



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

Well Name: Horsetail 07E-1836  
Well Id: 05-123-41646-00  
Location: Sec 7-T10N-R57W  
License Number: 05-123-41646-00  
Spud Date: 2/10/2016  
Surface Coordinates: Lat.: 40.853953 Long.: -103.800933

Region: Redtail Field  
Drilling Completed: 2/14/2016

Bottom Hole  
Coordinates:  
Ground Elevation (ft): 4926  
Logged Interval (ft): 5285 To: 14144  
Formation: Pierre, Sharon Springs, Niobrara A, Niobrara B, Niobrara C  
Type of Drilling Fluid: Water Based Mud

K.B. Elevation (ft): 4947  
Total Depth (ft): 14144

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: Brian Reddick and Todd Nakata  
Company: Acme Geologic Consulting  
Address: 108 Berry Street  
Little Rock, AR 72205

## Drilling Company

Unit Drilling Company  
Rig 409

## Gas Detection






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

## Comments

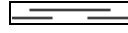
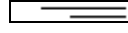

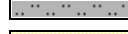
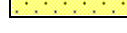
Lithologies and tops at drilled depths, not corrected to elogs. Where the well bore gas is 100% methane, the C1 line is moved to 85% for graphical purposes only.




## 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**



**Dead**

**INTERVAL**



**Core**



**Dst**

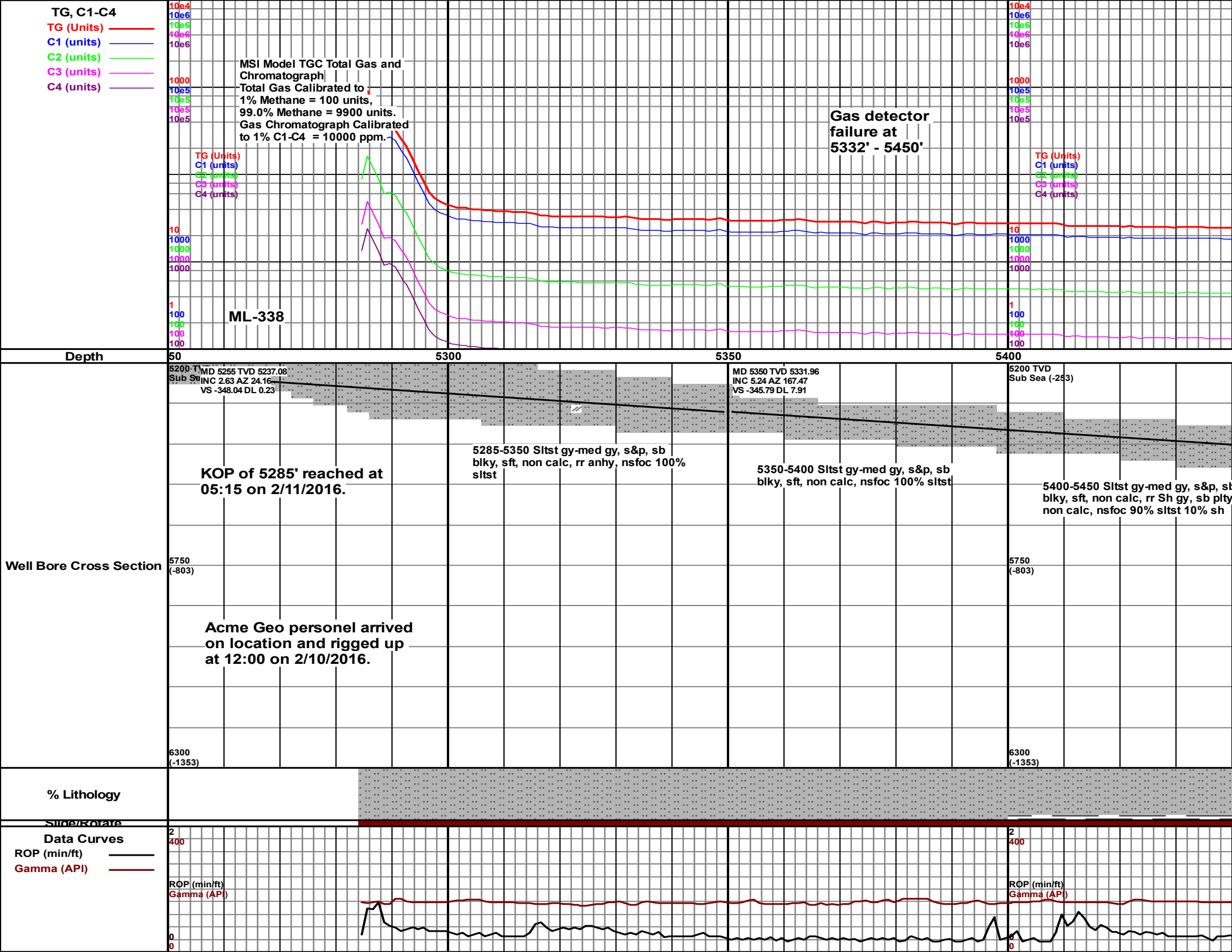
**EVENT**



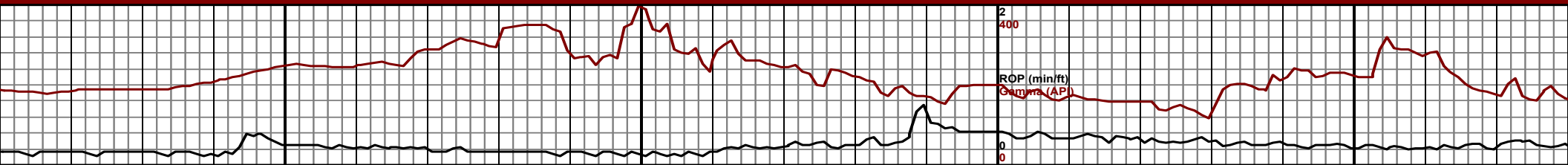
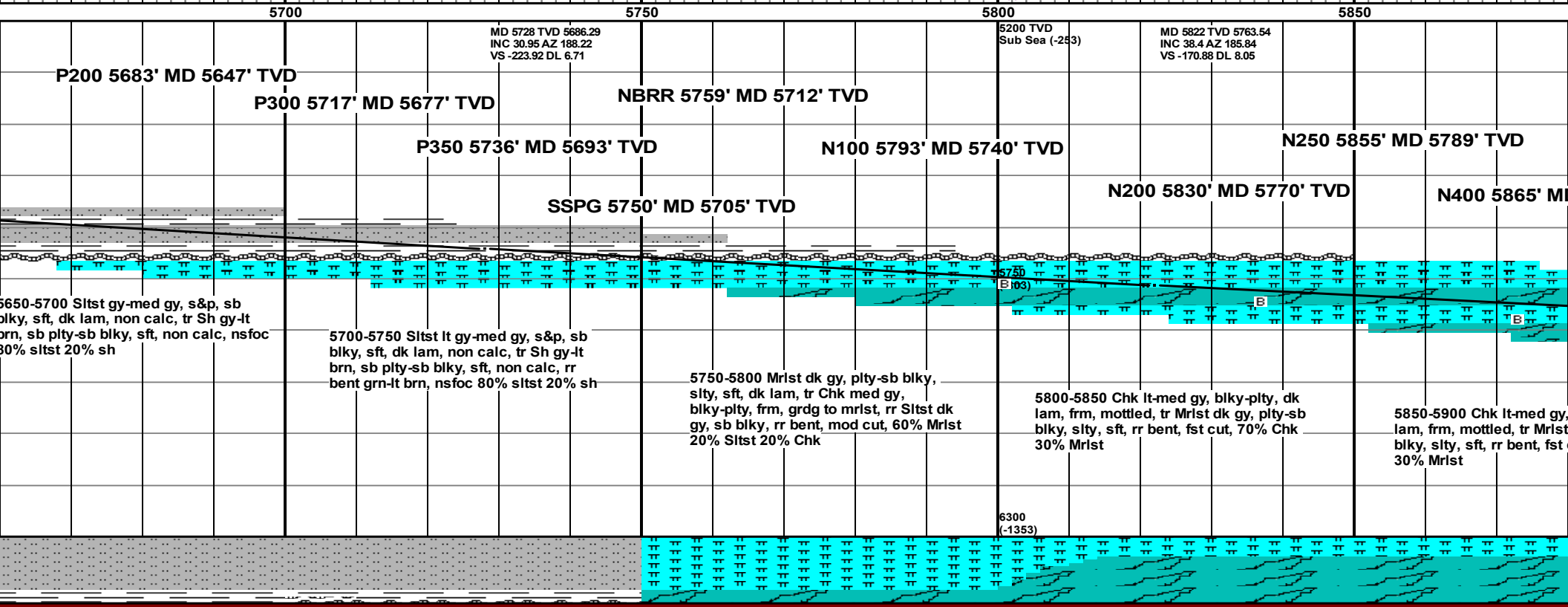
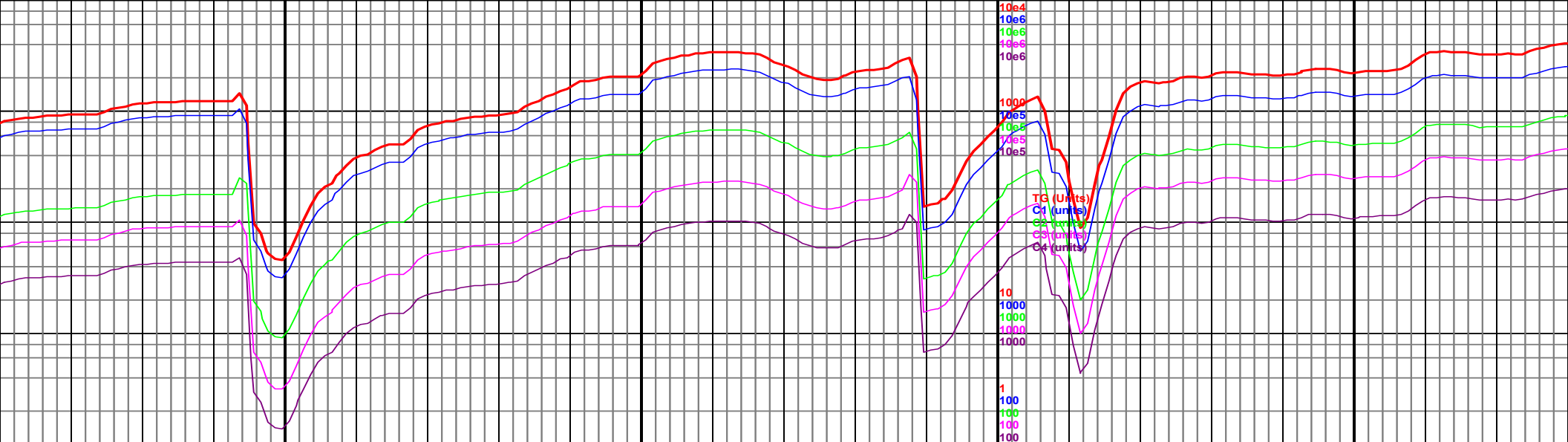
**Rft**

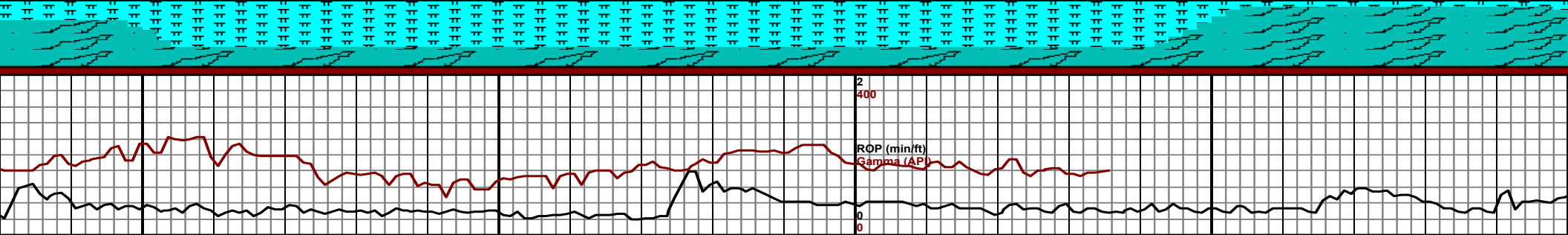
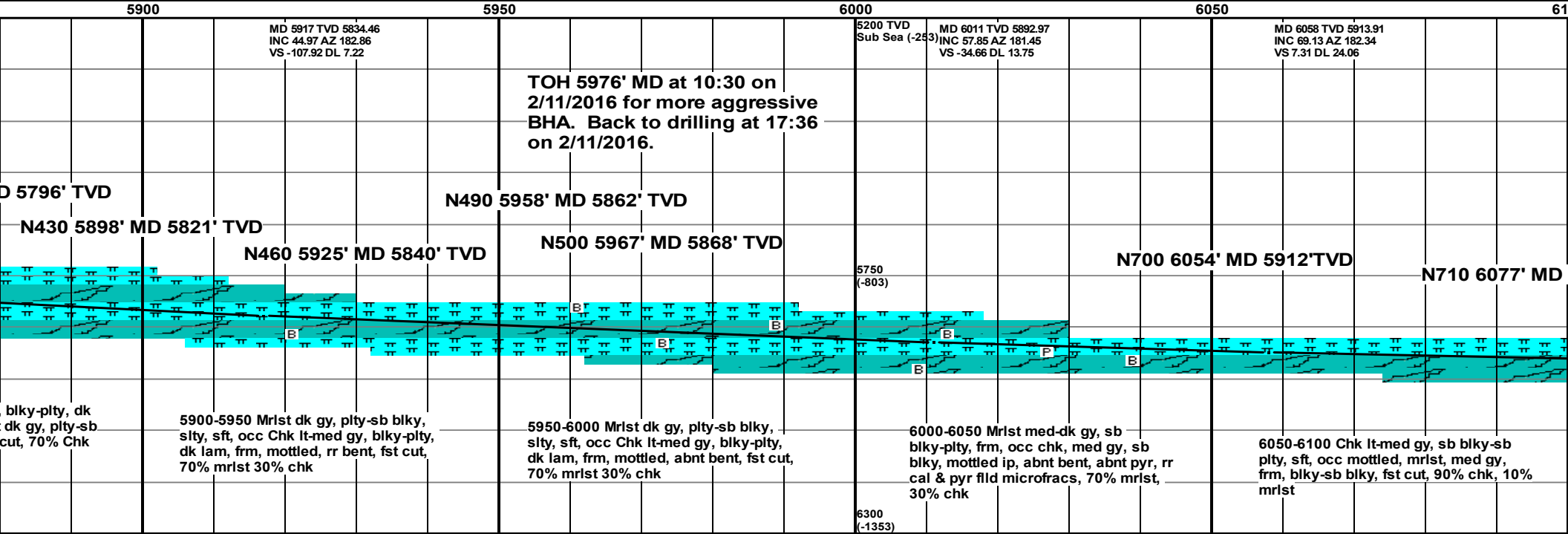
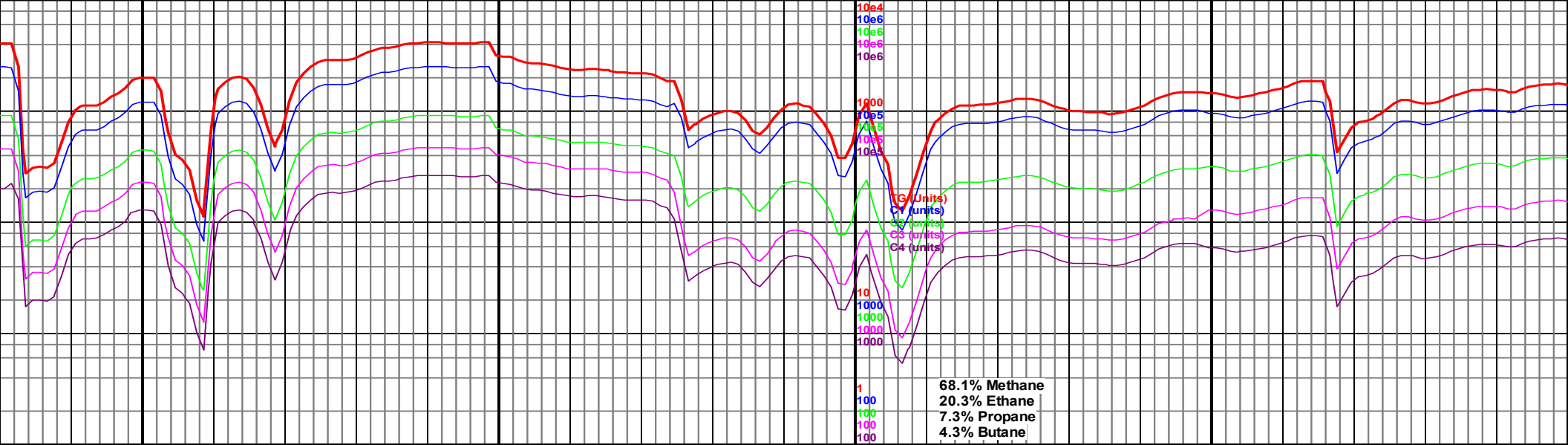


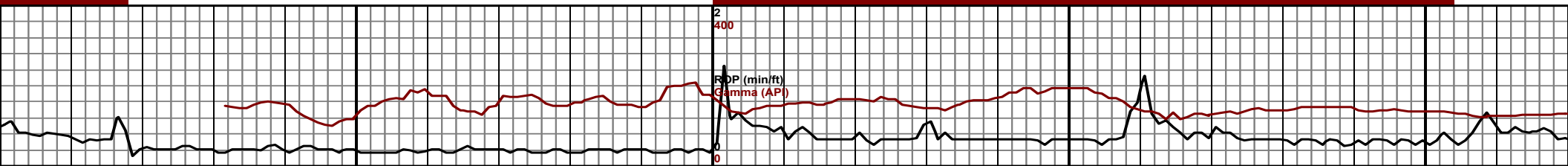
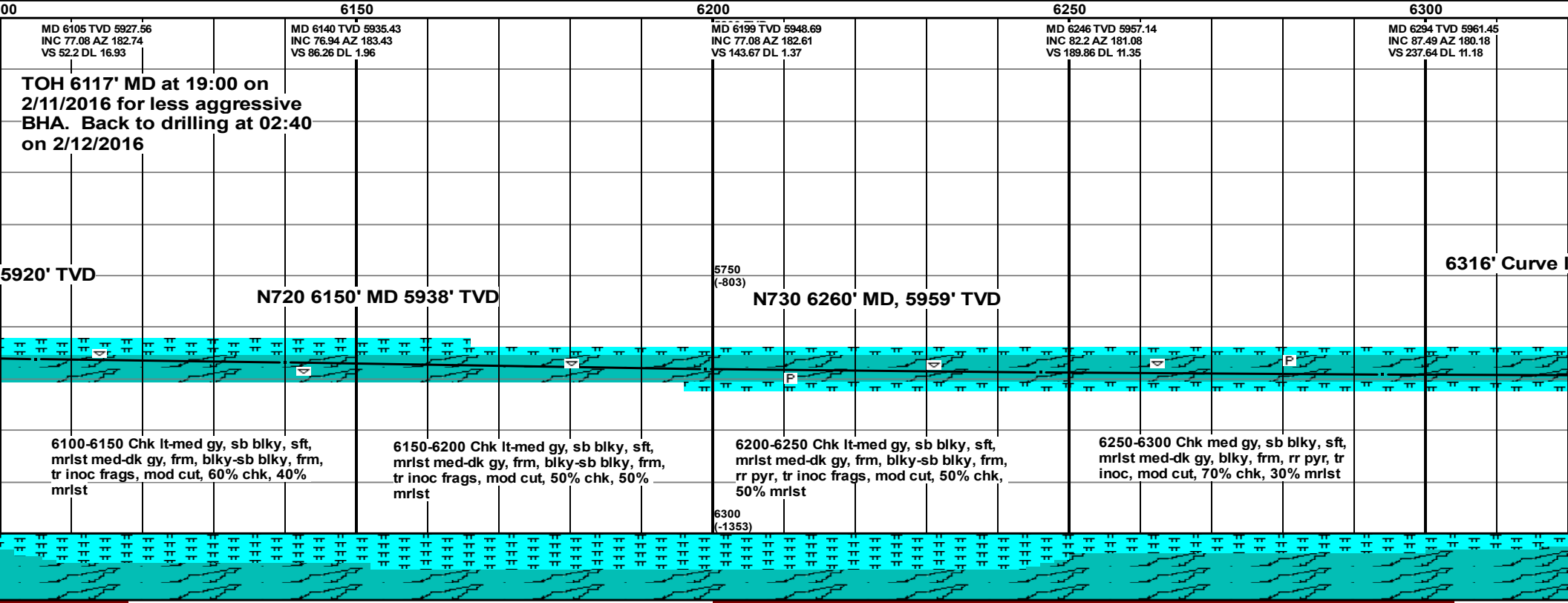
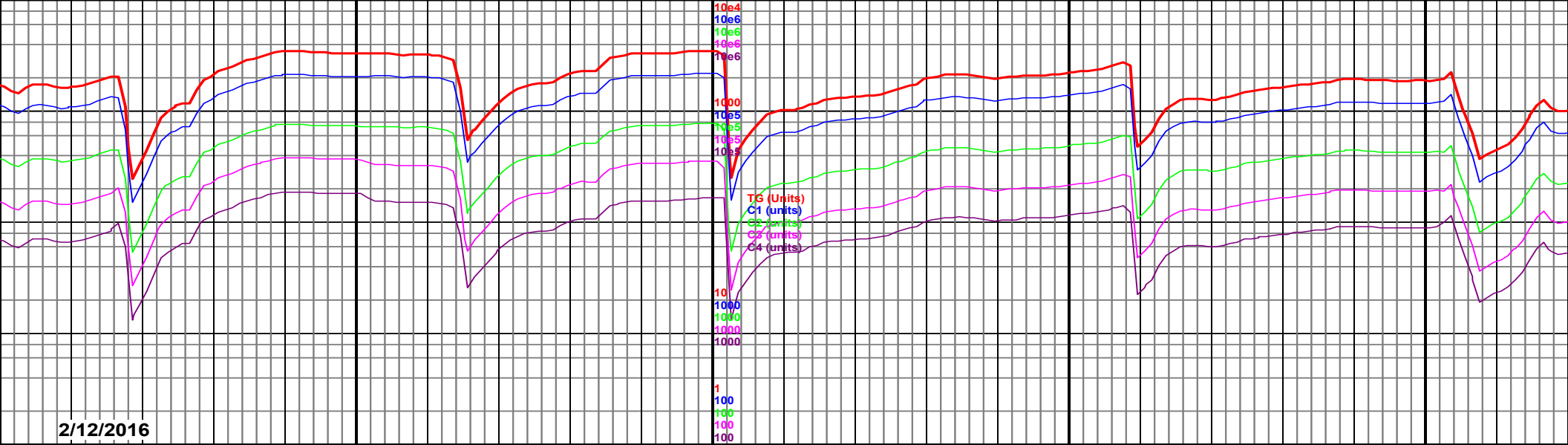
**Sidewall**



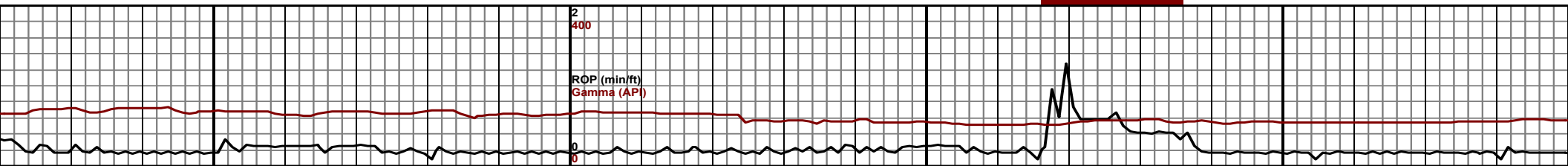
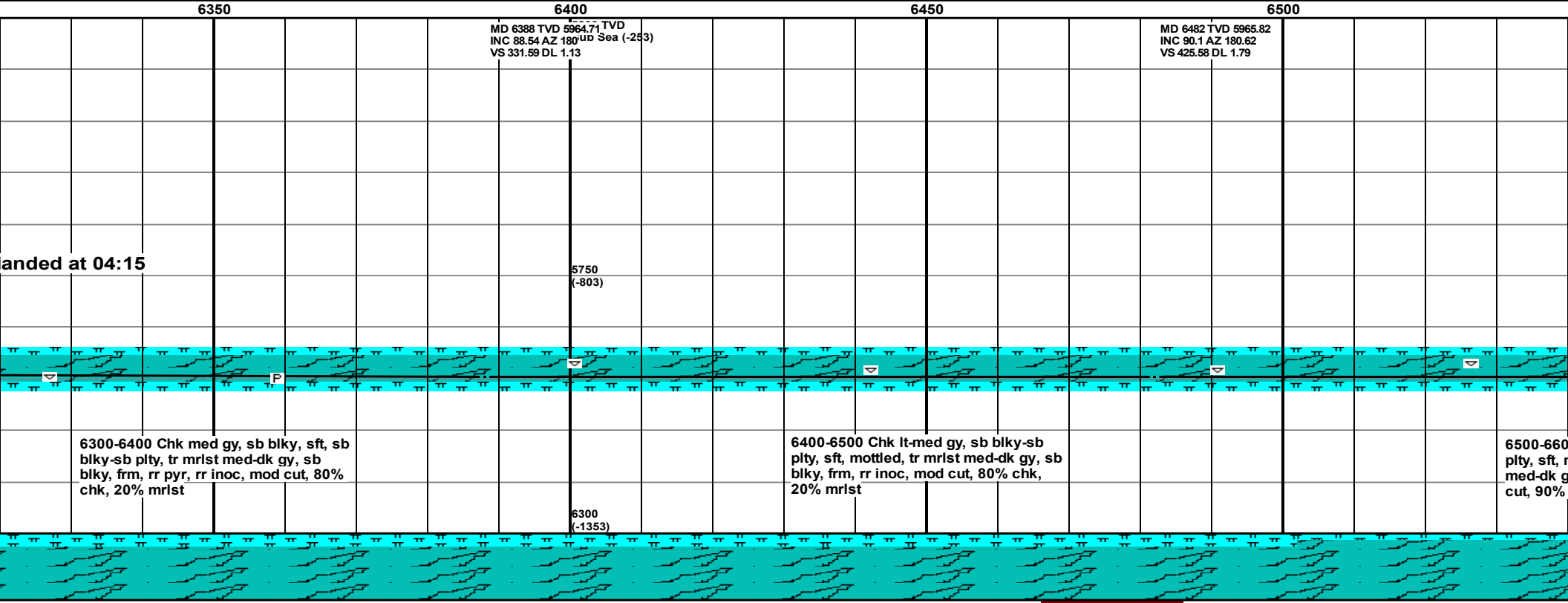
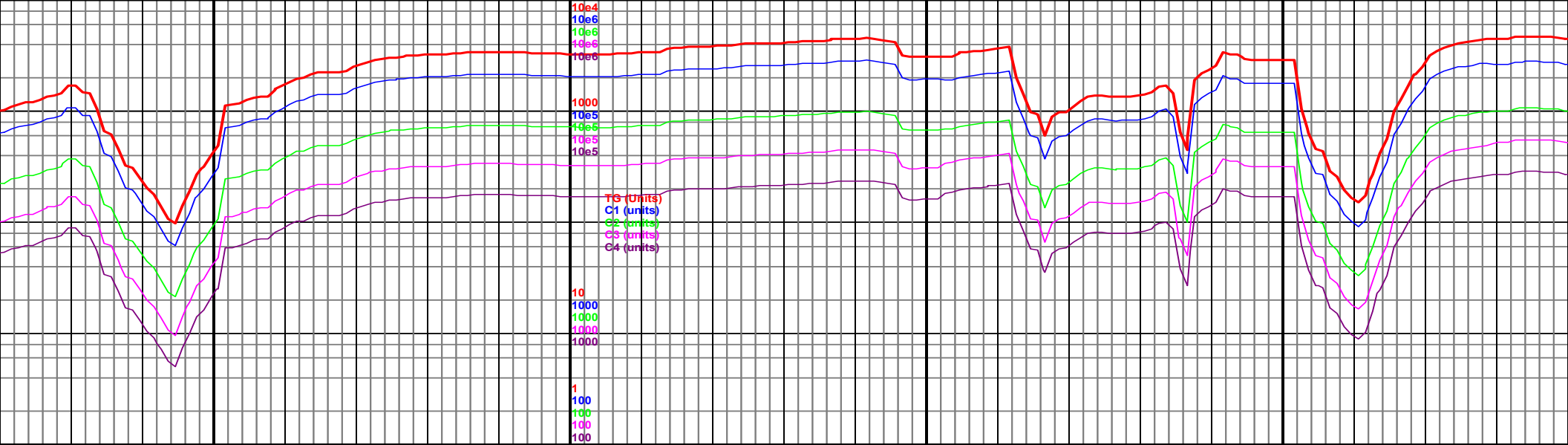




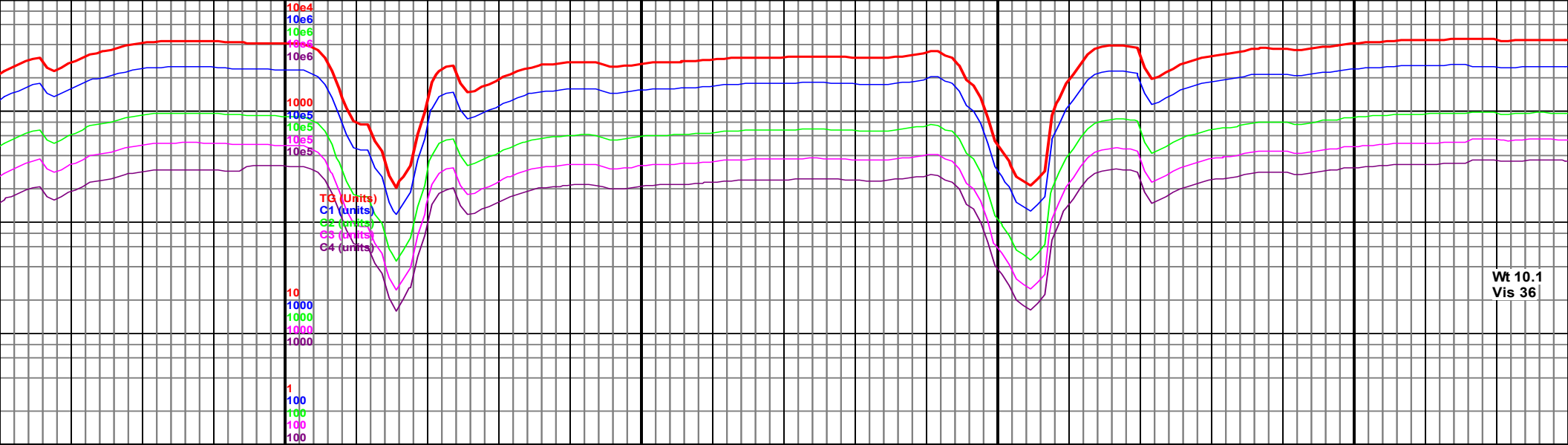




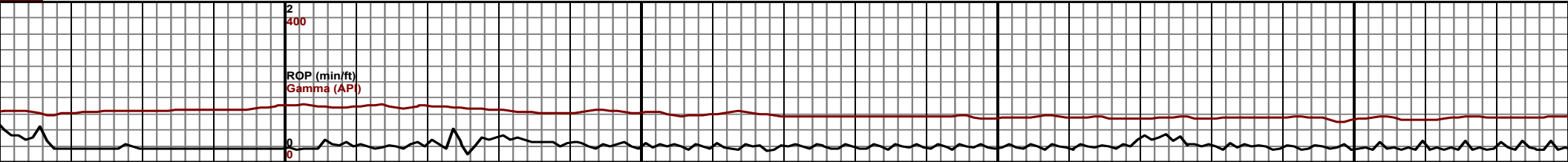
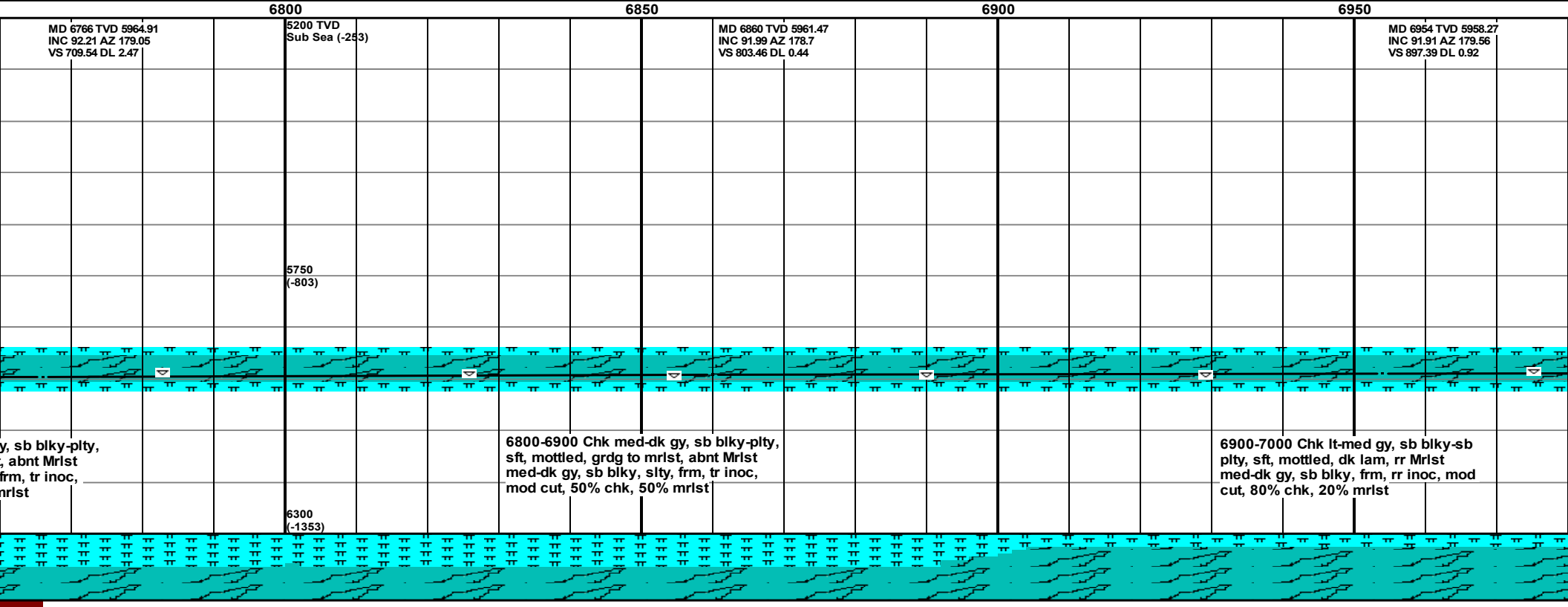


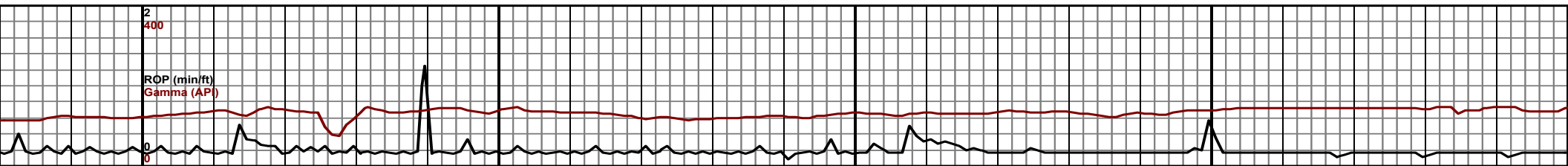
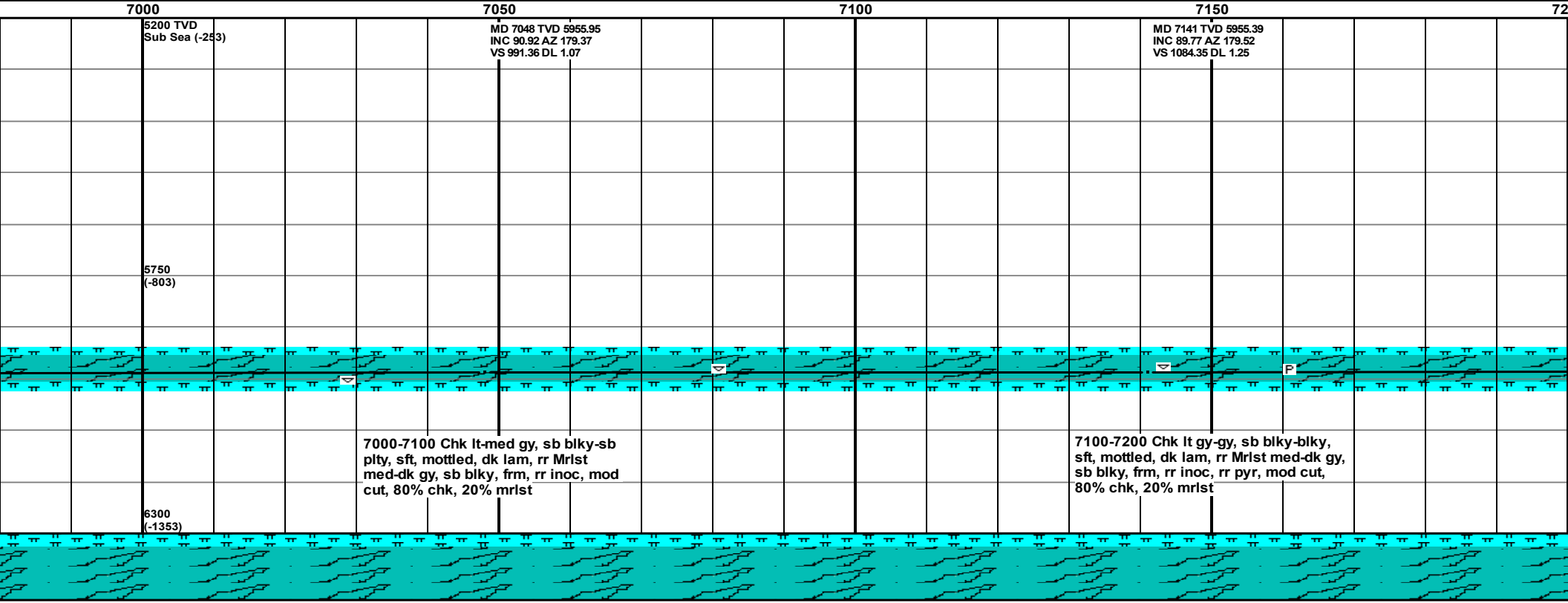
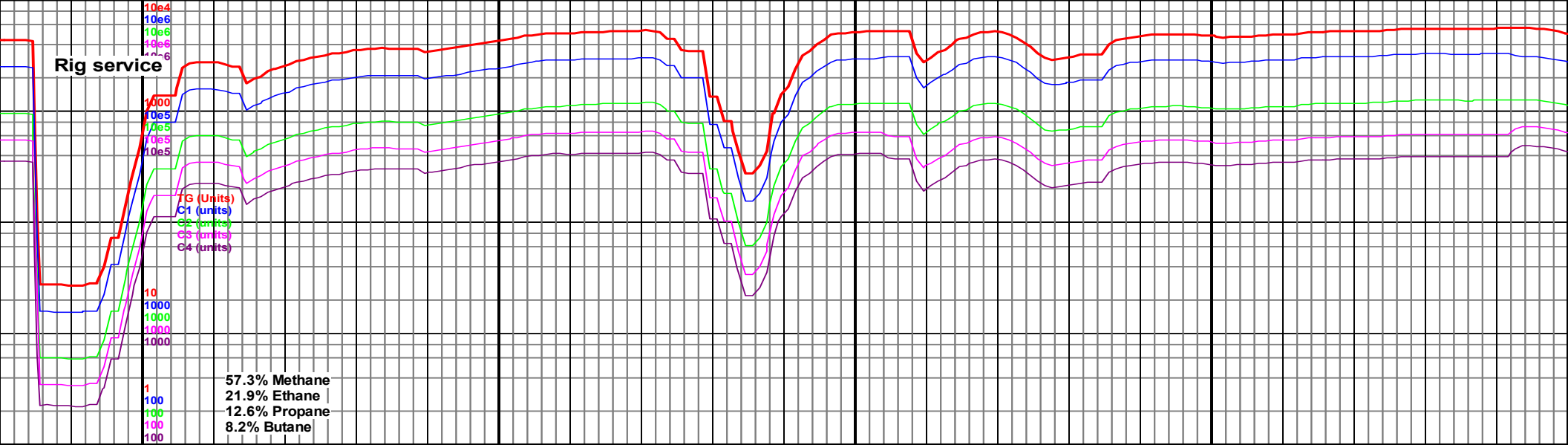


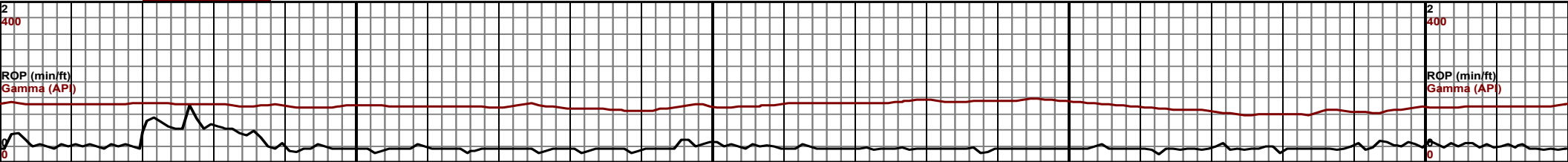
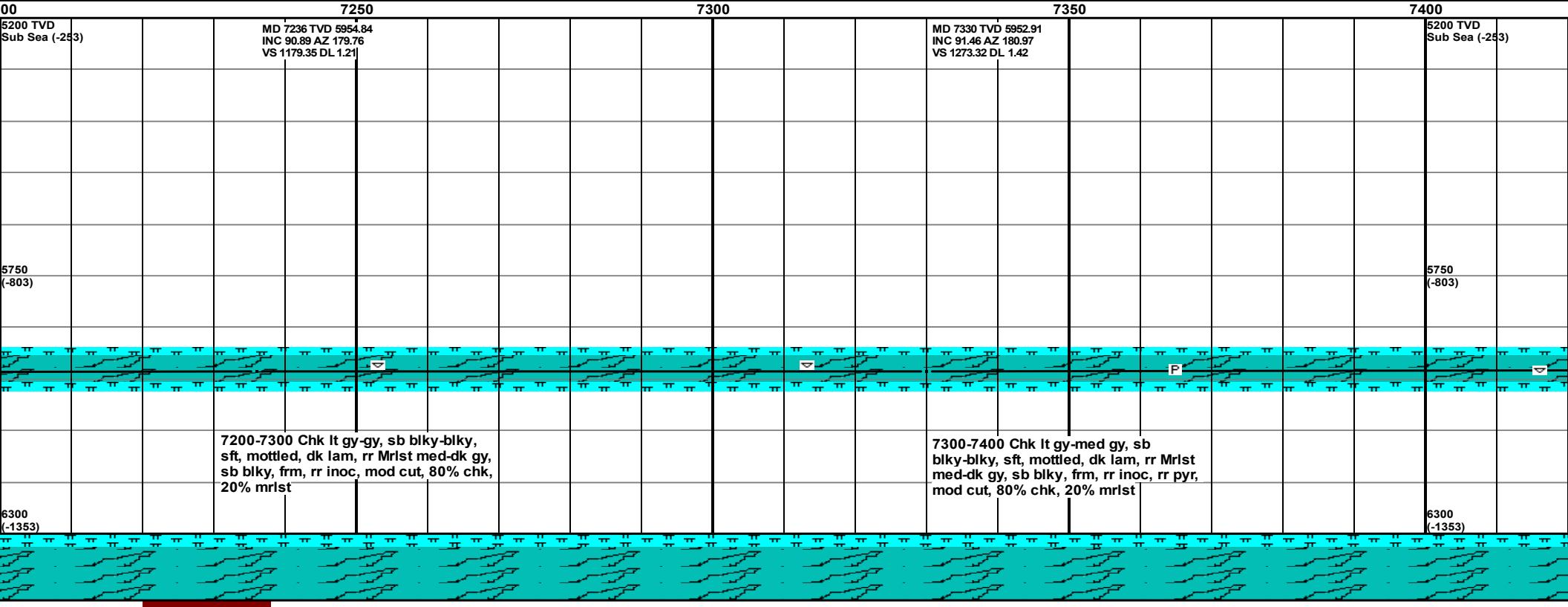
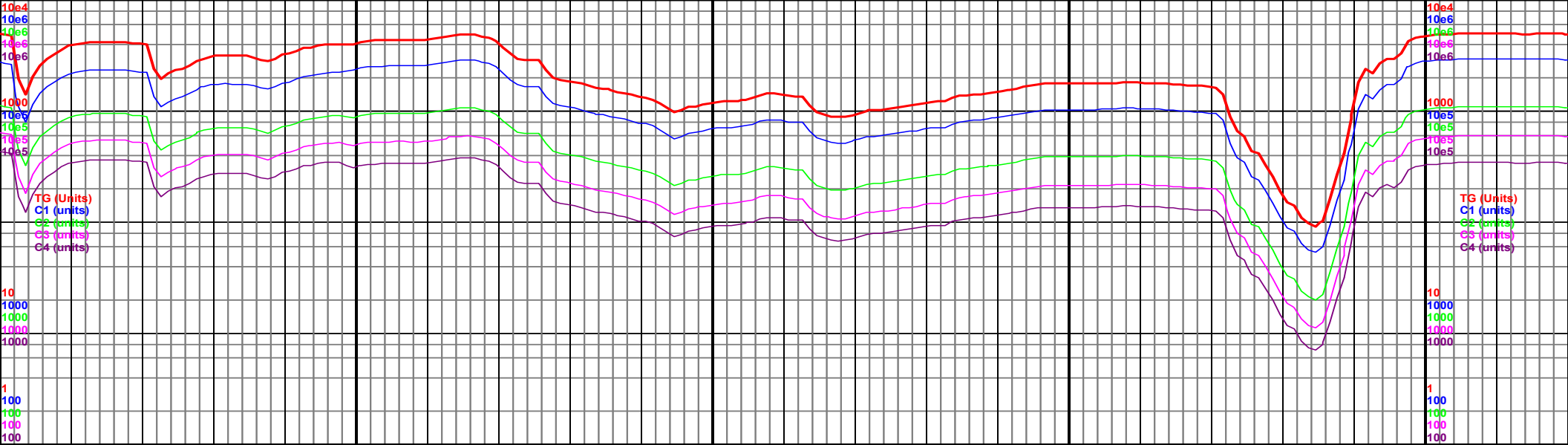


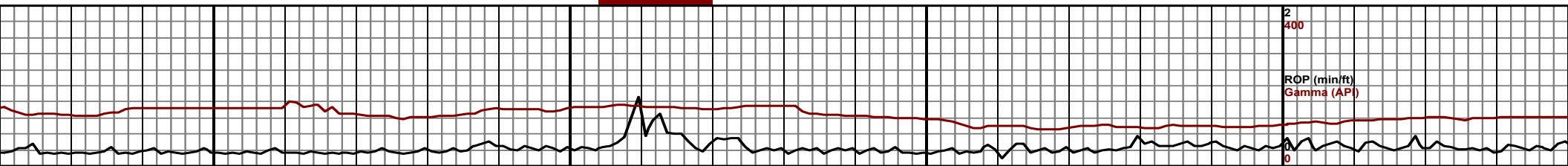
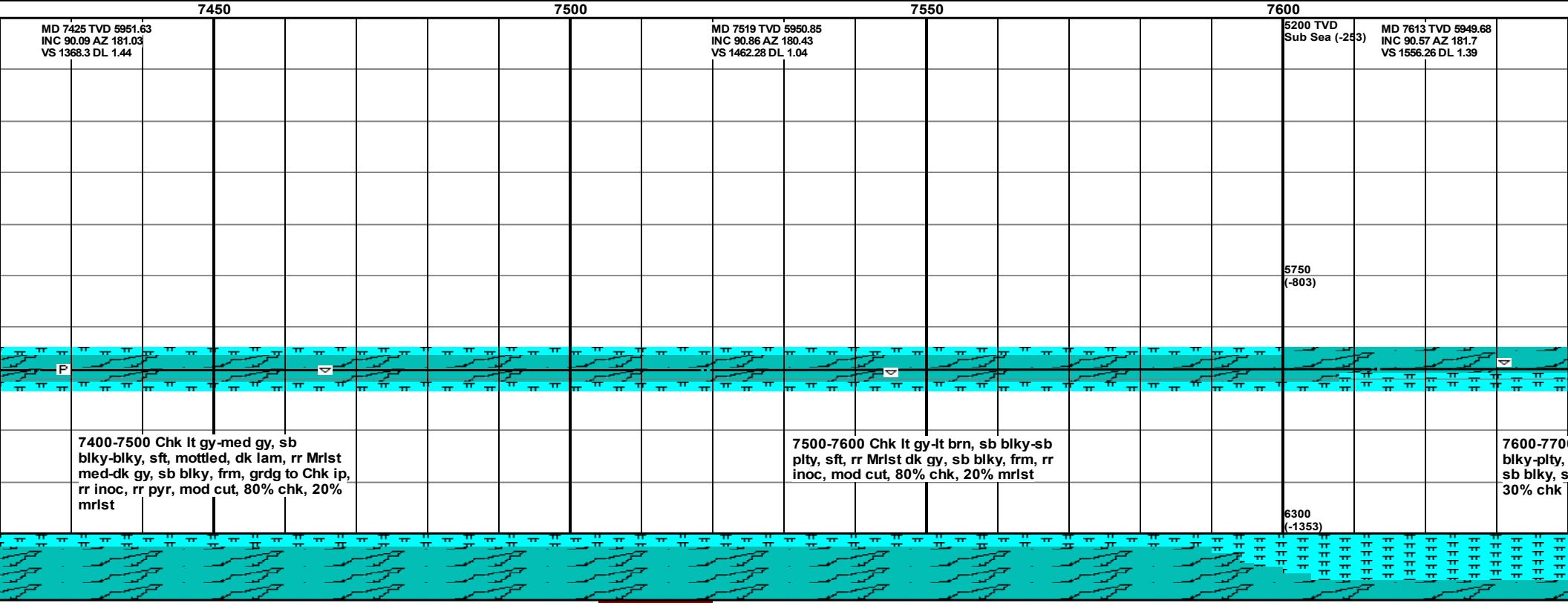
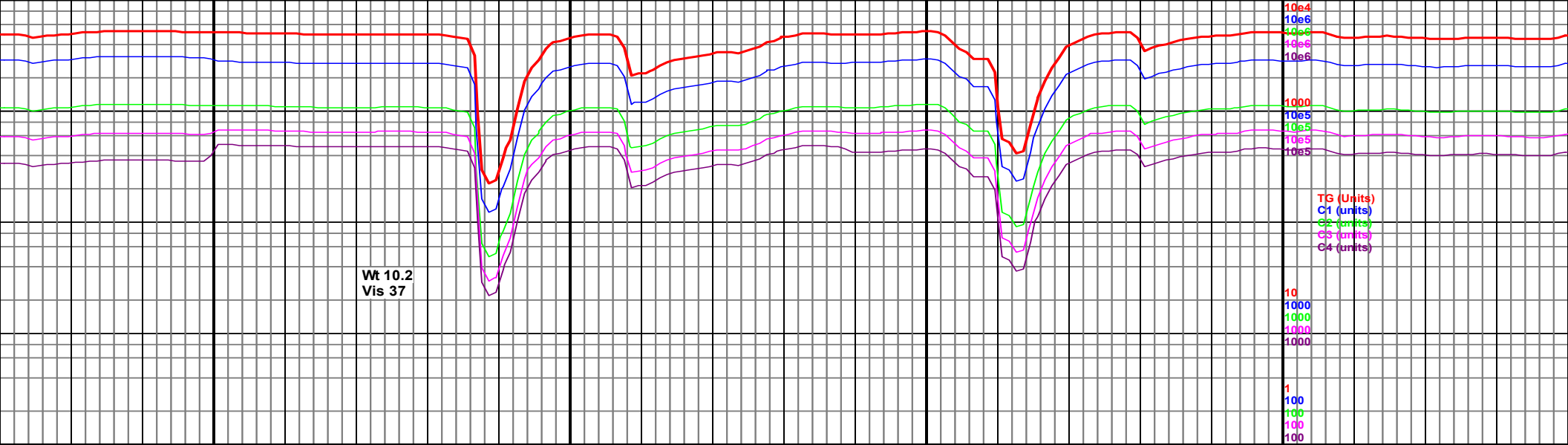


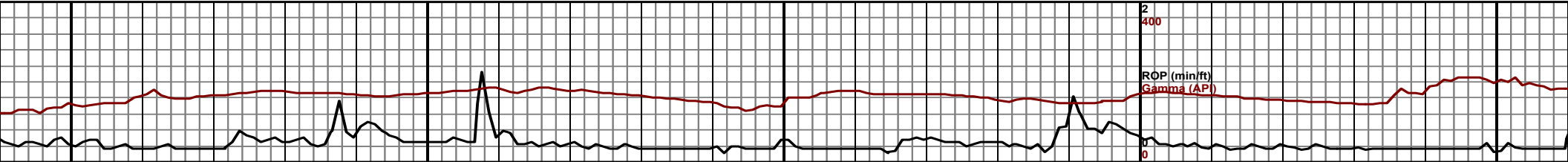
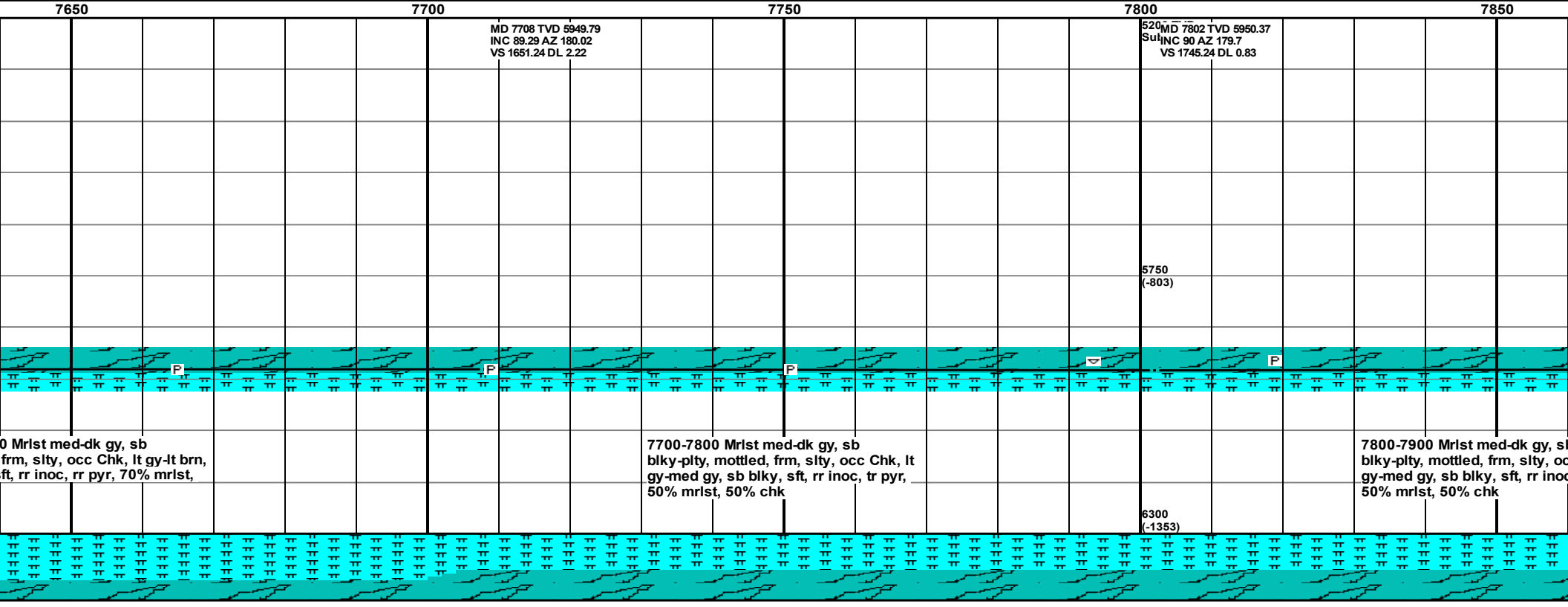
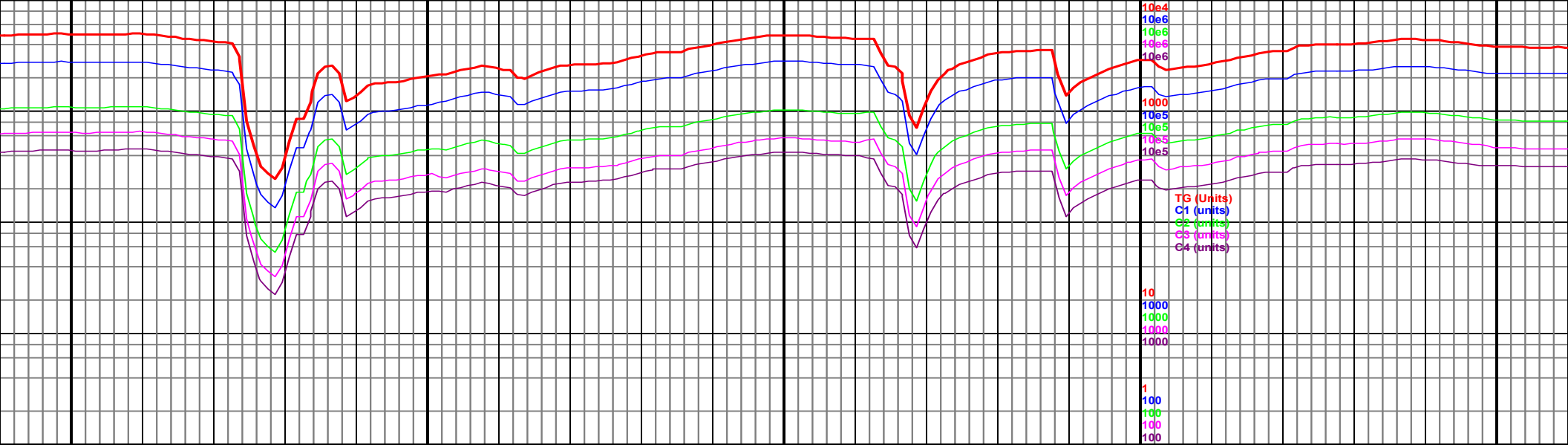
Wt 10.1  
Vis 36

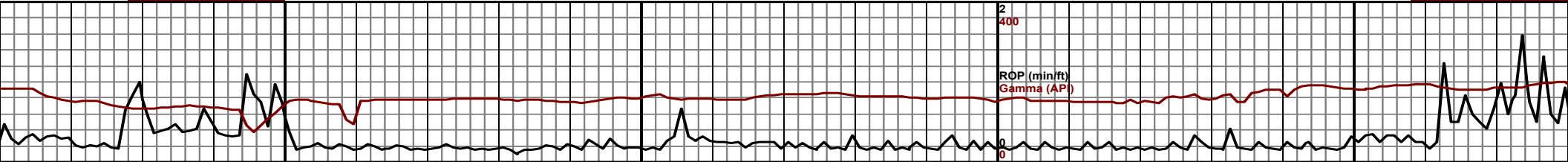
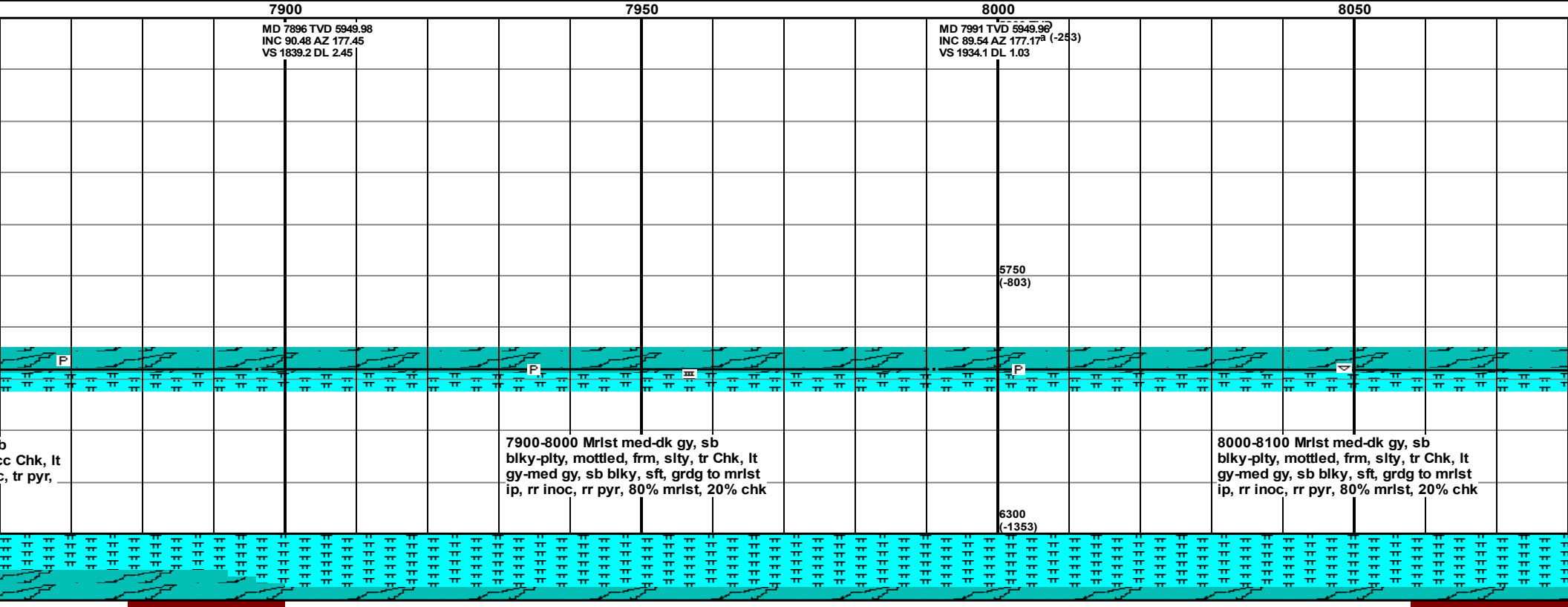
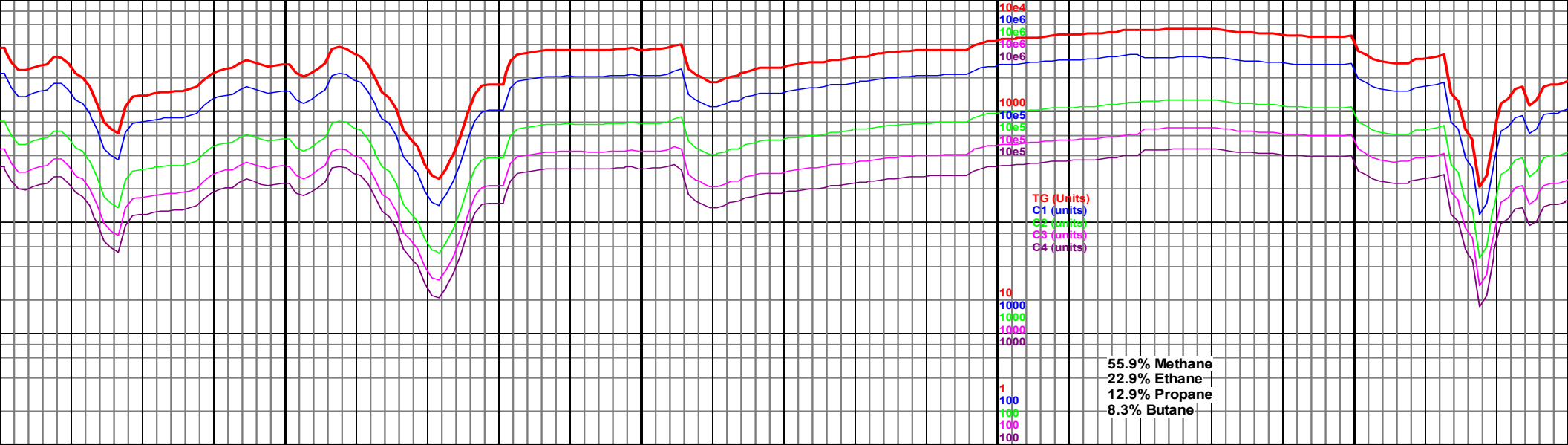




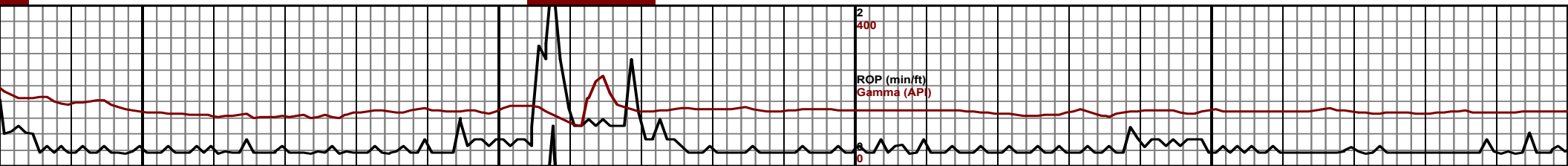
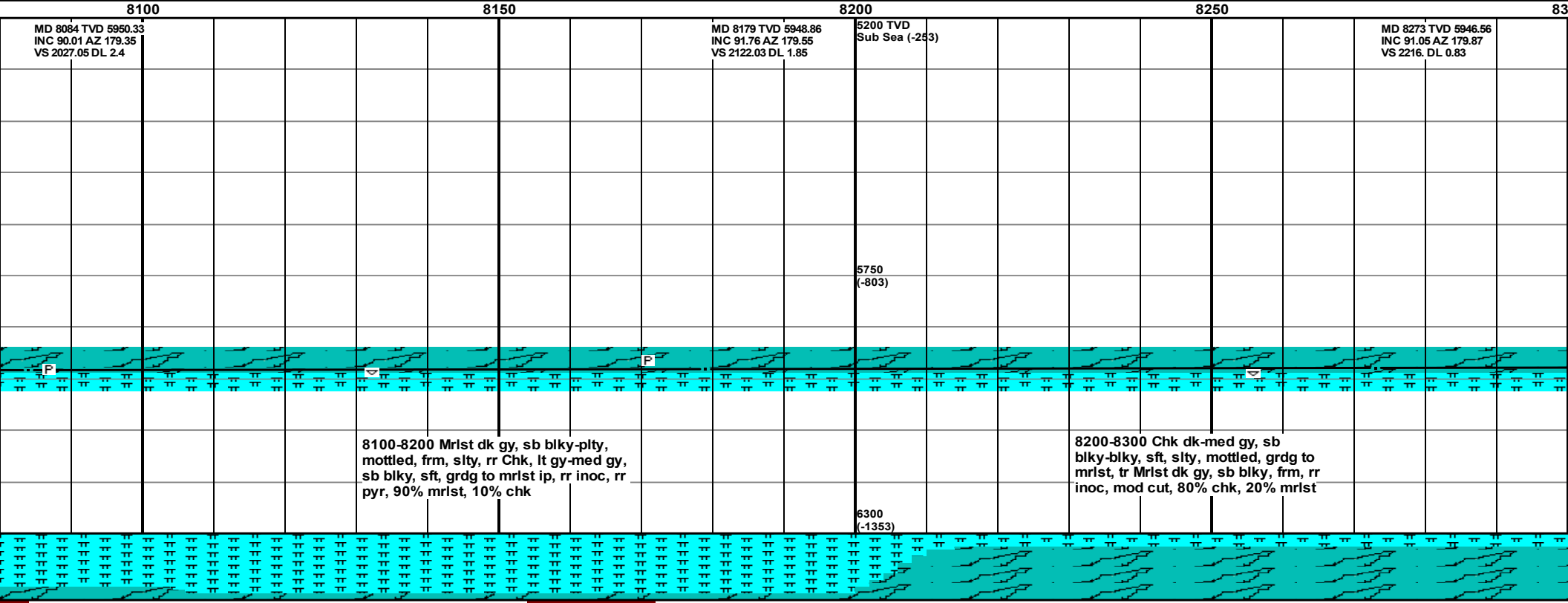
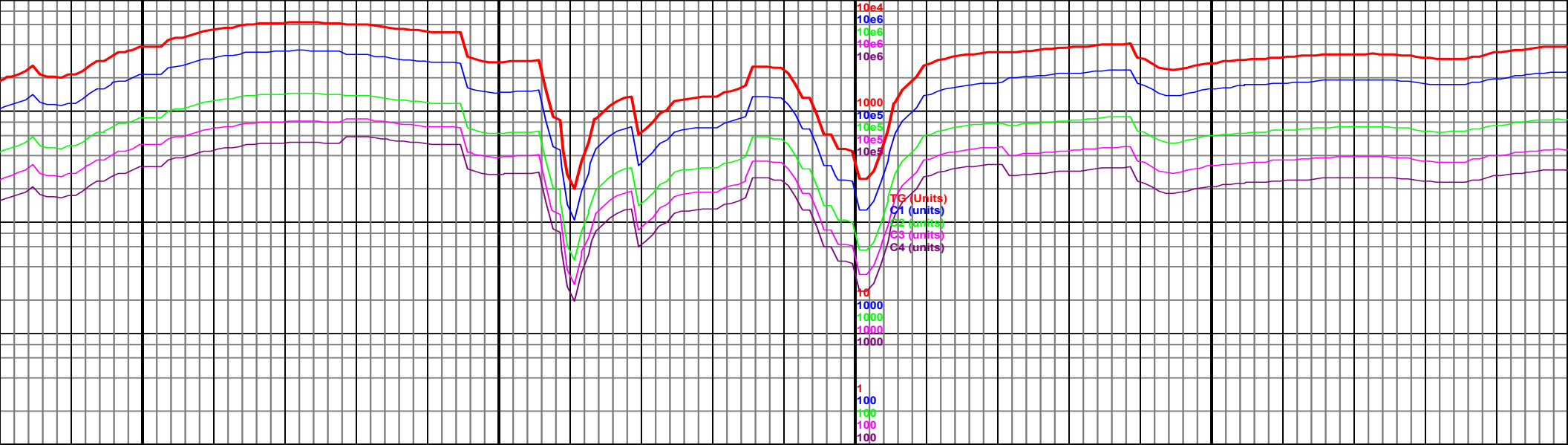


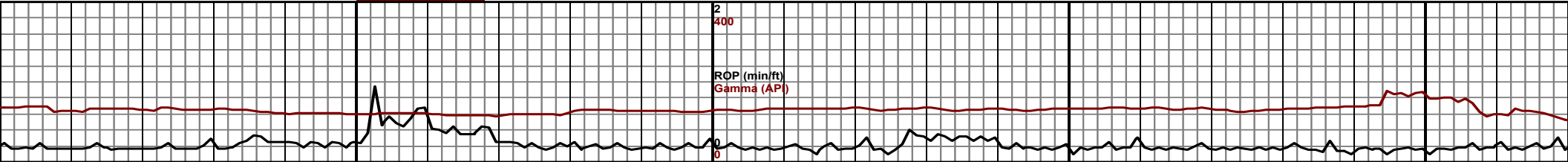
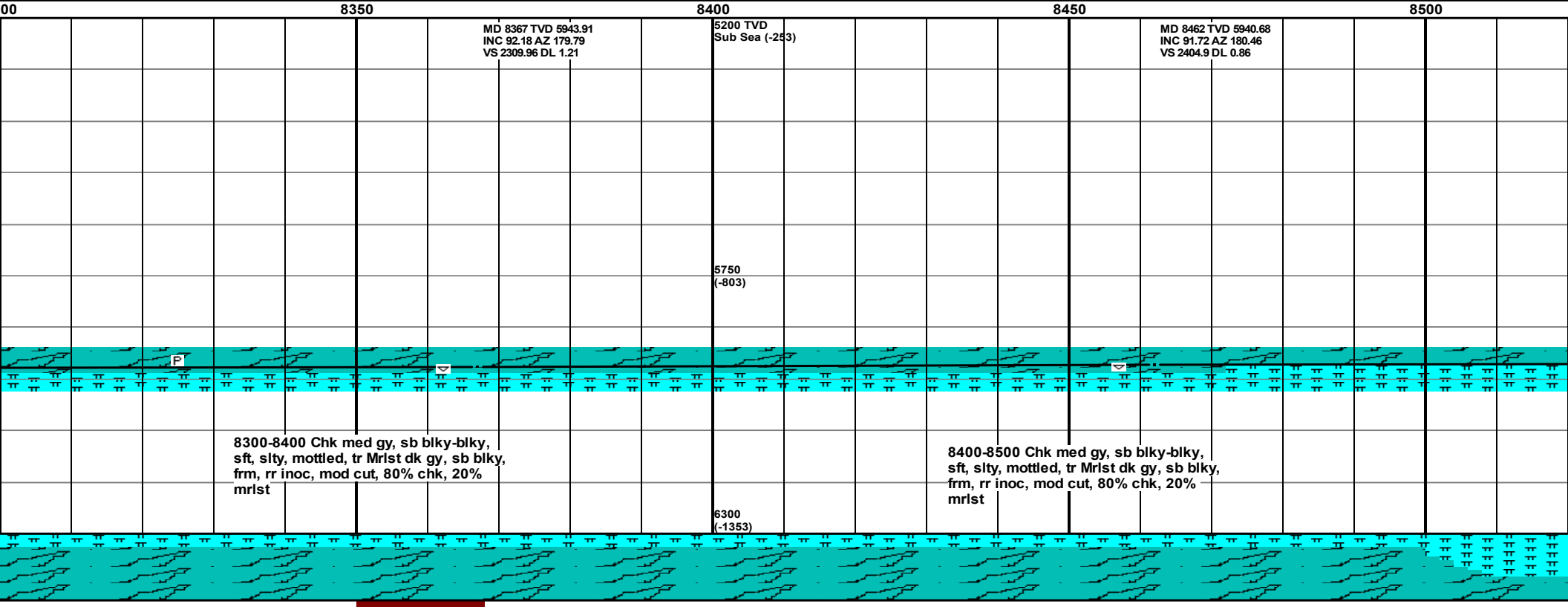
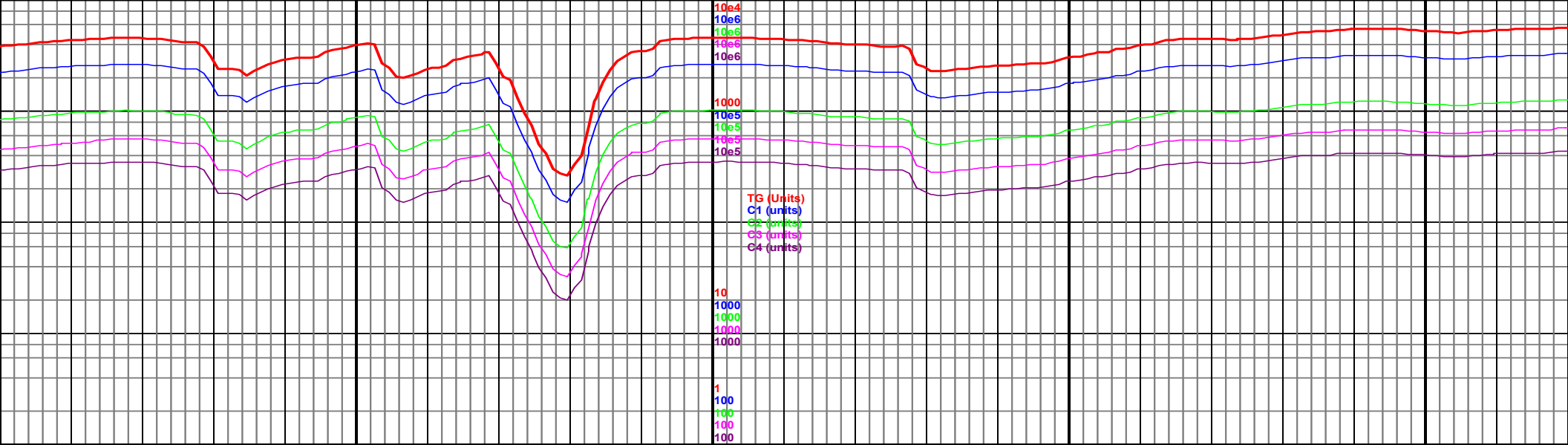


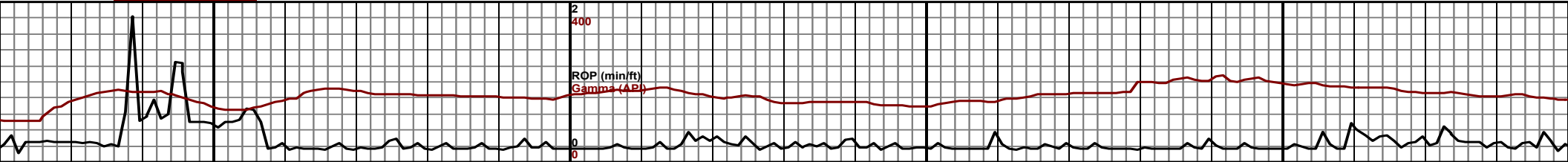
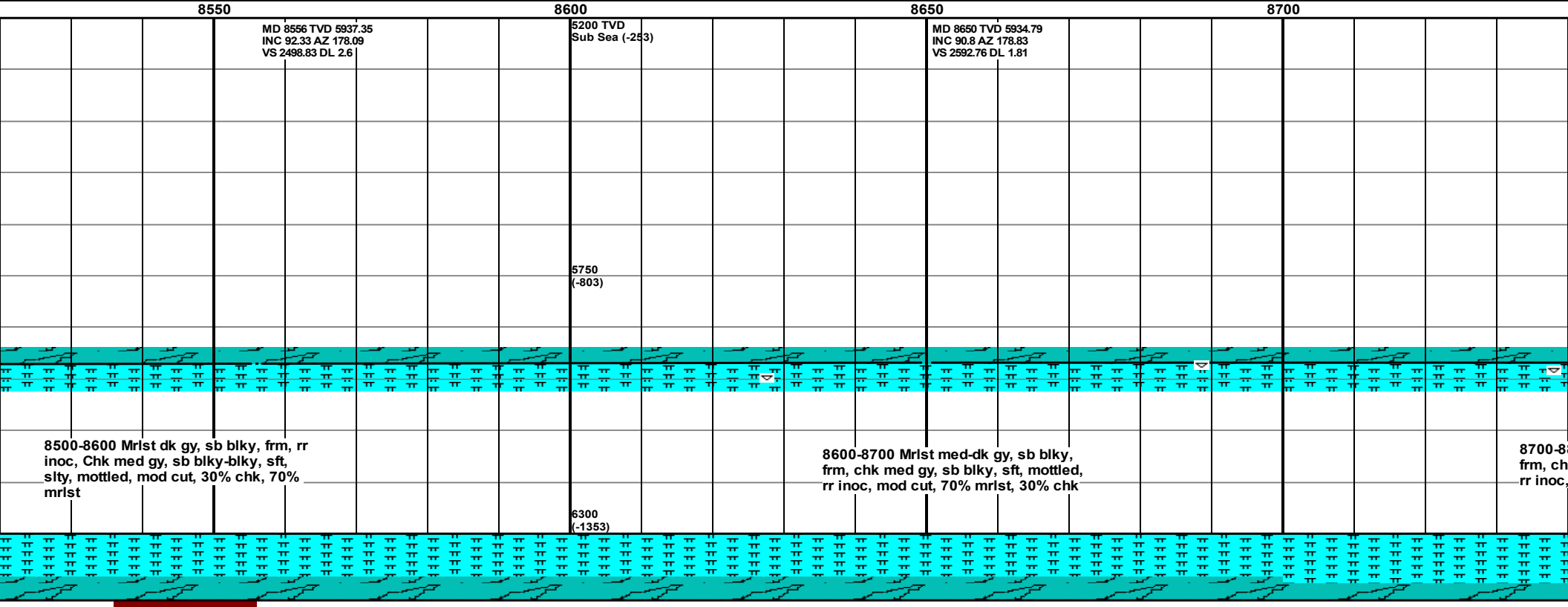
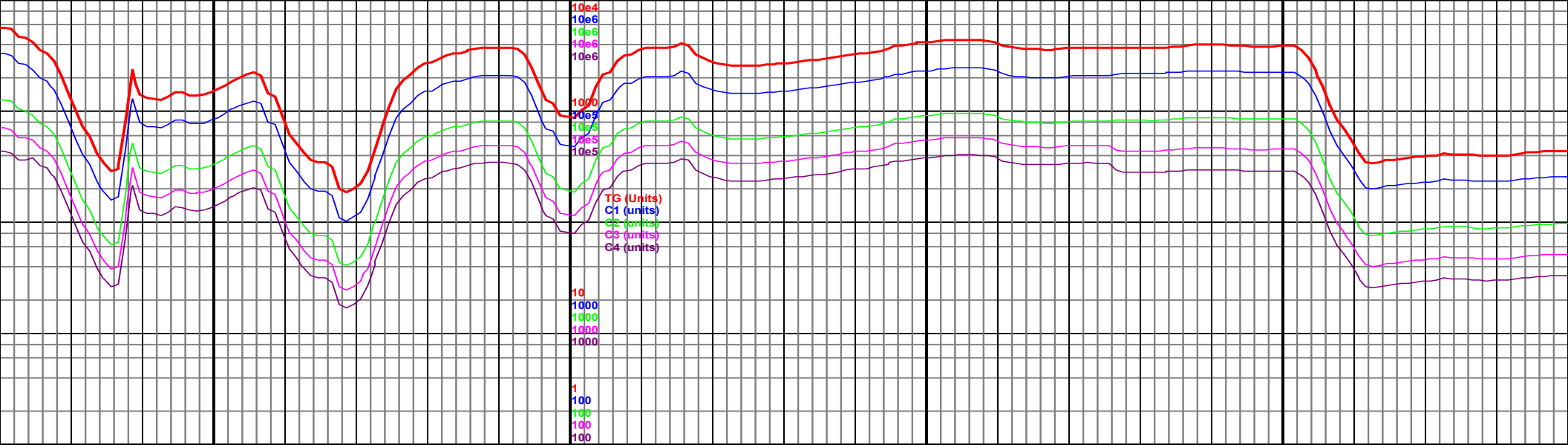


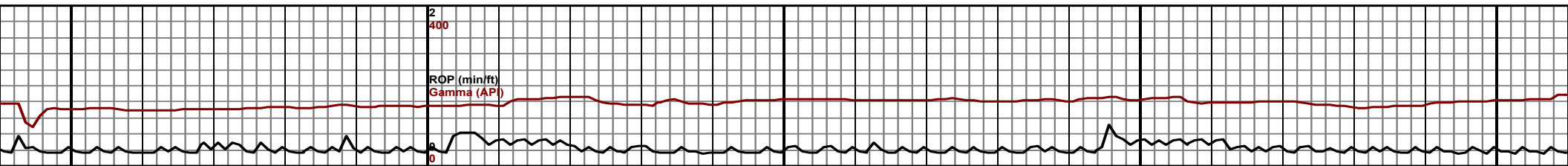
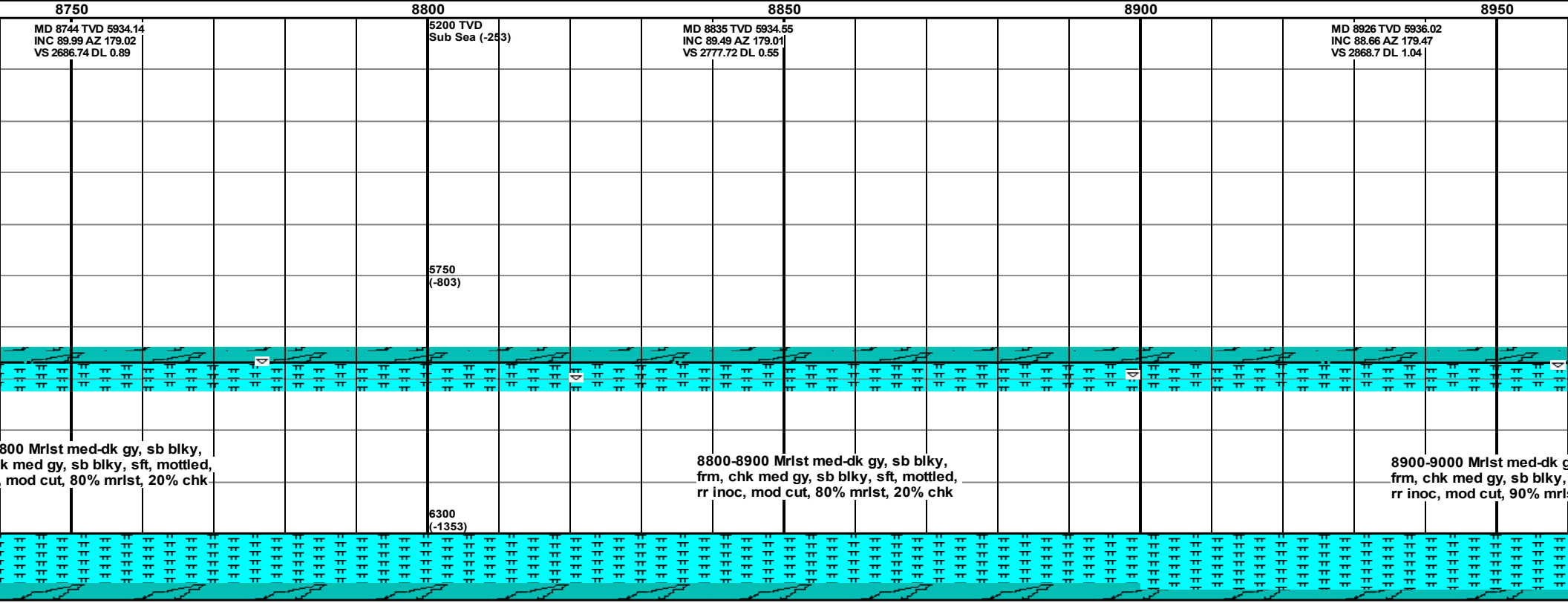
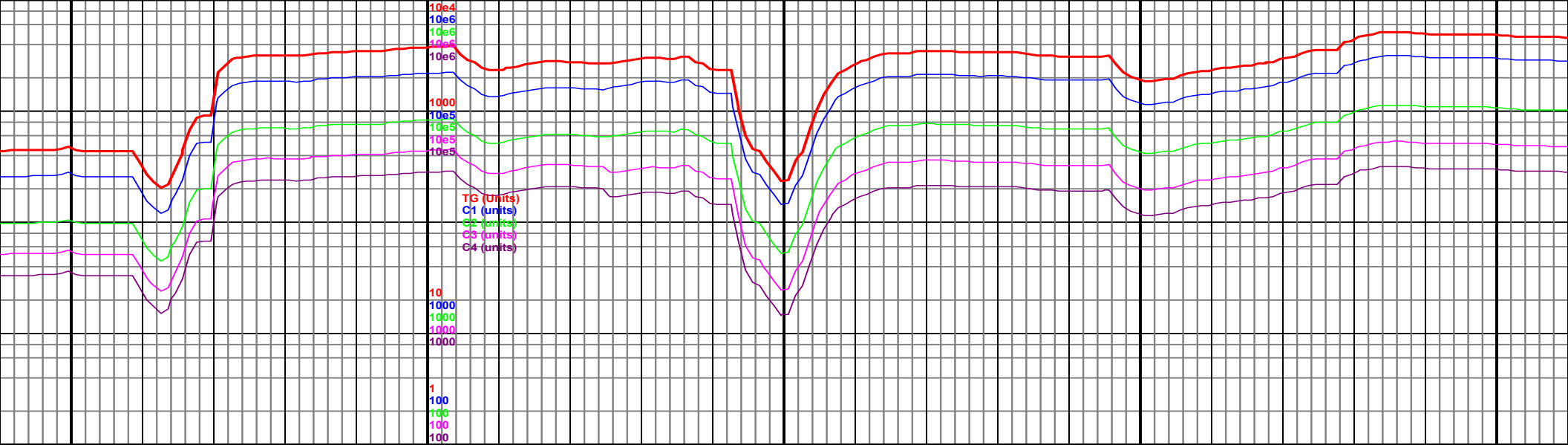


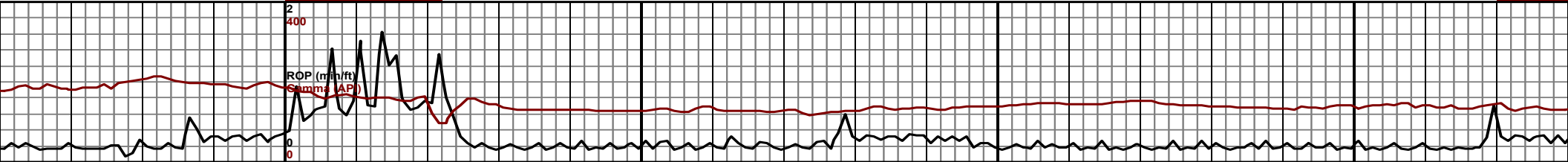
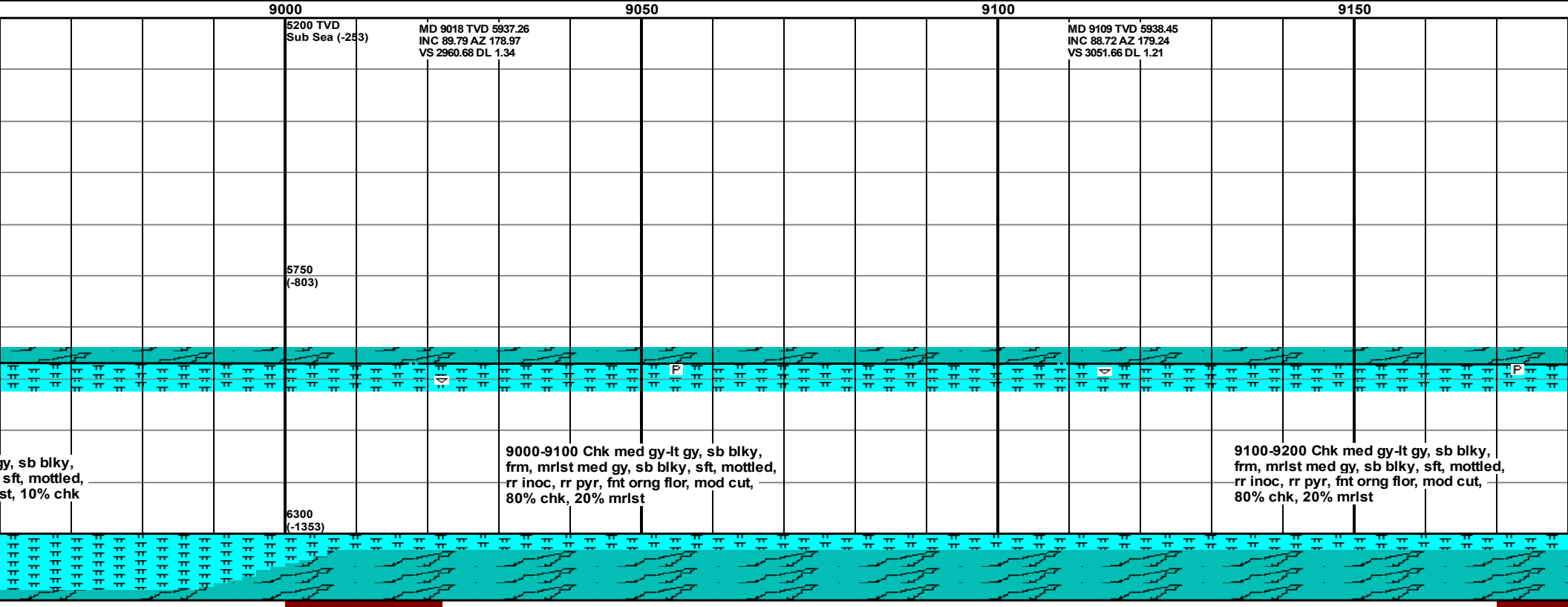
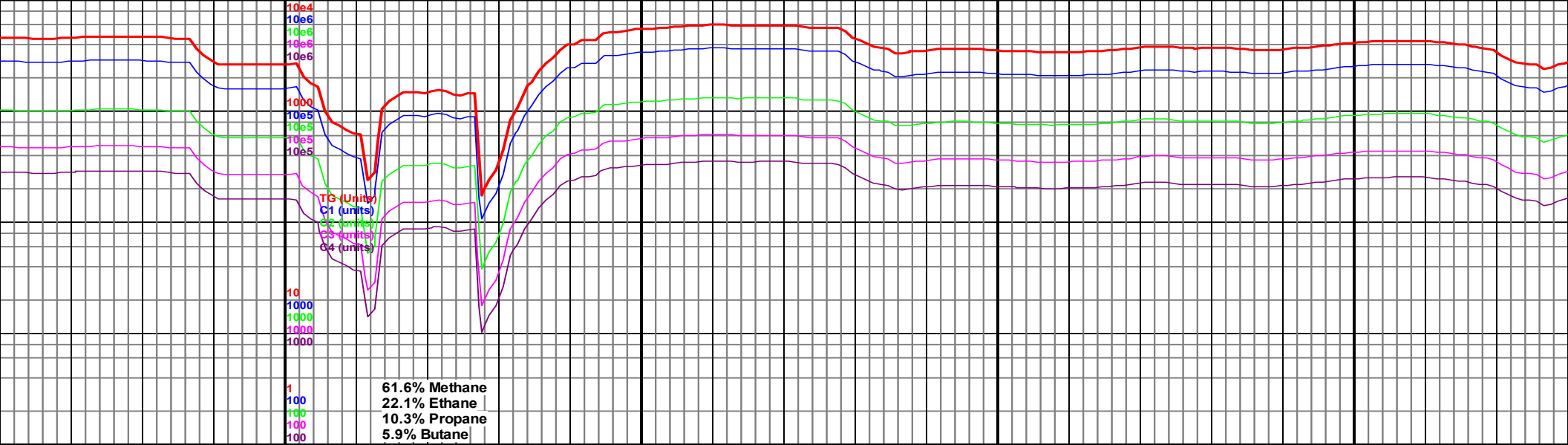


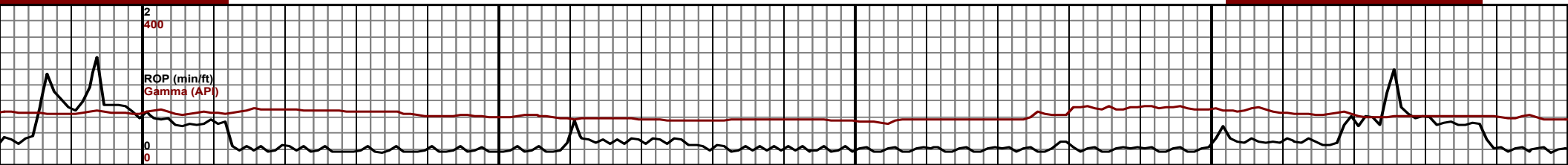
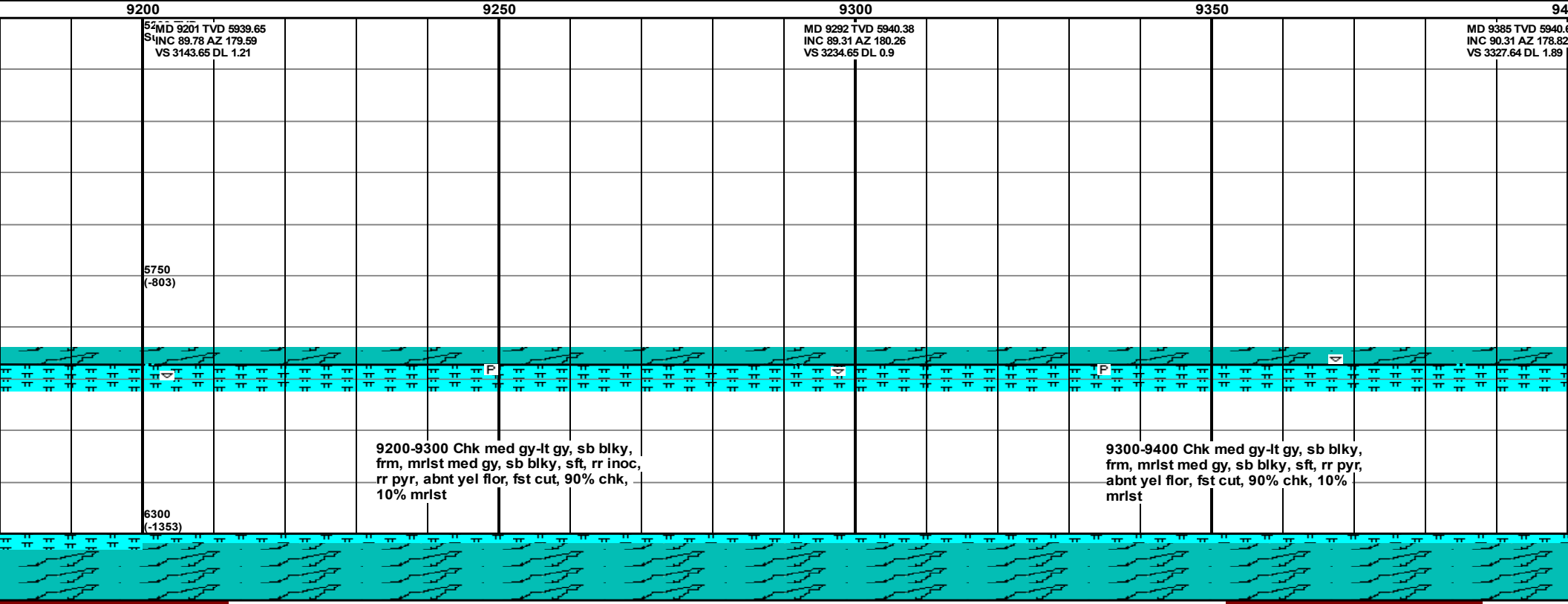
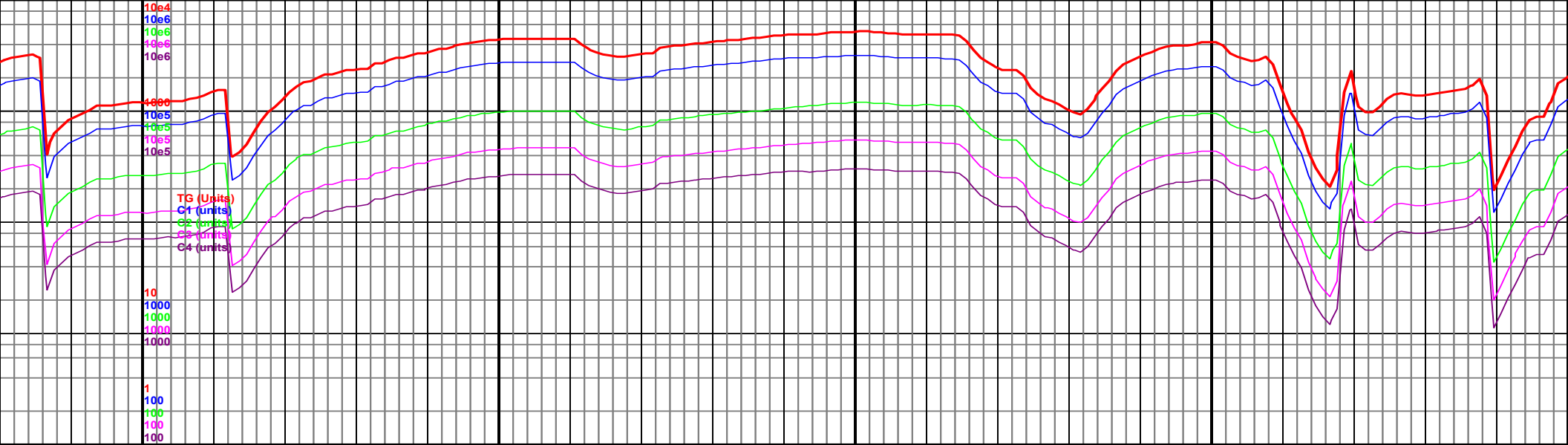








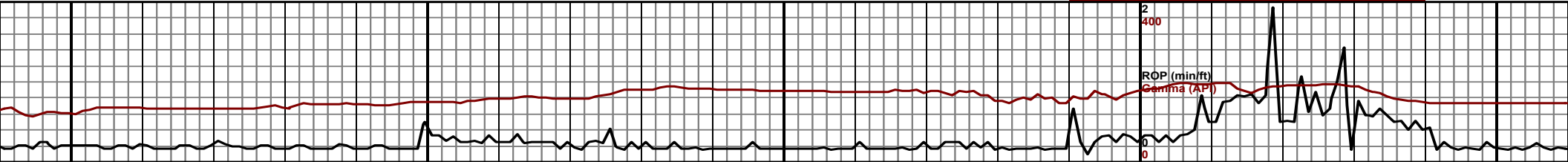
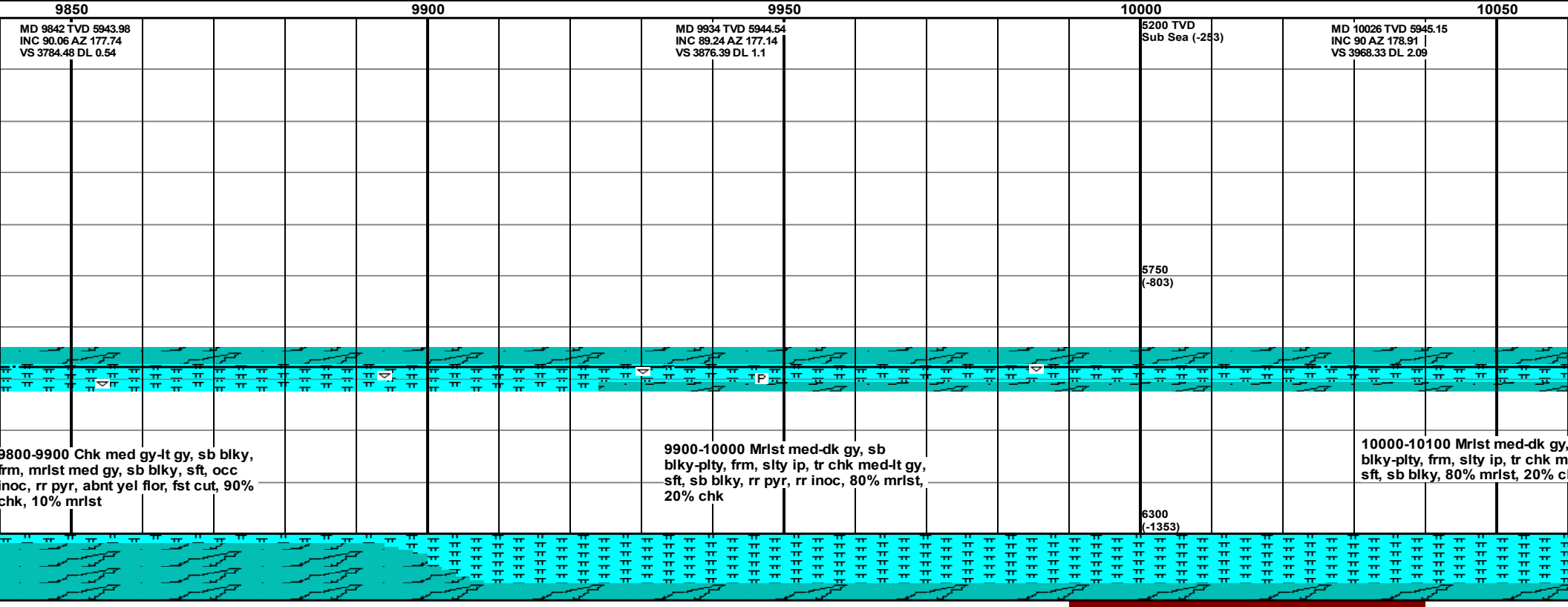
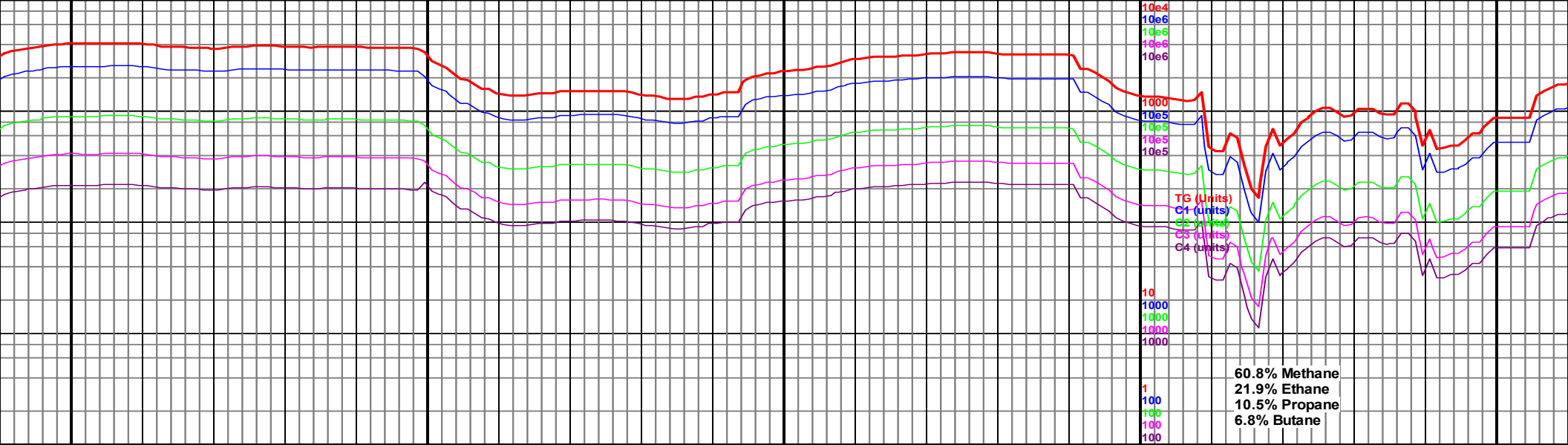


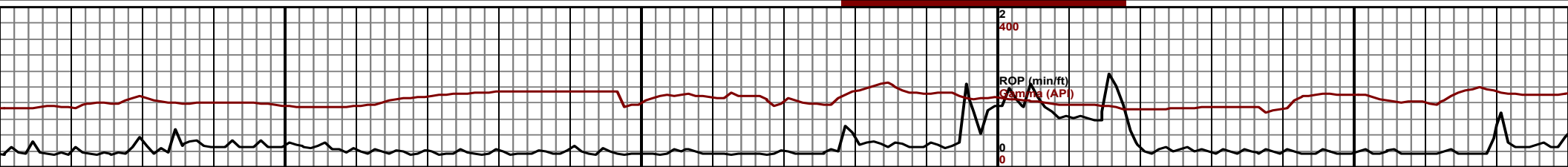
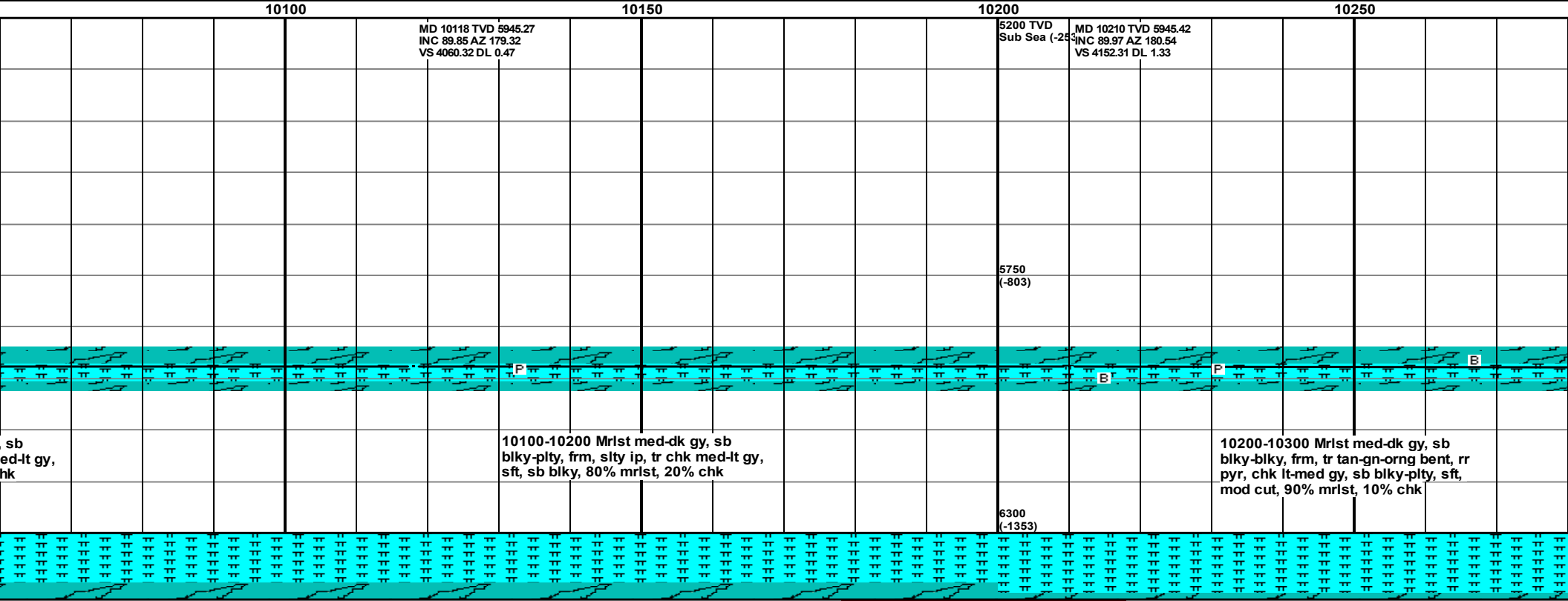
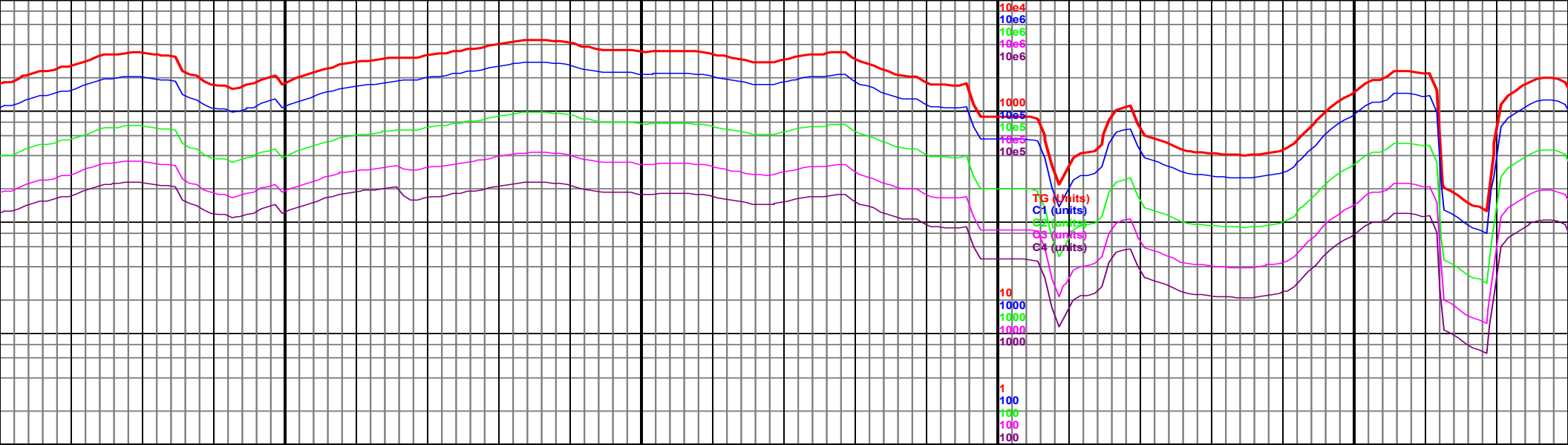


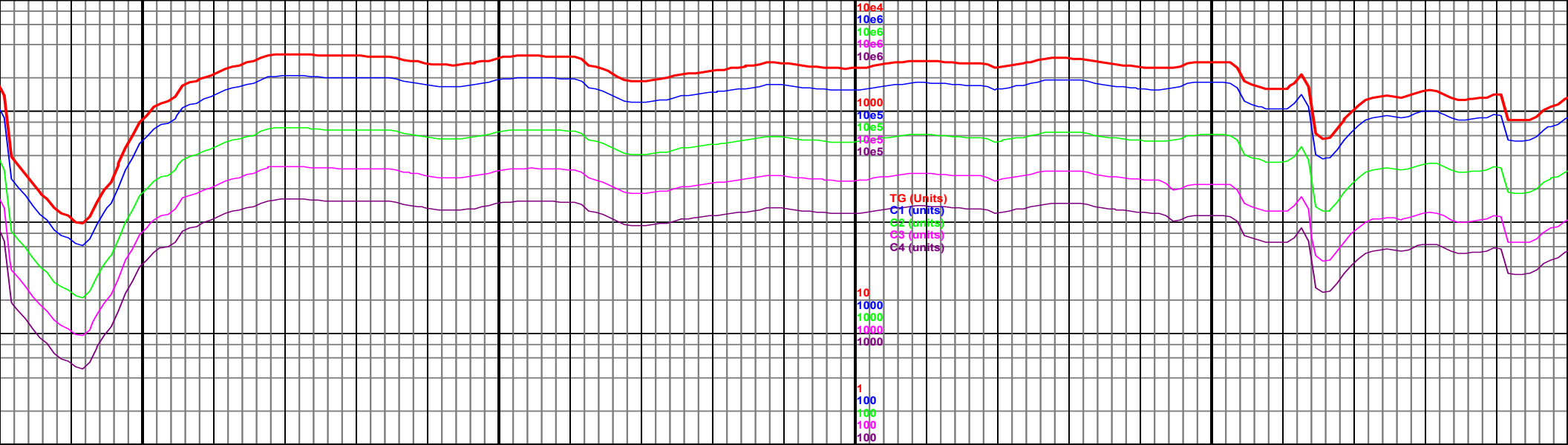












10300 10350 10400 10450 10500

MD 10302 TVD 5946.04  
INC 89.25 AZ 180.79  
VS 4244.3 DL 0.83

MD 10393 TVD 5947.89  
INC 88.43 AZ 180.43<sup>293</sup>  
VS 4335.28 DL 0.98

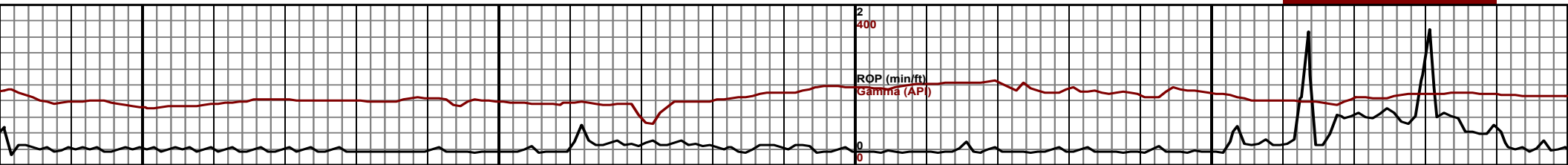
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INC 89.87 AZ 181.16  
VS 4426.26 DL 1.77

5750  
(-803)

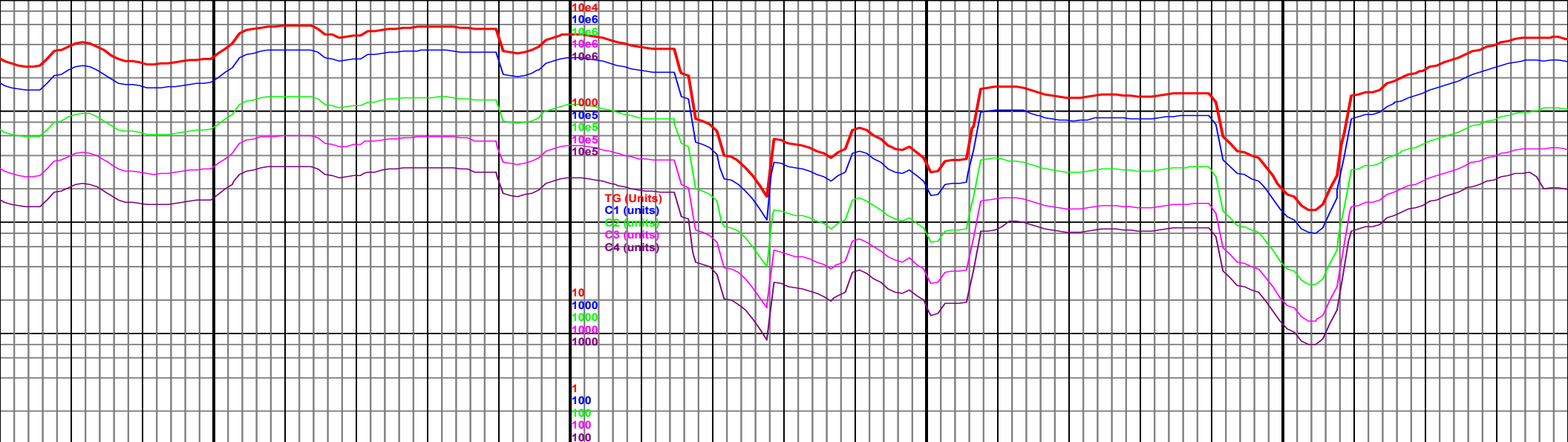
10300-10400 Mrlst dk gy, sb blkyl-blky,  
frm, slty, rr Chk med gy, sb blkyl-plty,  
sft, rr pyr, mod cut, 90% mrlst, 10%  
chk

10400-10500 Mrlst dk gy, sb blkyl-blky,  
frm, slty, rr Chk med gy, sb blkyl-plty,  
sft, rr inoc, mod cut, 90% mrlst, 10%  
chk

6300  
(-1353)







10750

10800

10850

10900

MD 10758 TVD 5947.34  
INC 89.52 AZ 179.57  
VS 4700.24 DL 1.17

5200 TVD  
Sub Sea (-253)

MD 10850 TVD 5946.56  
INC 91.44 AZ 180.37  
VS 4792.23 DL 2.26

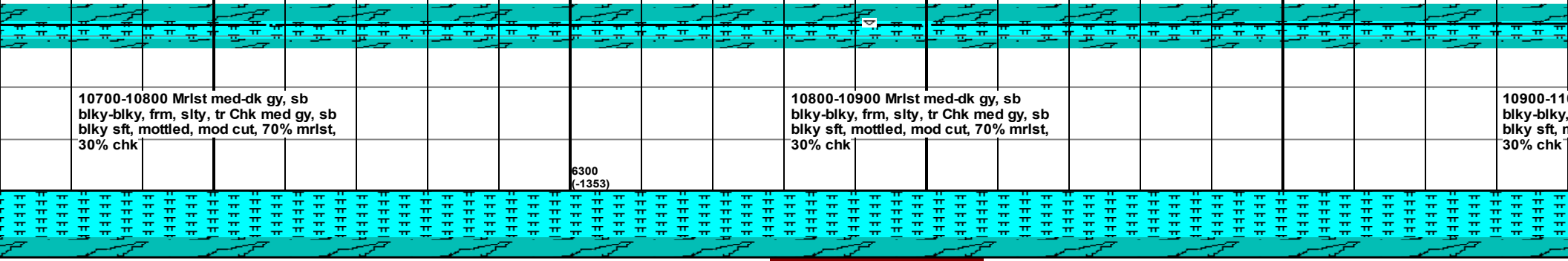
5750  
(-803)

10700-10800 Mrist med-dk gy, sb  
blky-blky, frm, slty, tr Chk med gy, sb  
blky sft, mottled, mod cut, 70% mrist,  
30% chk

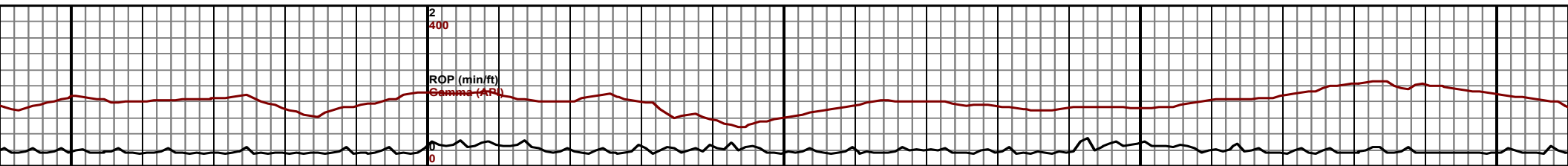
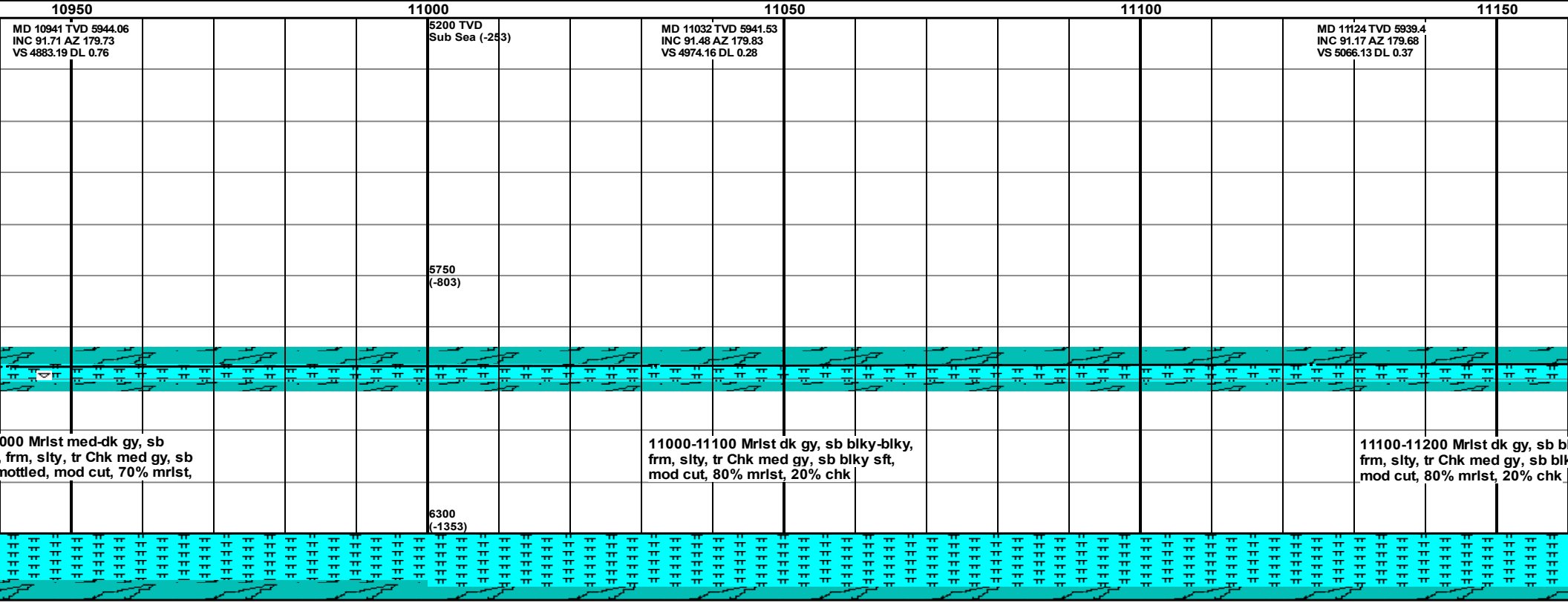
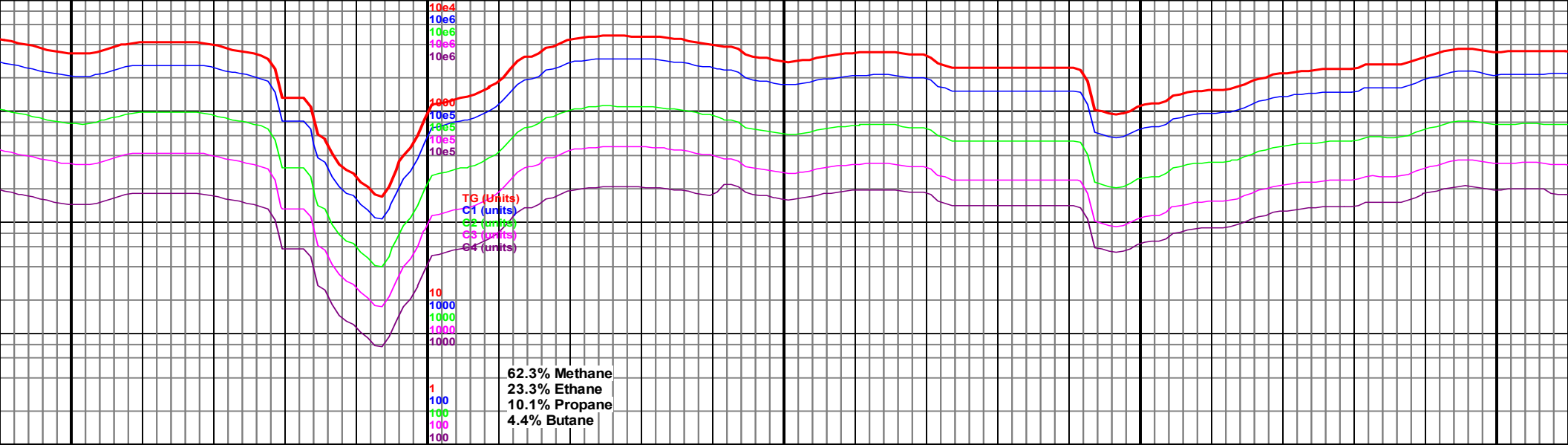
10800-10900 Mrist med-dk gy, sb  
blky-blky, frm, slty, tr Chk med gy, sb  
blky sft, mottled, mod cut, 70% mrist,  
30% chk

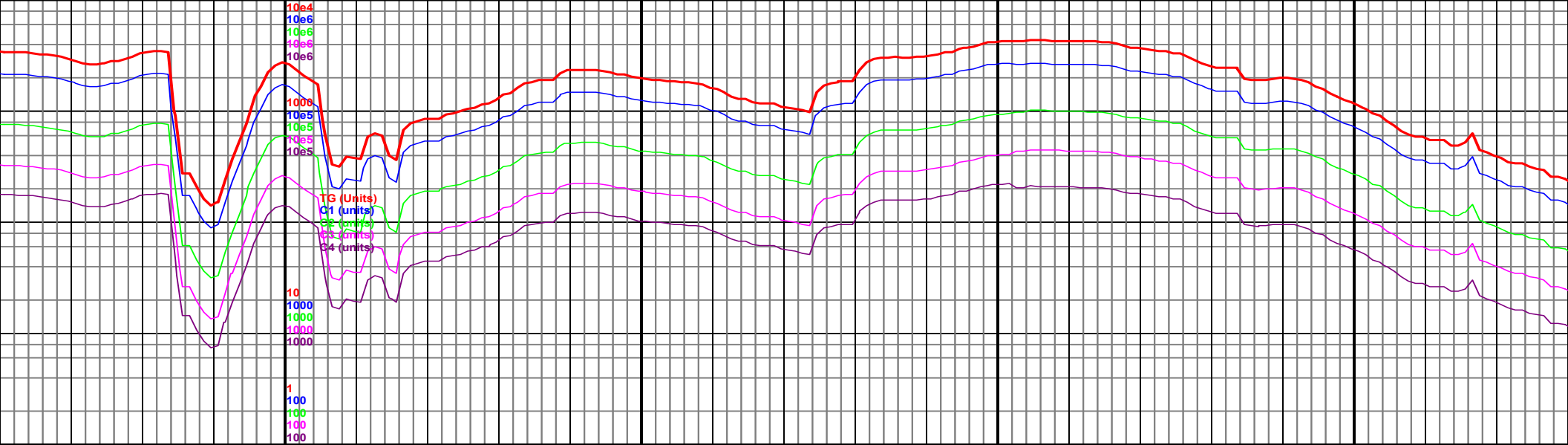
10900-11000 Mrist med-dk gy, sb  
blky-blky, frm, slty, tr Chk med gy, sb  
blky sft, mottled, mod cut, 70% mrist,  
30% chk

6300  
(-1353)



ROP (min/ft)  
Gamma (API)





11200

11250

11300

11350

5200 TVD  
Sub Sea (-253)

MD 11216 TVD 5938.42  
INC 90.06 AZ 179.02  
VS 5158.12 DL 1.4

MD 11308 TVD 5938.3  
INC 90.09 AZ 178.5  
VS 5250.1 DL 0.57

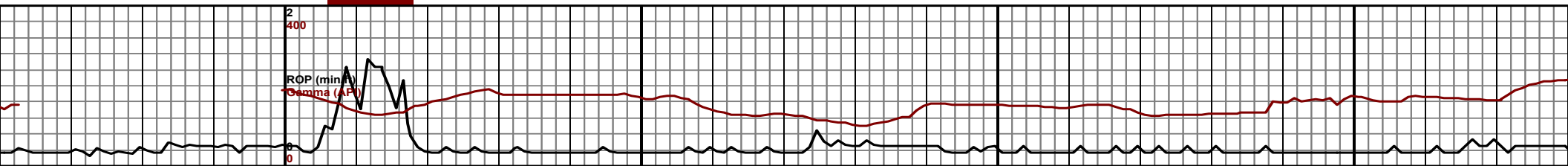
5750  
(-803)

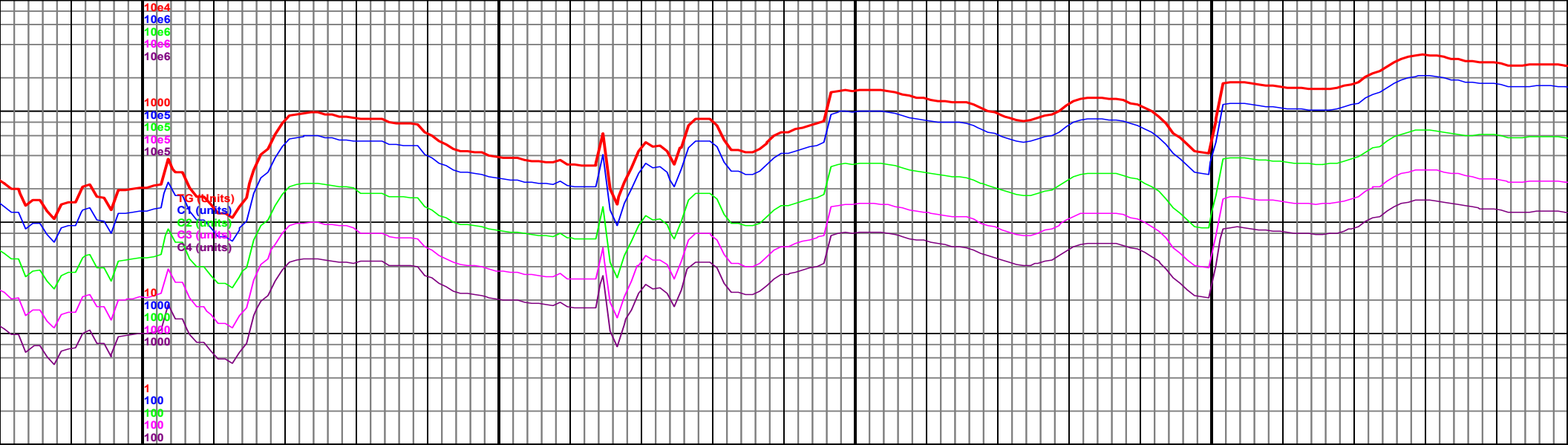
blky-blky,  
sft,

11200-11300 Chk med gy-lt brn, sb  
blky, frm, mottled ip, occ Mrlst dk gy,  
sb blky, sft, tr inoc, fst cut, 60% chk,  
40% mrlst

11300-11400 Chk gy-lt brn, sb blky,  
frm, mottled, tr Mrlst dk gy, sb blky, sft,  
grdg to chk ip, tr inoc, fst cut, 70% chk,  
30% mrlst

6300  
(-1353)





11400 11450 11500 11550 11600

MD 11400 TVD 5940.23  
INC 87.5 AZ 179.3  
VS 5342.05 DL 2.95

MD 11491 TVD 5944.48  
INC 87.14 AZ 179.54  
VS 5432.95 DL 0.48

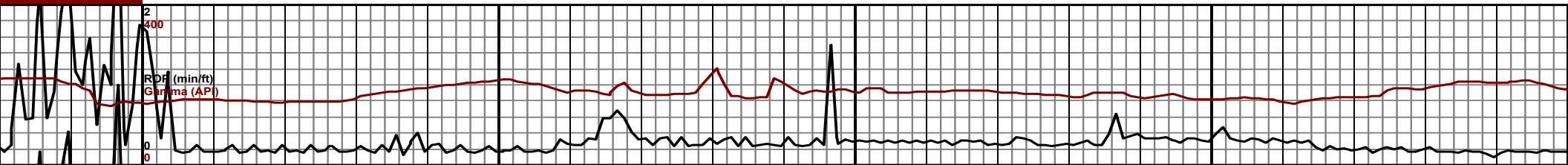
MD 11583 TVD 5949.86  
INC 86.16 AZ 179.37  
VS 5524.78 DL 1.08

5750  
(-803)

11400-11500 Mrlst dk gy, sb blkly-blky,  
frm, slty, tr Chk med gy, sb blkly sft,  
grdg to mrlst, rr inoc, mod cut, 60%  
mrlst, 40% chk

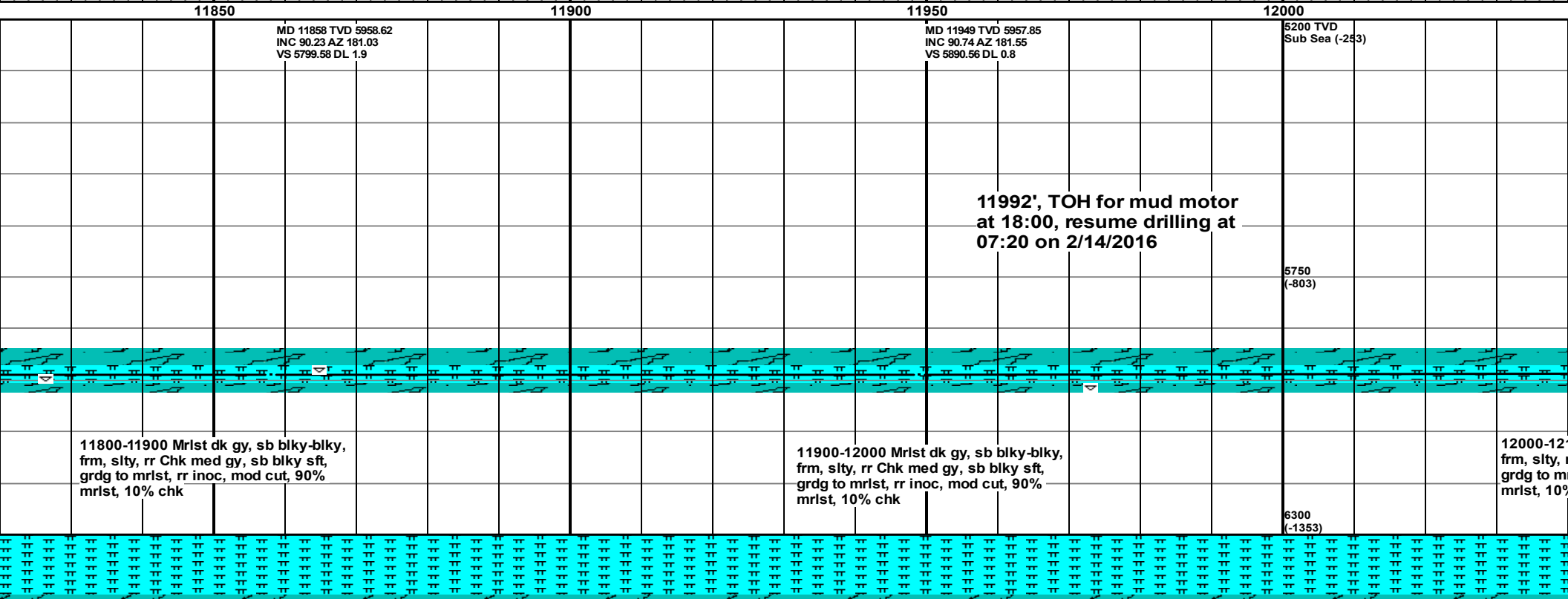
11500-11600 Mrlst dk gy, sb blkly-blky,  
frm, slty, tr Chk med gy, sb blkly sft,  
grdg to mrlst, rr inoc, mod cut, 70%  
mrlst, 30% chk

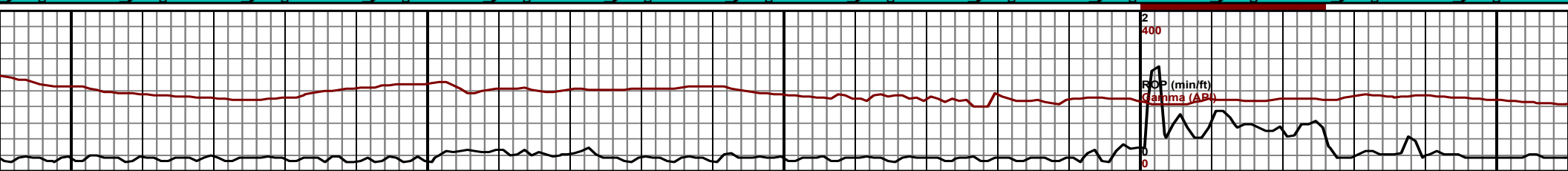
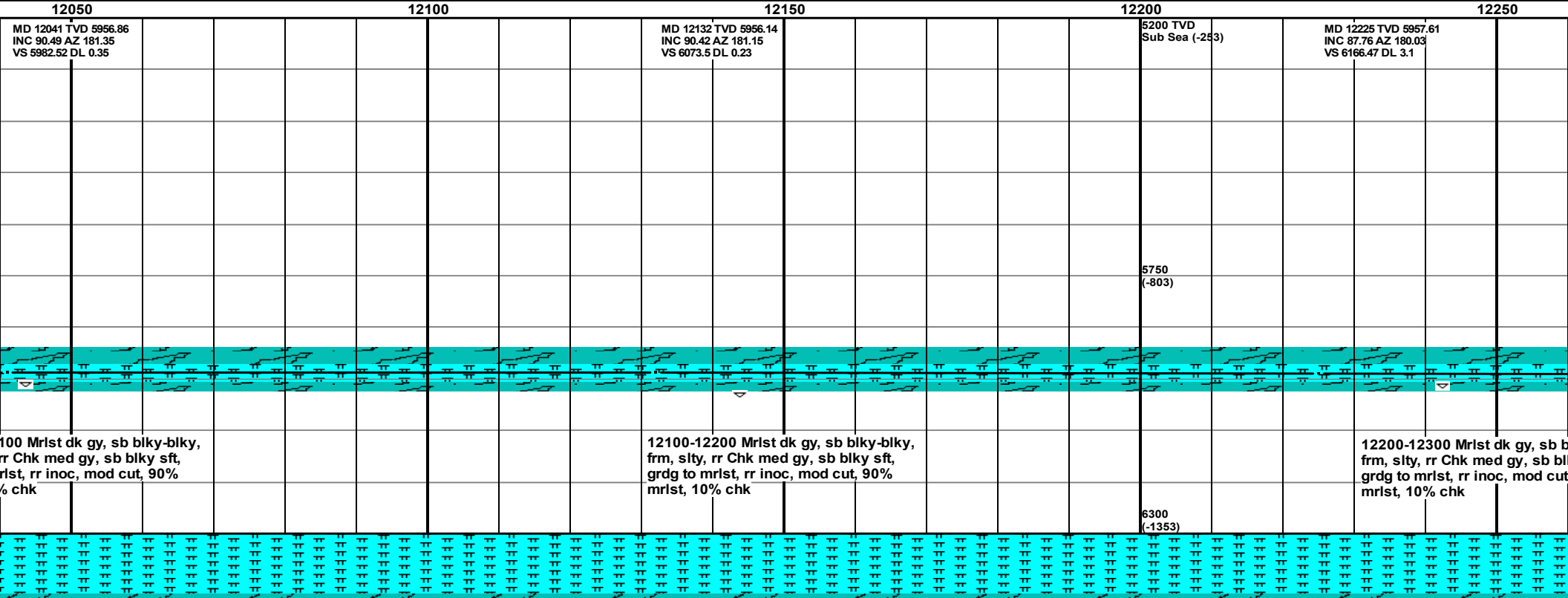
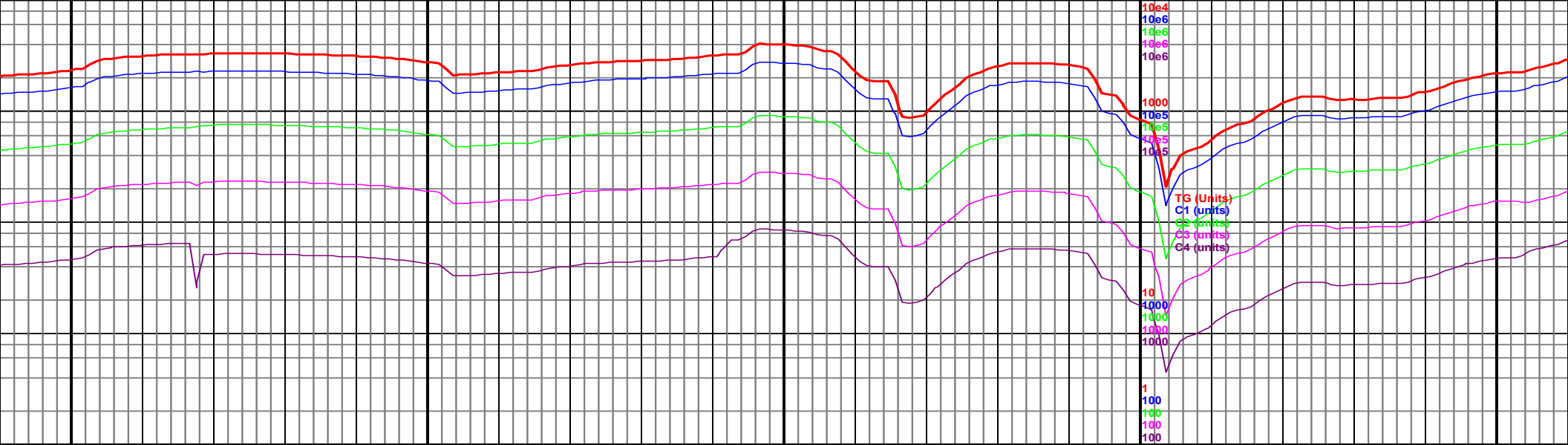
6300  
(-1353)



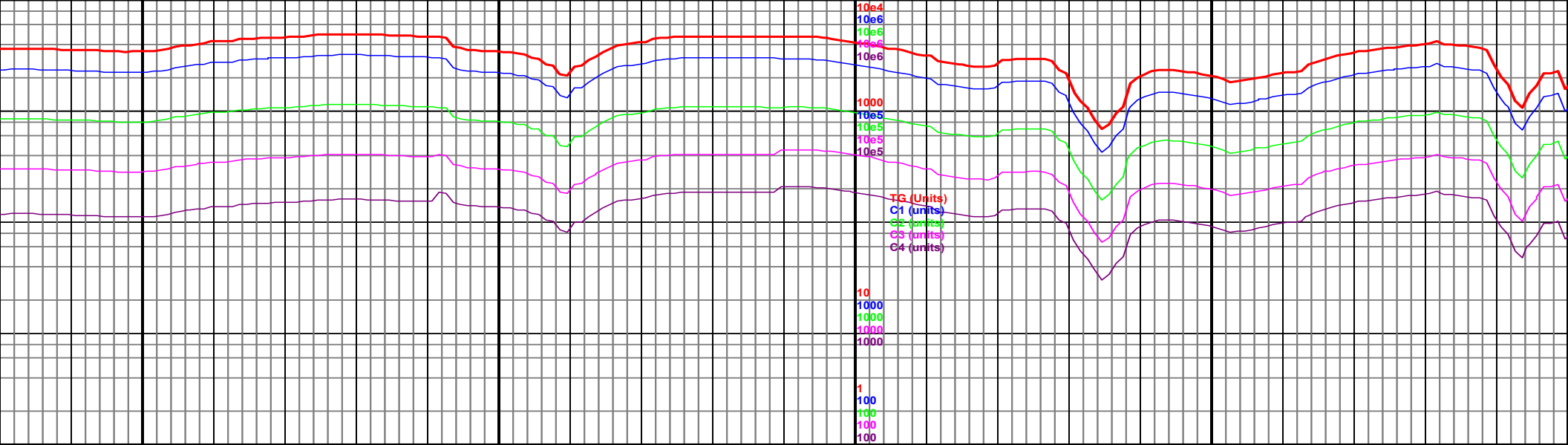










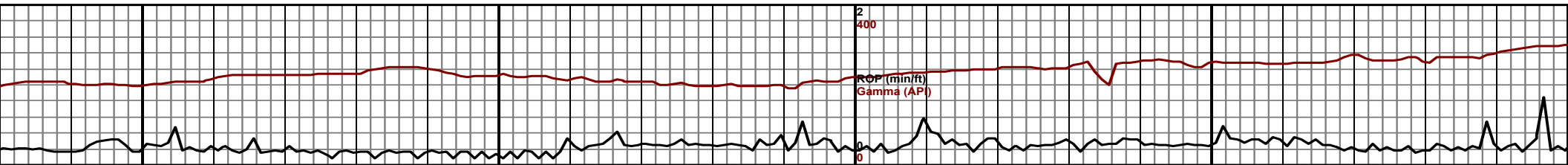
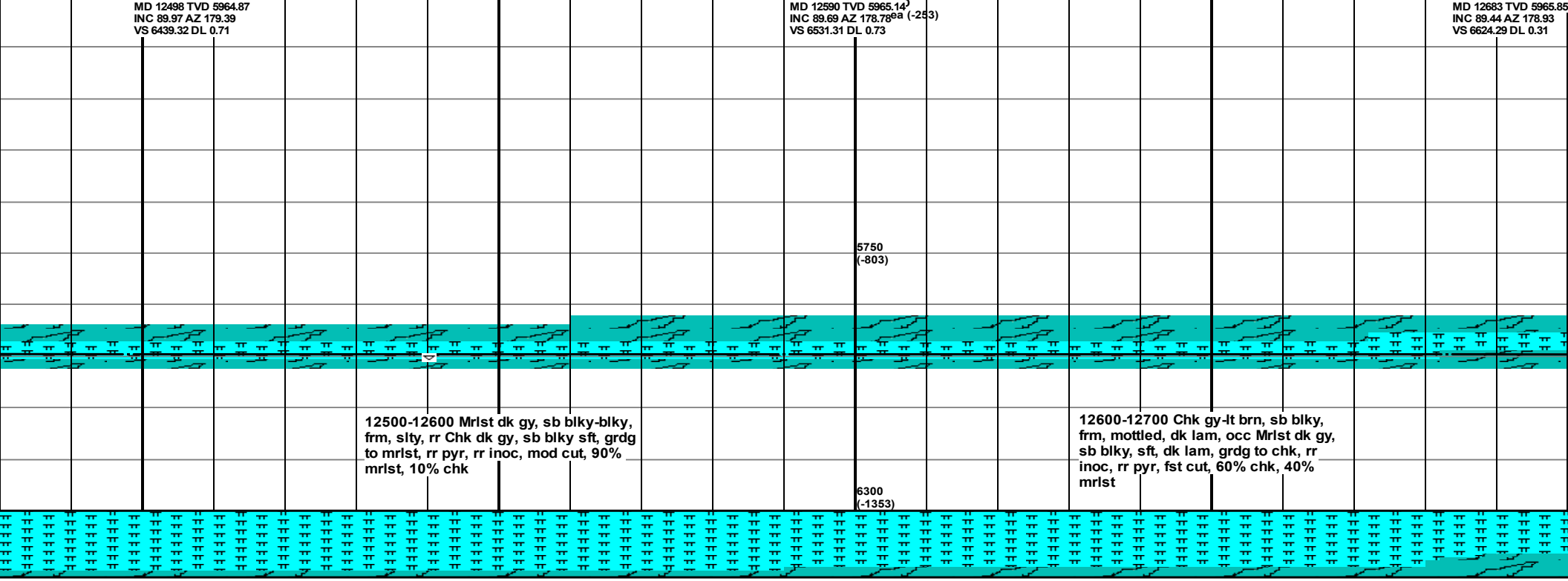


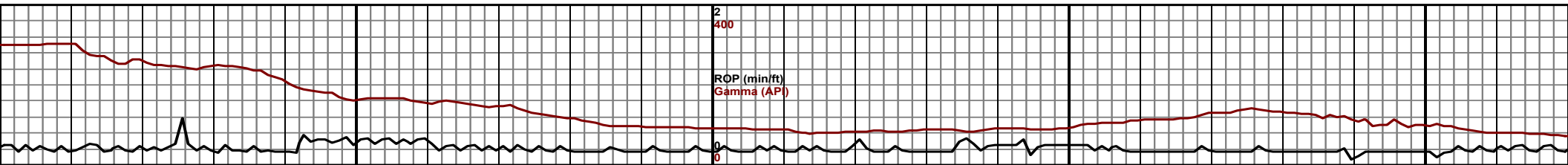
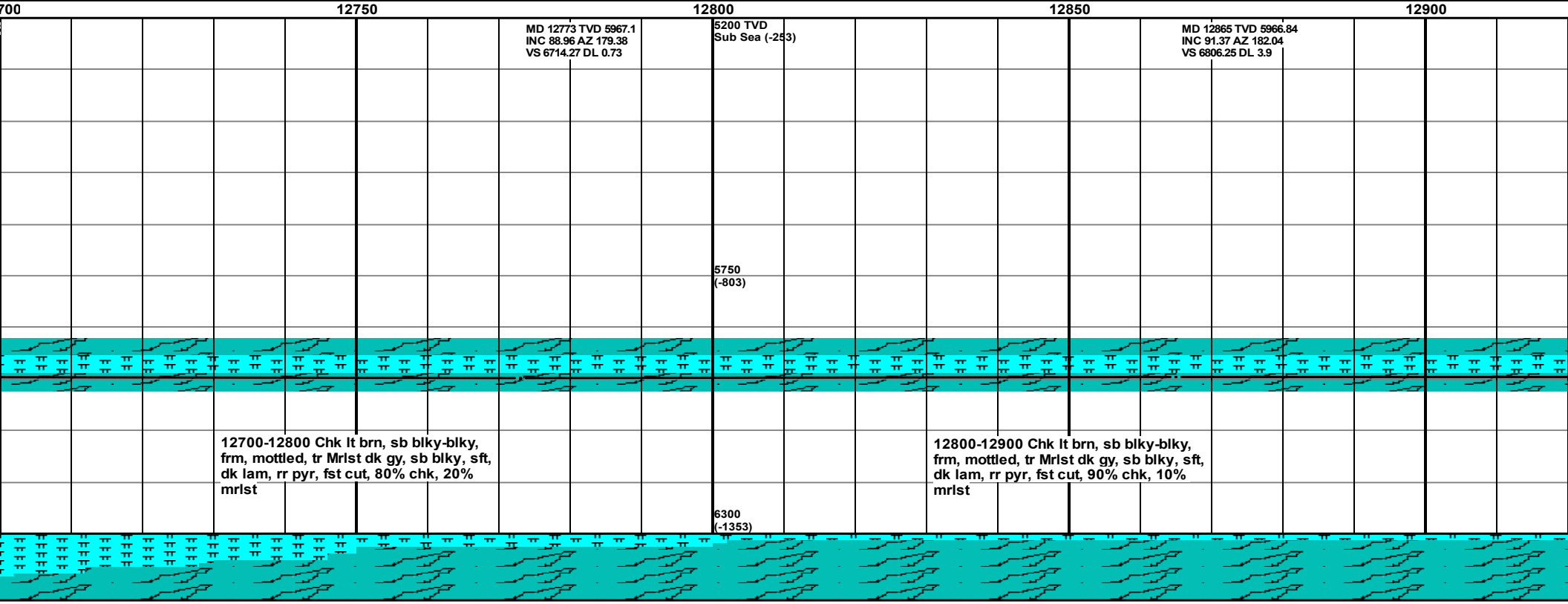
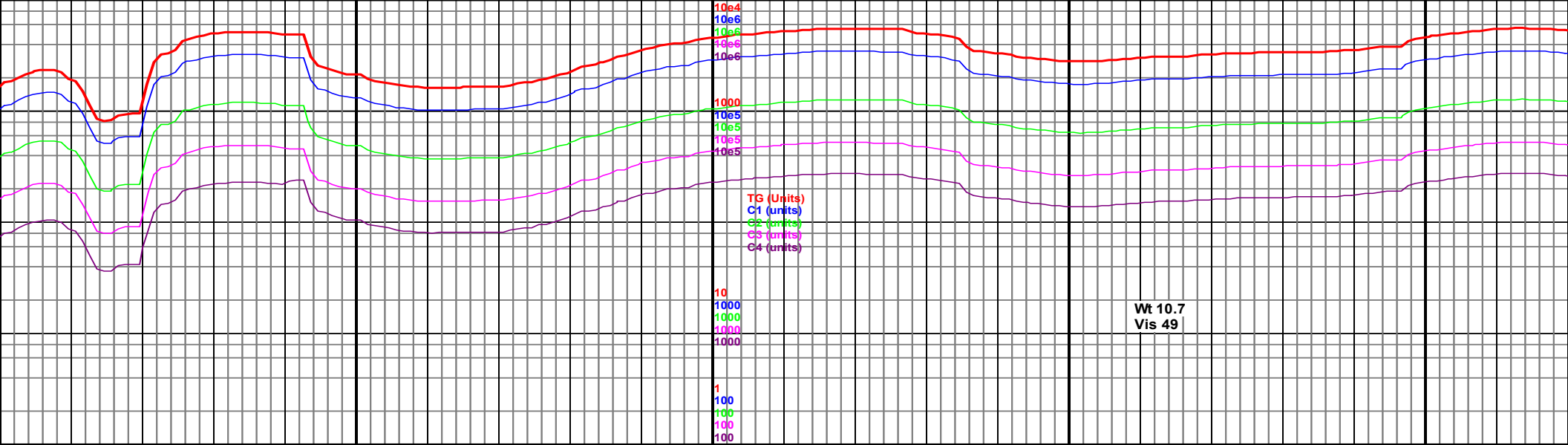
12500 12550 12600 12650 12700

MD 12498 TVD 5964.87  
INC 89.97 AZ 179.39  
VS 6439.32 DL 0.71

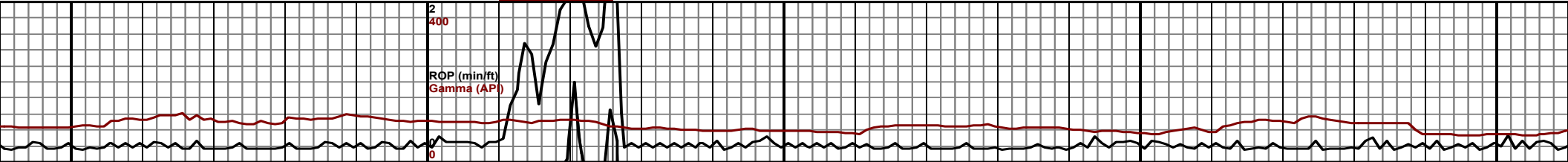
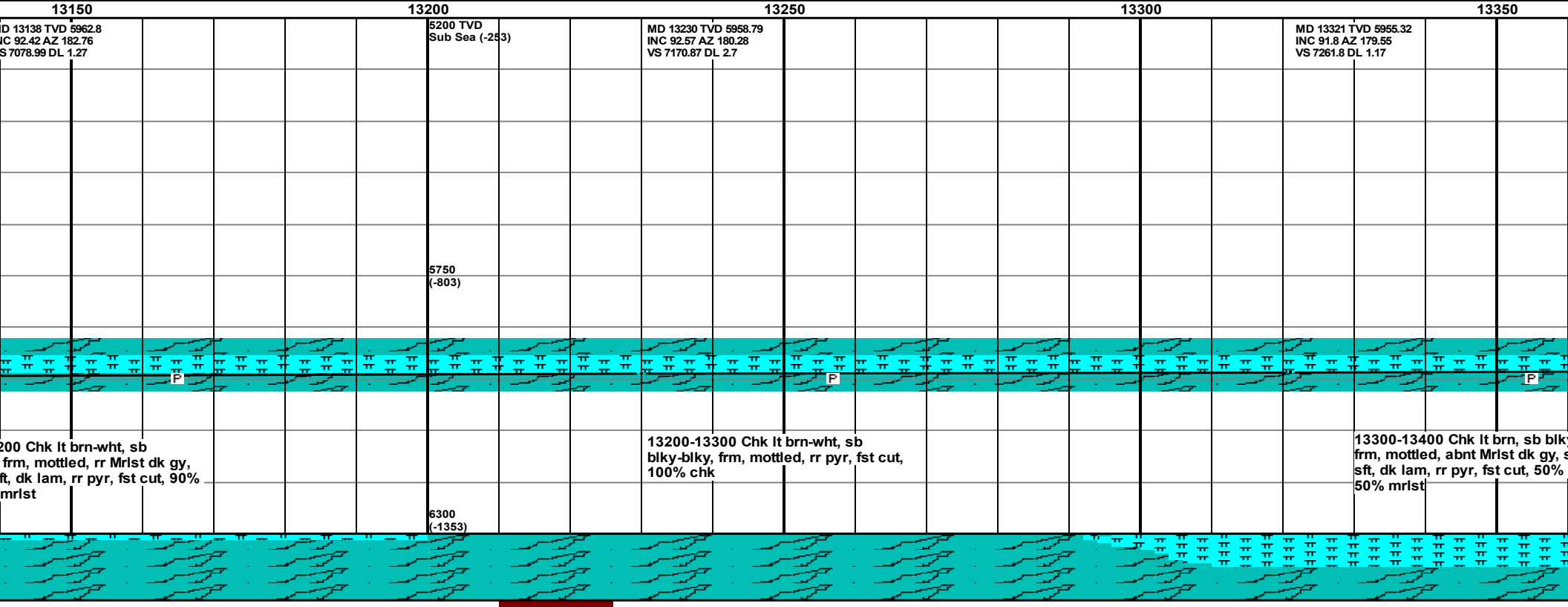
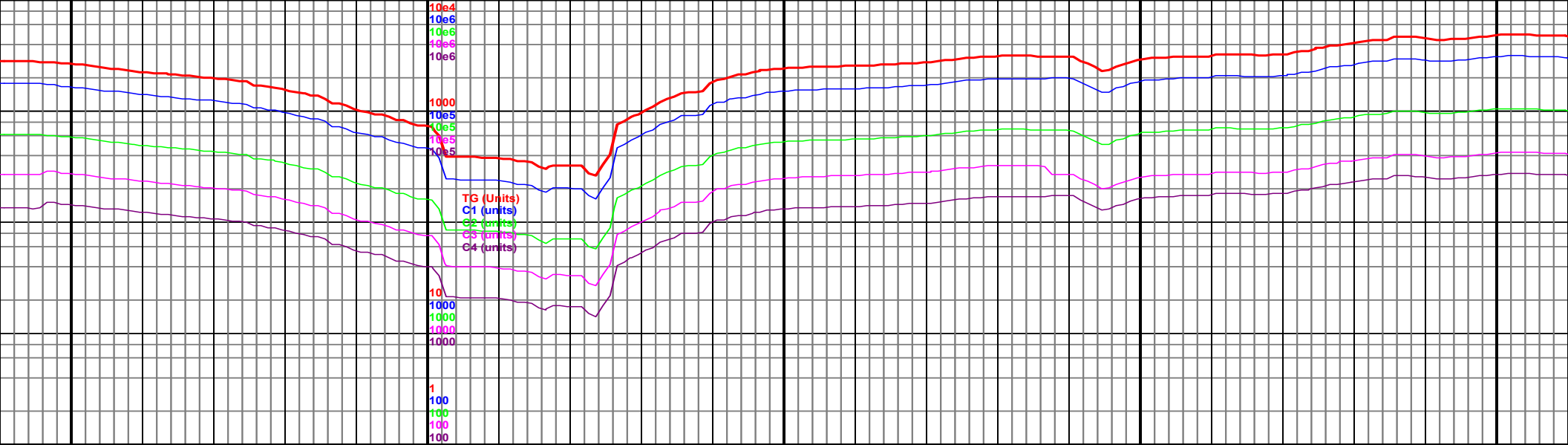
MD 12590 TVD 5965.14  
INC 89.69 AZ 178.78<sup>ea</sup> (-253)  
VS 6531.31 DL 0.73

MD 12683 TVD 5965.85  
INC 89.44 AZ 178.93  
VS 6624.29 DL 0.31

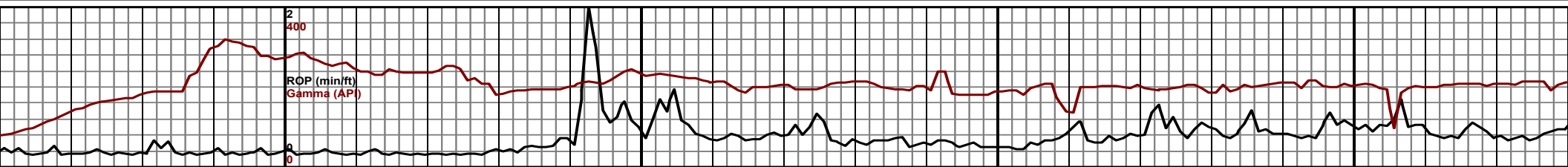
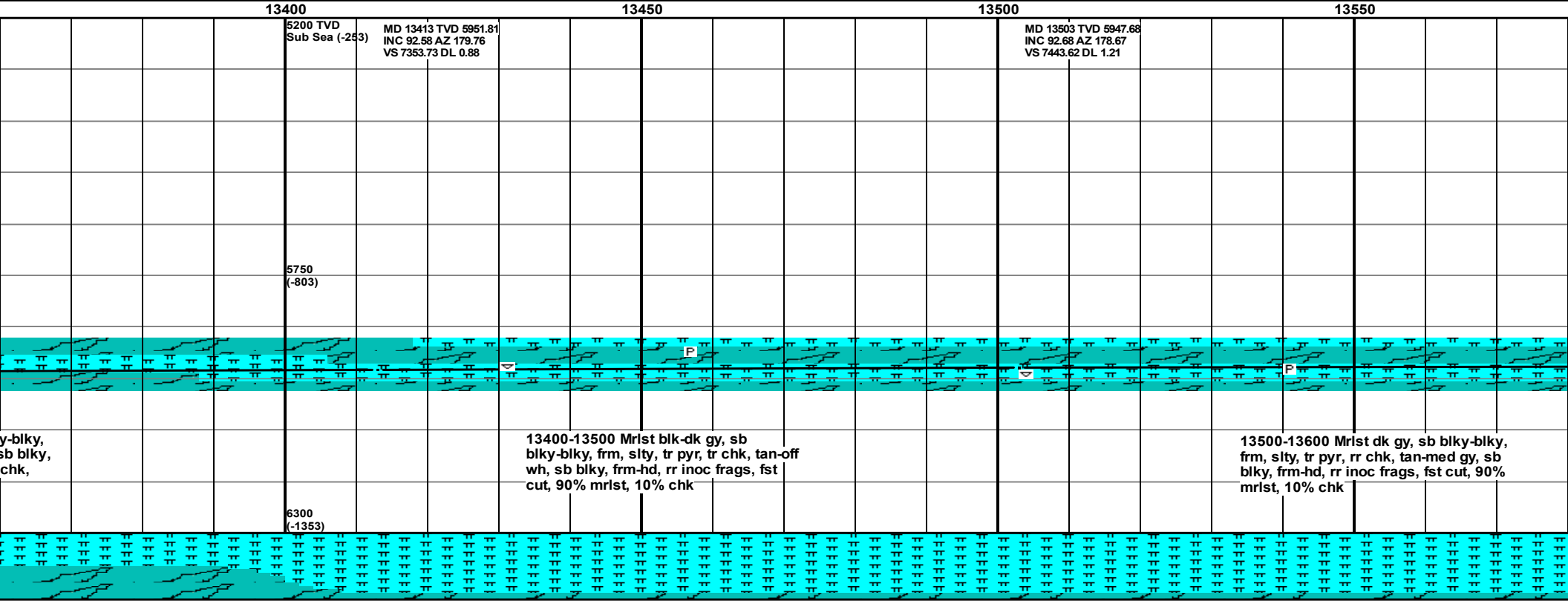
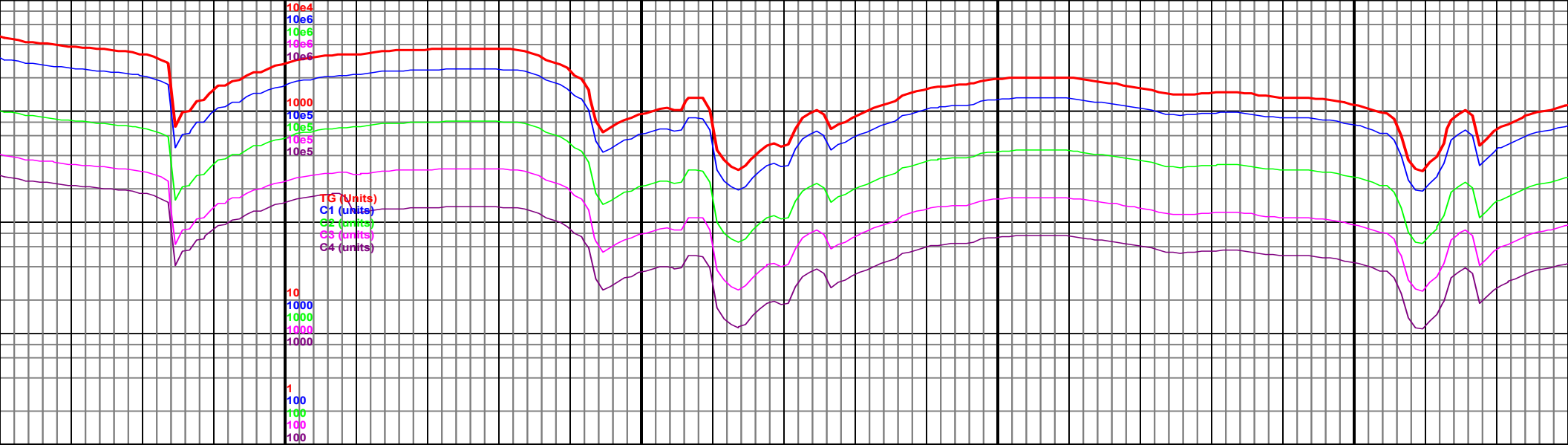


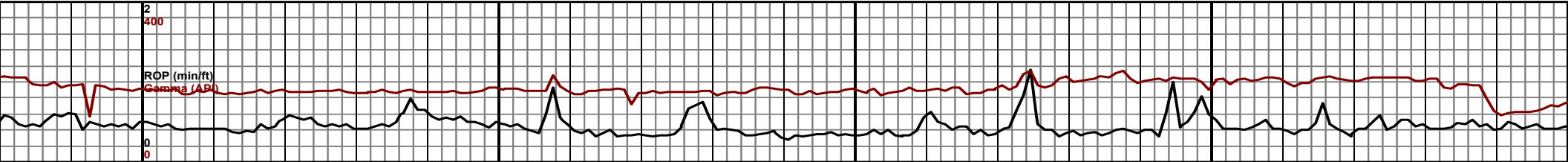
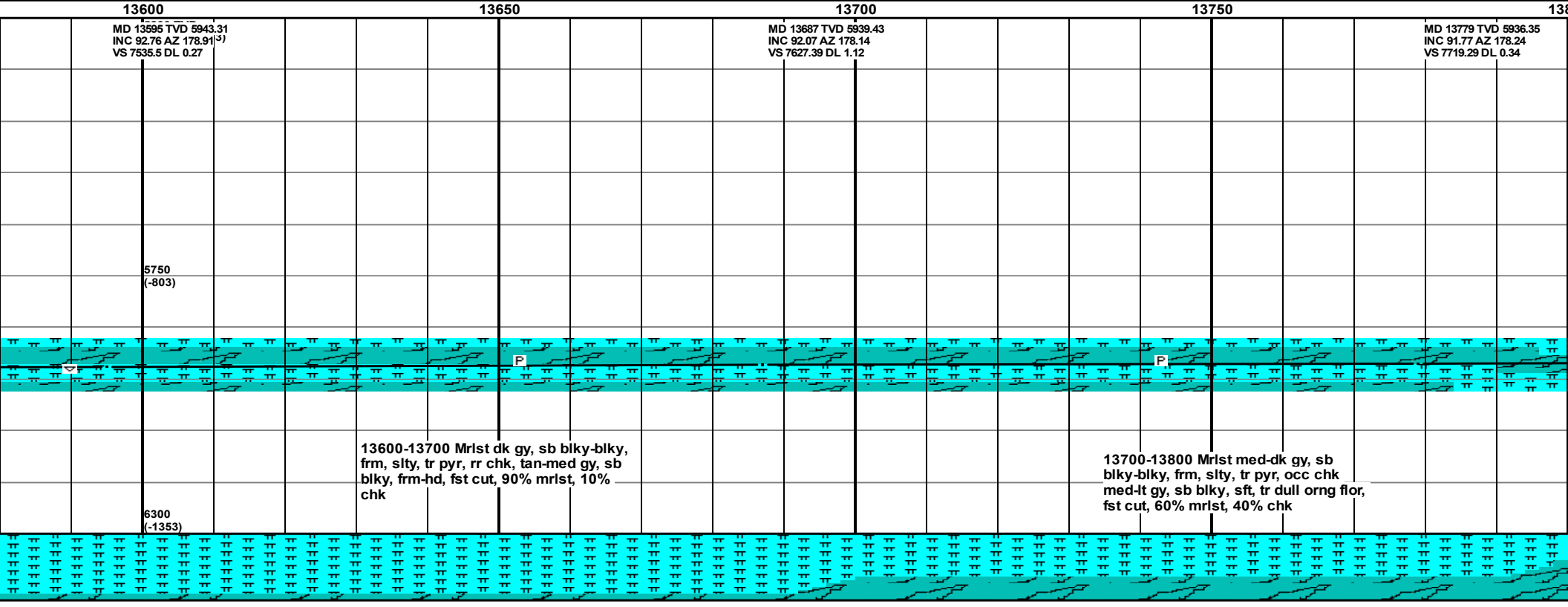
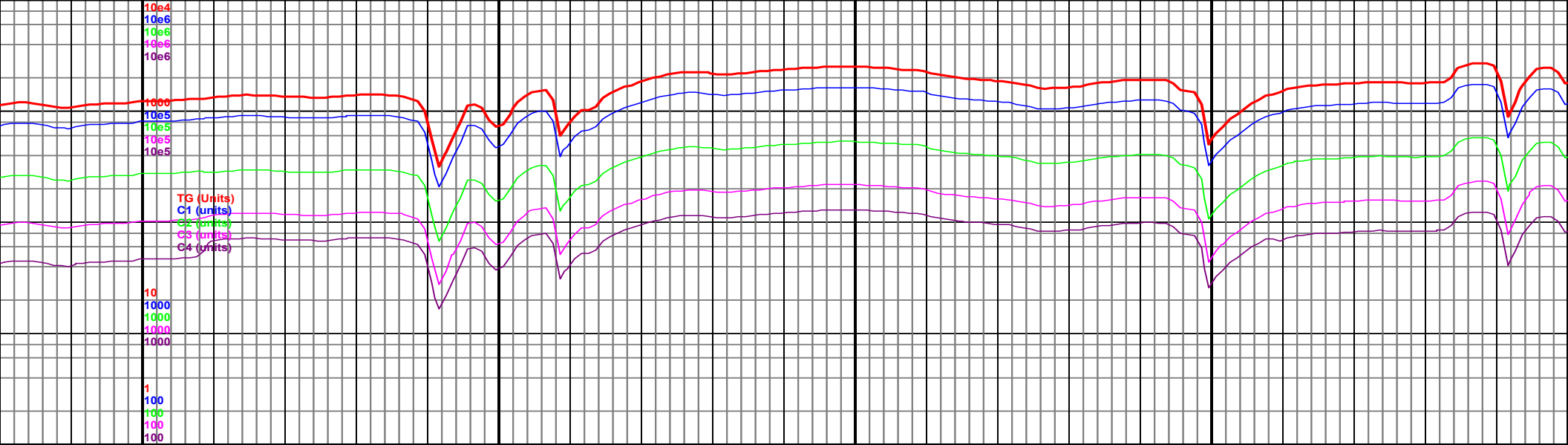




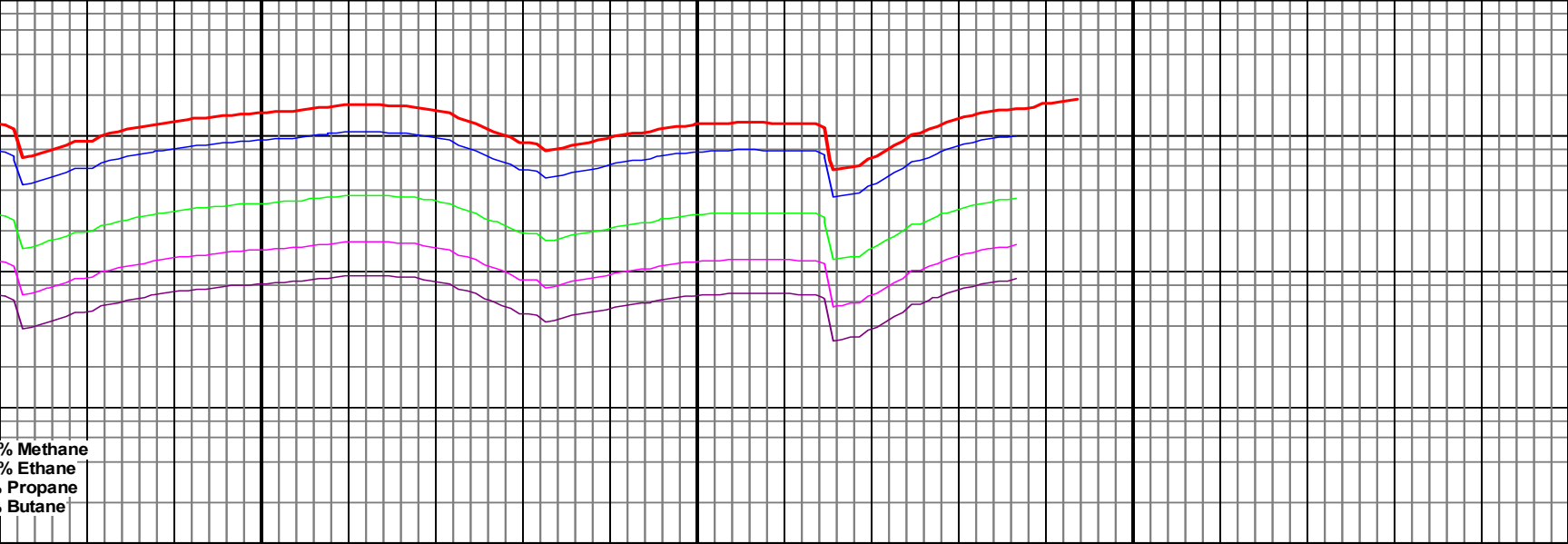












% Methane  
% Ethane  
% Propane  
% Butane

14050

14100

14150

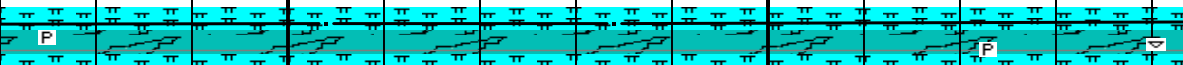
141

MD 14054 TVD 5927.67  
INC 91.8 AZ 176.46  
VS 7993.77 DL 0.09

MD 14084 TVD 5926.64  
INC 92.15 AZ 176.03  
VS 8023.69 DL 1.85

MD 14144 TVD 5924.39  
INC 92.15 AZ 176.03  
VS 8083.5 DL 0

Total Depth of 14144'  
reached at 23:50 on  
2/14/2016



14000-14100 Mrlst med-dk gy, sb  
blky-blky, frm, tr pyr, occ med gy chk,  
sft, mod cut, 80% mrlst, 20% chk

14100-14144 Mrlst med-dk gy, sb  
blky-blky, frm, rr inoc, tr pyr, occ med  
gy chk, sft, mod cut, 90% mrlst, 10%  
chk

