

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Mahalo State AA09\_75\_HNC\_Vert

**Location** SWSE, Sec. 4, T6N, R63W, 6th PM

**State** Colorado

**County** Weld

**Country** USA

**Rig Number** PD 829

**API Number** 05-123-39055

**AFE #** 200303

**Region** DJ Basin

**Field** Wattenberg

**Spud Date** 2/2/2015

**Drilling Completed** 2/9/2015

**Surface Coordinates** 325' FSL & 2415'FEL, Sec.4  
SWSE Sec. 4, T6N, R63W, 6th PM

**Bottom Hole Coordinates** 30'FNL & 2495'FWL, Sec.16  
NENW Sec. 16, T6N, R63W, 6th PM

**Ground Elevation** 4695'

**K.B. Elevation** 4711'

**Logged Interval** 848' **To** 6000'

**Total Depth** 11862'

**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.

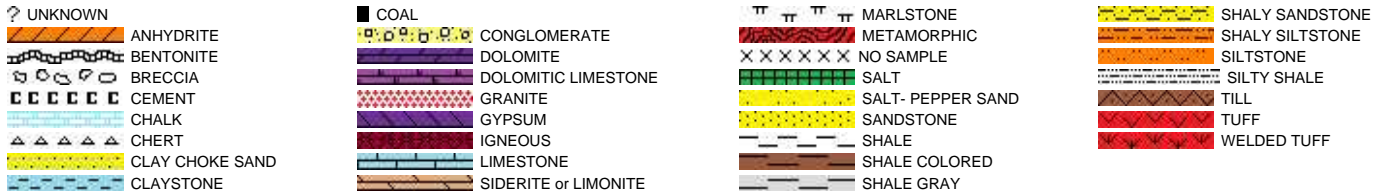
**Address** 1625 BROADWAY  
DENVER, CO 80202

# Other

602 S. Lipan St.  
Denver CO, 80223

David Hensley  
Jason Bell

## Rock Types



## Accessories

### Fossils



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

E 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

E EARTHY

FINELYXLN

GRAINSTONE

L LITHOGRAPHIC

MX MICROXLN

MS MUDSTONE

PS PACKSTONE

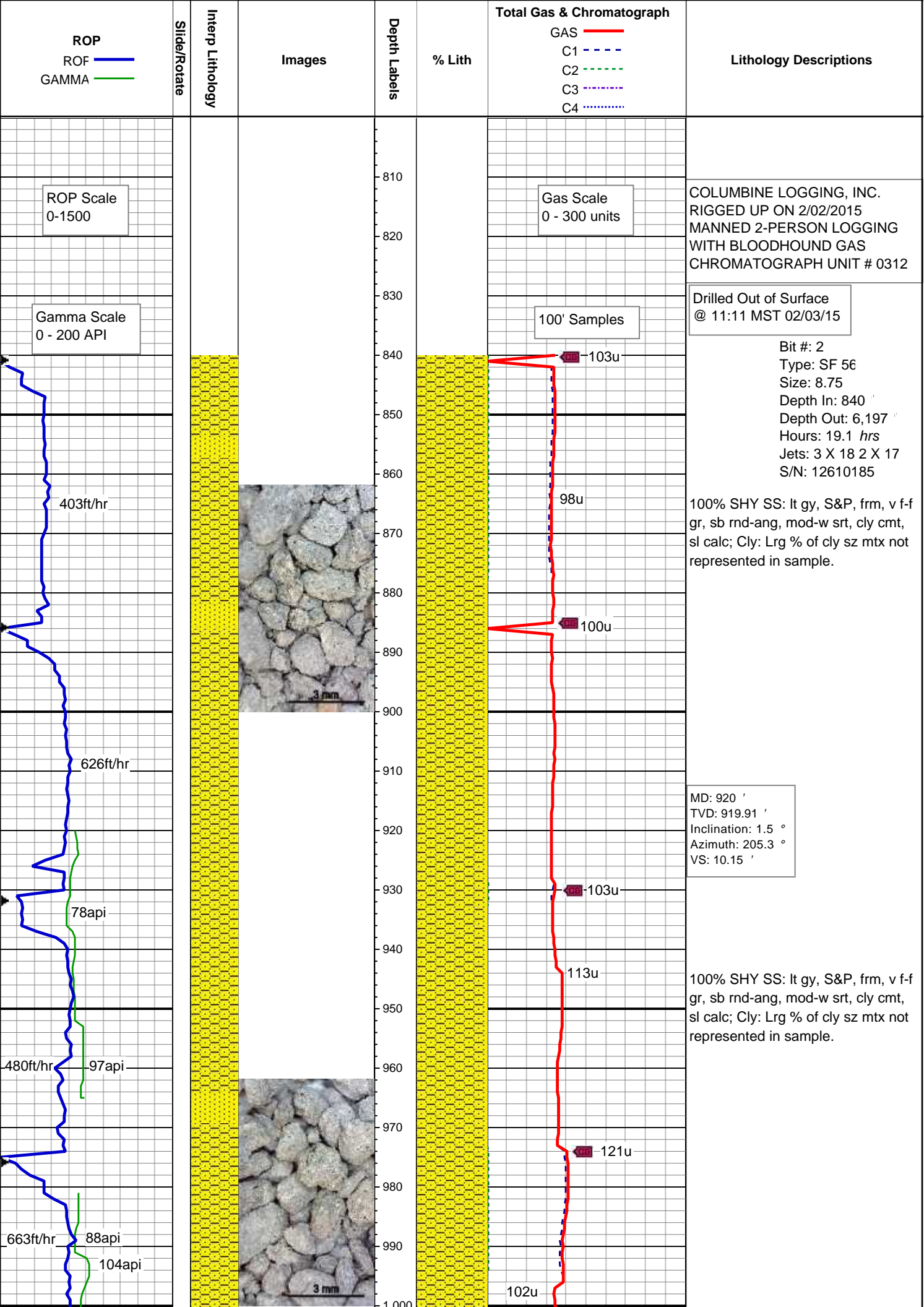
WS WACKESTONE

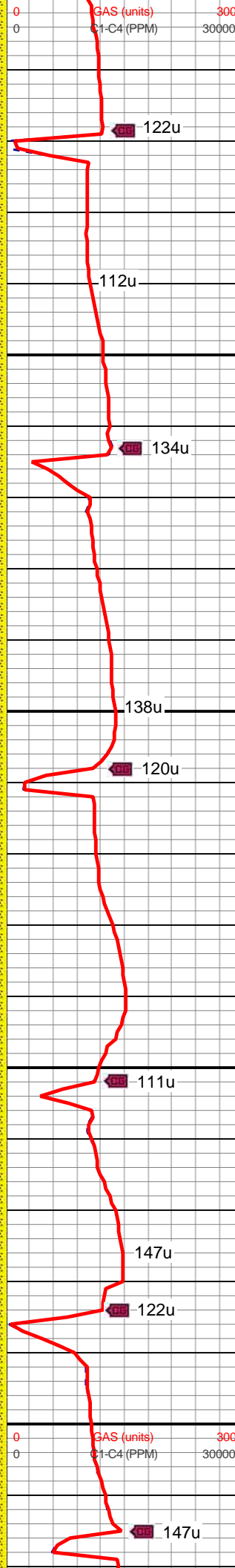
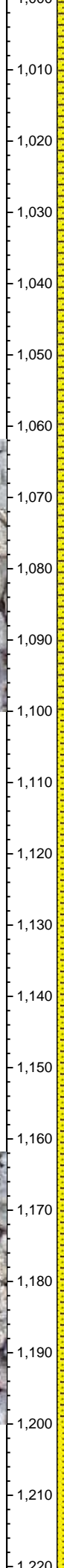
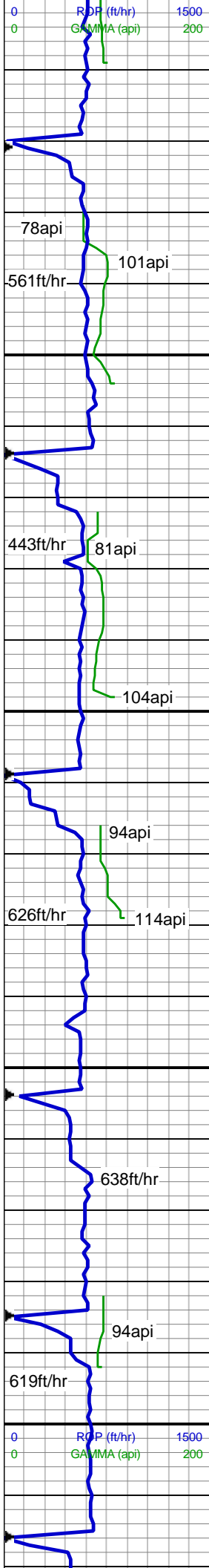
### Sorting

M MODERATE

P POOR

W WELL





MD: 1,009 '  
TVD: 1,008.88 '  
Inclination: 1.6 °  
Azimuth: 202.8 °  
VS: 12.38 '

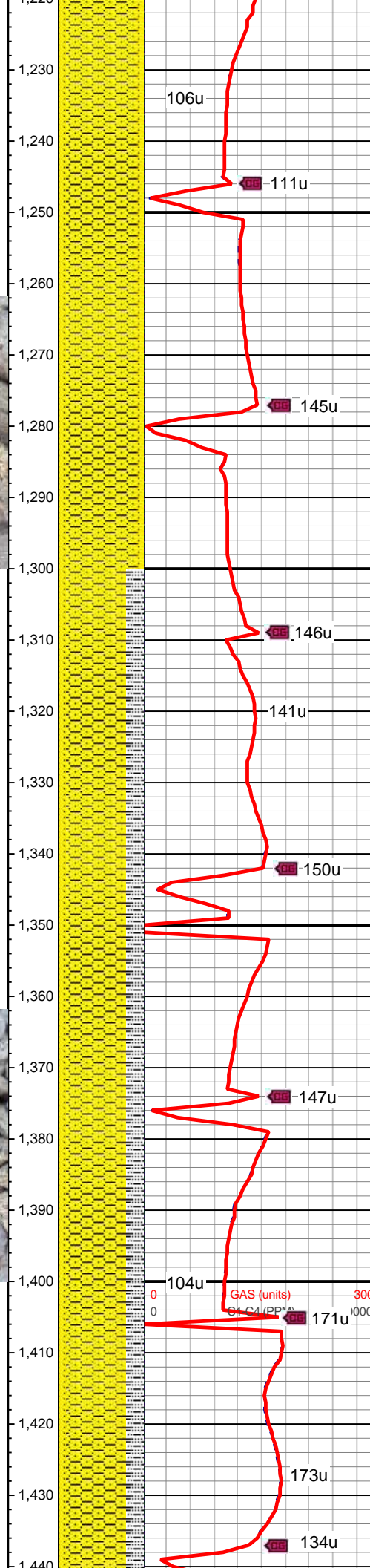
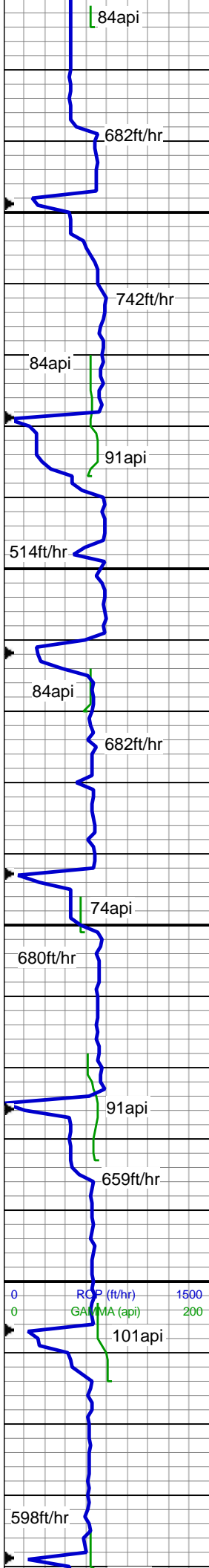
100% SHY SS: lt gy, S&P, frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc; Cly: Lrg % of cly sz mtx not represented in sample.

MD: 1,098 '  
TVD: 1,097.84 '  
Inclination: 1.7 °  
Azimuth: 201 °  
VS: 14.79 '

95% SHY SS: lt gy-med gy, S&P, frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc; 5% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, sl calc, occ glauc; Cly: Lrg % of cly sz mtx not represented in sample.

MD: 1,193 '  
TVD: 1,192.8 '  
Inclination: 1.8 °  
Azimuth: 203.2 °  
VS: 17.51 '





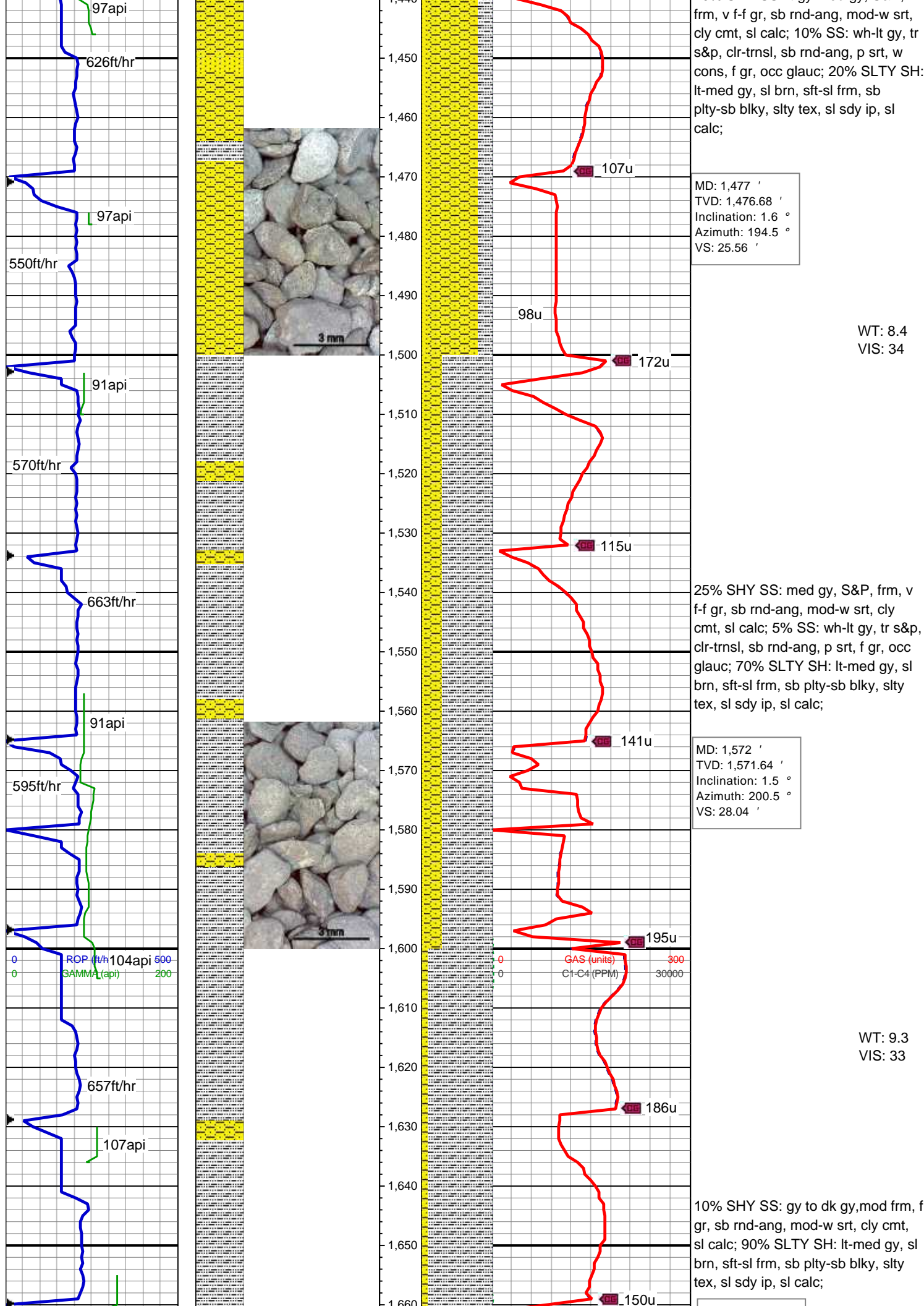
90% SHY SS: lt gy-med gy, S&P, frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc; 10% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, occ glauc; Cly: some cly sz mtx not represented in sample.

MD: 1,287 '  
TVD: 1,286.75 '  
Inclination: 1.8 °  
Azimuth: 194.7 °  
VS: 20.33 '

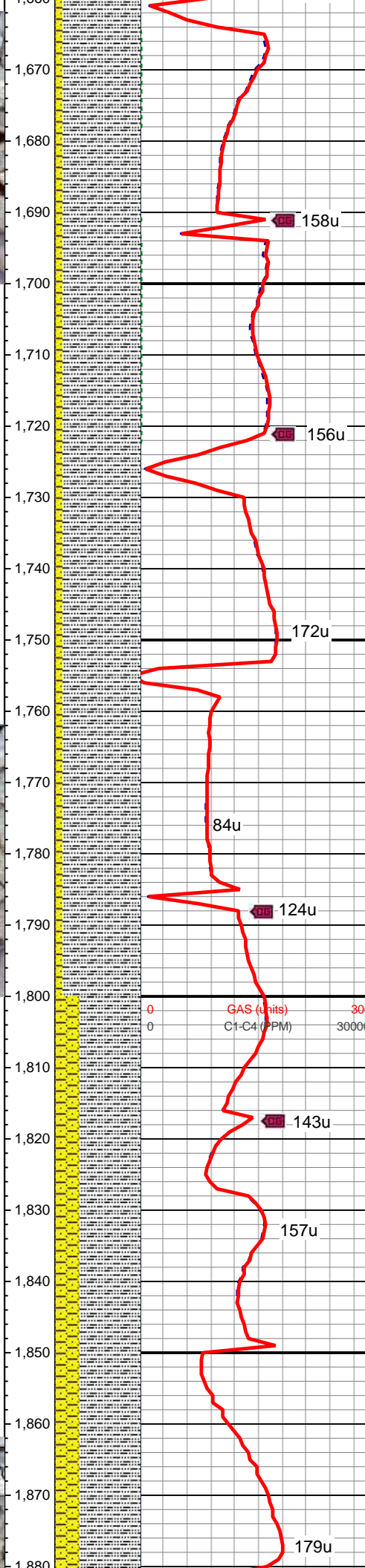
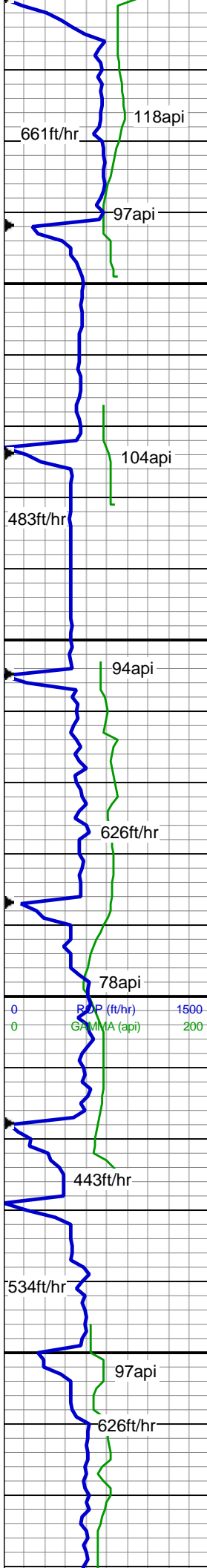
70% SHY SS: lt gy-med gy, S&P, frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc; 10% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, occ glauc; 20% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blkly, slty tex, sl sdy ip, sl calc;

MD: 1,382 '  
TVD: 1,381.71 '  
Inclination: 1.5 °  
Azimuth: 184.9 °  
VS: 23.03 '

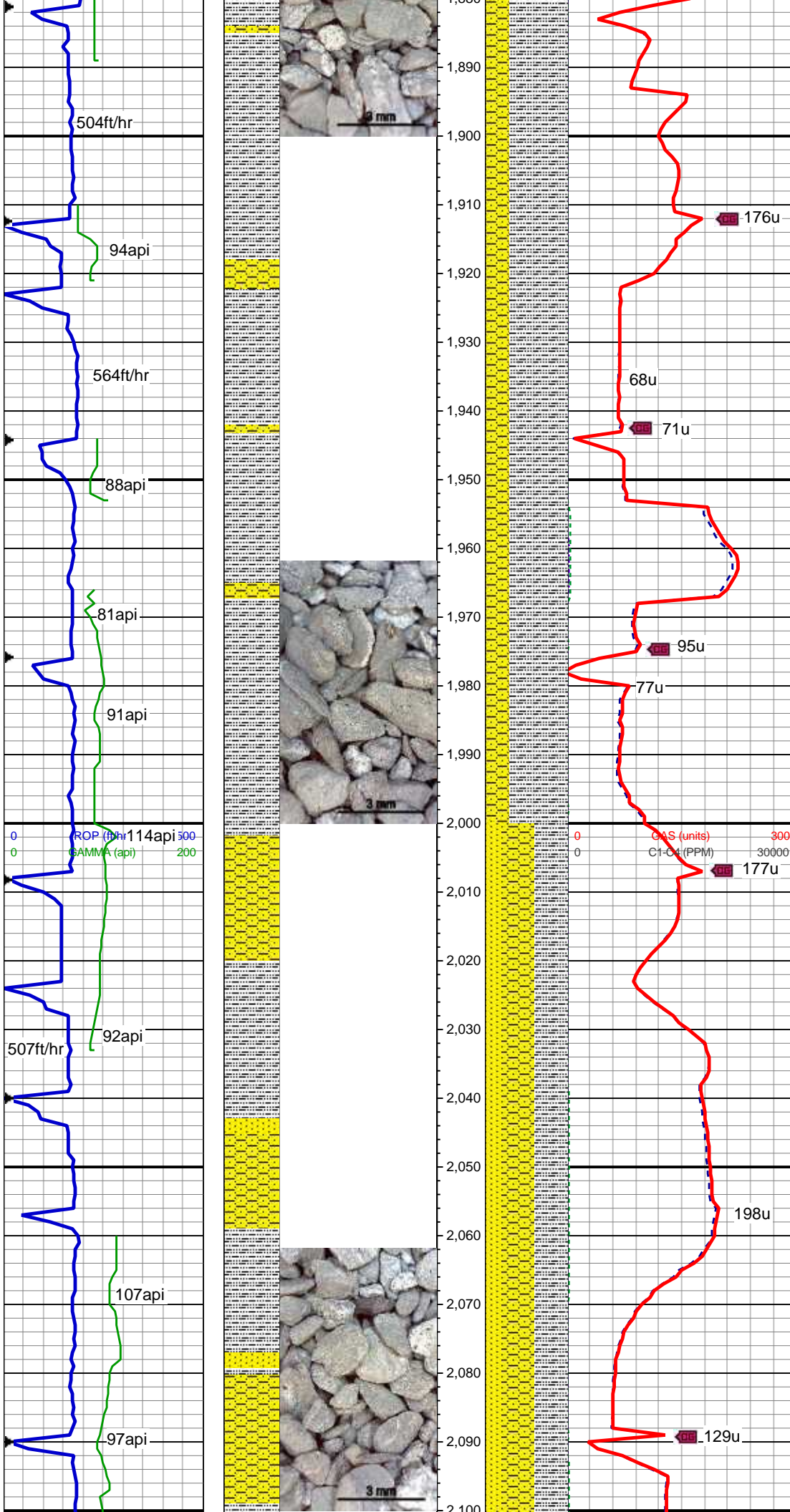
70% SHY SS: lt av-med gy, S&P.







MD: 1,667 '   
 TVD: 1,666.62 '   
 Inclination: 0.7 °   
 Azimuth: 181.5 °   
 VS: 29.79 '   
 90% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc   
 10% SHY SS: gy to dk gy, mod frm, f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc   
 90% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc   
 MD: 1,762 '   
 TVD: 1,761.61 '   
 Inclination: 1.3 °   
 Azimuth: 172.2 °   
 VS: 31.44 '   
 70% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc   
 30% SHY SS: gy to dk gy, mod frm, f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc   
 MD: 1,857 '   
 TVD: 1,856.56 '   
 Inclination: 2.6 °   
 Azimuth: 221.8 °   
 VS: 34.15 '   
 GAS (units) 0 300   
 C1-C4 (PPM) 0 30000   
 158u   
 156u   
 172u   
 84u   
 124u   
 143u   
 157u   
 179u



WT: 8.4  
VIS: 31

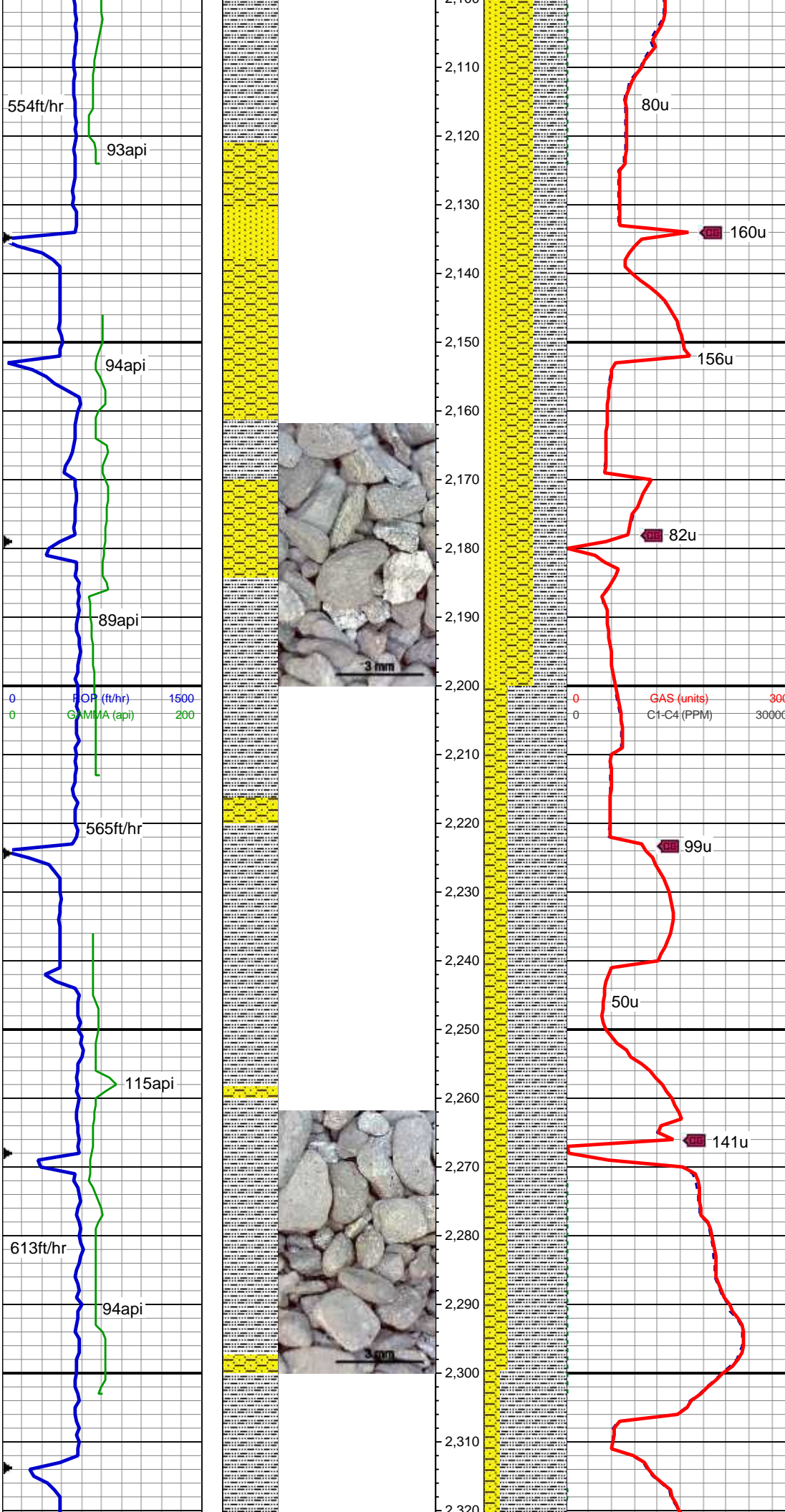
MD: 1,952 '  
TVD: 1,951.45 '  
Inclination: 2.9 °  
Azimuth: 239.6 °  
VS: 37.09 '

70% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc  
30% SHY SS: gy to dk gy, mod frm, f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc

40% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc  
40% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc  
20% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, mod-w srt, w cons, f gr, sl calc

MD: 2,079 '  
TVD: 2,078.23 '  
Inclination: 3.8 °  
Azimuth: 239.9 °  
VS: 41.04 '





40% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc

40% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc

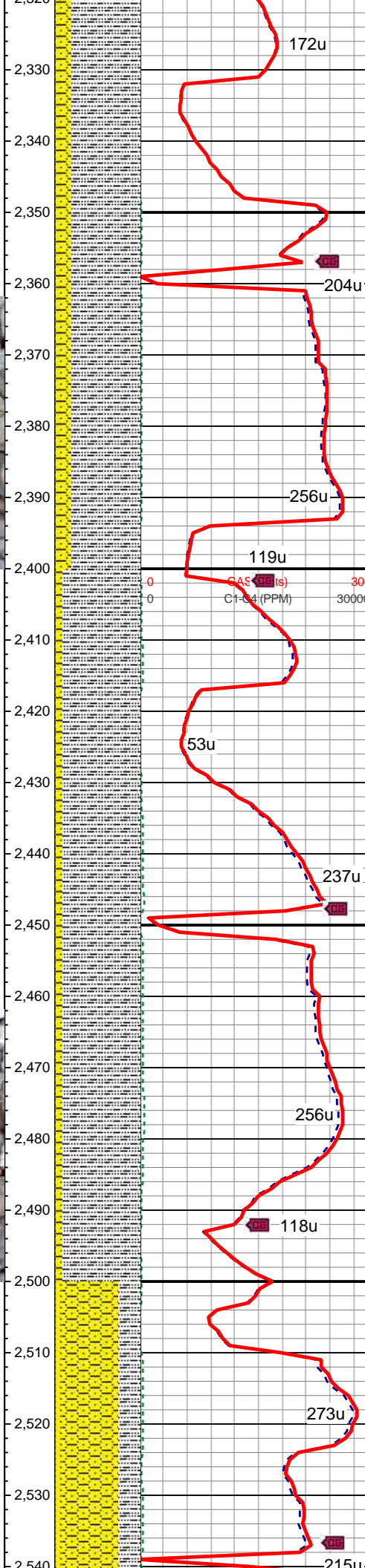
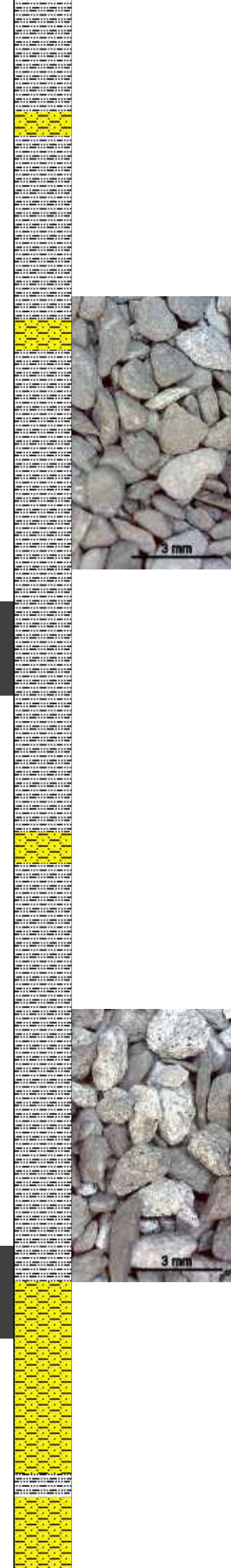
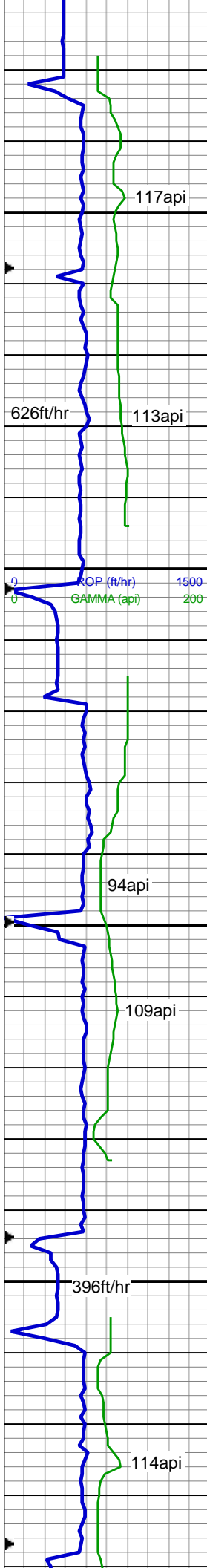
20% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, mod-w srt, w cons, f gr, sl calc

MD: 2,169 '  
TVD: 2,167.91 '  
Inclination: 5.8 °  
Azimuth: 253.5 °  
VS: 44.06 '

70% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc

30% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc

MD: 2,258 '  
TVD: 2,256.33 '  
Inclination: 7.3 °  
Azimuth: 250 °  
VS: 47.6 '



MD: 2,348 '  
TVD: 2,345.37 '  
Inclination: 9.4 °  
Azimuth: 244 °  
VS: 53.18 '

80% SLTY SH: lt-med gy, sl brn,  
sft-sl frm, sb plty-sb blkly, slty tex, sl  
sdy ip, sl calc  
20% SHY SS: lt gy-med gy, S&P,  
sft-sl frm, v f-f gr, sb rnd-ang,  
mod-w srt, cly cmt, sl calc

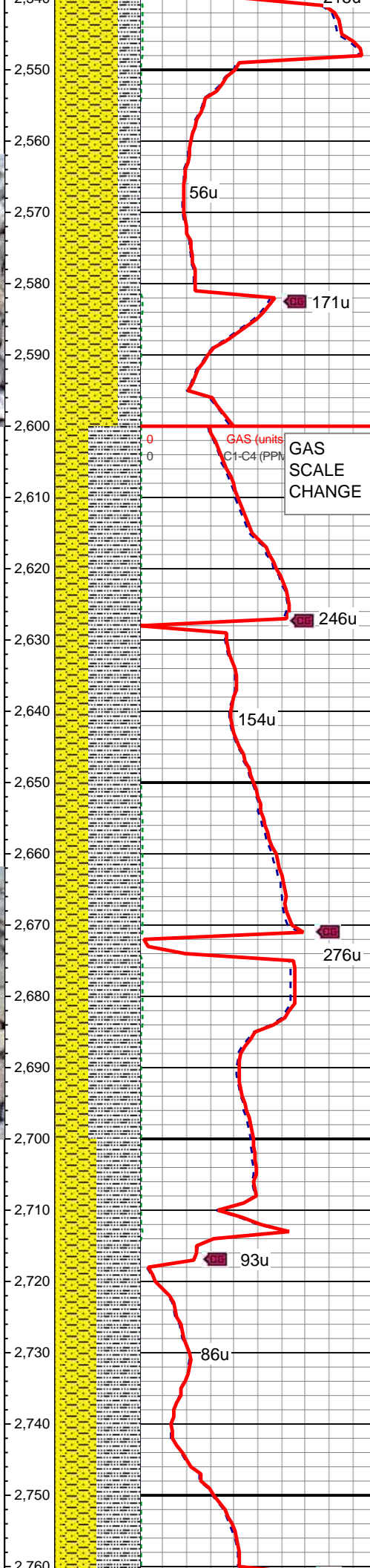
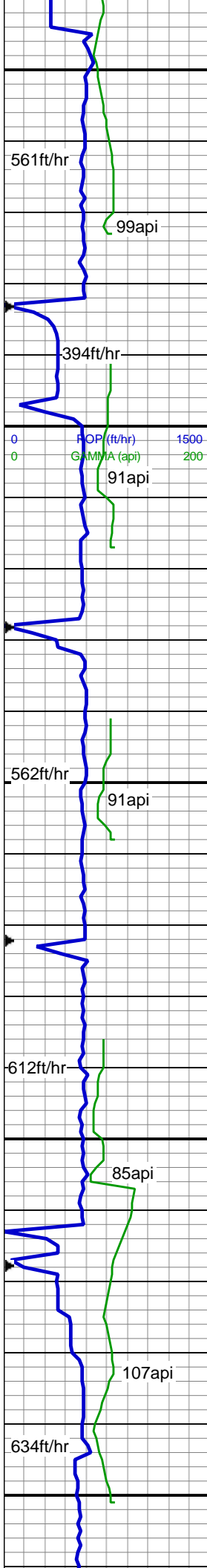
MD: 2,438 '  
TVD: 2,434 '  
Inclination: 10.6 °  
Azimuth: 242.4 °  
VS: 60.71 '

90% SLTY SH: lt-med gy, sl brn,  
sft-sl frm, sb plty-sb blkly, slty tex, sl  
sdy ip, sl calc  
10% SHY SS: lt gy-med gy, S&P,  
sft-sl frm, v f-f gr, sb rnd-ang,  
mod-w srt, cly cmt, sl calc

MD: 2,527 '  
TVD: 2,521.38 '  
Inclination: 11.3 °  
Azimuth: 243.1 °  
VS: 68.95 '

WT: 8.4  
VIS: 27





65% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc  
35% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc  
10% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, mod-w srt, w cons, f gr, sl calc

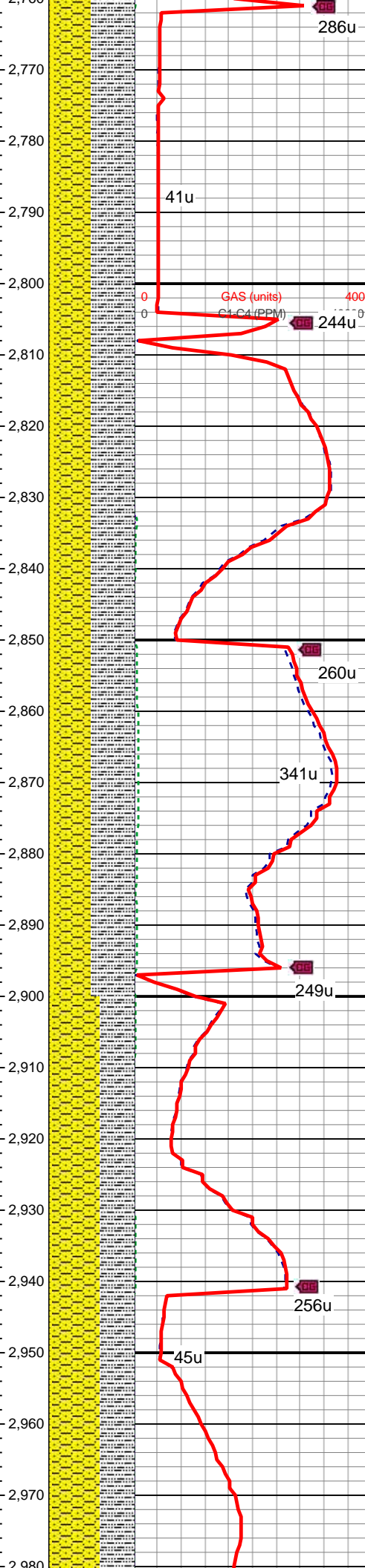
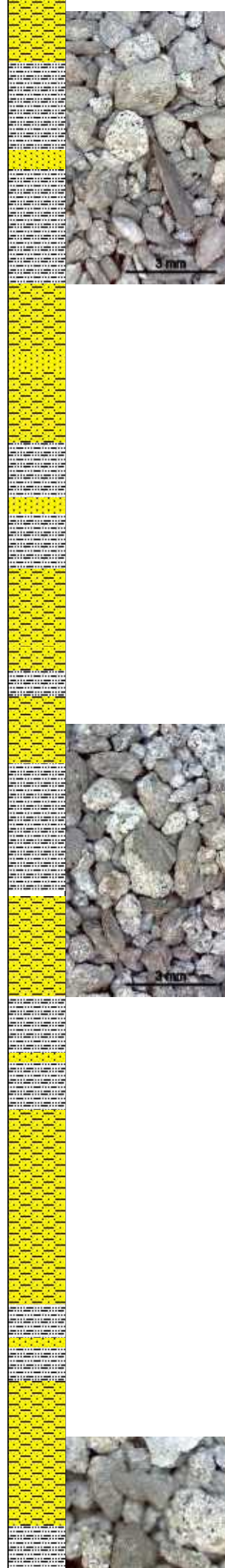
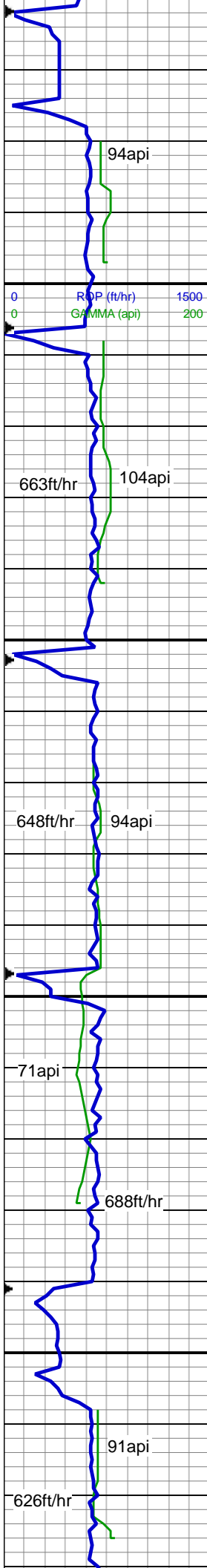
MD: 2,617 '  
TVD: 2,609.56 '  
Inclination: 11.8 °  
Azimuth: 244.3 °  
VS: 77.47 '

60% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc  
40% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc

MD: 2,706 '  
TVD: 2,696.77 '  
Inclination: 11.2 °  
Azimuth: 240.6 °  
VS: 86.19 '

50% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc  
40% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc  
10% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, mod-w srt, w cons, f gr, sl calc





sl calc

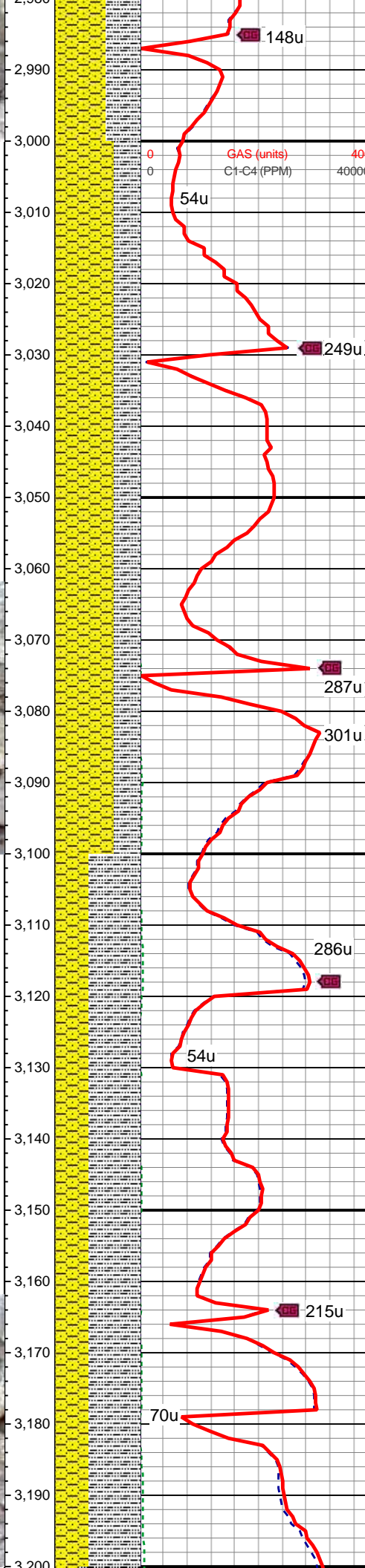
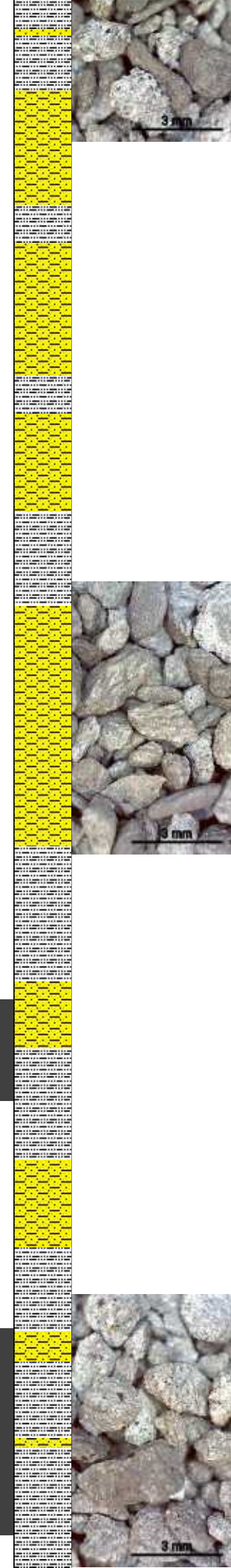
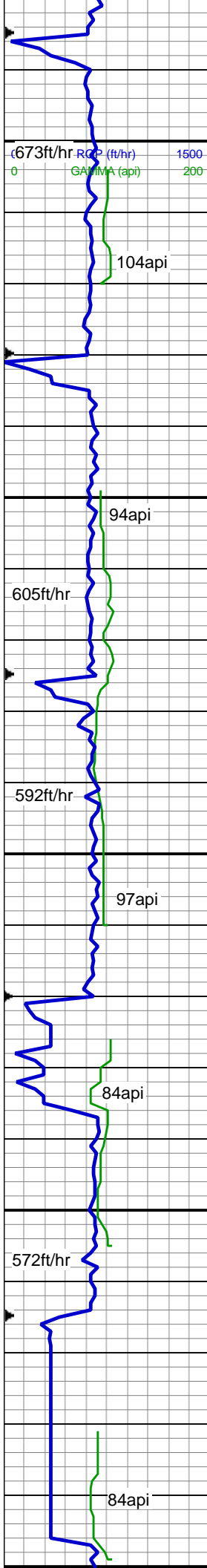
MD: 2,796 '  
TVD: 2,784.89 '  
Inclination: 12.3 °  
Azimuth: 241.6 °  
VS: 95.58 '

50% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc  
40% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc  
10% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, mod-w srt, w cons, f gr, sl calc

MD: 2,886 '  
TVD: 2,872.98 '  
Inclination: 11.3 °  
Azimuth: 238.5 °  
VS: 105.28 '

55% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip  
40% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt  
5% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, mod-w srt, w cons, f gr

MD: 2,975 '  
TVD: 2,960.09 '  
Inclination: 12.4 °  
Azimuth: 242.4 °  
VS: 114.8 '



70% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl cal  
30% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc, occ fos

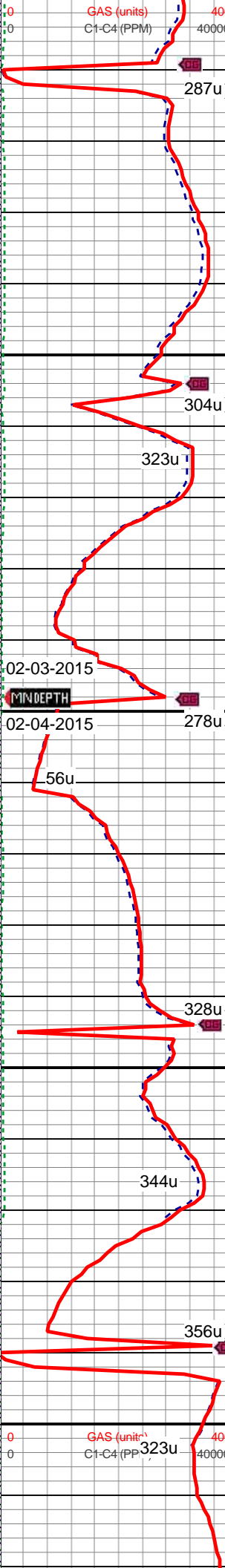
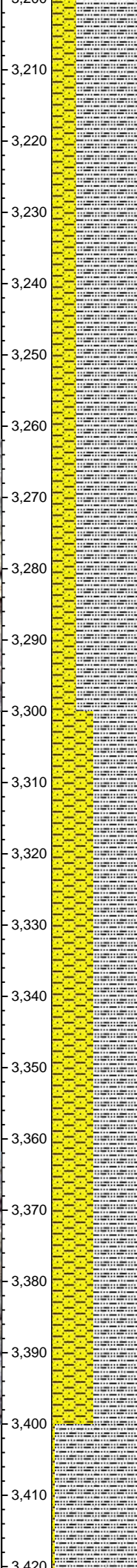
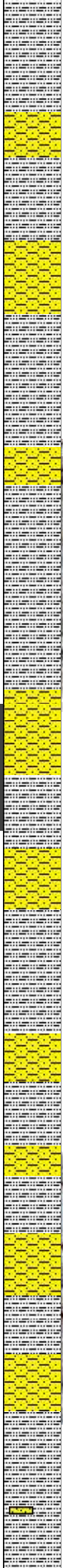
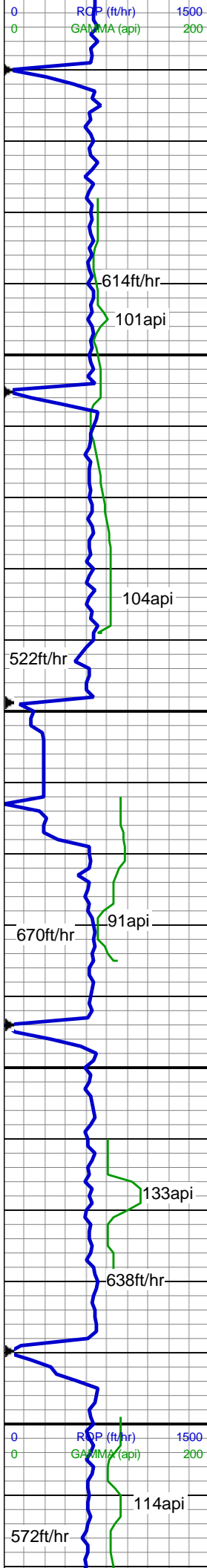
MD: 3,065 '  
TVD: 3,048.09 '  
Inclination: 11.8 °  
Azimuth: 238.9 °  
VS: 124.58 '

WT: 8.4  
VIS: 27

MD: 3,154 '  
TVD: 3,135.11 '  
Inclination: 12.4 °  
Azimuth: 237.1 °  
VS: 135 '

60% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip  
40% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt





MD: 3,244 '  
TVD: 3,223.16 '  
Inclination: 11.5 °  
Azimuth: 235.3 °  
VS: 145.87 '

70% SLTY SH: lt-med gy, sl brn,  
sft-sl frm, sb plty-sb blk, slty tex, sl  
sdy ip  
30% SHY SS: lt gy-med gy, S&P,  
sft-sl frm, v f-f gr, sb rnd-ang,  
mod-w srt, cly cmt

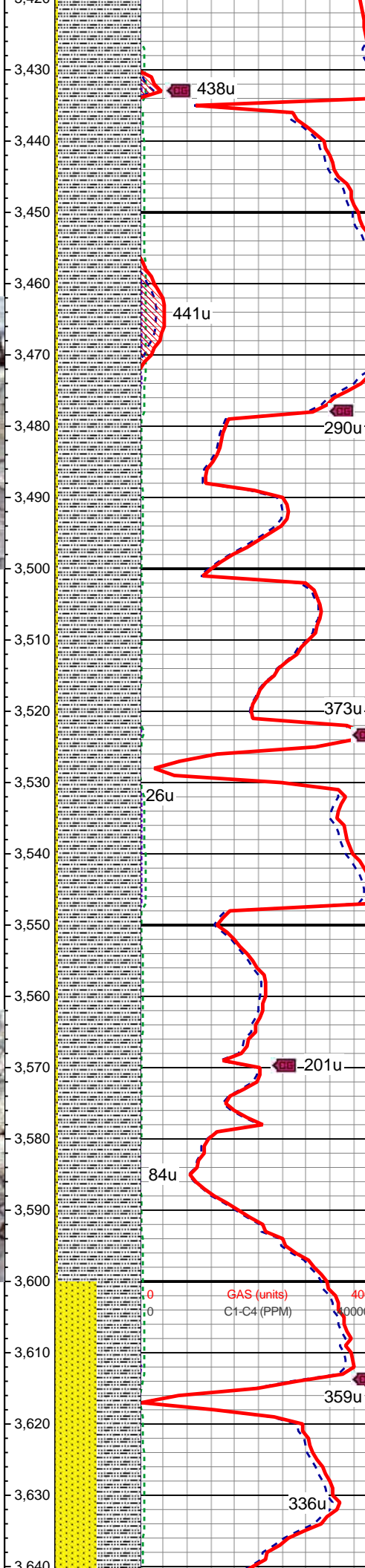
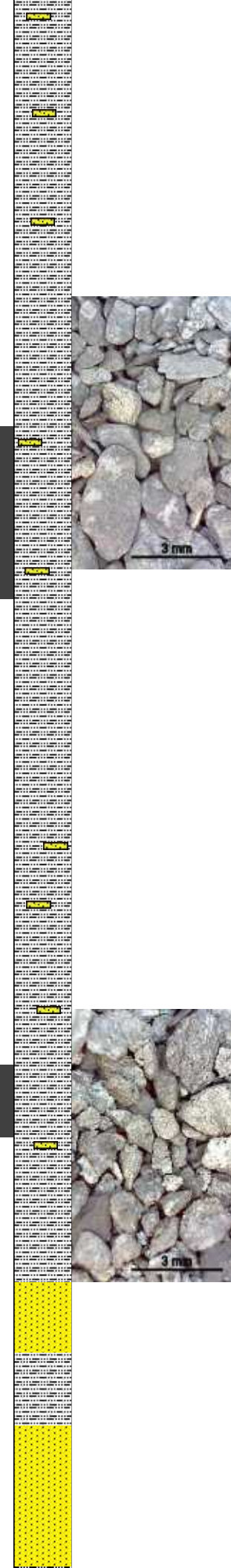
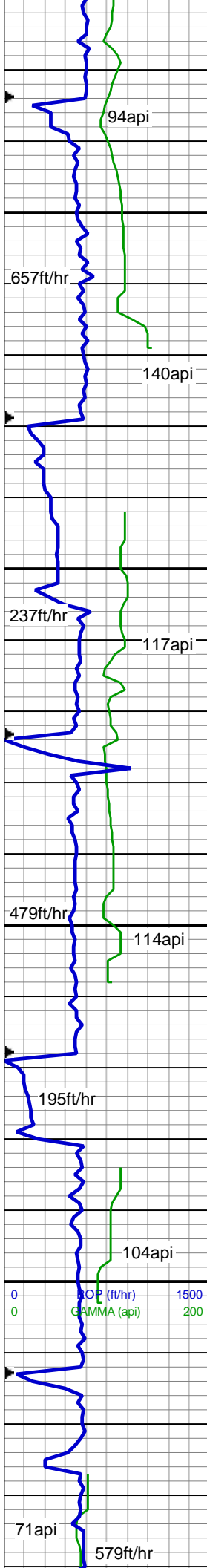
WT: 8.4  
VIS: 27

MD: 3,334 '  
TVD: 3,311.45 '  
Inclination: 10.9 °  
Azimuth: 239.2 °  
VS: 155.83 '

50% SLTY SH: lt-med gy, sl brn,  
sft-sl frm, sb plty-sb blk, slty tex, sl  
sdy ip  
50% SHY SS: lt gy-med gy, S&P,  
sft-sl frm, v f-f gr, sb rnd-ang,  
mod-w srt, cly cmt

MD: 3,423 '  
TVD: 3,399.03 '  
Inclination: 9.6 °





Azimuth: 237.4 °  
VS: 164.59 '

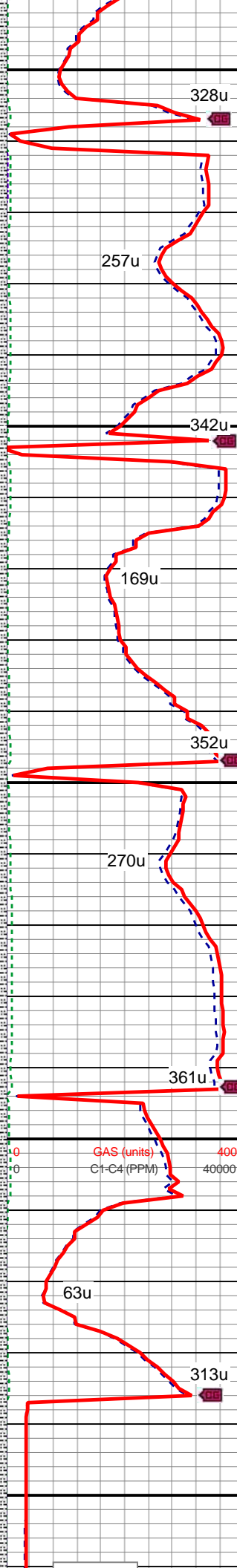
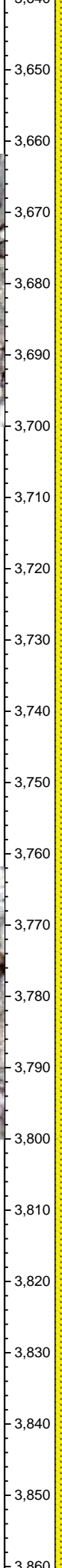
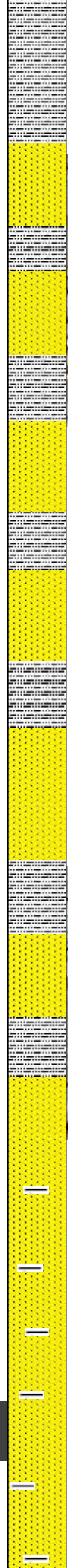
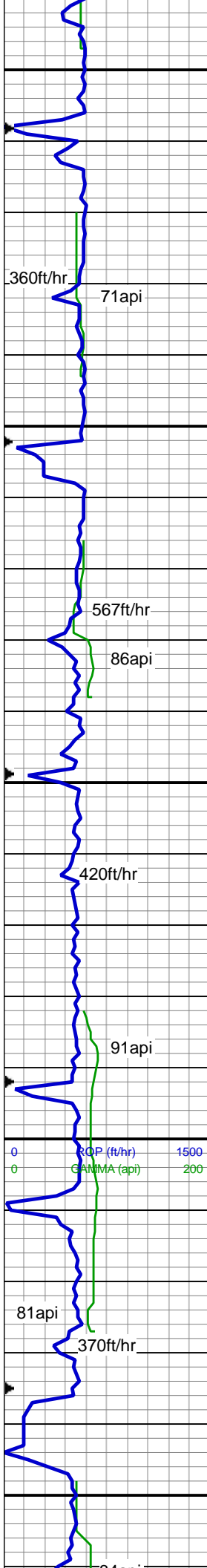
95% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip  
5% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt

MD: 3,513 '  
TVD: 3,487.7 '  
Inclination: 10.1 °  
Azimuth: 247.1 °  
VS: 172.16 '

WT: 8.4  
VIS: 27

95% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip  
5% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt

MD: 3,602 '  
TVD: 3,575.27 '  
Inclination: 10.5 °  
Azimuth: 252.1 °  
VS: 178.19 '



50% SLTY SH: med-dk gy, tr sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc  
50% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc

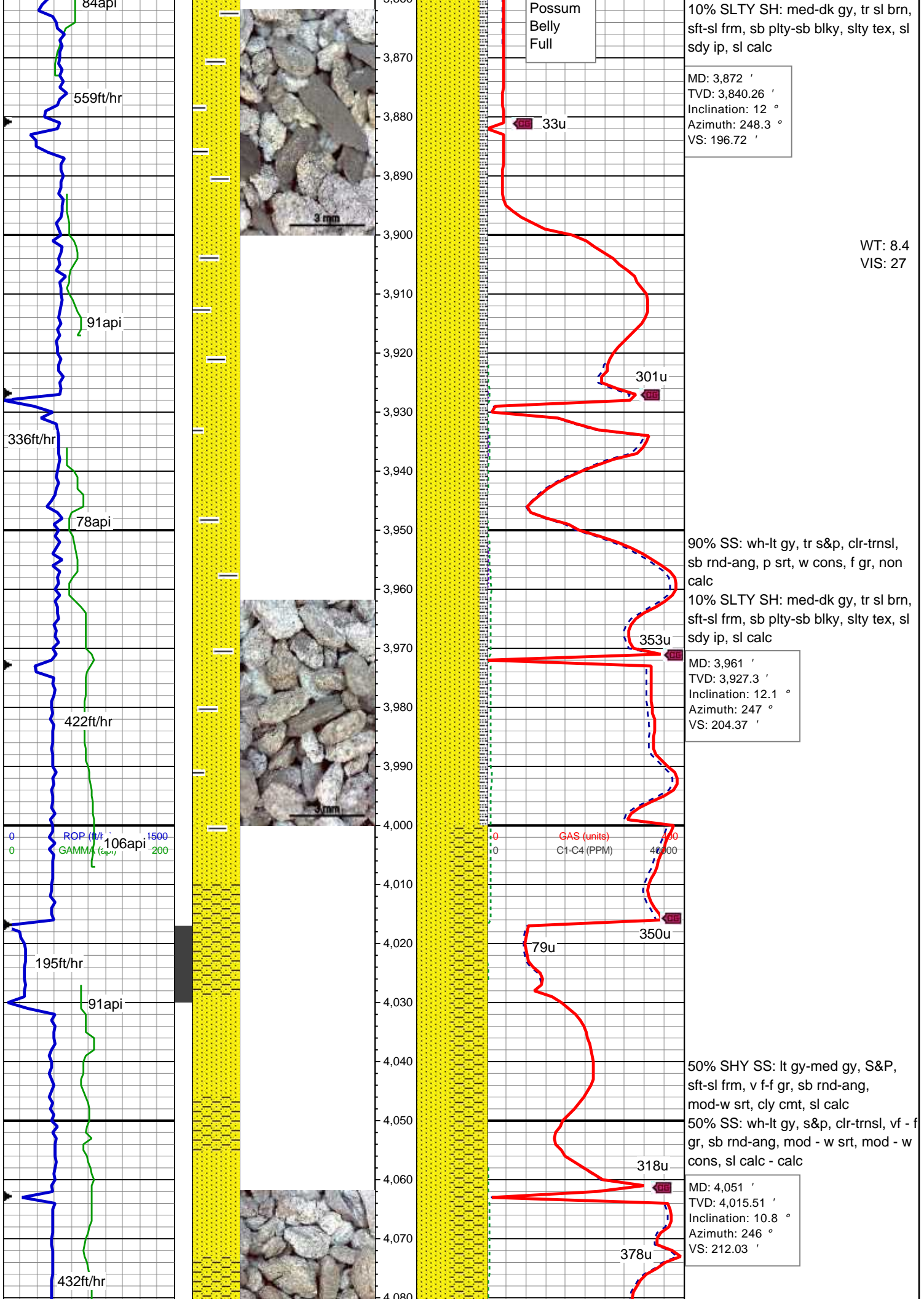
MD: 3,692 '  
TVD: 3,663.72 '  
Inclination: 10.8 °  
Azimuth: 251.5 °  
VS: 183.92 '

60% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc  
40% SLTY SH: med-dk gy, tr sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc

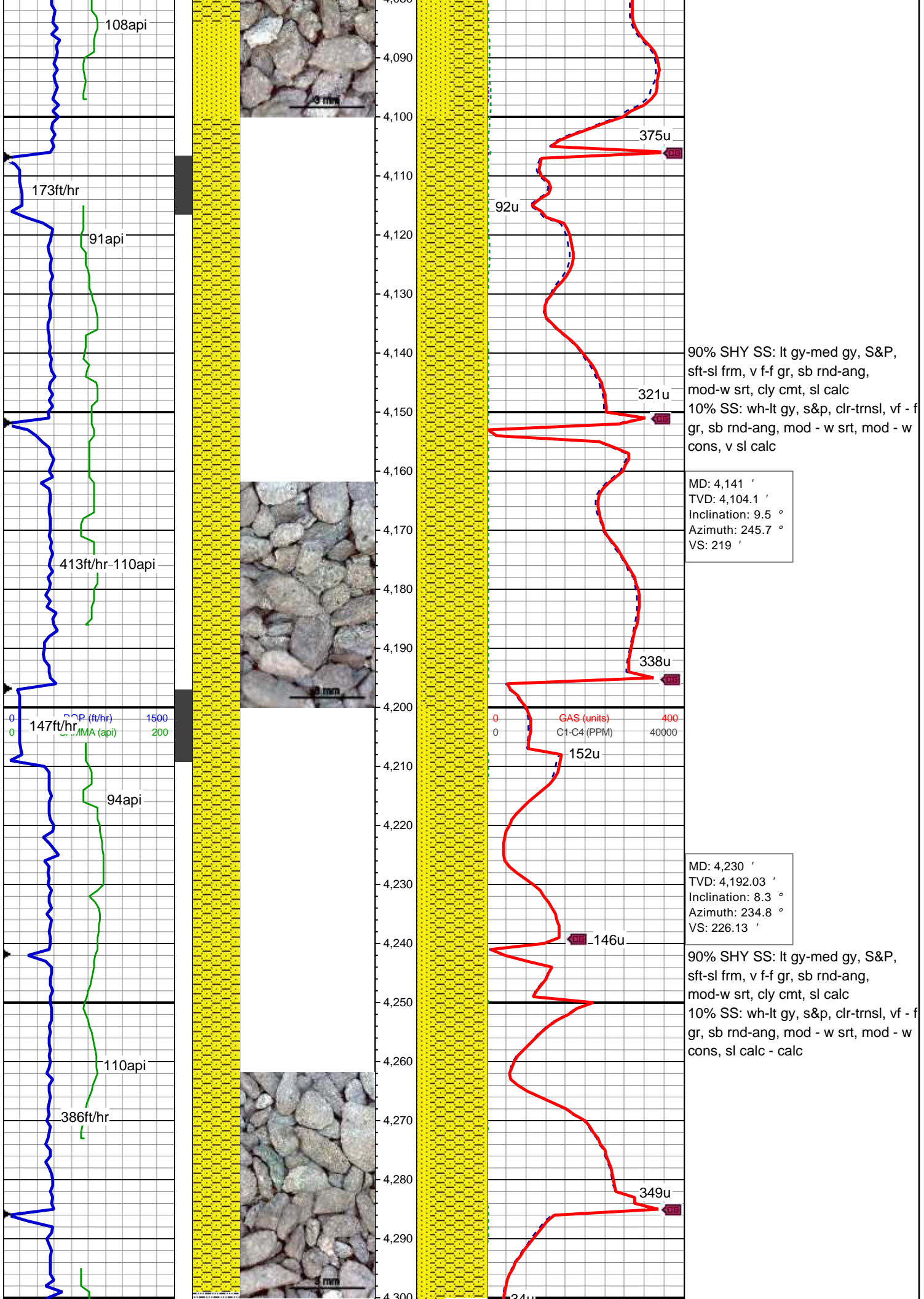
MD: 3,782 '  
TVD: 3,752.08 '  
Inclination: 11.1 °  
Azimuth: 251.3 °  
VS: 189.92 '

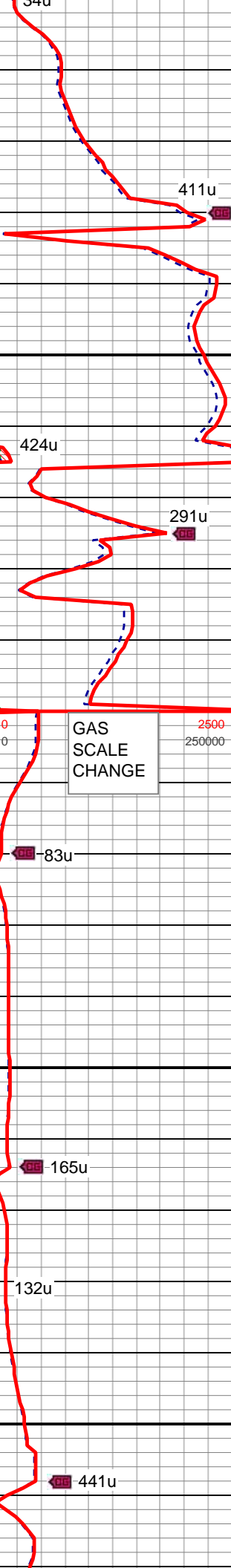
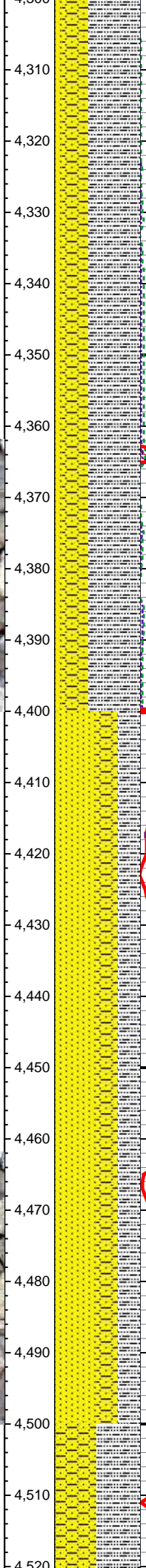
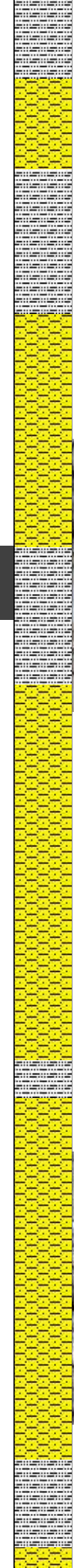
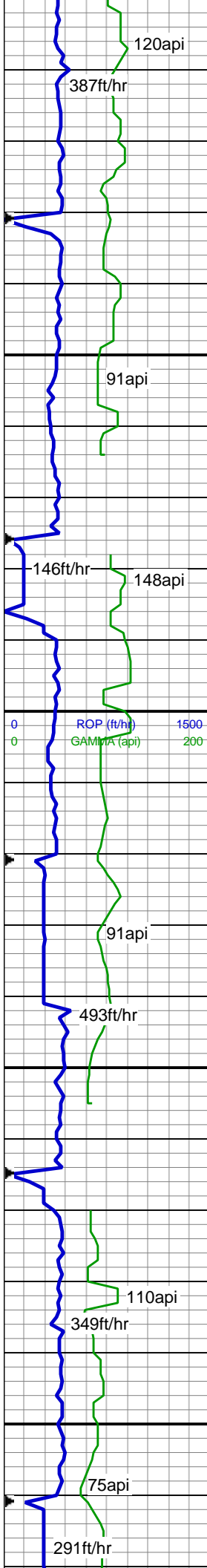
90% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, p srt, w cons, f gr, non calc











MD: 4,320 '  
TVD: 4,281.16 '  
Inclination: 7.6 °  
Azimuth: 236 °  
VS: 233.55 '

60% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc  
30% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc  
10% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, mod-w srt, w cons, f gr, sl calc

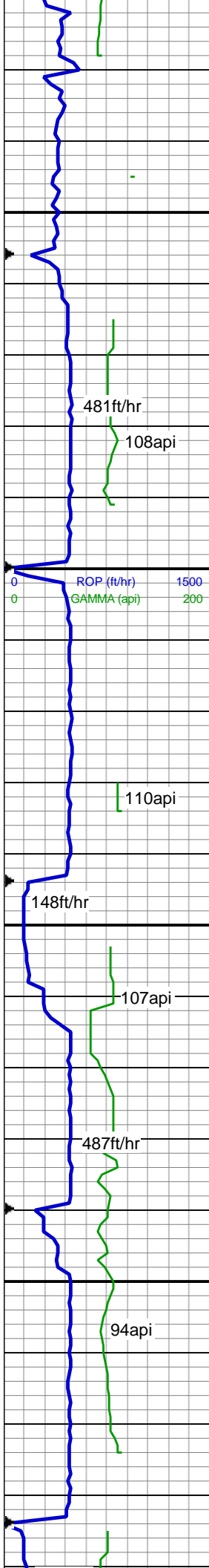
WT: 8.4  
VIS: 27

MD: 4,409 '  
TVD: 4,369.51 '  
Inclination: 6.3 °  
Azimuth: 232.2 °  
VS: 240.12 '

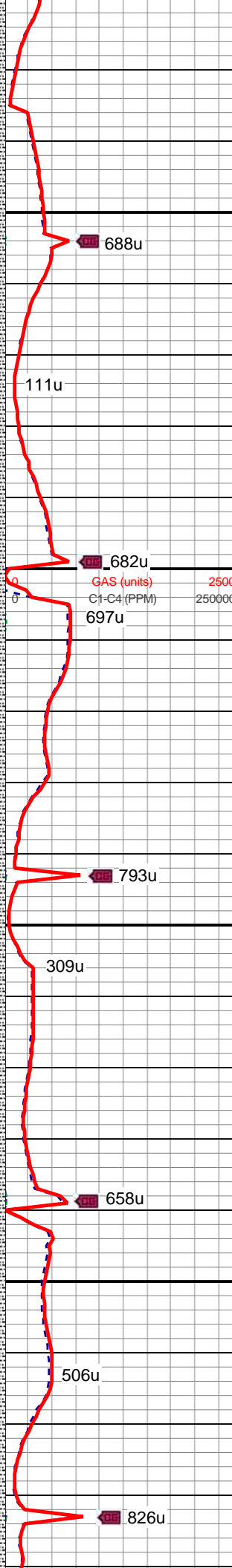
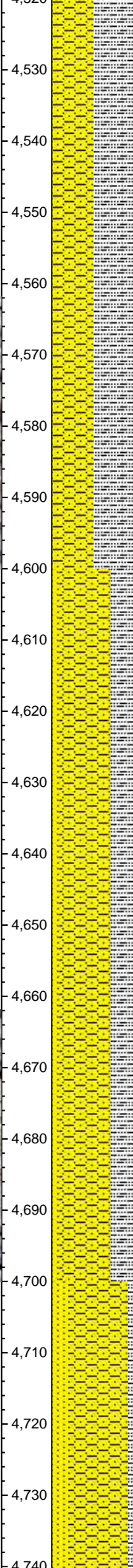
50% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, mod-w srt, w cons, f gr, sl calc  
25% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc  
25% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex

MD: 4,499 '  
TVD: 4,459.01 '  
Inclination: 5.8 °  
Azimuth: 235.3 °  
VS: 245.99 '





4530  
4540  
4550  
4560  
4570  
4580  
4590  
4600  
4610  
4620  
4630  
4640  
4650  
4660  
4670  
4680  
4690  
4700  
4710  
4720  
4730  
4740



50% SHY SS: lt gy-med gy, S&P,  
sft-sl frm, v f-f gr, sb rnd-ang,  
mod-w srt, cly cmt, sl calc  
50% SLTY SH: lt-med gy, sl brn,  
sft-sl frm, sb plty-sb blkly, slty tex, sl  
sdy ip, sl calc

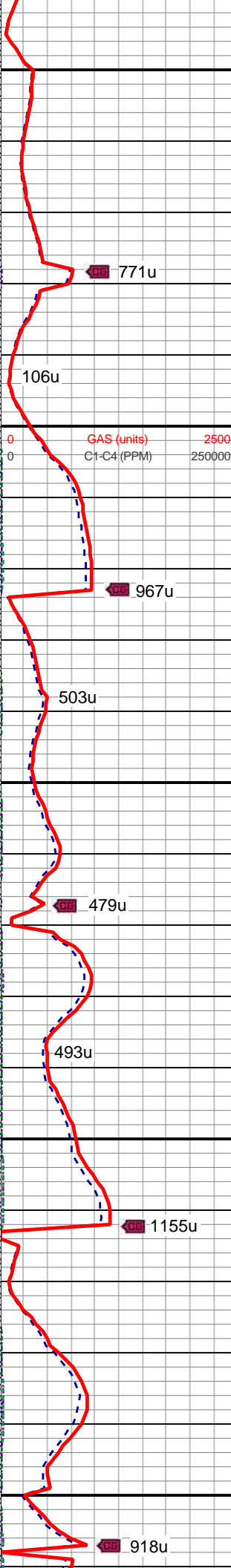
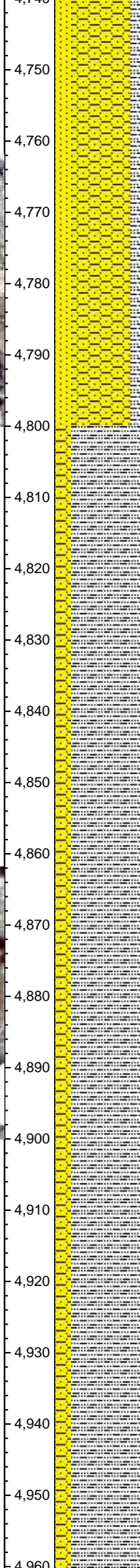
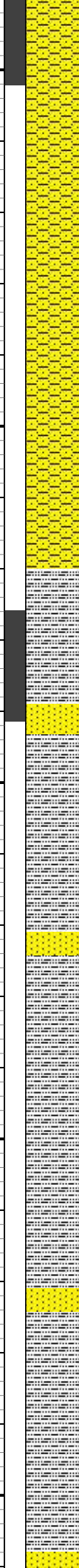
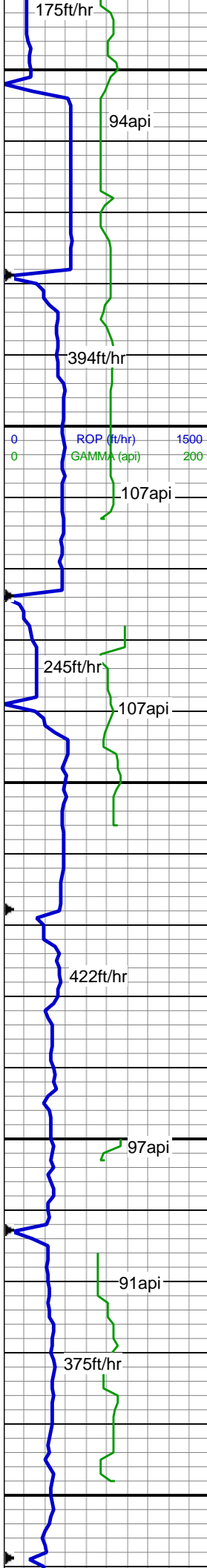
MD: 4,589 '  
TVD: 4,548.61 '  
Inclination: 4.9 °  
Azimuth: 233.7 °  
VS: 251.09 '

60% SHY SS: lt gy-med gy, S&P,  
sft-sl frm, v f-f gr, sb rnd-ang,  
mod-w srt, cly cmt  
30% SLTY SH: lt-med gy, sl brn,  
sft-sl frm, sb plty-sb blkly, slty tex  
10% SS: wh-lt gy, tr s&p, clr-trnsl,  
sb rnd-ang, mod-w srt, w cons, f gr

MD: 4,678 '  
TVD: 4,637.36 '  
Inclination: 3.8 °  
Azimuth: 228.8 °  
VS: 255.46 '

70% SHY SS: lt gy-med gy, S&P,  
sft-sl frm, v f-f gr, sb rnd-ang,  
mod-w srt, cly cmt, sl calc  
20% SLTY SH: lt-med gy, sl brn,  
sft-sl frm, sb plty-sb blkly, slty tex, sl





sdv ip, sl calc  
10% SS: wh-lt gy, tr s&p, clr-trnsl, sb rnd-ang, mod-w srt, w cons, f gr, sl calc

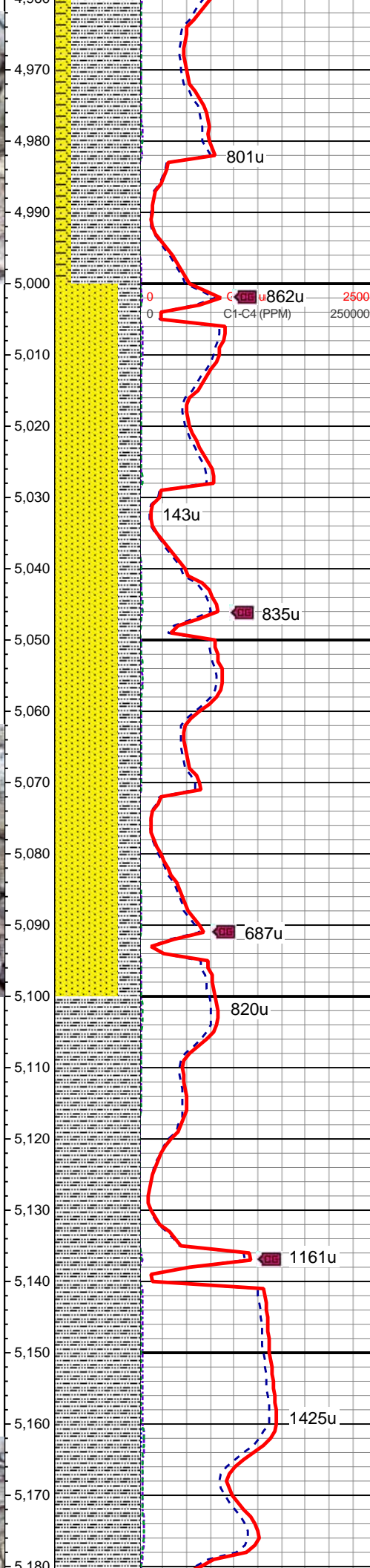
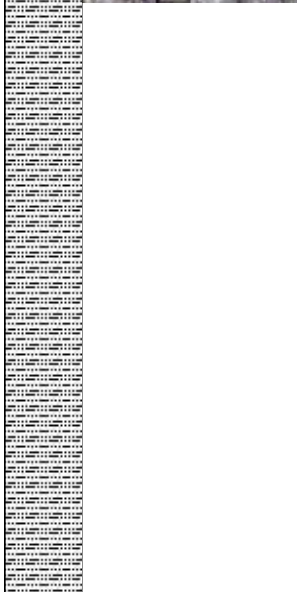
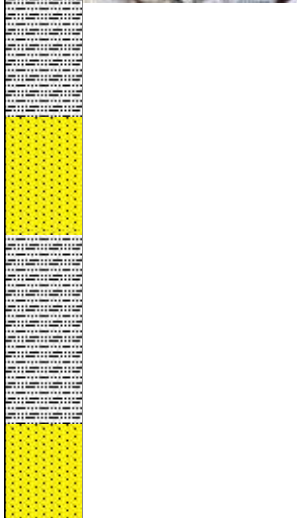
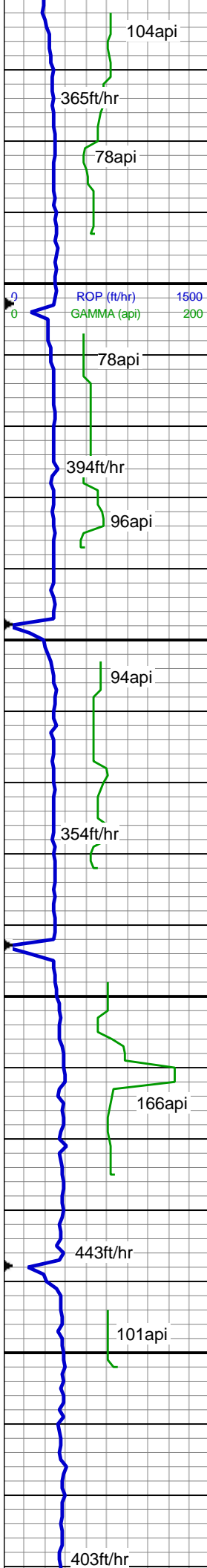
MD: 4,768 '  
TVD: 4,727.25 '  
Inclination: 1.6 °  
Azimuth: 208.8 °  
VS: 258.62 '

WT: 8.5  
VIS: 29

MD: 4,857 '  
TVD: 4,816.24 '  
Inclination: 0.9 °  
Azimuth: 131.5 °  
VS: 260.17 '

20% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc  
80% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc

20% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc  
80% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc



MD: 4,947 '   
TVD: 4,906.23 '   
Inclination: 0.5 °   
Azimuth: 116.4 °   
VS: 260.78 '

MD: 5,037 '   
TVD: 4,996.23 '   
Inclination: 0.3 °   
Azimuth: 67.5 °   
VS: 260.85 '

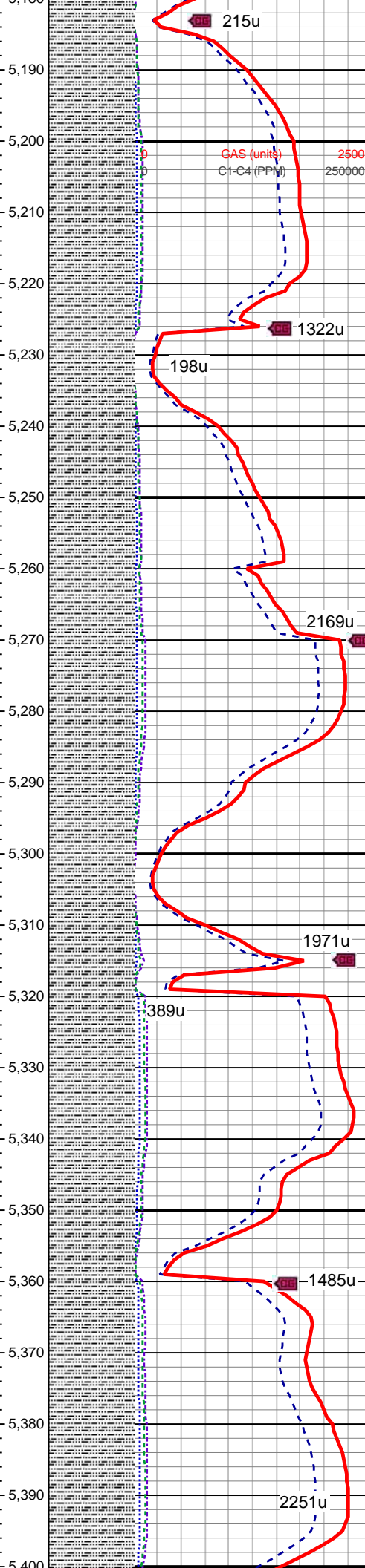
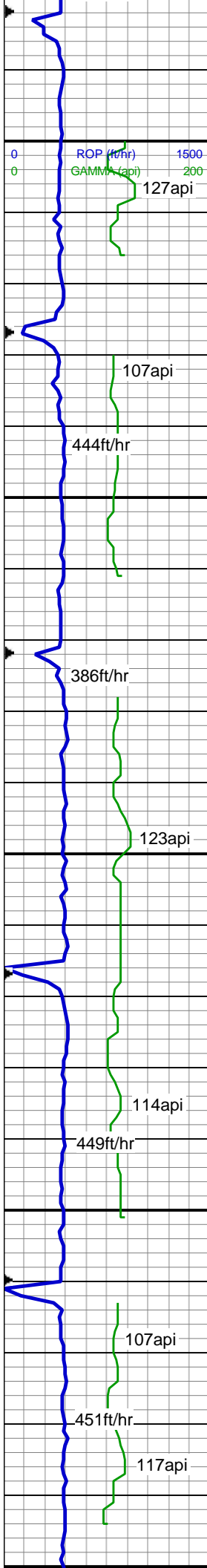
75% SHY SS: lt gy-med gy, S&P, sft-sl frm, v f-f gr, sb rnd-ang, mod-w srt, cly cmt, sl calc  
25% SLTY SH: lt-med gy, sl brn, sft-sl frm, sb plty-sb blk, slty tex, sl sdy ip, sl calc

MD: 5,126 '   
TVD: 5,085.23 '   
Inclination: 0.1 °   
Azimuth: 76.1 °   
VS: 260.73 '

100% SLTY SH: med-dk gy, tr sl brn, mod frm-frm, slty - sm tex, occ lam, sb blk - plty, non - tr calc, tr pyr, abnt ls inoc; abnt SHY SS; tr SS

WT: 8.5  
VIS: 30





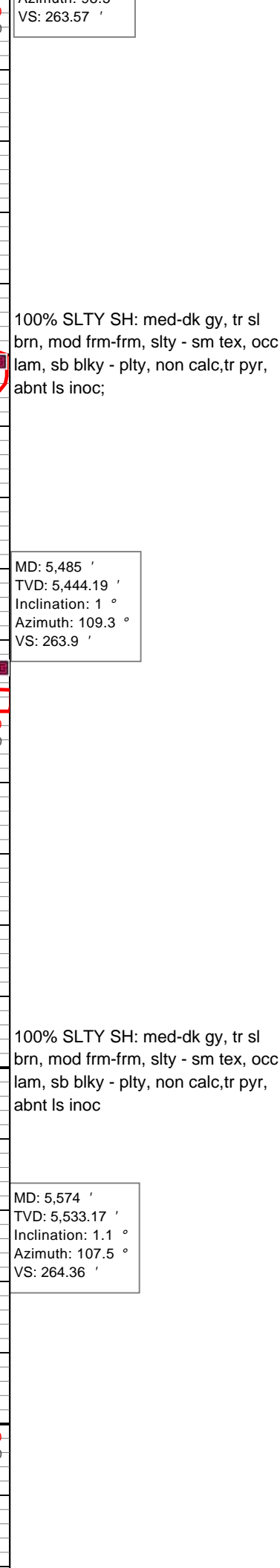
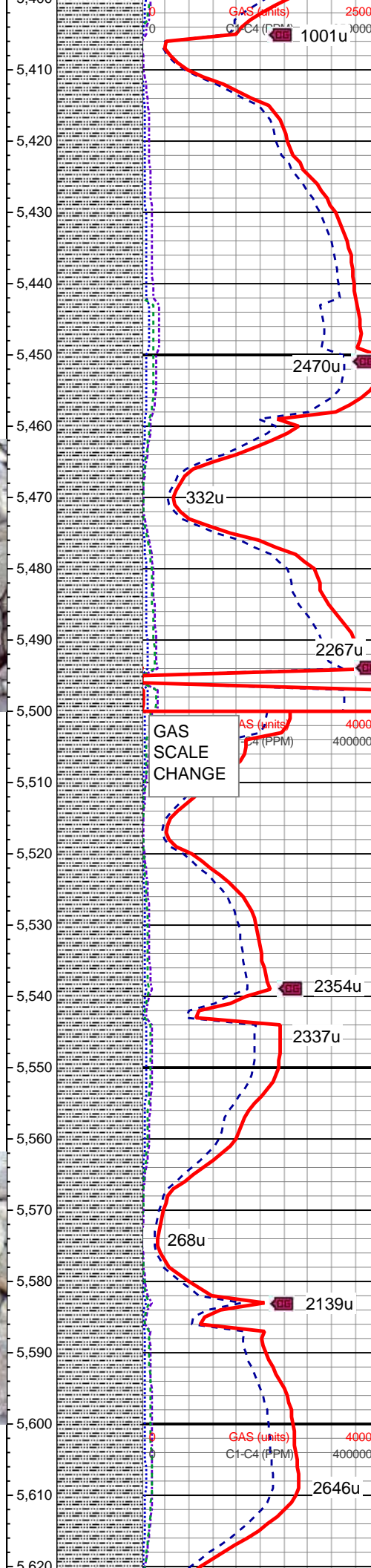
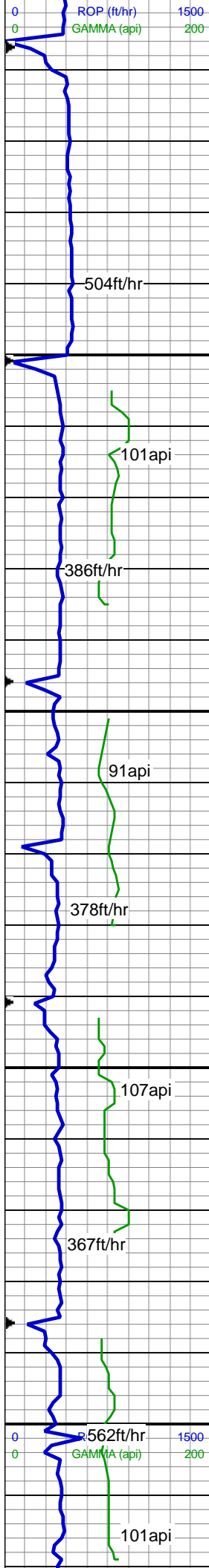
MD: 5,216 '  
TVD: 5,175.22 '  
Inclination: 0.8 °  
Azimuth: 186.6 °  
VS: 261.34 '

100% SLTY SH: med-dk gy, tr sl  
brn, mod frm-frm, slty - sm tex, occ  
lam, sb blkly - plty, non - tr calc, tr pyr,  
abnt ls inoc; abnt SHY SS; tr SS

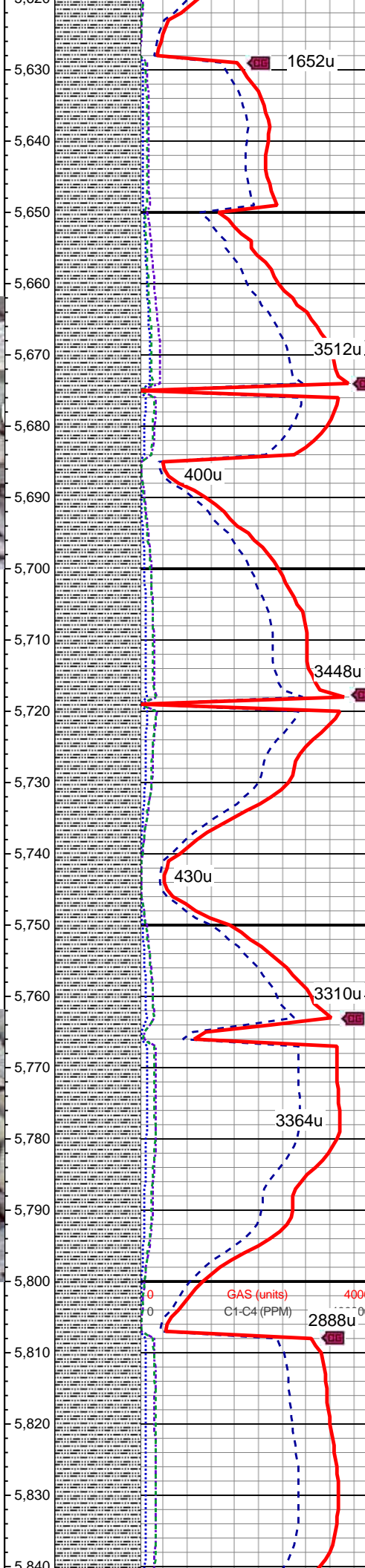
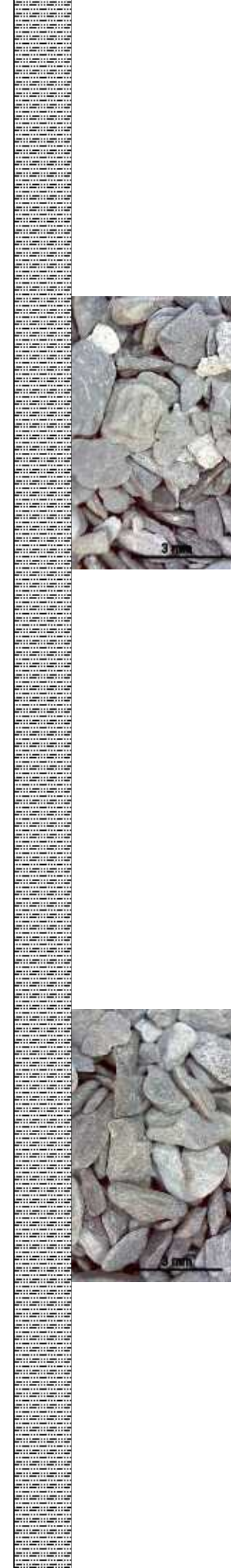
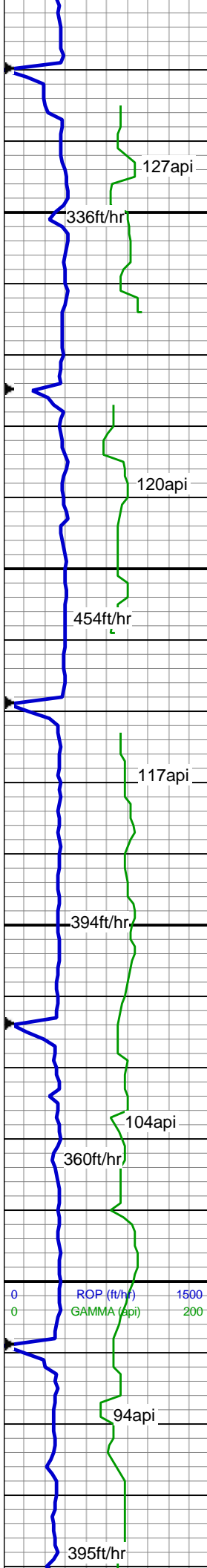
MD: 5,305 '  
TVD: 5,264.21 '  
Inclination: 1 °  
Azimuth: 170.1 °  
VS: 262.71 '

100% SLTY SH: med-dk gy, tr sl  
brn, mod frm-frm, slty - sm tex, occ  
lam, sb blkly - plty, non - tr calc, tr pyr,  
abnt ls inoc; abnt SHY SS; tr SS

MD: 5,395 '  
TVD: 5,354.2 '  
Inclination: 1 °  
Azimuth: 98.5 °







100% SLTY SH: med-dk gy, tr sl  
brn, mod frm-frn, slty - sm tex, occ  
lam, sb blkly - plty, non calc, tr pyr,  
abnt ls inoc

MD: 5,664 '  
TVD: 5,623.16 '  
Inclination: 1.1 °  
Azimuth: 107.4 °  
VS: 264.82 '

WT: 8.75  
VIS: 30

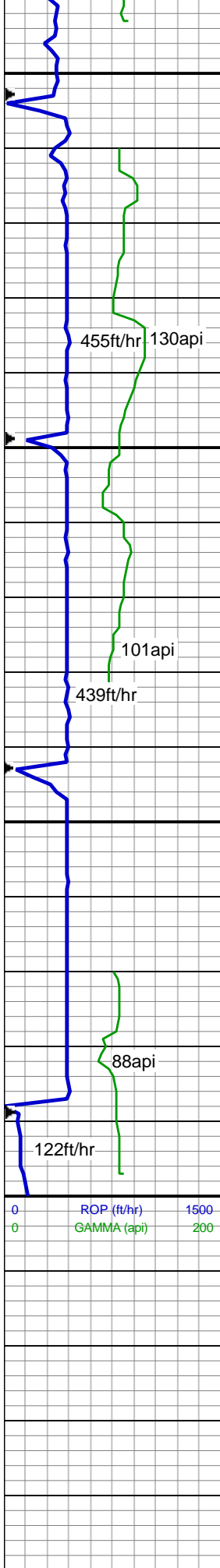
100% SLTY SH: med-dk gy, v f gr,  
mod frm-frn, some slty - sm tex,  
occ lam, sb blkly - plty, non calc,  
some ls, occ inoc

MD: 5,754 '  
TVD: 5,713.14 '  
Inclination: 1.2 °  
Azimuth: 103.8 °  
VS: 265.24 '

WT: 8.75  
VIS: 30

MD: 5,843 '  
TVD: 5,802.11 '  
Inclination: 1.6 °  
Azimuth: 98.4 °  
VS: 265.58 '

GAS (units) 4000  
C1-C4 (PPM) 00  
2888u



100% SLTY SH: med-dk gy, v f gr, mod frm-frm, some slty - sm tex, occ lam, sb blkly - plty, non calc, some ls, occ inoc, occ bent

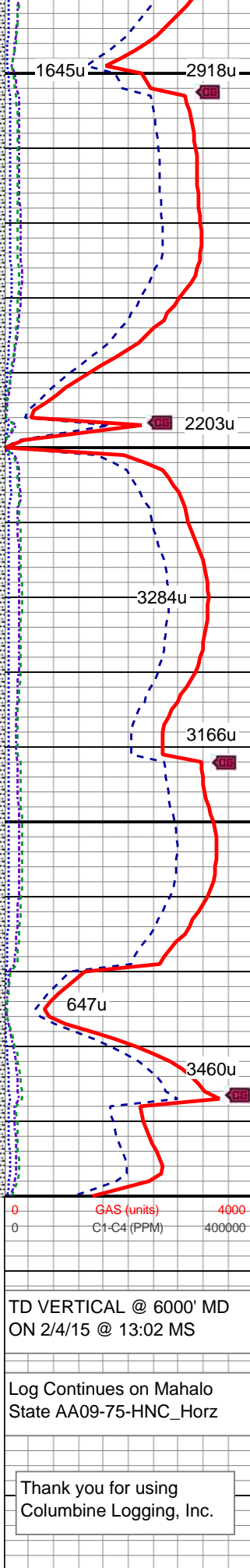


MD: 5,933 ' TVD: 5,892.08 ' Inclination: 1.5 ° Azimuth: 80.1 ° VS: 265.47 '

95% SLTY SH: med-dk gy, v f gr, mod frm-frm, some slty - sm tex, occ lam, sb blkly - plty, non calc, some ls, occ inoc, occ bent



1645u 2918u 2203u 3284u 3166u 647u 3460u



WT: 9.0  
VIS: 34

TD VERTICAL @ 6000' MD  
ON 2/4/15 @ 13:02 MS

Log Continues on Mahalo  
State AA09-75-HNC\_Horz

Thank you for using  
Columbine Logging, Inc.