Scale: 5" / 100'
Measured Depth Log

Well Name	SHOOK 3-10-4NBH_LATERAL		
Location	SECTION 3 T1S R67W		
State	COLORADO	**County**	ADAMS
Country	USA	**Rig Number**	ENSIGN 145
API Number	05-001-09976	**AFE #**	1700015
Geographic Region	DJ BASIN	**Field**	WATTENBERG
Spud Date	4/19/2017	**Drilling Completed**	7/15/2017
Surface Coordinates	Section 3, 2058' FSL x 2109' FEL 39.99222, -104.8737		
Bottom Hole Coordinates	Section 10, 370' FSL x 687' FEL 39.972001, -104.869353		
Ground Elevation	5098'	**K.B. Elevation**	5111'
Logged Interval	7200' **To** 13770'	**Total Depth**	6570'
Formation	SHARON SPRINGS to NIOBRARA B CHALK		
Type of Drilling Fluid	OBM - OIL BASED MUD		

Operator

Company PetroShare Corporation

Address 7200 S Alton Way
Englewood, CO 80112

Geologist

Name JOEY LUCE, SAGE BETTS

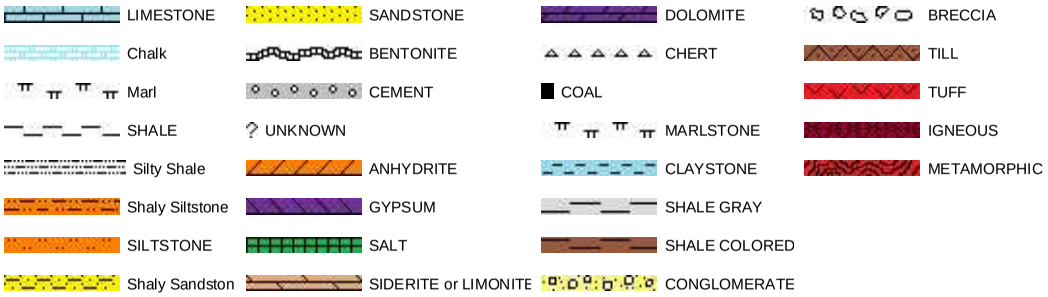
Company Terra Guidance

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

Zone Color Coding

Oil	Condensate	Gas
Note	Core	Pressu
Error	Water	Seal

Rock Types



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

Othe

Oil Show

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

Engineering

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

Porosity

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

er Symbols

ORMATION TOP

HOW

PTH

L FAULT

OW

URNED STRATA

SE FAULT

ALL CORE (LEFT)

ALL CORE (RIGHT)

EY

GAS

NE TESTED - LEFT

NE TESTED - RT

L LITHOGRAPHIC

Rounding

MX MICROXLN

A ANGULAR

MS MUDSTONE

R ROUNDED

PS PACKSTONE

a SUBANG

WS WACKESTONE

r SUBRND

Sorting

Textures

M MODERATE

BS BOUNDSTONE

P POOR

C CHALKY

W WELL

CX CRYPTOXLN

ConnectionGas(Vert)

E EARTHY

FX FINELYXLN

GS GRAINSTONE

Curve/Survey Data
ROP
Gamma

ROP SCALE: 0-600 ft/hr
GAMMA SCALE 0-300 api

600
300
ROP (ft/hr)
Gamma (API)
0
0

127 api
224 ft/hr

Gaps in Gamma Data due to Rapid Drilling Rate

Total Gas & Chromatograph
GAS
C1
C2
C3
C4

GAS SCALE: 0-7000 units

7000
700000
GAS (units)
C1-C4 (PPM)
0
0

KOP @ 7210' MD, 17:03 MDT, 07/13/2017

717u

Continued from Vertical Mudlog

Depth
7,160 7,170 7,180 7,190 7,200 7,210 7,220 7,230 7,240 7,250 7,260 7,270 7,280 7,290 7,300 7,310 7,320 7,330

% Lithology

Well Bore
TVD

MD: 7,166'
INC: 12.13°
AZM: 140.58°
TVD: 7,016.68'
VS: 1.38'

MD: 7,255'
INC: 18.25°
AZM: 150.19°
TVD: 7,102.55'
VS: 7.41'

6800

TVD Scale: 6800' - 8800'

TVD (ft)

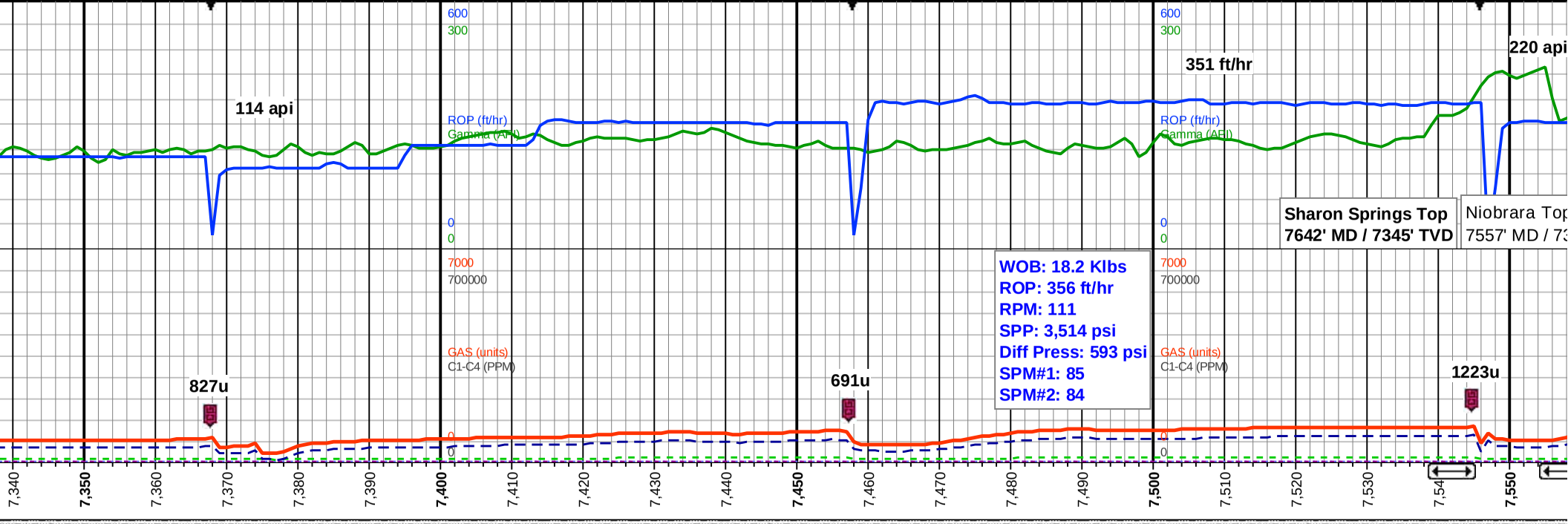
8800

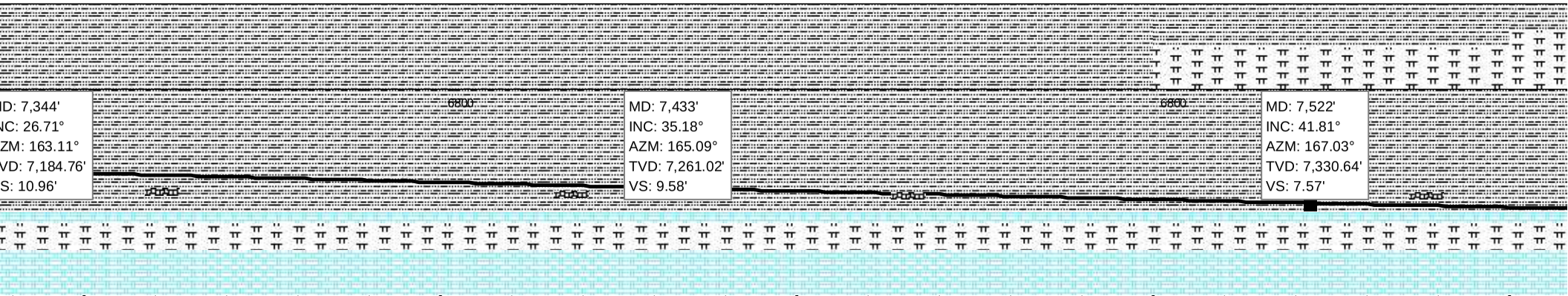
100% SLTY SH: dk gy-dk brn gy, frm-hrd, sb blky-sb plty, rthy-slty, arg mtx, v sl calc, tr lse cal grs/xls

100% SLTY SH: v dk gy-dk brn gy, v frm-hrd, sl fis, sb blky-sb plty, rthy-slty, arg mtx, v sl calc, tr bent

100% SLTY SH: v dk gy-dk brn frm, sl fis, sb blky-sb plty, rthy-s mtx, v sl calc, tr bent

Images



TVD (ft)

TVD (ft)

gy, sft-v
lty, arg

100% SLTY SH: v dk gy-dk brn gy, sft-v frm, sl fis, blky-sb plty, rthy-sl slty, arg mtx, v sl calc, tr bent

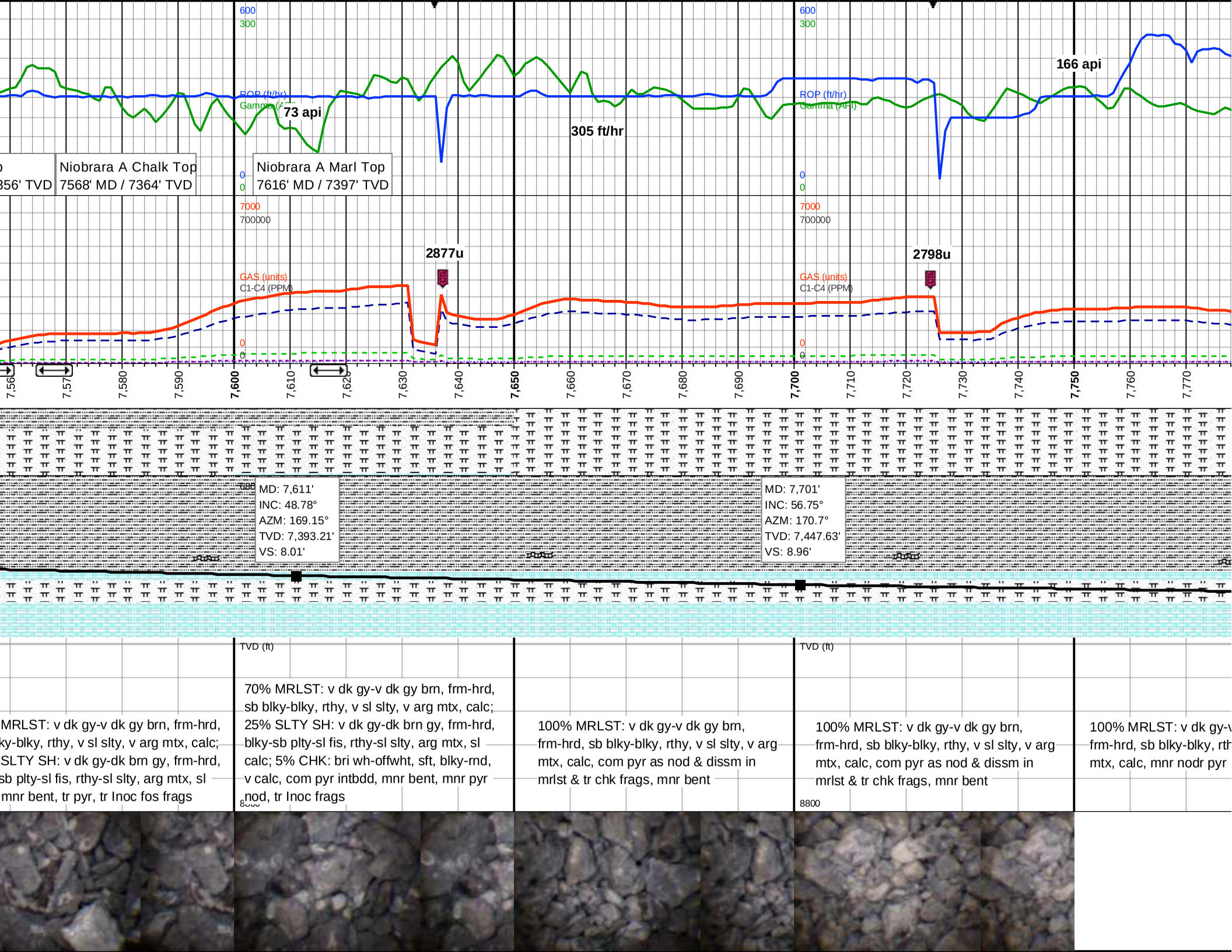
100% SLTY SH: v dk gy-dk brn gy, sft-frm, blky-sb plty-fis, rthy-sl slty, arg mtx, v sl calc, tr bent

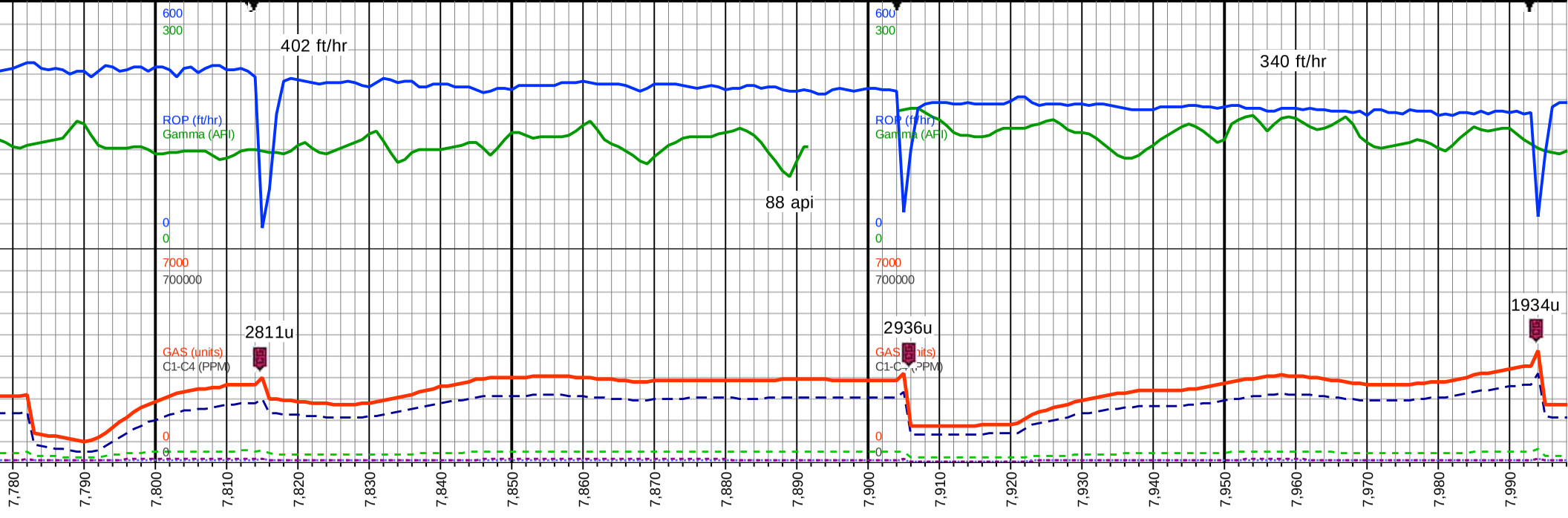
8800

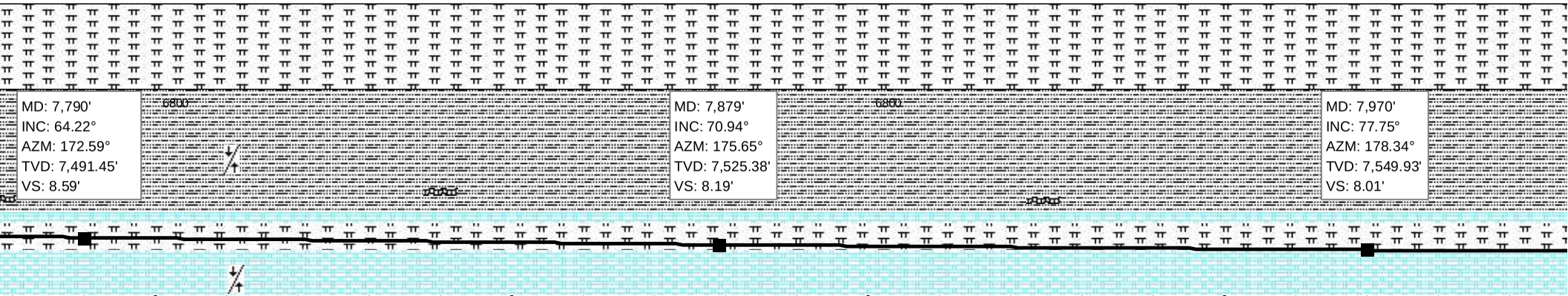
100% SLTY SH: v dk gy-dk brn gy, sft-frm, mnr hrd frags, blky-sb plty-fis, rthy-sl slty, arg mtx, v sl calc, mnr-sl com bent ~5%

50% SLTY SH: v dk gy-dk brn gy, frm-hrd frags, blky-sb plty-sl fis, rthy-sl slty, arg mtx, sl calc, mnr bent; 50% MRLST: v dk gy-v dk gy brn, frm, sb blky-blky, rthy, v sl slty, v arg mtx, calc, mnr bent

70%
sb bl
30%
blky-
calc,


600
300
ROP (ft/hr)
Gamma (API)
73 api
305 ft/hr
166 api
Niobrara A Chalk Top
7568' MD / 7364' TVD
Niobrara A Marl Top
7616' MD / 7397' TVD
0
0
7000
700000
GAS (units)
C1-C4 (PPM)
2877u
2798u
7,560
7,570
7,580
7,590
7,600
7,610
7,620
7,630
7,640
7,650
7,660
7,670
7,680
7,690
7,700
7,710
7,720
7,730
7,740
7,750
7,760
7,770
MD: 7,611'
INC: 48.78°
AZM: 169.15°
TVD: 7,393.21'
VS: 8.01'
MD: 7,701'
INC: 56.75°
AZM: 170.7°
TVD: 7,447.63'
VS: 8.96'
TVD (ft)
TVD (ft)
MRLST: v dk gy-v dk gy brn, frm-hrd,
ky-blky, rthy, v sl slty, v arg mtx, calc;
SLTY SH: v dk gy-dk brn gy, frm-hrd,
sb plty-sl fis, rthy-sl slty, arg mtx, sl
mnr bent, tr pyr, tr Inoc fos frags
70% MRLST: v dk gy-v dk gy brn, frm-hrd,
sb blky-blky, rthy, v sl slty, v arg mtx, calc;
25% SLTY SH: v dk gy-dk brn gy, frm-hrd,
blky-sb plty-sl fis, rthy-sl slty, arg mtx, sl
calc; 5% CHK: bri wh-offwht, sft, blky-rnd,
v calc, com pyr intbdd, mnr bent, mnr pyr
nod, tr Inoc frags
100% MRLST: v dk gy-v dk gy brn,
frm-hrd, sb blky-blky, rthy, v sl slty, v arg
mtx, calc, com pyr as nod & dissm in
mrlst & tr chk frags, mnr bent
100% MRLST: v dk gy-v dk gy brn,
frm-hrd, sb blky-blky, rthy, v sl slty, v arg
mtx, calc, com pyr as nod & dissm in
mrlst & tr chk frags, mnr bent
8800
100% MRLST: v dk gy-v
frm-hrd, sb blky-blky, rth
mtx, calc, mnr nodr pyr





TVD (ft)

~12' U/D Fault

TVD (ft)

v dk gy brn,
y, v sl slty, v arg

100% MRLST: v dk gy-v dk gy brn,
frm-hrd, sb blky-blky, rthy, v sl slty, v arg
mtx, calc, mnr dissm pyr, tr nodr pyr

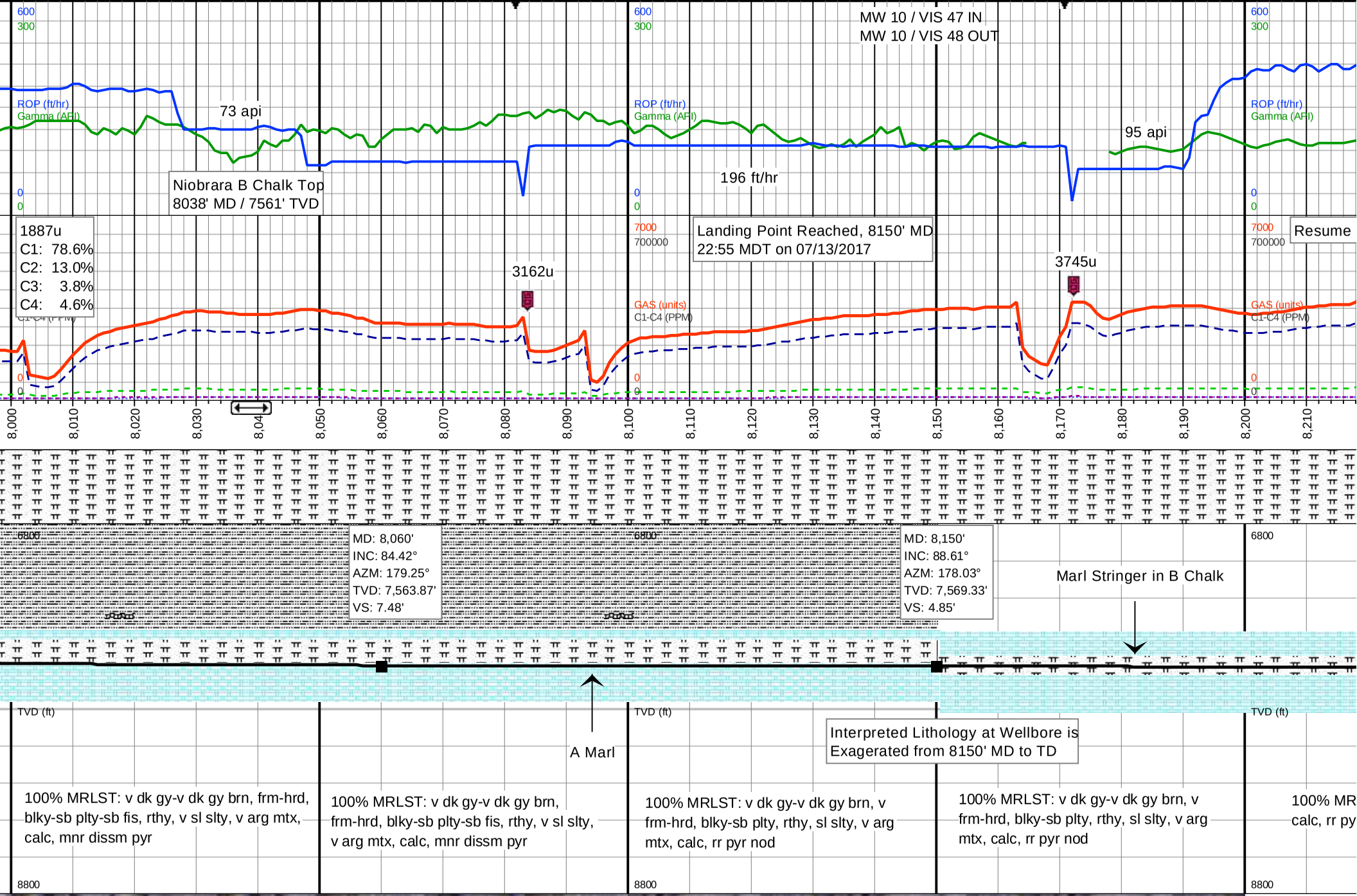
100% MRLST: v dk gy-v dk gy brn, sl
frm-hrd, blky-sb plty, rthy, v sl slty, v arg
mtx, calc, mnr dissm pyr, tr nodr pyr

100% MRLST: v dk gy-v dk gy brn,
frm-hrd, blky-sb plty, rthy, v sl slty, v arg
mtx, calc, tr dissm pyr

100% MRLST: v dk gy-v dk gy brn, sl
frm-hrd, blky-sb plty, rthy, v sl slty, v arg
mtx, calc, tr dissm pyr

8800

8800



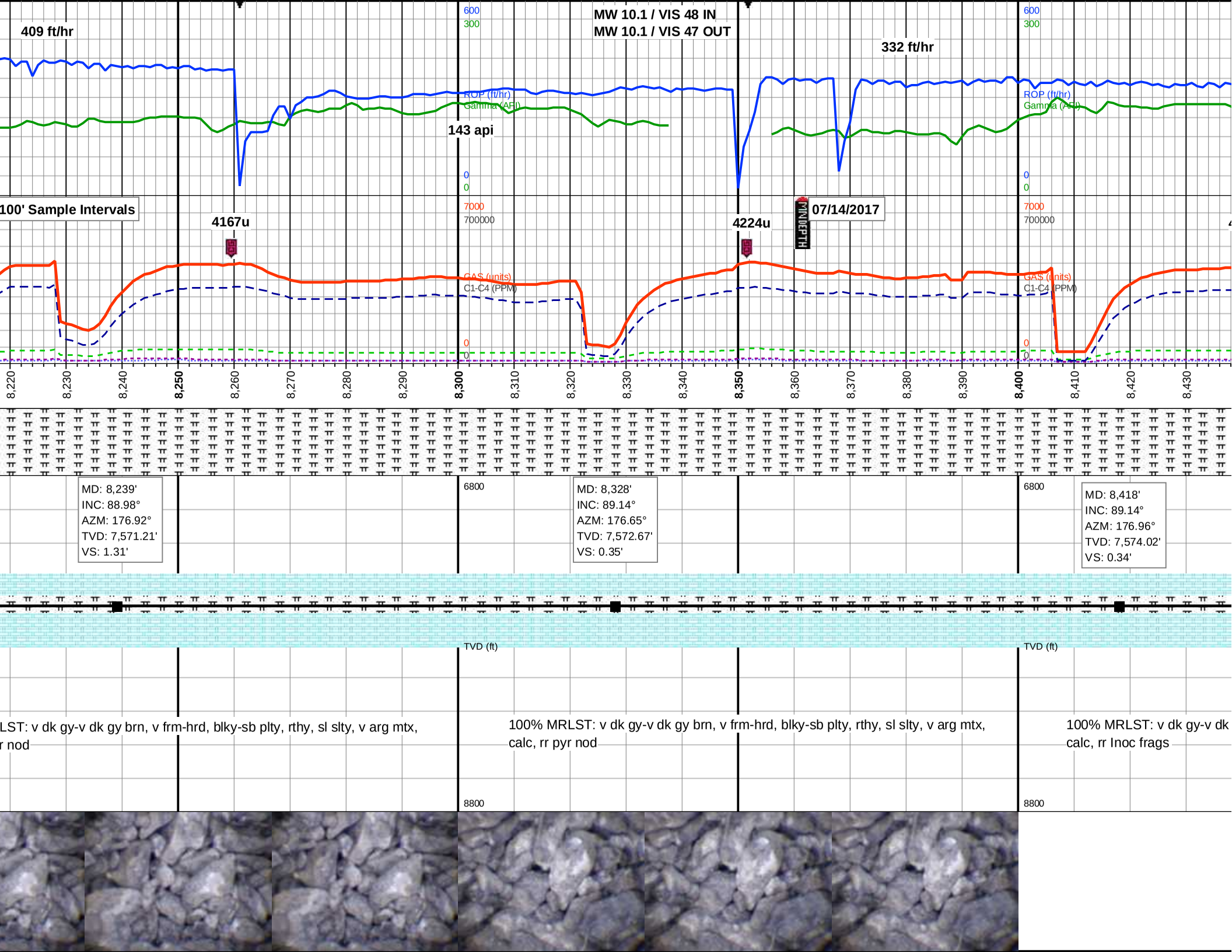
100% MRLST: v dk gy-v dk gy brn, frm-hrd, blky-sb plty-sb fis, rthy, v sl slty, v arg mtx, calc, mnr dissm pyr

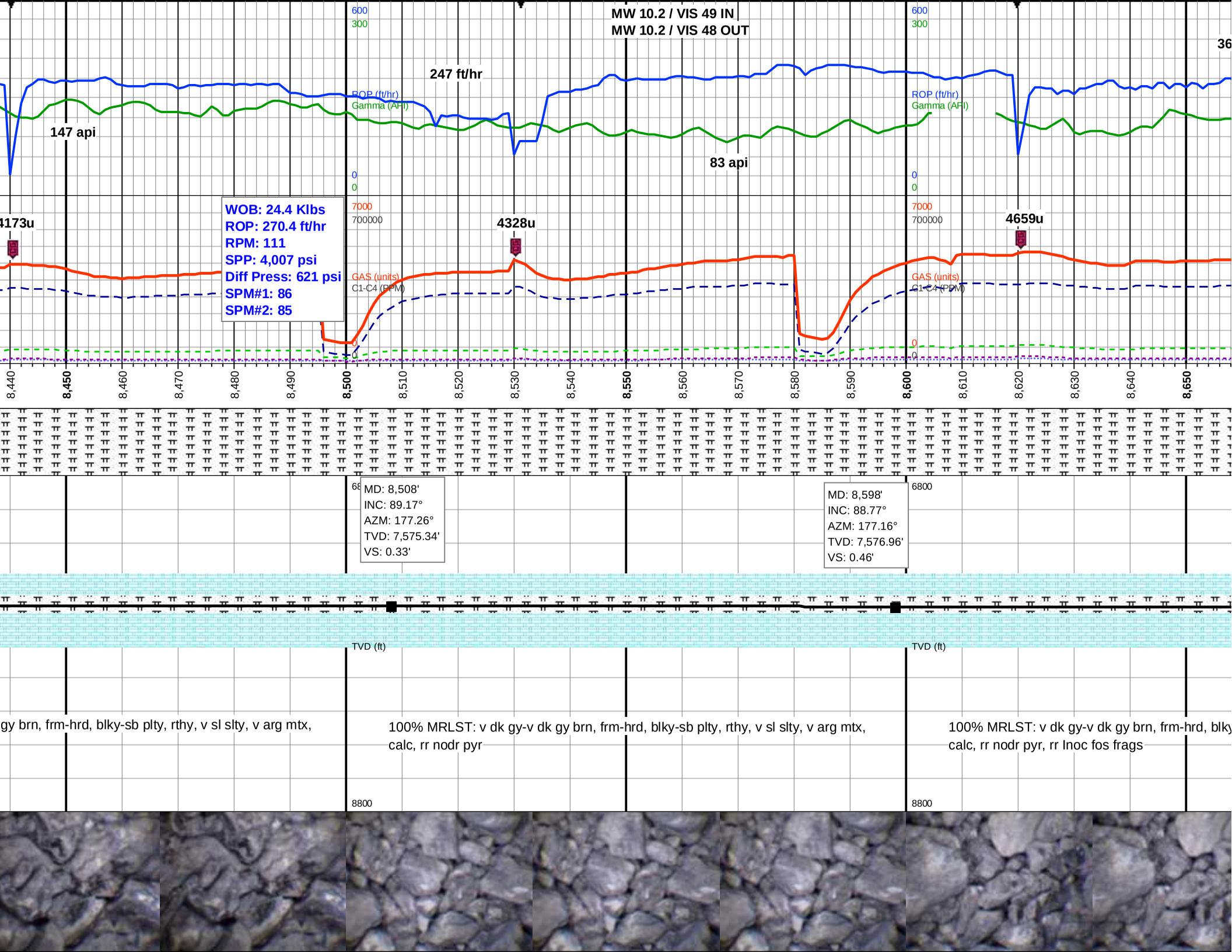
100% MRLST: v dk gy-v dk gy brn, frm-hrd, blky-sb plty-sb fis, rthy, v sl slty, v arg mtx, calc, mnr dissm pyr

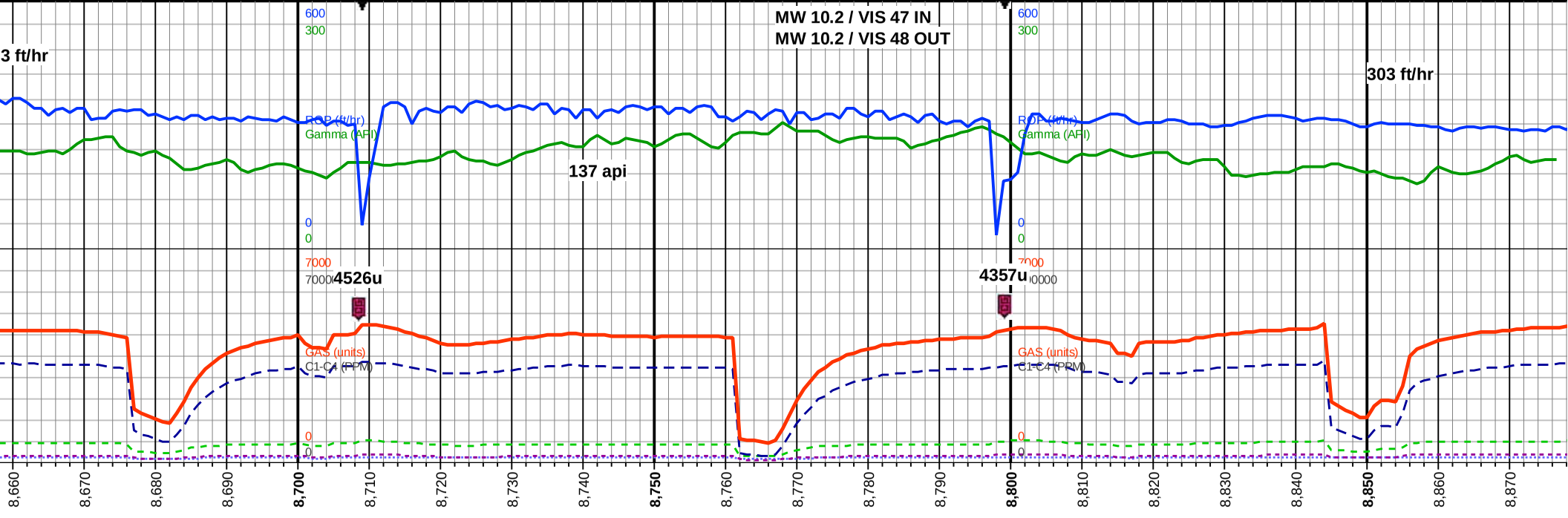
100% MRLST: v dk gy-v dk gy brn, v frm-hrd, blky-sb plty, rthy, sl slty, v arg mtx, calc, rr pyr nod

100% MRLST: v dk gy-v dk gy brn, v frm-hrd, blky-sb plty, rthy, sl slty, v arg mtx, calc, rr pyr nod

100% MR
calc, rr py


409 ft/hr
600
300
MW 10.1 / VIS 48 IN
MW 10.1 / VIS 47 OUT
332 ft/hr
ROP (ft/hr)
Gamma (API)
143 api
0
0
100' Sample Intervals
4167u
4224u
07/14/2017
MINDEPTH
7000
700000
GAS (units)
C1-C4 (PPM)
8,220
8,230
8,240
8,250
8,260
8,270
8,280
8,290
8,300
8,310
8,320
8,330
8,340
8,350
8,360
8,370
8,380
8,390
8,400
8,410
8,420
8,430
MD: 8,239'
INC: 88.98°
AZM: 176.92°
TVD: 7,571.21'
VS: 1.31'
6800
MD: 8,328'
INC: 89.14°
AZM: 176.65°
TVD: 7,572.67'
VS: 0.35'
MD: 8,418'
INC: 89.14°
AZM: 176.96°
TVD: 7,574.02'
VS: 0.34'
TVD (ft)
LST: v dk gy-v dk gy brn, v frm-hrd, blky-sb plty, rthy, sl slty, v arg mtx,
r nod
100% MRLST: v dk gy-v dk gy brn, v frm-hrd, blky-sb plty, rthy, sl slty, v arg mtx,
calc, rr pyr nod
100% MRLST: v dk gy-v dk
calc, rr Inoc frags
8800


MW 10.2 / VIS 49 IN
MW 10.2 / VIS 48 OUT
247 ft/hr
147 api
83 api
ROP (ft/hr)
Gamma (API)
GAS (units)
C1-C4 (PPM)
WOB: 24.4 Klbs
ROP: 270.4 ft/hr
RPM: 111
SPP: 4,007 psi
Diff Press: 621 psi
SPM#1: 86
SPM#2: 85
4173u
4328u
4659u
MD: 8,508'
INC: 89.17°
AZM: 177.26°
TVD: 7,575.34'
VS: 0.33'
MD: 8,598'
INC: 88.77°
AZM: 177.16°
TVD: 7,576.96'
VS: 0.46'
TVD (ft)
gy brn, frm-hrd, blky-sb plty, rthy, v sl slty, v arg mtx,
100% MRLST: v dk gy-v dk gy brn, frm-hrd, blky-sb plty, rthy, v sl slty, v arg mtx, calc, rr nodr pyr
100% MRLST: v dk gy-v dk gy brn, frm-hrd, blky calc, rr nodr pyr, rr Inoc fos frags



MD: 8,688'
INC: 89.05°
AZM: 177.34°
TVD: 7,578.67'
VS: 0.37'

MD: 8,777'
INC: 89.26°
AZM: 177.34°
TVD: 7,579.99'
VS: 0.24'

MD: 8,867'
INC: 89.63°
AZM: 177.25°
TVD: 7,580.86'
VS: 0.42'

6800

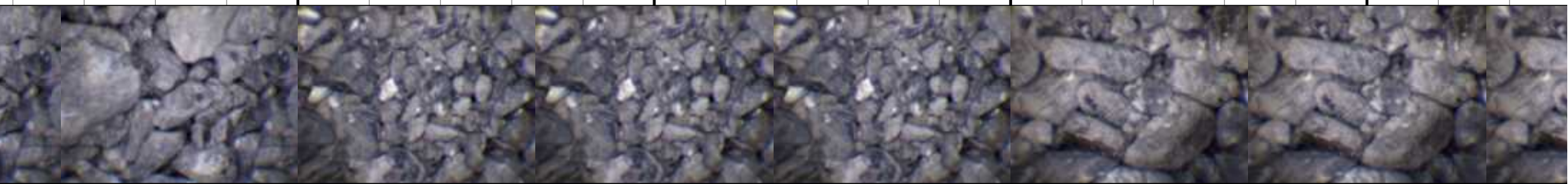
TVD (ft)

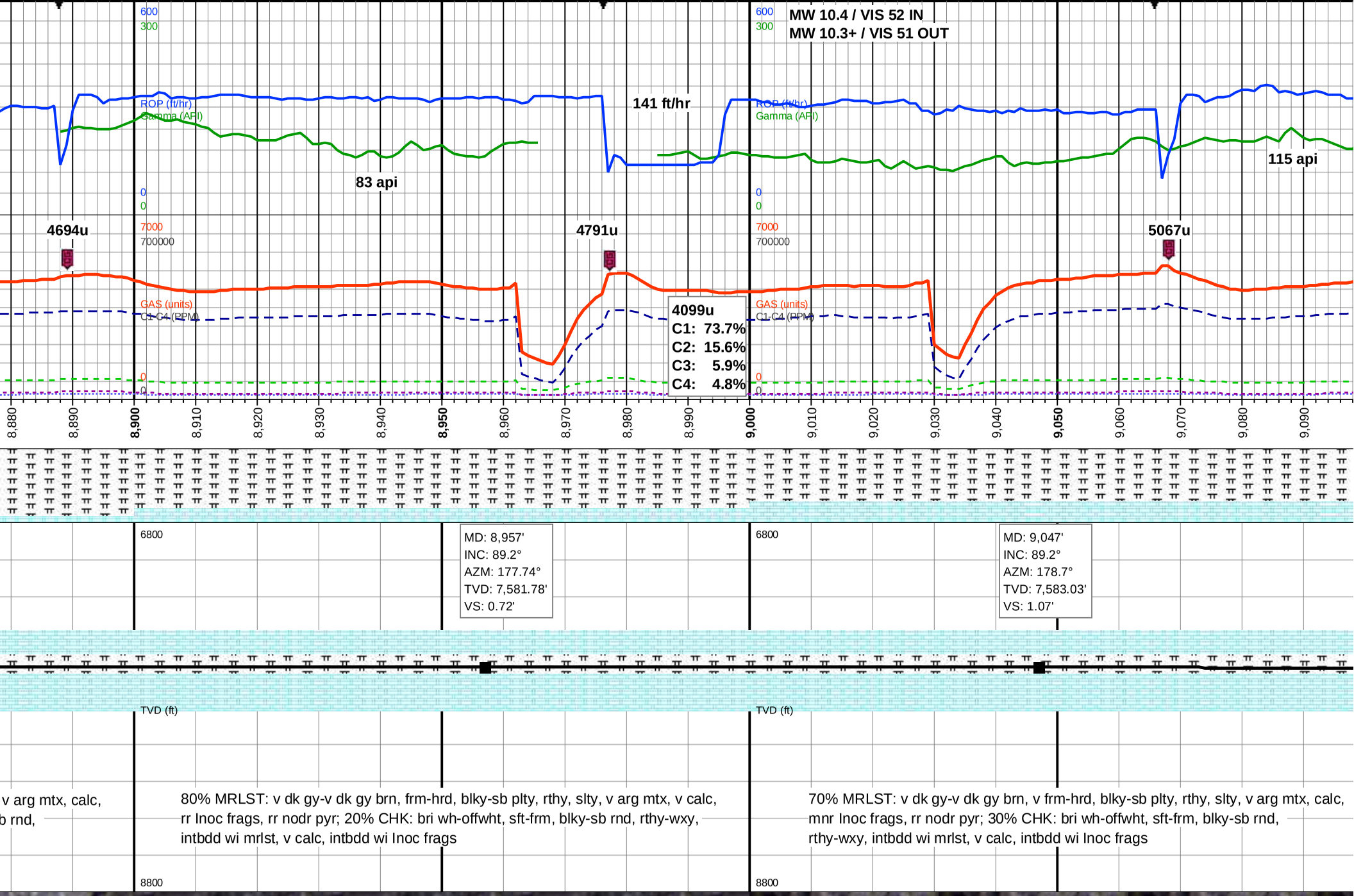
-sb plty, rthy, v sl slty, v arg mtx,

100% MRLST: v dk gy-v dk gy brn, v frm-hrd, blky-sb plty, rthy, slty, v arg mtx, calc, rr nodr pyr

90% MRLST: v dk gy-v dk gy brn, v frm-hrd, blky-sb plty, rthy, slty, mnr Inoc frags, rr nodr pyr; 10% CHK: bri wh-offwht, sft-frm, blky-sl rthy-wxy, intbdd wi mrlst, v calc, intbdd wi Inoc frags

8800

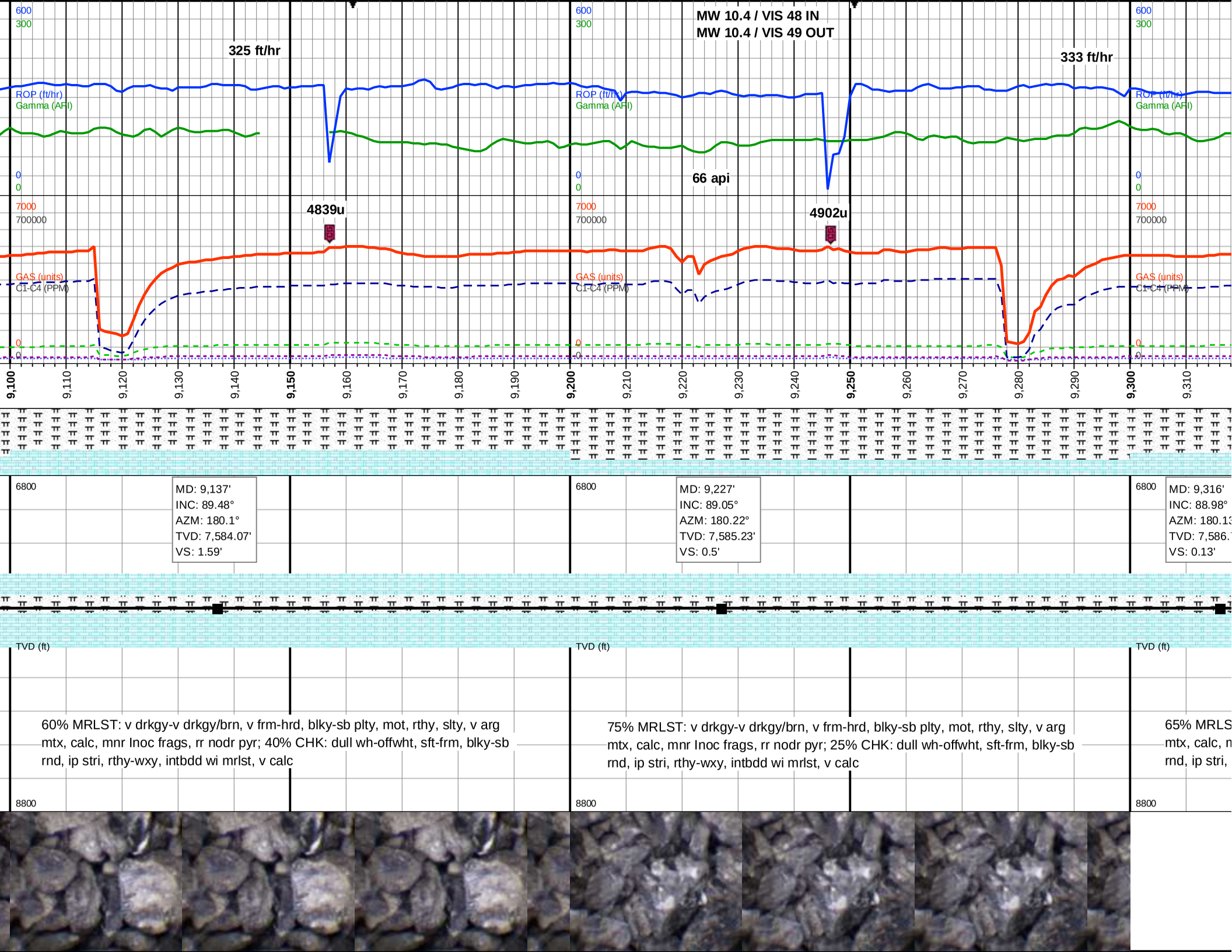


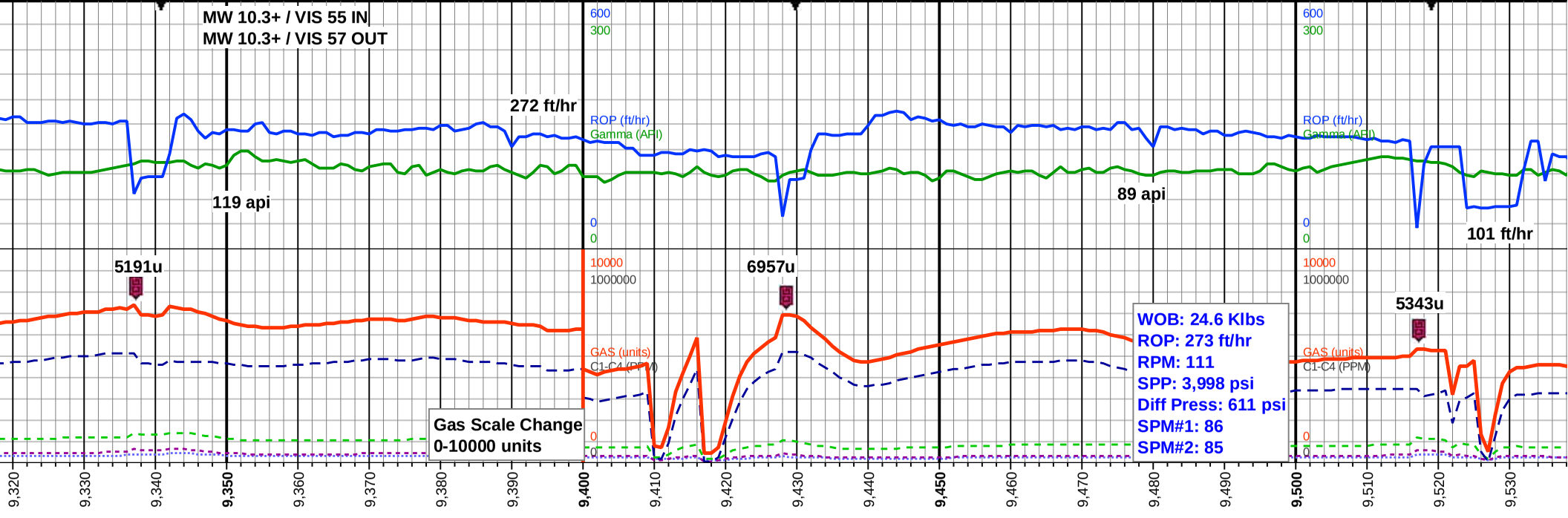


v arg mtx, calc,
b rnd,

80% MRLST: v dk gy-v dk gy brn, frm-hrd, blky-sb plty, rthy, slty, v arg mtx, v calc, rr Inoc frags, rr nodr pyr; 20% CHK: bri wh-offwht, sft-frm, blky-sb rnd, rthy-wxy, intbdd wi mrlst, v calc, intbdd wi Inoc frags

70% MRLST: v dk gy-v dk gy brn, v frm-hrd, blky-sb plty, rthy, slty, v arg mtx, calc, mnr Inoc frags, rr nodr pyr; 30% CHK: bri wh-offwht, sft-frm, blky-sb rnd, rthy-wxy, intbdd wi mrlst, v calc, intbdd wi Inoc frags


600
300
ROP (ft/hr)
Gamma (API)
0
0
7000
700000
GAS (units)
C1-C4 (PPM)
0
0
325 ft/hr
4839u
MW 10.4 / VIS 48 IN
MW 10.4 / VIS 49 OUT
333 ft/hr
66 api
4902u
9,100
9,110
9,120
9,130
9,140
9,150
9,160
9,170
9,180
9,190
9,200
9,210
9,220
9,230
9,240
9,250
9,260
9,270
9,280
9,290
9,300
9,310
6800
MD: 9,137'
INC: 89.48°
AZM: 180.1°
TVD: 7,584.07'
VS: 1.59'
MD: 9,227'
INC: 89.05°
AZM: 180.22°
TVD: 7,585.23'
VS: 0.5'
MD: 9,316'
INC: 88.98°
VS: 0.13'
TVD (ft)
8800
60% MRLST: v drkgy-v drkgy/brn, v frm-hrd, blky-sb plty, mot, rthy, slty, v arg mtx, calc, mnr Inoc frags, rr nodr pyr; 40% CHK: dull wh-offwht, sft-frm, blky-sb rnd, ip stri, rthy-wxy, intbdd wi mrlst, v calc
75% MRLST: v drkgy-v drkgy/brn, v frm-hrd, blky-sb plty, mot, rthy, slty, v arg mtx, calc, mnr Inoc frags, rr nodr pyr; 25% CHK: dull wh-offwht, sft-frm, blky-sb rnd, ip stri, rthy-wxy, intbdd wi mrlst, v calc
65% MRLS
mtx, calc, n
rnd, ip stri,



MD: 9,406'
INC: 90.28°
AZM: 181.38°
TVD: 7,587.34'
VS: 2,828.48'

MD: 9,496'
INC: 90.22°
AZM: 181.93°
TVD: 7,586.94'
VS: 2,916.16'

TVD (ft)

TVD (ft)

T: v drkgy-v drkgy/brn, v frm-hrd, blky-sb plty, mot, rthy, slty, v arg
nnr Inoc frags, rr nodr pyr; 35% CHK: dull wh-offwht, sft-frm, blky-sb
rthy-wxy, intbdd wi mrlst, v calc

65% MRLST: v drkgy-v drkgy/brn, v frm-hrd, blky-sb plty, mot, rthy, slty, v arg
mtx, calc, mnr Inoc frags, rr nodr pyr; 35% CHK: dull wh-offwht, sft-frm, blky-sb
rnd, ip stri, rthy-wxy, intbdd wi mrlst, v calc

70% MRLST: v drkgy-v drkgy/b
mtx, calc, mnr Inoc frags; 30%
ip stri, rthy-sb wxy, intbdd wi mr

8800

8800

MW 10.4 / VIS 59 IN
MW 10.4 / VIS 62 OUT

MW 10.4+ / VIS 59 IN
MW 10.4+ / VIS 63 OUT

MW 10.5 / VIS 55 IN
MW 10.4+ / VIS 58 OUT

600
300
ROP (ft/hr)
Gamma (API)
0
0
10000
1000000
GAS (units)
C1-C4 (PPM)
0
0

265 ft/hr
83 api
118 api
5147u
5226u

9,540 9,550 9,560 9,570 9,580 9,590 9,600 9,610 9,620 9,630 9,640 9,650 9,660 9,670 9,680 9,690 9,700 9,710 9,720 9,730 9,740 9,750

MD: 9,585'
INC: 90.22°
AZM: 182.72°
TVD: 7,586.6'
VS: 3,002.62'

MD: 9,674'
INC: 90.25°
AZM: 183.28°
TVD: 7,586.24'
VS: 3,088.82'

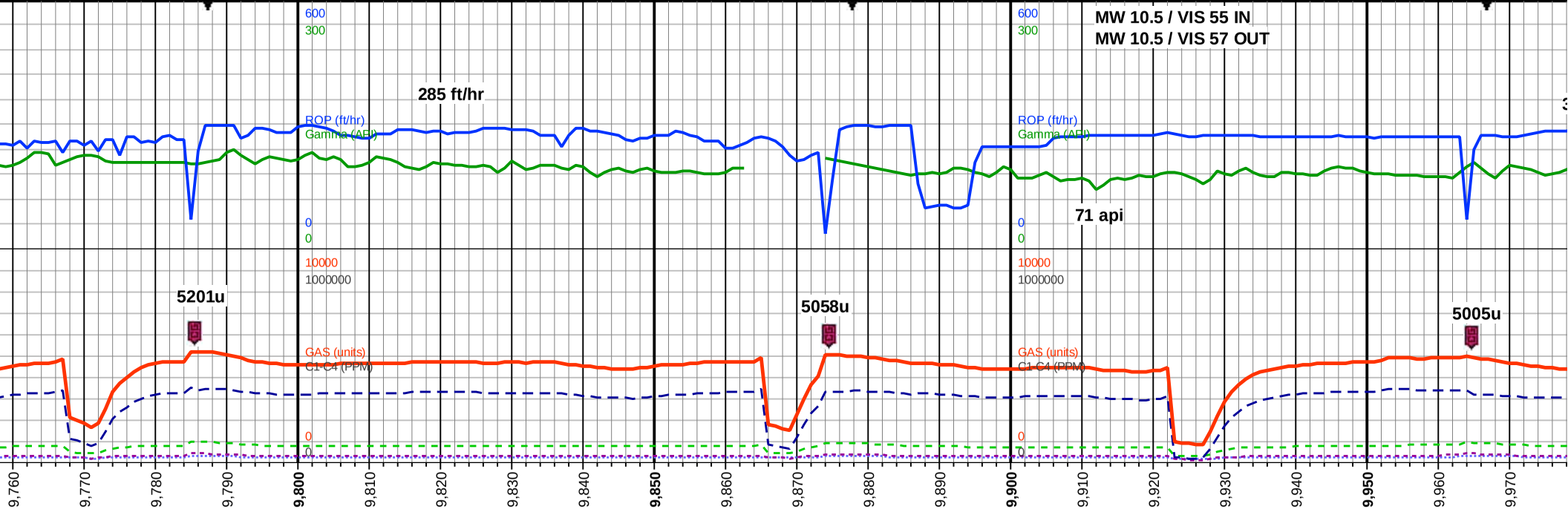
6800
6800
TVD (ft)
TVD (ft)

rn, v frm-hrd, blky-sb plty, mot, rthy, v slty, v arg
CHK: brn-gy/brn, sme bf wh, sft-sl frm, blky-sr,
rlst, v calc

75% MRLST: v drkgy-v drkgy/brn, v frm-hrd, blky-sb plty, mot, rthy, v slty, v arg
mtx, calc, mnr Inoc frags; 25% CHK: brn-gy/brn, sme bf wh, sft-sl frm, blky-sr,
ip stri, rthy-sb wxy, intbdd wi mrlst, v calc

80% MRLST: v drkgy-v drkgy/brn, v frm-hrd, blky-
mtx, calc, scat Inoc frags; 20% CHK: brn-gy/brn, s
ip stri, rthy-sb wxy, intbdd wi mrlst, v calc

8800
8800



MD: 9,764'
INC: 89.88°
AZM: 182.47°
TVD: 7,586.14'
VS: 3,176.05'

MD: 9,853'
INC: 90.03°
AZM: 180.04°
TVD: 7,586.21'
VS: 3,262.88'

MD: 9,943'
INC: 90°
AZM: 179.96°
TVD: 7,586.18'
VS: 3,351.11'

6800

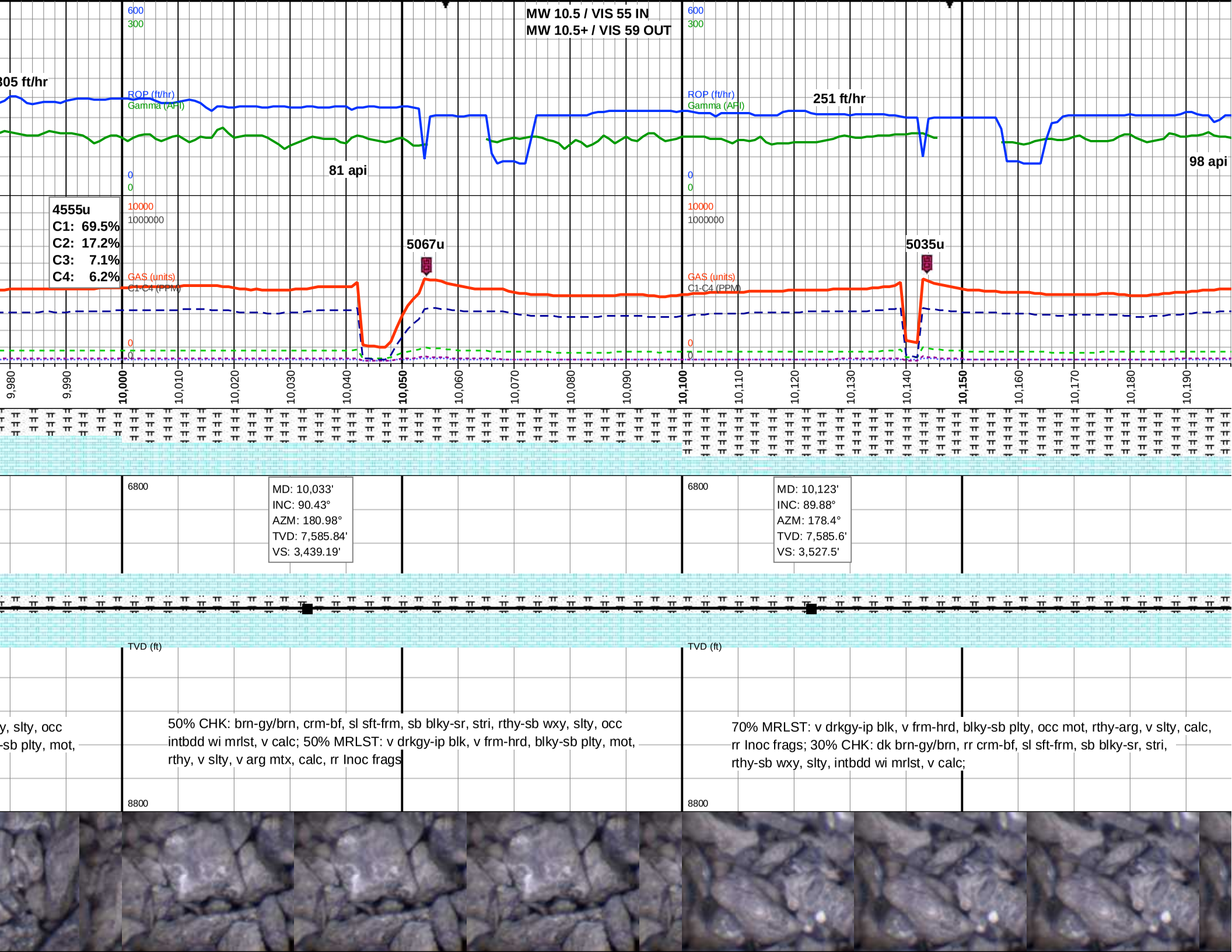
TVD (ft)

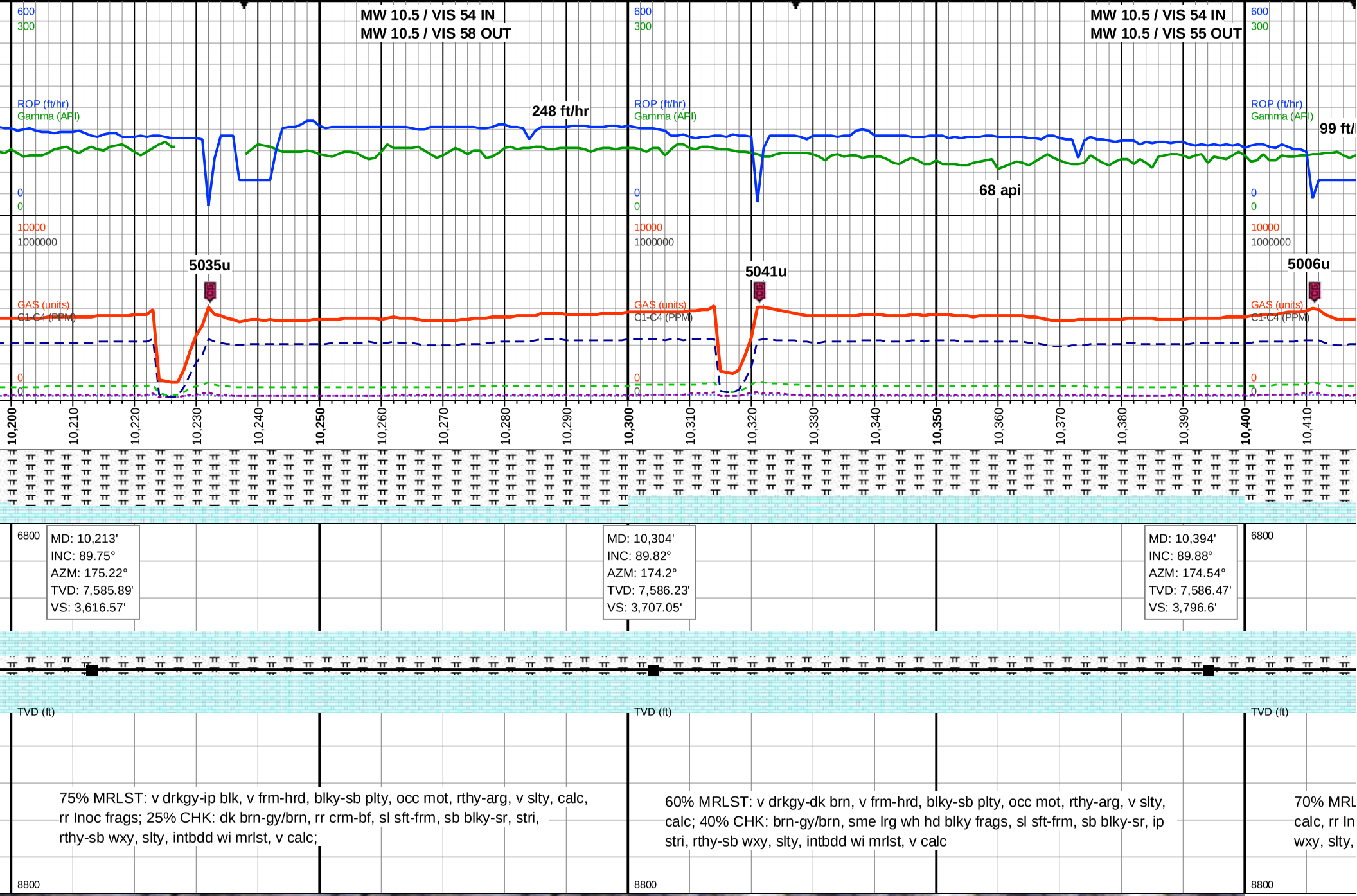
8800

sb plty, mot, rthy, v slty, v arg
sme bf wh, sft-sl frm, blky-sr,

60% MRLST: v drkgy-v drkgy/brn, v frm-hrd, blky-sb plty, mot, rthy, v slty, v arg mtx, calc, scat lnoc frags; 40% CHK: brn-gy/brn, sme bf wh, sft-sl frm, blky-sr, ip stri, rthy-sb wxy, intbdd wi mrlst, v calc

60% CHK: brn-gy/brn, crm-bf, sl sft-frm, sb blky-sr, stri, rthy-sb wx
intbdd wi mrlst, v calc; 40% MRLST: v drkgy-ip blk, v frm-hrd, blky
rthy, v slty, v arg mtx, calc, rr lnoc frags

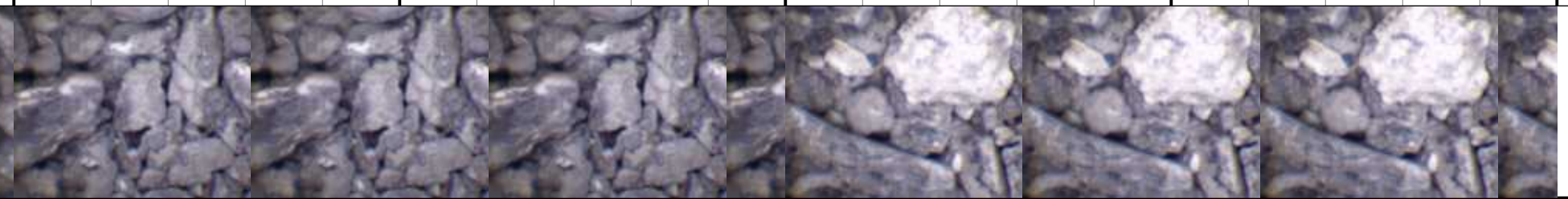

MW 10.5 / VIS 55 IN
MW 10.5+ / VIS 59 OUT
305 ft/hr
251 ft/hr
ROP (ft/hr)
Gamma (API)
81 api
98 api
4555u
C1: 69.5%
C2: 17.2%
C3: 7.1%
C4: 6.2%
5067u
5035u
GAS (units)
C1-C4 (PPM)
600
300
0
10000
1000000
9,980
9,990
10,000
10,010
10,020
10,030
10,040
10,050
10,060
10,070
10,080
10,090
10,100
10,110
10,120
10,130
10,140
10,150
10,160
10,170
10,180
10,190
6800
MD: 10,033'
INC: 90.43°
AZM: 180.98°
TVD: 7,585.84'
VS: 3,439.19'
MD: 10,123'
INC: 89.88°
AZM: 178.4°
TVD: 7,585.6'
VS: 3,527.5'
TVD (ft)
8800
y, slty, occ
-sb plty, mot,
50% CHK: brn-gy/brn, crm-bf, sl sft-frm, sb blky-sr, stri, rthy-sb wxy, slty, occ intbdd wi mrlst, v calc; 50% MRLST: v drkgy-ip blk, v frm-hrd, blky-sb plty, mot, rthy, v slty, v arg mtx, calc, rr Inoc frags
70% MRLST: v drkgy-ip blk, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty, calc, rr Inoc frags; 30% CHK: dk brn-gy/brn, rr crm-bf, sl sft-frm, sb blky-sr, stri, rthy-sb wxy, slty, intbdd wi mrlst, v calc;

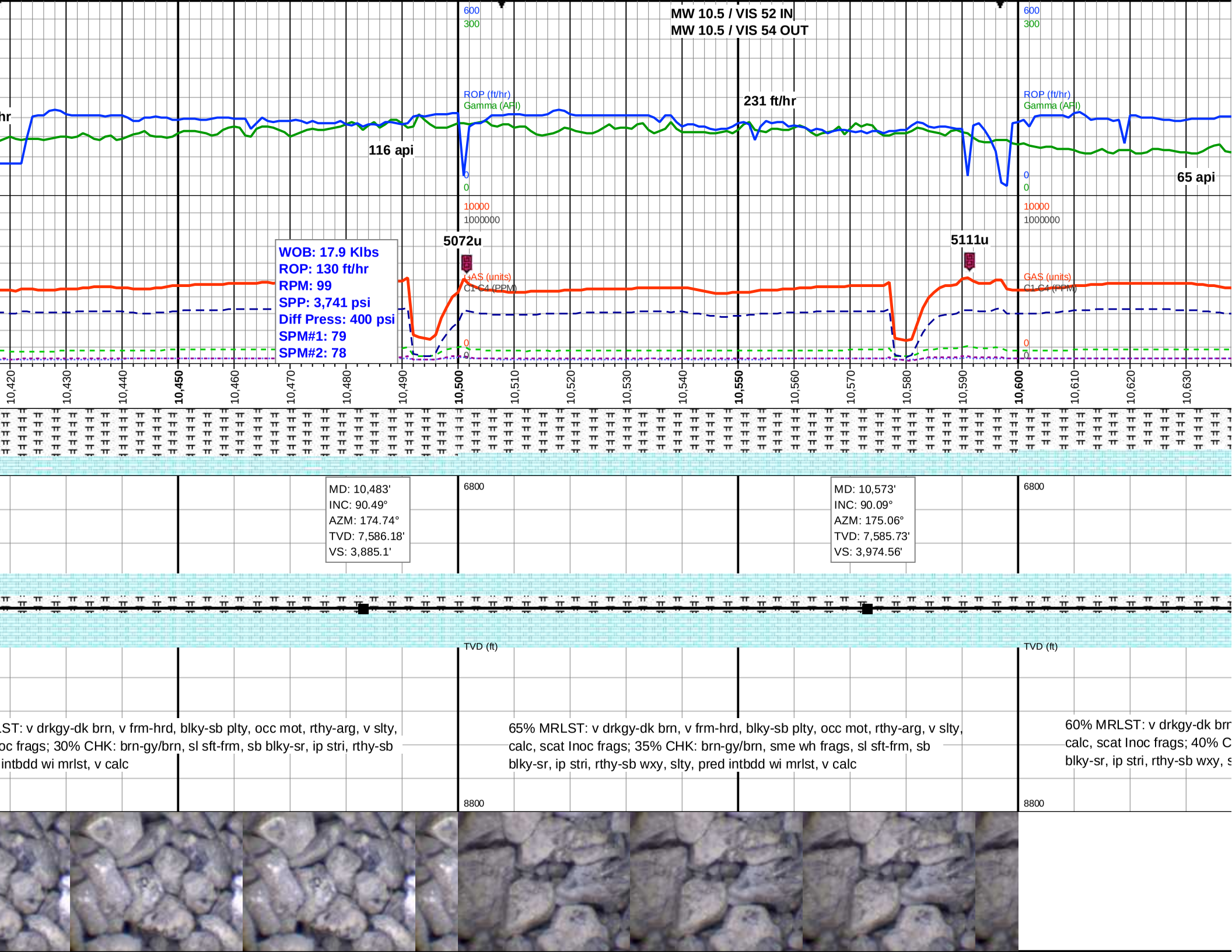


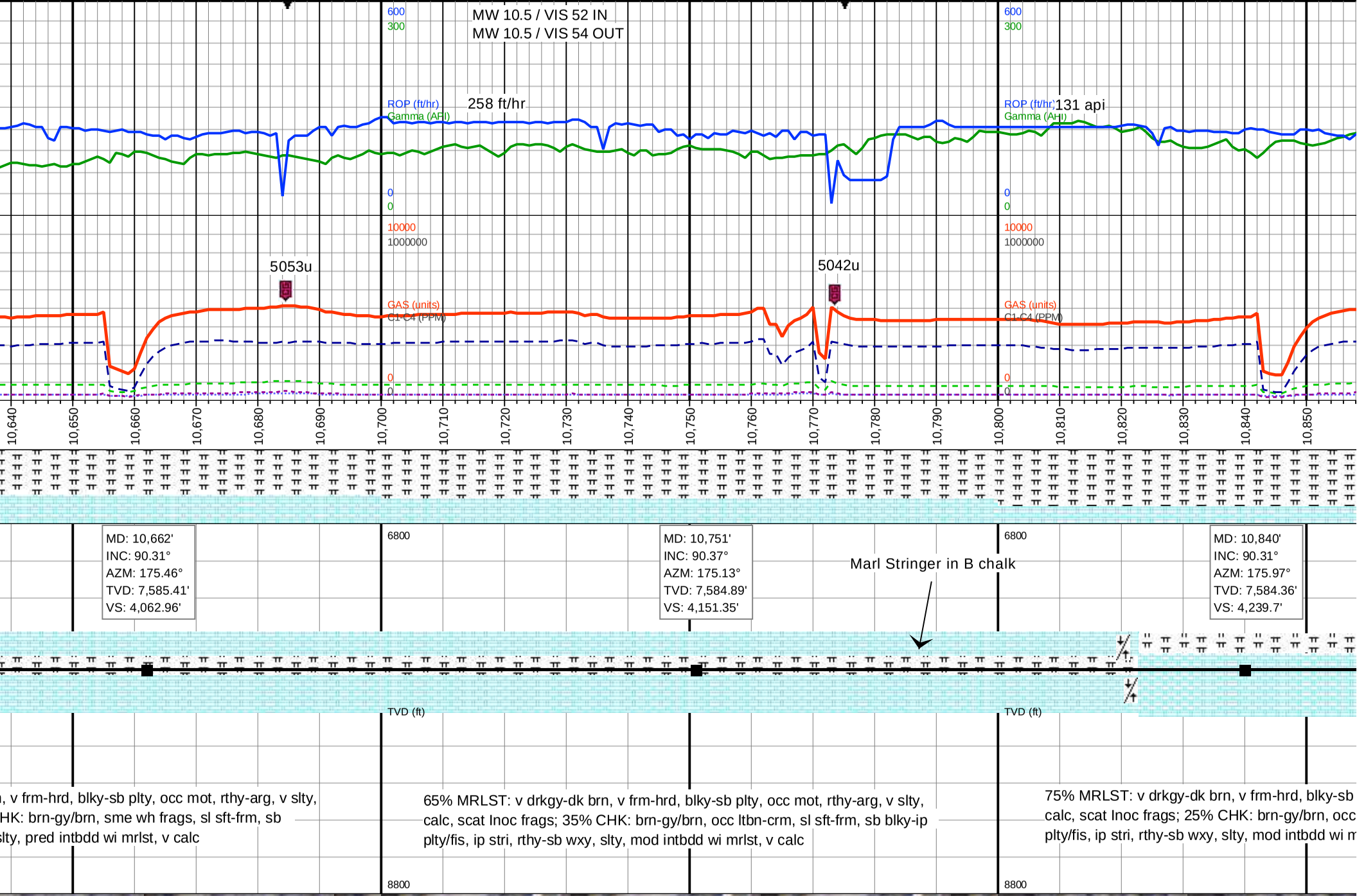
75% MRLST: v drkgy-ip blk, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty, calc, rr Inoc frags; 25% CHK: dk brn-gy/brn, rr crm-bf, sl sft-frm, sb blky-sr, stri, rthy-sb wxy, slty, intbdd wi mrlst, v calc;

60% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty, calc; 40% CHK: brn-gy/brn, sme lrg wh hd blky frags, sl sft-frm, sb blky-sr, ip stri, rthy-sb wxy, slty, intbdd wi mrlst, v calc

70% MRL
calc, rr In
wxy, slty,



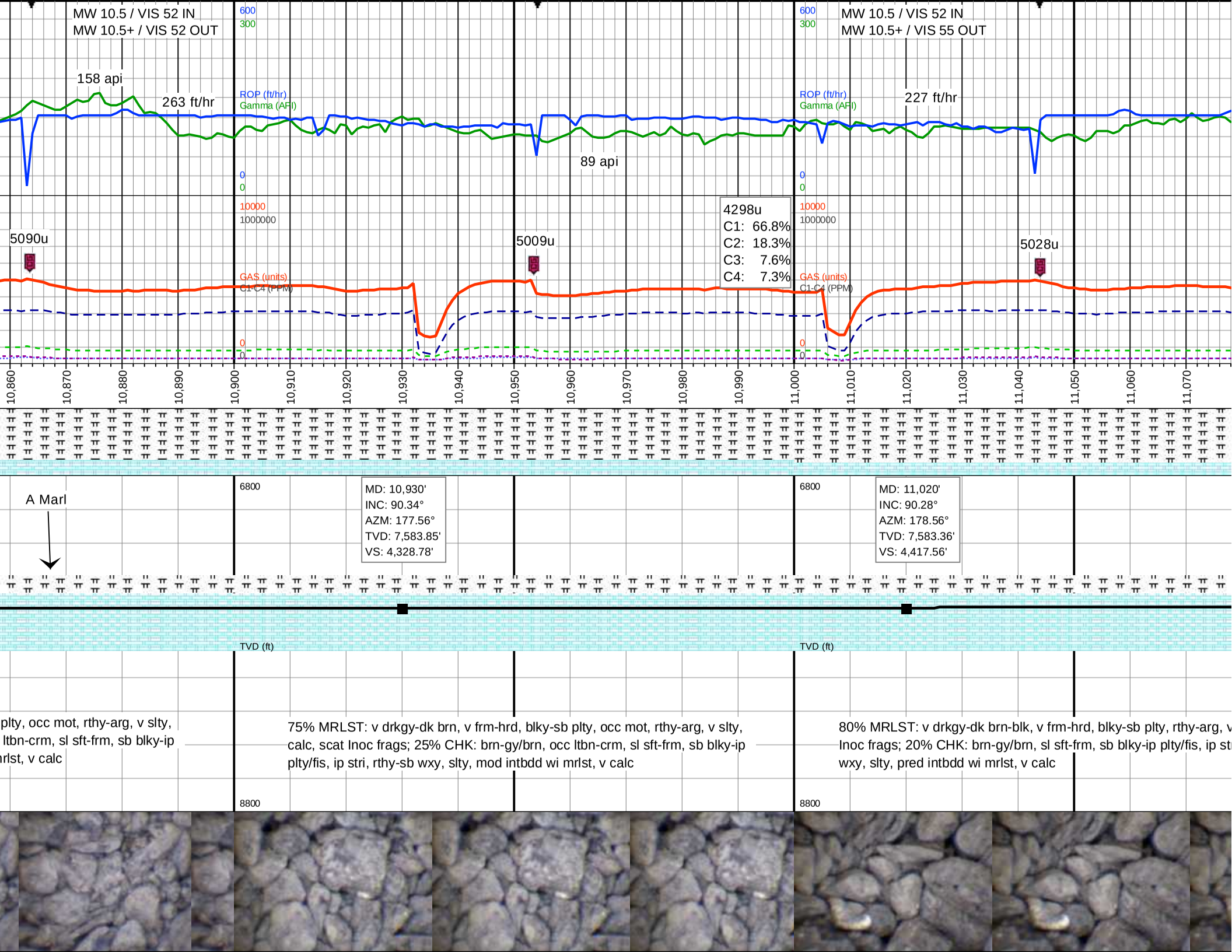

MW 10.5 / VIS 52 IN
MW 10.5 / VIS 54 OUT
600
300
ROP (ft/hr)
Gamma (API)
231 ft/hr
116 api
65 api
0
0
10000
1000000
5072u
5111u
GAS (units)
C1-C4 (PPM)
WOB: 17.9 Klbs
ROP: 130 ft/hr
RPM: 99
SPP: 3,741 psi
Diff Press: 400 psi
SPM#1: 79
SPM#2: 78
10,420
10,430
10,440
10,450
10,460
10,470
10,480
10,490
10,500
10,510
10,520
10,530
10,540
10,550
10,560
10,570
10,580
10,590
10,600
10,610
10,620
10,630
MD: 10,483'
INC: 90.49°
AZM: 174.74°
TVD: 7,586.18'
VS: 3,885.1'
MD: 10,573'
INC: 90.09°
AZM: 175.06°
TVD: 7,585.73'
VS: 3,974.56'
6800
TVD (ft)
8800
LST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty,
oc frags; 30% CHK: brn-gy/brn, sl sft-frm, sb blky-sr, ip stri, rthy-sb
intbdd wi mrlst, v calc
65% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty,
calc, scat Inoc frags; 35% CHK: brn-gy/brn, sme wh frags, sl sft-frm, sb
blky-sr, ip stri, rthy-sb wxy, slty, pred intbdd wi mrlst, v calc
60% MRLST: v drkgy-dk brn
calc, scat Inoc frags; 40% C
blky-sr, ip stri, rthy-sb wxy, s

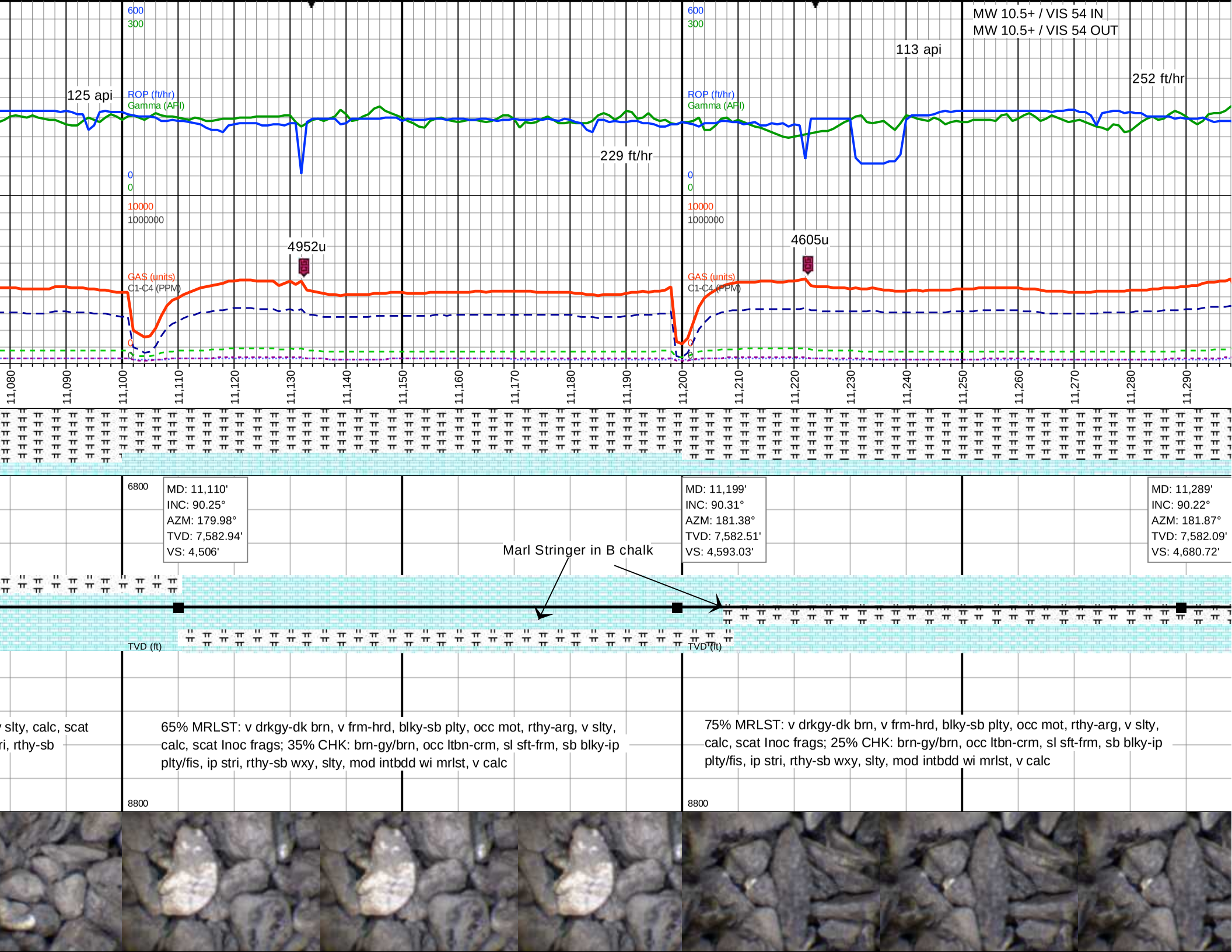


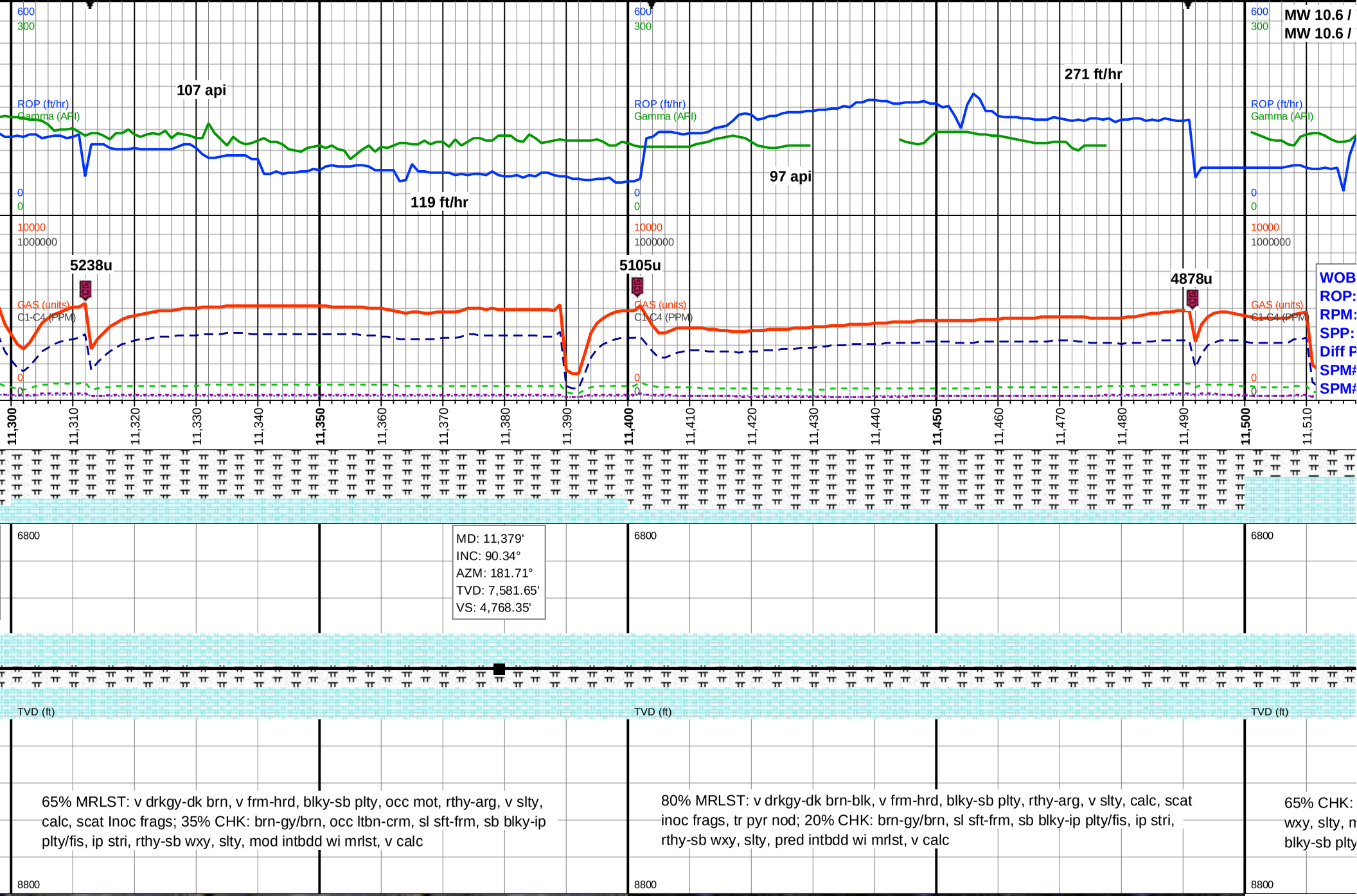
, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty,
HK: brn-gy/brn, sme wh frags, sl sft-frm, sb
lty, pred intbdd wi mrlst, v calc

65% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty, calc, scat lnoc frags; 35% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-ip plty/fis, ip stri, rthy-sb wxy, slty, mod intbdd wi mrlst, v calc

75% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb
calc, scat lnoc frags; 25% CHK: brn-gy/brn, occ
plty/fis, ip stri, rthy-sb wxy, slty, mod intbdd wi m


MW 10.5 / VIS 52 IN
MW 10.5+ / VIS 52 OUT
158 api
263 ft/hr
ROP (ft/hr)
Gamma (API)
89 api
MW 10.5 / VIS 52 IN
MW 10.5+ / VIS 55 OUT
227 ft/hr
5090u
5009u
4298u
C1: 66.8%
C2: 18.3%
C3: 7.6%
C4: 7.3%
5028u
GAS (units)
C1-C4 (PPM)
10,860
10,870
10,880
10,890
10,900
10,910
10,920
10,930
10,940
10,950
10,960
10,970
10,980
10,990
11,000
11,010
11,020
11,030
11,040
11,050
11,060
11,070
A Marl
MD: 10,930'
INC: 90.34°
AZM: 177.56°
TVD: 7,583.85'
VS: 4,328.78'
MD: 11,020'
INC: 90.28°
AZM: 178.56°
TVD: 7,583.36'
VS: 4,417.56'
TVD (ft)
6800
8800
plty, occ mot, rthy-arg, v slty,
ltbn-crm, sl sft-frm, sb blky-ip
rlst, v calc
75% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty,
calc, scat lnoc frags; 25% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-ip
plty/fis, ip stri, rthy-sb wxy, slty, mod intbdd wi mrlst, v calc
80% MRLST: v drkgy-dk brn-blk, v frm-hrd, blky-sb plty, rthy-arg, v
lnoc frags; 20% CHK: brn-gy/brn, sl sft-frm, sb blky-ip plty/fis, ip st
wxy, slty, pred intbdd wi mrlst, v calc

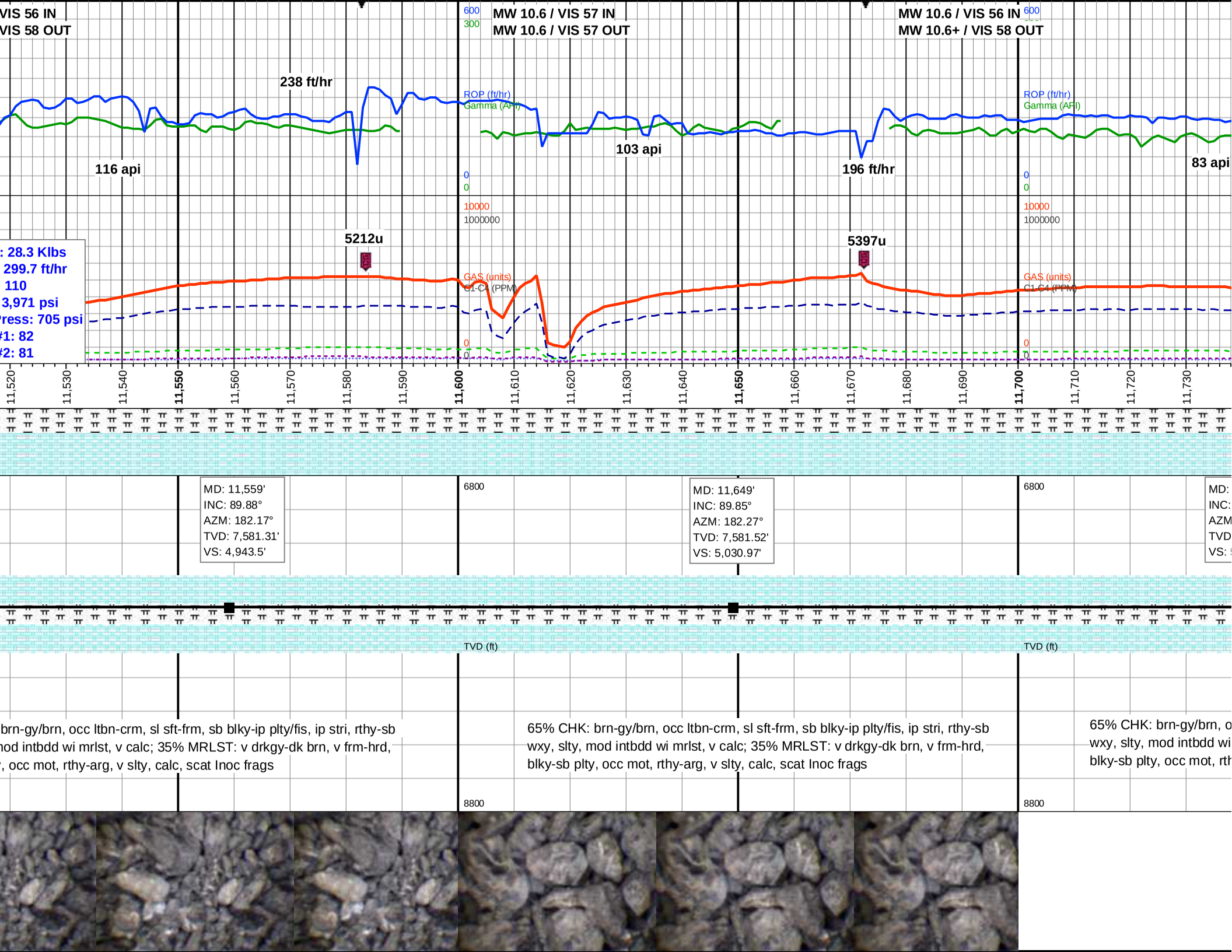

600
300
125 api
ROP (ft/hr)
Gamma (API)
0
0
10000
1000000
4952u
GAS (units)
C1-C4 (PPM)
229 ft/hr
MW 10.5+ / VIS 54 IN
MW 10.5+ / VIS 54 OUT
113 api
252 ft/hr
4605u
11,080
11,090
11,100
11,110
11,120
11,130
11,140
11,150
11,160
11,170
11,180
11,190
11,200
11,210
11,220
11,230
11,240
11,250
11,260
11,270
11,280
11,290
6800
MD: 11,110'
INC: 90.25°
AZM: 179.98°
TVD: 7,582.94'
VS: 4,506'
MD: 11,199'
INC: 90.31°
AZM: 181.38°
TVD: 7,582.51'
VS: 4,593.03'
MD: 11,289'
INC: 90.22°
AZM: 181.87°
TVD: 7,582.09'
VS: 4,680.72'
Marl Stringer in B chalk
TVD (ft)
TVD (ft)
slty, calc, scat
ri, rthy-sb
65% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty, calc, scat Inoc frags; 35% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-ip plty/fis, ip stri, rthy-sb wxy, slty, mod intbdd wi mrlst, v calc
75% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty, calc, scat Inoc frags; 25% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-ip plty/fis, ip stri, rthy-sb wxy, slty, mod intbdd wi mrlst, v calc
8800
8800

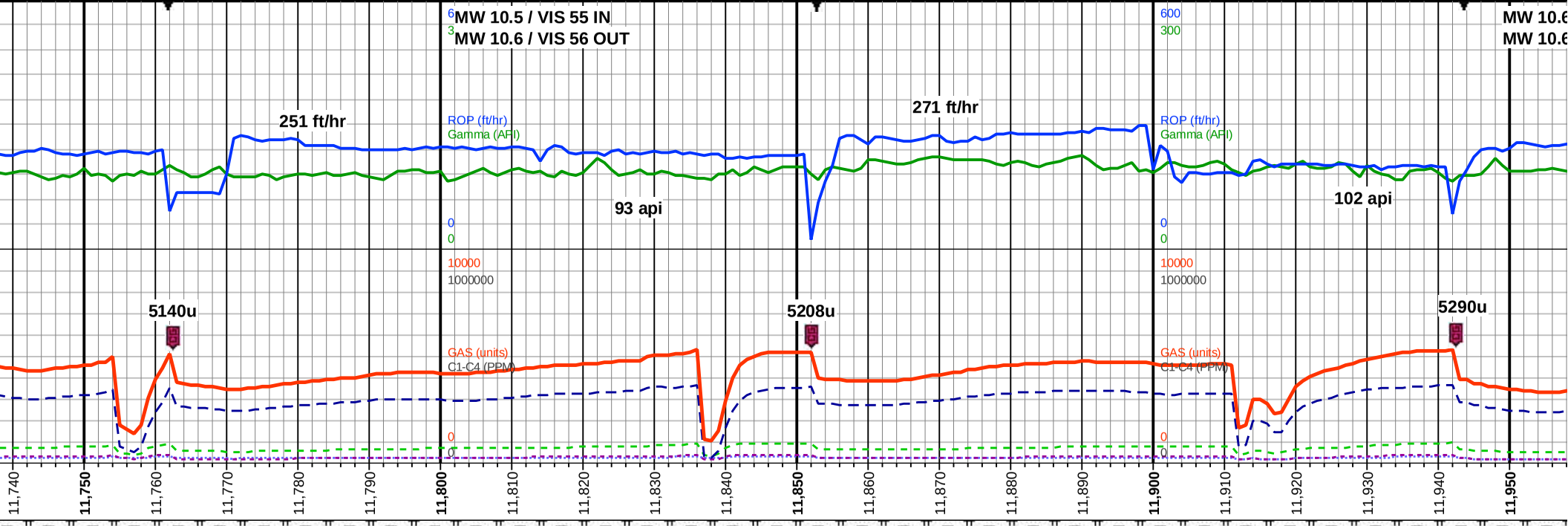


65% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty, calc, scat lnoc frags; 35% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-ip plty/fis, ip stri, rthy-sb wxy, slty, mod intbdd wi mrlst, v calc

80% MRLST: v drkgy-dk brn-blk, v frm-hrd, blky-sb plty, rthy-arg, v slty, calc, scat inoc frags, tr pyr nod; 20% CHK: brn-gy/brn, sl sft-frm, sb blky-ip plty/fis, ip stri, rthy-sb wxy, slty, pred intbdd wi mrlst, v calc

65% CHK:
wxy, slty, m
blky-sb plty


VIS 56 IN
VIS 58 OUT
MW 10.6 / VIS 57 IN
MW 10.6 / VIS 57 OUT
MW 10.6 / VIS 56 IN
MW 10.6+ / VIS 58 OUT
600
300
ROP (ft/hr)
Gamma (API)
238 ft/hr
116 api
103 api
196 ft/hr
83 api
0
0
10000
1000000
5212u
5397u
GAS (units)
C1-C4 (PPM)
: 28.3 Klbs
299.7 ft/hr
110
3,971 psi
ress: 705 psi
#1: 82
#2: 81
11,520
11,530
11,540
11,550
11,560
11,570
11,580
11,590
11,600
11,610
11,620
11,630
11,640
11,650
11,660
11,670
11,680
11,690
11,700
11,710
11,720
11,730
MD: 11,559'
INC: 89.88°
AZM: 182.17°
TVD: 7,581.31'
VS: 4,943.5'
MD: 11,649'
INC: 89.85°
AZM: 182.27°
TVD: 7,581.52'
VS: 5,030.97'
6800
TVD (ft)
8800
brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-ip plty/fis, ip stri, rthy-sb
od intbdd wi mrlst, v calc; 35% MRLST: v drkgy-dk brn, v frm-hrd,
, occ mot, rthy-arg, v slty, calc, scat Inoc frags
65% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-ip plty/fis, ip stri, rthy-sb
wxy, slty, mod intbdd wi mrlst, v calc; 35% MRLST: v drkgy-dk brn, v frm-hrd,
blky-sb plty, occ mot, rthy-arg, v slty, calc, scat Inoc frags
65% CHK: brn-gy/brn, o
wxy, slty, mod intbdd wi
blky-sb plty, occ mot, rth



11,739'
89.85°
: 183.66°
: 7,581.76'
5,118.16'

6800

MD: 11,829'
INC: 90°
AZM: 185.43°
TVD: 7,581.87'
VS: 5,204.7'

6800

MD: 11,919'
INC: 89.88°
AZM: 184.91°
TVD: 7,581.97'
VS: 5,290.96'

TVD (ft)

TVD (ft)

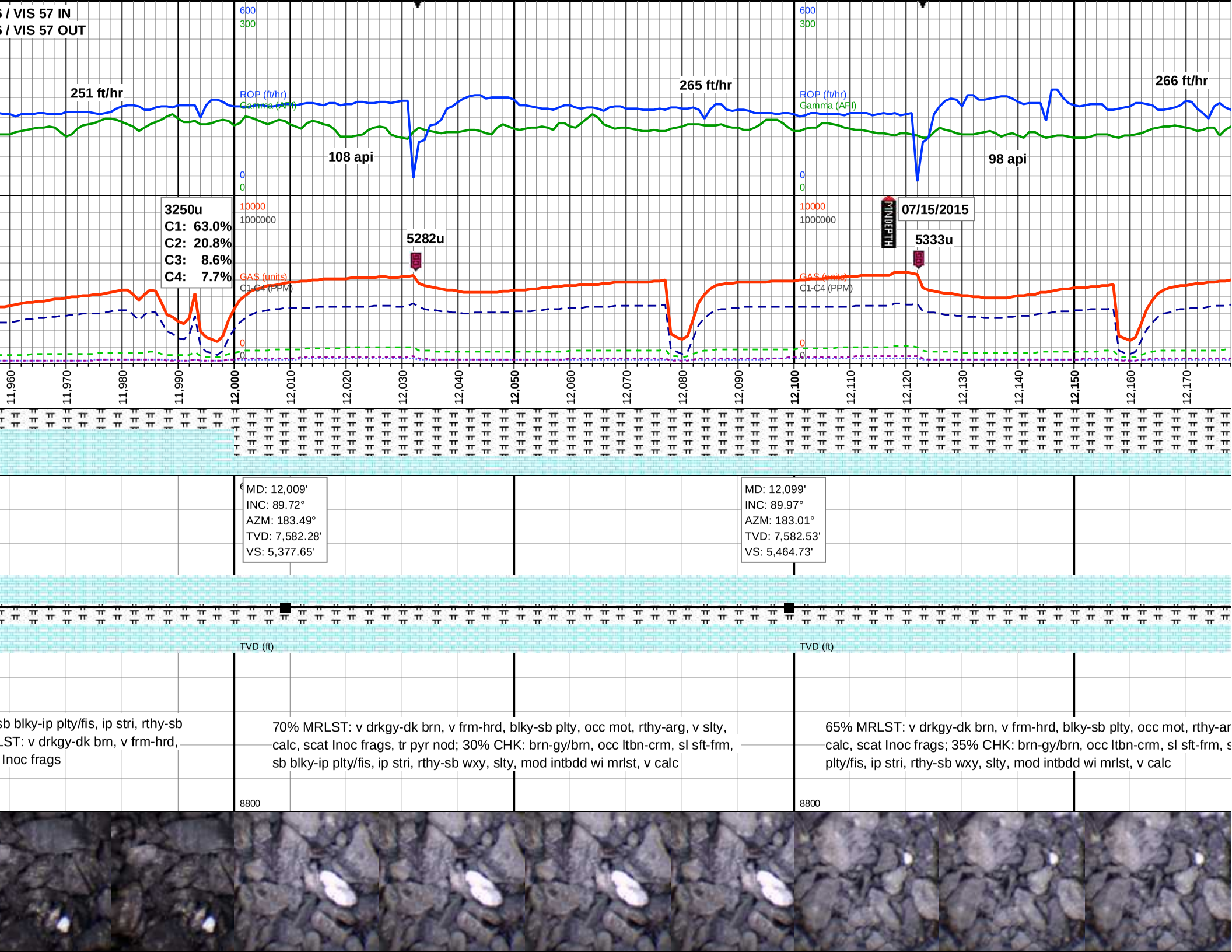
cc ltbn-crm, sl sft-frm, sb blky-ip plty/fis, ip stri, rthy-sb
mrlst, v calc; 35% MRLST: v drkgy-dk brn, v frm-hrd,
hy-arg, v slty, calc, scat lnoc frags

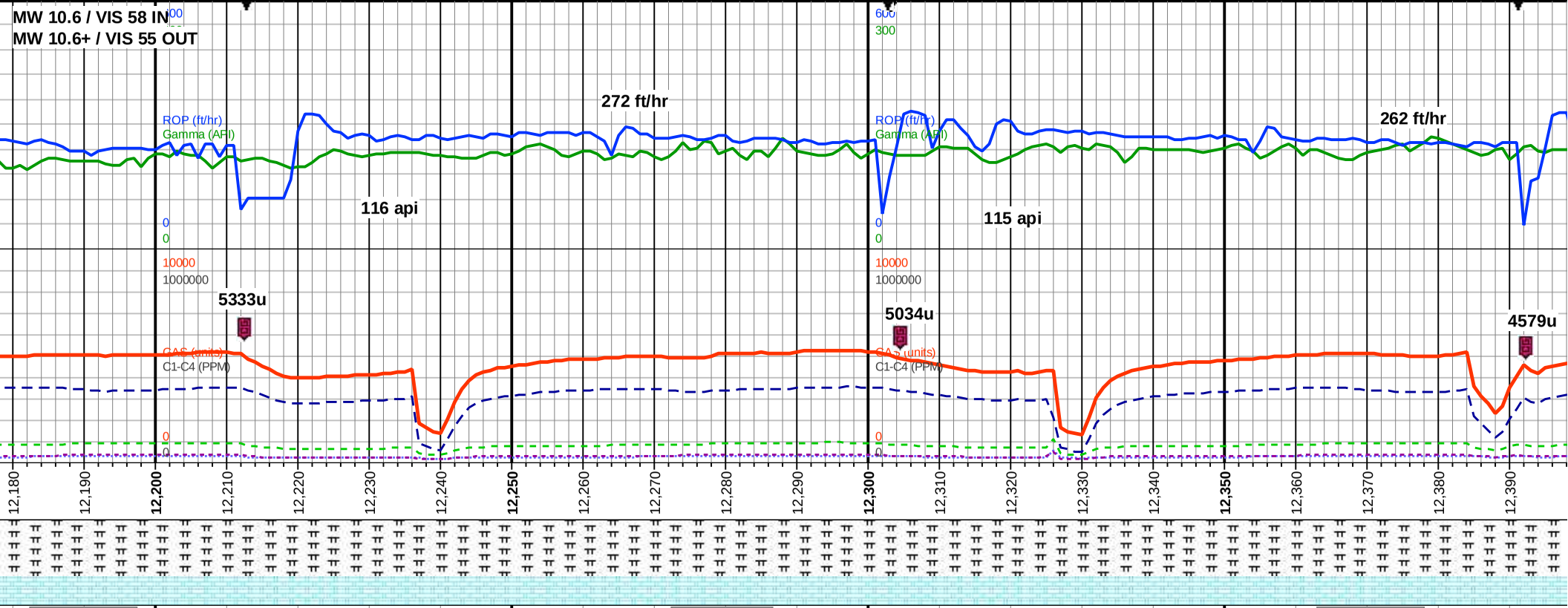
70% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-ip plty/fis, ip stri, rthy-sb wxy, slty, mod intbdd wi mrlst, v calc; 30% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty, calc, scat lnoc frags

70% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, s
wxy, slty, mod intbdd wi mrlst, v calc; 30% MRL
blky-sb plty, occ mot, rthy-arg, v slty, calc, scat

8800

8800


/ VIS 57 IN
/ VIS 57 OUT
251 ft/hr
265 ft/hr
266 ft/hr
ROP (ft/hr)
Gamma (API)
108 api
98 api
600
300
0
0
10000
1000000
3250u
C1: 63.0%
C2: 20.8%
C3: 8.6%
C4: 7.7%
5282u
5333u
07/15/2015
MINDEPTH
GAS (units)
C1-C4 (PPM)
11,960
11,970
11,980
11,990
12,000
12,010
12,020
12,030
12,040
12,050
12,060
12,070
12,080
12,090
12,100
12,110
12,120
12,130
12,140
12,150
12,160
12,170
MD: 12,009'
INC: 89.72°
AZM: 183.49°
TVD: 7,582.28'
VS: 5,377.65'
MD: 12,099'
INC: 89.97°
AZM: 183.01°
TVD: 7,582.53'
VS: 5,464.73'
TVD (ft)
TVD (ft)
sb blky-ip plty/fis, ip stri, rthy-sb
LST: v drkgy-dk brn, v frm-hrd,
Inoc frags
70% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty,
calc, scat Inoc frags, tr pyr nod; 30% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm,
sb blky-ip plty/fis, ip stri, rthy-sb wxy, slty, mod intbdd wi mrlst, v calc
65% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-ar
calc, scat Inoc frags; 35% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, s
plty/fis, ip stri, rthy-sb wxy, slty, mod intbdd wi mrlst, v calc
8800
8800



MD: 12,189'
INC: 89.82°
AZM: 182.09°
TVD: 7,582.69'
VS: 5,552.07'

MD: 12,279'
INC: 89.78°
AZM: 180.13°
TVD: 7,583'
VS: 5,639.94'

MD: 12,369'
INC: 90°
AZM: 179.68°
TVD: 7,583.18'
VS: 5,728.19'

6800

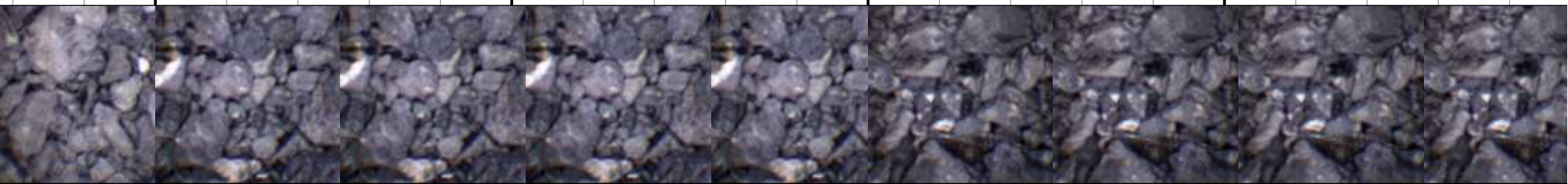
TVD (ft)

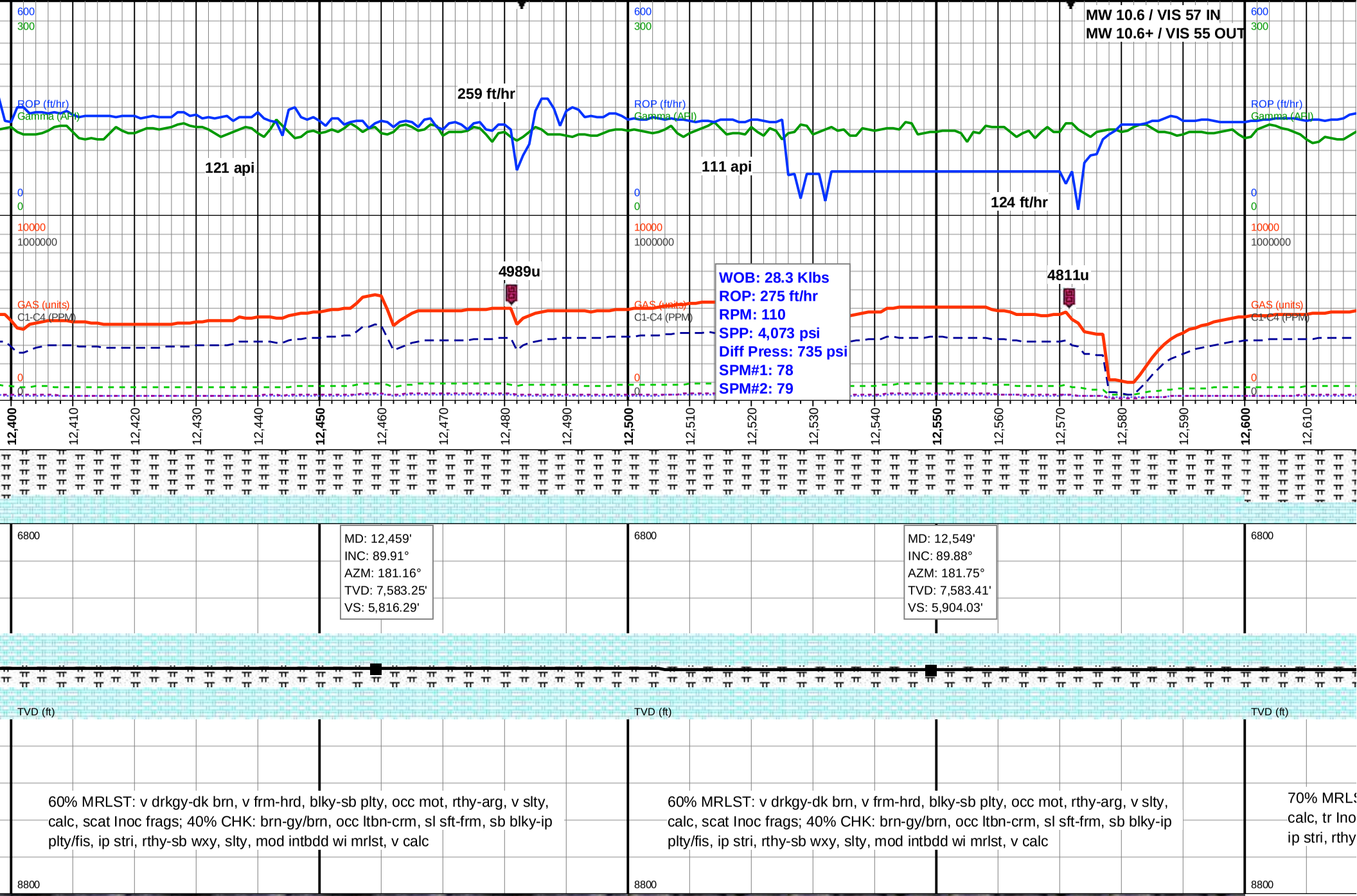
8800

g, v slty,
sb blky-ip

65% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty, calc, scat Inoc frags; 35% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-ip plty/fis, ip stri, rthy-sb wxy, slty, mod intbdd wi mrlst, v calc

65% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty, calc, scat Inoc frags; 35% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-ip plty/fis, ip stri, rthy-sb wxy, slty, mod intbdd wi mrlst, v calc

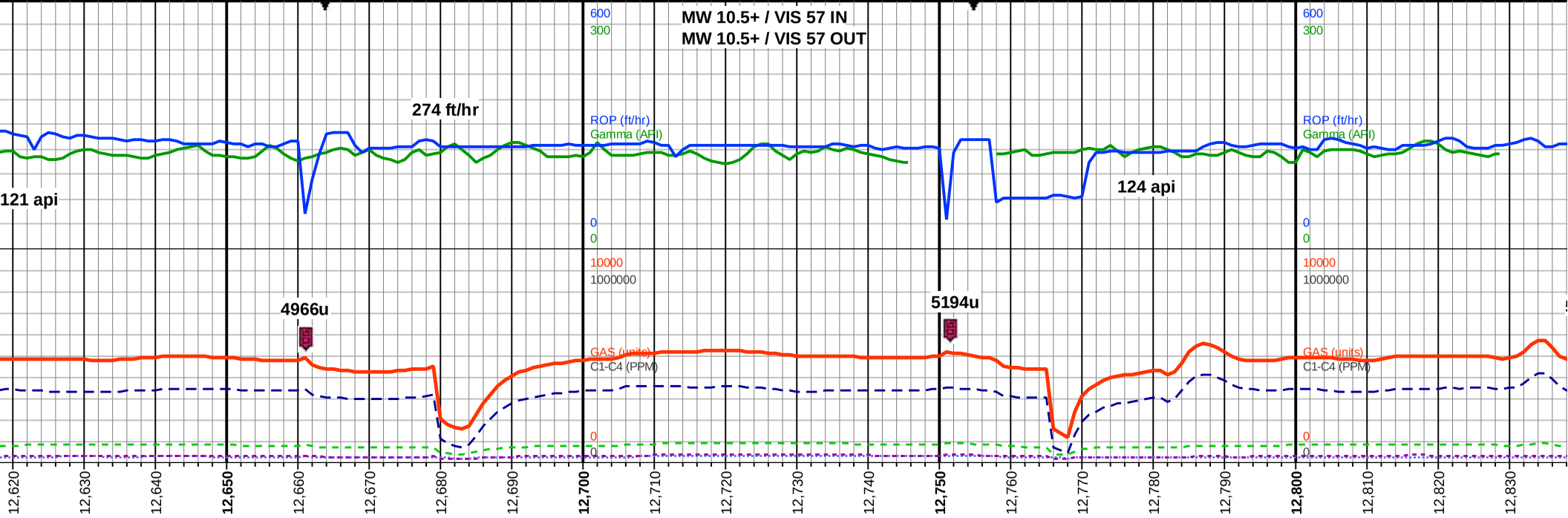




60% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty, calc, scat Inoc frags; 40% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-ip plty/fis, ip stri, rthy-sb wxy, slty, mod intbdd wi mrlst, v calc

60% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, occ mot, rthy-arg, v slty, calc, scat Inoc frags; 40% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-ip plty/fis, ip stri, rthy-sb wxy, slty, mod intbdd wi mrlst, v calc

70% MRLS
calc, tr Ino
ip stri, rthy



MD: 12,639'
INC: 89.69°
AZM: 179.31°
TVD: 7,583.75'
VS: 5,992.08'

MD: 12,729'
INC: 89.78°
AZM: 176.48°
TVD: 7,584.17'
VS: 6,080.9'

MD: 12,819'
INC: 90°
AZM: 174.27°
TVD: 7,584.34'
VS: 6,170.26'

6800

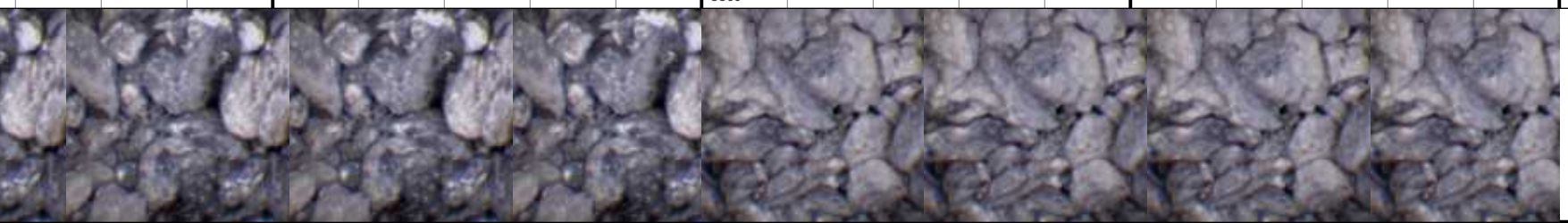
TVD (ft)

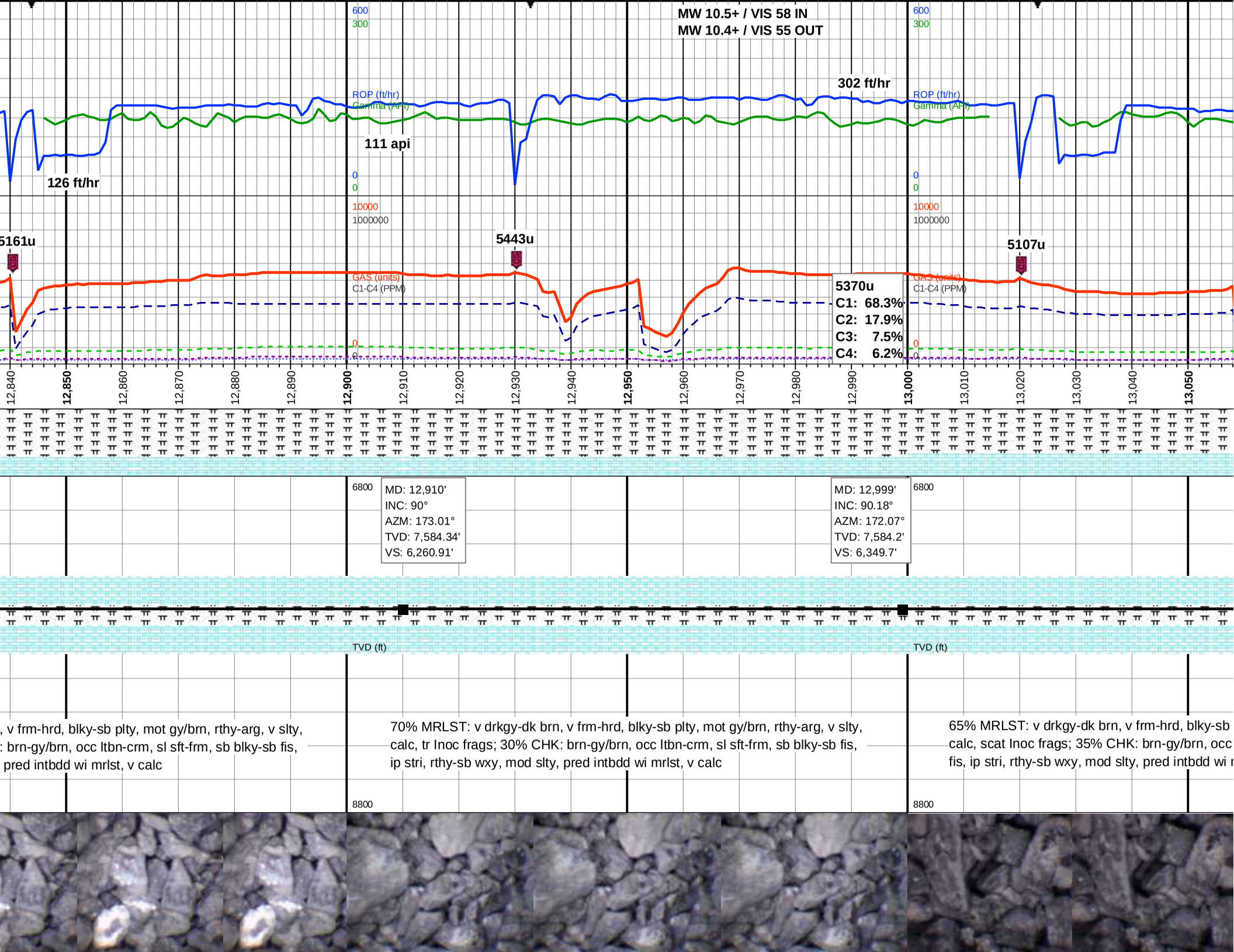
8800

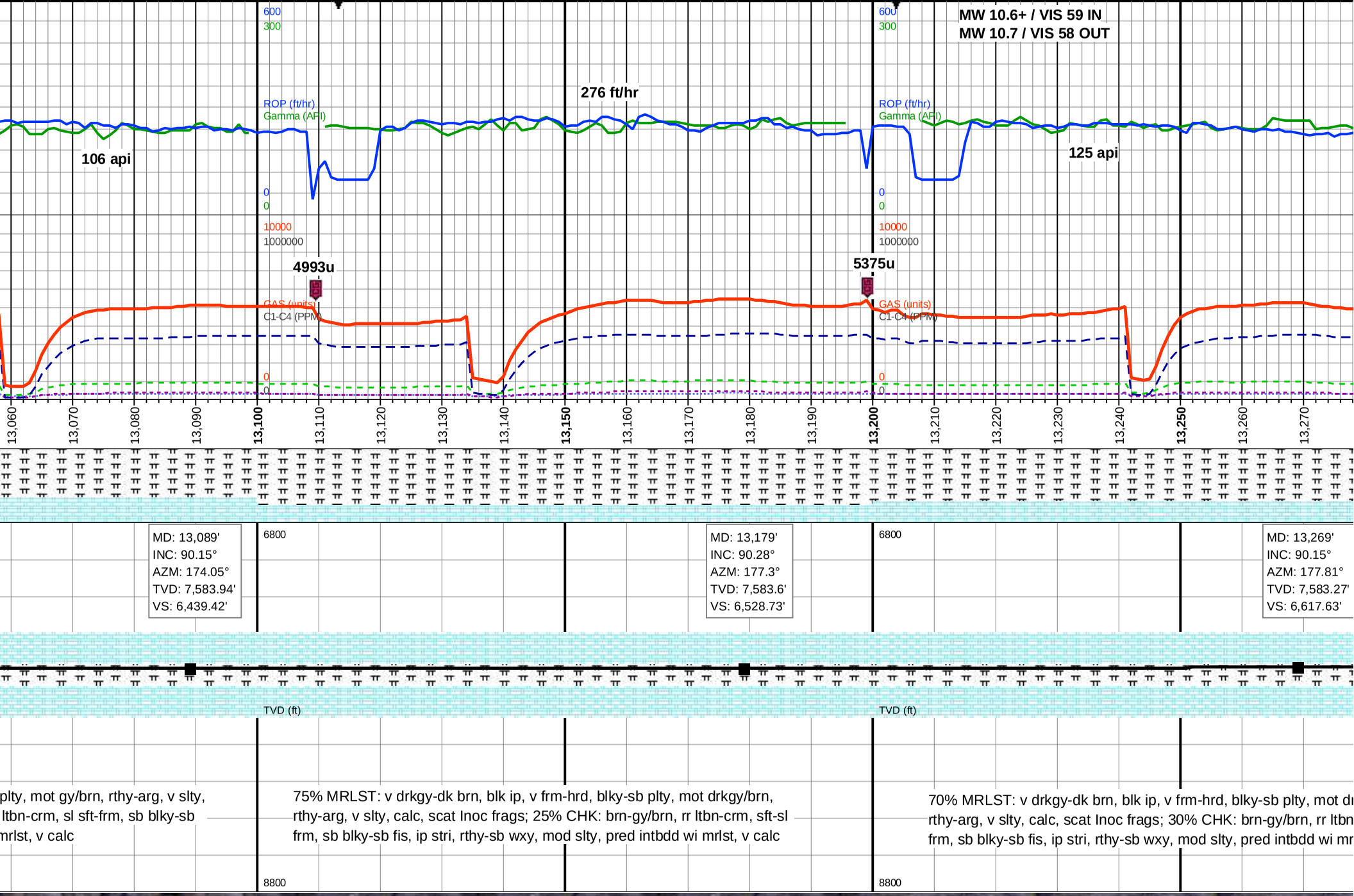
ST: v drkgy-dk brn, v frm-hrd, blky-sb plty, mot gy/brn, rthy-arg, v slty,
c frags; 30% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-sb fis,
-sb wxy, mod slty, pred intbdd wi mrlst, v calc

75% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, mot gy/brn, rthy-arg, v slty,
calc, tr Inoc frags; 25% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-sb fis,
ip stri, rthy-sb wxy, mod slty, pred intbdd wi mrlst, v calc

70% MRLST: v drkgy-dk brn
calc, tr Inoc frags; 30% CHK
ip stri, rthy-sb wxy, mod slty,



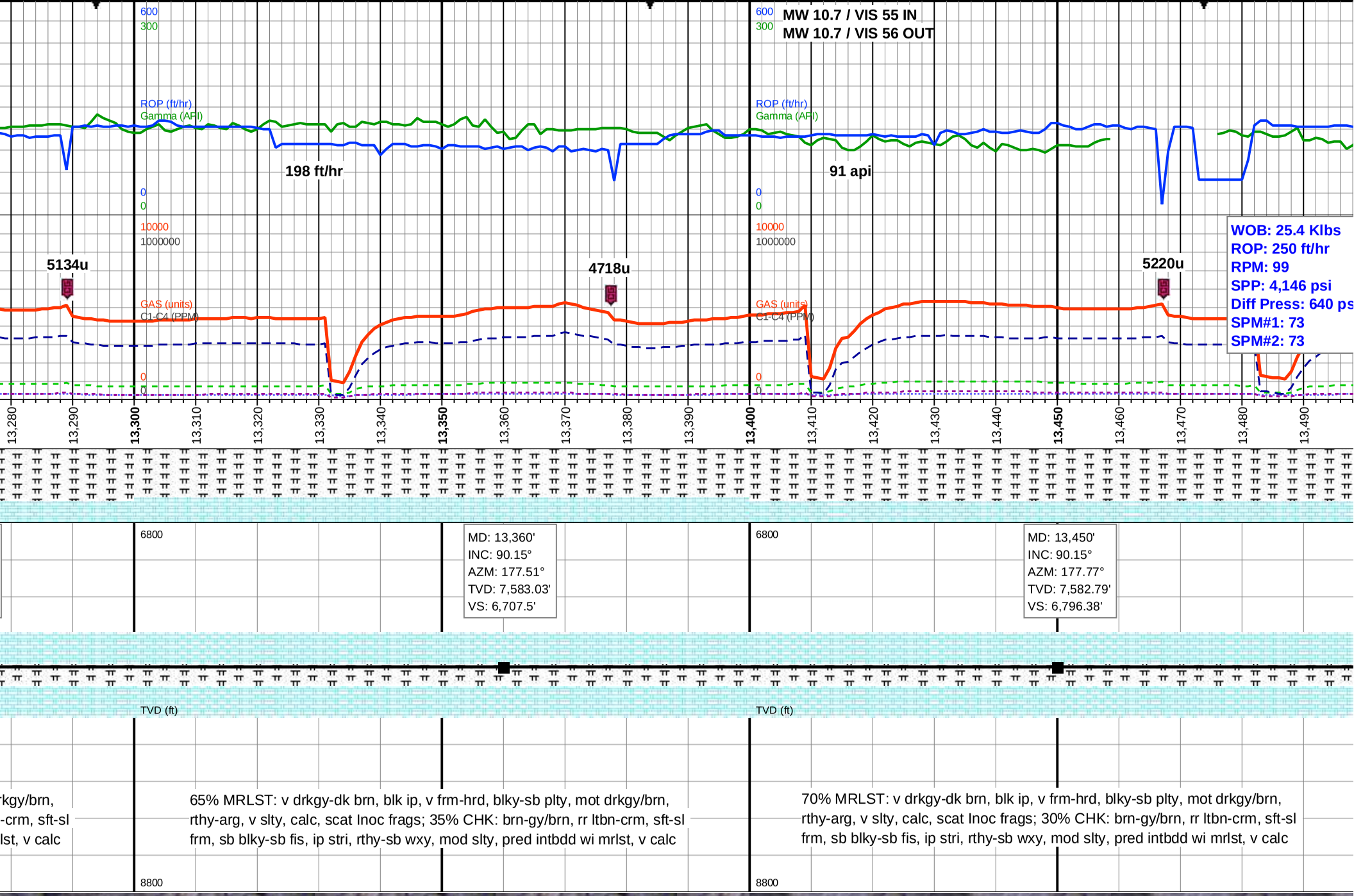

MW 10.5+ / VIS 58 IN
MW 10.4+ / VIS 55 OUT
302 ft/hr
126 ft/hr
111 api
ROP (ft/hr)
Gamma (API)
GAS (units)
C1-C4 (PPM)
5161u
5443u
5107u
5370u
C1: 68.3%
C2: 17.9%
C3: 7.5%
C4: 6.2%
MD: 12,910'
INC: 90°
AZM: 173.01°
TVD: 7,584.34'
VS: 6,260.91'
MD: 12,999'
INC: 90.18°
AZM: 172.07°
TVD: 7,584.2'
VS: 6,349.7'
TVD (ft)
, v frm-hrd, blky-sb plty, mot gy/brn, rthy-arg, v slty,
: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-sb fis,
pred intbdd wi mrlst, v calc
70% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb plty, mot gy/brn, rthy-arg, v slty,
calc, tr Inoc frags; 30% CHK: brn-gy/brn, occ ltbn-crm, sl sft-frm, sb blky-sb fis,
ip stri, rthy-sb wxy, mod slty, pred intbdd wi mrlst, v calc
65% MRLST: v drkgy-dk brn, v frm-hrd, blky-sb
calc, scat Inoc frags; 35% CHK: brn-gy/brn, occ
fis, ip stri, rthy-sb wxy, mod slty, pred intbdd wi



plty, mot gy/brn, rthy-arg, v slty,
ltbn-crm, sl sft-frm, sb blky-sb
mrlst, v calc

75% MRLST: v drkgy-dk brn, blk ip, v frm-hrd, blky-sb plty, mot drkgy/brn, rthy-arg, v slty, calc, scat lnoc frags; 25% CHK: brn-gy/brn, rr ltbn-crm, sft-sl frm, sb blky-sb fis, ip stri, rthy-sb wxy, mod slty, pred intbdd wi mrlst, v calc

70% MRLST: v drkgy-dk brn, blk ip, v frm-hrd, blky-sb plty, mot dr
rthy-arg, v slty, calc, scat lnoc frags; 30% CHK: brn-gy/brn, rr ltbn
frm, sb blky-sb fis, ip stri, rthy-sb wxy, mod slty, pred intbdd wi mr



6800

MD: 13,360'
INC: 90.15°
AZM: 177.51°
TVD: 7,583.03'
VS: 6,707.5'

6800

MD: 13,450'
INC: 90.15°
AZM: 177.77°
TVD: 7,582.79'
VS: 6,796.38'

TVD (ft)

TVD (ft)

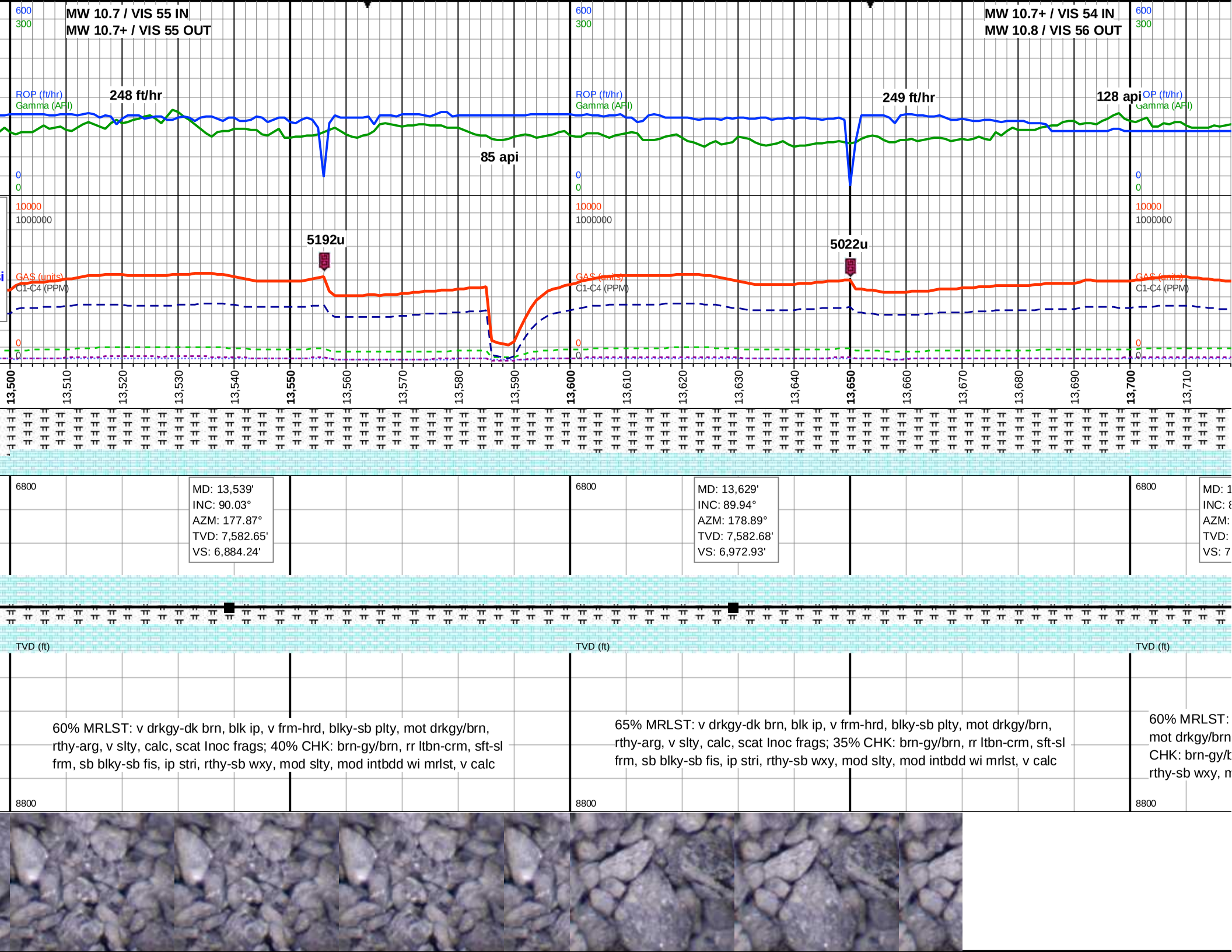
rkgy/brn,
-crm, sft-sl
lst, v calc

65% MRLST: v drkgy-dk brn, blk ip, v frm-hrd, blky-sb plty, mot drkgy/brn, rthy-arg, v slty, calc, scat Inoc frags; 35% CHK: brn-gy/brn, rr ltbn-crm, sft-sl frm, sb blky-sb fis, ip stri, rthy-sb wxy, mod slty, pred intbdd wi mrlst, v calc

70% MRLST: v drkgy-dk brn, blk ip, v frm-hrd, blky-sb plty, mot drkgy/brn, rthy-arg, v slty, calc, scat Inoc frags; 30% CHK: brn-gy/brn, rr ltbn-crm, sft-sl frm, sb blky-sb fis, ip stri, rthy-sb wxy, mod slty, pred intbdd wi mrlst, v calc

8800

8800


MW 10.7 / VIS 55 IN
MW 10.7+ / VIS 55 OUT
MW 10.7+ / VIS 54 IN
MW 10.8 / VIS 56 OUT
ROP (ft/hr)
Gamma (API)
248 ft/hr
85 api
249 ft/hr
128 api
GAS (units)
C1-C4 (PPM)
5192u
5022u
13,500
13,510
13,520
13,530
13,540
13,550
13,560
13,570
13,580
13,590
13,600
13,610
13,620
13,630
13,640
13,650
13,660
13,670
13,680
13,690
13,700
13,710
MD: 13,539'
INC: 90.03°
AZM: 177.87°
TVD: 7,582.65'
VS: 6,884.24'
MD: 13,629'
INC: 89.94°
AZM: 178.89°
TVD: 7,582.68'
VS: 6,972.93'
TVD (ft)
60% MRLST: v drkgy-dk brn, blk ip, v frm-hrd, blky-sb plty, mot drkgy/brn, rthy-arg, v slty, calc, scat Inoc frags; 40% CHK: brn-gy/brn, rr ltbn-crm, sft-sl frm, sb blky-sb fis, ip stri, rthy-sb wxy, mod slty, mod intbdd wi mrlst, v calc
65% MRLST: v drkgy-dk brn, blk ip, v frm-hrd, blky-sb plty, mot drkgy/brn, rthy-arg, v slty, calc, scat Inoc frags; 35% CHK: brn-gy/brn, rr ltbn-crm, sft-sl frm, sb blky-sb fis, ip stri, rthy-sb wxy, mod slty, mod intbdd wi mrlst, v calc
60% MRLST:
mot drkgy/brn
CHK: brn-gy/b
rthy-sb wxy, m
6800
8800

MW 10.8 / VIS 54 IN
MW 10.8 / VIS 56 OUT

600
300

ROP (ft/hr)
Gamma (API)

73 api

0
0

10000
1000000

TD Reached, 13,770' MD, 10:37 MDT, 07/15/2017

5102u

Thank you for usingTerra Guidance, LLC.

GAS (units)
C1-C4 (PPM)

0
0

13,720 13,730 13,740 13,750 13,760 13,770 13,780 13,790 13,800 13,810 13,820 13,830 13,840 13,850 13,860 13,870 13,880 13,890

,719'
89.85°
179.83°
7,582.84'
,061.35'

Projection to Bit:

MD: 13,770'
INC: 89.85°
AZM: 179.83°
TVD: 7,582.97'
VS: 7,111.37'

6800

TVD (ft)

8800

v drkgy-dk brn, blk ip, v frm-hrd, blky-sb plty,
, rthy-arg, v slty, calc, scat Inoc frags; 40%
rn, rr ltbn-crm, sft-sl frm, sb blky-sb fis, ip stri,
od slty, mod amt intbdd wi mrlst, v calc