



**Scale 1:200 Imperial  
Measured Depth Log**

**Well Name:** Howard 24N-22HZ  
**Location:** Weld County, CO.  
**License Number:** 05123382330000  
**Spud Date:** 10/20/13  
**Surface Coordinates:** 800'FSL & 905'FEL, SEC.27, T1N-R67W  
**Region:** Weld County  
**Drilling Completed:** 10/28/13  
**Bottom Hole Coordinates:** 2175'FSL & 916'FEL, SEC.22, T1N-R67W  
**Ground Elevation (ft):** 5068' **K.B. Elevation (ft):** 5084'  
**Logged Interval (ft):** 7650' **To:** 14800' **Total Depth (ft):** 14800'  
**Formation:** Niobrara B  
**Type of Drilling Fluid:** Water Based

Printed by HORIZONTAL.LOG from WellSight Systems 1-800-447-1534 [www.WellSight.com](http://www.WellSight.com)

**OPERATOR**

**Company:** Anadarko Petroleum Corporation  
**Address:** Granite Tower  
1099 18th St., Suite 1800  
Denver, CO 80202

## GEOLOGIST

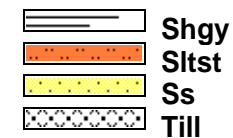
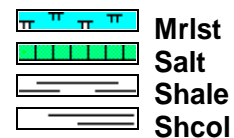
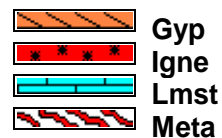
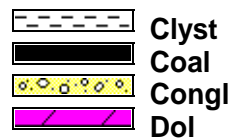
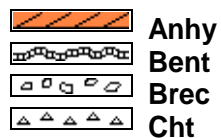
Name: Scott Crozier / Ben Thompson  
Company: Great Divide Consulting, Inc.  
Address: P.O. Box 630263  
Highlands Ranch, CO 80163

## Cores

## DSTs

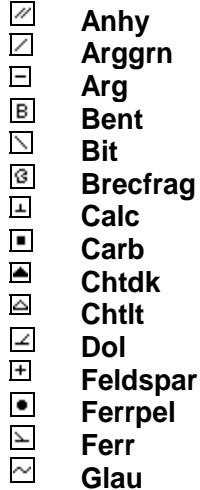
## Comments

## ROCK TYPES

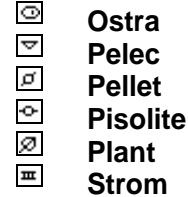
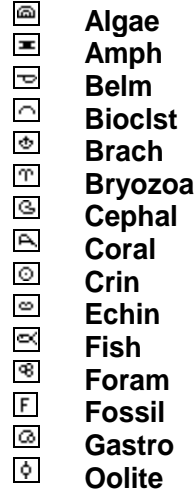


## ACCESSORIES

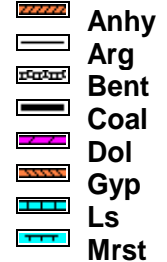
### MINERAL



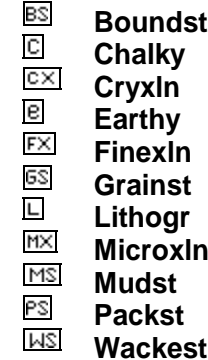
### FOSSIL










### STRINGER



### TEXTURE







**POROSITY**

 Earthy  
 Fenest  
 Fracture  
 Inter  
 Moldic  
 Organic  
 Pinpoint

**Vuggy****SORTING**

 Well  
 Moderate  
 Poor



**OTHER SYMBOLS****ROUNDING**

 Rounded  
 Subrnd  
 Subang  
 Angular


**OIL SHOW**

 Even

**Spotted**

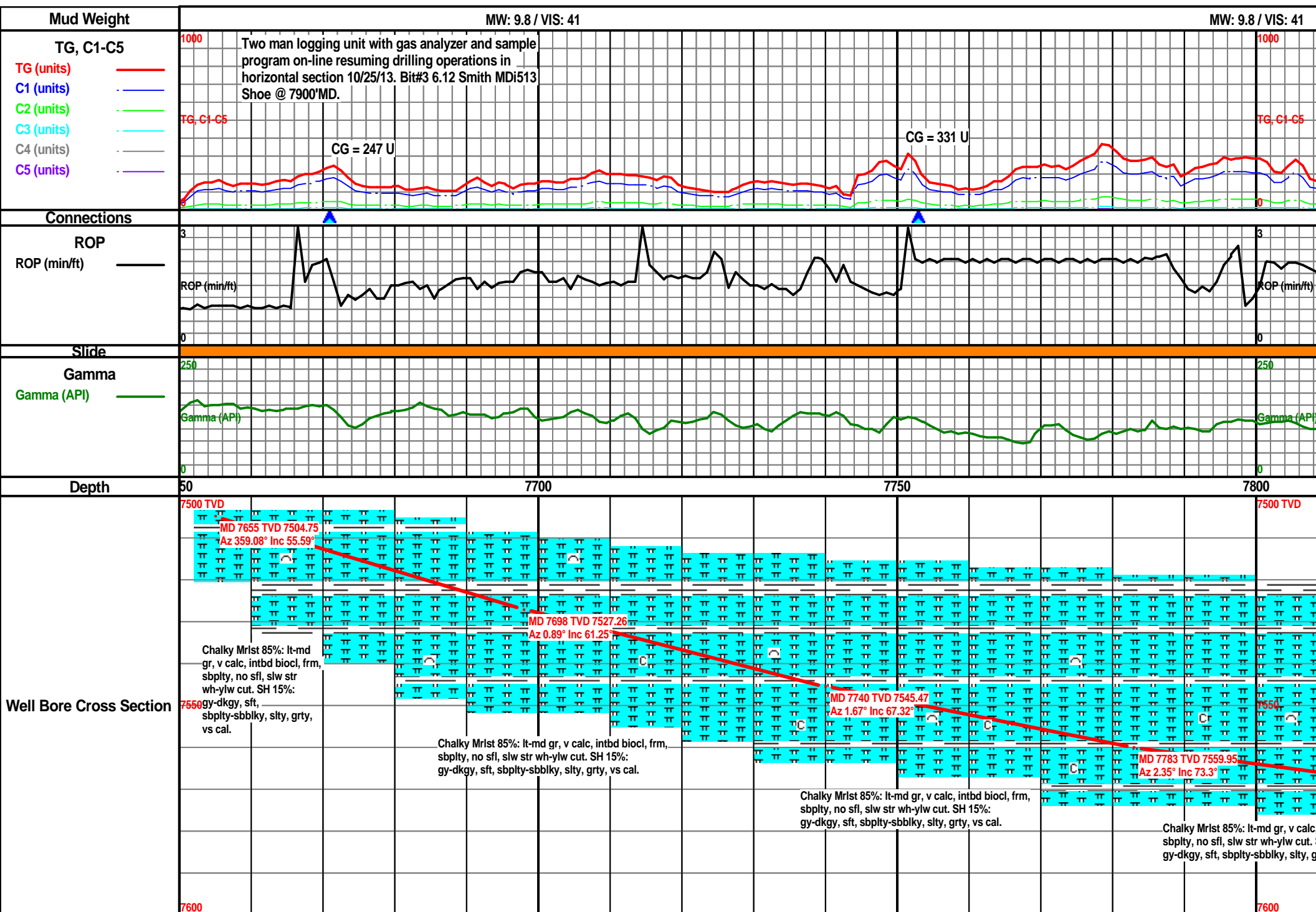
 Ques  
 Dead

**INTERVAL**

 Core  
 Dst

**EVENT**

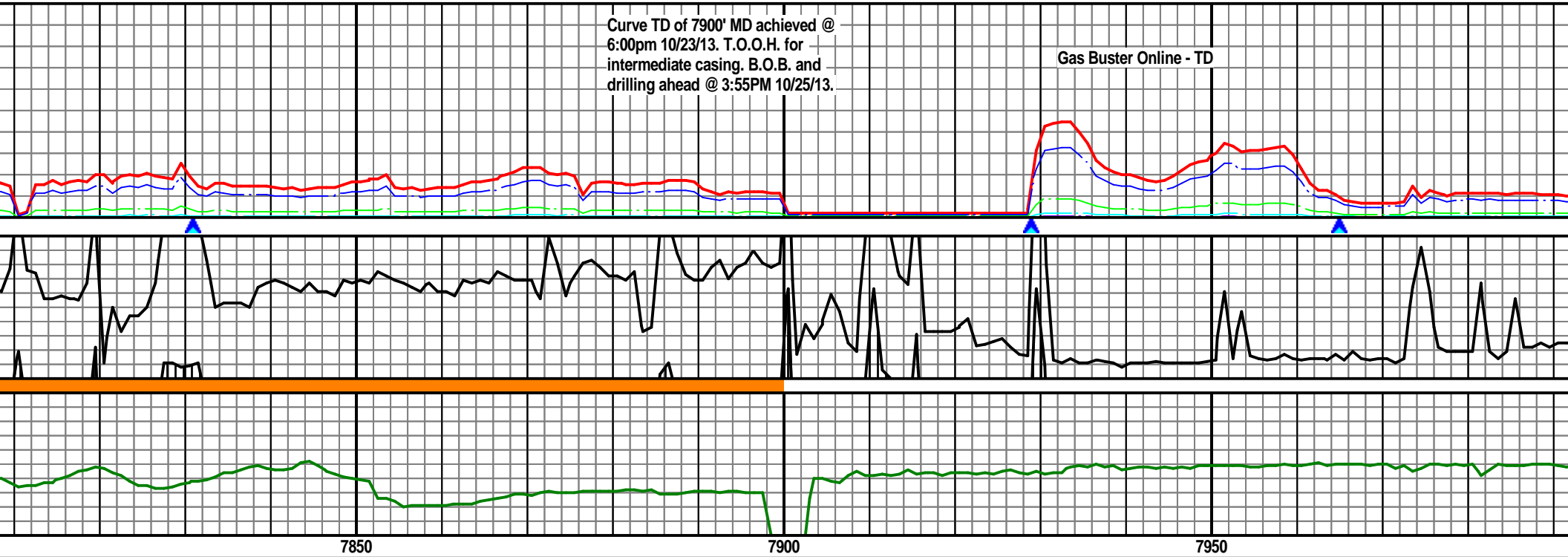
 Rft  
 Connection



MW: 9.8 / VIS: 40

Curve TD of 7900' MD achieved @  
6:00pm 10/23/13. T.O.O.H. for  
intermediate casing. B.O.B. and  
drilling ahead @ 3:55PM 10/25/13.

Gas Buster Online - TD

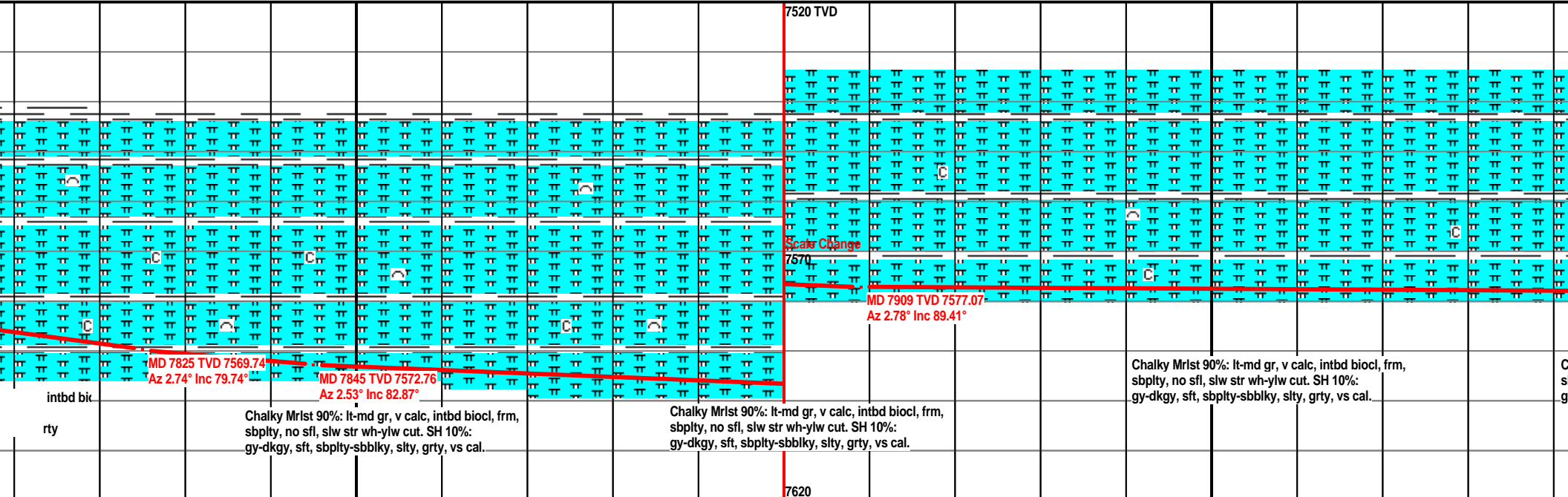


7850

7900

7950

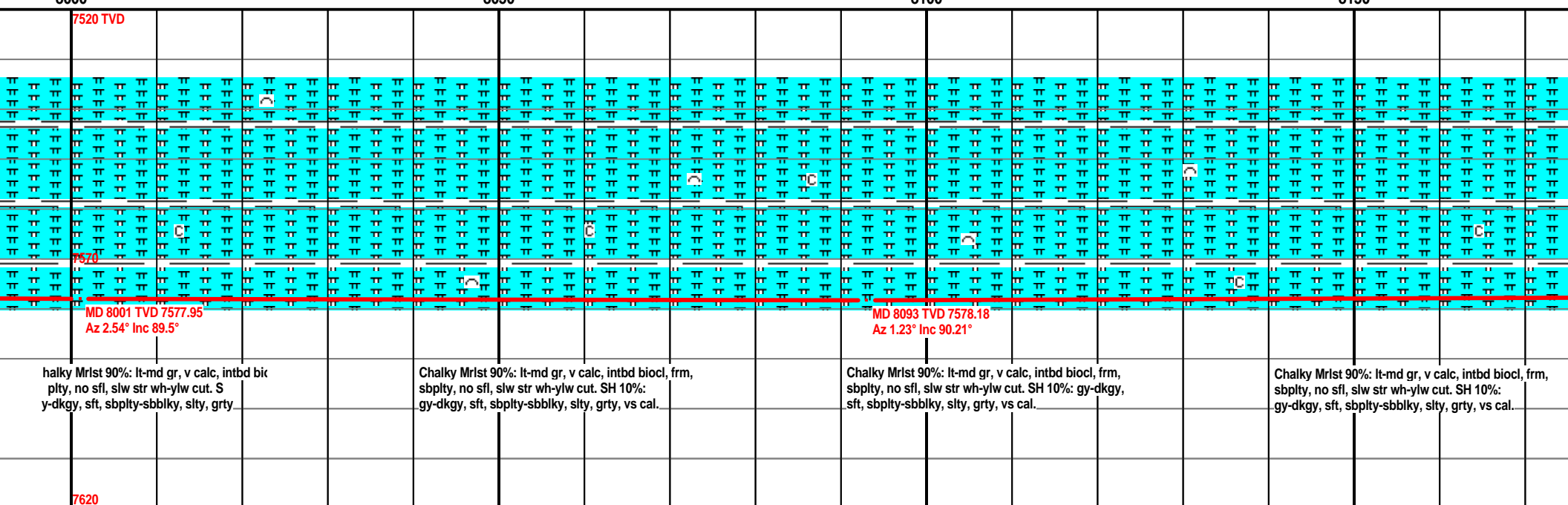
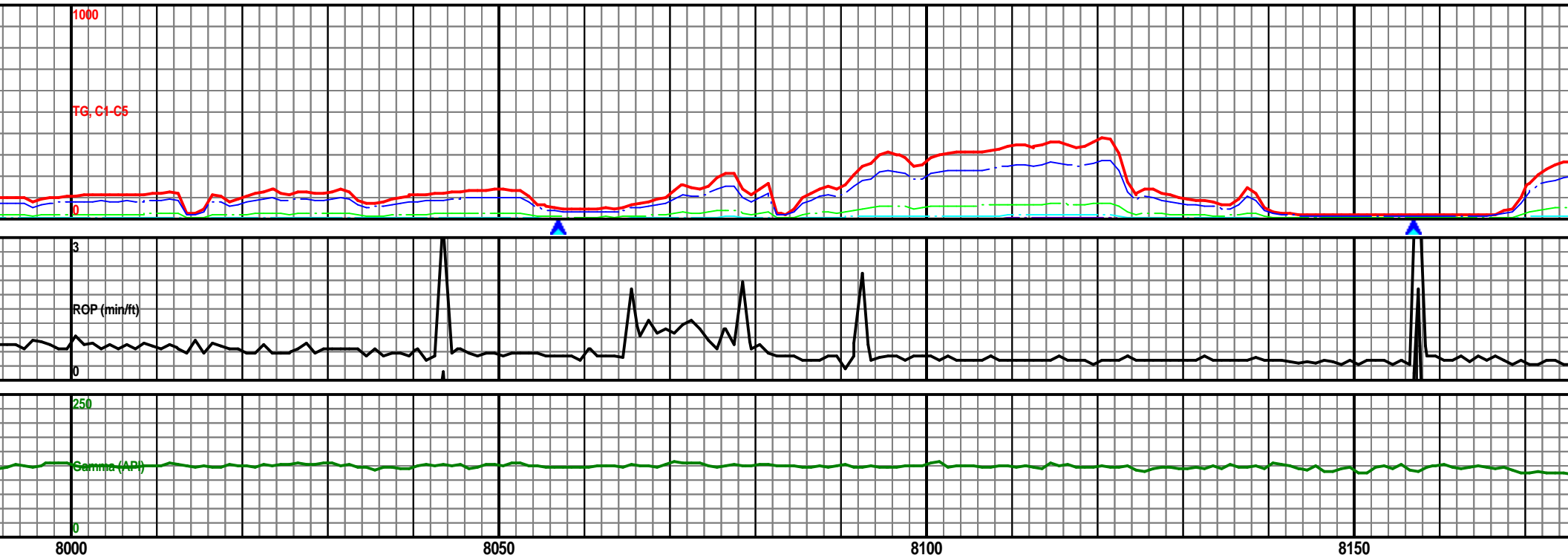
7520 TVD



7620

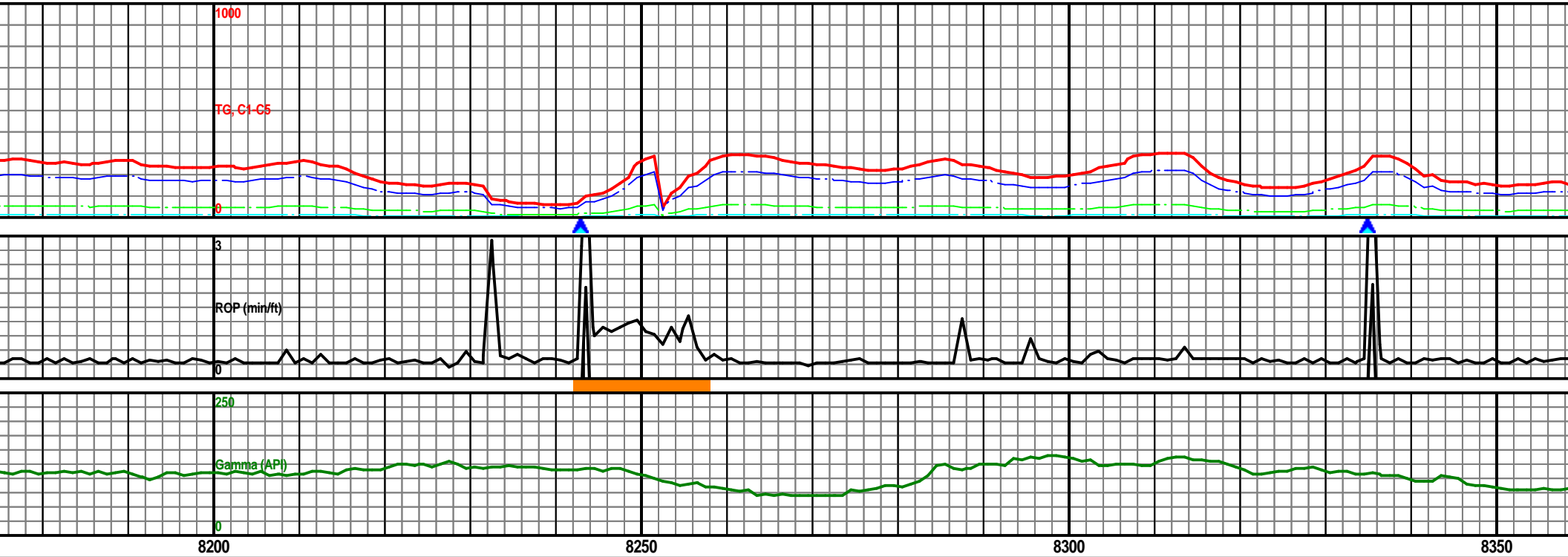
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MW: 9.0 / VIS: 42

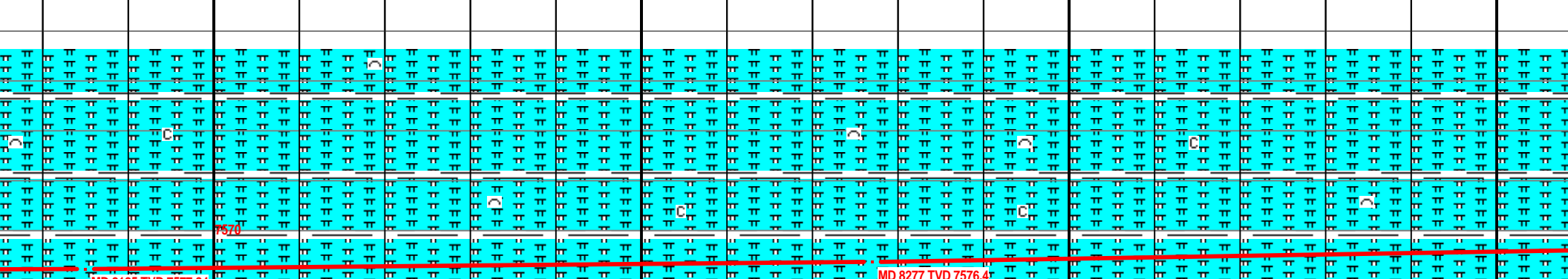


MW: 9.0 / VIS: 42

MW: 8.8 / VIS: 39



7520 TVD

MD 8185 TVD 7577.84  
Az 0.39° Inc 90.22°MD 8277 TVD 7576.4  
Az 359.83° Inc 91.57°

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm, sbpity, no sfl, slw str wh-yiw cut. SH 10%: gy-dkgy, sft, sbpity-sbbiky, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm, sbpity, no sfl, slw str wh-yiw cut. SH 10%: gy-dkgy, sft, sbpity-sbbiky, slty, grty, vs cal.

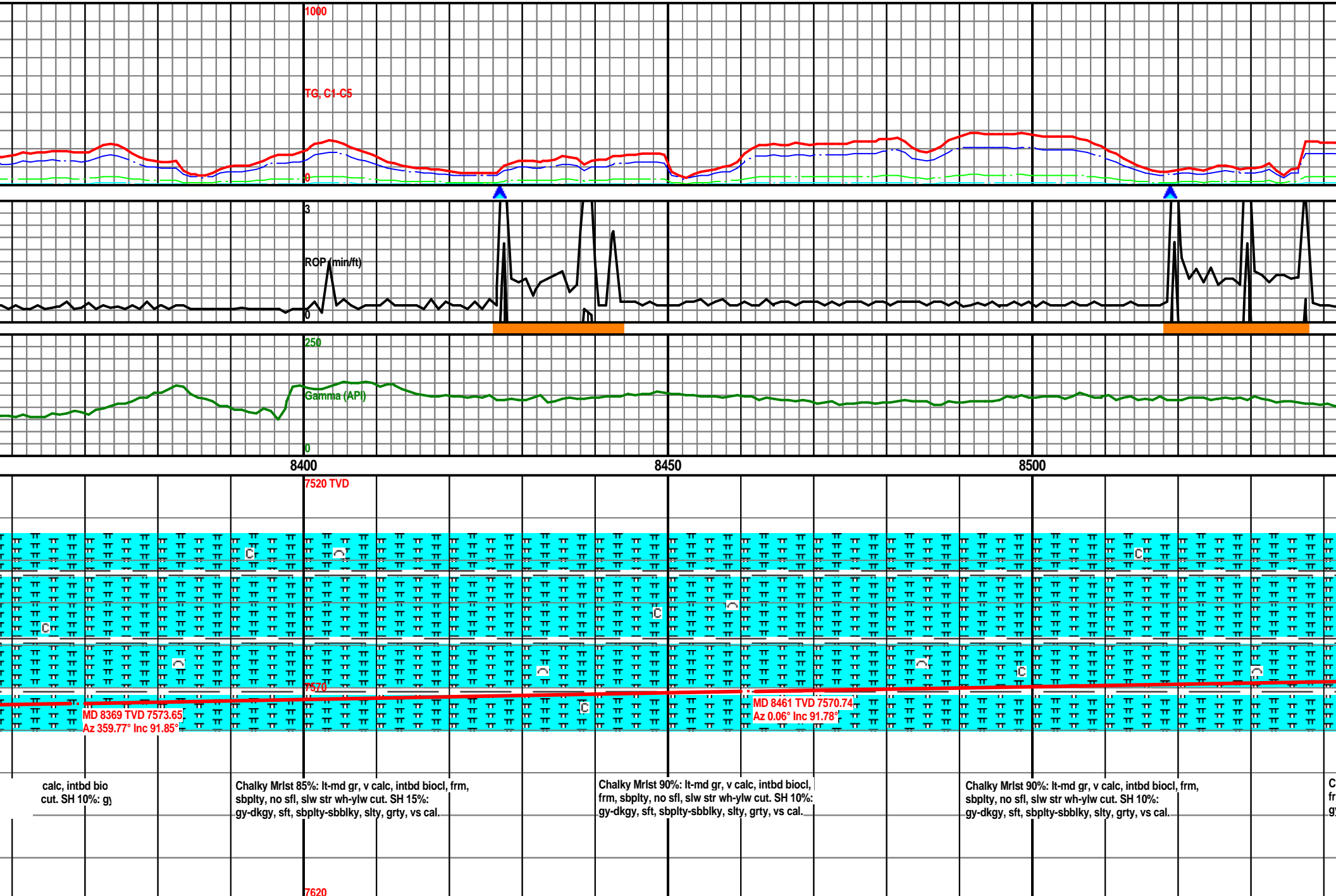
Chalky Mrlst 85%: lt-md gr, v calc, intbd biocl, frm, sbpity, no sfl, slw str wh-yiw cut. SH 15%: gy-dkgy, sft, sbpity-sbbiky, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm, sbpity, no sfl, slw str wh-yiw cut. SH 10%: gy-dkgy, sft, sbpity-sbbiky, slty, grty, vs cal.

7620

MW: 8.6 / VIS: 39

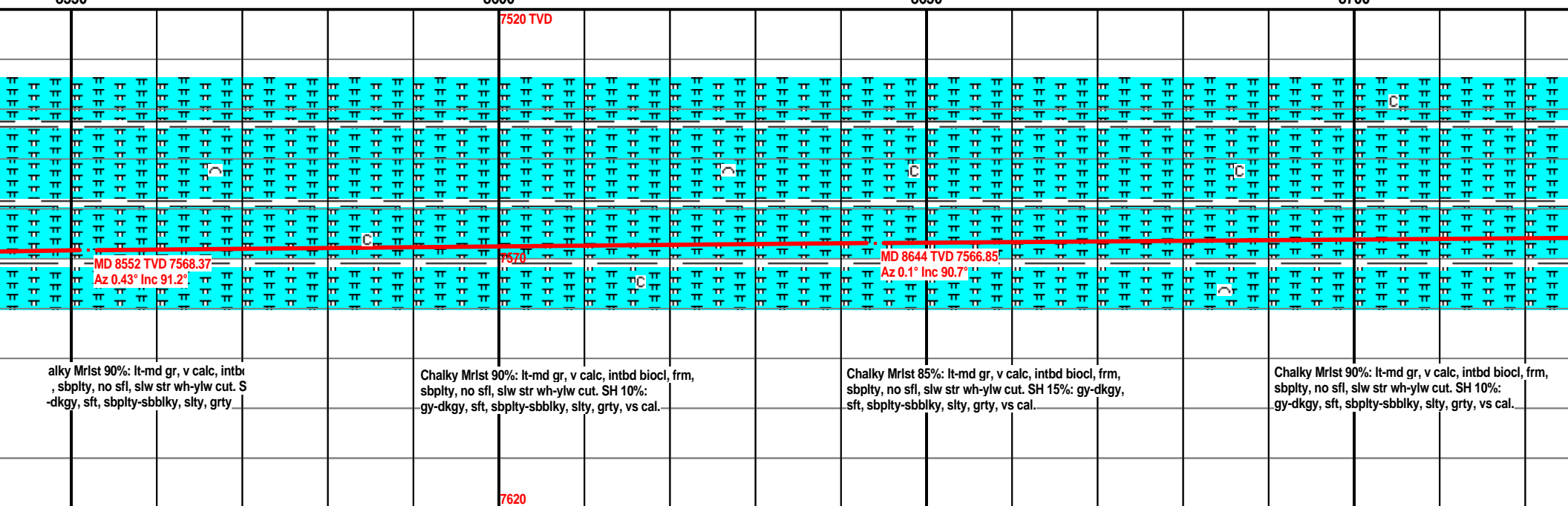
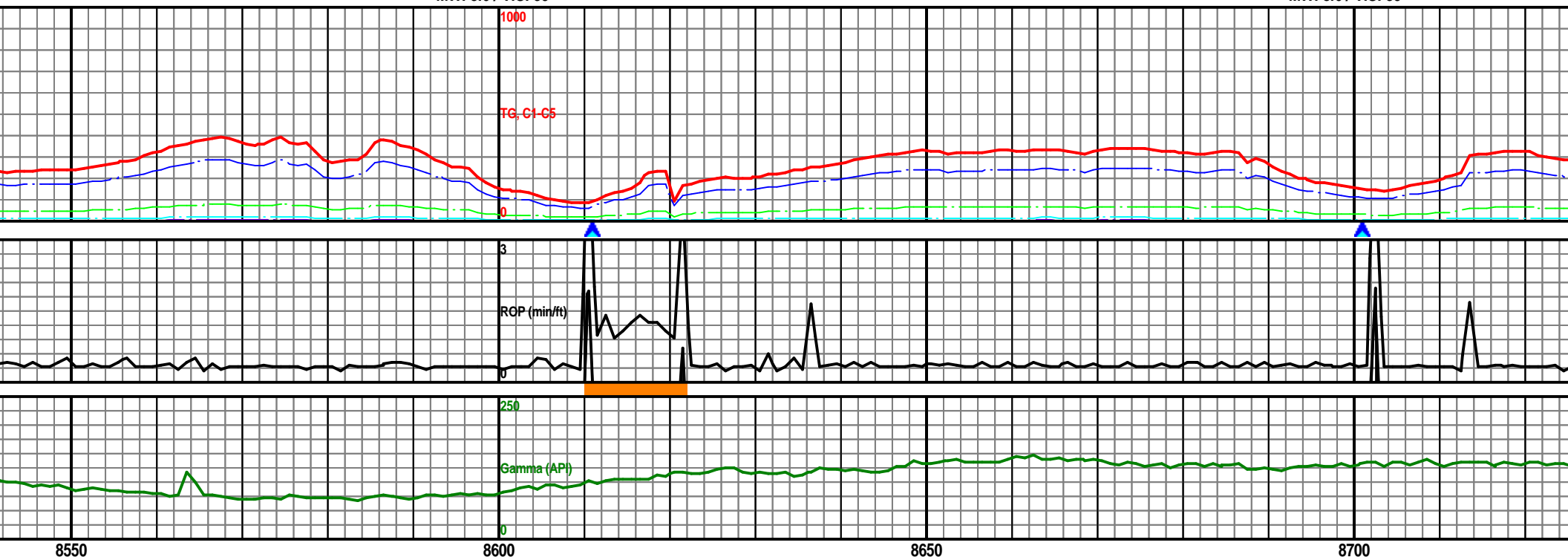
MW: 8.6 / VIS: 39





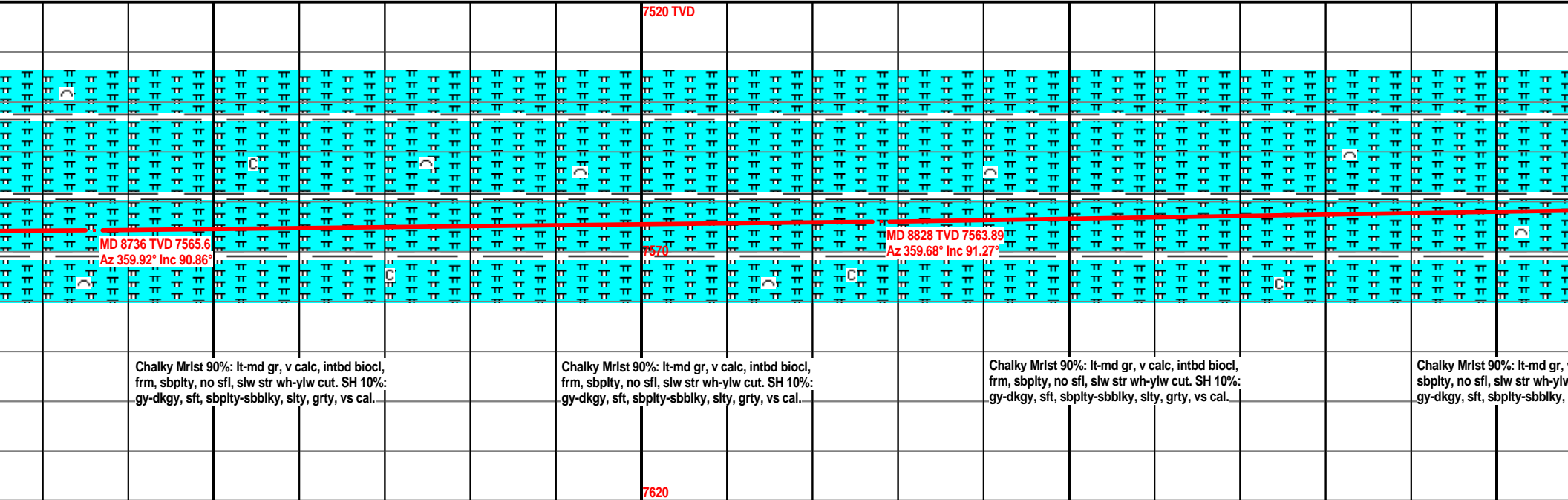
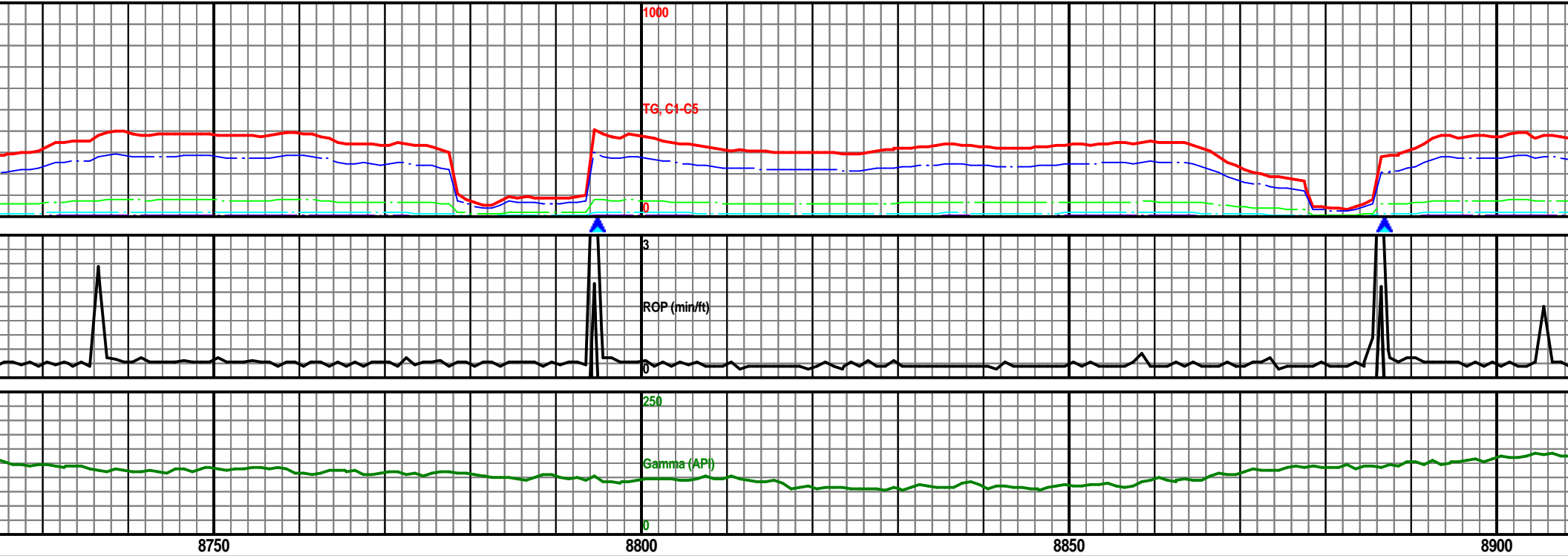
MW: 8.6 / VIS: 39

MW: 8.6 / VIS: 39

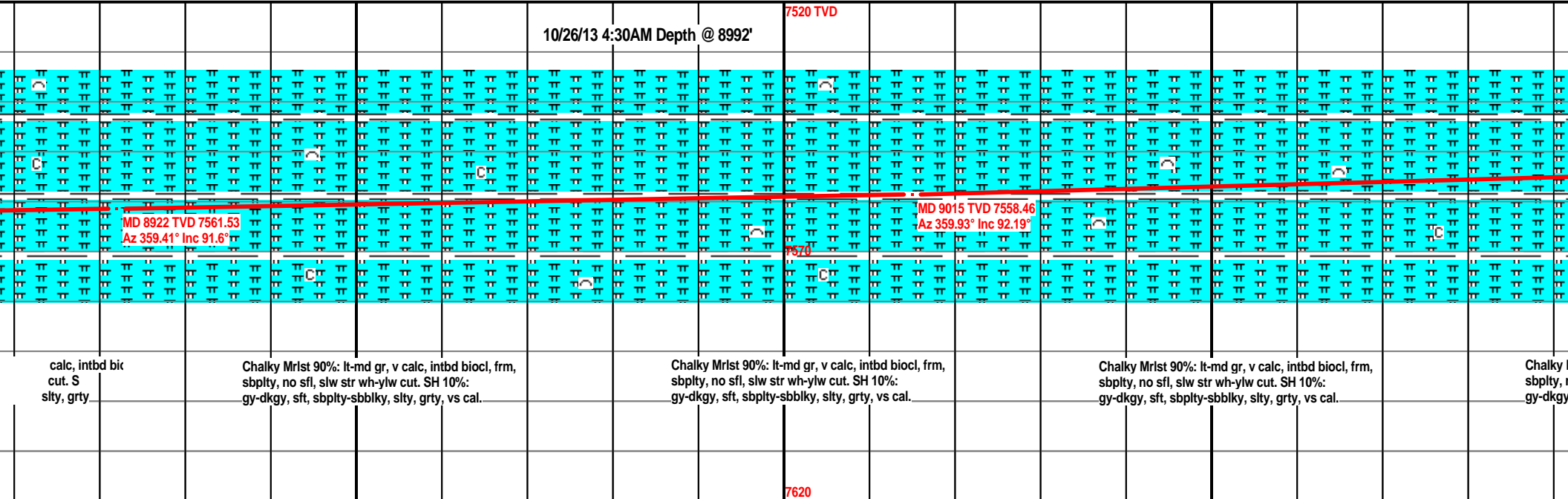
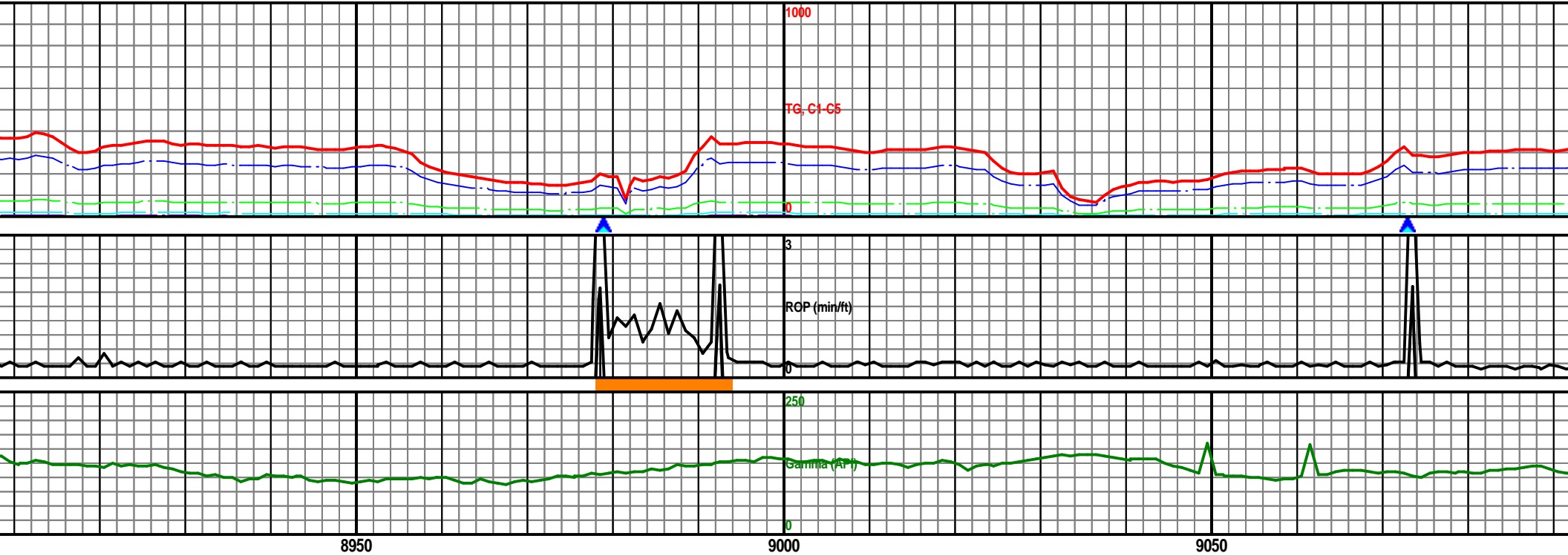


MW: 8.6 / VIS: 39

MW: 8.7 / VIS: 40

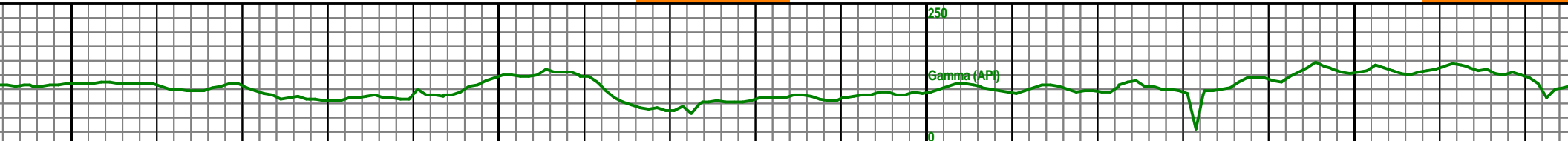
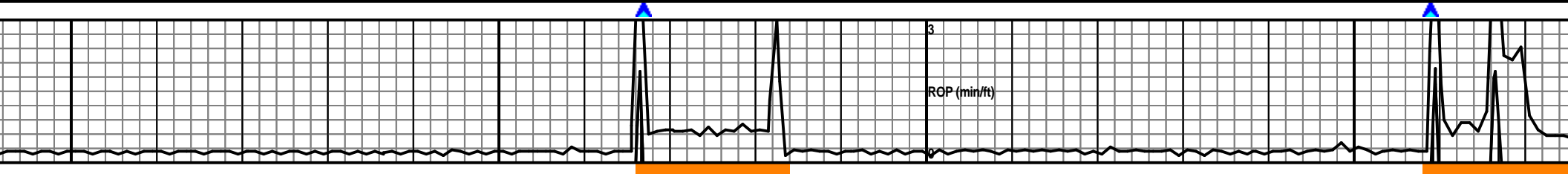
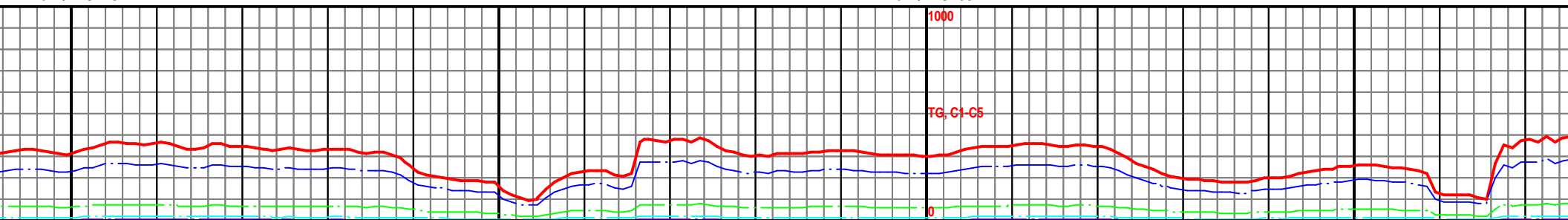


MW: 8.7 / VIS: 40

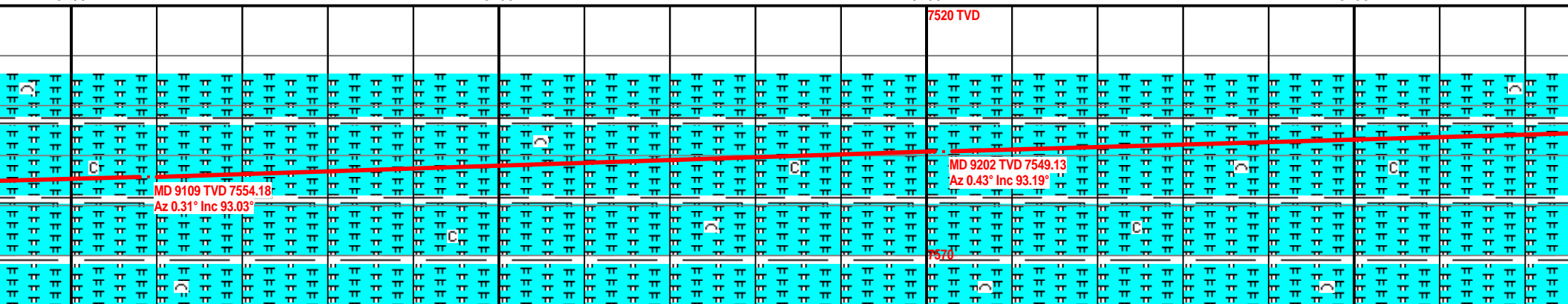


MW: 8.7 / VIS: 40

MW: 8.7 / VIS: 39



9100 9150 9200 9250



rlst 90%: lt-md gr, v calc, intbd bic  
o sfl, slw str wh-ylw cut. S  
sft, sbplty-sbbiky, slty, grty

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbiky, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbiky, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbiky, slty, grty, vs cal.

7620

MW: 8.7 / VIS: 39

MW: 8.7 / VIS: 39

10/26/13 @ 8:00am T.O.O.H.  
for mud motor. B.O.B. @  
5:45pm.

1000

TG, C1-C5

0

3

RGP (min/ft)

0

250

Gamma (API)

0

9300

9350

9400

9450

7520 TVD

MD 9296 TVD 7544.44  
Az 359.63° Inc 92.53°

MD 9390 TVD 7541.43  
Az 0.55° Inc 91.14°

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbply, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbply-sbbilky, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbply, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbply-sbbilky, slty, grty, vs cal.

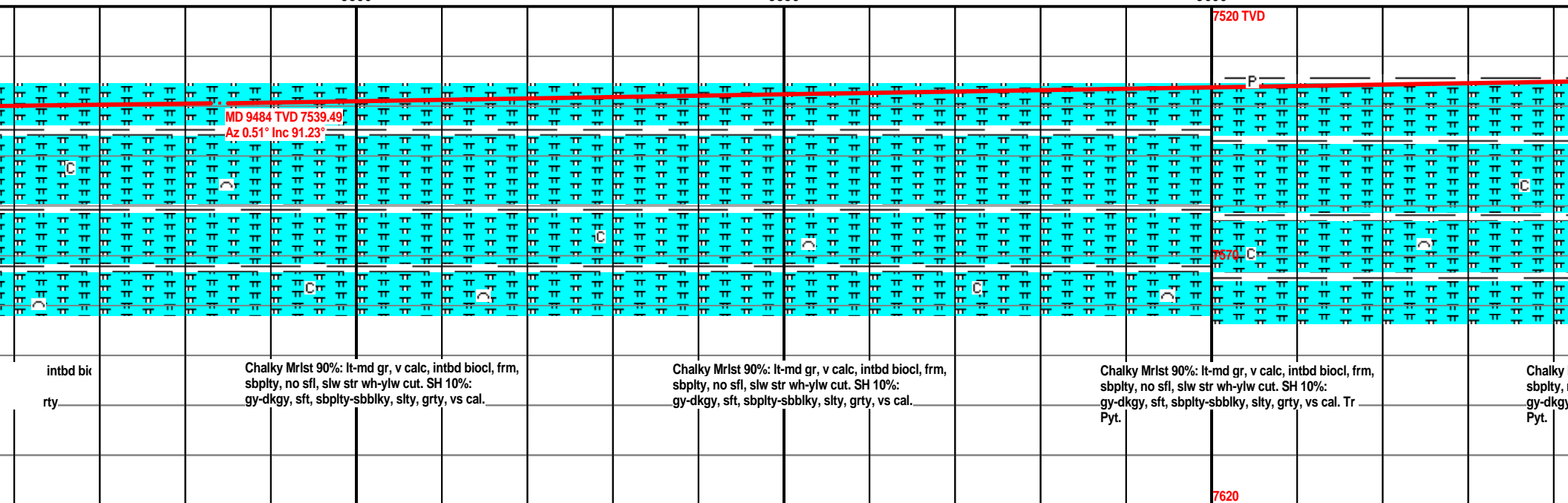
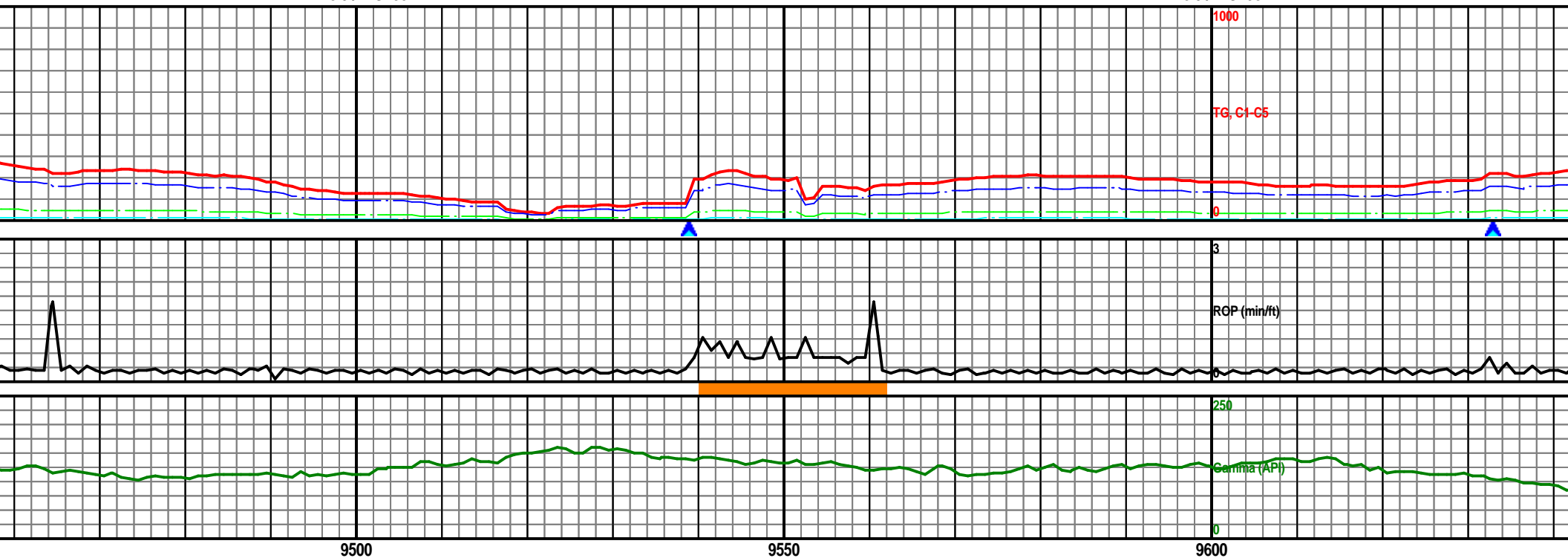
Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbply, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbply-sbbilky, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbply, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbply-sbbilky, slty, grty, vs cal.

7620

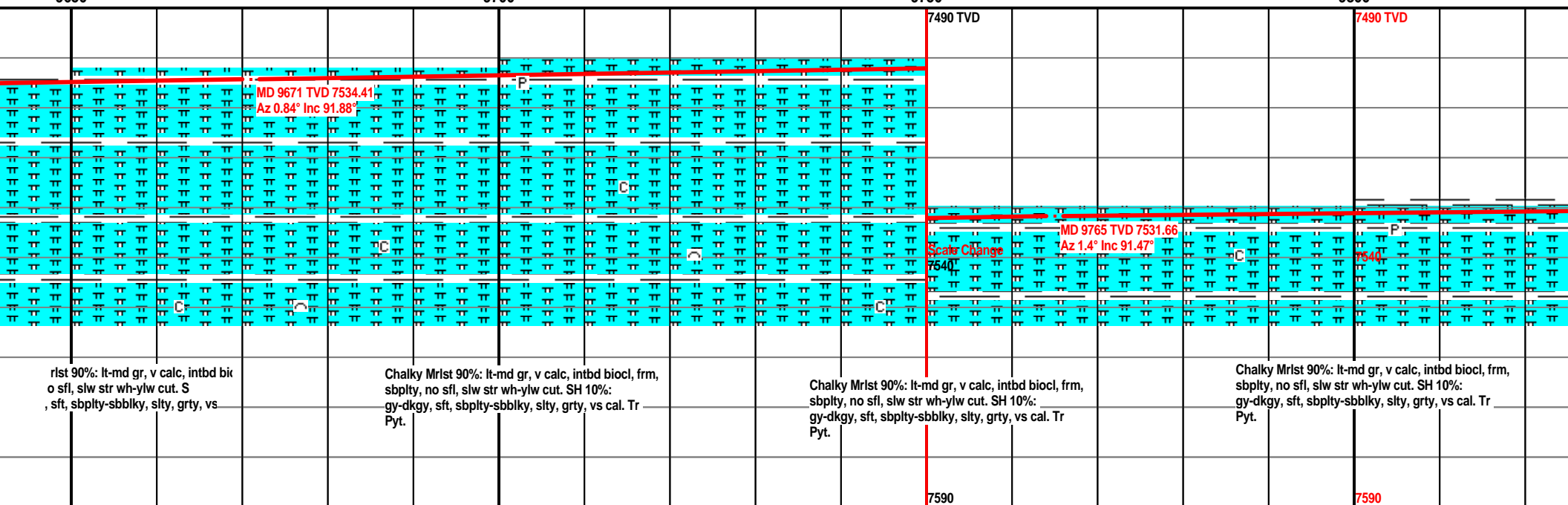
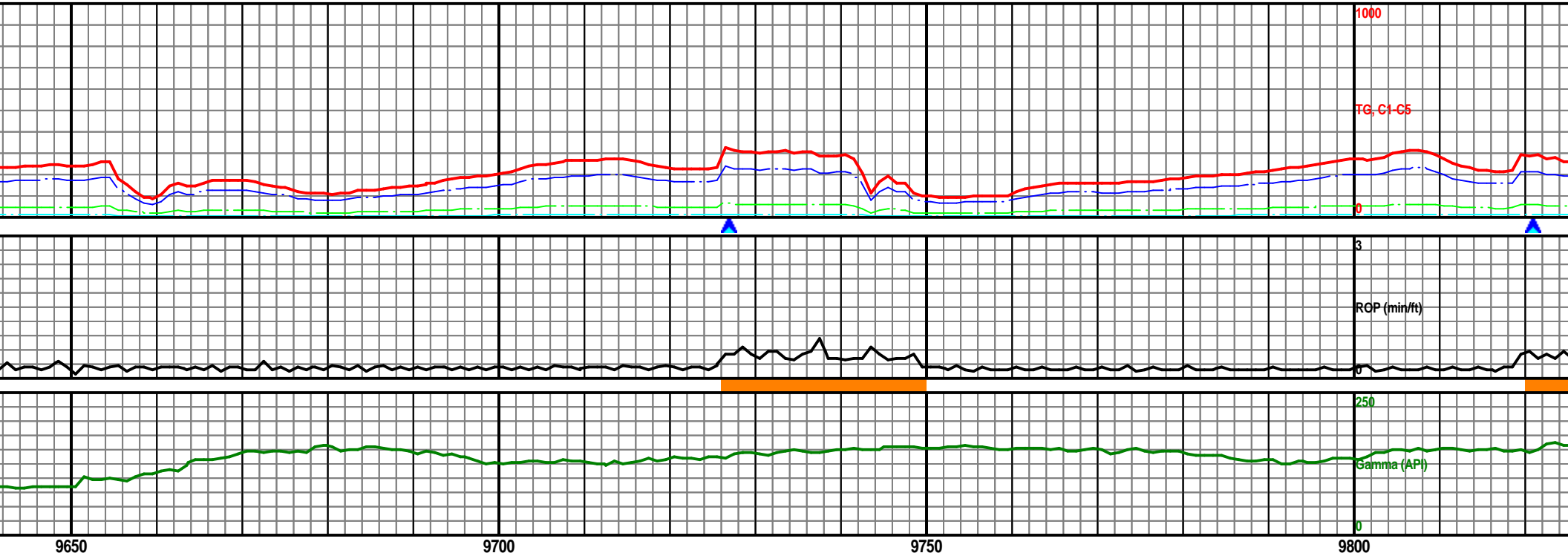
MW: 8.9 / VIS: 38

MW: 8.9 / VIS: 38



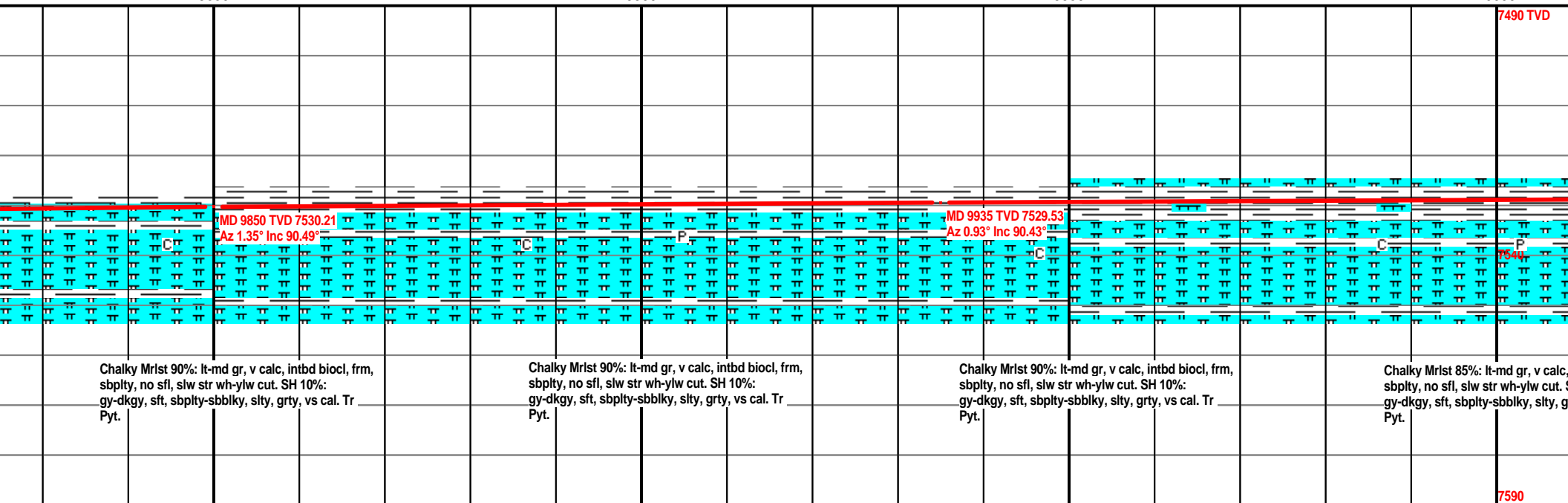
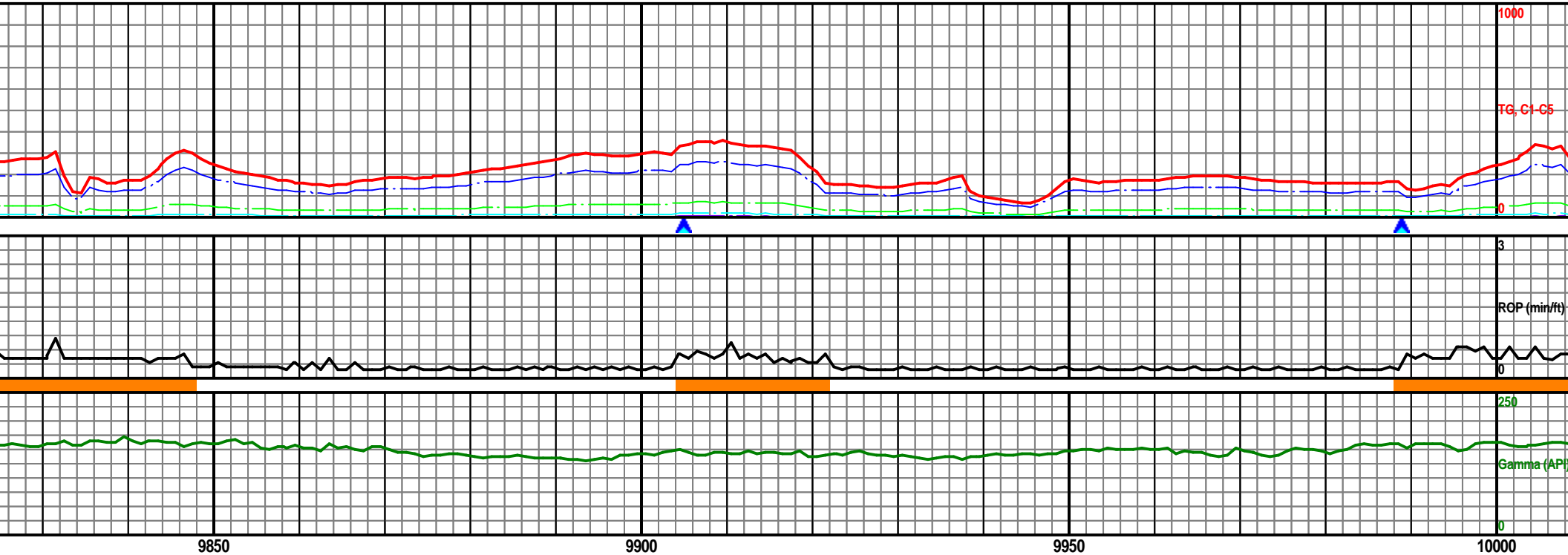
MW: 8.9 / VIS: 38

MW: 8.7 / VIS: 39



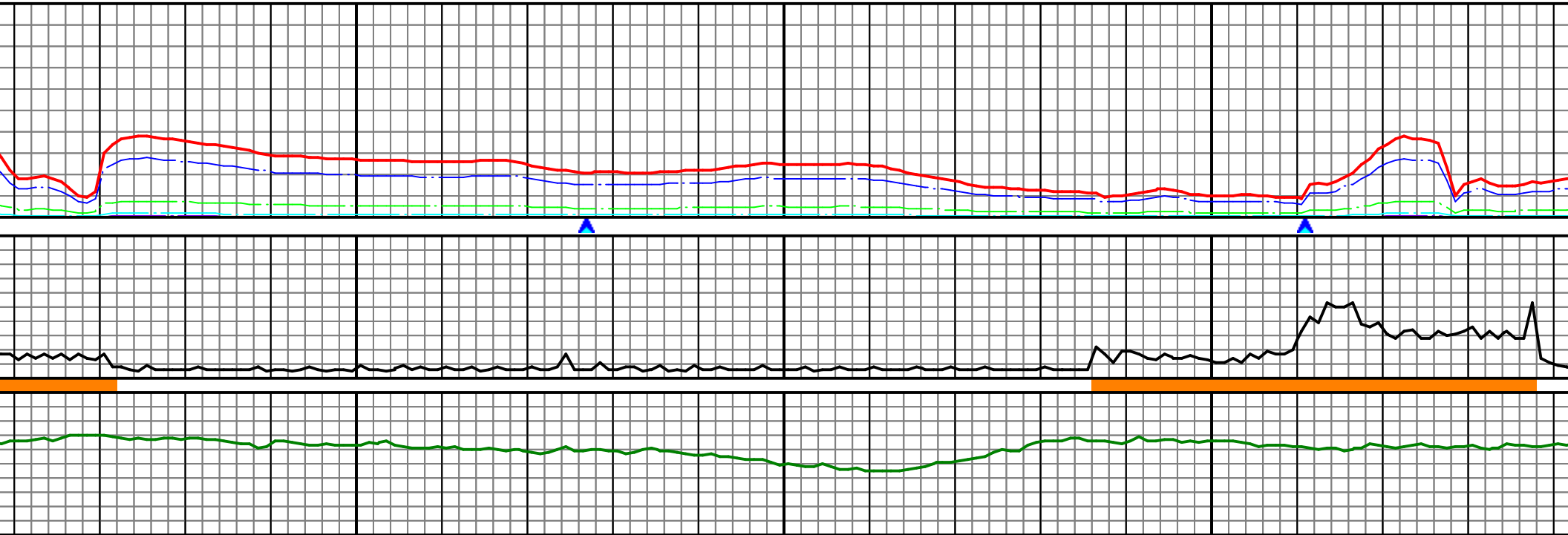
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MW: 8.7 / VIS: 39





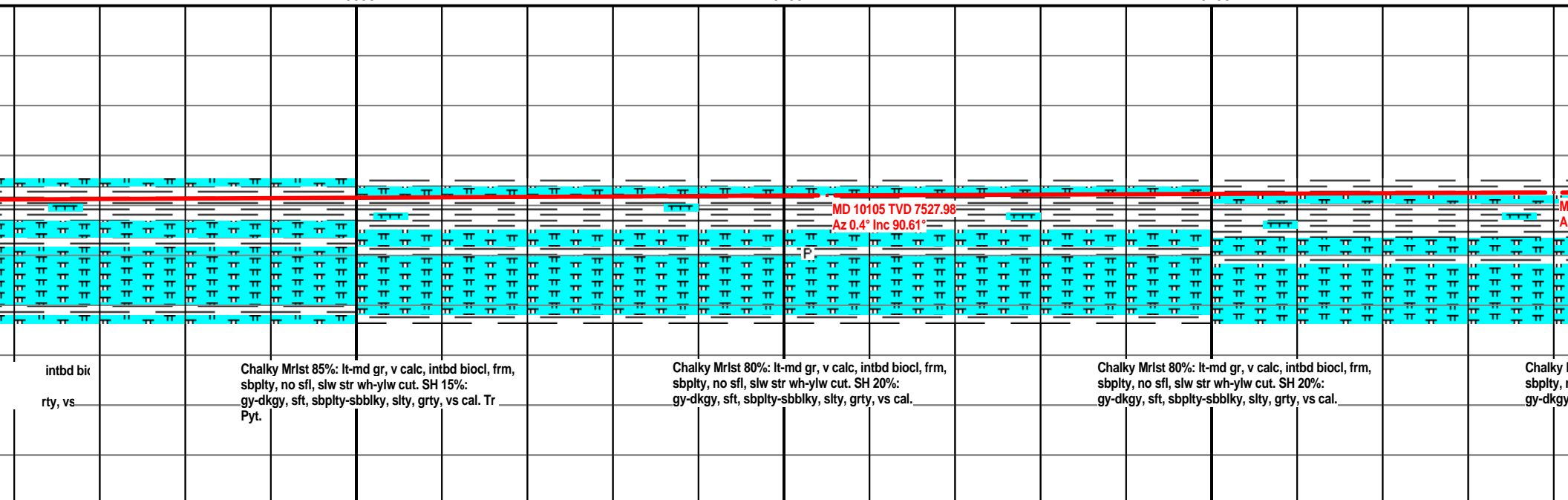
MW: 8.7 / VIS: 39



10050

10100

10150



MD 10105 TVD 7527.98  
Az 0.4° Inc 90.61°

intbd bi  
rty, vs

Chalky Mrlst 85%: lt-md gr, v calc, intbd biocl, frm,  
sbplty, no sfl, slw str wh-ylw cut. SH 15%:  
gy-dkgy, sft, sbplty-sbblky, slty, grty, vs cal. Tr  
Pyt.

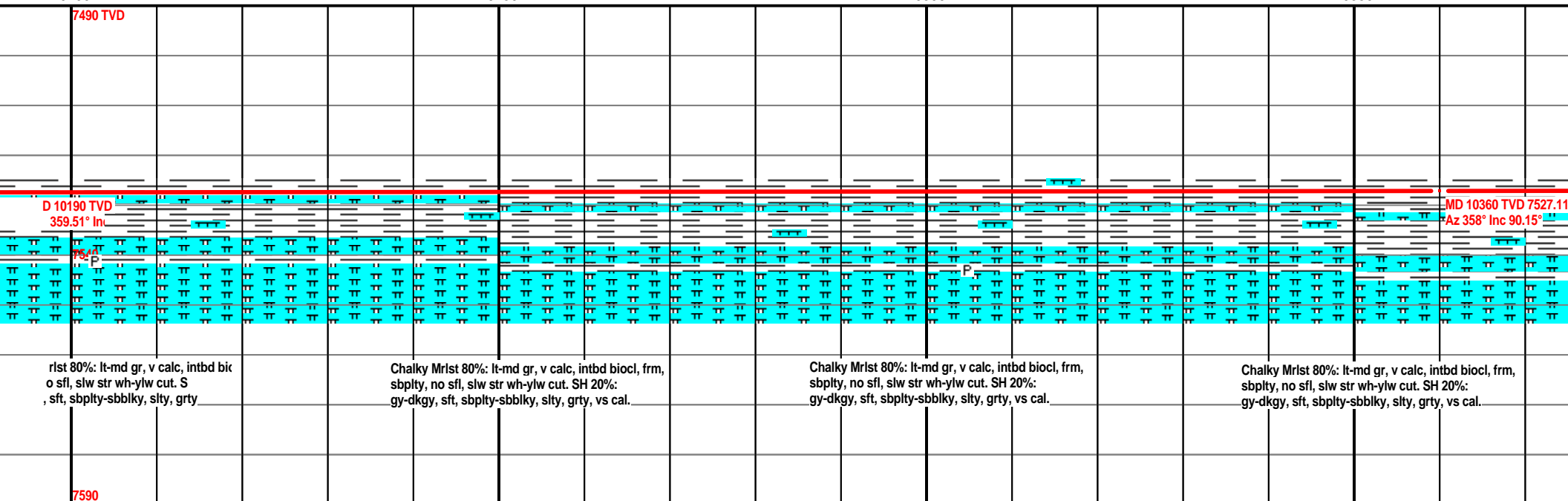
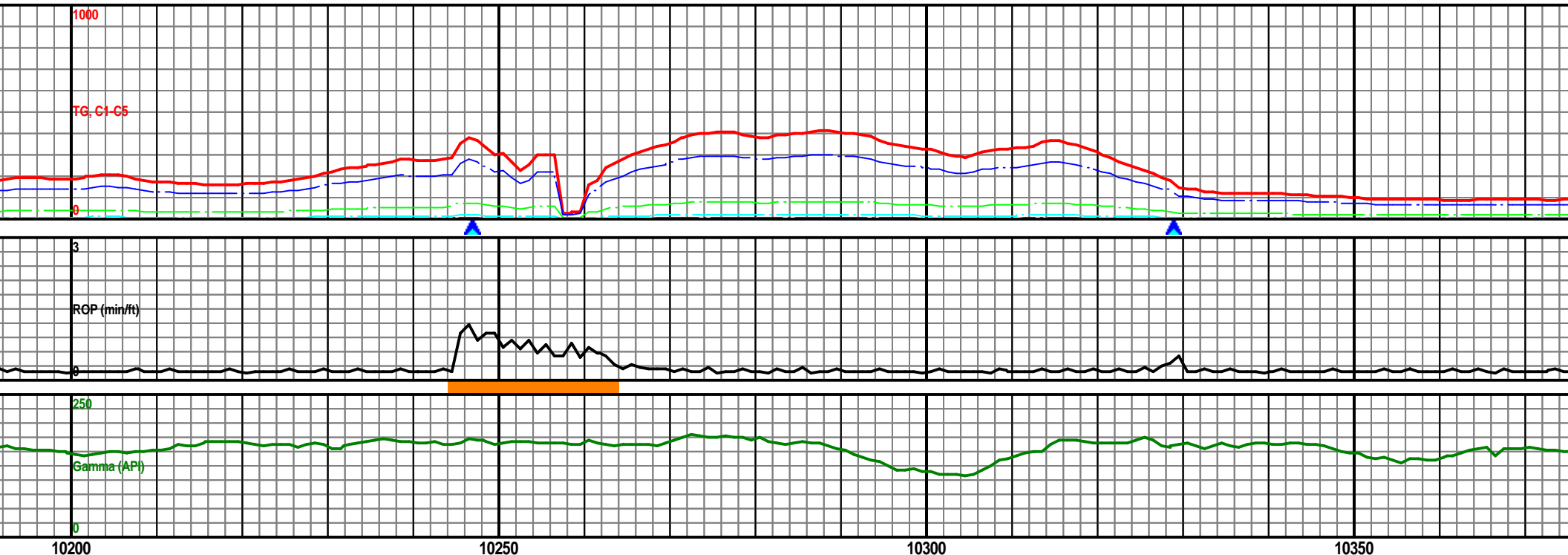
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gy-dkgy, sft, sbplty-sbblky, slty, grty, vs cal.

Chalky Mrlst 80%: lt-md gr, v calc, intbd biocl, frm,  
sbplty, no sfl, slw str wh-ylw cut. SH 20%:  
gy-dkgy, sft, sbplty-sbblky, slty, grty, vs cal.

Chalky  
sbplty,  
gy-dkgy

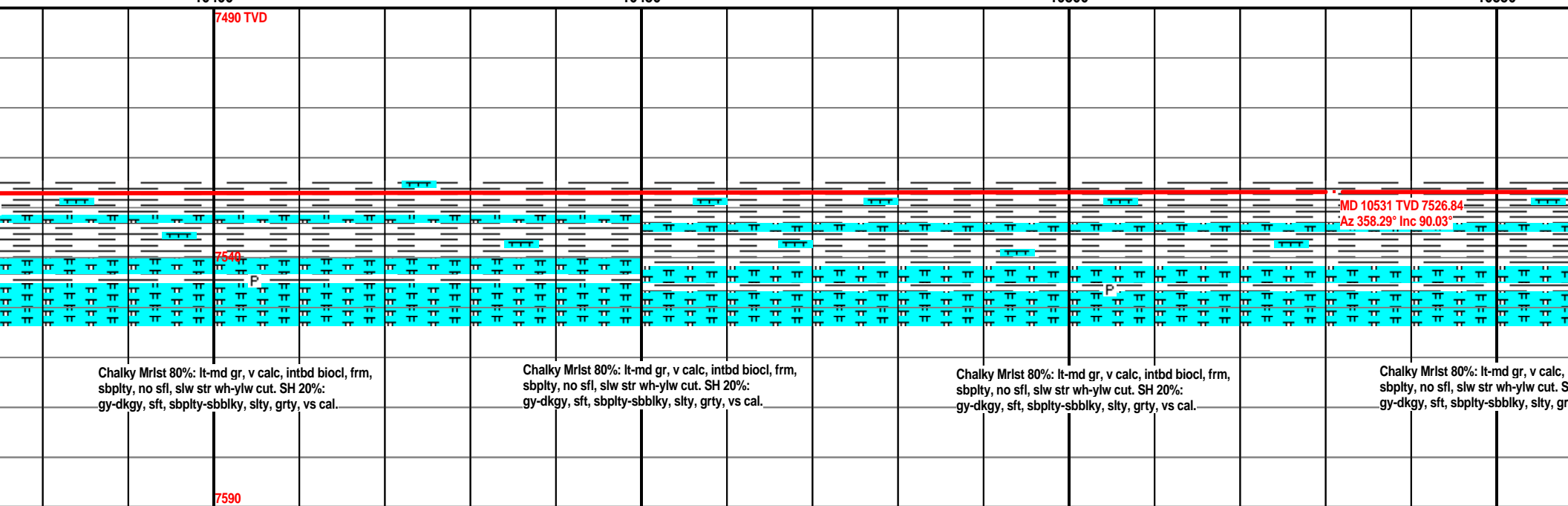
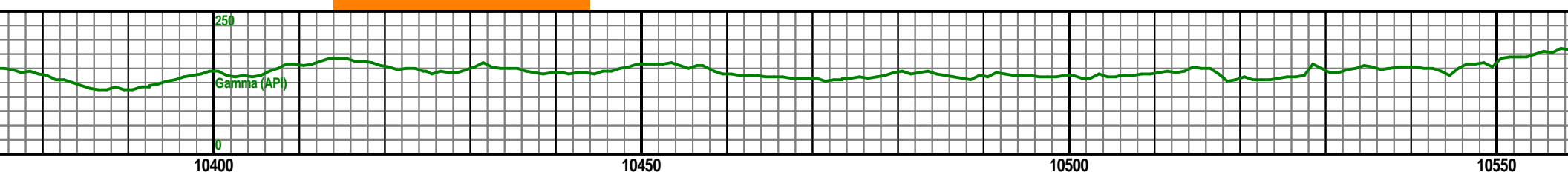
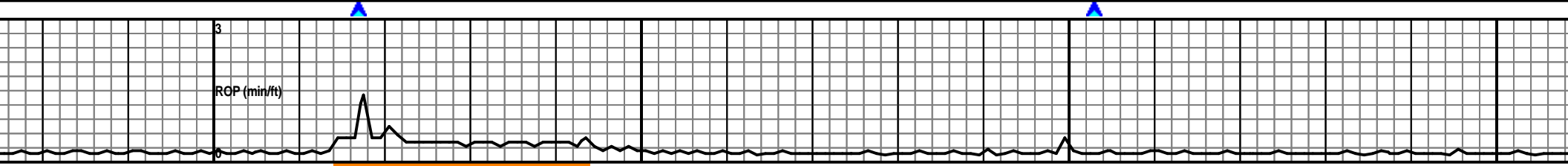
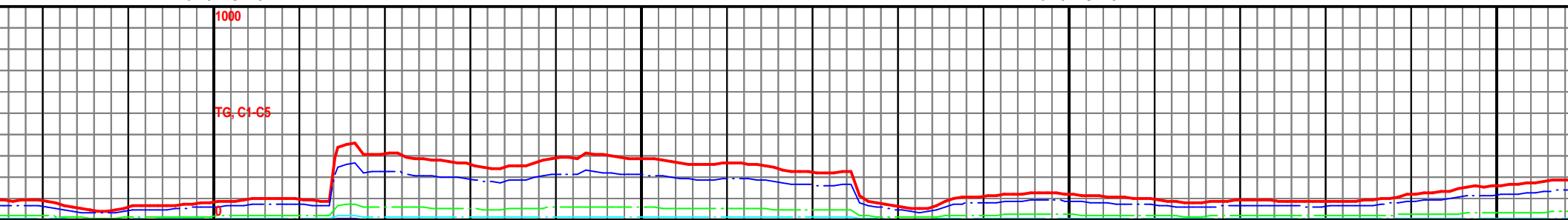
MW: 8.7 / VIS: 39

MW: 8.7 / VIS: 40



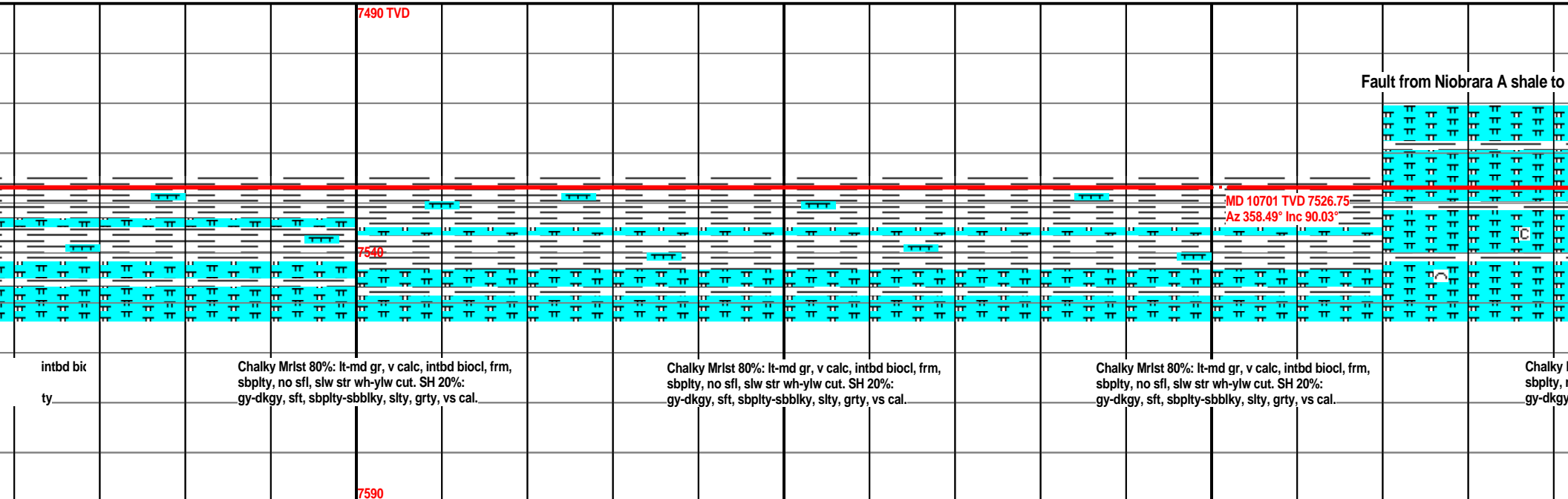
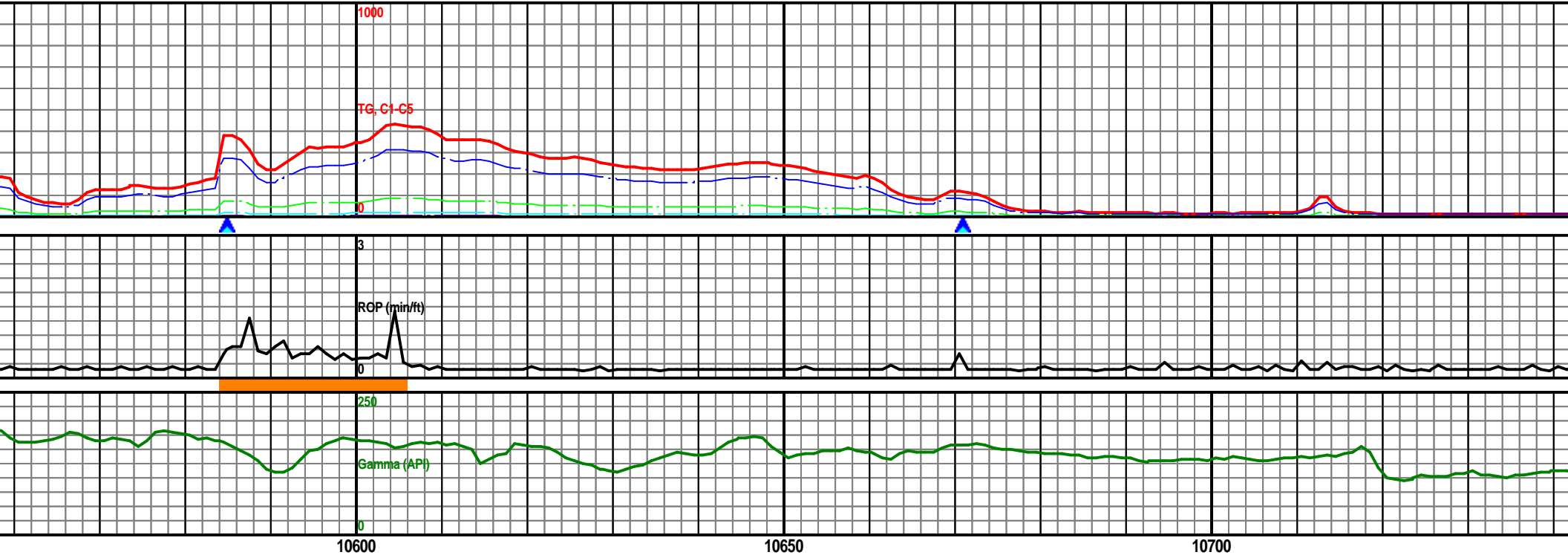
MW: 8.7 / VIS: 40

MW: 8.7 / VIS: 40



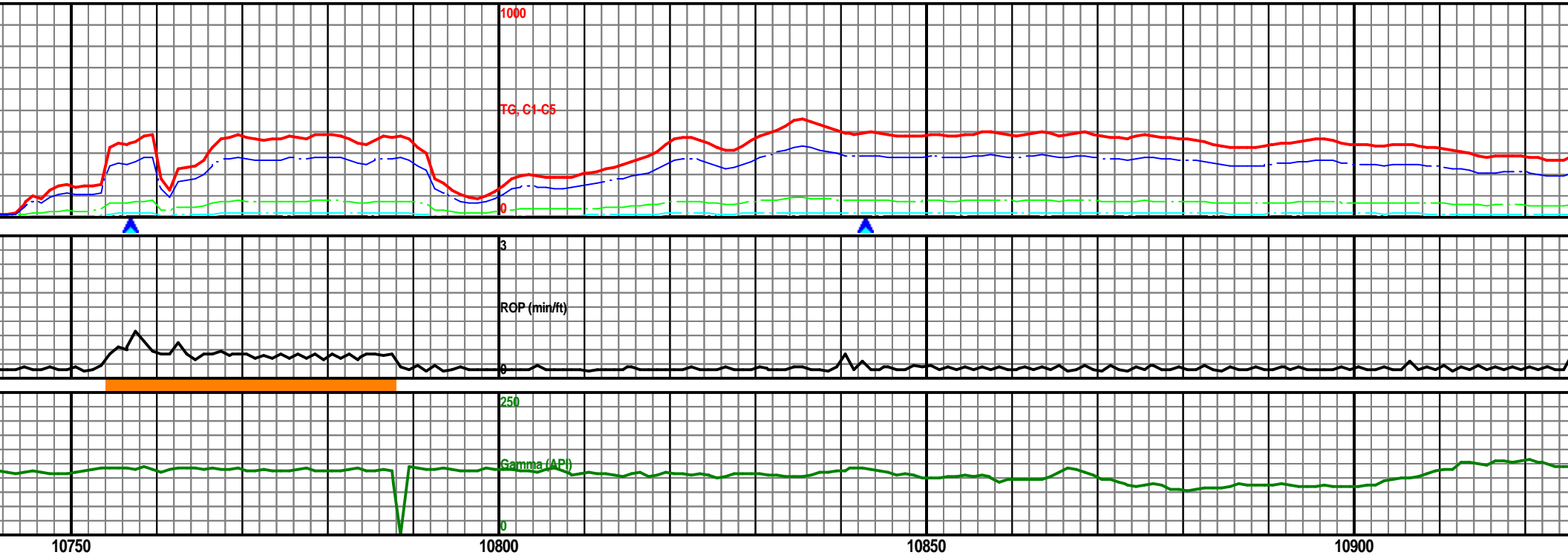
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MW: 8.7 / VIS: 39



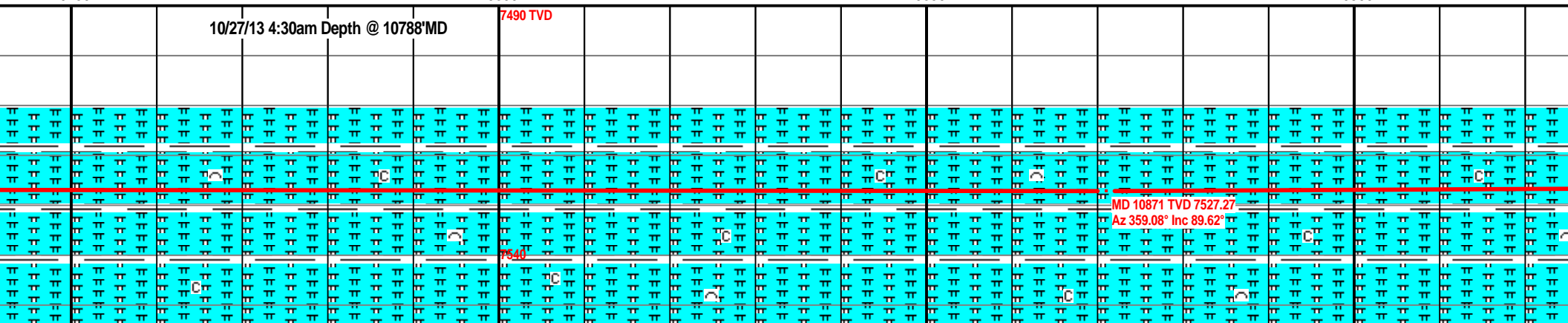
MW: 8.7 / VIS: 39

MW: 8.7 / VIS: 39



10/27/13 4:30am Depth @ 10788'MD

7490 TVD



rlst 90%: lt-md gr, v calc, intbd bic  
o sfl, slw str wh-yiw cut. S  
, sft, sbpity-sbbiky, slty, grty

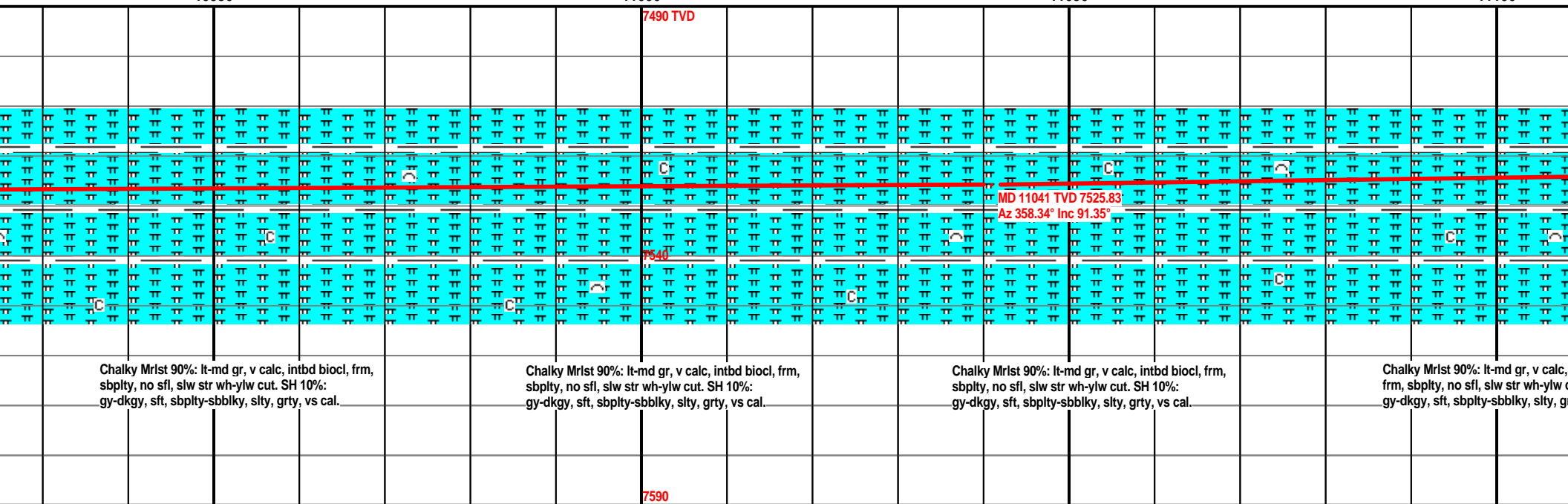
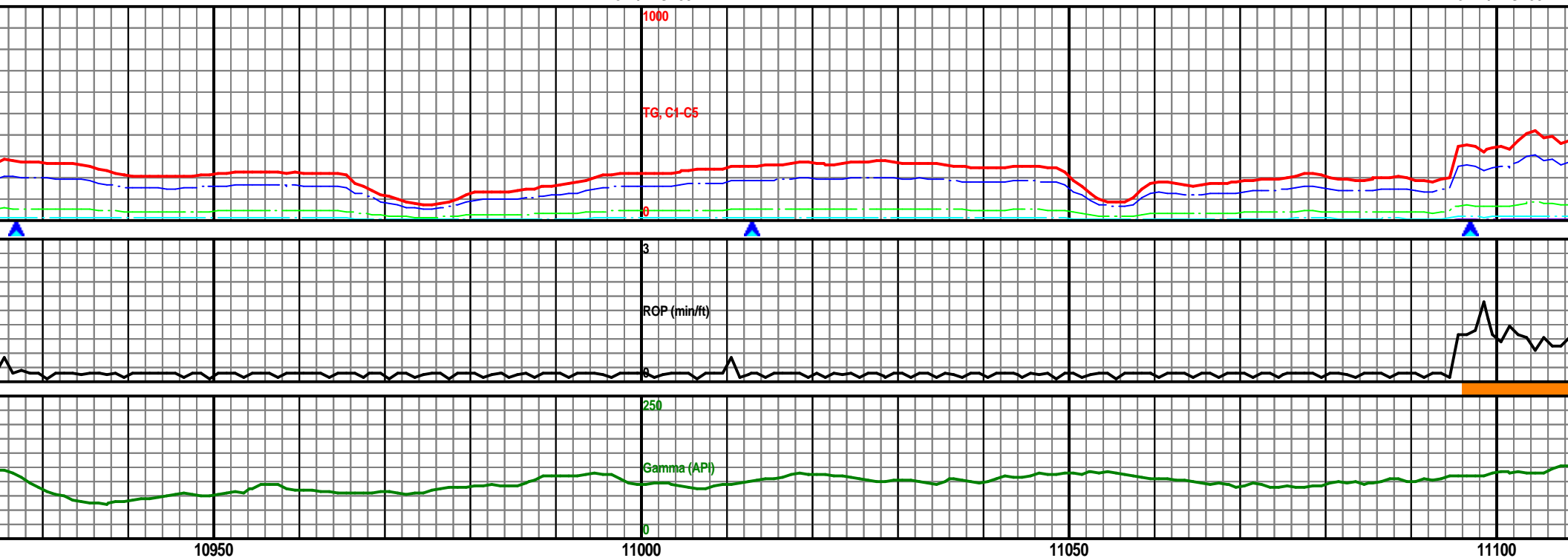
Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbpity, no sfl, slw str wh-yiw cut. SH 10%:  
gy-dkgy, sft, sbpity-sbbiky, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
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gy-dkgy, sft, sbpity-sbbiky, slty, grty, vs cal.

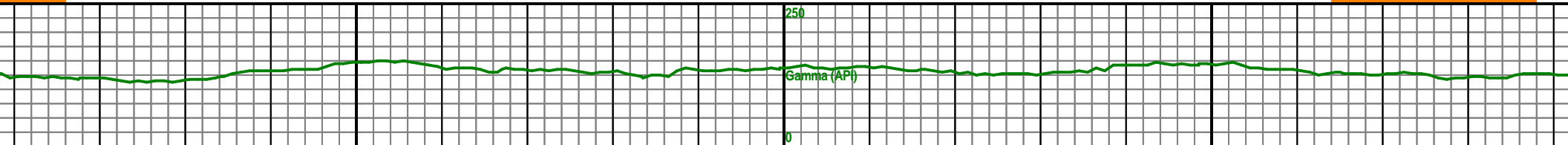
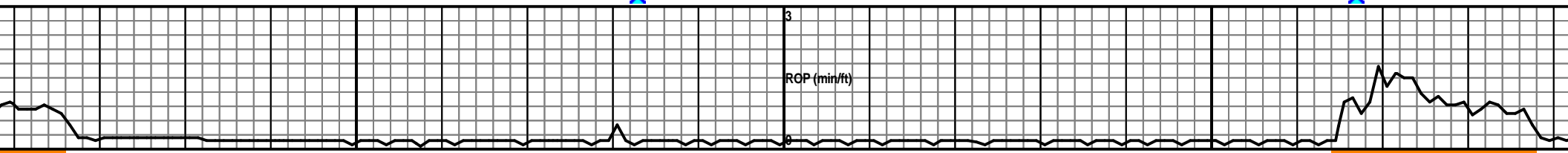
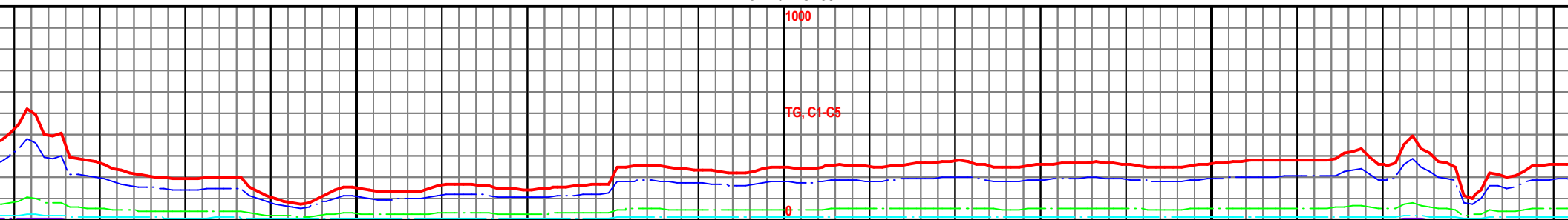
Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbpity, no sfl, slw str wh-yiw cut. SH 10%:  
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MW: 8.7 / VIS: 39

MW: 8.7+ / VIS: 39



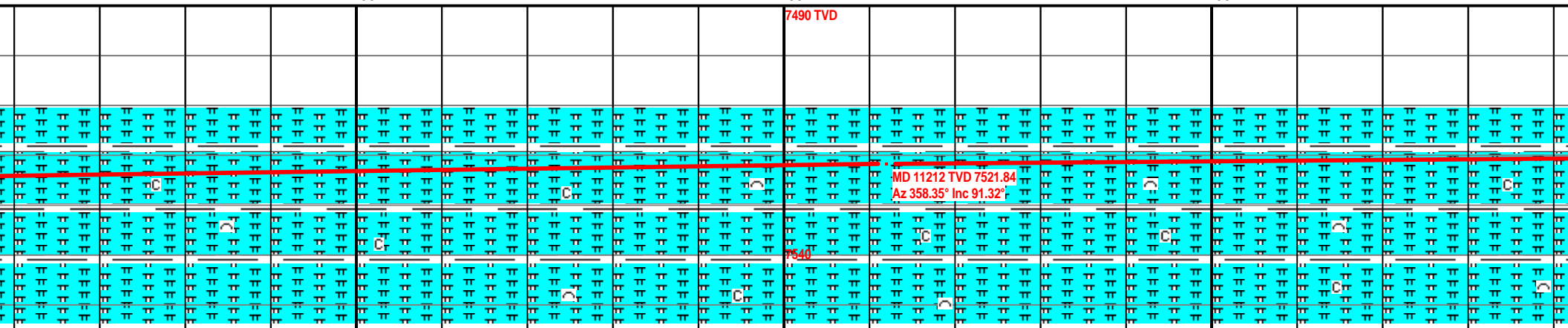
MW: 8.7+ / VIS: 39



11150

11200

11250



7490 TVD

MD 11212 TVD 7521.84  
Az 358.35° Inc 91.32°

7540

intbr  
ut. S  
ty

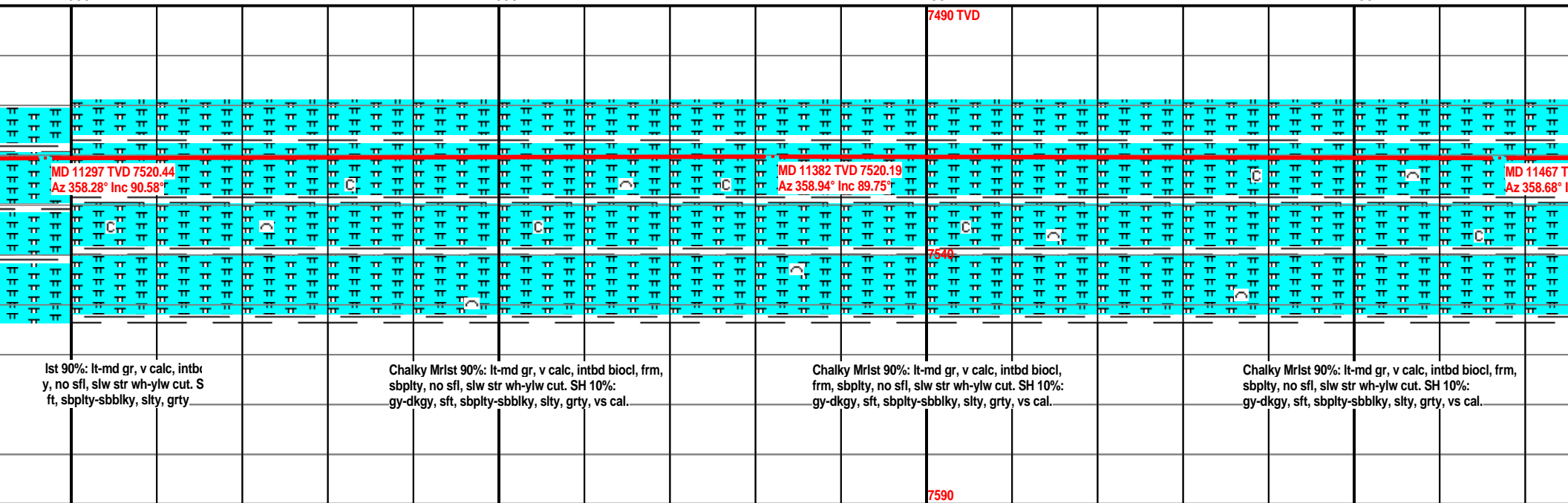
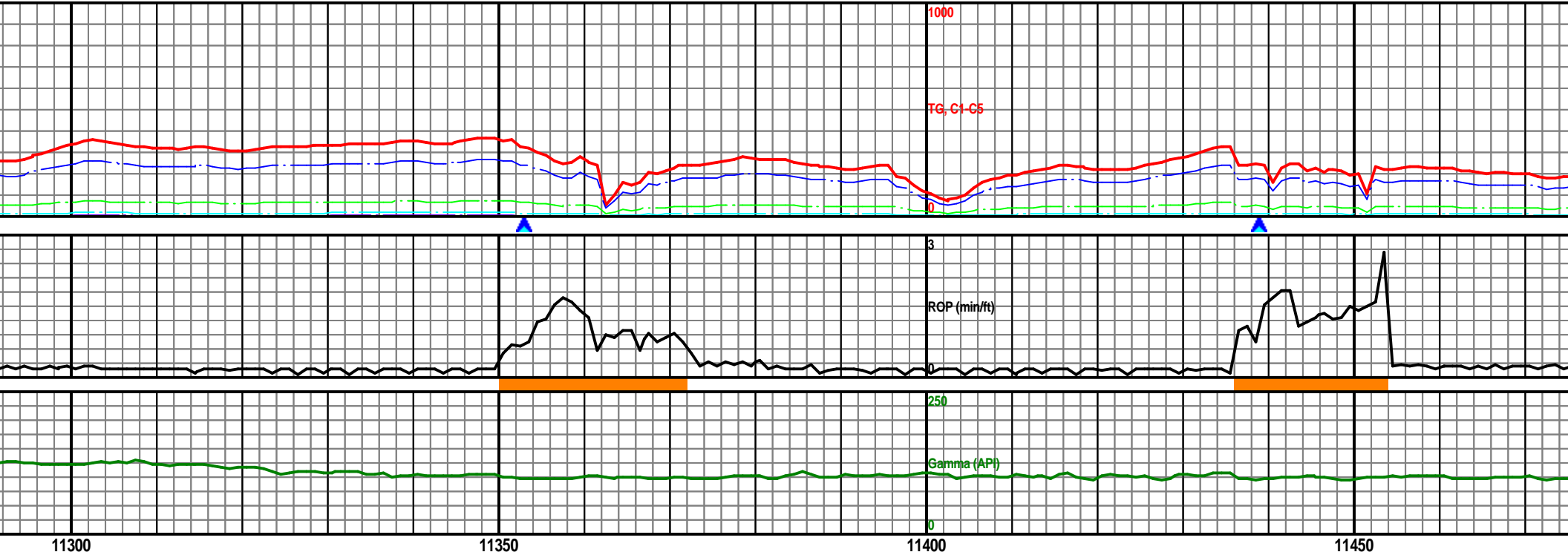
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Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbpity, no sfl, slw str wh-yfw cut. SH 10%:  
gy-dkgy, sft, sbpity-sbbiky, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbpity, no sfl, slw str wh-yfw cut. SH 10%:  
gy-dkgy, sft, sbpity-sbbiky, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
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gy-dkgy, sft, sbpity-sbbiky, slty, grty, vs cal.

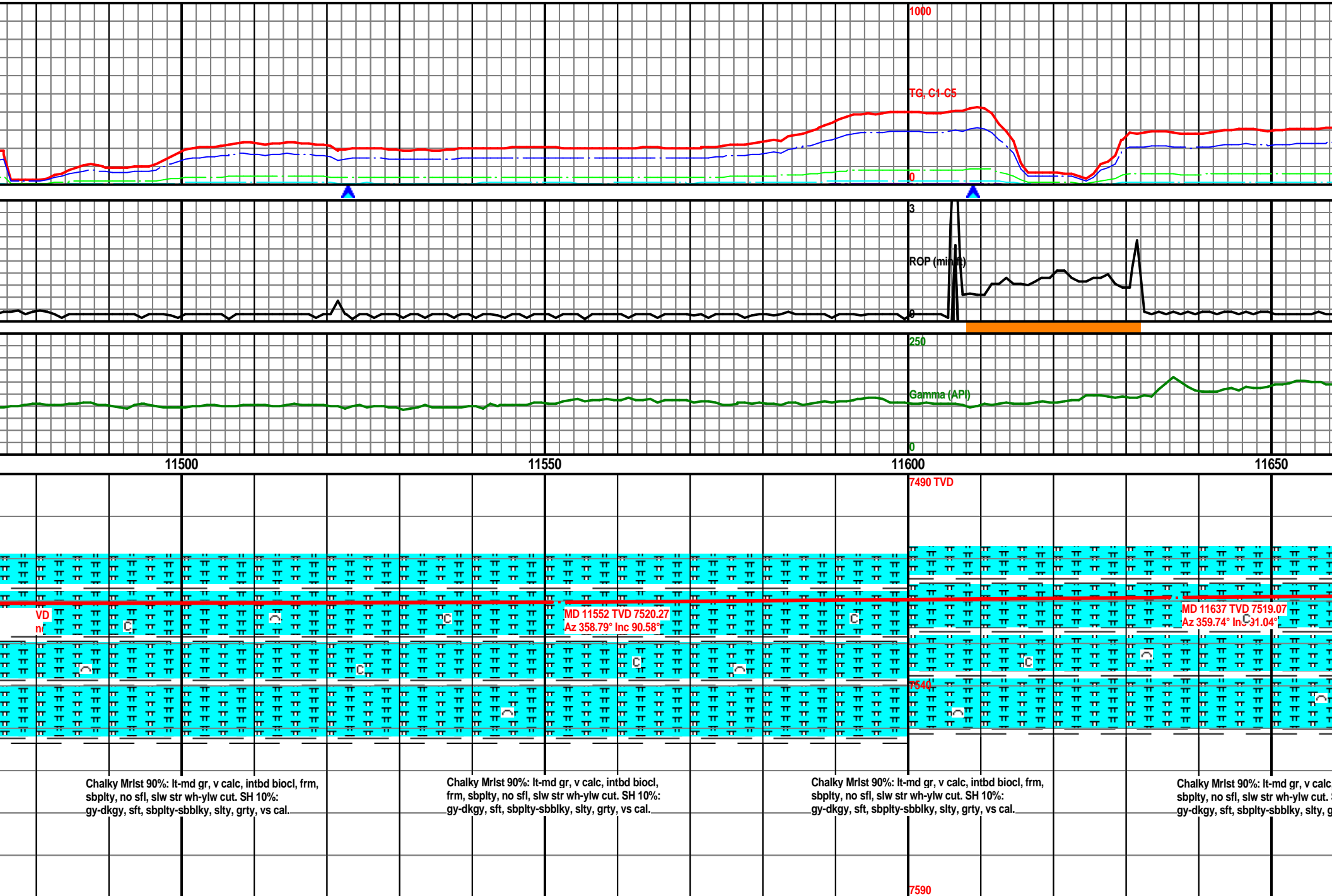
7590





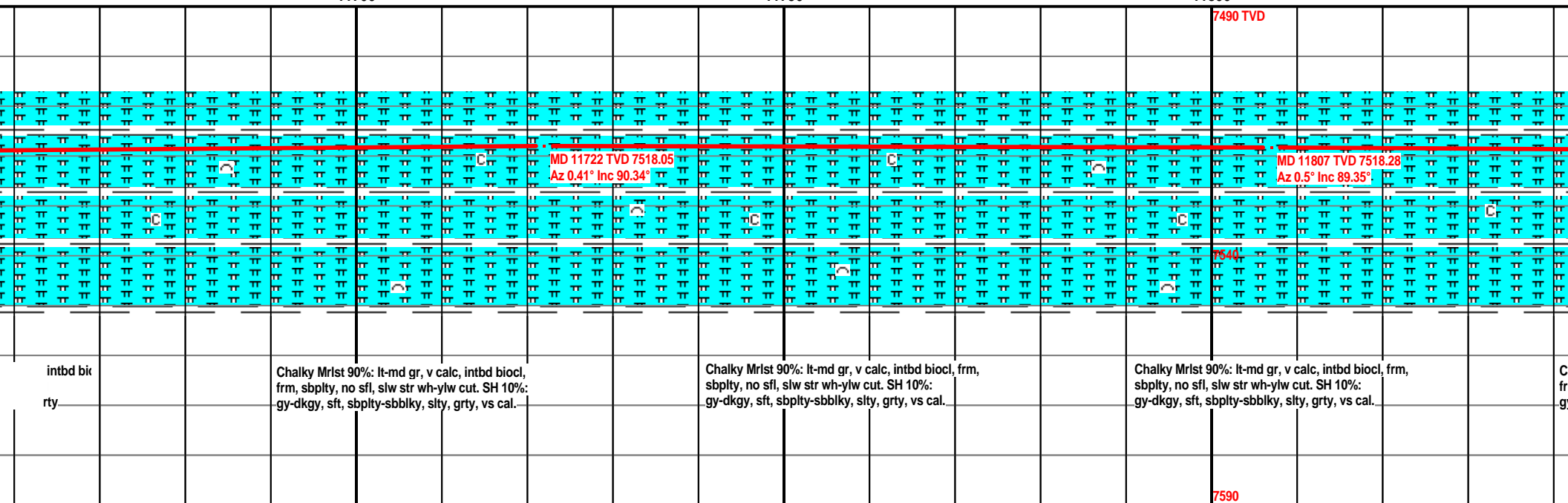
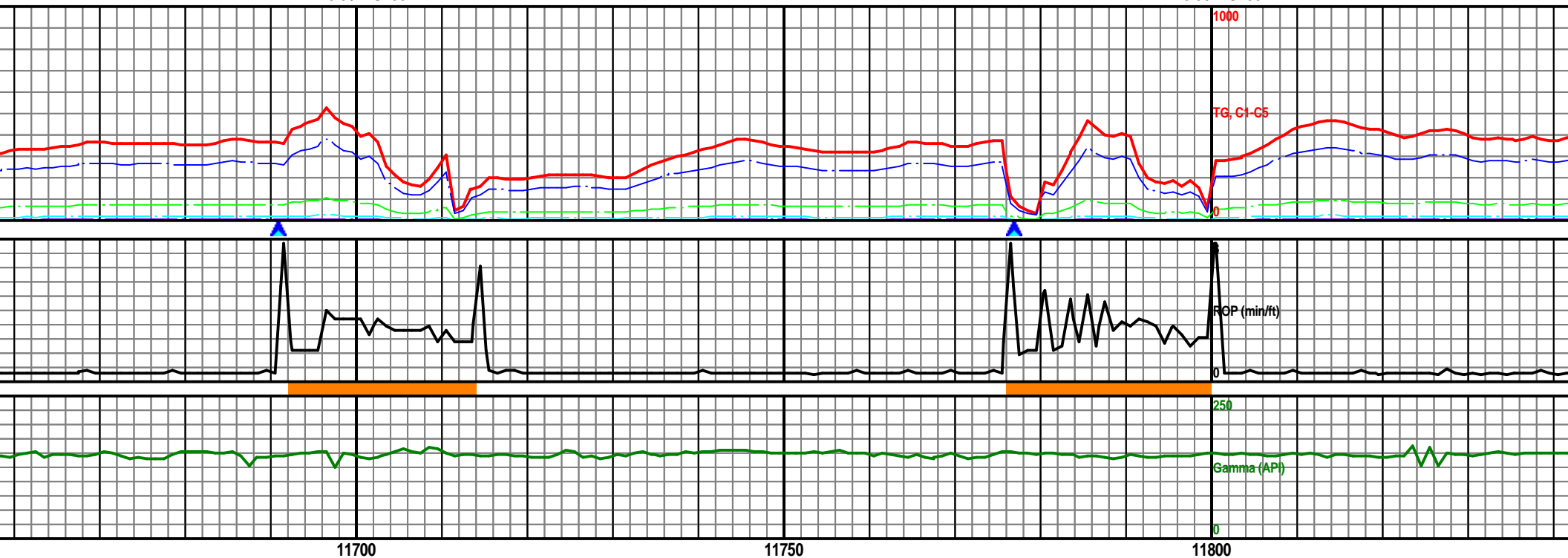
MW: 8.8 / VIS: 39

MW: 8.8 / VIS: 39



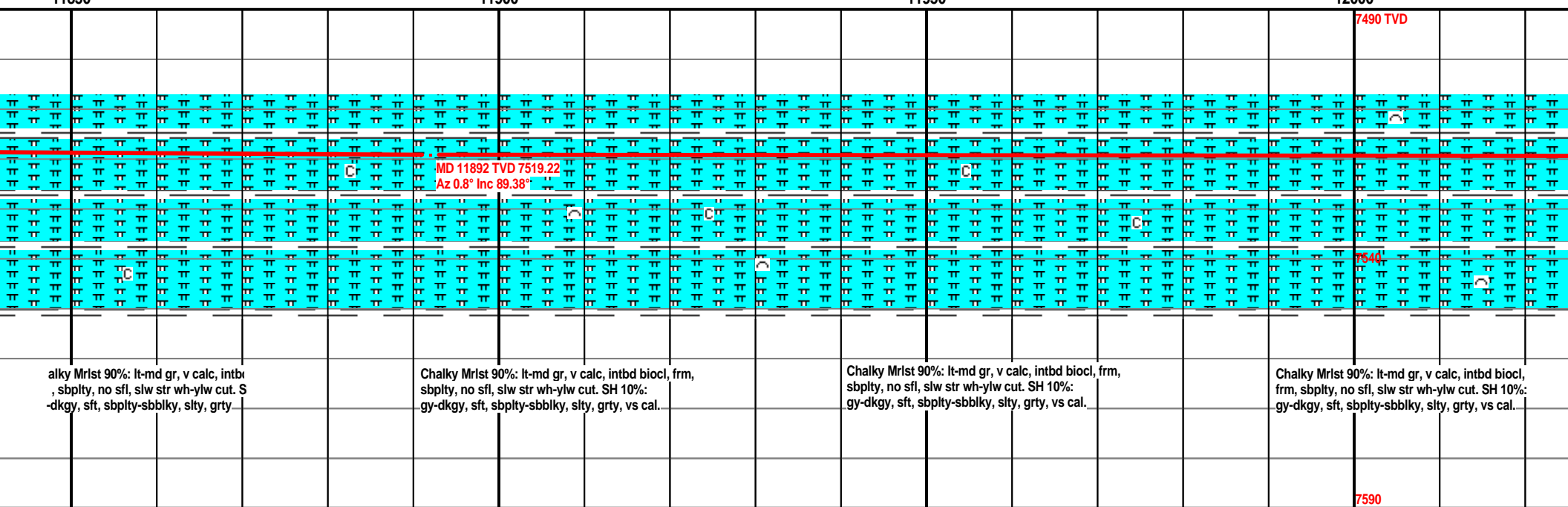
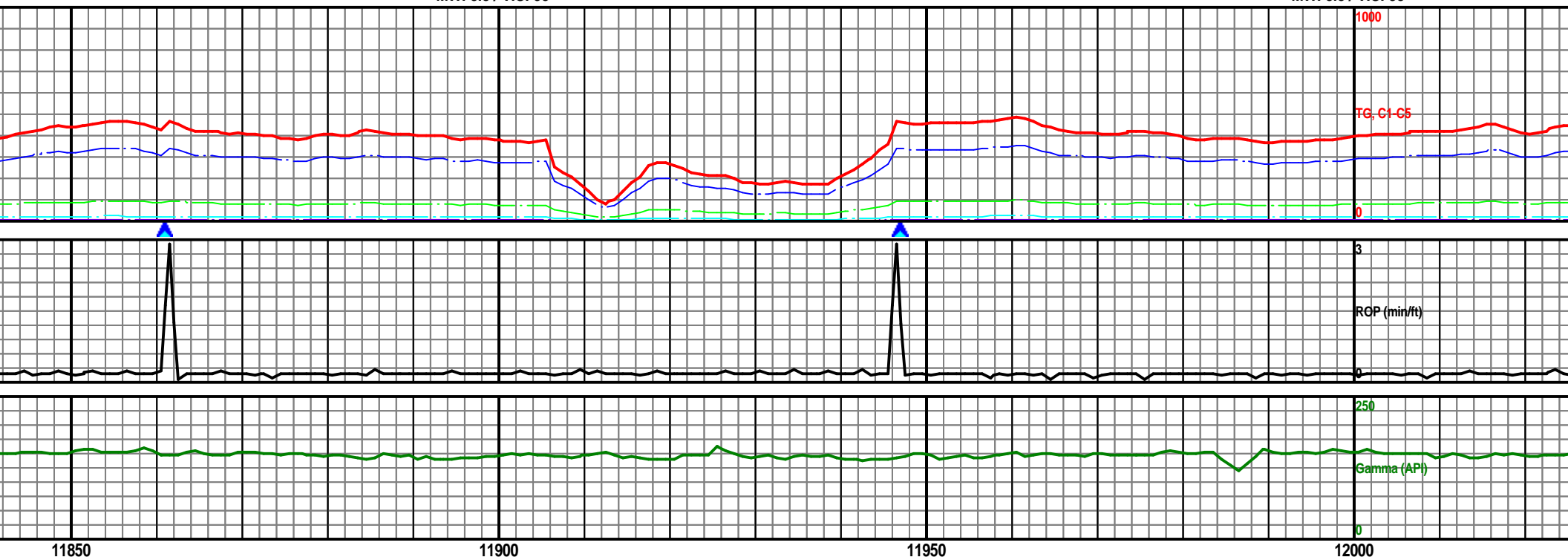
MW: 8.8 / VIS: 38

MW: 8.8 / VIS: 38



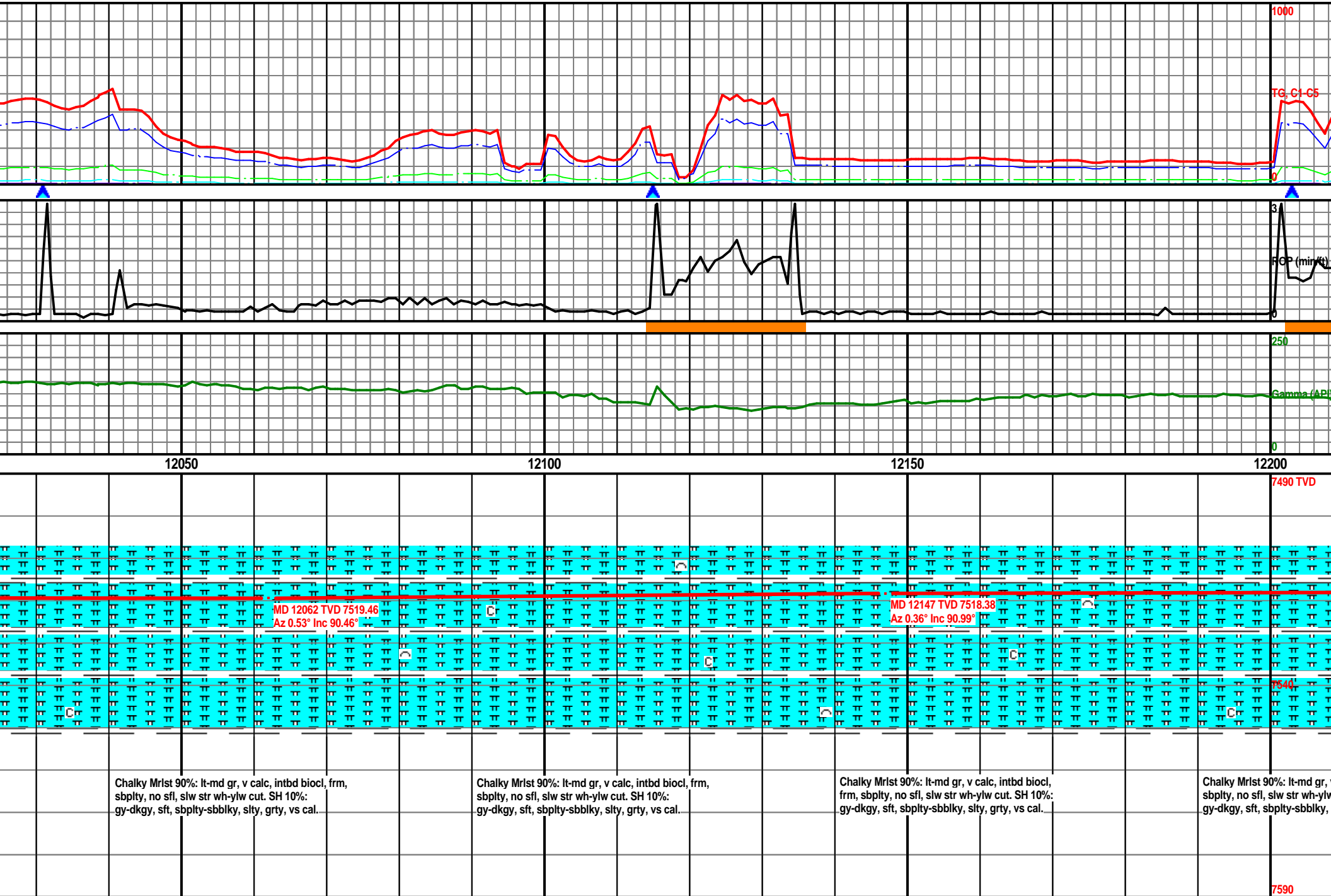
MW: 8.8 / VIS: 38

MW: 8.8 / VIS: 38

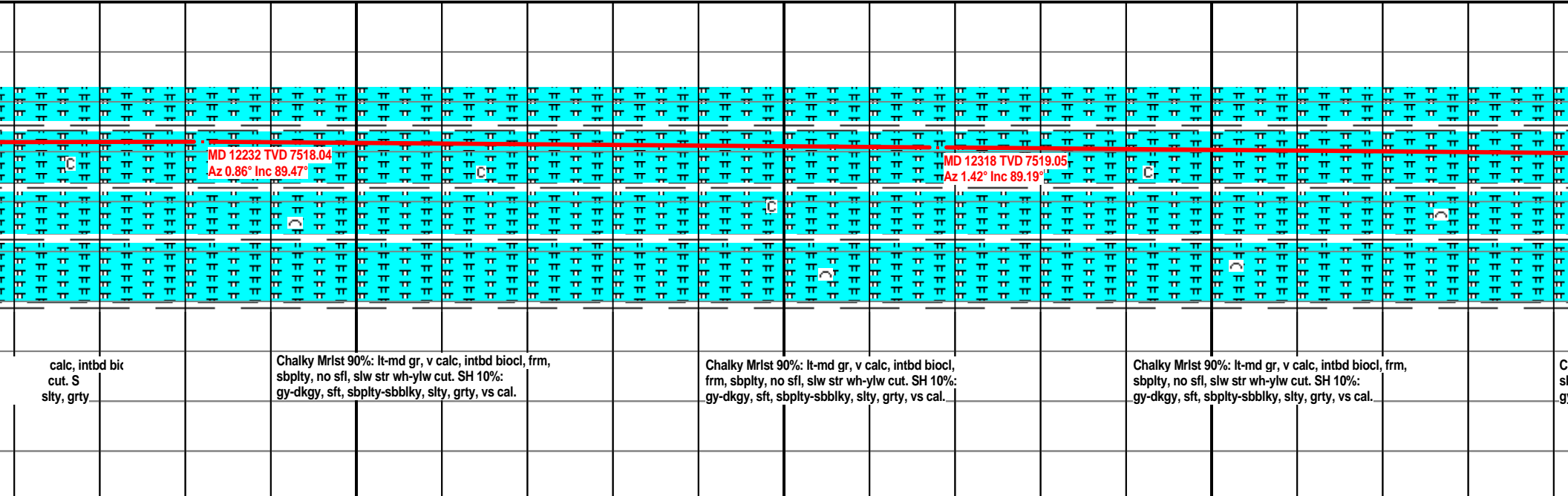
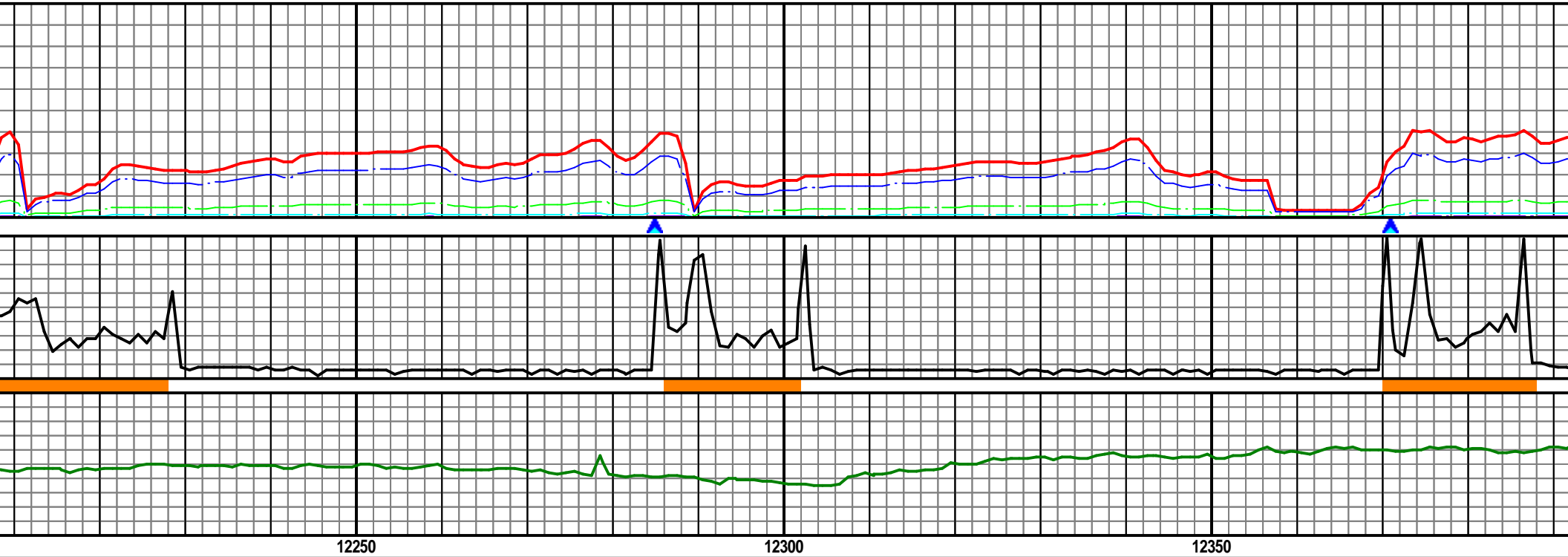


MW: 8.8 / VIS: 38

MW: 8.9 / VIS: 39

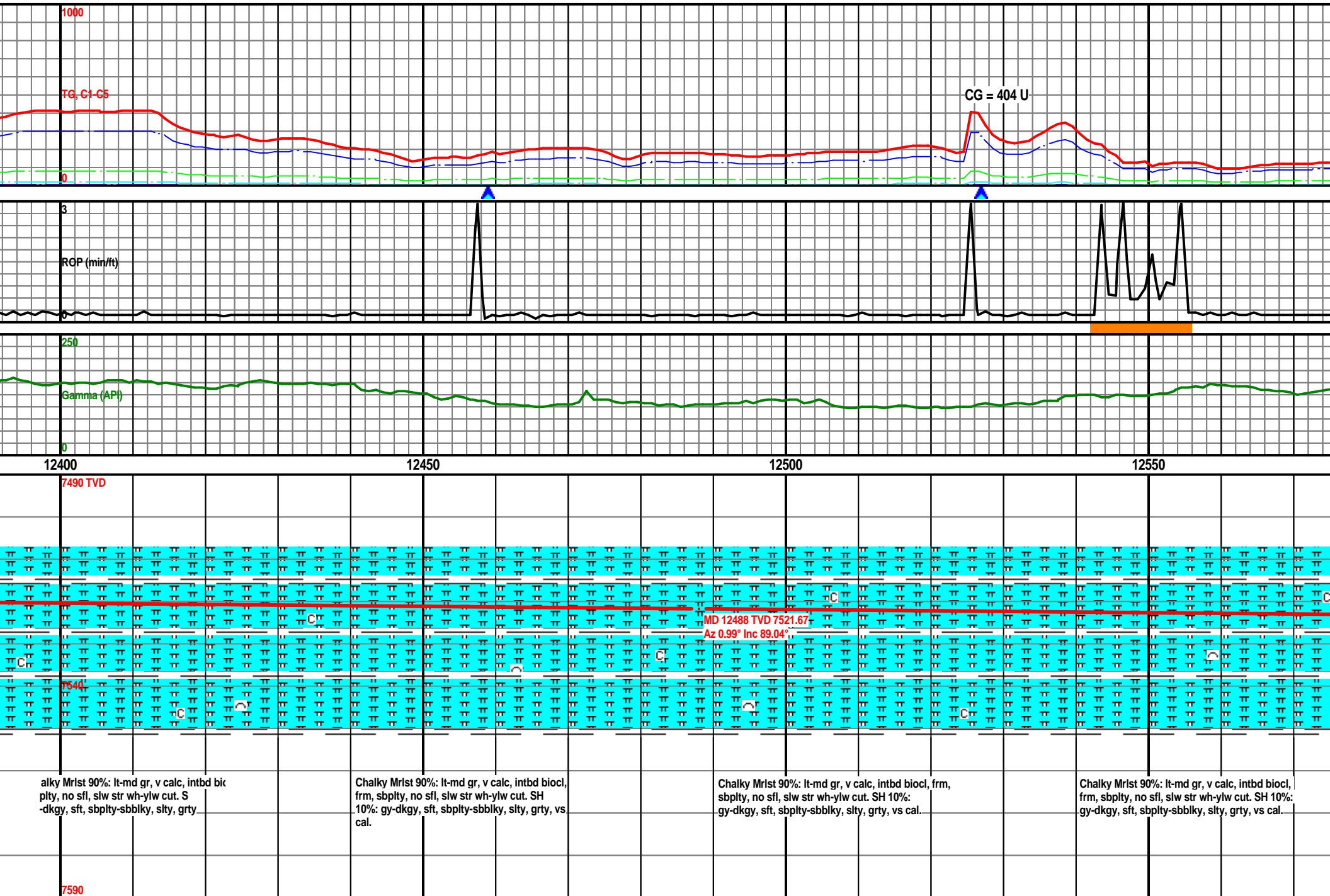


MW: 8.9 / VIS: 39



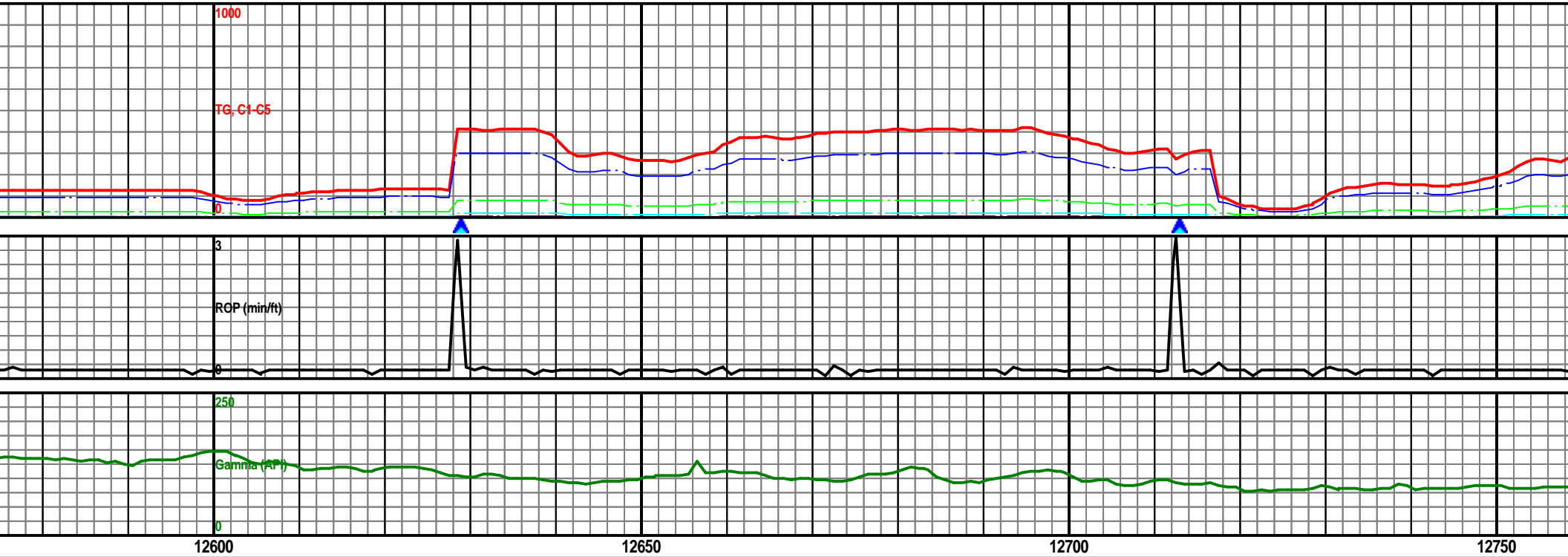
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MW: 8.9 / VIS: 39

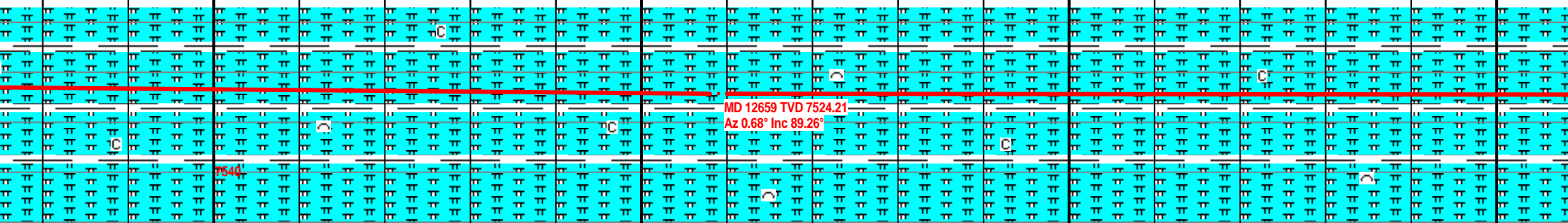


MW: 8.9 / VIS: 38

MW: 8.9 / VIS: 38



7490 TVD



Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbkly, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl,  
frm, sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbkly, slty, grty, vs cal.

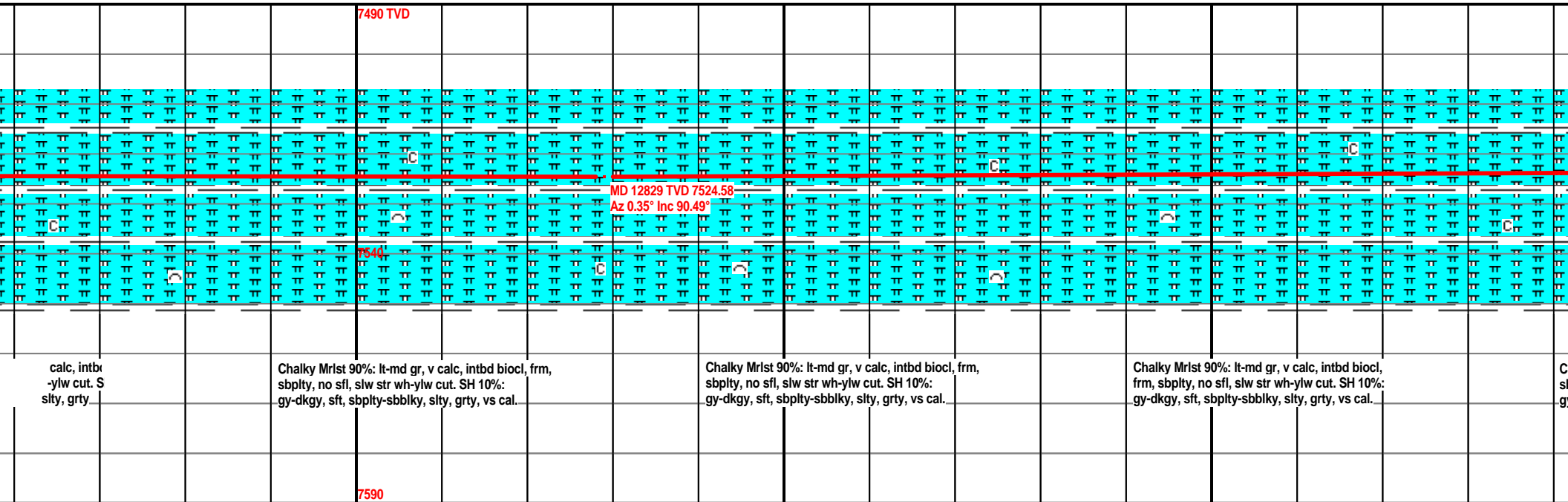
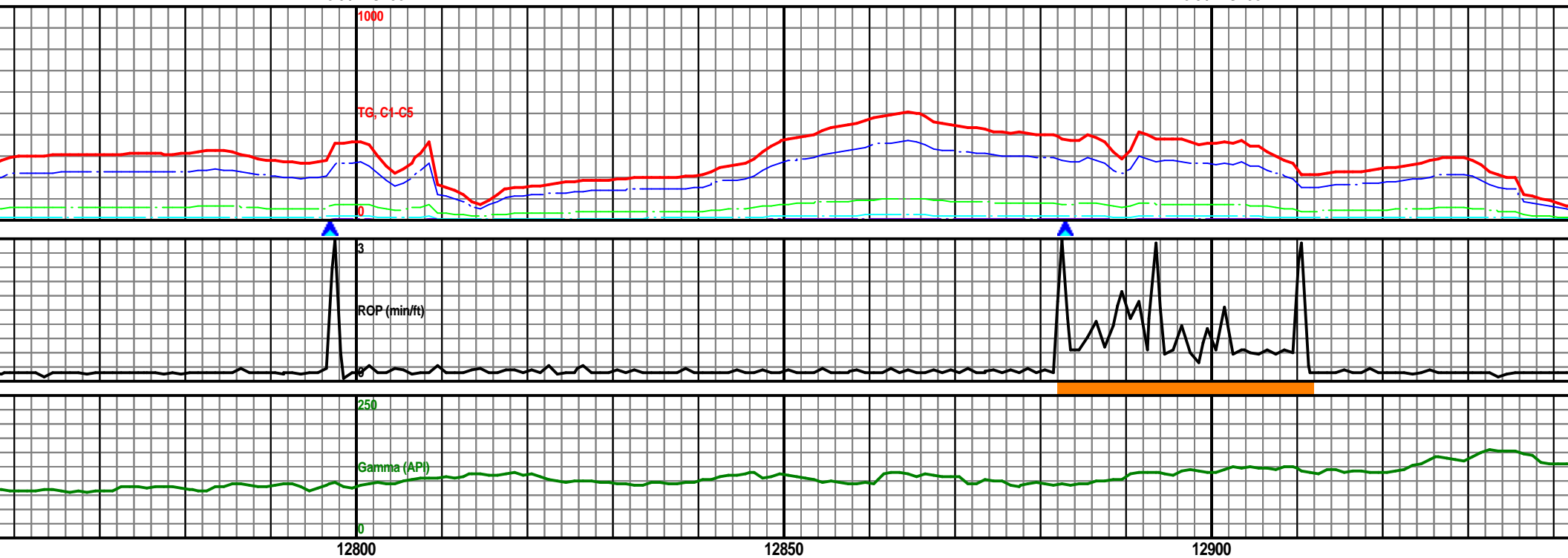
Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbkly, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbkly, slty, grty, vs cal.

7590

MW: 8.9 / VIS: 38

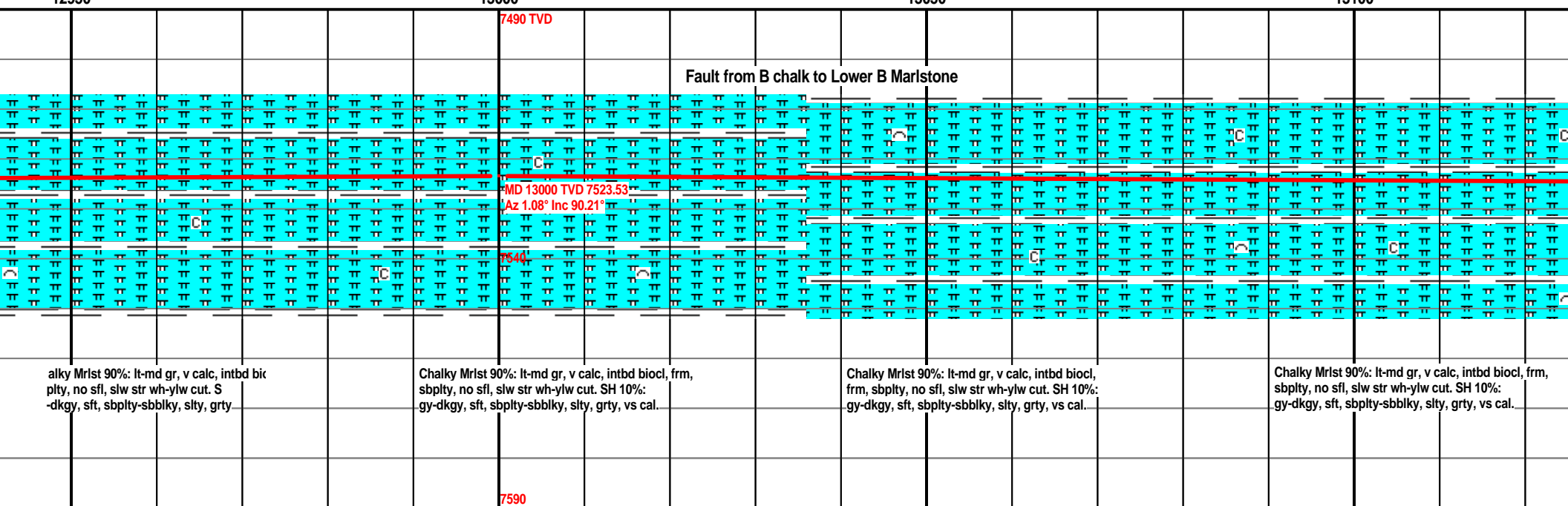
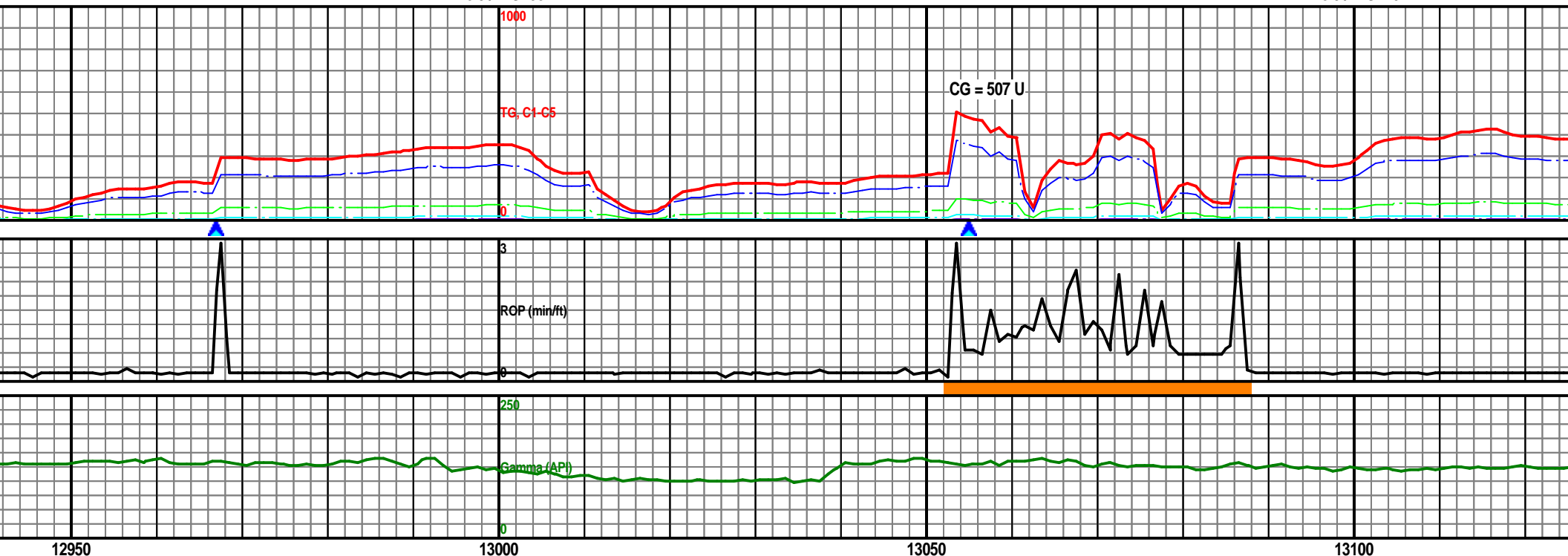
MW: 8.9 / VIS: 38





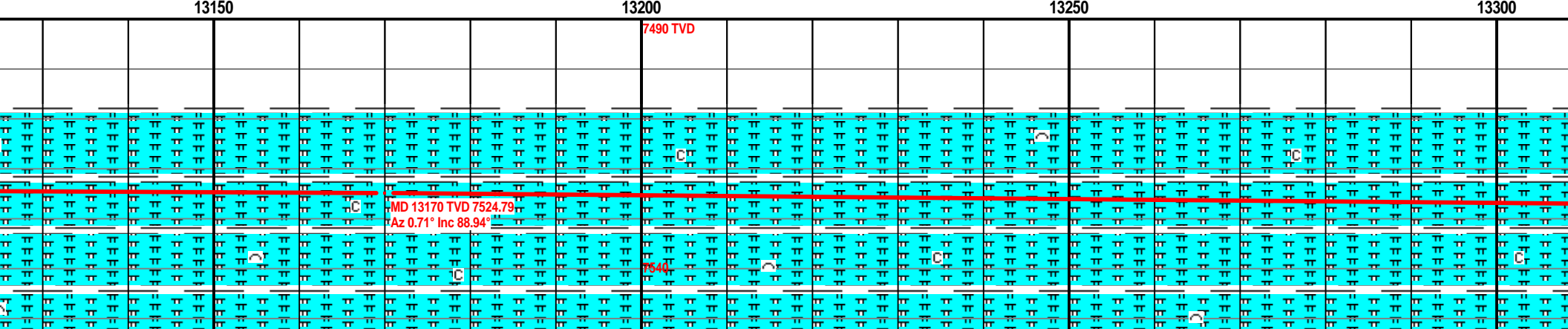
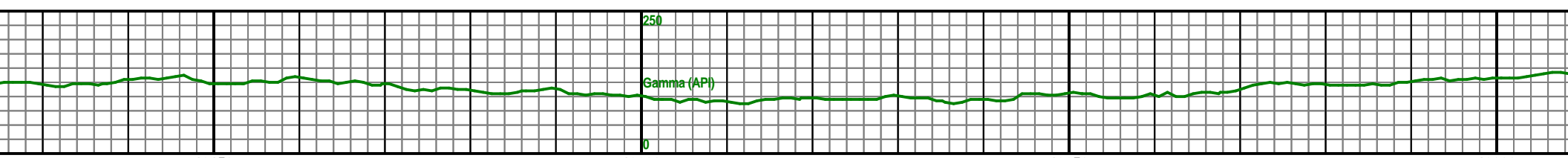
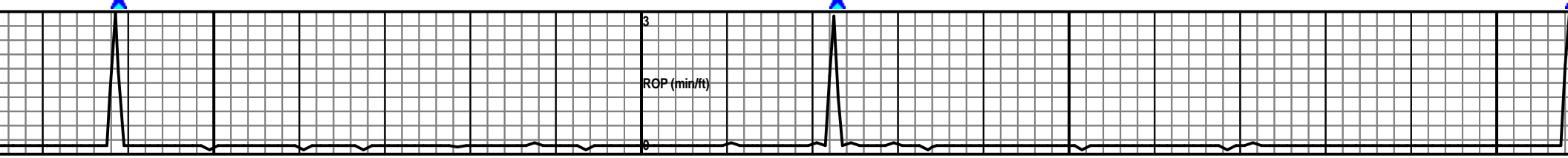
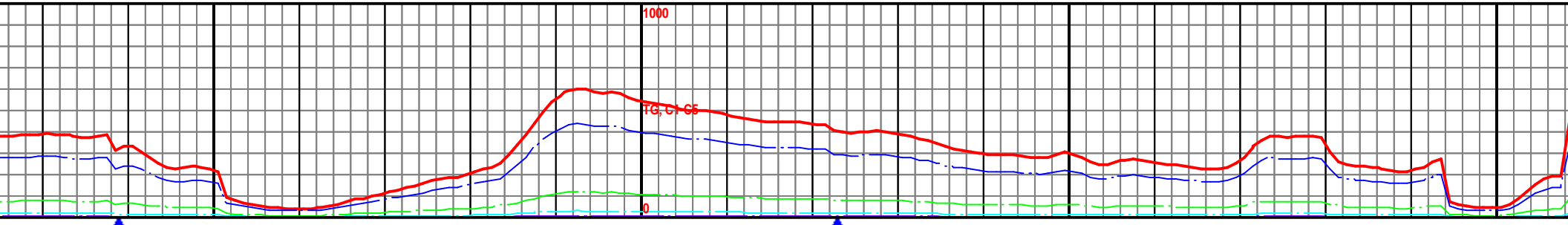
MW: 8.9 / VIS: 38

MW: 8.9 / VIS: 40



MW: 8.9 / VIS: 40

MW: 8.9 / VIS: 40



Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbkly, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl,  
frm, sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbkly, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbkly, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbkly, slty, grty, vs cal.

7590

MW: 8.9 / VIS: 40

CG = 517 U

TG, C1-C5

RGP (min/ft)

Gamma (API)

13350

13400

13450

7490 TVD

MD 13340 TVD 7527.42  
Az 1.27° Inc 89.29°

calc, intb  
-ylw cut. S  
silty, grty

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbiky, slty, grty, vs cal.

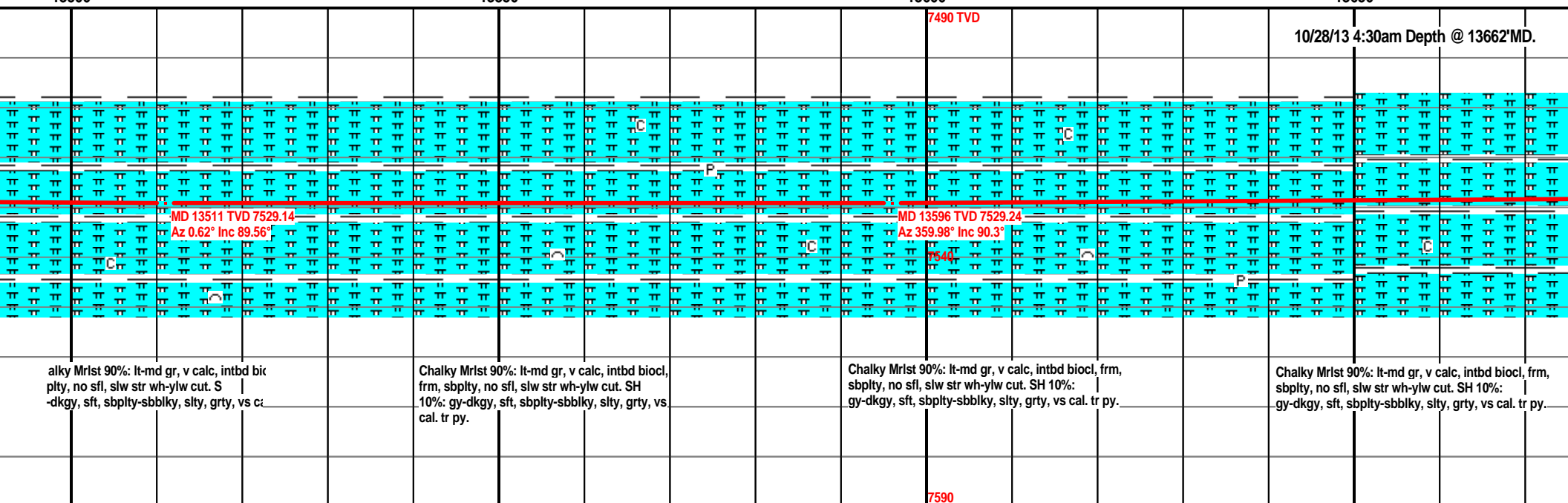
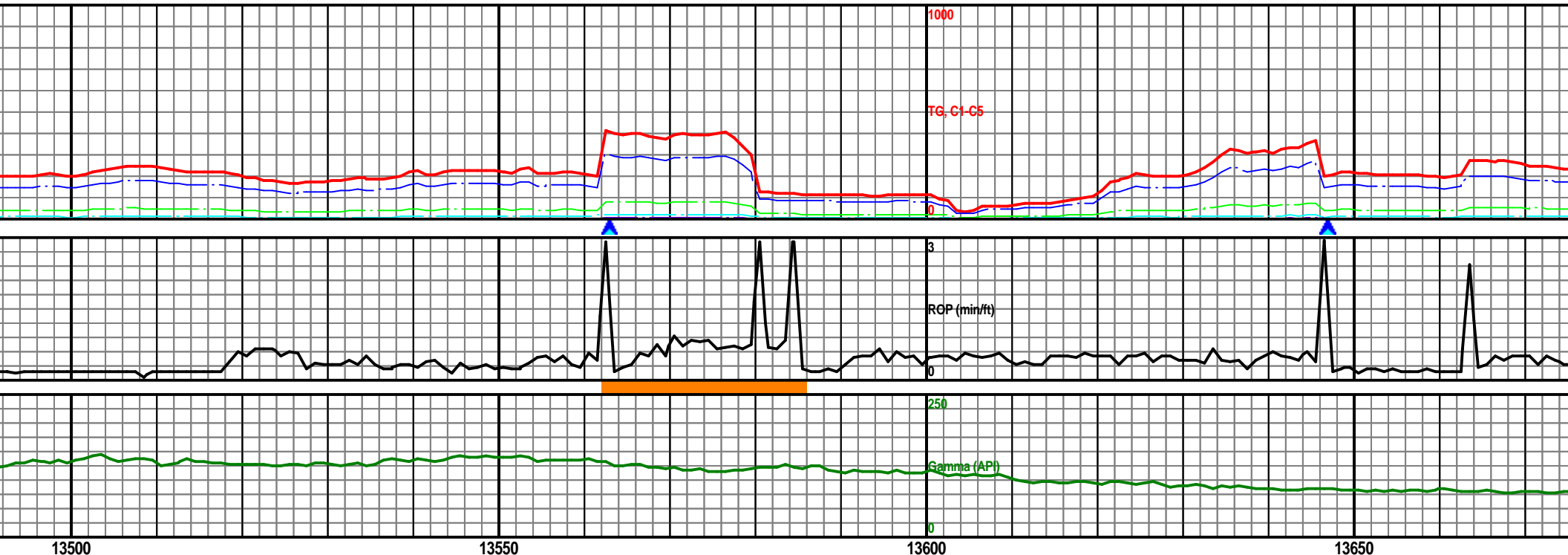
Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm,  
sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbiky, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl,  
frm, sbplty, no sfl, slw str wh-ylw cut. SH 10%:  
gy-dkgy, sft, sbplty-sbbiky, slty, grty, vs cal. tr  
py.

7590

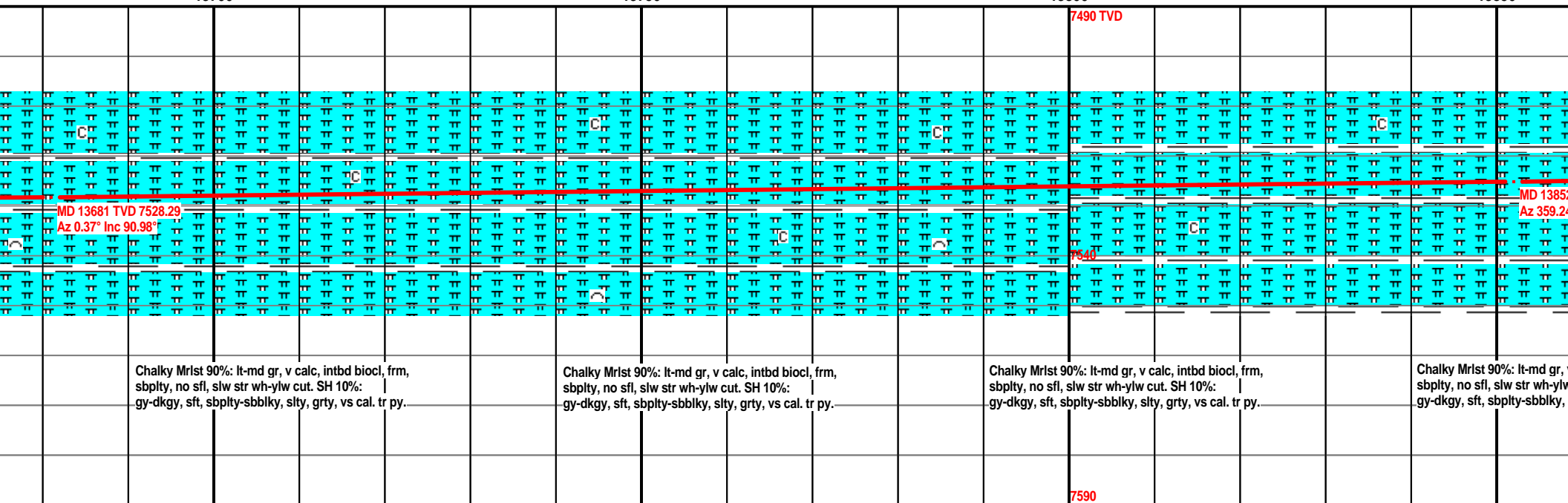
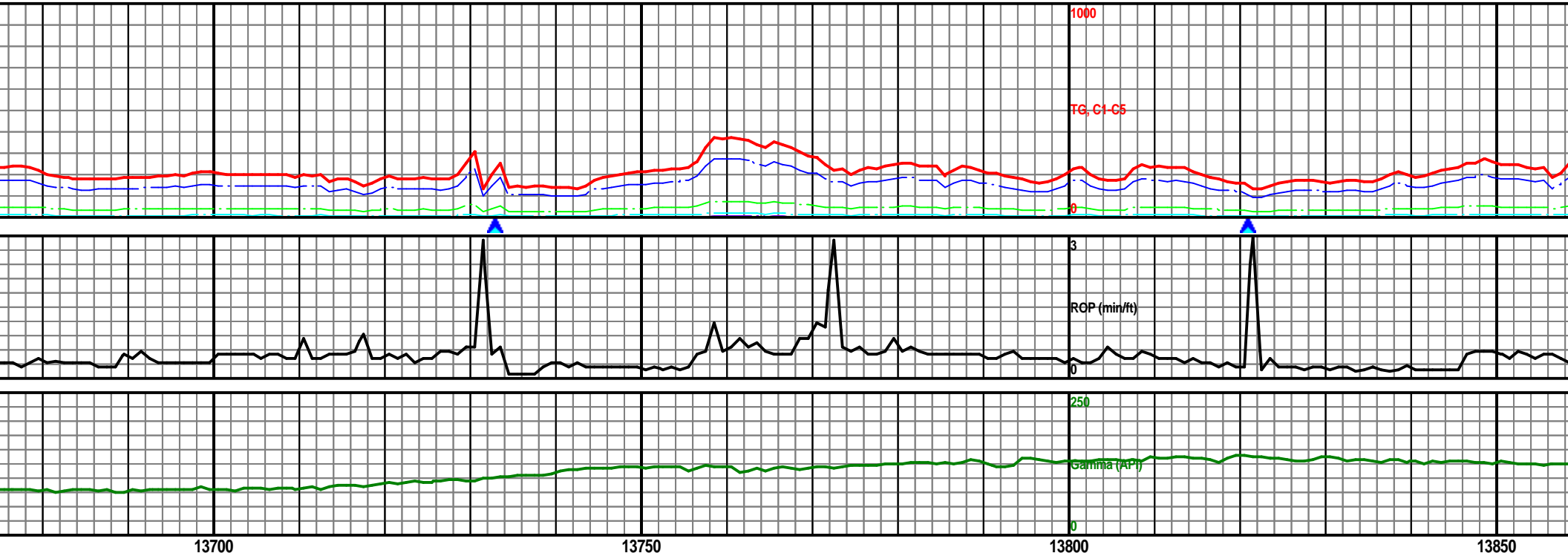
MW: 9.1 / VIS: 49

MW: 9.1 / VIS: 49



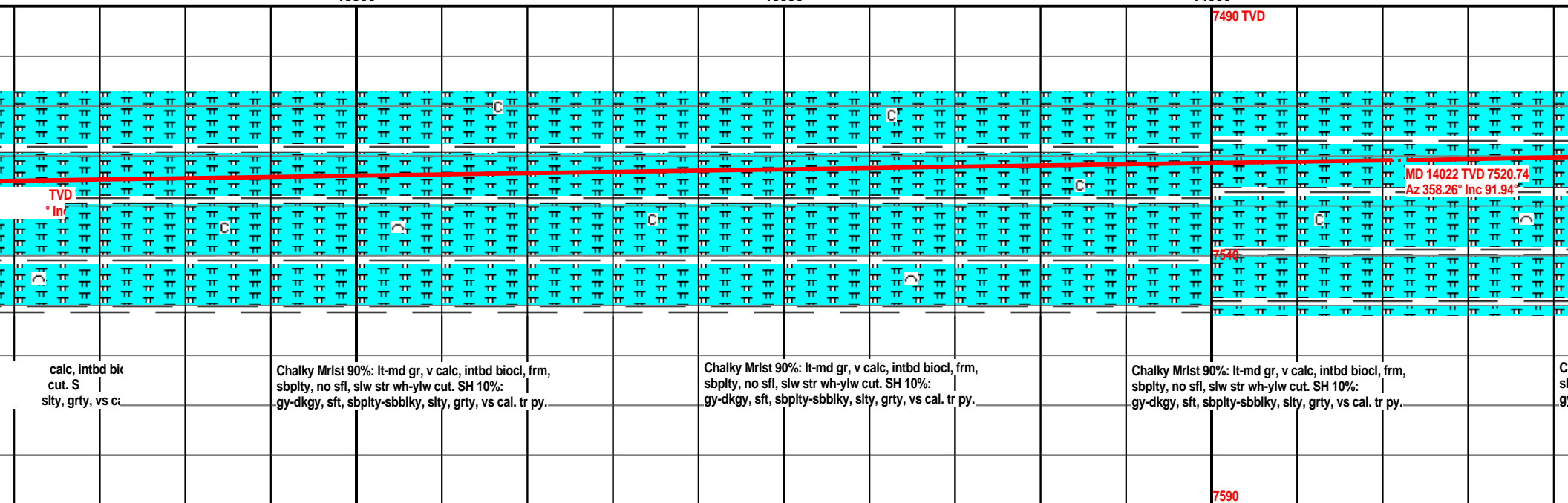
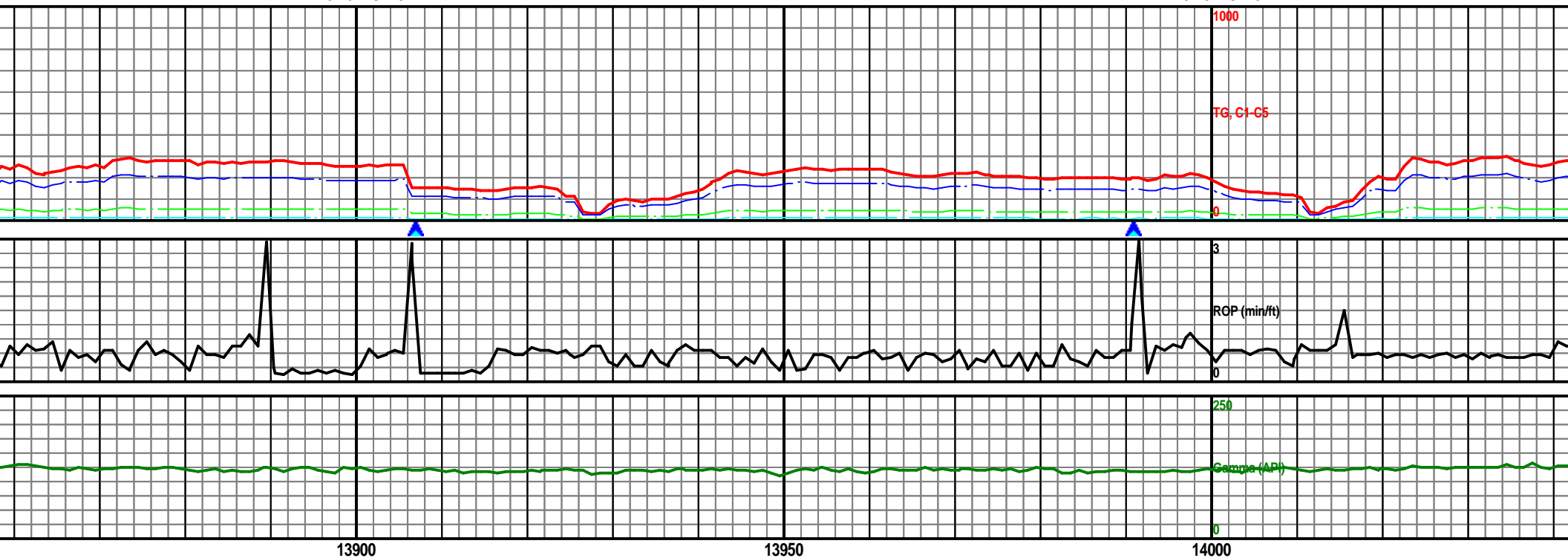
MW: 9.1 / VIS: 40

MW: 9.1 / VIS: 49



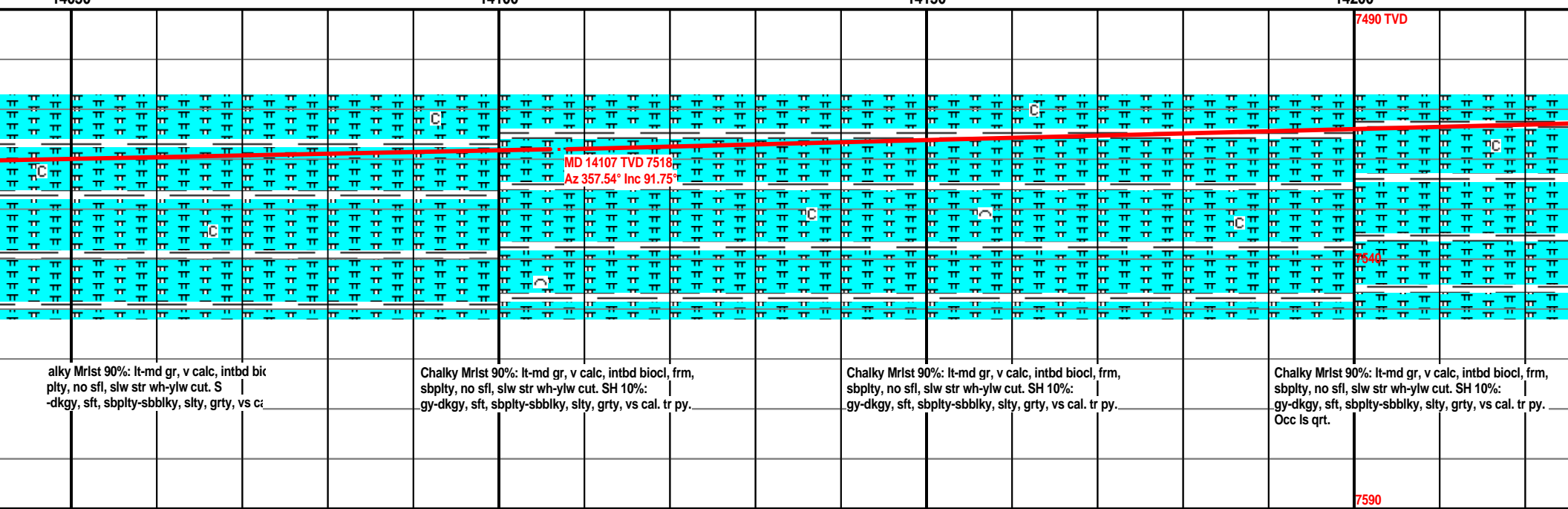
MW: 9.1 / VIS: 49

MW: 9.1 / VIS: 49



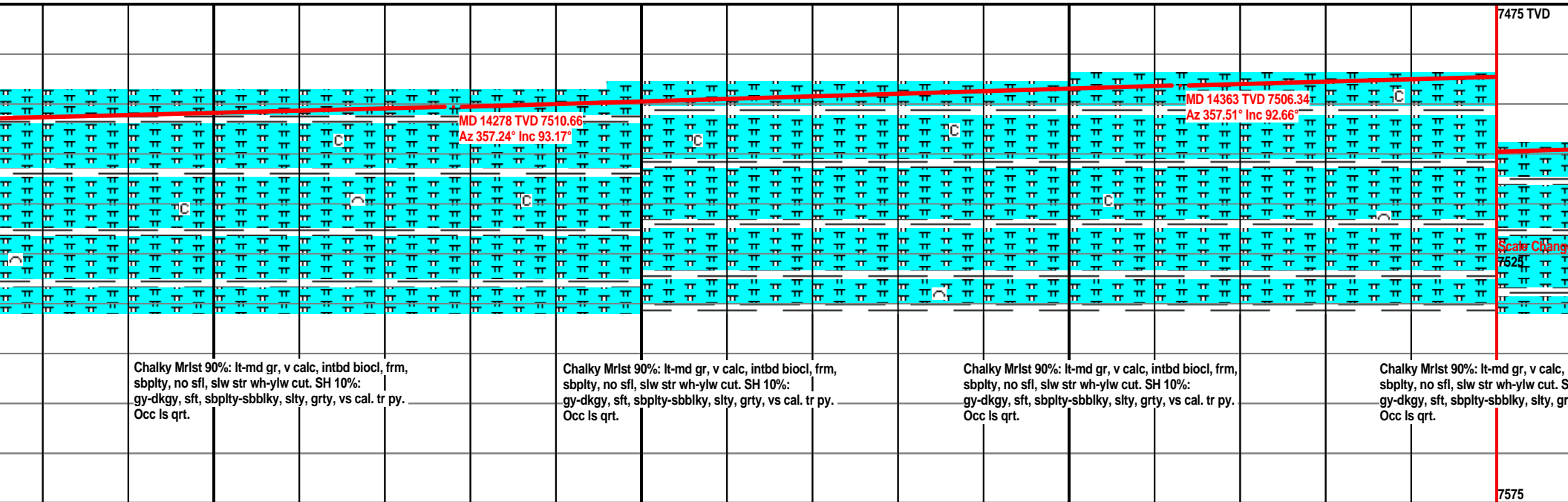
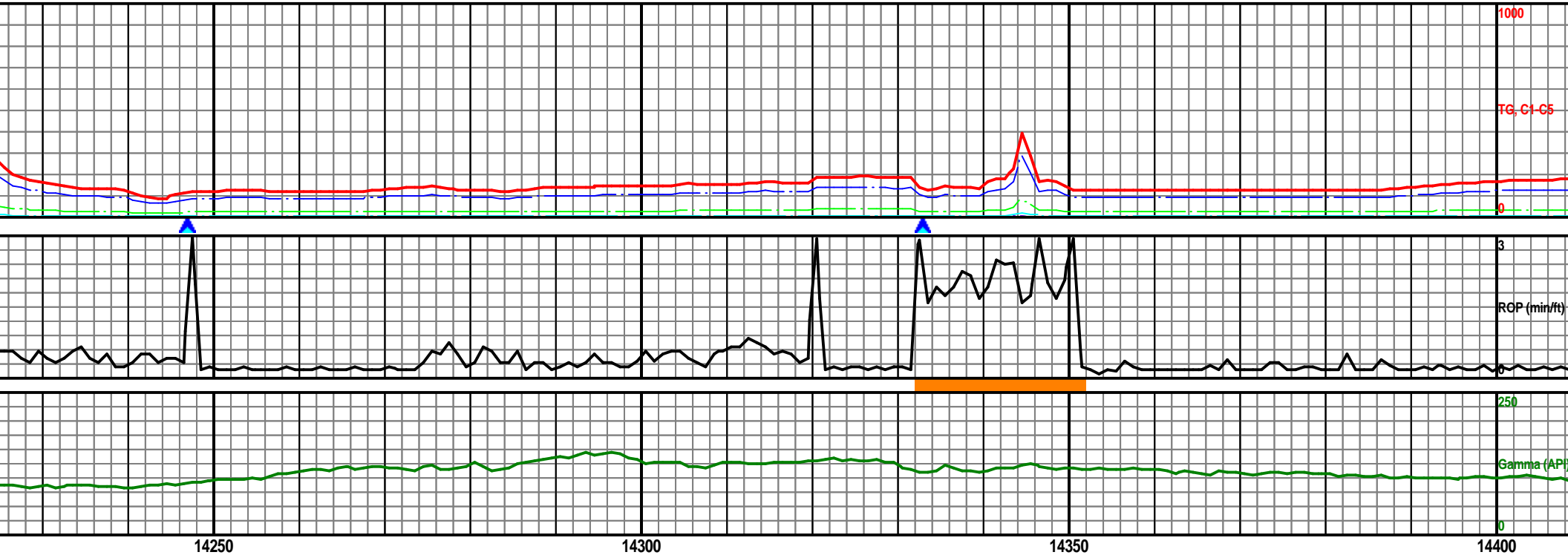
MW: 9.1 / VIS: 41

MW: 9.1 / VIS: 49



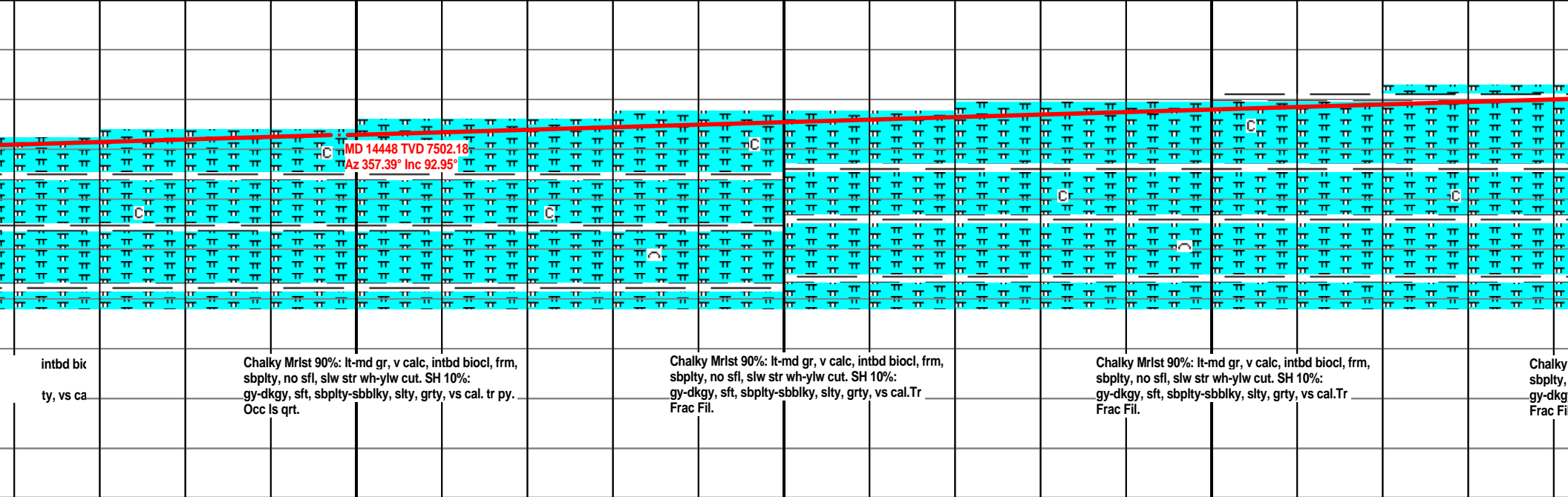
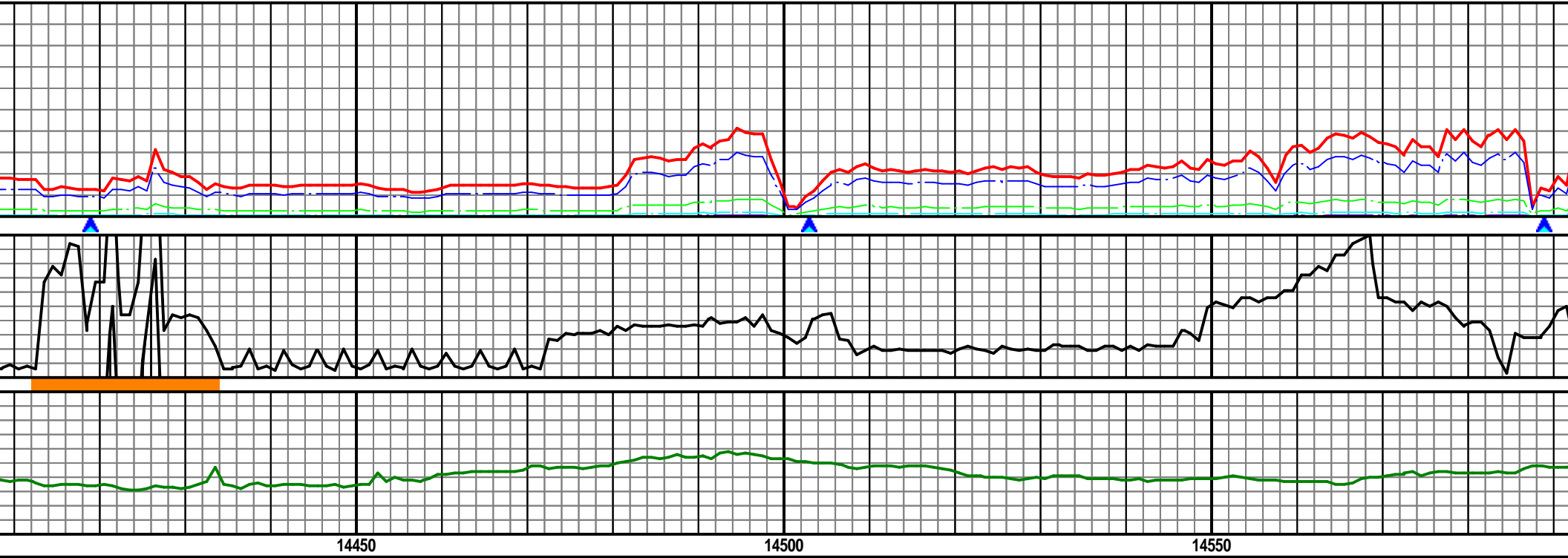
MW: 9.2 / VIS: 40

MW: 9.4 / VIS: 39



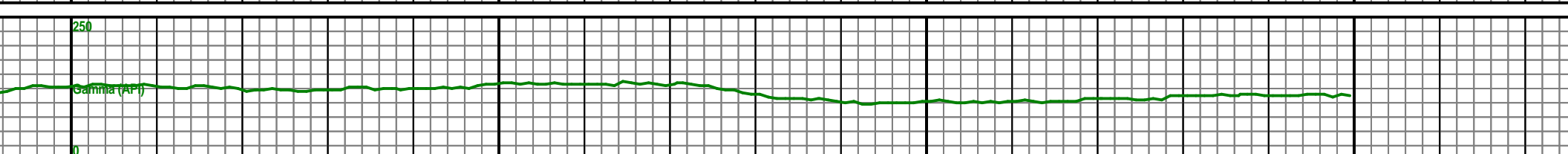
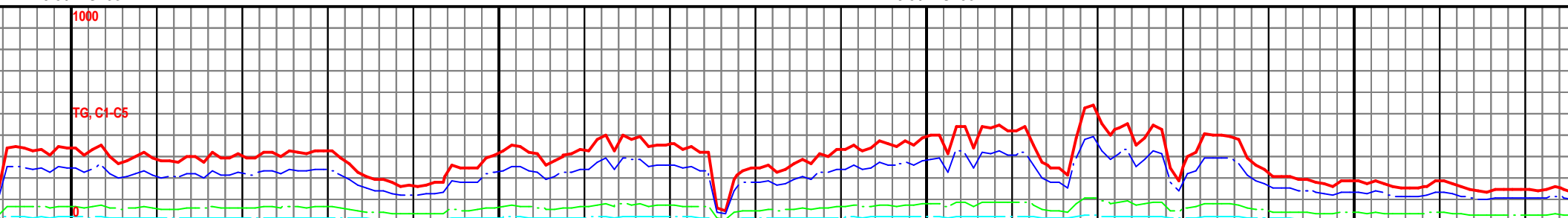


MW: 9.5 / VIS: 38

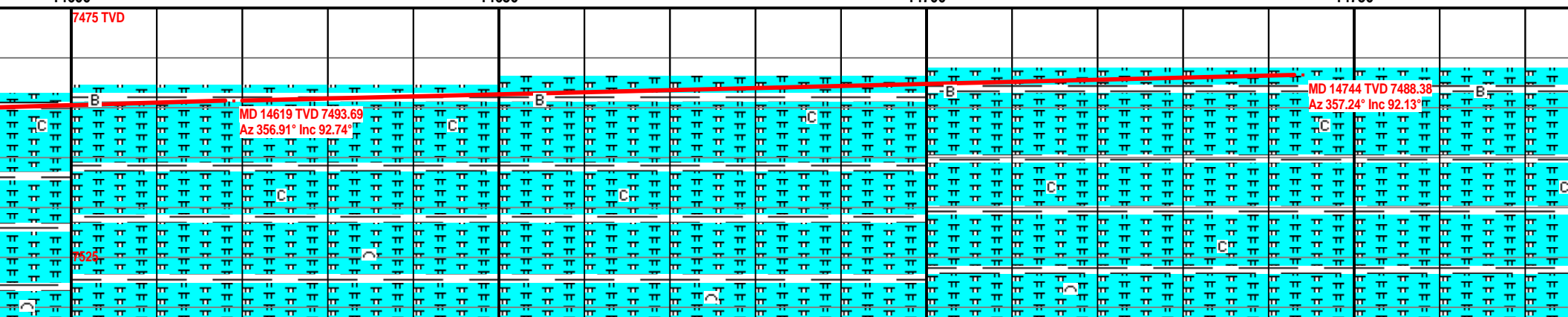


MW: 9.5 / VIS: 38

MW: 9.5 / VIS: 38



14600 14650 14700 14750



Mrlst 90%: lt-md gr, v calc, intbd biol, frm, sbply, no sfl, slw str wh-ylw cut. S  
sft, sbply-sbblky, slty, grty, vs cal.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm, sbply, no sfl, slw str wh-ylw cut. SH 10%: gy-dkgy, sft, sbply-sbblky, slty, grty, vs cal. Tr  
Frac Fil, Tr Bent.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm, sbply, no sfl, slw str wh-ylw cut. SH 10%: gy-dkgy, sft, sbply-sbblky, slty, grty, vs cal. Tr  
Bent.

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm, sbply, no sfl, slw str wh-ylw cut. SH 10%: gy-dkgy, sft, sbply-sbblky, slty, grty, vs cal. Tr  
Bent.

7575

MW: 9.5 / VIS: 38

TD of 14800' MD Achieved @ 10:50pm 10/28/13. T.O.O.H to make reamer run.

TG, C1-C5

Casing Trip Gas = 1170 U

ROP (min/ft)

Two man logging unit with sample program and gas analyzer released 11/01/13.

14800

7475 TVD

7525

7575

Chalky Mrlst 90%: lt-md gr, v calc, intbd biocl, frm, sbppty, no sfl, slw str wh-ylw cut. SH 10%: gy-dkgy, sft, sbppty-sbbkly, slty, grty, vs cal. Tr Bent.