

LOG created using LPLOT VH Version 3.0, October 05, 2013, Copyright (C) 1999-2009 Pason Systems Corp.

OPERATOR: NOBLE ENERGY INC.
WELL: CROW CREEK STATE AC36-78-1HN
LOCATION: SWSW SEC36 T7N R63W
COUNTY: WELD
STATE: COLORADO
SPOT: 270' FSL 300' FWL
ELEVATION: 4,775' GL, 4,791' KB
FIELD: WATTENBERG
SPUD DATE: 9/23/13
TD DATE: 10/4/13
DATES LOGGED: 9/25/13 - 10/4/13
DEPTHS LOGGED: 604' - 11182'
GEOLOGISTS: GARY MYERS, JESSICA SILVEY
DRILLING FLUID: LSND
DRILLING RIG: PRECISION 828
API: 05-123-37274
LOG TYPE: VERTICAL
SCALE: 1:240 (5 inches per 100 feet)
REMARKS: WELLSITE GEOLOGICAL SERVICES PROVIDED BY COLUMBINE LOGGING INC.

LOG CONTINUES ON FILE: Crow Creek State AC36-78-1HN Horiz.lplot

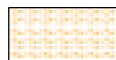
LITHOLOGIES



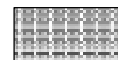
Sandstone



Shaly Sandstone



Shaly Siltstone



Silty Shale

ENGINEERING SYMBOLS



Connection



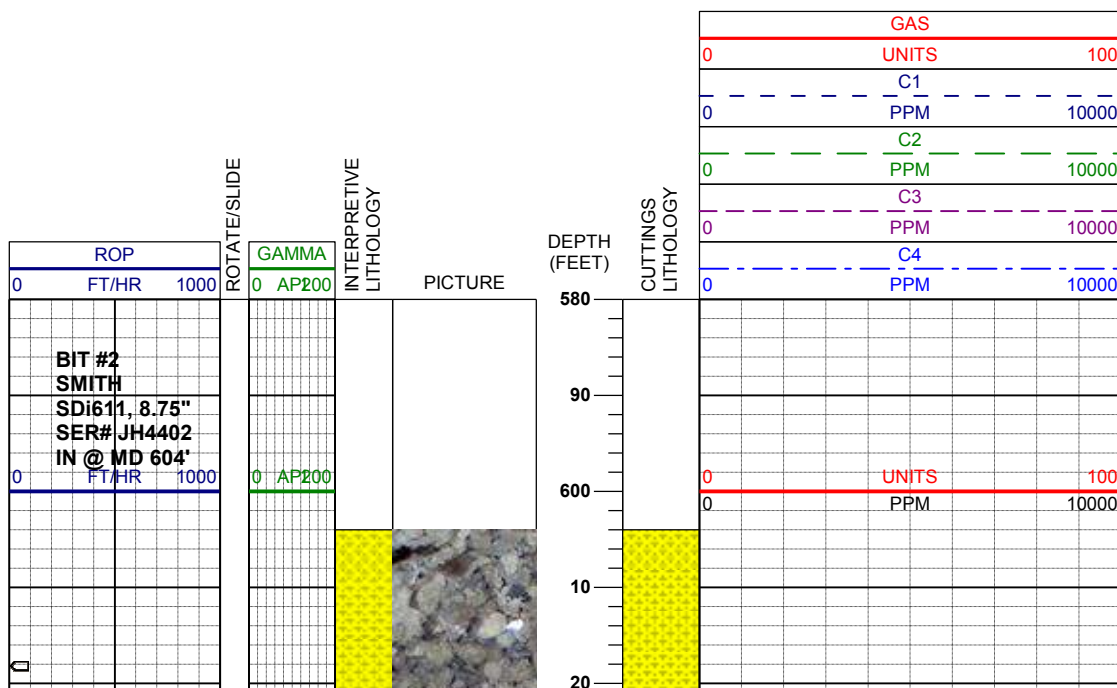
Connection Gas



Midnight Depth



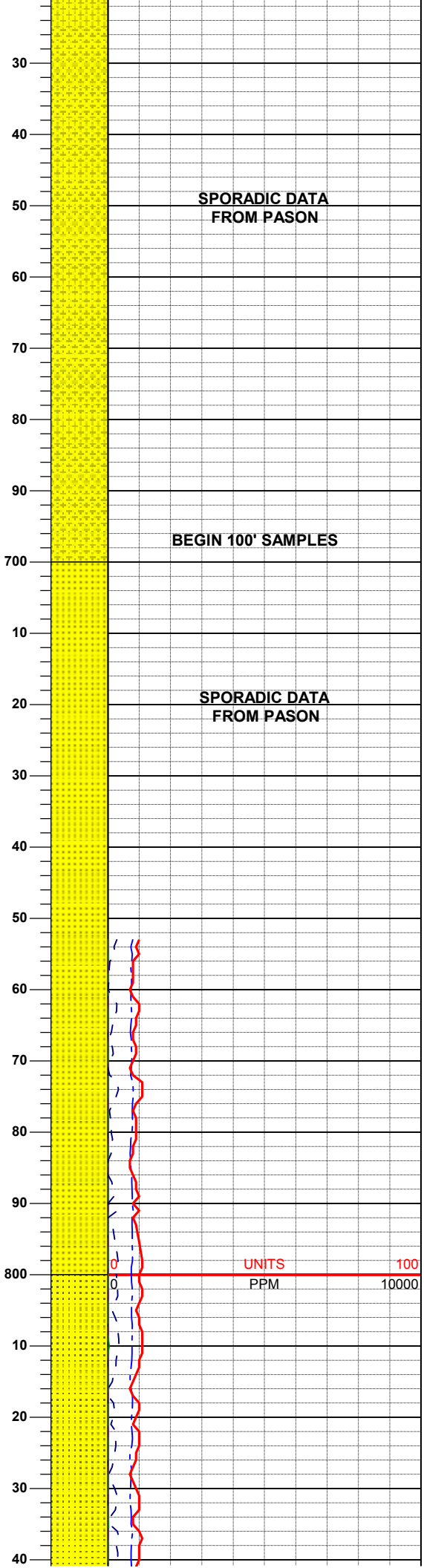
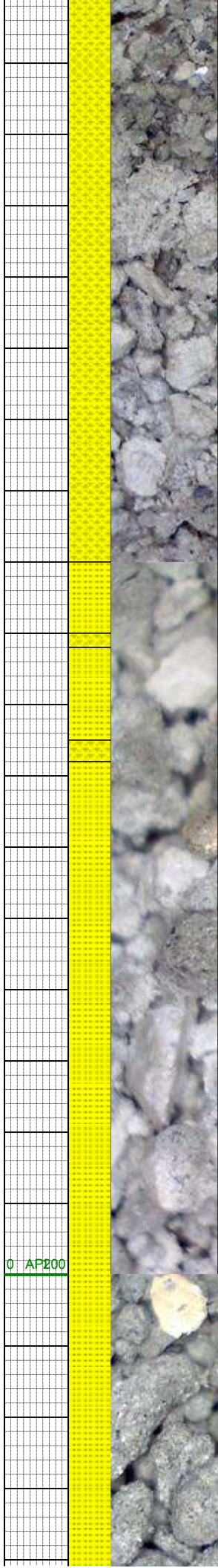
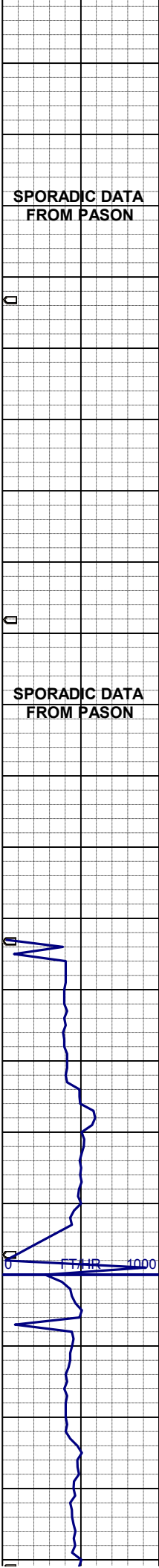
Midnight Depth



LITHOLOGY DESCRIPTION

COLUMBINE LOGGING, INC.
ON LOCATION 9/24/13
MANNED 2-PERSON LOGGING
USING PASON GAS SYSTEM

DRILLED OUT OF SHOE
0300 HRS, 9/25/13



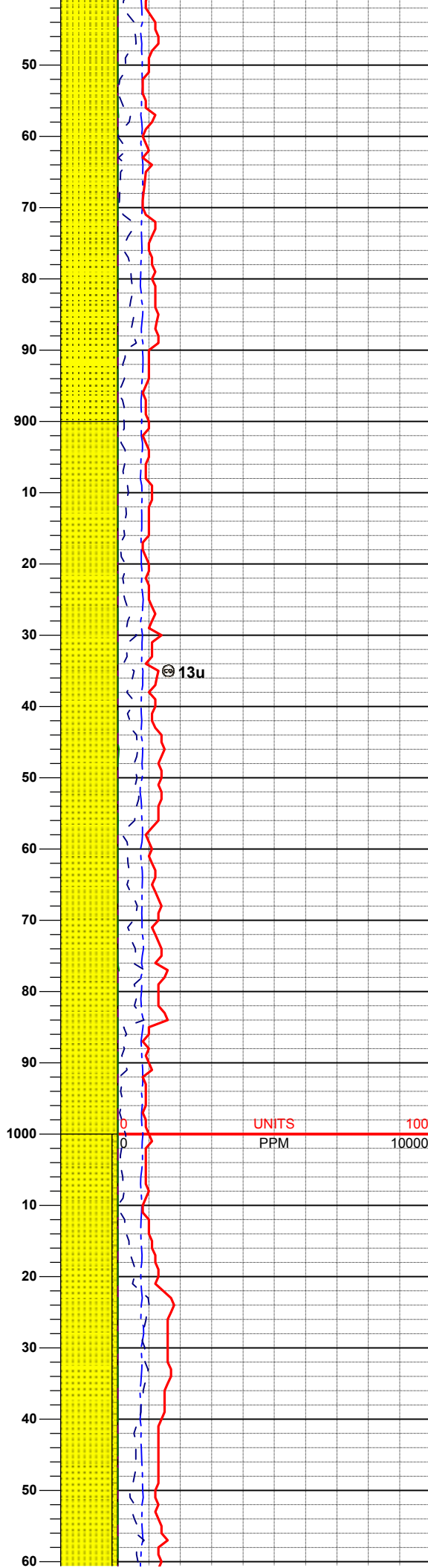
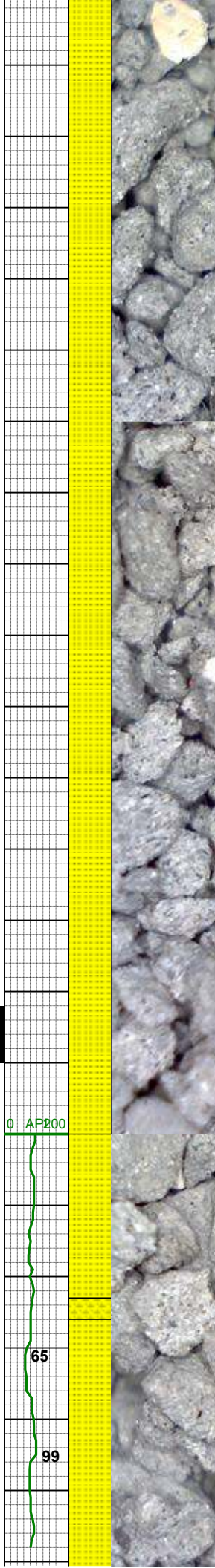
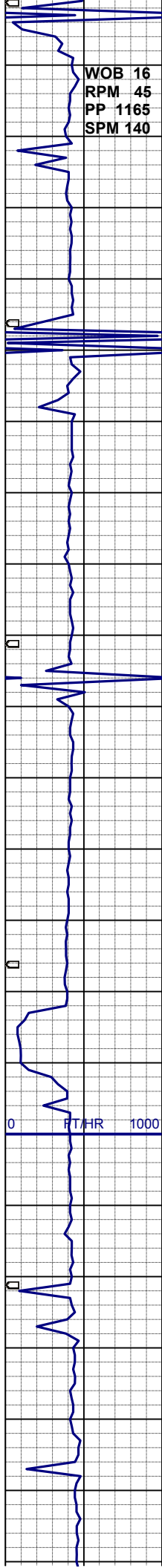
SHYSS: lt -mgy, trnsI- op, sme clr, vf-
fgr, sbblky, sbply ip mod srt, v sft-sft,
arg-sil mtX, sl calc, sl mica

MD 658'
INC 0.2°
AZI 179.6°
TVD 658.0'

MD 747'
INC 0.3°
AZI 187.1°
TVD 747.0'

SS: wh -mgy, trnsI- op, sme clr, s&p
ip, f- mgr, sbblky, mod srt, sft, arg-sil
mtX, sl calc, sl mica

MD 836'
INC 0.7°
AZI 151.3°
TVD 836.0'



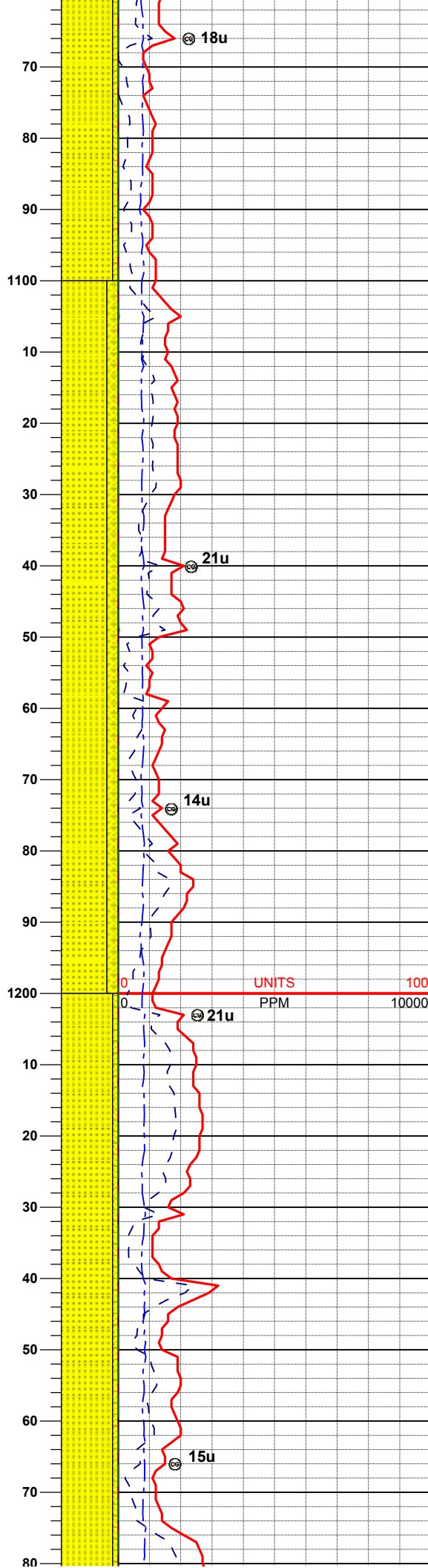
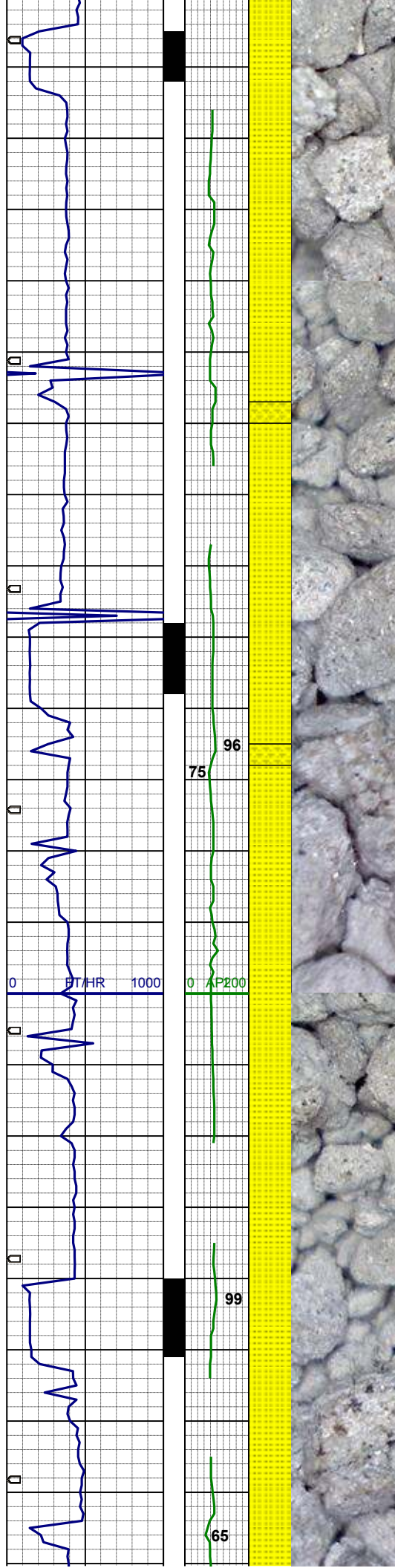
SS: wh -mgy, trnsi- op, sme clr, s&p ip, f- gr, sbblky, mod srt, sft, arg-sil mtz, sl calc, sl mica

MD 926'
INC 0.3°
AZI 198.4°
TVD 926.0'

SS: wh -mgy, trnsi- op, sme clr, s&p ip, f- mgr, sbblky, mod srt, sft, arg-sil mtz, sl calc, sl mica

MD 1016'
INC 0.9°
AZI 121.9°
TVD 1016.0'

SS: - SHYSS: wh -mgy, trnsi- op, sme clr, s&p ip, vf- mgr, sbblky, p srt, sft, arg-sil mtz, sl calc, sl mica



MD 1093'
INC 1.7°
AZI 105.7°
TVD 1093.0'

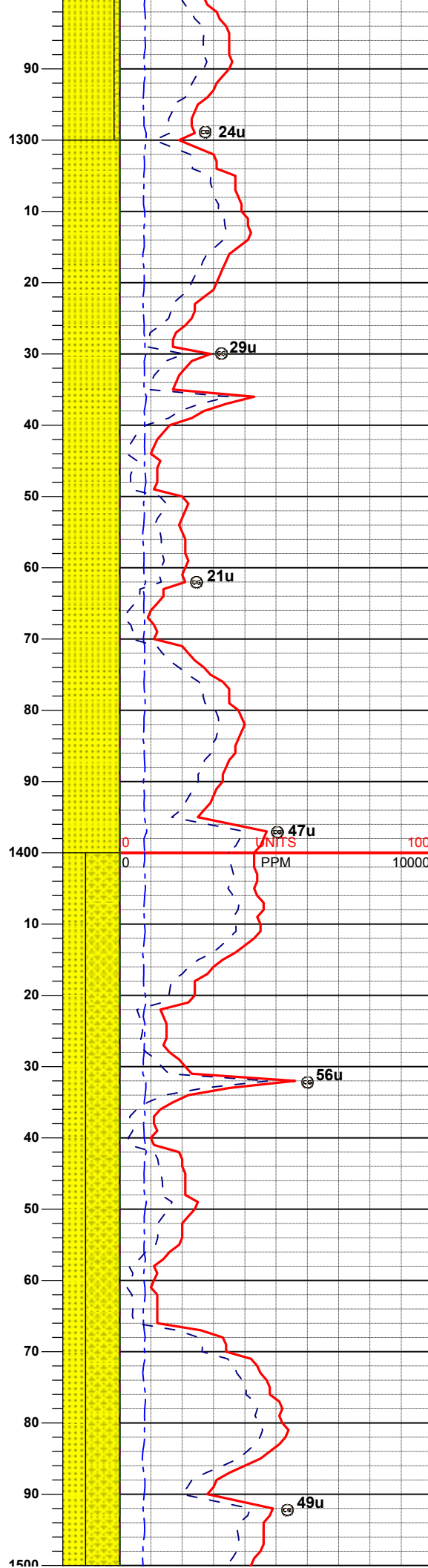
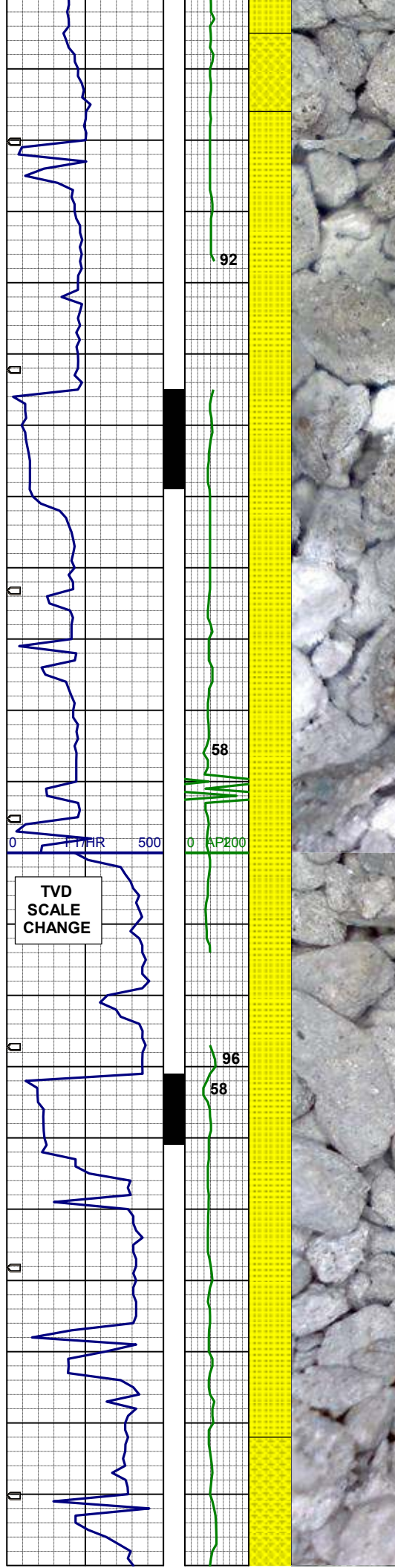
SS: - SHYSS: wh -mgy, trnsI- op,
sme clr, s&p ip, vf- mgr, sbbiky, p srt,
sft, arg-sil mtX, sl calc, sl mica

MD 1187'
INC 3.1°
AZI 110.5°
TVD 1186.9'

WT 8.5 / VIS 27

SS: - SHYSS: wh -mgy, trnsI- op,
sme clr, s&p ip, vf- mgr, sbbiky, p srt,
sft, arg-sil mtX, sl calc, sl mica, glau

MD 1282'
INC 4.3°



INC 4.3
AZI 110.7°
TVD 1281.7'

SS: wh -mgy, trnsl- op, sme clr, s&p
ip, f - mgr, sbblky, p srt, sft, arg-sil
mtx, sl calc, sl mica, glau

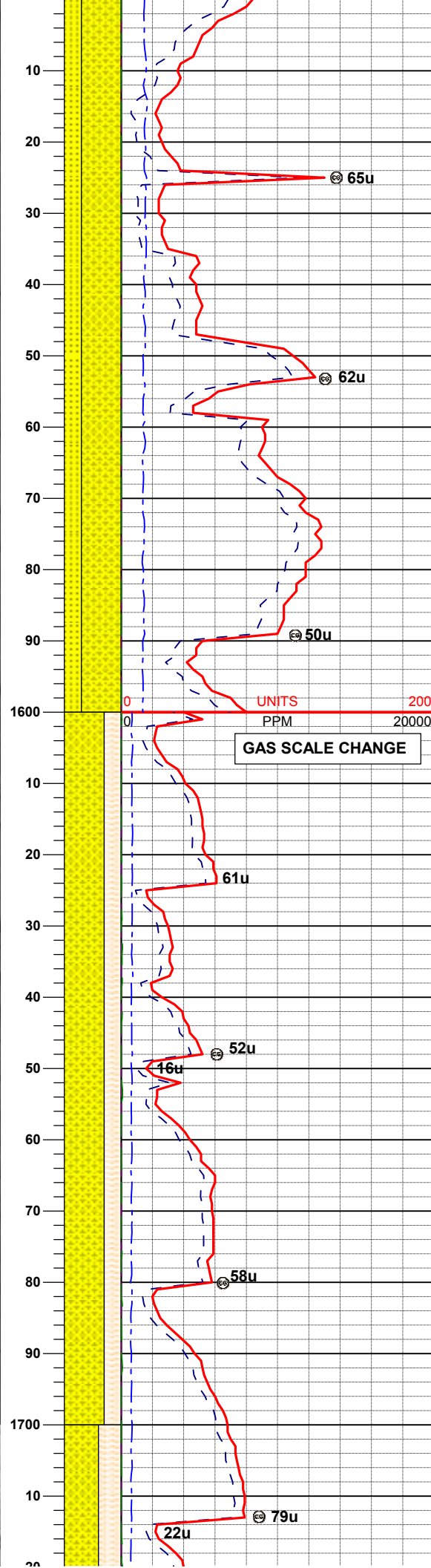
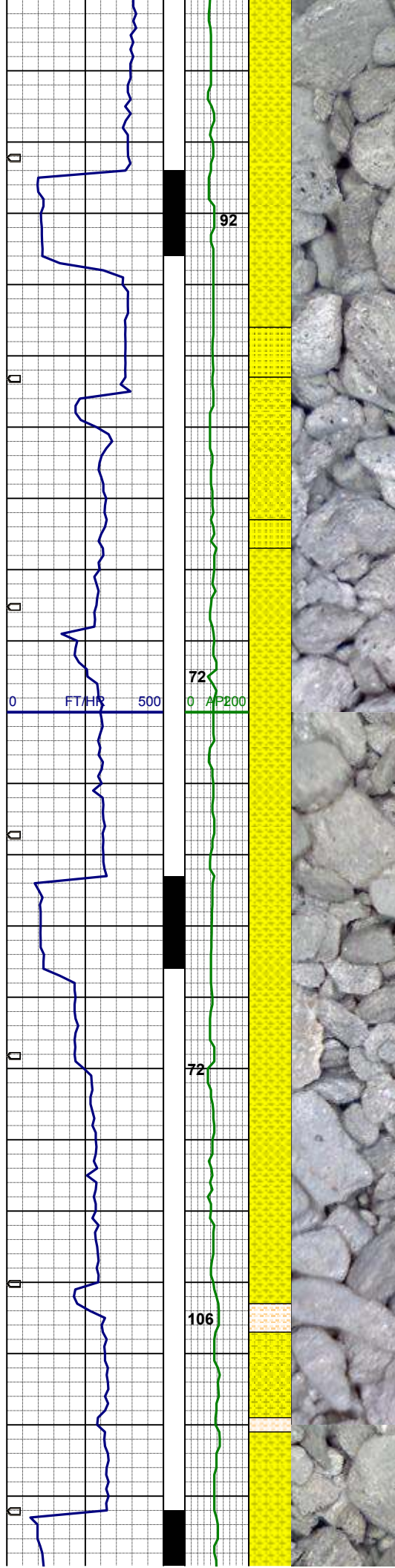
MD 1377'
INC 5.6°
AZI 108.4°
TVD 1376.3'

TVD
SCALE
CHANGE

UNITS
PPM

SHYSS: lt -mgy, trnsl- op, vf- fgr,
sbbiky mod srt, sft- sl firm, arg-sil mtx,
sl calc
SS: wh- ltgy, clr- trnsl, sme op, f-mgr,
sbbiky, mod srt, sl firm- brit, sil- calc
mtx, sl mica, tr glau

MD 1472'
INC 6.8°
AZI 104.9°
TVD 1470.8'



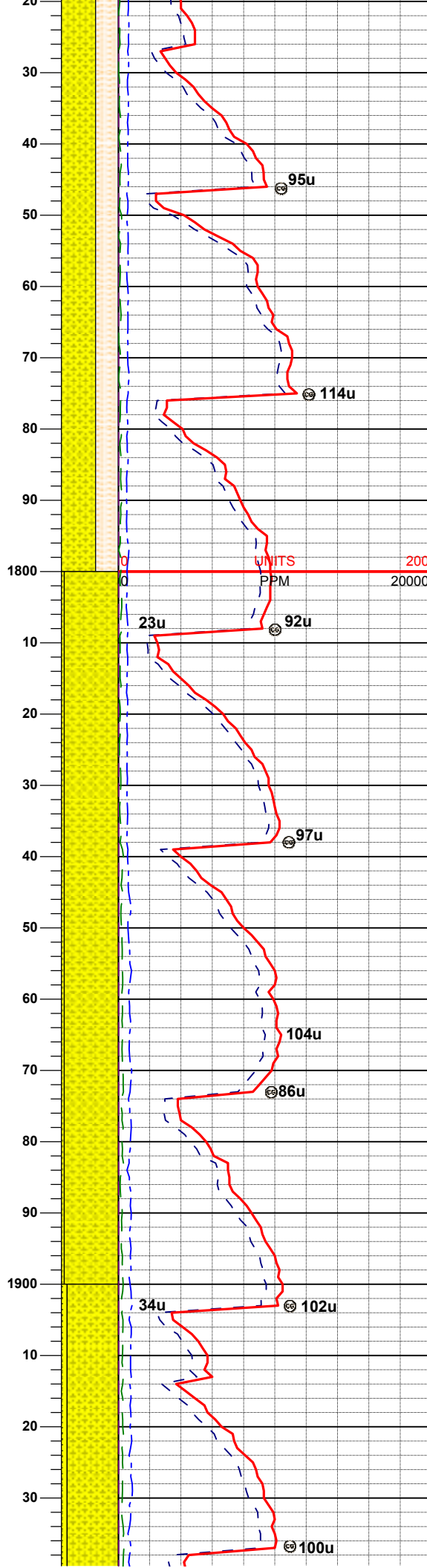
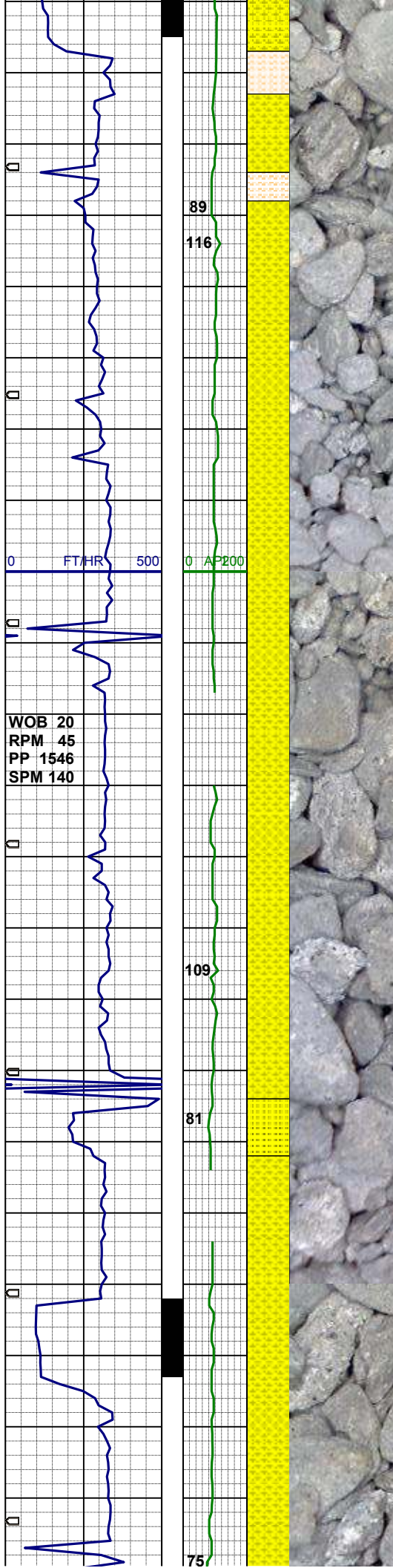
SHYSS: lt -mgy, trnsl- op, vf- fgr, sbbly mod srt, sft- sl firm, arg-sil mtx, sl calc
 SS: wh- ltgy, clr- trnsl, sme op, f-mgr, sbbly, mod srt, sl firm- brit, sil- calc mtx, sl mica, tr glau

MD 1567'
 INC 8.2°
 AZI 102.9°
 TVD 1565.0'

UNITS 200
 PPM 20000
 GAS SCALE CHANGE

SHYSS: lt -mgy, trnsl- op, vf- fgr, sbbly, sbply ip mod srt, sft, pred arg mtx, sl calc, v sl mica, grdg- shysltst

MD 1662'
 INC 9.7°
 AZI 107.9°
 TVD 1658.8'

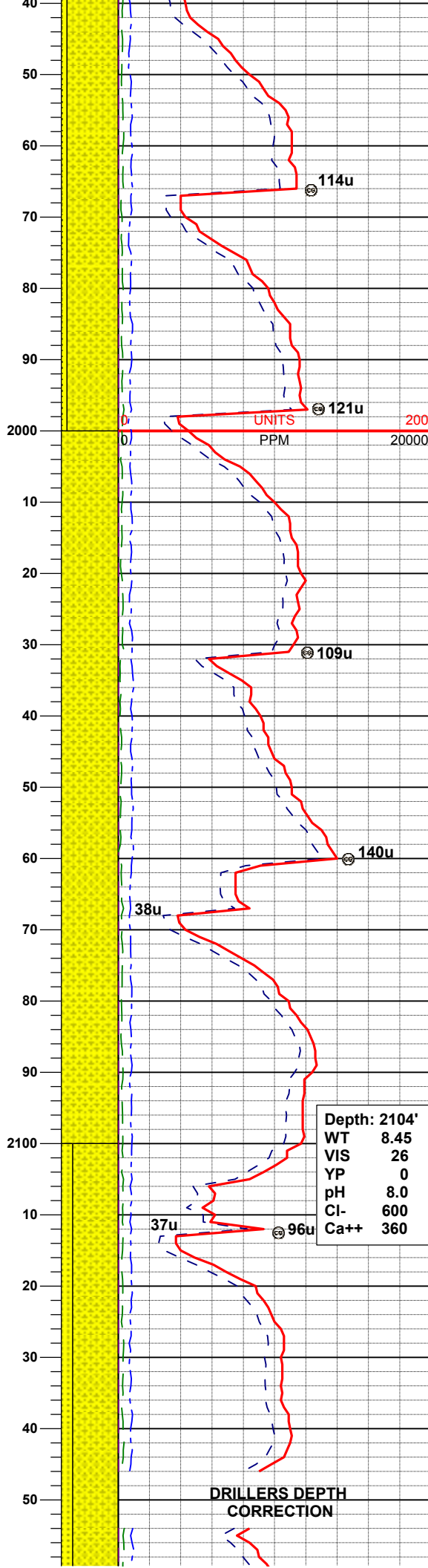
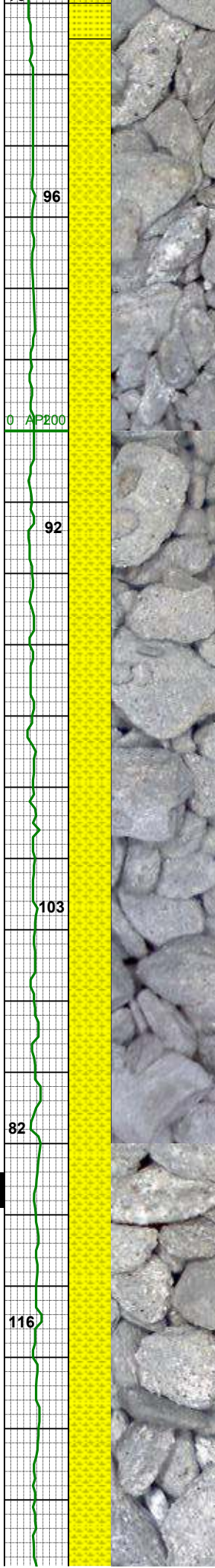
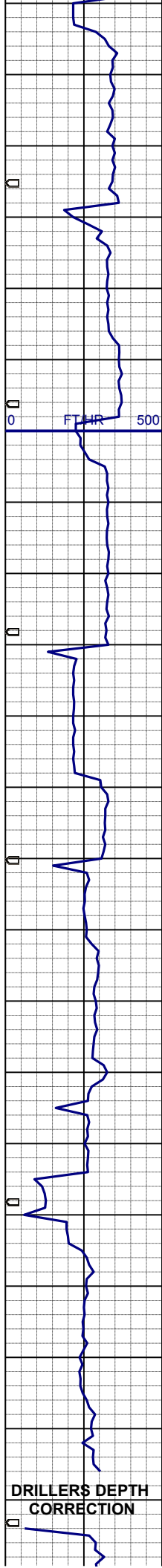


SHYSS: It -mgy, trnsl- op, vf- fgr, sbbiky, sbply ip mod srt, sft, pred arg mtz, sl calc, v sl mica, grdg- shysltst

MD 1757'
INC 10.5°
AZI 106.4°
TVD 1752.3'

SHYSS: - SS: It -mgy, trnsl- op, vf- fgr, occ mgr, sbbiky, sbply ip, mod srt, sft sl firm, arg- sil mtz, sl calc, sl mica

MD 1851'
INC 9.7°
AZI 101.5°
TVD 1844.9'



MD 1946'
INC 10.6°
AZI 104.9°
TVD 1938.4'

SHYSS: - SS: lt -mgy, trnsI- op, vf-
fgr, occ mgr, sbblky, sbpIty ip, mod
srt, sft sl firm, arg- sil mtx, sl calc, sl
mica

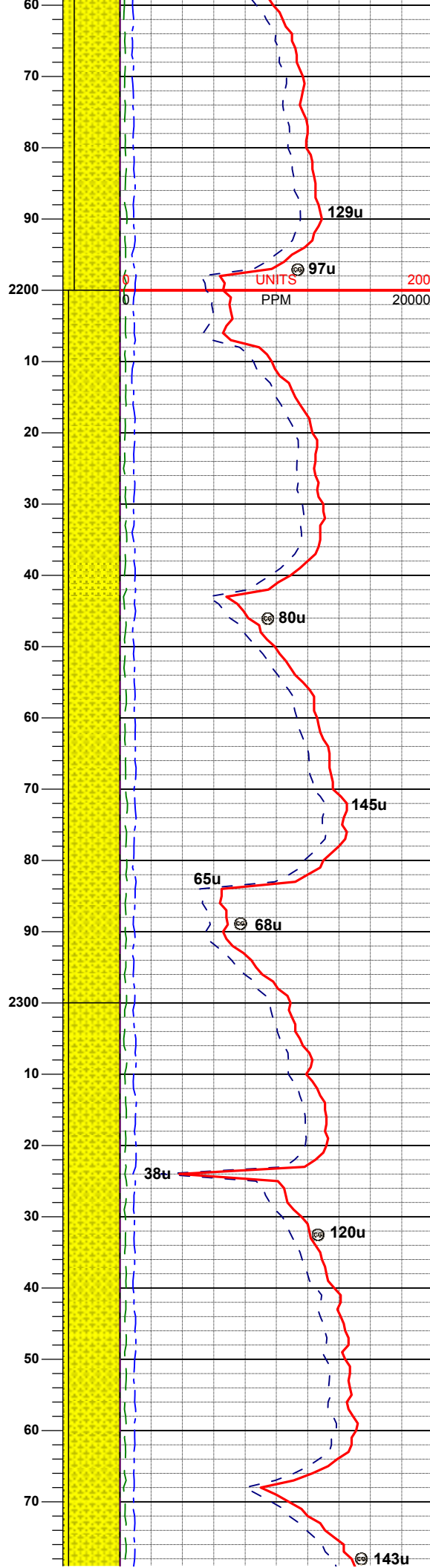
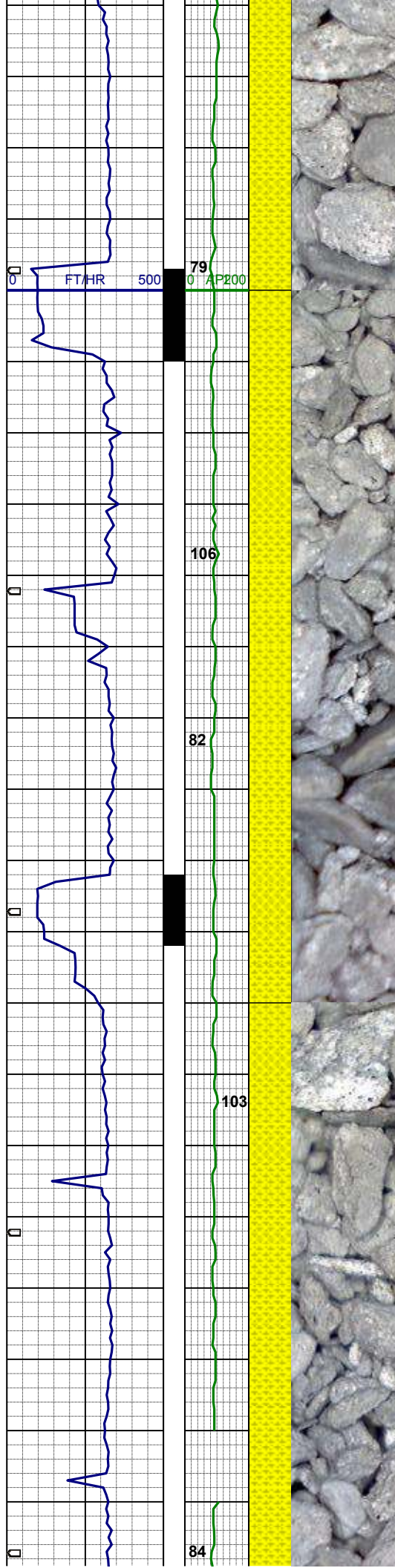
WT 8.5 / VIS 27

MD 2058'
INC 10.4°
AZI 97.5°
TVD 2048.5'

MD 2147'
INC 9.1°
AZI 102.2°
TVD 2136.2'

SHYSS: lt -mgy, trnsI- op, vf- fgr,
sbblky mod srt, sft- sl firm, arg-sil mtx,

Depth: 2104'	
WT	8.45
VIS	26
YP	0
pH	8.0
Cl-	600
Ca++	360



sl calc
SS: wh- ltgy, clr- trnsI, sme op, f-mgr,
sbbIky, mod srt, sl firm- brit, arg-sil
mtx, sl mica

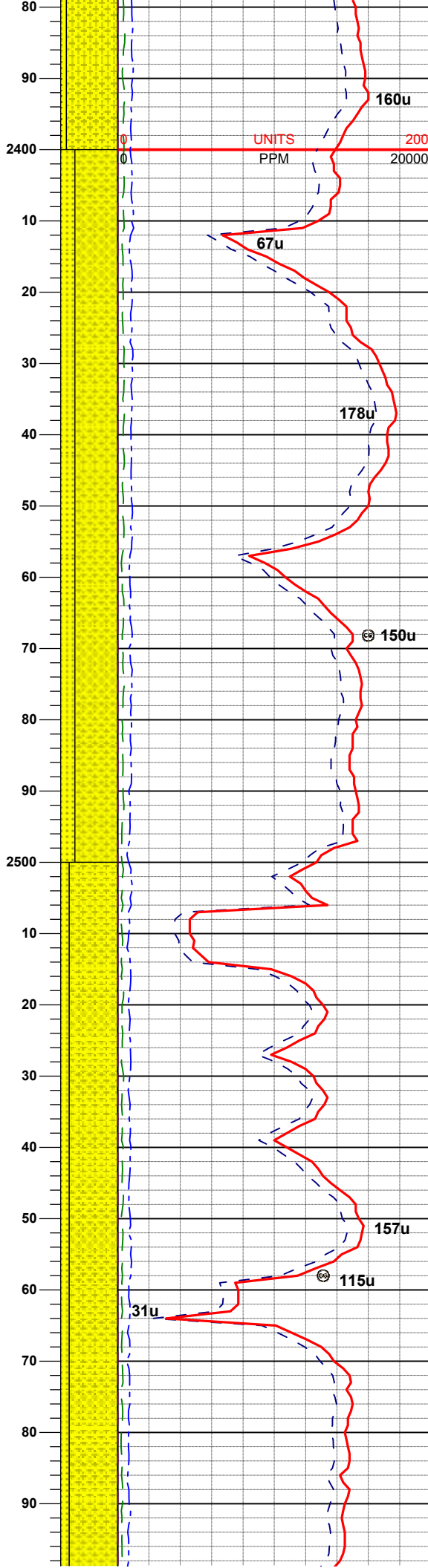
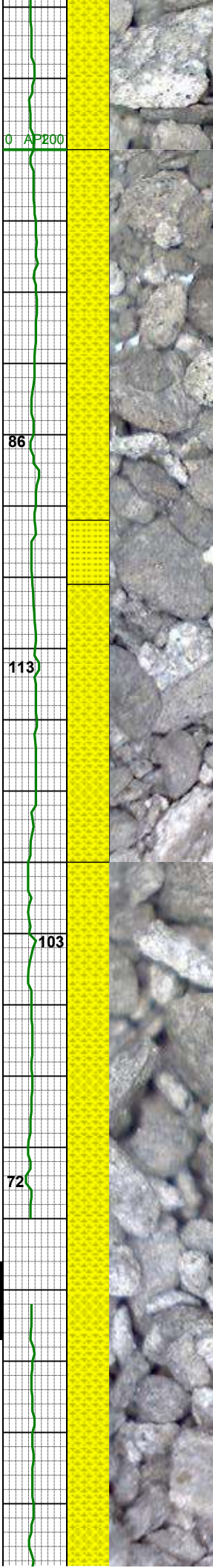
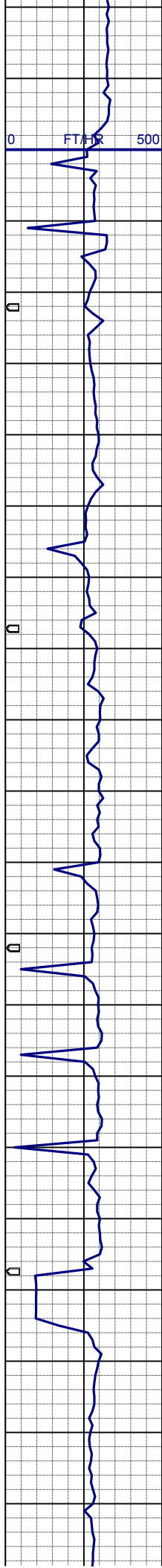
MD 2237'
INC 10.0°
AZI 104.2°
TVD 2225.0'

SHYSS: It -mgy, trnsI- op, vf gr,
sbbIky mod srt, sft- sl firm, arg-sil mtx,
sl calc
SS: wh- ltgy, clr- trnsI, sme op, f-mgr,
sbbIky, mod srt, sl firm- brit, arg-sil
mtx, sl mica

WT 8.4 / VIS 27

MD 2327'
INC 10.4°
AZI 110.1°
TVD 2313.8'

SHYSS: It -mgy, trnsI- op, vf gr,
sbbIky mod srt, sft- sl firm, arg-sil mtx,
sl calc
SS: wh- ltgy, clr- trnsI, sme op, f-mgr,
sbbIky, mod srt, sl firm- brit, arg-sil
mtx, sl mica



MD 2417'
INC 10.1°
AZI 104.7°
TVD 2402.1'

SHYSS: lt-mgy, trnsl- op, vf- fgr, sbbkly mod srt, sft- sl firm, arg-sil mtx, sl calc
SS: wh- ltgy, clr- trnsl, sme op, f-mgr, sbbkly, mod srt, sl firm- brit, arg-sil mtx, sl mica

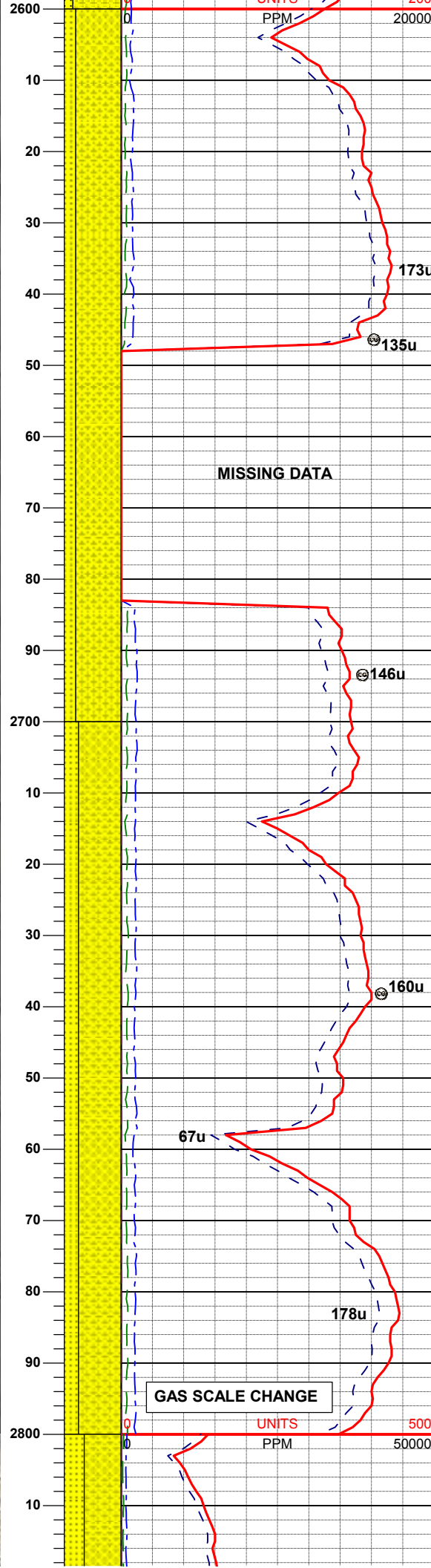
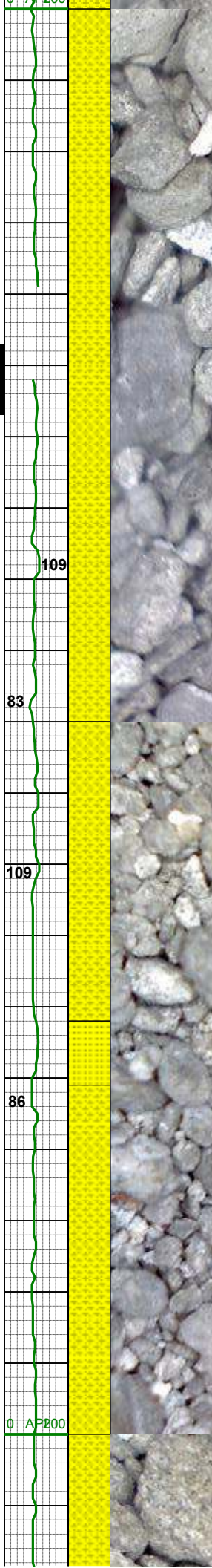
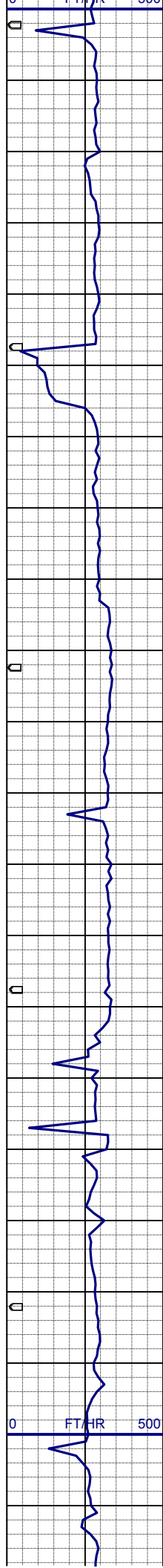
MD 2507'
INC 10.0°
AZI 100.3°
TVD 2490.7'

WT 8.40 / VIS 26

SHYSS: lt-mgy, trnsl- op, vf- fgr, sbbkly mod srt, sft- sl firm, arg-sil mtx, sl calc
SS: wh- ltgy, clr- trnsl, sme op, f-mgr, sbbkly, mod srt, sl firm- brit, arg-sil mtx, sl mica

WT 8.45 / VIS 26

MD 2597'
INC 10.4°
AZI 102.8°
TVD 2572.2'



SHYSS: lt-mgy, trnsl- op, vfgr, sbblky
mod srt, sft- sl firm, arg-sil mtx, sl calc
SS: wh- ltgy, clr- trnsl, sme op, f-mgr,
sbblky, mod srt, sl firm- brit, arg-sil
mtx, sl mica

MD 2687'
INC 9.8°
AZI 105.9°
TVD 2667.9'

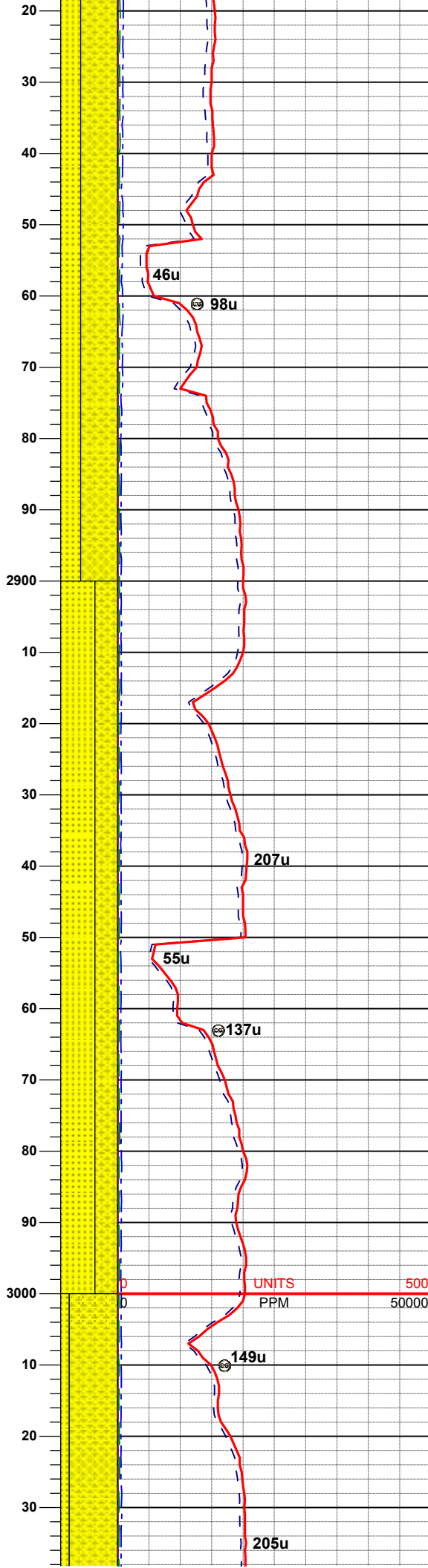
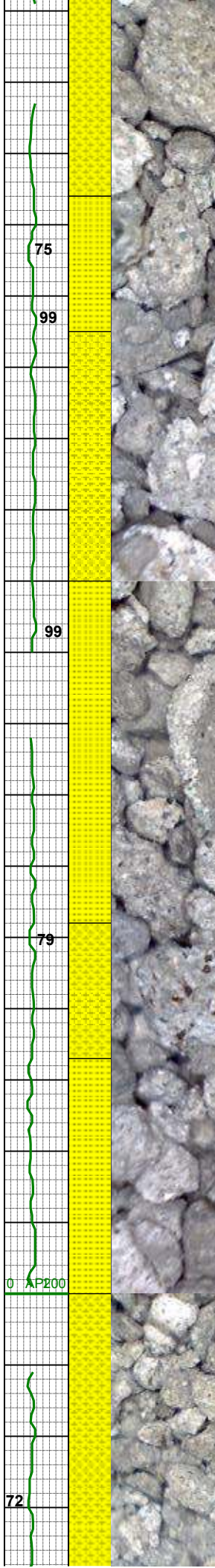
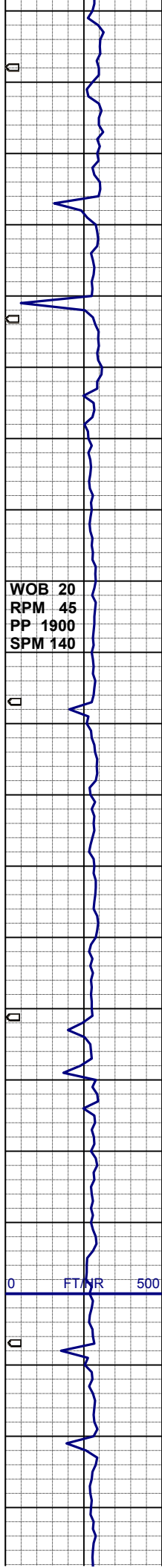
WT 8.5 / VIS 26

SHYSS: lt-mgy, trnsl- op, vfgr, sbblky
mod srt, sft- sl firm, arg-sil mtx, sl calc
SS: wh- ltgy, clr- trnsl, sme op, f-mgr,
sbblky, mod srt, sl firm- brit, arg-sil
mtx, sl mica

MD 2777'
INC 10.2°
AZI 109.6°
TVD 2756.6'

GAS SCALE CHANGE

UNITS
PPM



SHYSS: lt -mgy, trnsl- op, vf-fgr, sbbiky, mod srt, sft- sl firm, arg-sil mtz, sl calc
SS: wh- ltgy, clr- trnsl, sme op, f-mgr, sbbiky, mod srt, sl firm- brit, arg-sil mtz, mica

MD 2866'
INC 10.3°
AZI 108.9°
TVD 2844.1'

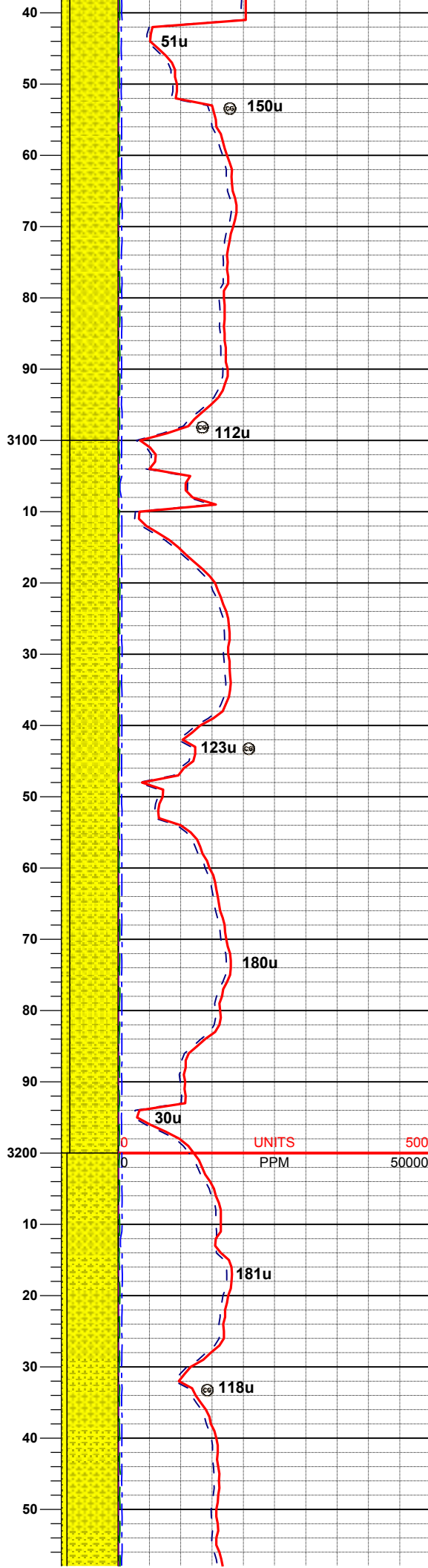
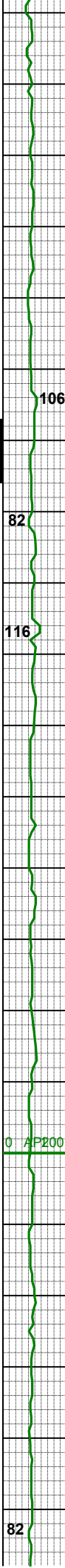
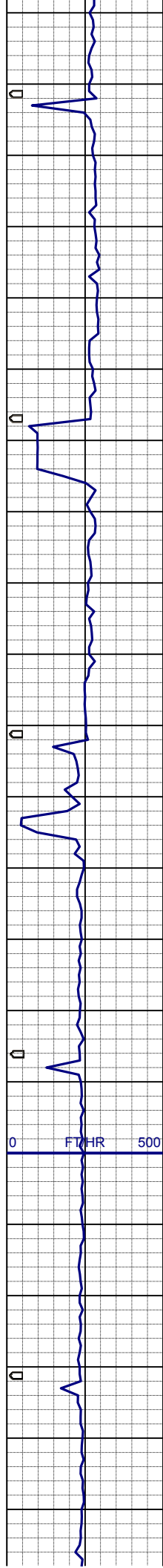
WT 8.55 / VIS 27

SS: wh- ltgy, clr- trnsl, sme op, f-mgr, sbbiky, mod srt, sl firm- brit, arg-sil mtz, sl mica
SHYSS: lt -mgy, trnsl- op, vf-fgr, sbbiky, mod srt, sft- sl firm, arg-sil mtz, sl calc

MD 2956'
INC 10.2°
AZI 109.4°
TVD 2932.7'

WT 8.65 / VIS 27

MD 3046'
INC 10.4°
AZI 111.0°



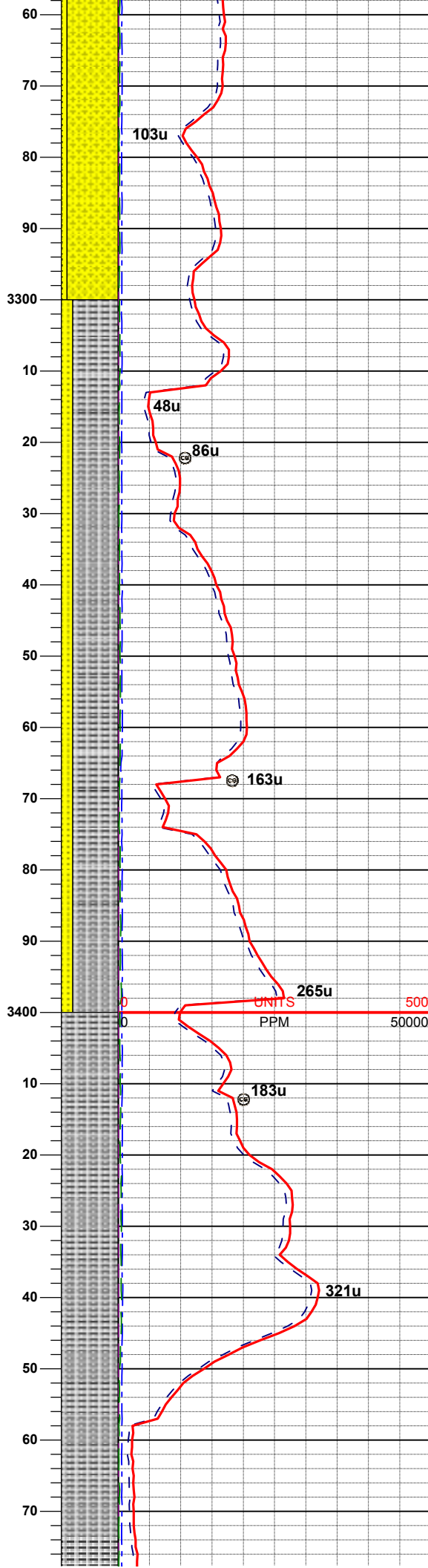
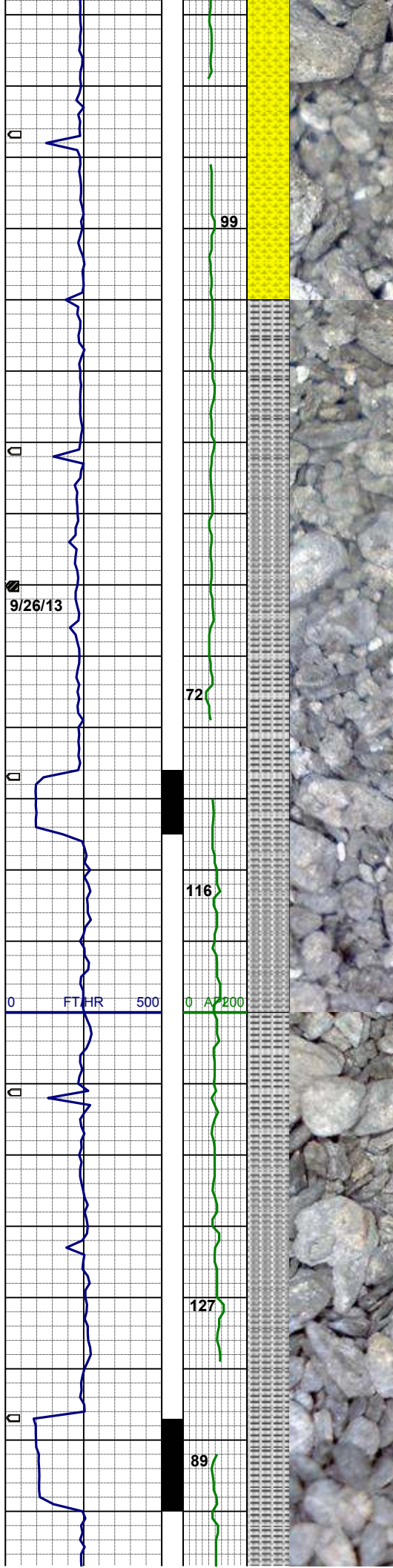
MD 3136'
INC 10.4°
AZI 103.5°
TVD 3109.8'

SHYSS: lt -mgy, trnsI- op, vf-fgr, sbbIky, mod srt, sft- sl firm, arg-sil mtX, sl calc
SS: wh- ltgy, clr- trnsI, sme op, f-mgr, sbbIky, mod srt, sl firm- brit, arg-sil mtX,sl mica

MD 3226'
INC 10.1°
AZI 103.3°
TVD 3198.3'

WT 8.75 / VIS 27

SHYSS: lt -mgy, trnsI- op, vf-fgr, sbbIky, mod srt, sft- sl firm, arg-sil mtX, sl calc
SS: wh- ltgy, clr- trnsI, sme op, f-vfgr, sbbIky, mod srt, sl firm- brit, arg-sil mtX,sl mica



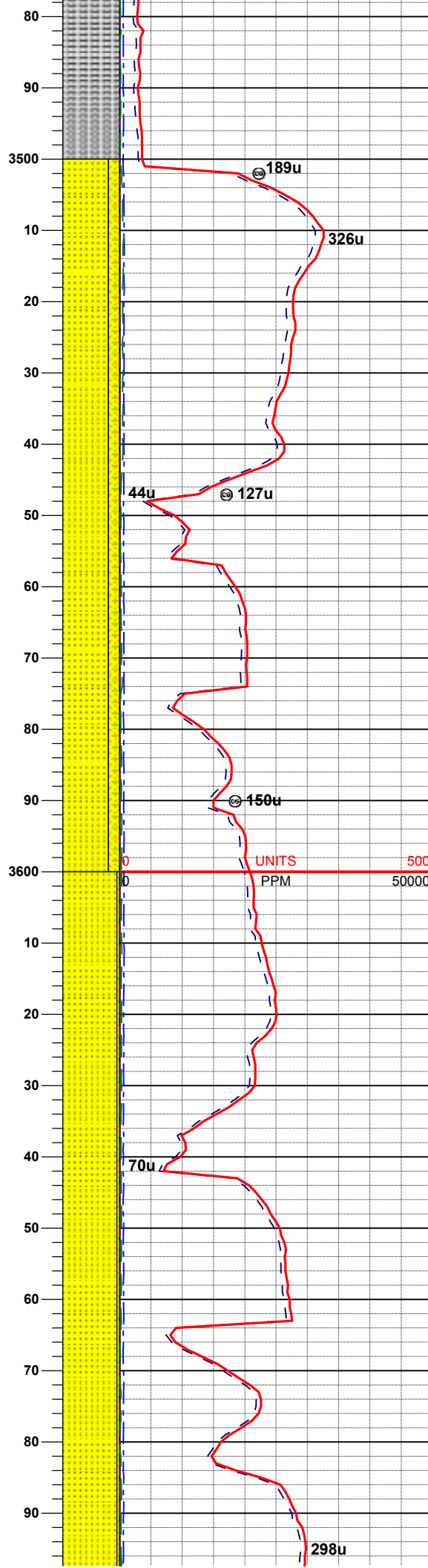
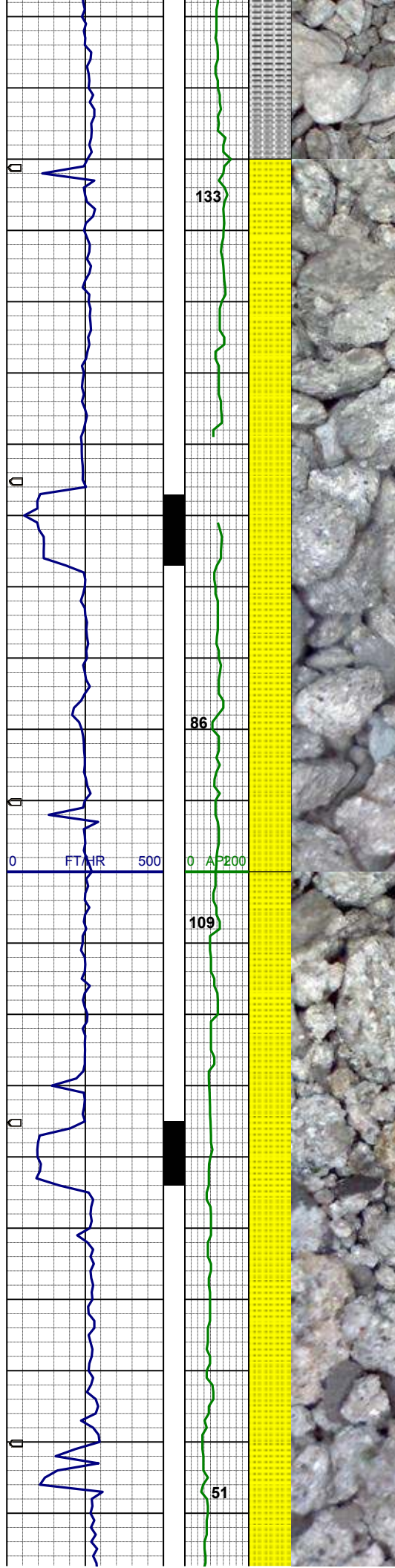
MD 3316'
INC 9.7°
AZI 103.6°
TVD 3287.0'

WT 8.85 / VIS 30

SLTYSH: lt-mgy, f-vfgr, sbbky-sbply,
occ ply, sft-firm, arg, sl calc
SS: wh- ltgy, clr- trns, sme op, f-vfgr,
sbbky, mod srt, sl firm- brit, arg-sil
mtx, sl mica

MD 3406'
INC 9.2°
AZI 104.2°
TVD 3375.8'

SLTYSH: lt-mgy, f-vfgr, sbbky-sbply,
occ ply, sft, p-mod srt, s, arg, sl calc,
sl mica, tr cly



MD 3495'
INC 9.6°
AZI 103.6°
TVD 3463.6'

SS: gy- ltgy, f-vfgr, op, sbrndd-sbang,
blky-sbblky, p-mod srt, sft-firm, sl arg
-sil mtx, sl calc
SHYSS: lt- mgy, vf- fgr, trns- op,
sbblky-sbplty, p srt, vsft- sft, arg mtx,
mod cmt, sl calc

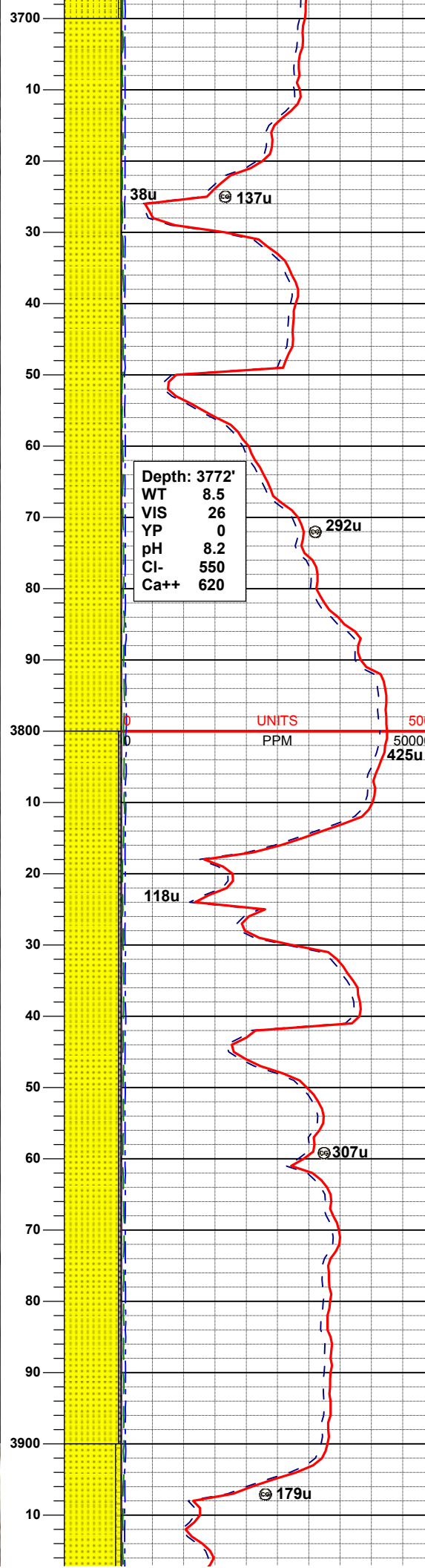
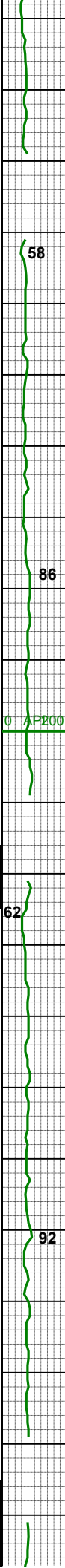
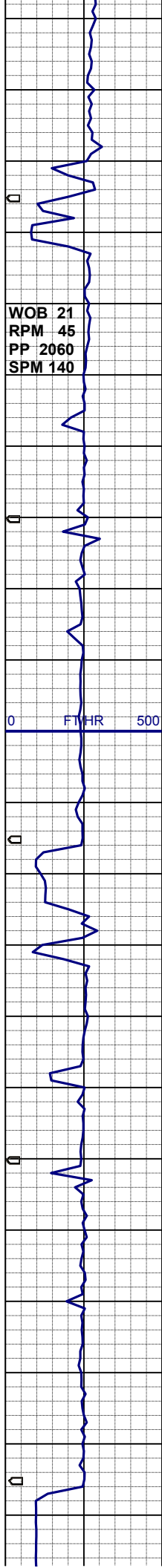
MD 3585'
INC 9.5°
AZI 105.9°
TVD 3552.3'

WT 8.5 / VIS 26

SS: wh- ltgy, clr- trns- sme op, f-vfgr,
sbblky, mod srt, sl firm- brit, arg-sil
mtx, sl mica
SHYSS: lt- mgy, vf- fgr, trns- op,
sbblky-sbplty, p srt, vsft- sft, arg mtx,
mod cmt, sl calc

MD 3675'
INC 10.6°
AZI 110.0°
TVD 3641.0'

WT 8.55 / VIS 26



SS: wh- ltgy, clr- trnsl, sme op, f-vfgr, sbbiky-sbrd mod srt, sl firm- brit, arg-sil mtx, slmica

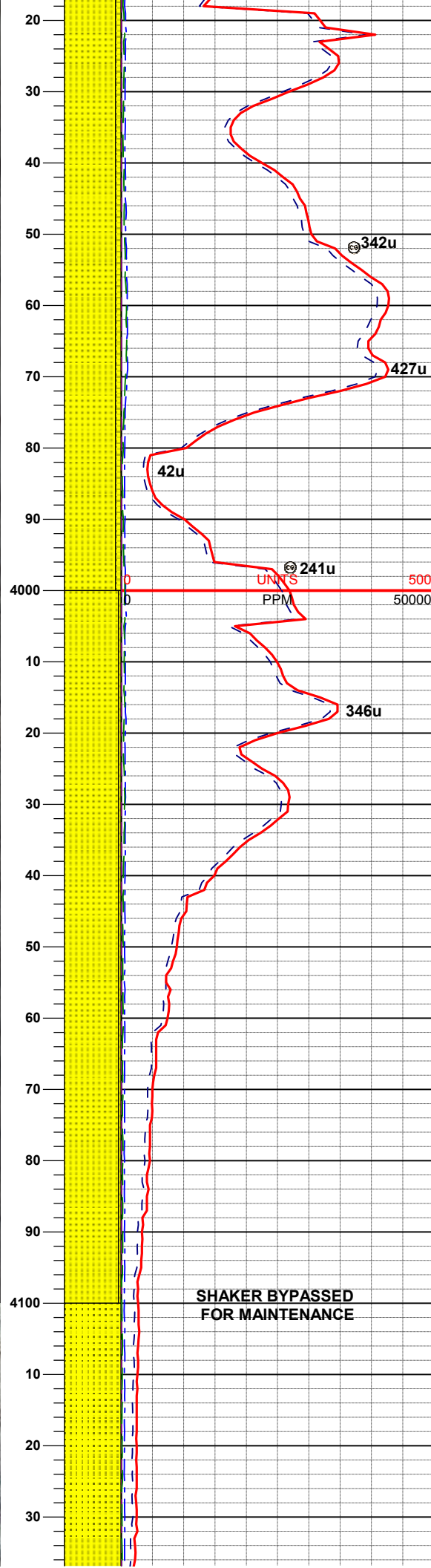
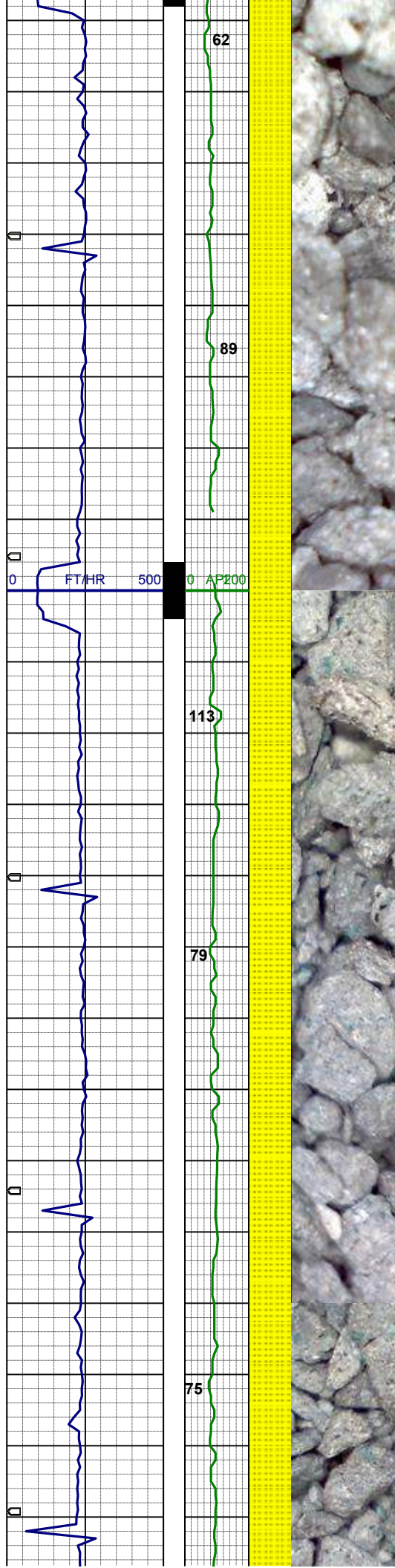
MD 3765'
INC 11.3°
AZI 111.7°
TVD 3729.3'

UNITS
PPM
50000
425u

SS: wh- ltgy, clr- trnsl, sme op, s&p, f-mgr, sbbiky, mod- w srt, sl firm- brit, arg-sil mtx, mica ip, occ glau, tr fos frag
SLTYSH: m- dkgy, sbplty- plty, firm, some v firm, arg, sl calc

MD 3855'
INC 12.7°
AZI 107.5°
TVD 3817.4'

WT 8.45 / VIS 25



MD 3945'
INC 12.0°
AZI 103.3°
TVD 3905.3'

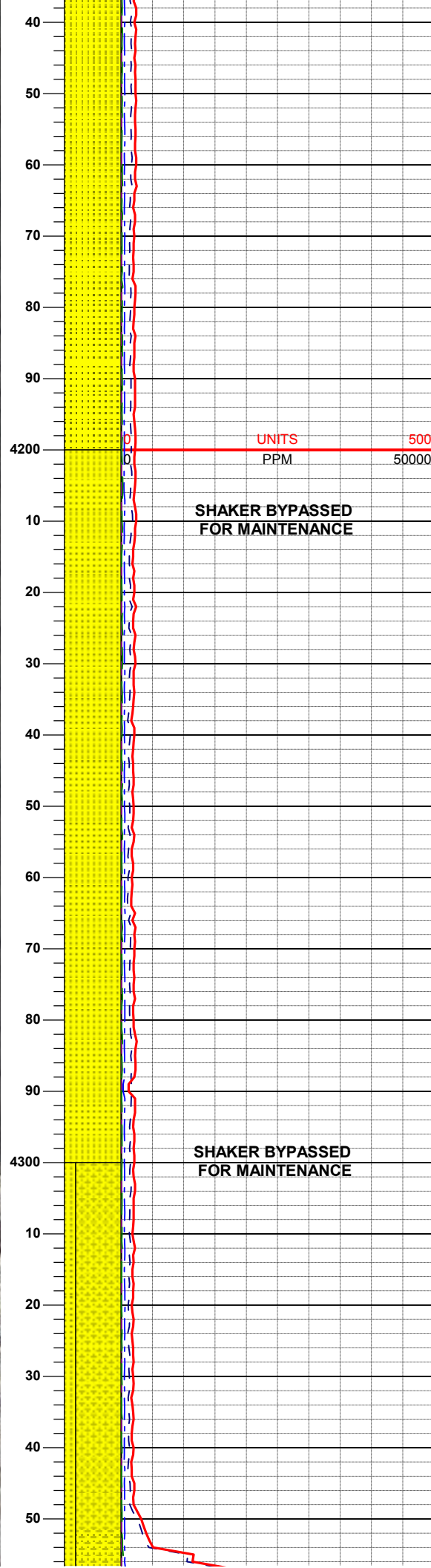
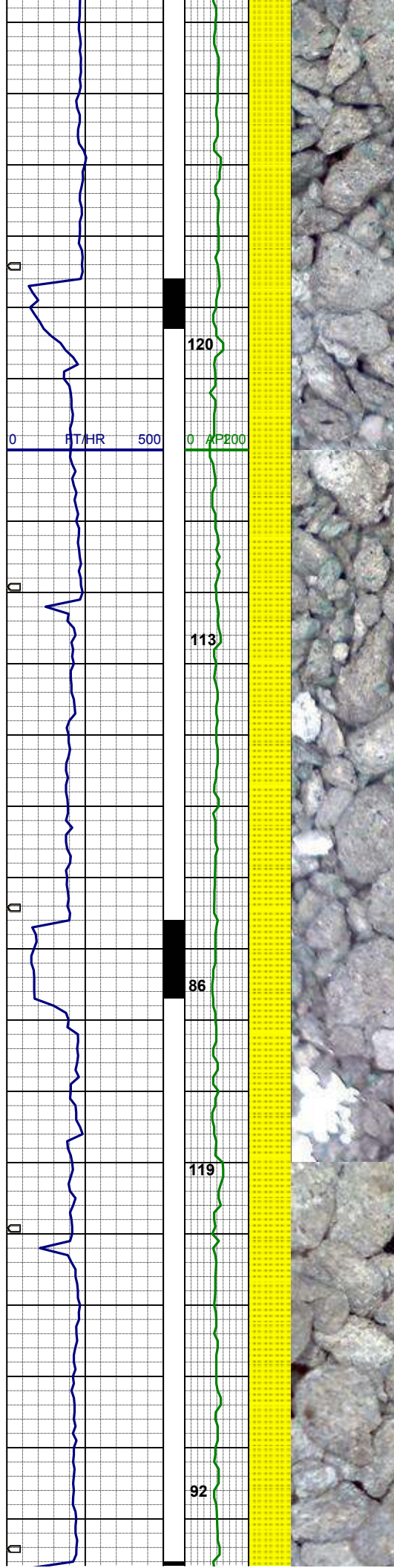
SS: wh- ltgy, clr- trnsl, sme op, s&p ip, pred f- mgr, sbblky, mod srt, sl firm- brit, arg-sil mtx, mica ip, tr glau, grdng to vfgr shyss

MD 4034'
INC 11.2°
AZI 98.5°
TVD 3992.5'

SS: m- ltgy, clr- trnsl, sme op, s&p ip, pred f- mgr, sbblky, mod srt, sl firm- brit, arg-sil mtx, mica ip, abnt glau, grdng to vfgr shyss

SHAKER BYPASSED
FOR MAINTENANCE

MD 4124'
INC 11.1°
AZI 97.5°
TVD 4080.8'



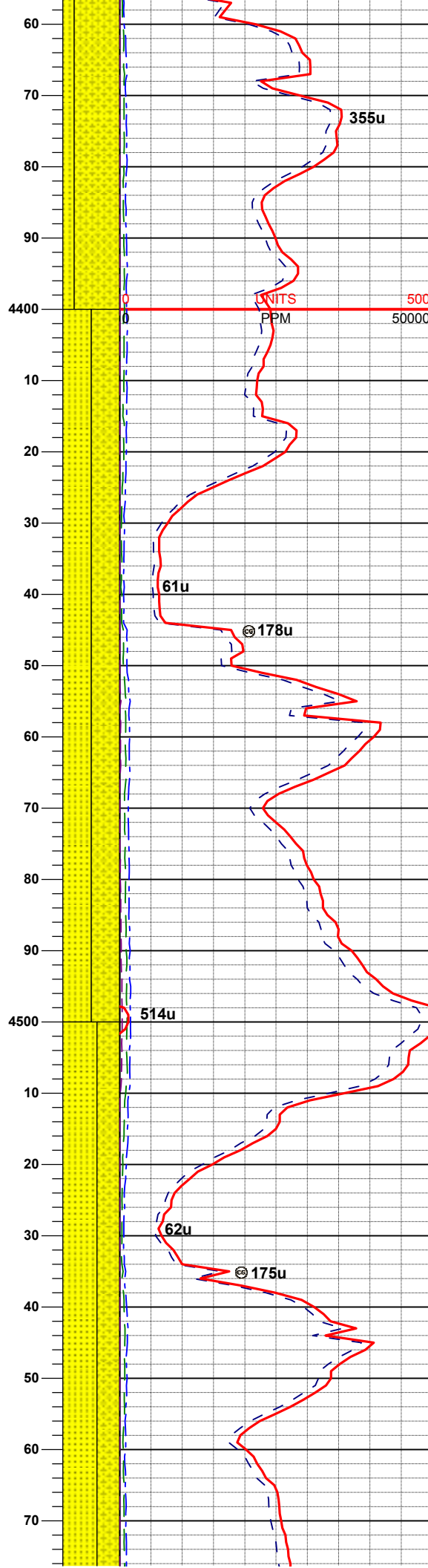
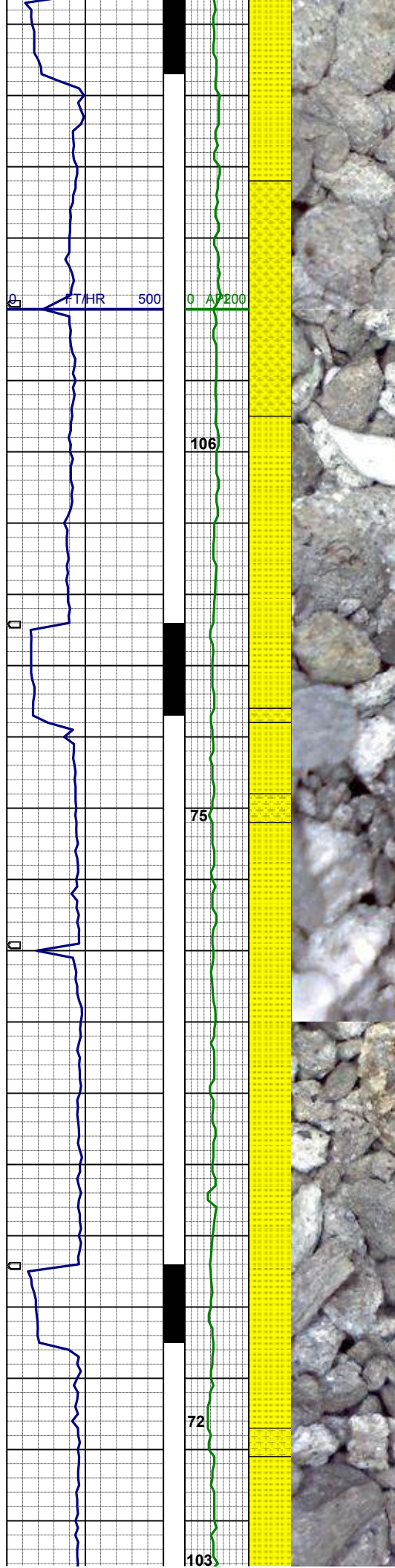
SS: m- ltgy, clr- trnsl, sme op, s&p ip ,
pred f- mgr, sbblky, mod srt, sl firm-
brit, arg-sil mtx, mica ip, abnt glau,
grdng to vfgr shyss

MD 4214'
INC 9.9°
AZI 97.7°
TVD 4169.2'

SS: m- ltgy, clr- trnsl, sme op, s&p ip ,
pred f- mgr, sbblky, mod srt, sl firm-
brit, arg-sil mtx, mica ip, abnt glau,
grdng to vfgr shyss

MD 4304'
INC 10.1°
AZI 100.1°
TVD 4257.9'

SHYSS: mgy, vf- fgr, trnsl- op, sbblky-
sbply, p srt, vsft- sft, arg mtx, mod
cmt, sl calc, grdng- shyssltst
SS: m- ltgy, clr- trnsl, sme op, s&p ip,
f- mgr, sbblky, mod srt, sl firm- brit,



arg-sil mt, mica ip

WT 8.4 / VIS 28

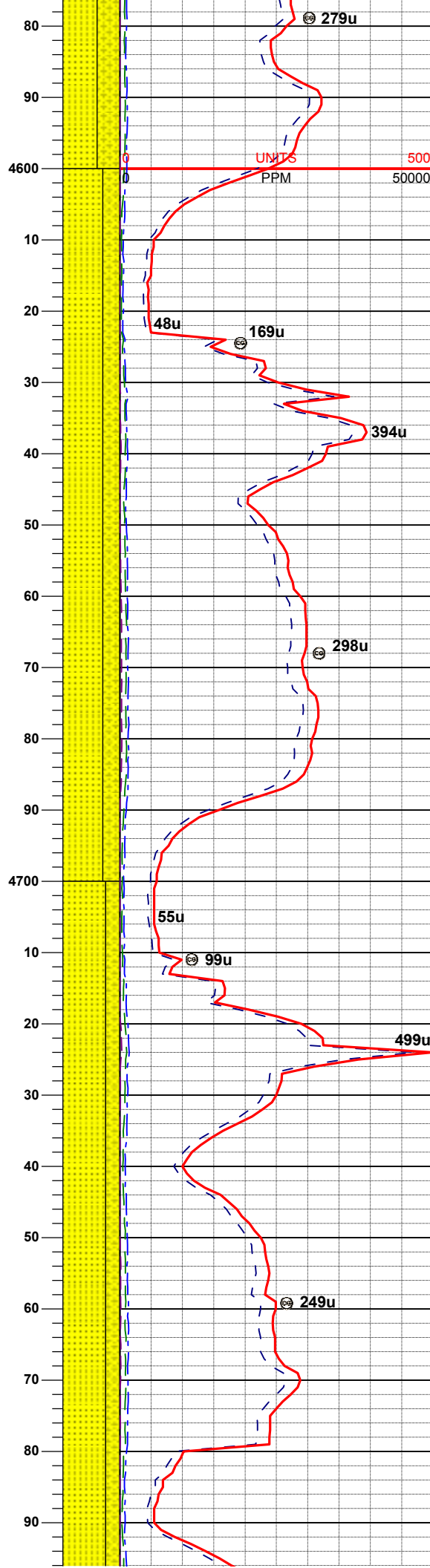
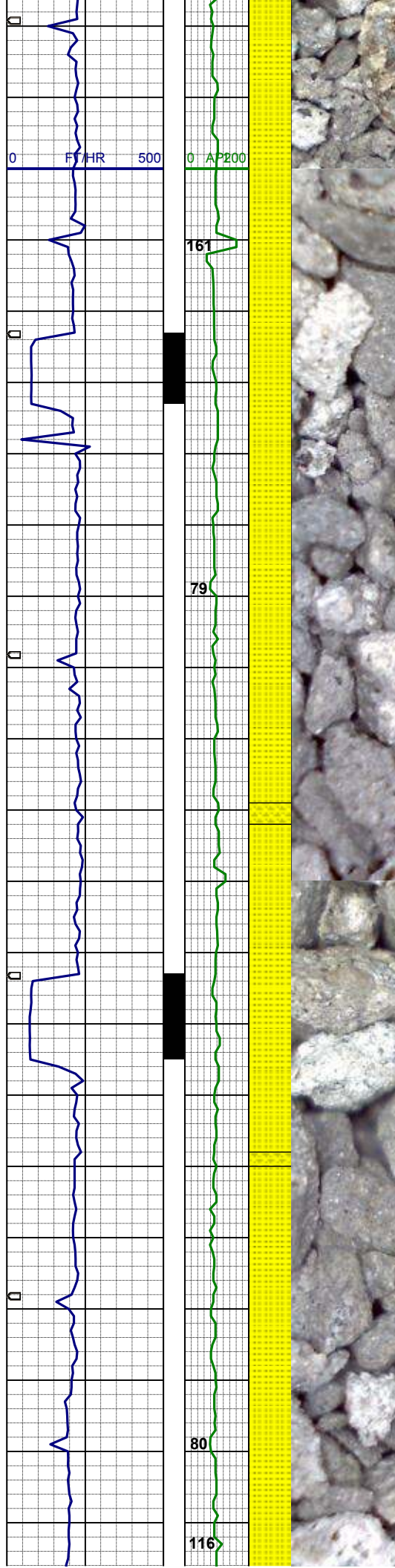
MD 4394'
INC 9.1°
AZI 103.5°
TVD 4346.6'

SS: wh- mgy, clr- trns, sme op, s&p
ip, f- mgr, sbblky, mod srt, sl firm-
brit, arg-sil mt, mica ip
SHYSS: mgy, vf- fgr, trns- op, sbblky-
sbplty, p srt, vsft- sft, arg mt, mod
cmt, sl calc

MD 4484'
INC 9.3°
AZI 108.7°
TVD 4435.5'

SS: wh- mltgy, clr- trns, sme op, s&p
ip, f- mgr, sbblky, mod srt, sl firm-
brit, arg-sil mt, mica ip
SHYSS: mgy, vf- fgr, trns- op, sbblky-
sbplty, p srt, vsft- sft, arg mt, mod
cmt, sl calc

MD 4573'
INC 9.9°
AZI 114.9°
TVD 4521.5'



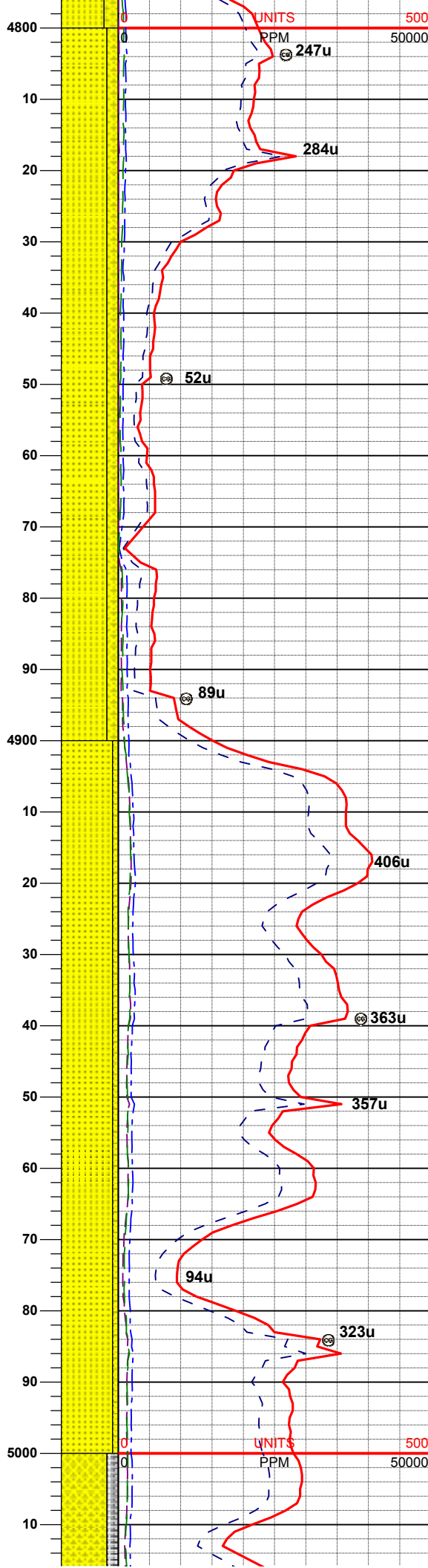
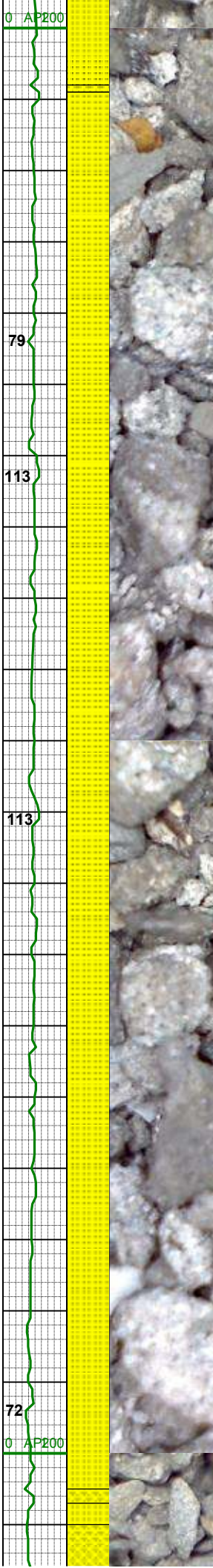
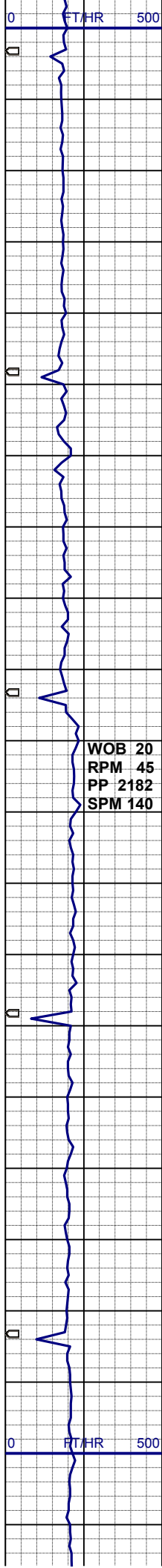
SS: wh- mgy, clr- trnsl, sme op, s&p
ip, f- mgr, sbblky, mod srt, sl firm-
brit, arg-sil mtx, mica ip, tr glau
SHYSS: mgy, vf- fgr, trnsl- op, sbblky-
sbplty, p srt, vsft- sft, arg mtx, mod
cmt, sl calc, grdg- shysltst

MD 4663'
INC 10.6°
AZI 113.3°
TVD 4611.8'

WT 8.4 / VIS 28

SS: wh- mgy, clr- trnsl, sme op, s&p
ip, f- mgr, sbblky, mod srt, sl firm-
brit, arg-sil mtx, mica ip, tr glau
SHYSS: mgy, vf- fgr, trnsl- op, sbblky-
sbplty, p srt, vsft- sft, arg mtx, mod
cmt, sl calc, grdg- shysltst

MD 4753'
INC 11.3°
AZI 107.0°
TVD 4700.1'

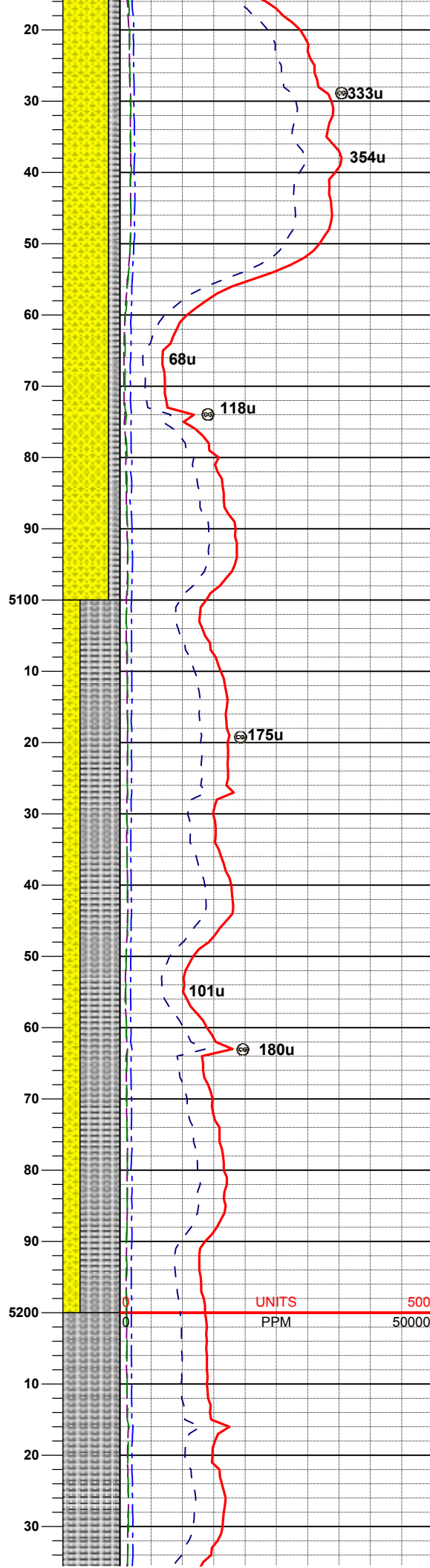
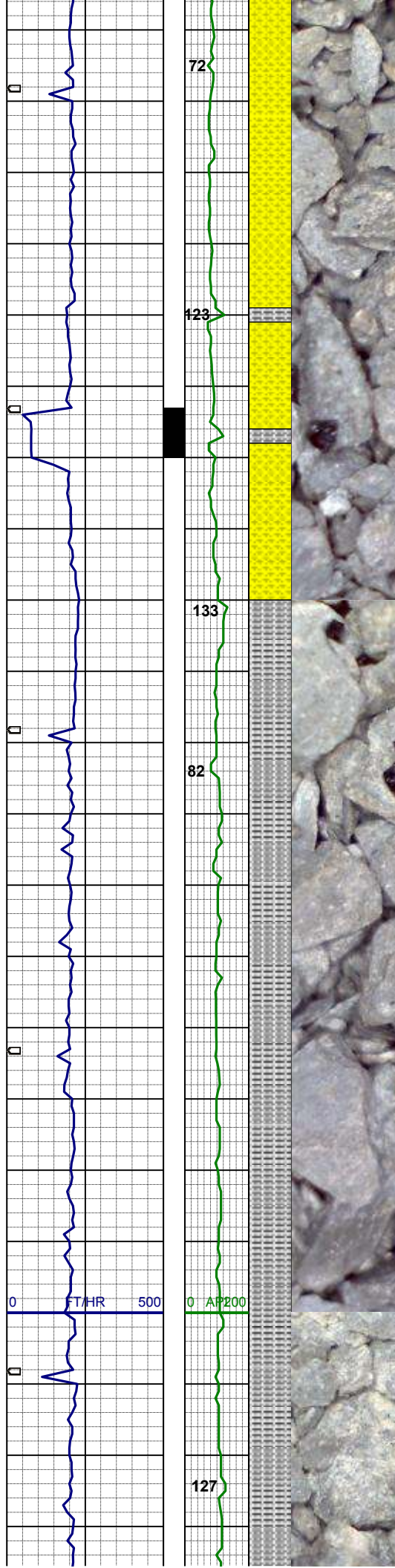


MD 4843'
INC 11.3°
AZI 107.3°
TVD 4788.4'

SS: wh- mgy, clr- trnsf, sme op, s&p
ip, f- mgr, sbblky, mod srt, sl firm-
brit, arg-sil mtx, mica ip, tr glau
SHYSS: mgy, vf- fgr, trnsf- op, sbblky-
sbplty, p srt, vsft- sft, arg mtx, mod
cmt, sl calc, grdg- shysltst

MD 4933'
INC 10.5°
AZI 106.8°
TVD 4876.8'

SS: wh- mgy, clr- trnsf, sme op, s&p
ip, f- mgr, sbblky, mod srt, sl firm-
brit, arg-sil mtx, mica ip, tr glau
SHYSS: mgy, vf- fgr, trnsf- op, sbblky-
sbplty, p srt, vsft- sft, arg mtx, mod
cmt, sl calc, grdg- shysltst



MD 5023'
INC 10.5°
AZI 106.1°
TVD 4965.3'

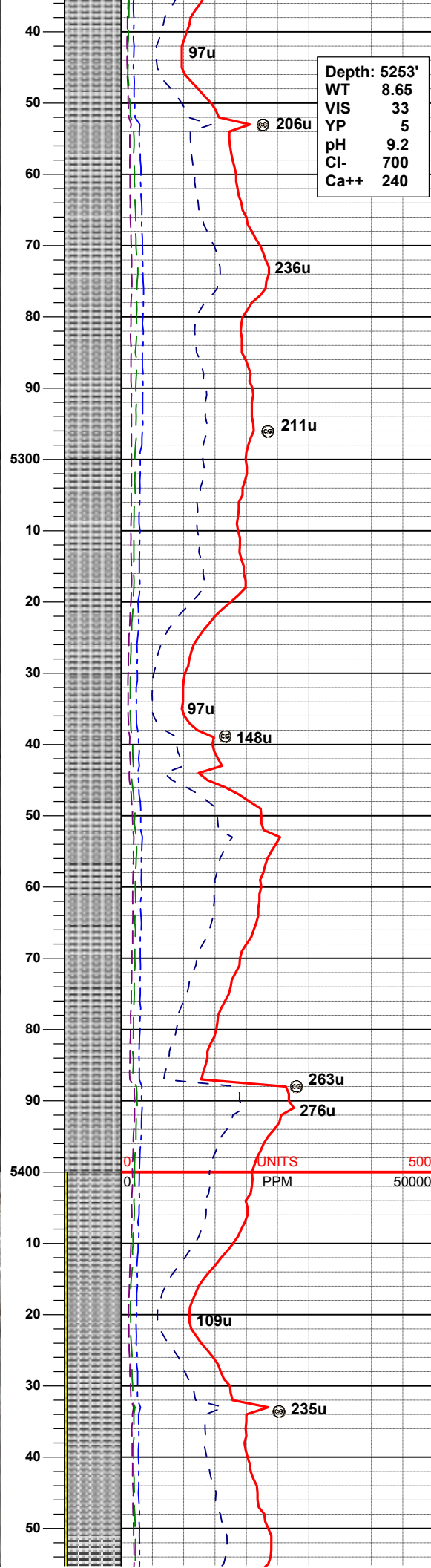
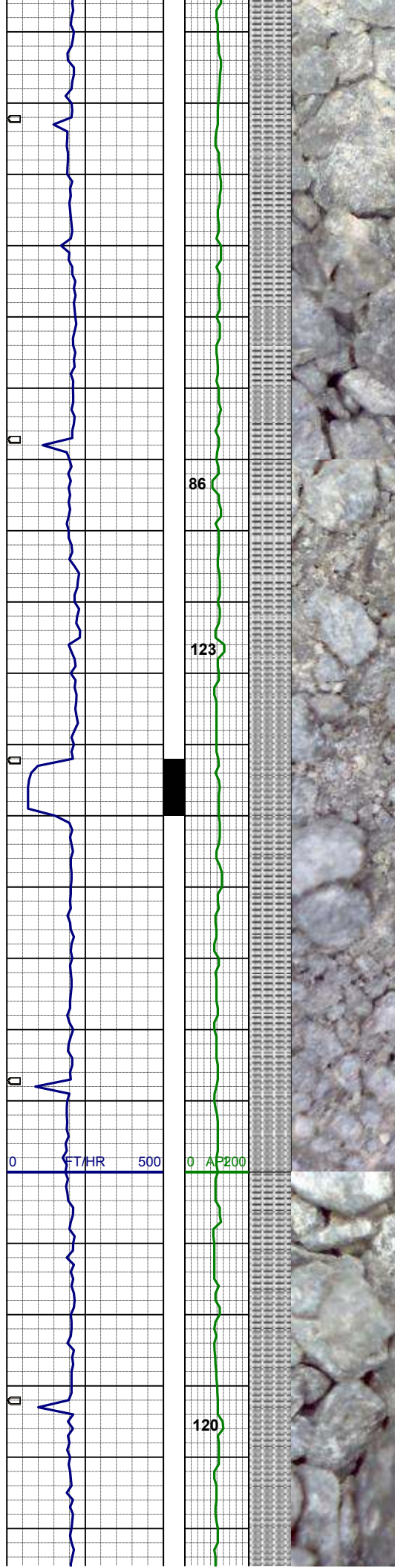
SHYSS: mgy, vf- fgr, trnsI- op, sbblky-
sbplty, mod srt, vsft- sft, arg mtX, mod
cmt, sl calc, slty, grdg- sltysh, occ mgr
ss

MD 5113'
INC 8.8°
AZI 102.8°
TVD 5054.6'

SLTYSH: lt-mgy, plty- sbplty, sft- sl
firm, mod srt, arg, sl calc, sl mica,
grdg-
SHYSS: mgy, vf- fgr, trnsI- op, sbblky-
sbplty, mod srt, sft, arg mtX, mod cmt,
sl calc, slty

MD 5202'
INC 7.6°
AZI 107.7°
TVD 5142.1'

UNITS
PPM



SLTYSH: lt- mgy- gybrn, plty- sbplty,
sft- sl firm, mod srt, arg, sl calc, sl
mica, sdy ip, grdg- shyss

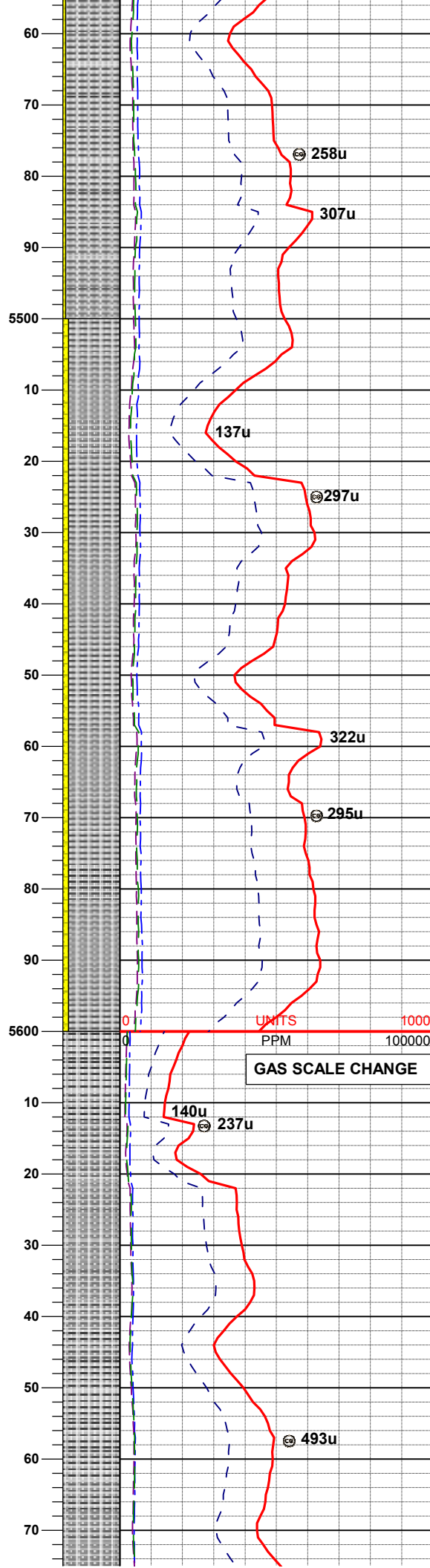
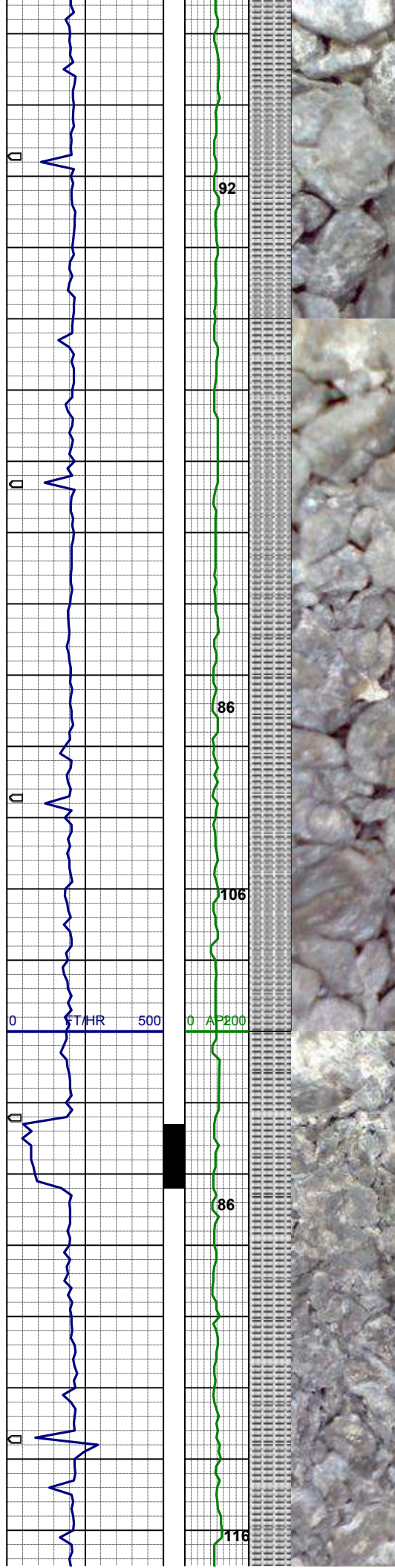
MD 5292'
INC 6.9°
AZI 116.8°
TVD 5231.4'

SLTYSH: lt- mgy, plty- sbplty, sft- sl
firm, mod srt, arg, sl calc, sl mica, sdy
ip, grdg- shyss

MD 5382'
INC 4.7°
AZI 112.8°
TVD 5320.9'

WT IN 8.9 / VIS IN 35
WT OUT 8.8/ VIS OUT 36

SLTYSH: lt-mav. oltv- sbolty. sft- sl



firm, mod srt, arg, sl calc
SHYSS: mgy, vf- fgr, trns- op, sbblky-
sbplty, mod srt, sft, arg mtx, mod cmt,
sl calc, slty

MD 5472'
INC 3.5°
AZI 113.5°
TVD 5410.7'

WT 9.35/ VIS 32

SLTYSH: lt-mgy, sbblky- sbplty, sft- sl
firm, mod srt, arg, sl calc
SHYSS: mgy, vf- fgr, trns- op, sbblky-
sbplty, mod srt, sft, arg mtx, mod cmt,
sl calc, slty

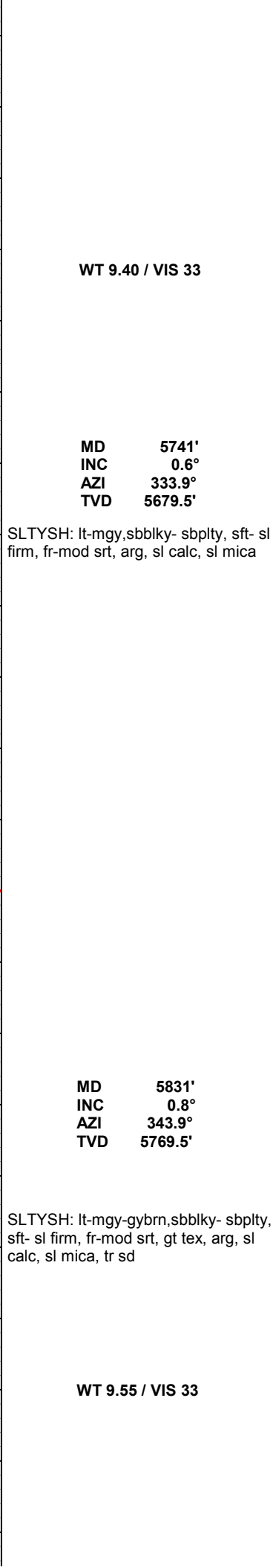
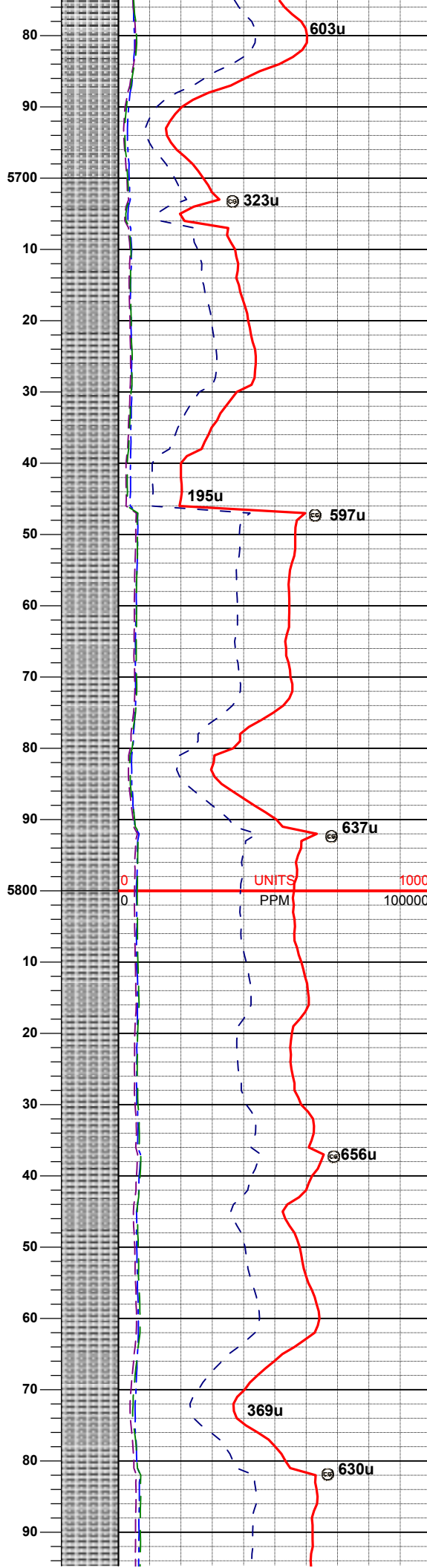
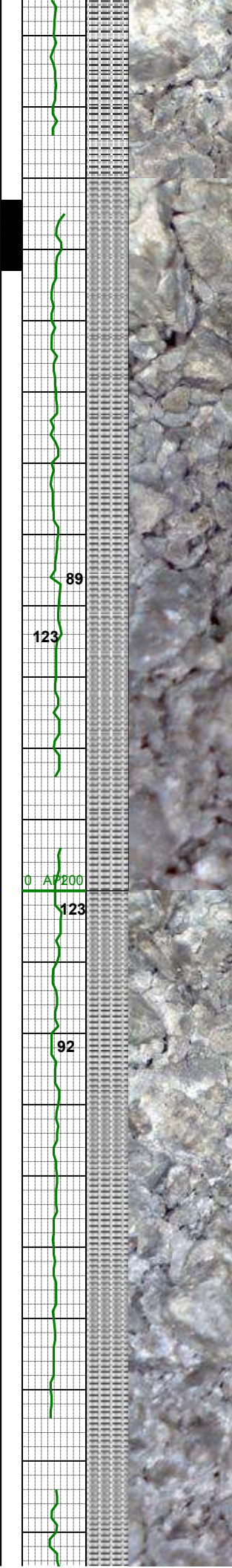
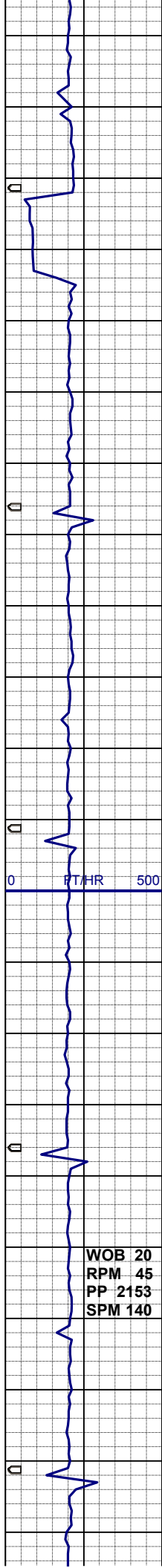
MD 5562'
INC 2.6°
AZI 112.6°
TVD 5500.5'

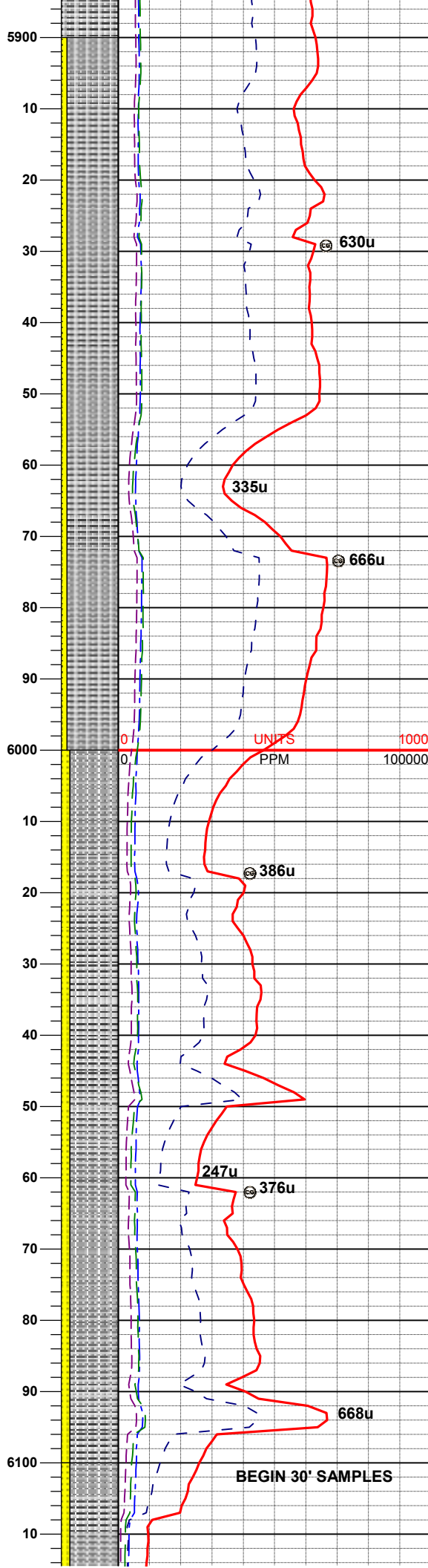
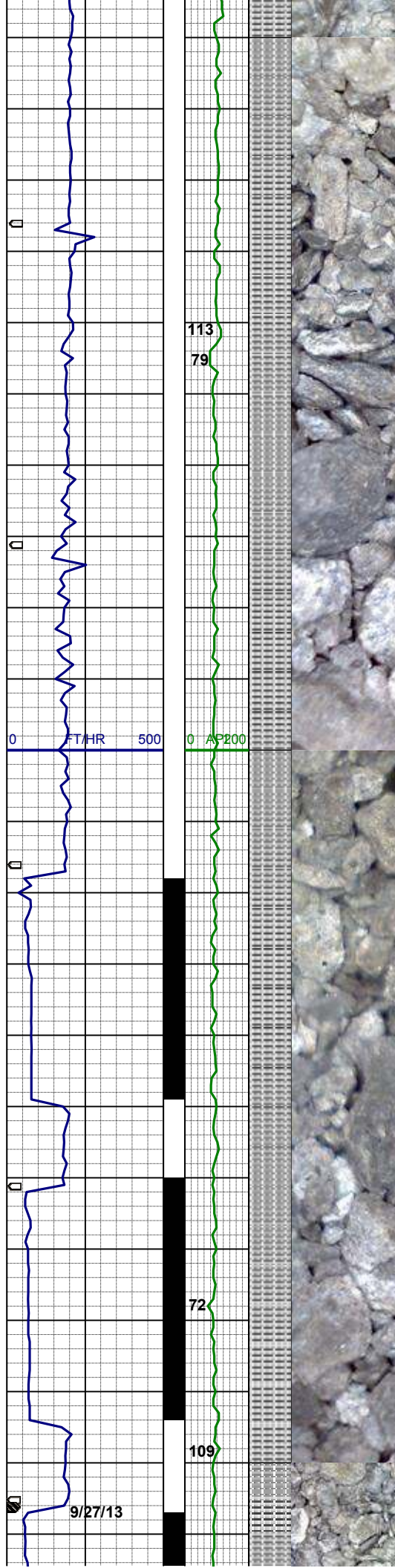
WT 9.25 / VIS 33

SLTYSH: lt-mgy, sbblky- sbplty, sft- sl
firm, fr-mod srt, arg, sl calc, sl mica, tr
sd

MD 5651'
INC 1.2°
AZI 99.2°
TVD 5589.5'

GAS SCALE CHANGE





MD 5921'
INC 0.8°
AZI 1.7°
TVD 5859.4'

SLTYSH: lt-mgy-gybrn,blky-sbblky-
sbplty, sft- sl firm, fr-mod srt, gt tex,
arg, sl calc, sl mica
SS: wh- mgy, clr- trnsi, sme op, s&p
ip, f- mgr, sbblky, fr srt, sl firm- brit,
arg-sil mtz

MD 5966'
INC 0.7°
AZI 353.1°
TVD 5904.5'

WT 9.85/ VIS 34

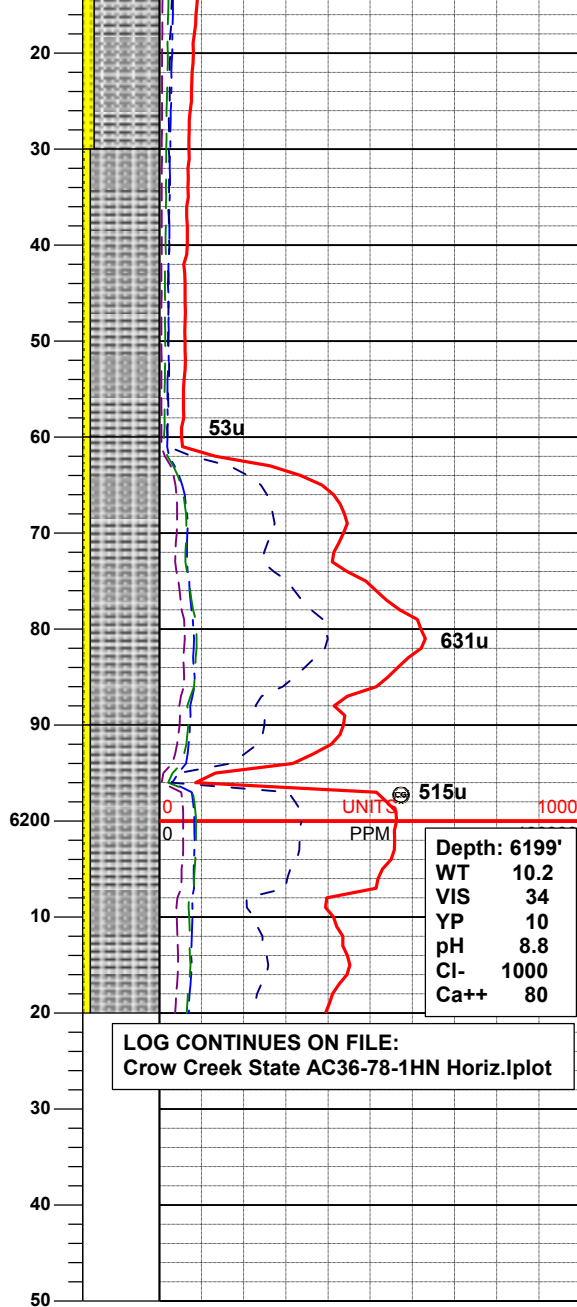
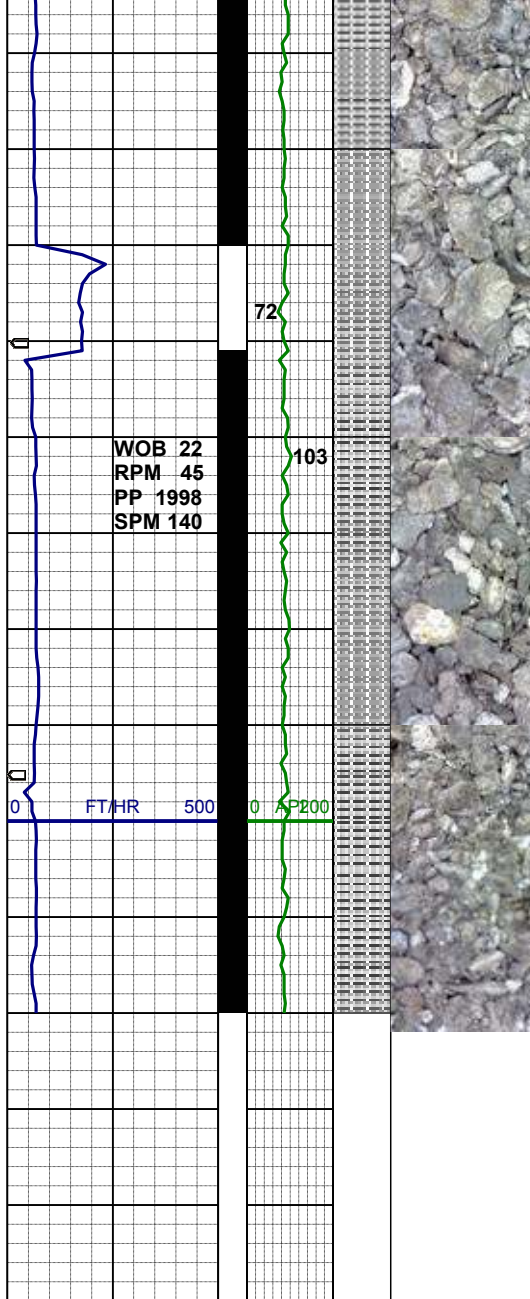
MD 6011'
INC 1.1°
AZI 343.1°
TVD 5949.5'

SLTYSH: lt-mgy-gybrn,sbblky- sbplty,
sft- sl firm, fr-mod srt, gt tex, arg, sl
calc, sl mica
SS: wh- mgy, trnsi, sme op, s&p ip, f-
mgr, sbblky, fr srt, sl firm- brit, arg-sil
mtz, tr glau

MD 6055'
INC 3.5°
AZI 357.5°
TVD 5993.4'

MD 6100'
INC 5.7°
AZI 2.9°
TVD 6038.3'

SLTYSH: lt-mgy,sbblky- sbplty, sft- sl
firm, fr-mod srt, gt tex, arg, sl calc, sl



LOG CONTINUES ON FILE:
Crow Creek State AC36-78-1HN Horiz.lplot

mica, tr pyr
SS: wh- mgy, trnsl, sme op, s&p ip, f- mgr, sbblky, fr srt, sl firm- brit, arg-sil mtx, tr glau

WT 9.95/ VIS 33

MD 6145'
INC 7.8°
AZI 5.0°
TVD 6083.0'

SLTYSH: lt-mgy, sbblky- sbplty-plty, sft- sl firm, fr-mod srt, gt tex, arg, sl calc
SS: wh- mgy, trnsl, sme op, f- vfgr, sbblky, fr srt, sl firm- brit, arg-sil mtx

MD 6190'
INC 10.7°
AZI 7.1°
TVD 6127.4'

SLTYSH: lt-mgy, sbblky- sbplty, sft- sl firm, fr-mod srt, gt tex, arg, sl calc, sl mica
SS: wh- mgy, trnsl, sme op, f- mgr, sbblky, fr srt, sl firm- brit, arg-sil mtx, tr glau

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