



Scale: 6.98" / 100'
Measured Depth Log

Well Name Sandau K25-66-1HN

Location SEC 25 T4N R66W

State Colorado

Country USA

API Number 05-123-37764

Region DJ Basin

Spud Date 2/17/2014

Surface Coordinates 40.28214, 104.73374
2332' FSL x 318' FWL

Bottom Hole Coordinates 40.28474, 104.7158
2210' FNL x 75' FEL

Ground Elevation 4780'

Logged Interval 6488' **To** 12230'

Formation Nio C chalk

Type of Drilling Fluid FW LSND

County Weld

Rig Number Precision Drilling 829

AFE # 136987

Field Hambert

Drilling Completed 3/1/2014

K.B. Elevation 4796'

Total Depth 12230'

Company Noble Energy Inc
Address 1625 BROADWAY
DENVER, CO 80202

Name Holly Duncan
Company Noble Energy, Inc
Address 1625 BROADWAY
DENVER, CO 80202

Columbine Logging, Inc.
Well Site Geologists

Operator

c
AY
2022

Geologist

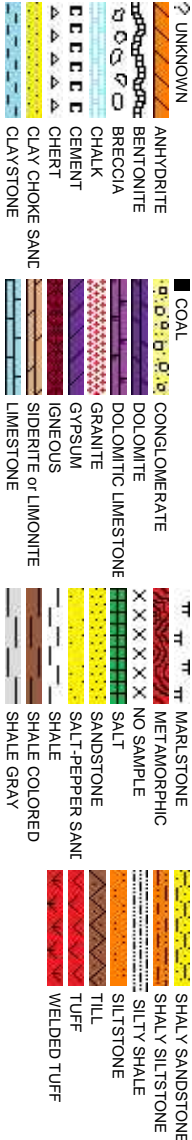
c.
AY
2022

Other

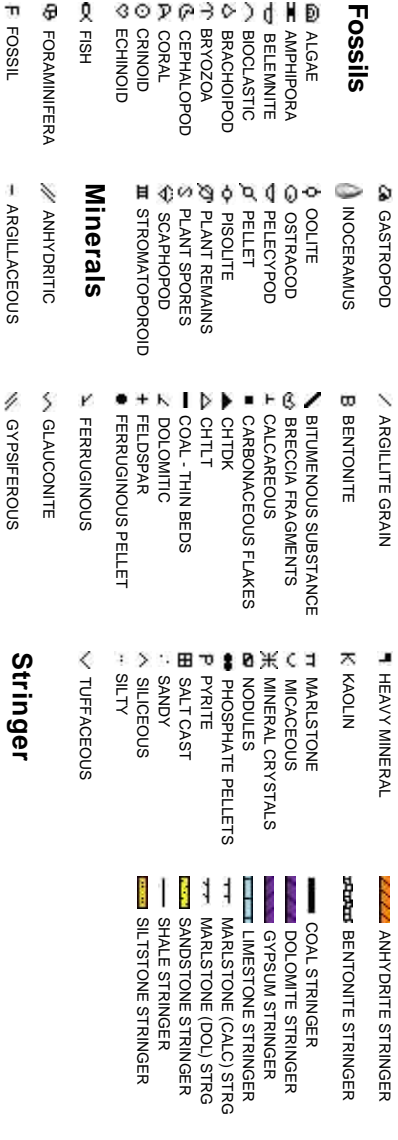
2385 S. LIPAN STREET
DENVER, CO 80223

Ryan Shilling
Whitney Jacks
Conor Pesicka

Rock Types



Accessories



Stringer

Other Symbols

Oil Show
P PINPOINT
V VUGGY

D DEAD
EVEN
QUESTIONABLE
Engineering

SPOTTED STAINING
CONNECTION (UP)
BIT

Porosity
CONNECTION (DOWN)

E EARTHY
F FENESTRAL
F FRACTURE
X INTERCRYSTALLINE
INTEROOLITIC
MOLDIC
ORGANIC
CONNECTION GAS
CONNECTION GAS (LEFT)
TRIP GAS
TRIP GAS (LEFT)
DOWN TIME GAS
DOWN TIME GAS (LEFT)
CORE - LOST
CORE - RECOVERED

DST INTERVAL
FAULT
FORMATION TOP
GAS SHOW
OIL SHOW
MN DEPTH UP
MN DEPTH (DOWN)

WIRELINE TESTED - LEFT
WIRELINE TESTED - RT
FINELYXLN
DRILL STEM TEST
MN DEPTH
MN DEPTH
E EARTHY
FX FINELYXLN
GS GRAINSTONE
L LITHOGRAPHIC
MX MICROXLN
MS MUDSTONE

Rounding

ANGULAR
PACKSTONE

NORMAL FAULT
OVERTURNED STRATA
REVERSE FAULT
SUBBANG
SUBBANG
SUBBANG

Textures

CASING
SIDEWALL CORE (LEFT)
SIDEWALL CORE (RIGHT)
SLIDE
SURVEY
BOUNDSTONE
CHALKY
CRYPTOXLN
P POOR
W WELL

Sorting

M MODERATE

Slide/Rotate

ROP
ROF
GAMMA

ROP Scale
0-500 ft/hr

Gamma Scale
0 - 200 API

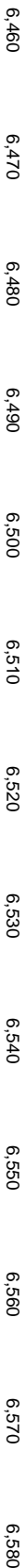
Gas Scale
0 - 5000 units

Total Gas & Chromatograph

GAS
C1
C2
C3
C4

COLUMBINE LOGGING, INC.
RIGGED UP ON 02/18/2014
MANNED 2-PERSON LOGGING
WITH BLOODHOUND GAS
CHROMATOGRAPH UNIT # 0715

Depth Labels



% Lith

TVD SCALE
6300'-7300'

Well Bore
TVD

Bit Data
Bit #: 2
Type: MMM63
Size: 8.75
Depth In: 671 '
Depth Out: 6,904 '
Jets: 6x13
S/N: 12352023

Log Continues From
Sandau K25-66-1HN-HORZ

Oil Show

exc
mod
1"
1"
sl

Images



85% SLTY SH: lt-med gy, sft-sl frm, fri, sb ply-blky, v' gr, silty tex, rthy lstr, sl
calc; 15% SHY SS: wh-lt gy, s&p, blkly, frm, v f' gr, sb rnd-ang, mod-w srt,
cl sup, cly cnt, non calc

MD: 6,532 '
TVD: 6,465.5 '
Inclination: 3.6 °
Azimuth: 82 °
VS: -133.61 '

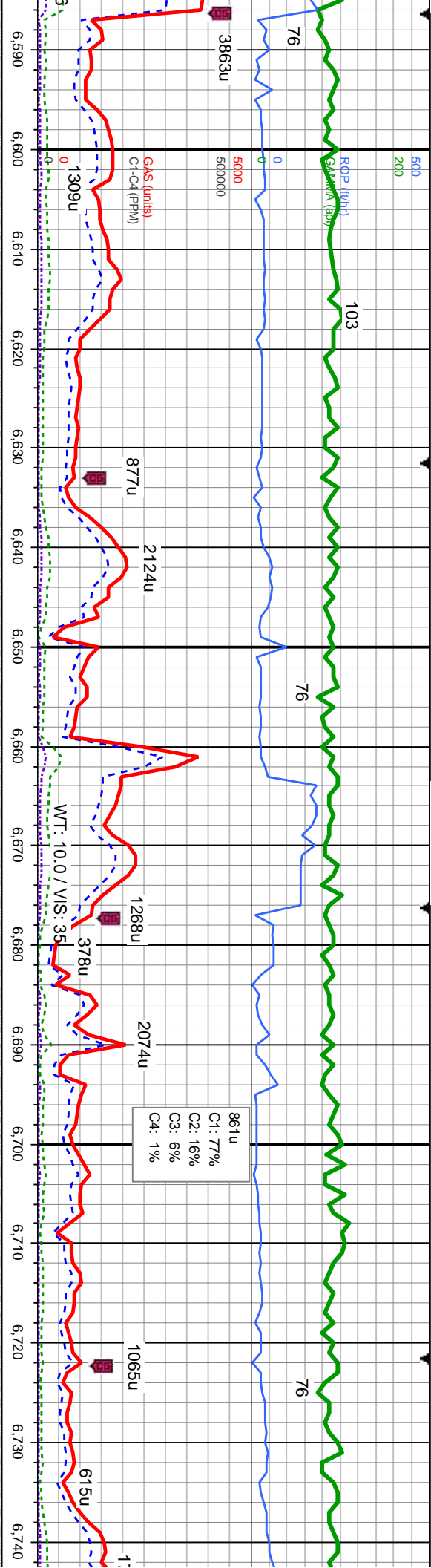
80% SLTY SH: lt-med gy, sft-sl frm, fri, sb ply-blky,
rthy lstr, sl calc; 20% SHY SS: wh-lt gy, s&p, blkly, f
md-ang, mod-w srt, cl sup, cly cnt, non calc

KOP = 6488'

1520u
C1: 76%
C2: 16%
C3: 7%
C4: 1%

2248u

WT: 10.0 / VIS: 30



6300

MD: 6.622 '
 TVD: 6,554.76 '
 Inclination: 10.4 °
 Azimuth: 81.3 °
 VS: -122.51 '

MD: 6.667 '
 TVD: 6,598.85 '
 Inclination: 12.9 °
 Azimuth: 86 °
 VS: -114.66 '

MD: 6.712 '
 TVD: 6,642.46 '
 Inclination: 15.6 °
 Azimuth: 87.1 °
 VS: -103.69 '

v f gr, silty tex, frm, v f f gr, sb

90% SLTY SH: lt-med gy, sft-sl frm, fri, sb pily-biky, v f gr, silty tex, rthy lstr, sl calc, 10% SHY SS, wh-lt-gy, s&p, biky, frm, v f f gr, sb md-ang, mod-w srt, cl sup, cly cnt, non calc

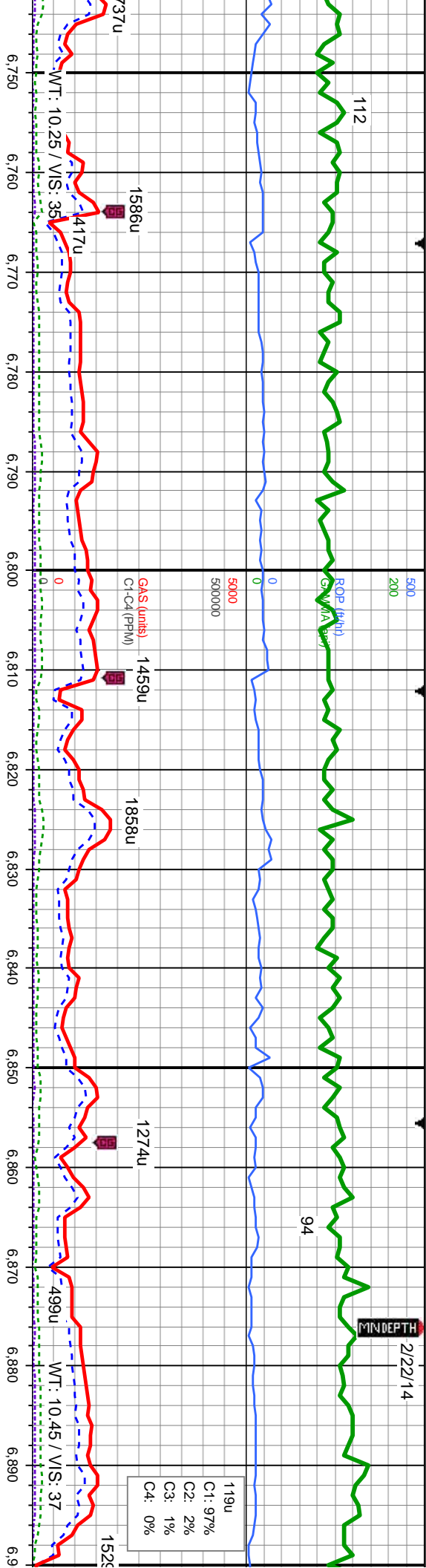
85% SLTY SH: lt-med gy, sft-sl frm, fri, sb pily-biky, v f gr, silty tex, rthy lstr, sl calc, 15% SHY SS, wh-lt-gy, s&p, biky, frm, v f f gr, sb md-ang, mod-w srt, cl sup, cly cnt, non calc

100% SLTY SH: lt-med gy, sft-sl frm, fri, sb pily-biky, v f gr, silty tex, rthy lstr, sl calc, lt shy ss



2/22/14

MINDEPTH



MD: 6,757 '
TVD: 6,686.42 '
Inclination: 19 °
Azimuth: 86.6 °
VS: -90.44 '

MD: 6,801 '
TVD: 6,726.56 '
Inclination: 22.5 °
Azimuth: 83.4 °
VS: -74.95 '

MD: 6,846 '
TVD: 6,767.61 '
Inclination: 25.8 °
Azimuth: 84.6 °
VS: -56.62 '

MD: 6,891 '
TVD: 6,807.6 '
Inclination: 28.8 °
Azimuth: 84.1 °
VS: -36.08 '

100% SLTY SH: lt-med gy, sft-sl frm, fri, sb ply-bkly, vf gr, silty tex, rthy lstr, sl calc, tr shly ss

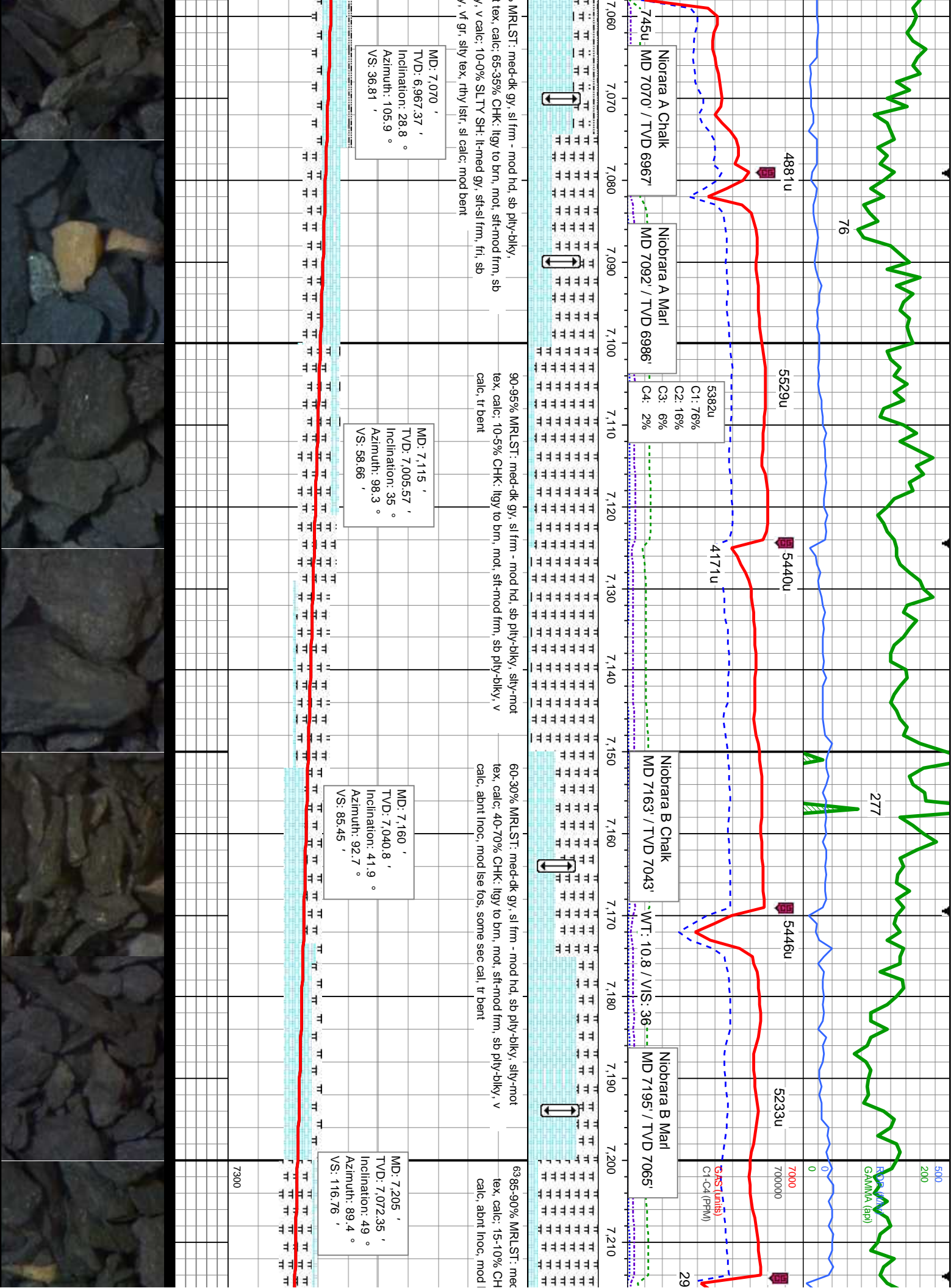
100% SLTY SH: lt-med gy, sft-sl frm, fri, sb ply-bkly, vf gr, silty tex, rthy lstr, sl calc, tr shly ss

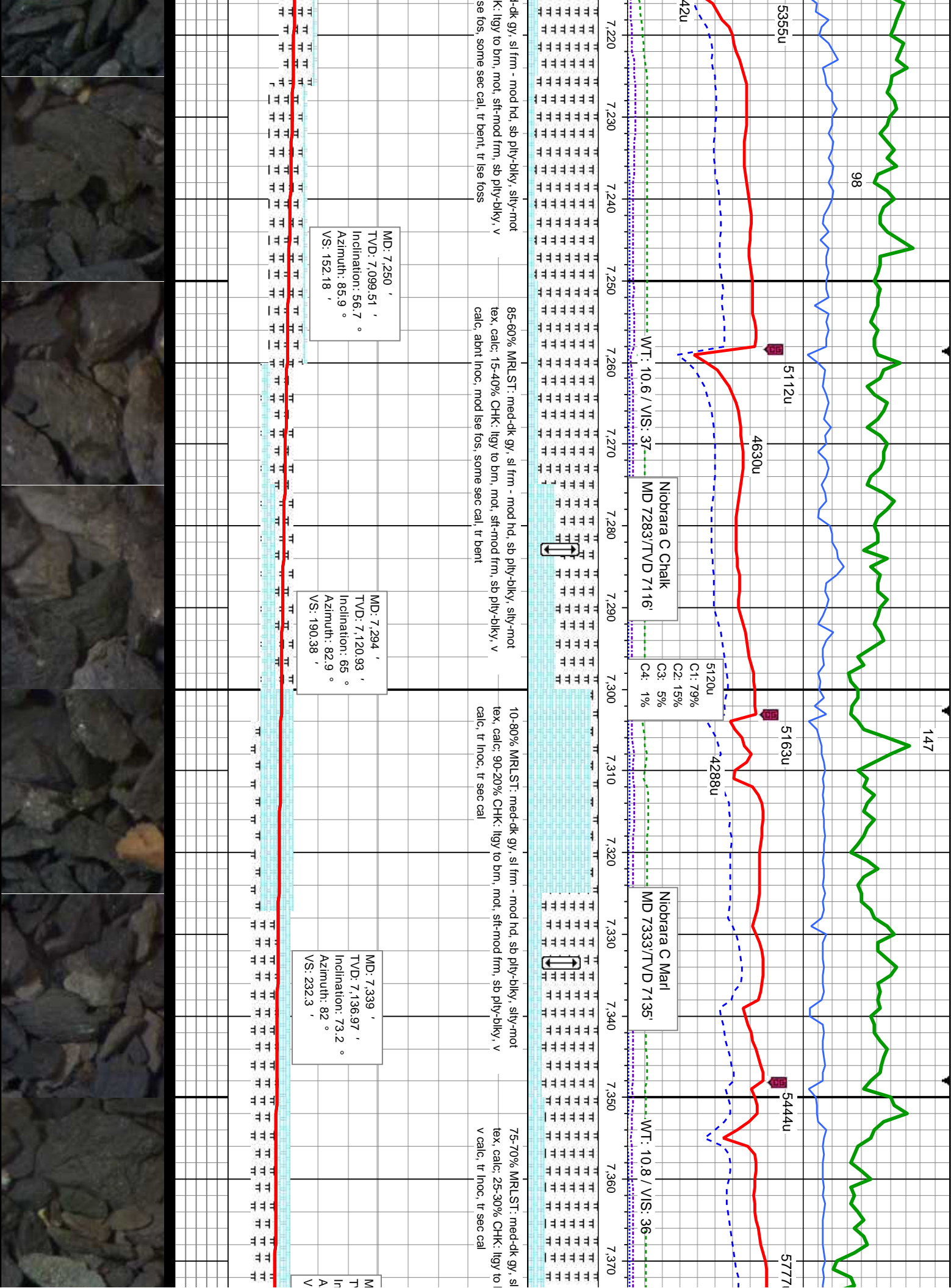
100% SLTY SH: lt-med gy, sft-sl frm, fri, sb ply-bkly, vf gr, silty tex, rthy lstr, sl calc, tr shly ss

7300

6300







2/25-26/14

MINDEPTH

143

135

ROP (ft/h)
GAMMA (api)

48

7000
700000

4387u

5479u

5183u

4531u

GAS (m/s)
C1-C4 (PPH)

3436u

3105u

5612u
C1: 78%
C2: 16%
C3: 5%
C4: 1%

WT: 9.95 / VIS: 34

4140u

7,380 7,390 7,400 7,410 7,420 7,430 7,440 7,450 7,460 7,470 7,480 7,490 7,500 7,510 7,520 7,53

fm - mod hd, sb ply-bkly, silty-mot
pon, mot, sft-mod frm, sb ply-bkly,

63% MRLST: med-dk gy, sl frm - mod hd, sb
ply-bkly, silty-mot tex, calc, 5% CHK: lly to
brn, mot, sft-mod frm, sb ply-bkly, v calc, tr
Inoc, tr sec cal

Bit Data
Bit #: 4
Type: DP405S
Size: 6.12
Depth In: 7,434 '
Jets: 5x13
S/N: 7040032

90% MRLST: med-dk gy, sl frm - mod hd, sb ply-bkly, silty-mot tex, calc;
10% CHK: lly to brn, mot, sft-mod frm, sb ply-bkly, v calc, tr Inoc, tr sec
cal

90% MRLST: med-dk gy, sl frm - mod hd, sb p
calc, 10% CHK: lly to brn, mot, sft-mod frm, s
Inoc, tr sec cal, tr tos

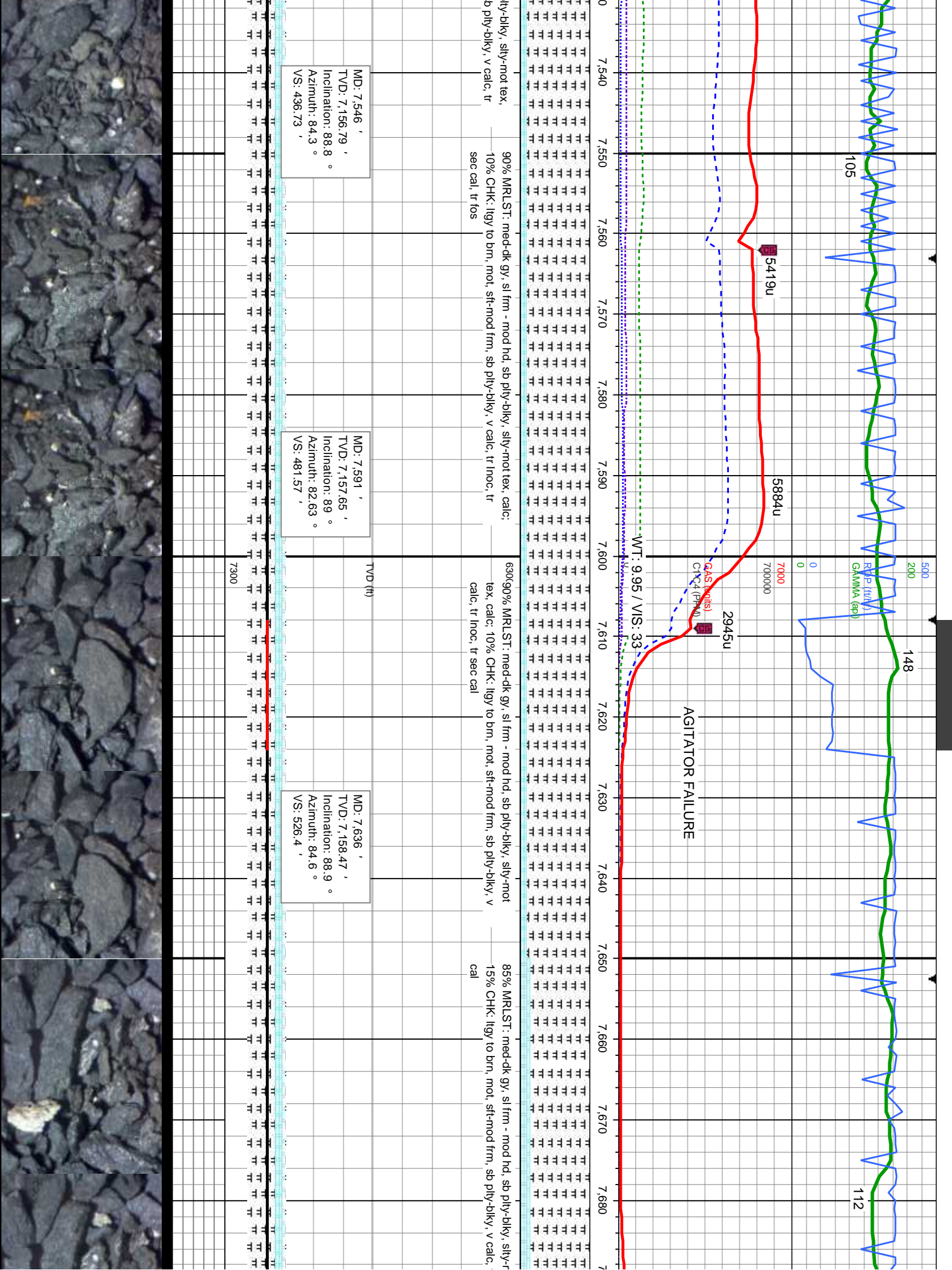
D: 7,379 '
VD: 7,146.27 '
Inclination: 79.9 °
Azimuth: 85 °
S: 271.04 '

MD: 7,456 '
TVD: 7,154.31 '
Inclination: 88.1 °
Azimuth: 83.88 °
VS: 347.18 '

MD: 7,501 '
TVD: 7,155.69 '
Inclination: 88.4 °
Azimuth: 84.47 °
VS: 391.96 '

7300





2/27/14

150

500
200
0
GAMMA (api)
RHO (gm/cc)

55

7000
700000
0

AGITATOR FAILURE

4827u

5763u

5282u

GAS (units)
C1-C4 (PPM)

WT

690 7,700 7,710 7,720 7,730 7,740 7,750 7,760 7,770 7,780 7,790 7,800 7,810 7,820 7,830 7,840



not tex, calc;
tr inoc, tr sec

75% MRLST: med-dk gy, sl frm - mod hd, sb ply-biky, silty-mot tex,
calc; 25% CHK: ligy to brn, mot, sft-mod frm, sb ply-biky, v calc, tr
inoc, tr sec cal

75% MRLST: med-dk gy, sl frm - mod hd, sb ply-biky, silty-mot
tex, calc; 25% CHK: ligy to brn, mot, sft-mod frm, sb ply-biky, v
calc, tr inoc, tr sec cal

75% MRLST: med-dk gy, sl frm - mod hd, sb ply-biky, silty-mot
calc; 25% CHK: ligy to brn, mot, sft-mod frm, sb ply-biky, v calc, tr
inoc, tr sec cal

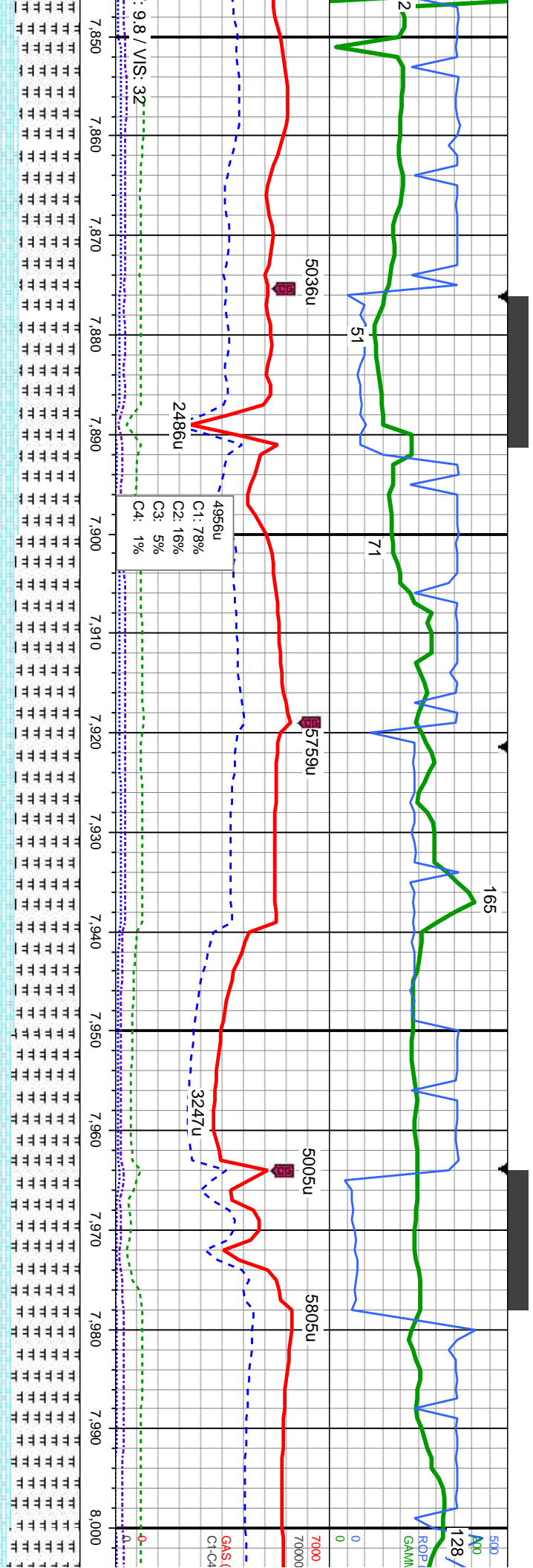
MD: 7,725 '
TVD: 7,159.72 '
Inclination: 89.5 °
Azimuth: 84.13 °
VS: 614.97 '

TVD (ft)

MD: 7,815 '
TVD: 7,160.58 '
Inclination: 89.4 °
Azimuth: 83.77 °
VS: 704.6 '

7300





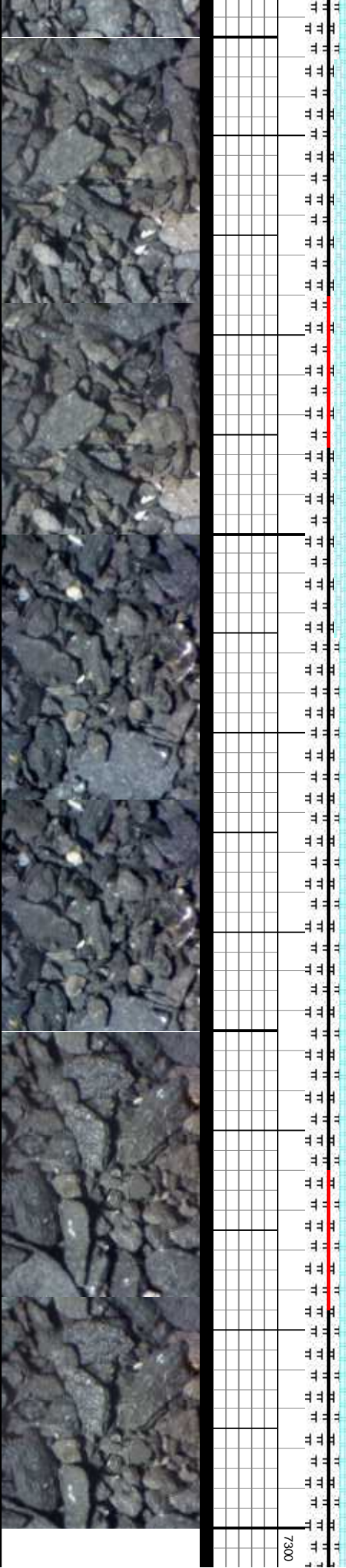
70% MRSLT: med-dk gy, sl frm - mod hd, sb ply-bkly, silty-mot tex, calc;
30% CHK: ltgy to brn, mot, sft-mod frm, sb ply-bkly, v calc, tr inoc, tr sec cal

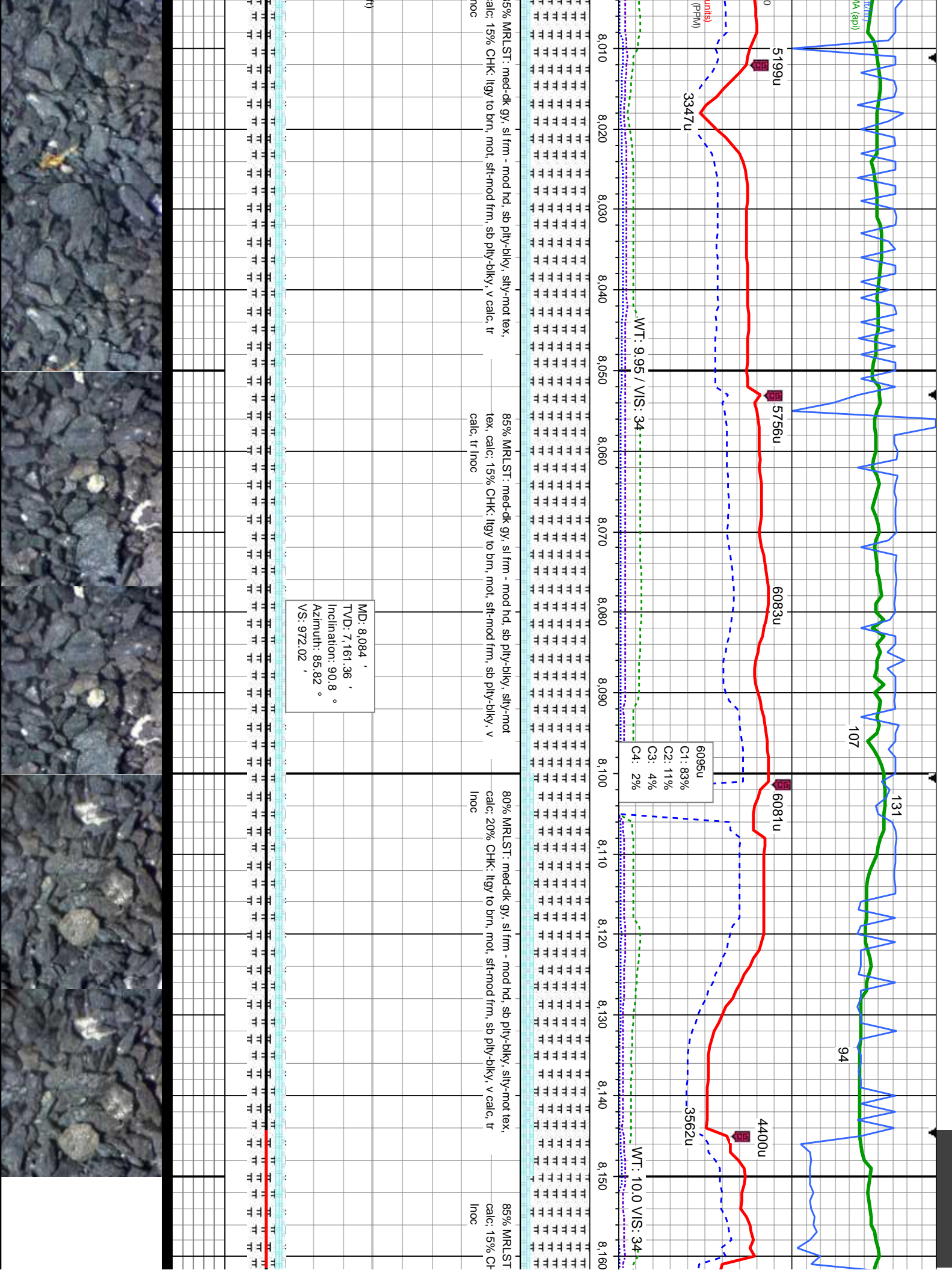
75% MRSLT: med-dk gy, sl frm - mod hd, sb ply-bkly, silty-mot tex,
calc; 25% CHK: ltgy to brn, mot, sft-mod frm, sb ply-bkly, v calc, tr inoc, tr sec cal

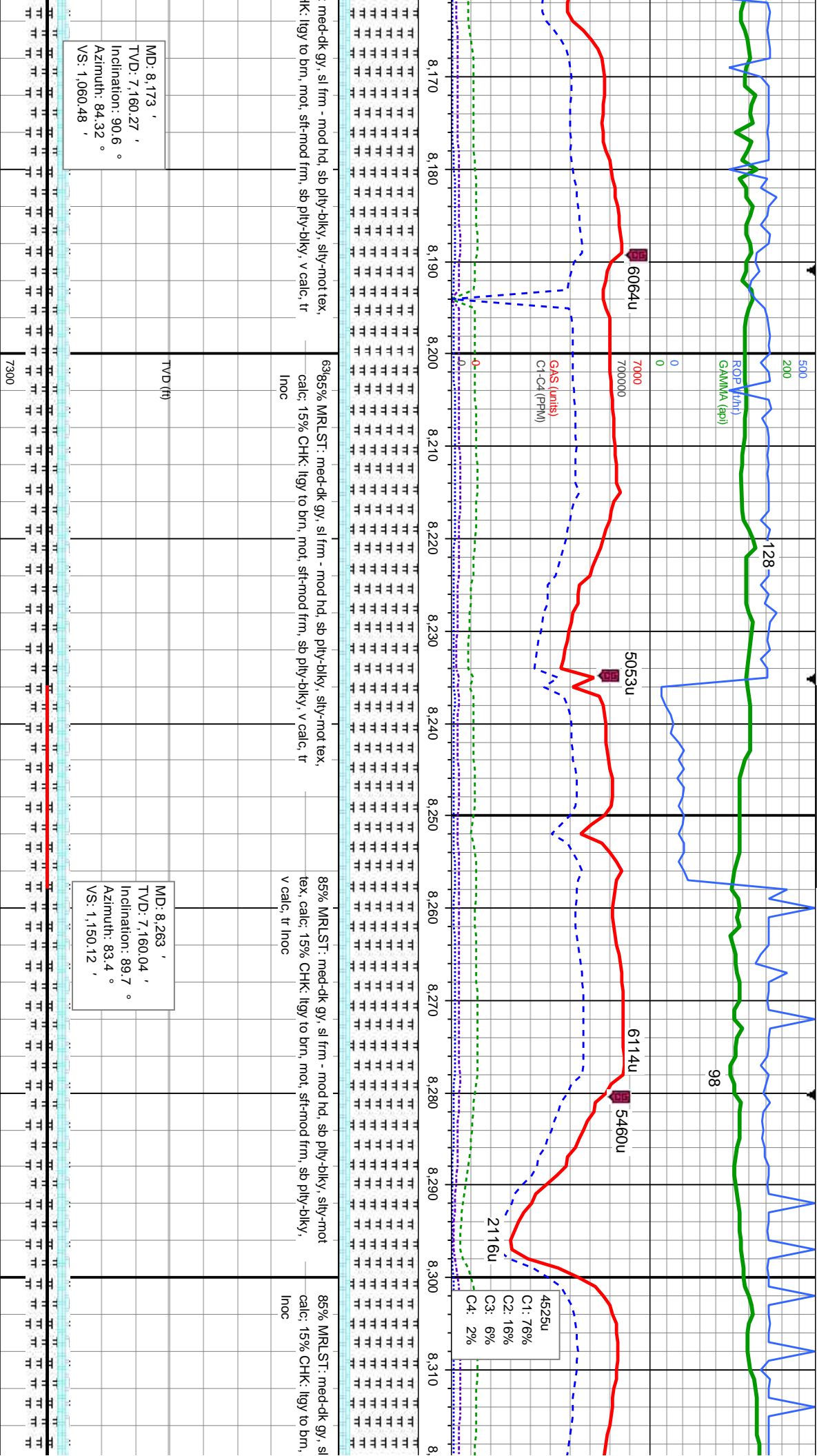
80% MRSLT: med-dk gy, sl frm - mod hd, sb ply-bkly, silty-mot
tex, calc; 20% CHK: ltgy to brn, mot, sft-mod frm, sb ply-bkly, v calc, tr inoc, tr sec cal

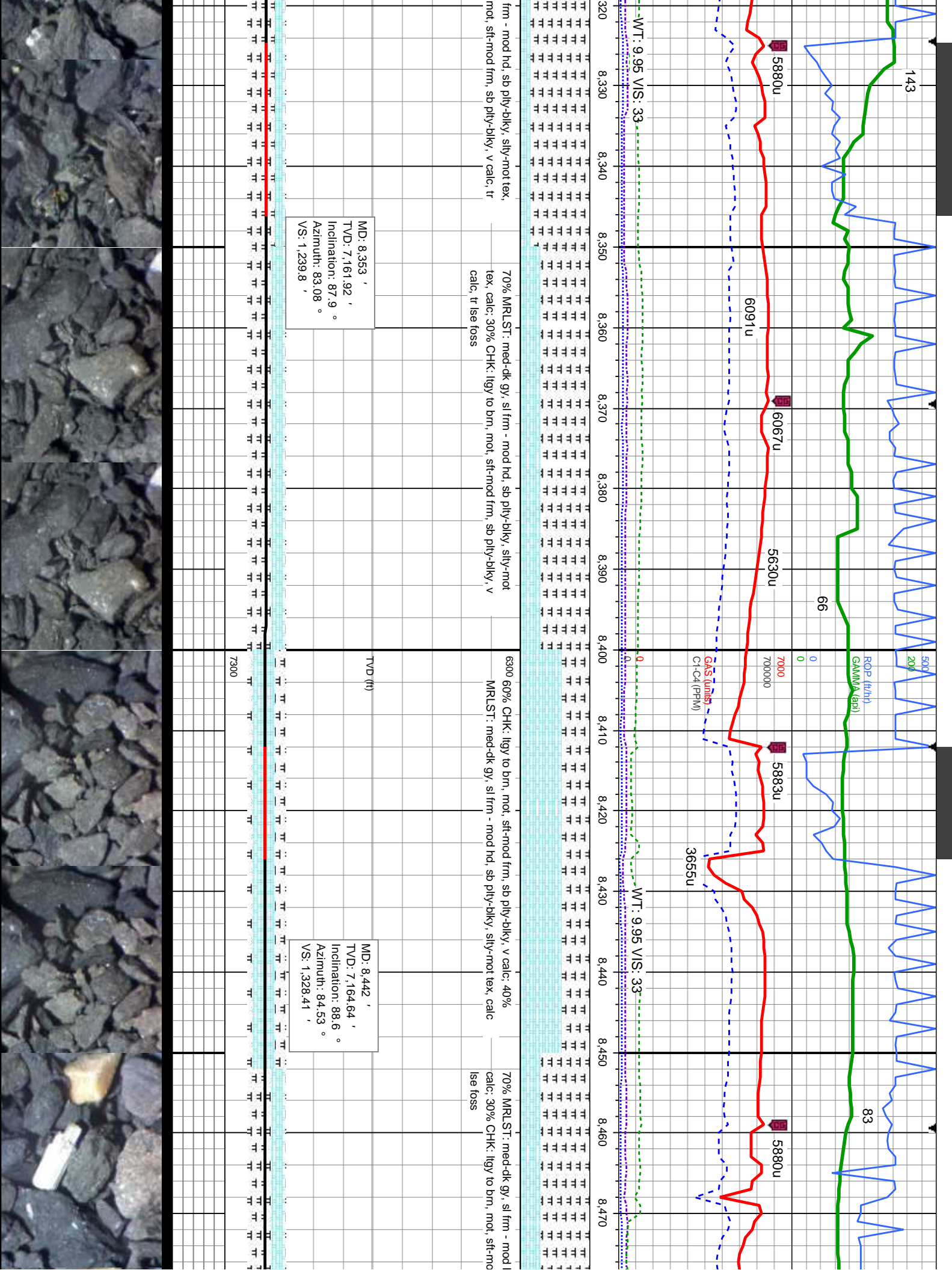
MD: 7,904 '
TVD: 7,161.12 '
Inclination: 89.9 °
Azimuth: 84.9 °
VS: 793.18 '

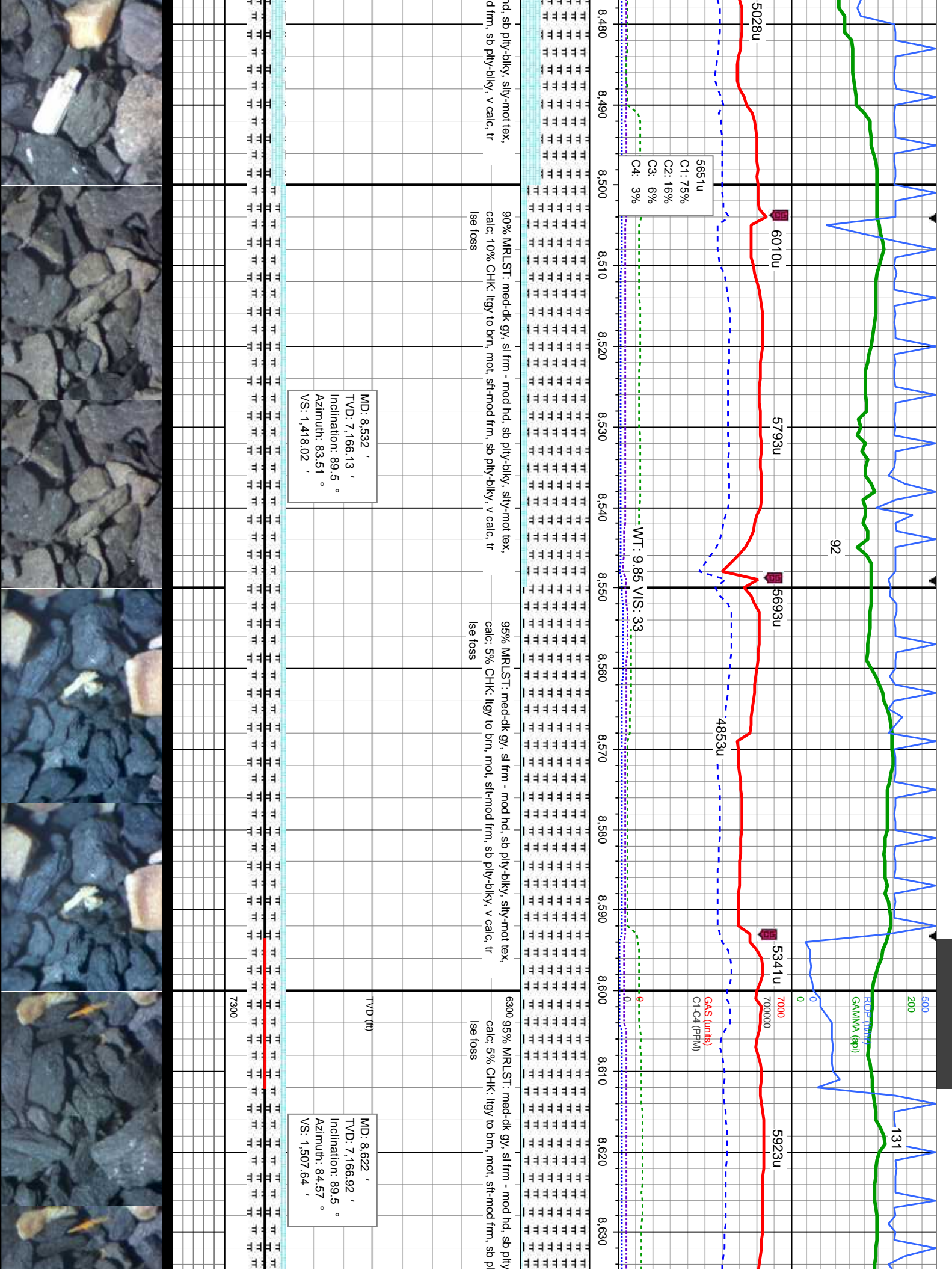
MD: 7,994 '
TVD: 7,161.6 '
Inclination: 89.5 °
Azimuth: 85.05 °
VS: 882.63 '

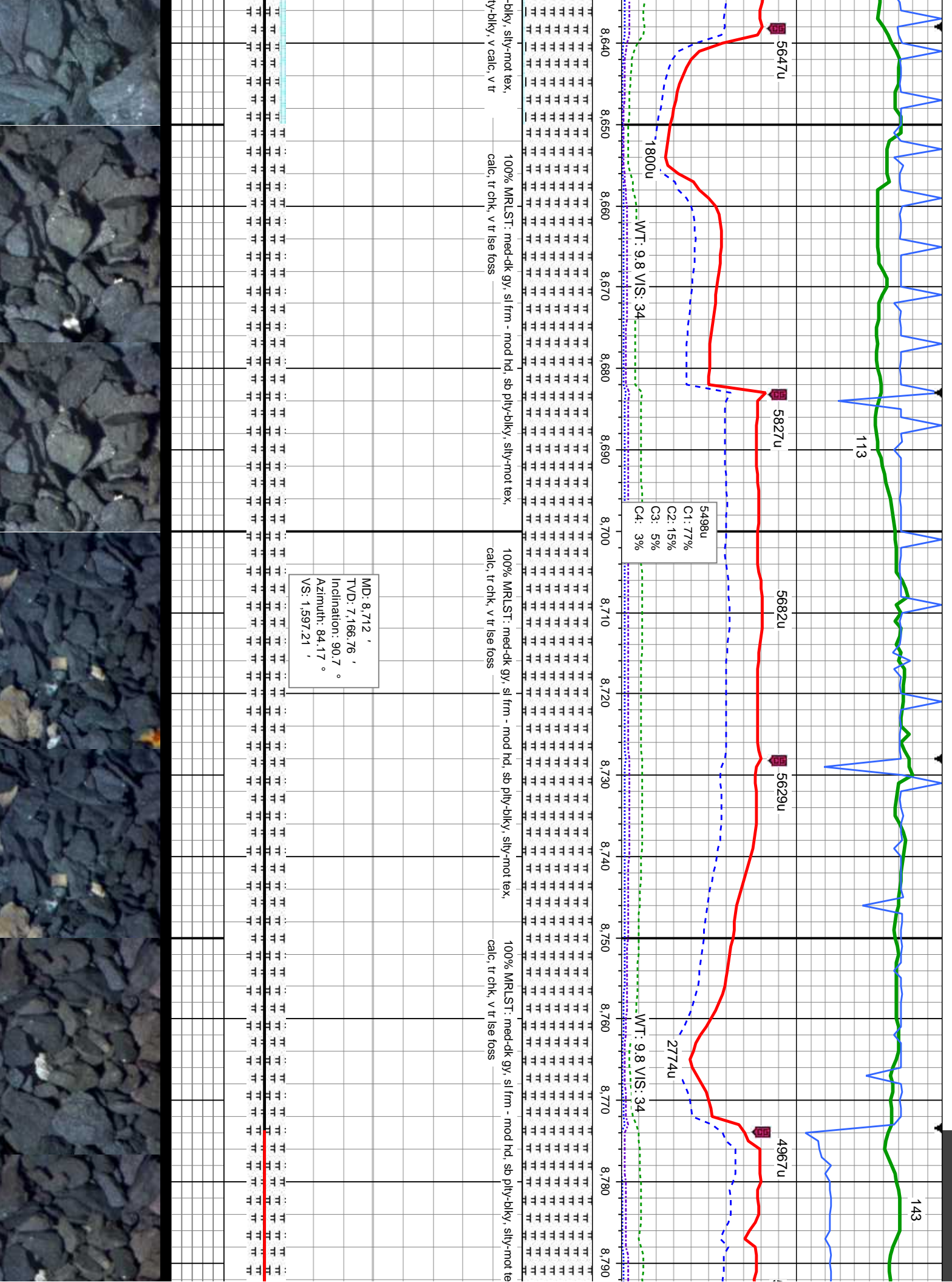


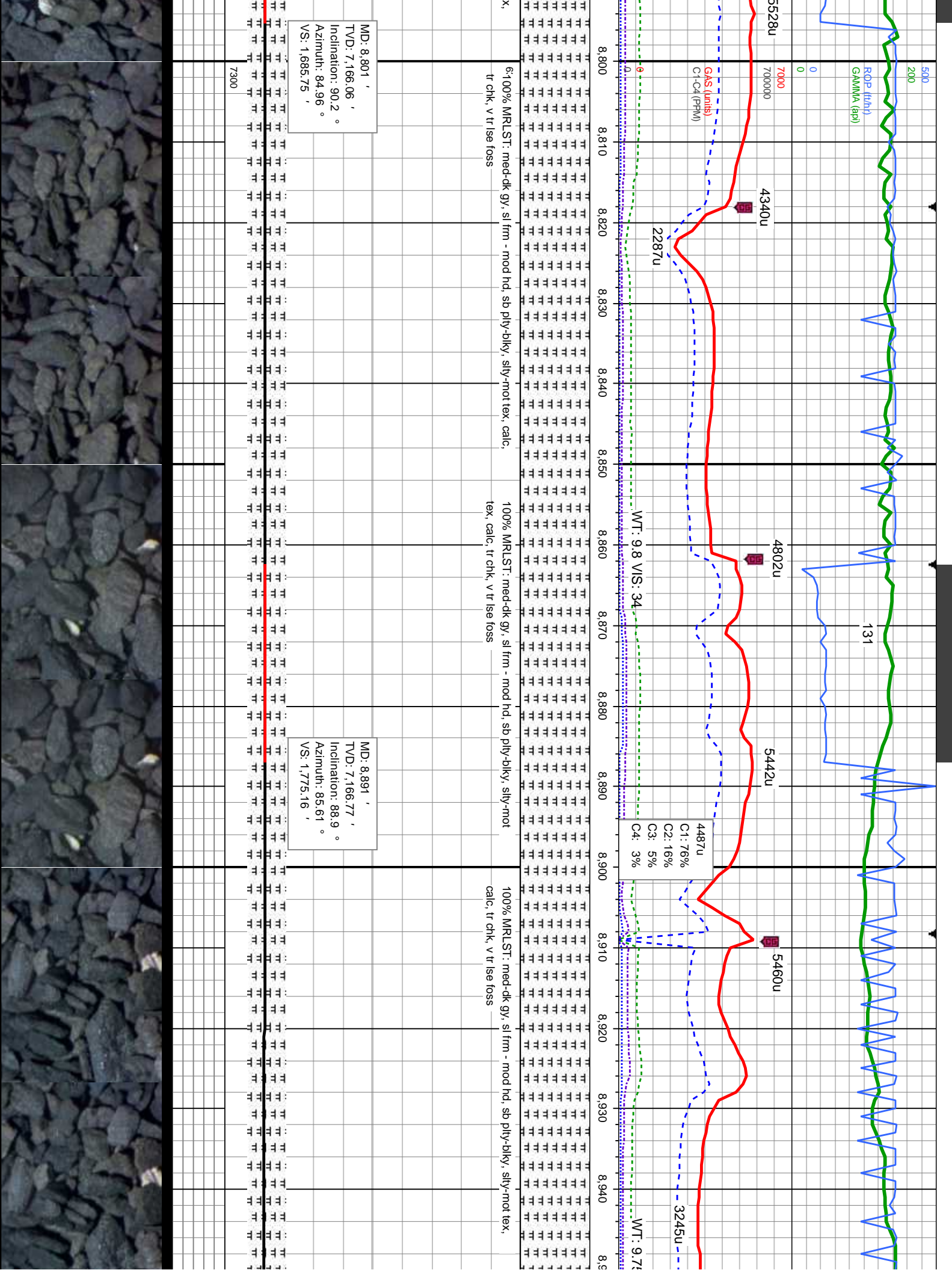


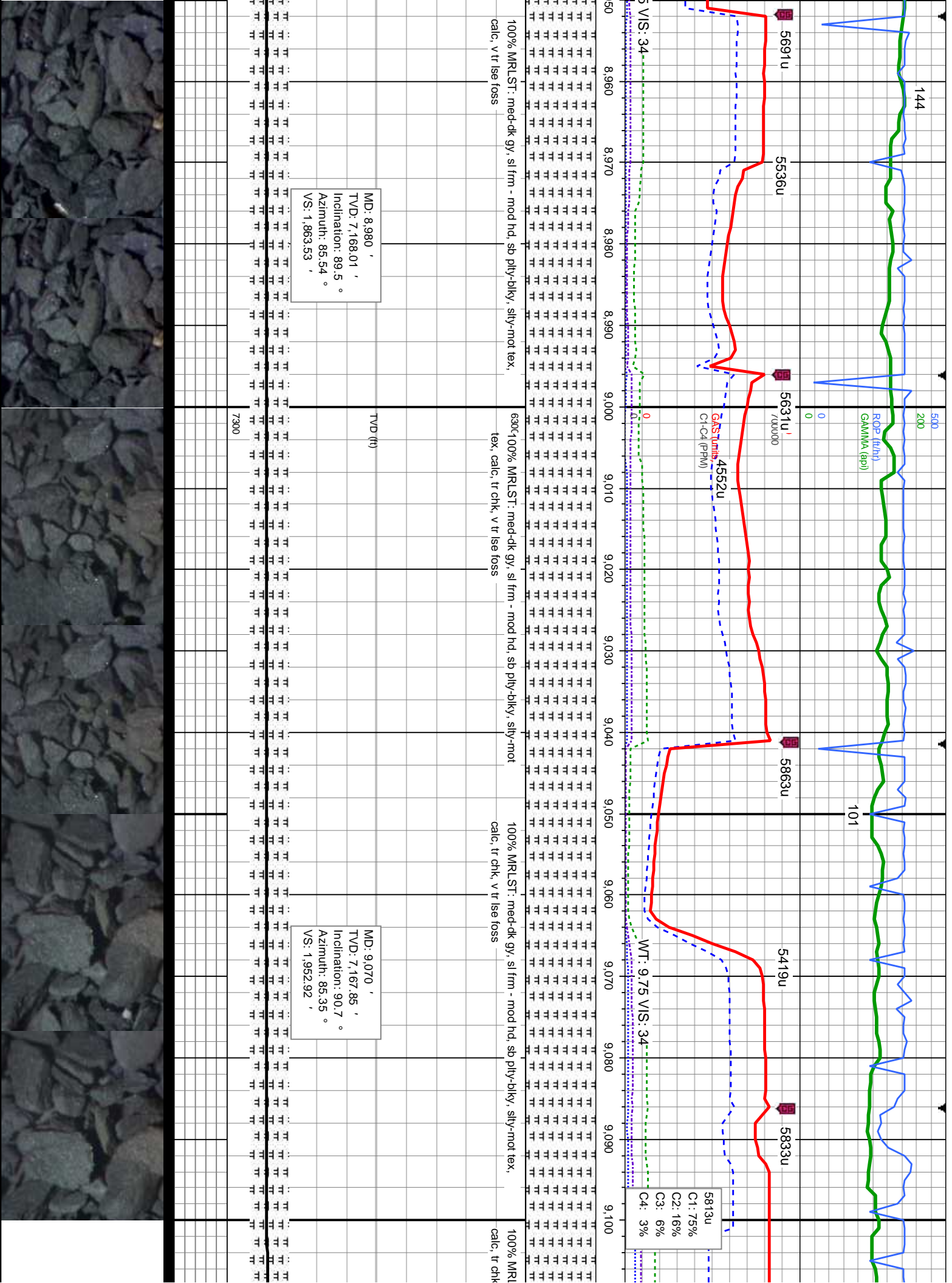


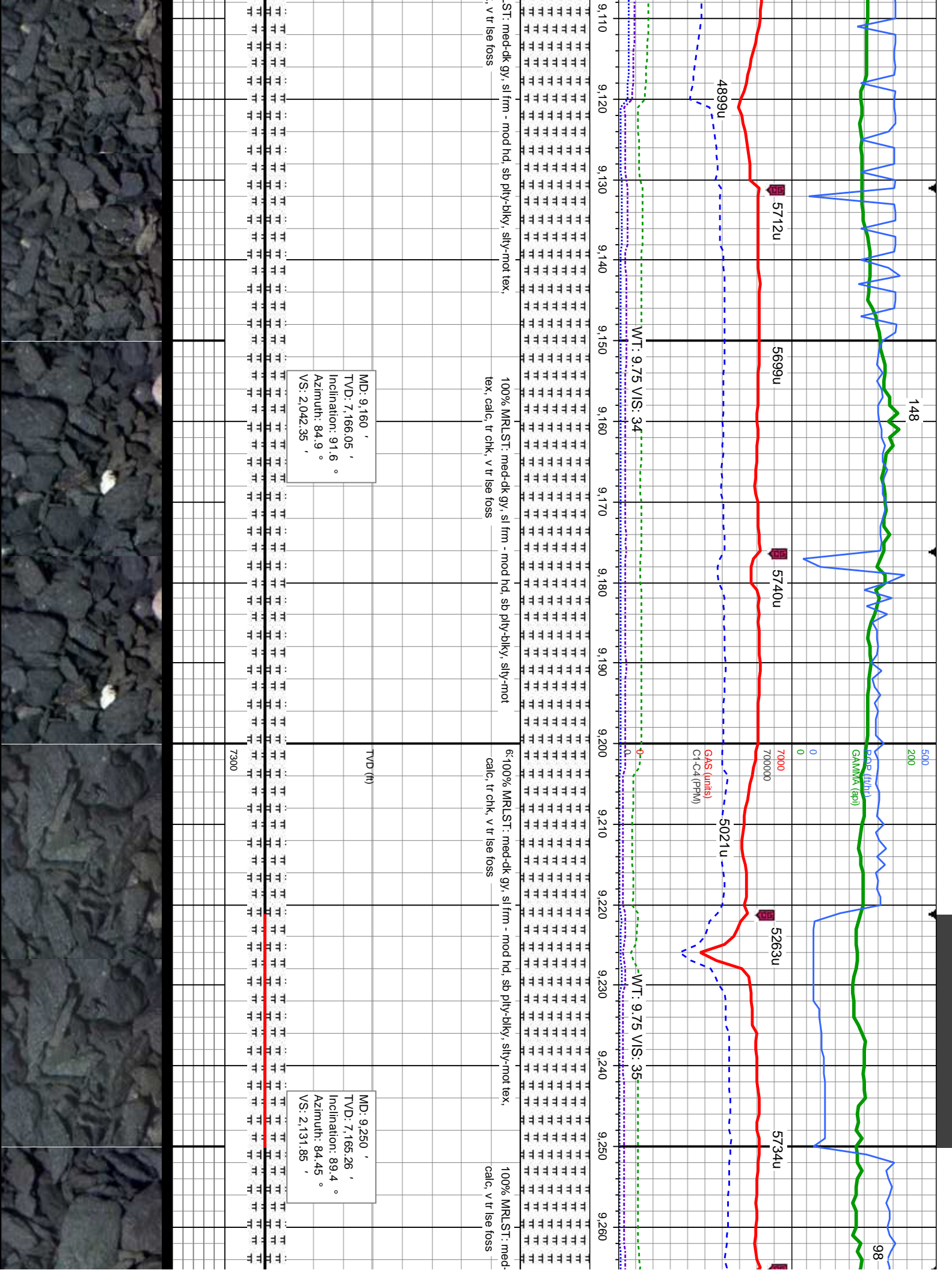


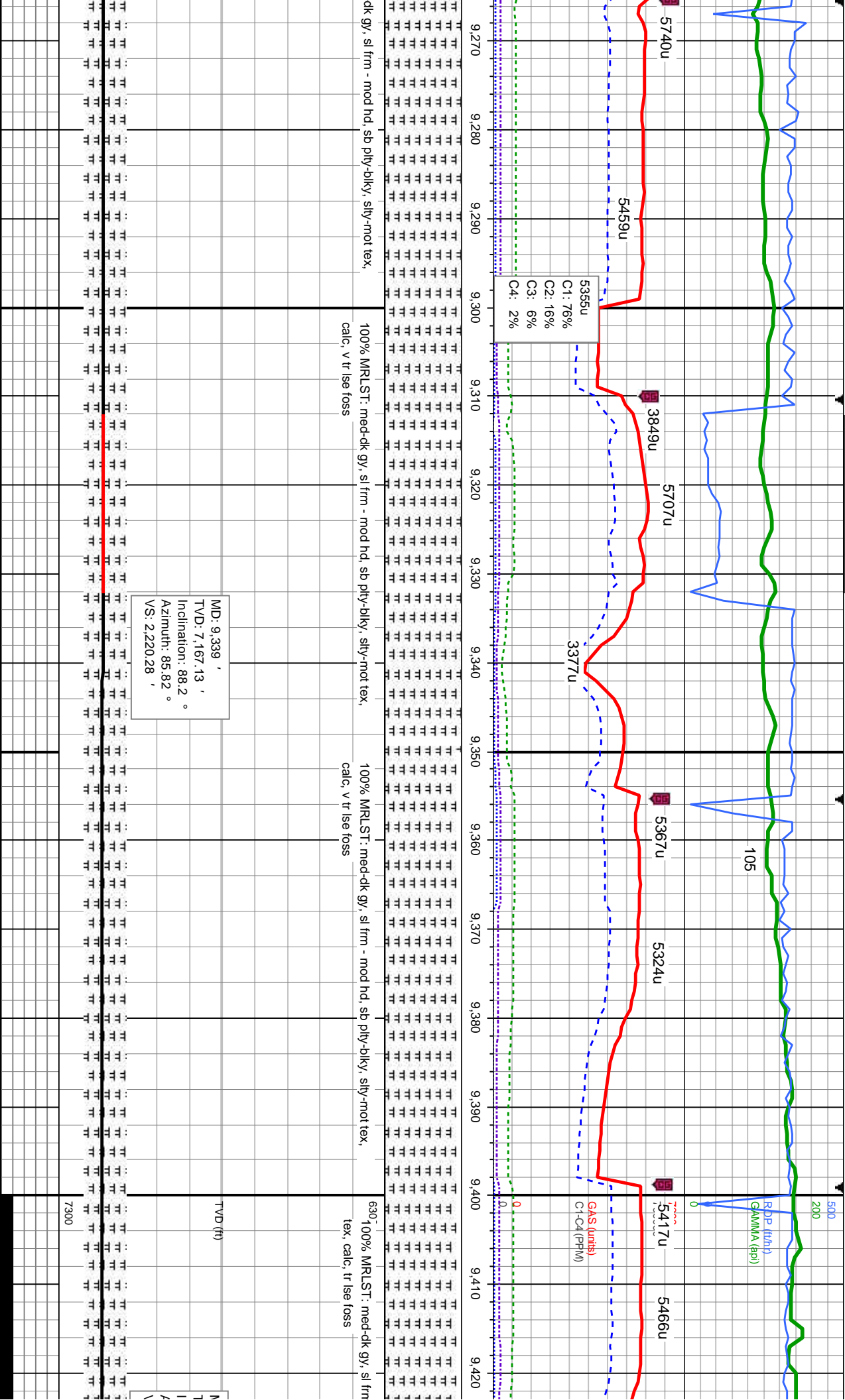


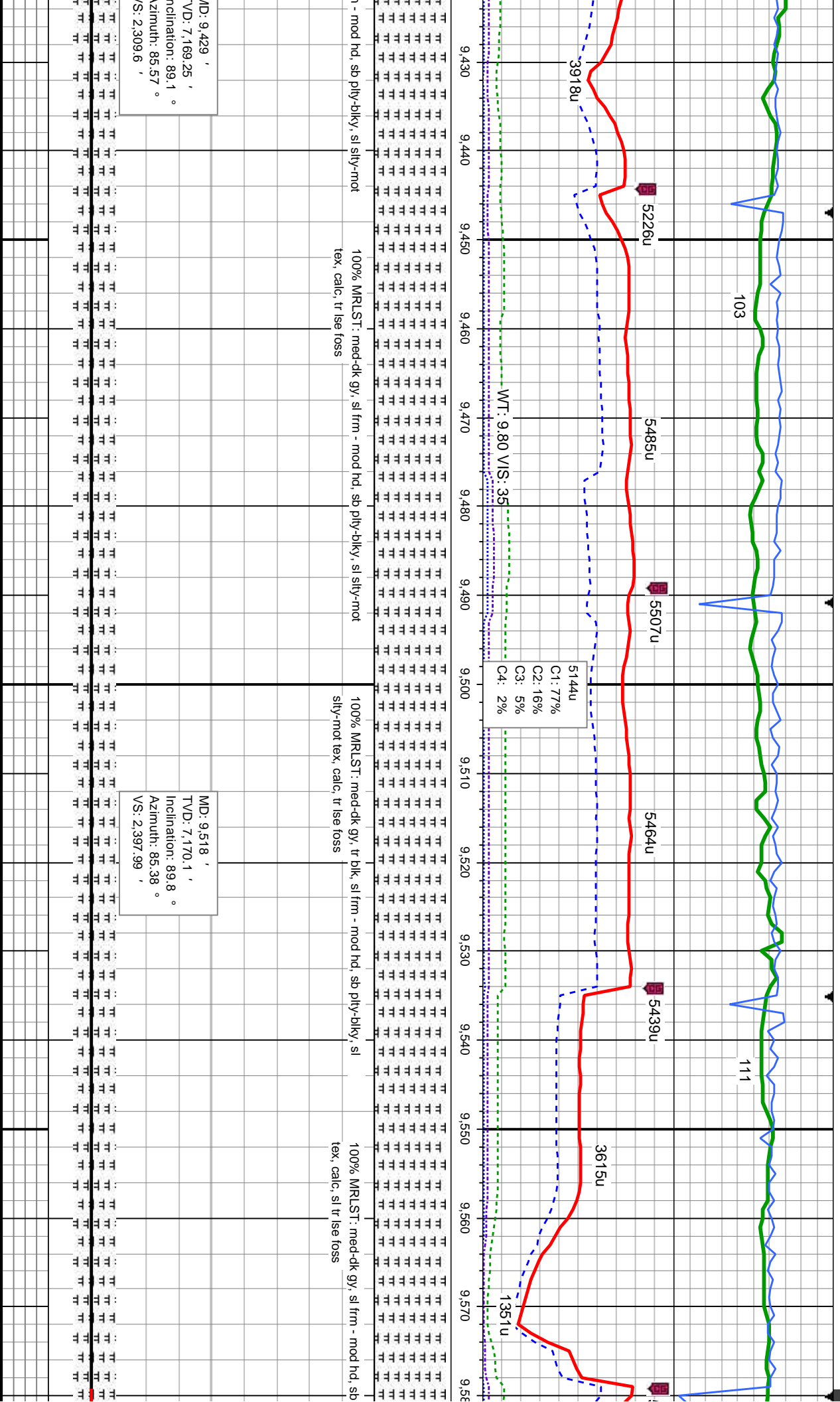


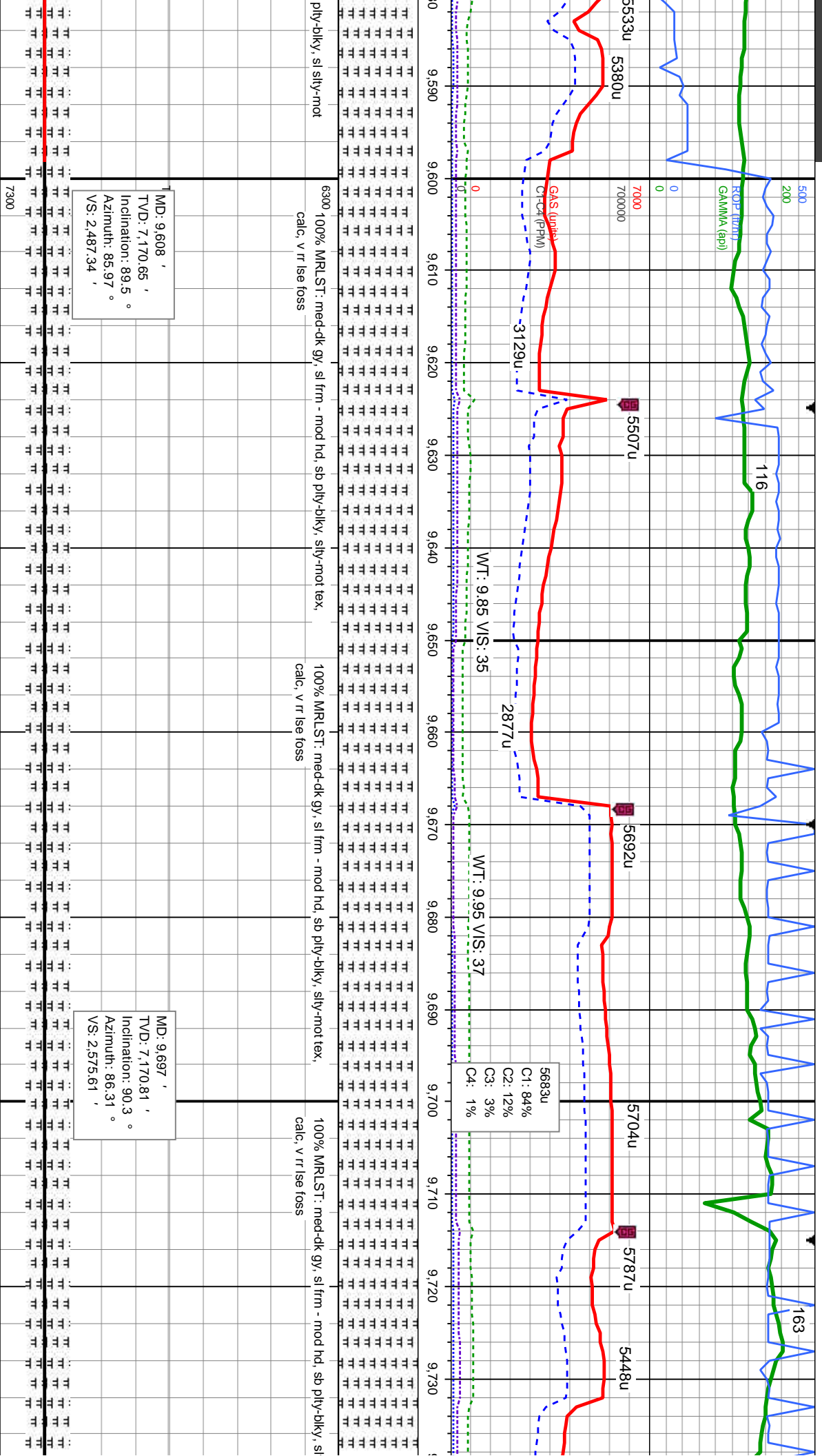


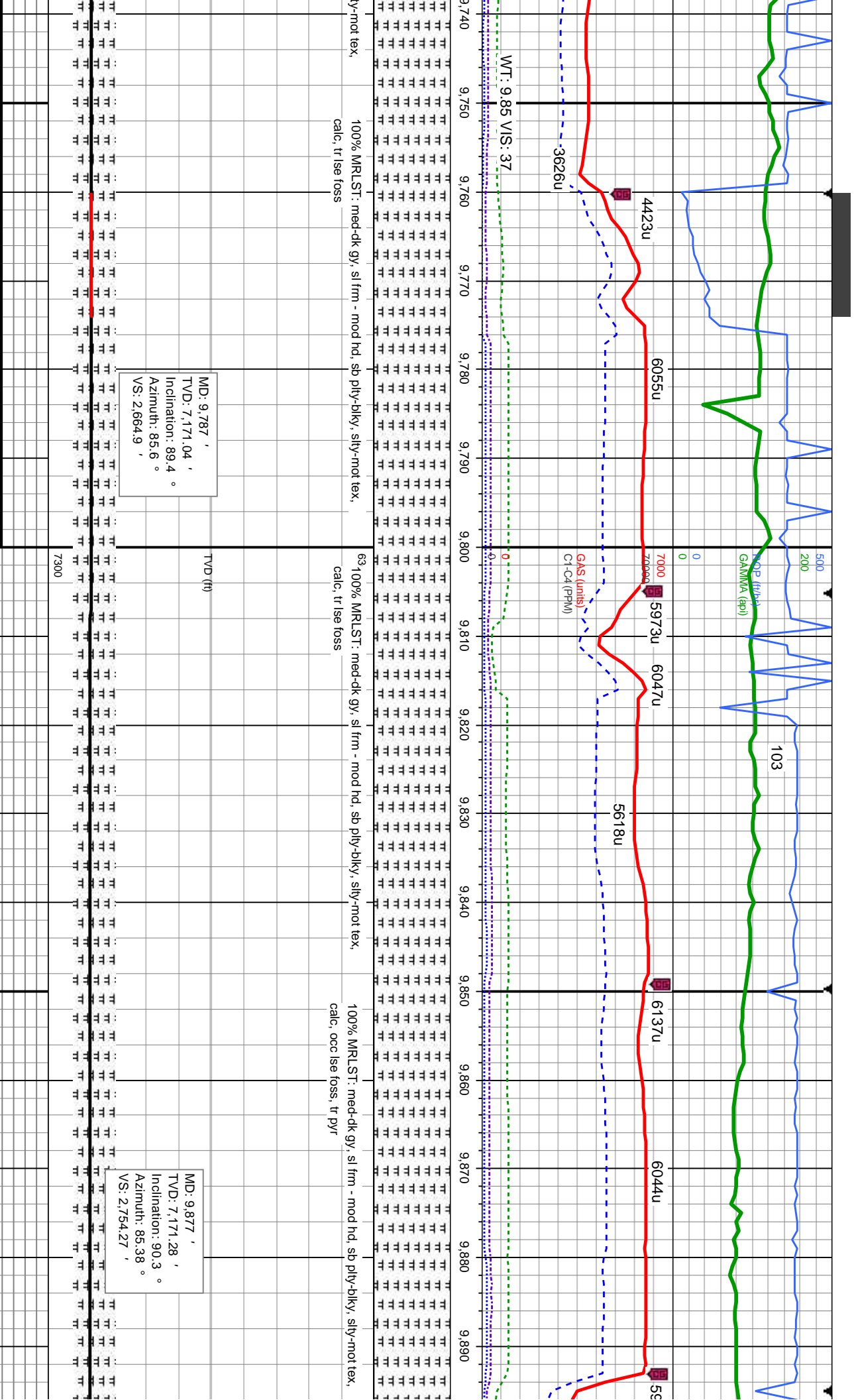


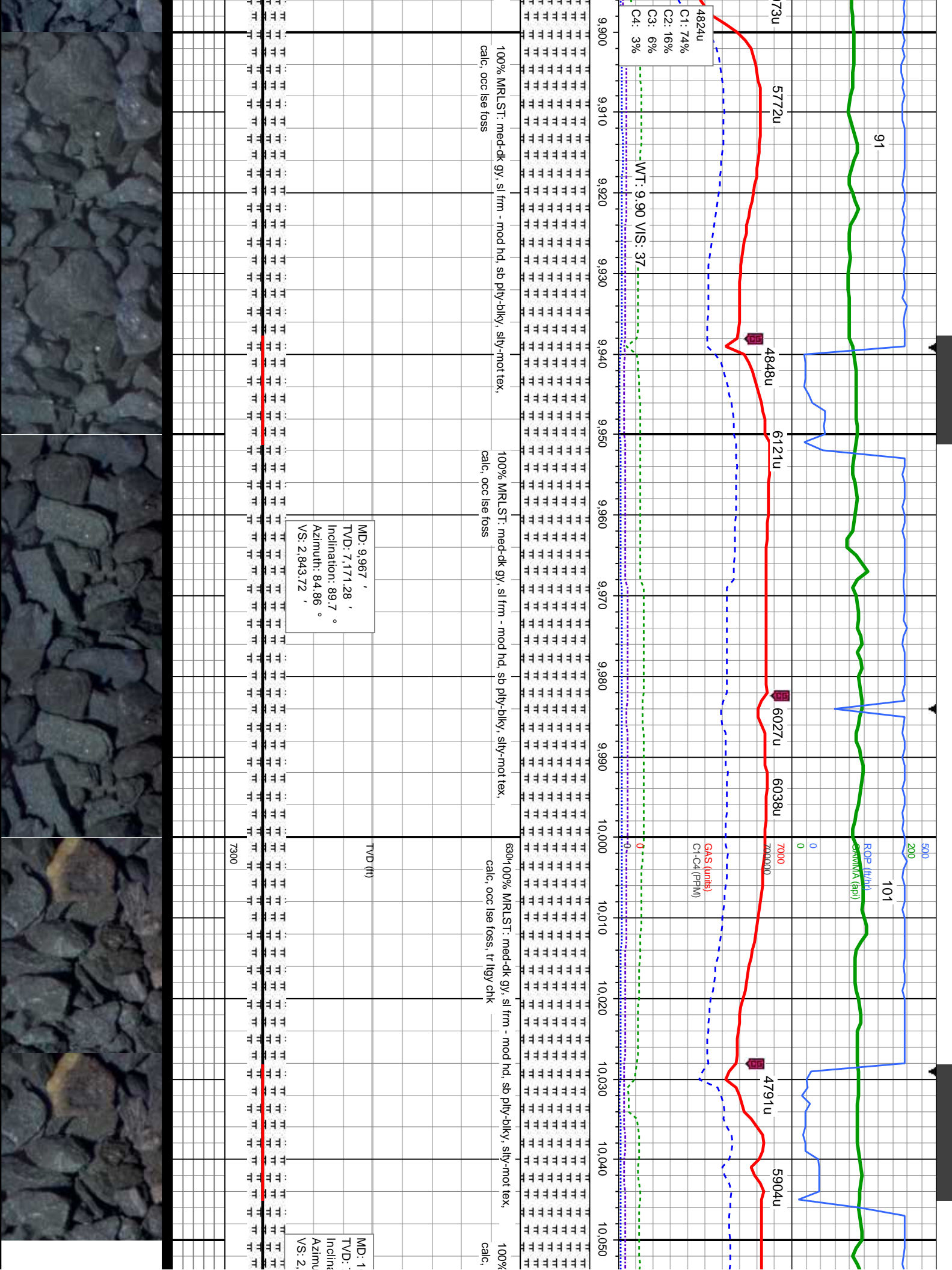


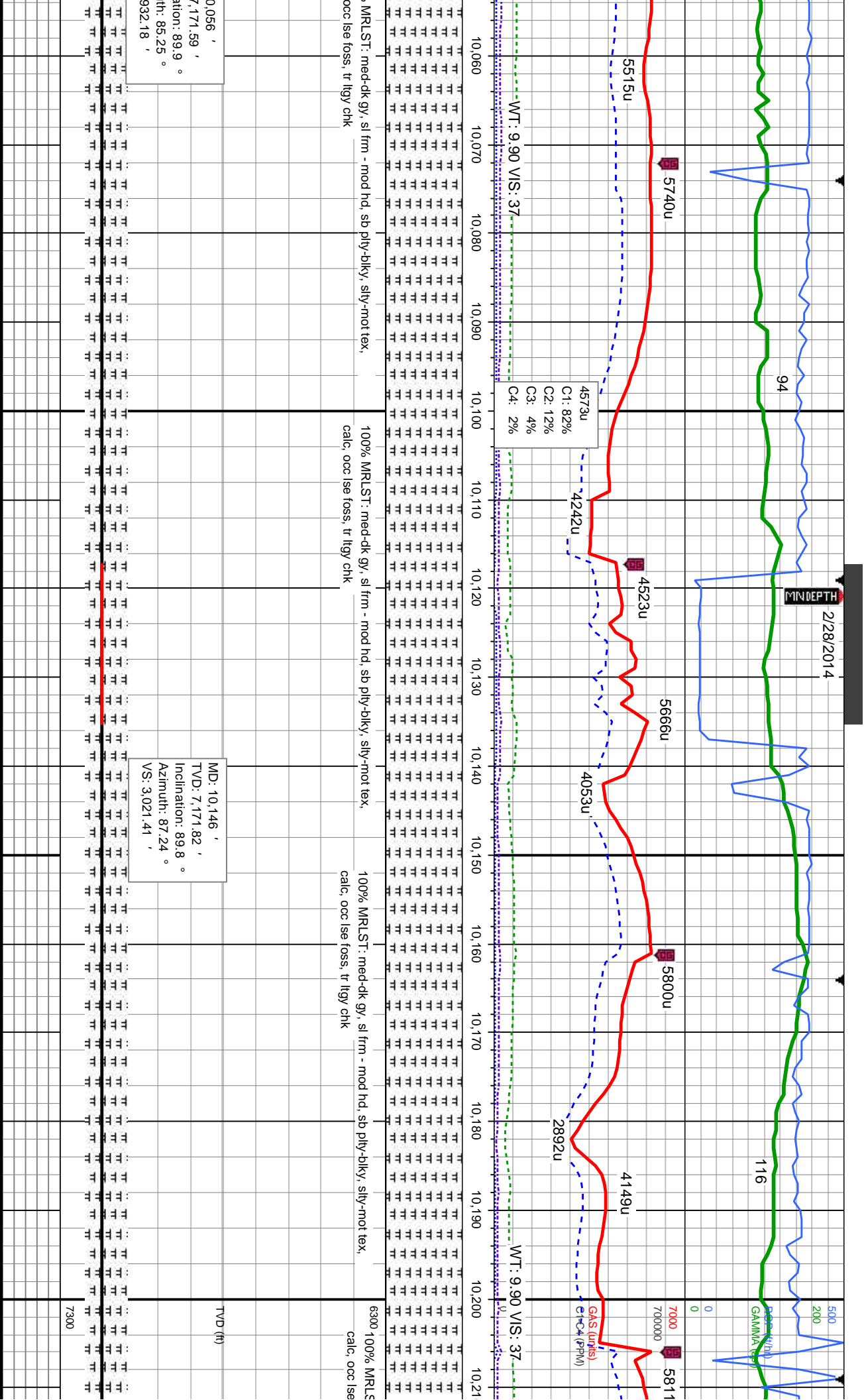


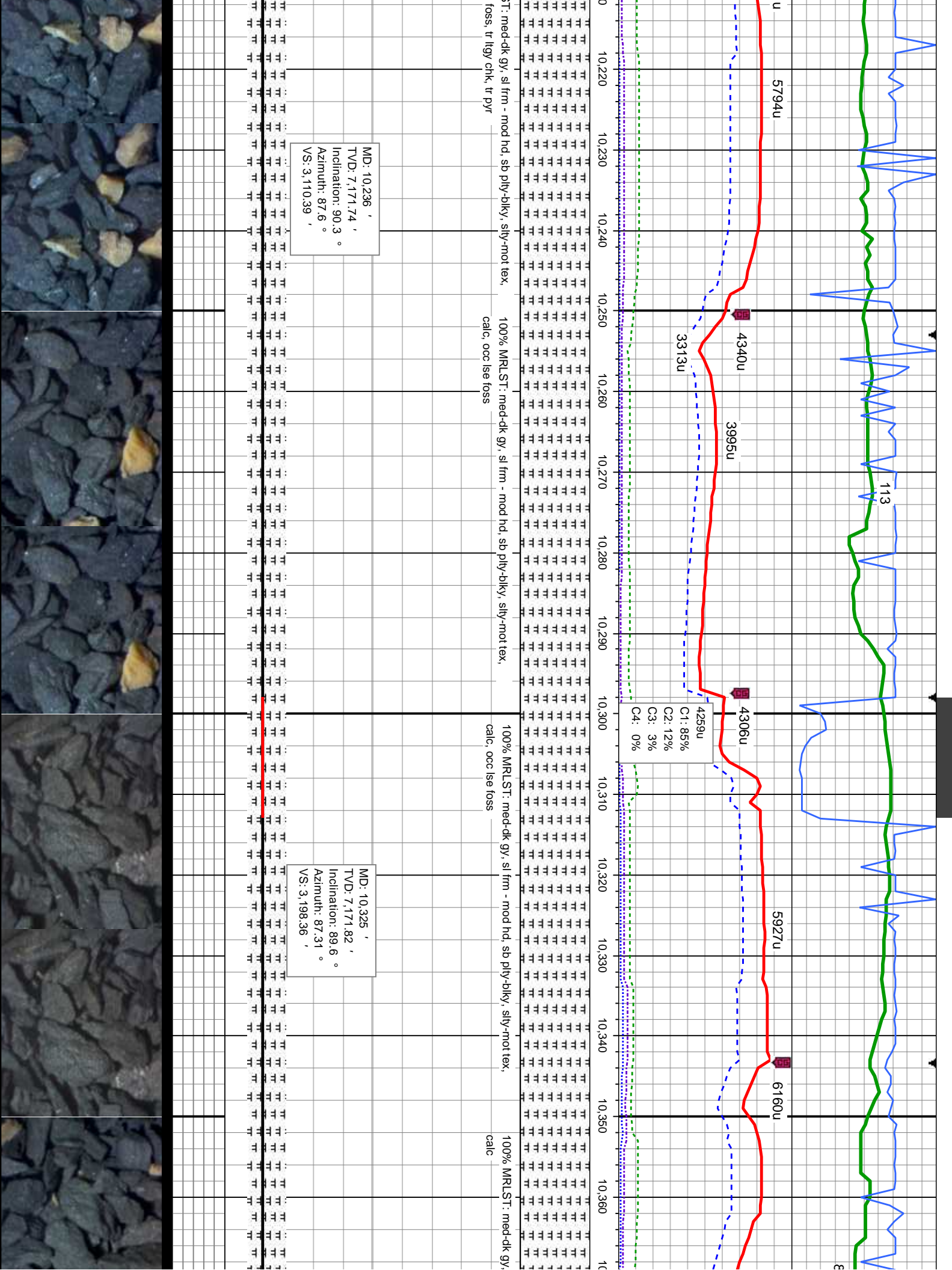


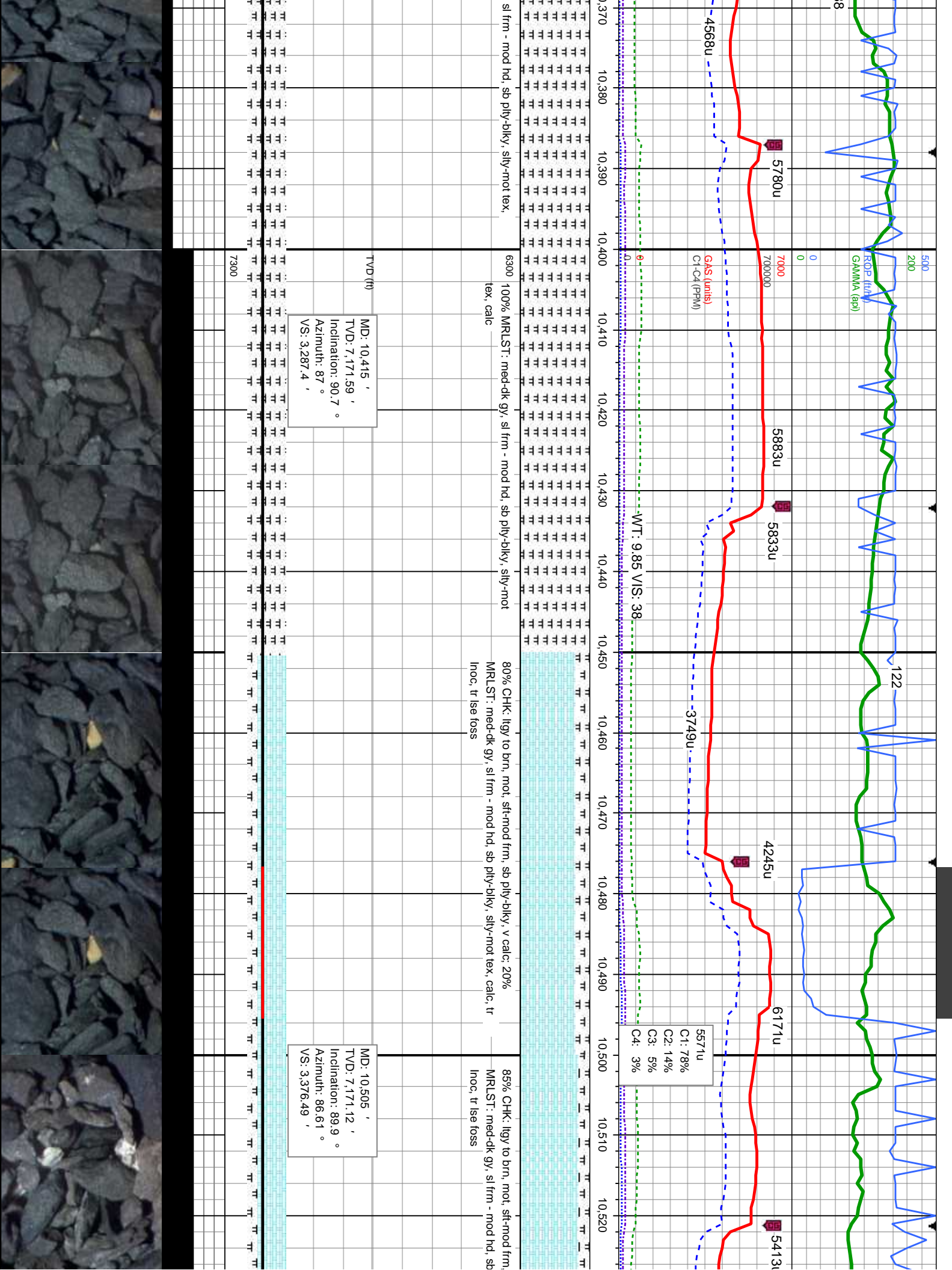


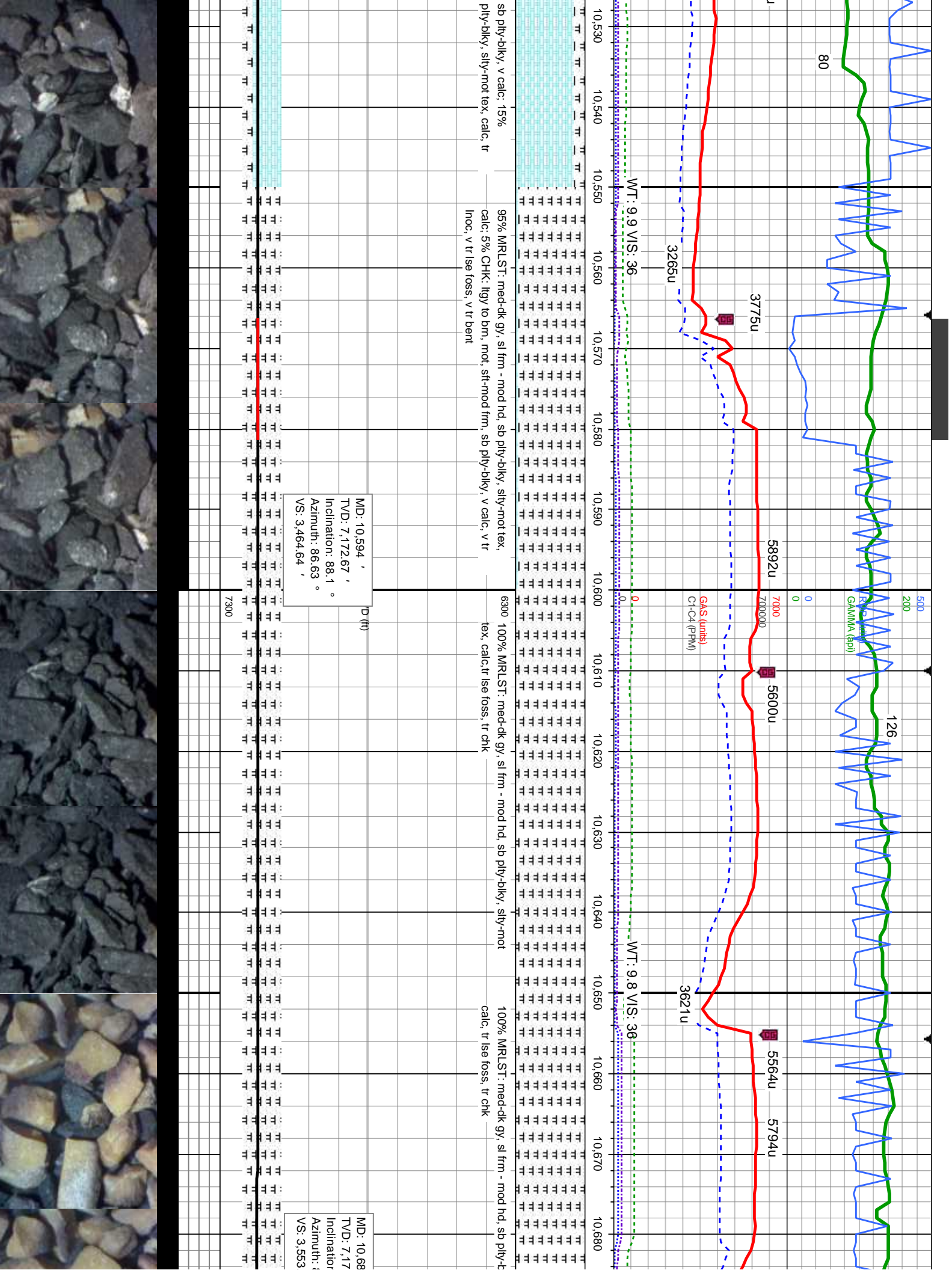


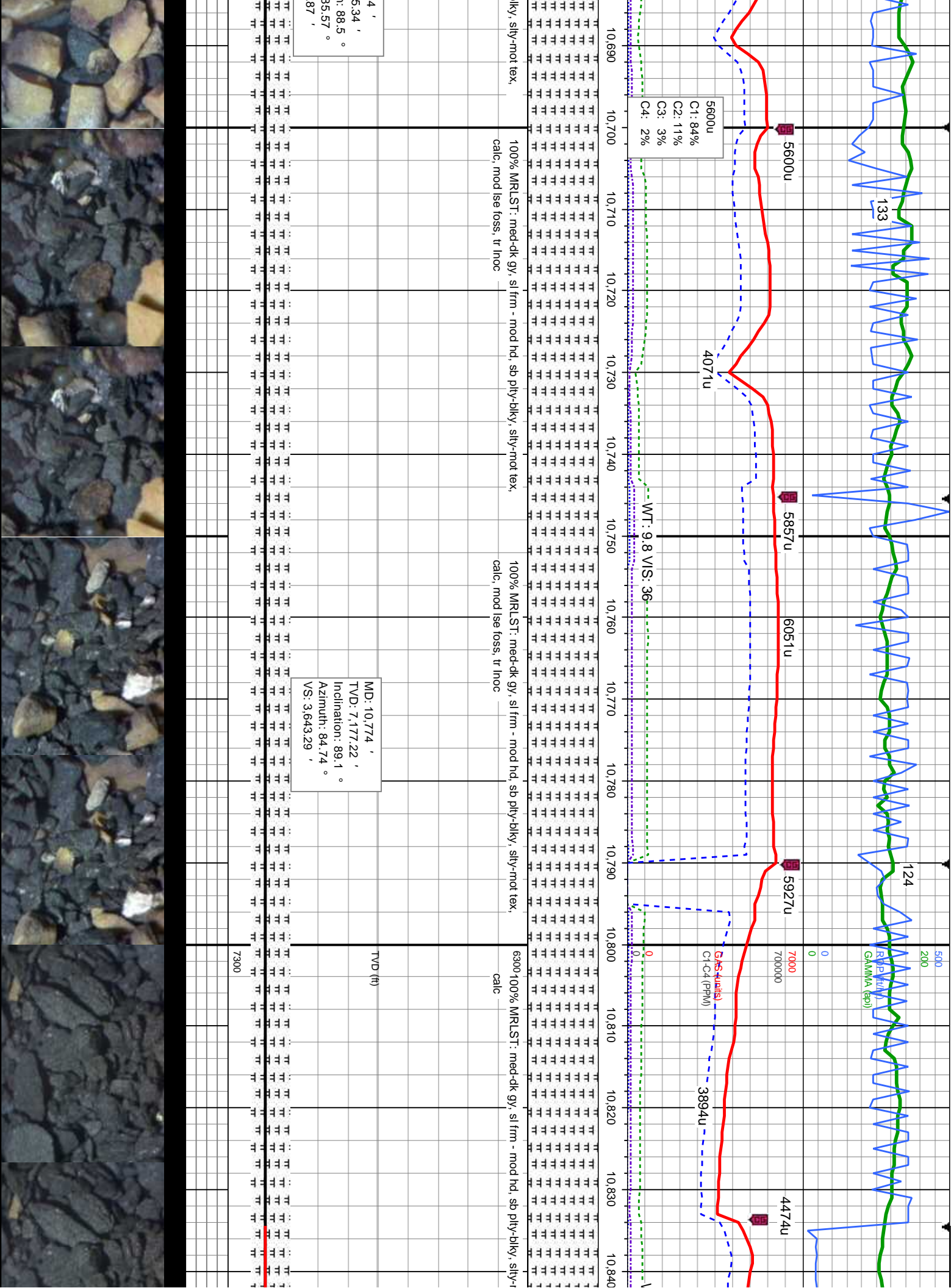


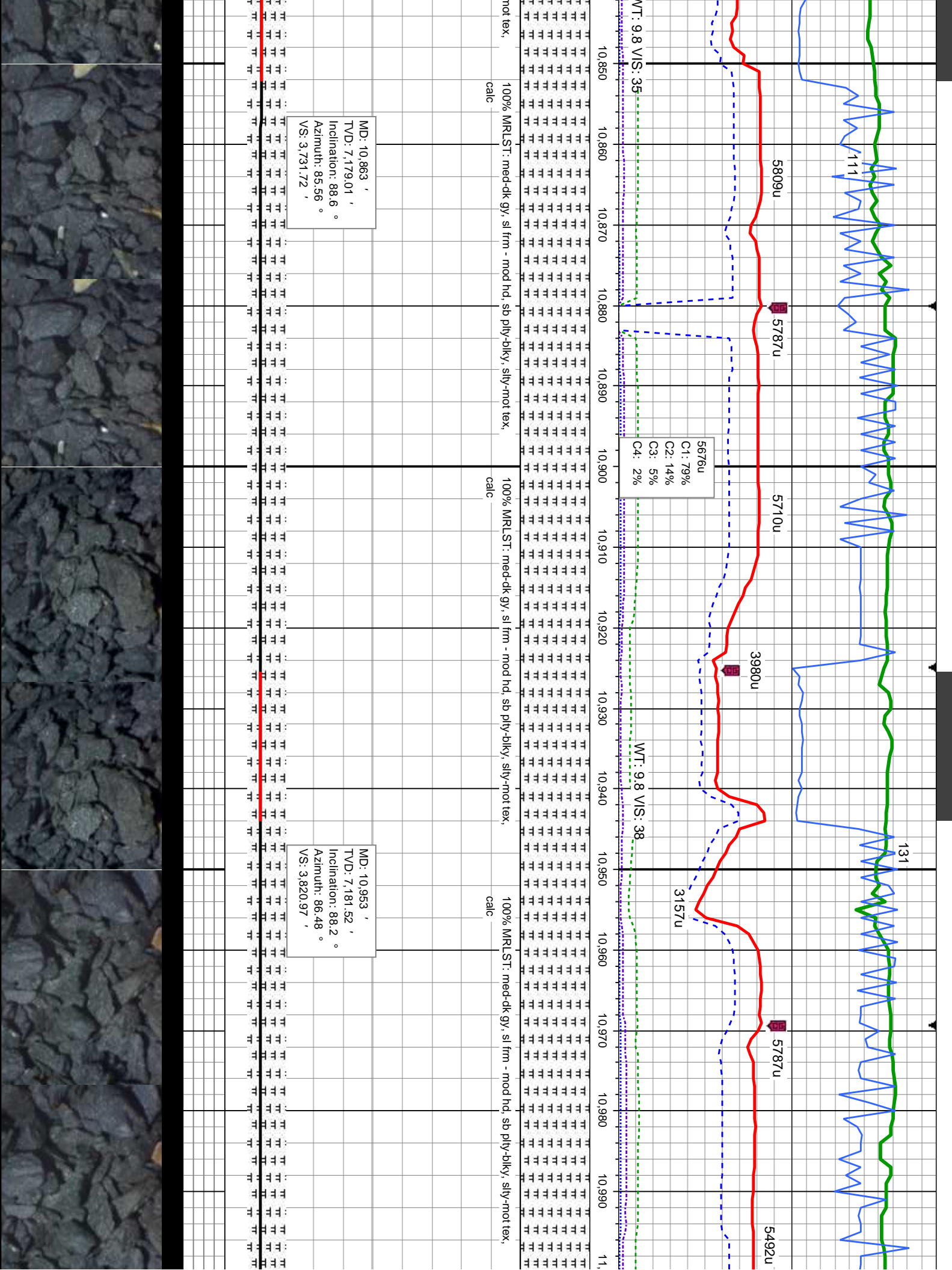




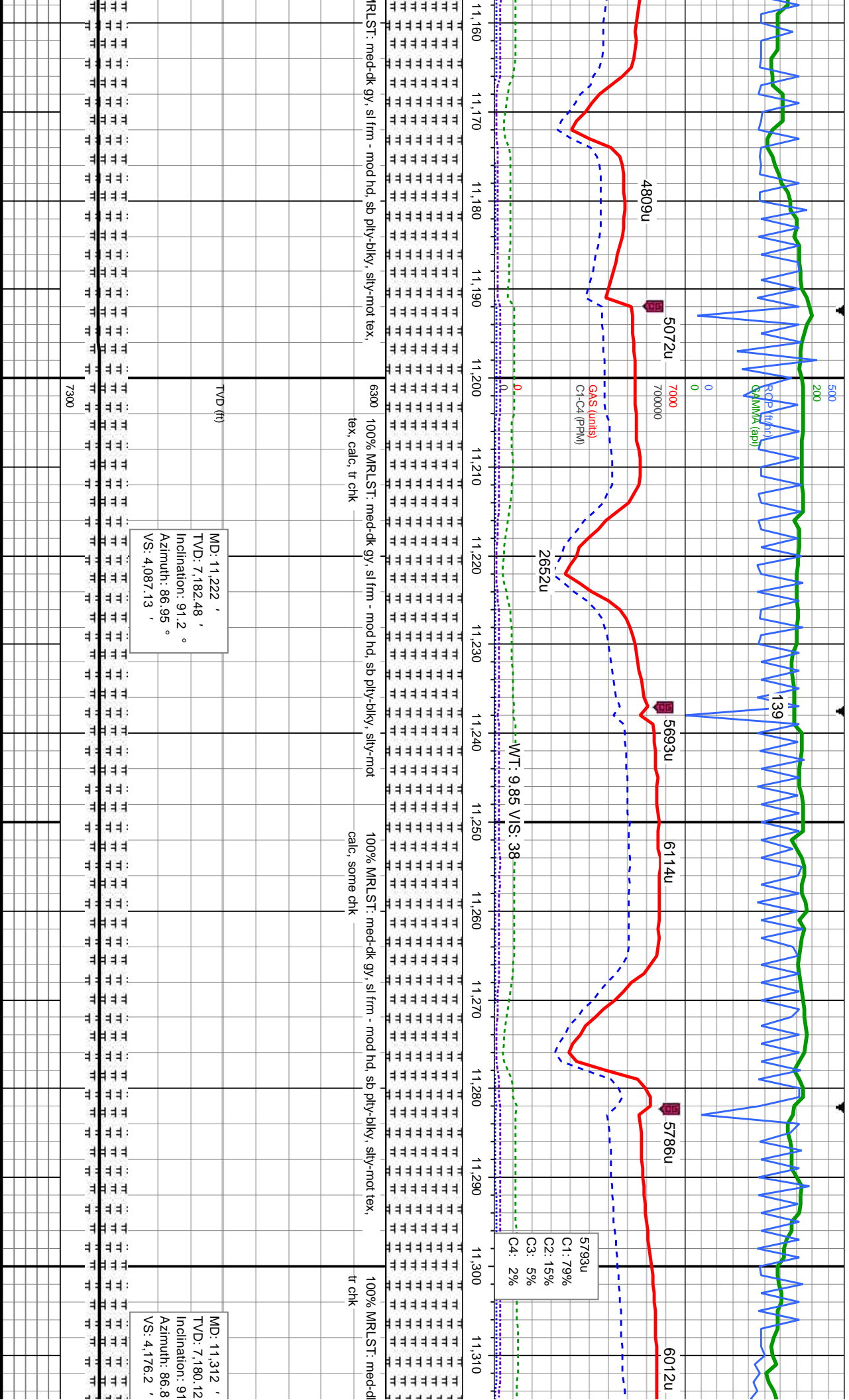


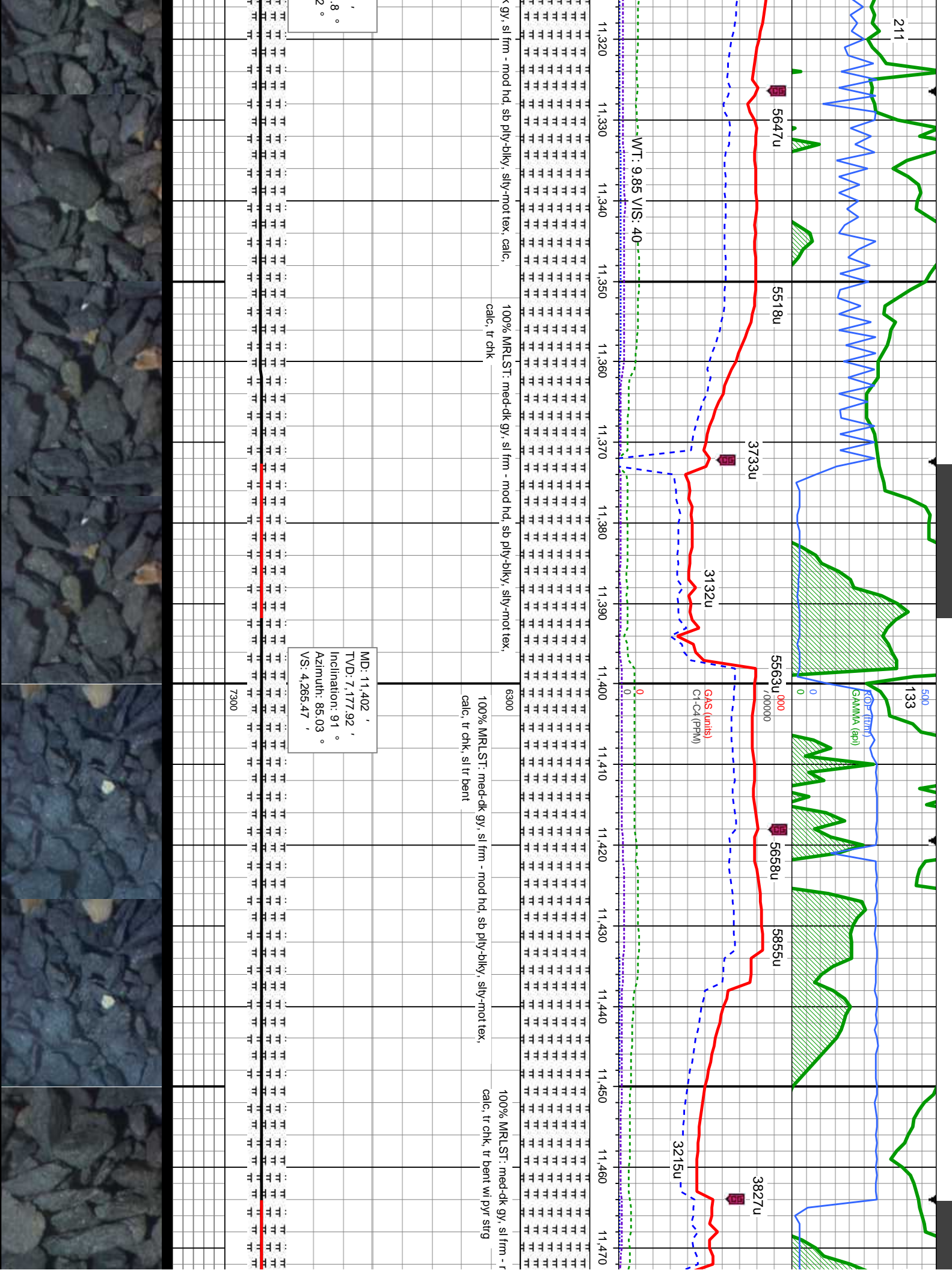


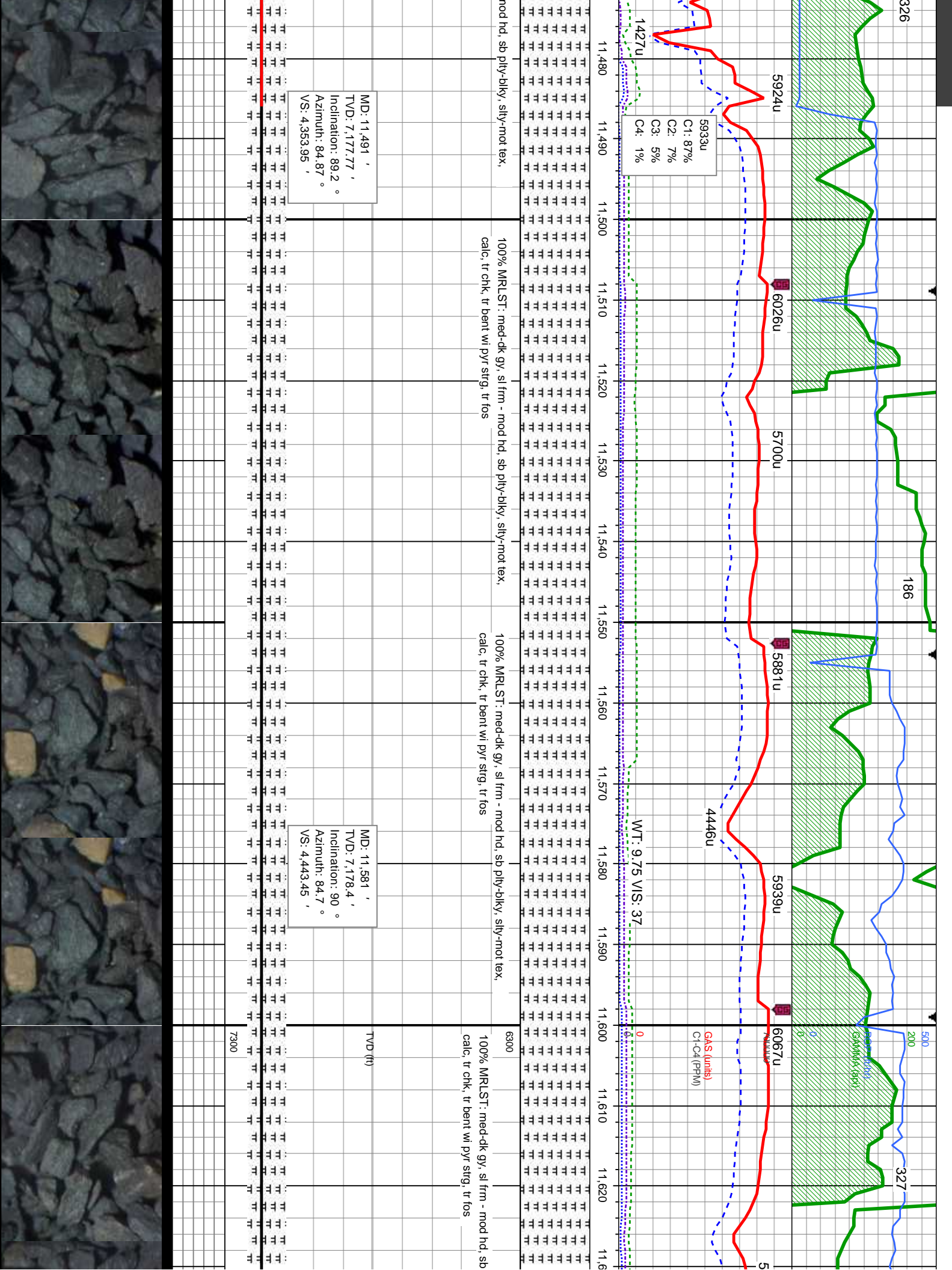


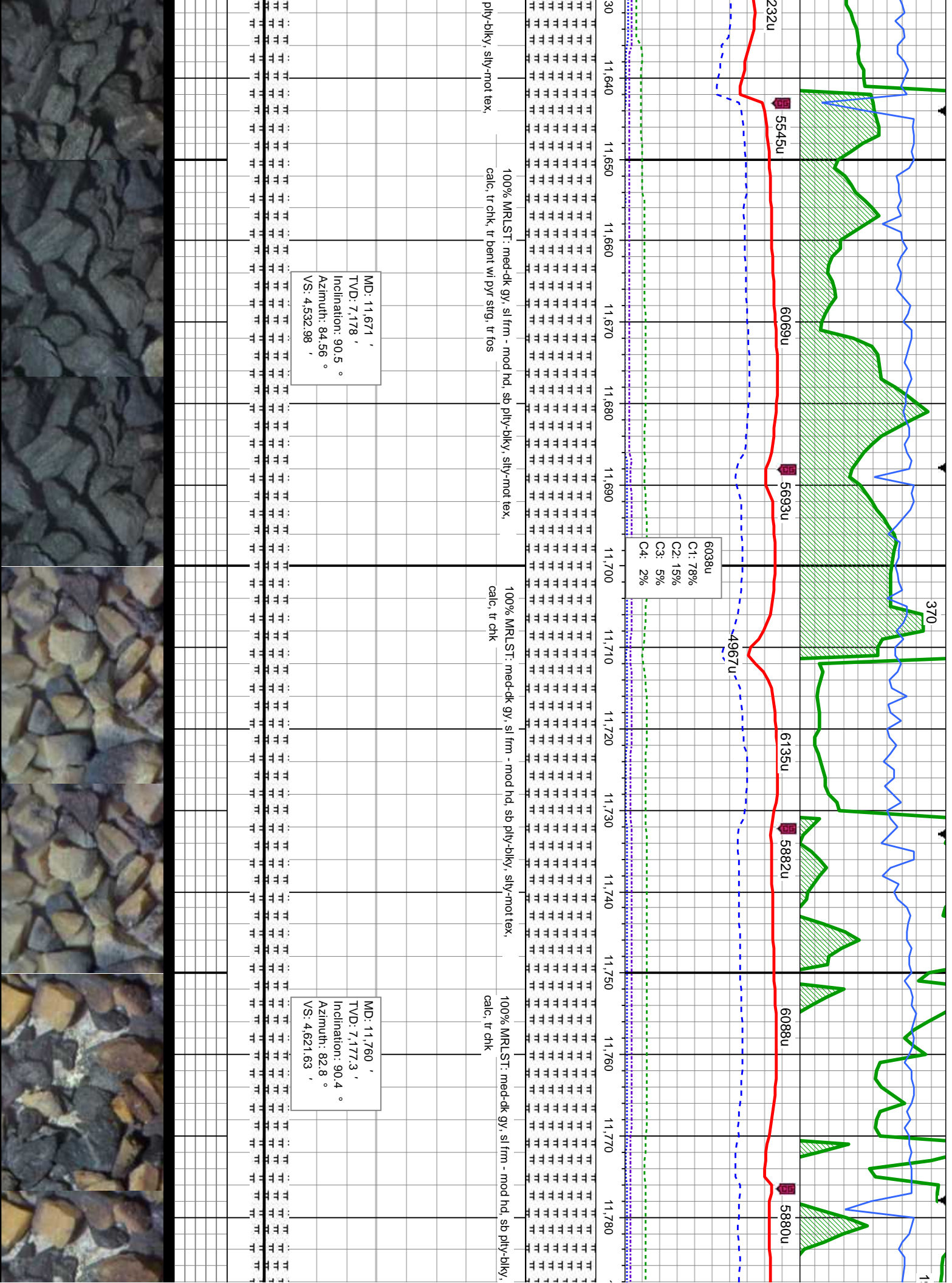


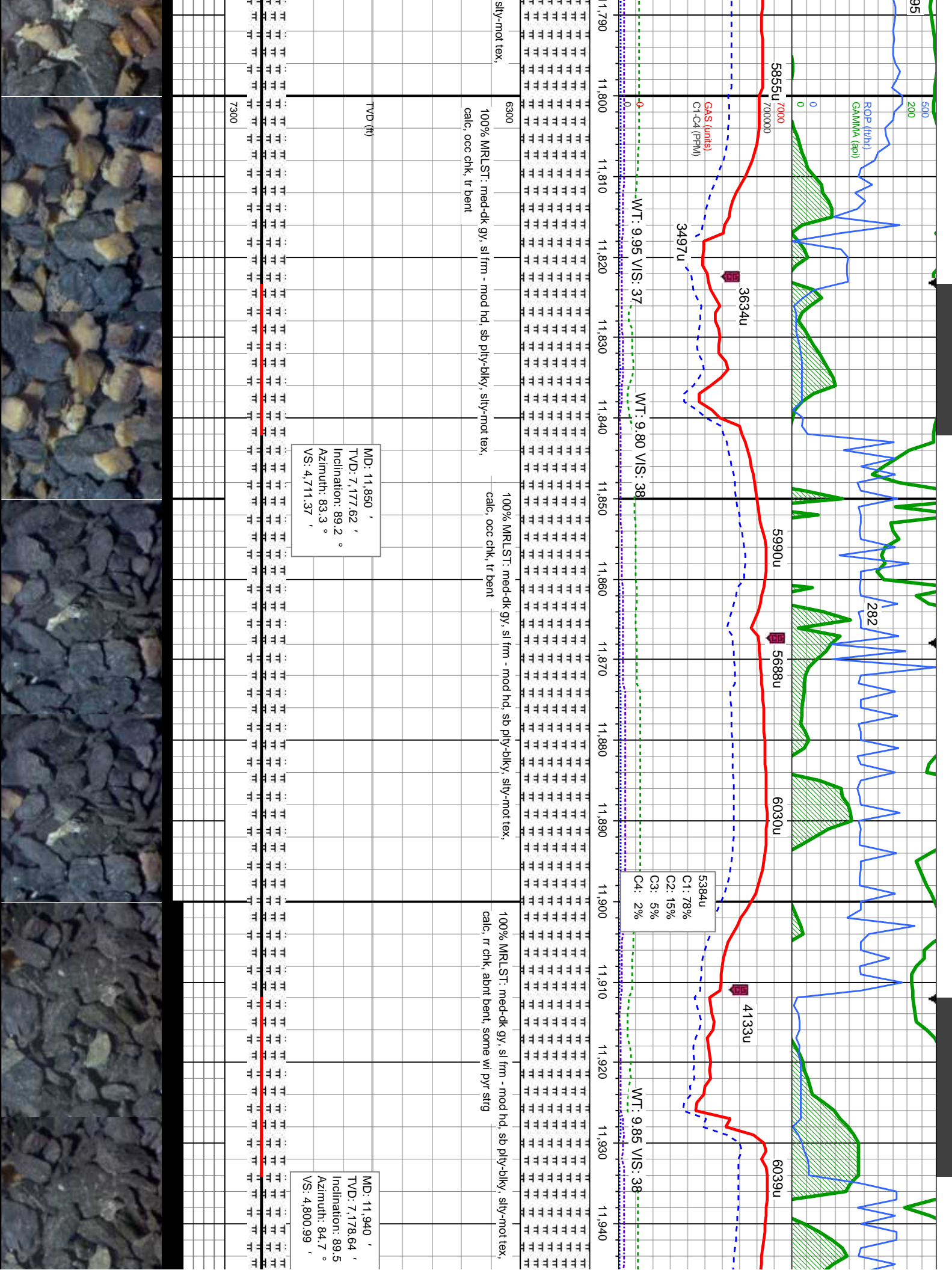


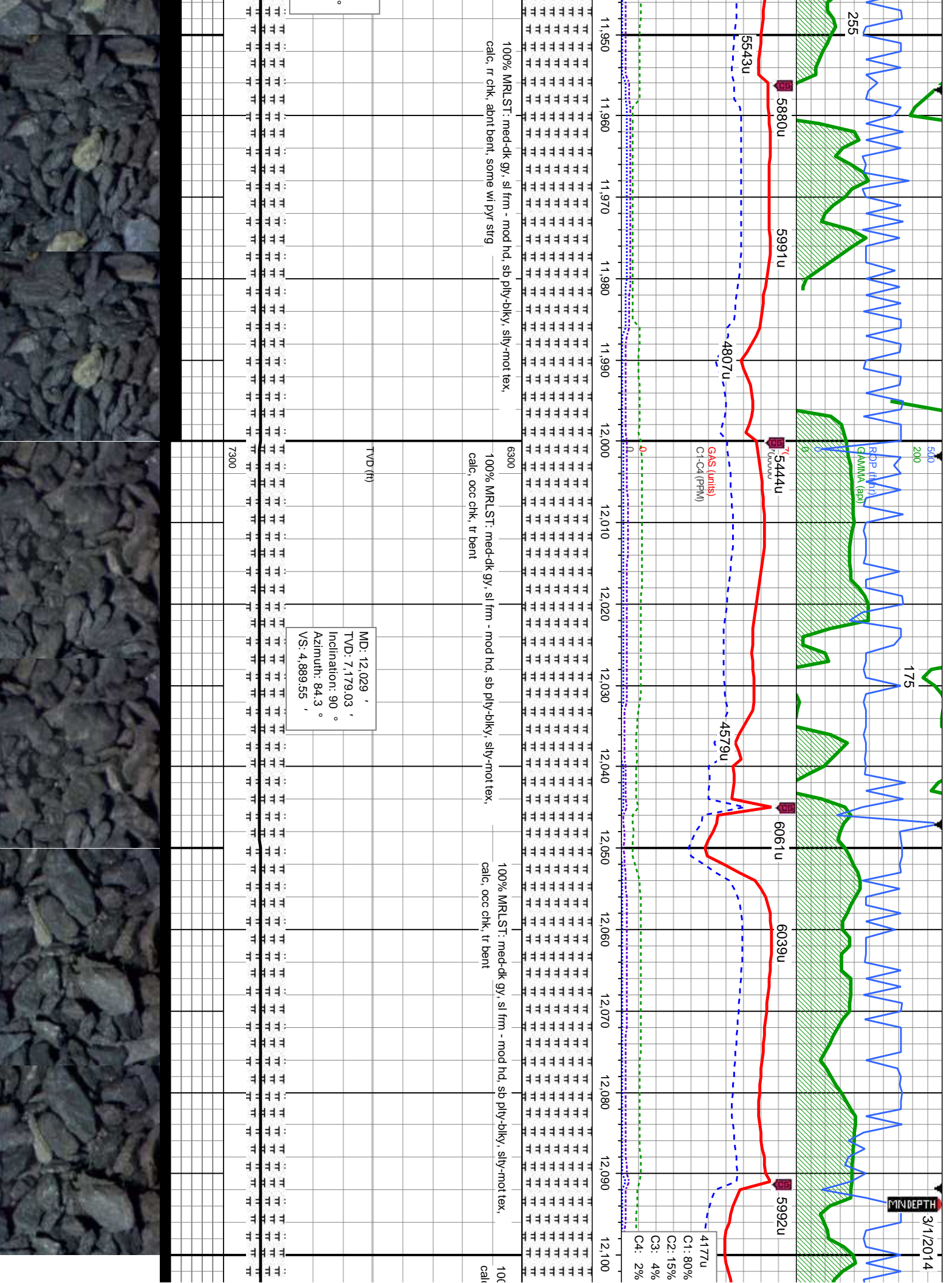


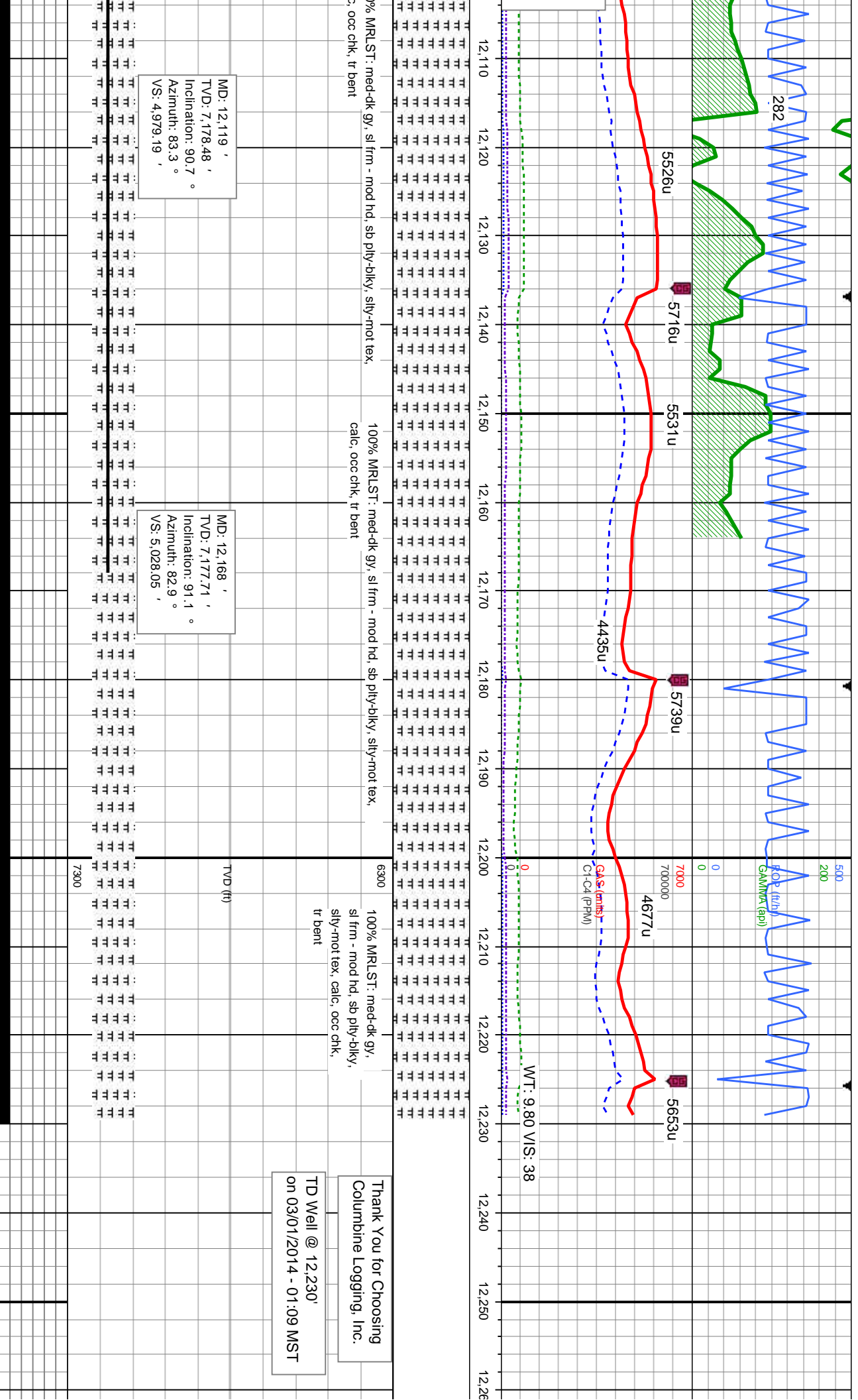












Thank You for Choosing
Columbine Logging, Inc.

TD Well @ 12,230'
on 03/01/2014 - 01:09 MST

