

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name Five Rivers K07-65-1BHN VERT

Location SEC 8 T4N R66W

State COLORADO

County WELD

Country USA

Rig Number H&P 315

API Number 05-123-39477

AFE # 200360

Region DJ BASIN

Field WATTENBERG

Spud Date 8/5/2014

Drilling Completed 8/7/2014

Surface Coordinates NESE SEC 8 T4N R66W
2,234' FSL; 55' FEL

LAT/LON: 40.32505/-104.79277

Bottom Hole Coordinates SEC 7 T4N R66W
2,475' FSL; 535' FWL

Ground Elevation 4,700'

K.B. Elevation 4,724'

Logged Interval 2,000' To 6,312'

Total Depth 16,291'

Formation NIOBRARA A 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

Fossil

- GASTROPOD
- INOCERAMUS
- OOLITE
- OSTRACOD
- PELECYPOD
- PELLET
- PISOLITE
- PLANT REMAINS
- PLANT SPORES
- SCAPHOPOD
- STROMATOPOROID

Minerals

Argillaceous

- 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

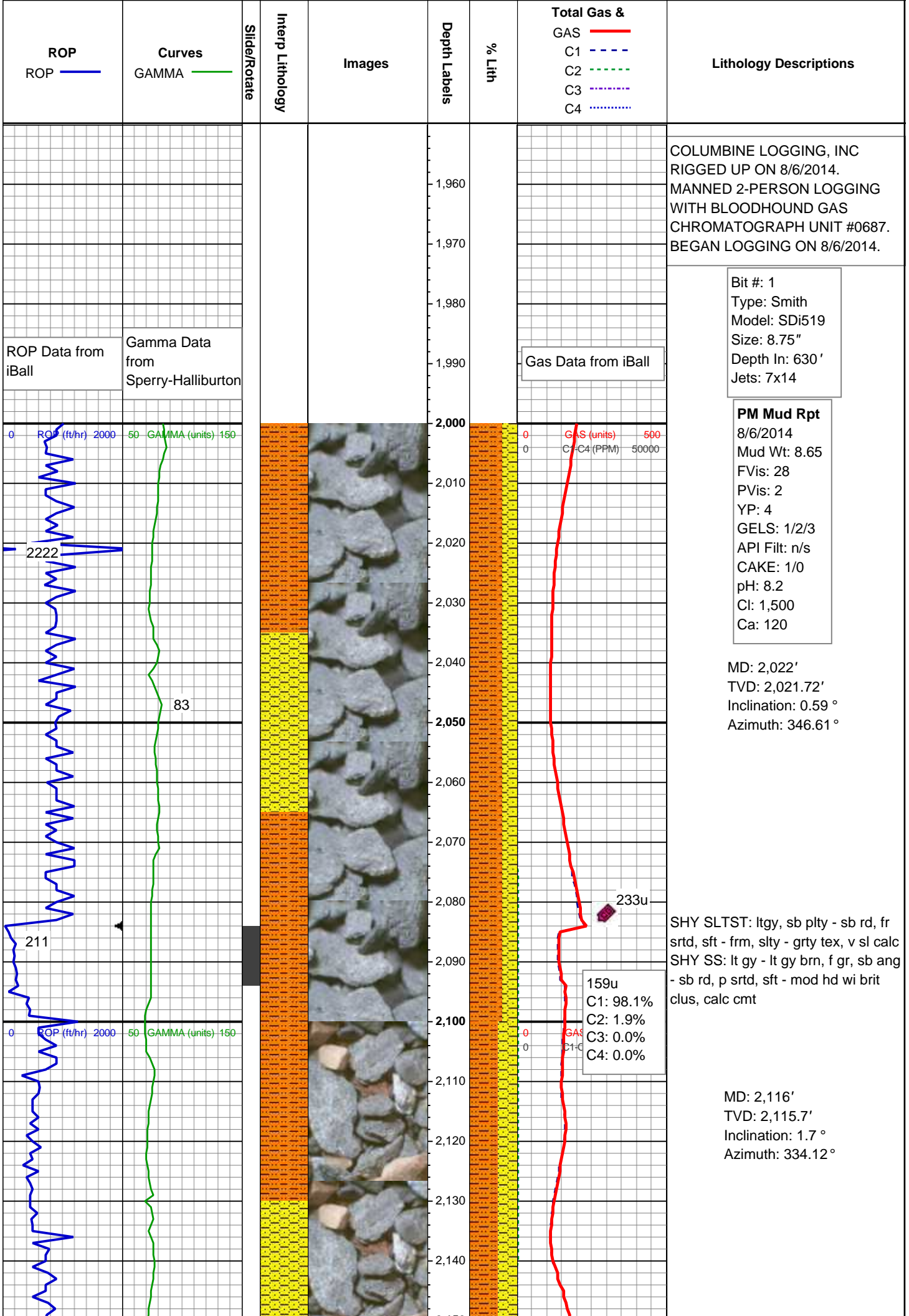
Name NATHAN MURPHY; MARK COLE

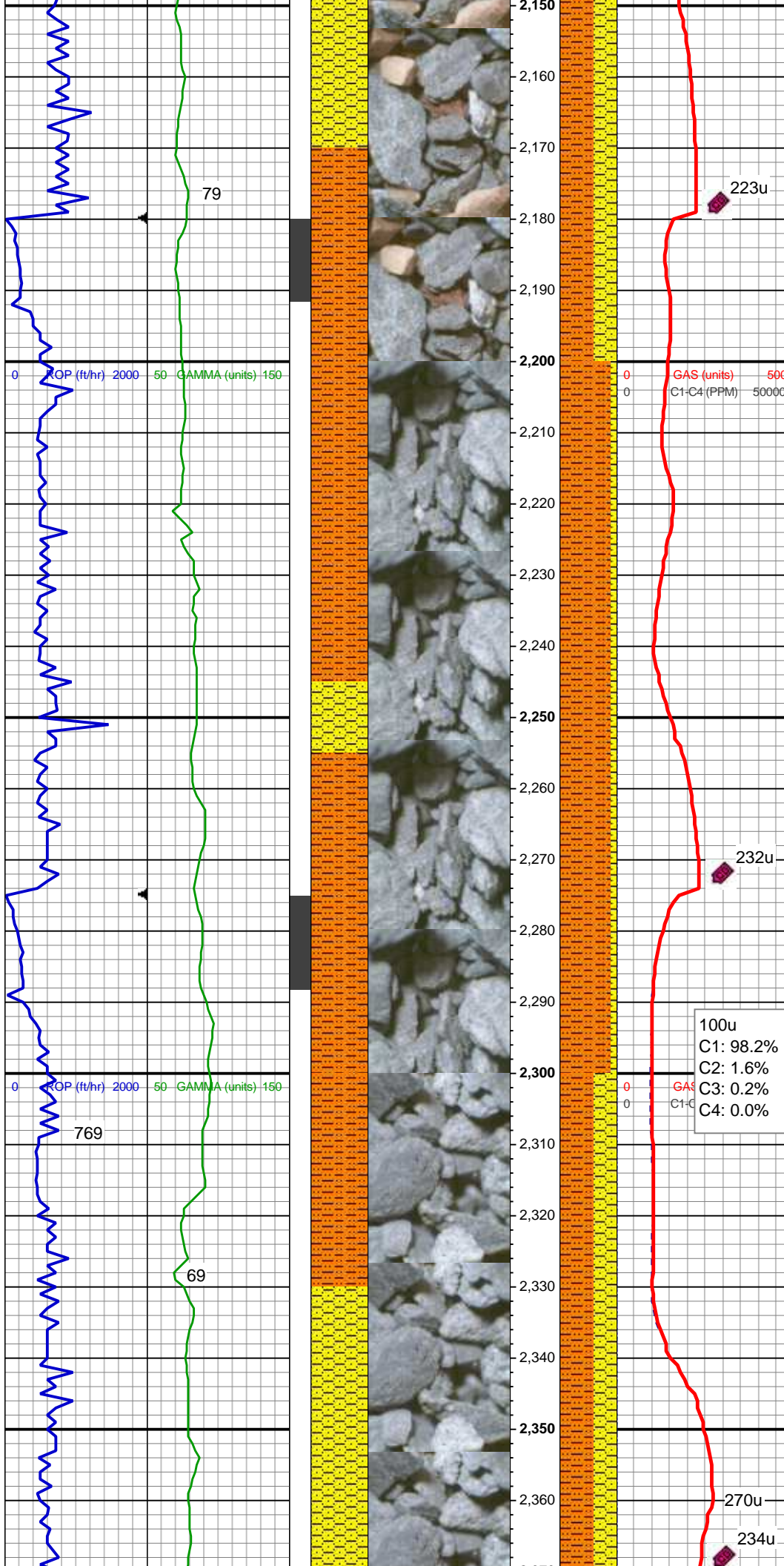
Company COLUMBINE LOGGING, INC

Address 2385 S LIPAN ST
DENVER, CO 80223

Zone Color Coding

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



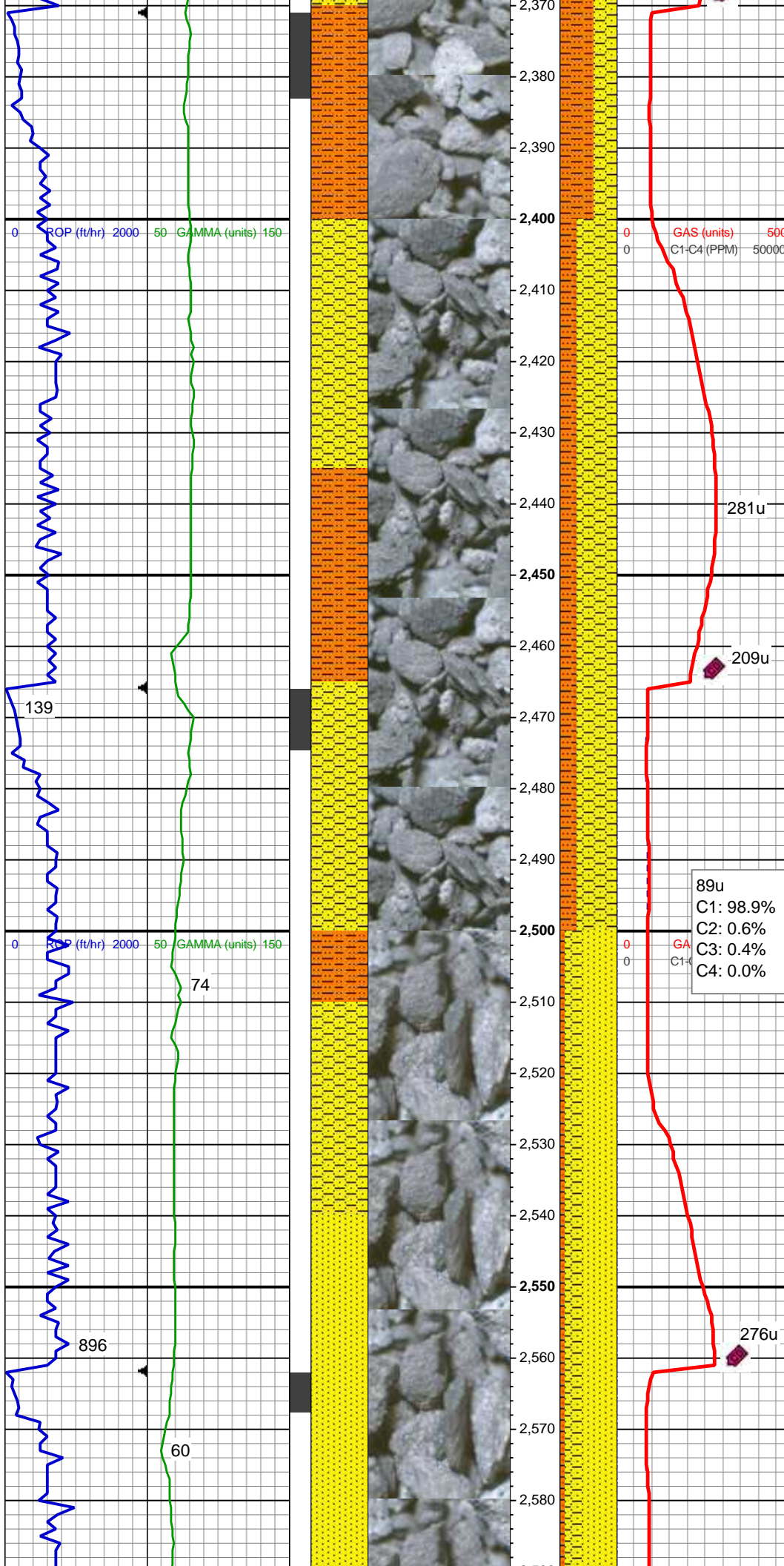


SHY SLTST: ltgy, sb plty - sb rd, fr
srted, sft - frm, slty - grty tex, v sl calc
SHY SS: lt gy - lt gy brn, f gr, sb ang
- sb rd, p srted, sft - mod hd wi brit
clus, calc cmt

MD: 2,211'
TVD: 2,210.6'
Inclination: 3.5 °
Azimuth: 326.88 °

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

MD: 2,306'
TVD: 2,305.32'
Inclination: 5.34 °
Azimuth: 332.11 °



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

MD: 2,401'
TVD: 2,399.81'
Inclination: 6.52 °
Azimuth: 326.34 °

MUD WT: 8.70/8.60
VIS: 29/28 IN/OUT

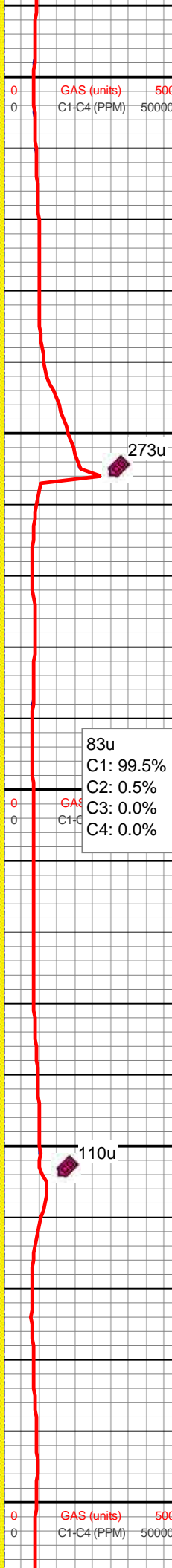
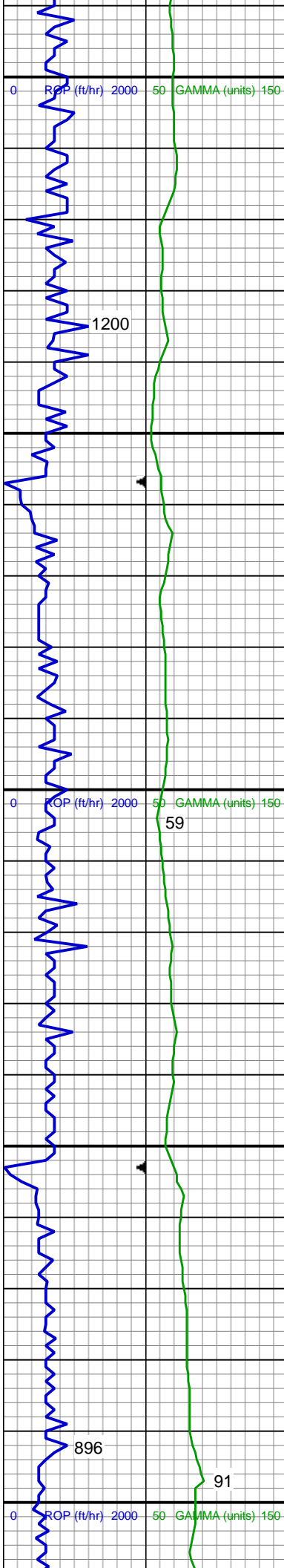
SHY SS: lt gy - lt gy brn, f gr, sb ang
- sb rd, p srted, sft - mod hd wi brit
clus, calc cmt

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

MD: 2,496'
TVD: 2,494.12'
Inclination: 7.24 °
Azimuth: 324.71 °

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

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

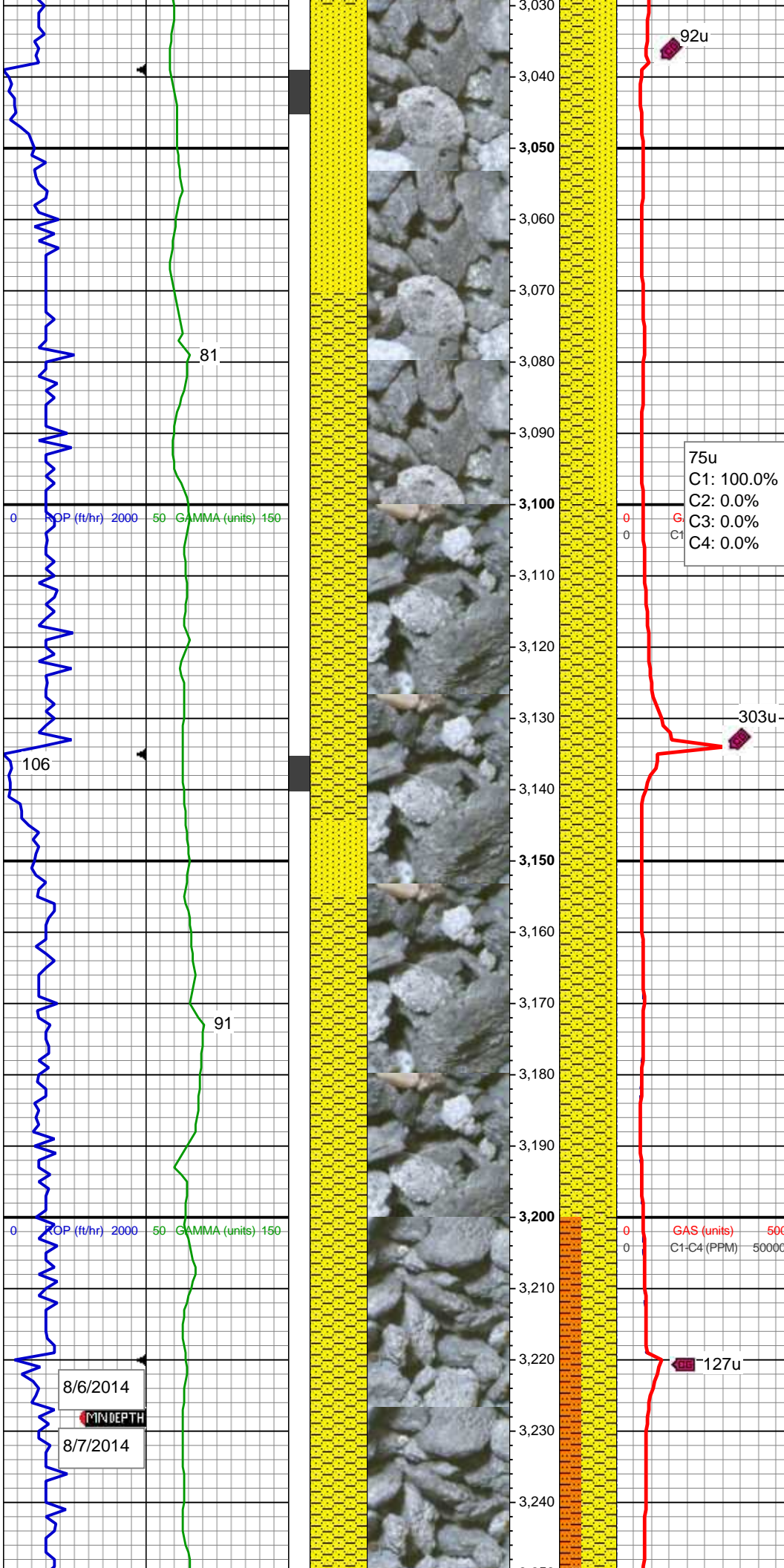
MD: 2,591'
TVD: 2,588.27'
Inclination: 8.08 °
Azimuth: 322.92 °

MD: 2,686'
TVD: 2,682.25'
Inclination: 8.73 °
Azimuth: 323.34 °

SS: wh, fros - trns, s&p, f gr, ang -
sb ang, p srted, hd brit clus, v calc
cmt
SHY SS: lt gy - lt gy brn, f gr, sb ang
- sb rd, p srted, sft - mod hd wi brit
clus, calc cmt

MD: 2,781'
TVD: 2,776.15'
Inclination: 8.76 °
Azimuth: 323.13 °

SS: wh, fros - trns, s&p, f gr, ang -
sb ang, p srted, hd brit clus, v calc
cmt
SHY SS: lt gy - lt gy brn, f gr, sb ang
- sb rd, p srted, sft - mod hd wi brit
clus, calc cmt



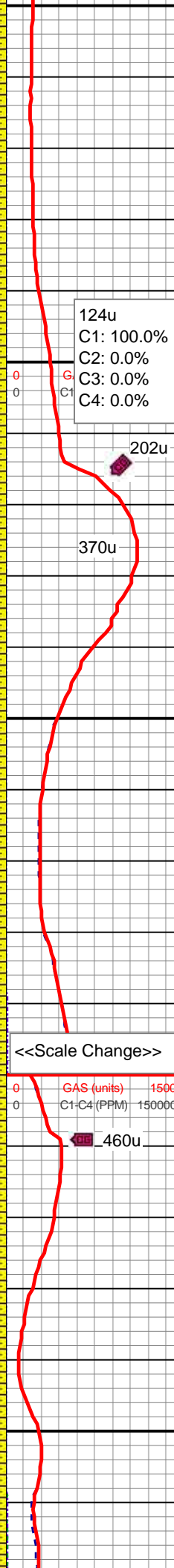
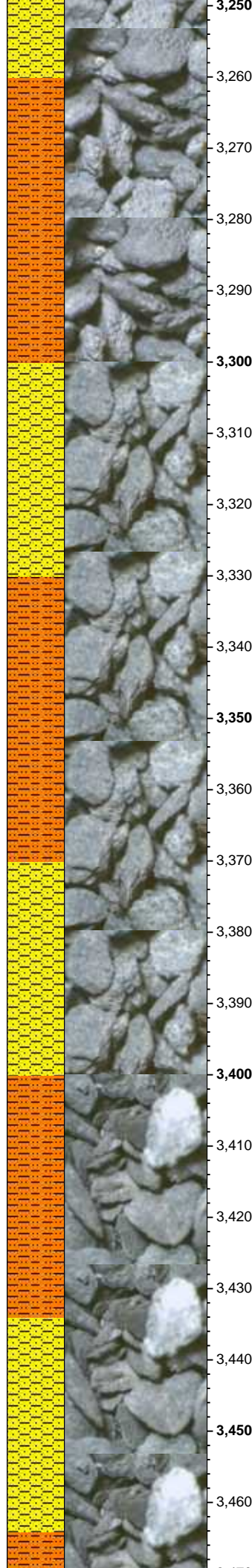
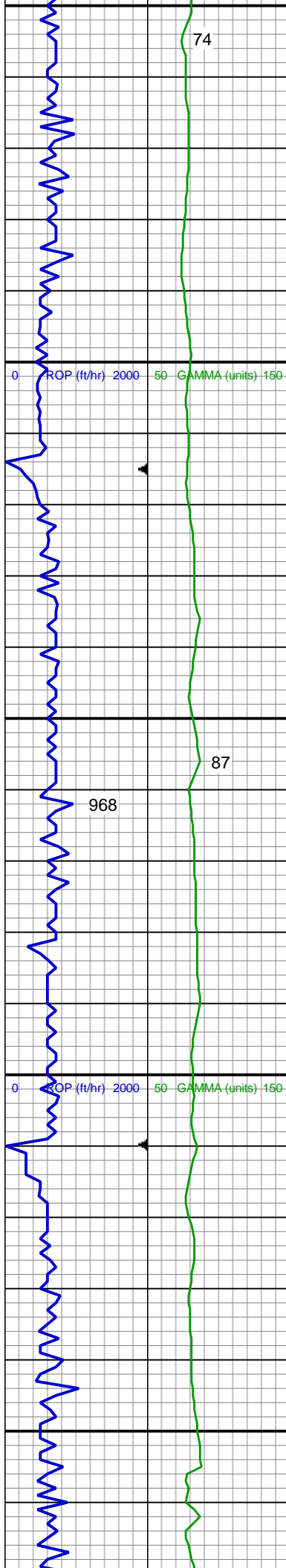
MD: 3,065'
TVD: 3,057.22'
Inclination: 7.81 °
Azimuth: 324.75 °

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

MD: 3,160'
TVD: 3,151.42'
Inclination: 7.06 °
Azimuth: 327.8 °

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

8/6/2014
MINDEPTH
8/7/2014



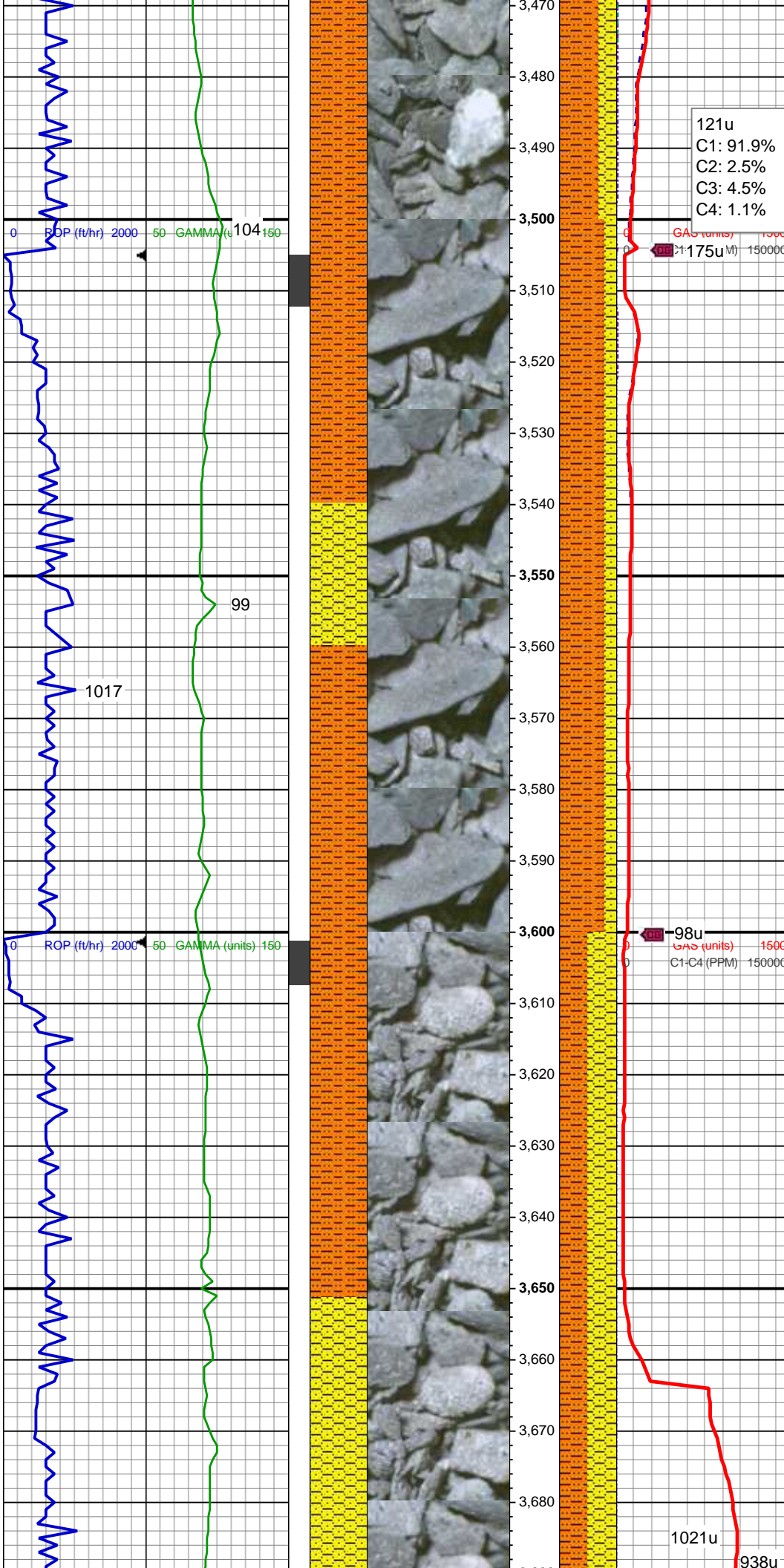
MD: 3,255'
TVD: 3,245.75'
Inclination: 6.61 °
Azimuth: 329.01 °

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: 3,350'
TVD: 3,340.21'
Inclination: 5.53 °
Azimuth: 329.15 °

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: 3,445'
TVD: 3,434.83'
Inclination: 4.8 °
Azimuth: 331.93 °



121u
C1: 91.9%
C2: 2.5%
C3: 4.5%
C4: 1.1%

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

MUD WT: 8.70/8.75
VIS: 30/29 IN/OUT

MD: 3,540'
TVD: 3,529.52'
Inclination: 4.45 °
Azimuth: 321.55 °

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

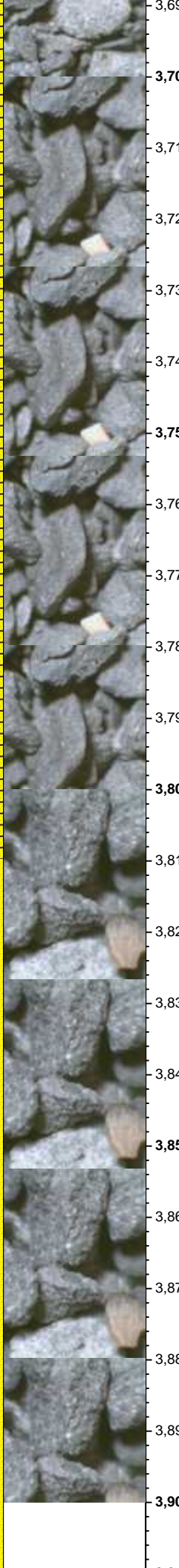
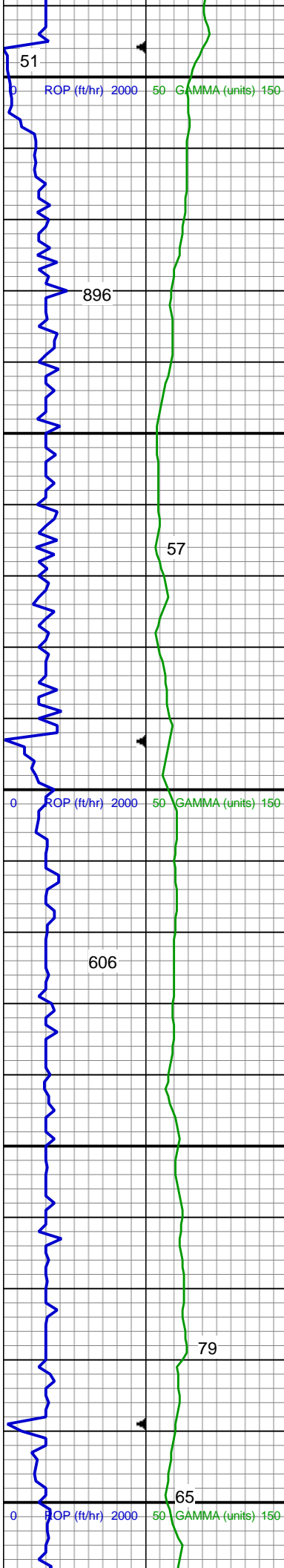
MD: 3,635'
TVD: 3,624.22'
Inclination: 4.65 °
Azimuth: 322.72 °

Parkman Top @
3,651' MD; 3,641' TVD

1021u

938u

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

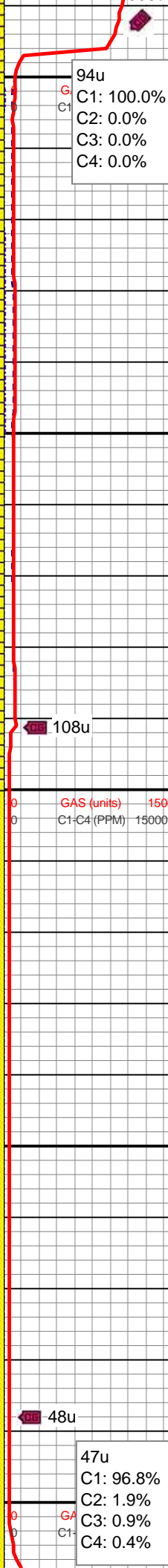
3,860

3,870

3,880

3,890

3,900



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

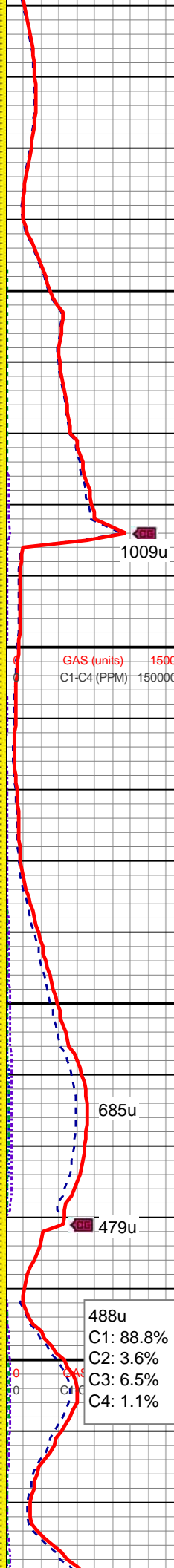
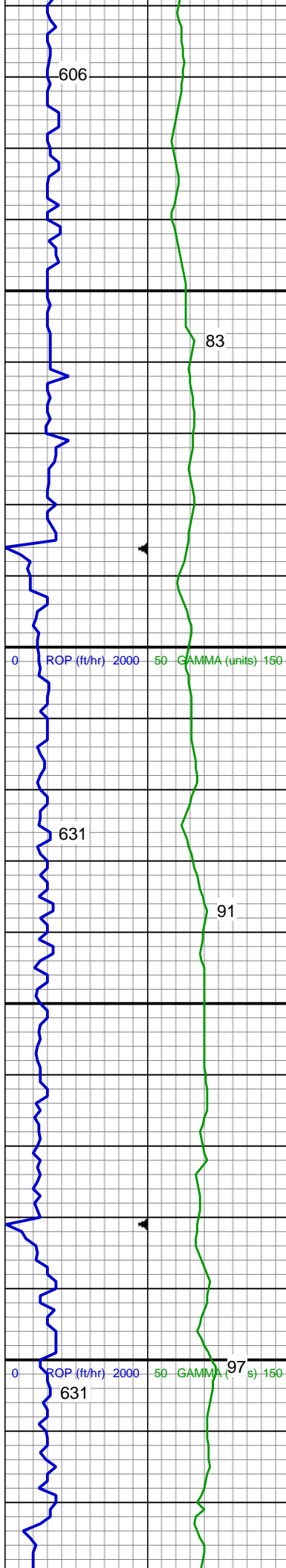
SHY SS: lt gy - lt gy brn, f gr, sb ang
- sb rd, p srted, sft - mod hd wi brit
clus, calc cmt, grdg to ss

MD: 3,825'
TVD: 3,813.4'
Inclination: 5.81 °
Azimuth: 326.91 °

MUD WT: 8.80/8.70
VIS: 30/29 IN/OUT

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

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



MD: 3,920'
TVD: 3,907.86'
Inclination: 6.36 °
Azimuth: 326 °

SS: wh - ltgy, fros - trns, s&p, f gr,
ang - sb ang, p srt, hd brit clus, v
calc cmt
SHY SS: lt gy - lt gy brn, f gr, sb ang
- sb rd, p srt, sft - mod hd wi brit
clus, calc cmt

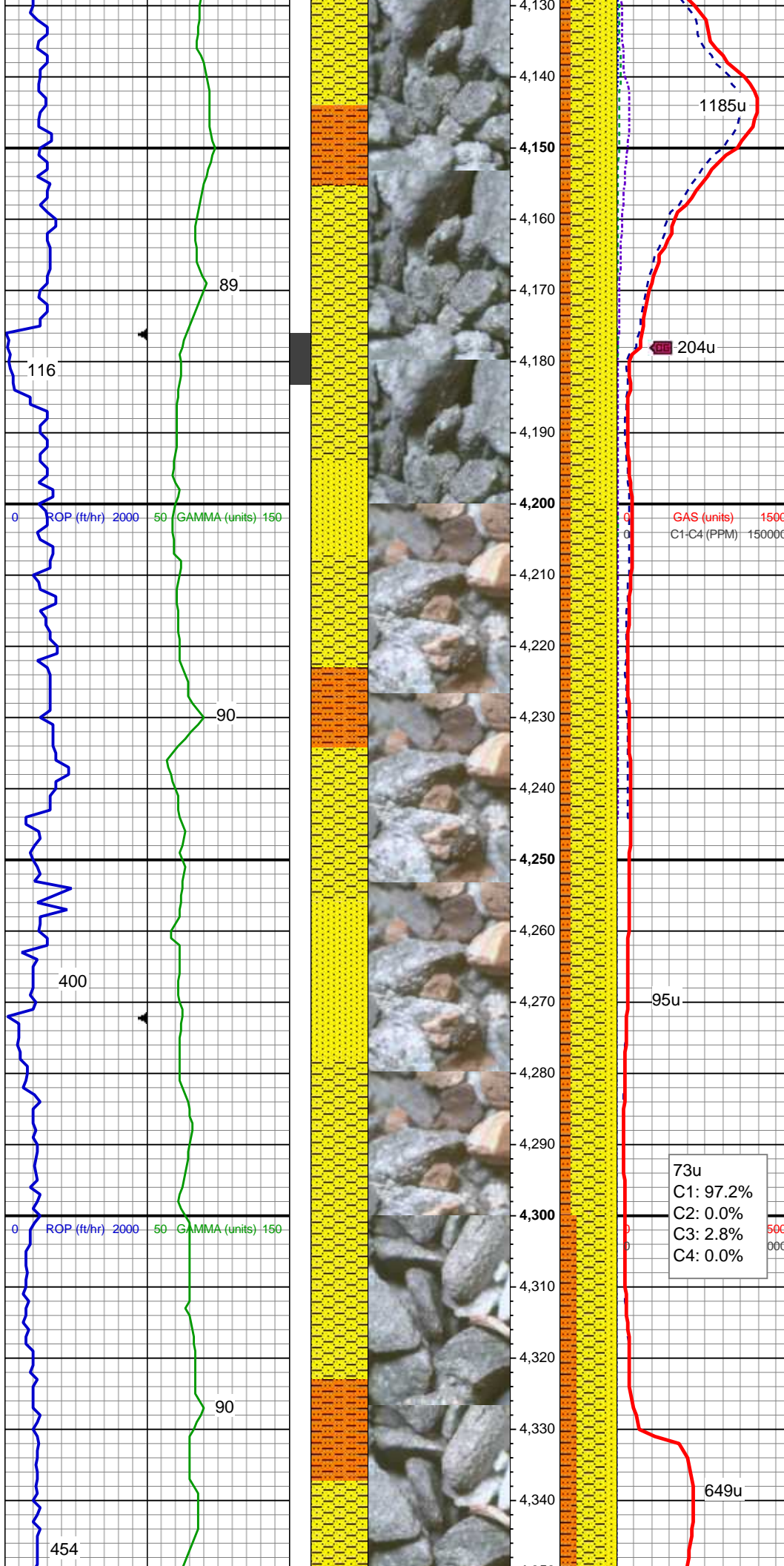
MD: 4,015'
TVD: 4,002.33'
Inclination: 5.82 °
Azimuth: 327.76 °

AM Mud Rpt
8/7/2014
Mud Wt: 9.00
FVis: 30
PVis: 4
YP: 6
GELS: 1/2/3
API Filt: n/s
CAKE: 1/0
pH: 8.9
Cl: 1,500
Ca: 120

MUD WT: 9.0/9.0
VIS: 31/31 IN/OUT

SS: wh - ltgy, fros - trns, s&p, f gr,
ang - sb ang, p srt, hd brit clus, v
calc cmt
SHY SS: lt gy - lt gy brn, f gr, sb ang
- sb rd, p srt, sft - mod hd wi brit
clus, calc cmt

MD: 4,110'
TVD: 4,096.92'
Inclination: 4.76 °
Azimuth: 325.72 °



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

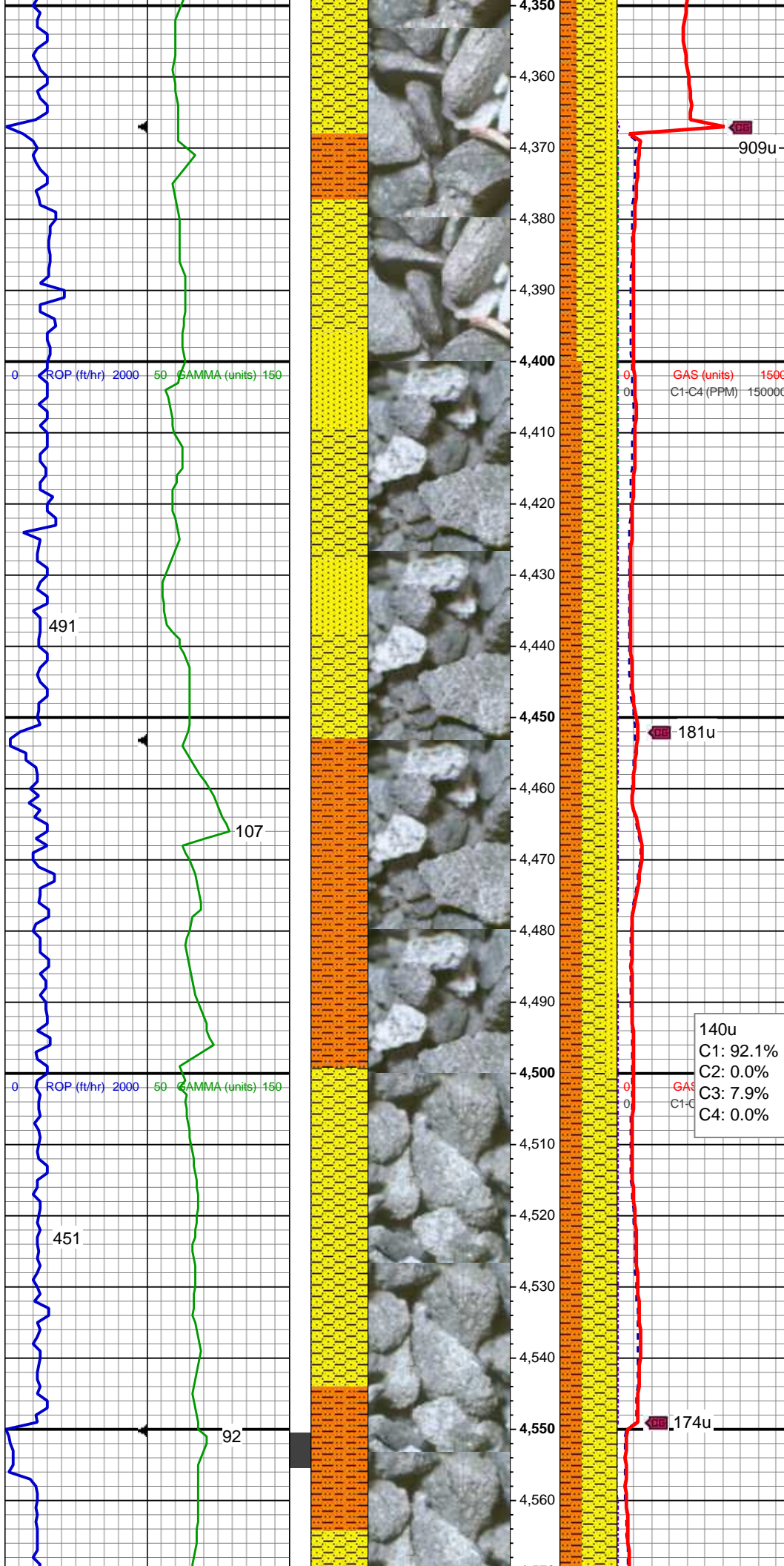
MD: 4,205'
TVD: 4,191.6'
Inclination: 4.59 °
Azimuth: 327.92 °

Sussex Top @
4,298' MD; 4,284' TVD

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, fros - trnsl, s&p, f gr, ang - sb ang, p srted, hd brit clus, v calc cmt
SHY SLTST: ltgy, sb plty - sb rd, fr srted, sft - frm, slty - grty tex, v sl calc

MD: 4,300'
TVD: 4,286.3'
Inclination: 4.58 °
Azimuth: 328.16 °

73u
C1: 97.2%
C2: 0.0%
C3: 2.8%
C4: 0.0%



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, fros - trnsd, s&p, f gr, ang -
sb ang, p srted, hd brit clus, v calc
cmt
SHY SLTST: ltgy, sb plty - sb rd, fr
srted, sft - frm, slty - grty tex, v sl calc

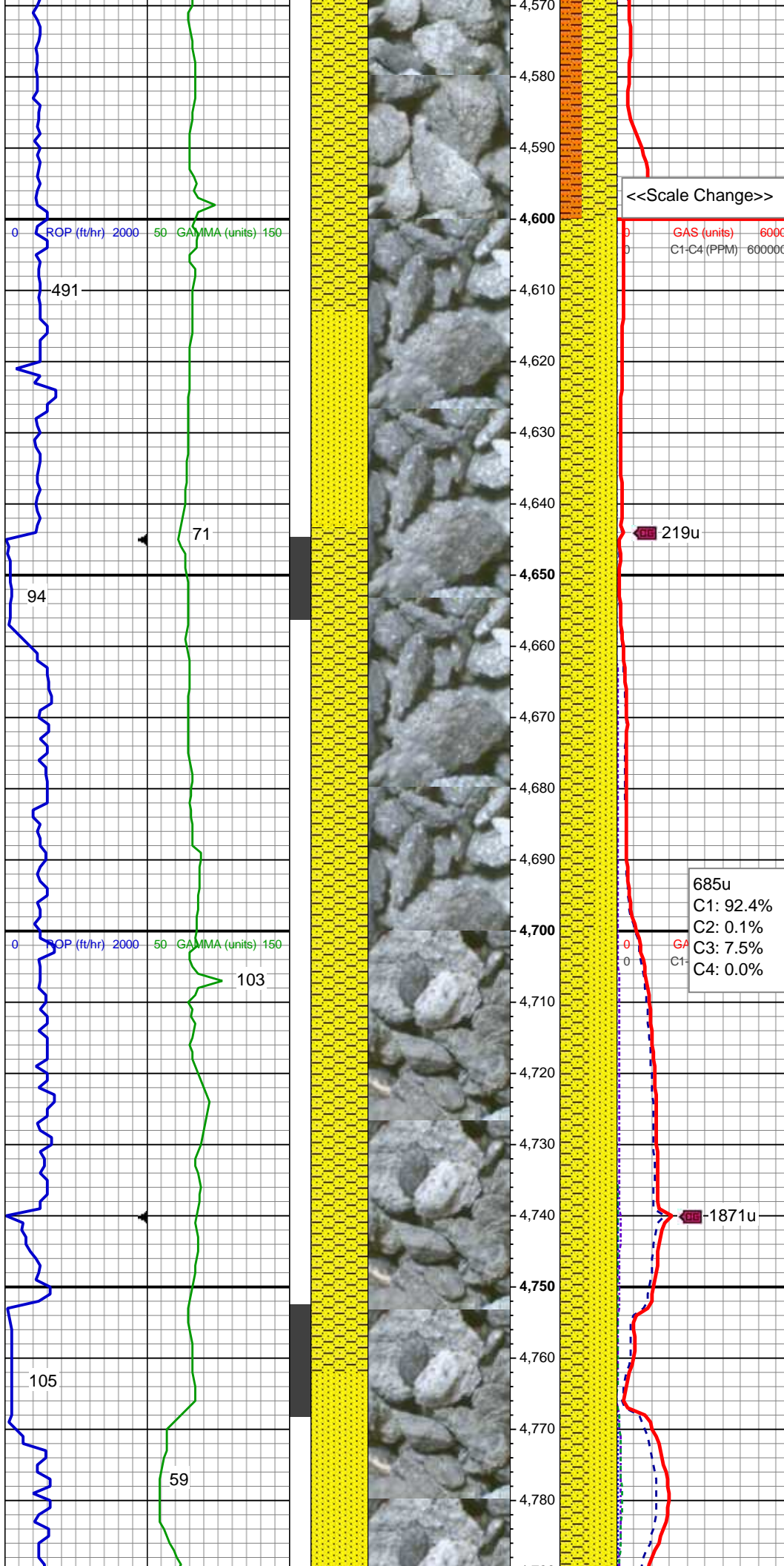
MD: 4,394'
TVD: 4,380'
Inclination: 4.55 °
Azimuth: 324.43 °

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, fros - trnsd, s&p, f gr, ang -
sb ang, p srted, hd brit clus, v calc
cmt
SHY SLTST: ltgy, sb plty - sb rd, fr
srted, sft - frm, slty - grty tex, v sl calc

140u
C1: 92.1%
C2: 0.0%
C3: 7.9%
C4: 0.0%

MD: 4,489'
TVD: 4,474.7'
Inclination: 4.52 °
Azimuth: 326.71 °

MUD WT: 9.35/9.40
VIS: 31/31 IN/OUT



MD: 4,584'
TVD: 4,569.45'
Inclination: 3.82 °
Azimuth: 320.41 °

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

<<Scale Change>>

GAS (units) 6000
C1-C4 (PPM) 600000

219u

MD: 4,679'
TVD: 4,664.29'
Inclination: 3 °
Azimuth: 338.61 °

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

685u
C1: 92.4%
C2: 0.1%
C3: 7.5%
C4: 0.0%

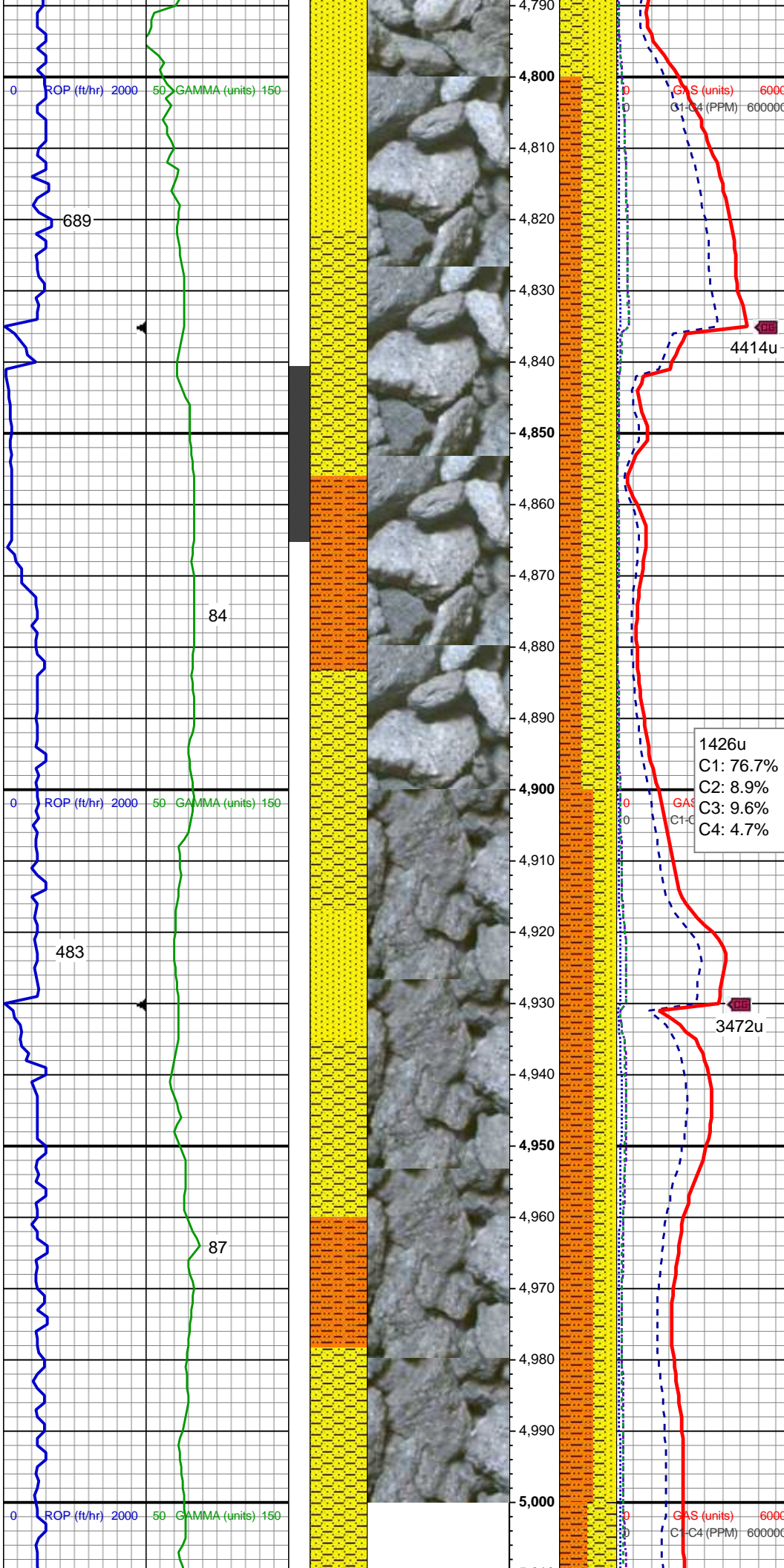
MUD WT: 9.35/9.55
VIS: 30/30 IN/OUT

Shannon Top @
4,724' MD; 4,709' TVD

1871u

MD: 4,774'
TVD: 4,759.18'
Inclination: 2.48 °
Azimuth: 311.25 °

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, fros - trns, s&p, f gr, ang -
sb ang, p srt, hd brit clus, v calc
cmt

MUD WT: 9.20/9.40
VIS: 30/30 IN/OUT

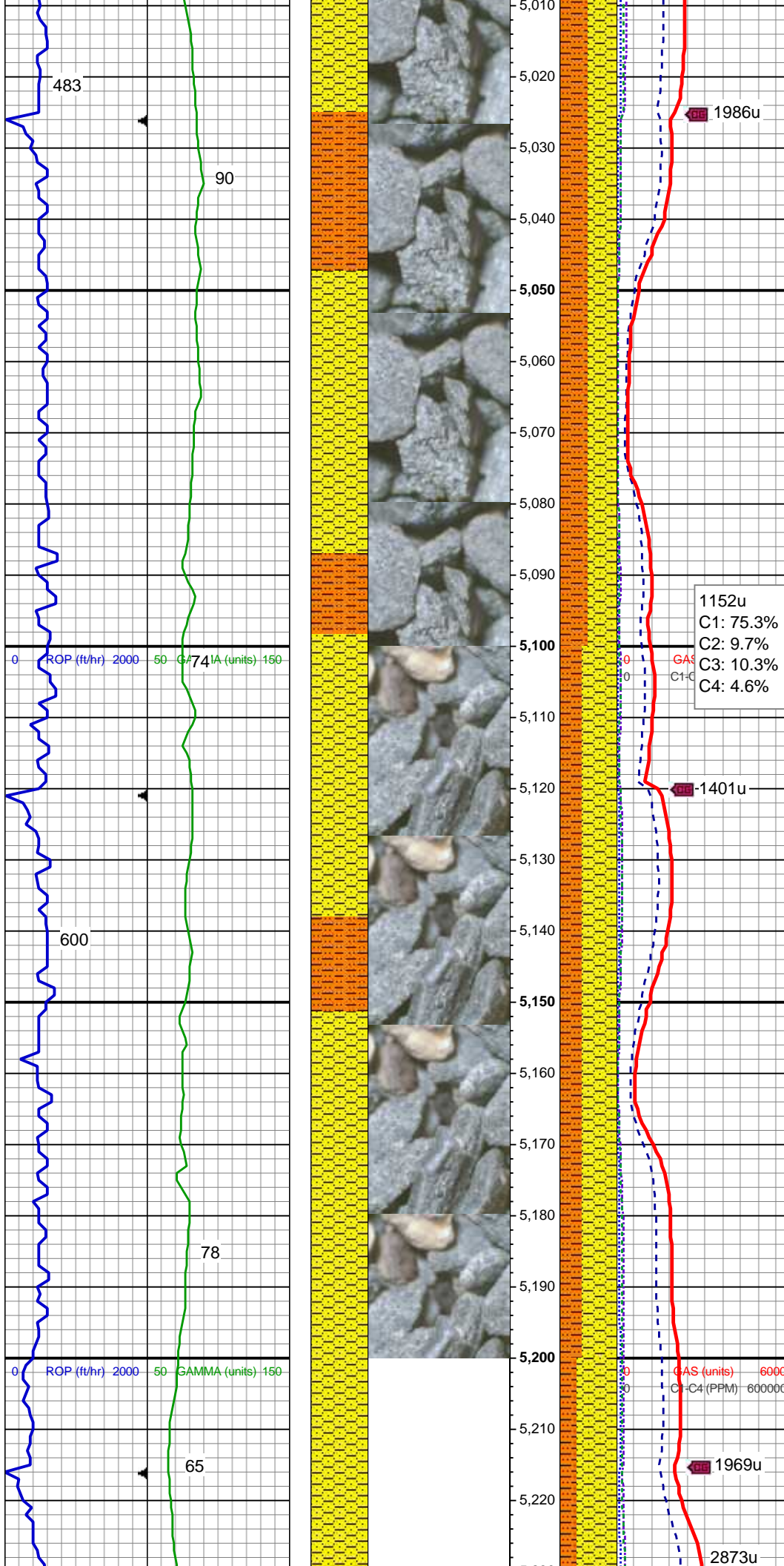
MD: 4,869'
TVD: 4,854.15'
Inclination: 0.28 °
Azimuth: 306.28 °

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
SS: wh, fros - trns, s&p, f gr, ang -
sb ang, p srt, hd brit clus, v calc
cmt

1426u
C1: 76.7%
C2: 8.9%
C3: 9.6%
C4: 4.7%

MD: 4,964'
TVD: 4,949.15'
Inclination: 0.12 °
Azimuth: 206.3 °

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



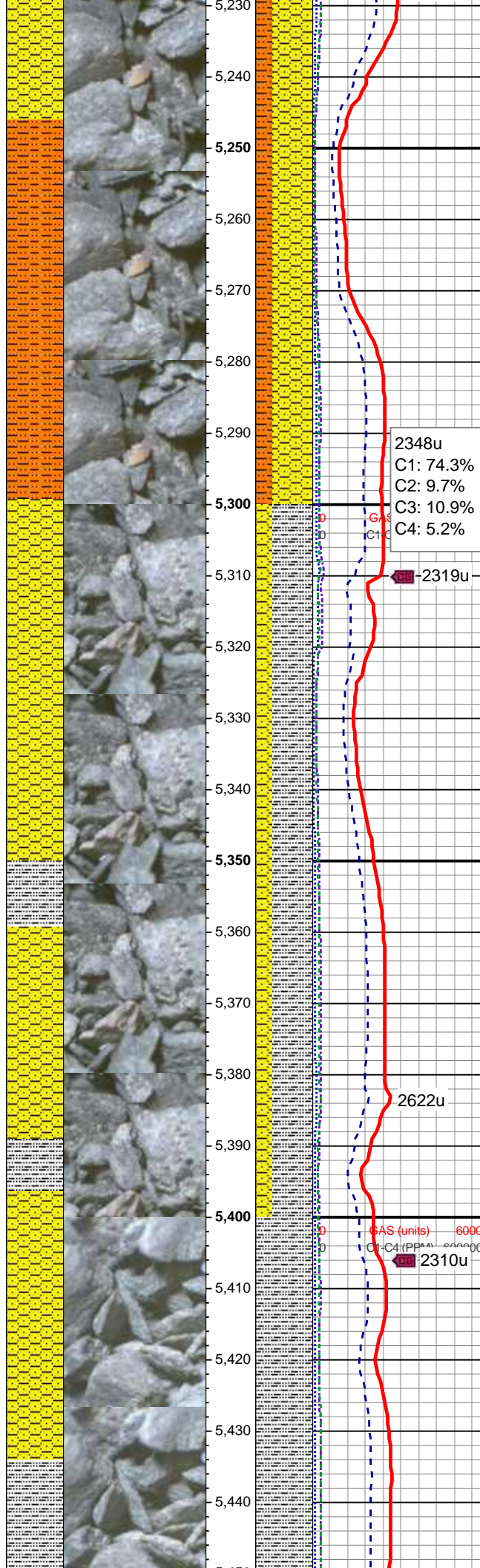
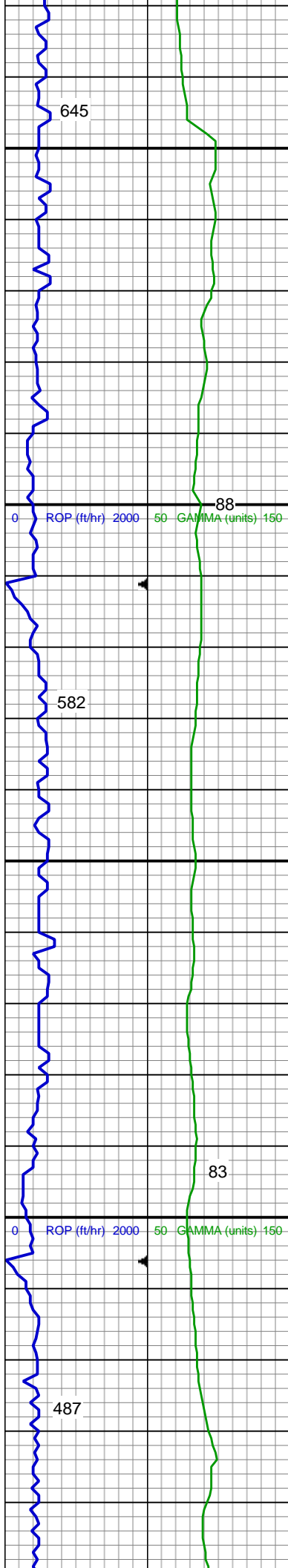
MD: 5,058'
TVD: 5,043.15'
Inclination: 0.52 °
Azimuth: 151.39 °

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

MD: 5,153'
TVD: 5,138.14'
Inclination: 0.55 °
Azimuth: 188.79 °

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

MUD WT: 9.35/9.50



VIS: 32/32 IN/OUT

MD: 5,248'
TVD: 5,233.14'
Inclination: 0.37 °
Azimuth: 172.34 °

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

2348u
C1: 74.3%
C2: 9.7%
C3: 10.9%
C4: 5.2%

2319u

MD: 5,343'
TVD: 5,328.14'
Inclination: 0.22 °
Azimuth: 188.38 °

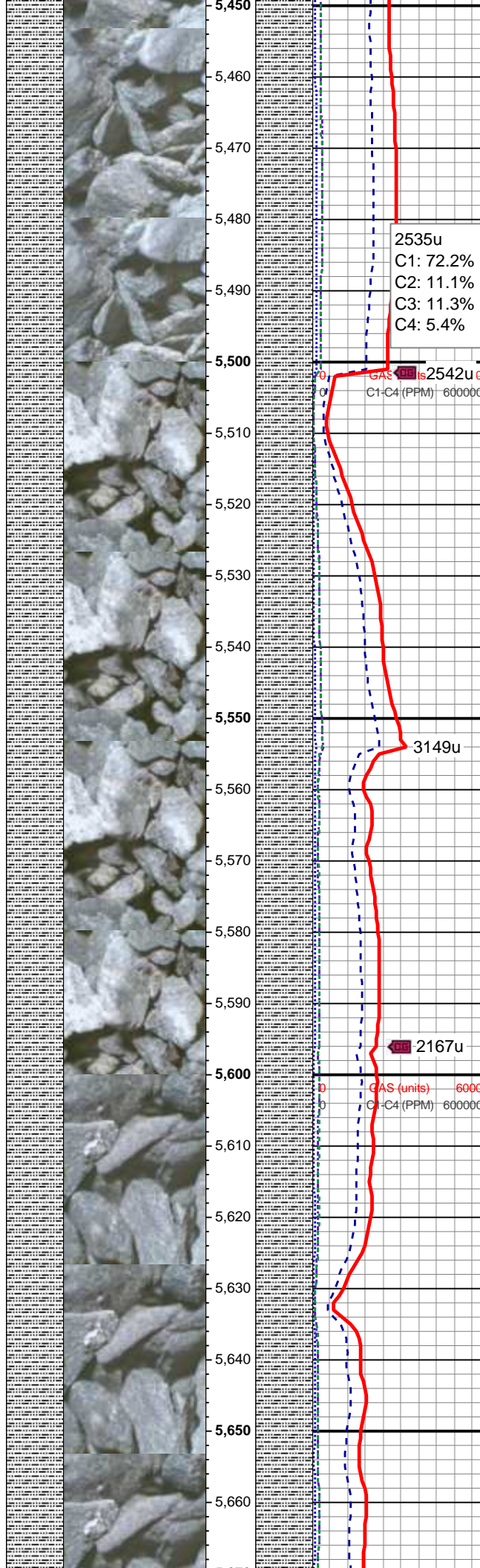
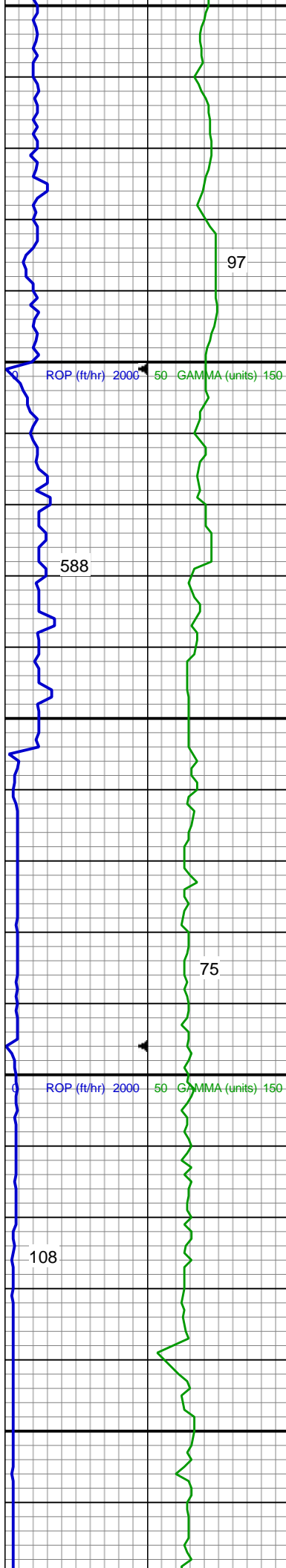
SLTY SH: lt - med gy - gy brn, frm -
hd, plty - sb plty, occ sb blk, slty -
grty tex, v sl calc
SHY SS: lt gy - lt gy brn, f gr, sb ang
- sb rd, p srted, sft - mod hd wi brit
clus, calc cmt

2622u

GAS (units) 6000
C1-C4 (PPM) 10000
2310u

MUD WT: 9.60/9.55
VIS: 33/32 IN/OUT

MD: 5,438'
TVD: 5,423.14'
Inclination: 0.48 °
Azimuth: 188.9 °

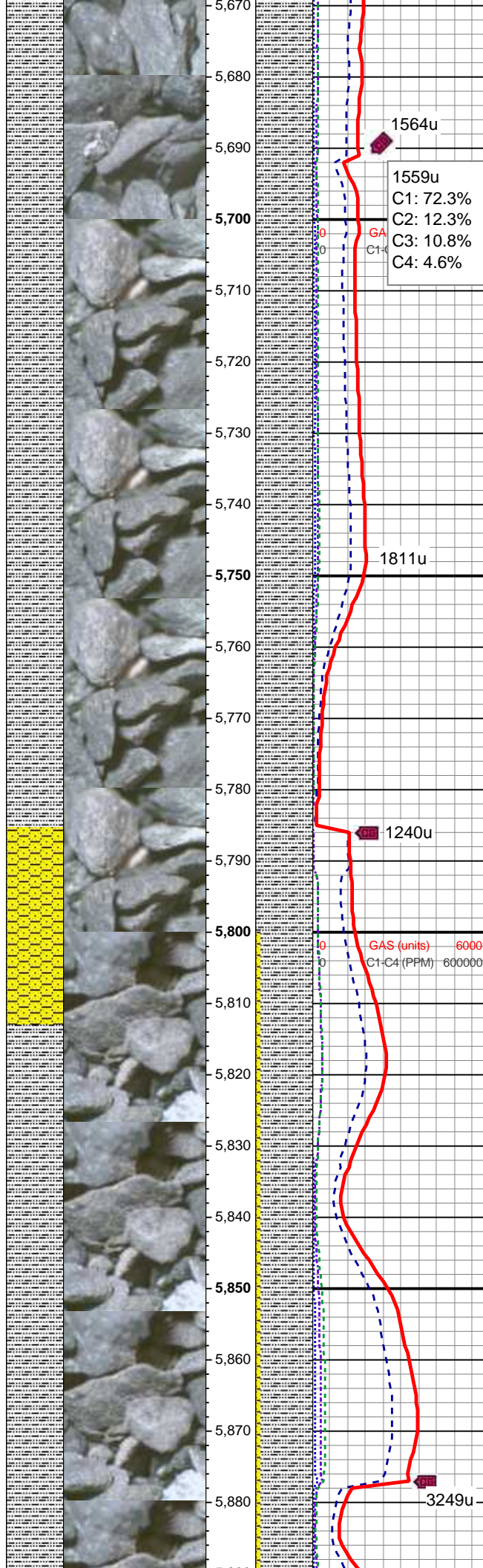
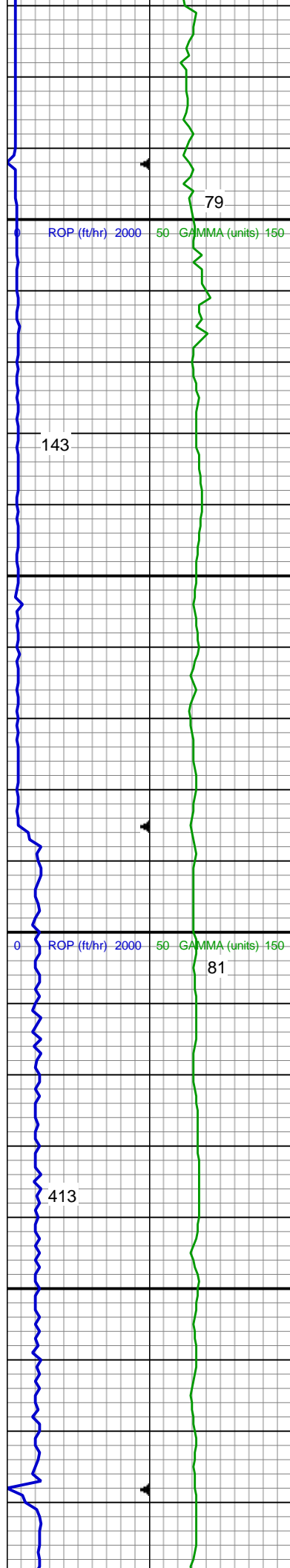


SLTY SH: lt - med gy - gy brn, frm -
hd, plty - sb plty, occ sb blkly, slty -
grty tex, v sl calc

MD: 5,533'
TVD: 5,518.13'
Inclination: 0.29 °
Azimuth: 160.53 °

SLTY SH: lt - med gy - gy brn, frm -
hd, plty - sb plty, occ sb blkly, slty -
grty tex, v sl calc

MD: 5,628'
TVD: 5,613.13'
Inclination: 0.39 °
Azimuth: 154.44 °



SLTY SH: lt - med gy - gy brn, frm -
hd, plty - sb plty, occ sb blkly, slty -
grty tex, v sl calc

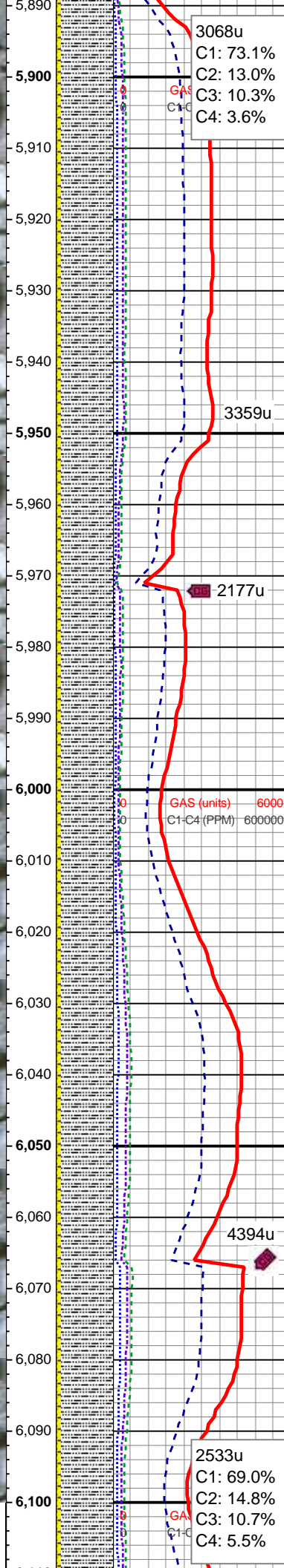
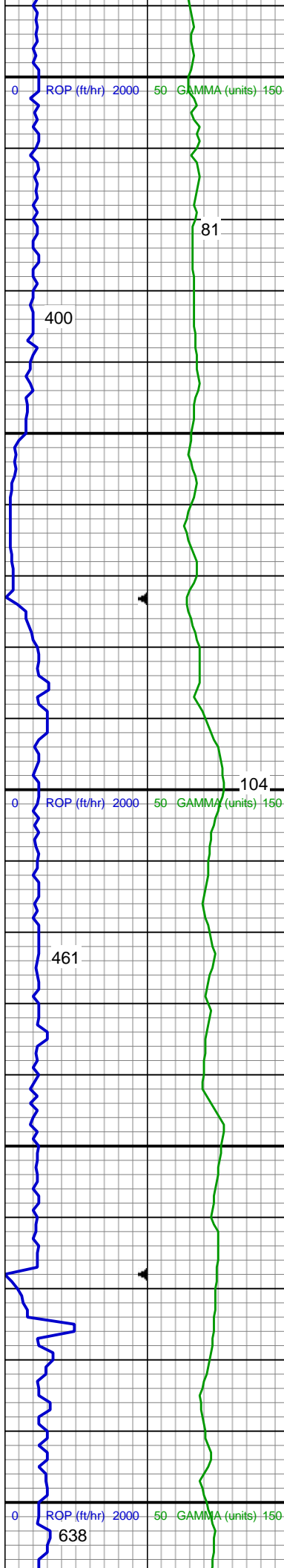
MD: 5,722'
TVD: 5,707.13'
Inclination: 0.82 °
Azimuth: 135.18 °

MUD WT: 9.65/9.65
VIS: 33/32 IN/OUT

SLTY SH: lt - med gy - gy brn, frm -
hd, plty - sb plty, occ sb blkly, slty -
grty tex, v sl calc

MD: 5,817'
TVD: 5,802.12'
Inclination: 0.29 °
Azimuth: 105.64 °

SLTY SH: lt - med gy - gy brn, frm -
hd, plty - sb plty, occ sb blkly, slty -
grty tex, v sl calc



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

MD: 5,912'
TVD: 5,897.12'
Inclination: 0.19 °
Azimuth: 86.95 °

MUD WT: 9.65/9.70
VIS: 33/32 IN/OUT

SLTY SH: lt - med gy - gy brn, frm -
hd, plty - sb plty, occ sb blk, slty -
grty tex, v sl calc

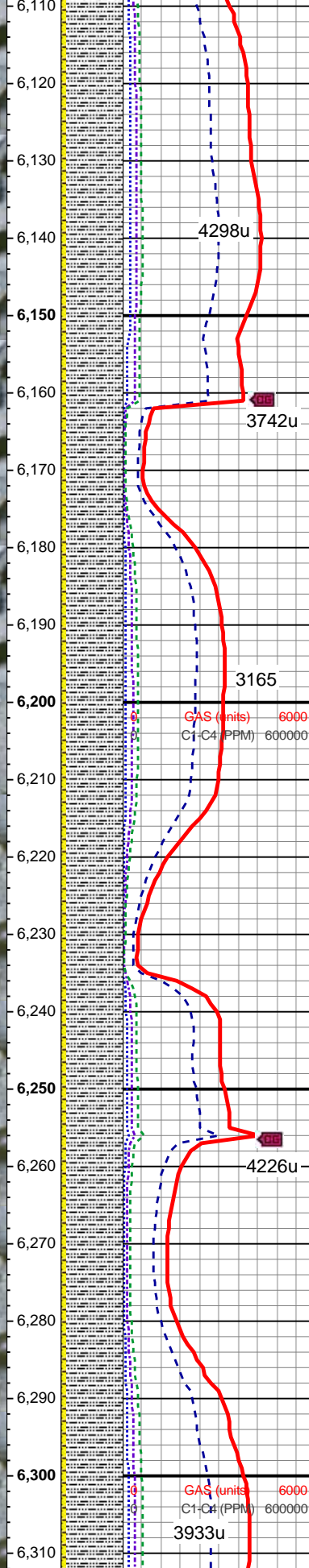
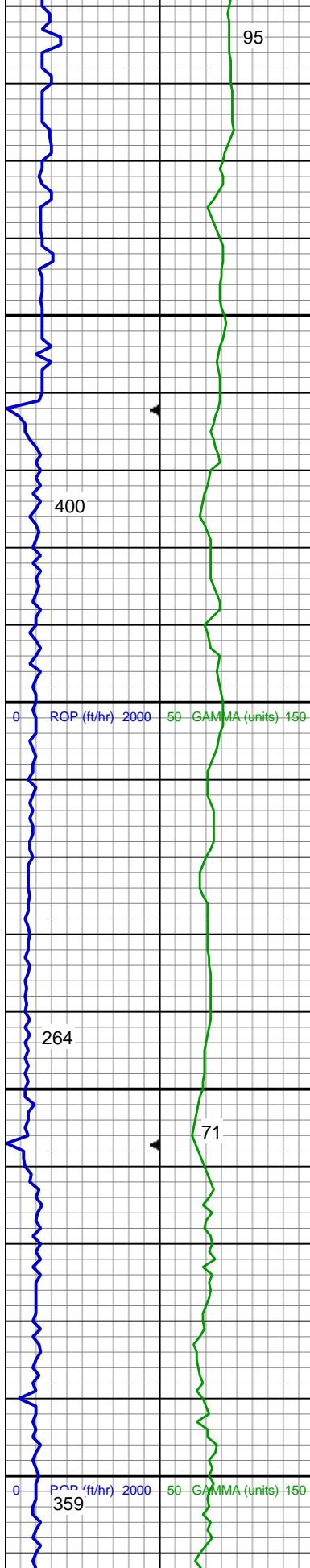
SHY SS: lt gy - lt gy brn, f gr, sb ang
- sb rd, p srtd, sft - mod hd wi brit
clus, calc cmt

MD: 6,007'
TVD: 5,992.12'
Inclination: 0.48 °
Azimuth: 126.67 °

SLTY SH: lt - med gy - gy brn, frm -
hd, plty - sb plty, occ sb blk, slty -
grty tex, v sl calc

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

MD: 6,102'
TVD: 6,087.12'



Inclination: 0.28 °
Azimuth: 137.16 °

Teepee Buttes Top @
6,126' MD; 6,111' TVD

SLTY SH: lt - med gy - gy brn, frm -
hd, plty - sb plty, occ sb blkly, 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

MD: 6,196'
TVD: 6,181.12'
Inclination: 0.28 °
Azimuth: 165.41 °

MD: 6,252'
TVD: 6,237.12'
Inclination: 0.58 °
Azimuth: 135.04 °

SLTY SH: lt - med gy - gy brn, frm -
hd, plty - sb plty, occ sb blkly, 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

See Corresponding Horizontal Log

