

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** 70 Ranch 4-63-3-3225CH Vertical

**Location** NWSW S3 T4N R63W

**State** COLORADO

**County** WELD

**Country** USA

**Rig Number** NABORS M37

**API Number** 05-123-37921

**AFE #** 18530D

**Region** DJ BASIN

**Field** WATTENBERG

**Spud Date** 1/4/2014

**Drilling Completed** 1/21/2014

**Surface Coordinates** 2018' FSL, 234' FWL

**Bottom Hole Coordinates** 2630' FNL, 500' FEL

**Ground Elevation** 4559'

**K.B. Elevation** 4582'

**Logged Interval** 4000' **To** 10990'

**Total Depth** 10990'

**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

## 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

## Other Symbols

## Oil Show

DEAD  
EVEN  
QUESTIONABLE  
SPOTTED STAINING

## Porosity

E EARTHY  
FENESTRAL  
F 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

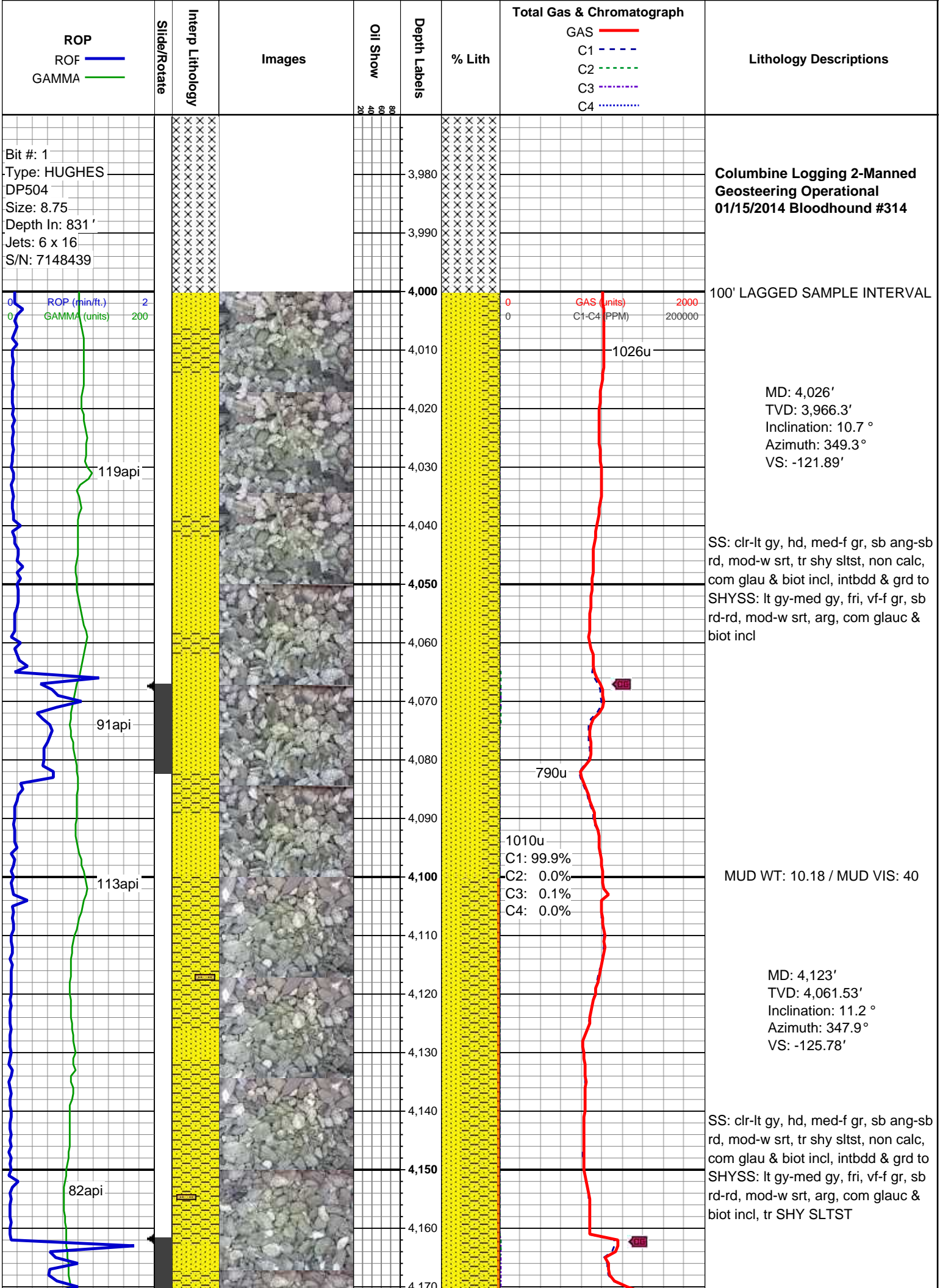
BOUNDSTONE  
CHALKY  
CRYPTOXLN

## E EARTHY

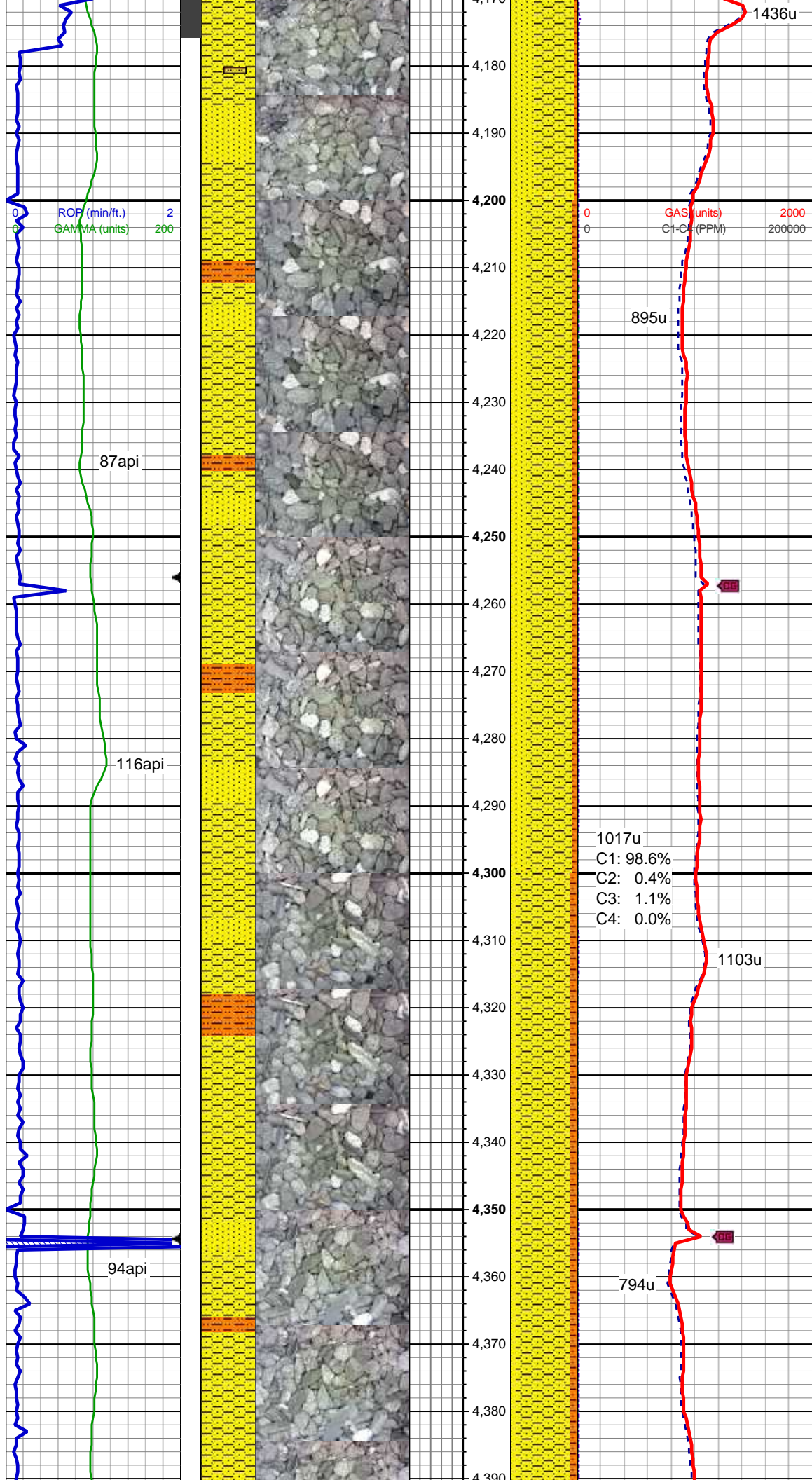
FINELYXLN  
GRAINSTONE  
L LITHOGRAPHIC  
MICROXLN  
MUDSTONE  
PACKSTONE  
WACKESTONE

## Sorting

M MODERATE  
P POOR  
W WELL







MD: 4,218'  
TVD: 4,154.54'  
Inclination: 12.3 °  
Azimuth: 349.4 °  
VS: -129.82'

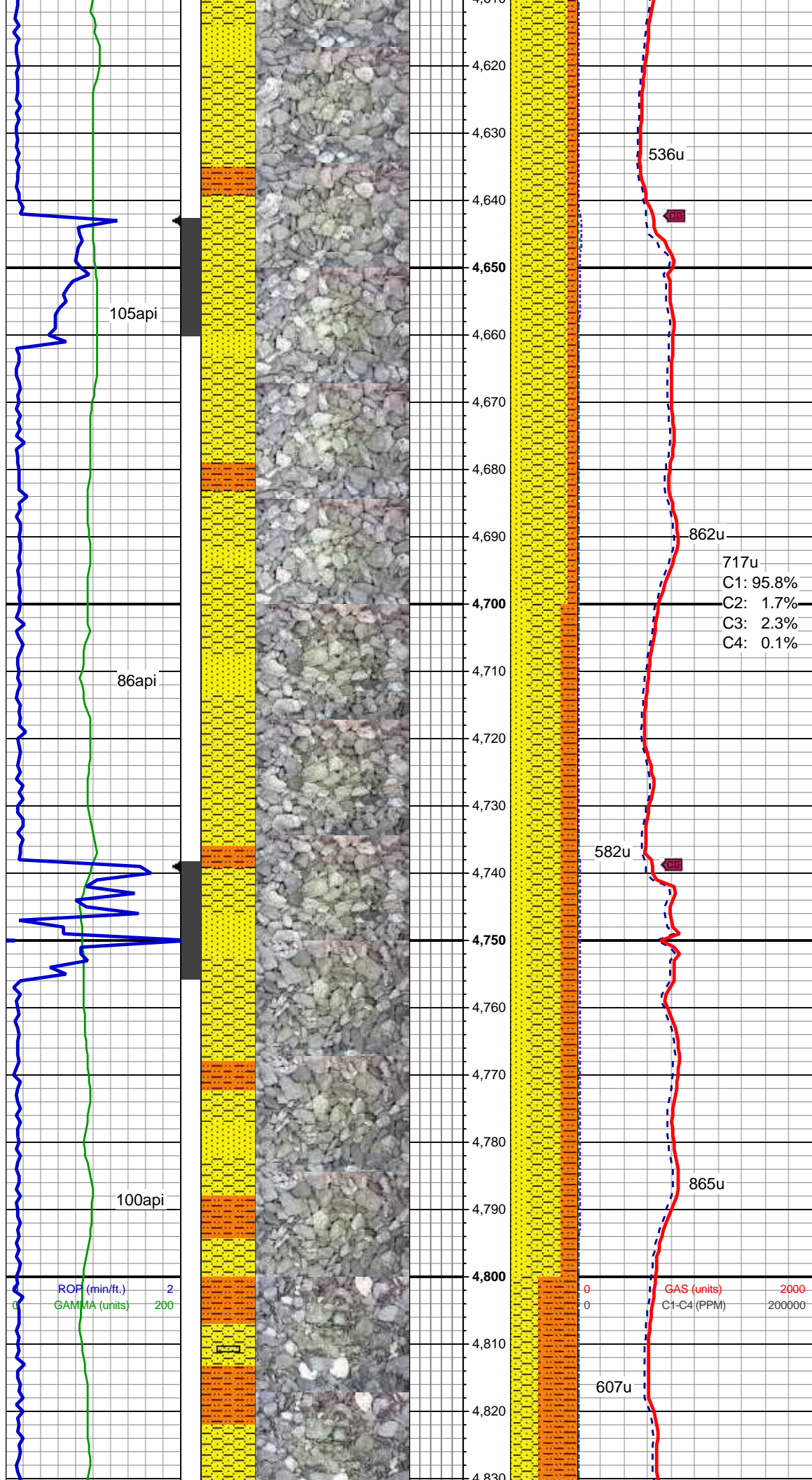
SHYSS: lt gy-med gy, fri, vf-f gr, sb rd-rd, mod-w srt, arg, com glauc & biot incl, intbdd & grd to SS: clr-lt gy, hd, med-f gr, sb ang-sb rd, mod-w srt, non calc, com glau & biot incl, SHY SLTST: gy-dk gy, frm-hd, sb blk-y-sb plty, gr-rthy, occ sd, non calc, arg cmt

MD: 4,315'  
TVD: 4,249.44'  
Inclination: 11.6 °  
Azimuth: 348.7 °  
VS: -133.89'

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: 10.30 / MUD VIS: 38

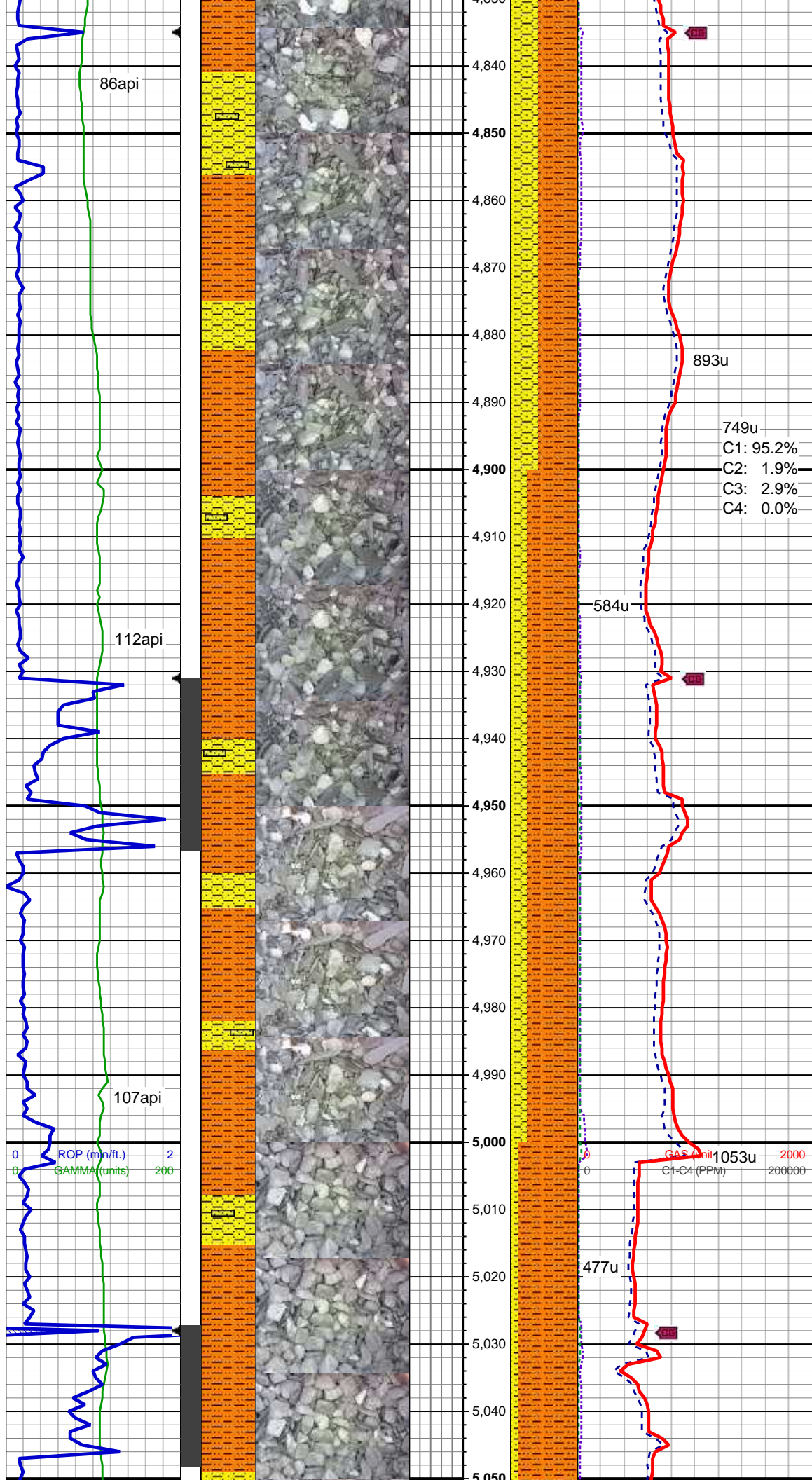
SHYSS: lt gy-med gy, fri, vf-f gr, sb  
rd-rd, mod-w srt, arg, com glauc &  
biot incl, intbdd & grd to SS: clr-lt gy,  
hd, med-f gr, sb ang-sb rd, mod-w  
srt, non calc, com glau & biot incl,  
SHY SLTST: gy-dk gy, frm-hd, sb  
blky-sb plty, gr-rthy, occ sd, non  
calc, arg cmt

MD: 4,699'  
TVD: 4,626.81'  
Inclination: 11.4 °  
Azimuth: 344.5 °  
VS: -152.56'

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  
blky-sb plty, gr-rthy, occ sd, non  
calc, arg cmt

MD: 4,795'  
TVD: 4,721.02'  
Inclination: 10.8 °  
Azimuth: 346.3 °  
VS: -157.46'

MUD WT: 10.30 / MUD VIS: 39



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

MD: 4,891'  
TVD: 4,815.53'  
Inclination: 9.4 °  
Azimuth: 343 °  
VS: -162.1'

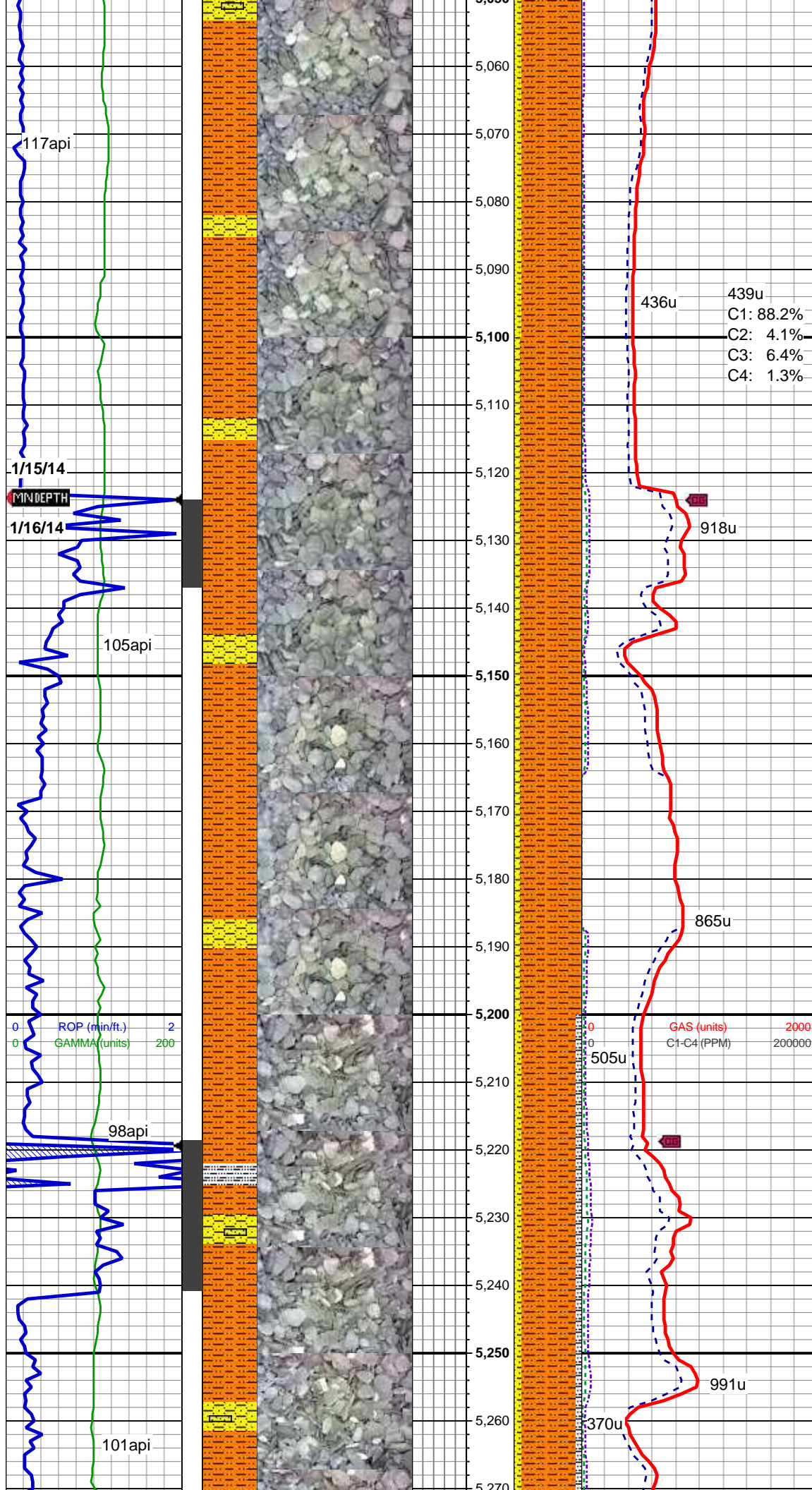
SHY SLTST: gy-dk gy, frm-hd, sb blk-y-sb plty, gr-rthy, occ sd, non calc, arg cmt, SHYSS: lt gy-med gy, fri, vf-f gr, sb rd-rd, mod-w srt, arg, com glauc & biot incl, tr SS

MD: 4,987'  
TVD: 4,910.67'  
Inclination: 5.8 °  
Azimuth: 349.1 °  
VS: -165.47'

MUD WT: 10.35 / MUD VIS: 40

SHY SLTST: gy-dk gy, frm-hd, sb blk-y-sb plty, gr-rthy, occ sd, non calc, arg cmt, tr SS





calc, arg cmt, SHYSS: lt gy-med gy,  
fri, vf-f gr, sb rd-rd, mod-w srt, arg,  
com glauc & biot incl, tr SS

MD: 5,083'  
TVD: 5,005.99'  
Inclination: 7.8 °  
Azimuth: 348.6°  
VS: -167.82'

436u 439u  
C1: 88.2%  
C2: 4.1%  
C3: 6.4%  
C4: 1.3%

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

MD: 5,179'  
TVD: 5,101.05'  
Inclination: 8.3 °  
Azimuth: 352.7°  
VS: -170.16'

MUD WT: 10.45 / MUD VIS: 40

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, SLTY SH:  
dk-med gy, sb blky-plty, fis ip, vf-mic  
gr, non calc, tr SS



MUD WT: 10.50 / MUD VIS: 40

MD: 5,275'  
TVD: 5,195.82'  
Inclination: 10 °  
Azimuth: 349.2 °  
VS: -172.8'

787u  
C1: 81.8%  
C2: 5.6%  
C3: 9.4%  
C4: 3.2%

1379u

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, SLTY SH:  
dk-med gy, sb blky-plty, fis ip, vf-mic  
gr, non calc, tr SS

MD: 5,370'  
TVD: 5,289.56'  
Inclination: 8.7 °  
Azimuth: 346.4 °  
VS: -176.23'

554u

GAS SCALE CHANGE  
0-3000u

GAS (units)  
C1-C4 (PPM)

2130u

966u

SHY SLTST: gy-dk gy, frm-hd, sb  
blky-sb plty, gr-rthy, occ sd, non  
calc, arg cmt, SLTY SH: dk-med gy,  
sb blky-plty, fis ip, vf-mic gr, non  
calc, tr SHY SS

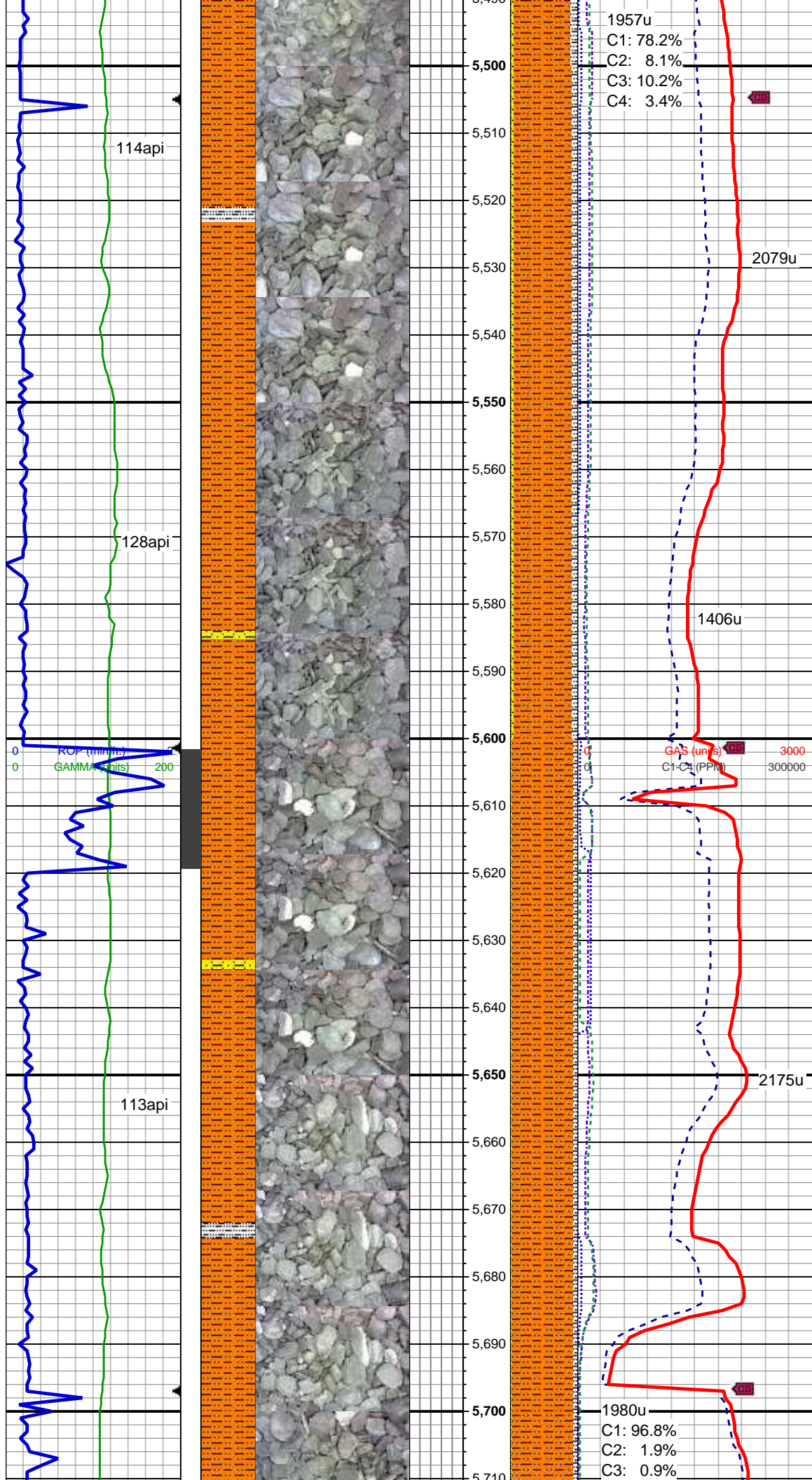
MD: 5,465'  
TVD: 5,383.66'  
Inclination: 7 °  
Azimuth: 342.9 °  
VS: -179.79'

105api

109api

121api

ROP (min/ft.) 2  
GAMMA (units) 200



MUD WT: 10.55 / MUD VIS: 41

SHY SLTST: gy-dk gy, frm-hd, sb  
blky-sb plty, sl gr-rthy, tr sdy ip, non  
calc, arg cmt, tr SLTY SH & SHY SS

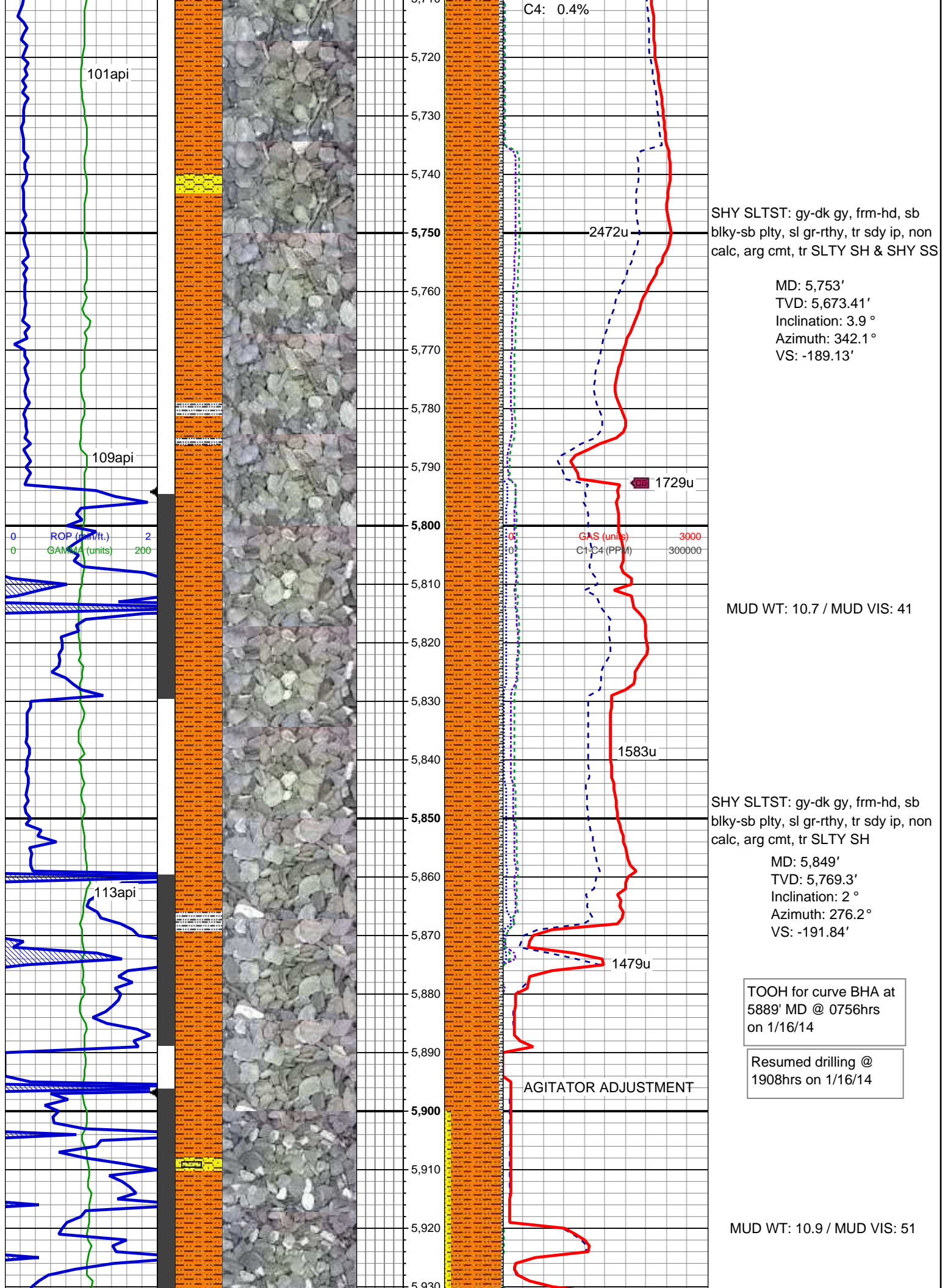
MD: 5,561'  
TVD: 5,482.1'  
Inclination: 5.4 °  
Azimuth: 334.3°  
VS: -184.01'

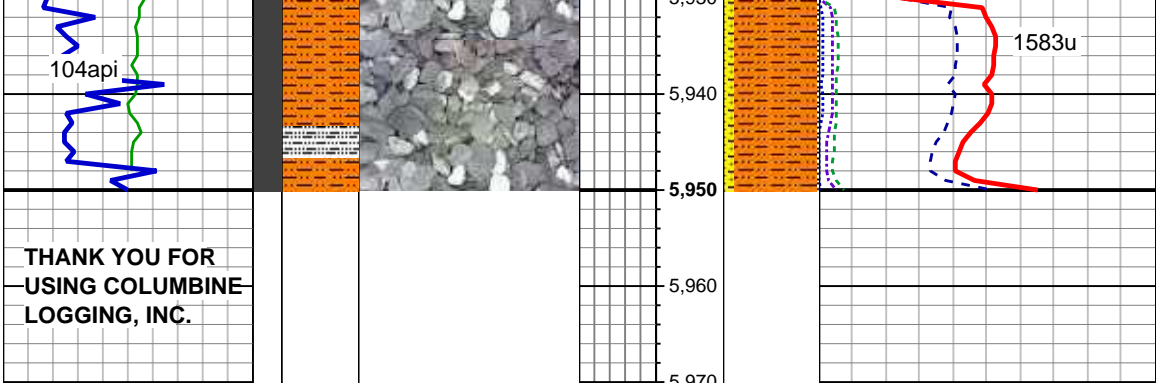
SHY SLTST: gy-dk gy, frm-hd, sb  
blky-sb plty, sl gr-rthy, tr sdy ip, non  
calc, arg cmt, tr SLTY SH & SHY SS

MD: 5,657'  
TVD: 5,577.7'  
Inclination: 5.1 °  
Azimuth: 346.8°  
VS: -187.05'

MUD WT: 10.6 / MUD VIS: 41







MD: 5,944'  
TVD: 5,864.26'  
Inclination: 2.6 °  
Azimuth: 161.5 °  
VS: -193.5'

REFER TO 70 RANCH  
4-63-3-3225CH  
HORIZONTAL FOR INC >2.6°