

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Five Rivers K09-65-1HN VERT

**Location** SEC 8 T4N R66W

**State** COLORADO

**County** WELD

**Country** USA

**Rig Number** H&P 315

**API Number** 05-123-39476

**AFE #** 200355

**Region** DJ BASIN

**Field** WATTENBERG

**Spud Date** 8/22/2014

**Drilling Completed** 8/24/2014

**Surface Coordinates** NESE SEC 8 T4N R66W  
2,211' FSL; 56' FEL

LAT/LON: 40.32499/-104.79277

**Bottom Hole Coordinates** SEC 9 T4N R66W  
2,310' FSL; 75' FEL

**Ground Elevation** 4,700'

**K.B. Elevation** 4,724'

**Logged Interval** 2,000' To 6,473'

**Total Depth** 12,052'

**Formation** NIOBRARA C CHALK

**Type of Drilling Fluid** LSND

## Other Symbols

### Oil Show

- DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

### Porosity

- E EARTHY
- F FENESTRAL
- F FRACTURE
- INTERCRYSTALLINE
- INTEROOLITIC
- MOLDIC

- ORGANIC
- PINPOINT
- VUGGY

### Engineering

- BIT
- CONNECTION (LEFT)
- CONNECTION (RIGHT)
- CONNECTION GAS
- CONNECTION GAS DOWN...
- CONNECTION GAS DOWN
- 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

- ANGULAR
- ROUNDED
- SUBANG
- SUBRND

### Textures

- BOUNDSTONE
- CHALKY
- CRYPTOXLN
- E EARTHY
- FINELYXLN

- GRAINSTONE
- L LITHOGRAPHIC
- MIX MICROXLN
- MS MUDSTONE
- PS PACKSTONE
- WS WACKSTONE

### Sorting

- M MODERATE
- P POOR
- W WELL

## Accessories

## Fossils

- ALGAE
- AMPHIPORA
- BELEMNITE
- BIOCLASTIC
- BRACHIOPOD
- BRYOZOA
- CEPHALOPOD
- CORAL
- CRINOID
- ECHINOID
- FISH
- FORAMINIFERA

## F 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

## Rock Types

- SHALY SILTSTONE
- SHALY SANDSTONE
- SANDSTONE
- SILTY SHALE
- LIMESTONE
- CHALK
- MARLSTONE
- UNKNOWN
- ANHYDRITE

- BENTONITE
- BRECCIA
- CEMENT
- CHERT
- CLAY CHOKE SAND
- CLAYSTONE
- COAL
- CONGLOMERATE
- DOLOMITE

- GRANITE
- GYPSUM
- IGNEOUS
- SIDERITE or LIMONITE
- METAMORPHIC
- NO SAMPLE
- SALT
- SALT- PEPPER SAND
- SHALE

- SHALE COLORED
- SHALE GRAY
- SILTSTONE
- TILL
- TUFF
- WELDED TUFF

## Operator

**Company** Noble Energy Inc

**Address** 1625 BROADWAY SUITE 2200  
DENVER, CO 80202

## Geologist

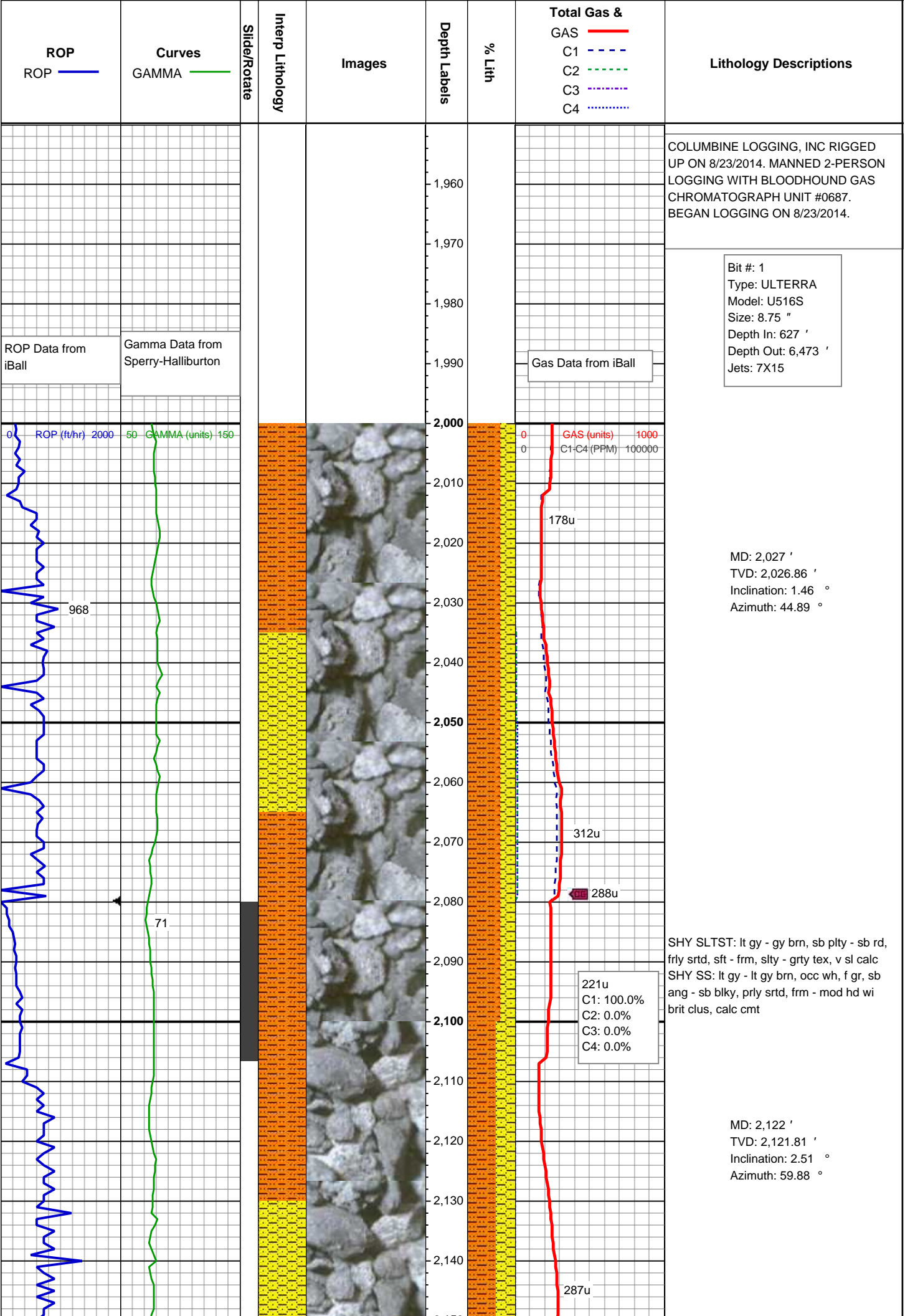
**Name** MARK COLE; ZACH UBER

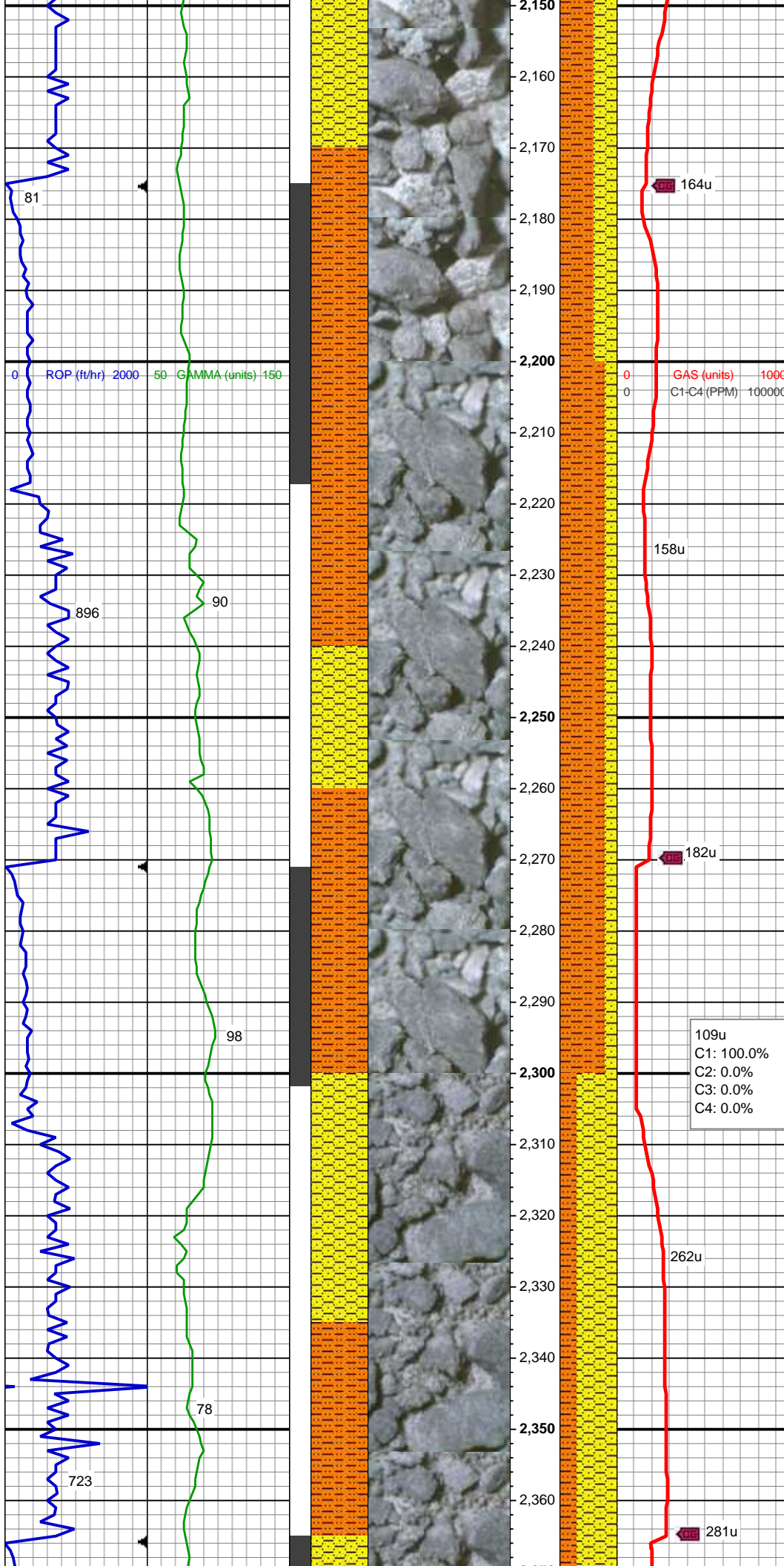
**Company** COLUMBINE LOGGING, INC

**Address** 2385 S LIPAN ST  
DENVER, CO 80223

## Zone Color Coding

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





SHY SLTST: lt gy - gy brn, sb plty - sb rd,  
frly srted, sft - frm, slty - grty tex, v sl calc  
SHY SS: lt gy - lt gy brn, occ wh, f gr, sb  
ang - sb blkly, prly srted, frm - mod hd wi  
brit clus, calc cmt

MD: 2,217 '  
TVD: 2,216.65 '  
Inclination: 4.09 °  
Azimuth: 68.53 °

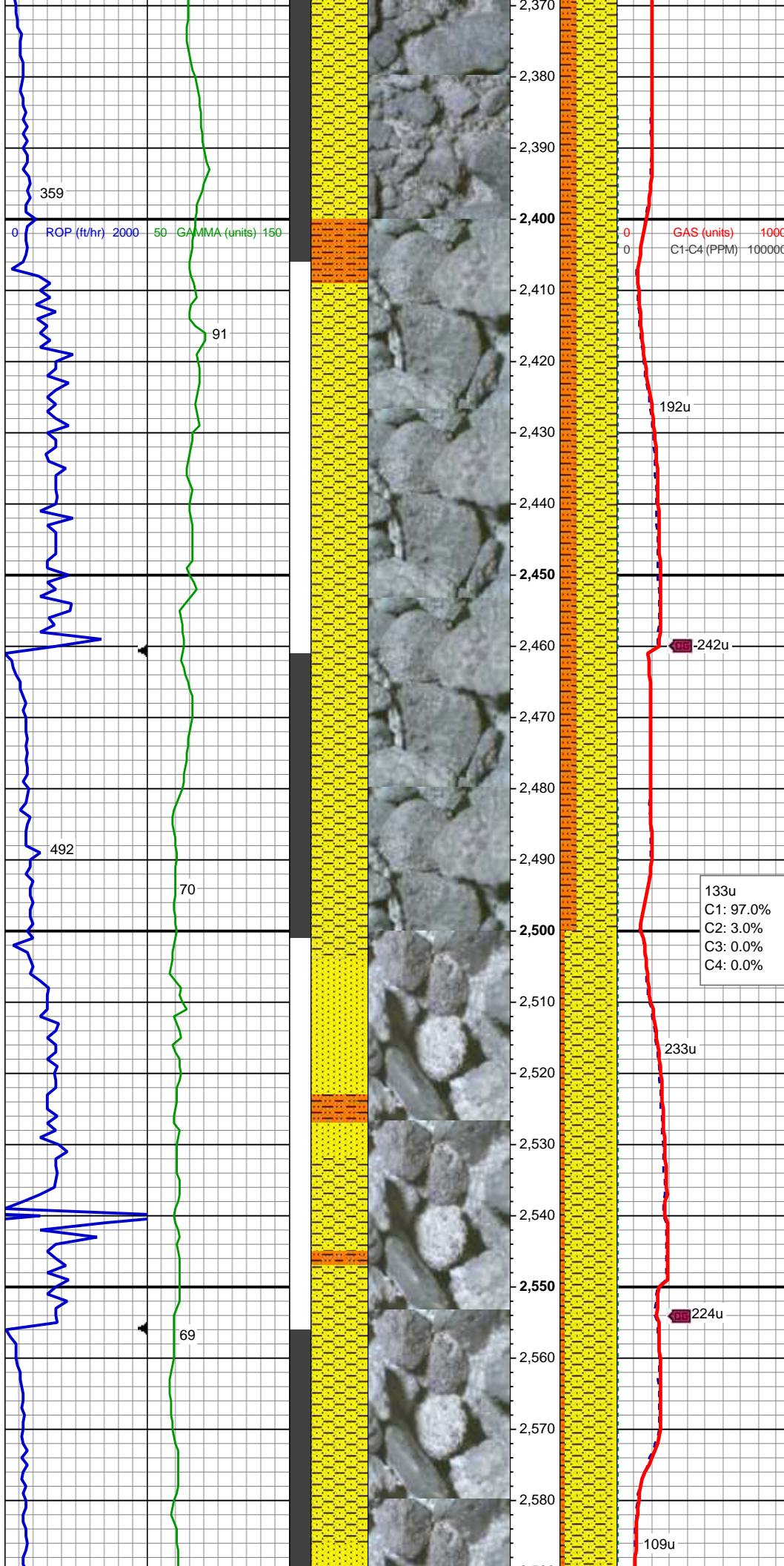
MUD WT: 8.70/8.70  
VIS: 40/40 IN/OUT

SHY SLTST: lt gy - gy brn, sb plty - sb rd,  
frly srted, sft - frm, slty - grty tex, v sl calc  
SHY SS: lt gy - lt gy brn, occ wh, f gr, sb  
ang - sb blkly, prly srted, frm - mod hd wi  
brit clus, calc cmt

MD: 2,311 '  
TVD: 2,310.34 '  
Inclination: 5.12 °  
Azimuth: 62.84 °

**PM Mud Rpt**  
8/23/2014  
Mud Wt: 8.65  
FVis: 36  
PVis: 9  
YP: 8  
GELS: 3/6/11  
API Filt: 7.8  
CAKE: 2/0  
pH: 10.4  
Cl: 1,500  
Ca: 80





SHY SS: lt gy - lt gy brn, occ wh, f gr, sb  
ang - sb blk, prly srt, frm - mod hd wi  
brit clus, calc cmt  
SHY SLTST: lt gy - gy brn, sb plty - sb rd,  
frly srt, sft - frm, slty - grty tex, v sl calc

MD: 2,406 '  
TVD: 2,404.85 '  
Inclination: 6.5 °  
Azimuth: 62.66 °

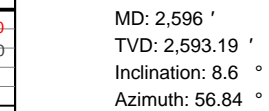
SHY SS: lt gy - lt gy brn, occ wh, f gr, sb  
ang - sb blk, prly srt, frm - mod hd wi  
brit clus, calc cmt  
SHY SLTST: lt gy - gy brn, sb plty - sb rd,  
frly srt, sft - frm, slty - grty tex, v sl calc

133u  
C1: 97.0%  
C2: 3.0%  
C3: 0.0%  
C4: 0.0%

MD: 2,501 '  
TVD: 2,499.14 '  
Inclination: 7.56 °  
Azimuth: 59.21 °

SHY SS: lt gy - lt gy brn, occ wh, f gr, sb  
ang - sb blk, prly srt, frm - mod hd wi  
brit clus, calc cmt  
SHY SLTST: lt gy - gy brn, sb plty - sb rd,  
frly srt, sft - frm, slty - grty tex, v sl calc

MD: 2,596 '  
TVD: 2,593.19 '  
Inclination: 8.6 °  
Azimuth: 56.84 °



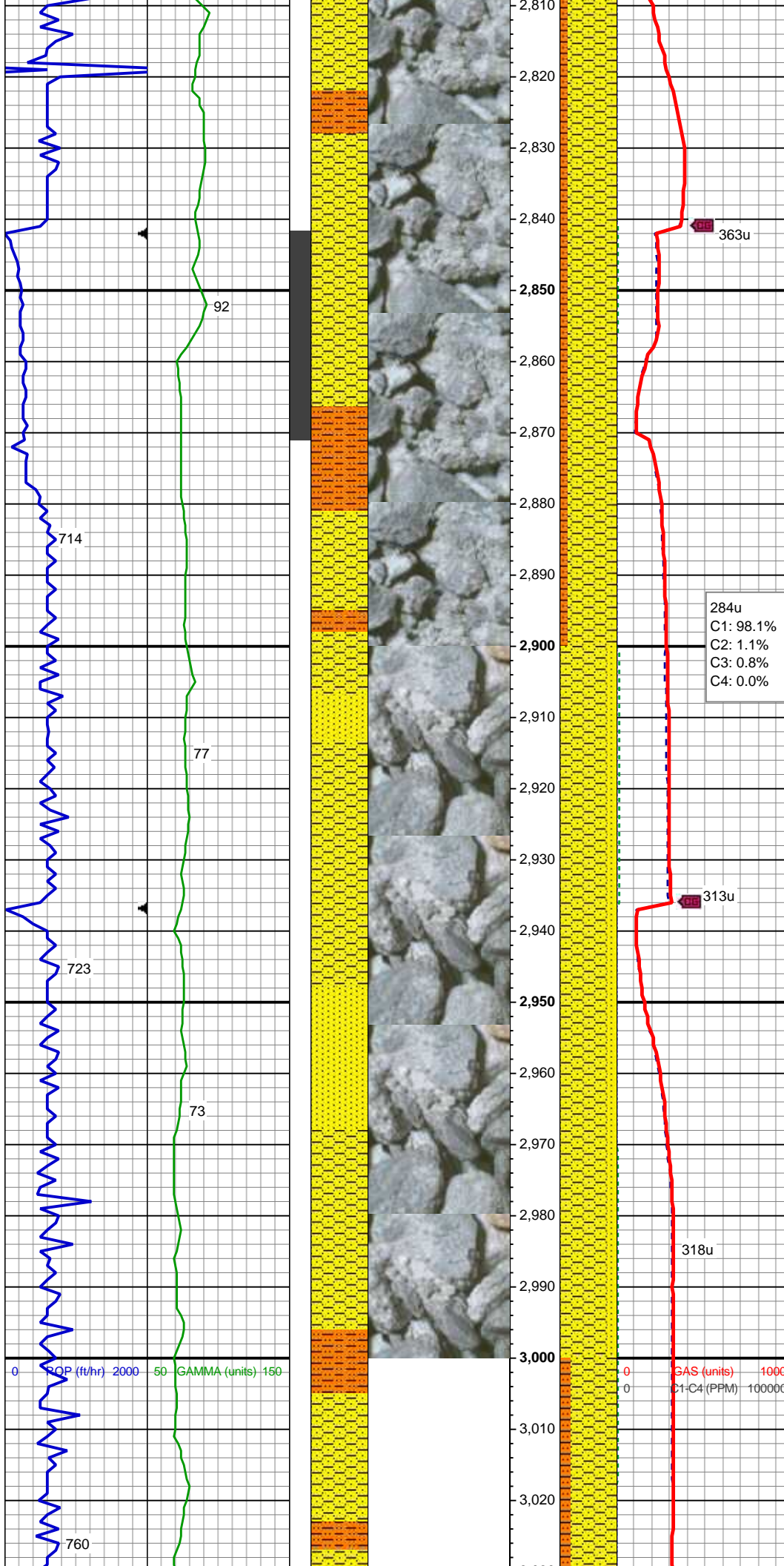
MD: 2,691 '   
 TVD: 2,686.99 '   
 Inclination: 9.6 °   
 Azimuth: 53.34 °

MD: 2,786 '  
TVD: 2,780.65 '  
Inclination: 9.69 °  
Azimuth: 52.87 °

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb  
rd, p srtld, sft - mod hd wi brit clus, calc  
cmt

SHY SLTST: ltgy, sb plty - sb rd, fr srtld,  
sft - frm, slty - grty tex, v sl calc





MUD WT: 8.75/8.75  
VIS: 38/38 IN/OUT

MD: 2,881 '  
TVD: 2,874.5 '  
Inclination: 8.16 °  
Azimuth: 58.44 °

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb  
rd, p srted, sft - mod hd wi brit clus, calc  
cmt

SHY SLTST: ltgy, sb plty - sb rd, fr srted,  
sft - frm, slty - grty tex, v sl calc

284u  
C1: 98.1%  
C2: 1.1%  
C3: 0.8%  
C4: 0.0%

MD: 2,976 '  
TVD: 2,968.66 '  
Inclination: 7.04 °  
Azimuth: 55.47 °

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb  
rd, p srted, sft - mod hd wi brit clus, calc  
cmt

SS: wh - ltgy, fros - trnsd, s&p, f gr, ang -  
sb ang, p srted, hd brit clus, v calc cmt

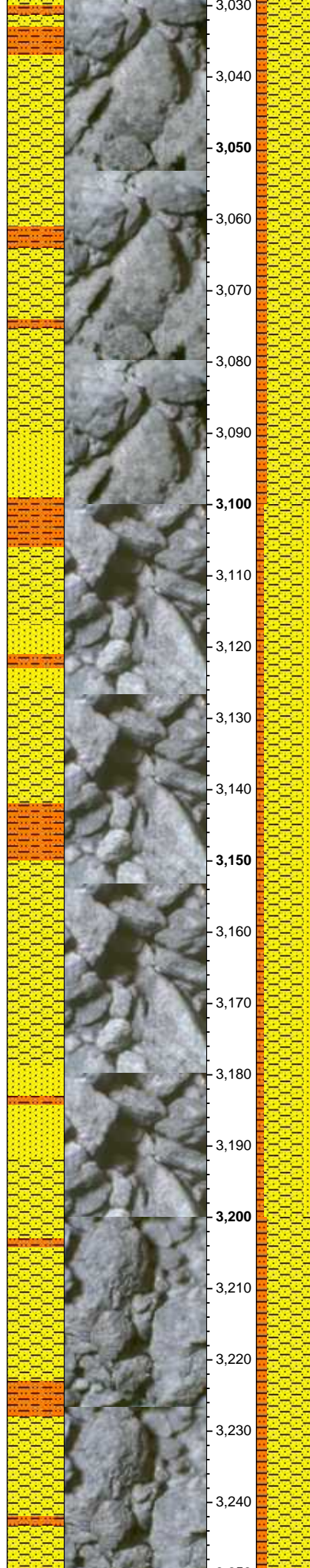
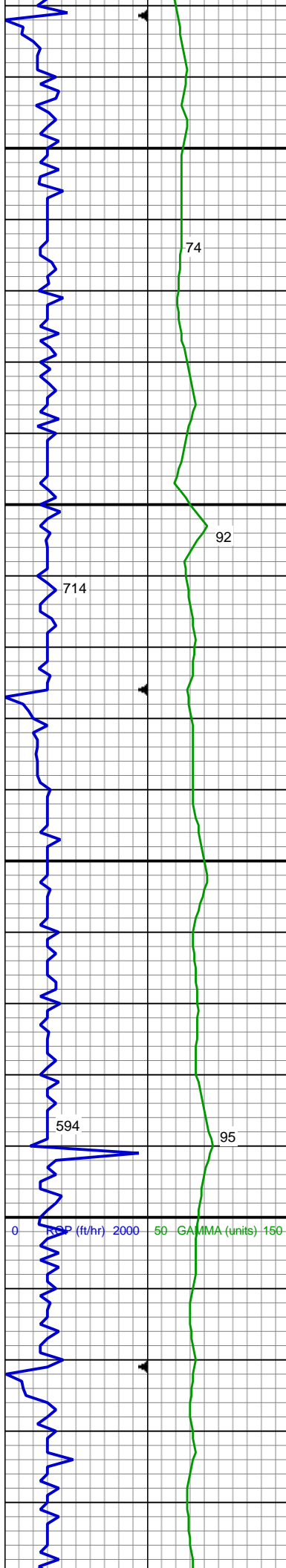
318u

313u

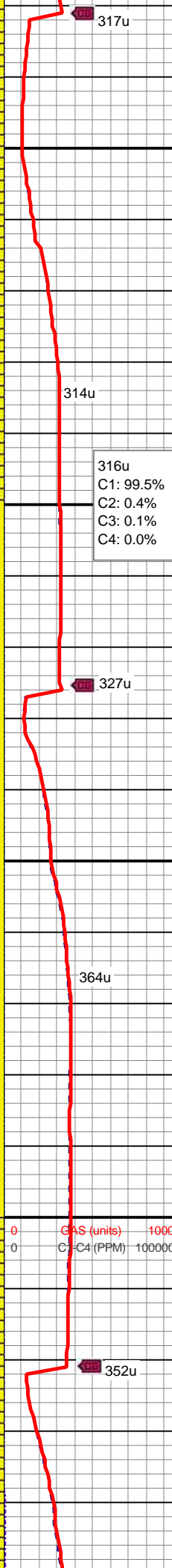
363u

ROP (ft/hr) 2000  
GAMMA (units) 150

GAS (units) 1000  
C1-C4 (PPM) 100000



3,030  
3,040  
3,050  
3,060  
3,070  
3,080  
3,090  
3,100  
3,110  
3,120  
3,130  
3,140  
3,150  
3,160  
3,170  
3,180  
3,190  
3,200  
3,210  
3,220  
3,230  
3,240



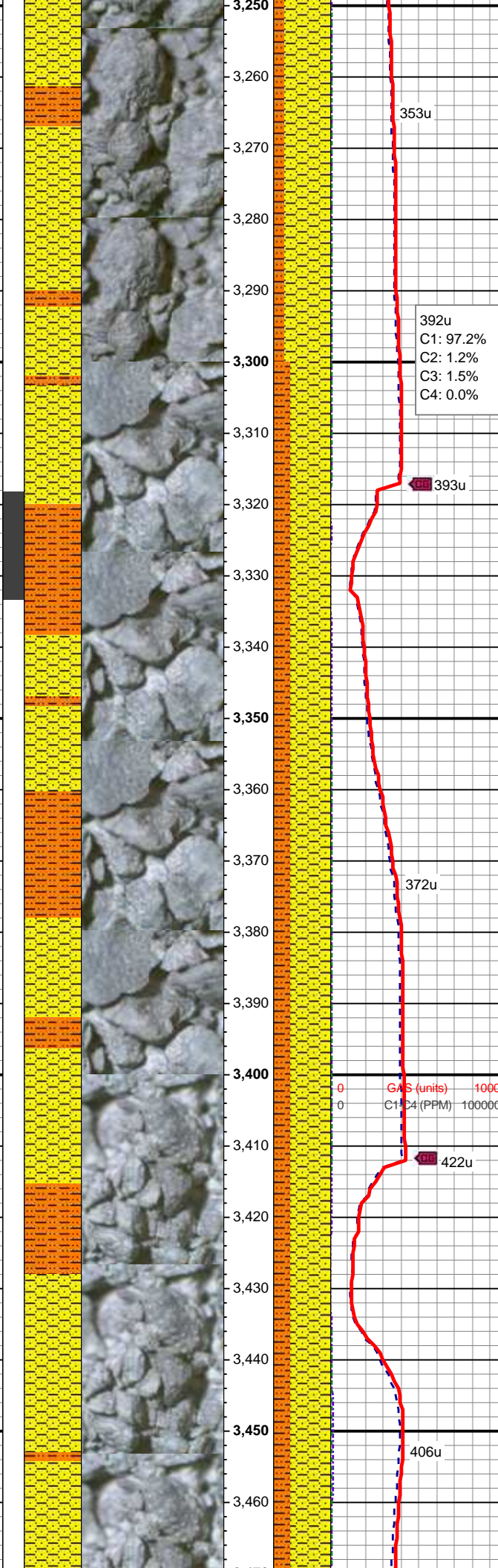
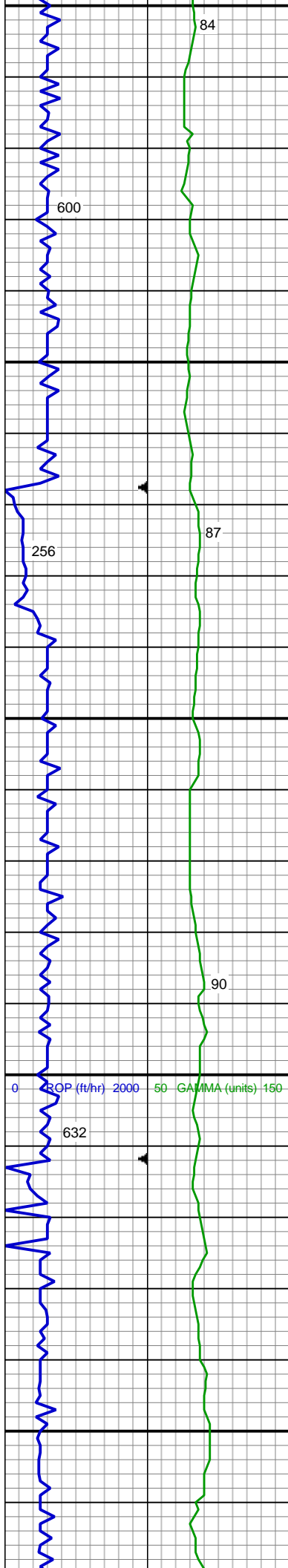
MD: 3,071 '  
TVD: 3,063.06 '  
Inclination: 5.87 °  
Azimuth: 55.04 °

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb  
rd, p srted, sft - mod hd wi brit clus, calc  
cmt  
SHY SLTST: ltgy, sb plty - sb rd, fr srted,  
sft - frm, slty - grty tex, v sl calc

MD: 3,166 '  
TVD: 3,157.67 '  
Inclination: 4.54 °  
Azimuth: 47.08 °

SHY SS: lt gy - lt gy brn, occ wh, f gr, sb  
ang - sb blk, prly srted, frm - mod hd wi  
brit clus, calc cmt  
SHY SLTST: lt gy - gy brn, sb plty - sb rd,  
frly srted, sft - frm, slty - grty tex, v sl calc  
SS: wh, fros - trns, s&p, f gr, ang - sb ang,  
p srted, hd brit clus, v calc cmt





MD: 3,261 '  
TVD: 3,252.43 '  
Inclination: 3.61 °  
Azimuth: 45.58 °

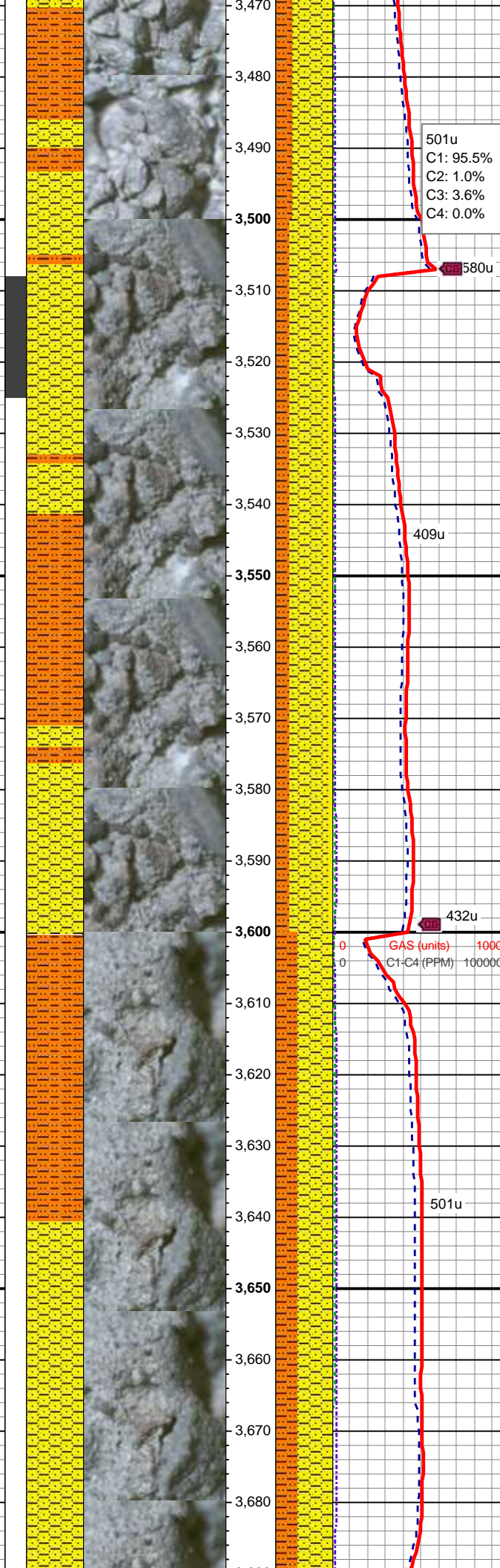
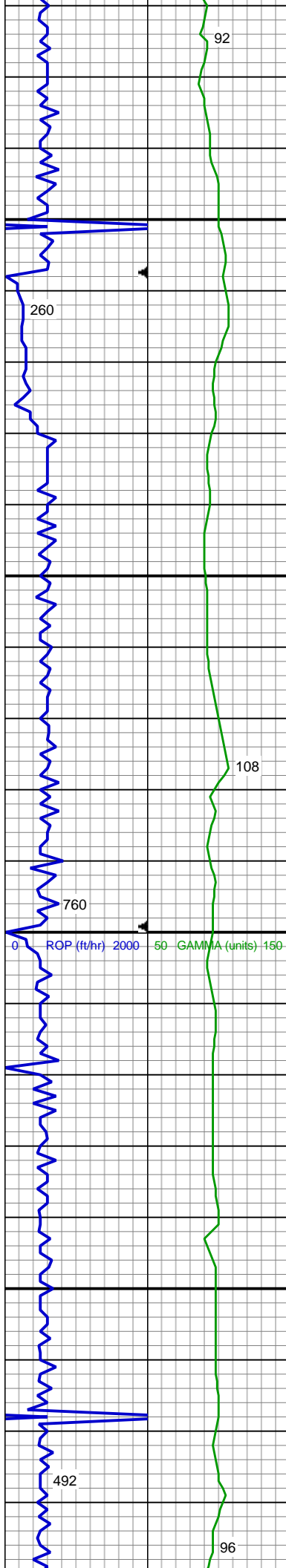
SHY SS: lt gy - lt gy brn, f gr, sb ang - sb rd, p srted, sft - mod hd wi brit clus, calc cmt  
SHY SLTST: ltgy, sb plty - sb rd, fr srted, sft - frm, slty - grty tex, v sl calc

MD: 3,356 '  
TVD: 3,347.3 '  
Inclination: 2.26 °  
Azimuth: 57.79 °

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb rd, p srted, sft - mod hd wi brit clus, calc cmt  
SHY SLTST: ltgy, sb plty - sb rd, fr srted, sft - frm, slty - grty tex, v sl calc

0 GAS (units) 1000  
0 C1-C4 (PPM) 100000

MD: 3,451 '  
TVD: 3,442.24 '  
Inclination: 1.93 °  
Azimuth: 49.3 °



SHY SS: lt gy - lt gy brn, f gr, sb ang - sb rd, p srted, sft - mod hd wi brit clus, calc cmt  
SHY SLTST: ltgy, sb plty - sb rd, fr srted, sft - frm, slty - grty tex, v sl calc

501u  
C1: 95.5%  
C2: 1.0%  
C3: 3.6%  
C4: 0.0%

580u

409u

432u

GAS (units)  
C1-C4 (PPM)

501u

MUD WT: 8.90/8.75  
VIS: 40/41 IN/OUT

MD: 3,546 '  
TVD: 3,537.2 '  
Inclination: 1.37 °  
Azimuth: 77.48 °

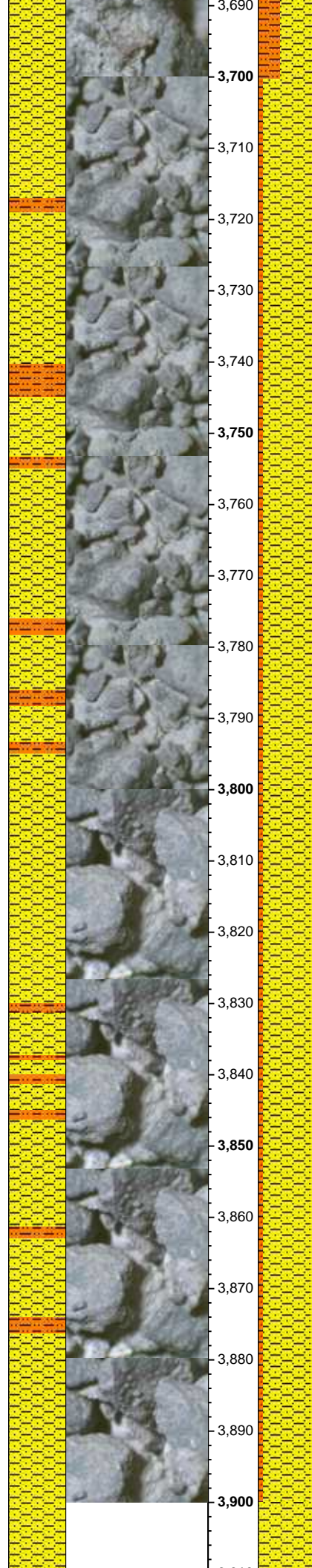
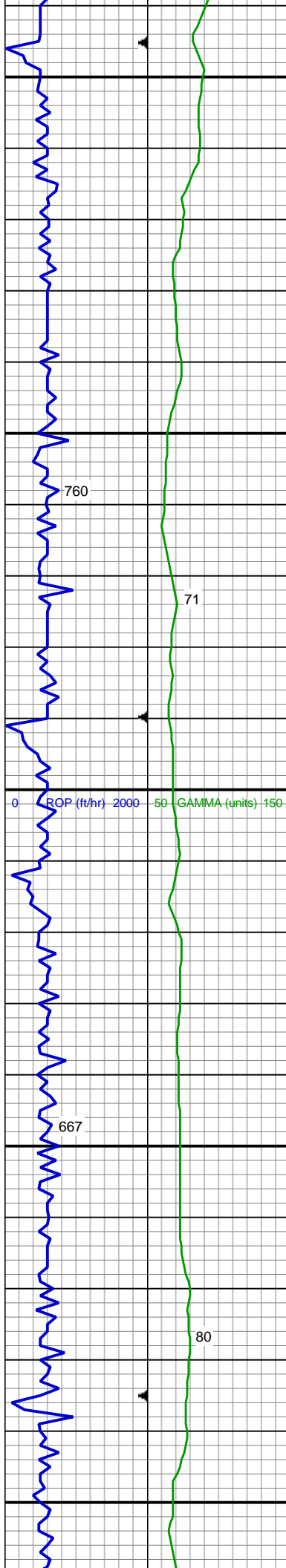
SHY SS: lt gy - lt gy brn, occ wh, f gr, sb ang - sb blk, prly srted, frm - mod hd wi brit clus, calc cmt  
SHY SLTST: lt gy - gy brn, sb plty - sb rd, frly srted, sft - frm, slty - grty tex, v sl calc  
SS: wh, fros - trns, s&p, f gr, ang - sb ang, p srted, hd brit clus, v calc cmt

MD: 3,640 '  
TVD: 3,631.18 '  
Inclination: 1.21 °  
Azimuth: 76.12 °

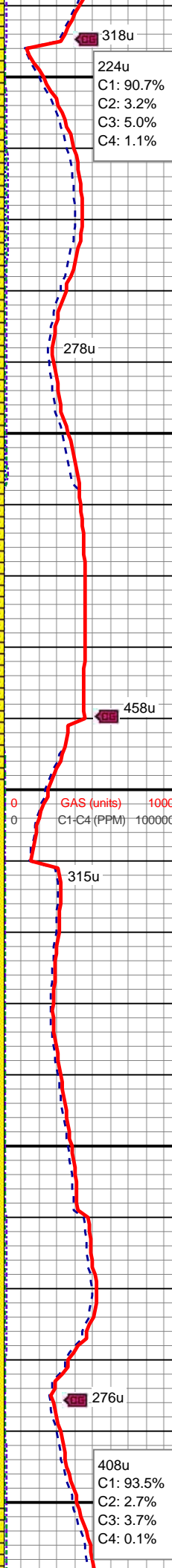
Parkman Top @  
3,641' MD; 3,632' TVD

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb rd, p srted, sft - mod hd wi brit clus, calc





3,690  
3,700  
3,710  
3,720  
3,730  
3,740  
3,750  
3,760  
3,770  
3,780  
3,790  
3,800  
3,810  
3,820  
3,830  
3,840  
3,850  
3,860  
3,870  
3,880  
3,890  
3,900



rd, p srted, sft - frm, slty - grty tex, v sl calc  
cmt  
SHY SLTST: ltgy, sme dk gry sb plty - sb  
rd, fr srted, sft - frm, slty - grty tex, v sl calc

MD: 3,735 '  
TVD: 3,726.16 '  
Inclination: 1.07 °  
Azimuth: 72.68 °

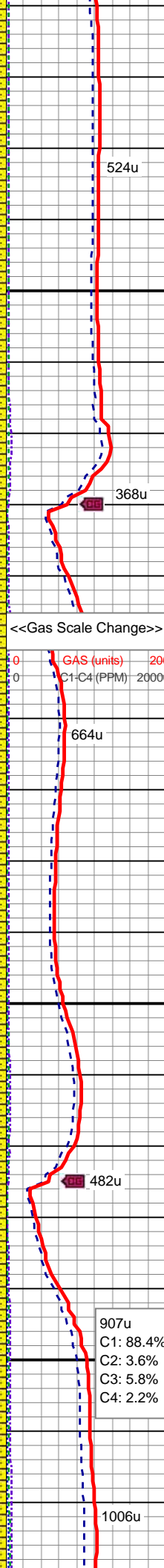
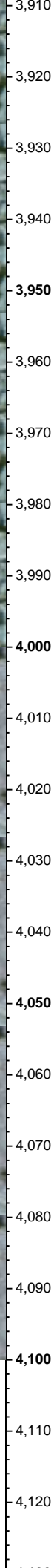
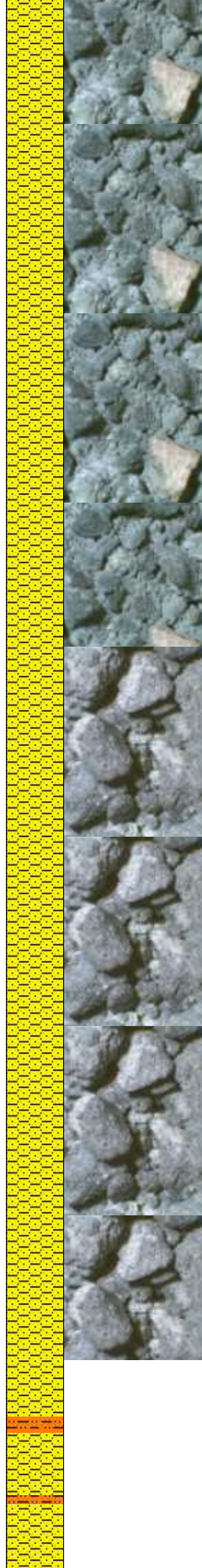
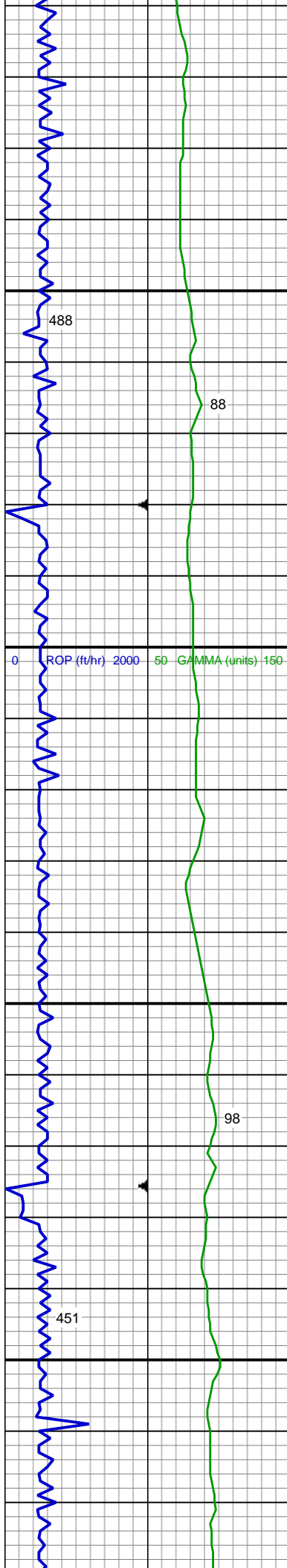
SHY SS: lt gy - lt gy brn, f gr, sb ang - sb  
rd, p srted, sft - mod hd wi brit clus, calc  
cmt  
SHY SLTST: ltgy, sme dk gy, sb plty - sb  
rd, fr srted, sft - frm, slty - grty tex, v sl calc

MD: 3,830 '  
TVD: 3,821.14 '  
Inclination: 1.14 °  
Azimuth: 74.99 °

SHY SS: lt gy - lt gy brn, occ wh, f gr, sb  
ang - sb blk, prly srted, frm - mod hd wi  
brit clus, calc cmt  
SHY SLTST: lt gy - gy brn, sb plty - sb rd,  
frly srted, sft - frm, slty - grty tex, v sl calc  
SS: wh, fros - trns, s&p, f gr, ang - sb ang,  
p srted, hd brit clus, v calc cmt

408u  
C1: 93.5%  
C2: 2.7%  
C3: 3.7%  
C4: 0.1%





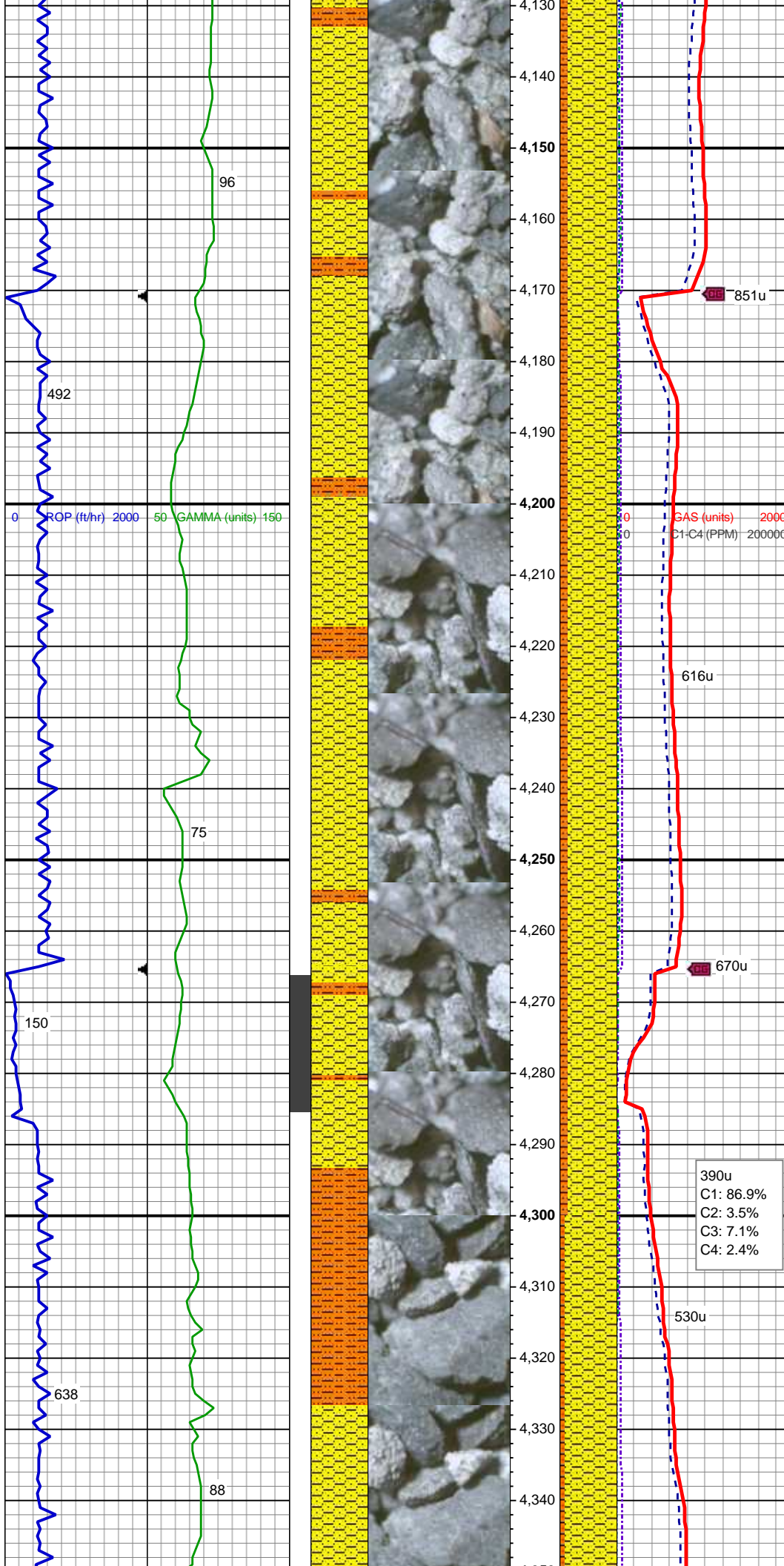
MD: 3,925 '  
TVD: 3,916.12 '  
Inclination: 0.92 °  
Azimuth: 81.56 °

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb  
rd, p srted, sft - mod hd wi brit clus, cal

MD: 4,020 '  
TVD: 4,011.11 '  
Inclination: 1.08 °  
Azimuth: 84.05 °

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb  
rd, p srted, sft - mod hd wi brit clus, cal

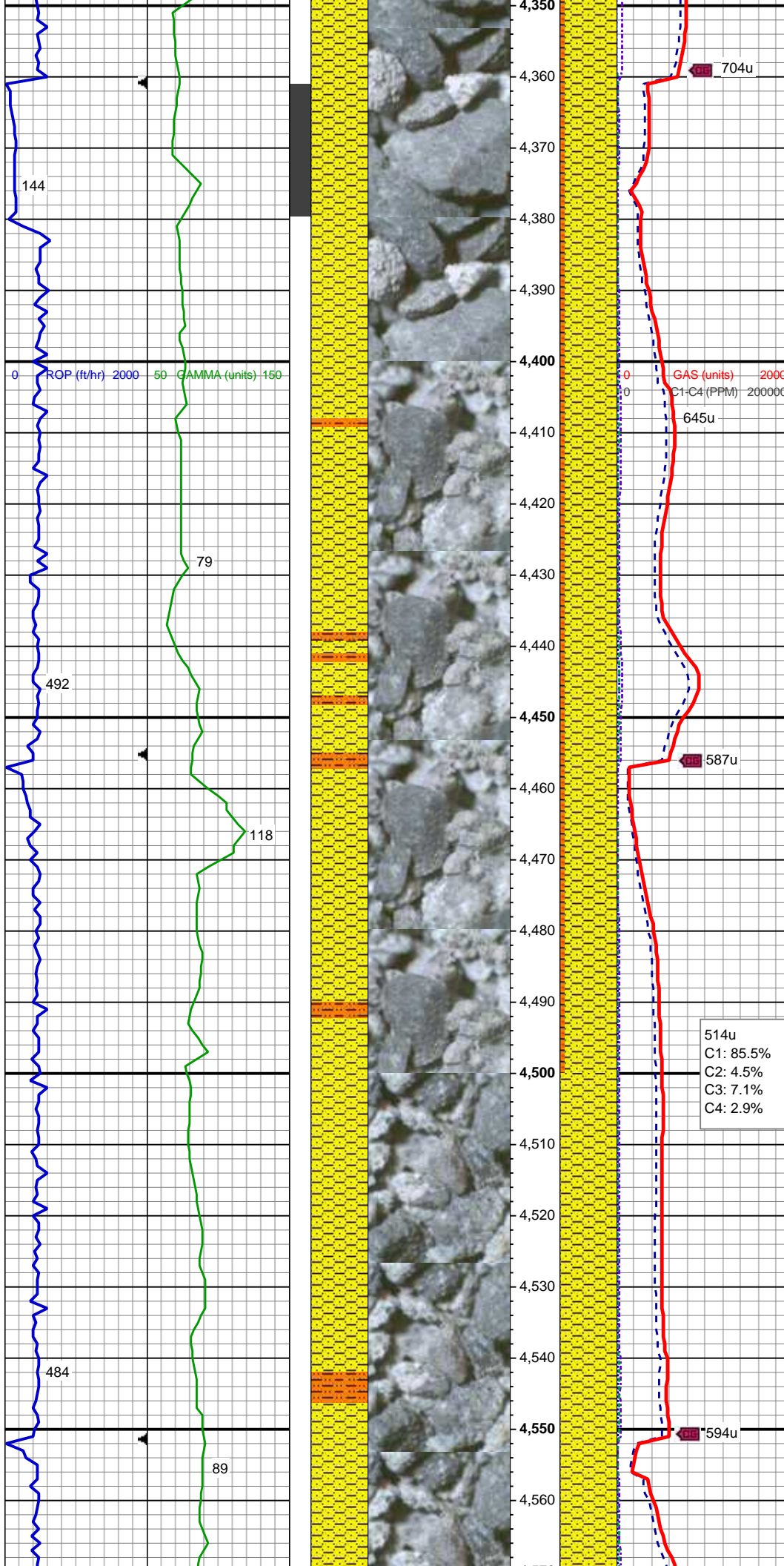
MD: 4,115 '  
TVD: 4,106.08 '  
Inclination: 1.52 °  
Azimuth: 92.71 °



SHY SS: lt gy - lt gy brn, f gr, sb ang - sb rd, p srted, sft - mod hd wi brit clus, calc cmt  
SHY SLTST: ltgy, sb plty - sb rd, fr srted, sft - frm, slty - grty tex, v sl calc

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb rd, p srted, sft - mod hd wi brit clus, calc cmt  
SHY SLTST: ltgy, sb plty - sb rd, fr srted, sft - frm, slty - grty tex, v sl calc





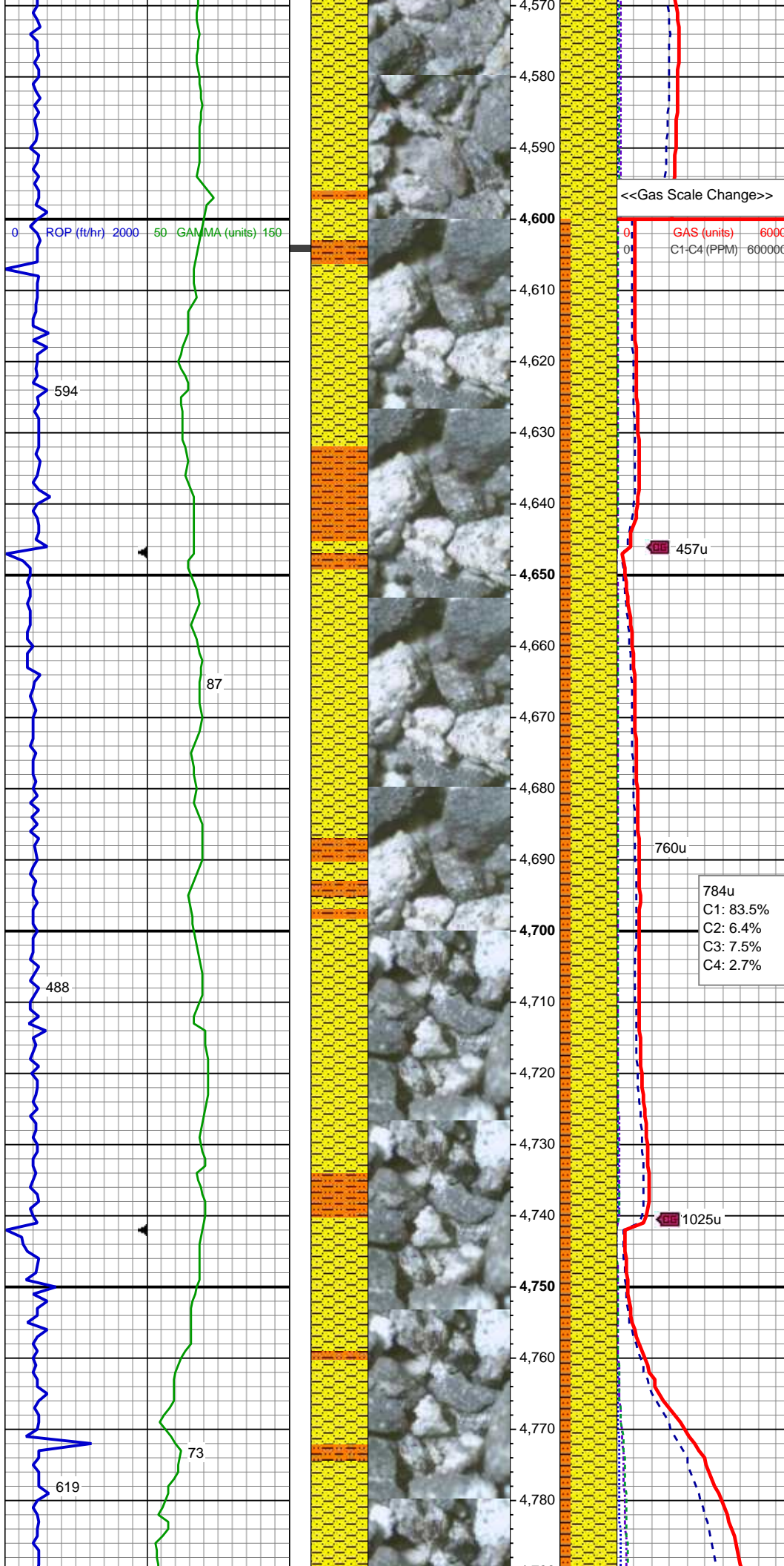
SHY SS: lt gy - lt gy brn, f gr, sb ang - sb rd, p srted, sft - mod hd wi brit clus, calc cmt  
SHY SLTST: ltgy, sb plty - sb rd, fr srted, sft - frm, slty - grty tex, tr wh inoc foss, v sl calc

MD: 4,399 '  
TVD: 4,389.99 '  
Inclination: 0.79 °  
Azimuth: 189.53 °

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb rd, p srted, sft - mod hd wi brit clus, calc cmt;  
SHY SLTST: ltgy, sb plty - sb rd, fr srted, sft - frm, slty - grty tex, v sl calc

MD: 4,494 '  
TVD: 4,484.98 '  
Inclination: 0.98 °  
Azimuth: 197.39 °





SHY SS: lt gy - lt gy brn, sme dk gy, f gr, sb ang - sb rd, p srted, sft - mod hd wi brit clus, tr cal, calc cmt

MD: 4,589 '  
TVD: 4,579.97 '  
Inclination: 1.02 °  
Azimuth: 210.87 °

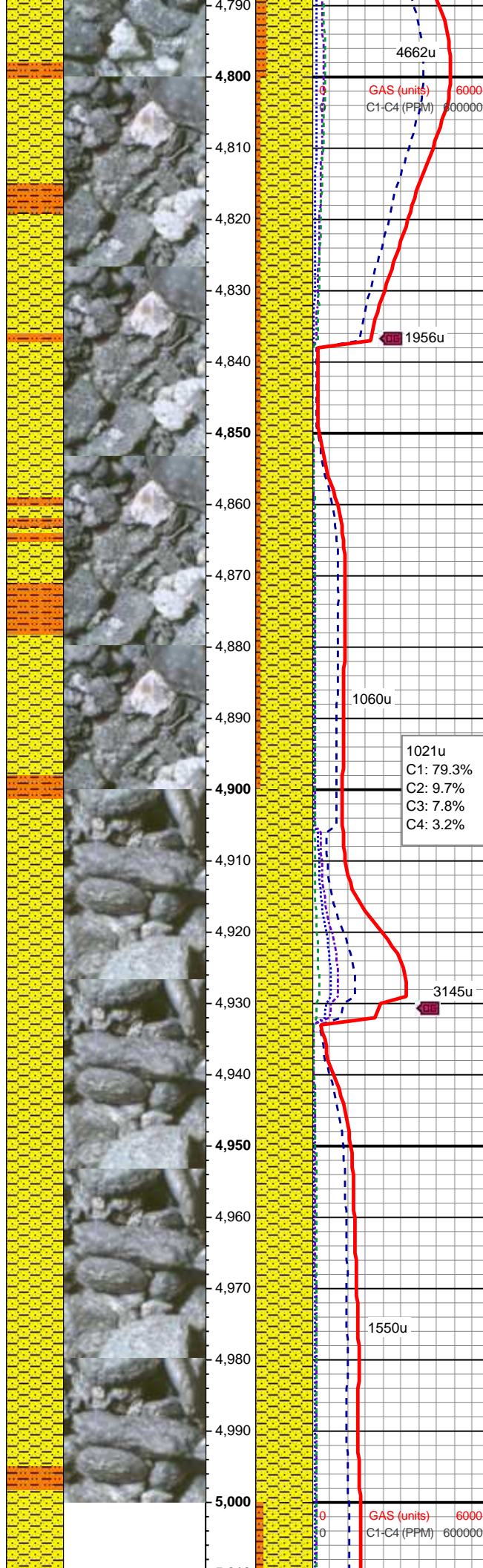
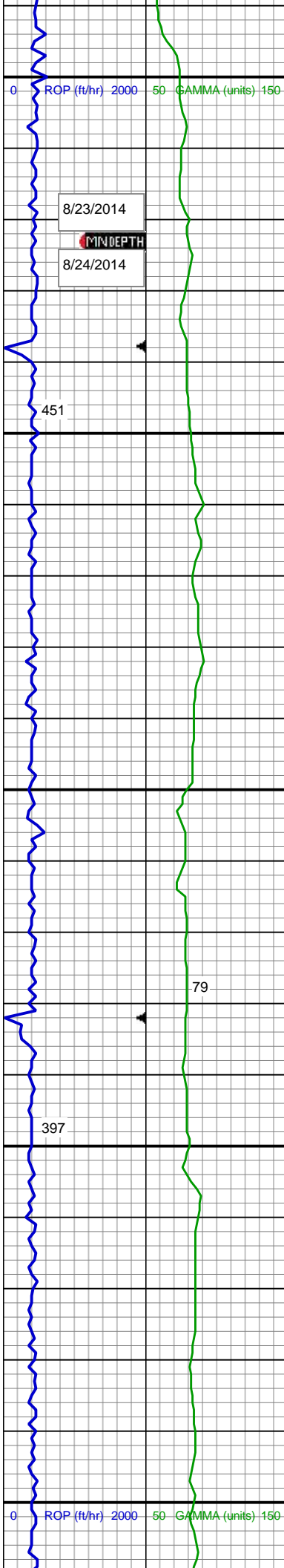
MD: 4,684 '  
TVD: 4,674.94 '  
Inclination: 1.52 °  
Azimuth: 227.78 °

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb rd, p srted, sft - mod hd wi brit clus, calc cmt;

SHY SLTST: ltgy, sb plty - sb rd, fr srted, sft - frm, slty - grty tex, tr cal, v sl calc

Shannon Top @  
4,740' MD; 4,731' TVD

MD: 4,779 '  
TVD: 4,769.91 '  
Inclination: 1.39 °  
Azimuth: 230.29 °



SHY SS: lt gy - lt gy brn, f gr, sb ang - sb rd, p srted, sft - mod hd wi brit clus, calc cmt;  
SHY SLTST: ltgy, sb plty - sb rd, fr srted, sft - frm, slty - grty tex, v sl calc

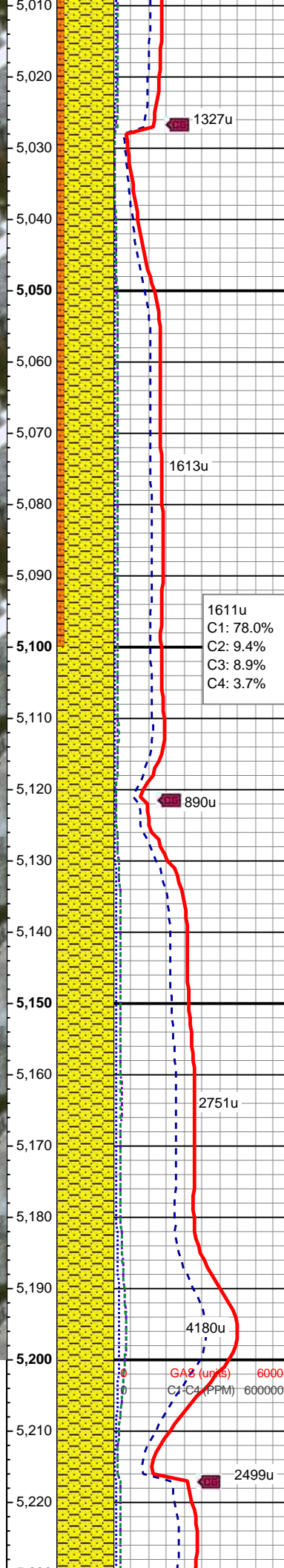
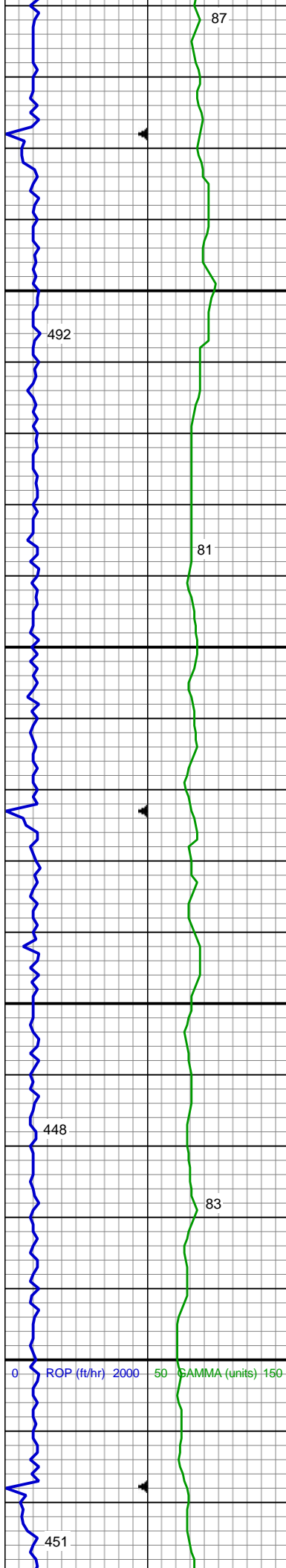
MD: 4,874 '  
TVD: 4,864.89 '  
Inclination: 1.4 °  
Azimuth: 233.8 °

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb rd, p srted, sft - mod hd wi brit clus, calc cmt;  
SHY SLTST: ltgy, sb plty - sb rd, fr srted, sft - frm, slty - grty tex, v sl calc

MD: 4,969 '  
TVD: 4,959.86 '  
Inclination: 1.23 °  
Azimuth: 232.74 °

SHY SS: lt gy - lt gy brn, sme tan, f gr, sb ang - sb rd, p srted, sft - mod hd wi brit clus, calc cmt





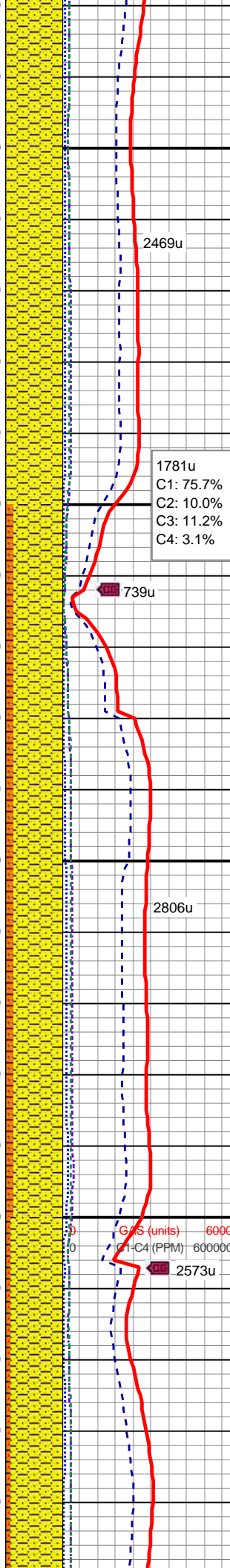
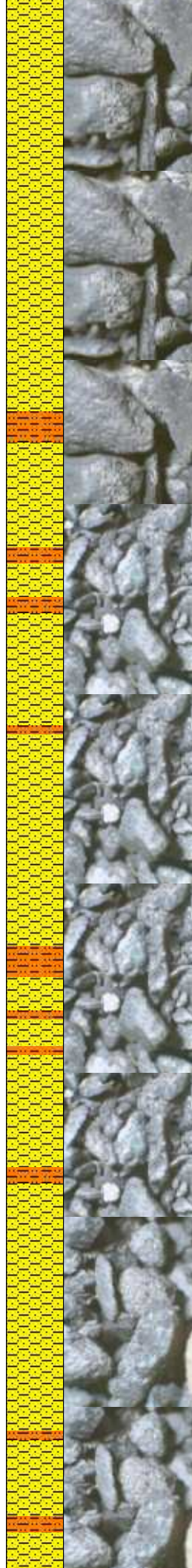
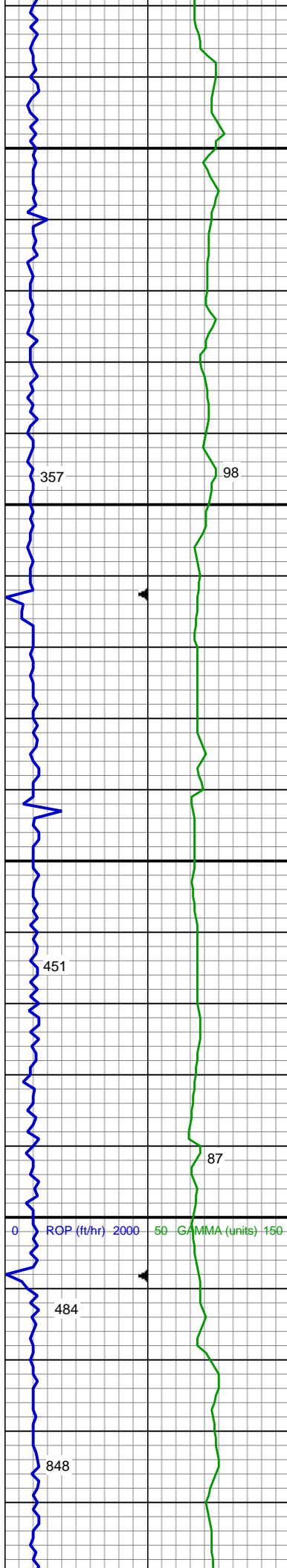
MD: 5,063 '  
TVD: 5,053.84 '  
Inclination: 1.12 °  
Azimuth: 230.12 °

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb rd, p srt, sft - mod hd wi brit clus, calc cmt;  
SHY SLTST: ltgy, sb plty - sb rd, fr srt, sft - frm, slty - grty tex, v sl calc

MD: 5,158 '  
TVD: 5,148.83 '  
Inclination: 0.85 °  
Azimuth: 235.06 °

SHY SS: lt gy - lt gy brn, tr dk gy, f gr, sb ang - sb rd, p srt, sft - mod hd wi brit clus, calc cmt





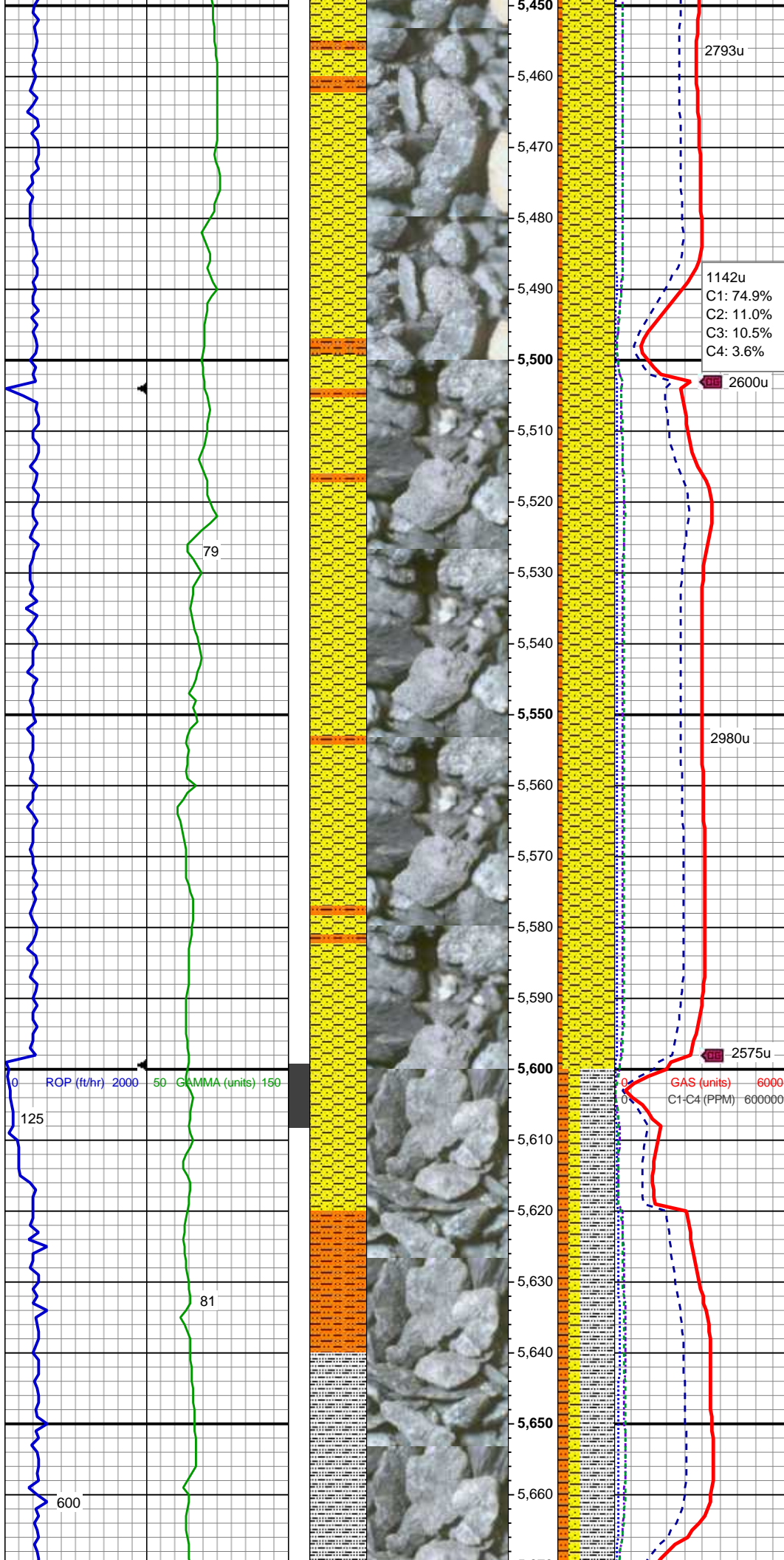
MD: 5,253 '  
TVD: 5,243.81 '  
Inclination: 0.99 °  
Azimuth: 237.33 °

SHY SS: lt gy - lt gy brn, tr dk gy, f gr, sb  
ang - sb rd, p srted, sft - mod hd wi brit  
clus, calc cmt

MD: 5,348 '  
TVD: 5,338.8 '  
Inclination: 0.74 °  
Azimuth: 214.1 °

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb  
rd, p srted, sft - mod hd wi brit clus, calc  
cmt;  
SHY SLTST: ltgy, sb plty - sb rd, fr srted,  
sft - frm, slty - grty tex, v sl calc

MD: 5,443 '  
TVD: 5,433.8 '  
Inclination: 0.44 °  
Azimuth: 187.12 °



SHY SS: lt gy - lt gy brn, f gr, sb ang - sb  
rd, p srted, sft - mod hd wi brit clus, calc  
cmt;  
SHY SLTST: ltgy, sb plty - sb rd, fr srted,  
sft - frm, slty - grty tex, v sl calc

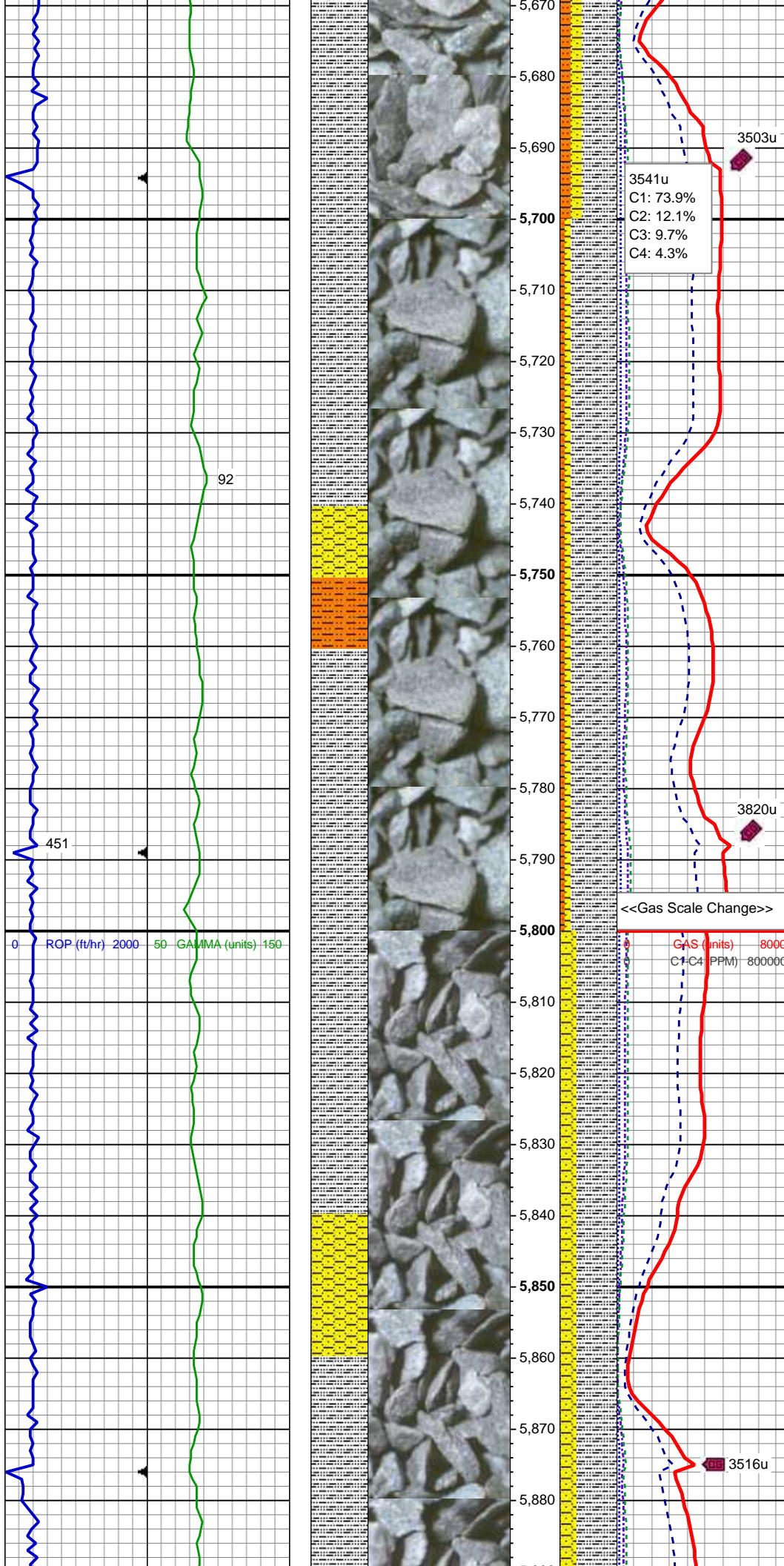
MD: 5,538 '  
TVD: 5,528.8 '  
Inclination: 0.48 °  
Azimuth: 158.27 °

SHY SS: lt gy - lt gy brn, f gr, sb ang - sb  
rd, p srted, sft - mod hd wi brit clus, calc  
cmt;  
SHY SLTST: ltgy, sb plty - sb rd, fr srted,  
sft - frm, slty - grty tex, v sl calc

MD: 5,633 '  
TVD: 5,623.79 '  
Inclination: 0.34 °  
Azimuth: 44.47 °

**AM Mud Rpt**  
8/24/2014  
Mud Wt: 9.50  
FVis: 50  
PVis: 17  
YP: 16  
GELS: 4/22/30  
API Filt: 5.6  
CAKE: 2/0  
pH: 9.5





SLTY SH: predy ltgy, occ med gy, frm - hd, plty - sb plty, occ sb blkly, slty - grty tex, v sl calc  
SHY SLTST: ltgy, sb plty - sb rd, fr srtd, sft - frm, slty - grty tex, v sl calc  
SHY SS: lt gy, f gr, sb ang - sb rd, p srtd, sft - mod hd wi brit clus, calc cmt

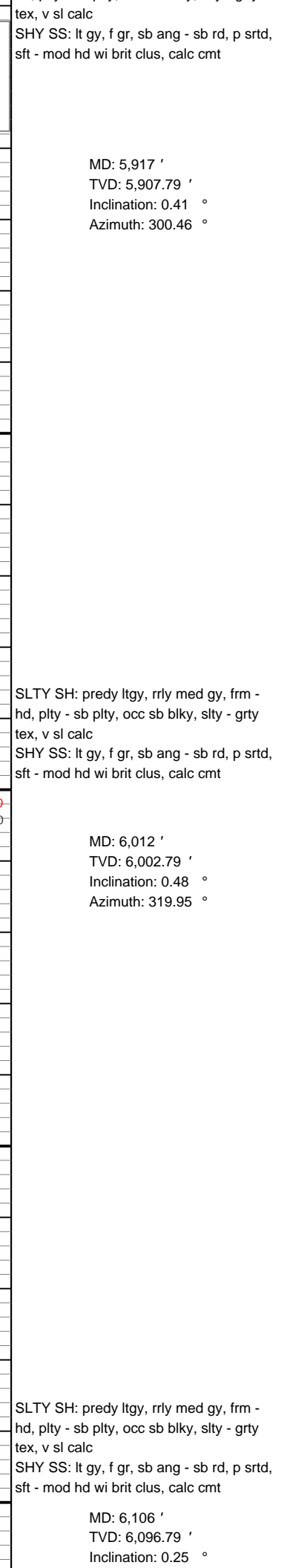
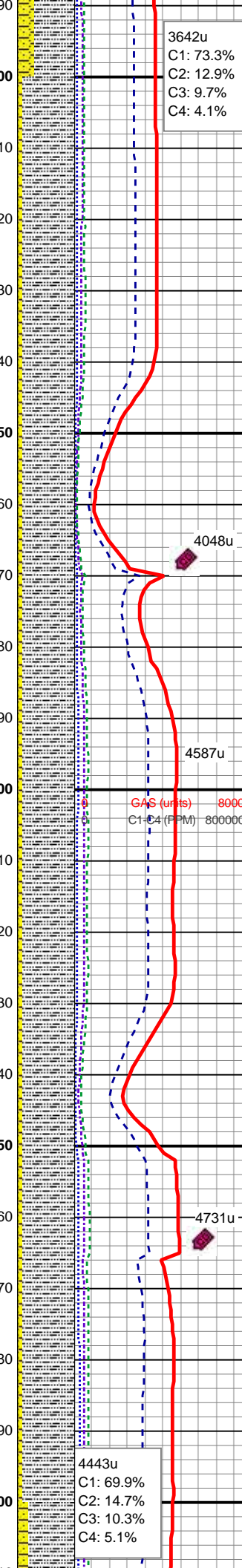
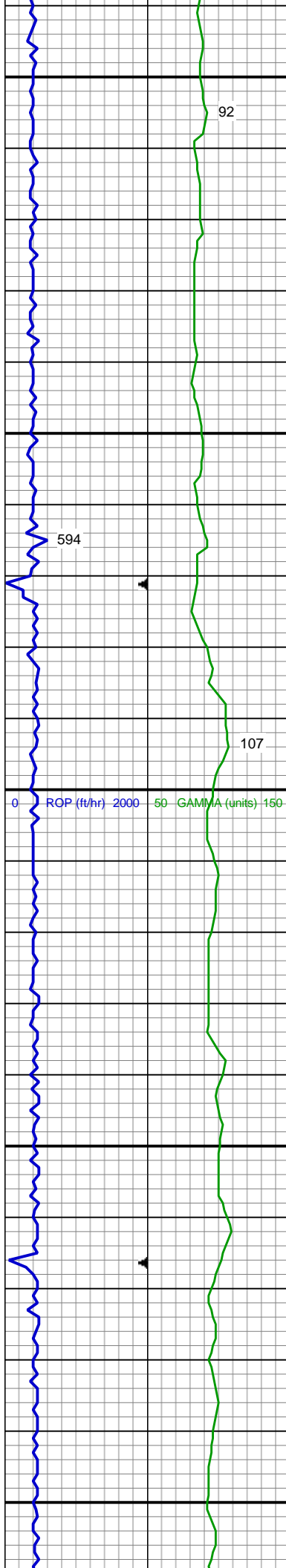
MD: 5,727 '  
TVD: 5,717.79 '  
Inclination: 0.29 °  
Azimuth: 41.62 °

SLTY SH: predy ltgy, occ med gy, frm - hd, plty - sb plty, occ sb blkly, slty - grty tex, v sl calc  
SHY SLTST: ltgy, sb plty - sb rd, fr srtd, sft - frm, slty - grty tex, v sl calc  
SHY SS: lt gy, f gr, sb ang - sb rd, p srtd, sft - mod hd wi brit clus, calc cmt

MD: 5,822 '  
TVD: 5,812.79 '  
Inclination: 0.29 °  
Azimuth: 356.3 °

SLTY SH: predy ltgy, rrlly med gy, frm - hd, plty - sb plty, occ sb blkly, slty - grty





Azimuth: 321.67 °

Teepee Buttes Top @  
6,132' MD; 6,123' TVD



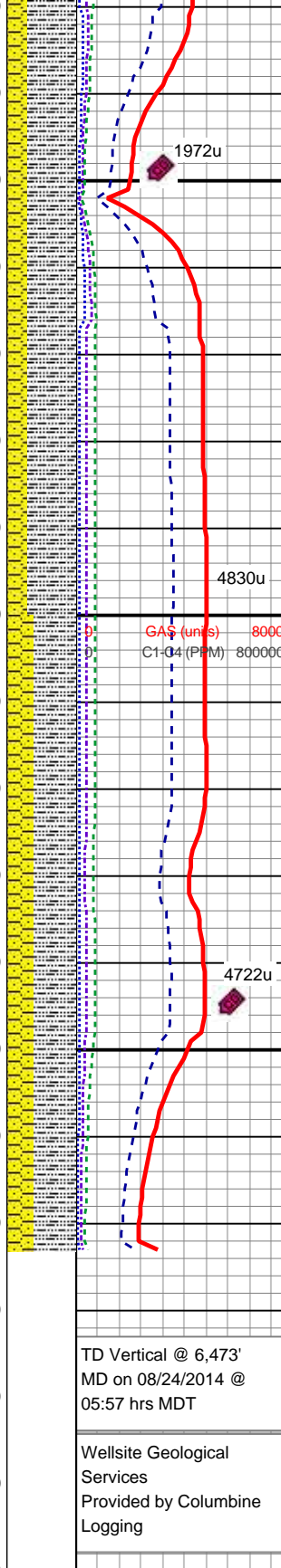
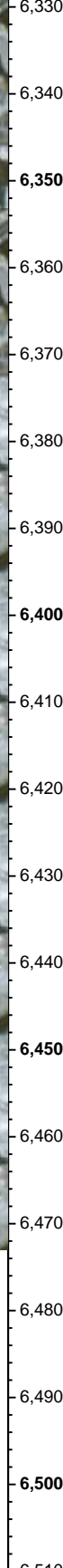
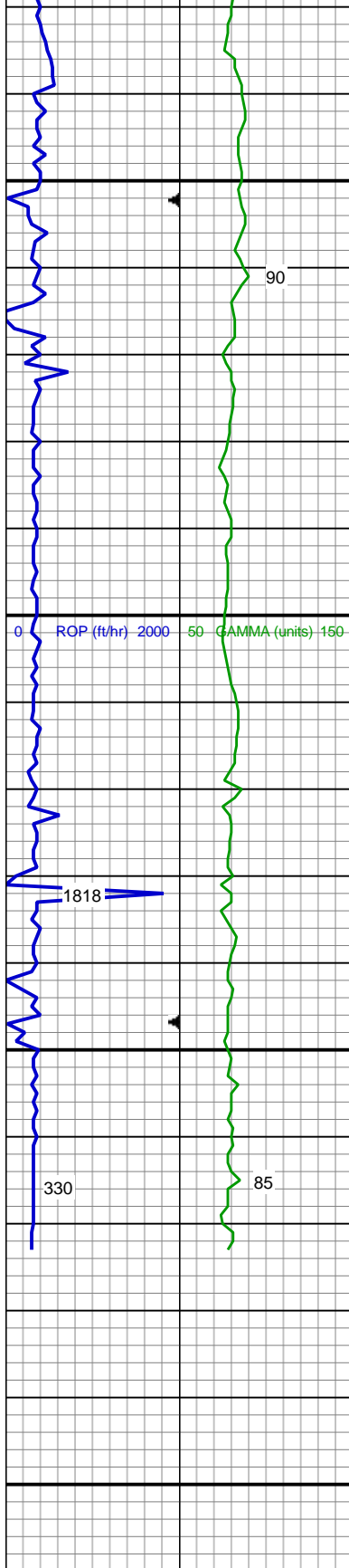
SLTY SH: predy ltgy, rrlly med gy, frm -  
hd, plty - sb plty, occ sb blkly, slty - grty  
tex, v sl calc  
SHY SS: lt gy, f gr, sb ang - sb rd, p srtd,  
sft - mod hd wi brit clus, calc cmt

MD: 6,201 '  
TVD: 6,191.79 '  
Inclination: 0.28 °  
Azimuth: 335.87 °

SLTY SH: predy ltgy, rrlly med gy, frm -  
hd, plty - sb plty, occ sb blkly, slty - grty  
tex, v sl calc  
SHY SS: lt gy, f gr, sb ang - sb rd, p srtd,  
sft - mod hd wi brit clus, calc cmt

MD: 6,297 '  
TVD: 6,287.78 '  
Inclination: 0.1 °  
Azimuth: 352.23 °





MD: 6,392 '

TVD: 6,382.78 '

Inclination: 0.12 °

Azimuth: 36.67 °

SLTY SH: predy ltgy, rrlly med gy, frm - hd, plty - sb plty, occ sb blkly, slty - grty tex, v sl calc

SHY SS: lt gy, f gr, sb ang - sb rd, p srtd, sft - mod hd wi brit clus, calc cmt

SLTY SH: predy ltgy, rrlly med gy, frm - hd, plty - sb plty, occ sb blkly, slty - grty tex, v sl calc

SHY SS: lt gy, f gr, sb ang - sb rd, p srtd, sft - mod hd wi brit clus, calc cmt

See Corresponding Horizontal Log **Five Rivers K09-65-1HN HORZ**