



Scale: 5" / 100'
Measured Depth Log

Well Name Five Rivers K09-66-1HN

Location SWNW SEC 9, T4N, R66W

State COLORADO County WELD

Country USA Rig Number H&P 330

API Number 05-123-39482 Field WATTENBERG

Region DJ BASIN Drilling Completed 8/12/2014

Spud Date 8/6/2014

Surface Coordinates 2105' FNL, 512' FWL

Bottom Hole Coordinates 219' FSL, 4865' FWL

Ground Elevation 4699' K.B. Elevation 4729'

Logged Interval 6225' To 12018 Total Depth 12018'

Formation NIOBRARA A CHALK

Type of Drilling Fluid LSND

Operator

Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202

Geologist

Name RENEE CLACKLER

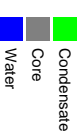
Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202



















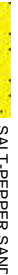











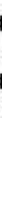

Other

WELL SITE GEOLOGIST ANDREA ZUIDEMA
JESSICA SILVEY


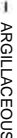

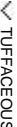
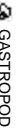

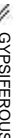



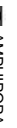


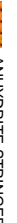


































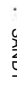





Zone Color Coding



Rock Types

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









Accessories

 F FOSSIL	 ARGILLACEOUS	 GLAUCONITE	 TUFFACEOUS
 GASTROPOD	 ARGILLITE GRAIN	 GYPSIFEROUS	
 ALGAE	 B BENTONITE	 HEAVY MINERAL	
 AMPHIPORA	 BITUMENOUS SUBSTANCE	 INOCERAMUS	 ANHYDRITE STRINGER
 BELEMNITE	 BRECCIA FRAGMENTS	 K KAOLIN	 BENTONITE STRINGER
 BIOCLASTIC	 C CALCAREOUS	 M MARLSTONE	 COAL STRINGER
 BRACHIOPOD	 CARBONACEOUS FLAKES	 MINERAL CRYSTALS	 DOLOMITE STRINGER
 BRYOZOA	 CHTDK	 N NODULES	 GYPSUM STRINGER
 CEPHALOPOD	 CHTLT	 PHOSPHATE PELLETS	 LIMESTONE STRINGER
 CORAL	 COAL - THIN BEDS	 P PYRITE	 MARLSTONE (CALC) STRG
 CRINOID	 D DOLOMITIC	 S SALT CAST	 MARLSTONE (DOL) STRG
 ECHINOID	 F FELDSPAR	 S SANDY	 SANDSTONE STRINGER
 FISH	 FERRUGINOUS PELLET	 S SILICEOUS	 SHALE STRINGER
 FORAMINIFERA	 F FERRUGINOUS	 S SILTY	 SILTSTONE STRINGER

Minerals

Engineering

Oil Show

 MOLDIC	 O ORGANIC
 D DEAD	 P PINPOINT
 E EVEN	 V VUGGY
 Q QUESTIONABLE	
 S SPOTTED STAINING	

Porosity

 CONNECTION (LEFT)	 CONNECTION (RIGHT)
 E EARTHY	 F FENESTRAL
 F FRACTURE	 C CORE - LOST
 I INTERCRYSTALLINE	 C CORE - RECOVERED
 I INTEROOLITIC	 D DST INTERVAL

Stringer

Other Symbols

 FAULT  WIRELINE TESTED - LEFT **E** EARTHY

 FORMATION TOP  WIRELINE TESTED - RT **FX** FINELYXLN

 GAS SHOW **GS** GRAINSTONE

Rounding

 **MINDEPTH** MN DEPTH **L** LITHOGRAPHIC

 NORMAL FAULT **A** ANGULAR **MX** MICROXLN


 OIL SHOW **R** ROUNDED **MS** MUDSTONE

 OVERTURNED STRATA **B** SUBANG **PS** PACKSTONE

 REVERSE FAULT **F** SUBRND **WS** WACKESTONE

 SIDEWALL CORE (LEFT)


Textures

 SIDEWALL CORE (RIGHT)

Sorting

 SLIDE **BS** BOUNDSTONE **M** MODERATE

 **DS** SURVEY **C** CHALKY **P** POOR

 TRIP GAS **CX** CRYPTOXLN **W** WELL

Slide/Rotate

ROP

ROP

Total Gas & Chromatograph

GAS

C1

C2

C3

C4

BEGAN DRILLING CURVE
@ 09:38 AM on 08/08/2014

50' Sample Interval

COLUMBINE LOGGING INC.
RIGGED UP ON 08/06/2014
MANNED 2-PERSON LOGGING
WITH BLOODHOUND GAS
CHROMATOGRAPH UNIT #0595
COLUMBINE BEGAN LOGGING
ON 08/07/2014

Depth Labels

% Lith

Gamma

GAMMA

Well Bore
TVD

Oil Show

Images

ROP (ft/hr)
4000
400000

GAS (units)
C1-C4 (PPM)

AGITATOR UNPLUGGED

2424u

2495u

2878u

C1: 96.8%
C2: 01.9%
C3: 00.9%
C4: 00.4%

MUD WT 10.20 VIS 37

MD: 6.263 '
TVD: 6.223.36 '
Inclination: 3.38 °
Azimuth: 79.49 °
VS: -430.92 '

MUD WT 10.2

MD: 6.312 '
TVD: 6.272.24 '
Inclination: 4.51 °
Azimuth: 88.54 °
VS: -427.59 '

TVD (ft)

SLTY SH: gy - med gy, sme
dk gy, sft, sb blk y - sb pty, tr
pty, arg - rthy mtx, non calc,
tr shy ss

SLTY SH: gy - med gy, sme dk gy, sft, sb
blk y - sb pty, tr pty, arg - rthy mtx, non calc, tr
shy ss

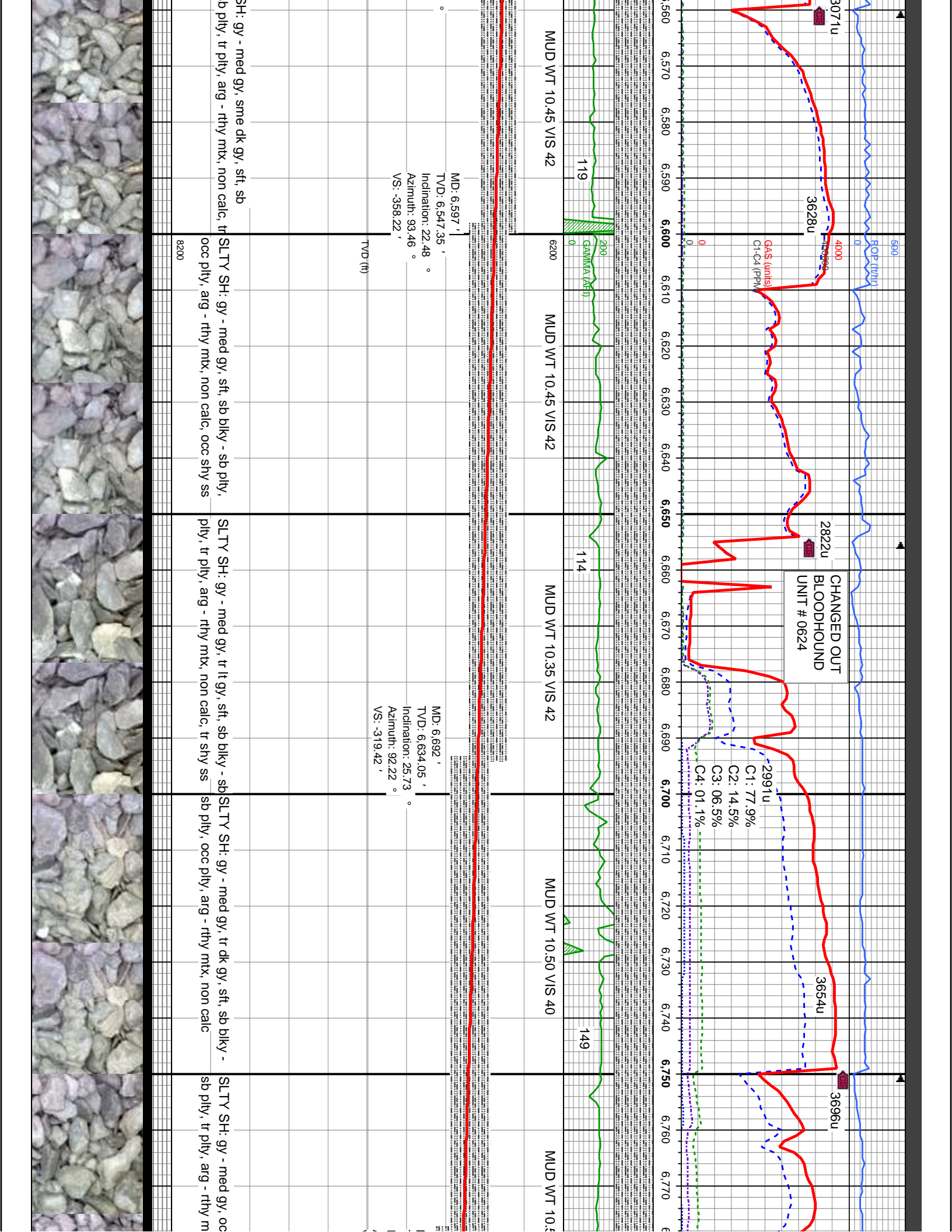
SLTY SH: gy - med gy, sme dk gy,
blk y - sb pty, tr pty, arg - rthy mtx,
shy ss

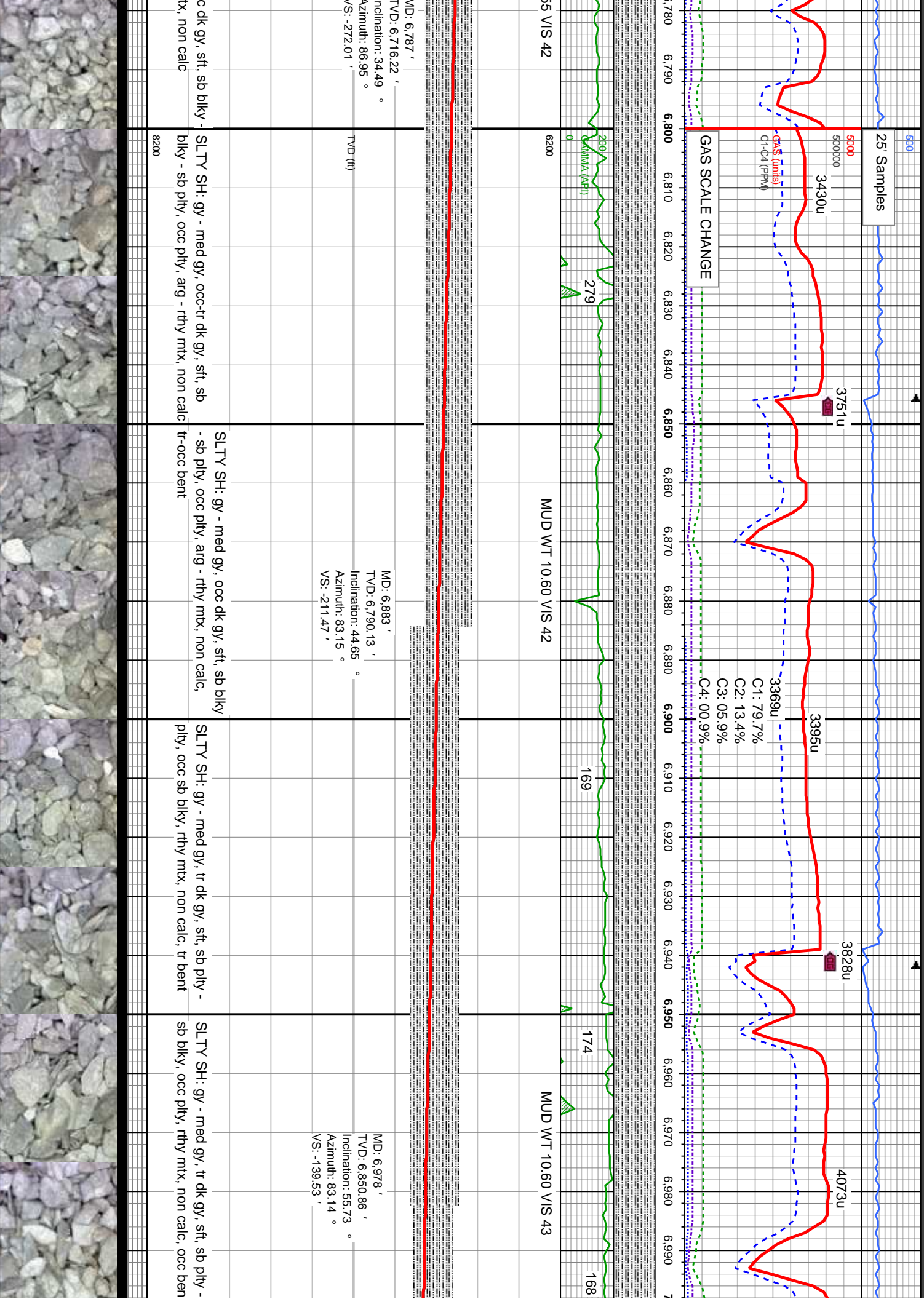
Acetone was used as the cutting
agent with the dimple filled to the rim

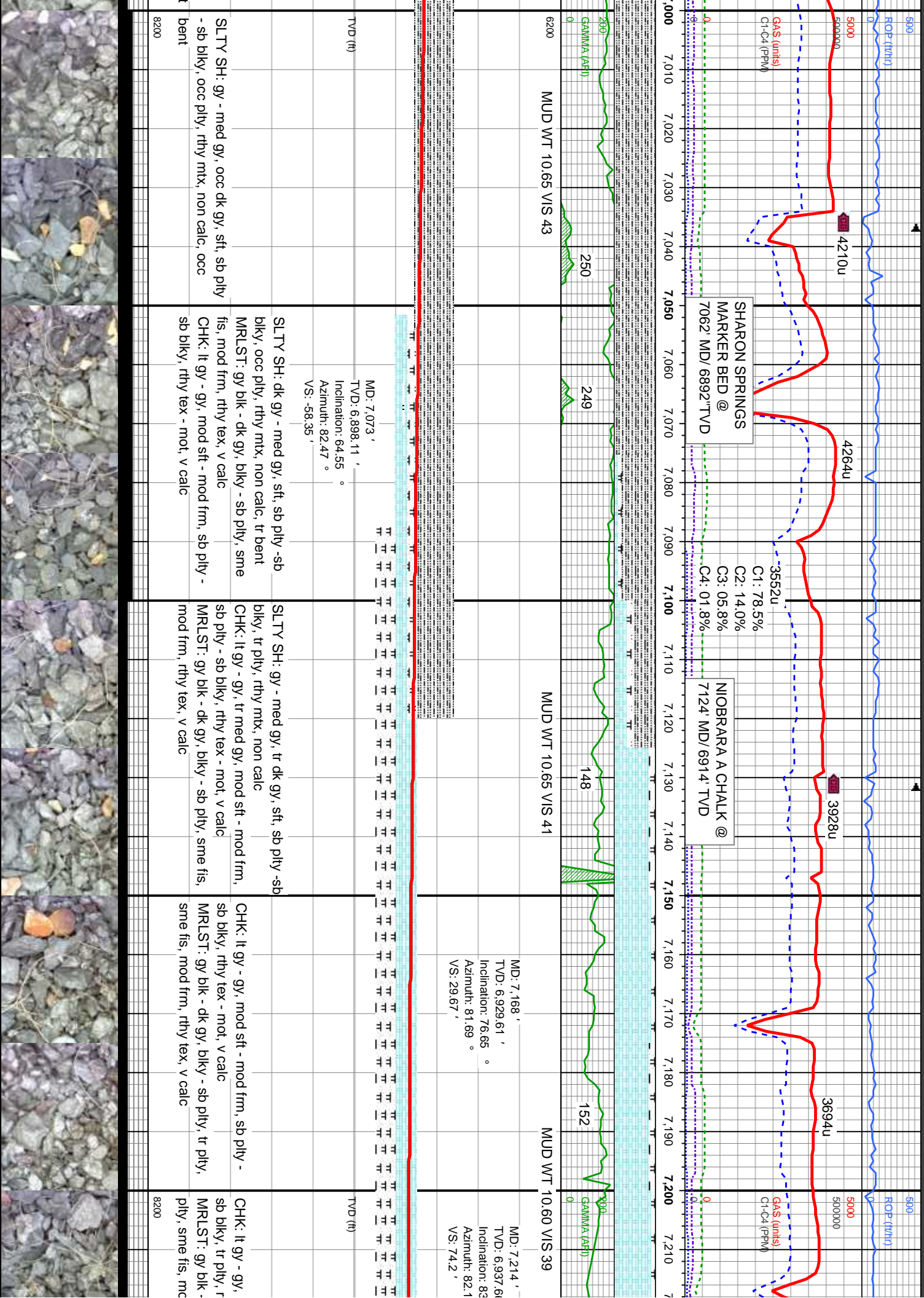
The ratings are based on 7 descriptors:
None, Slight trace, Trace, Fair, Moderate,
Good, and Excellent. The descriptor used
is based on the loggers observations and
best judgment of brilliance, color and
longevity of the cut.

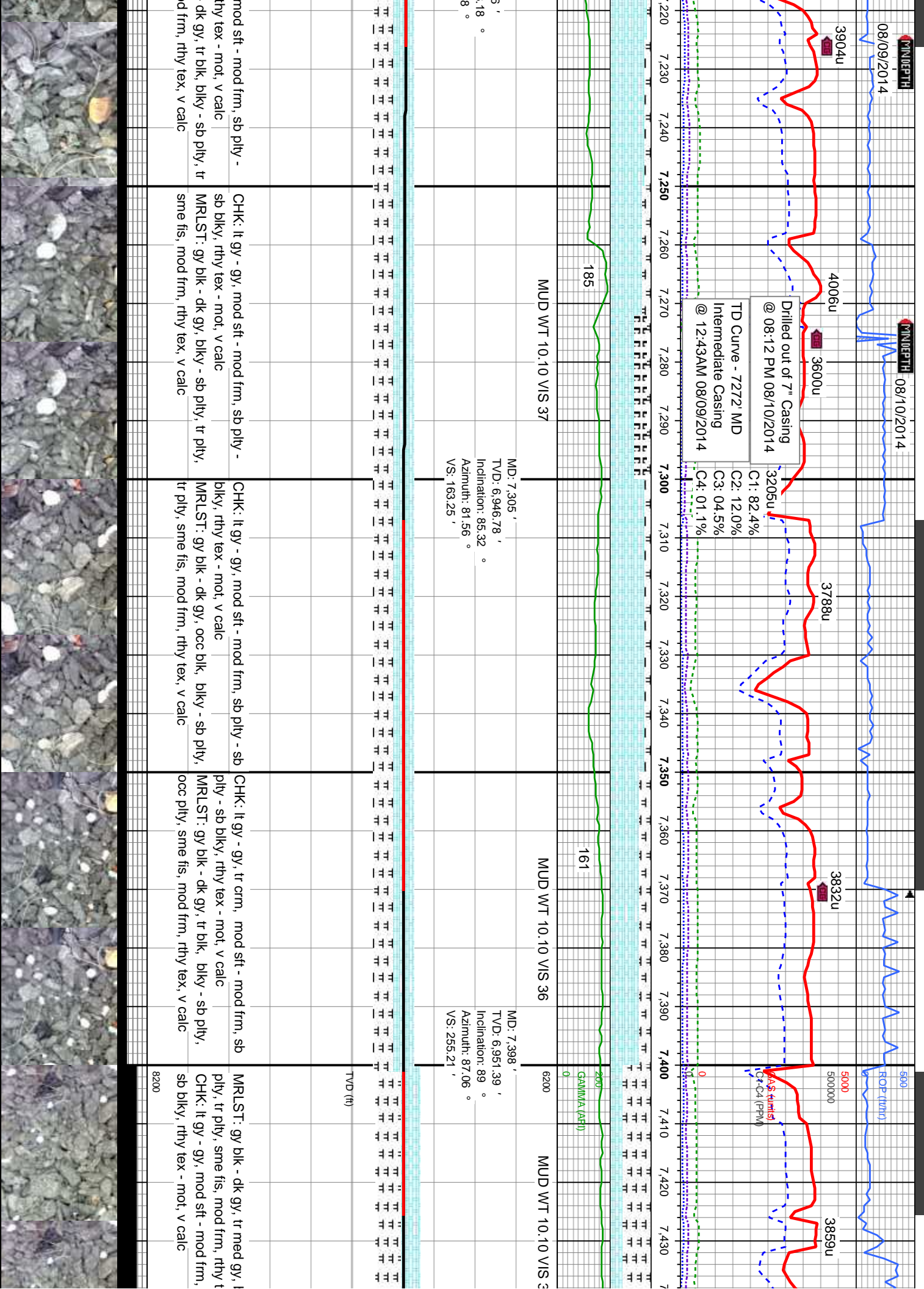
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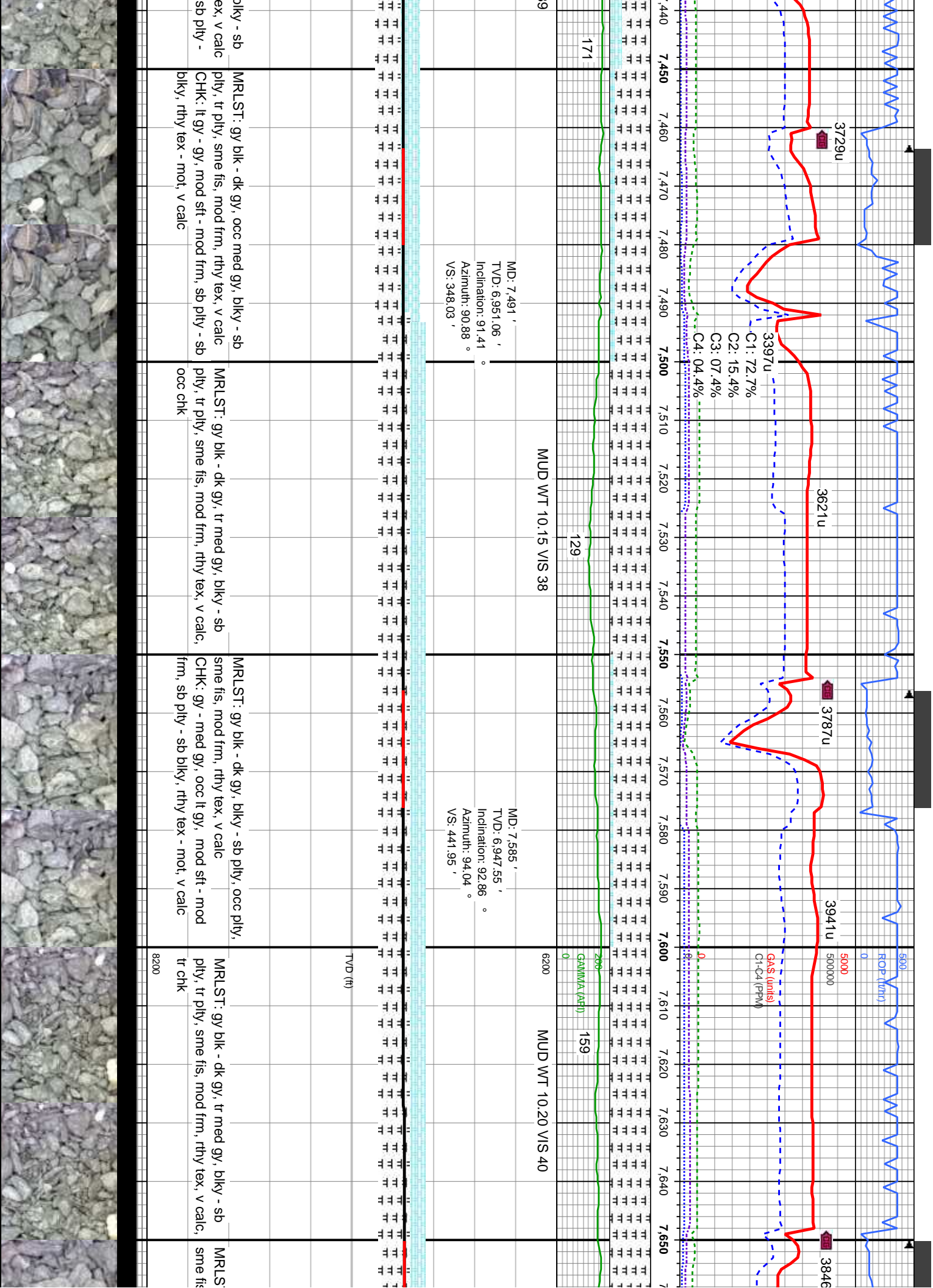






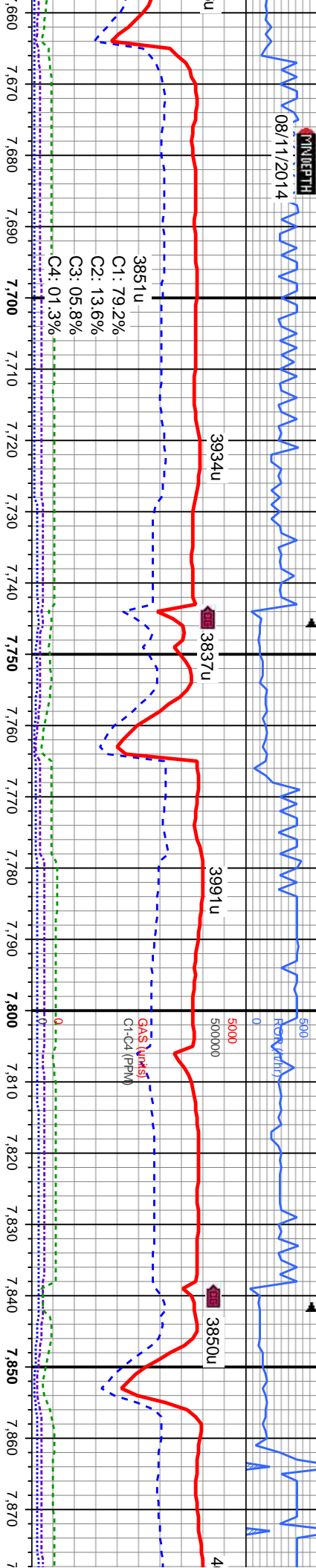






PN100PT4

08/11/2014



MUD WT 10.20 VIS 40

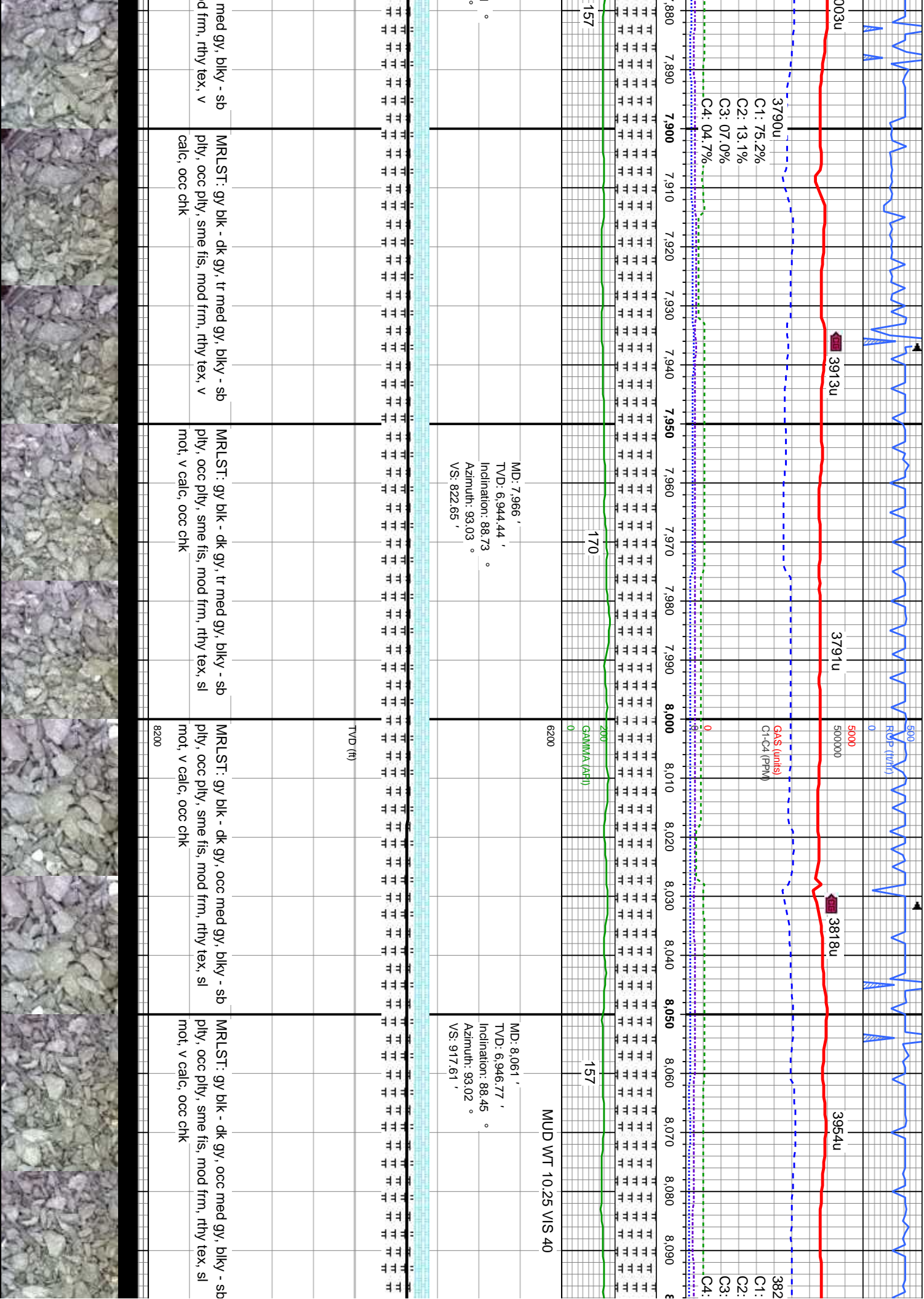
MD: 7,680 '
TVD: 6,943.44 '
Inclination: 92.1 °
Azimuth: 93.25 °
VS: 536.83 '

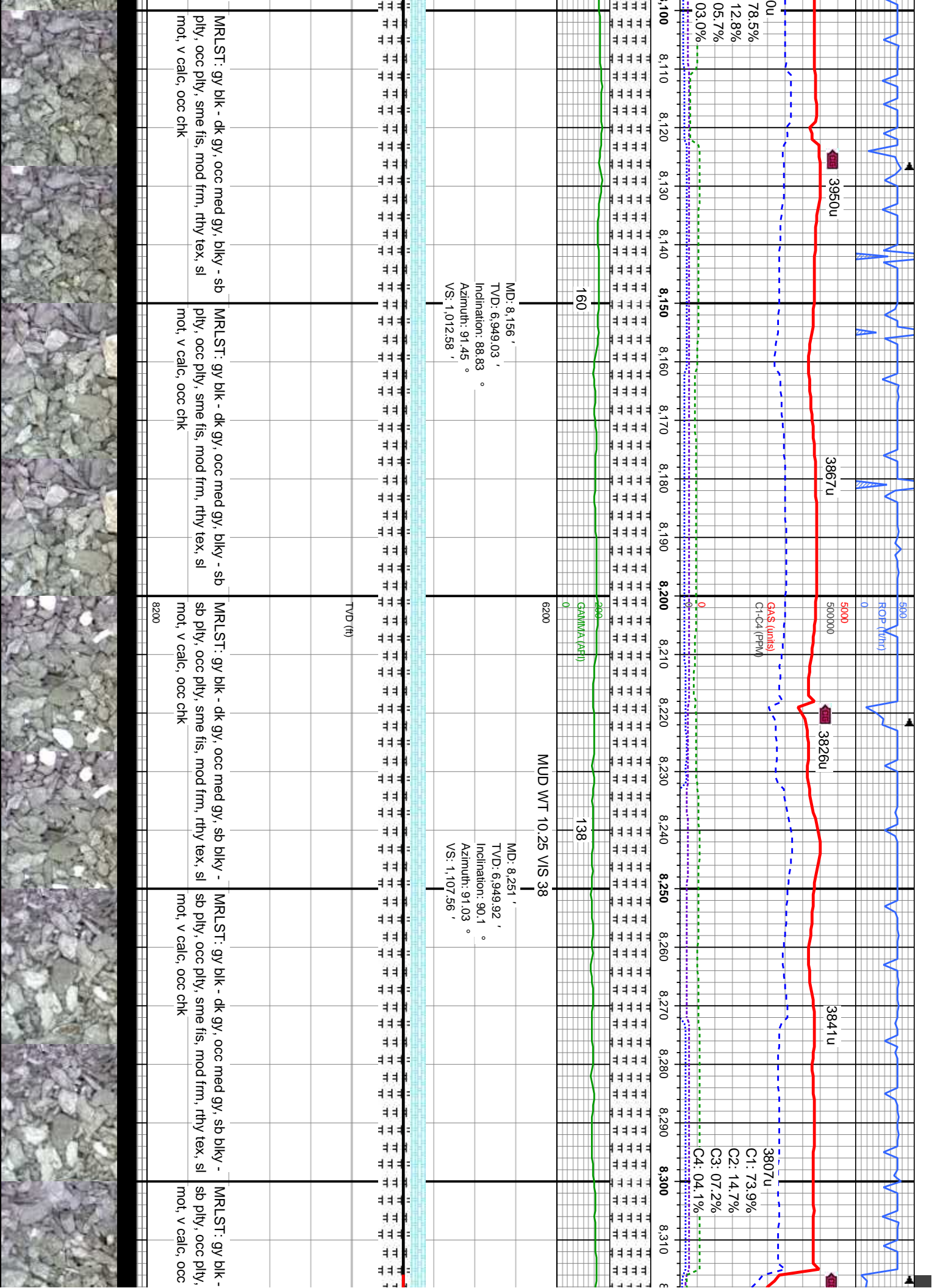
MD: 7,776 '
TVD: 6,940.96 '
Inclination: 90.86 °
Azimuth: 94.22 °
VS: 632.77 '

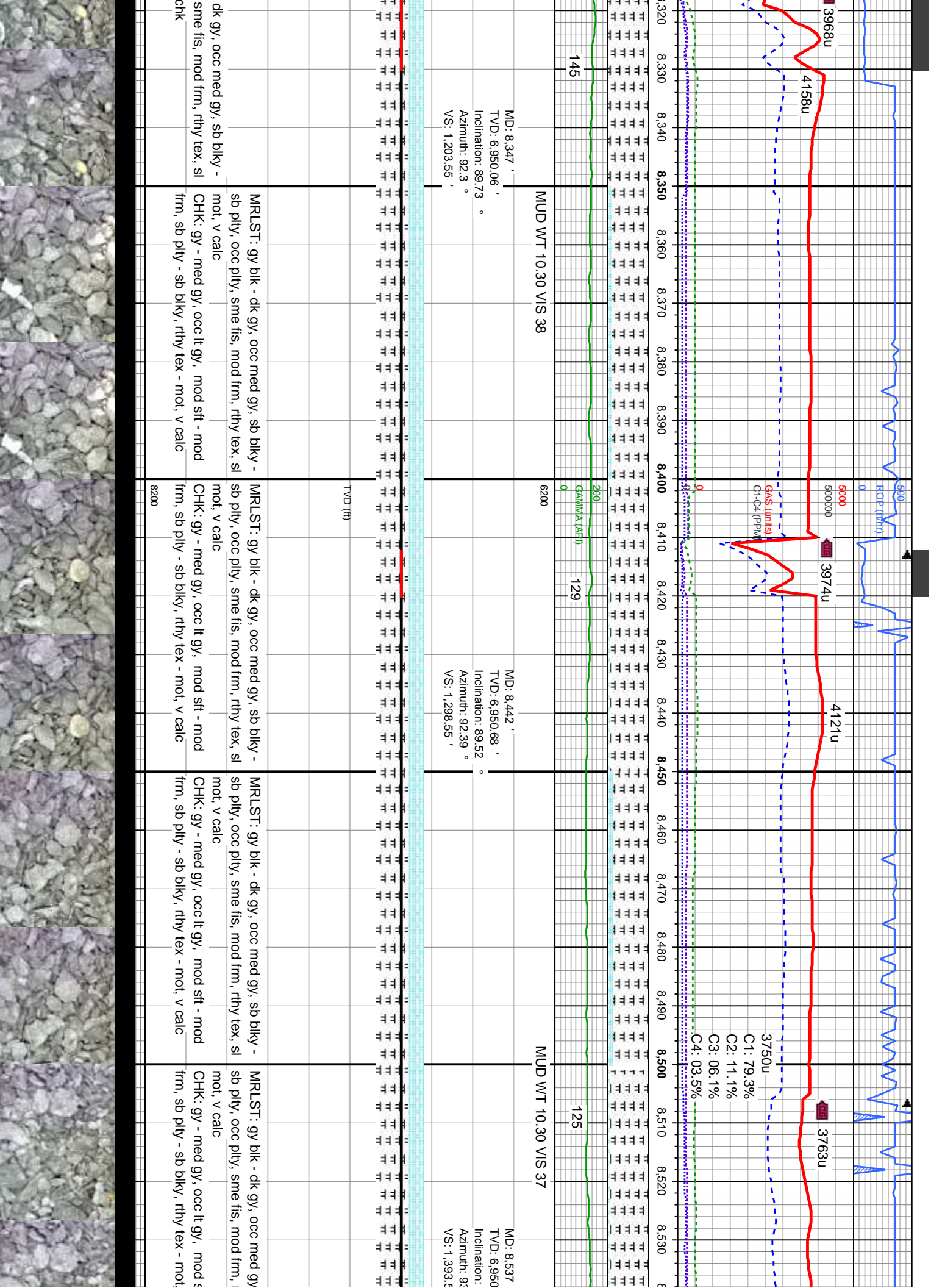
MD: 7,871 '
TVD: 6,941.82 '
Inclination: 88.1 °
Azimuth: 93.82 °
VS: 727.71 '

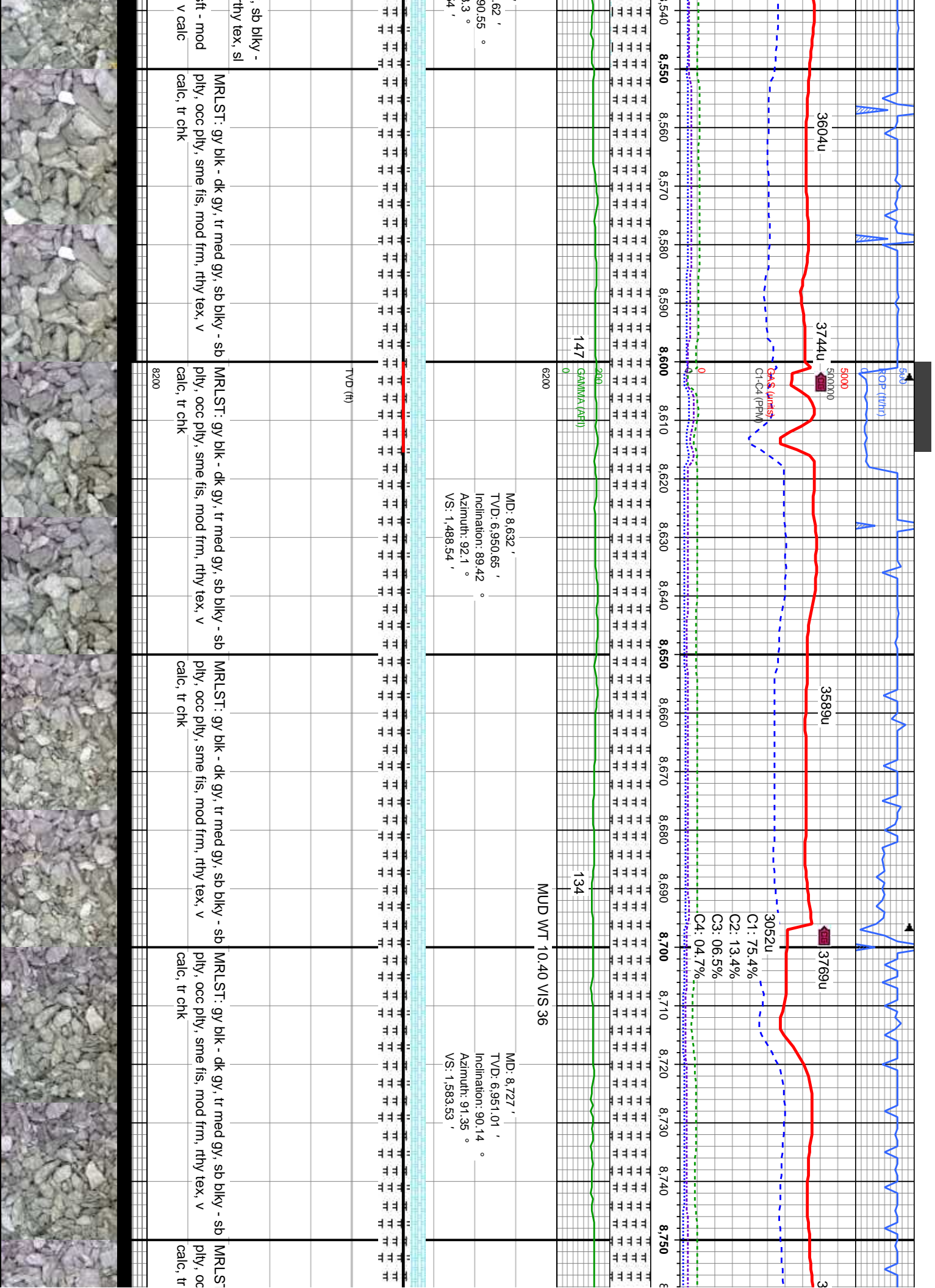
TVD (ft)

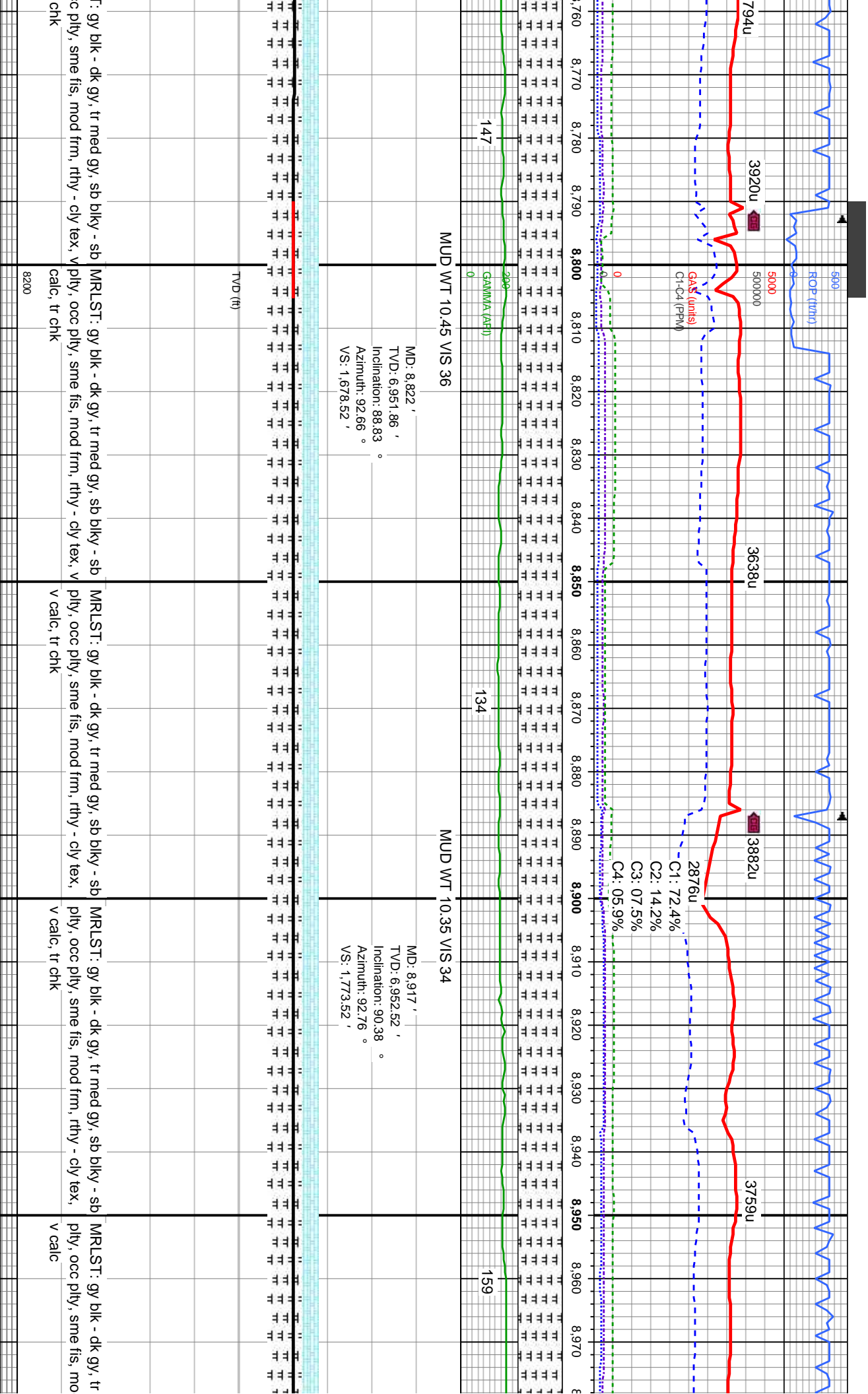
T: gy blk - dk gy, blk - sb pty, occ pty, s, mod frm, rthy tex, v calc, occ chk
MRLST: gy blk - dk gy, tr blk, blk - sb pty, occ pty, sme fis, mod frm, rthy tex, v calc, tr chk
MRLST: gy blk - dk gy, tr med gy, blk - sb pty, tr pty, sme fis, mod frm, rthy tex, v calc, tr chk
MRLST: gy blk - dk gy, blk - sb pty, sme fis, mod frm, rthy tex, v calc, tr chk
MRLST: gy blk - dk gy, tr pty, occ pty, sme fis, mod frm, rthy tex, v calc, occ chk

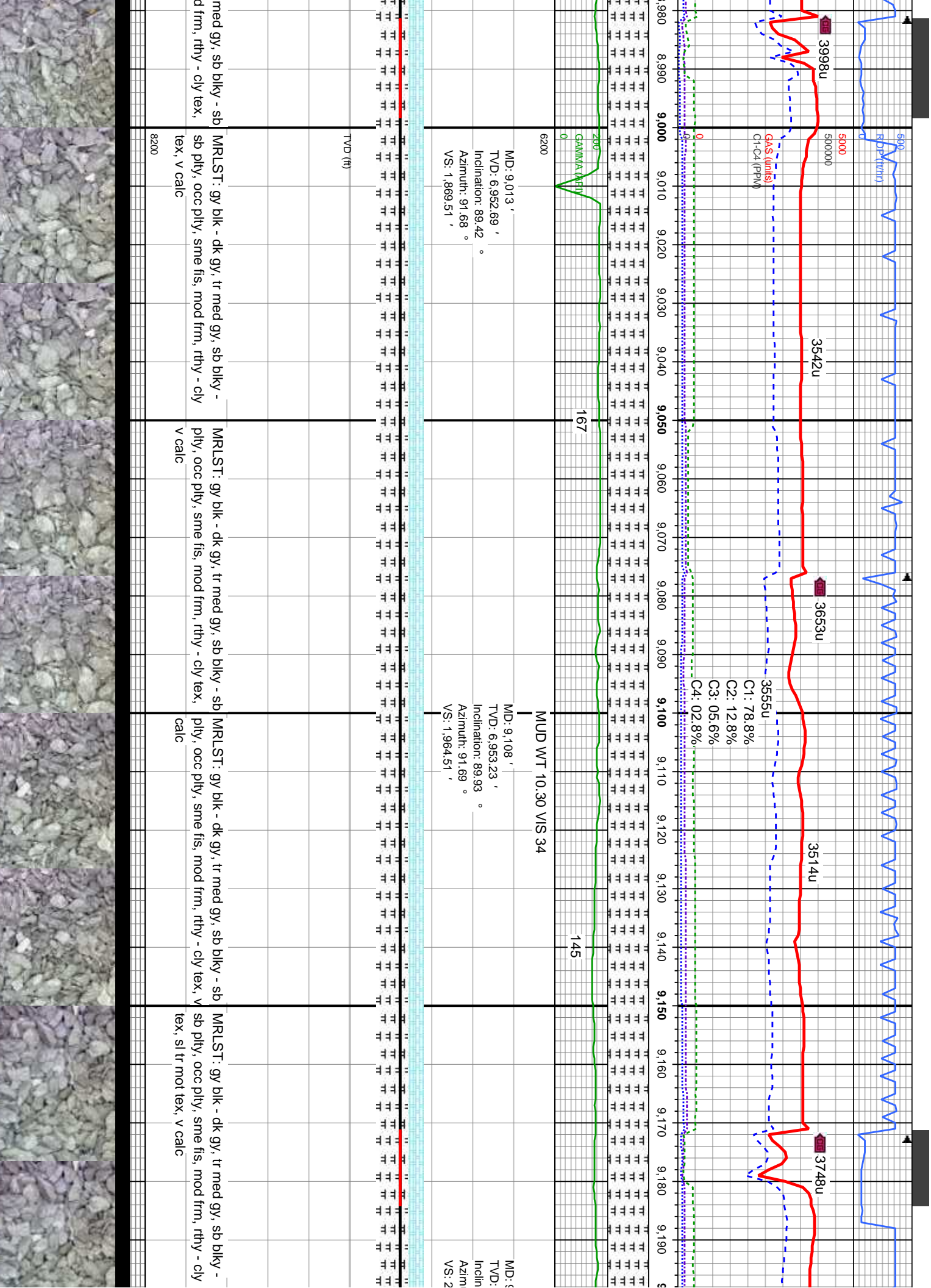


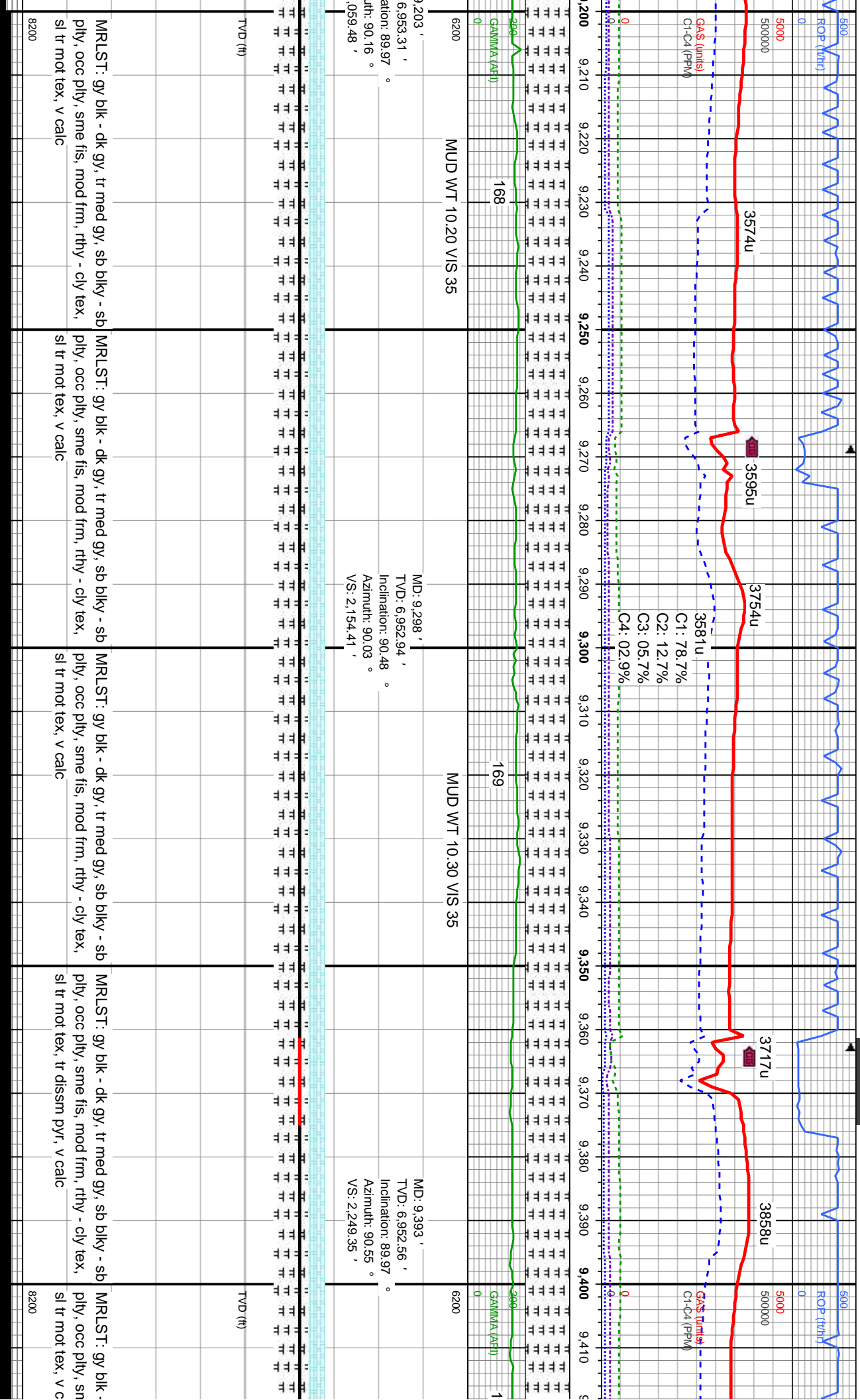


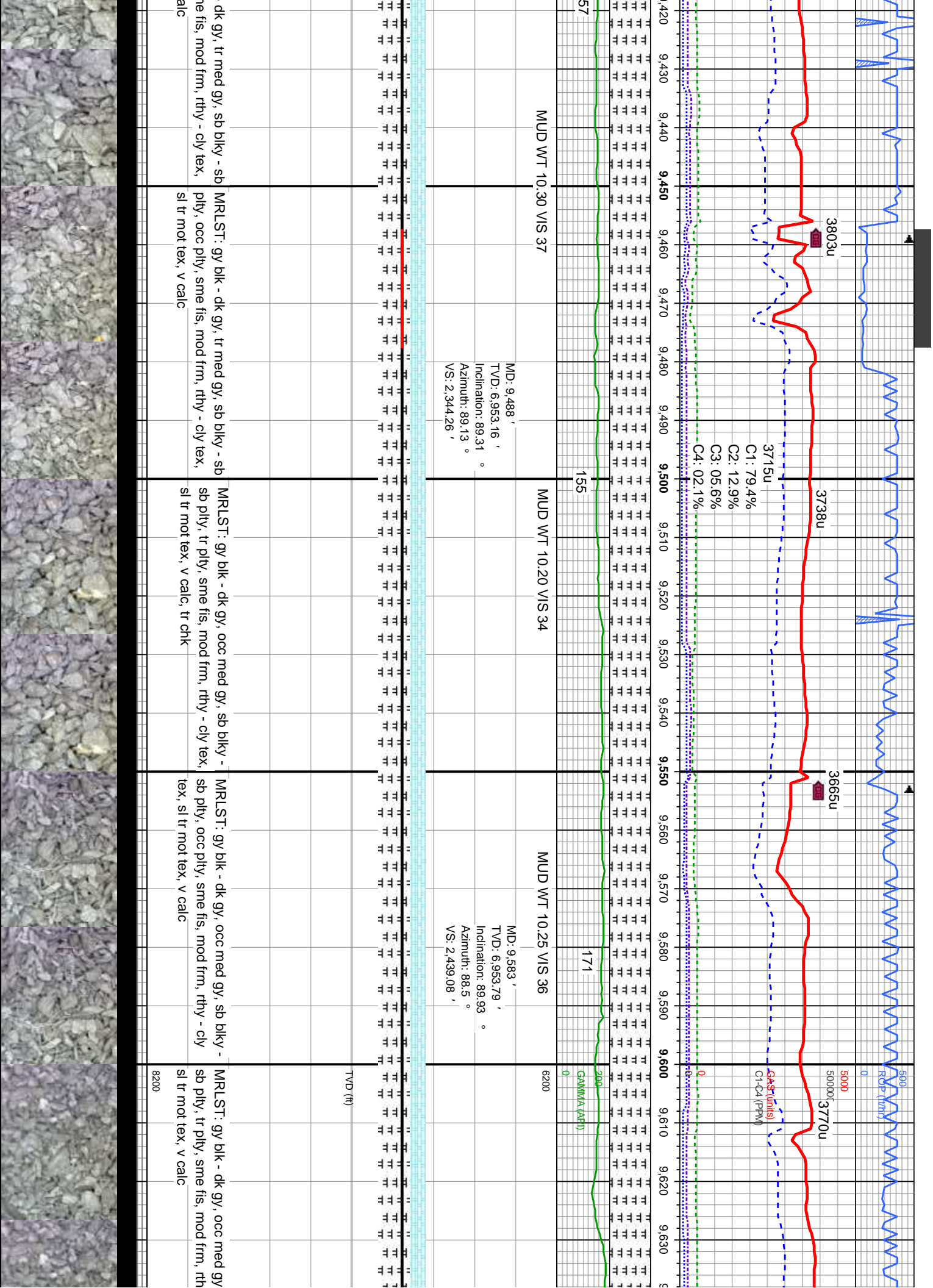


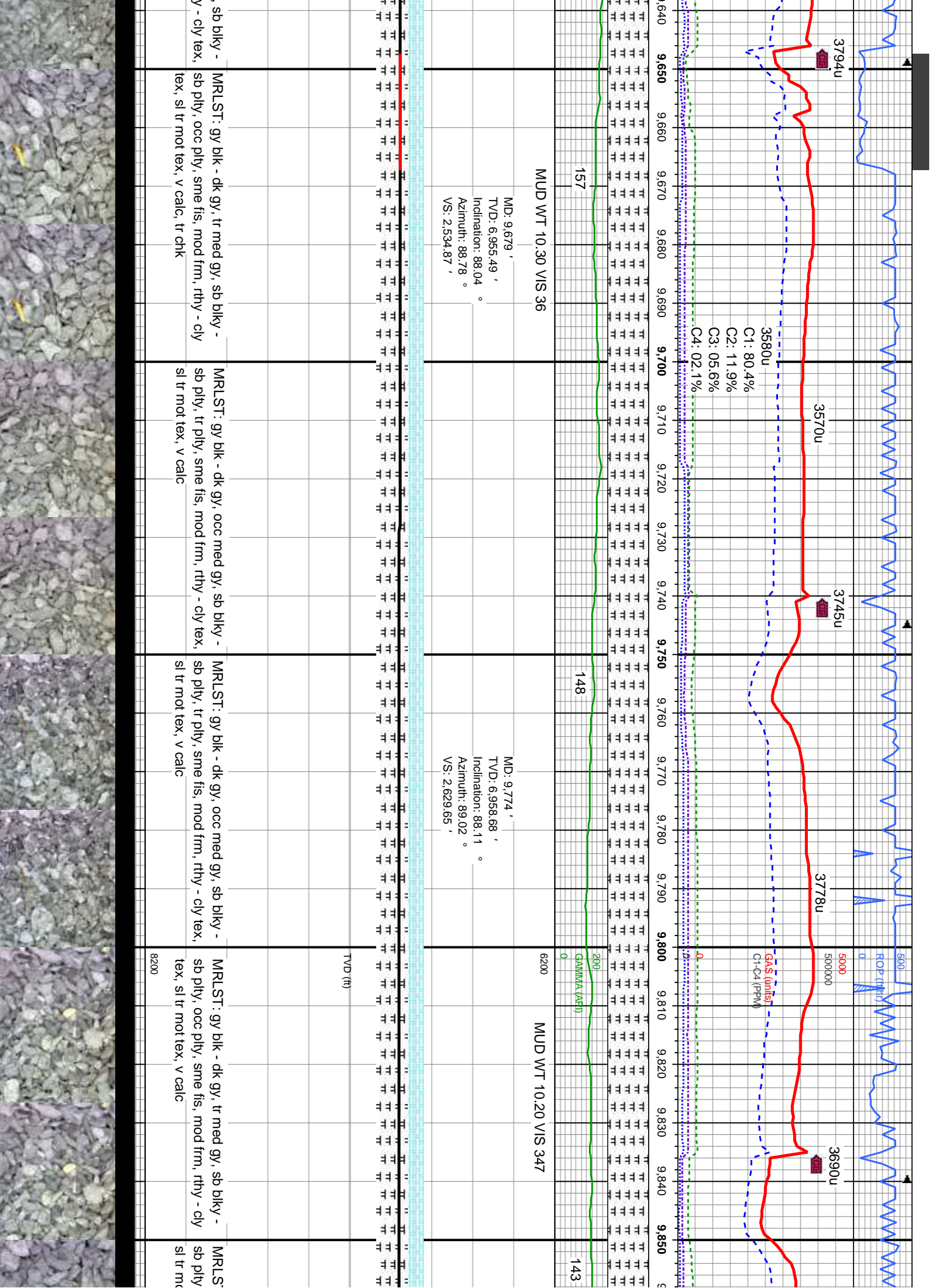


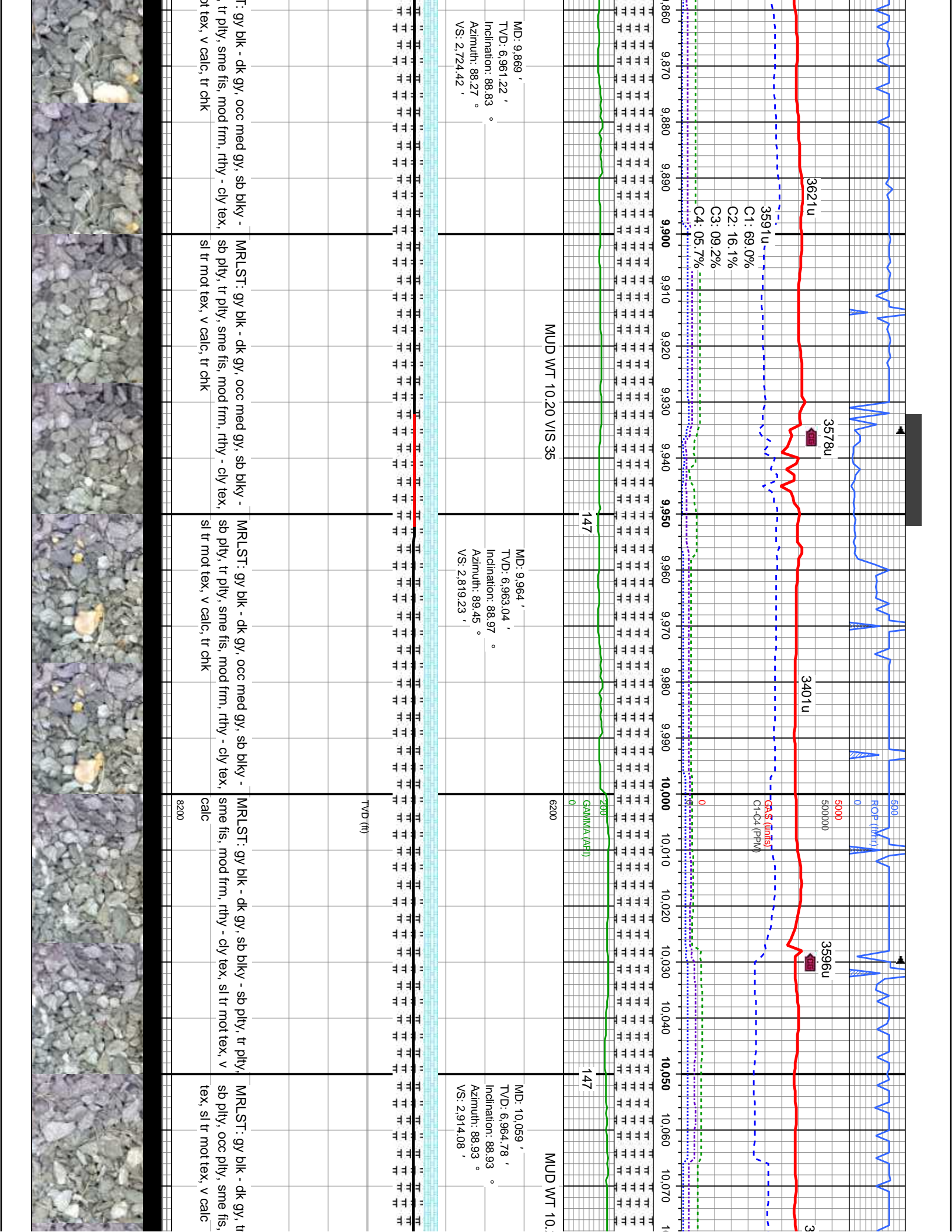


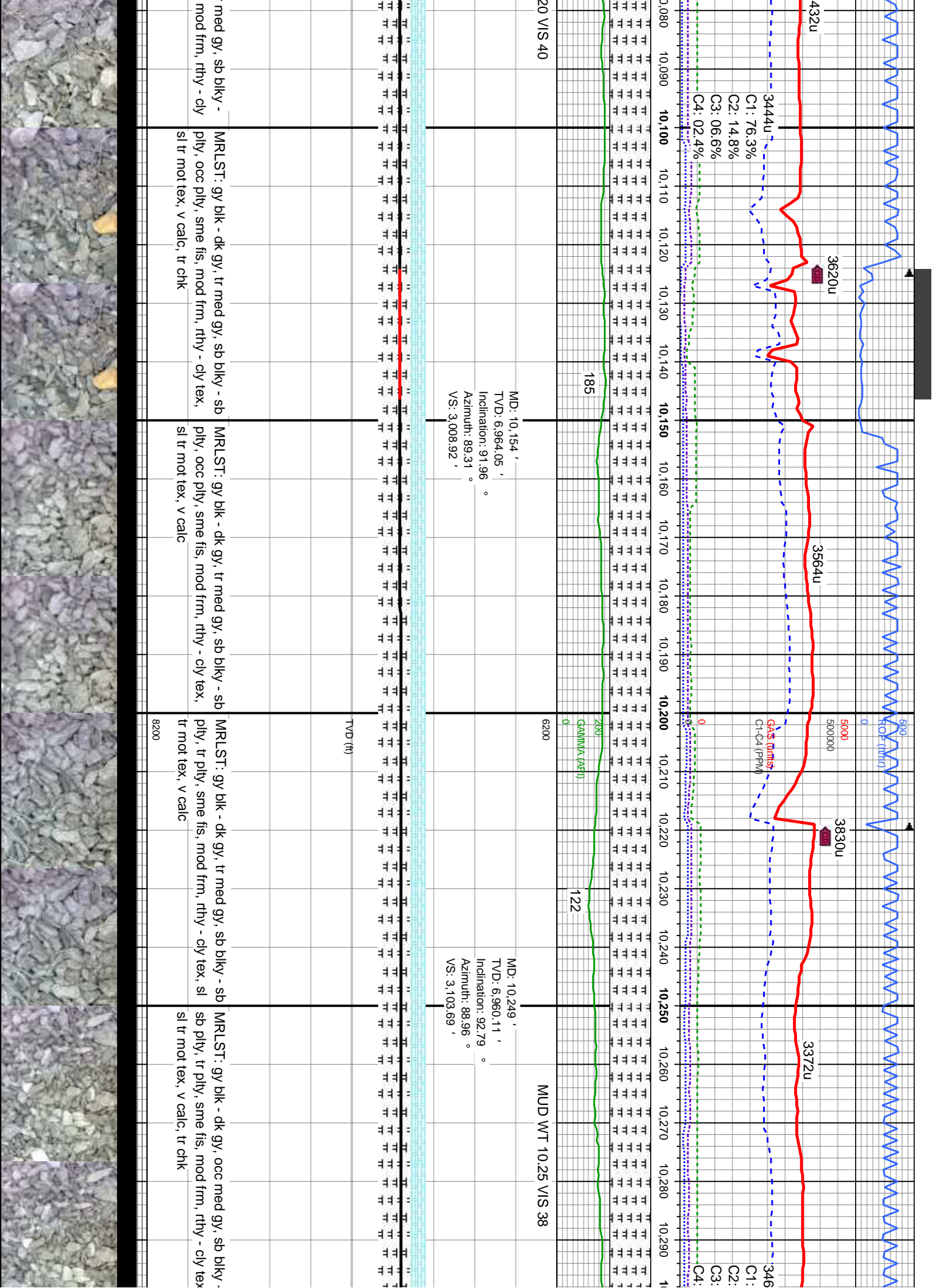








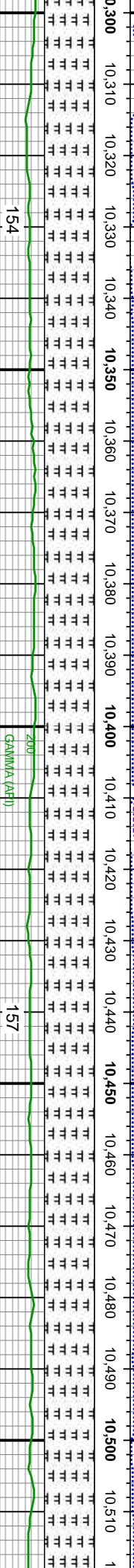




3615u 3452u 3699u 3514u 3635u 3199u

2u 74.8% 14.6% 07.2% 03.4%

C1: 81.2%
C2: 10.5%
C3: 06.0%
C4: 02.4%



MUD WT 10.30 VIS 36

MUD WT 10.20 VIS 38

MUD

MD: 10,345 '
TVD: 6,956.62 '
Inclination: 91.38 °
Azimuth: 89.26 °
VS: 3,199.48 '

MD: 10,440 '
TVD: 6,954.84 '
Inclination: 90.76 °
Azimuth: 91.22 °
VS: 3,294.4 '

TVD (ft)

MRLST: gy blk - dk gy, tr blk, sb blk - sb pily, tr pily, sme fis, mod frm, rthy - cly tex, sl tr mot tex, v calc

MRLST: gy blk - dk gy, tr blk, occ med gy, sb blk - sb pily, tr pily, sme fis, mod frm, rthy - cly tex, sl tr mot tex, v calc

MRLST: gy blk - dk gy, occ med gy, sb pily, tr pily, sme fis, mod frm, rthy - cly tex, sl tr mot tex, v calc

MRLST: gy blk - dk gy, occ med gy, sb blk - sb pily, occ pily, sme fis, mod frm, rthy - cly tex, sl tr mot tex, v calc

MRLST: gy blk - tr pily, sme fis, r mot tex, v calc



