Scale: 5" / 100'
Measured Depth Log

Well Name	Ottesen LE 06-351HNX		
Location	SEC 33, T1N, R66W		
State	COLORADO	**County**	WELD
Country	USA	**Rig Number**	PRECISION 466
API Number	051234828700	**AFE #**	18DC00195
Geographic Region	DJ BASIN	**Field**	WATTENBERG
Ground Elevation	5076.5'	**K.B. Elevation**	5096.5'
Logged Interval	6000' MD **To** 17750' MD	**Total Depth**	17750' MD
Formation	NIOBRARA A CHALK		
Type of Drilling Fluid	OIL BASED MUD		

Operator

Company Great Western Oil and Gas

Address 1801 Broadway, Ste 500
Denver, CO 80202

Geologist

Name Wyatt Wicks, Gabriel Rubio, Zach Souvall

Company Terra Guidance

Address 67 W. Floyd Ave. Ste 105
Englewood, CO 80110
(970) 260-5408

Other

Begin Mudlogging	12/22/2018
Mudlog Start Date	12/24/2018

Color Coding

Oil	Condensate	Gas
Note	Core	Pressure
Error	Water	Seal

Rock Types

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

Fossils

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

Minerals

ANHYDRITIC

Oil Show

O ORGANIC	
P PINPOINT	
D DEAD	
VUGGY	
EVEN	
QUESTIONABLE	
SPOTTED STAINING	

Engineering

BIT	
CASING	
CONNECTION (LEFT)	
CONNECTION (RIGHT)	
CONNECTION GAS	
CORE - LOST	
CORE - RECOVERED	
DST INTERVAL	
FAULT	

Porosity

E EARTHY	
FENESTRAL	
F FRACTURE	
INTERCRYSTALLINE	
INTEROOLITIC	
MOLDIC	

Accessories

RGILLACEOUS
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

Other Symbols

FORMATION TOP
GAS SHOW
MN DEPTH
NORMAL FAULT
OIL SHOW
OVERTURNED STRATA
REVERSE FAULT
SIDEWALL CORE (LEFT)
SIDEWALL CORE (RIGHT)
SLIDE
SURVEY
TRIP GAS
WIRELINE TESTED - LEFT
WIRELINE TESTED - RT

Rounding

ANGULAR
ROUNDED
SUBANG
SUBRND

Textures

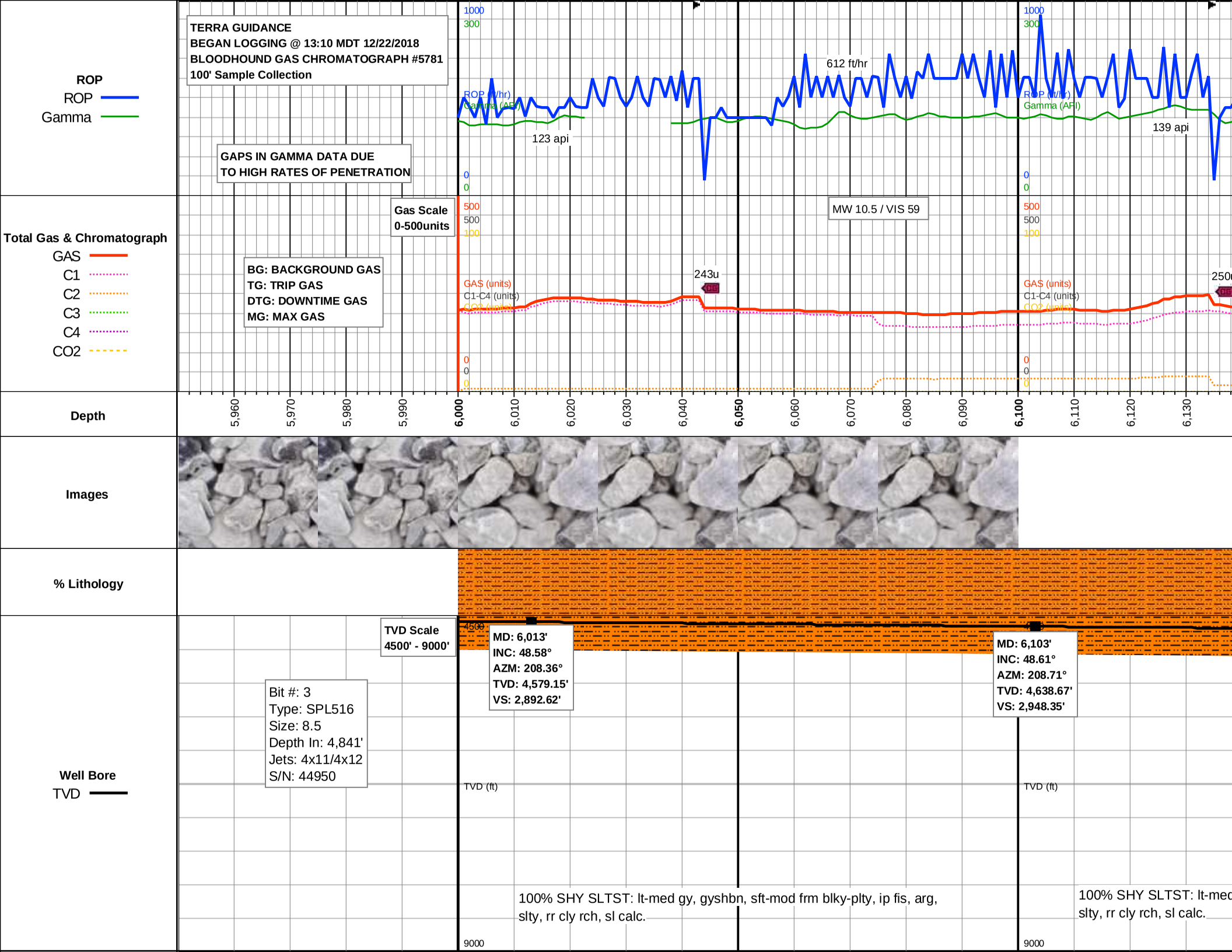
BOUNDSTONE
CHALKY
CRYPTOXLN
EARTHY
FINELYXLN
GRAINSTONE
LITHOGRAPHIC
MICROXLN
MUDSTONE
PACKSTONE
WACKESTONE

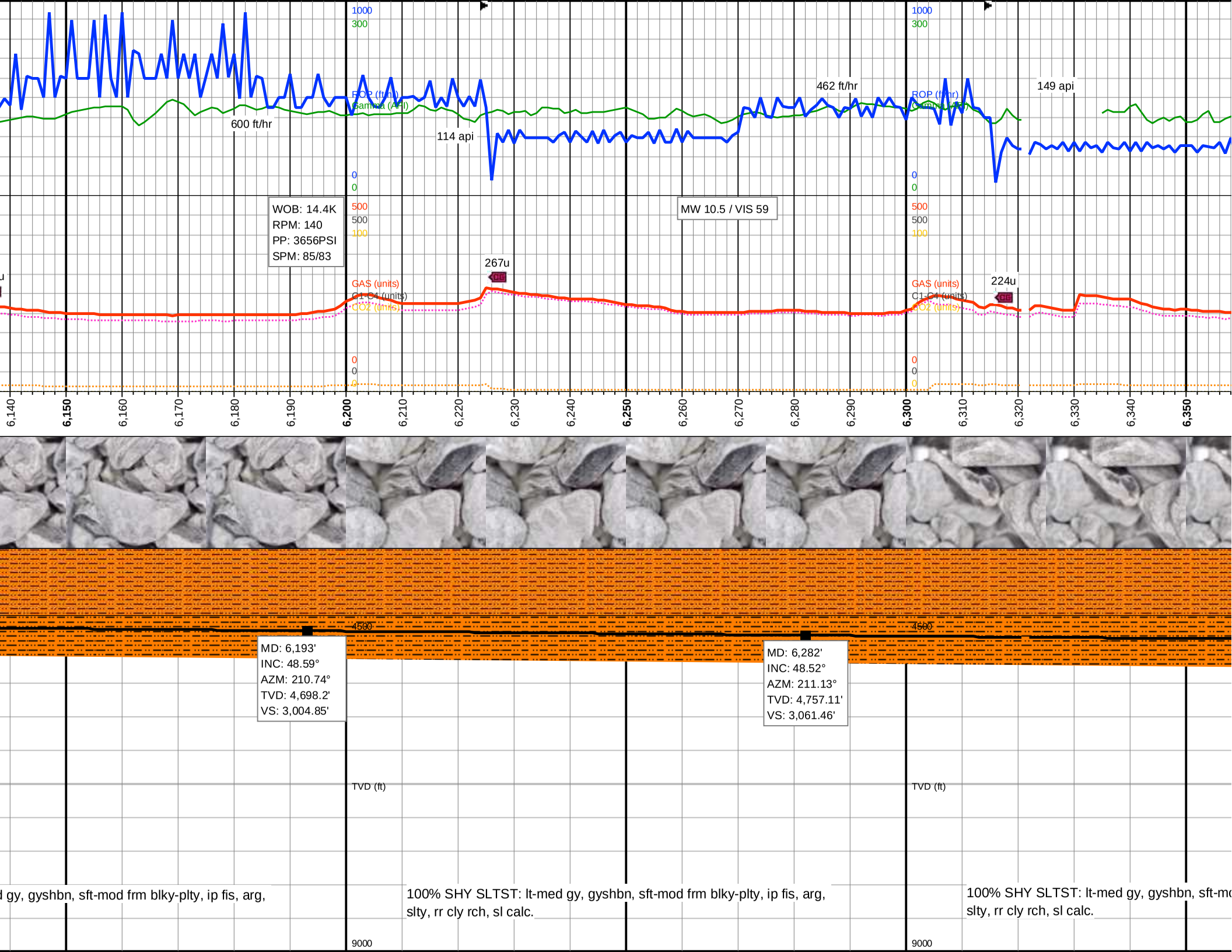
Sorting

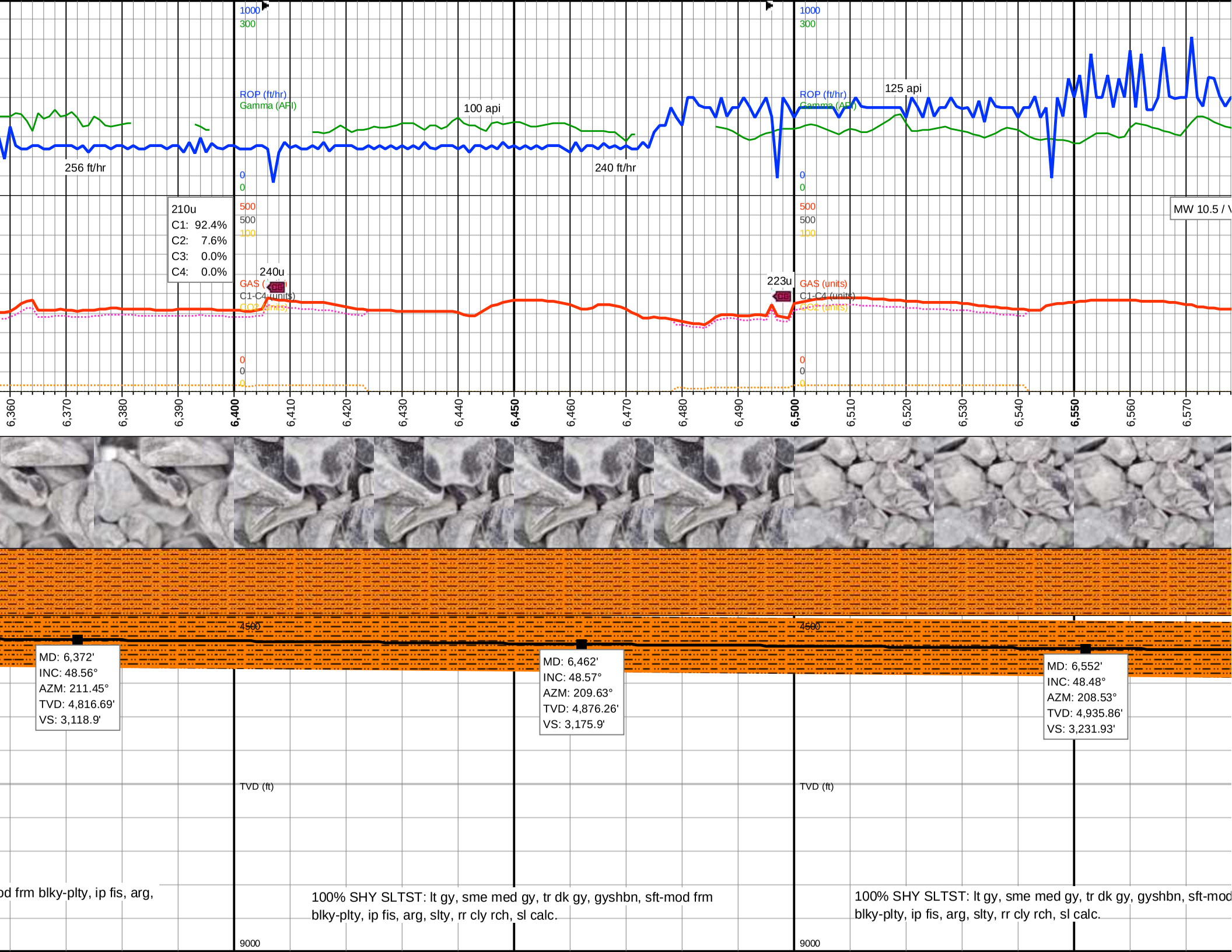
MODERATE
POOR
WELL

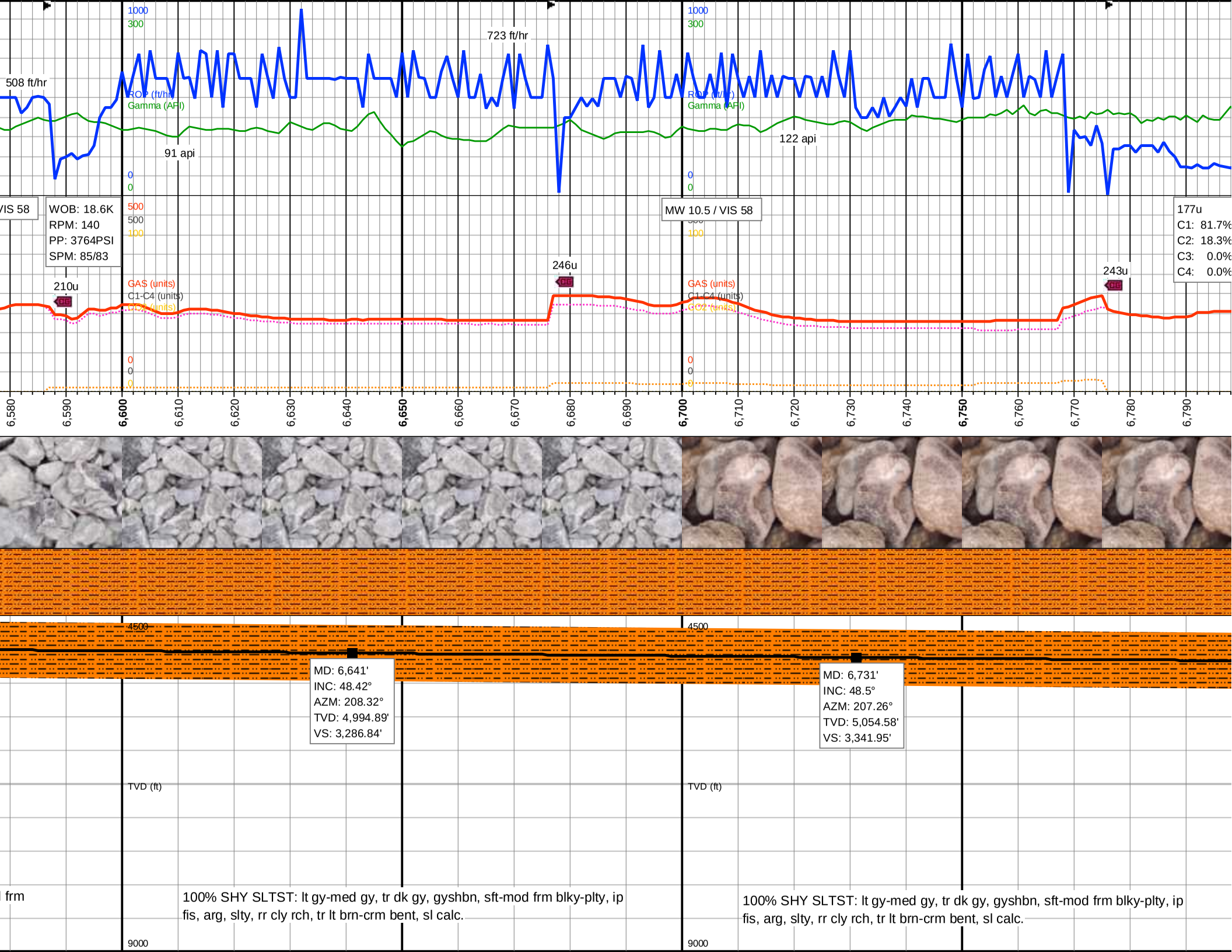
CALCARIUOS SHALE

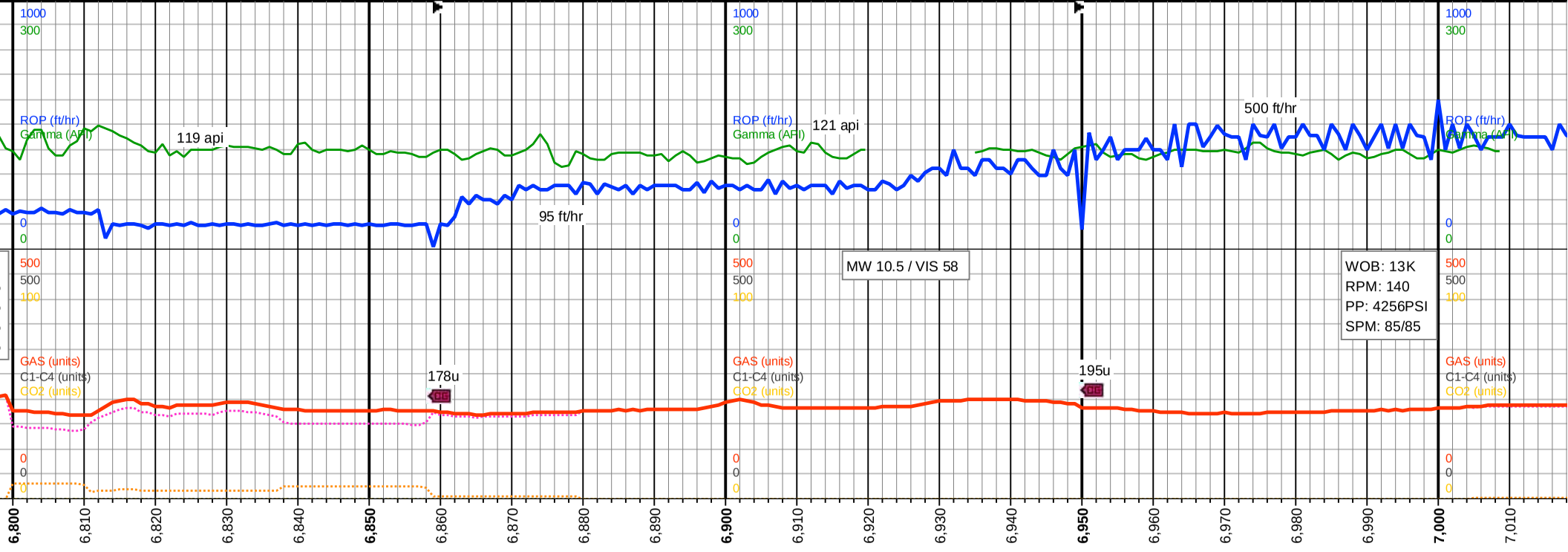
CALCARIOUS SHALE

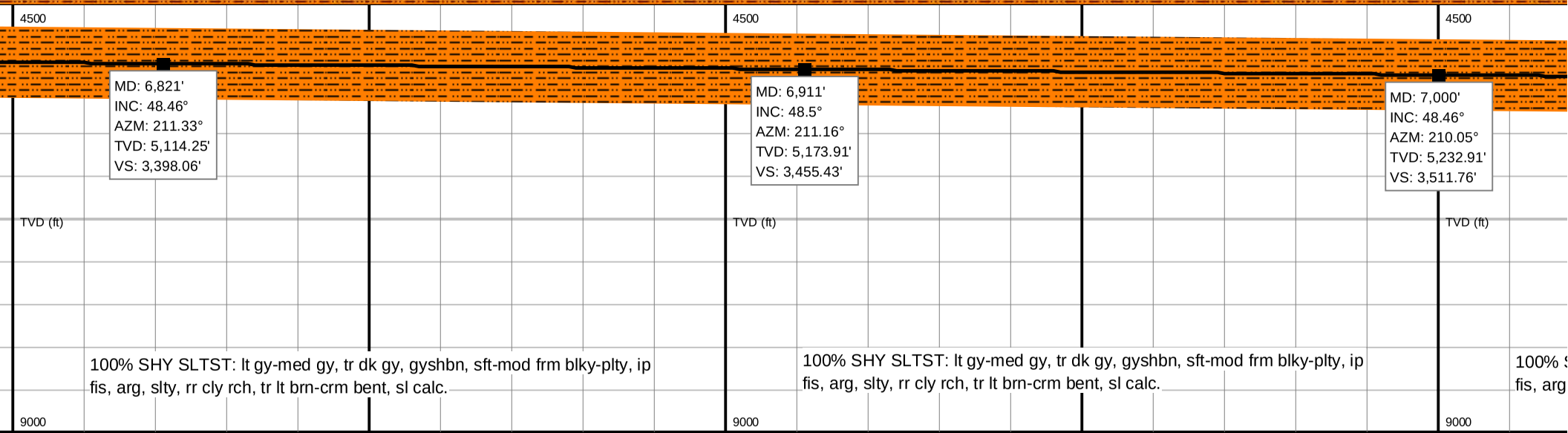

ROP
ROP
Gamma
TERRA GUIDANCE
BEGAN LOGGING @ 13:10 MDT 12/22/2018
BLOODHOUND GAS CHROMATOGRAPH #5781
100' Sample Collection
GAPS IN GAMMA DATA DUE
TO HIGH RATES OF PENETRATION
1000
300
ROP (ft/hr)
Gamma (API)
123 api
612 ft/hr
139 api
0
0
Total Gas & Chromatograph
GAS
C1
C2
C3
C4
CO2
Gas Scale
0-500units
BG: BACKGROUND GAS
TG: TRIP GAS
DTG: DOWNTIME GAS
MG: MAX GAS
MW 10.5 / VIS 59
500
500
100
GAS (units)
C1-C4 (units)
CO2 (units)
243u
250u
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
4500' - 9000'
4500
MD: 6,013'
INC: 48.58°
AZM: 208.36°
TVD: 4,579.15'
VS: 2,892.62'
MD: 6,103'
INC: 48.61°
AZM: 208.71°
TVD: 4,638.67'
VS: 2,948.35'
Bit #: 3
Type: SPL516
Size: 8.5
Depth In: 4,841'
Jets: 4x11/4x12
S/N: 44950
TVD (ft)
TVD (ft)
100% SHY SLTST: lt-med gy, gyshbn, sft-mod frm blky-plty, ip fis, arg, slty, rr cly rch, sl calc.
100% SHY SLTST: lt-med
slty, rr cly rch, sl calc.
9000
9000

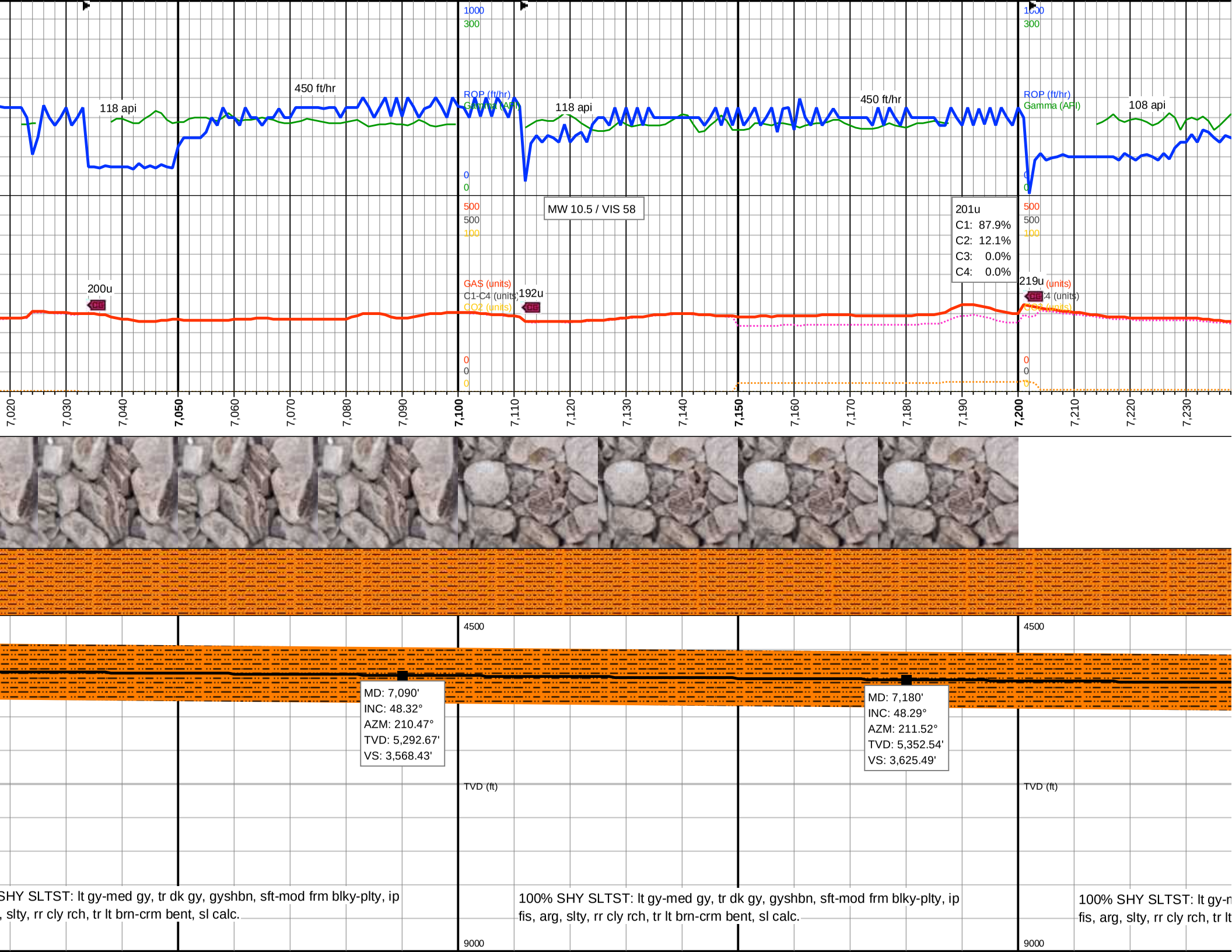

1000
300
ROP (ft/hr)
Gamma (API)
600 ft/hr
114 api
462 ft/hr
149 api
0
0
WOB: 14.4K
RPM: 140
PP: 3656PSI
SPM: 85/83
MW 10.5 / VIS 59
500
500
100
267u
224u
GAS (units)
C1-C4 (units)
CO2 (units)
6,140
6,150
6,160
6,170
6,180
6,190
6,200
6,210
6,220
6,230
6,240
6,250
6,260
6,270
6,280
6,290
6,300
6,310
6,320
6,330
6,340
6,350
4500
MD: 6,193'
INC: 48.59°
AZM: 210.74°
TVD: 4,698.2'
VS: 3,004.85'
MD: 6,282'
INC: 48.52°
AZM: 211.13°
TVD: 4,757.11'
VS: 3,061.46'
TVD (ft)
9000
d gy, gyshbn, sft-mod frm blky-plty, ip fis, arg,
100% SHY SLTST: lt-med gy, gyshbn, sft-mod frm blky-plty, ip fis, arg, slty, rr cly rch, sl calc.
100% SHY SLTST: lt-med gy, gyshbn, sft-mo slty, rr cly rch, sl calc.

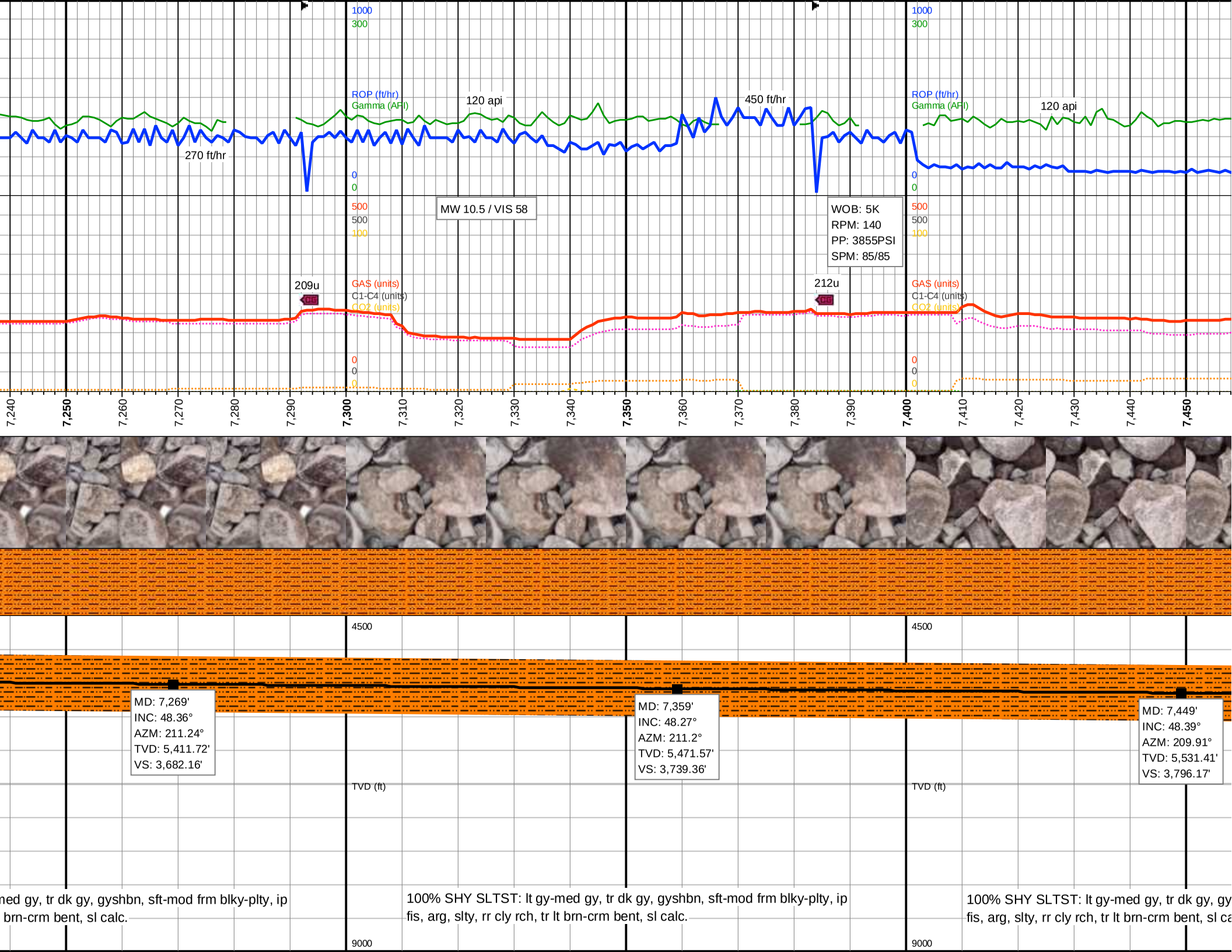

1000
300
ROP (ft/hr)
Gamma (API)
100 api
125 api
256 ft/hr
240 ft/hr
0
0
210u
C1: 92.4%
C2: 7.6%
C3: 0.0%
C4: 0.0%
500
500
100
240u
223u
GAS (units)
C1-C4 (units)
CO2 (units)
MW 10.5 / V
6,360
6,370
6,380
6,390
6,400
6,410
6,420
6,430
6,440
6,450
6,460
6,470
6,480
6,490
6,500
6,510
6,520
6,530
6,540
6,550
6,560
6,570
4500
MD: 6,372'
INC: 48.56°
AZM: 211.45°
TVD: 4,816.69'
VS: 3,118.9'
MD: 6,462'
INC: 48.57°
AZM: 209.63°
TVD: 4,876.26'
VS: 3,175.9'
MD: 6,552'
INC: 48.48°
AZM: 208.53°
TVD: 4,935.86'
VS: 3,231.93'
TVD (ft)
9000
od frm blky-plty, ip fis, arg,
100% SHY SLTST: lt gy, sme med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip fis, arg, slty, rr cly rch, sl calc.
100% SHY SLTST: lt gy, sme med gy, tr dk gy, gyshbn, sft-mod blky-plty, ip fis, arg, slty, rr cly rch, sl calc.

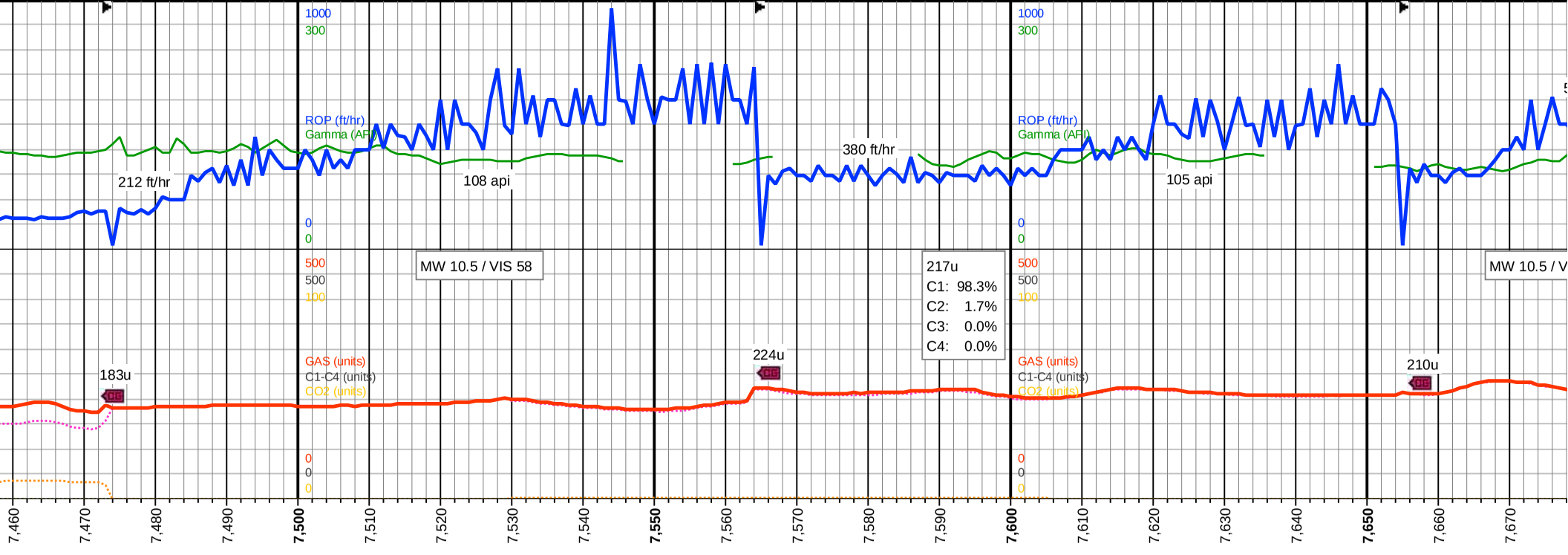

1000
300
508 ft/hr
723 ft/hr
ROP (ft/hr)
Gamma (API)
91 api
122 api
0
0
VIS 58
WOB: 18.6K
RPM: 140
PP: 3764PSI
SPM: 85/83
MW 10.5 / VIS 58
177u
C1: 81.7%
C2: 18.3%
C3: 0.0%
C4: 0.0%
500
100
210u
246u
243u
GAS (units)
C1-C4 (units)
CO2 (units)
6,580
6,590
6,600
6,610
6,620
6,630
6,640
6,650
6,660
6,670
6,680
6,690
6,700
6,710
6,720
6,730
6,740
6,750
6,760
6,770
6,780
6,790
4500
MD: 6,641'
INC: 48.42°
AZM: 208.32°
TVD: 4,994.89'
VS: 3,286.84'
MD: 6,731'
INC: 48.5°
AZM: 207.26°
TVD: 5,054.58'
VS: 3,341.95'
TVD (ft)
9000
frm
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.

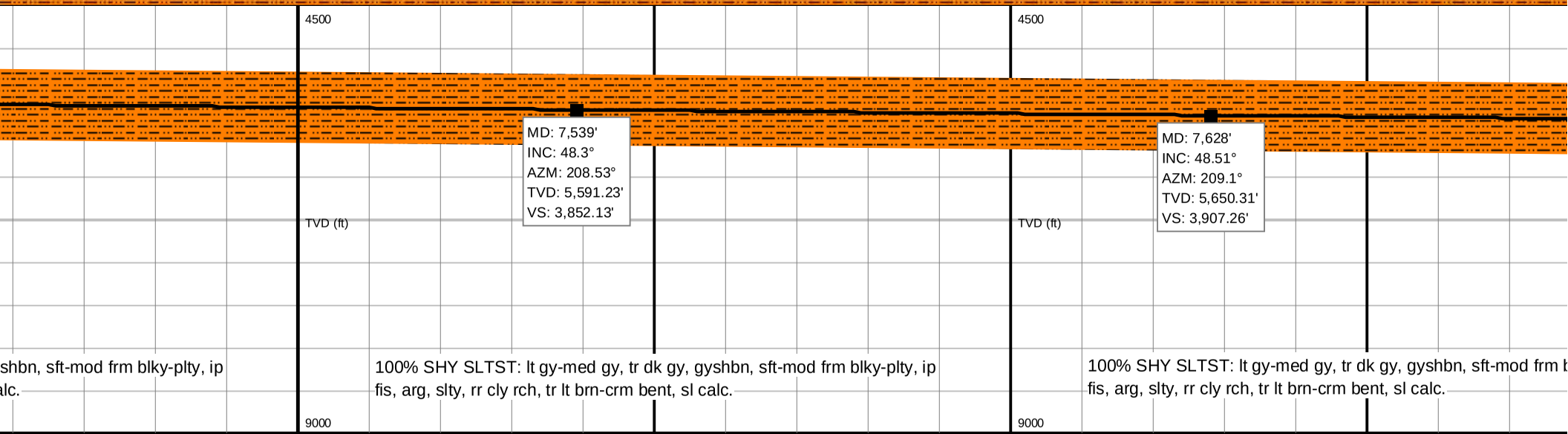

1000
300
ROP (ft/hr)
Gamma (API)
119 api
95 ft/hr
121 api
500 ft/hr
0
0
500
500
100
GAS (units)
C1-C4 (units)
CO2 (units)
178u
195u
MW 10.5 / VIS 58
WOB: 13K
RPM: 140
PP: 4256PSI
SPM: 85/85
6,800
6,810
6,820
6,830
6,840
6,850
6,860
6,870
6,880
6,890
6,900
6,910
6,920
6,930
6,940
6,950
6,960
6,970
6,980
6,990
7,000
7,010


4500
MD: 6,821'
INC: 48.46°
AZM: 211.33°
TVD: 5,114.25'
VS: 3,398.06'
MD: 6,911'
INC: 48.5°
AZM: 211.16°
TVD: 5,173.91'
VS: 3,455.43'
MD: 7,000'
INC: 48.46°
AZM: 210.05°
TVD: 5,232.91'
VS: 3,511.76'
TVD (ft)
9000
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.


1000
300
ROP (ft/hr)
Gamma (API)
450 ft/hr
118 api
0
0
500
500
100
MW 10.5 / VIS 58
GA$ (units)
C1-C4 (units)
CO2 (units)
200u
192u
0
0
0
7,020
7,030
7,040
7,050
7,060
7,070
7,080
7,090
7,100
7,110
7,120
7,130
7,140
7,150
7,160
7,170
7,180
7,190
7,200
7,210
7,220
7,230
1000
300
ROP (ft/hr)
Gamma (API)
118 api
450 ft/hr
108 api
201u
C1: 87.9%
C2: 12.1%
C3: 0.0%
C4: 0.0%
500
500
100
219u (units)
0
0
0
4500
4500
MD: 7,090'
INC: 48.32°
AZM: 210.47°
TVD: 5,292.67'
VS: 3,568.43'
MD: 7,180'
INC: 48.29°
AZM: 211.52°
TVD: 5,352.54'
VS: 3,625.49'
TVD (ft)
TVD (ft)
9000
9000
SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip
, slty, rr cly rch, tr lt brn-crm bent, sl calc.
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip
fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.
100% SHY SLTST: lt gy-m
fis, arg, slty, rr cly rch, tr lt


1000
300
ROP (ft/hr)
Gamma (API)
120 api
450 ft/hr
270 ft/hr
120 api
0
0
500
500
100
MW 10.5 / VIS 58
WOB: 5K
RPM: 140
PP: 3855PSI
SPM: 85/85
209u
212u
GAS (units)
C1-C4 (units)
CO2 (units)
0
0
0
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
4500
MD: 7,269'
INC: 48.36°
AZM: 211.24°
TVD: 5,411.72'
VS: 3,682.16'
MD: 7,359'
INC: 48.27°
AZM: 211.2°
TVD: 5,471.57'
VS: 3,739.36'
MD: 7,449'
INC: 48.39°
AZM: 209.91°
TVD: 5,531.41'
VS: 3,796.17'
TVD (ft)
9000
med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip
brn-crm bent, sl calc.
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip
fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.
100% SHY SLTST: lt gy-med gy, tr dk gy, gy
fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl ca

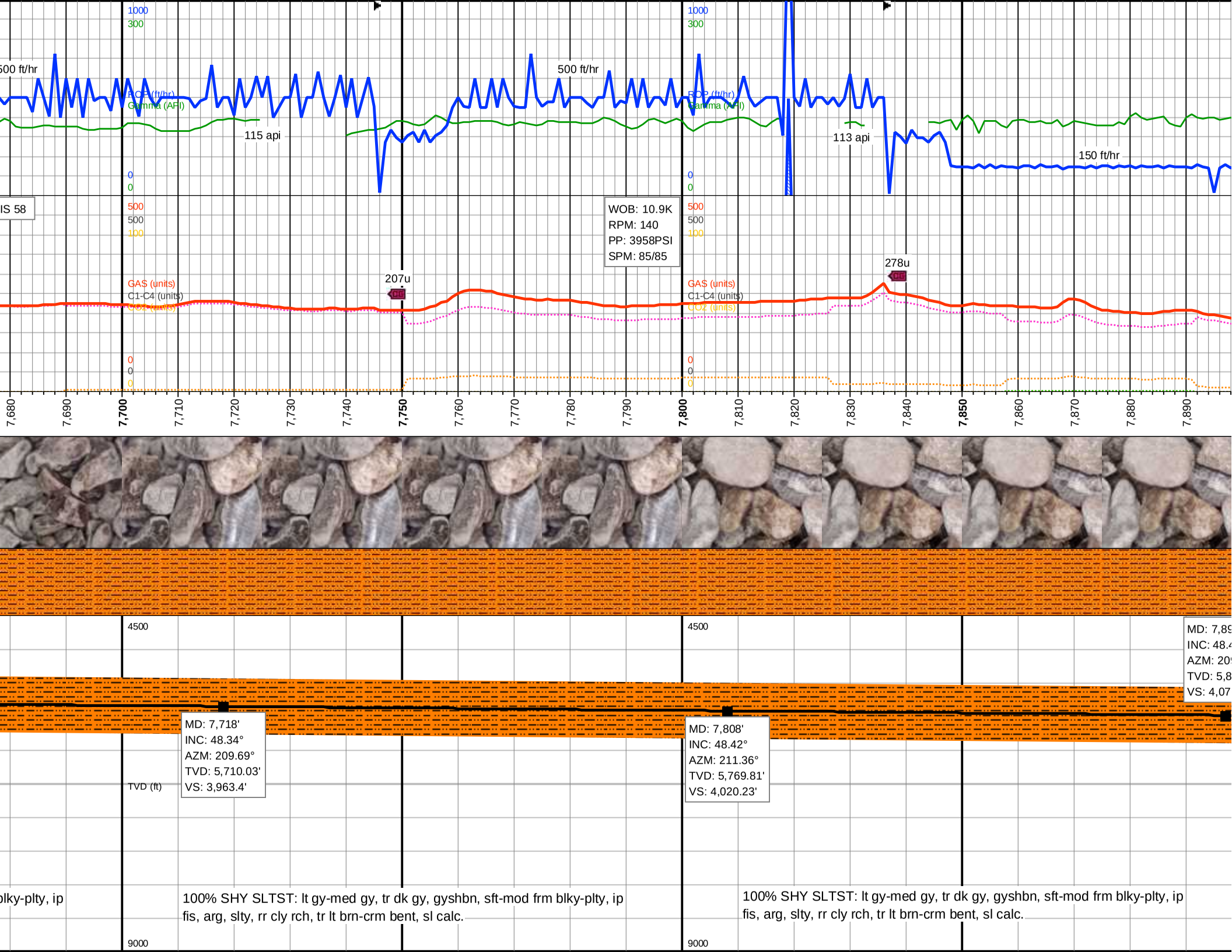


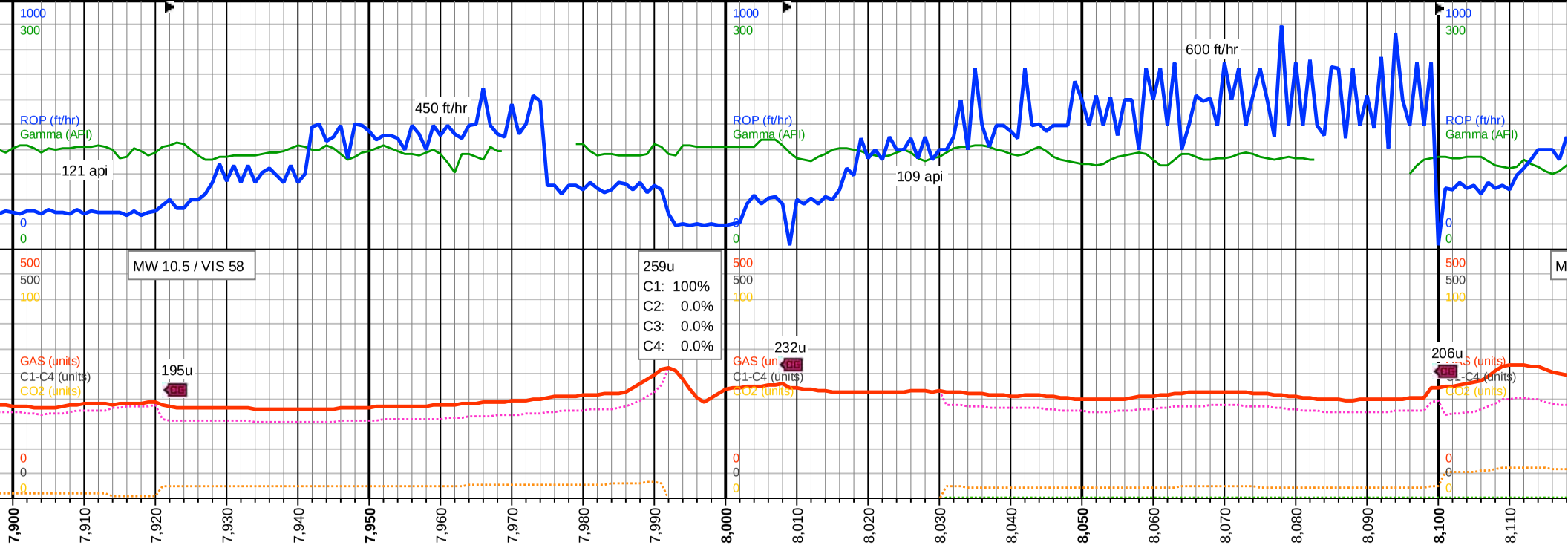


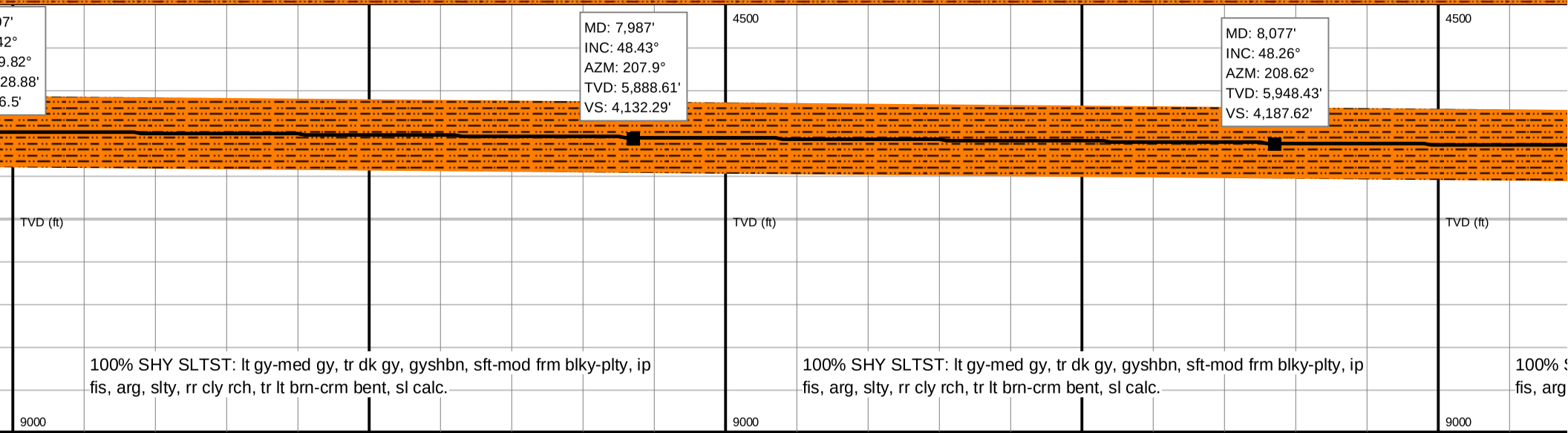
shbn, sft-mod frm blky-plty, ip
alc.

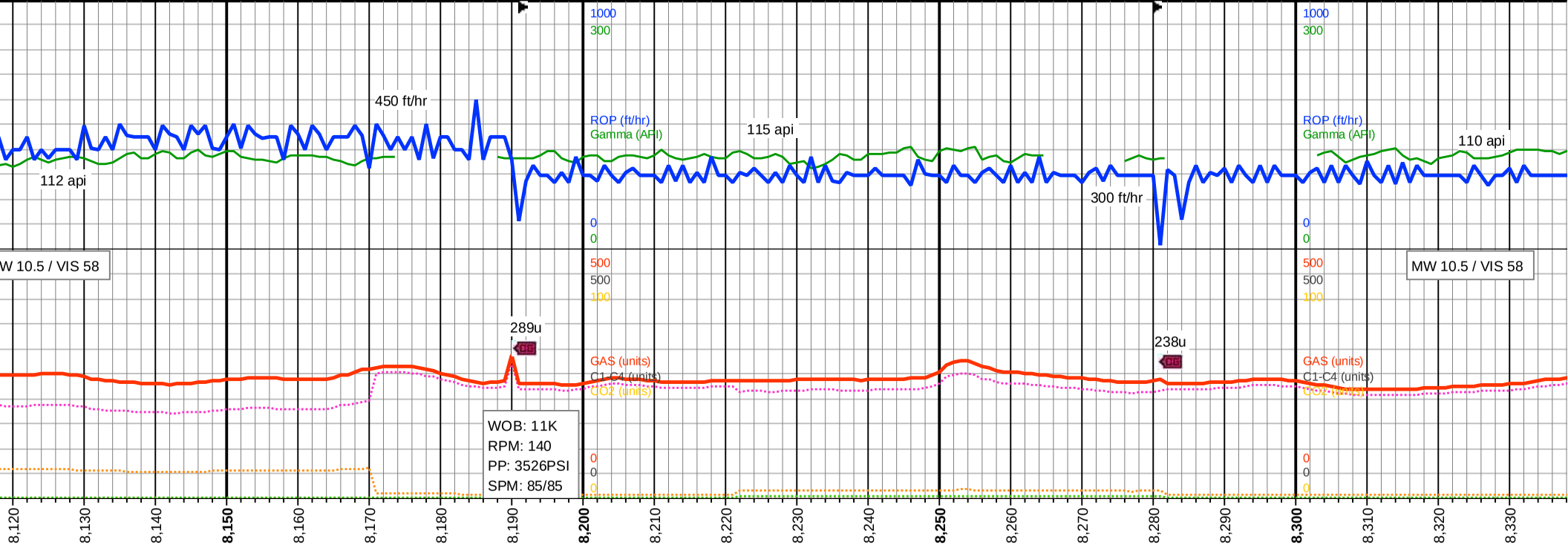
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.

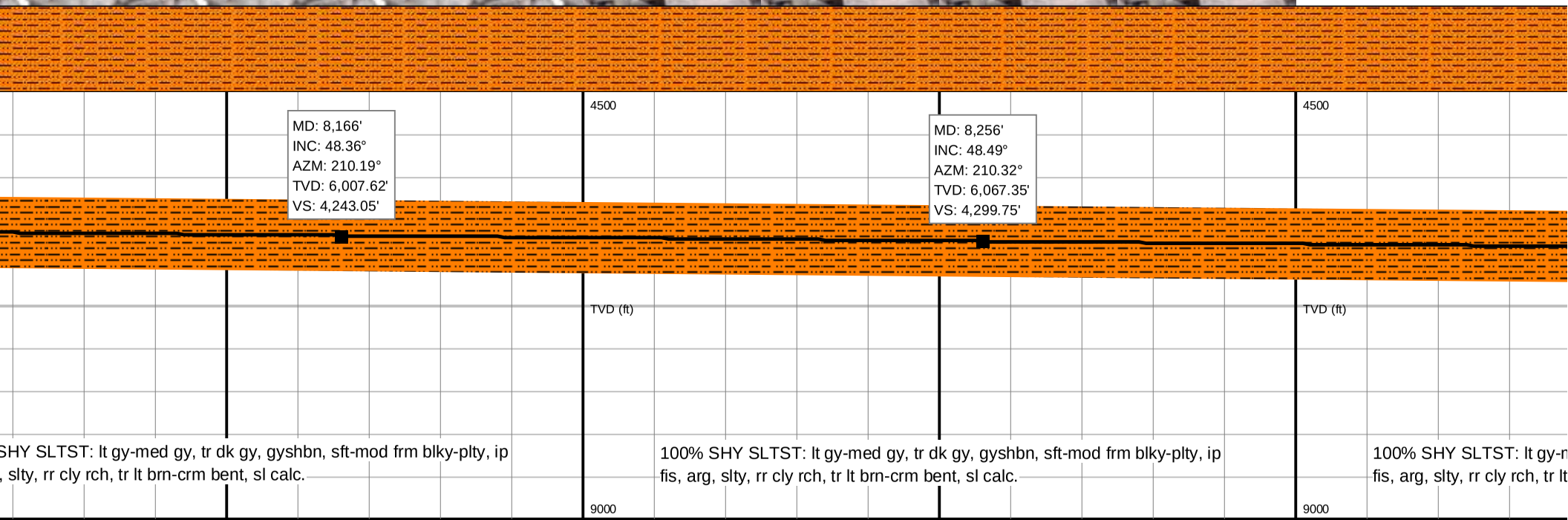
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm b fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.


1000
300
500 ft/hr
ROP (ft/hr)
Gamma (API)
115 api
0
0
500 ft/hr
1000
300
ROP (ft/hr)
Gamma (API)
113 api
150 ft/hr
0
0
IS 58
500
500
100
GAS (units)
C1-C4 (units)
CO2 (units)
207u
WOB: 10.9K
RPM: 140
PP: 3958PSI
SPM: 85/85
500
500
100
278u
GAS (units)
C1-C4 (units)
CO2 (units)
0
0
0
0
0
0
7,680
7,690
7,700
7,710
7,720
7,730
7,740
7,750
7,760
7,770
7,780
7,790
7,800
7,810
7,820
7,830
7,840
7,850
7,860
7,870
7,880
7,890
4500
4500
MD: 7,718'
INC: 48.34°
AZM: 209.69°
TVD: 5,710.03'
VS: 3,963.4'
MD: 7,808'
INC: 48.42°
AZM: 211.36°
TVD: 5,769.81'
VS: 4,020.23'
MD: 7,89
INC: 48.4
AZM: 20
TVD: 5,8
VS: 4,07
TVD (ft)
lky-plty, ip
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.
9000
9000


1000
300
ROP (ft/hr)
Gamma (API)
450 ft/hr
121 api
600 ft/hr
109 api
0
0
500
500
100
GAS (units)
C1-C4 (units)
CO2 (units)
MW 10.5 / VIS 58
259u
C1: 100%
C2: 0.0%
C3: 0.0%
C4: 0.0%
195u
232u
206u
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


MD: 7,987'
INC: 48.43°
AZM: 207.9°
TVD: 5,888.61'
VS: 4,132.29'
MD: 8,077'
INC: 48.26°
AZM: 208.62°
TVD: 5,948.43'
VS: 4,187.62'
4500
TVD (ft)
9000
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.

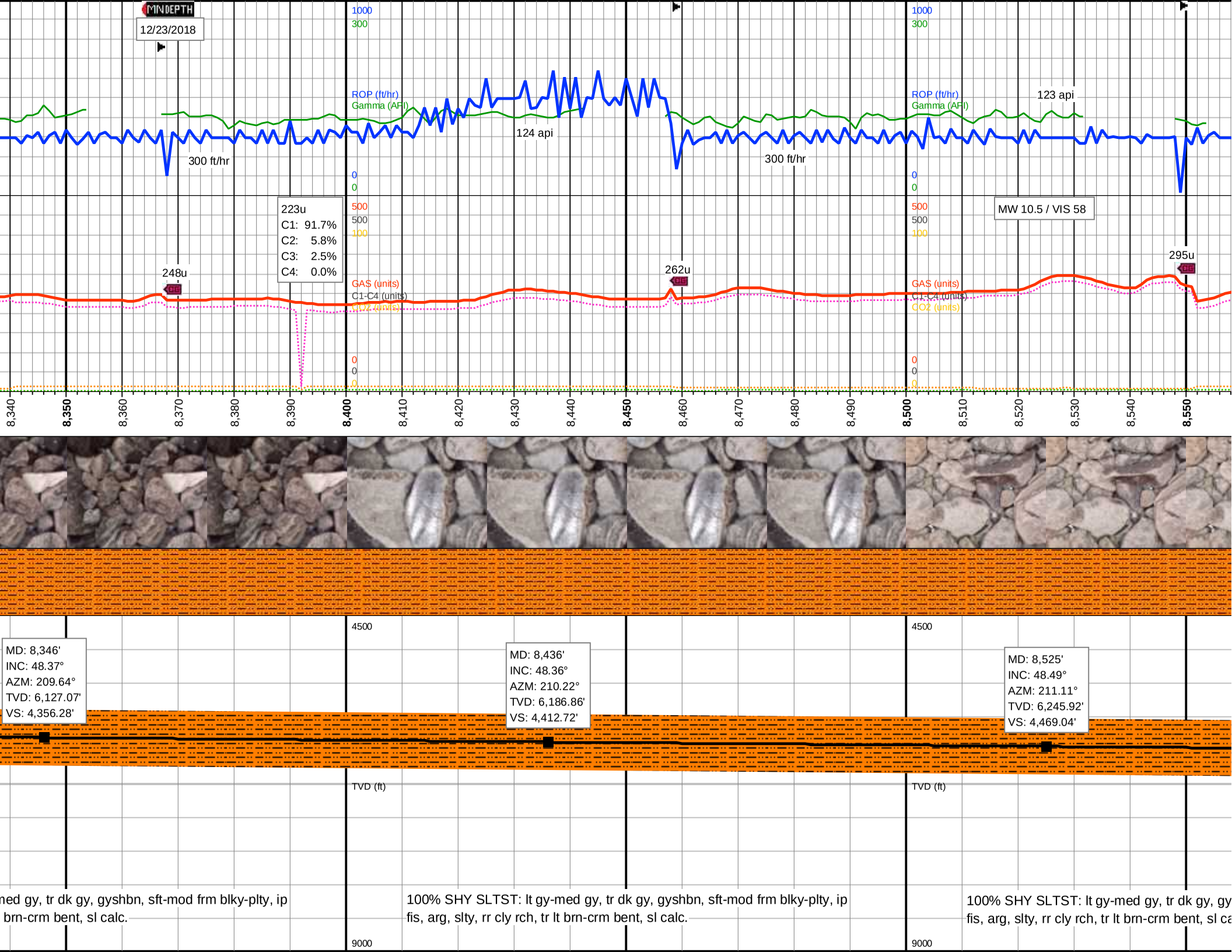


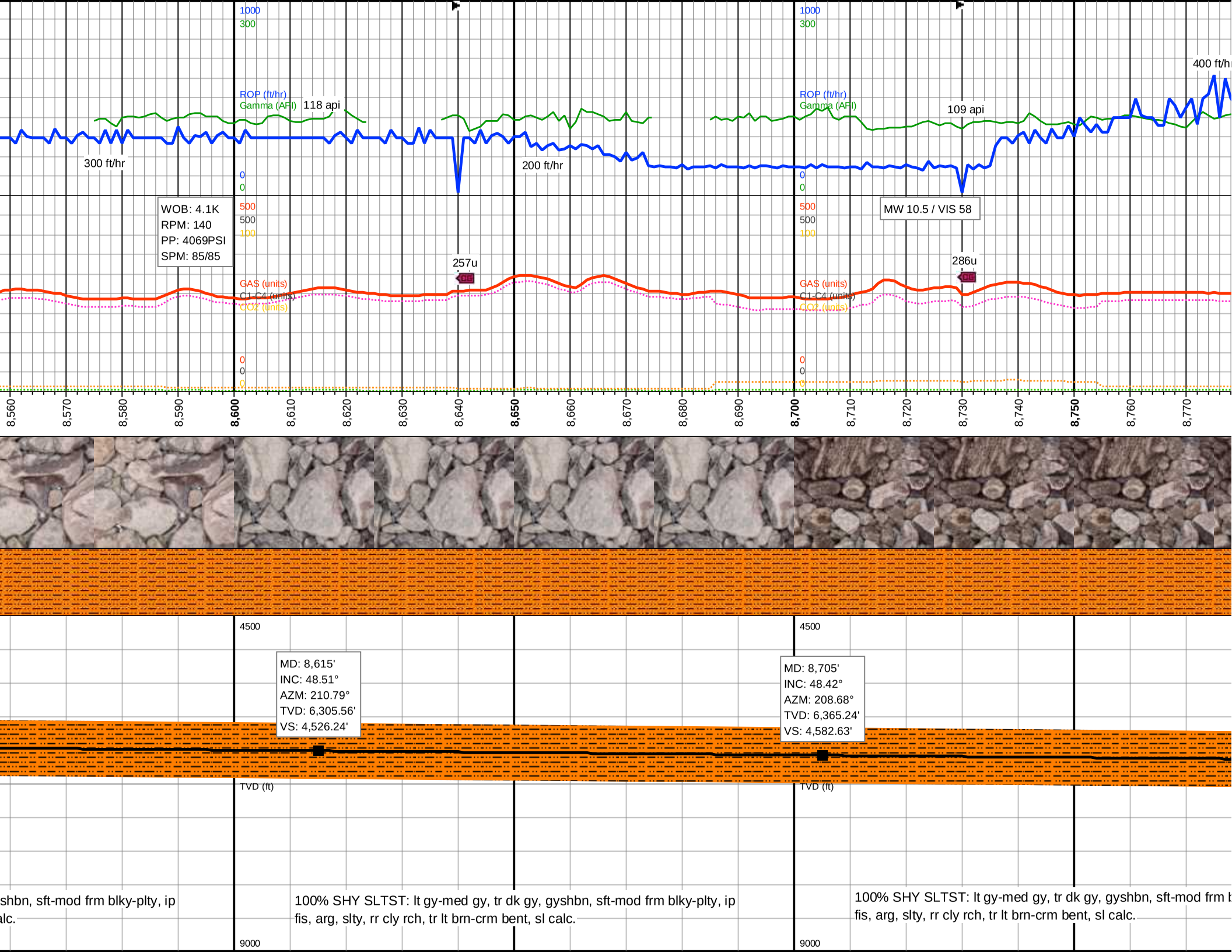


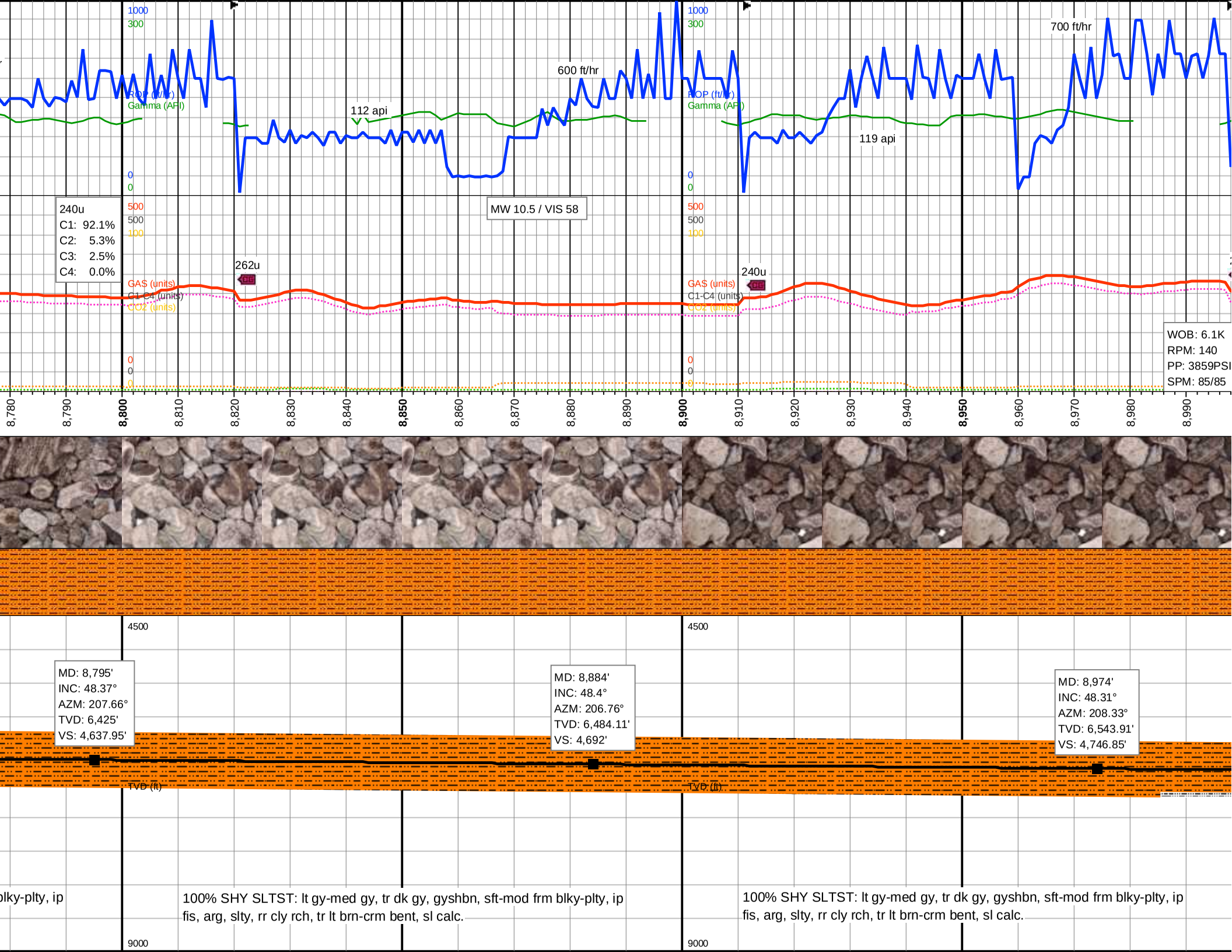
SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip
, slty, rr cly rch, tr lt brn-crm bent, sl calc.

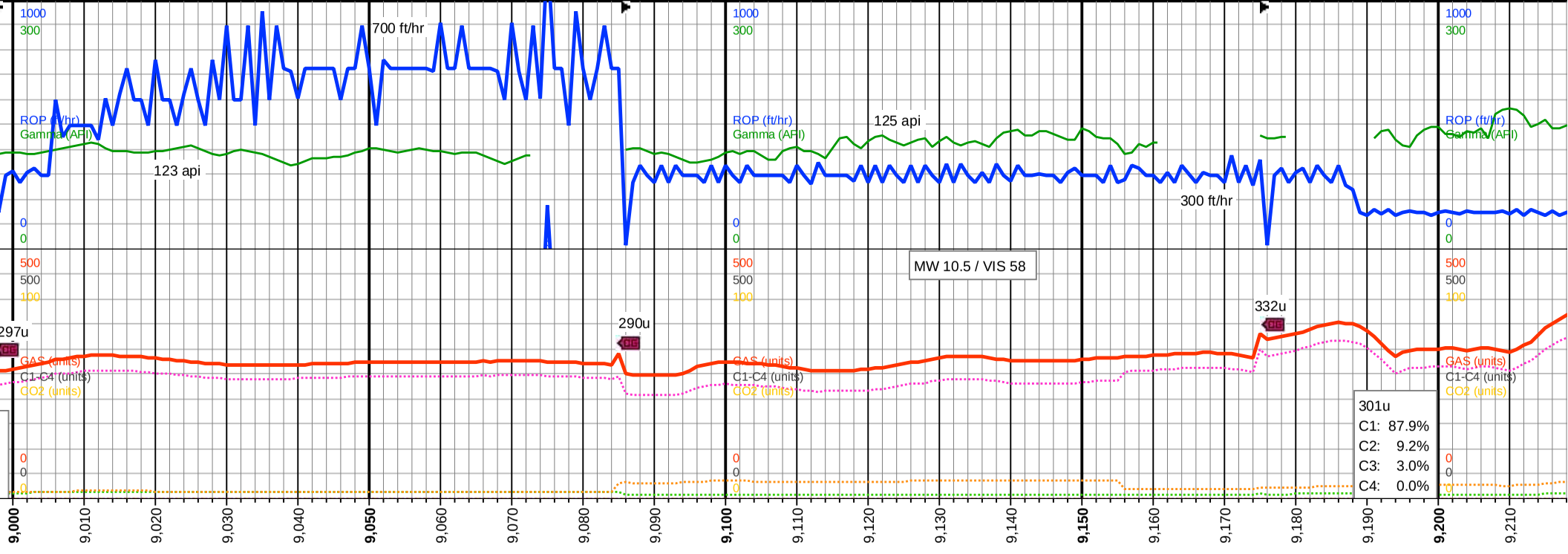
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip
fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.

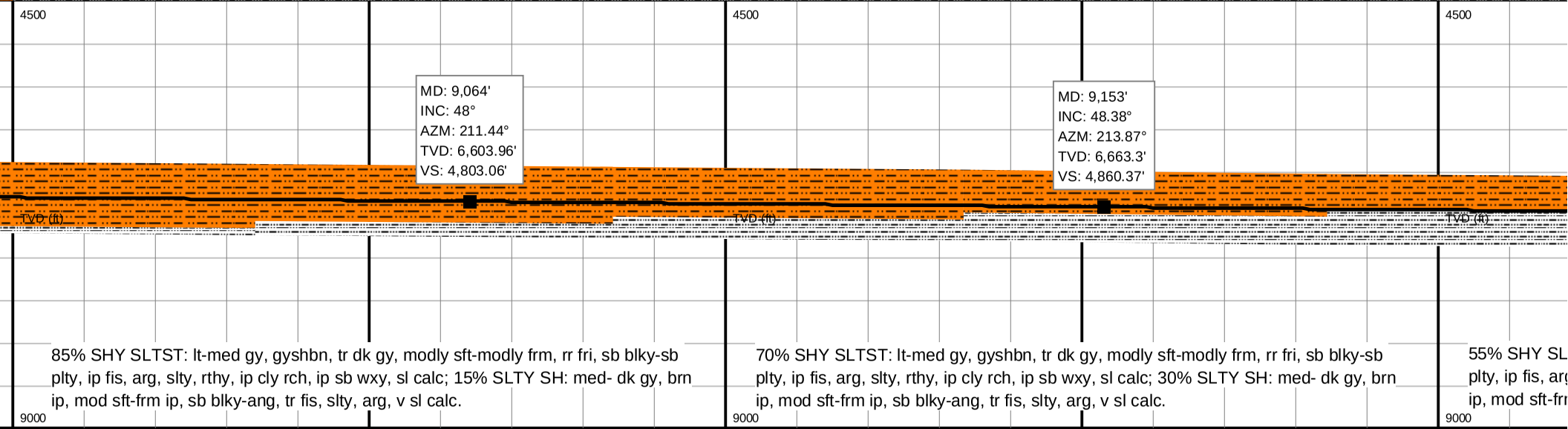
100% SHY SLTST: lt gy-m
fis, arg, slty, rr cly rch, tr lt


MNDEPTH
12/23/2018
1000
300
ROP (ft/hr)
Gamma (API)
300 ft/hr
124 api
300 ft/hr
123 api
0
0
500
500
100
223u
C1: 91.7%
C2: 5.8%
C3: 2.5%
C4: 0.0%
248u
262u
295u
MW 10.5 / VIS 58
GAS (units)
C1-C4 (units)
CO2 (units)
8,340
8,350
8,360
8,370
8,380
8,390
8,400
8,410
8,420
8,430
8,440
8,450
8,460
8,470
8,480
8,490
8,500
8,510
8,520
8,530
8,540
8,550
4500
MD: 8,346'
INC: 48.37°
AZM: 209.64°
TVD: 6,127.07'
VS: 4,356.28'
MD: 8,436'
INC: 48.36°
AZM: 210.22°
TVD: 6,186.86'
VS: 4,412.72'
MD: 8,525'
INC: 48.49°
AZM: 211.11°
TVD: 6,245.92'
VS: 4,469.04'
TVD (ft)
9000
med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip
brn-crm bent, sl calc.
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip
fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.
100% SHY SLTST: lt gy-med gy, tr dk gy, gy
fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl ca


1000
300
ROP (ft/hr)
Gamma (AFI)
118 api
300 ft/hr
200 ft/hr
109 api
400 ft/hr
0
0
WOB: 4.1K
RPM: 140
PP: 4069PSI
SPM: 85/85
500
500
100
MW 10.5 / VIS 58
257u
286u
GAS (units)
C1-C4 (units)
CO2 (units)
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
4500
MD: 8,615'
INC: 48.51°
AZM: 210.79°
TVD: 6,305.56'
VS: 4,526.24'
MD: 8,705'
INC: 48.42°
AZM: 208.68°
TVD: 6,365.24'
VS: 4,582.63'
TVD (ft)
9000
shbn, sft-mod frm blky-plty, ip
lc.
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip
fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm b
fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.


1000
300
ROP (ft/hr)
Gamma (API)
0
0
600 ft/hr
112 api
700 ft/hr
119 api
240u
C1: 92.1%
C2: 5.3%
C3: 2.5%
C4: 0.0%
MW 10.5 / VIS 58
500
500
100
GAS (units)
C1-C4 (units)
CO2 (units)
262u
240u
WOB: 6.1K
RPM: 140
PP: 3859PSI
SPM: 85/85
8,780
8,790
8,800
8,810
8,820
8,830
8,840
8,850
8,860
8,870
8,880
8,890
8,900
8,910
8,920
8,930
8,940
8,950
8,960
8,970
8,980
8,990
4500
MD: 8,795'
INC: 48.37°
AZM: 207.66°
TVD: 6,425'
VS: 4,637.95'
MD: 8,884'
INC: 48.4°
AZM: 206.76°
TVD: 6,484.11'
VS: 4,692'
MD: 8,974'
INC: 48.31°
AZM: 208.33°
TVD: 6,543.91'
VS: 4,746.85'
TVD (ft)
9000
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.
100% SHY SLTST: lt gy-med gy, tr dk gy, gyshbn, sft-mod frm blky-plty, ip fis, arg, slty, rr cly rch, tr lt brn-crm bent, sl calc.

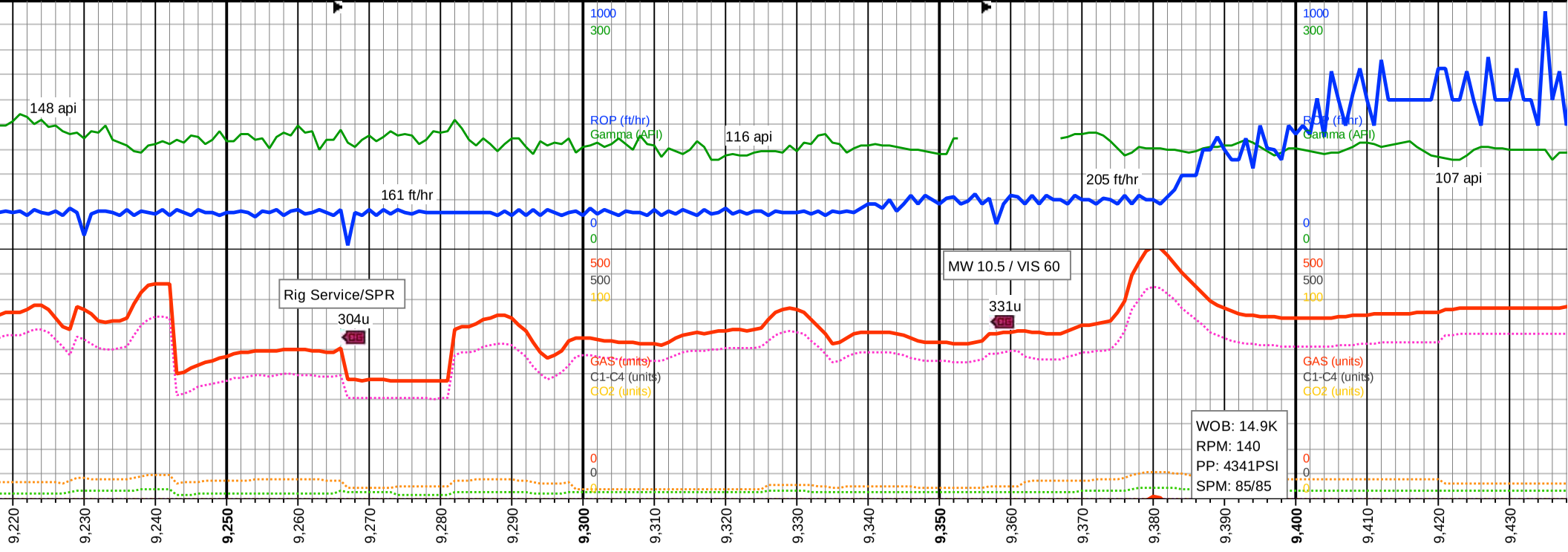


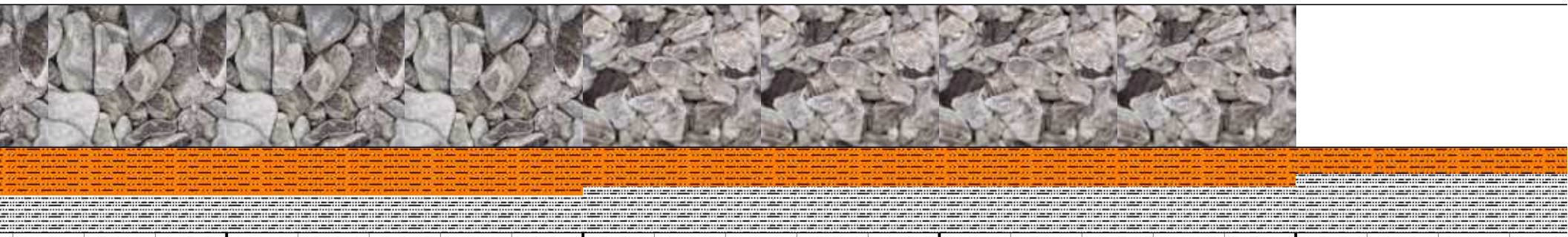


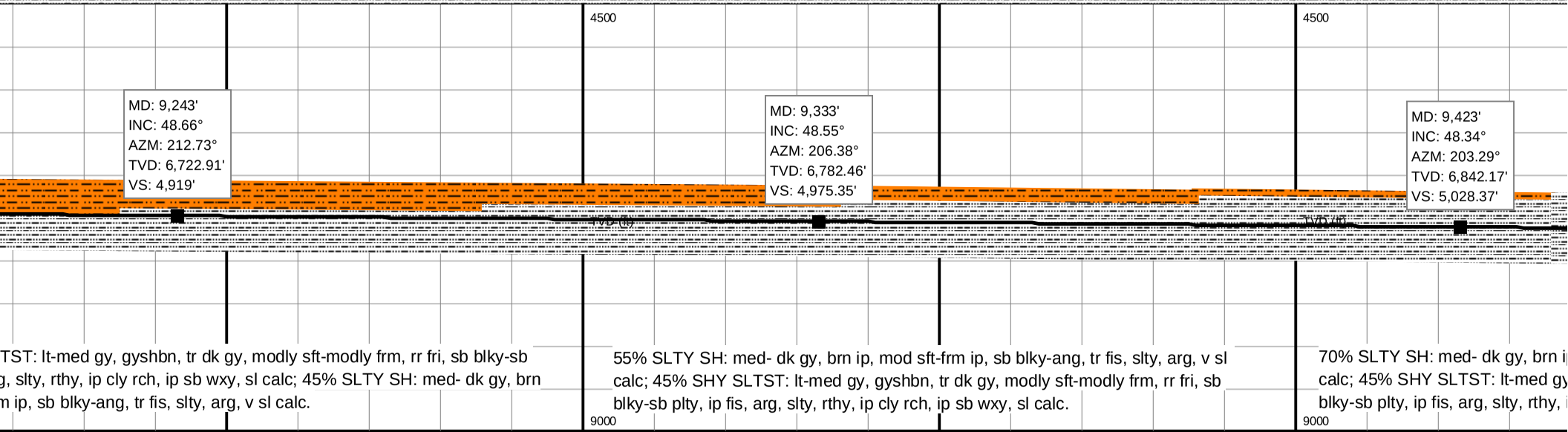
85% SHY SLTST: lt-med gy, gyshbn, tr dk gy, modly sft-modly frm, rr fri, sb blky-sb plty, ip fis, arg, slty, rthy, ip cly rch, ip sb wxy, sl calc; 15% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc.

70% SHY SLTST: lt-med gy, gyshbn, tr dk gy, modly sft-modly frm, rr fri, sb blky-sb plty, ip fis, arg, slty, rthy, ip cly rch, ip sb wxy, sl calc; 30% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc.

55% SHY SL
plty, ip fis, arg
ip, mod sft-fr



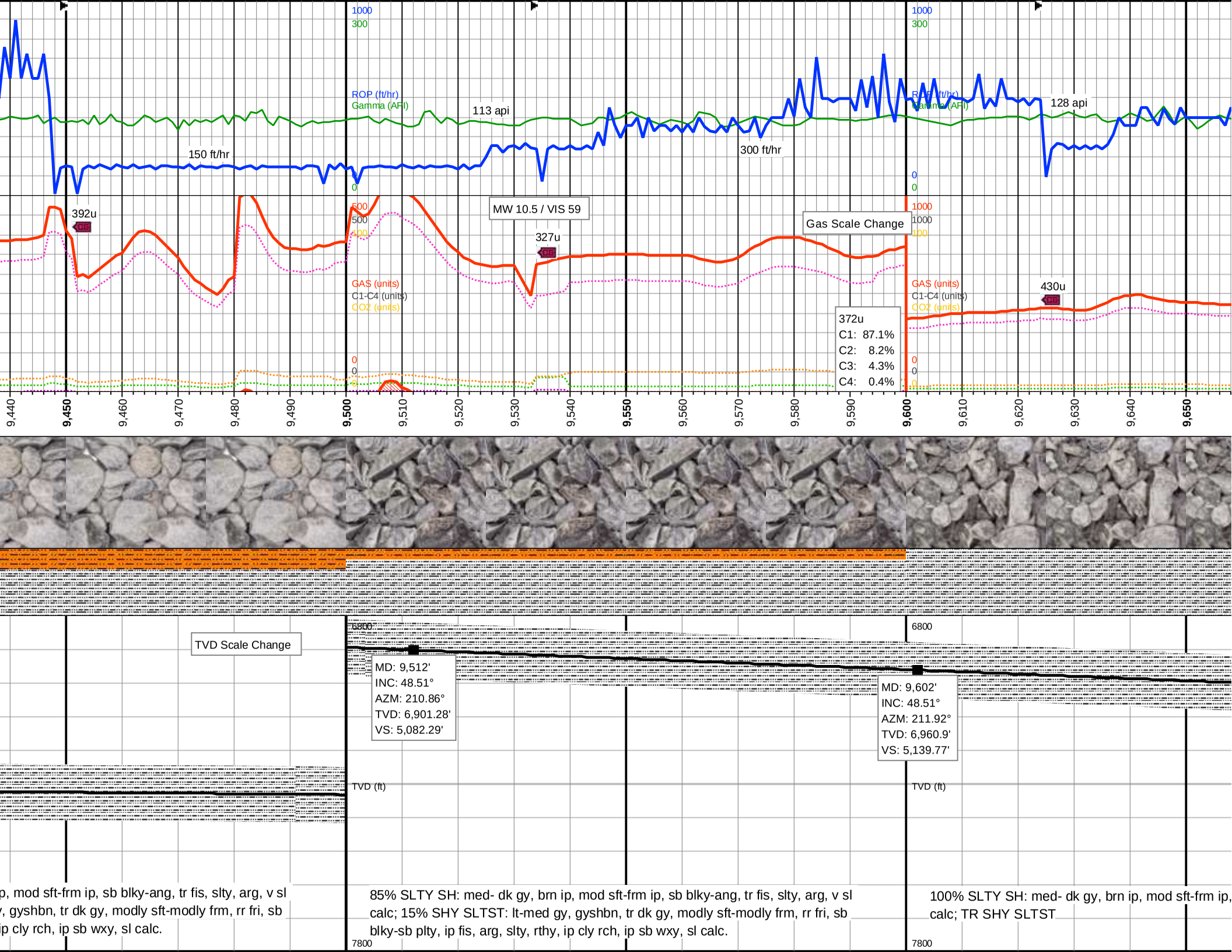


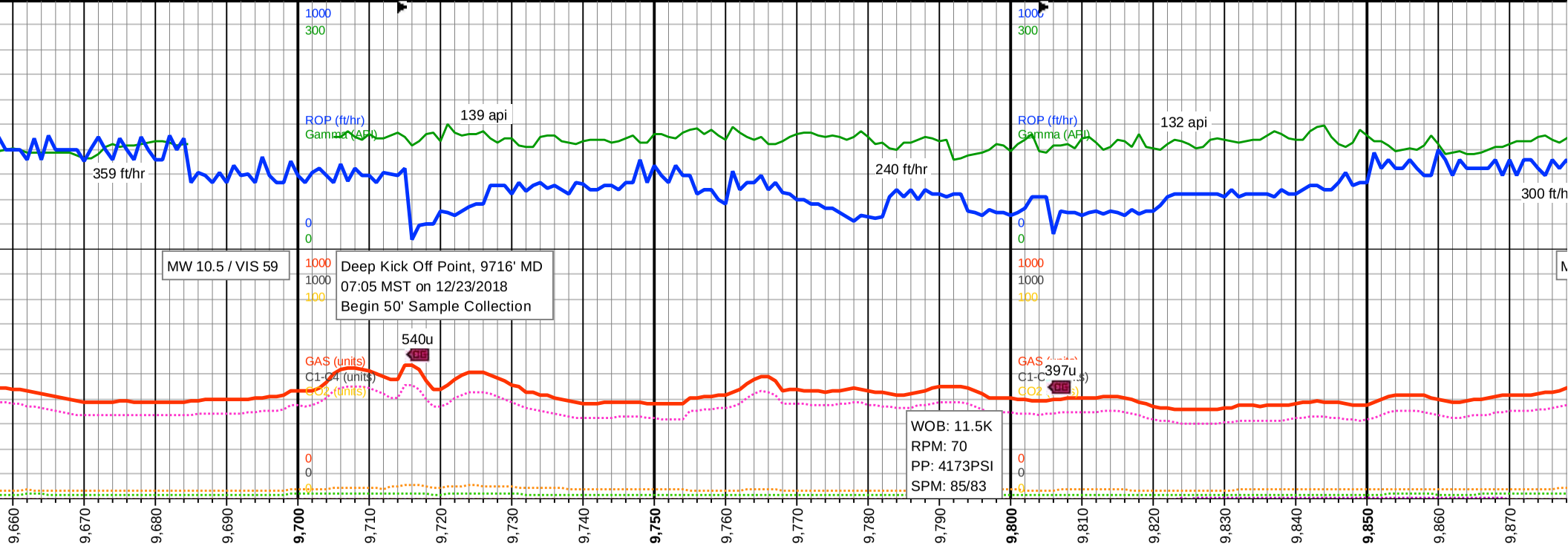


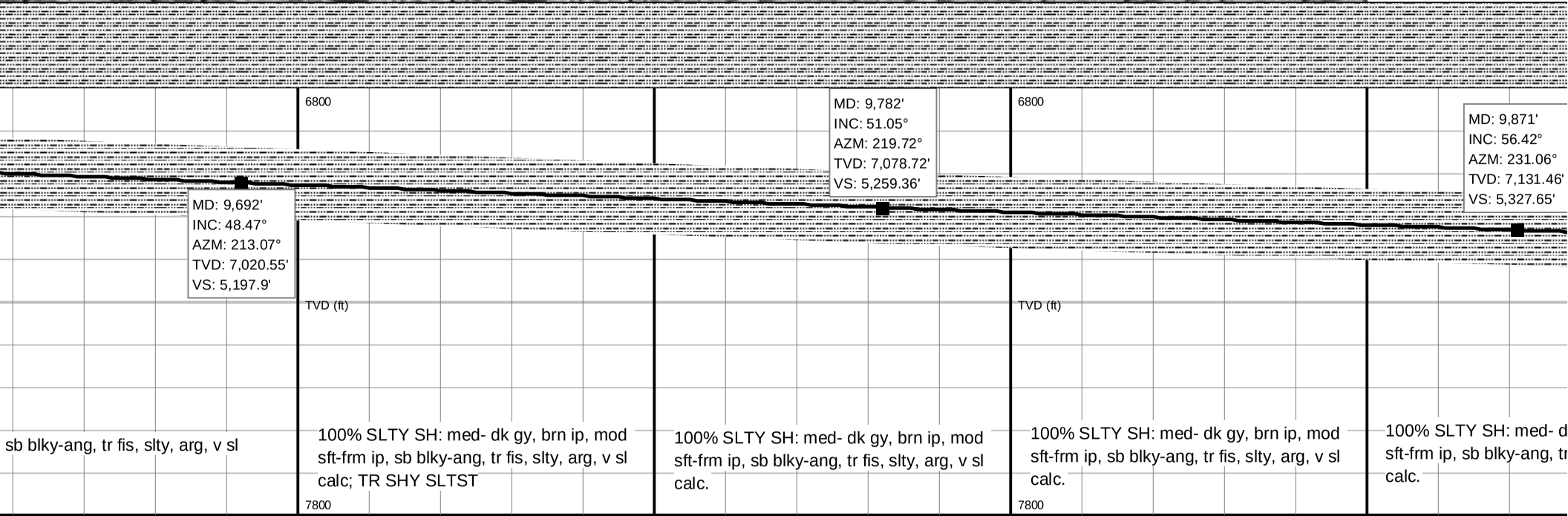
TST: lt-med gy, gyshbn, tr dk gy, modly sft-modly frm, rr fri, sb blky-sb
g, slty, rthy, ip cly rch, ip sb wxy, sl calc; 45% SLTY SH: med- dk gy, brn
m ip, sb blky-ang, tr fis, slty, arg, v sl calc.

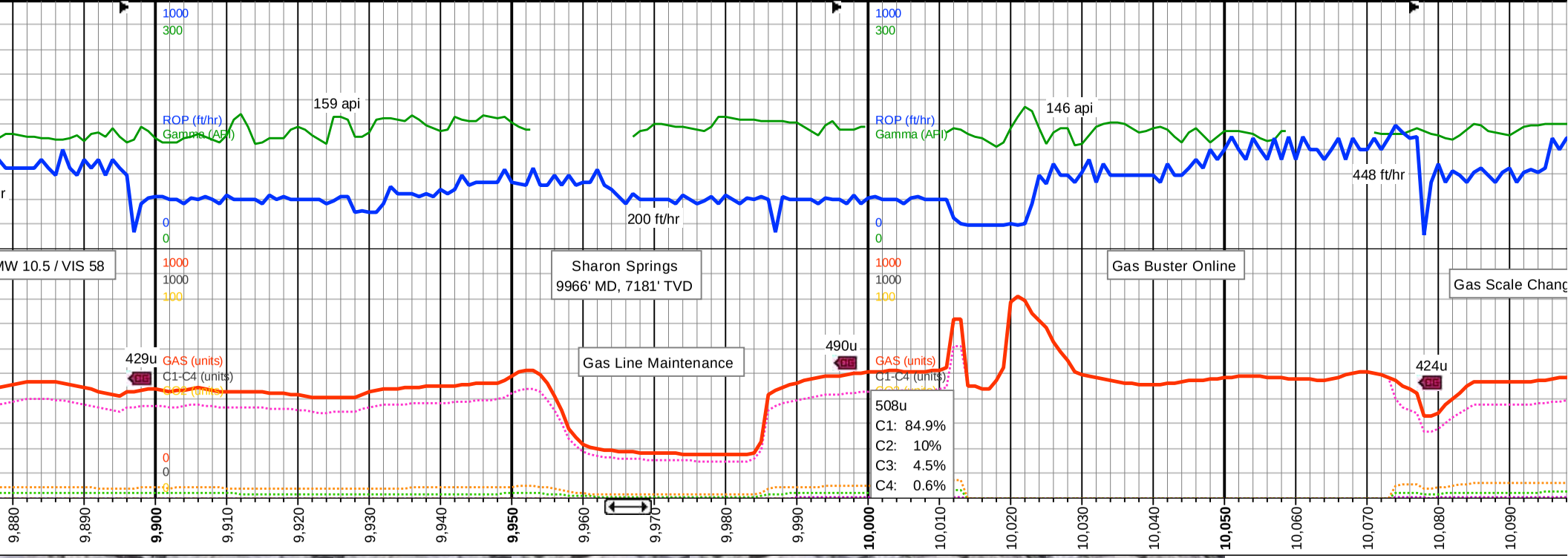
55% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc; 45% SHY SLTST: lt-med gy, gyshbn, tr dk gy, modly sft-modly frm, rr fri, sb blky-sb plty, ip fis, arg, slty, rthy, ip cly rch, ip sb wxy, sl calc.

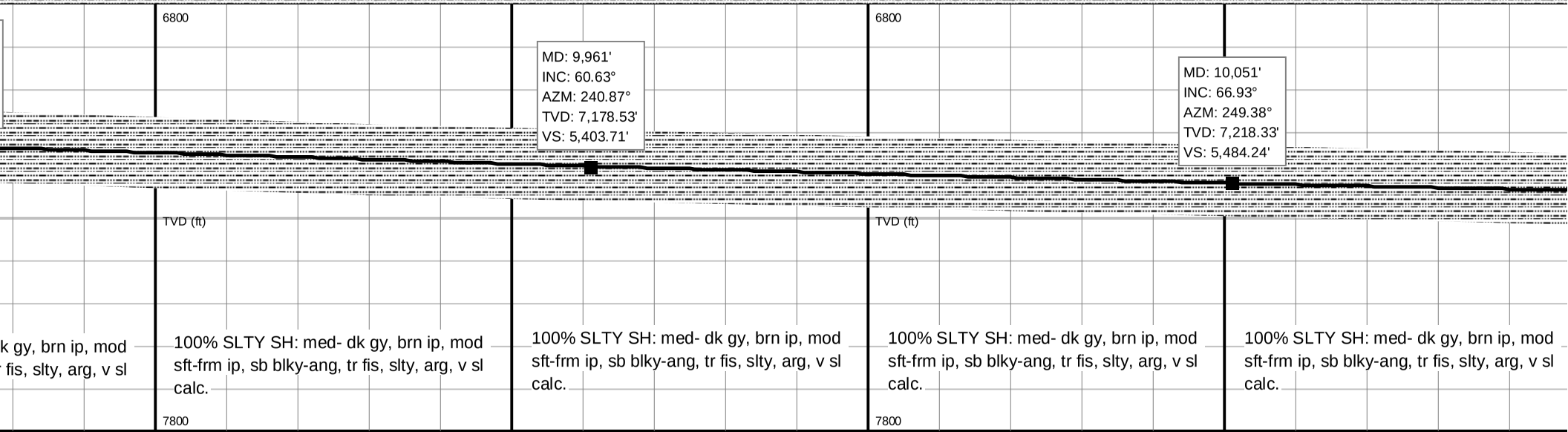
70% SLTY SH: med- dk gy, brn i
calc; 45% SHY SLTST: lt-med gy
blky-sb plty, ip fis, arg, slty, rthy,


1000
300
ROP (ft/hr)
Gamma (API)
150 ft/hr
113 api
300 ft/hr
128 api
0
500
100
MW 10.5 / VIS 59
392u
327u
Gas Scale Change
430u
GAS (units)
C1-C4 (units)
CO2 (units)
372u
C1: 87.1%
C2: 8.2%
C3: 4.3%
C4: 0.4%
9,440
9,450
9,460
9,470
9,480
9,490
9,500
9,510
9,520
9,530
9,540
9,550
9,560
9,570
9,580
9,590
9,600
9,610
9,620
9,630
9,640
9,650
TVD Scale Change
6800'
MD: 9,512'
INC: 48.51°
AZM: 210.86°
TVD: 6,901.28'
VS: 5,082.29'
MD: 9,602'
INC: 48.51°
AZM: 211.92°
TVD: 6,960.9'
VS: 5,139.77'
TVD (ft)
7800
p, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl
, gyshbn, tr dk gy, modly sft-modly frm, rr fri, sb
ip cly rch, ip sb wxy, sl calc.
85% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc; 15% SHY SLTST: lt-med gy, gyshbn, tr dk gy, modly sft-modly frm, rr fri, sb blky-sb plty, ip fis, arg, slty, rthy, ip cly rch, ip sb wxy, sl calc.
100% SLTY SH: med- dk gy, brn ip, mod sft-frm ip,
calc; TR SHY SLTST


1000
300
ROP (ft/hr)
Gamma (API)
359 ft/hr
139 api
240 ft/hr
132 api
300 ft/h
0
0
MW 10.5 / VIS 59
Deep Kick Off Point, 9716' MD
07:05 MST on 12/23/2018
Begin 50' Sample Collection
1000
1000
100
540u
GAS (units)
C1-C4 (units)
CO2 (units)
397u
WOB: 11.5K
RPM: 70
PP: 4173PSI
SPM: 85/83
9,660
9,670
9,680
9,690
9,700
9,710
9,720
9,730
9,740
9,750
9,760
9,770
9,780
9,790
9,800
9,810
9,820
9,830
9,840
9,850
9,860
9,870


6800
MD: 9,692'
INC: 48.47°
AZM: 213.07°
TVD: 7,020.55'
VS: 5,197.9'
MD: 9,782'
INC: 51.05°
AZM: 219.72°
TVD: 7,078.72'
VS: 5,259.36'
MD: 9,871'
INC: 56.42°
AZM: 231.06°
TVD: 7,131.46'
VS: 5,327.65'
TVD (ft)
7800
sb blky-ang, tr fis, slty, arg, v sl
100% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc; TR SHY SLTST
100% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc.
100% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc.
100% SLTY SH: med- d
sft-frm ip, sb blky-ang, tr
calc.





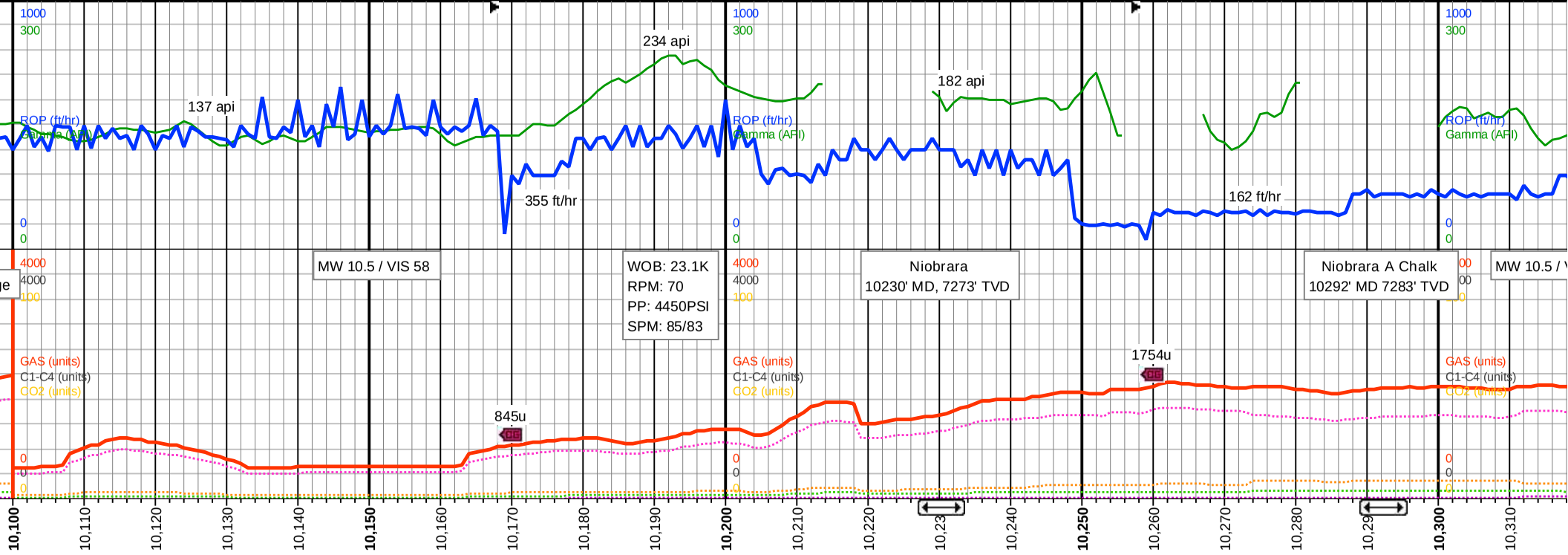
k gy, brn ip, mod
r fis, slty, arg, v sl

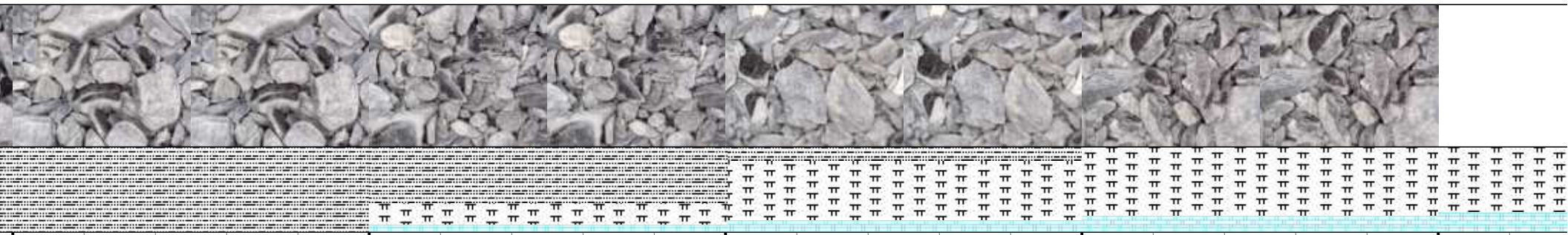
100% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc.

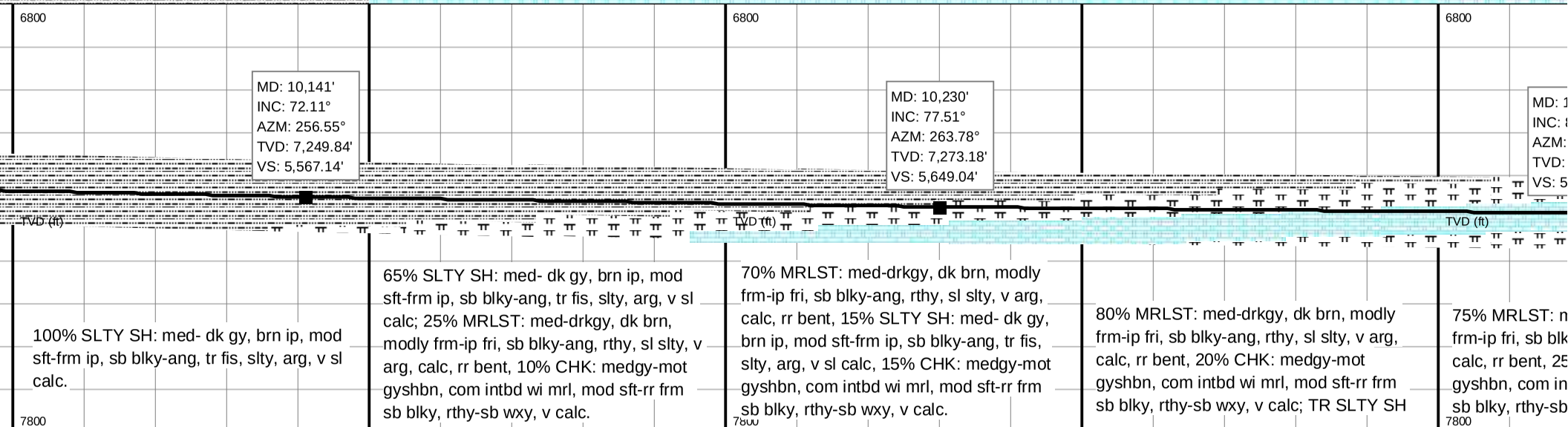
100% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc.

100% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc.

100% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc.







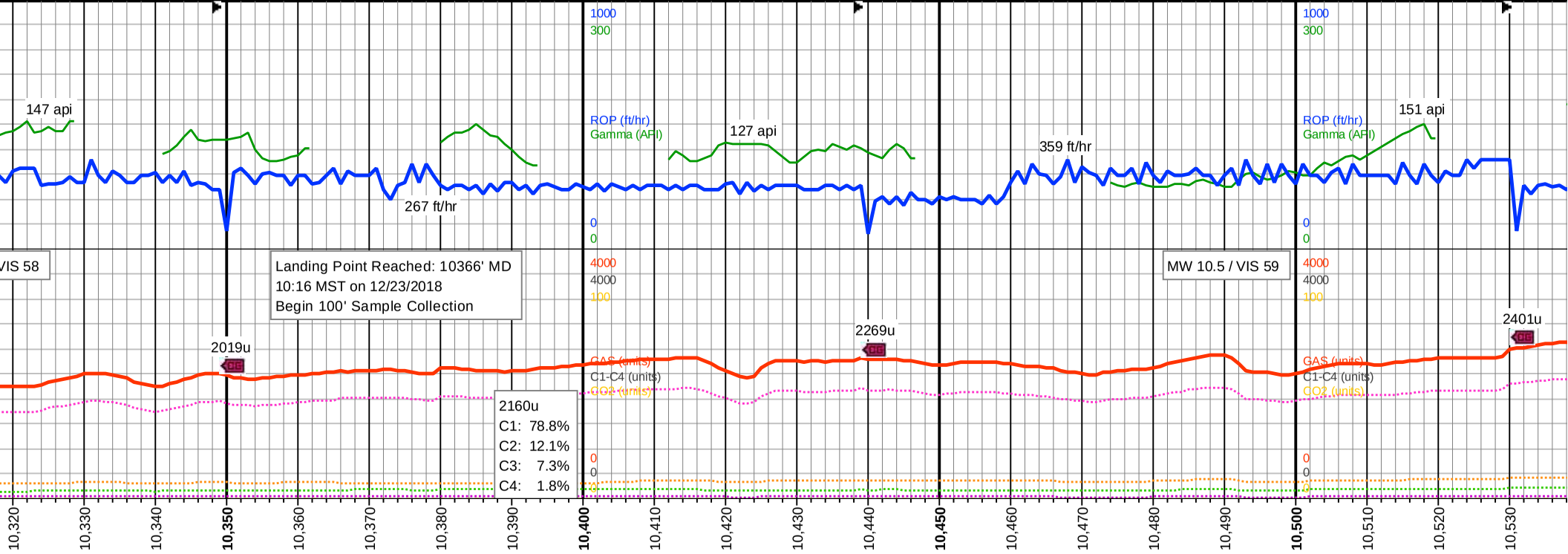
100% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc.

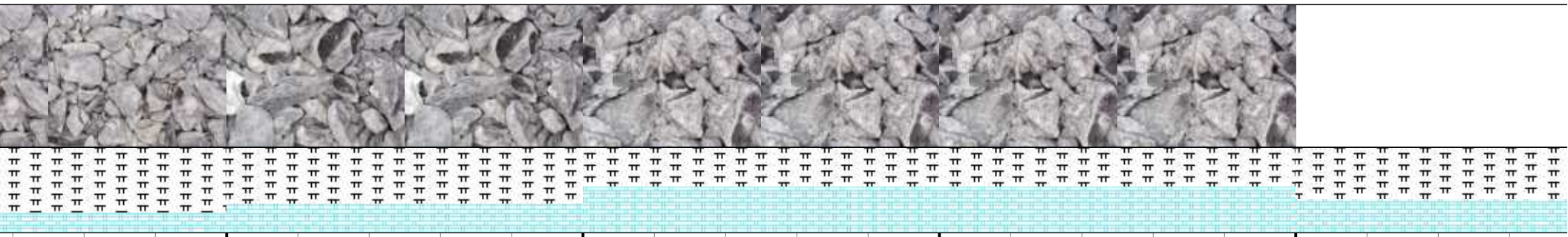
65% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc; 25% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent, 10% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

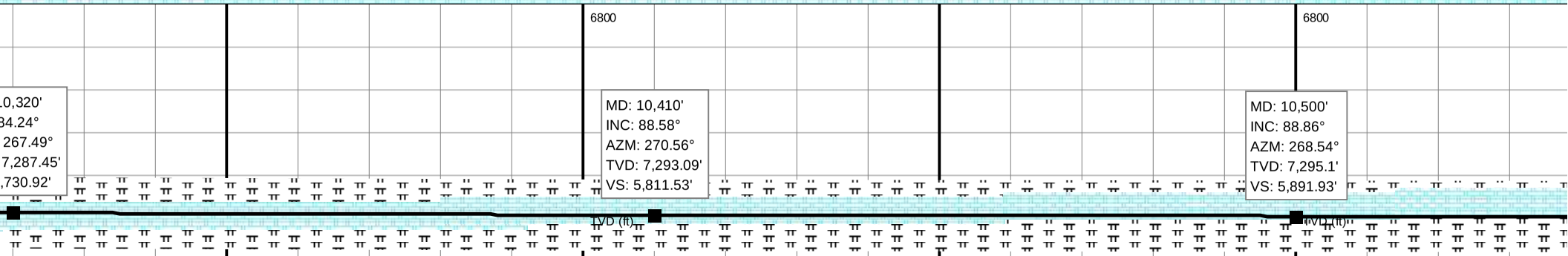
70% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent, 15% SLTY SH: med- dk gy, brn ip, mod sft-frm ip, sb blky-ang, tr fis, slty, arg, v sl calc, 15% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

80% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent, 20% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc; TR SLTY SH

75% MRLST: m
frm-ip fri, sb blk
calc, rr bent, 25
gyshbn, com in
sb blky, rthy-sb





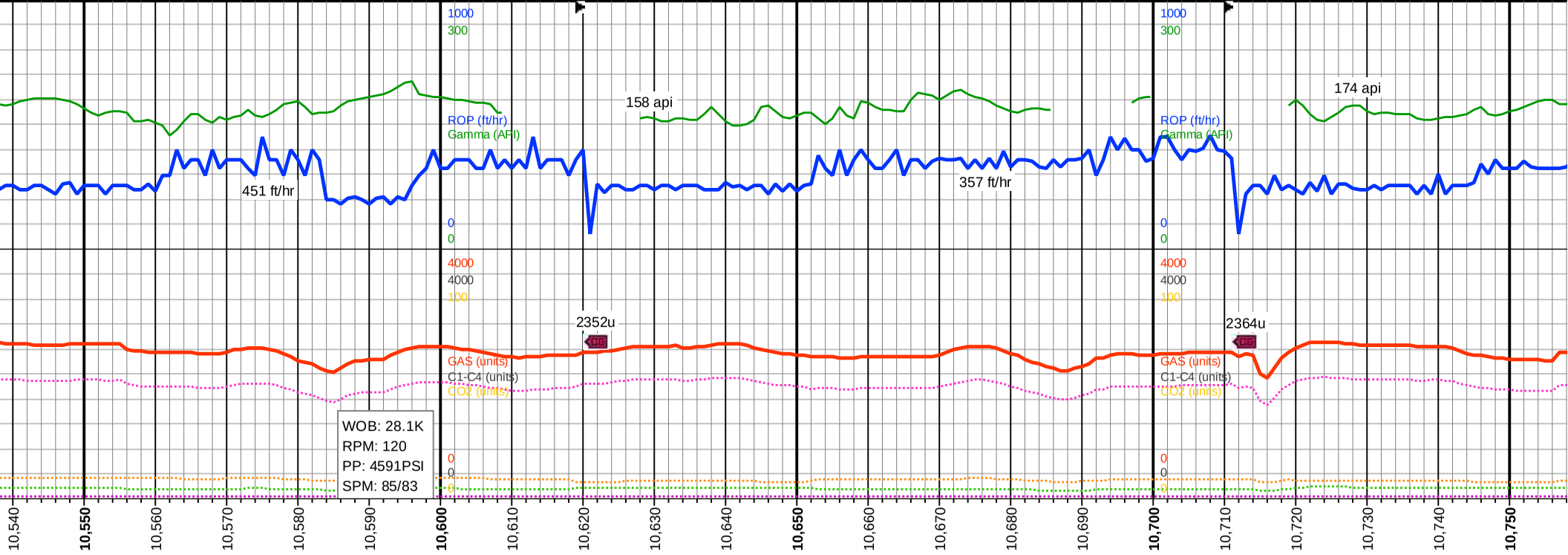


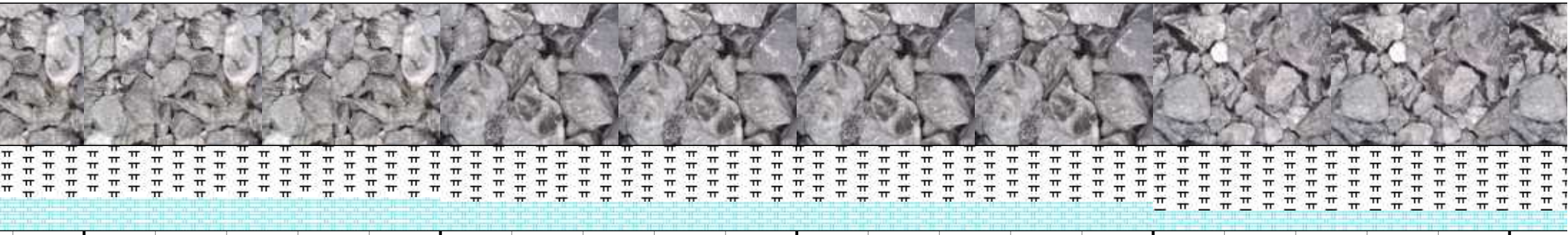
med-drkgy, dk brn, modly
y-ang, rthy, sl slty, v arg,
% CHK: medgy-mot
tbd wi mrl, mod sft-rr frm
wxy, v calc.

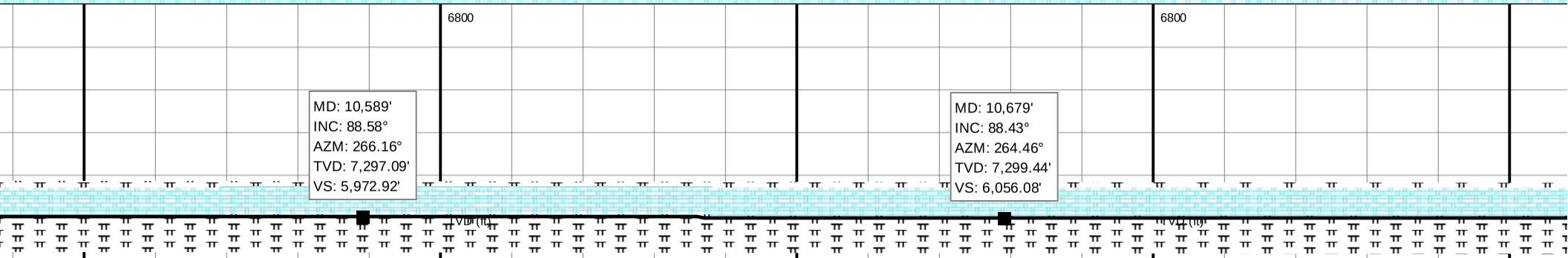
65% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent, 35% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

55% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc, v rr dissm pyr; 45% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent,

60% MRLST: med-drkgy, dk b
calc, tr bent; 40% CHK: medgy
blky, rthy-sb wxy, v calc.



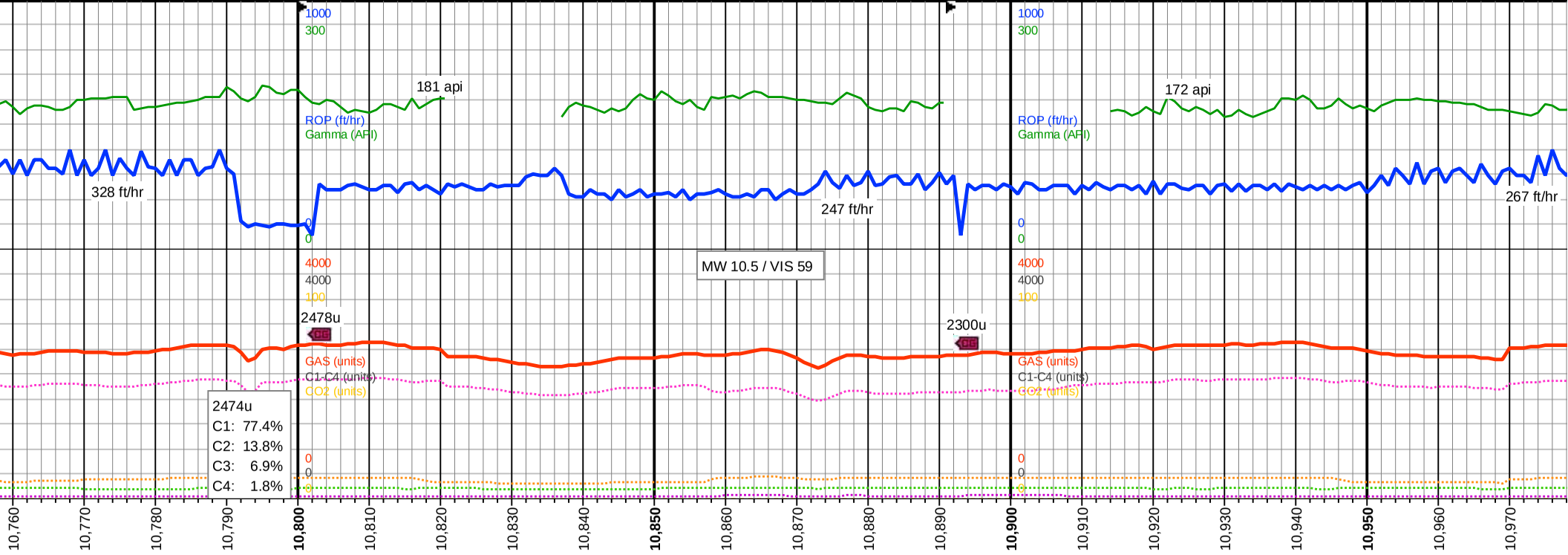


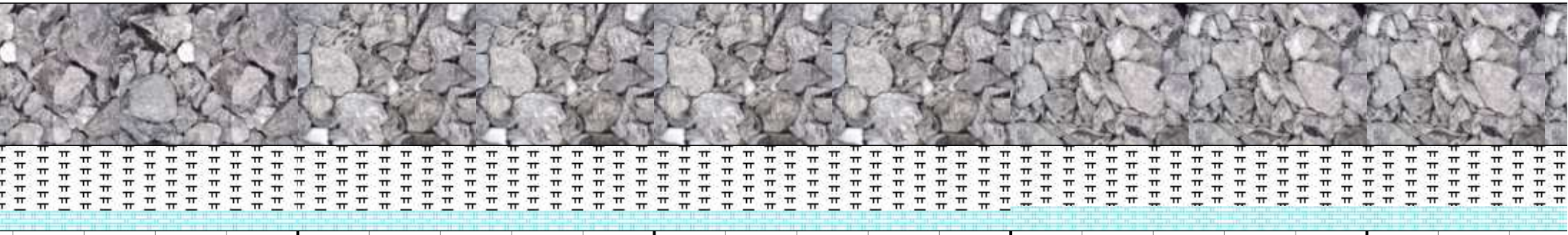


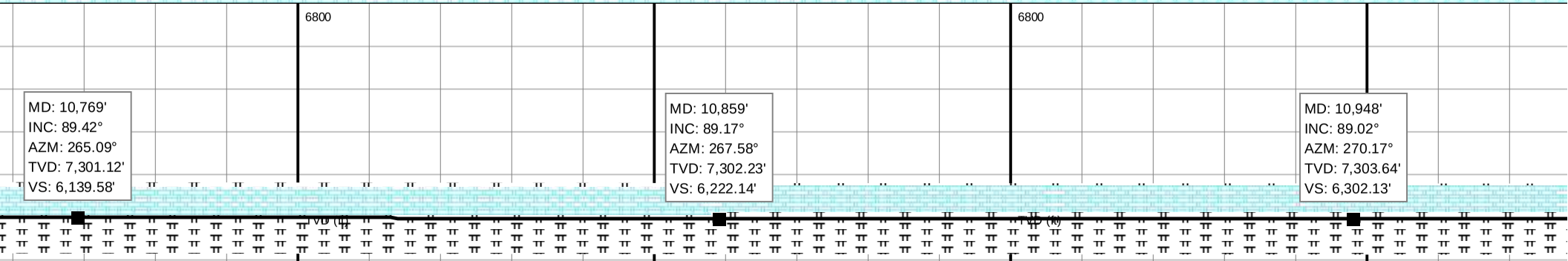
rn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, y-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb

65% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent; 35% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

75% MRLST: med-drkgy, dk brn, modly frm-ip calc, v rr bent; 25% CHK: medgy-mot gyshbn, blky, rthy-sb wxy, v calc.



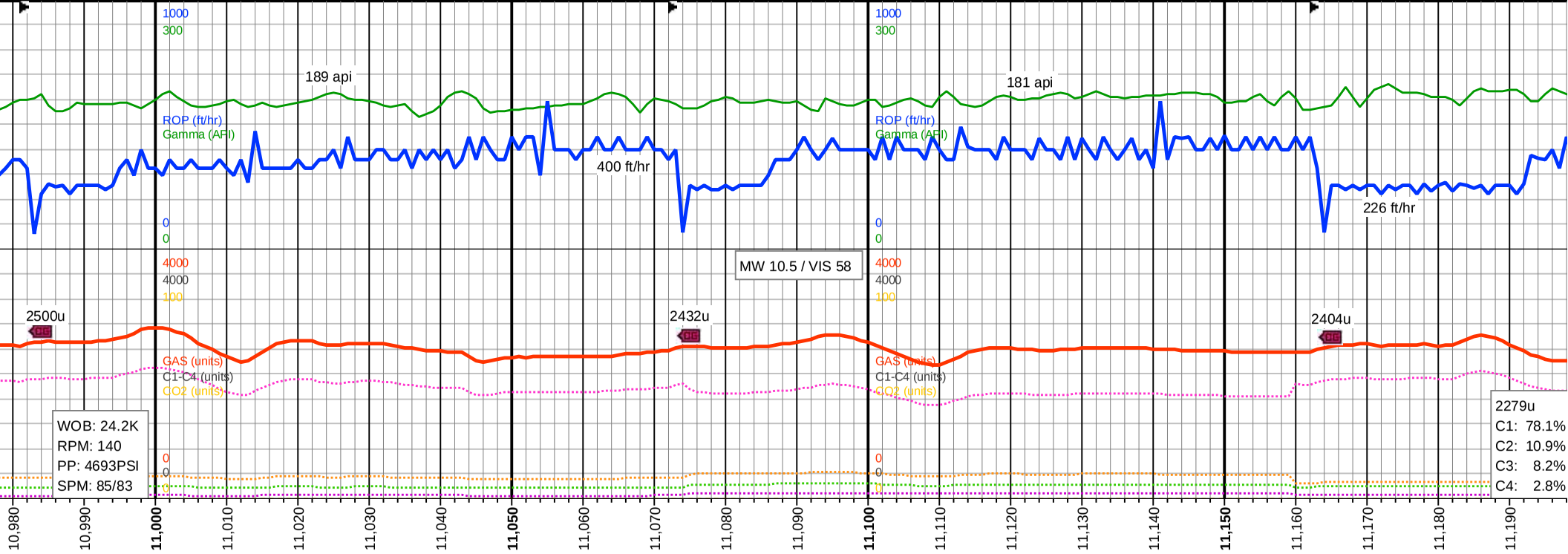


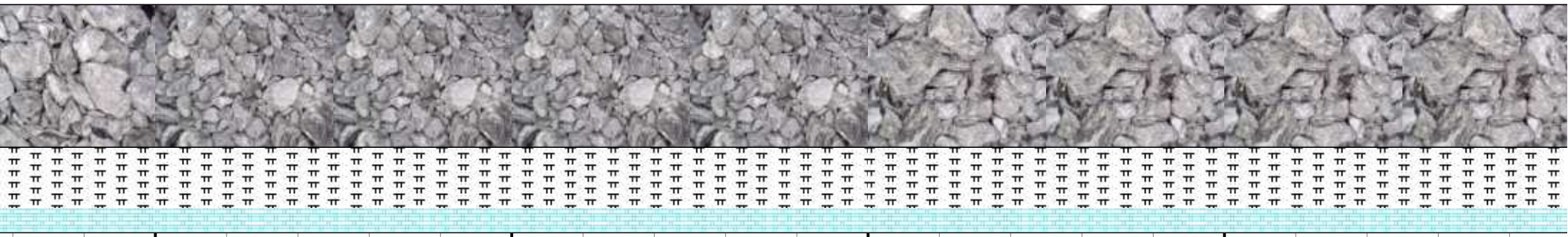


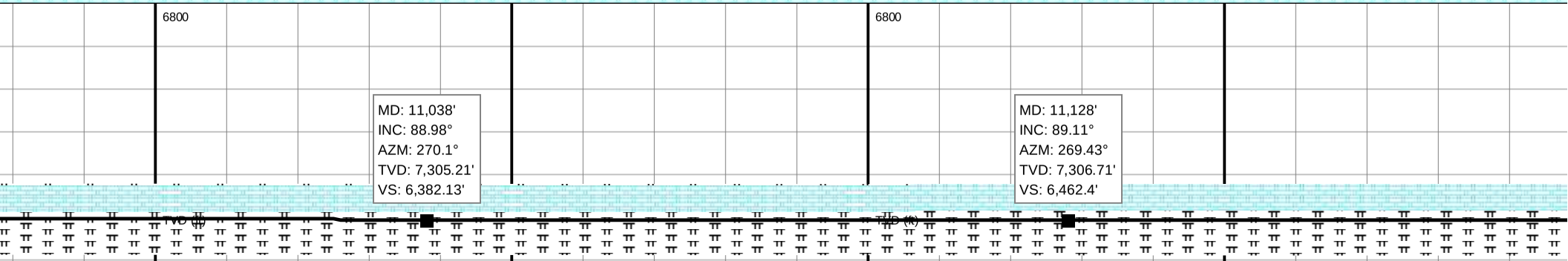
fri, sb blky-ang, rthy, sl slty, v arg, com intbd wi mrl, mod sft-rr frm sb

75% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent; 25% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

70% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy calc, rr bent; 30% CHK: medgy-mot gyshbn, com intbd wi mrl, mod blky, rthy-sb wxy, v calc.







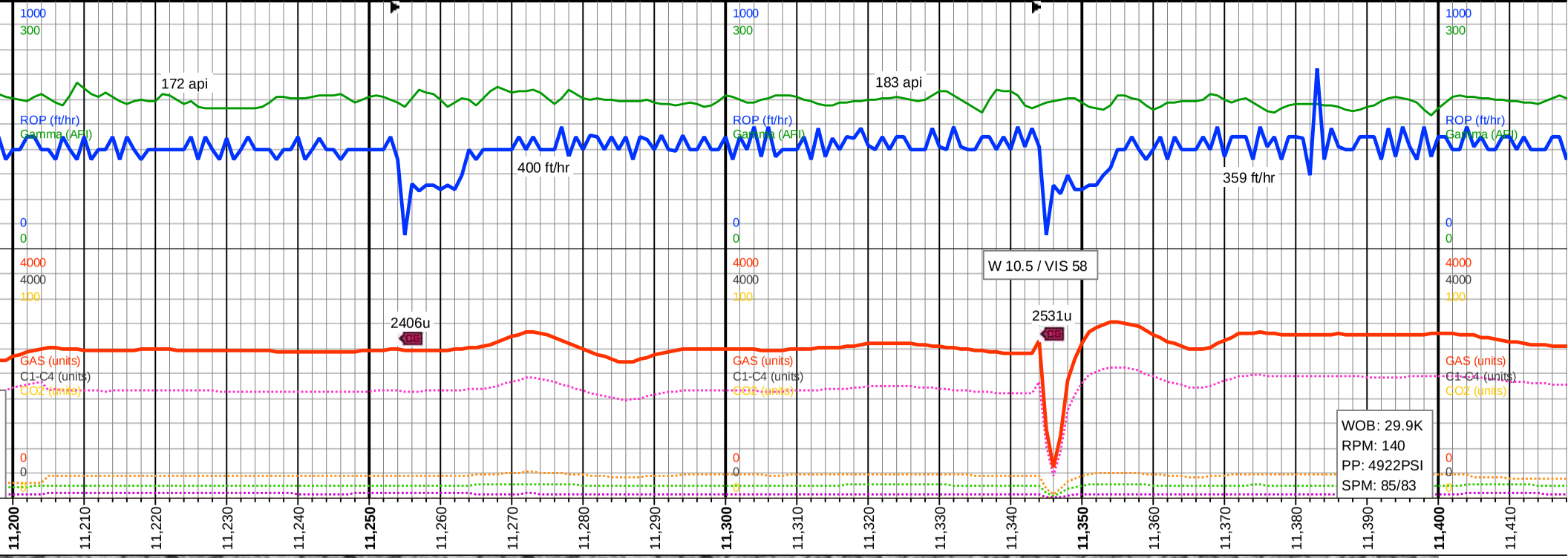
, sl slty, v arg,
l sft-rr frm sb

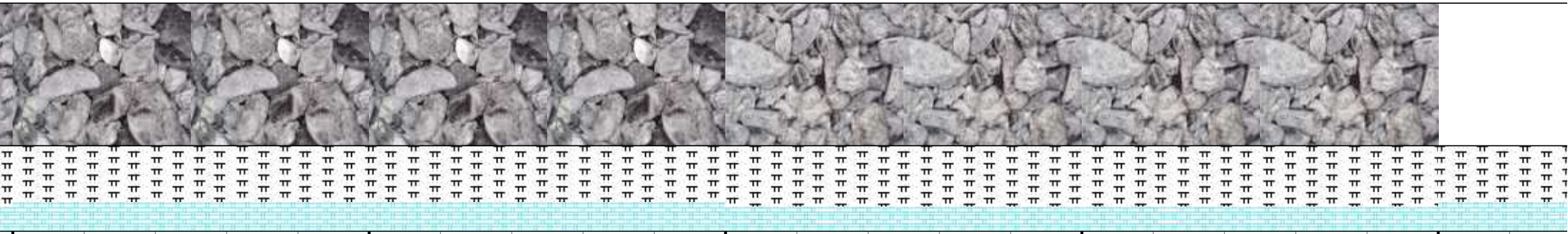
70% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 30% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

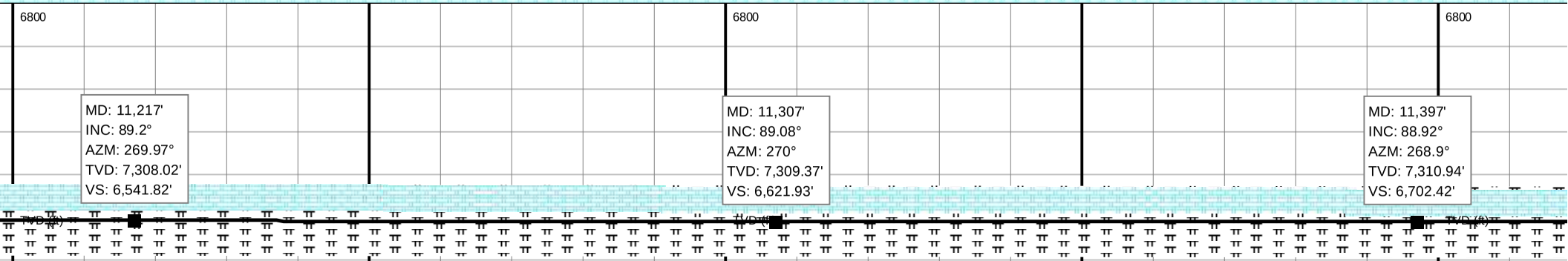
70% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 30% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

7800

7800





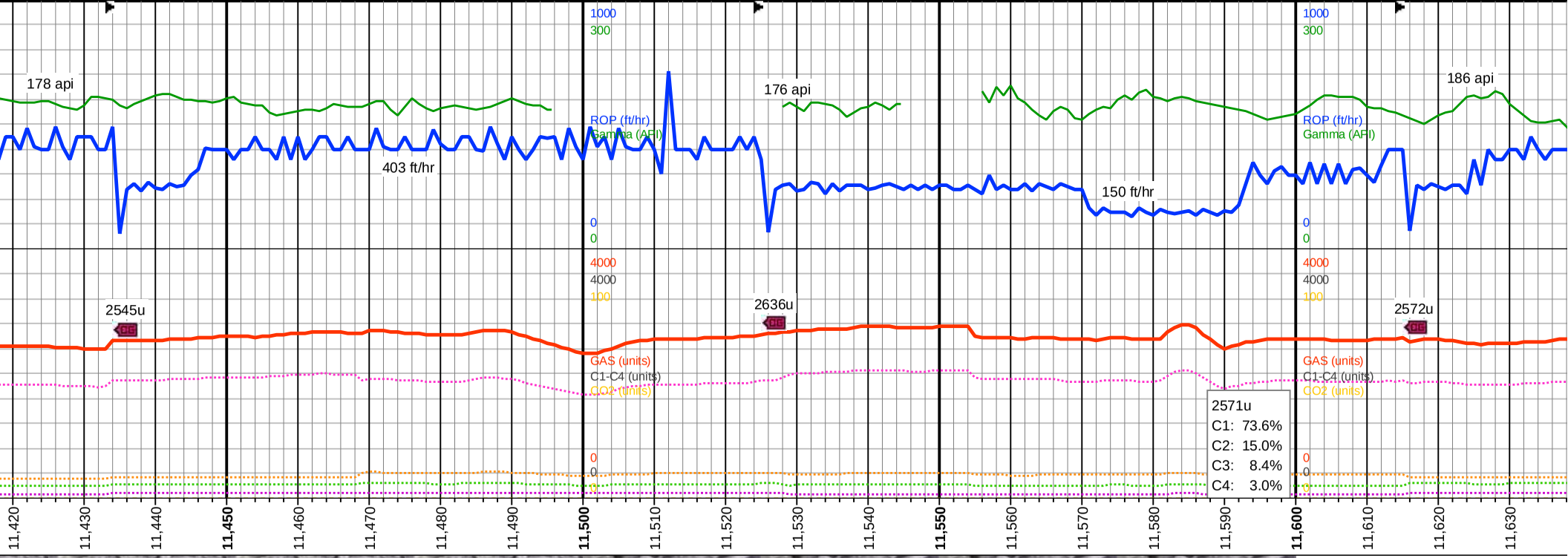


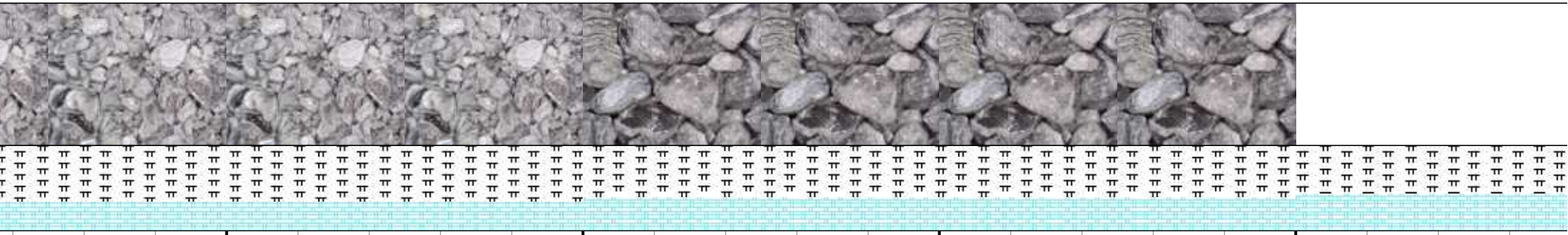
65% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent, v rr dissm pyr; 35% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

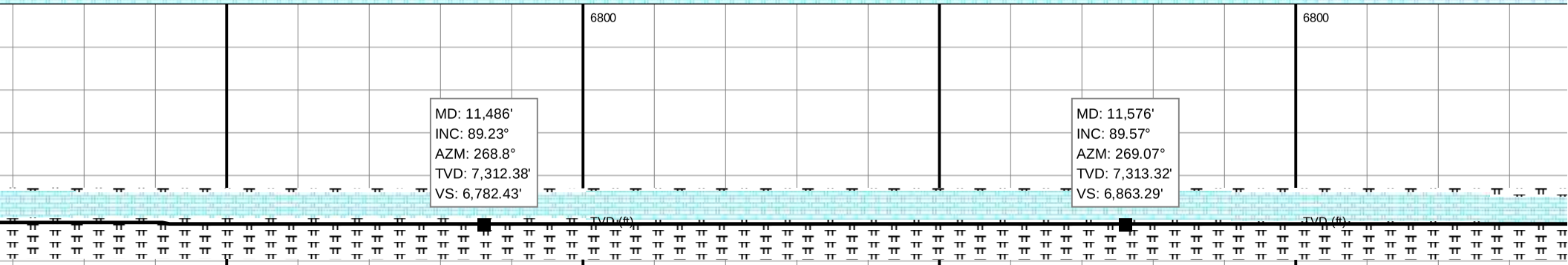
70% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 30% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

65% MRLS
calc, tr ben
blky, rthy-s

7800
7800
7800



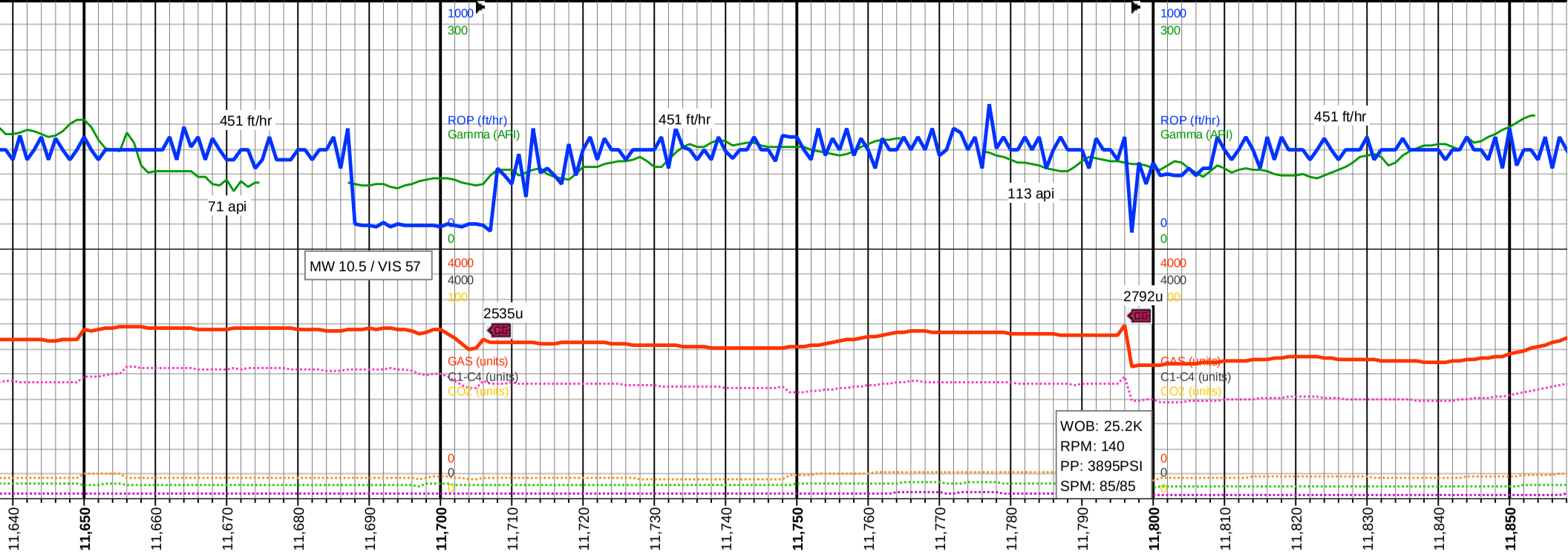


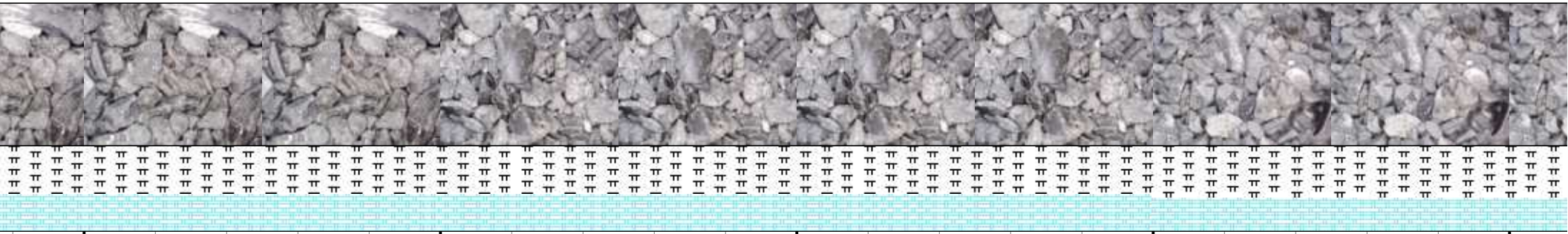


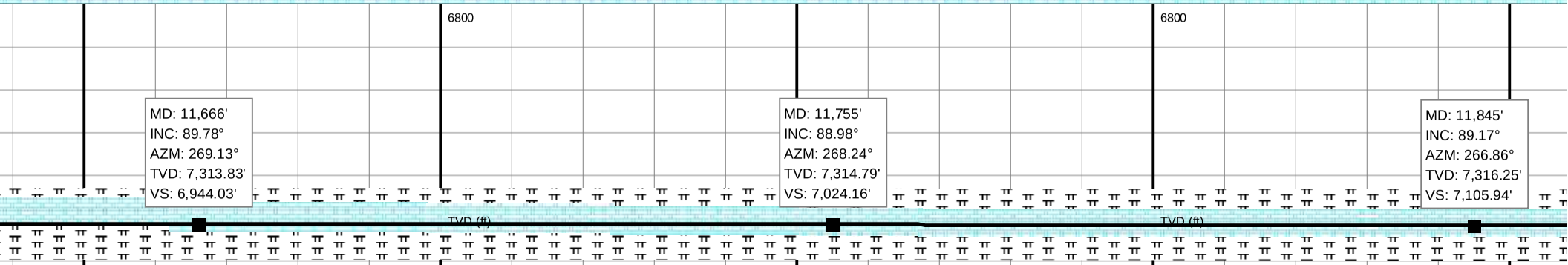
ST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, nt; 35% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb sb wxy, v calc.

60% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

55% MRLST: med-drkgy, dk b calc, tr bent; 45% CHK: medgy blky, rthy-sb wxy, v calc, v rr d



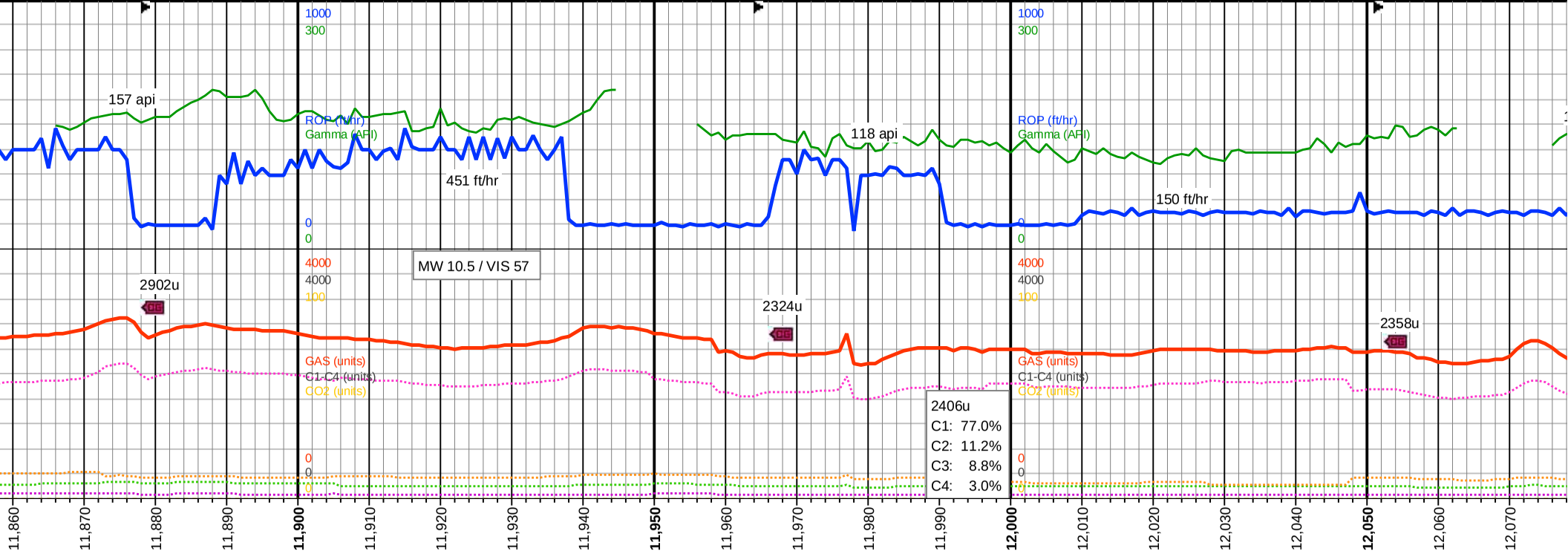


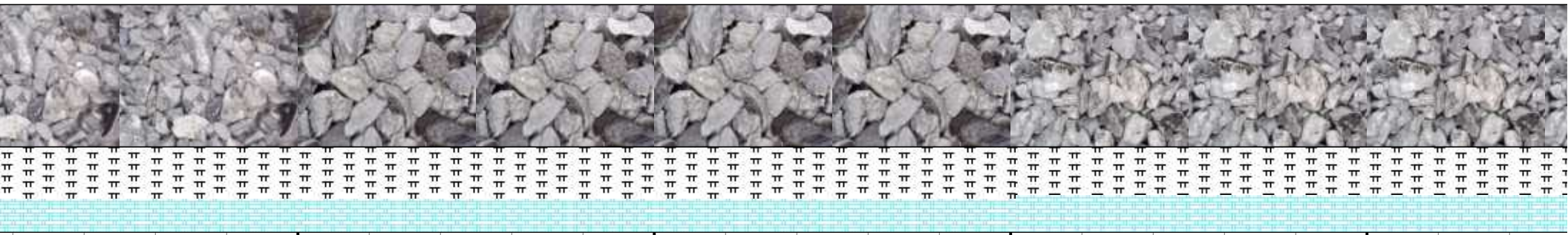


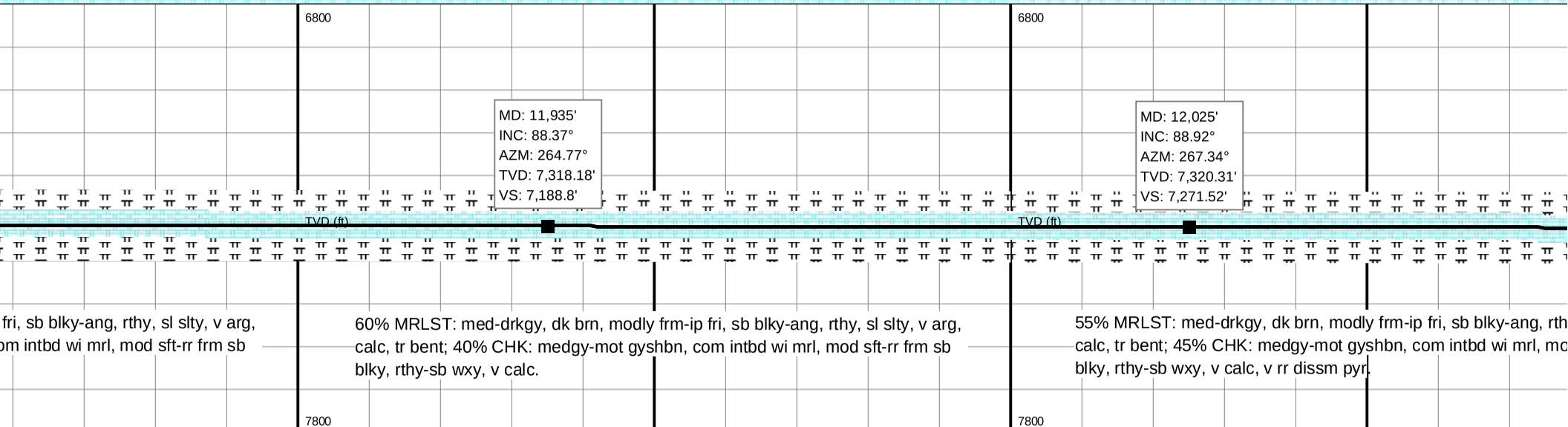
rn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, y-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb issm pyr.

55% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 45% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc, v rr dissm pyr.

60% MRLST: med-drkgy, dk brn, modly frm-ip calc, tr bent; 40% CHK: medgy-mot gyshbn, co blky, rthy-sb wxy, v calc.



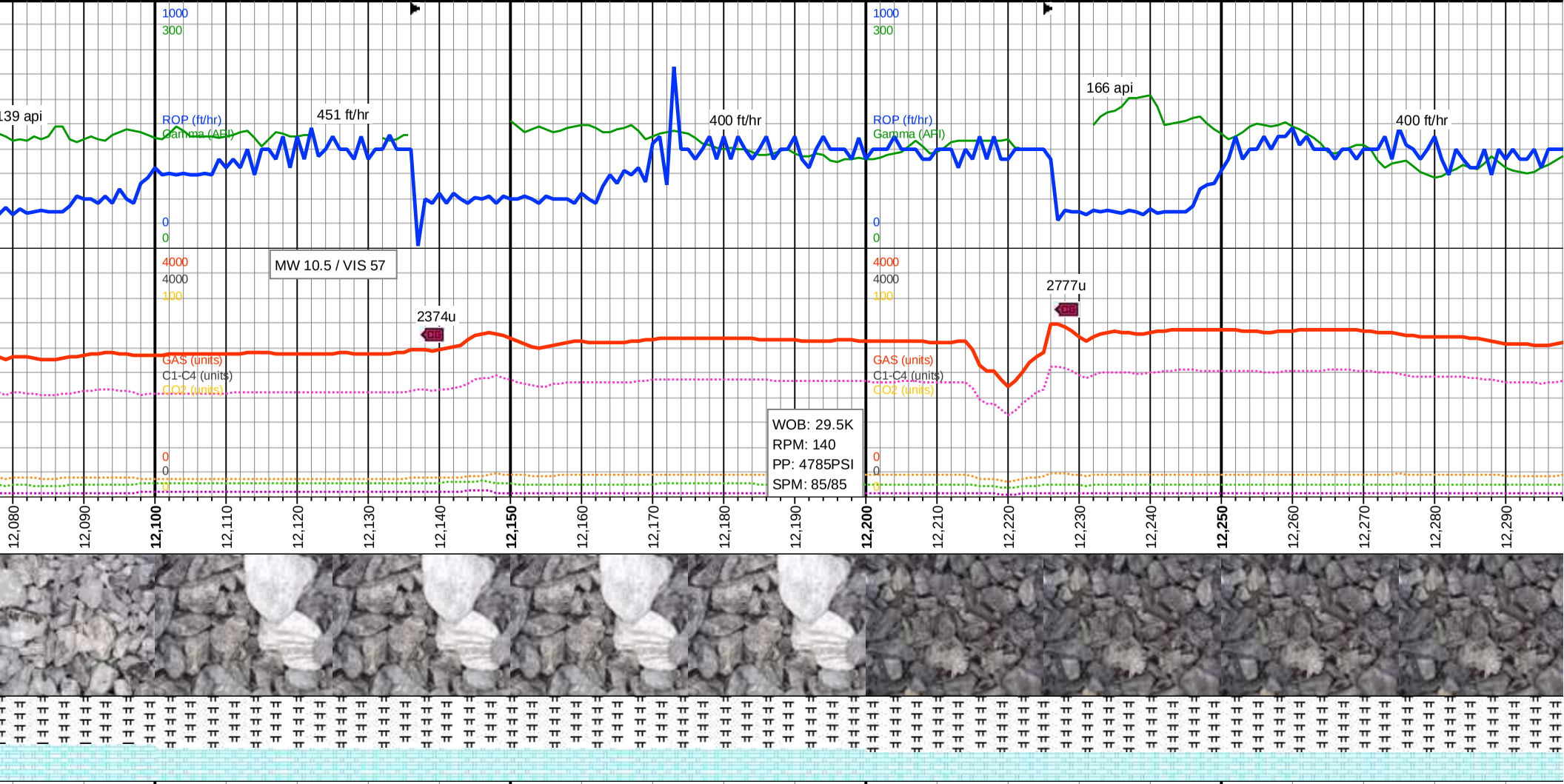


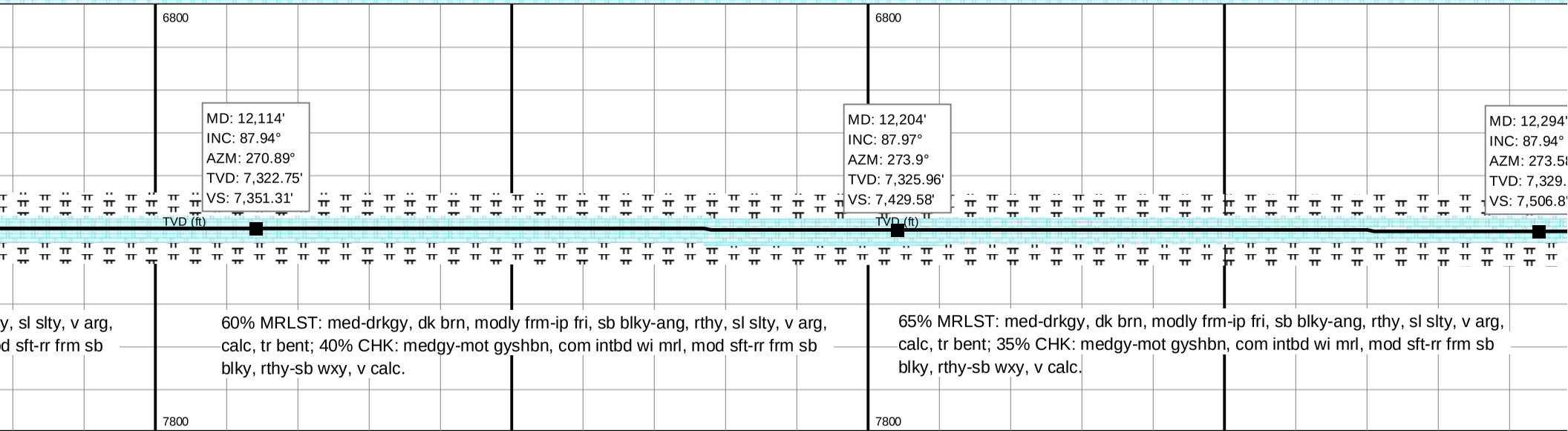


fri, sb blky-ang, rthy, sl slty, v arg, om intbd wi mrl, mod sft-rr frm sb

60% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

55% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rth calc, tr bent; 45% CHK: medgy-mot gyshbn, com intbd wi mrl, mo blky, rthy-sb wxy, v calc, v rr dissm pyr

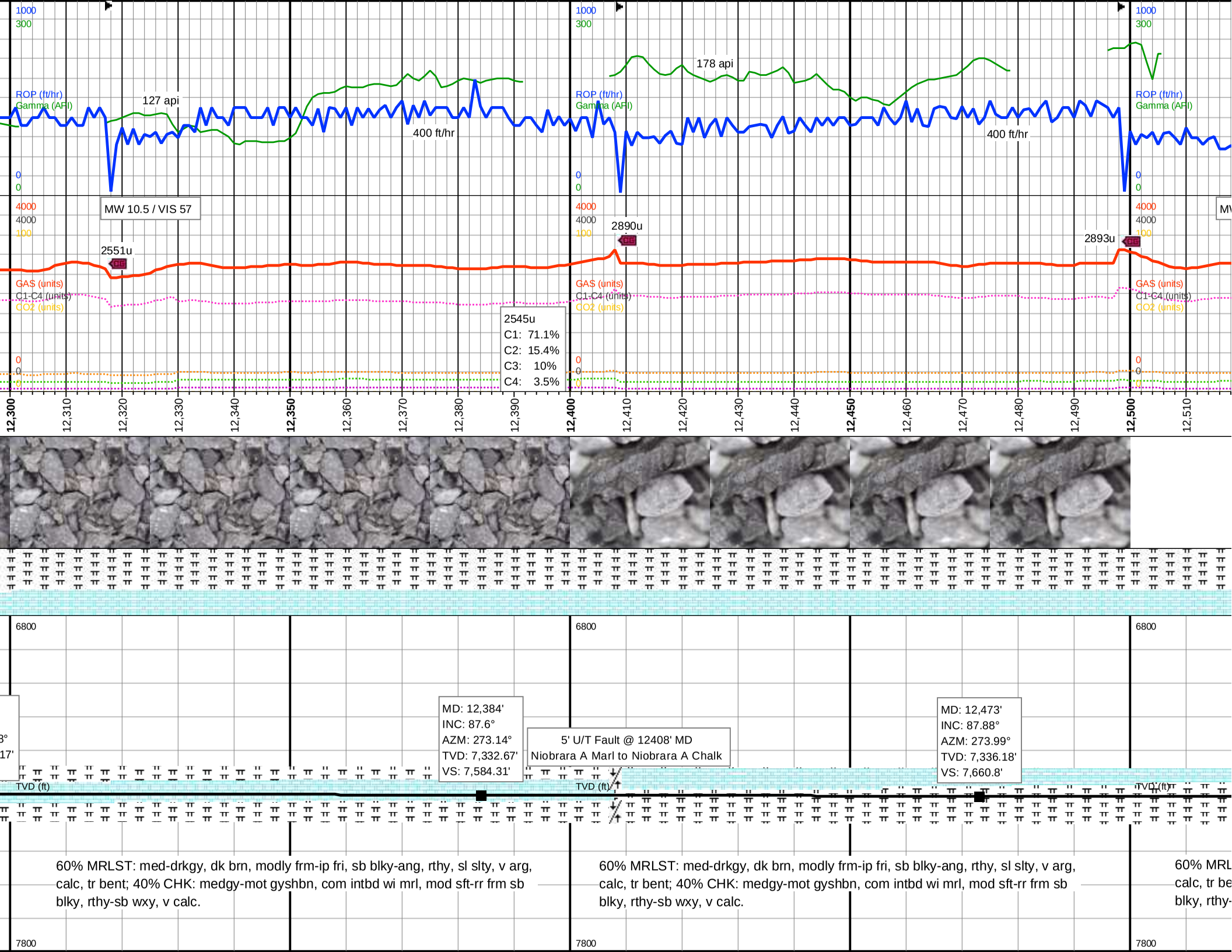




y, sl slty, v arg, od sft-rr frm sb

60% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

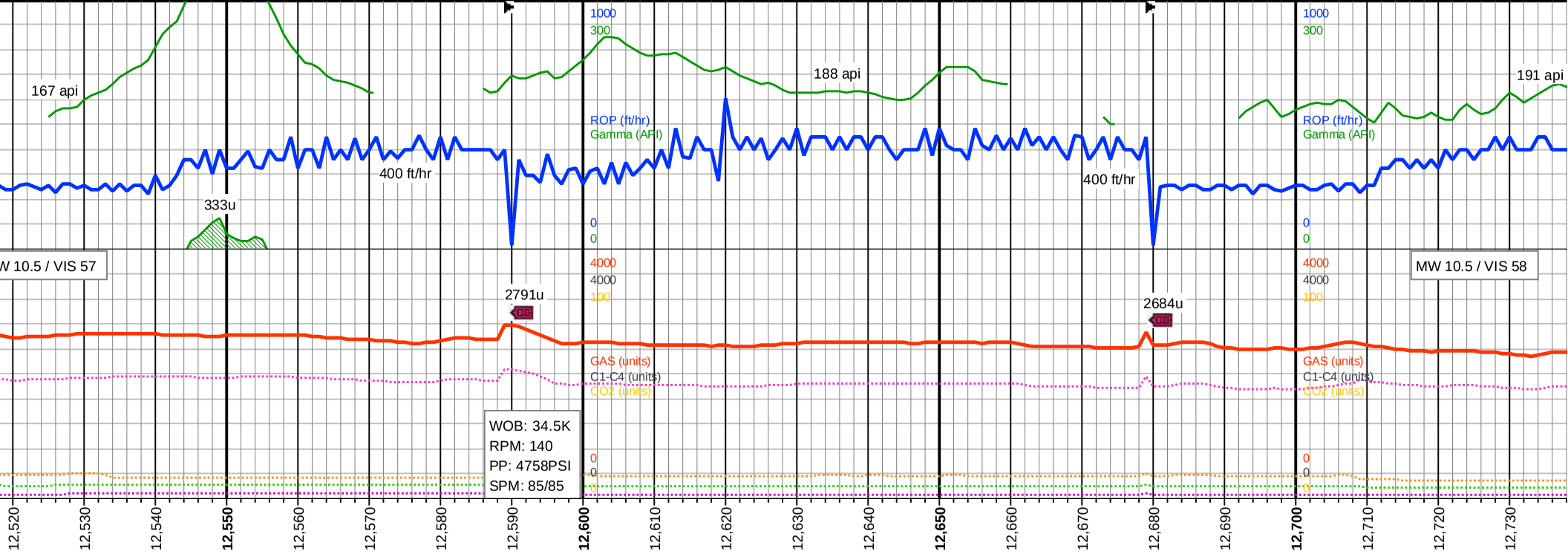
65% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 35% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

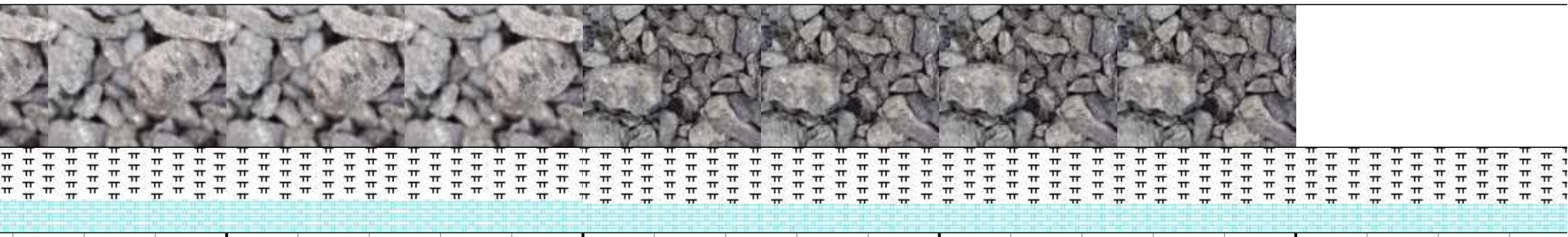


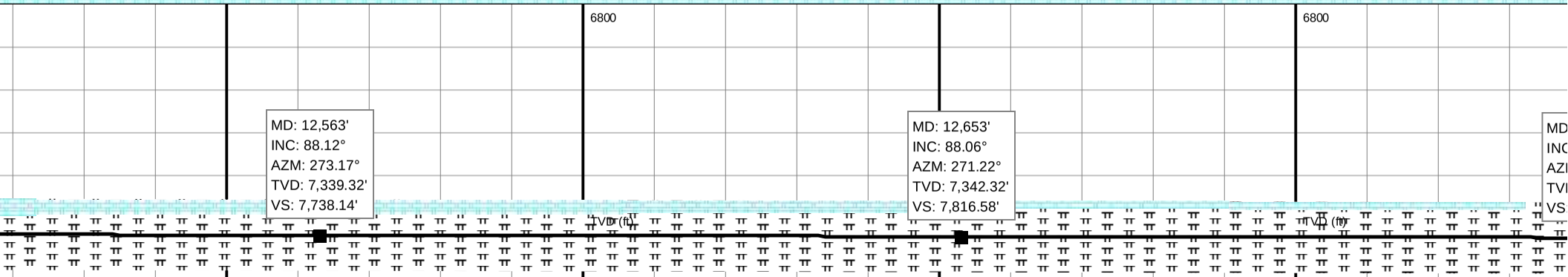
60% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

60% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

60% MRL
calc, tr be
blky, rthy-



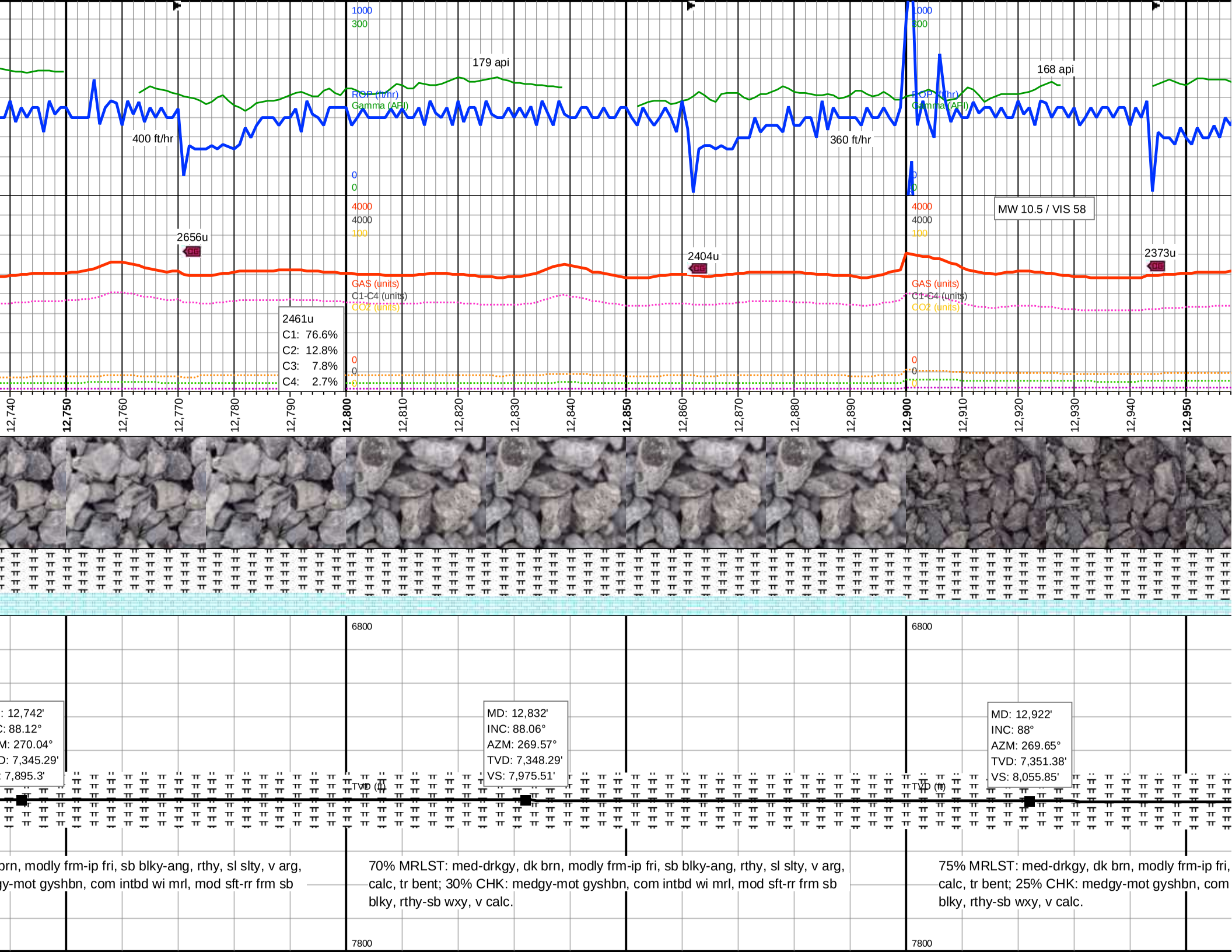




LST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, nt; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb sb wxy, v calc.

65% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 35% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

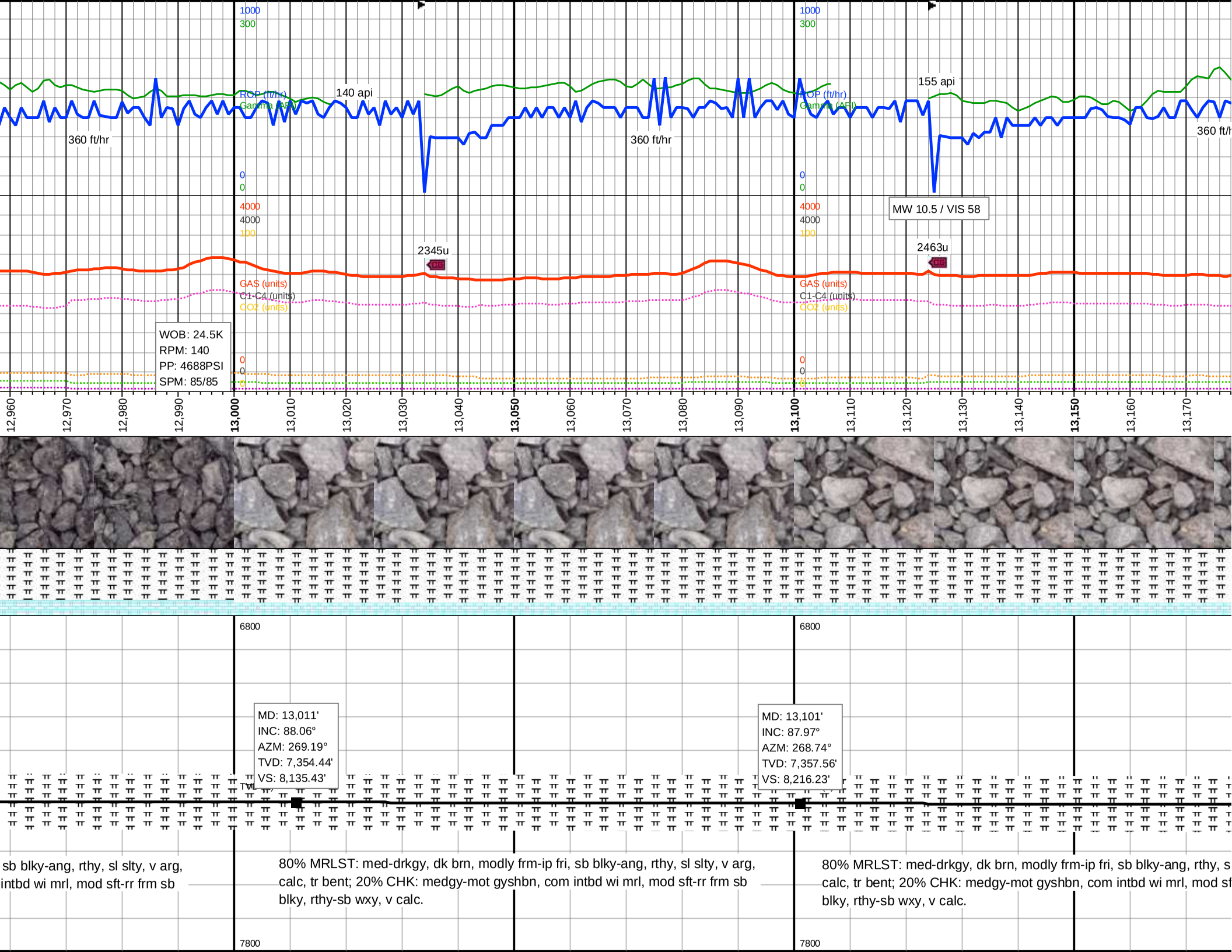
65% MRLST: med-drkgy, dk calc, tr bent; 35% CHK: medg blky, rthy-sb wxy, v calc.



brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, gy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb

70% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 30% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

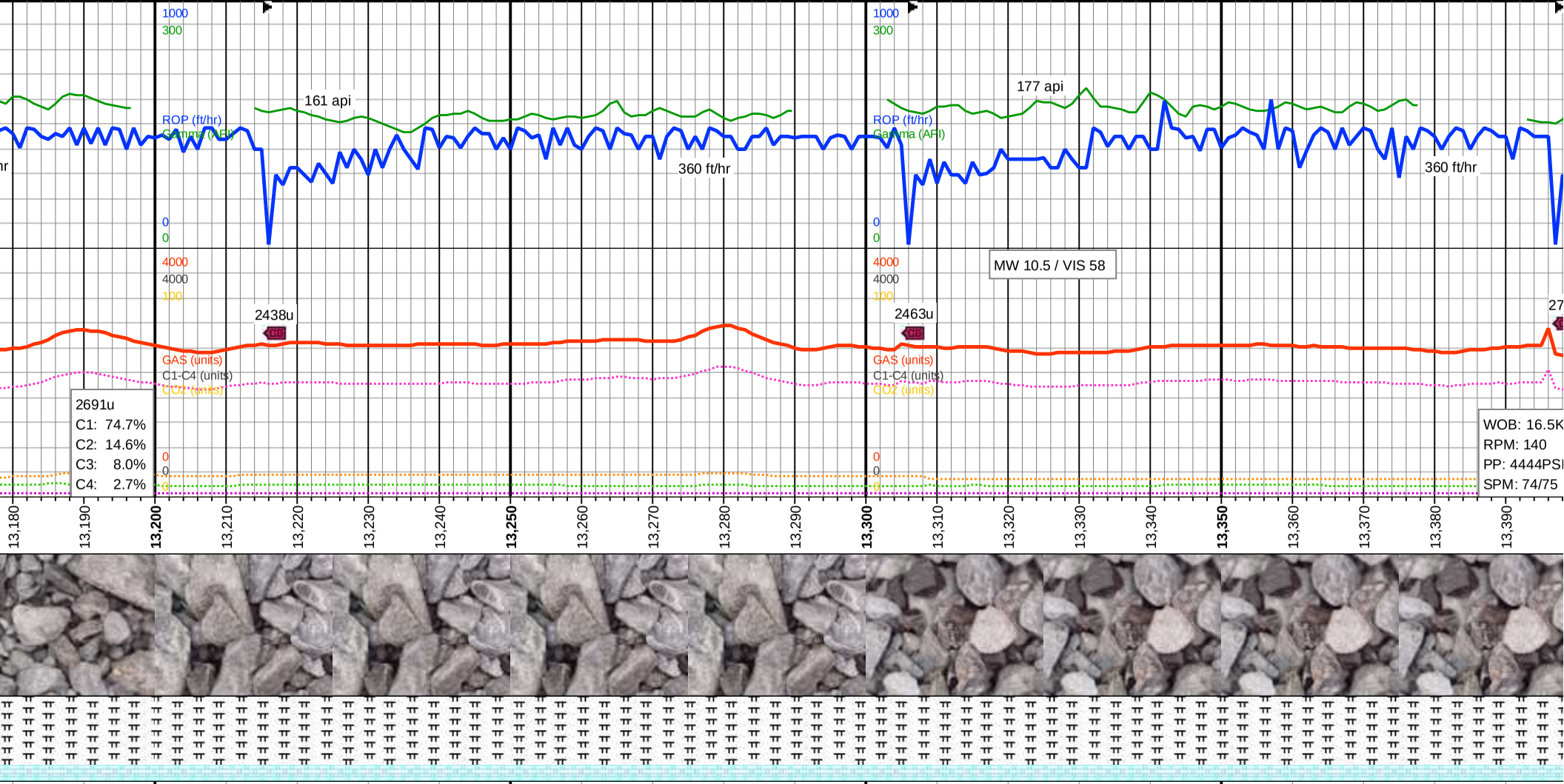
75% MRLST: med-drkgy, dk brn, modly frm-ip fri, calc, tr bent; 25% CHK: medgy-mot gyshbn, com blky, rthy-sb wxy, v calc.

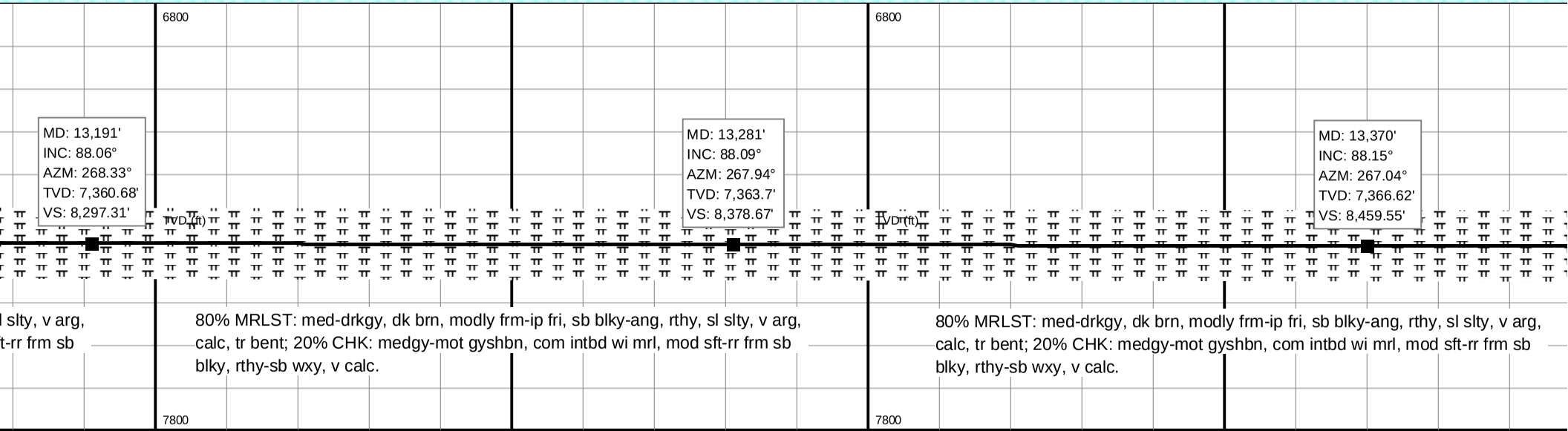


sb blky-ang, rthy, sl slty, v arg, intbd wi mrl, mod sft-rr frm sb

80% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 20% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

80% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, s calc, tr bent; 20% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sf blky, rthy-sb wxy, v calc.

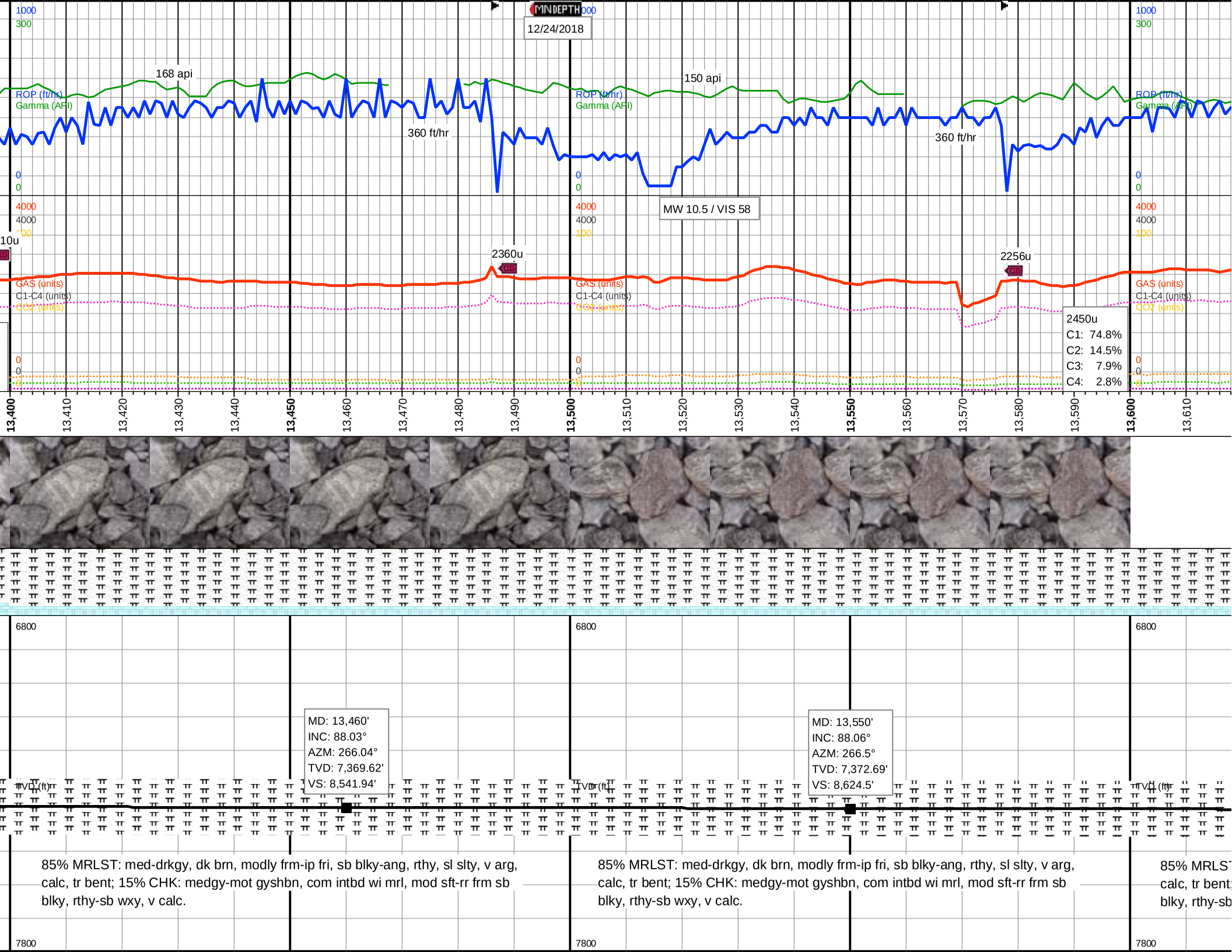




l slty, v arg,
t-rr frm sb

80% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 20% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

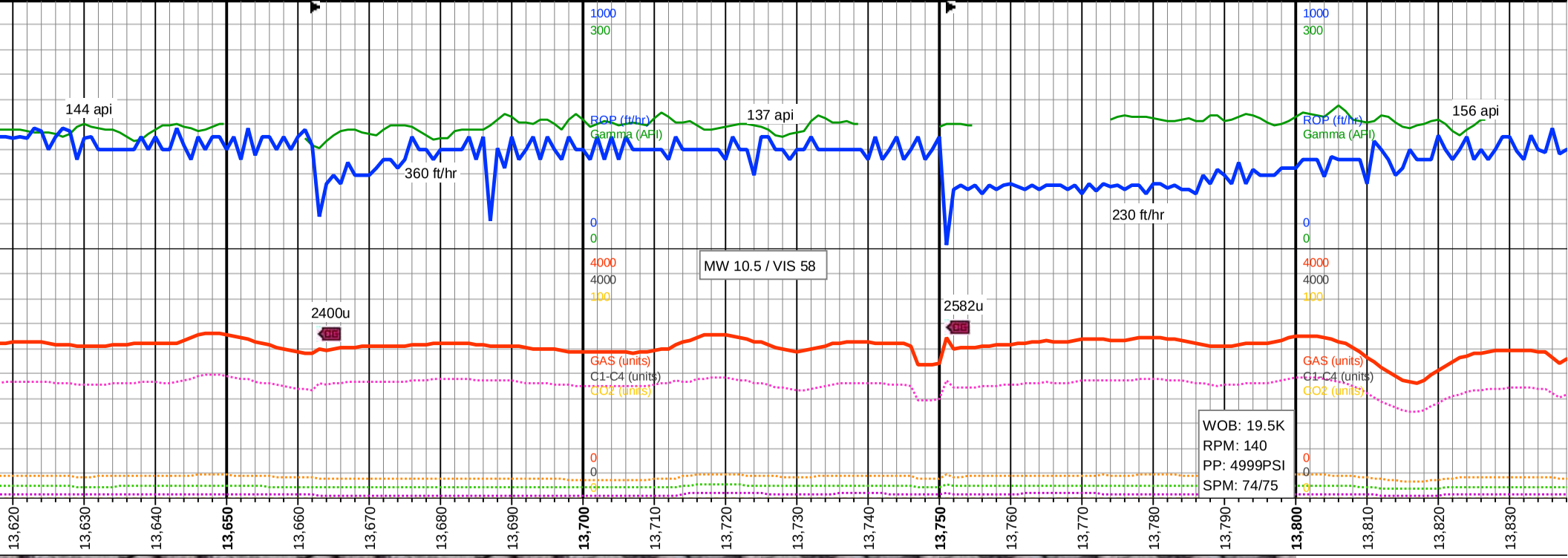
80% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 20% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

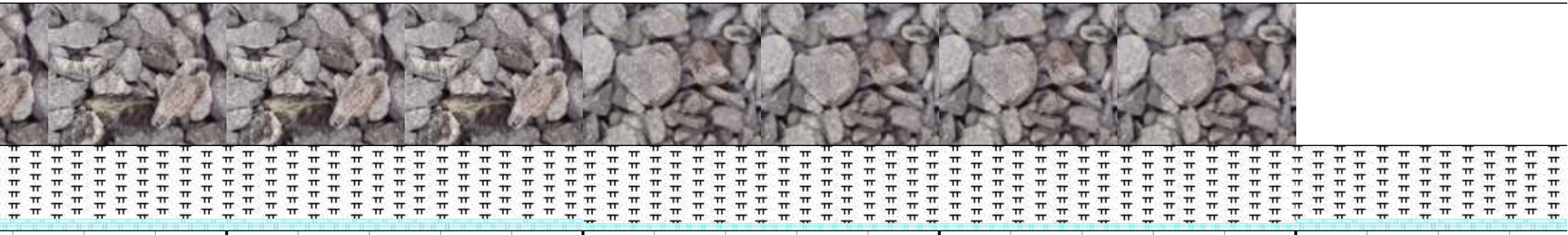


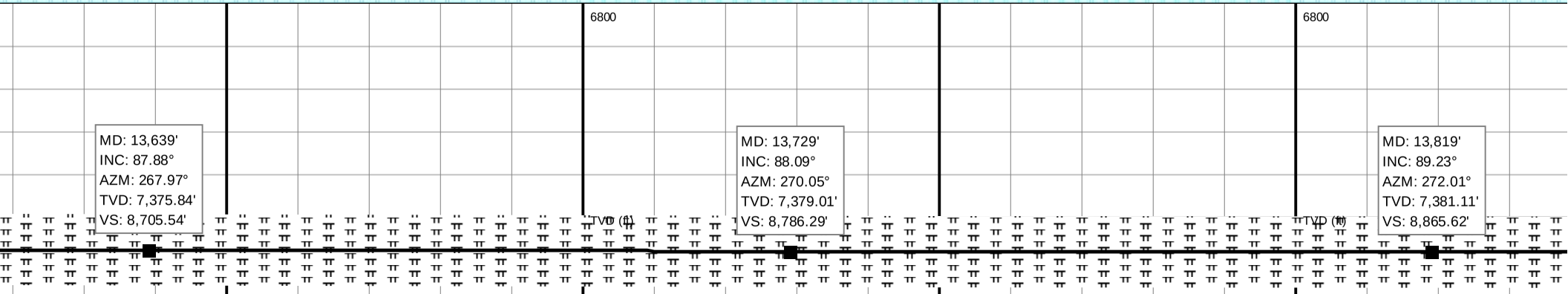
85% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 15% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

85% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 15% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

85% MRLST
calc, tr bent;
blky, rthy-sb



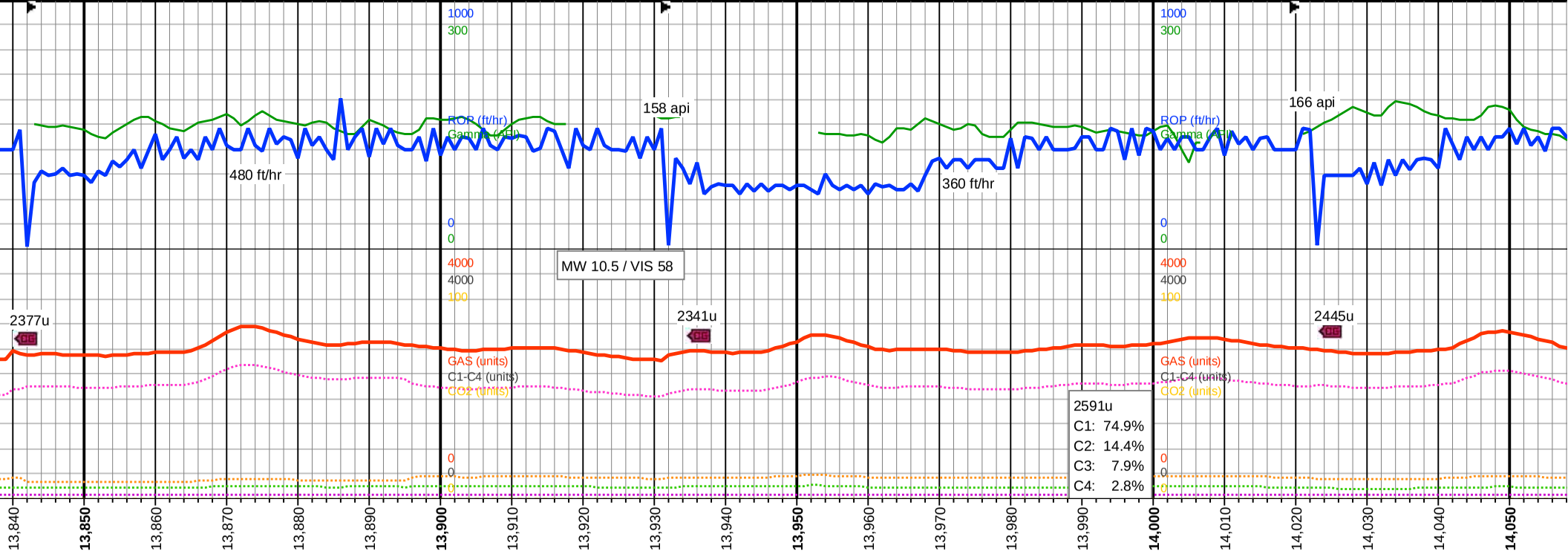


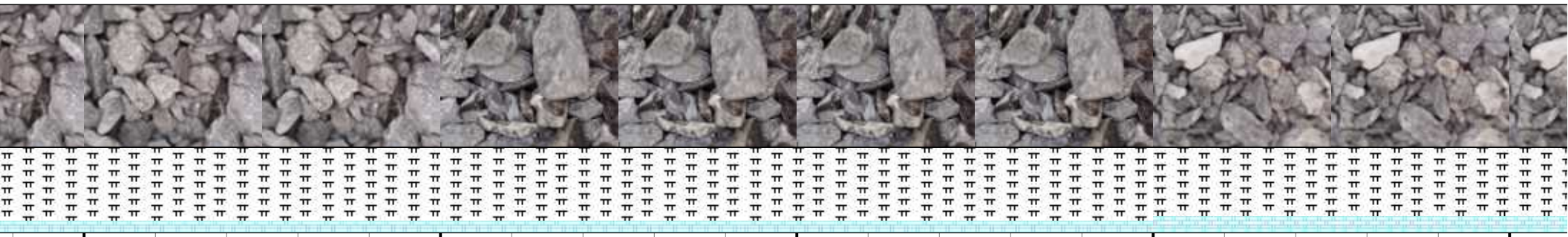


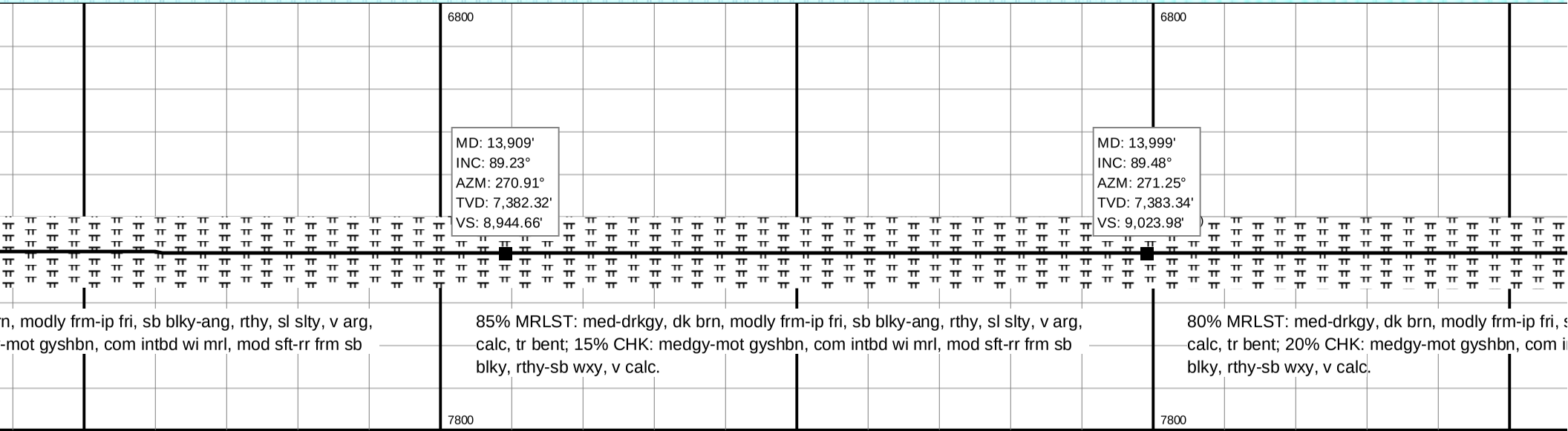
T: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, ; 15% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb wxy, v calc.

90% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 10% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc, tr bent, tr pyr nod.

85% MRLST: med-drkgy, dk br calc, tr bent; 15% CHK: medgy blky, rthy-sb wxy, v calc.



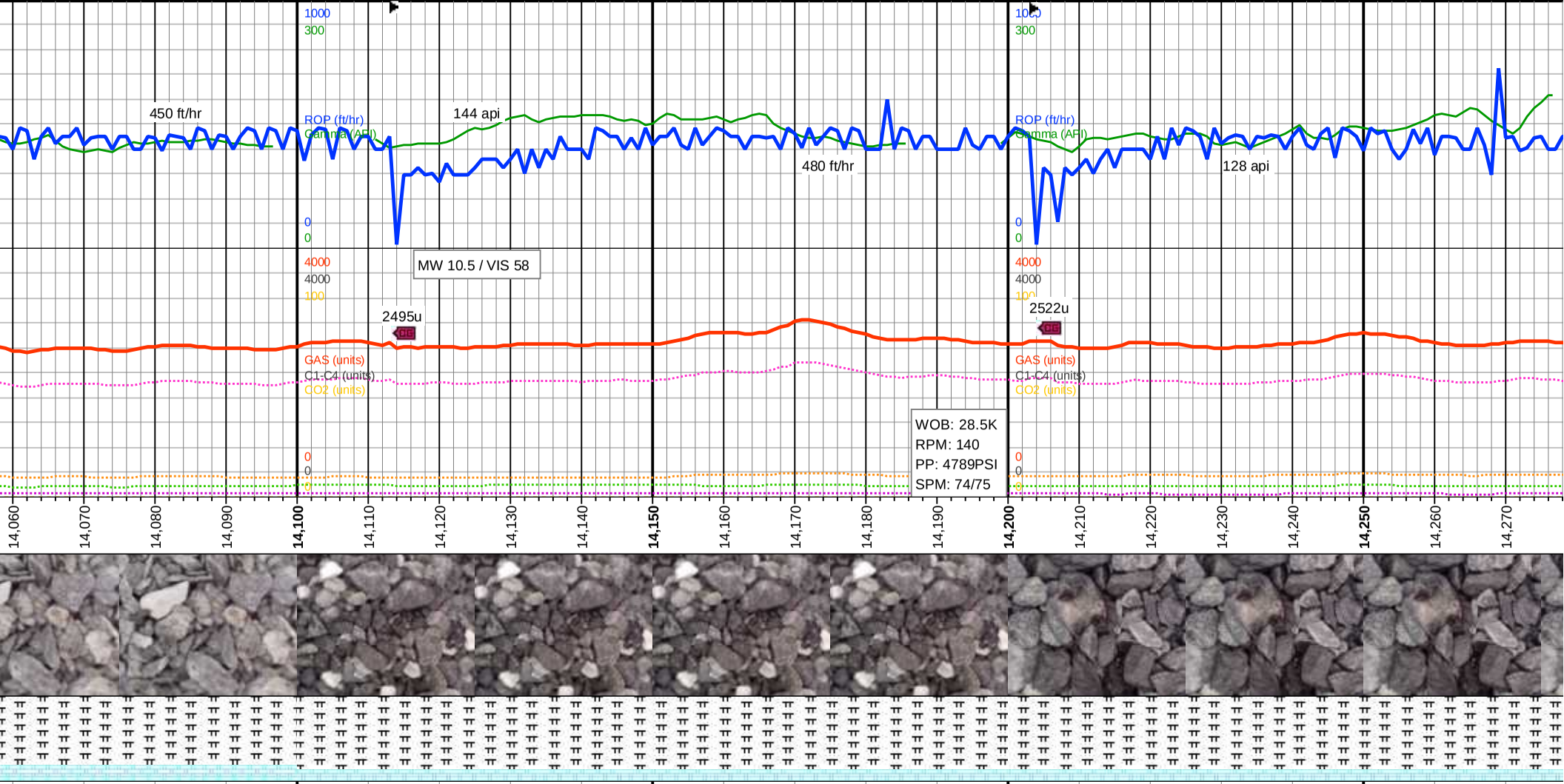


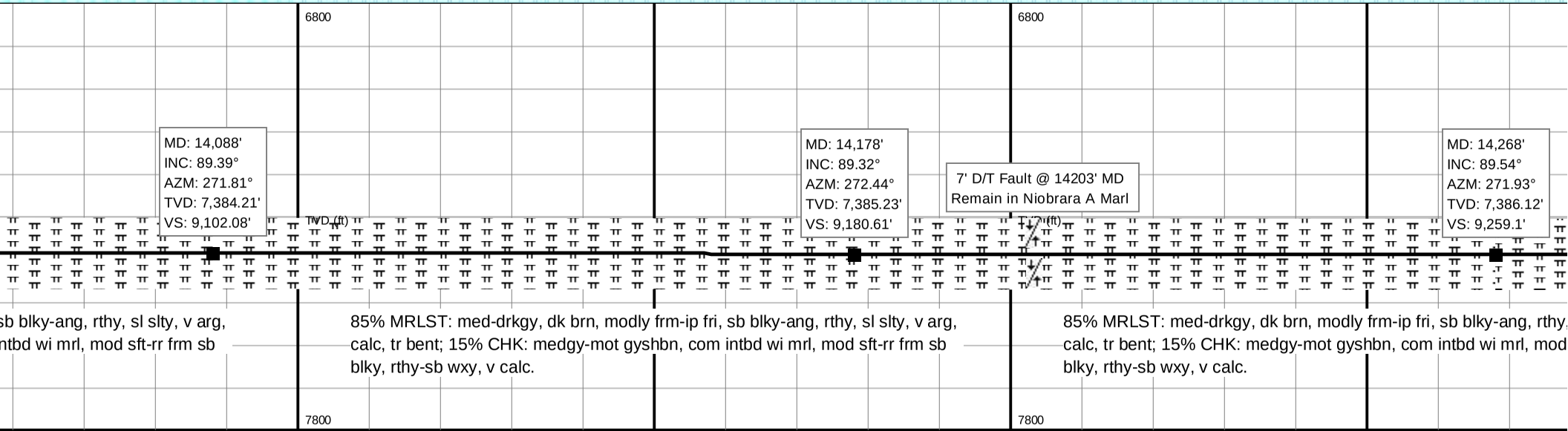


rn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, -mot gyshbn, com intbd wi mrl, mod sft-rr frm sb

85% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 15% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

80% MRLST: med-drkgy, dk brn, modly frm-ip fri, s calc, tr bent; 20% CHK: medgy-mot gyshbn, com i blky, rthy-sb wxy, v calc.

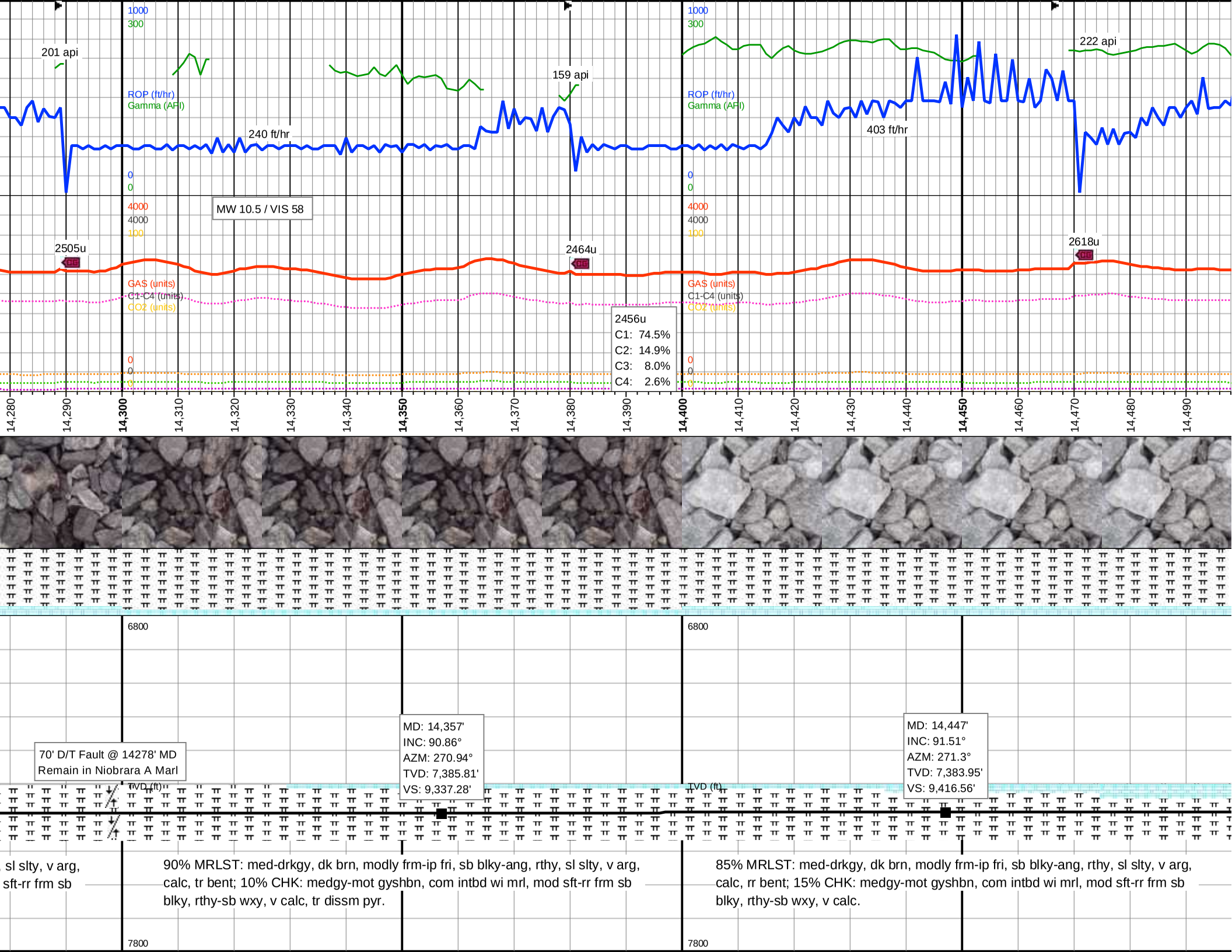




sb blky-ang, rthy, sl slty, v arg, ntbd wi mrl, mod sft-rr frm sb

85% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 15% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

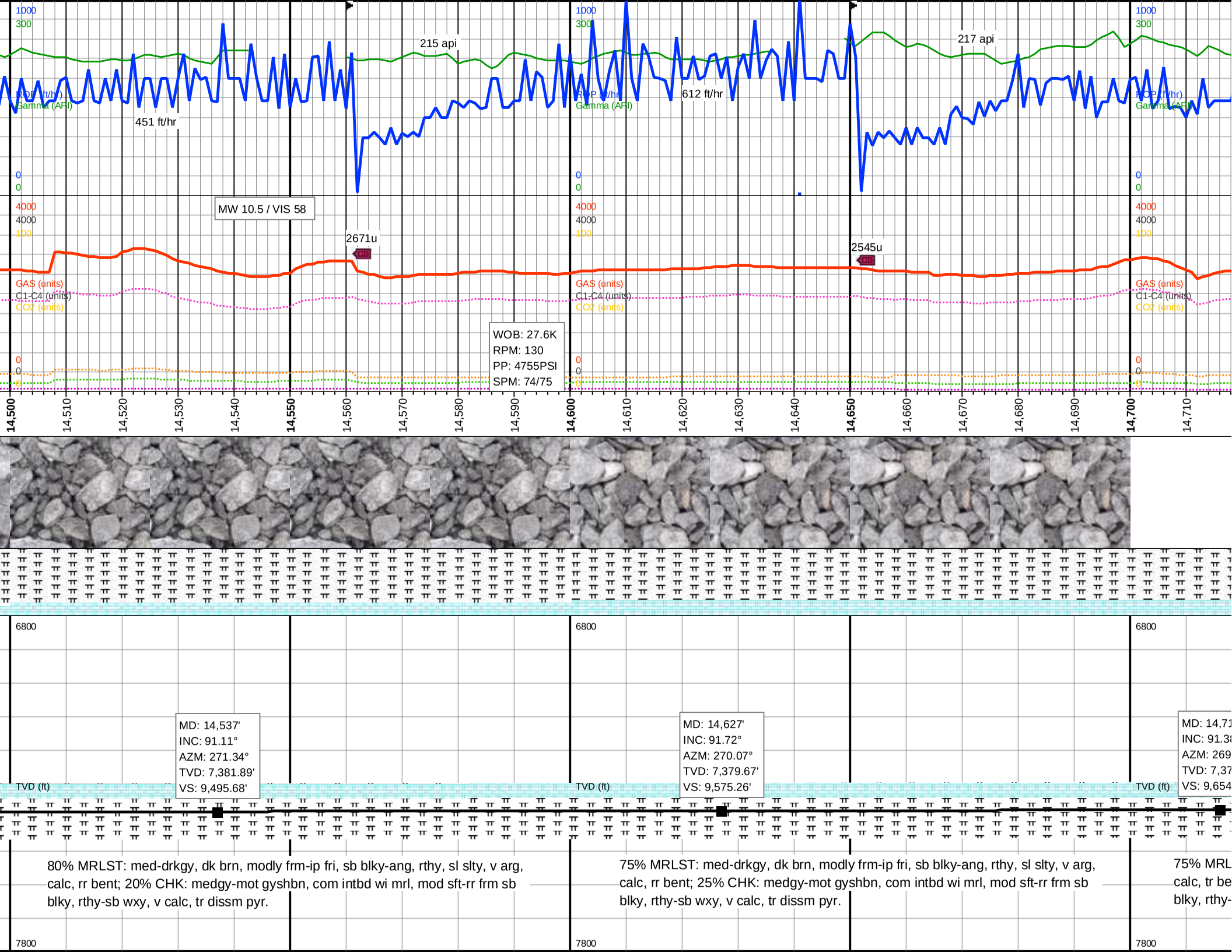
85% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, calc, tr bent; 15% CHK: medgy-mot gyshbn, com intbd wi mrl, mod blky, rthy-sb wxy, v calc.



sl slty, v arg,
sft-rr frm sb

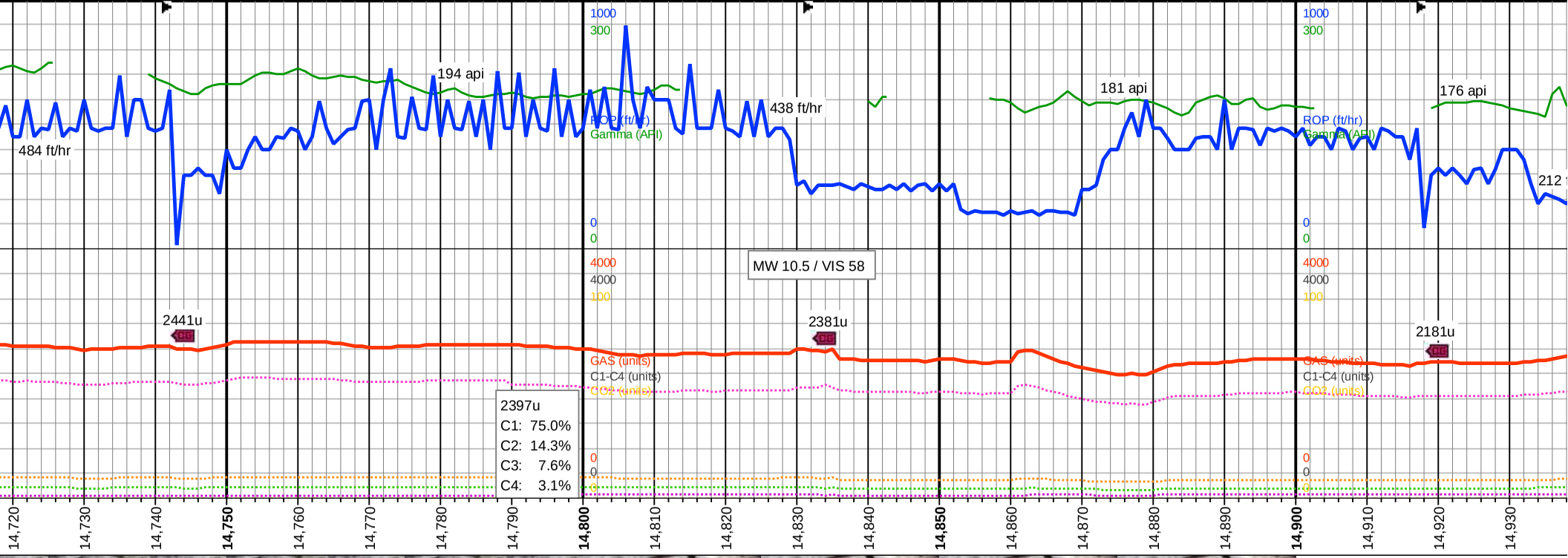
90% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 10% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc, tr dissm pyr.

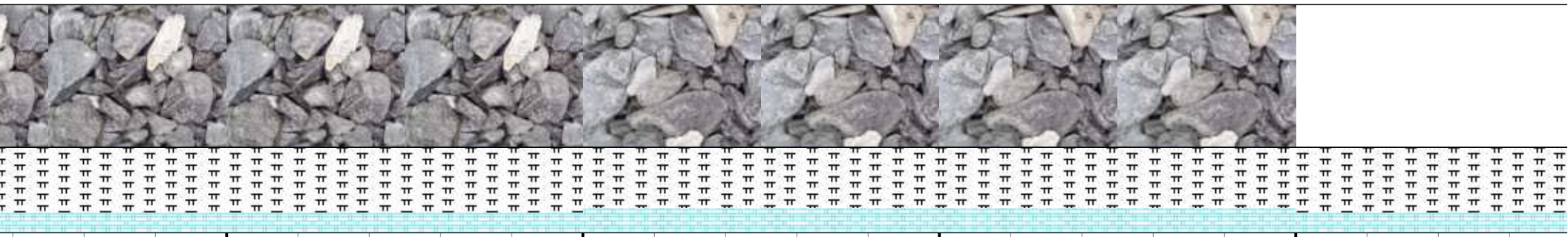
85% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent; 15% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

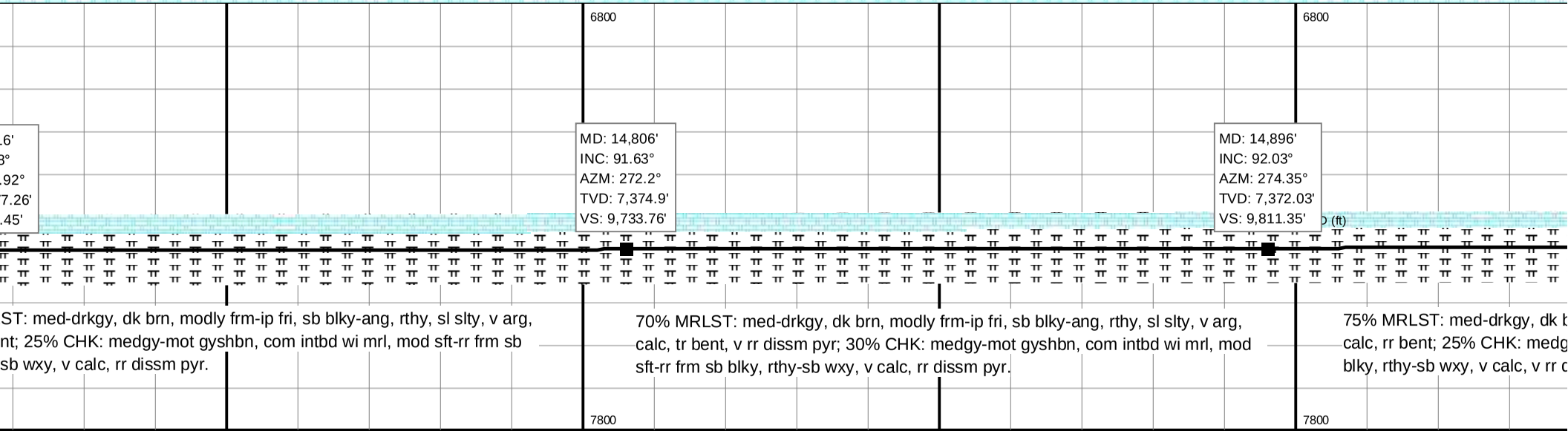


80% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent; 20% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc, tr dissm pyr.

75% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent; 25% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc, tr dissm pyr.



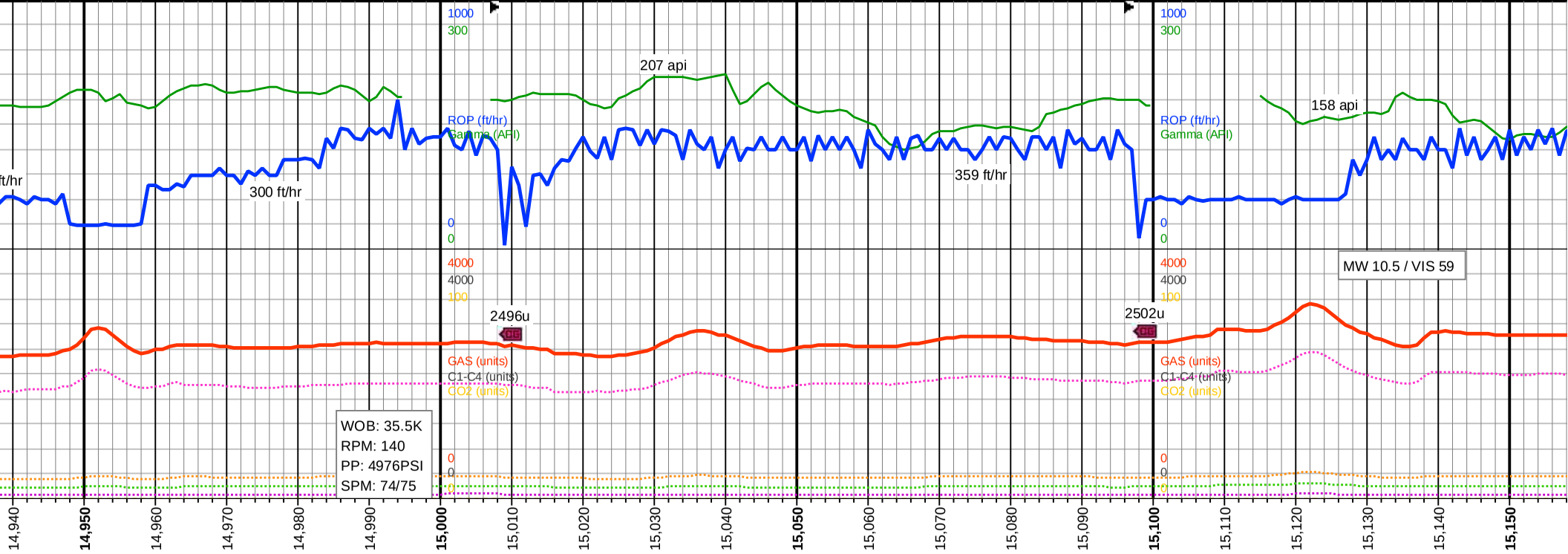


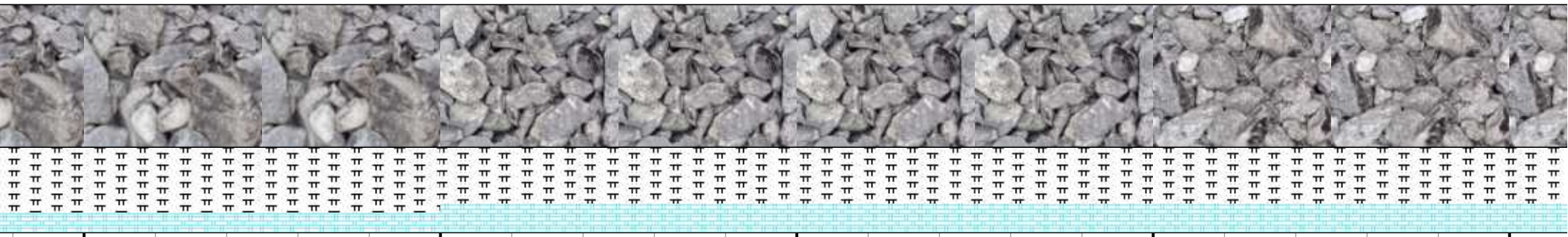


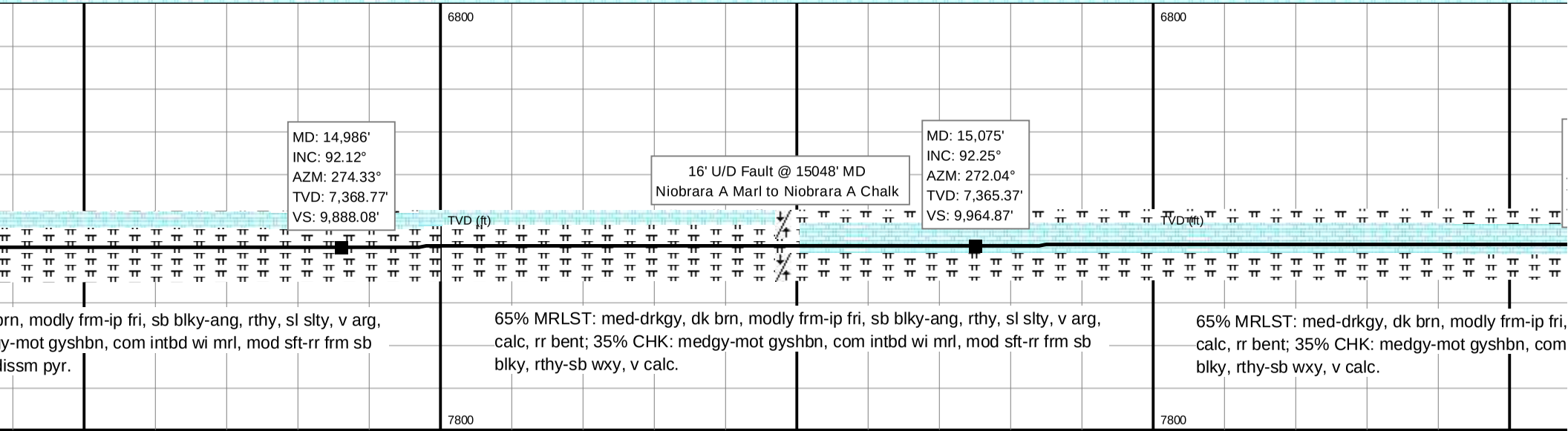
ST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, nt; 25% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb sb wxy, v calc, rr dissm pyr.

70% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent, v rr dissm pyr; 30% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc, rr dissm pyr.

75% MRLST: med-drkgy, dk b calc, rr bent; 25% CHK: medg blky, rthy-sb wxy, v calc, v rr d



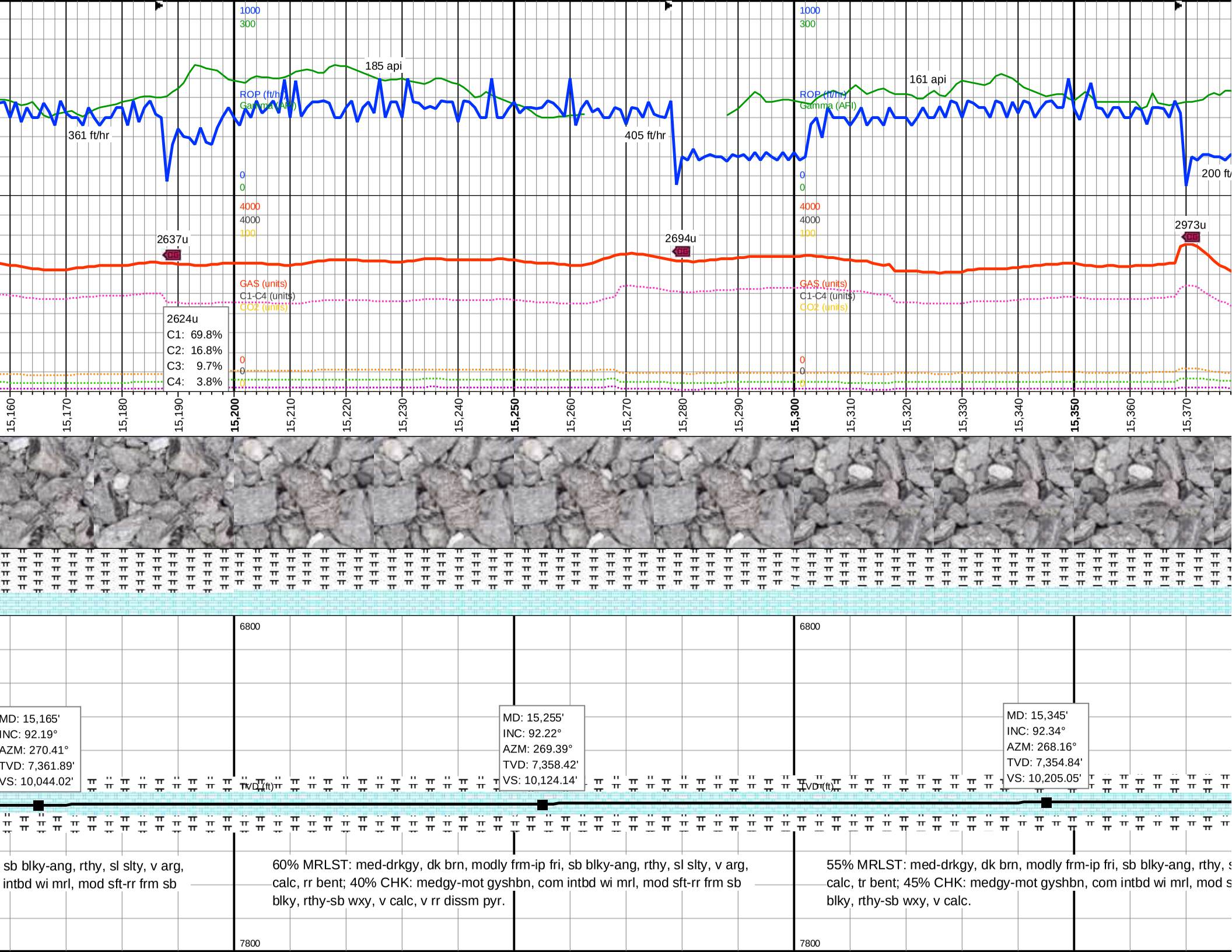


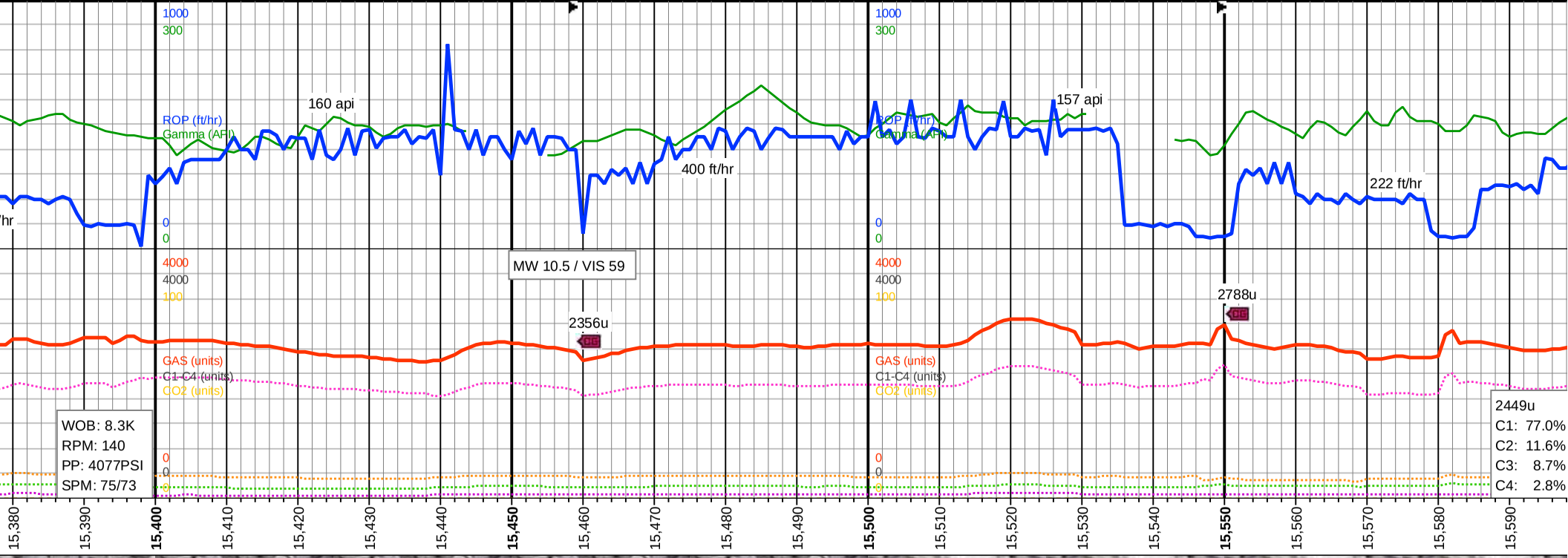


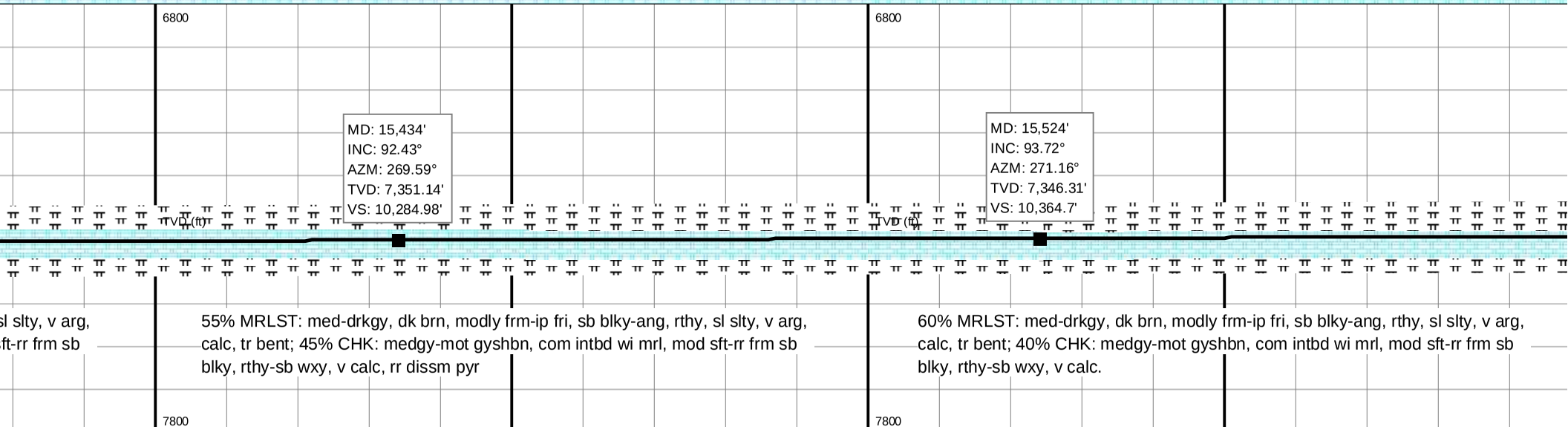
brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, y-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb lissm pyr.

65% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent; 35% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

65% MRLST: med-drkgy, dk brn, modly frm-ip fri, calc, rr bent; 35% CHK: medgy-mot gyshbn, com blky, rthy-sb wxy, v calc.


1000
300
185 api
ROP (ft/hr)
Gamma (API)
361 ft/hr
405 ft/hr
161 api
0
0
4000
4000
100
2637u
2694u
2973u
GAS (units)
C1-C4 (units)
CO2 (units)
2624u
C1: 69.8%
C2: 16.8%
C3: 9.7%
C4: 3.8%
15,160
15,170
15,180
15,190
15,200
15,210
15,220
15,230
15,240
15,250
15,260
15,270
15,280
15,290
15,300
15,310
15,320
15,330
15,340
15,350
15,360
15,370
6800
7800
TVD (ft)
MD: 15,165'
INC: 92.19°
AZM: 270.41°
TVD: 7,361.89'
VS: 10,044.02'
MD: 15,255'
INC: 92.22°
AZM: 269.39°
TVD: 7,358.42'
VS: 10,124.14'
MD: 15,345'
INC: 92.34°
AZM: 268.16°
TVD: 7,354.84'
VS: 10,205.05'
sb blky-ang, rthy, sl slty, v arg, intbd wi mrl, mod sft-rr frm sb
60% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc, v rr dissm pyr.
55% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, calc, tr bent; 45% CHK: medgy-mot gyshbn, com intbd wi mrl, mod blky, rthy-sb wxy, v calc.

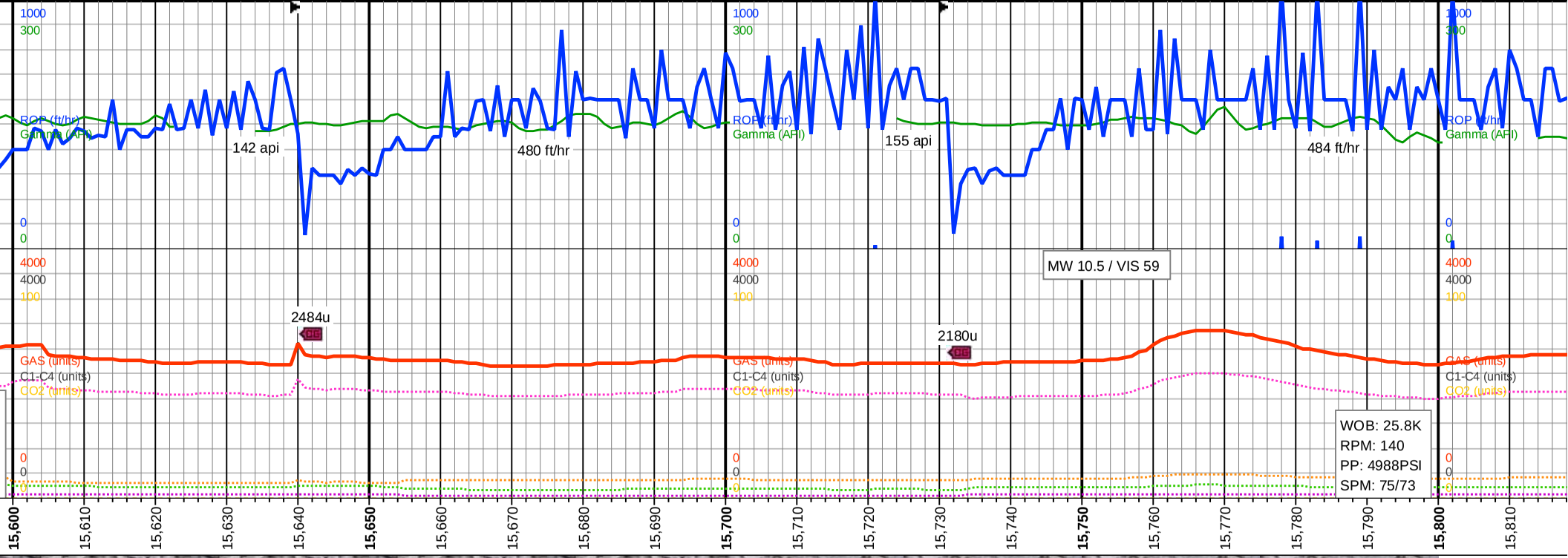


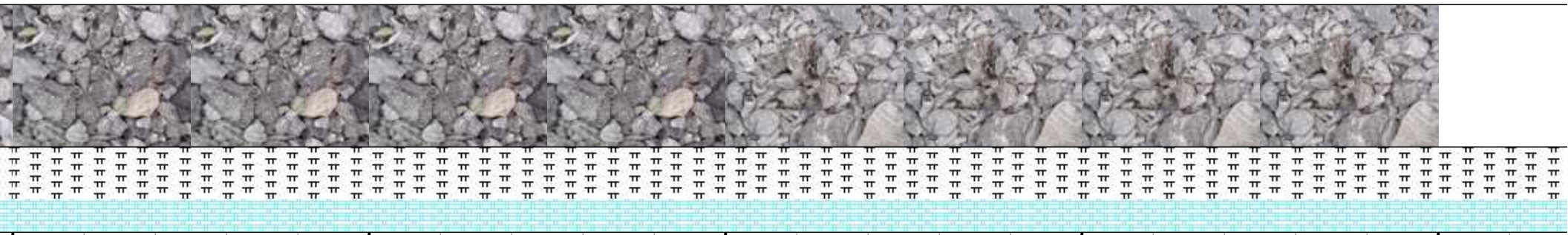


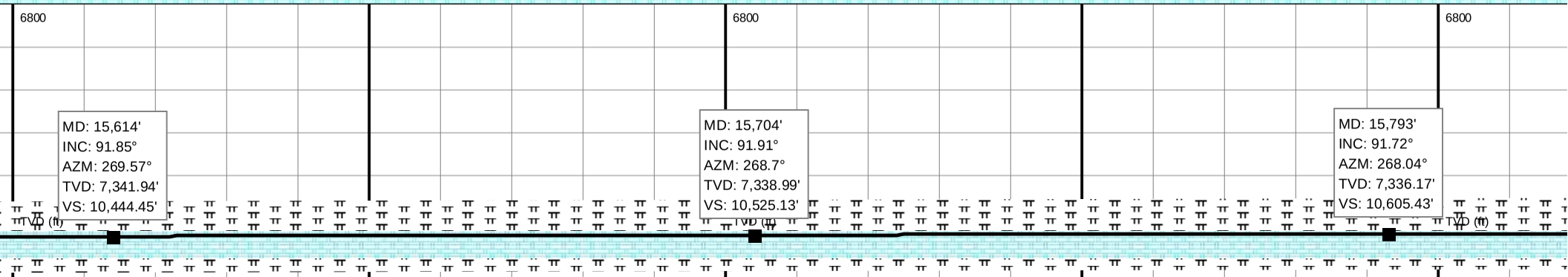
sl slty, v arg,
ft-rr frm sb

55% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 45% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc, rr dissm pyr

60% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.



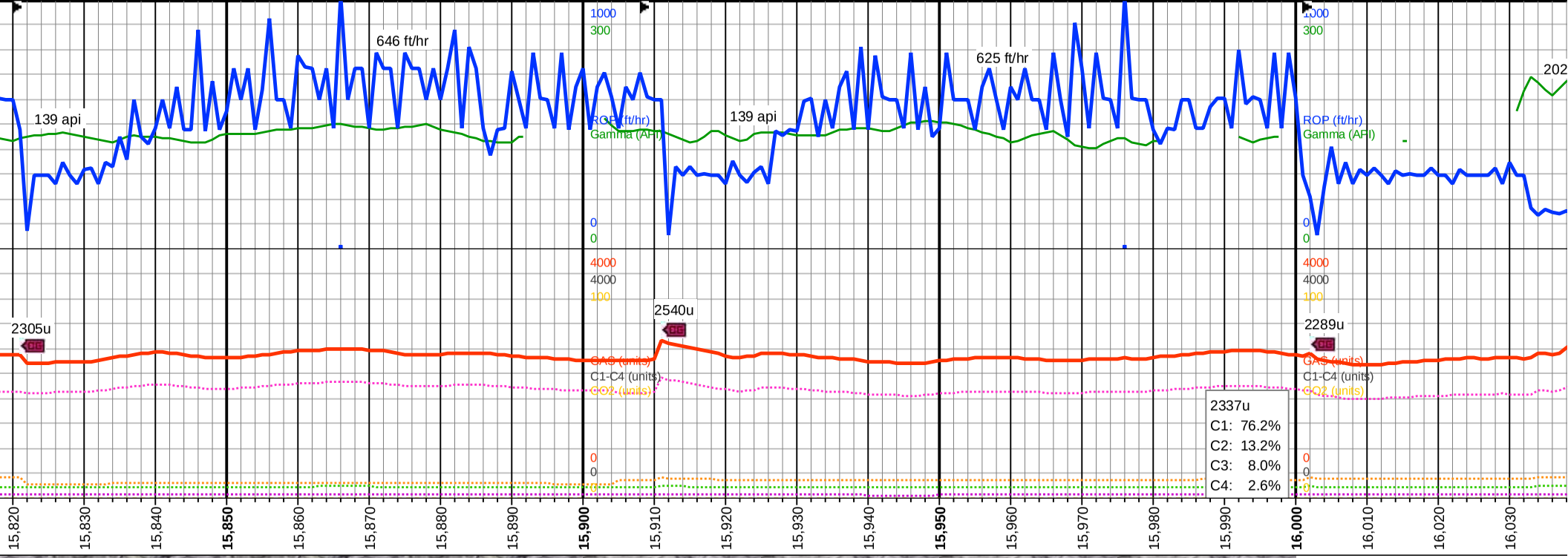


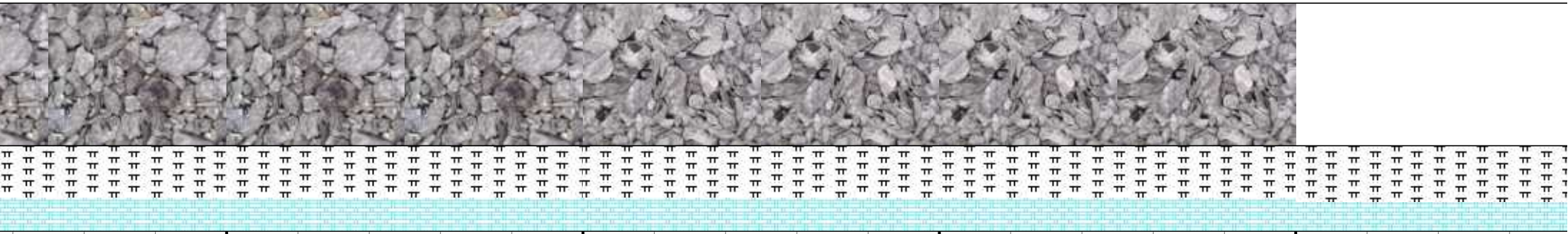


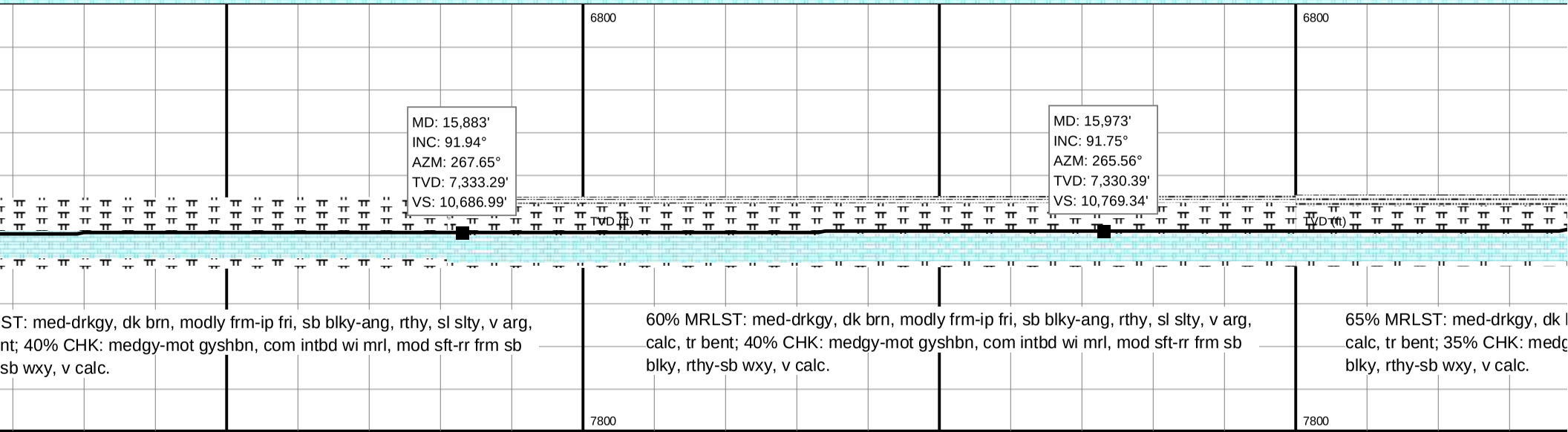
60% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr-mod bent; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

60% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr-mod bent; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

60% MRL
calc, tr be
blky, rthy-



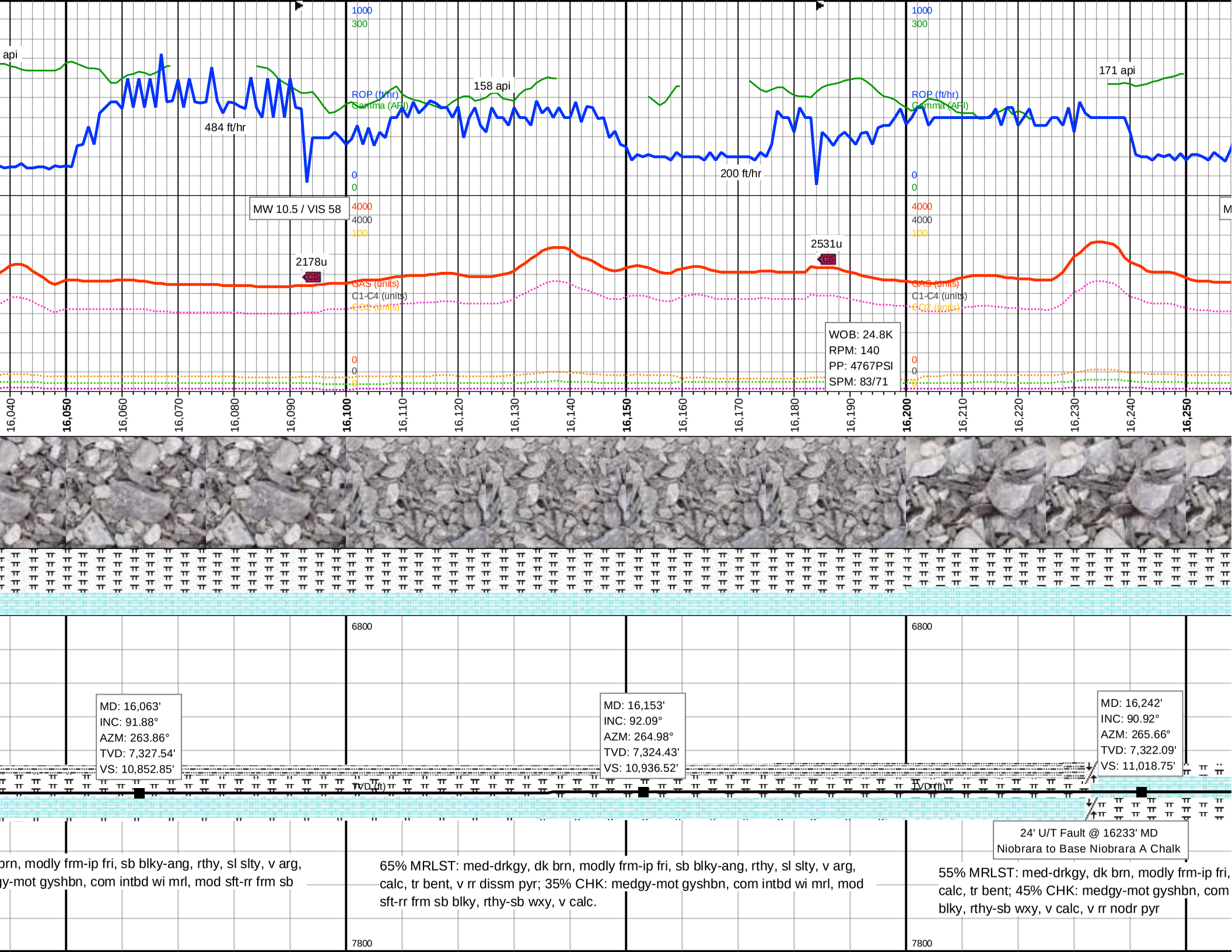


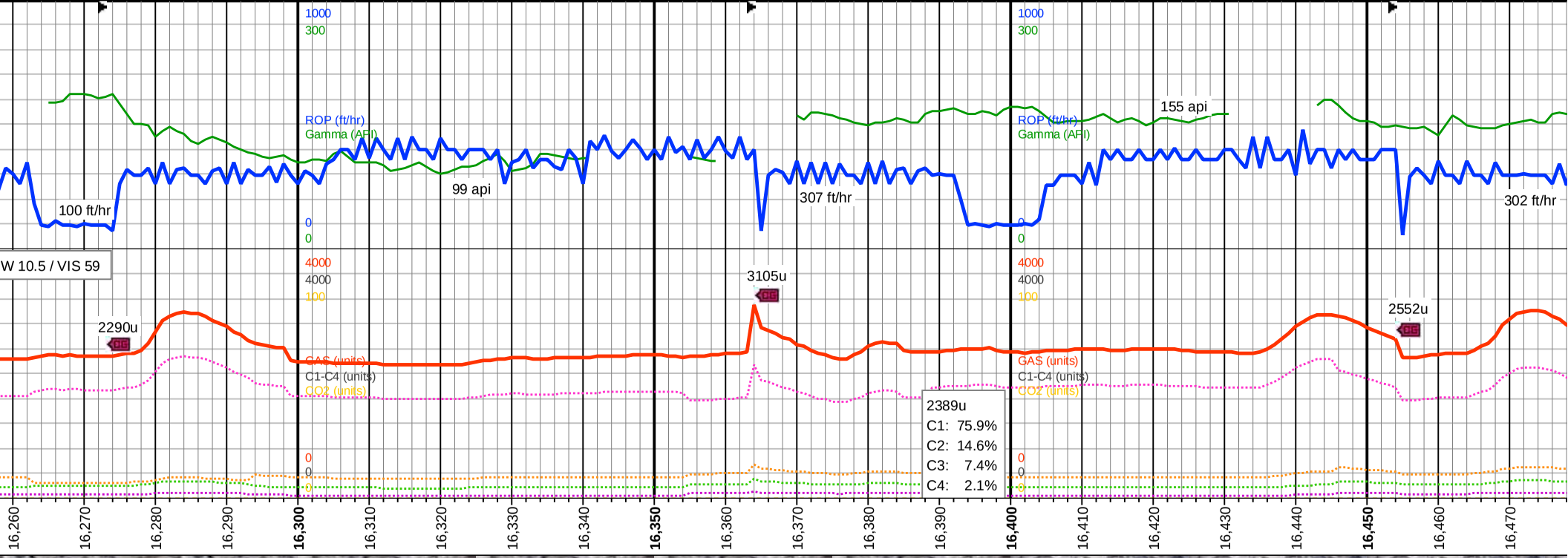


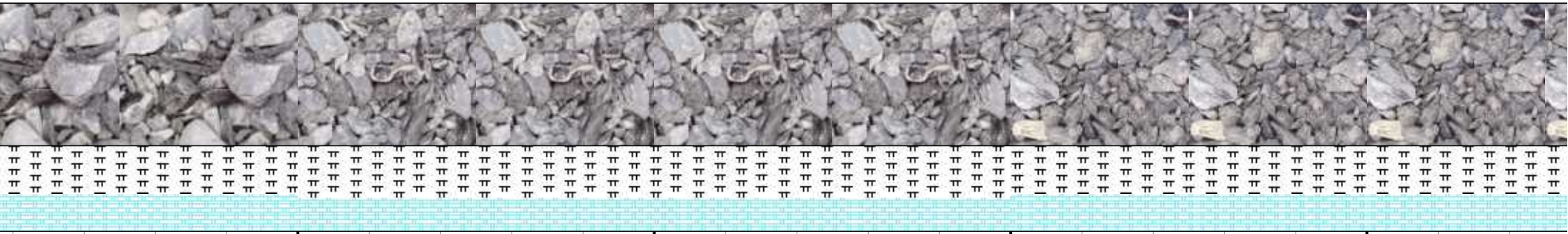
ST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, nt; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb sb wxy, v calc.

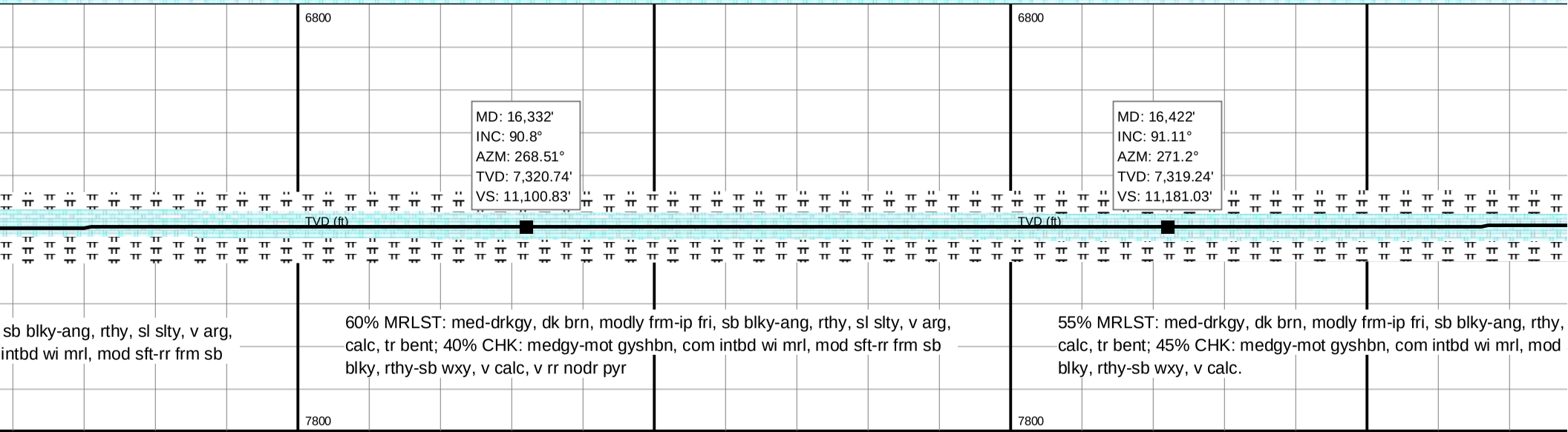
60% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

65% MRLST: med-drkgy, dk calc, tr bent; 35% CHK: medg blky, rthy-sb wxy, v calc.


api
484 ft/hr
158 api
200 ft/hr
171 api
ROP (ft/hr)
Gamma (API)
1000
300
0
0
MW 10.5 / VIS 58
4000
4000
100
2178u
2531u
GAS (units)
C1-C4 (units)
CO2 (units)
WOB: 24.8K
RPM: 140
PP: 4767PSI
SPM: 83/71
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
6800
7800
MD: 16,063'
INC: 91.88°
AZM: 263.86°
TVD: 7,327.54'
VS: 10,852.85'
MD: 16,153'
INC: 92.09°
AZM: 264.98°
TVD: 7,324.43'
VS: 10,936.52'
MD: 16,242'
INC: 90.92°
AZM: 265.66°
TVD: 7,322.09'
VS: 11,018.75'
TVD (ft)
24' U/T Fault @ 16233' MD
Niobrara to Base Niobrara A Chalk
brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg,
gy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb
65% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg,
calc, tr bent, v rr dissm pyr; 35% CHK: medgy-mot gyshbn, com intbd wi mrl, mod
sft-rr frm sb blky, rthy-sb wxy, v calc.
55% MRLST: med-drkgy, dk brn, modly frm-ip fri,
calc, tr bent; 45% CHK: medgy-mot gyshbn, com
blky, rthy-sb wxy, v calc, v rr nodr pyr



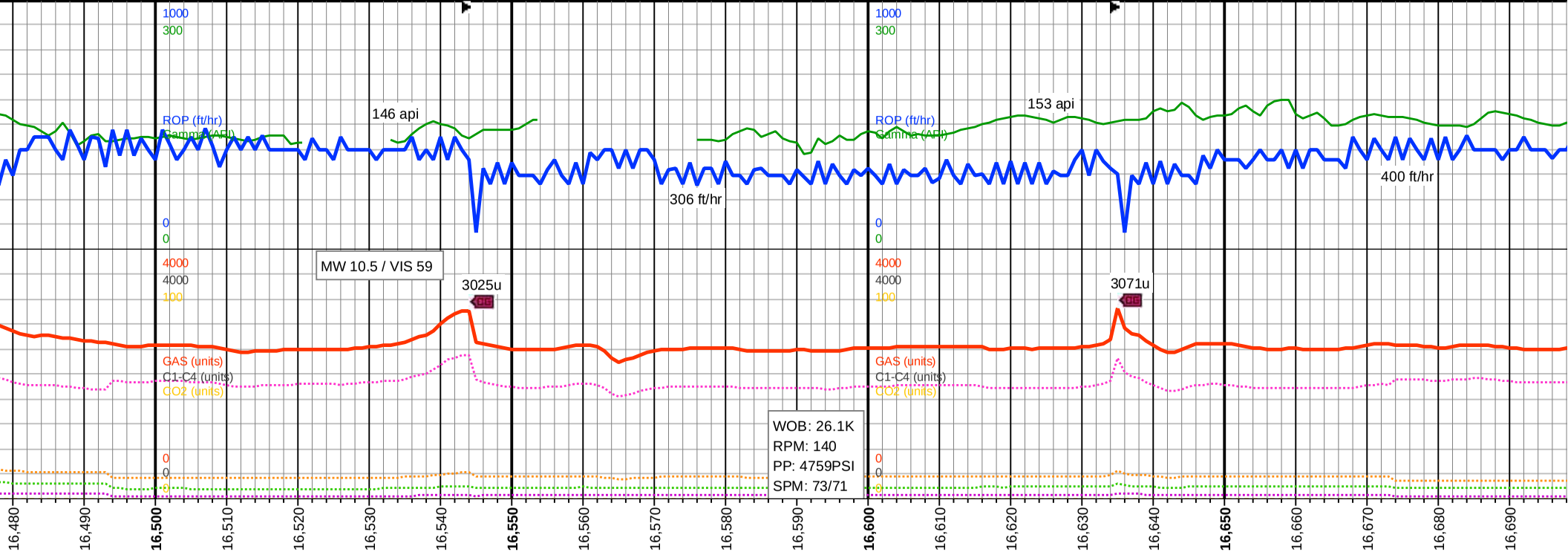


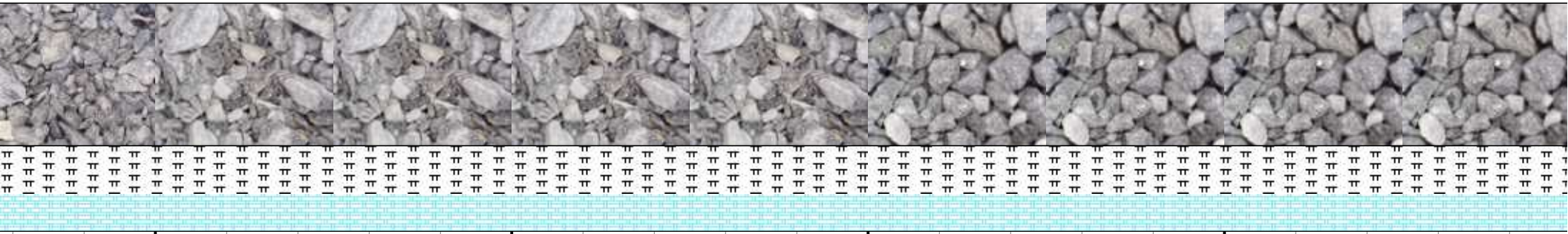


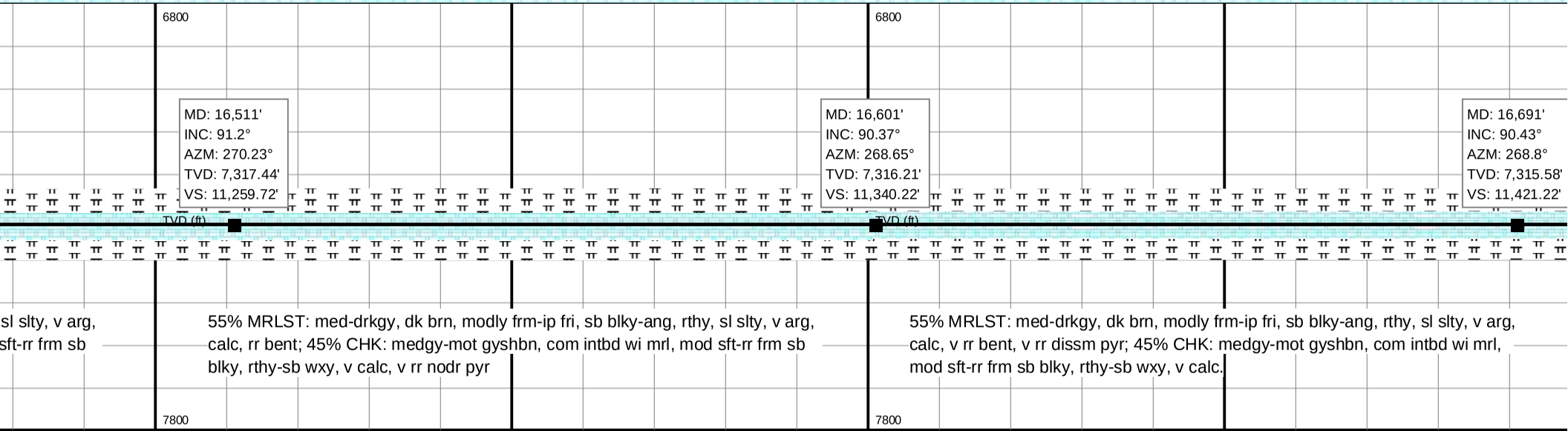
sb blky-ang, rthy, sl slty, v arg, intbd wi mrl, mod sft-rr frm sb

60% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc, v rr nodr pyr

55% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, calc, tr bent; 45% CHK: medgy-mot gyshbn, com intbd wi mrl, mod blky, rthy-sb wxy, v calc.



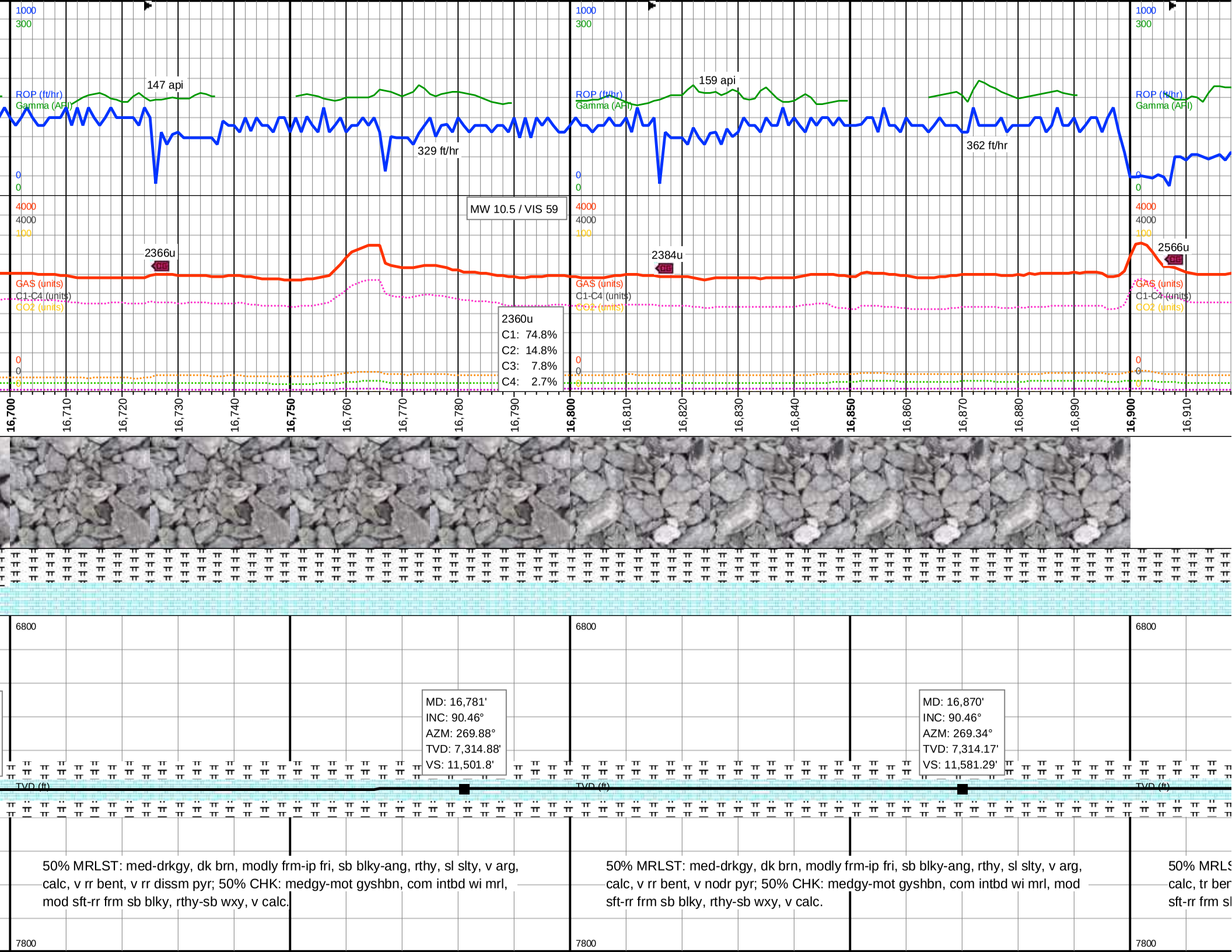




sl slty, v arg, sft-rr frm sb

55% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, rr bent; 45% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc, v rr nodr pyr

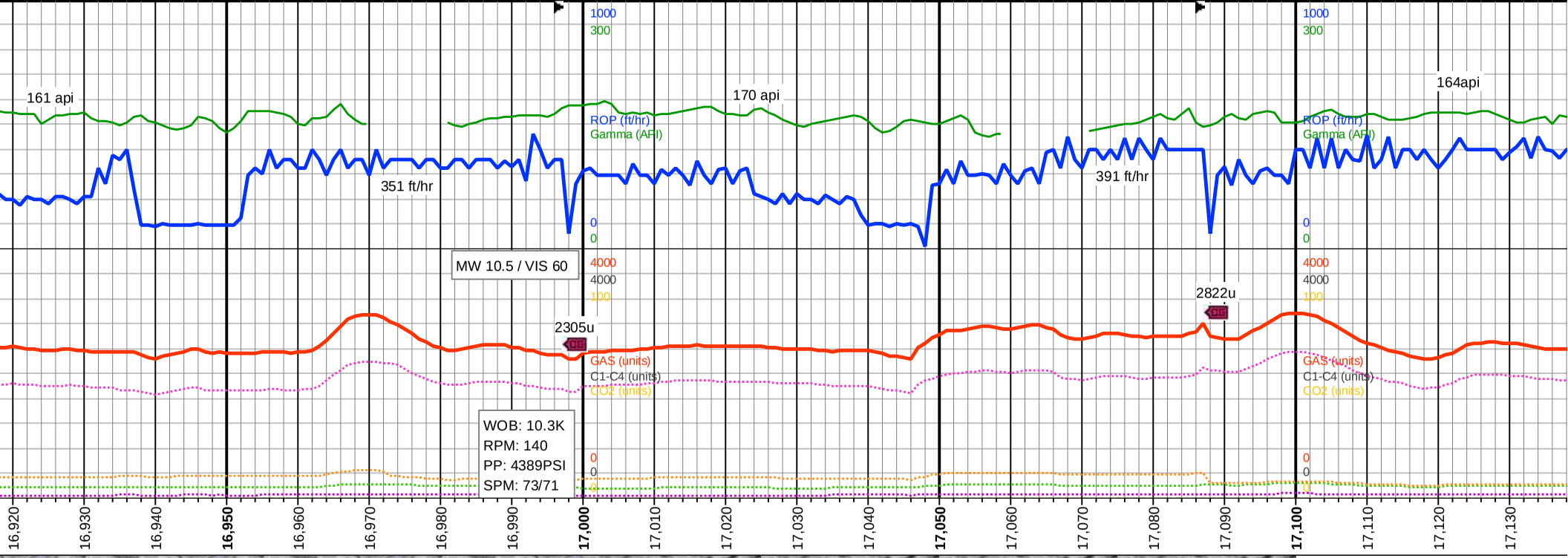
55% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, v rr bent, v rr dissm pyr; 45% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

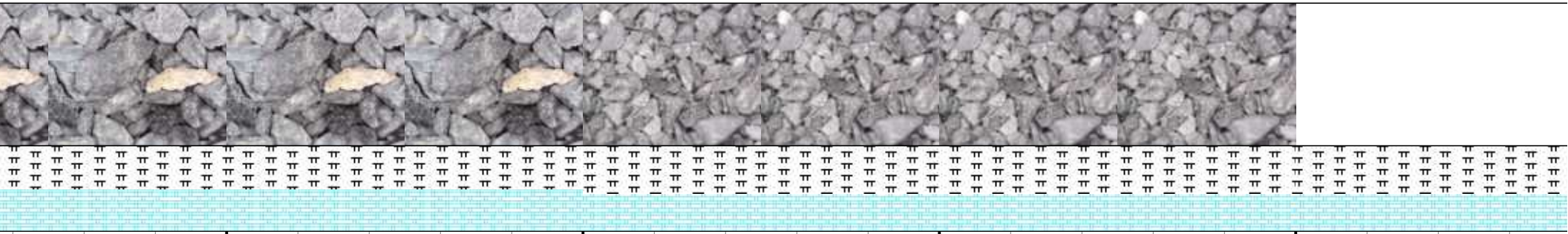


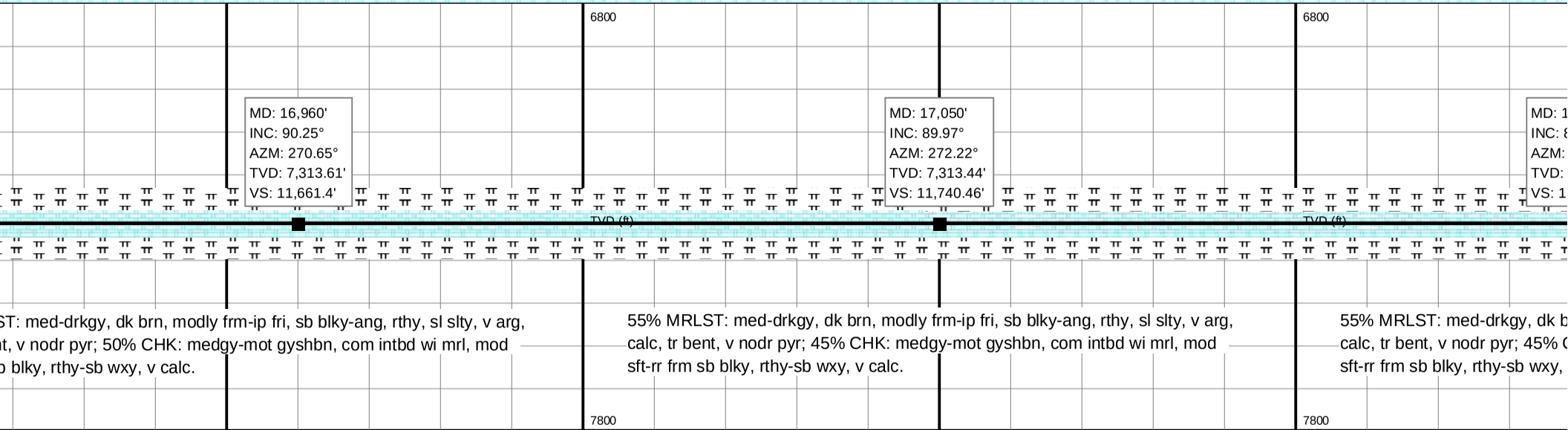
50% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, v rr bent, v rr dissm pyr; 50% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

50% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, v rr bent, v nodr pyr; 50% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

50% MRLS
calc, tr ben
sft-rr frm sl



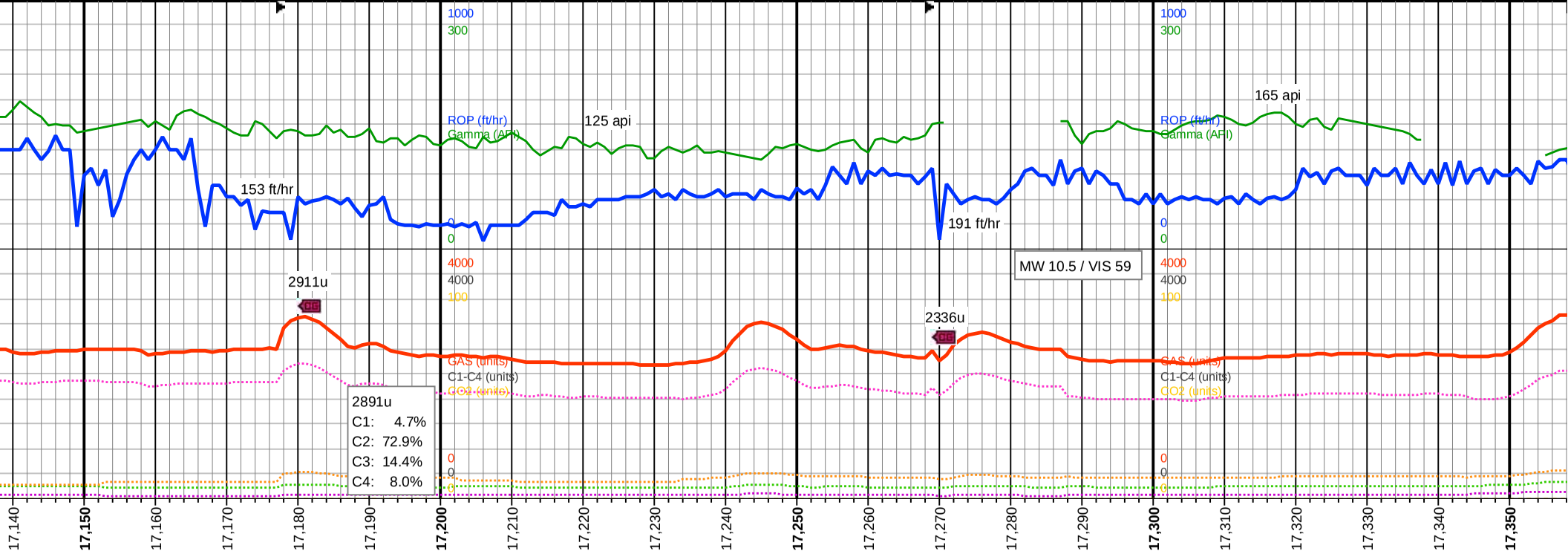


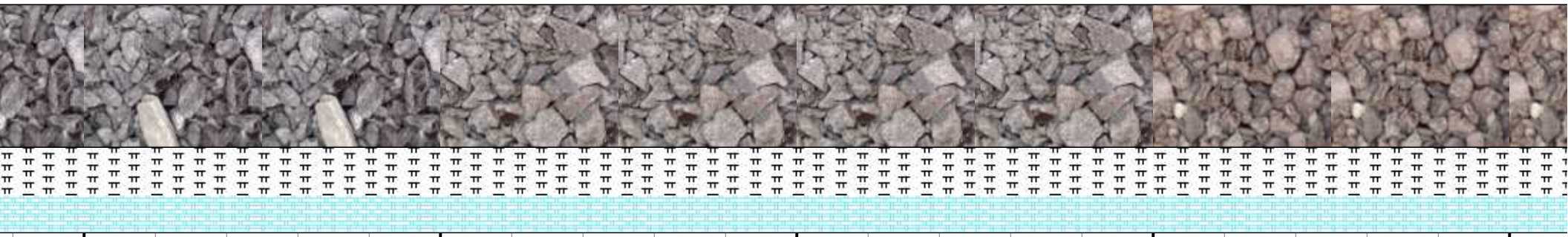


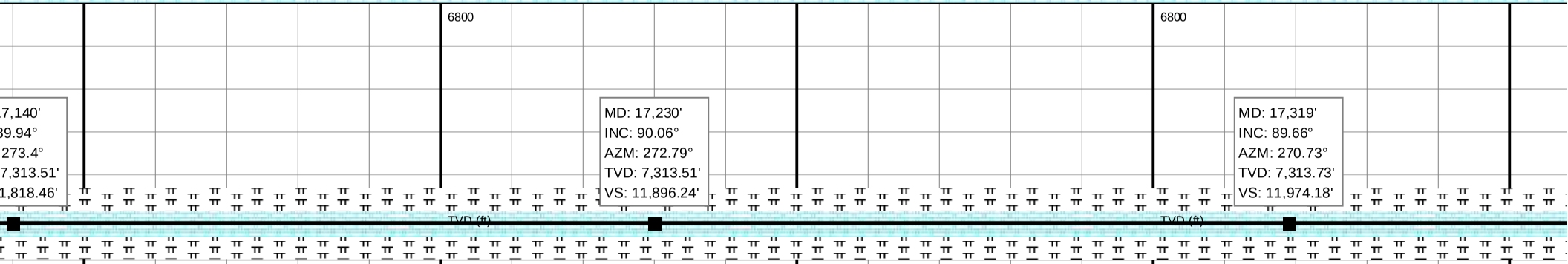
ST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, nt, v nodr pyr; 50% CHK: medgy-mot gyshbn, com intbd wi mrl, mod b blky, rthy-sb wxy, v calc.

55% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent, v nodr pyr; 45% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

55% MRLST: med-drkgy, dk b calc, tr bent, v nodr pyr; 45% C sft-rr frm sb blky, rthy-sb wxy,



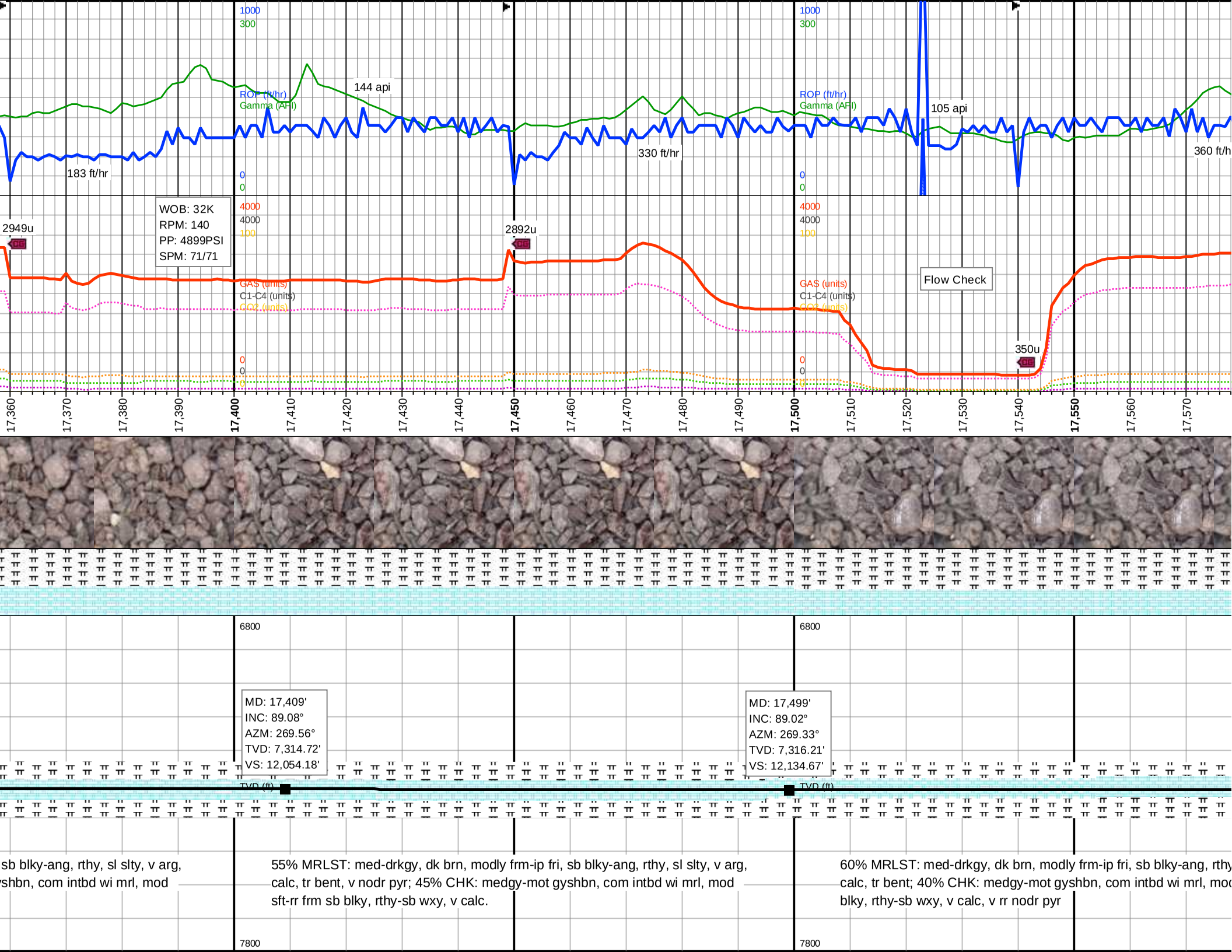




rn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, CHK: medgy-mot gyshbn, com intbd wi mrl, mod v calc.

55% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent, v nodr pyr; 45% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

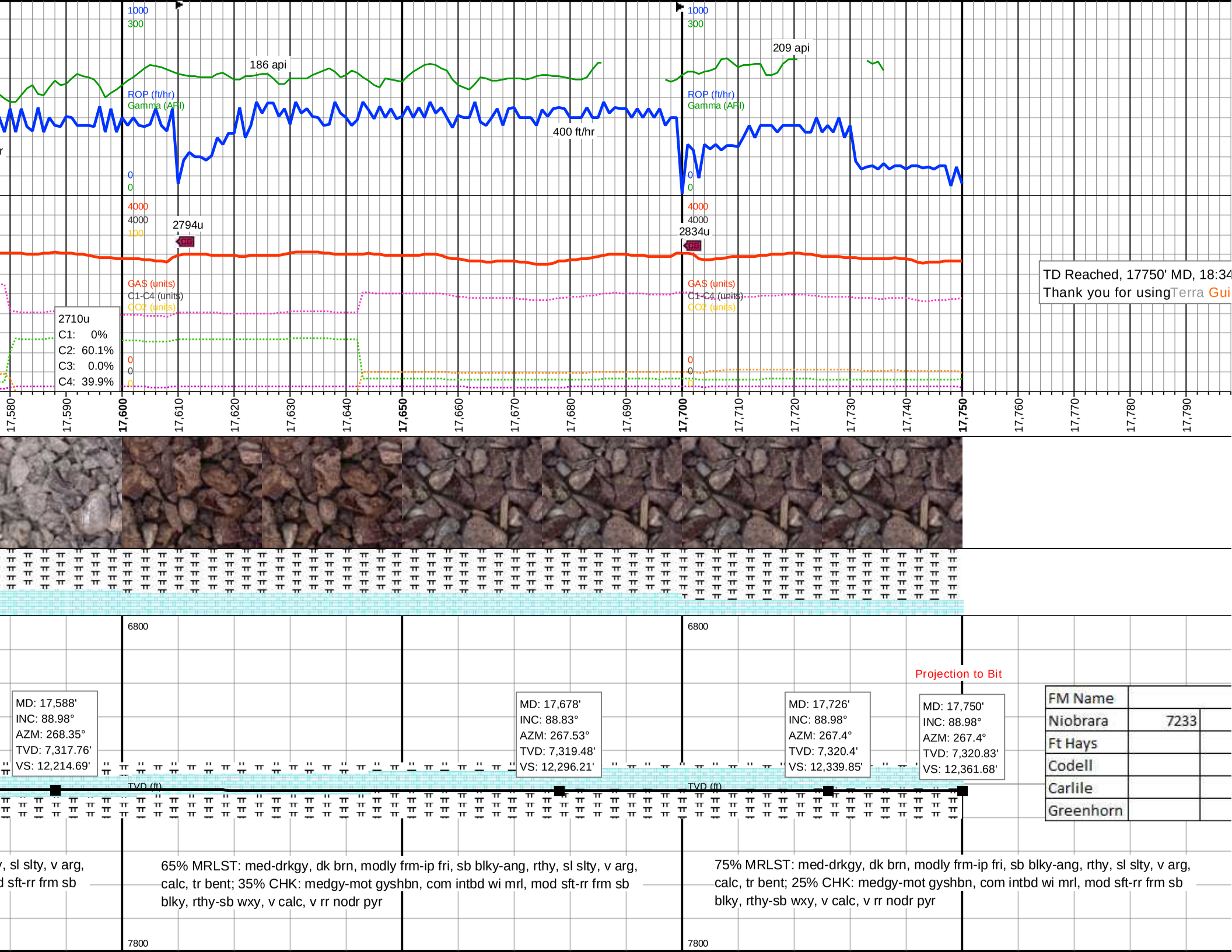
55% MRLST: med-drkgy, dk brn, modly frm-ip fri, calc, tr bent, v nodr pyr; 45% CHK: medgy-mot gy sft-rr frm sb blky, rthy-sb wxy, v calc.

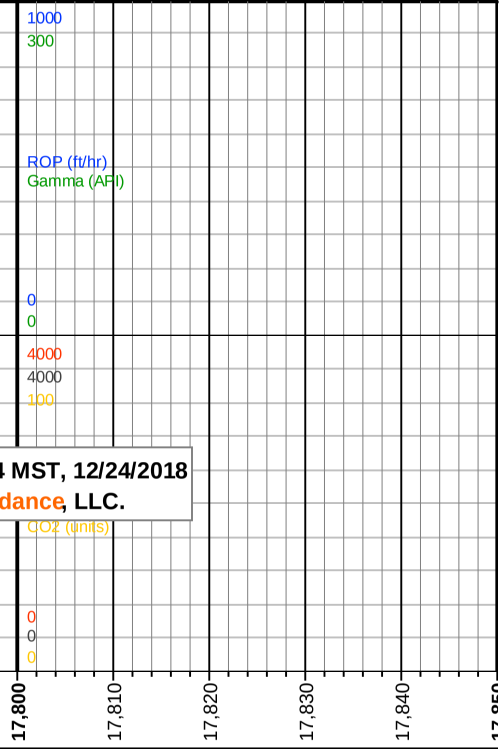


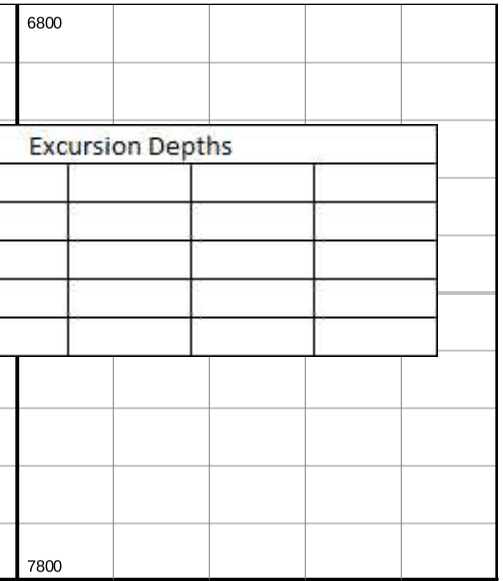
sb blky-ang, rthy, sl slty, v arg, yshbn, com intbd wi mrl, mod

55% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent, v nodr pyr; 45% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc.

60% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy calc, tr bent; 40% CHK: medgy-mot gyshbn, com intbd wi mrl, mod blky, rthy-sb wxy, v calc, v rr nodr pyr


1000
300
186 api
ROP (ft/hr)
Gamma (API)
400 ft/hr
209 api
0
0
4000
4000
100
2794u
2834u
GAS (units)
C1-C4 (units)
CO2 (units)
2710u
C1: 0%
C2: 60.1%
C3: 0.0%
C4: 39.9%
TD Reached, 17750' MD, 18:34
Thank you for using Terra Gui
17,580
17,590
17,600
17,610
17,620
17,630
17,640
17,650
17,660
17,670
17,680
17,690
17,700
17,710
17,720
17,730
17,740
17,750
17,760
17,770
17,780
17,790
6800
MD: 17,588'
INC: 88.98°
AZM: 268.35°
TVD: 7,317.76'
VS: 12,214.69'
MD: 17,678'
INC: 88.83°
AZM: 267.53°
TVD: 7,319.48'
VS: 12,296.21'
MD: 17,726'
INC: 88.98°
AZM: 267.4°
TVD: 7,320.4'
VS: 12,339.85'
Projection to Bit
MD: 17,750'
INC: 88.98°
AZM: 267.4°
TVD: 7,320.83'
VS: 12,361.68'
TVD (ft)
FM Name
Niobrara 7233
Ft Hays
Codell
Carlile
Greenhorn
, sl slty, v arg,
d sft-rr frm sb
65% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 35% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc, v rr nodr pyr
75% MRLST: med-drkgy, dk brn, modly frm-ip fri, sb blky-ang, rthy, sl slty, v arg, calc, tr bent; 25% CHK: medgy-mot gyshbn, com intbd wi mrl, mod sft-rr frm sb blky, rthy-sb wxy, v calc, v rr nodr pyr
7800


1000
300
ROP (ft/hr)
Gamma (API)
0
0
4000
4000
100
4 MST, 12/24/2018
dance, LLC.
CO2 (units)
0
0
0
17,800
17,810
17,820
17,830
17,840


6800
Excursion Depths
7800