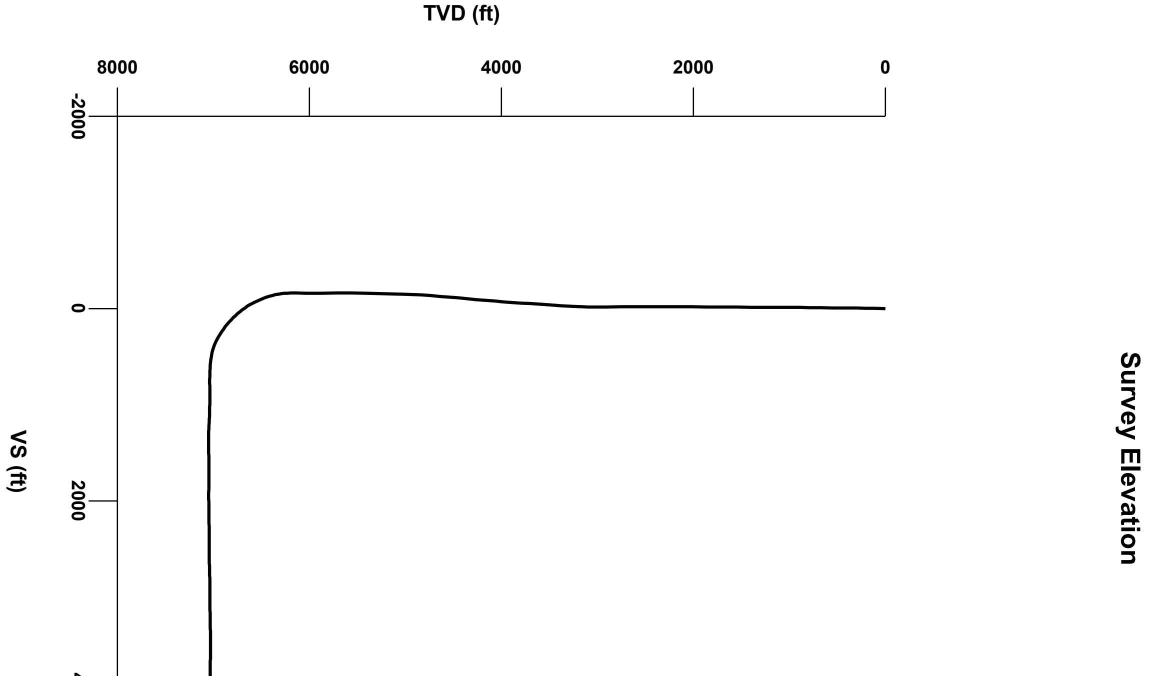
Pason Systems USA Corp.
(720) 880-2000

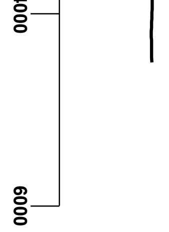
Lplot VH

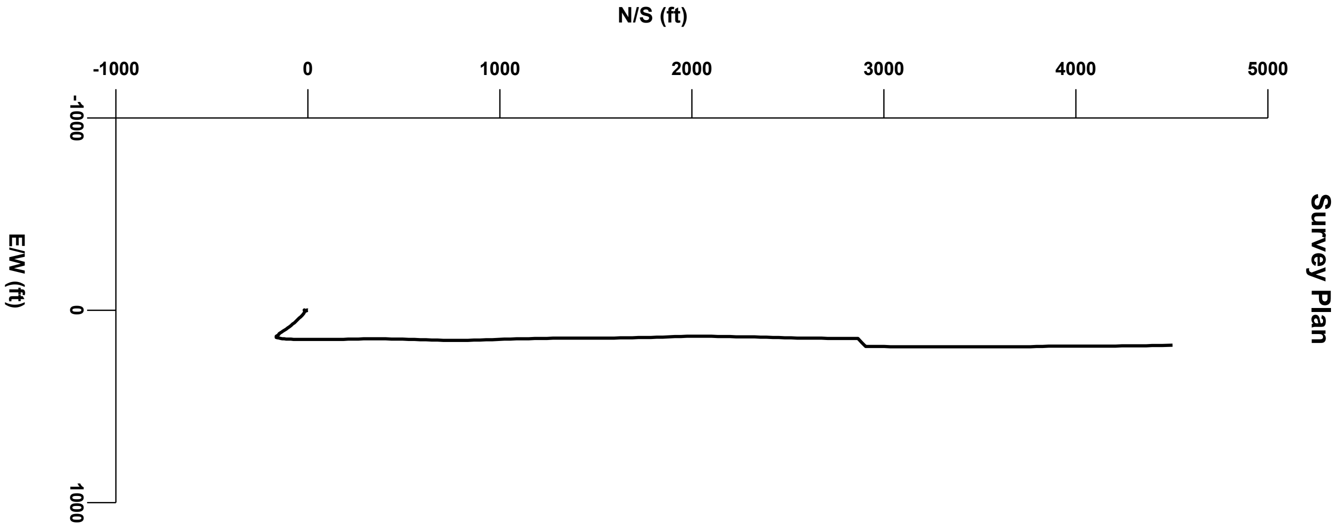
LOG created using LPLOT VH Version 3.0, June 24, 2013, Copyright (C) 1999-2009 Pason Systems Corp.

OPERATOR:	PDC ENERGY
WELL:	WASTE MANAGEMENT 2L-441
LOCATION:	SWSW SEC 2, 2N, 64W, 6TH
COUNTY:	WELD
STATE:	COLORADO
SPOT:	230' FSL x 680' FWL
ELEVATION:	GL 4,939' KB 4,954'
FIELD:	WATTENBERG
SPUD DATE:	6/15/2013
TD DATE:	6/24/2013
DATES LOGGED:	6/18/2013 - 6/24/2013
DEPTHS LOGGED:	6,300' - 11,379'
LOGGERS:	K. DONAHUE, S. HAMPTON& W. HOWLAND
DRILLING FLUID:	LSND
DRILLING RIG:	ENSIGN 14
API:	05-123-36953-0000
LOG TYPE:	BUILD & LATERAL (CODELL)
SCALE:	1:240 (5 inches per 100 feet)
REMARKS:	WELLSITE GEOLOGICAL SERVICES PROVIDED BY COLUMBINE LOGGING, INC.



Survey Elevation


6000

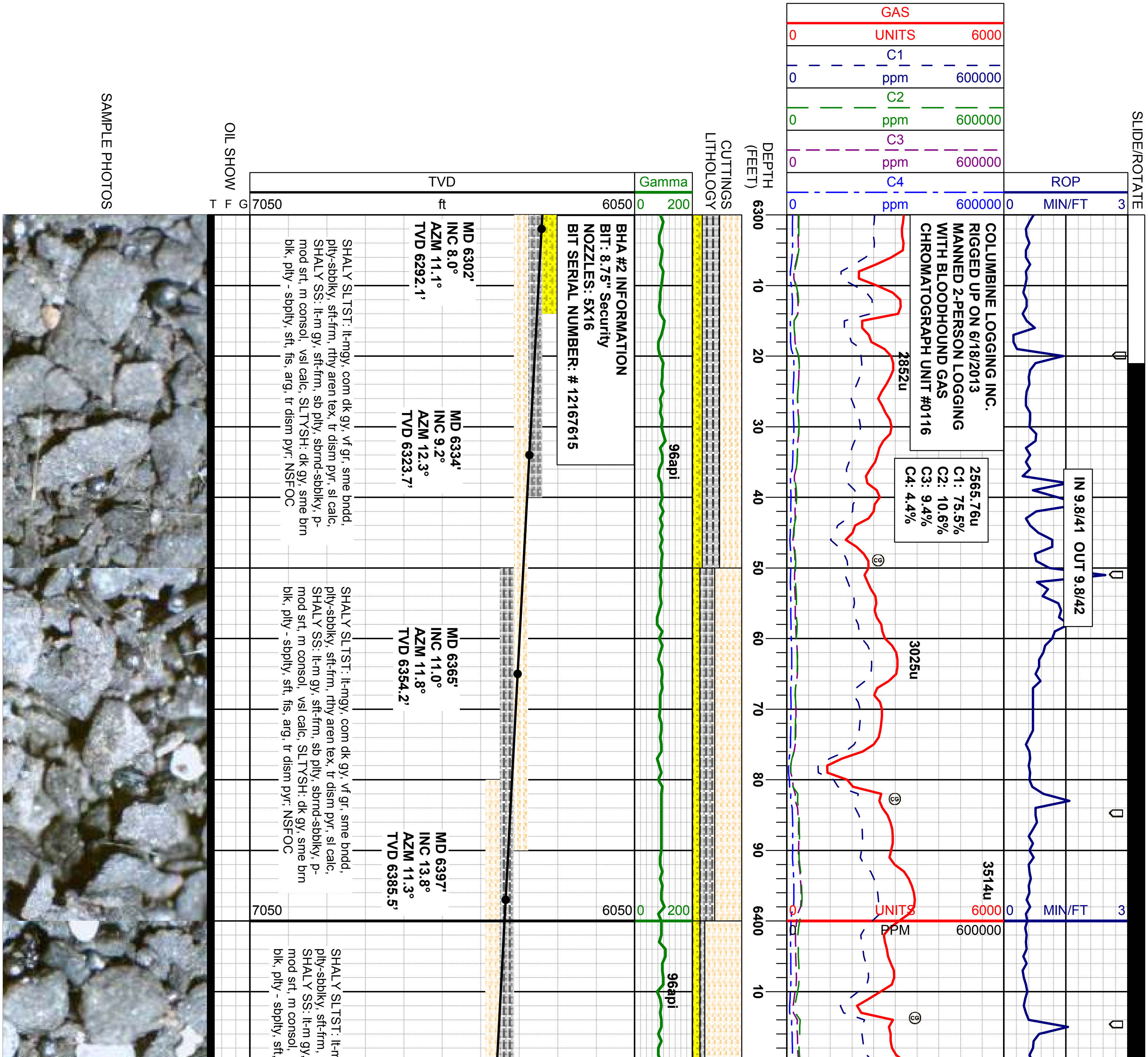

N/S (ft)
-1000
0
1000
2000
3000
4000
5000
E/W (ft)
-1000
0
1000
Survey Plan

LITHOLOGIES

▦ Chalk	▦ Limestone	▦ Marl	▦ Sandstone
▦ Shaly Sandstone	▦ Shaly Siltstone	▦ Silty Shale	

ENGINEERING SYMBOLS

◢ Casing	◣ Casing	⌂ Connection
Ⓒ Connection Gas	← Arrow	▨ Midnight Depth
▨ Midnight Depth	⫽ Reverse Fault	→ Arrow



BHA #2 INFORMATION
BIT: 8.75" Security
NOZZLES: 5X16
BIT SERIAL NUMBER: # 12167615

MD 6302'
INC 8.0°
AZM 11.1°
TVD 6292.1'

MD 6334'
INC 9.2°
AZM 12.3°
TVD 6323.7'

SHALY SLTST: lt-mgy, com dk gy, vf gr, sme bndd, plty-sbblky, sft-frm, rthy aren tex, tr dism pyr, sl calc, SHALY SS: lt-m gy, sft-frm, sb plty, sbrnd-sbblky, p-mod srt, m consol, vsl calc, SLTYSH: dk gy, sme brn blk, plty - sbplty, sft, fis, arg, tr dism pyr; NSFOC

COLUMBINE LOGGING INC.
RIGGED UP ON 6/18/2013
MANNED 2-PERSON LOGGING
WITH BLOODHOUND GAS
CHROMATOGRAPH UNIT #0116

2565.76u
C1: 75.5%
C2: 10.6%
C3: 9.4%
C4: 4.4%

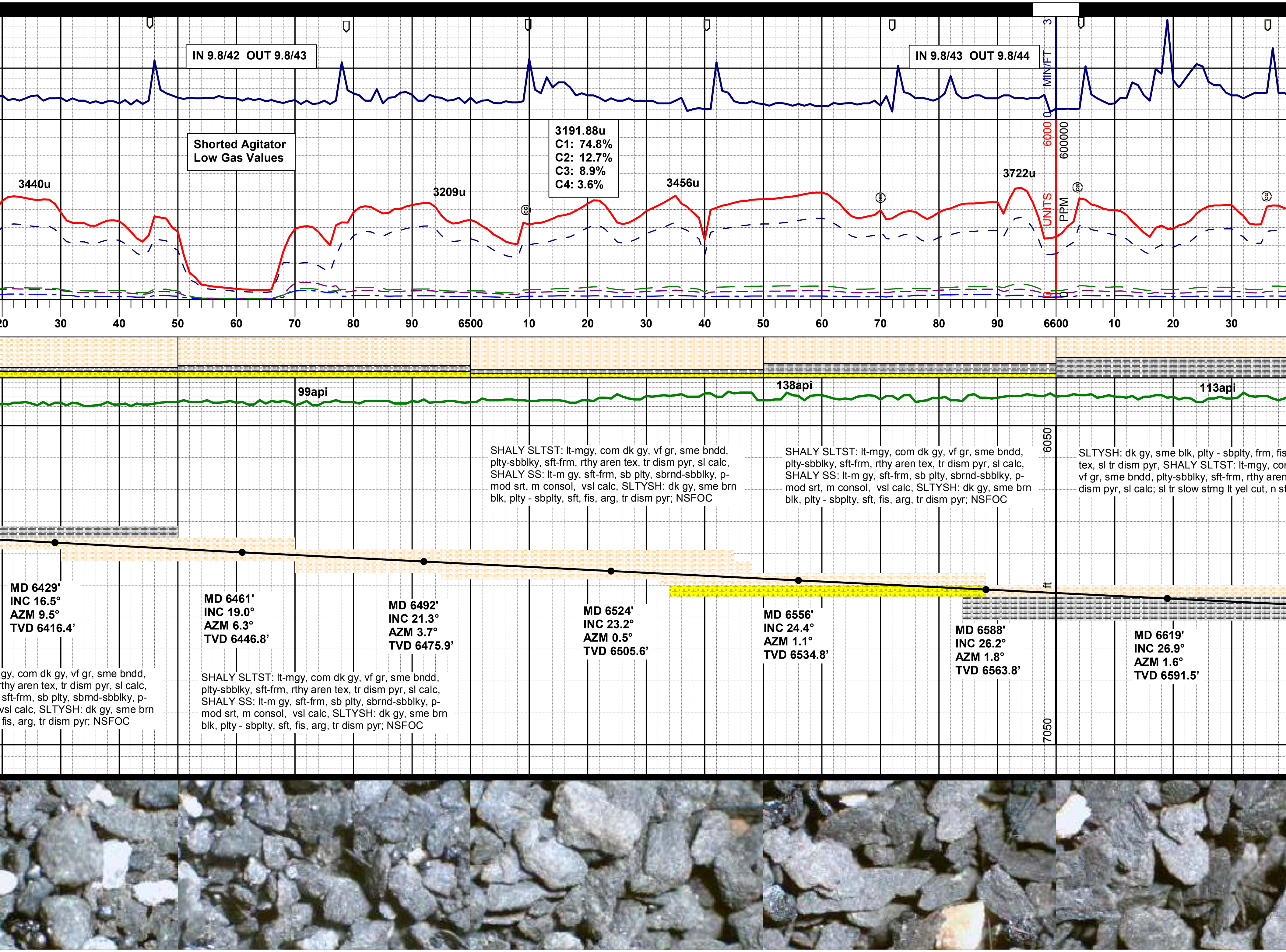
IN 9.8/41 OUT 9.8/42

MD 6365'
INC 11.0°
AZM 11.8°
TVD 6354.2'

SHALY SLTST: lt-mgy, com dk gy, vf gr, sme bndd, plty-sbblky, sft-frm, rthy aren tex, tr dism pyr, sl calc, SHALY SS: lt-m gy, sft-frm, sb plty, sbrnd-sbblky, p-mod srt, m consol, vsl calc, SLTYSH: dk gy, sme brn blk, plty - sbplty, sft, fis, arg, tr dism pyr; NSFOC

MD 6397'
INC 13.8°
AZM 11.3°
TVD 6385.5'

SHALY SLTST: lt-m
plty-sbblky, sft-frm,
SHALY SS: lt-m gy,
mod srt, m consol,
blk, plty - sbplty, sft,



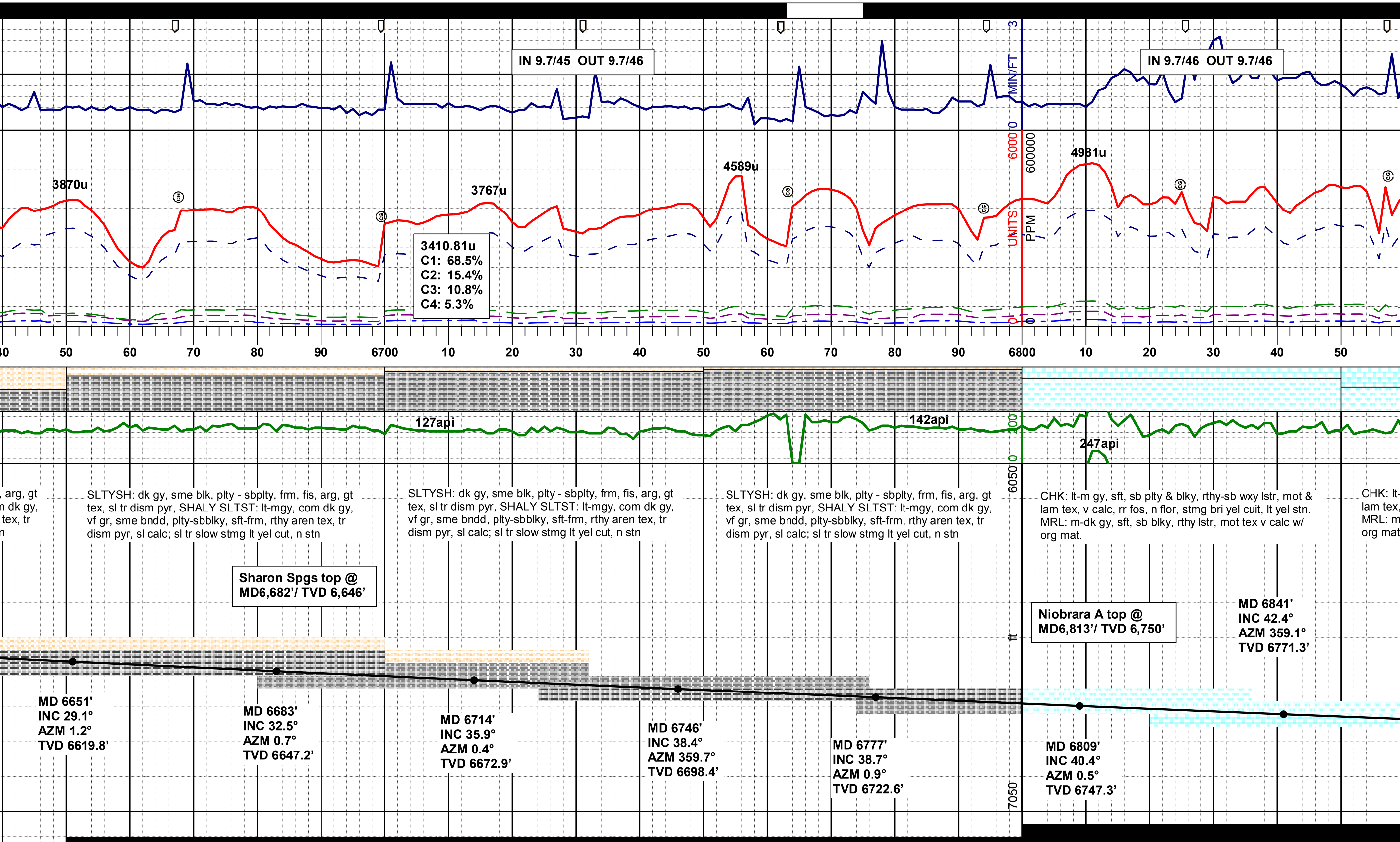
gy, com dk gy, vf gr, sme bndd,
rthy aren tex, tr dism pyr, sl calc,
sft-frm, sb plty, sbrnd-sbblky, p-
vsl calc, SLTYSH: dk gy, sme brn
fis, arg, tr dism pyr; NSFOC

SHALY SLTST: lt-mgy, com dk gy, vf gr, sme bndd, plty-sbblky, sft-frm, rthy aren tex, tr dism pyr, sl calc, SHALY SS: lt-m gy, sft-frm, sb plty, sbrnd-sbblky, p-mod srt, m consol, vsl calc, SLTYSH: dk gy, sme brn blk, plty - sbplty, sft, fis, arg, tr dism pyr; NSFOC

SHALY SLTST: lt-mgy, com dk gy, vf gr, sme bndd, plty-sbblky, sft-frm, rthy aren tex, tr dism pyr, sl calc, SHALY SS: lt-m gy, sft-frm, sb plty, sbrnd-sbblky, p-mod srt, m consol, vsl calc, SLTYSH: dk gy, sme brn blk, plty - sbplty, sft, fis, arg, tr dism pyr; NSFOC

SHALY SLTST: lt-mgy, com dk gy, vf gr, sme bndd, plty-sbblky, sft-frm, rthy aren tex, tr dism pyr, sl calc, SHALY SS: lt-m gy, sft-frm, sb plty, sbrnd-sbblky, p-mod srt, m consol, vsl calc, SLTYSH: dk gy, sme brn blk, plty - sbplty, sft, fis, arg, tr dism pyr; NSFOC

SLTYSH: dk gy, sme blk, plty - sbplty, frm, fis
tex, sl tr dism pyr, SHALY SLTST: lt-mgy, co
vf gr, sme bndd, plty-sbblky, sft-frm, rthy aren
dism pyr, sl calc; sl tr slow stmg lt yel cut, n s



, arg, gt
n dk gy,
tex, tr
n

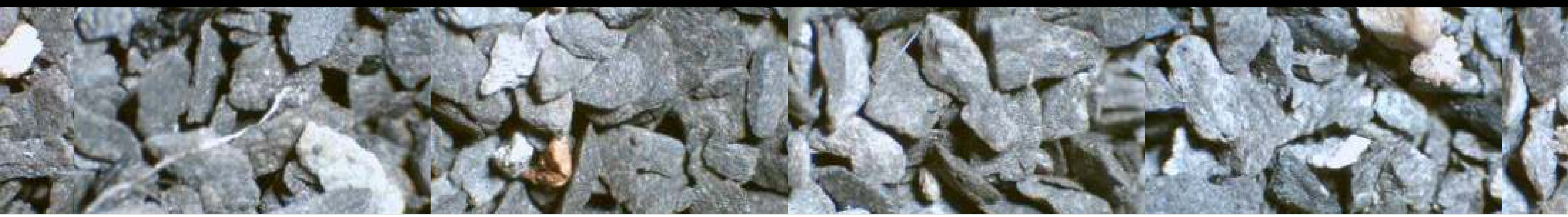
SLTYSH: dk gy, sme blk, plty - sbplty, frm, fis, arg, gt tex, sl tr dism pyr, SHALY SLTST: lt-mgy, com dk gy, vf gr, sme bndd, plty-sbblky, sft-frm, rthy aren tex, tr dism pyr, sl calc; sl tr slow stmg lt yel cut, n stn

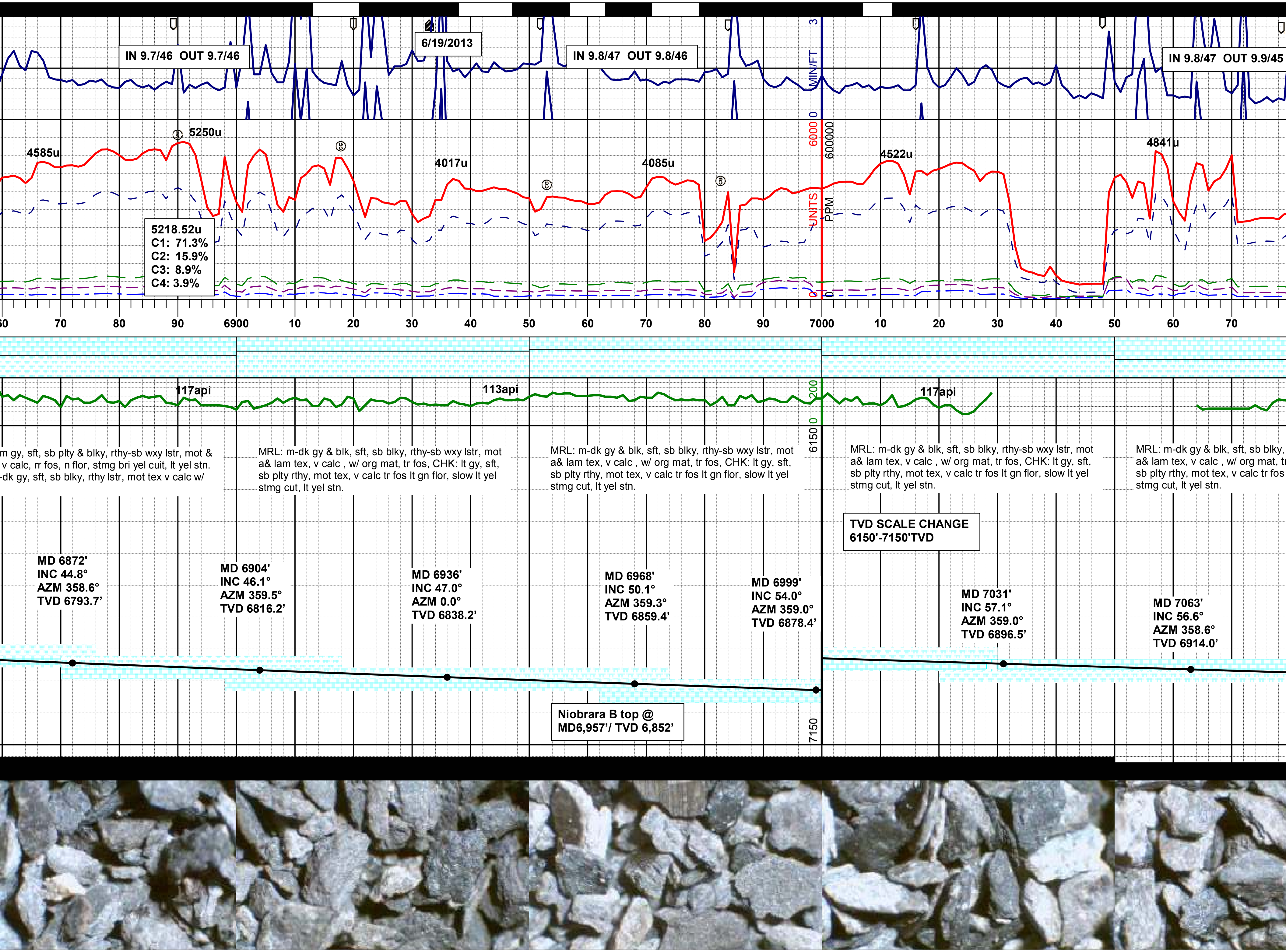
SLTYSH: dk gy, sme blk, plty - sbplty, frm, fis, arg, gt tex, sl tr dism pyr, SHALY SLTST: lt-mgy, com dk gy, vf gr, sme bndd, plty-sbblky, sft-frm, rthy aren tex, tr dism pyr, sl calc; sl tr slow stmg lt yel cut, n stn

SLTYSH: dk gy, sme blk, plty - sbplty, frm, fis, arg, gt tex, sl tr dism pyr, SHALY SLTST: lt-mgy, com dk gy, vf gr, sme bndd, plty-sbblky, sft-frm, rthy aren tex, tr dism pyr, sl calc; sl tr slow stmg lt yel cut, n stn

CHK: lt-m gy, sft, sb plty & blky, rthy-sb wxy lstr, mot & lam tex, v calc, rr fos, n flor, stmg bri yel cuit, lt yel stn. MRL: m-dk gy, sft, sb blky, rthy lstr, mot tex v calc w/ org mat.

CHK: lt-
lam tex,
MRL: m
org mat





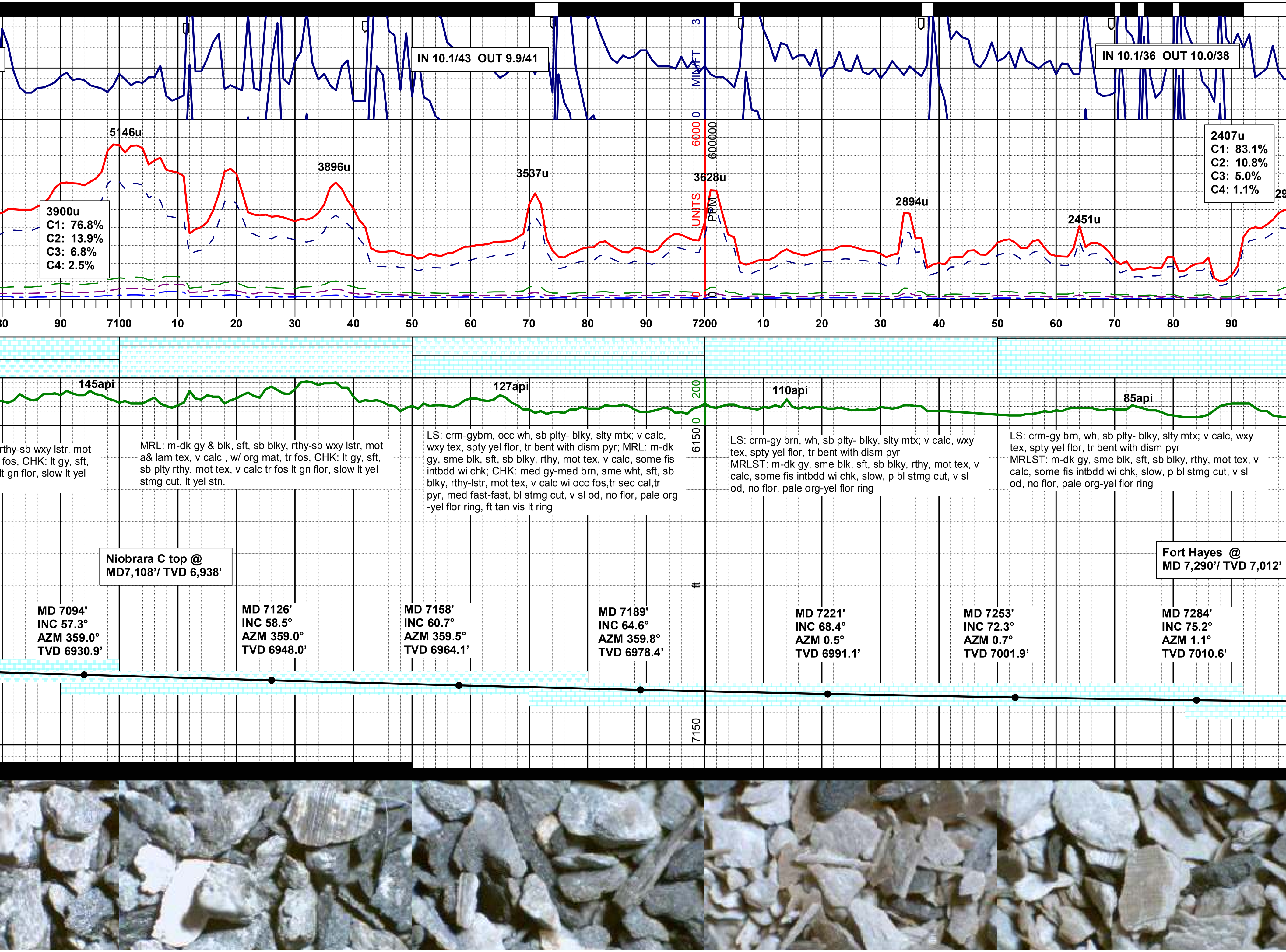
m gy, sft, sb plty & blky, rthy-sb wxy lstr, mot &
v calc, rr fos, n flor, stmg bri yel cuit, lt yel stn.
-dk gy, sft, sb blky, rthy lstr, mot tex v calc w/

MRL: m-dk gy & blk, sft, sb blky, rthy-sb wxy lstr, mot a& lam tex, v calc , w/ org mat, tr fos, CHK: lt gy, sft, sb plty rthy, mot tex, v calc tr fos lt gn flor, slow lt yel stmg cut, lt yel stn.

MRL: m-dk gy & blk, sft, sb blky, rthy-sb wxy lstr, mot a& lam tex, v calc , w/ org mat, tr fos, CHK: lt gy, sft, sb plty rthy, mot tex, v calc tr fos lt gn flor, slow lt yel stmg cut, lt yel stn.

MRL: m-dk gy & blk, sft, sb blky, rthy-sb wxy lstr, mot a& lam tex, v calc , w/ org mat, tr fos, CHK: lt gy, sft, sb plty rthy, mot tex, v calc tr fos lt gn flor, slow lt yel stmg cut, lt yel stn.

MRL: m-dk gy & blk, sft, sb blky,
a& lam tex, v calc , w/ org mat, tr
sb plty rthy, mot tex, v calc tr fos
stmg cut, lt yel stn.



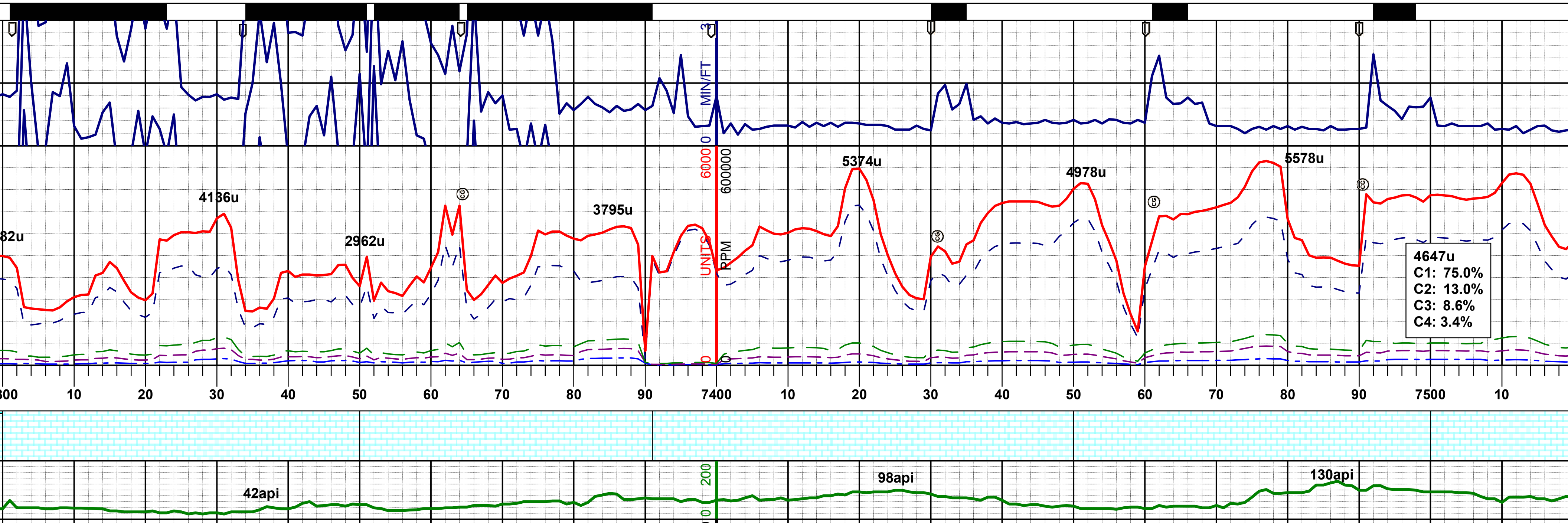
rthy-sb wxy lstr, mot fos, CHK: lt gy, sft, lt gn flor, slow lt yel

MRL: m-dk gy & blk, sft, sb blky, rthy-sb wxy lstr, mot a& lam tex, v calc , w/ org mat, tr fos, CHK: lt gy, sft, sb plty rthy, mot tex, v calc tr fos lt gn flor, slow lt yel stmg cut, lt yel stn.

LS: crm-gybrn, occ wh, sb plty- blky, slty mtx; v calc, wxy tex, spty yel flor, tr bent with dism pyr; MRL: m-dk gy, sme blk, sft, sb blky, rthy, mot tex, v calc, some fis intbdd wi chk; CHK: med gy-med brn, sme wht, sft, sb blky, rthy-lstr, mot tex, v calc wi occ fos,tr sec cal,tr pyr, med fast-fast, bl stmg cut, v sl od, no flor, pale org -yel flor ring, ft tan vis lt ring

LS: crm-gy brn, wh, sb plty- blky, slty mtx; v calc, wxy tex, spty yel flor, tr bent with dism pyr
MRLST: m-dk gy, sme blk, sft, sb blky, rthy, mot tex, v calc, some fis intbdd wi chk, slow, p bl stmg cut, v sl od, no flor, pale org-yel flor ring

LS: crm-gy brn, wh, sb plty- blky, slty mtx; v calc, wxy tex, spty yel flor, tr bent with dism pyr
MRLST: m-dk gy, sme blk, sft, sb blky, rthy, mot tex, v calc, some fis intbdd wi chk, slow, p bl stmg cut, v sl od, no flor, pale org-yel flor ring



LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buf
-semi dull luster, mic
sl tr lt gn flor, pred lt y

6150

BHA #3 INFORMATION
BIT: 6.125" Smith
NOZZLES: ?
BIT SERIAL NUMBER: # JG3453

ft

MD 7316'
INC 78.1°
AZM 1.1°
TVD 7017.9'

MD 7343'
INC 80.5°
AZM 1.4°
TVD 7022.9'

MD 7376'
INC 83.4°
AZM 1.6°
TVD 7027.6'

7" Intermediate Casing
Set To 7379'

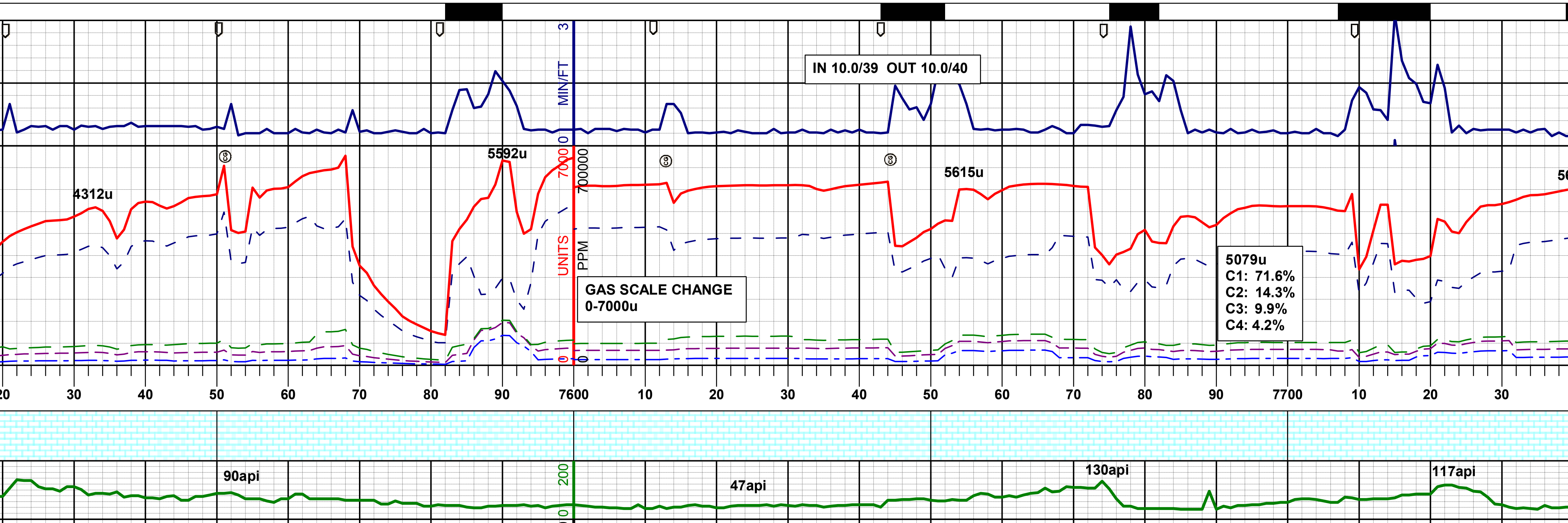
MD 7406'
INC 84.7°
AZM 1.8°
TVD 7030.7'

MD 7436'
INC 85.1°
AZM 1.2°
TVD 7033.4'

MD 7466'
INC 86.0°
AZM 1.6°
TVD 7035.7'

MD 7496'
INC 87.2°
AZM 1.8°
TVD 7037.5'

7150



wh, sft-m frm, sb plty & blky, dull
xl tex, v calc, w/ occ fos, v tr ss,
el resd ring cut, n stn

MD 7526'
INC 88.0°
AZM 1.9°
TVD 7038.7'

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr ss, sl tr lt gn flor, pred lt yel resd ring cut, n stn

MD 7557'
INC 88.4°
AZM 1.4°
TVD 7039.7'

MD 7589'
INC 89.5°
AZM 0.9°
TVD 7040.3'

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr ss, sl tr lt gn flor, pred lt yel resd ring cut, n stn

MD 7620'
INC 90.5°
AZM 0.0°
TVD 7040.3'

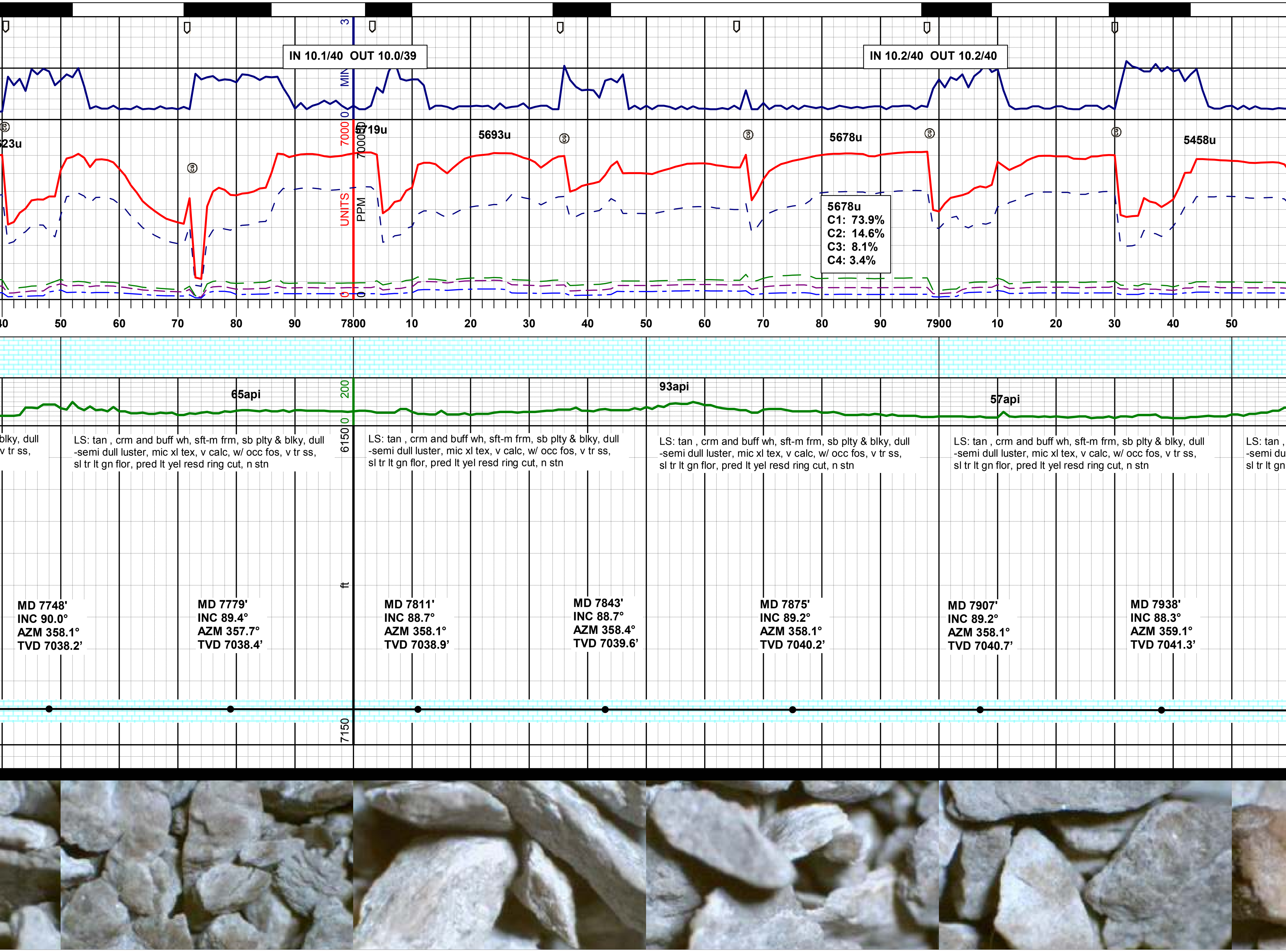
LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr ss, sl tr lt gn flor, pred lt yel resd ring cut, n stn

MD 7653'
INC 91.3°
AZM 359.3°
TVD 7039.8'

MD 7684'
INC 91.1°
AZM 358.6°
TVD 7039.1'

LS: tan , crm and buff wh, sft-m frm, sb plty &
-semi dull luster, mic xl tex, v calc, w/ occ fos,
sl tr lt gn flor, pred lt yel resd ring cut, n stn

MD 7716'
INC 91.1°
AZM 358.8°
TVD 7038.5'



5678u
C1: 73.9%
C2: 14.6%
C3: 8.1%
C4: 3.4%

blky, dull
v tr ss,

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr ss, sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr ss, sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr ss, sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr ss, sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan ,
-semi du
sl tr lt gn

MD 7748'
INC 90.0°
AZM 358.1°
TVD 7038.2'

MD 7779'
INC 89.4°
AZM 357.7°
TVD 7038.4'

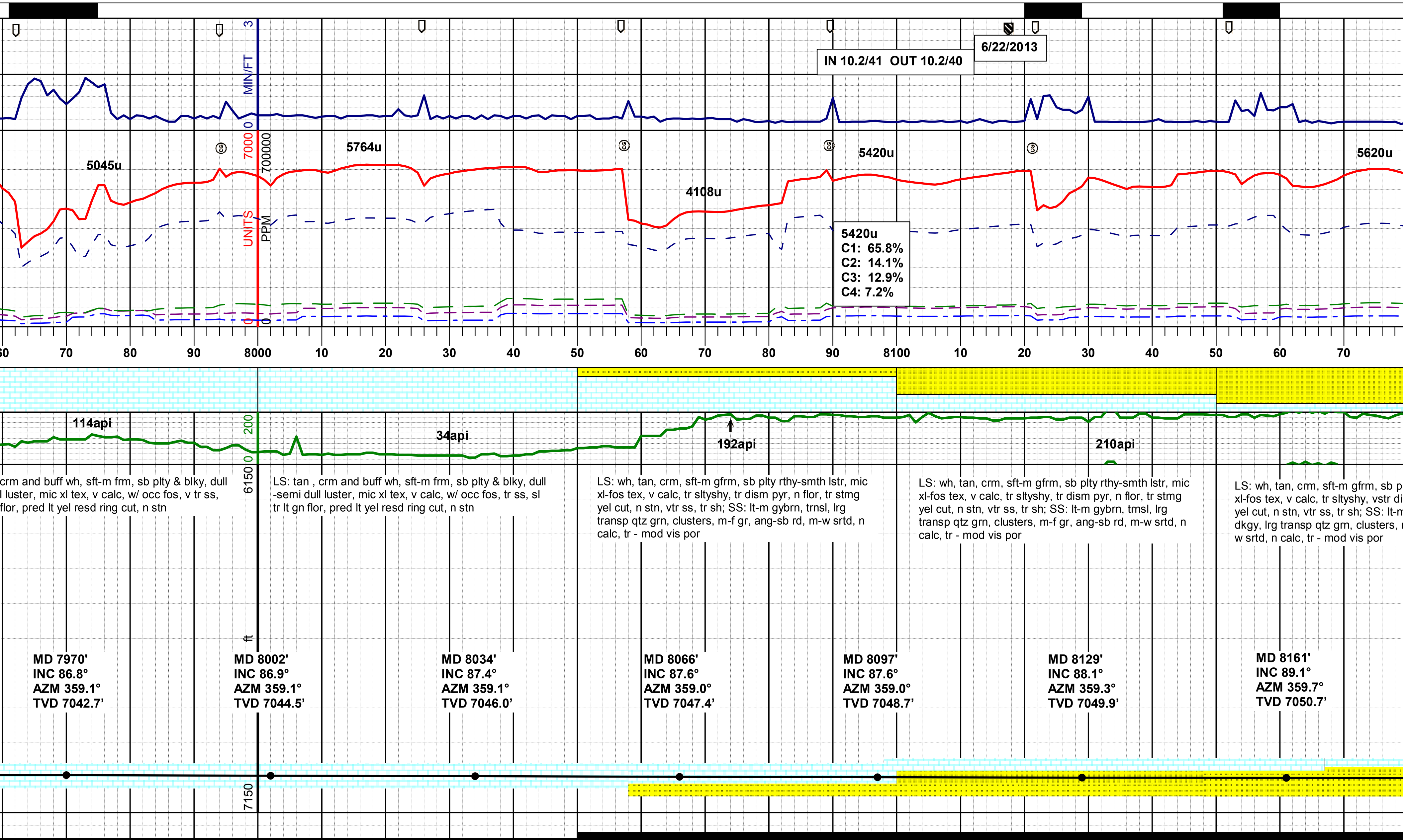
MD 7811'
INC 88.7°
AZM 358.1°
TVD 7038.9'

MD 7843'
INC 88.7°
AZM 358.4°
TVD 7039.6'

MD 7875'
INC 89.2°
AZM 358.1°
TVD 7040.2'

MD 7907'
INC 89.2°
AZM 358.1°
TVD 7040.7'

MD 7938'
INC 88.3°
AZM 359.1°
TVD 7041.3'



crm and buff wh, sft-m frm, sb plty & blky, dull luster, mic xl tex, v calc, w/ occ fos, v tr ss, flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, tr ss, sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: wh, tan, crm, sft-m gfrm, sb plty rthy-smth lstr, mic xl-fos tex, v calc, tr sltyshy, tr dism pyr, n flor, tr stmg yel cut, n stn, vtr ss, tr sh; SS: lt-m gybrn, trnsl, lrg transp qtz grn, clusters, m-f gr, ang-sb rd, m-w srtd, n calc, tr - mod vis por

LS: wh, tan, crm, sft-m gfrm, sb plty rthy-smth lstr, mic xl-fos tex, v calc, tr sltyshy, tr dism pyr, n flor, tr stmg yel cut, n stn, vtr ss, tr sh; SS: lt-m gybrn, trnsl, lrg transp qtz grn, clusters, m-f gr, ang-sb rd, m-w srtd, n calc, tr - mod vis por

LS: wh, tan, crm, sft-m gfrm, sb p xl-fos tex, v calc, tr sltyshy, vstr di yel cut, n stn, vtr ss, tr sh; SS: lt-m dkgy, lrg transp qtz grn, clusters, w srtd, n calc, tr - mod vis por

MD 7970'
INC 86.8°
AZM 359.1°
TVD 7042.7'

MD 8002'
INC 86.9°
AZM 359.1°
TVD 7044.5'

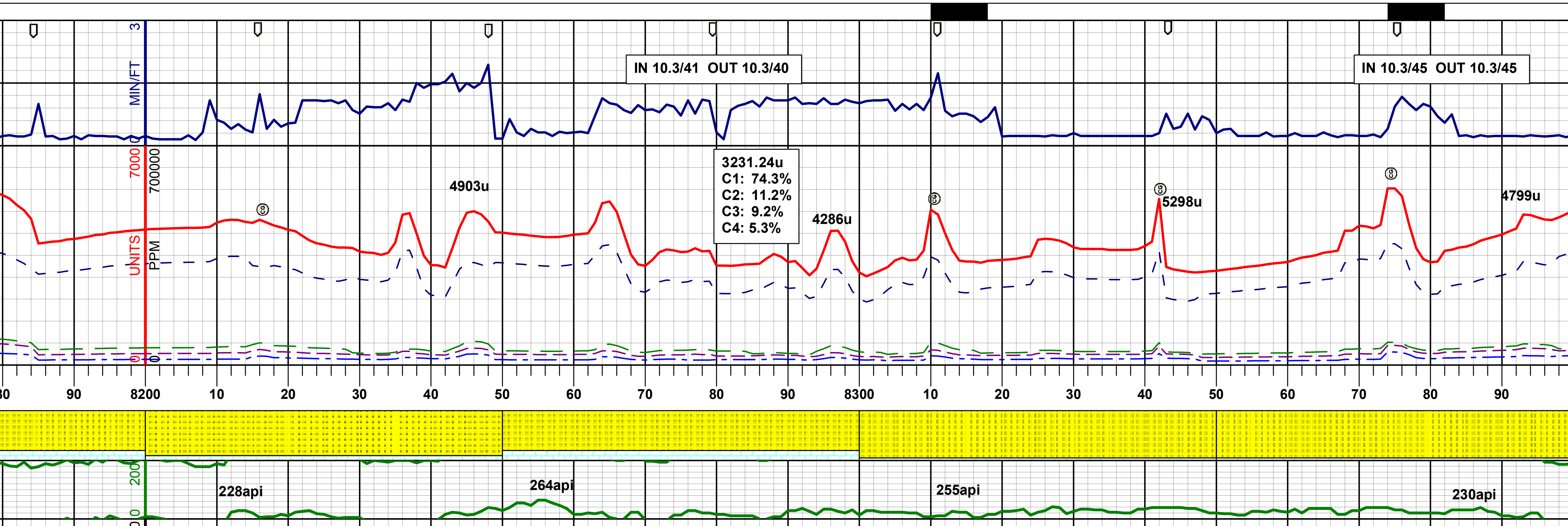
MD 8034'
INC 87.4°
AZM 359.1°
TVD 7046.0'

MD 8066'
INC 87.6°
AZM 359.0°
TVD 7047.4'

MD 8097'
INC 87.6°
AZM 359.0°
TVD 7048.7'

MD 8129'
INC 88.1°
AZM 359.3°
TVD 7049.9'

MD 8161'
INC 89.1°
AZM 359.7°
TVD 7050.7'



6150

ty rthy-smth lstr, mic
sm pyr, n flor, tr stmg
gybrn, trnsl, sme
n-f gr, ang-sb rd, m-

LS: wh, tan, crm, sft-m gfrm, sb plty rthy-smth lstr, mic xl-fos tex, v calc, tr sltyshy, vstr dism pyr, n flor, tr stmg yel cut, n stn, vtr ss, tr sh; SS: lt-m gybrn, trnsl, sme dkgy, lrg transp qtz grn, clusters, m-f gr, ang-sb rd, m-w srtd, n calc, tr - mod vis por

LS: wh, tan, crm, sft-m gfrm, sb plty rthy-smth lstr, mic xl-fos tex, v calc, tr sltyshy, vstr dism pyr, n flor, tr stmg yel cut, n stn, vtr ss, tr sh; SS: lt-m gybrn, trnsl, sme dkgy, lrg transp qtz grn, clusters, m-f gr, ang-sb rd, m-w srtd, n calc, tr - mod vis por

LS: wh, tan, crm, sft-m gfrm, sb plty rthy-smth lstr, mic xl-fos tex, v calc, tr sltyshy, vstr dism pyr, n flor, tr stmg yel cut, n stn, vtr ss, tr sh; SS: lt-m gybrn, trnsl, sme dkgy, lrg transp qtz grn, clusters, m-f gr, ang-sb rd, m-w srtd, n calc, tr - mod vis por

LS: wh, tan, crm, sft-m gfrm, sb plty rthy-smth lstr, mic xl-fos tex, v calc, tr sltyshy, vstr dism pyr, n flor, tr stmg yel cut, n stn, vtr ss, tr sh; SS: lt-m gybrn, trnsl, sme dkgy, lrg transp qtz grn, clusters, m-f gr, ang-sb rd, m-w srtd, n calc, tr - mod vis por

ft

MD 8193'
INC 89.6°
AZM 359.8°
TVD 7051.1'

MD 8224'
INC 90.0°
AZM 0.2°
TVD 7051.2'

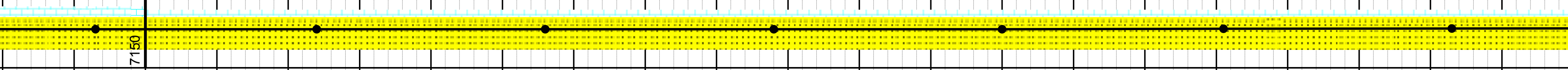
MD 8256'
INC 89.8°
AZM 0.2°
TVD 7051.3'

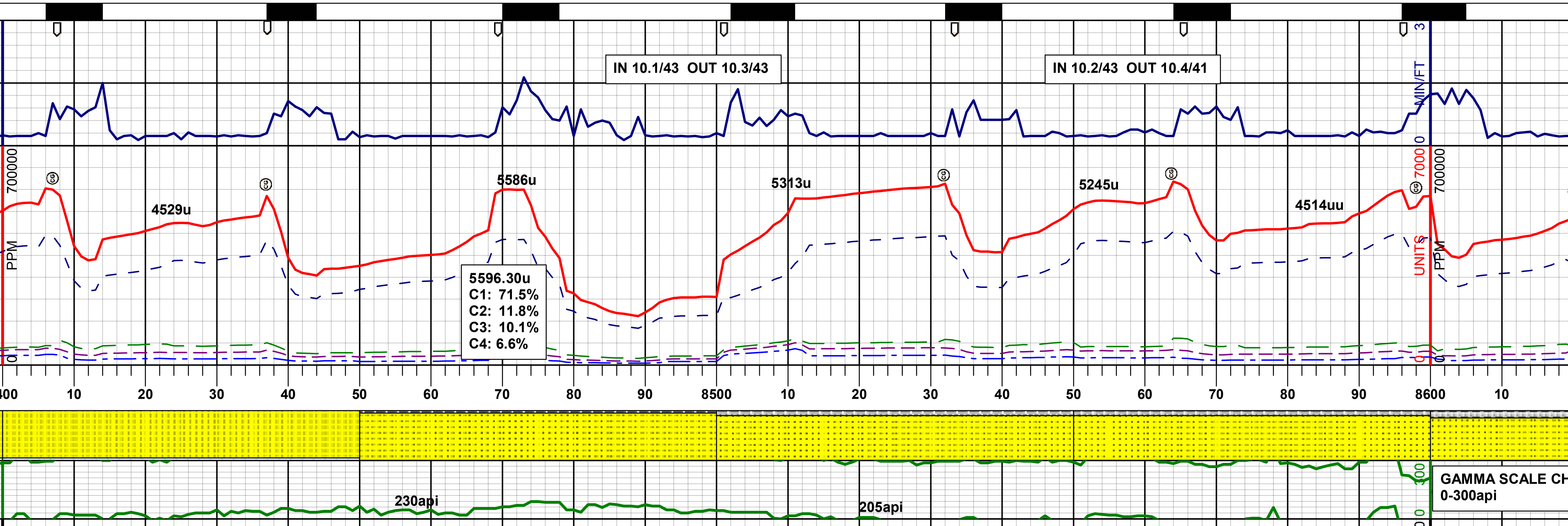
MD 8288'
INC 89.7°
AZM 359.5°
TVD 7051.4'

MD 8320'
INC 91.2°
AZM 359.7°
TVD 7051.1'

MD 8351'
INC 91.7°
AZM 359.8°
TVD 7050.4'

MD 8383'
INC 91.3°
AZM 359.5°
TVD 7049.5'





LS: wh, tan, crm, sft-m gfrm, sb plty rthy-smth lstr, mic xl-fos tex, v calc, tr sltyshy, vstr dism pyr, n flor, tr stmg yel cut, n stn, vtr ss, tr sh; SS: lt-m gybrn, trnsl, sme dkgy, lrg transp qtz grn, clusters, m-f gr, ang-sb rd, m-w srtd, n calc, tr - mod vis por

SS: m-dk gy, occ mgybrn, tr transp qtz grn, clusters, vf -f gr, ang-sb rd, p-m srtd, tr bio, o stn, n calc; SLTY
SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, bioturb in part, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, tr transp qtz grn, clusters, vf -f gr, ang-sb rd, p-m srtd, tr bio, o stn, n calc; SLTY
SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, bioturb in part, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, lge transp qtz gr, clusters, vf -f gr, ang-sb rd, p-m srtd, tr bio, o stn, n calc; SLTY
SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, bioturb in part, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mg
-f gr, ang-sb rd, p-m s
SH: m-dkgy sft-frm, s
lam, tr pyr, sl calc; tr -
stn.

MD 8415'
INC 90.7°
AZM 359.5°
TVD 7048.9'

MD 8447'
INC 90.7°
AZM 359.7°
TVD 7048.6'

MD 8478'
INC 90.5°
AZM 359.3°
TVD 7048.2'

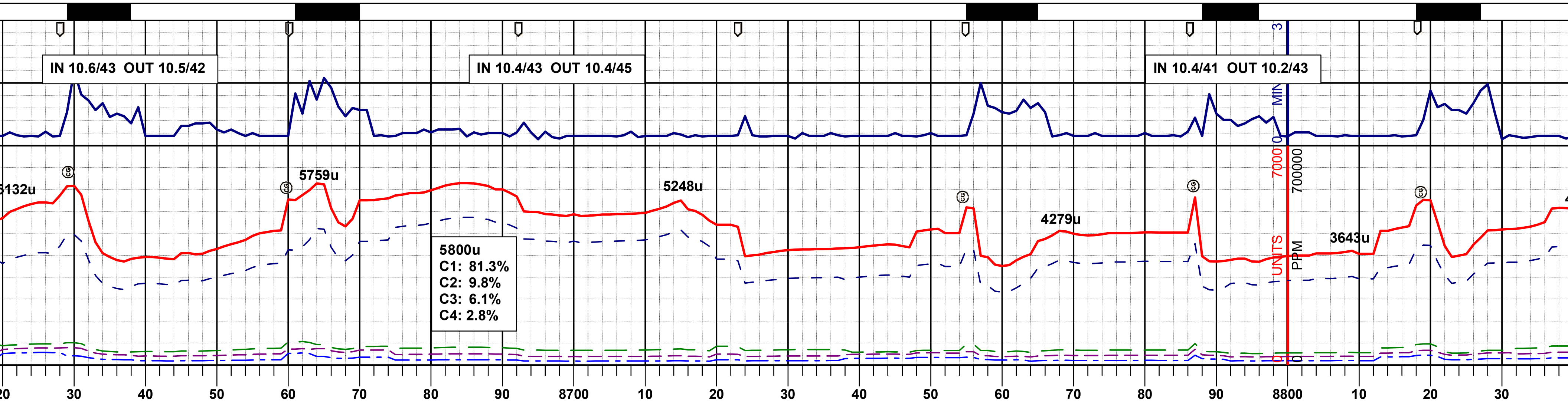
MD 8510'
INC 90.7°
AZM 358.8°
TVD 7047.9'

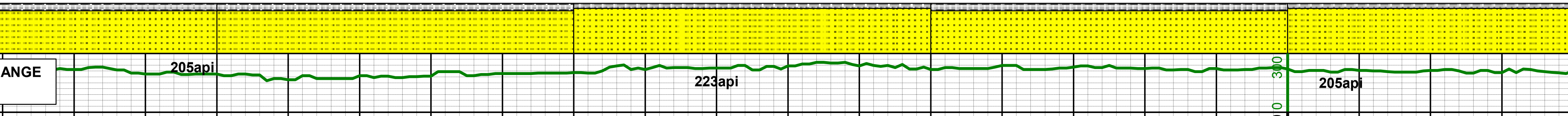
MD 8542'
INC 90.6°
AZM 358.8°
TVD 7047.5'

MD 8574'
INC 90.6°
AZM 359.0°
TVD 7047.2'

MD 8606'
INC 90.4°
AZM 359.1°
TVD 7046.9'

ft
7150





ybrn, lge transp qtz gr, clusters, vf
rtd, tr bio, o stn, n calc; SLTY
bplty-sbblky, rthy & aren tex, occ
mod vis por, stmg cut, mod brn

SS: m-dk gy, occ mgybrn, lge transp qtz gr, clusters, vf -f gr, ang-sb rd, p-m srtd, tr bio, o stn, n calc; SLTY
SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, lge transp qtz gr, clusters, vf -f gr, ang-sb rd, p-m srtd, shy ip, o stn, n calc; SLTY
SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, lge transp qtz gr, clusters, vf -f gr, ang-sb rd, p-m srtd, shy ip, o stn, n calc; SLTY
SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, lge transp qtz gr, clus
-f gr, ang-sb rd, p-m srtd, shy ip, o stn, n calc; S
SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren te
lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mo
stn.

MD 8638'
INC 89.4°
AZM 358.8°
TVD 7046.9'

MD 8669'
INC 88.5°
AZM 359.0°
TVD 7047.6'

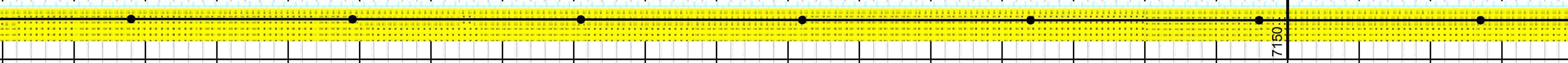
MD 8701'
INC 88.0°
AZM 357.7°
TVD 7048.5'

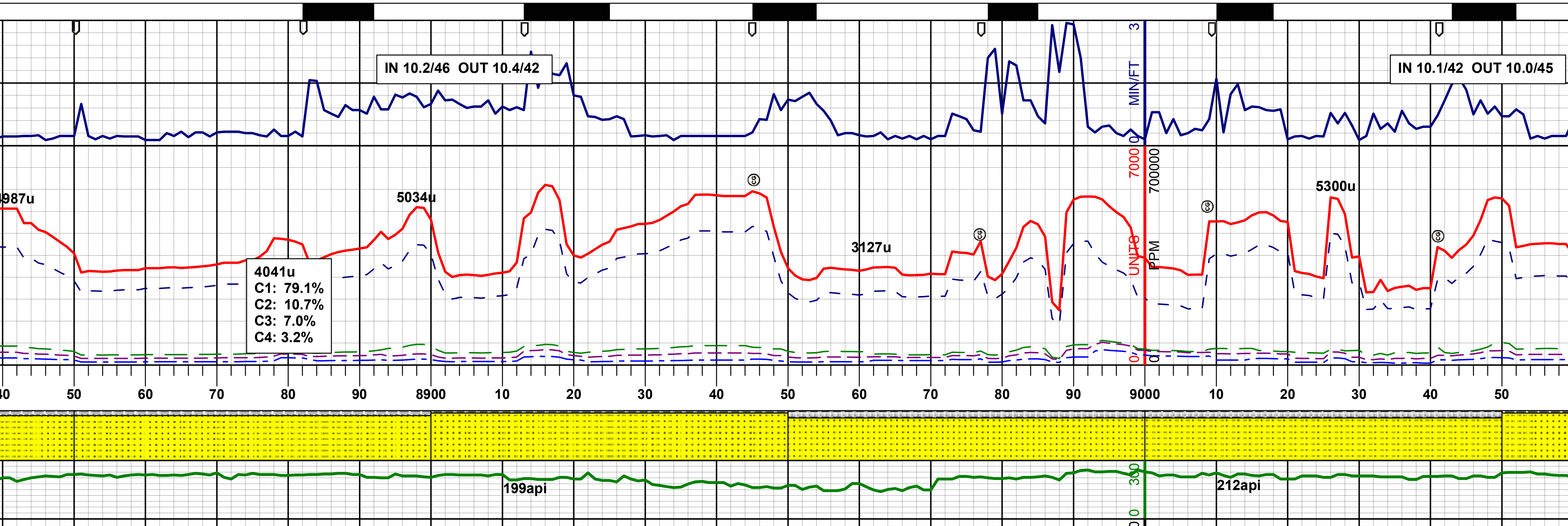
MD 8732'
INC 88.5°
AZM 357.6°
TVD 7049.5'

MD 8764'
INC 89.2°
AZM 357.9°
TVD 7050.1'

MD 8796'
INC 89.9°
AZM 358.8°
TVD 7050.4'

MD 8827'
INC 90.6°
AZM 359.5°
TVD 7050.2'





ters, vf
LTY
x, occ
d brn

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, tr shy ip, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, tr shy ip, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, lge transp qtz gr, clusters, vf -f gr, ang-sb rd, p-m srtd, shy ip, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, lge transp qtz gr, clusters, vf -f gr, ang-sb rd, p-m srtd, shy ip, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m
cluste
SLTY
tex, o
mod b

6150 ft 7150

MD 8859'
INC 90.9°
AZM 359.3°
TVD 7049.8'

MD 8891'
INC 90.9°
AZM 0.2°
TVD 7049.2'

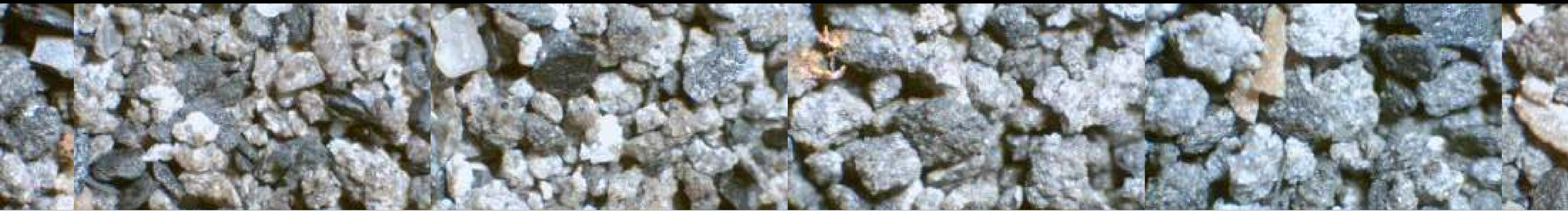
MD 8923'
INC 91.8°
AZM 0.4°
TVD 7048.4'

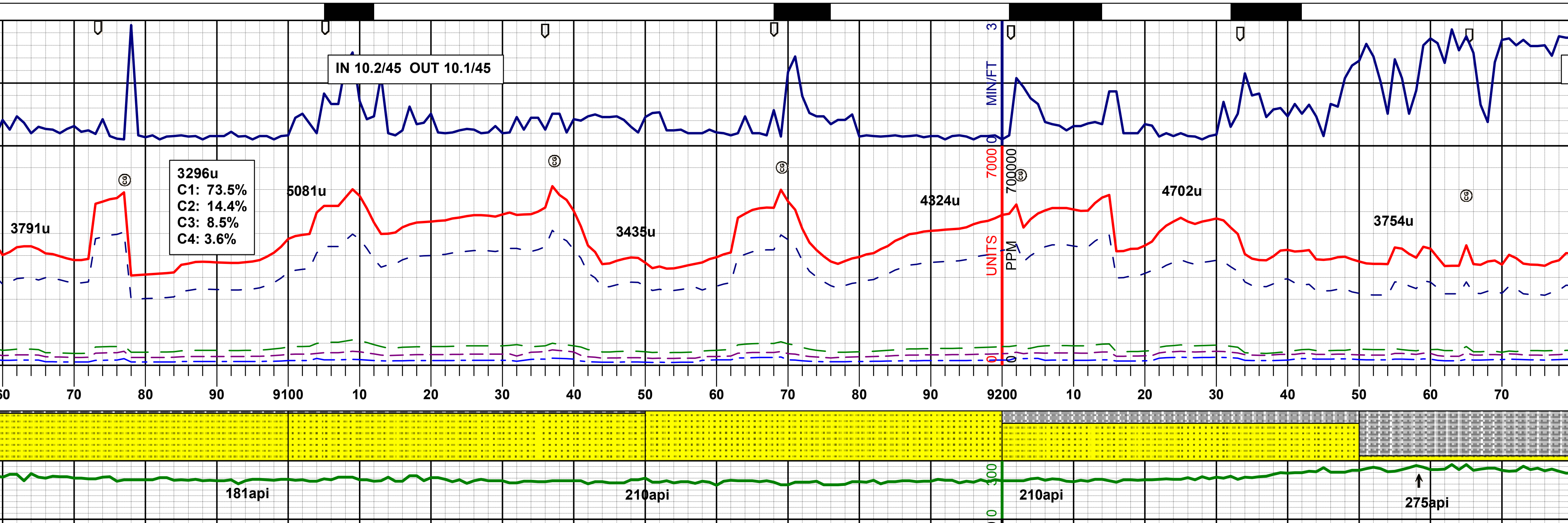
MD 8954'
INC 91.1°
AZM 0.5°
TVD 7047.6'

MD 8987'
INC 90.7°
AZM 0.5°
TVD 7047.1'

MD 9019'
INC 90.4°
AZM 1.4°
TVD 7046.8'

MD 9050'
INC 89.9°
AZM 1.4°
TVD 7046.7'





-dk gy, occ mgybrn, mod lge transp qtz gr,
s, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc;
SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren
c lam, tr pyr, sl calc; tr - mod vis por, stmg cut,
rn stn.

MD 9082'
INC 89.9°
AZM 1.1°
TVD 7046.8'

SS: m-dk gy, occ mgybrn, mod lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

MD 9114'
INC 90.8°
AZM 0.2°
TVD 7046.6'

MD 9146'
INC 90.8°
AZM 0.5°
TVD 7046.1'

SS: m-dk gy, occ mgybrn, mod lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc, str sltysh; tr - mod vis por, stmg cut, mod brn stn.

MD 9178'
INC 90.7°
AZM 0.9°
TVD 7045.7'

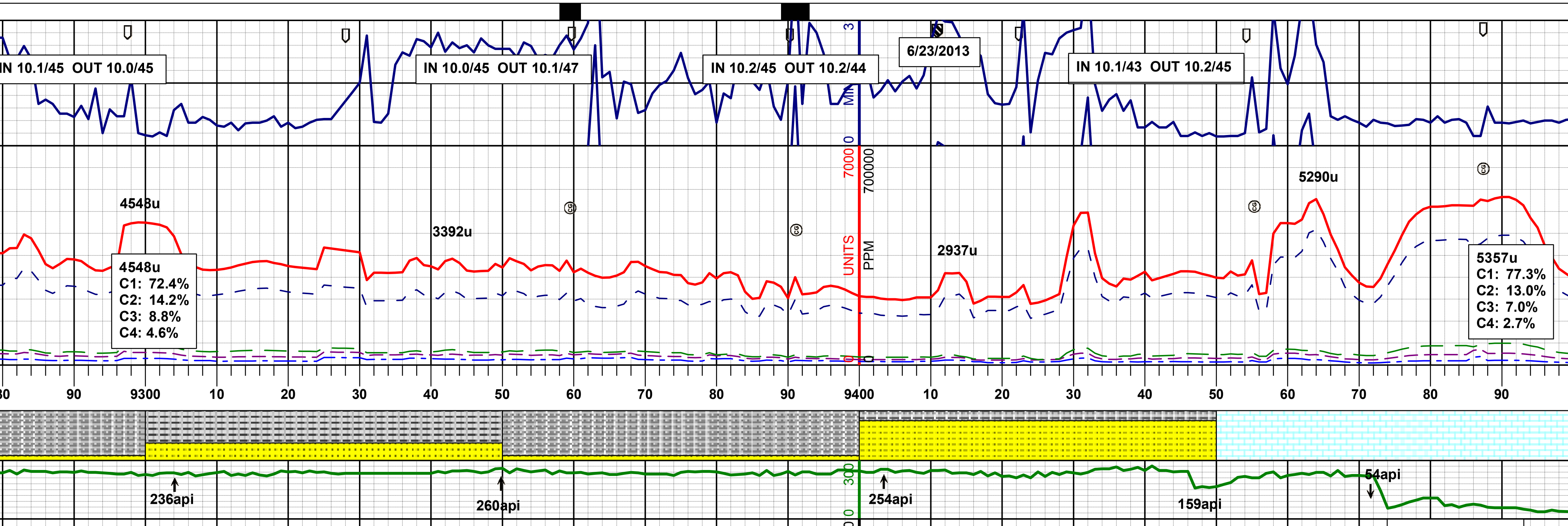
SS: m-dk gy, occ mgybrn, mod lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

MD 9209'
INC 90.2°
AZM 1.2°
TVD 7045.4'

MD 9241'
INC 89.4°
AZM 1.4°
TVD 7045.6'

SLTY SH: m-dkgy sft-frm, sbplty-
tex, occ lam, tr pyr, sl calc, SS: m
sme mod lge transp qtz gr, cluste
p-m srtd, o stn, n calc; tr - mod v
stn.

MD 9273'
INC 89.9°
AZM 1.6°
TVD 7045.8'



sbblky, rthy & aren
-dk gy, occ mgybrn,
rs, vf-f gr, ang-sb rd,
is por, stmg cut, lt brn

SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc, SS: m-dk gy, occ mgybrn, mod lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc; tr - mod vis por, stmg cut, lt brn stn.

SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc, SS: m-dk gy, occ mgybrn, sme mod lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc; tr - mod vis por, stmg cut, lt brn stn.

SS: m-dk gy, occ mgybrn, tr mod lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, tr ss, sl tr lt gn flor, pred lt yel resd ring cut, n stn

ft

MD 9304'
INC 90.1°
AZM 1.8°
TVD 7045.8'

MD 9336'
INC 90.3°
AZM 1.6°
TVD 7045.7'

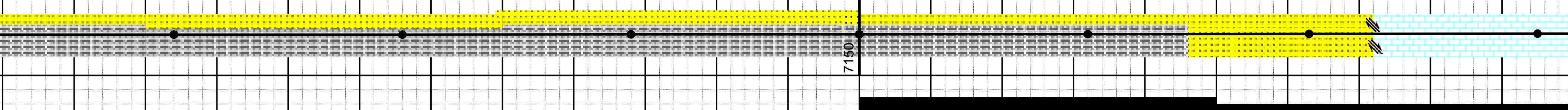
MD 9368'
INC 90.5°
AZM 1.4°
TVD 7045.4'

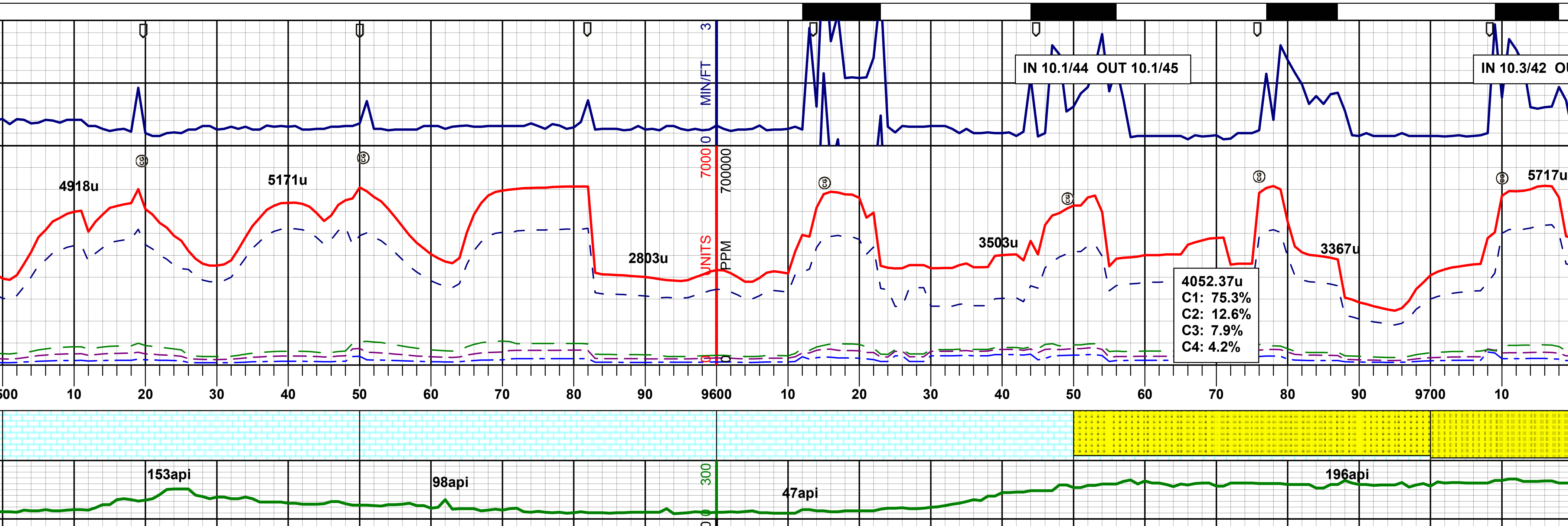
MD 9400'
INC 90.8°
AZM 0.9°
TVD 7045.1'

MD 9432'
INC 90.8°
AZM 0.9°
TVD 7044.6'

MD 9463'
INC 90.8°
AZM 0.7°
TVD 7044.2'

MD 9495'
INC 91.1°
AZM 0.4°
TVD 7043.7





LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, tr ss, sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, tr ss, sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, tr ss, sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: wh, tan, crm, sft-m gfrm, sb plty rthy-smth lstr, mic xl-fos tex, v calc, tr sltyshy, vstr dism pyr, n flor, tr stmg yel cut, n stn, vtr ss, tr sh; SS: lt-m gybrn, trnsl, sme dkgy, lrg transp qtz grn, clusters, m-f gr, ang-sb rd, m-w srtd, n calc, tr - mod vis por

LS: wh, tan, crm, sft-m
xl-fos tex, v calc, tr slt
yel cut, n stn, vtr ss, tr
dkgy, lrg transp qtz gr
w srtd, n calc, tr - mod

ft

MD 9527'
INC 91.2°
AZM 0.2°
TVD 7043.0'

MD 9559'
INC 91.6°
AZM 0.2°
TVD 7042.2'

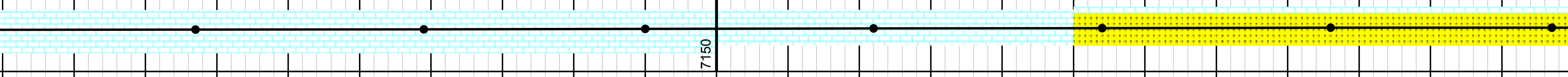
MD 9590'
INC 92.2°
AZM 0.2°
TVD 7041.2'

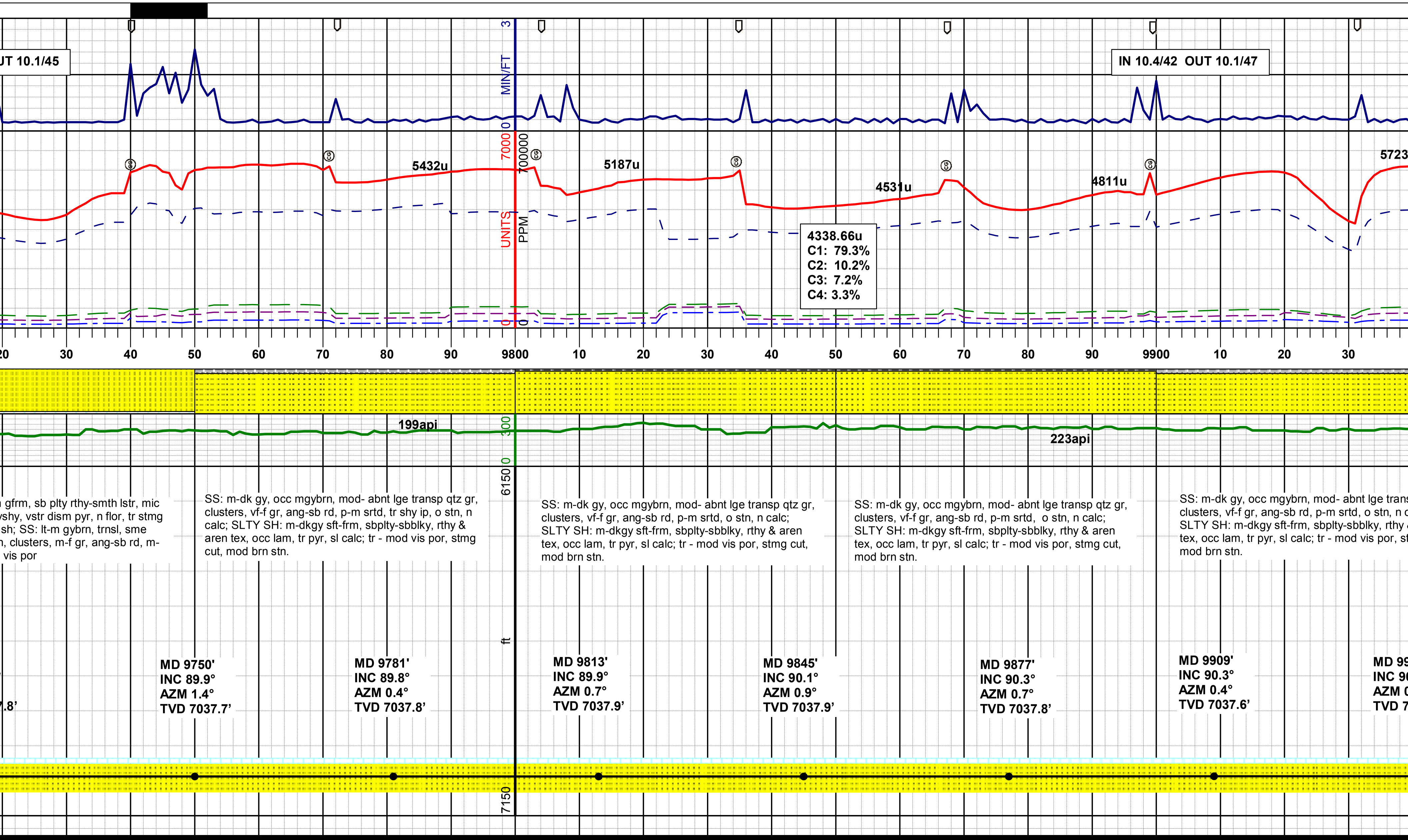
MD 9622'
INC 92.2°
AZM 0.5°
TVD 7039.9'

MD 9654'
INC 91.5°
AZM 0.5°
TVD 7038.9'

MD 9686'
INC 91.1°
AZM 0.5°
TVD 7038.2'

MD 9717
INC 90.4
AZM 0.0
TVD 703





gfrm, sb plty rthy-smth lstr, mic
vshy, vstr dism pyr, n flor, tr stmg
sh; SS: lt-m gybrn, trnsl, sme
n, clusters, m-f gr, ang-sb rd, m-
vis por

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, tr shy ip, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, mod- abnt lge trans
clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n c
SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy
tex, occ lam, tr pyr, sl calc; tr - mod vis por, st
mod brn stn.

.8’

MD 9750'
INC 89.9°
AZM 1.4°
TVD 7037.7’

MD 9781'
INC 89.8°
AZM 0.4°
TVD 7037.8’

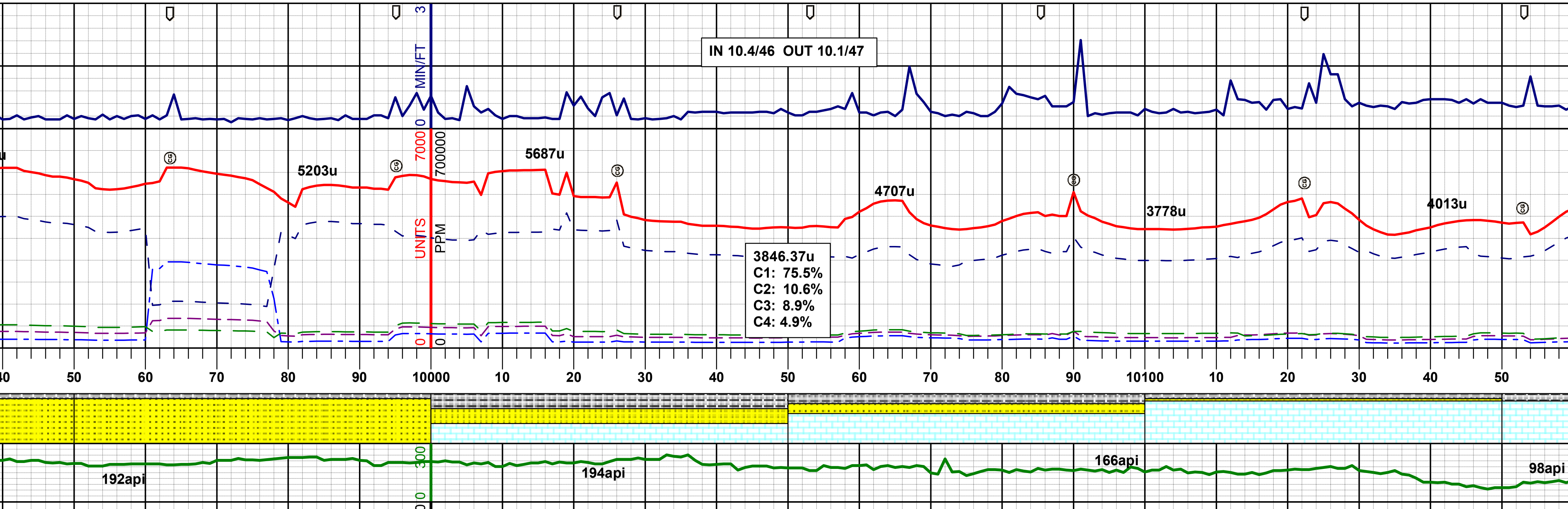
MD 9813'
INC 89.9°
AZM 0.7°
TVD 7037.9’

MD 9845'
INC 90.1°
AZM 0.9°
TVD 7037.9’

MD 9877'
INC 90.3°
AZM 0.7°
TVD 7037.8’

MD 9909'
INC 90.3°
AZM 0.4°
TVD 7037.6’

MD 99
INC 9
AZM 0
TVD 7



p qtz gr,
alc;
& aren
mg cut,

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, tr shy ip, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, tr shy ip, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr ss, tr sec calcite; sl tr lt gn flor, pred lt yel resd ring cut, n stn

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, tr shy ip, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr ss, tr sec calcite; sl tr lt gn flor, pred lt yel resd ring cut, n stn

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, tr shy ip, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr ss, tr sec calcite; sl tr lt gn flor, pred lt yel resd ring cut, n stn

SLTY S
tex, occ
sft-m fr
tex, v c
flor, pre

ft

40'
.5°
4°
037.4'

MD 9972'
INC 90.8°
AZM 0.5°
TVD 7037.0'

MD 10004'
INC 90.8°
AZM 0.4°
TVD 7036.6'

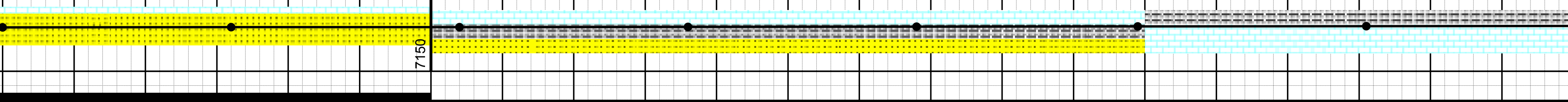
MD 10036'
INC 91.1°
AZM 0.2°
TVD 7036.1'

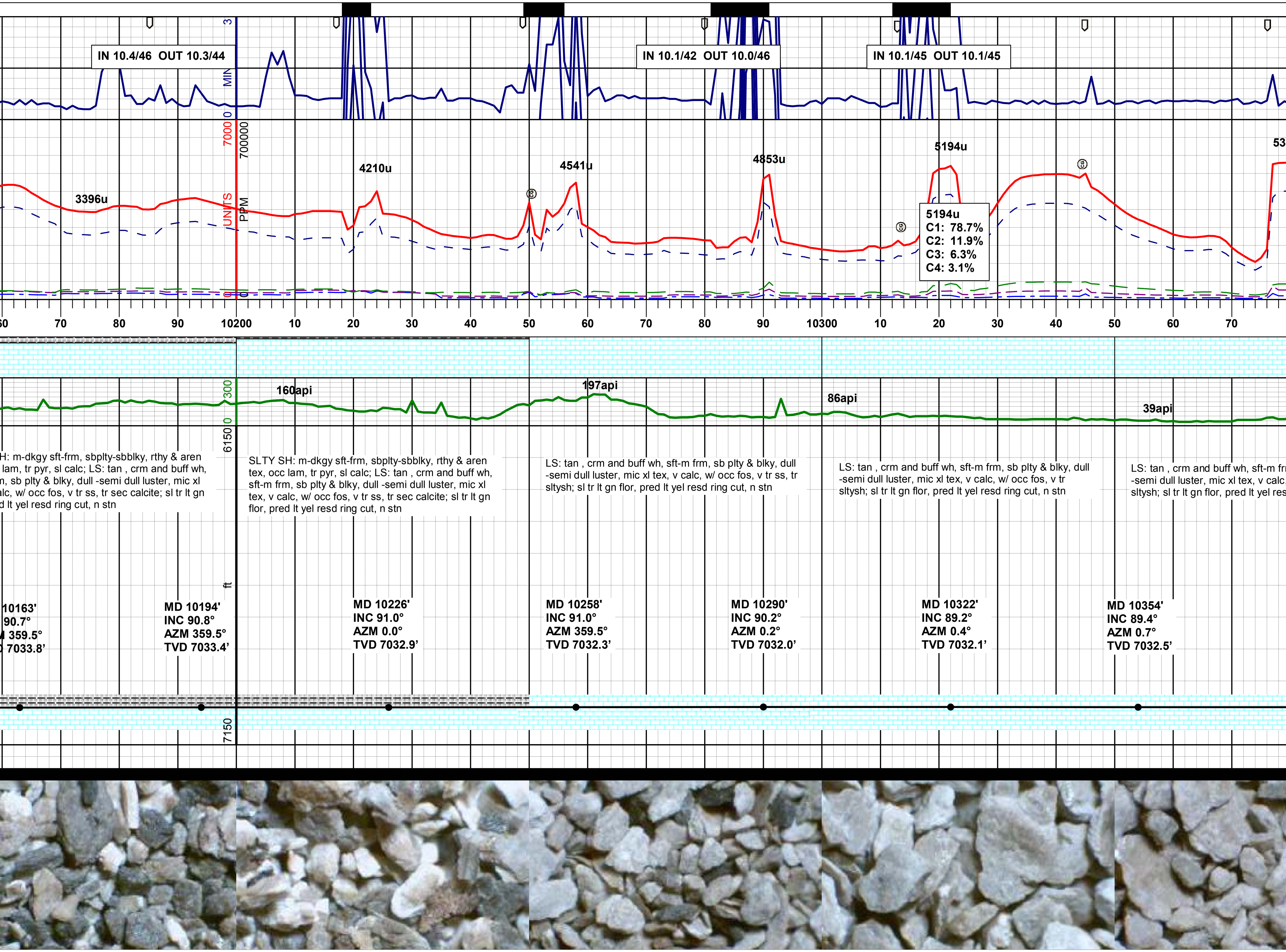
MD 10068'
INC 91.2°
AZM 0.4°
TVD 7035.4'

MD 10099'
INC 91.1°
AZM 0.2°
TVD 7034.8'

MD 10131'
INC 90.9°
AZM 0.0°
TVD 7034.2'

MD
INC
AZI
TVI





5194u
C1: 78.7%
C2: 11.9%
C3: 6.3%
C4: 3.1%

H: m-dkgy sft-frm, sbplty-sbblky, rthy & aren
lam, tr pyr, sl calc; LS: tan , crm and buff wh,
n, sb plty & blky, dull -semi dull luster, mic xl
alc, w/ occ fos, v tr ss, tr sec calcite; sl tr lt gn
d lt yel resd ring cut, n stn

SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr ss, tr sec calcite; sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr ss, tr sltysh; sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr sltysh; sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m fr
-semi dull luster, mic xl tex, v calc
sltysh; sl tr lt gn flor, pred lt yel res

10163'
90.7°
359.5°
7033.8'

MD 10194'
INC 90.8°
AZM 359.5°
TVD 7033.4'

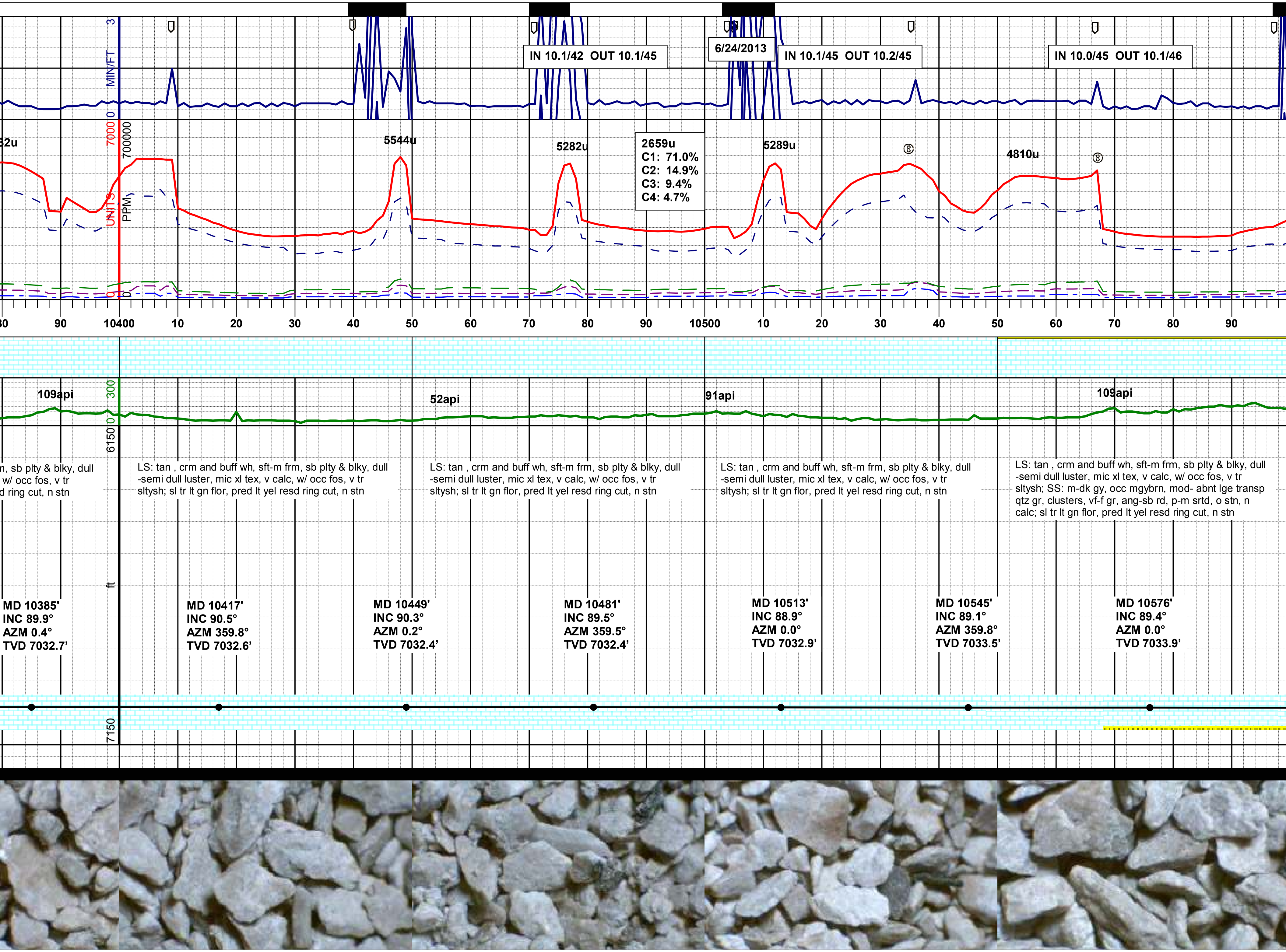
MD 10226'
INC 91.0°
AZM 0.0°
TVD 7032.9'

MD 10258'
INC 91.0°
AZM 359.5°
TVD 7032.3'

MD 10290'
INC 90.2°
AZM 0.2°
TVD 7032.0'

MD 10322'
INC 89.2°
AZM 0.4°
TVD 7032.1'

MD 10354'
INC 89.4°
AZM 0.7°
TVD 7032.5'



2659u
C1: 71.0%
C2: 14.9%
C3: 9.4%
C4: 4.7%

n, sb plty & blky, dull
w/ occ fos, v tr
d ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr sltysh; sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr sltysh; sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr sltysh; sl tr lt gn flor, pred lt yel resd ring cut, n stn

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, v tr sltysh; SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc; sl tr lt gn flor, pred lt yel resd ring cut, n stn

MD 10385'
INC 89.9°
AZM 0.4°
TVD 7032.7'

MD 10417'
INC 90.5°
AZM 359.8°
TVD 7032.6'

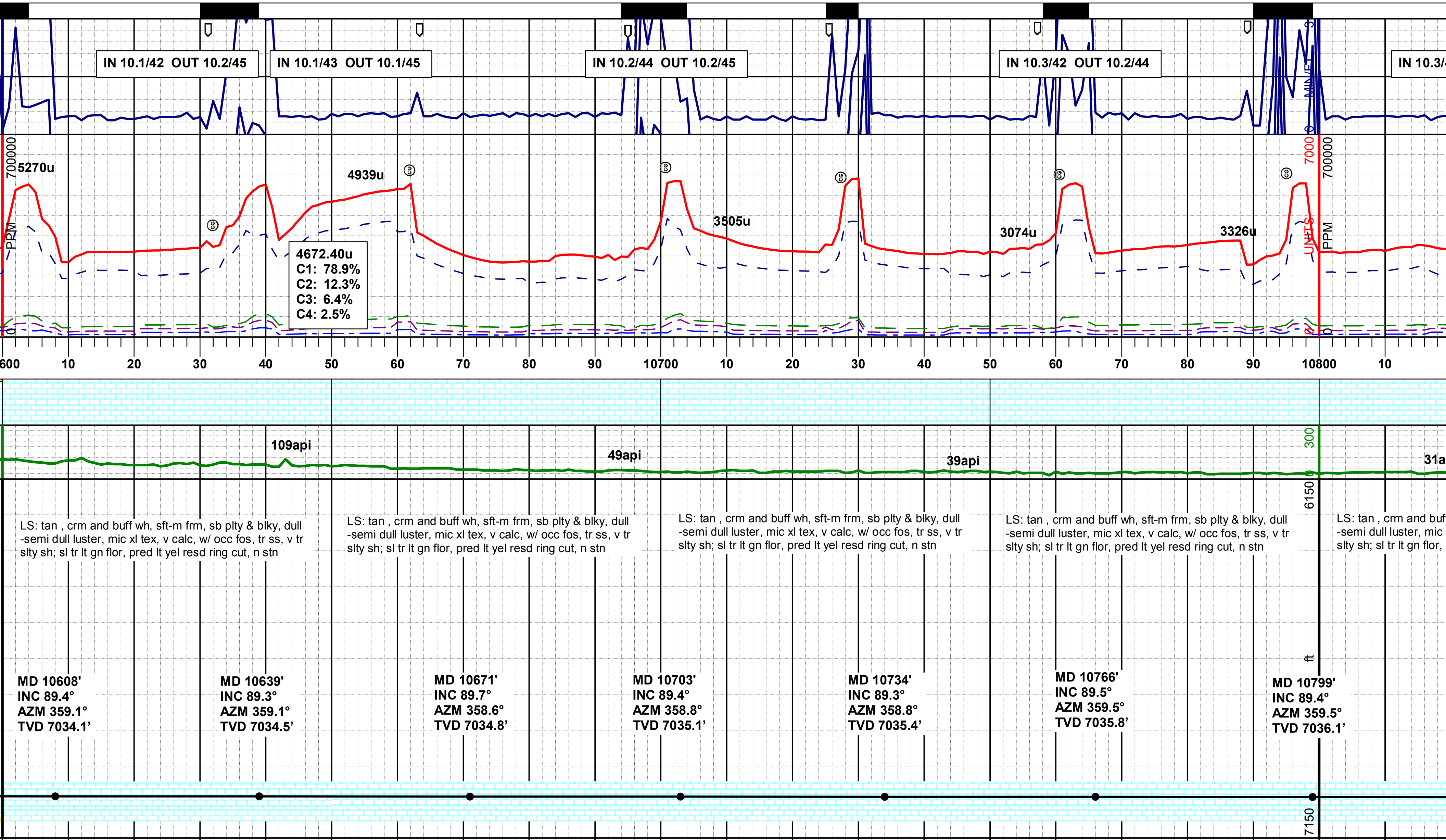
MD 10449'
INC 90.3°
AZM 0.2°
TVD 7032.4'

MD 10481'
INC 89.5°
AZM 359.5°
TVD 7032.4'

MD 10513'
INC 88.9°
AZM 0.0°
TVD 7032.9'

MD 10545'
INC 89.1°
AZM 359.8°
TVD 7033.5'

MD 10576'
INC 89.4°
AZM 0.0°
TVD 7033.9'



LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, tr ss, v tr slty sh; sl tr lt gn flor, pred lt yel resd ring cut, n stn

MD 10608'
INC 89.4°
AZM 359.1°
TVD 7034.1'

MD 10639'
INC 89.3°
AZM 359.1°
TVD 7034.5'

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, tr ss, v tr slty sh; sl tr lt gn flor, pred lt yel resd ring cut, n stn

MD 10671'
INC 89.7°
AZM 358.6°
TVD 7034.8'

MD 10703'
INC 89.4°
AZM 358.8°
TVD 7035.1'

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, tr ss, v tr slty sh; sl tr lt gn flor, pred lt yel resd ring cut, n stn

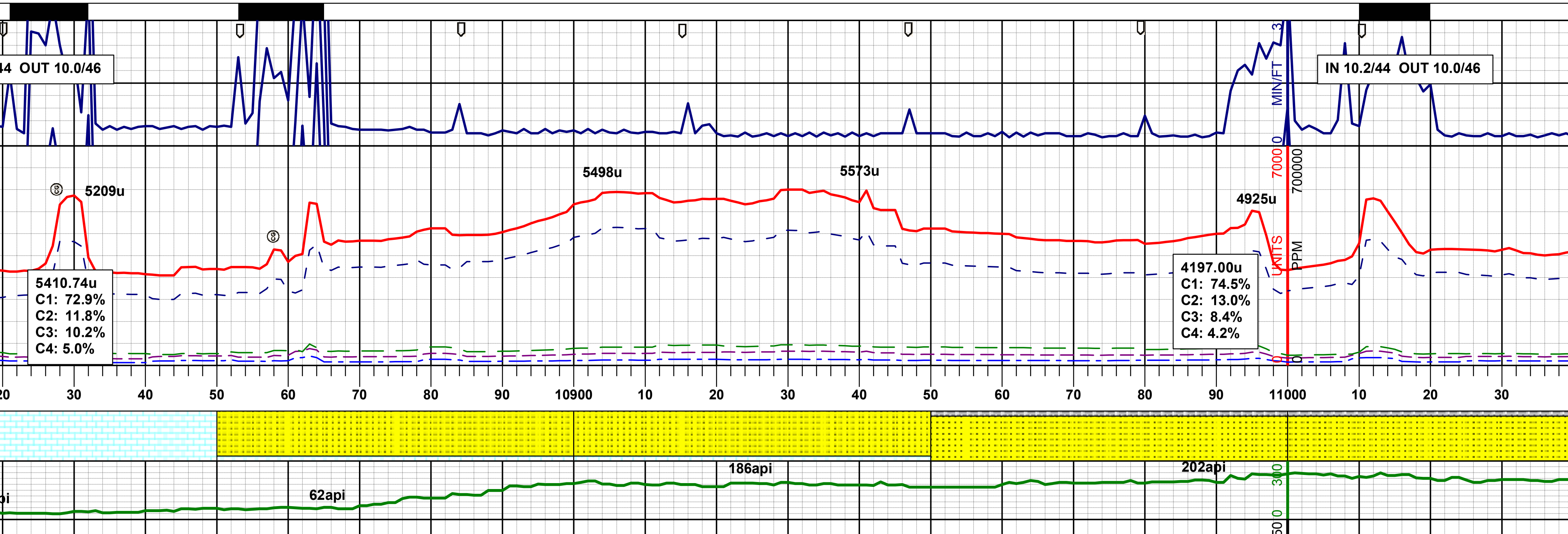
MD 10734'
INC 89.3°
AZM 358.8°
TVD 7035.4'

LS: tan , crm and buff wh, sft-m frm, sb plty & blky, dull -semi dull luster, mic xl tex, v calc, w/ occ fos, tr ss, v tr slty sh; sl tr lt gn flor, pred lt yel resd ring cut, n stn

MD 10766'
INC 89.5°
AZM 359.5°
TVD 7035.8'

MD 10799'
INC 89.4°
AZM 359.5°
TVD 7036.1'

LS: tan , crm and buf
-semi dull luster, mic
slty sh; sl tr lt gn flor,



wh, sft-m frm, sb plty & blky, dull
xl tex, v calc, w/ occ fos, tr ss, v tr
ored lt yel resd ring cut, n stn

LS: wh, tan, crm, sft-m gfrm, sb plty rthy-smth lstr, mic xl-fos tex, v calc, tr sltyshy, vstr dism pyr, n flor, tr stmg yel cut, n stn, vtr ss, tr sh; SS: lt-m gybrn, trnsl, sme dkgy, lrg transp qtz grn, clusters, m-f gr, ang-sb rd, m-w srtd, n calc, tr - mod vis por

LS: wh, tan, crm, sft-m gfrm, sb plty rthy-smth lstr, mic xl-fos tex, v calc, tr sltyshy, vstr dism pyr, n flor, tr stmg yel cut, n stn, vtr ss, tr sh; SS: lt-m gybrn, trnsl, sme dkgy, lrg transp qtz grn, clusters, m-f gr, ang-sb rd, m-w srtd, n calc, tr - mod vis por

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, mod- abnt lge trans
clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n ca
SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy &
tex, occ lam, tr pyr, sl calc; tr - mod vis por, str
mod brn stn.

ft

MD 10830'
INC 88.9°
AZM 359.8°
TVD 7036.5'

MD 10861'
INC 88.2°
AZM 0.5°
TVD 7037.3'

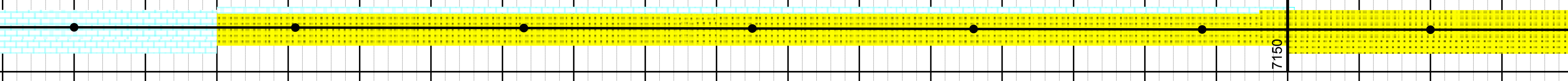
MD 10893'
INC 87.7°
AZM 0.2°
TVD 7038.5'

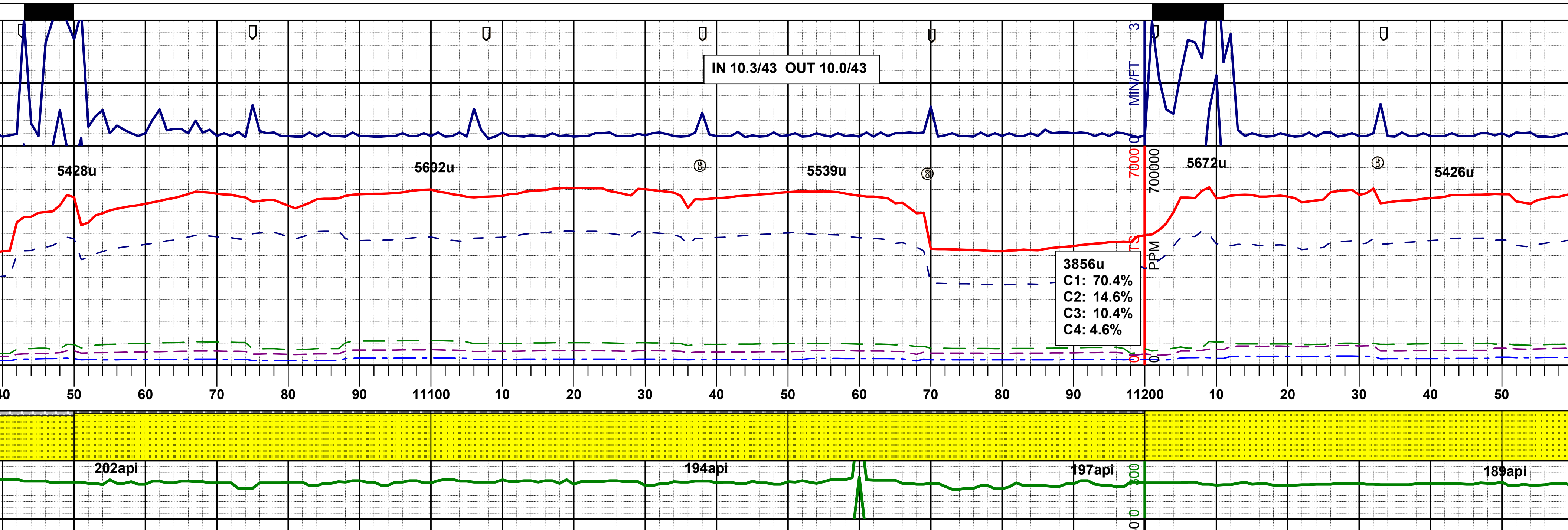
MD 10925'
INC 87.8°
AZM 359.7°
TVD 7039.7'

MD 10956'
INC 87.9°
AZM 359.7°
TVD 7040.9'

MD 10988'
INC 88.0°
AZM 359.5°
TVD 7042.0'

MD 11020'
INC 88.8°
AZM 359.7°
TVD 7042.9'





o qtz gr,
lc;
aren
ng cut,

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc; SLTY SH: m-dkgy sft-frm, sbplty-sbblky, rthy & aren tex, occ lam, tr pyr, sl calc; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc, vstr slty sh ; tr - mod vis por, stmg cut, mod brn stn.

SS: m-d
clusters
slty sh ;

MD 11052'
INC 89.6°
AZM 0.2°
TVD 7043.4'

MD 11083'
INC 90.0°
AZM 359.3°
TVD 7043.5'

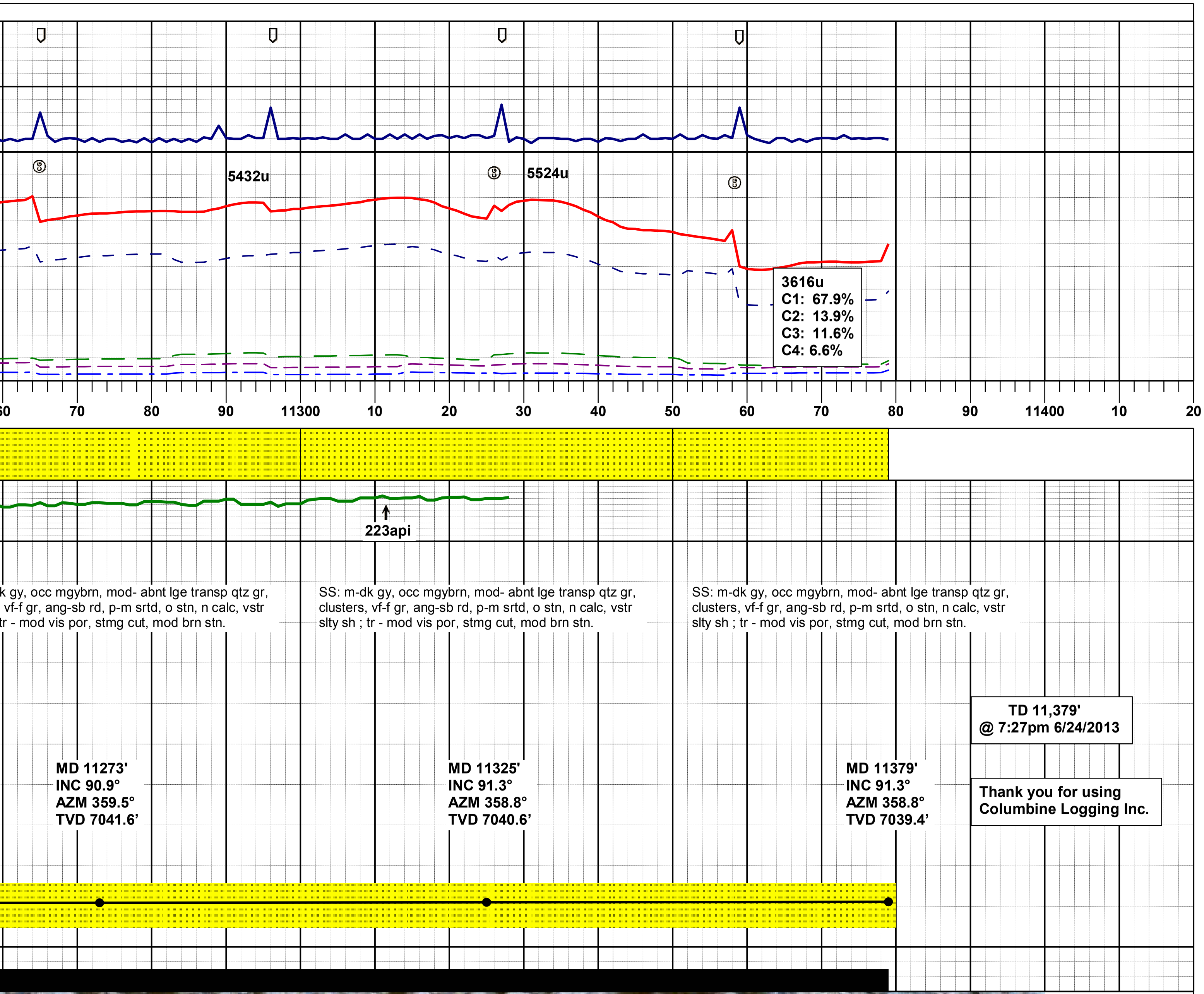
MD 11115'
INC 90.3°
AZM 359.5°
TVD 7043.4'

MD 11146'
INC 90.6°
AZM 359.7°
TVD 7043.2'

MD 11178'
INC 90.1°
AZM 359.1°
TVD 7042.7'

MD 11210'
INC 90.6°
AZM 359.5°
TVD 7042.3'

MD 11242'
INC 90.5°
AZM 359.1°
TVD 7042.0'



k gy, occ mgybrn, mod- abnt lge transp qtz gr, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc, vstr tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc, vstr slty sh ; tr - mod vis por, stmg cut, mod brn stn.

SS: m-dk gy, occ mgybrn, mod- abnt lge transp qtz gr, clusters, vf-f gr, ang-sb rd, p-m srtd, o stn, n calc, vstr slty sh ; tr - mod vis por, stmg cut, mod brn stn.

MD 11273'
INC 90.9°
AZM 359.5°
TVD 7041.6'

MD 11325'
INC 91.3°
AZM 358.8°
TVD 7040.6'

MD 11379'
INC 91.3°
AZM 358.8°
TVD 7039.4'

TD 11,379'
@ 7:27pm 6/24/2013

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