



Scale: 5" / 100'
Measured Depth Log

Well Name Wells Ranch AA35-67-1AHNA(VERT)

Location SEC 36;T6N;R63W

State COLORADO

County WELD

Country USA

Rig Number H&P 322

API Number 05-123-38654-0000

AFE # 140199

Region DJ BASIN

Field WATTENBERG

Spud Date 2/22/2014

Drilling Completed 3/1/2014

Surface Coordinates LAT: 40.44486°N
LONG: 104.3941°W
1929' FSL
168' FEL

Ground Elevation 4790'

K.B. Elevation 4814'

Logged Interval 1000' **To** 5872'

Total Depth 11094'

Formation NIOBRARA "A" MARL

Type of Drilling Fluid MUD;WATER;POLY

Operator

Company Noble Energy Inc

Address 1625 BROADWAY
DENVER, CO 80202
(303) 228-4000

Geologist

Name JOHN READY, MIKE GREENE

Company COLUMBINE LOGGING, INC.

Address 2385 S. LIPAN ST
DENVER, COLORADO 80223
(303) 289-7764

Rock Types

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

Accessories

Fossils

ALGAE
AMPHIPORA
BELEMNITE
BIOCLASTIC
BRACHIOIPOD
BRYOZOA
CEPHALOPOD
CORAL
CRINOID
ECHINOID
FISH
FORAMINIFERA

Fossils

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

Minerals

Minerals

ANHYDRITIC
ARGILLACEOUS
ARGILLITE GRAIN
BENTONITE
BITUMENOUS SUBSTANCE
BRECCIA FRAGMENTS
CALCAREOUS
CARBONACEOUS FLAKES
CHTDK
CHTLT
COAL - THIN BEDS
DOLOMITIC
FELDSPAR
FERRUGINOUS PELLET

Minerals

FERRUGINOUS
GLAUCONITE
GYPSIFEROUS
HEAVY MINERAL
KAOLIN
MARLSTONE
MINERAL CRYSTALS
NODULES
PHOSPHATE PELLETS
PYRITE
SALT CAST
SANDY
SILICEOUS
SILTY

Minerals

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
FENESTRAL
FRACTURE
INTERCRYSTALLINE
INTEROOLITIC

Oil Show

MOLDIC
ORGANIC
PINPOINT
VUGGY

Engineering

BIT
CONNECTION (LEFT)
CONNECTION (RIGHT)
CONNECTION GAS
CORE - LOST
CORE - RECOVERED
DST INTERVAL

Other Symbols

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

Other Symbols

WIRELINE TESTED - LEFT
WIRELINE TESTED - RT

Rounding

ANGULAR
ROUNDED
SUBANG
SUBRND

Textures

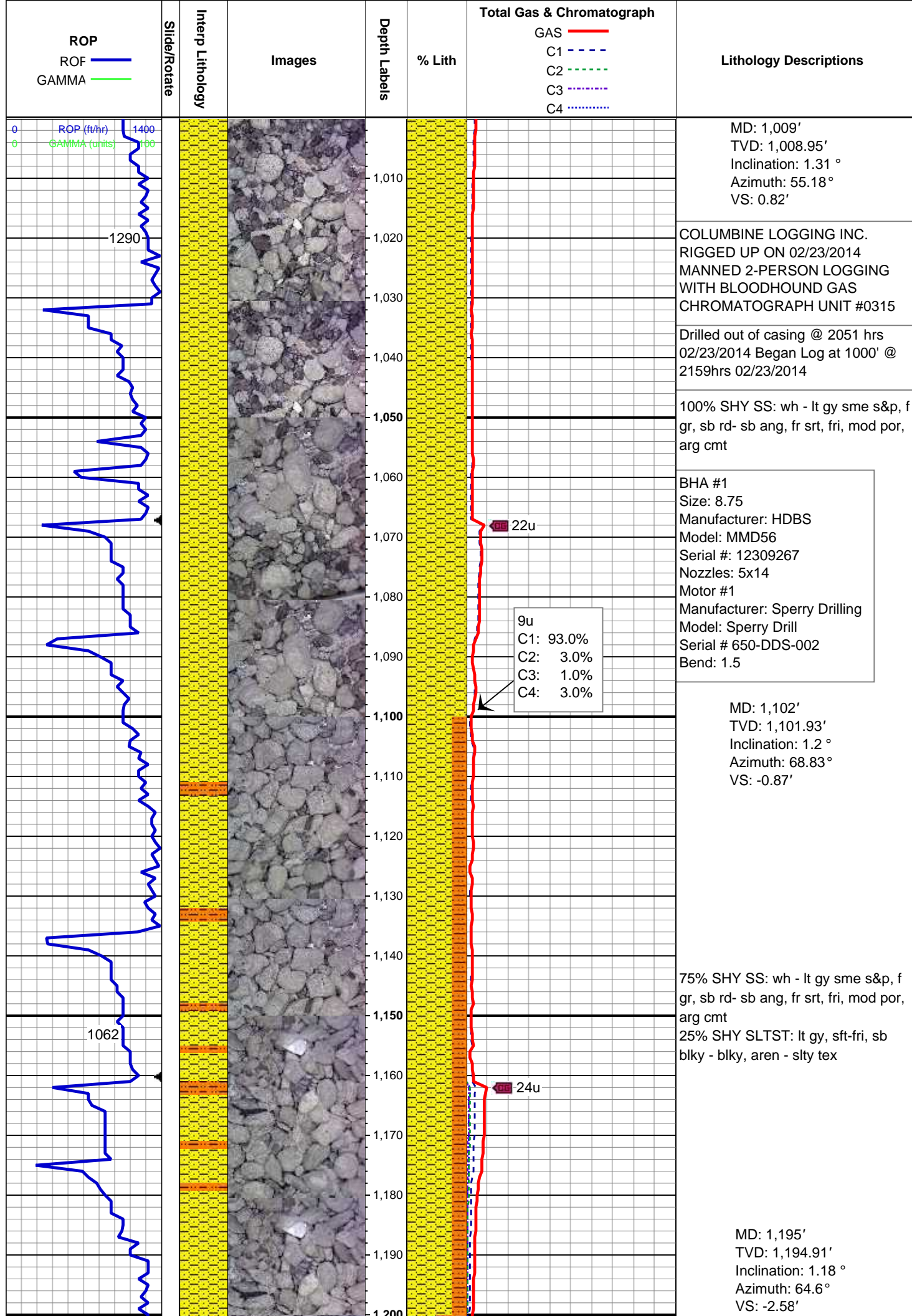
BOUNDSTONE
CHALKY
CRYPTOXLN

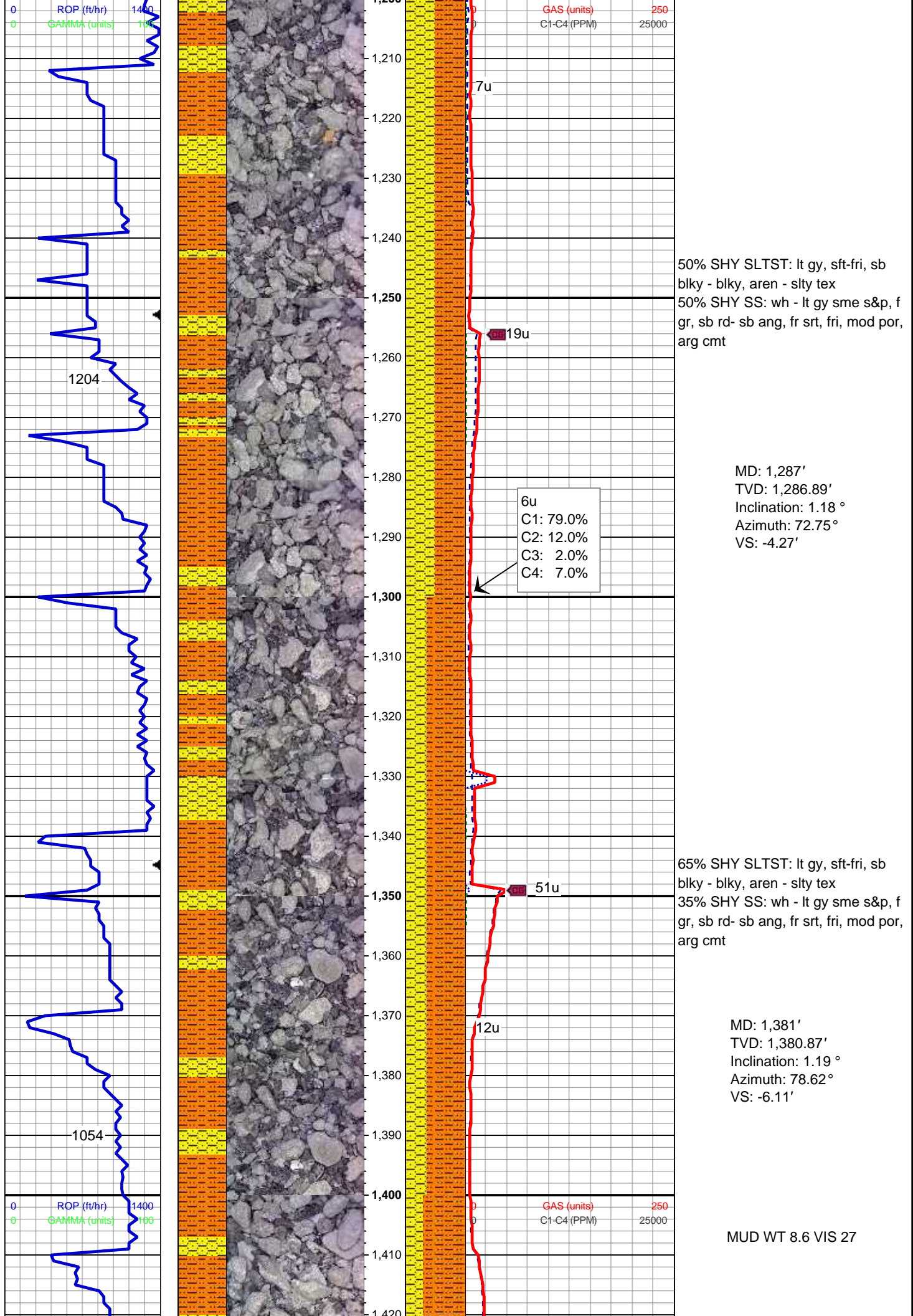
Other Symbols

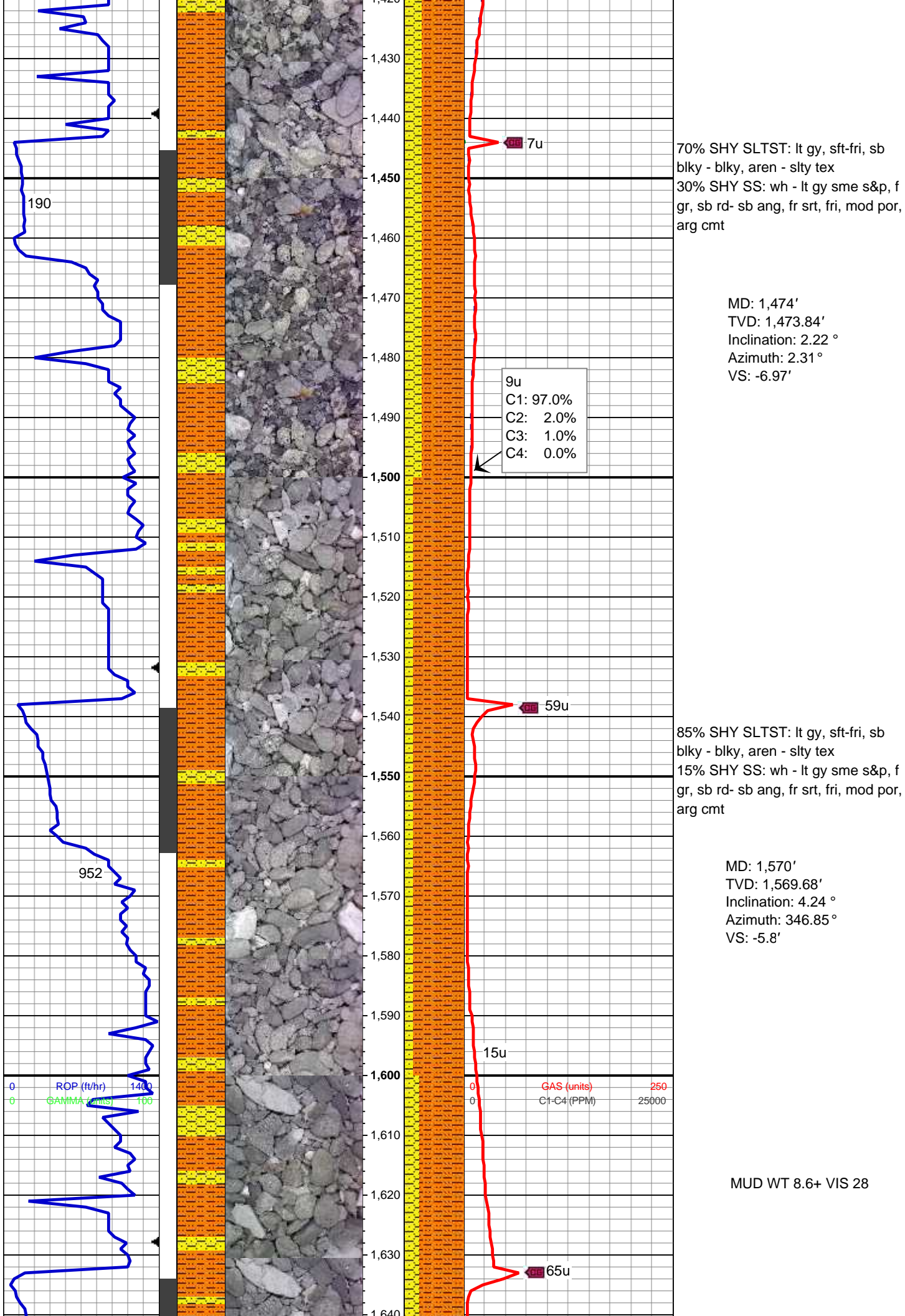
E EARTHY
FINELYXLN
GRAINSTONE
L LITHOGRAPHIC
MICROXLN
MUDSTONE
PACKSTONE
WACKESTONE

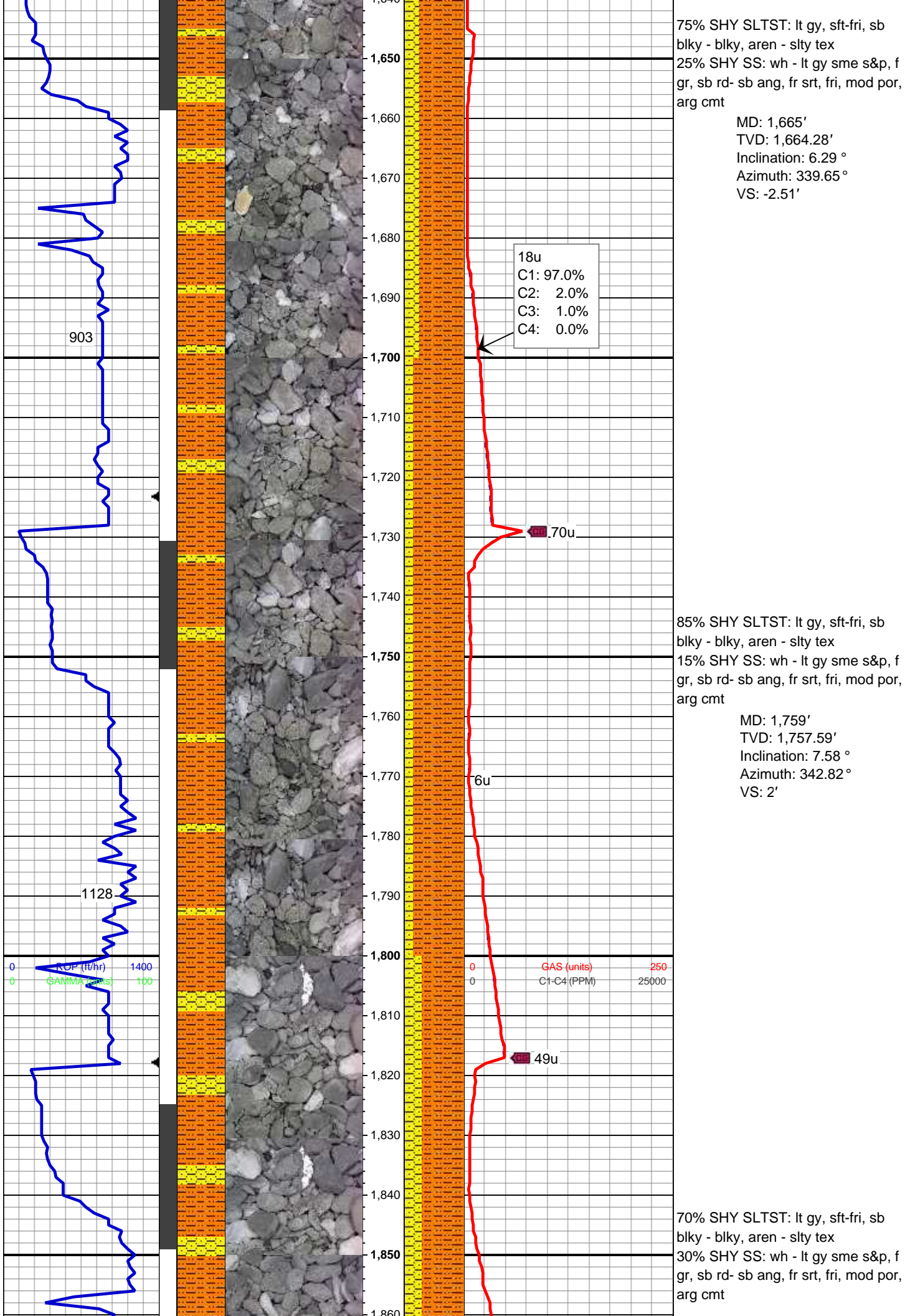
Sorting

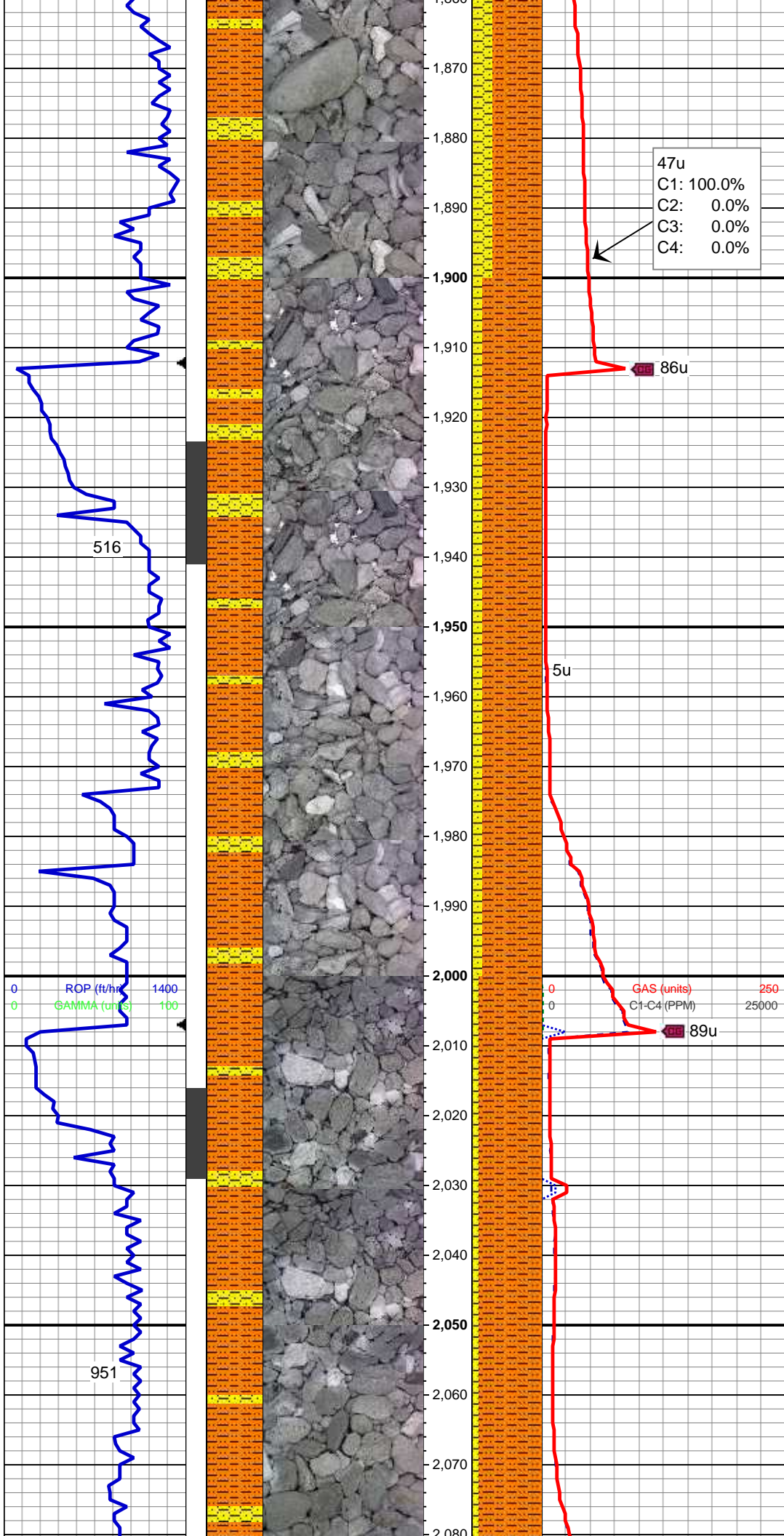
M MODERATE
P POOR
W WELL









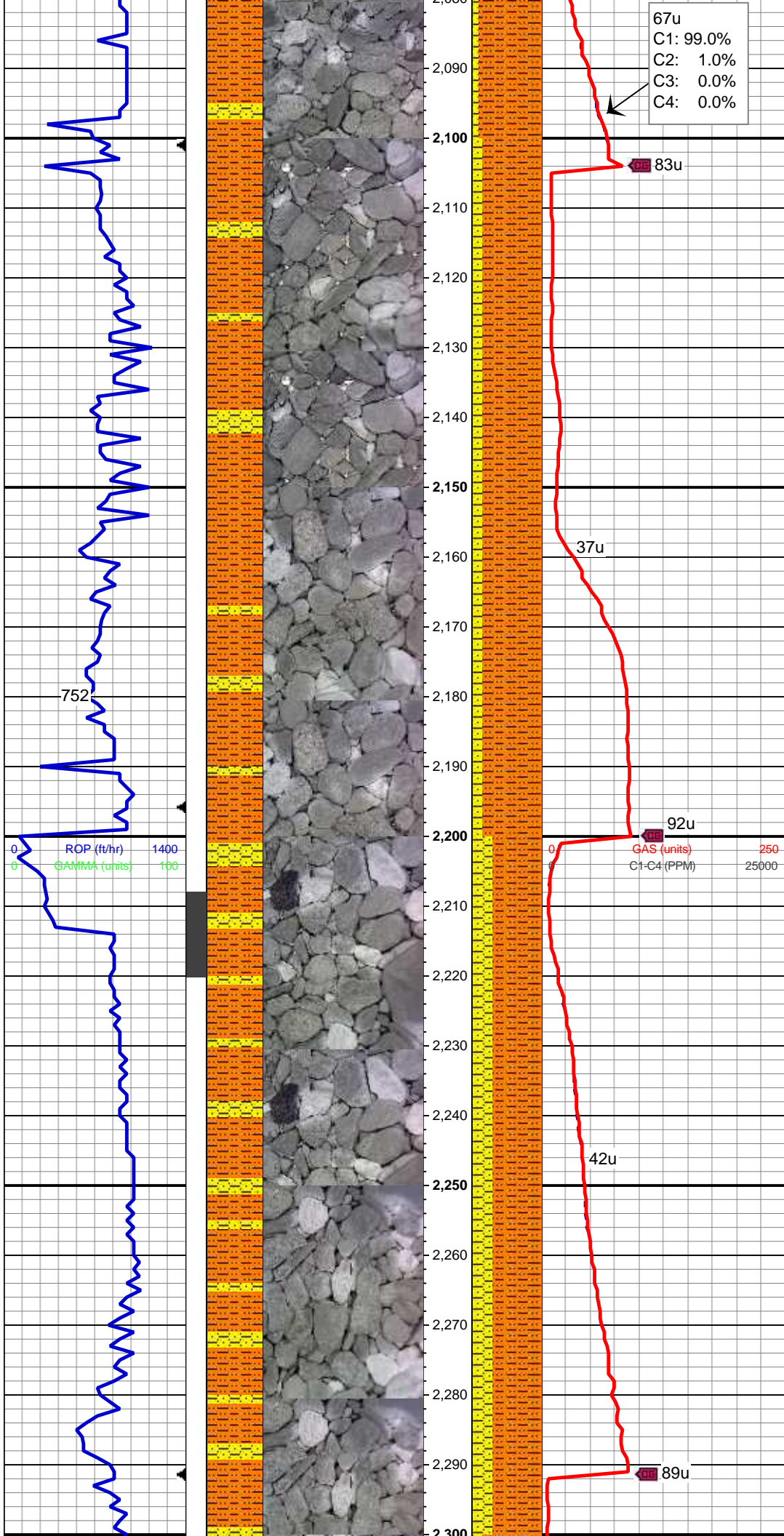


MD: 1,854'
TVD: 1,851.57'
Inclination: 9.2 °
Azimuth: 345.65 °
VS: 6.83'

85% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
15% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

MD: 1,949'
TVD: 1,945.19'
Inclination: 10.38 °
Azimuth: 348.15 °
VS: 11.78'

90% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
10% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt



67u
C1: 99.0%
C2: 1.0%
C3: 0.0%
C4: 0.0%

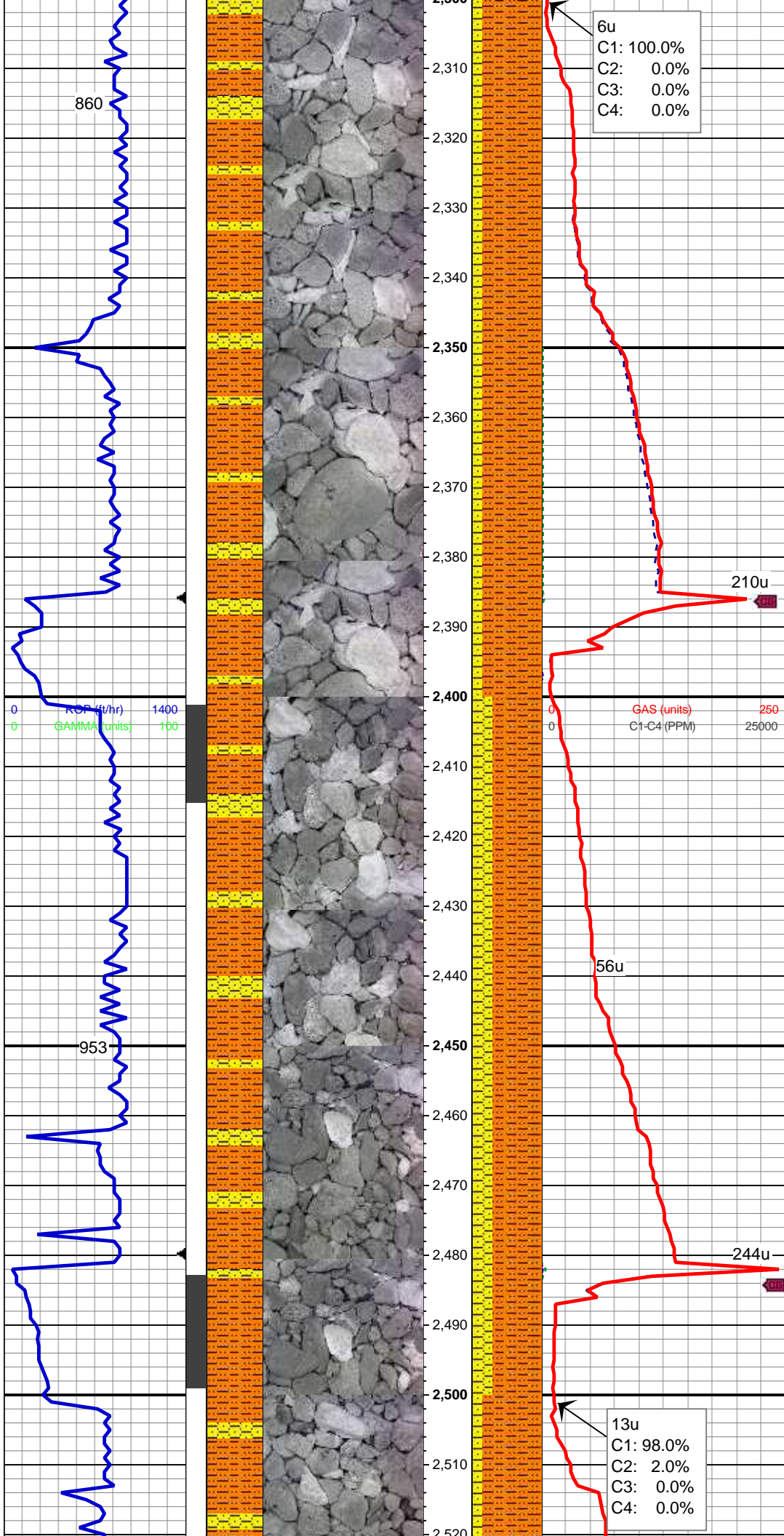
MD: 2,138'
TVD: 2,131.11'
Inclination: 9.55 °
Azimuth: 340.53 °
VS: 24.27'

85% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
15% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

MUD WT 8.6+ VIS 29

MD: 2,233'
TVD: 2,224.68'
Inclination: 10.36 °
Azimuth: 342.88 °
VS: 30.7'

70% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
30% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt



860

953

0 RSP (ft/hr) 1400
0 GAMMA (units) 100

6u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

MD: 2,328'
TVD: 2,318.28'
Inclination: 9.27 °
Azimuth: 341.47 °
VS: 36.92'

85% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
15% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

210u

0 GAS (units) 250
0 C1-C4 (PPM) 25000

MD: 2,422'
TVD: 2,411.04'
Inclination: 9.41 °
Azimuth: 338.76 °
VS: 43.29'

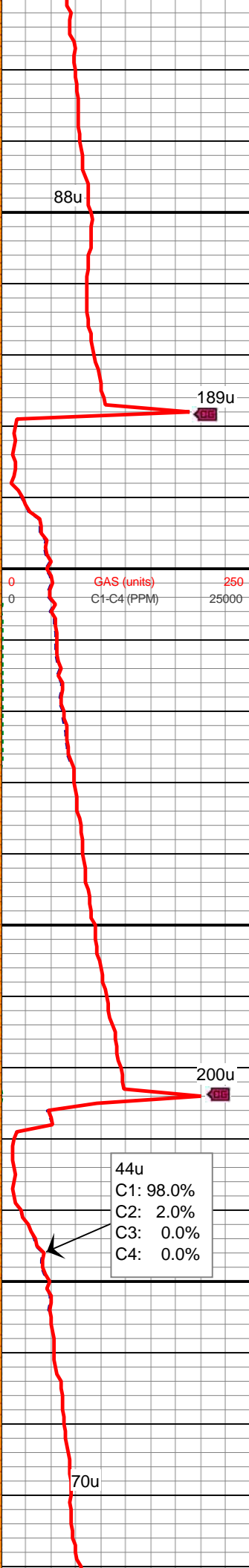
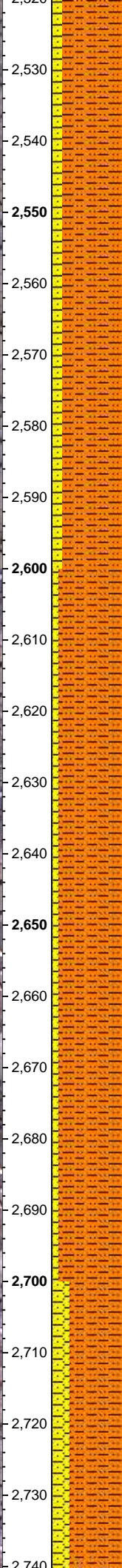
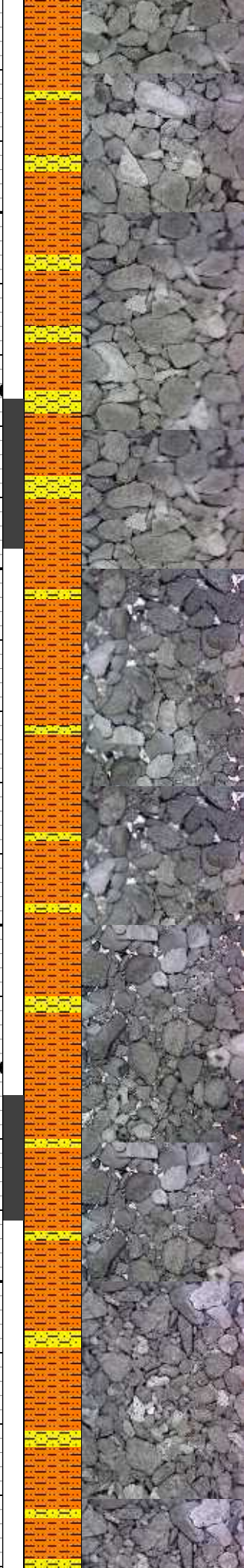
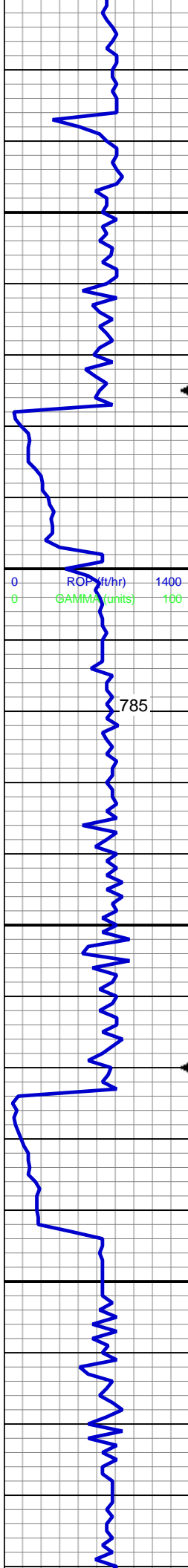
70% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
30% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

56u

244u

13u
C1: 98.0%
C2: 2.0%
C3: 0.0%
C4: 0.0%

MD: 2,517'
TVD: 2,504.7'
Inclination: 9.87 °
Azimuth: 337.35 °
VS: 50.45'



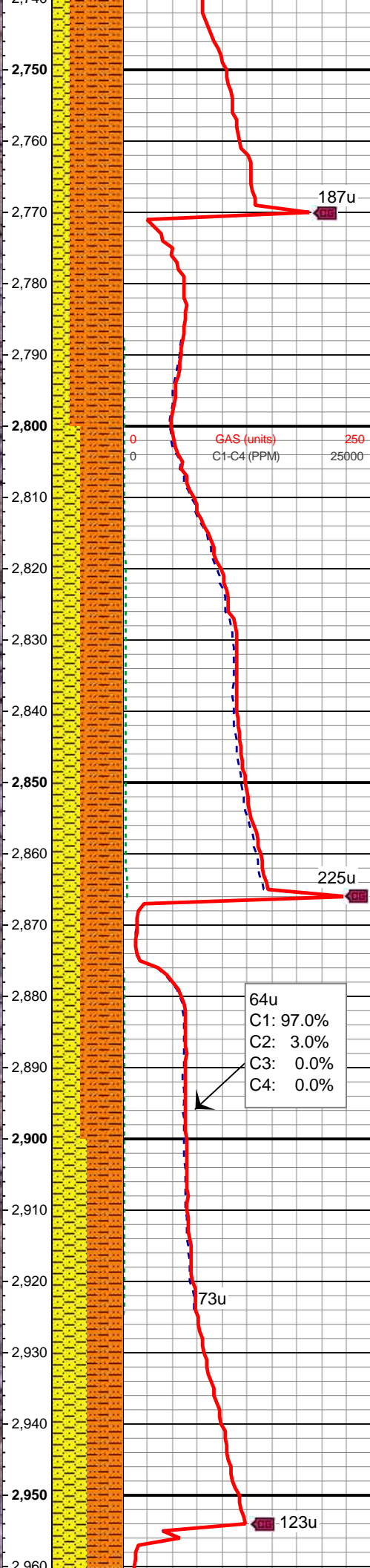
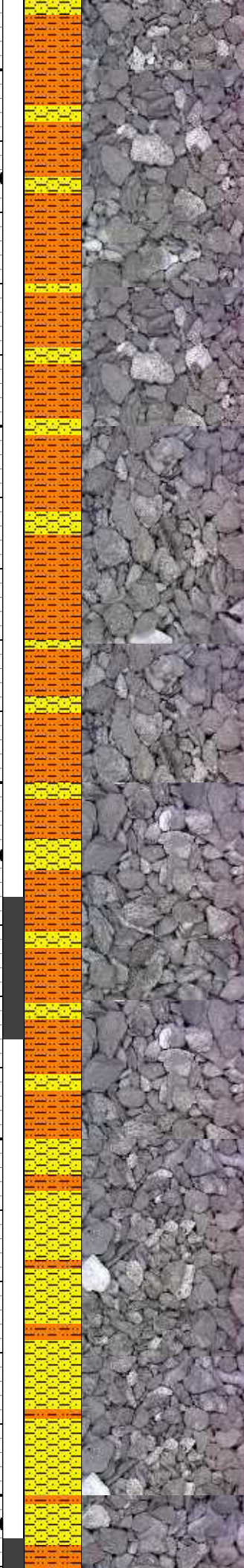
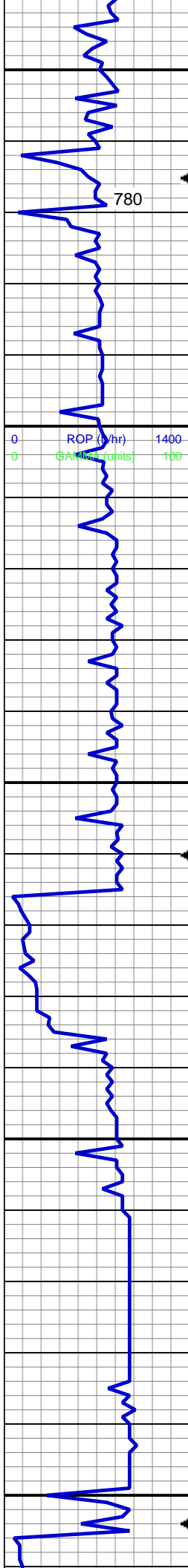
85% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
15% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

MUD WT 8.6 VIS 28

MD: 2,612'
TVD: 2,598.18'
Inclination: 10.62 °
Azimuth: 338.56 °
VS: 58.07'

90% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
10% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

MD: 2,707'
TVD: 2,691.55'
Inclination: 10.66 °
Azimuth: 345.96 °
VS: 64.78'



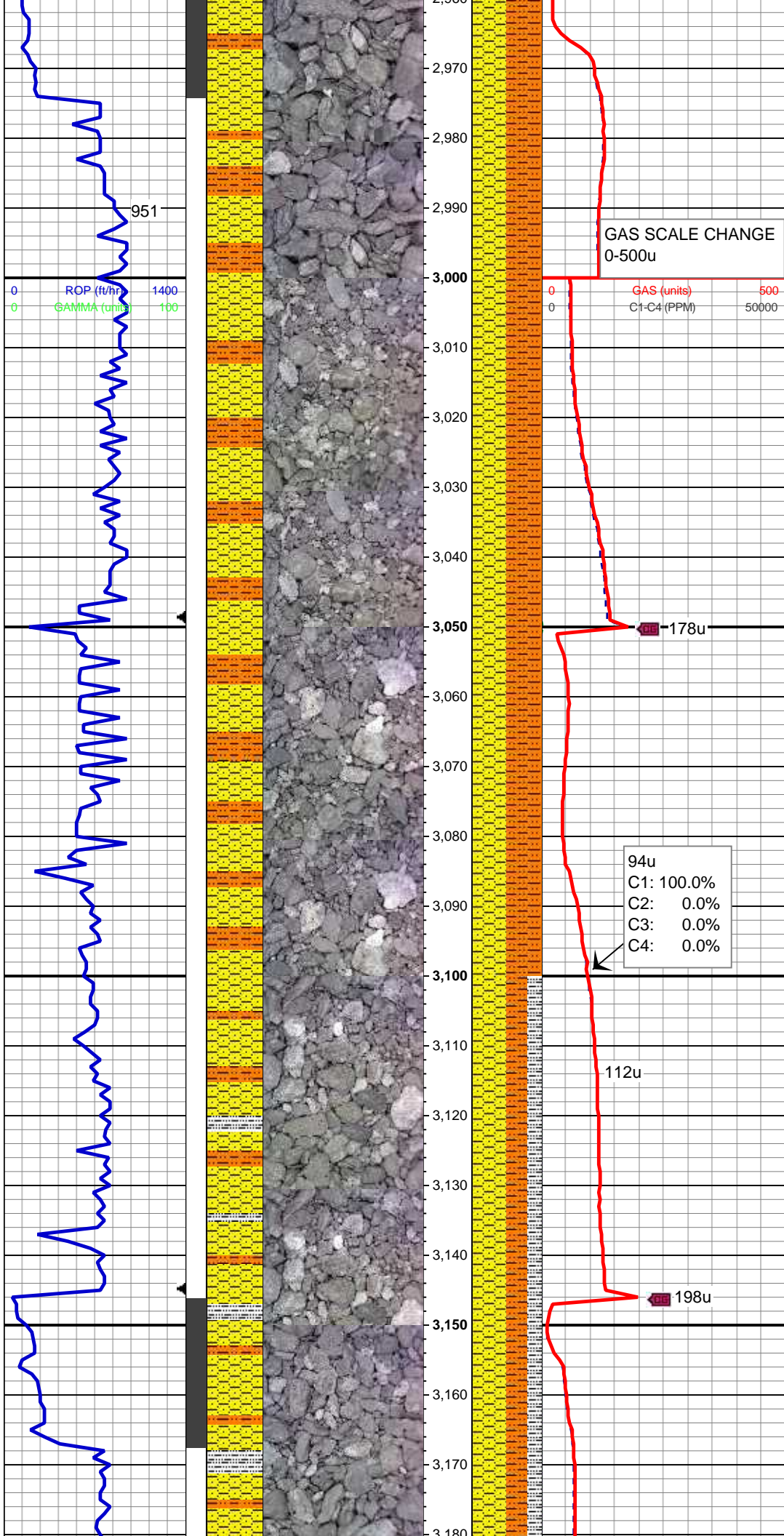
75% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
25% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

MD: 2,802'
TVD: 2,785.14'
Inclination: 9.07 °
Azimuth: 344.71 °
VS: 70.19'

60% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
40% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

MD: 2,896'
TVD: 2,877.96'
Inclination: 9.19 °
Azimuth: 350.32 °
VS: 74.6'

50% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
50% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt



MD: 2,991'
TVD: 2,971.59'
Inclination: 10.26 °
Azimuth: 343.96 °
VS: 79.51'

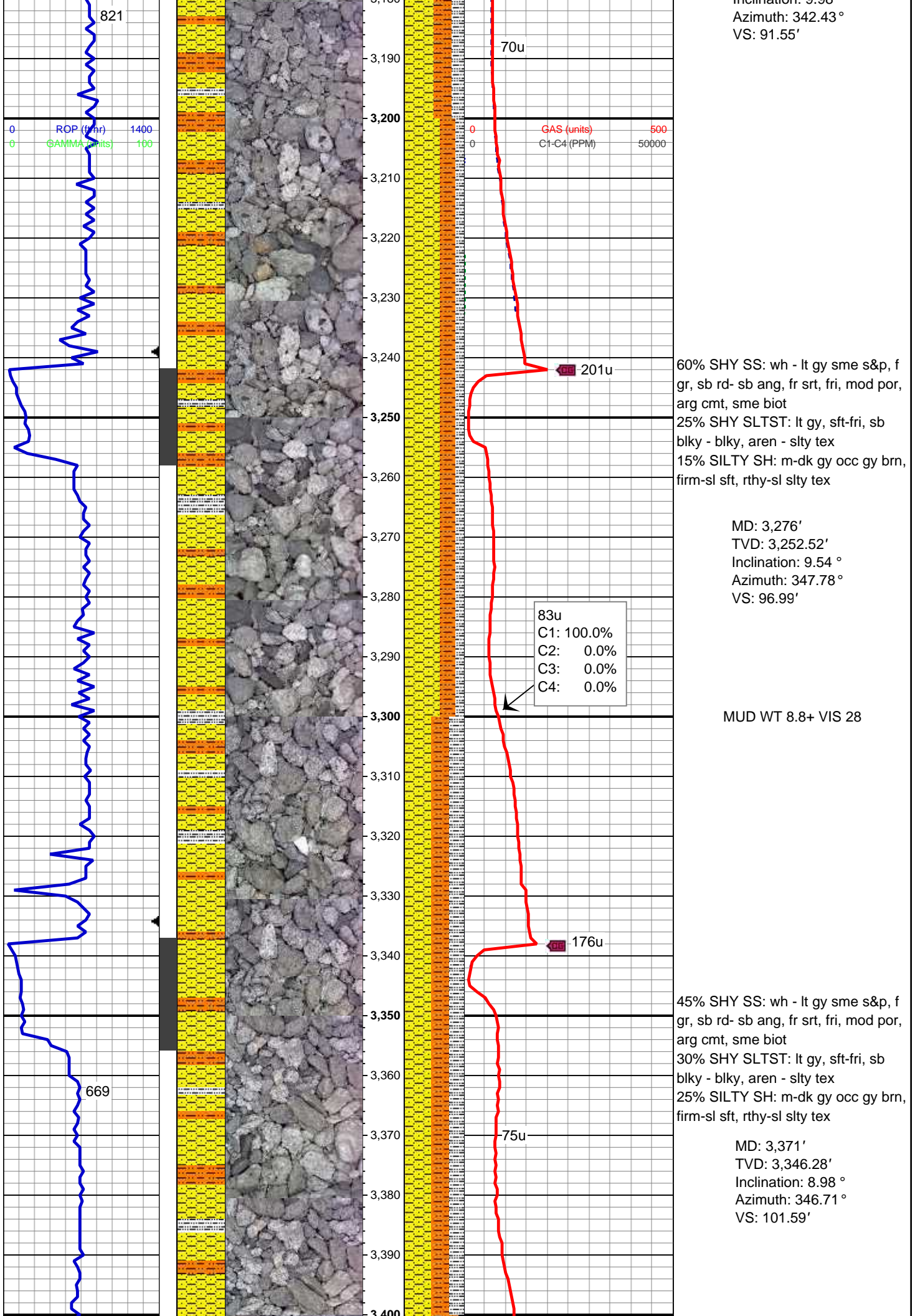
MUD WT 8.6 VIS 28

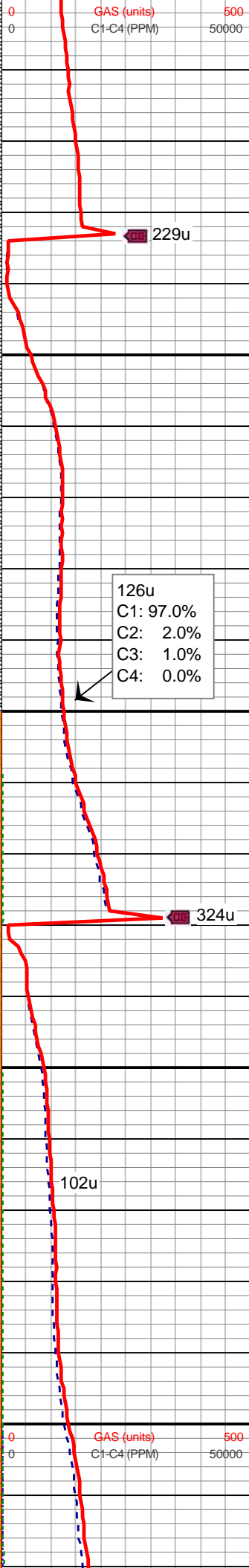
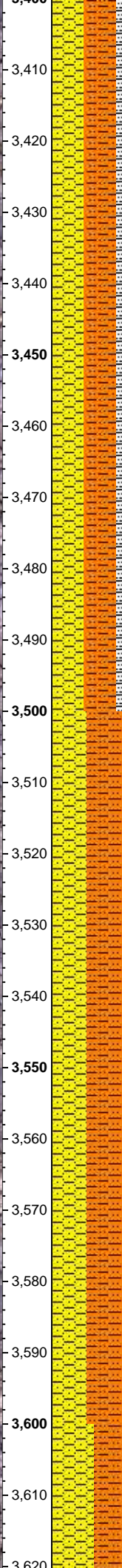
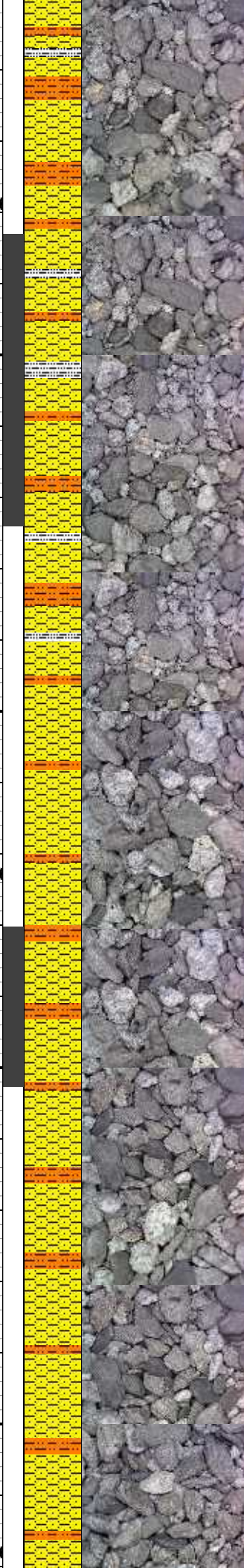
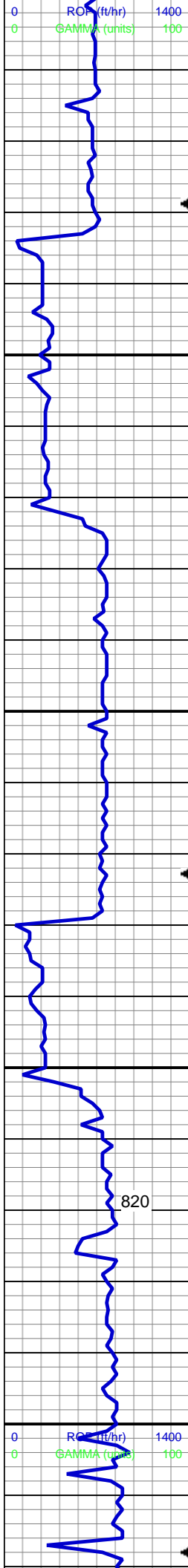
50% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
50% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

MD: 3,086'
TVD: 3,065.22'
Inclination: 9.24 °
Azimuth: 341.99 °
VS: 85.47'

50% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
30% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
20% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty tex

MD: 3,181'
TVD: 3,158.89'
Inclination: 9.98 °





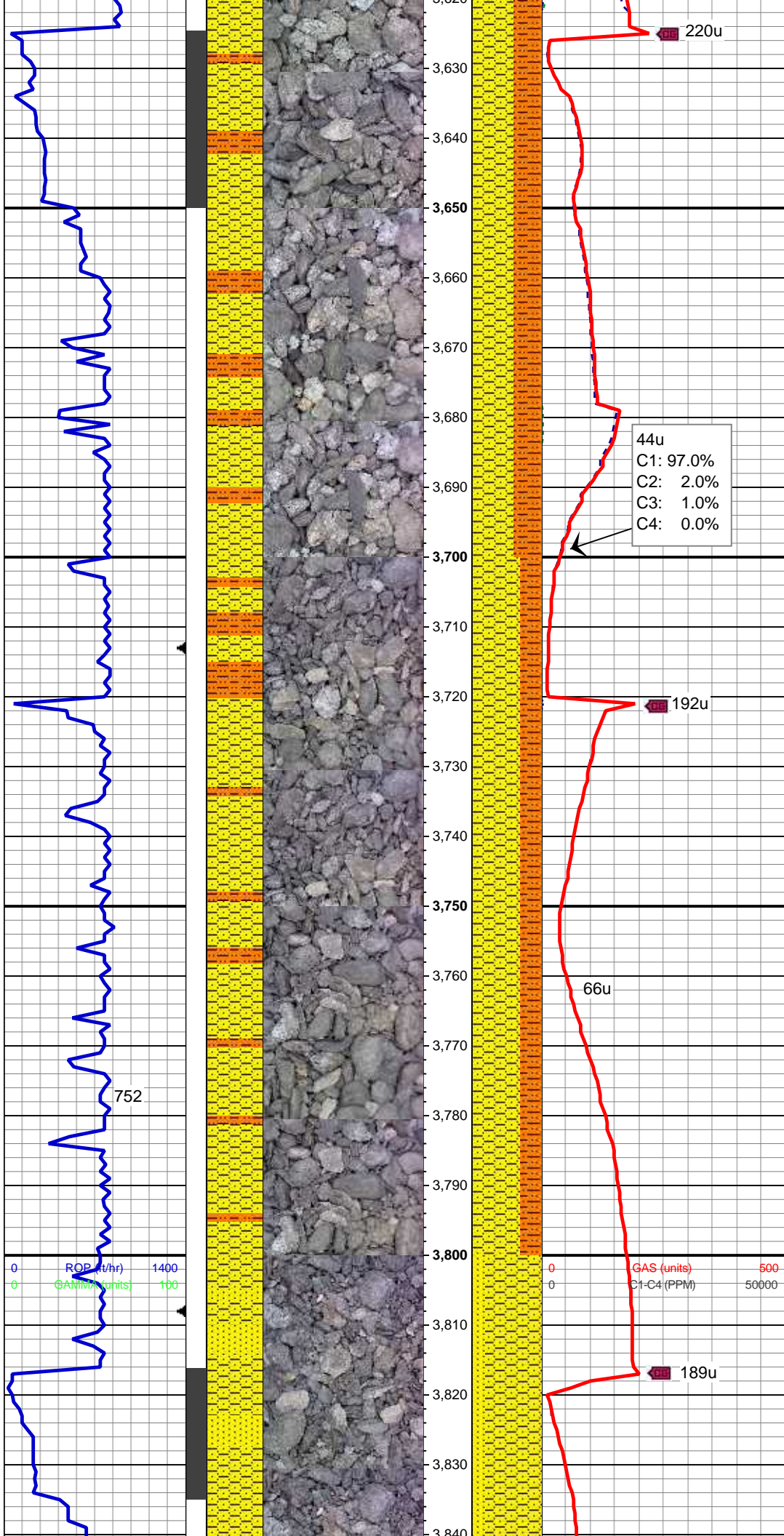
45% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, sme biot
45% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex
10% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty tex

MD: 3,465'
TVD: 3,439.02'
Inclination: 9.78 °
Azimuth: 349.11 °
VS: 106.02'

MUD WT 8.8+ VIS 29

50% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, sme biot
50% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex

MD: 3,560'
TVD: 3,532.77'
Inclination: 8.86 °
Azimuth: 347.09 °
VS: 110.43'



60% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, sme biot
40% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex

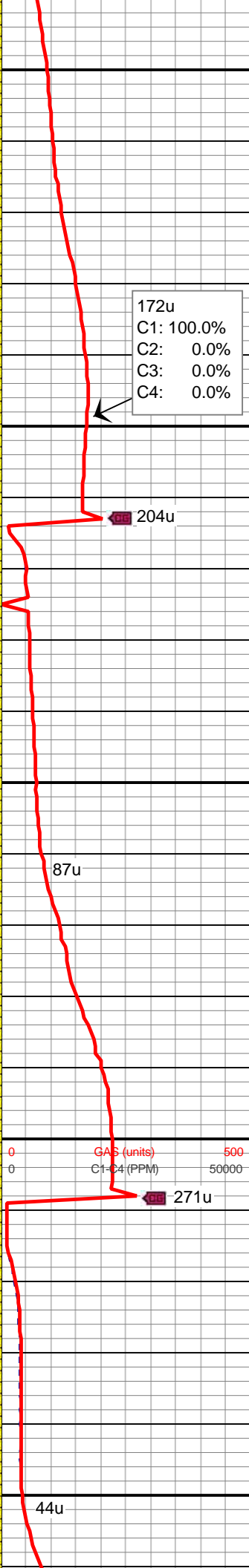
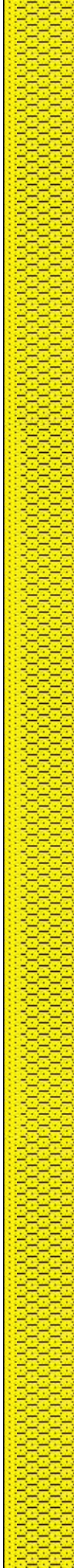
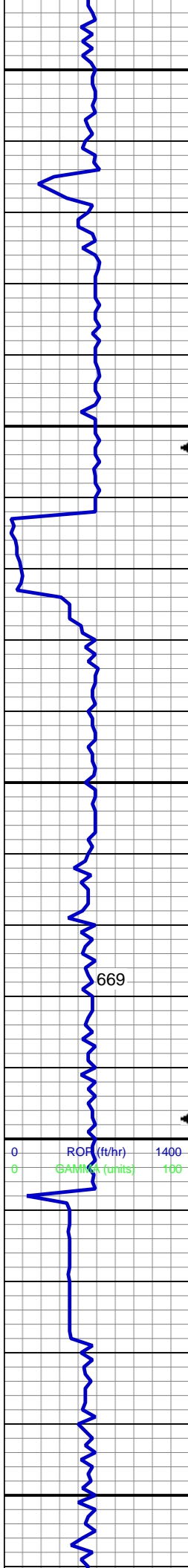
MD: 3,655'
TVD: 3,626.33'
Inclination: 11.06 °
Azimuth: 346.6°
VS: 115.5'

44u
C1: 97.0%
C2: 2.0%
C3: 1.0%
C4: 0.0%

70% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt, sme biot
30% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex

MD: 3,750'
TVD: 3,719.31'
Inclination: 12.57 °
Azimuth: 348.13°
VS: 121.31'

MD: 3,844'
TVD: 3,811.19'
Inclination: 11.83 °
Azimuth: 351.4°
VS: 126.47'



80% SHY SS: wh - lt gy sme s&p, f gr, sb rd- sb ang, fr srt, fri, mod por, arg cmt
20% SS: lt gy - wh, sme s&p, f gr, sb rd-sbang, mod srt, fri, p por, arg cmt ; sme biot, scat glau

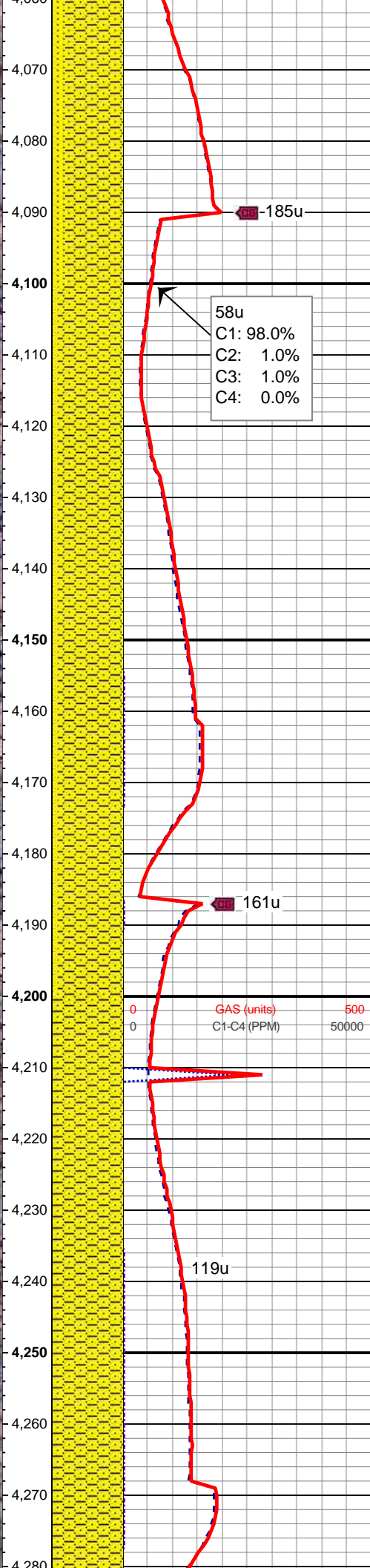
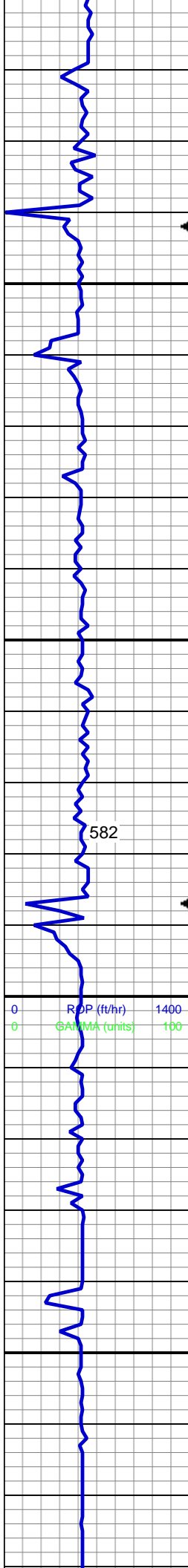
MD: 3,939'
TVD: 3,904.33'
Inclination: 10.88 °
Azimuth: 347.12 °
VS: 131.45'

75% SHY SS: wh - lt gy sme s&p, f gr, sb rd- sb ang, fr srt, fri, mod por, arg cmt
25% SS: lt gy - wh, sme s&p, f gr, sb rd-sbang, mod srt, fri, p por, arg cmt ; sme biot, scat glau

MUD WT 8.8 VIS 28

MD: 4,034'
TVD: 3,997.75'
Inclination: 10.06 °
Azimuth: 346.63 °
VS: 136.75'

80% SHY SS: wh - lt gy sme s&p, f gr, sb rd- sb ang, fr srt, fri, mod por, arg cmt
20% SS: lt gy - wh, sme s&p, f gr, sb rd-sbang, mod srt, fri, p por, arg cmt ; sme biot, scat glau

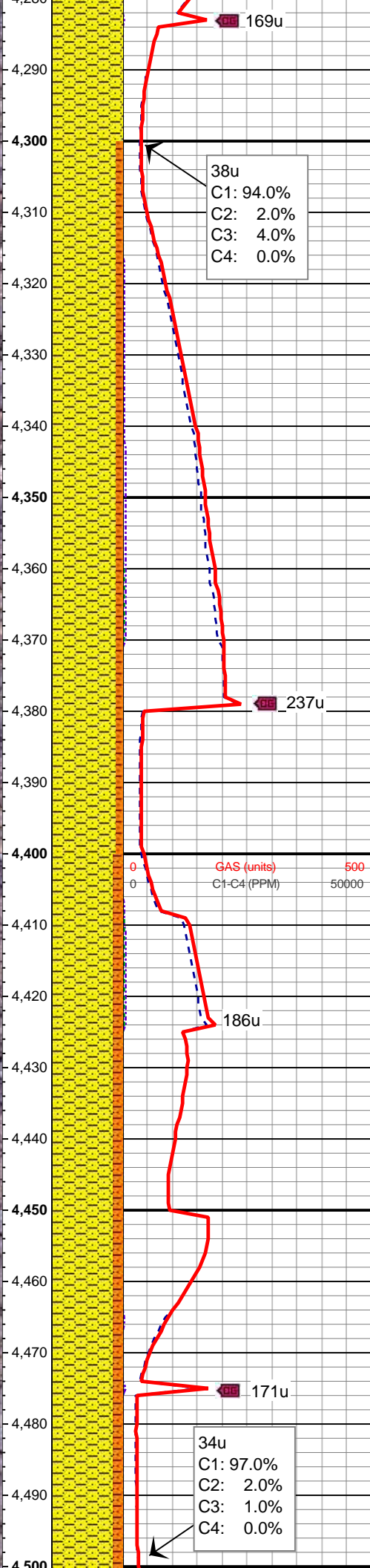
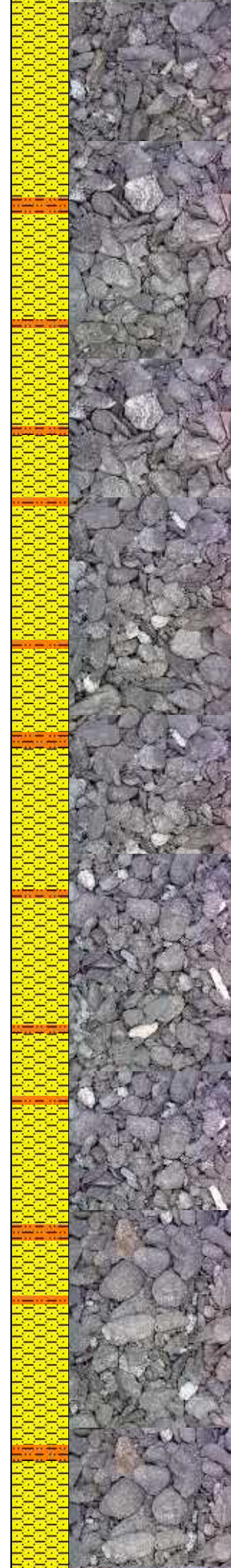
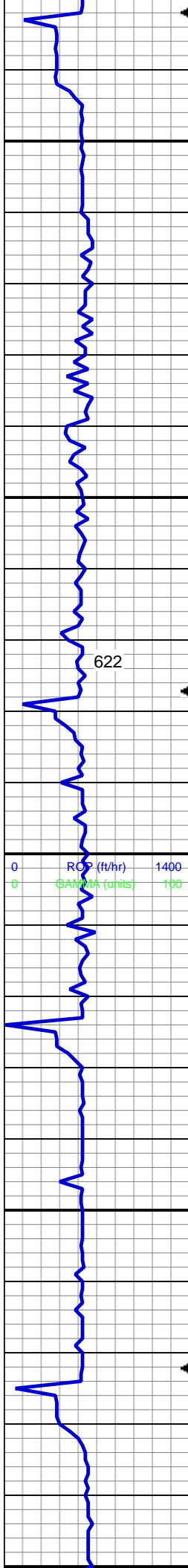


MD: 4,129'
TVD: 4,091.37'
Inclination: 9.5 °
Azimuth: 346.2 °
VS: 141.84'

90% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
10% SS: lt gy - wh, sme s&p, f gr,
sbrd-sbang, mod srt, fri, p por, arg
cmt ; sme biot, scat glau

MD: 4,224'
TVD: 4,185.18'
Inclination: 8.6 °
Azimuth: 344.31 °
VS: 146.83'

100% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt ; sme biot, scat glau



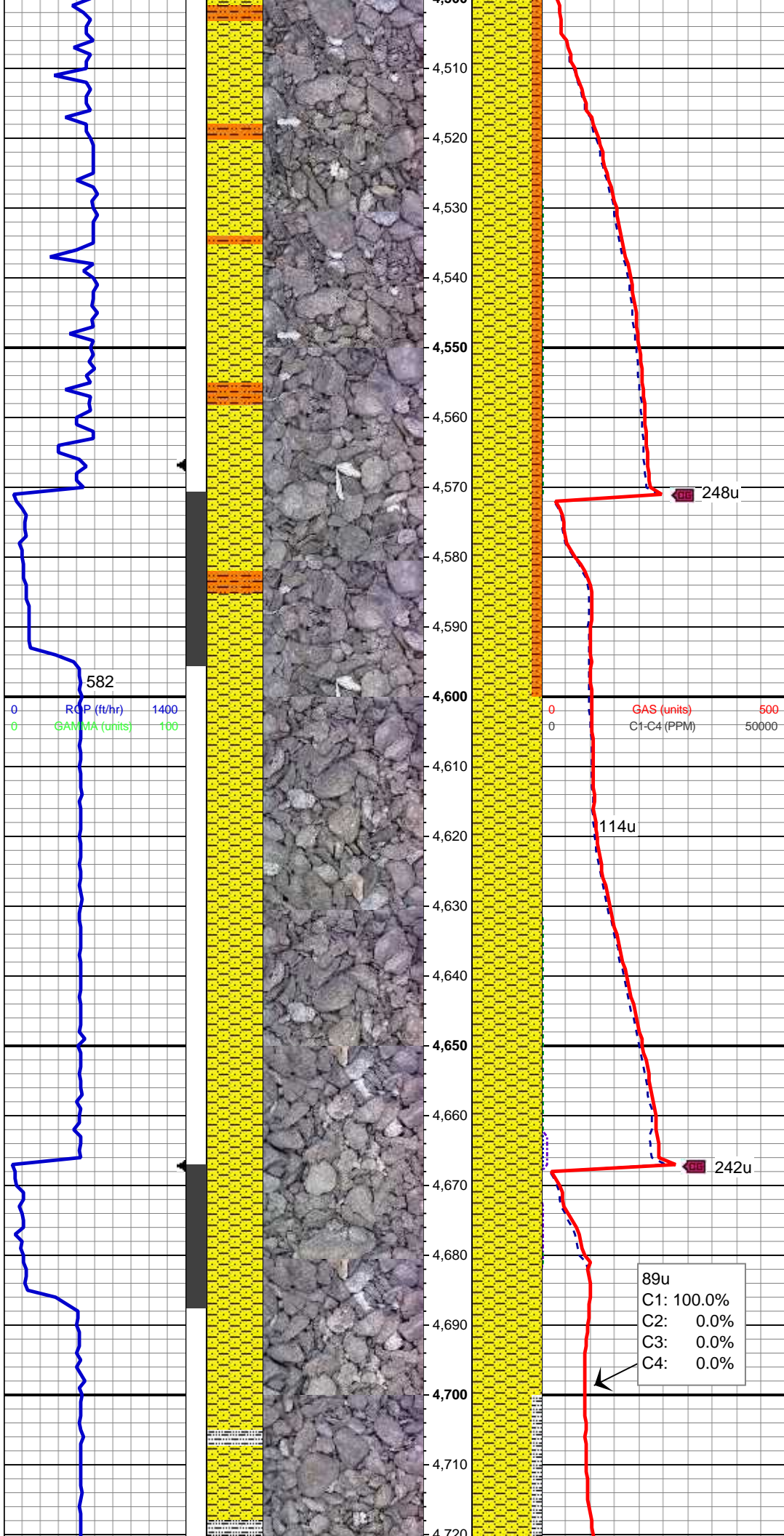
MD: 4,319'
TVD: 4,279.25'
Inclination: 7.44 °
Azimuth: 343.23 °
VS: 151.58'

90% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
10% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex ; sme biot,
scat glau

MD: 4,414'
TVD: 4,373.51'
Inclination: 6.88 °
Azimuth: 341.08 °
VS: 156.13'

85% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
15% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex ; sme biot,
scat glau

MD: 4,509'
TVD: 4,467.85'



TVD: 4,567.08'
Inclination: 6.6 °
Azimuth: 339.83 °
VS: 160.72'

85% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
15% SHY SLTST: lt gy, sft-fri, sb
blky - blky, aren - slty tex

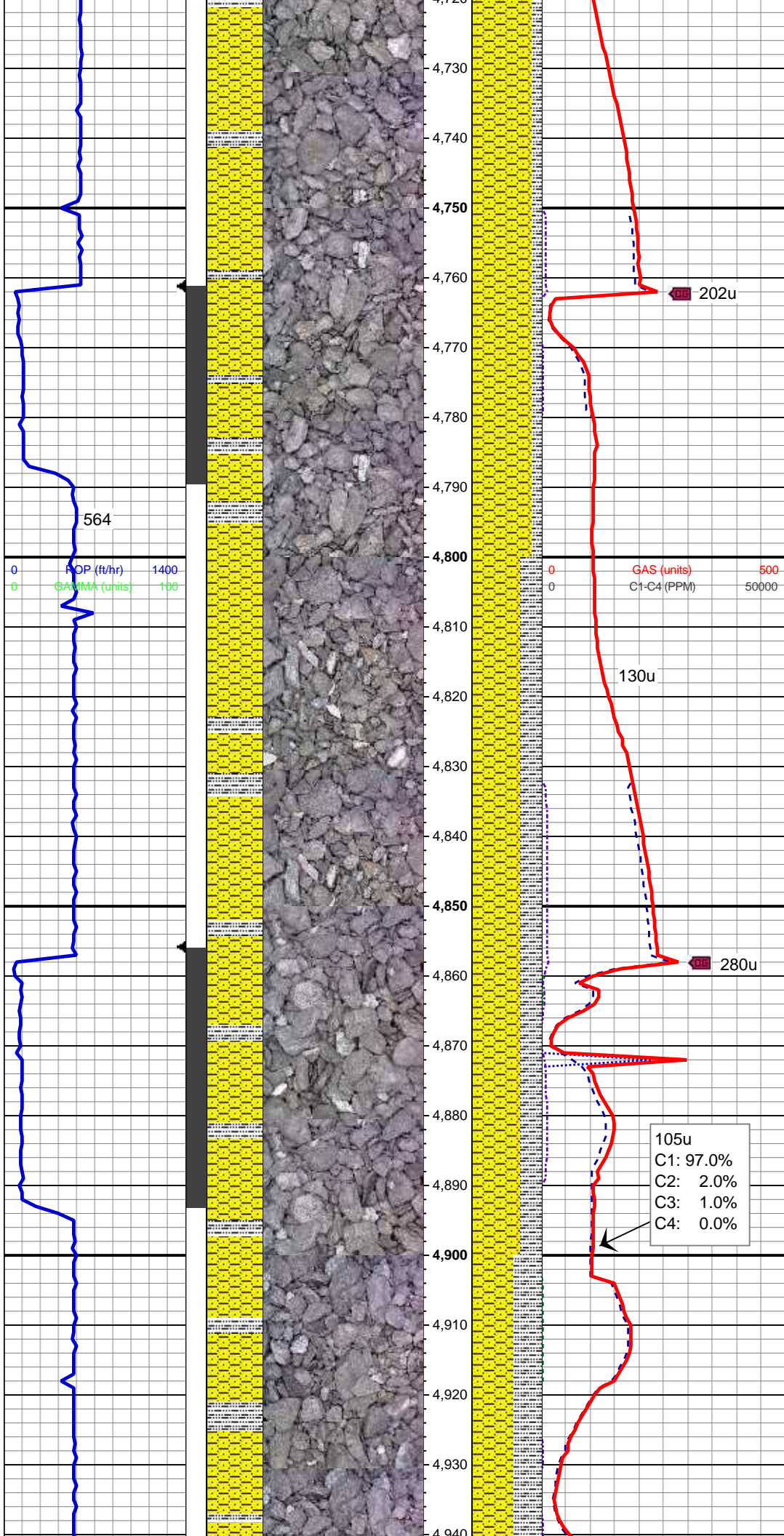
MD: 4,604'
TVD: 4,562.37'
Inclination: 4.89 °
Azimuth: 345.95 °
VS: 164.33'

MUD WT 8.7+ VIS 28

100% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt

89u
C1: 100.0%
C2: 0.0%
C3: 0.0%
C4: 0.0%

MD: 4,699'
TVD: 4,657.08'
Inclination: 4.16 °
Azimuth: 330.09 °
VS: 167.61'



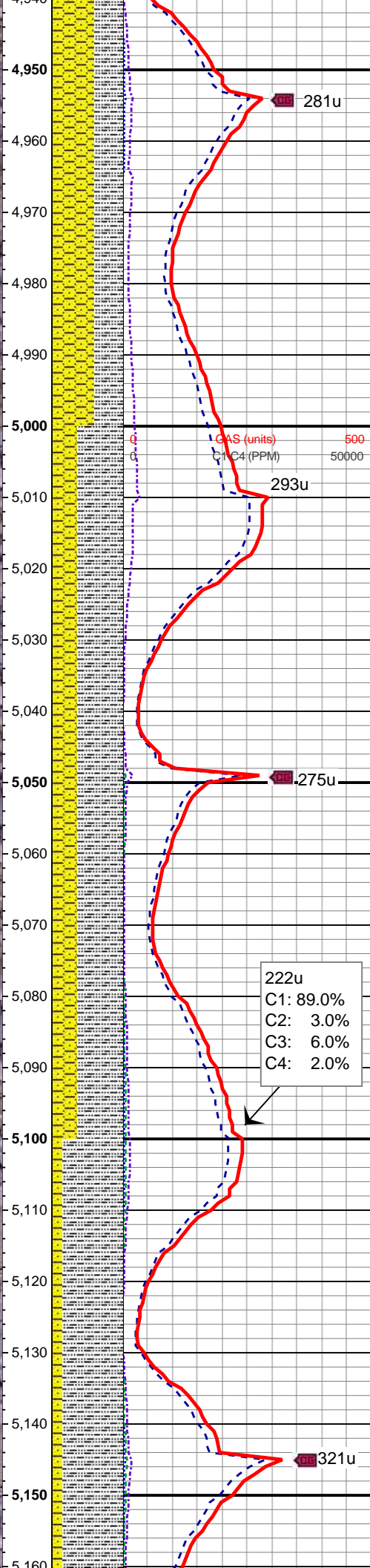
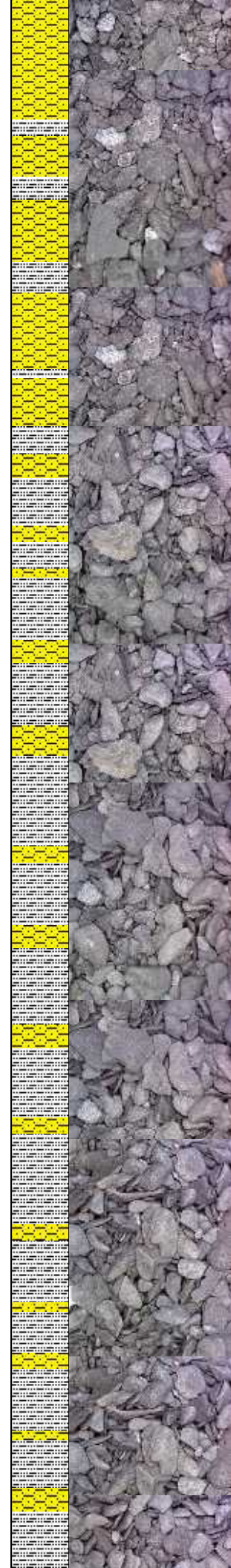
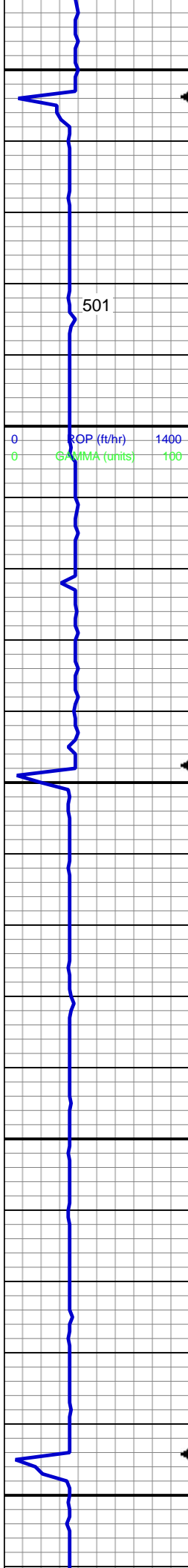
85% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
15% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty tex

MD: 4,793'
TVD: 4,750.93'
Inclination: 2.35 °
Azimuth: 341.38 °
VS: 170.31'

70% SHY SS: wh - lt gy sme s&p, f
gr, sb rd- sb ang, fr srt, fri, mod por,
arg cmt
30% SILTY SH: m-dk gy occ gy brn,
firm-sl sft, rthy-sl slty tex

MD: 4,888'
TVD: 4,845.9'
Inclination: 0.54 °
Azimuth: 125.33 °
VS: 170.7'

105u
C1: 97.0%
C2: 2.0%
C3: 1.0%
C4: 0.0%



60% SILTY SH: m-dk gy occ gy brn, firm-sl sft, rthy-sl slty tex
40% SHY SS: wh - lt gy sme s&p, f gr, sb rd- sb ang, fr srt, fri, mod por, arg cmt

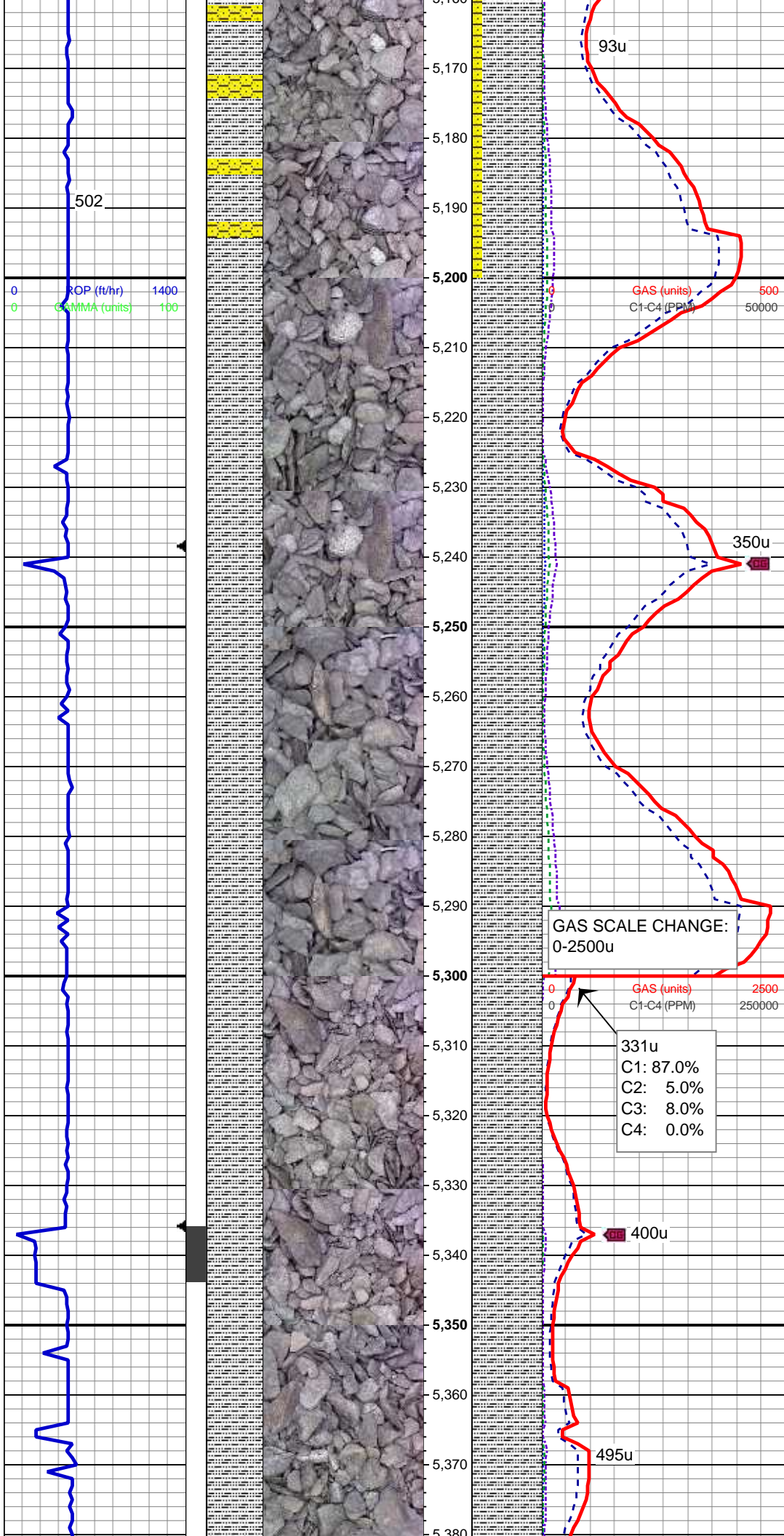
MD: 4,983'
TVD: 4,940.89'
Inclination: 1.15 °
Azimuth: 86.45 °
VS: 169.38'

MUD WT 8.6+ VIS 28

65% SILTY SH: m-dk gy occ gy brn, firm-sl sft, rthy-sl slty tex
35% SHY SS: wh - lt gy sme s&p, f gr, sb rd- sb ang, fr srt, fri, mod por, arg cmt

MD: 5,077'
TVD: 5,034.88'
Inclination: 1.09 °
Azimuth: 103.18 °
VS: 167.56'

85% SILTY SH: m-dk gy occ gy brn, firm-sl sft, rthy-sl slty tex
15% SHY SS: wh - lt gy sme s&p, f gr, sb rd- sb ang, fr srt, fri, mod por, arg cmt



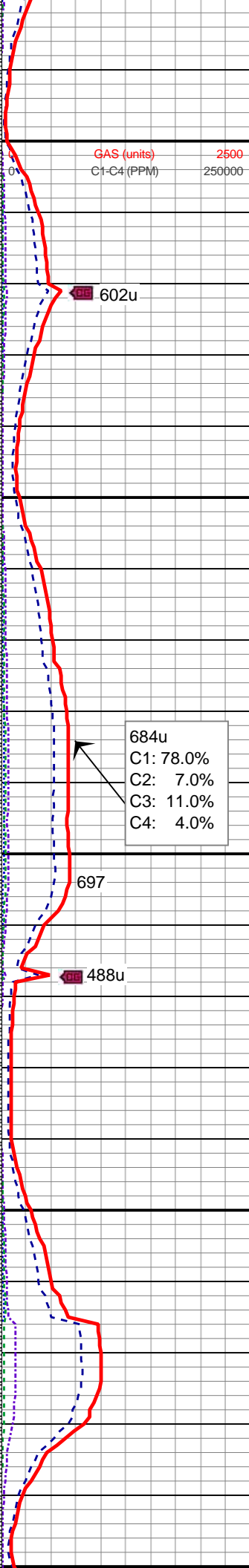
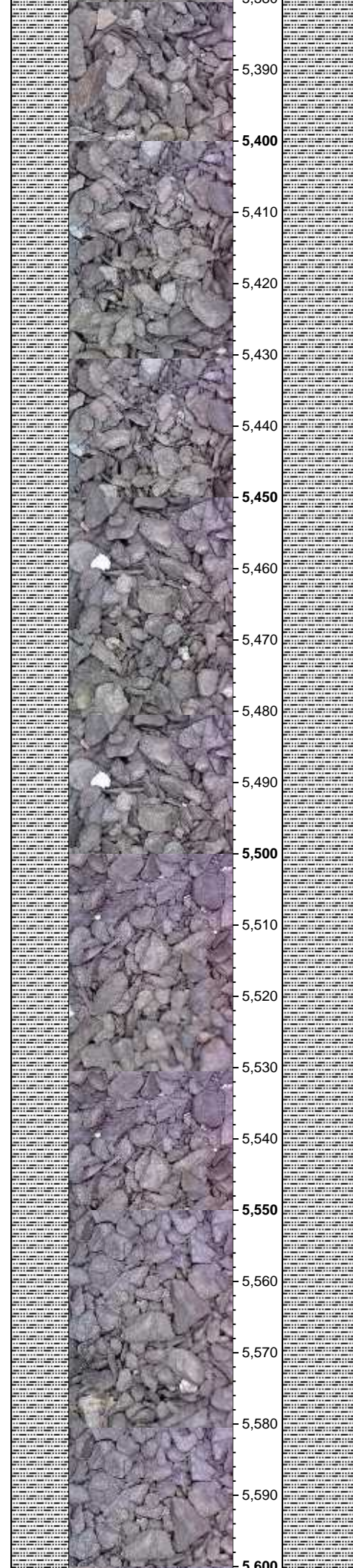
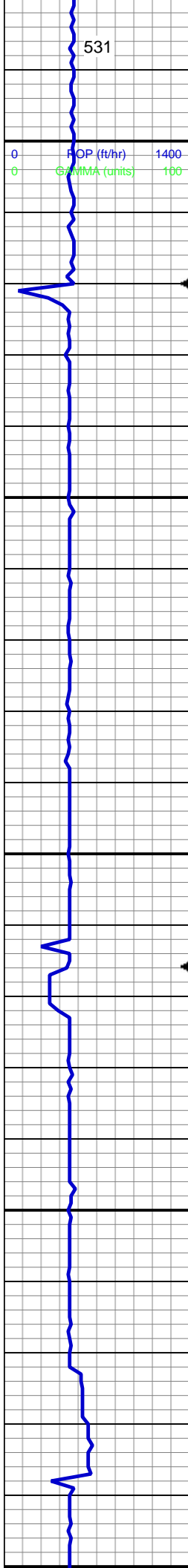
MD: 5,173'
TVD: 5,130.86'
Inclination: 1 °
Azimuth: 99.08 °
VS: 165.82'

100% SILTY SH: m-dk gy occ gy
brn, firm-sl sft, rthy-sl slty tex

MD: 5,268'
TVD: 5,225.85'
Inclination: 0.59 °
Azimuth: 123.86 °
VS: 164.57'

100% SILTY SH: m-dk gy occ gy
brn, firm-sl sft, rthy-sl slty tex

MD: 5,362'
TVD: 5,319.85'
Inclination: 0.07 °
Azimuth: 85.52 °
VS: 164.09'



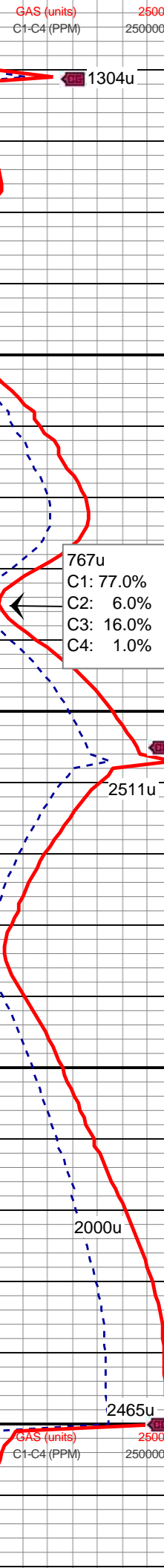
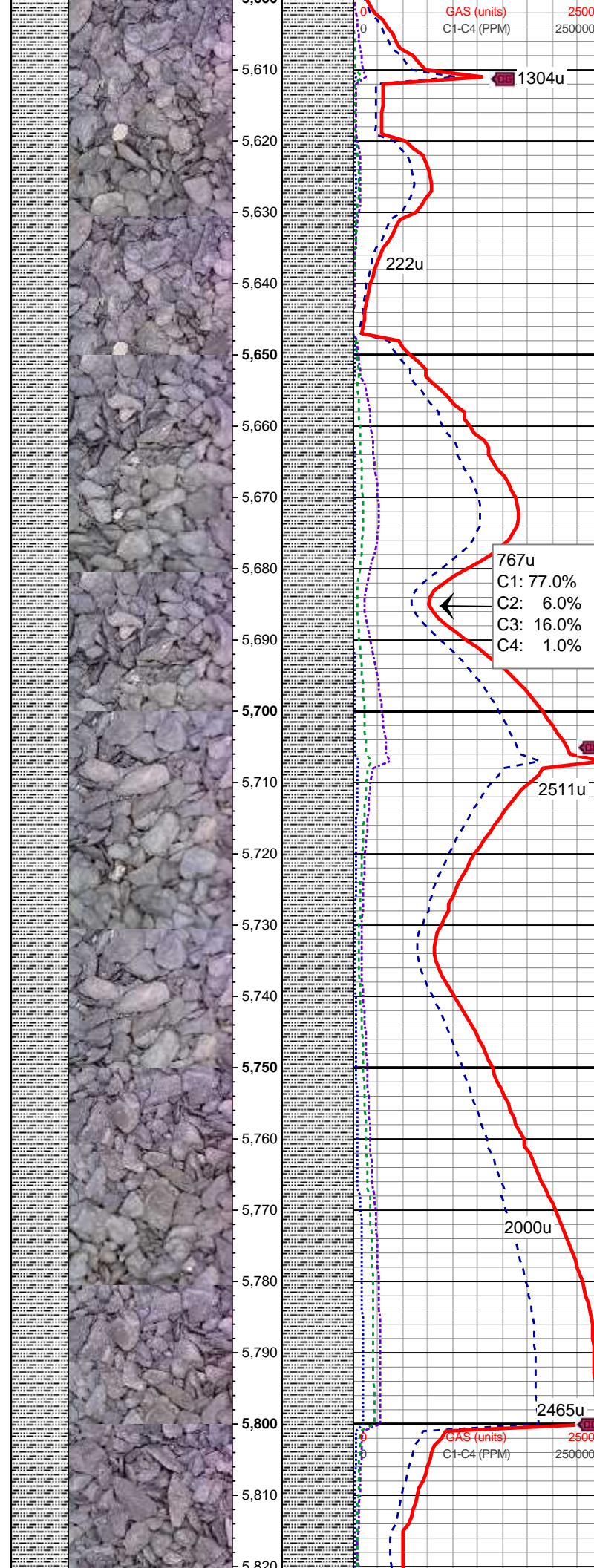
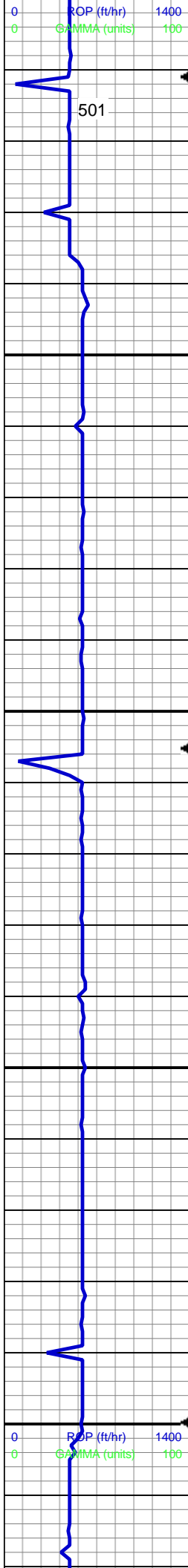
100% SILTY SH: m-dk gy occ gy
brn, firm-sl sft, rthy-sl slty tex

MD: 5,457'
TVD: 5,414.85'
Inclination: 0.14 °
Azimuth: 245.05 °
VS: 164.13'

MUD WT 8.8 VIS 31

100% SILTY SH: m-dk gy occ gy
brn, firm-sl sft, rthy-sl slty tex

MD: 5,553'
TVD: 5,510.85'
Inclination: 0.1 °
Azimuth: 205.24 °
VS: 164.26'



MD: 5,647'
TVD: 5,604.85'
Inclination: 0.19 °
Azimuth: 237.69 °
VS: 164.41'

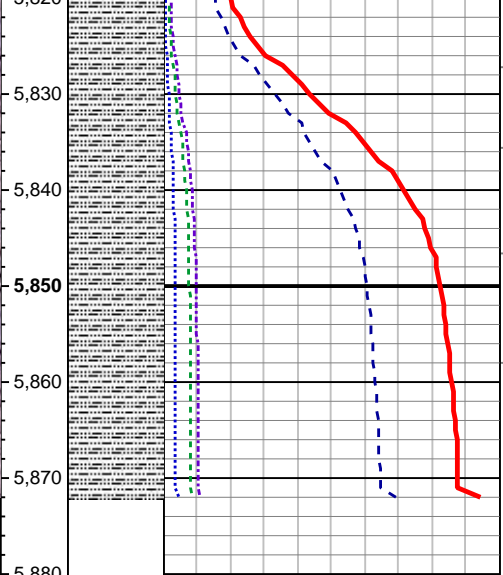
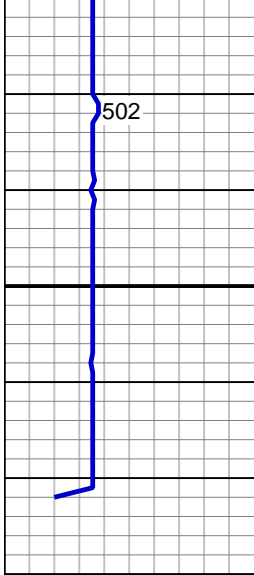
100% SILTY SH: m-dk gy occ gy
brn, firm-sl sft, rthy-sl slty tex

MD: 5,742'
TVD: 5,699.85'
Inclination: 0.22 °
Azimuth: 213.49 °
VS: 164.62'

100% SILTY SH: m-dk gy occ gy
brn, firm-sl sft, rthy-sl slty tex

MD: 5,814'
TVD: 5,771.85'
Inclination: 0.14 °
Azimuth: 225.02 °
VS: 164.75'

MUD WT 9.0+ VIS 33



TD Vertical @ 5872' MD; 1555 hrs
2/24/2014

TOOH For Directional BHA

LOG CONTINUED ON:
WELLS RANCH
AA35-67-1AHNA(HORZ).mplot

Thank You For Choosing
Columbine Logging Inc.