

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name 70 Ranch 04-63-03-3340CH Vertical

Location NWSW S3 T4N R63W

State COLORADO

County WELD

Country USA

Rig Number NABORS M37

API Number 05-123-37930

AFE # 18532D

Region DJ BASIN

Field WATTENBERG

Spud Date 1/4/2014

Drilling Completed 1/12/2014

Surface Coordinates 1995' FSL, 234' FWL

Bottom Hole Coordinates 2442' FSL, 500' FEL

Ground Elevation 4559'

K.B. Elevation 4582'

Logged Interval 4000' **To** 10865'

Total Depth 10865'

Formation NIOBRARA C CHALK

Type of Drilling Fluid H2O, LSND

Operator

Company Bill Barrett Corporation

Address 1099 18th St., Ste. 2300
Denver, CO 80202

Geologist

Name JOHN ROESINK

Company BILL BARRETT CORPORATION

Address 1099 18th St., Ste. 2300
Denver, CO 80202

Other

Rock Types

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

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

E EARTHY
F FENESTRAL
F FRACTURE
X INTERCRYSTALLINE
Q 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

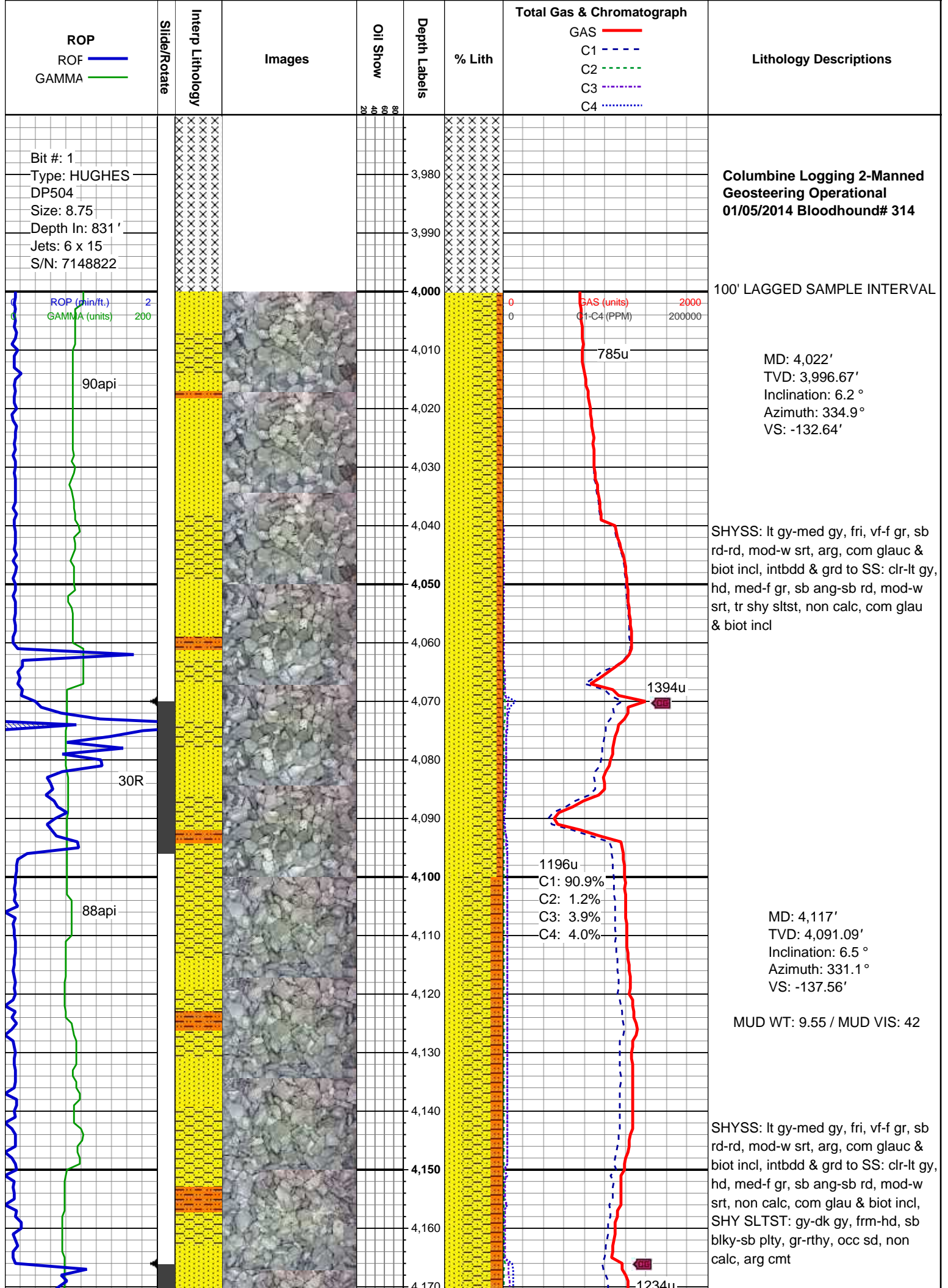
BOUNDSTONE
CHALKY
CRYPTOXLN

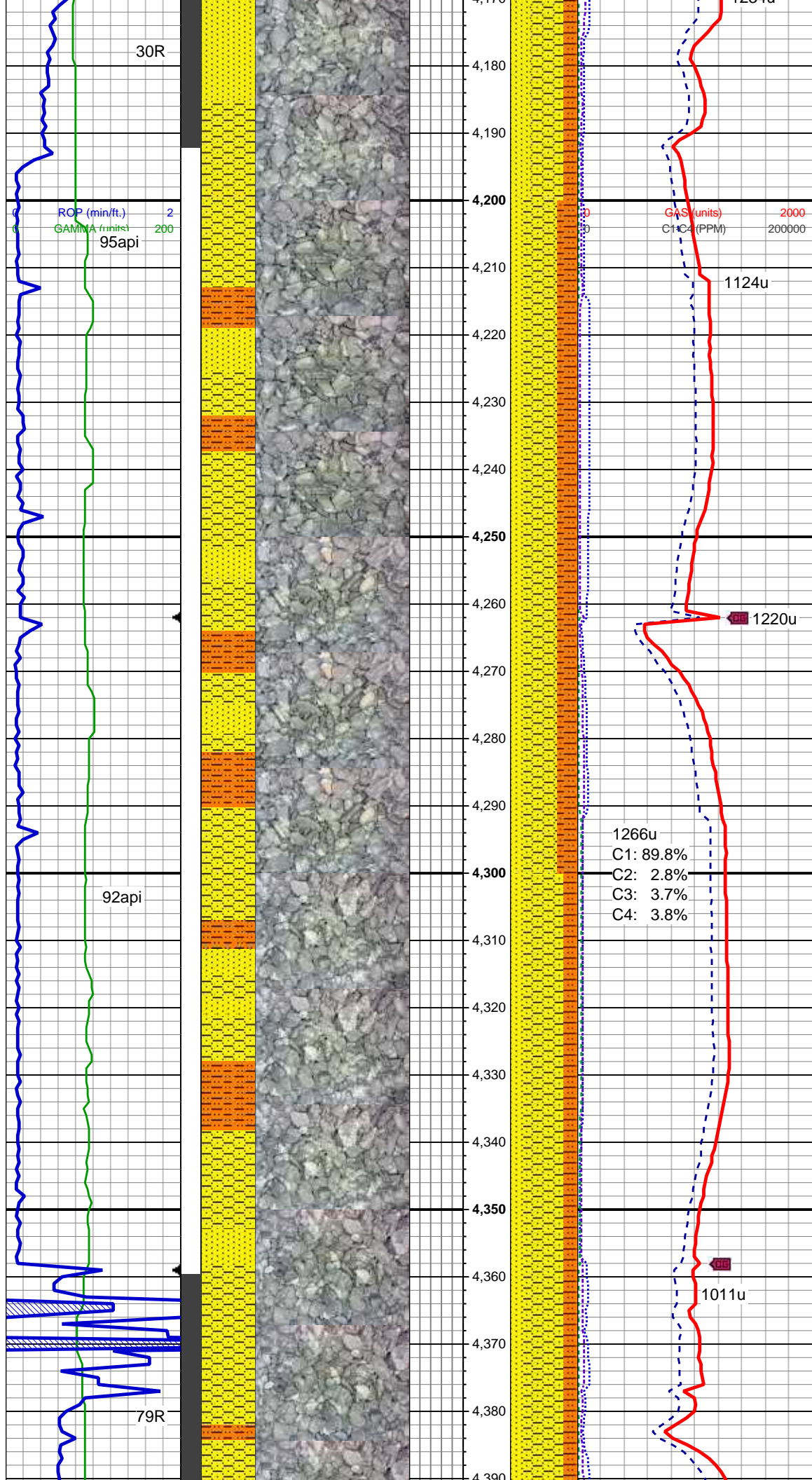
E EARTHY

FINELYXLN
GRAINSTONE
L LITHOGRAPHIC
MX MICROXLN
MS MUDSTONE
PS PACKSTONE
WS WACKESTONE

Sorting

M MODERATE
P POOR
W WELL





MD: 4,213'
TVD: 4,186.35'
Inclination: 7.7 °
Azimuth: 334.2 °
VS: -143.14'

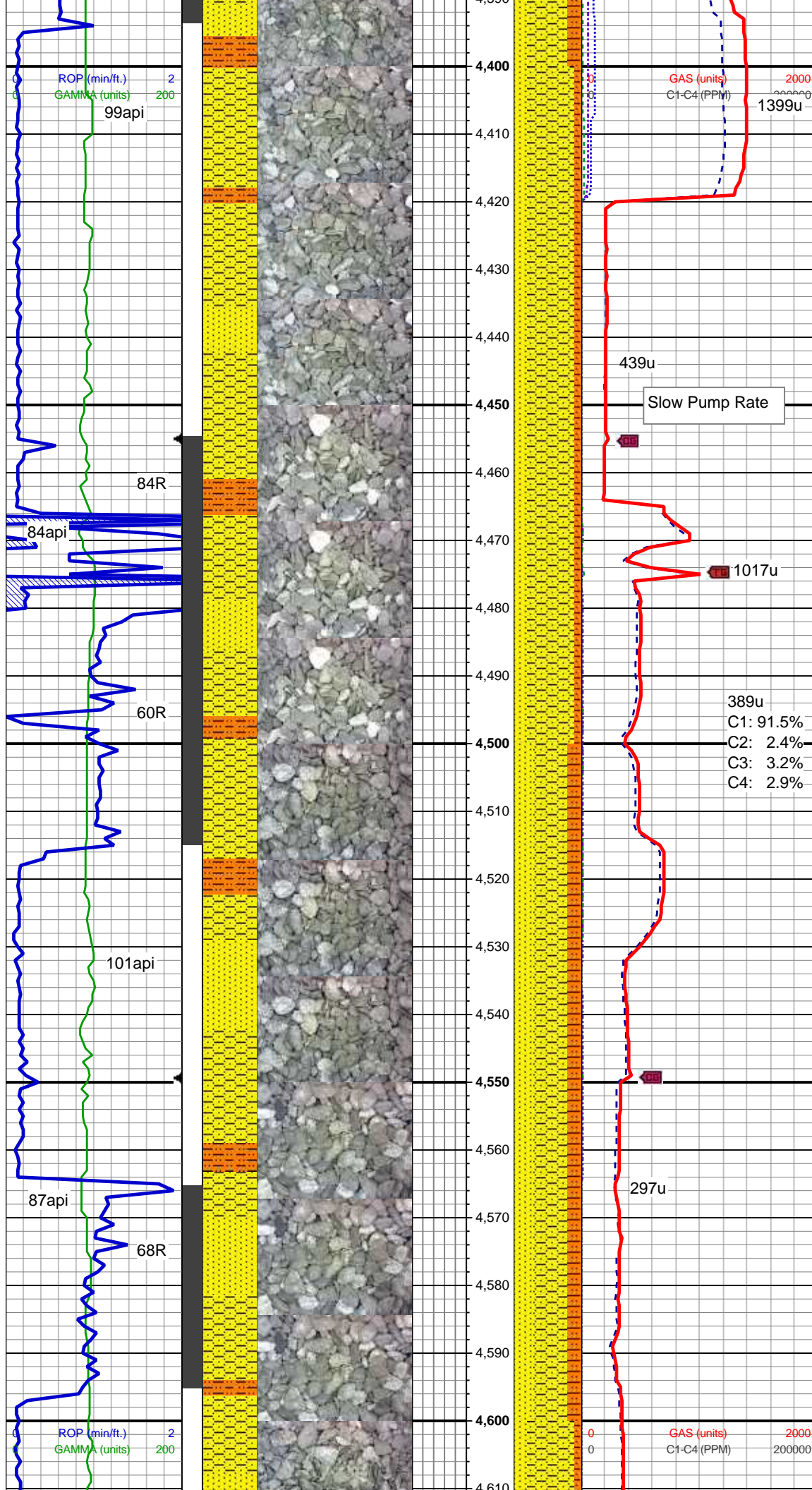
SHYSS: lt gy-med gy, fri, vf-f gr, sb rd-rd, mod-w srt, arg, com glauc & biot incl, intbdd & grd to SS: clr-lt gy, hd, med-f gr, sb ang-sb rd, mod-w srt, non calc, com glau & biot incl, SHY SLTST: gy-dk gy, frm-hd, sb blk-sb plty, gr-rthy, occ sd, non calc, arg cmt

MD: 4,310'
TVD: 4,282.61'
Inclination: 6.5 °
Azimuth: 327.7 °
VS: -149.06'

MUD WT: 9.6 / MUD VIS: 42

SHYSS: lt gy-med gy, fri, vf-f gr, sb rd-rd, mod-w srt, arg, com glauc & biot incl, intbdd & grd to SS: clr-lt gy, hd, med-f gr, sb ang-sb rd, mod-w srt, non calc, com glau & biot incl, SHY SLTST: gy-dk gy, frm-hd, sb blk-sb plty, gr-rthy, occ sd, non calc, arg cmt

MUD WT: 9.6 / MUD VIS: 40



MD: 4,405'
TVD: 4,377.07'
Inclination: 5.7 °
Azimuth: 324.9 °
VS: -154.77'

SHYSS: lt gy-med gy, fri, vf-f gr, sb rd-rd, mod-w srt, arg, com glauc & biot incl, intbdd & grd to SS: clr-lt gy, hd, med-f gr, sb ang-sb rd, mod-w srt, non calc, com glau & biot incl, SHY SLTST: gy-dk gy, frm-hd, sb blk-sb plty, gr-rthy, occ sd, non calc, arg cmt

MUD WT: 9.75 / MUD VIS: 45

TOOH to change motor at 4475' MD @ 1142hrs on 1/5/14

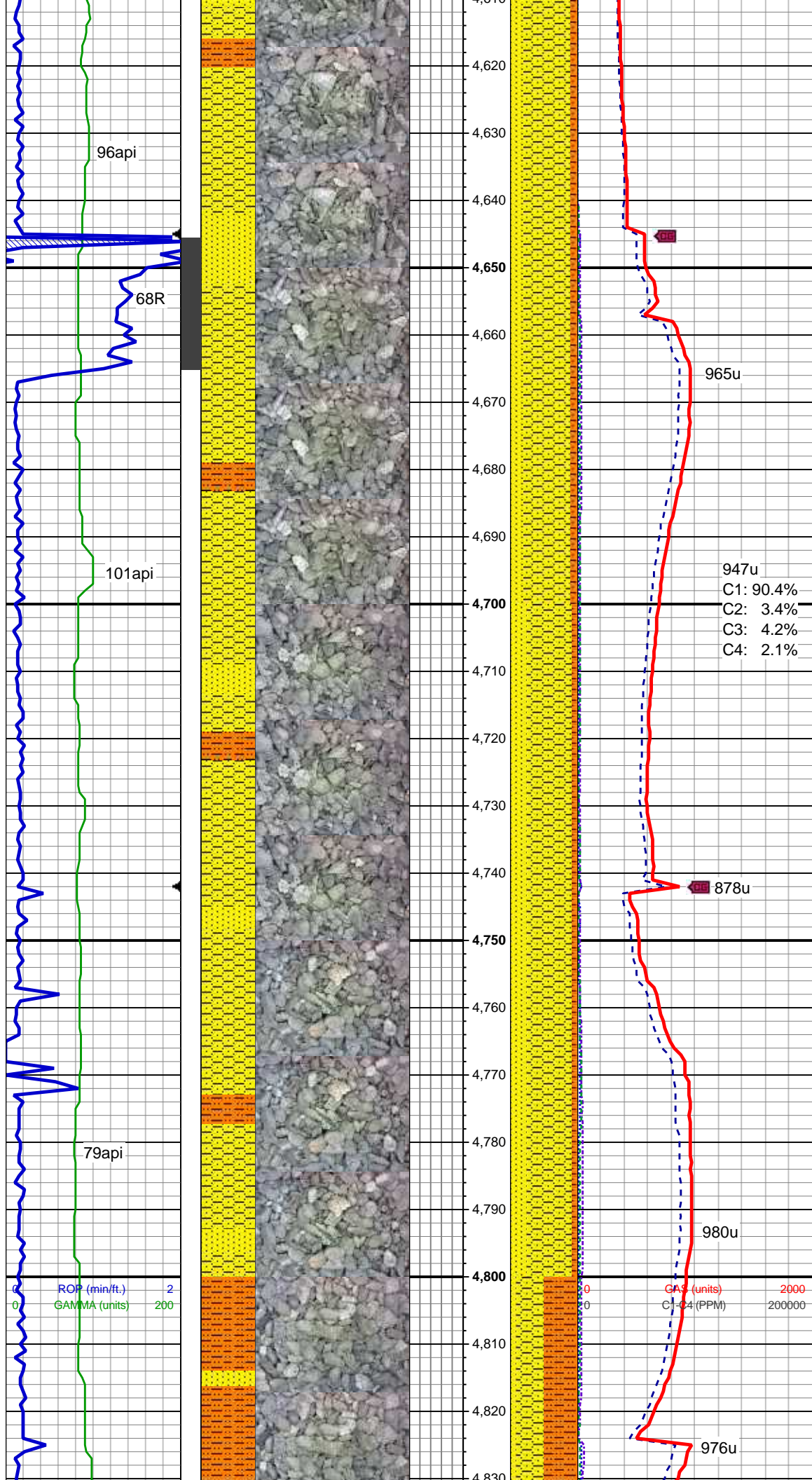
Resume drilling @ 1835hrs

MD: 4,500'
TVD: 4,471.5'
Inclination: 6.8 °
Azimuth: 332 °
VS: -160.26'

SHYSS: lt gy-med gy, fri, vf-f gr, sb rd-rd, mod-w srt, arg, com glauc & biot incl, intbdd & grd to SS: clr-lt gy, hd, med-f gr, sb ang-sb rd, mod-w srt, non calc, com glau & biot incl, SHY SLTST: gy-dk gy, frm-hd, sb blk-sb plty, gr-rthy, occ sd, non calc, arg cmt

MUD WT: 9.70 / MUD VIS: 43

MD: 4,595'
TVD: 4,565.81'
Inclination: 7.1 °
Azimuth: 340.9 °
VS: -164.97'



SHYSS: lt gy-med gy, fri, vf-f gr, sb rd-rd, mod-w srt, arg, com glauc & biot incl, intbdd & grd to SS: clr-lt gy, hd, med-f gr, sb ang-sb rd, mod-w srt, non calc, com glau & biot incl, SHY SLTST: gy-dk gy, frm-hd, sb blk-y-sb plty, gr-rthy, occ sd, non calc, arg cmt

MD: 4,690'
TVD: 4,659.94'
Inclination: 8.4 °
Azimuth: 349.5°
VS: -168.35'

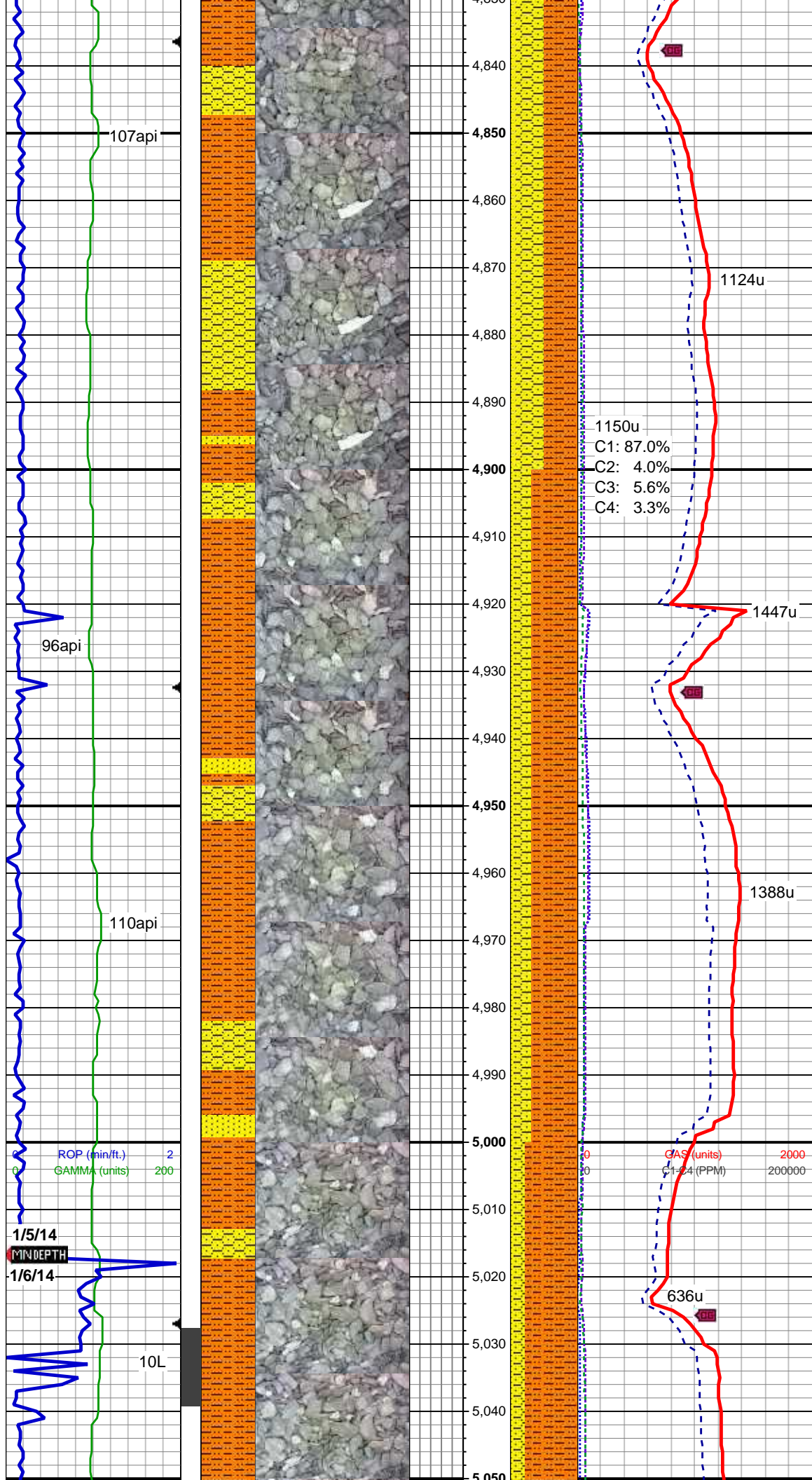
947u
C1: 90.4%
C2: 3.4%
C3: 4.2%
C4: 2.1%

SHYSS: lt gy-med gy, fri, vf-f gr, sb rd-rd, mod-w srt, arg, com glauc & biot incl, intbdd & grd to SS: clr-lt gy, hd, med-f gr, sb ang-sb rd, mod-w srt, non calc, com glau & biot incl, SHY SLTST: gy-dk gy, frm-hd, sb blk-y-sb plty, gr-rthy, occ sd, non calc, arg cmt

MUD WT: 9.70 / MUD VIS: 41

MD: 4,785'
TVD: 4,754.03'
Inclination: 7.5 °
Azimuth: 349.9°
VS: -170.89'

GAS (units)
C1-C4 (PPM)



SHY SLTST: gy-dk gy, frm-hd, sb
blky-sb plty, gr-rthy, occ sd, non
calc, arg cmt, SHYSS: lt gy-med gy,
fri, vf-f gr, sb rd-rd, mod-w srt, arg,
com glauc & biot incl, intbdd & grd
to SS: clr-lt gy, hd, med-f gr, sb
ang-sb rd, mod-w srt, non calc,
com glau & biot incl

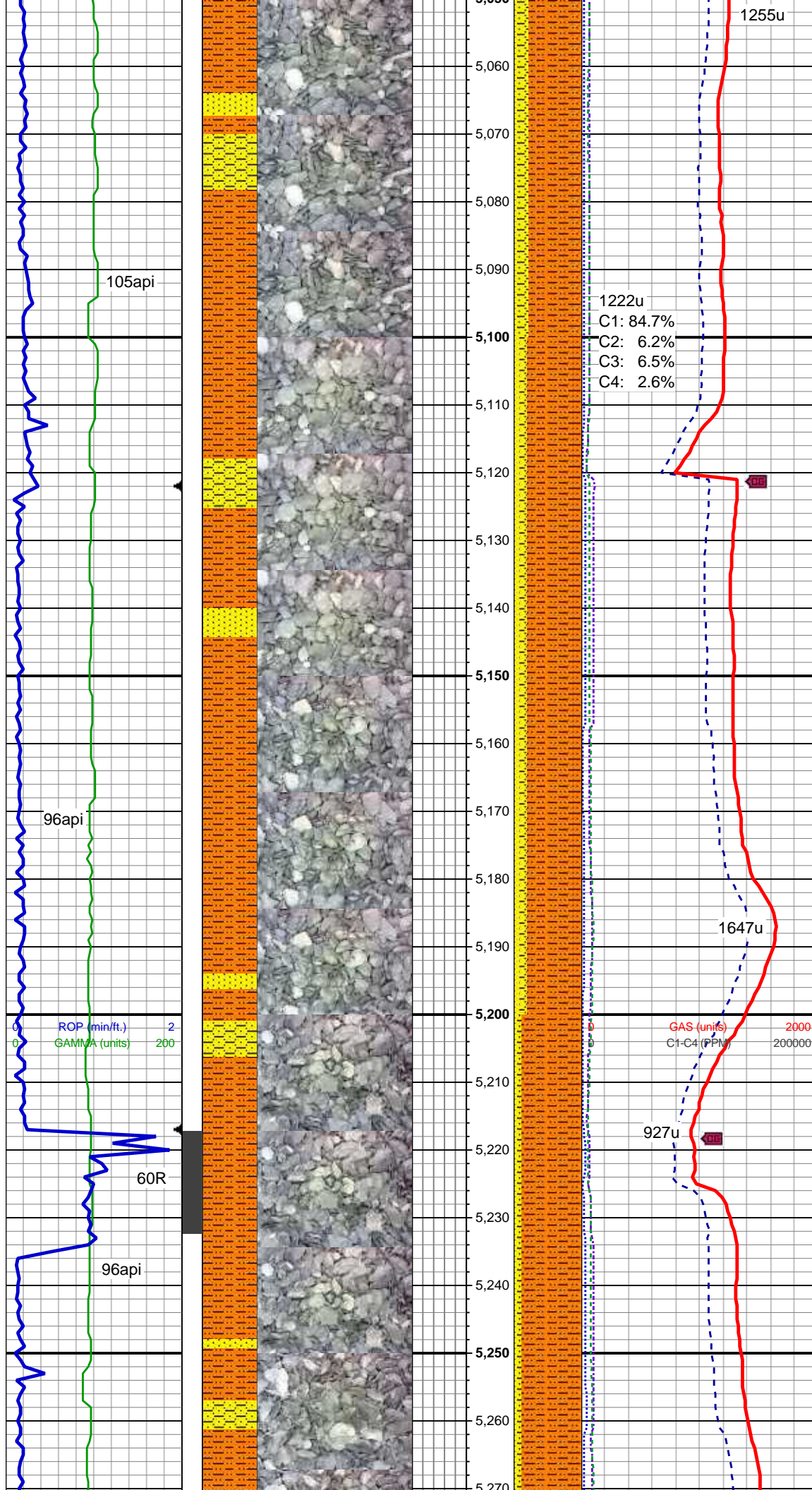
MD: 4,882'
TVD: 4,850.34'
Inclination: 6.1 °
Azimuth: 344.3°
VS: -173.56'

1150u
C1: 87.0%
C2: 4.0%
C3: 5.6%
C4: 3.3%

SHY SLTST: gy-dk gy, frm-hd, sb
blky-sb plty, gr-rthy, occ sd, non
calc, arg cmt, SHYSS: lt gy-med gy,
fri, vf-f gr, sb rd-rd, mod-w srt, arg,
com glauc & biot incl, intbdd & grd
to SS: clr-lt gy, hd, med-f gr, sb
ang-sb rd, mod-w srt, non calc,
com glau & biot incl

MD: 4,977'
TVD: 4,944.94'
Inclination: 4.4 °
Azimuth: 343.2°
VS: -176.11'

SHY SLTST: gy-dk gy, frm-hd, sb
blky-sb plty, gr-rthy, occ sd, non
calc, arg cmt, SHYSS: lt gy-med gy,
fri, vf-f gr, sb rd-rd, mod-w srt, arg,
com glauc & biot incl, intbdd & grd
to SS: clr-lt gy, hd, med-f gr, sb
ang-sb rd, mod-w srt, non calc,
com glau & biot incl



com glauc & biot incl, intbdd & grd
to SS: clr-lt gy, hd, med-f gr, sb
ang-sb rd, mod-w srt, non calc,
com glau & biot incl

MD: 5,072'
TVD: 5,039.67'
Inclination: 4.3 °
Azimuth: 339.3°
VS: -178.52'

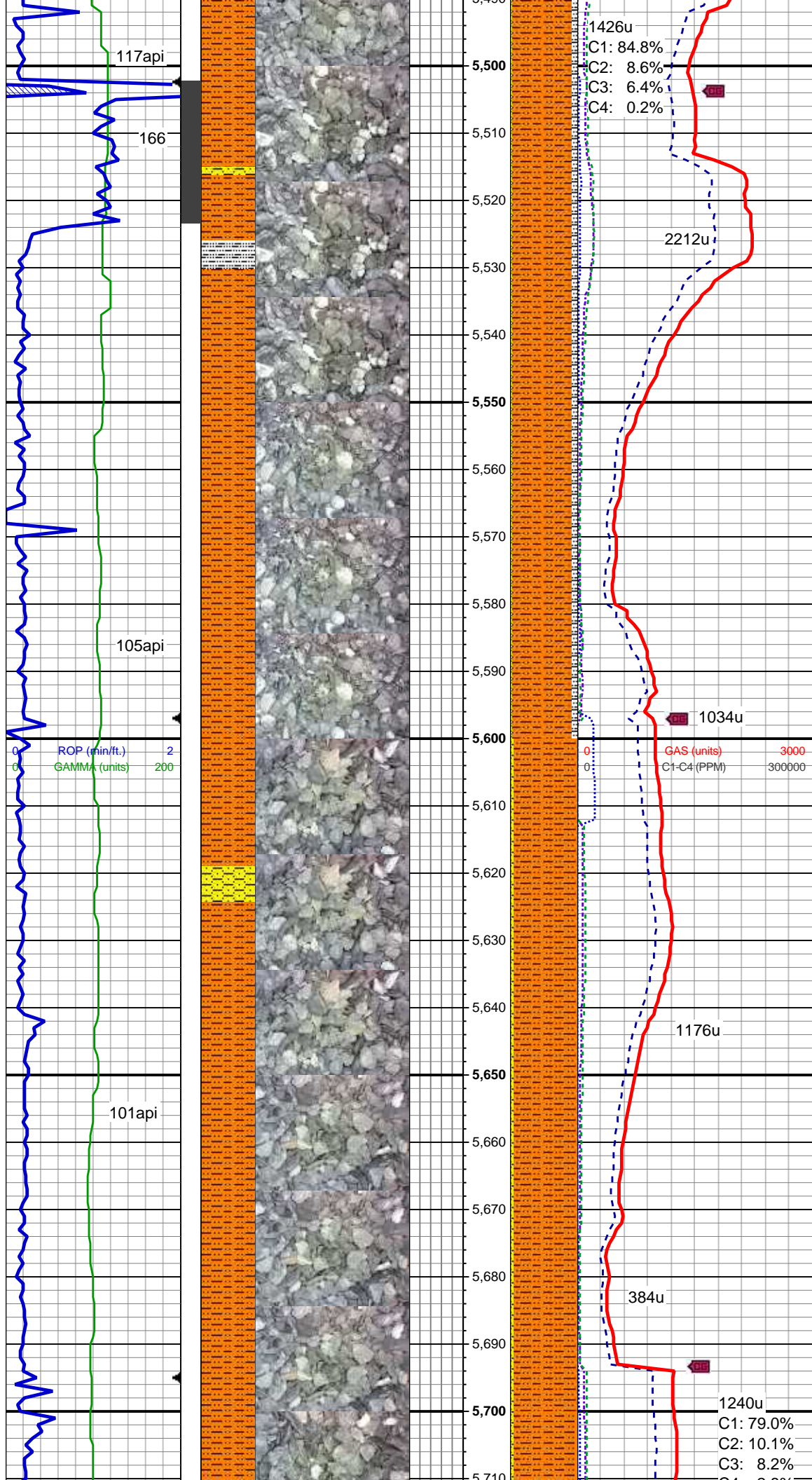
SHY SLTST: gy-dk gy, frm-hd, sb
blky-sb plty, gr-rthy, occ sd, non
calc, arg cmt, SHYSS: lt gy-med gy,
fri, vf-f gr, sb rd-rd, mod-w srt, arg,
com glauc & biot incl, intbdd & grd
to SS: clr-lt gy, hd, med-f gr, sb
ang-sb rd, mod-w srt, non calc,
com glau & biot incl

MD: 5,167'
TVD: 5,134.47'
Inclination: 3.1 °
Azimuth: 335.8°
VS: -180.92'

MUD WT: 9.90 / MUD VIS: 48

SHY SLTST: gy-dk gy, frm-hd, sb
blky-sb plty, gr-rthy, occ sd, non
calc, arg cmt, SHYSS: lt gy-med gy,
fri, vf-f gr, sb rd-rd, mod-w srt, arg,
com glauc & biot incl, intbdd & grd
to SS: clr-lt gy, hd, med-f gr, sb
ang-sb rd, mod-w srt, non calc,
com glau & biot incl

MD: 5,262'
TVD: 5,229.32'



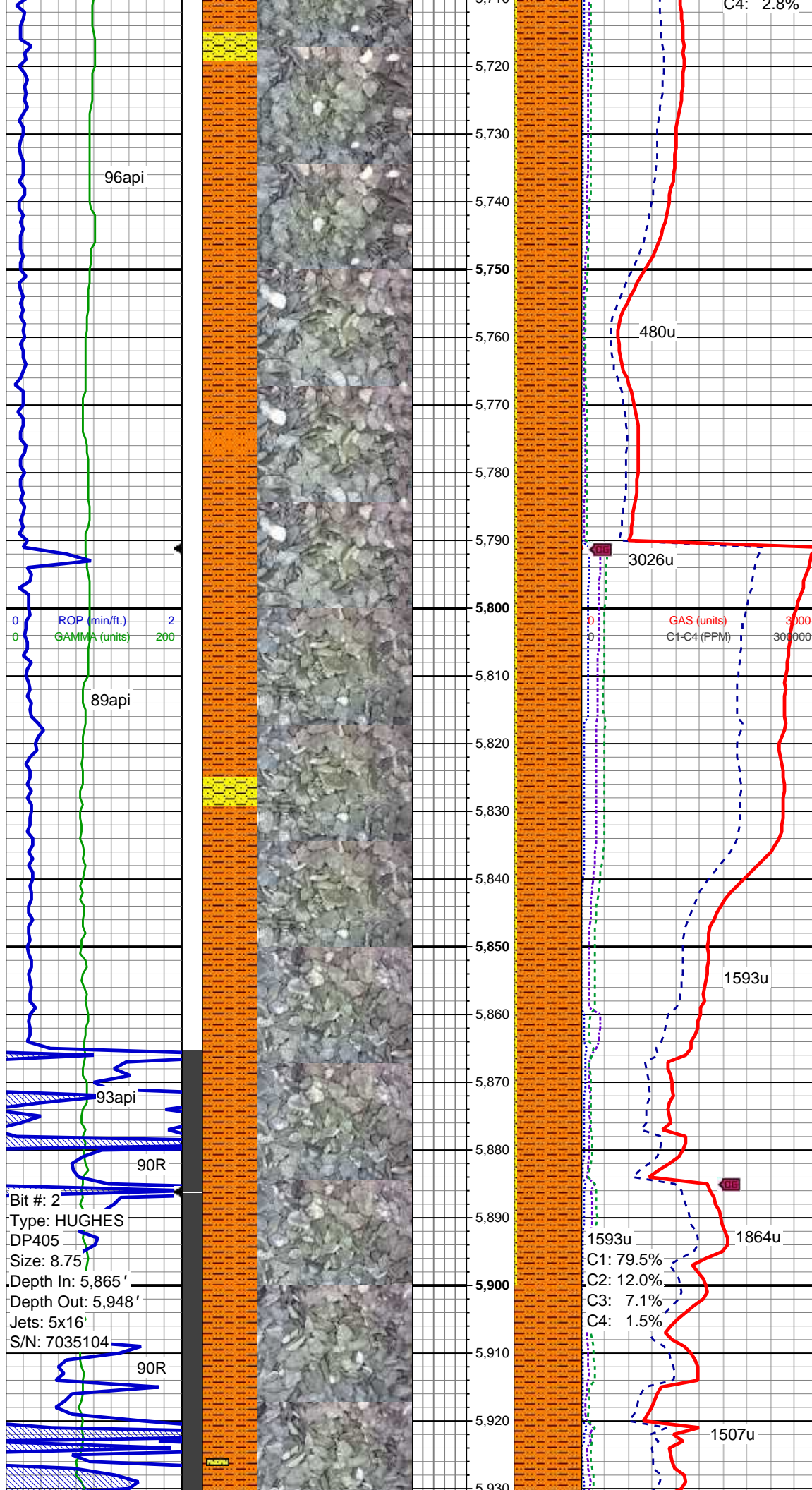
MD: 5,549'
TVD: 5,516.15'
Inclination: 0.3 °
Azimuth: 106.6 °
VS: -182.55'

SHY SLTST: gy-dk gy, frm-hd, sb
blky-sb plty, gr-rthy, occ sd, non
calc, arg cmt, tr SLTY SH: dk gy,
mod frm, sb plty, slty tex, non calc

MUD WT: 9.95 / MUD VIS: 51

MD: 5,645'
TVD: 5,612.15'
Inclination: 0.3 °
Azimuth: 80.6 °
VS: -182.06'

SHY SLTST: gy-dk gy, frm-hd, sb
blky-sb plty, gr-rthy, occ sd, non
calc, arg cmt, tr shy ss



MD: 5,741'
TVD: 5,708.15'
Inclination: 0.3 °
Azimuth: 351.6 °
VS: -181.86'

SHY SLTST: gy-dk gy, frm-hd, sb
blky-sb plty, gr-rthy, occ sd, non
calc, arg cmt, grdg to tr sltst, tr shy
ss

SHY SLTST: gy-dk gy, frm-hd, sb
blky-sb plty, gr-rthy, occ sd, non
calc, arg cmt, grdg to tr sltst, tr shy
ss

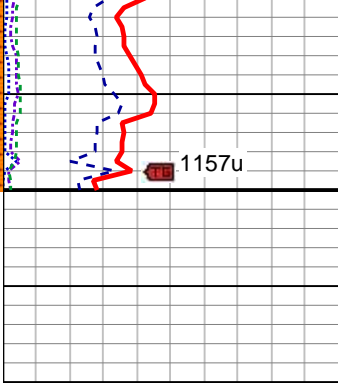
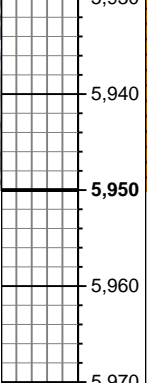
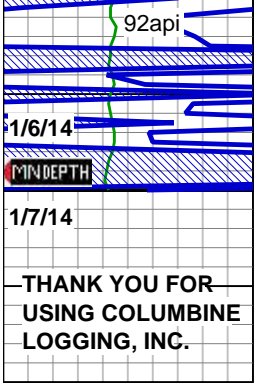
TOOH for curve BHA at 5865' MD
@ 0730hrs on 1/6/14

Resume Drilling @ 1716hrs

MUD WT: 10.20 / MUD VIS: 47

MD: 5,885'
TVD: 5,851.99'
Inclination: 4.6 °
Azimuth: 76.7 °
VS: -176.32'

SHY SLTST: gy-dk gy, frm-hd, sb
blky-sb plty, gr-rthy, occ sd, non
calc, arg cmt, grdg to tr sltst, tr shy
ss



MUD WT: 10.10 / MUD VIS: 40

TOOH for BHA change at 5948' MD
@ 2051hrs on 1/6/14

Resume drilling @
0953hrs on 1/7/14

REFER TO 70 RANCH
04-63-03-3340CH
HORIZONTAL FOR INC >4°