



Scale: 6.98" / 100'  
Measured Depth Log

**Well Name** Reliance E23-79HN

**Location** Sec. 14 T6N R64W

**State** Colorado

**Country** USA

**API Number** 05-123-38868

**Region** DJ Basin

**Spud Date** 5/19/2014

**Surface Coordinates** 270' FSL ; 530' FWL  
40.47594 ; -104.63816

**Bottom Hole Coordinates** 225' FSL ; 75' FWL  
40.46479 ; -104.63960

**Ground Elevation** 4737'

**Logged Interval** 6202' **To** 11604'

**Formation** Nio B Chalk

**Type of Drilling Fluid** FW LSND

**County** Weld

**Rig Number** PD 829

**AFE #** 139629

**Field** Wattenberg

**Drilling Completed** 5/25/2014

**K.B. Elevation** 4753'

**Total Depth** 11604'

**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

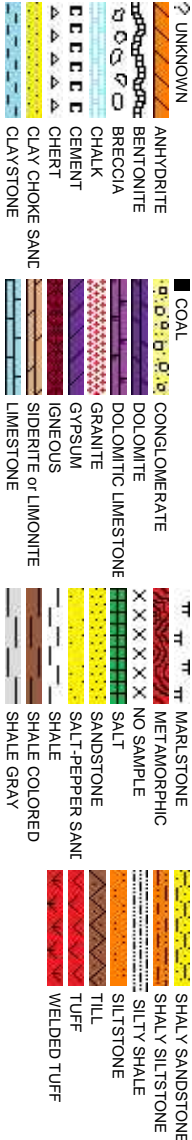
Geologist

c.  
AY  
2022

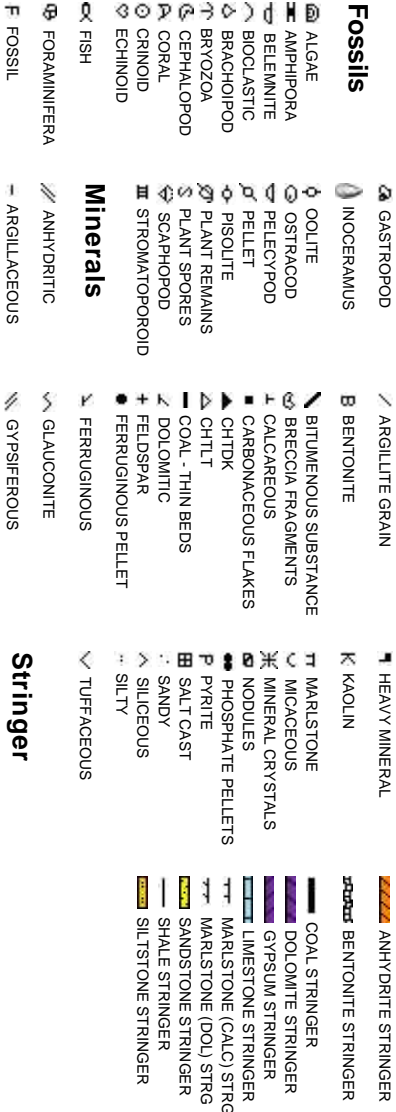
Other

2385 S. LIPAN STREET  
DENVER, CO 80223  
  
Ryan Shilling  
Adam Neumann  
Whitney Jacks

Rock Types



Accessories



Stringer

Other Symbols

<b>Oil Show</b>	P PINPOINT V VUGGY	DST INTERVAL FAULT	WIRELINE TESTED - LEFT WIRELINE TESTED - RT	E EARTHY FX FINELYXLN
D DEAD	<b>Engineering</b>	FORMATION TOP	DRILL STEM TEST	GS GRAINSTONE
● EVEN	BIT	GAS SHOW OIL SHOW	MNDEPTH MN DEPTH	L LITHOGRAPHIC MX MICROXLN
○ QUESTIONABLE	SPOTTED STAINING	CONNECTION (UP)	<b>Rounding</b>	MS MUDSTONE
● SPOTTED STAINING	CONNECTION (UP)	MNDEPTH UP		
	CONNECTION (DOWN)	MNDEPTH (DOWN)	A ANGULAR	PS PACKSTONE
<b>Porosity</b>	CONNECTION GAS	NORMAL FAULT	R ROUNDED	WS WACKESTONE
E EARTHY	CONNECTION GAS (LEFT)	OVERTURNED STRATA	B SUBANG	
F FENESTRAL	TRIP GAS	REVERSE FAULT	P SUBRND	<b>Sorting</b>
F FRACTURE	TRIP GAS (LEFT)	CASING		M MODERATE
X INTERCRYSTALLINE	DOWN TIME GAS	SIDEWALL CORE (LEFT)	<b>Textures</b>	P POOR
Q INTEROOLITIC	DOWN TIME GAS (LEFT)	SIDEWALL CORE (RIGHT)	BS BOUNDSTONE	W WELL
M MOLDIC	CORE - LOST	SLIDE	C CHALKY	
O ORGANIC	CORE - RECOVERED	SURVEY	CX CRYPTOXLN	

Slide/Rotate

ROP  
ROF  
GAMMA

ROP Scale  
0-700 ft/hr

Gamma Scale  
0 - 200 API

Gas Scale  
0 - 4000 units

Total Gas & Chromatograph

GAS  
C1  
C2  
C3  
C4

COLUMBINE LOGGING, INC. RIGGED UP  
ON 05/20/2014 MANNED 2-PERSON  
LOGGING WITH BLOODHOUND GAS  
CHROMATOGRAPH UNIT # 0715

Depth Labels



% Lith

TVD SCALE  
6100'-7100'

BEGIN 50' SAMPLES

Bit Data  
Bit #: 2  
Type: SD1519  
Size: 8.75  
Depth In: 700 '  
Depth Out: 7,374 '  
Jets: 7x16  
S/N: JJ1351

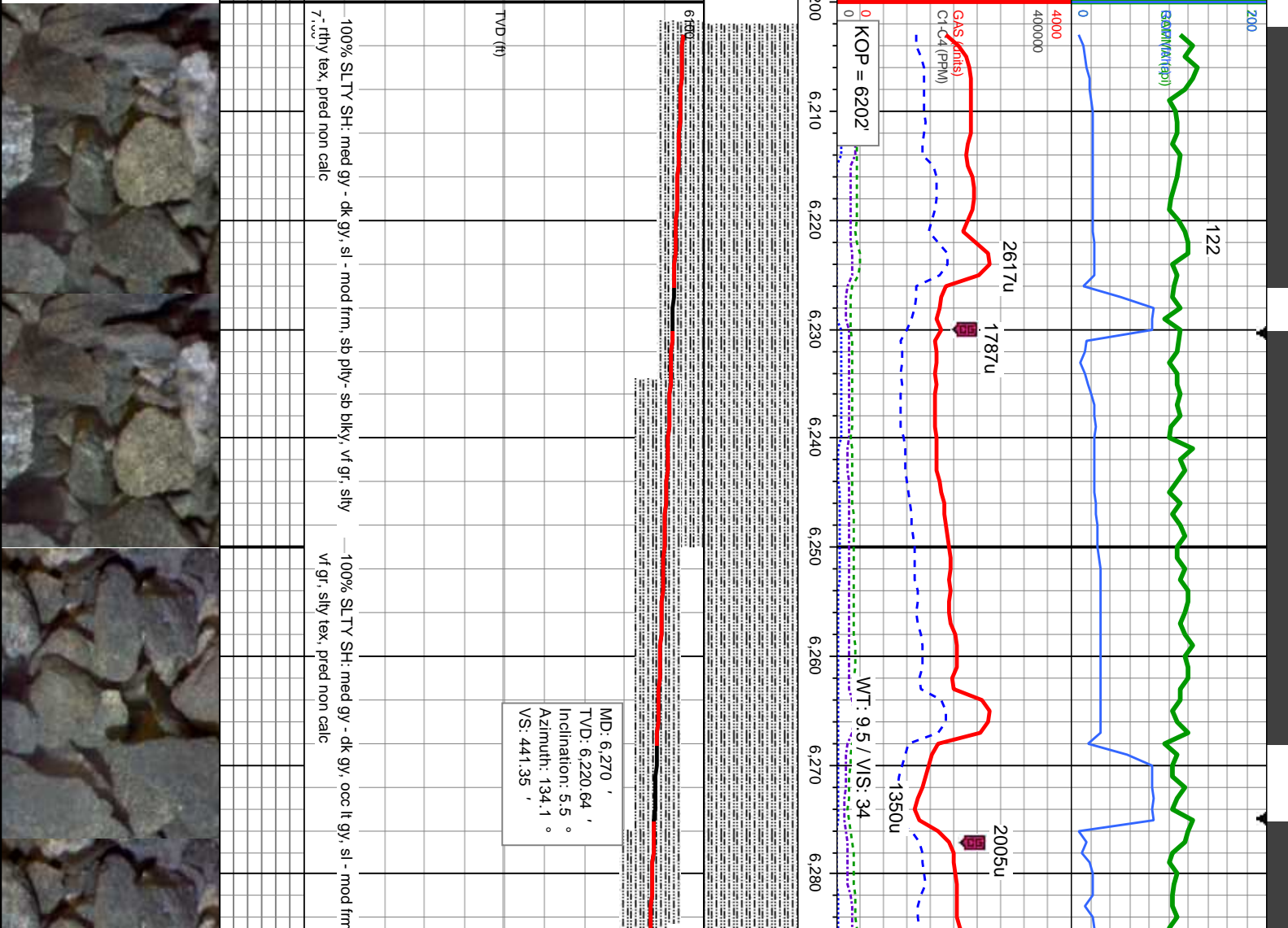
Well Bore  
TVD

Log Continued from  
Reliance E23-79HN

Oil Show

exc  
mod  
tr  
sl

Images



05/22/2014

MINDEPTH

113

700  
200

KOP (ft)  
GAMMA (api)

89

0  
4000  
40000

1761u

GAS (in)  
C1-C4 (in)

1001u

WT: 10.1 / VS: 32

2480u

1931u

1893u

2462u

2414u

C1: 70%  
C2: 16%  
C3: 11%  
C4: 3%

6,290 6,300 6,310 6,320 6,330 6,340 6,350 6,360 6,370 6,380 6,390 6,400 6,410 6,420 6,430 6,440

6100

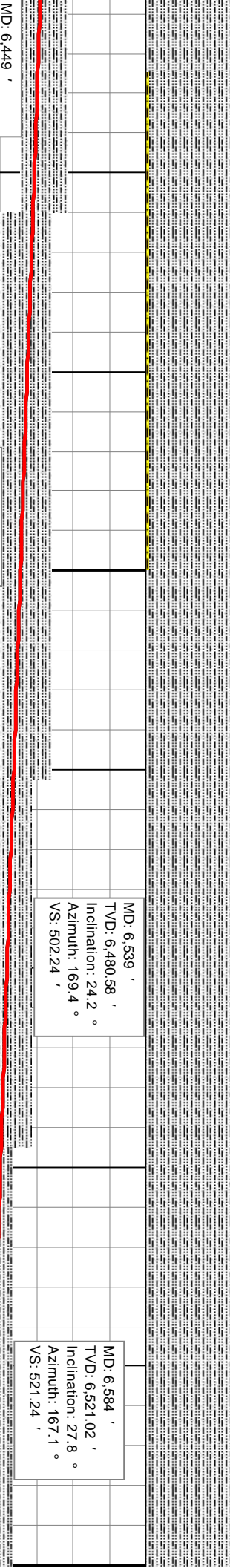
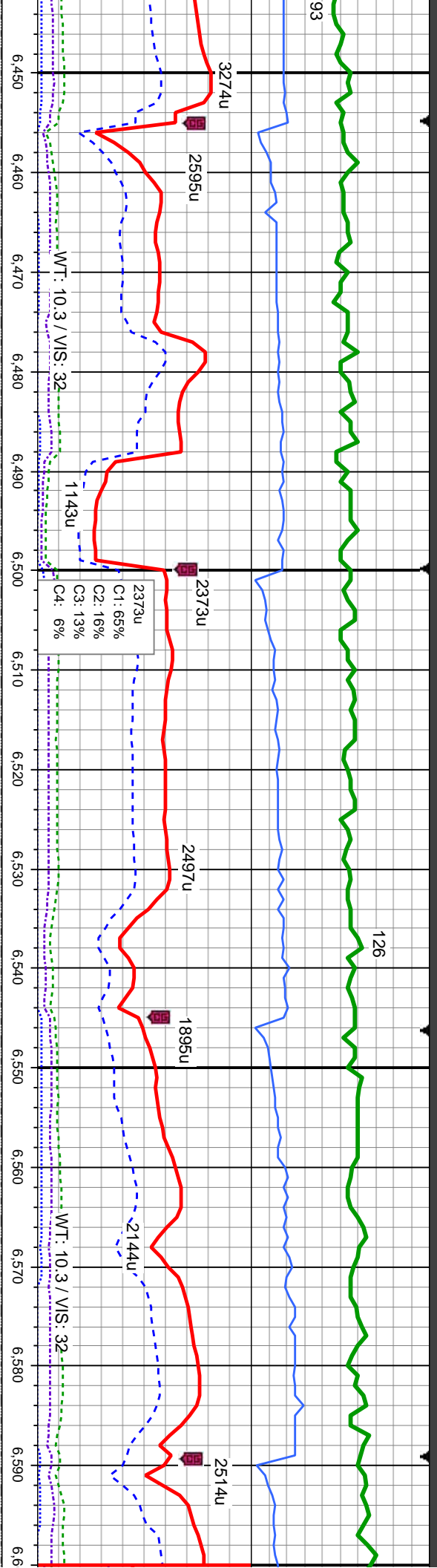
MD: 6359 '  
TVD: 6,308.88 '  
Inclination: 9.7 °  
Azimuth: 170.8 °  
VS: 451.44 '

TVD (ft)

95% SLTY SH: med gy - dk gy, occ lt gy, sl - mod frm, sb ply- sb blk, v f  
gr, silty tex, non calc, 5% SHY SS: med gy, blk, frm, v f f gr, sb rnd-ang, w srt, cly cmf, non calc, 100% SLTY SH: med gy - dk gy, occ lt gy, sl - mod frm, sb ply- sb blk, v f gr, silty tex, non calc, r r shy ss 100% SLTY SH: med gy - lt gy, occ dk gy, sl frm- v frm, sb ply- s, blk, v f gr, silty tex, non calc, occ shy ss







MD: 6,449 ' TVD: 6,396 ' Inclination: 17.1 ° Azimuth: 167.5 ° VS: 471.56 ' 95% SLTY SH: med gy - lt gy, occ dk gy, sl - mod frm, sb pty- sb blkly, vf gr, silty tex, non calc, 5% SHY SS: med gy, sb blkly, frm, v f f gr, sb md-ang, w srt, cly cmt, non calc

MD: 6,494 ' TVD: 6,438.94 ' Inclination: 20.3 ° Azimuth: 169.8 ° VS: 485.72 ' 100% SLTY SH: med gy - lt gy, occ dk gy, sl frm- v frm, sb pty- sb blkly, vf gr, silty tex, non calc, occ shly ss

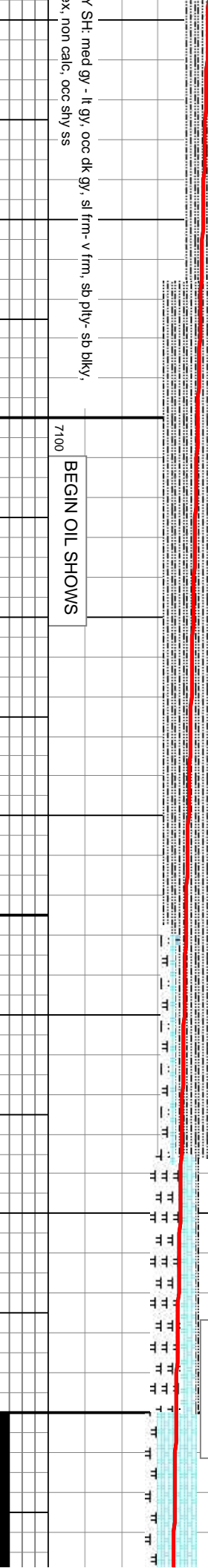
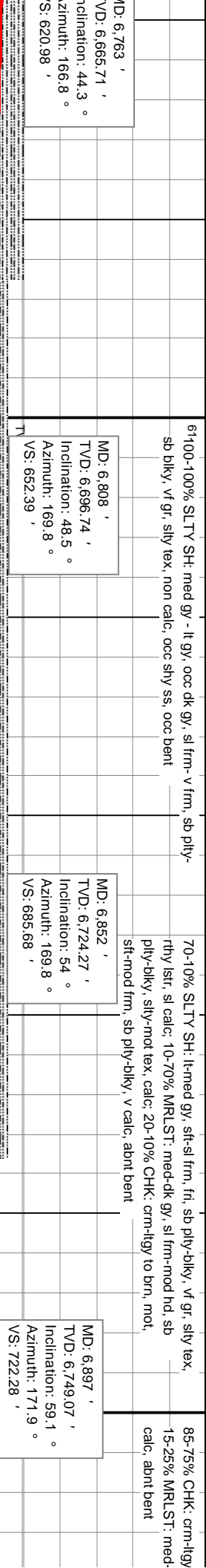
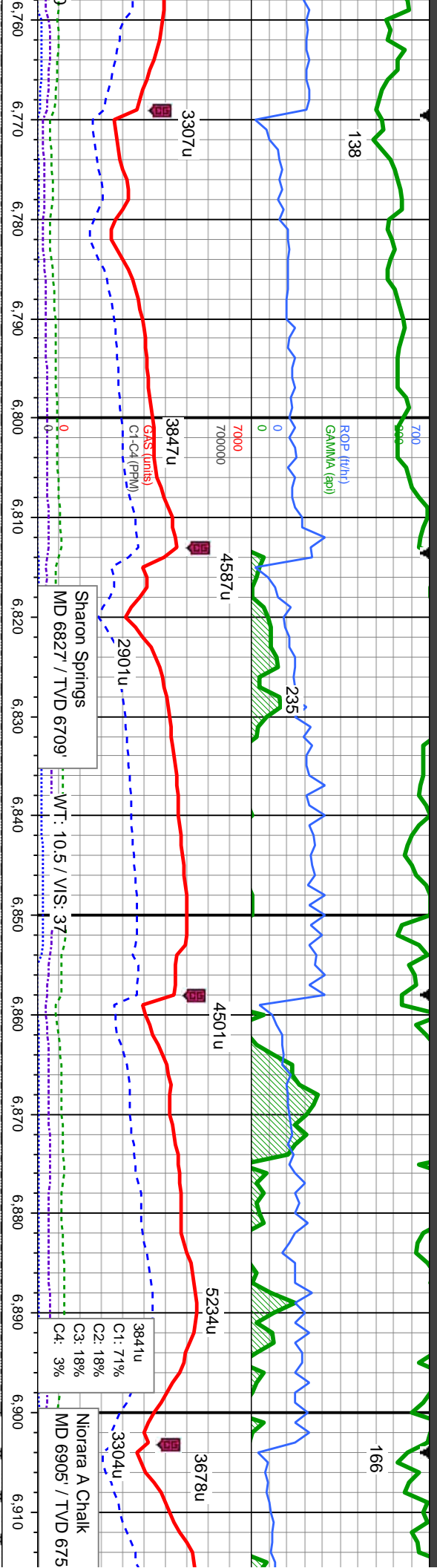
MD: 6,539 ' TVD: 6,480.58 ' Inclination: 24.2 ° Azimuth: 169.4 ° VS: 502.24 ' 100% SLTY SH: med gy - lt gy, occ dk gy, sl frm- v frm, sb pty- sb blkly, vf gr, silty tex, non calc, occ shly ss

MD: 6,584 ' TVD: 6,521.02 ' Inclination: 27.8 ° Azimuth: 167.1 ° VS: 521.24 ' 100% SLTY SH: med gy - lt gy, occ dk gy, sl frm- v frm, sb pty- sb blkly, vf gr, silty tex, non calc, occ shly ss

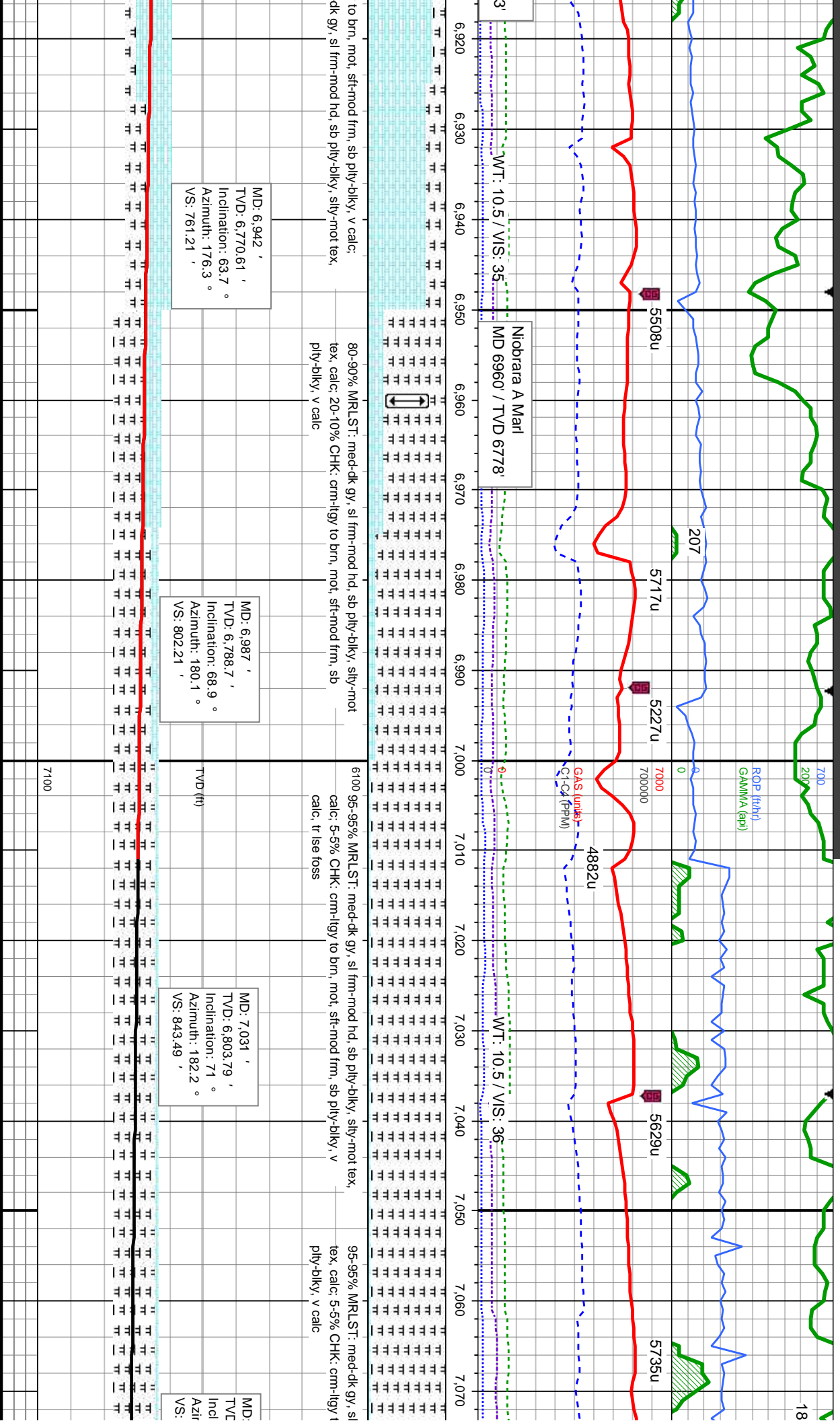












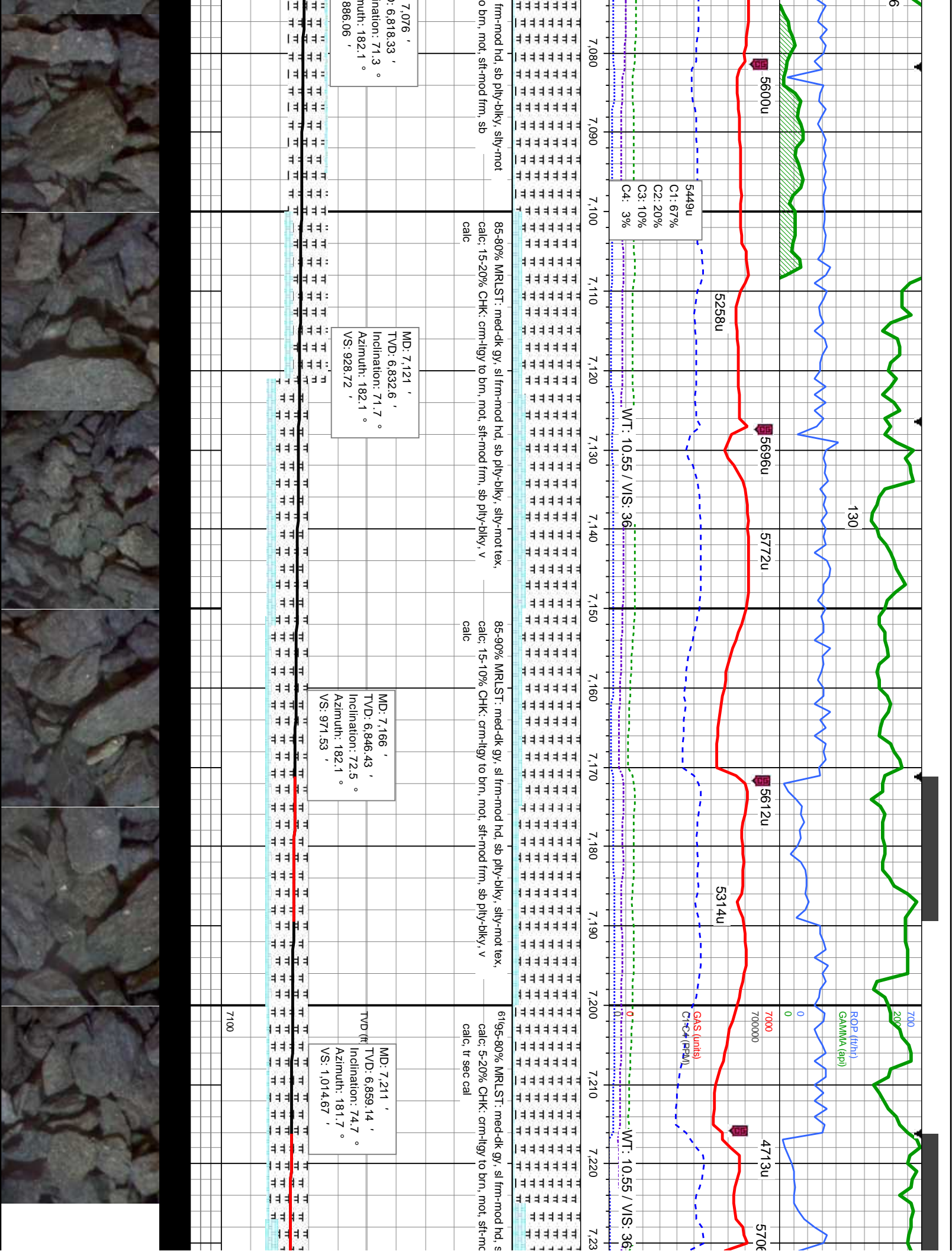
MD: 6,942 '  
TVD: 6,770.61 '  
Inclination: 63.7 °  
Azimuth: 176.3 °  
VS: 761.21 '

Niobrara A Marl  
MD 6960 / TVD 6778'

MD: 6,987 '  
TVD: 6,788.7 '  
Inclination: 68.9 °  
Azimuth: 180.1 °  
VS: 802.21 '

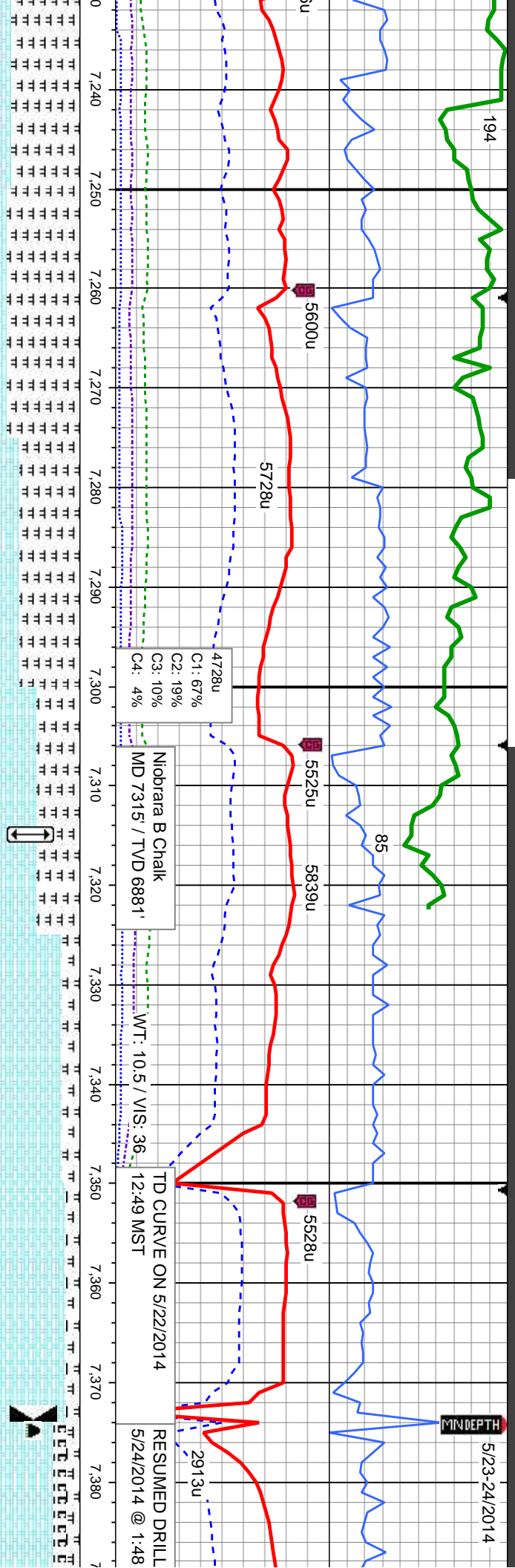
MD: 7,031 '  
TVD: 6,803.79 '  
Inclination: 71 °  
Azimuth: 182.2 °  
VS: 843.49 '

MD: 7,031 '  
TVD: 6,803.79 '  
Inclination: 71 °  
Azimuth: 182.2 °  
VS: 843.49 '





MINDEPTH



Niobrara B Chalk  
MD 7315 / TVD 6881'

WT: 10.5 / VIS: 36  
12:49 MST

5/24/2014 @ 1:48

C1: 67%  
C2: 19%  
C3: 10%  
C4: 4%

85-70% MRLST: med-dk gy, sl frm-mod hd, sb pily-biky, silty-not tex, calc; 15-30% CHK: crm-lyg to brn, mot, sft-mod frm, sb pily-biky, v calc, tr sec cal

50-80% CHK: crm-lyg to brn, mot, sft-mod frm, sb pily-biky, v calc; 50-20% MRLST: med-dk gy, sl frm-mod hd, sb pily-biky, silty-not tex, calc

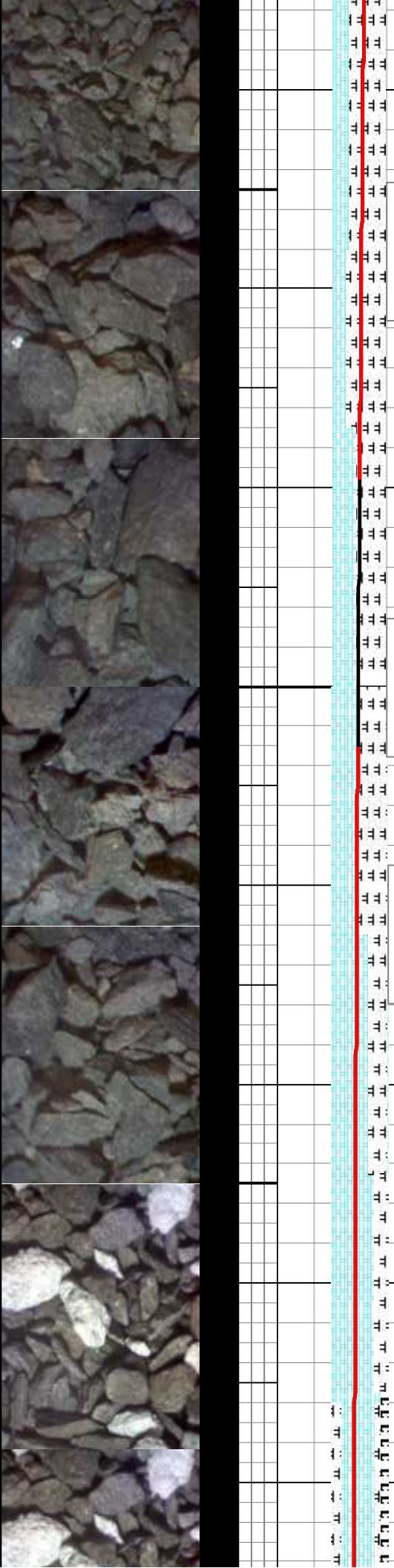
85-70% CHK: crm-lyg to brn, mot, sft-mod frm, sb pily-biky, 15-15% MRLST: med-dk gy, sl frm-mod hd, sb pily-biky, silty calc; 0-15% CMT

MD: 7,255 '  
TVD: 6,870.01 '  
Inclination: 76.7 °  
Azimuth: 181.4 °  
VS: 1,057.27 '

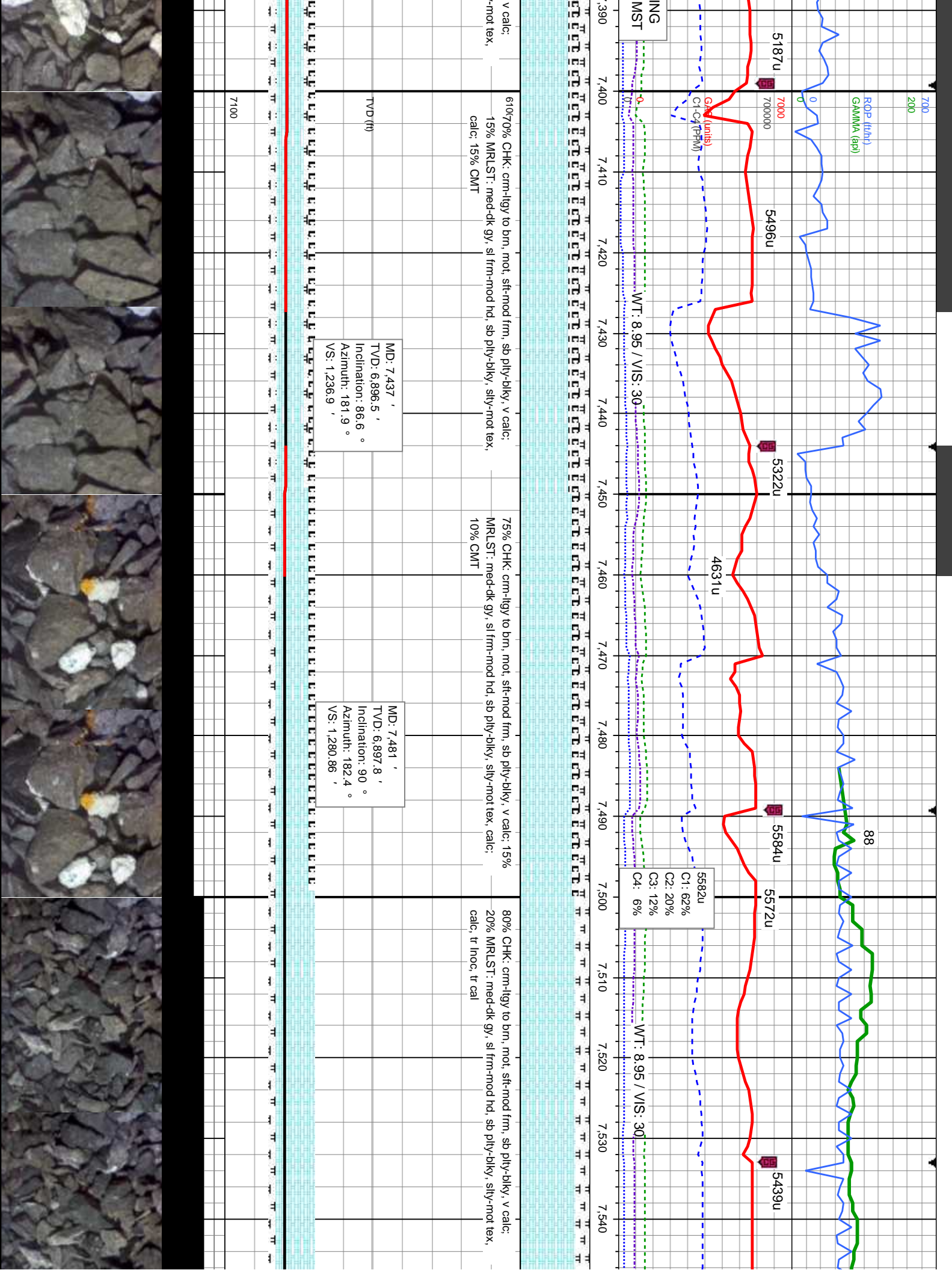
MD: 7,300 '  
TVD: 6,879.44 '  
Inclination: 79.1 °  
Azimuth: 180.7 °  
VS: 1,101.22 '

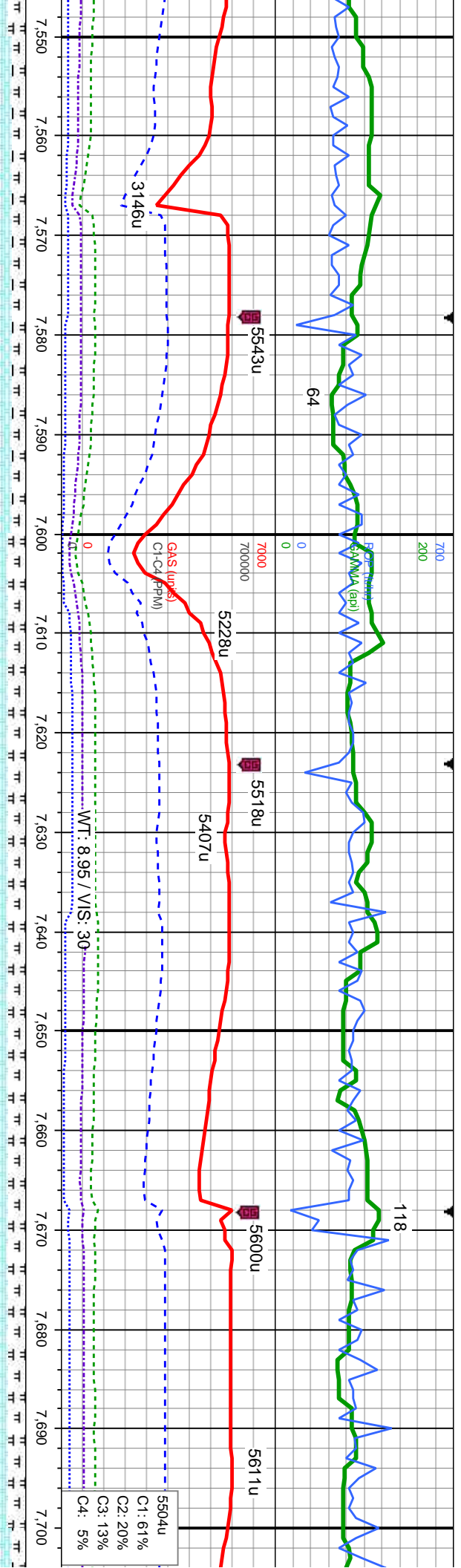
MD: 7,324 '  
TVD: 6,883.71 '  
Inclination: 80.4 °  
Azimuth: 180.3 °  
VS: 1,124.8 '

Bit Data  
Bit #: 3  
Type: DP40SS  
Size: 6.12  
Depth In: 7,374 '  
Jets: 5x15  
S/N: 7038452









85% CHK: crm-llgy to brn, mot, sft-mod frm, sb ply-blky, v calc;  
15% MRLST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex,  
calc, tr inoc, tr cal

MD: 7,571 '  
TVD: 6,897.64 '  
Inclination: 90.2 °  
Azimuth: 182.1 °  
VS: 1,370.83 '

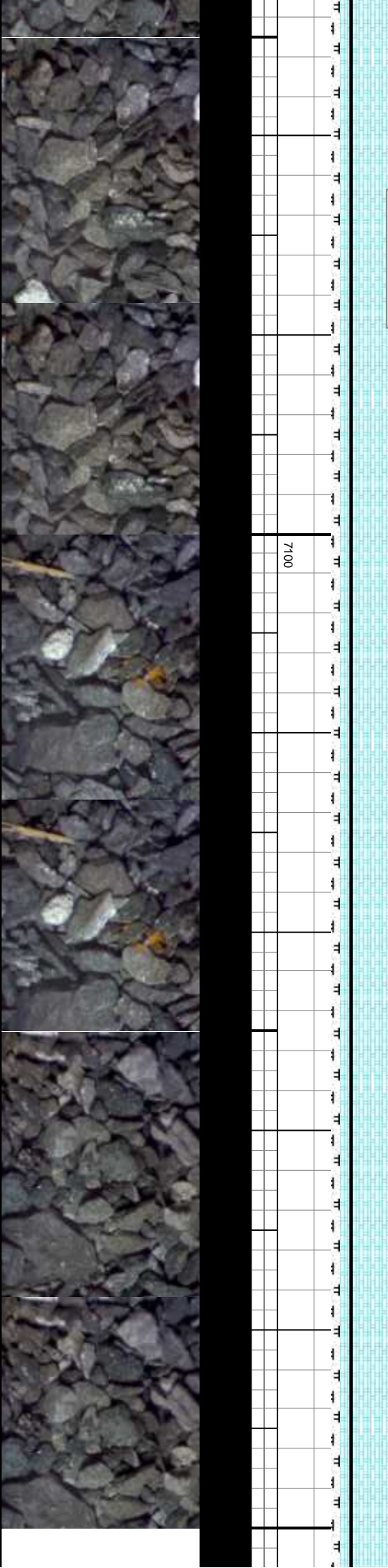
6100  
80% CHK: crm-llgy to brn, mot, sft-mod frm, sb ply-blky, v calc;  
20% MRLST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex,  
calc, tr inoc, tr cal

TVD (ft)

80% CHK: crm-llgy to brn, mot, sft-mod frm, sb ply-blky, v calc;  
20% MRLST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex,  
calc, tr inoc, tr cal

MD: 7,661 '  
TVD: 6,898.12 '  
Inclination: 89.2 °  
Azimuth: 181.9 °  
VS: 1,460.79 '

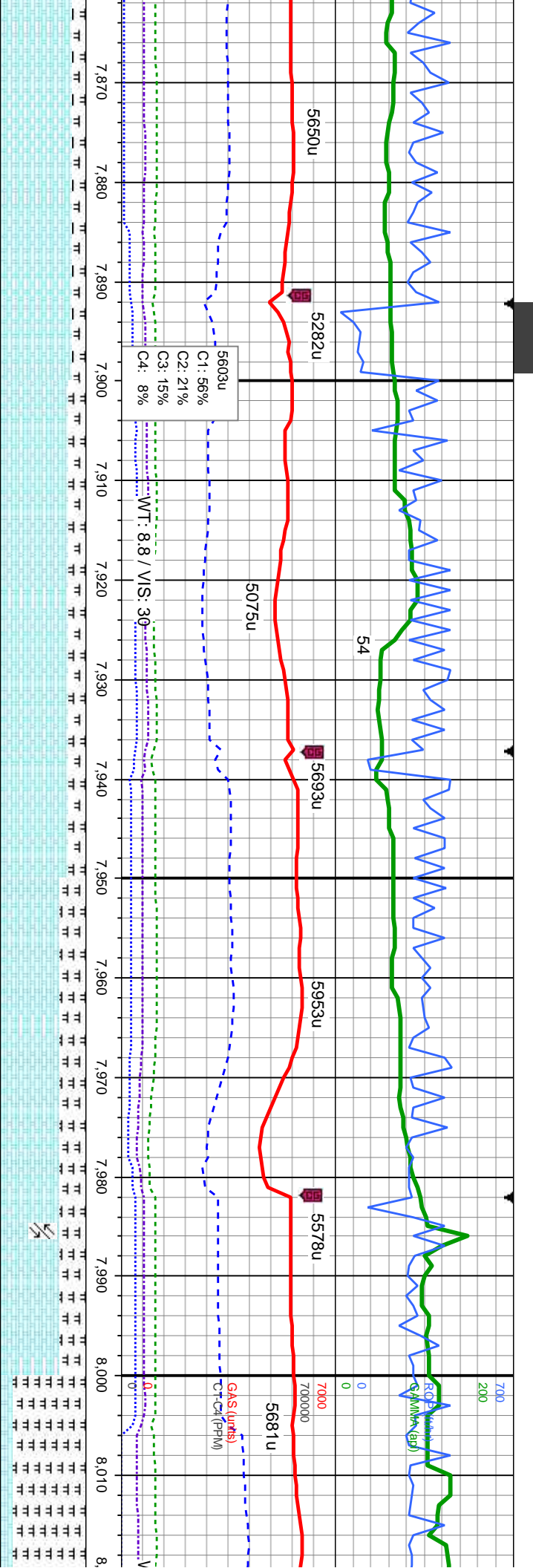
85% MRL  
Inoc











cm-lgy to brn, mot, sft-mod frm, sb ply-bkly, v calc;  
med-dk gy, sl frm-mod hd, sb ply-bkly, silty-mot tex, tr cal

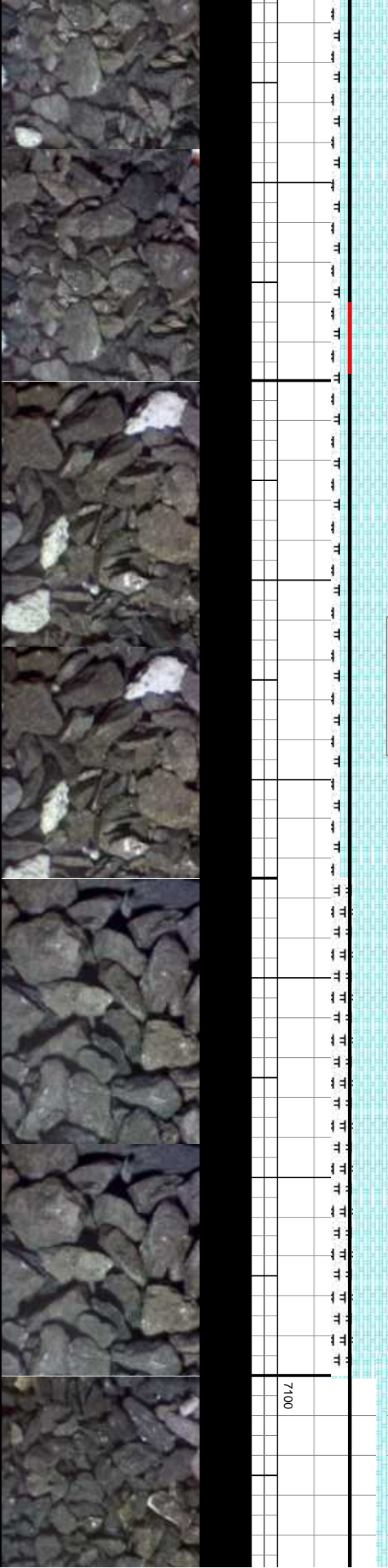
80% CHK: cm-lgy to brn, mot, sft-mod frm, sb ply-bkly, v calc; 20% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, silty-mot tex, calc, tr inoc

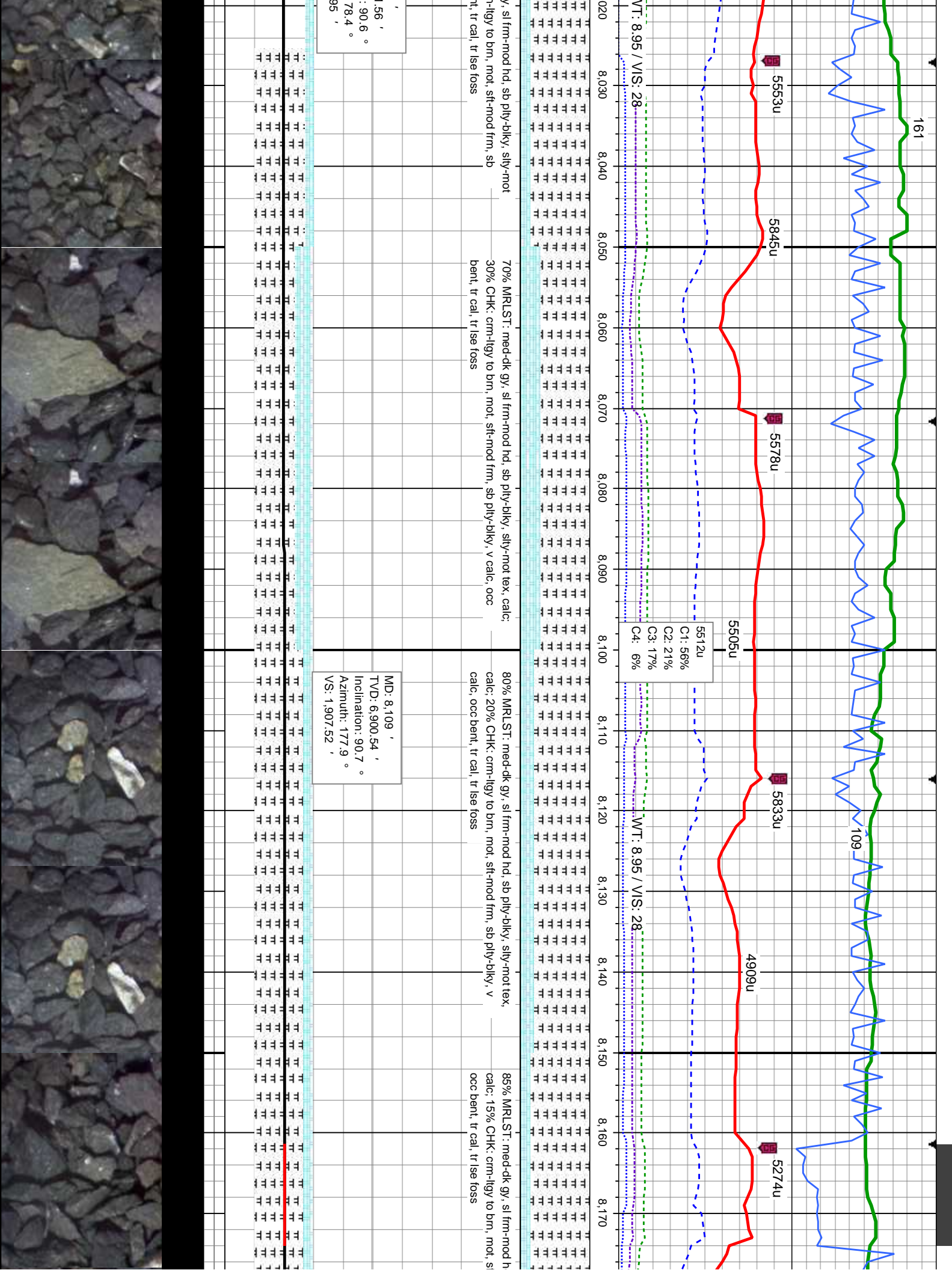
70% CHK: cm-lgy to brn, mot, sft-mod frm, sb ply-bkly, v calc; 30% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, silty-mot tex, calc, tr inoc

85% MRLST: med-dk g tex, calc; 15% CHK: cm ply-bkly, v calc, occ bel

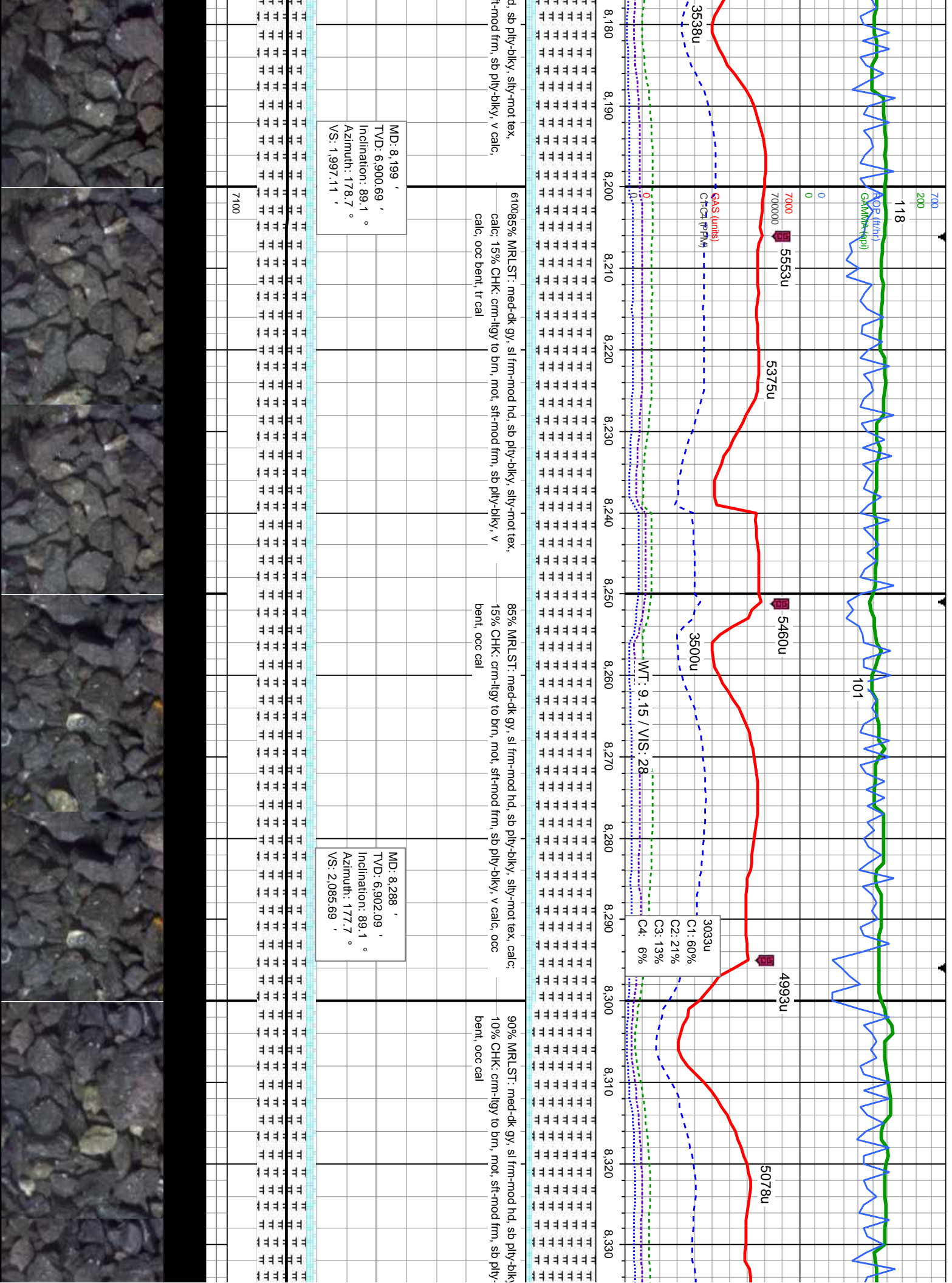
MD: 7,930 '  
TVD: 6,902.33 '  
Inclination: 90.4 °  
Azimuth: 179.1 °  
VS: 1,729.29 '

MD: 8,019 '  
TVD: 6,902.33 '  
Inclination: 90.4 °  
Azimuth: 179.1 °  
VS: 1,817.29 '

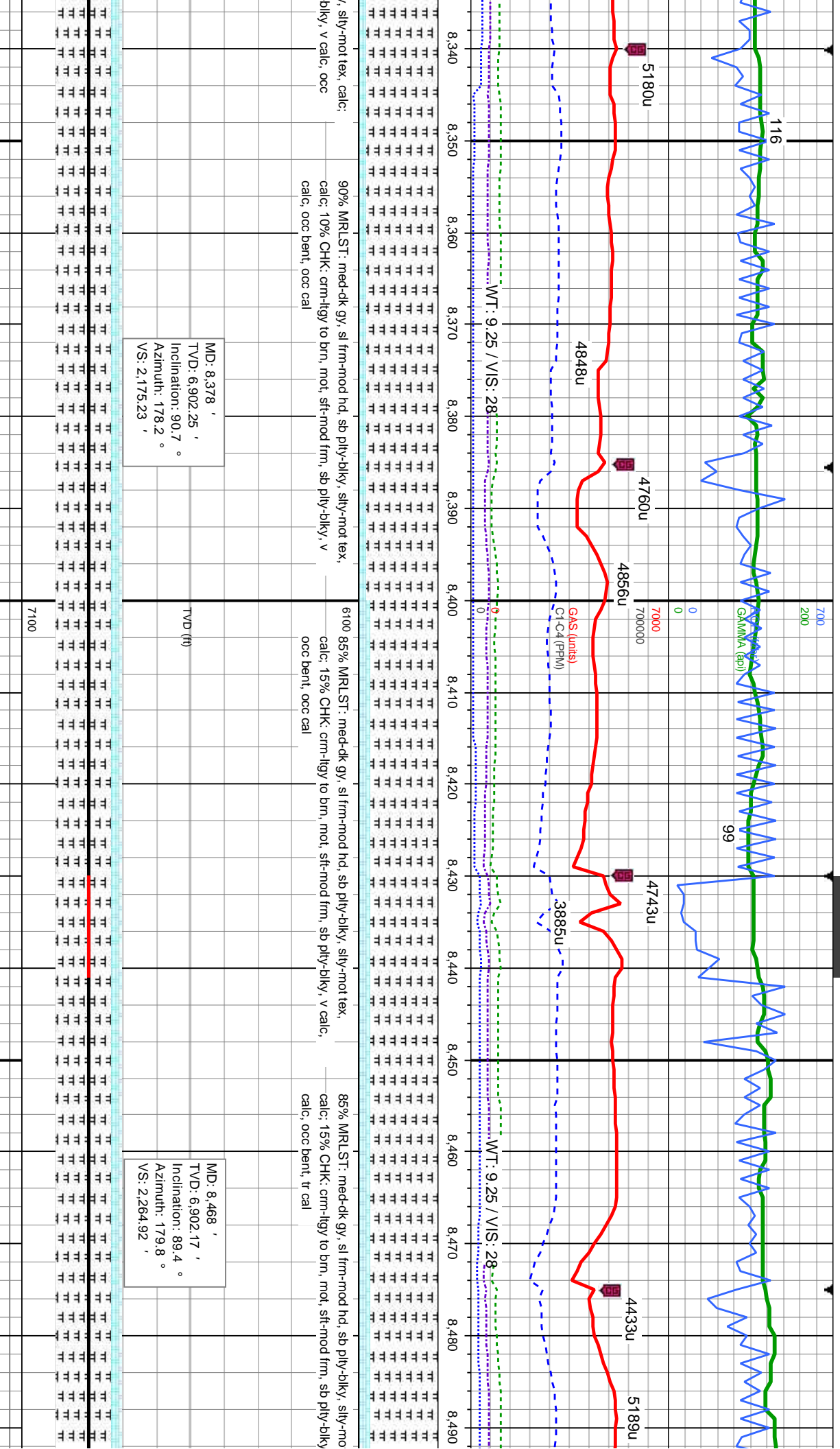


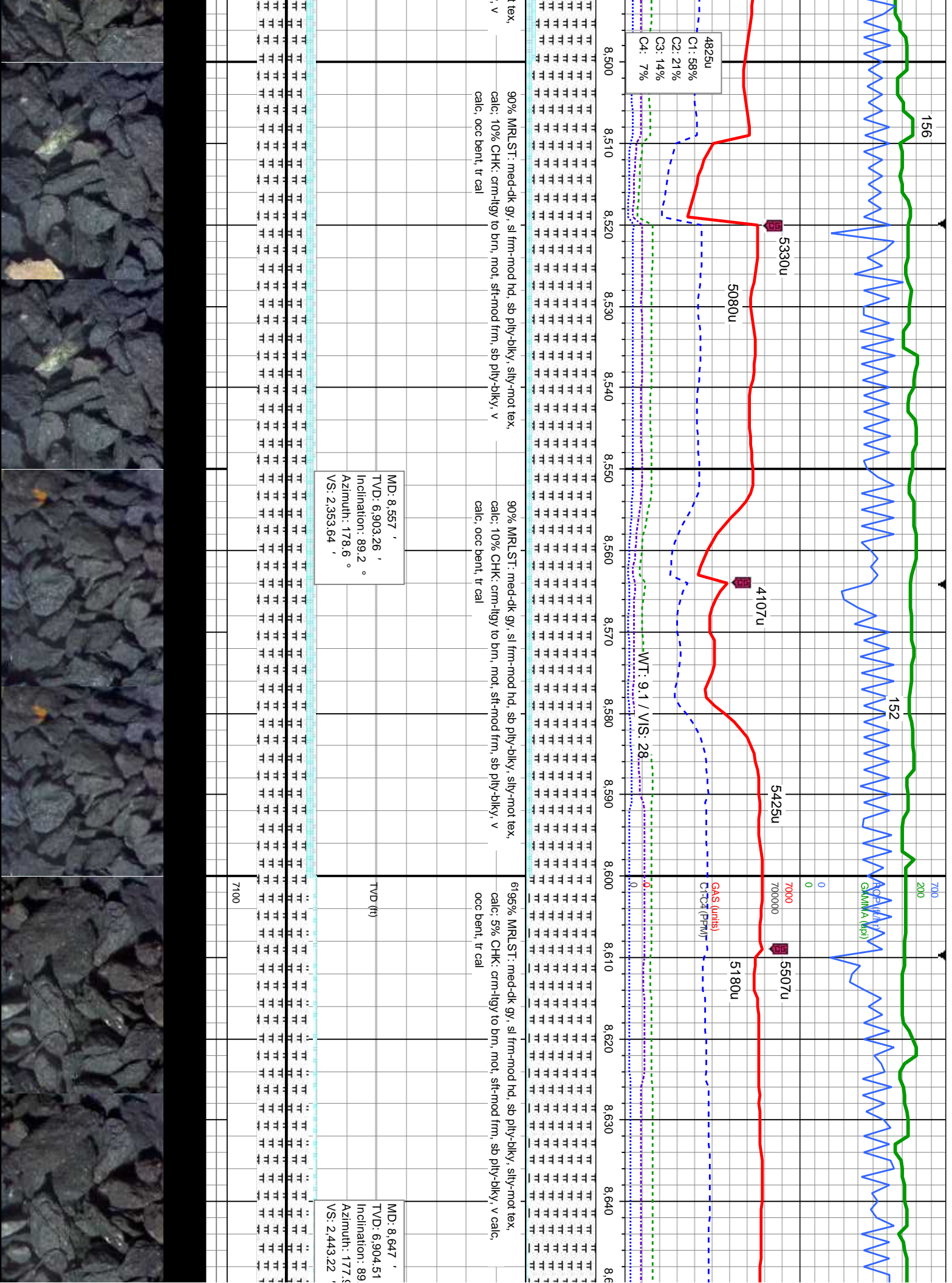




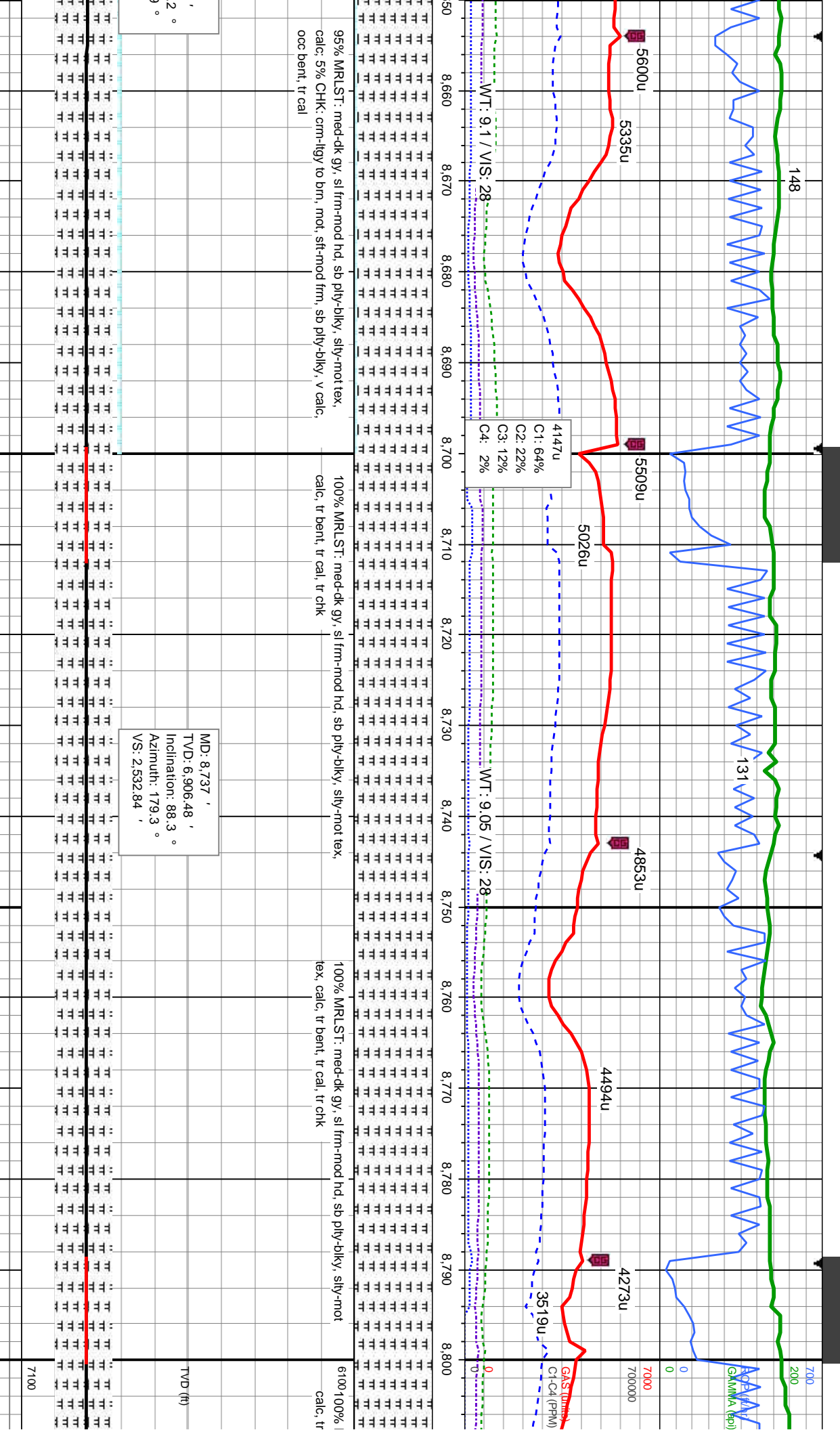




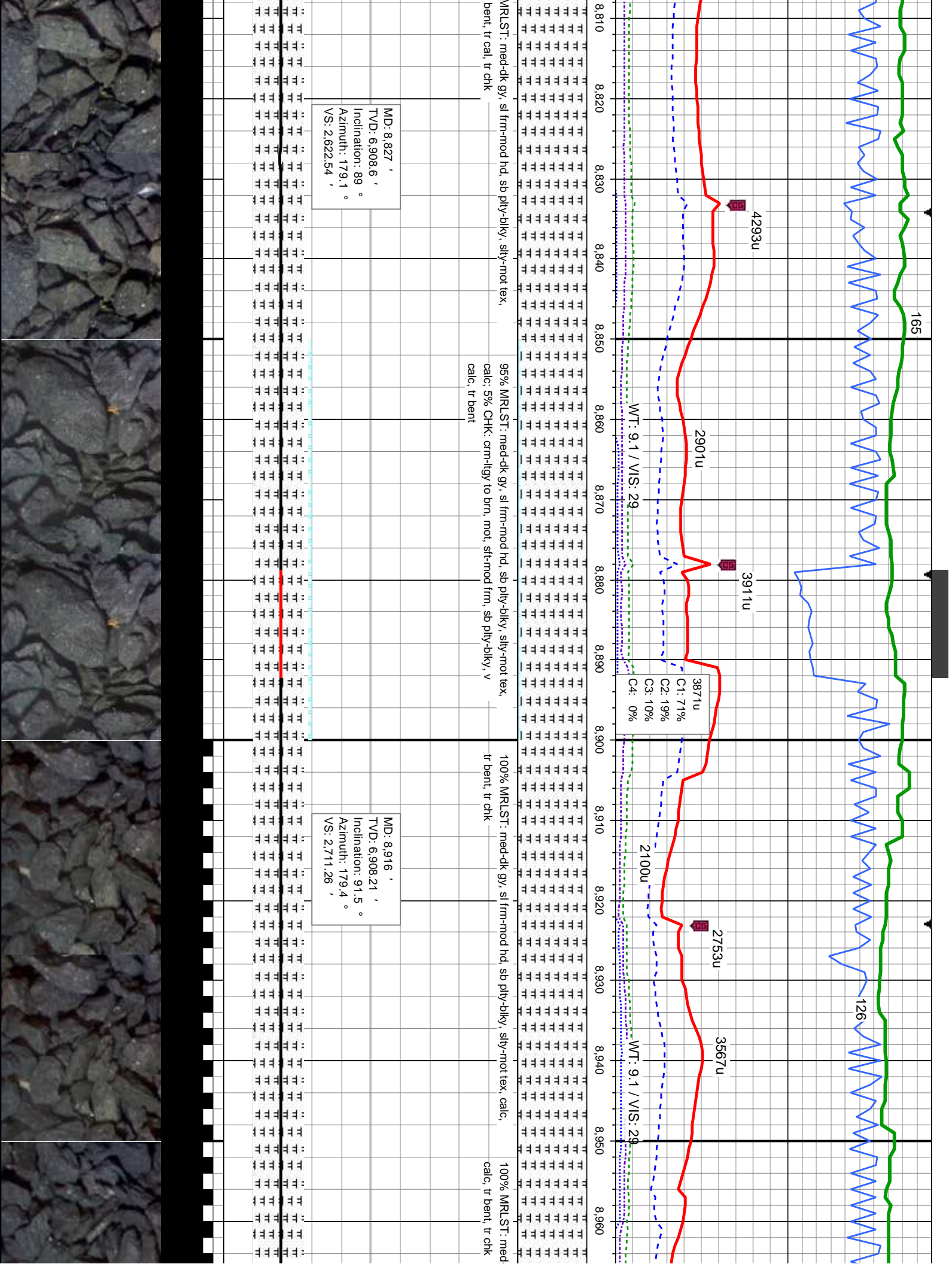


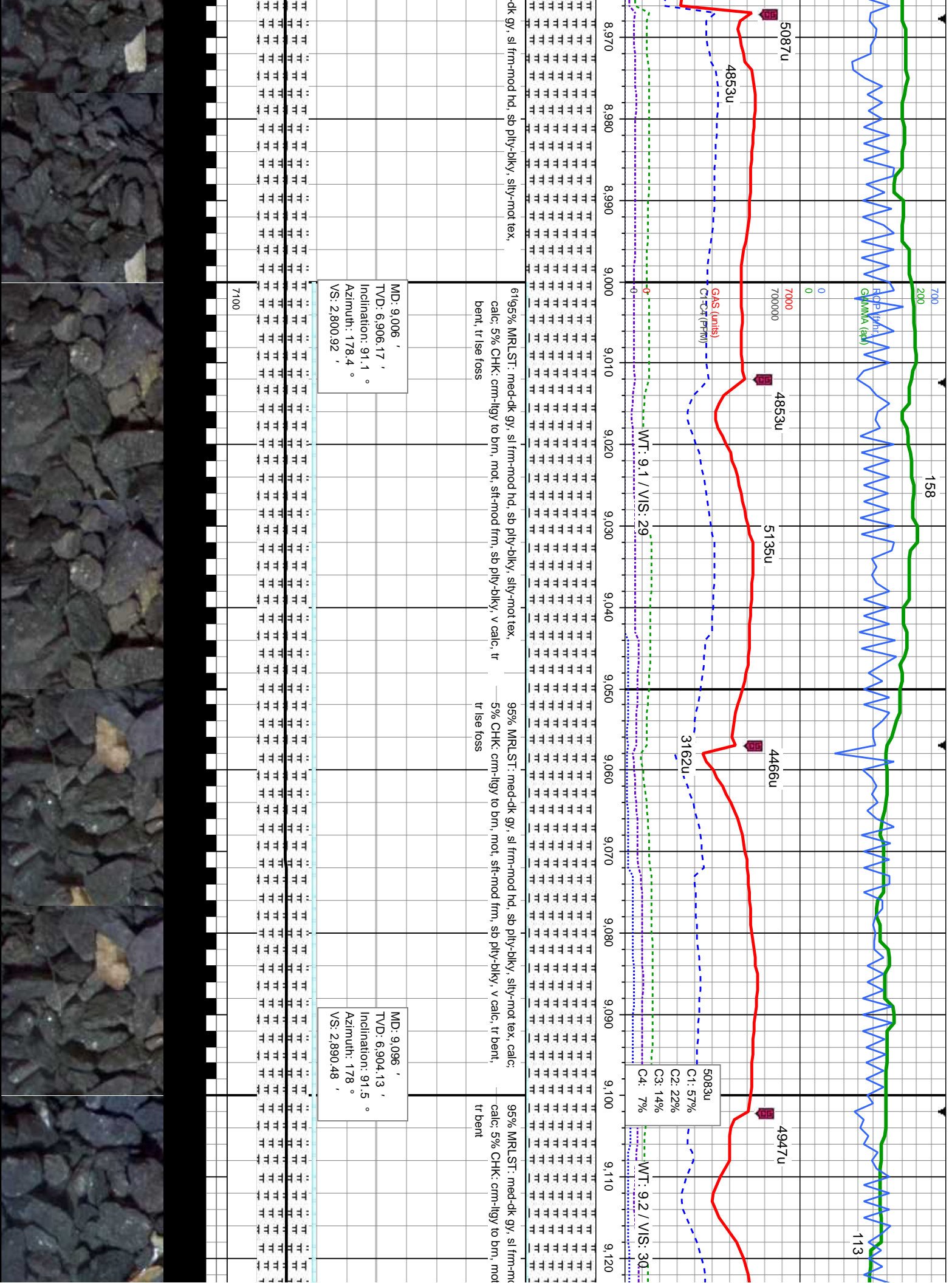




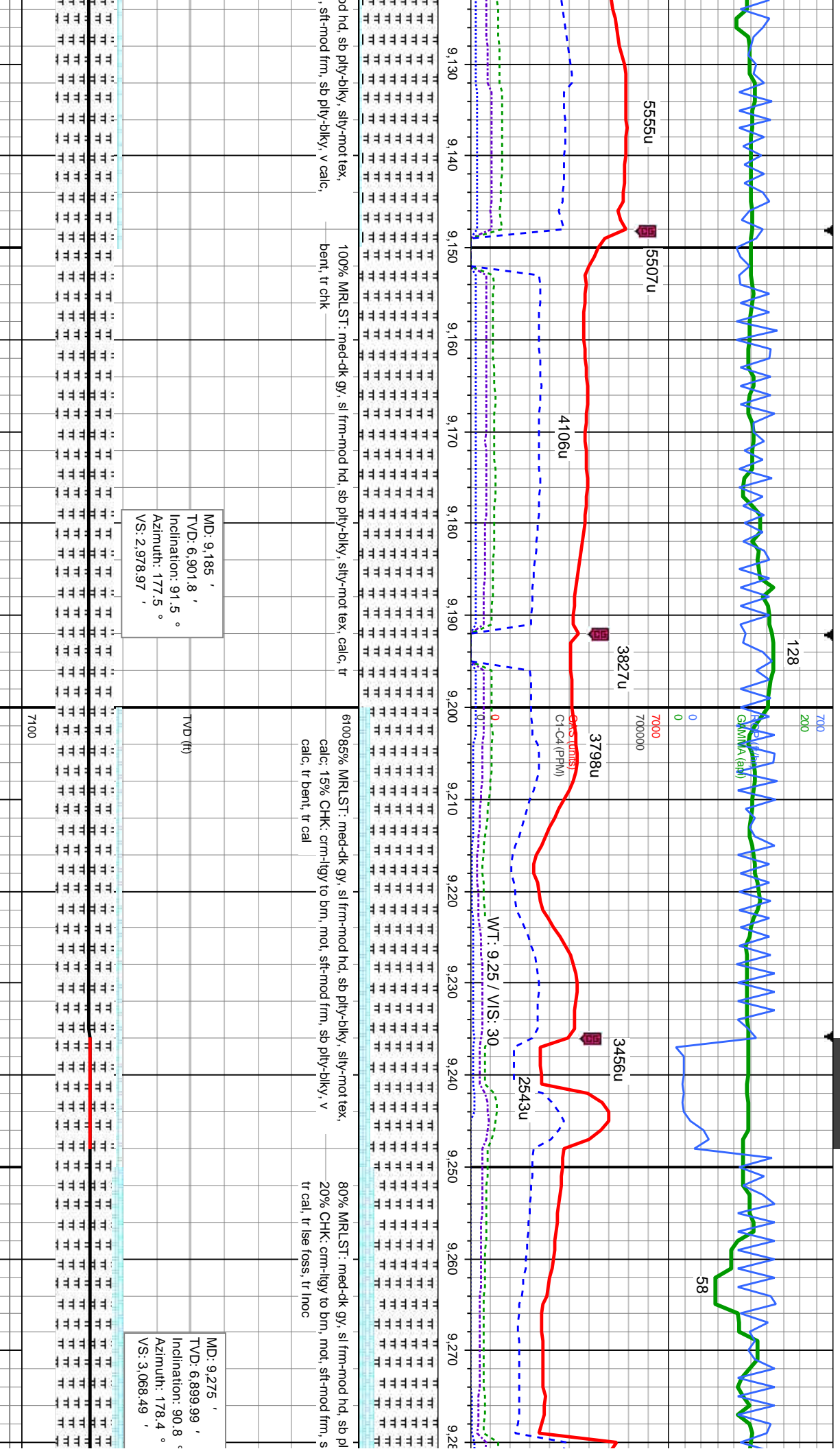


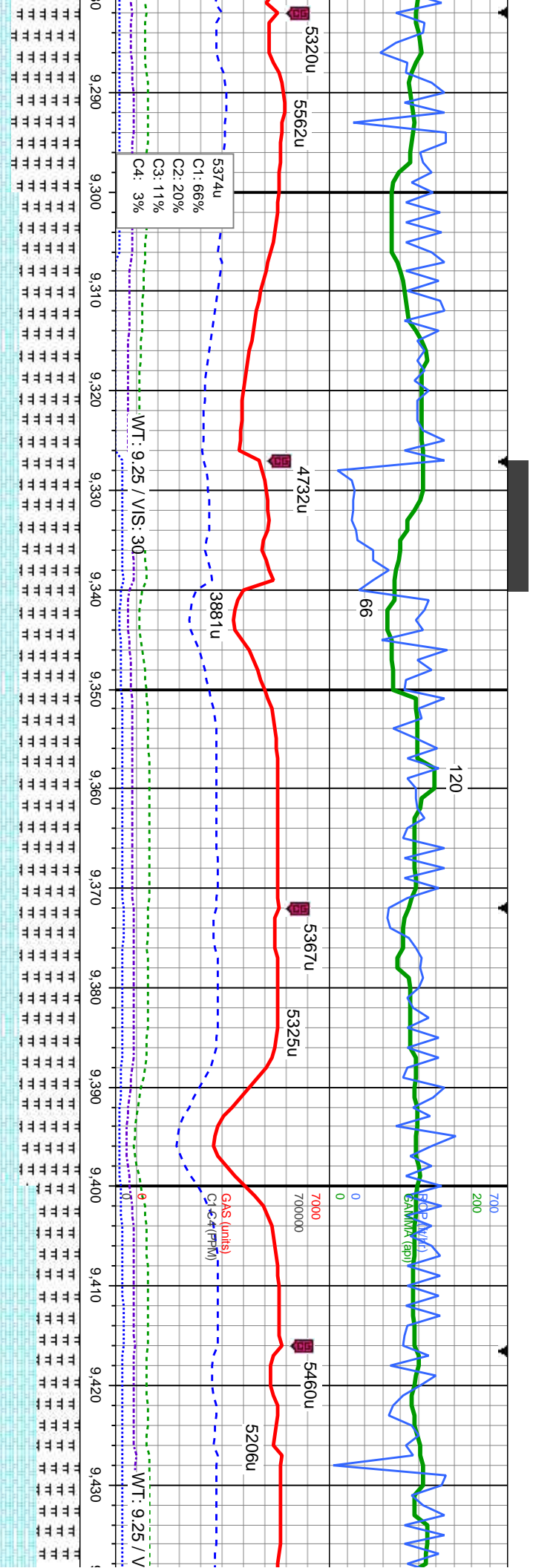






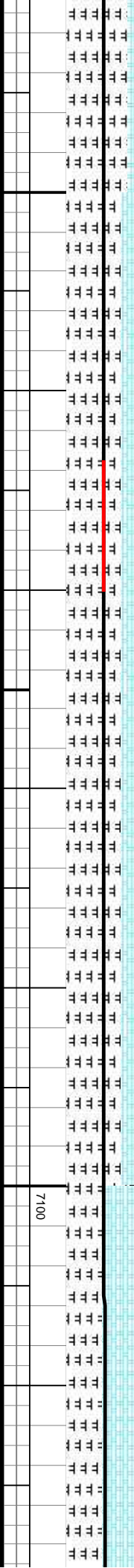




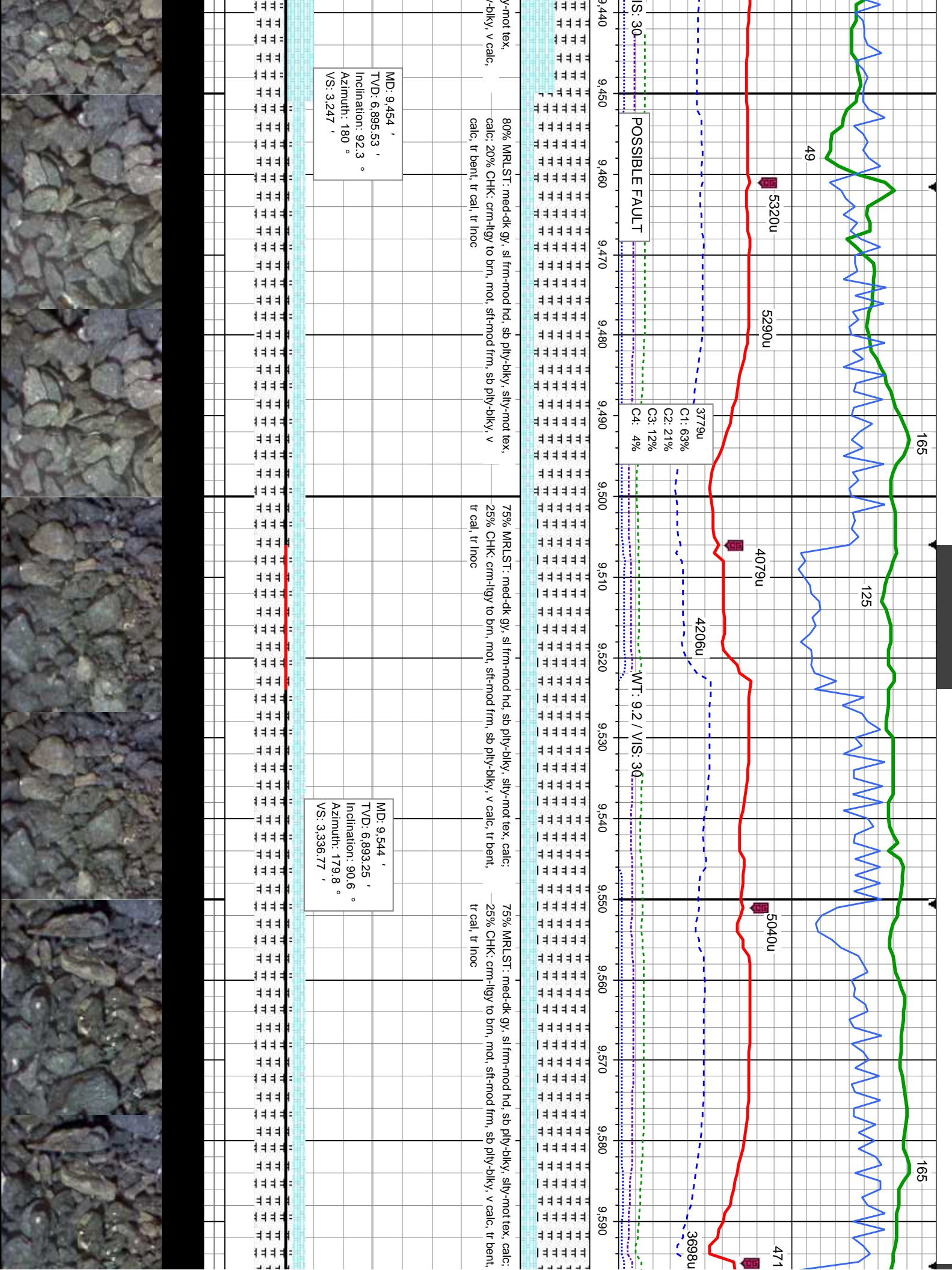


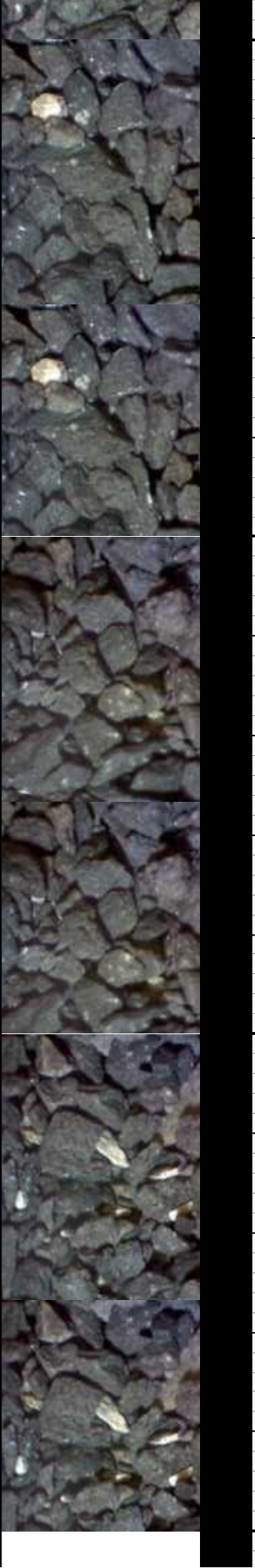
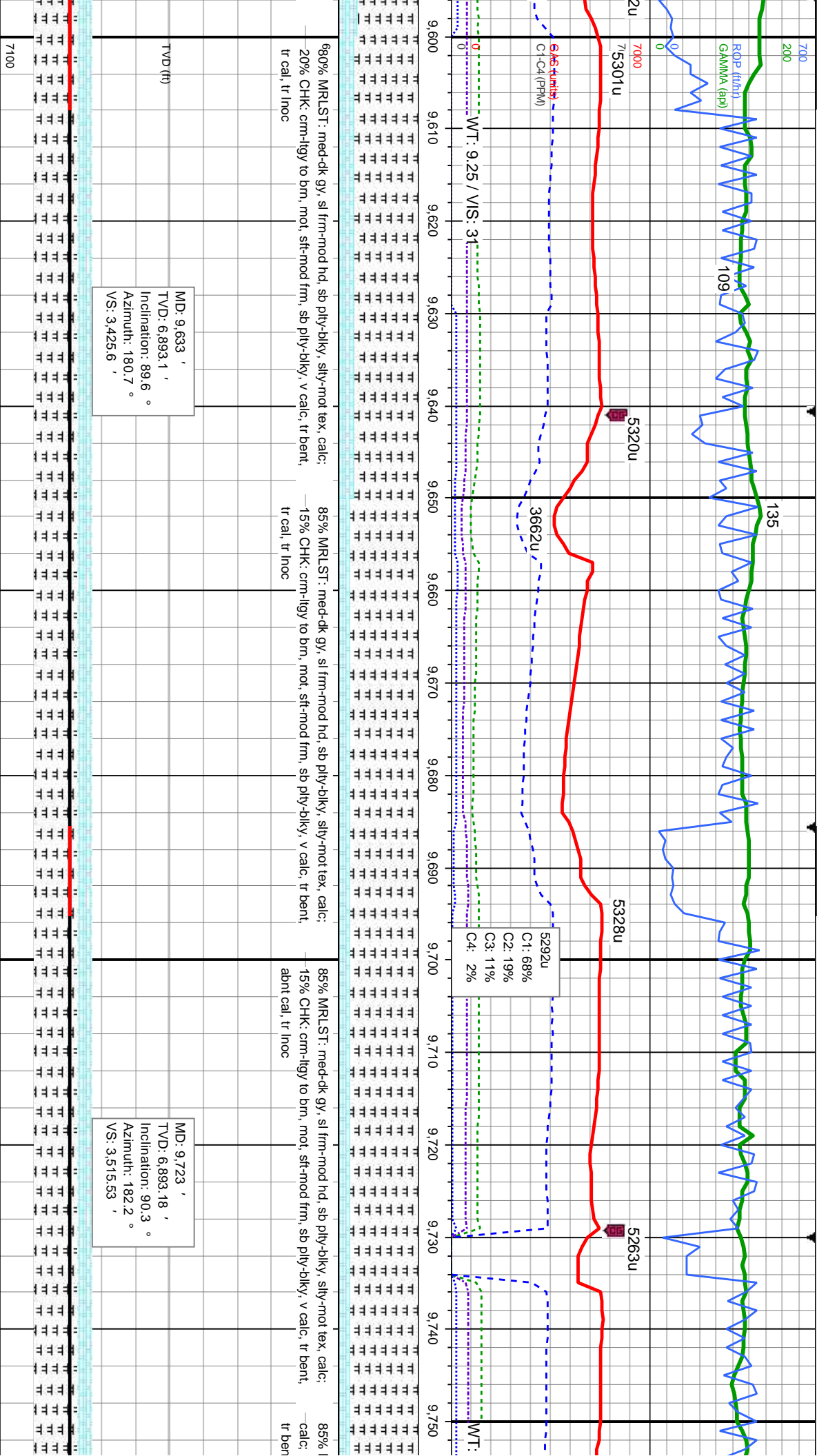
70% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, silty-mot tex, calc; 30% CHK: crm-lygy to brn, mot, sft-mod frm, sb ply-bkly, v calc, tr bent, tr cal, tr lse foss, tr inoc	70% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, silty-mot tex, calc; calc: 30% CHK: crm-lygy to brn, mot, sft-mod frm, sb ply-bkly, v calc, tr bent, tr cal, tr lse foss, tr inoc	610/50% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, silty-mot tex, calc: 50% CHK: crm-lygy to brn, mot, sft-mod frm, sb ply-bkly, v tr bent, tr cal, tr inoc
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MD: 9,364 '  
TVD: 6,898.36 '  
Inclination: 91.3 °  
Azimuth: 180.3 °  
VS: 3,157.22 '

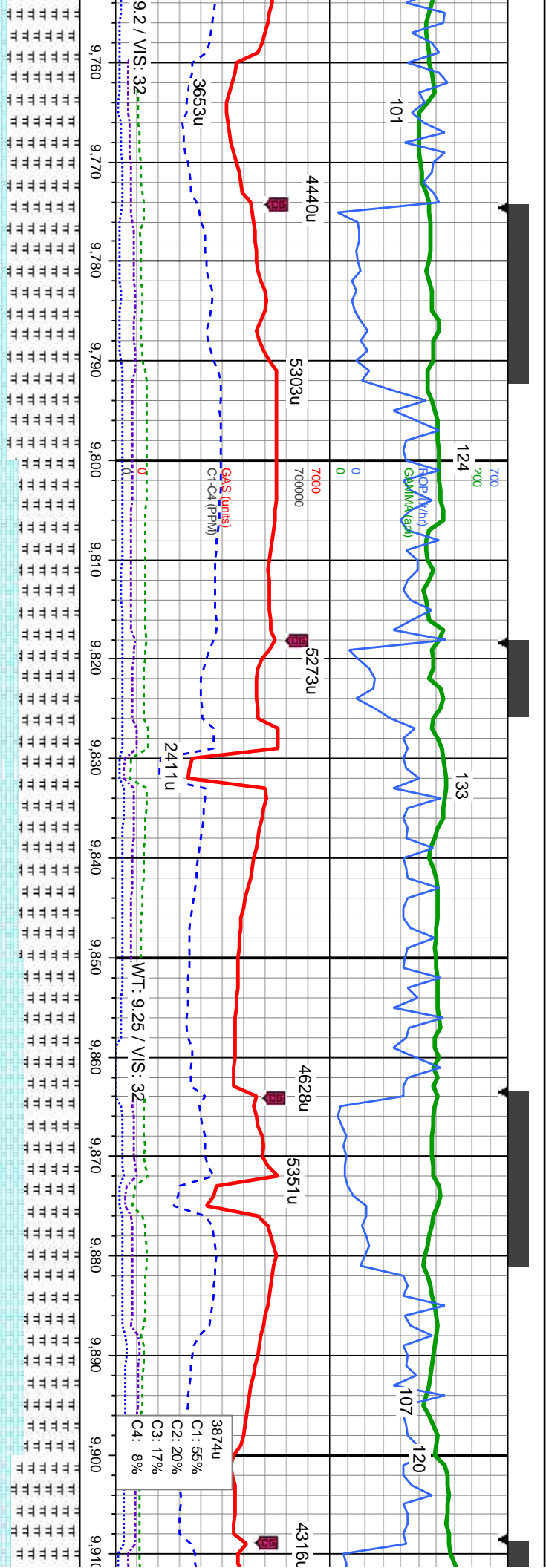












MR.LST: med-dk gy, sl frm-mod hd, sb pily-biky, silty-mot tex,  
15% CHK: crm-illy to brn, mot, sft-mod frm, sb pily-biky, v calc,  
t, abnt cal, tr inoc

70% MR.LST: med-dk gy, sl frm-mod hd, sb pily-biky, silty-mot tex, calc;  
30% CHK: crm-illy to brn, mot, sft-mod frm, sb pily-biky, v calc, tr bent,  
mod cal, tr inoc

65% MR.LST: med-dk gy, sl frm-mod hd, sb pily-biky, silty-mot tex, calc;  
35% CHK: crm-illy to brn, mot, sft-mod frm, sb pily-biky, v calc, tr bent,  
mod cal, tr inoc

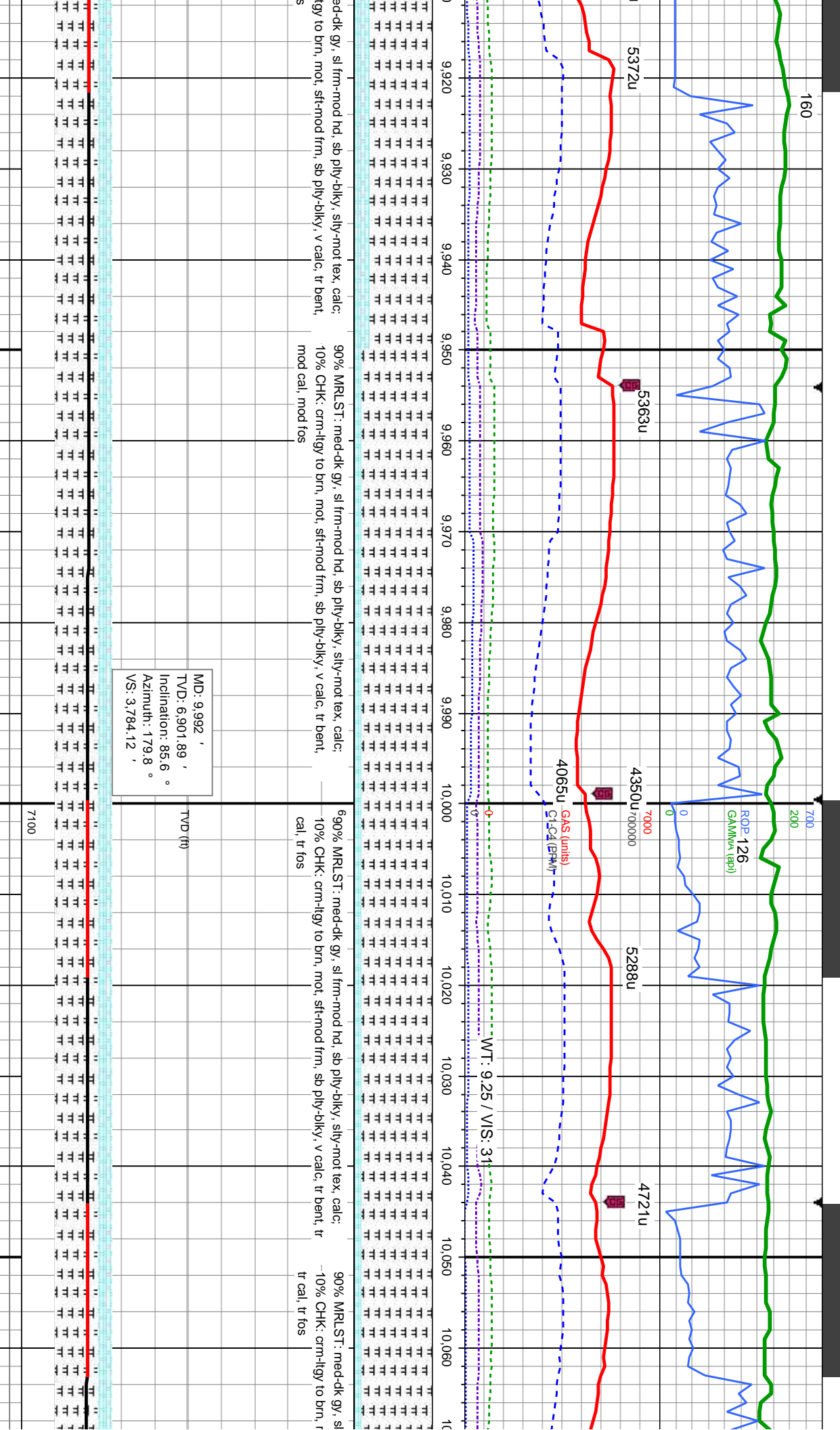
80% MR.LST: m  
20% CHK: crm-l  
mod cal, mod fo

MD: 9,812 '  
TVD (ft): 6,893.57 '  
Inclination: 89.2 °  
Azimuth: 183.5 °  
VS: 3,604.51 '

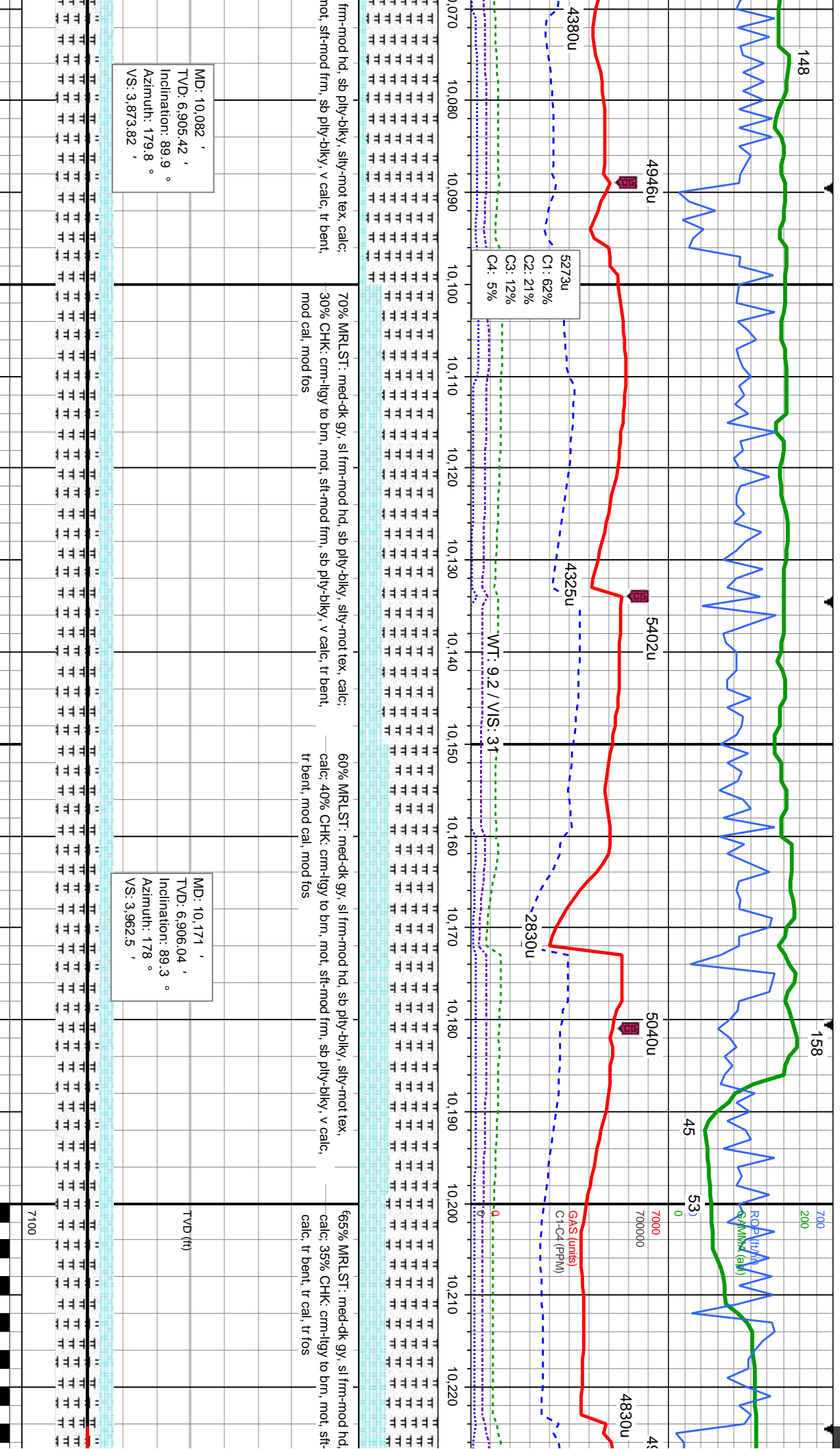
MD: 9,902 '  
TVD: 6,896.32 '  
Inclination: 87.3 °  
Azimuth: 181.2 °  
VS: 3,694.44 '

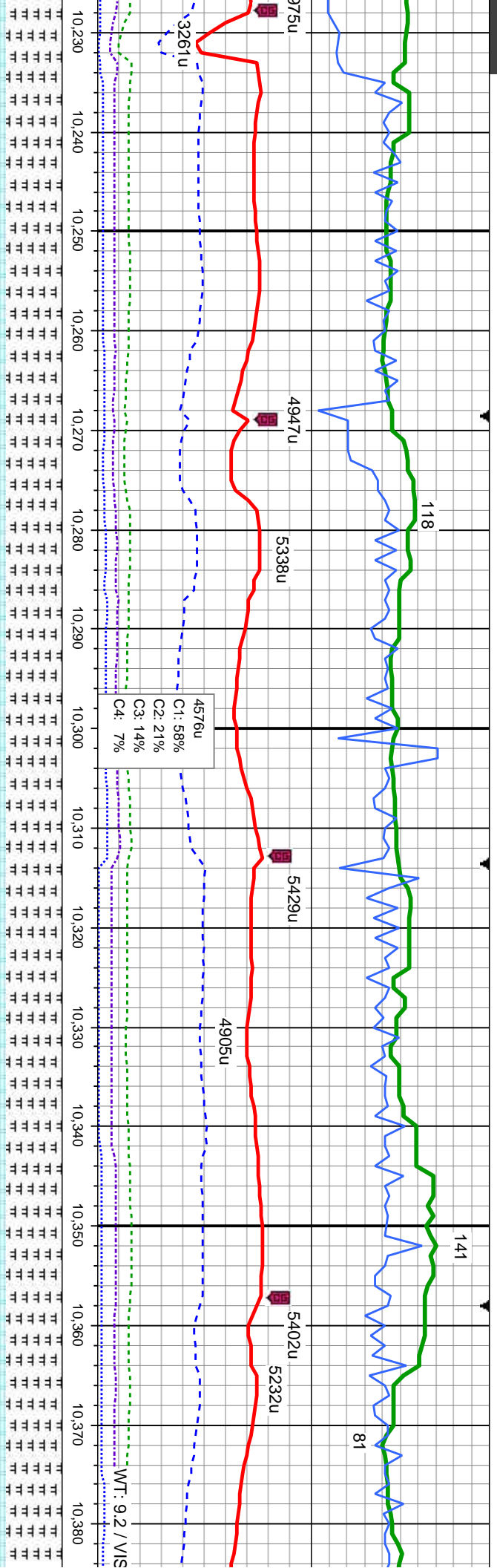
7100











sb ply-bkly, silty-mot tex, 65% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, silty-mot tex, calc: 35% CHK: crm-lygy to brn, mot, sft-mod frm, sb ply-bkly, v calc, tr bent, mod cal, mod fos

mod frm, sb ply-bkly, v 65% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, silty-mot tex, calc: 35% CHK: crm-lygy to brn, mot, sft-mod frm, sb ply-bkly, v calc, tr bent, mod cal, mod fos

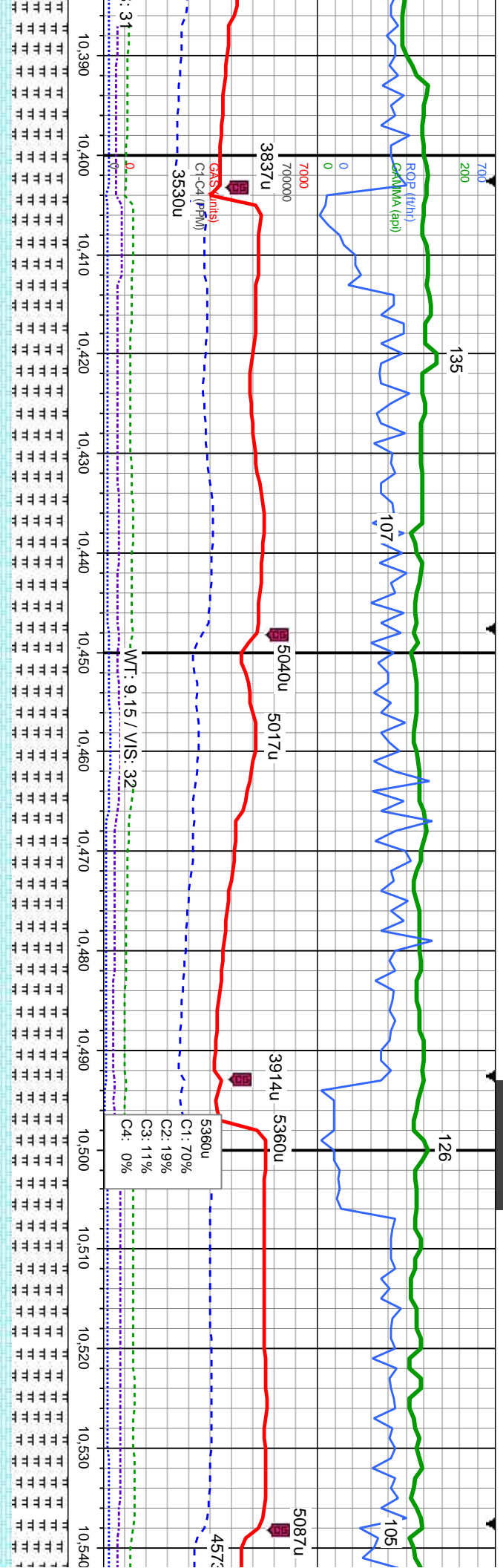
mod cal, mod fos 65% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, silty-mot tex, calc: 35% CHK: crm-lygy to brn, mot, sft-mod frm, sb ply-bkly, v calc, tr bent, cal, mod fos

MD: 10,261 '  
TVD: 6,905.81 '  
Inclination: 91 °  
Azimuth: 177.7 °  
VS: 4,052.02 '

MD: 10,350 '  
TVD: 6,904.49 '  
Inclination: 90.7 °  
Azimuth: 177 °  
VS: 4,140.47 '







slty-mot tex, calc;  
ly, v calc, tr bent, tr

65% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, slty-mot tex, calc;  
35% CHK: crm-lygy to brn, mot, sft-mod frm, sb ply-bkly, v calc, mod bent, tr cal, mod fos

65% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, slty-mot tex, calc;  
35% CHK: crm-lygy to brn, mot, sft-mod frm, sb ply-bkly, v calc, abnt bent, tr cal, tr fos

65% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, slty-mot tex, calc;  
35% CHK: crm-lygy to brn, mot, sft-mod frm, sb ply-bkly, v calc, calc, abnt bent, tr cal, tr fos

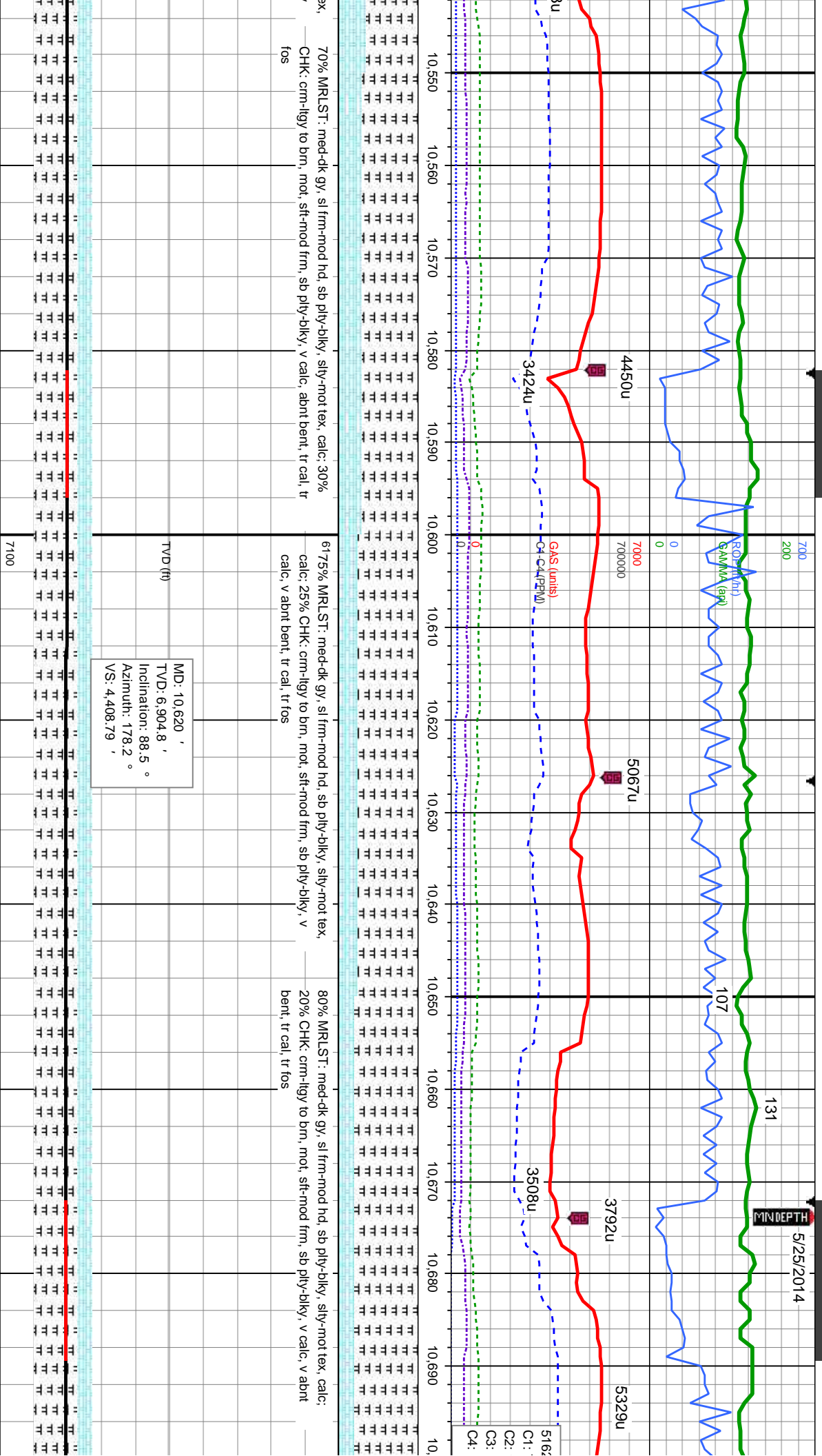
MD: 10,440 '  
TVD: 6,903.54 '  
Inclination: 90.5 °  
Azimuth: 177 °  
VS: 4.229.84 '

MD: 10,530 '  
TVD: 6,903.39 '  
Inclination: 89.7 °  
Azimuth: 177.5 °  
VS: 4.319.27 '

7100



MINDEPTH



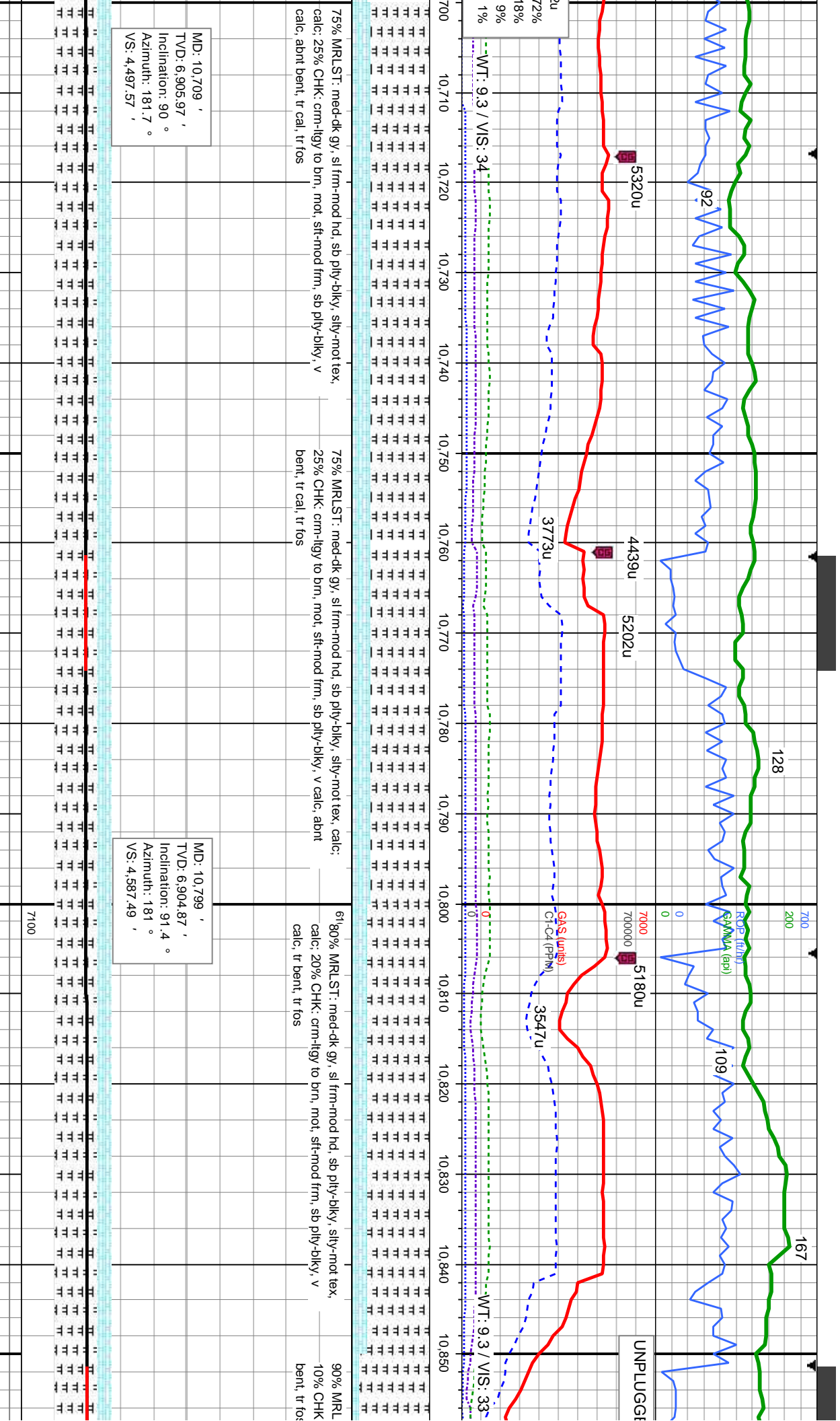
70% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, silty-mot tex, calc; 30%  
CHK: crm-illy to brn, mot, sft-mod frm, sb ply-bkly, v calc, abnt bent, tr cal, tr  
fos

6175% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, silty-mot tex,  
calc; 25% CHK: crm-illy to brn, mot, sft-mod frm, sb ply-bkly, v  
calc, v abnt bent, tr cal, tr fos

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



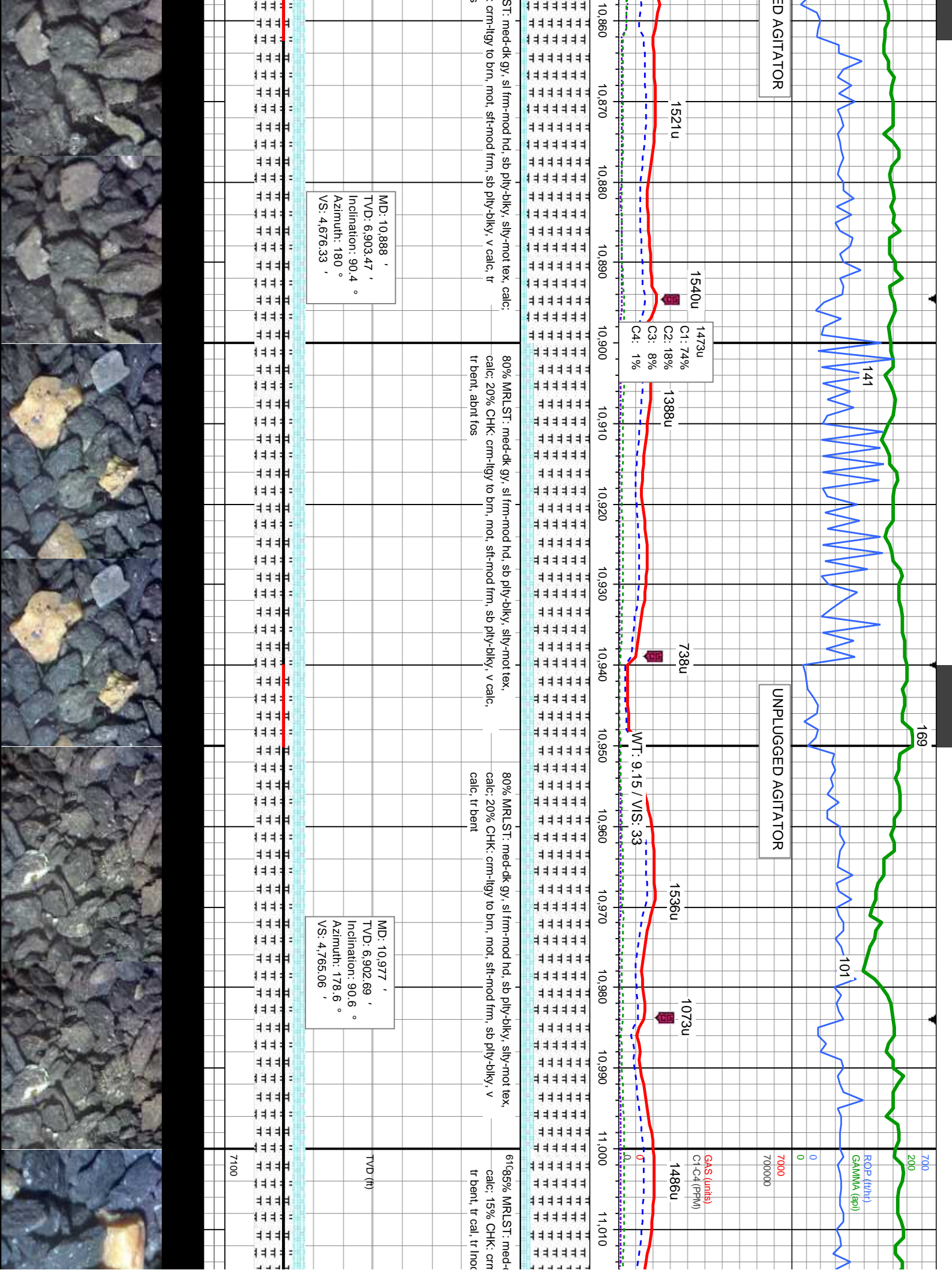




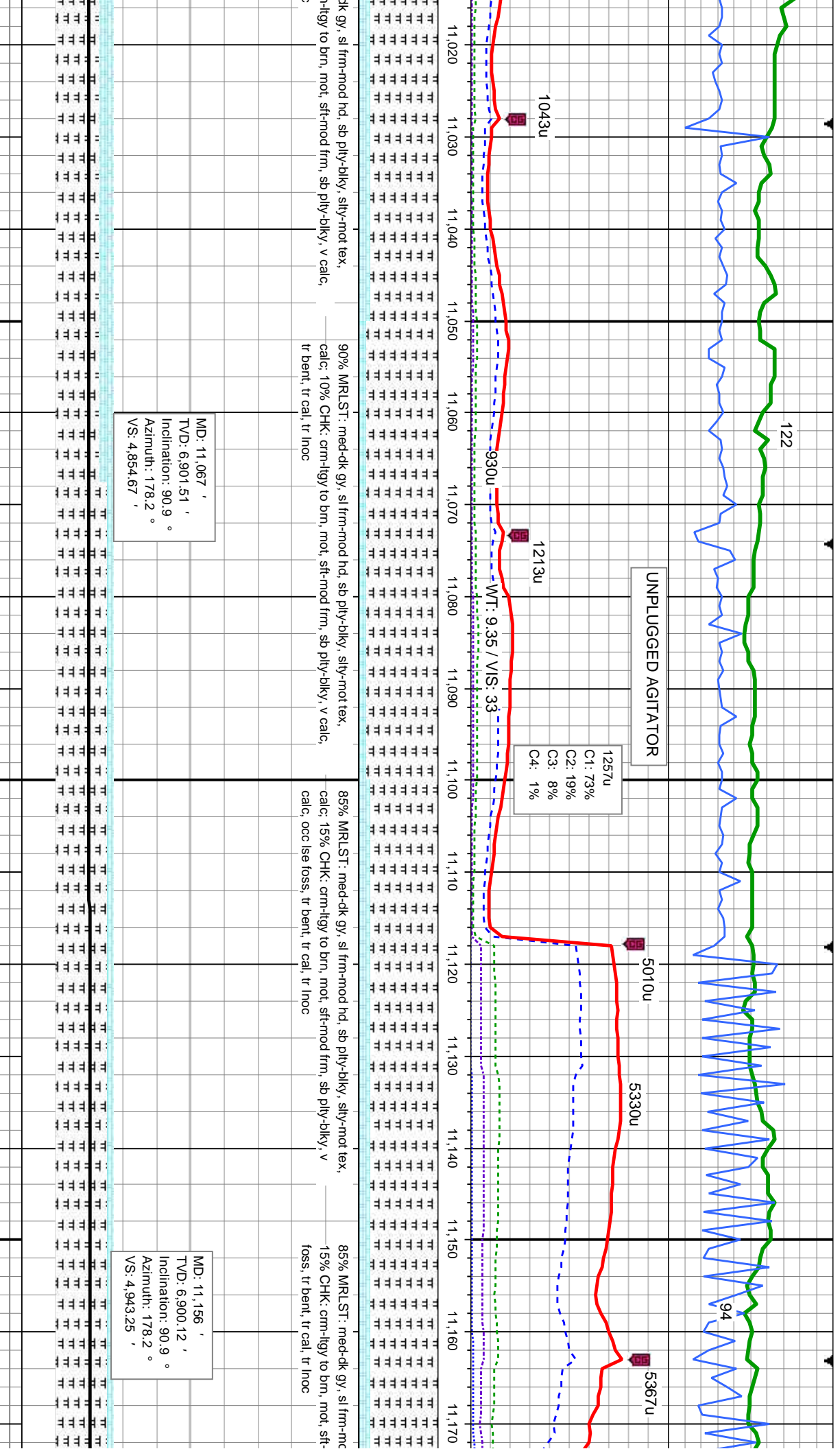
MD: 10,709 '  
TVD: 6,905.97 '  
Inclination: 90 °  
Azimuth: 181.7 °  
VS: 4,497.57 '

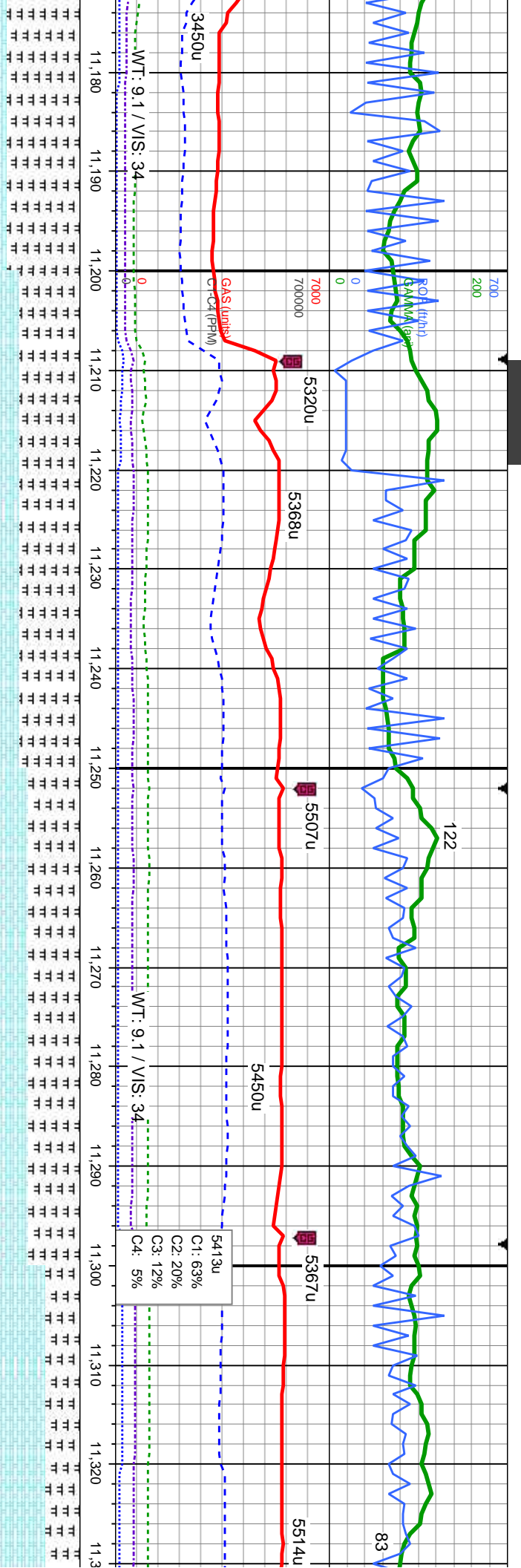
MD: 10,799 '  
TVD: 6,904.87 '  
Inclination: 91.4 °  
Azimuth: 181 °  
VS: 4,587.49 '











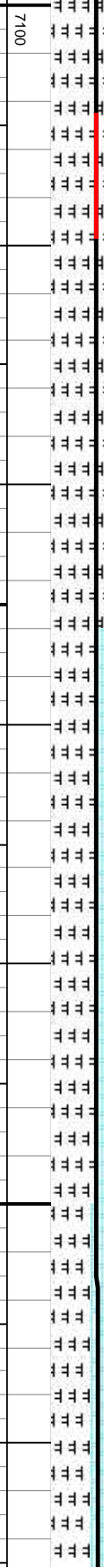
mod frm, sb ply-blky, v calc, occ ise

61% MRLST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex, calc: 30% CHK: crm-lygy to brn, mot, sft-mod frm, sb ply-blky, v calc, occ ise foss, occ bent, occ cal, tr inoc

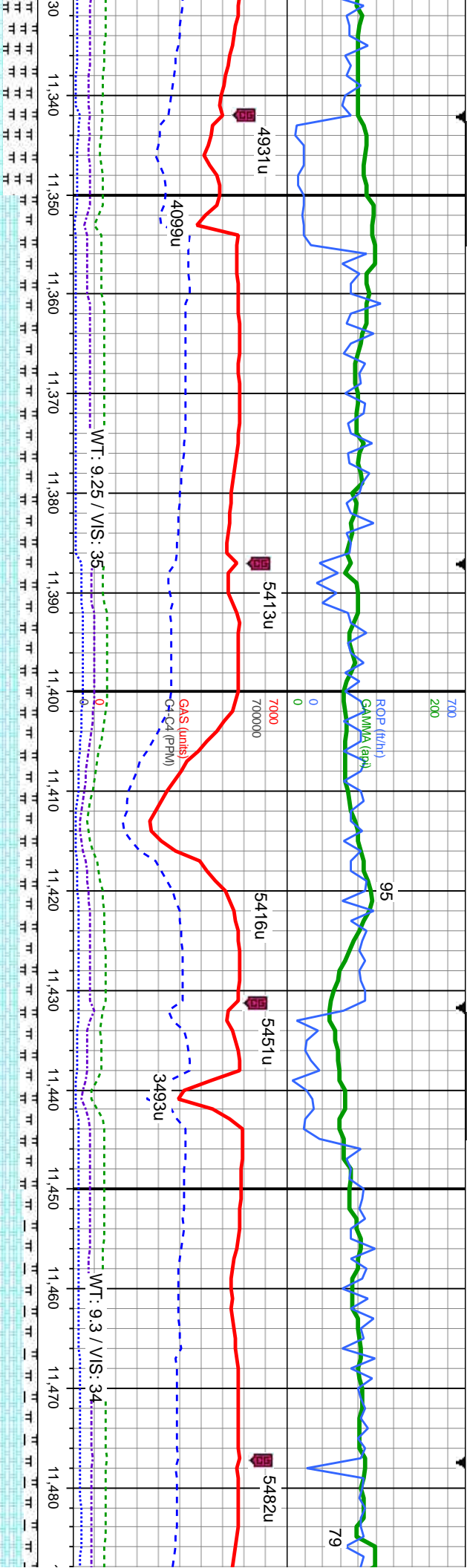
60% MRLST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex, calc: 40% CHK: crm-lygy to brn, mot, sft-mod frm, sb ply-blky, v calc, occ ise foss, occ bent, occ cal, tr inoc

60% CHK: crm-lygy to brn, mot, sft-mod frm, sb ply-blky, v calc, occ ise foss, occ bent, tr cal, tr inoc

MD: 11,246 '  
TVD: 6,898.47 '  
Inclination: 91.2 °  
Azimuth: 176.4 °  
VS: 5,032.67 '







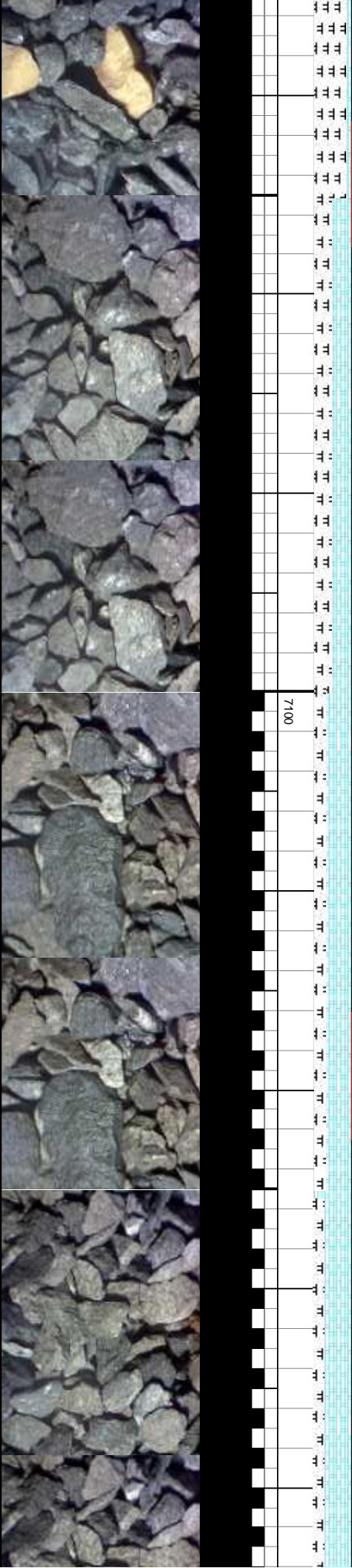
sb ply-biky, v calc; 40% gy, silty-mot tex, calc, occ	80% CHK: crm-lyg to brn, mot, sft-mod frm, sb ply-biky, v calc; 20% MRLST: med-dk gy, sl frm-mod hd, sb ply-biky, silty-mot tex, calc, tr bent, tr inoc, v tr cal	61% 80% CHK: crm-lyg to brn, mot, sft-mod frm, sb ply-biky, v calc; 20% MRLST: med-dk gy, sl frm-mod hd, sb ply-biky, silty-mot tex, calc, tr bent, tr inoc	85% CHK: crm-lyg to brn, mot, sft-mod frm, sb ply-biky, MRLST: med-dk gy, sl frm-mod hd, sb ply-biky, silty-mot bent, tr inoc
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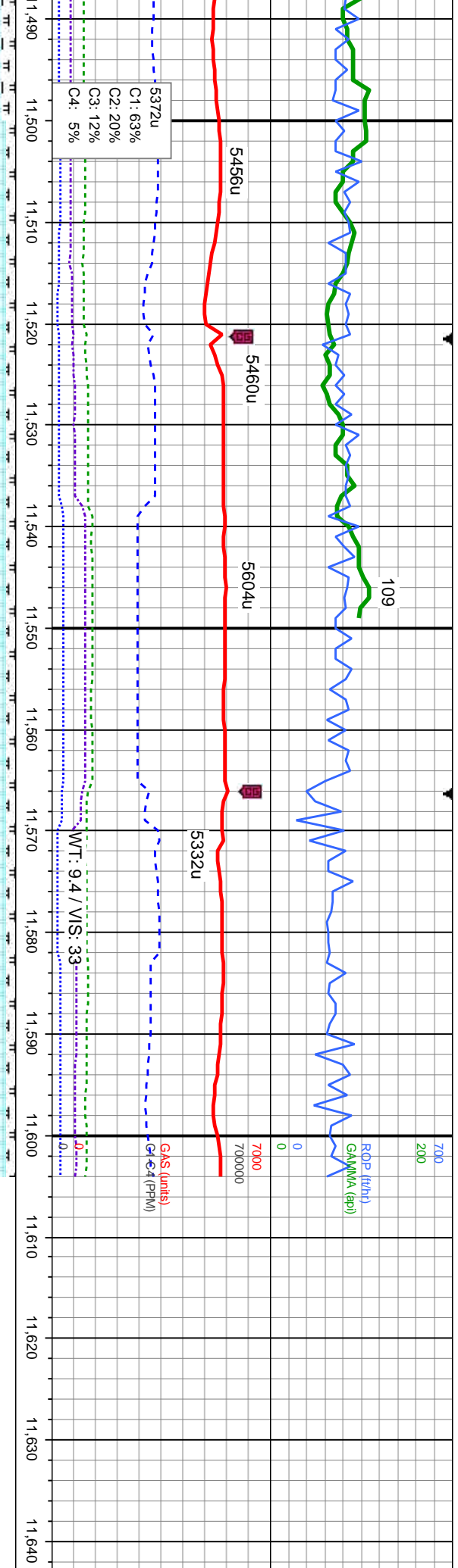
MD: 11,336 '  
TVD: 6,896.11 '  
Inclination: 91.8 °  
Azimuth: 176.3 °  
VS: 5.109.03 '

TVD (ft)

7100

MD: 11,425 '  
TVD: 6,893.94 '  
Inclination: 91 °  
Azimuth: 176.3 °  
VS: 5.197.82 '





v calc; 15%  
tex, calc, tr

90% CHK: crm-llgy to brn, mot, sft-mod frm, sb plyt-biky, v calc; 10% MRLST: med-dk gy, sl frm-mod hd, sb plyt-biky, slty-mot tex, calc, tr inoc, v tr bent, v tr lse foss

90% CHK: crm-llgy to brn, mot, sft-mod frm, sb ply-blky, v calc;  
10% MR LST: med-ck gy, sl frm-mod hd, sb ply-blky, sfty-mot tex,  
calc, v tr lnc, v tr bent, v tr lse foss

MD: 11,515 '   
 TVD: 6,893.07 '   
 Inclination: 90.1 °   
 Azimuth: 175.4 °   
 VS: 5,287.58 '

MD: 11,552 '   
 TVD: 6,892.85 '   
 Inclination: 90.6 °   
 Azimuth: 175.2 °   
 VS: 5,324.45 '

MD: 11,604 '   
 TVD: 6,892.3 '   
 Inclination: 90.6 °   
 Azimuth: 175.2 °   
 VS: 5,376.27 '

Thank You for Choosing  
Columbine Logging, Inc.

TD Well @ 11,604'  
on 05/25/2014 - 07:59 MST





[illegible]