

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name NAKAGAWA B13-64-1HN

Location SEC 13 T5N R64W

State COLORADO

County WELD

Country USA

Rig Number H&P 330

API Number 05-123-36378

AFE # 136877

Region DJ BASIN

Field WATTENBERG

Spud Date 7/1/2013

Drilling Completed 7/9/2013

Surface Coordinates 1060' FSL, 239' FWL

Bottom Hole Coordinates 1650' FSL, 535' FEL

Ground Elevation 4570'

K.B. Elevation 4600'

Logged Interval 2500' **To** 11025

Total Depth 11025

Formation NIOBRARA C CHALK

Type of Drilling Fluid LSND

Operator

Company Noble Energy, Inc.

Address 1625 Broadway, Suite 2200
Denver, CO 80202

Geologist

Name Teresa Malesardi

Company Noble Energy, Inc.

Address 1625 Broadway, Suite 2200
Denver, CO 80202

Other

Rock Types

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

Fossils

ALGAE
 AMPHIPORA
 BELEMNITE
 BIOCLASTIC
 BRACHIOIPOD
 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
 O INTEROOLITIC

Moldic

O ORGANIC
 P PINPOINT
 V 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

A ANGULAR
 R ROUNDED
 B SUBANG
 F SUBRND

Textures

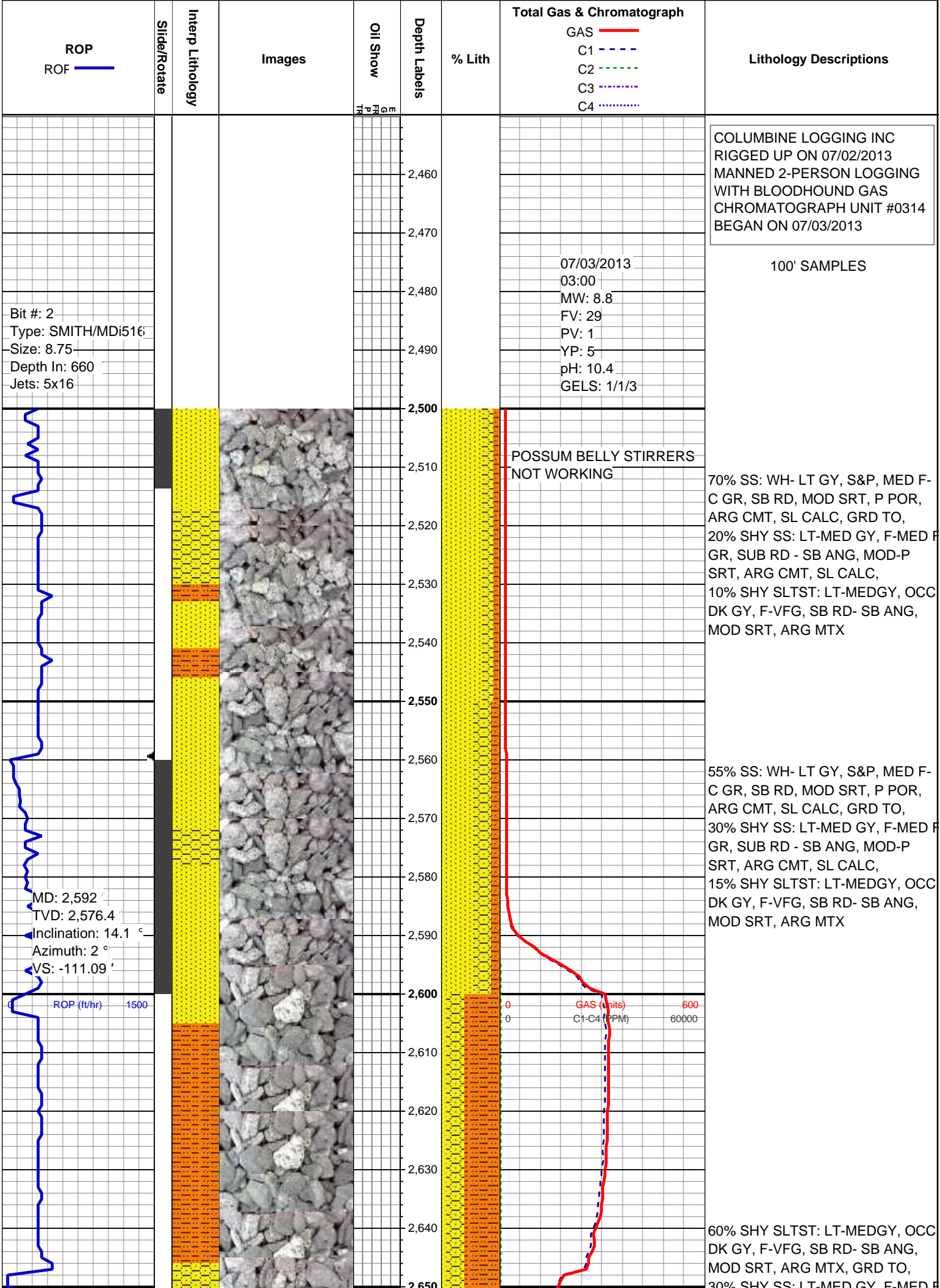
B BOUNDSTONE
 C CHALKY
 CX CRYPTOXLN

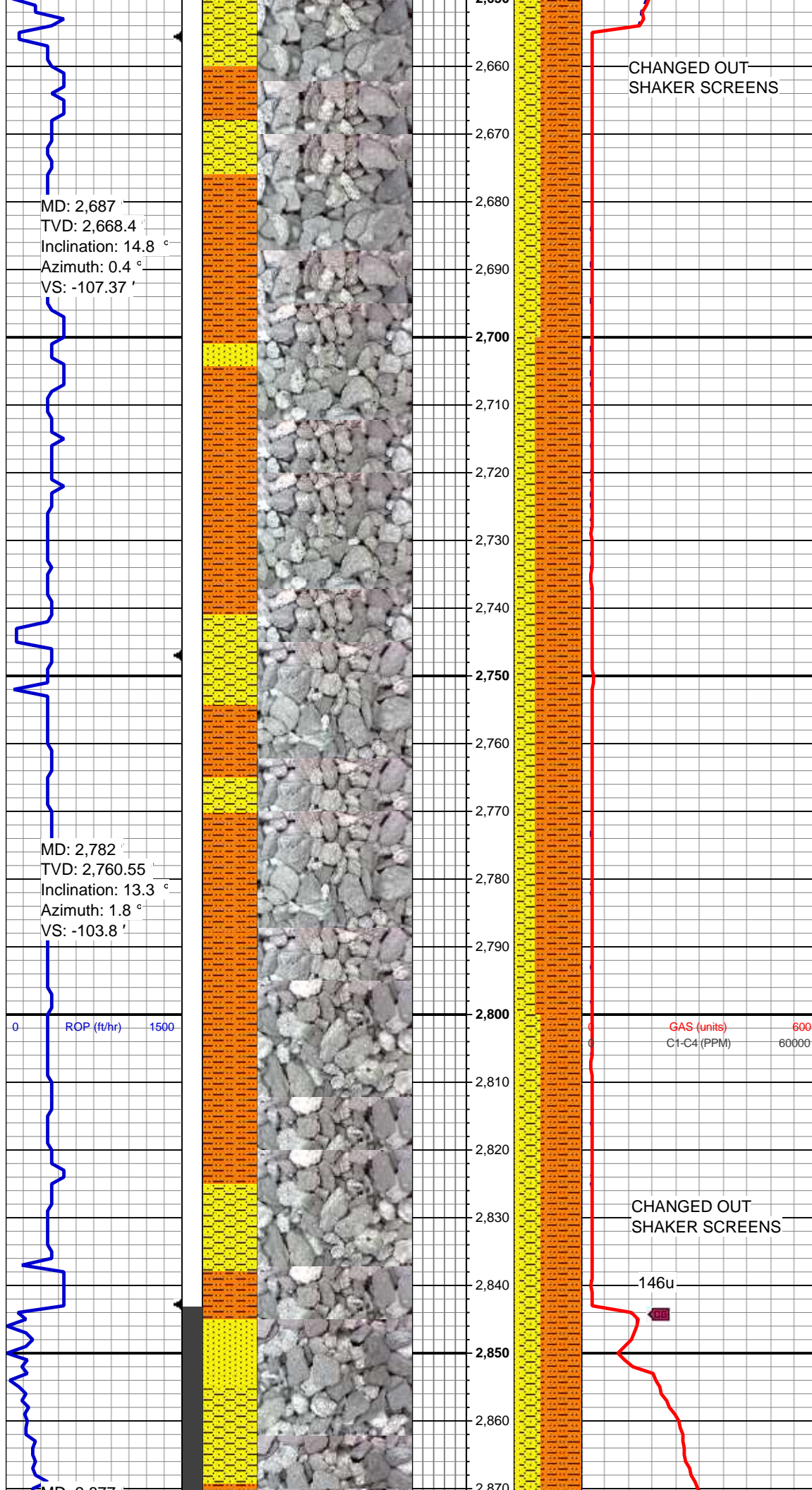
E earthy

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

Sorting

M MODERATE
 P POOR
 W WELL





MD: 2,687
TVD: 2,668.4
Inclination: 14.8 °
Azimuth: 0.4 °
VS: -107.37 '

MD: 2,782
TVD: 2,760.55
Inclination: 13.3 °
Azimuth: 1.8 °
VS: -103.8 '

CHANGED OUT
SHAKER SCREENS

CHANGED OUT
SHAKER SCREENS

GAS (units) 600
C1-C4 (PPM) 60000

146u

50% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
10% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC

75% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX, GRD TO,
25% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
5% SS: WH- LT GY, S&P, MED F- C
GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC

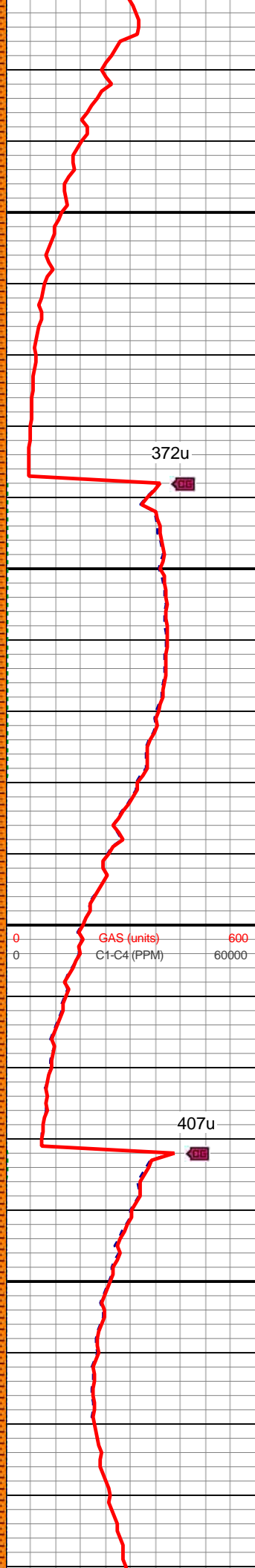
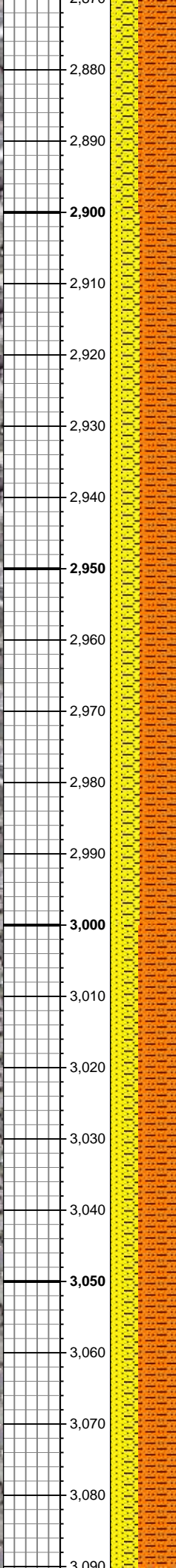
60% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX, GRD TO,
30% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
10% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC

MD: 2,877'
TVD: 2,852.75'
Inclination: 14.6 °
Azimuth: 1.1 °
VS: -100.11'

MD: 2,972'
TVD: 2,944.93'
Inclination: 13.4 °
Azimuth: 359.6 °
VS: -96.82'

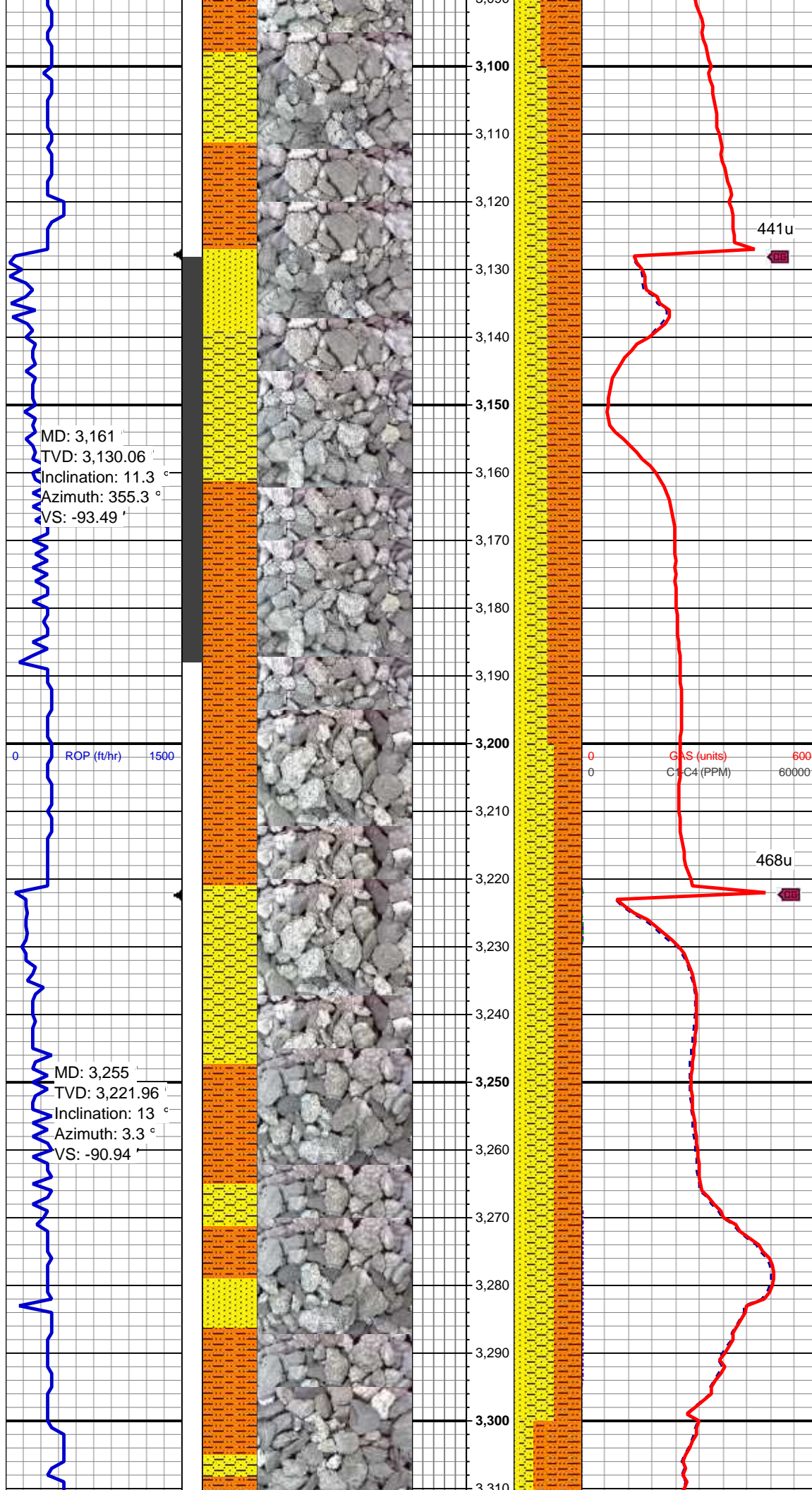
ROP (ft/hr)

MD: 3,067'
TVD: 3,037.81'
Inclination: 10.8 °
Azimuth: 356.7 °
VS: -94.69'



60% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX, GRD TO,
25% SHY SS: LT-MED GY, F-MED P
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
15% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC

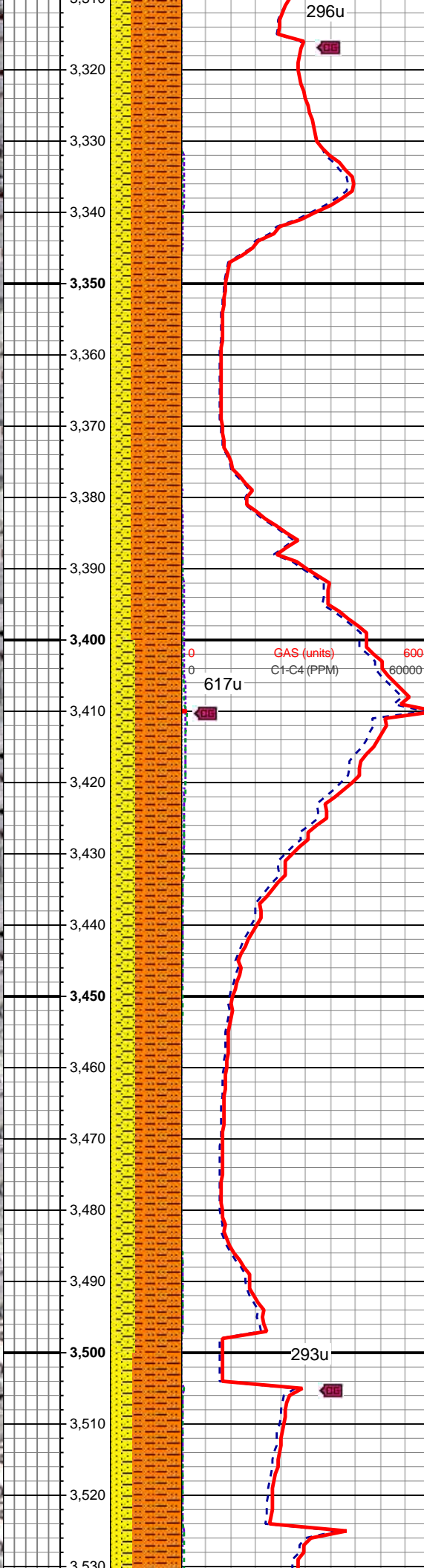
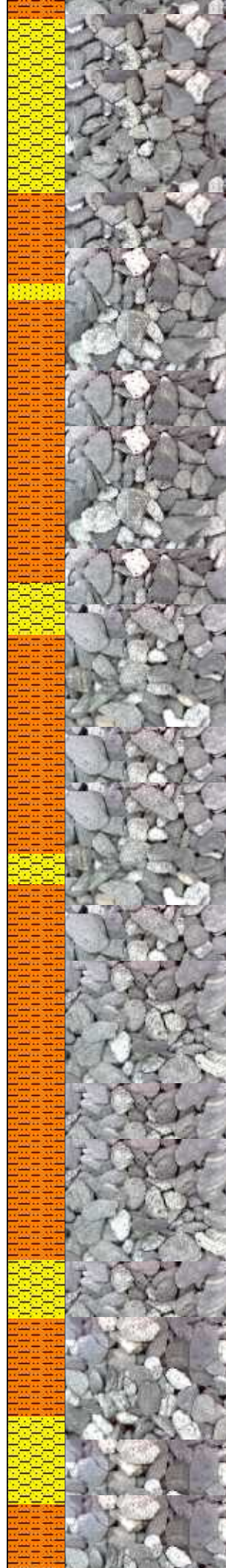
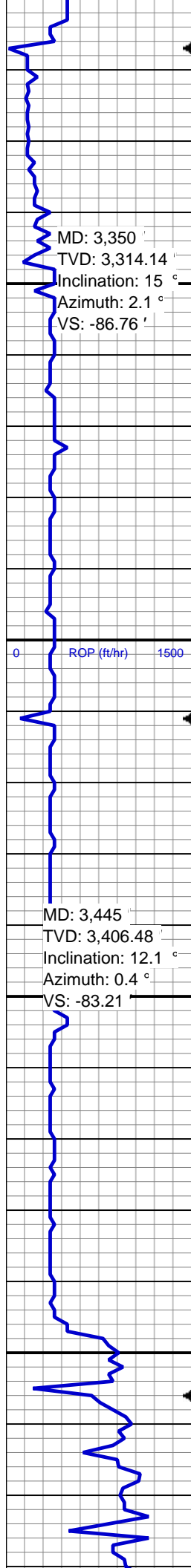
60% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX, GRD TO,
20% SHY SS: LT-MED GY, F-MED P
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
20% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC



Mud Wt. 8.9/ Mud Vis. 27

50% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX, GRD TO,
30% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
20% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC

40% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX, GRD TO,
40% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
20% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC



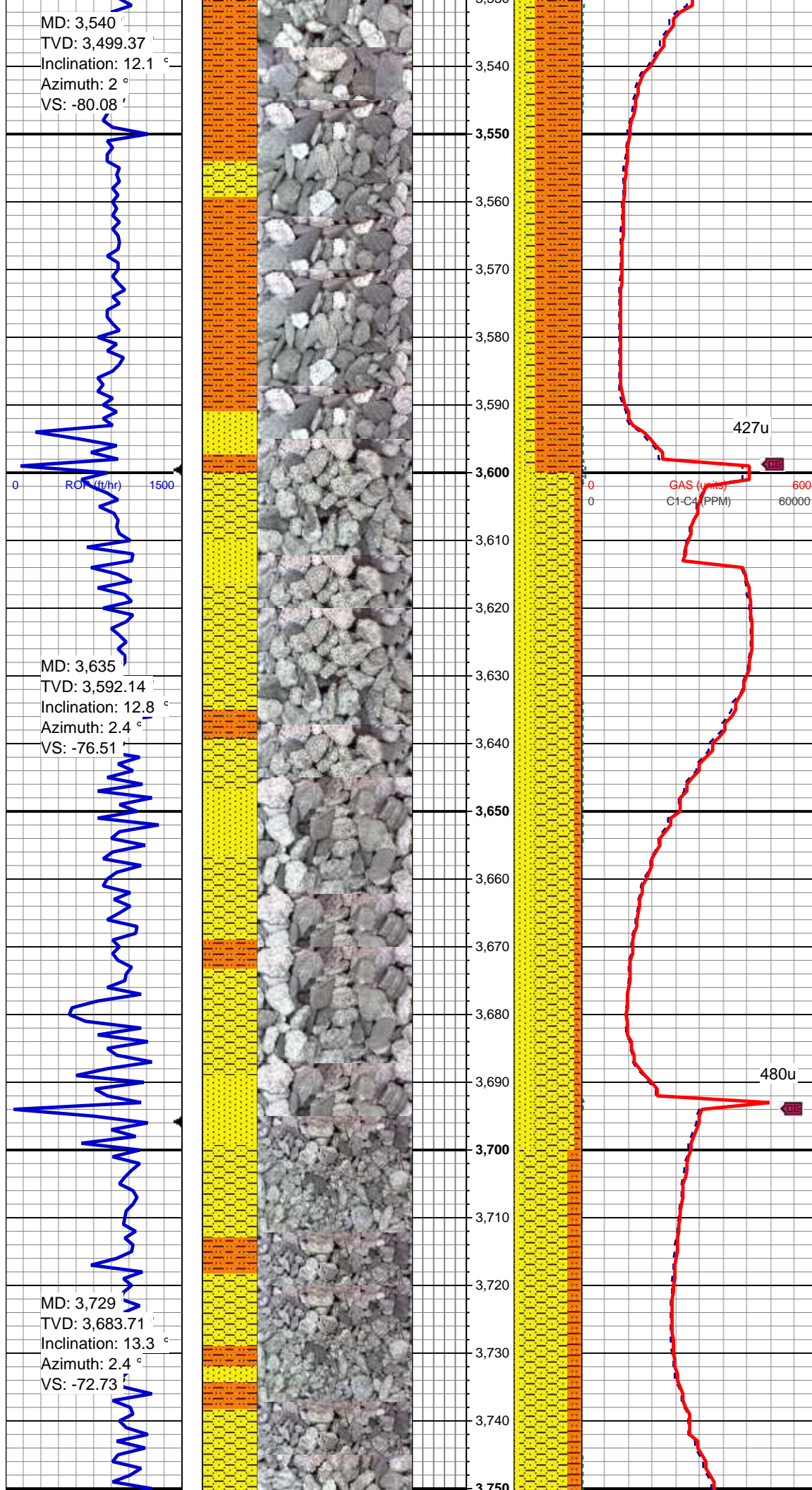
70% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX, GRD TO,
20% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
10% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC

65% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX, GRD TO,
25% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
10% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC

MD: 3,540
TVD: 3,499.37
Inclination: 12.1 °
Azimuth: 2 °
VS: -80.08

MD: 3,635
TVD: 3,592.14
Inclination: 12.8 °
Azimuth: 2.4 °
VS: -76.51

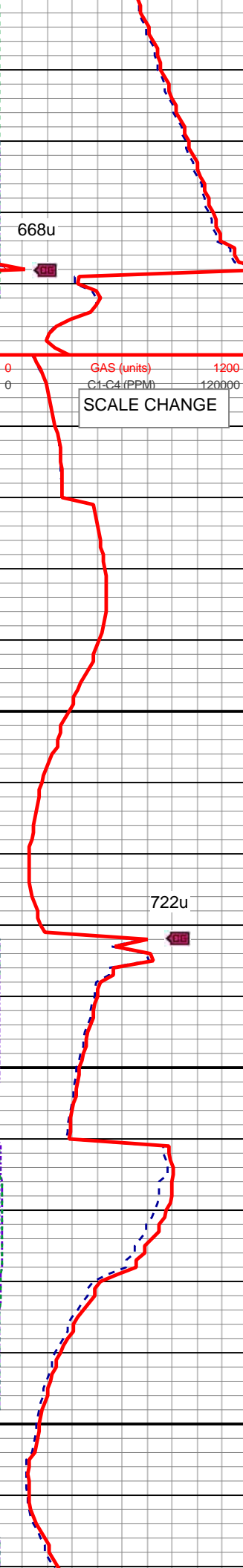
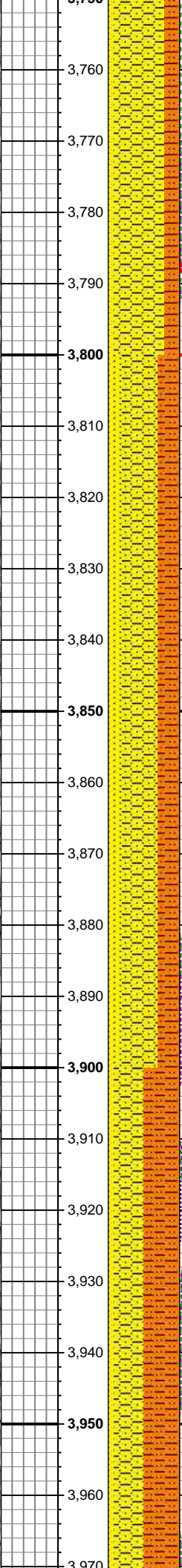
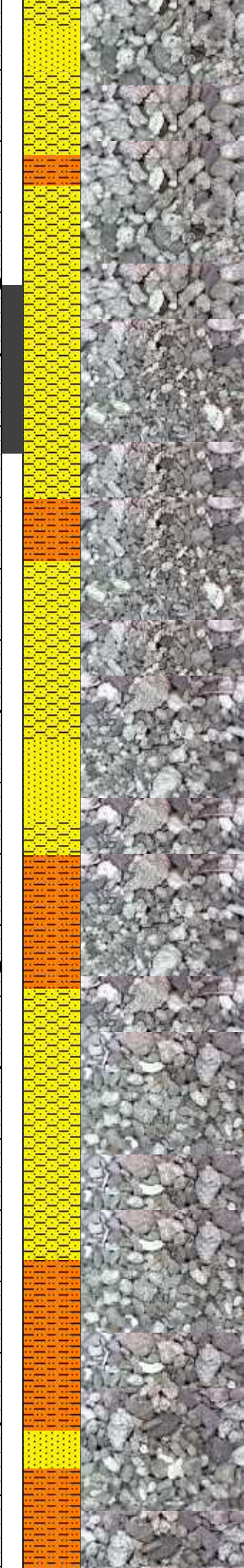
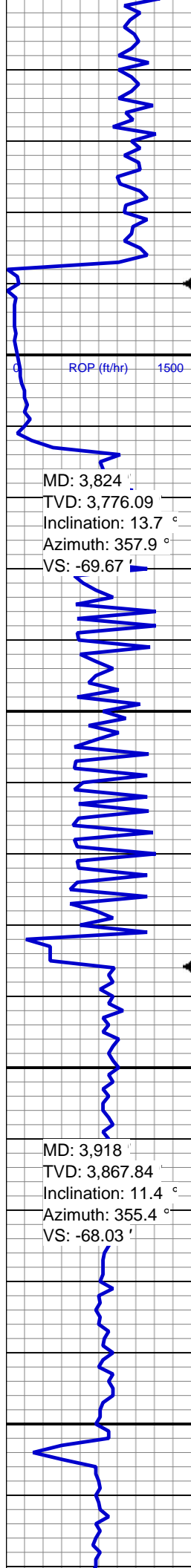
MD: 3,729
TVD: 3,683.71
Inclination: 13.3 °
Azimuth: 2.4 °
VS: -72.73



70% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX, GRD TO,
15% SHY SS: LT-MED GY, F-MED P
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
15% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC

60% SHY SS: LT-MED GY, F-MED P
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC, GRD TO
30% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC,
10% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX

70% SHY SS: LT-MED GY, F-MED P
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC, GRD TO
30% SHY SLTST: LT-MEDGY, OCC



20% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX,
10% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC

668u

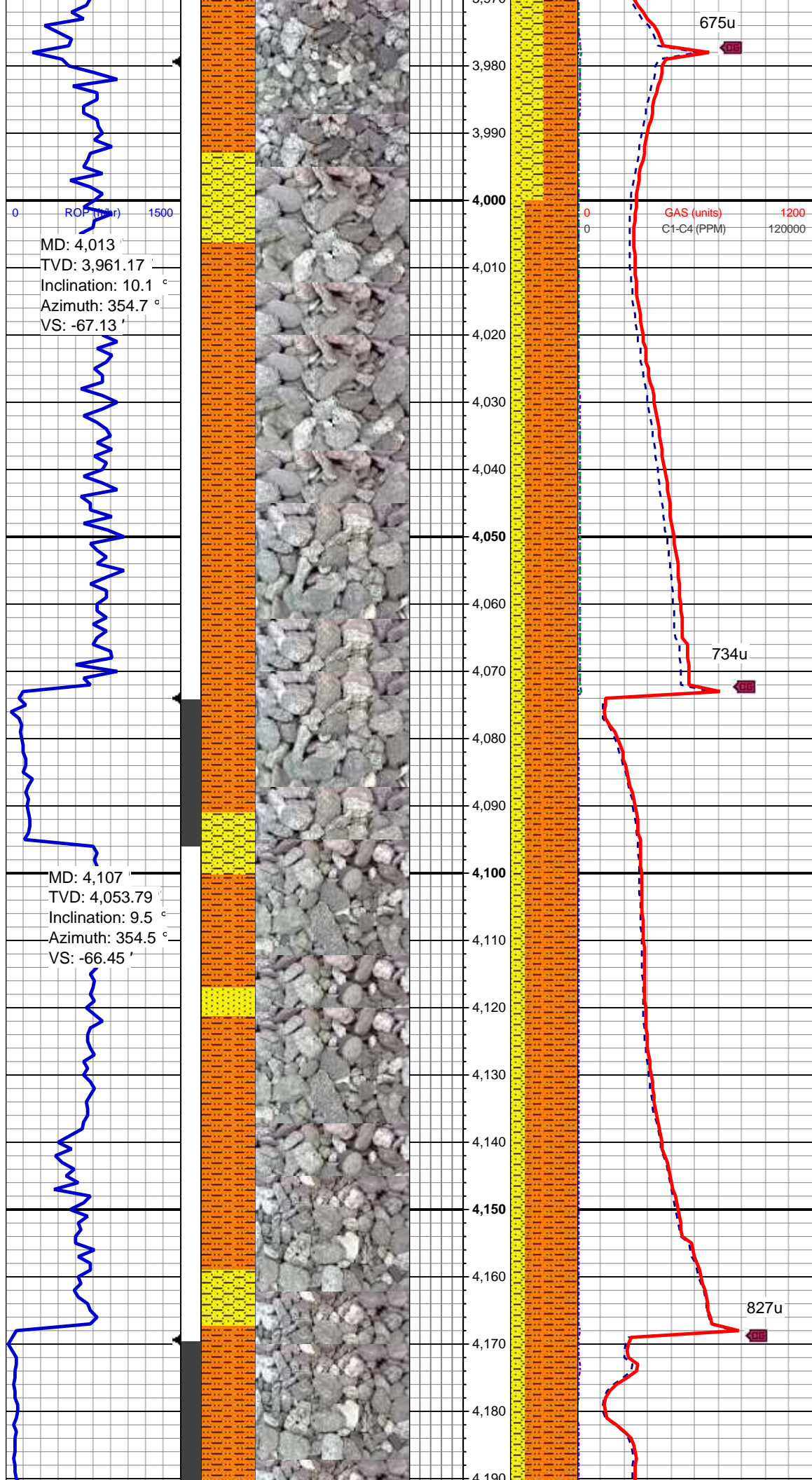
GAS (units) 1200
C1-C4 (PPM) 120000

SCALE CHANGE

50% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC, GRD TO
30% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX,
20% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC

722u

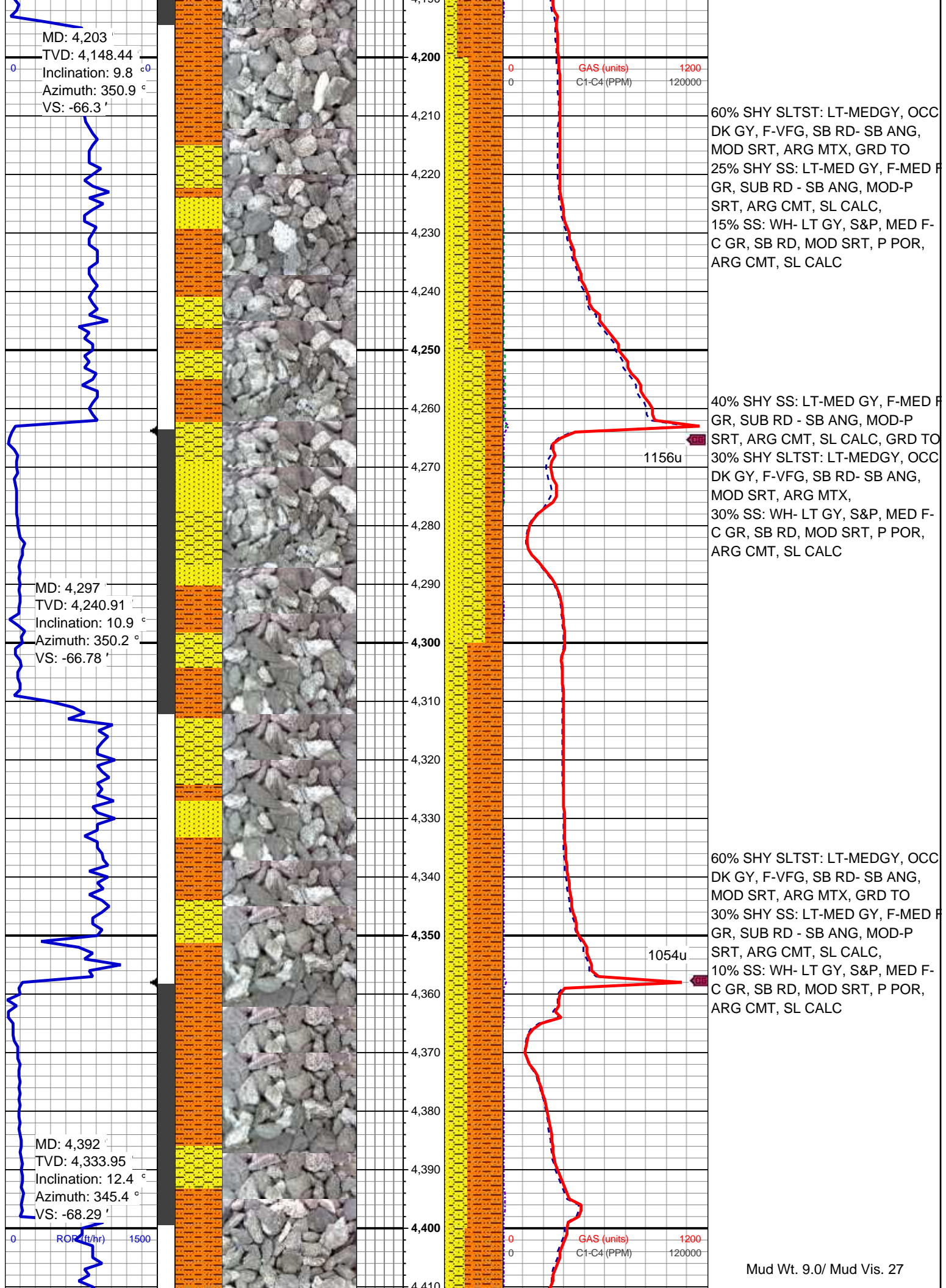
50% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX, GRD TO
40% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
10% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC

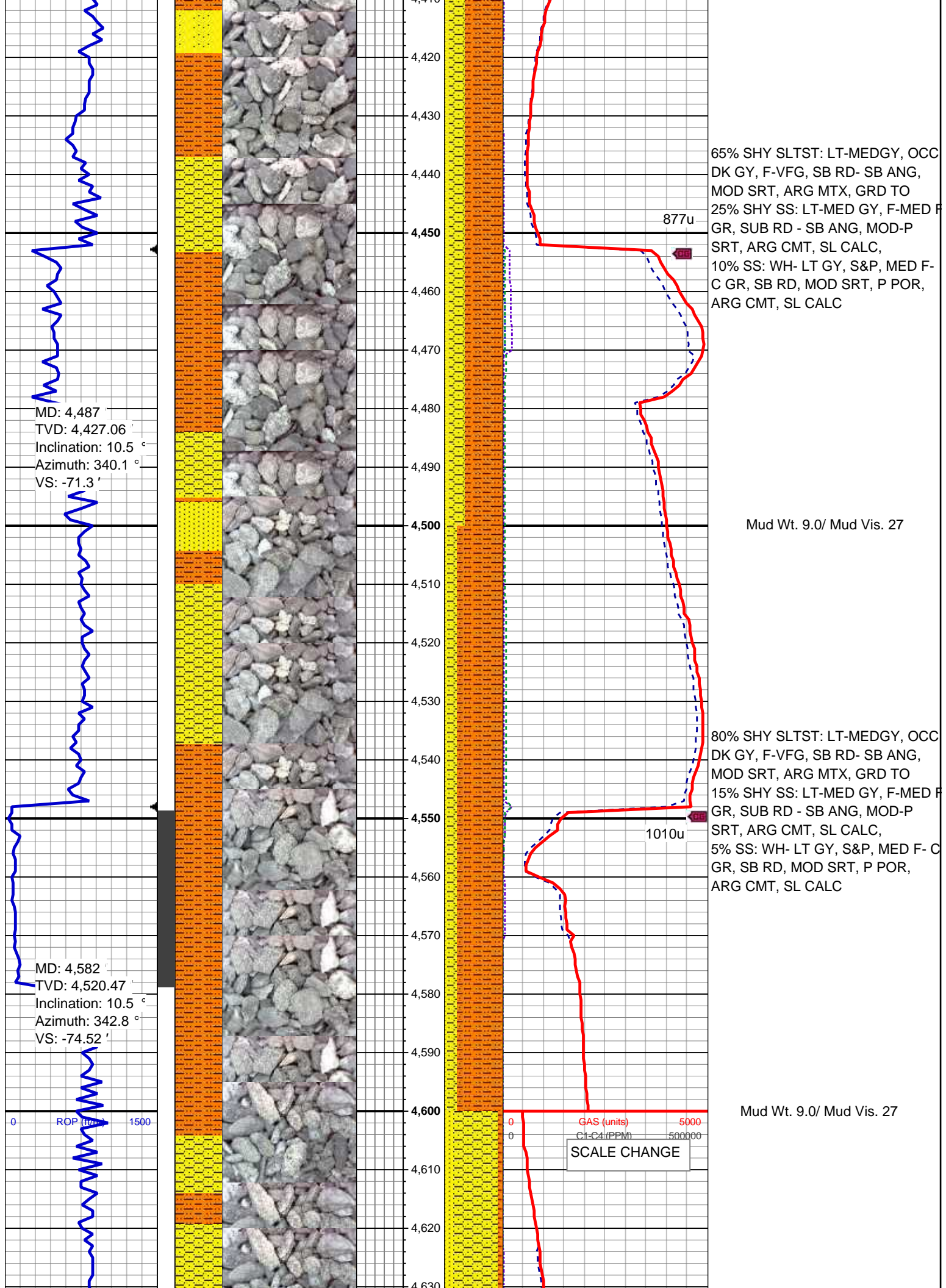


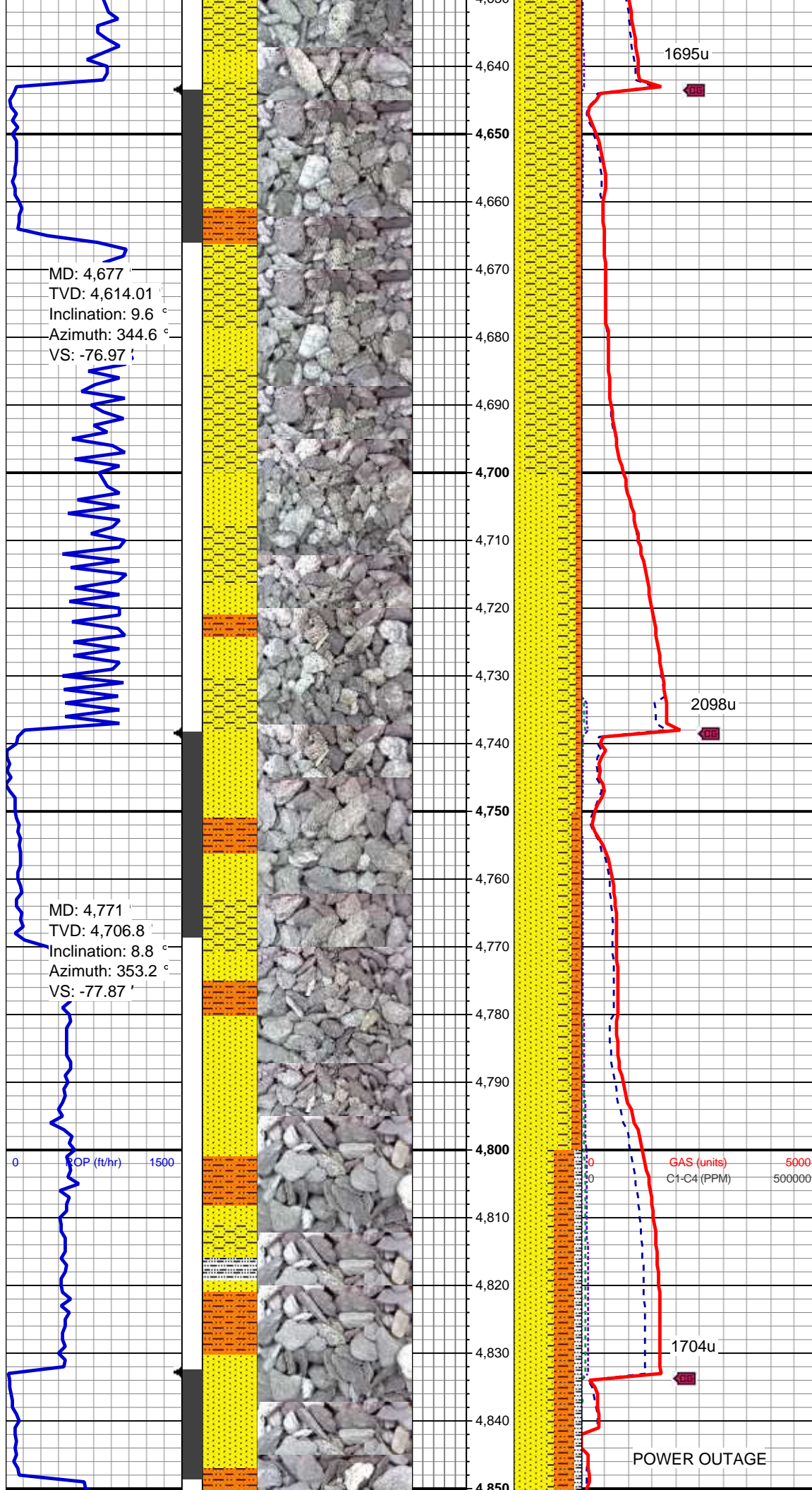
Mud Wt. 8.9/ Mud Vis. 28

80% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX, GRD TO
15% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
5% SS: WH- LT GY, S&P, MED F- C
GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC

80% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX, GRD TO
15% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
5% SS: WH- LT GY, S&P, MED F- C
GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC







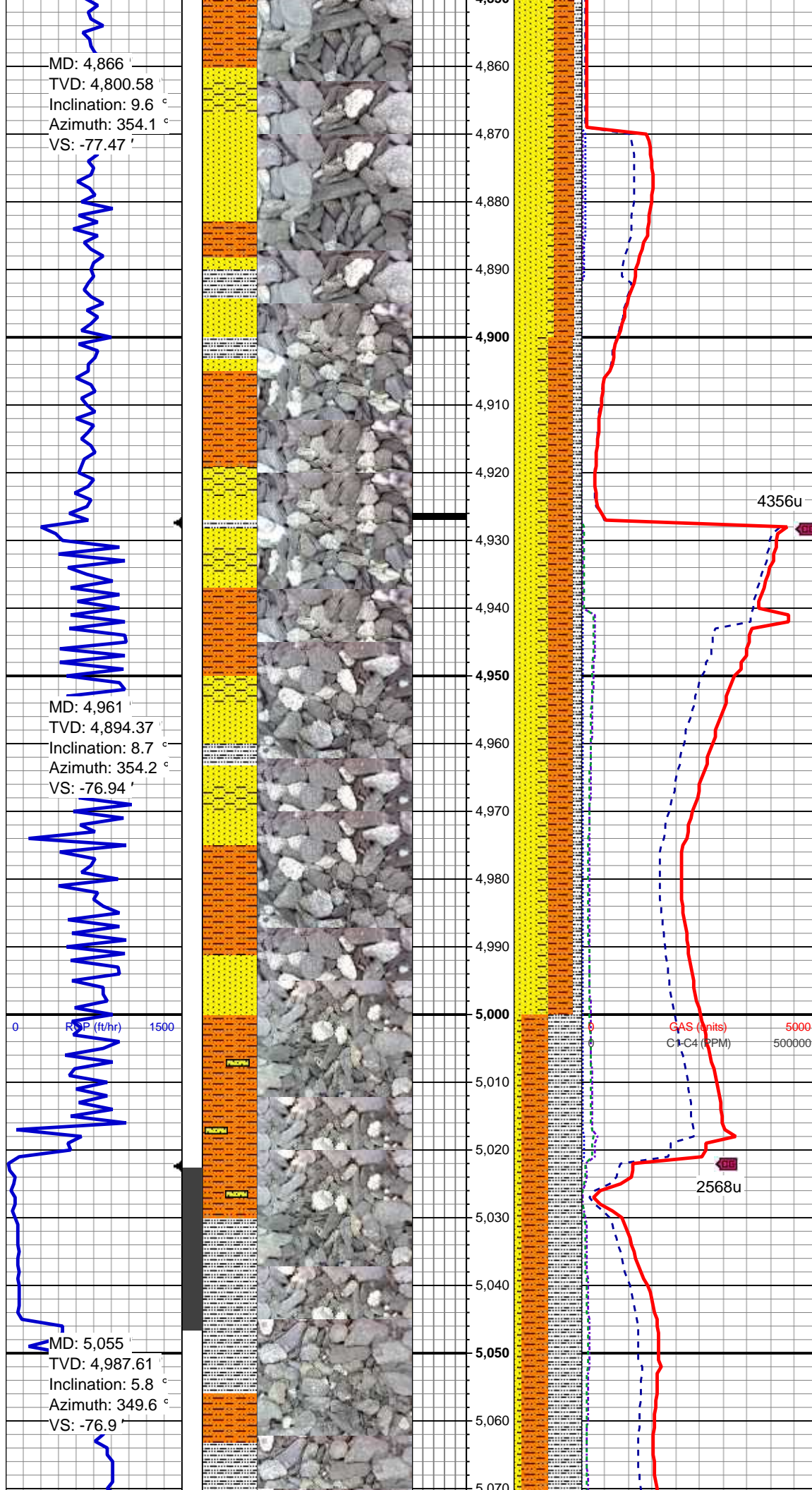
75% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
15% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC
10% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX

65% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC
25% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
10% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX

Mud Wt. 9.0/ Mud Vis. 29

65% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC
20% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
15% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX

50% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC, GRD TO
30% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX,

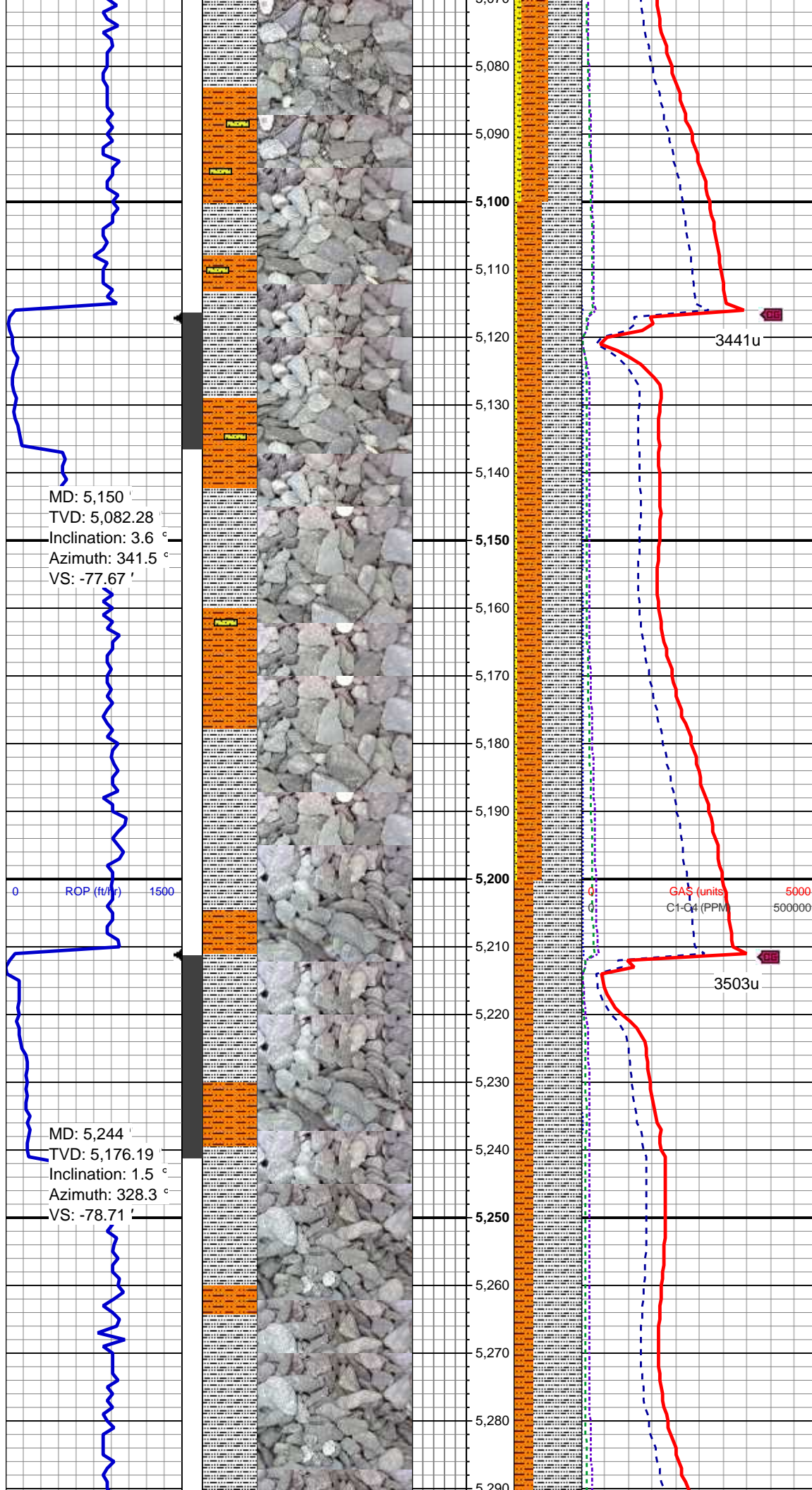


10% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
10% SLTY SH: MED - DK GY, OCC
TAN, V F GR, FRI- BRIT, SUB PLTY
SUB BLKY, SL CALC

Mud Wt. 9.0/ Mud Vis. 29

35% SS: WH- LT GY, S&P, MED F-
C GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC, GRD TO
35% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX,
15% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC,
15% SLTY SH: MED - DK GY, OCC
TAN, V F GR, FRI- BRIT, SUB PLTY
SUB BLKY, SL CALC

50% SLTY SH: MED - DK GY, OCC
TAN, V F GR, FRI- BRIT, SUB PLTY
SUB BLKY, SL CALC,
40% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX,
5% SS: WH- LT GY, S&P, MED F- C
GR, SB RD, MOD SRT, P POR,
ARG CMT, SL CALC,
5% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC

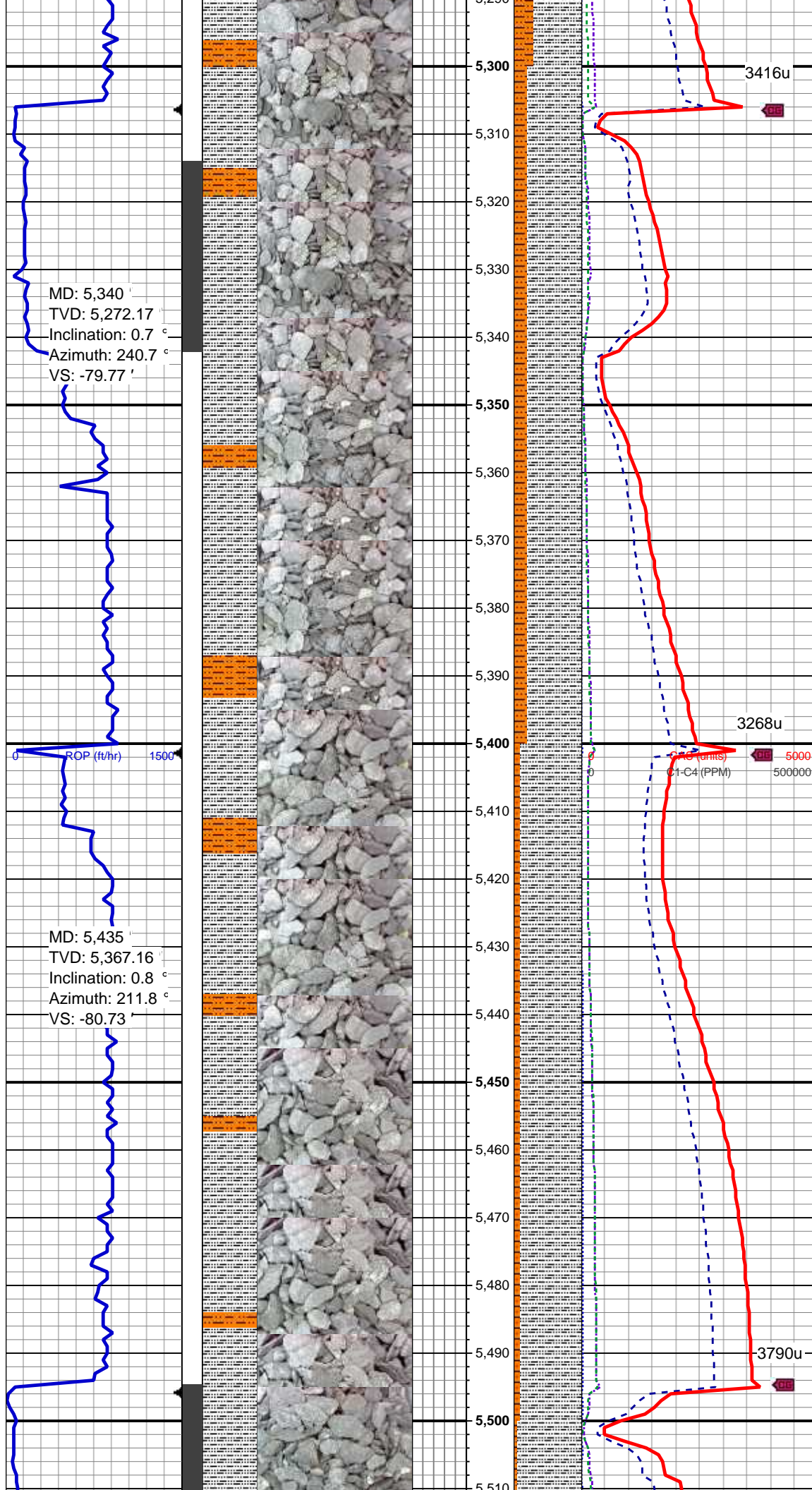


Mud Wt. 8.80/ Mud Vis. 28

60% SLTY SH: MED - DK GY, OCC
TAN, V F GR, FRI- BRIT, SUB PLTY
SUB BLKY, SL CALC,
35% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX,
5% SHY SS: LT-MED GY, F-MED F
GR, SUB RD - SB ANG, MOD-P
SRT, ARG CMT, SL CALC

Mud Wt. 8.95/ Mud Vis. 31

70% SLTY SH: MED - DK GY, OCC
TAN, V F GR, FRI- BRIT, SUB PLTY
SUB BLKY, SL CALC,
30% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX



MD: 5,340
TVD: 5,272.17
Inclination: 0.7 °
Azimuth: 240.7 °
VS: -79.77 '

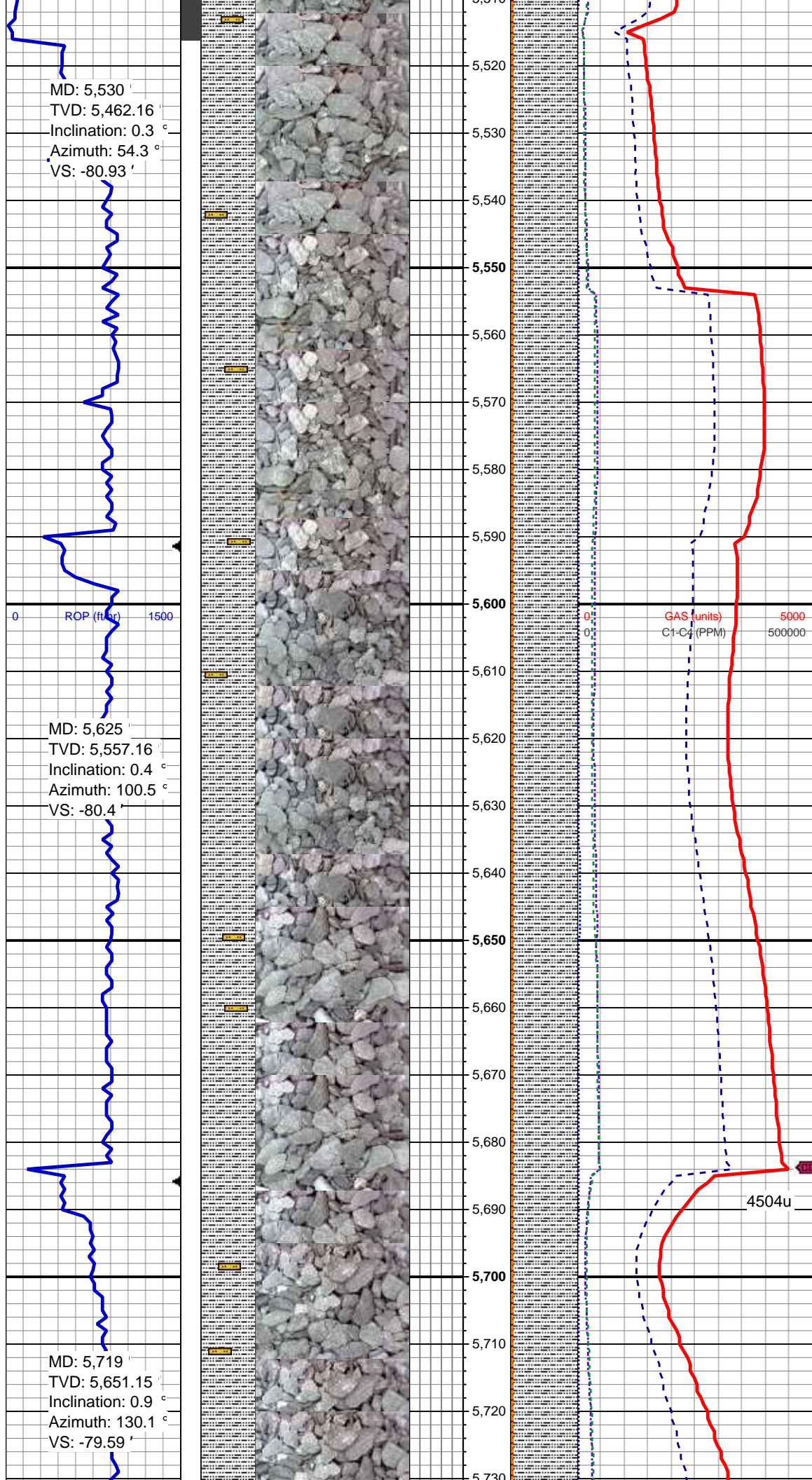
MD: 5,435
TVD: 5,367.16
Inclination: 0.8 °
Azimuth: 211.8 °
VS: -80.73 '

Mud Wt. 9.0/ Mud Vis. 31

80% SLTY SH: MED - DK GY, OCC
TAN, V F GR, FRI- BRIT, SUB PLTY
SUB BLKY, SL CALC,
20% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX

Mud Wt. 9.0/ Mud Vis. 31

90% SLTY SH: MED - DK GY, OCC
TAN, V F GR, FRI- BRIT, SUB PLTY
SUB BLKY, SL CALC,
10% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX



MD: 5,530 '
TVD: 5,462.16 '
Inclination: 0.3 °
Azimuth: 54.3 °
VS: -80.93 '

MD: 5,625 '
TVD: 5,557.16 '
Inclination: 0.4 °
Azimuth: 100.5 °
VS: -80.4 '

MD: 5,719 '
TVD: 5,651.15 '
Inclination: 0.9 °
Azimuth: 130.1 °
VS: -79.59 '

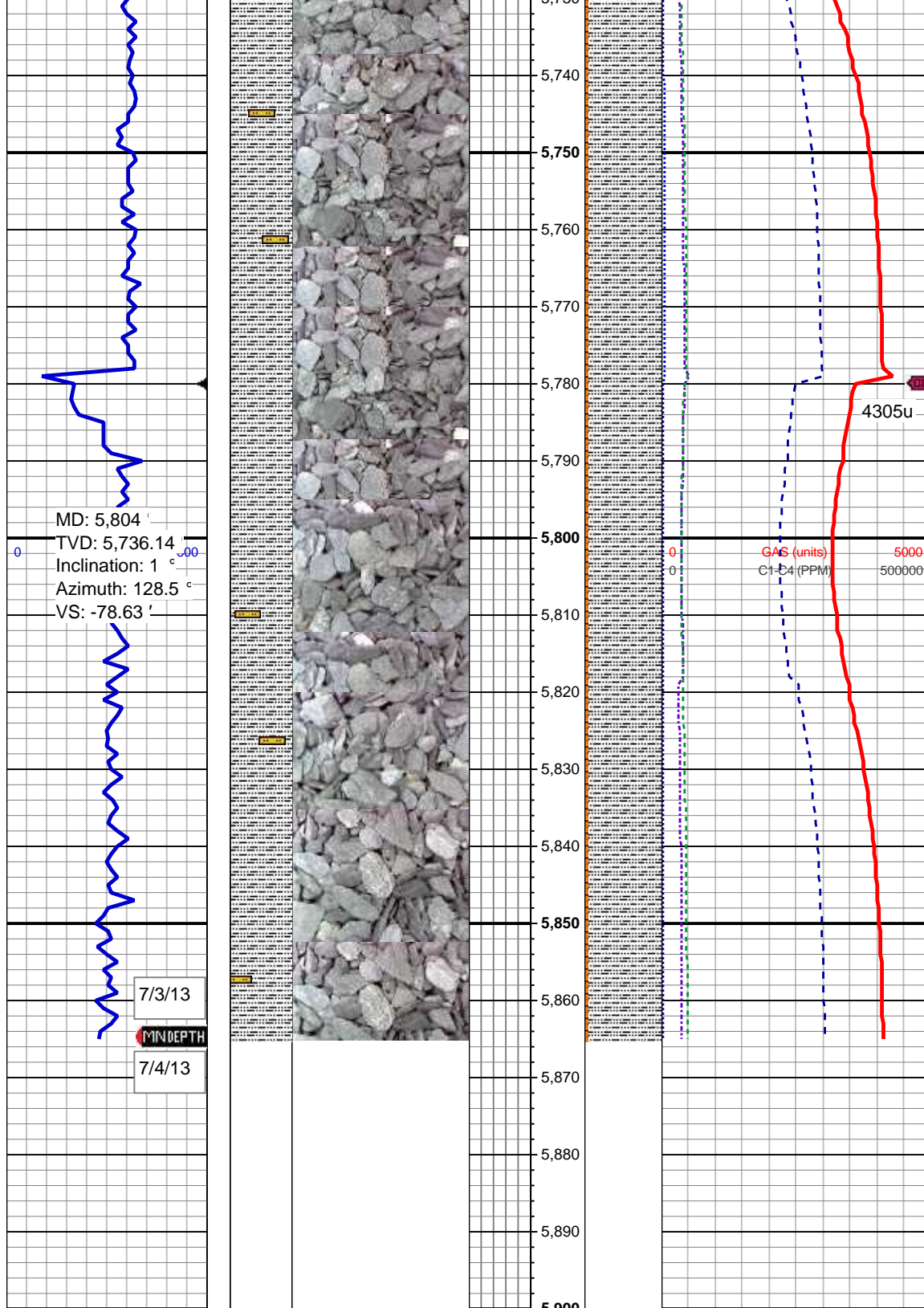
95% SLTY SH: MED - DK GY, OCC
TAN, V F GR, FRI- BRIT, SUB PLTY
SUB BLKY, SL CALC,
5% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX

Mud Wt. 9.2/ Mud Vis. 33

95% SLTY SH: MED - DK GY, OCC
TAN, V F GR, FRI- BRIT, SUB PLTY
SUB BLKY, SL CALC,
5% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX

GAS (units)
C1-C4 (PPM)

4504u



95% SLTY SH: MED - DK GY, OCC
TAN, V F GR, FRI- BRIT, SUB PLTY
SUB BLKY, SL CALC,
5% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX

Mud Wt. 9.2/ Mud Vis. 33

95% SLTY SH: MED - DK GY, OCC
TAN, V F GR, FRI- BRIT, SUB PLTY
SUB BLKY, SL CALC,
5% SHY SLTST: LT-MEDGY, OCC
DK GY, F-VFG, SB RD- SB ANG,
MOD SRT, ARG MTX

TD VERTICAL @ 5865' MD
07/03/2013 21:44 MST

LOG CONTINUES ON MPlot
NAKAGAWA B13-64-1HN
HORIZONTAL

THANK YOU FOR USING
COLUMBINE LOGGING INC.