



Scale: 5" / 100'
Measured Depth Log

Well Name Morton State LD01-79-1BHN

Location SWSW SEC1 T9N R58W

State CO

County WELD

Country USA

Rig Number PRECISION 828

API Number 05-123-39899

AFE # 200166

Region DENVER-JULESBURG BASIN

Field WILDCAT

Spud Date 12/5/2014

Drilling Completed 12/13/2014

Surface Coordinates 400' FSL, 352' FWL

Lat/Long: 40.77445/-103.82038

Ground Elevation 4656'

K.B. Elevation 4672'

Logged Interval 4800' To 14600'

Total Depth 14600'

Formation PIERRE (TEEPEE BUTTES, SHARON SPRINGS), NIOBRARA (SMOKY HILLS A & B SUBMEMBERS)

Type of Drilling Fluid LSND

Company NOBLE ENERGY INC.

Address 1625 Broadway
Denver, CO 80202

Name TERESA MALESARDI

Company NOBLE ENERGY INC.

Address 1625 Broadway
Denver, CO 80202

WELL SITE GEOLOGIST:

Operator










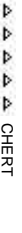














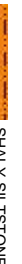
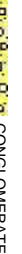








Geologist

Other


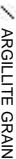










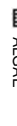


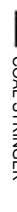

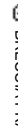
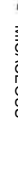
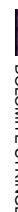












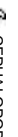








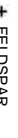








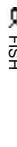
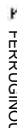


S: GARY MYERS
C.S. METZ

LOG CONTINUES FROM FILE: Morton State LD01-79-1BHN Vert.mplot
GEOLOGICAL SERVICES PROVIDED BY COLUMBINE LOGGING, INC.

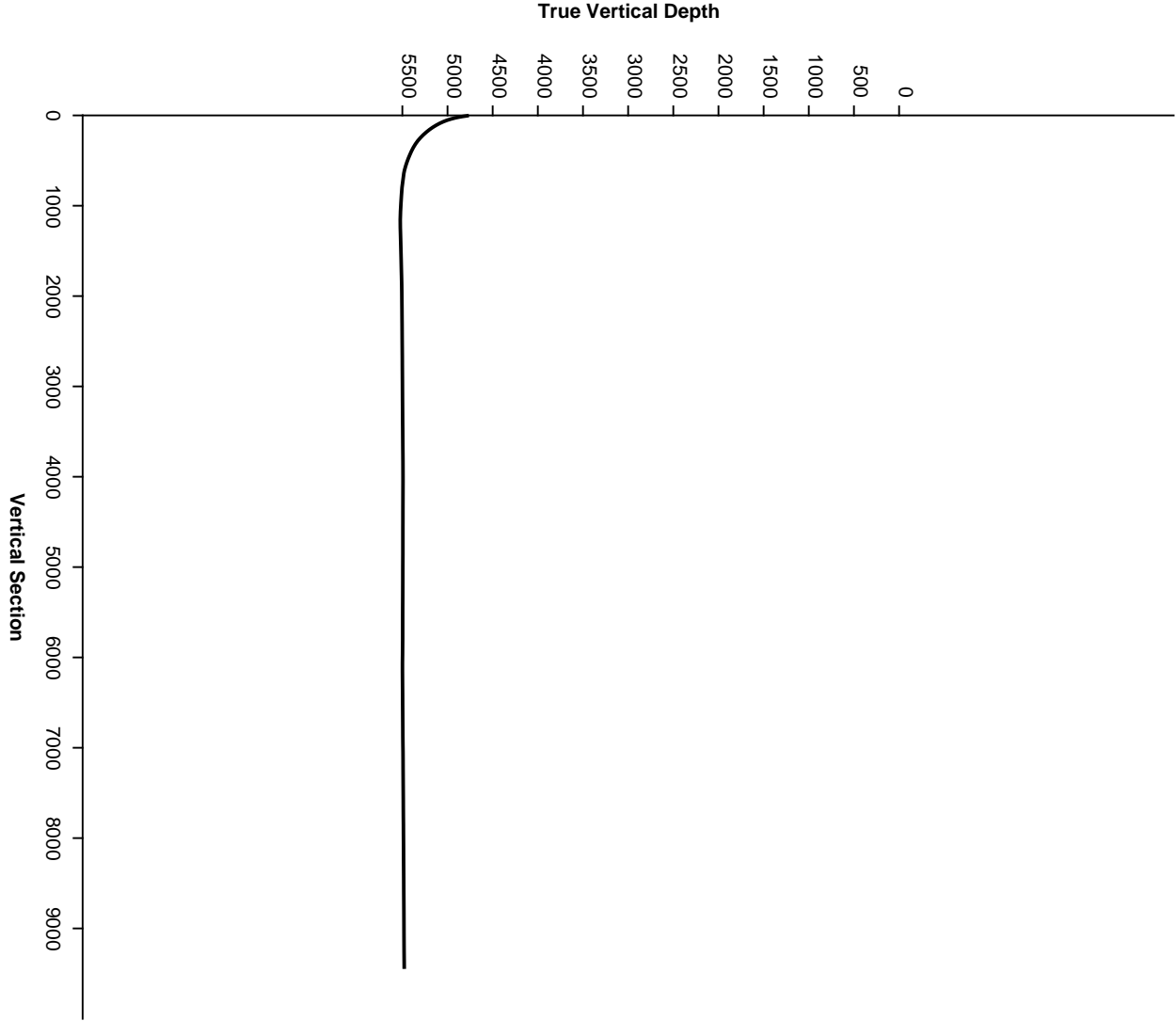
Rock Types

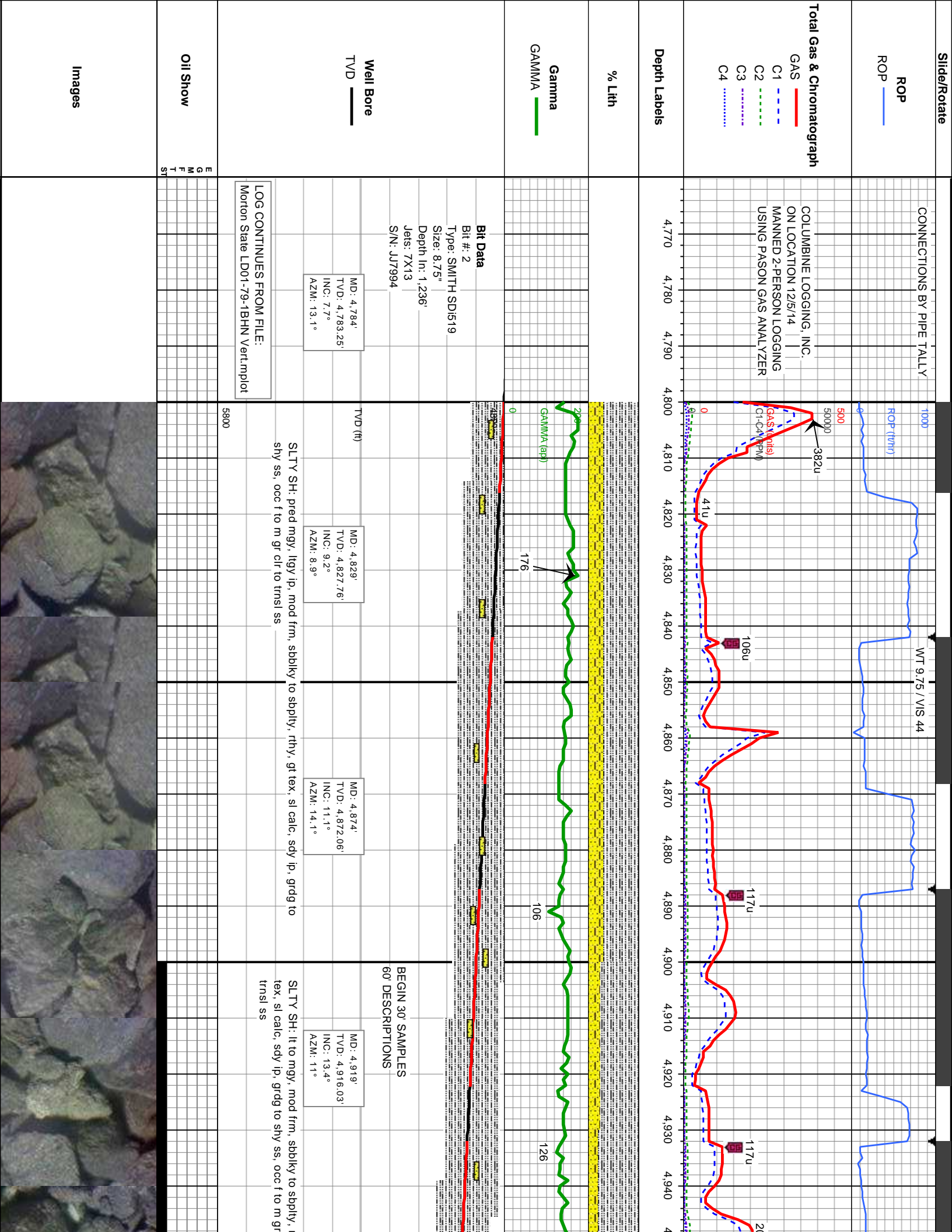
 UNKNOWN	 BRECCIA	 GRANITE	 SHALE
 CHALK	 CEMENT	 GYPSUM	 SHALE CO
 MARLSTONE	 CHERT	 IGNEOUS	 SHALE GR
 SANDSTONE	 CLAY CHOKE SAND	 SIDERITE or LIMONITE	 SILTSTON
 SHALY SANDSTONE	 CLAYSTONE	 LIMESTONE	 TILL
 SILTY SHALE	 COAL	 METAMORPHIC	 TUFF
 SHALY SILTSTONE	 CONGLOMERATE	 NO SAMPLE	 WELDED
 ANHYDRITE	 DOLOMITE	 SALT	
 BENTONITE	 DOLOMITIC LIMESTONE	 SALT-PEPPER SAND	

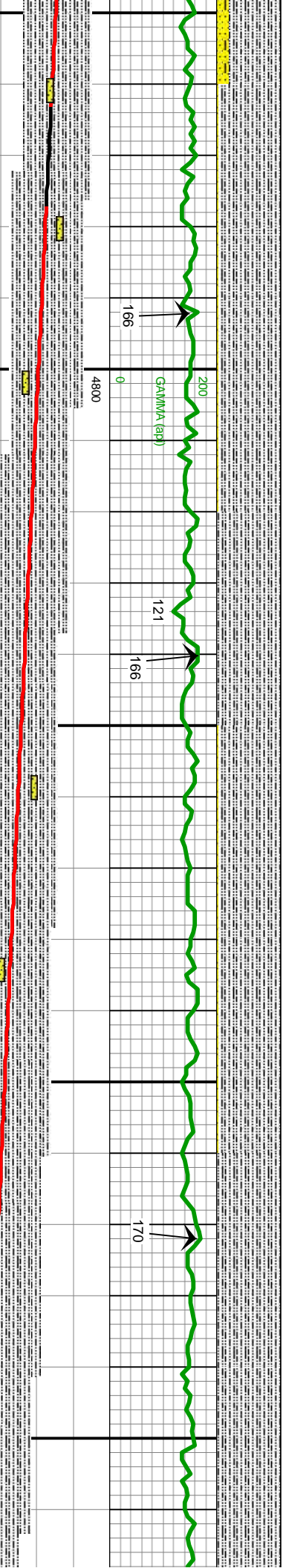
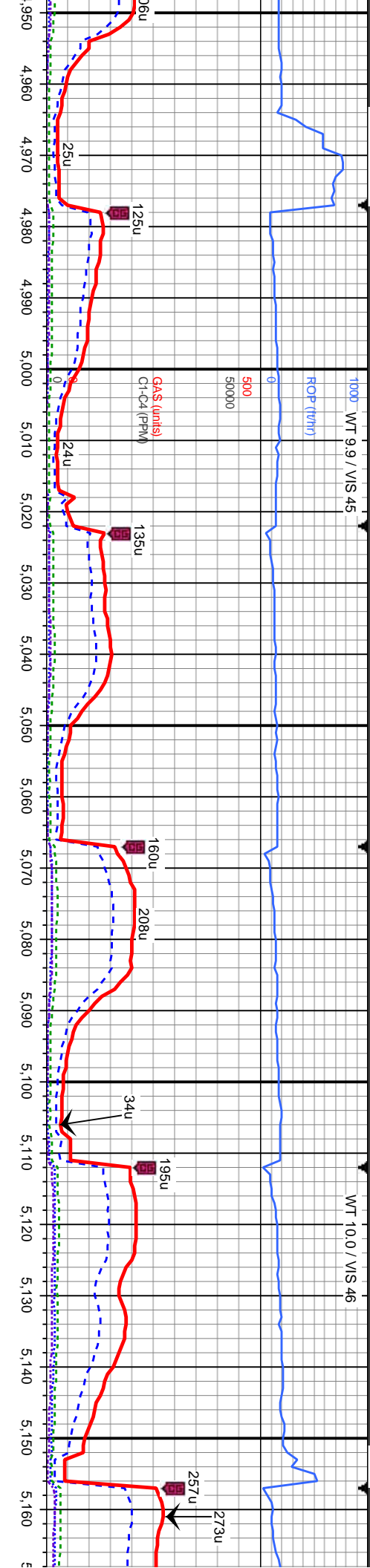
Accessories

 GASTROPOD	 ARGILLITE GRAIN	 HEAVY MINERAL	 ANHYDRITE STRINGER
 INOCERAMUS	 B BENTONITE	 K KAOLIN	 BENTONITE STRINGER
 ALGAE	 BITUMENOUS SUBSTANCE	 M MARLSTONE	 COAL STRINGER
 AMPHIPORA	 BRECCIA FRAGMENTS	 M MICACEOUS	 DOLOMITE STRINGER
 BELEMNITE	 C CALCAREOUS	 M MINERAL CRYSTALS	 GYPSUM STRINGER
 BIOCLASTIC	 C CARBONACEOUS FLAKES	 N NODULES	 LIMESTONE STRINGER
 BRACHIOPOD	 C CHTDK	 P PHOSPHATE PELLETS	 MARLSTONE (CALC) ST
 BRYOZOA	 C CHTLT	 P PYRITE	 MARLSTONE (DOL) ST
 CEPHALOPOD	 COAL - THIN BEDS	 S SALT CAST	 SANDSTONE STRINGER
 CORAL	 D DOLOMITIC	 S SANDY	 SHALE STRINGER
 CRINOID	 F FELDSPAR	 S SILICEOUS	 SILTSTONE STRINGER
 ECHINOID	 F FERRUGINOUS PELLET	 S SILTY	
 FISH	 F FERRUGINOUS	 T TUFFACEOUS	
 FORAMINIFERA	 G GLAUCONITE		
 F FOSSIL	 G GYPSIFEROUS		
		Stringer	

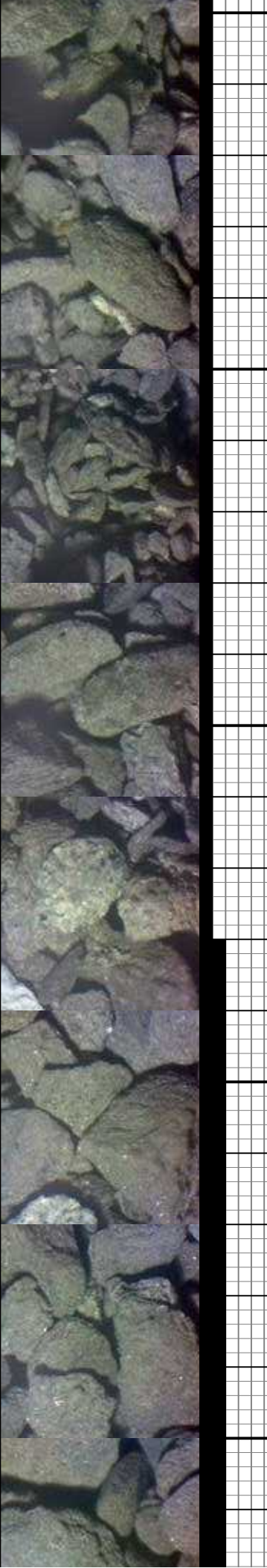
Survey Elevation

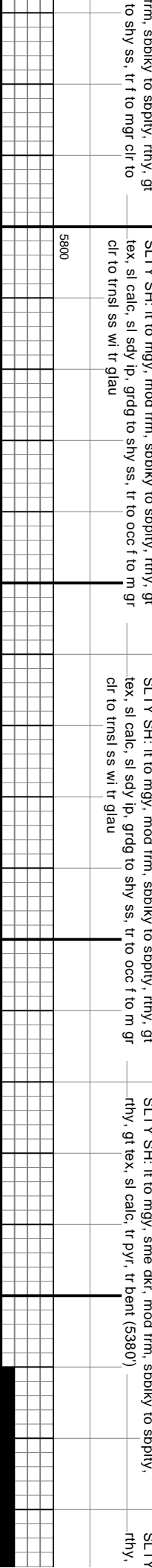
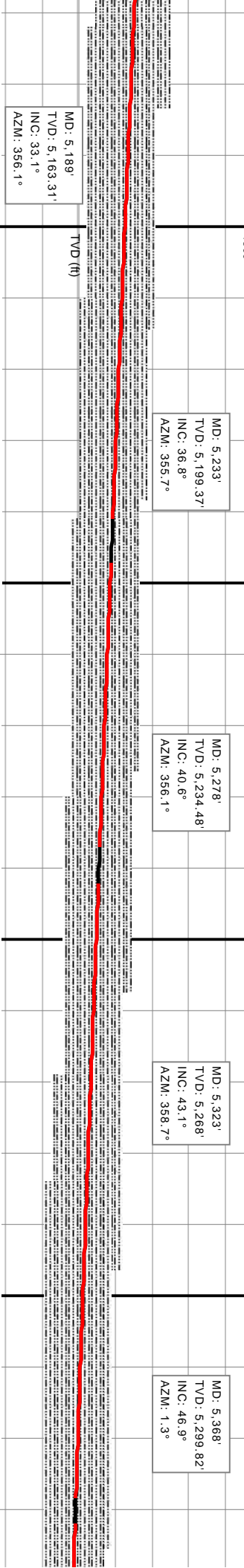
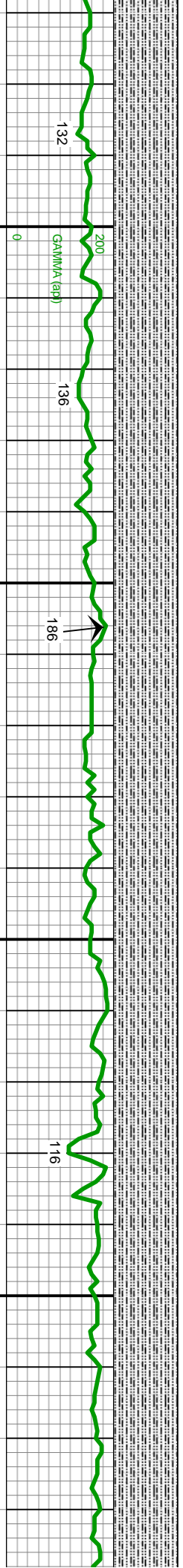
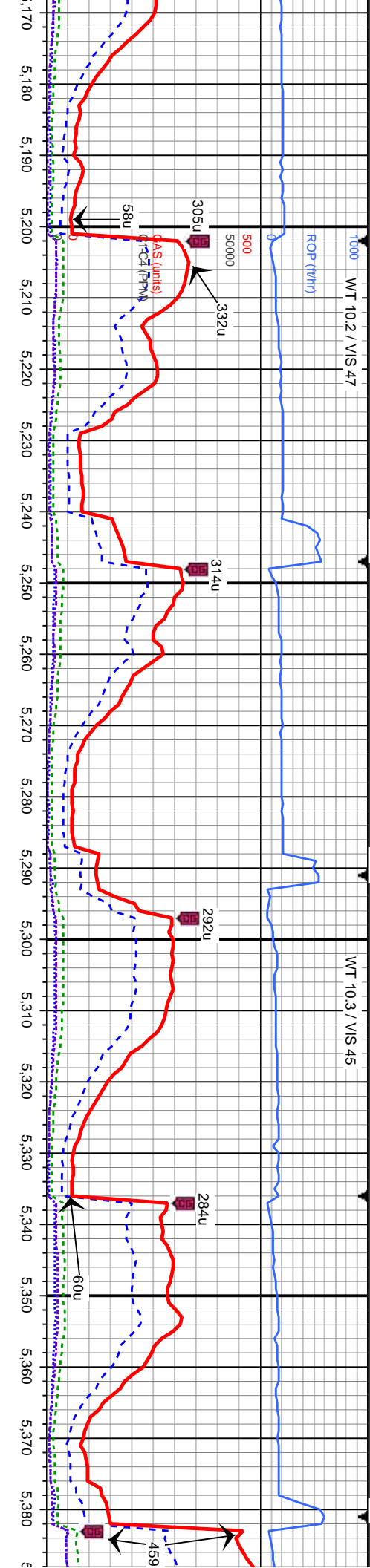


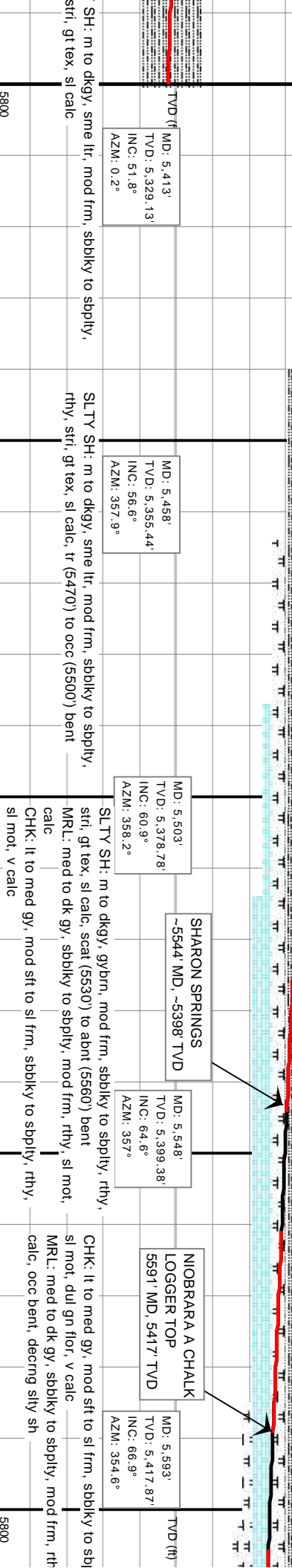
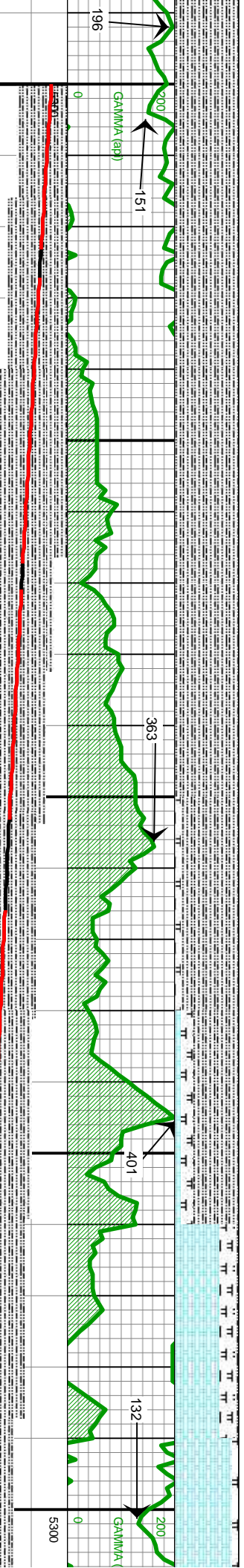
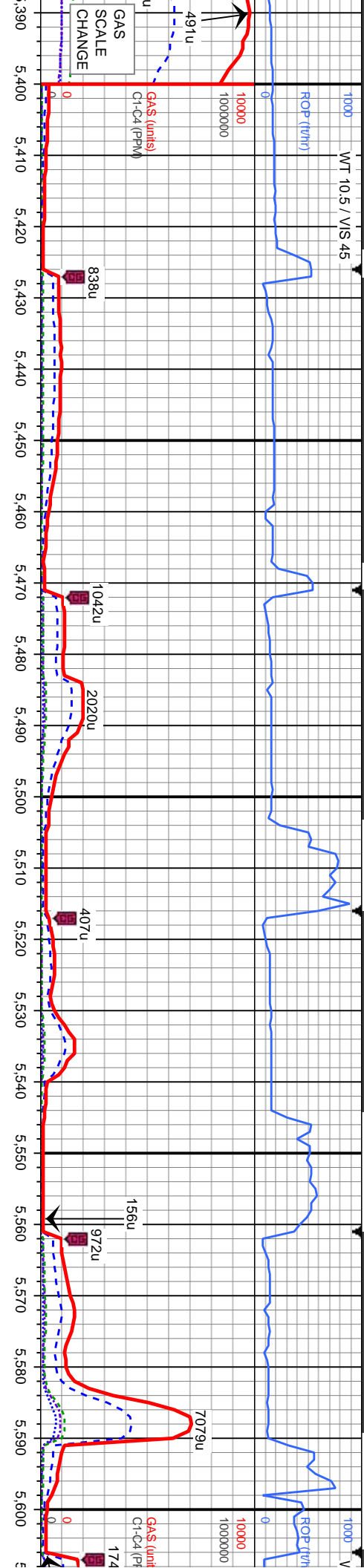




MD: 4.964' TVD: 4.959.54' INC.: 16.1° AZM: 9.5°	SLTY SH: It to mgy, mod frm, sbbkly to sbply, rthy, gt tex, sl calc, sl sdy, grdg to shy ss, occ f to m gr clr to trnsi ss, tr bent (4990')
MD: 5.009' TVD: 5.002.42' INC.: 19.2° AZM: 7.2°	SLTY SH: It to mgy, mod frm, sbbkly to sbply, rthy, gt tex, sl calc, sl sdy, grdg to shy ss, tr to occ f to m gr clr to trnsi ss
MD: 5.054' TVD: 5.044.38' INC.: 23.1° AZM: 4.4°	SLTY SH: It to mgy, mod frm, sbbkly to sbply, rthy, gt tex, sl calc, sl sdy, grdg to shy ss, tr to occ f to m gr clr to trnsi ss w tr pyr
MD: 5.099' TVD: 5.085.3' INC.: 26.1° AZM: 0.9°	SLTY SH: It to mgy, mod frm, sbbkly to sbply, rthy, gt tex, sl calc, sl sdy, grdg to shy ss, tr to occ f to m gr clr to trnsi ss
MD: 5.144' TVD: 5.124.99' INC.: 30.1° AZM: 358°	SLTY SH: It to mgy, mod tex, sl calc, sl sdy ip, grdg trnsi ss







MD: 5,413'
TVD: 5,329.13'
INC: 51.8°
AZM: 0.2°

MD: 5,458'
TVD: 5,365.44'
INC: 56.6°
AZM: 357.9°

MD: 5,503'
TVD: 5,378.78'
INC: 60.9°
AZM: 358.2°

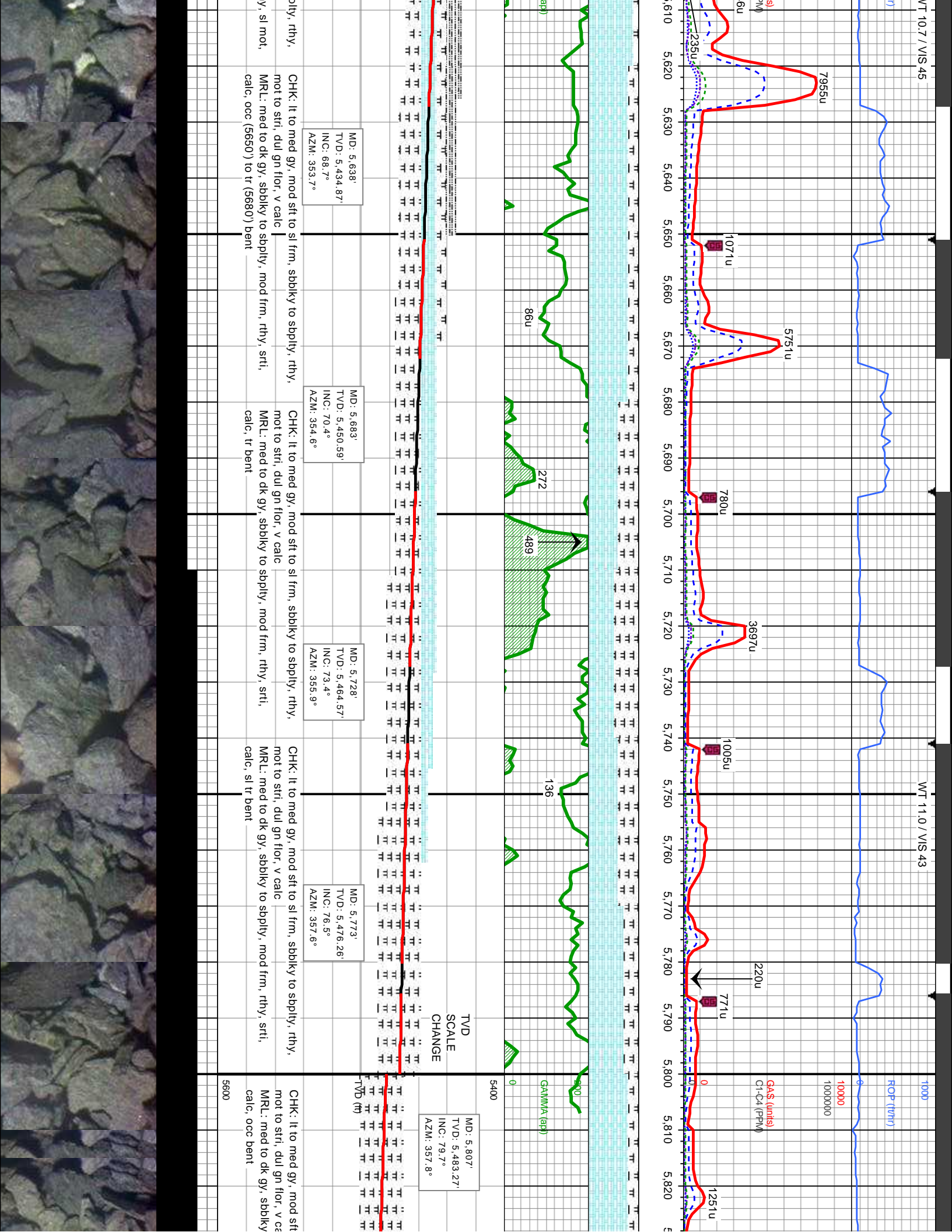
SHARON SPRINGS
~5544' MD, ~5398 TVD

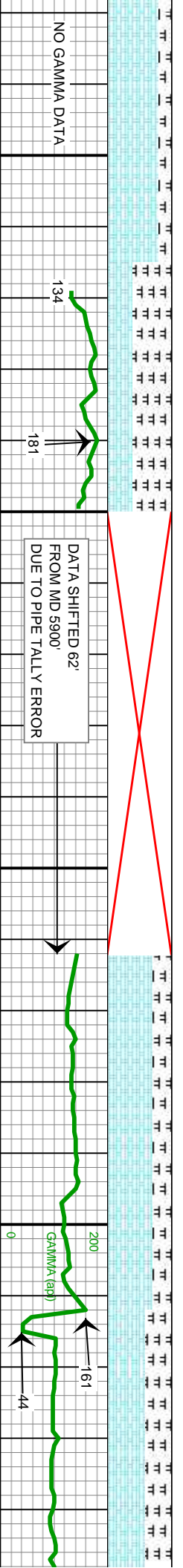
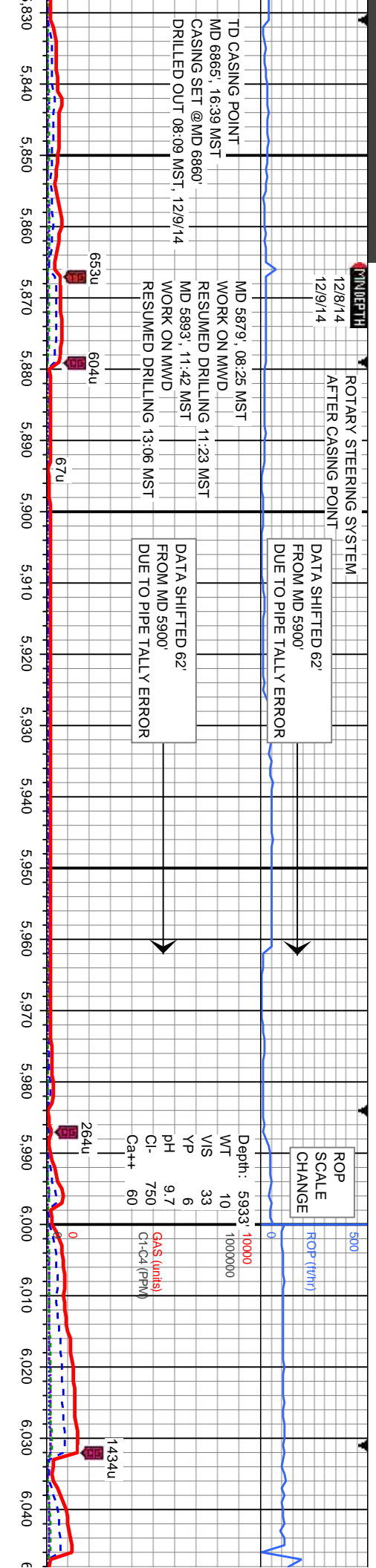
MD: 5,548'
TVD: 5,399.38'
INC: 64.6°
AZM: 357°

NIOBRARA A CHALK
LOGGER TOP
5591' MD, 5417' TVD

MD: 5,593'
TVD: 5,417.87'
INC: 66.9°
AZM: 354.6°

CHK: lt to med gy, mod sft to sl frm, sbblky to spbly, sl mot, dul gn floor, v calc
MRL: med to dk gy, sbblky to spbly, mod frm, rth calc, occ bent, decrn sfty sh





Bit Data
Bit #: 2
Depth In: 1,236
Depth Out: 5,865
Hours: 17.5 hrs
Avg Fv/Hr: 264.5'/hr

Bit Data
Bit #: 3
Type: SMITH SDI513UBPX
Size: 6.125"
Depth In: 5,860'
Jets: 5X11
S/N: JJ4895

MD: 5,964'
TVD: 5,503.68'
INC: 85.35°
AZM: 356.94°

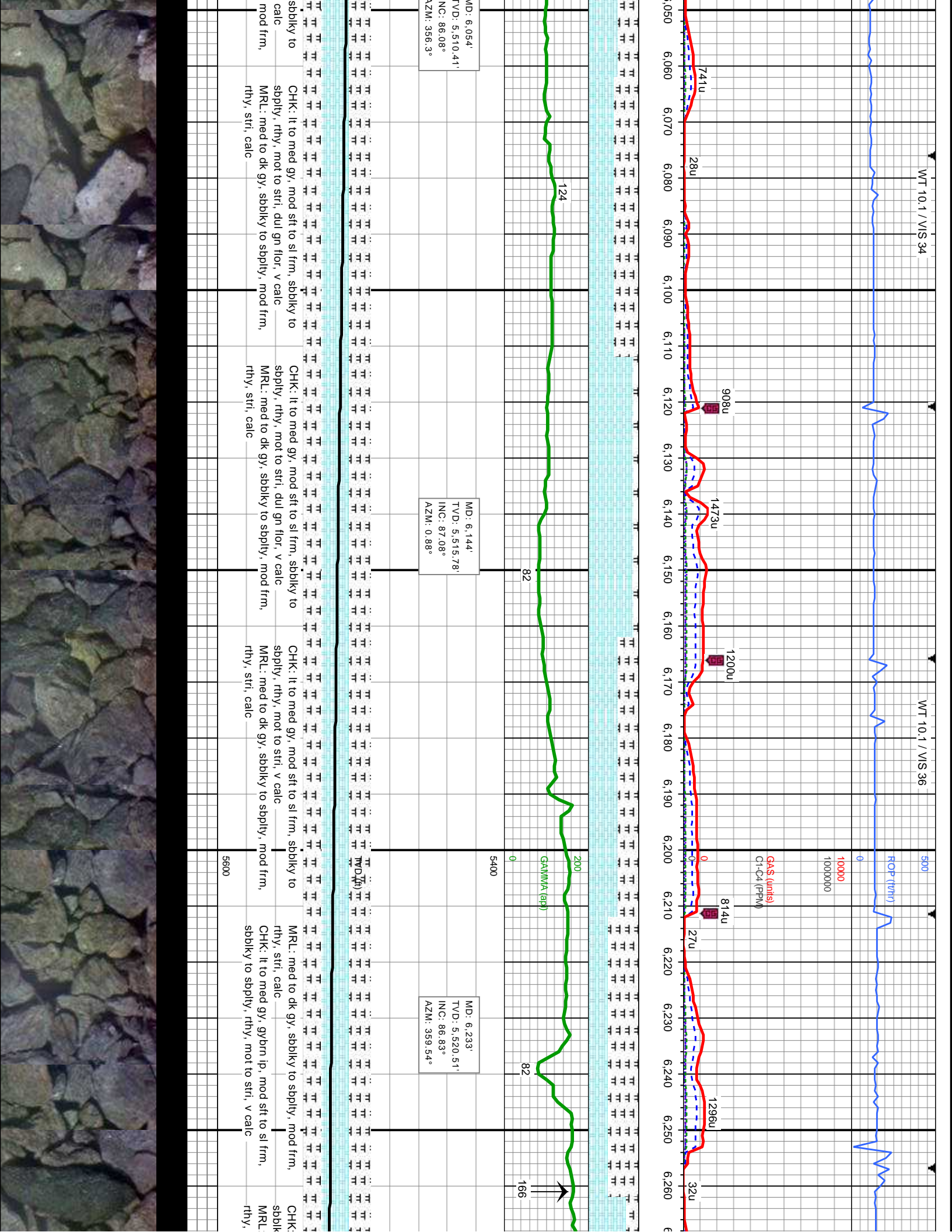
NOBORARA B CHALK
LOGGER TOP
6016 MD, 5508' TVD

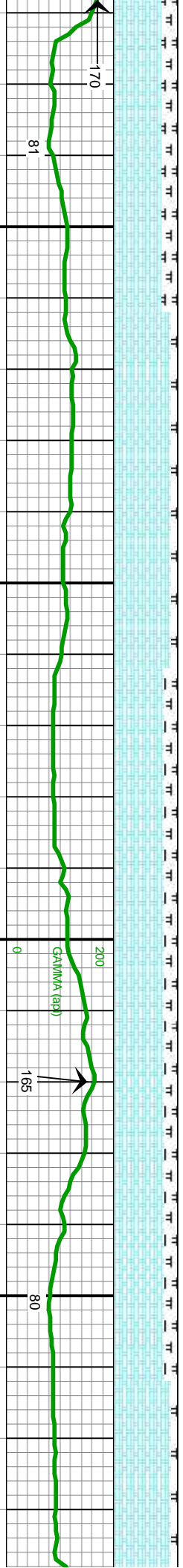
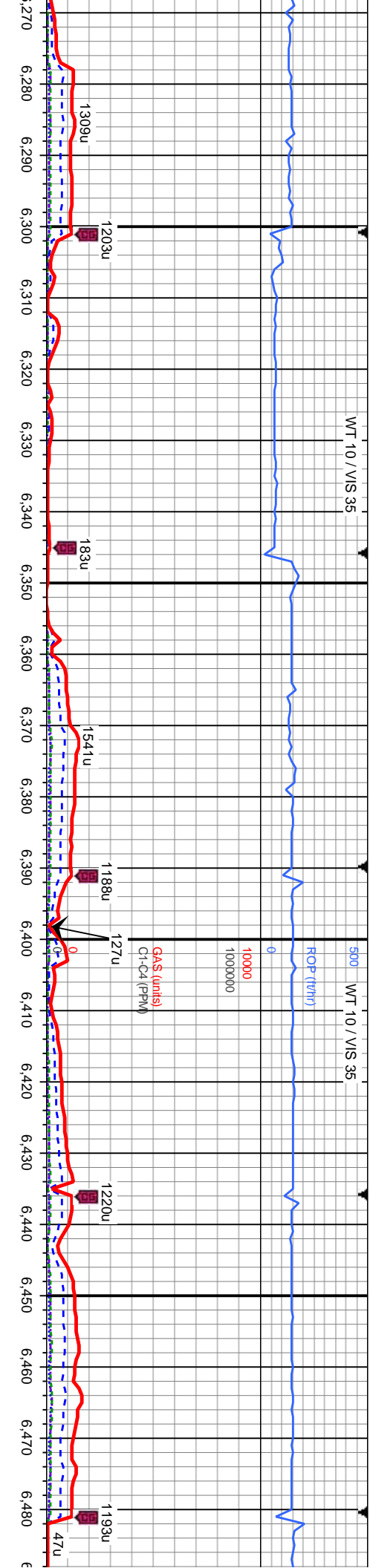
to sl frm, sbblky to sbply, rthy,
to sbply, mod frm, rthy, strl,
MRL: med to dk gy, sbblky to sbply,
mod frm, rthy, strl, calc, scat bent
CHK: It to med gy, mod sft to sl frm,
sbply to sbply, rthy, mot to strl, dul
gn flr, v calc

CHK: It to med gy, mod sft to sl frm, sbblky to
sbply, rthy, mot to strl, dul gn flr, v calc
MRL: med to dk gy, sbblky to sbply, mod frm,
rthy, strl, calc, sl tr bent

CHK: It to med gy, mod sft to sl frm, sbblky to
sbply, rthy, mot to strl, dul gn flr, v calc
MRL: med to dk gy, sbblky to sbply,
rthy, strl, calc

5600





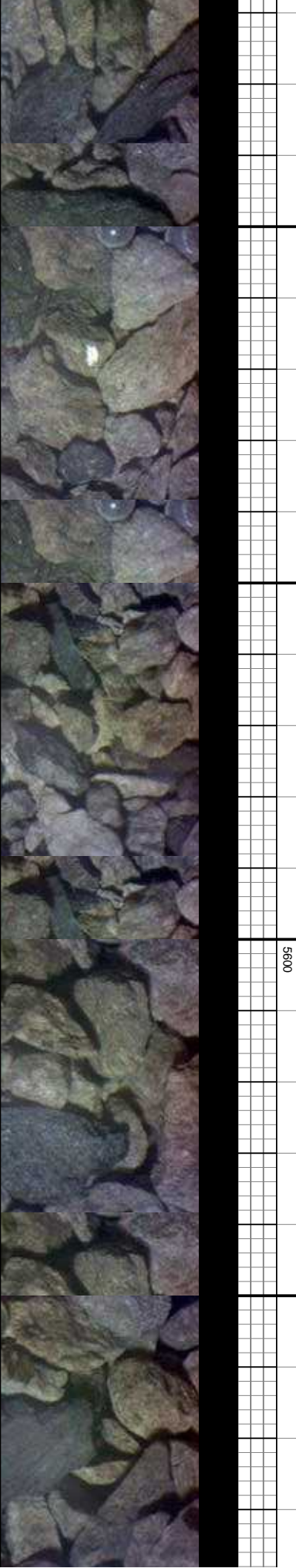
It to med gy, sme gybrn, mod sft to sl frm,
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med to dk gy, sbply to sbply, mod frm,
strf, calc

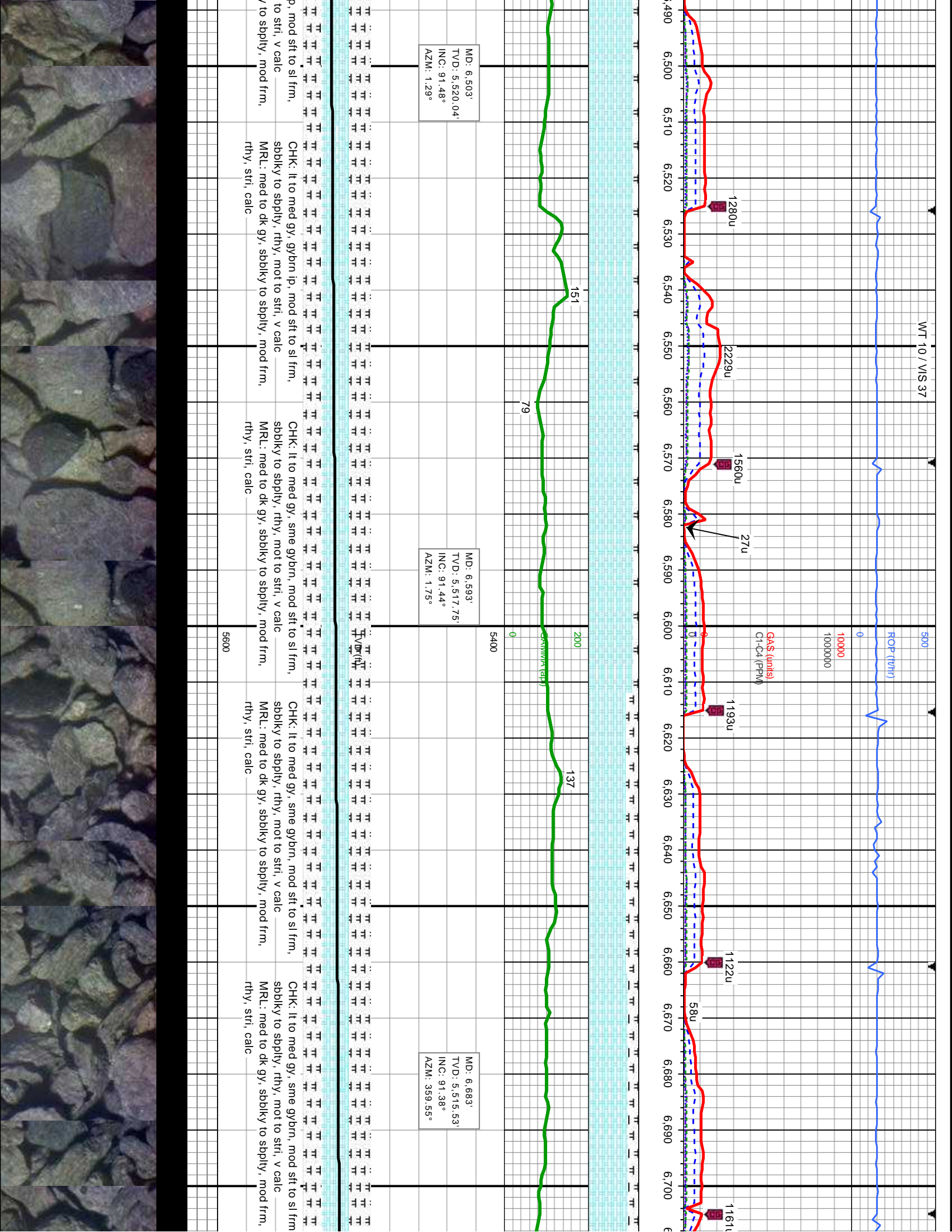
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MRL: med to dk gy, sbply to sbply, mod frm,
rthy, strf, calc

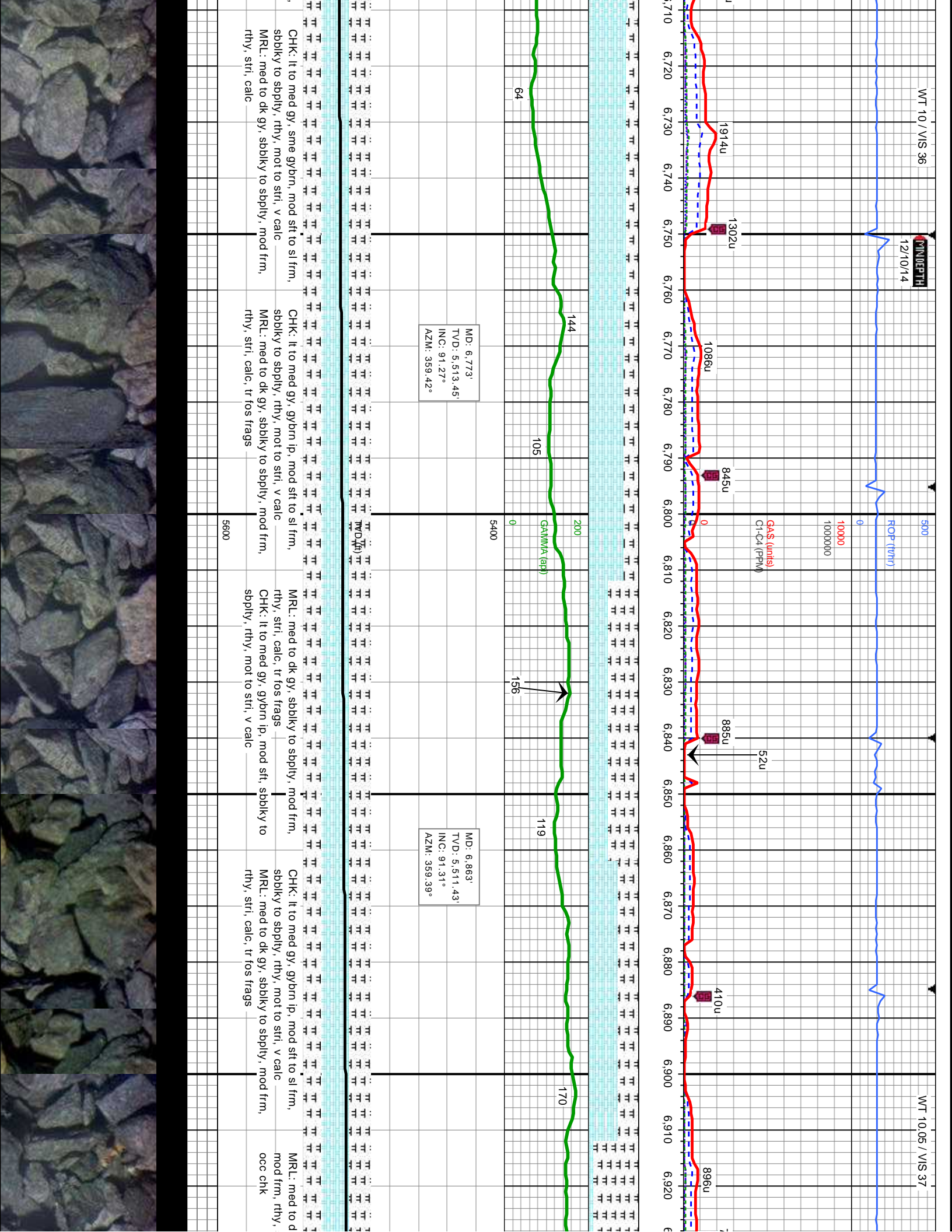
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sbply to sbply, rthy, mot to strf, v calc
MRL: med to dk gy, sbply to sbply, mod frm,
rthy, strf, calc, tr fos frags, tr cal incl

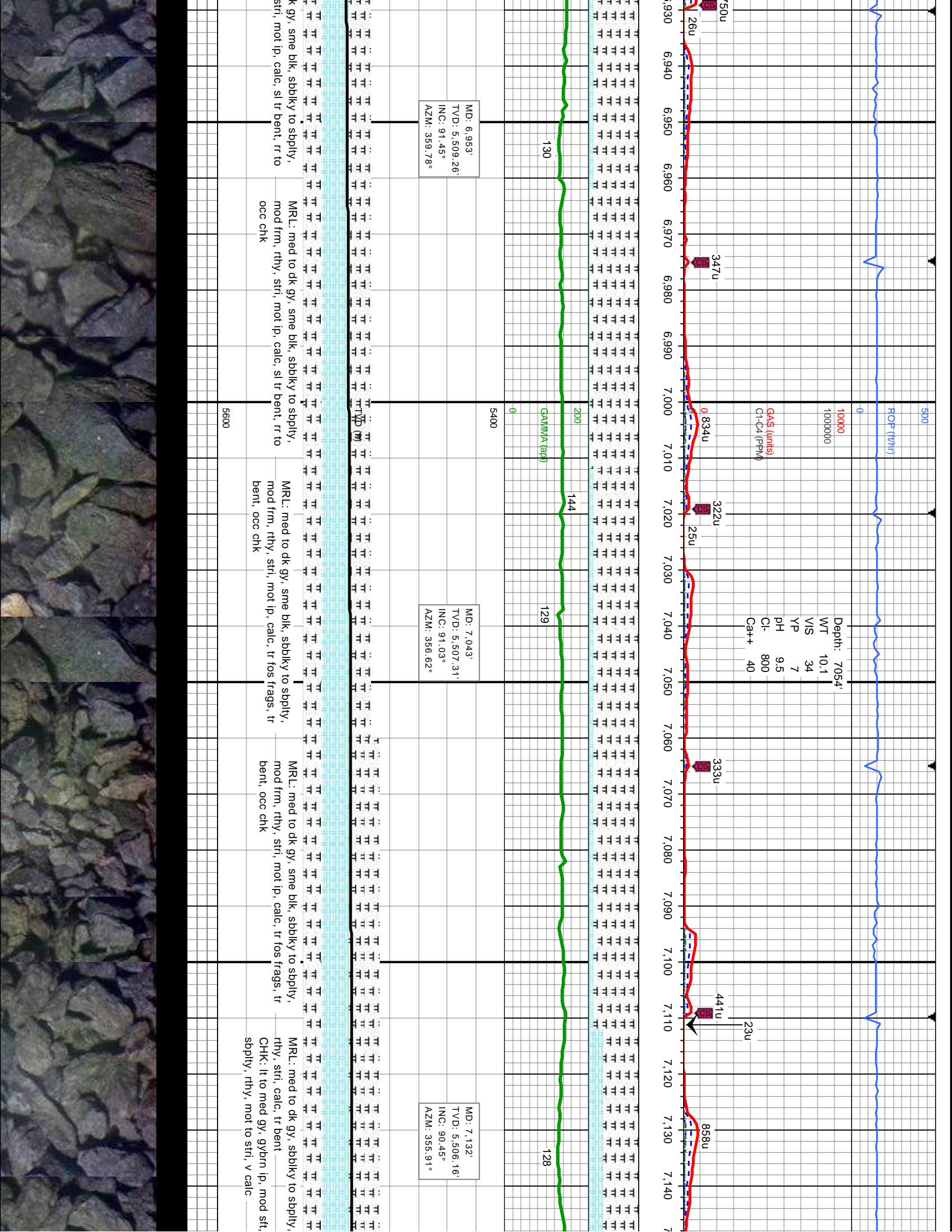
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MRL: med to dk gy, sbply to sbply, mod frm,
rthy, strf, calc

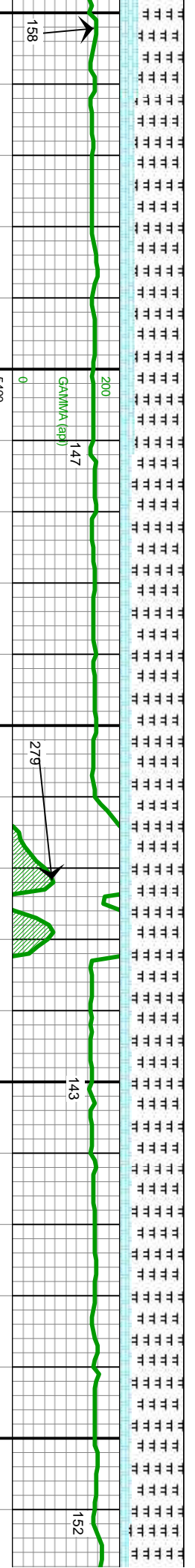
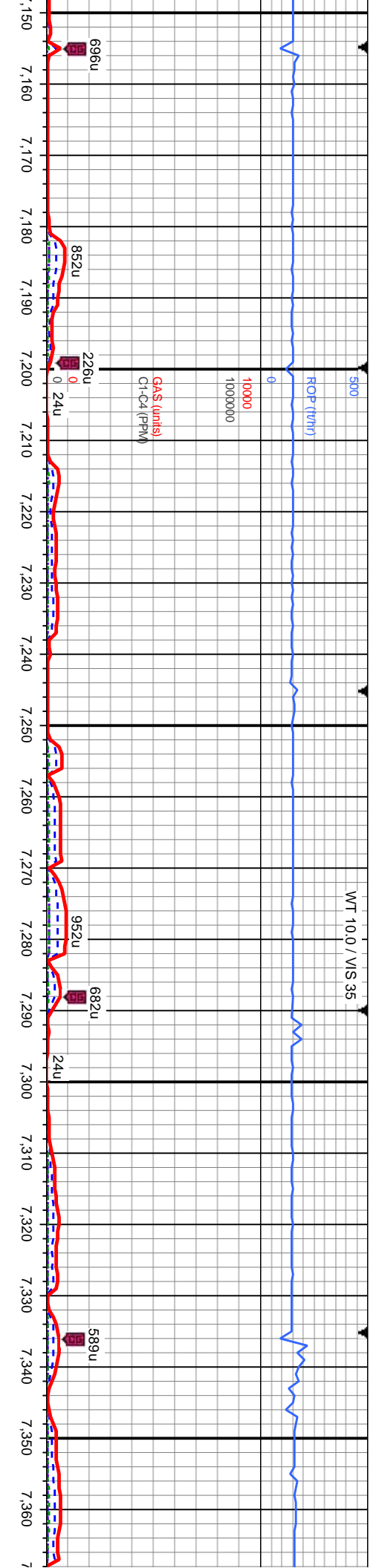
CHK: It to med gy, gybrn i
sbply to sbply, rthy, mot
MRL: med to dk gy, sbply
rthy, strf, calc







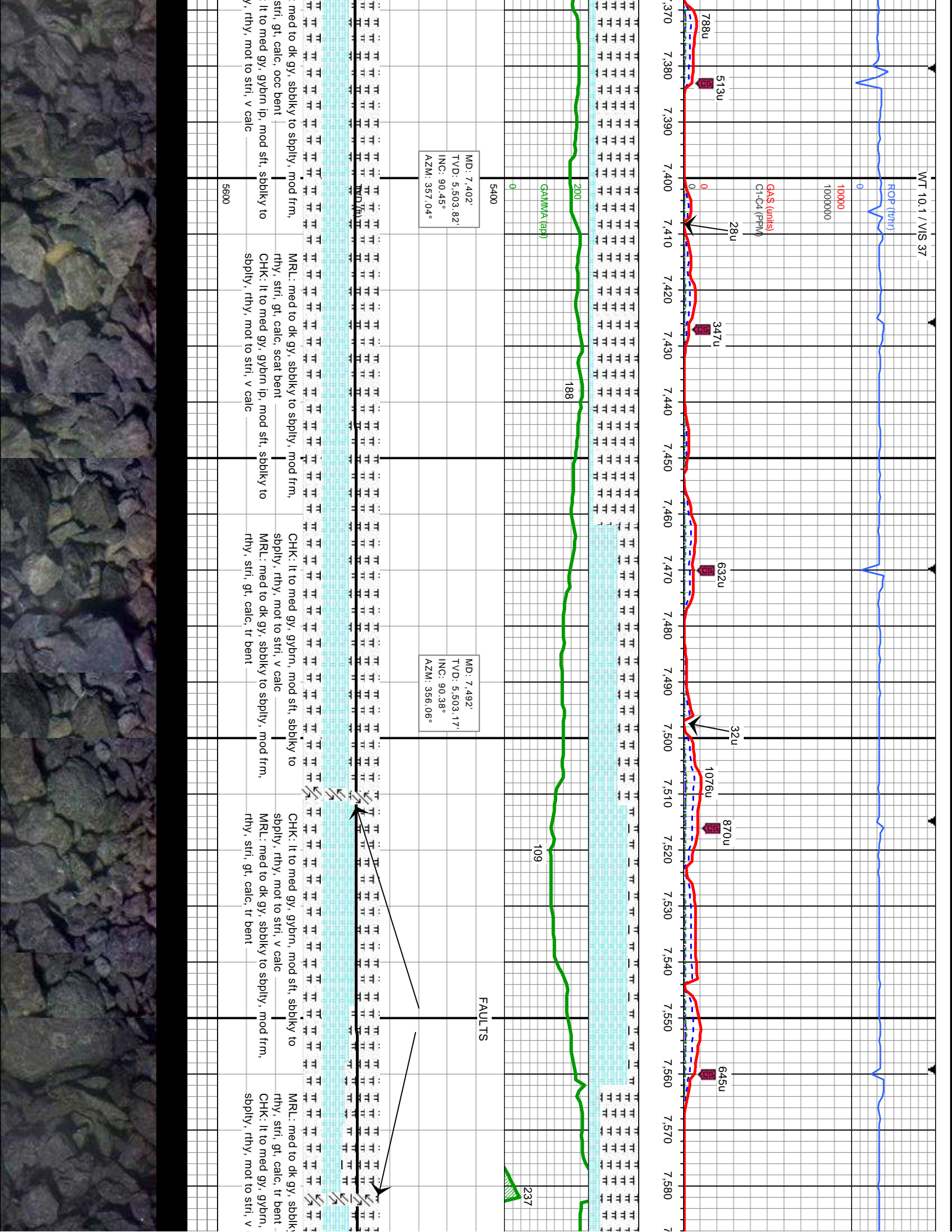


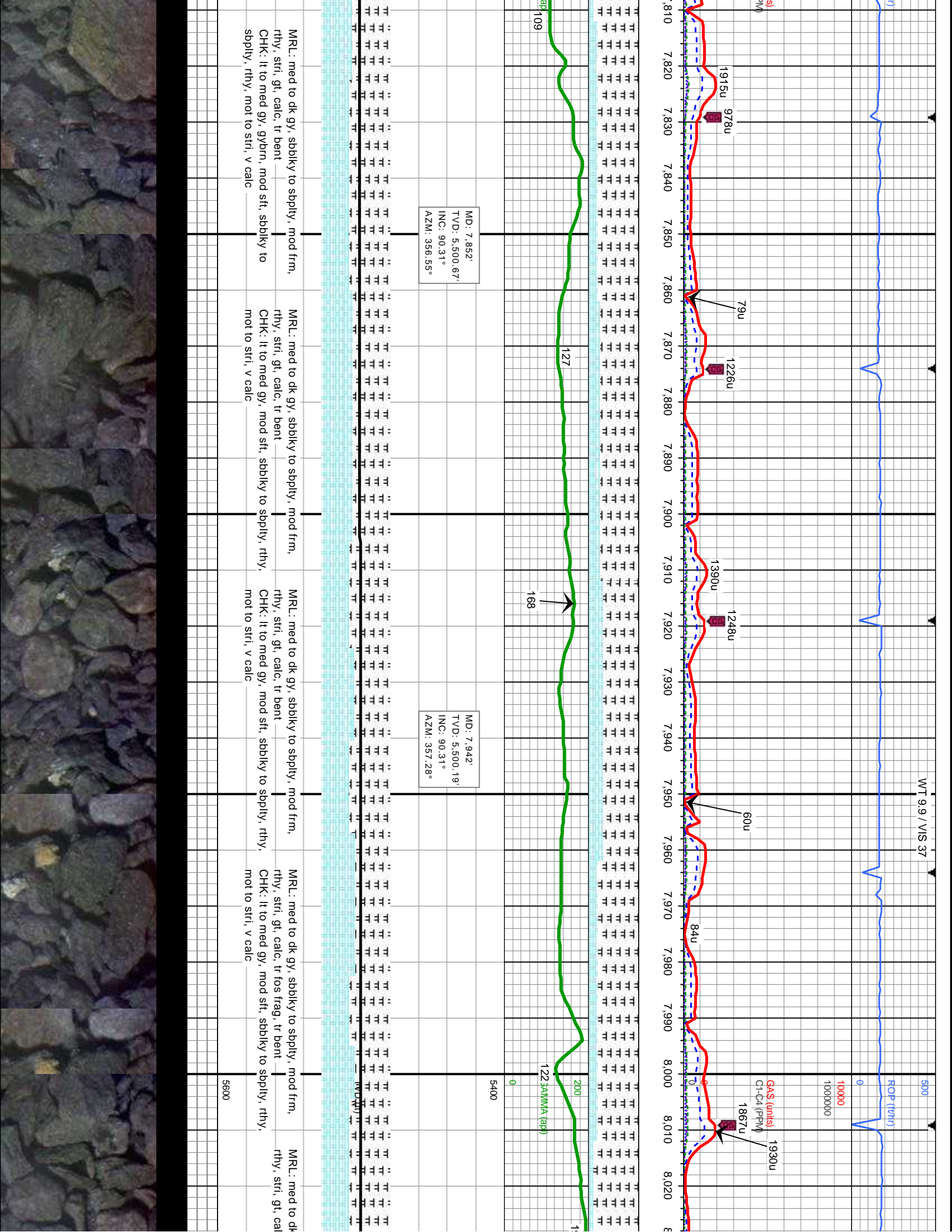


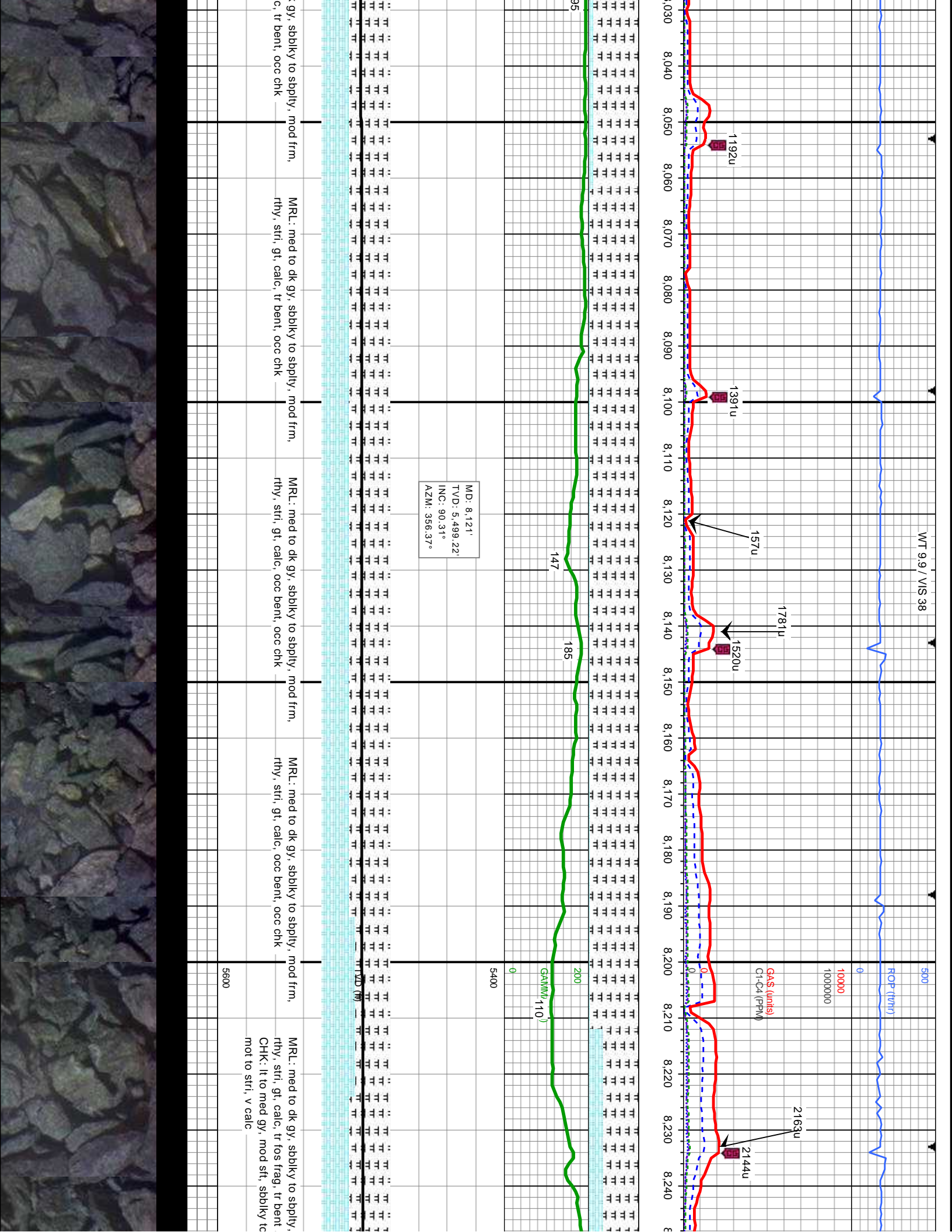
MD: 7.223
TVD: 5,505.39'
INC: 90.52°
AZM: 357.42°

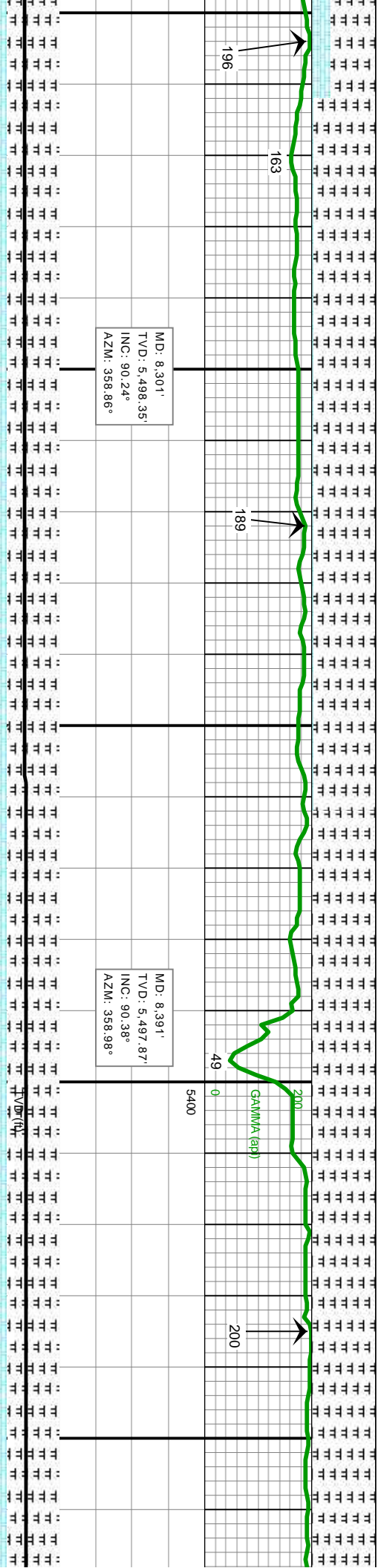
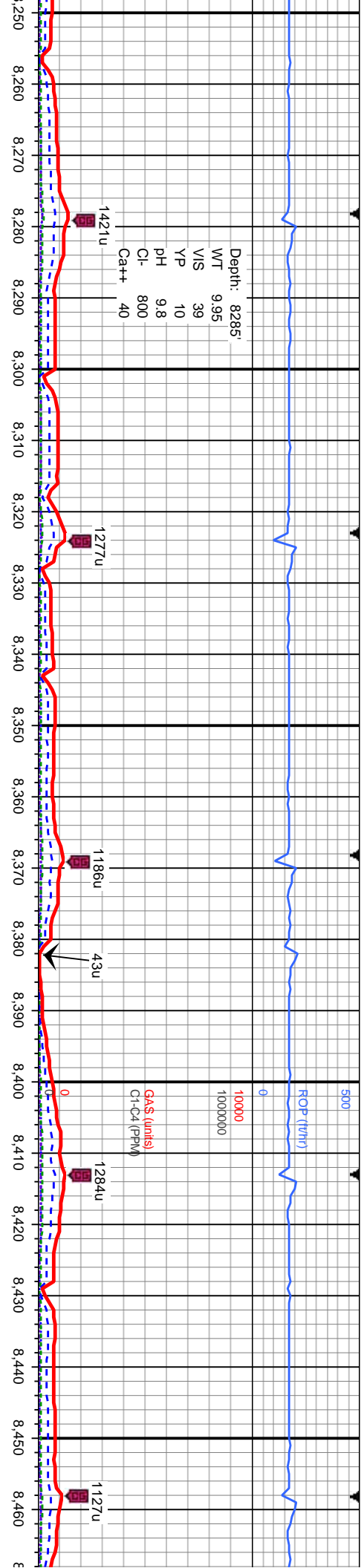
MD: 7.312
TVD: 5,504.58'
INC: 90.52°
AZM: 357.38°

mod frm,	mod frm,	mod frm,	mod frm,	mod frm,
rtly, strf, calc, tr bent	rtly, strf, calc, tr bent	rtly, strf, calc	rtly, strf, calc	rtly,
CHK: lt to med gy, gybrn ip, mod sft, sbblky to sbply, rtly, mot to strf, v calc	CHK: lt to med gy, gybrn ip, mod sft, sbblky to sbply, rtly, mot to strf, v calc	CHK: lt to med gy, gybrn ip, mod sft, sbblky to sbply, rtly, mot to strf, v calc	CHK: lt to med gy, gybrn ip, mod sft, sbblky to sbply, rtly, mot to strf, v calc	CHK









mod frm,	MRL: med to dk gy, sbblkly to sbply, mod frm,
rbly, rthly,	rthly, strl, gt, calc, occ bent, occ chk
sbply, rthly,	

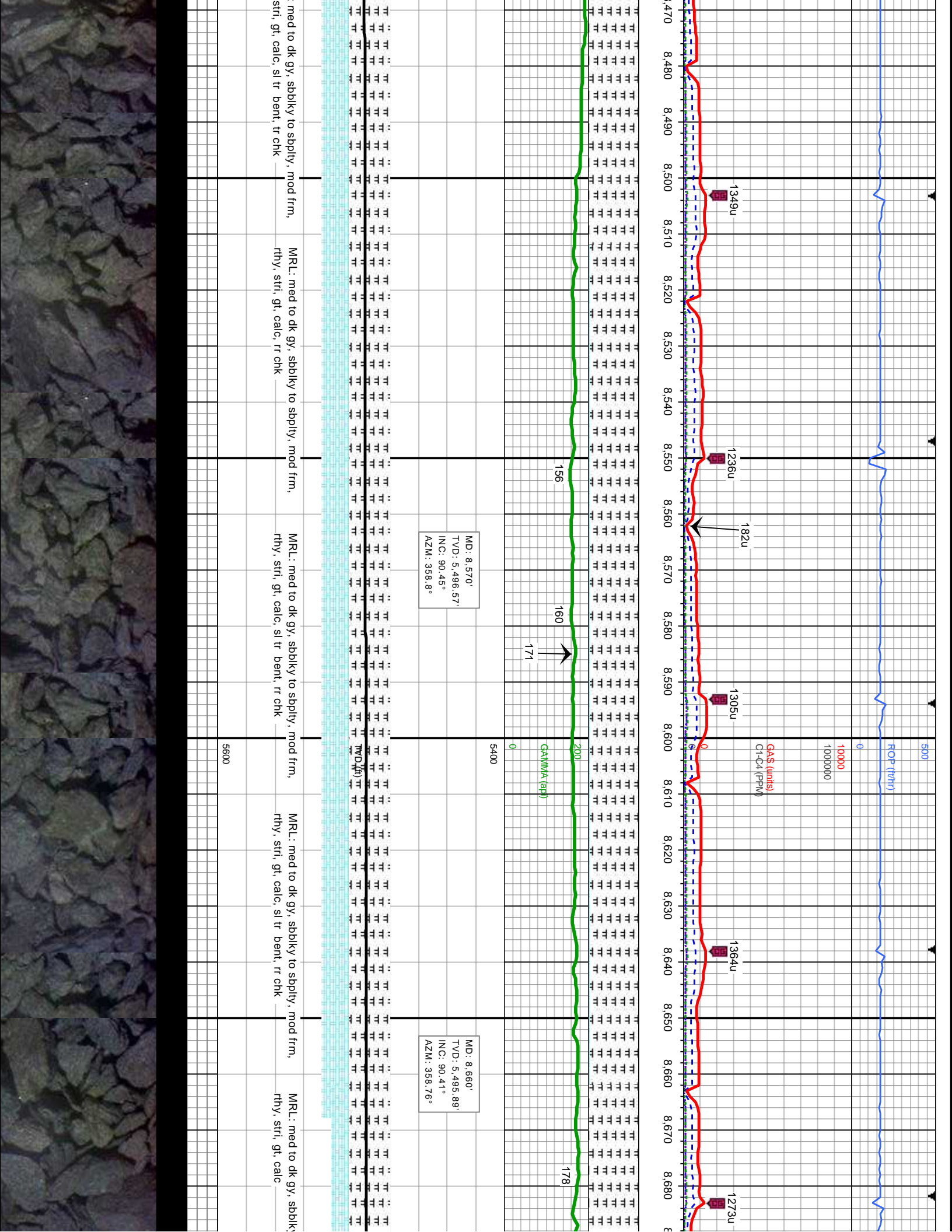
MRL: med to dk gy, sblbky to sblpty, mod frm, rthy, stri, gt, calc, sl tr bent, rr to occ chk

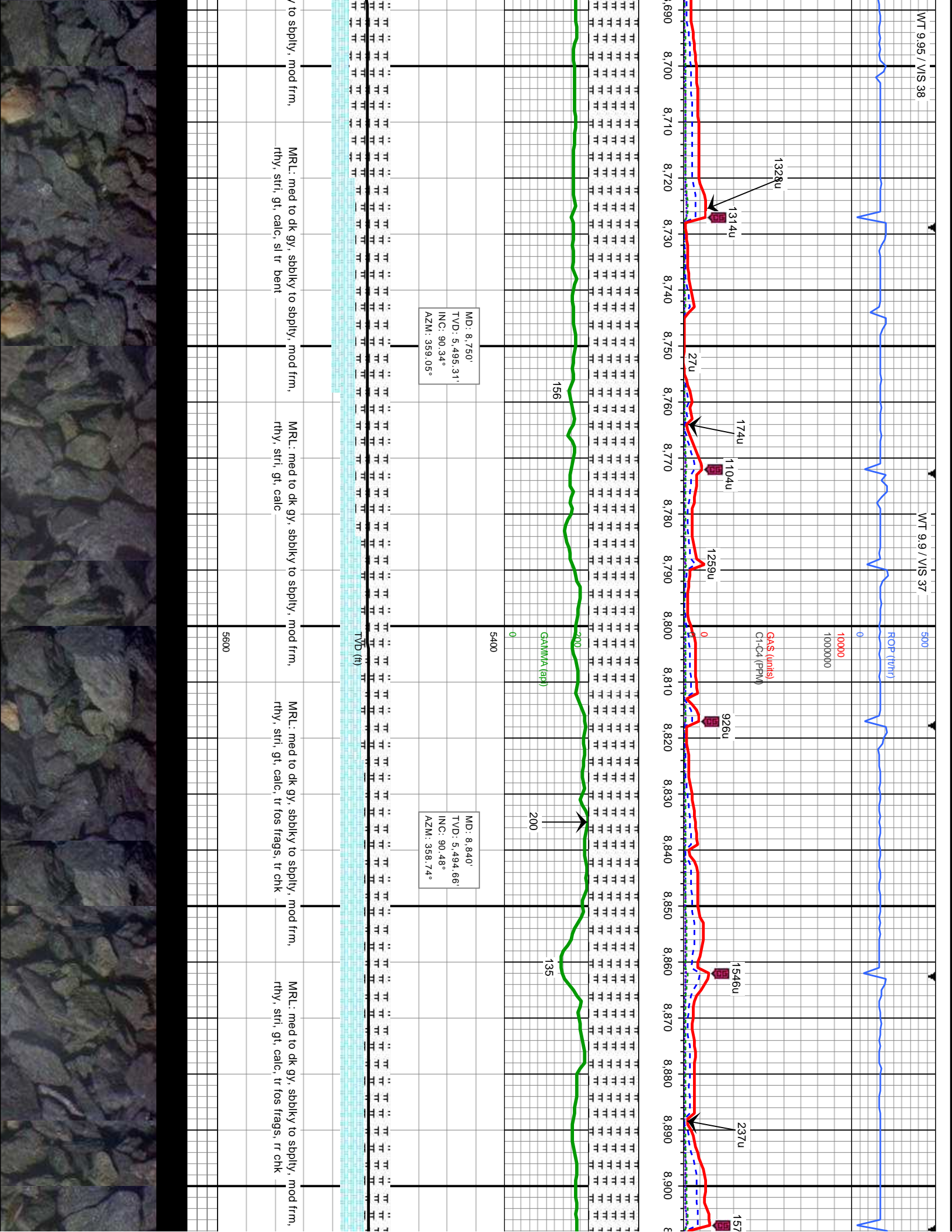
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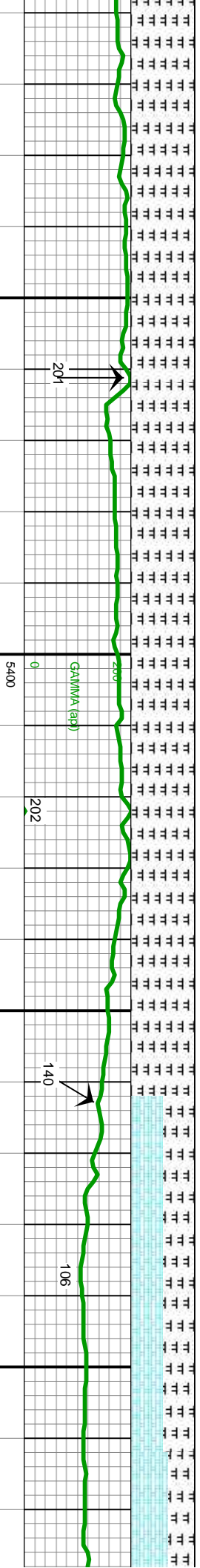
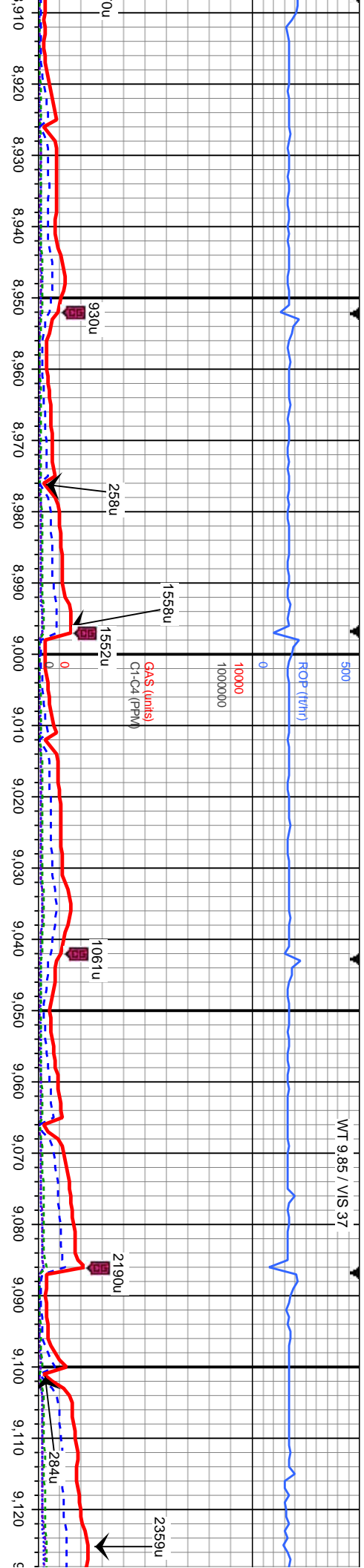
MRL: med to dk gy, sbblky to sbply, mod frm, rthy, stri, gt, calc, sl tr bent, tr chk

MRL:
rthy,

5600







MD: 8,930'
TVD: 5,493.99'
INC: 90.38°
AZM: 358.83°

MD: 9,020'
TVD: 5,493.42'
INC: 90.34°
AZM: 359.44°

MRL: med to dk gy, sblbky to sblply, mod frm, rthy, stri, gt, calc, tr fos frags, rr chk

MRL: med to dk gy, sbbly to sbply, mod frm, rthy, stri, gt, calc, tr fos frags, tr chk

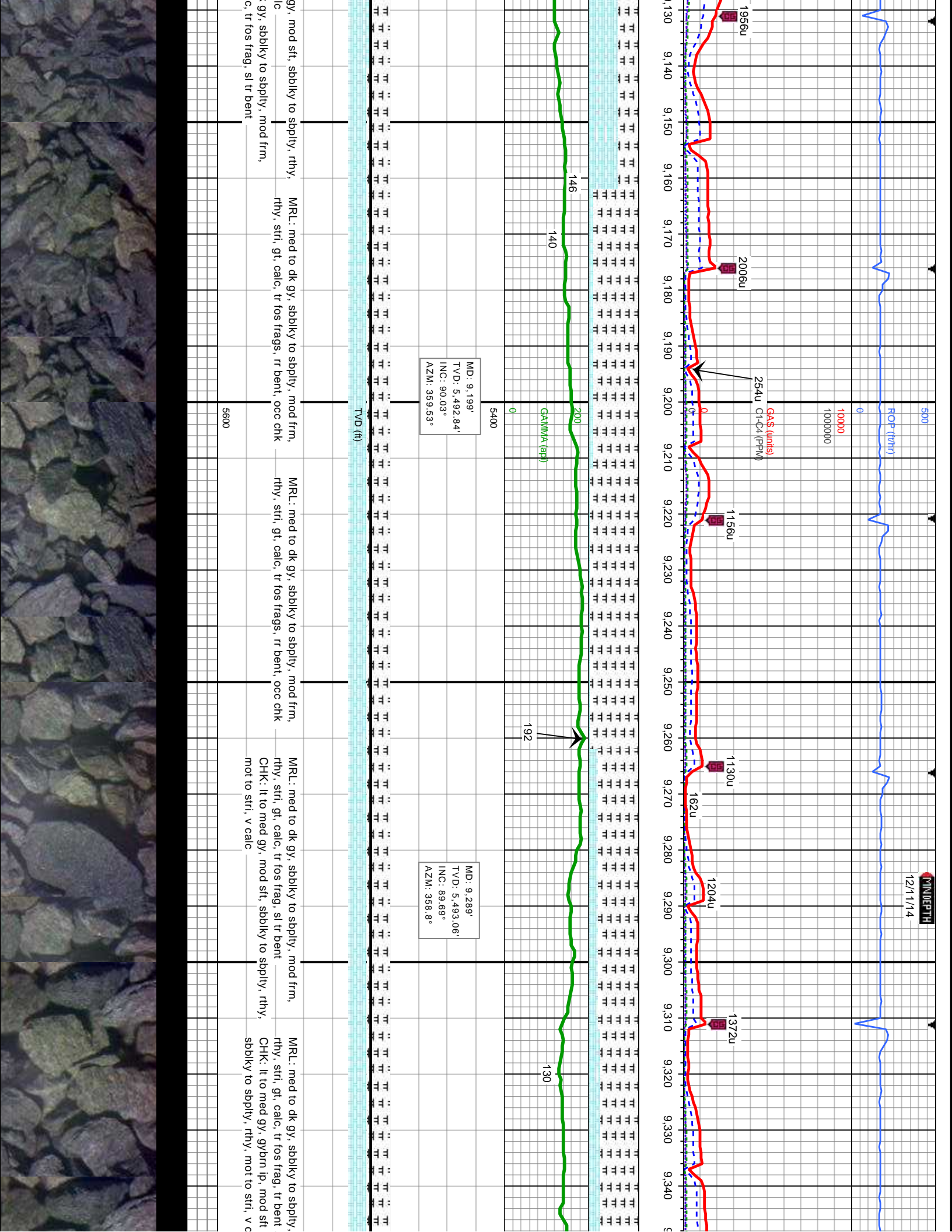
MRL: med to dk gy, sbbly to sbbly, mod frm, rthy, stri, gt, calc, tr fos frags

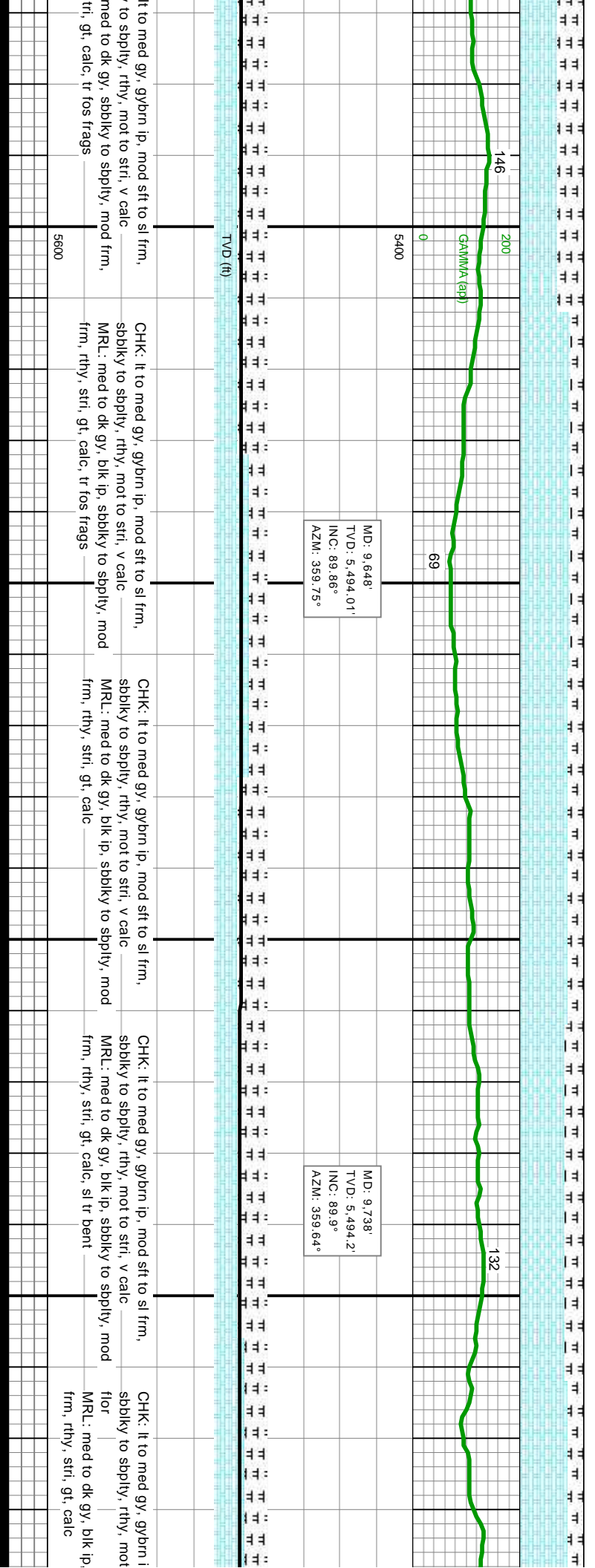
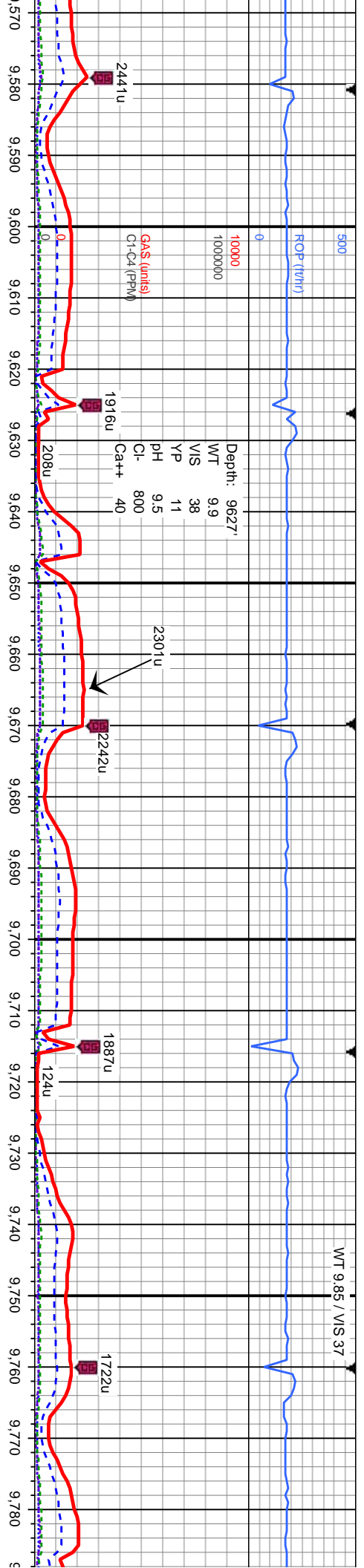
MRL: med to dk gy, sbbkly to spbly, mod frm, rthy, stri, gt, calc, tr fos frag, sl tr bent
CHK: lt to med gy, mod sft, sbbkly to spbly, r
mot to stri, v calc

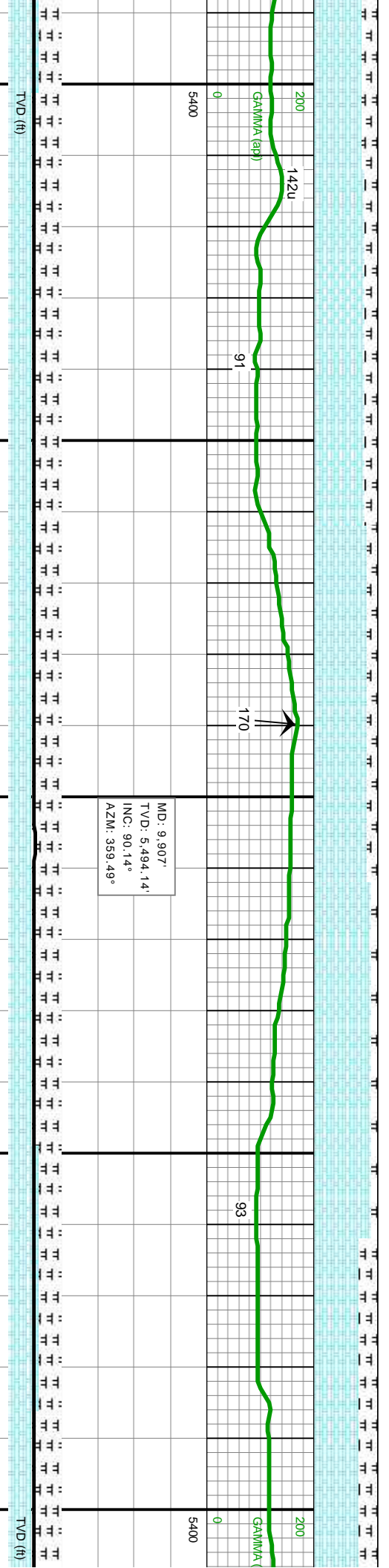
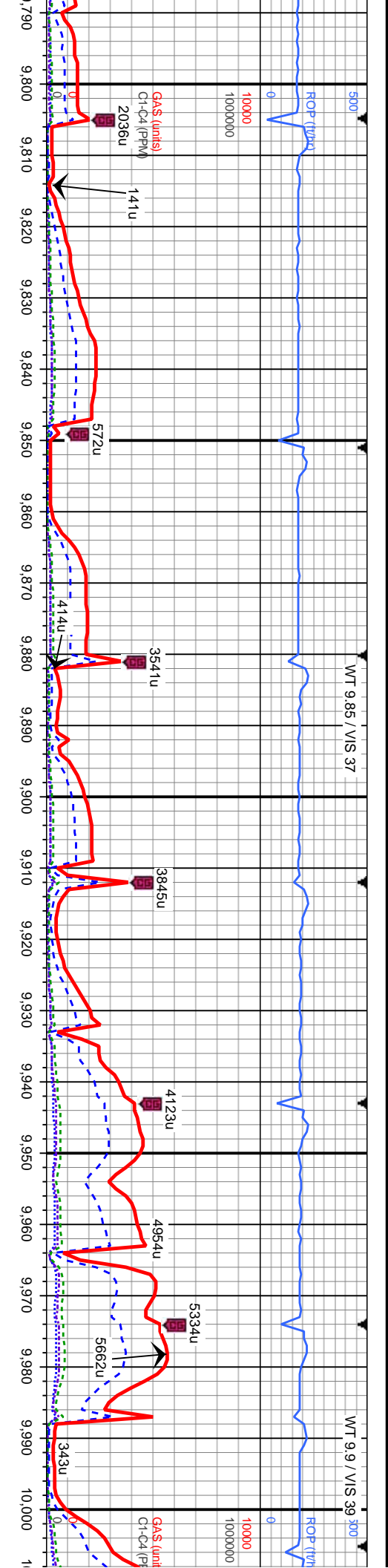
CHK: It to med
mot to stri, v ca
MRL: med to dk
rthy, stri, gt, cal

TVD (ft)

5600



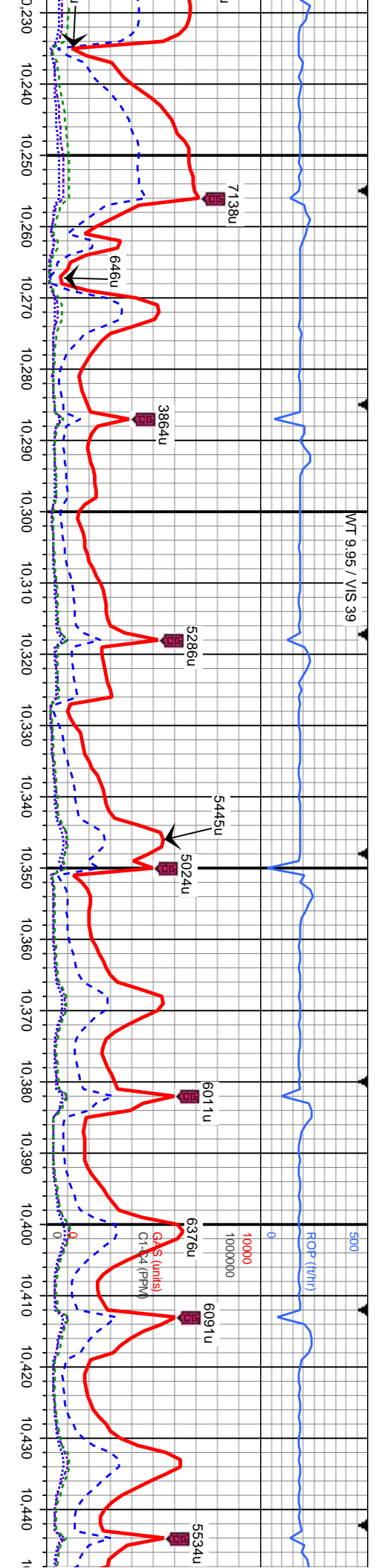




MD: 9.907'
TVD: 5,494.14'
INC: 90.14°
AZM: 359.49°

p, mod sft to sl frm, sbbiky to sbbiky, rthy, mot to stri, v calc, dul gn	CHK: It to med gy, gybrn ip, mod sft to sl frm, sbbiky to sbbiky, rthy, mot to stri, v calc, dul gn	CHK: It to med gy, gybrn ip, mod sft to sl frm, sbbiky to sbbiky, rthy, mot to stri, v calc, dul gn	CHK: It to med gy, gybrn ip, mod sft to sl frm, sbbiky to sbbiky, rthy, mot to stri, v calc, dul gn	CHK: It to med gy, gybrn ip, mod sft to sl frm, sbbiky to sbbiky, rthy, mot to stri, v calc, dul gn	CHK: It to med gy, gybrn ip, mod sft to sl frm, sbbiky to sbbiky, rthy, mot to stri, v calc, dul gn
sbbiky to sbbiky, mod	frn, rthy, stri, gt, calc, sl tr bent	rthy, stri, gt, calc, tr fos frag, sl tr bent	frn, rthy, stri, gt, calc, sl tr bent	frn, rthy, stri, gt, calc, sl tr bent	frn, rthy, stri, gt, calc, sl tr bent
5600					



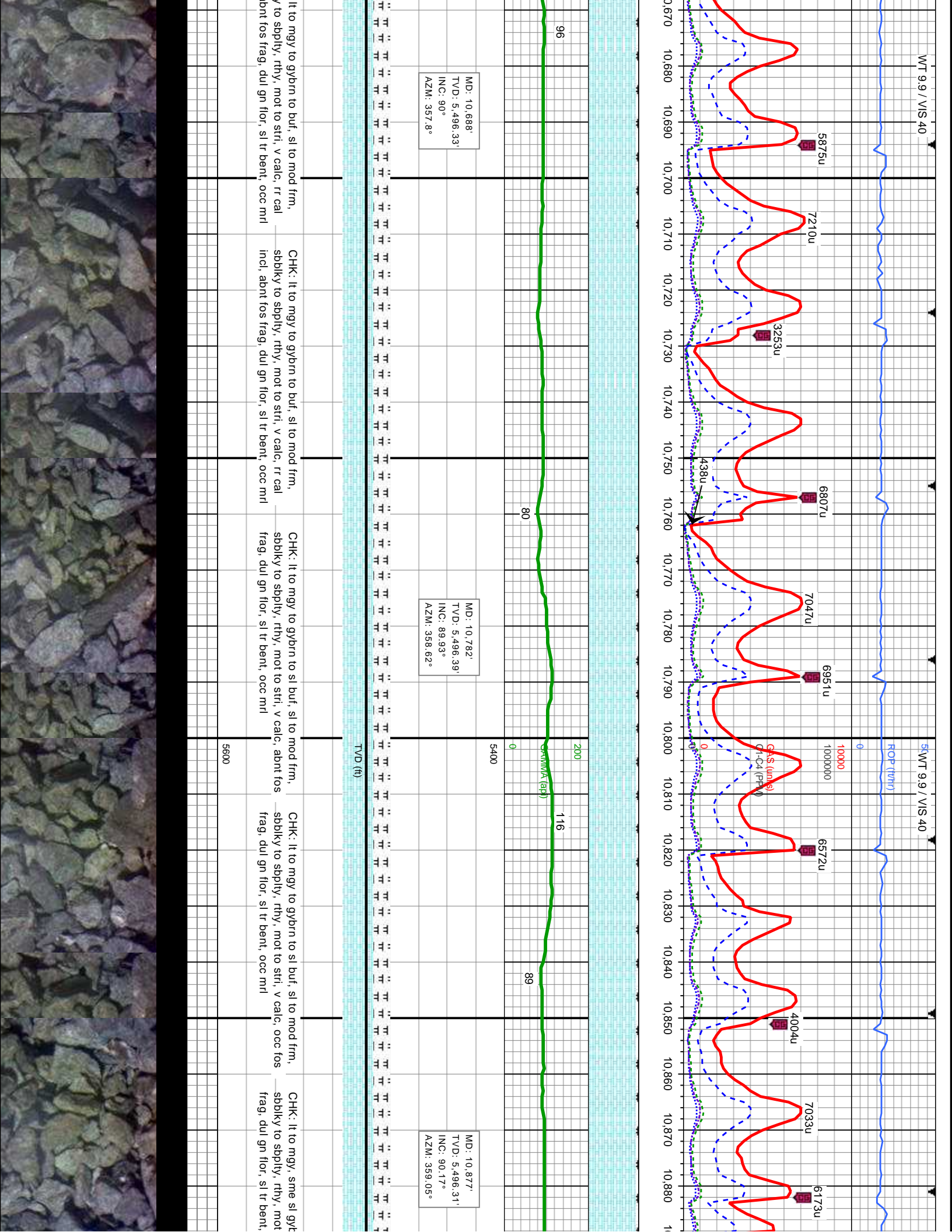


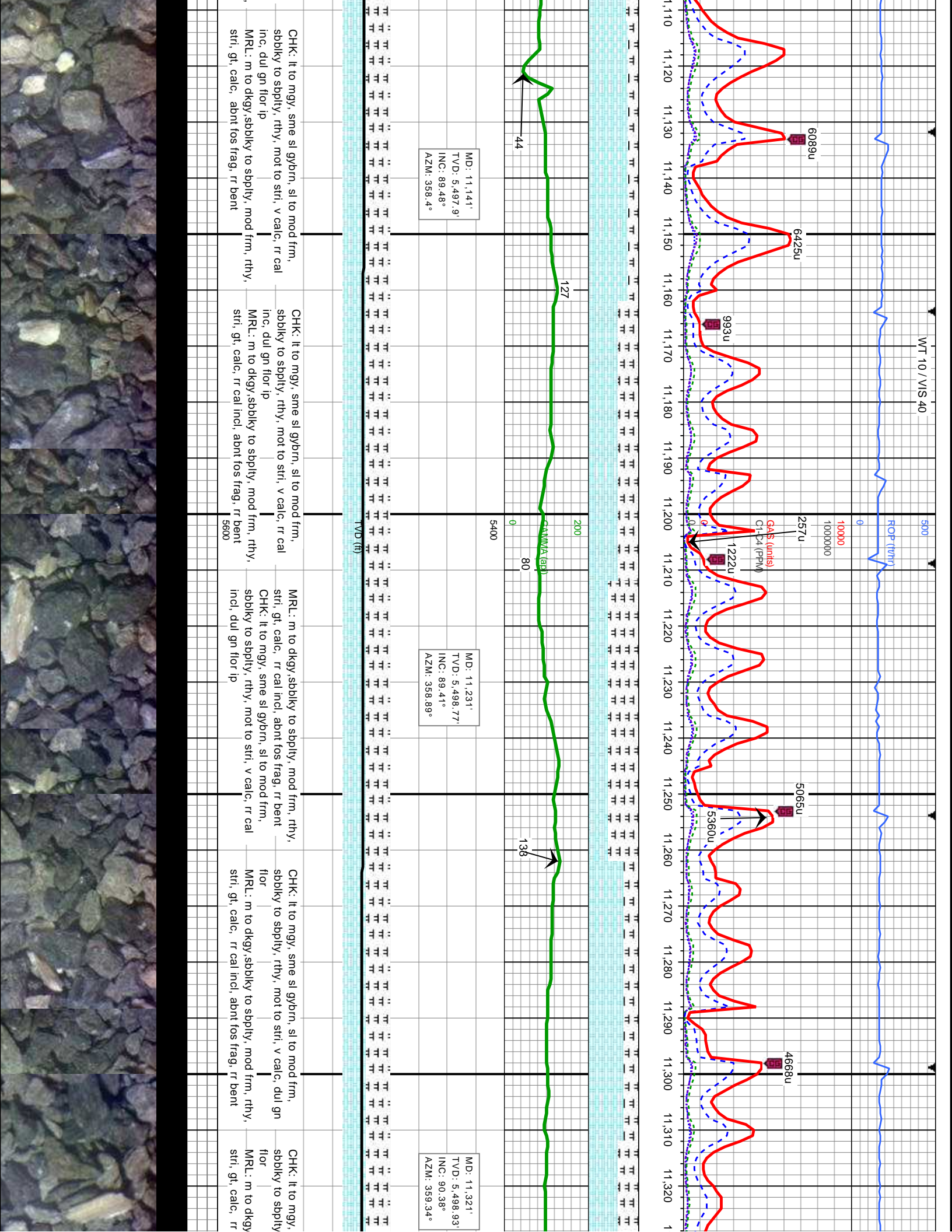
MD: 10,313'
TVD: 5,495.07'
INC: 89.9°
AZM: 356.99°

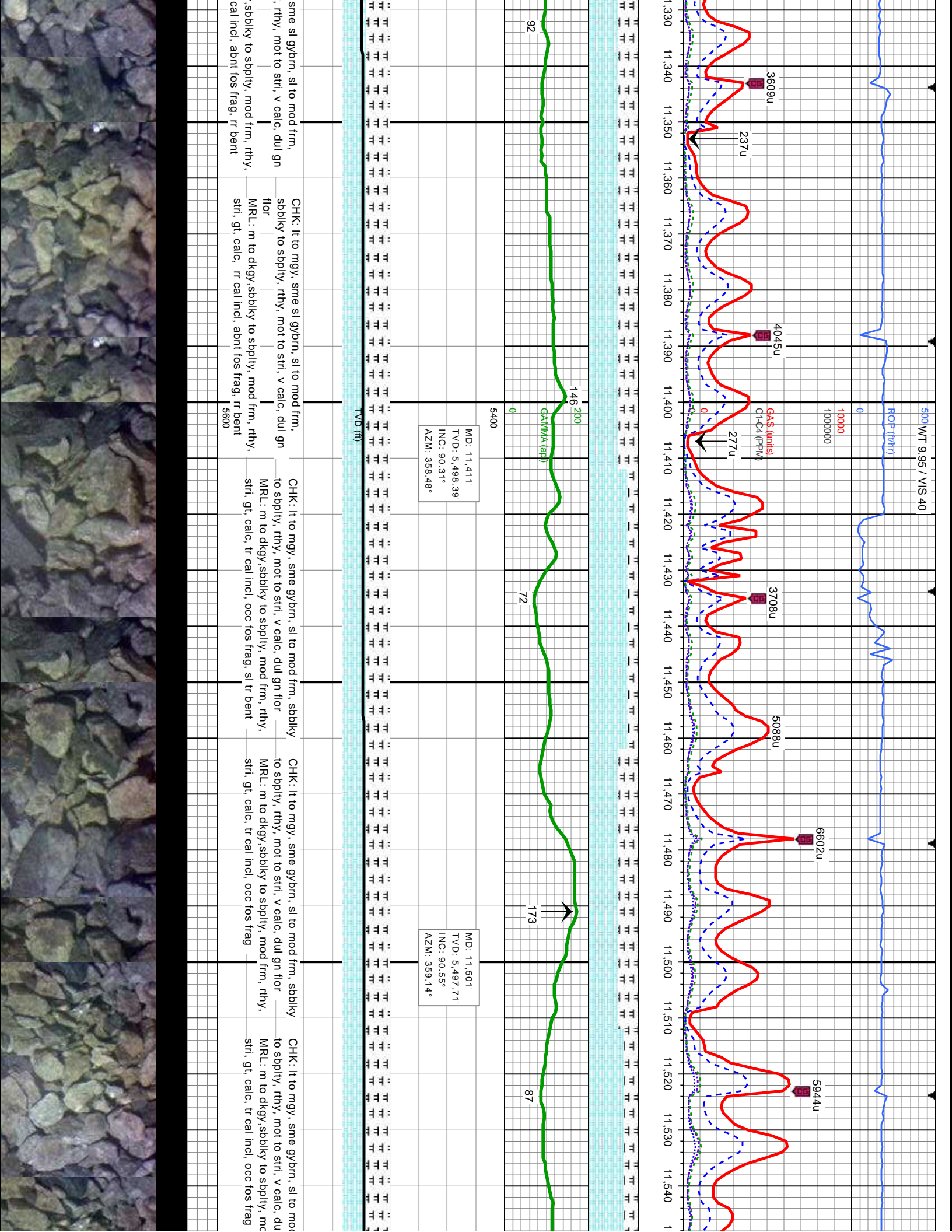
MD: 10,407'
TVD: 5,495.29'
INC: 89.83°
AZM: 356.95°

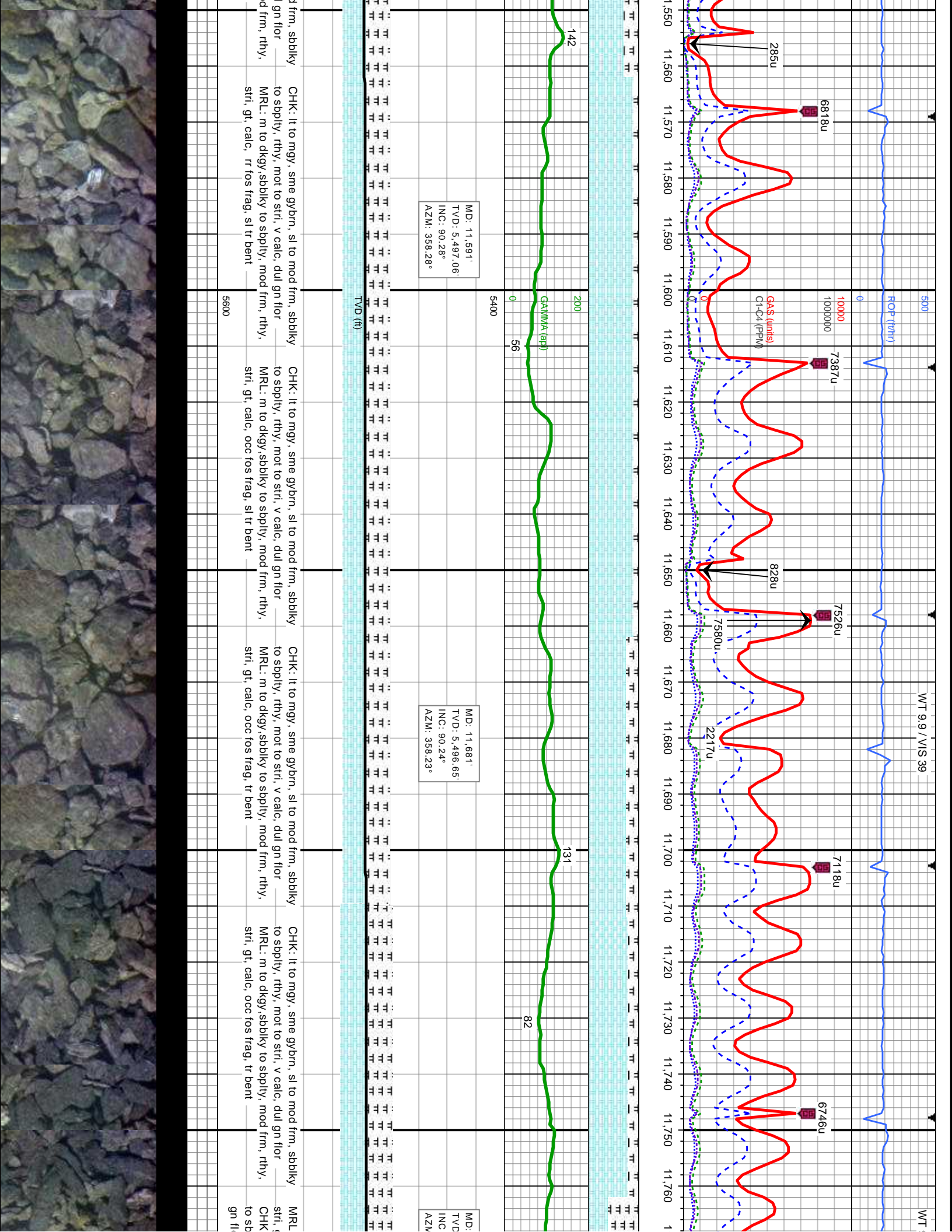
to gybn to buf, mod sft to sl frm, , rthy, mot to strf, v calc, sl tr fos occ mrl	CHK: It to mgy to gybn to buf, sl to mod frm, —sbbky to sbply, rthy, mot to strf, v calc, tr fos frag, dui gn flor, occ mrl	CHK: It to mgy to gybn to buf, sl to mod frm, —sbbky to sbply, rthy, mot to strf, v calc, tr fos frag, dui gn flor, occ mrl	CHK: It to mgy to gybn to buf, sl to mod frm, —sbbky to sbply, rthy, mot to strf, v calc, tr fos frag, dui gn flor, occ mrl	CHK: It to mgy to gybn to buf, sl to mod frm, —sbbky to sbply, rthy, mot to strf, v c incl, occ fos frag, dui gn flor, occ mr
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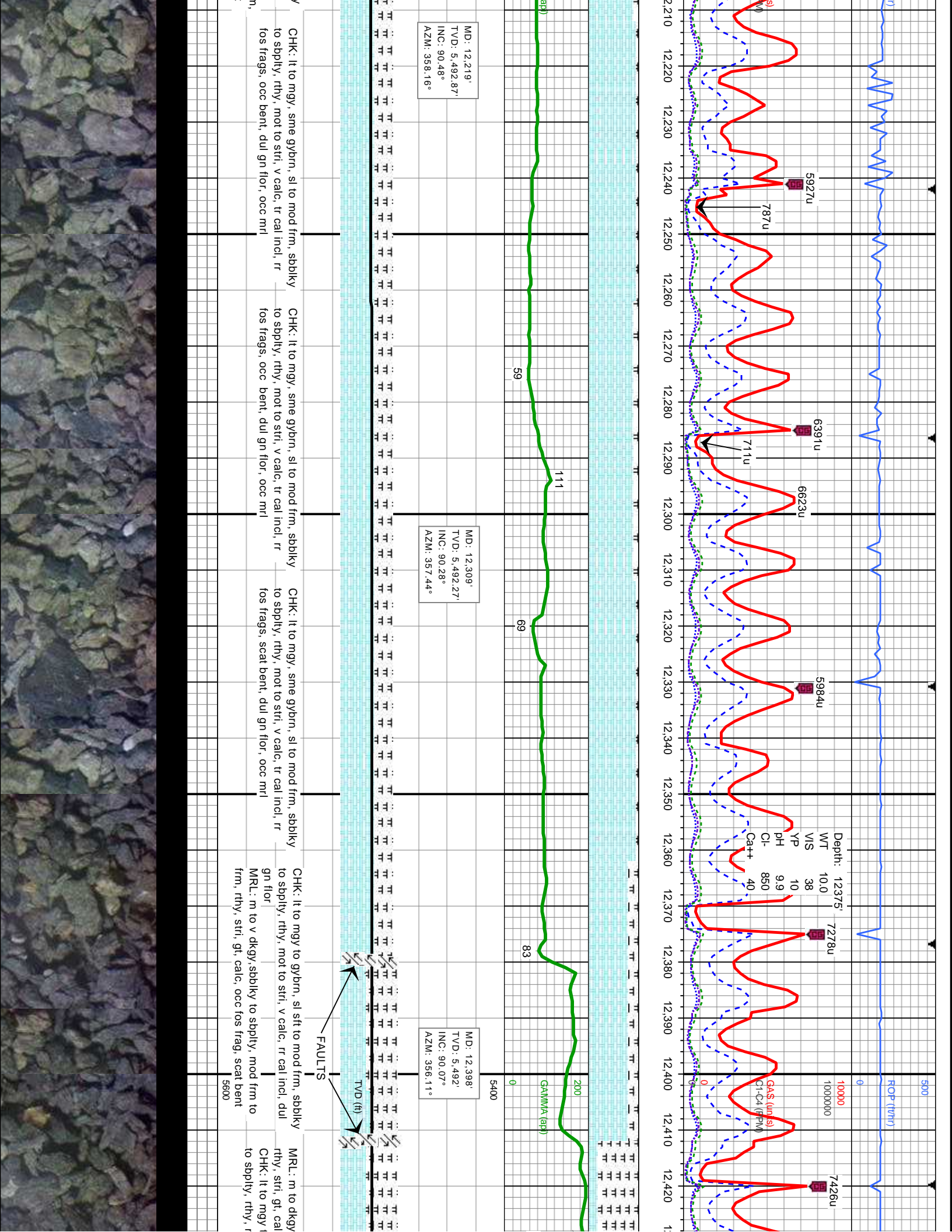


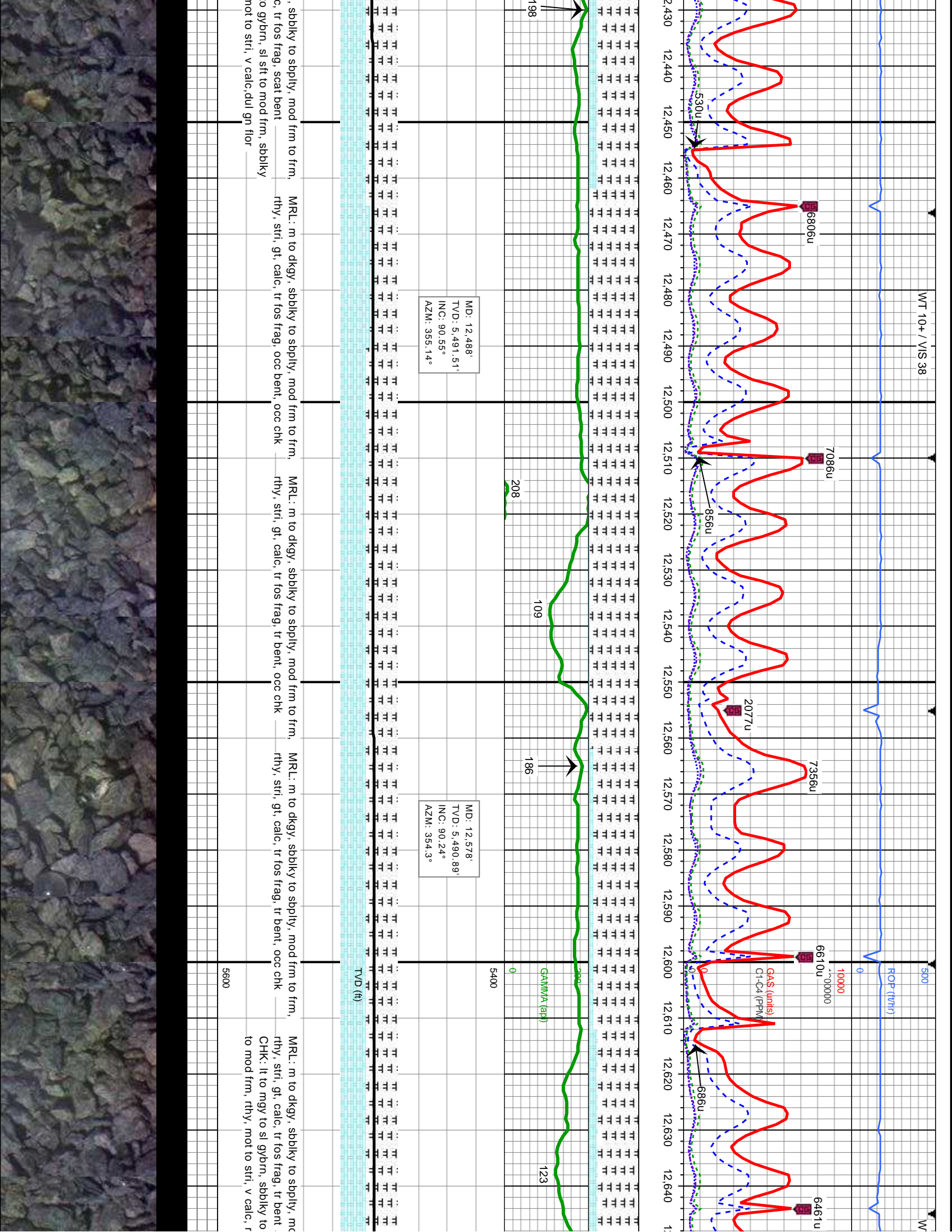


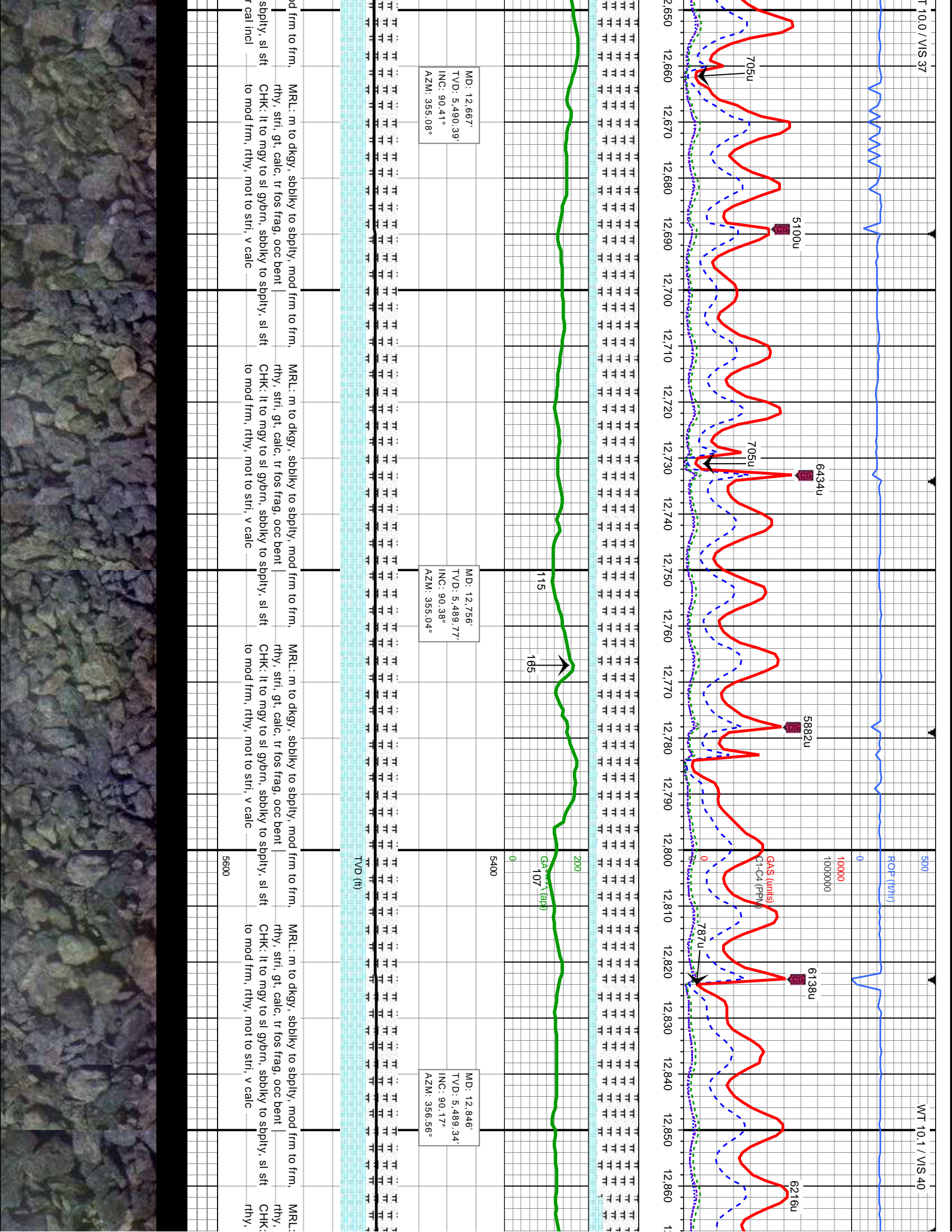


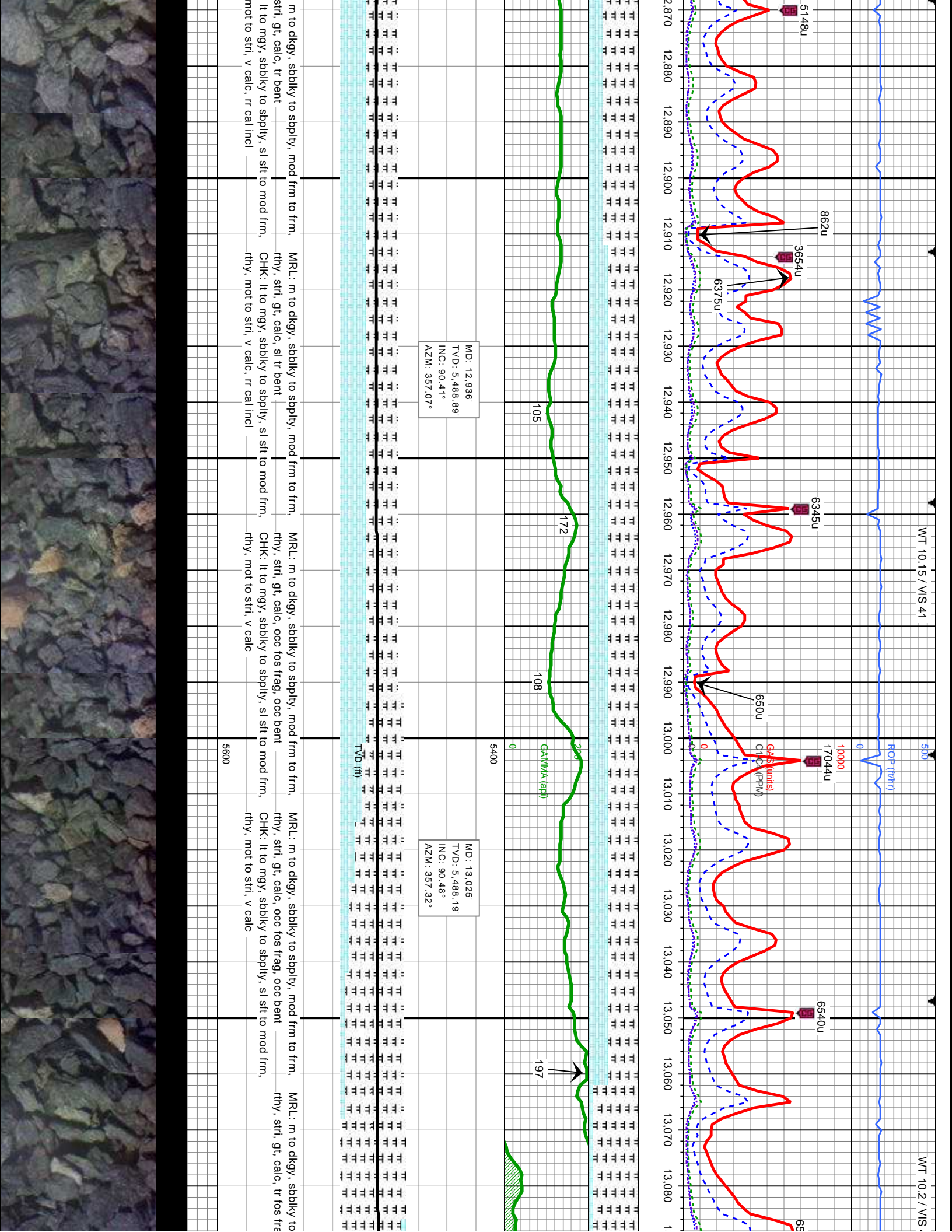


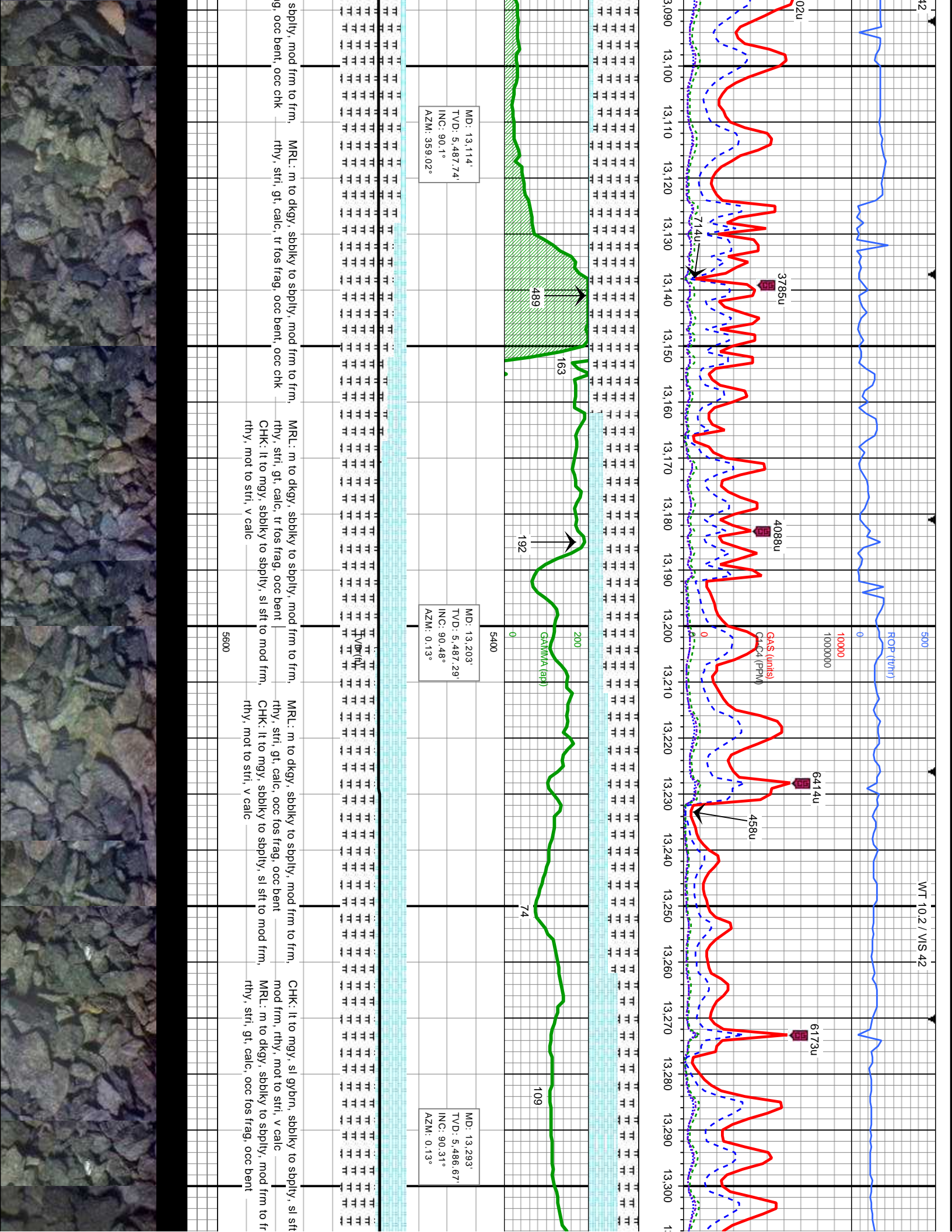


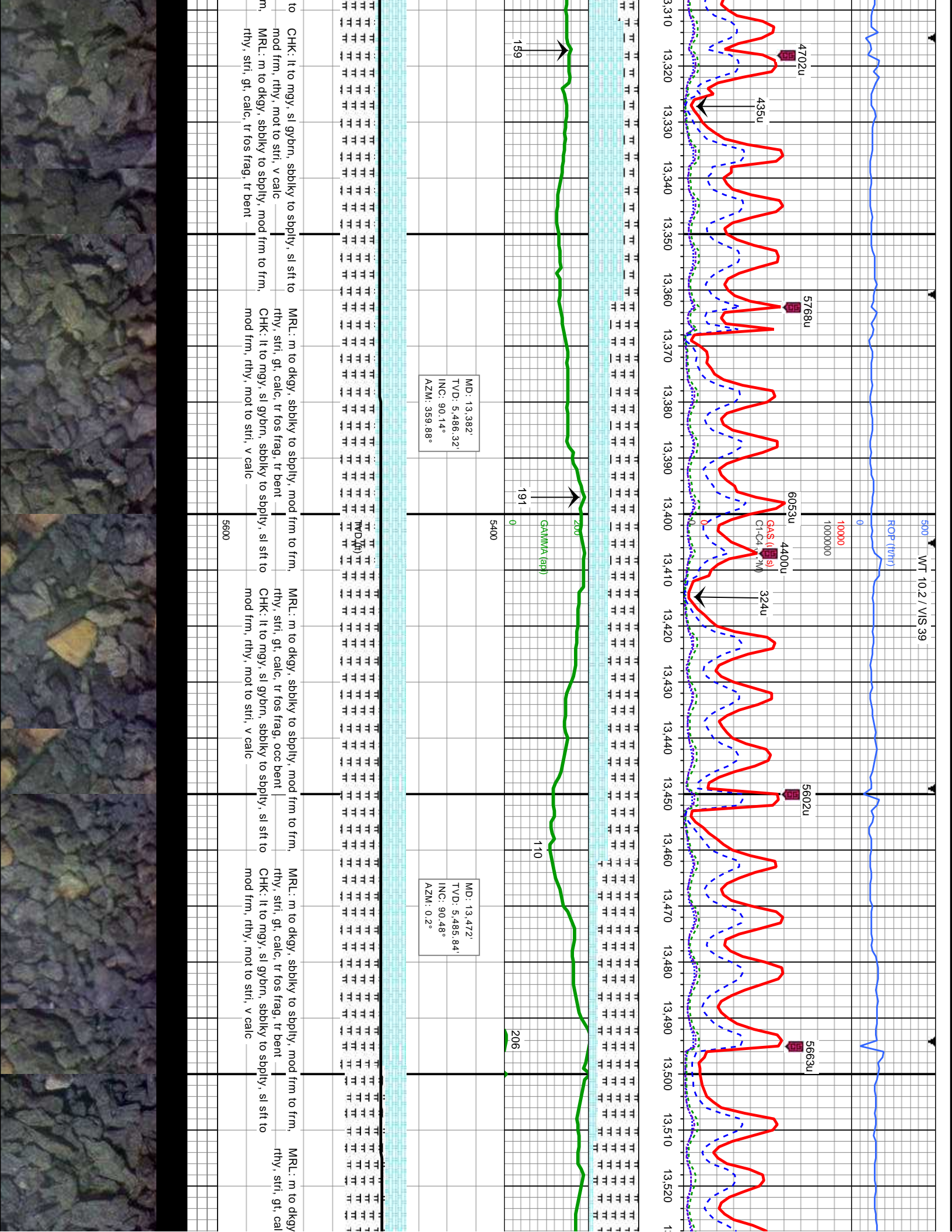


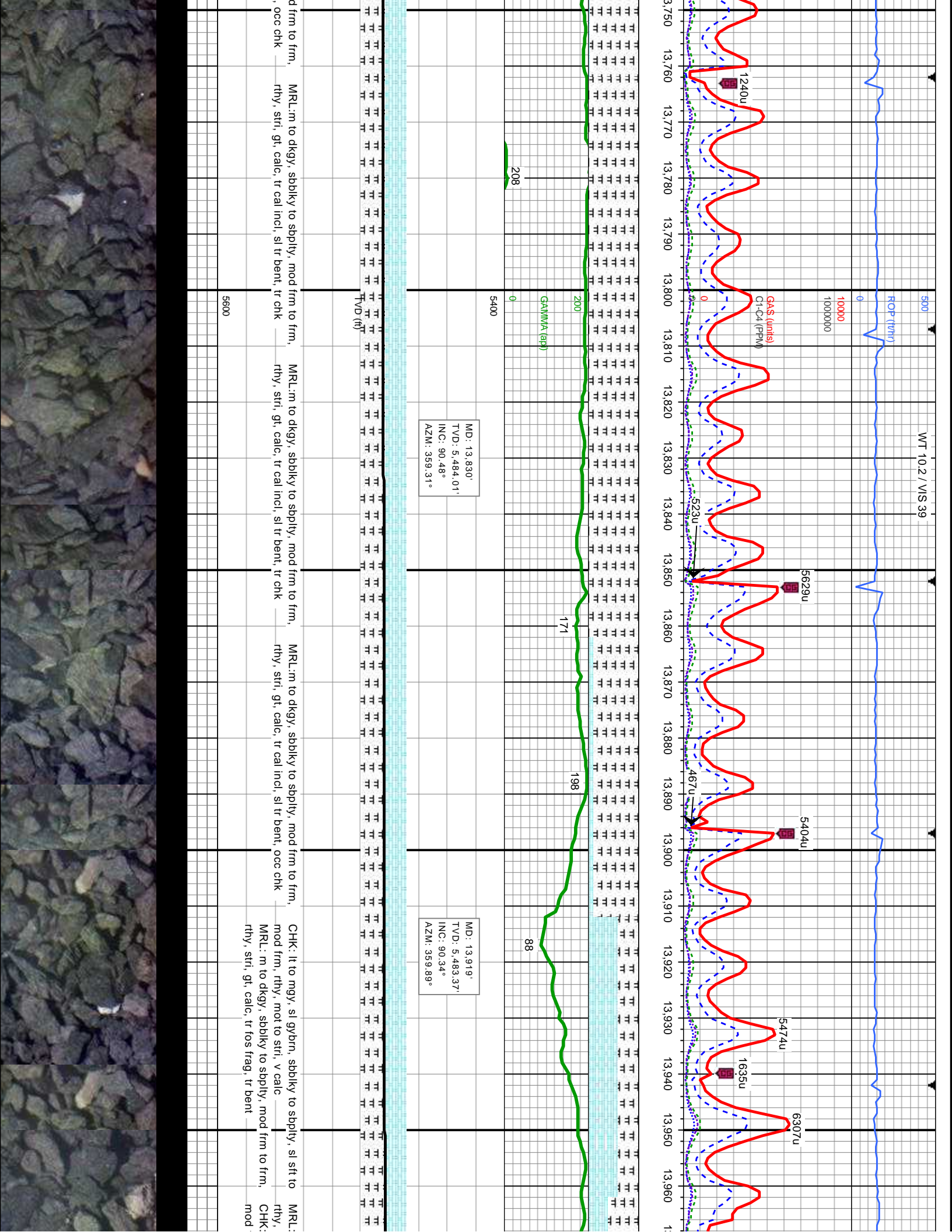


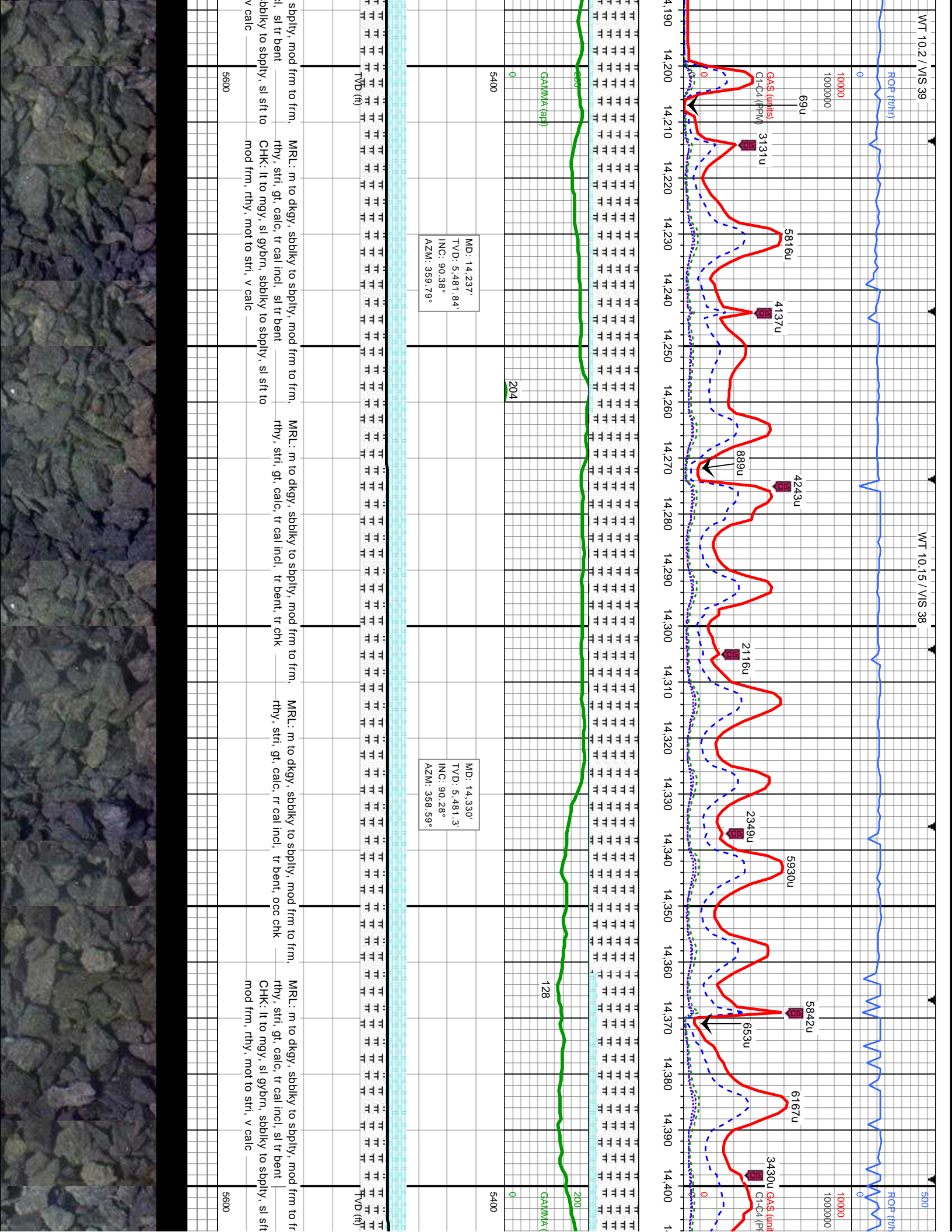


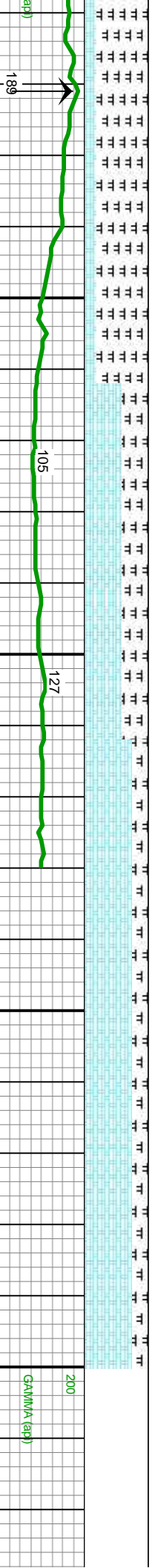
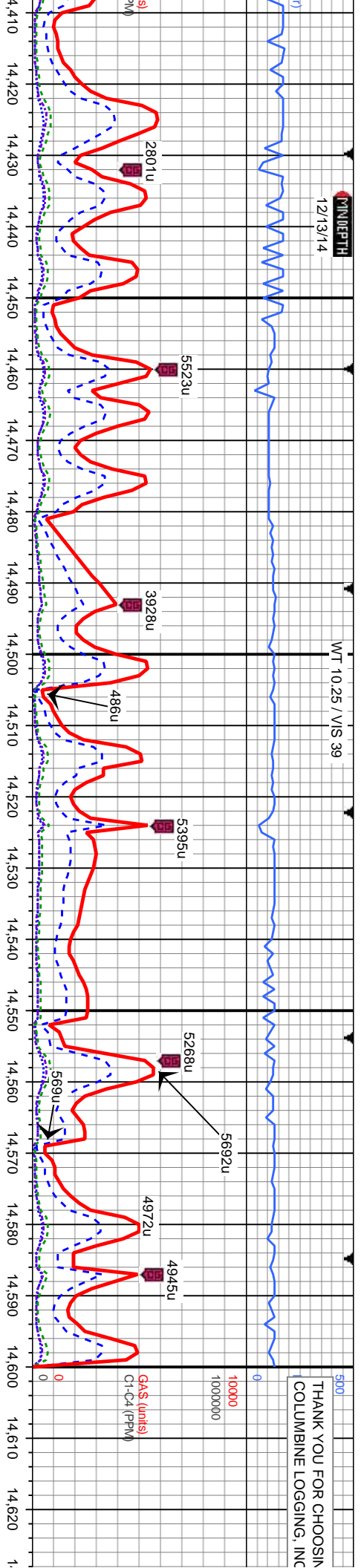












MD: 14,424'
TV D: 5,480.76
INC: 90.38°
AZM: 357.73°

MD: 14,517'
TV D: 5,480.01'
INC: 90.55°
AZM: 357.78°

MD: 14,533'
TV D: 5,479.86
INC: 90.52°
AZM: 358.08°

PROJECTION TO BIT

MD: 14,600'
 TVD: 5,479.25
 INC: 90.52°
 AZM: 358.08°

PROJECTION TO BIT

TD @ MD 14600'
01:52 MST, 12/13/14

Bit Data

[illegible]

