

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Storis-E24-78-1HN(VERT)

**Location** SWSW SEC 24, T6N R65W

**State** COLORADO

**County** WELD

**Country** USA

**Rig Number** H&P 330

**API Number** 05-123-38162

**AFE #** 139621

**Region** DJ BASIN

**Field** WATTENBERG

**Spud Date** 5/5/2014

**Drilling Completed** 5/14/2014

**Surface Coordinates** 350' FSL 927' FWL

**Bottom Hole Coordinates** 4579.30' FNL 23.5' FWL

**Ground Elevation** 4,692'

**K.B. Elevation** 4,722'

**Logged Interval** 800 To 6161

**Total Depth** 6161

**Formation** NIOBRARA C CHALK

**Type of Drilling Fluid** LSND

## 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

MOHAMMED ALMUDARAK

## 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
BRACHIOIPOD
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
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
O INTEROOLITIC

### Moldic

O 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
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

A ANGULAR
R ROUNDED
S SUBANG
S SUBRND

### Textures

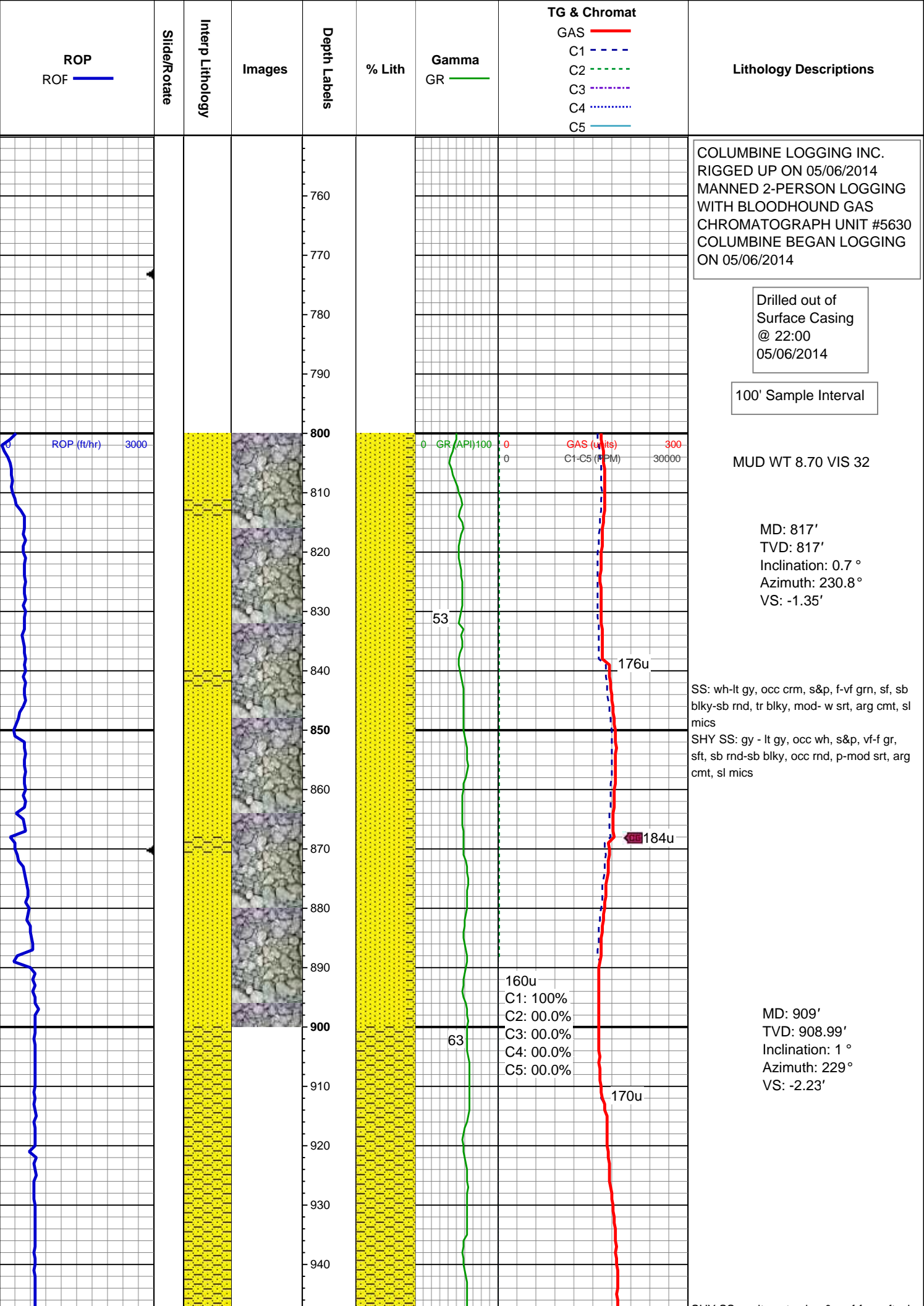
B BOUNDSTONE
C CHALKY
C CRYPTOXLN

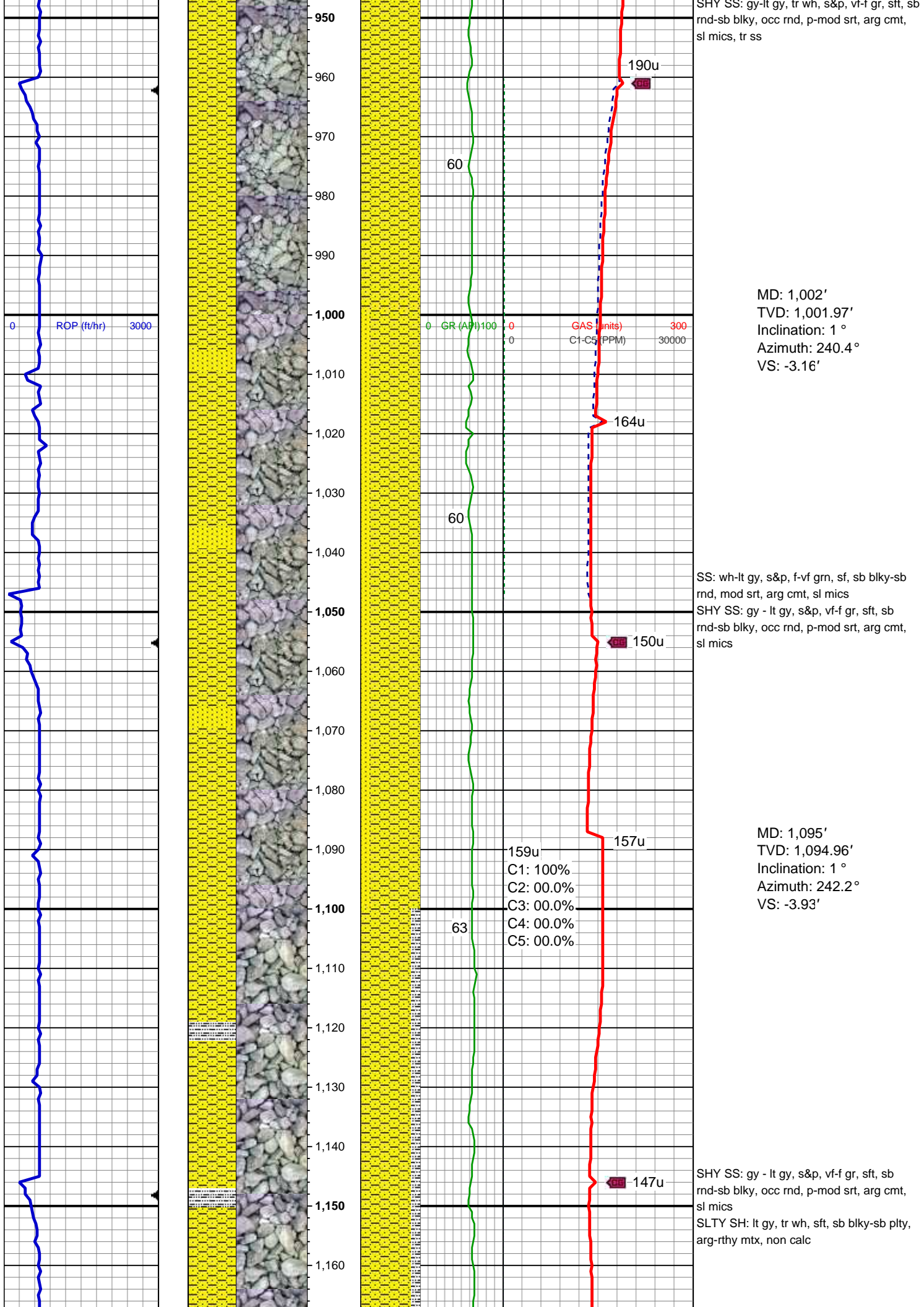
### Earthy

F FINELYXLN
G GRAINSTONE
L LITHOGRAPHIC
M MICROXLN
M MUDSTONE
P PACKSTONE
W WACKESTONE

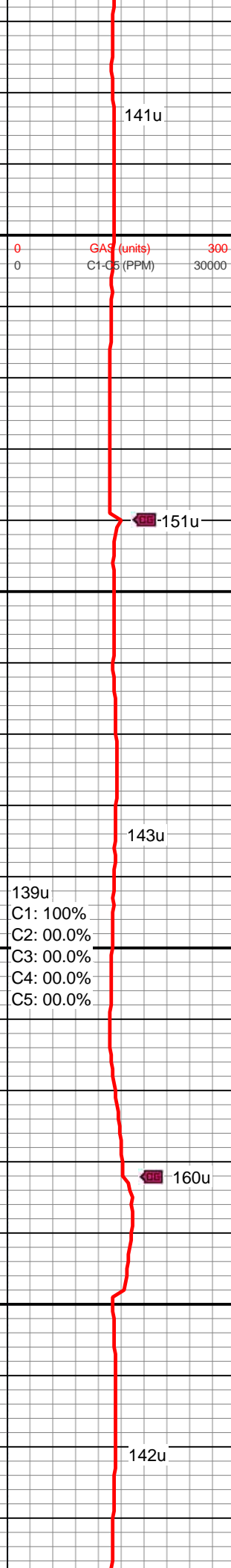
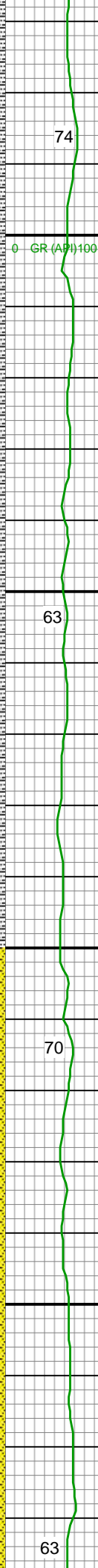
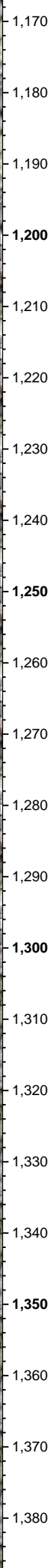
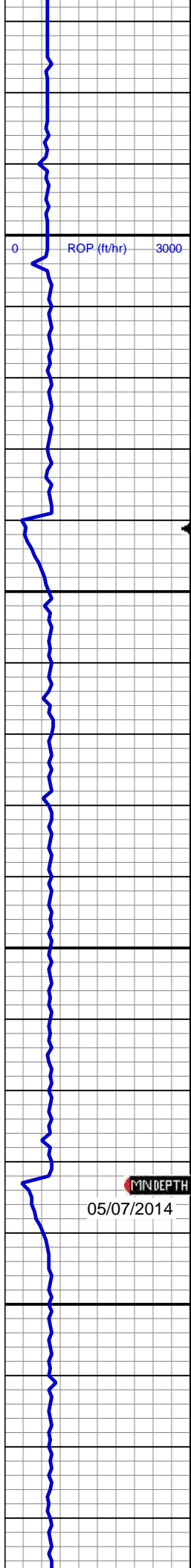
### Sorting

M MODERATE
P POOR
W WELL









MD: 1,188'  
TVD: 1,187.94'  
Inclination: 1 °  
Azimuth: 238.2 °  
VS: -4.74'

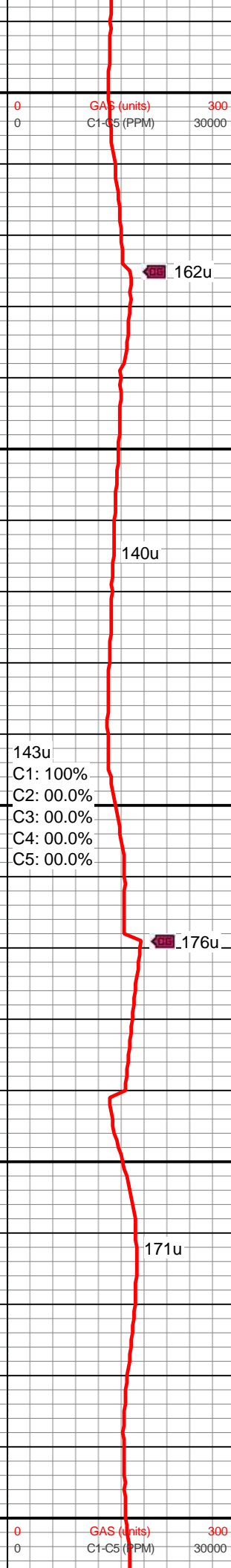
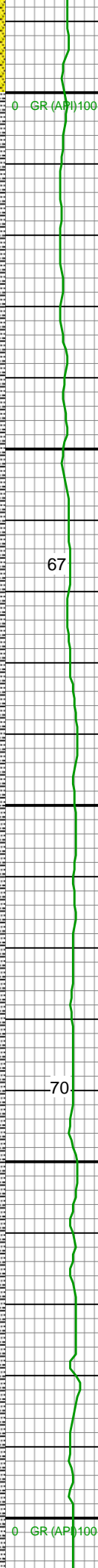
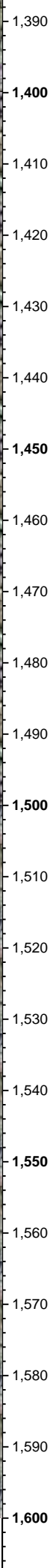
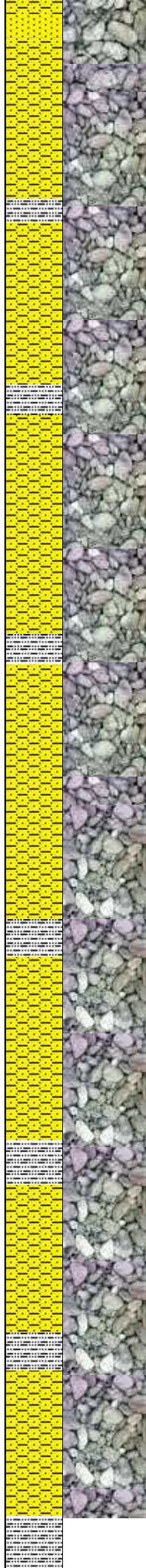
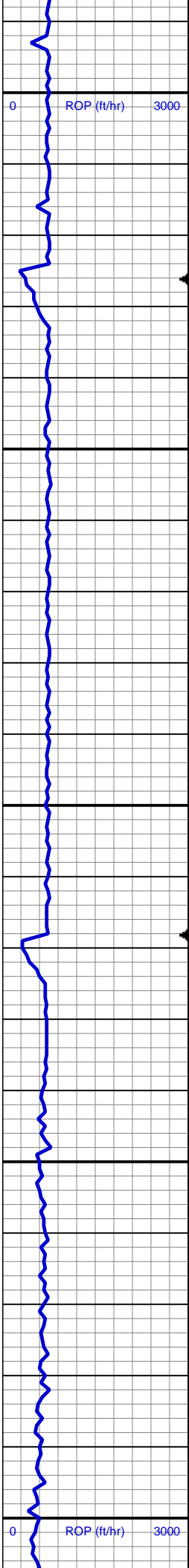
SHY SS: gy - lt gy, tr wh, s&p, vf-f gr, sft, sb rnd-sb blkly, occ rnd, p-mod srt, arg cmt  
SS: lt gy, tr wh-trnsl, s&p, vf-f gr, sb rnd-sb blkly, p-mod srt, tr glau  
SLTY SH: lt-med gy, sft, sb blkly-sb plty, arg-rthy mtx, non calc

MD: 1,280'  
TVD: 1,279.93'  
Inclination: 1.1 °  
Azimuth: 234.4 °  
VS: -5.67'

SHY SS: gy - lt gy, tr wh, s&p, vf-f gr, sft, sb rnd-sb blkly, tr rnd, p-mod srt, arg cmt  
SS: lt gy, tr wh-trnsl, s&p, vf-f gr, sb rnd-sb blkly, p-mod srt, occ glau

MD: 1,373'  
TVD: 1,372.91'  
Inclination: 1 °  
Azimuth: 237.3 °  
VS: -6.63'

MINDEPTH  
05/07/2014



SLTY SH: lt-med gy, sft, sb blkly-sb plty, v f grn, arg-rthy mtx, non calc

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

MD: 1,465'

TVD: 1,464.9'

Inclination: 1.1 °

Azimuth: 236.9 °

VS: -7.54'

MUD WT 8.90 VIS 32

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

SLTY SH: lt-med gy, sft, sb blkly-sb rnd, occ sb plty, v f grn, arg-rthy mtx, non calc

MD: 1,558'

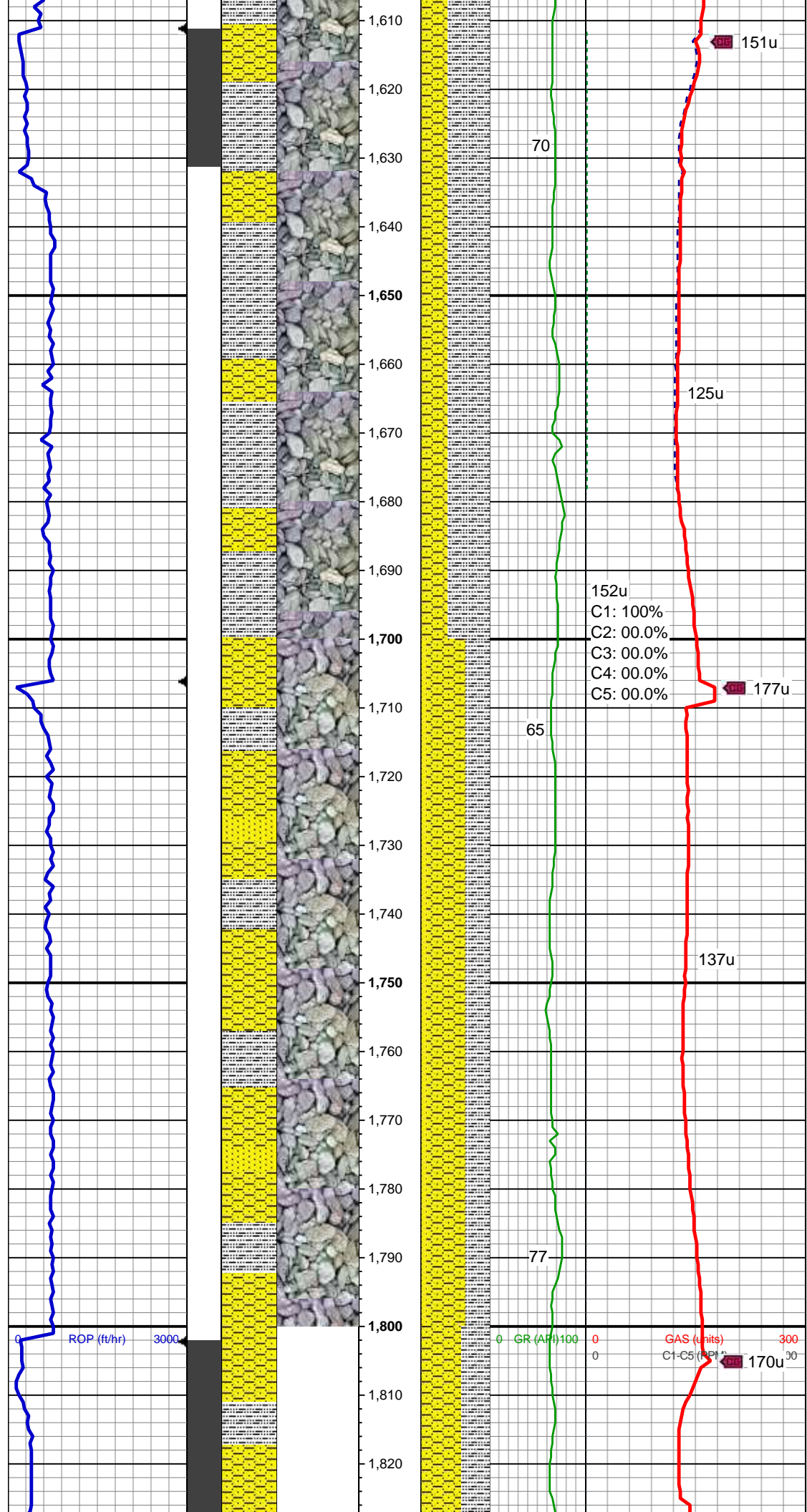
TVD: 1,557.88'

Inclination: 1 °

Azimuth: 240.3 °

VS: -8.43'





MD: 1,653'  
TVD: 1,652.86'  
Inclination: 1.5 °  
Azimuth: 166.2 °  
VS: -10.05'

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

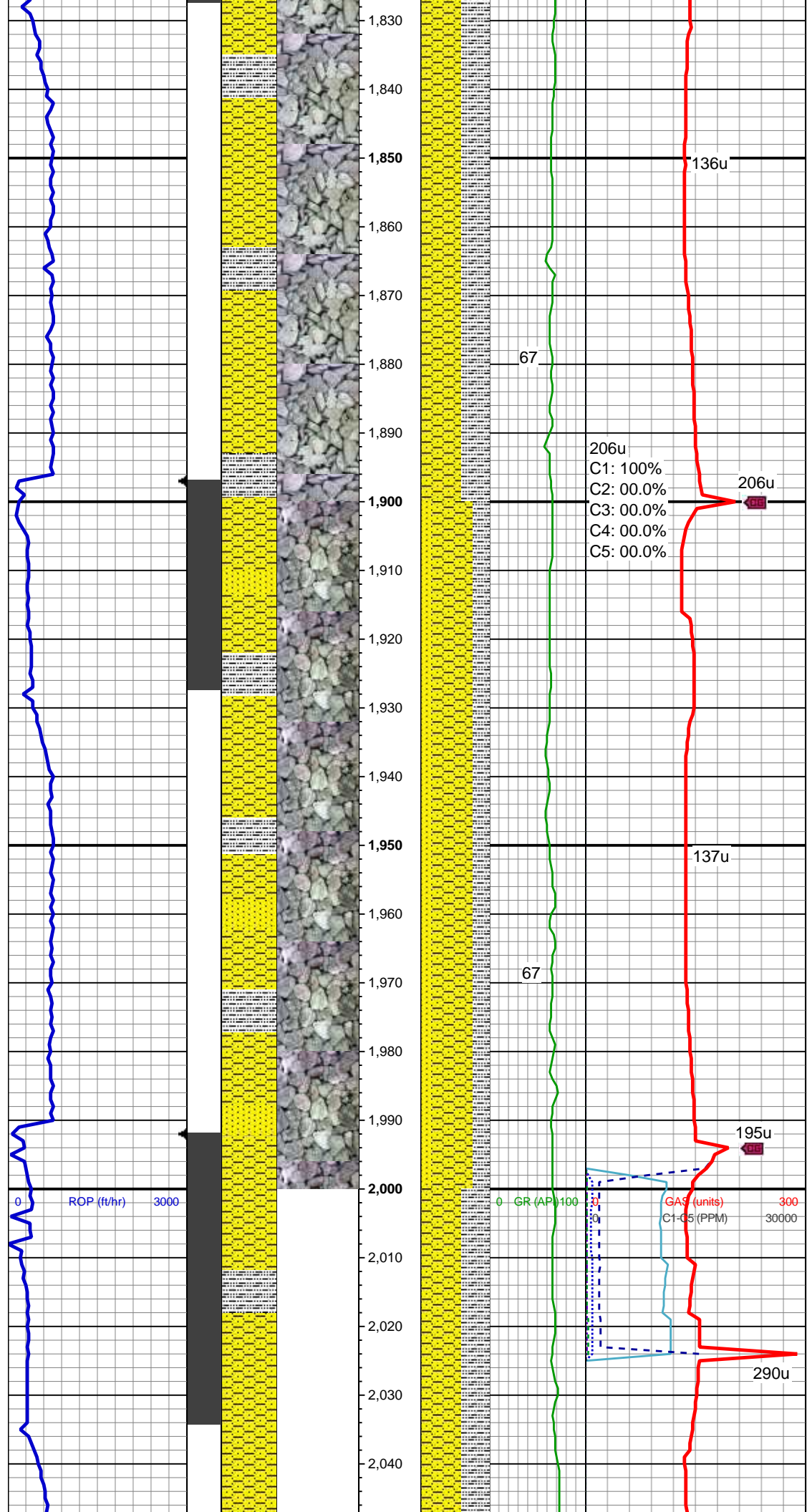
152u  
C1: 100%  
C2: 00.0%  
C3: 00.0%  
C4: 00.0%  
C5: 00.0%

MD: 1,749'  
TVD: 1,748.83'  
Inclination: 1.5 °  
Azimuth: 149.6 °  
VS: -12.35'

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

MUD WT 9.0 VIS 32

MD: 1,844'  
TVD: 1,843.77'



TVD: 1,843.77'  
Inclination: 2.7 °  
Azimuth: 135.1 °  
VS: -15.02'

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

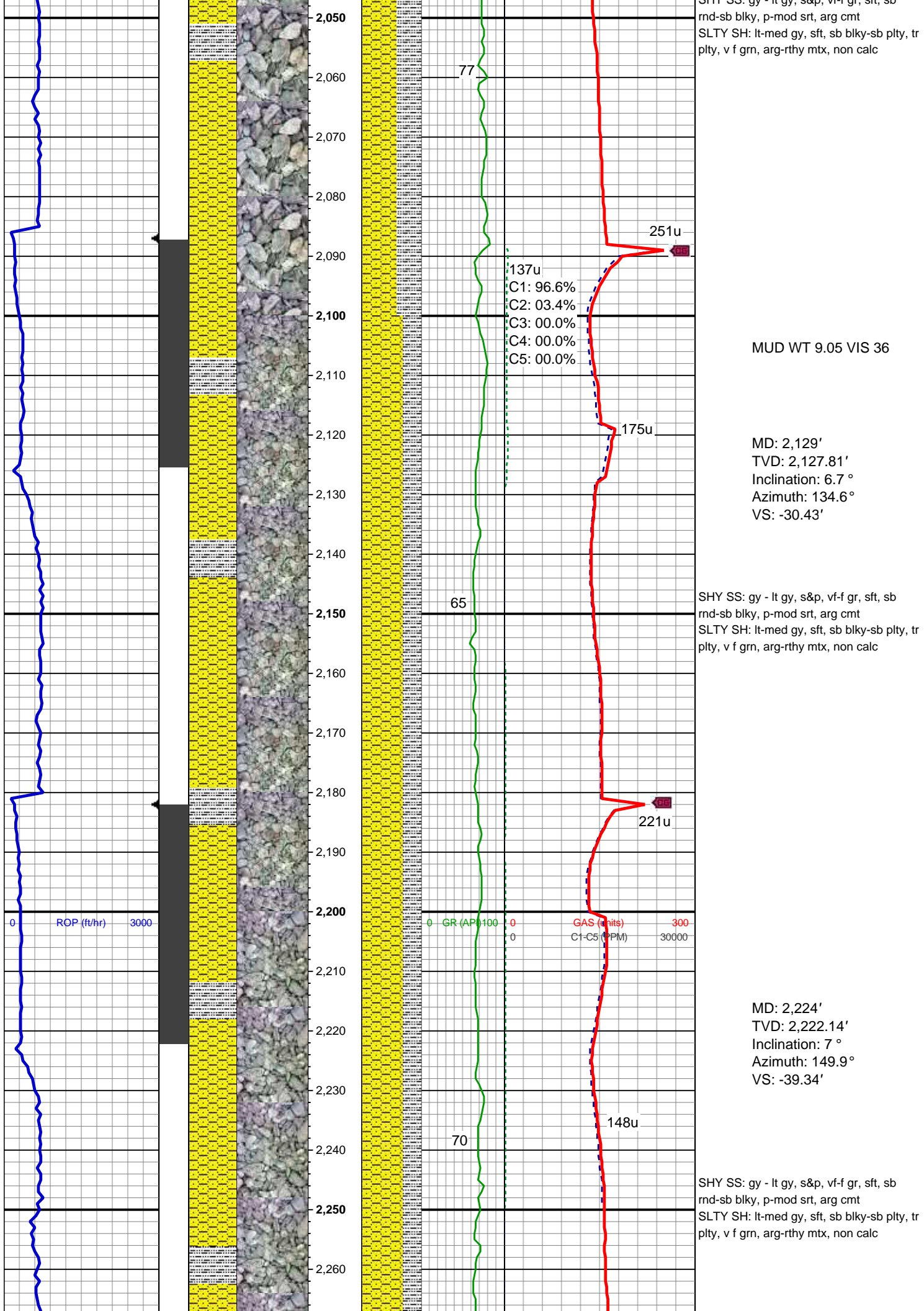
MD: 1,939'  
TVD: 1,938.6'  
Inclination: 4 °  
Azimuth: 136.6 °  
VS: -19.01'

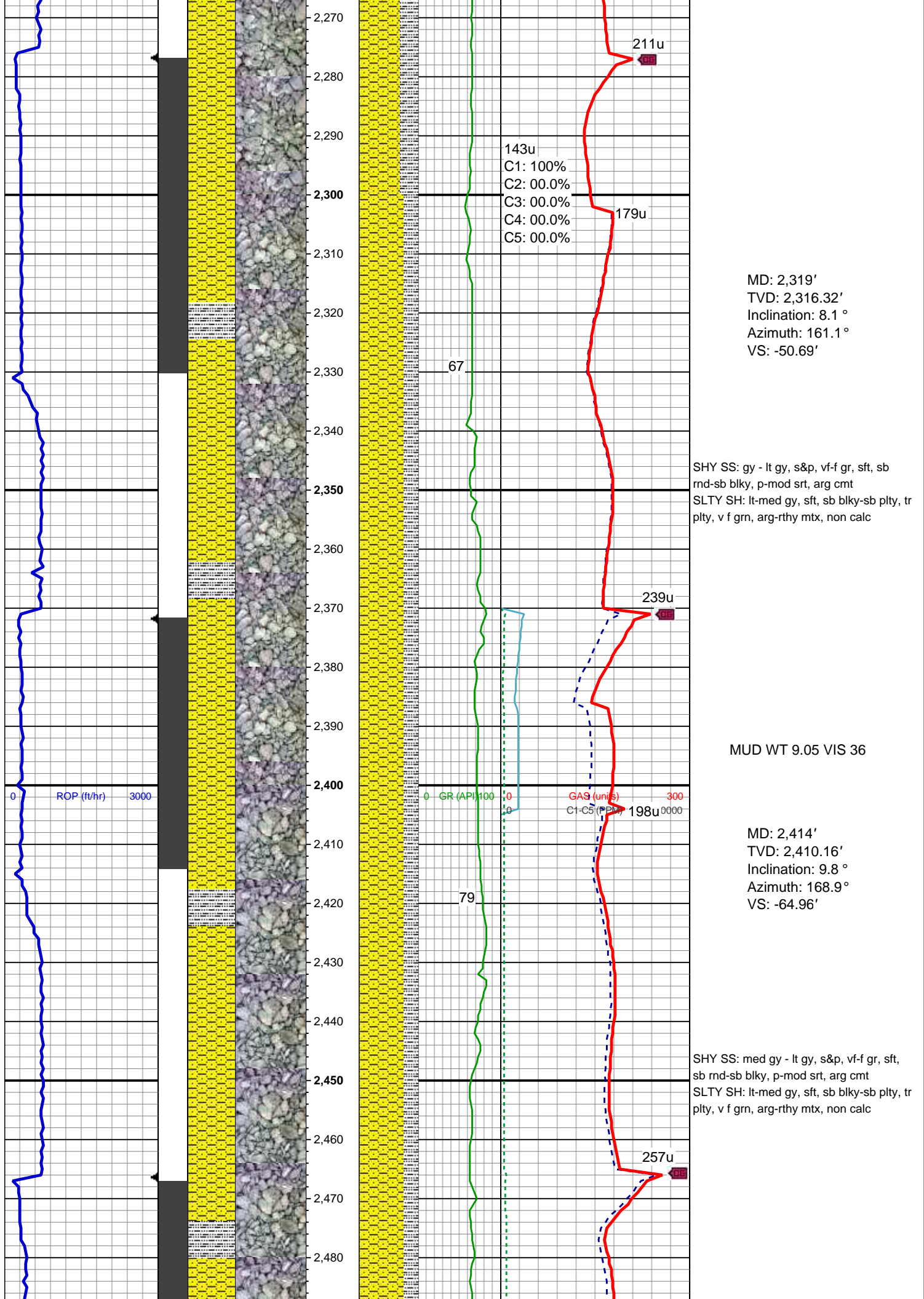
SHY SS: gy - lt gy, s&p, vf-f gr, sft, sb  
rnd-sb blk, tr rnd, p-mod srt, arg cmt  
SLTY SH: lt-med gy, sft, sb blk-sb plty, v  
f grn, arg-rthy mtx, non calc  
SS: wh - lt gy, tr wh-trnsl, s&p, vf-f gr, sb  
rnd-sb blk, p-mod srt

MD: 2,034'  
TVD: 2,033.31'  
Inclination: 5 °  
Azimuth: 128 °  
VS: -23.98'

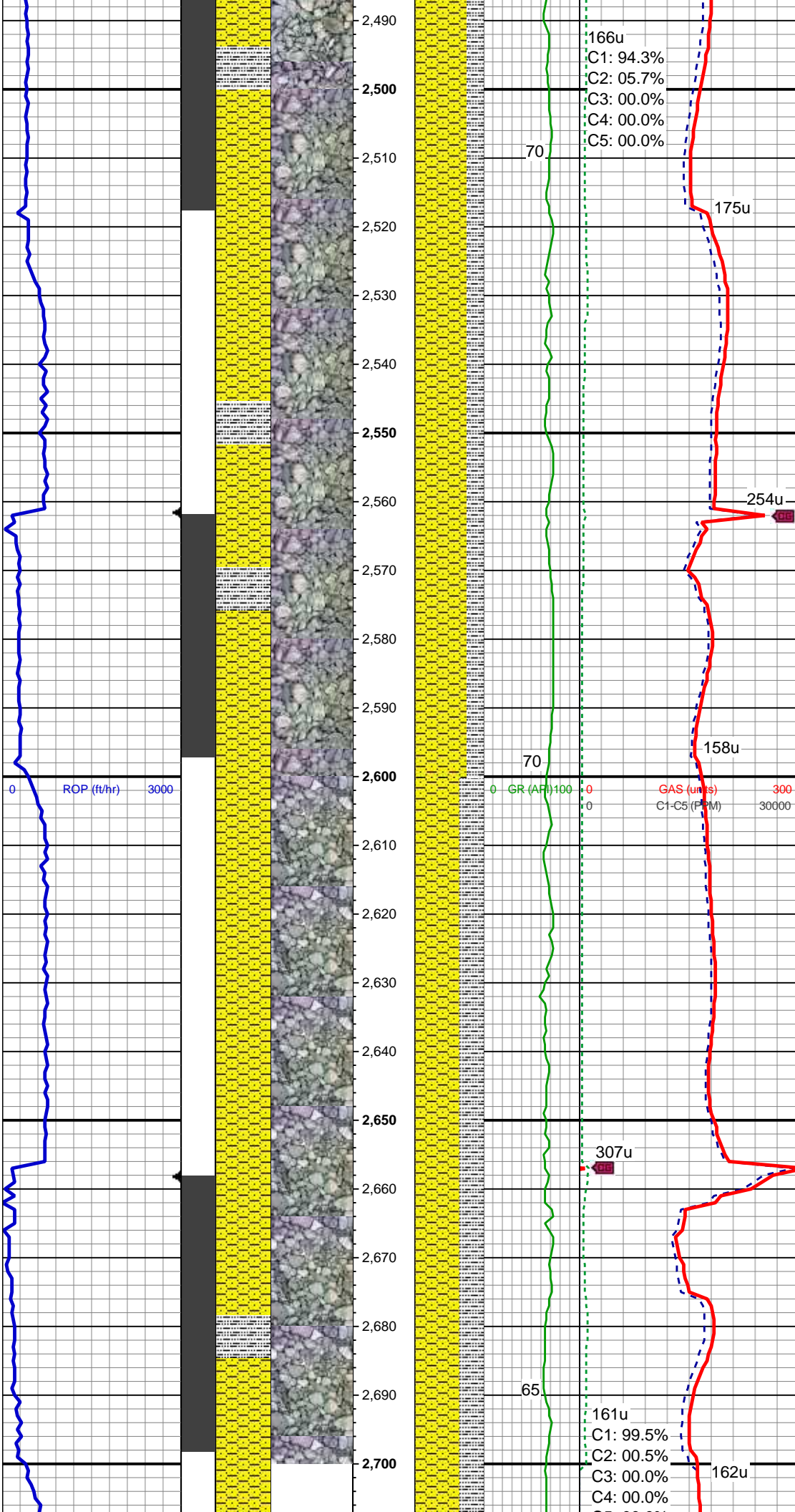
SHY SS: gy - lt gy, s&p, vf-f gr, sft, sb











MD: 2,509'  
TVD: 2,503.49'  
Inclination: 11.7 °  
Azimuth: 170 °  
VS: -82.38'

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

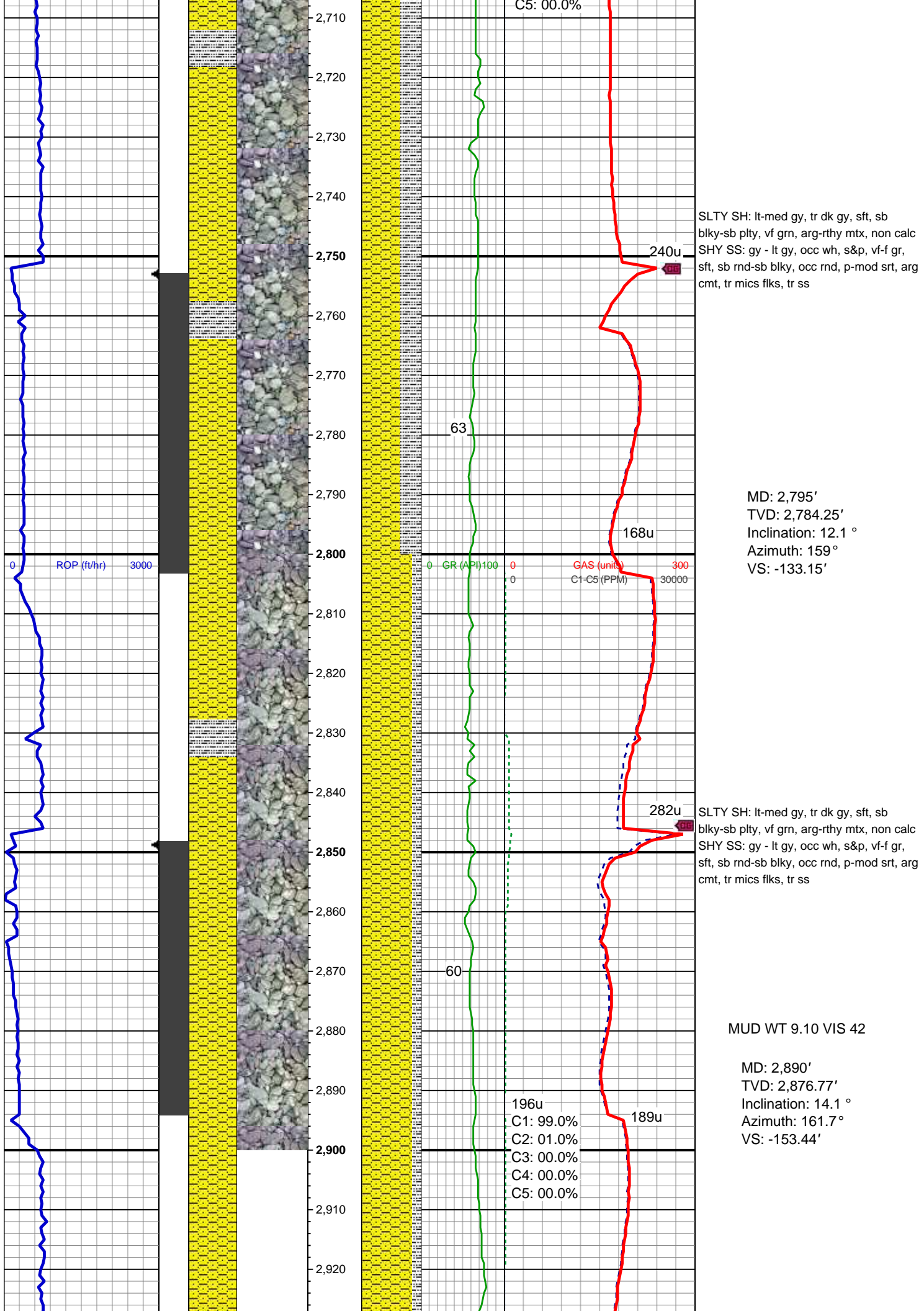
MD: 2,605'  
TVD: 2,597.71'  
Inclination: 10.5 °  
Azimuth: 159.3 °  
VS: -100.16'

MUD WT 9.10 VIS 40

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

MD: 2,700'  
TVD: 2,691.1'  
Inclination: 10.6 °  
Azimuth: 153 °  
VS: -116.06'





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

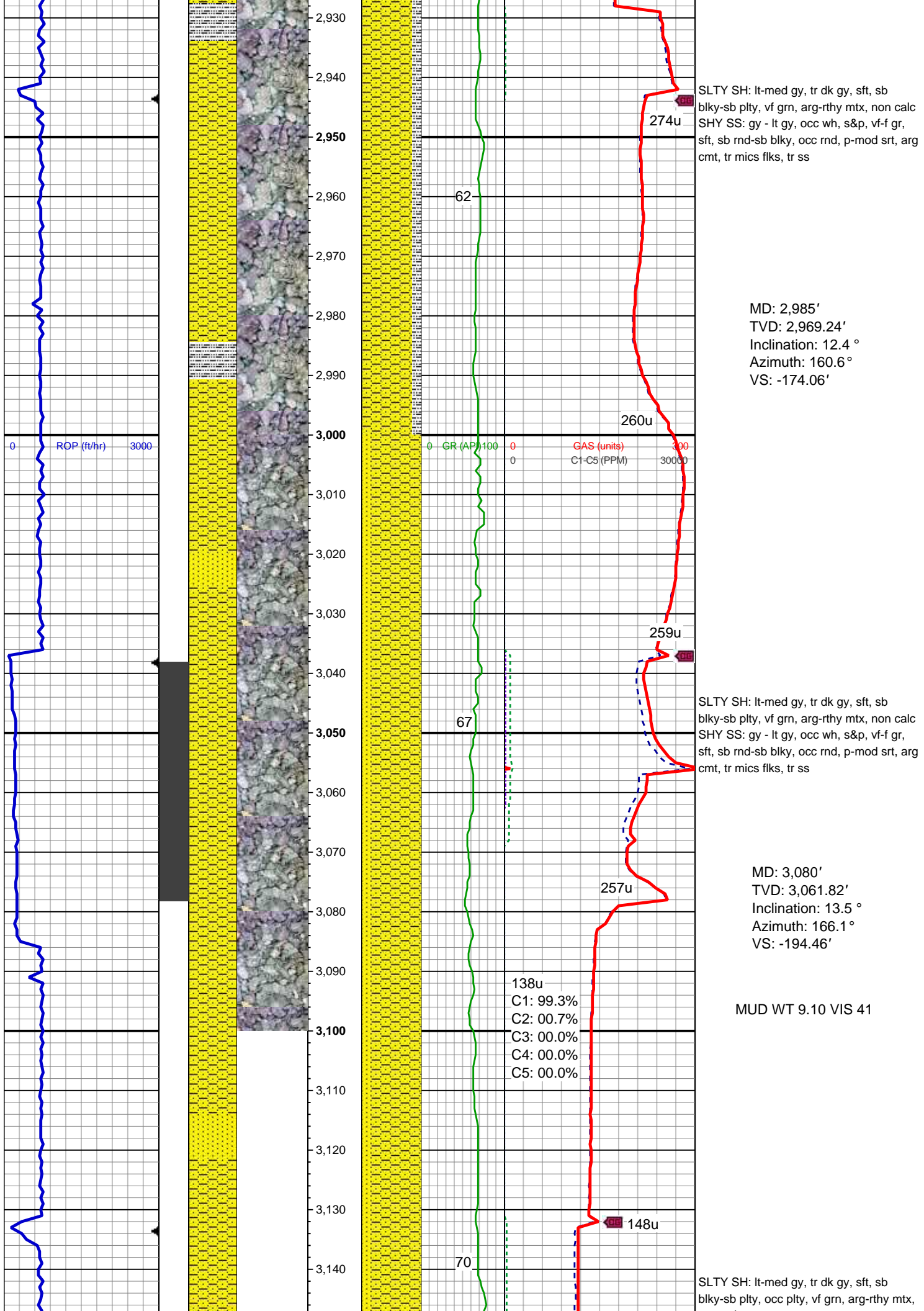
MD: 2,795'  
TVD: 2,784.25'  
Inclination: 12.1 °  
Azimuth: 159 °  
VS: -133.15'

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

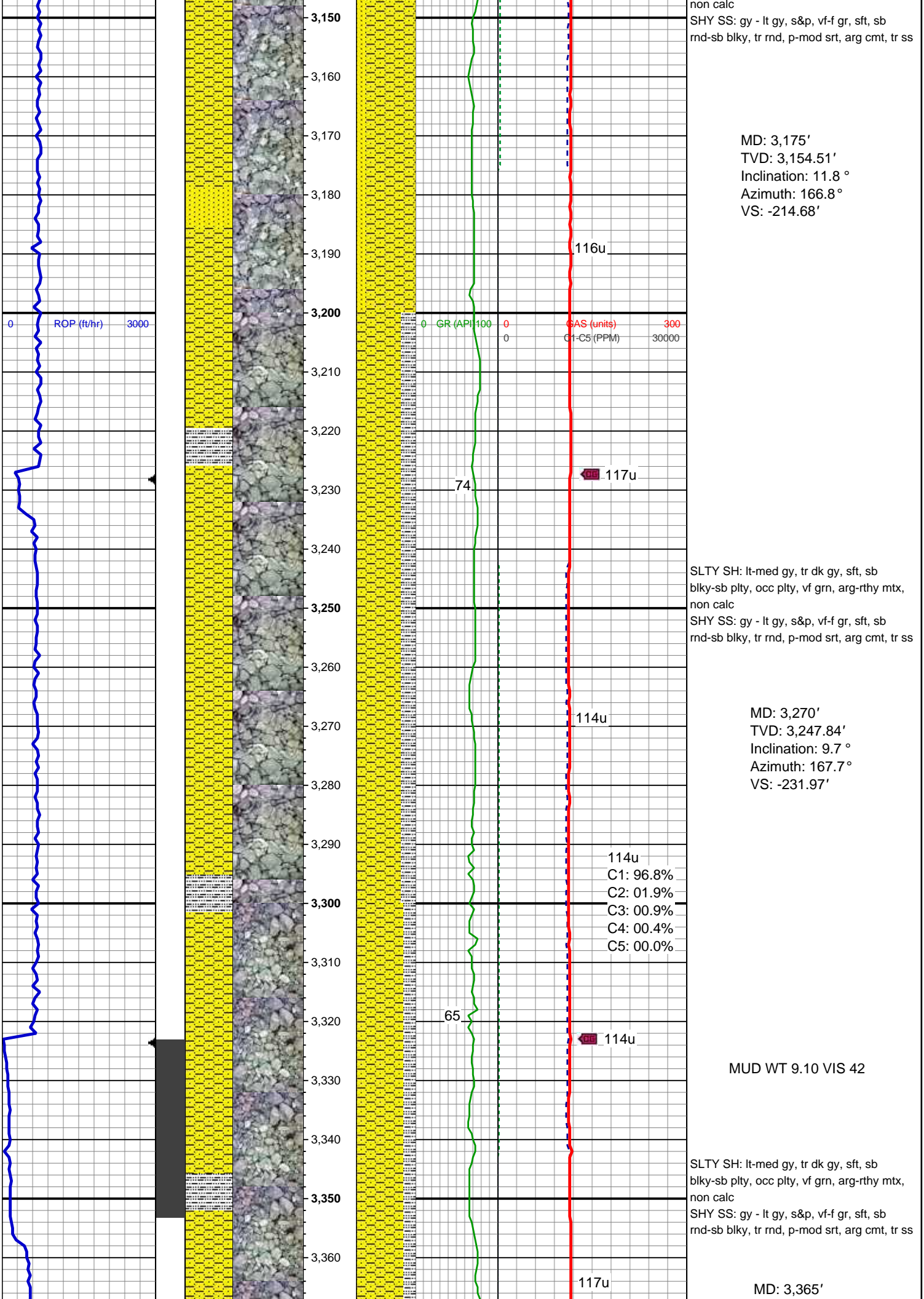
MUD WT 9.10 VIS 42

MD: 2,890'  
TVD: 2,876.77'  
Inclination: 14.1 °  
Azimuth: 161.7 °  
VS: -153.44'

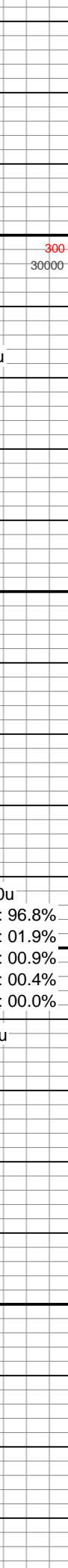
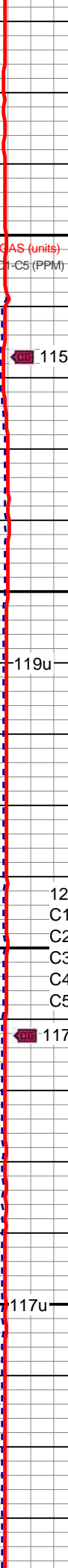
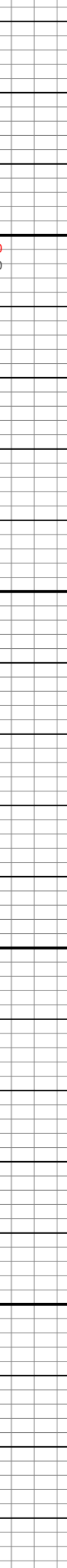
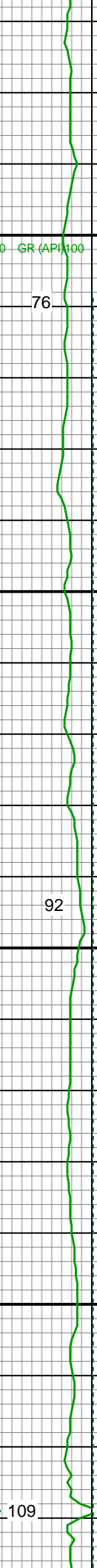
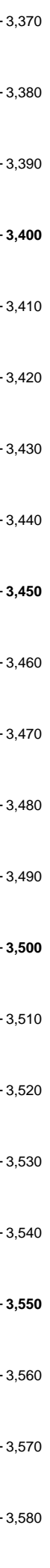
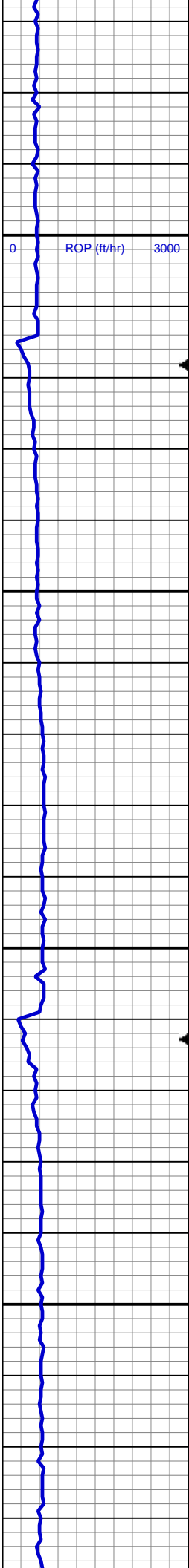
196u  
C1: 99.0%  
C2: 01.0%  
C3: 00.0%  
C4: 00.0%  
C5: 00.0%











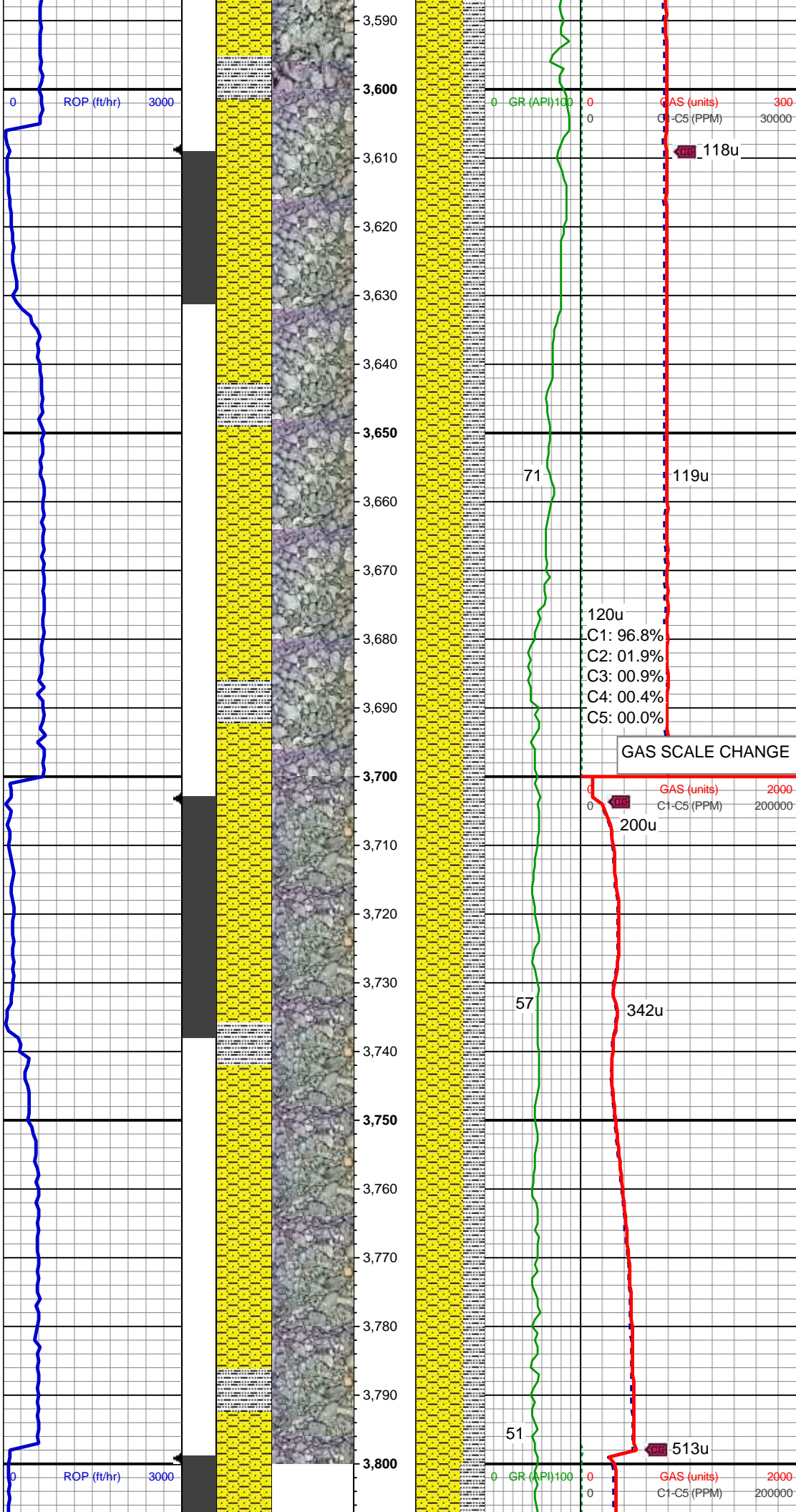
TVD: 3,341.74'  
Inclination: 7.8 °  
Azimuth: 181.7°  
VS: -246.24'

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

MD: 3,460'  
TVD: 3,436.03'  
Inclination: 6.2 °  
Azimuth: 183.8°  
VS: -257.8'

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

MD: 3,556'  
TVD: 3,531.6'  
Inclination: 4.7 °  
Azimuth: 195.4°  
VS: -266.76'



MD: 3,650'  
TVD: 3,625.38'  
Inclination: 3.1 °  
Azimuth: 205.8 °  
VS: -272.76'

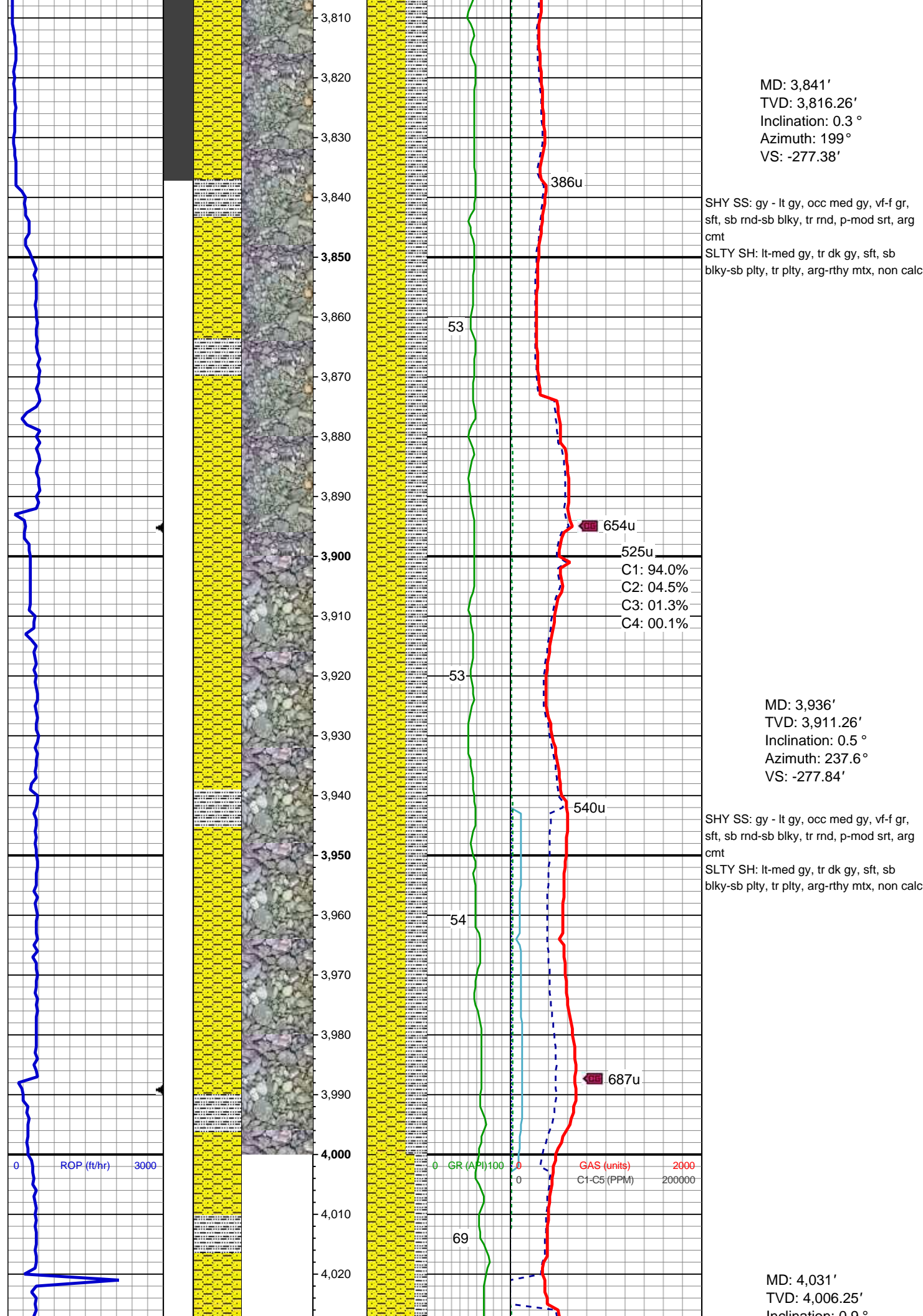
SLTY SH: lt-med gy, tr dk gy, sft, sb  
blk-y-sb plty, occ plty, vf grn, arg-rthy mtx,  
non calc  
SHY SS: gy - lt gy, s&p, vf-f gr, sft, sb  
rnd-sb blk-y, tr rnd, p-mod srt, arg cmt, tr ss

MD: 3,746'  
TVD: 3,721.28'  
Inclination: 2 °  
Azimuth: 231.9 °  
VS: -276.13'

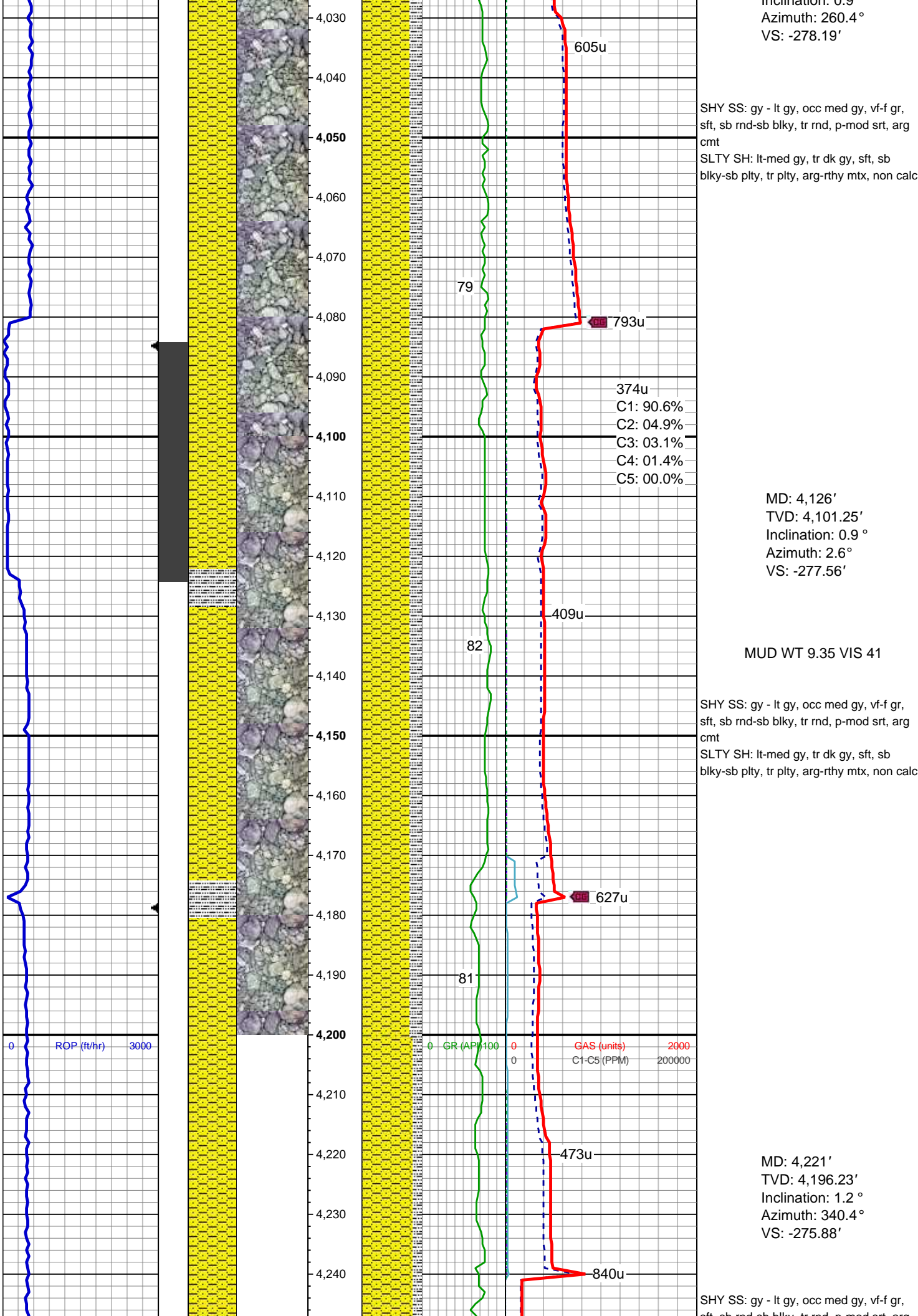
SLTY SH: lt-med gy, tr dk gy, sft, sb  
blk-y-sb plty, occ plty, vf grn, arg-rthy mtx,  
non calc  
SHY SS: gy - lt gy, s&p, vf-f gr, sft, sb  
rnd-sb blk-y, tr rnd, p-mod srt, arg cmt, tr ss

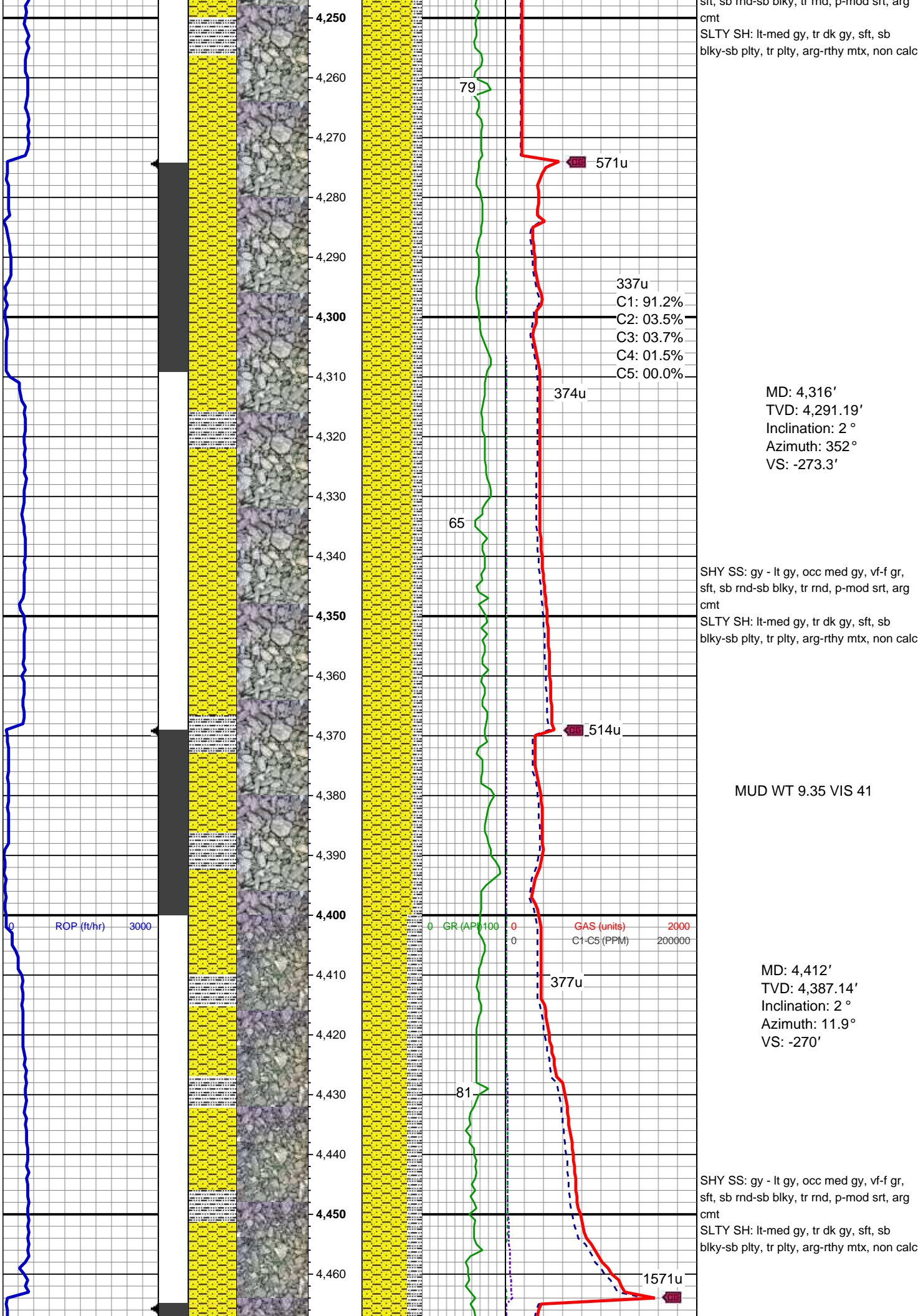
MUD WT 9.25 VIS 44



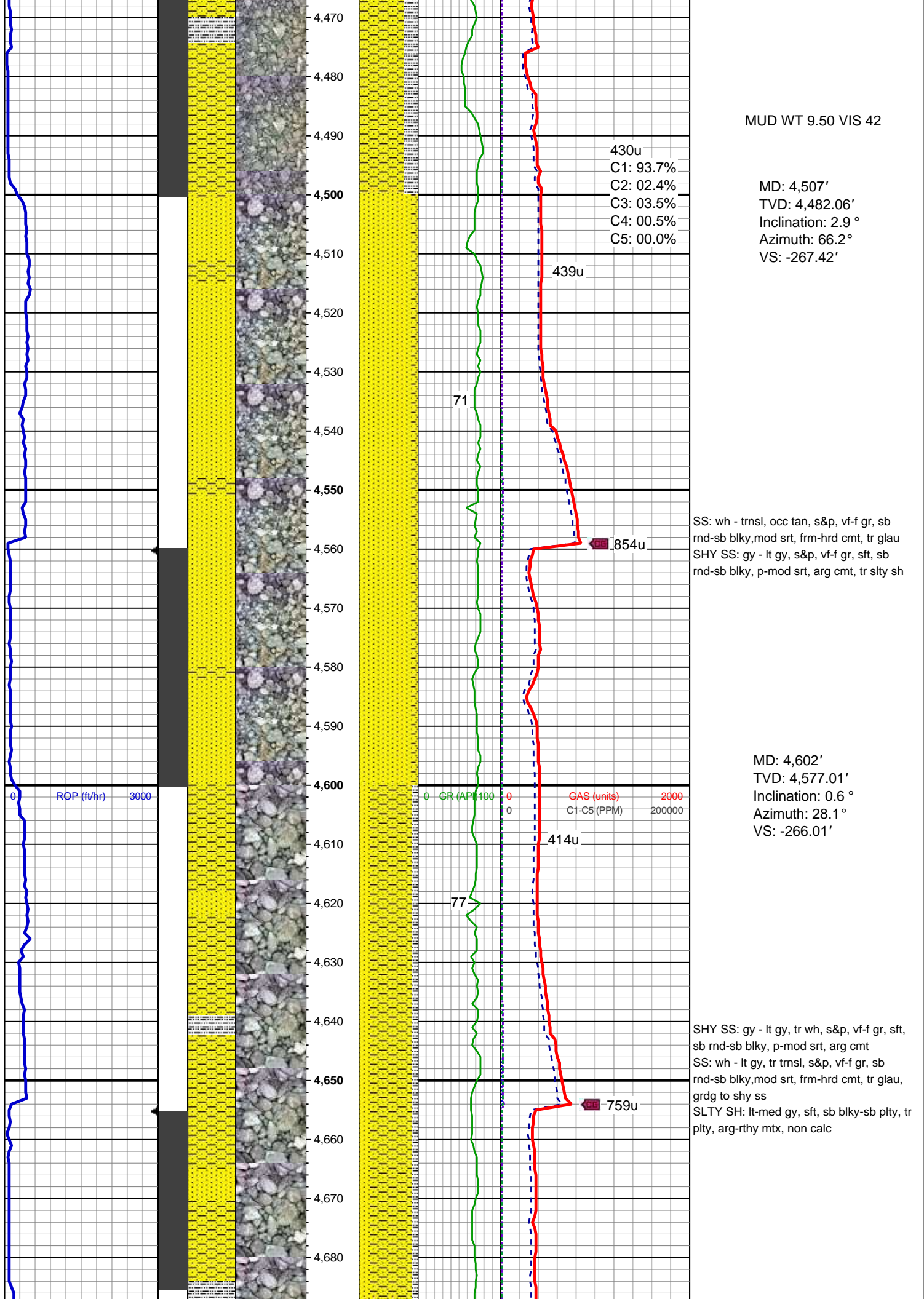




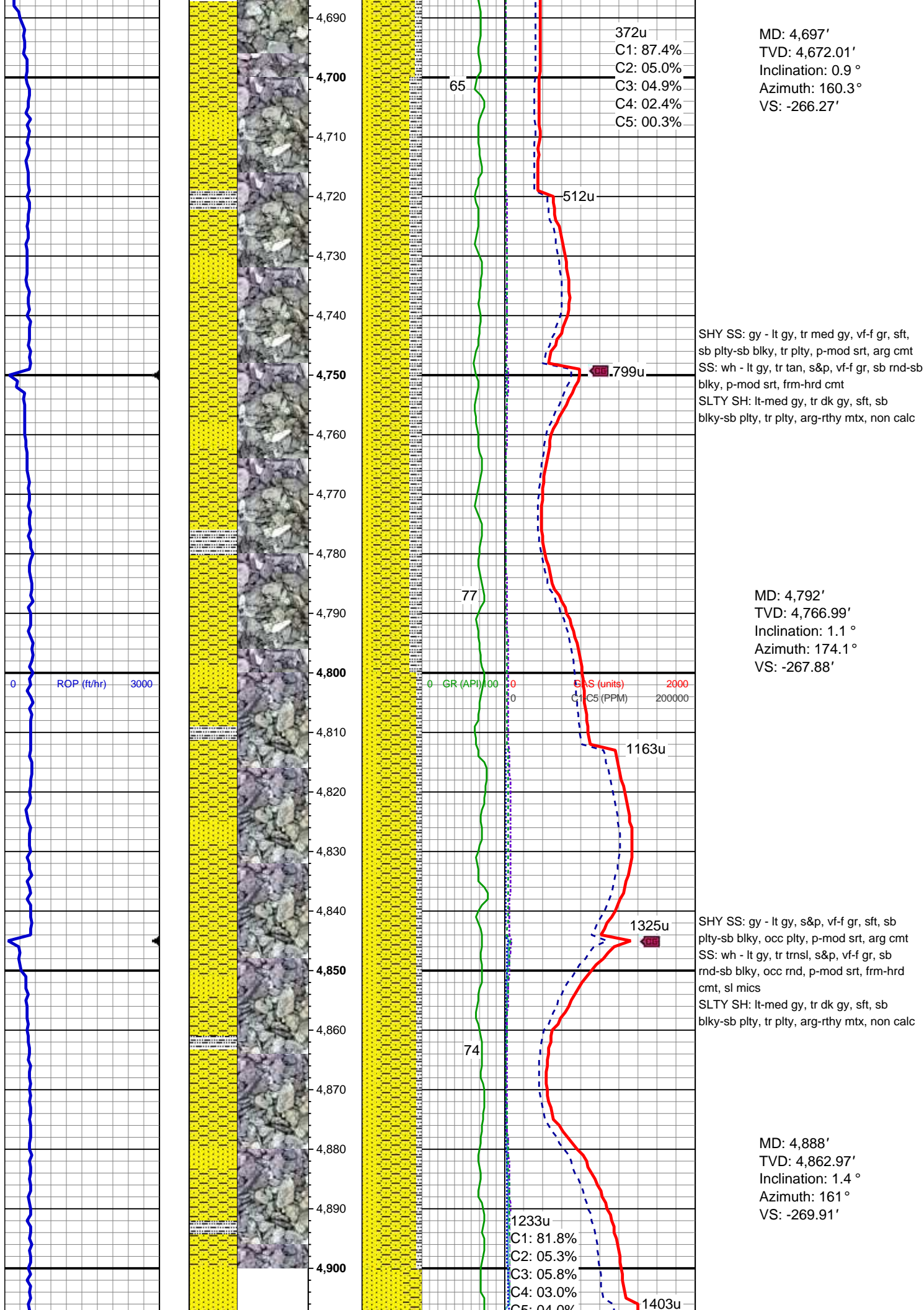


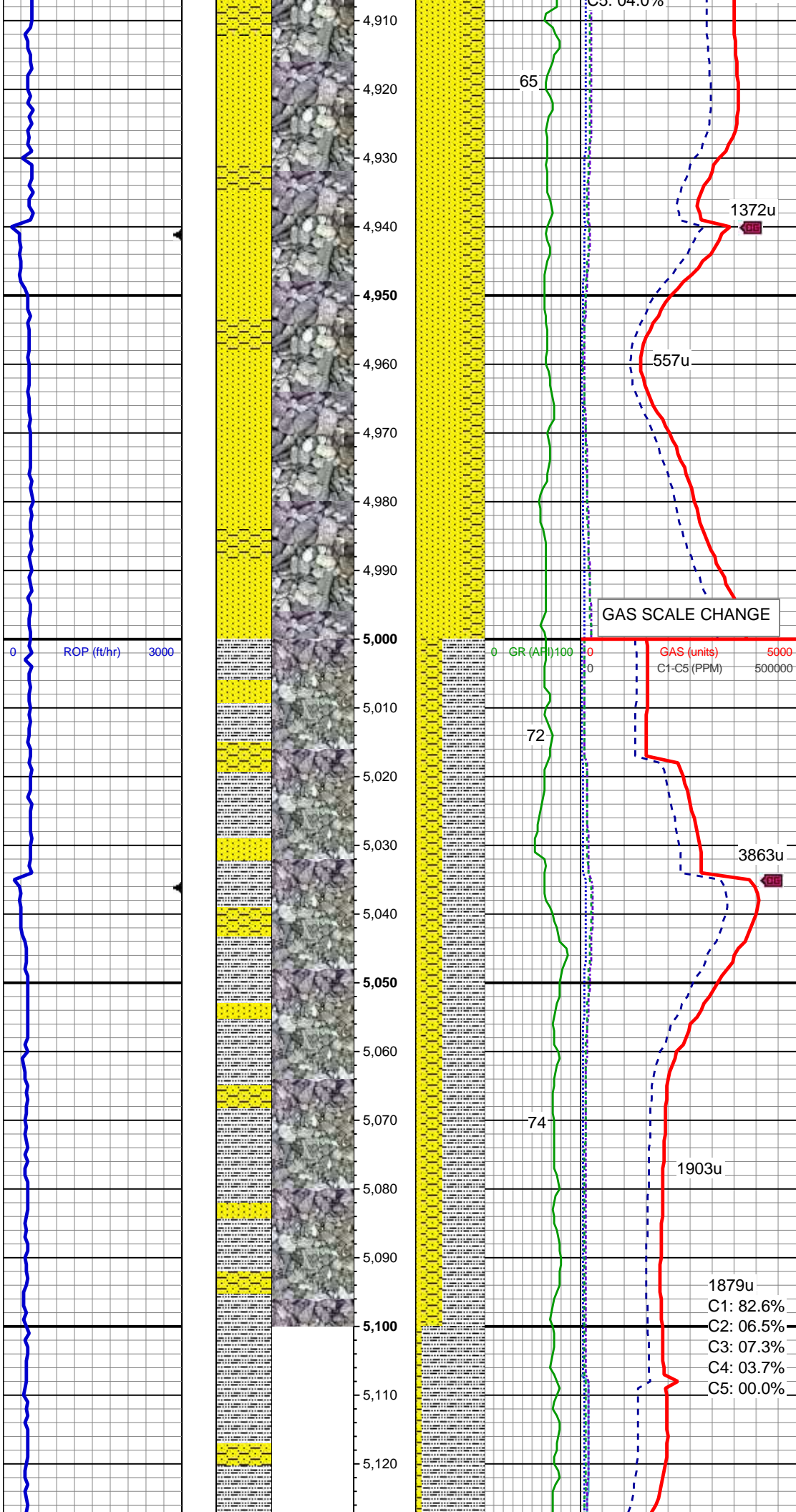












SS: wh - lt gy, tr tan & trnsl, vf-f gr, sb  
rnd-sb blkly, p-mod srt, frm-hrd cmt  
SHY SS: gy - lt gy, tr med gy, vf-f gr, sft,  
sb plty-sb blkly, tr plty, p-mod srt, arg cmt,  
tr slty sh

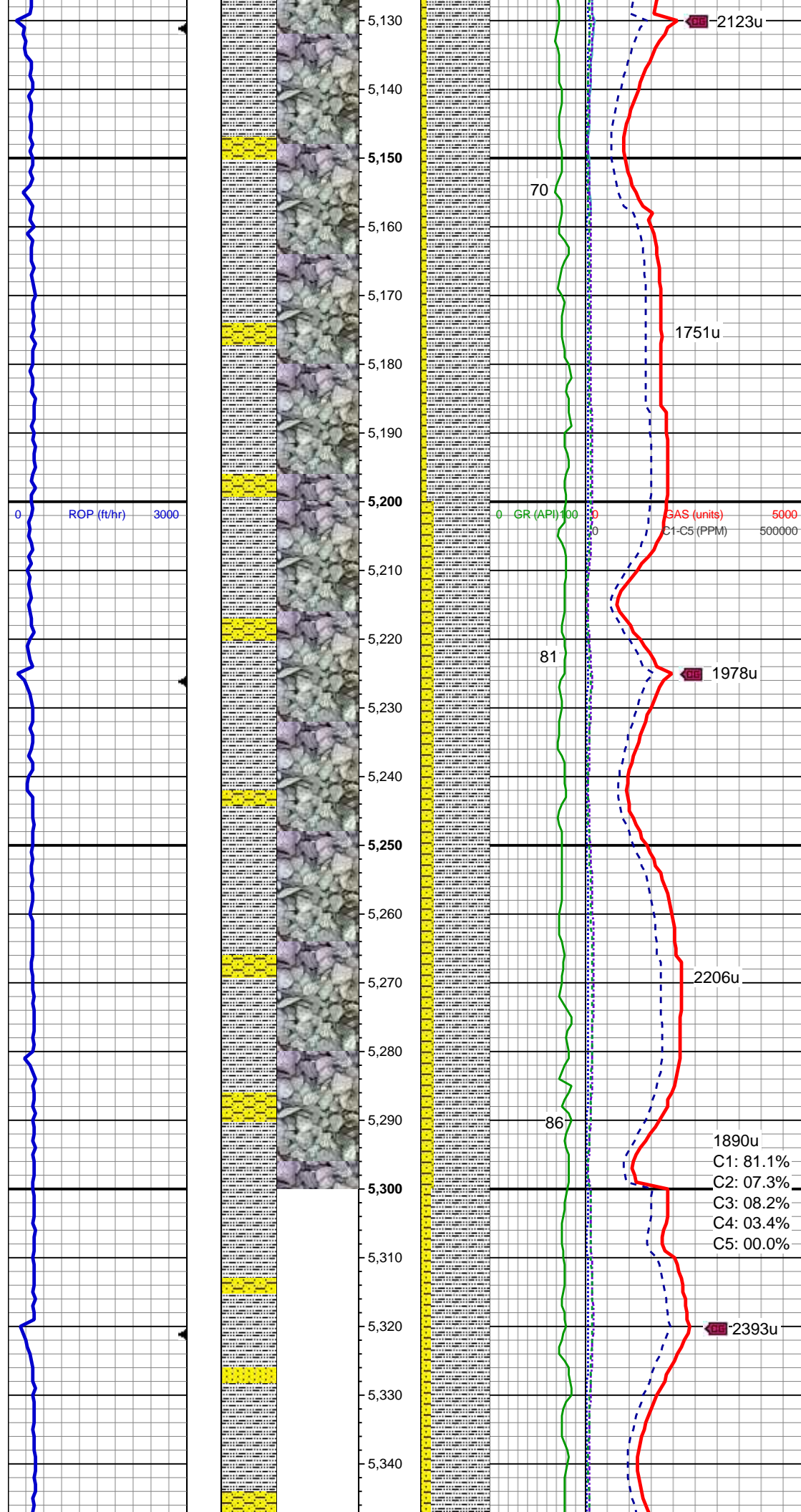
MD: 4,983'  
TVD: 4,957.94'  
Inclination: 1.4 °  
Azimuth: 165 °  
VS: -272.13'

SLTY SH: lt-med gy, sft, sb blkly-sb plty, tr  
plty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, s&p, vf-f gr, sft, sb  
plty-sb blkly, tr plty, p-mod srt, arg cmt  
SS: wh - lt gy, tr trnsl, s&p, vf-f gr, sb  
rnd-sb blkly, mod - w srt, sl mics, tr glau

MD: 5,078'  
TVD: 5,052.92'  
Inclination: 1.1 °  
Azimuth: 169.5 °  
VS: -274.15'

1879u  
C1: 82.6%  
C2: 06.5%  
C3: 07.3%  
C4: 03.7%  
C5: 00.0%





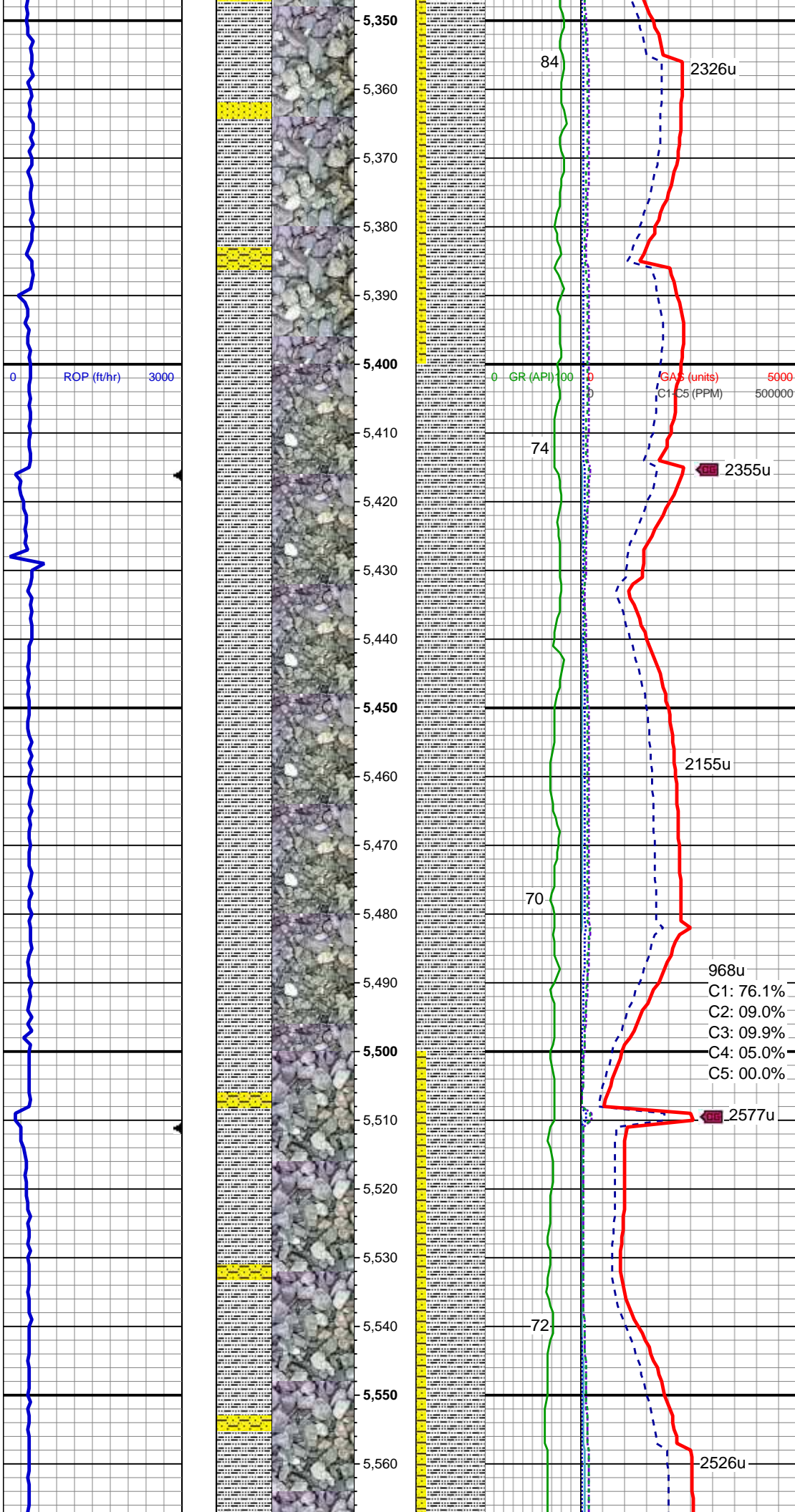
SLTY SH: lt-med gy, sft, sb blkly-sb plty, occ plty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, vf-f gr, sft, sb blkly-sb plty, mod srt, arg cmt, tr ss

MD: 5,173'  
TVD: 5,147.91'  
Inclination: 0.8°  
Azimuth: 169°  
VS: -275.7'

SLTY SH: lt-med gy, sft, sb blkly-sb plty, occ plty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, vf-f gr, sft, sb blkly-sb plty, tr plty, w- mod srt, arg cmt, tr ss

MD: 5,268'  
TVD: 5,242.9'  
Inclination: 0.5°  
Azimuth: 173.1°  
VS: -276.76'

SLTY SH: lt-med gy, sft, sb blkly-sb plty, occ plty, arg-rthy mtx, non calc



SHY SS: gy - lt gy, vf-f gr, sft, sb plty-sb  
blkly, tr plty, mod srt, arg cmt, sl mics  
SS: wh - lt gy, s&p, vf-f gr, sb rnd-sb blkly,  
mod srt, tr glau, sl mics

MD: 5,363'  
TVD: 5,337.9'  
Inclination: 0.2 °  
Azimuth: 246.4 °  
VS: -277.24'

MUD WT 9.65 VIS 37

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

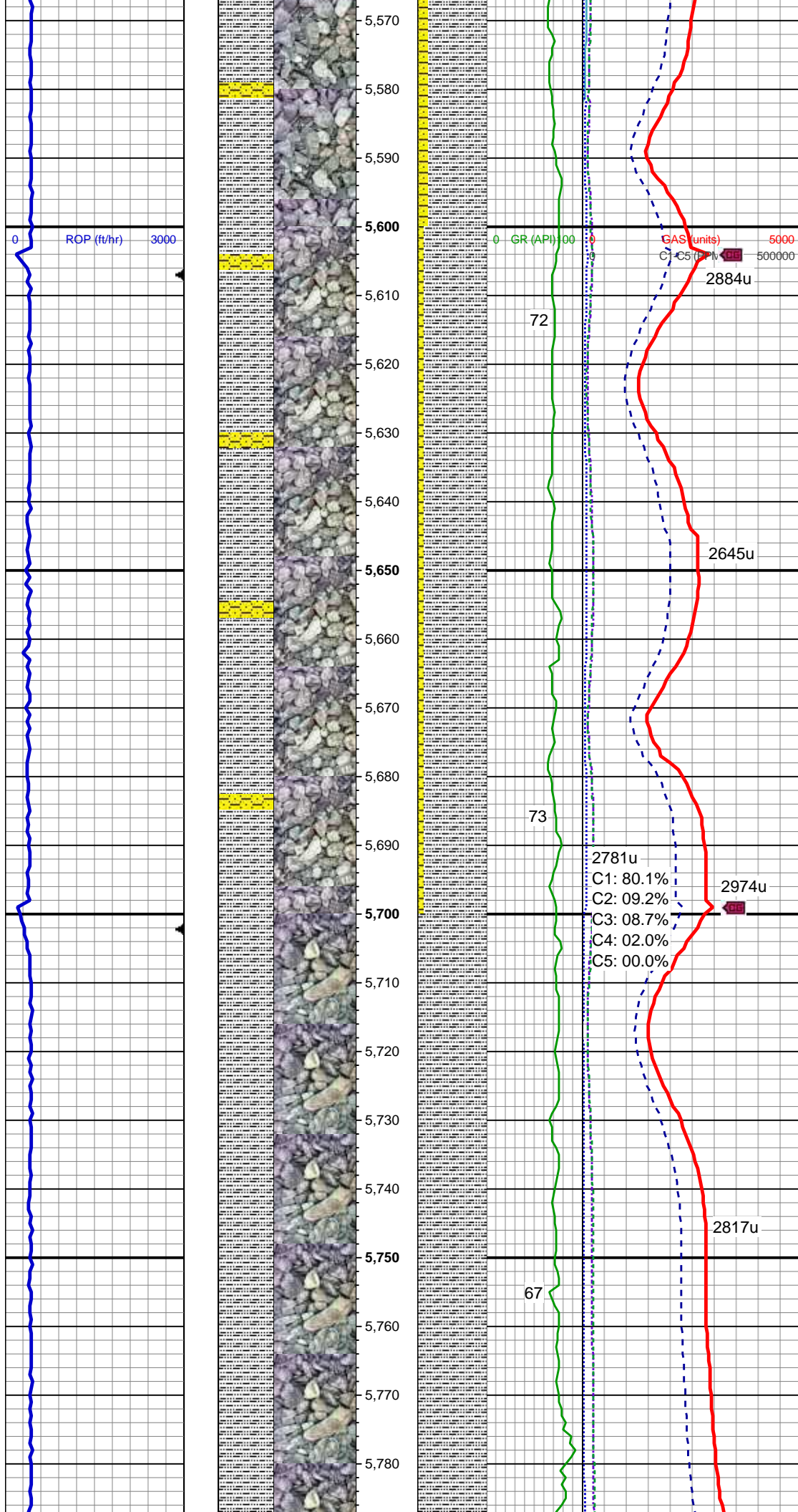
MD: 5,458'  
TVD: 5,432.9'  
Inclination: 0.2 °  
Azimuth: 67.5 °  
VS: -277.24'

968u  
C1: 76.1%  
C2: 09.0%  
C3: 09.9%  
C4: 05.0%  
C5: 00.0%

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

MD: 5,554'  
TVD: 5,528.89'  
Inclination: 1.1 °





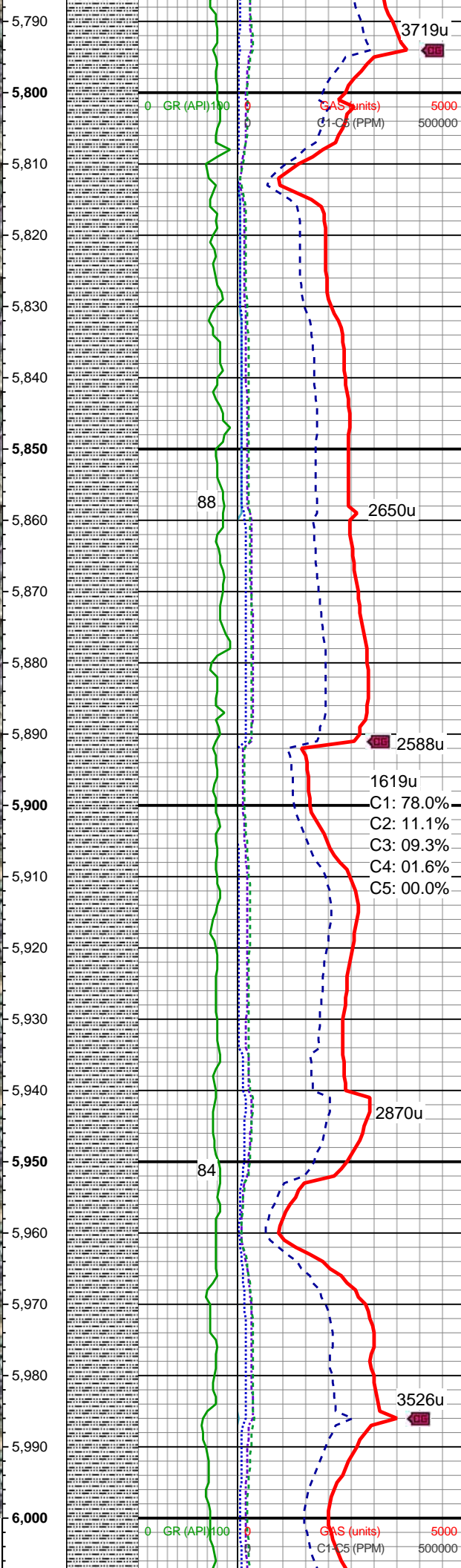
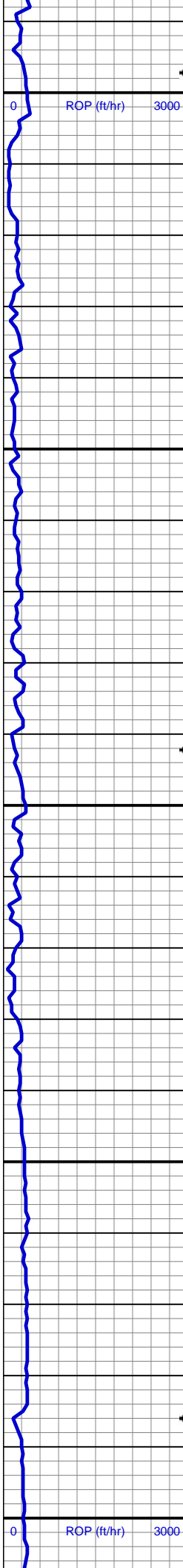
Azimuth: 77°  
VS: -276.97'

MD: 5,649'  
TVD: 5,623.87'  
Inclination: 1.4°  
Azimuth: 60.8°  
VS: -276.2'

SLTY SH: lt gy-gy, sft, sb blk-y-sb plty, occ  
plty, arg-rthy mtx, non calc  
SHY SS: lt gy-gy, vf-f gr, sft, sb plty-sb  
blk-y, tr plty, mod srt, arg cmt, sl mics

MD: 5,744'  
TVD: 5,718.83'  
Inclination: 1.6°  
Azimuth: 65.7°  
VS: -275.09'

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



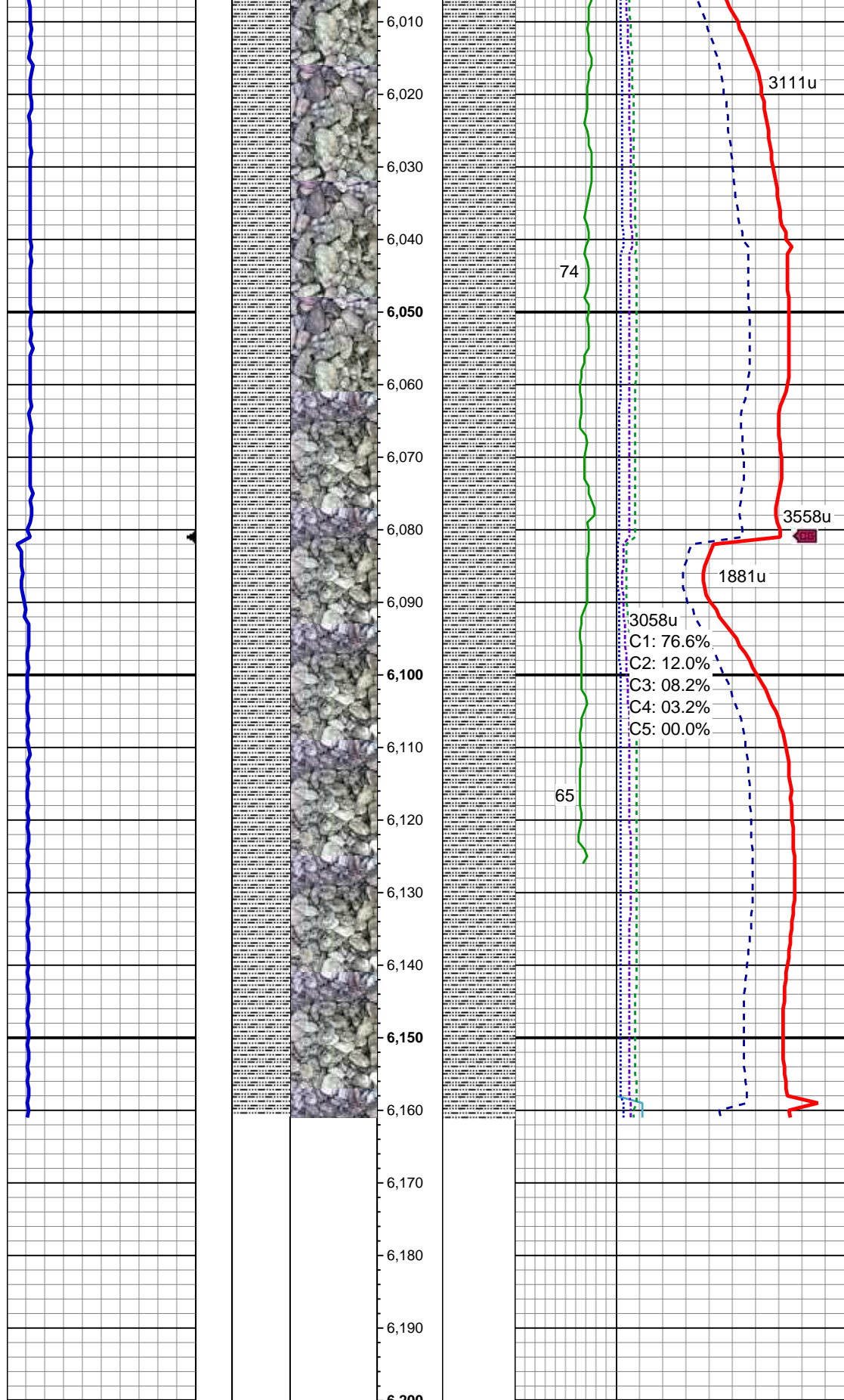
MD: 5,839'  
TVD: 5,813.8'  
Inclination: 1.4 °  
Azimuth: 77 °  
VS: -274.29'

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

MD: 5,933'  
TVD: 5,907.78'  
Inclination: 1.3 °  
Azimuth: 64.6 °  
VS: -273.58'

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





MD: 6,028'  
TVD: 6,002.75'  
Inclination: 1.3 °  
Azimuth: 57.5 °  
VS: -272.54'

SLTY SH: lt gy-gy, sft, sb blk-y-sb plty, occ  
plty, arg-rthy mtx, non calc, tr ss

MD: 6,108'  
TVD: 6,082.73'  
Inclination: 1.2 °  
Azimuth: 64 °  
VS: -271.68'

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

TD @ 6161' MD  
05/07/2014 @ 22:18

TOOH FOR MWD TOOLS  
LOG CONTINUES ON MPlot  
"STORIS E24-78-1HN(HORZ)"

Thank you for choosing  
Columbine Logging Inc.