



Scale: 6.98" / 100'
Measured Depth Log

Well Name Heartland State H01-74-1HN Sidetrack

Location Sec 25, T4N, R65W

State COLORADO

Country USA

API Number 05-123-39550

Region DJ BASIN

Spud Date 8/5/2014

Surface Coordinates 282' FSL, 784' FEL
40.27673, -104.60515

Bottom Hole Coordinates 75' FSL, 1650' FEL
40.24724, -104.60842

Ground Elevation 4834'

Logged Interval 7171' **To** 17522'

Formation Niobrara "C" Chalk

Type of Drilling Fluid FW LSND

County WELD

Rig Number Precision #829

AFE # 200373

Field WATTENBERG

Drilling Completed 8/27/2014

K.B. Elevation 4850'

Total Depth 17522'

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

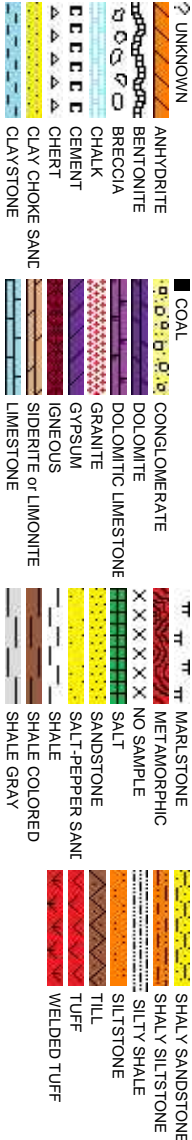
c.
AY
2022

Other

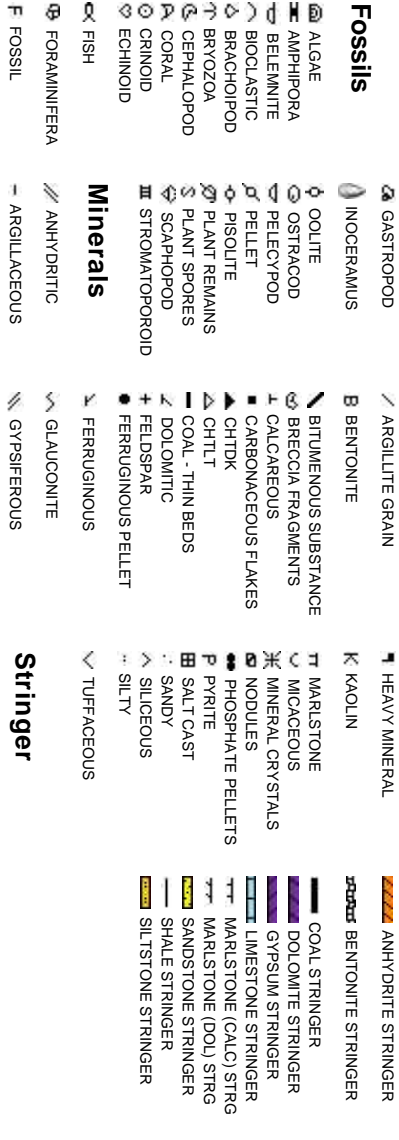
2385 S. Lipan St.
Denver, CO 80223

Ryan Shilling
Terry Acomb

Rock Types



Accessories



Other Symbols

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

Slide/Rotate

8/19/14

MINDEPTH

ROP (ft/hr)
GAMMA (API)
Gas Scale (units)

ROP
ROF
GAMMA

ROP Scale
0-700 ft/hr

84

200
200

Gamma Scale
0 - 200 API

0
0

Gas Scale
0 - 7000 units

7000
700000

Total Gas & Chromatograph

GAS
C1
C2
C3
C4

COLUMBINE LOGGING, INC. RIGGED UP ON
08/06/2014 MANNED 2-PERSON LOGGING WITH
BLOODHOUND GAS CHROMATOGRAPH UNIT # 0715

KOP = 7171

WT: 9.3 / VIS: 37

2081u GAS (units)
C1-C4 (PPM)

3156u

Depth Labels

% Lith

TVD SCALE
6500'-7200'

BEGIN 30' SAMPLES

6500

Bit Data
Bit #: 4
Type: RLD 513S5
Size: 6.12
Depth In: 7,171 '
Jets: 5x12
S/N: SO9036

MD: 7,158
TVD: 6,887.48
Inclination: 69.5
Azimuth: 182.4
VS: 472.25

Well Bore
TVD

TVD (ft)

Log Continued from Heartland State
H01-74-1HN_Horiz

60% CHK: crm-llgy, occ wh incl, mot,
sft-mod frm, sb blkly, wxy, v calc; 40%
MRLST: med-dk gy, sl frm-mod hd, sb
ply-blky, silty-mot tex, calc, tr calc frags

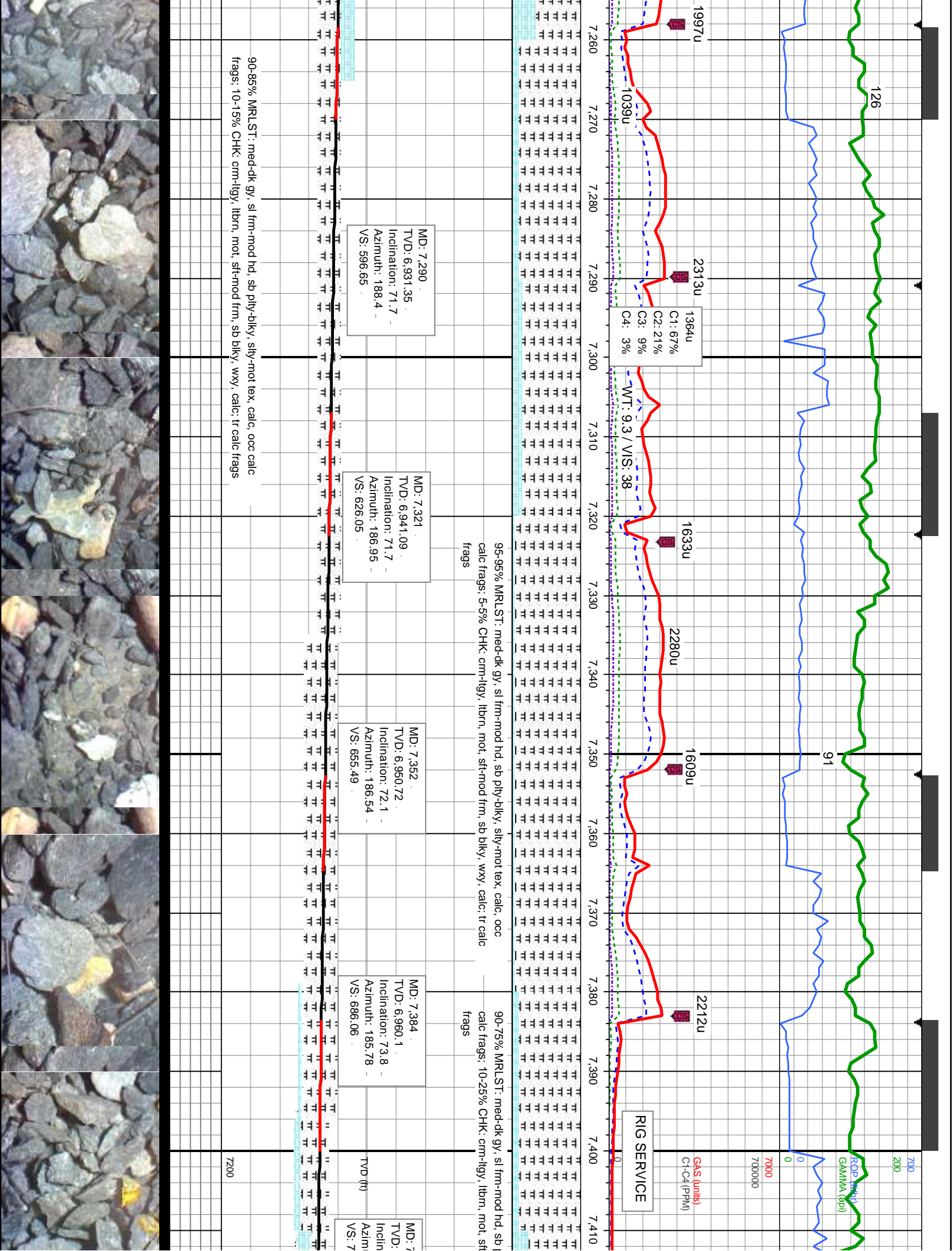
50-35% CHK: crm-llgy, occ wh incl, mot, sft-mod frm, sb blkly, wxy, v calc;
50-65% MRLST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex, calc, tr
7200 calc frags

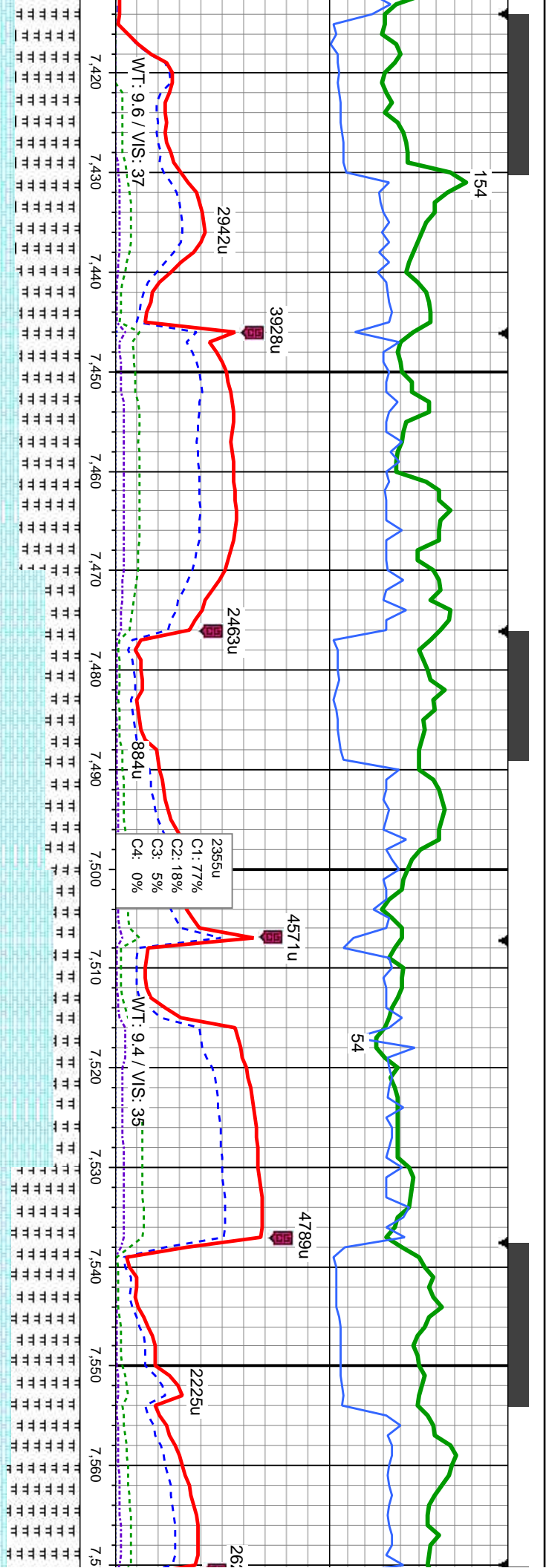
Oil Show

exc
mod
tr
sl

Images







415
6,968.25
ation: 75.7
uth: 184.31
15.97

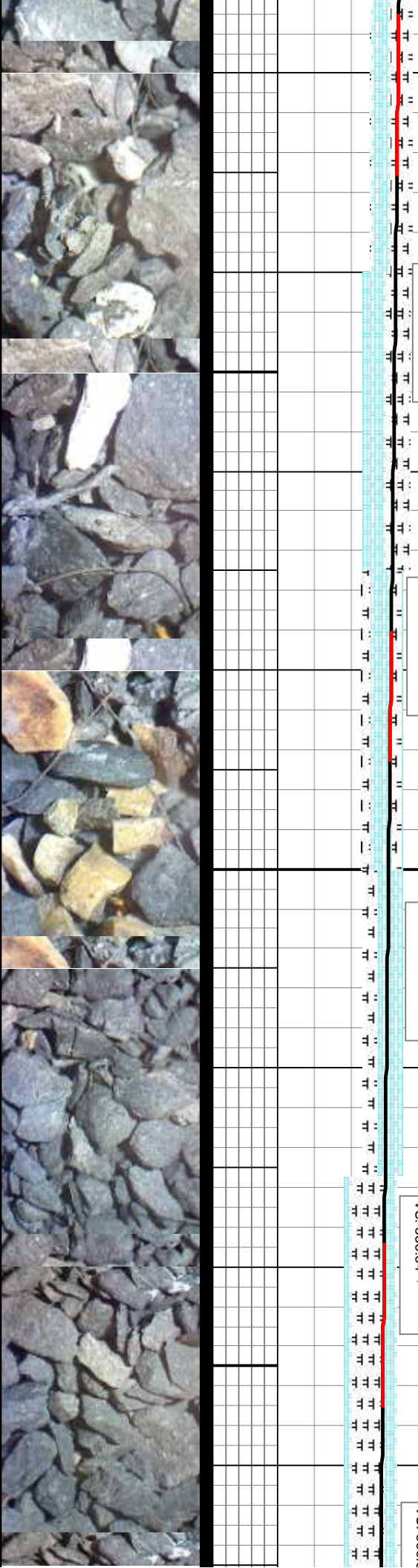
MD: 7,445
TVD: 6,975.33
Inclination: 77
Azimuth: 183.45
VS: 745.12

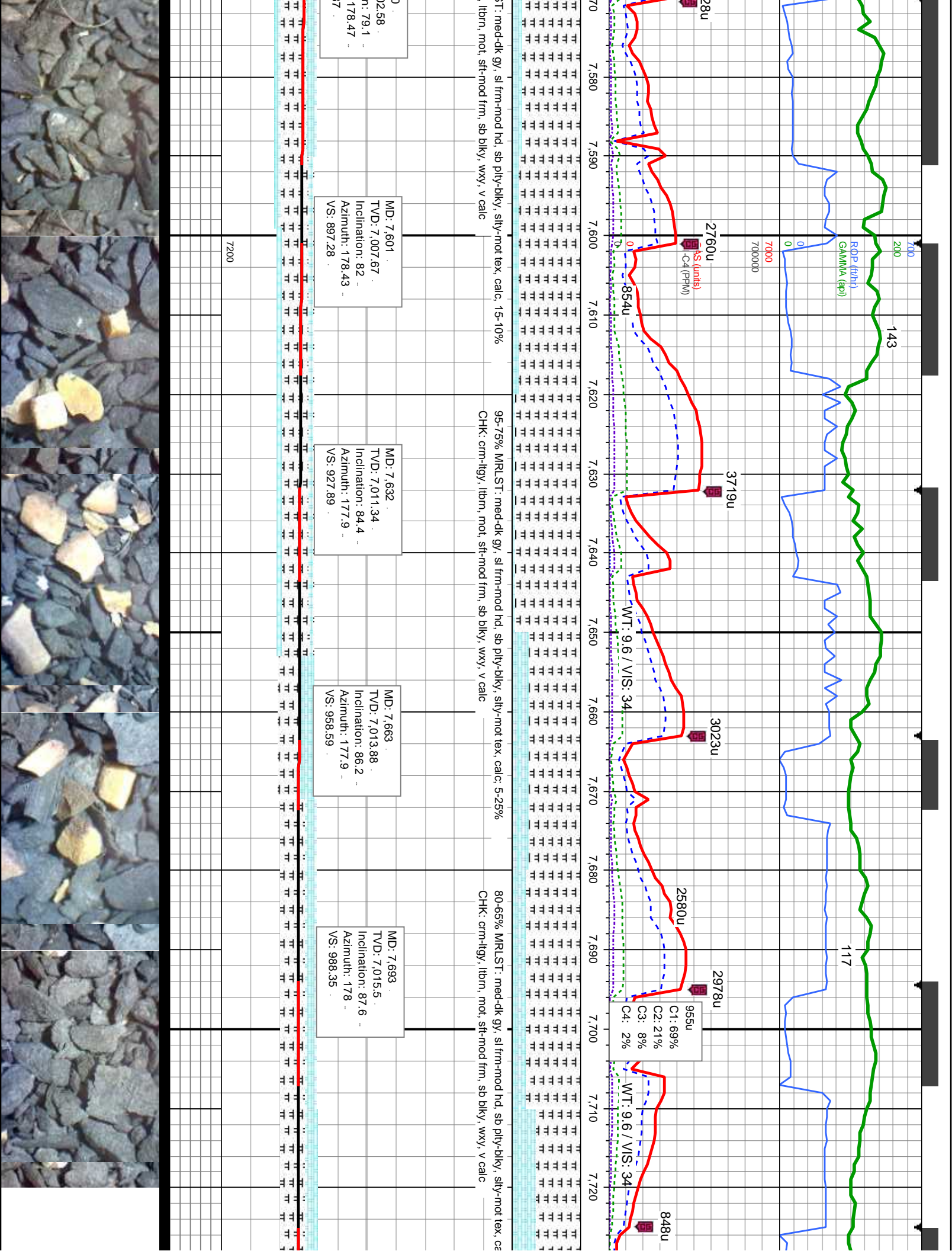
MD: 7,477
TVD: 6,982.5
Inclination: 77.1
Azimuth: 182.26
VS: 776.29

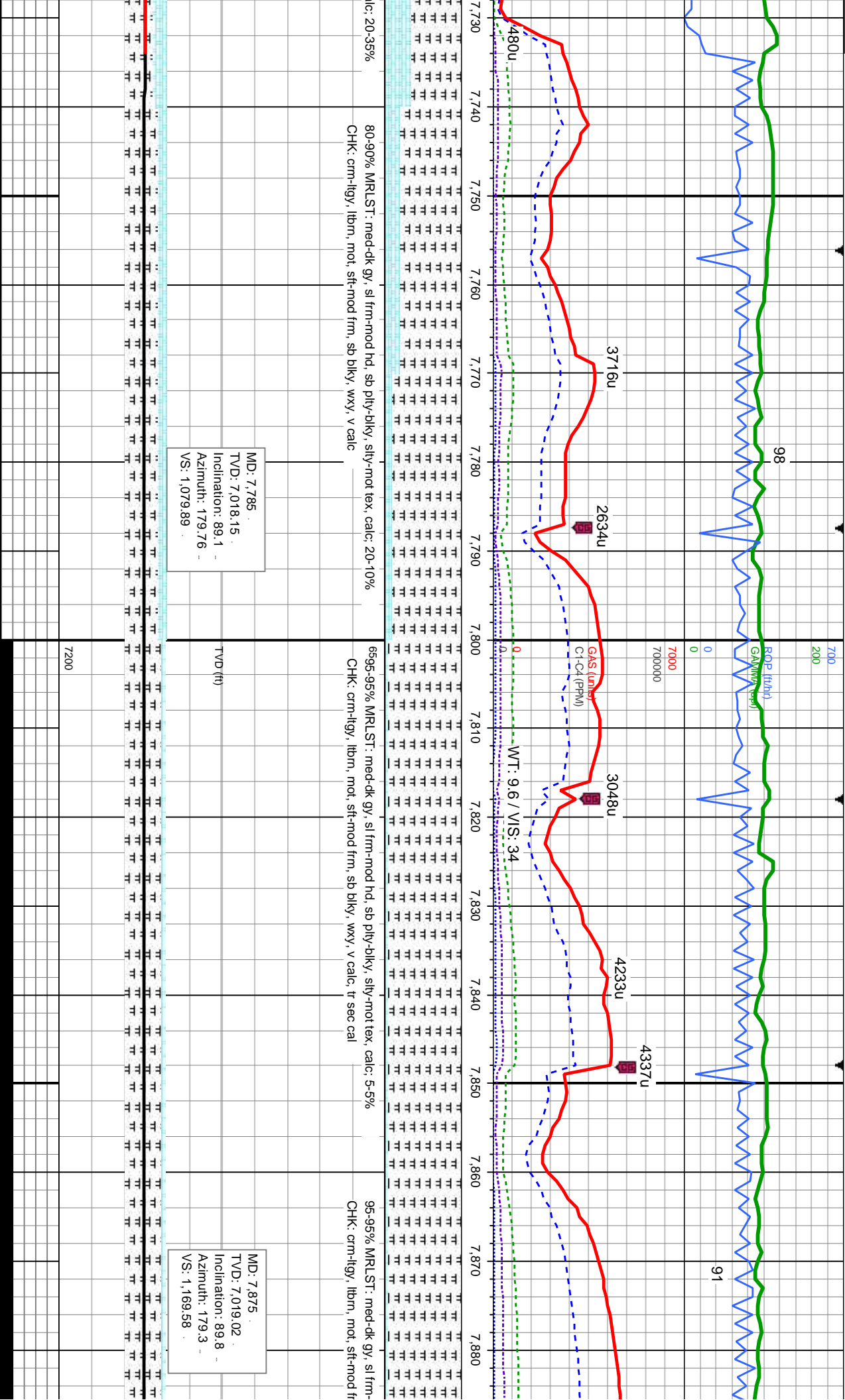
MD: 7,509
TVD: 6,989.65
Inclination: 77.1
Azimuth: 180.58
VS: 807.45

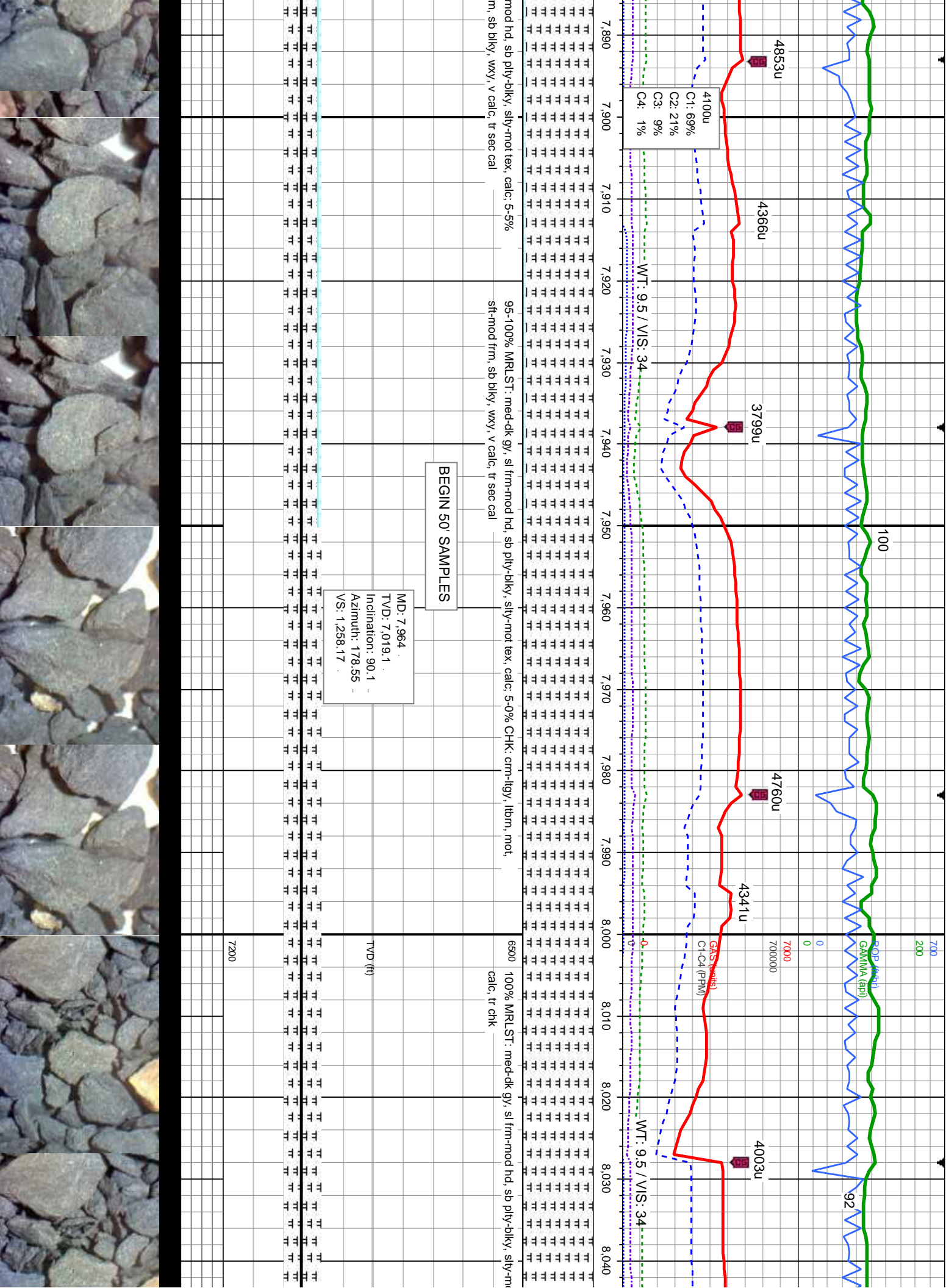
MD: 7,539
TVD: 6,996.27
Inclination: 77.4
Azimuth: 180.04
VS: 836.64

MD: 7,571
TVD: 7,000
Inclination: 77.4
Azimuth: 180.04
VS: 866.6









4100u
C1: 69%
C2: 21%
C3: 9%
C4: 1%

BEGIN 50' SAMPLES

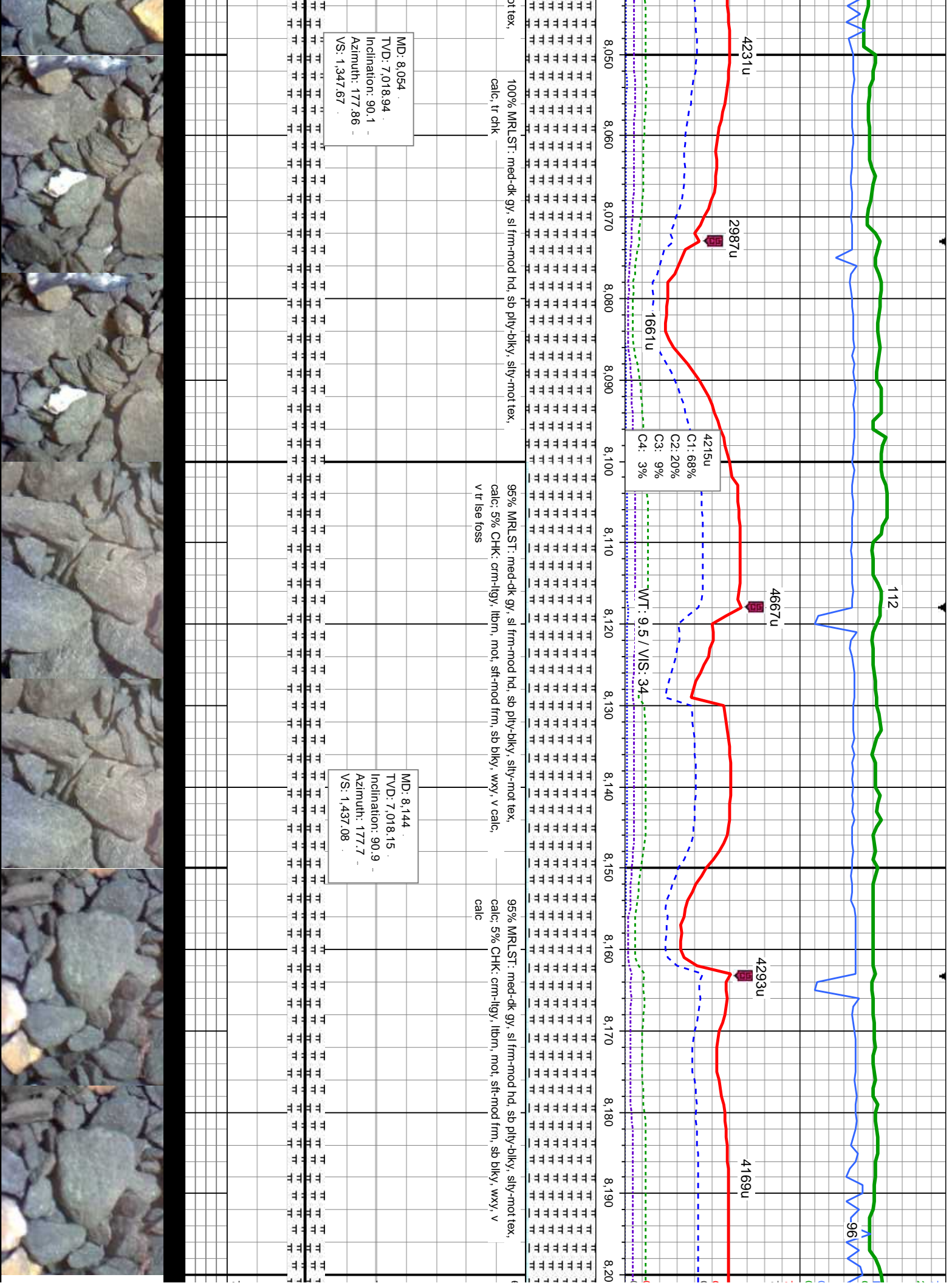
MD: 7,964
TVD: 7,019.1
Inclination: 90.1
Azimuth: 178.55
VS: 1,258.17

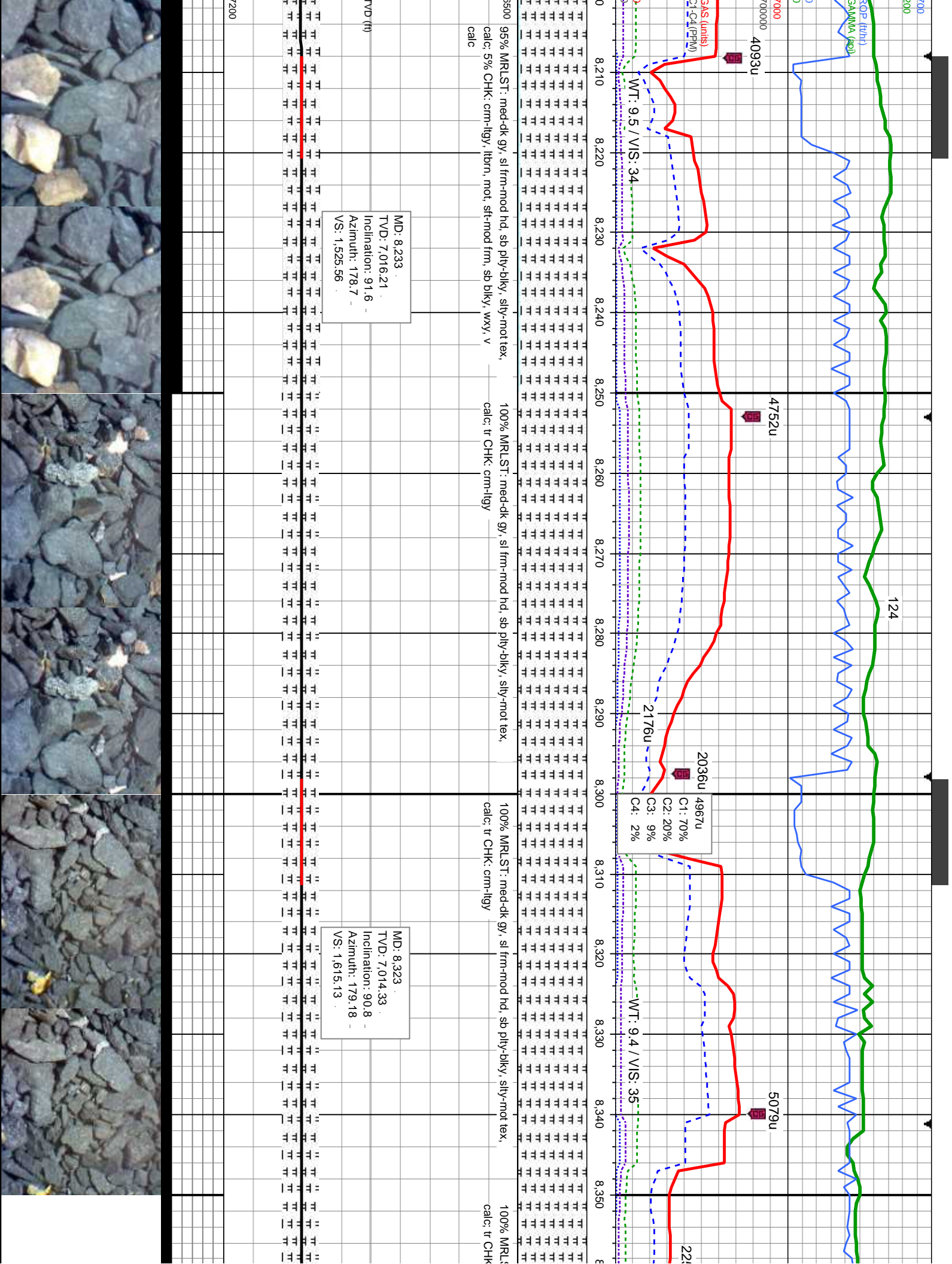
95-100% MRLST: med-dk gy, sl frm-mod hd, sb pty-blky, silty-mot tex, calc: 5-0% CHK: crn-llgy, librn, mot
sft-mod frm, sb blky, wxy, v calc, tr sec cal

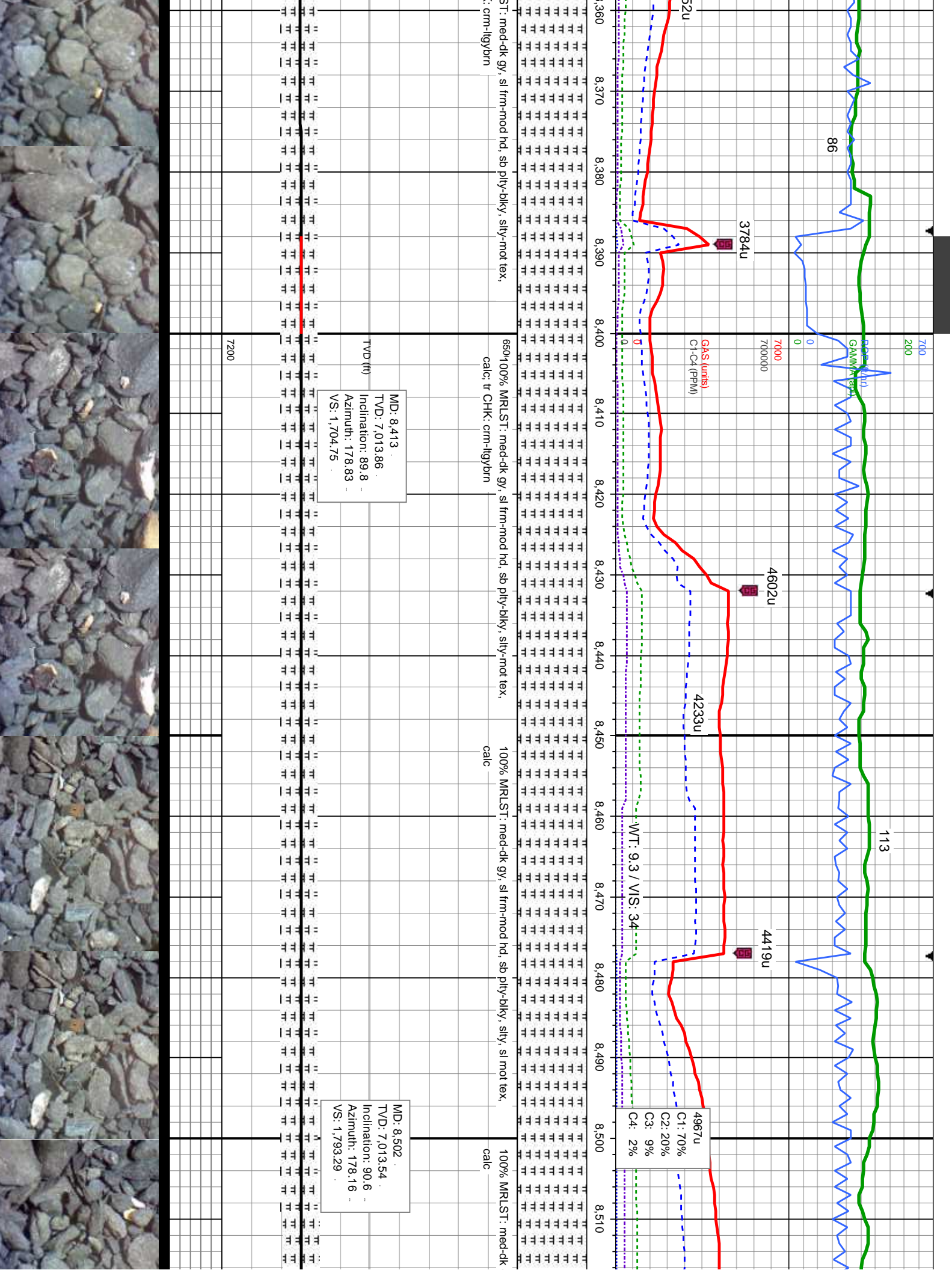
6500 100% MRLST: med-dk gy, sl frm-mod hd, sb pty-blky, silty-mot tex, calc, tr chk

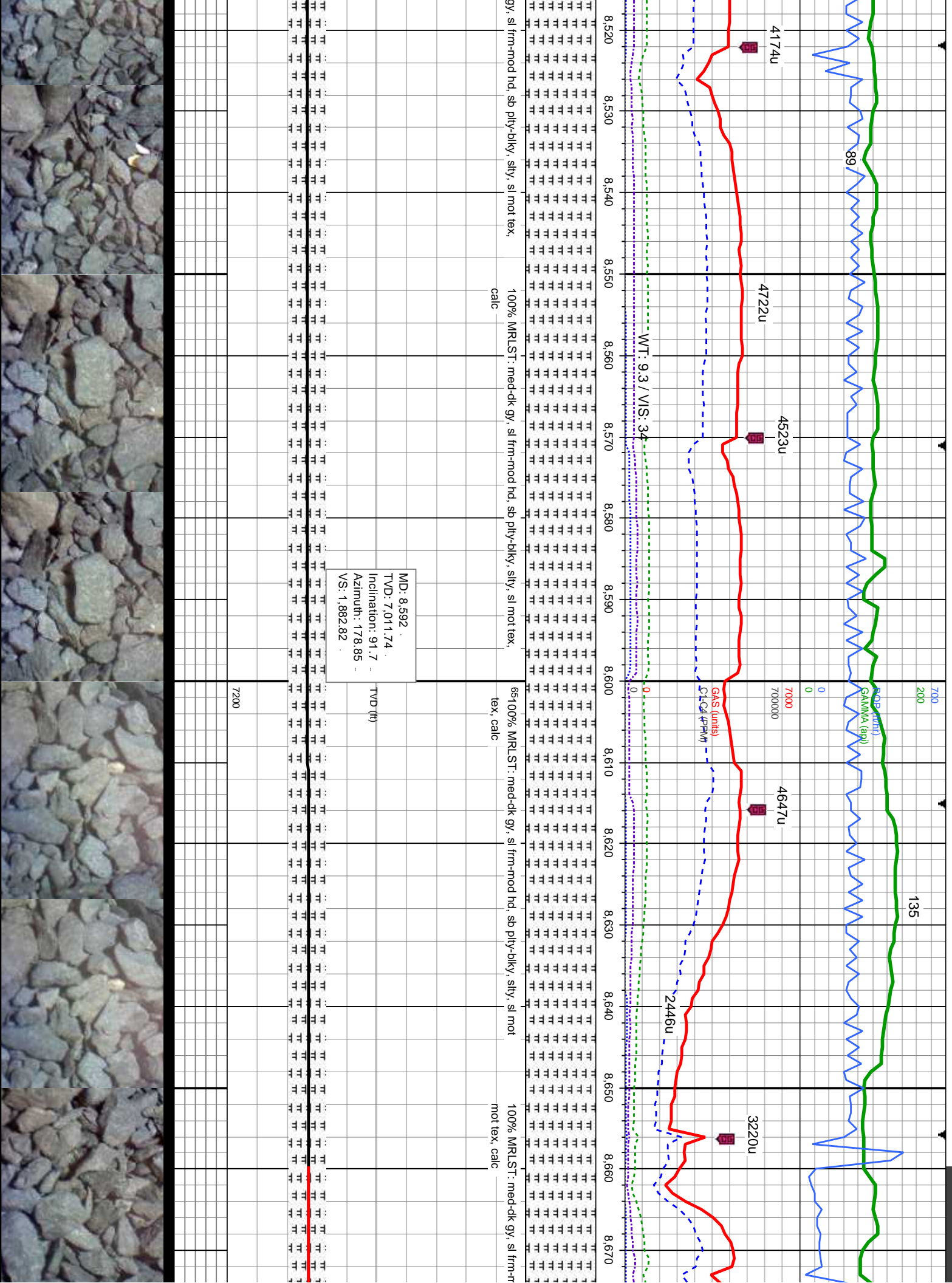
TVD (ft)

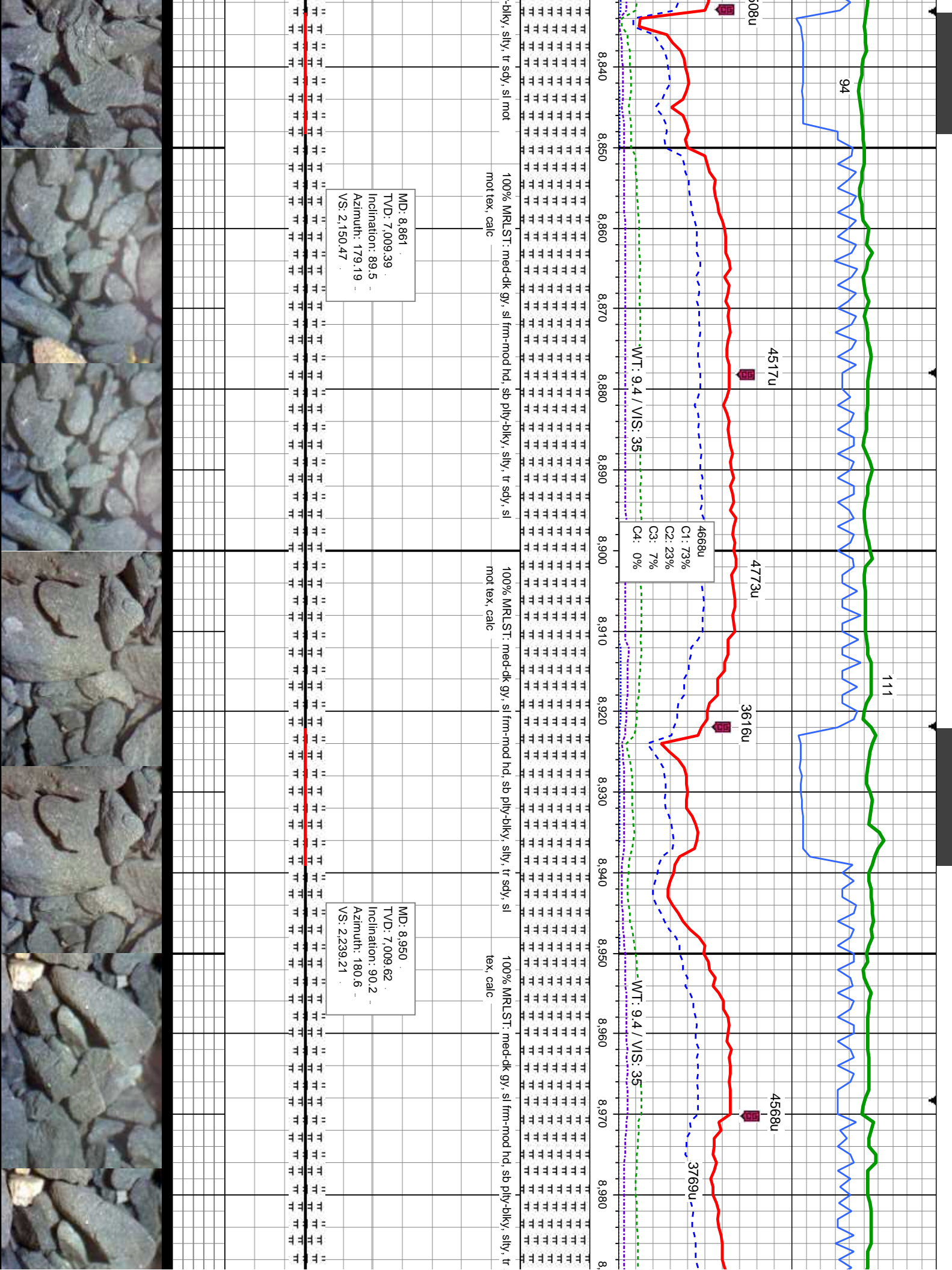
7200

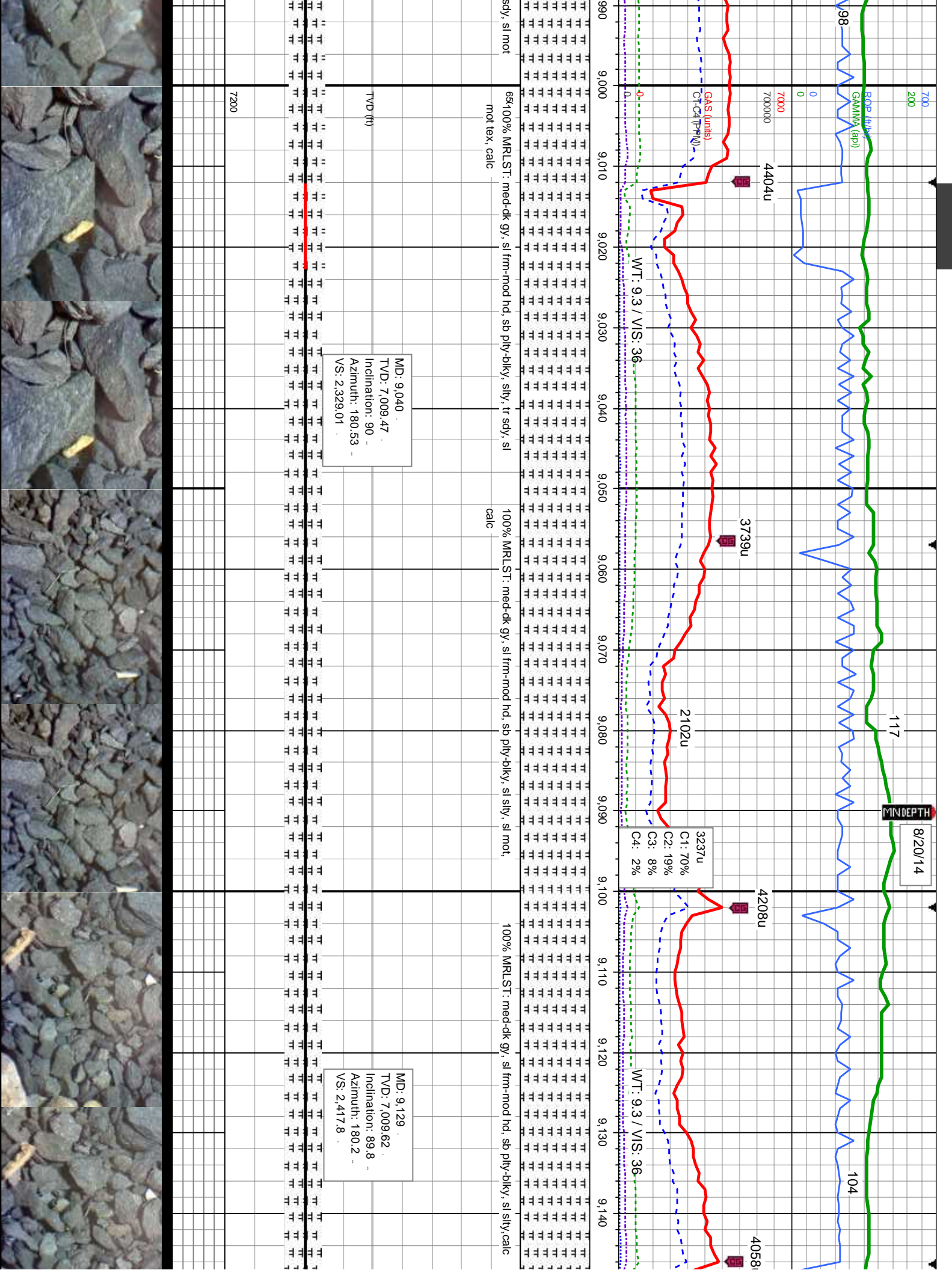


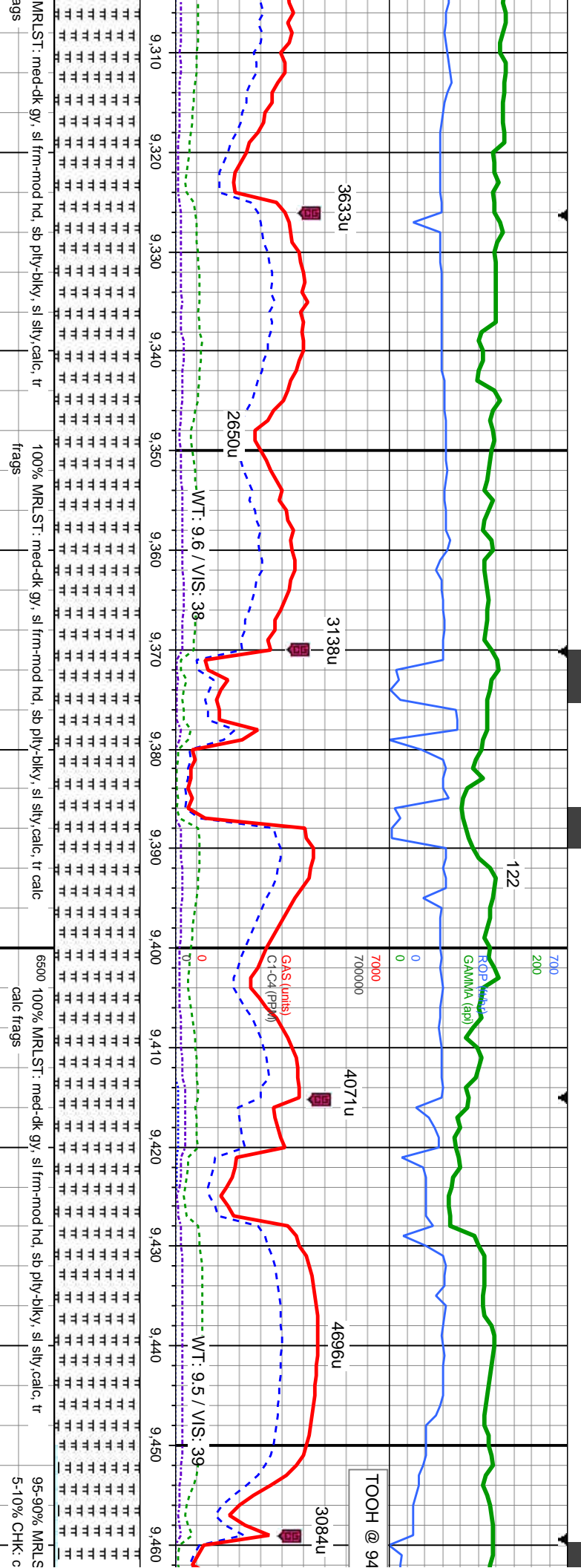












9,308
MD: 7,008.77
TVD: 7,008.77
Inclination: 90.7
Azimuth: 179.24
VS: 2,596.21

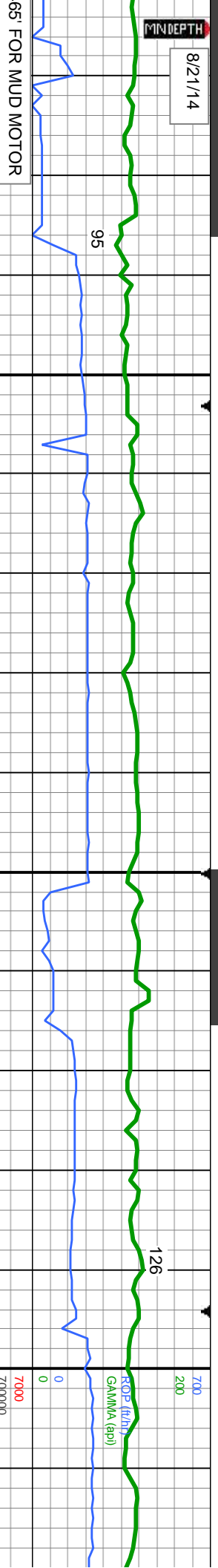
MD: 9,398
TVD: 7,006.8
Inclination: 91.8
Azimuth: 179.2
VS: 2,685.83

7200

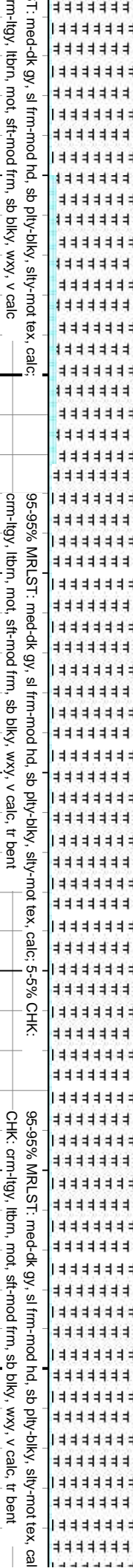
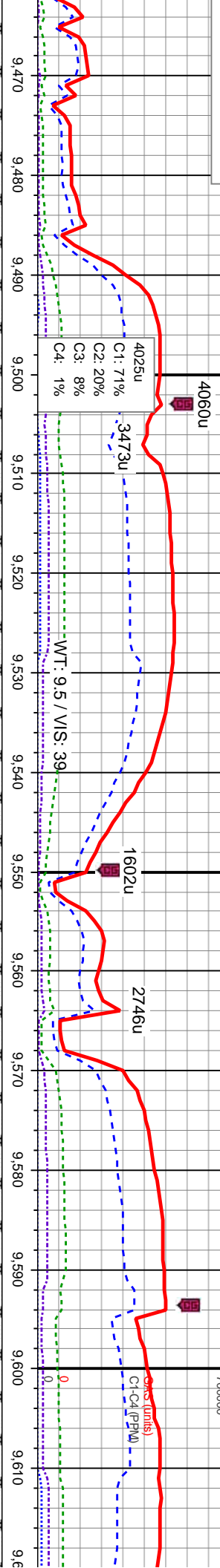


8/21/14

MINDEPTH



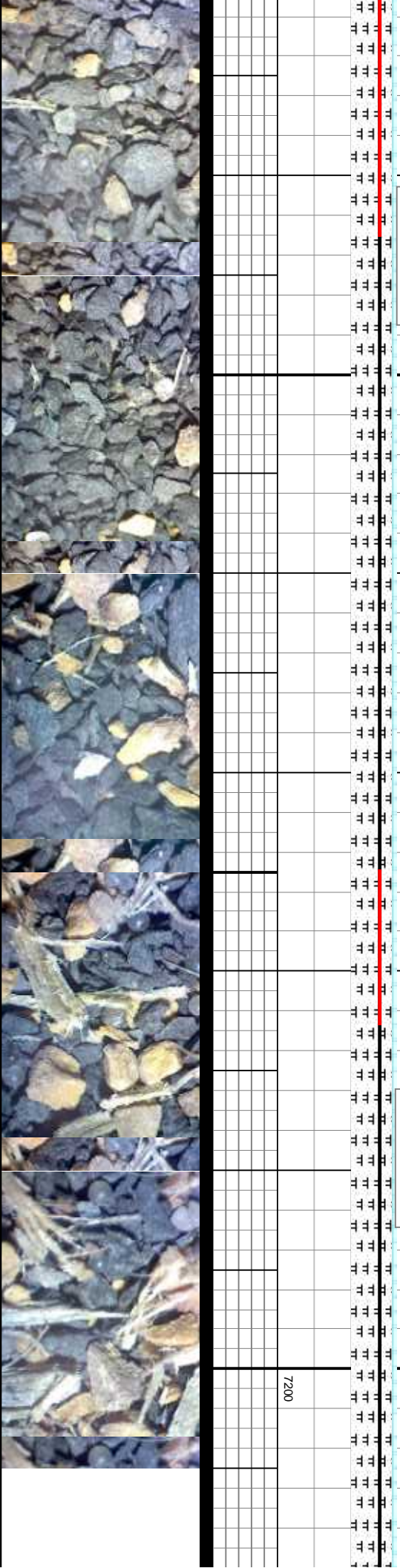
65' FOR MUD MOTOR

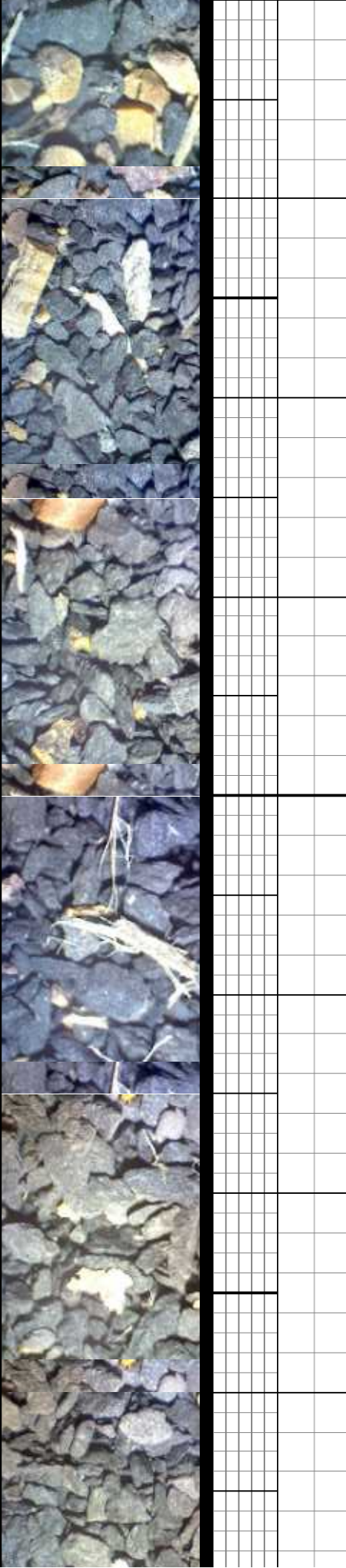
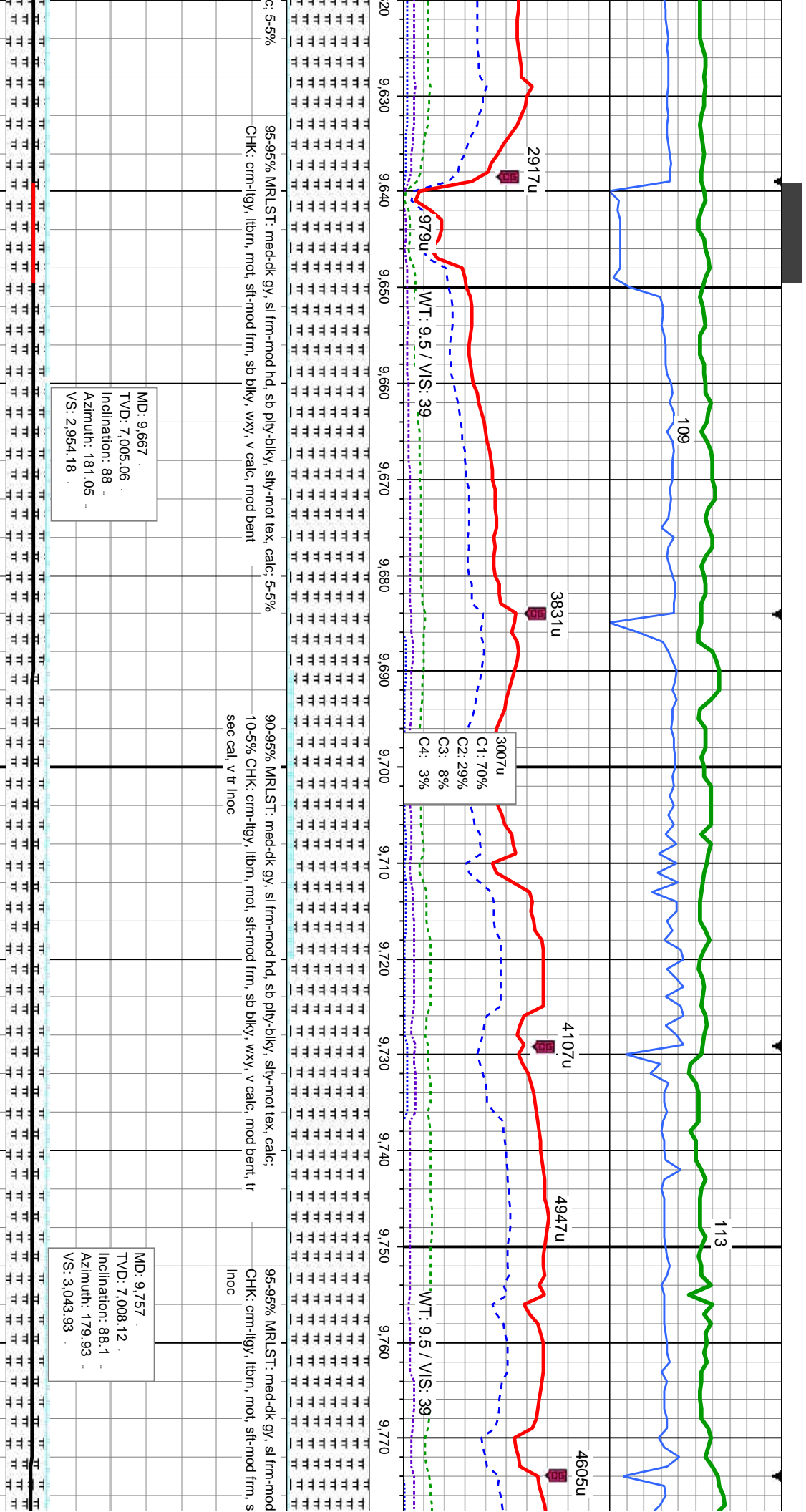


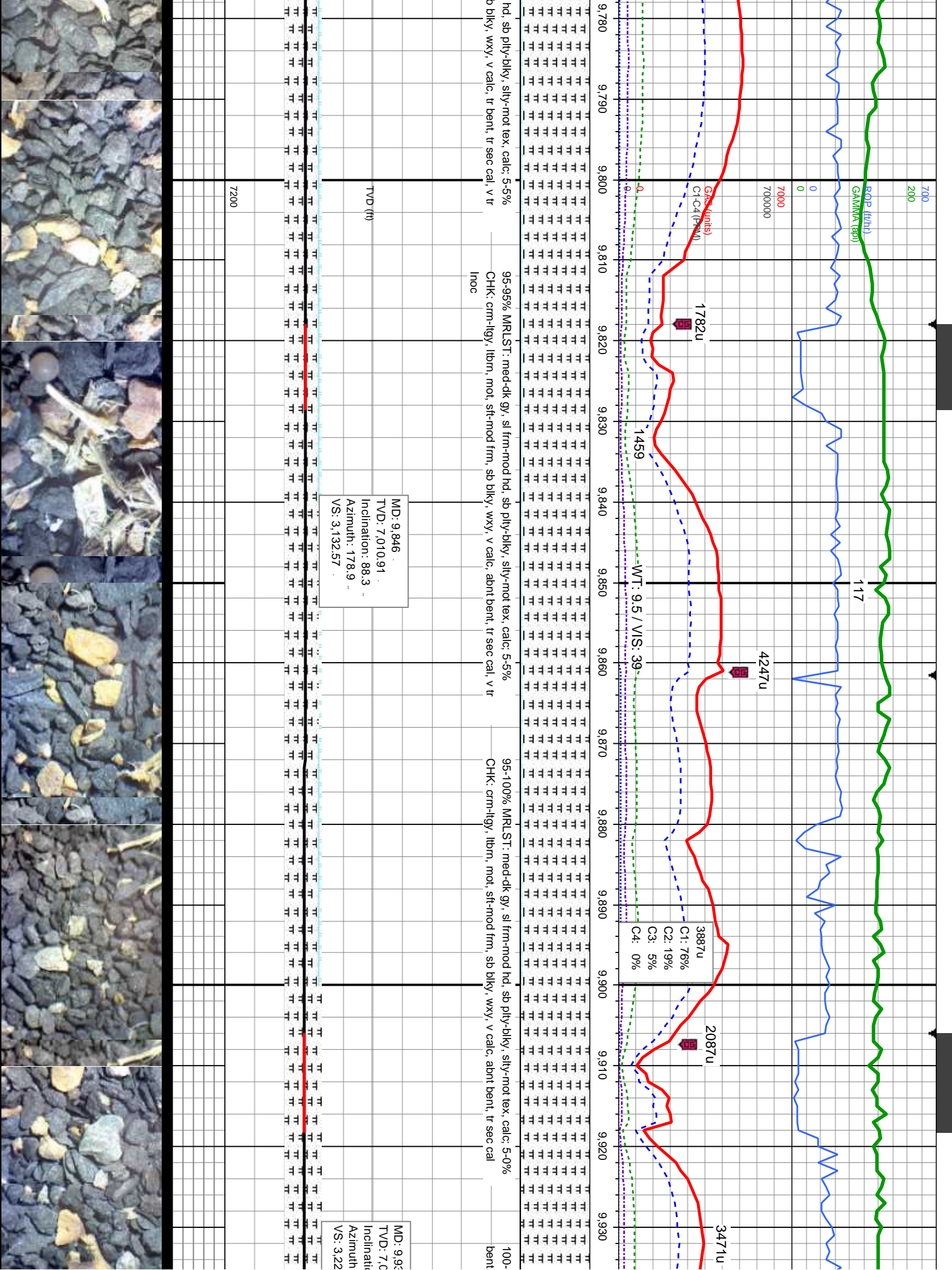
MD: 9,488
TVD: 7,004.37
Inclination: 91.3
Azimuth: 180.33
VS: 2,775.51

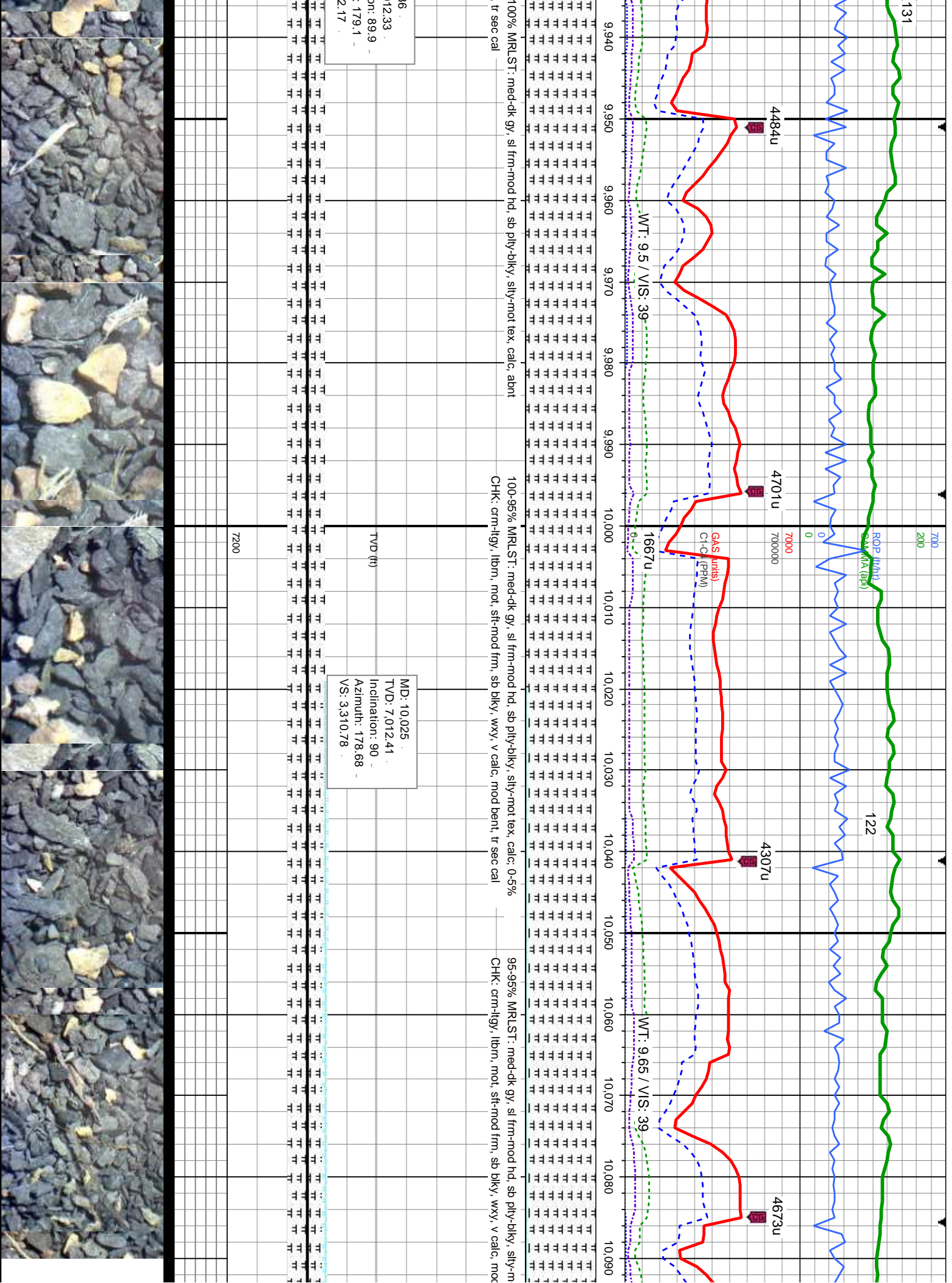
MD: 9,578
TVD: 7,003.43
Inclination: 89.9
Azimuth: 181.21
VS: 2,865.34

TVD (ft)







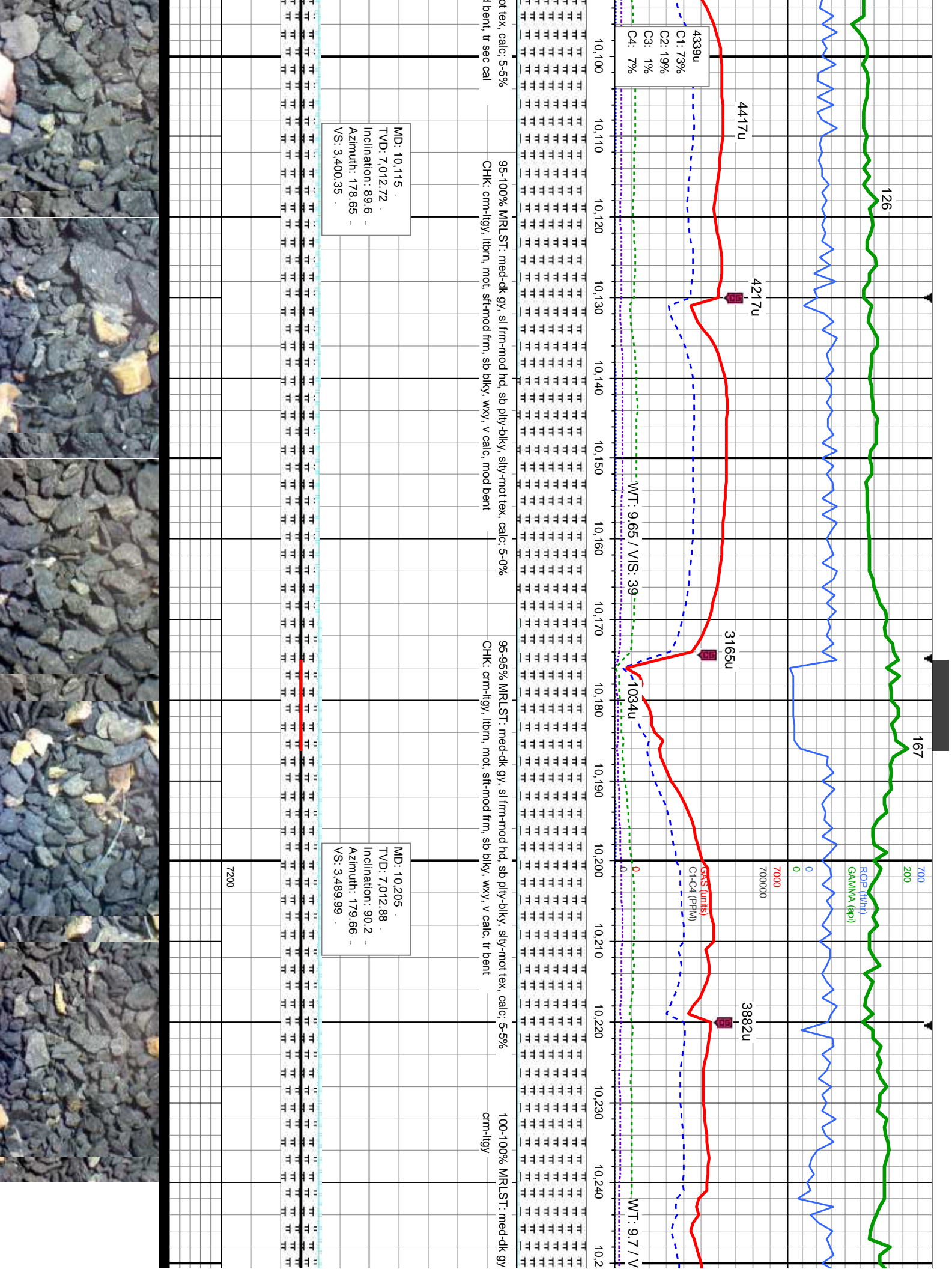


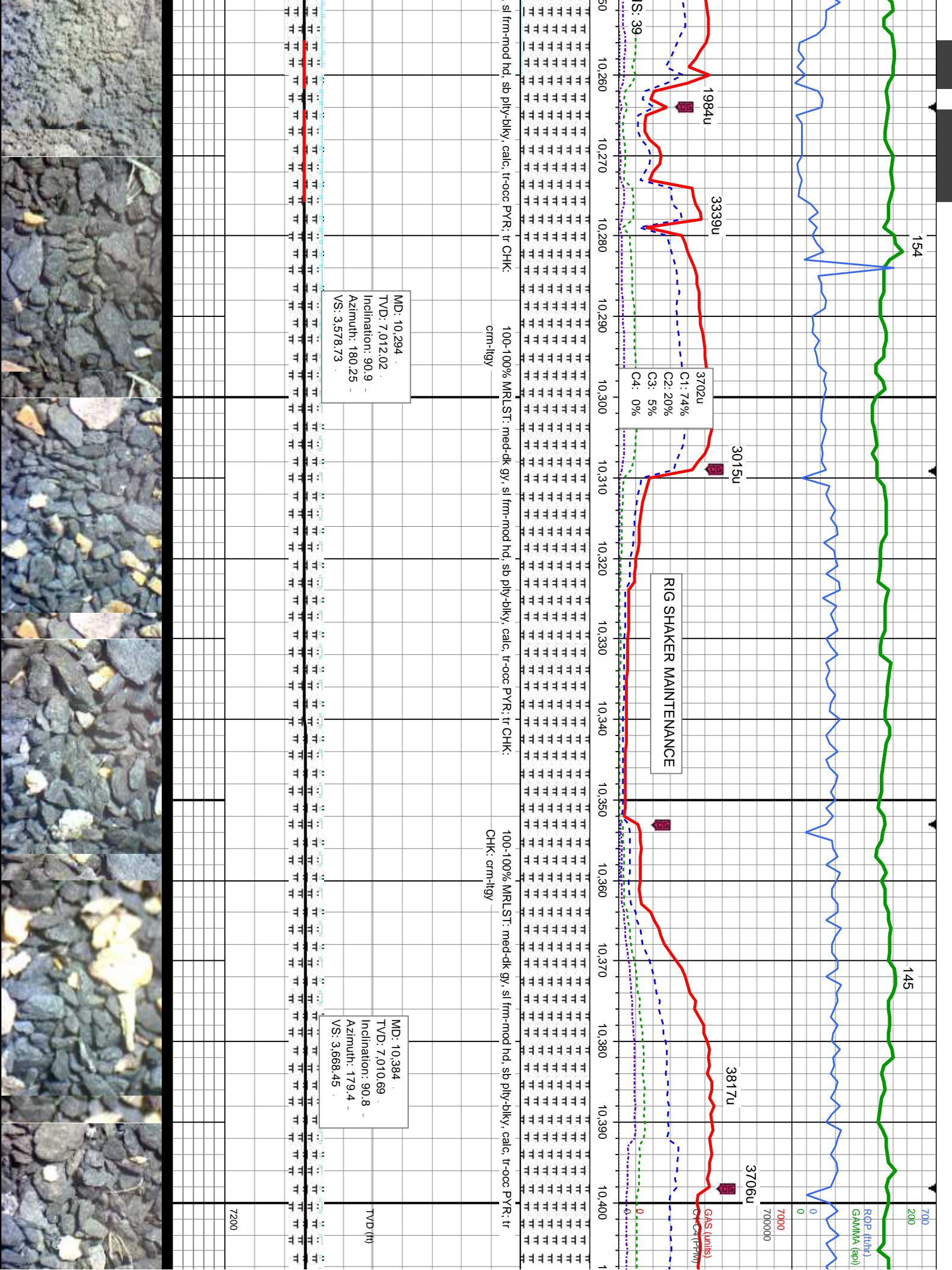
6
12.33
on: 89.9
179.1
2.17

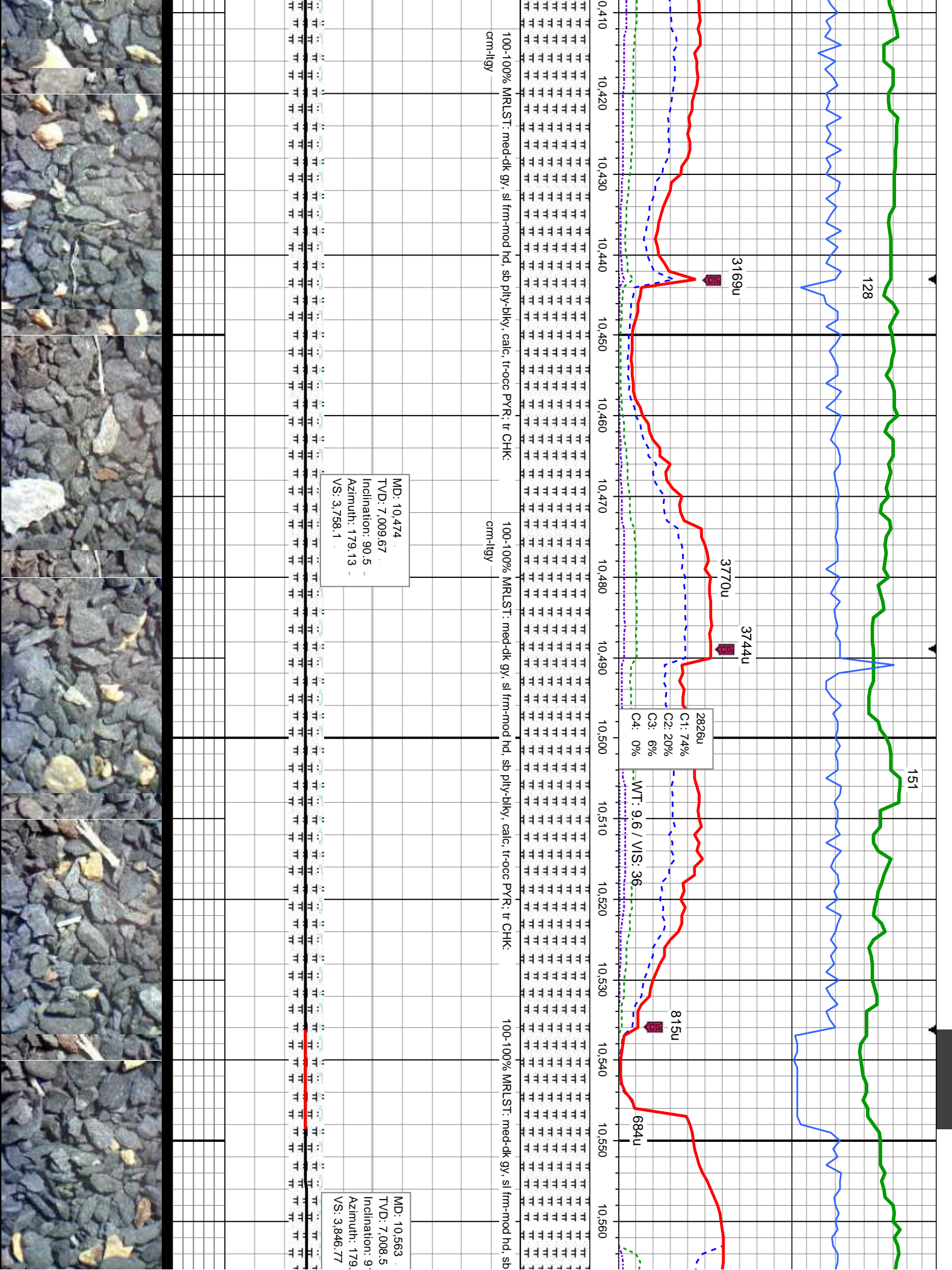
MD: 10.025
TVD: 7.01241
Inclination: 90
Azimuth: 178.68
VS: 3.310.78

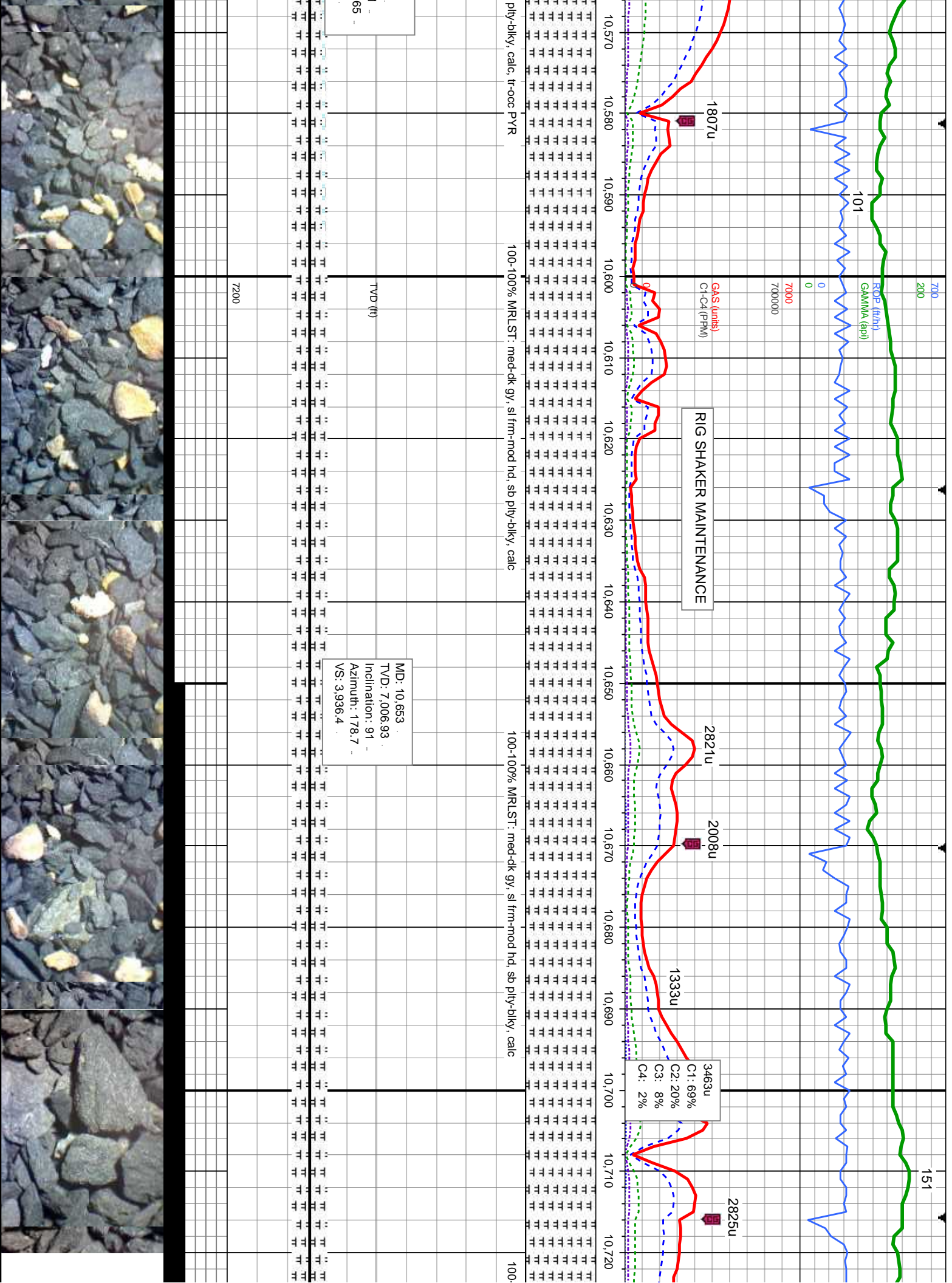
100% MRLST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex, calc, abnt
CHK: crm-ltgy, lbrn, mot, sft-mod frm, sb blk, wxy, v calc, mod bent, tr sec cal

95-95% MRLST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex, calc, abnt
CHK: crm-ltgy, lbrn, mot, sft-mod frm, sb blk, wxy, v calc, mod bent, tr sec cal









8/22/14

MINDEPTH

113

87

BOE (ft/lb)

GAMMA (cp)

7000

70000

GAS (units)

C1-C4 (PPM)

4331u

1815u

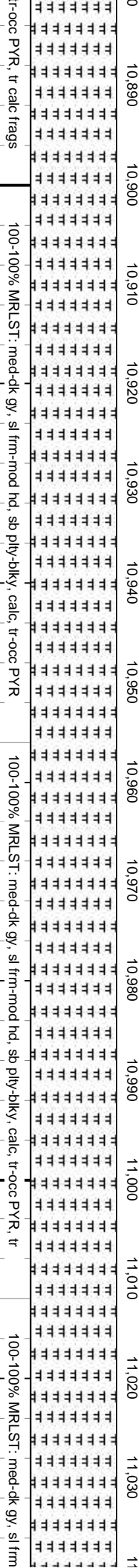
2056u

1723u

862u
C1: 68%
C2: 21%
C3: 9%
C4: 2%

2171u

WT: 9.6 / VIS: 38



100-100% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, calc, tr-occ PYR, tr

100-100% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, calc, tr-occ PYR

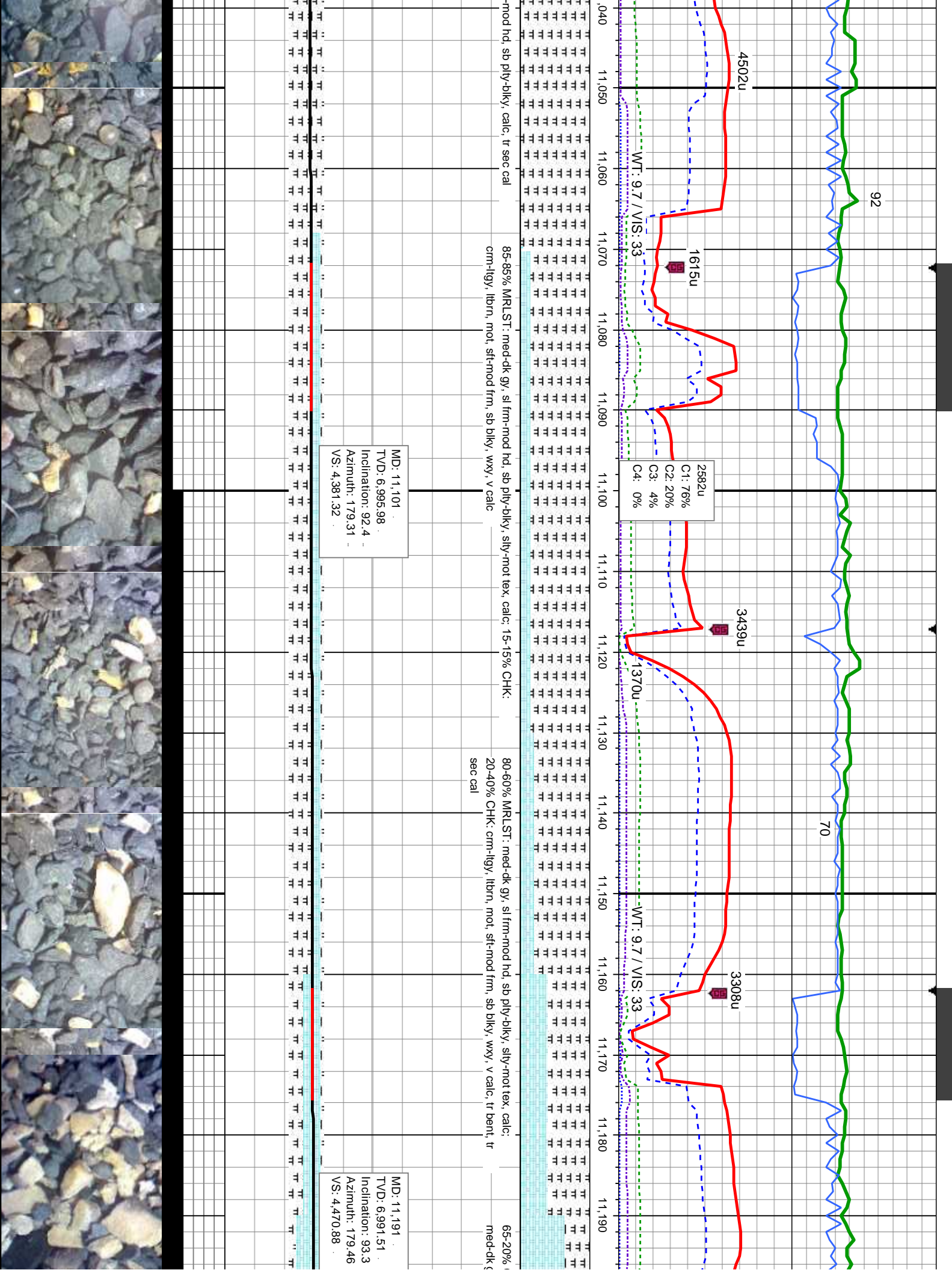
tr-occ PYR, tr calc frags

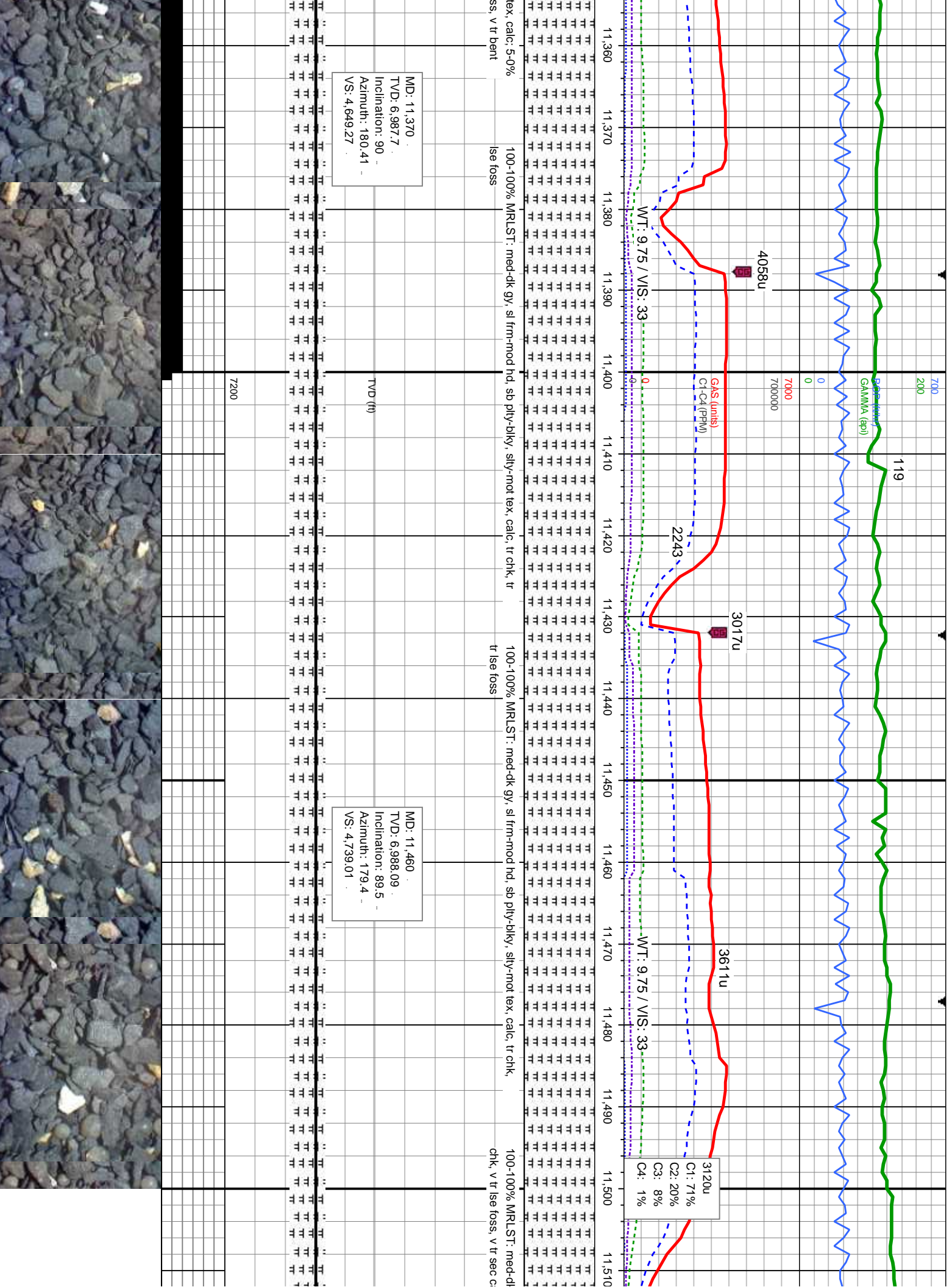
MD: 10,922
TVD: 7,002.62
Inclination: 91.5
Azimuth: 177
VS: 4,203.56

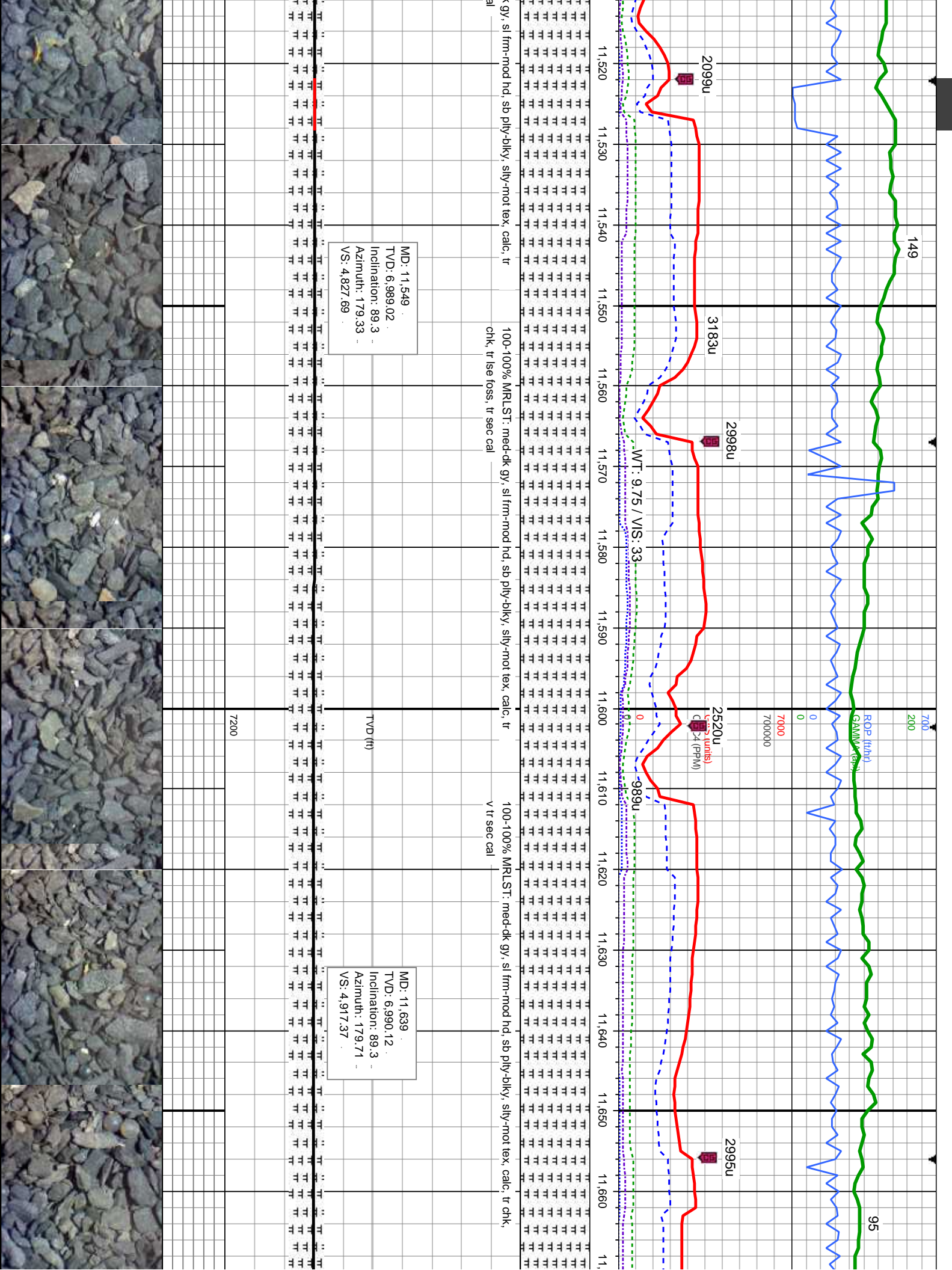
MD: 11,011
TVD: 6,999.67
Inclination: 92.3
Azimuth: 177.65
VS: 4,291.85

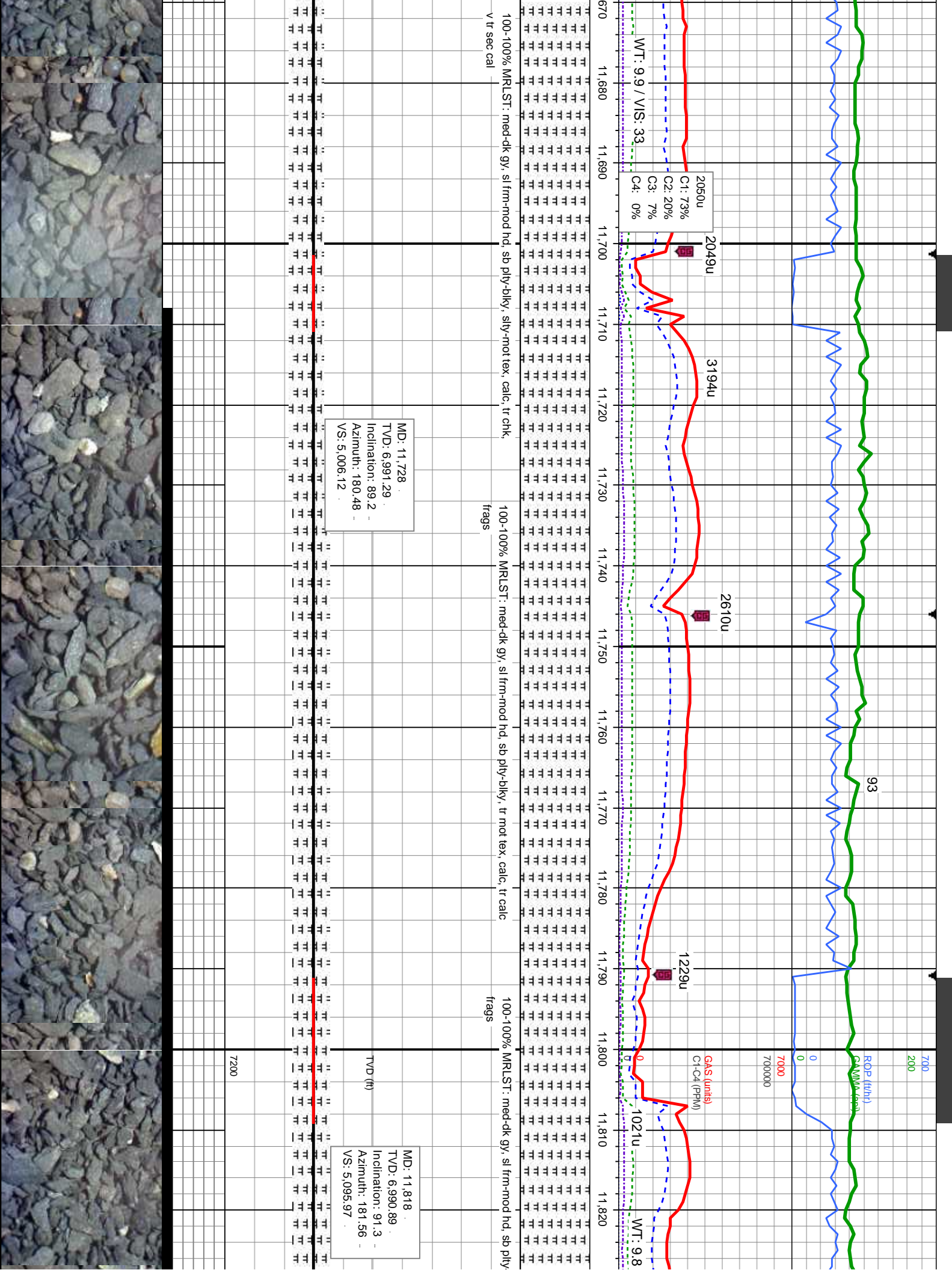
7200

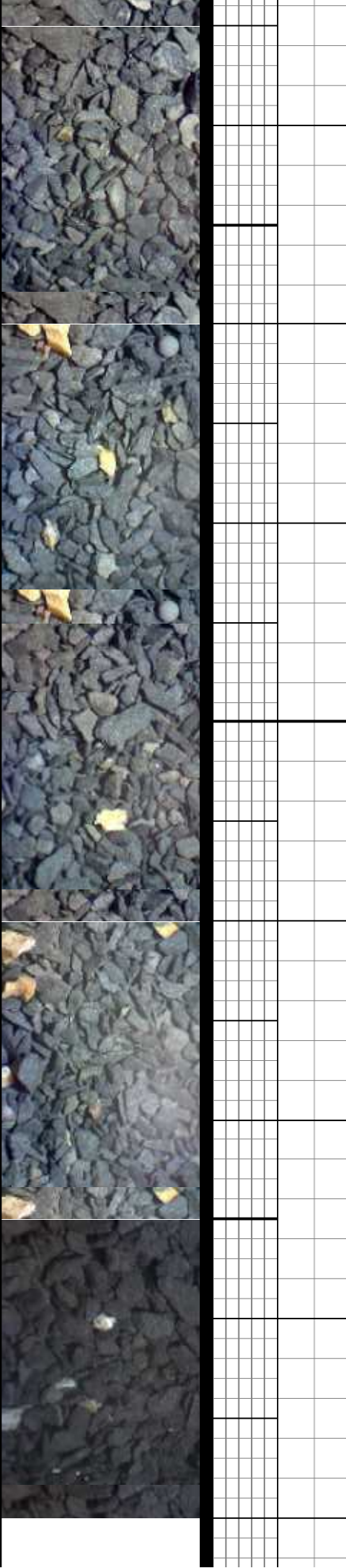
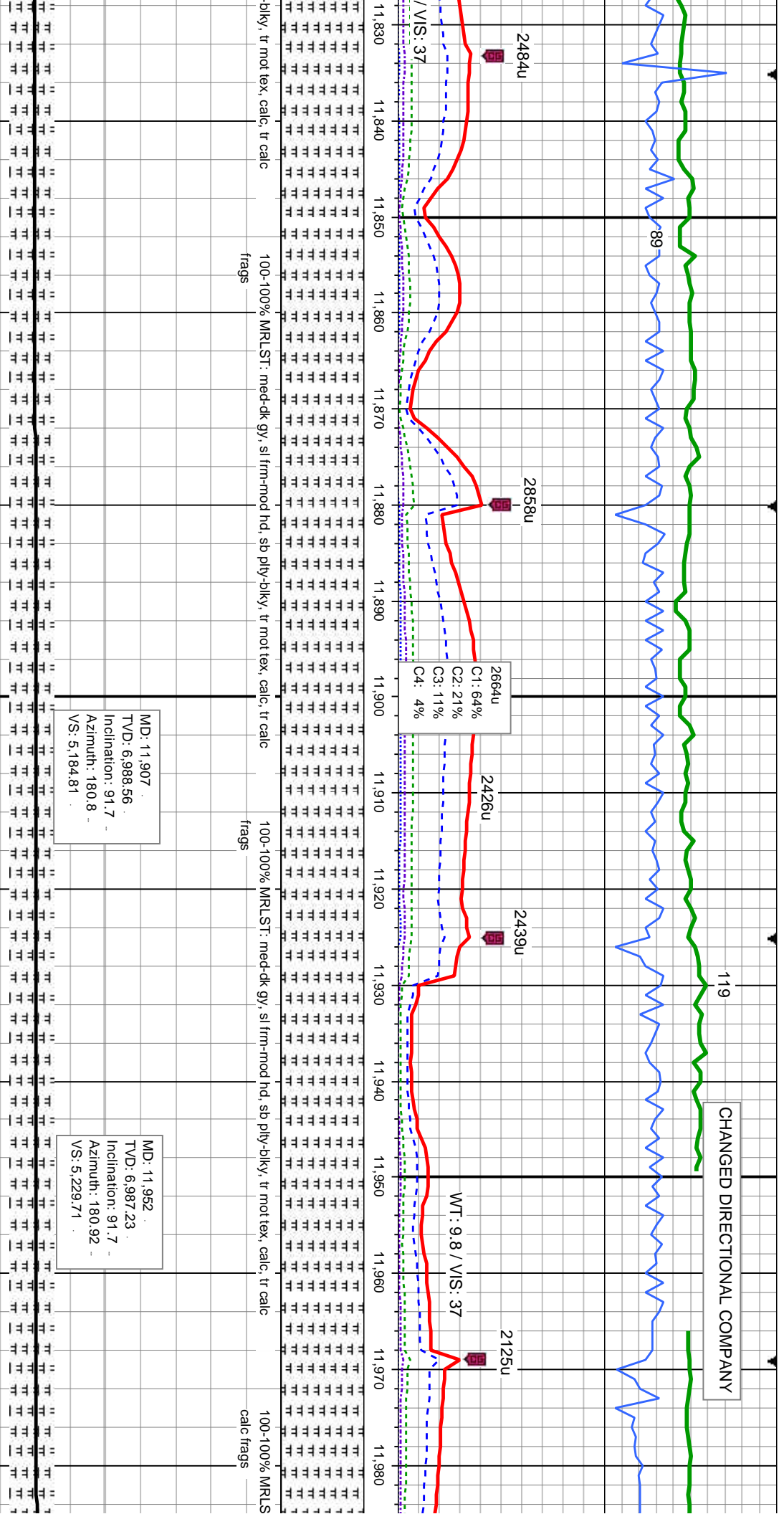


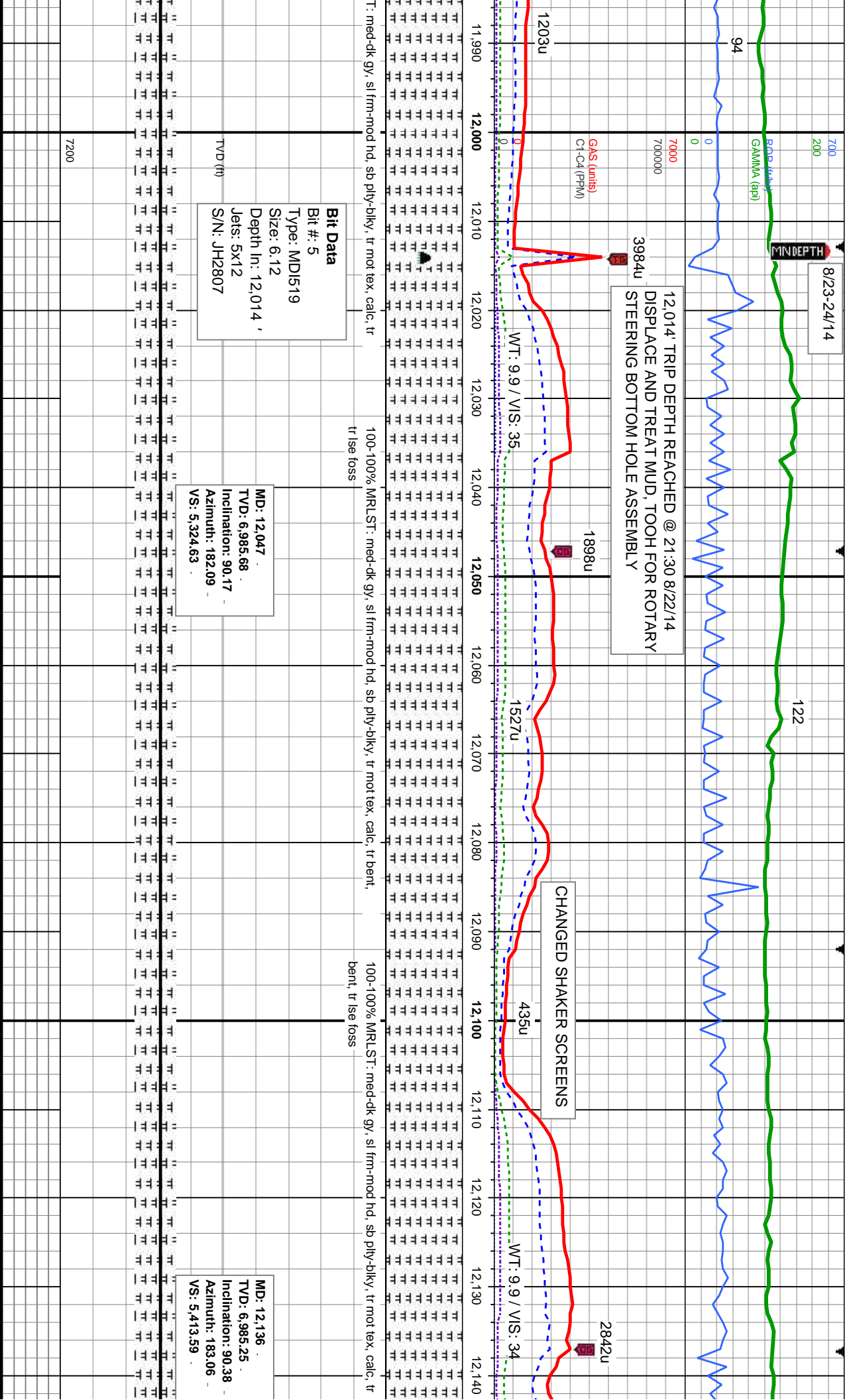


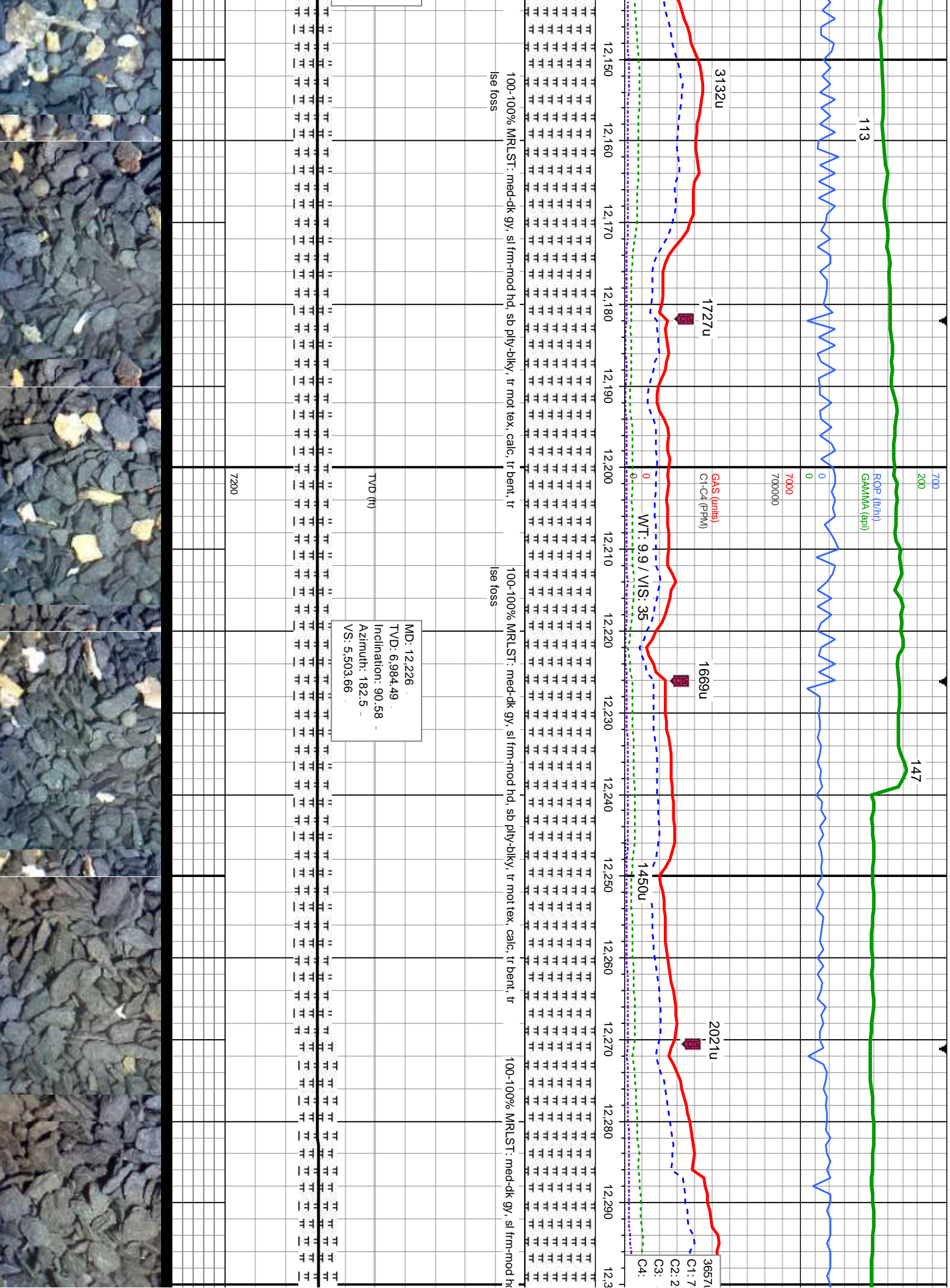


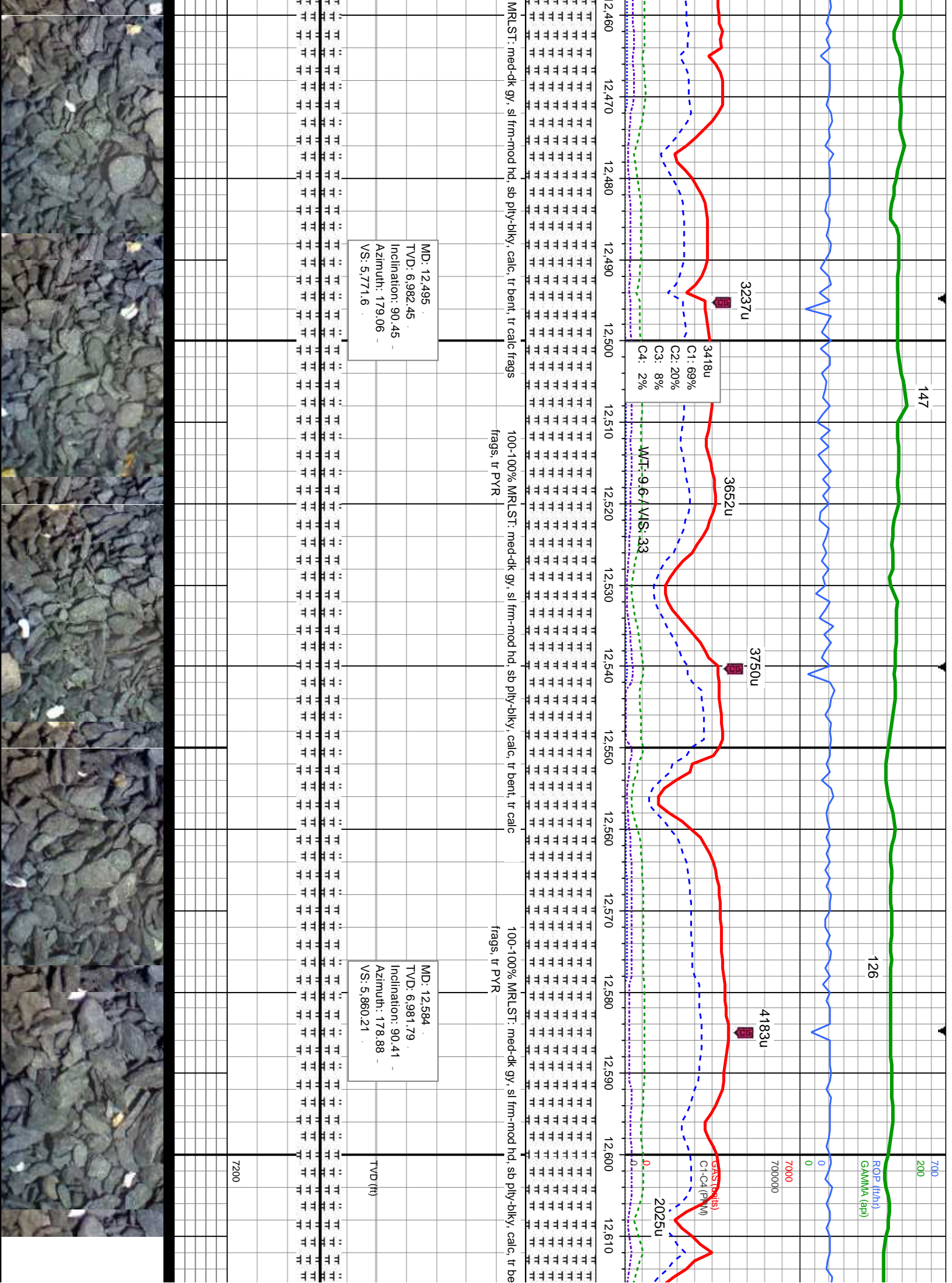


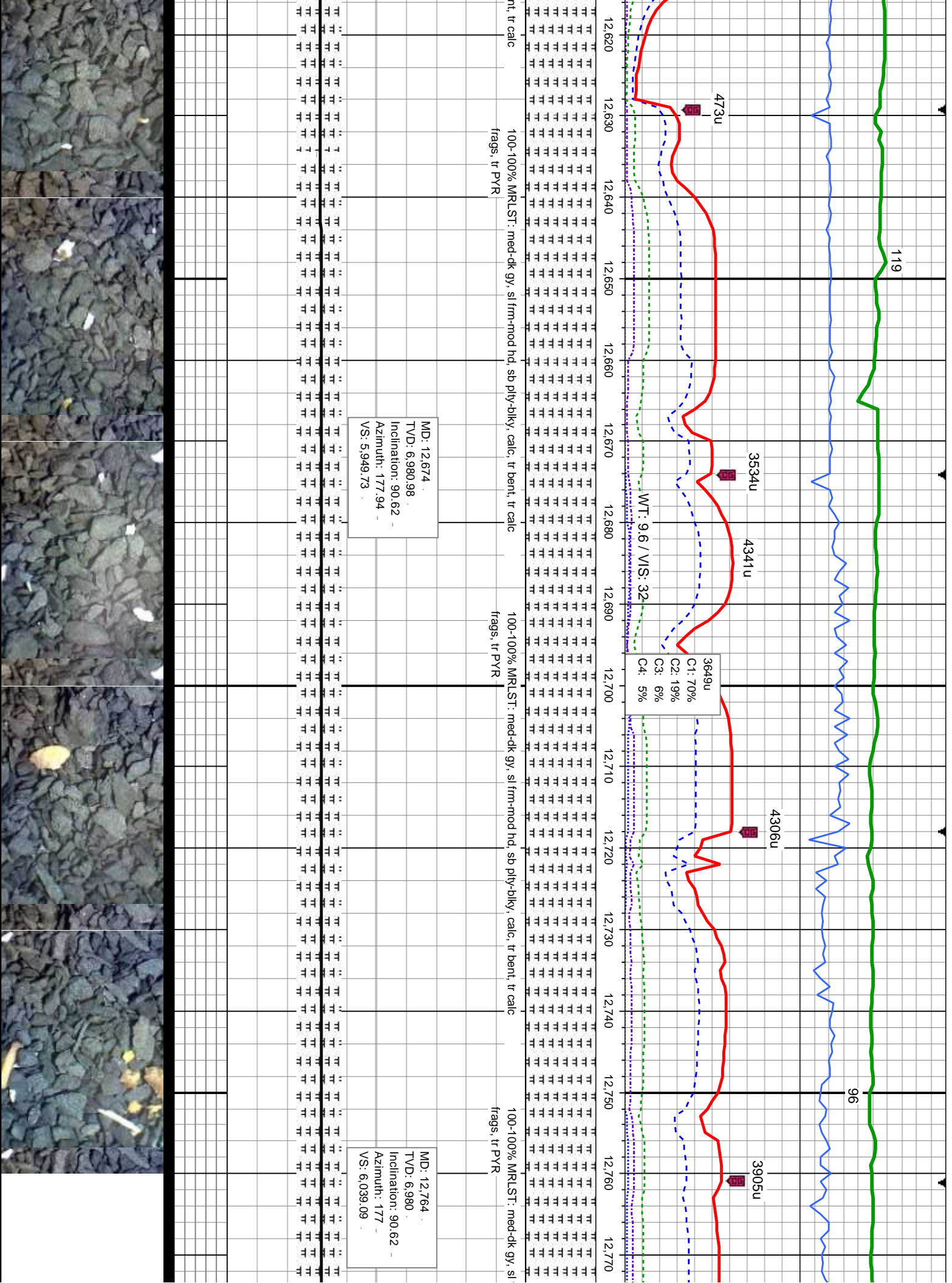












119

96

473u

3534u

4341u

3649u

4306u

3905u

WT: 9.6 / VIS: 32

C1: 70%
C2: 19%
C3: 6%
C4: 5%

MD: 12,674
TVD: 6,980.98
Inclination: 90.62
Azimuth: 177.94
VS: 5,949.73

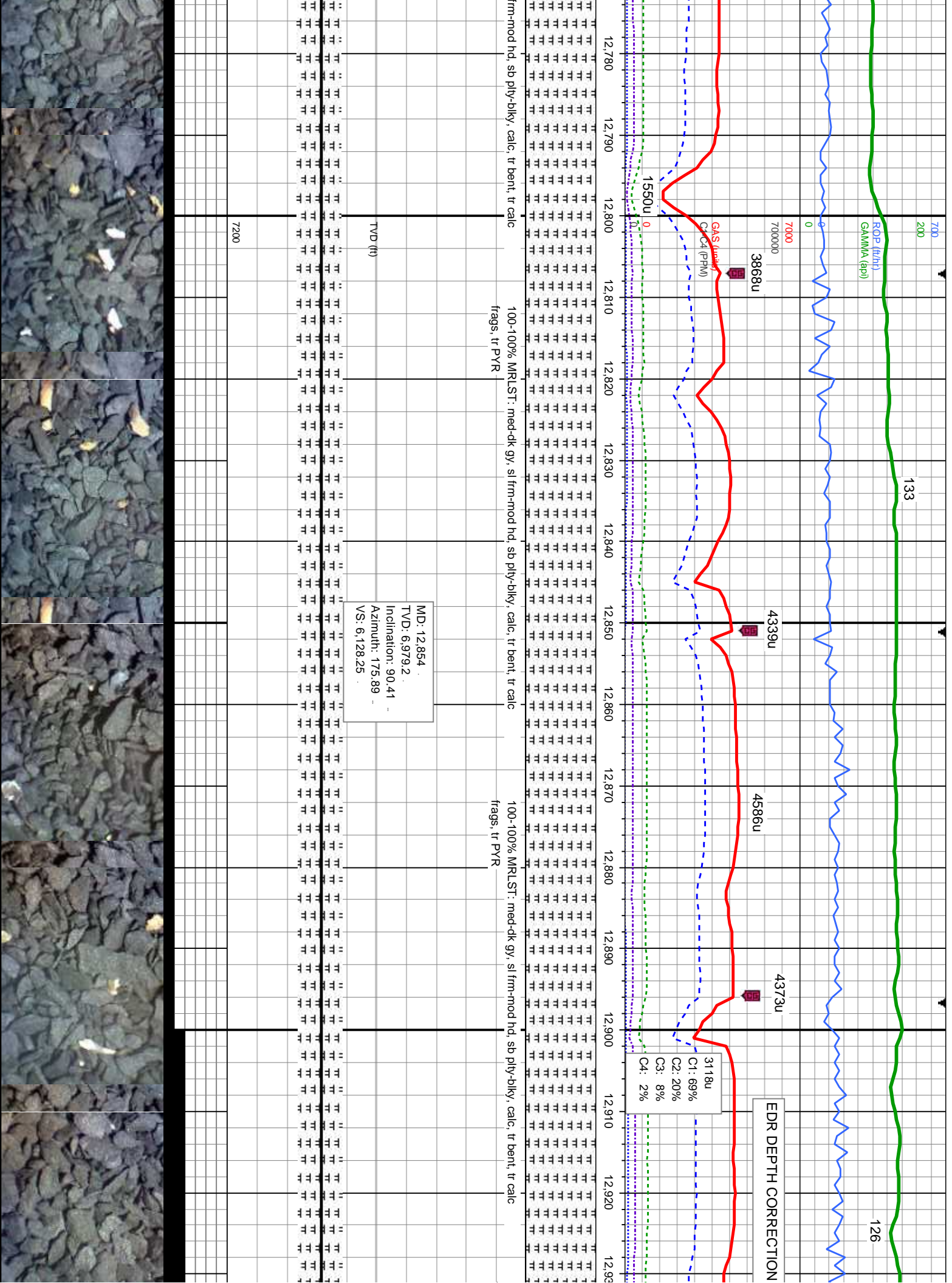
MD: 12,764
TVD: 6,980
Inclination: 90.62
Azimuth: 177
VS: 6,039.09

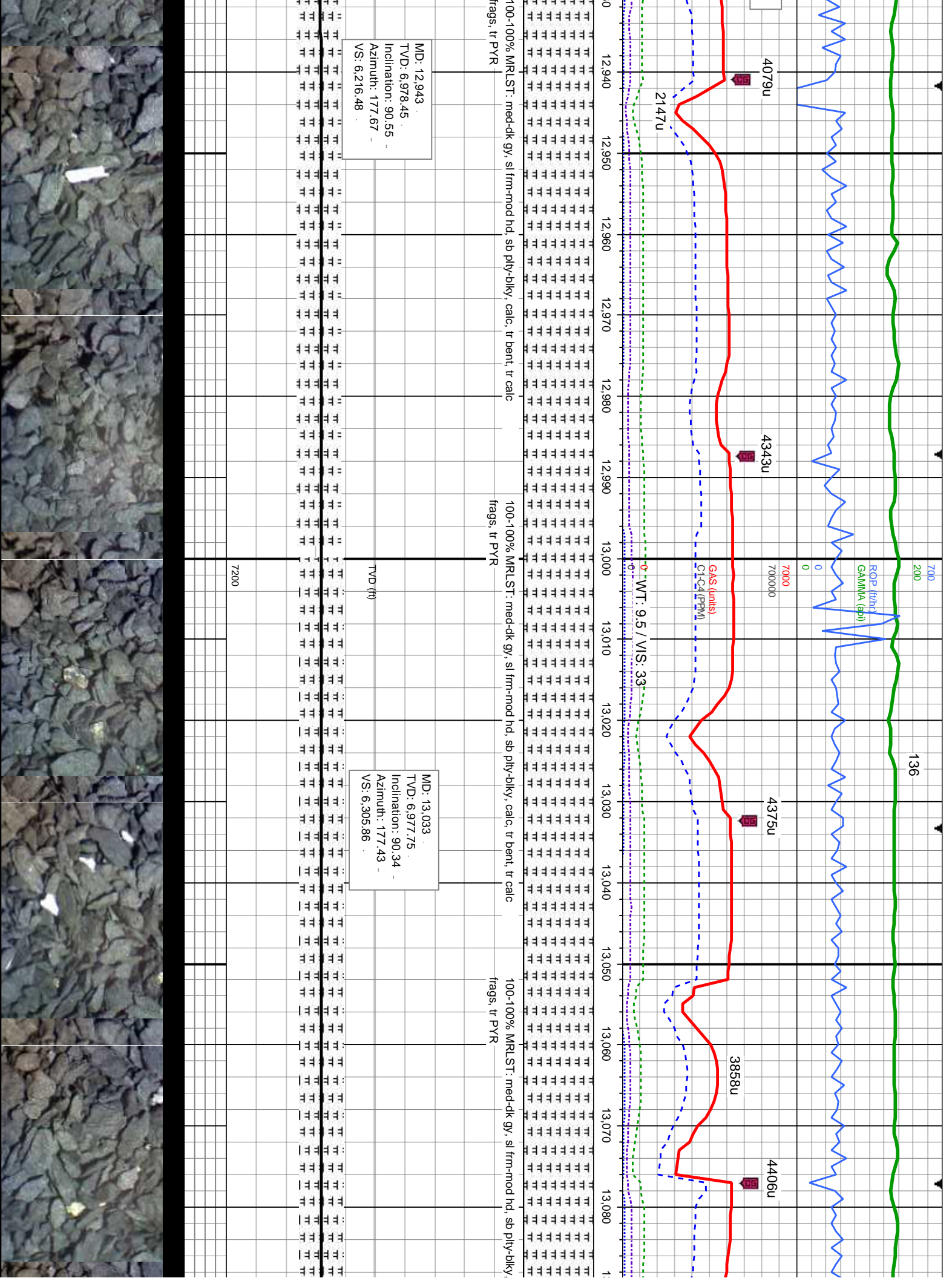
100-100% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, calc, tr bent, tr calc
frags, tr PYR

100-100% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, calc, tr bent, tr calc
frags, tr PYR

100-100% MRLST: med-dk gy, sl
frags, tr PYR







8/25/14
132

149

7200

ROP (ft/h)
GAMMA (api)

7000
700000

3737u

4295u

Gas (umts)
C1-C4 (PPM)

4162u
C1: 68%
C2: 21%
C3: 9%
C4: 3%

WT: 9.5 / VIS: 38

13,090 13,100 13,110 13,120 13,130 13,140 13,150 13,160 13,170 13,180 13,190 13,200 13,210 13,220 13,230 13,240

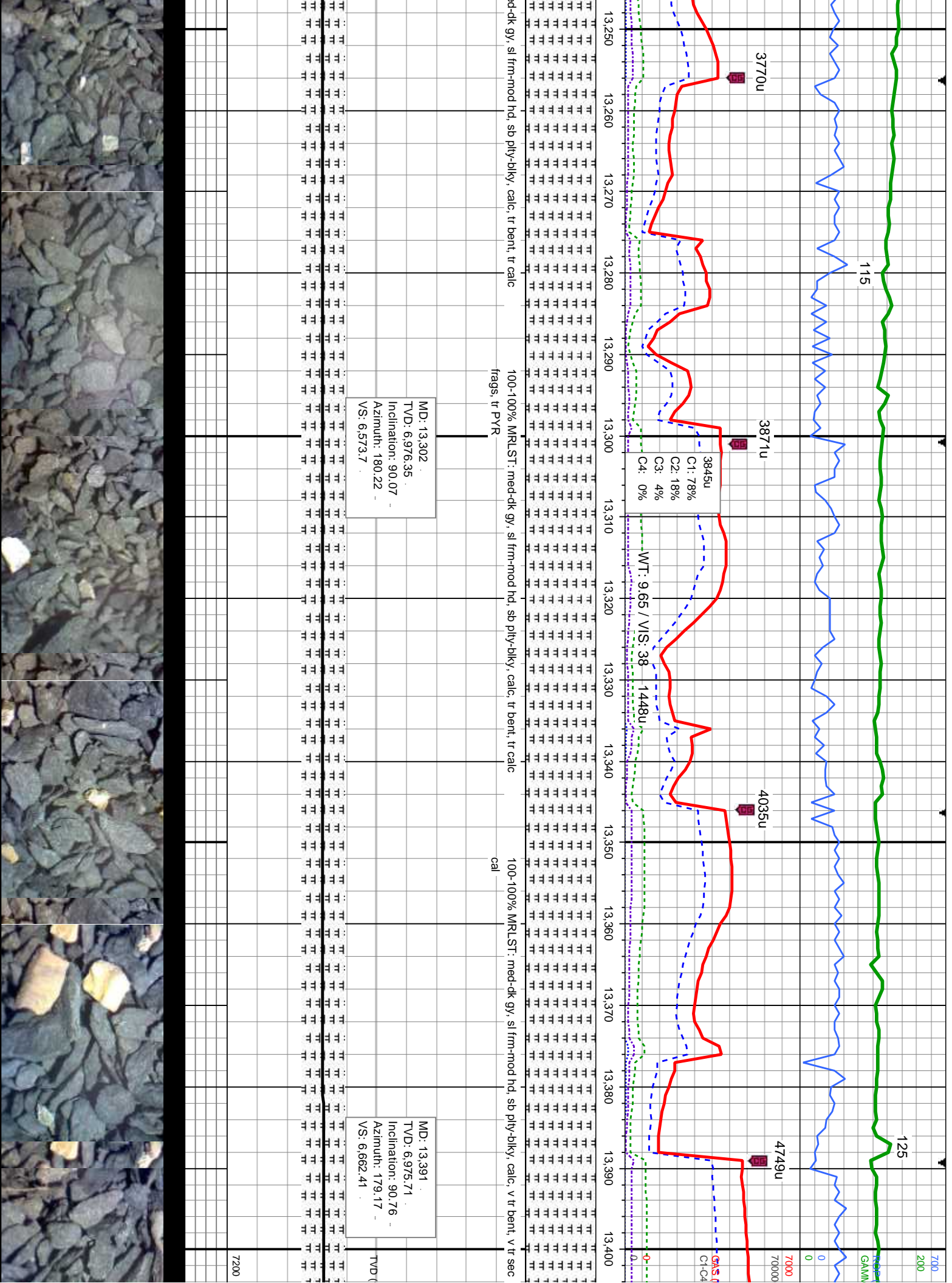
calc, tr bent, tr calc
100-100% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, calc, tr bent, tr calc
frags, tr PYR
100-100% MRLST: med-dk gy, sl frm-mod hd, sb ply-bkly, calc, tr bent, tr calc
frags, tr PYR
100-100% MRLST: me

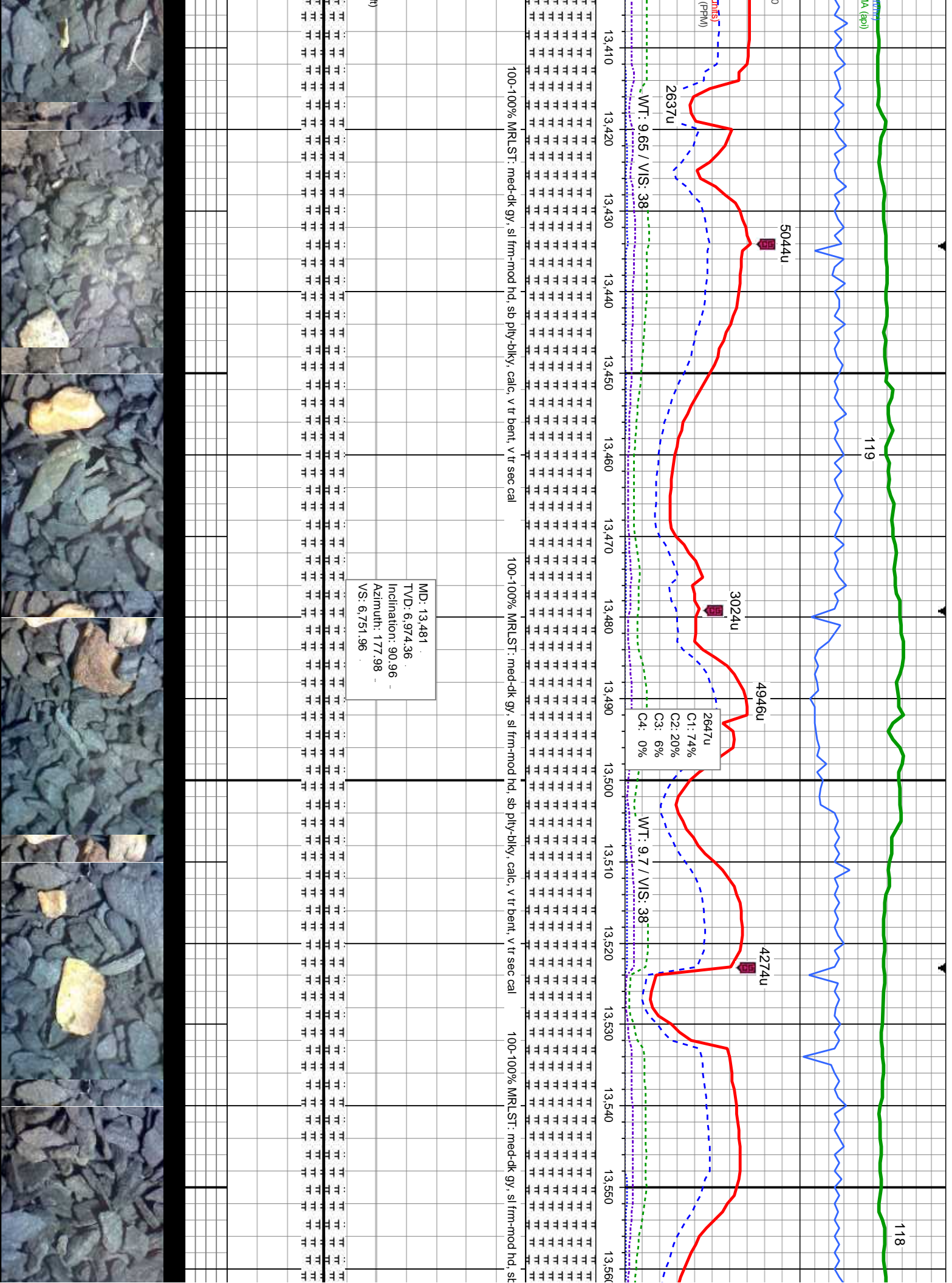
MD: 13,123
TVD: 6,977.24
Inclination: 90.31
Azimuth: 178.93
VS: 6,395.34

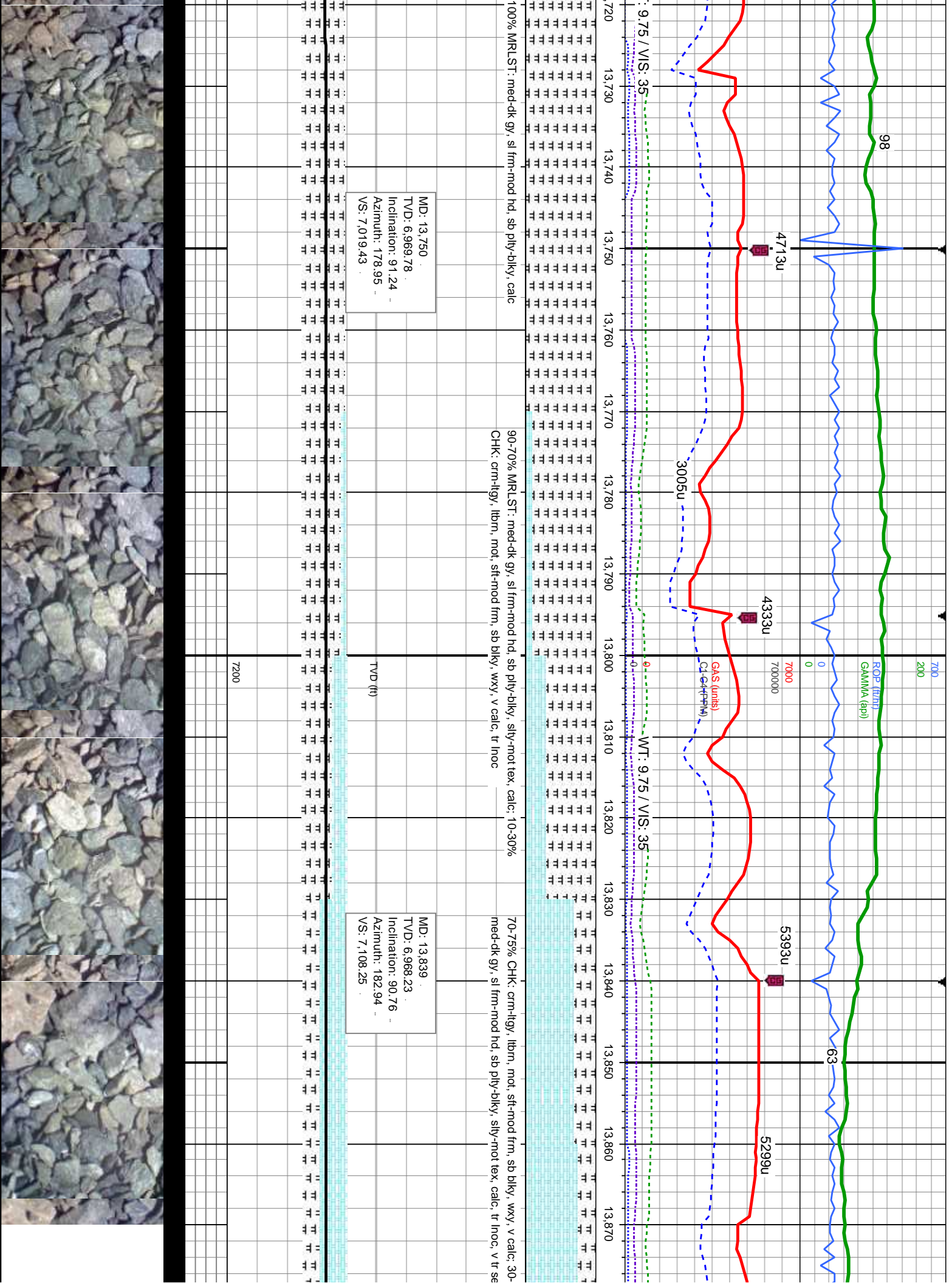
MD: 13,212
TVD: 6,976.7
Inclination: 90.38
Azimuth: 179.32
VS: 6,483.98

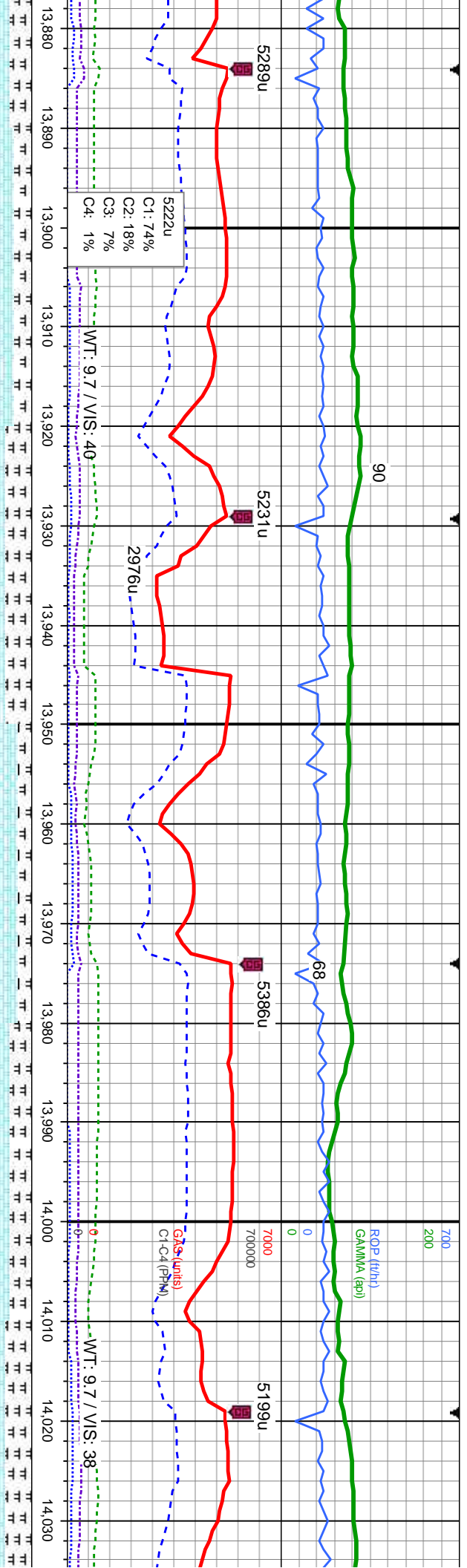
7200











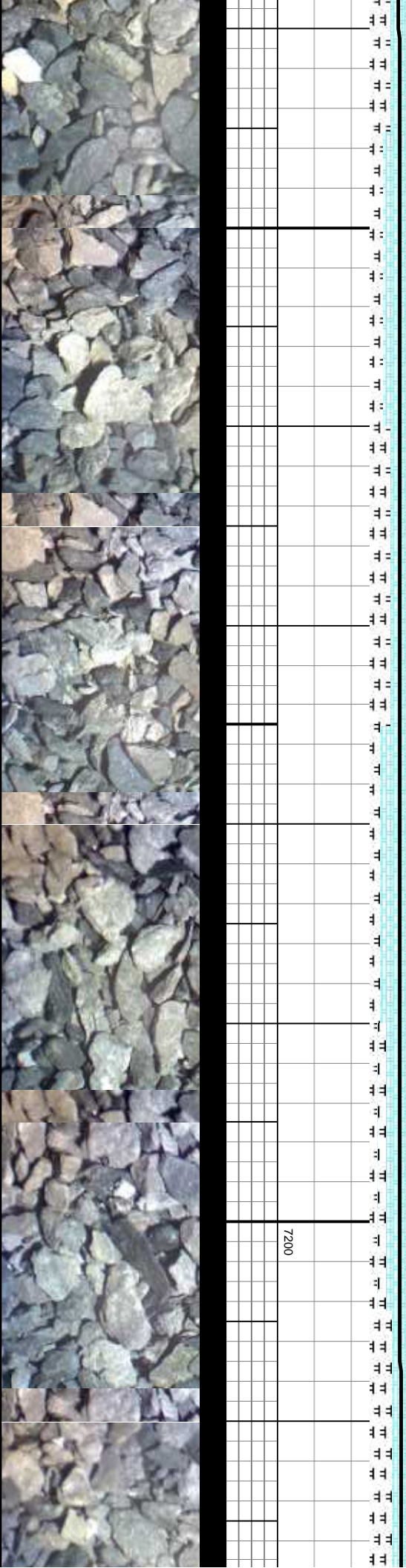
25% MRST: 80-70% CHK: crm-lgy, lbm, mot, sft-mod frm, sb blk, wxy, v calc: 20-30% MRST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex, calc, tr inoc, tr lse foss

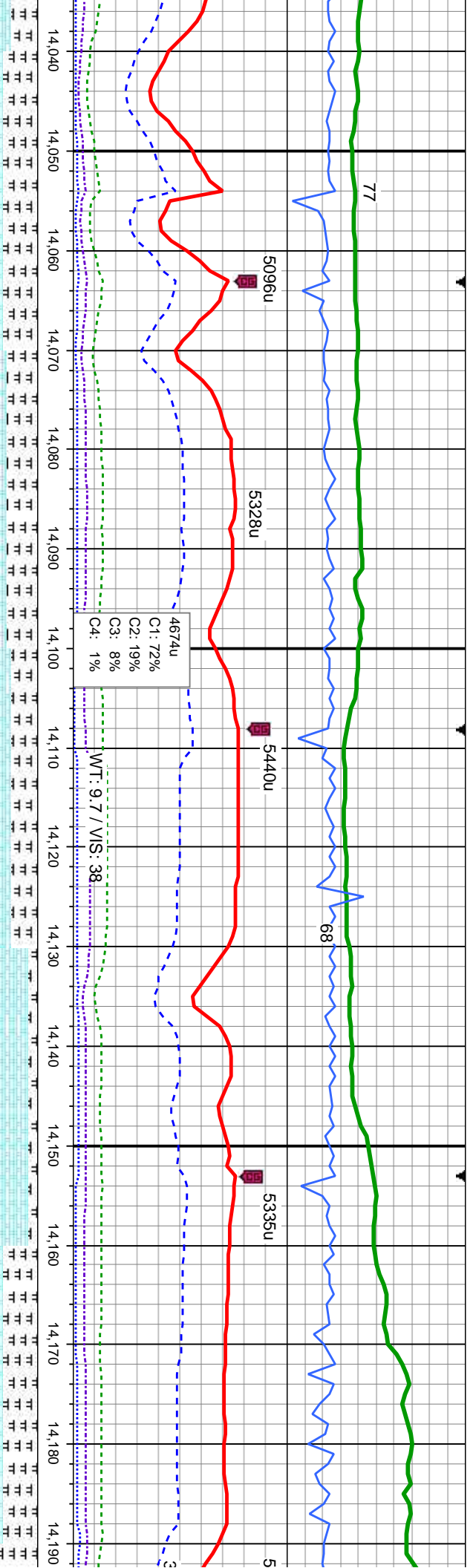
85-75% CHK: crm-lgy, lbm, mot, sft-mod frm, sb blk, wxy, v calc: 15-25% MRST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex, calc, tr inoc, tr lse foss

MD: 13.929
TVD: 6.966.82
Inclination: 91.03
Azimuth: 181.7
VS: 7.198.18

TVD (ft)

MD: 14.018
TVD: 6.964.77
Inclination: 91.62
Azimuth: 180.76
VS: 7.287.03

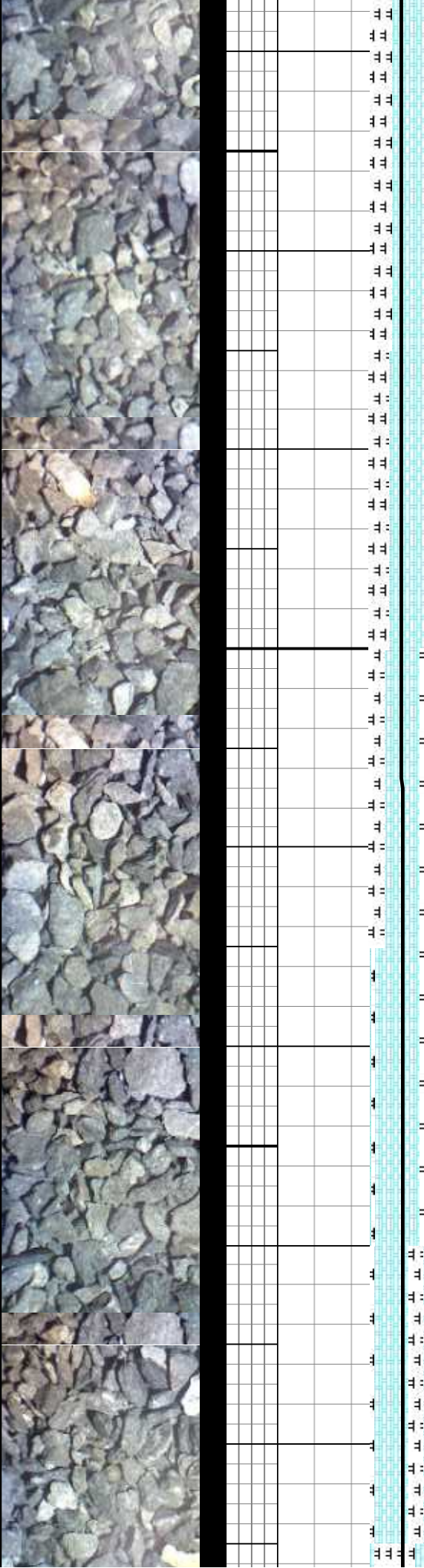


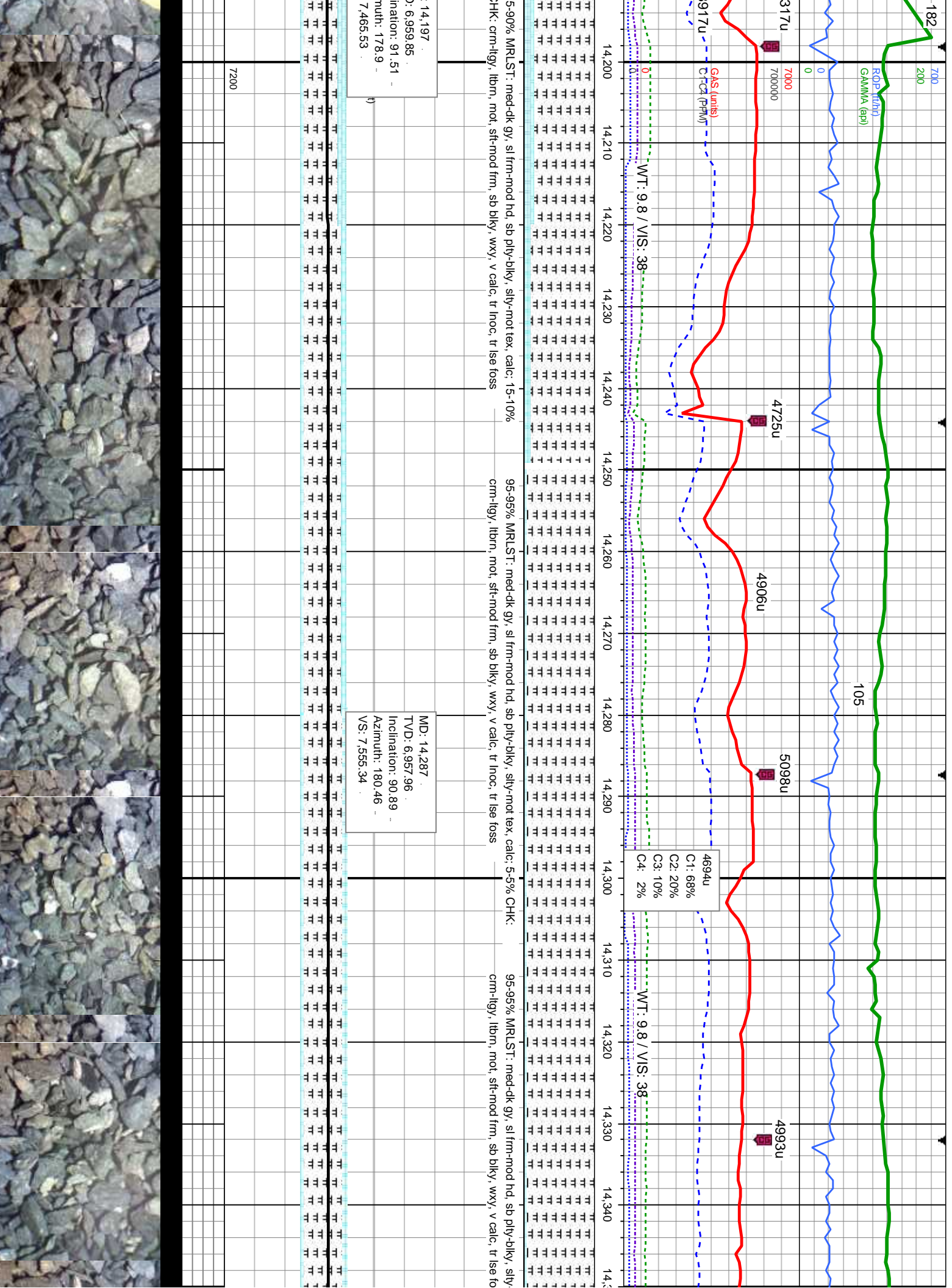


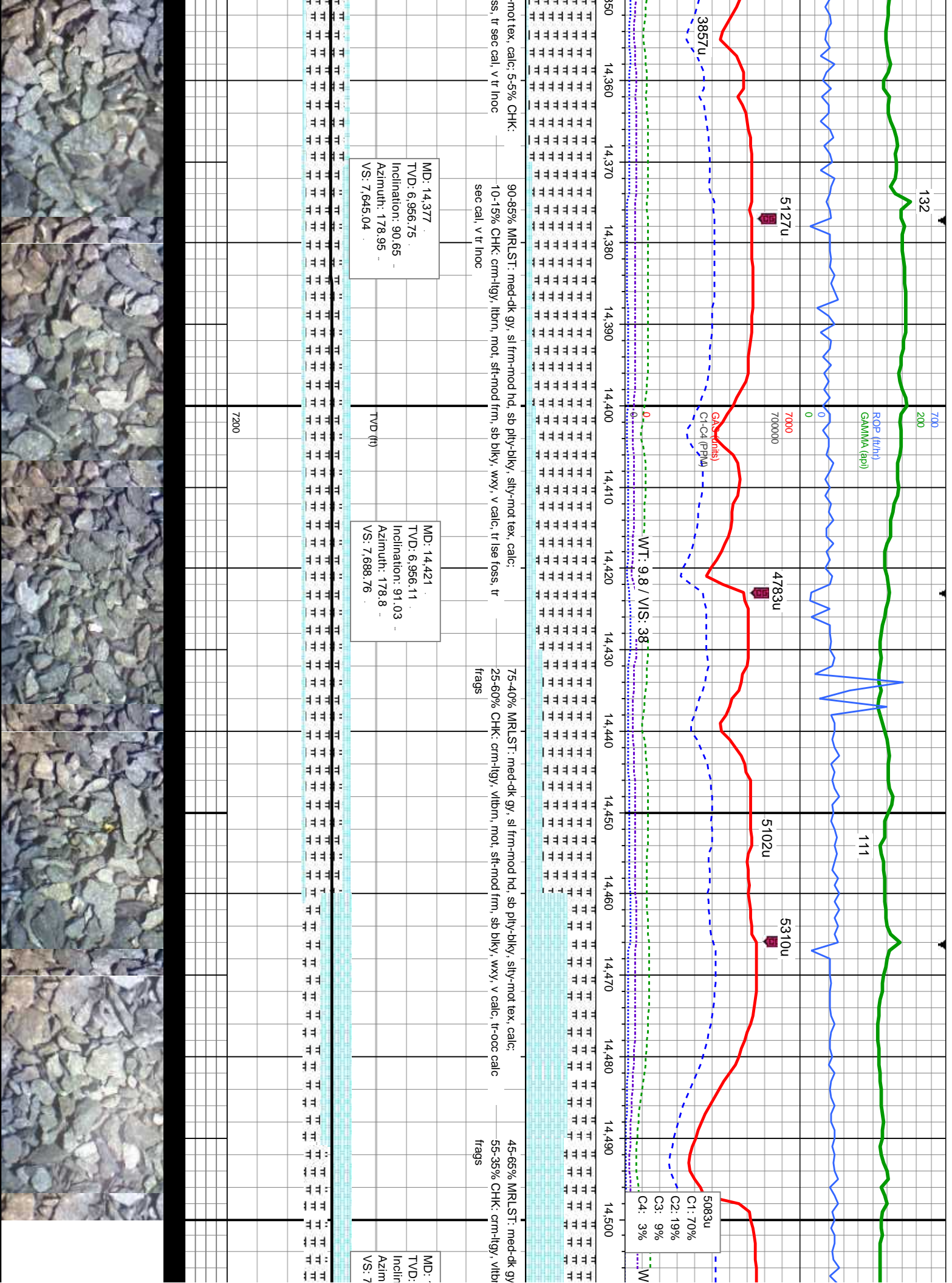
mod frm, sb blkly, wxy, v calc; 30-40% MRLST: 65-70% CHK: crm-lgy, lbm, mot, sft-mod frm, sb blkly, wxy, v calc; 35-30% MRLST: 90-60% CHK: crm-lgy, lbm, mot, sft-mod frm, sb blkly, wxy, v calc; 10-40% MRLST: 8

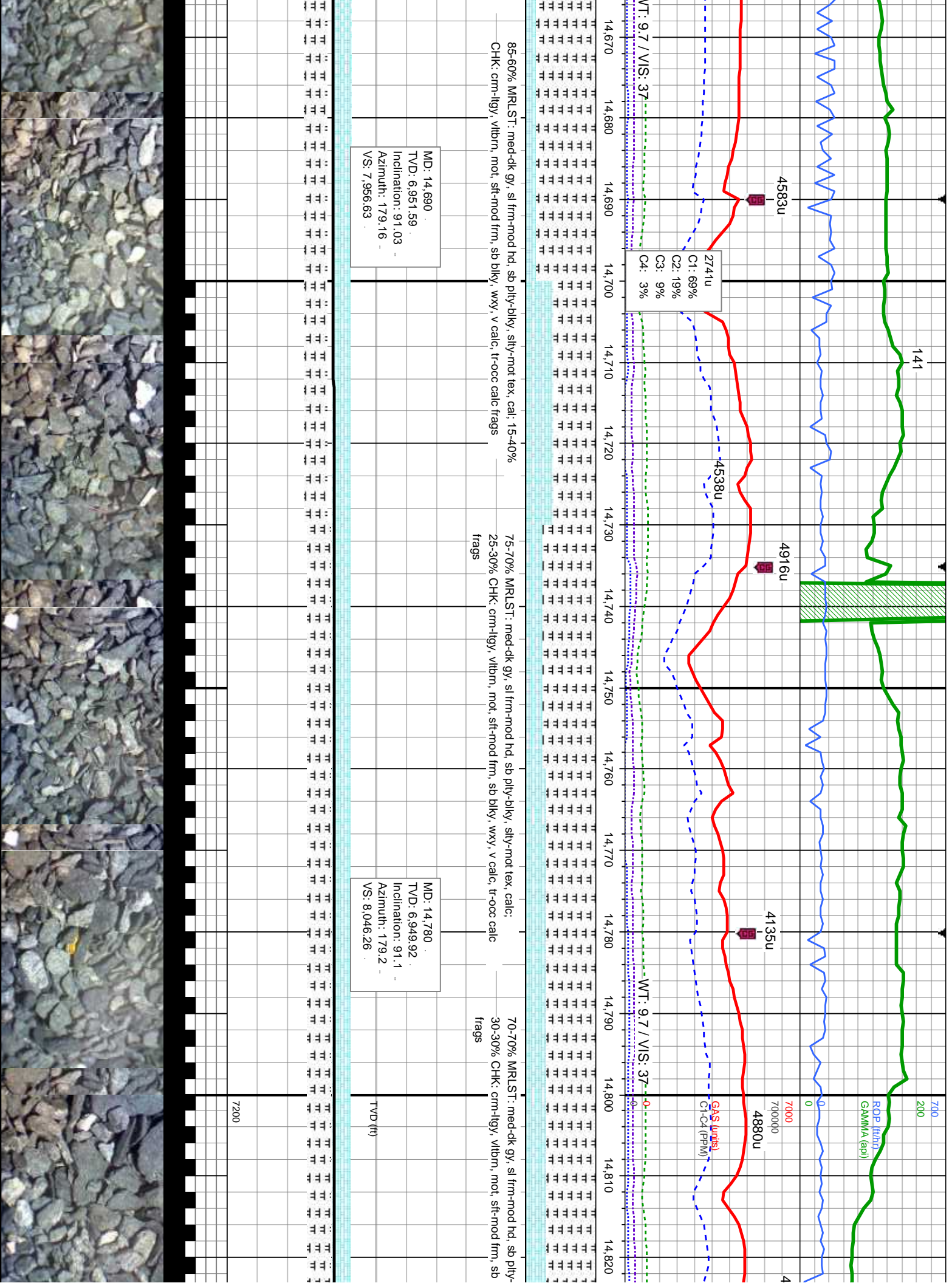
MD: 14,108
TVD: 6,962.25
Inclination: 91.58
Azimuth: 180.89
VS: 7,376.83

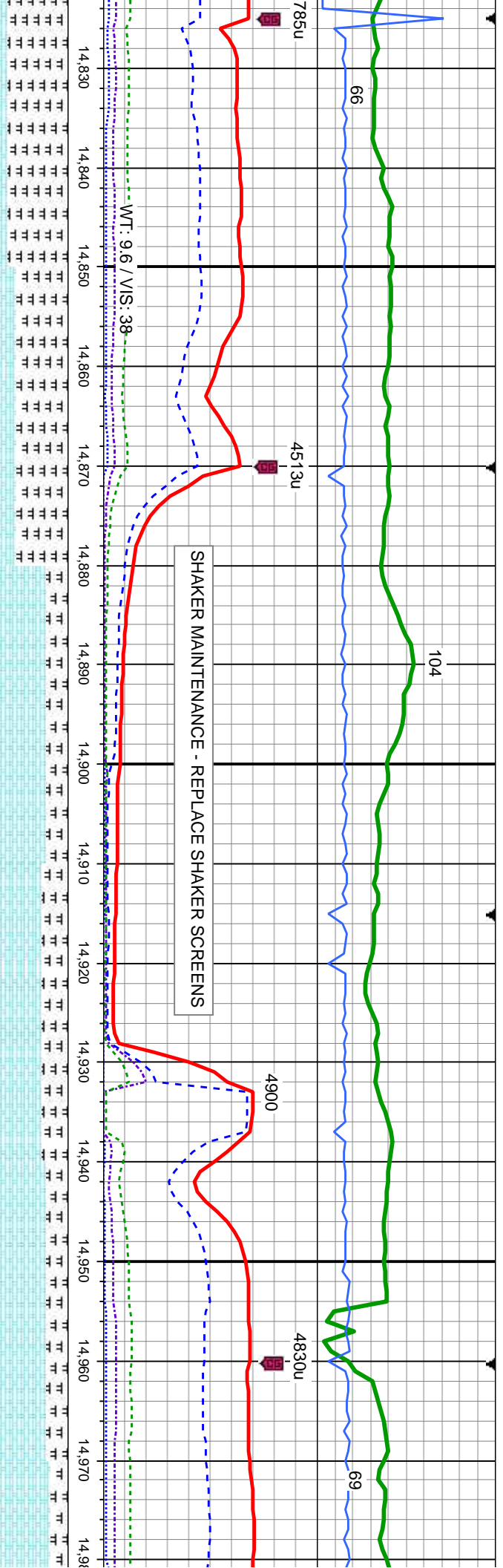
MD
TVD
Incl
Azim
VS











SHAKER MAINTENANCE - REPLACE SHAKER SCREENS

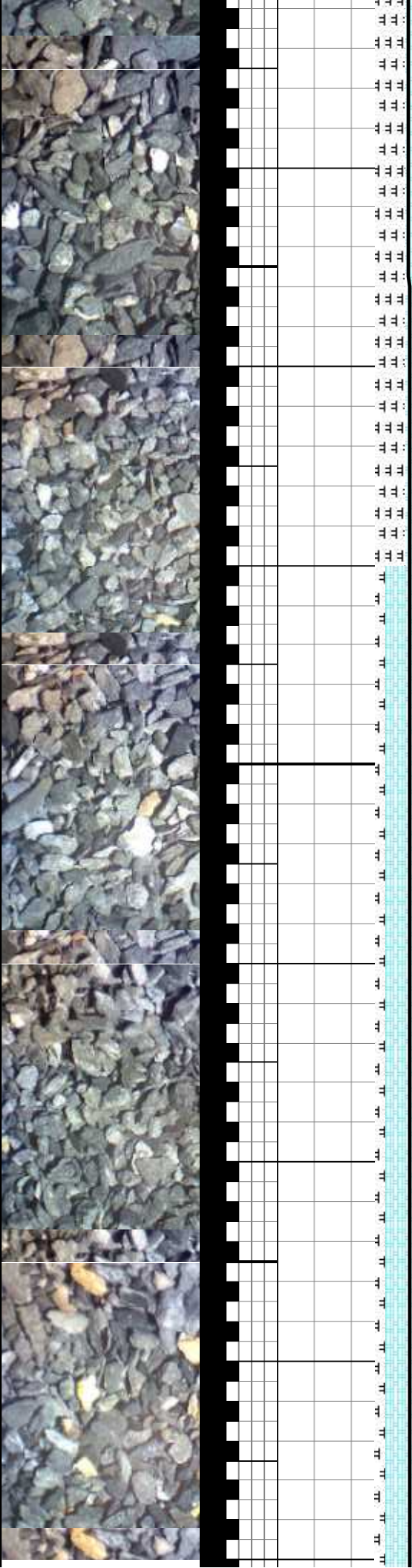
MD: 14,869
TVD: 6,948.08
Inclination: 91.27
Azimuth: 178.95
VS: 8,134.87

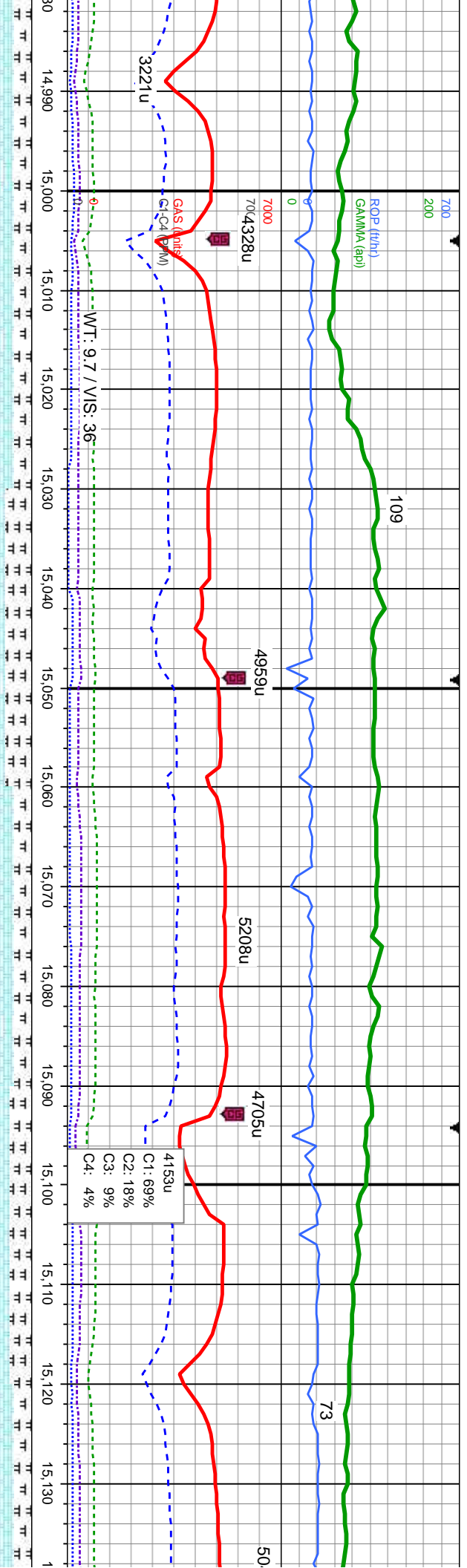
MD: 14,959
TVD: 6,946.35
Inclination: 90.93
Azimuth: 179.55
VS: 8,224.51

60-25% MRLST: med-dk gy, sl frm-mod hd, sb ply-biky, silty-mot tex, calc;
40-75% CHK: crm-ligy, vibrn, mot, sft-mod frm, sb biky, wxy, v calc, tr-occ calc
frags, tr PYR

70-75% CHK: crm-ligy, vibrn, mot, sft-mod frm, sb biky, wxy, v calc, tr calc frags;
30-25% MRLST: med-dk gy, sl frm-mod hd, sb ply-biky, silty-mot tex, calc, tr PYR

80-80% CHK
20-20% MRLST





cm-lyg, vibrn, mot, sft-mod frm, sb blk, wxy, v calc, tr calc frags;
ST: med-dk gy, sl frm-mod hd, sb ply-blk, silty-mot tex, calc, tr PYR

70-80% CHK: cm-lyg, vibrn, mot, sft-mod frm, sb blk, wxy, v calc, tr calc frags;
30-20% MRLST: med-dk gy, sl frm-mod hd, sb ply-blk, silty-mot tex, calc, tr PYR

75-80% CHK: cm-lyg, vibrn, mot, sft-mod frm, sb blk, wxy, v calc, tr calc frags;
25-20% MRLST: med-dk gy, sl frm-mod hd, sb ply-blk, silty-mot tex, calc, tr PYR

TVD (ft)

MD: 15.049
TVD: 6.944.68
Inclination: 91.2
Azimuth: 178.97
VS: 8.314.15

MD: 15.13
TVD: 6.94
Inclination
Azimuth:
VS: 8.402

7200



700

200

8/26/14

ROP (ft/h)

GA/MMA (api)

63

5031u

5268u

5367u

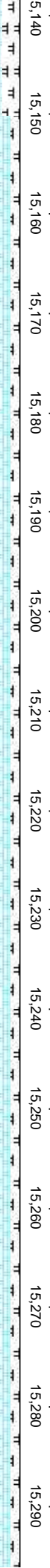
5258u

3328u

GAS (units)

Gt-Cd (PPM)

WT: 9.7 / VIS: 38



90-90% CHK: crm-lgy, vitbrn, gybrn, mot, sft-mod frm, sb blkly, wxy, v calc, tr
calc frags: 10-10% MRLST: med-dk gy, sl frm-mod hd, sb plty-blky, silty-mot tex, calc, tr PYR

90-90% CHK: crm-lgy, vitbrn, gybrn, mot, sft-mod frm, sb blkly, wxy, v calc, tr calc
frags: 10-10% MRLST: med-dk gy, sl frm-mod hd, sb plty-blky, silty-mot tex, calc, tr PYR

90-90% CHK: crm-lgy, vitbrn, gybrn, mot, sft-mod frm, sb blkly, wxy, v calc, tr calc
calc frags: 10-10% MRLST: med-dk gy, sl frm-mod hd, sb plty-blky, silty-mot tex, calc, tr PYR

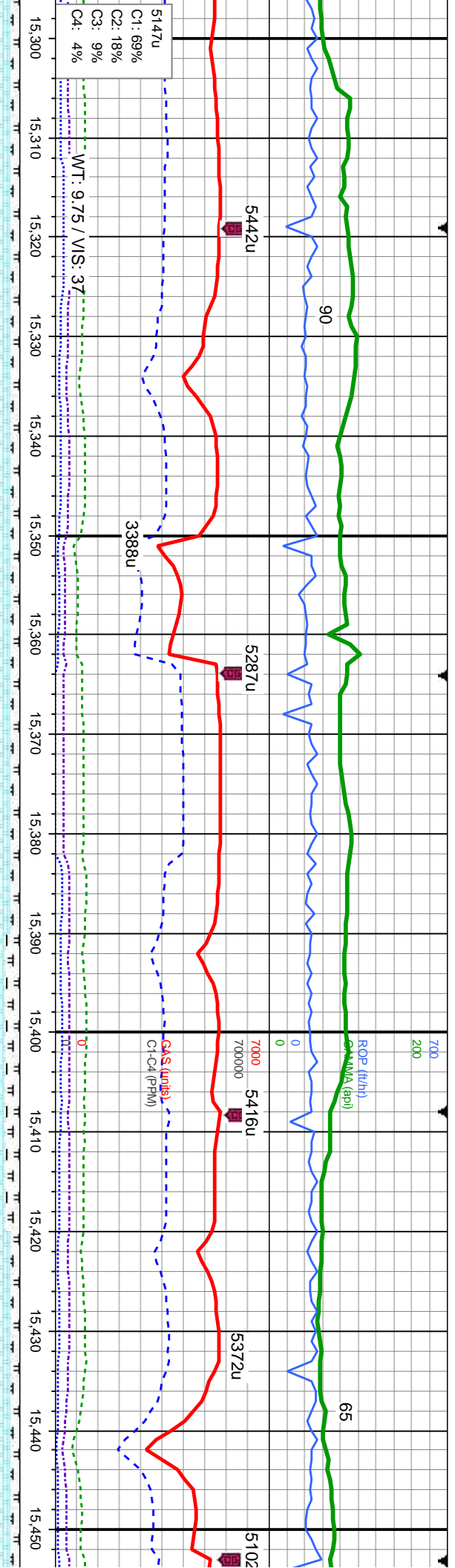
8
3
1: 90.96
80.7
86

TVD (ft)

MD: 15,228
TVD: 6,941.19
Inclination: 91.34
Azimuth: 177.99
VS: 8.492.5

7200

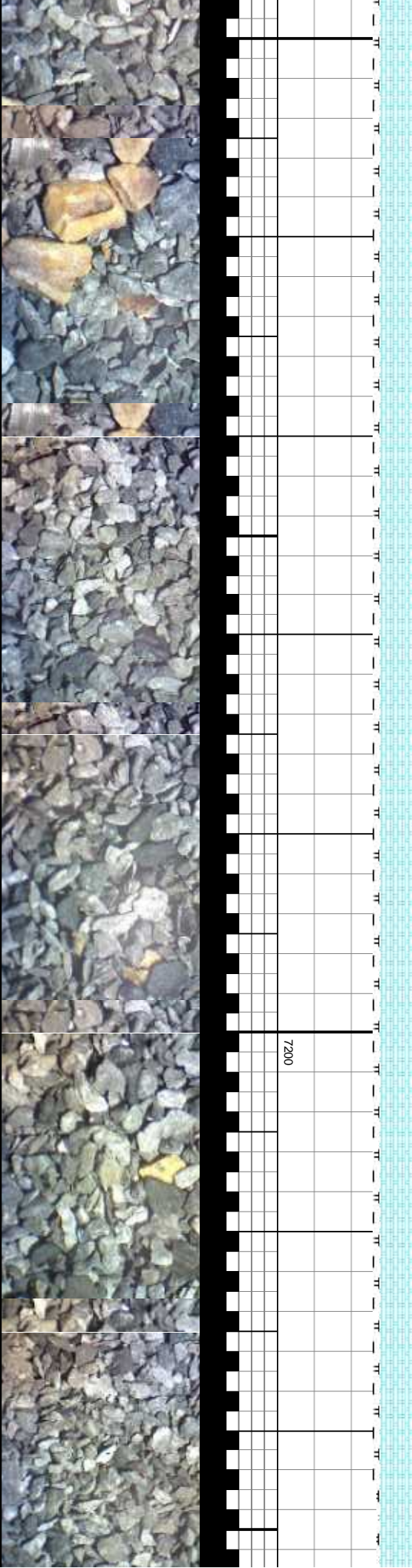


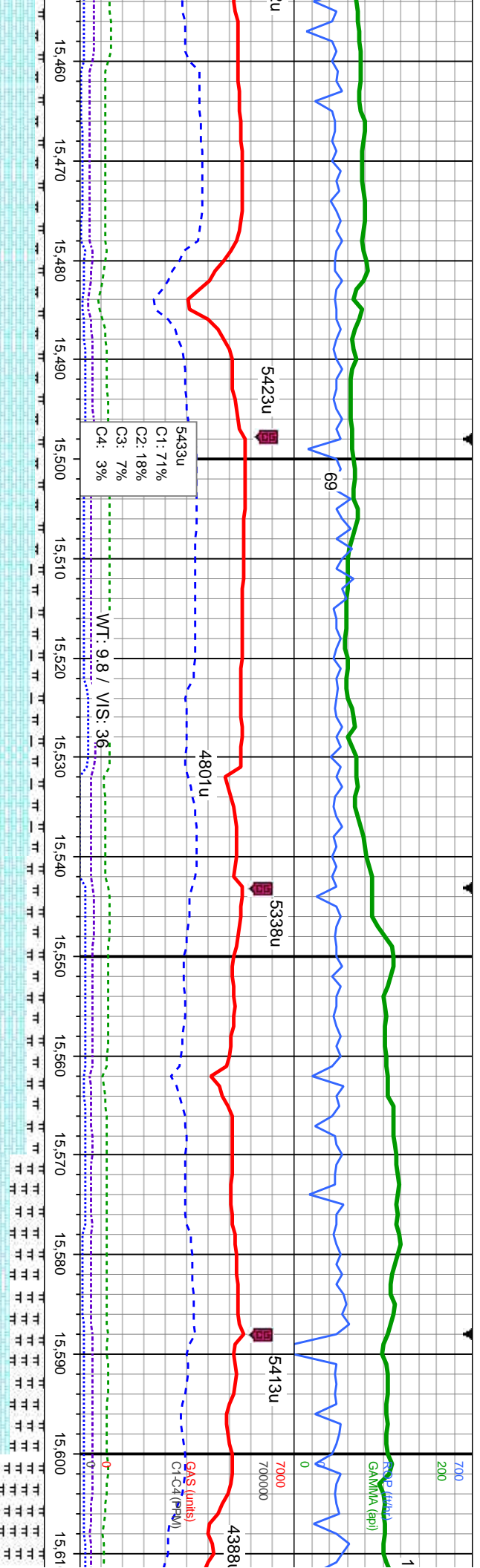


sft-mod frm, sb blk, wxy, v calc, tr
gy, sl frm-mod hd, sb ply-blky, silty-mot tex,
90-90% CHK: crn-lyg, vibrn, gybrn, mot, sft-mod frm, sb blk, wxy, v calc, tr
calc frags: 10-10% MRLST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex,
calc, tr PYR
85-90% CHK: crn-lyg, vibrn, gybrn, mot, sft-mod frm, sb blk, wxy, v calc, tr
calc frags: 15-10% MRLST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex,
calc, tr PYR
90-
cal
cal

MD: 15,318
TVD: 6,939.35
Inclination: 91
Azimuth: 178.86
VS: 8,582.01

MD: 15,407
TVD: 6,937.91
Inclination: 90.86
Azimuth: 181.31
VS: 8,670.76





90% CHK: crn-lyg, vibrn, gybrn, mot, sft-mod frm, sb blkly, wxy, v calc, tr
c frags: 10-10% MRLST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex, c, tr PYR

85-80% CHK: crn-lyg, vibrn, gybrn, mot, sft-mod frm, sb blkly, wxy, v calc: 15-20%
MRLST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex, calc

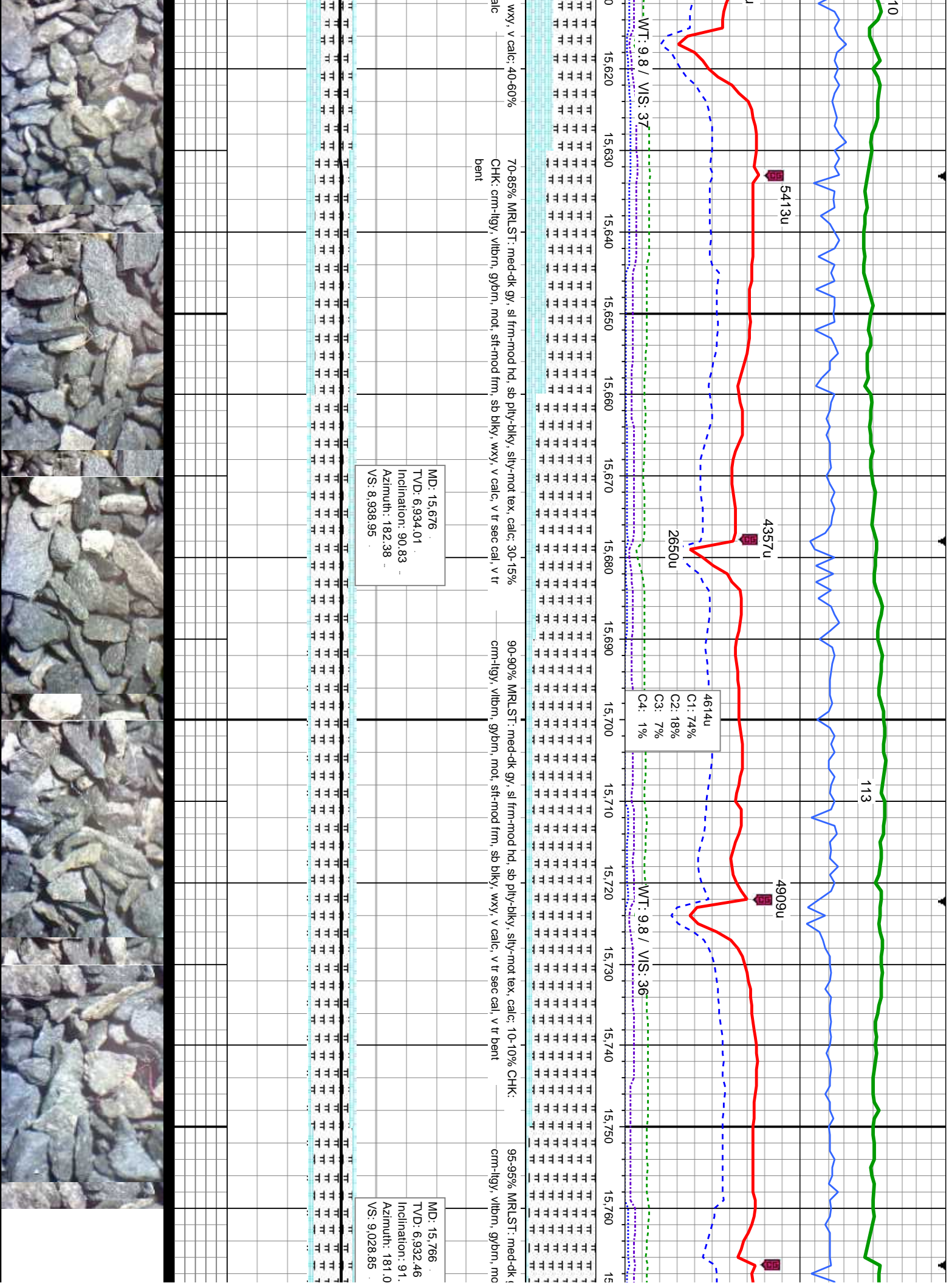
60-40% CHK: crn-lyg, vibrn, gybrn, mot, sft-mod frm, sb blkly,
MRLST: med-dk gy, sl frm-mod hd, sb ply-blky, silty-mot tex, c

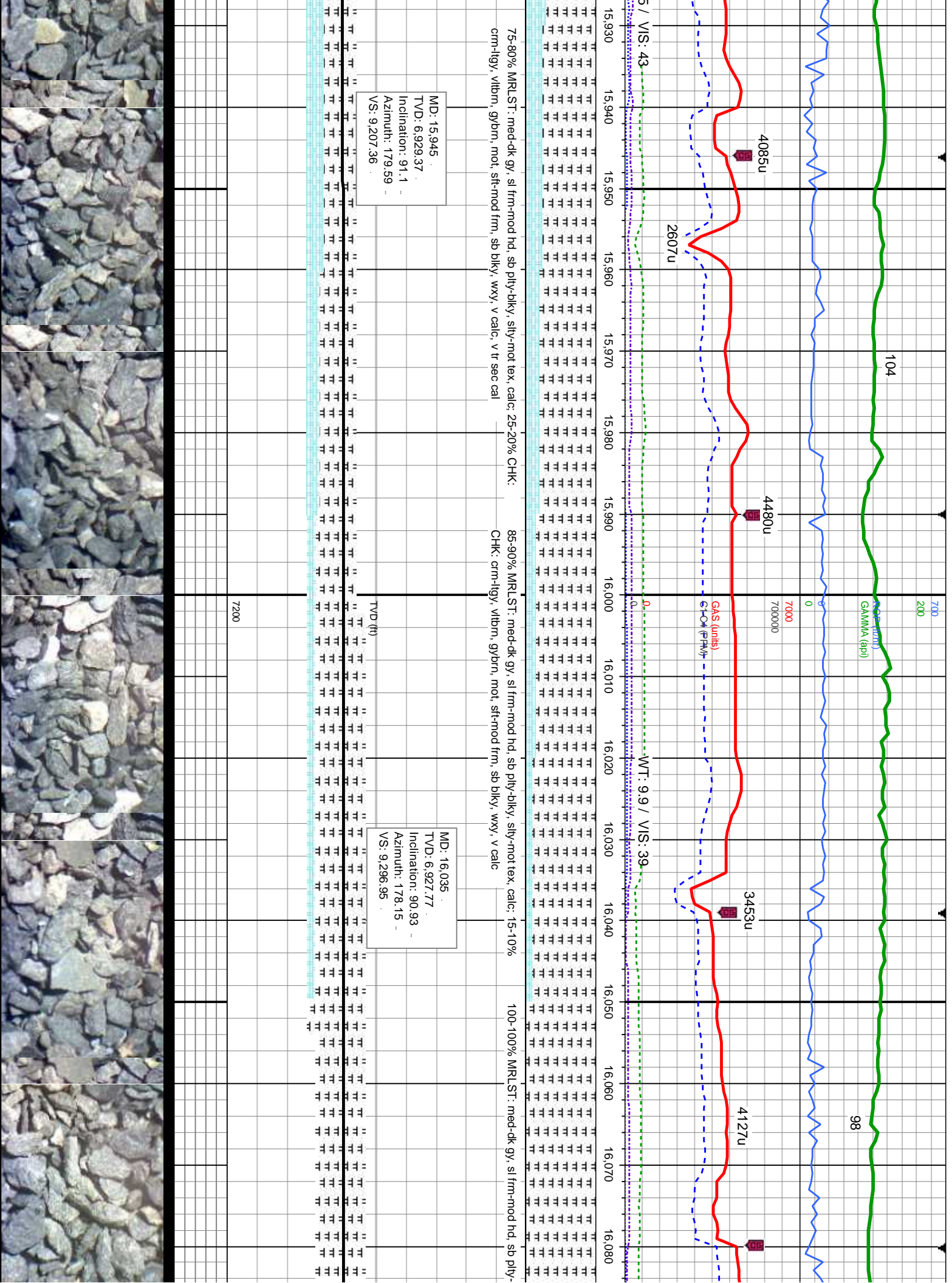
MD: 15,497
TVD: 6,936.82
Inclination: 90.52
Azimuth: 180.01
VS: 8,760.57

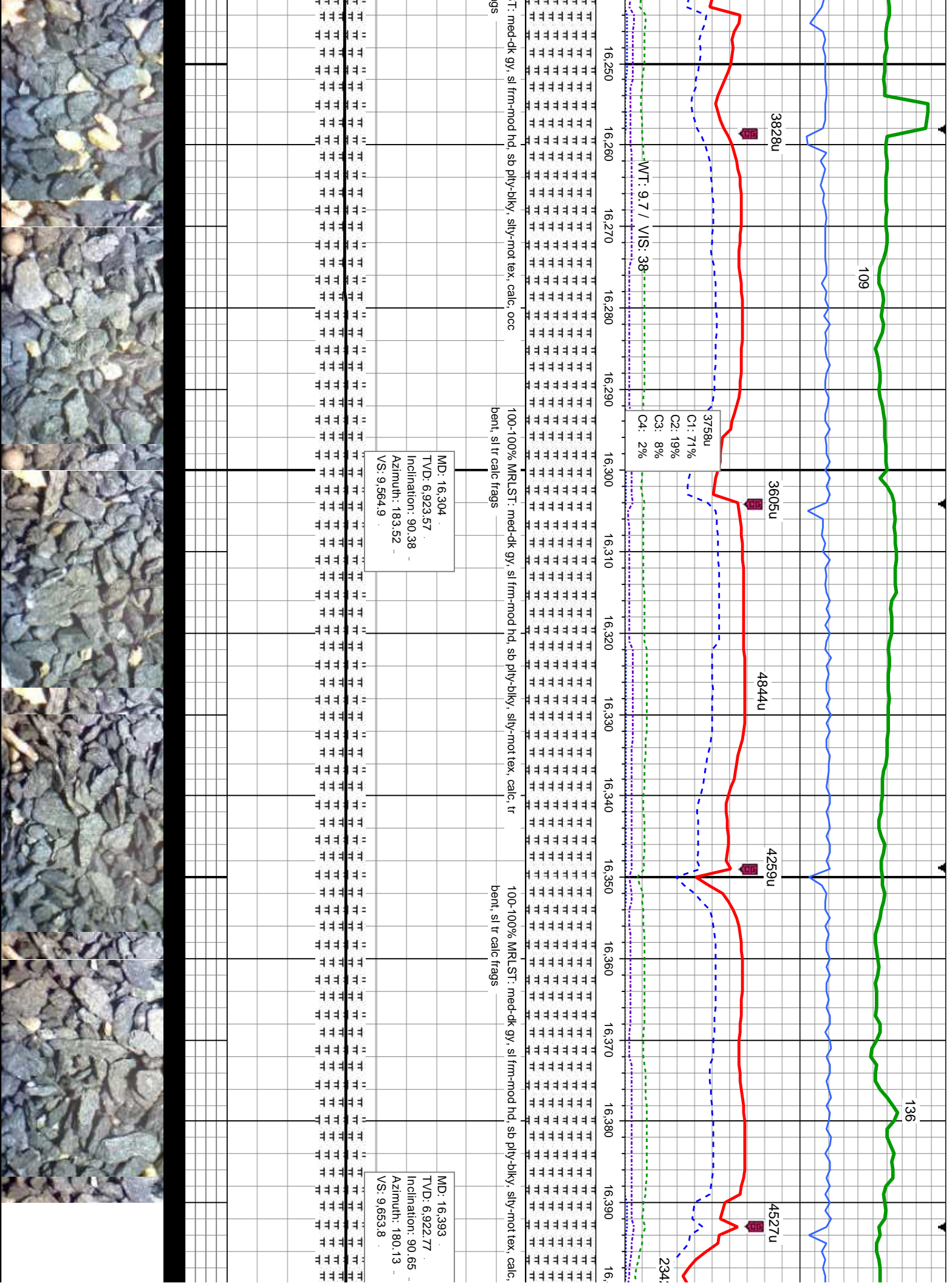
MD: 15,587
TVD: 6,936.53
Inclination: 91.13
Azimuth: 178.29
VS: 8,850.2

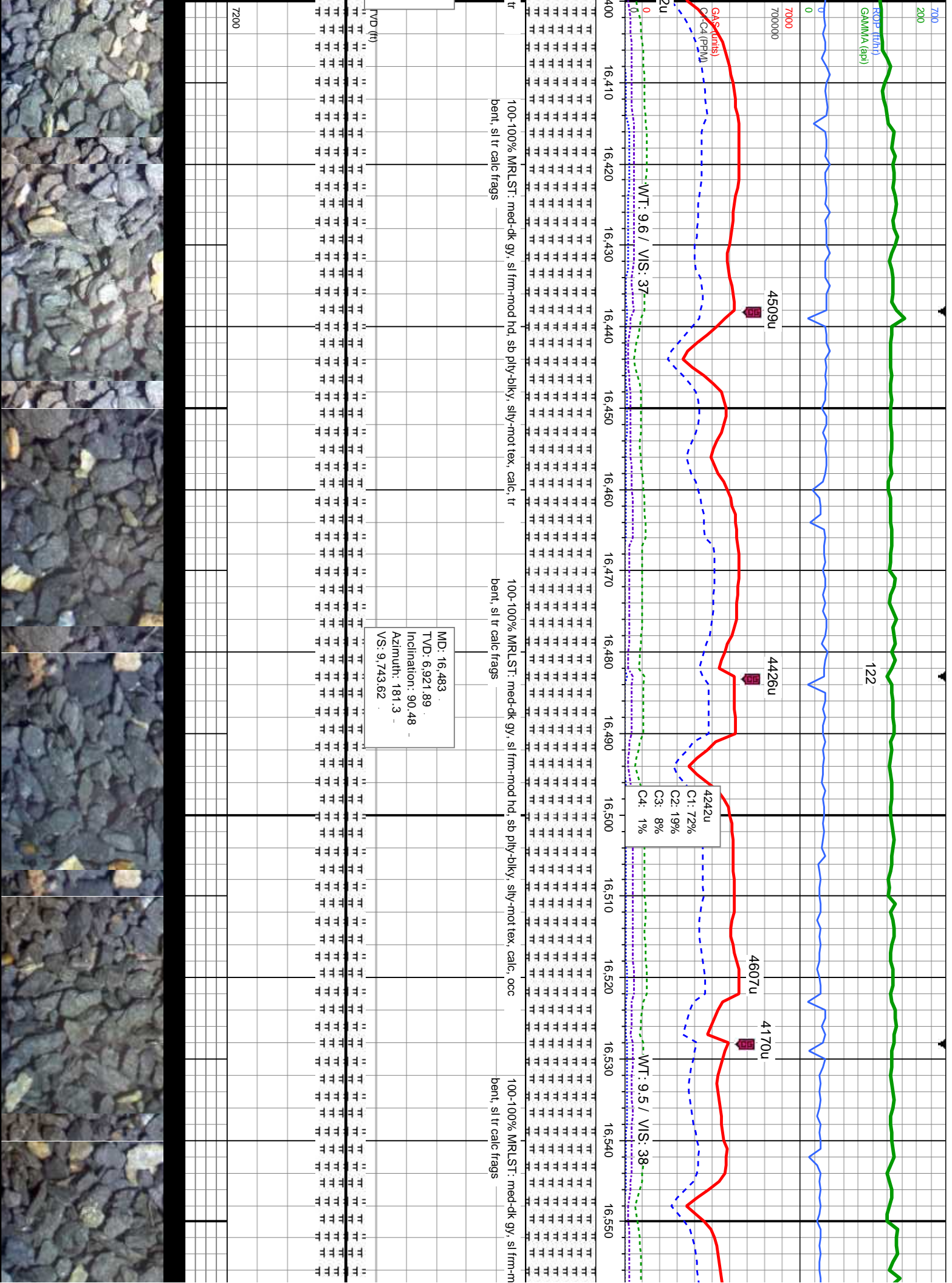
TVD (ft)











8/27/14

MINDEPTH

200

126

ROP (ft/h)
GAMMA (api)

7000
700000

3660u

3999u

3308u

3915u

4416u

C1: 73%
C2: 18%
C3: 7%
C4: 1%

4383u

2694u

GAS (lunb)
Cl-C4 (ppm)

WT: 9.6 / VS: 37

od hd, sb ply-biky, silty-mot tex, calc, occ

100-100% MRLST: med-dk gy, sl frm-mod hd, sb ply-biky, silty-mot tex, calc, tr-occ
bent, sl tr calc frags

100-100% MRLST: med-dk gy, sl frm-mod hd, sb ply-biky, silty-mot tex, calc, tr-occ
bent, sl tr calc frags

100-1

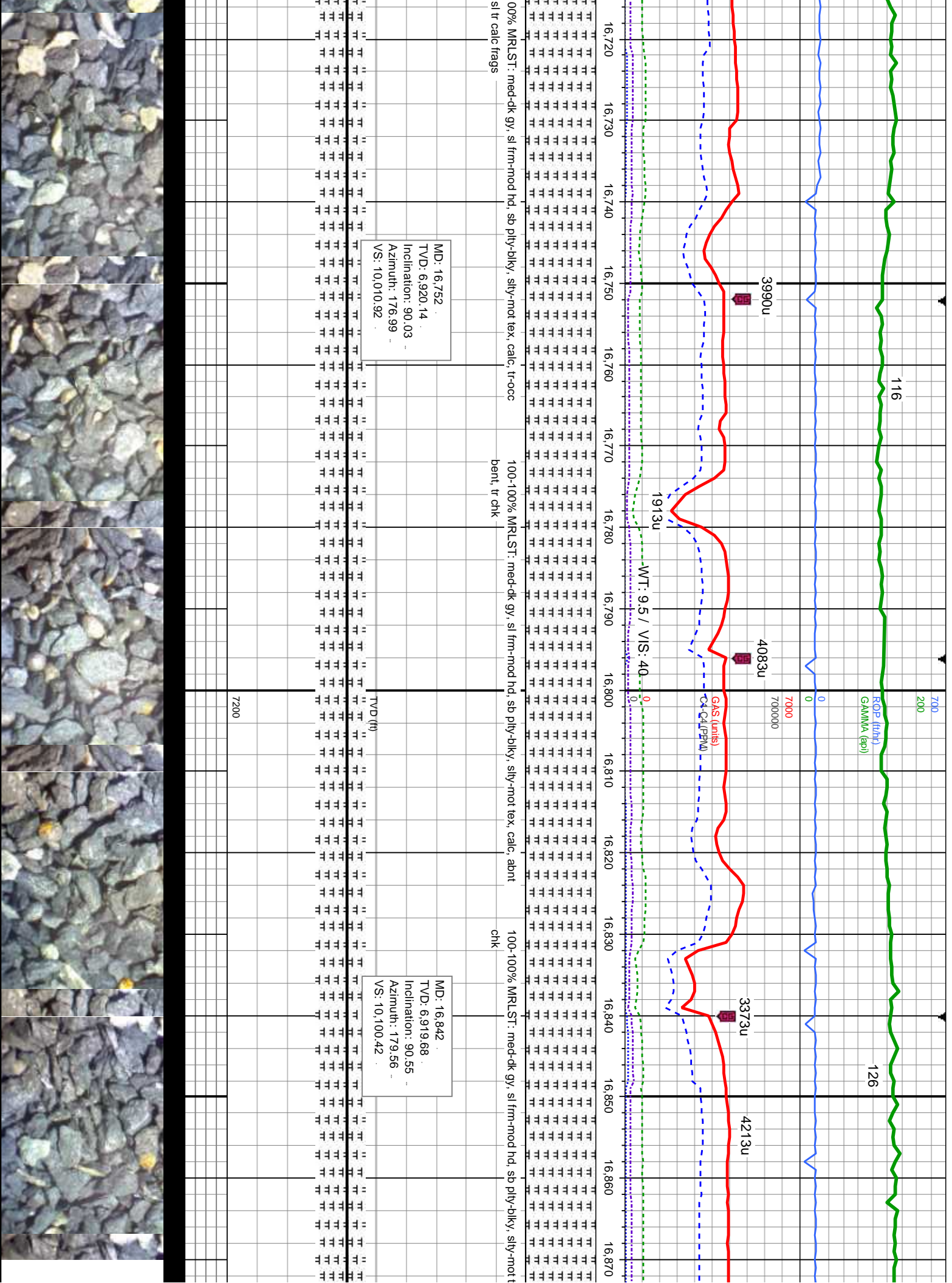
MD: 16,573
TVD: 6,921.19
Inclination: 90.41
Azimuth: 179.1
VS: 9,833.38

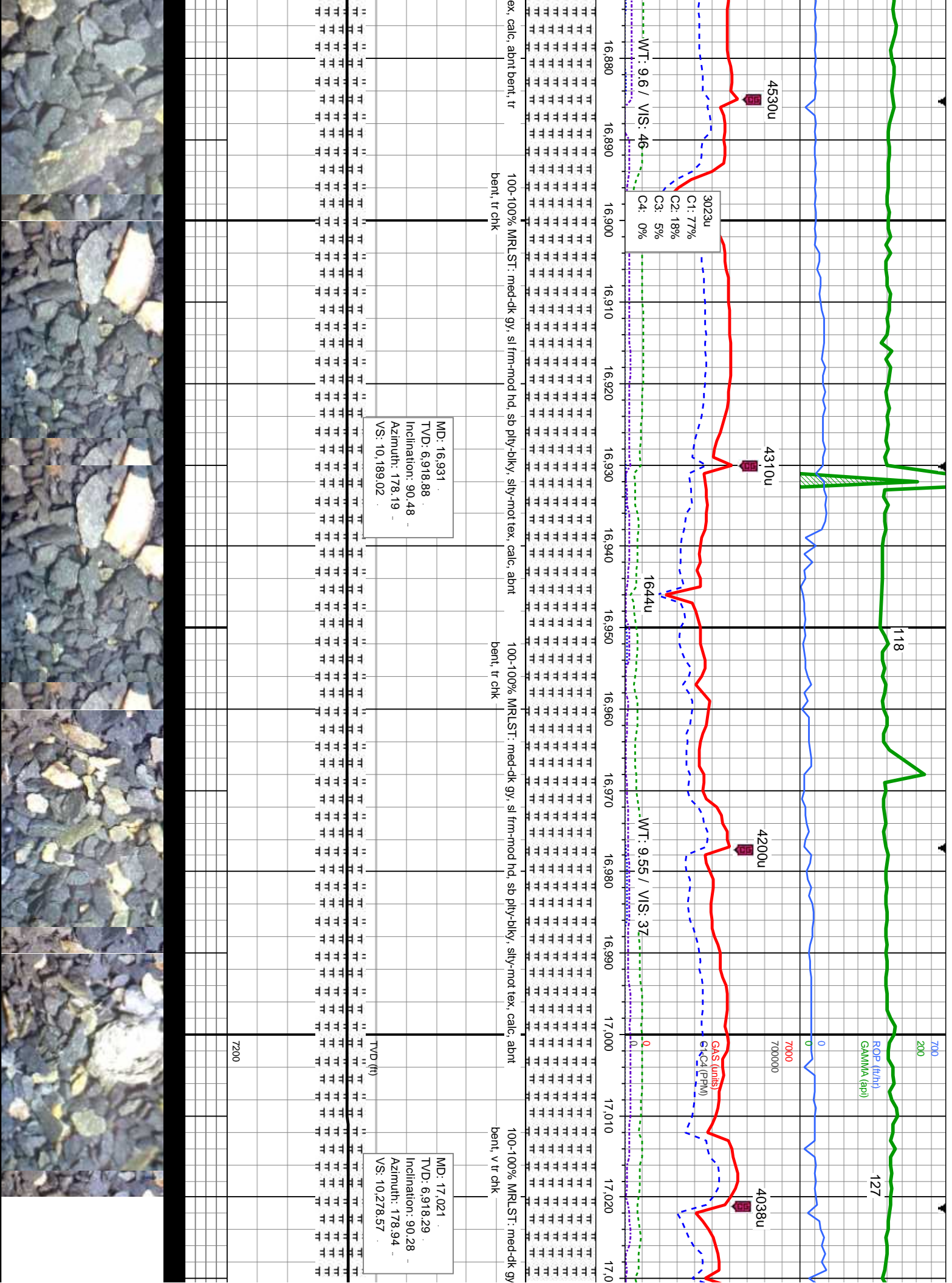
MD: 16,663
TVD: 6,920.51
Inclination: 90.45
Azimuth: 175.97
VS: 9,922.75

TVD (ft)

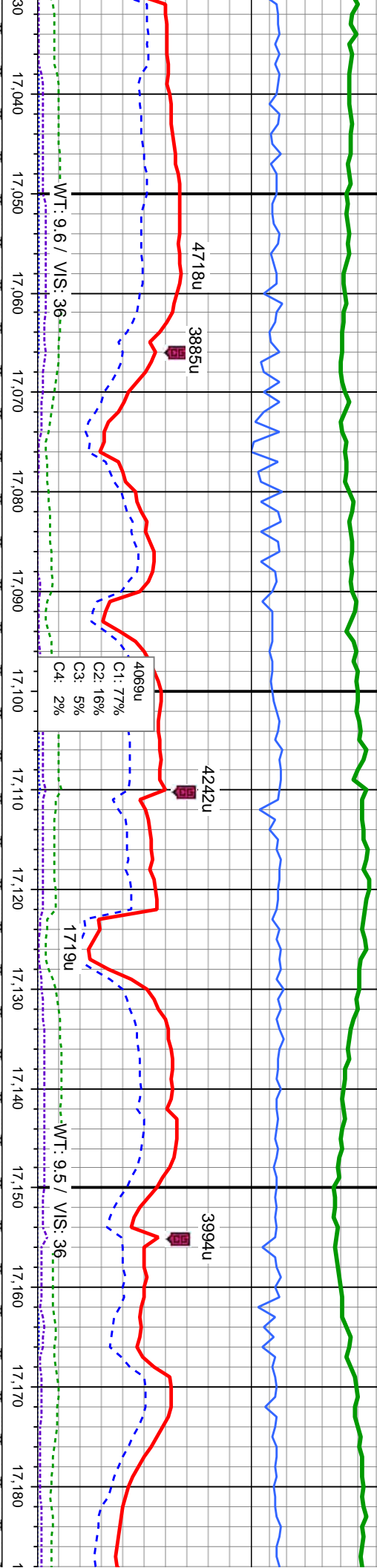
7200







133



17,030 17,040 17,050 17,060 17,070 17,080 17,090 17,100 17,110 17,120 17,130 17,140 17,150 17,160 17,170 17,180 1

, sl frm-mod hd, sb pily-biky, silty-mot tex, calc, abnt

100-100% MRLST: med-dk gy, sl frm-mod hd, sb pily-biky, silty-mot tex, calc, abnt bent, v tr

chk

bent, v tr chk

