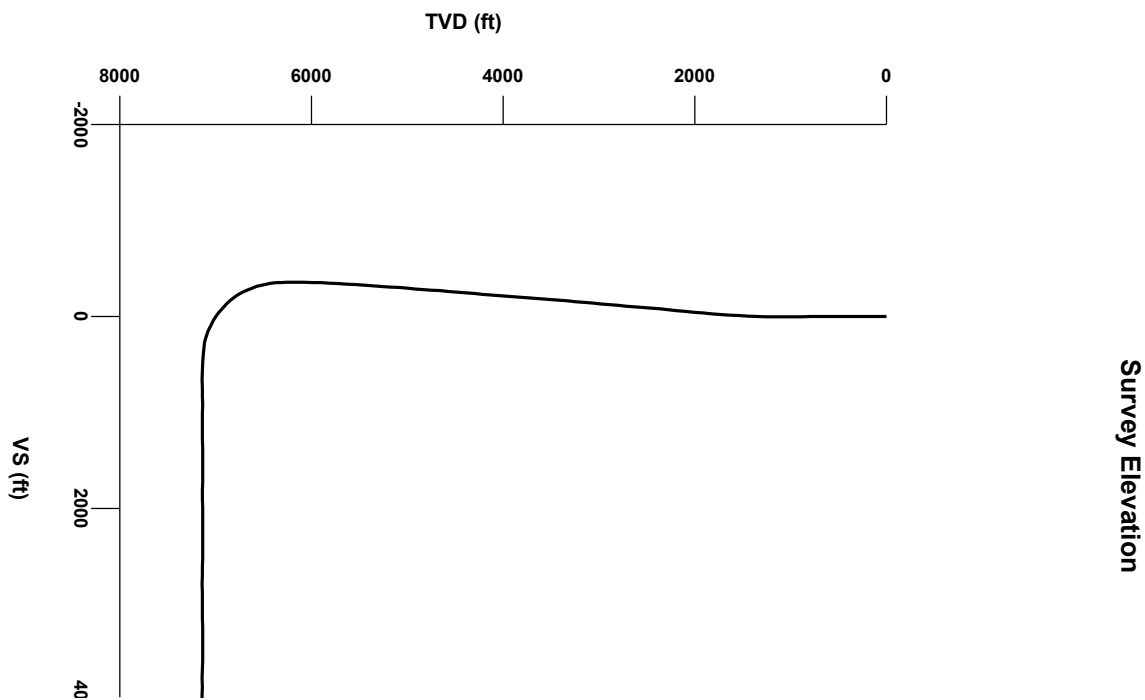


LOG created using L PLOT VH Version 3.0, November 08, 2013, Copyright (C) 1999-2009 Pason Systems Corp.

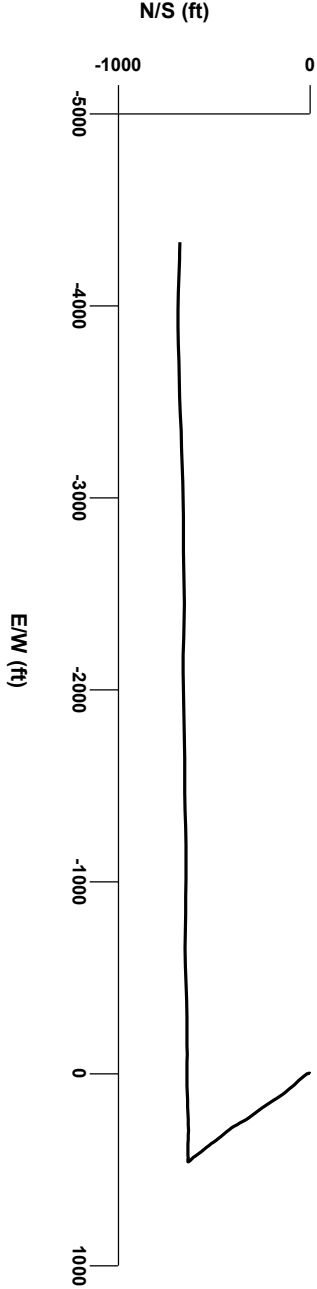
OPERATOR: NOBLE ENERGY INC.
WELL: SCHAFER K16-64-1HN
LOCATION: NESE SEC16 T4N R66W
COUNTY: WELD
STATE: COLORADO
SPOT: 2284' FSL, 340' FEL
ELEVATION: 4744' GL, 4760' KB
FIELD: WATTENBERG
SPUD DATE: 10/30/13
TD DATE: 11/7/13
DATES LOGGED: 11/1/13 - 11/7/13
DEPTHS LOGGED: 595' - 11642'
GEOLOGISTS: GARY MYERS, MOHAMMED ALMUBARAK
DRILLING FLUID: LSND
DRILLING RIG: PRECISION 828
API: 05-123-37807
LOG TYPE: HORIZONTAL
SCALE: 1:240 (5 inches per 100 feet)
REMARKS: WELLSITE GEOLOGICAL SERVICES PROVIDED BY COLUMBINE LOGGING INC.

LOG CONTINUES FROM FILE: Schafer K16-64-1HN Vert.lplot



Survey Elevation

Survey Plan



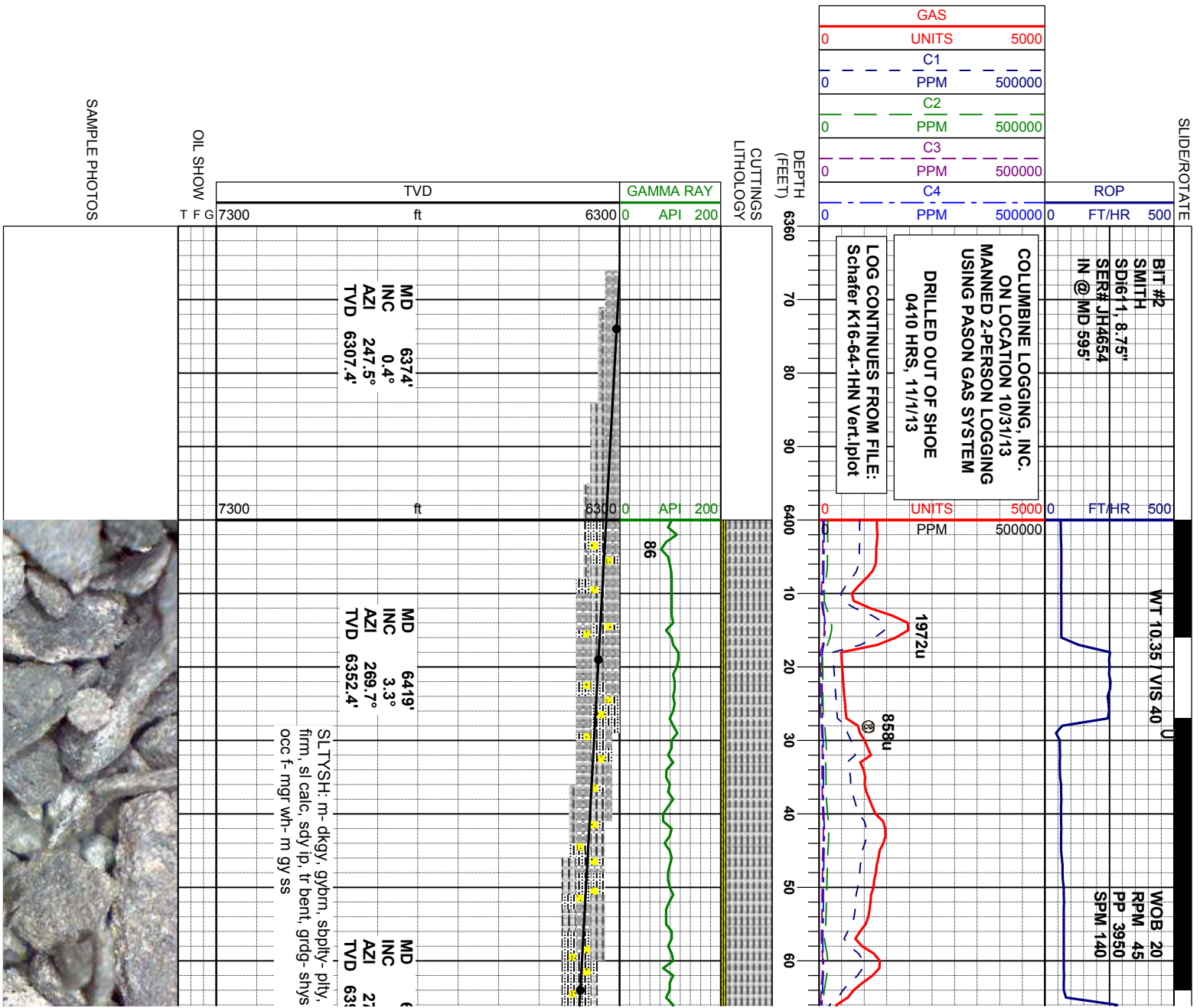
6000

Figure 1 displays five 10x10 grids representing different rock types, each with a corresponding label to its right:

- Chalk:** A grid of light blue squares.
- Marl:** A grid of light blue squares with horizontal lines.
- Sandstone:** A grid of yellow squares.
- Shaly Sandstone:** A grid of yellow squares with horizontal lines.
- Silty Shale:** A grid of grey squares with horizontal lines.

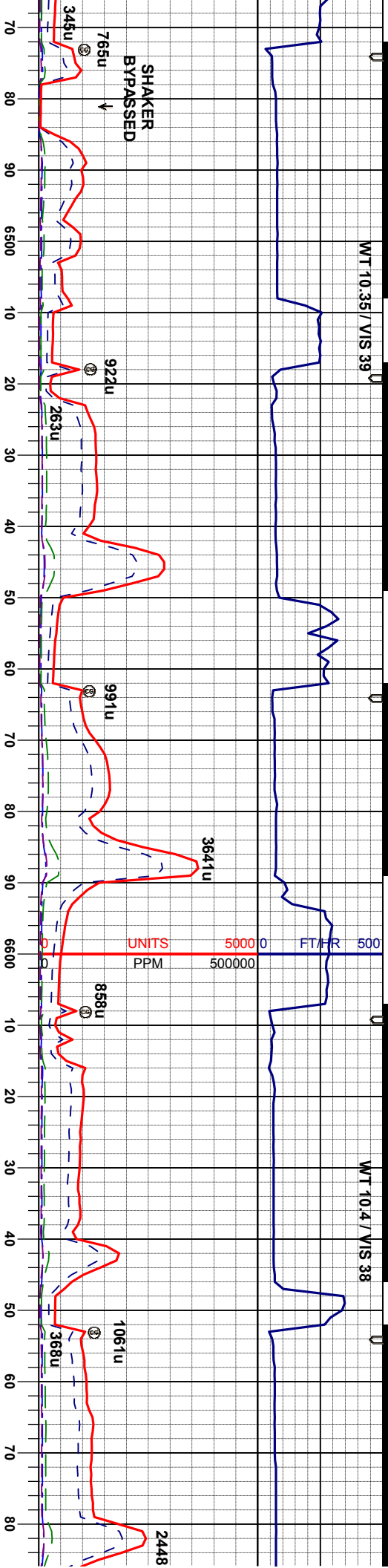
B	Bentonite
---	-----------

	Bit Change		Casing		Casing		Connection
	Connection Gas		Arrow		Midnight Depth		Normal Fault
	Arrow		Trip Gas				



WT 10.35 / VIS 39

WT 10.4 / VIS 38



BEGIN 30' SAMPLES
60' DESCRIPTIONS

MD 6509'
INC 10.2°
AZI 273.4°
TVD 6441.7'

MD 6554'
INC 12.6°
AZI 269.8°
TVD 6485.8'

MD 6599'
INC 14.6°
AZI 268.4°
TVD 6529.5'

MD 6644'
INC 16.6°
AZI 267.9°
TVD 6572.9'

MD
INC
AZI
TVD

SL TVSH: m- dkgy, gy/bm, sbply- pily, mod
firm, sl calc, sdy ip, grdg- shyss

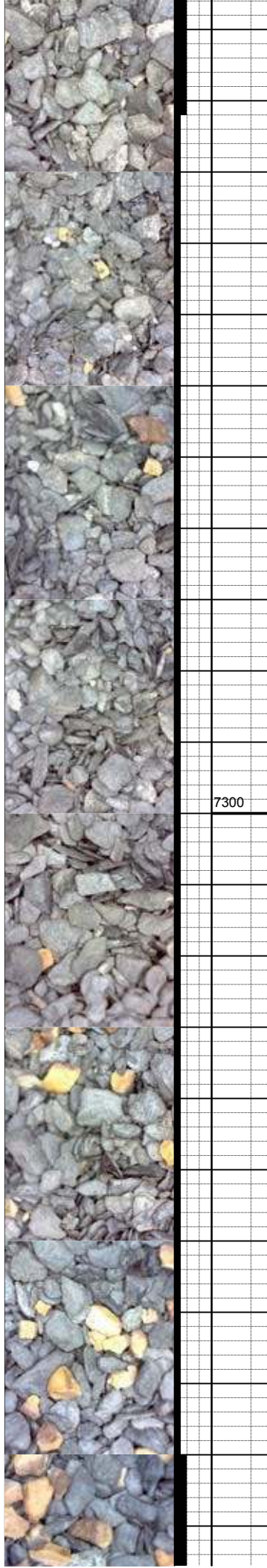
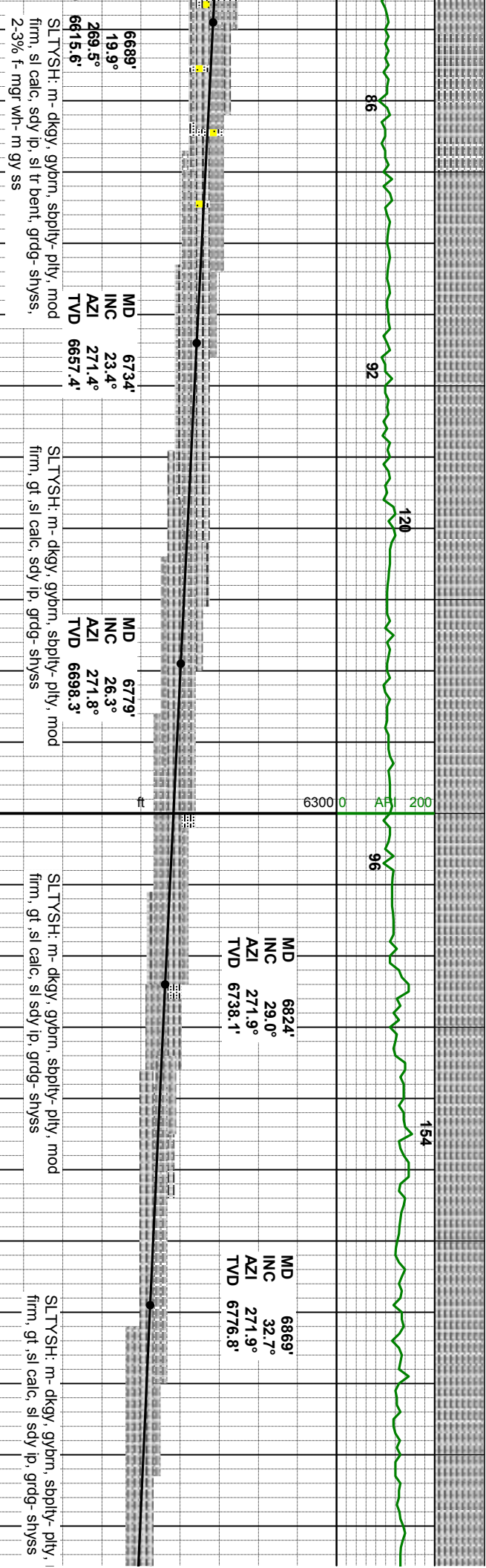
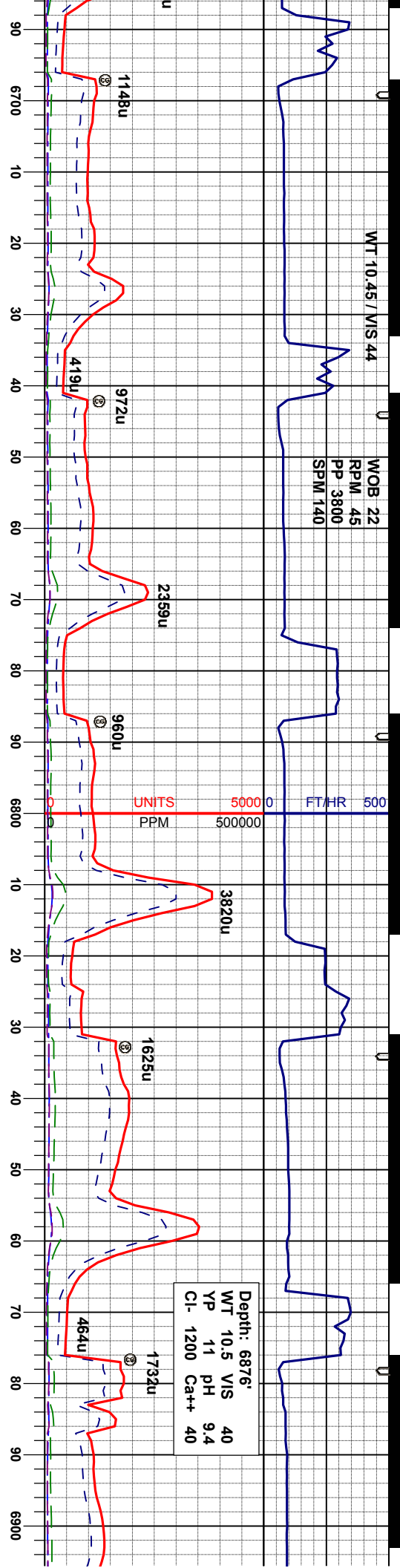
SL TVSH: m- dkgy, gy/bm, sbply- pily, mod
firm, sl calc, sdy ip, tr bent, grdg- shyss,
occ f- mgr wh- m gy ss

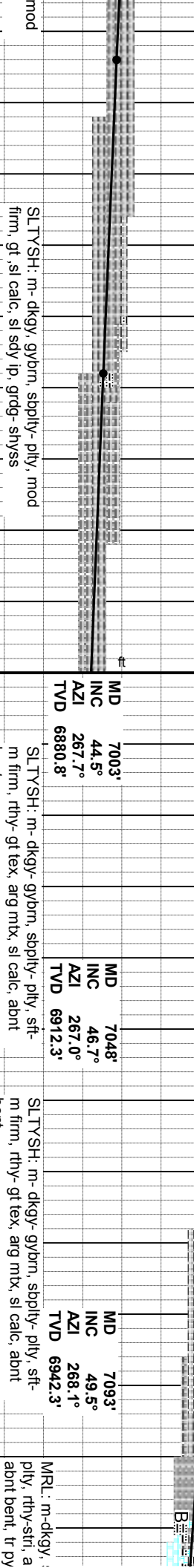
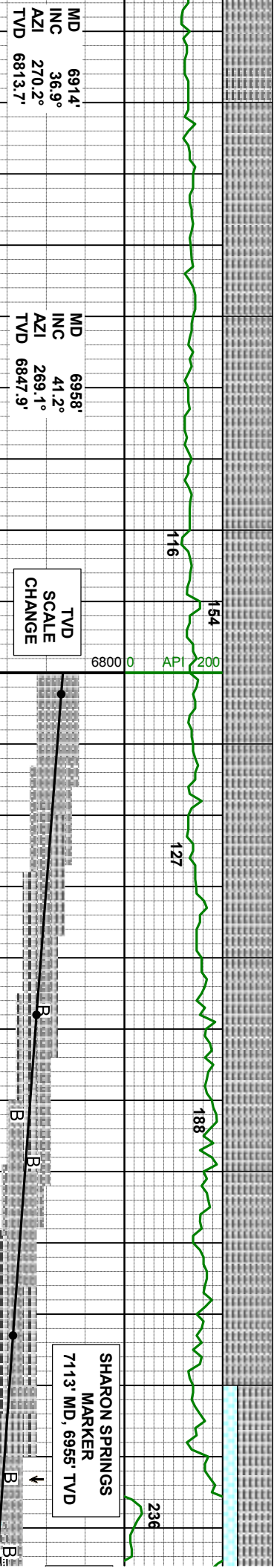
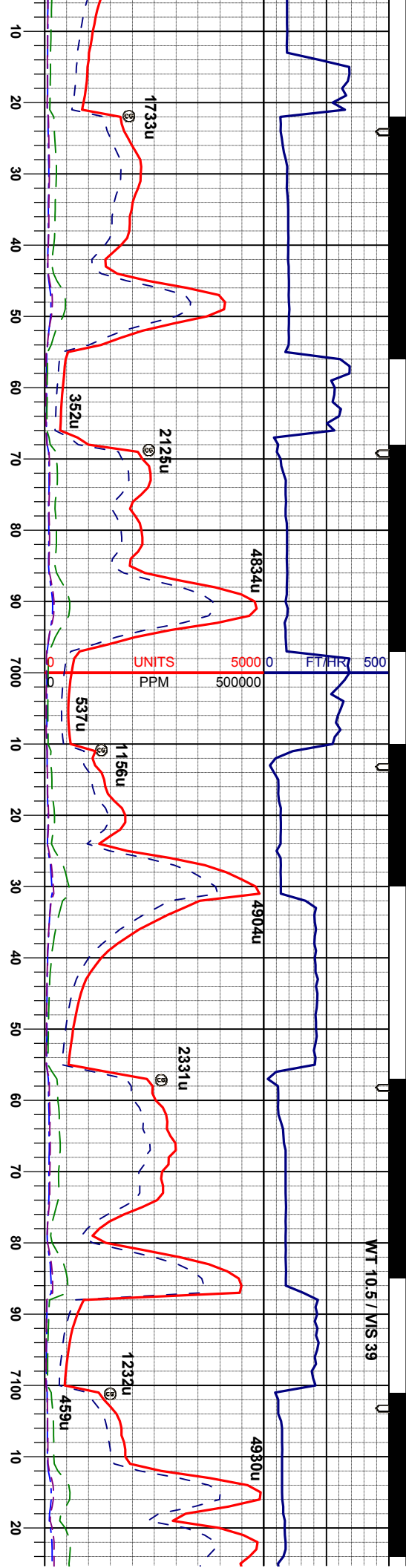
SL TVSH: m- dkgy, gy/bm, sbply- pily, mod
firm, sl calc, sdy ip, sl tr bent, grdg- shyss,
occ f- mgr wh- m gy ss

7300

6300 0 API 200

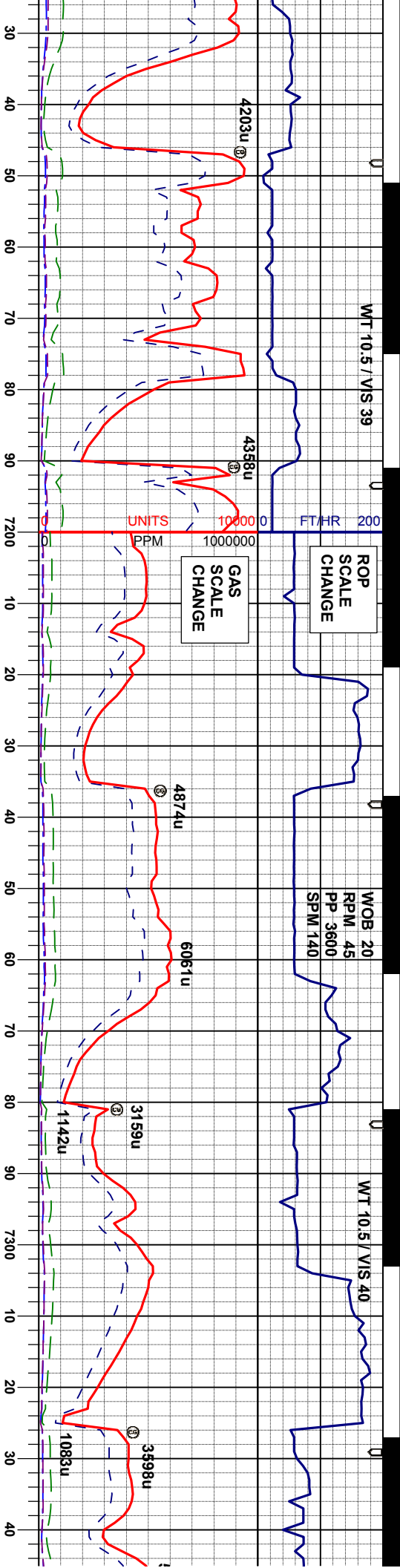






MR: m-dkgy, r
pily, rthy- str, a
abnt bent, tr py
CHK- wh-lt- mg
sbply- sbply, r
SLTYSH: m-dl
mod firm, mod





NIORARA A CHALK
LOGGER TOP
7149' MD, 6977' TVD

MD 7138'
INC 52.2°
AZI 268.4°
TVD 6970.8'

MD 7183'
INC 55.8°
AZI 268.4°
TVD 6997.2'

NIORARA B CHALK
LOGGER TOP
7250' MD, 7032' TVD

MD 7273'
INC 62.8°
AZI 269.8°
TVD 7043.2'

MD 7318'
INC 65.5°
AZI 270.2°
TVD 7062.8'

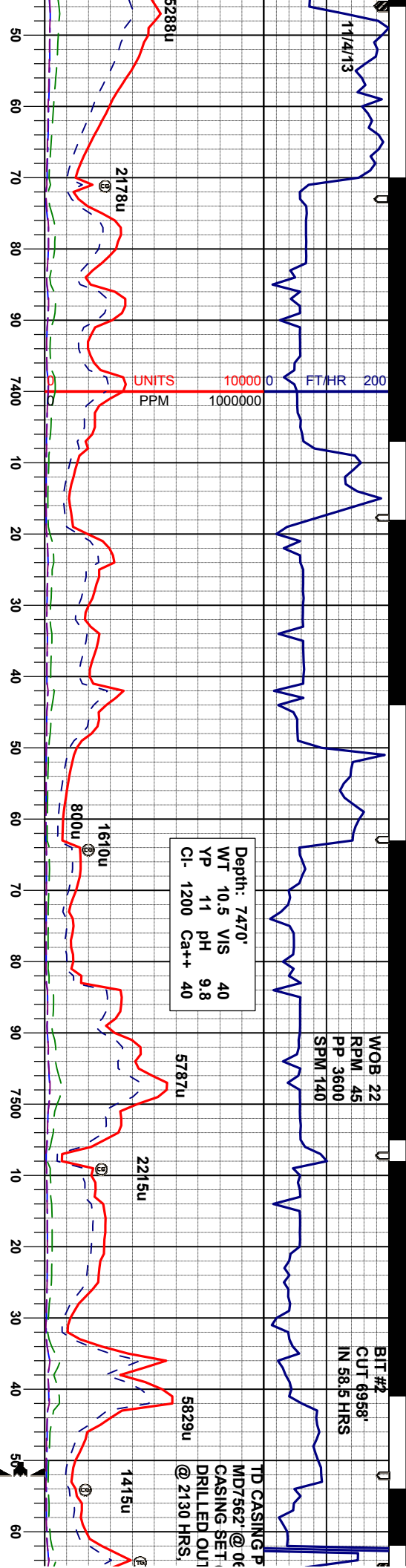
sft- mfirm, sbblky-sbply, tr
rg, org/calc mtx, mod calc,
y, mot, sft- sl firm, sl arg,
thy lstr, vcalc
ky, occ lt gy, ply- sbply,
srt, gt lex, sl calc

MRL: m-dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- str, arg, org/calc mtx, mod calc,
scat bent, occ fos frag
CHK: gy - mgy, sbblky-sbply, mot, sft- sl
firm, sl arg, rthy- mot lstr, vcalc

CHK: lt- mgy, sme mod dk gy, sbblky-
sbply, mot, sft- sl firm, sl arg, rthy- mot lstr,
vcalc
MRL: m-dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- str, arg, org/calc mtx, mod calc,
tr bent

MRL: m-dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- str, arg, org/calc mtx, mod calc,
tr bent
CHK: lt- mgy, sbblky-sbply, mot, sft- sl
firm, sl arg, rthy- mot lstr, vcalc





MD 7363'
INC 68.4°
AZI 270.7°
TVD 7080.4'

TVD
SCALE
CHANGE

MD 7408'
INC 72.3°
AZI 270.0°
TVD 7095.5'

MD 7452'
INC 75.7°
AZI 269.5°
TVD 7107.6'

MD 7497' MD 7507'
INC 79.8° INC 81.3°
AZI 269.0° AZI 268.8°
TVD 7117.2' TVD 7118.8'

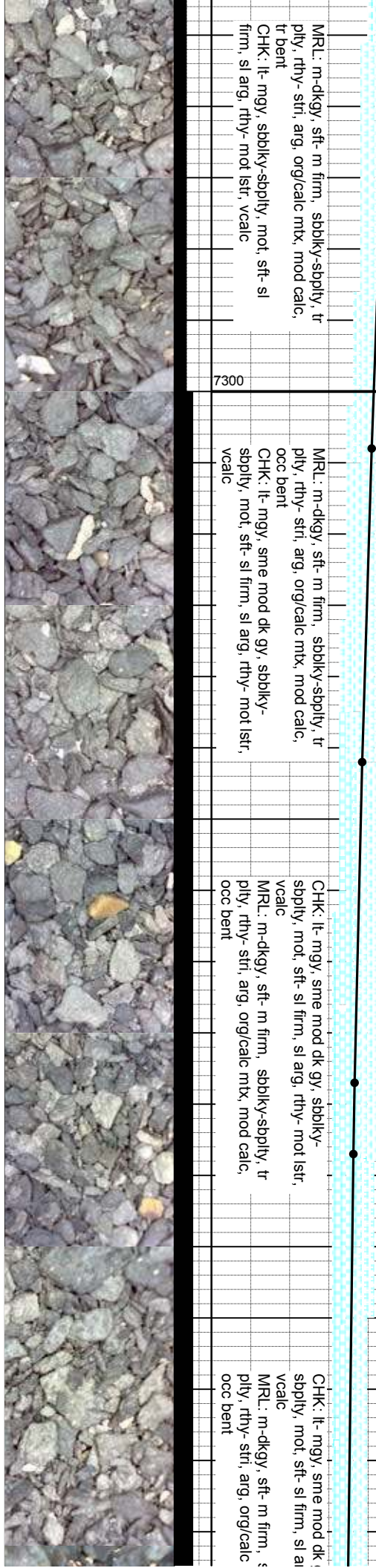
NIORARAC CHALK
LOGGER TOP
7485' MD, 7115' TVD

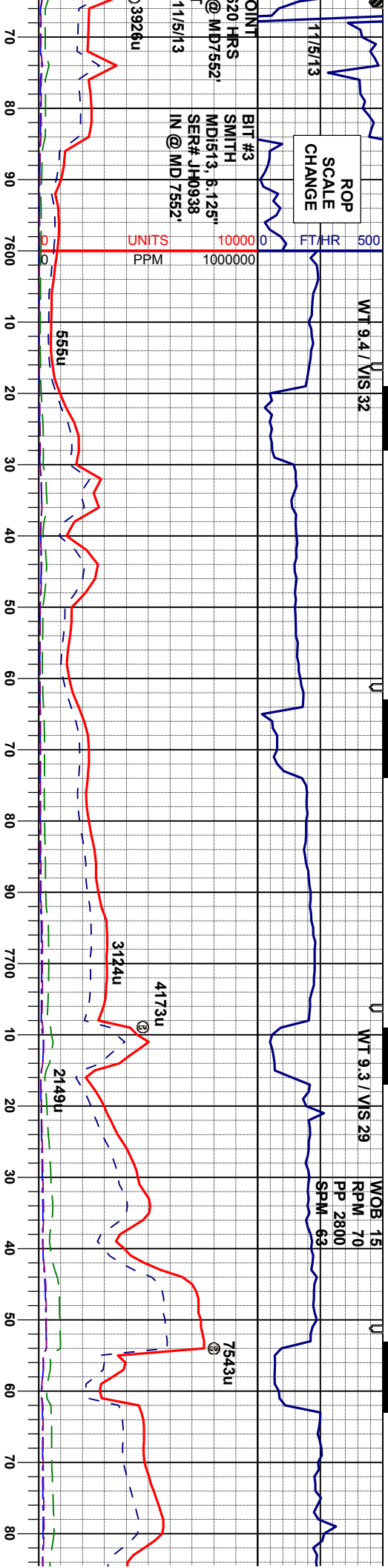
MRL: m-dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- stri, arg, org/calc mt, mod calc,
tr bent
CHK: lt- mgy, sbblky-sbply, mot, sft- sl
firm, sl arg, rthy- mot istr, vcalc

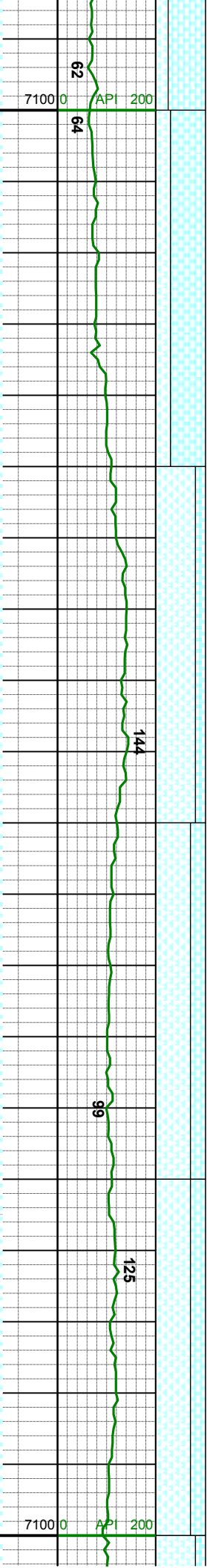
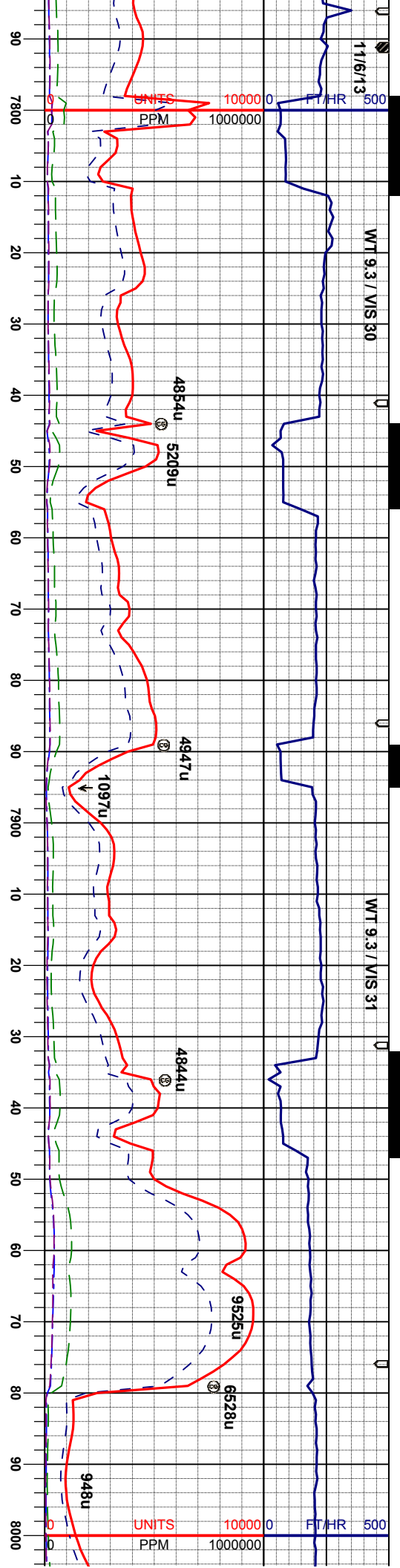
MRL: m-dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- stri, arg, org/calc mt, mod calc,
occ bent
CHK: lt- mgy, sme mod dk gy, sbblky-
sbply, mot, sft- sl firm, sl arg, rthy- mot istr,
vcalc

CHK: lt- mgy, sme mod dk gy, sbblky-
sbply, mot, sft- sl firm, sl arg, rthy- mot istr,
vcalc
MRL: m-dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- stri, arg, org/calc mt, mod calc,
occ bent

CHK: lt- mgy, sme mod dk
sbply, mot, sft- sl firm, sl arg,
vcalc
MRL: m-dkgy, sft- m firm, s
ply, rthy- stri, arg, org/calc
occ bent

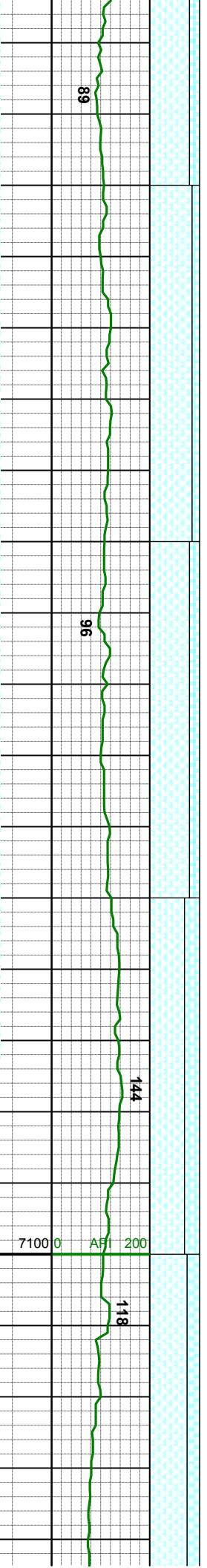






7785'	MD 7875'	MD 7965'
88.4°	INC 90.0°	INC 91.2°
266.9°	AZI 268.4°	AZI 269.8°
7139.1'	TVD 7140.3'	TVD 7139.4'
sbblky- ny- mot lstr,	MRL: m-dkgy, sft- m firm, sbblky-sbply, tr ply, rthy- str, arg, org/calc mtx, mod calc, occ bent	MRL: m-dkgy, sft- m firm, sbblky-sbply, tr ply, rthy- str, arg, org/calc mtx, mod calc, occ bent
y-sbply, tr mod calc,	CHK: lt- mgy, sme mod dk gy, sbblky- sbply, mot, sft- sl firm, sl arg, rthy- mot lstr, vcalc	CHK: lt- mgy, sme mod dk gy, sbblky- sbply, mot, sft- sl firm, sl arg, rthy- mot lstr, vcalc
7300	7300	7300

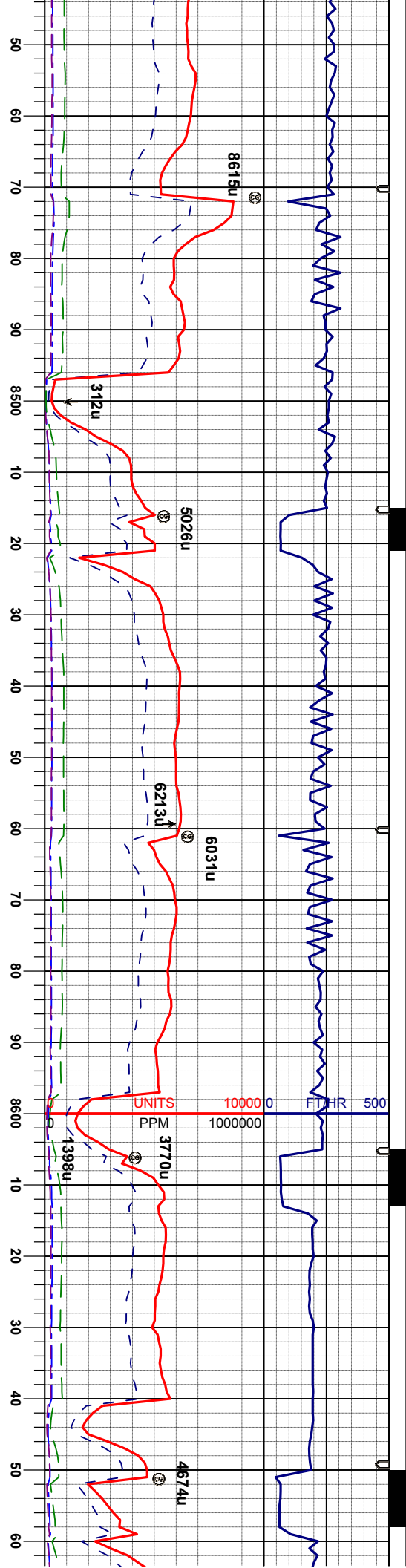




MD	8414'
INC	89.7°
AZI	270.5°
TVD	7139.0'

MR.: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- str, arg, org/calc mtz, v calc, oc
fos frag, sl tr bent
CHK- lt- mgy, sme mod dk gy, sbblky-
sbply, mot, sft- sl firm, sl arg, rthy- mot is
vcalc





MD 8504'
INC 91.1°
AZI 269.3°
TVD 7138.4'

MD 8593'
INC 91.3°
AZI 268.1°
TVD 7136.5'

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- stri, arg, org/calc mtz, v calc, occ
fos frag, sl tr bent
CHK: lt- mgy, sme mod dk gy, sbblky-
sbply, mot, sft- sl firm, sl arg, rthy- mot lstr,
vcalc

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- stri, arg, org/calc mtz, v calc, tr
fos frag
CHK: lt- mgy, sme mod dk gy, sbblky-
sbply, mot, sft- sl firm, sl arg, rthy- mot lstr,
vcalc

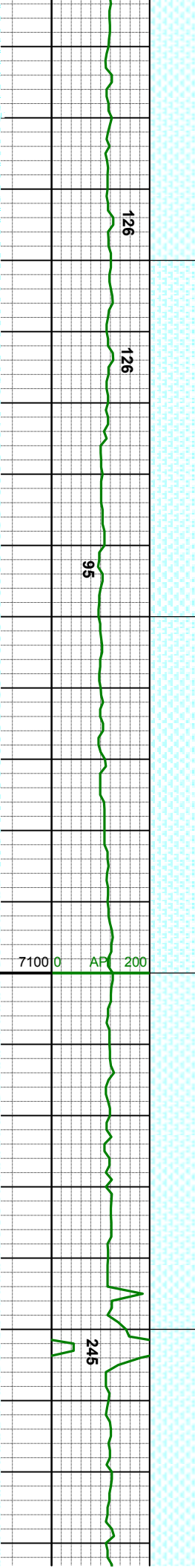
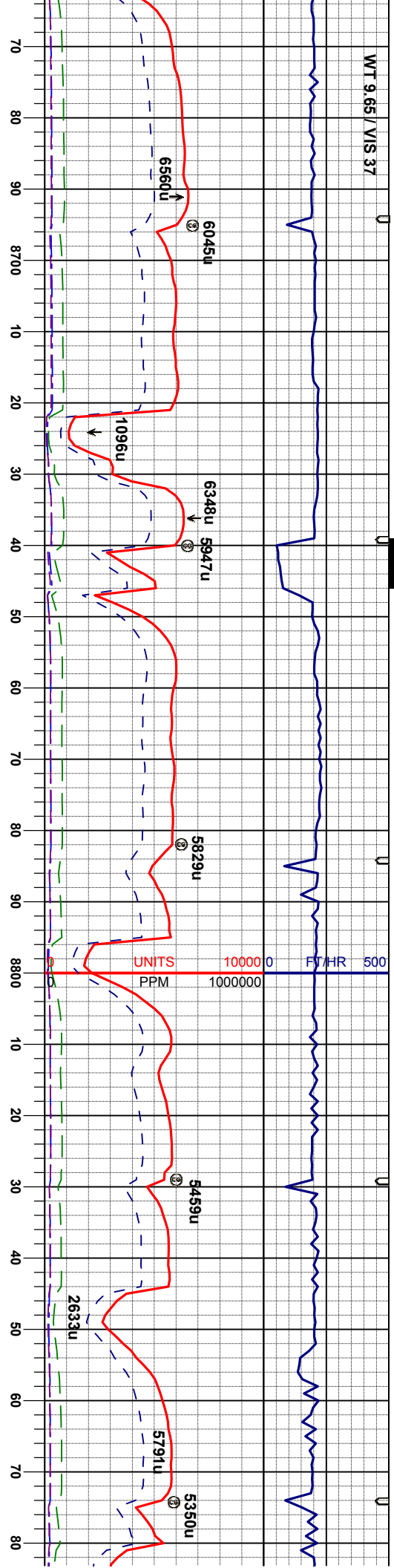
MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- stri, arg, org/calc mtz, v calc, tr
fos frag
CHK: lt- mgy, sme mod dk gy, sbblky-
sbply, mot, sft- sl firm, sl arg, rthy- mot lstr,
vcalc

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- stri, arg, org/calc mtz, abnt m gr
calcite ind, v calc, abnt fos frag

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- stri, arg, org/calc mtz, abnt m gr
calcite ind, v calc, abnt fos frag



WT 9.65 / VIS 37



MD 8683'
INC 90.0°
AZI 268.1°
TVD 7135.2'

MD 8773'
INC 89.2°
AZI 269.1°
TVD 7136.2'

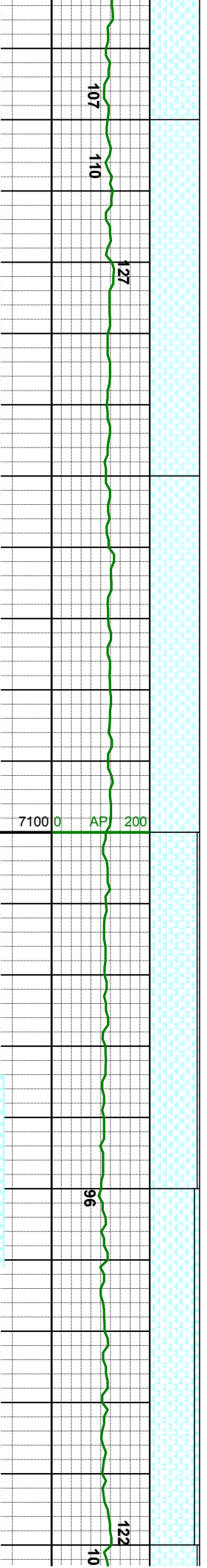
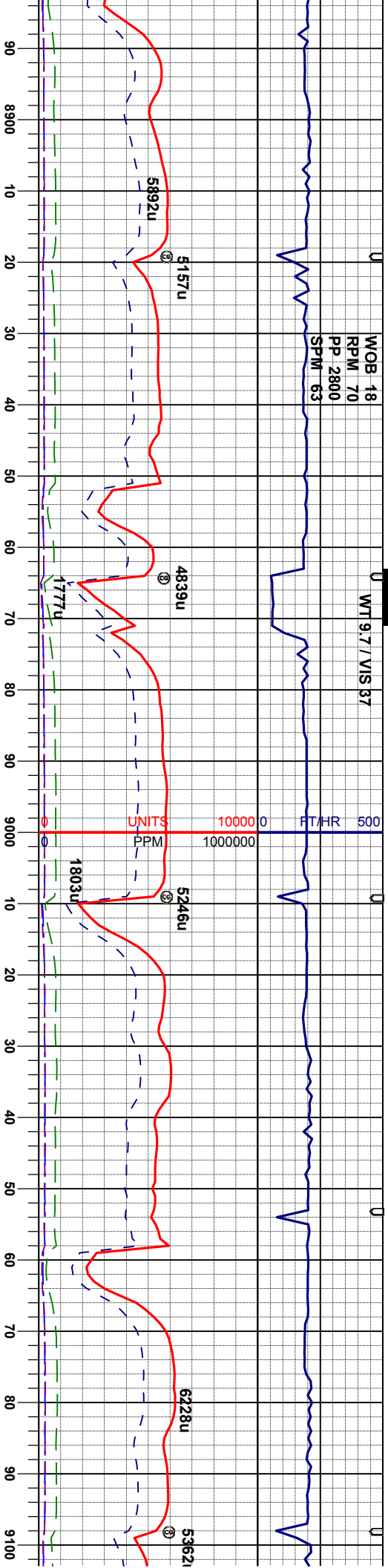
MD 8863'
INC 89.9°
AZI 270.9°
TVD 7136.9'

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- stri, arg, org/calcalc mtz, abnt m gr
calcite incl, v calc, abnt fos frag, occ chk

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- stri, arg, org/calcalc mtz, v calc, abnt
fos frag, tr chk

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy- stri, arg, org/calcalc mtz
fos frag, tr chk



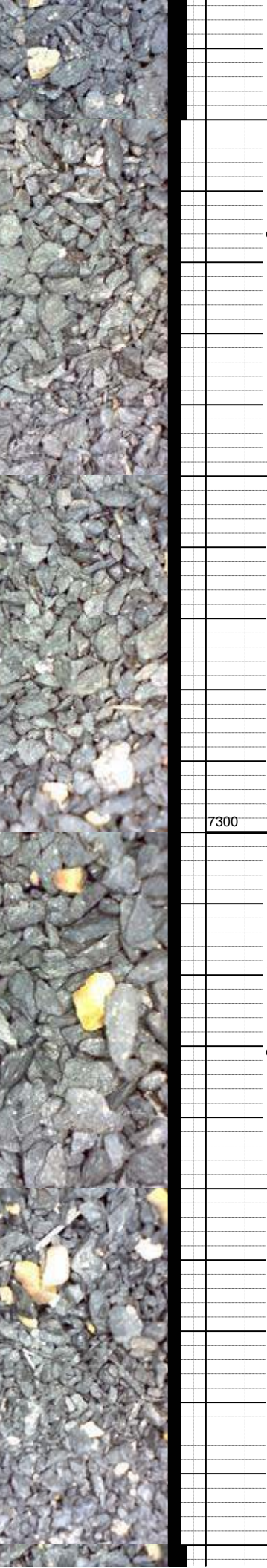


MD 8953'
INC 90.1°
AZI 269.7°
TVD 7136.9'

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy, stri ip, arg, org/calc mt, v calc,
abt fos frag

MD 9042'
INC 89.4°
AZI 269.1°
TVD 7137.2'

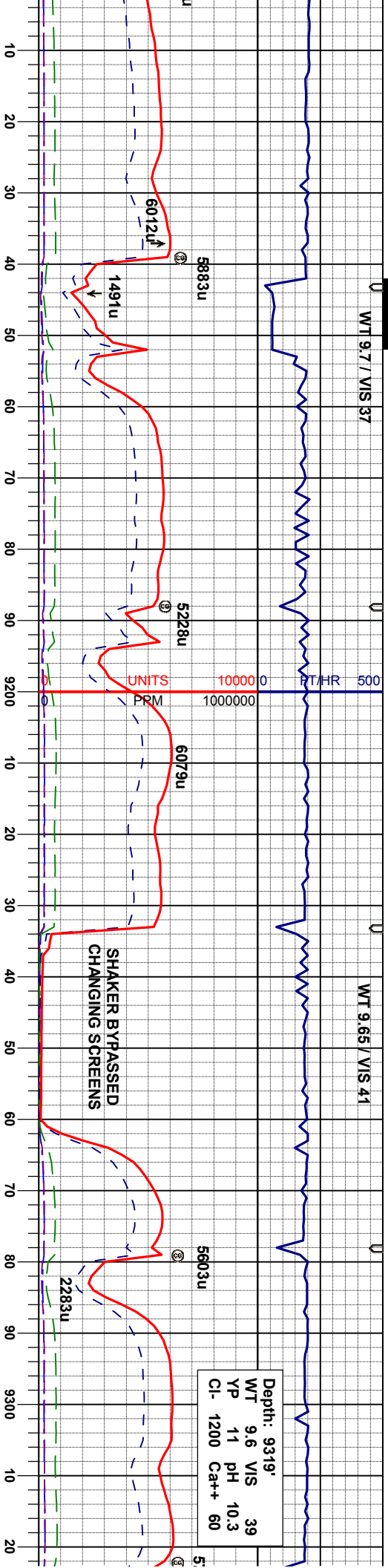
MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy, stri ip, arg, org/calc mt, occ m gr
calcite incl, calc, occ fos frag, occ chk



WT 9.7 / VIS 37

WT 9.65 / VIS 41

Depth: 9319'
WT 9.6 VIS 39
YP 11 pH 10.3
Cl- 1200 Ca++ 60



125

121

96

MD 9132'
INC 90.7°
AZI 268.4°
TVD 7137.2'

MD 9222'
INC 89.7°
AZI 268.6°
TVD 7136.9'

MD 9312'
INC 90.3°
AZI 269.3°
TVD 7136.9'

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy, stri ip, arg, org/calc mt, occ m gr
calcite incl, calc, occ fos frag, occ chk

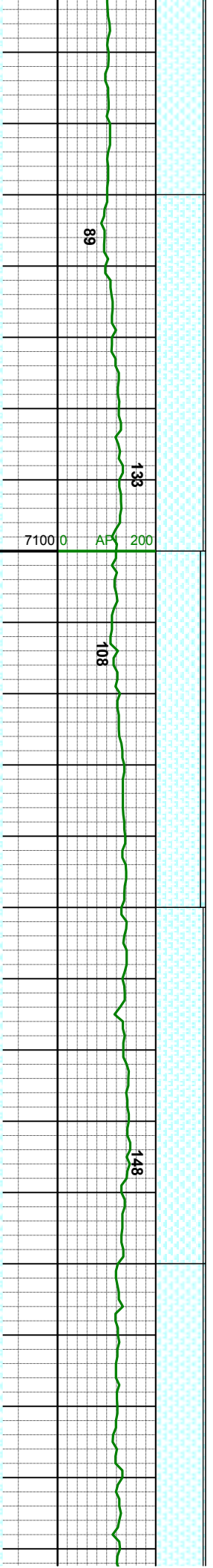
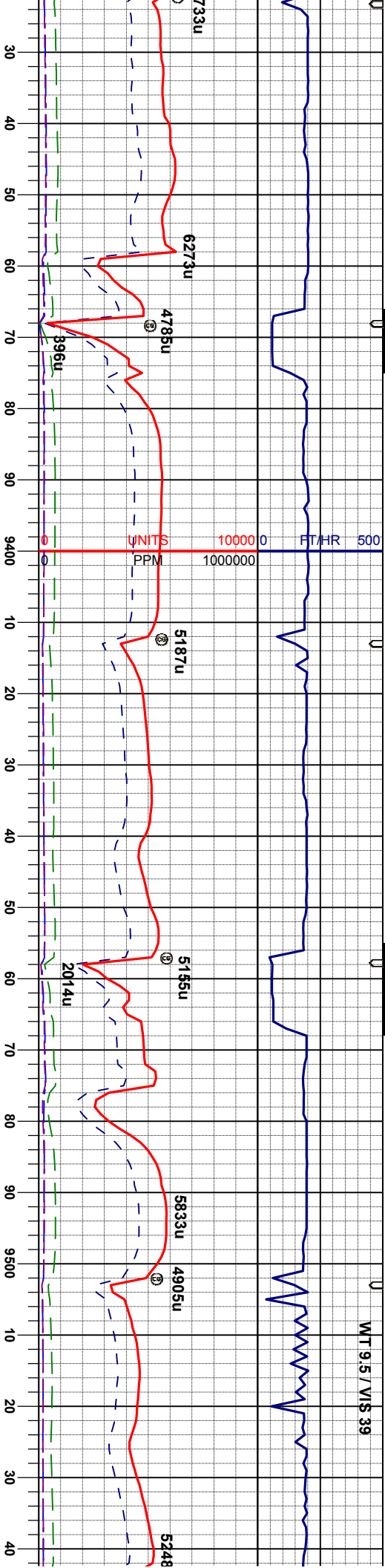
MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy, stri ip, arg, org/calc mt, occ m gr
calcite incl, calc, occ fos frag, tr chk

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy, stri ip, arg, org/calc mt, occ m gr
calcite incl, calc, occ fos frag, rr pyr clus,
occ chk

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy, stri ip, arg, org/calc mt, occ m gr
calcite incl, calc, occ fos frag, rr pyr clus,
occ chk

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy, stri ip, arg, org/calc mt, occ m gr
calcite incl, calc, occ fos frag, rr pyr clus,
occ chk



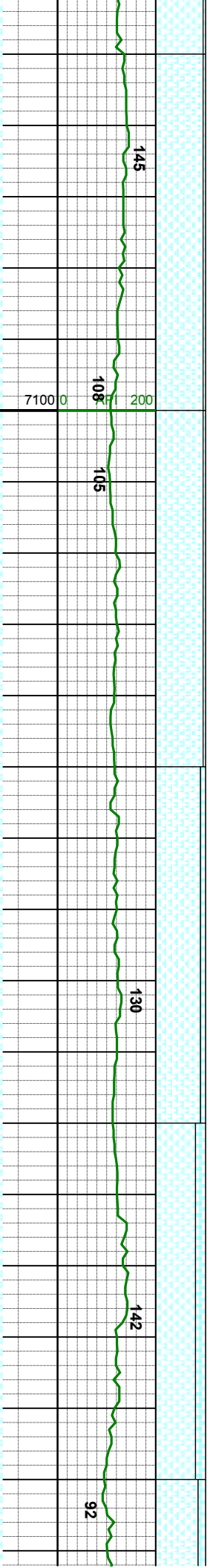
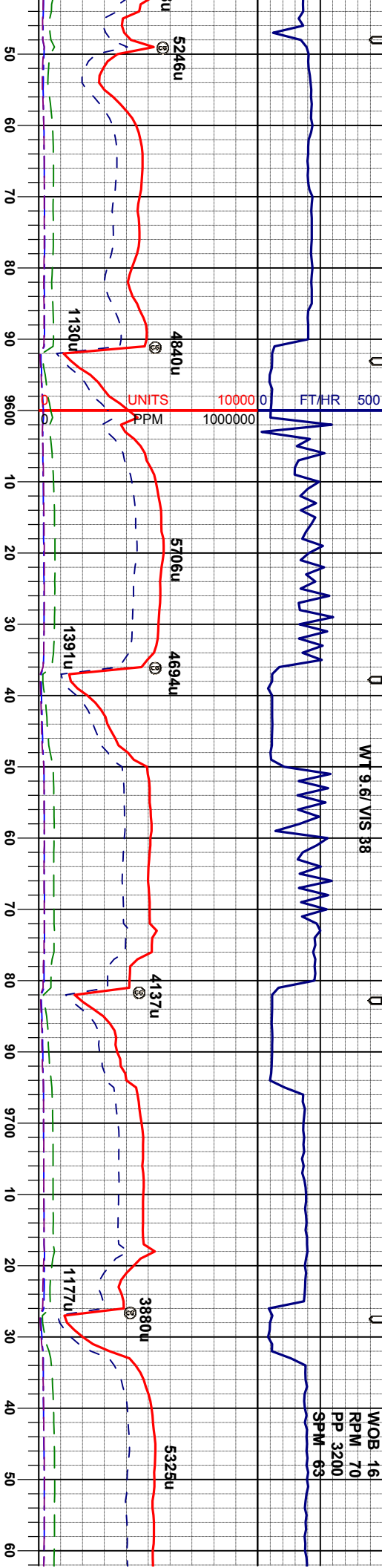


firm, sbbkly-sbply, tr org/calc mtx, occ m gr c fos frag, rr pyr clus,		MRL: dkgy, sft- m firm, sbbkly-sbply, tr ply, rthy, stri ip, arg, org/calc mtx, occ m gr calcite incl, calc, occ fos frag, rr pyr clus, occ chk	
MD 9402' INC 90.6° AZI 269.5° TVD 7136.1'		MRL: dkgy, sft- m firm, sbbkly-sbply, tr ply, rthy, stri ip, arg, org/calc mtx, occ m gr calcite incl, calc, occ fos frag, rr pyr clus, occ chk	
MD 9492' INC 89.5° AZI 270.5° TVD 7136.1'		MRL: dkgy, sft- m firm, sbbkly-sbply, tr ply, rthy, stri ip, arg, org/calc mtx, occ m gr calcite incl, calc, occ fos frag, rr pyr clus, occ chk	



WT 9.6 / VIS 38

WOB 16
RPM 70
PP 3200
SPM 63



MD 9582'
INC 90.7°
AZI 272.7°
TVD 7135.9'

MD 9671'
INC 90.0°
AZI 270.9°
TVD 7135.4'

MD
INC
AZI
TVD

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy, stri ip, arg, org/calc mt, occ m gr
calcite incl, calc, occ fos frag, rr pyr clus,
occ chk

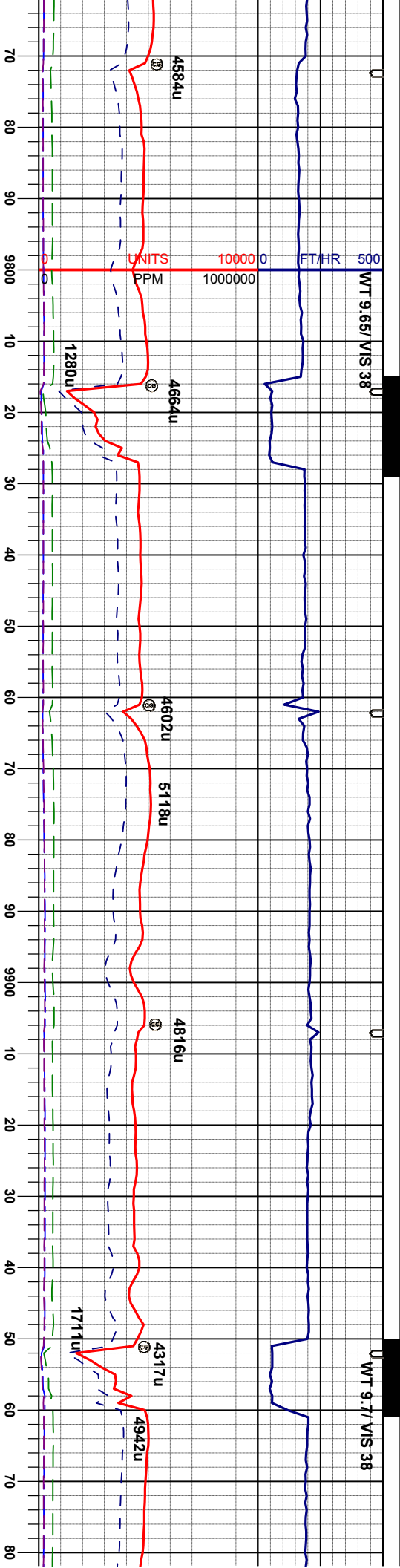
MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy, stri ip, arg, org/calc mt, occ m gr
calcite incl, calc, occ fos frag, rr pyr clus,
occ chk

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy, stri ip, arg, org/calc mt, occ m gr
calcite incl, calc, occ fos frag, rr pyr clus,
occ chk

MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy, stri ip, arg, org/calc mt, occ m gr
calcite incl, calc, occ fos frag, rr pyr clus,
occ chk

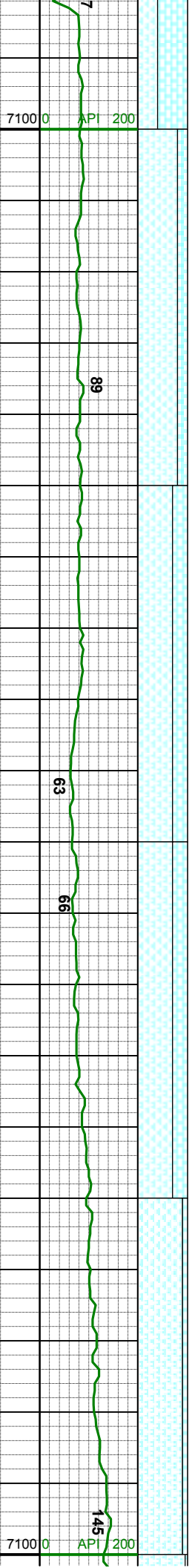
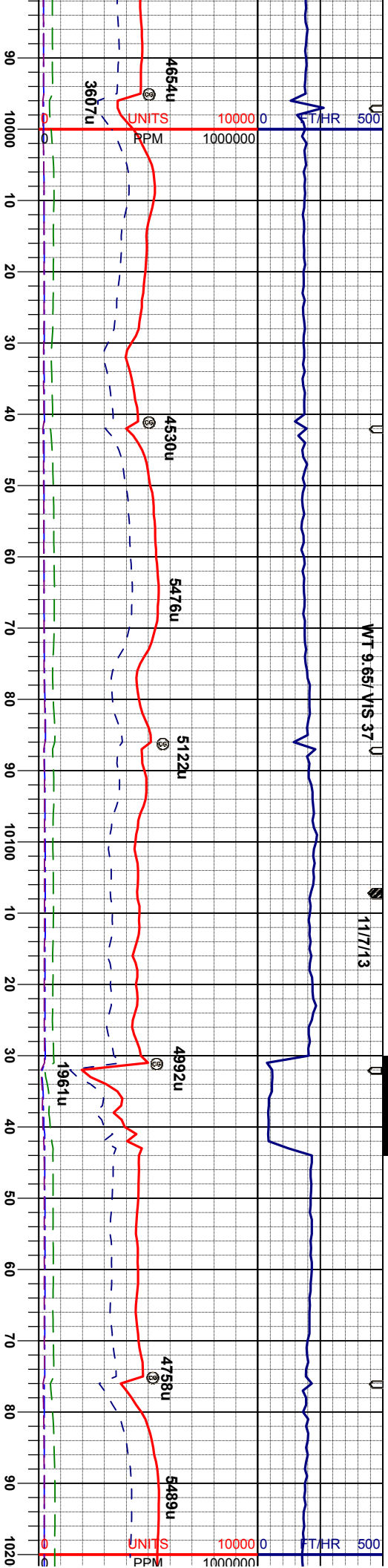
MRL: dkgy, sft- m firm, sbblky-sbply, tr
ply, rthy, stri ip, arg, org/calc mt, occ m gr
calcite incl, calc, occ fos frag, rr pyr clus,
occ chk





9761'	88.3°	270.0°	7136.7'
MD 9851'	INC 88.9°	AZI 269.1°	TVD 7138.9'
MR.L: dkgy, sft- m firm, sbbkly-sbply, tr ply, rthy, str ip, arg, org/calc mtx, occ m gr calcl, calc, occ fos frag, tr pyr clus,			
CH.K: lt- mgy, sme mod dk gy, sbbkly- sbply, mot, sft- sl firm, sl arg, rthy- mot lstr, vcalc			
MR.L: m-dkgy, sft- m firm, sbbkly-sbply, tr ply, rthy- str, arg, org/calc mtx, mod calc, occ bent			
CH.K: lt- mgy, sme mod dk gy, sbbkly- sbply, mot, sft- sl firm, sl arg, rthy- mot lstr, vcalc			
MR.L: m-dkgy, sft- m firm, sbbkly-sbply, tr ply, rthy- str, arg, org/calc mtx, mod calc, occ bent			
CH.K: lt- mgy, sme mod dk gy, sbbkly- sbply, mot, sft- sl firm, sl arg, rthy- mot lstr, vcalc			
MR.L: m-dkgy, sft- m firm, sbbkly-sbply, tr ply, rthy- str, arg, org/calc mtx, mod calc, occ bent			





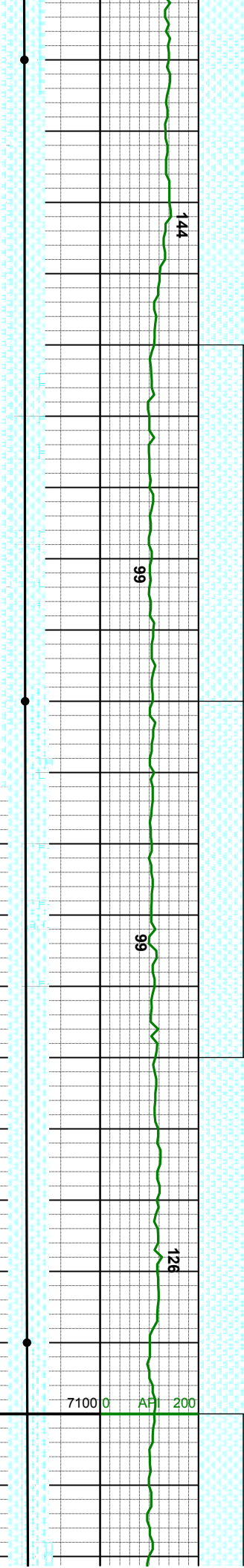
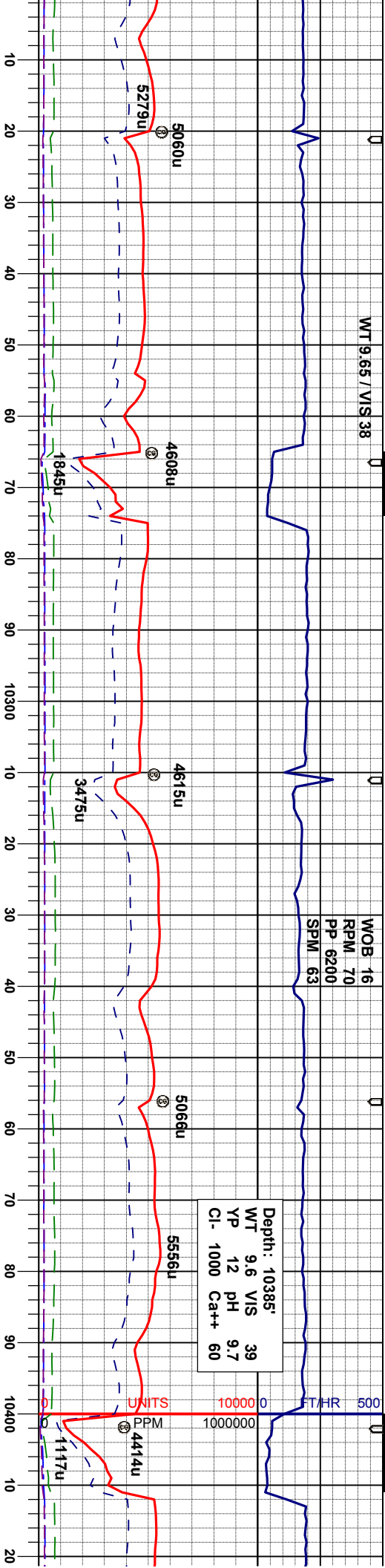
MD 10031'	MD 10120'	MD 10120'
INC 90.1°	INC 91.1°	INC 91.1°
AZI 269.7°	AZI 270.5°	AZI 270.5°
TVD 7140.8'	TVD 7139.9'	TVD 7139.9'
MRL: dkgy, sft- m firm, sbdky-sbply, tr pily, rthy- stri, arg, org/calc mtz, v calc, occ fos frag	MRL: dkgy, sft- m firm, sbdky-sbply, tr pily, rthy- stri, arg, org/calc mtz, v calc, occ fos frag	MRL: dkgy, sft- m firm, sbdky-sbply, tr pily, rthy, stri ip, arg, org/calc mtz, occ m gr calcite incl, calc, occ fos frag, tr pyr clus, occ chk
CHK: lt- mgy, sme mod dk gy, sbdky-sbply, mot, sft- sl firm, sl arg, rthy- mot lstr, vcalc	CHK: lt- mgy, sme mod dk gy, sbdky-sbply, mot, sft- sl firm, sl arg, rthy- mot lstr, vcalc	



WT 9.65 / VIS 38

WOB 16
RPM 70
PP 6200
SPM 63

Depth: 10385'
WT 9.6 VIS 39
YP 12 pH 9.7
Cl- 1000 Ca++ 60



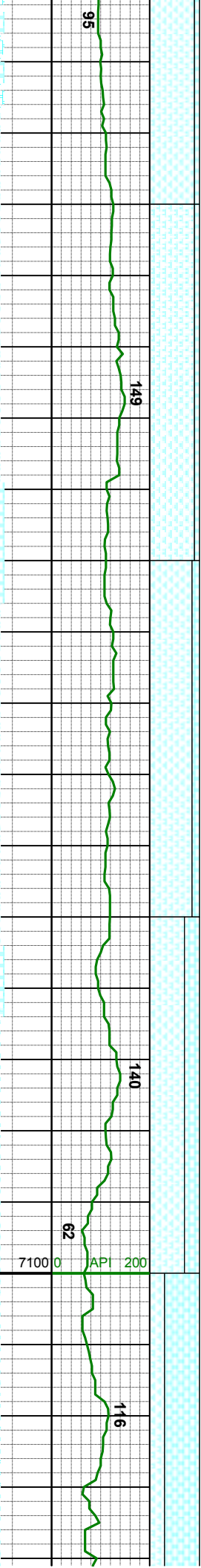
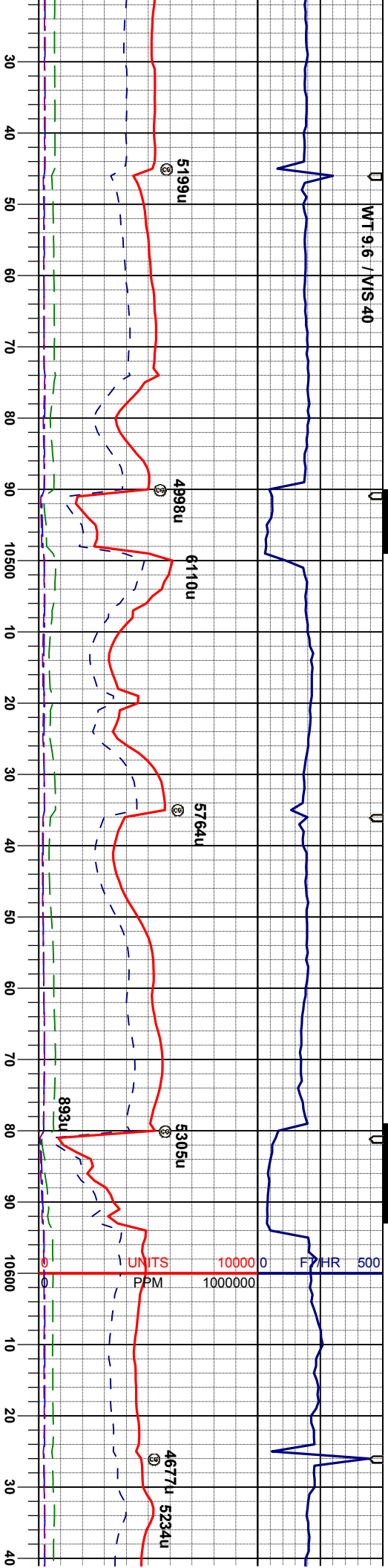
MD	10210'	MD	10300'	MD	10390'
INC	90.5°	INC	89.9°	INC	91.3°
AZI	269.1°	AZI	268.6°	AZI	268.6°
TVD	7138.6'	TVD	7138.2'	TVD	7137.3'

MR.L: dkgy, sft- m firm, sbbiky-sbply, tr
ply, rthy, stri ip, arg, org/calc mtx, occ m gr
calcite incl, calc, occ fos frag, tr pyr clus,
occ chk

MR.L: dkgy, sft- m firm, sbbiky-sbply, tr
ply, rthy, stri ip, arg, org/calc mtx, occ m gr
calcite incl, calc, occ fos frag, tr pyr clus,
occ chk

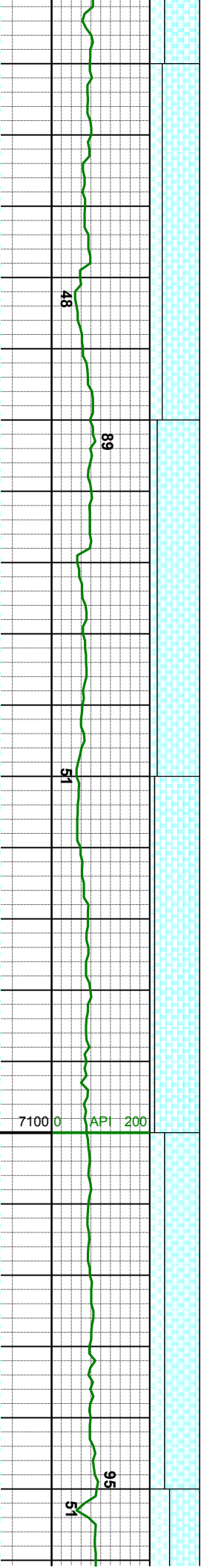
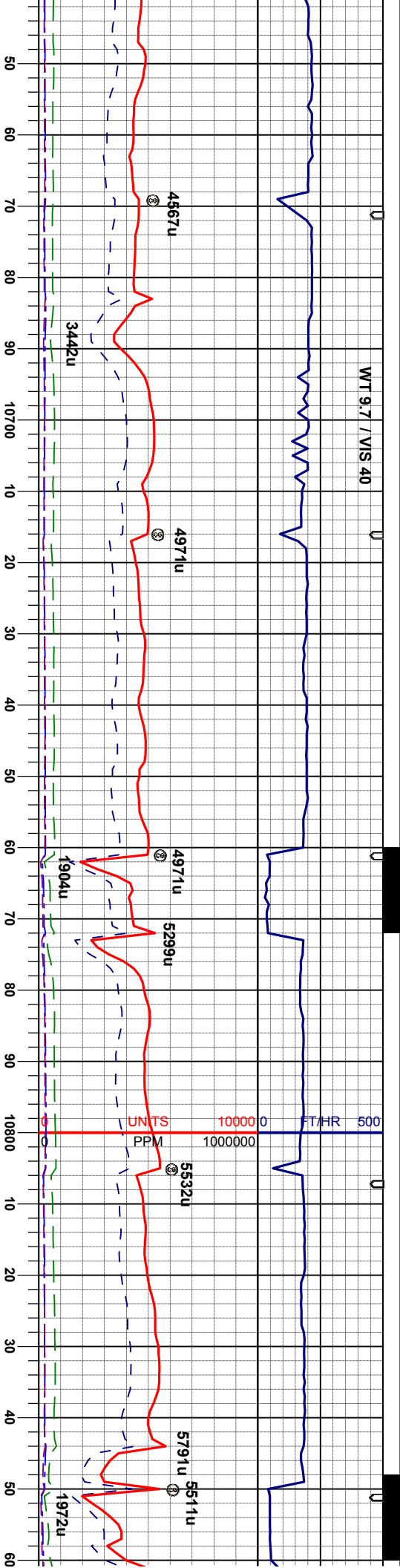
MR.L: dkgy, sft- m firm, sbbiky-sbply, tr
ply, rthy, stri ip, arg, org/calc mtx, occ m gr
calcite incl, calc, occ fos frag, tr pyr clus,
occ chk





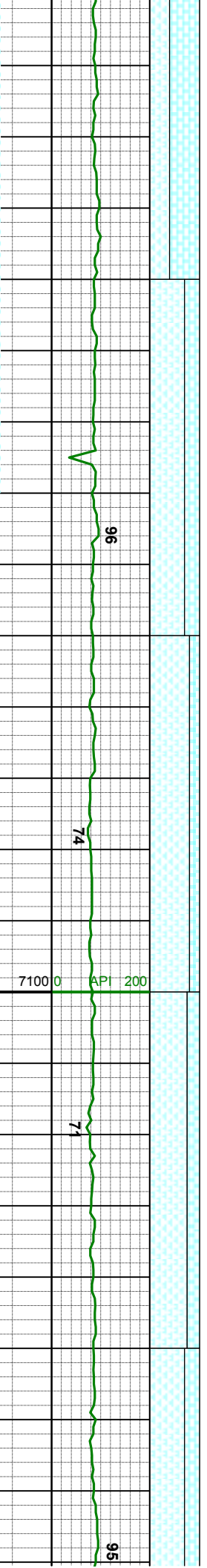
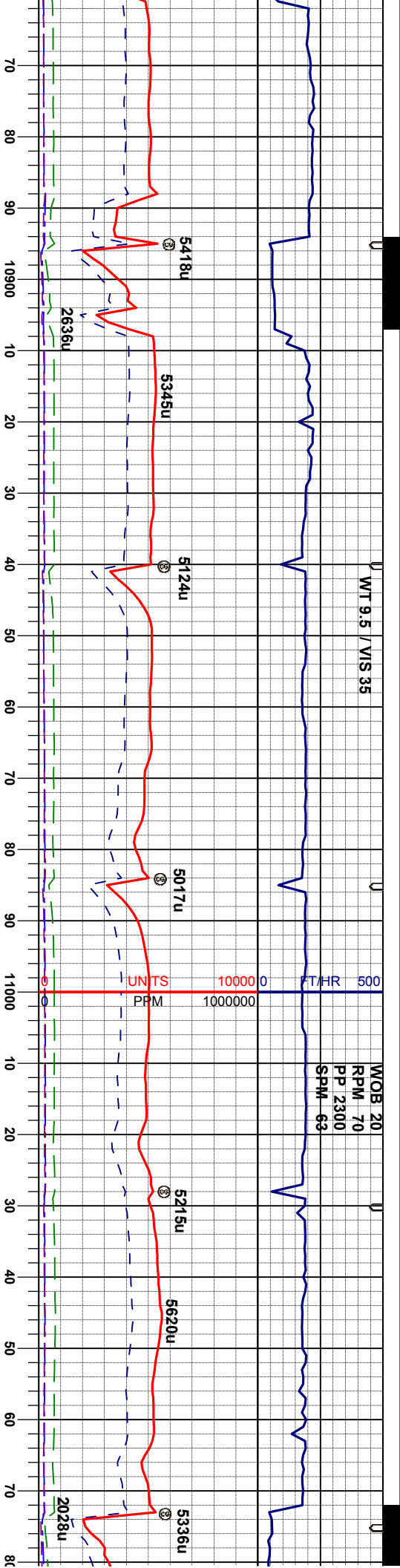
firm, sbblky-sbply, tr g, org/calc mt, occ m gr occ fos frag, occ chk	MRL: dkgy, sft- m firm, sbblky-sbply, tr ply, rthy, stri ip, arg, org/calc mt, occ m gr calcite incl, calc, occ fos frag, occ chk	MRL: dkgy, sft- m firm, sbblky-sbply, tr ply, rthy, stri ip, arg, org/calc mt, occ m gr calcite incl, calc, occ fos frag, occ chk	MRL: dkgy, sft- m firm, sbblky-sbply, tr ply, rthy, stri ip, arg, org/calc mt, vcalc, occ fos frag, occ bent CHK: lt- mgy, sme mod dk gy, sbblky- sbply, mot, sft- sl firm, sl arg, rthy- mot lstr, vcalc
	MD 10480' INC 90.4° AZI 268.1° TVD 7136.0'	MD 10570' INC 90.3° AZI 268.1° TVD 7135.5'	CHK: lt- mgy, sme mod dk gy, sbblky- sbply, mot, sft- sl firm, sl arg, rthy- mc vcalc MRL: dkgy, sft- m firm, sbblky-sbply, ply, rthy, stri ip, arg, org/calc mt, vca occ fos frag, tr bent





MD 10660'		MD 10750'		MD 10839'	
INC 89.3°		INC 90.3°		INC 89.4°	
AZI 267.9°		AZI 267.4°		AZI 267.4°	
TVD 7135.8'		TVD 7136.1'		TVD 7136.3'	
CHK: lt-mgy, sme mod dk gy, sbbiky-sbply, mot, sft-si firm, si arg, rthy-mot istr, vcalc		CHK: lt-mgy, sme mod dk gy, sbbiky-sbply, mot, sft-si firm, si arg, rthy-mot istr, vcalc		CHK: lt-mgy, sme mod dk gy, sbbiky-sbply, mot, sft-si firm, si arg, rthy-mot istr, vcalc	
MRL: dkgy, sft-m firm, sbbiky-sbply, tr pthy, rthy, str ip, arg, org/calc mix, vcalc, occ fos frag, tr bent		MRL: dkgy, sft-m firm, sbbiky-sbply, tr pthy, rthy, str ip, arg, org/calc mix, vcalc, occ fos frag, tr bent		MRL: m-dkgy, sft-m firm, sbbiky-sbply, tr pthy, rthy, str ip, arg, org/calc mix, vcalc, occ fos frag, tr bent	
7300		7300		7300	



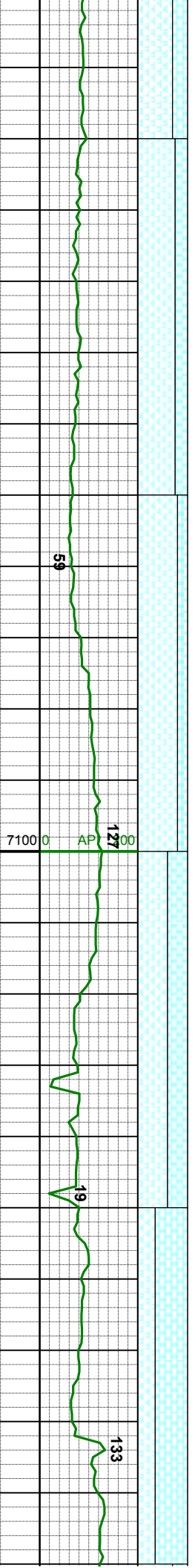
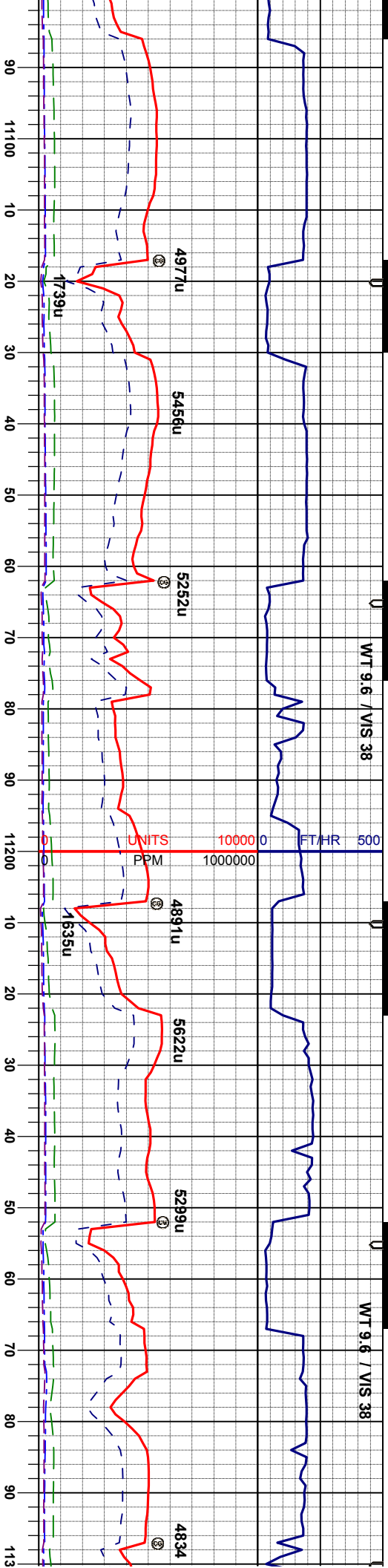


MD 10929'		MD 11019'		MD 11019'	
INC 87.8°		INC 89.7°		INC 89.7°	
AZI 270.4°		AZI 268.3°		AZI 268.3°	
TVD 7138.5'		TVD 7140.5'		TVD 7140.5'	
MRL: m- dkgy, sft- m firm, sbblky-sbply, tr pty, rthy- str, arg, org/calc mt, v calc, occ fos frag, tr bent		MRL: m- dkgy, sft- m firm, sbblky-sbply, tr pty, rthy- str, arg, org/calc mt, v calc, abnt fos frag, occ bent		MRL: m- dkgy, sft- m firm, sbblky-sbply, tr pty, rthy- str, arg, org/calc r	
CHK: lt- mgy, sme mod dk gy, sbblky-sbply, mot, sft- sl firm, sl arg, rthy- mot lstr, vcalc		CHK: lt- mgy, sme mod dk gy, sbblky-sbply, mot, sft- sl firm, sl arg, rthy- mot lstr, vcalc		CHK: lt- mgy, sme mod dk gy, sbblky-sbply, mot, sft- sl firm, sl ar	



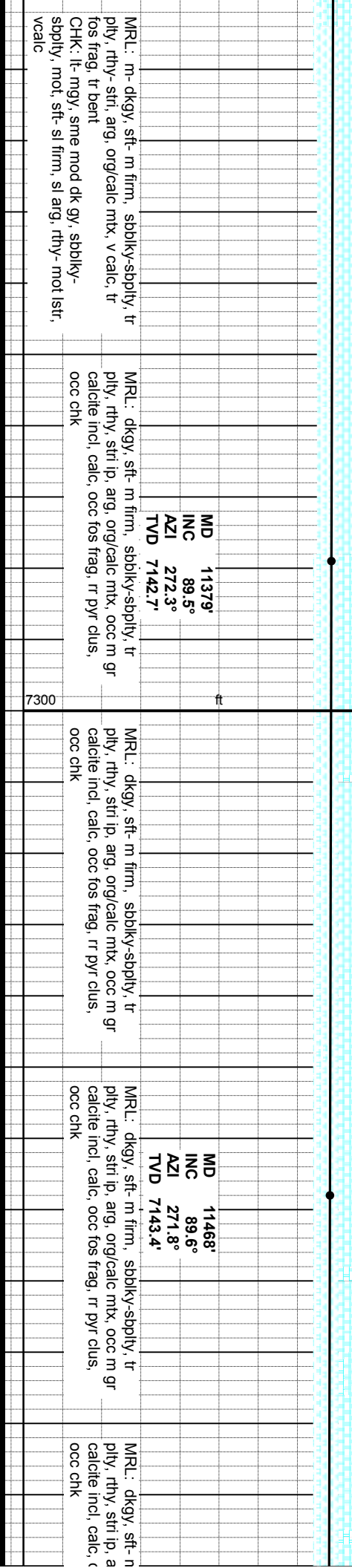
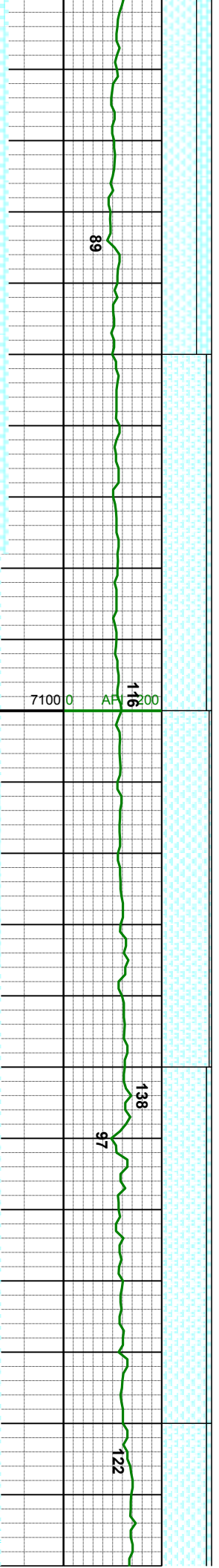
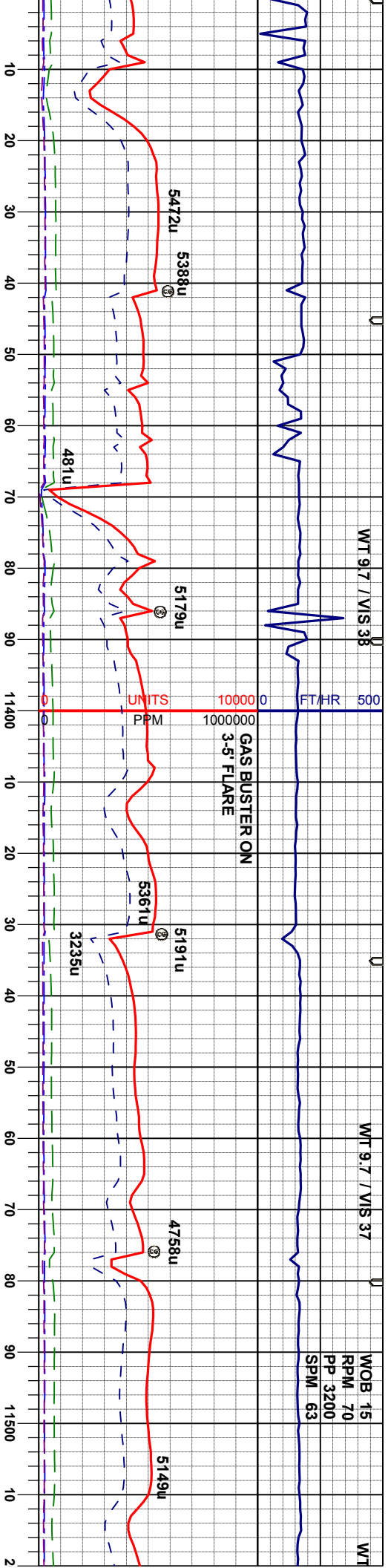
WT 9.6 / VIS 38

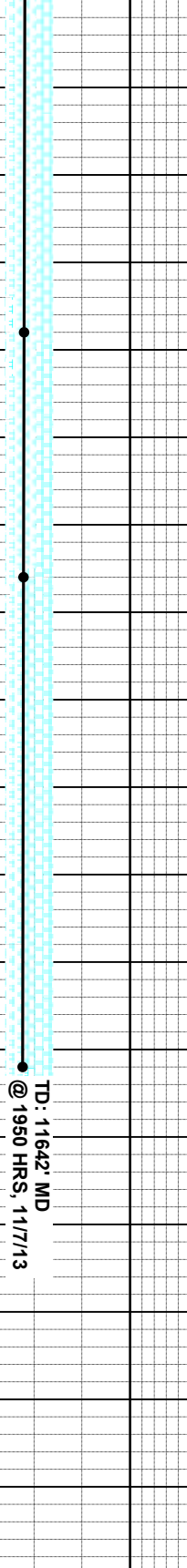
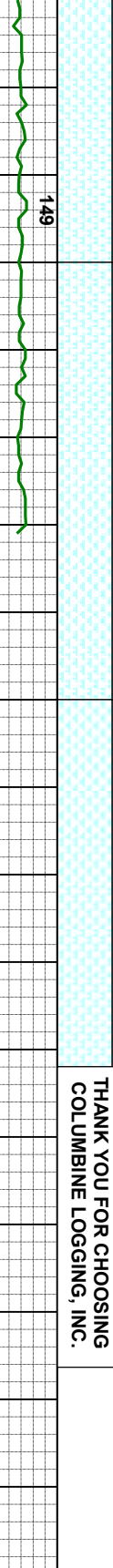
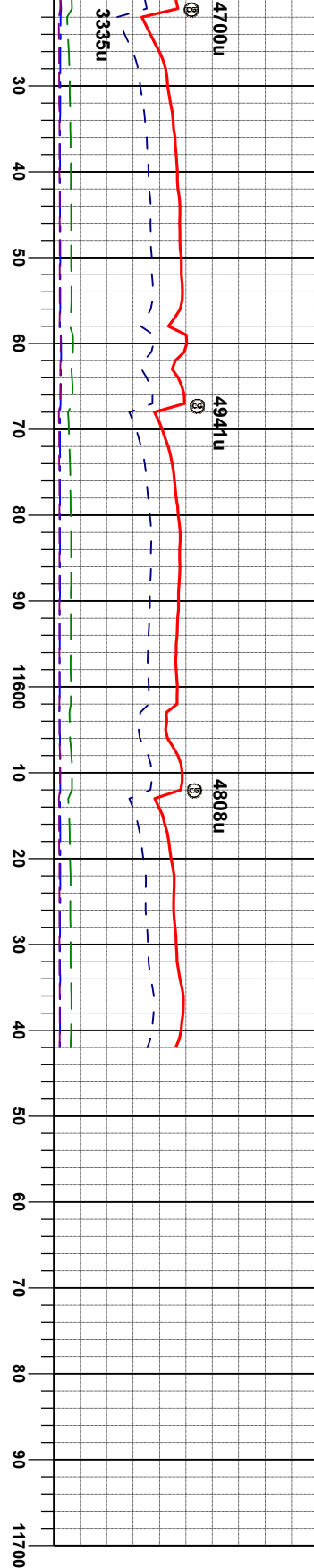
WT 9.6 / VIS 38



MD 11109'		MD 11199'		MD 11289'	
INC 90.5°		INC 89.3°		INC 89.2°	
AZI 267.6°		AZI 268.8°		AZI 271.4°	
TVD 7140.3'		TVD 7140.5'		TVD 7141.7'	
MRL: m-dkgy, sft- m firm, sbblky-sbply, tr pily, rthy- str, arg, org/calc mtx, v calc, tr fos frag, tr bent		MRL: m-dkgy, sft- m firm, sbblky-sbply, tr pily, rthy- str, arg, org/calc mtx, v calc, tr fos frag, tr bent		MRL: m-dkgy, sft- m firm, sbblky-sbply, tr pily, rthy- str, arg, org/calc mtx, v calc, tr fos frag, tr bent	
CHK: lt- mgy, sme mod dk gy, sbblky-sbply, mot, sft- sl firm, sl arg, rthy- mot lstr, vcalc		CHK: lt- mgy, sme mod dk gy, sbblky-sbply, mot, sft- sl firm, sl arg, rthy- mot lstr, vcalc		CHK: lt- mgy, sme mod dk gy, sbblky-sbply, mot, sft- sl firm, sl arg, rthy- mot lstr, vcalc	







MD	11558'	MD	11589'	MD	11642'
INC	89.5°	INC	89.6°	INC	89.6°
AZI	271.2°	AZI	271.4°	AZI	271.4°
TVD	7144.1'	TVD	7144.3'	TVD	7144.7'
MRL: dkgy, sft- m firm, sbbiky-sbply, tr pity, rthy, stri ip, arg, org/calc mtx, occ m gr calcite incl, calc, occ fos frag, tr pyr clus, occ chk					



THANK YOU FOR CHOOSING
COLUMBINE LOGGING, INC.