Scale: 5" / 100'
Measured Depth Log

Well Name	Marcus LD 11-371HNX		
Location	SESE SEC 34 T1N R67W		
State	COLORADO	**County**	WELD
Country	USA	**Rig Number**	PRECISION 460
API Number	05-123-45383-0000	**AFE #**	17DC0132
Geographic Region	DJ BASIN	**Field**	WATTERBERG
Spud Date	12/17/2017	**Drilling Completed**	12/20/2017
Surface Coordinates	SESE SEC 34, T1N, R67W 862' FSL x 260' FEL		
Bottom Hole Coordinates	SESW SEC 11, T1S, R67W 719' FSL x 2301' FEL		
Ground Elevation	5042'	**K.B. Elevation**	5062'
Logged Interval	6000' MD **To** 17598' MD	**Total Depth**	17598' MD
Formation	NIOBRARA A BENCH		
Type of Drilling Fluid	OIL BASED MUD		

Operator

Company Great Western Oil and Gas

Address 1801 Broadway, Ste 500
Denver, CO 80202

Geologist

Name Joey Luce and Gabriel Rubio

Company Terra Guidance

Address 1298 O Road
Loma CO 81524
(970) 260-5408

Color Coding

- Oil
- Condensate
- Gas
- Note
- Core
- Pressure
- Error
- Water
- Seal

Rock Types

- LIMESTONE
- Chalk
- Marl
- SHALE
- Silty Shale
- Shaly Siltstone
- Shaly Sandston
- SILTSTONE
- SANDSTONE
- BENTONITE
- CEMENT
- UNKNOWN
- ANHYDRITE
- GYPSUM
- SALT
- SIDERITE or LIMONITE
- DOLOMITE
- CHERT
- COAL
- MARLSTONE
- CLAYSTONE
- SHALE GRAY
- SHALE COLORED
- CONGLOMERATE
- BRECCIA
- TILL
- TUFF
- IGNEOUS
- METAMORPHIC
- CALCARIOUS SHALE

Accessories

Fossils

- ALGAE
- AMPHIPORA
- BELEMNITE
- BIOCLASTIC
- BRACHOIPOD
- BRYOZOA
- CEPHALOPOD
- CORAL
- CRINOID
- ECHINOID
- FISH
- FORAMINIFERA
- FOSSIL
- GASTROPOD
- OOLITE
- OSTRACOD
- PELECYPOD
- PELLET
- PISOLITE
- PLANT REMAINS
- PLANT SPORES
- SCAPHOPOD
- STROMATOPOROID

Minerals

- ANHYDRITIC
- ARGILLACEOUS
- ARGILLITE GRAIN
- BENTONITE
- BITUMENOUS SUBSTANCE
- BRECCIA FRAGMENTS
- CALCAREOUS
- CARBONACEOUS FLAKES
- CHTDK
- CHTLT
- COAL - THIN BEDS
- DOLOMITIC
- FELDSPAR
- FERRUGINOUS PELLET
- FERRUGINOUS
- GLAUCONITE
- GYPSIFEROUS
- HEAVY MINERAL
- KAOLIN
- MARLSTONE
- MINERAL CRYSTALS
- NODULES
- PHOSPHATE PELLETS
- PYRITE
- SALT CAST
- SANDY
- SILICEOUS
- SILTY
- TUFFACEOUS

Stringer

- ANHYDRITE STRINGER
- BENTONITE STRINGER
- COAL STRINGER
- DOLOMITE STRINGER
- GYPSUM STRINGER
- LIMESTONE STRINGER
- MARLSTONE (CALC) STRG
- MARLSTONE (DOL) STRG
- SANDSTONE STRINGER
- SHALE STRINGER
- SILTSTONE STRINGER

Oil Show

- ORGANIC
- PINPOINT
- DEAD
- VUGGY
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

Porosity

- EARTHY
- FENESTRAL
- FRACTURE
- INTERCRYSTALLINE
- INTEROOLITIC
- MOLDIC

Engineering

- BIT
- CASING
- CONNECTION (LEF
- CONNECTION (RIG
- CONNECTION G
- CORE - LOST
- CORE - RECOVERE
- DST INTERVAL
- FAULT

Other Symbols

FORMATION TOP

GAS SHOW

MNDEPTH MN DEPTH

NORMAL FAULT

OIL SHOW

OVERTURNED STRATA

REVERSE FAULT

SIDEWALL CORE (LEFT)

SIDEWALL CORE (RIGHT)

SLIDE

DS SURVEY

TG TRIP GAS

WIRELINE TESTED - LEFT

WIRELINE TESTED - RT

L LITHOGRAPHIC

Rounding

MX MICROXLN

A ANGULAR

MS MUDSTONE

R ROUNDED

PS PACKSTONE

a SUBANG

WS WACKESTONE

r SUBRND

Sorting

M MODERATE

P POOR

W WELL

Textures

BS BOUNDSTONE

C CHALKY

CX CRYPTOXLN

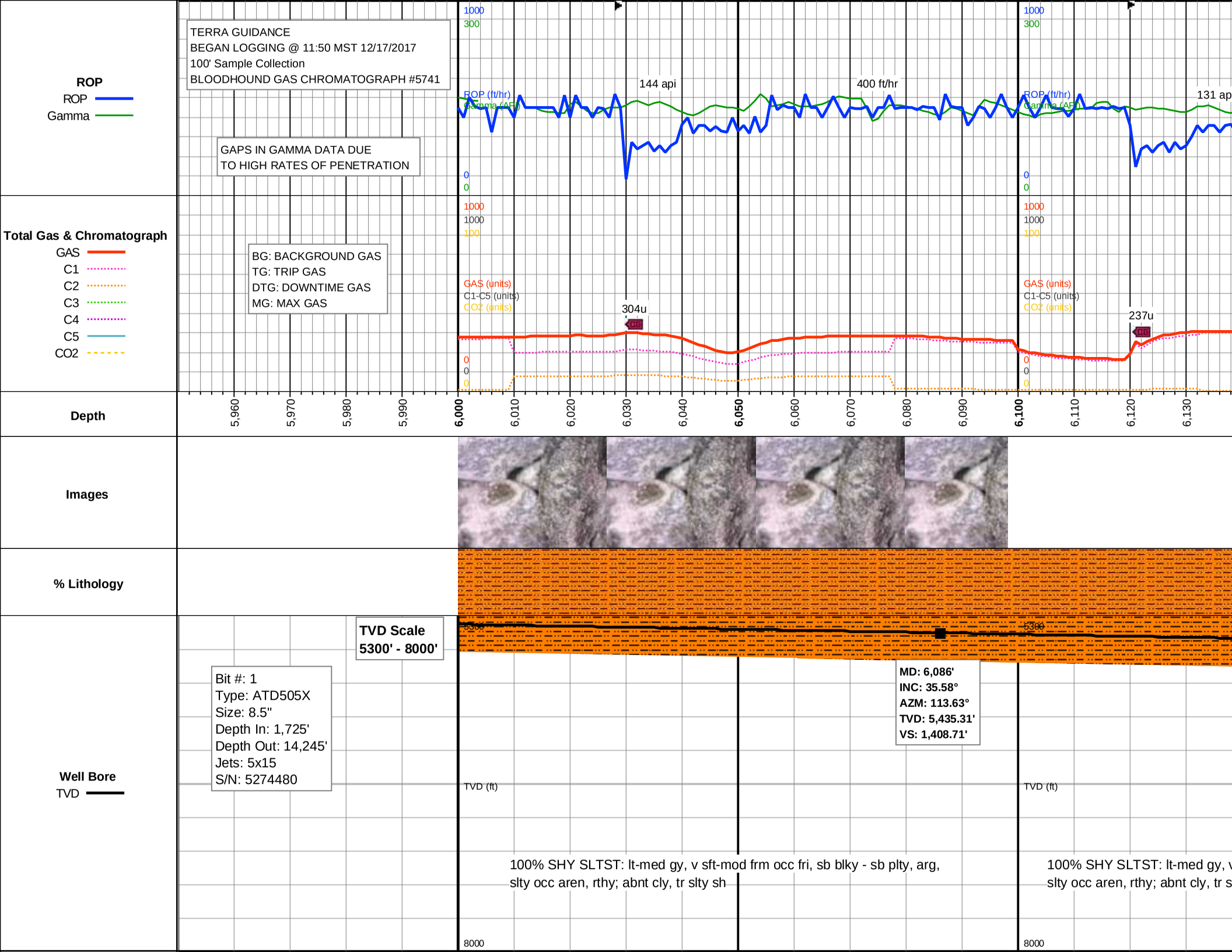
E EARTHY

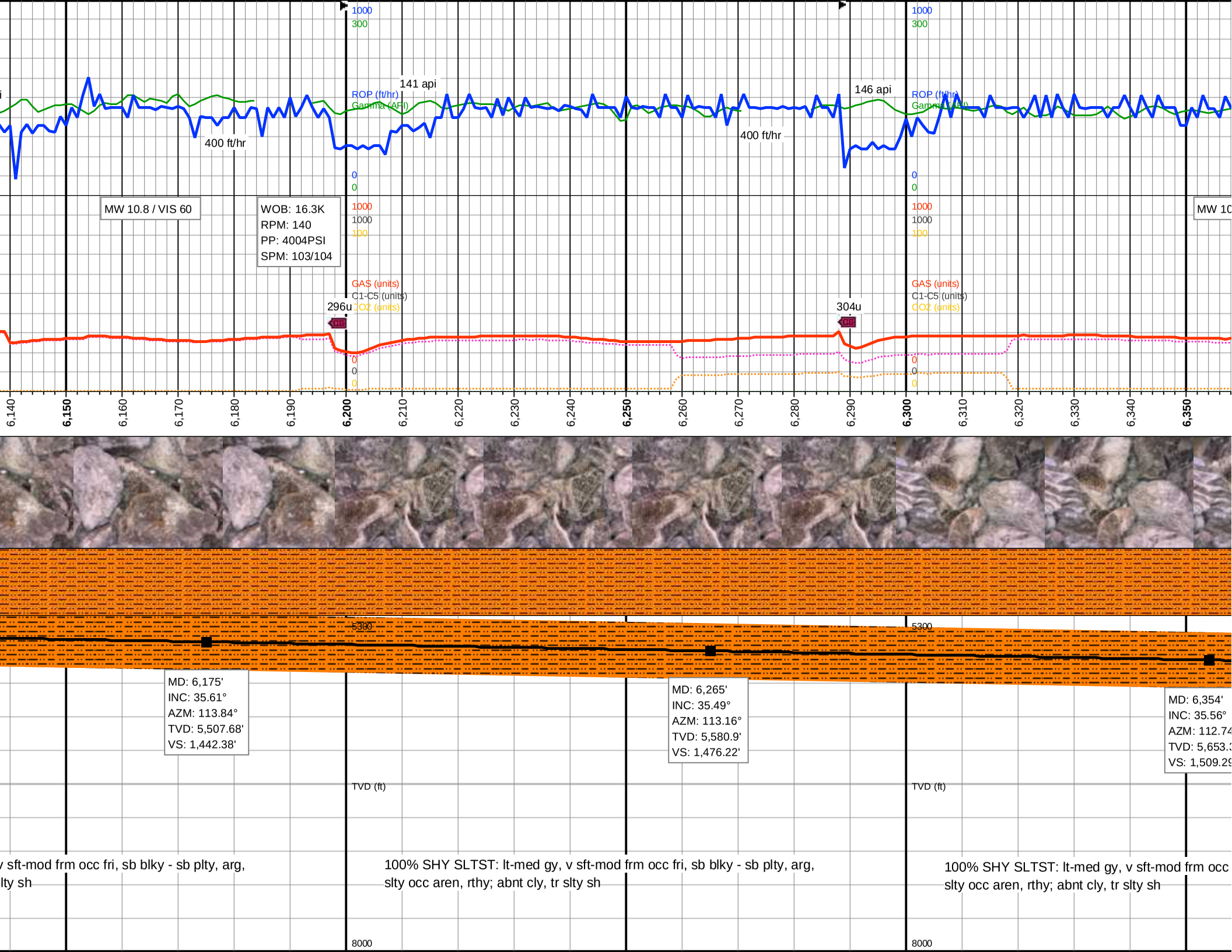
FX FINELYXLN

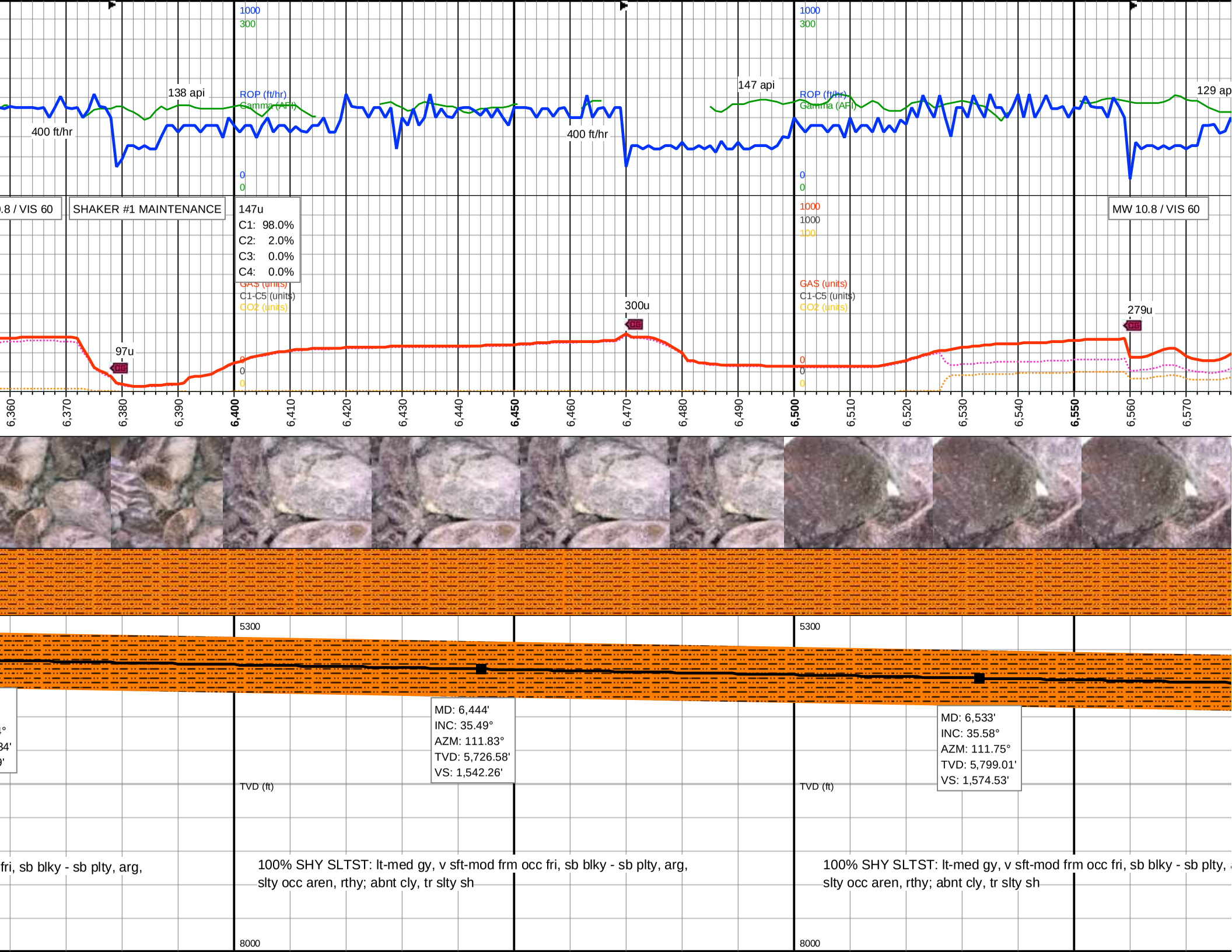
GS GRAINSTONE

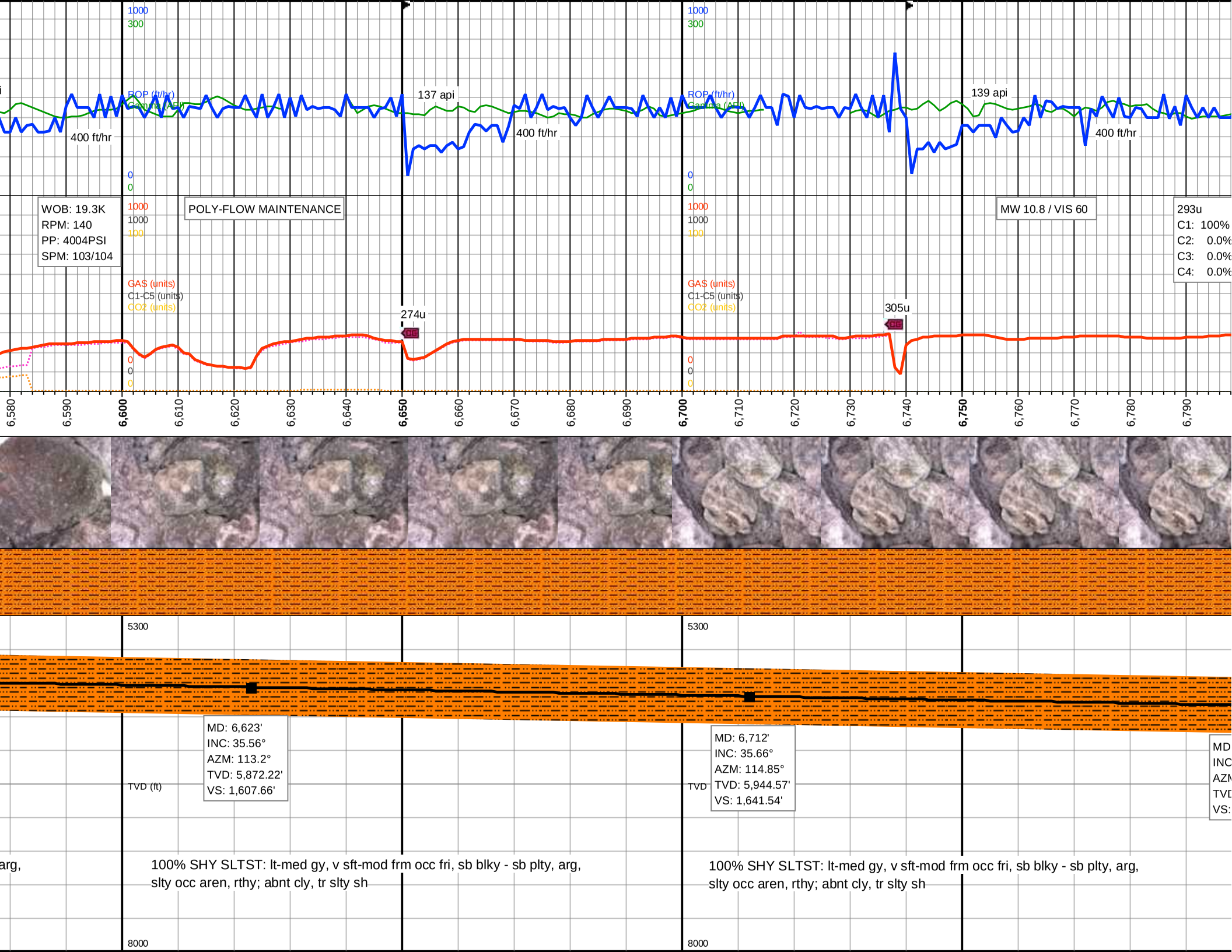
CALCARIUOS SHALE

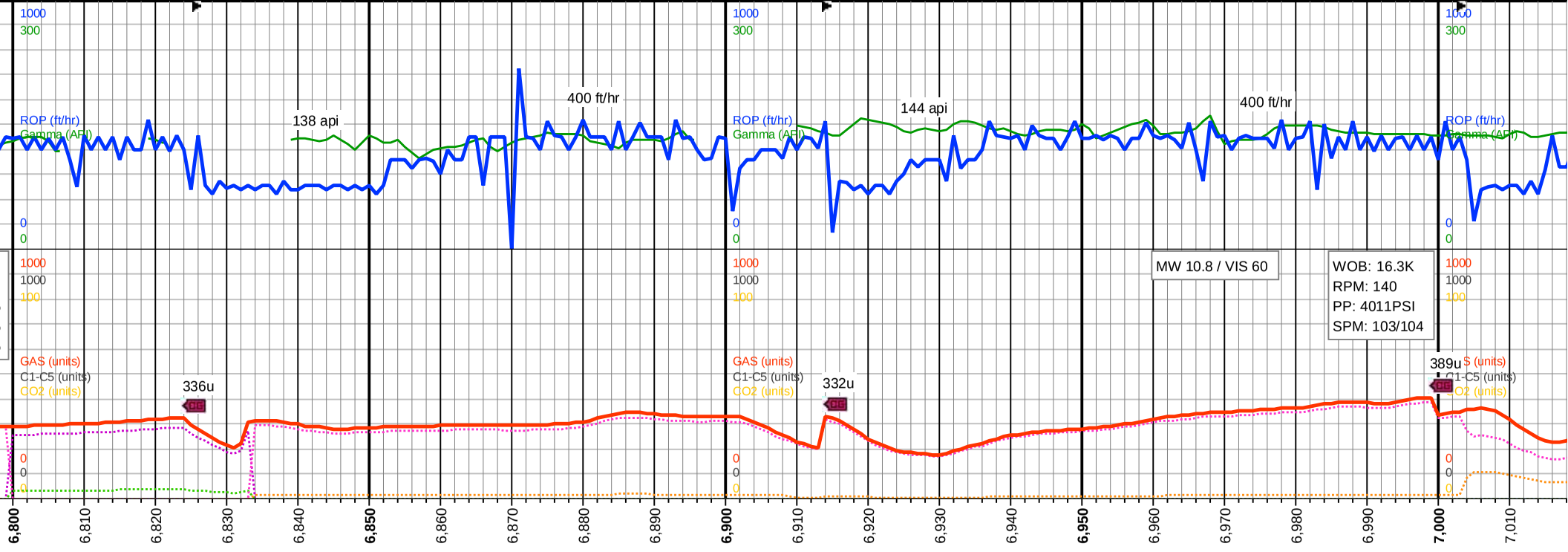
CALCARIOUS SHALE

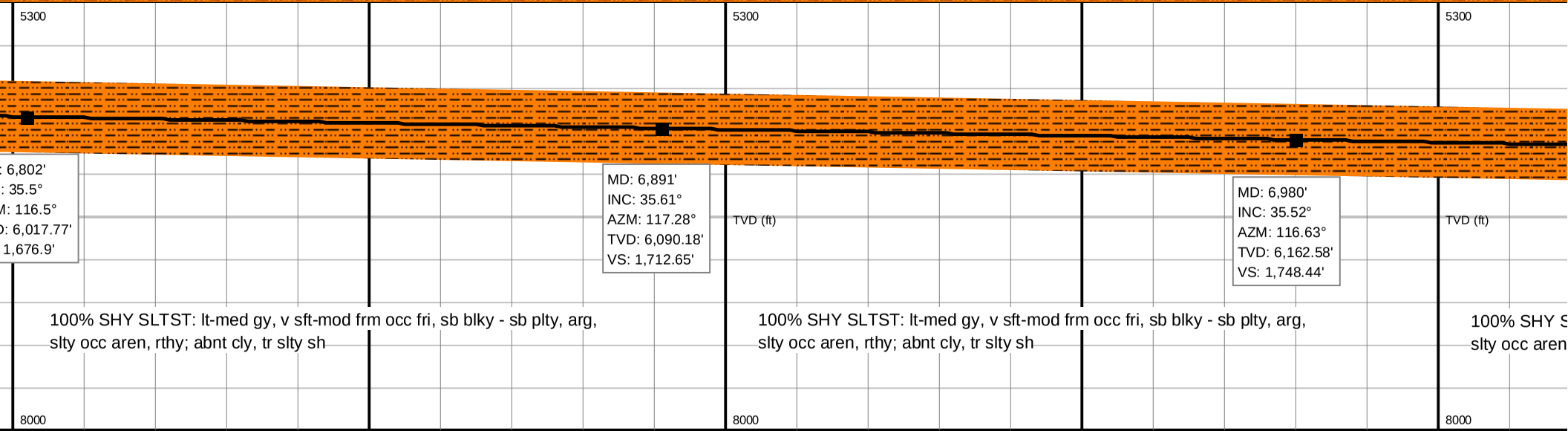

ROP
ROP
Gamma
TERRA GUIDANCE
BEGAN LOGGING @ 11:50 MST 12/17/2017
100' Sample Collection
BLOODHOUND GAS CHROMATOGRAPH #5741
GAPS IN GAMMA DATA DUE
TO HIGH RATES OF PENETRATION
1000
300
ROP (ft/hr)
Gamma (API)
144 api
400 ft/hr
131 ap
0
0
Total Gas & Chromatograph
GAS
C1
C2
C3
C4
C5
CO2
BG: BACKGROUND GAS
TG: TRIP GAS
DTG: DOWNTIME GAS
MG: MAX GAS
1000
1000
100
GAS (units)
C1-C5 (units)
CO2 (units)
304u
237u
0
0
0
Depth
5,960
5,970
5,980
5,990
6,000
6,010
6,020
6,030
6,040
6,050
6,060
6,070
6,080
6,090
6,100
6,110
6,120
6,130
Images
% Lithology
Well Bore
TVD
TVD Scale
5300' - 8000'
Bit #: 1
Type: ATD505X
Size: 8.5"
Depth In: 1,725'
Depth Out: 14,245'
Jets: 5x15
S/N: 5274480
5300
MD: 6,086'
INC: 35.58°
AZM: 113.63°
TVD: 5,435.31'
VS: 1,408.71'
TVD (ft)
100% SHY SLTST: lt-med gy, v sft-mod frm occ fri, sb blky - sb plty, arg, slty occ aren, rthy; abnt cly, tr slty sh
8000

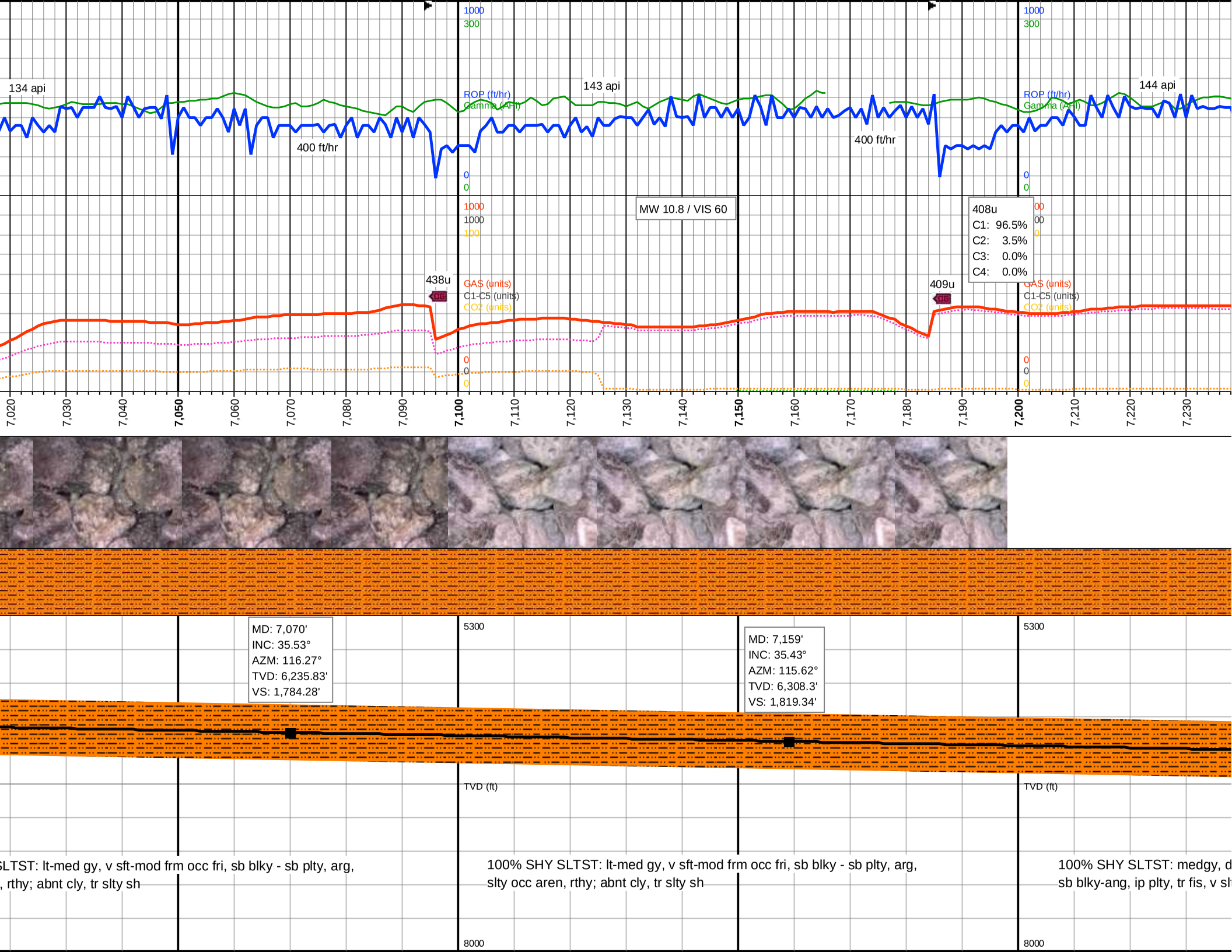

1000
300
ROP (ft/hr)
Gamma (API)
141 api
146 api
400 ft/hr
400 ft/hr
0
0
MW 10.8 / VIS 60
WOB: 16.3K
RPM: 140
PP: 4004PSI
SPM: 103/104
1000
1000
100
GAS (units)
C1-C5 (units)
CO2 (units)
296u
304u
6,140
6,150
6,160
6,170
6,180
6,190
6,200
6,210
6,220
6,230
6,240
6,250
6,260
6,270
6,280
6,290
6,300
6,310
6,320
6,330
6,340
6,350
5300
MD: 6,175'
INC: 35.61°
AZM: 113.84°
TVD: 5,507.68'
VS: 1,442.38'
MD: 6,265'
INC: 35.49°
AZM: 113.16°
TVD: 5,580.9'
VS: 1,476.22'
MD: 6,354'
INC: 35.56°
TVD (ft)
8000
v sft-mod frm occ fri, sb blky - sb plty, arg,
lty sh
100% SHY SLTST: lt-med gy, v sft-mod frm occ fri, sb blky - sb plty, arg,
slty occ aren, rthy; abnt cly, tr slty sh
100% SHY SLTST: lt-med gy, v sft-mod frm occ
slty occ aren, rthy; abnt cly, tr slty sh


1000
300
ROP (ft/hr)
Gamma (API)
138 api
400 ft/hr
147 api
400 ft/hr
129 ap
0
0
MW 10.8 / VIS 60
SHAKER #1 MAINTENANCE
147u
C1: 98.0%
C2: 2.0%
C3: 0.0%
C4: 0.0%
GAS (units)
C1-C5 (units)
CO2 (units)
1000
1000
100
97u
300u
279u
6,360
6,370
6,380
6,390
6,400
6,410
6,420
6,430
6,440
6,450
6,460
6,470
6,480
6,490
6,500
6,510
6,520
6,530
6,540
6,550
6,560
6,570
5300
MD: 6,444'
INC: 35.49°
AZM: 111.83°
TVD: 5,726.58'
VS: 1,542.26'
MD: 6,533'
INC: 35.58°
AZM: 111.75°
TVD: 5,799.01'
VS: 1,574.53'
TVD (ft)
8000
100% SHY SLTST: lt-med gy, v sft-mod frm occ fri, sb blky - sb plty, arg, slty occ aren, rthy; abnt cly, tr slty sh


1000
300
ROP (ft/hr)
Gamma (API)
137 api
400 ft/hr
400 ft/hr
139 api
400 ft/hr
0
0
WOB: 19.3K
RPM: 140
PP: 4004PSI
SPM: 103/104
POLY-FLOW MAINTENANCE
MW 10.8 / VIS 60
293u
C1: 100%
C2: 0.0%
C3: 0.0%
C4: 0.0%
1000
1000
100
GAS (units)
C1-C5 (units)
CO2 (units)
274u
305u
0
0
0
6,580
6,590
6,600
6,610
6,620
6,630
6,640
6,650
6,660
6,670
6,680
6,690
6,700
6,710
6,720
6,730
6,740
6,750
6,760
6,770
6,780
6,790
5300
TVD (ft)
MD: 6,623'
INC: 35.56°
AZM: 113.2°
TVD: 5,872.22'
VS: 1,607.66'
TVD
MD: 6,712'
INC: 35.66°
AZM: 114.85°
TVD: 5,944.57'
VS: 1,641.54'
8000
arg,
100% SHY SLTST: lt-med gy, v sft-mod frm occ fri, sb blky - sb plty, arg, slty occ aren, rthy; abnt cly, tr slty sh
100% SHY SLTST: lt-med gy, v sft-mod frm occ fri, sb blky - sb plty, arg, slty occ aren, rthy; abnt cly, tr slty sh


1000
300
ROP (ft/hr)
Gamma (API)
138 api
400 ft/hr
144 api
400 ft/hr
0
0
1000
1000
100
GAS (units)
C1-C5 (units)
CO2 (units)
336u
332u
389u
MW 10.8 / VIS 60
WOB: 16.3K
RPM: 140
PP: 4011PSI
SPM: 103/104
6,800
6,810
6,820
6,830
6,840
6,850
6,860
6,870
6,880
6,890
6,900
6,910
6,920
6,930
6,940
6,950
6,960
6,970
6,980
6,990
7,000
7,010

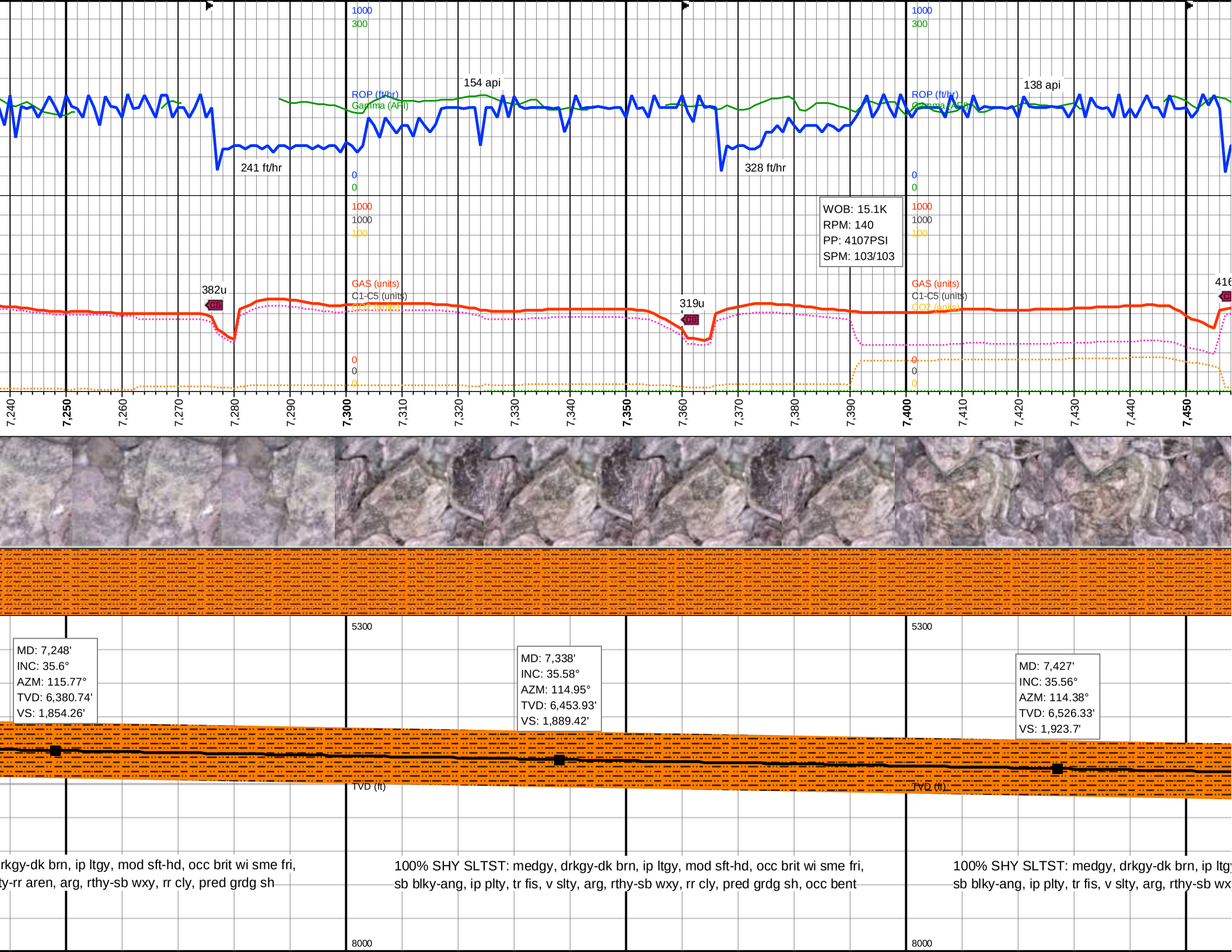

5300
6,802'
35.5°
116.5°
6,017.77'
1,676.9'
MD: 6,891'
INC: 35.61°
AZM: 117.28°
TVD: 6,090.18'
VS: 1,712.65'
TVD (ft)
MD: 6,980'
INC: 35.52°
AZM: 116.63°
TVD: 6,162.58'
VS: 1,748.44'
100% SHY SLTST: lt-med gy, v sft-mod frm occ fri, sb blky - sb plty, arg, slty occ aren, rthy; abnt cly, tr slty sh
8000

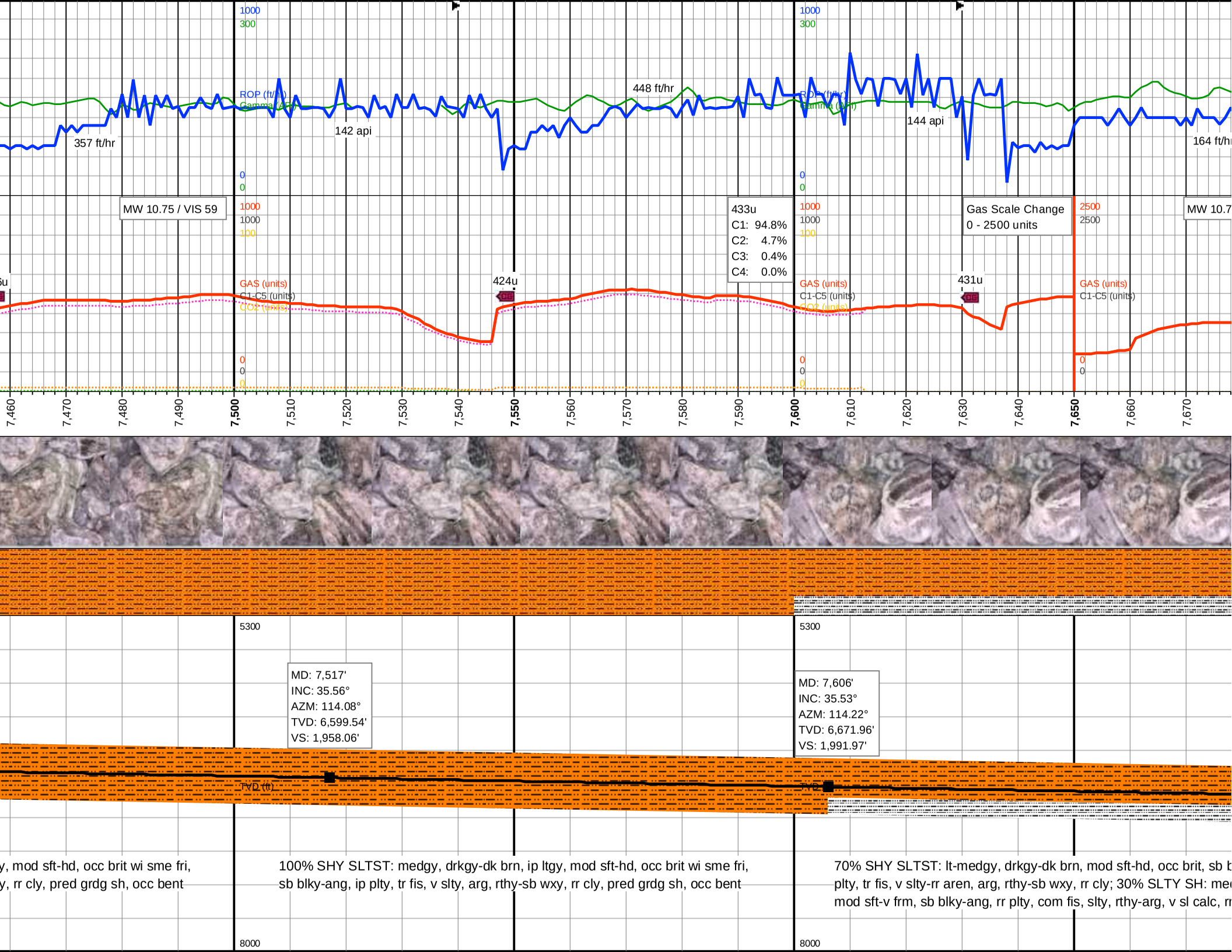


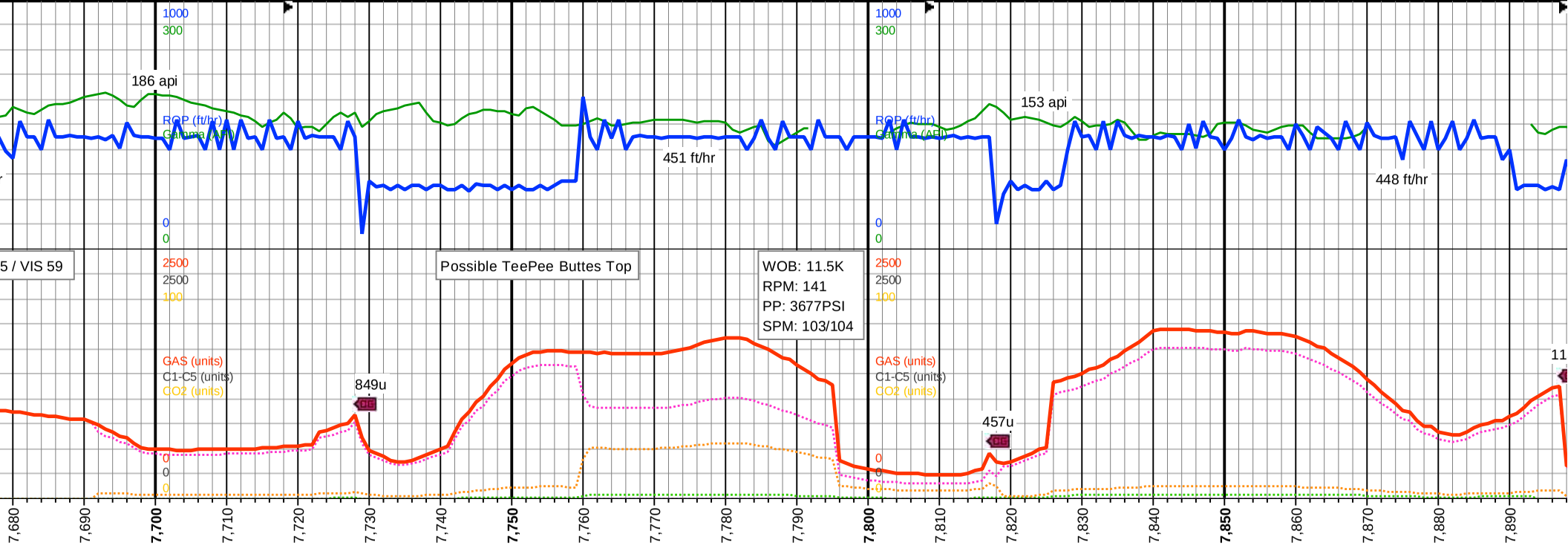
SLTST: lt-med gy, v sft-mod frm occ fri, sb blky - sb plty, arg, , rthy; abnt cly, tr slty sh

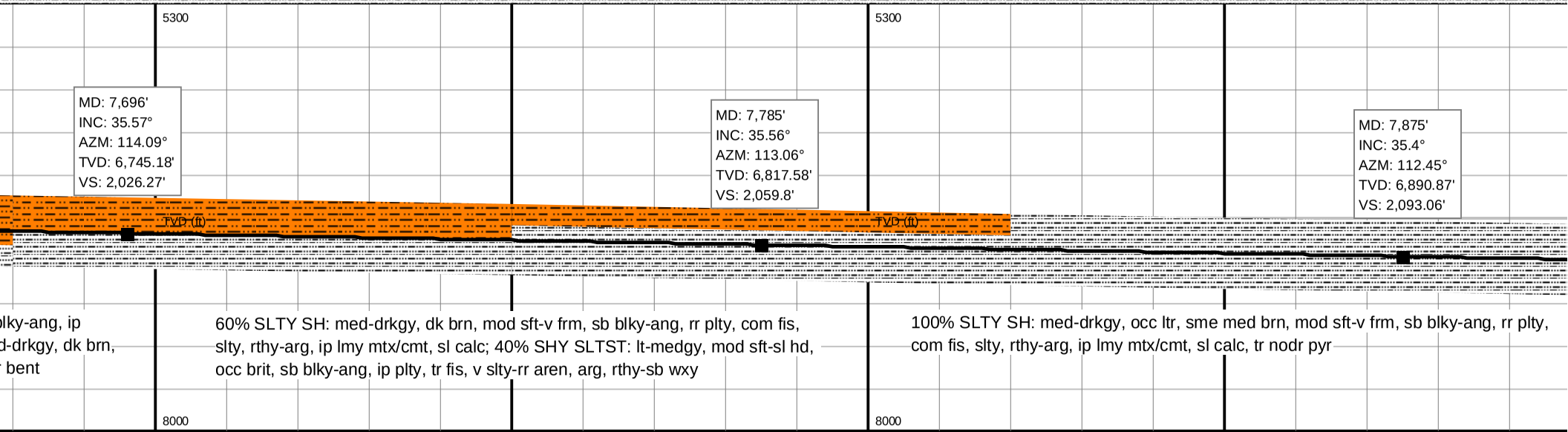
100% SHY SLTST: lt-med gy, v sft-mod frm occ fri, sb blky - sb plty, arg, slty occ aren, rthy; abnt cly, tr slty sh

100% SHY SLTST: medgy, d sb blky-ang, ip plty, tr fis, v sl


1000
300
ROP (ft/hr)
Gamma (API)
154 api
241 ft/hr
328 ft/hr
138 api
0
0
1000
1000
100
WOB: 15.1K
RPM: 140
PP: 4107PSI
SPM: 103/103
GAS (units)
C1-C5 (units)
CO2 (units)
382u
319u
416
7,240
7,250
7,260
7,270
7,280
7,290
7,300
7,310
7,320
7,330
7,340
7,350
7,360
7,370
7,380
7,390
7,400
7,410
7,420
7,430
7,440
7,450
5300
MD: 7,248'
INC: 35.6°
AZM: 115.77°
TVD: 6,380.74'
VS: 1,854.26'
MD: 7,338'
INC: 35.58°
AZM: 114.95°
TVD: 6,453.93'
VS: 1,889.42'
MD: 7,427'
INC: 35.56°
AZM: 114.38°
TVD: 6,526.33'
VS: 1,923.7'
TVD (ft)
8000
rkgy-dk brn, ip ltgy, mod sft-hd, occ brit wi sme fri,
ty-rr aren, arg, rthy-sb wxy, rr cly, pred grdg sh
100% SHY SLTST: medgy, drkgy-dk brn, ip ltgy, mod sft-hd, occ brit wi sme fri,
sb blky-ang, ip plty, tr fis, v slty, arg, rthy-sb wxy, rr cly, pred grdg sh, occ bent
100% SHY SLTST: medgy, drkgy-dk brn, ip ltg
sb blky-ang, ip plty, tr fis, v slty, arg, rthy-sb wx


1000
300
ROP (ft/hr)
Gamma (API)
357 ft/hr
142 api
448 ft/hr
144 api
164 ft/hr
0
0
MW 10.75 / VIS 59
1000
1000
100
GAS (units)
C1-C5 (units)
CO2 (units)
433u
C1: 94.8%
C2: 4.7%
C3: 0.4%
C4: 0.0%
424u
431u
Gas Scale Change
0 - 2500 units
2500
2500
MW 10.7
7,460
7,470
7,480
7,490
7,500
7,510
7,520
7,530
7,540
7,550
7,560
7,570
7,580
7,590
7,600
7,610
7,620
7,630
7,640
7,650
7,660
7,670
5300
MD: 7,517'
INC: 35.56°
AZM: 114.08°
TVD: 6,599.54'
VS: 1,958.06'
MD: 7,606'
INC: 35.53°
AZM: 114.22°
TVD: 6,671.96'
VS: 1,991.97'
TVD (ft)
8000
y, mod sft-hd, occ brit wi sme fri,
y, rr cly, pred grdg sh, occ bent
100% SHY SLTST: medgy, drkgy-dk brn, ip ltgy, mod sft-hd, occ brit wi sme fri,
sb blky-ang, ip plty, tr fis, v slty, arg, rthy-sb wxy, rr cly, pred grdg sh, occ bent
70% SHY SLTST: lt-medgy, drkgy-dk brn, mod sft-hd, occ brit, sb b
plty, tr fis, v slty-rr aren, arg, rthy-sb wxy, rr cly; 30% SLTY SH: me
mod sft-v frm, sb blky-ang, rr plty, com fis, slty, rthy-arg, v sl calc, r

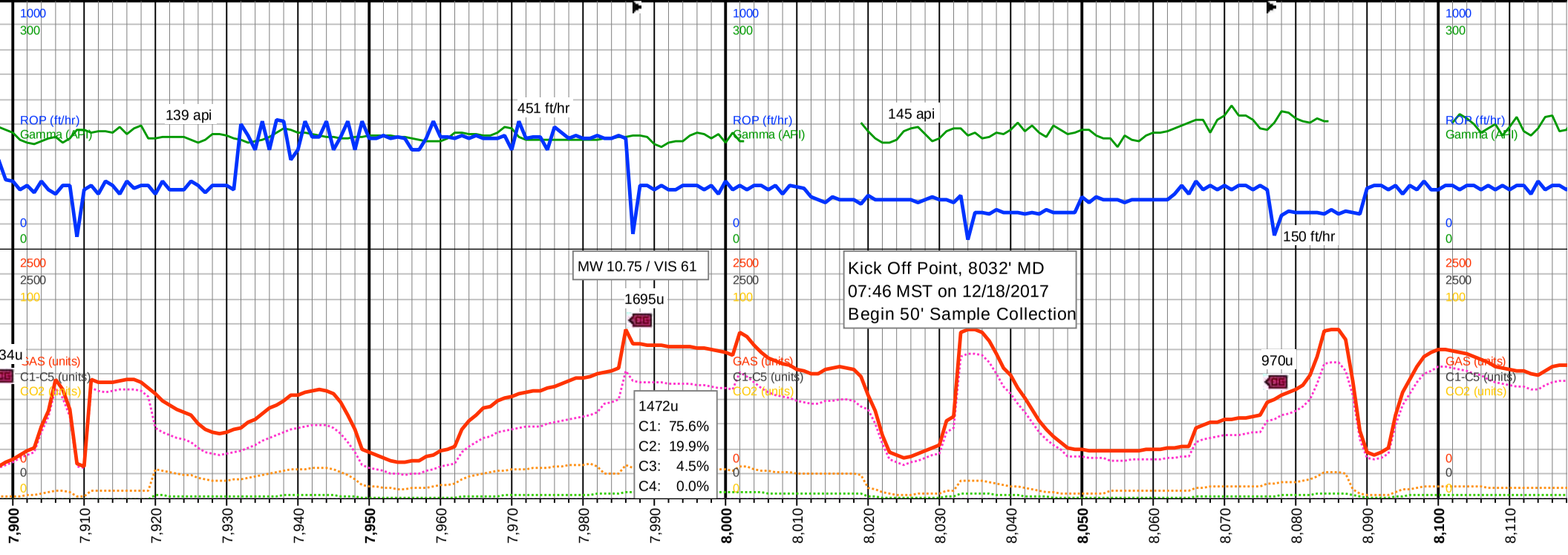


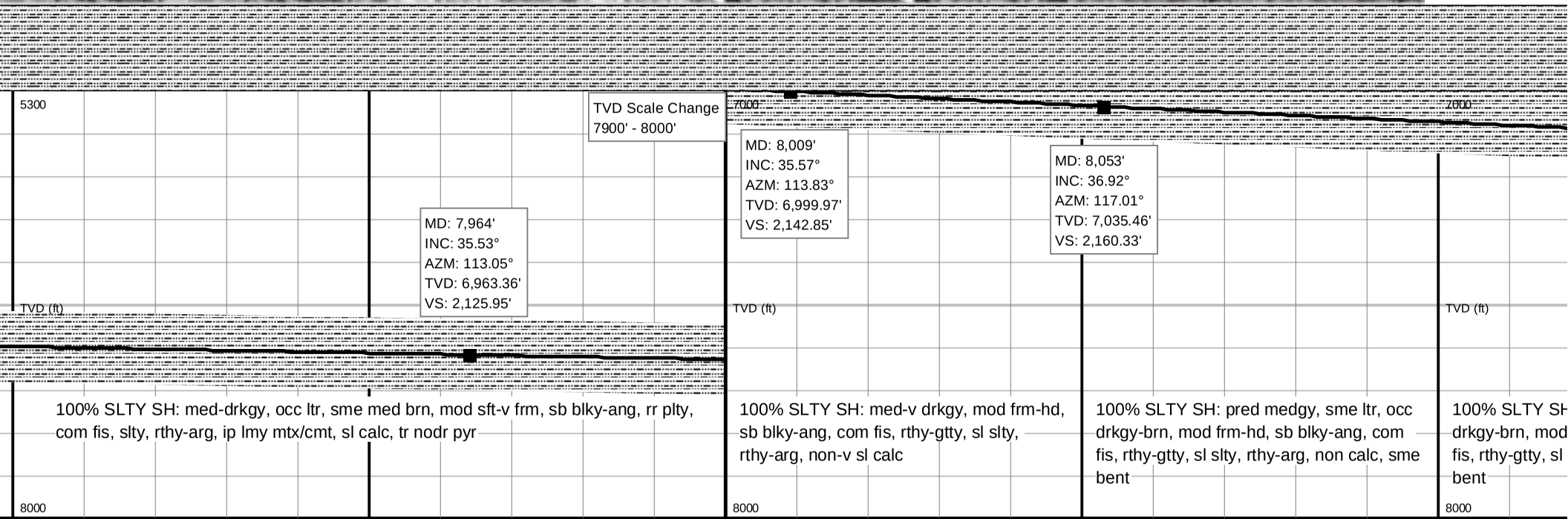


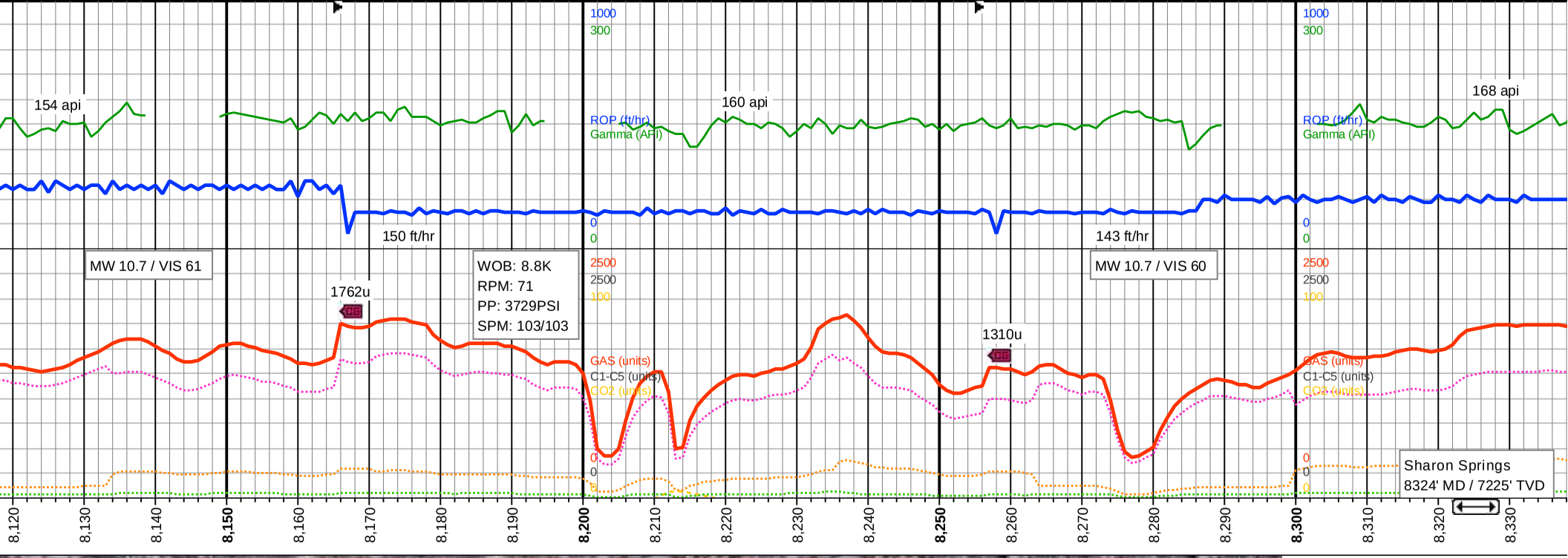
lky-ang, ip
d-drkgy, dk brn,
bent

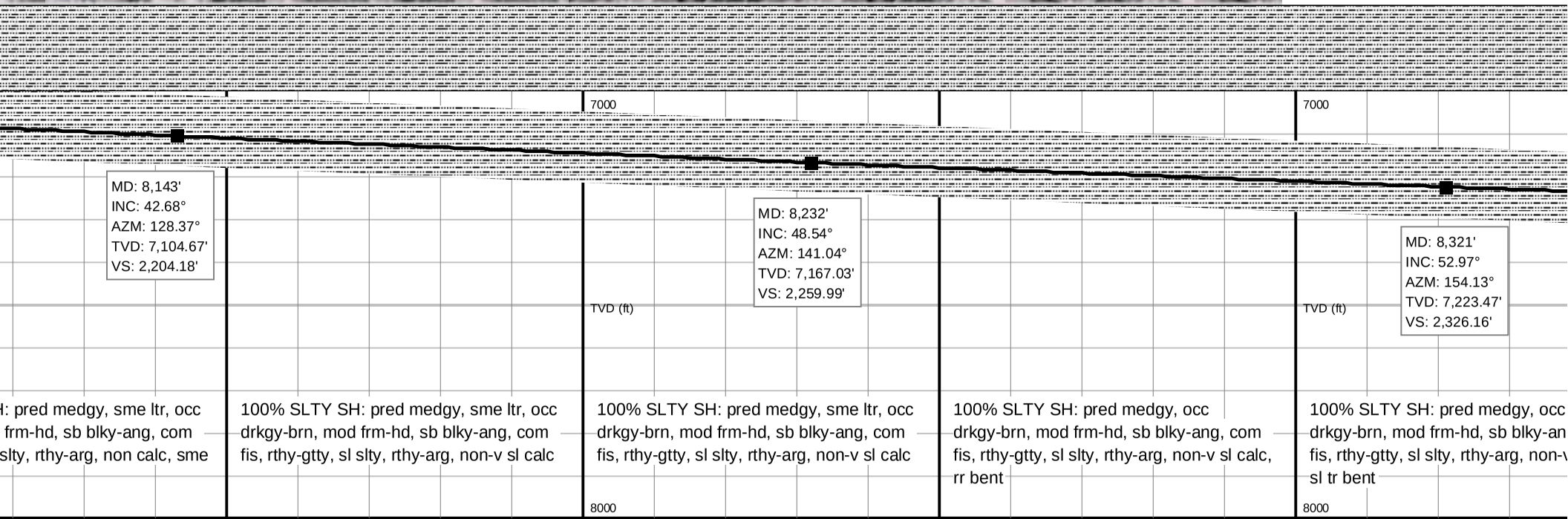
60% SLTY SH: med-drkgy, dk brn, mod sft-v frm, sb blky-ang, rr plty, com fis, slty, rthy-arg, ip lmy mtx/cmt, sl calc; 40% SHY SLTST: lt-medgy, mod sft-sl hd, occ brit, sb blky-ang, ip plty, tr fis, v slty-rr aren, arg, rthy-sb wxy

100% SLTY SH: med-drkgy, occ ltr, sme med brn, mod sft-v frm, sb blky-ang, rr plty, com fis, slty, rthy-arg, ip lmy mtx/cmt, sl calc, tr nodr pyr


1000
300
ROP (ft/hr)
Gamma (API)
139 api
451 ft/hr
145 api
150 ft/hr
0
0
2500
2500
100
GAS (units)
C1-C5 (units)
CO2 (units)
MW 10.75 / VIS 61
1695u
1472u
C1: 75.6%
C2: 19.9%
C3: 4.5%
C4: 0.0%
Kick Off Point, 8032' MD
07:46 MST on 12/18/2017
Begin 50' Sample Collection
970u
7,900
7,910
7,920
7,930
7,940
7,950
7,960
7,970
7,980
7,990
8,000
8,010
8,020
8,030
8,040
8,050
8,060
8,070
8,080
8,090
8,100
8,110


5300
TVD Scale Change
7900' - 8000'
7000
7000
MD: 7,964'
INC: 35.53°
AZM: 113.05°
TVD: 6,963.36'
VS: 2,125.95'
MD: 8,009'
INC: 35.57°
AZM: 113.83°
TVD: 6,999.97'
VS: 2,142.85'
MD: 8,053'
INC: 36.92°
AZM: 117.01°
TVD: 7,035.46'
VS: 2,160.33'
TVD (ft)
TVD (ft)
TVD (ft)
100% SLTY SH: med-drkgy, occ ltr, sme med brn, mod sft-v frm, sb blky-ang, rr plty, com fis, slty, rthy-arg, ip lmy mtx/cmt, sl calc, tr nodr pyr
100% SLTY SH: med-v drkgy, mod frm-hd, sb blky-ang, com fis, rthy-gtty, sl slty, rthy-arg, non-v sl calc
100% SLTY SH: pred medgy, sme ltr, occ drkgy-brn, mod frm-hd, sb blky-ang, com fis, rthy-gtty, sl slty, rthy-arg, non calc, sme bent
100% SLTY SH
drkgy-brn, mod
fis, rthy-gtty, sl
bent
8000
8000
8000





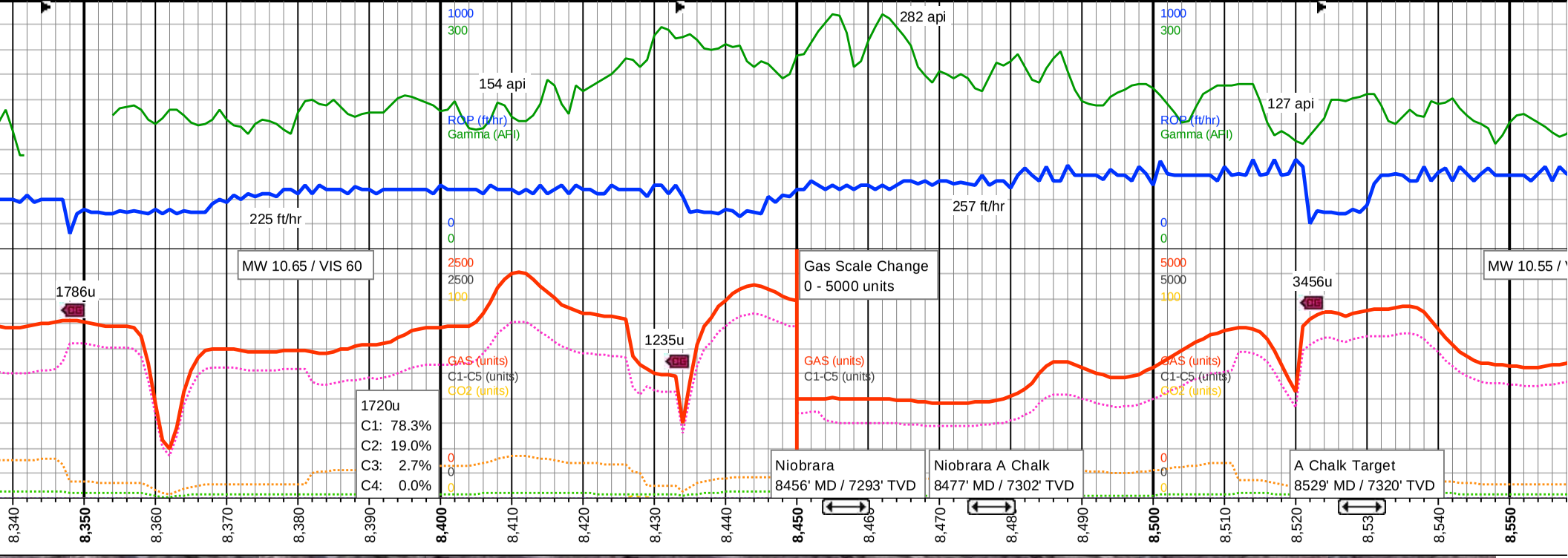
H: pred medgy, sme ltr, occ frm-hd, sb blky-ang, com slty, rthy-arg, non calc, sme

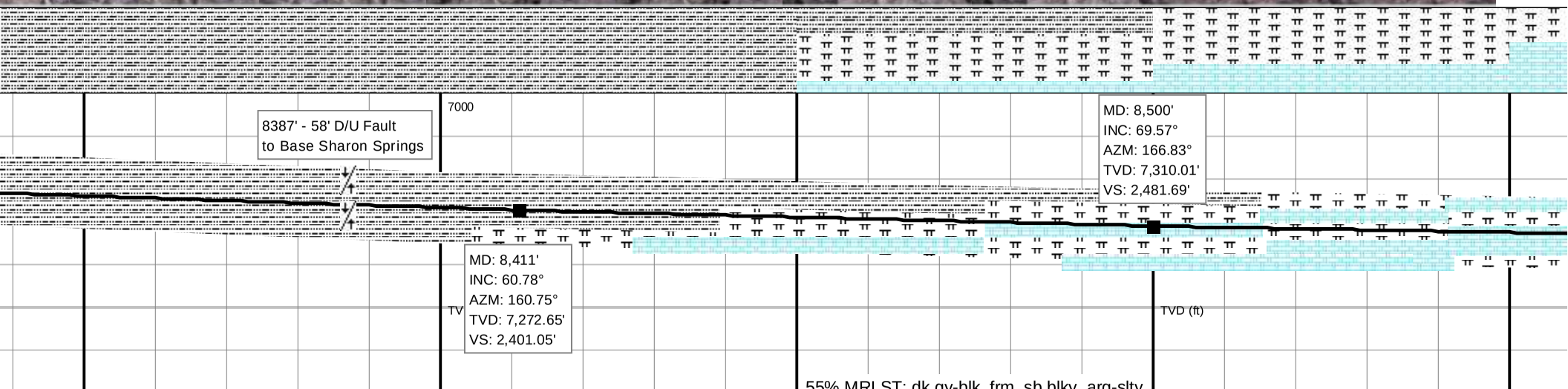
100% SLTY SH: pred medgy, sme ltr, occ drkgy-brn, mod frm-hd, sb blky-ang, com fis, rthy-gtty, sl slty, rthy-arg, non-v sl calc

100% SLTY SH: pred medgy, sme ltr, occ drkgy-brn, mod frm-hd, sb blky-ang, com fis, rthy-gtty, sl slty, rthy-arg, non-v sl calc

100% SLTY SH: pred medgy, occ drkgy-brn, mod frm-hd, sb blky-ang, com fis, rthy-gtty, sl slty, rthy-arg, non-v sl calc, rr bent

100% SLTY SH: pred medgy, occ drkgy-brn, mod frm-hd, sb blky-an fis, rthy-gtty, sl slty, rthy-arg, non-v sl tr bent





g, com
y sl calc,

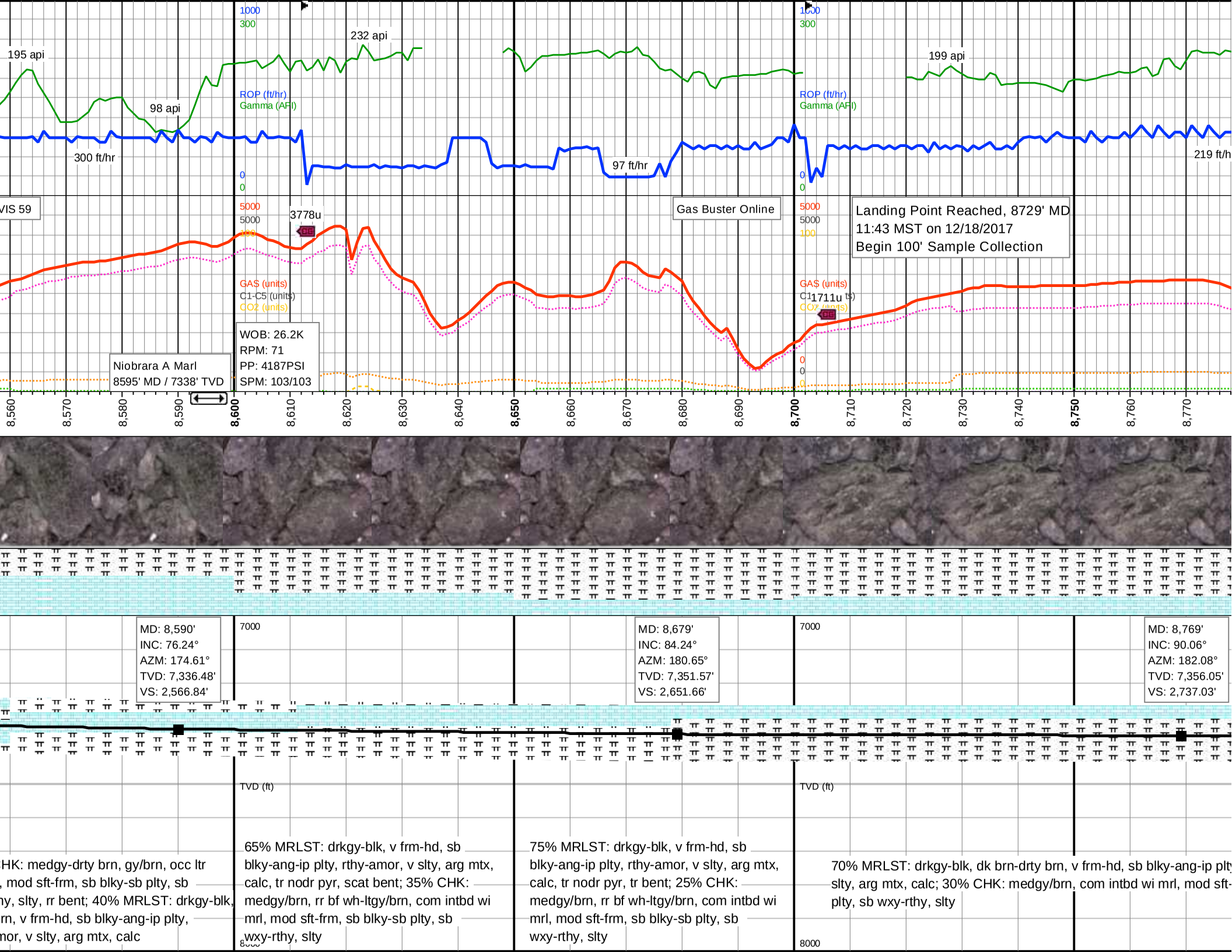
100% SLTY SH: med-drkgy, ip blk-dk brn, mod frm-hd, sb blky-ang, tr fis, rthy-gtty, sl slty, rthy-arg, non calc, abnt lrg cly bent, tr pyrc bent

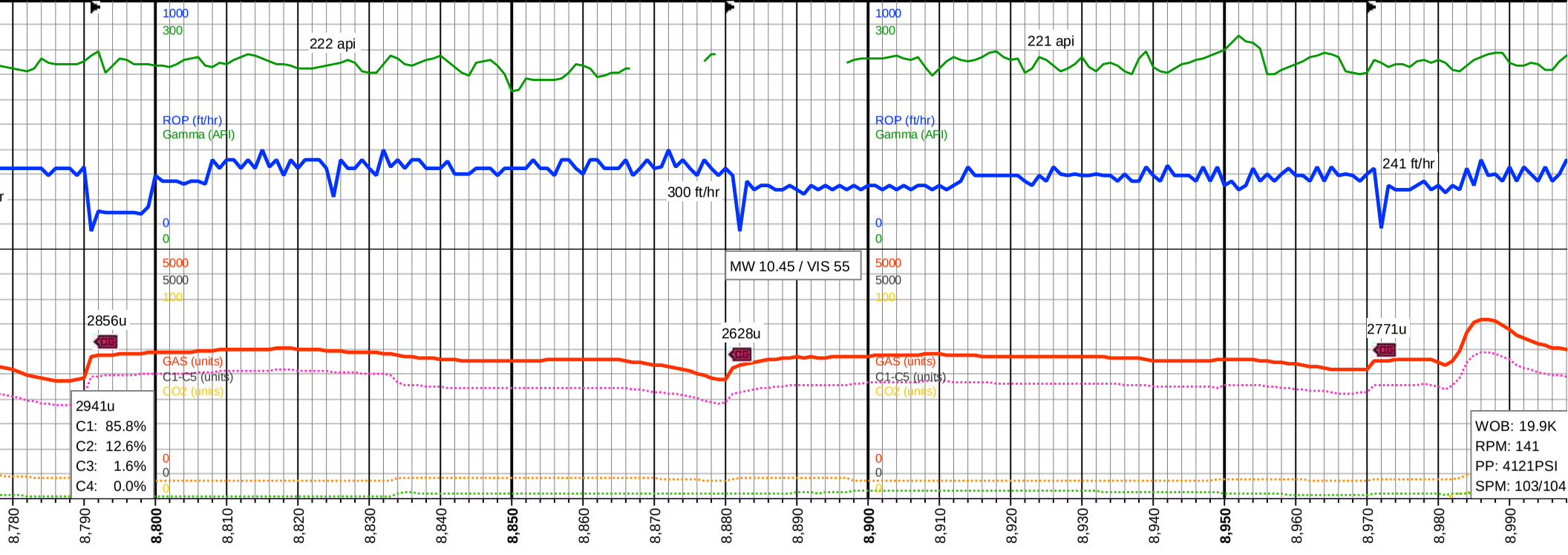
100% SLTY SH: med-drkgy, ip blk-dk brn, mod frm-hd, sb blky-ang, tr fis, rthy-gtty, sl slty, rthy-arg, non-occ calc, mod amt pyrc bent, tr cly bent

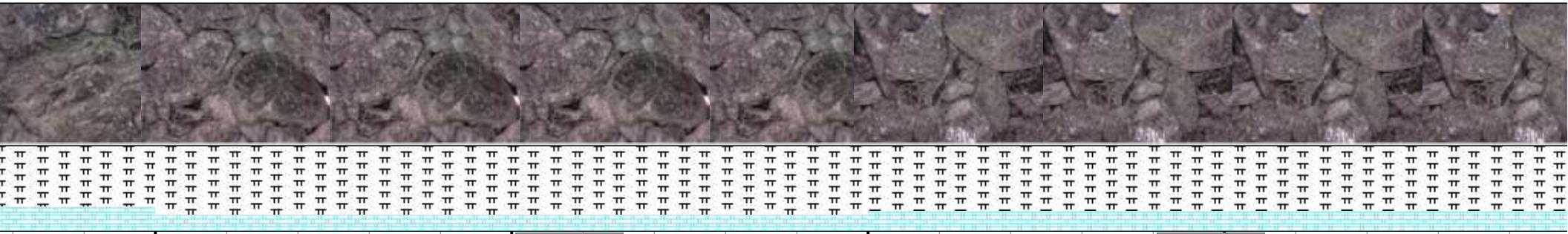
55% MRLST: dk gy-blk, frm, sb blky, arg-slty tex, v calc, scat bent, tr pyr; 30% SLTY SH: med-drkgy, ip blk-dk brn, mod frm-hd, sb blky-ang, tr fis, rthy-gtty, sl slty, rthy-arg, sl calc; 15% CHK: med gy-bri wht, pred sft, sb blky, rthy-wxy tex

65% MRLST: drkgy-ip blk, drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc, tr nodr pyr, scat bent; 35% CHK: medgy, gy/brn, ip intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

60% C
gy-brn
wxy-rth
ip dk b
rthy-ar


195 api
232 api
199 api
98 api
ROP (ft/hr)
Gamma (API)
300 ft/hr
97 ft/hr
219 ft/h
VIS 59
Gas Buster Online
3778u
Landing Point Reached, 8729' MD
11:43 MST on 12/18/2017
Begin 100' Sample Collection
GA$ (units)
C1-C5 (units)
CO2 (units)
1711u
WOB: 26.2K
RPM: 71
PP: 4187PSI
SPM: 103/103
Niobrara A Marl
8595' MD / 7338' TVD
8,560
8,570
8,580
8,590
8,600
8,610
8,620
8,630
8,640
8,650
8,660
8,670
8,680
8,690
8,700
8,710
8,720
8,730
8,740
8,750
8,760
8,770
MD: 8,590'
INC: 76.24°
AZM: 174.61°
TVD: 7,336.48'
VS: 2,566.84'
MD: 8,679'
INC: 84.24°
AZM: 180.65°
TVD: 7,351.57'
VS: 2,651.66'
MD: 8,769'
INC: 90.06°
AZM: 182.08°
TVD: 7,356.05'
VS: 2,737.03'
TVD (ft)
65% MRLST: drkgy-blk, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc, tr nodr pyr, scat bent; 35% CHK: medgy/brn, rr bf wh-ltgy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty
75% MRLST: drkgy-blk, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc, tr nodr pyr, tr bent; 25% CHK: medgy/brn, rr bf wh-ltgy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty
70% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty slty, arg mtx, calc; 30% CHK: medgy/brn, com intbd wi mrl, mod sft-plty, sb wxy-rthy, slty

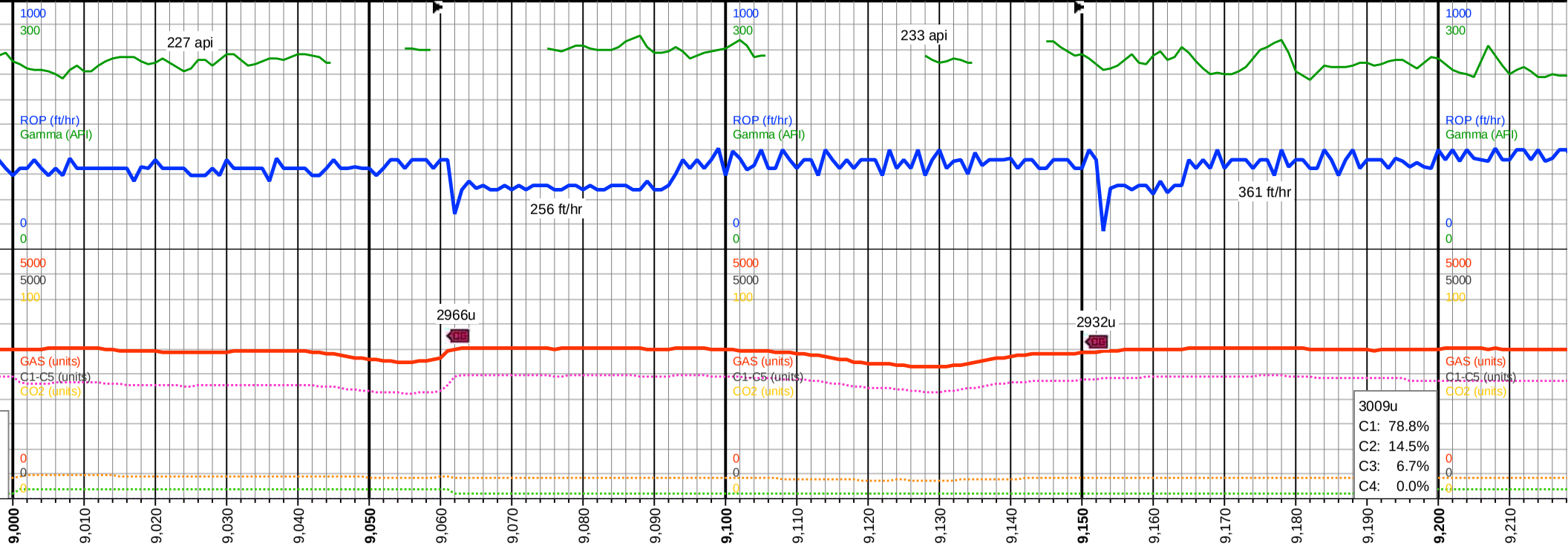


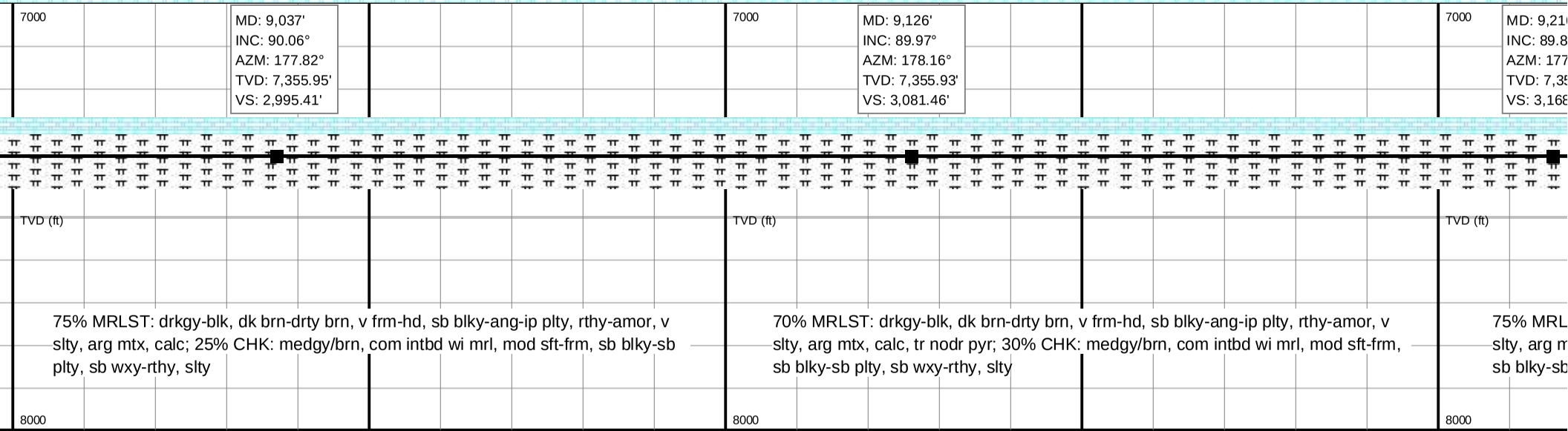


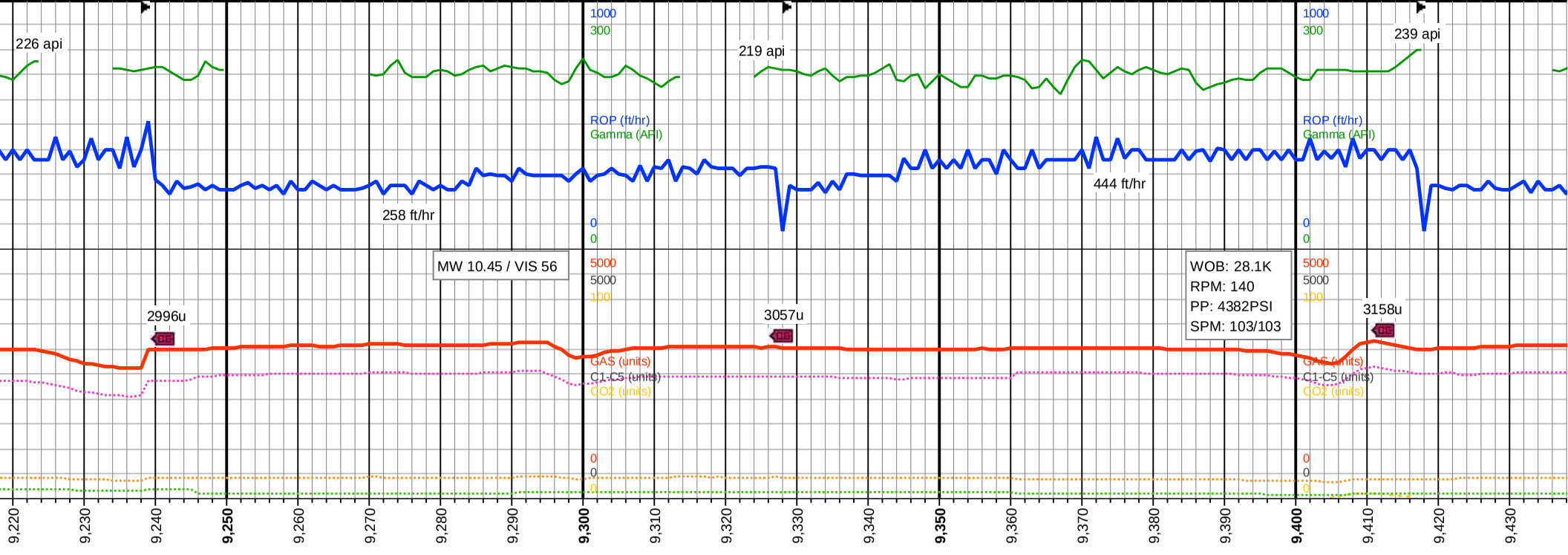
y, rthy-amor, v
-frm, sb blky-sb

80% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc; 20% CHK: medgy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

75% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc, tr cly bent; 25% CHK: medgy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty


1000
300
227 api
ROP (ft/hr)
Gamma (AFI)
0
0
256 ft/hr
5000
5000
100
2966u
GAS (units)
C1-C5 (units)
CO2 (units)
0
0
0
9,000
9,010
9,020
9,030
9,040
9,050
9,060
9,070
9,080
9,090
9,100
1000
300
233 api
ROP (ft/hr)
Gamma (AFI)
0
0
361 ft/hr
5000
5000
100
2932u
GAS (units)
C1-G5 (units)
CO2 (units)
0
0
0
3009u
C1: 78.8%
C2: 14.5%
C3: 6.7%
C4: 0.0%
9,110
9,120
9,130
9,140
9,150
9,160
9,170
9,180
9,190
9,200
9,210
1000
300
ROP (ft/hr)
Gamma (AFI)
0
0
5000
5000
100
GAS (units)
C1-C5 (units)
CO2 (units)
0
0
0


7000
MD: 9,037'
INC: 90.06°
AZM: 177.82°
TVD: 7,355.95'
VS: 2,995.41'
TVD (ft)
75% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc; 25% CHK: medgy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty
8000
7000
MD: 9,126'
INC: 89.97°
AZM: 178.16°
TVD: 7,355.93'
VS: 3,081.46'
TVD (ft)
70% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc, tr nodr pyr; 30% CHK: medgy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty
8000
7000
TVD (ft)
8000



MD: 9,305'
INC: 90.06°
AZM: 178.11°
TVD: 7,356.09'
VS: 3,254.64'

MD: 9,395'
INC: 89.85°
AZM: 177.43°
TVD: 7,356.17'
VS: 3,341.75'

TVD (ft)

TVD (ft)

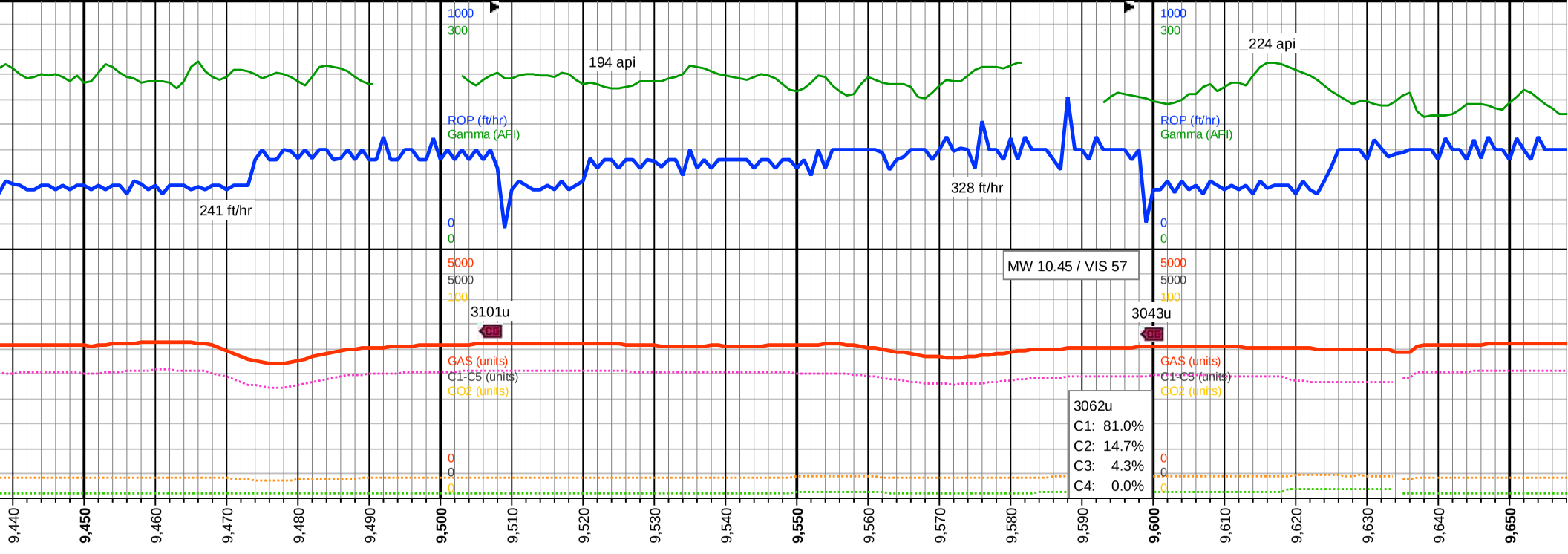
8000

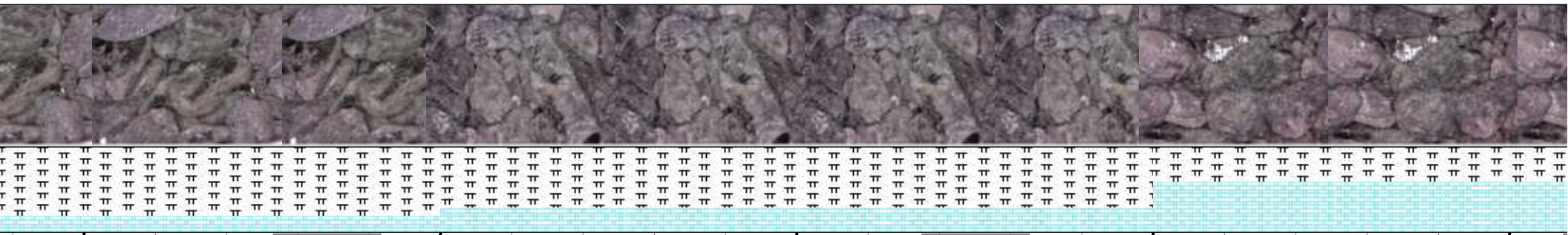
8000

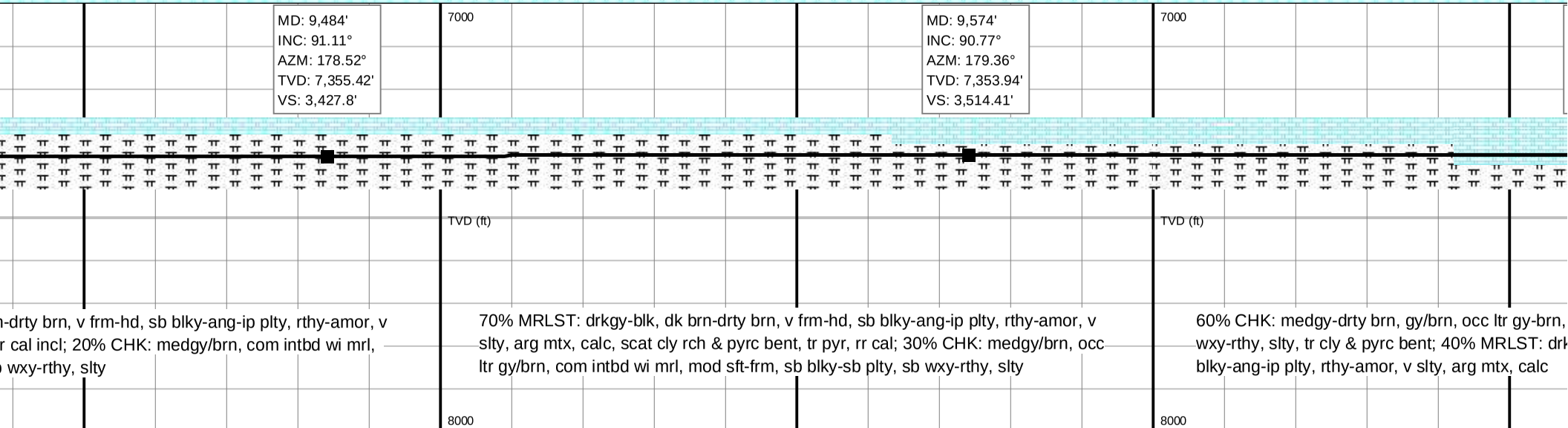
ST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v ntx, calc, tr pyr nod; 25% CHK: medgy/brn, com intbd wi mrl, mod sft-frm, plty, sb wxy-rthy, slty

80% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc, tr pyr nod, rr cal incl; 20% CHK: medgy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

80% MRLST: drkgy-blk, dk brn slty, arg mtx, calc, tr pyr nod, r mod sft-frm, sb blky-sb plty, sb



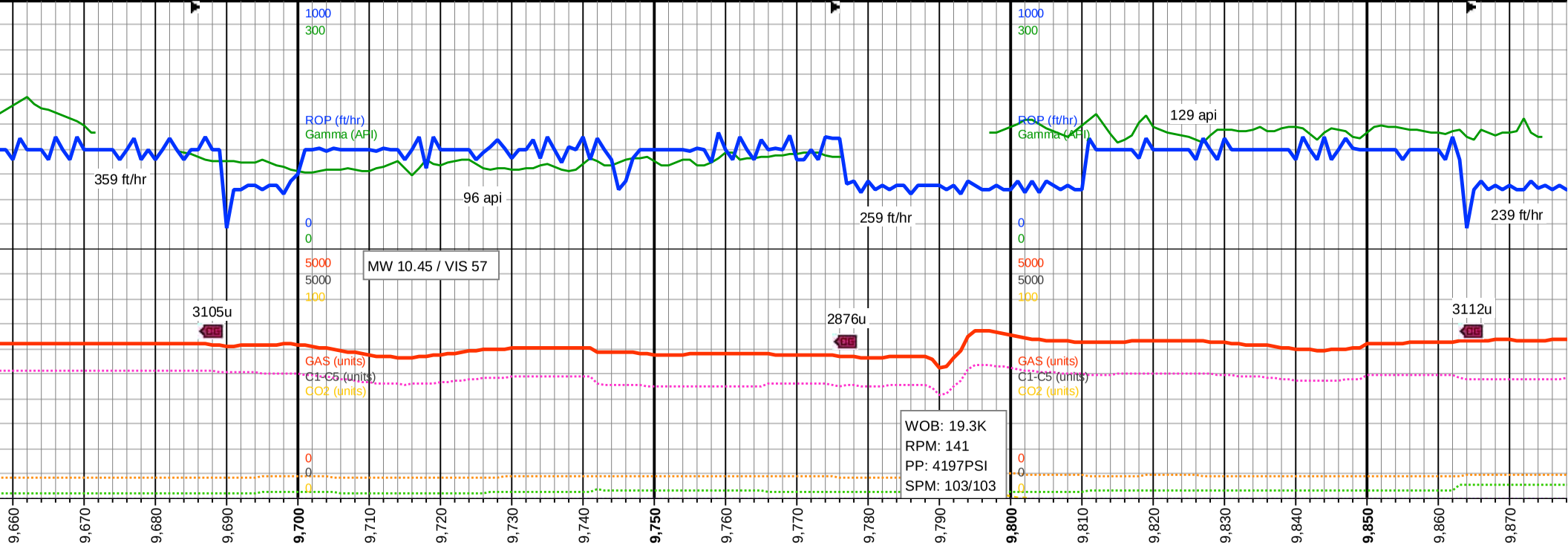


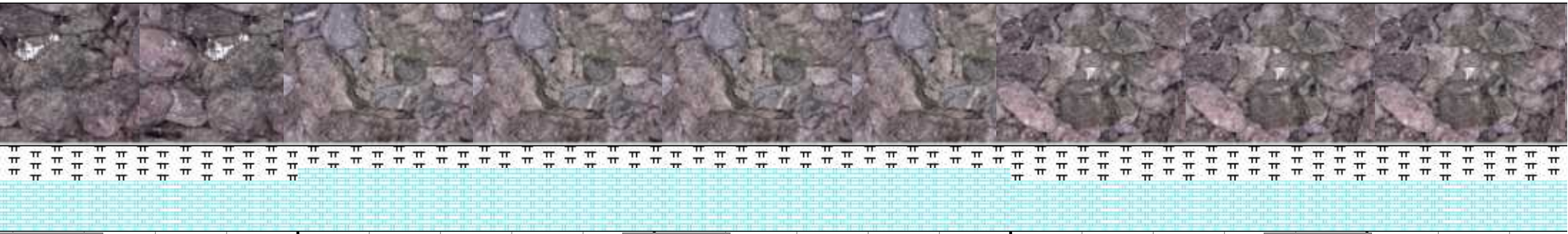


-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v
r cal incl; 20% CHK: medgy/brn, com intbd wi mrl,
wxy-rthy, slty

70% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc, scat cly rch & pyrc bent, tr pyr, rr cal; 30% CHK: medgy/brn, occ ltr gy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

60% CHK: medgy-drty brn, gy/brn, occ ltr gy-brn, wxy-rthy, slty, tr cly & pyrc bent; 40% MRLST: drk blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

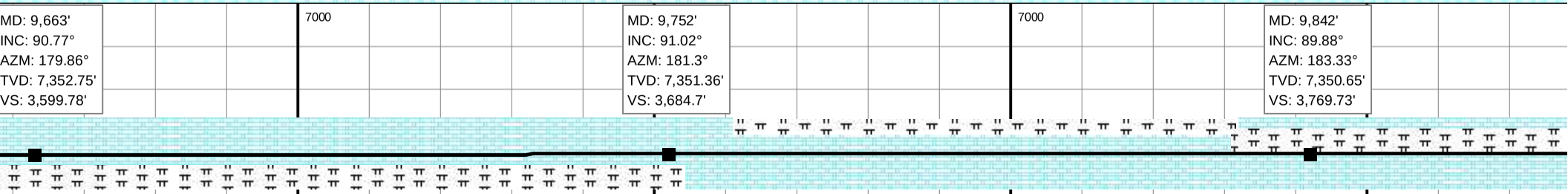




MD: 9,663'
INC: 90.77°
AZM: 179.86°
TVD: 7,352.75'
VS: 3,599.78'

MD: 9,752'
INC: 91.02°
AZM: 181.3°
TVD: 7,351.36'
VS: 3,684.7'

MD: 9,842'
INC: 89.88°
AZM: 183.33°
TVD: 7,350.65'
VS: 3,769.73'



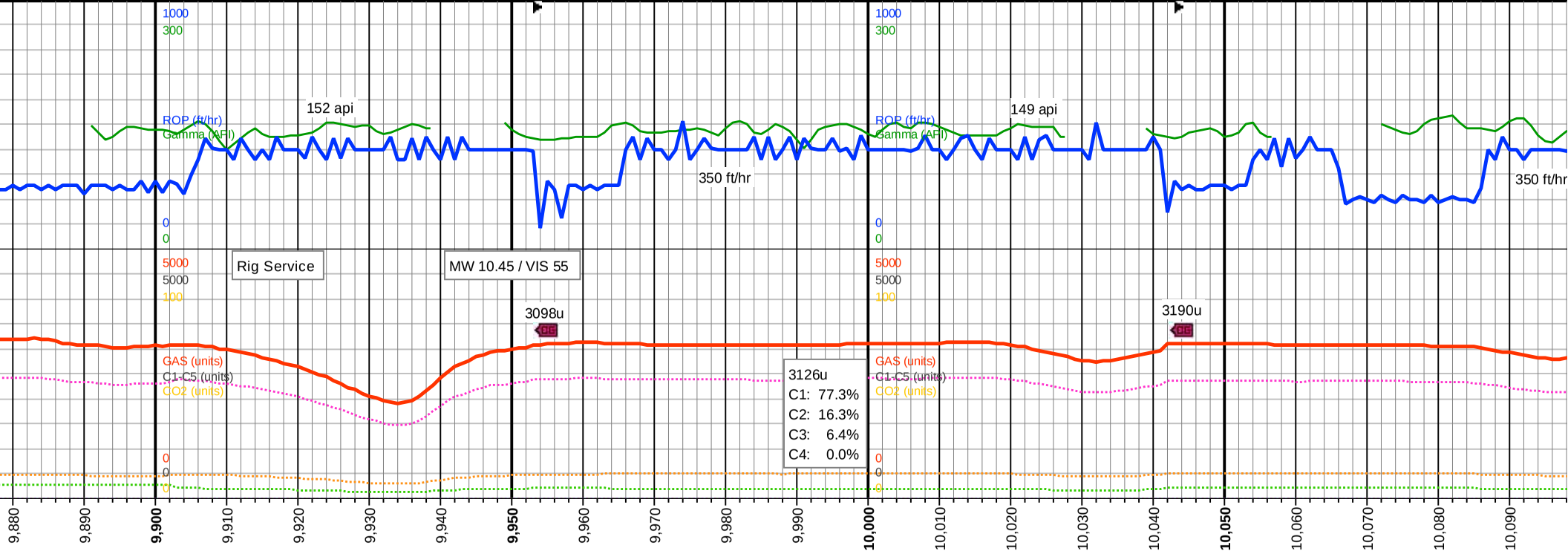
mod sft-frm, sb blky-sb plty, sb
kgy-blk, ip dk brn, v frm-hd, sb

75% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, scat pyrc bent, tr nod pyr; 25% MRLST: drkgy-blk, ip dk brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

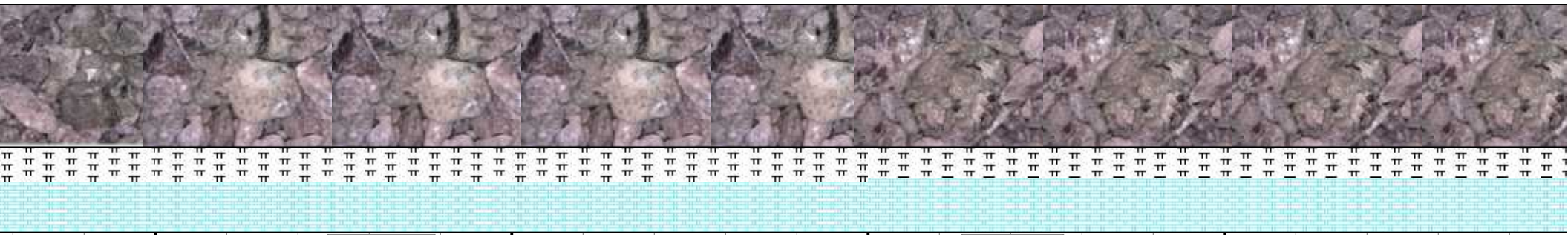
60% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb
wxy-rthy, slty, scat pyrc bent, tr nod pyr; 40% MRLST: drkgy-blk, ip d
sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

8000

8000



3126u
C1: 77.3%
C2: 16.3%
C3: 6.4%
C4: 0.0%



7000

MD: 9,931'
INC: 89.72°
AZM: 182.8°
TVD: 7,350.96'
VS: 3,853.44'

7000

MD: 10,020'
INC: 89.72°
AZM: 180.62°
TVD: 7,351.4'
VS: 3,937.83'

TVD (ft)

TVD (ft)

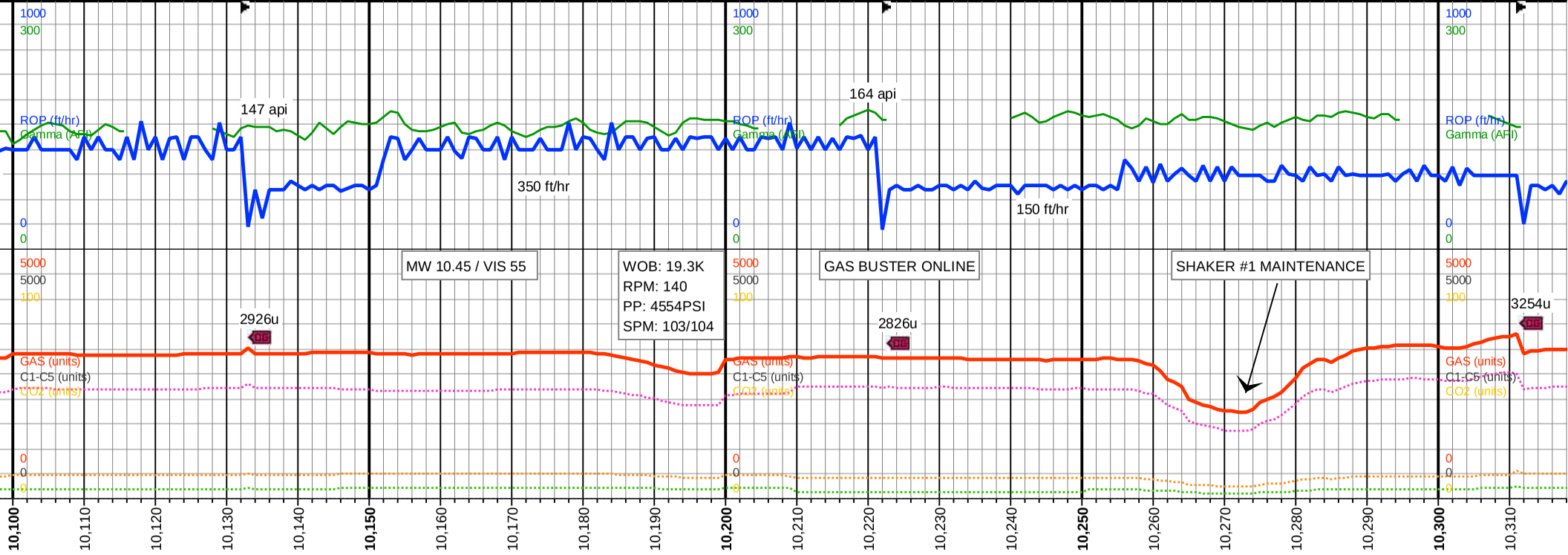
plty, sb
dk brn, v frm-hd,

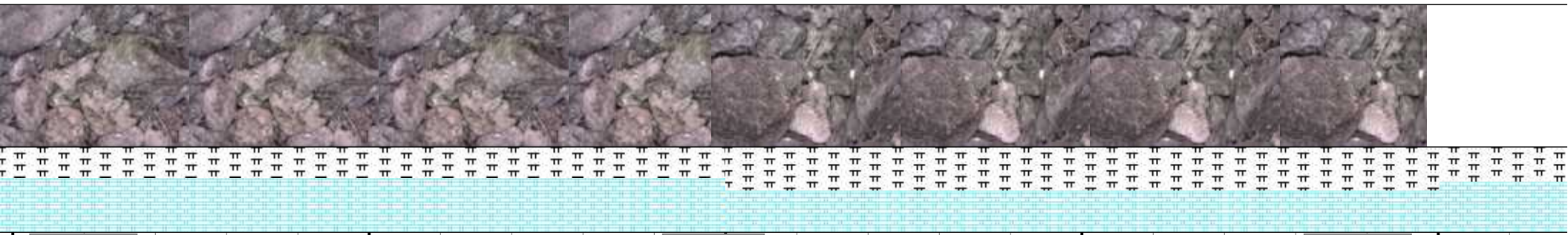
60% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, scat pyrc bent, tr nod pyr; 40% MRLST: drkgy-blk, ip dk brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

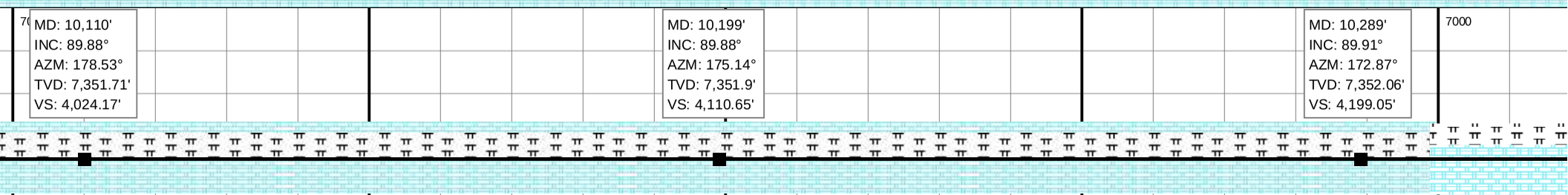
65% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, scat pyrc bent, tr nod pyr; 35% MRLST: drkgy-blk, ip dk brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

8000

8000





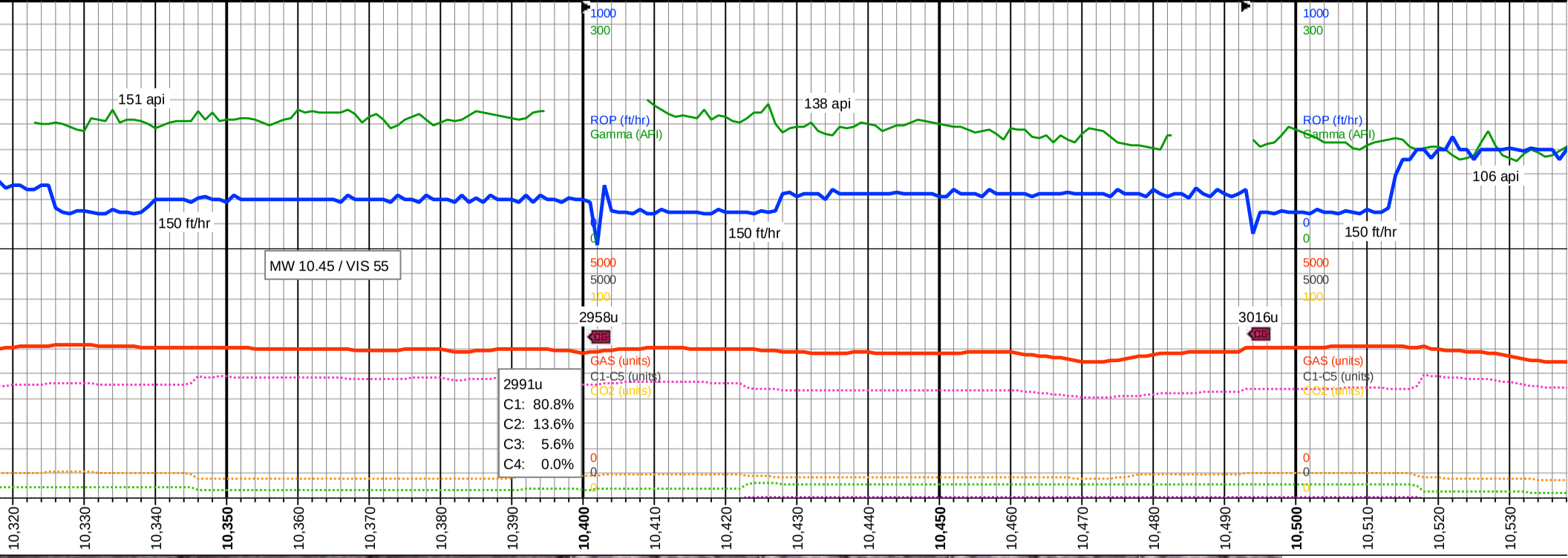


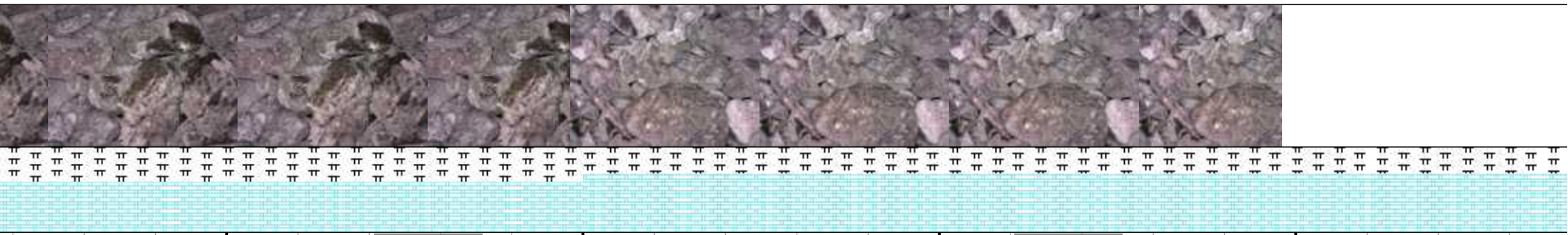
65% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, scat pyrc bent, tr nod pyr; 35% MRLST: drkgy-blk, ip dk brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

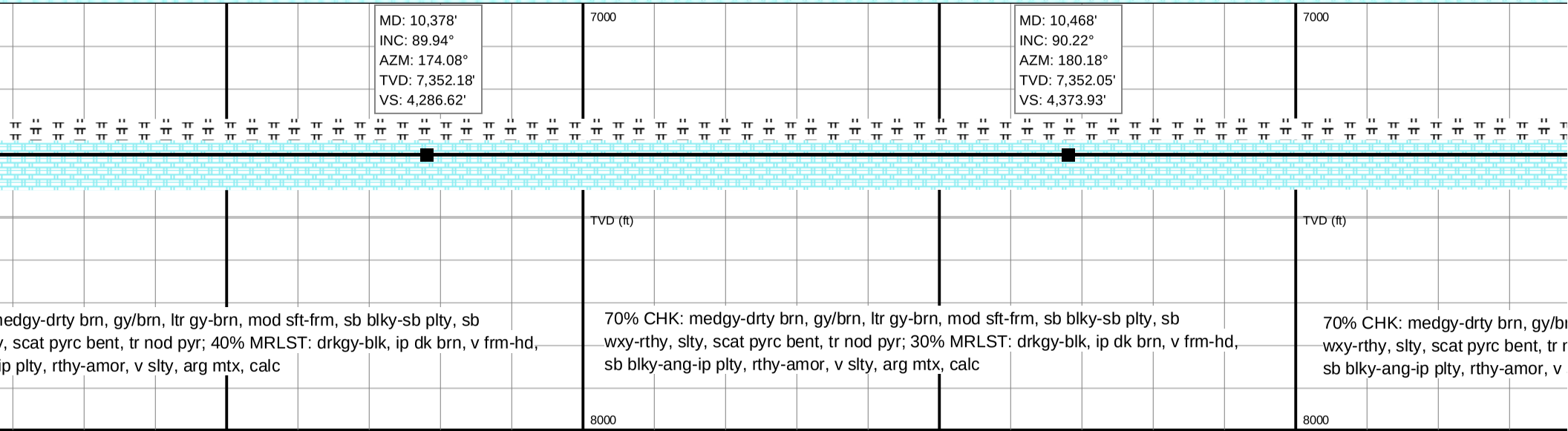
50% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, scat pyrc bent, tr nod pyr; 50% MRLST: drkgy-blk, ip dk brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

60% CHK: m
wxy-rthy, slty
sb blky-ang-

8000



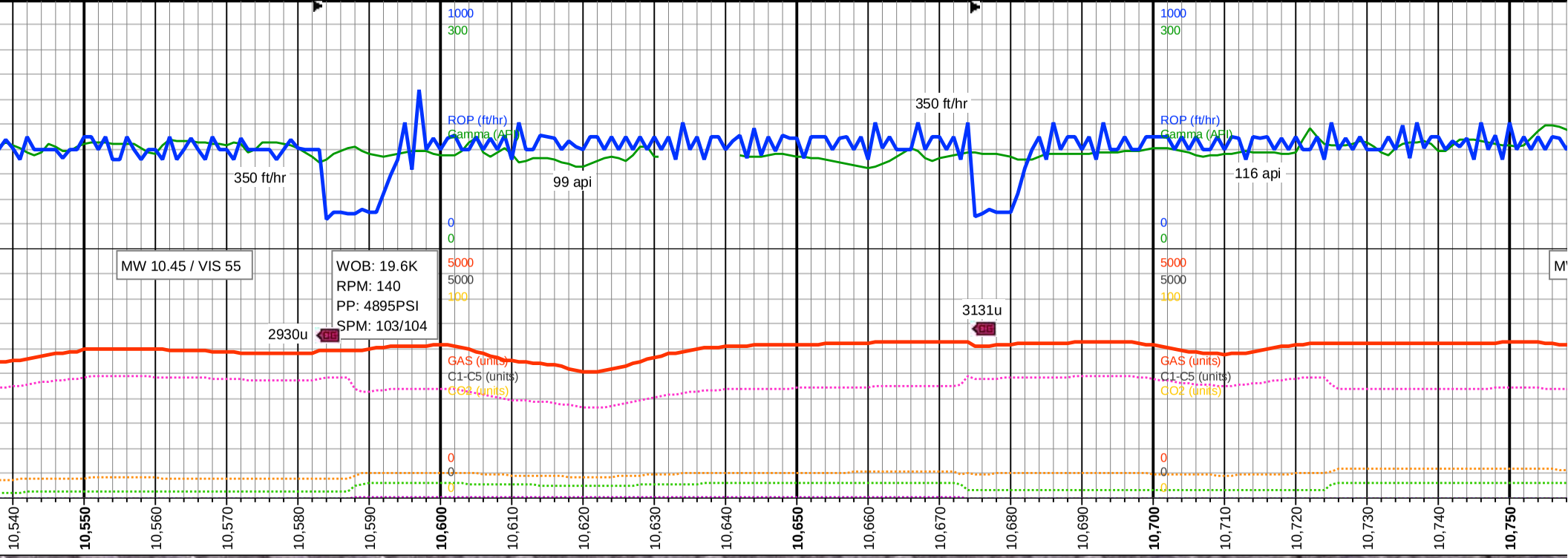


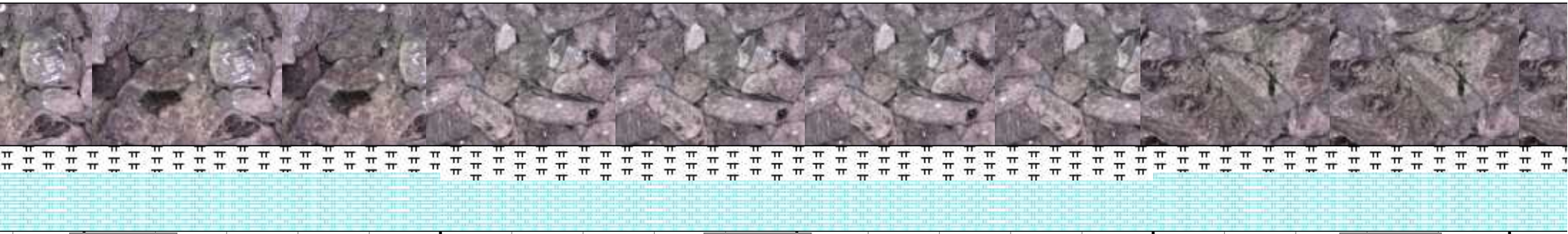


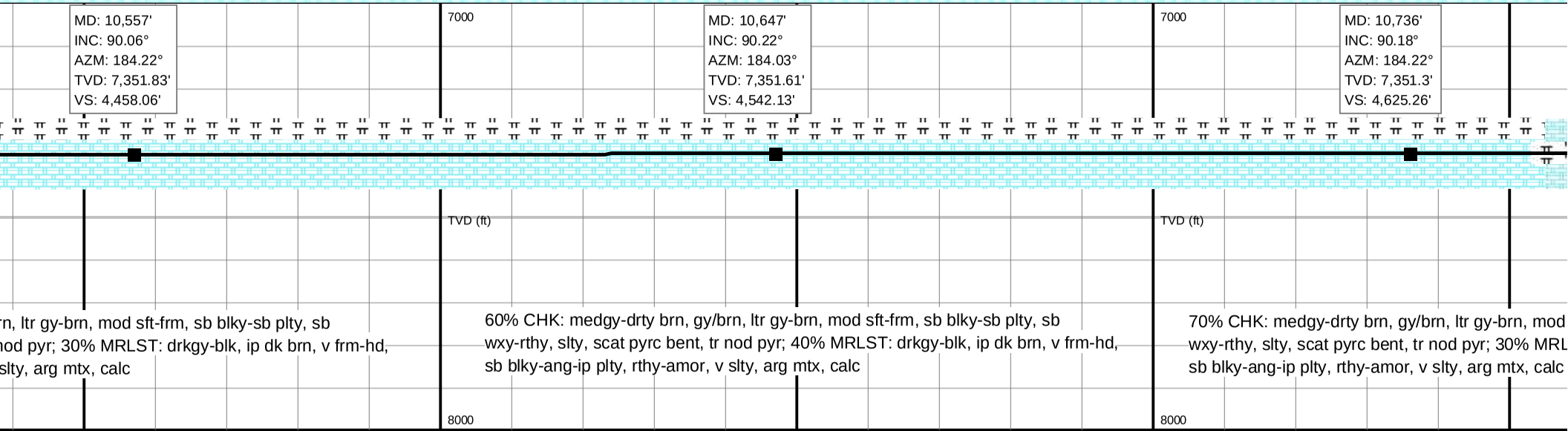
edgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb
, scat pyrc bent, tr nod pyr; 40% MRLST: drkgy-blk, ip dk brn, v frm-hd,
ip plty, rthy-amor, v slty, arg mtx, calc

70% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb
wxy-rthy, slty, scat pyrc bent, tr nod pyr; 30% MRLST: drkgy-blk, ip dk brn, v frm-hd,
sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

70% CHK: medgy-drty brn, gy/br
wxy-rthy, slty, scat pyrc bent, tr
sb blky-ang-ip plty, rthy-amor, v



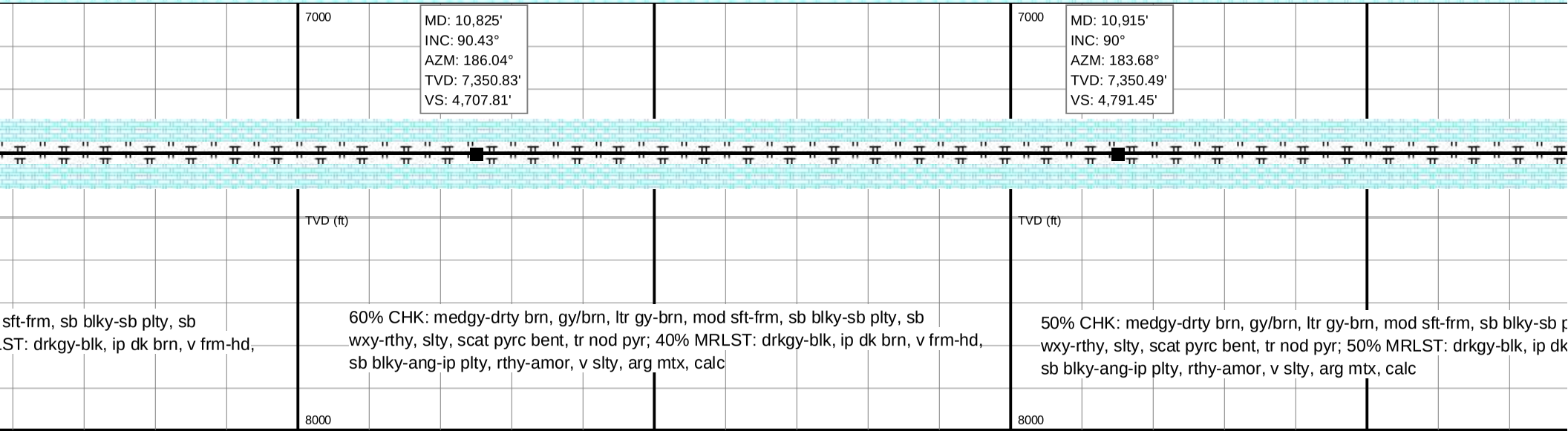




rn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb
nod pyr; 30% MRLST: drkgy-blk, ip dk brn, v frm-hd,
slty, arg mtx, calc

60% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, scat pyrc bent, tr nod pyr; 40% MRLST: drkgy-blk, ip dk brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

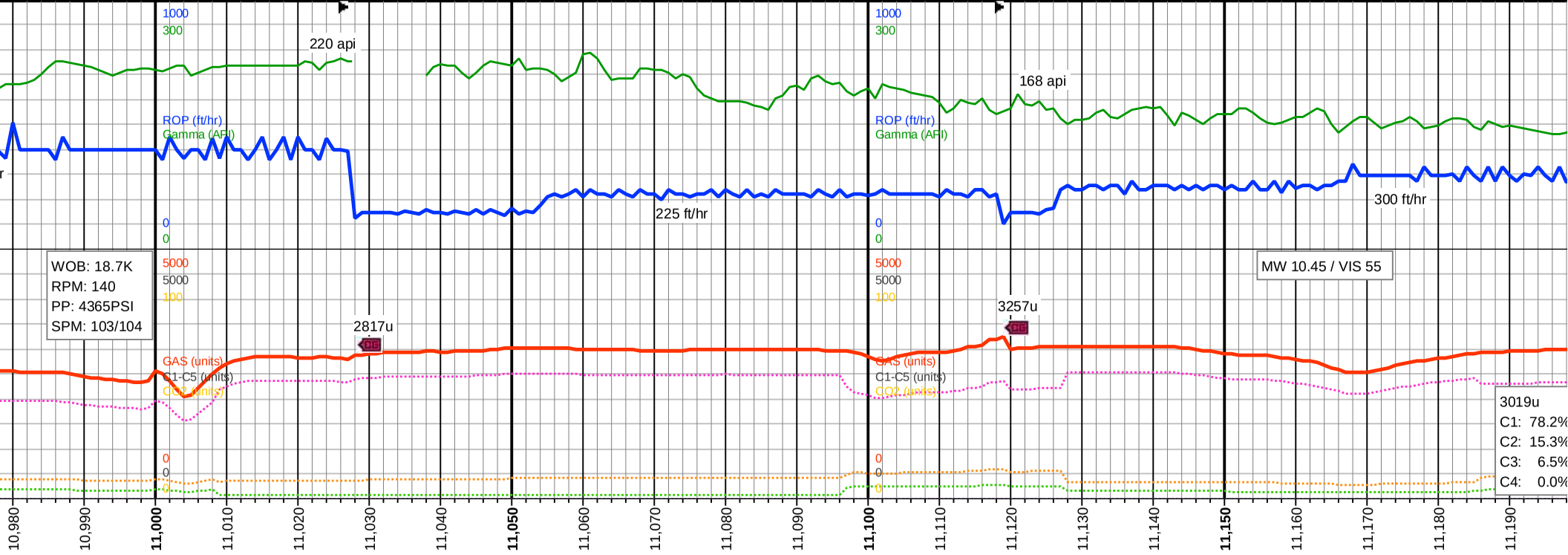
70% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod
wxy-rthy, slty, scat pyrc bent, tr nod pyr; 30% MRL
sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

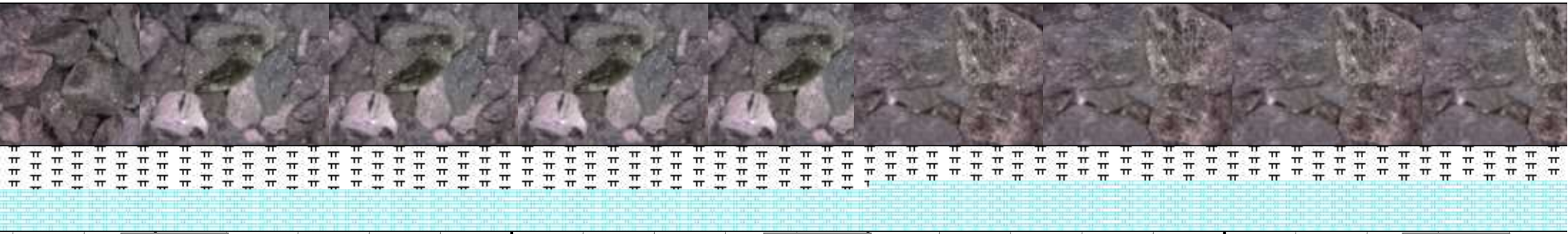


sft-frm, sb blky-sb plty, sb
LST: drkgy-blk, ip dk brn, v frm-hd,

60% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, scat pyrc bent, tr nod pyr; 40% MRLST: drkgy-blk, ip dk brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

50% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb p
wxy-rthy, slty, scat pyrc bent, tr nod pyr; 50% MRLST: drkgy-blk, ip dk
sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc





MD: 11,004'
INC: 89.91°
AZM: 176.42°
TVD: 7,350.56'
VS: 4,876.57'

MD: 11,094'
INC: 90.12°
AZM: 175.86°
TVD: 7,350.54'
VS: 4,964.29'

MD: 11,183'
INC: 89.94°
AZM: 180.14°
TVD: 7,350.49'
VS: 5,050.31'

7000

TVD (ft)

TVD (ft)

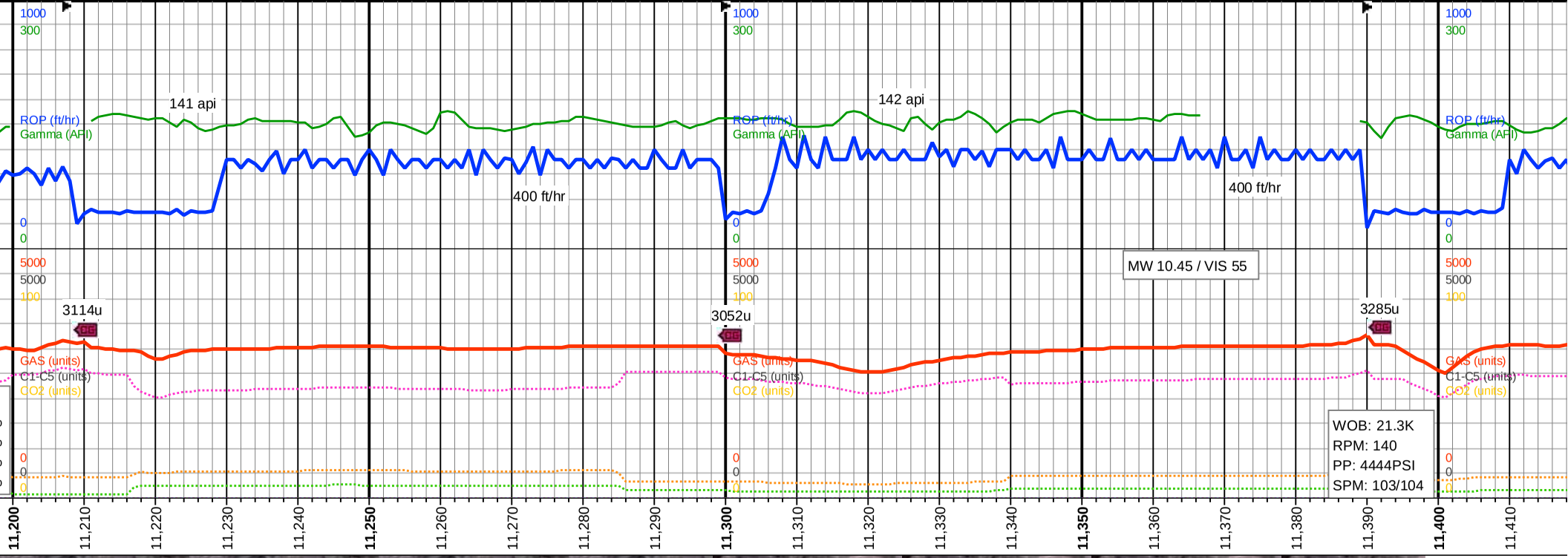
lty, sb
brn, v frm-hd,

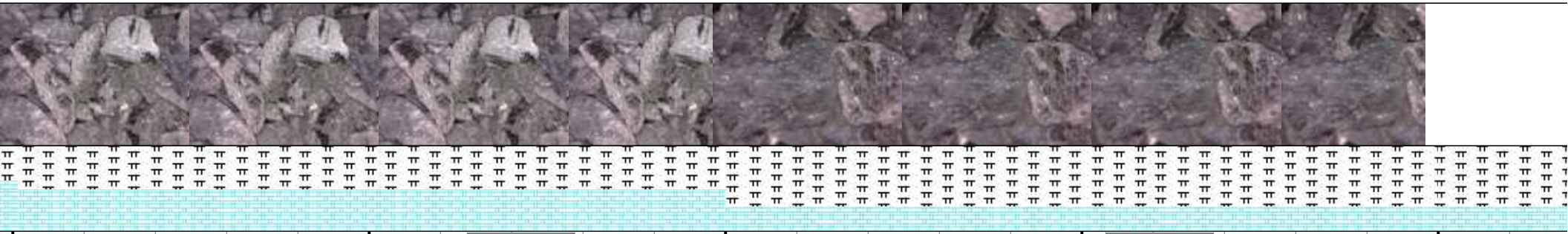
50% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, scat pyrc bent, tr nod pyr; 50% MRLST: drkgy-blk, ip dk brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

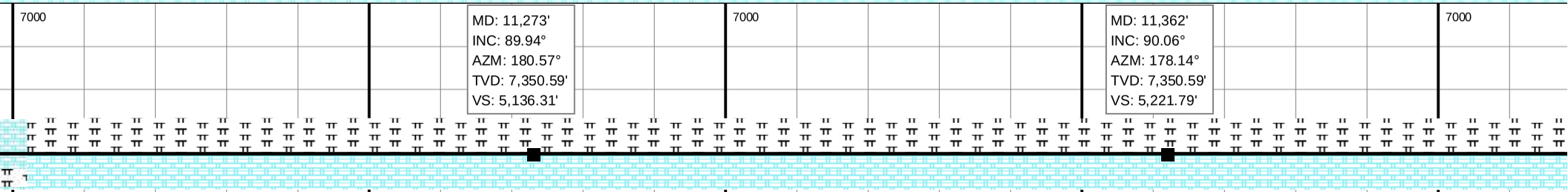
60% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, scat pyrc bent, tr nod pyr; 40% MRLST: drkgy-blk, ip dk brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

8000

8000



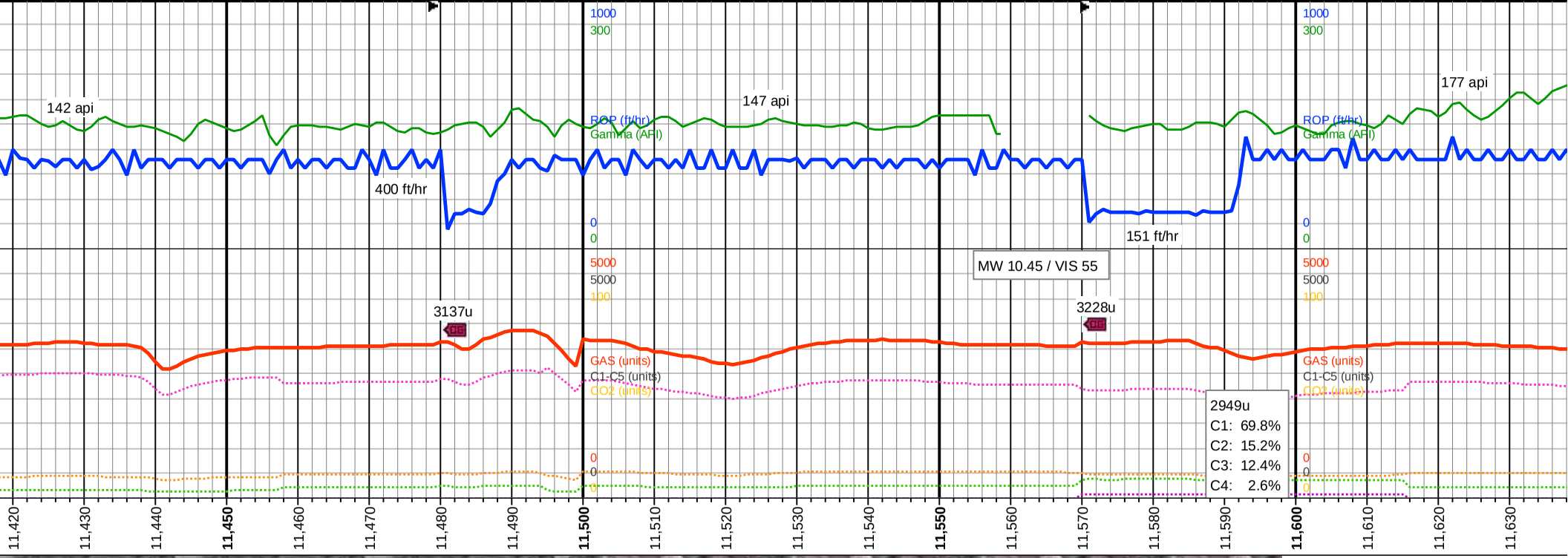


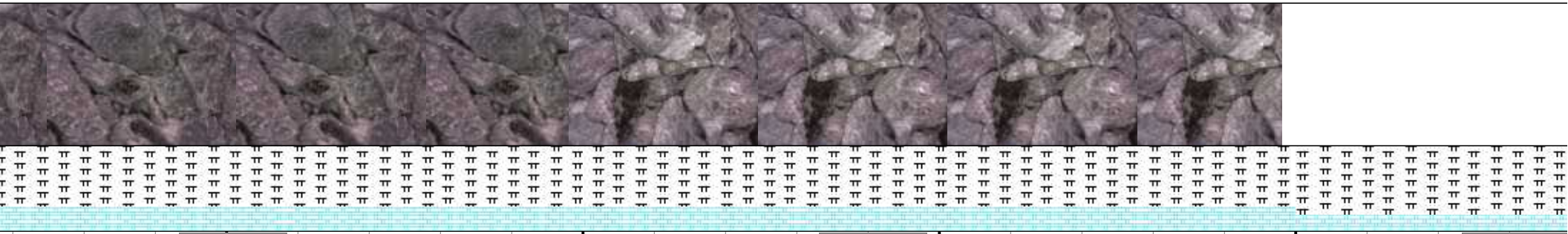


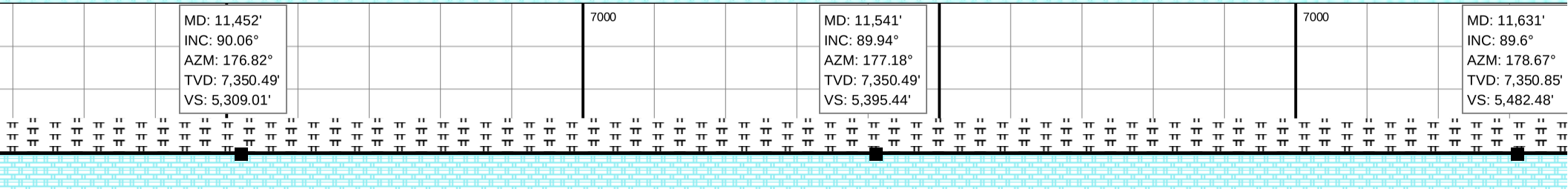
50% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, scat pyrc bent, tr nod pyr; 50% MRLST: drkgy-blk, ip dk brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

70% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc, scat cly rch & pyrc bent, tr pyr, rr cal; 30% CHK: medgy/brn, occ ltr gy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

70% MRLST:
slty, arg mtx,
ltr gy/brn, com



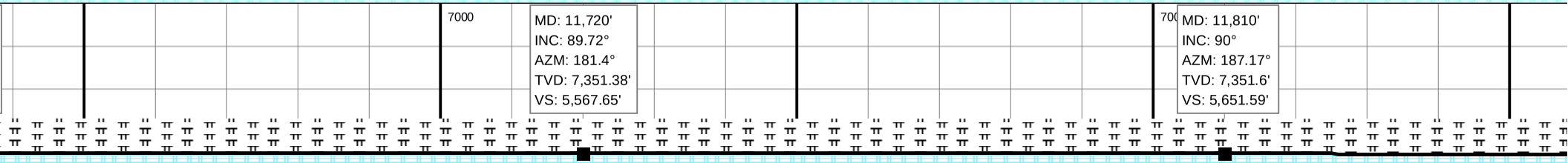




drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v
calc, scat cly rch & pyrc bent, tr pyr, rr cal; 30% CHK: medgy/brn, occ
n intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

70% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v
slty, arg mtx, calc, scat cly rch & pyrc bent, tr pyr, rr cal; 30% CHK: medgy/brn, occ
ltr gy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

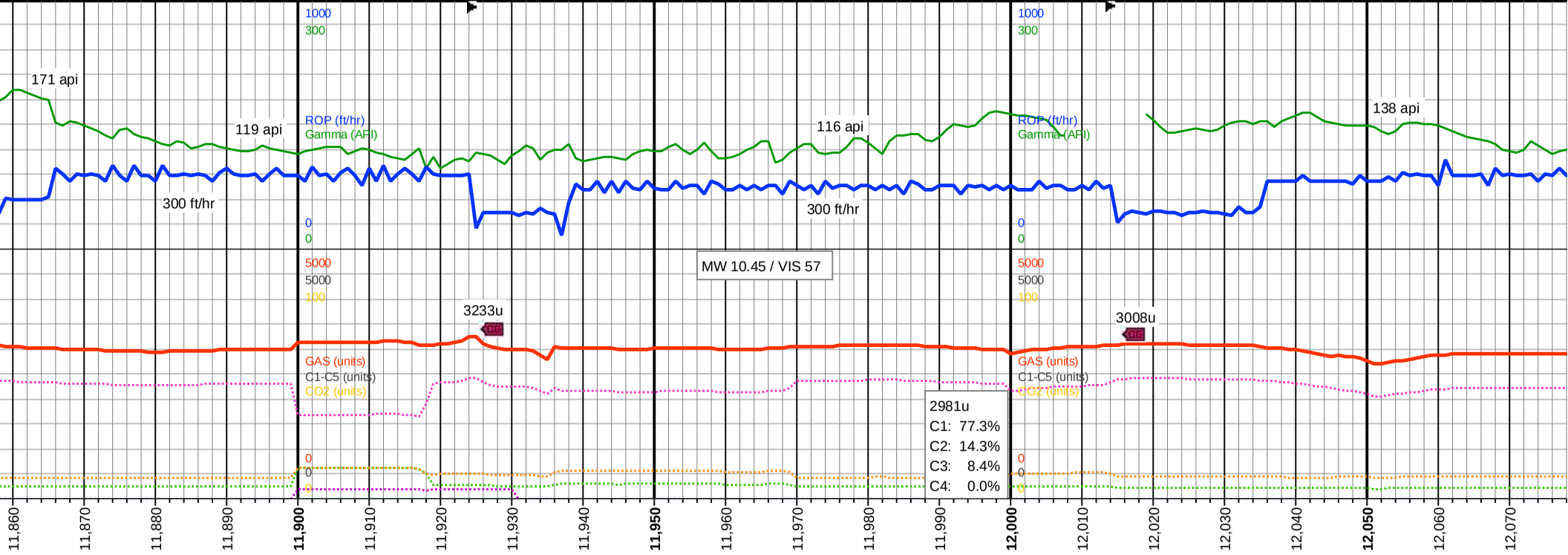
80% MRLST: drkgy-blk, dk brn-d
slty, arg mtx, calc, scat cly rch &
ltr gy/brn, com intbd wi mrl, mod

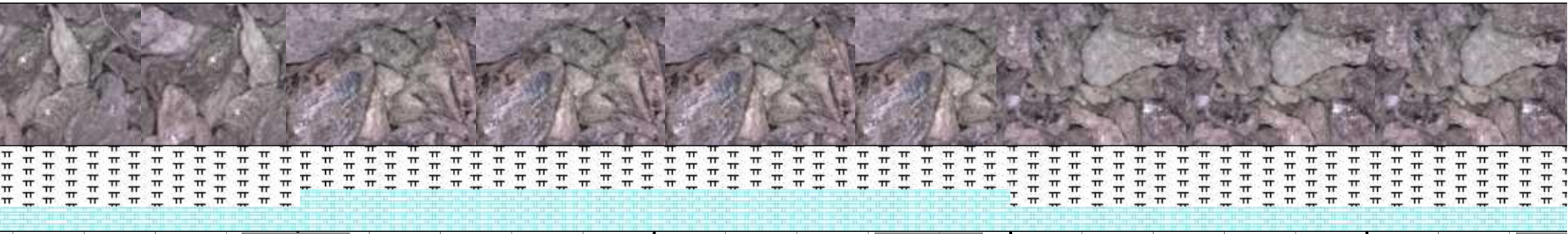


rty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v pyrc bent, tr pyr, rr cal; 20% CHK: medgy/brn, occ sft-frm, sb blky-sb plty, sb wxy-rthy, slty

80% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc, scat cly rch & pyrc bent, tr pyr, rr cal; 20% CHK: medgy/brn, occ ltr gy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

70% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb slty, arg mtx, calc, scat cly rch & pyrc bent, tr pyr, rr ltr gy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb p





MD: 11,899'
INC: 89.51°
AZM: 187.49°
TVD: 7,351.98'
VS: 5,732.81'

MD: 11,988'
INC: 89.45°
AZM: 183.36°
TVD: 7,352.79'
VS: 5,815.18'

MD: 12
INC: 89
AZM: 1
TVD: 7
VS: 5,9

7000

TVD (ft)

TVD (ft)

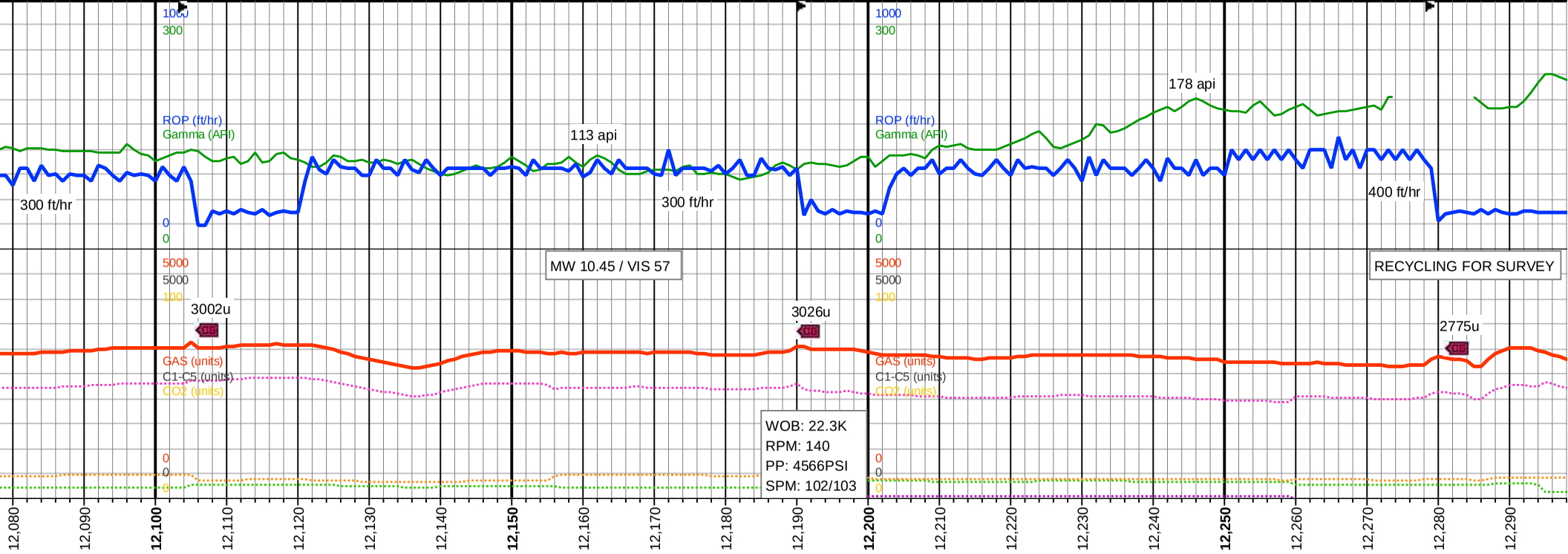
b blky-ang-ip plty, rthy-amor, v
cal; 30% CHK: medgy/brn, occ
lty, sb wxy-rthy, slty

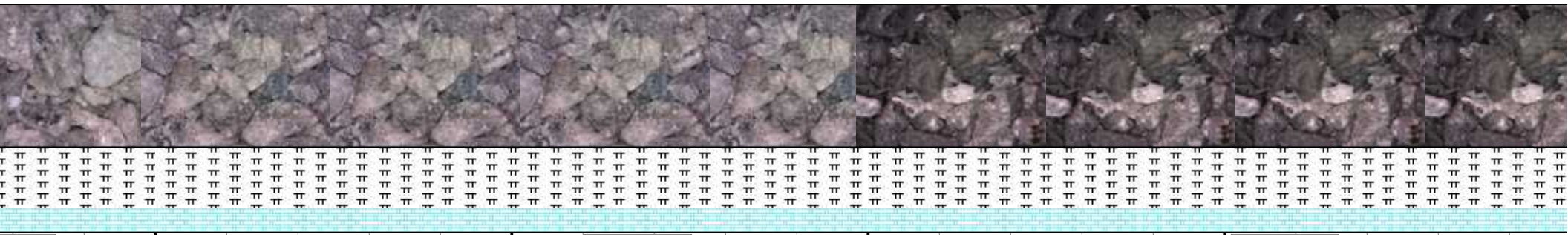
50% CHK: medgy-drty brn, gy/brn, ltr gy-brn, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, scat pyrc bent, tr nod pyr; 50% MRLST: drkgy-blk, ip dk brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc

70% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rt
slty, arg mtx, calc, scat cly rch & pyrc bent, tr pyr, rr cal; 30% CHK: me
ltr gy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slt

8000

8000





,078'
.32°
79.52°
,353.76'
00.64'

7000

MD: 12,167'
INC: 89.42°
AZM: 179.22°
TVD: 7,354.74'
VS: 5,986.11'

7000

MD: 12,257'
INC: 89.38°
AZM: 178.6°
TVD: 7,355.68'
VS: 6,072.74'

TVD (ft)

TVD (ft)

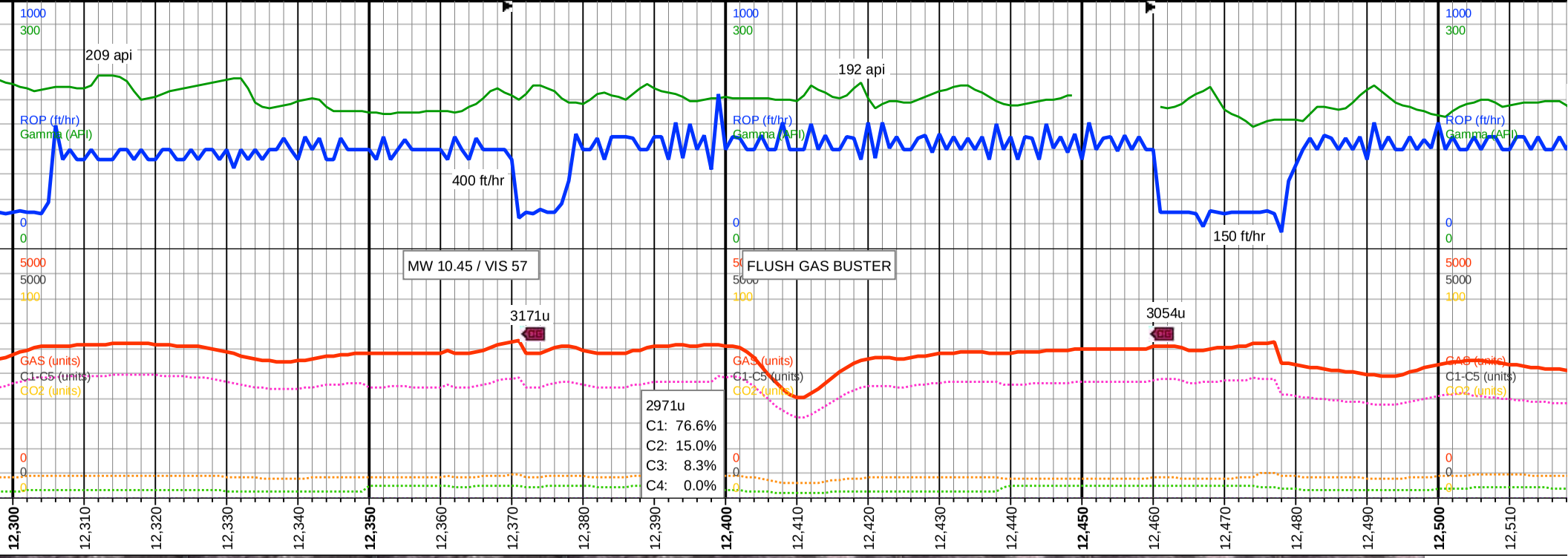
hy-amor, v
dgy/brn, occ
y, tr bent

70% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc, scat cly rch & pyrc bent, tr pyr, rr cal; 30% CHK: medgy/brn, occ ltr gy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, tr bent

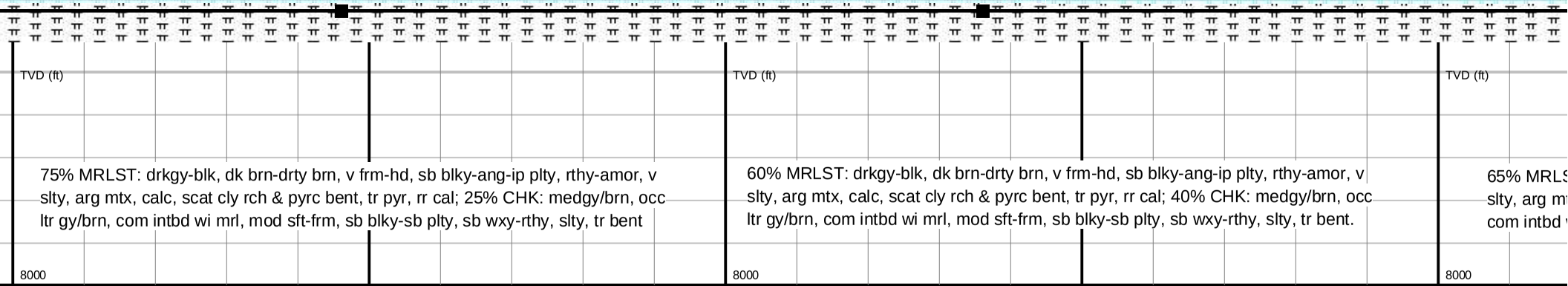
70% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc, scat cly rch & pyrc bent, tr pyr, rr cal; 30% CHK: medgy/brn, occ ltr gy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, tr bent

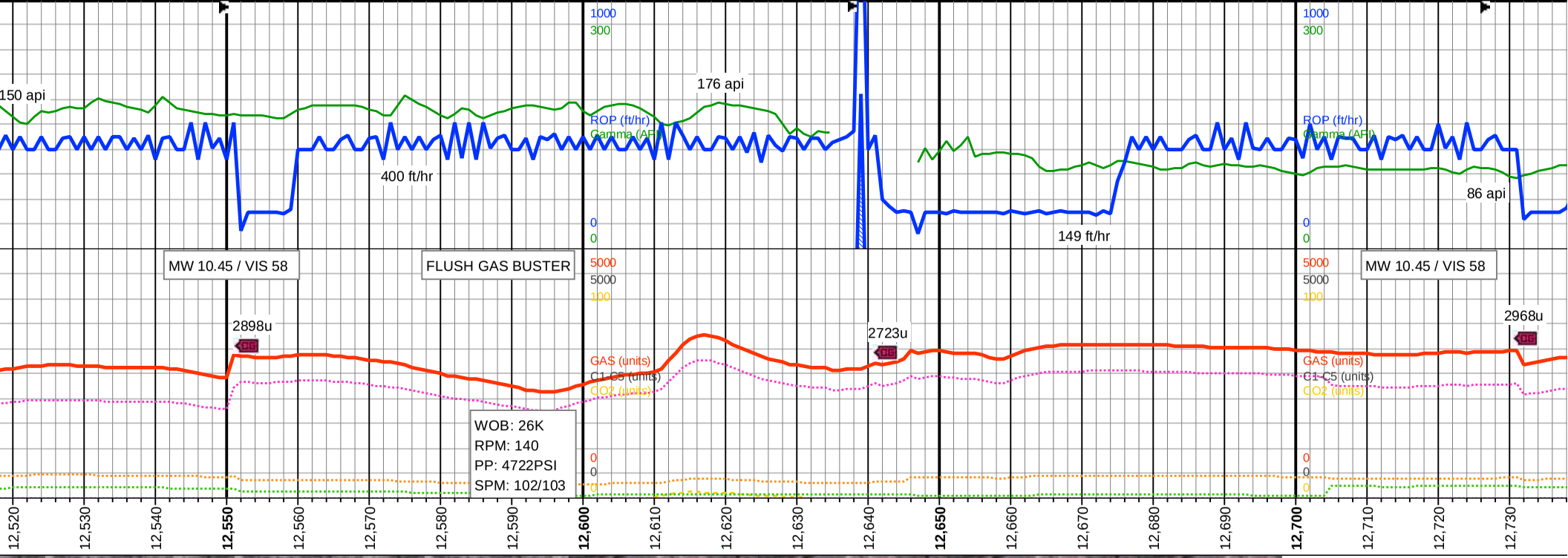
8000

8000


1000
300
209 api
ROP (ft/hr)
Gamma (API)
0
0
400 ft/hr
MW 10.45 / VIS 57
5000
5000
100
3171u
GAS (units)
C1-C5 (units)
CO2 (units)
0
0
0
2971u
C1: 76.6%
C2: 15.0%
C3: 8.3%
C4: 0.0%
12,300
12,310
12,320
12,330
12,340
12,350
12,360
12,370
12,380
12,390
12,400
1000
300
192 api
ROP (ft/hr)
Gamma (API)
0
0
FLUSH GAS BUSTER
5000
100
3054u
GAS (units)
C1-C5 (units)
CO2 (units)
0
0
0
12,410
12,420
12,430
12,440
12,450
12,460
12,470
12,480
12,490
12,500
12,510
1000
300
150 ft/hr
ROP (ft/hr)
Gamma (API)
0
0
5000
5000
100
GAS (units)
C1-C5 (units)
CO2 (units)
0
0
0


7000
MD: 12,346'
INC: 89.97°
AZM: 178.23°
TVD: 7,356.18'
VS: 6,158.62'
7000
MD: 12,436'
INC: 90.15°
AZM: 182.51°
TVD: 7,356.09'
VS: 6,244.59'
7000


TVD (ft)
75% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc, scat cly rch & pyrc bent, tr pyr, rr cal; 25% CHK: medgy/brn, occ ltr gy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, tr bent
8000
TVD (ft)
60% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v slty, arg mtx, calc, scat cly rch & pyrc bent, tr pyr, rr cal; 40% CHK: medgy/brn, occ ltr gy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, tr bent.
8000
TVD (ft)
65% MRLS
slty, arg m
com intbd
8000



MD: 12,525'
INC: 90.09°
AZM: 182.26°
TVD: 7,355.9'
VS: 6,328.65'

7000

MD: 12,614'
INC: 90.03°
AZM: 176.2°
TVD: 7,355.81'
VS: 6,414.15'

MD: 12,704'
INC: 90°
AZM: 176.61°
TVD: 7,355.78'
VS: 6,501.77'

TVD (ft)

TVD (ft)

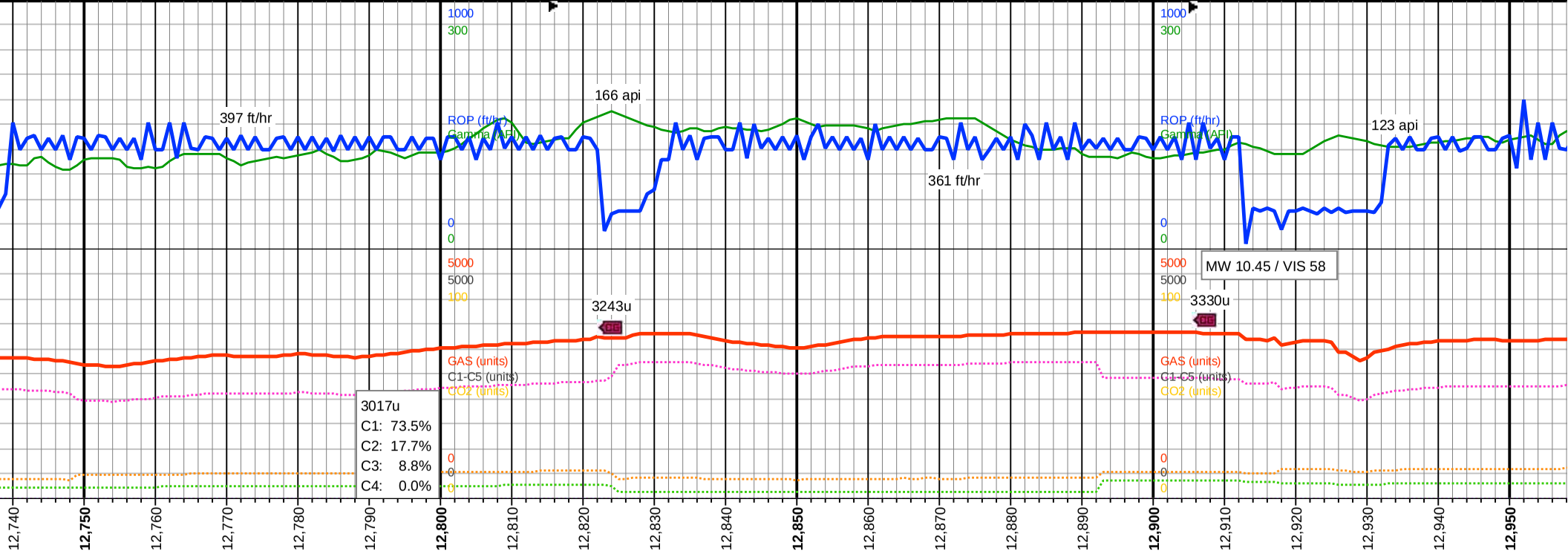
ST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor, v tx, calc, scat pyrc bent, rr Inoc frags; 35% CHK: medgy/brn, rr ltr gy/brn, wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

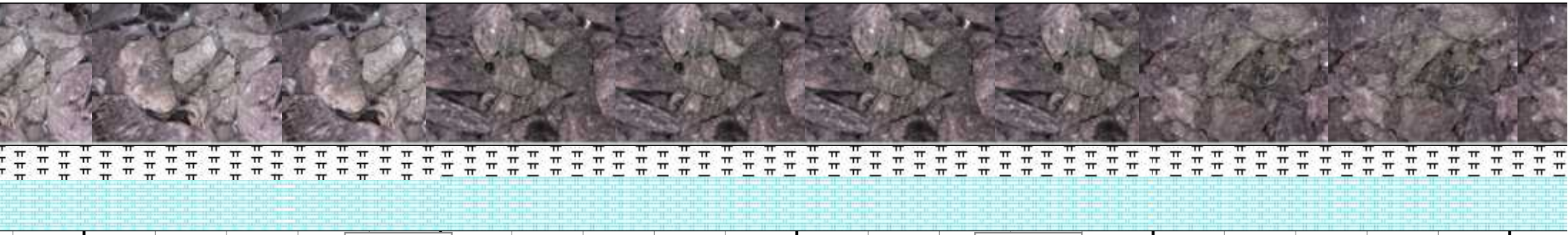
55% CHK: medgy/brn, sme ltr gy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, tr pyr bent, rr cal/Inoc frags; 45% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor-grty, v slty, arg mtx, calc

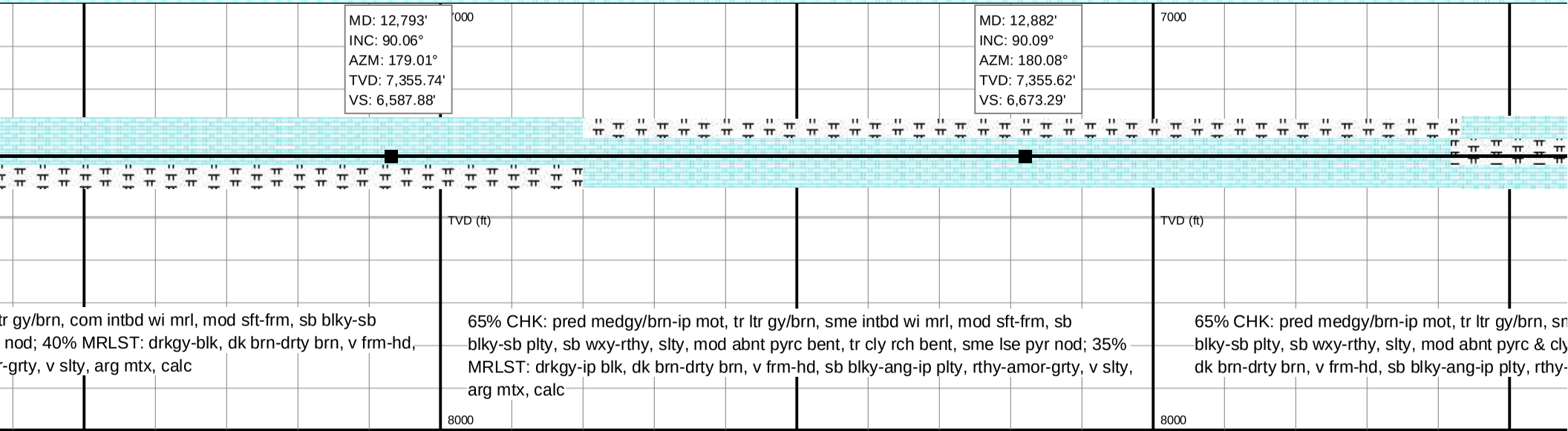
60% CHK: medgy/brn, sme l
plty, sb wxy-rthy, slty, lse pyr
sb blky-ang-ip plty, rthy-amor

8000

8000



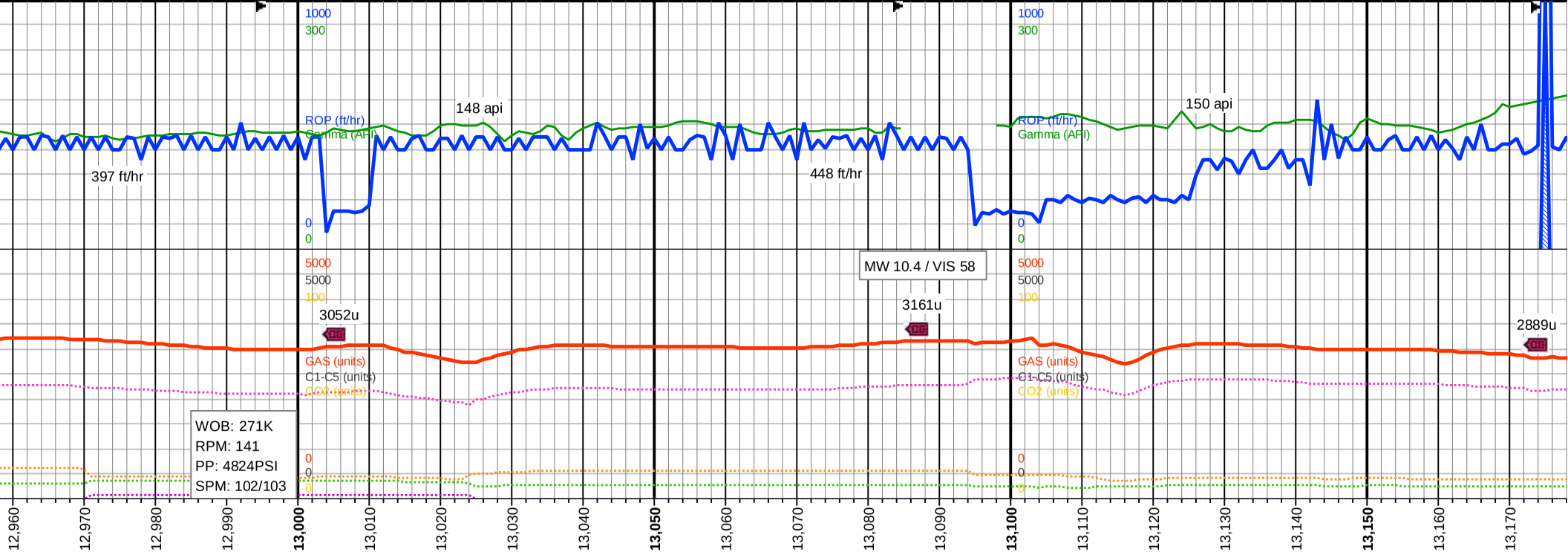


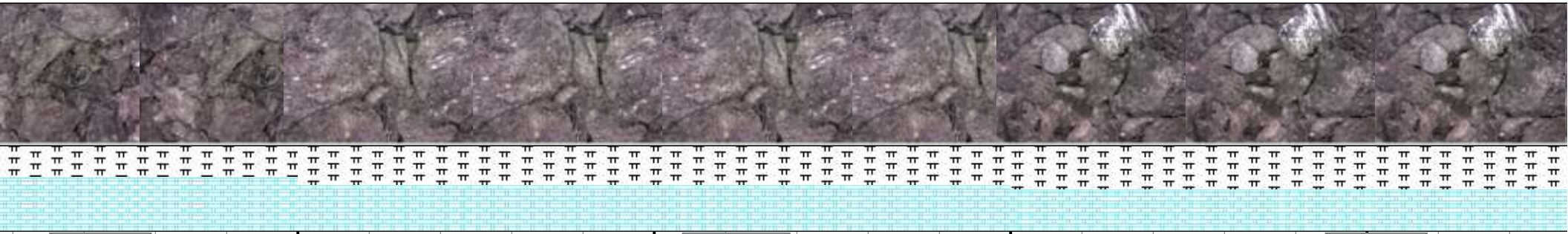


tr gy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb nod; 40% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, r-grty, v slty, arg mtx, calc

65% CHK: pred medgy/brn-ip mot, tr ltr gy/brn, sme intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, mod abnt pyrc bent, tr cly rch bent, sme lse pyr nod; 35% MRLST: drkgy-ip blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor-grty, v slty, arg mtx, calc

65% CHK: pred medgy/brn-ip mot, tr ltr gy/brn, sm blky-sb plty, sb wxy-rthy, slty, mod abnt pyrc & cly dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-





MD: 12,972'
INC: 90.06°
AZM: 181.02°
TVD: 7,355.5'
VS: 6,759.19'

MD: 13,061'
INC: 90.09°
AZM: 183.5°
TVD: 7,355.39'
VS: 6,843.3'

MD: 13,150'
INC: 90.15°
AZM: 184.89°
TVD: 7,355.2'
VS: 6,926.39'

7000

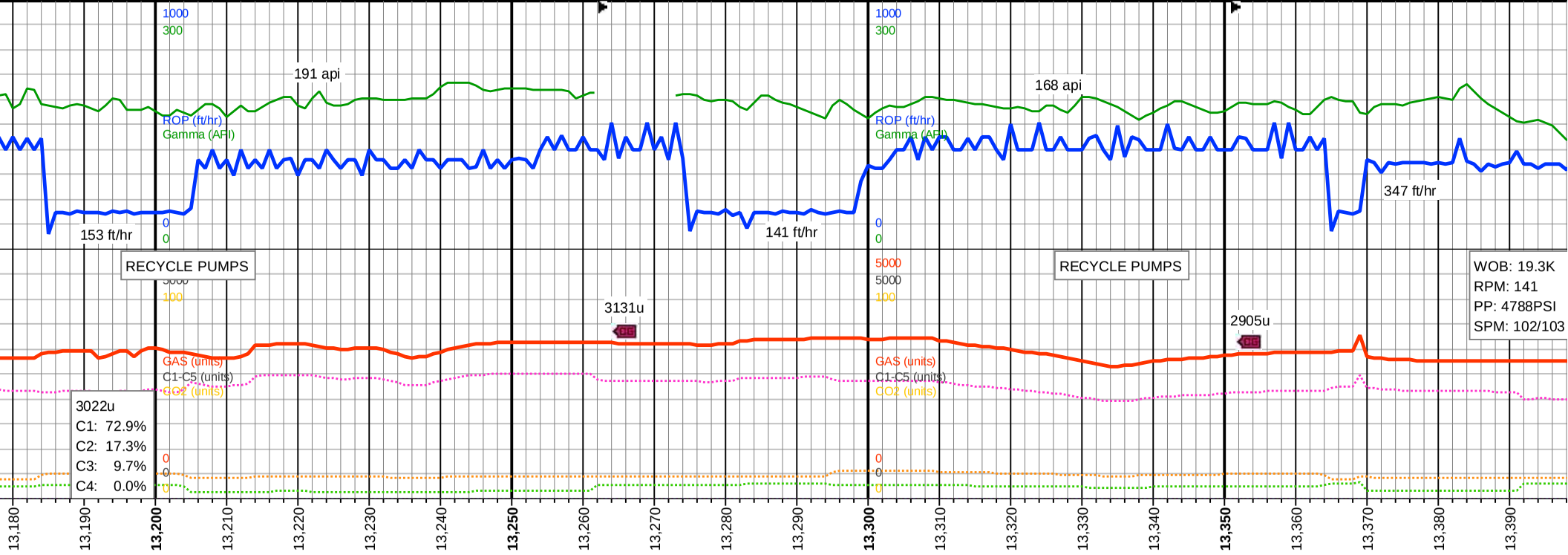
TVD (ft)

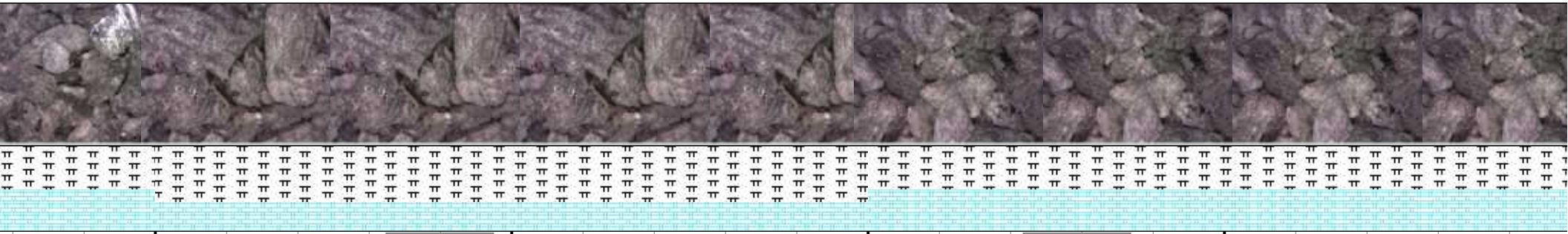
8000

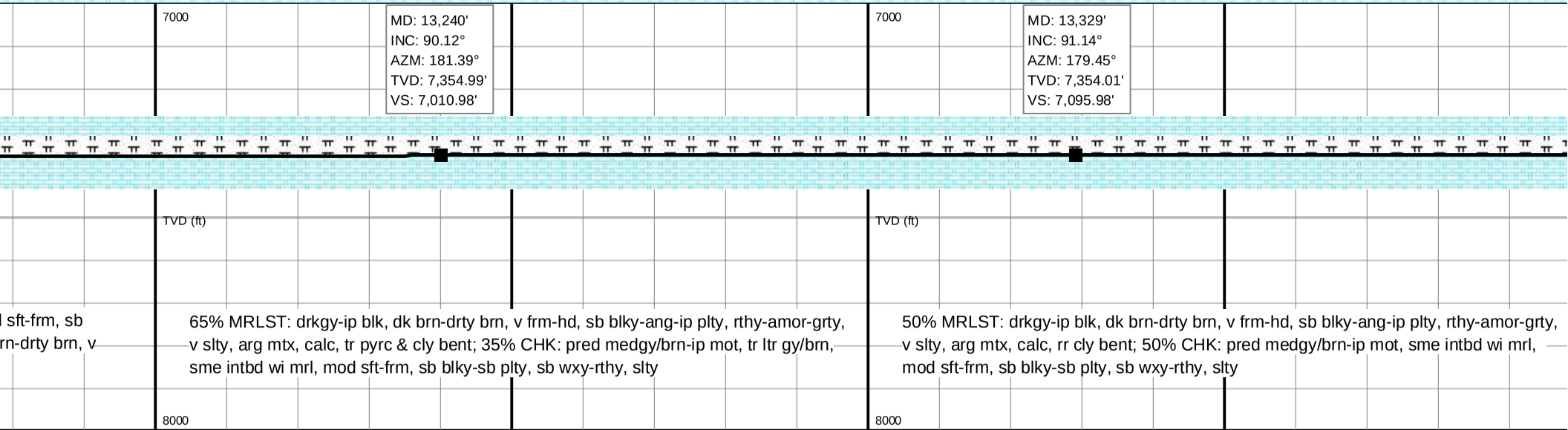
me intbd wi mrl, mod sft-frm, sb
y rch bent; 35% MRLST: drkgy-ip blk,
-amor-grty, v slty, arg mtx, calc

55% CHK: pred medgy/brn-ip mot, tr ltr gy/brn, sme intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, scat pyrc & cly rch bent; 45% MRLST: drkgy-ip blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor-grty, v slty, arg mtx, calc

50% CHK: pred medgy/brn-ip mot, tr ltr gy/brn, sme intbd wi mrl, mod
blky-sb plty, sb wxy-rthy, slty, rr bent; 50% MRLST: drkgy-ip blk, dk b
frm-hd, sb blky-ang-ip plty, rthy-amor-grty, v slty, arg mtx, calc



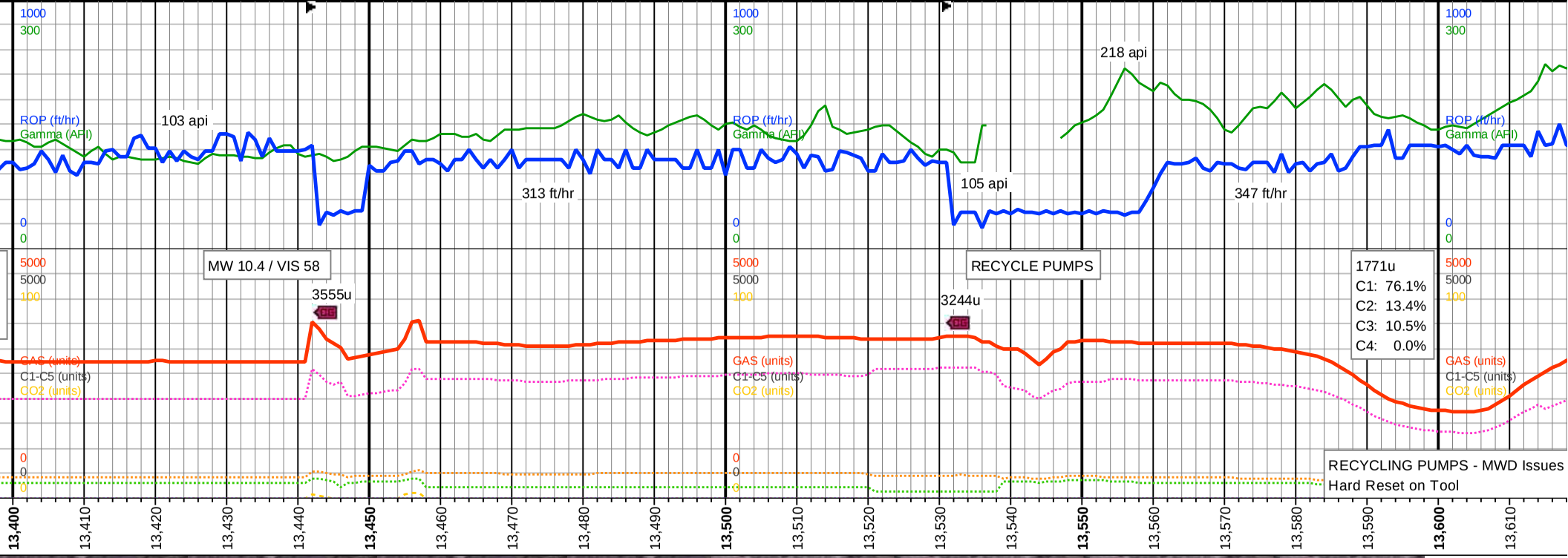


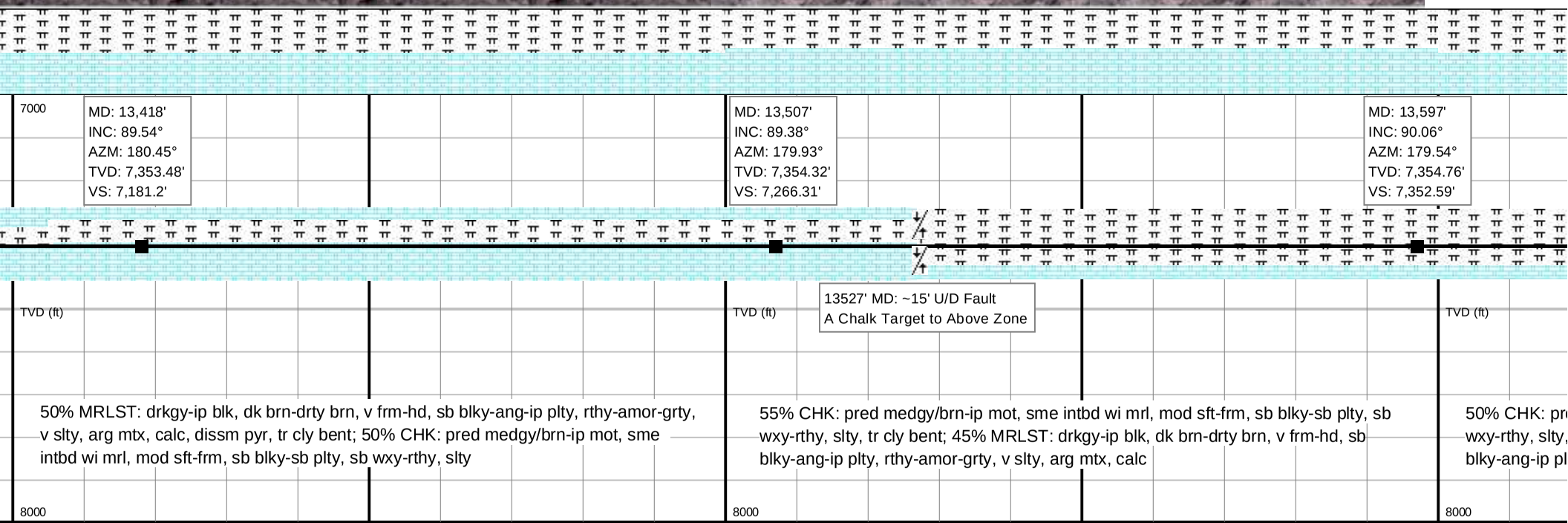


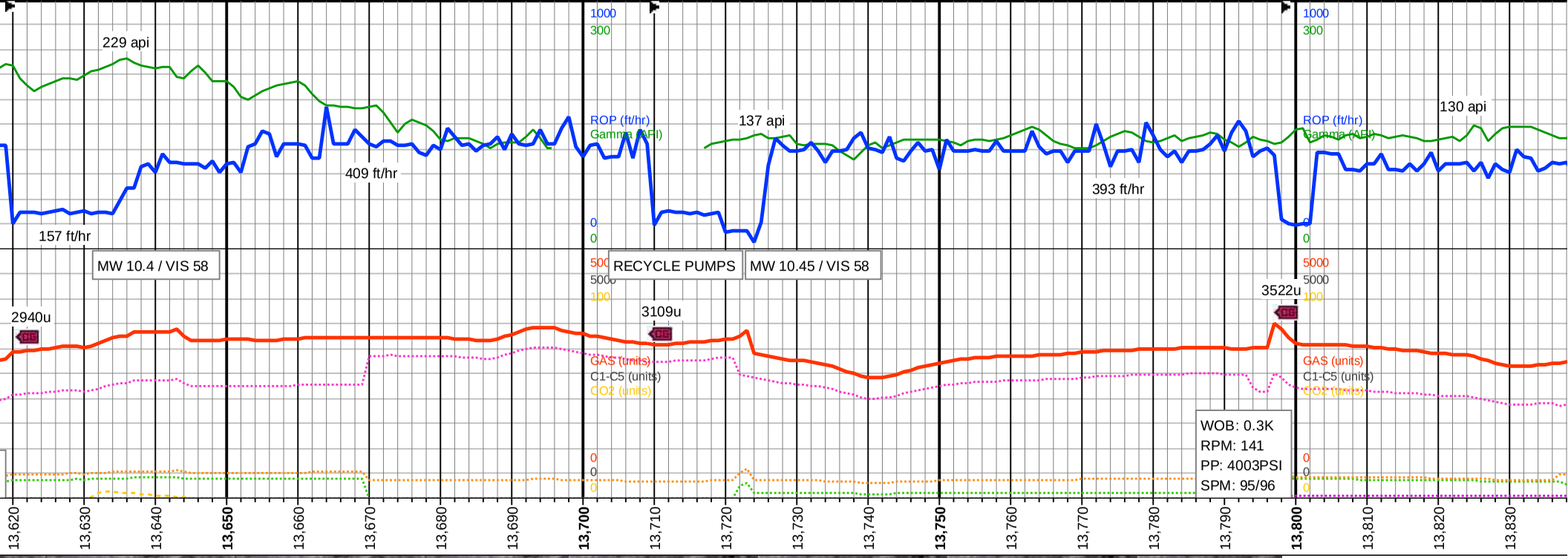
l sft-frm, sb
rn-drty brn, v

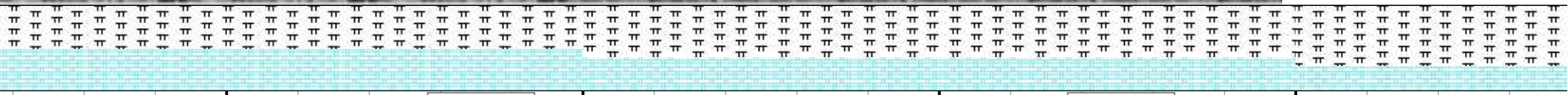
65% MRLST: drkgy-ip blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor-grty, v slty, arg mtx, calc, tr pyrc & cly bent; 35% CHK: pred medgy/brn-ip mot, tr ltr gy/brn, sme intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

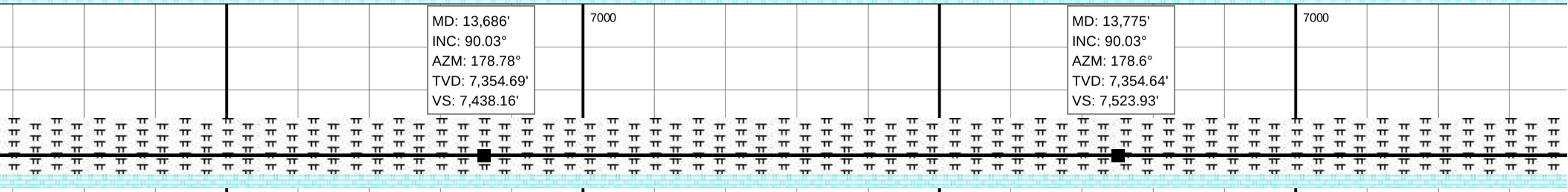
50% MRLST: drkgy-ip blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor-grty, v slty, arg mtx, calc, rr cly bent; 50% CHK: pred medgy/brn-ip mot, sme intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty


1000
300
ROP (ft/hr)
Gamma (API)
103 api
313 ft/hr
218 api
105 api
347 ft/hr
0
0
5000
5000
100
GAS (units)
C1-C5 (units)
CO2 (units)
MW 10.4 / VIS 58
3555u
3244u
RECYCLE PUMPS
1771u
C1: 76.1%
C2: 13.4%
C3: 10.5%
C4: 0.0%
RECYCLING PUMPS - MWD Issues
Hard Reset on Tool
13,400
13,410
13,420
13,430
13,440
13,450
13,460
13,470
13,480
13,490
13,500
13,510
13,520
13,530
13,540
13,550
13,560
13,570
13,580
13,590
13,600
13,610


7000
MD: 13,418'
INC: 89.54°
AZM: 180.45°
TVD: 7,353.48'
VS: 7,181.2'
MD: 13,507'
INC: 89.38°
AZM: 179.93°
TVD: 7,354.32'
VS: 7,266.31'
MD: 13,597'
INC: 90.06°
AZM: 179.54°
TVD: 7,354.76'
VS: 7,352.59'
TVD (ft)
13527' MD: ~15' U/D Fault
A Chalk Target to Above Zone
50% MRLST: drkgy-ip blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor-grty, v slty, arg mtx, calc, dissm pyr, tr cly bent; 50% CHK: pred medgy/brn-ip mot, sme intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty
55% CHK: pred medgy/brn-ip mot, sme intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, tr cly bent; 45% MRLST: drkgy-ip blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor-grty, v slty, arg mtx, calc
8000



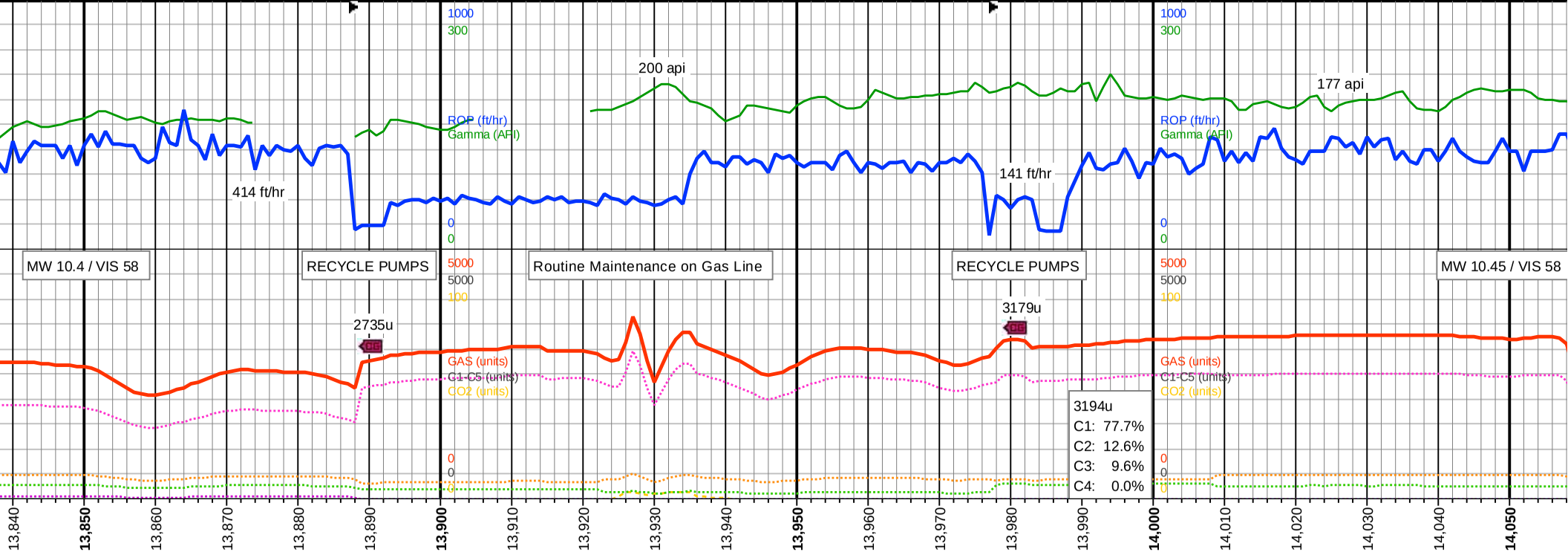


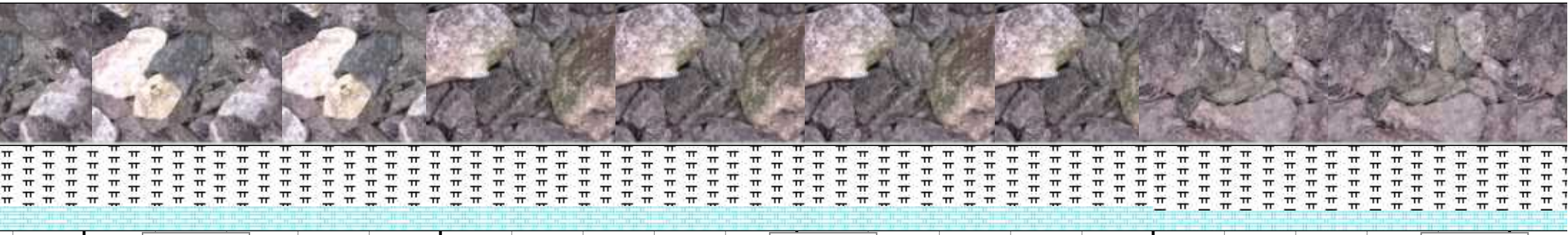


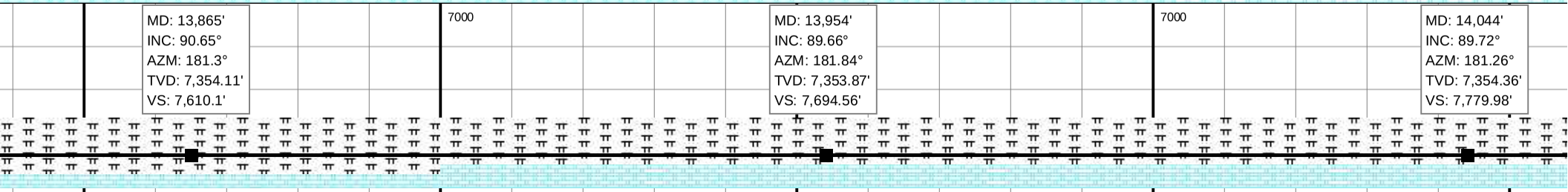
ed medgy/brn-ip mot, sme intbd wi mrl, mod sft-frm, sb blky-sb plty, sb
tr cly bent; 50% MRLST: drkgy-ip blk, dk brn-drty brn, v frm-hd, sb
ty, rthy-amor-grty, v slty, arg mtx, calc

60% MRLST: drkgy-ip blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor-grty, v slty, arg mtx, calc, abnt cly rch wi tr pyrc bent, occ pyr; 40% CHK: pred medgy/brn-ip mot, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

70% MRLST: drkgy-ip blk, dk b
v slty, arg mtx, calc, abnt cly rc
com intbd wi mrl, mod sft-frm, s





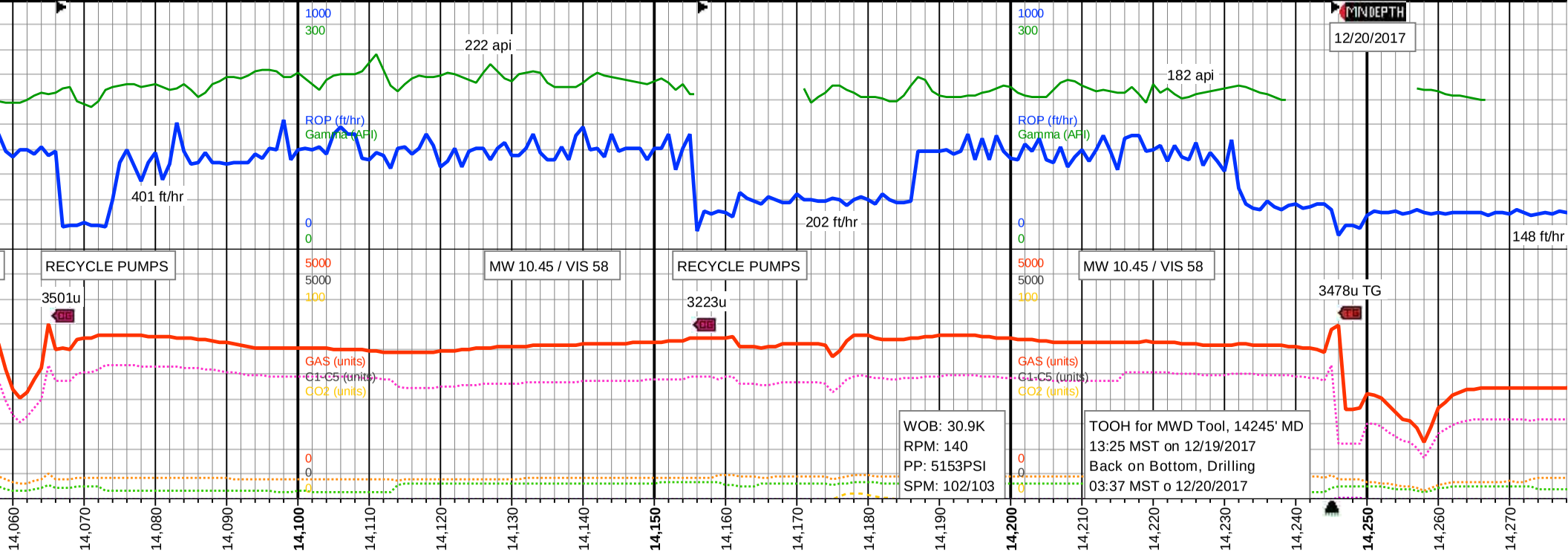


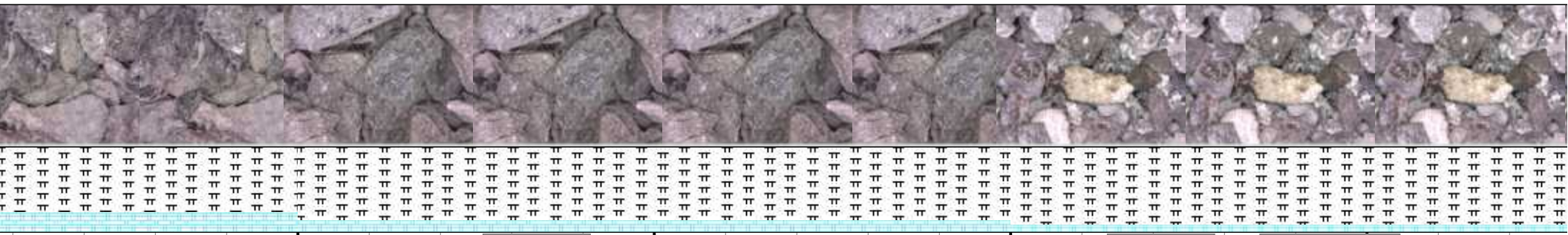
rn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor-grty, h & pyrc bent, rr pyr; 30% CHK: pred medgy/brn-ip mot, sb blky-sb plty, sb wxy-rthy, slty

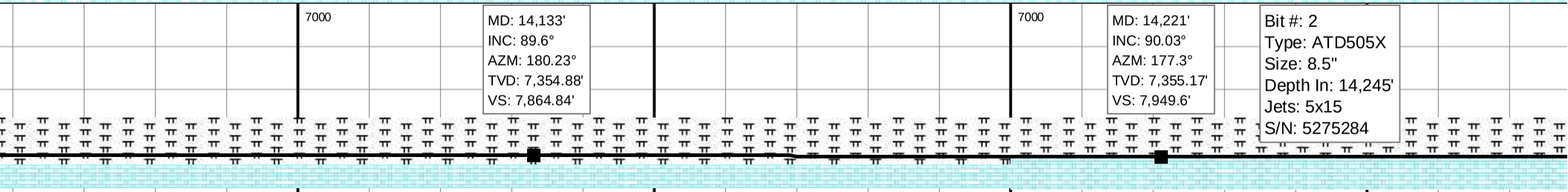
70% MRLST: drkgy-ip blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor-grty, v slty, arg mtx, calc, mod abnt cly rch & pyrc bent; 30% CHK: pred medgy/brn-ip mot, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

75% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, slty, arg mtx, calc, tr cly & pyrc bent, rr dissm pyr; com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb w

8000
8000







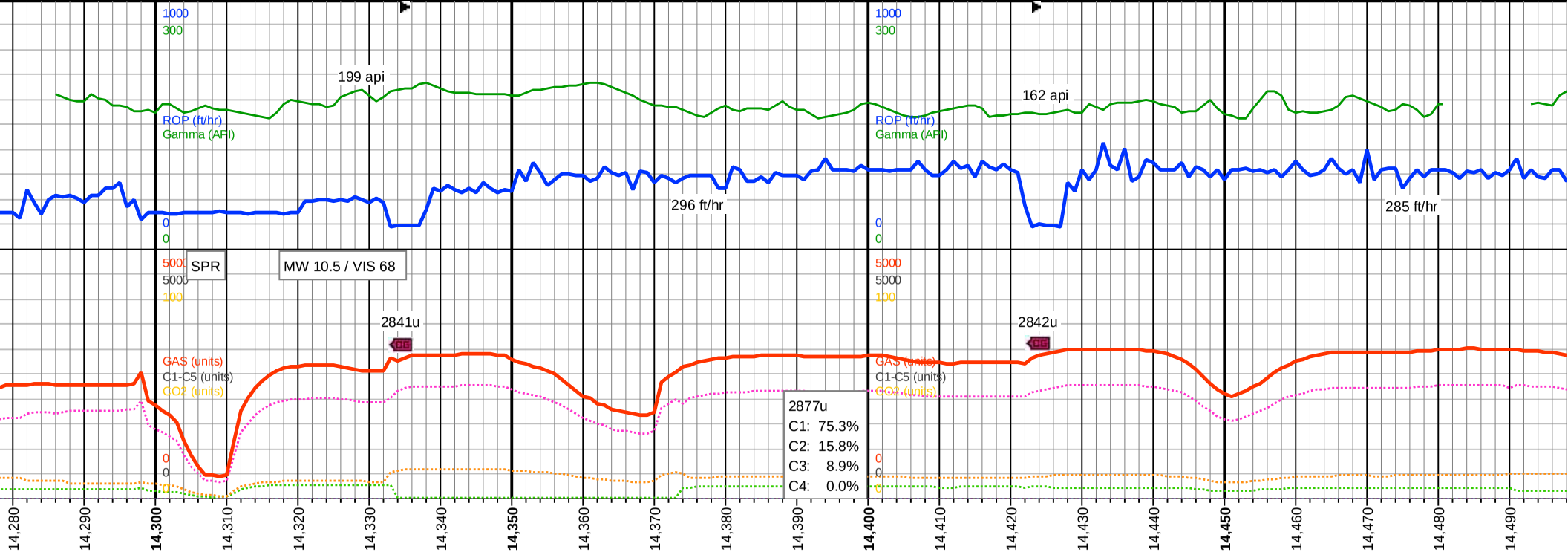
sb blky-ang-ip plty, rthy-amor-grty, v
25% CHK: pred medgy/brn-ip mot,
xy-rthy, slty

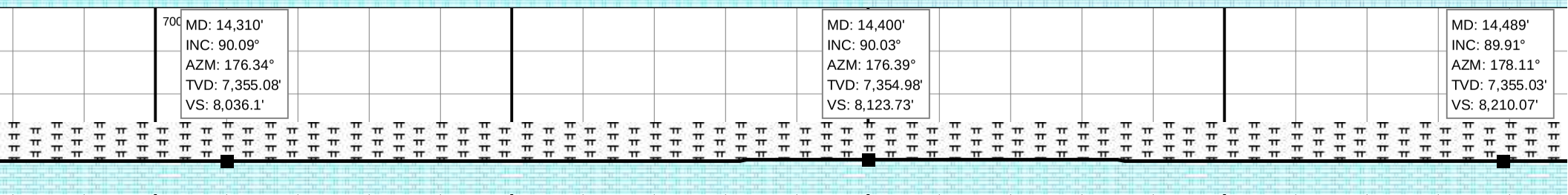
85% MRLST: drkgy-blk, dk brn-drty brn, v frm-hd, sb blky-ang-ip plty, rthy-amor-grty, v slty, arg mtx, calc, tr cly & pyrc bent, tr nodr pyr; 15% CHK: medgy-gy/brn, pred intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

90% MRLST: drkgy-blk, v dk brn, v frm-hd, sb blky-ang, rthy-amor-grty calc, abnt cly & pyrc bent; 10% CHK: medgy-gy/brn, pred intbd wi mrl, blky-sb plty, sb wxy-rthy, slty

8000

8000





TVD (ft)

TVD (ft)

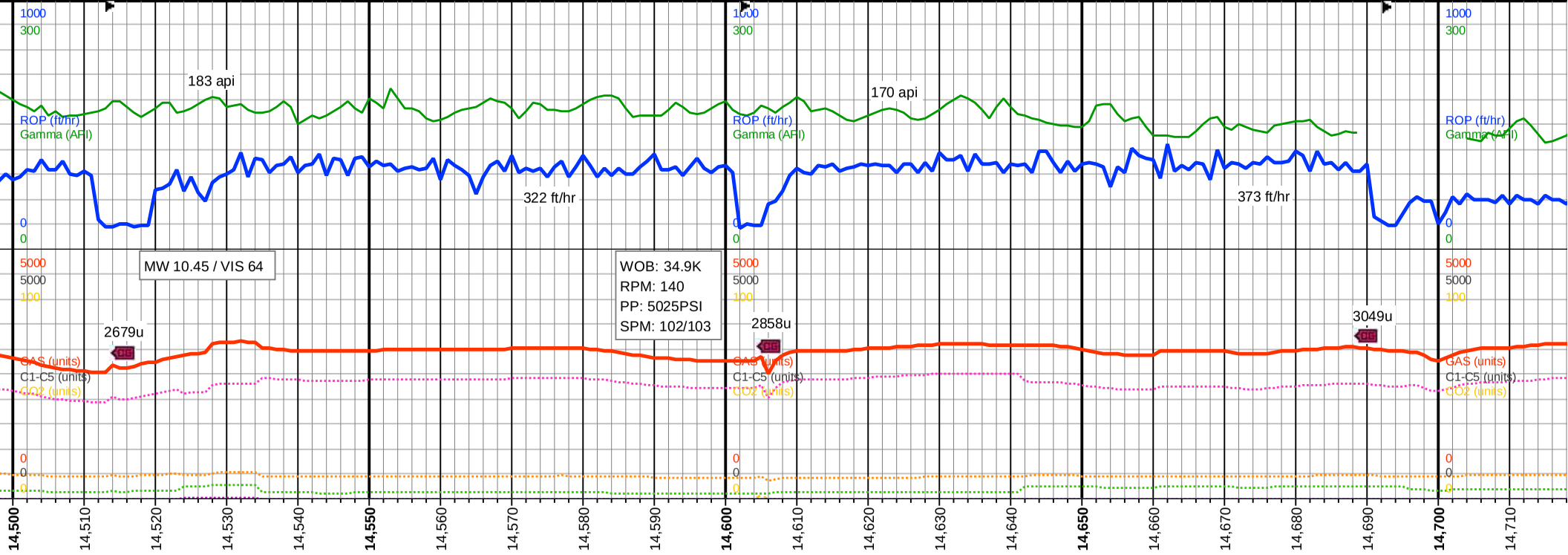
, v slty, arg mtx,
mod sft-frm, sb

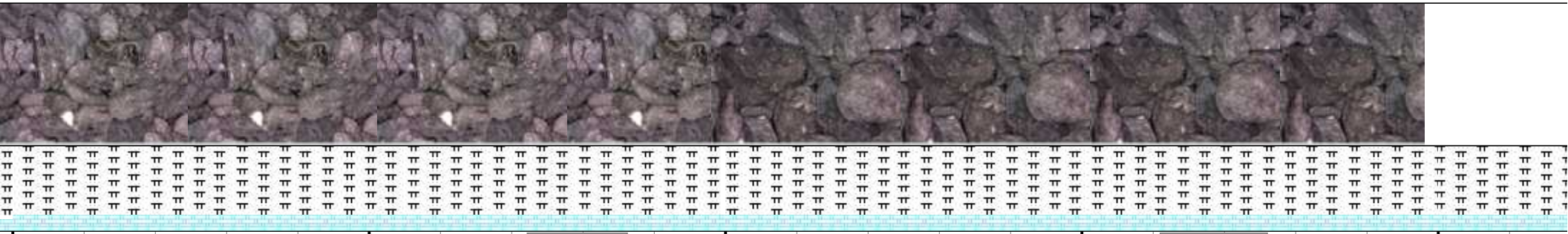
90% MRLST: drkgy-blk, v dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, abnt cly rch wi mnr pyrc bent; 10% CHK: medgy-gy/brn, pred intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

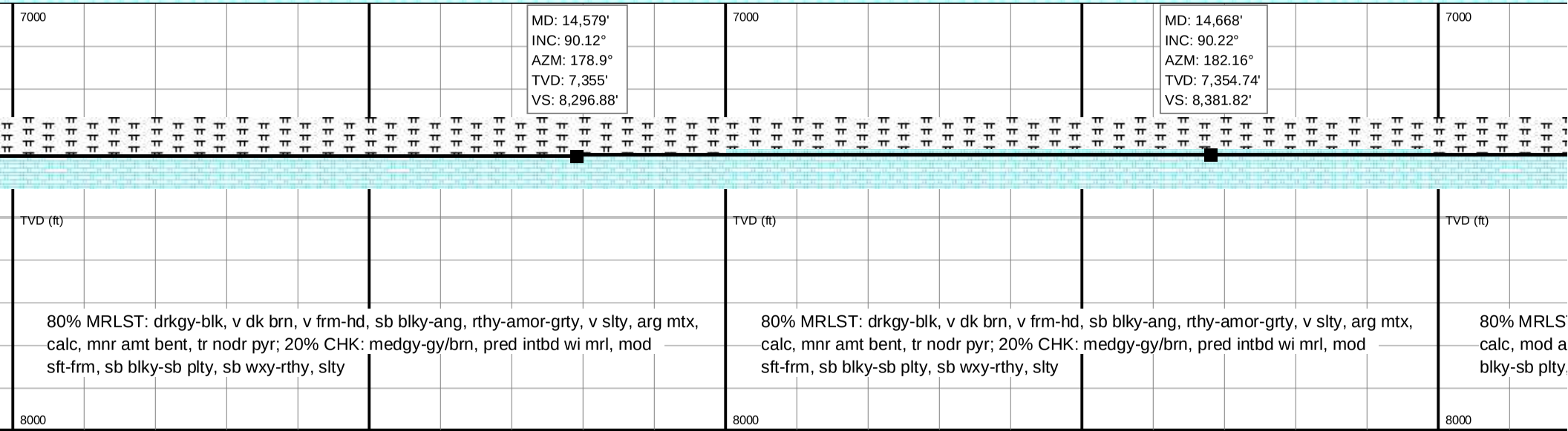
85% MRLST: drkgy-blk, v dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, abnt cly rch wi mnr pyrc bent; 15% CHK: medgy-gy/brn, pred intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

8000

8000

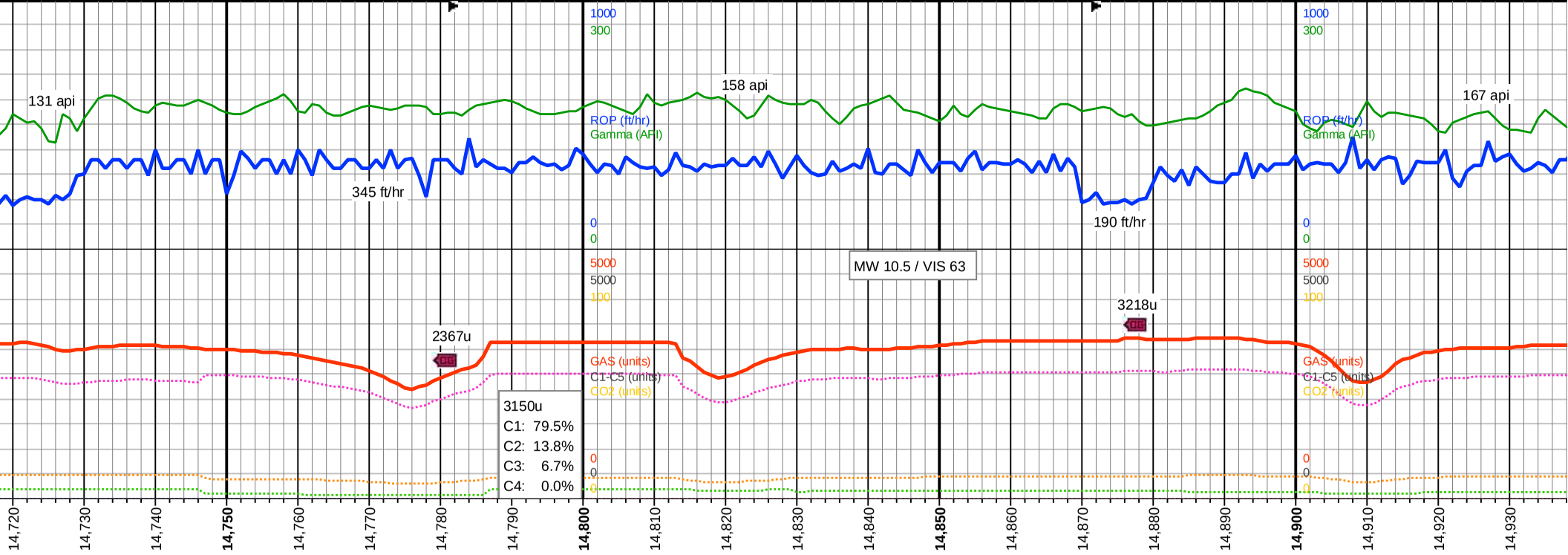


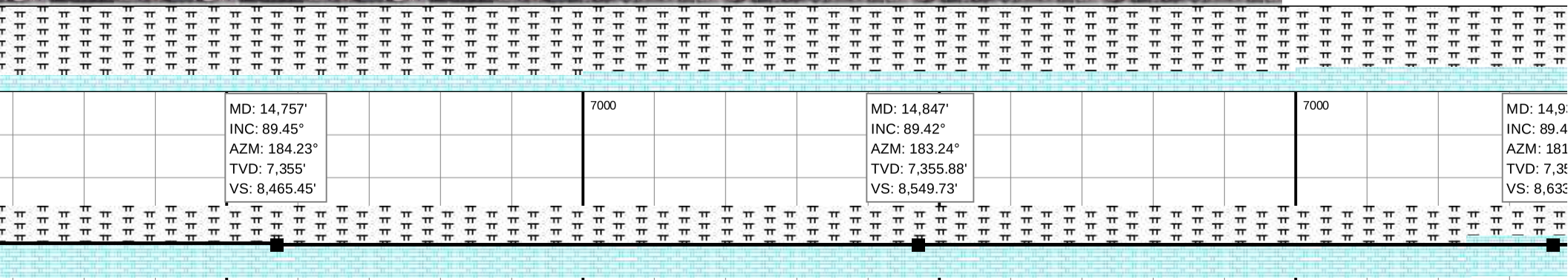




80% MRLST: drkgy-blk, v dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, mnr amt bent, tr nodr pyr; 20% CHK: medgy-gy/brn, pred intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

80% MRLST: drkgy-blk, v dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, mnr amt bent, tr nodr pyr; 20% CHK: medgy-gy/brn, pred intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

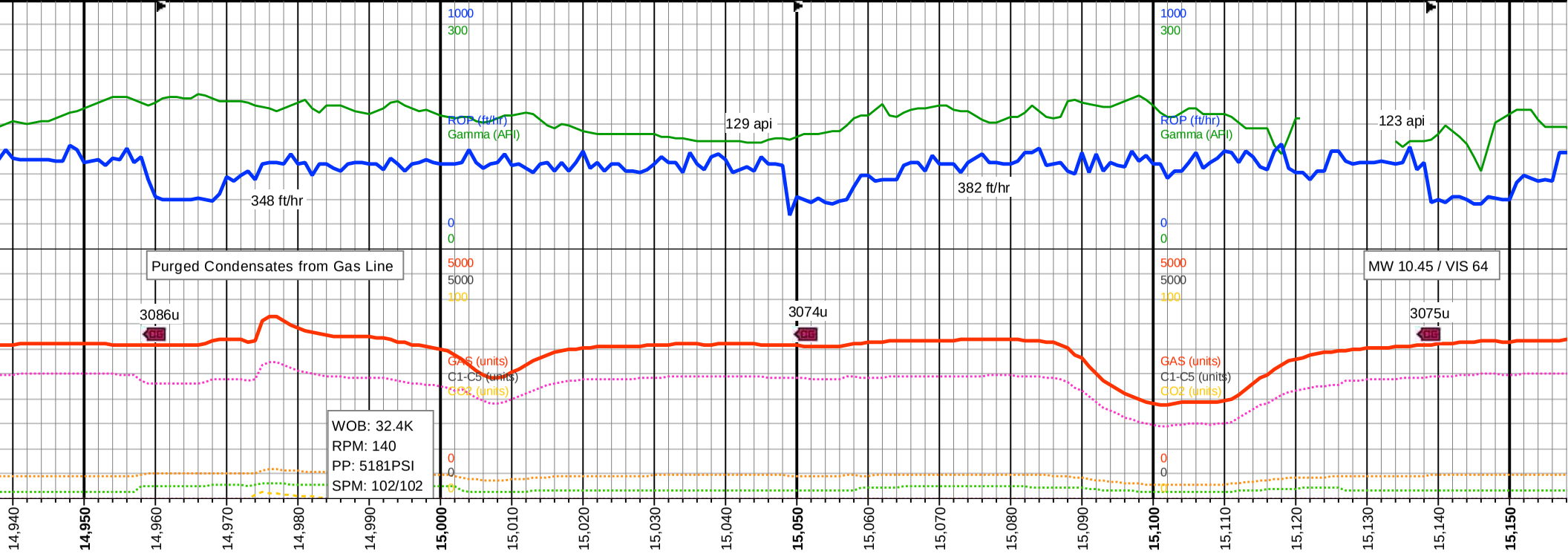


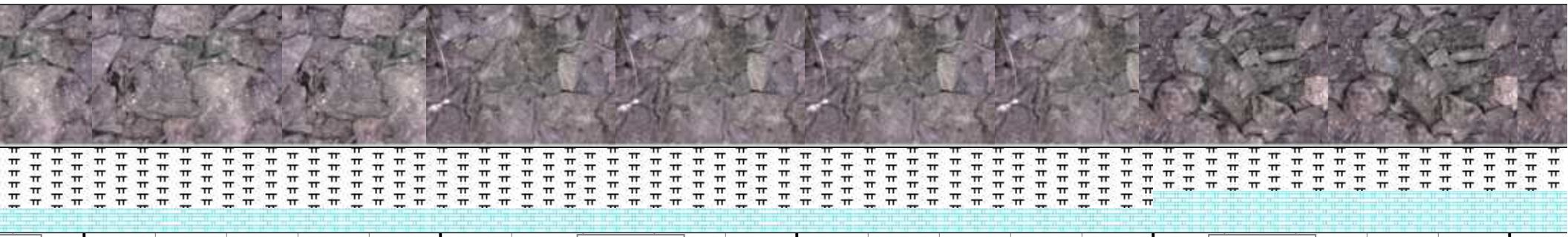


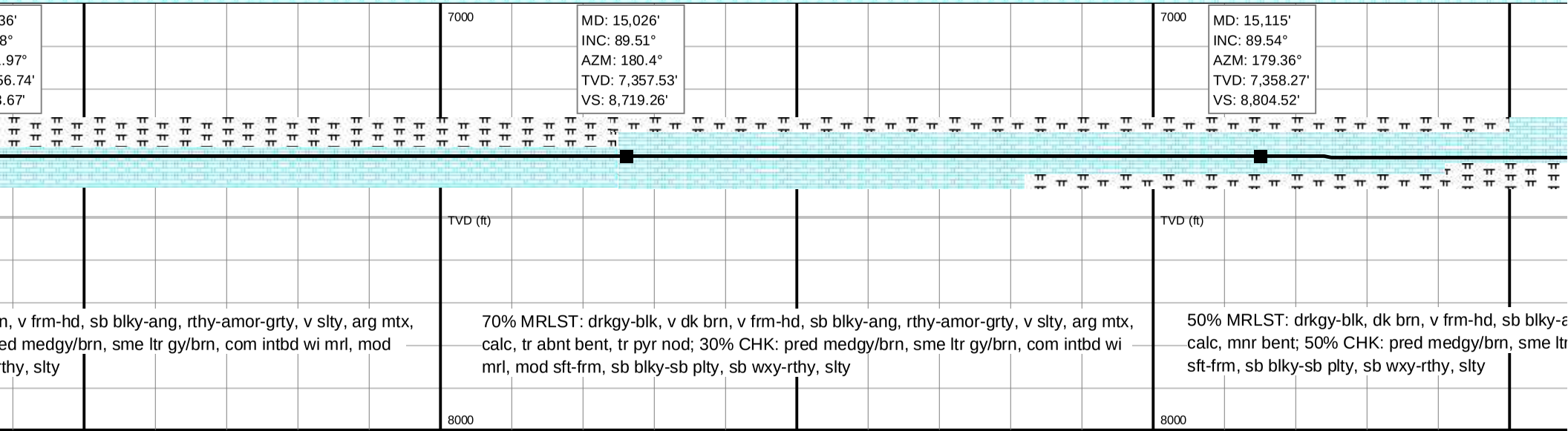
T: drkgy-blk, v dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, bnt bent; 20% CHK: medgy-gy/brn, pred intbd wi mrl, mod sft-frm, sb , sb wxy-rthy, slty

75% MRLST: drkgy-blk, v dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, mod abnt bent; 25% CHK: medgy-gy/brn, pred intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

70% MRLST: drkgy-blk, v dk br calc, tr abnt bent; 30% CHK: pr sft-frm, sb blky-sb plty, sb wxy-



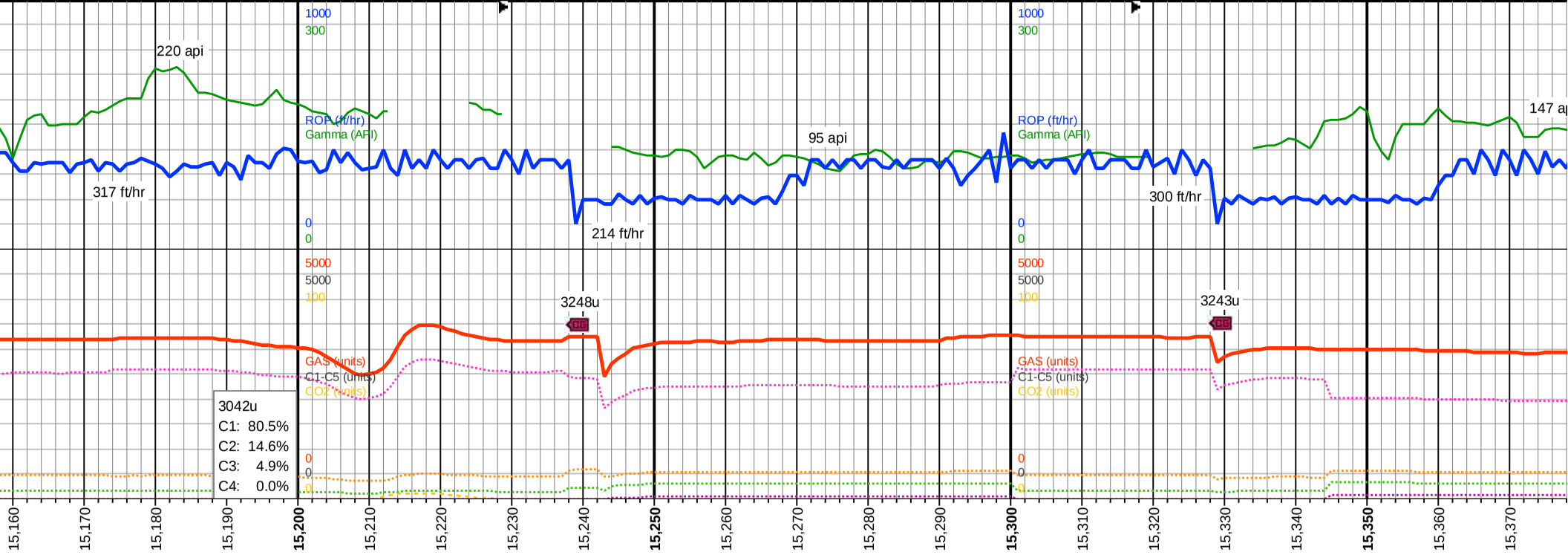


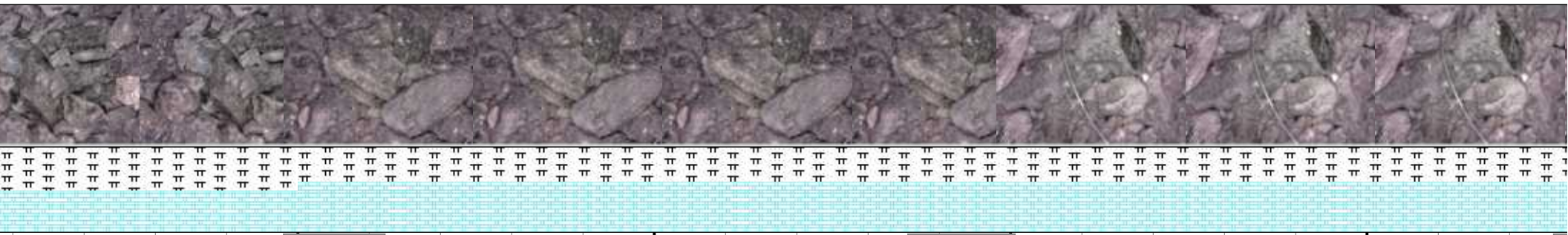


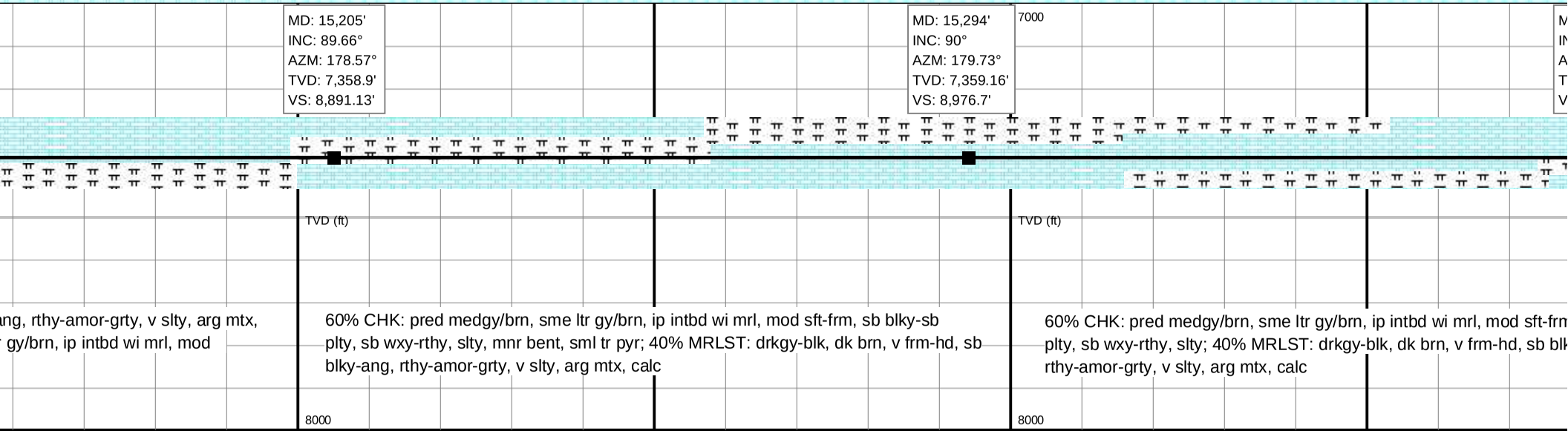
n, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, ed medgy/brn, sme ltr gy/brn, com intbd wi mrl, mod rthy, slty

70% MRLST: drkgy-blk, v dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, tr abnt bent, tr pyr nod; 30% CHK: pred medgy/brn, sme ltr gy/brn, com intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

50% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-a calc, mnr bent; 50% CHK: pred medgy/brn, sme ltr sft-frm, sb blky-sb plty, sb wxy-rthy, slty



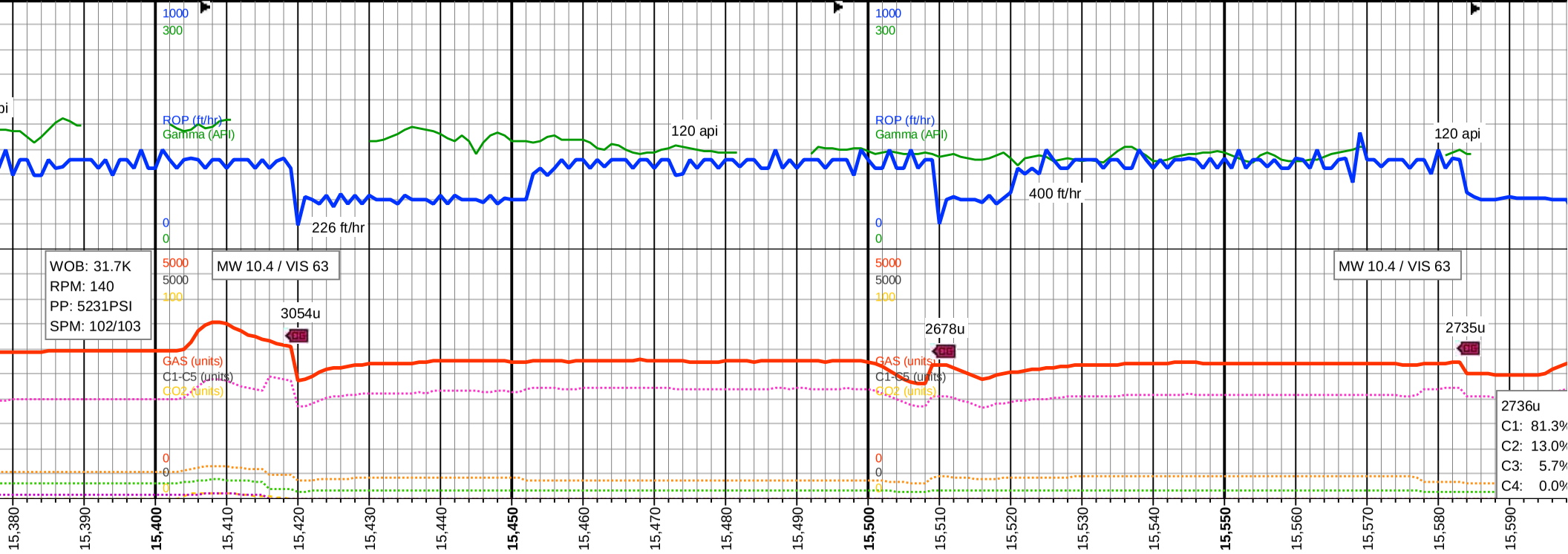


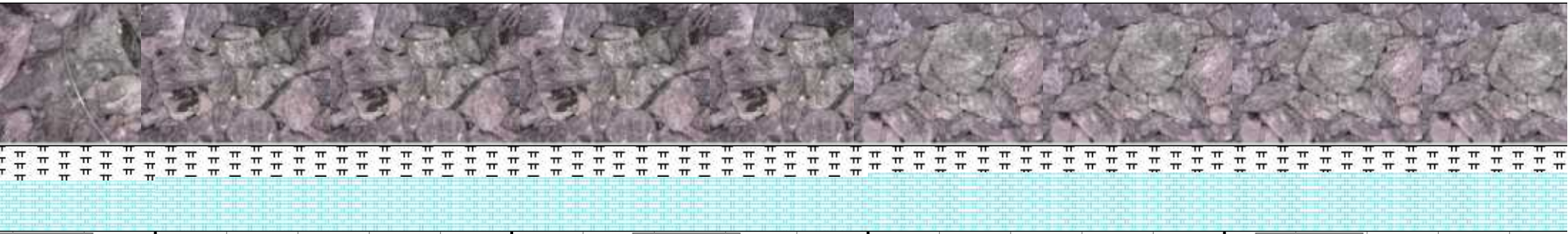


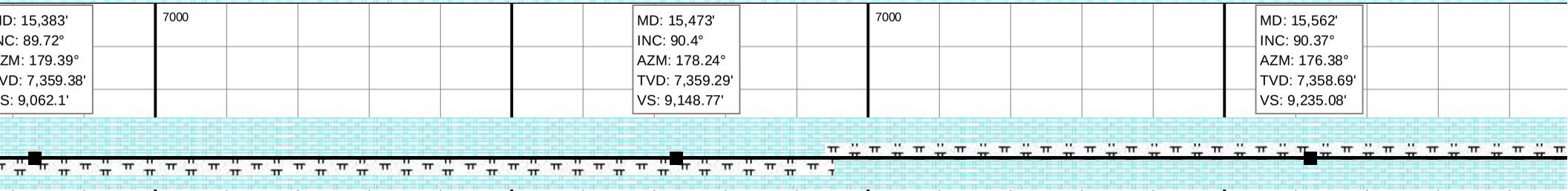
ang, rthy-amor-grty, v slty, arg mtx,
r gy/brn, ip intbd wi mrl, mod

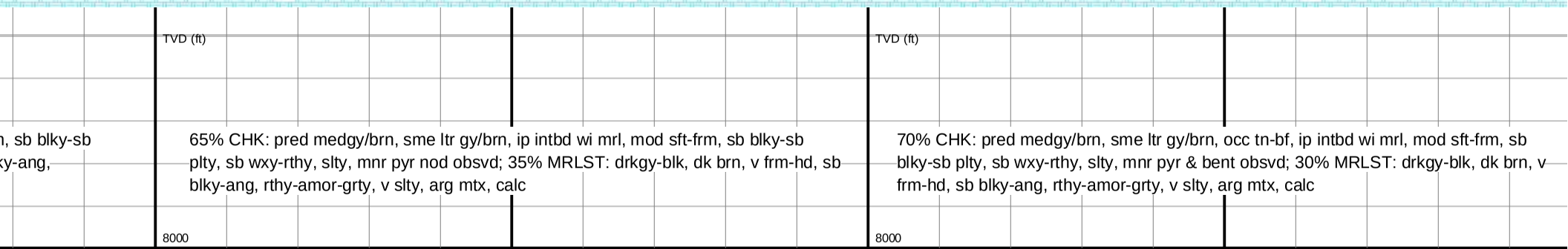
60% CHK: pred medgy/brn, sme ltr gy/brn, ip intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, mnr bent, sml tr pyr; 40% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc

60% CHK: pred medgy/brn, sme ltr gy/brn, ip intbd wi mrl, mod sft-frm
plty, sb wxy-rthy, slty; 40% MRLST: drkgy-blk, dk brn, v frm-hd, sb blk
rthy-amor-grty, v slty, arg mtx, calc





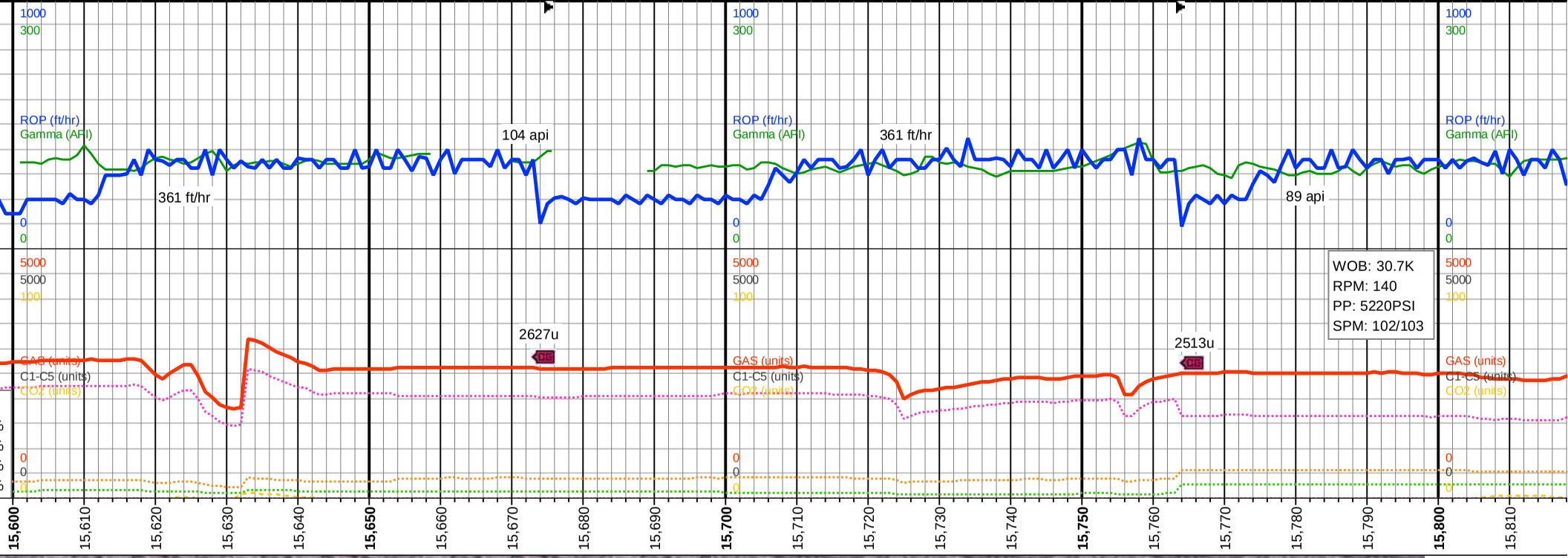


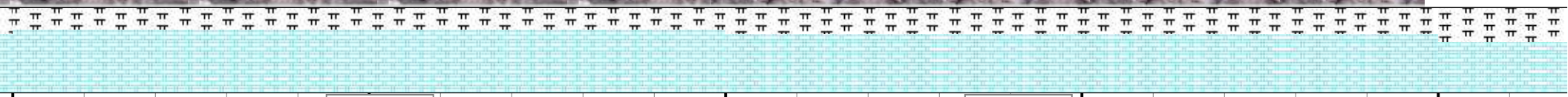


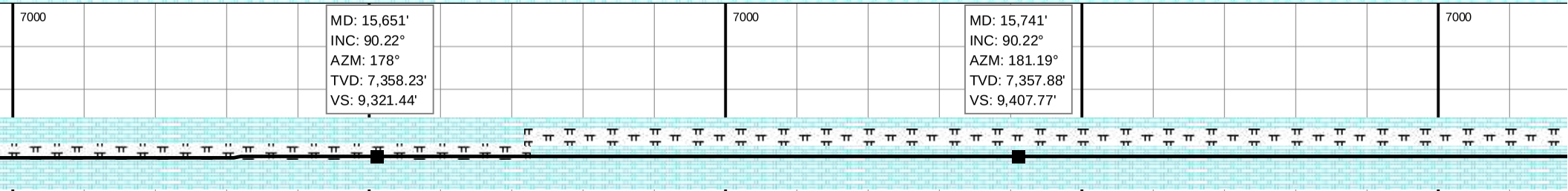
n, sb blky-sb
ky-ang,

65% CHK: pred medgy/brn, sme ltr gy/brn, ip intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, mnr pyr nod obsvd; 35% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc

70% CHK: pred medgy/brn, sme ltr gy/brn, occ tn-bf, ip intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, mnr pyr & bent obsvd; 30% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc



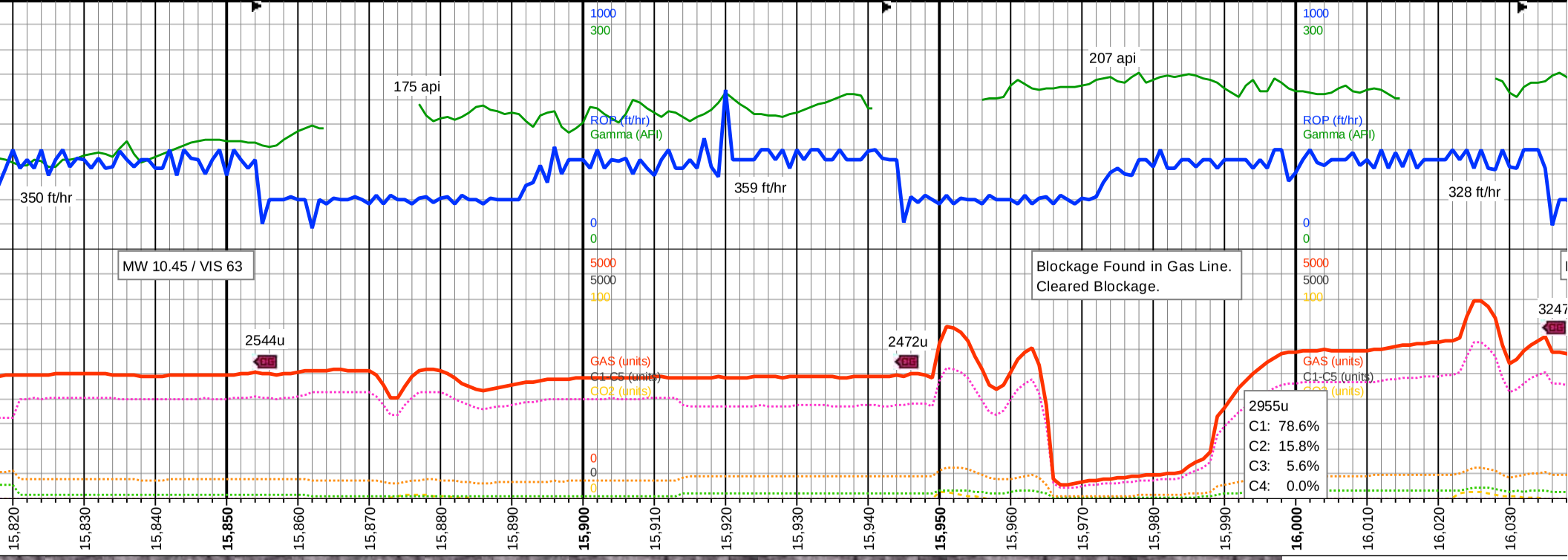


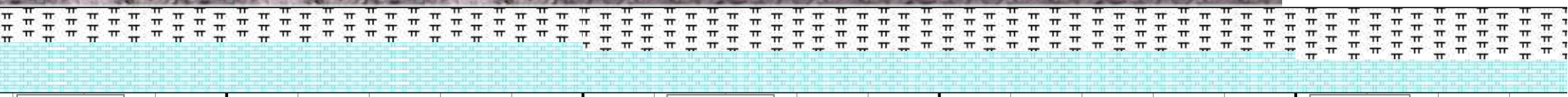


75% CHK: pred medgy/brn, sme ltr gy/brn, occ tn-bf, ip intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, mnr pyr & bent obsvd; 25% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc

70% CHK: pred medgy/brn, sme ltr gy/brn, occ tn-bf, ip intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty, scat bent, tr pyr nod; 30% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc

60% CHK: p
blky-sb plty,
v frm-hd, sb





MD: 15,830'
INC: 90.25°
AZM: 183°
TVD: 7,357.52'
VS: 9,491.97'

MD: 15,919'
INC: 90.34°
AZM: 180.71°
TVD: 7,357.06'
VS: 9,576.28'

MD: 16,009'
INC: 90.25°
AZM: 180.8°
TVD: 7,356.6'
VS: 9,662.09'

7000

TVD (ft)

TVD (ft)

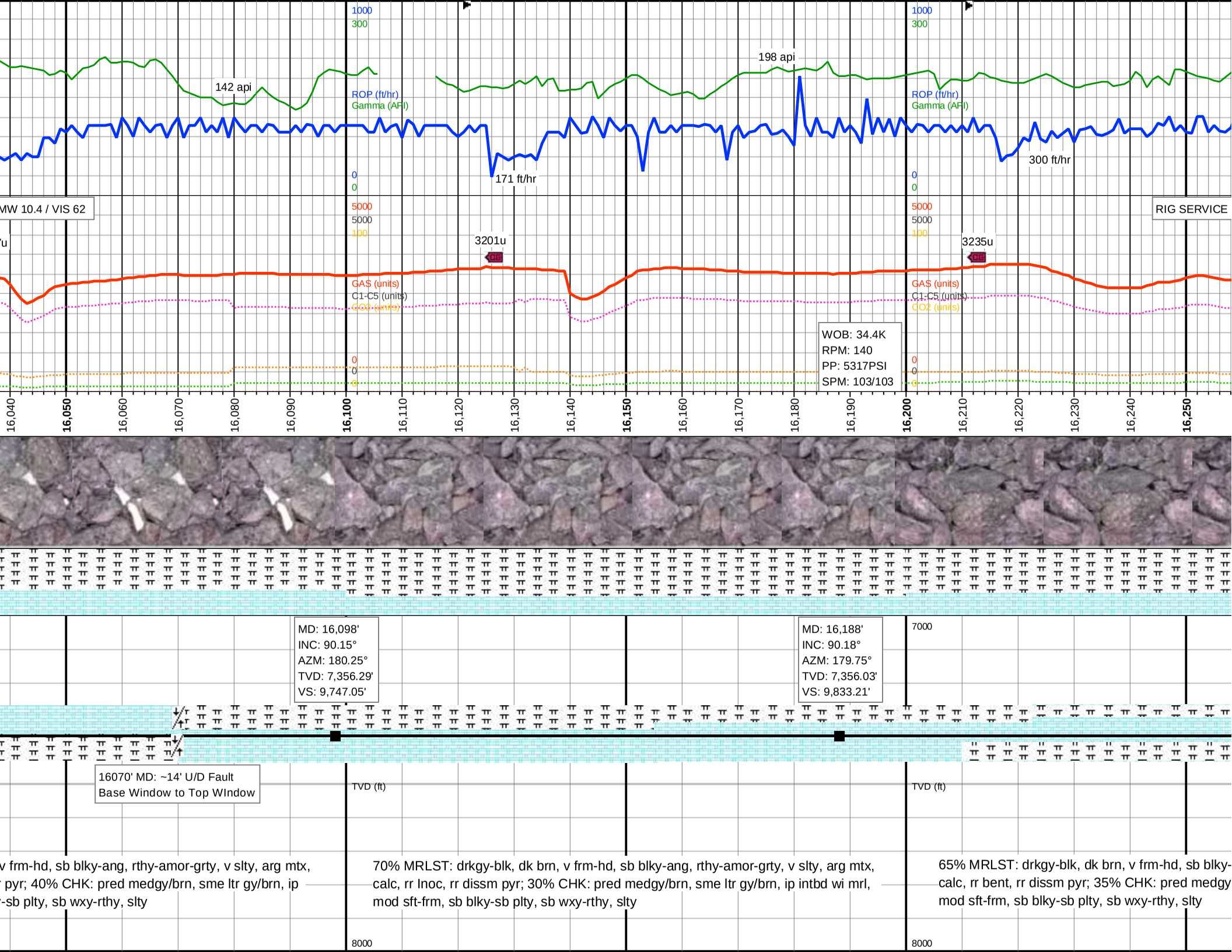
8000

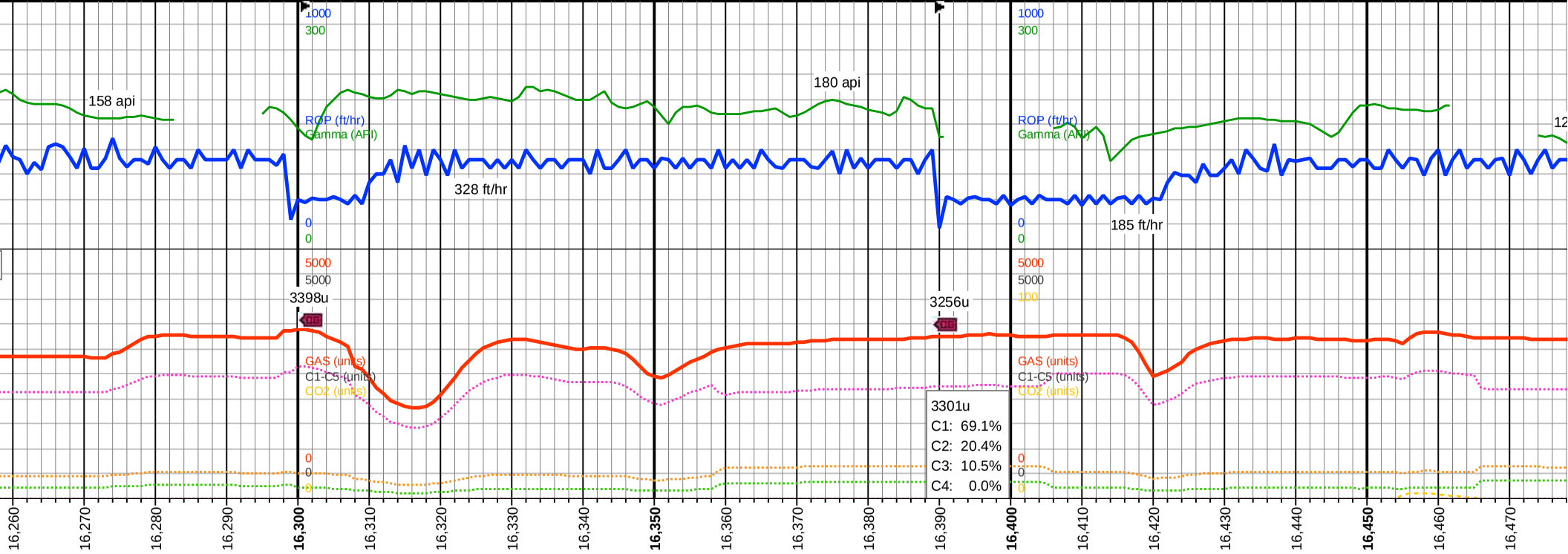
8000

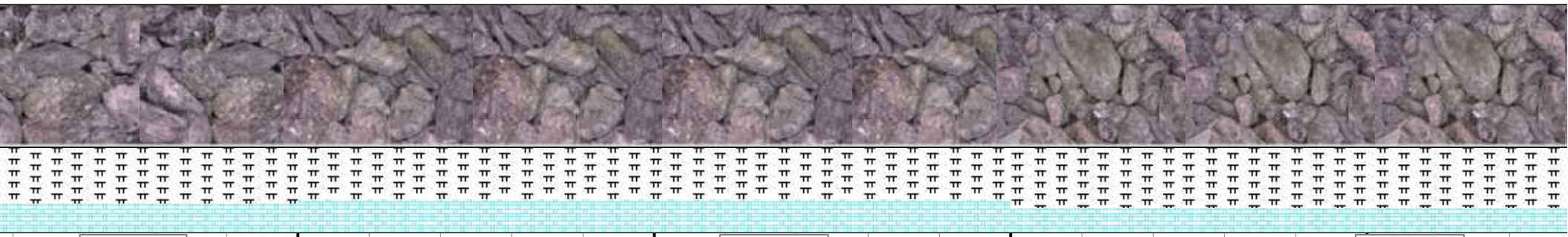
red medgy/brn, sme ltr gy/brn, occ tn-bf, ip intbd wi mrl, mod sft-frm, sb
sb wxy-rthy, slty, scat pyrc bent & nodr pyr; 40% MRLST: drkgy-blk, dk brn,
blky-ang, rthy-amor-grty, v slty, arg mtx, calc

50% CHK: pred medgy/brn, sme ltr gy/brn, ip intbd wi mrl, mod sft-frm, sb blky-sb
plty, sb wxy-rthy, slty, mod abnt pyrc bent, tr nodr pyr; 50% MRLST: drkgy-blk, dk brn, v
frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc

60% MRLST: drkgy-blk, dk brn,
calc, mod abnt pyrc bent, tr nodr
intbd wi mrl, mod sft-frm, sb blky


1000
300
142 api
198 api
ROP (ft/hr)
Gamma (API)
0
0
171 ft/hr
300 ft/hr
MW 10.4 / VIS 62
RIG SERVICE
5000
5000
100
3201u
3235u
GAS (units)
C1-C5 (units)
CO2 (units)
WOB: 34.4K
RPM: 140
PP: 5317PSI
SPM: 103/103
16,040
16,050
16,060
16,070
16,080
16,090
16,100
16,110
16,120
16,130
16,140
16,150
16,160
16,170
16,180
16,190
16,200
16,210
16,220
16,230
16,240
16,250
MD: 16,098'
INC: 90.15°
AZM: 180.25°
TVD: 7,356.29'
VS: 9,747.05'
MD: 16,188'
INC: 90.18°
AZM: 179.75°
TVD: 7,356.03'
VS: 9,833.21'
7000
16070' MD: ~14' U/D Fault
Base Window to Top WIndow
TVD (ft)
TVD (ft)
v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx,
r pyr; 40% CHK: pred medgy/brn, sme ltr gy/brn, ip
-sb plty, sb wxy-rthy, slty
70% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx,
calc, rr Inoc, rr dissm pyr; 30% CHK: pred medgy/brn, sme ltr gy/brn, ip intbd wi mrl,
mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty
65% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-
calc, rr bent, rr dissm pyr; 35% CHK: pred medgy
mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty
8000
8000





MD: 16,277'
INC: 90.25°
AZM: 179.54°
TVD: 7,355.69'
VS: 9,918.57'

MD: 16,367'
INC: 90.22°
AZM: 178.1°
TVD: 7,355.32'
VS: 10,005.24'

MD: 16,456'
INC: 90.22°
AZM: 178.7°
TVD: 7,354.98'
VS: 10,091.13'

7000

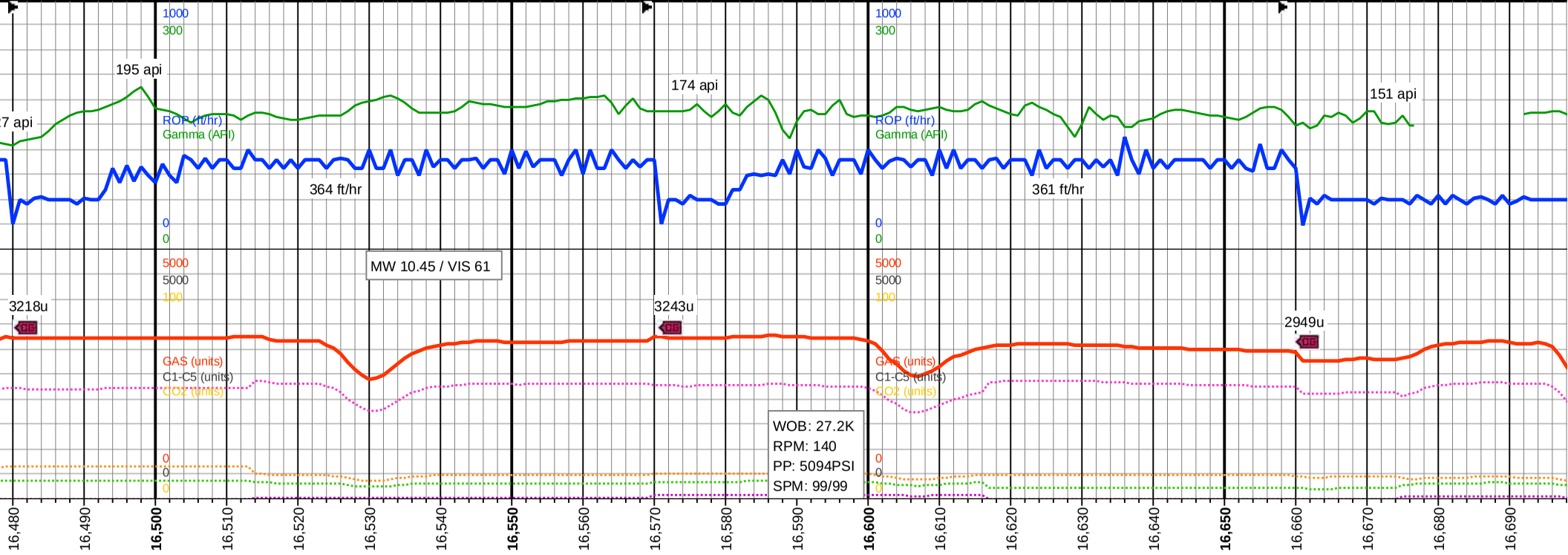
TVD (ft)

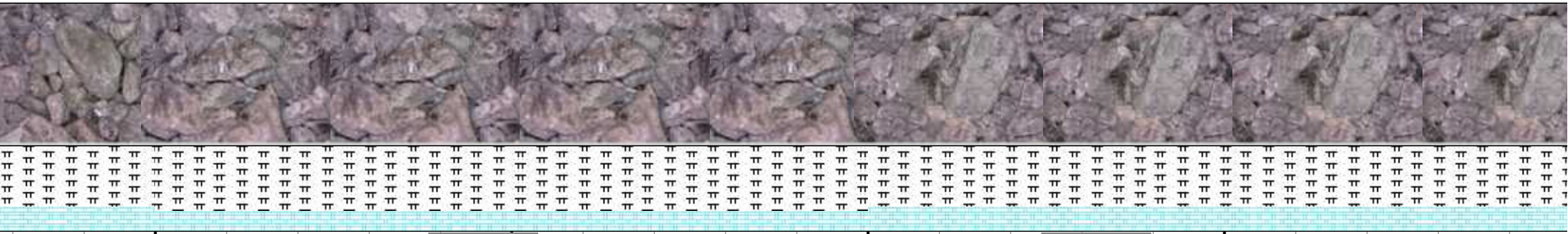
8000

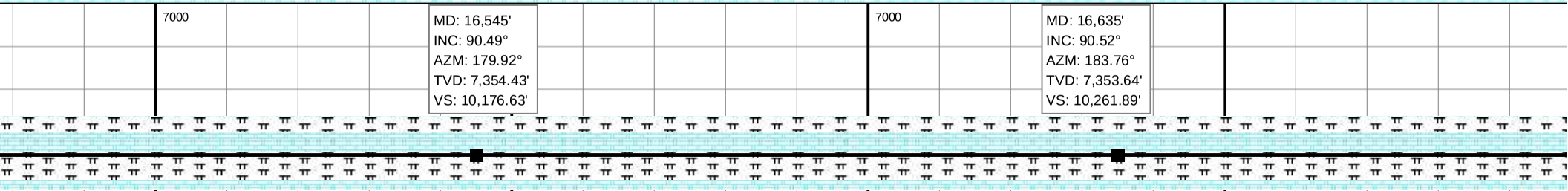
ang, rthy-amor-grty, v slty, arg mtx,
/brn, sme ltr gy/brn, ip intbd wi mrl,

60% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, tr bent, scat nodr pyr; 40% CHK: pred medgy/brn, sme ltr gy/brn, ip intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

70% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-ang, rthy-amor-grty
calc, tr bent, scat nodr pyr; 30% CHK: pred medgy/brn, sme ltr gy/br
mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty





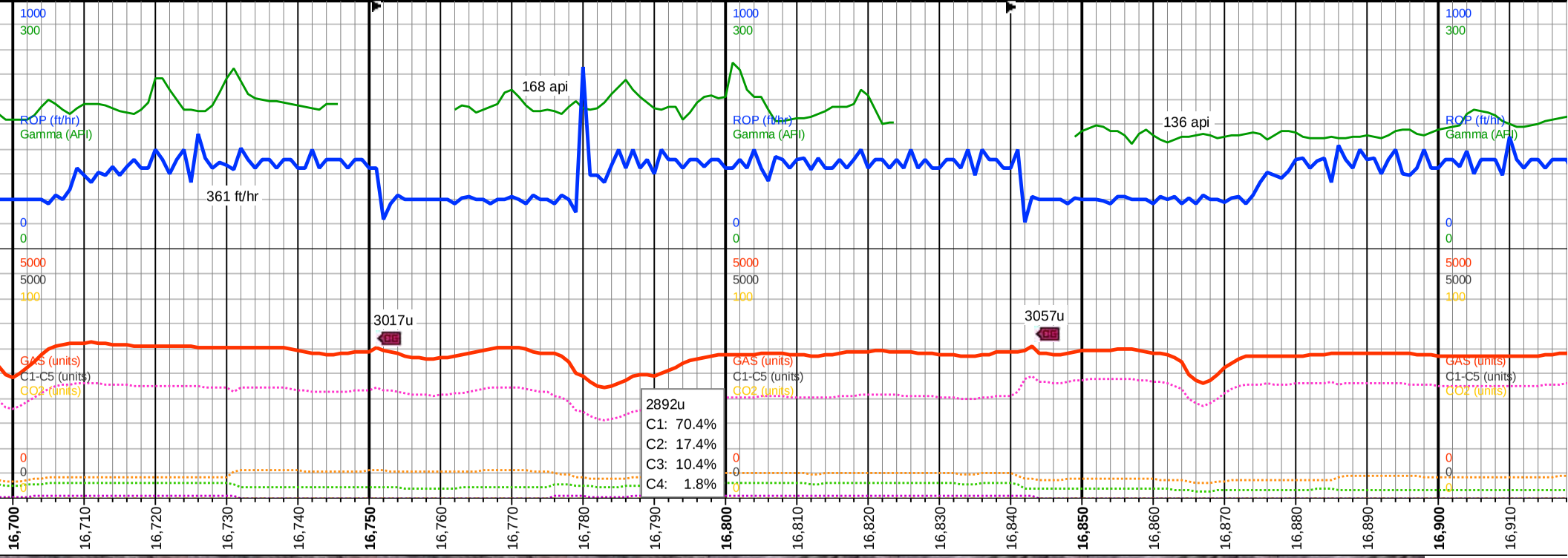


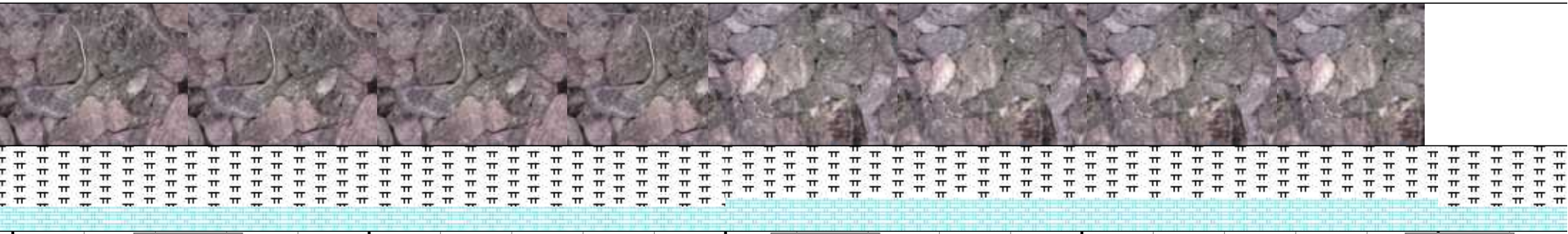
, v slty, arg mtx,
n, ip intbd wi mrl,

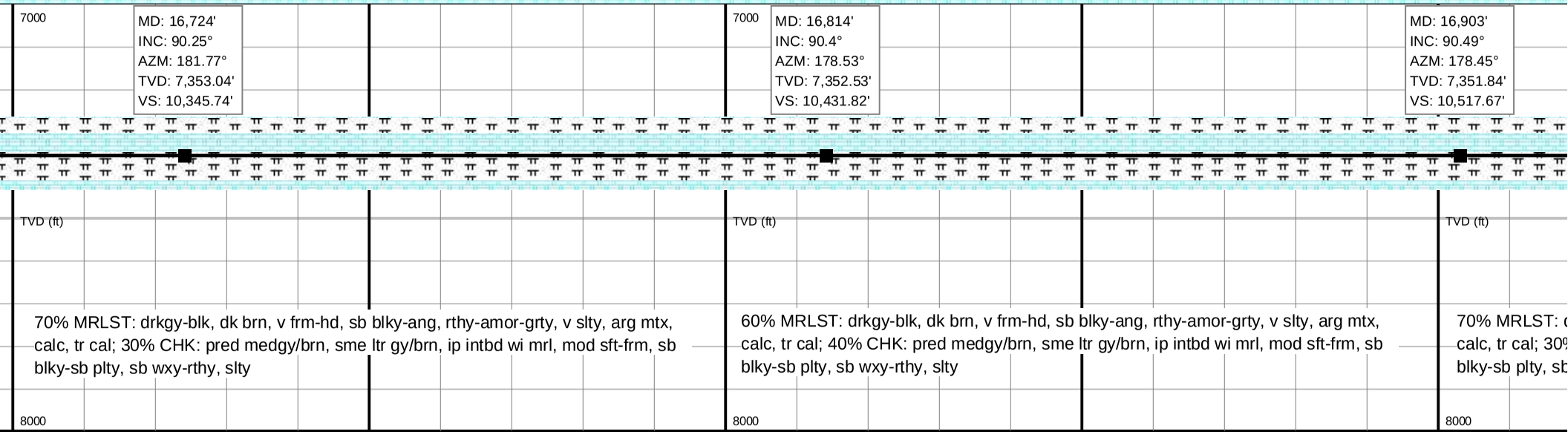
75% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, tr cal; 25% CHK: pred medgy/brn, sme ltr gy/brn, ip intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

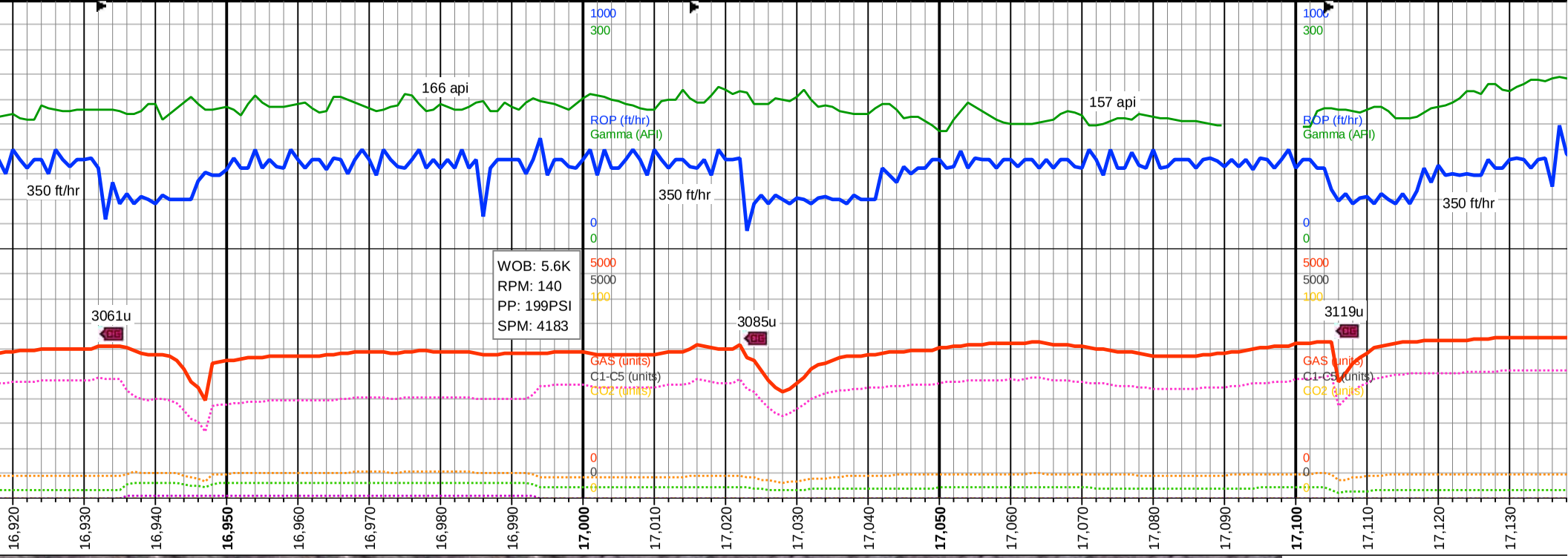
70% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, tr cal; 30% CHK: pred medgy/brn, sme ltr gy/brn, ip intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

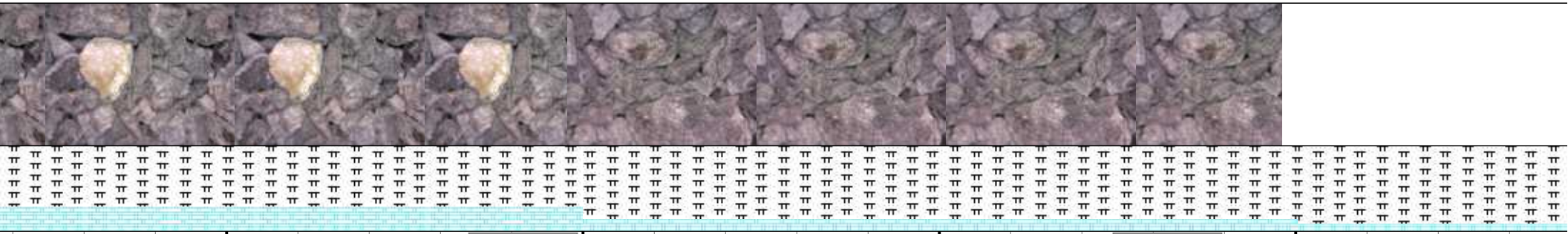
8000
8000

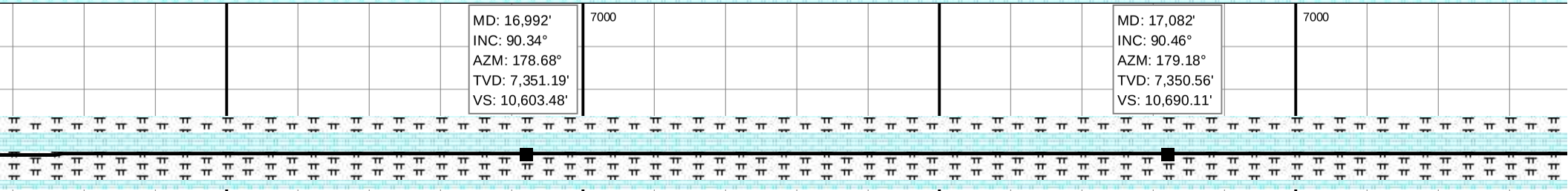

1000
300
ROP (ft/hr)
Gamma (API)
361 ft/hr
168 api
136 api
0
0
5000
5000
100
3017u
3057u
GAS (units)
C1-C5 (units)
CO2 (units)
2892u
C1: 70.4%
C2: 17.4%
C3: 10.4%
C4: 1.8%
16,700
16,710
16,720
16,730
16,740
16,750
16,760
16,770
16,780
16,790
16,800
16,810
16,820
16,830
16,840
16,850
16,860
16,870
16,880
16,890
16,900
16,910




7000
MD: 16,724'
INC: 90.25°
AZM: 181.77°
TVD: 7,353.04'
VS: 10,345.74'
MD: 16,814'
INC: 90.4°
AZM: 178.53°
TVD: 7,352.53'
VS: 10,431.82'
MD: 16,903'
INC: 90.49°
AZM: 178.45°
TVD: 7,351.84'
VS: 10,517.67'
TVD (ft)
70% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, tr cal; 30% CHK: pred medgy/brn, sme ltr gy/brn, ip intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty
60% MRLST: drkgy-blk, dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, tr cal; 40% CHK: pred medgy/brn, sme ltr gy/brn, ip intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty
8000



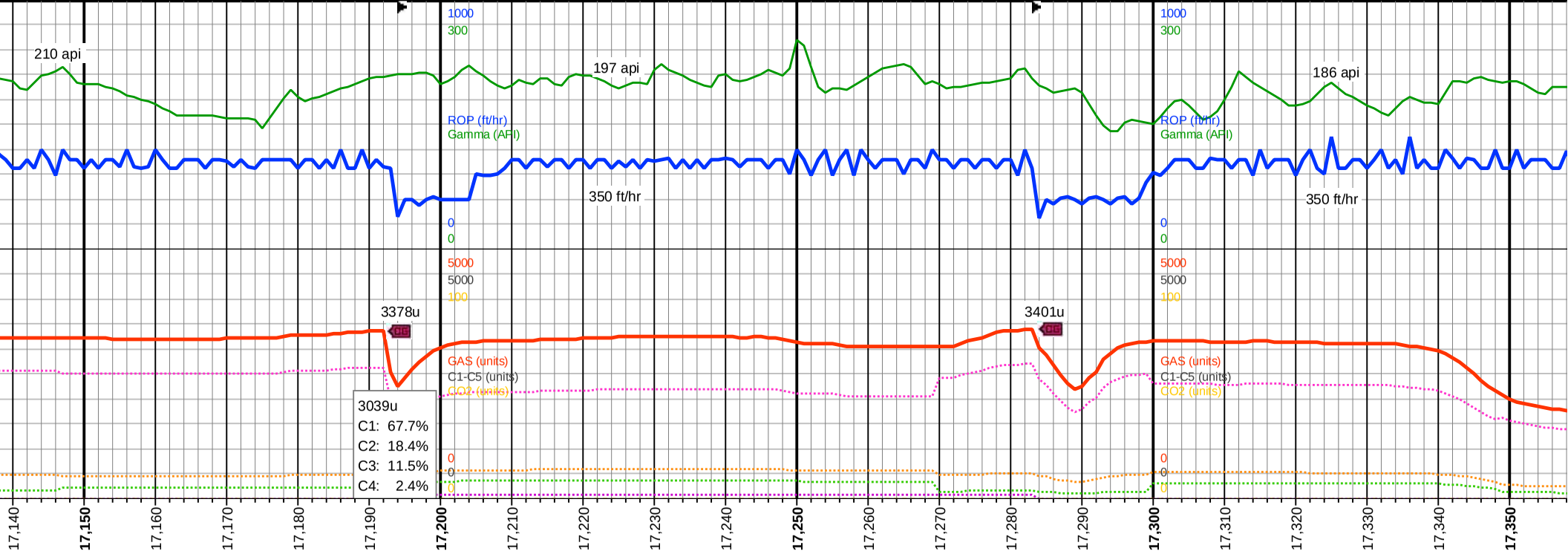


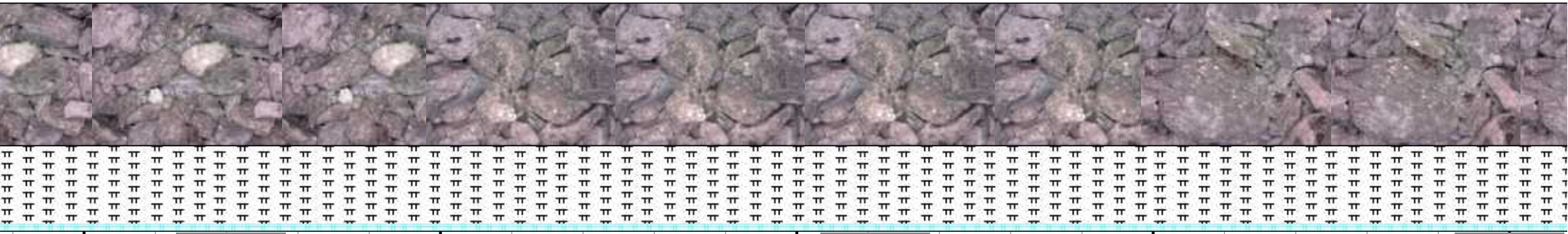


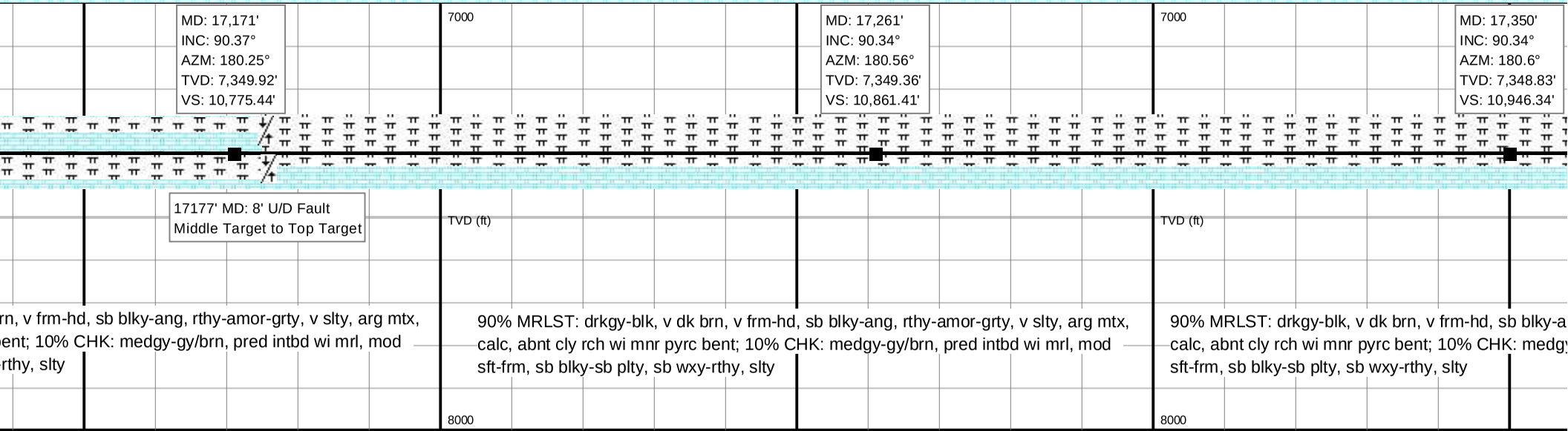
drkgy-blk, dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, % CHK: pred medgy/brn, sme ltr gy/brn, ip intbd wi mrl, mod sft-frm, sb wxy-rthy, slty

85% MRLST: drkgy-blk, v dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, abnt cly rch wi mnr pyrc bent; 15% CHK: medgy-gy/brn, pred intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

90% MRLST: drkgy-blk, v dk b calc, abnt cly rch wi mnr pyrc b sft-frm, sb blky-sb plty, sb wxy-



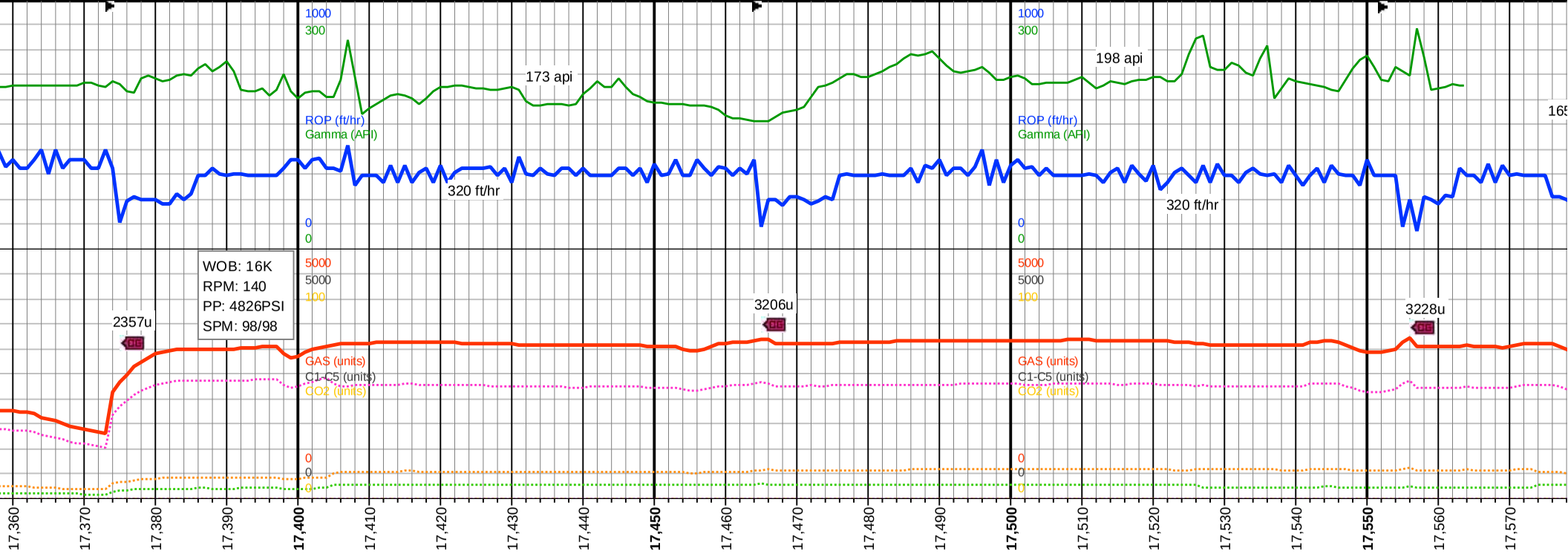


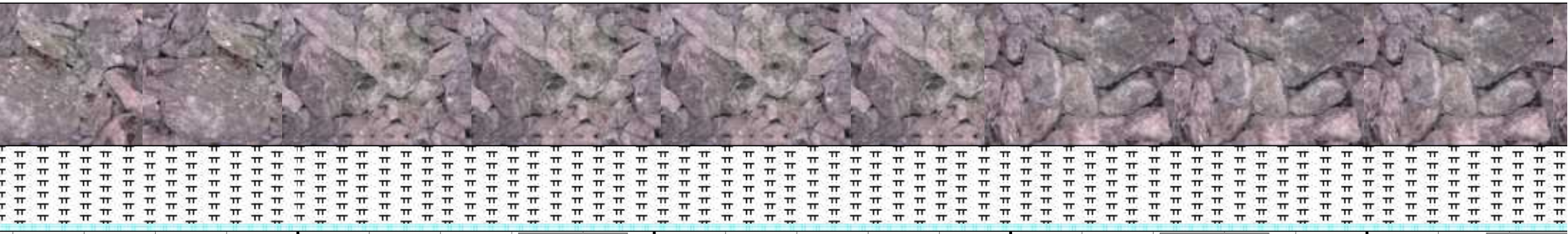


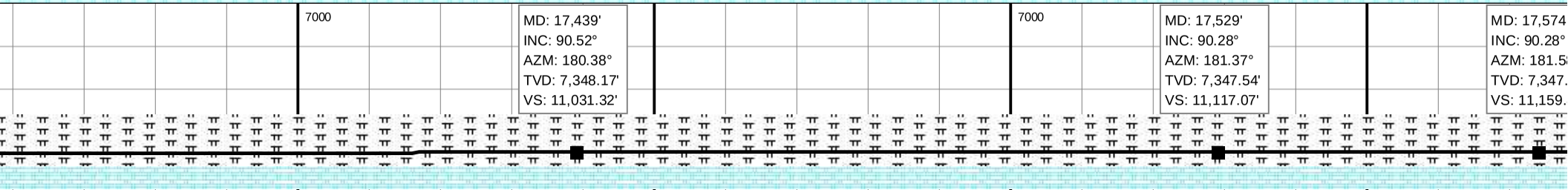
rn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, ent; 10% CHK: medgy-gy/brn, pred intbd wi mrl, mod rthy, slty

90% MRLST: drkgy-blk, v dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, abnt cly rch wi mnr pyrc bent; 10% CHK: medgy-gy/brn, pred intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

90% MRLST: drkgy-blk, v dk brn, v frm-hd, sb blky-a calc, abnt cly rch wi mnr pyrc bent; 10% CHK: medgy sft-frm, sb blky-sb plty, sb wxy-rthy, slty



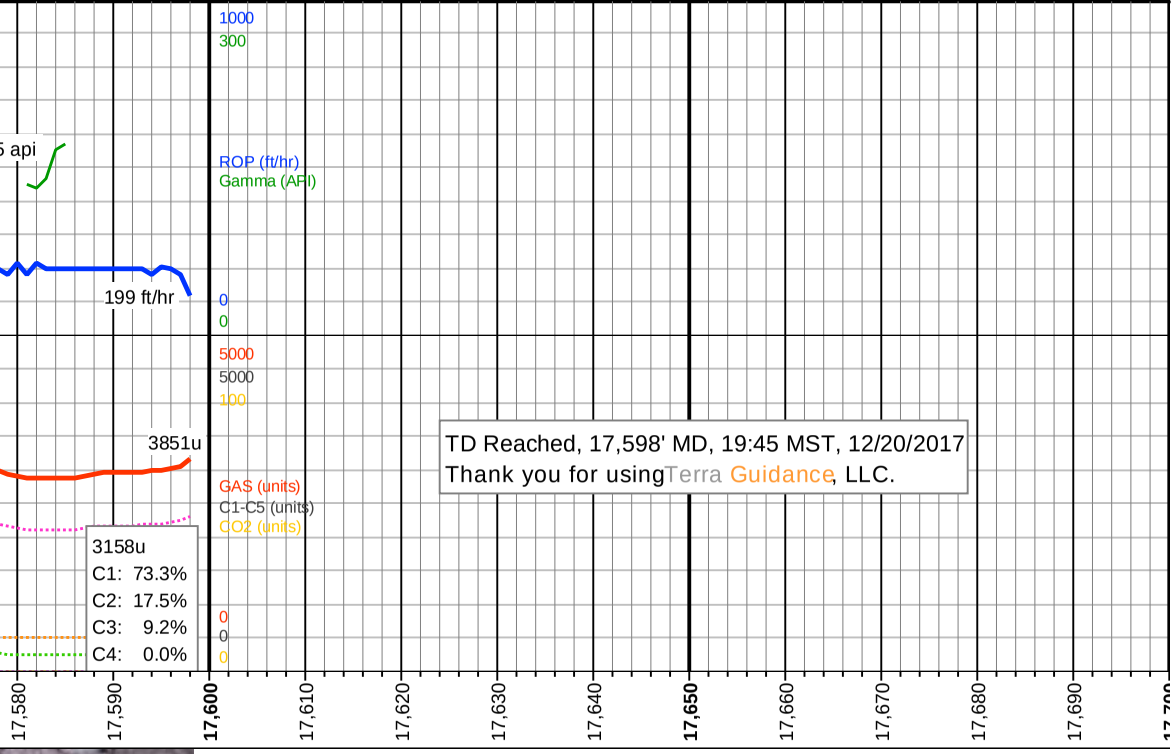


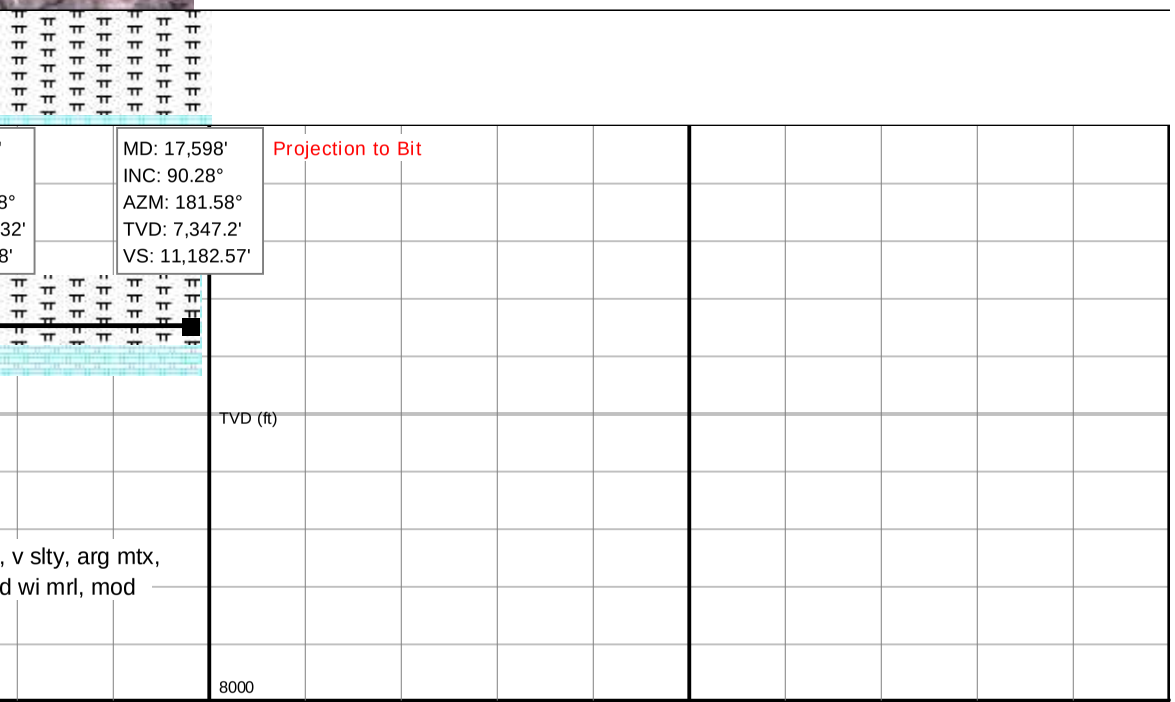


ng, rthy-amor-grty, v slty, arg mtx,
y-gy/brn, pred intbd wi mrl, mod

90% MRLST: drkgy-blk, v dk brn, v frm-hd, sb blky-ang, rthy-amor-grty, v slty, arg mtx, calc, abnt cly rch wi mnr pyrc bent; 10% CHK: medgy-gy/brn, pred intbd wi mrl, mod sft-frm, sb blky-sb plty, sb wxy-rthy, slty

90% MRLST: drkgy-blk, v dk brn, v frm-hd, sb blky-ang, rthy-amor-grty calc, abnt cly rch wi mnr pyrc bent; 10% CHK: medgy-gy/brn, pred intb sft-frm, sb blky-sb plty, sb wxy-rthy, slty, plty gn flor bent.


1000
300
5 api
ROP (ft/hr)
Gamma (API)
199 ft/hr
0
0
5000
5000
100
3851u
GAS (units)
C1-C5 (units)
CO2 (units)
TD Reached, 17,598' MD, 19:45 MST, 12/20/2017
Thank you for usingTerra Guidance, LLC.
3158u
C1: 73.3%
C2: 17.5%
C3: 9.2%
C4: 0.0%
0
0
0
17,580
17,590
17,600
17,610
17,620
17,630
17,640
17,650
17,660
17,670
17,680
17,690


MD: 17,598'
INC: 90.28°
AZM: 181.58°
TVD: 7,347.2'
VS: 11,182.57'
Projection to Bit
TVD (ft)
8000
, v slty, arg mtx,
d wi mrl, mod