COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name	Waste Management 2T-221		
Location	SESE SEC 2, 2N, 64W, 6TH		
State	COLORADO	**County**	WELD
Country	USA	**Rig Number**	ENSIGN 119
API Number	05-123-36964-0000		
Region	DJ BASIN	**Field**	WATTENBERG
Spud Date	8/19/2013	**Drilling Completed**	8/29/2013
Surface Coordinates	230' FSL x 1046' FEL		
Bottom Hole Coordinates	500' FNL x 812' FEL		
Ground Elevation	4893'	**K.B. Elevation**	4916'
Logged Interval	5950' **To** 11189'	**Total Depth**	11189
Formation	NIOBRARA B		
Type of Drilling Fluid	LSND		

Company PDC Energy

Address 1775 Sherman Street, Ste
Denver , CO 80203

Name Brian Hoffman

Company PDC Energy

Address 1775 Sherman Street, Ste
Denver , CO 80203

Operator

3000

Geologist

3000

Rock Types

Accessories

Fossils

FOSSIL
GASTROPOD
ALGAE
AMPHIPORA
BELEMNITE
BIOCLASTIC
BRACHOIPOD
BRYOZOA
CEPHALOPOD
CORAL
CRINOID
ECHINOID
FISH
FORAMINIFERA
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
INOCERAMUS
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

Oil Show

DEAD
EVEN
QUESTIONABLE
SPOTTED STAINING

Porosity

EARTHY
FENESTRAL
FRACTURE
INTERCRYSTALLINE
INTEROOLITIC

MOLDIC
ORGANIC
PINPOINT
VUGGY

Engineering

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

FAULT
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

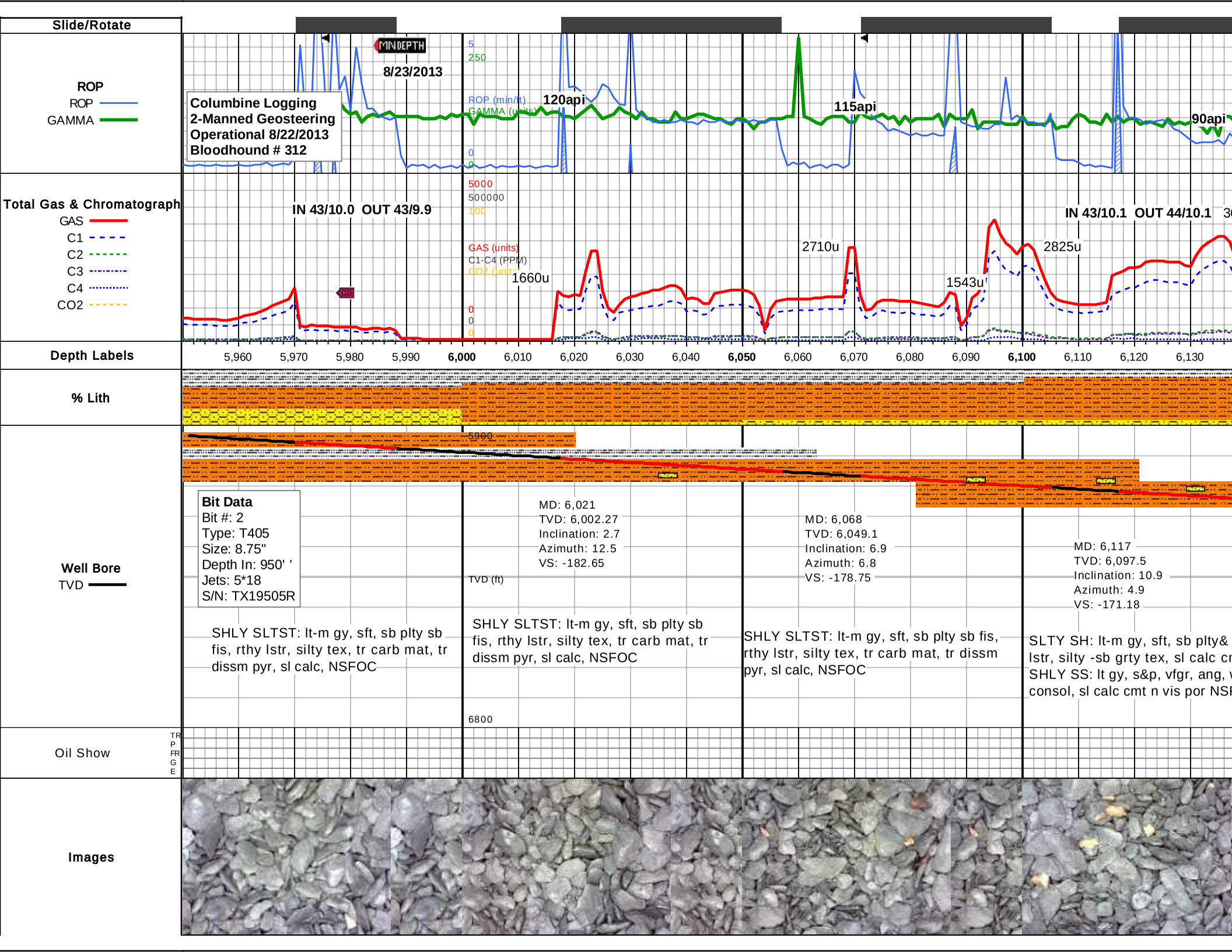
Textures

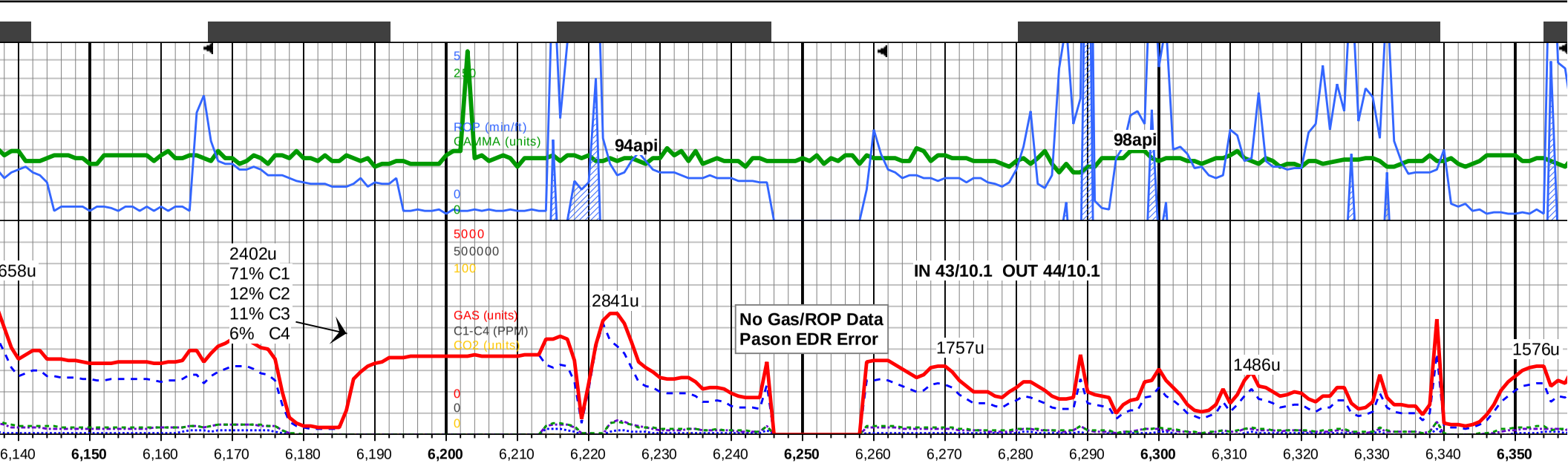
BOUNDSTONE
CHALKY
CRYPTOXLN

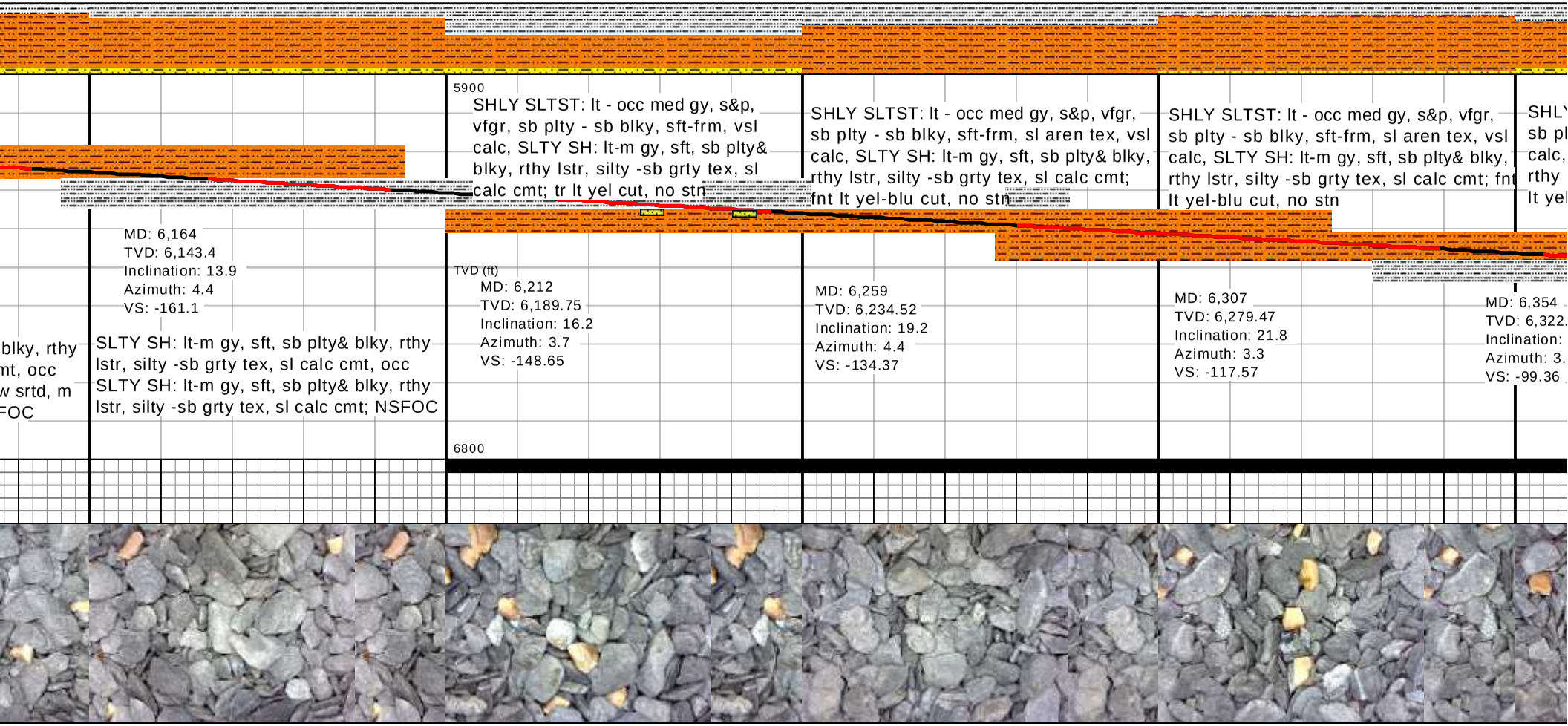
EARTHY
FINELYXLN
GRAINSTONE
LITHOGRAPHIC
MICROXLN
MUDSTONE
PACKSTONE
WACKESTONE

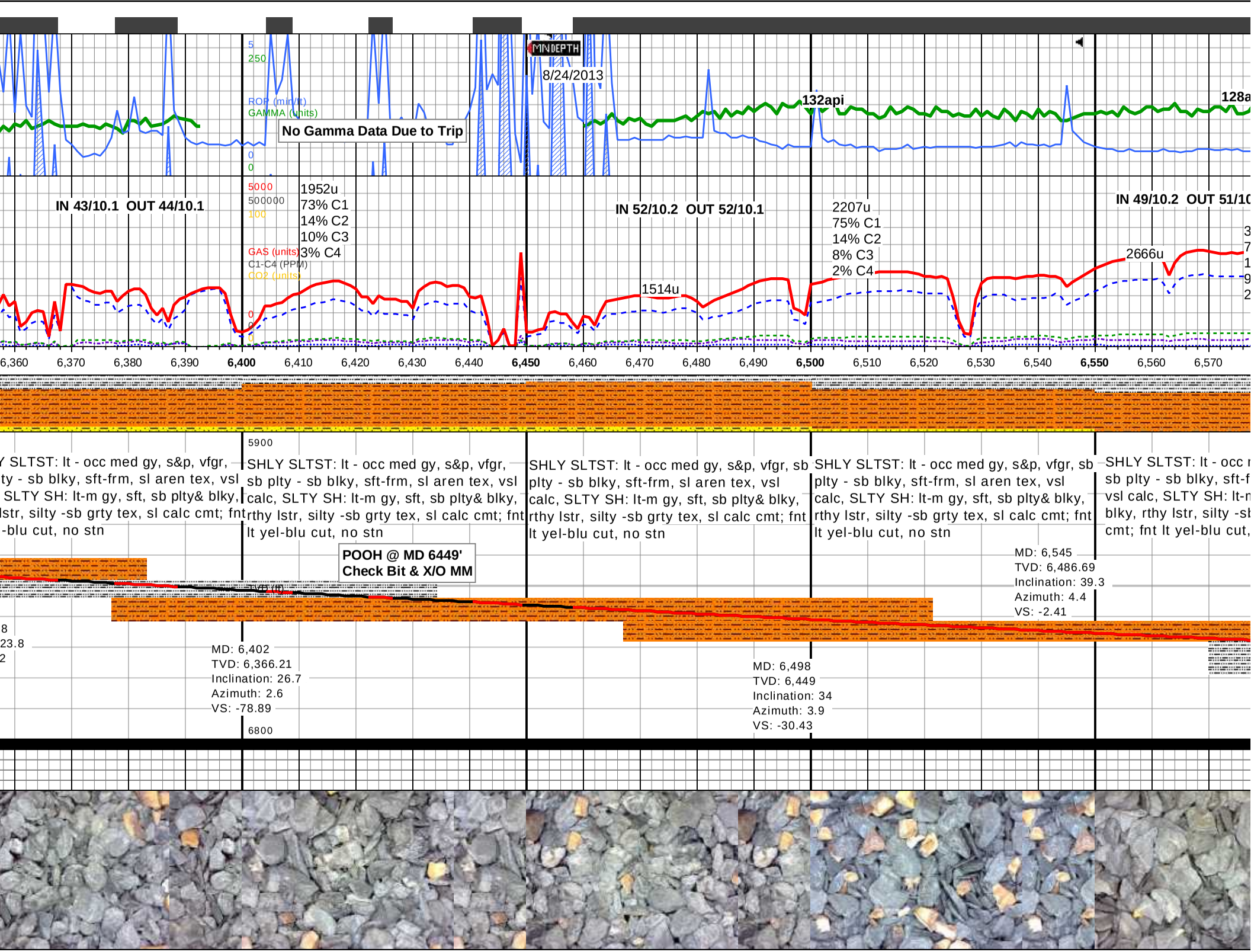
Sorting

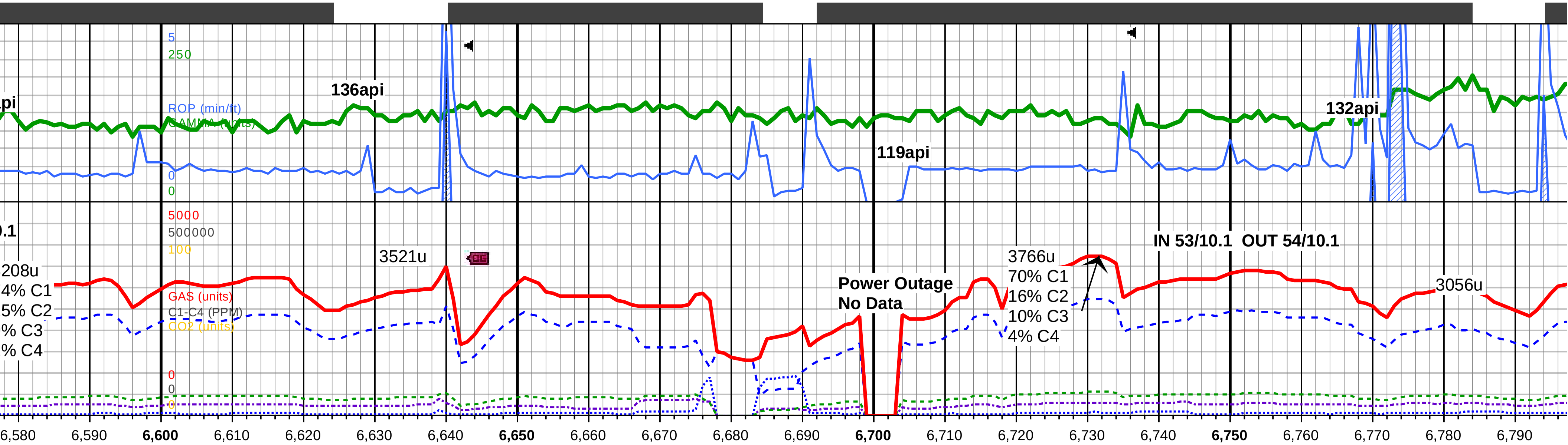
MODERATE
POOR
WELL


Slide/Rotate
ROP
ROP
GAMMA
MNDEPTH
8/23/2013
Columbine Logging
2-Manned Geosteering
Operational 8/22/2013
Bloodhound # 312
5
250
ROP (min/ft)
GAMMA (units)
0
0
120api
115api
90api
Total Gas & Chromatograph
GAS
C1
C2
C3
C4
CO2
IN 43/10.0 OUT 43/9.9
5000
500000
100
GAS (units)
C1-C4 (PPM)
CO2 (units)
1660u
2710u
1543u
2825u
IN 43/10.1 OUT 44/10.1
0
0
0
Depth Labels
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
% Lith
Well Bore
TVD
5900
Bit Data
Bit #: 2
Type: T405
Size: 8.75"
Depth In: 950' '
Jets: 5*18
S/N: TX19505R
MD: 6,021
TVD: 6,002.27
Inclination: 2.7
Azimuth: 12.5
VS: -182.65
MD: 6,068
TVD: 6,049.1
Inclination: 6.9
Azimuth: 6.8
VS: -178.75
MD: 6,117
TVD: 6,097.5
Inclination: 10.9
Azimuth: 4.9
VS: -171.18
TVD (ft)
6800
SHLY SLTST: lt-m gy, sft, sb plty sb fis, rthy lstr, silty tex, tr carb mat, tr dissm pyr, sl calc, NSFOC
SHLY SLTST: lt-m gy, sft, sb plty sb fis, rthy lstr, silty tex, tr carb mat, tr dissm pyr, sl calc, NSFOC
SHLY SLTST: lt-m gy, sft, sb plty sb fis, rthy lstr, silty tex, tr carb mat, tr dissm pyr, sl calc, NSFOC
SLTY SH: lt-m gy, sft, sb plty&
lstr, silty -sb grty tex, sl calc cr
SHLY SS: lt gy, s&p, vfgr, ang, v
consol, sl calc cmt n vis por NSF
Oil Show
TR
P
FR
G
E
Images


ROP (min/ft)
GAMMA (units)
94api
98api
GAS (units)
C1-C4 (PPM)
CO2 (units)
2402u
71% C1
12% C2
11% C3
6% C4
658u
2841u
No Gas/ROP Data
Pason EDR Error
IN 43/10.1 OUT 44/10.1
1757u
1486u
1576u
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


5900
6800
TVD (ft)
MD: 6,164
TVD: 6,143.4
Inclination: 13.9
Azimuth: 4.4
VS: -161.1
SLTY SH: lt-m gy, sft, sb plty& blky, rthy lstr, silty -sb grty tex, sl calc cmt, occ
SLTY SH: lt-m gy, sft, sb plty& blky, rthy lstr, silty -sb grty tex, sl calc cmt; NSFOC
MD: 6,212
TVD: 6,189.75
Inclination: 16.2
Azimuth: 3.7
VS: -148.65
SHLY SLTST: lt - occ med gy, s&p, vfgr, sb plty - sb blky, sft-frm, vsl calc, SLTY SH: lt-m gy, sft, sb plty& blky, rthy lstr, silty -sb grty tex, sl calc cmt; tr lt yel cut, no stn
MD: 6,259
TVD: 6,234.52
Inclination: 19.2
Azimuth: 4.4
VS: -134.37
SHLY SLTST: lt - occ med gy, s&p, vfgr, sb plty - sb blky, sft-frm, sl aren tex, vsl calc, SLTY SH: lt-m gy, sft, sb plty& blky, rthy lstr, silty -sb grty tex, sl calc cmt; fnt lt yel-blu cut, no stn
MD: 6,307
TVD: 6,279.47
Inclination: 21.8
Azimuth: 3.3
VS: -117.57
SHLY SLTST: lt - occ med gy, s&p, vfgr, sb plty - sb blky, sft-frm, sl aren tex, vsl calc, SLTY SH: lt-m gy, sft, sb plty& blky, rthy lstr, silty -sb grty tex, sl calc cmt; fnt lt yel-blu cut, no stn
MD: 6,354
VS: -99.36


5
250
ROP (min/ft)
GAMMA (units)
No Gamma Data Due to Trip
0
0
MNDEPTH
8/24/2013
132api
128a
5000
500000
100
GAS (units)
C1-C4 (PPM)
CO2 (units)
1952u
73% C1
14% C2
10% C3
3% C4
IN 43/10.1 OUT 44/10.1
IN 52/10.2 OUT 52/10.1
2207u
75% C1
14% C2
8% C3
2% C4
1514u
2666u
IN 49/10.2 OUT 51/10
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
5900
Y SLTST: lt - occ med gy, s&p, vfgr,
ty - sb blky, sft-frm, sl aren tex, vsl
SLTY SH: lt-m gy, sft, sb plty& blky,
lstr, silty -sb grty tex, sl calc cmt; fnt
-blu cut, no stn
SHLY SLTST: lt - occ med gy, s&p, vfgr,
sb plty - sb blky, sft-frm, sl aren tex, vsl
calc, SLTY SH: lt-m gy, sft, sb plty& blky,
rthy lstr, silty -sb grty tex, sl calc cmt; fnt
lt yel-blu cut, no stn
SHLY SLTST: lt - occ med gy, s&p, vfgr, sb
plty - sb blky, sft-frm, sl aren tex, vsl
calc, SLTY SH: lt-m gy, sft, sb plty& blky,
rthy lstr, silty -sb grty tex, sl calc cmt; fnt
lt yel-blu cut, no stn
SHLY SLTST: lt - occ med gy, s&p, vfgr, sb
plty - sb blky, sft-frm, sl aren tex, vsl
calc, SLTY SH: lt-m gy, sft, sb plty& blky,
rthy lstr, silty -sb grty tex, sl calc cmt; fnt
lt yel-blu cut, no stn
SHLY SLTST: lt - occ m
sb plty - sb blky, sft-f
vsl calc, SLTY SH: lt-m
blky, rthy lstr, silty -sb
cmt; fnt lt yel-blu cut,
POOH @ MD 6449'
Check Bit & X/O MM
TVD (ft)
8
23.8
2
MD: 6,402
TVD: 6,366.21
Inclination: 26.7
Azimuth: 2.6
VS: -78.89
6800
MD: 6,498
TVD: 6,449
Inclination: 34
Azimuth: 3.9
VS: -30.43
MD: 6,545
TVD: 6,486.69
Inclination: 39.3
Azimuth: 4.4
VS: -2.41



med gy, s&p, vfgr,
rm, sl aren tex,
n gy, sft, sb plty&
o grty tex, sl calc
no stn

5900

SLTY SH: m-dk gy, sft, sb plty& blky, rthy-sb wxy lustr, silty tex, tr dissm pyr, sl calc n flor, tr stmg lt yel cut, v lt yel stn.

SLTY SH: m-dk gy, sft, sb plty& blky, rthy-sb wxy lustr, silty tex, tr dissm pyr, sl calc n flor, tr stmg lt yel cut, v lt yel stn.

SLTY SH: m-dk gy, sft, sb plty& blky, rthy-sb wxy lustr, silty tex, tr dissm pyr, sl calc n flor, tr stmg lt yel cut, v lt yel stn.

SLTY SH: m-dk gy, sft, sb plty& blky, rthy-sb wxy lustr, silty tex, tr dissm pyr, sl calc n flor, tr stmg lt yel cut, v lt yel stn.

MD: 6,593
TVD: 6,522.49
Inclination: 44.2
Azimuth: 4.9
VS: 29.51

VD (ft)

MD: 6,640
TVD: 6,555.02
Inclination: 48
Azimuth: 4.2
VS: 63.43

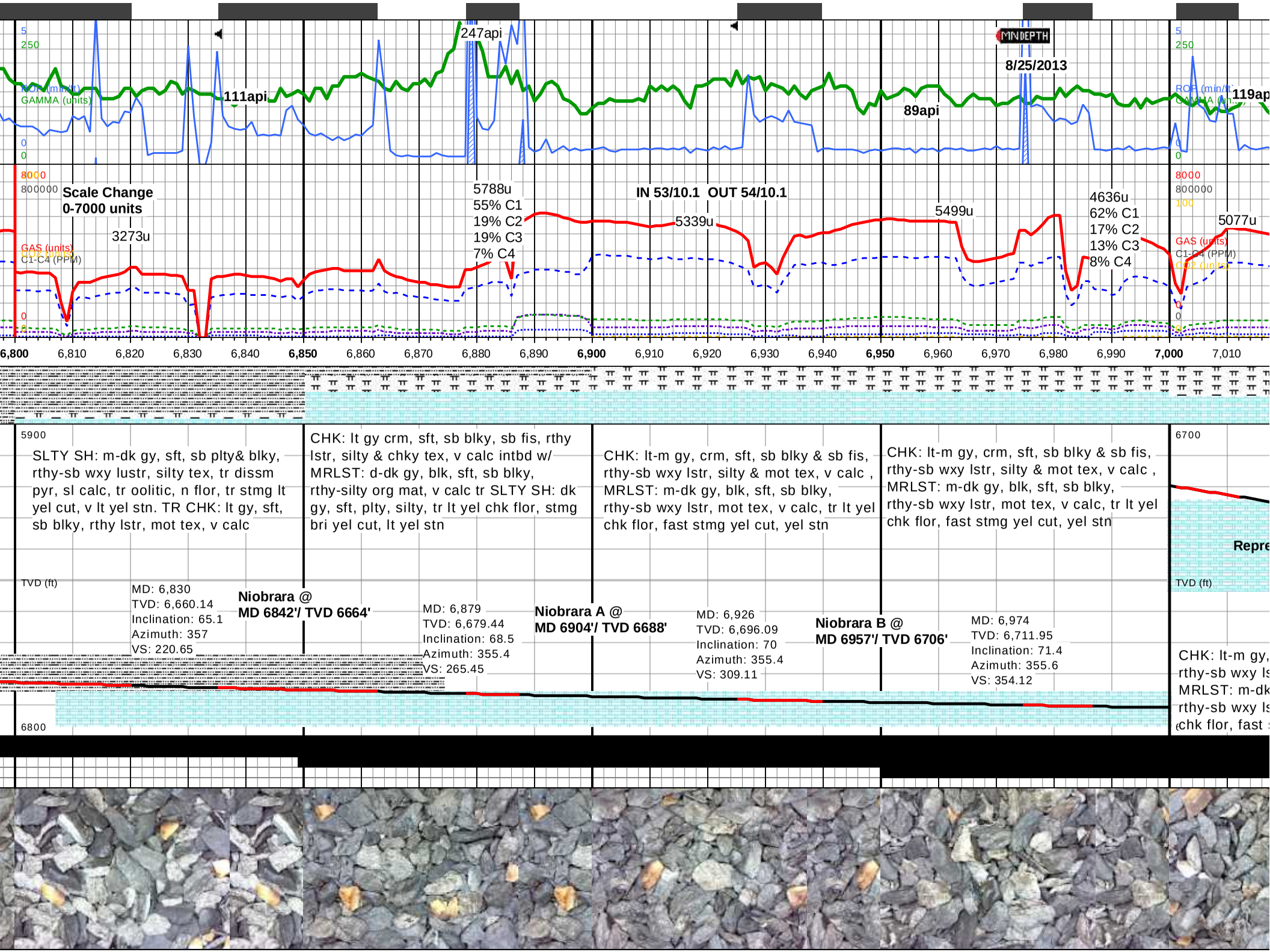
Sharon Springs @
MD 6664'/ TVD 6570'

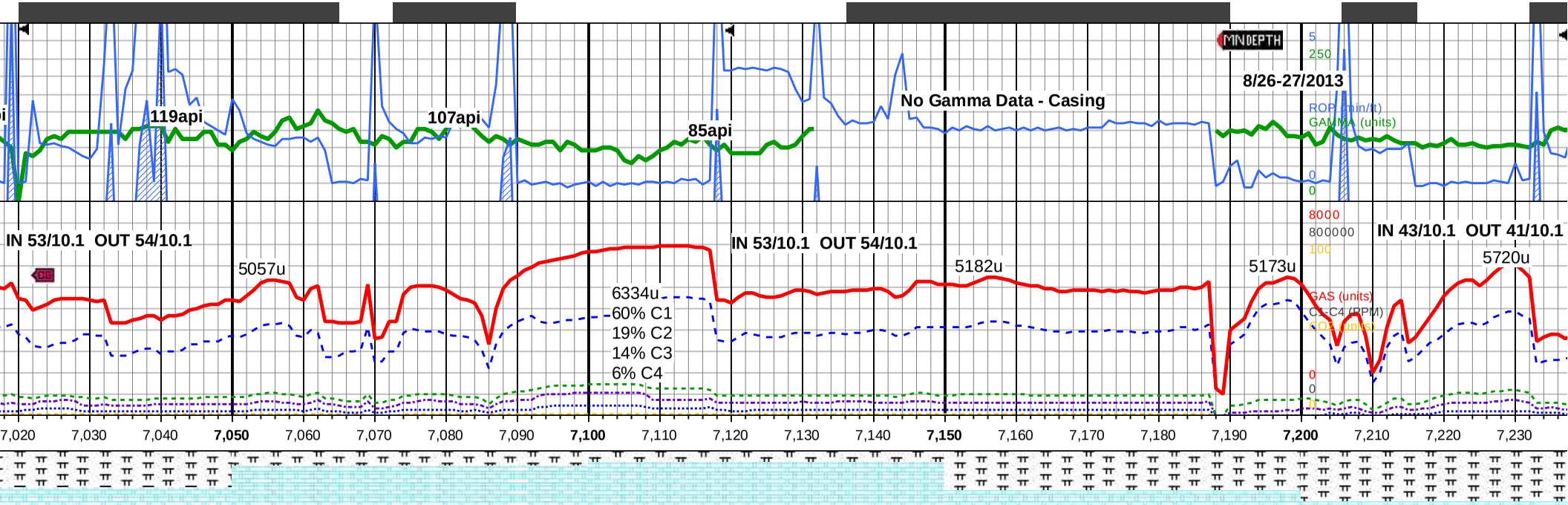
MD: 6,688
TVD: 6,586
Inclination: 51.6
Azimuth: 3.9
VS: 100.06

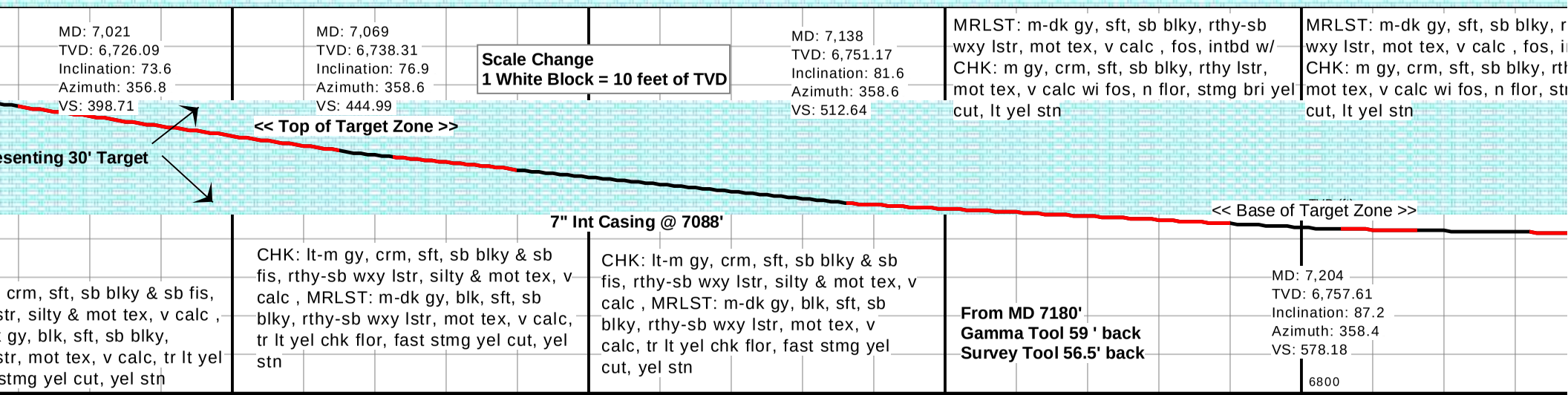
MD: 6,735
TVD: 6,613.66
Inclination: 56.3
Azimuth: 0.9
VS: 138.04

MD: 6,783
TVD: 6,638.73
Inclination: 60.7
Azimuth: 358.9
VS: 178.93

6800


5
250
ROP (min/ft)
GAMMA (units)
0
0
111api
247api
MNDEPTH
8/25/2013
89api
119api
8000
800000
Scale Change
0-7000 units
3273u
GAS (units)
C1-C4 (PPM)
5788u
55% C1
19% C2
19% C3
7% C4
IN 53/10.1 OUT 54/10.1
5339u
5499u
4636u
62% C1
17% C2
13% C3
8% C4
5077u
100
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
5900
SLTY SH: m-dk gy, sft, sb plty& blky, rthy-sb wxy lustr, silty tex, tr dissm pyr, sl calc, tr oolitic, n flor, tr stmg lt yel cut, v lt yel stn. TR CHK: lt gy, sft, sb blky, rthy lstr, mot tex, v calc
CHK: lt gy crm, sft, sb blky, sb fis, rthy lstr, silty & chky tex, v calc intbd w/ MRLST: d-dk gy, blk, sft, sb blky, rthy-silty org mat, v calc tr SLTY SH: dk gy, sft, plty, silty, tr lt yel chk flor, stmg bri yel cut, lt yel stn
CHK: lt-m gy, crm, sft, sb blky & sb fis, rthy-sb wxy lstr, silty & mot tex, v calc , MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc, tr lt yel chk flor, fast stmg yel cut, yel stn
CHK: lt-m gy, crm, sft, sb blky & sb fis, rthy-sb wxy lstr, silty & mot tex, v calc , MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc, tr lt yel chk flor, fast stmg yel cut, yel stn
6700
Repre
TVD (ft)
MD: 6,830
TVD: 6,660.14
Inclination: 65.1
Azimuth: 357
VS: 220.65
Niobrara @
MD 6842'/ TVD 6664'
MD: 6,879
TVD: 6,679.44
Inclination: 68.5
Azimuth: 355.4
VS: 265.45
Niobrara A @
MD 6904'/ TVD 6688'
MD: 6,926
TVD: 6,696.09
Inclination: 70
Azimuth: 355.4
VS: 309.11
Niobrara B @
MD 6957'/ TVD 6706'
MD: 6,974
TVD: 6,711.95
Inclination: 71.4
Azimuth: 355.6
VS: 354.12
6800
CHK: lt-m gy,
rthy-sb wxy ls
MRLST: m-dk
rthy-sb wxy ls
chk flor, fast





crm, sft, sb blky & sb fis,
str, silty & mot tex, v calc ,
gy, blk, sft, sb blky,
str, mot tex, v calc, tr lt yel
stmg yel cut, yel stn

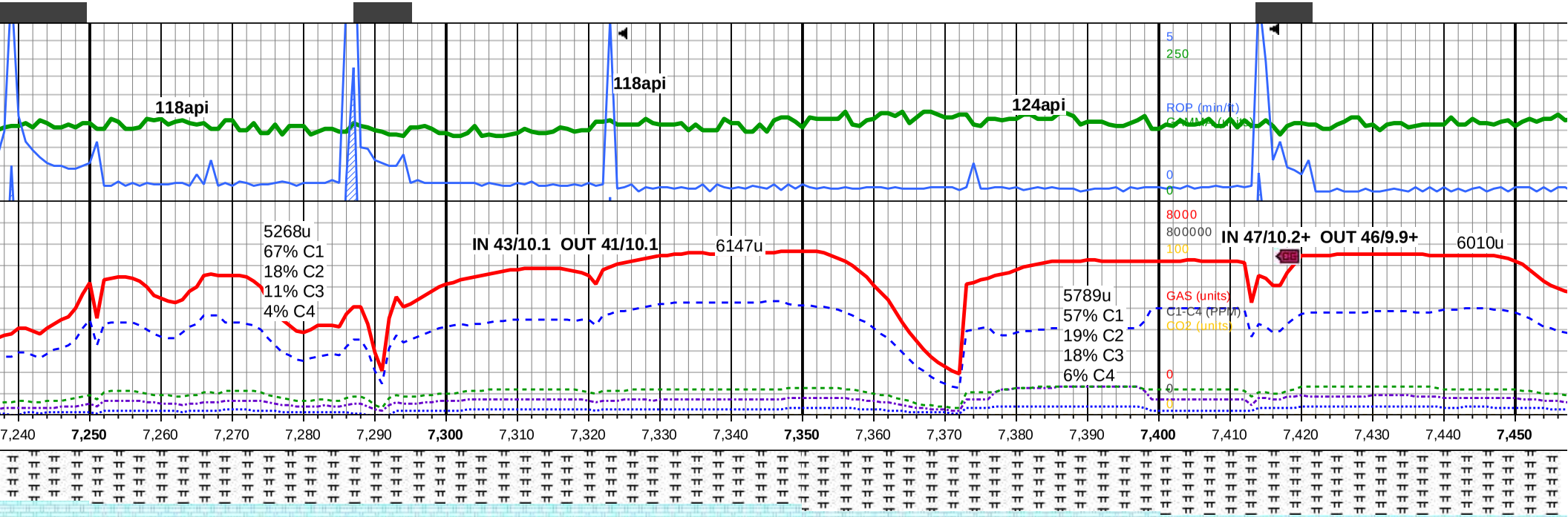
CHK: lt-m gy, crm, sft, sb blky & sb fis, rthy-sb wxy lstr, silty & mot tex, v calc , MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc, tr lt yel chk flor, fast stmg yel cut, yel stn

CHK: lt-m gy, crm, sft, sb blky & sb fis, rthy-sb wxy lstr, silty & mot tex, v calc , MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc, tr lt yel chk flor, fast stmg yel cut, yel stn

From MD 7180'
Gamma Tool 59 ' back
Survey Tool 56.5' back

MD: 7,204
TVD: 6,757.61
Inclination: 87.2
Azimuth: 358.4
VS: 578.18

6800



thy-sb
ntbd w/
ny lstr,
mg bri yel

MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , fos, intbd w/ CHK: m gy, crm, sft, sb blky, rthy lstr, mot tex, v calc wi fos, n flor, stmg bri yel cut, lt yel stn

MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , fos, intbd w/ CHK: m gy, crm, sft, sb blky, rthy lstr, mot tex, v calc wi fos, n flor, stmg bri yel cut, lt yel stn

MD: 7,359
TVD: 6,760.37
Inclination: 90
Azimuth: 357.2
VS: 732.73

6700

MD: 7,450
TVD: 6,760.45
Inclination: 89.9
Azimuth: 356.5
VS: 823.36

<< Base of Target Zone >>

TVD (ft)

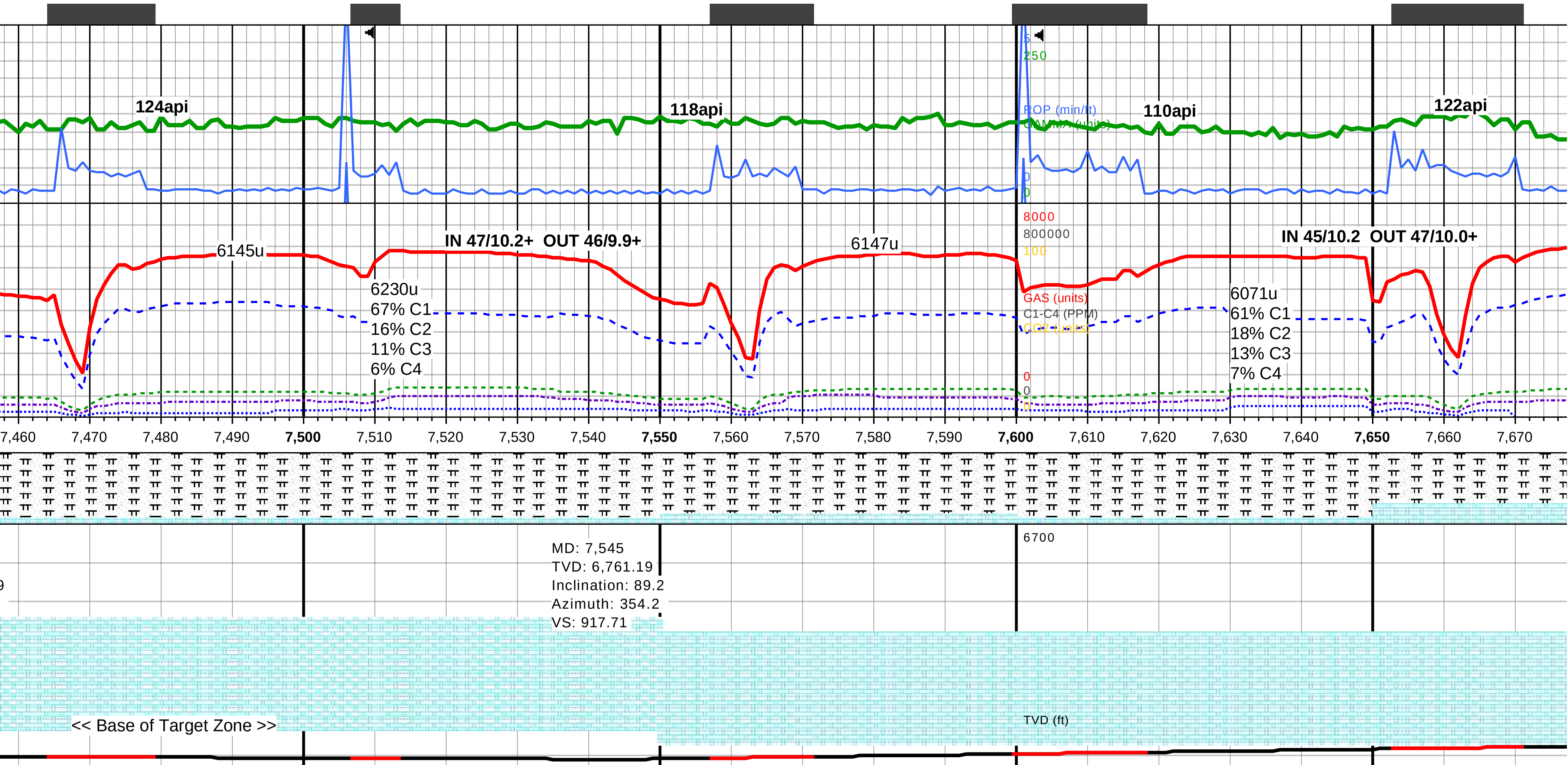
MD: 7,267
TVD: 6,759.65
Inclination: 89.1
Azimuth: 358
VS: 641

MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , abnt fos, intbd w/ CHK: m gy, sft, sb blky, rthy lstr, mot tex, v calc wi fos, n flor, tr inoc fos, occ sec cal, stmg bri yel cut, lt yel stn

MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , abnt fos, intbd w/ CHK: m gy, sft, sb blky, rthy lstr, mot tex, v calc wi fos, n flor, tr inoc fos, occ sec cal, stmg bri yel cut, lt yel stn

6800

MRL
wxy
w/ C
tex,
sec



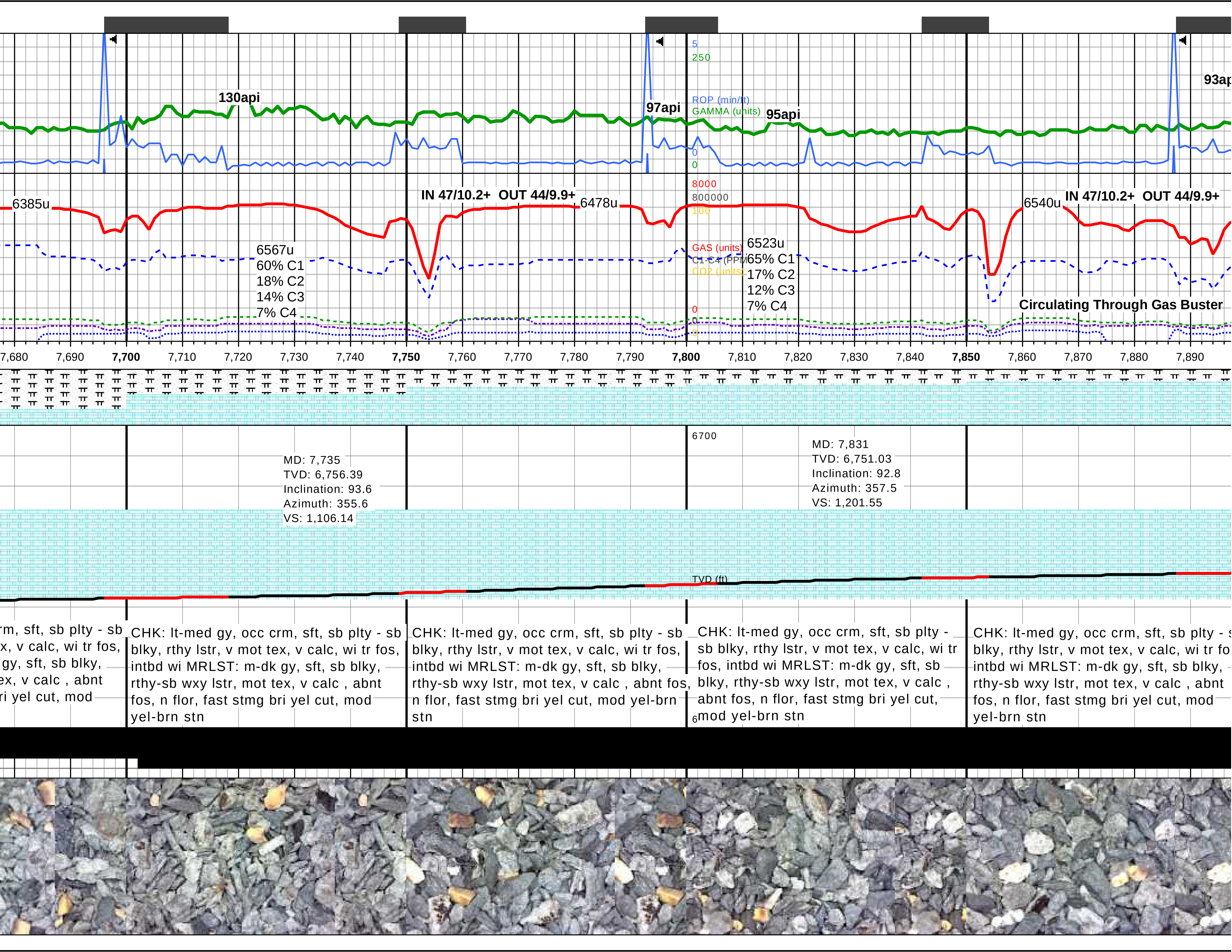
ST: m-dk gy, sft, sb blky, rthy-sb lstr, mot tex, v calc , abnt fos, intbd HK: m gy, sft, sb blky, rthy lstr, mot v calc wi fos, n flor, tr inoc fos, occ cal, stmg bri yel cut, lt yel stn

MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , abnt fos, intbd w/ CHK: m gy, sft, sb blky, rthy lstr, mot tex, v calc wi fos, n flor, tr inoc fos, occ sec cal, stmg bri yel cut, lt yel stn

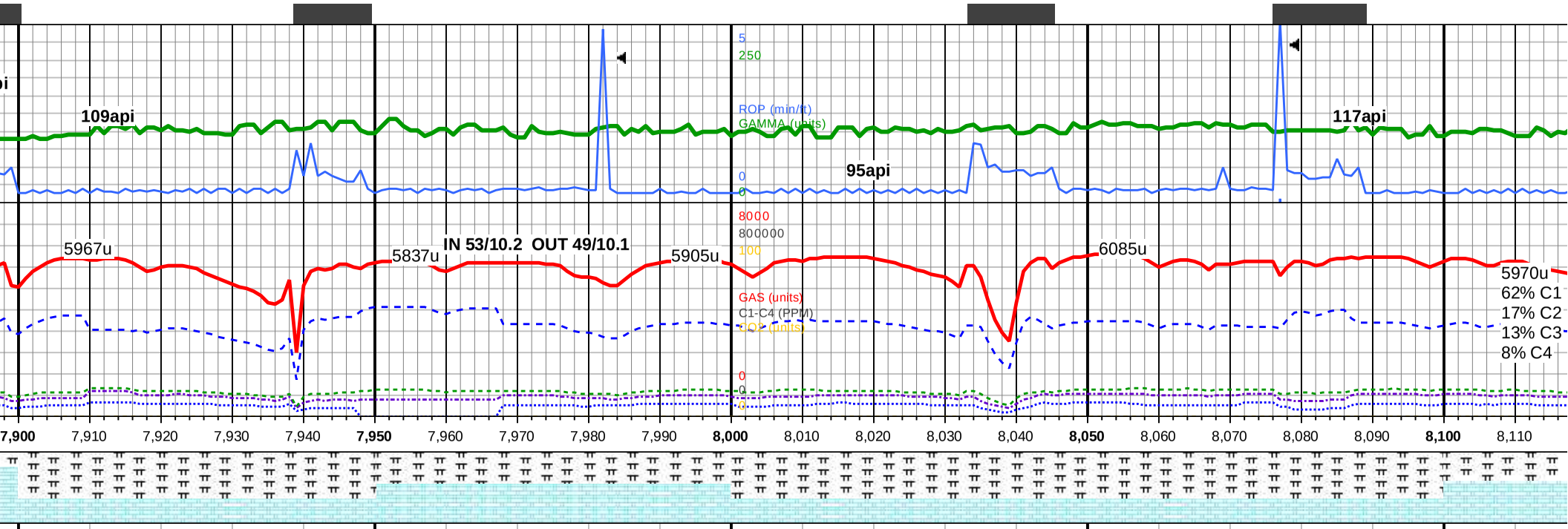
MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , abnt fos, intbd w/ CHK: m gy, sft, sb blky, rthy lstr, mot tex, v calc wi fos, n flor, tr inoc fos, occ sec cal, stmg bri yel cut, lt yel stn

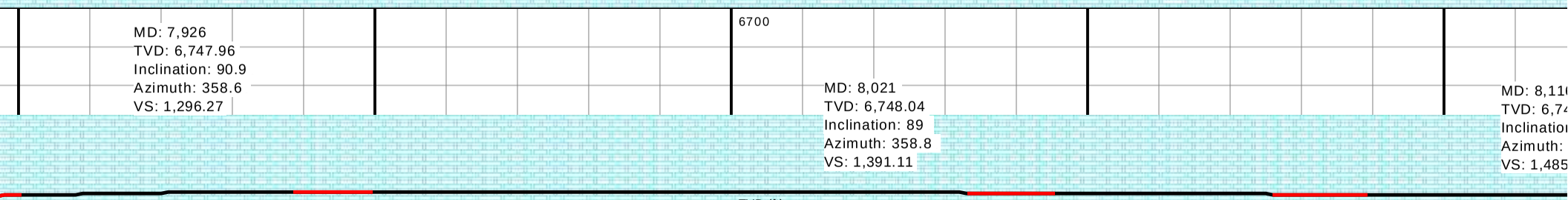
MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , abnt fos, intbd w/ CHK: m gy, sft, sb blky, rthy lstr, mot tex, v calc wi fos, n flor, tr inoc fos, occ sec cal, stmg bri yel cut, lt yel stn

CHK: lt-med gy, occ c blky, rthy lstr, v mot te intbd wi MRLST: m-dk rthy-sb wxy lstr, mot t fos, n flor, fast stmg b yel-brn stn



ROP (min/ft)
GAMMA (units)
5
250
0
0
130api
97api
95api
93ap
GAS (units)
C1-C4 (PPM)
CO2 (units)
8000
800000
100
0
0
0
6385u
6567u
60% C1
18% C2
14% C3
7% C4
IN 47/10.2+ OUT 44/9.9+
6478u
6523u
65% C1
17% C2
12% C3
7% C4
6540u
IN 47/10.2+ OUT 44/9.9+
Circulating Through Gas Buster
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
6700
TVD (ft)
MD: 7,735
TVD: 6,756.39
Inclination: 93.6
Azimuth: 355.6
VS: 1,106.14
MD: 7,831
TVD: 6,751.03
Inclination: 92.8
Azimuth: 357.5
VS: 1,201.55
rm, sft, sb plty - sb
x, v calc, wi tr fos,
gy, sft, sb blky,
ex, v calc , abnt
ri yel cut, mod
CHK: lt-med gy, occ crm, sft, sb plty - sb blky, rthy lstr, v mot tex, v calc, wi tr fos, intbd wi MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , abnt fos, n flor, fast stmg bri yel cut, mod yel-brn stn
CHK: lt-med gy, occ crm, sft, sb plty - sb blky, rthy lstr, v mot tex, v calc, wi tr fos, intbd wi MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , abnt fos, n flor, fast stmg bri yel cut, mod yel-brn stn
CHK: lt-med gy, occ crm, sft, sb plty - sb blky, rthy lstr, v mot tex, v calc, wi tr fos, intbd wi MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , abnt fos, n flor, fast stmg bri yel cut, mod yel-brn stn
CHK: lt-med gy, occ crm, sft, sb plty - s blky, rthy lstr, v mot tex, v calc, wi tr fo intbd wi MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , abnt fos, n flor, fast stmg bri yel cut, mod yel-brn stn



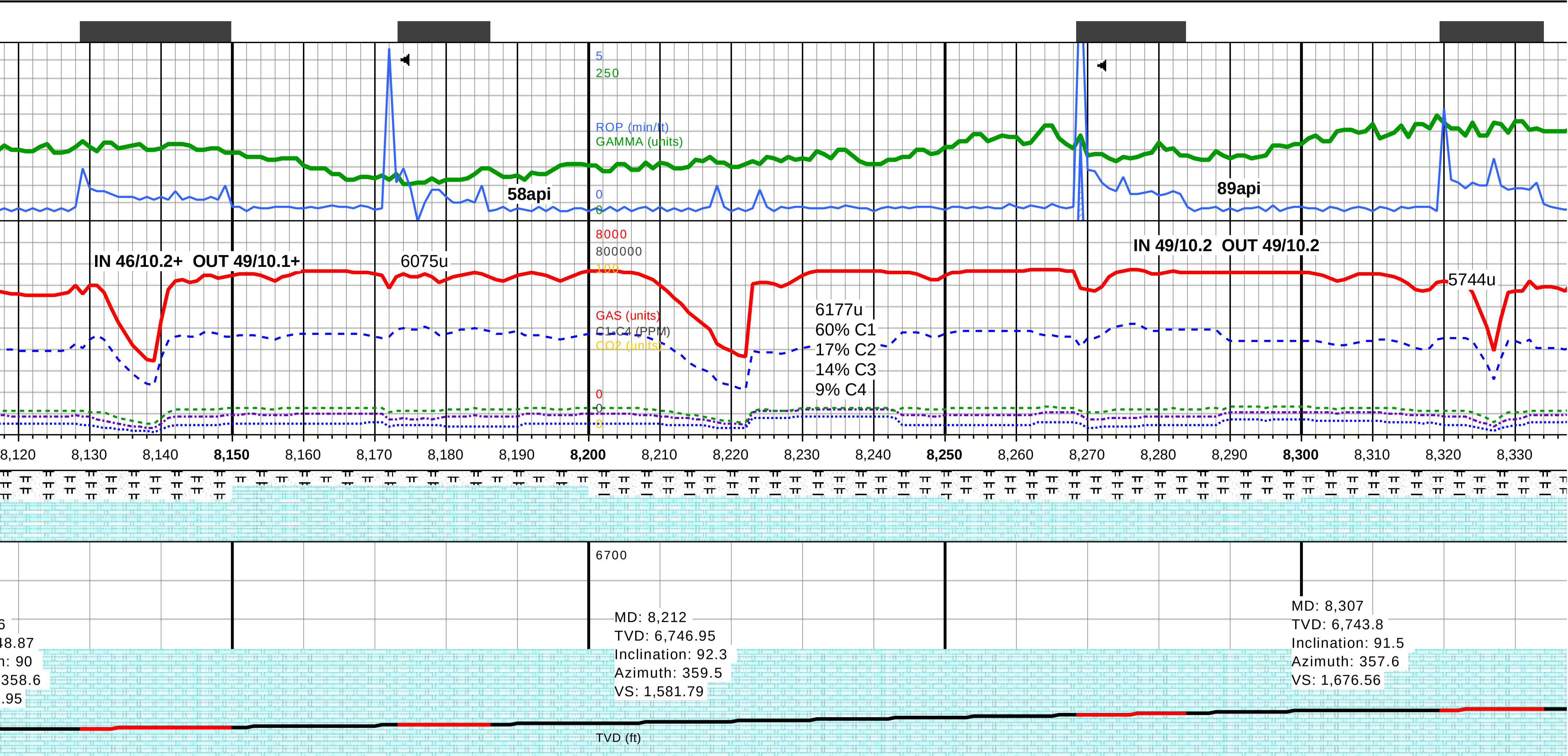


CHK: lt-med gy, occ crm, sft, sb plty - sb blky, rthy lstr, v mot tex, v calc, wi tr fos, intbd wi MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , abnt fos, n flor, fast stmg bri yel cut, mod yel-brn stn

CHK: lt-med gy, occ crm, sft, sb plty - sb blky, rthy lstr, v mot tex, v calc, intbd wi MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc ,sl tr fos, n flor, fast stmg bri yel cut, mod yel-brn stn

MRLST: m-dk gy, sft, sbv blky, rthy-sb wxy lstr, mot & sb grty tex, wi occ fos, intbd wi CHK: lt-m gy, sft, sb fis, blky, rthy, v calc wi occ fos, tr lt yel flor, stmg yel cut, lt yel stn.

MRLST: m-dk gy, sft, sbv blky, rthy-sb wxy lstr, mot & sb grty tex, wi occ fos, intbd wi CHK: lt-m gy, sft, sb fis, blky, rthy, v calc wi occ fos, tr lt yel flor, stmg yel cut, lt yel stn.

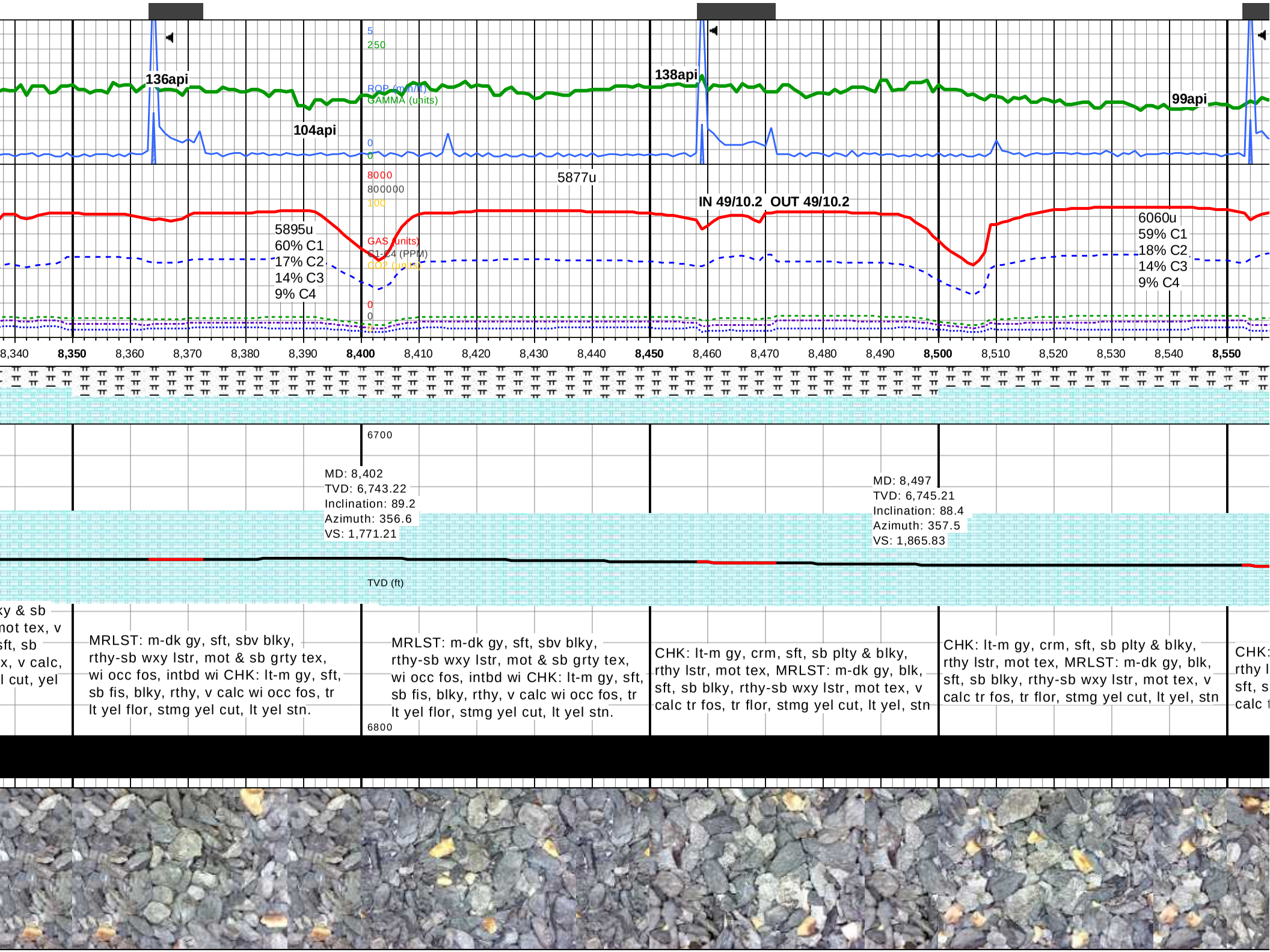


CHK: lt-med gy, occ crm, sft, sb plty - sb blky, rthy lstr, v mot tex, v calc, wi tr fos, intbd wi MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , abnt fos, n flor, fast stmg bri yel cut, mod yel-brn stn

CHK: lt-med gy, occ crm, sft, sb plty - sb blky, rthy lstr, v mot tex, v calc, wi tr fos, intbd wi MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , abnt fos, n flor, fast stmg bri yel cut, mod yel-brn stn

CHK: lt-med gy, occ crm, sft, sb plty - sb blky, rthy lstr, v mot tex, v calc, wi tr fos, intbd wi MRLST: m-dk gy, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc , abnt fos, n flor, fast stmg bri yel cut, mod yel-brn stn

CHK: lt-m gy, crm, sft, sb blk fis, rthy-sb wxy lstr, silty & r calc , MRLST: m-dk gy, blk, s blky, rthy-sb wxy lstr, mot te tr lt yel chk flor, fast stmg ye stn



ky & sb
not tex, v
sft, sb
x, v calc,
l cut, yel

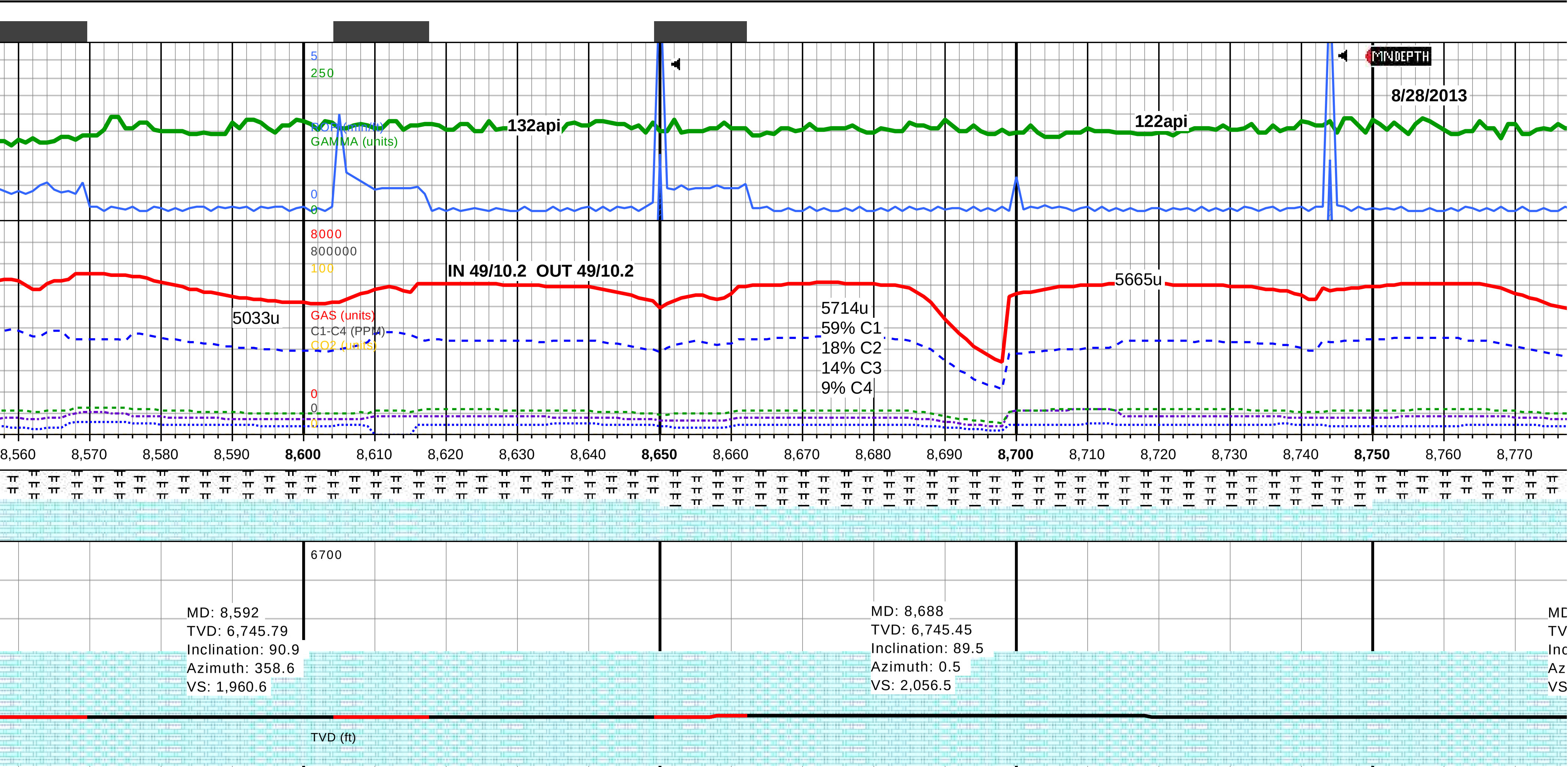
MRLST: m-dk gy, sft, sbv blky, rthy-sb wxy lstr, mot & sb grty tex, wi occ fos, intbd wi CHK: lt-m gy, sft, sb fis, blky, rthy, v calc wi occ fos, tr lt yel flor, stmg yel cut, lt yel stn.

MRLST: m-dk gy, sft, sbv blky, rthy-sb wxy lstr, mot & sb grty tex, wi occ fos, intbd wi CHK: lt-m gy, sft, sb fis, blky, rthy, v calc wi occ fos, tr lt yel flor, stmg yel cut, lt yel stn.

CHK: lt-m gy, crm, sft, sb plty & blky, rthy lstr, mot tex, MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc tr fos, tr flor, stmg yel cut, lt yel, stn

CHK: lt-m gy, crm, sft, sb plty & blky, rthy lstr, mot tex, MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc tr fos, tr flor, stmg yel cut, lt yel, stn

CHK:
rthy l
sft, s
calc t



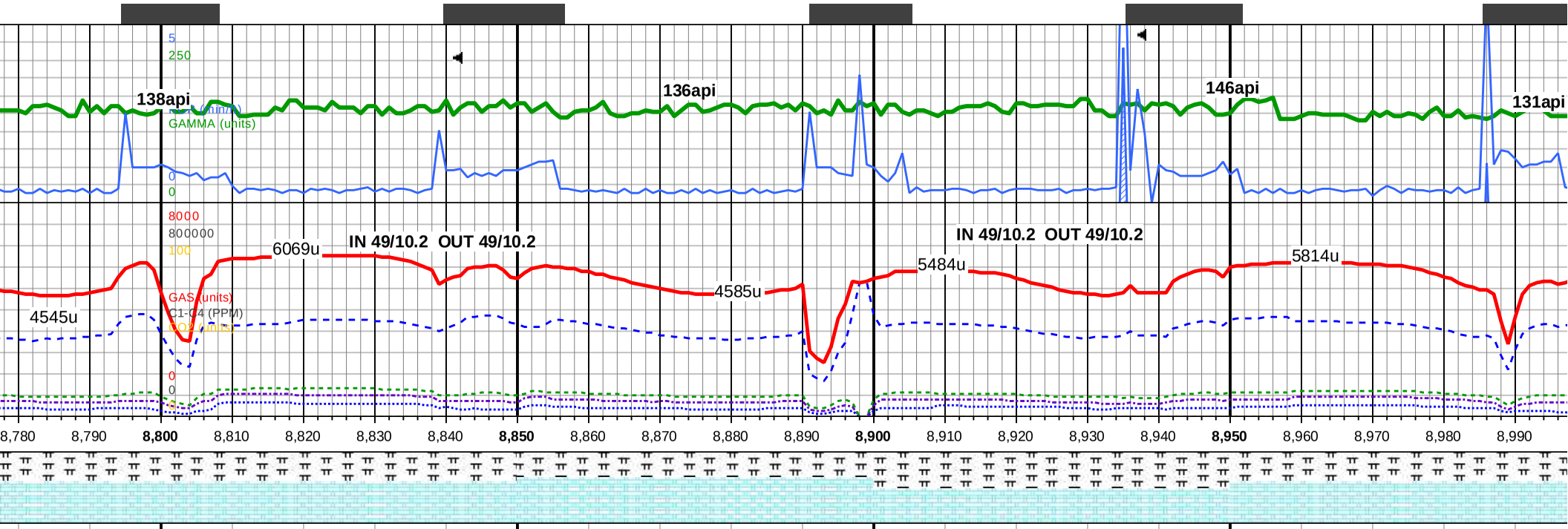
lt-m gy, crm, sft, sb plty & blky, str, mot tex, MRLST: m-dk gy, blk, b blky, rthy-sb wxy lstr, mot tex, v r fos, tr flor, stmg yel cut, lt yel, stn

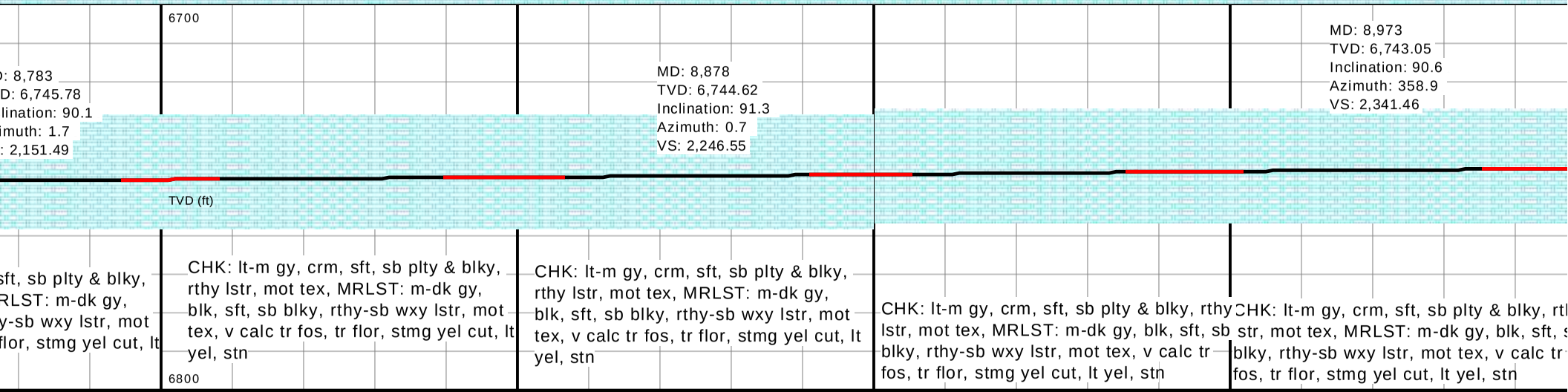
CHK: lt-m gy, crm, sft, sb plty & blky, rthy lstr, mot tex, MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc tr fos, tr flor, stmg yel cut, lt yel, stn

CHK: lt-m gy, crm, sft, sb plty & blky, rthy lstr, mot tex, MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc tr fos, tr flor, stmg yel cut, lt yel, stn

CHK: lt-m gy, crm, sft, sb plty & blky, rthy lstr, mot tex, MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc tr fos, tr flor, stmg yel cut, lt yel, stn

CHK: lt-m gy, crm, s[illegible] rthy lstr, mot tex, M[illegible] blk, sft, sb blky, rth[illegible] tex, v calc tr fos, tr [illegible] yel, stn





sft, sb plty & blky, RLST: m-dk gy, y-sb wxy lstr, mot flor, stmg yel cut, lt

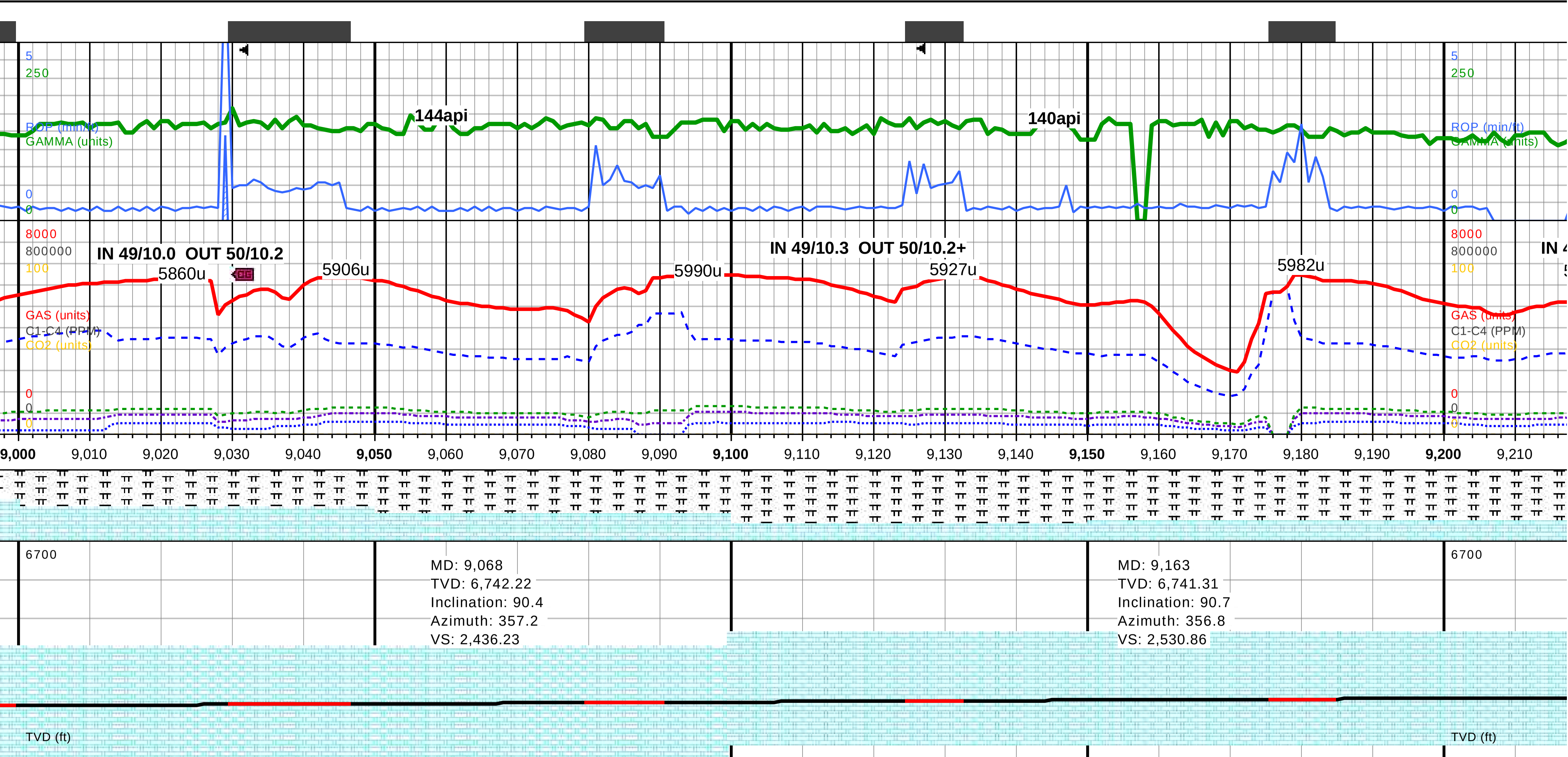
CHK: lt-m gy, crm, sft, sb plty & blky, rthy lstr, mot tex, MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc tr fos, tr flor, stmg yel cut, lt yel, stn

6800

CHK: lt-m gy, crm, sft, sb plty & blky, rthy lstr, mot tex, MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc tr fos, tr flor, stmg yel cut, lt yel, stn

CHK: lt-m gy, crm, sft, sb plty & blky, rthy lstr, mot tex, MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc tr fos, tr flor, stmg yel cut, lt yel, stn

CHK: lt-m gy, crm, sft, sb plty & blky, rt str, mot tex, MRLST: m-dk gy, blk, sft, blky, rthy-sb wxy lstr, mot tex, v calc tr fos, tr flor, stmg yel cut, lt yel, stn



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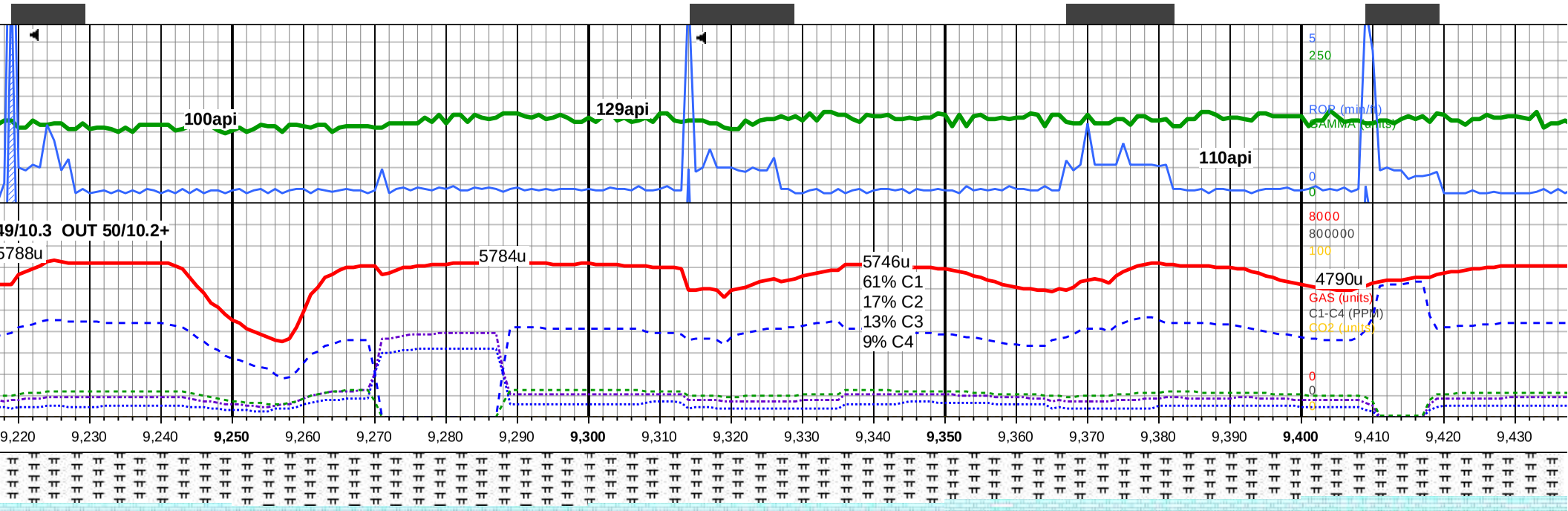
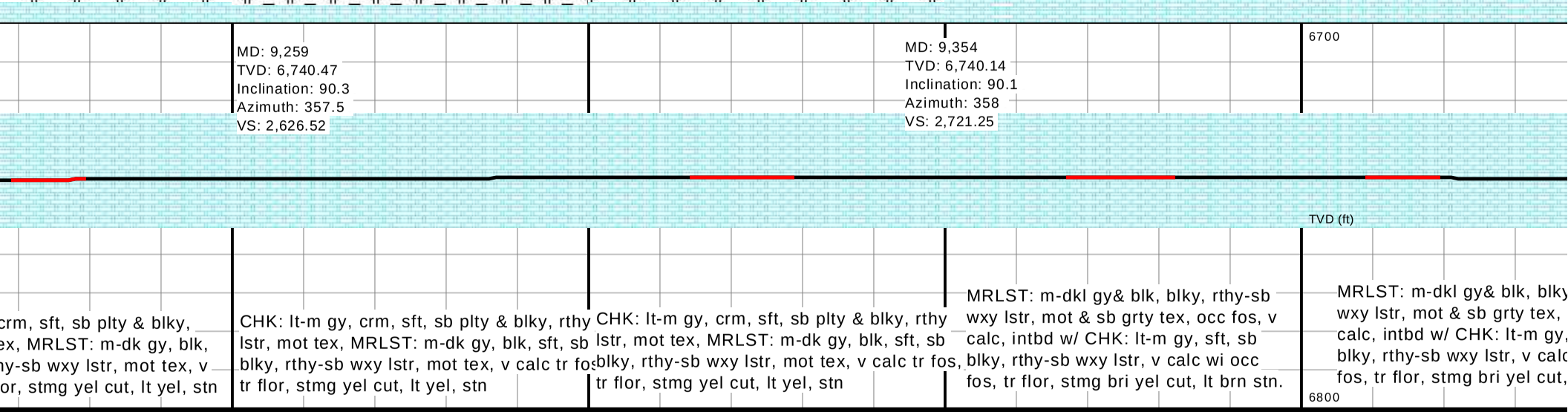
CHK: lt-m gy, crm, sft, sb plty & blky, rthy lstr, mot tex, MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc tr fos, tr flor, stmg yel cut, lt yel, stn

CHK: lt-m gy, crm, sft, sb plty & blky, rthy lstr, mot tex, MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc tr fos, tr flor, stmg yel cut, lt yel, stn

CHK: lt-m gy, crm, sft, sb plty & blky, rthy lstr, mot tex, MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc tr fos, tr flor, stmg yel cut, lt yel, stn





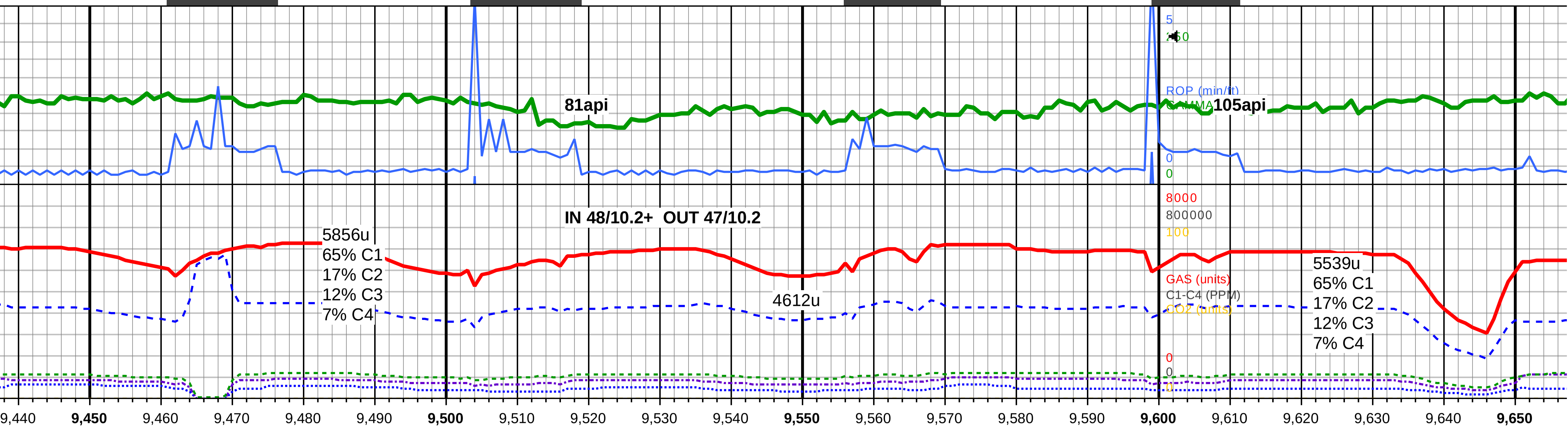
crm, sft, sb plty & blky, ex, MRLST: m-dk gy, blk, hy-sb wxy lstr, mot tex, v or, stmg yel cut, lt yel, stn

CHK: lt-m gy, crm, sft, sb plty & blky, rthy lstr, mot tex, MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc tr fos tr flor, stmg yel cut, lt yel, stn

CHK: lt-m gy, crm, sft, sb plty & blky, rthy lstr, mot tex, MRLST: m-dk gy, blk, sft, sb blky, rthy-sb wxy lstr, mot tex, v calc tr fos, tr flor, stmg yel cut, lt yel, stn

MRLST: m-dkl gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRLST: m-dkl gy& blk, blky wxy lstr, mot & sb grty tex, calc, intbd w/ CHK: lt-m gy, blky, rthy-sb wxy lstr, v calc fos, tr flor, stmg bri yel cut,



MD: 9,449
TVD: 6,740.47
Inclination: 89.5
Azimuth: 359.6
VS: 2,816.1

MD: 9,544
TVD: 6,739.22
Inclination: 92
Azimuth: 0.3
VS: 2,911.03

6700

MD: 9,640
TVD: 6,734.7
Inclination: 93.4
Azimuth: 358.8
VS: 3,006.83

TVD (ft)

6800

..., rthy-sb ... occ fos, v ... sft, sb ... c wi occ ... lt brn stn.

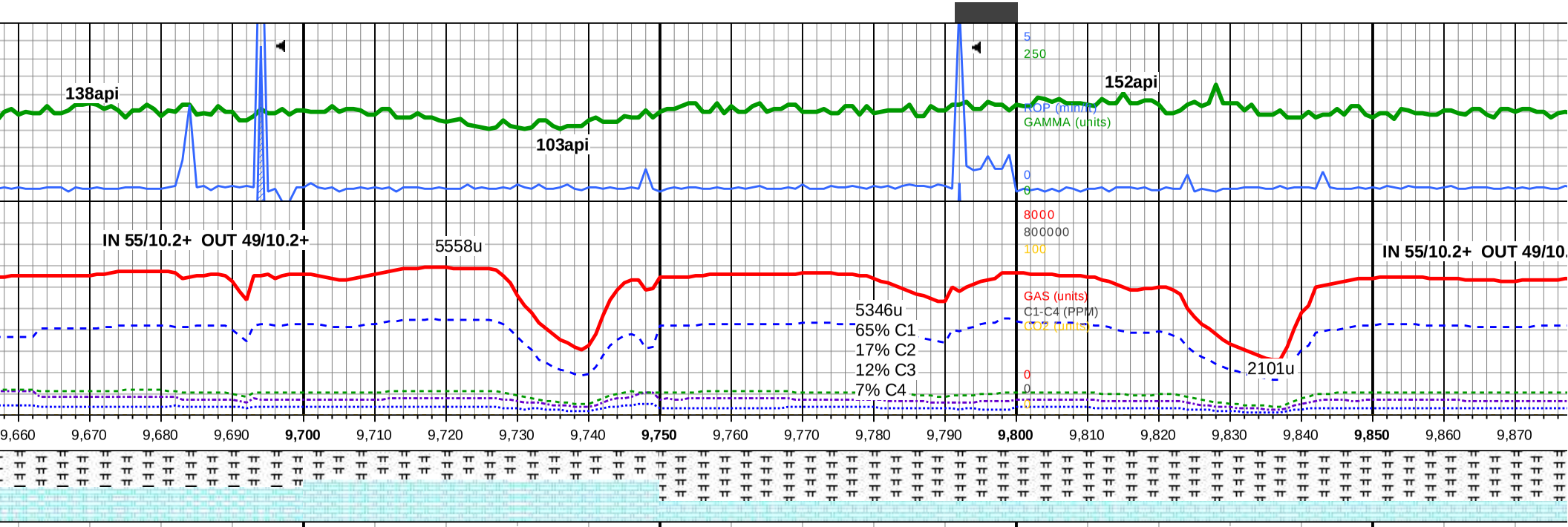
MRLST: m-dkl gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

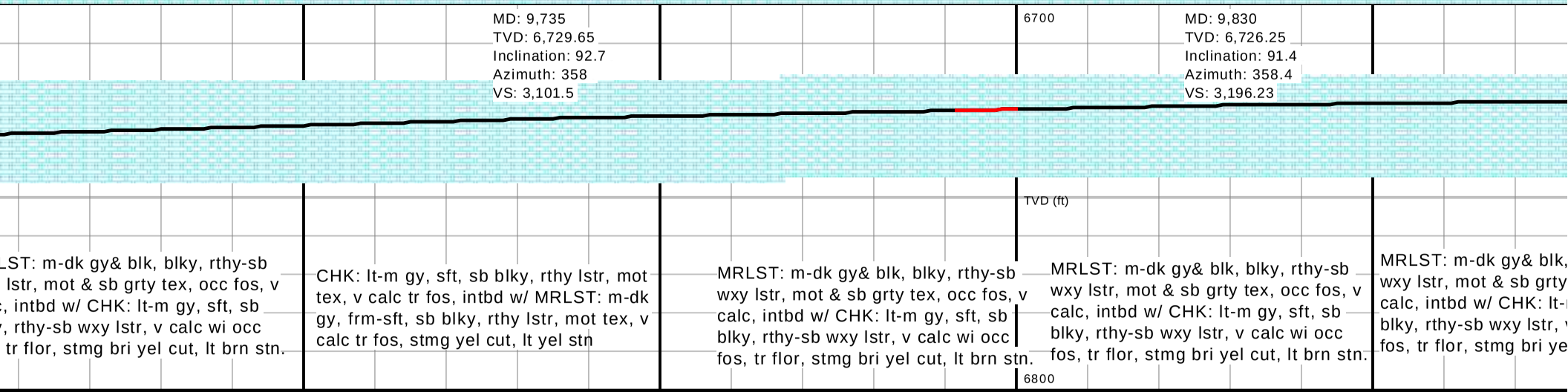
MRLST: m-dkl gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRLST: m-dkl gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRLST: m-dkl gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRl... wxy... calc... blky... fos,...





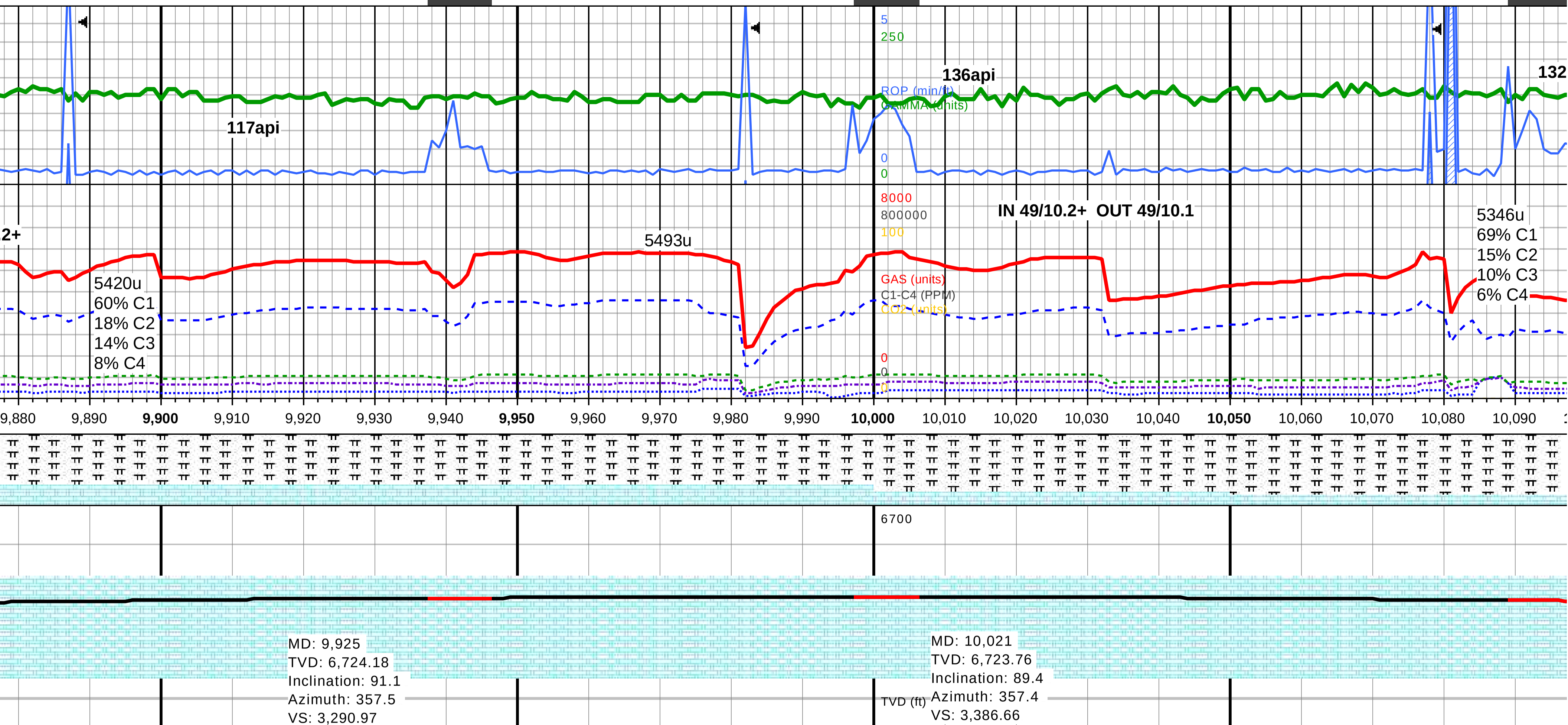
LST: m-dk gy& blk, blky, rthy-sb lstr, mot & sb grty tex, occ fos, v , intbd w/ CHK: lt-m gy, sft, sb , rthy-sb wxy lstr, v calc wi occ tr flor, stmg bri yel cut, lt brn stn.

CHK: lt-m gy, sft, sb blky, rthy lstr, mot tex, v calc tr fos, intbd w/ MRLST: m-dk gy, frm-sft, sb blky, rthy lstr, mot tex, v calc tr fos, stmg yel cut, lt yel stn

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRLST: m-dk gy& blk, wxy lstr, mot & sb grty calc, intbd w/ CHK: lt- blky, rthy-sb wxy lstr, fos, tr flor, stmg bri ye



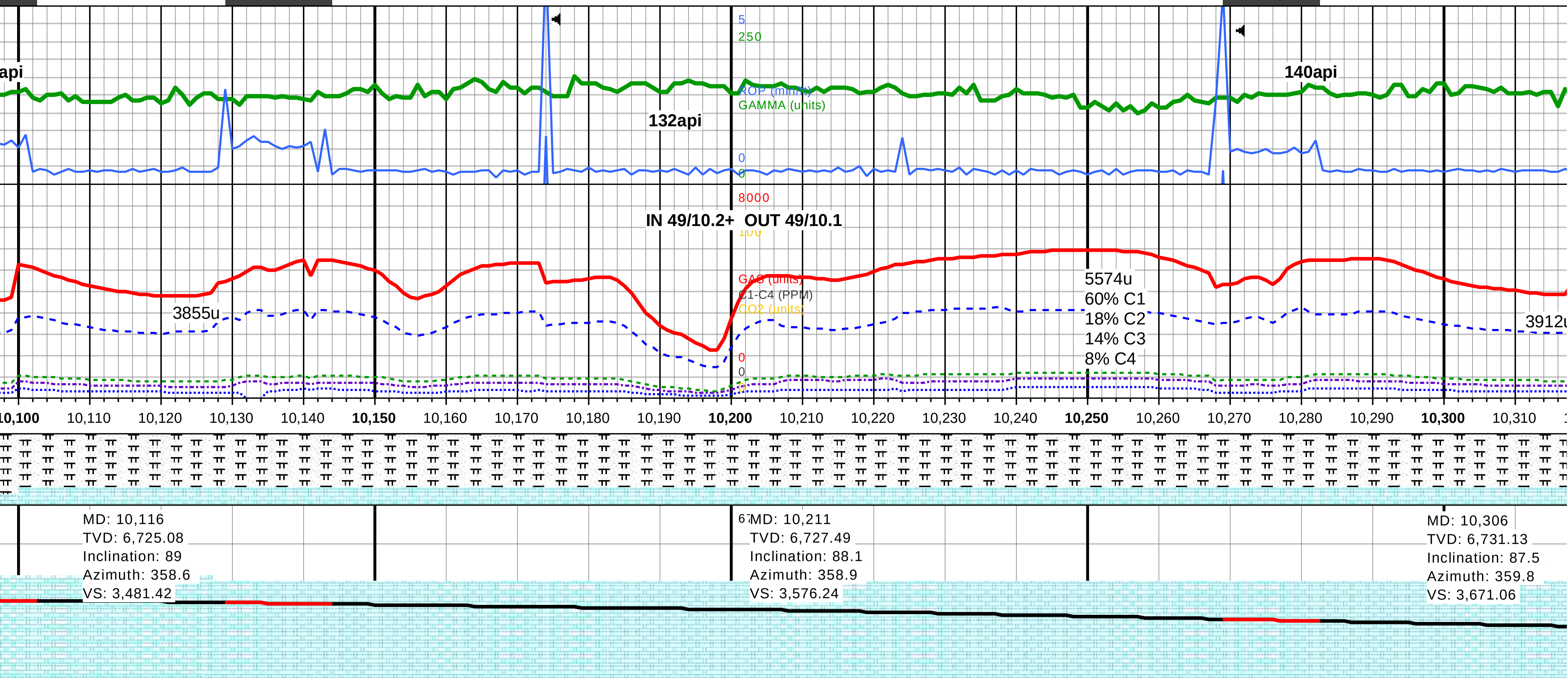
blky, rthy-sb
tex, occ fos, v
m gy, sft, sb
v calc wi occ
l cut, lt brn stn.

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn str



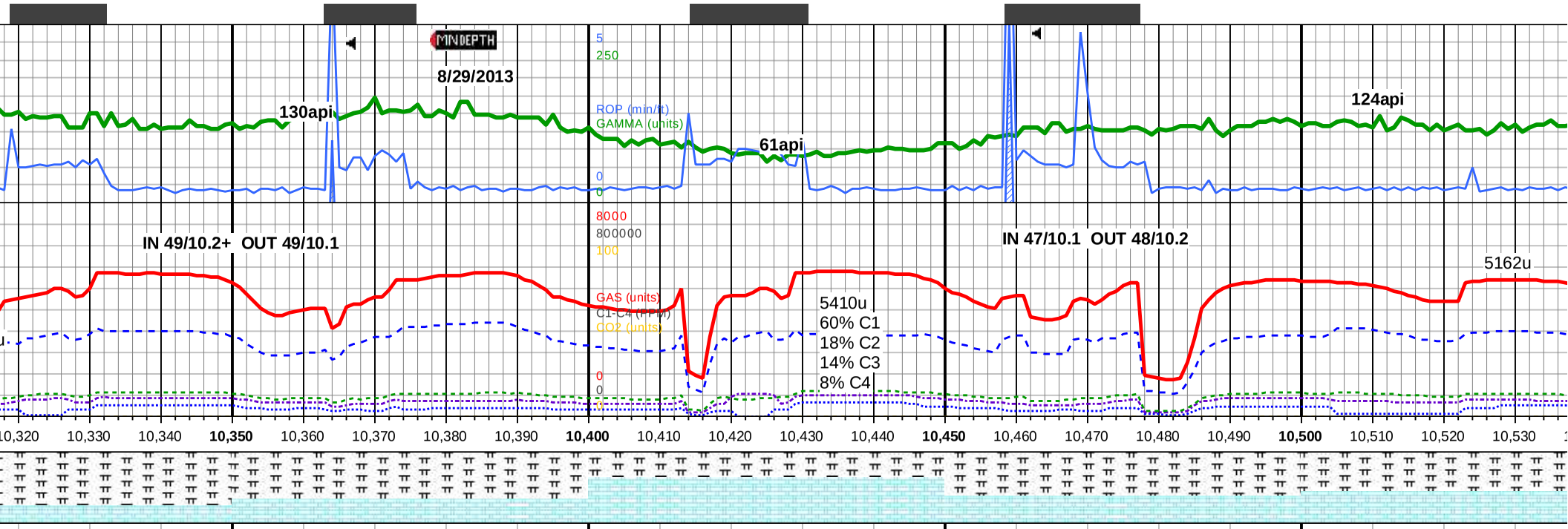
MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

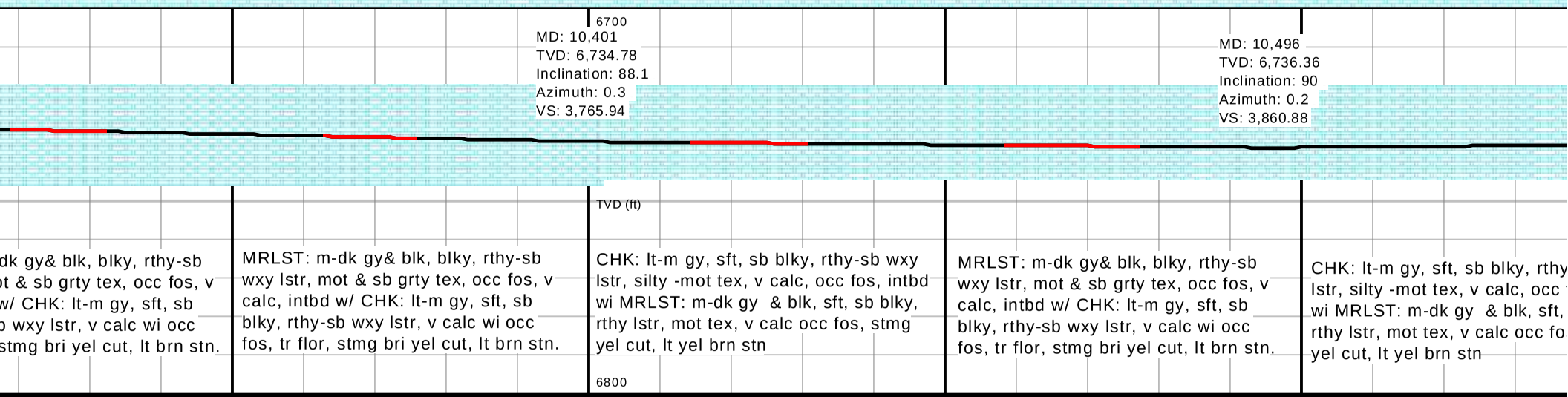
MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRLST: m- wxy lstr, mo calc, intbd blky, rthy-sl fos, tr flor,





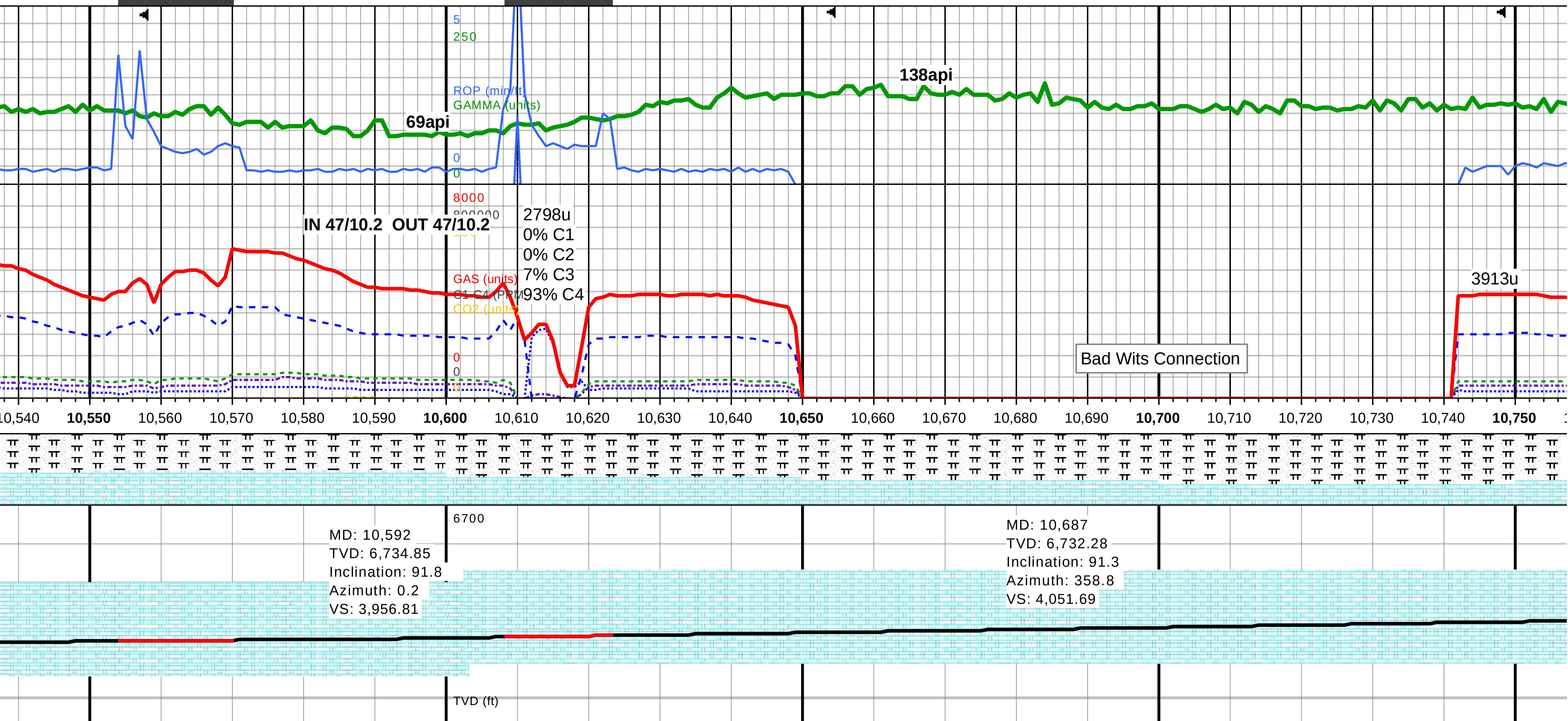
dk gy& blk, blky, rthy-sb
ot & sb grty tex, occ fos, v
w/ CHK: lt-m gy, sft, sb
b wxy lstr, v calc wi occ
stmg bri yel cut, lt brn stn.

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, silty -mot tex, v calc, occ fos, intbd wi MRLST: m-dk gy & blk, sft, sb blky, rthy lstr, mot tex, v calc occ fos, stmg yel cut, lt yel brn stn

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

CHK: lt-m gy, sft, sb blky, rthy
lstr, silty -mot tex, v calc, occ
wi MRLST: m-dk gy & blk, sft,
rthy lstr, mot tex, v calc occ fo
yel cut, lt yel brn stn



-sb wxy fos, intbd sb blky, s, stmg

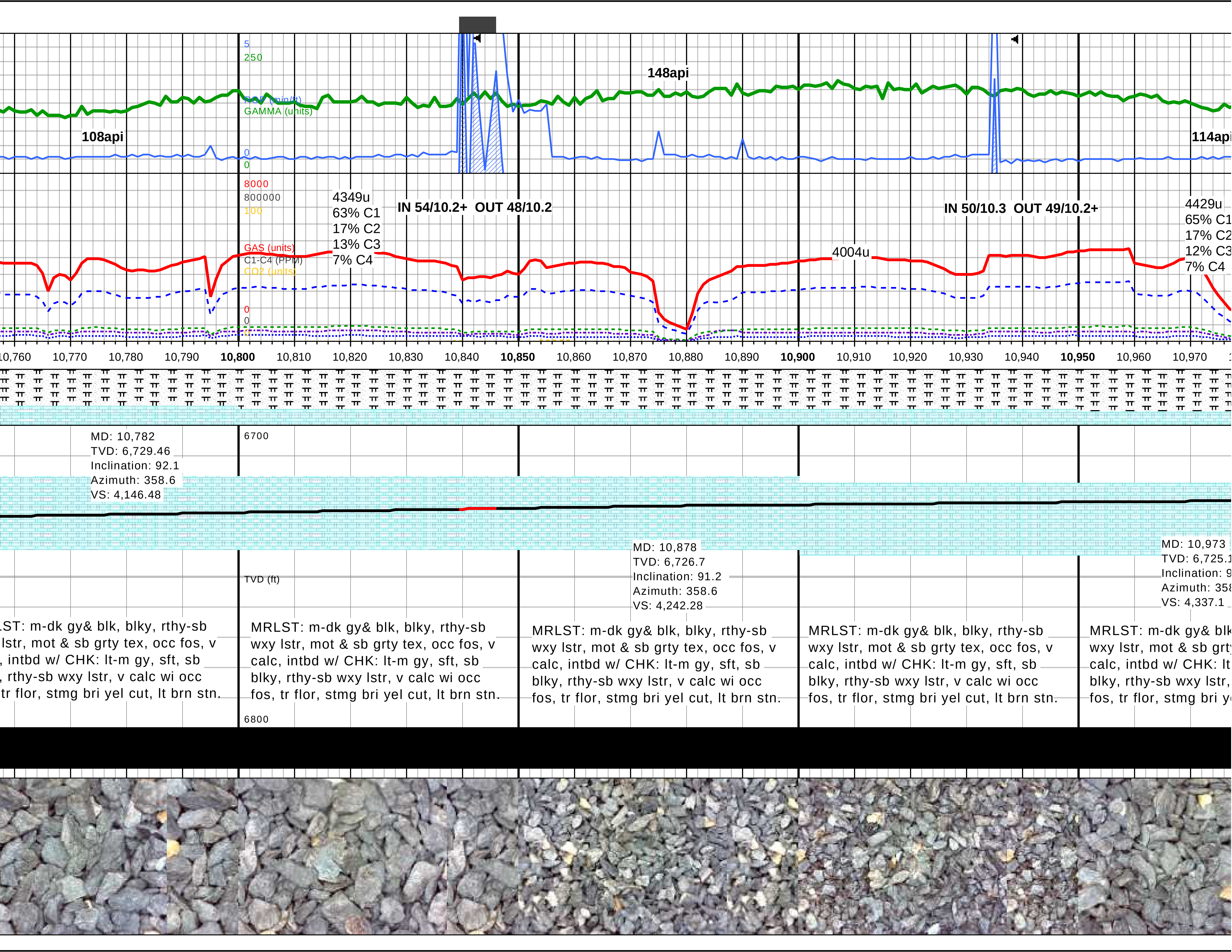
CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, silty -mot tex, v calc, occ fos, intbd wi MRLST: m-dk gy & blk, sft, sb blky, rthy lstr, mot tex, v calc occ fos, stmg yel cut, lt yel brn stn

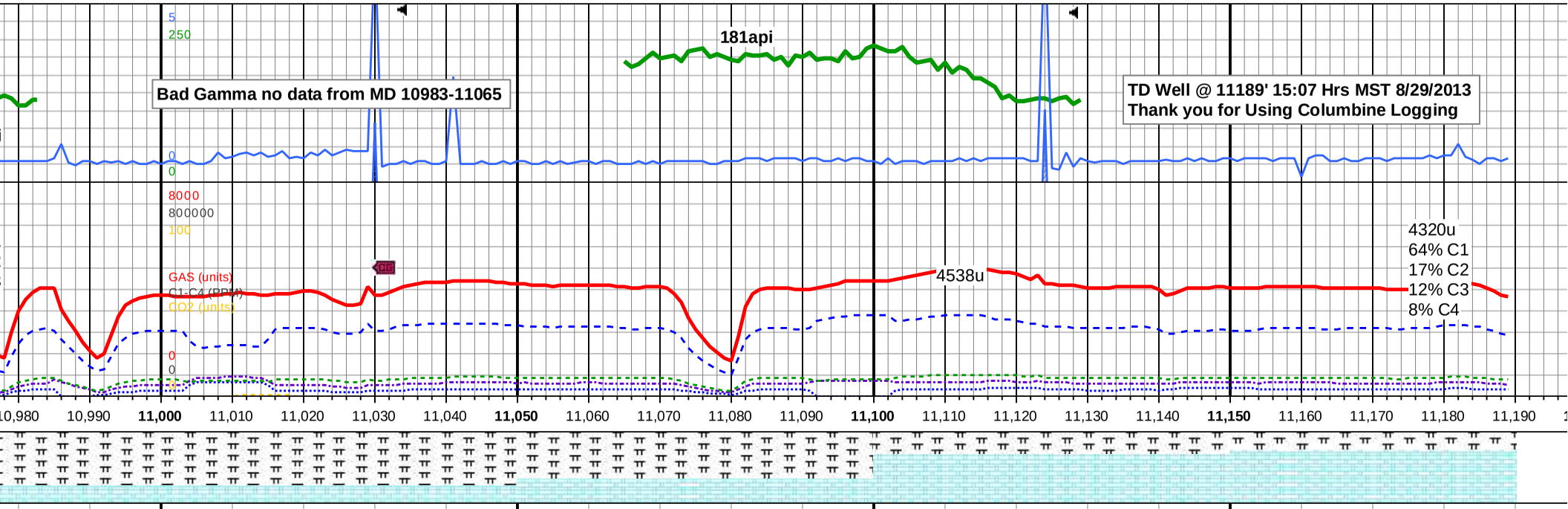
MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MRL wxy calc blky fos,


5
250
ROP (min/ft)
GAMMA (units)
0
0
108api
148api
114api
8000
800000
100
GAS (units)
C1-C4 (PPM)
CO2 (units)
0
0
0
4349u
63% C1
17% C2
13% C3
7% C4
IN 54/10.2+ OUT 48/10.2
4004u
IN 50/10.3 OUT 49/10.2+
4429u
65% C1
17% C2
12% C3
7% C4
10,760
10,770
10,780
10,790
10,800
10,810
10,820
10,830
10,840
10,850
10,860
10,870
10,880
10,890
10,900
10,910
10,920
10,930
10,940
10,950
10,960
10,970
MD: 10,782
TVD: 6,729.46
Inclination: 92.1
Azimuth: 358.6
VS: 4,146.48
6700
TVD (ft)
6800
MD: 10,878
TVD: 6,726.7
Inclination: 91.2
Azimuth: 358.6
VS: 4,242.28
MD: 10,973
LST: m-dk gy& blk, blky, rthy-sb lstr, mot & sb grty tex, occ fos, v , intbd w/ CHK: lt-m gy, sft, sb , rthy-sb wxy lstr, v calc wi occ tr flor, stmg bri yel cut, lt brn stn.
MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.
MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.
MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.



6700

TVD (ft)

6800

, blky, rthy-sb
y tex, occ fos, v
-m gy, sft, sb
v calc wi occ
el cut, lt brn stn.

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MD: 11,068
TVD: 6,724.21
Inclination: 90.4
Azimuth: 358.6
VS: 4,431.94

MRLST: m-dk gy& blk, blky, rthy-sb wxy lstr, mot & sb grty tex, occ fos, v calc, intbd w/ CHK: lt-m gy, sft, sb blky, rthy-sb wxy lstr, v calc wi occ fos, tr flor, stmg bri yel cut, lt brn stn.

MD: 11,129
TVD: 6,724
Inclination: 90
Azimuth: 358.6
VS: 4,492.82

CHK: lt gy, crm, sft, sb fis, sb blky, rthy-sb wxy lstr, mot tex, tr fos, v calc intbd wi MRLST: m-dk gy & blk, sft, sb blky, sb wxy lstr, mot tex, v calc stmg bri yel cut , lt brn stn.

MD: 11,189
TVD: 6,724
Inclination: 90
Azimuth: 358.6
VS: 4,552.72

CHK: lt gy, crm, sft, sb fis, sb blky, rthy-sb wxy lstr, mot tex, tr fos, v calc intbd wi MRLST: m-dk gy & blk, sft, sb blky, sb wxy lstr, mot tex, v calc stmg bri yel cut , lt brn stn.