

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name BULLEIT FEDERAL PC LG04-62HN VERT

Location SEC 4 T8N R59W

State COLORADO

County WELD

Country USA

Rig Number H&P 315

API Number 05-123-38758

AFE # 137848

Region DJ BASIN

Field WILDCAT

Spud Date 2/16/2014

Drilling Completed 2/19/2014

Surface Coordinates SESE SEC 4 T8N R59W
430' FSL; 300' FEL

LAT/LON: 40.68528/-103.97292

Bottom Hole Coordinates SWSW SEC 4 T8N R59W
660' FSL 660' FWL

Ground Elevation 4,814'

K.B. Elevation 4,838'

Logged Interval 2,000' **To** 5,403'

Total Depth 5,403'

Formation NIOBRARA B CHALK

Type of Drilling Fluid LSND

Operator

Company Noble Energy Inc

Address 1625 BROADWAY SUITE 2200
DENVER, CO 80202

Geologist

Name MARK COLE, NATHAN MURPHY

Company COLUMBINE LOGGING, INC

Address 2385 S LIPAN ST
DENVER, CO 80223

Rock Types

	SHALY SILTSTONE		CHALK		IGNEOUS		SHALE COLORED
	SHALY SANDSTONE		CHERT		LIMESTONE		SHALE GRAY
	SANDSTONE		CLAY CHOKE SAND		SIDERITE or LIMONITE		SILTSTONE
	SILTY SHALE		CLAYSTONE		MARLSTONE		TILL
	UNKNOWN		COAL		METAMORPHIC		TUFF
	ANHYDRITE		CONGLOMERATE		NO SAMPLE		WELDED TUFF
	BENTONITE		DOLOMITE		SALT		
	BRECCIA		GRANITE		SALT- PEPPER SAND		
	CEMENT		GYPSUM		SHALE		

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

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

EARTHY
 FENESTRAL
 FRACTURE
 INTERCRYSTALLINE
 INTEROOLITIC

Moldic

ORGANIC
 PINPOINT
 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

ANGULAR
 ROUNDED
 SUBANG
 SUBRND

Textures

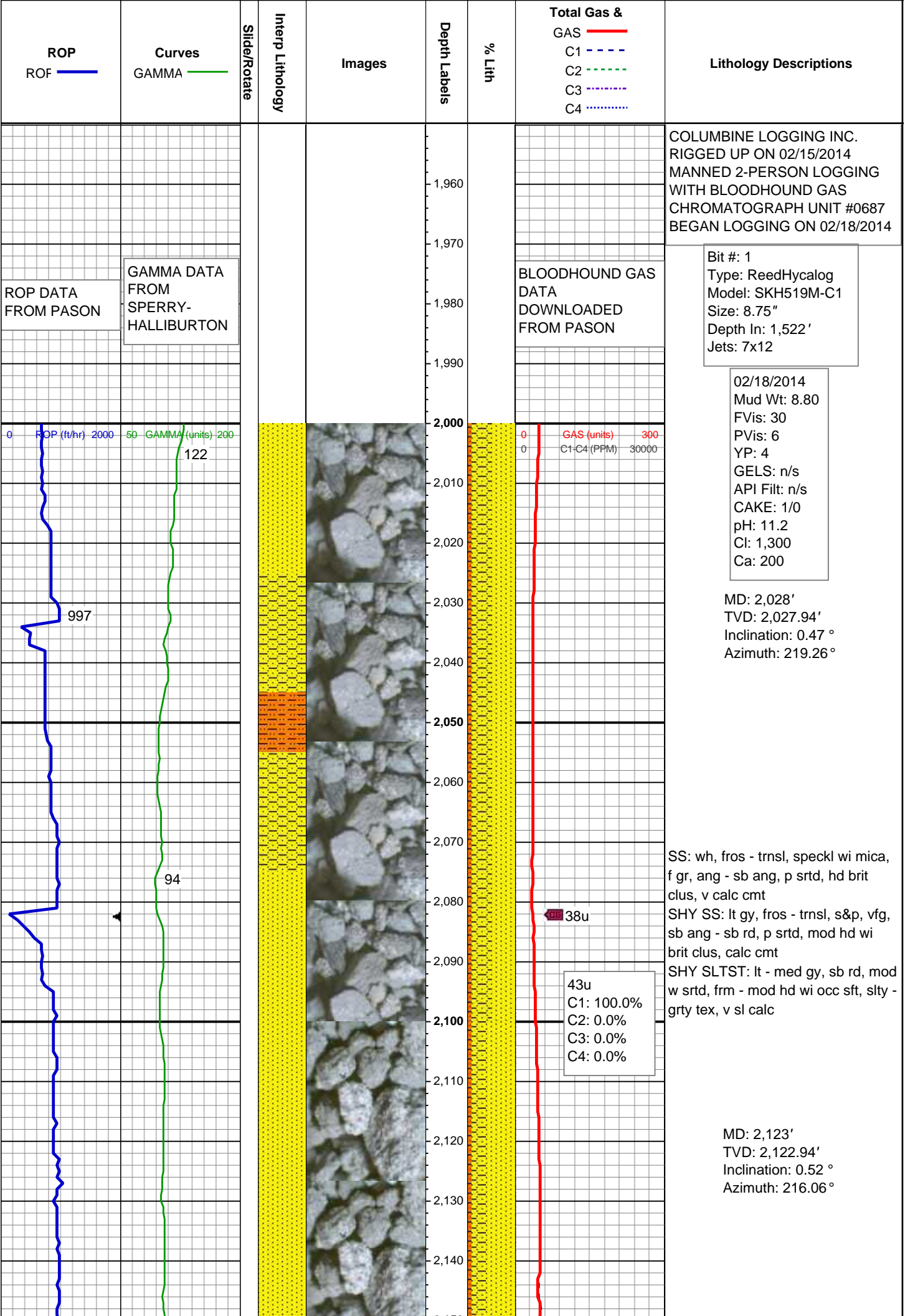
BOUNDSTONE
 CHALKY
 CRYPTOXLN

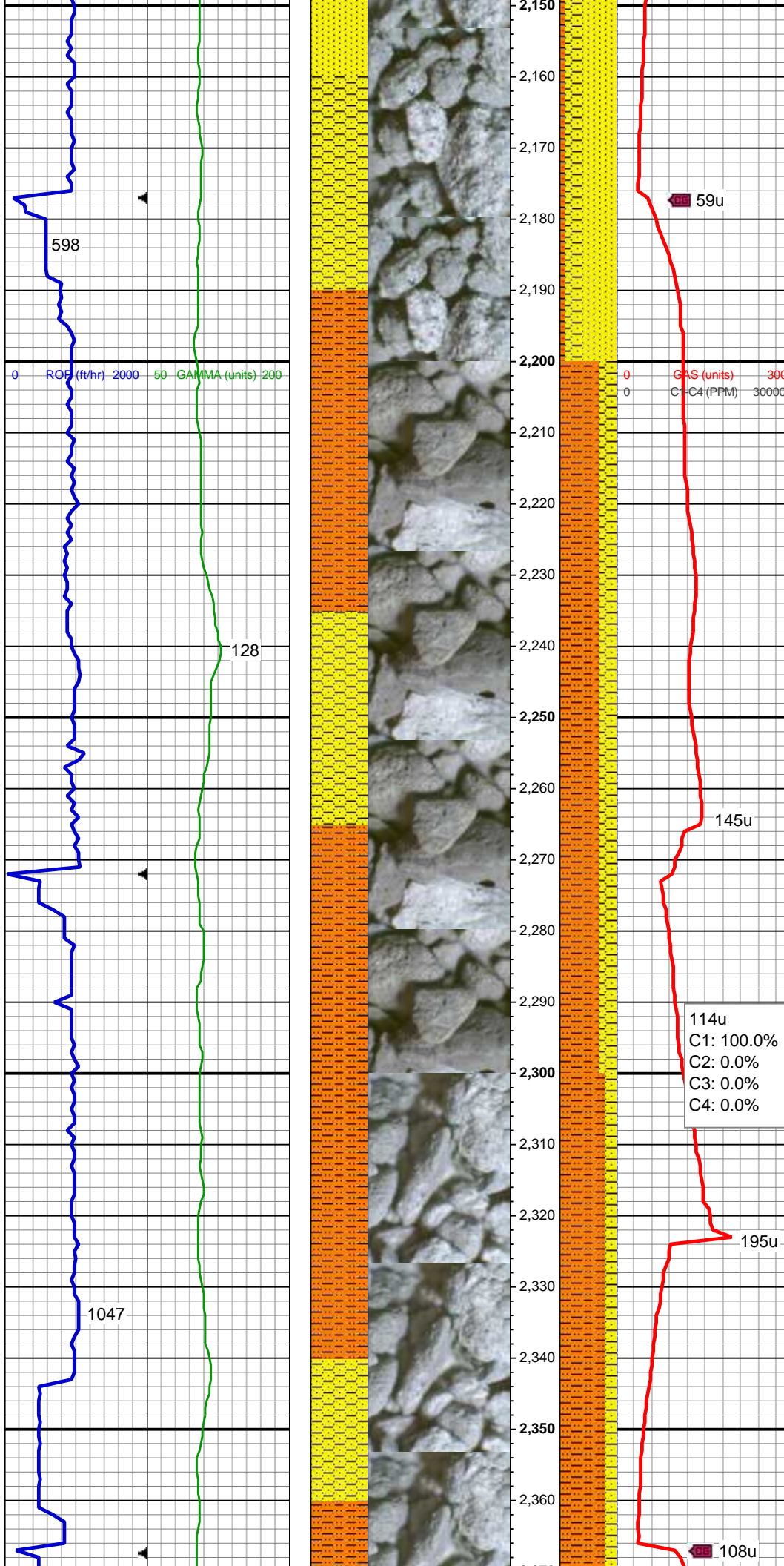
Earthy

FINELYXLN
 GRAINSTONE
 LITHOGRAPHIC
 MICROXLN
 MUDSTONE
 PACKSTONE
 WACKESTONE

Sorting

MODERATE
 POOR
 WELL



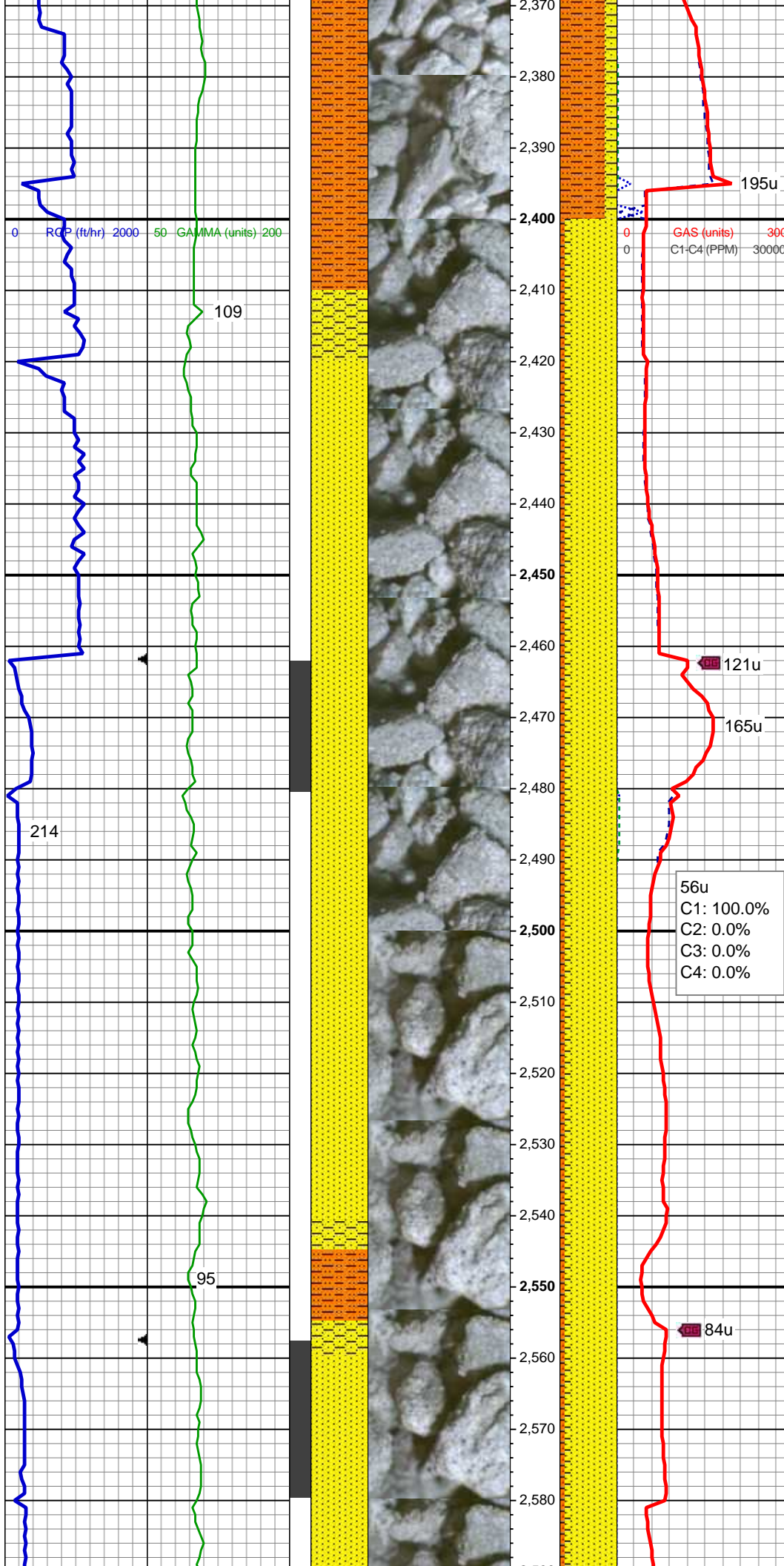


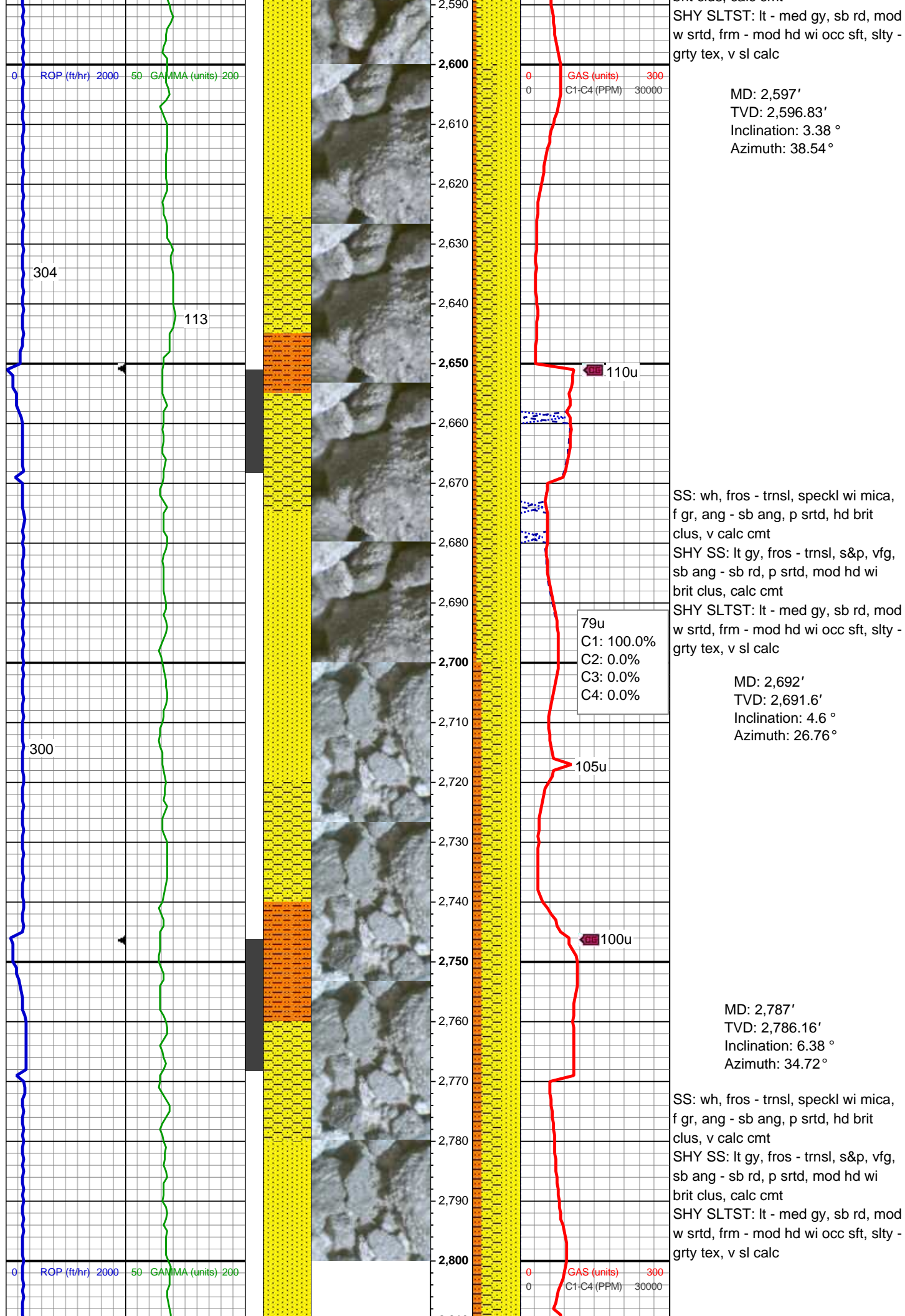
SS: wh, fros - trnsl, speckl wi mica,
f gr, ang - sb ang, p srted, hd brit
clus, v calc cmt
SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt
SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc

MD: 2,218'
TVD: 2,217.94'
Inclination: 0.6 °
Azimuth: 191.85 °

SHY SLTST: lt - med gy, sb rd -sb
blky, mod w srted, sft - frm, slty - grty
tex, v sl calc
SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt

MD: 2,313'
TVD: 2,312.93'
Inclination: 0.5 °
Azimuth: 203.04 °





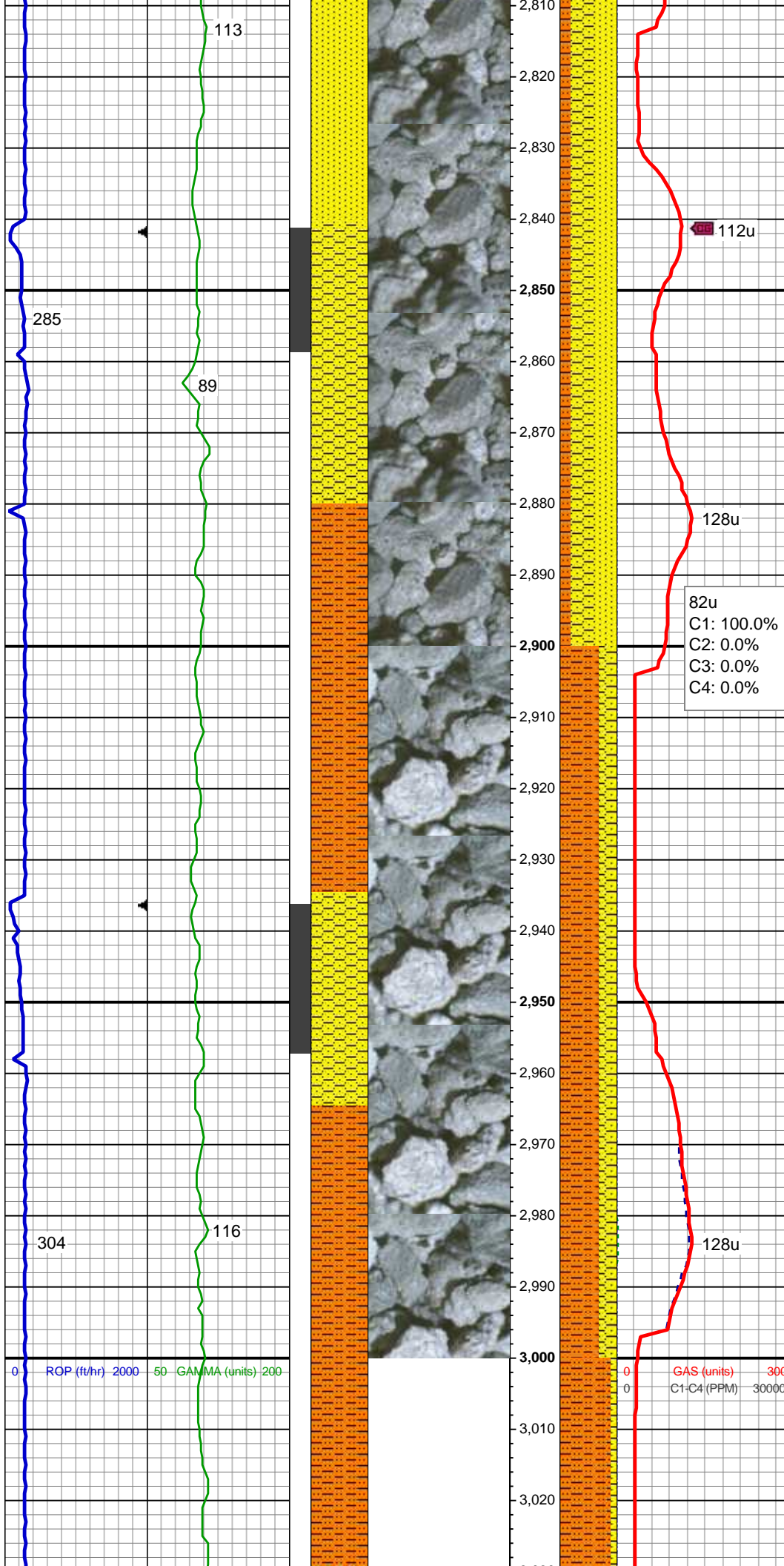
SHY SLTST: lt - med gy, sb rd, mod w srted, frm - mod hd wi occ sft, slty - grty tex, v sl calc

MD: 2,597'
TVD: 2,596.83'
Inclination: 3.38 °
Azimuth: 38.54 °

SS: wh, fros - trnsf, speckl wi mica, f gr, ang - sb ang, p srted, hd brit clus, v calc cmt
SHY SS: lt gy, fros - trnsf, s&p, vfg, sb ang - sb rd, p srted, mod hd wi brit clus, calc cmt
SHY SLTST: lt - med gy, sb rd, mod w srted, frm - mod hd wi occ sft, slty - grty tex, v sl calc

MD: 2,692'
TVD: 2,691.6'
Inclination: 4.6 °
Azimuth: 26.76 °

SS: wh, fros - trnsf, speckl wi mica, f gr, ang - sb ang, p srted, hd brit clus, v calc cmt
SHY SS: lt gy, fros - trnsf, s&p, vfg, sb ang - sb rd, p srted, mod hd wi brit clus, calc cmt
SHY SLTST: lt - med gy, sb rd, mod w srted, frm - mod hd wi occ sft, slty - grty tex, v sl calc



MUD WT: 8.75/8.75
VIS: 32/32 IN/OUT

MD: 2,882'
TVD: 2,880.48'
Inclination: 7.38 °
Azimuth: 38.9 °

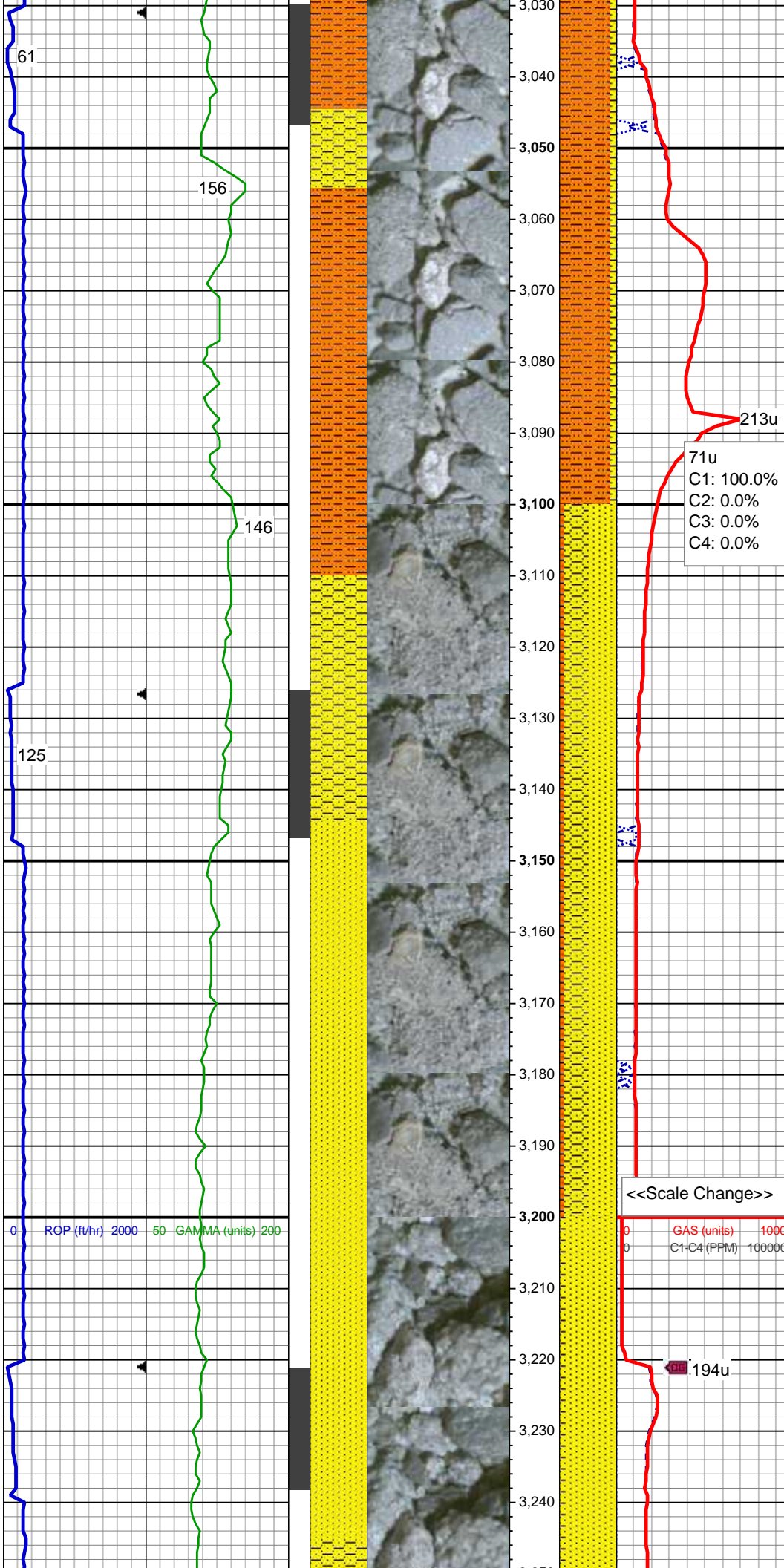
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f gr, ang - sb ang, p srted, hd brit
clus, v calc cmt
SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt
SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc

82u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

MD: 2,977'
TVD: 2,974.52'
Inclination: 8.85 °
Azimuth: 39.13 °

SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc
SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt

MUD WT: 9.20/9.15
VIS: 52/48 IN/OUT

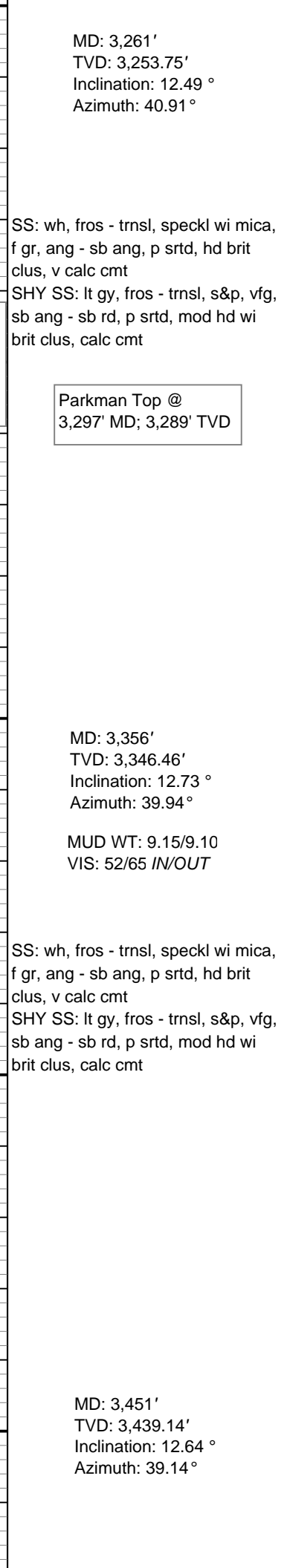
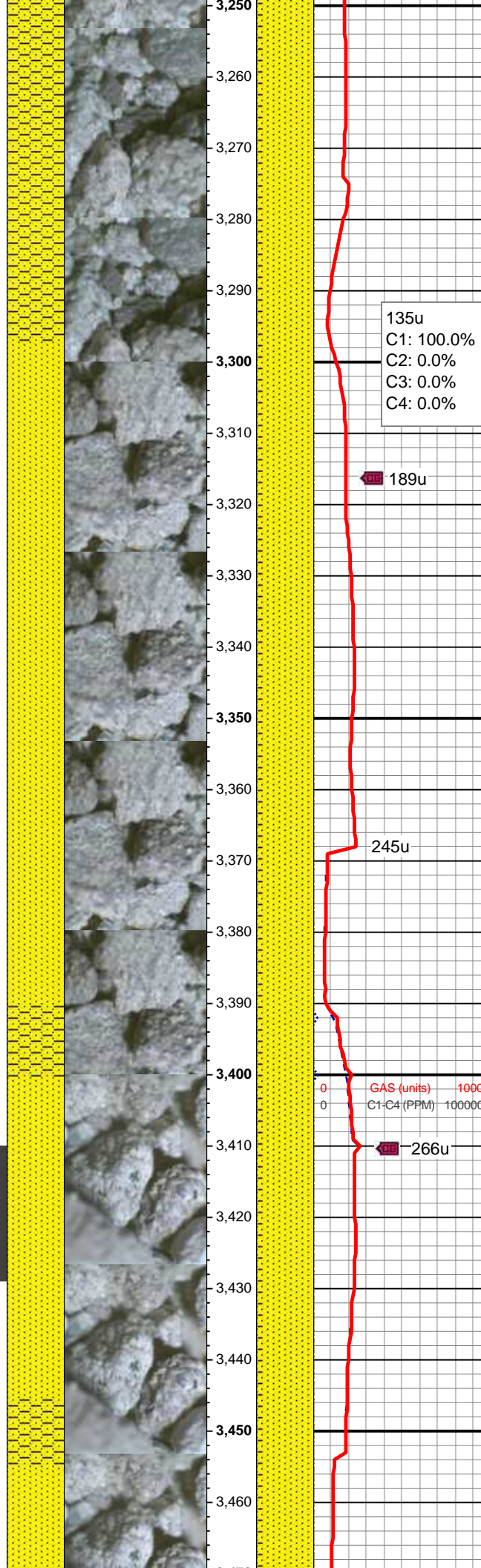
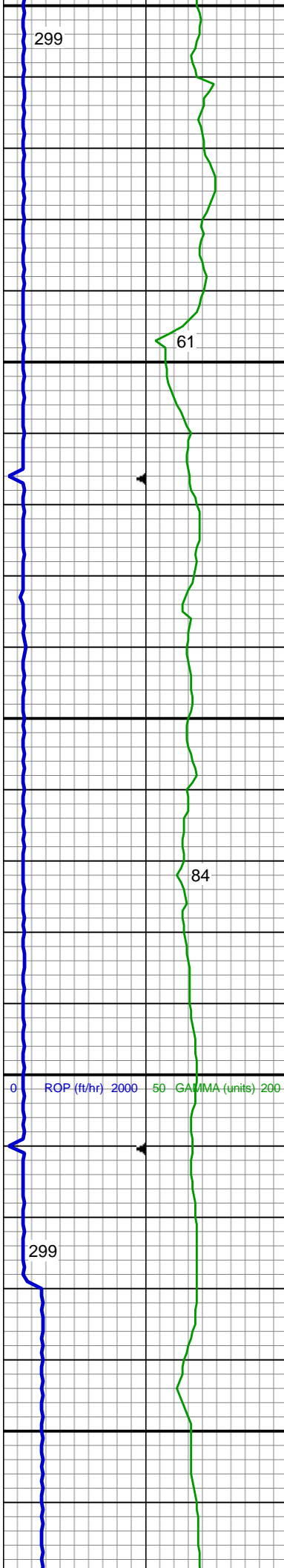


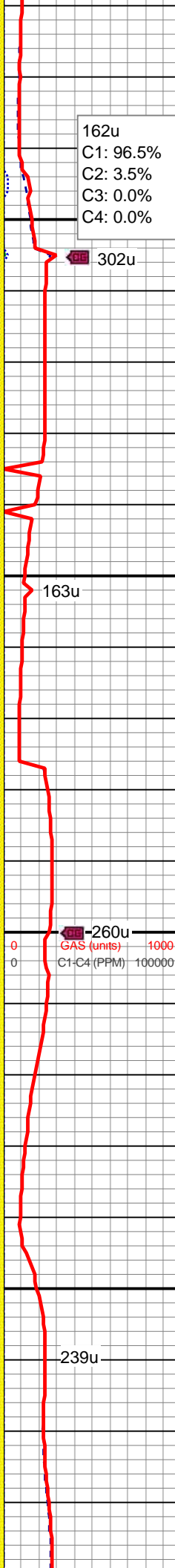
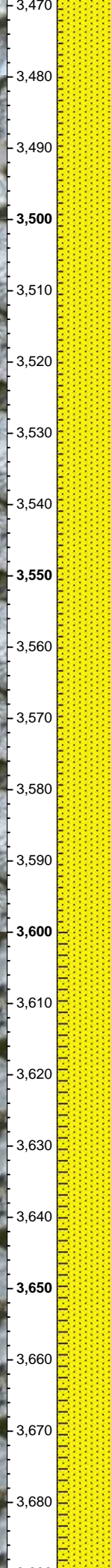
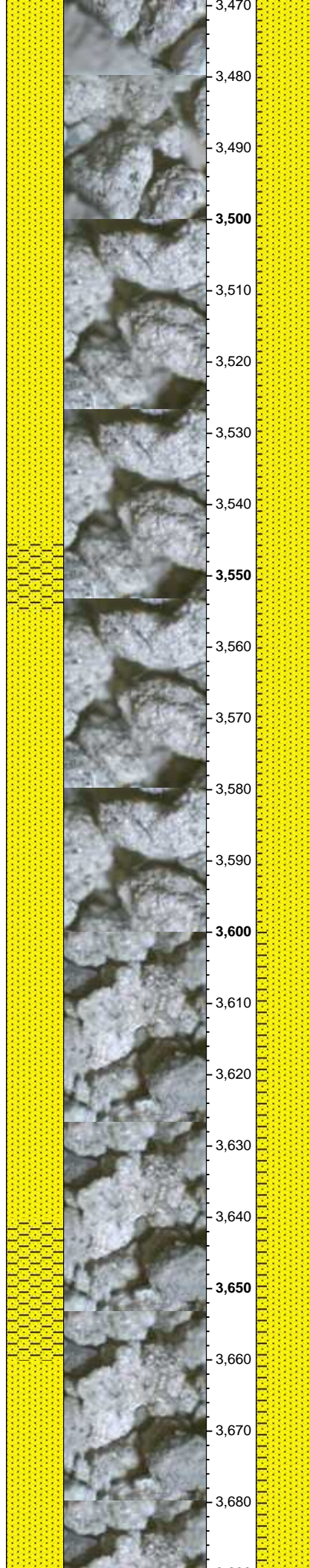
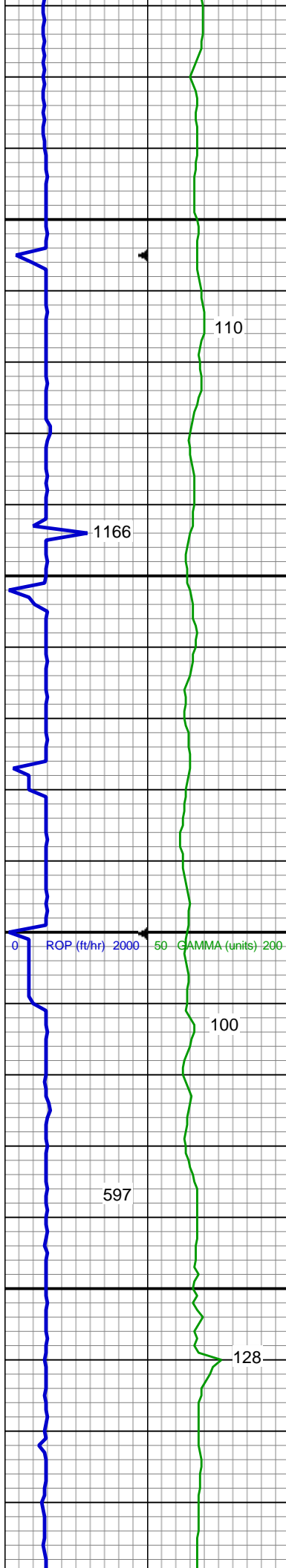
MD: 3,072'
TVD: 3,068.3'
Inclination: 9.56 °
Azimuth: 43.61 °

SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc
SHY SS: lt gy, fros - trnsf, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt

MD: 3,167'
TVD: 3,161.75'
Inclination: 11.16 °
Azimuth: 40.54 °

SS: wh, fros - trnsf, speckl wi mica,
f gr, ang - sb ang, p srted, hd brit
clus, v calc cmt
SHY SS: lt gy, fros - trnsf, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt
SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc





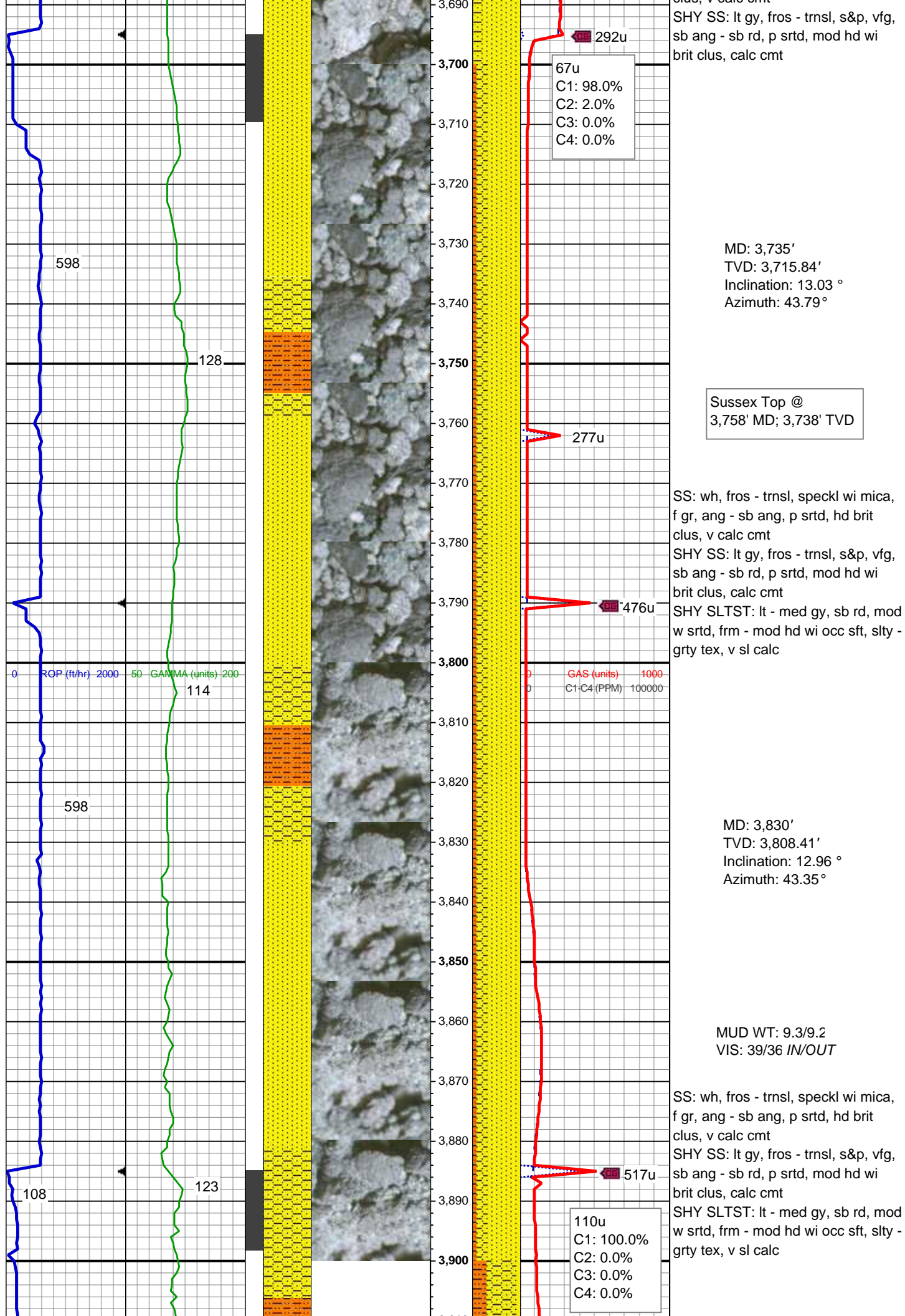
SS: wh, fros - trnsl, speckl wi mica,
f gr, ang - sb ang, p srted, hd brit
clus, v calc cmt
SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt

MD: 3,546'
TVD: 3,531.77'
Inclination: 13.01 °
Azimuth: 38.26 °

SS: wh, fros - trnsl, speckl wi mica,
f gr, ang - sb ang, p srted, hd brit
clus, v calc cmt
SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt

MD: 3,640'
TVD: 3,623.32'
Inclination: 13.22 °
Azimuth: 37.76 °

SS: wh, fros - trnsl, speckl wi mica,
f gr, ang - sb ang, p srted, hd brit
clus, v calc cmt



clus, v calc cmt
SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt

MD: 3,735'
TVD: 3,715.84'
Inclination: 13.03 °
Azimuth: 43.79°

Sussex Top @
3,758' MD; 3,738' TVD

SS: wh, fros - trnsl, speckl wi mica,
f gr, ang - sb ang, p srted, hd brit
clus, v calc cmt
SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt

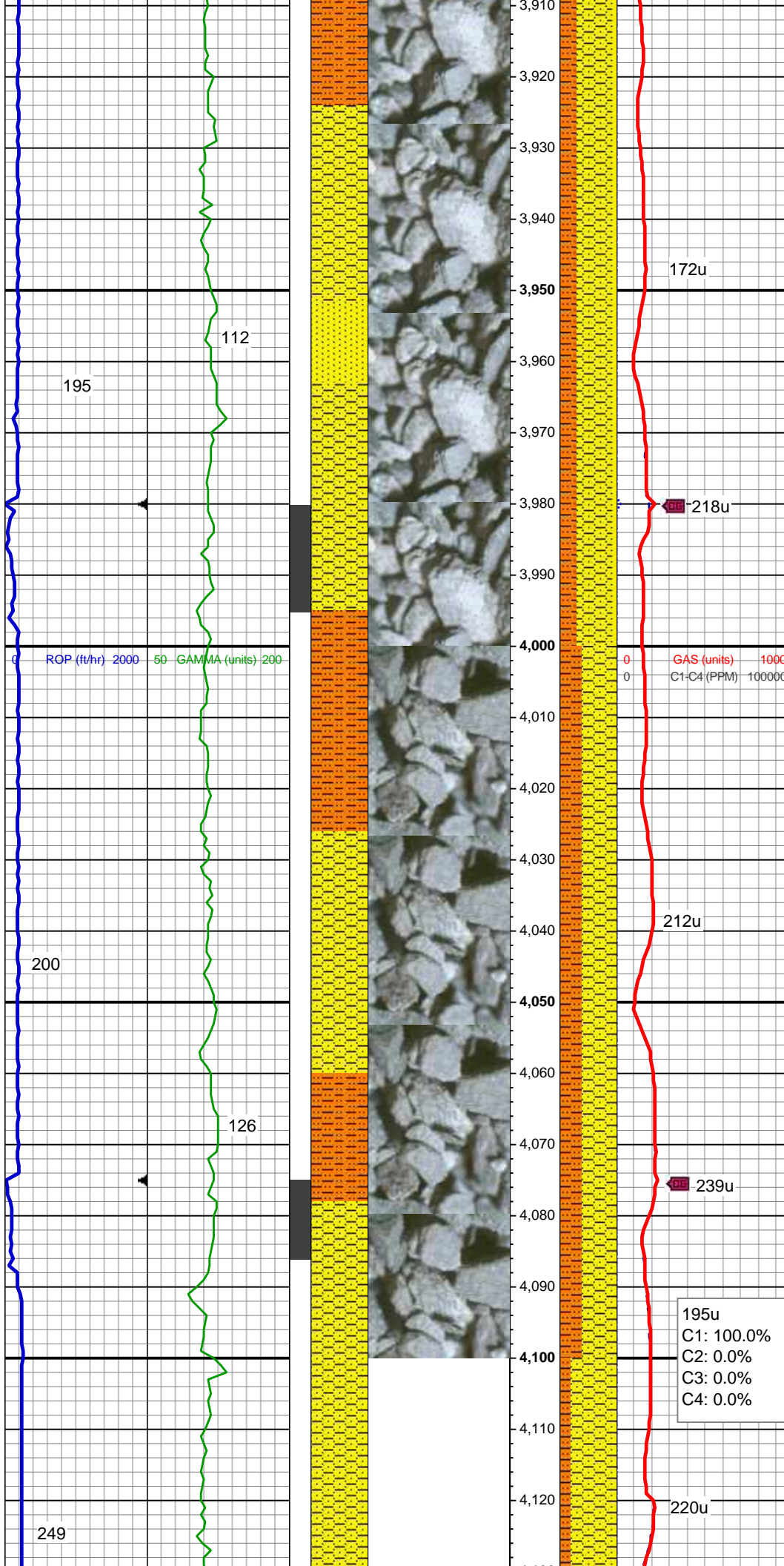
SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc

MD: 3,830'
TVD: 3,808.41'
Inclination: 12.96 °
Azimuth: 43.35°

MUD WT: 9.3/9.2
VIS: 39/36 IN/OUT

SS: wh, fros - trnsl, speckl wi mica,
f gr, ang - sb ang, p srted, hd brit
clus, v calc cmt
SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt

SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc



MD: 3,925'
TVD: 3,901.11'
Inclination: 12.3 °
Azimuth: 45.4 °

02/18/2014
Mud Wt: 9.15
FVis: 43
PVis: 15
YP: 9
GELS: 5/11/24
API Filt: 8.5
CAKE: 1/0
pH: 10.6
Cl: 1,200
Ca: 160

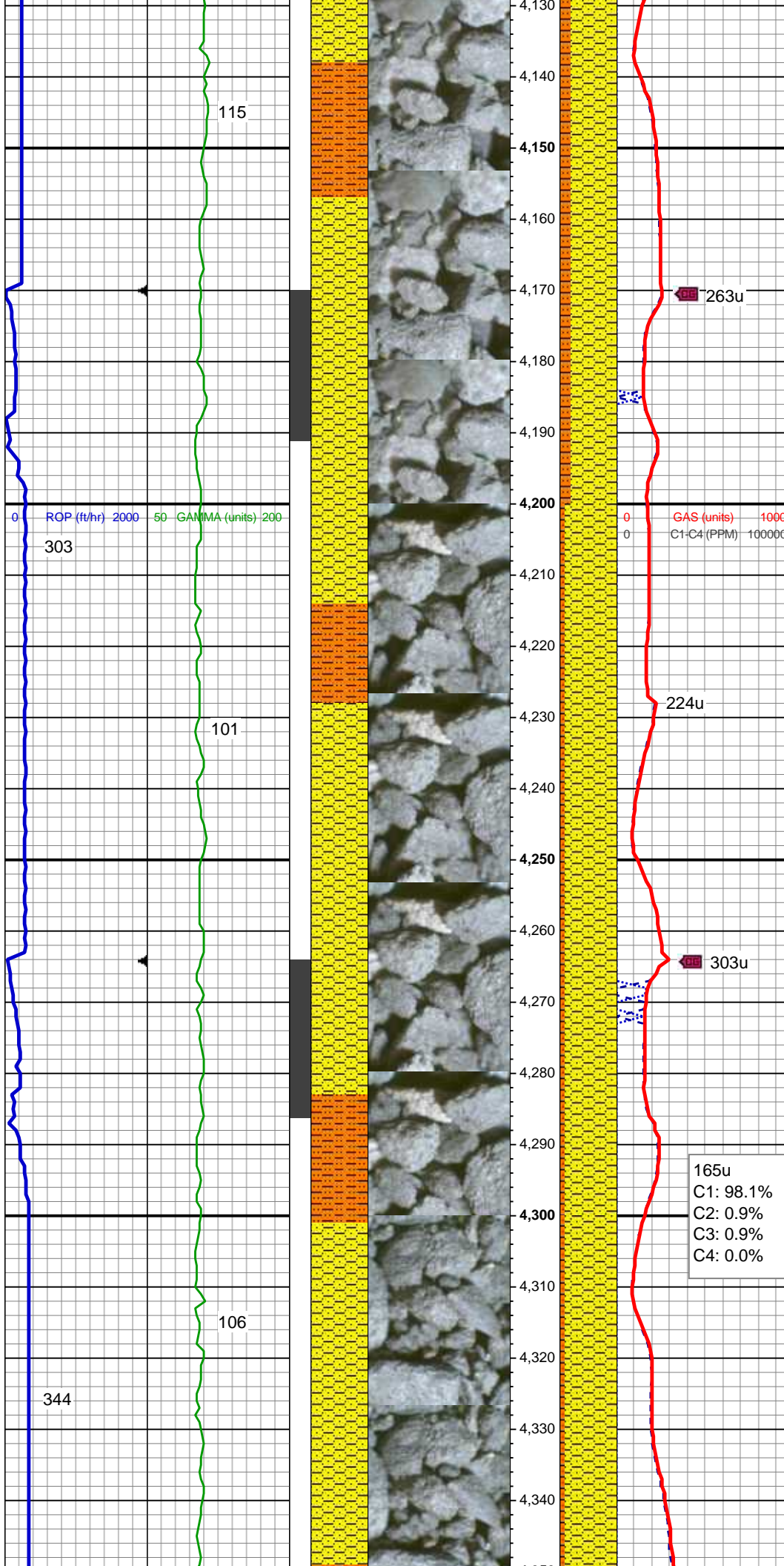
SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt
SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc
SS: wh, fros - trnsl, speckl wi mica,
f gr, ang - sb ang, p srted, hd brit
clus, v calc cmt

MD: 4,020'
TVD: 3,994.16'
Inclination: 10.99 °
Azimuth: 47.03 °

SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt
SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc

195u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

MD: 4,115'
TVD: 4,087.43'
Inclination: 10.94 °
Azimuth: 42.09 °



MUD WT: 9.50/9.45
VIS: 37/36 IN/OUT

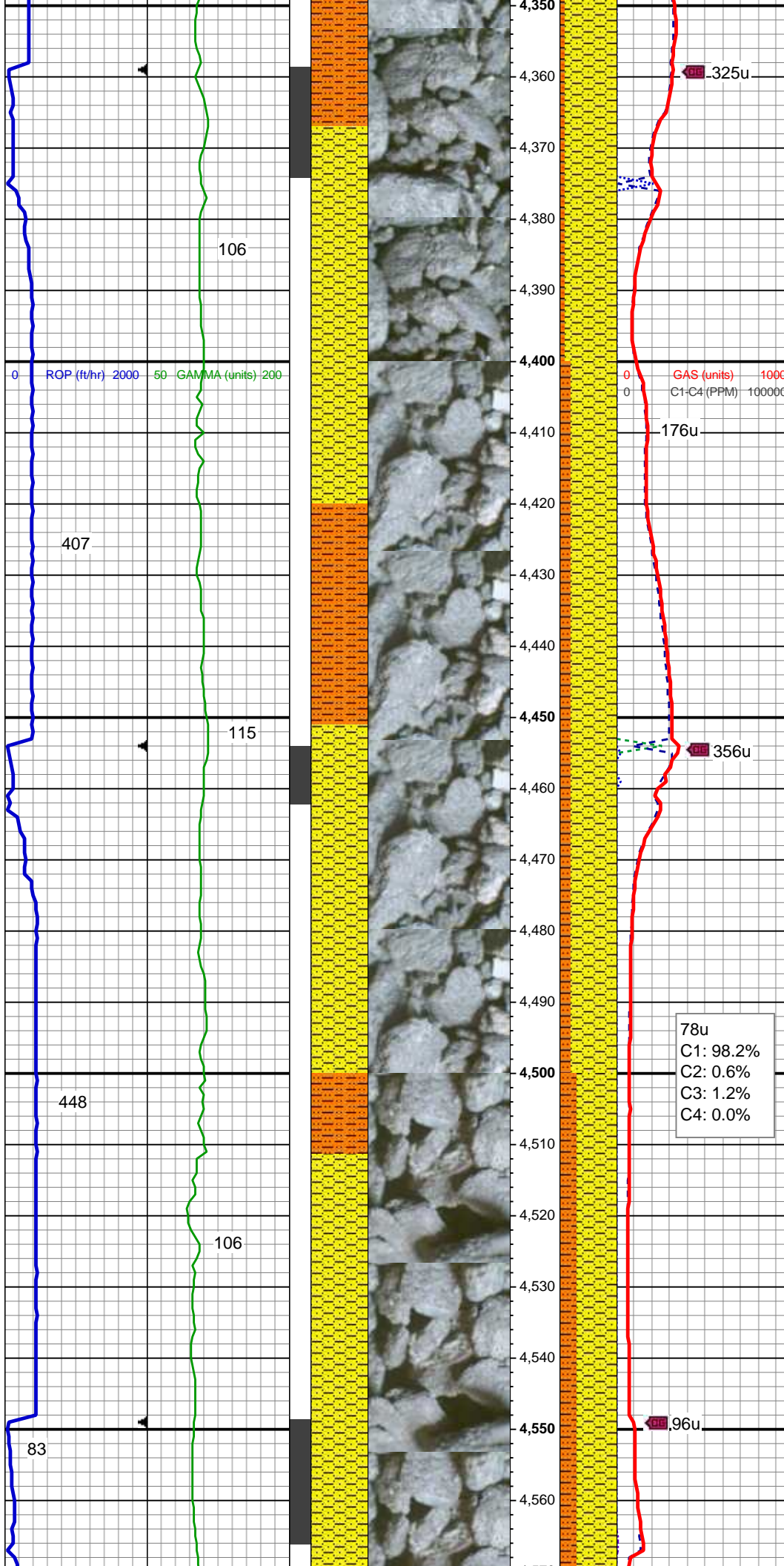
SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt
SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc

MD: 4,210'
TVD: 4,180.92'
Inclination: 9.52 °
Azimuth: 35.78 °

SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt
SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc

MD: 4,305'
TVD: 4,274.87'
Inclination: 7.49 °
Azimuth: 35.62 °

165u
C1: 98.1%
C2: 0.9%
C3: 0.9%
C4: 0.0%



MUD WT: 9.50/9.50
VIS: 43/39 IN/OUT

SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt

SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc

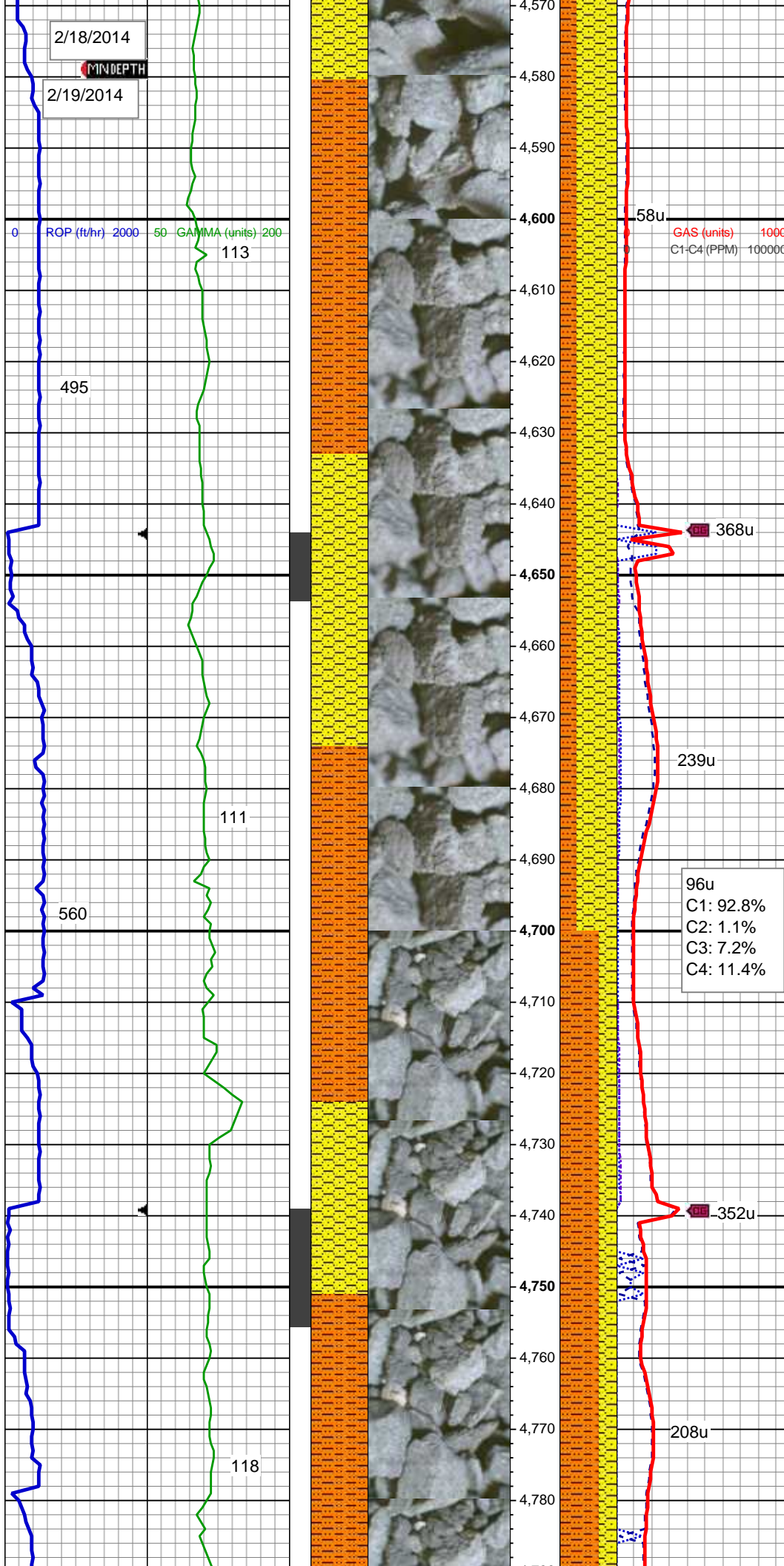
MD: 4,400'
TVD: 4,369.23'
Inclination: 5.72 °
Azimuth: 36.28 °

SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt

SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc

MD: 4,495'
TVD: 4,463.82'
Inclination: 4.92 °
Azimuth: 38.38 °

Shannon Top @
4,511' MD; 4,479' TVD



SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt
SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc

MD: 4,589'
TVD: 4,557.59'
Inclination: 3.15 °
Azimuth: 27.05 °

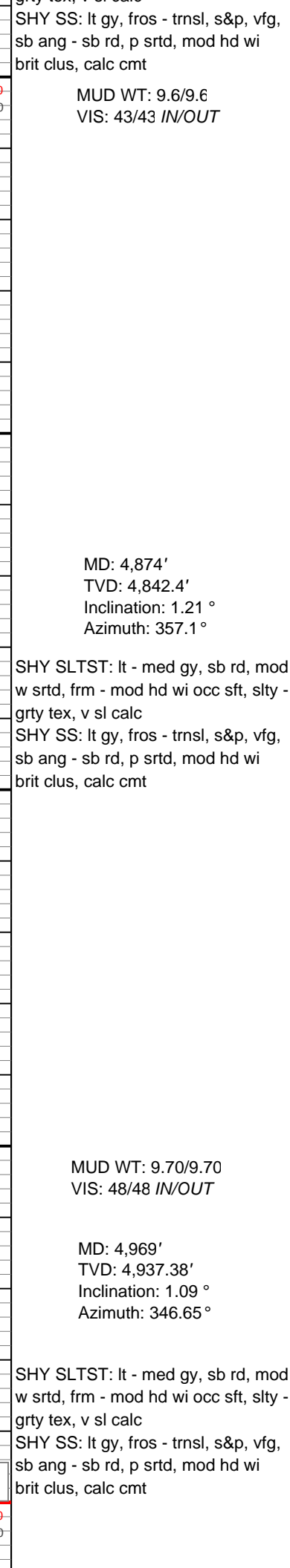
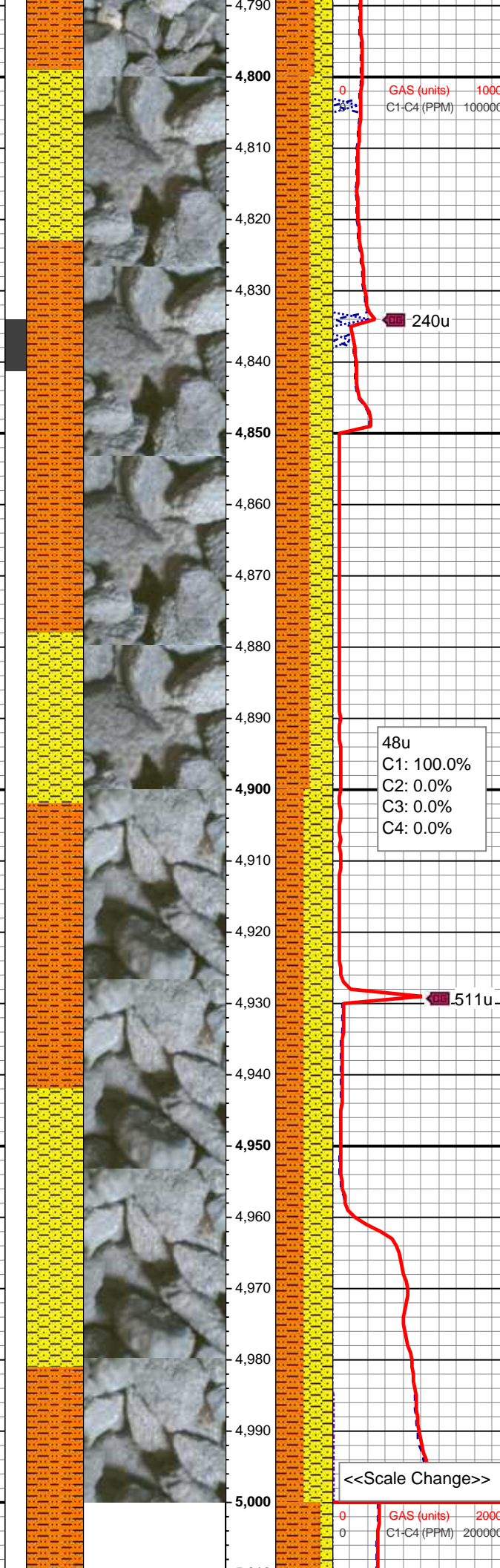
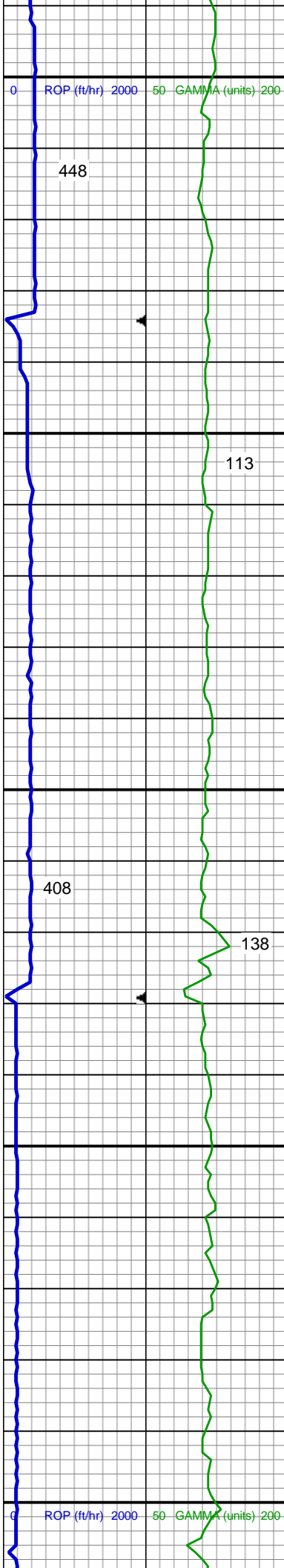
MUD WT: 9.60/9.50
VIS: 43/43 IN/OUT

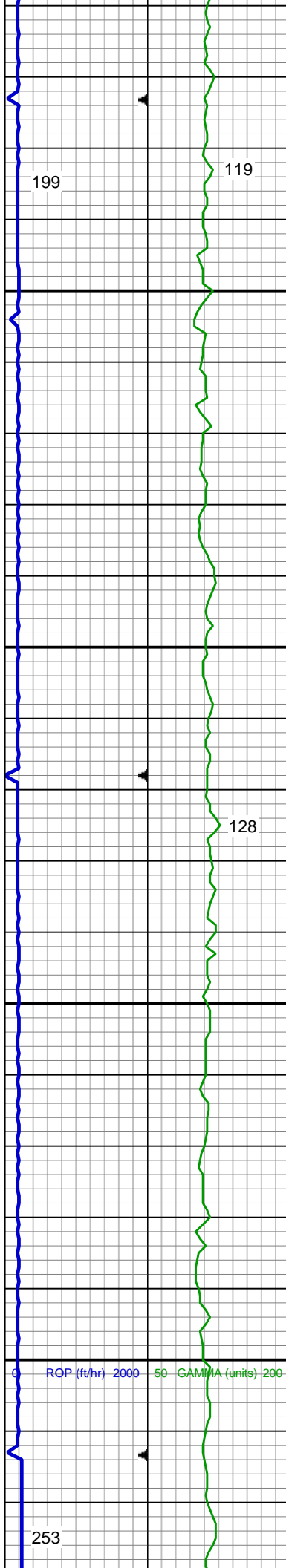
MD: 4,684'
TVD: 4,652.48'
Inclination: 2.35 °
Azimuth: 12.95 °

SHY SS: lt gy, fros - trnsl, s&p, vfg,
sb ang - sb rd, p srted, mod hd wi
brit clus, calc cmt
SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc

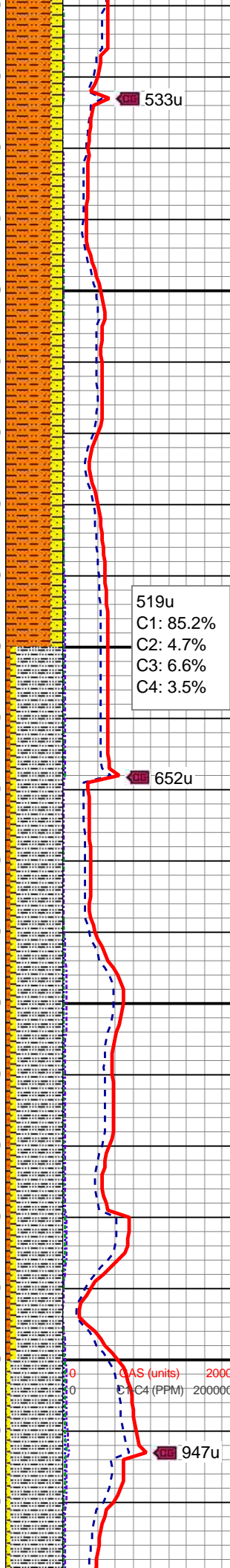
MD: 4,779'
TVD: 4,747.43'
Inclination: 1.51 °
Azimuth: 357.99 °

SHY SLTST: lt - med gy, sb rd, mod
w srted, frm - mod hd wi occ sft, slty -
grty tex, v sl calc





5,010
5,020
5,030
5,040
5,050
5,060
5,070
5,080
5,090
5,100
5,110
5,120
5,130
5,140
5,150
5,160
5,170
5,180
5,190
5,200
5,210
5,220



MD: 5,064'
TVD: 5,032.37'
Inclination: 0.98 °
Azimuth: 1.75°

MUD WT: 9.80/9.80
VIS: 48/52 IN/OUT

SHY SLTST: lt - med gy, sb rd, mod w srted, frm - mod hd wi occ sft, slty - grty tex, v sl calc

SHY SS: lt gy, fros - trns, s&p, vfg, sb ang - sb rd, p srted, mod hd wi brit clus, calc cmt

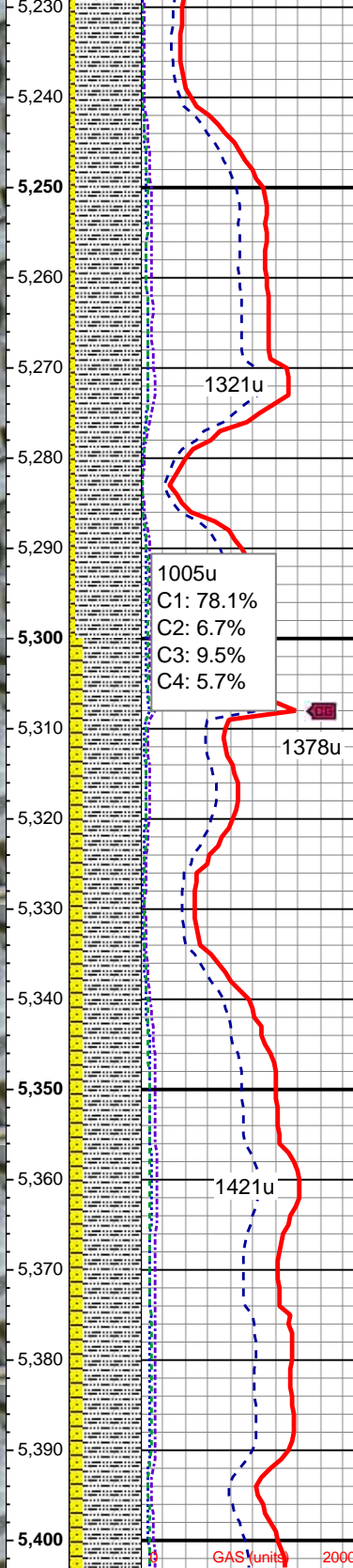
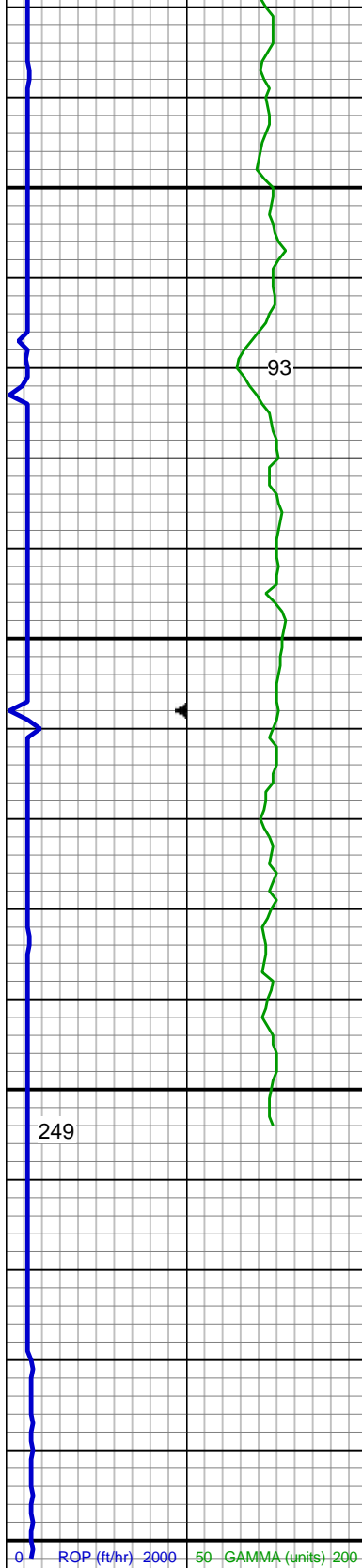
MD: 5,158'
TVD: 5,126.35'
Inclination: 0.95 °
Azimuth: 14.59°

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

SHY SLTST: lt - med gy, sb rd, mod w srted, frm - mod hd wi occ sft, slty - grty tex, v sl calc

SHY SS: lt gy, fros - trns, s&p, vfg, sb ang - sb rd, p srted, mod hd wi brit clus, calc cmt

02/19/2014
Mud Wt: 9.70
FVis: 48
PVis: 13
YP: 14
GELS: 5/12/26
API Filt: 5.8
CAKE: 1/0



pH: 9.8
Cl: 1,200
Ca: 160

MD: 5,253'
TVD: 5,221.34'
Inclination: 0.7 °
Azimuth: 9.84 °

Teepee Buttes Top @
5,270' MD; 5,239' TVD

SLTY SH: lt - med gy brn, occ dk gy,
frm - hd, plty - sb plty, occ sb blk,
slty - grty tex, v sl calc
SHY SS: lt gy, fros - trns, s&p, vfg,
sb ang - sb rd, p srt, mod hd wi
brit clus, calc cmt

MUD WT: 9.90/9.95
VIS: 52/54 IN/OUT

MD: 5,347'
TVD: 5,315.34'
Inclination: 0.49 °
Azimuth: 15.41 °

SLTY SH: lt - med gy brn, occ dk gy,
frm - hd, plty - sb plty, occ sb blk,
slty - grty tex, v sl calc
SHY SS: lt gy, fros - trns, s&p, vfg,
sb ang - sb rd, p srt, mod hd wi
brit clus, calc cmt

TD Vertical @ 5,403'
MD on 2/19/2014 @
05:10 hrs MST

Wellsite Geological
Services
Provided by
Columbine Logging

See Corresponding Horizontal Log
Bulleit Federal PC LG04-62HN
HORZ

