



Scale: 5" / 100'
Measured Depth Log

Well Name	Heartland G25-72-1HN		
Location	SESE SEC25 T4N R65W		
State	COLORADO	County	WELD
Country	USA	Rig Number	PRECISION 828
API Number	05-123-39557	AFE #	141938
Region	DENVER-JULESBURG BASIN	Field	WATTENBERG
Spud Date	7/25/2014	Drilling Completed	8/4/2014
Surface Coordinates	282' FSL, 365' FEL	Lat/Long:	40.27673/-104.60365
Ground Elevation	4842'	K.B. Elevation	4858'
Logged Interval	6300'	To	16939'
		Total Depth	16939'
Formation	Pierre (Teepee Buttes, Sharon Springs), Niobrara (Smokey Hills A,B,C layers)		
Type of Drilling Fluid	LSND		

Operator

Company NOBLE ENERGY INC.
Address 1625 Broadway
Denver, CO 80202

Geologist

Name MELANIE PETERSON
Company NOBLE ENERGY INC.
Address 1625 Broadway
Denver, CO 80202

Other

WELLSITE GEOLOGISTS: GARY MYERS, N
GEOLOGICAL S
LOG CONTINUE

Rock Type

CHALK TT TT TT MARLSTONE

ator

gist

er

MARK COLE, ELIZABETH VAN DIEPEN
SERVICES PROVIDED BY COLUMBINE LOGGING, INC.
S FROM FILE: Heartland G25-72-1HN Vert.mplot

ypes

SILTY SHALE



SHALY SANDSTONE

Other Symbols

Engineering



BIT



CONNECTION (DOWN)



CONNECTION GAS



CONNECTION GAS (LEFT)



TRIP GAS (LEFT)



MN DEPTH (DOWN)



NORMAL FAULT

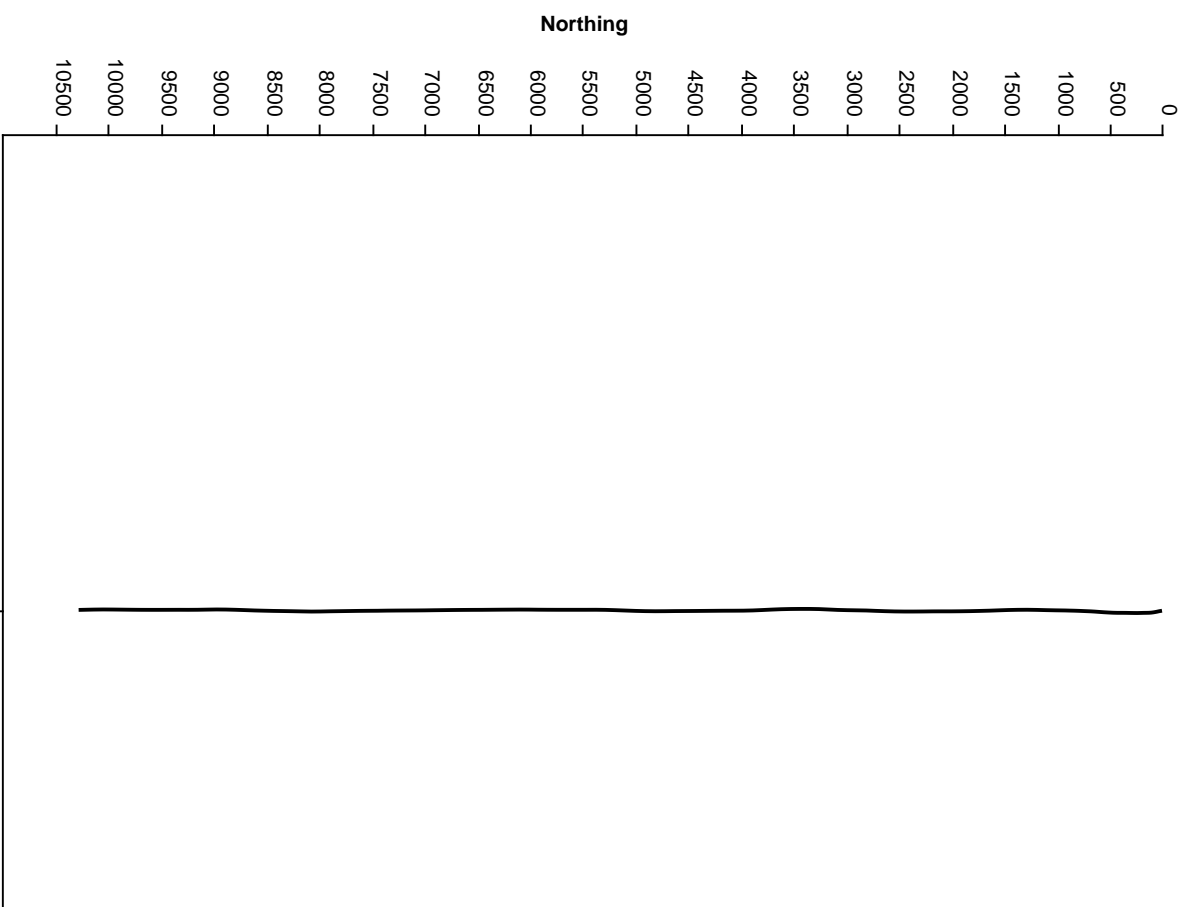


CASING

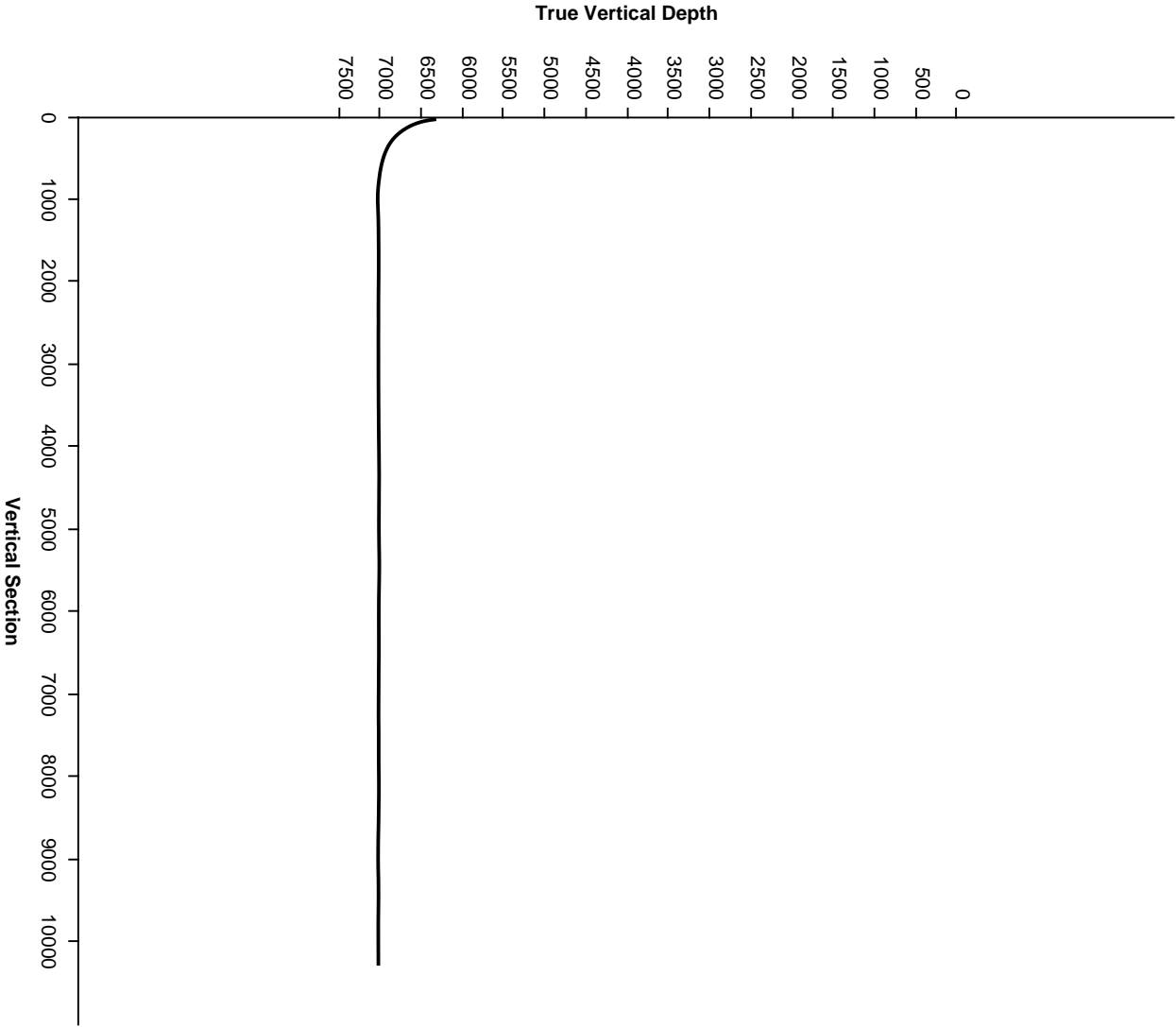


MN DEPTH

Survey Plan



Survey Elevation



Slide/Rotate

ROP —

Total Gas & Chromatograph

A diagram showing a vertical column of gas. On the left, the labels GAS, C1, C2, C3, and C4 are listed vertically. To the right of each label is a horizontal line segment. The line for GAS is red and the longest. The line for C1 is blue and shorter than GAS. The line for C2 is green and shorter than C1. The line for C3 is purple and shorter than C2. The line for C4 is blue and the shortest.

**COLUMBINE LOGGING, INC.
ON LOCATION 7/27/14
MANNED 2-PERSON LOGGING
USING PASON GAS ANALYZER**

Depth Labels

% Lith

Gamma
GAMMA

Well Bore
TV D —

LOG CONTINUES FROM FILE:

Heartland G25-72-1HN Vert.mplot

Bit Data

Bit #: 2

Type: Smith SDi513

Size: 8.75" "

Depth In: 718'

MD: 6,328

TV D: 6,327.17.

INC: 7.3_{max}

AZM: 11-

MD: 6,372.

TV D: 6,370.75

INC: 8.5%

AZM: 10.3

MD: 6,417

TV D: 6,415.12

INC: 10.6

AZM: 12.4

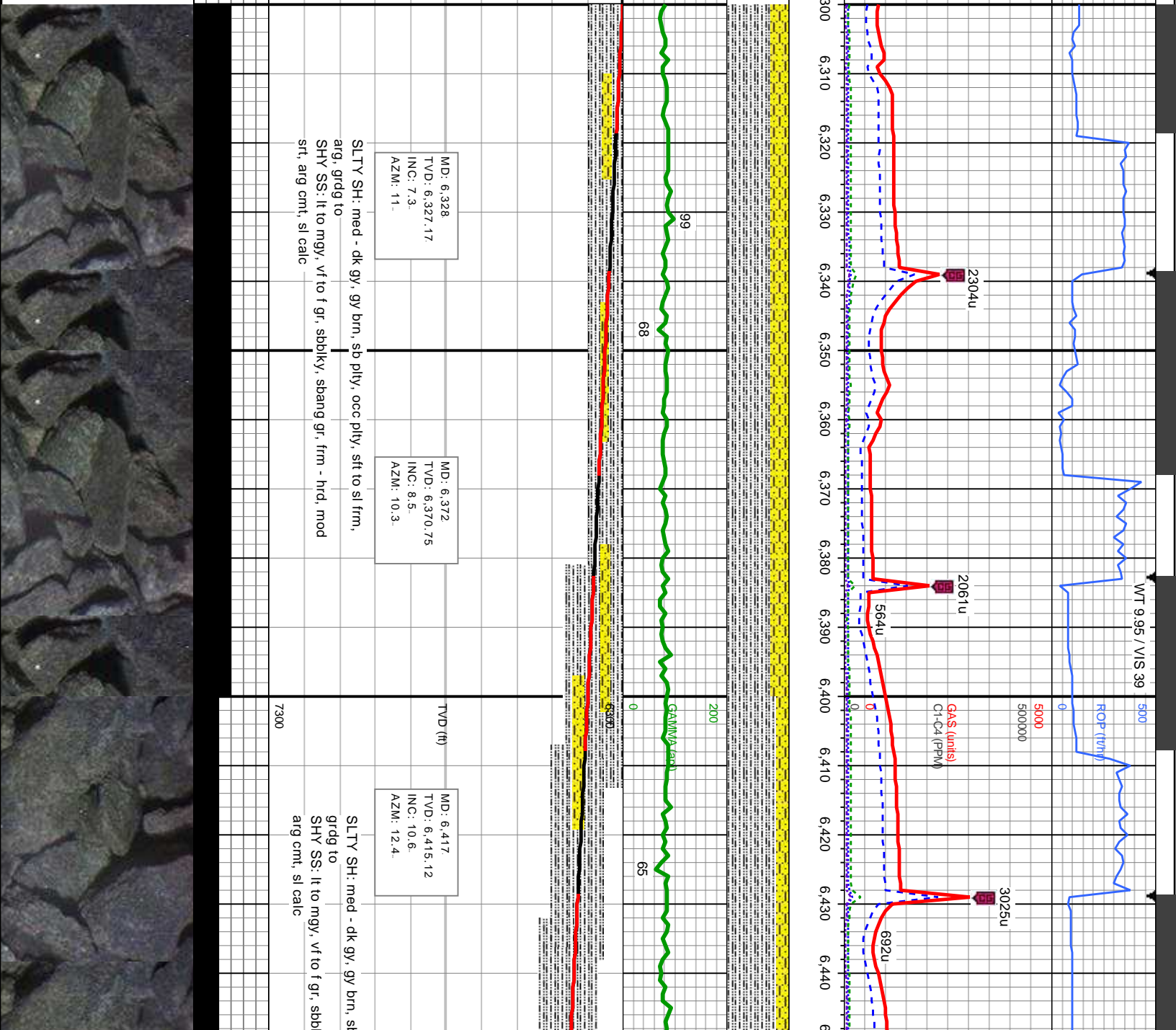
SLTY SH: med - dk gy, gy brn, sb ply, occ ply, sft to sl frm,
arg, grgd to —————
SHY SS: lt to mgy, vf to f gr, sbilky, sbang gr, frm - hrd, mod
sft, arg cmf, sl calc —————

SLTY SH: med - dk gy, gy brn, s	
grgd to	
SHY SS: lt to mgy, vfto f gr, sbb	
arg cmf, sl calc	

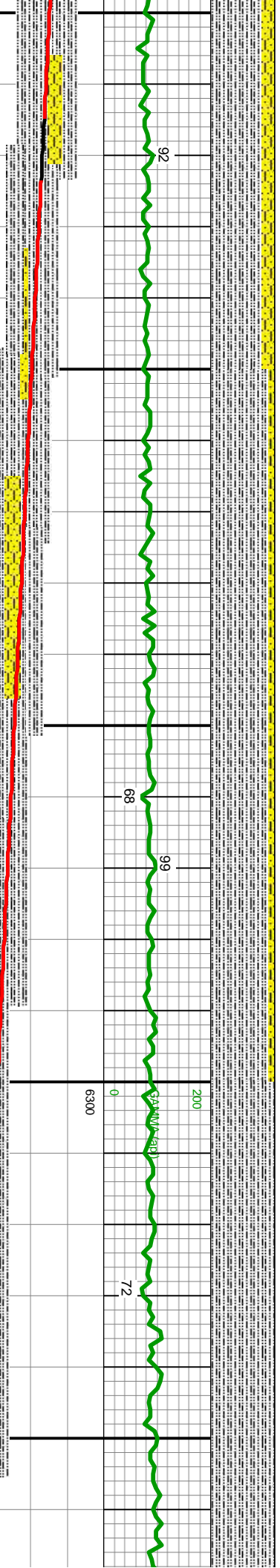
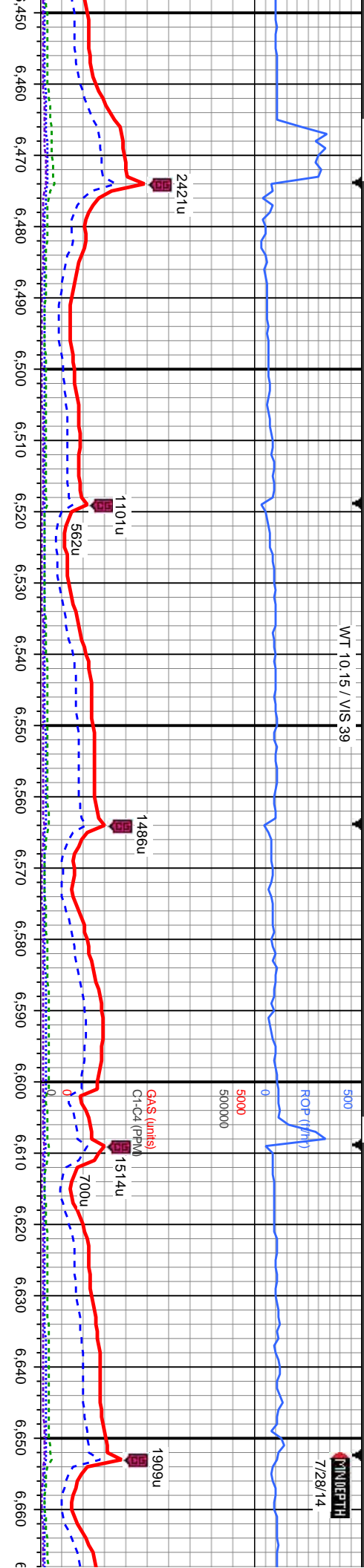
Oil Show

ST T F M G E

Images



WT 10.15 / VIS 39



MD: 6,462
TVD: 6,459.13
INC: 13.4
AZM: 12.3

MD: 6,507
TVD: 6,502.62
INC: 16.4
AZM: 11.5

MD: 6,552
TVD: 6,545.33
INC: 20.2
AZM: 10.2

MD: 6,597
TVD: 6,587.07
INC: 23.7
AZM: 9.3

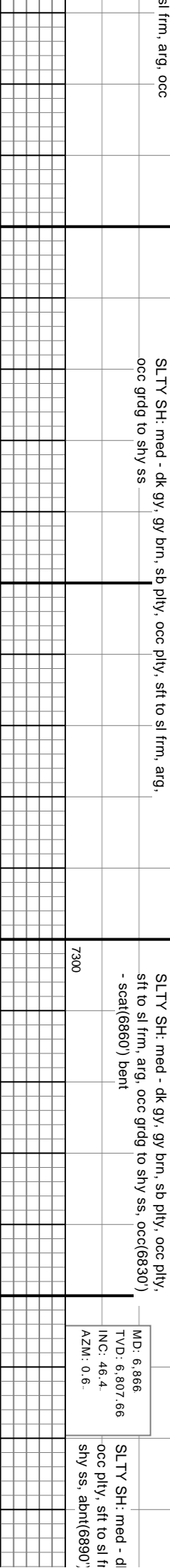
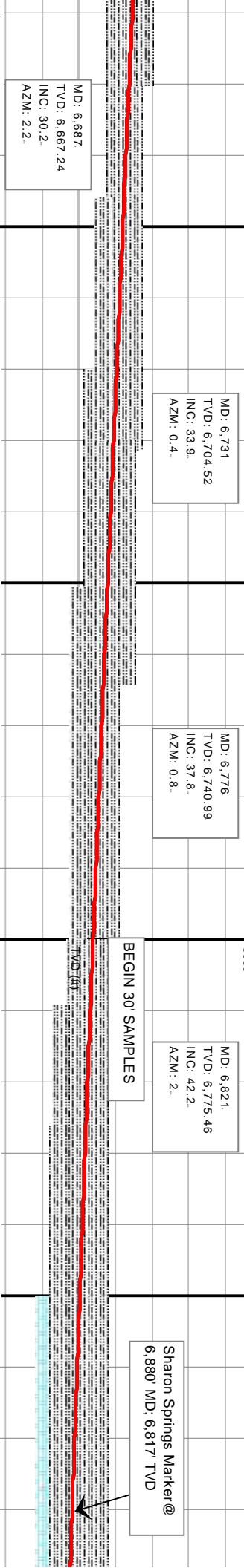
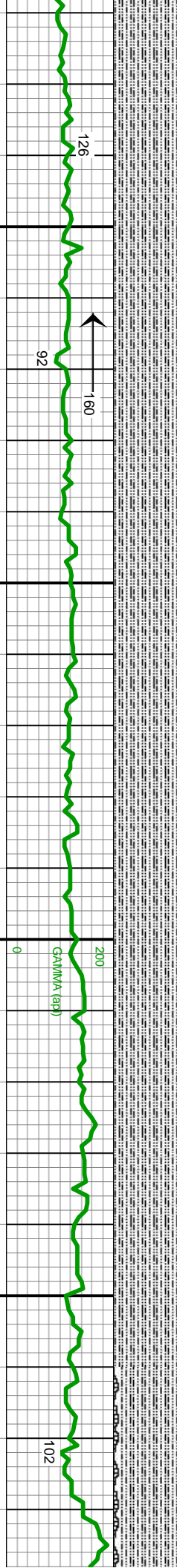
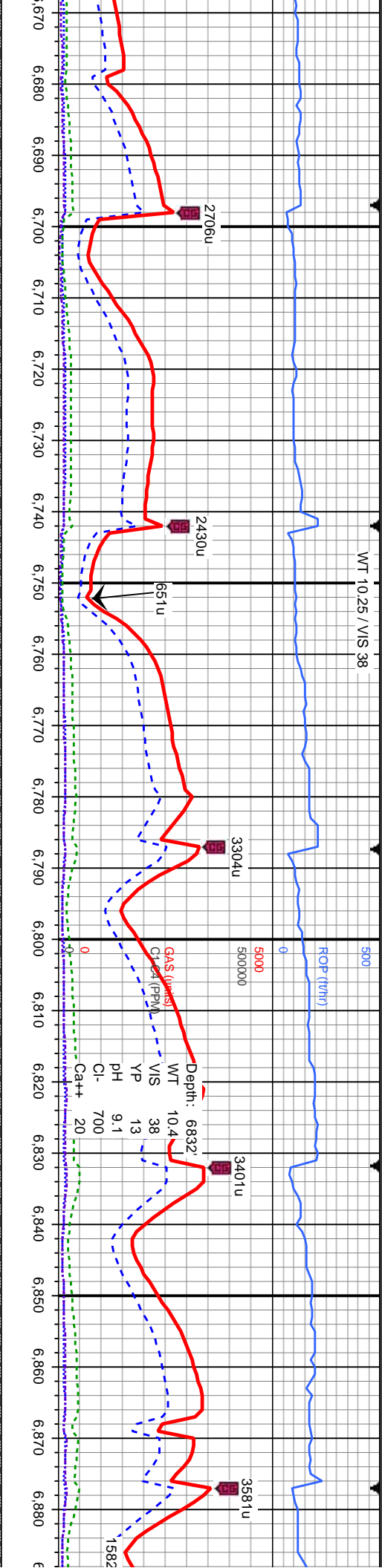
MD: 6,642
TVD: 6,627.73
INC: 27
AZM: 5.9

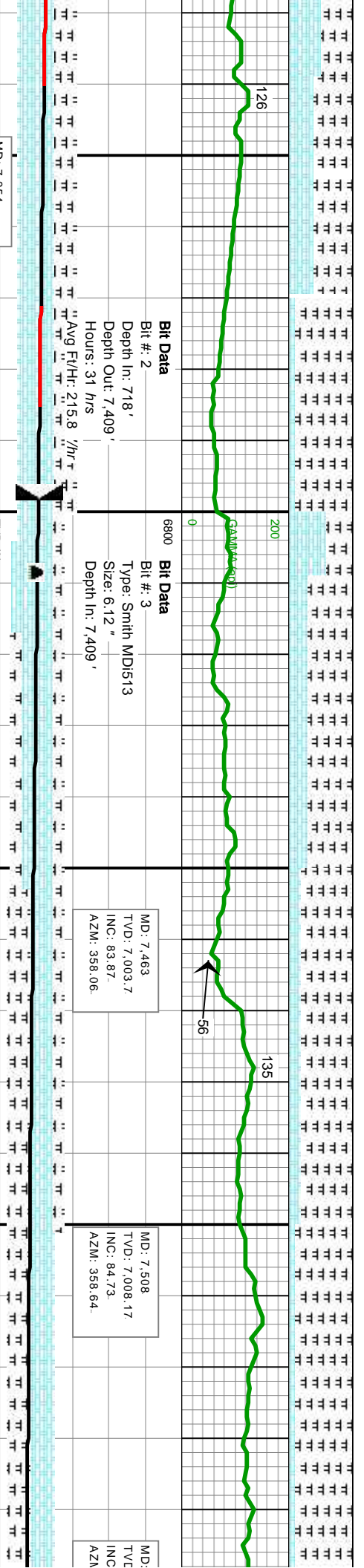
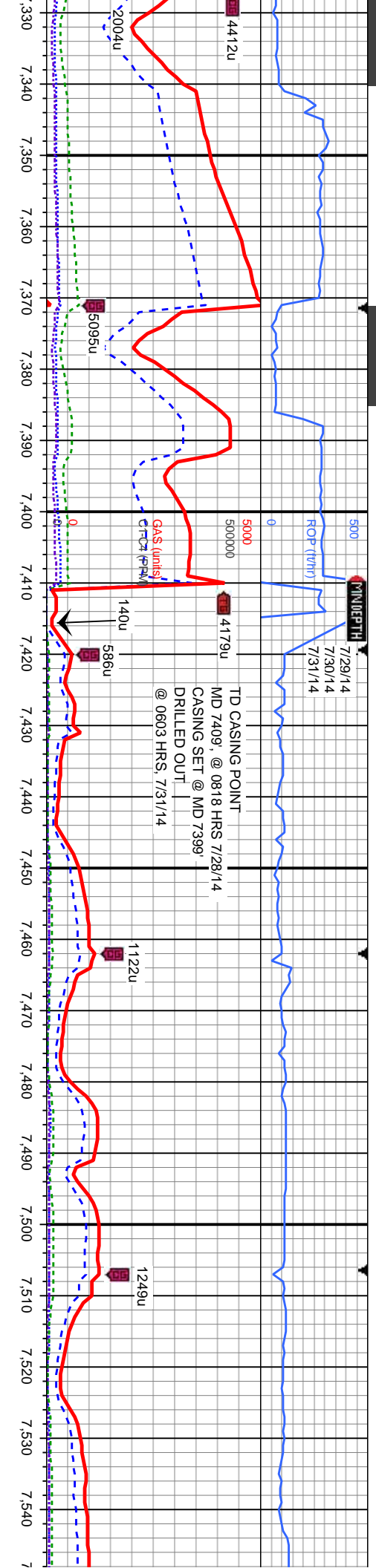
o ply, occ ply, sft to sl frm, arg.
ky, sbang gr, frm - hrd, mod srt,

SLTY SH: med - dk gy, gy brn, sb ply, occ ply, sft to sl frm,
arg, occ ss, grdg to SHY SS

SLTY SH: med - dk gy, gy brn, sb ply, occ ply, sft to
grdg to shy ss







MD: 7.354
TVD: 6.990.01
INC: 81.7
AZM: 357

Bit Data
Bit #: 2
Depth In: 718'
Depth Out: 7,409'
Hours: 31 hrs
Avg FV/Hr: 2:15.8

Bit Data
Bit #: 3
Type: Smith MD1513
Size: 6.12"
Depth In: 7,409'

MD: 7.463
TVD: 7.003.7
INC: 83.87
AZM: 358.06

MD: 7.508
TVD: 7.008.17
INC: 84.73
AZM: 358.64

MD:
TVC:
INC
AZM

BEGIN 50' SAMPLES

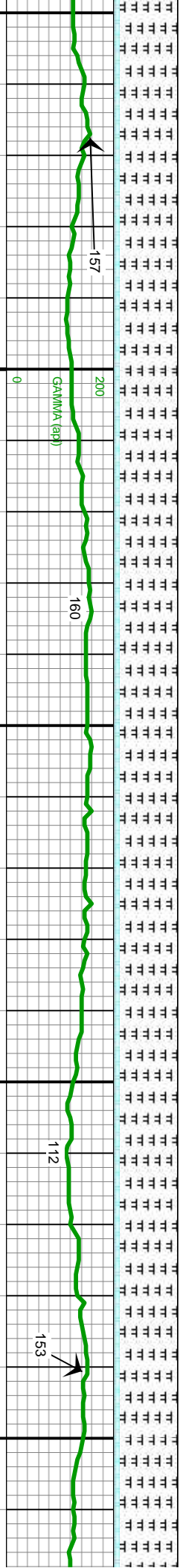
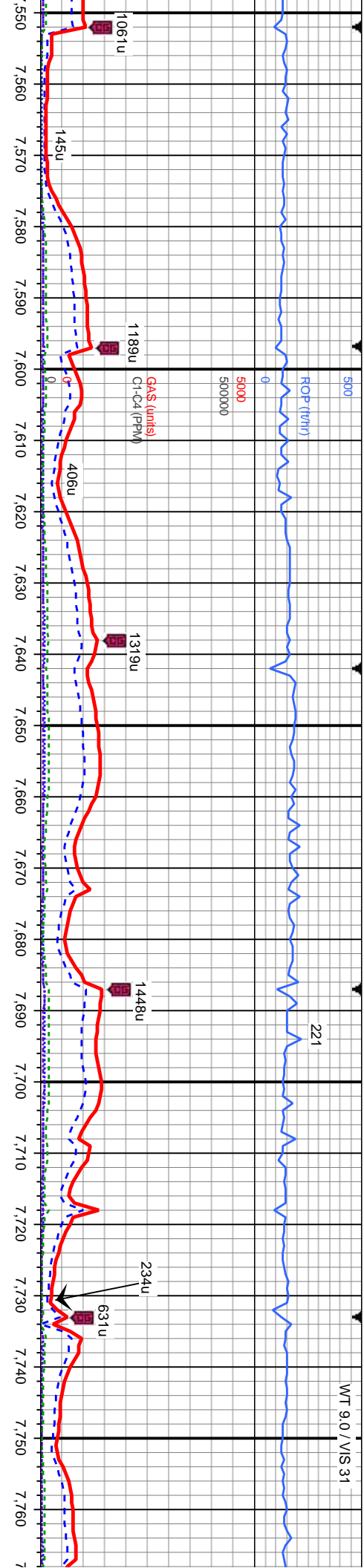
MRL: pred m - dk gy, sme blk, sft to mod frm, sb bly to sb ply, rthy lstr, arg lp, org/calc mix, v calc, occ fos frag, tr bent
CHK: It to med gy, v sft to sft, sbply to sbply, stri tex, rthy lstr, sl arg, v calc

MRL: pred m to dkgy, sme blk, sft to mod frm, sbply to sbply, sb wxy lstr, org/calc mix, v calc, occ fos frag, tr bent
CHK: It to med gy, sft to frm, sbply to sbply, stri tex, rthy lstr, sl arg, v calc

MRL: pred m - dk gy, sme blk, sft to mod frm, sb bly to sb ply, sb wxy lstr, org/calc mix, v calc, occ fos frag, tr bent
CHK: It to med gy, sft to frm, sbply to sbply, stri tex, rthy lstr, sl arg, v calc

MRL: pred m - dk gy, sme blk, sft to mod frm, sb bly to sb ply, sb wxy lstr, org/calc mix, v calc, occ fos frag, tr bent
CHK: It to med gy, sft to frm, sbply to sbply, stri tex, rthy lstr, sl arg, v calc





7.552
MD: 7.597
TVD: 7.014.3
INC: 87.42
AZM: 358.29

MD: 7.688
TVD: 7.015.26
INC: 91.38
AZM: 359.26

TVDS
SCALE
CHANGE

TVD (ft)

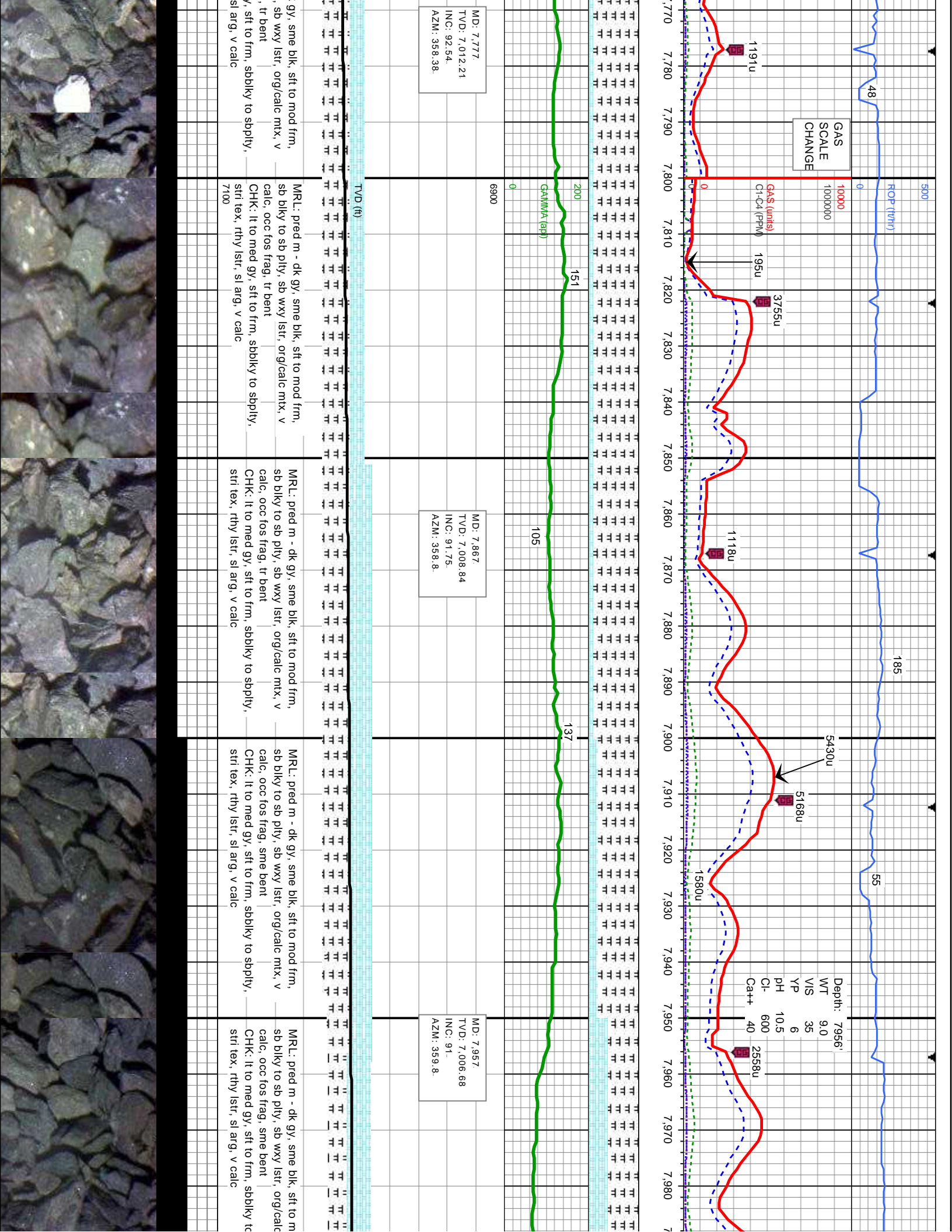
MRL: pred m - dk gy, sme blk, sft to mod frm,
sb blkly to sb plty, sb wxy lstr, org/calc mtx, v
calc, occ fos frag, tr bent
CHK: It to med gy, sft to frm, sbblkly to sbply,
stri tex, rthy lstr, sl arg, v calc

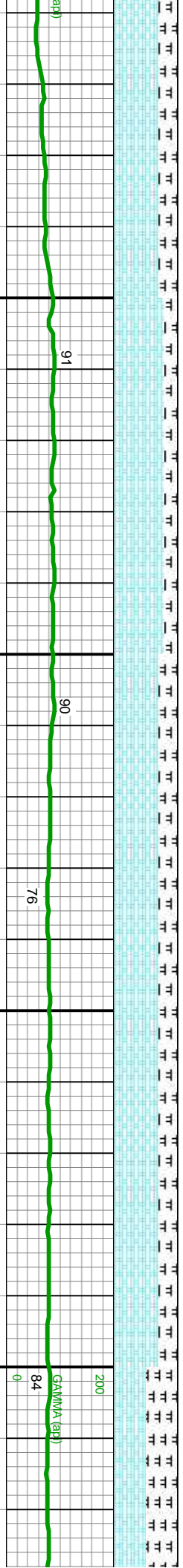
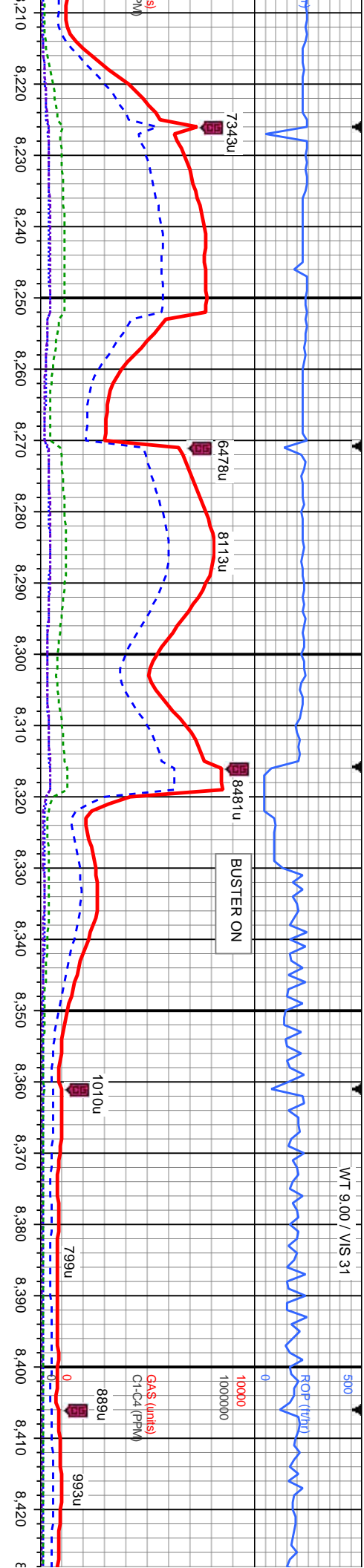
MRL: pred m - dk gy, sme blk, sft to mod frm,
sb blkly to sb plty, sb wxy lstr, org/calc mtx, v
calc, occ fos frag, tr bent
CHK: It to med gy, sft to frm, sbblkly to sbply,
stri tex, rthy lstr, sl arg, v calc

MRL: pred m - dk gy, sme blk, sft to mod frm,
sb blkly to sb plty, sb wxy lstr, org/calc mtx, v
calc, occ fos frag, tr bent
CHK: It to med gy, sft to frm, sbblkly to sbply,
stri tex, rthy lstr, sl arg, v calc

MRL: pred m - dk
sb blkly to sb plty
calc, occ fos frag
CHK: It to med g
stri tex, rthy lstr,





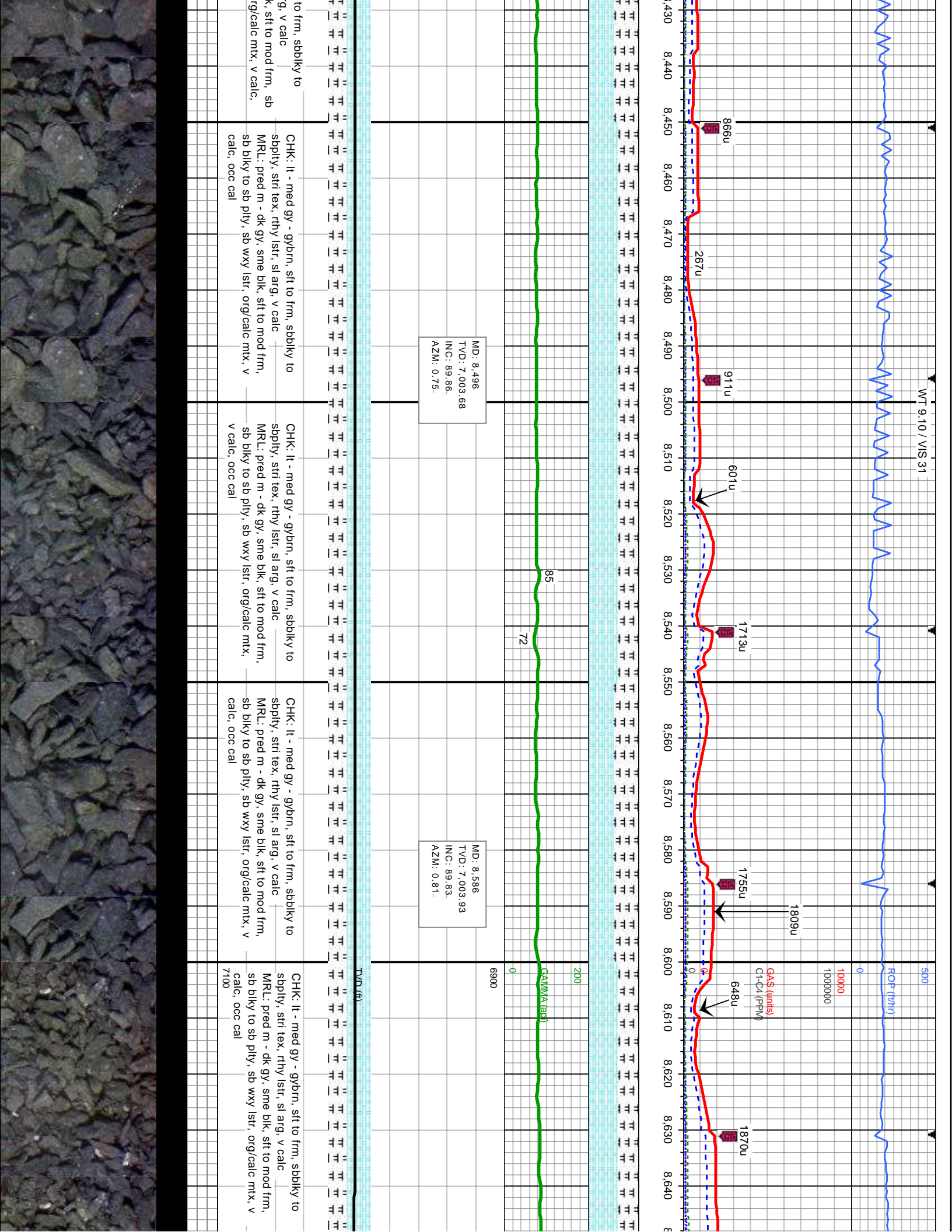


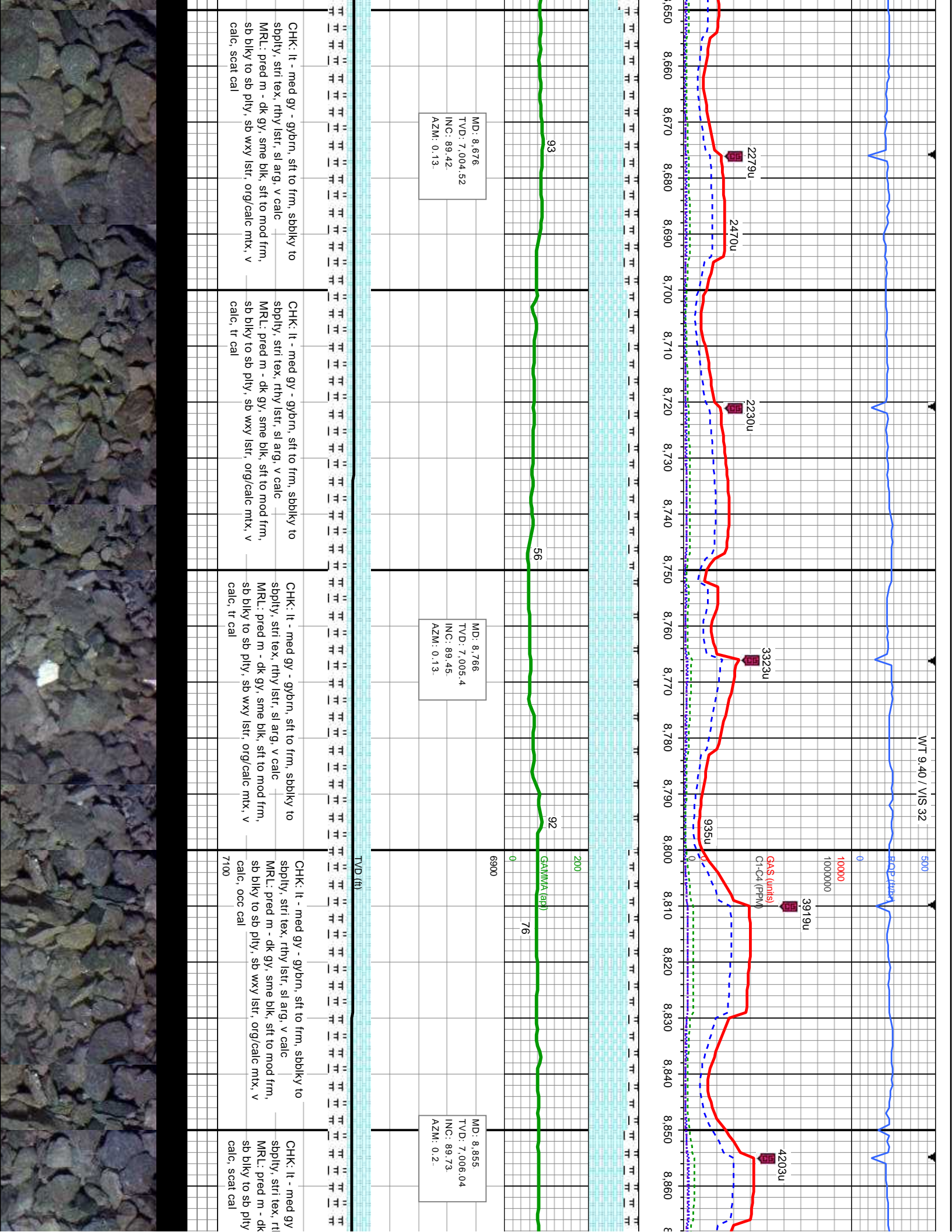
MD: 8.227
TVD: 7,004.18
INC: 90.55.
AZM: 2.37.

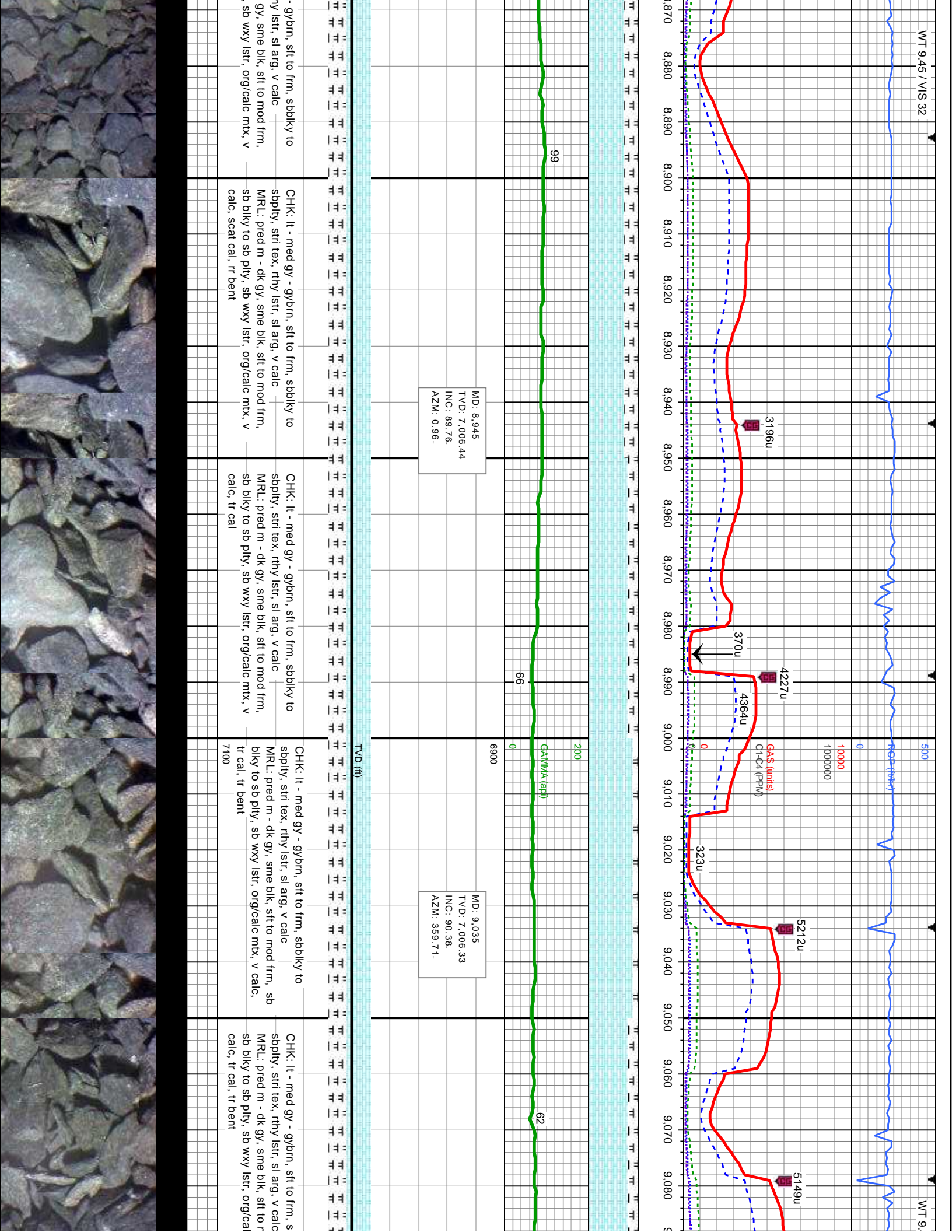
MD: 8.317.
TVD: 7,003.58
INC: 90.21.
AZM: 1.58.

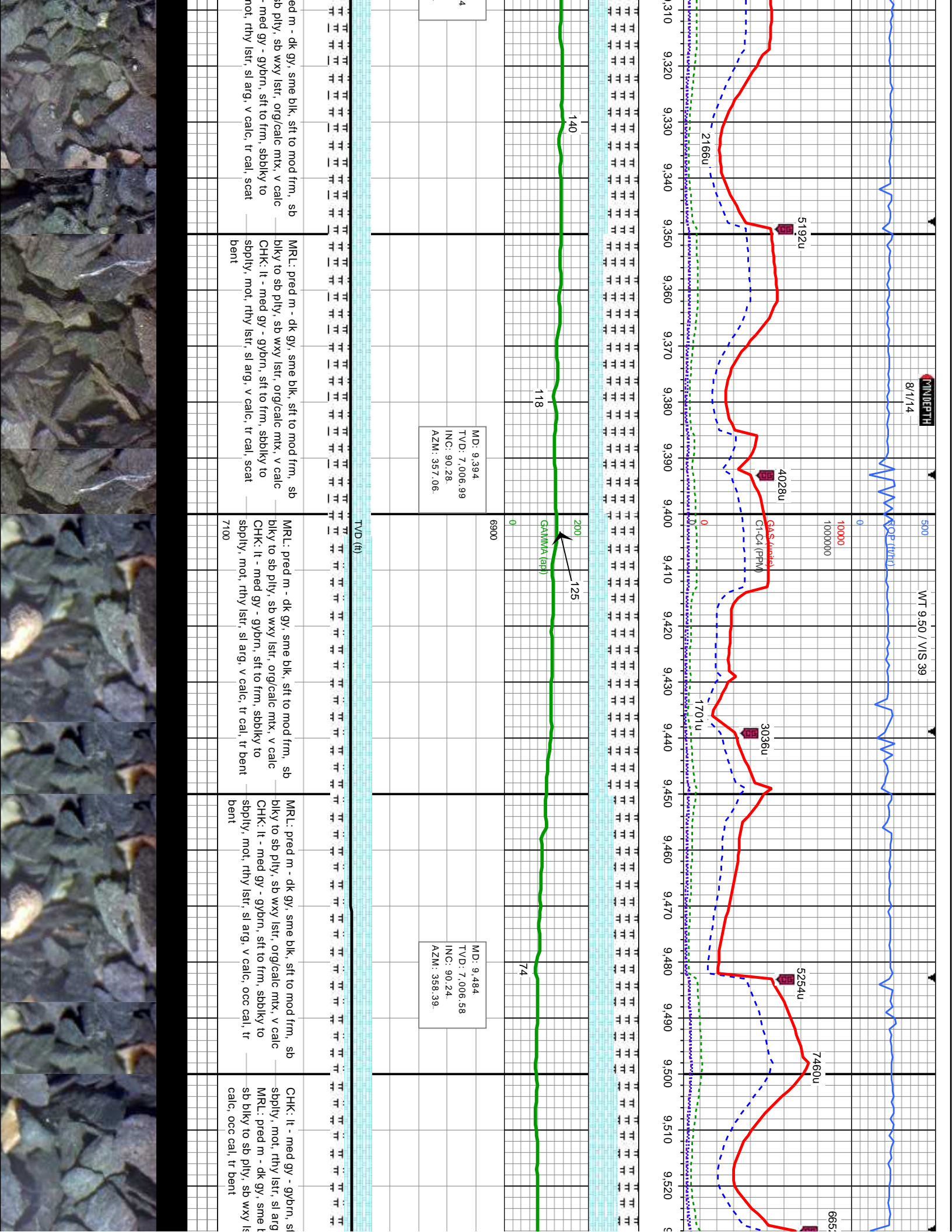
MD: 8.406
TVD: 7,003.5
INC: 89.9.
AZM: 1.63.

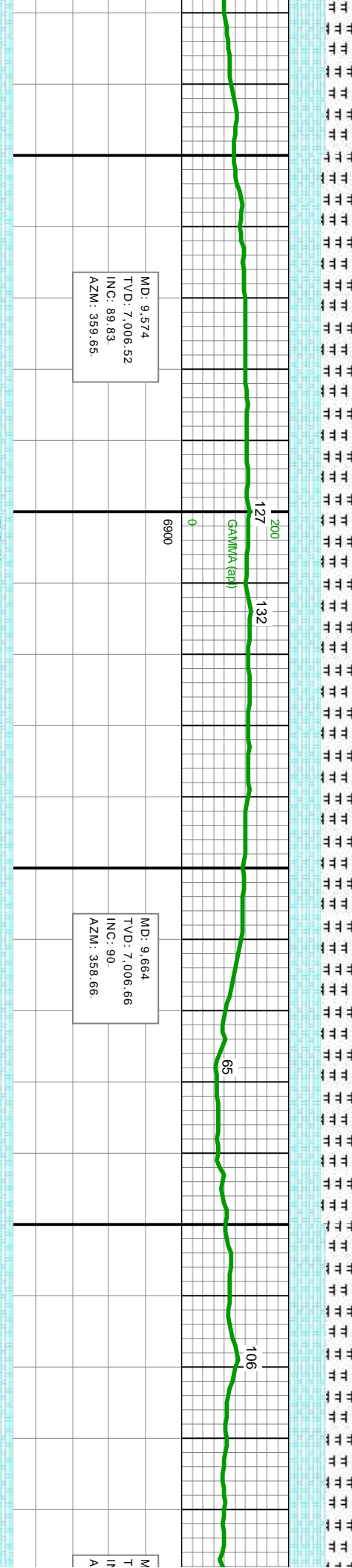
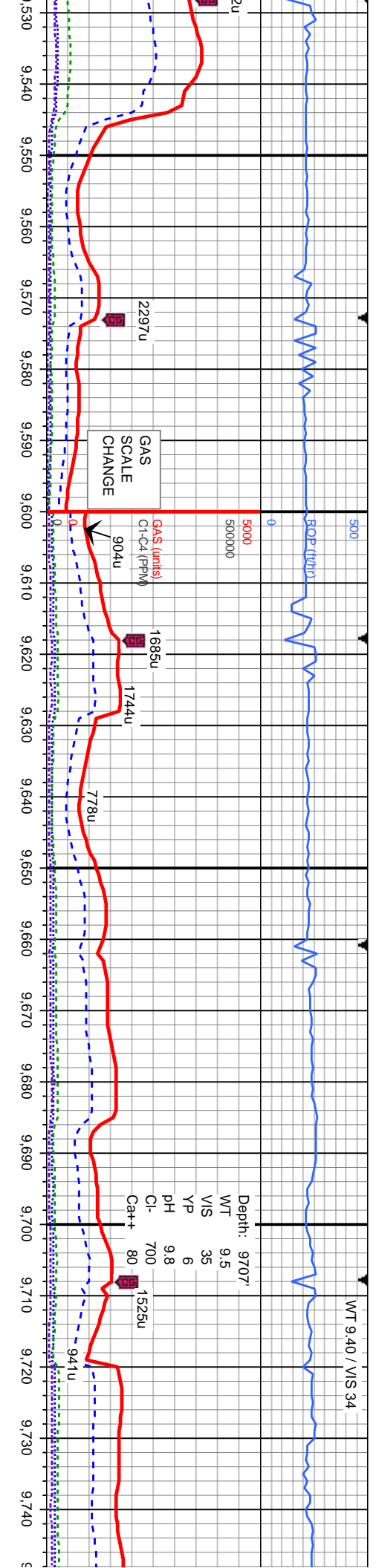
to med gy, sft to frm, sbblky to sbply, stri	CHK: It to med gy, sft to frm, sbblky to sbply, stri tex, rthy lstr, sl arg, v calc	CHK: It to med gy, sft to frm, sbblky to sbply, stri tex, rthy lstr, sl arg, v calc	CHK: It to med gy, sft to frm, sbblky to sbply, stri tex, rthy lstr, sl arg, v calc	CHK: It - med gy - gybrn, sft sbply, stri tex, rthy lstr, sl arg
lstr, sl arg, v calc	MRL: pred m - dk gy, sme blk, sft to mod frm, sb bly to sb ply, sb wxy lstr, org/calc mtx, v calc, rr fos frag, no bent	MRL: pred m - dk gy, sme blk, sft to mod frm, sb bly to sb ply, sb wxy lstr, org/calc mtx, v calc, rr fos frag, tr bent	MRL: pred m - dk gy, sme blk, sft to mod frm, sb bly to sb ply, sb wxy lstr, org/calc mtx, v calc, rr fos frag, tr bent	MRL: pred m - dk gy, sme blk, sft to mod frm, sb bly to sb ply, sb wxy lstr, org cal
ag, no bent				7100





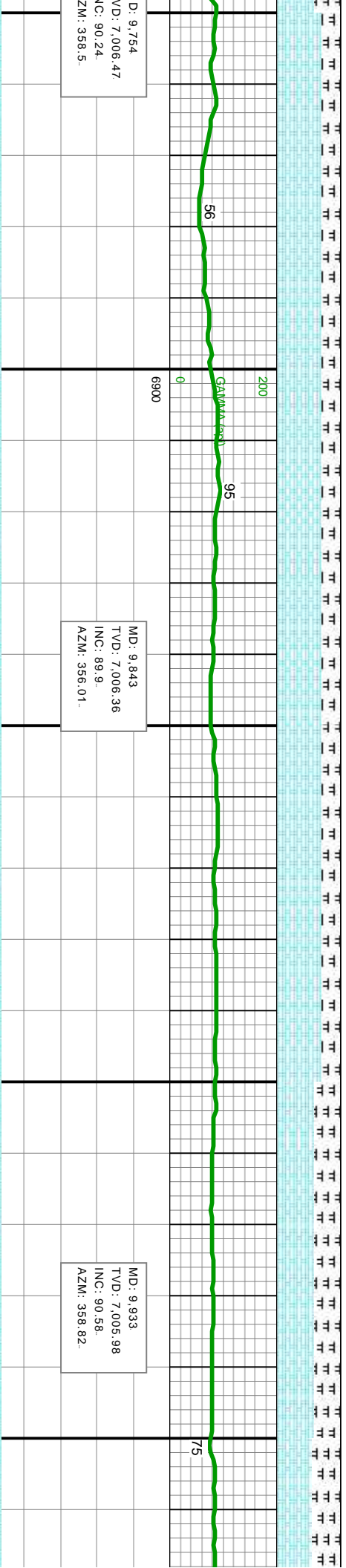
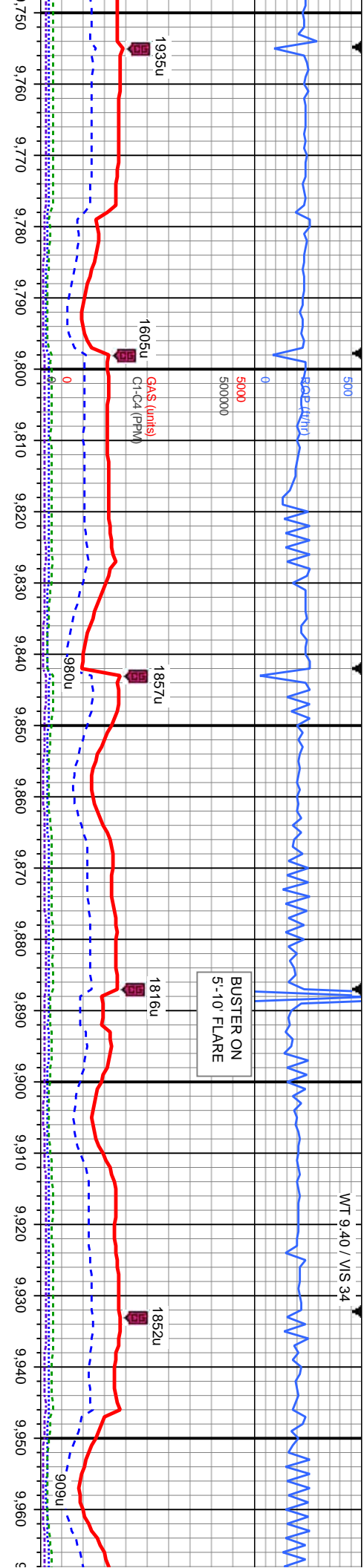






t to frm, sbbkly to v calc	CHK: It - med gy - gybrn, sft to frm, sbbkly to sbbply, mot, rthy lstr, sl arg, v calc	CHK: It - med gy - gybrn, sft to frm, sbbkly to sbbply, mot, rthy lstr, sl arg, v calc	CHK: It - med gy - gybrn, sft to frm, sbbkly to sbbply, mot, rthy lstr, sl arg, v calc
sbkly, sft to mod frm, org/calc mt, v	MRL: pred m - dk gy, sme blk, sft to mod frm, sb blkly to sb ply, sb wxy lstr, org/calc mt, v calc, scat cal, occ bent	MRL: pred m - dk gy, sme blk, sft to mod frm, sb blkly to sb ply, sb wxy lstr, org/calc mt, v calc, scat cal, occ bent	MRL: pred m - dk gy, sme blk, sft to mod frm, sb blkly to sb ply, sb wxy lstr, org/calc mt, v calc, scat cal, occ bent





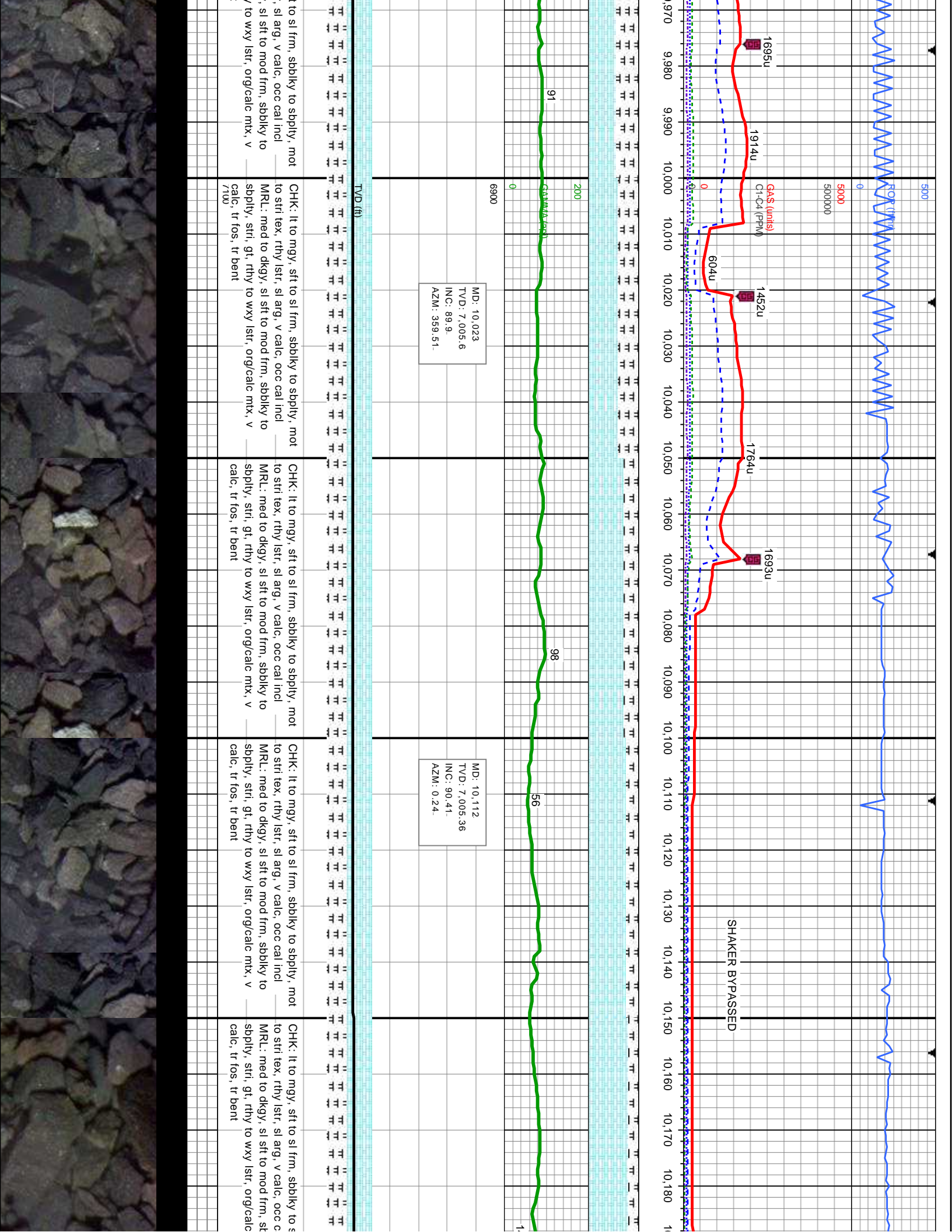
D: 9.754
VD: 7.006.47
IC: 90.24.
ZM: 358.5.

MD: 9.843
TVD: 7.006.36
INC: 89.9
AZM: 356.01.

MD: 9.933
TVD: 7.005.98
INC: 90.58.
AZM: 358.82.

TVD (ft)		9,754	9,764	9,774	9,784	9,794	9,804	9,814	9,824	9,834	9,844	9,854	9,864	9,874	9,884	9,894	9,904	9,914	9,924	9,934	9,944	9,954	9,964
CHK:	It - med gy - gybrn, sft to frm, sbbkly to sbbply, mot, rthy lstr, sl arg, v calc	9,754	9,764	9,774	9,784	9,794	9,804	9,814	9,824	9,834	9,844	9,854	9,864	9,874	9,884	9,894	9,904	9,914	9,924	9,934	9,944	9,954	9,964
MRL:	pred m - dk gy, sme blk, sft to mod frm, sb bply to sb ply, sb wxy lstr, org/calc mtx, v calc, scat cal, occ bent	9,754	9,764	9,774	9,784	9,794	9,804	9,814	9,824	9,834	9,844	9,854	9,864	9,874	9,884	9,894	9,904	9,914	9,924	9,934	9,944	9,954	9,964
CHK:	It to mgy, sft to sl frm, sbbkly to sbbply, mot to stri tex, rthy lstr, sl arg, v calc, occ cal incl	9,843	9,853	9,863	9,873	9,883	9,893	9,903	9,913	9,923	9,933	9,943	9,953	9,963	9,973	9,983	9,993	10,003	10,013	10,023	10,033	10,043	10,053
MRL:	pred dkgy, sl sft to mod frm, sbbkly to sbbply, stri, gt, rthy to wxy lstr, org/calc mtx, v calc, tr fos, occ bent	9,843	9,853	9,863	9,873	9,883	9,893	9,903	9,913	9,923	9,933	9,943	9,953	9,963	9,973	9,983	9,993	10,003	10,013	10,023	10,033	10,043	10,053
CHK:	It to mgy, sft to sl frm, sbbkly to sbbply, mot to stri tex, rthy lstr, sl arg, v calc, occ cal incl	9,933	9,943	9,953	9,963	9,973	9,983	9,993	10,003	10,013	10,023	10,033	10,043	10,053	10,063	10,073	10,083	10,093	10,103	10,113	10,123	10,133	10,143
MRL:	med to dkgy, sl sft to mod frm, sbbkly to sbbply, stri, gt, rthy to wxy lstr, org/calc mtx, v calc, tr fos, occ bent	9,933	9,943	9,953	9,963	9,973	9,983	9,993	10,003	10,013	10,023	10,033	10,043	10,053	10,063	10,073	10,083	10,093	10,103	10,113	10,123	10,133	10,143





to sl frm, sbblky to sbply, mot
sl arg, v calc, occ cal incl
sl sft to mod frm, sbblky to
/ to wxy lstr, org/calc mtk, v

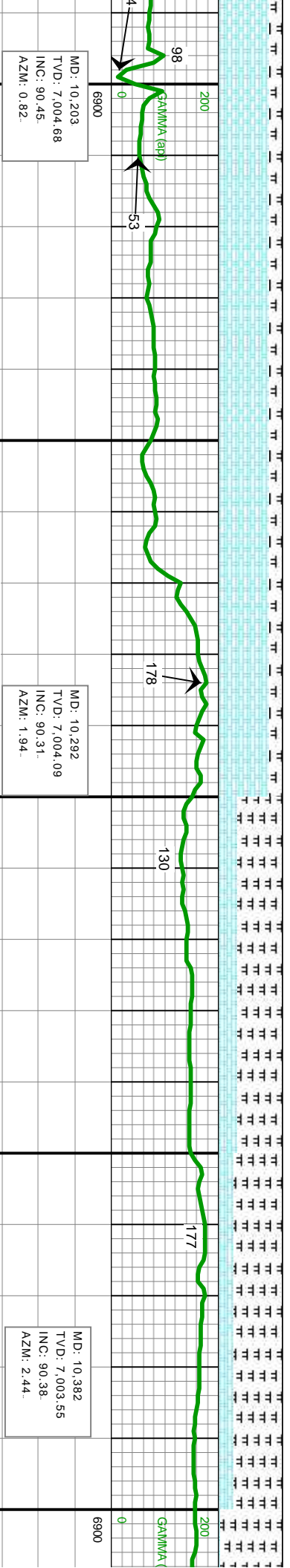
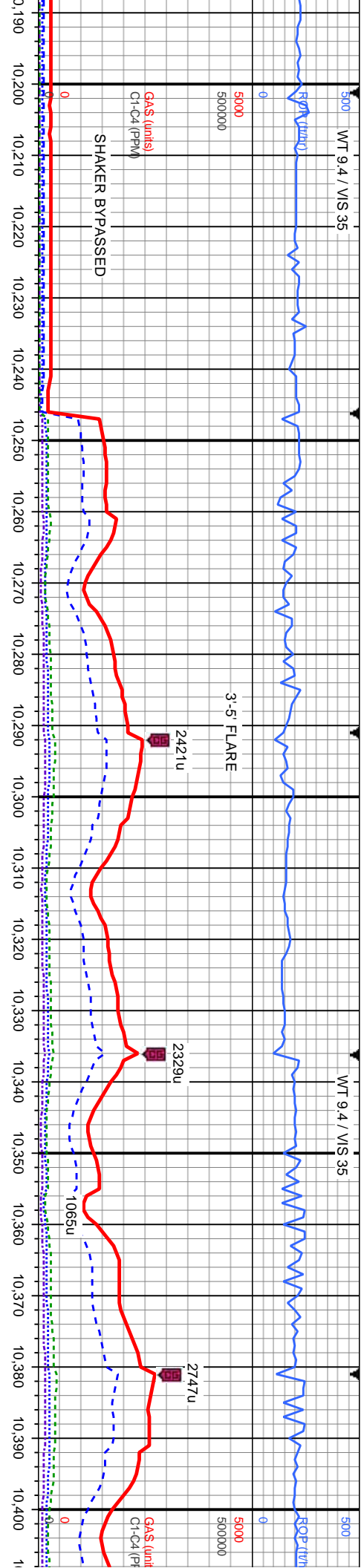
CHK: It to mgy, sft to sl frm, sbblky to sbply, mot
to stri tex, rthy lstr, sl arg, v calc, occ cal incl
MRL: med to dkgy, sl sft to mod frm, sbblky to
sbply, sfti, gt, rthy to wxy lstr, org/calc mtk, v
calc, tr fos, tr bent

CHK: It to mgy, sft to sl frm, sbblky to sbply, mot
to stri tex, rthy lstr, sl arg, v calc, occ cal incl
MRL: med to dkgy, sl sft to mod frm, sbblky to
sbply, sfti, gt, rthy to wxy lstr, org/calc mtk, v
calc, tr fos, tr bent

CHK: It to mgy, sft to sl frm, sbblky to sbply, mot
to stri tex, rthy lstr, sl arg, v calc, occ cal incl
MRL: med to dkgy, sl sft to mod frm, sbblky to
sbply, sfti, gt, rthy to wxy lstr, org/calc mtk, v
calc, tr fos, tr bent

MD: 10.023
TVD: 7.005.6
INC: 89.9
AZM: 359.51.

MD: 10.112
TVD: 7.005.36
INC: 90.41.
AZM: 0.24.



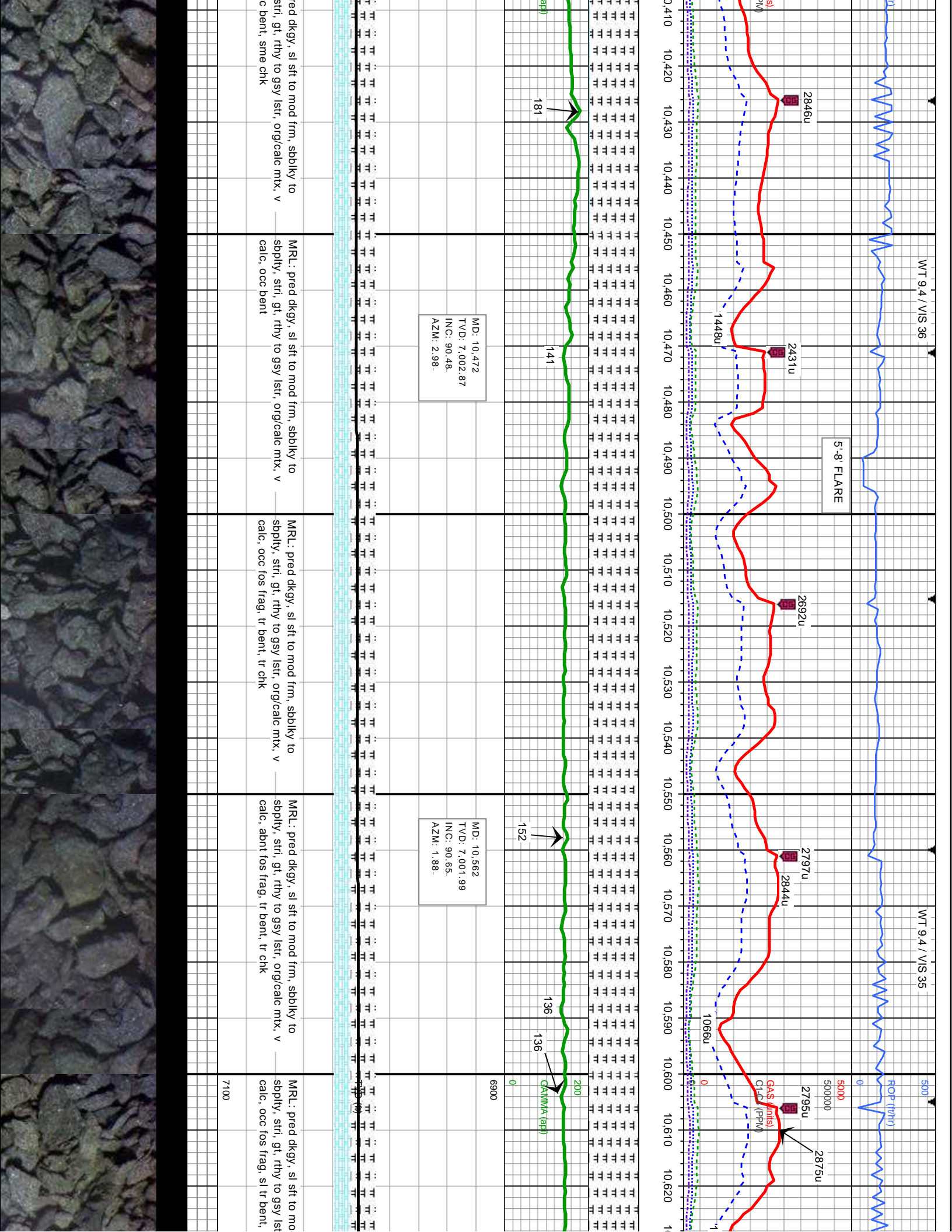
sbblky, mot al incl to mtx, v	CHK: It to mgy, gybrn, sft to sl frm, sbblky to sbply, mot to strf tex, rthy lstr, sl arg, v calc, occ cal incl MRL: med to dky, sl sft to mod frm, sbblky to sbply, strf, gt, rthy to wxy lstr, org/calc mtx, v calc, occ fos, occ bent
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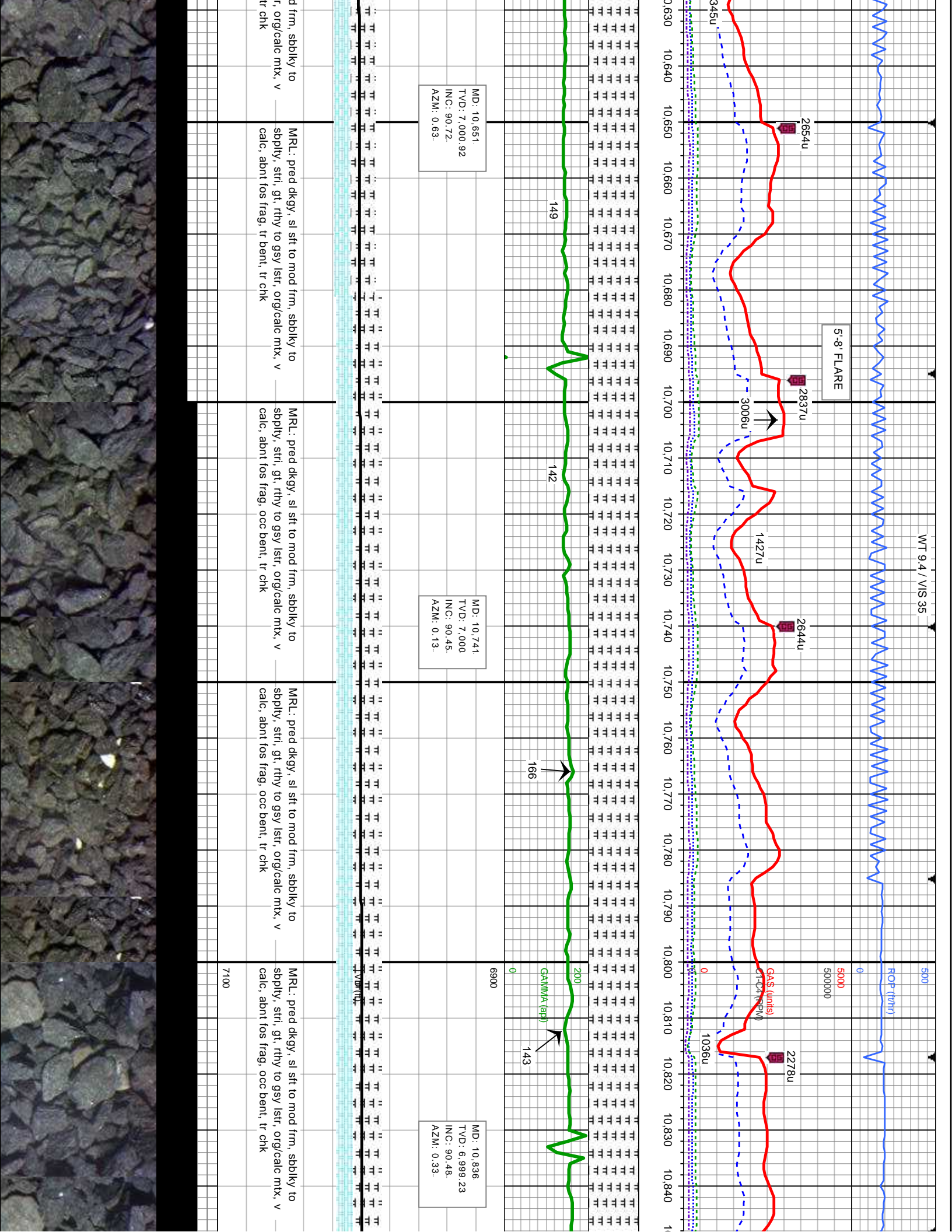
CHK: it to mgy, gybhn, sft to sl frm, sbblky to -
supply, mot to strt tex, rthy lstr, sl arg, v calc, r
cal incl
MR: med to dkg, sl sft to mod frm, sbblky to -
supply, str, gt, rthy to wxy lstr, org/calc mtx, v
calc, occ fos, occ bent

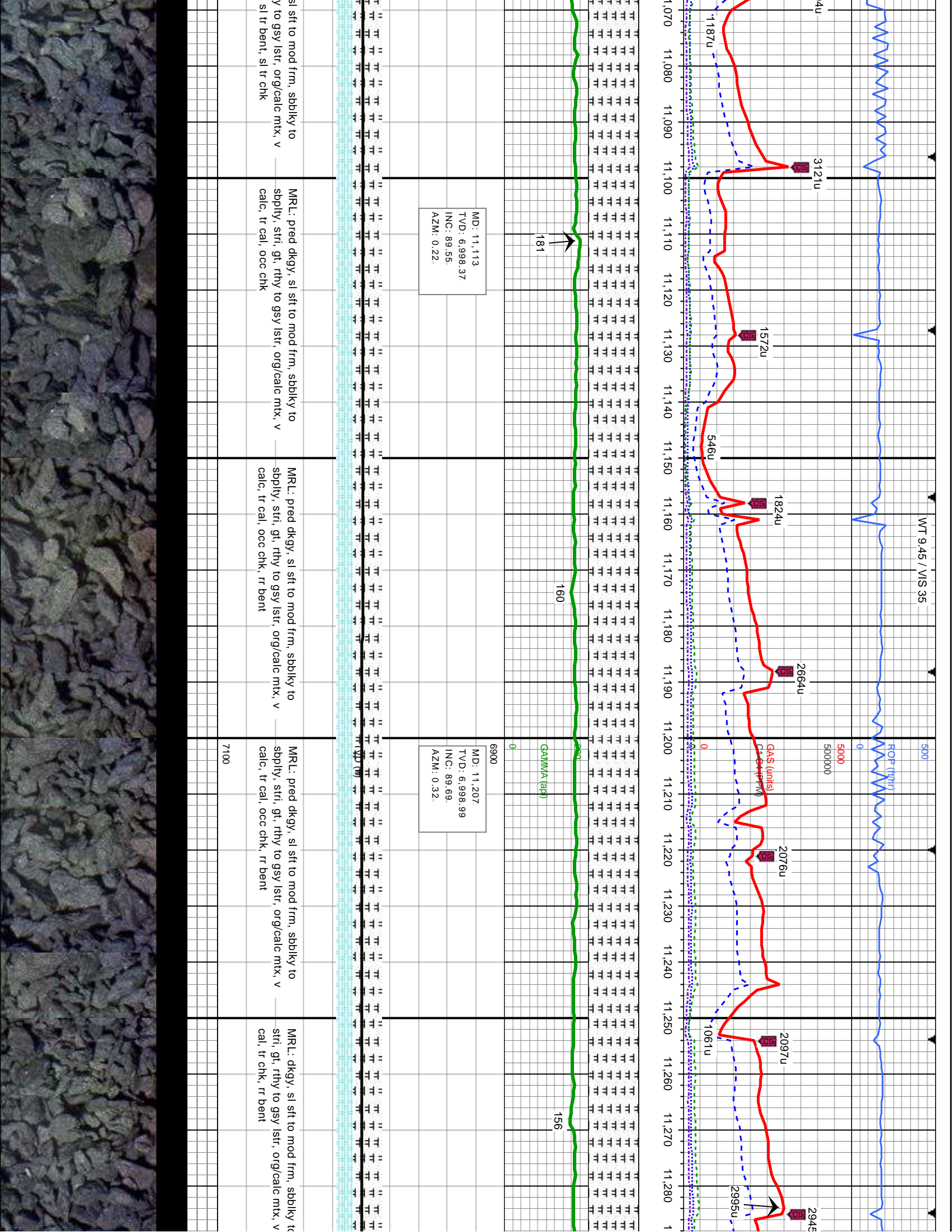
IMRL: med to dkyg, sl sft to mod frm, sbblky to
-sblpy, strl, gt, rthy to wxy lstr, org/calc mtx, v
calc, tr fos, tr bent
CHK: lt to mgy, gy/brn, sft to sl frm, sbblky to -
sblpy, mot to strl tx, rthy lstr, sl arg, v calc

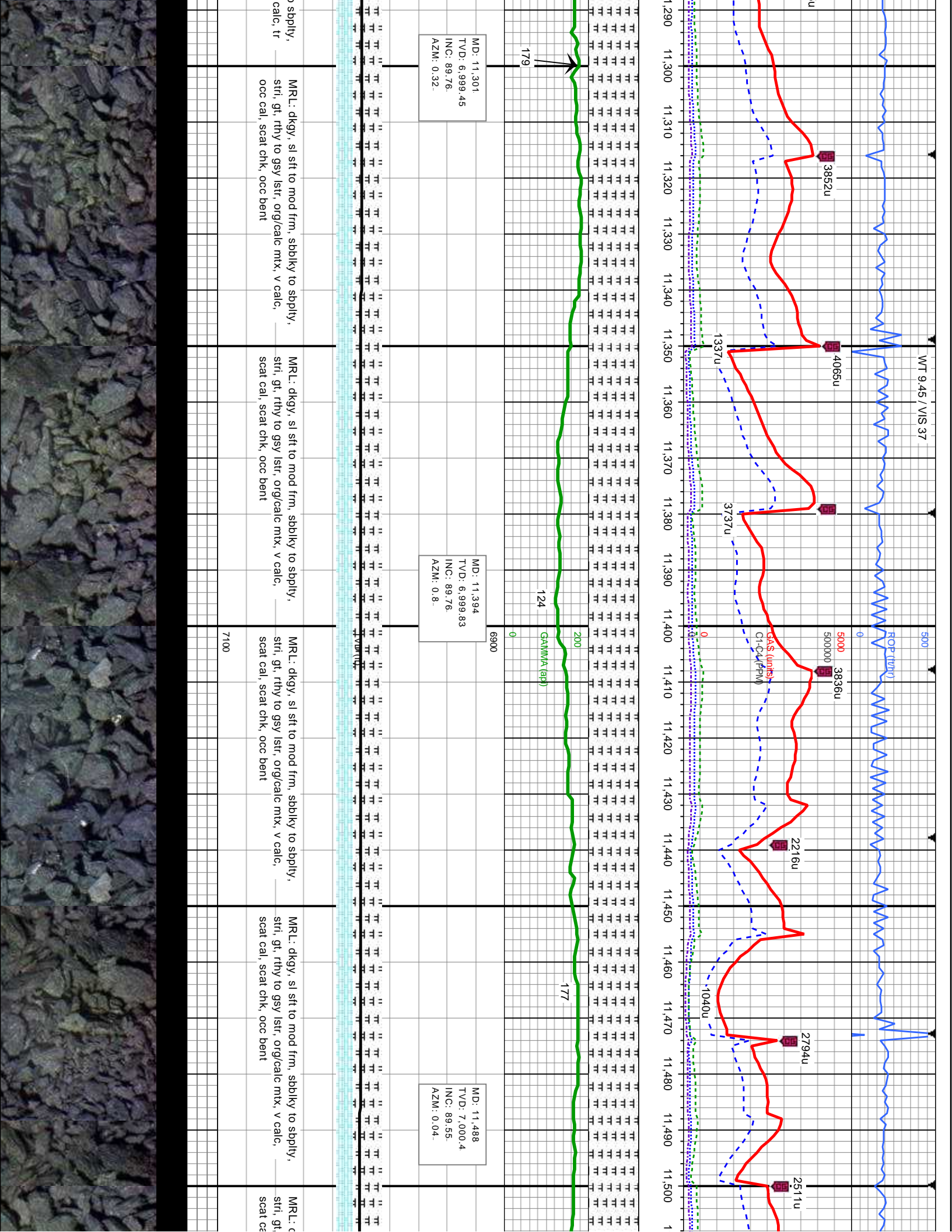
IMRL: med to dkgy, sl sft to mod frm, sbblky to
sbply, strig, gt, rthy to wxy lstr, org/calc mtz, v
calc, tr fos, tr bent
CHK: lt to mgy, gybm, sft to sl frm, sbblky to
sbply, mot to strig tex, rthy lstr, sl arg, v calc

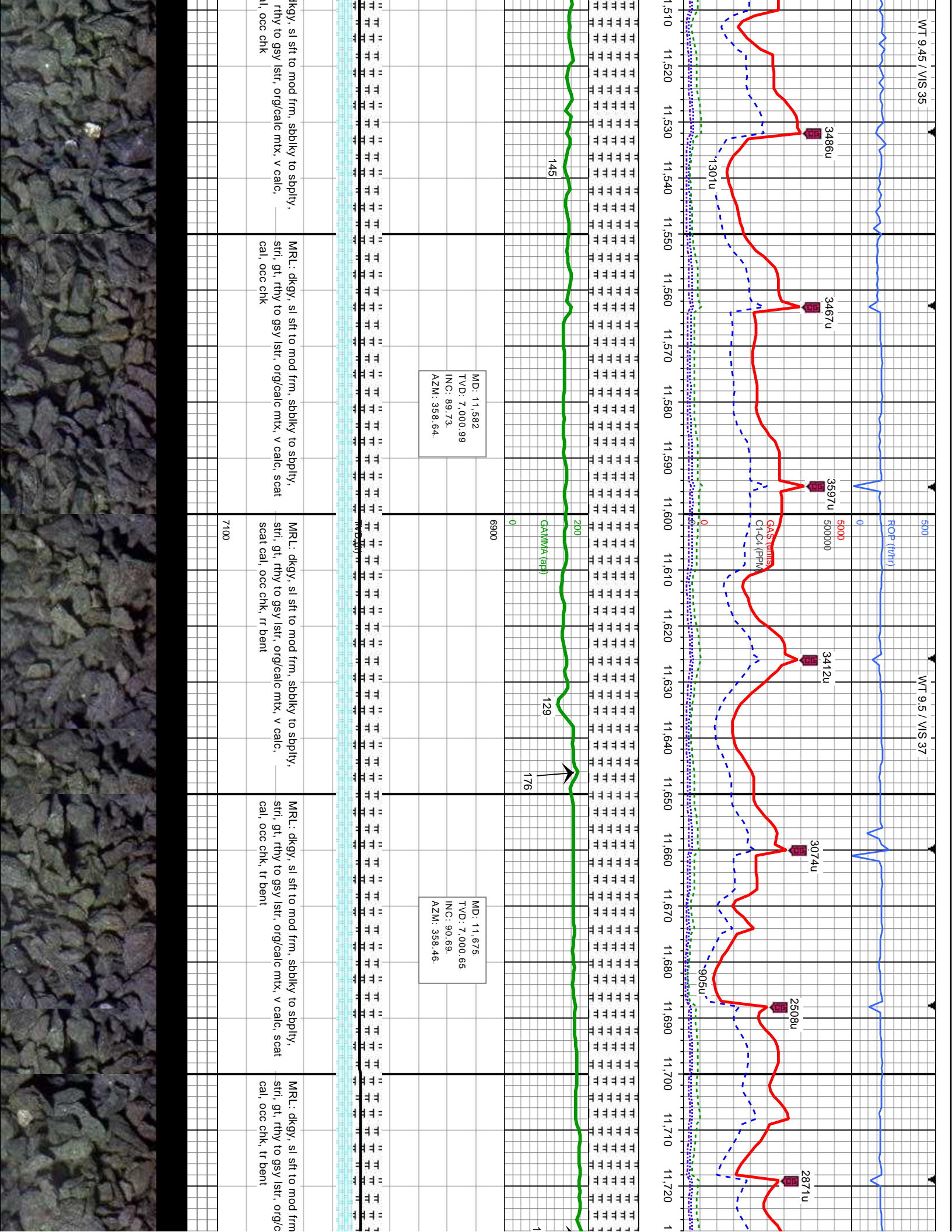
MRL: pi	
sbplty, :	
calc, oc	
7100	

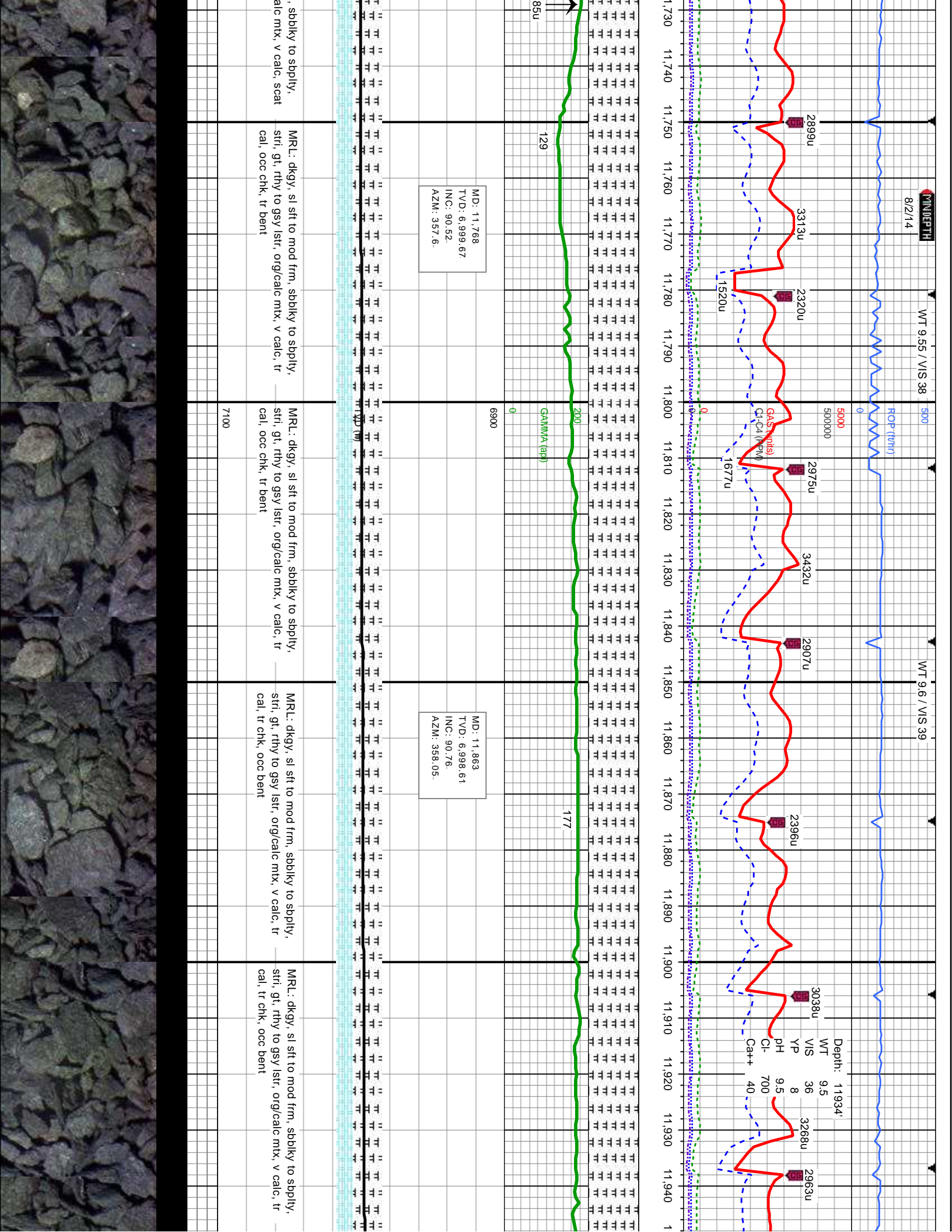


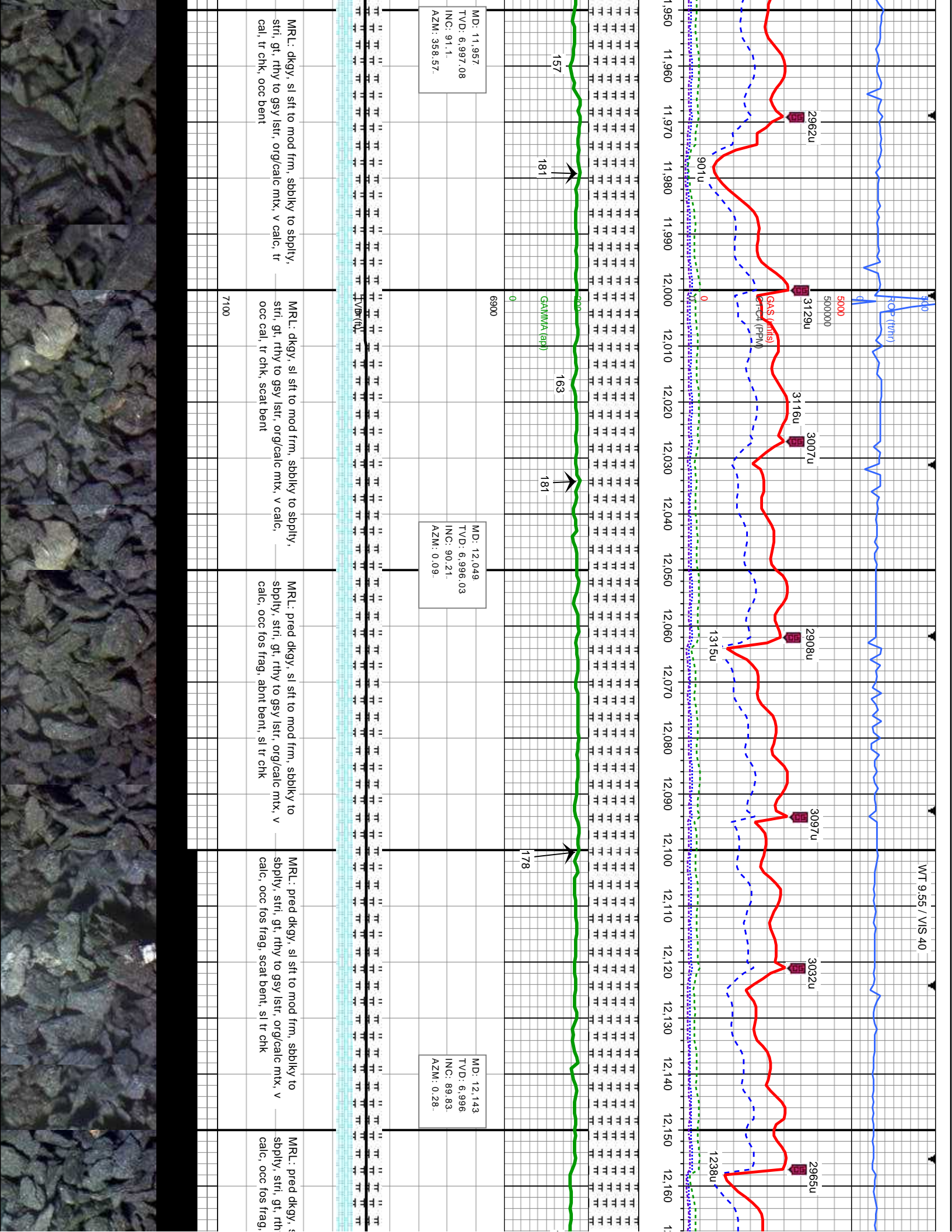


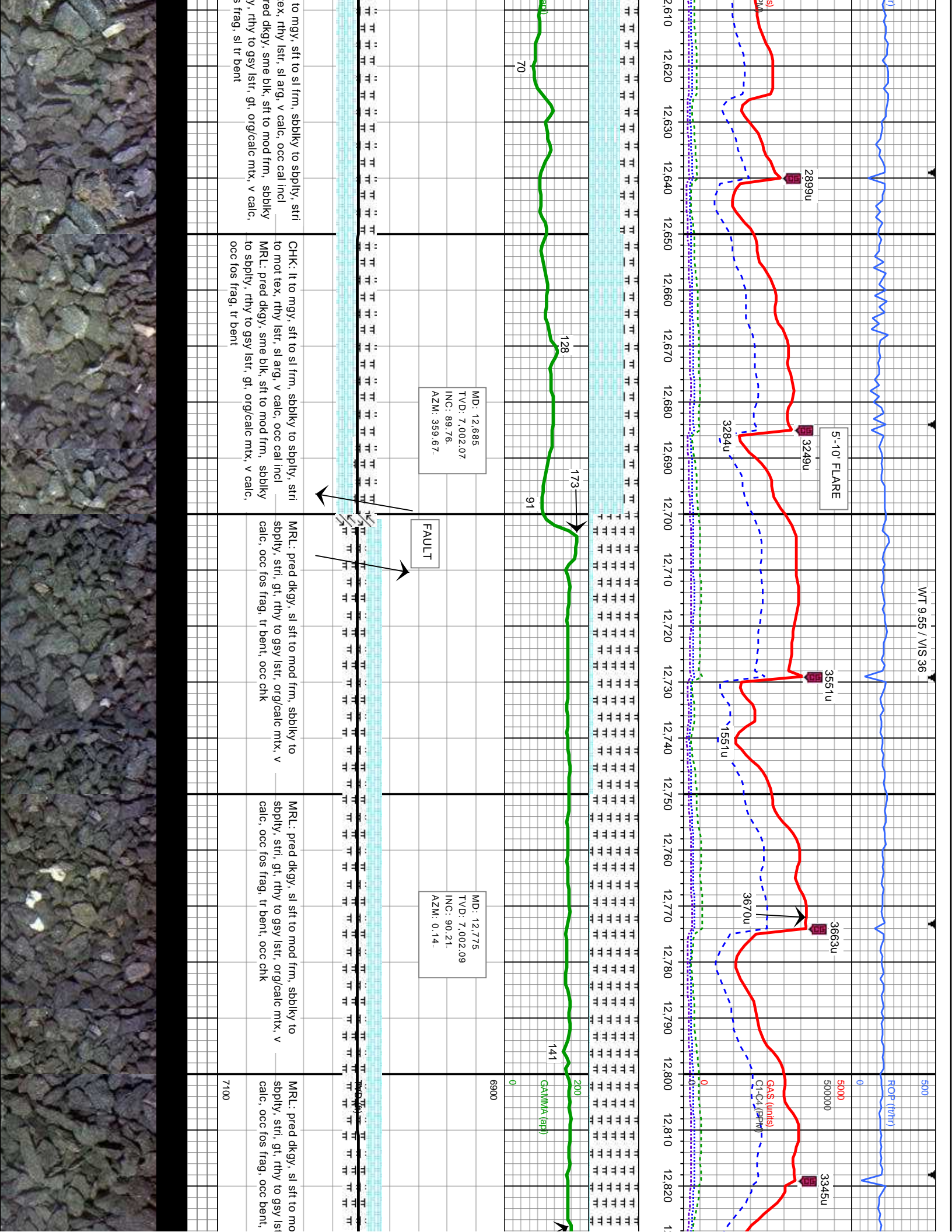


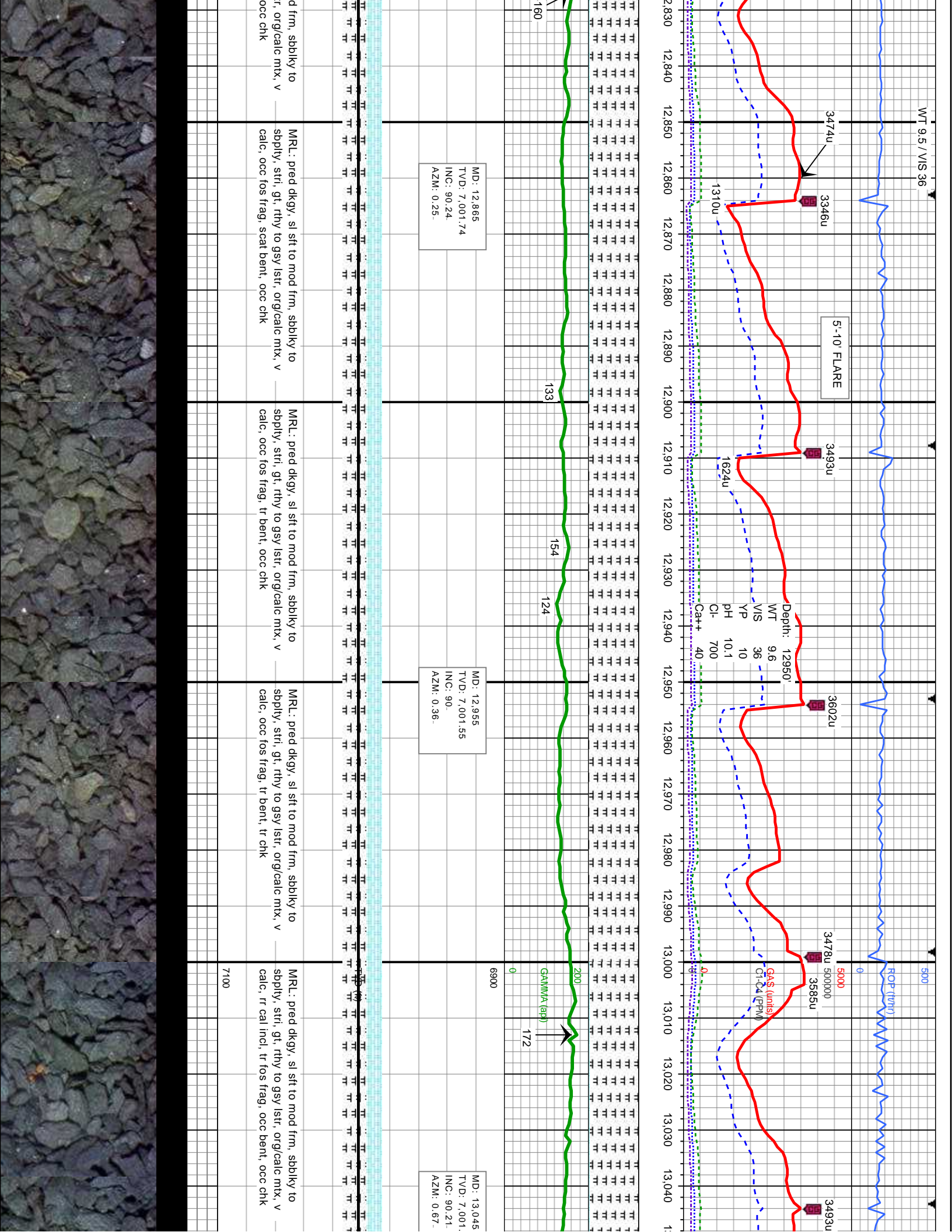


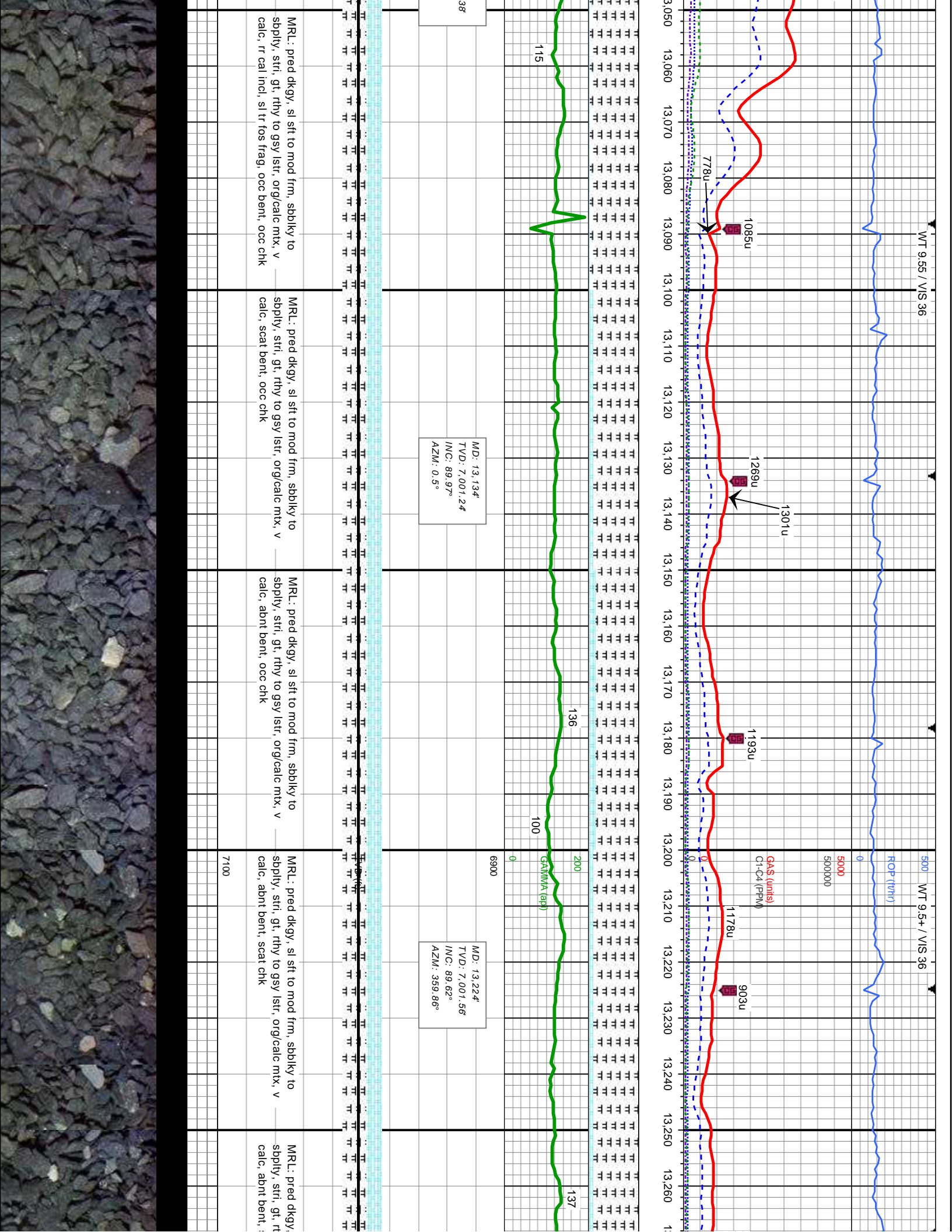


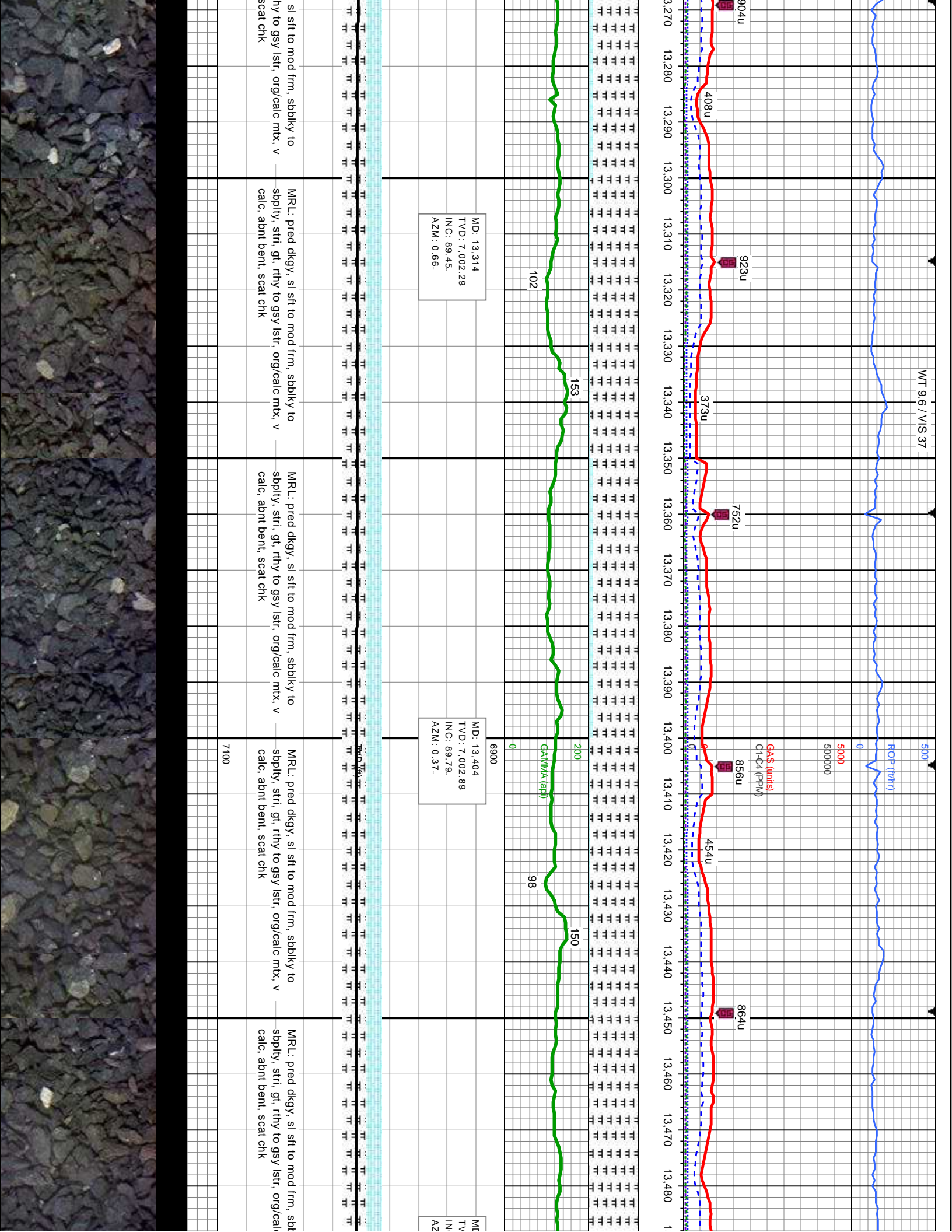


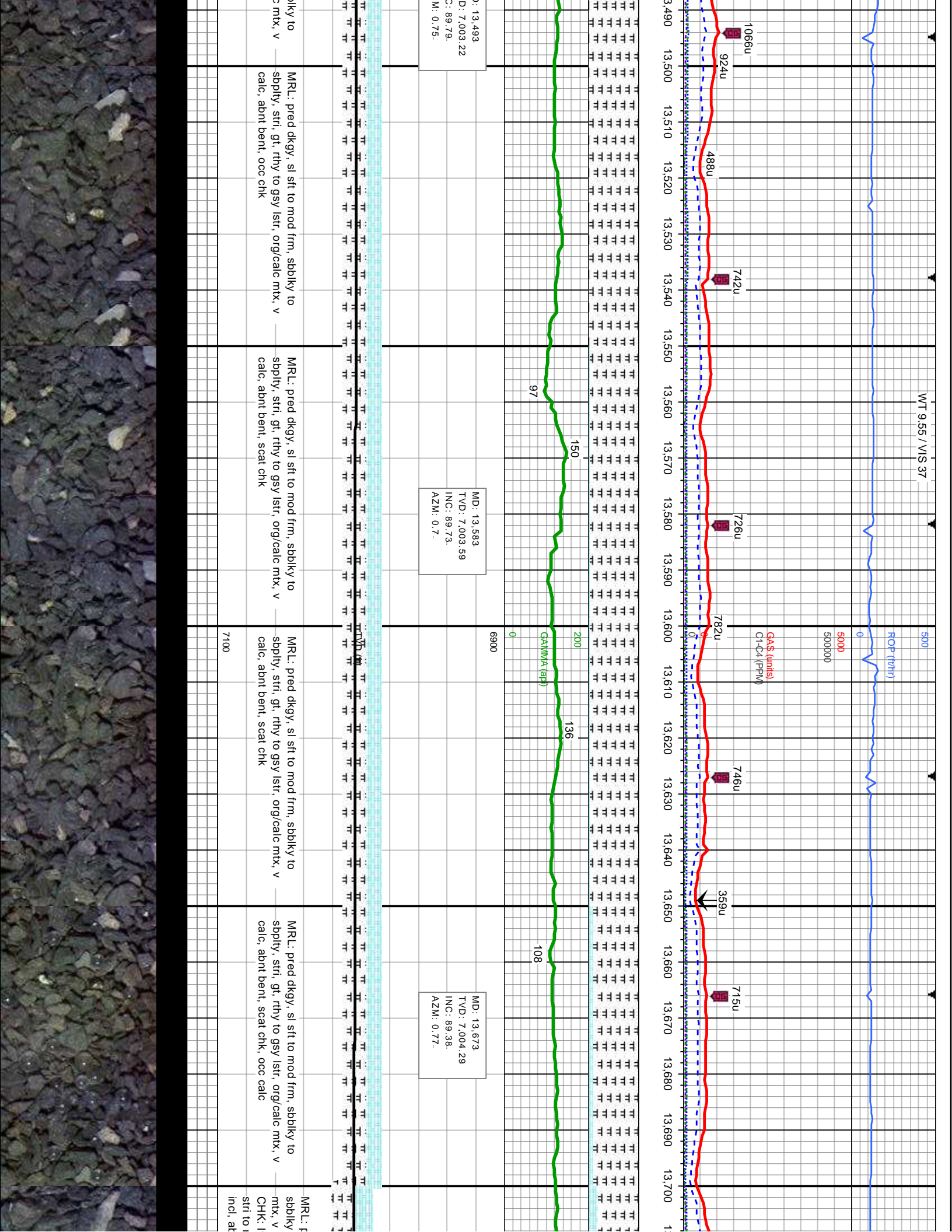


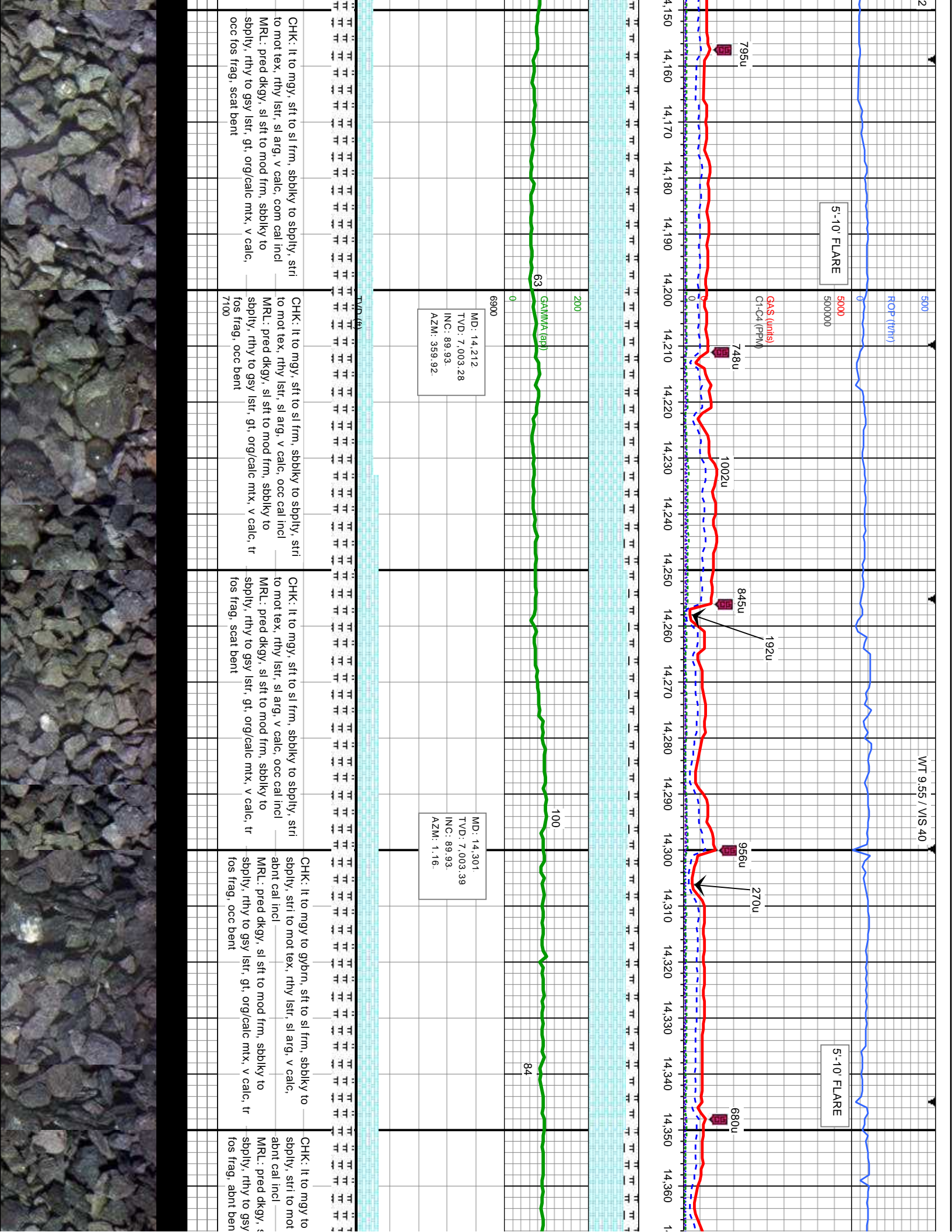


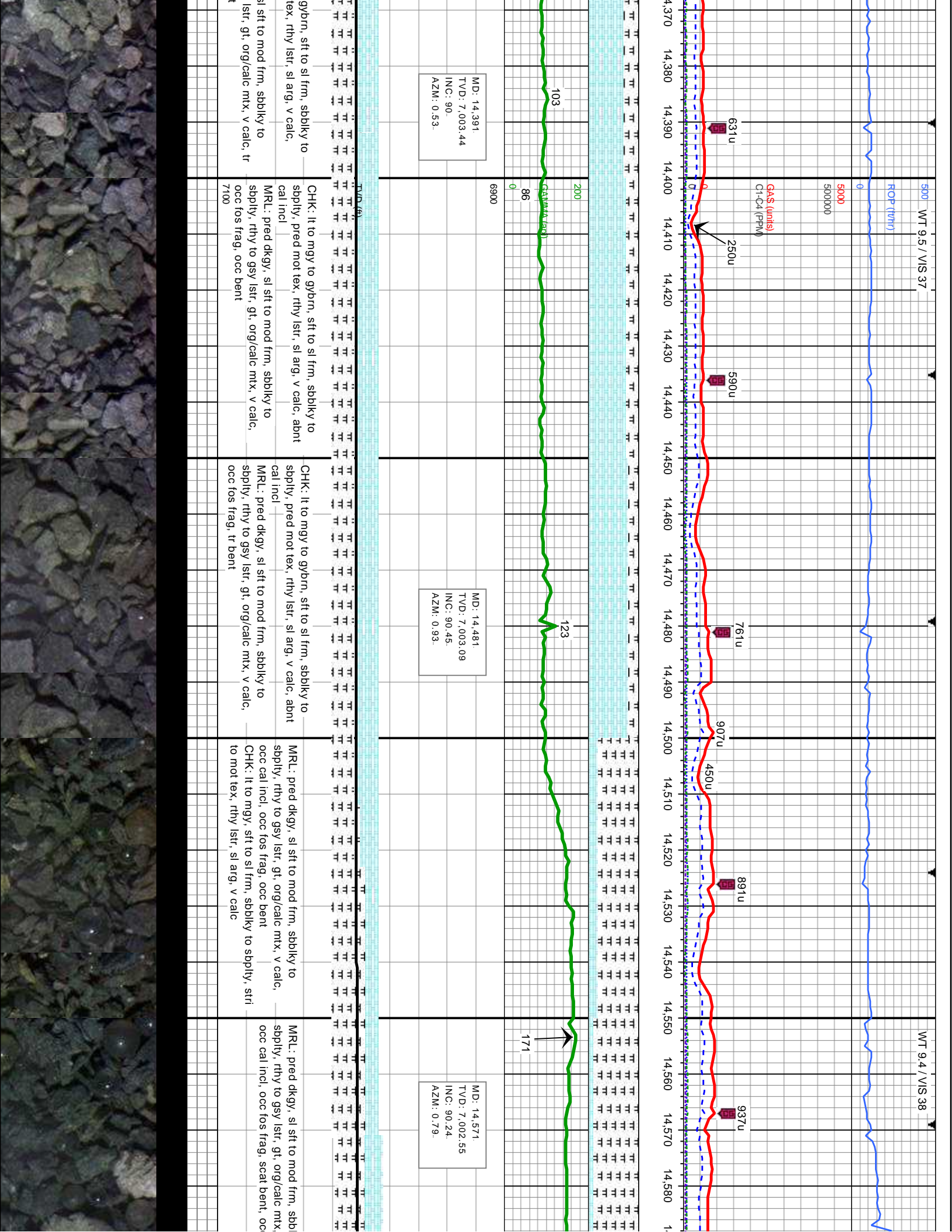


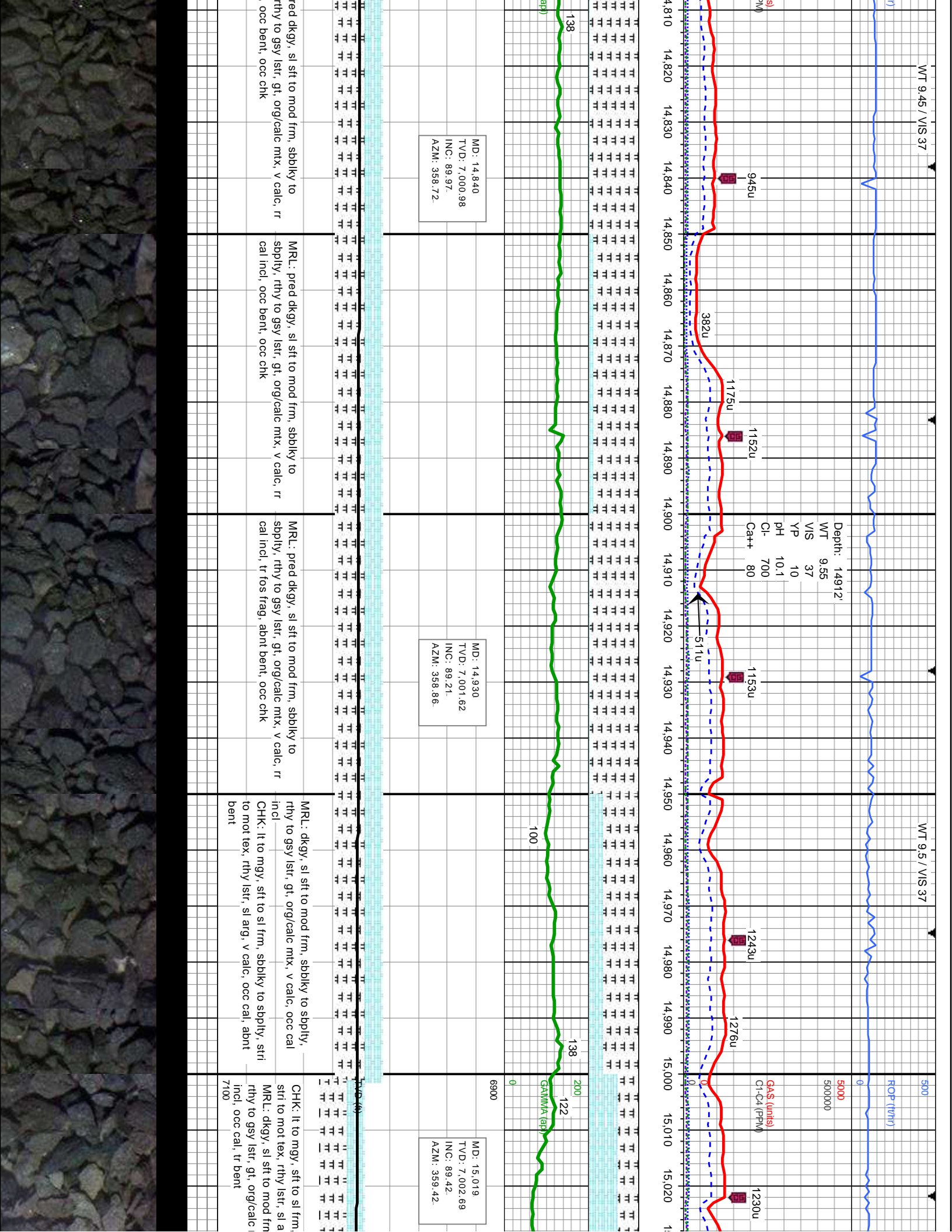


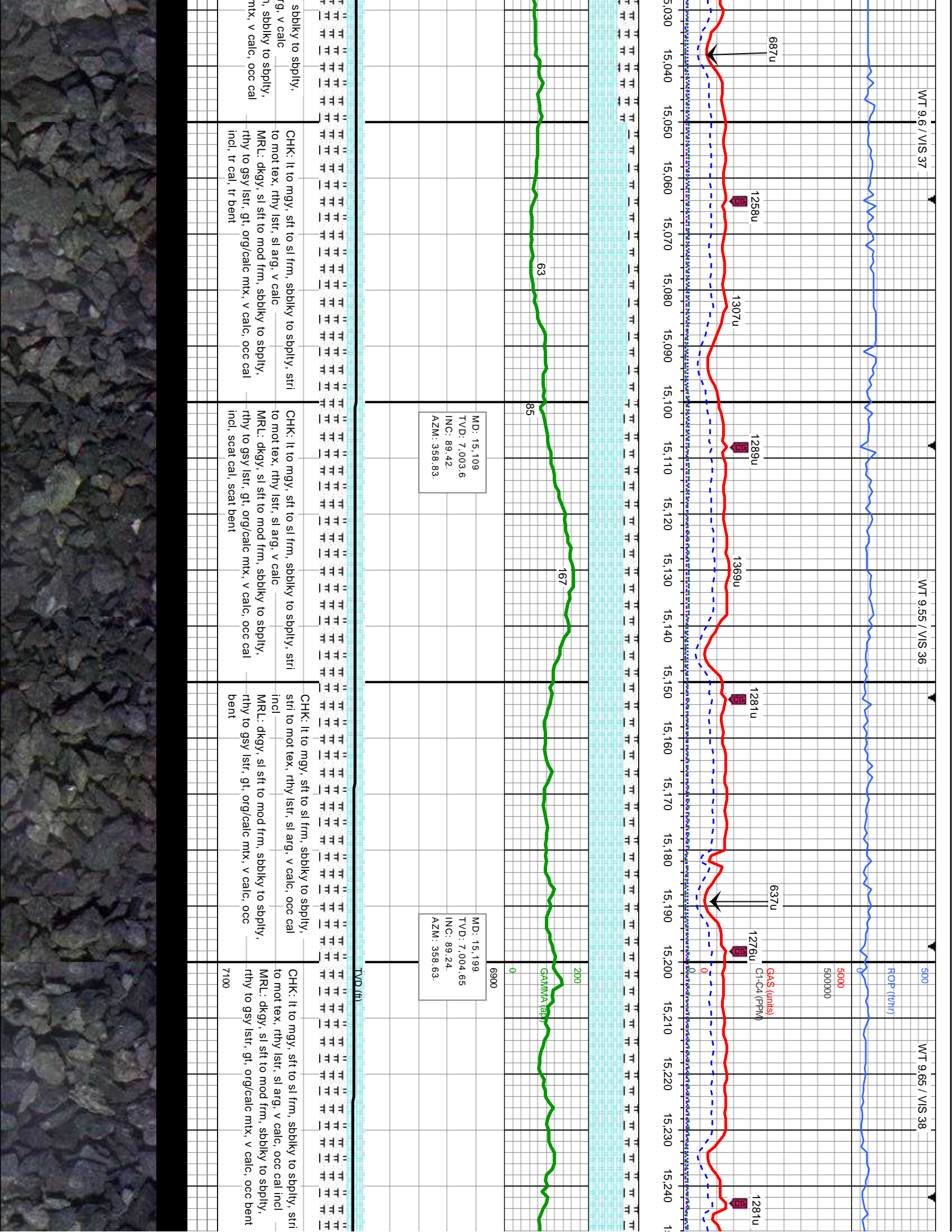


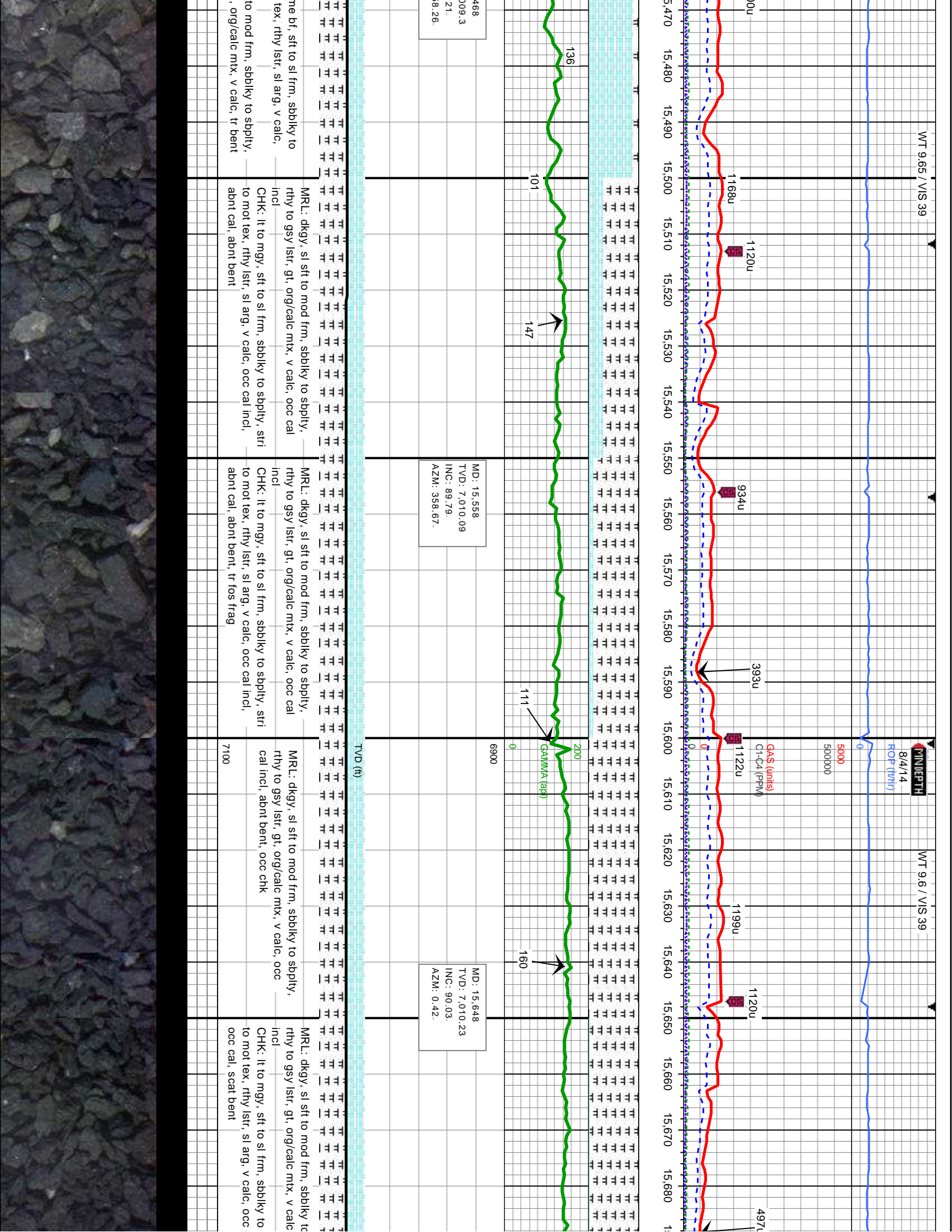


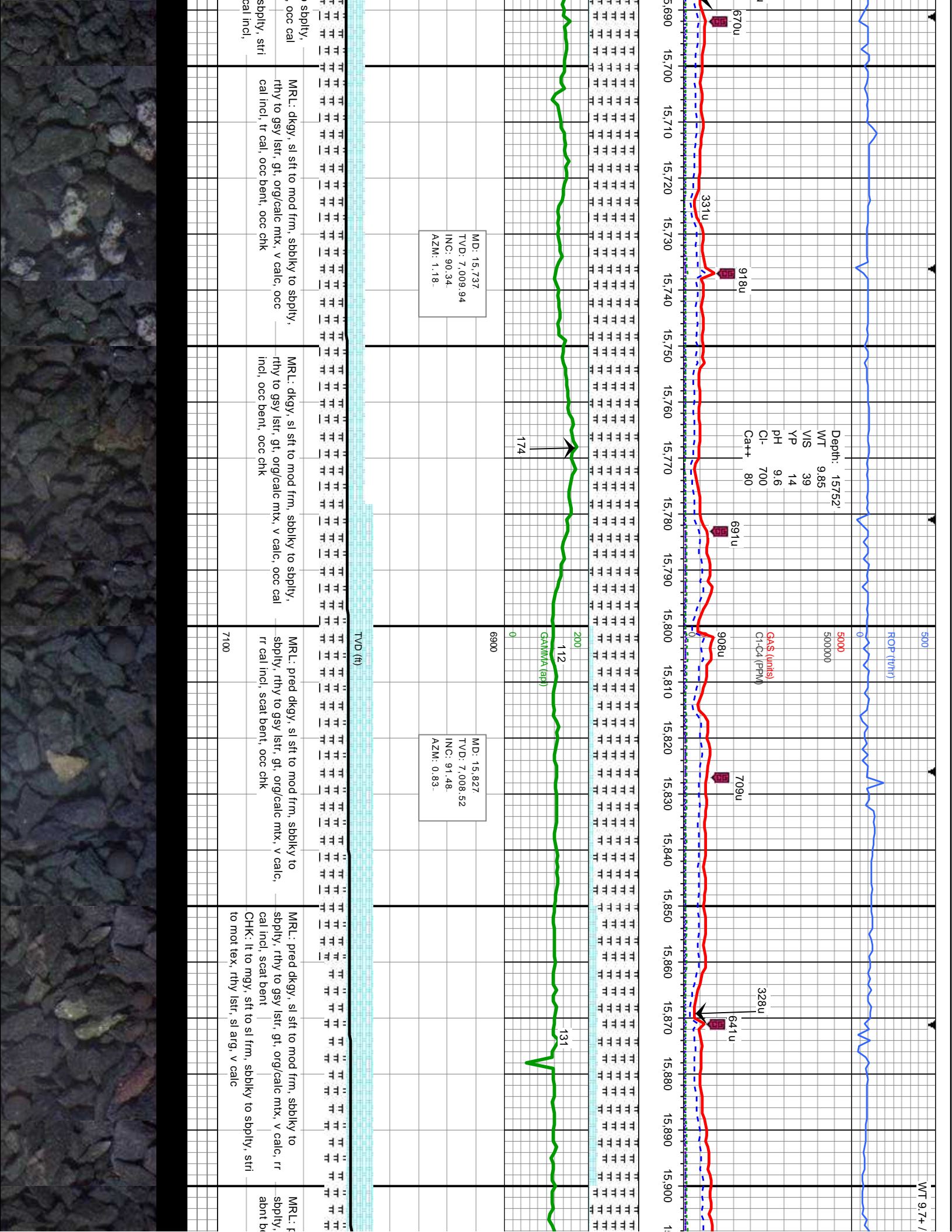


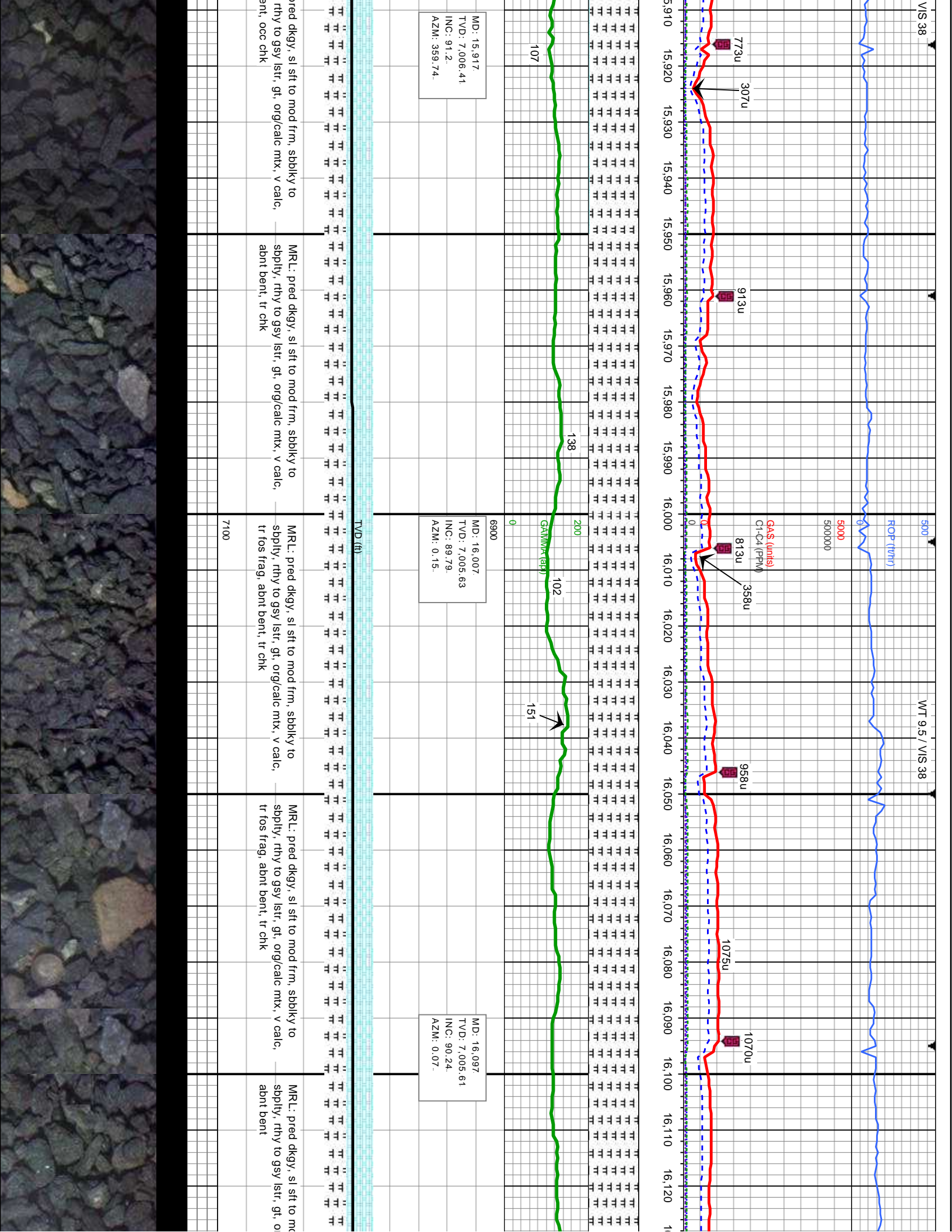


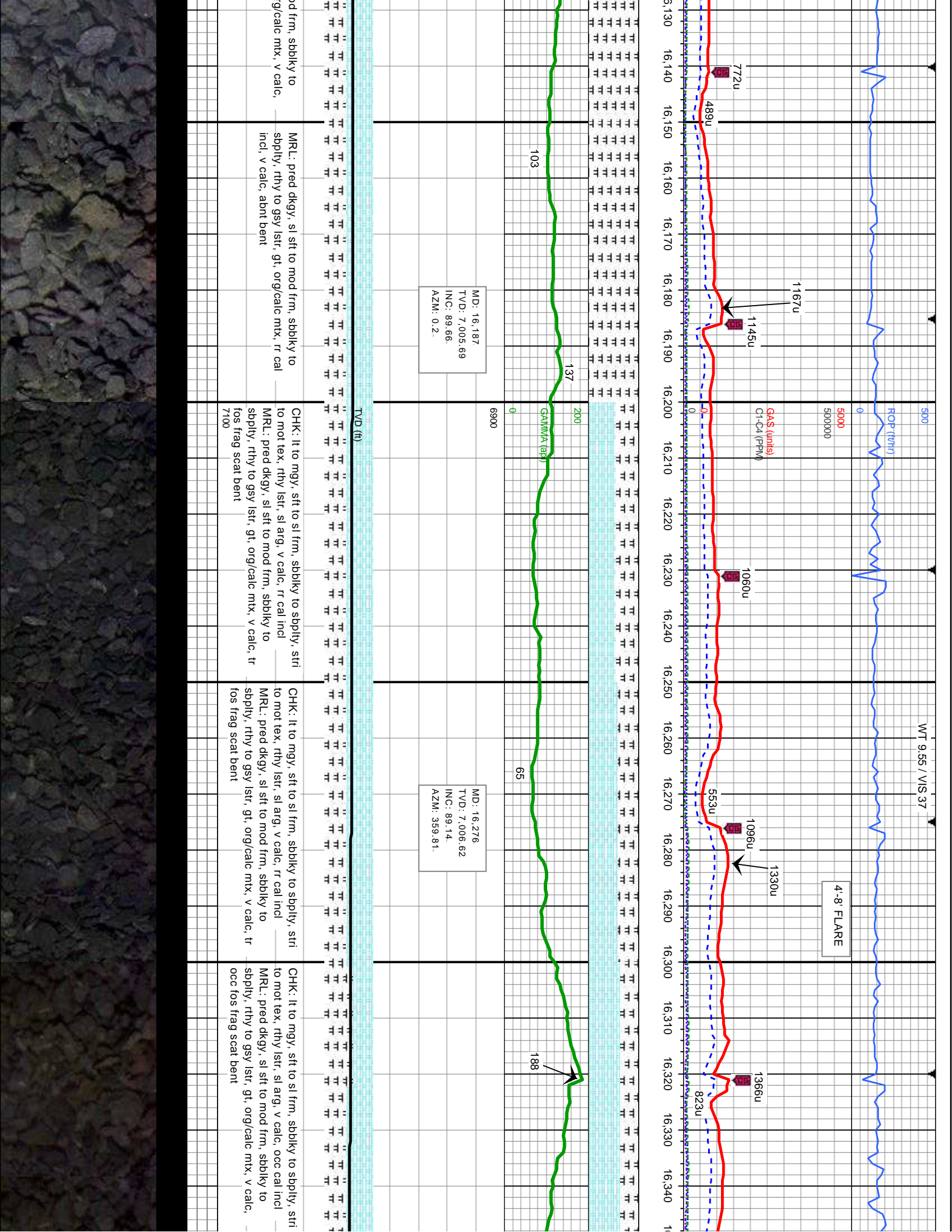


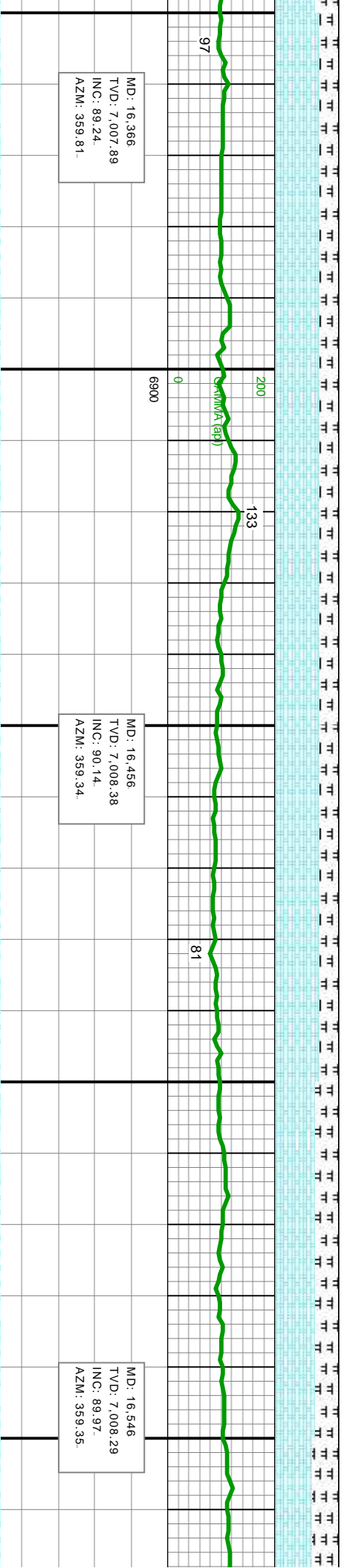
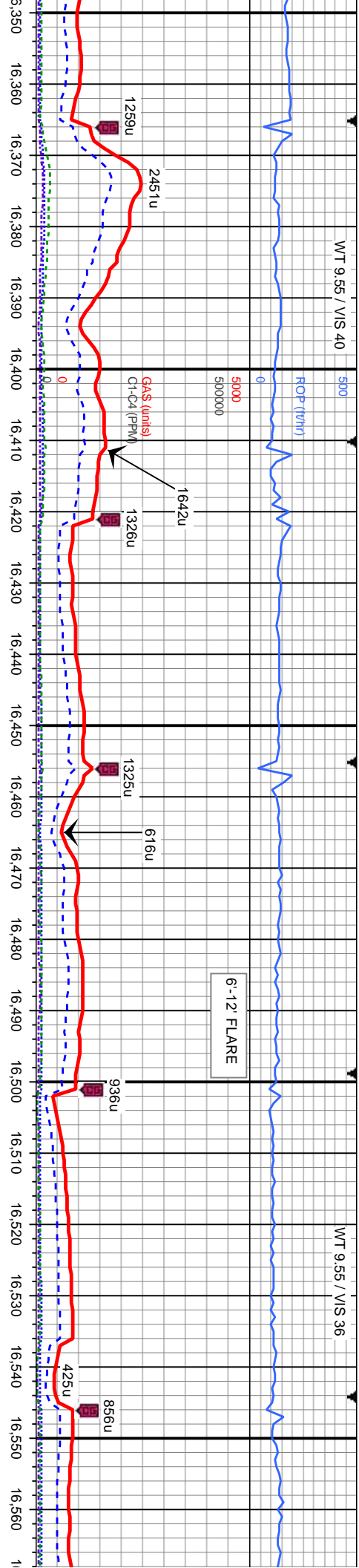




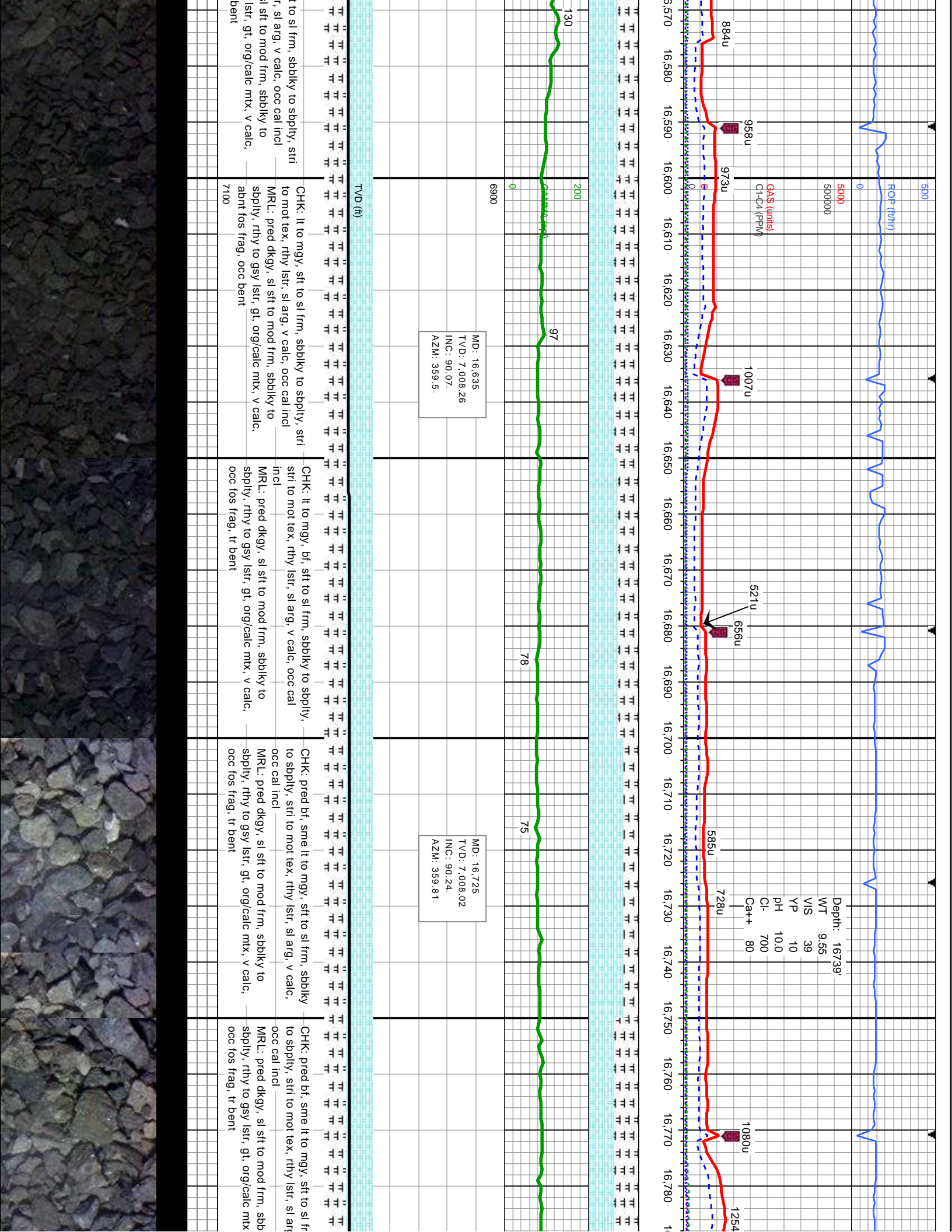


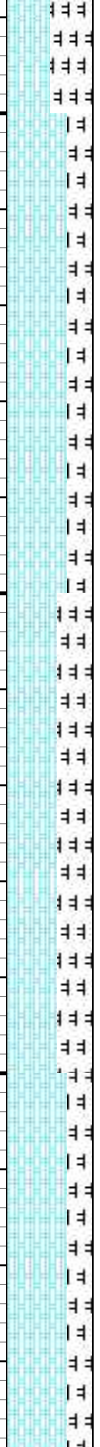
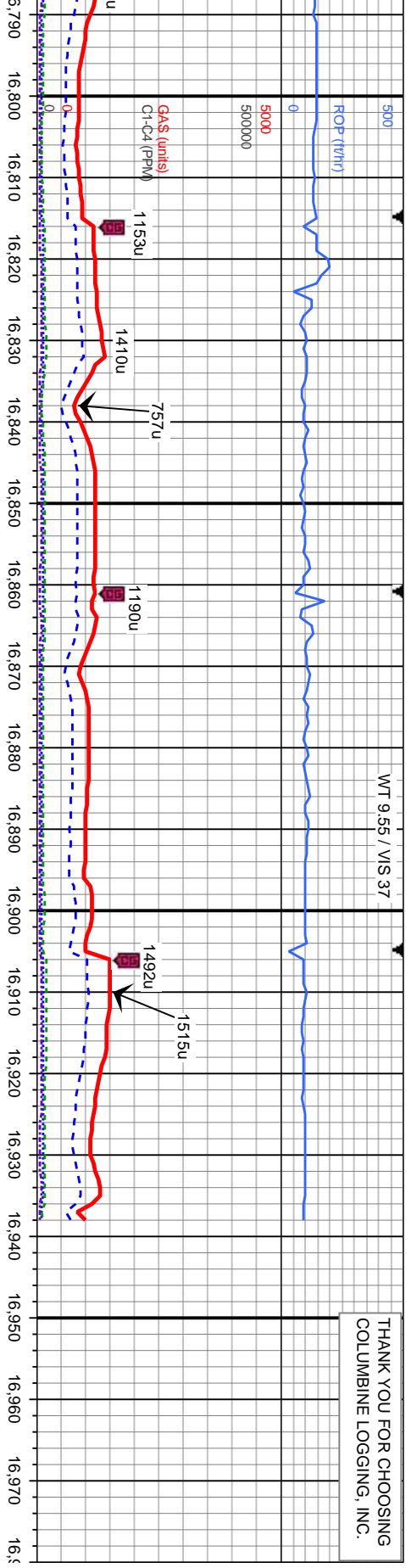






CHK: It to mgy, sft to sl frm, sbbkly to sbply, stri to mot tex, rthy lstr, sl arg, v calc, occ cal incl	CHK: It to mgy, sft to sl frm, sbbkly to sbply, stri to mot tex, rthy lstr, sl arg, v calc	CHK: It to mgy, sft to sl frm, sbbkly to sbply, stri to mot tex, rthy lstr, sl arg, v calc, occ cal incl	CHK: It to mgy, sft to sl frm, sbbkly to sbply, stri to mot tex, rthy lstr, sl arg, v calc, occ cal incl
MRL: pred dkg, sl sft to mod frm, sbbkly to sbply, rthy to gsy lstr, gt, org/calc mtx, v calc, occ fos frag scat bent	MRL: pred dkg, sl sft to mod frm, sbbkly to sbply, rthy to gsy lstr, gt, org/calc mtx, v calc, occ fos frag, occ bent	MRL: pred dkg, sl sft to mod frm, sbbkly to sbply, rthy to gsy lstr, gt, org/calc mtx, v calc, occ fos frag, occ bent	MRL: pred dkg, sl sft to mod frm, sbbkly to sbply, rthy to gsy lstr, gt, org/calc mtx, v calc, abnt fos frag, occ bent
7100			





MD: 16,815
TVD: 7,007.56
INC: 90.34
AZM: 1.26

MD: 16,897
TVD: 7,007.25
INC: 90.1
AZM: 1.3

MD: 16,939
TVD: 7,007.17
INC: 90.1
AZM: 1.3

Bit Data
Bit #: 3
Depth In: 7,409 '
Depth Out: 16,939 '
Hours: 93 hrs
Avg Ft/Hr: 102.5 '/hr

TD: 16939' MD
@ 1855 HRS 8/4/14

CHK: It to mgy, sme bf, sft to sl frm, sbbkly to
spply, str to mot tex, rthy lstr, sl arg, v calc,
occ cal incl

MRL: pred dkg, sl sft to mod frm, sbbkly to
spply, rthy to gsy lstr, gt, org/calc mix, v calc,
occ fos frag, tr bent

7100

CHK: It to mgy, sme bf, sft to sl frm, sbbkly to
spply, str to mot tex, rthy lstr, sl arg, v calc,
occ cal incl

MRL: pred dkg, sl sft to mod frm, sbbkly to
spply, rthy to gsy lstr, gt, org/calc mix, v calc,
occ fos frag, occ bent

