



Scale 1:240 (5"=100') Imperial  
Measured Depth Log

Well Name: Horsetail 30G-3139  
API: 0512343032  
Location: SWNE SEC 30-T10N-R57W  
License Number:  
Spud Date: 1/5/2017  
Surface Coordinates: Lat.: 40.810528 Long.: -103.792342

Region: Redtail Field  
Drilling Completed: 1/10/2017

Bottom Hole  
Coordinates:  
Ground Elevation (ft): 4740  
Logged Interval (ft): 5150 To: 13980  
Formation: Niobrara  
Type of Drilling Fluid: Water Based Mud

K.B. Elevation (ft): 4761  
Total Depth (ft): 13980

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

#### OPERATOR

Company: Whiting Oil & Gas Corp.  
Address: 1700 Broadway Suite 2300  
Denver, CO 80290

#### GEOLOGIST

Name: Todd Nakata, Kyle Newman, and Craig Dreiling  
Company: Acme Geologic Consulting  
Address: 108 Berry Street  
Little Rock, AR 72205

## Drilling Company

Unit Drilling Company  
Rig 406

## Gas Detection

Mudlogging Systems, Inc., M Logger, Model TGC, Total Gas and Chromatograph

## Comments

Lithologies and tops at drilled depths, not corrected to elogs. Where the well bore gas is 100% methane, the C1 line is moved to 85% for graphical purposes only.

## ROCK TYPES

 Anhy  
 Bent  
 Brec  
 Cht  
 Clyst

 Coal  
 Congl  
 Dol  
 Gyp  
 Igne

 Lmst  
 Meta  
 Cyan mrlst  
 Mrlst  
 Salt

 Shale  
 Shcol  
 Shgy  
 Sltst  
 Ss







 Till  
 Cyan chk  
 Chalk

## ACCESSORIES

**MINERAL**  
 Anhy  
 Arggrn  
 Arg  
 Bent  
 Bit  
 Brecfrag  
 Calc  
 Carb  
 Chtdk  
 Chtlt  
 Dol  
 Feldspar  
 Ferrpel  
 Ferr  
 Glau

 Gyp  
 Hvymin  
 Kaol  
 Marl  
 Minxl  
 Nodule  
 Phos  
 Pyr  
 Salt  
 Sandy  
 Silt  
 Sil  
 Sulphur  
 Tuff

**FOSSIL**  
 Algae  
 Amph  
 Belm  
 Bioclst  
 Brach  
 Bryozoa  
 Cephal  
 Coral  
 Crin  
 Echin  
 Fish  
 Foram  
 Fossil  
 Gastro  
 Oolite








 Ostra  
 Pelec  
 Pellet  
 Pisolite  
 Plant  
 Strom

**STRINGER**  
 Anhy  
 Arg  
 Bent  
 Coal  
 Dol  
 Gyp  
 Ls  
 Mrst

 Sltstrg  
 Ssstrg

**TEXTURE**  
 Boundst  
 Chalky  
 Cryxln  
 Earthy  
 Finexln  
 Grainst  
 Lithogr  
 Microxln  
 Mudst  
 Packst  
 Wackest

**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**



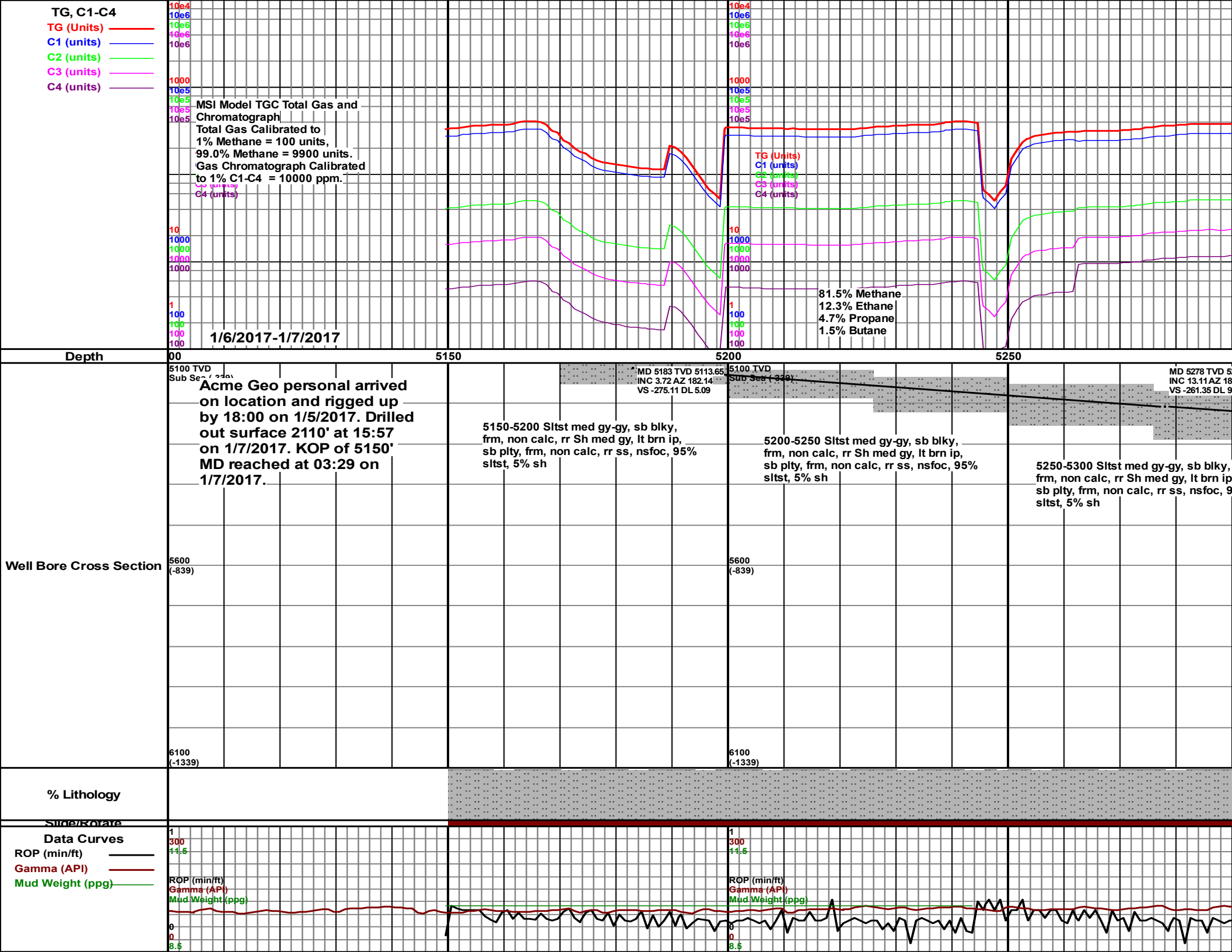
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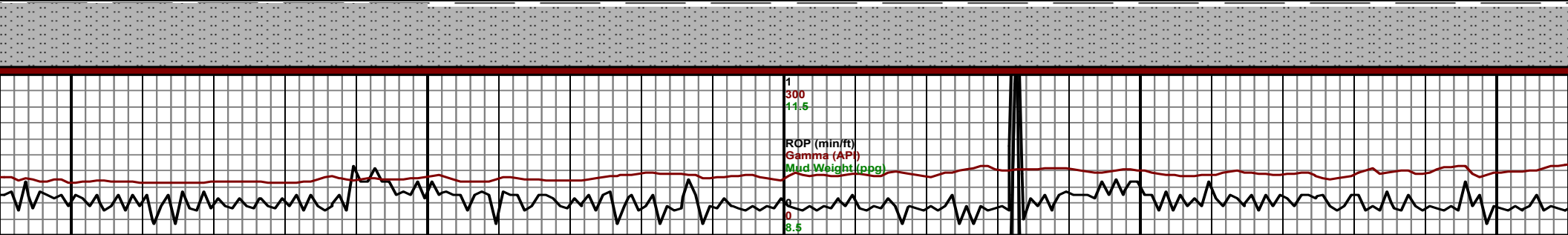
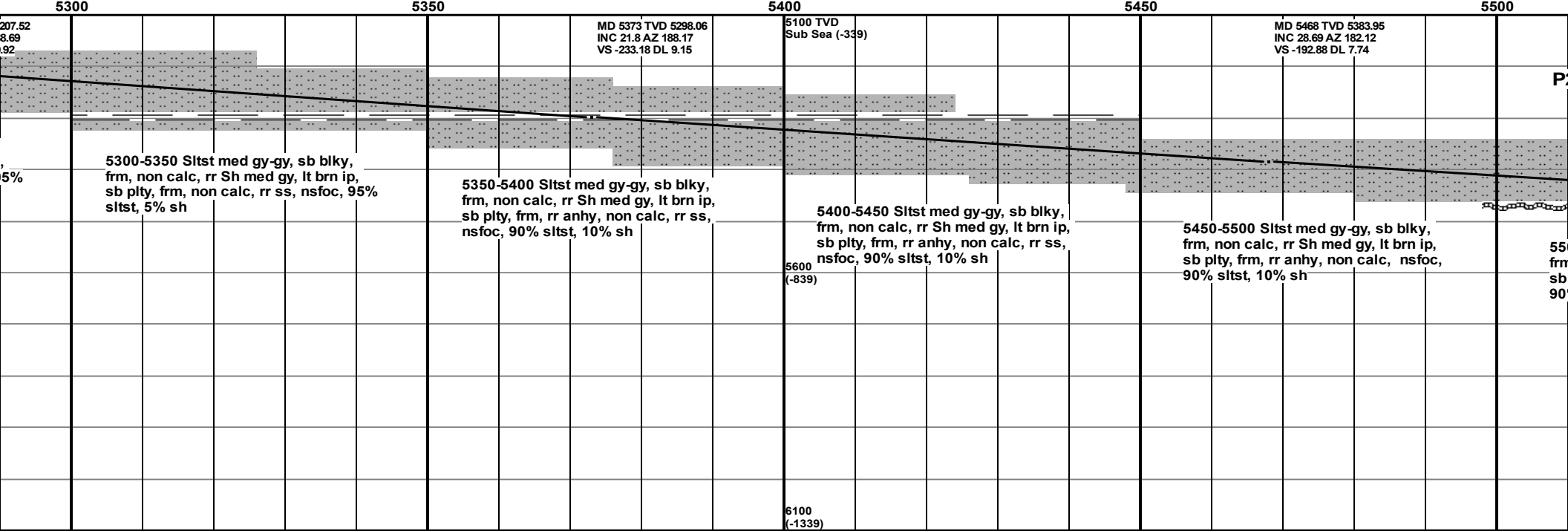
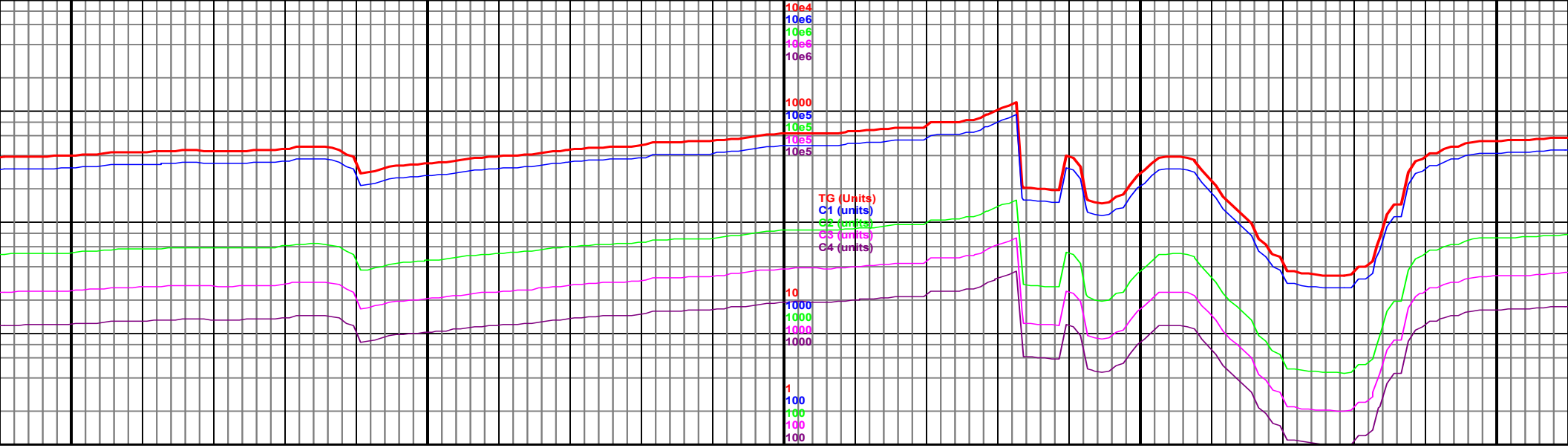
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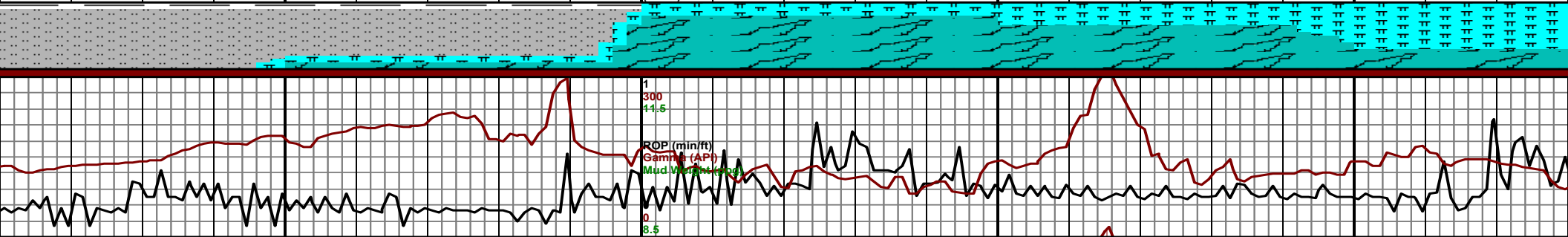
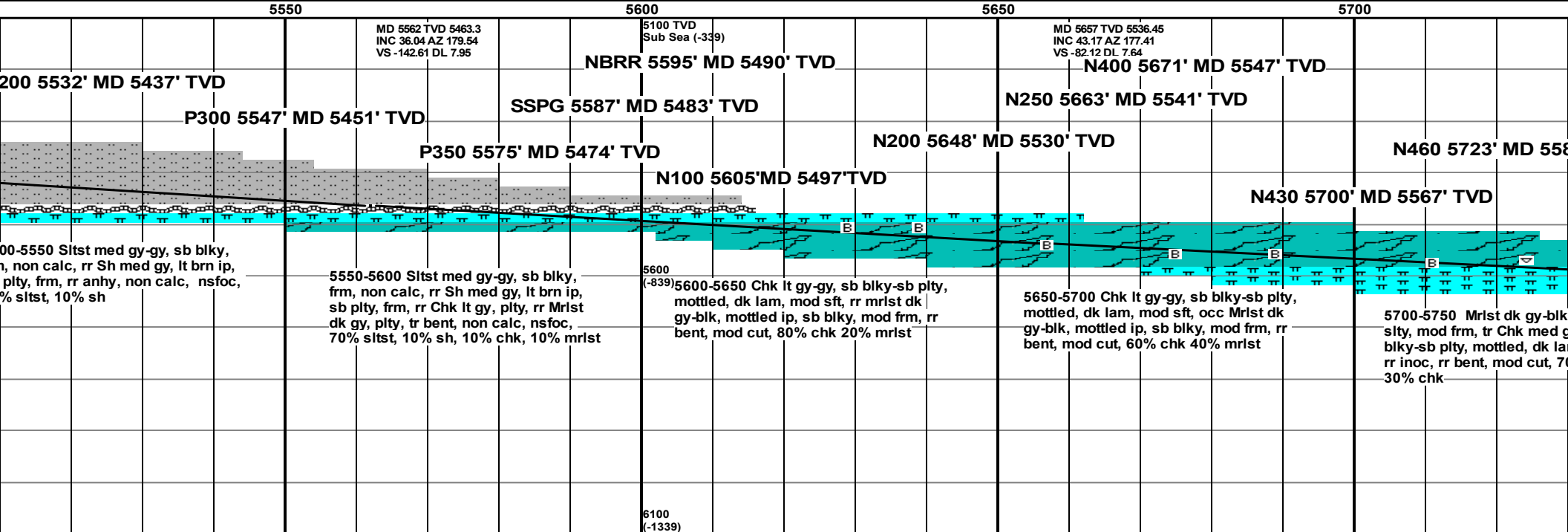
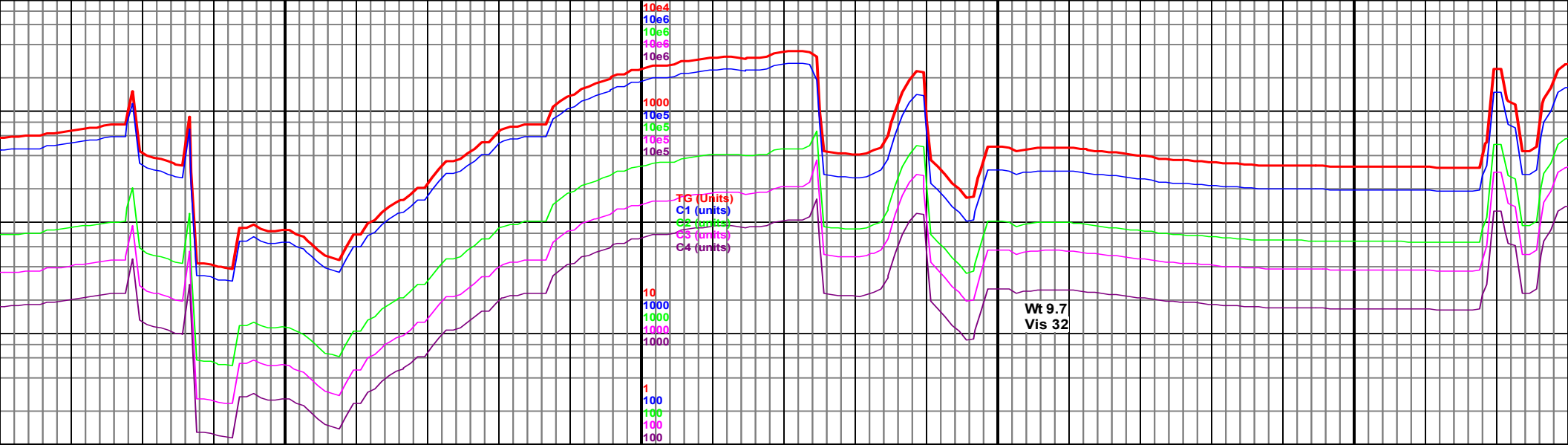
-  Core
-  Dst

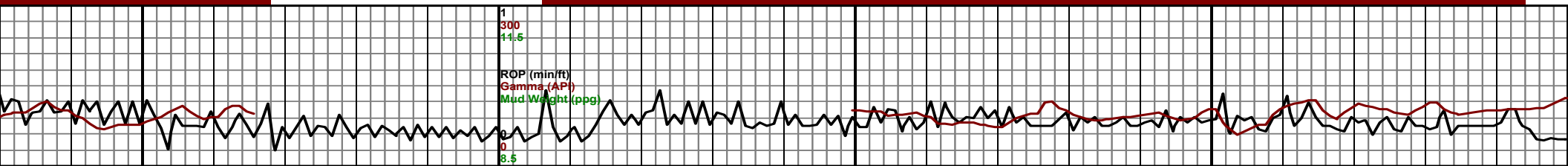
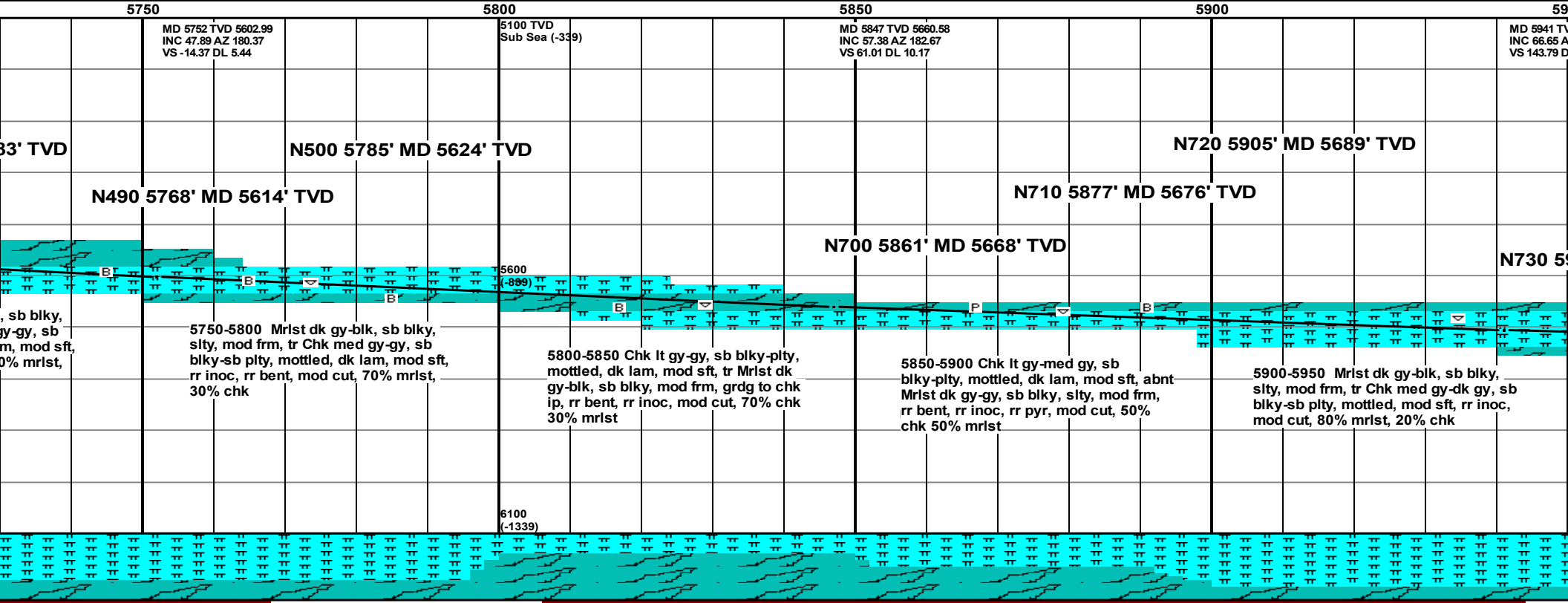
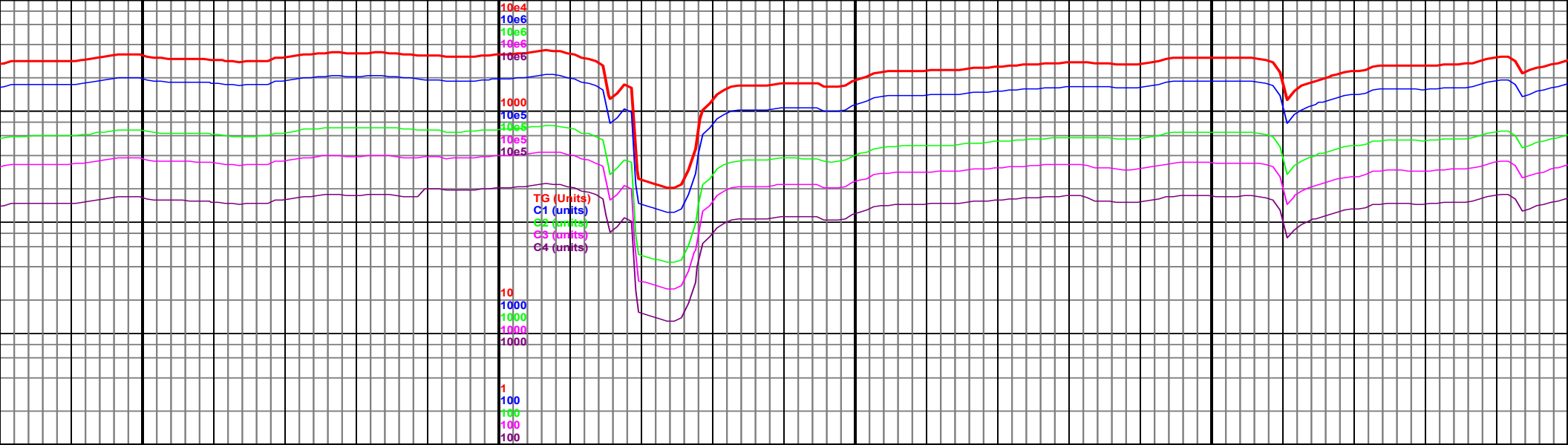
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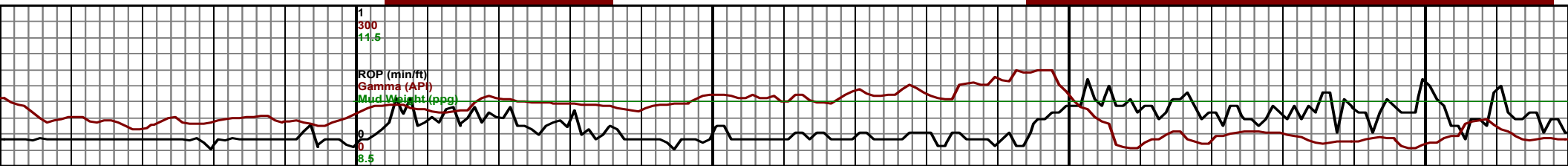
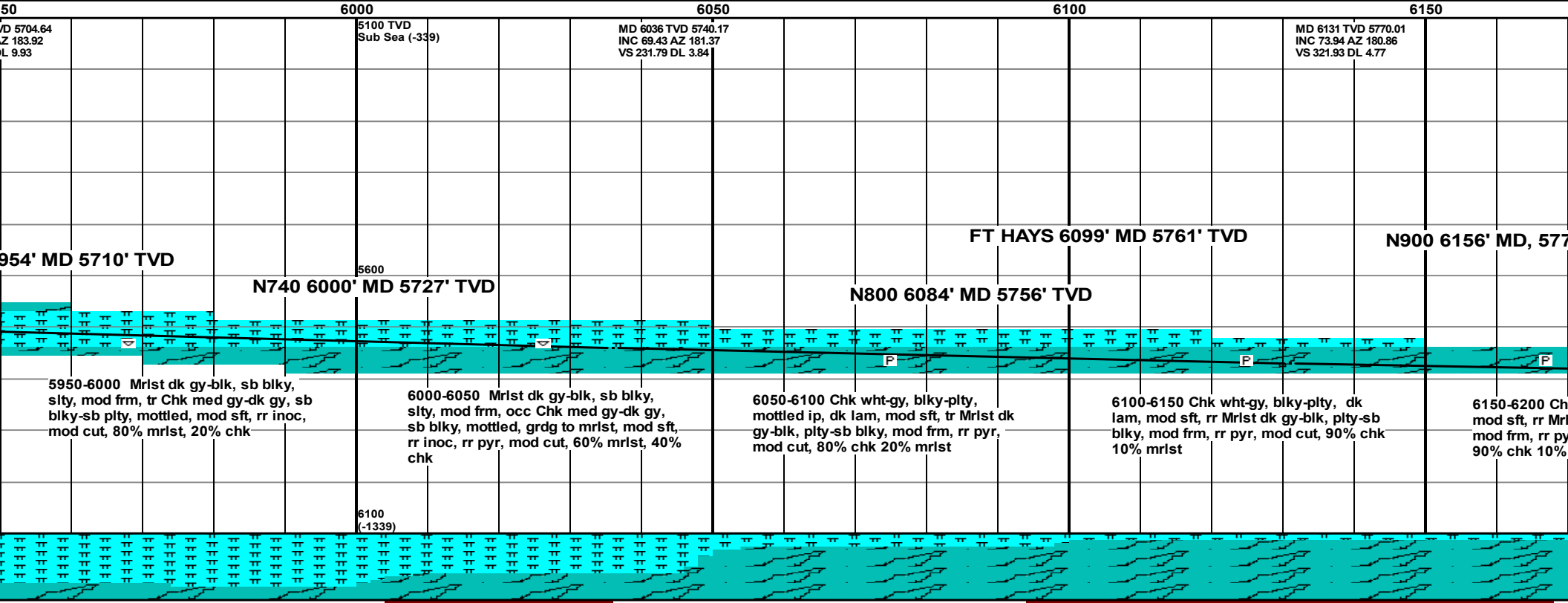
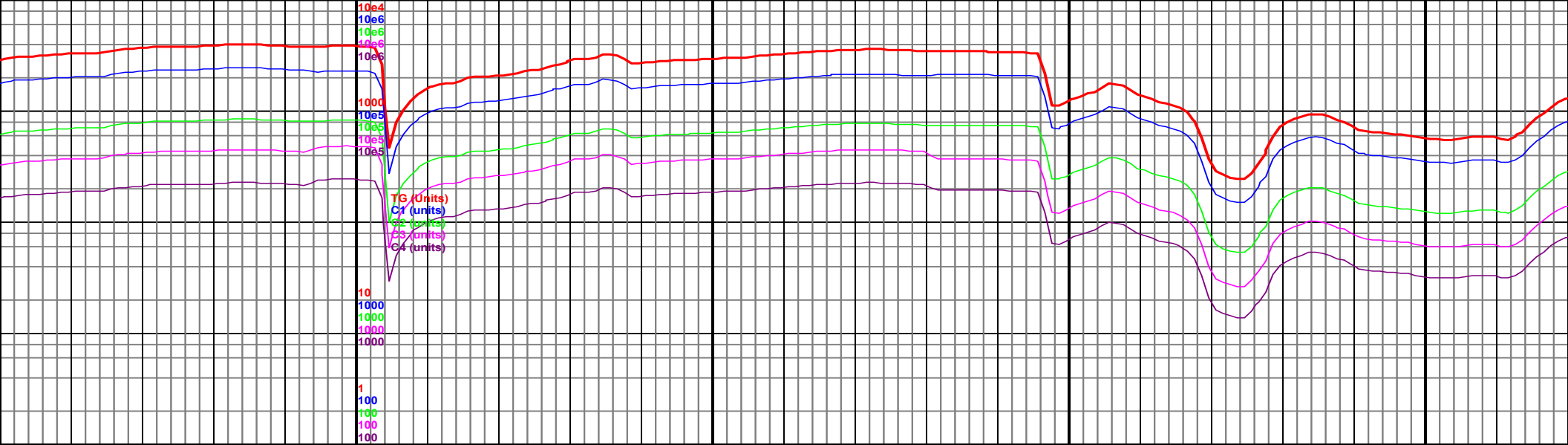
-  Rft
-  Sidewall



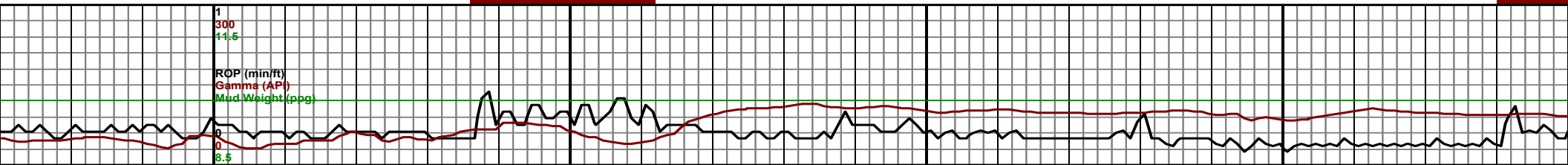
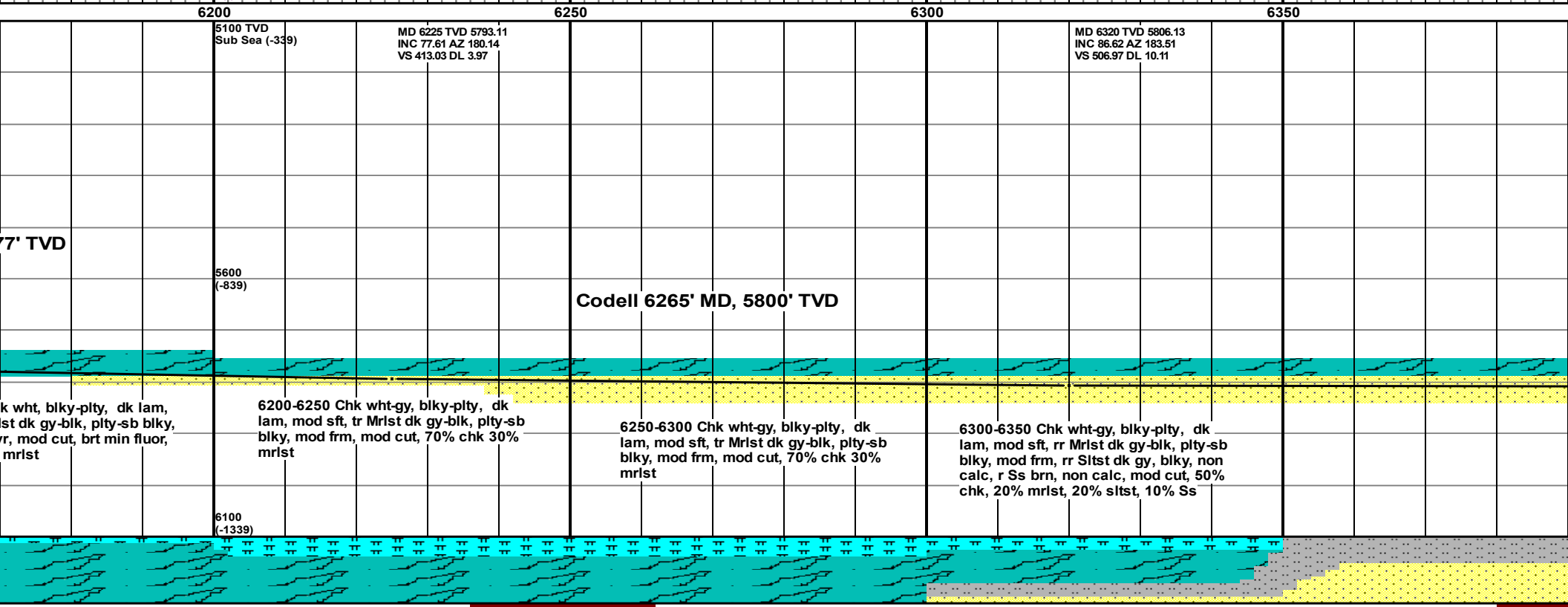
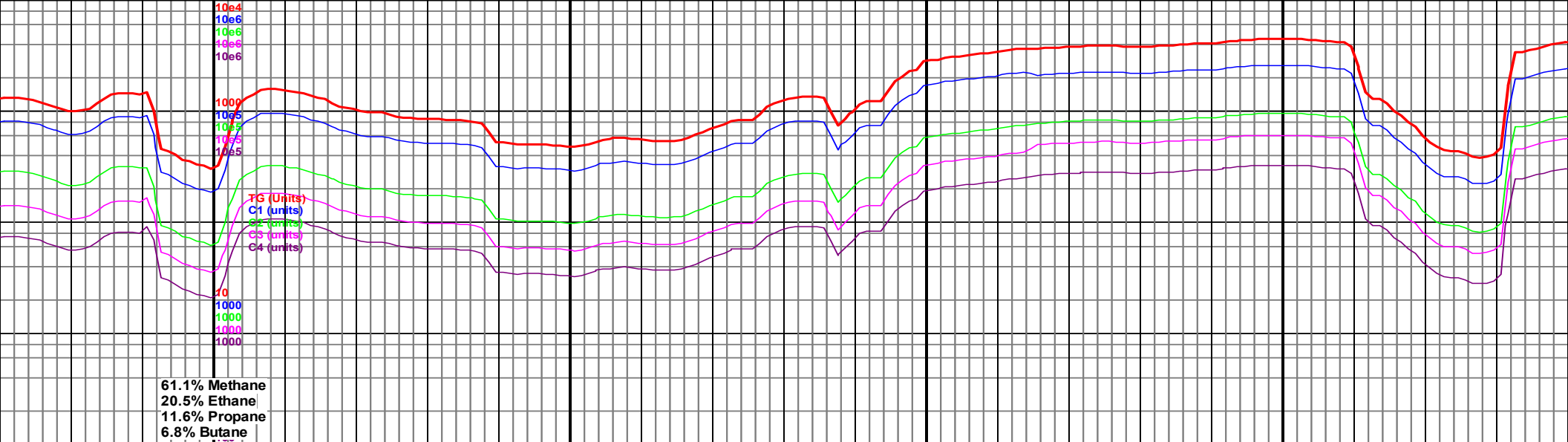


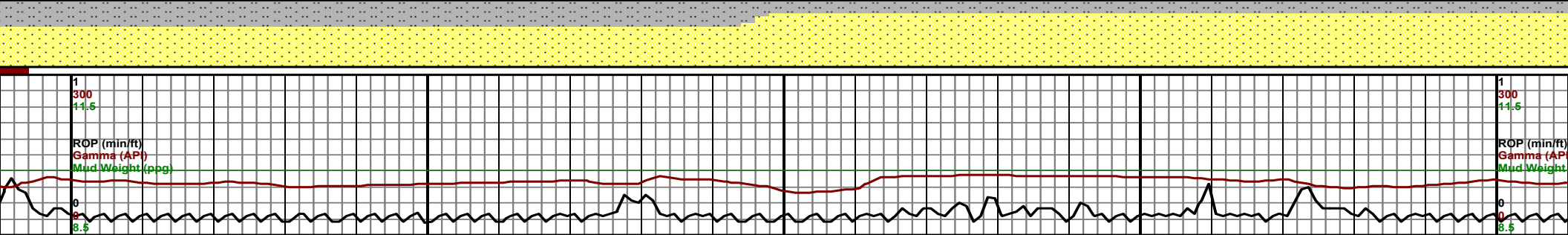
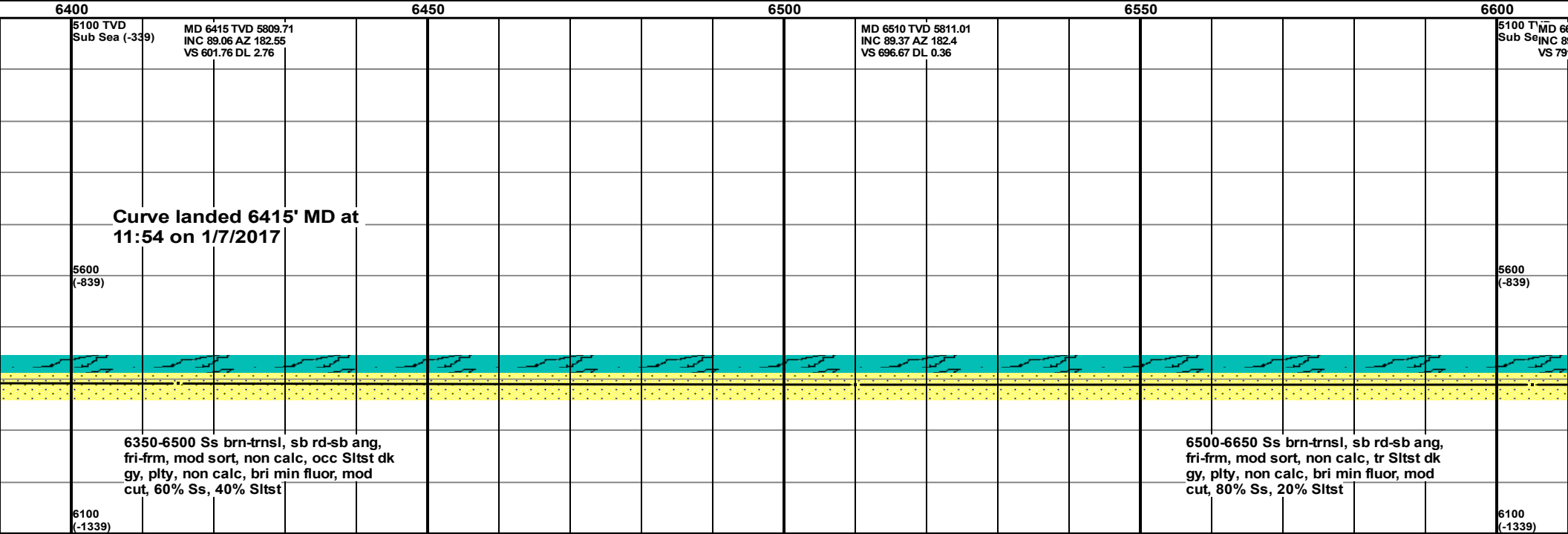
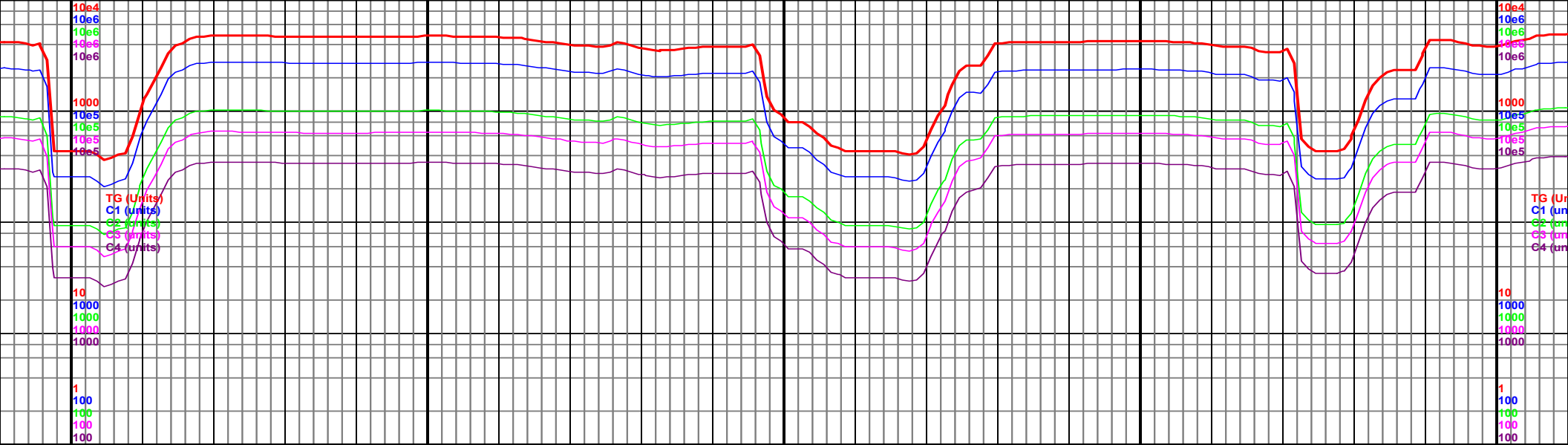


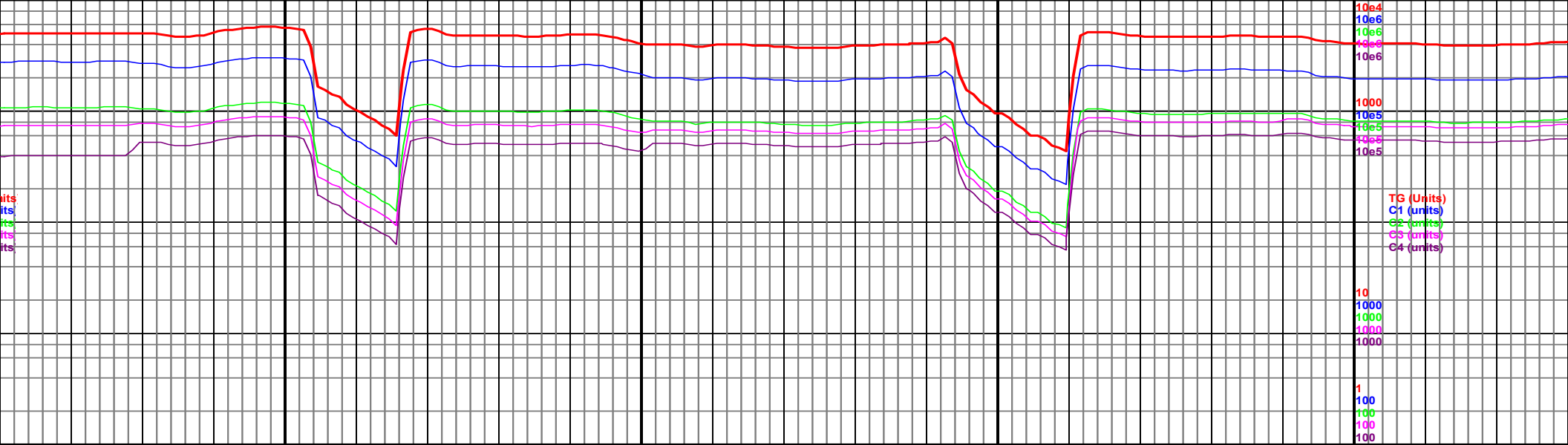












MD 6695 TVD 5811.76  
INC 9.73 AZ 182.5  
VS 1.58 DL 0.39

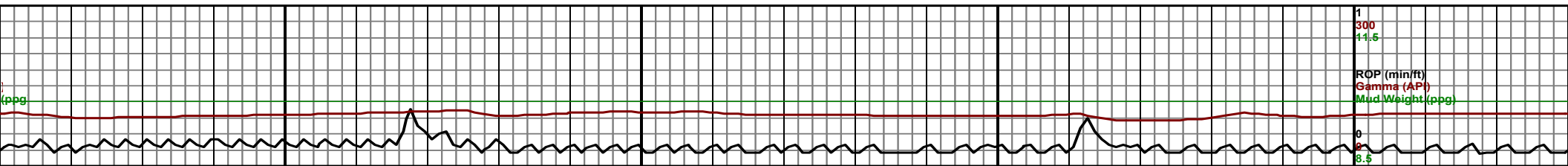
MD 6699 TVD 5812.04  
INC 89.93 AZ 181.62  
VS 885.51 DL 0.96

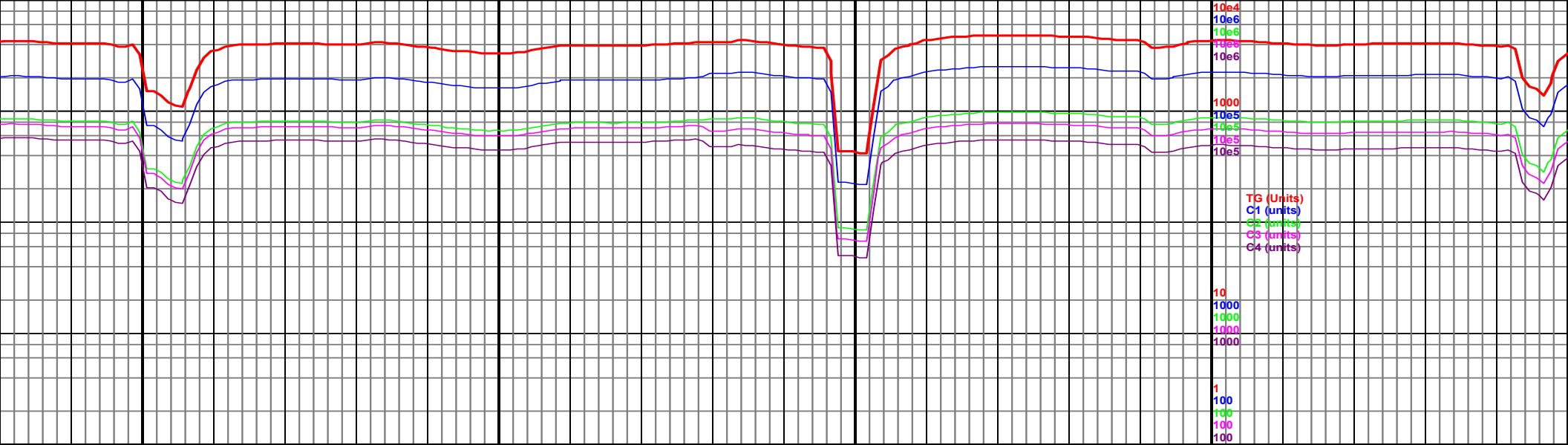
MD 6794 TVD 5811.38  
INC 90.86 AZ 180.94<sup>(9)</sup>  
VS 980.49 DL 1.21

6650-6800 Ss brn-trnsl, sb rd-sb ang,  
fri-uncons, mod sort, non calc, rr Sltst  
dk gy, plty, non calc, bri min fluor, mod  
cut, 80% Ss, 20% Sltst

5600  
(-839)

6100  
(-1339)





6850

6900

6950

7000

70

MD 6888 TVD 5809.91  
INC 90.94 AZ 179.47  
VS 1074.47 DL 1.57

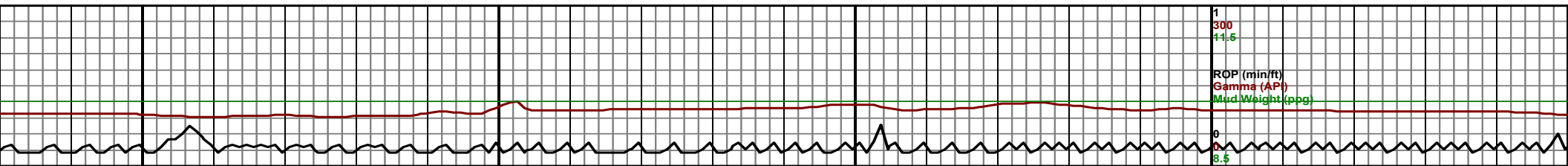
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VS 1169.46 DL 0.86

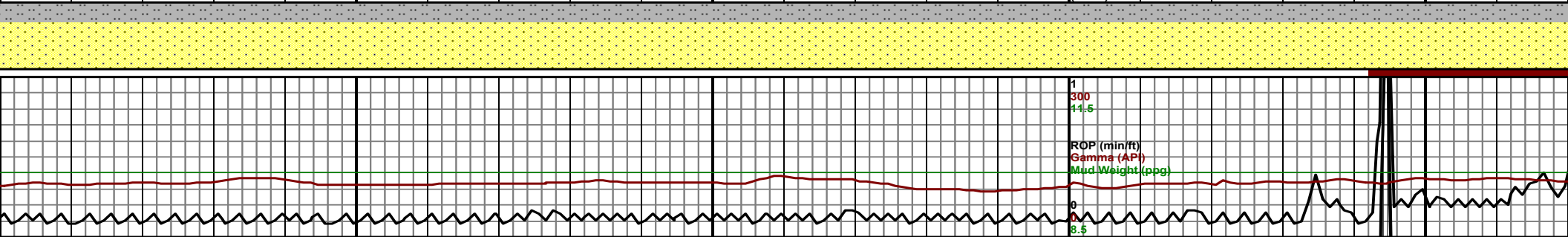
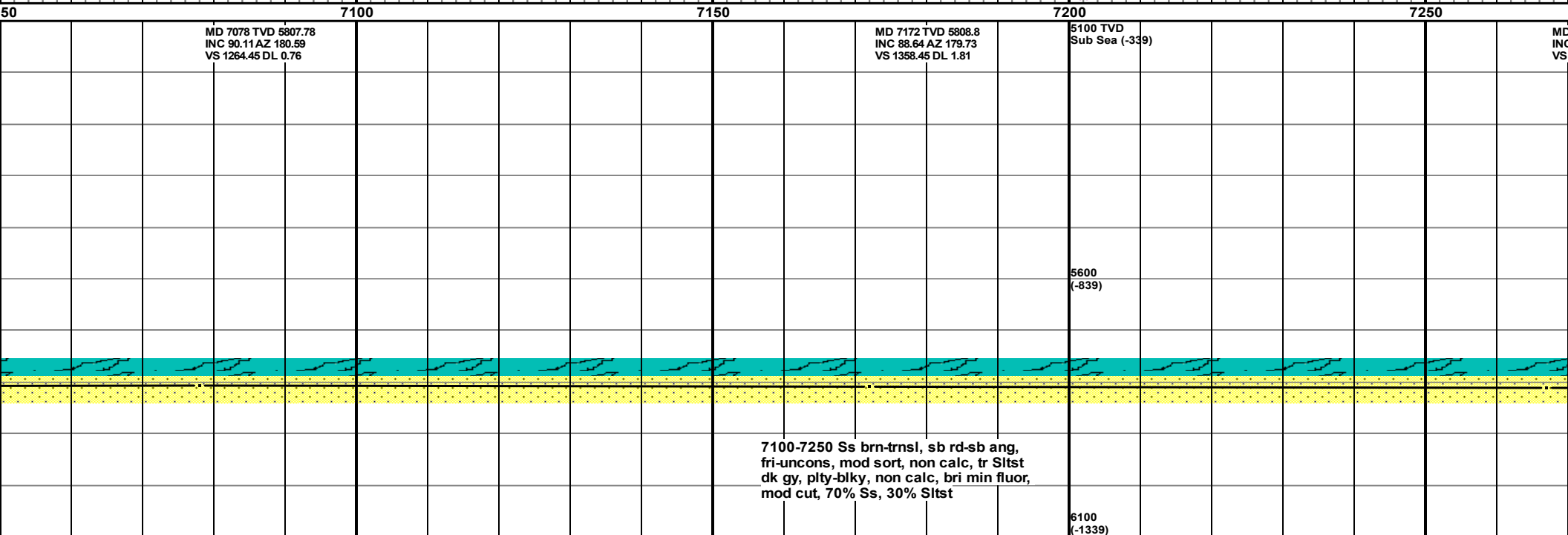
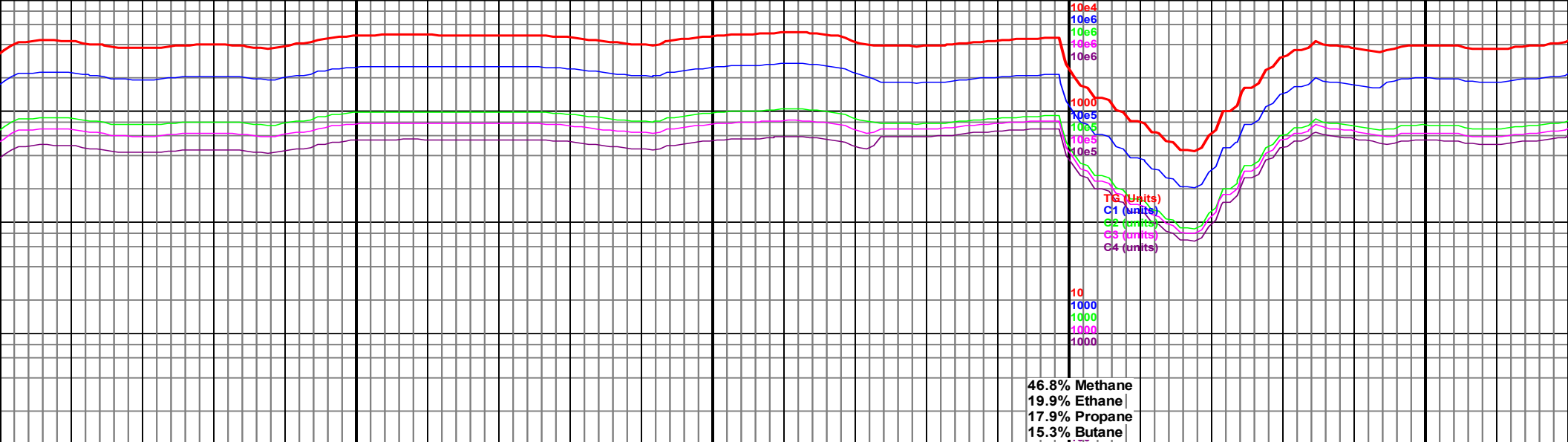
5100 TVD  
Sub Sea (-339)

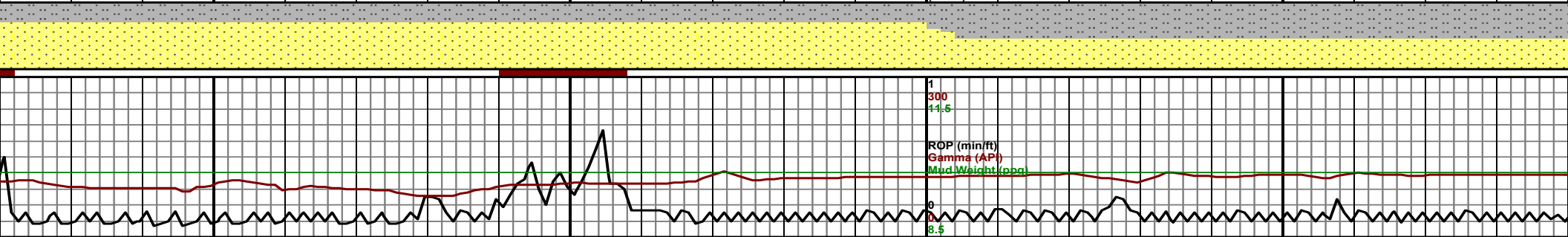
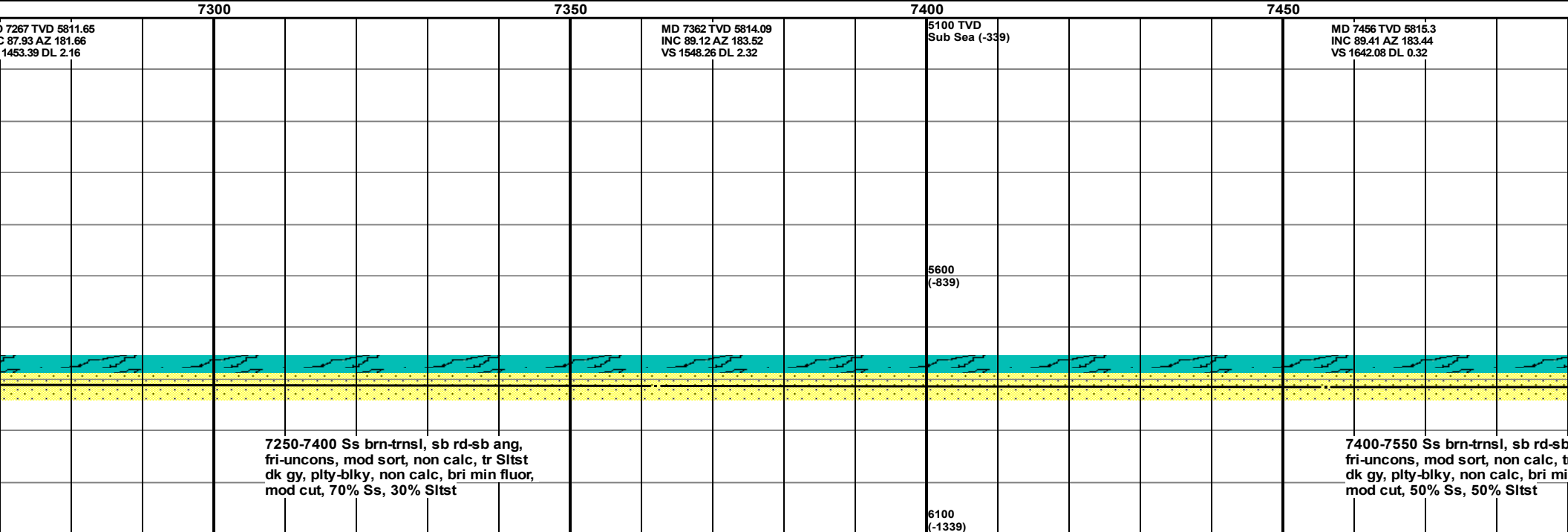
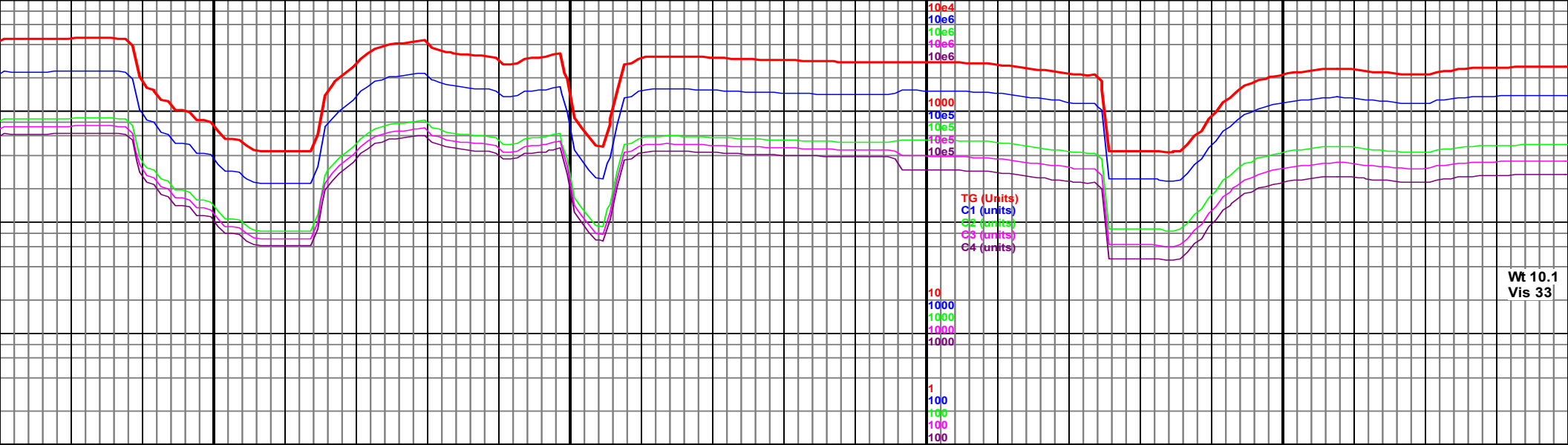
6800-6950 Ss brn-trnsl, sb rd-sb ang,  
fri-uncons, mod sort, non calc, rr Sltst  
dk gy, plty, non calc, bri min fluor, mod  
cut, 80% Ss, 20% Sltst

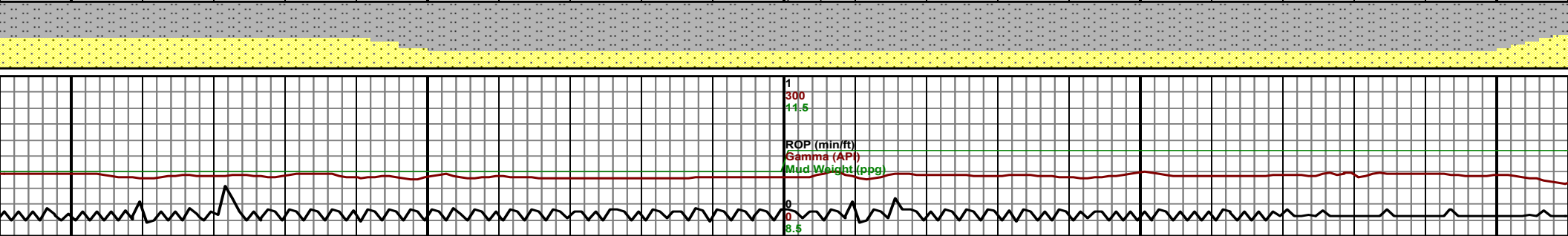
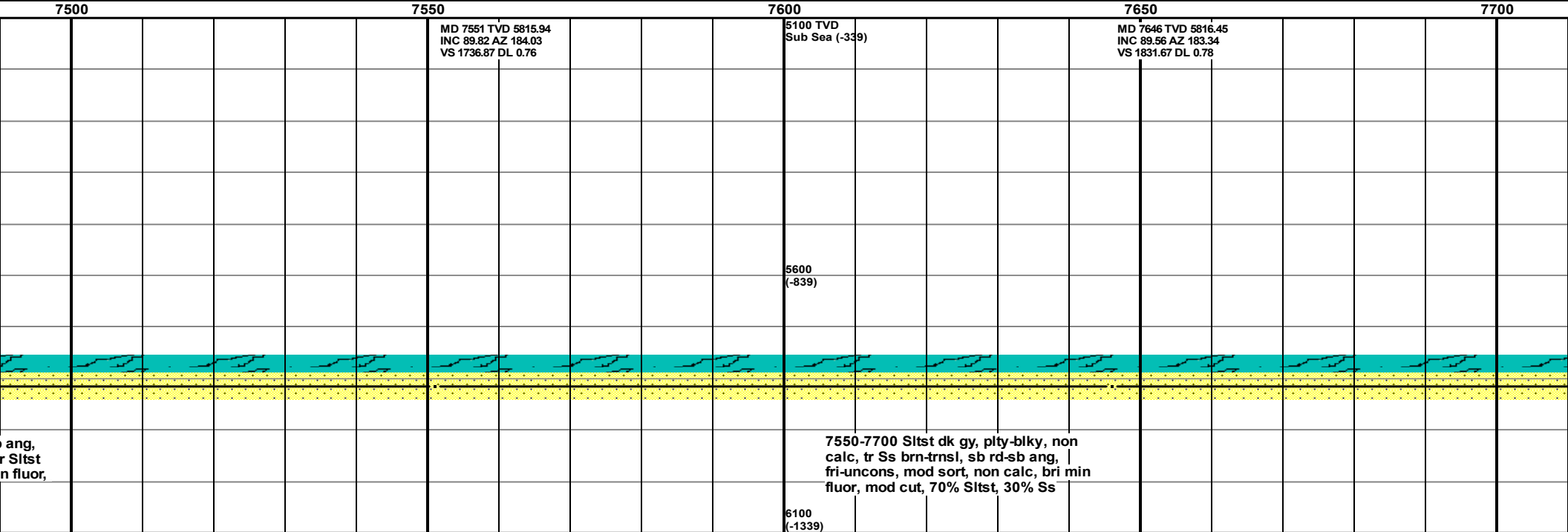
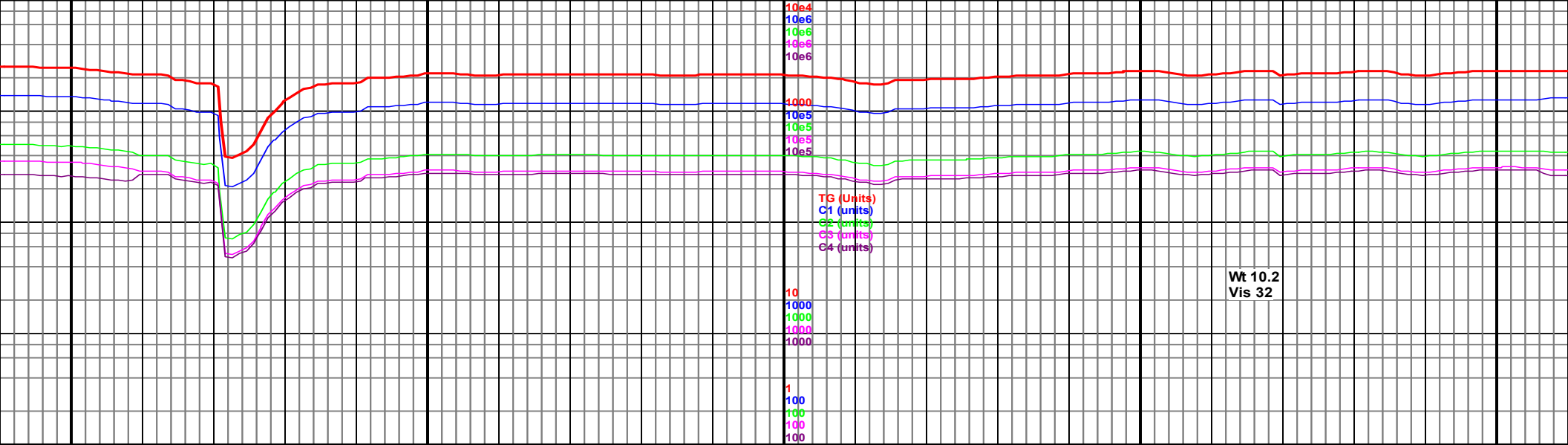
6950-7100 Ss brn-trnsl, sb rd-sb ang,  
fri-uncons, mod sort, non calc, tr Sltst  
dk gy, plty-blky, non calc, bri min fluor,  
mod cut, 70% Ss, 30% Sltst

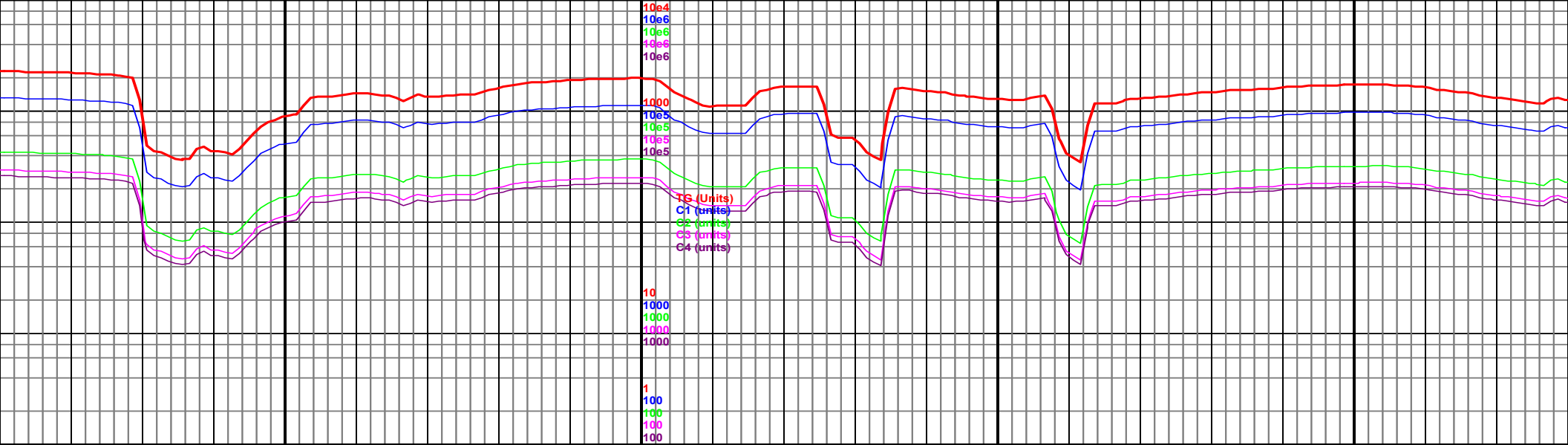
6100  
(-1339)











7750  
MD 7740 TVD 5815.29  
INC 91.85 AZ 183.81  
VS 1925.48 DL 2.49

7800  
5100 TVD  
Sub Sea (-339)

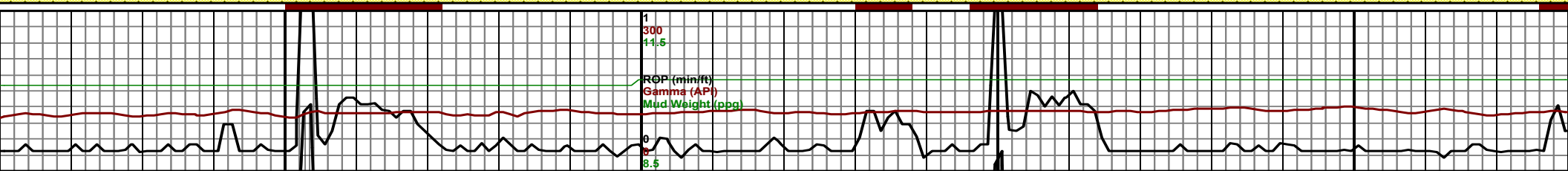
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MD 7835 TVD 5812.36  
INC 91.69 AZ 182.36  
VS 2020.29 DL 1.53

7900

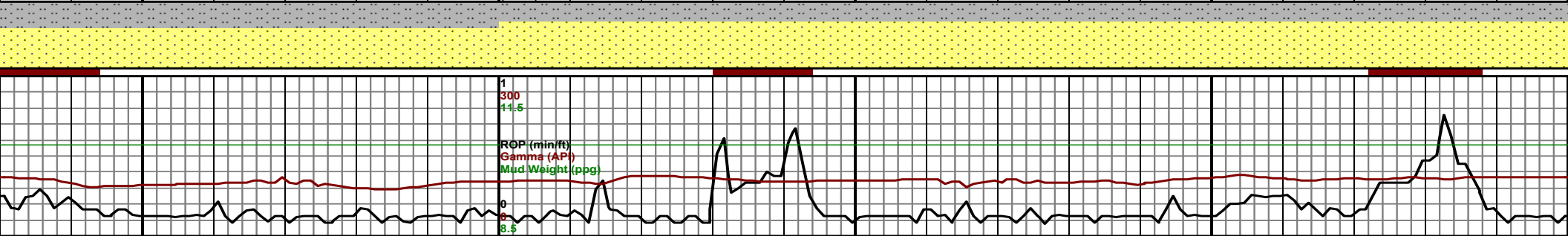
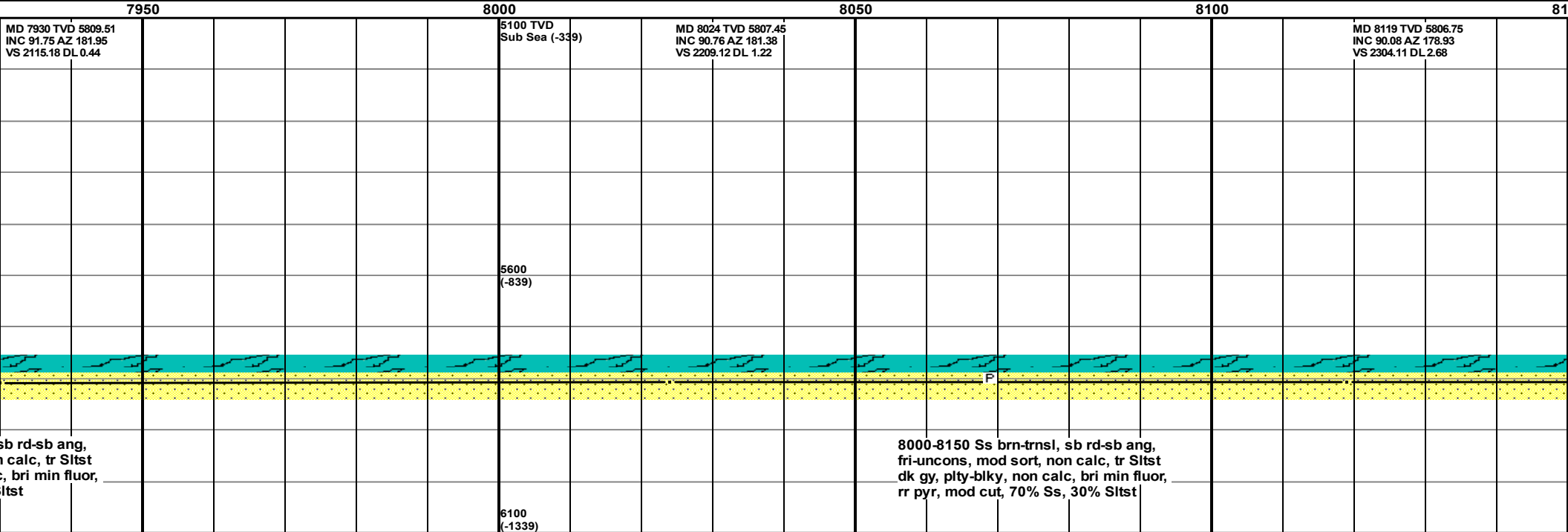
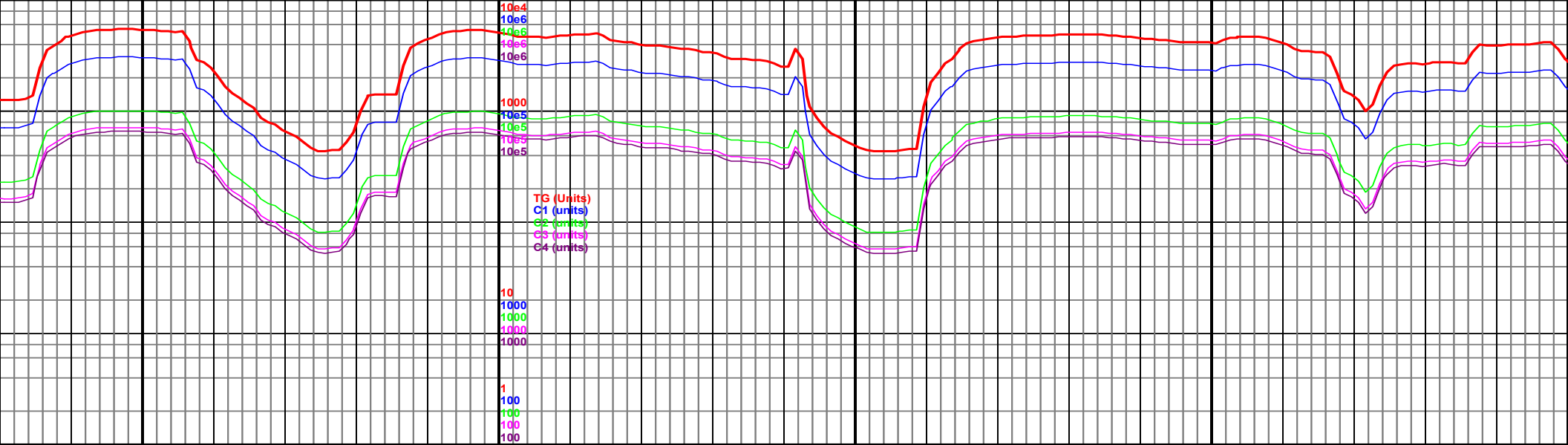
7700-7850 Siltst dk gy, plty-blky, suc,  
non calc, abnt Ss brn-trnsl, sb rd-sb  
ang, fri, mod sort, non calc, bri min  
fluor, mod cut, 50% Siltst, 50% Ss

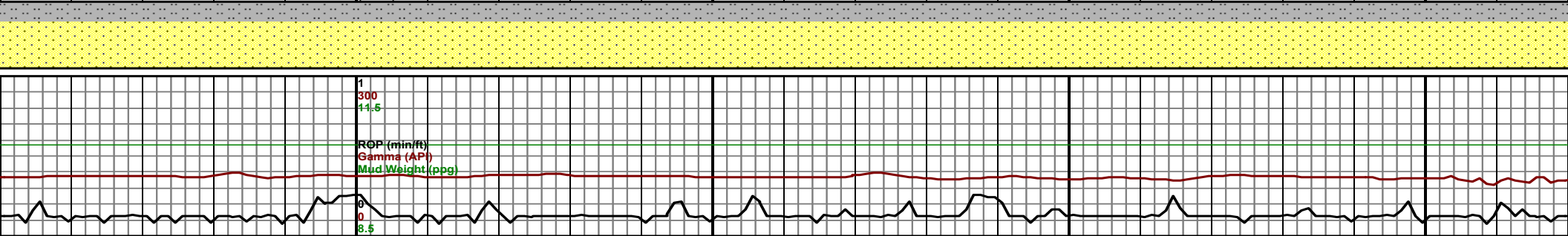
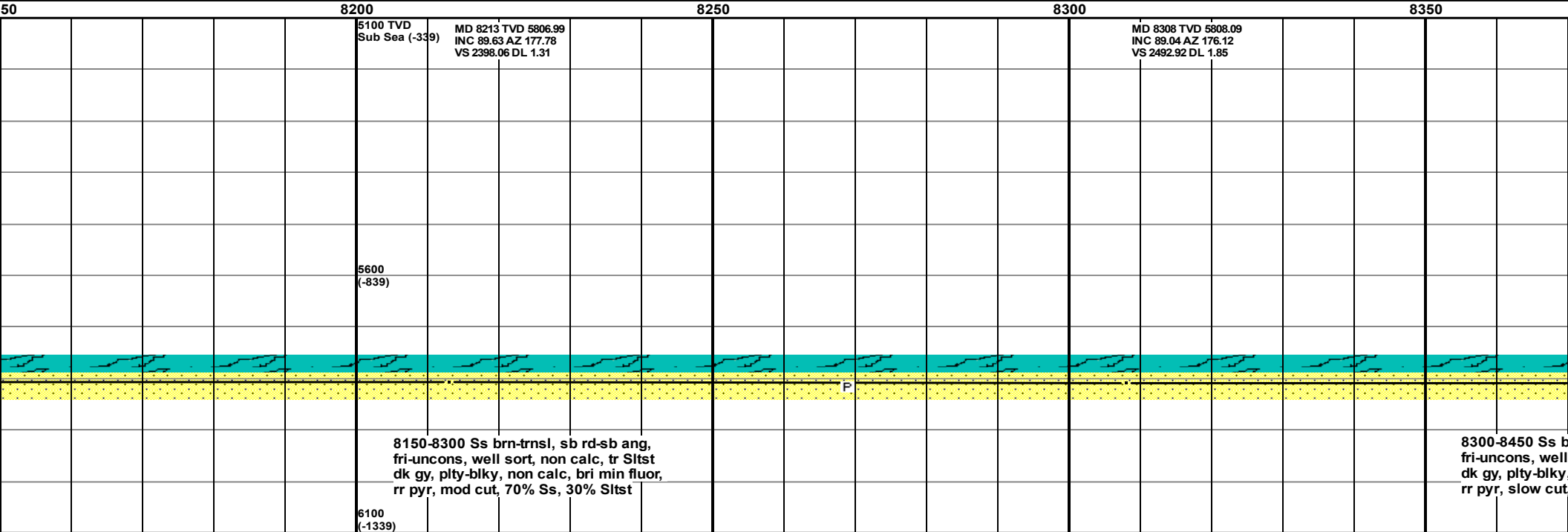
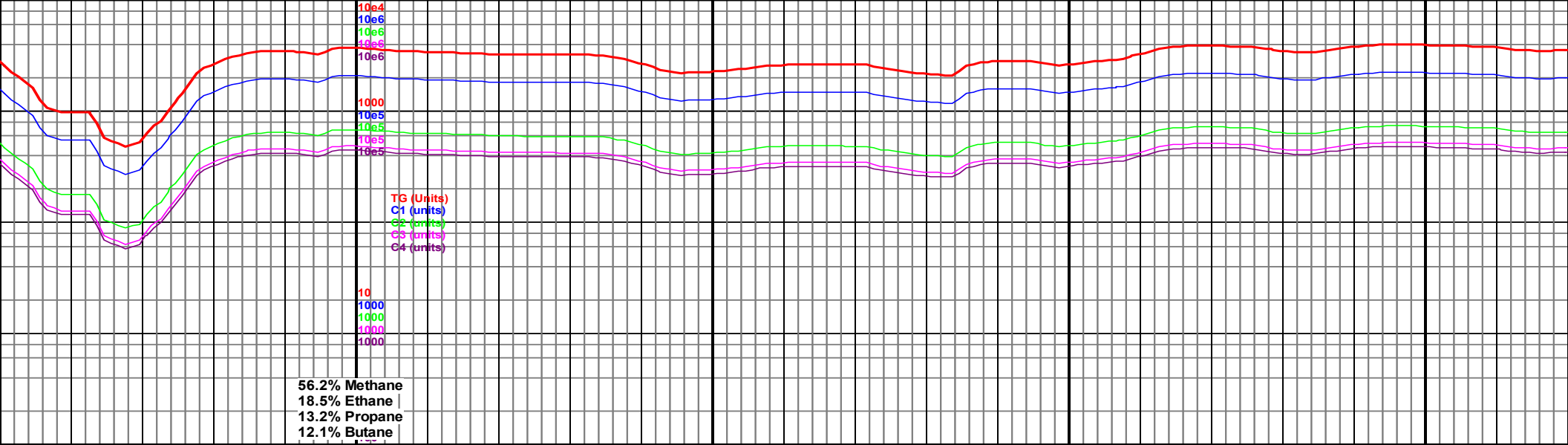
6100  
(-1339)

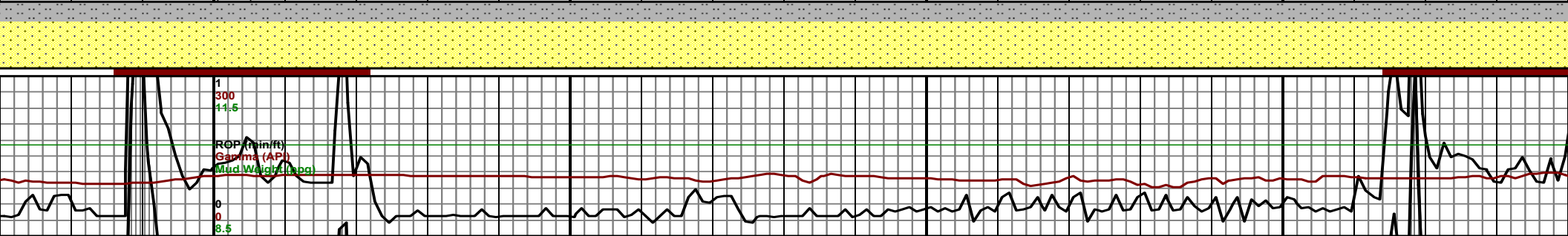
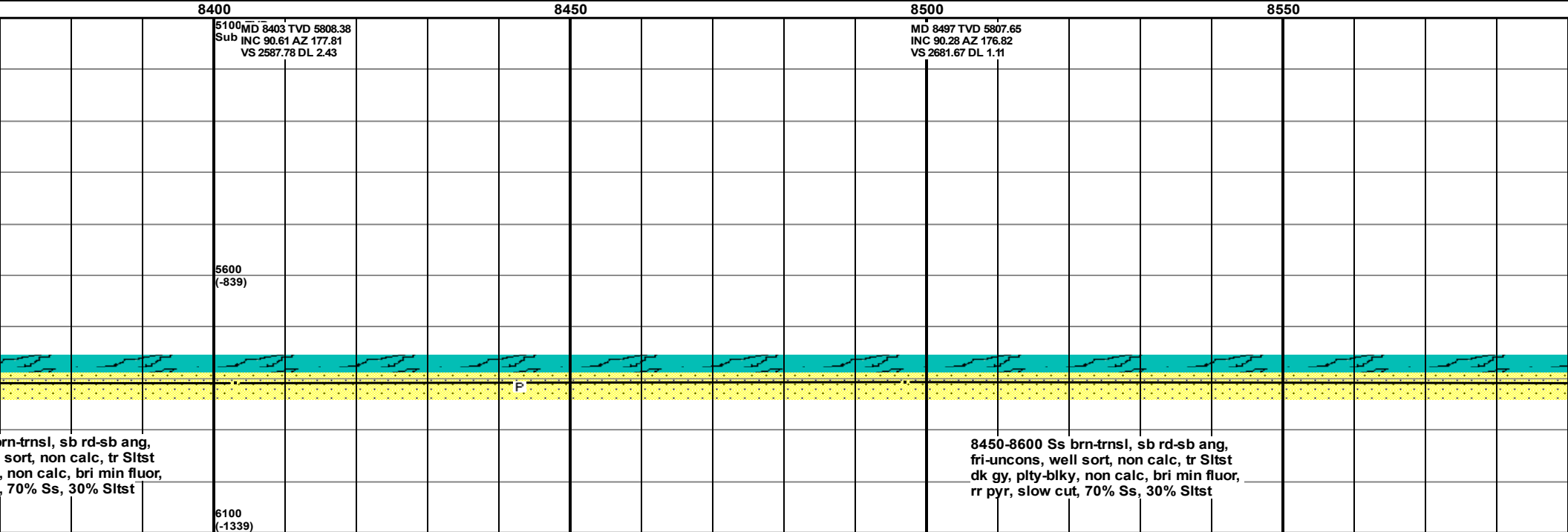
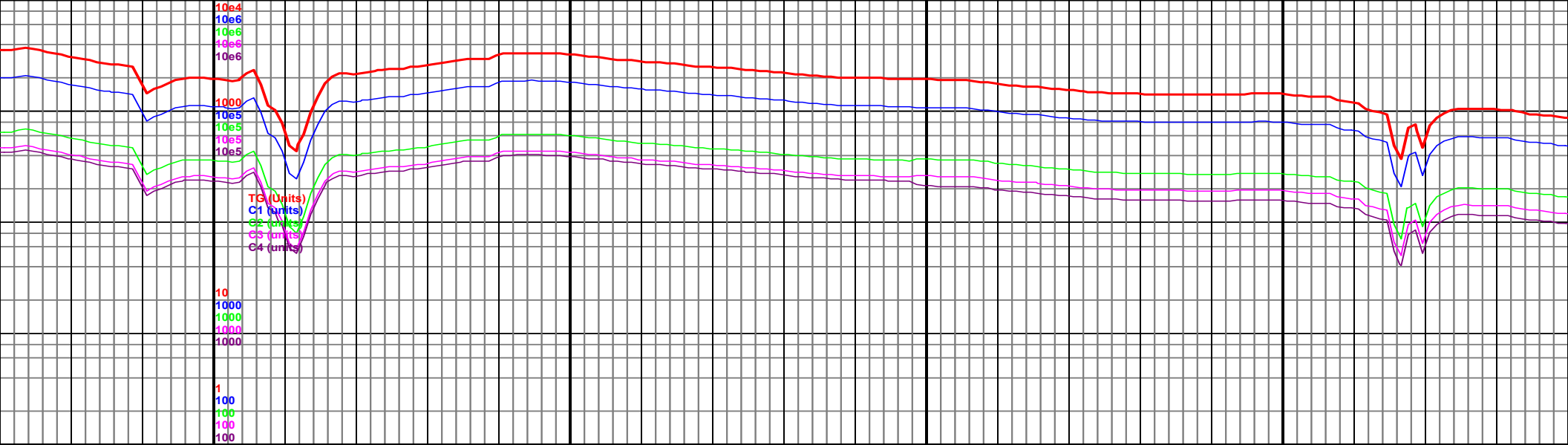
7850-8000 Ss brn-trnsl, s  
fri-uncons, mod sort, non  
dk gy, plty-blky, non calc  
slow cut, 60% Ss, 40% S

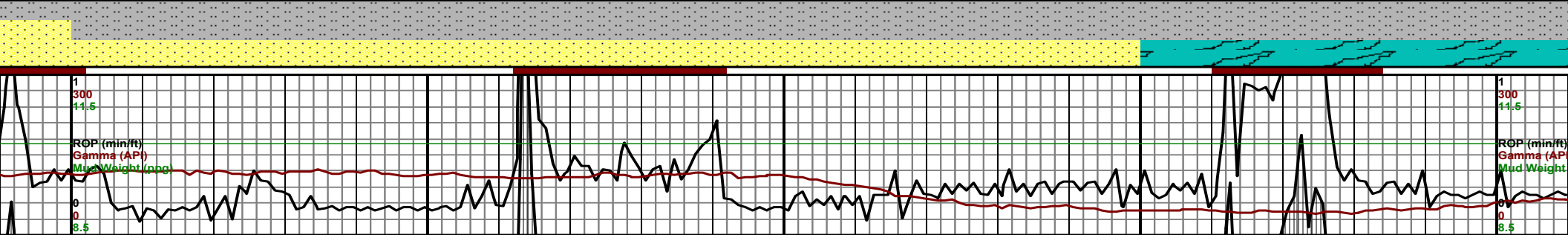
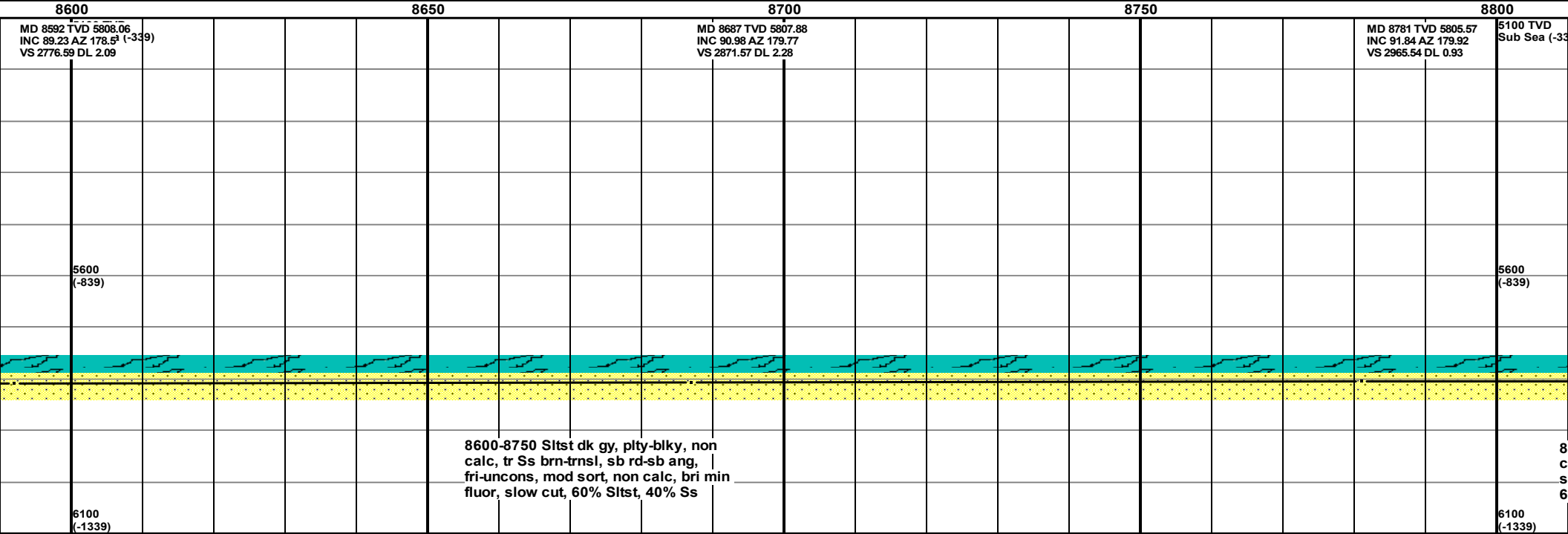
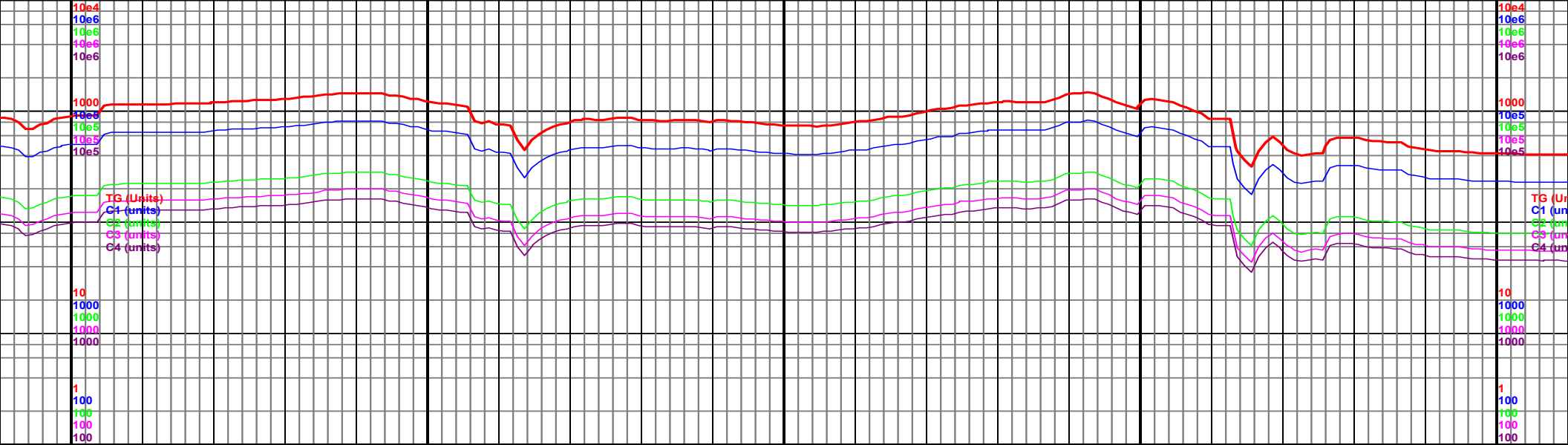


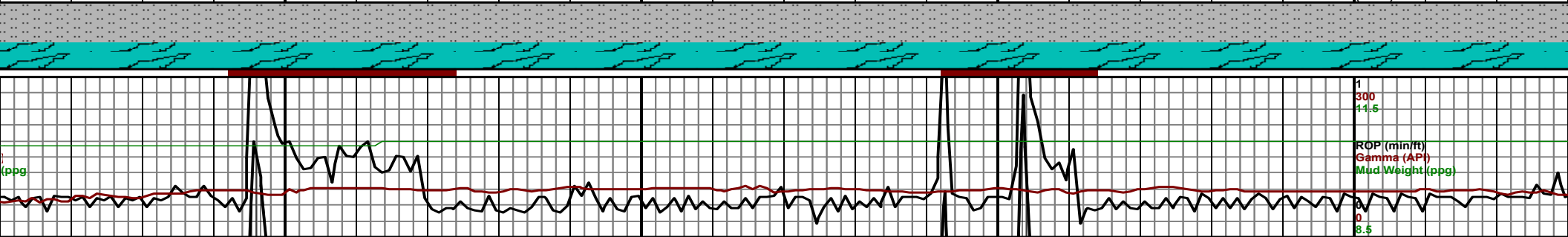
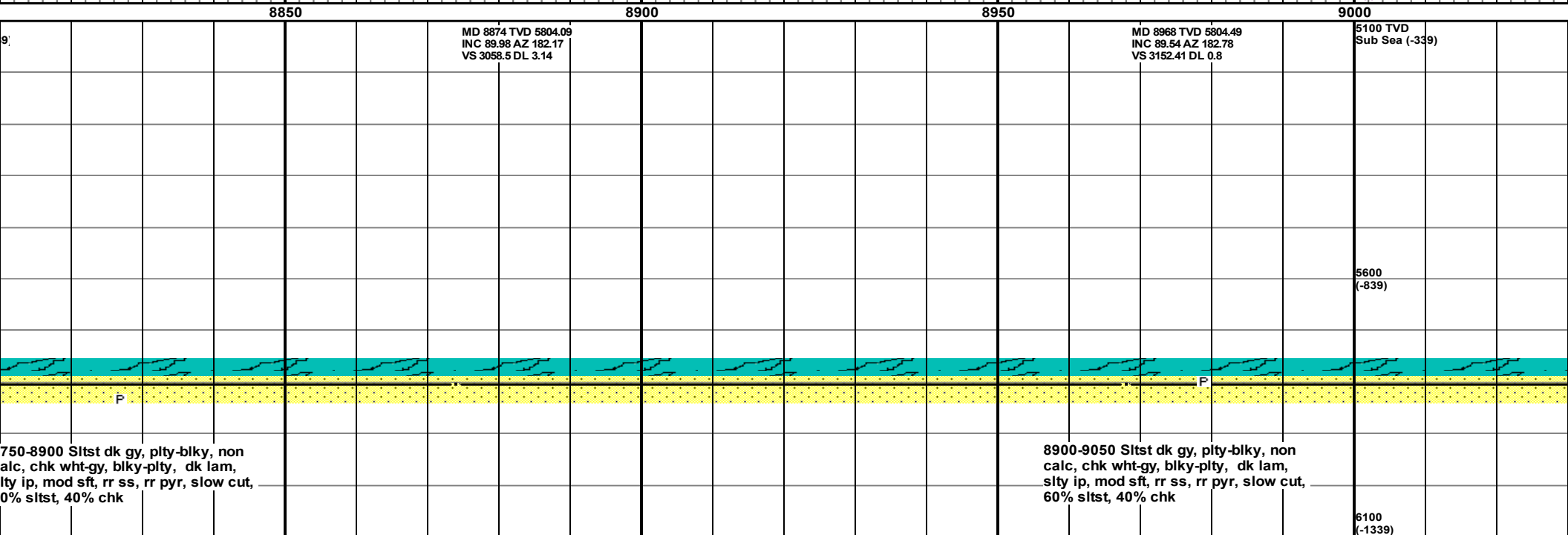
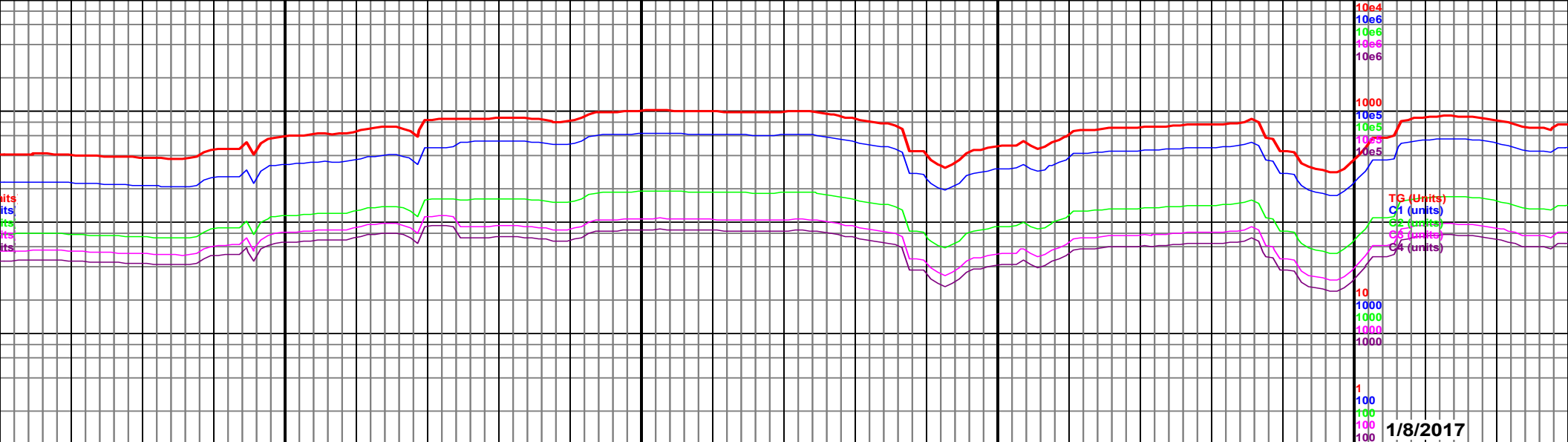


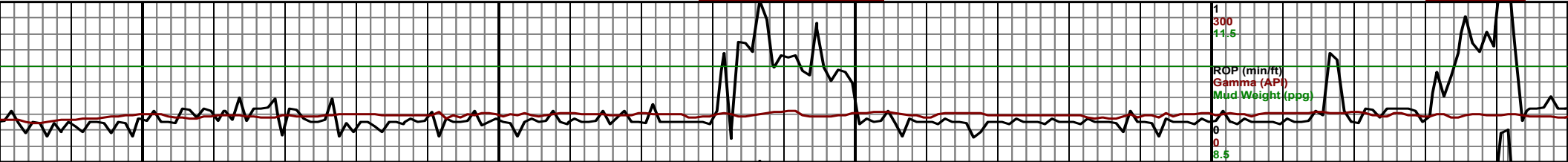
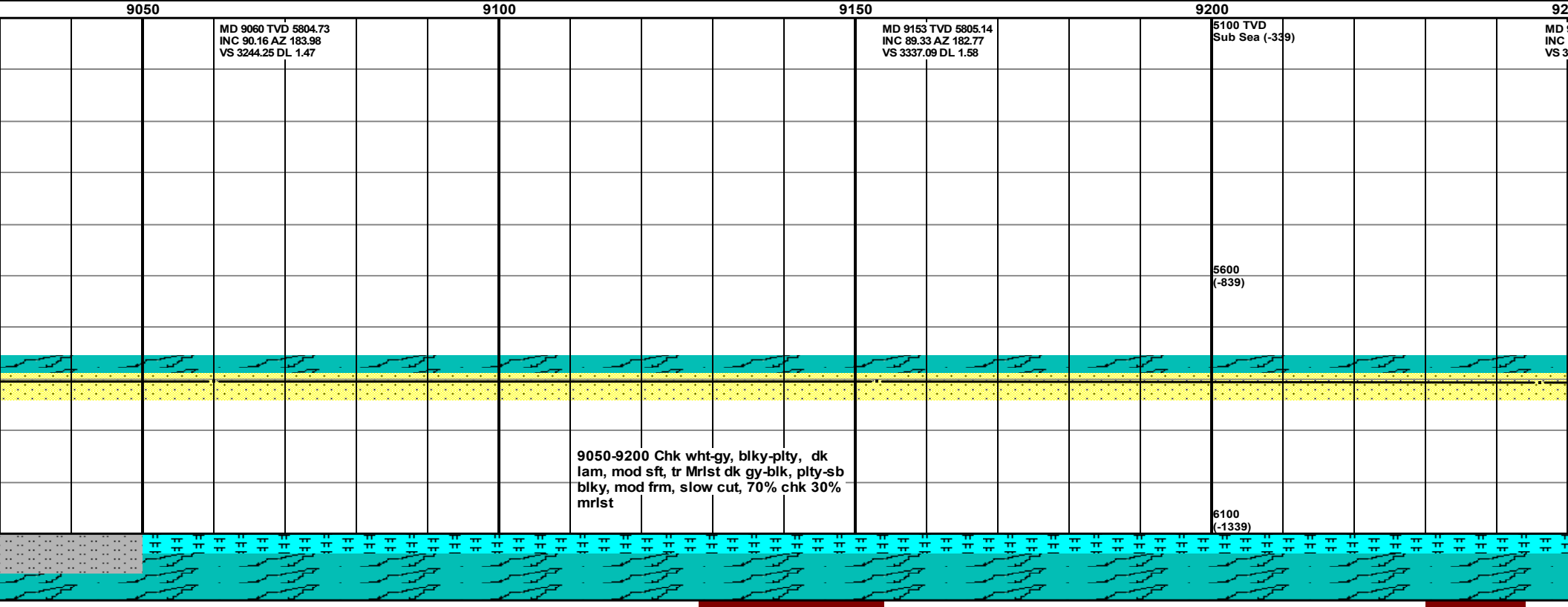
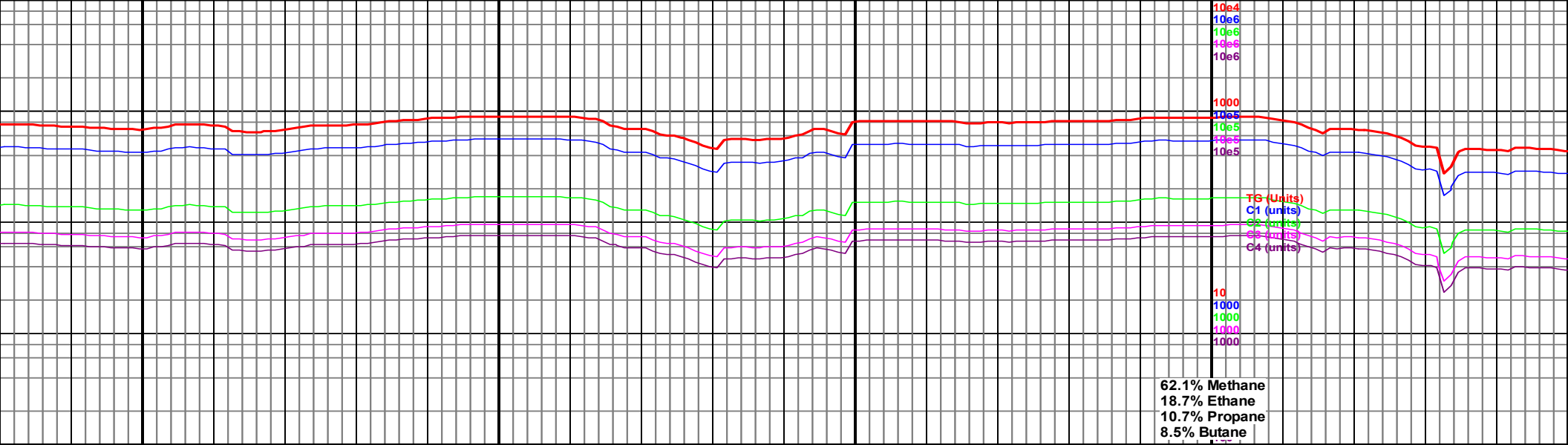




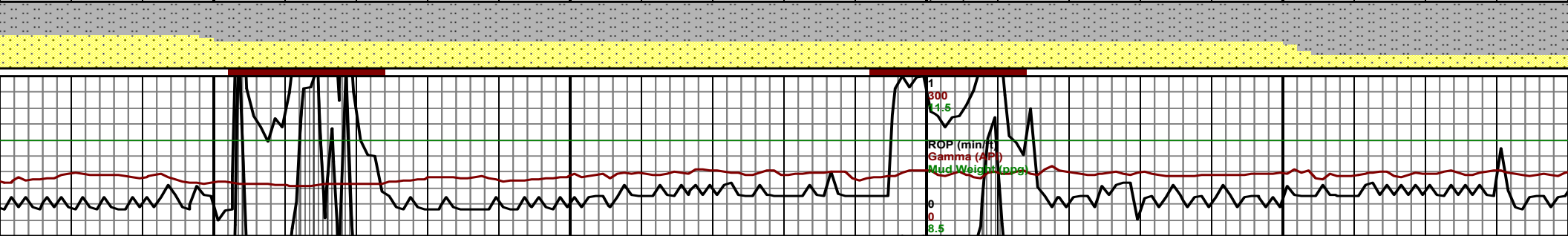
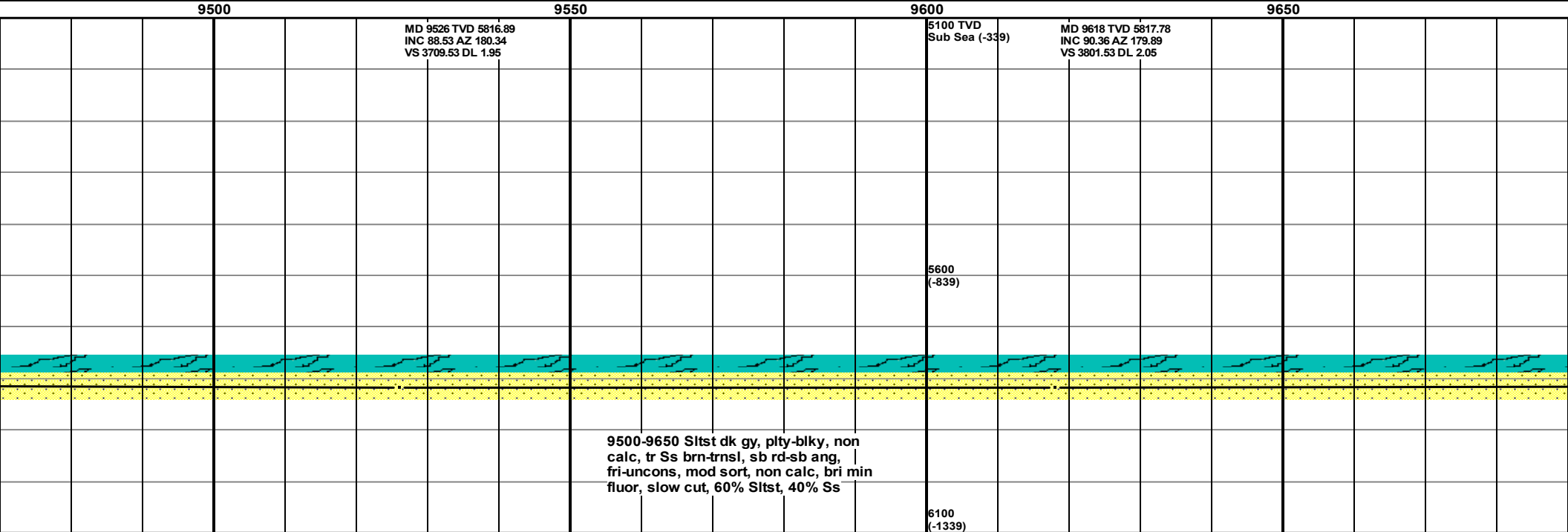
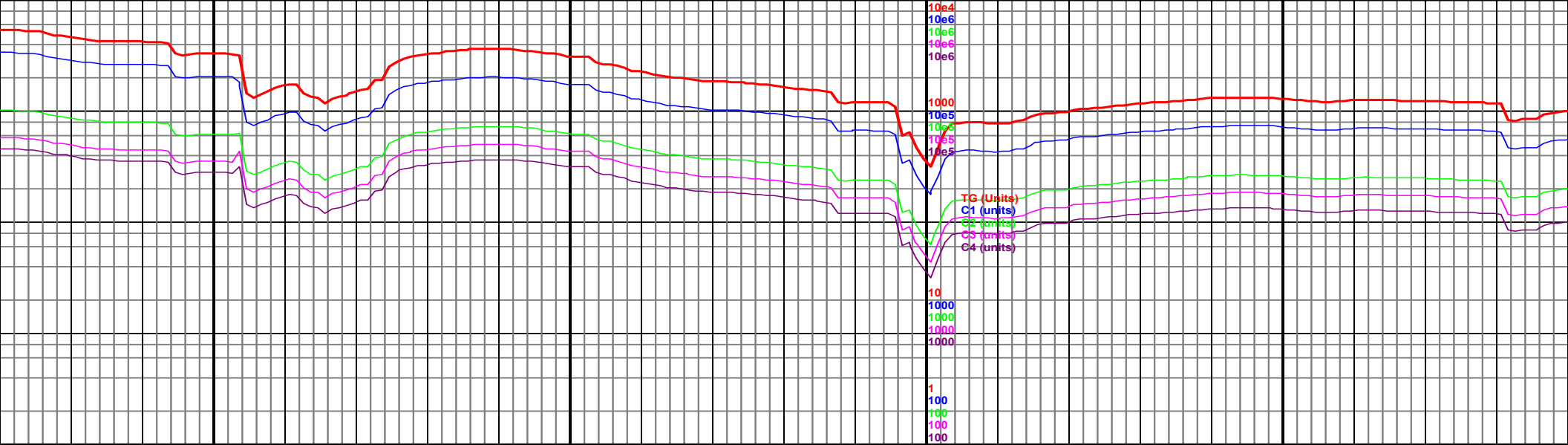




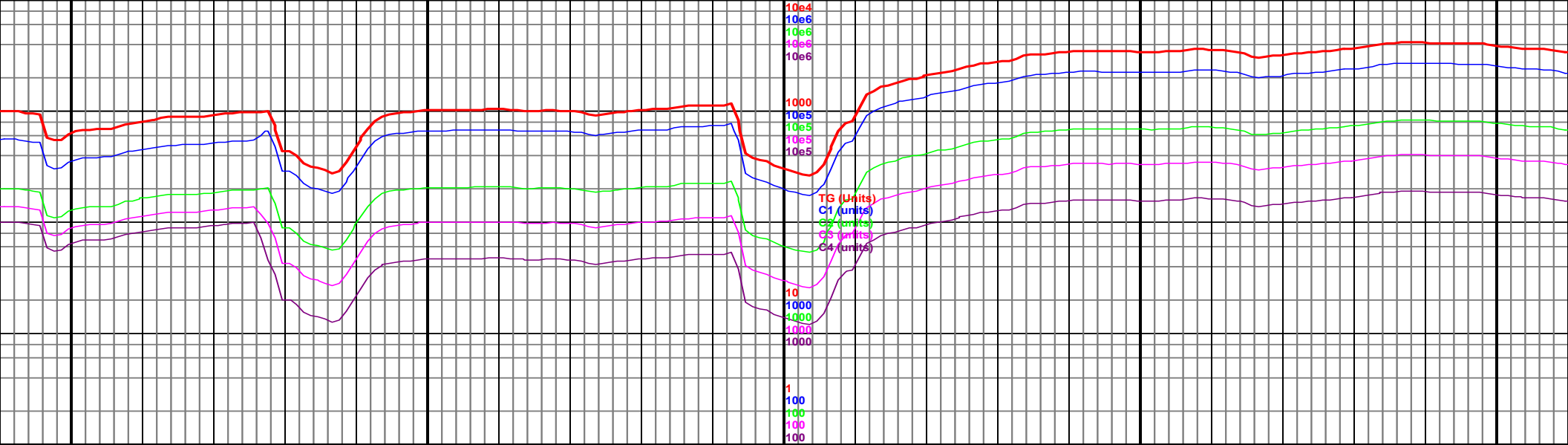












9700

9750

9800

9850

9900

MD 9711 TVD 5816.58  
INC 91.12 AZ 179.9  
VS 3894.52 DL 0.82

MD 9804 TVD 5814.61  
Sub S<sub>INC</sub> 91.31 AZ 179.81  
VS 3987.5 DL 0.23

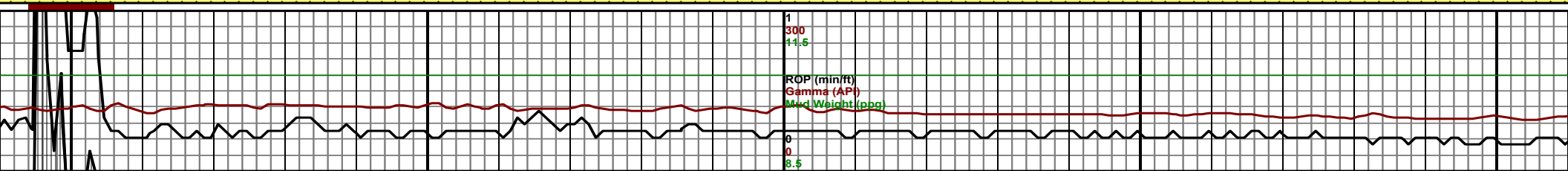
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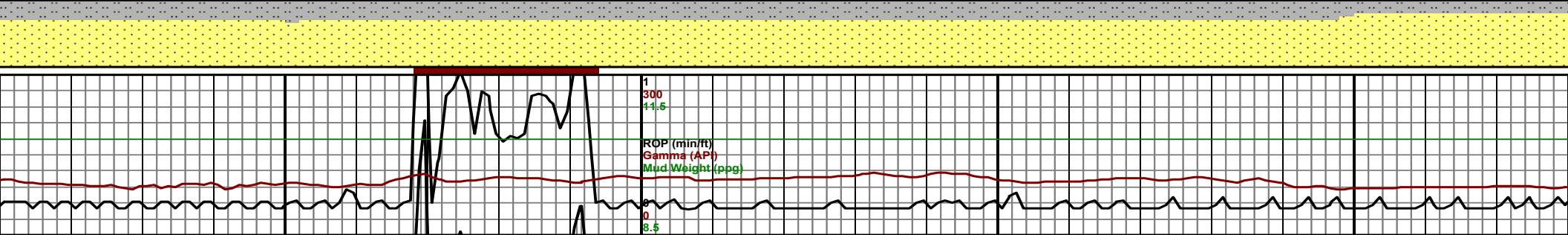
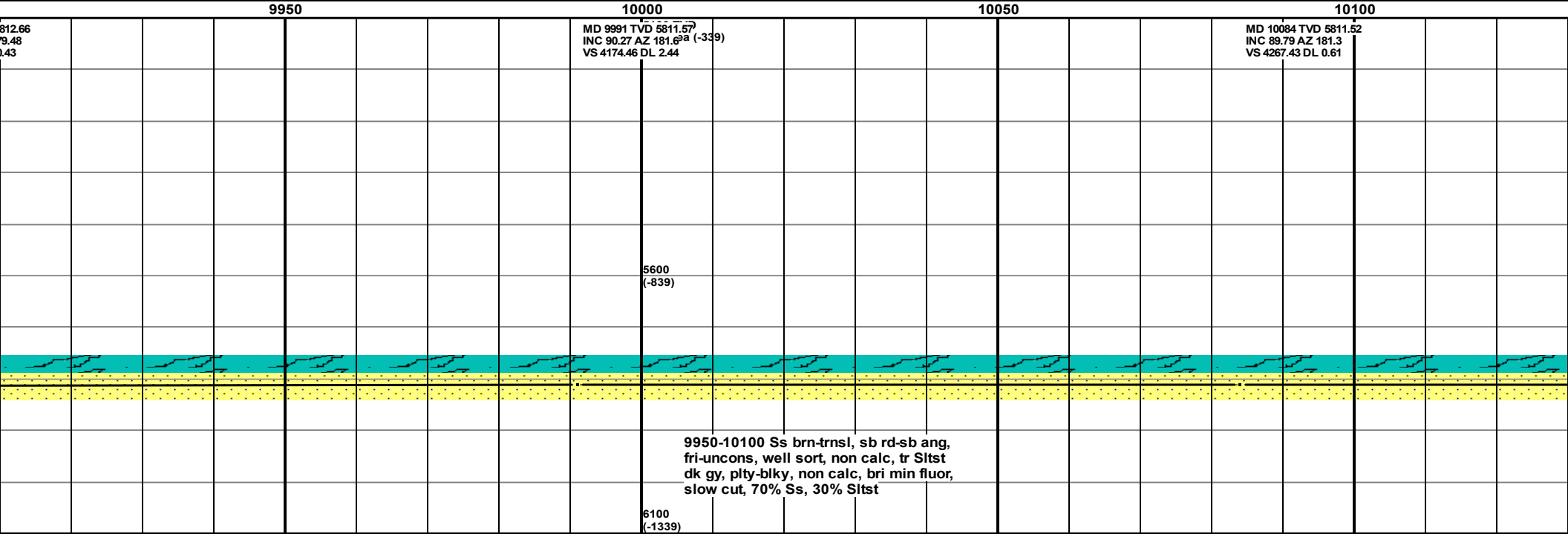
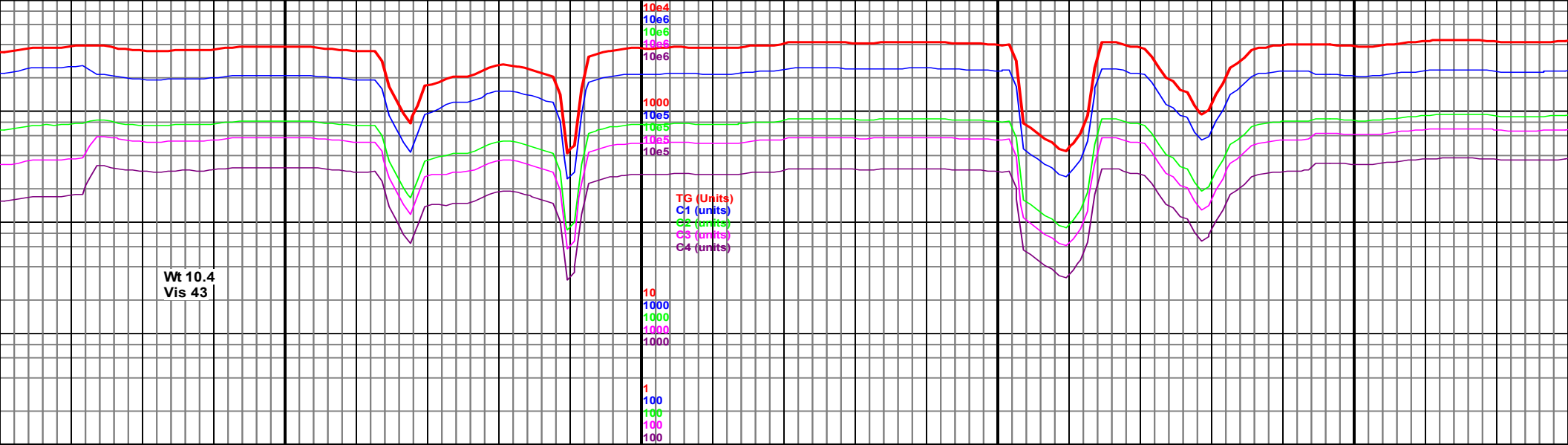
9650-9800 Siltst dk gy, sb rd, frm, non  
calc, tr Ss brn-trnsl, sb rd-sb ang,  
fri-uncons, mod sort, non calc, slow  
cut, 80% Siltst, 20% Ss

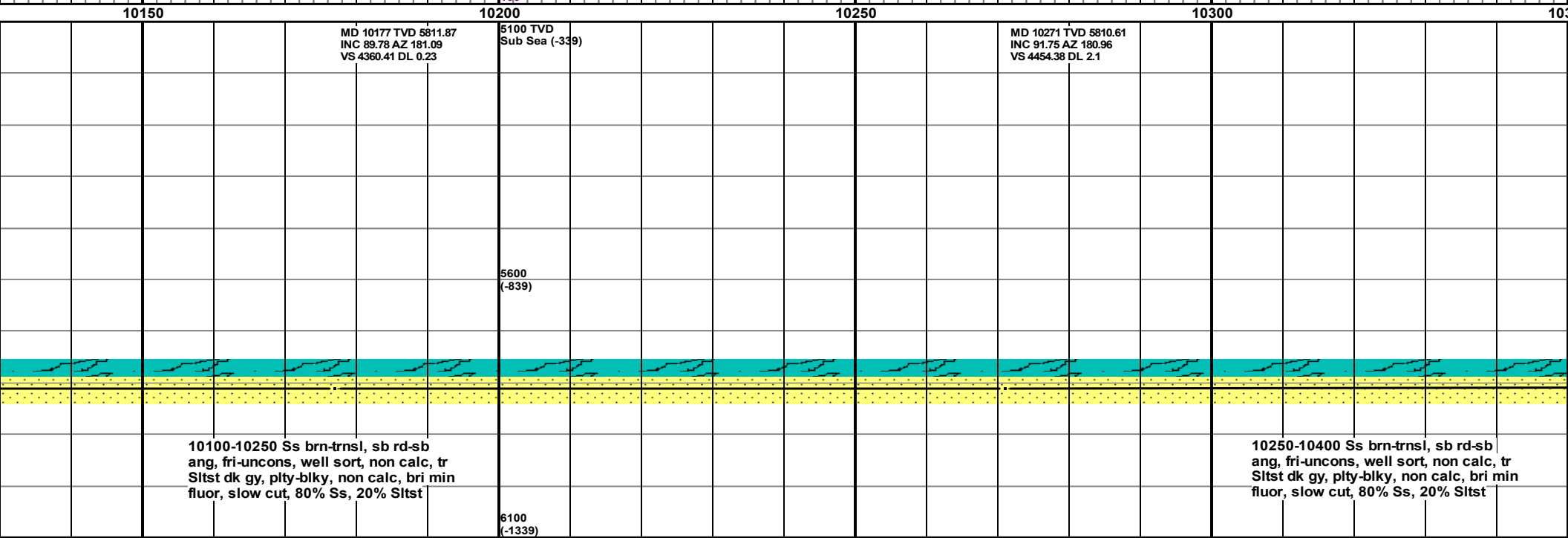
9800-9950 Ss brn-trnsl, sb rd-sb ang,  
fri-uncons, well sort, non calc, tr Siltst  
dk gy, plty-blky, non calc, bri min fluor,  
slow cut, 70% Ss, 30% Siltst

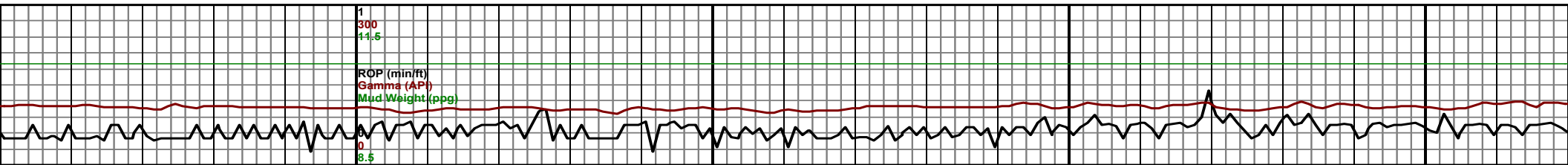
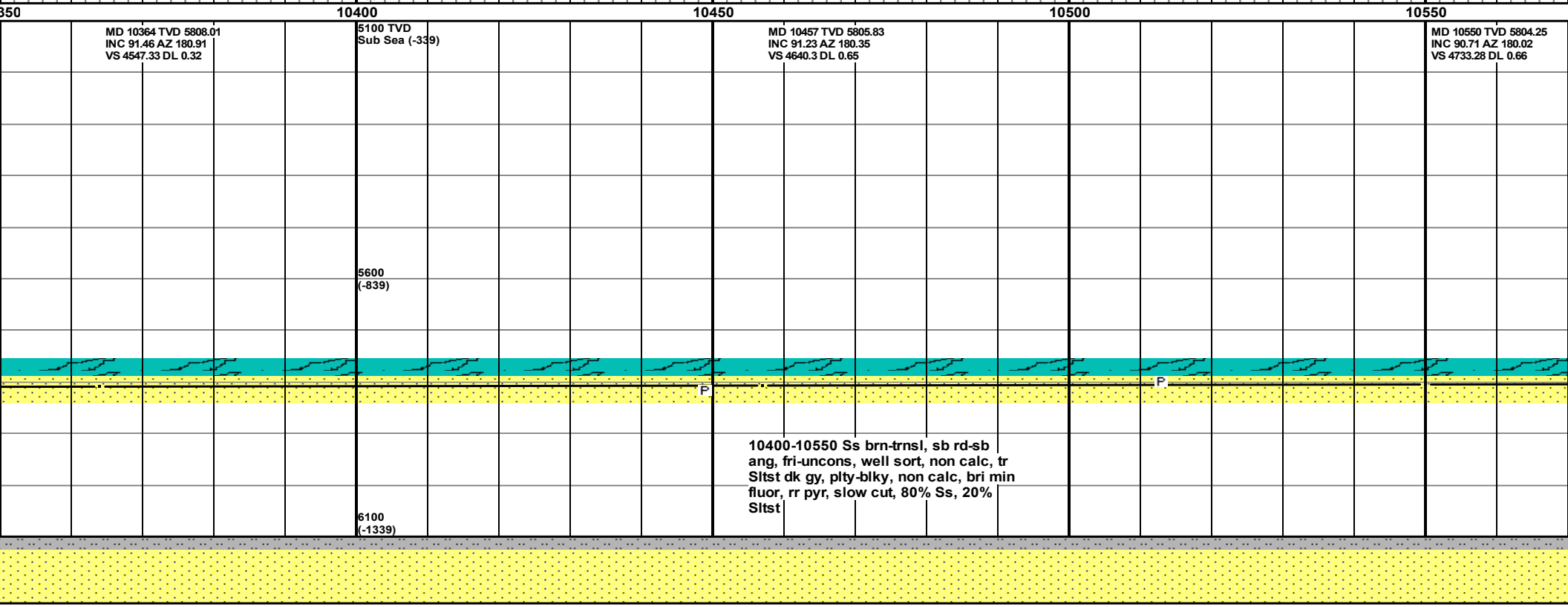
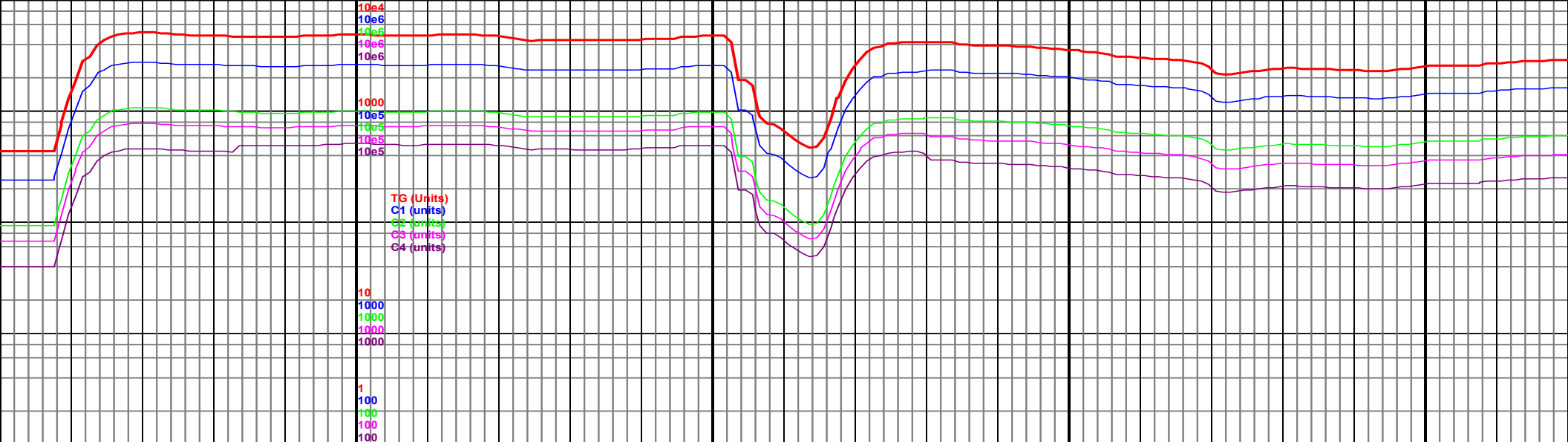
5100  
(-839)

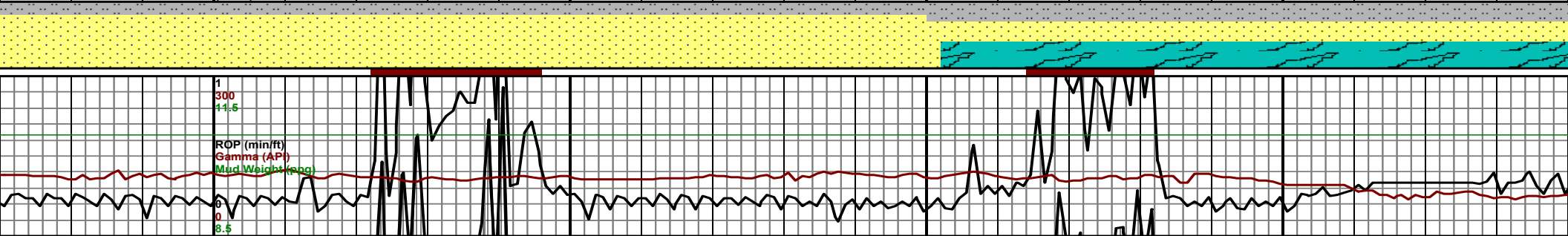
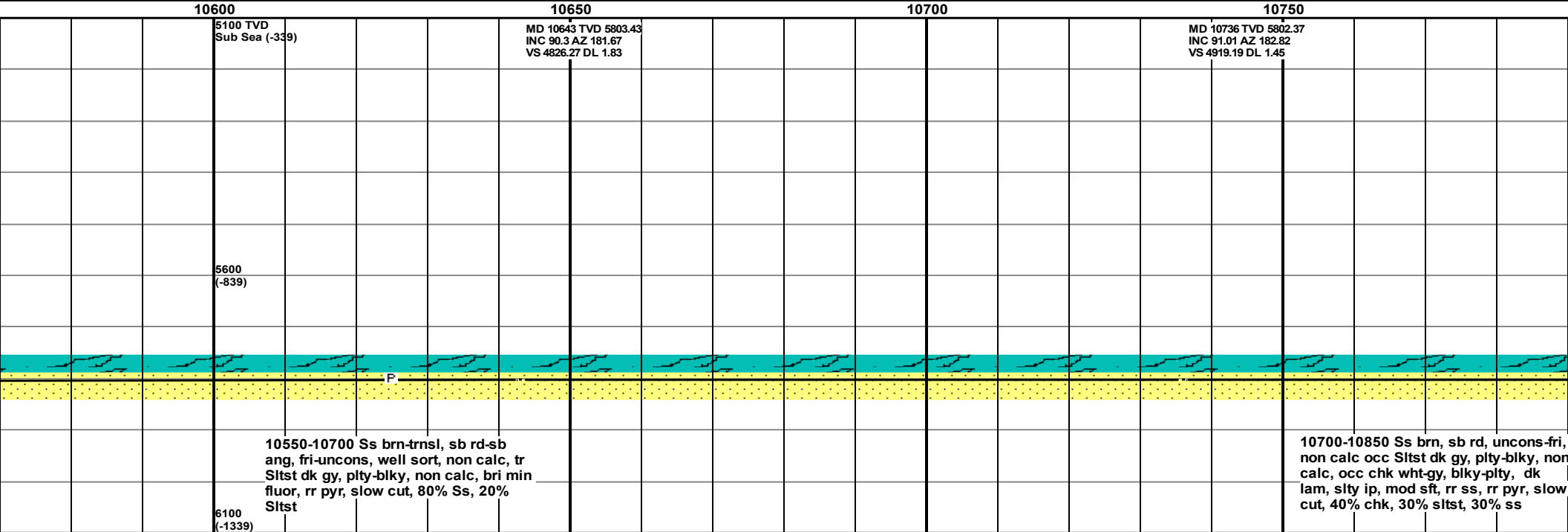
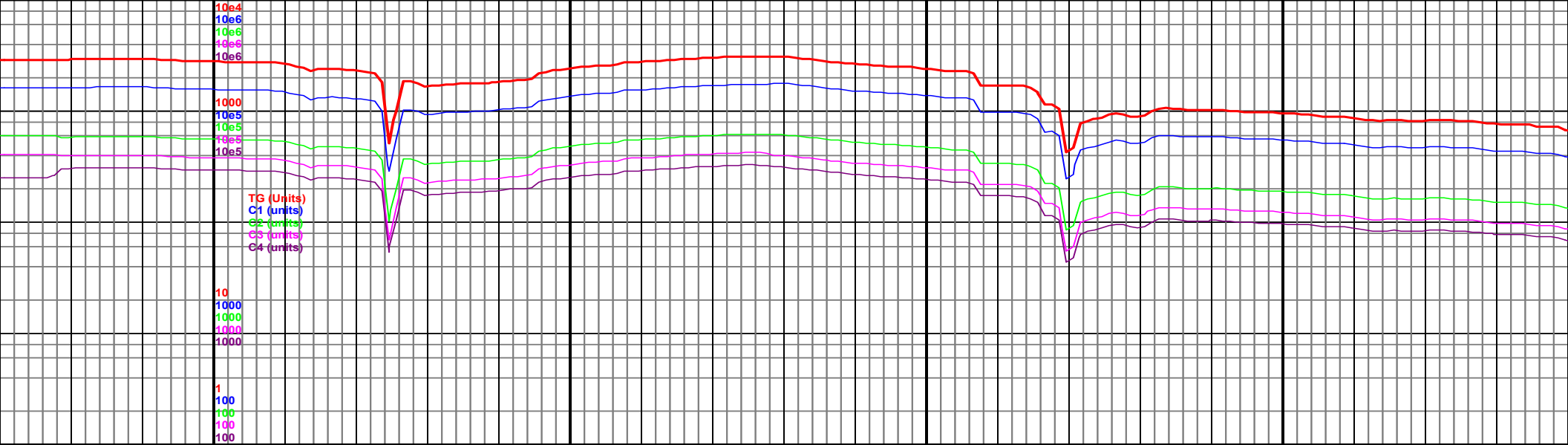
6100  
(-1339)



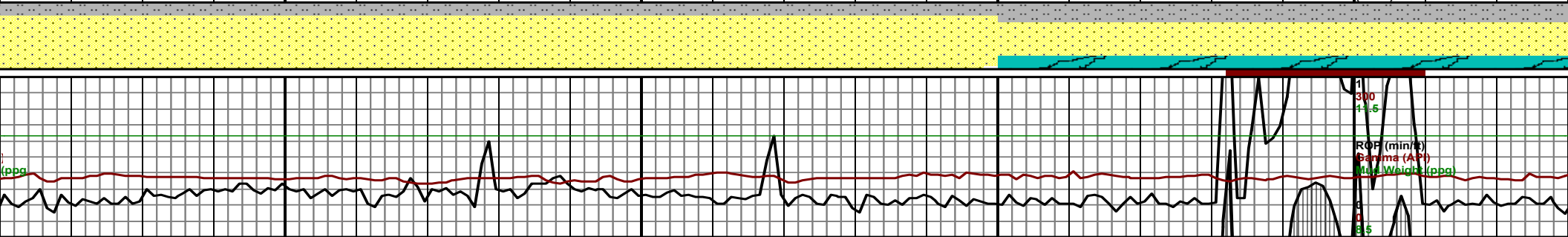
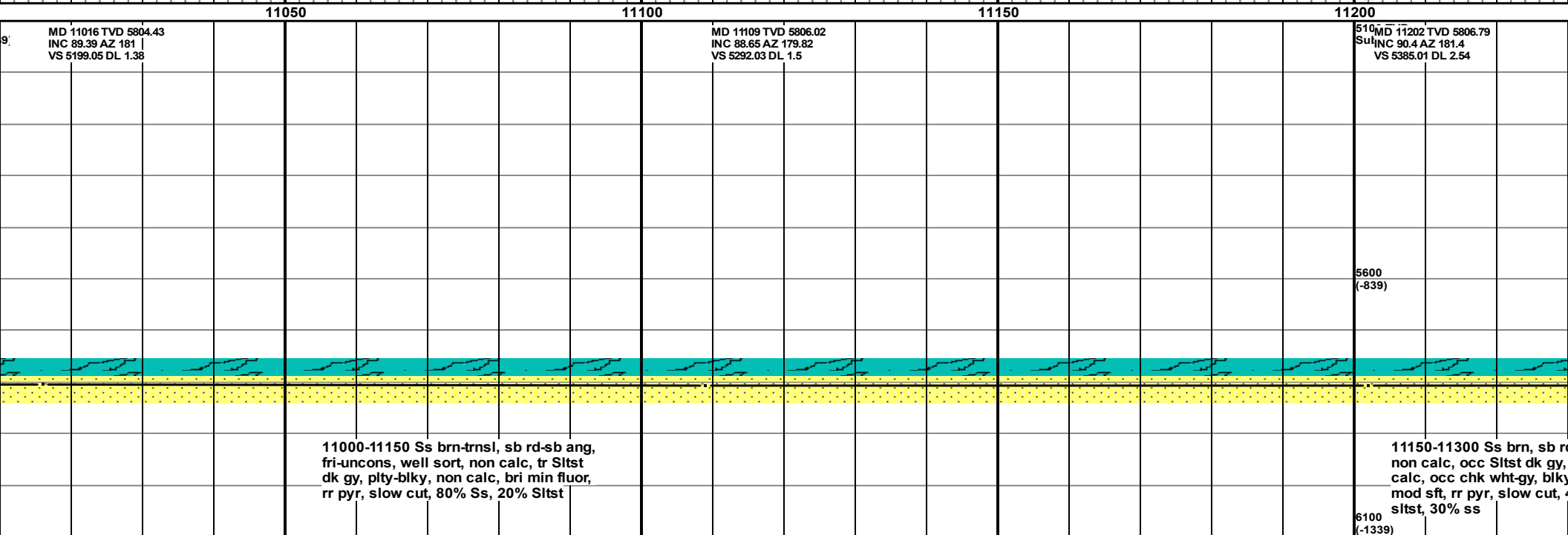
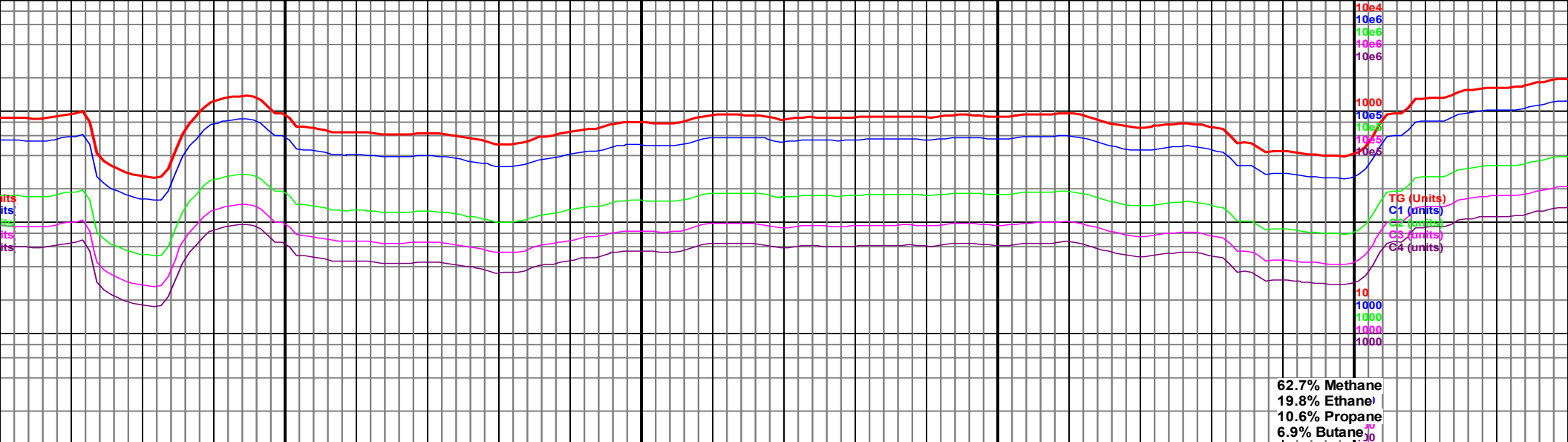


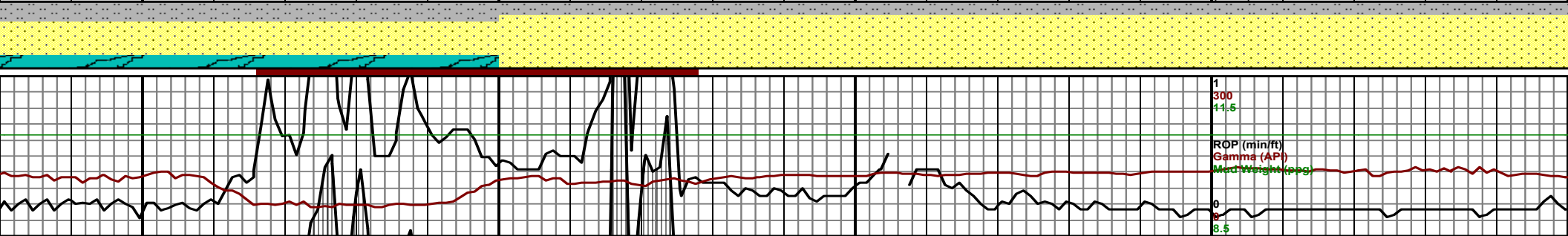
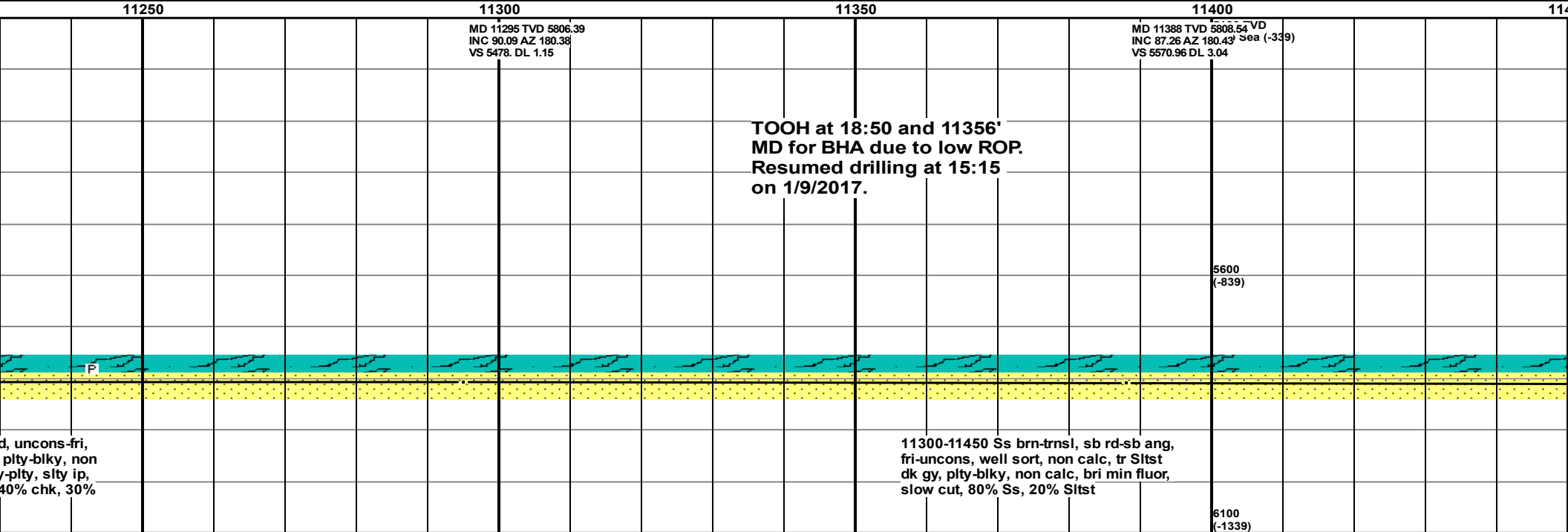
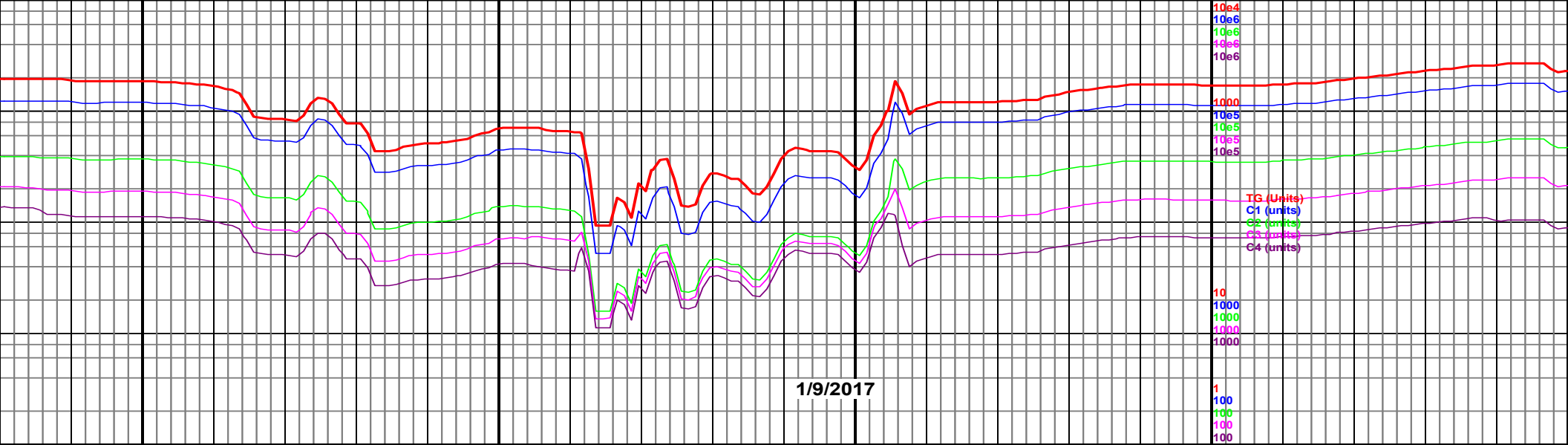






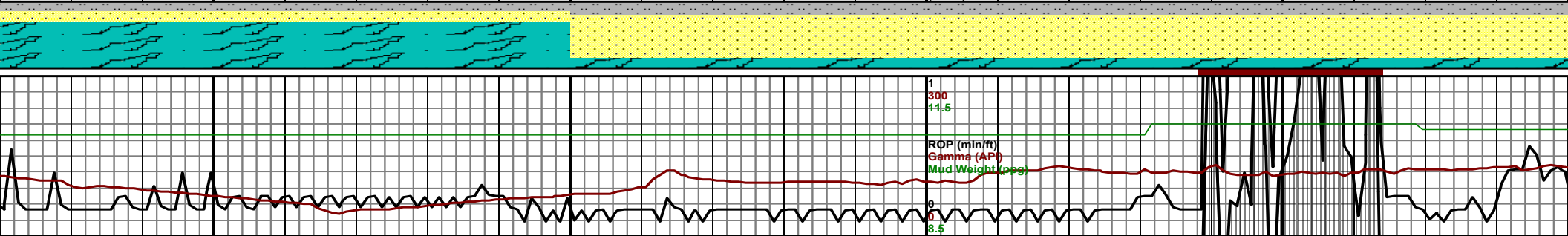
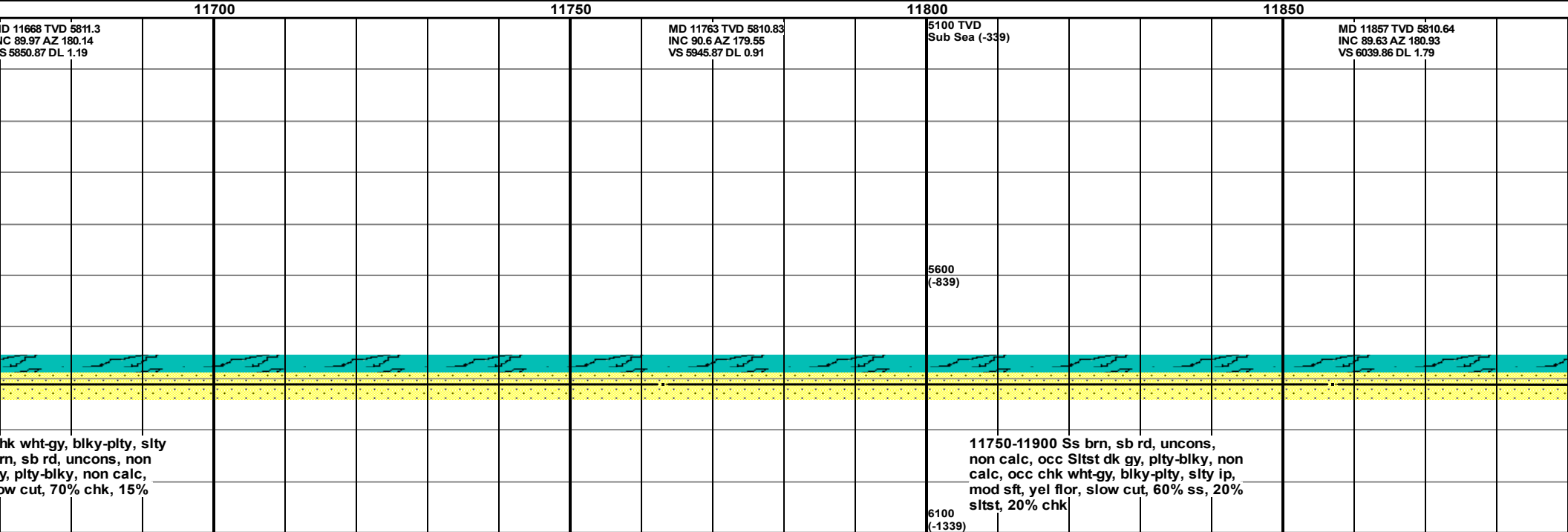
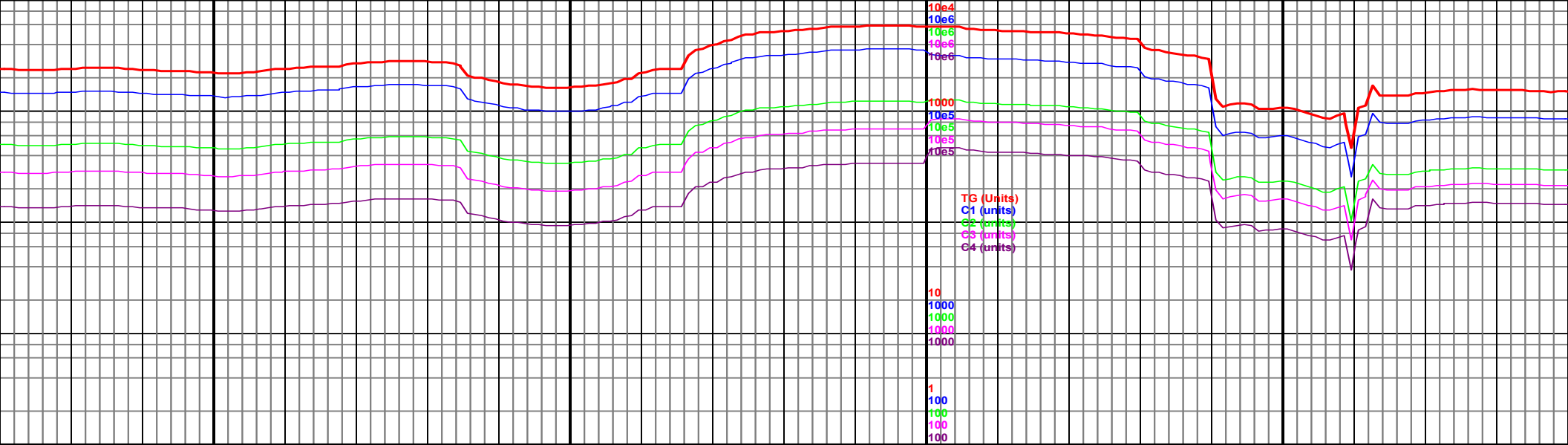


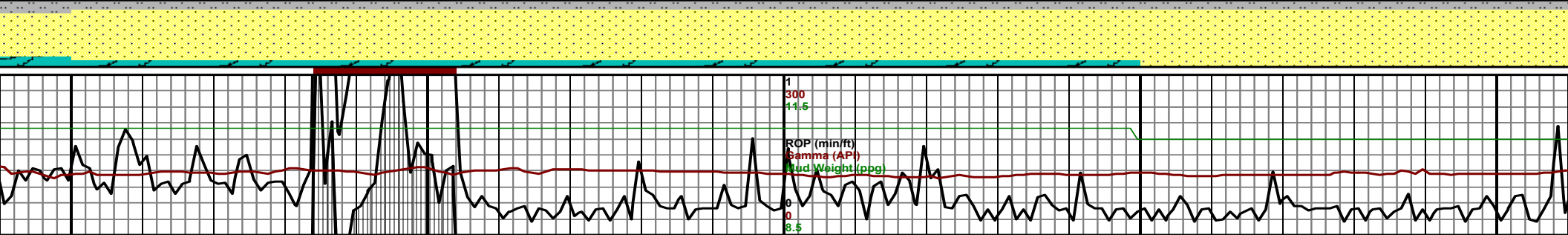
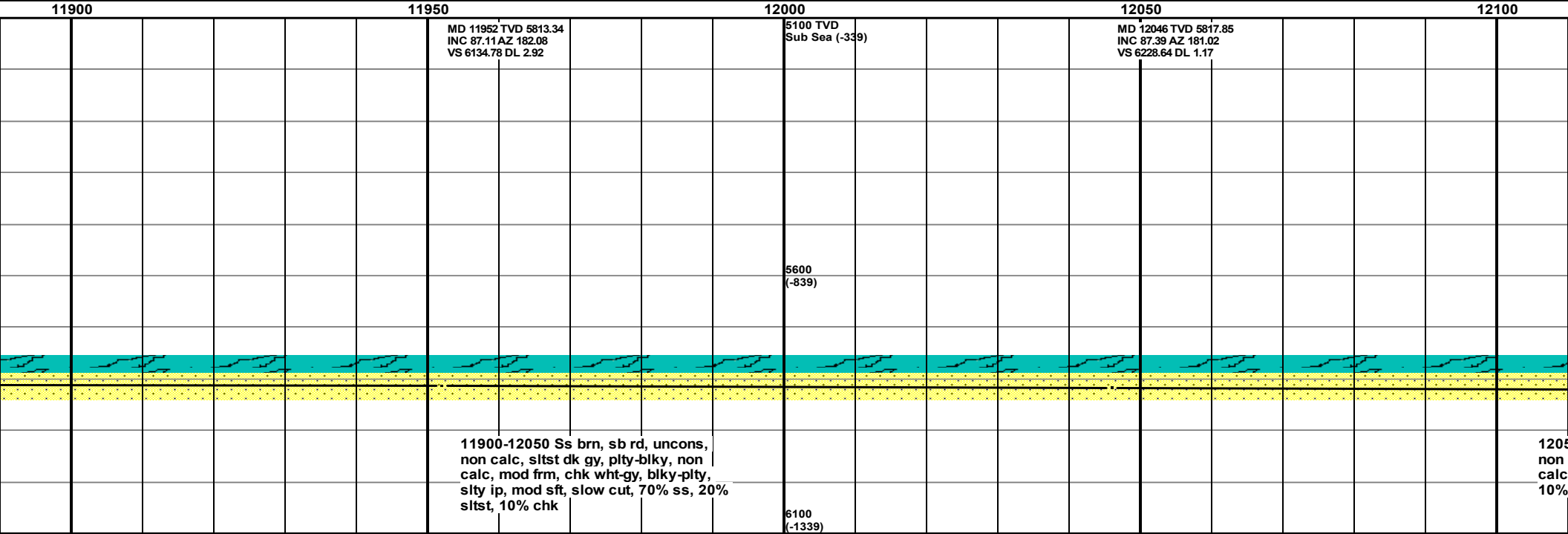
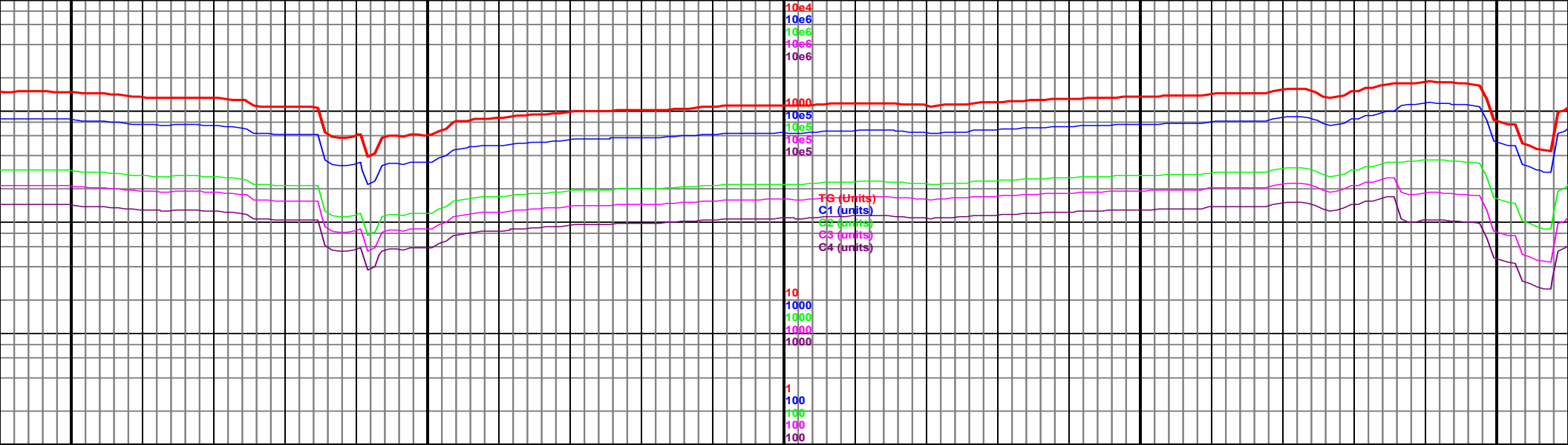


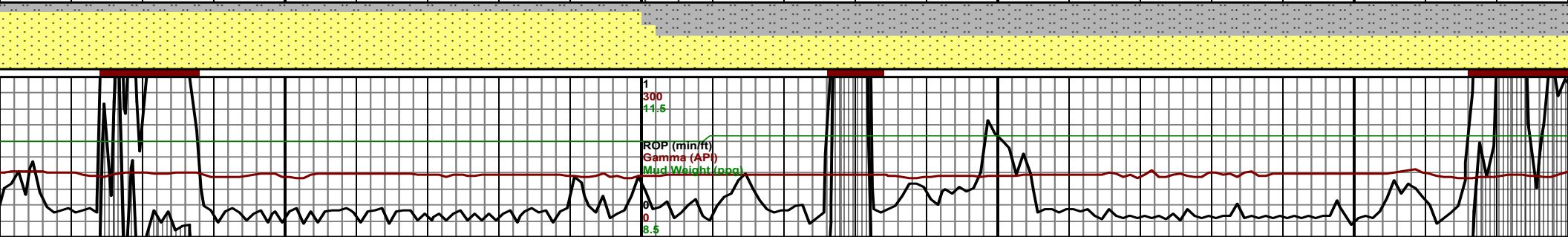
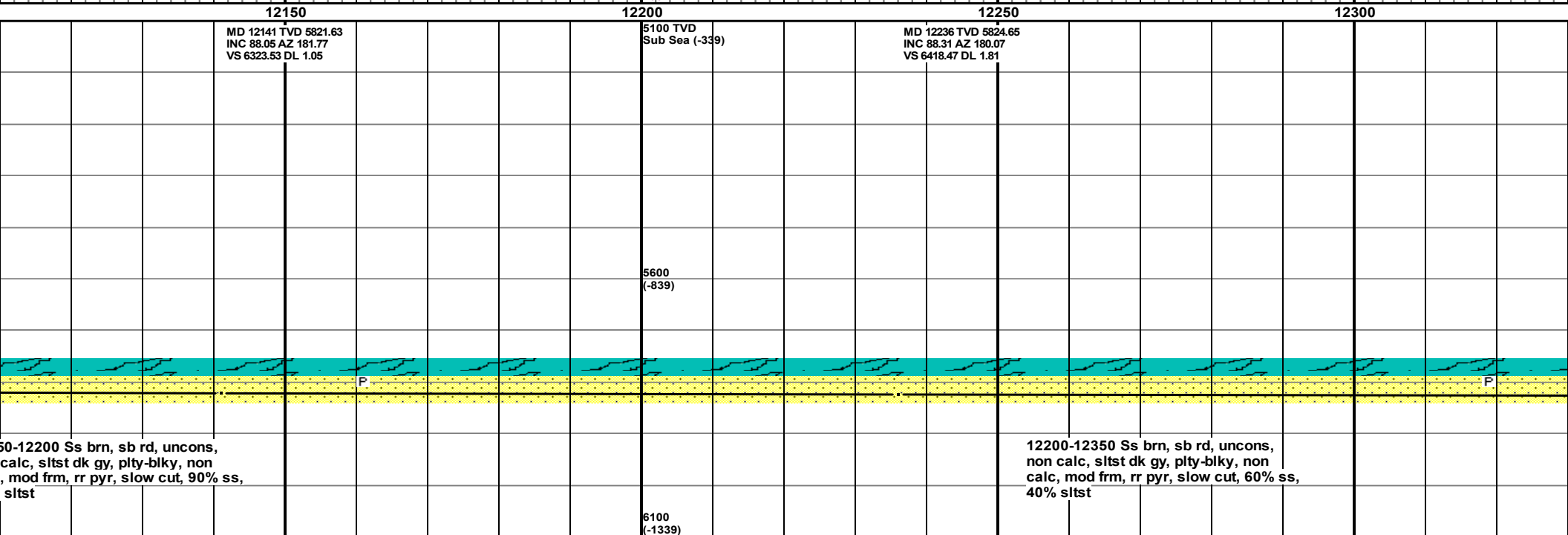
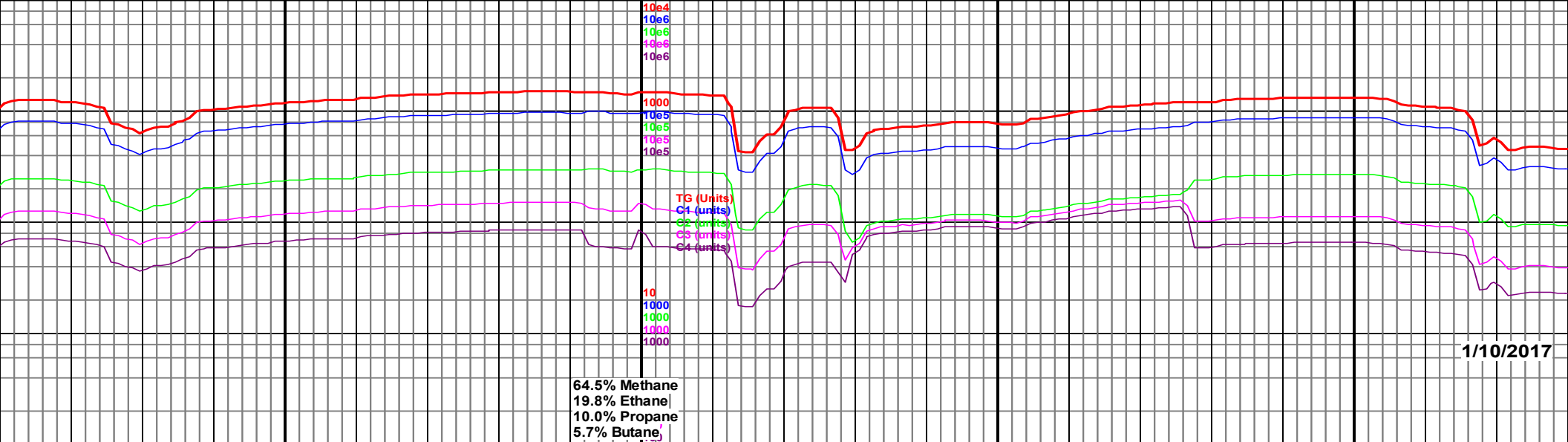


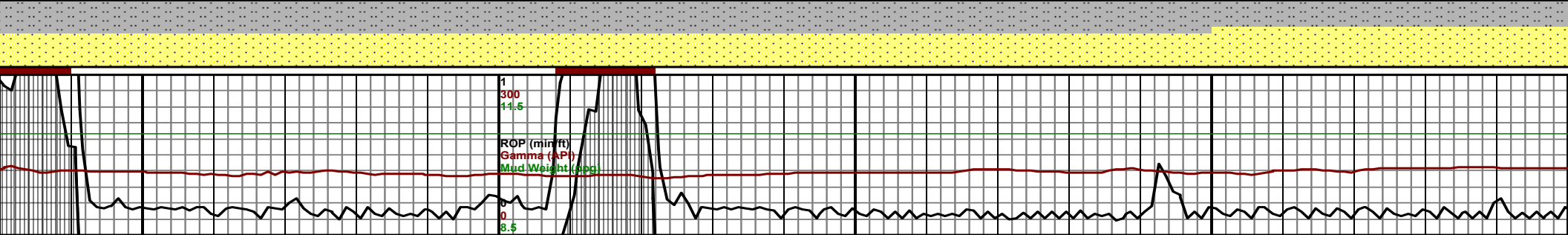
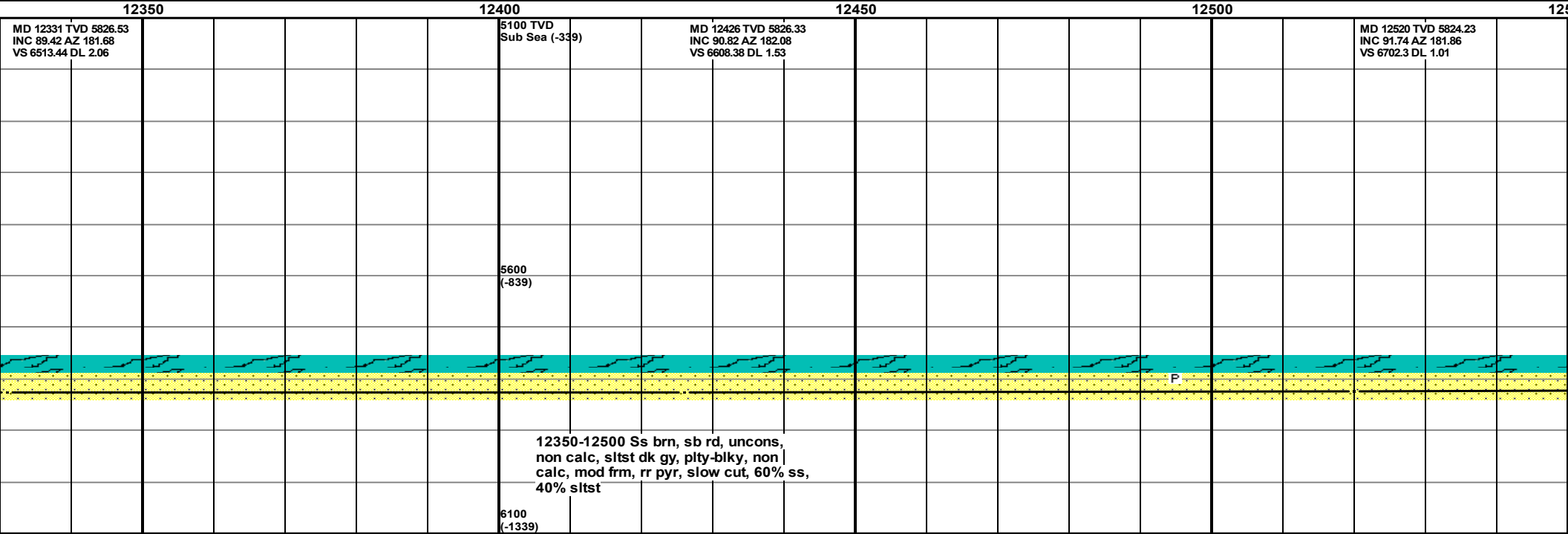
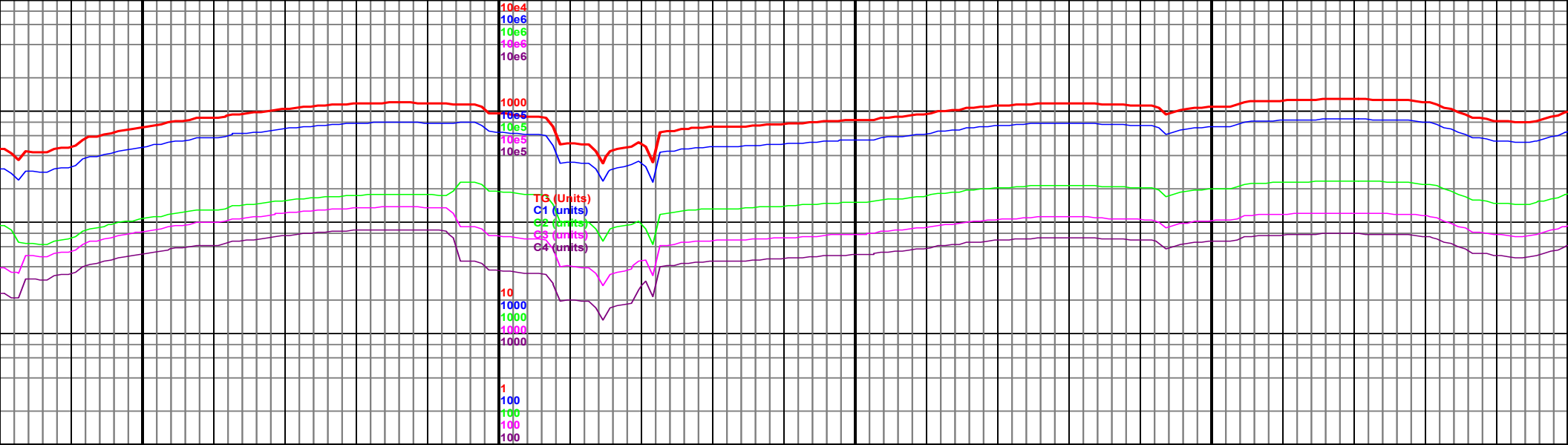


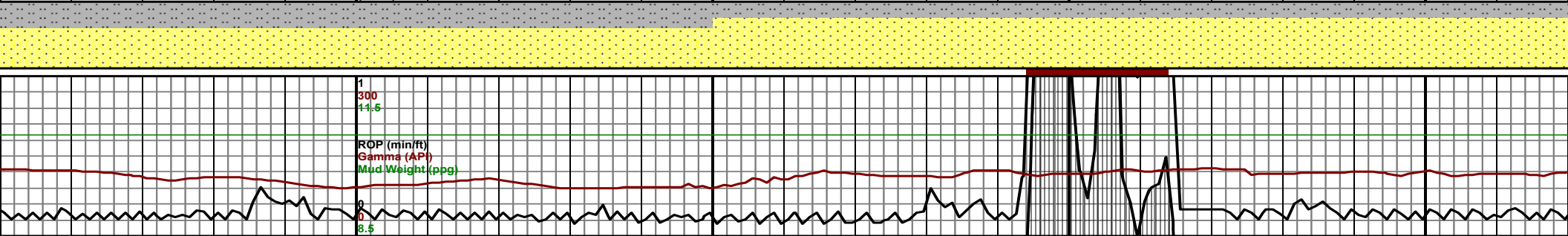
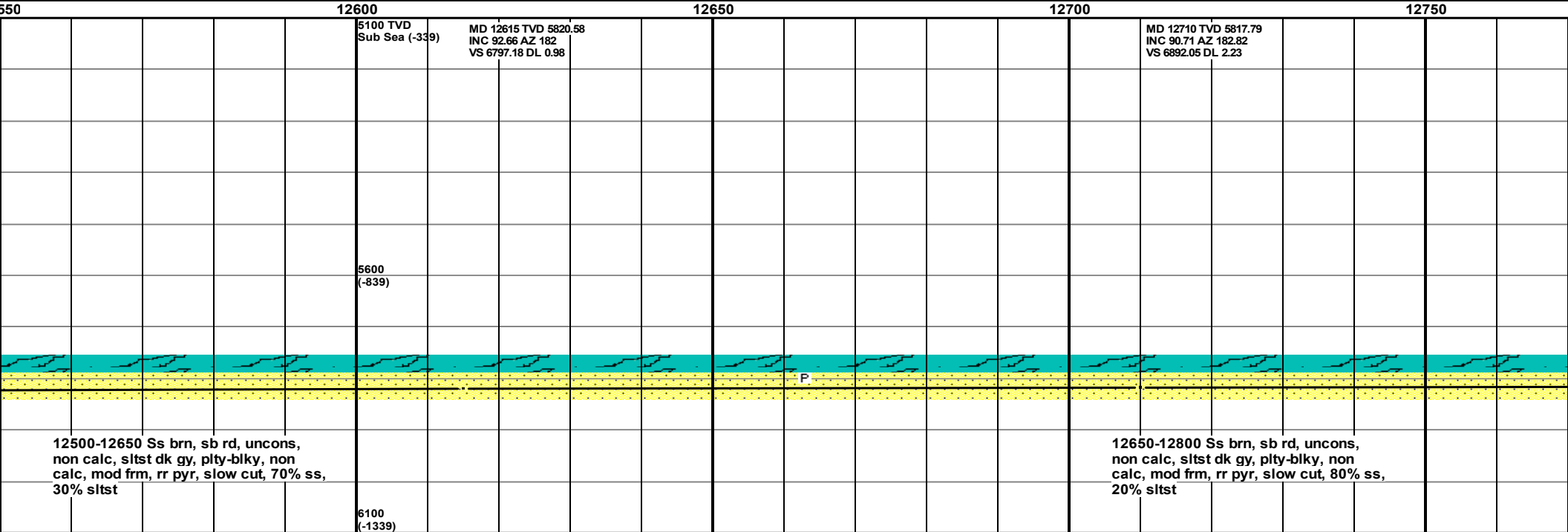
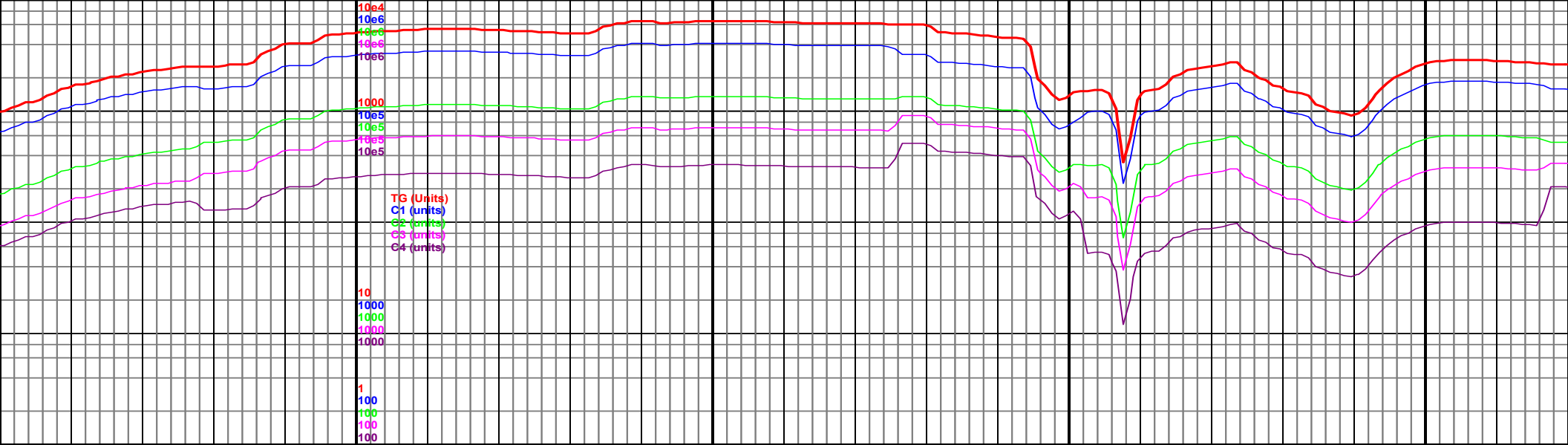


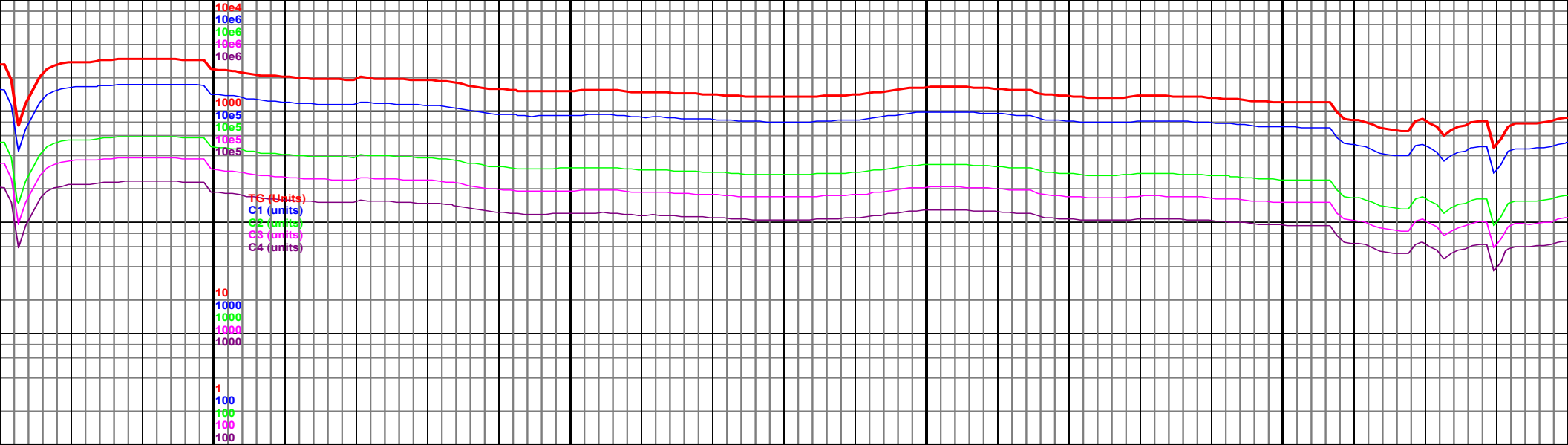












12800

12850

12900

12950

5100 MD 12804 TVD 5816.54  
Sub SINC 90.81 AZ 182.49  
VS 6985.94 DL 0.37

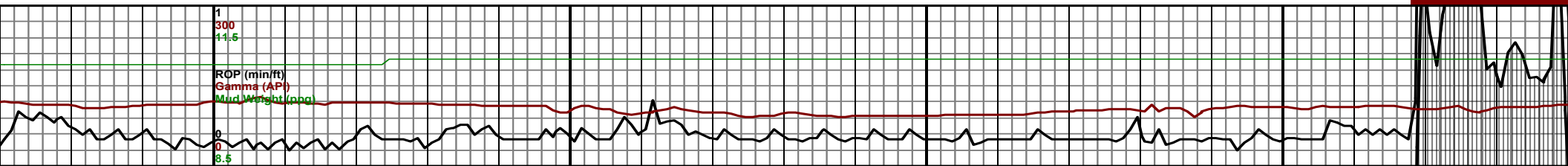
MD 12899 TVD 5816.11  
INC 89.72 AZ 179.62  
VS 7080.91 DL 3.23

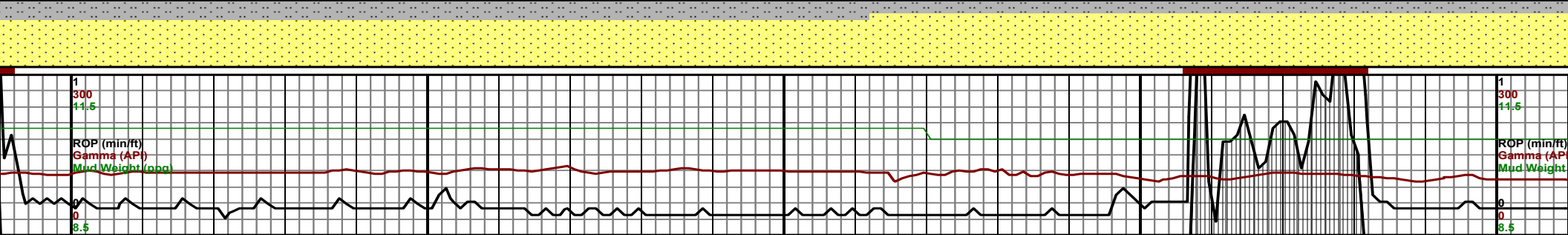
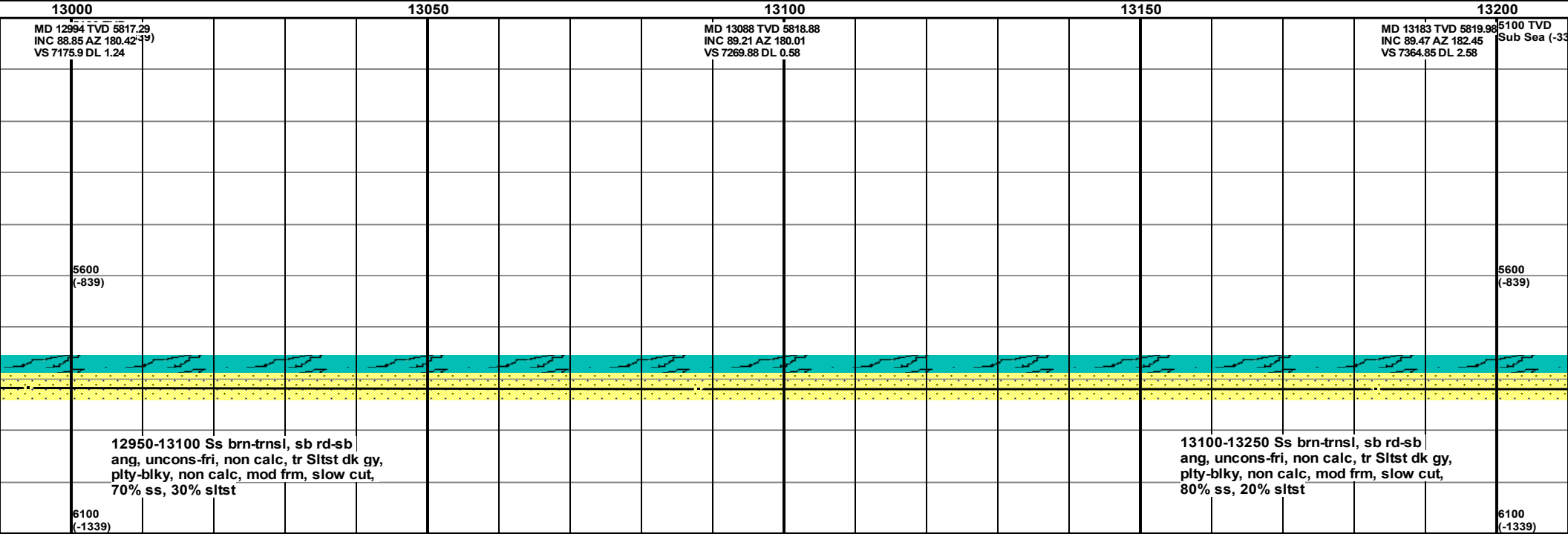
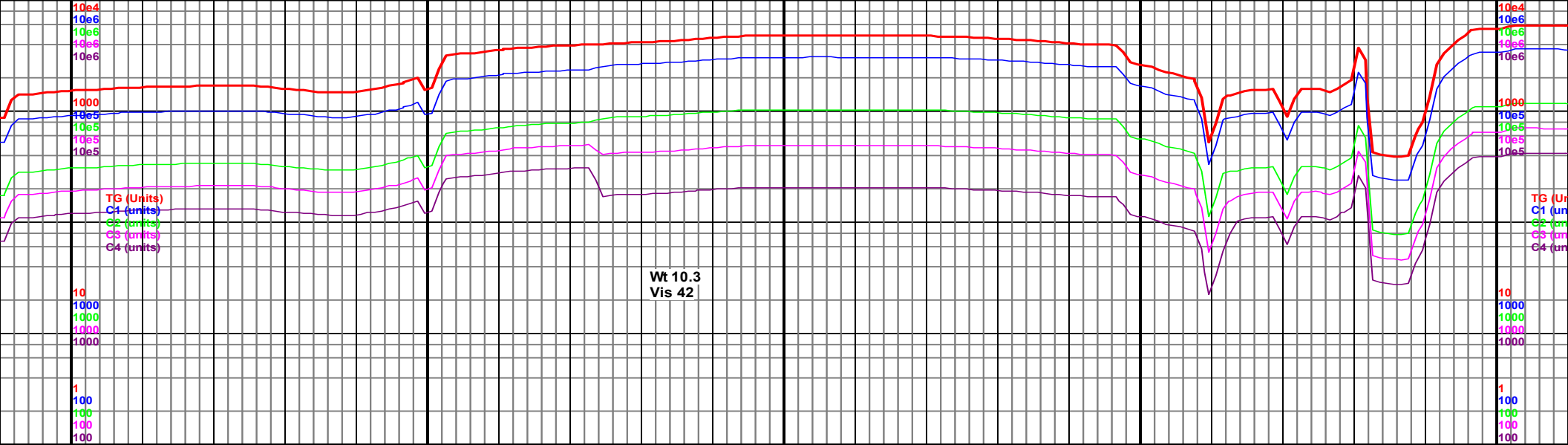
5600  
(-839)

6100  
(-1339)

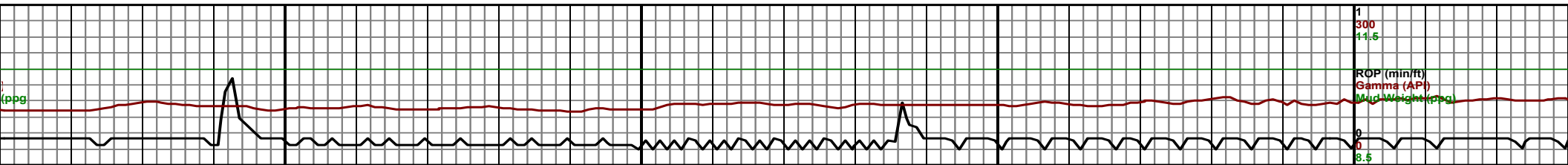
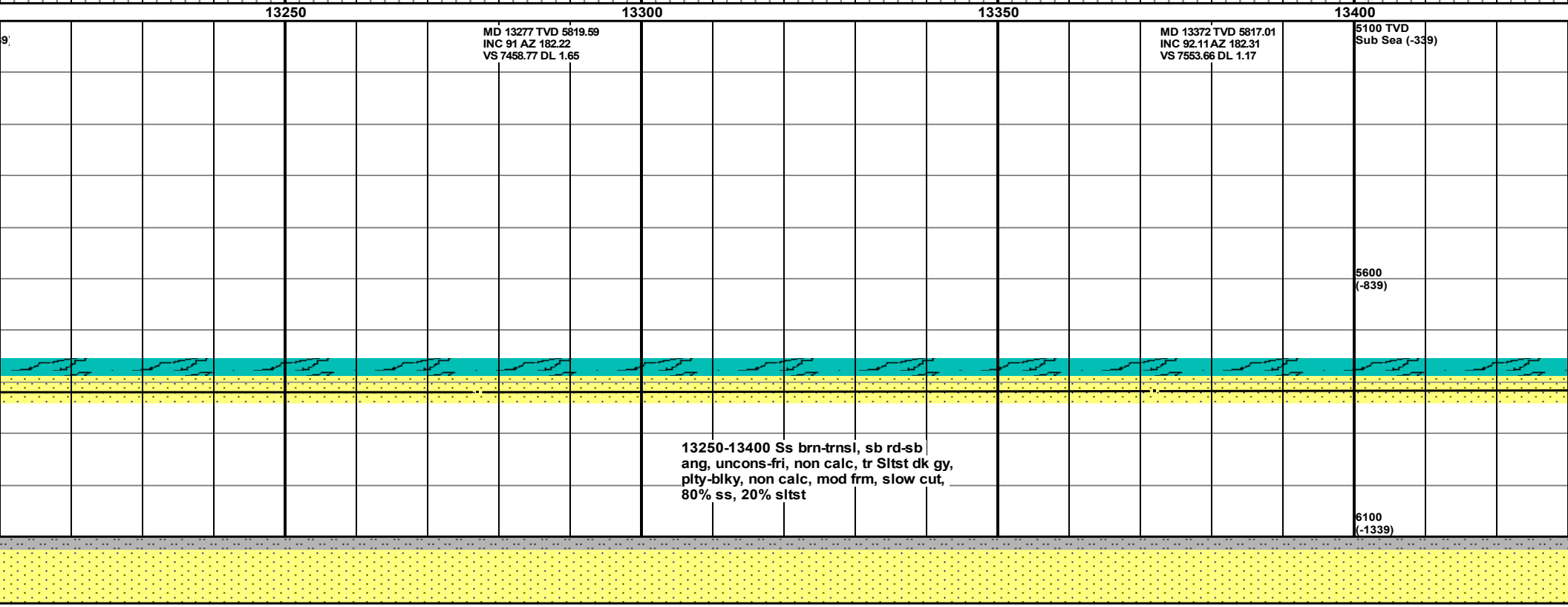
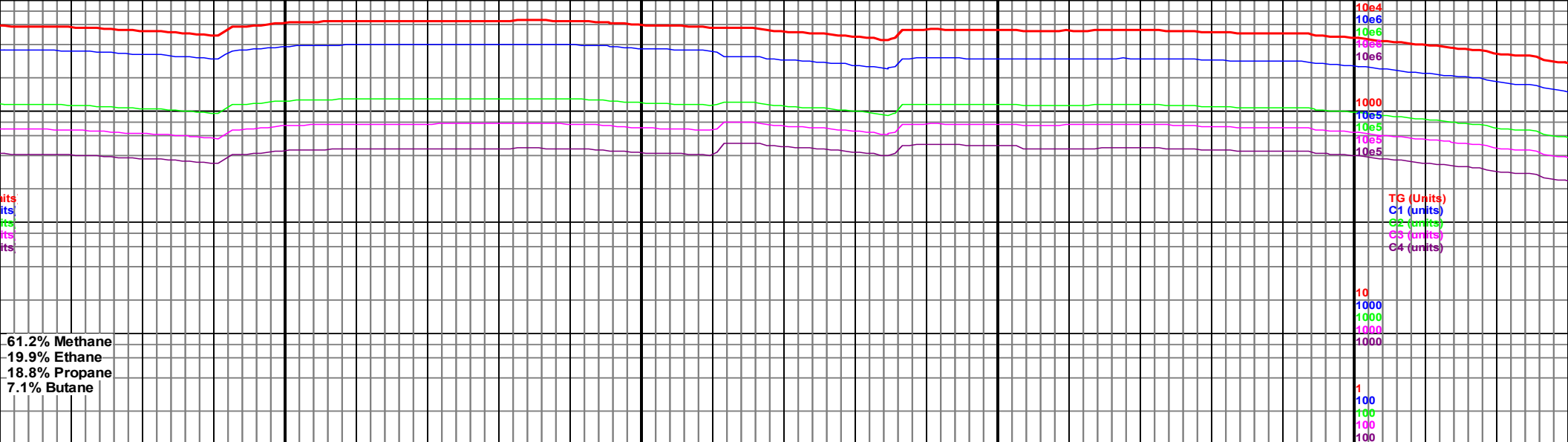
12800-12950 Ss brn, sb rd, unconc,  
non calc, sltst dk gy, plty-blky, non  
calc, mod frm, rr pyr, slow cut, 90% ss,  
10% sltst

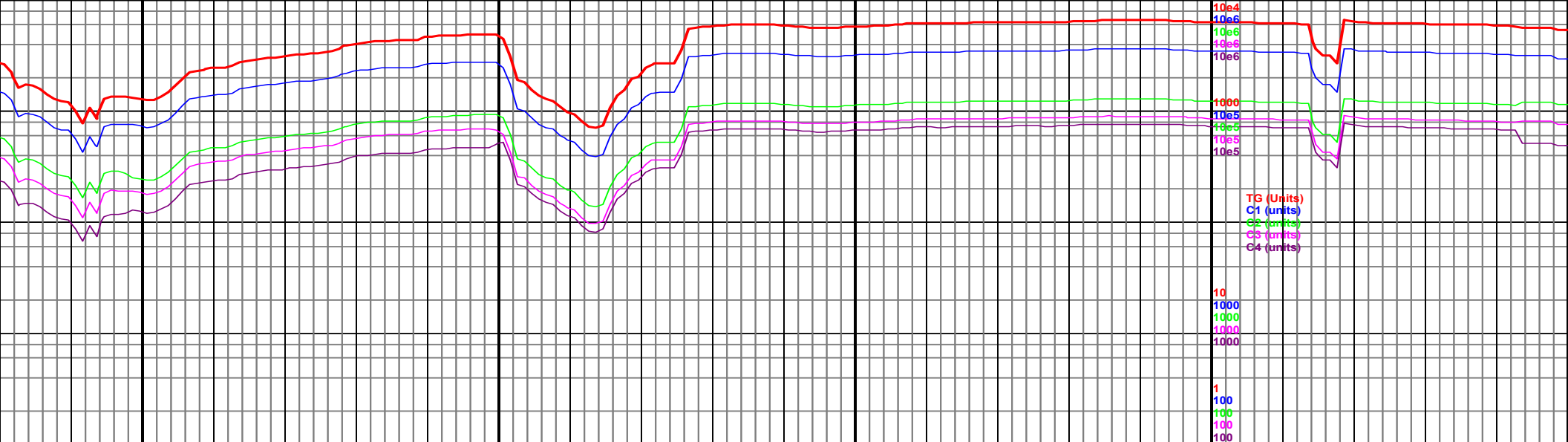
P











13450

MD 13467 TVD 5815.95  
INC 89.17 AZ 182.88  
VS 7648.54 DL 3.15

13500

13550

MD 13562 TVD 5816.72  
INC 89.9 AZ 181.66  
VS 7743.46 DL 1.5

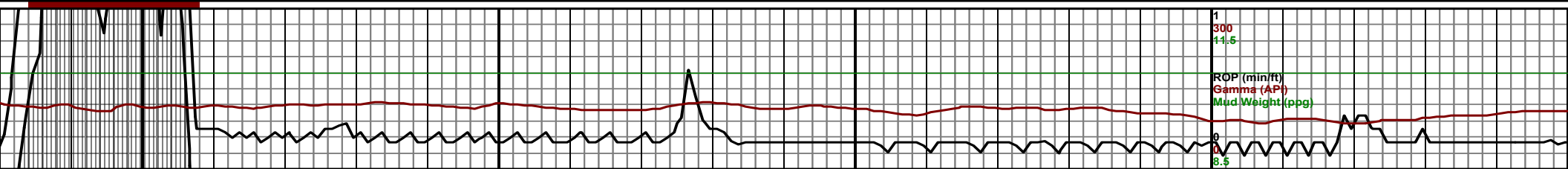
13600

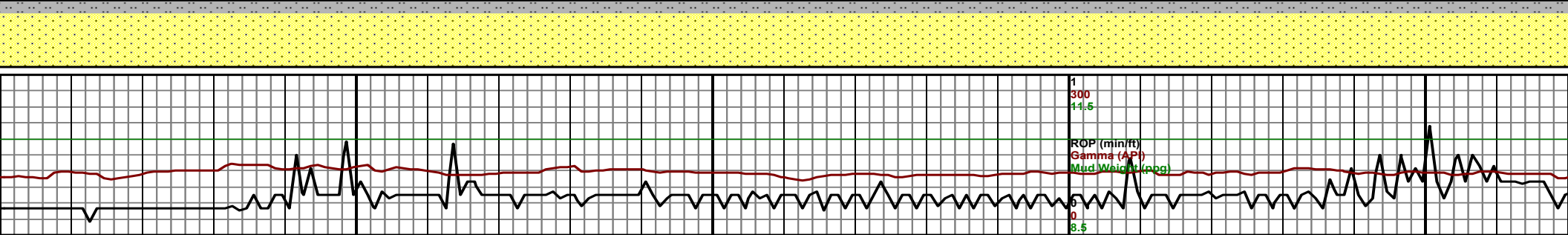
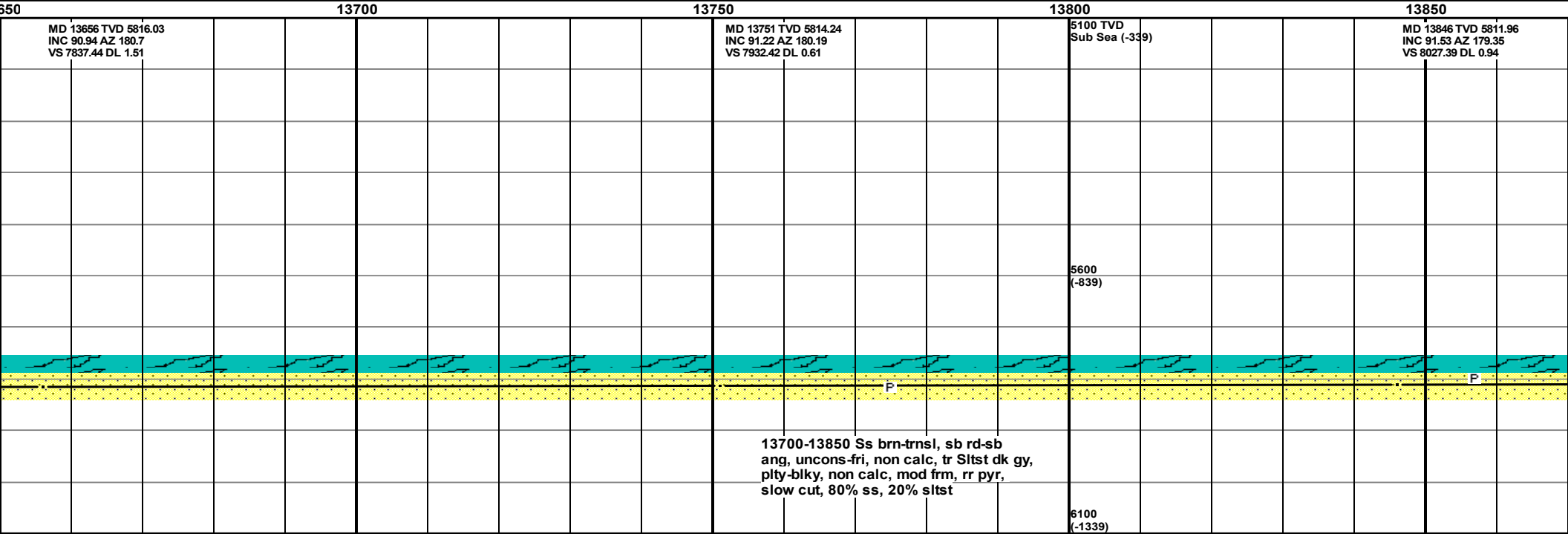
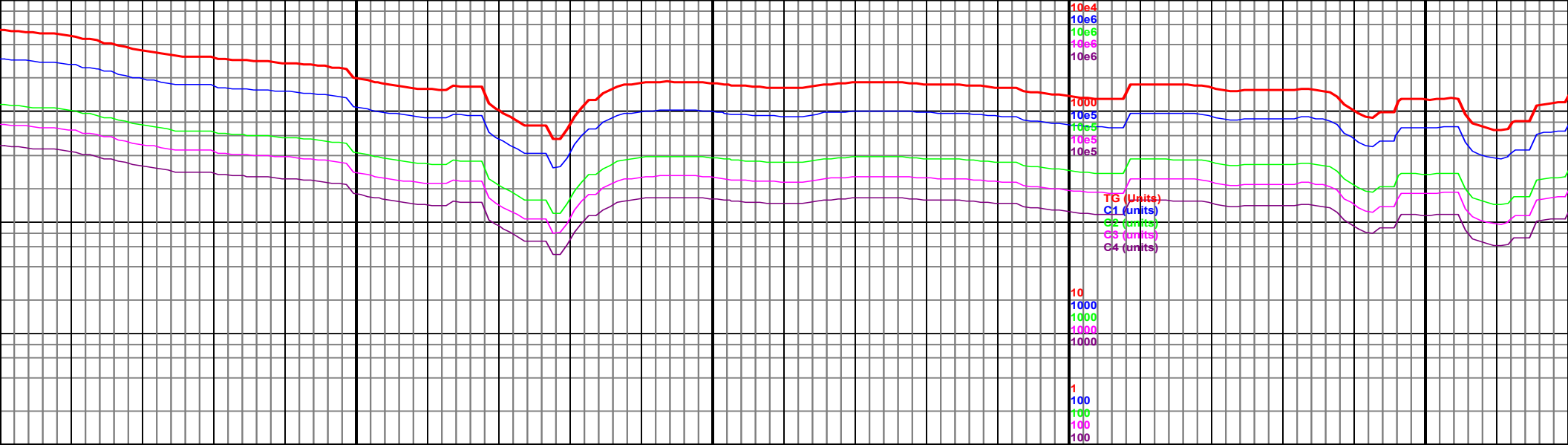
5100 TVD  
Sub Sea (-339)

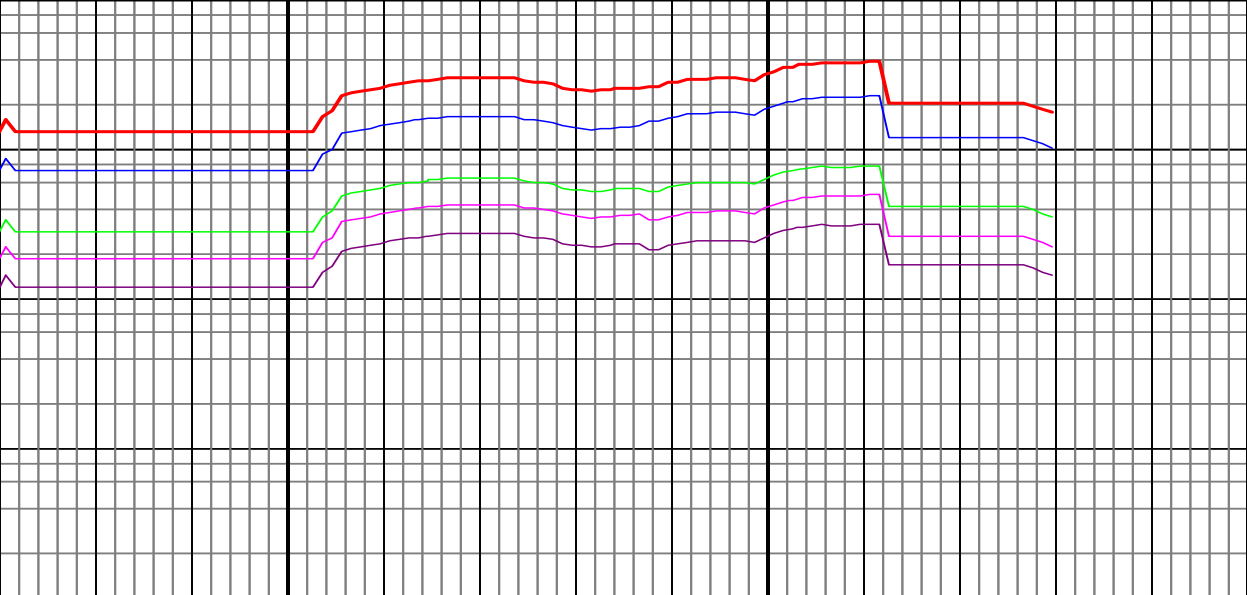
13400-13550 Ss brn-trnsl, sb rd-sb  
ang, uncon-fri, non calc, tr Sltst dk gy,  
pty-blky, non calc, mod frm, rr pyr,  
slow cut, 80% ss, 20% sltst

13550-13700 Ss brn-trnsl, sb rd-sb  
ang, uncon-fri, non calc, tr Sltst dk gy,  
pty-blky, non calc, mod frm, rr pyr,  
slow cut, 80% ss, 20% sltst

6100  
(-1339)







13900

13950

14

MD 13921 TVD 5809.61  
INC 92.07 AZ 178.28  
VS 8102.33 DL 1.6

MD 13980 TVD 5807.48  
INC 92.07 AZ 178.28  
VS 8161.27 DL 0

TD of 13980 reached at  
12:30 on 1/10/2017



13850-13980 Ss brn-trnsl, sb rd-sb  
ang, uncons-fri, non calc, tr Sltst dk gy,  
pity-blky, non calc, mod frm, slow cut,  
80% ss, 20% sltst

