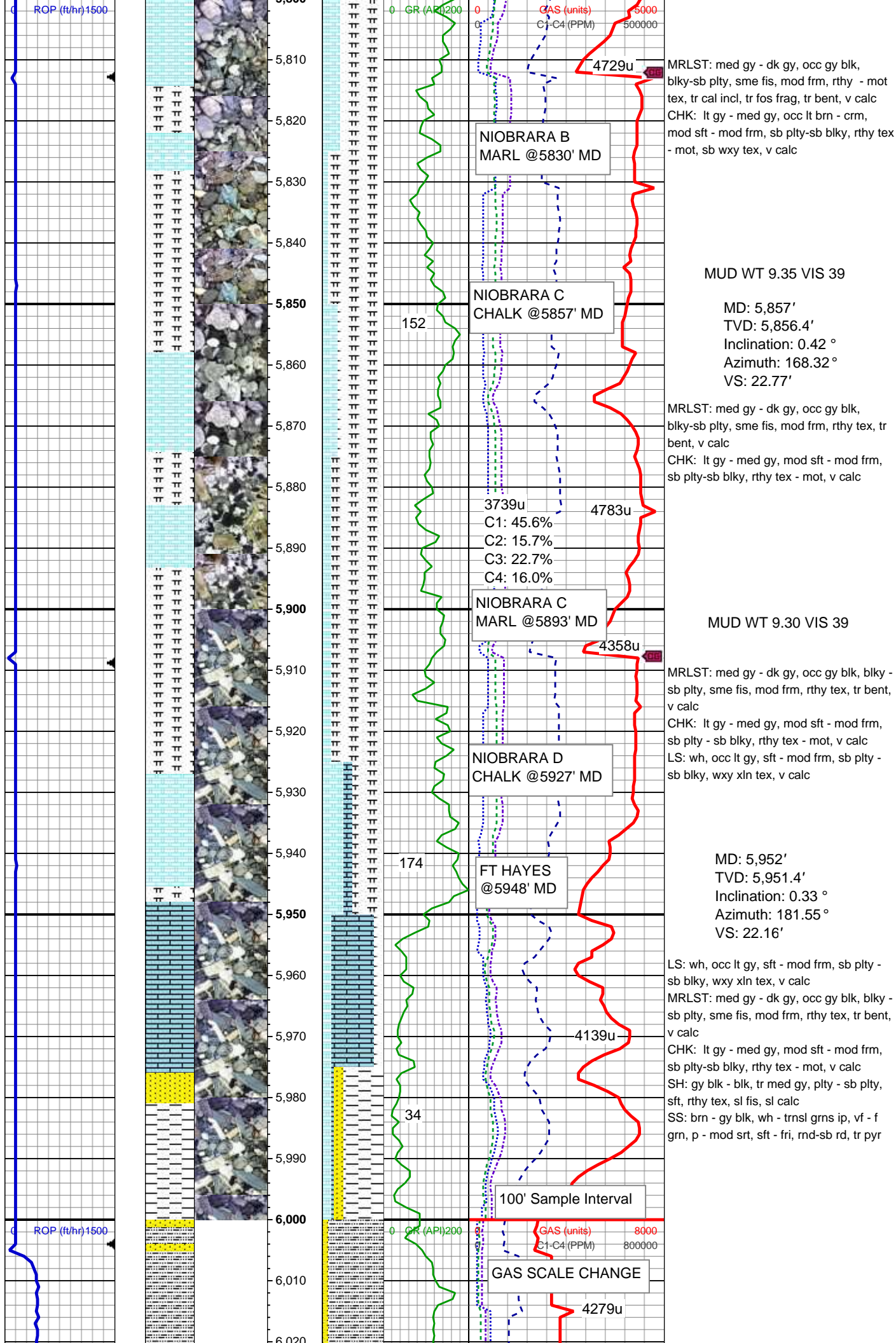
SLTY SH: med - dk gy, tr lt gy, sft, pty -  
sb pty, rthy mtx, occ arg mtx, non calc,  
tr bent

SLTY SH: med - dk gy, tr lt gy, sft, pty -  
sb pty, rthy mtx, occ arg mtx, non calc,  
tr bent  
CHK: lt gy - med gy, occ lt brn - crm,  
mod sft - mod frm, sb pty-sb blk, rthy tex  
- mot, tr pyr, v calc  
MRLST: med gy - dk gy, occ gy blk,  
blk-sb pty, sme fis, mod frm, rthy tex, v  
calc

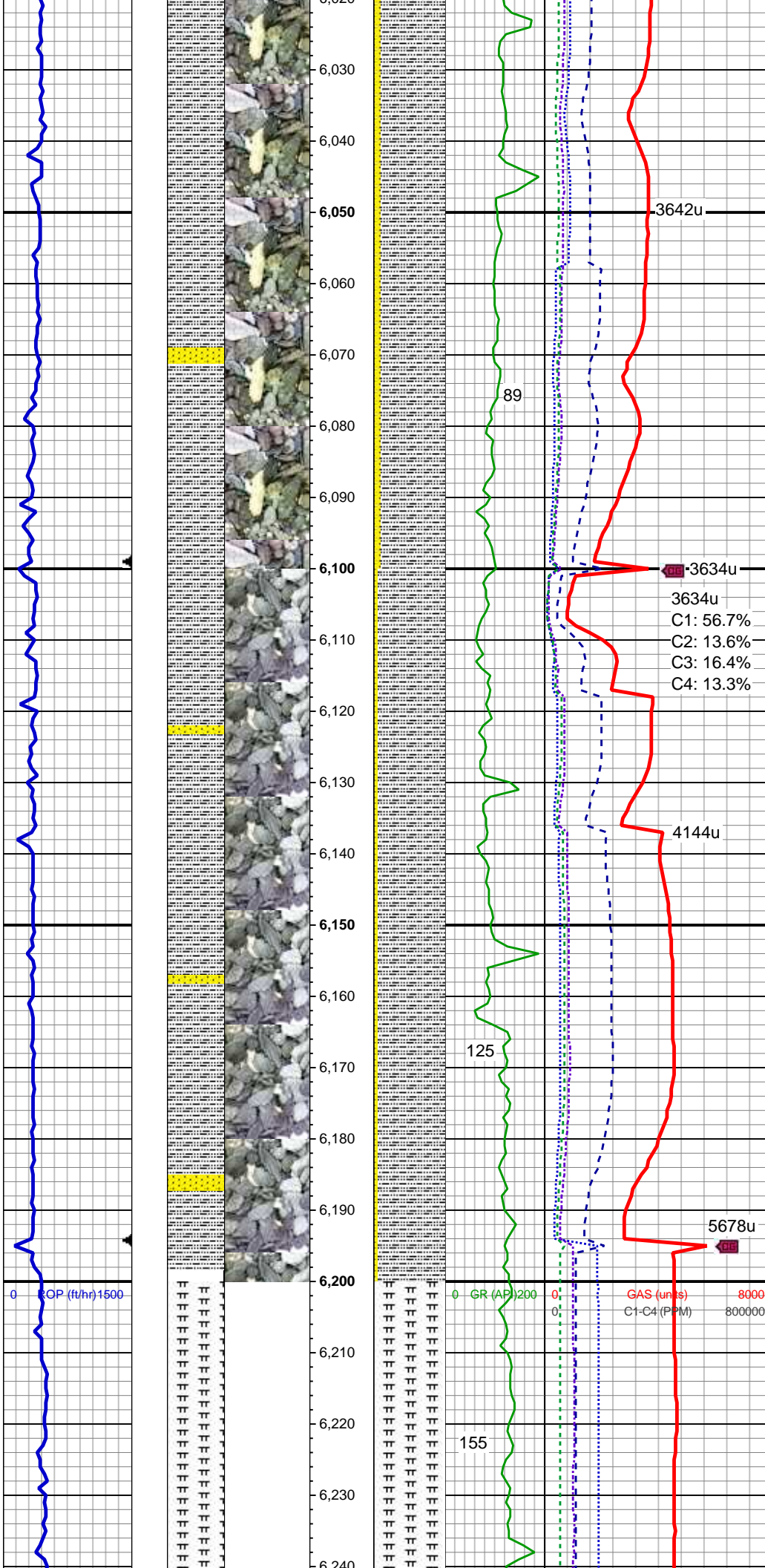
MD: 5,761'  
TVD: 5,760.4'  
Inclination: 0.46 °  
Azimuth: 187.44 °  
VS: 23.5'

MRLST: med gy - dk gy, occ gy blk,  
blk-sb pty, sme fis, mod frm, rthy - mot  
tex, v calc  
CHK: lt gy - med gy, occ lt brn - crm,  
mod sft - mod frm, sb pty-sb blk, rthy tex  
- mot, sb wxy tex, v calc

MUD WT 9.40 VIS 42







MD: 6,047'  
TVD: 6,046.39'  
Inclination: 0.34 °  
Azimuth: 160.77 °  
VS: 21.63'

SLTY SH: med gy tr blk, plty - sb plty, sft,  
rthy tex, sl fis, sl calc, rr inoc  
SS: brn - gy blk, wh-trnsl grns ip, occ s&p  
vf - f grn, p - mod srt, sft - fri, rnd - sb rd, tr  
pyr

MD: 6,142'  
TVD: 6,141.39'  
Inclination: 0.35 °  
Azimuth: 147.17 °  
VS: 21.12'

MUD WT 9.10 VIS 33

SLTY SH: med gy tr blk, plty - sb plty, sft,  
rthy tex, sl fis, sl calc, rr inoc  
SS: brn-gy blk, wh - trnsl grns ip, occ s&p  
vf - f grn, p - mod srt, sft - fri, rnd - sb rd, tr  
pyr

MD: 6,237'  
TVD: 6,236.39'  
Inclination: 0.37 °  
Azimuth: 124.20 °

Azimuth: 134.39°  
VS: 20.66'

MRLST: med gy - dk gy, blkly - sb plty, vit  
lstr, mod frm, slty - rthy tex, v calc, occ  
bent

MUD WT 9.05 VIS 33

MRLST: med gy - dk gy, blkly - sb plty, vit  
lstr, mod frm, slty - rthy tex, v calc, occ  
bent, tr ls, occ pyr, rr ss strg

MD: 6,332'  
TVD: 6,331.39'  
Inclination: 0.5 °  
Azimuth: 125.12 °  
VS: 20.21'

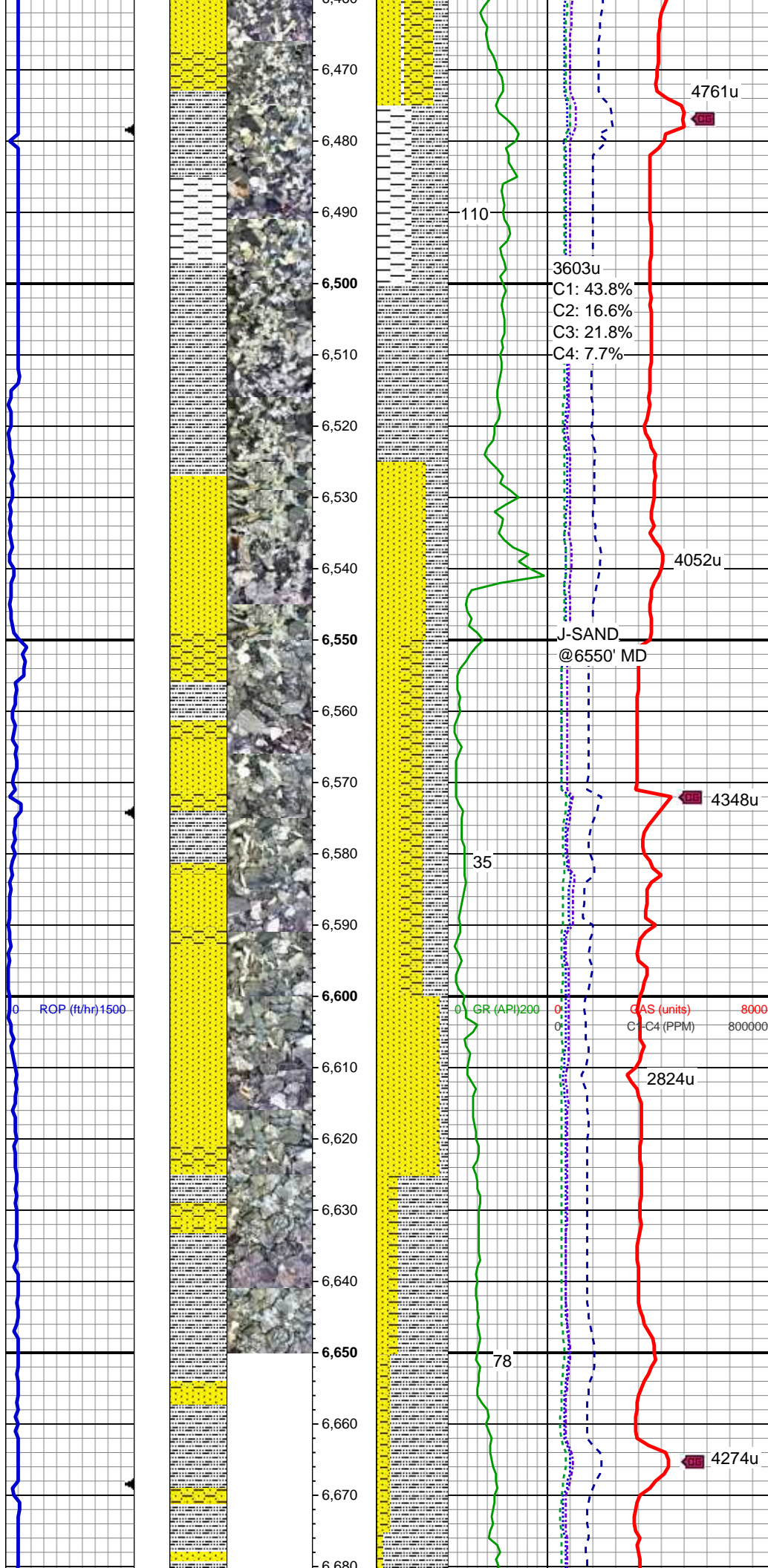
SLTY SH: med gy tr blk, plty - sb plty, sft,  
slty tex, sl fis, sl calc, tr bent

SS: wh - trnsl grns ip, occ s&p, f-med grn,  
p-mod srt, sft - fri, rnd - sb rd, tr bent  
SLTY SH: med gy tr blk, plty - sb plty, sft,  
rthy tex, sl fis

MD: 6,427'  
TVD: 6,426.38'  
Inclination: 0.72 °  
Azimuth: 137.78 °  
VS: 19.53'

D-SAND  
@6450' MD





SHY SS: lt gy - bf, sl s&p, vf - f gr, sft, sb  
rnd, p - mod srt, sl mics, arg cmt  
SS: wh-trnsl grns ip, occ s&p, f-med grn,  
p-mod srt, sft-fri, rnd - sb rd  
SLTY SH: lt - med gy, plty - sb plty, sft,  
vit lstr, slty tex, sl fis  
SH: dk gy - blk, plty, brit, fis, rthy - slty tex

MUD WT 9.10 VIS 37

MD: 6,522'  
TVD: 6,521.37'  
Inclination: 0.76 °  
Azimuth: 154.72 °  
VS: 18.52'

SS: wh - trnsl grns ip, predy unconcs, f -  
med grn, p - mod srt, sft - fri, rnd - sb rd,  
abnt bent, tr bitns frags  
SLTY SH: med gy tr blk, plty - sb plty, sft,  
slty tex, sl fis, tr sh

MUD WT 9.10 VIS 40

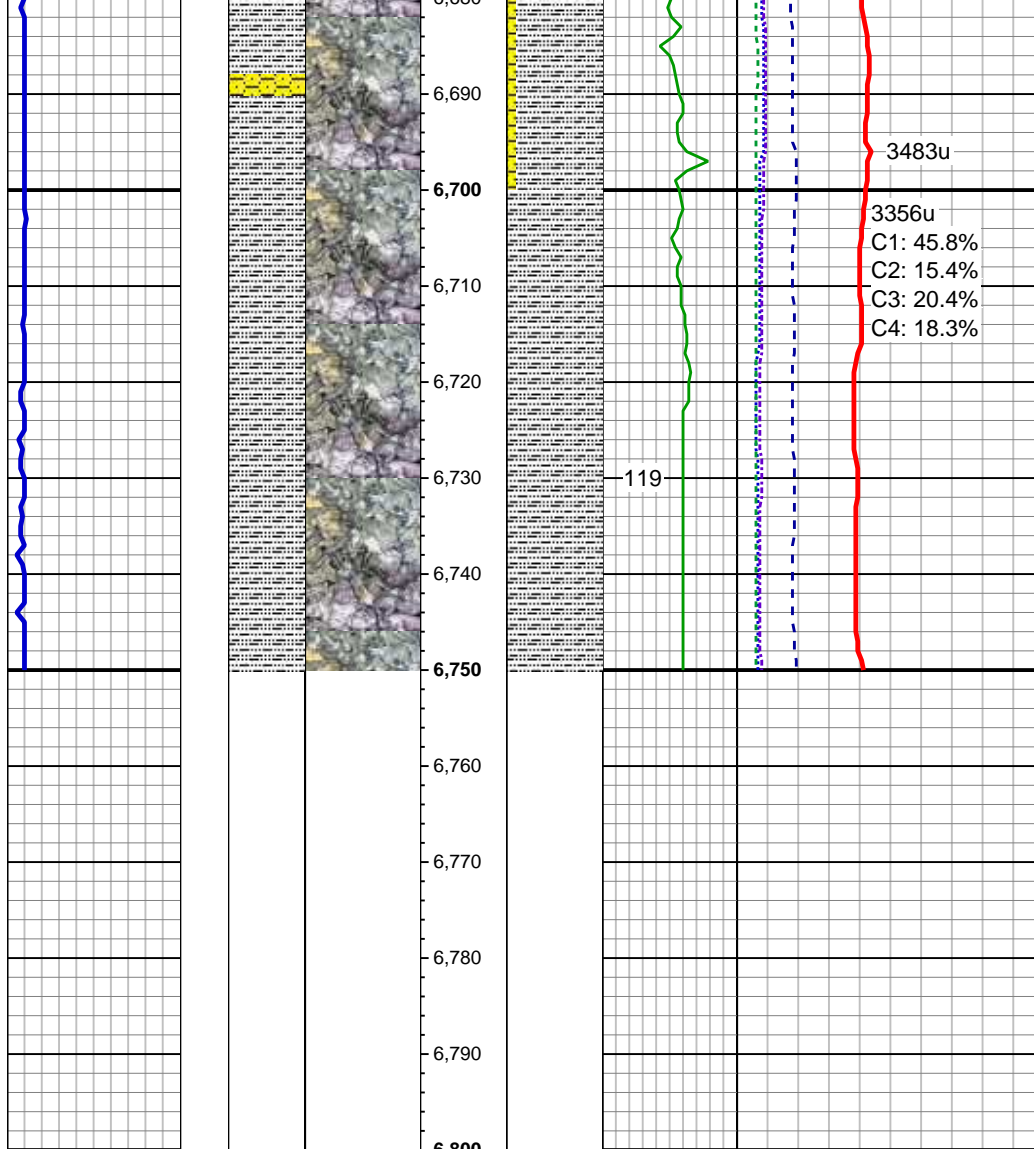
SS: wh - trnsl grns ip, occ unconcs, f -  
med grn, p - mod srt, sft - fri, rnd - sb rd,  
abnt bent, tr bitns frags  
SLTY SH: med gy tr blk, plty - sb plty, sft,  
slty tex, sl fis, tr sh  
SHY SS: lt gy - bf, sl s&p, vf - f gr, sft, sb  
rnd, p - mod srt, sl mics, arg cmt

MD: 6,617'  
TVD: 6,616.37'  
Inclination: 0.86 °  
Azimuth: 174.29 °  
VS: 17.23'

SS: wh - trnsl grns ip, occ unconcs, f -  
med grn, p - mod srt, sft - fri, rnd - sb rd, tr  
bent, tr bitns frags  
SLTY SH: med gy tr blk, plty - sb plty, sft,  
slty tex, sl fis, tr sh  
SHY SS: lt gy - bf, sl s&p, vf - f gr, sft, sb  
rnd, p - mod srt, sl mics, arg cmt

MUD WT 9.05 VIS 38

SLTY SH: med gy tr blk, plty - sb plty, sft,  
slty tex, sl fis, tr sh, rr bent  
SHY SS: lt gy - bf, sl s&p, vf - f gr, sft, sb  
rnd, p - mod srt, sl mics, arg cmt  
SS: wh - trnsl, grns ip, occ unconcs, f -  
med grn, p - mod srt, sft - fri, rnd - sb rd



MD: 6,698'  
TVD: 6,697.36'  
Inclination: 0.34 °  
Azimuth: 164.9 °  
VS: 16.39'

PROJECTED  
MD: 6,750'  
TVD: 6,749.36'  
Inclination: 0.34 °  
Azimuth: 164.9 °  
VS: 16.09'

NOBLE ENERGY INC.  
Lilli Federal LG13-02  
TD @ 6750'  
09/09/2014 @ 10:20 PM  
THANK YOU  
COLUMBINE LOGGING INC