



Scale: 6.98" / 100'
Measured Depth Log

Well Name Sandau K25-65-1HN

Location SEC 25 T4N R66W

State COLORADO

Country USA

API Number 05-123-37763

Region DJ BASIN

Spud Date 3/4/2014

Surface Coordinates 40.28208, 104.73374
2310' FSL x 318' FWL

Bottom Hole Coordinates 40.28228, 104.71579
2210' FSL x 75' FEL

Ground Elevation 4786'

Logged Interval 6435' **To** 12127'

Formation NIOBRARA C CHALK

Type of Drilling Fluid FW LSND

K.B. Elevation 4802'

Total Depth 12127'

County WELD

Rig Number PERCISION DRILLING 829

AFE # 136988

Field HAMBERT

Drilling Completed 3/15/2014

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

AY
2022

Geologist

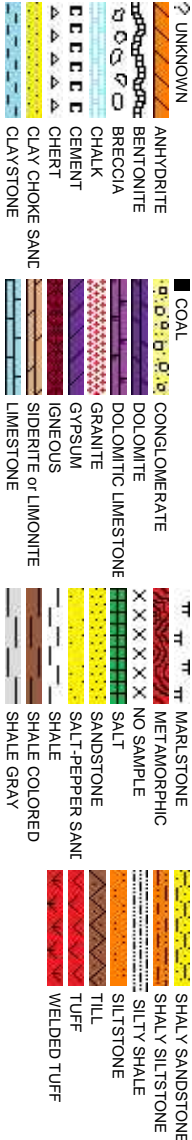
c.
AY
2022

Other

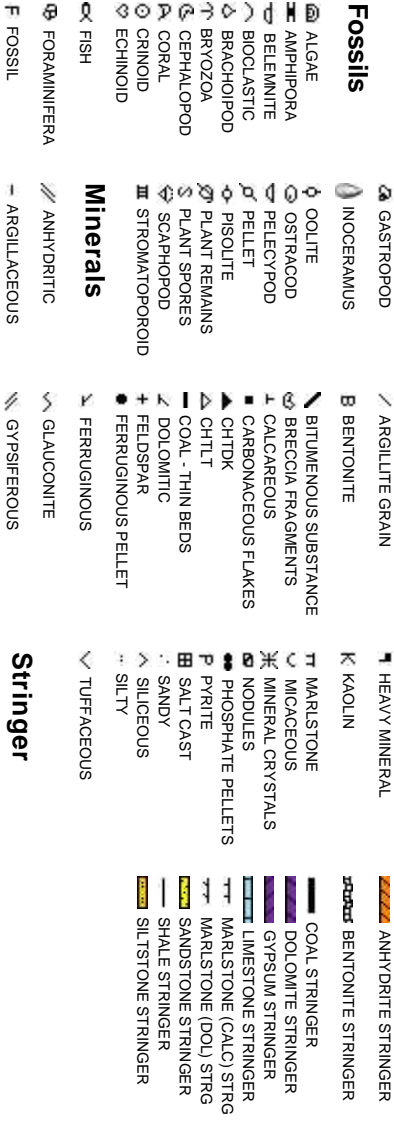
2385 S. LIPAN STREET
DENVER, CO 80223

RYAN SHILLING
WHITNEY JACKS

Rock Types



Accessories



Other Symbols

Oil Show P PINPOINT V VUGGY

D DEAD **Engineering**

● EVEN ○ QUESTIONABLE BIT

● SPOTTED STAINING ▲ CONNECTION (UP)

⋮ DST INTERVAL ⚡ FAULT

⇄ FORMATION TOP

● GAS SHOW ● OIL SHOW

▽ WIRELINE TESTED - LEFT E EARTHY
△ WIRELINE TESTED - RT FX FINELYXLN

LSB DRILL STEM TEST
MNDEPTH MN DEPTH L LITHOGRAPHIC
MX MICROXLN

Rounding MNDEPTH UP MS MUDSTONE

Porosity ▼ CONNECTION (DOWN)

CONNECTION GAS
E EARTHY CONNECTION GAS (LEFT)

F FENESTRAL TRIP GAS

F FRACTURE TRIP GAS (LEFT)

X INTERCRYSTALLINE

INTEROOLITIC DOWN TIME GAS

MOLDIC CORE - LOST

DOWN TIME GAS (LEFT)
CORE - LOST
CORE - RECOVERED

MNDEPTH MNDEPTH
MN DEPTH (DOWN)

▲ ANGULAR

NORMAL FAULT

OVERTURNED STRATA

REVERSE FAULT

CASING

Textures

SIDEWALL CORE (LEFT)
SIDEWALL CORE (RIGHT)
SLIDE
SURVEY

R ROUNDED
B SUBANG
SUBRND

Sorting

M MODERATE

P POOR
W WELL

BS BOUNDSTONE
CHALKY
CRYPTOXLN

Slide/Rotate

ROP
ROF
GAMMA

ROP Scale
0-500 ft/hr
Gamma Scale
0 - 200 API

Total Gas & Chromatograph

GAS
C1
C2
C3
C4

Gas Scale
0 - 5000 units

COLUMBINE LOGGING, INC. RIGGED
UP ON 03/05/2014 MANNED
2-PERSON LOGGING WITH
BLOODHOUND GAS
CHROMATOGRAPH UNIT # 0715

Depth Labels

6,390 6,400 6,410 6,420 6,430 6,440 6,450 6,460 6,470 6,480 6,490 6,500 6,510 6,5

% Lith

TVD SCALE
6300'-7300'

Well Bore
TVD

Bit Data
Bit #: 3
Type: V516DUX
Size: 8.75
Depth In: 6,435 '
Jets: 5x14
S/N: 4006609

Log Continues From
Sandau K25-65-1HN-VERT

Oil Show

exc
mod
tr
sl

Images



3/7-10/2014

100

4877u

1372u
C1: 71%
C2: 20%
C3: 8%
C4: 1%

1817u

3151u

KOP = 6435'

1017u

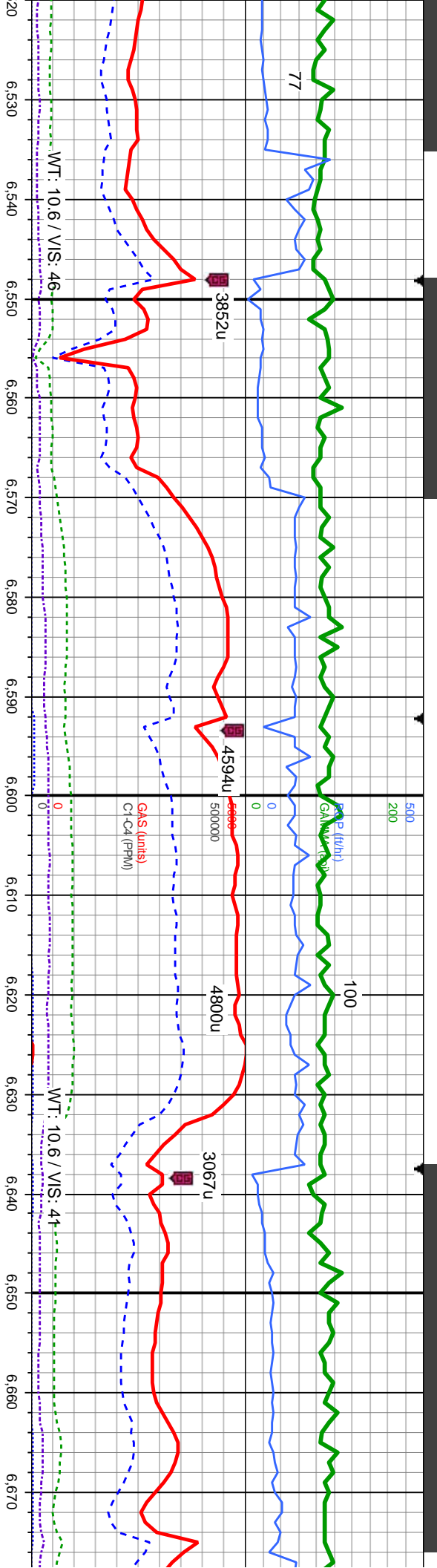
WT: 10.5 / VIS: 46

MD: 6,454 '
TVD: 6,423.79 '
Inclination: 3.3 °
Azimuth: 109.1 °
VS: -260.88 '

MD: 6,499 '
TVD: 6,468.57 '
Inclination: 7.8 °
Azimuth: 93.2 °
VS: -256.62 '

85% SLTY SH: lt-med gy, sft-sl frm, fin, 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 md-ang, mod-w srt, cl sup, cly cmt, non calc, tr ss

85% SLTY SH: lt-med gy, sft-sl
lstr, sl calc; 15% SHY SS: wh-
mod-w srt, cl sup, cly cmt, non



MD: 6,543 '
TVD: 6,511.94 '
Inclination: 11.5 °
Azimuth: 89.9 °
VS: -249.26 '

MD: 6,588 '
TVD: 6,565.93 '
Inclination: 12.8 °
Azimuth: 91.1 °
VS: -239.79 '

MD: 6,633 '
TVD: 6,599.89 '
Inclination: 11.9 °
Azimuth: 91 °
VS: -230.18 '

MD: 6,67
TVD: 6,6
Inclination:
Azimuth:
VS: -219.

sl frm, fri, sb pty-bkly, v' gr, silty tex, rthy
it gy, s&p, bkly, frm, v f' gr, sb rnd-ang, calc, tr ss

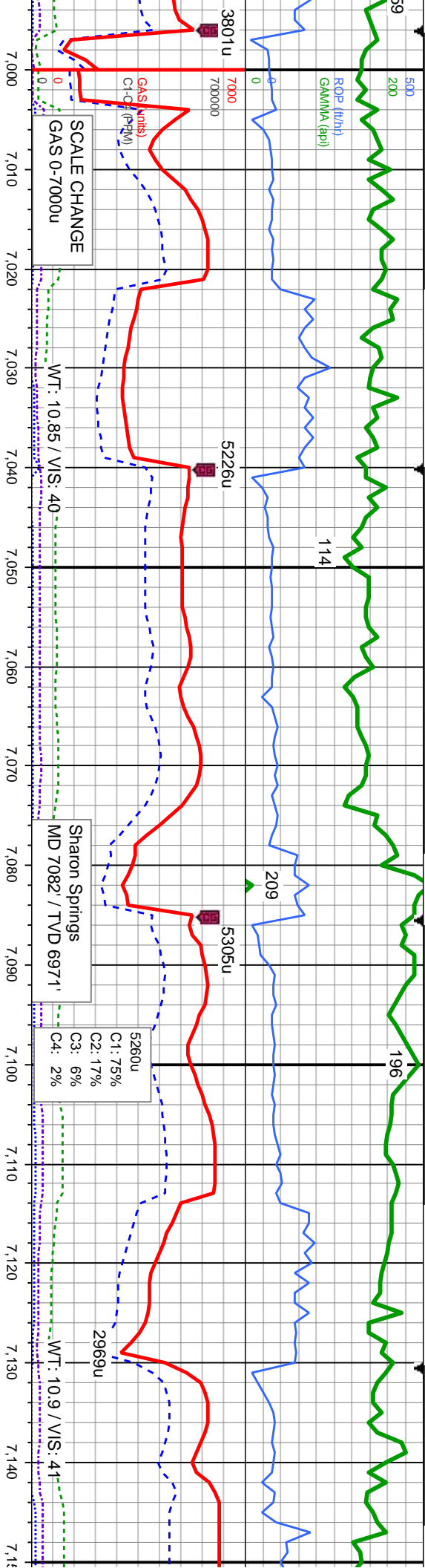
80% SLTY SH: lt-med gy, sft-sl frm, fri, sb pty-bkly, v' gr, silty tex, rthy lstr, sl calc, 20% SHY SS: wh-it gy, s&p, bkly, frm, v f' gr, sb rnd-ang, mod-w srl, cl sup, cly cnt, non calc, tr sh

85% SLTY SH: lt-med gy, sft-sl frm, fri, sb pty-bkly, v' gr, silty tex, rthy lstr, sl calc, 15% SHY SS: wh-it gy, s&p, bkly, frm, v f' gr, sb rnd-ang, mod-w srl, cl sup, cly cnt, non calc, tr sh

85% SLTY SH: lt-med gy, sft-sl frm, fri, rthy lstr, sl calc, 15% SHY SS: wh-it gy, rnd-ang, mod-w srl, cl sup, cly cnt, non







100-100% SLTY SH: lt-med gy, sft-sl frm, fri, sb ply-bkly, vf gr, silty tex,
rthy lstf, sl calc, tr sh, tr chk, tr mist

MD: 7,036 '
TVD: 6,941.53 '
Inclination: 46.7 °
Azimuth: 89.7 °
VS: -30.41 '

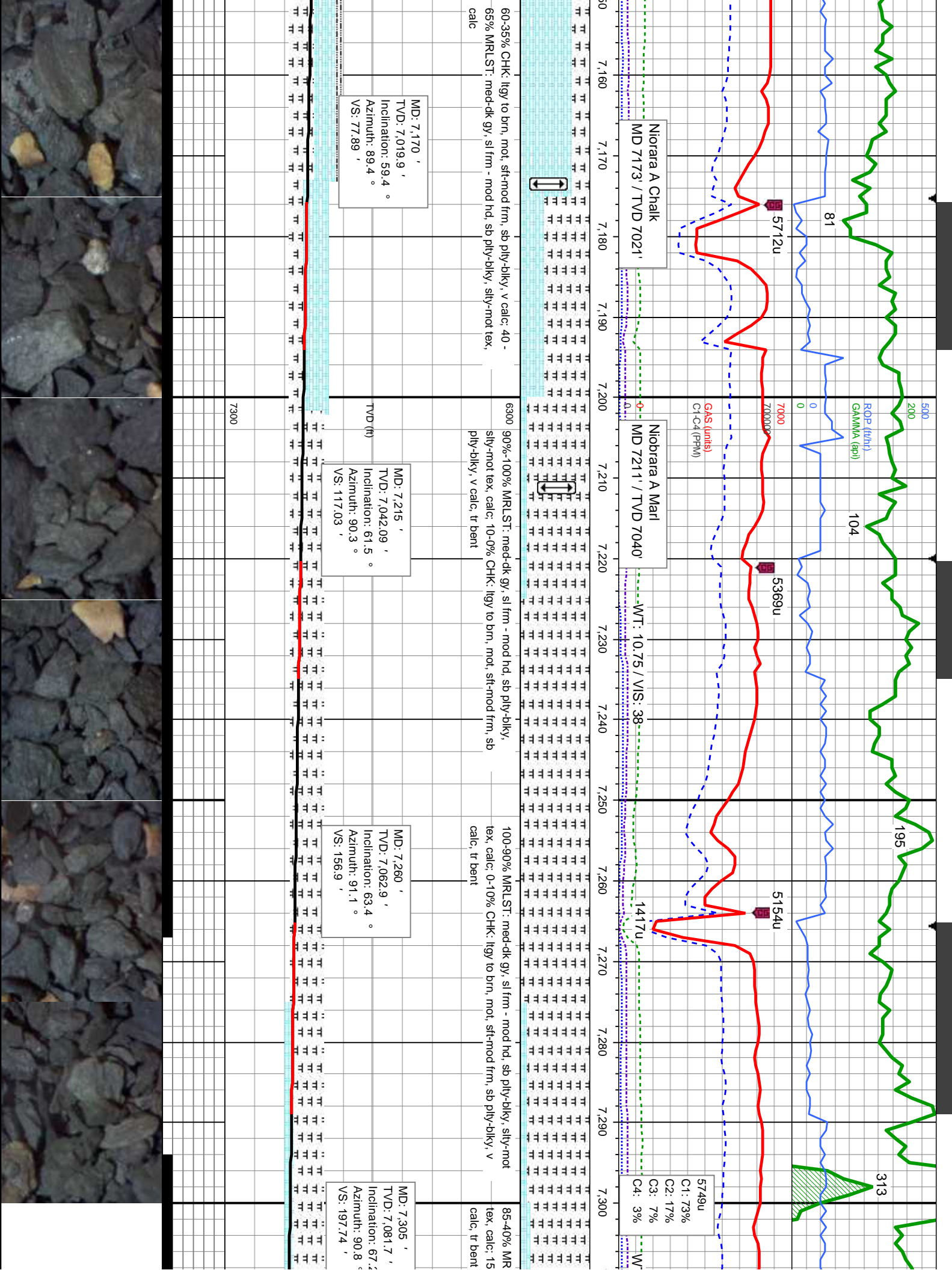
MD: 7,081 '
TVD: 6,970.74 '
Inclination: 52.3 °
Azimuth: 90.1 °
VS: 3.79 '

MD: 7,125 '
TVD: 6,996.22 '
Inclination: 56.9 °
Azimuth: 90.8 °
VS: 39.63 '

OIL SHOWS BEGIN

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





163

500
200

132

3/11/14
MINDEPTH

86

ROD (ft)
GAMMA (cp)

68

5273u
140000

5839u

GAS (units)
C1-C4 (PPM)

-3677u

4756u

Niobrara B Chalk
MD 7347' / TVD 7097'

Niobrara B Marl
MD 7414' / TVD 7119'

WT: 10.95 / VIS: 40

T: 10.7 / VIS: 38

ST: med-dk gy, sl frm - mod hd, sb ply-bkly, silty-mot
60% CHK: lgy to brn, mot, sft-mod frm, sb ply-bkly, v

80-20% CHK: lgy to brn, mot, sft-mod frm, sb ply-bkly, v calc;
20-80% MRLST: med-dk gy, sl frm - mod hd, sb ply-bkly, silty-mot
tex, calc, mod fos

6300 100-100% MRLST: med-dk gy, sl frm - mod hd, sb ply-bkly,
silty-mot tex, calc, tr chk

100-100% MRLST: med
calc

MD: 7,350 '
TVD: 7,098.34 '
Inclination: 69.4 °
Azimuth: 90.8 °
VS: 239.52 '

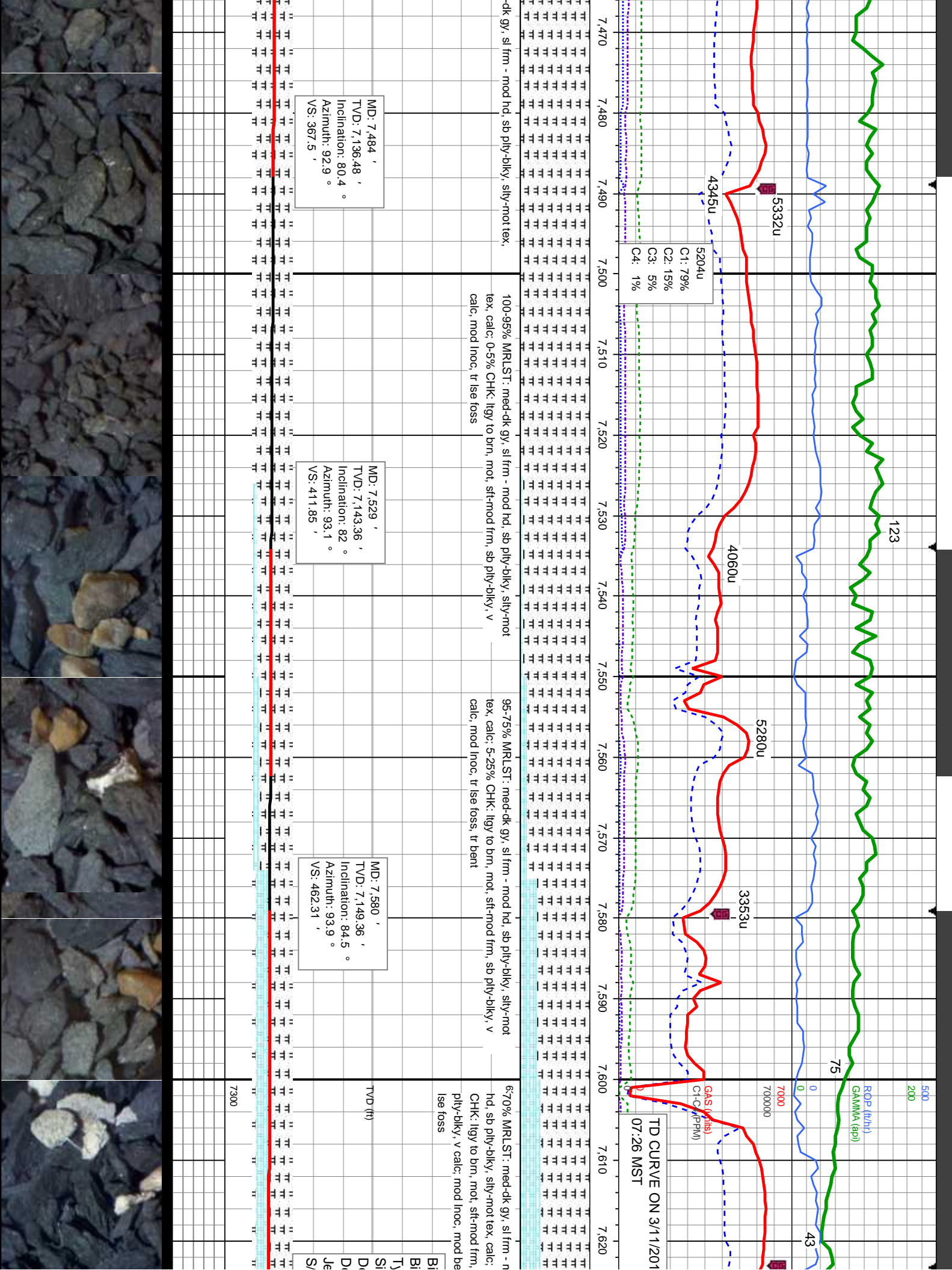
MD: 7,395 '
TVD: 7,113.66 '
Inclination: 70.8 °
Azimuth: 91.1 °
VS: 281.8 '

MD: 7,439 '
TVD: 7,126.74 '
Inclination: 74.6 °
Azimuth: 93.2 °
VS: 323.72 '

D (ft)

7300





3/12-13/2014

MINDEPTH

156

92

141

92

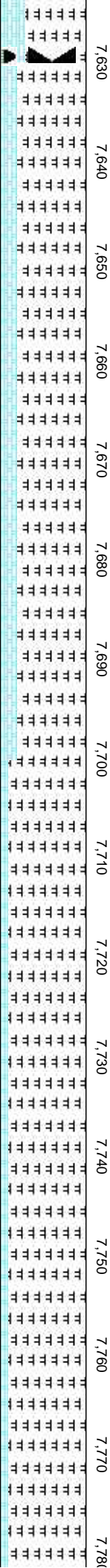
5841u

RESUMED ON 3/13/2014 @ 17:28
MST

BLOCKED SAMPLE LINE

WT: 10.0 / VIS: 36

BLOCKED S



80% MRLST: med-dk gy, sl frm - mod hd, sb ply-bkly, silty-mot tex, calc: 20% CHK:
lly to brn, mot, sft-mod frm, sb ply-bkly, v calc: mod inoc, mod bent, tr lse foss

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: mod
inoc, mod bent

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: mod
inoc, mod bent

t Data

t #: 4

type: DP4055

size: 6.12

depth In: 7,630 '

depth Out: 12,127 '

bits: 5x13

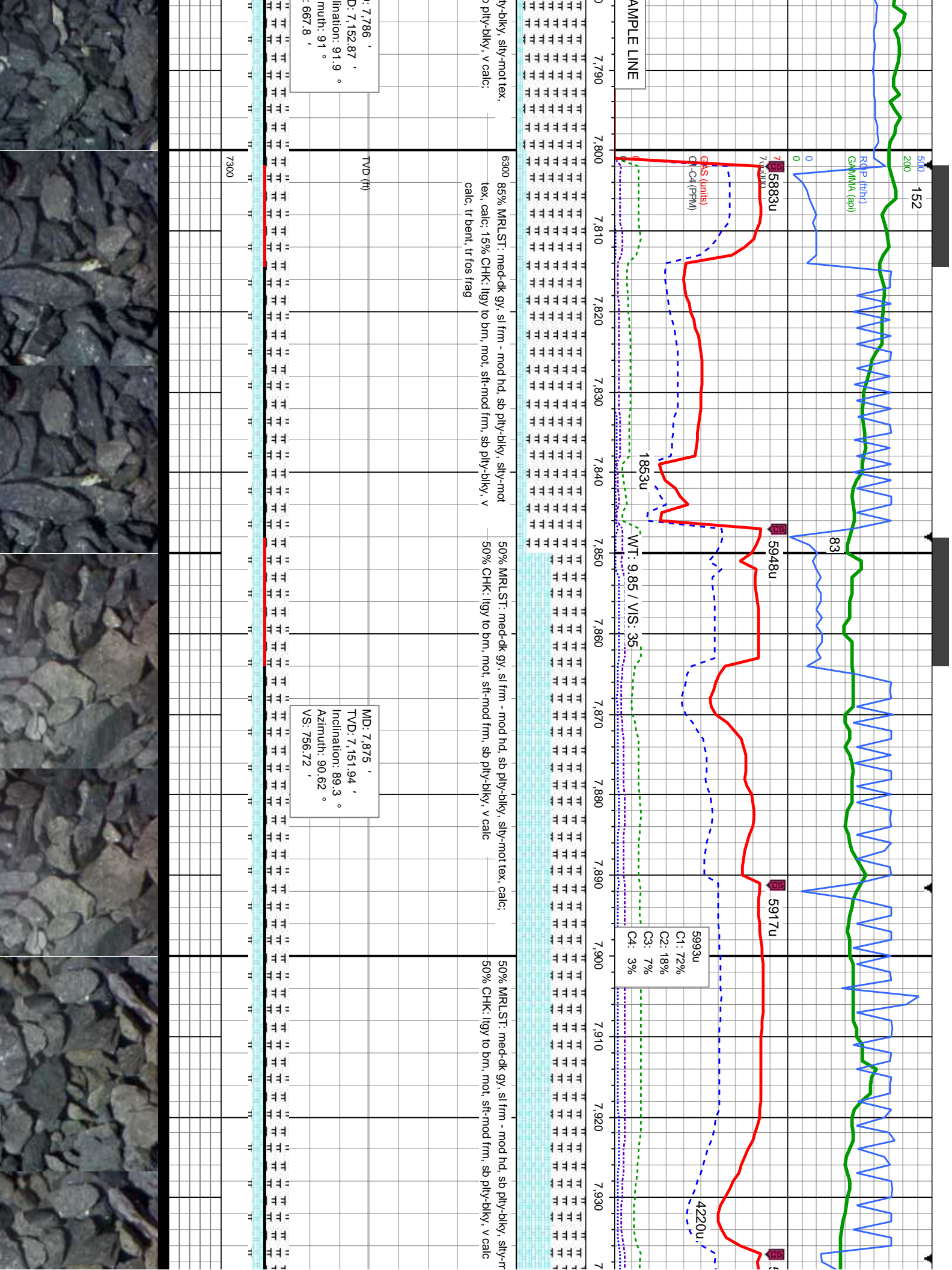
N: 7039078

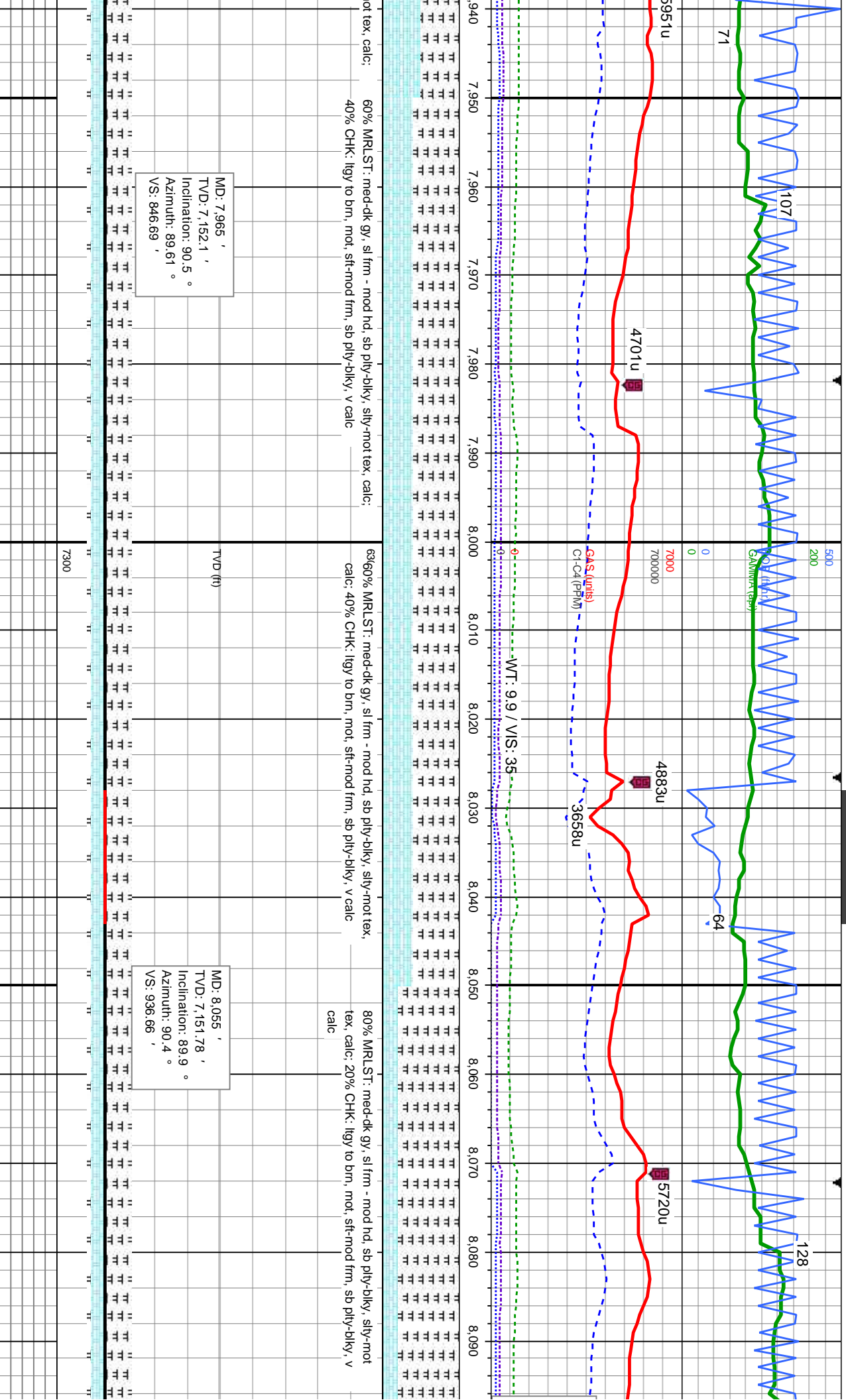
MD: 7,651 '
TVD: 7,154.25 '
Inclination: 87.6 °
Azimuth: 91.5 °
VS: 532.95 '

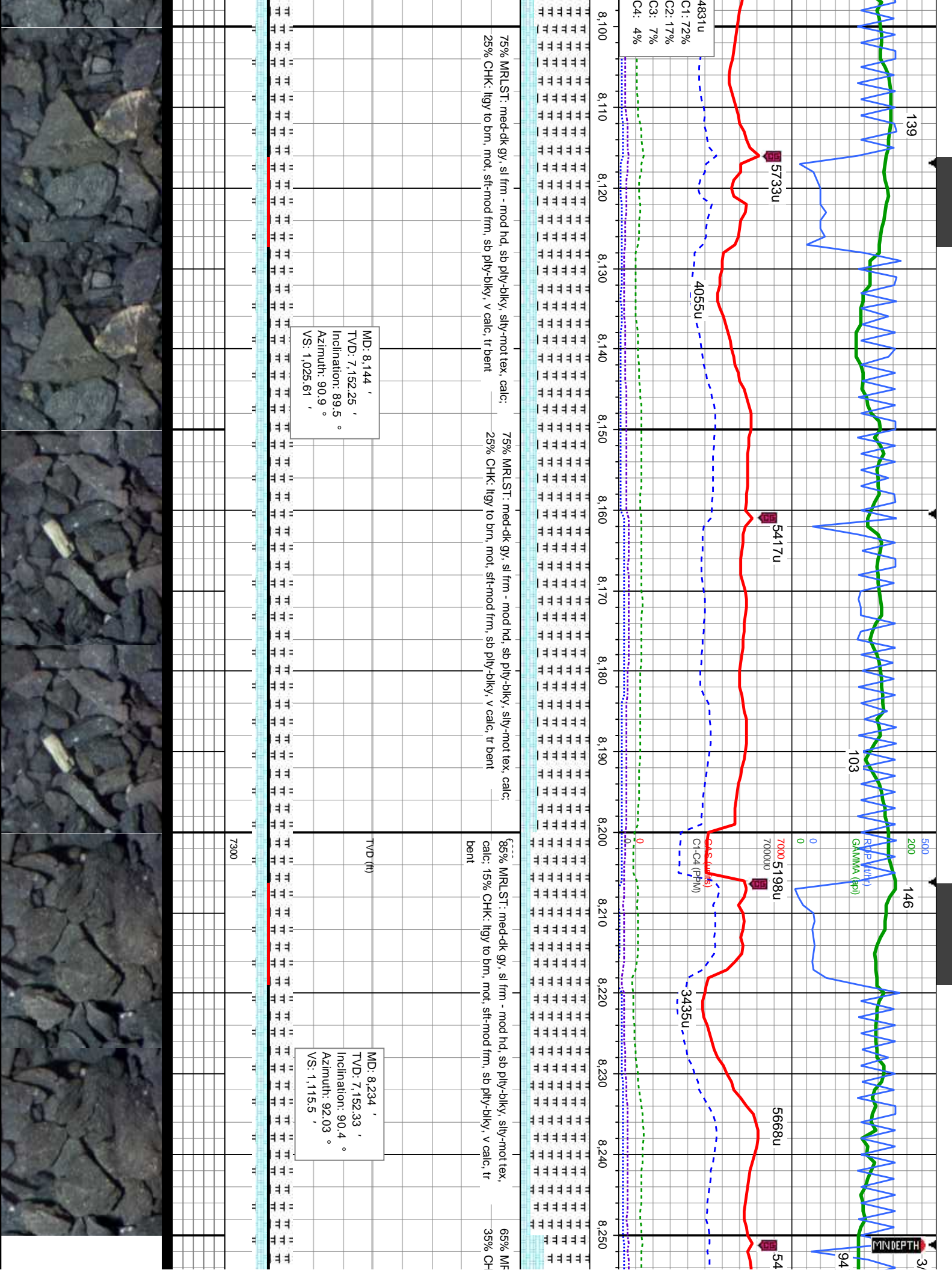
MD: 7,696 '
TVD: 7,154.91 '
Inclination: 90.7 °
Azimuth: 90.84 °
VS: 577.89 '

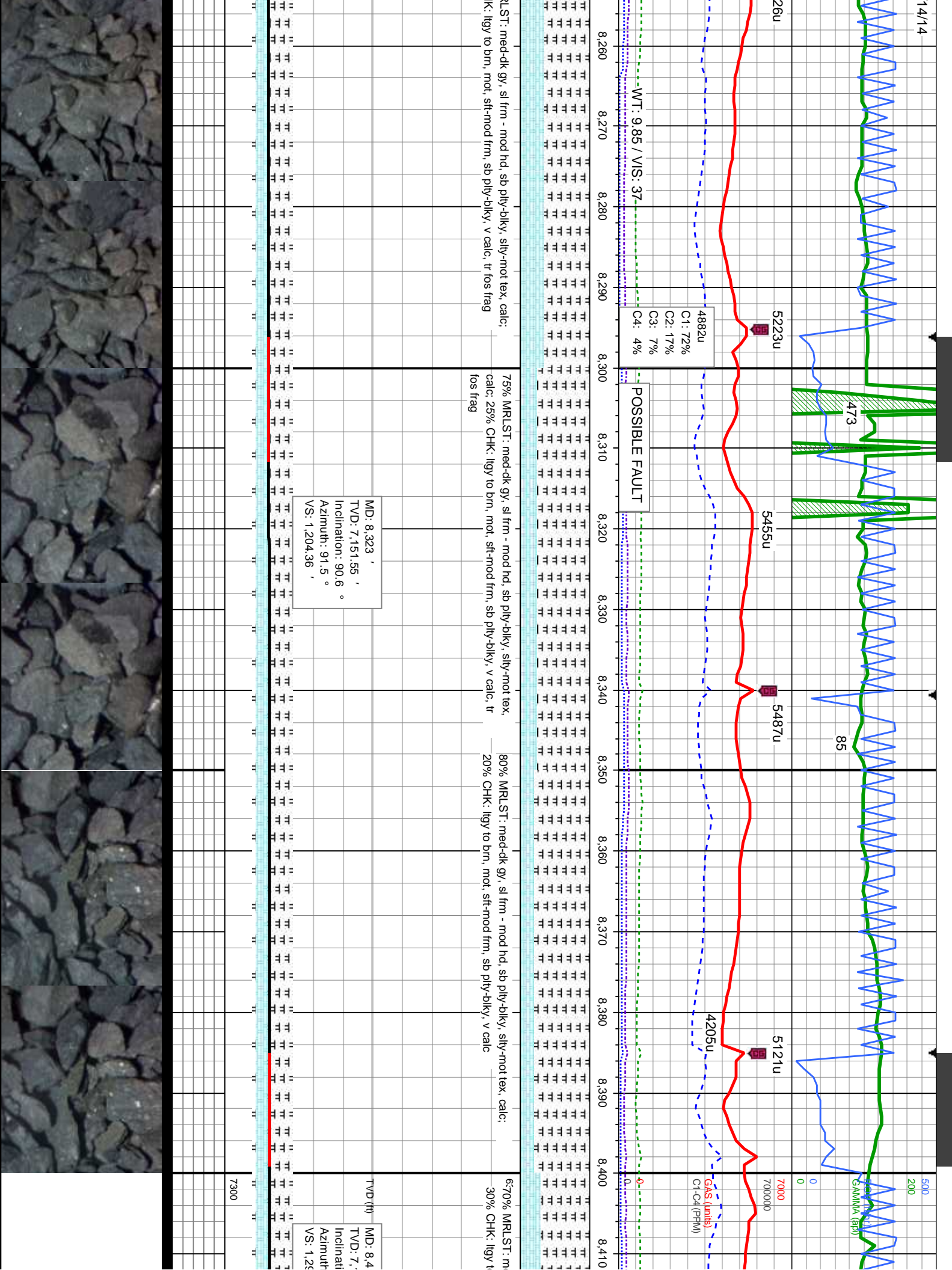
ME
TV
Ince
Azi
VS

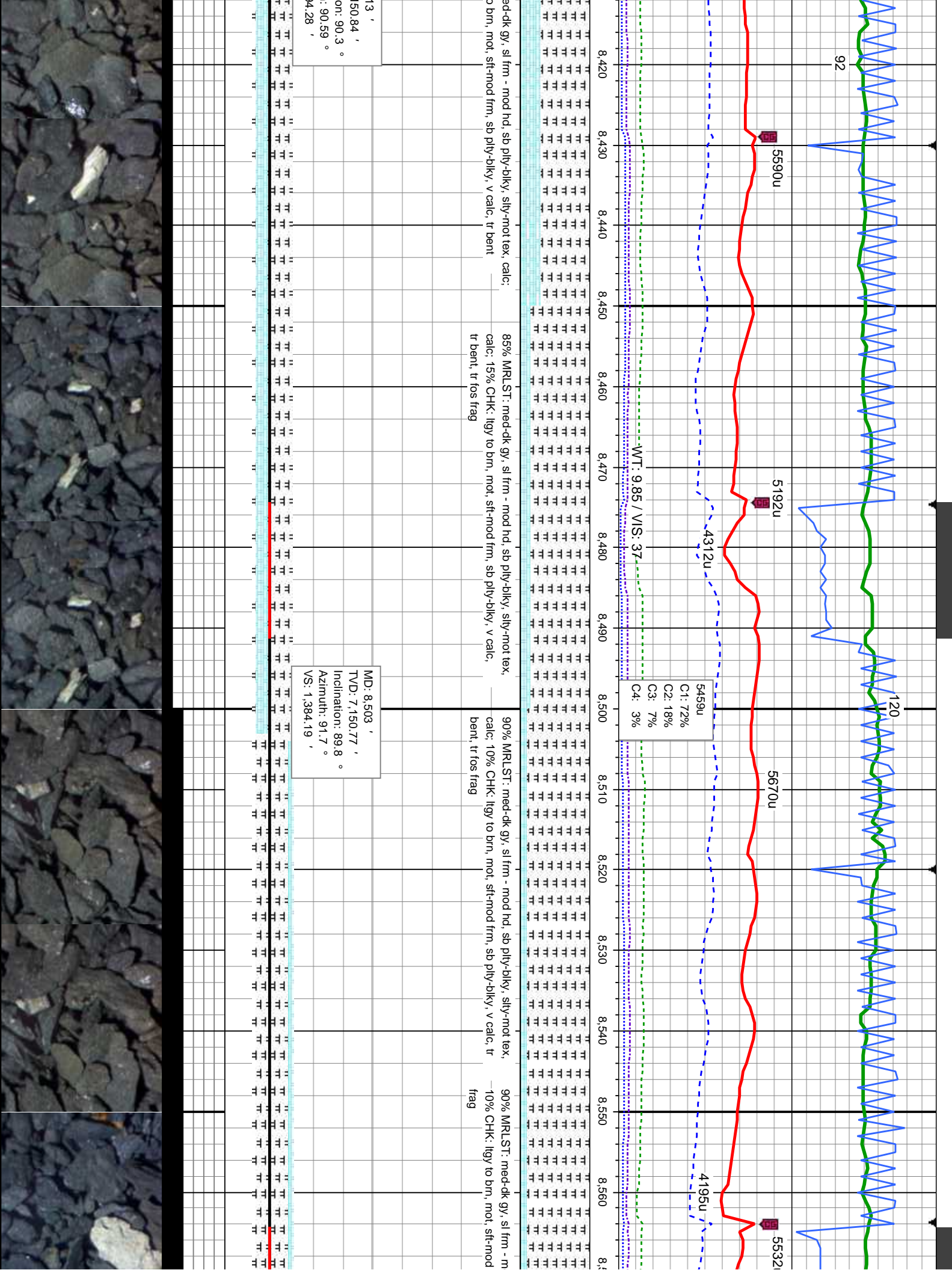


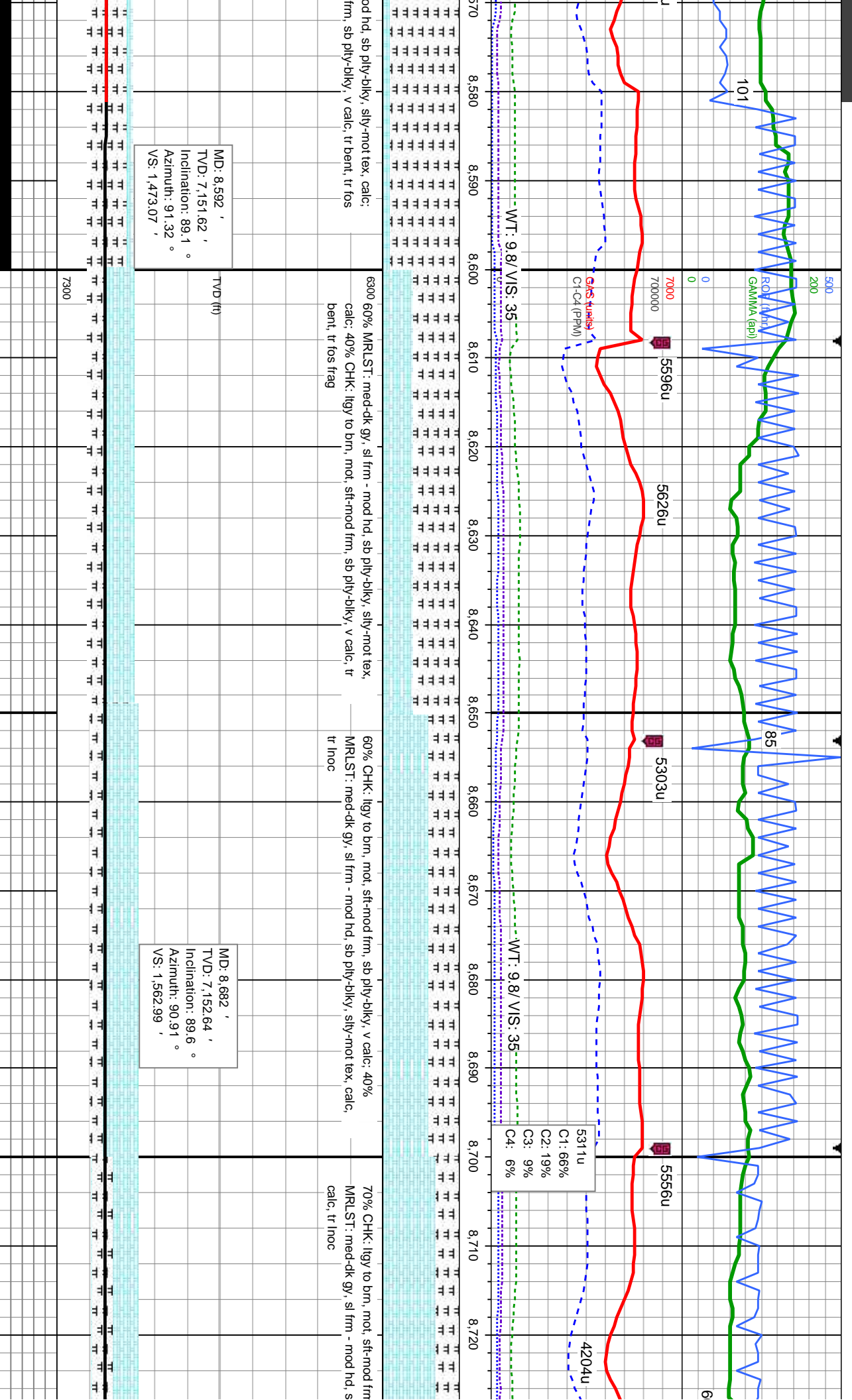


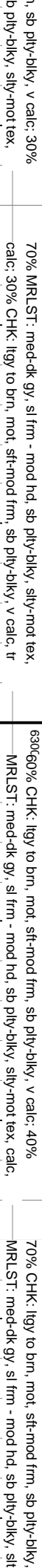










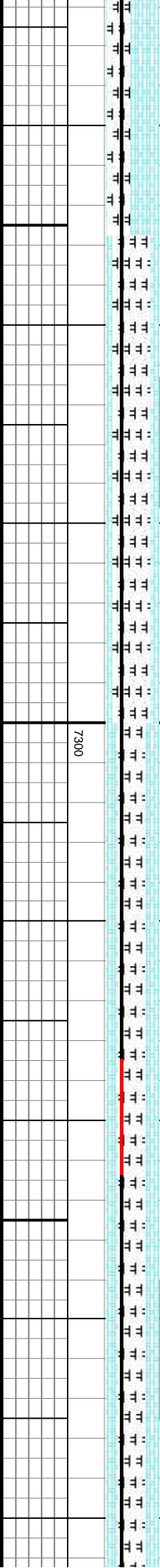


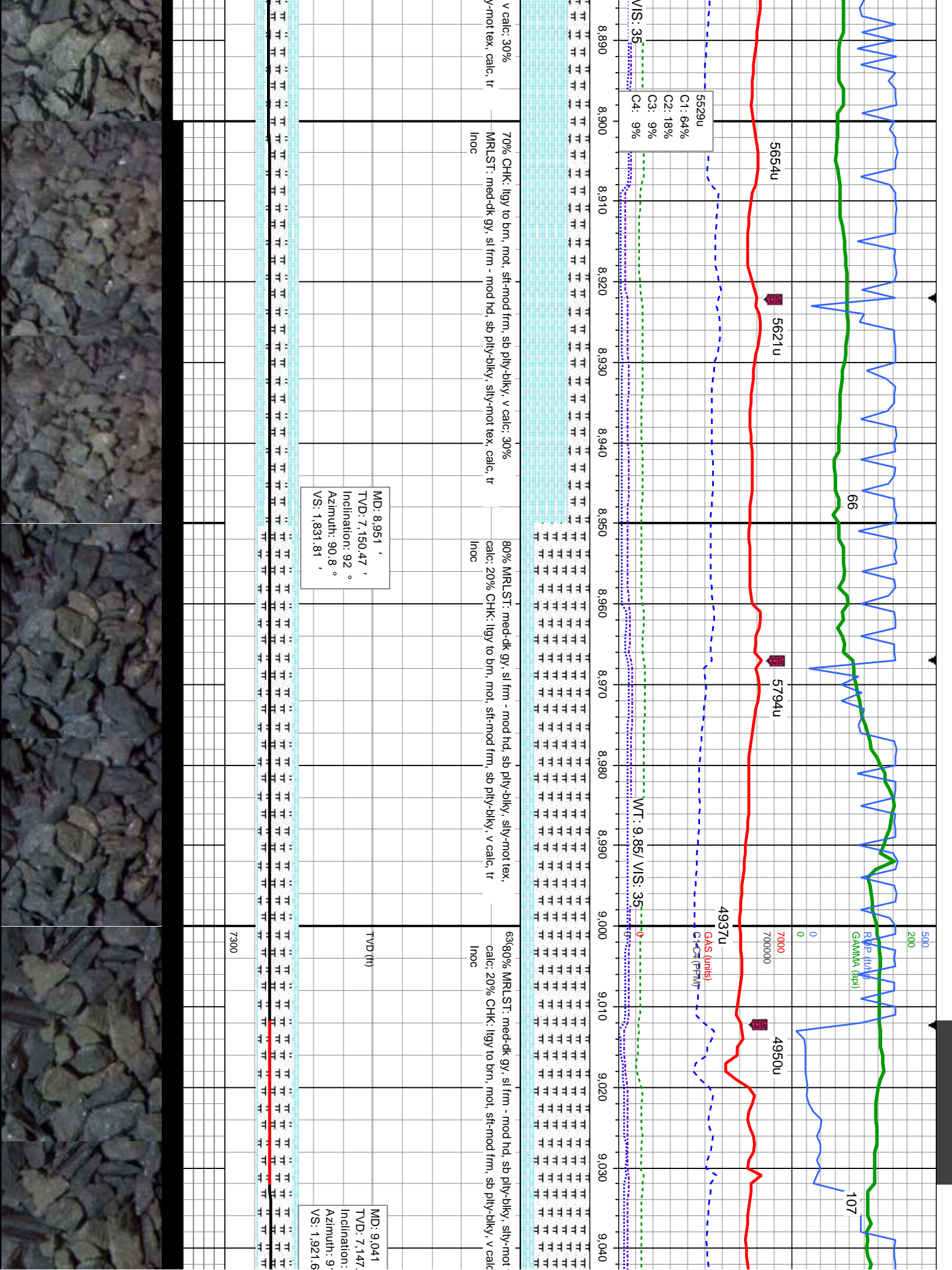
6300, 60% CHK: lgy to brn, mod, sft-mod frm, sb ply-bkly, v calc; 40% MRLST; med-dk gy, sl frm - mod hd, sb ply-bkly, slty-mot tex, calc, tr inoc

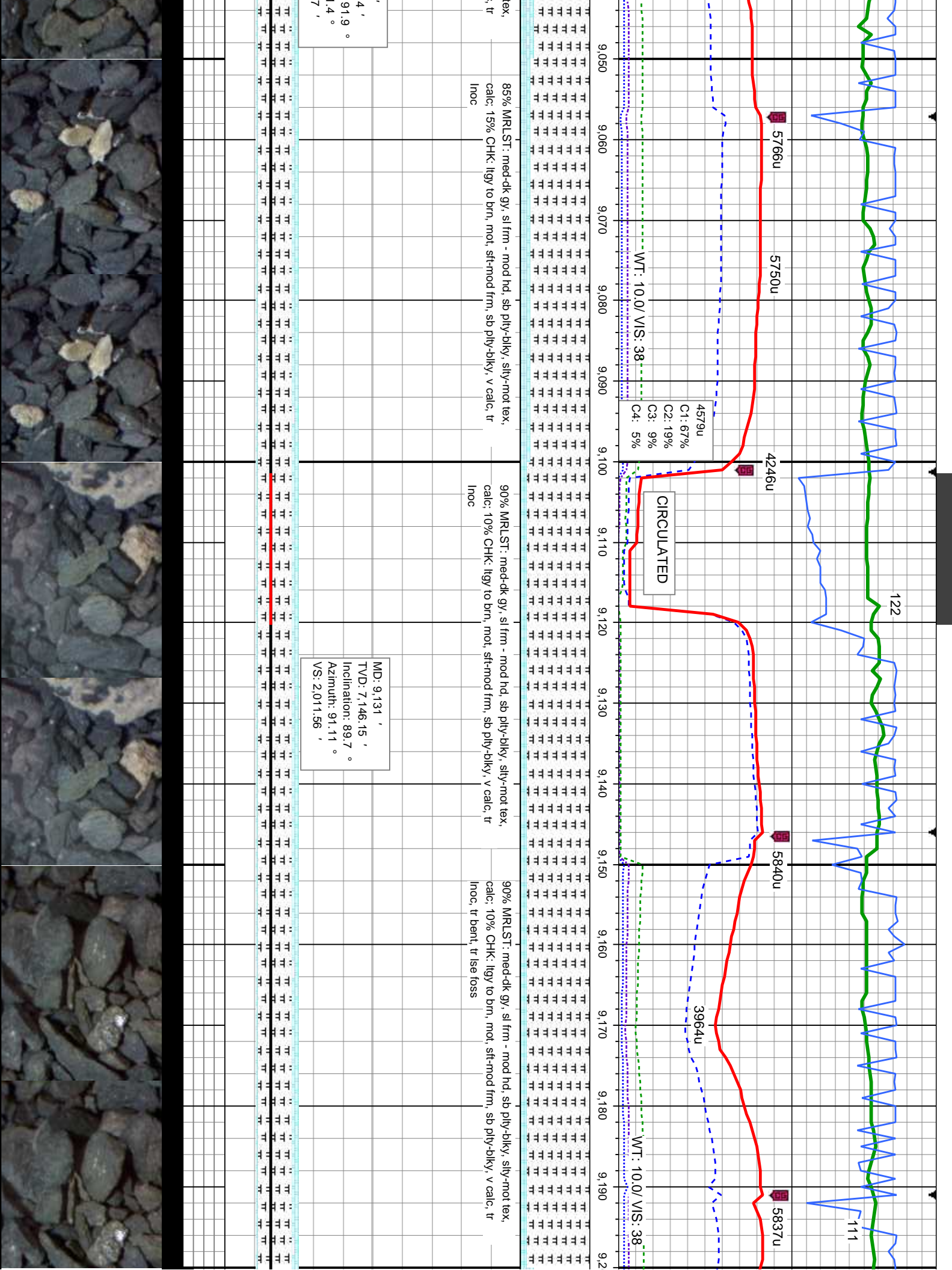
70% CHK: lity to brn, mot, sft-mod frm, sb plty-bilky, MRLST: med-dk gy, sl frm - mod hd, sb plty-bilky, slt Inoc

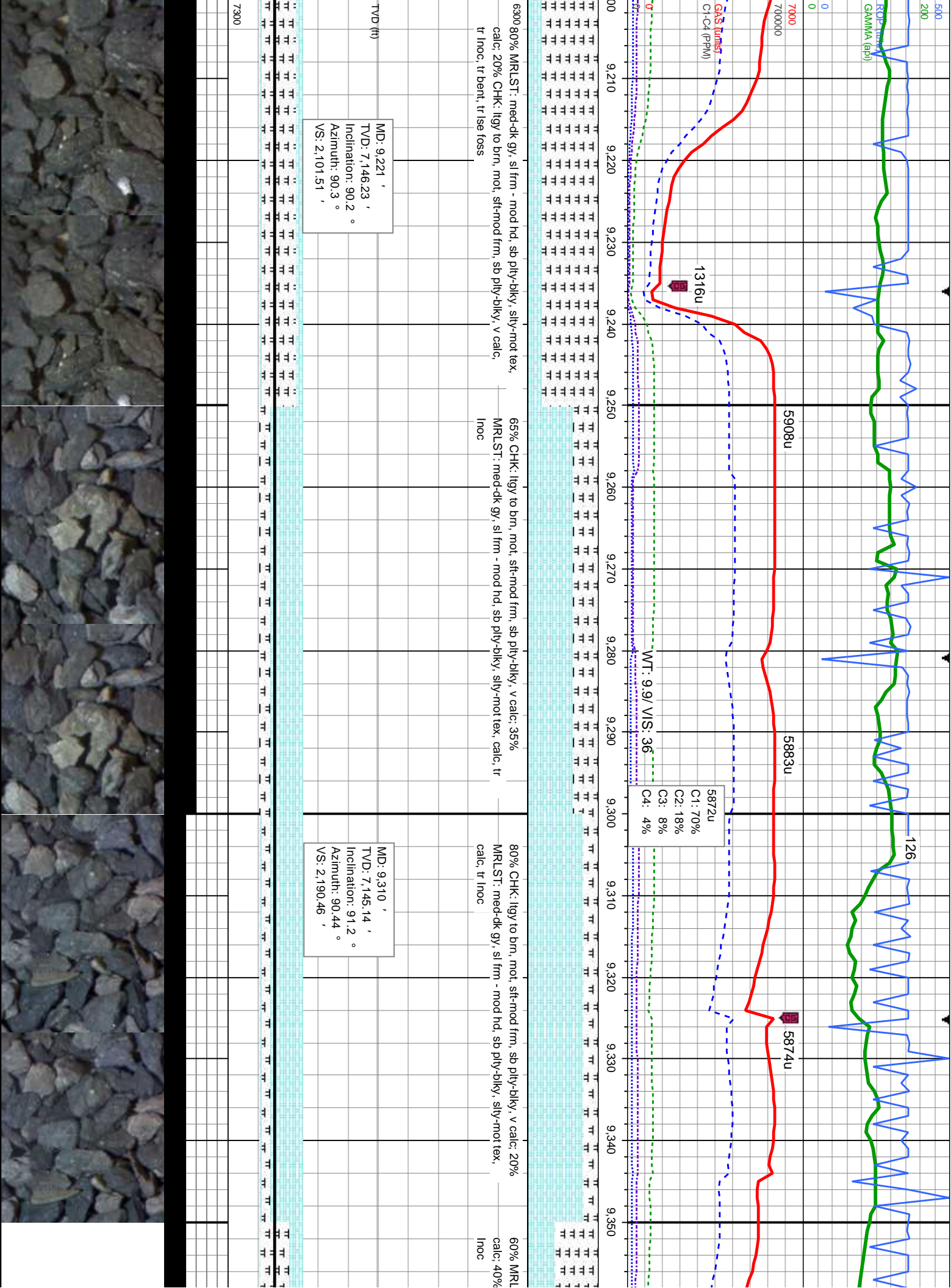
TV/D (ft)

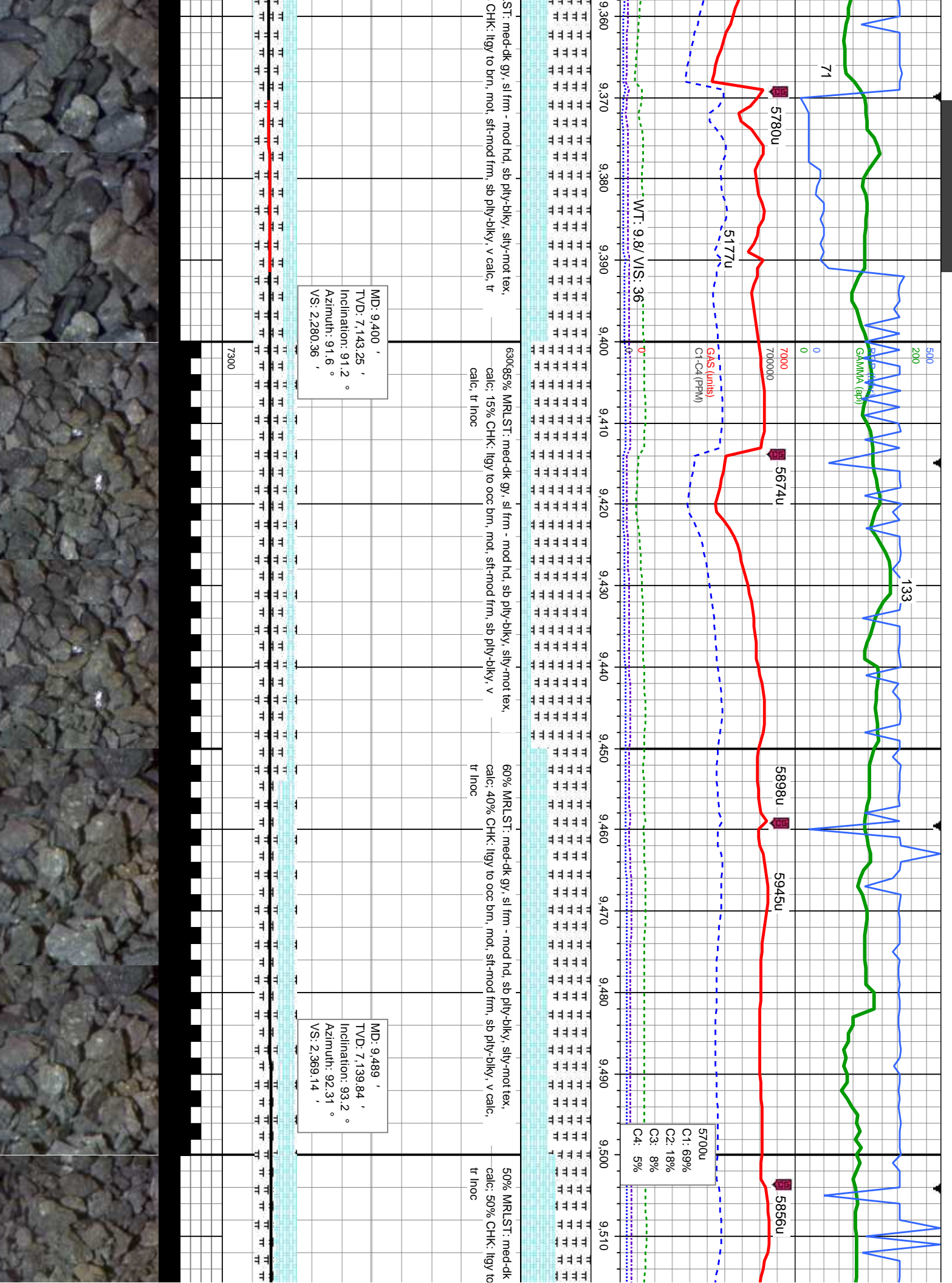
MD: 8,862 '
TVD: 7,152.48 '
Inclination: 90.6 °
Azimuth: 90.58 °
VS: 1,742.89 '

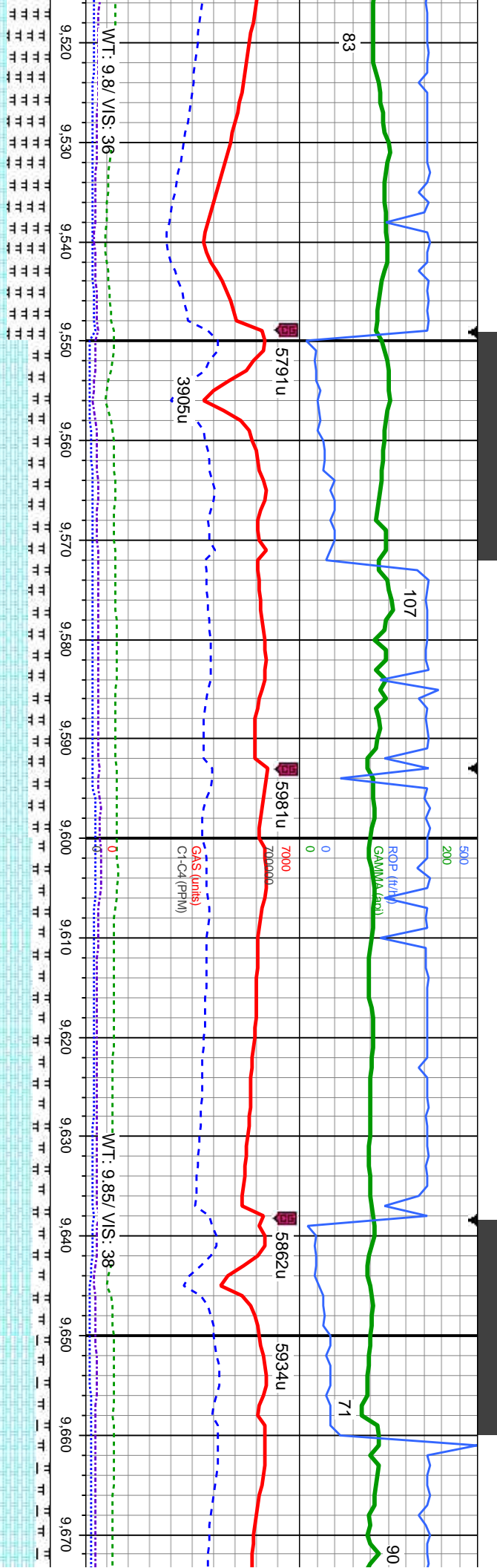












gy, sl frm - mod hd, sb ply-biky, silty-mot tex, 75% CHK: lgy to occ brn, mot, sft-mod frm, sb ply-biky, v calc, 6300 80% CHK: lgy to occ brn, mot, sft-mod frm, sb ply-biky, v calc, 85% CHK: lgy to occ brn, mot, s

occ brn, mot, sft-mod frm, sb ply-biky, v calc, MRLST: med-dk gy, sl frm - mod hd, sb ply-biky, silty-mot tex, 20% MRLST: med-dk gy, sl frm - mod hd, sb ply-biky, silty-mot tex, MRLST: med-dk gy, sl frm - mod

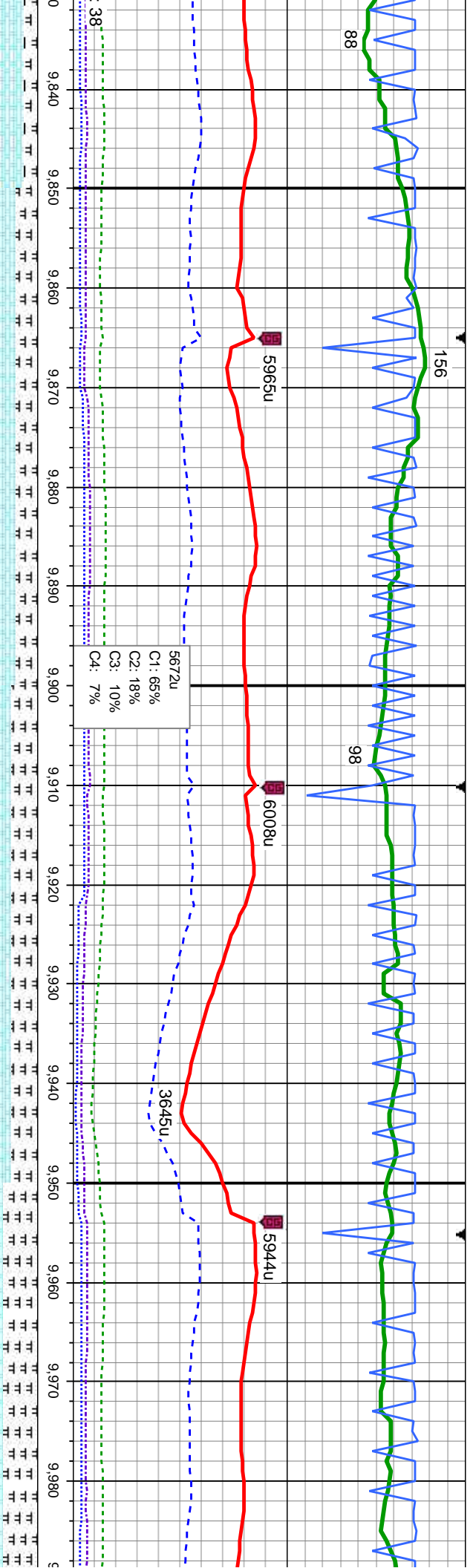
Inoc, tr lse foss Inoc, tr lse foss Inoc, tr lse foss

MD: 9,579 '
TVD: 7,135.52 '
Inclination: 92.3 °
Azimuth: 92.2 °
VS: 2,458.86 '

MD: 9,669 '
TVD: 7,132.53 '
Inclination: 91.5 °
Azimuth: 92.08 °
VS: 2,548.64 '

TVD (ft)





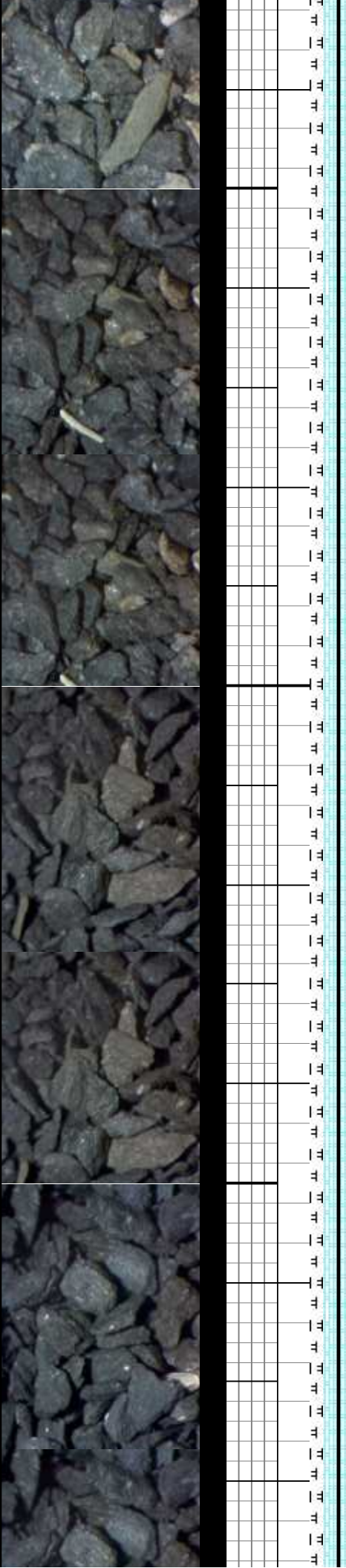
ply-bkly, v calc, 15%
75% CHK: lgy to ooc brn, mot, sft-mod frm, sb ply-bkly, v calc, 25%
MRLST: med-dk gy, sl frm - mod hd, sb ply-bkly, silty-mot tex, calc, tr
Inoc, abnt fos frag

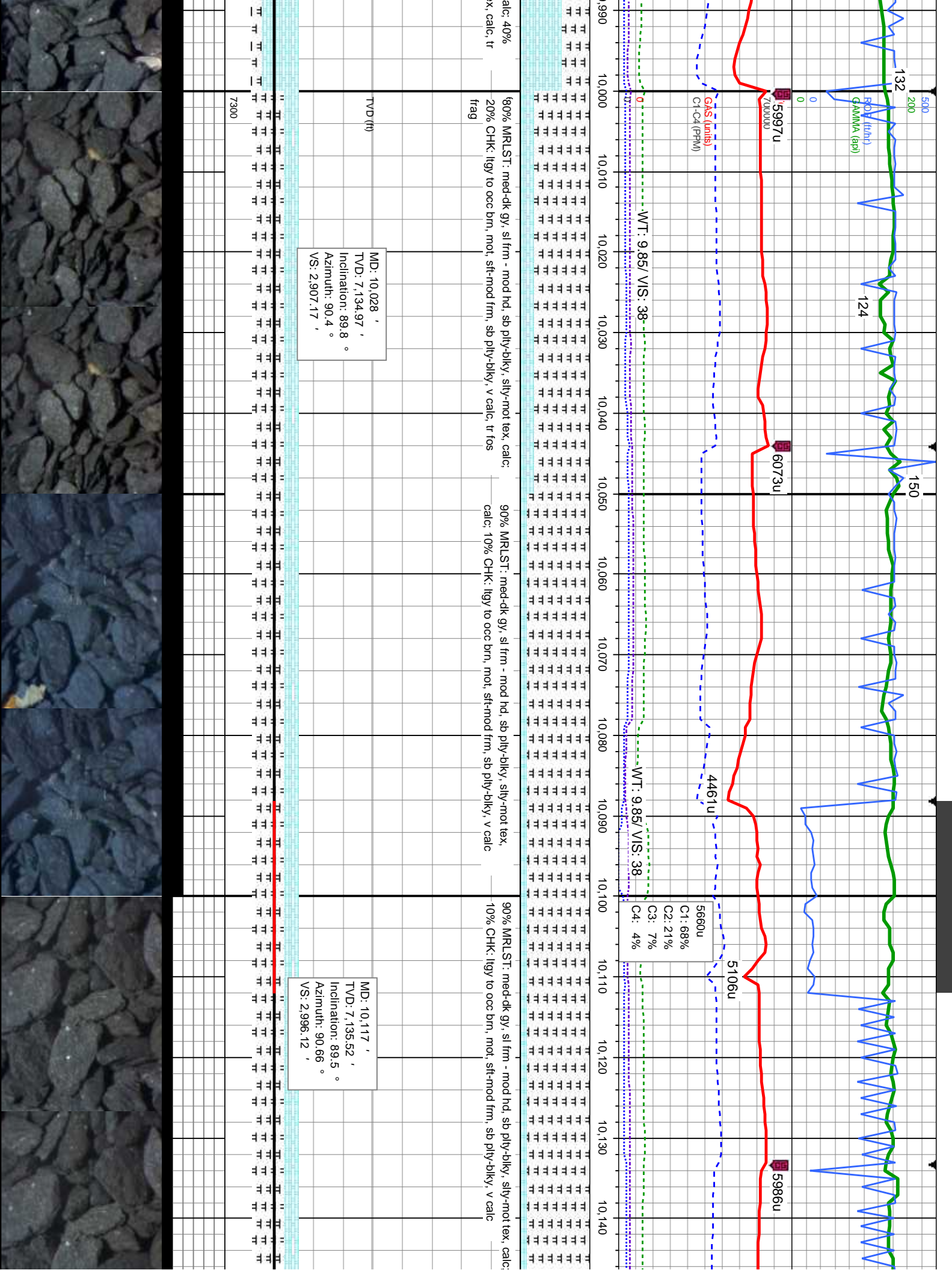
MD: 9,848 '
TVD: 7,133.56 '
Inclination: 89.2 °
Azimuth: 91.91 °
VS: 2,727.34 '

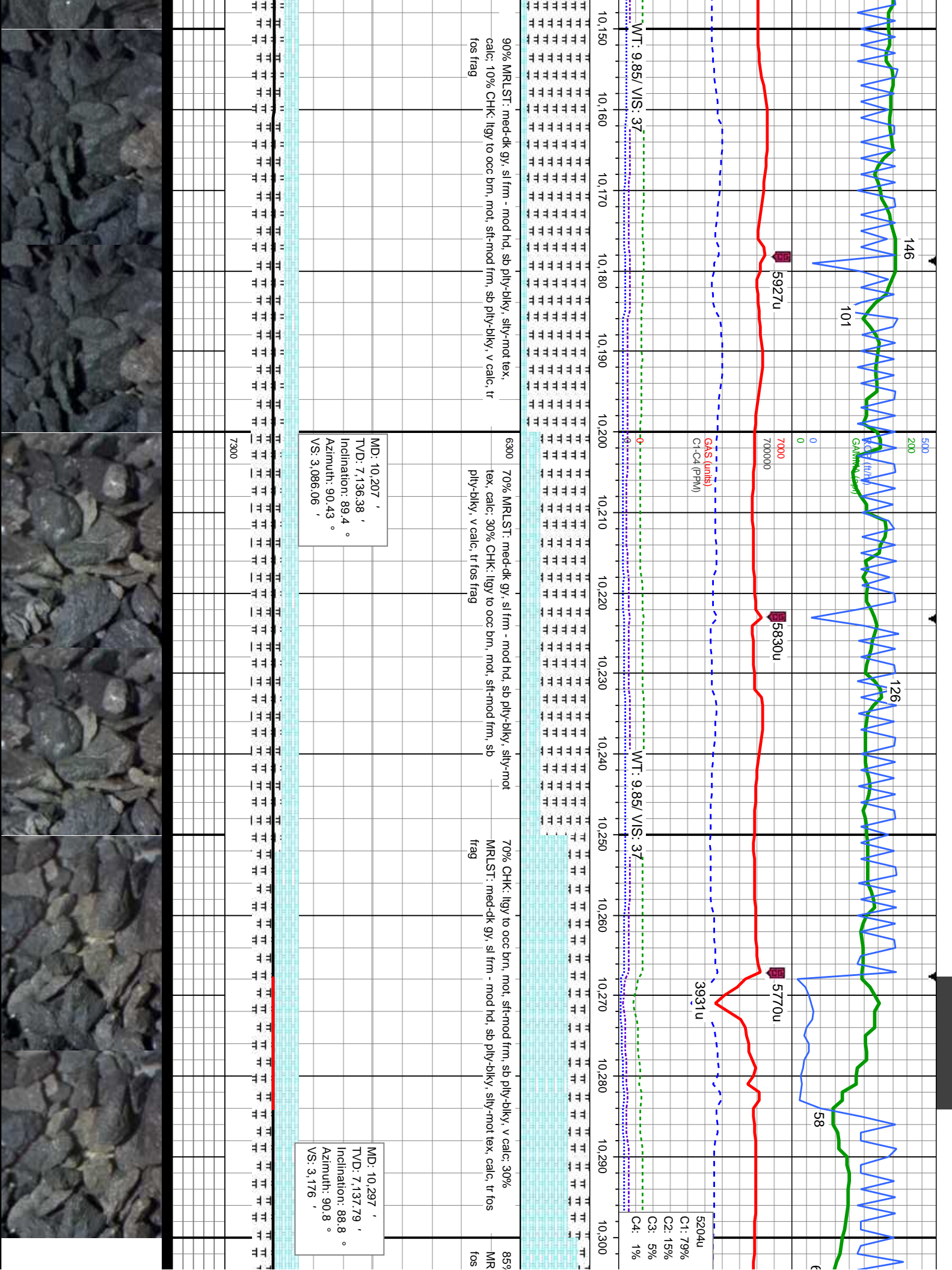
70% CHK: lgy to ooc brn, mot, sft-mod frm, sb ply-bkly, v calc, 30%
MRLST: med-dk gy, sl frm - mod hd, sb ply-bkly, silty-mot tex, calc, tr Inoc,
mod fos frag

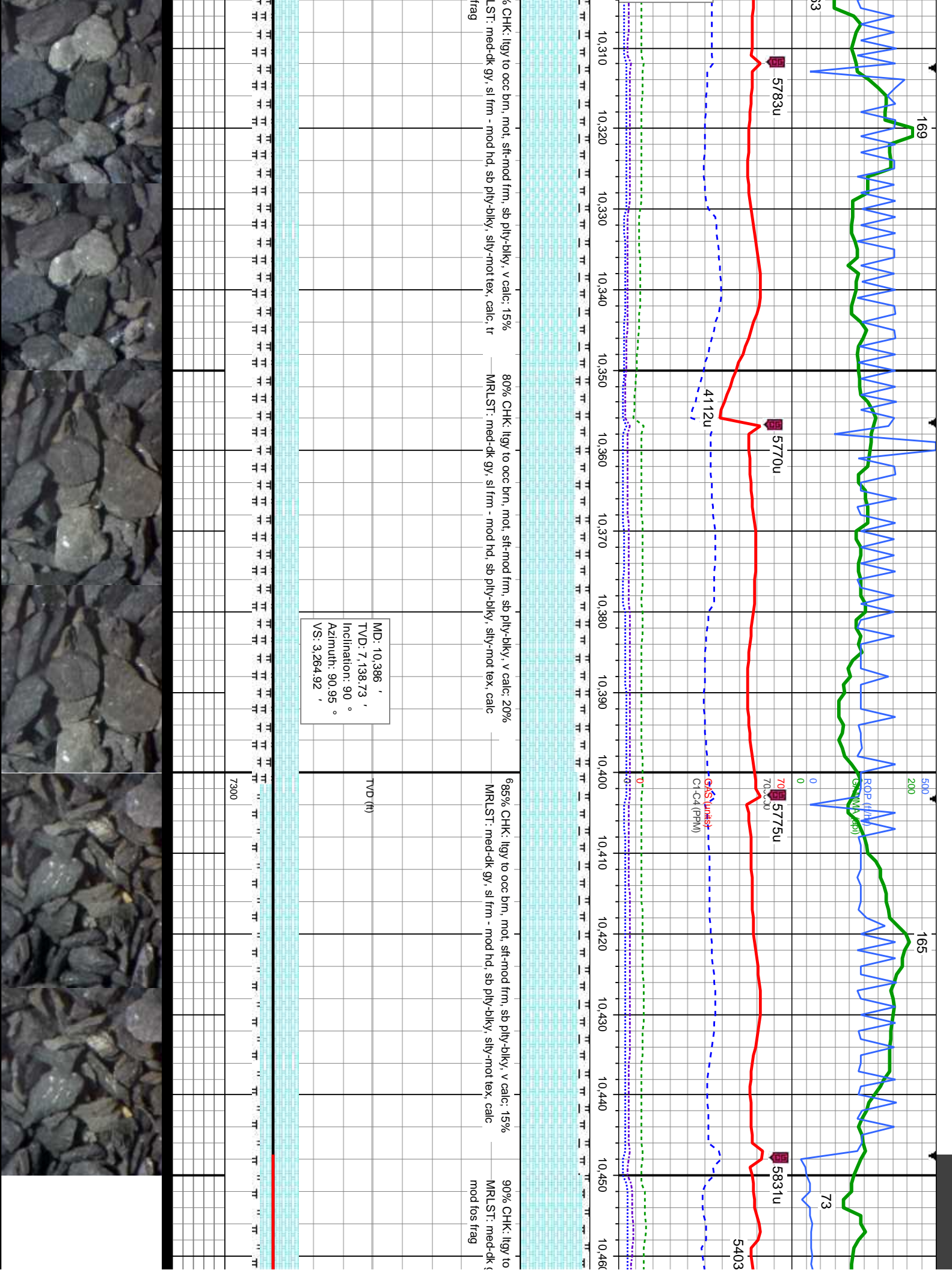
MD: 9,938 '
TVD: 7,134.5 '
Inclination: 89.6 °
Azimuth: 91.05 °
VS: 2,817.23 '

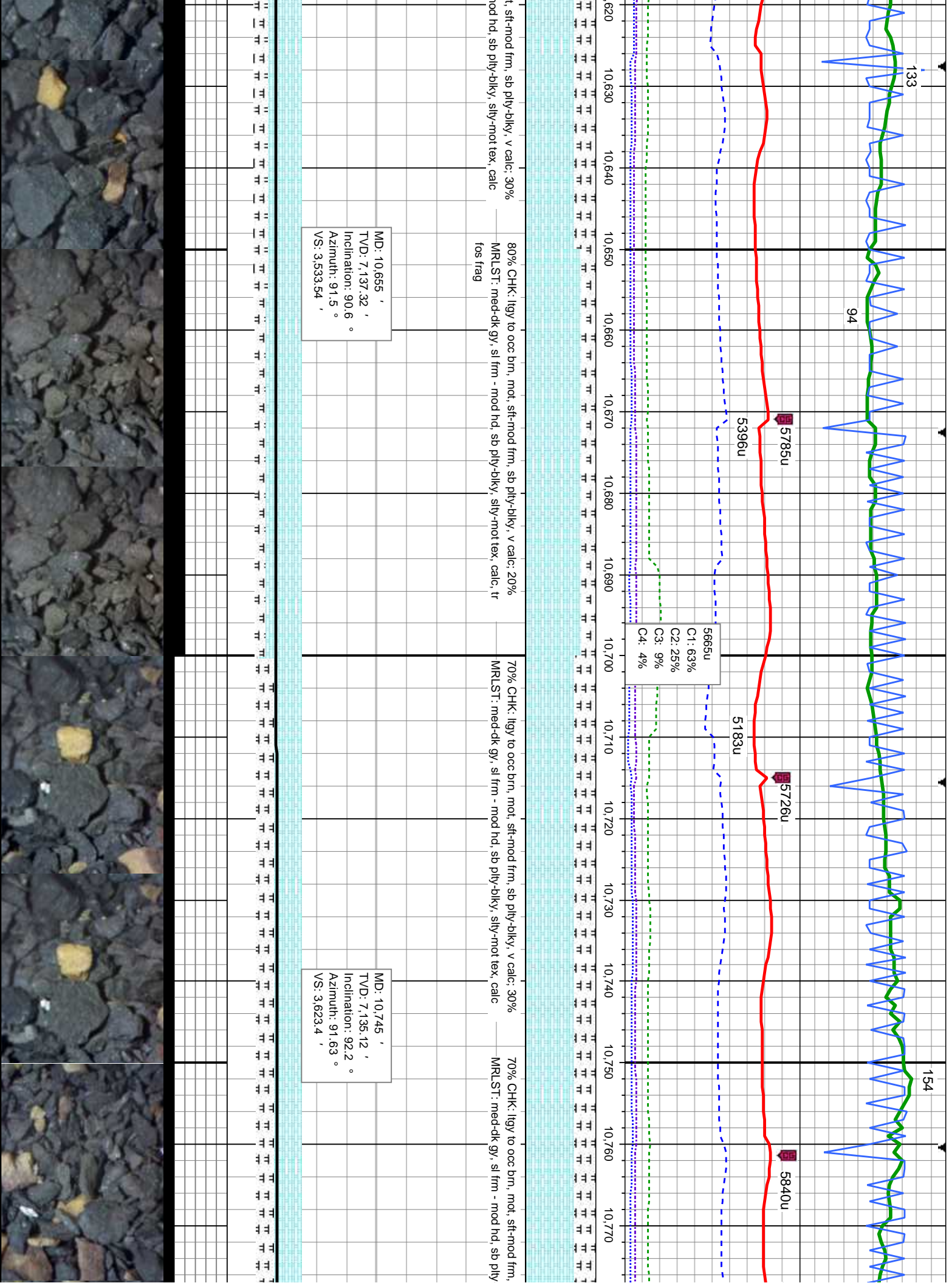
60% CHK: lgy to ooc brn, mot, sft-mod frm, sb ply-bkly, v c
MRLST: med-dk gy, sl frm - mod hd, sb ply-bkly, silty-mot te
Inoc, tr fos frag

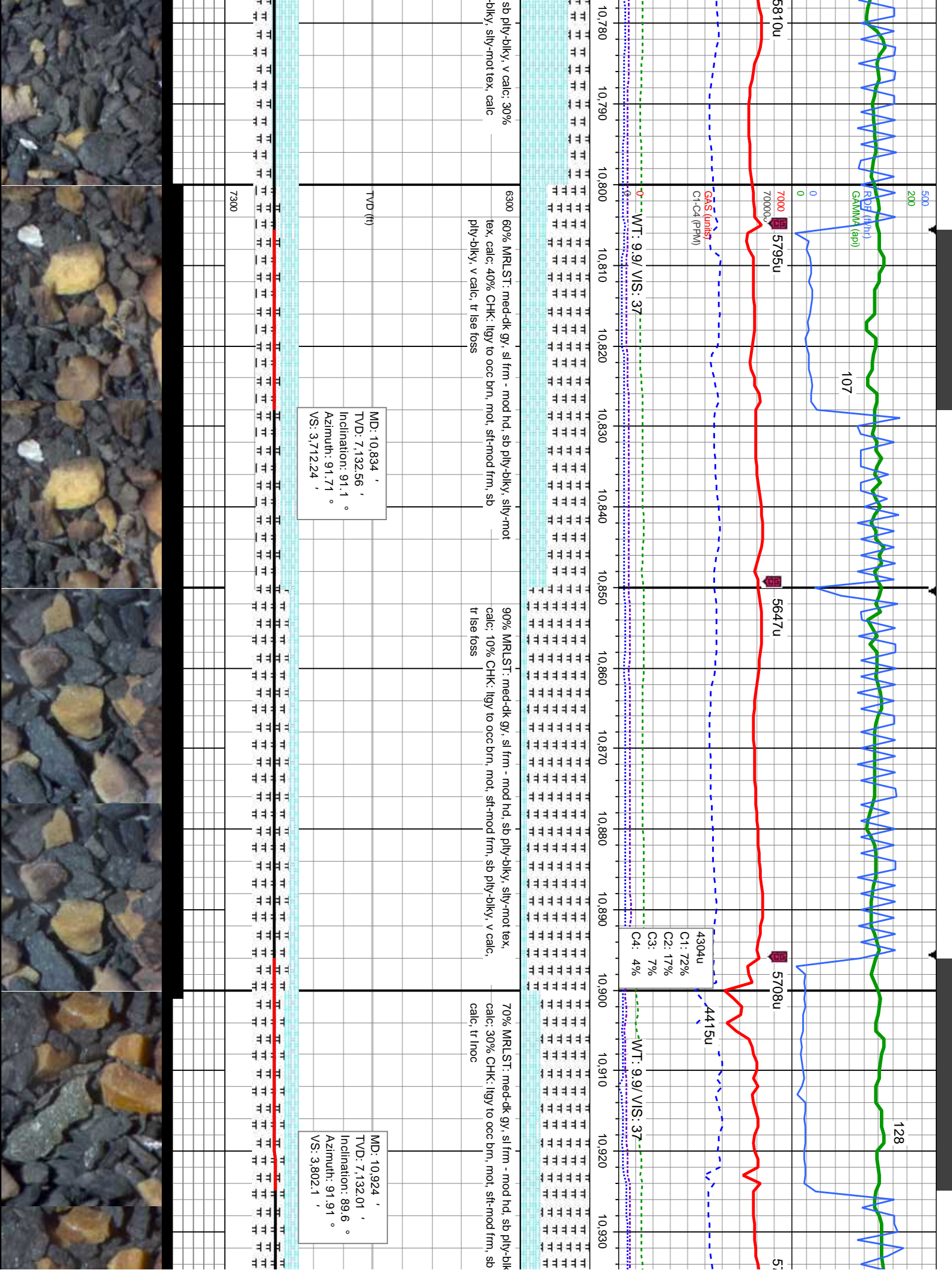


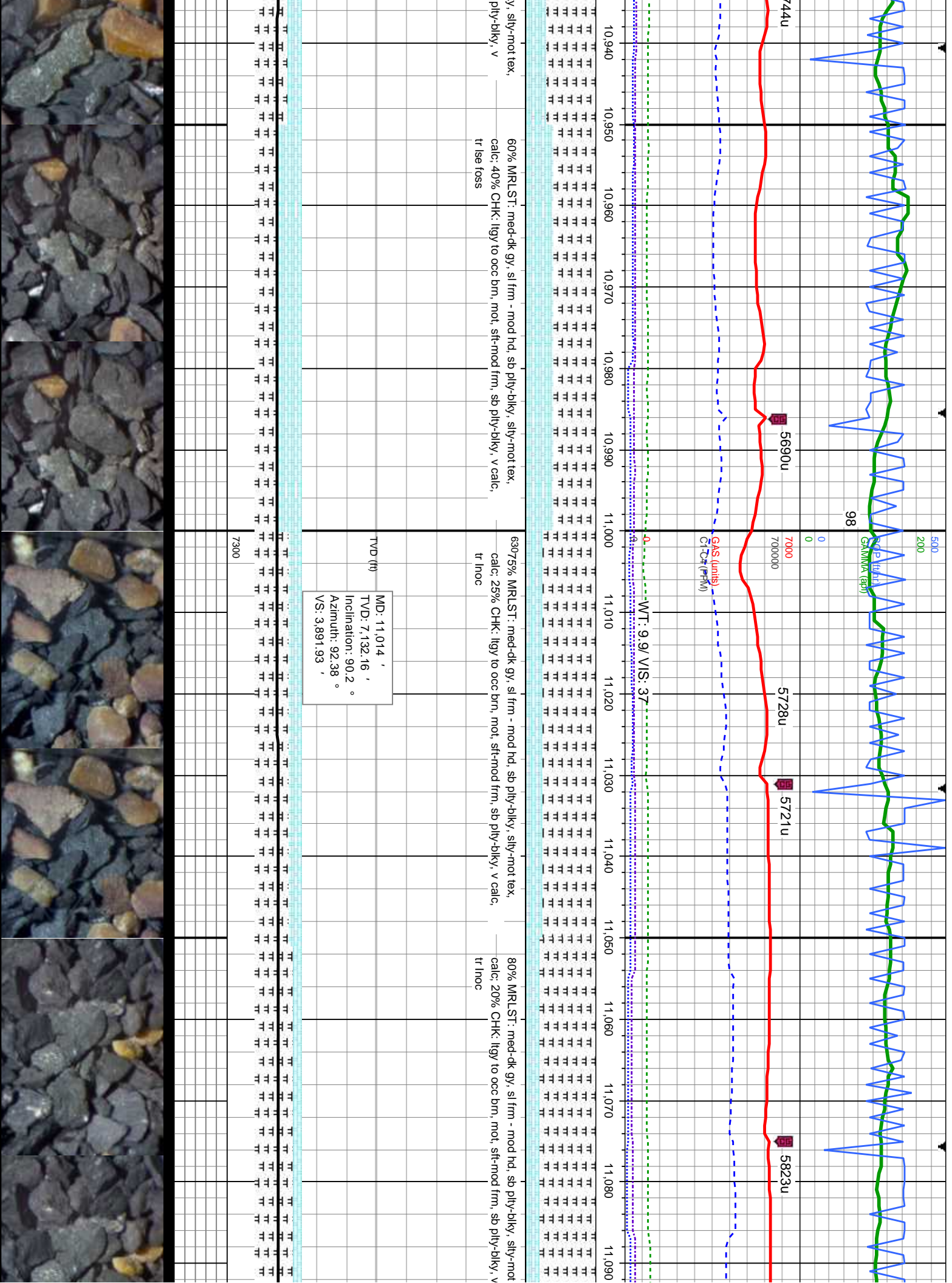


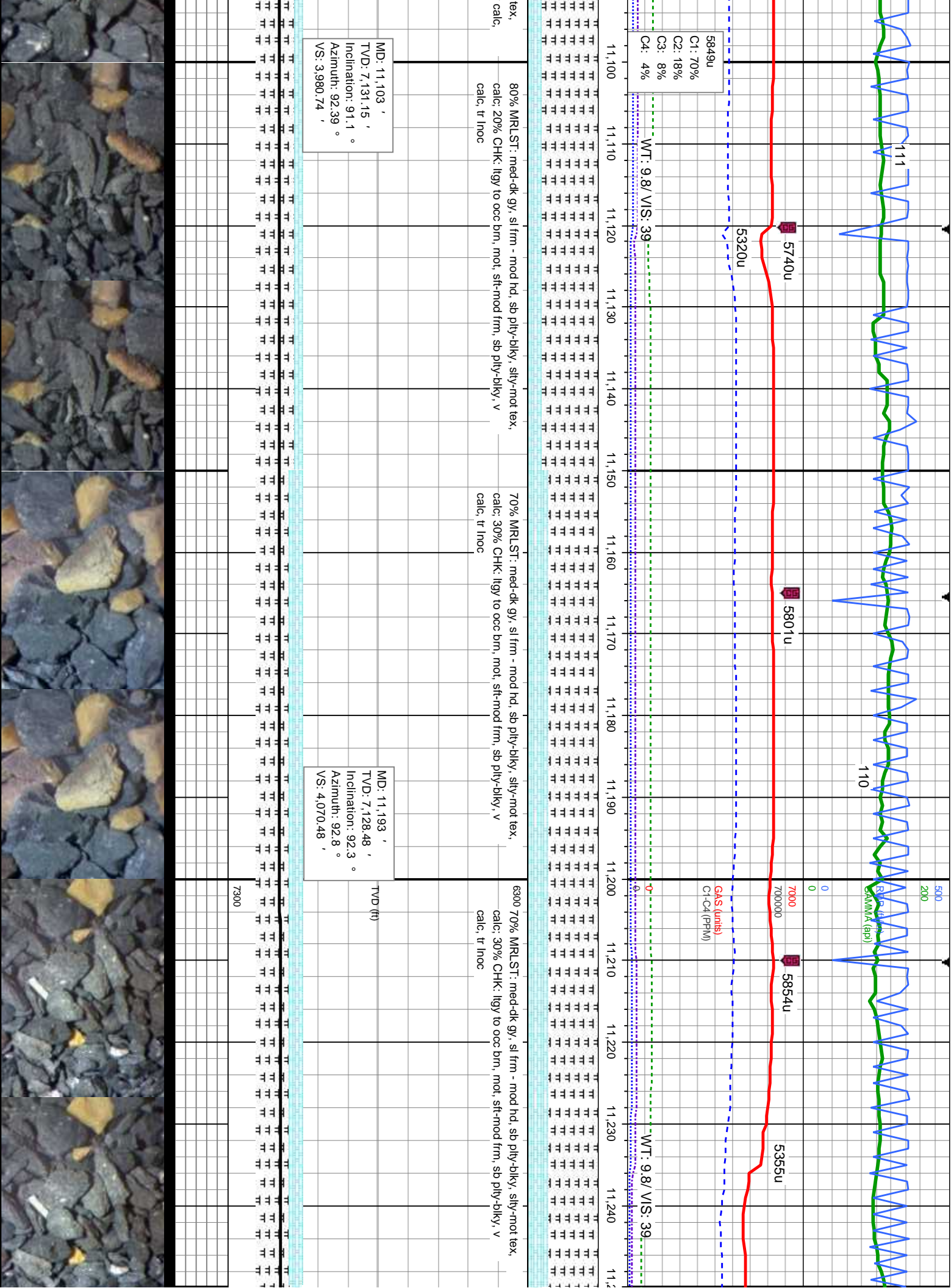


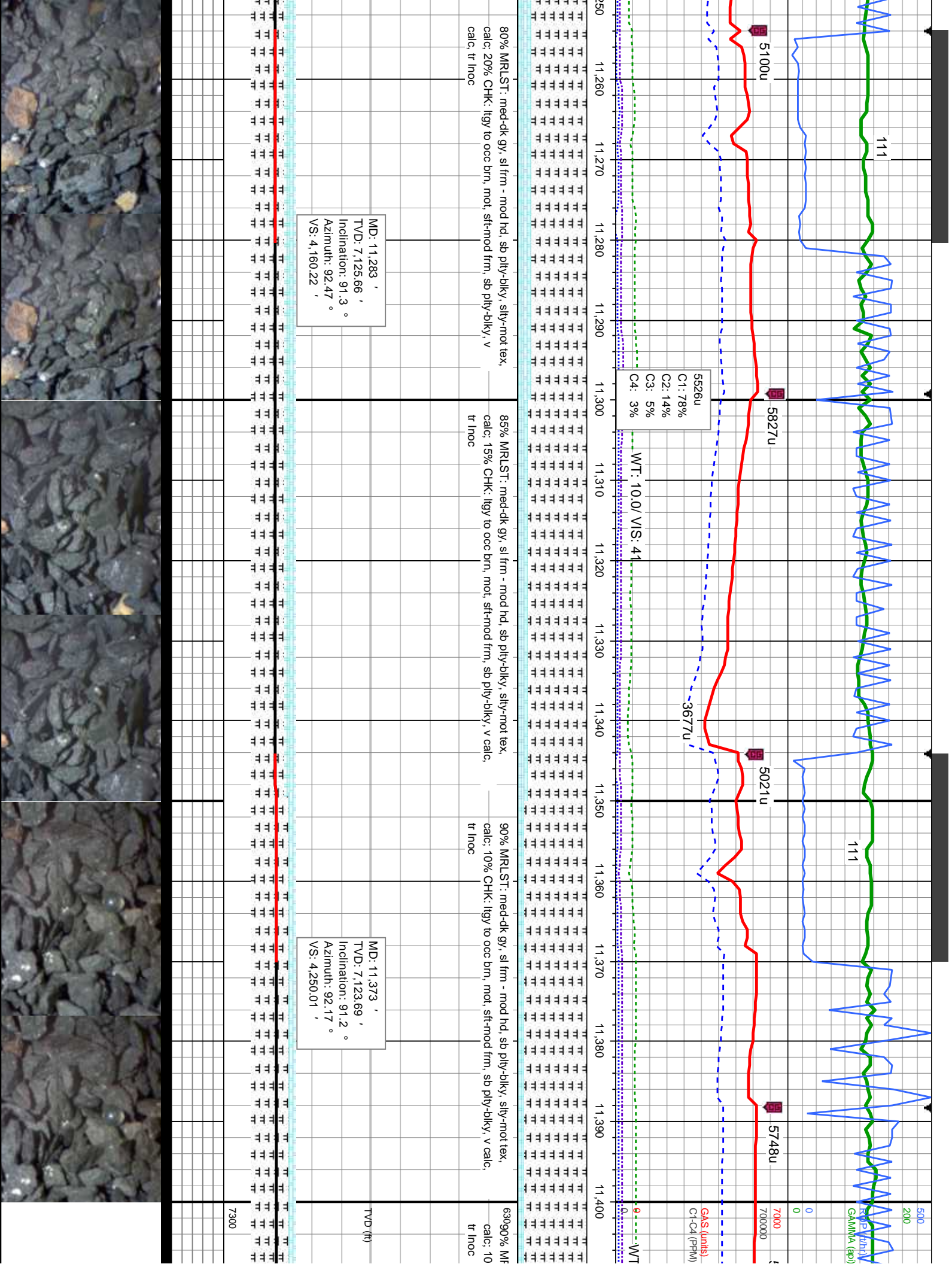


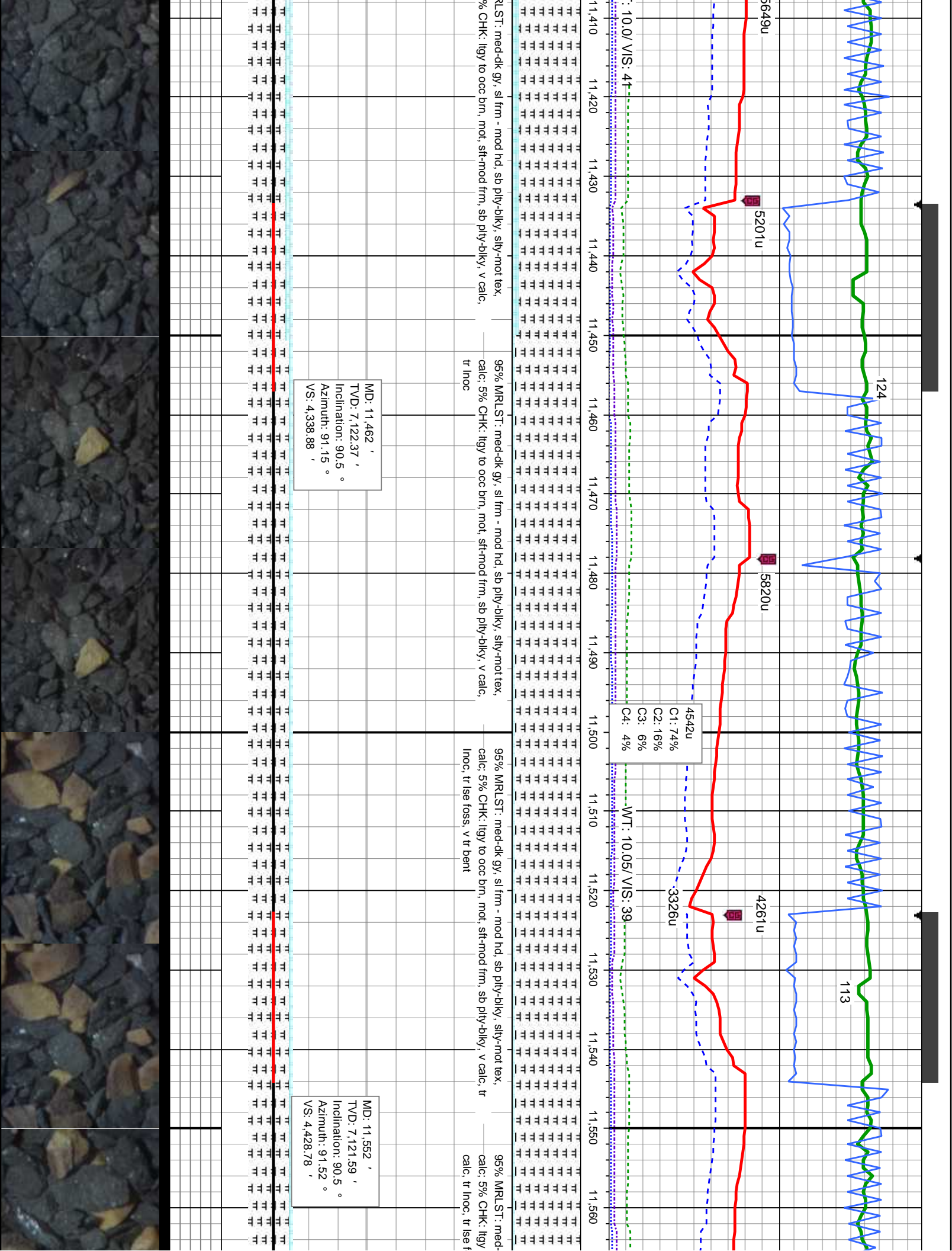


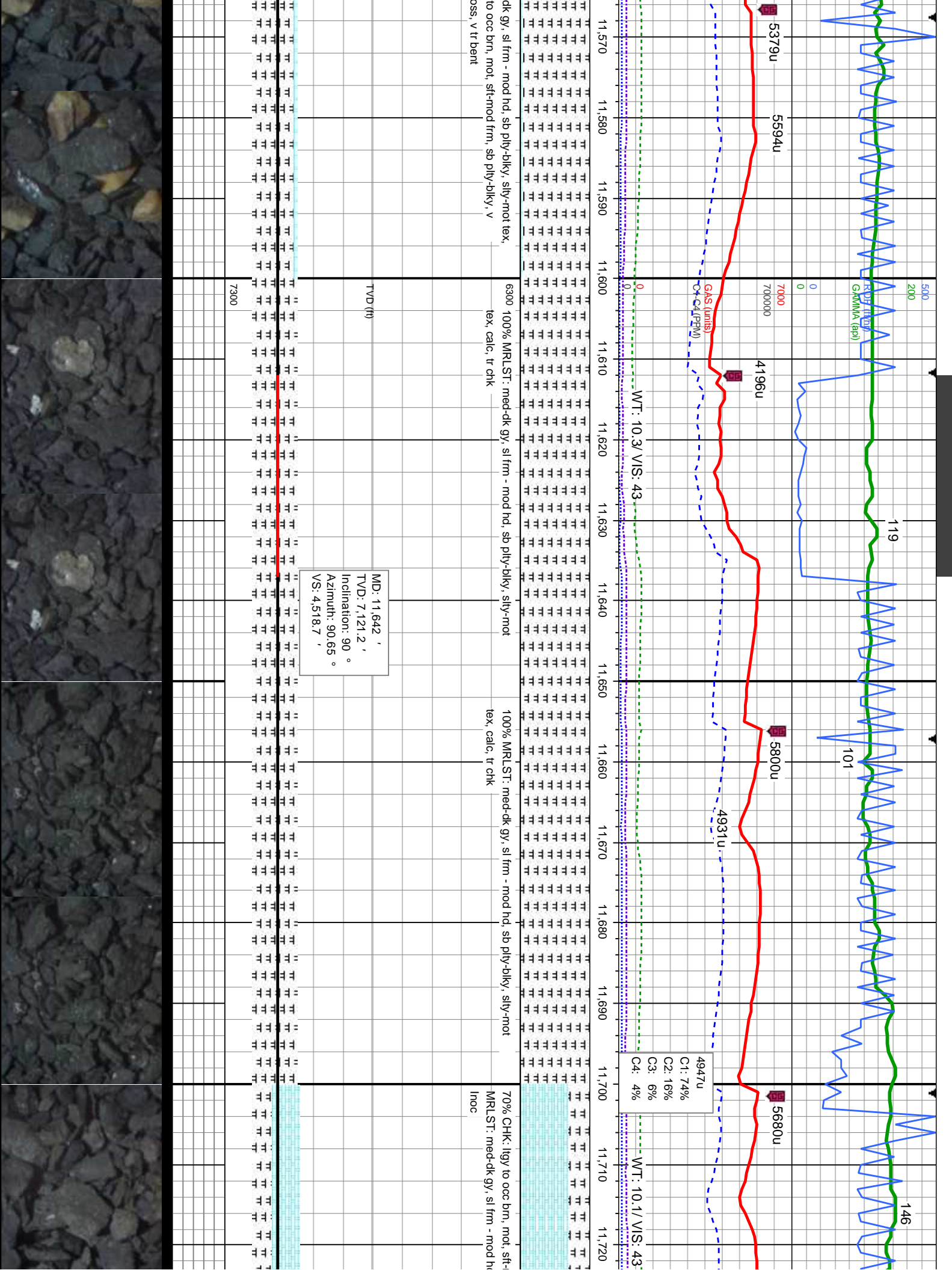


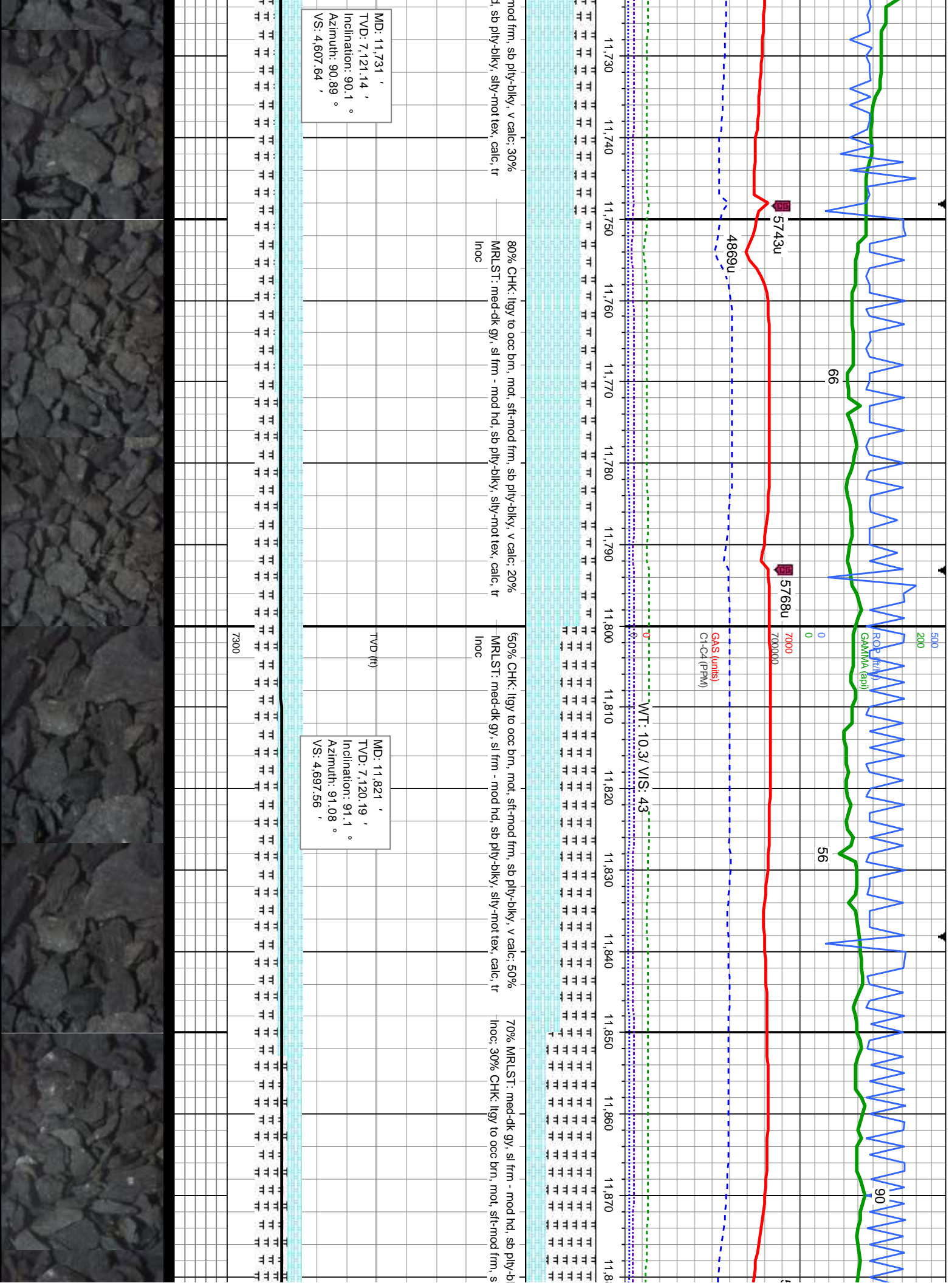


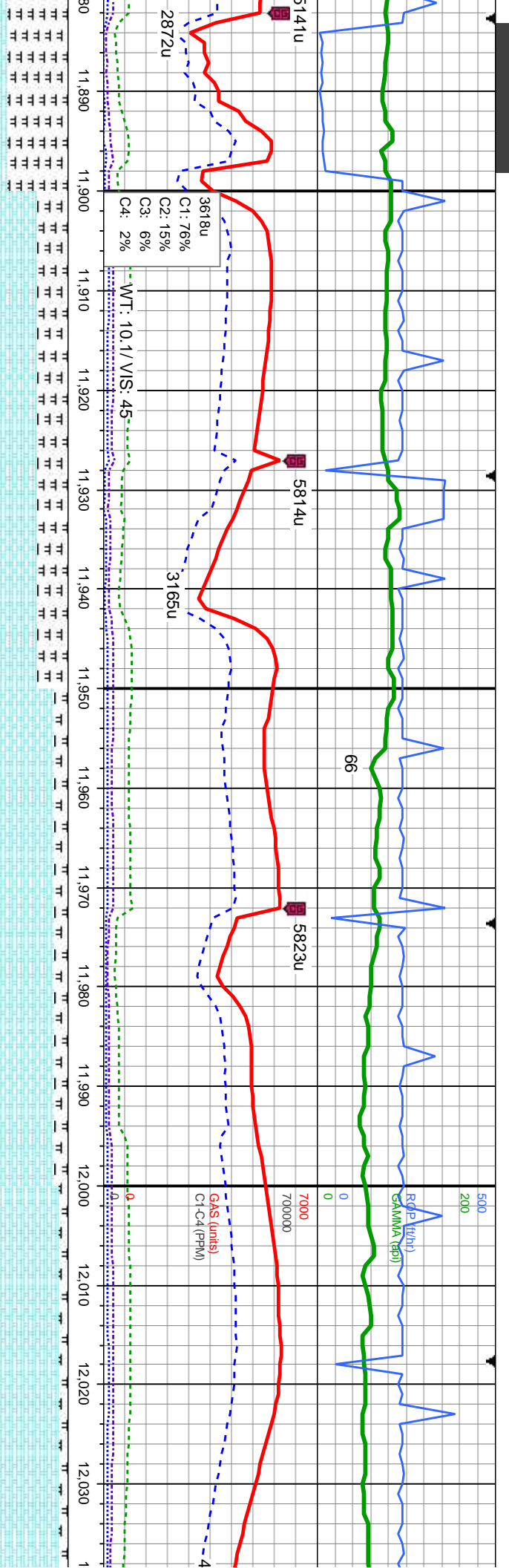












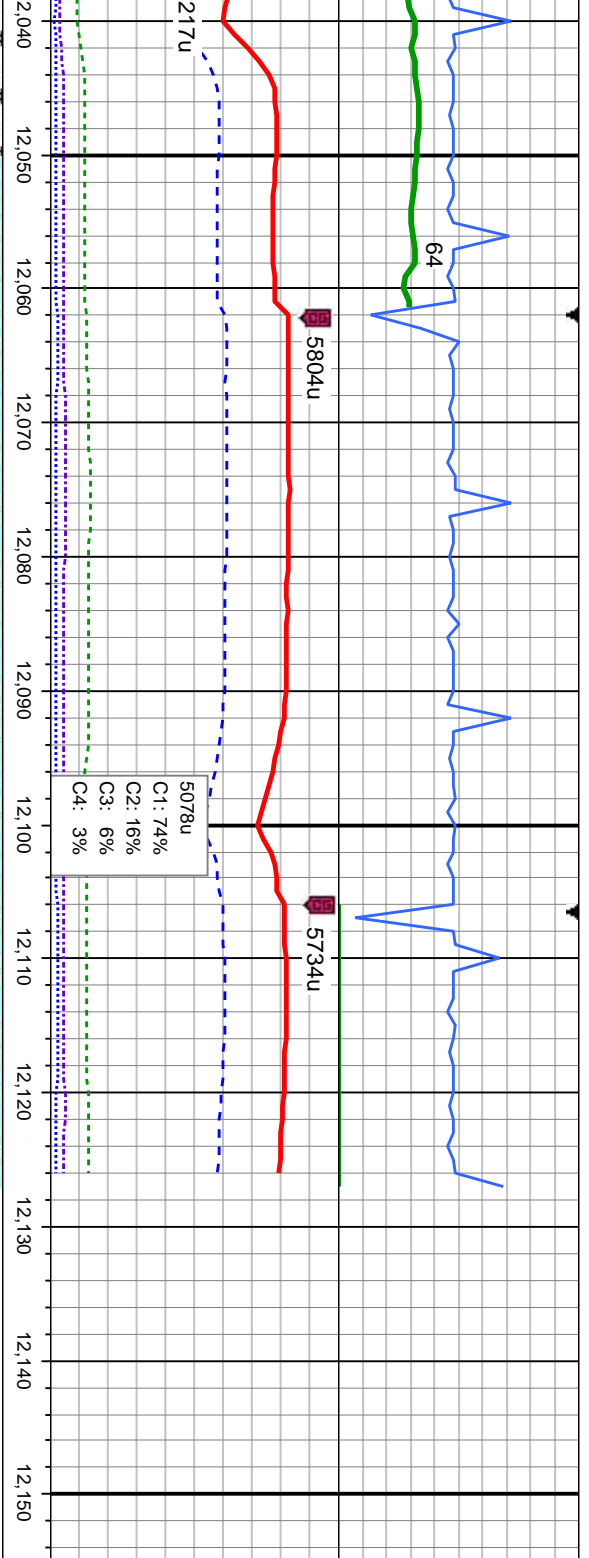
65% CHK: lgy to occ brn, mot, sft-mod frm, sb pty-bkly, v calc; 35%
MR.LST: med-dk gy, sl frm - mod hd, sb pty-bkly, sily-mot tex, calc, tr
Inoc

MD: 11,911 '
TVD: 7,118.94 '
Inclination: 90.5 °
Azimuth: 90.5 °
VS: 4,787.49 '

63%90% CHK: lgy to occ brn, mot, sft-mod frm, sb pty-bkly,
10% MR.LST: med-dk gy, sl frm - mod hd, sb pty-bkly, s
calc, tr inoc

MD: 12,000 '
TVD: 7,117.62 '
Inclination: 91.2 °
Azimuth: 90.5 °
VS: 4,876.43 '

7300



v calc;
ly-mot tex,
100% CHK: lgy to occ brn, mot, sft-mod frm, sb ply-bkly, v calc, tr
mrlst

100% CHK: lgy to occ brn, mot,
sft-mod frm, sb ply-bkly, v calc, tr
mrlst

MD: 12,065 '
TVD: 7,115.8 '
Inclination: 92.0 °
Azimuth: 90.2 °
VS: 4,941.38 '

Thank You for Choosing
Columbine Logging, Inc.
TD Well @ 12,212'
on 03/15/2014 - 19:29 MST

