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[WWW.HZMUD.COM/25](http://WWW.HZMUD.COM/25)

### Customer Information

**Operator:** Noble Energy Inc  
1625 Broadway  
Suite 2200  
Denver, Colorado 80202

**Geologist:** Holly Duncan  
Noble Energy Inc.

### Mud Logging Details

**Logger:** Casey Sensecqua &  
Tom Denney  
**Log Interval:** 6550' MD TO 11066' MD  
**Start Date:** September 15, 2013  
**Release Date:** September 18, 2013

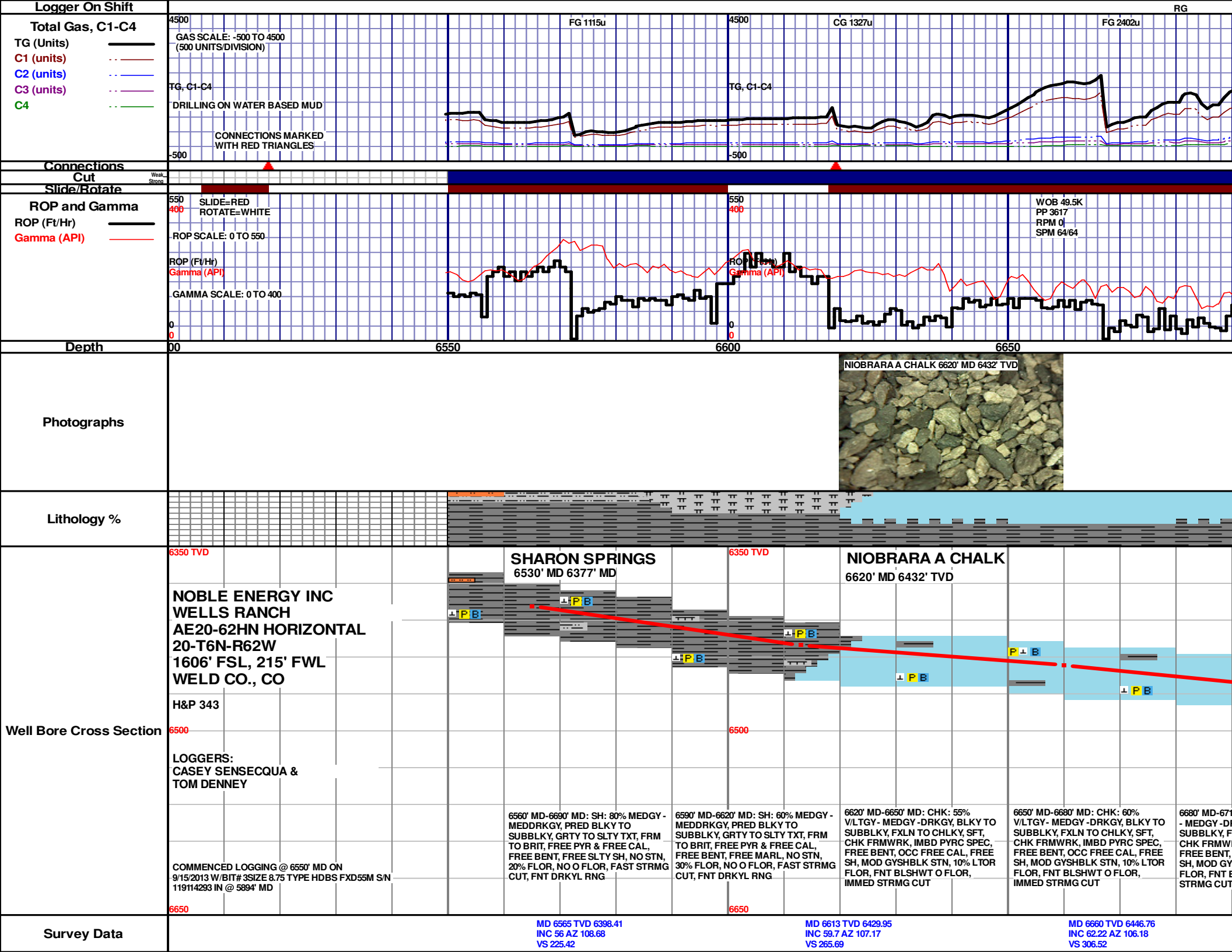
### Well Information

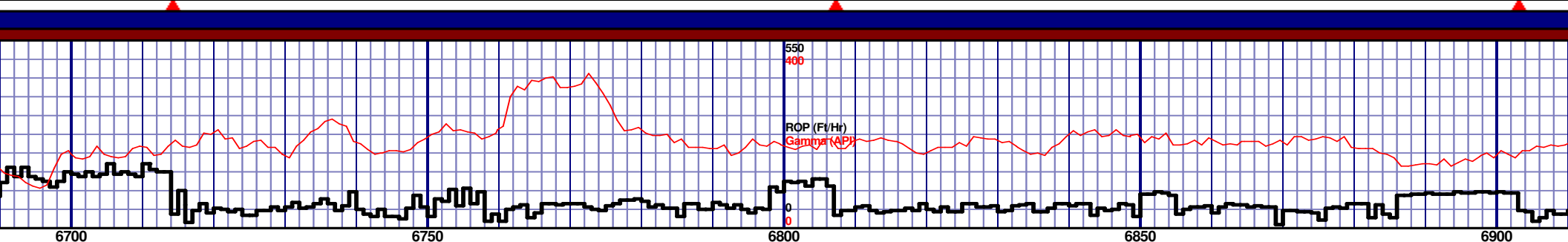
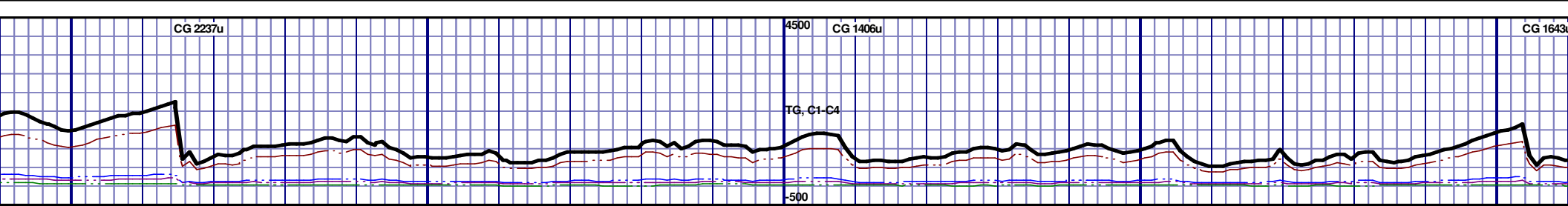
**Well Name:** Wells Ranch AE20-62HN  
Horizontal

**Location:** 20-T6N-R62W  
1606' FSL, 215' FWL

**County:** Weld  
**State:** Colorado

**Drilling Rig:** H&P 343  
**Total Depth:** 11066' MD  
**TD Date:** September 18, 2013  
**Formation:** Niobrara B Chalk  
**KB Elevation:** 4809'  
**GR Elevation:** 4785'  
**API Number:** 05-123-37224-0000





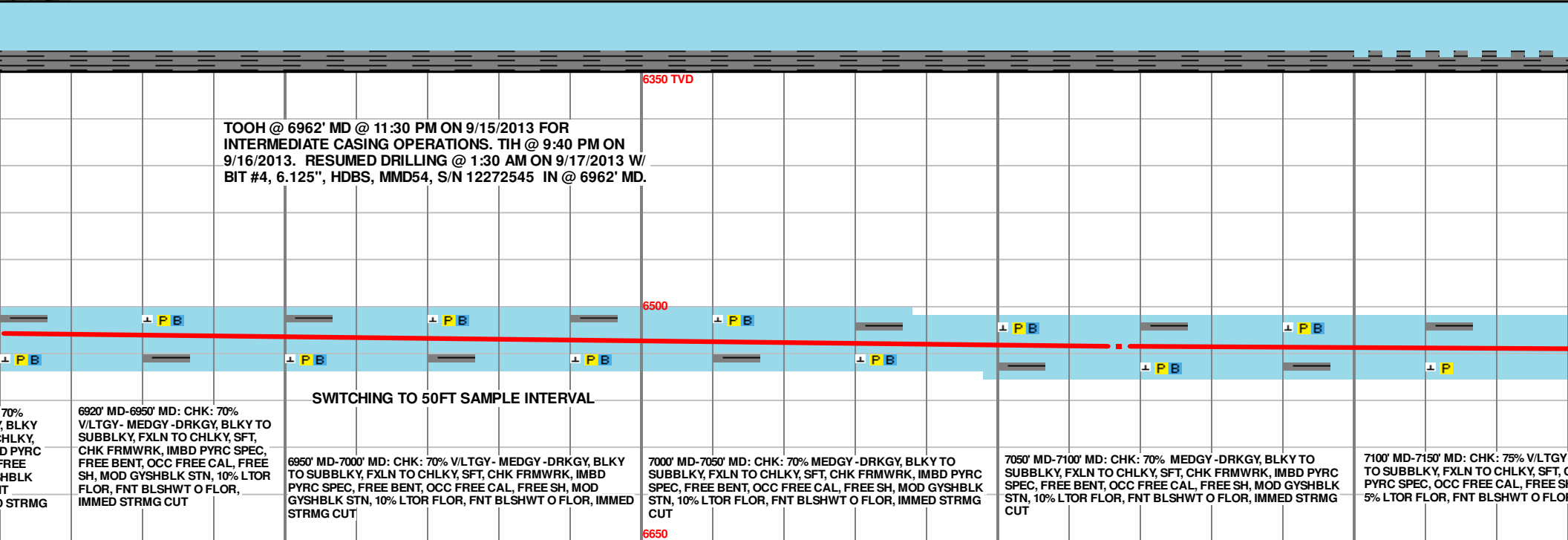
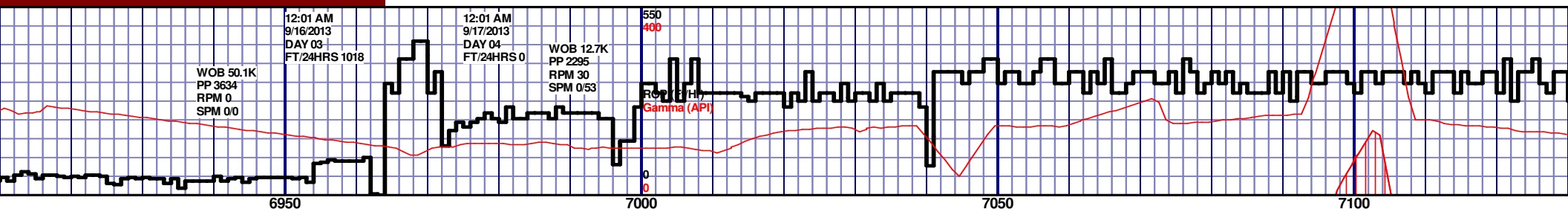
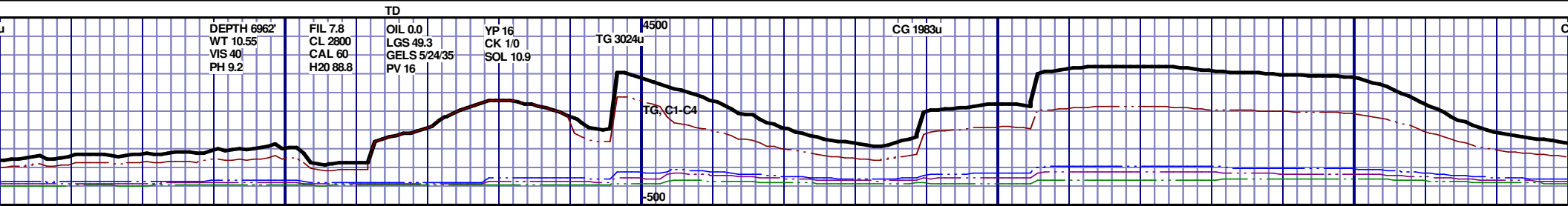
NIORARA A MARL 6736' MD 6479' TVD					NIORARA B CHALK 6879' MD 6513' TVD				
6700' MD-6740' MD: MRL: 50% - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT	6740' MD-6770' MD: MRL: 50% - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT	6770' MD-6800' MD: MRL: 45% - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT	6800' MD-6830' MD: MRL: 45% - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT	6830' MD-6860' MD: MRL: 50% - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT	6860' MD-6890' MD: CHK: 70% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT	6890' MD-6920' MD: CHK: V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT			

MD 6708 TVD 6468.32  
INC 64.39 AZ 105.15  
VS 349.22

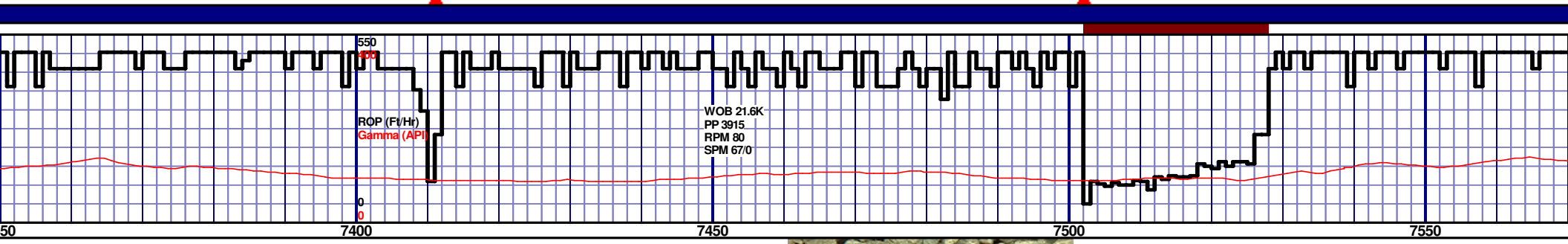
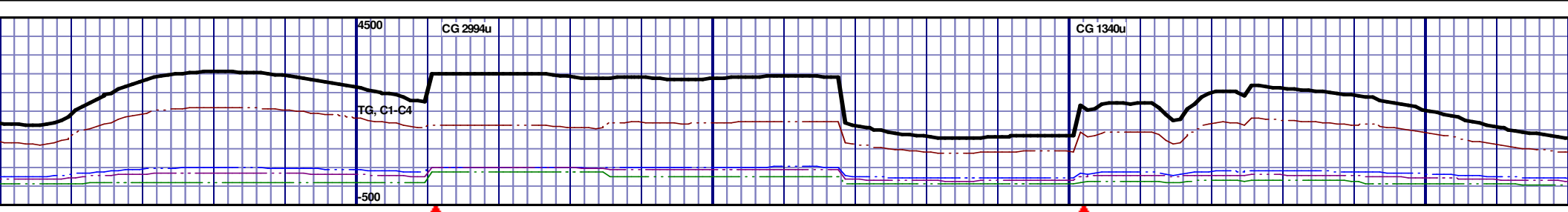
MD 6755 TVD 6486.56  
INC 69.94 AZ 102.35  
VS 392.43

MD 6803 TVD 6500  
INC 75.41 AZ 100.49  
VS 438.23

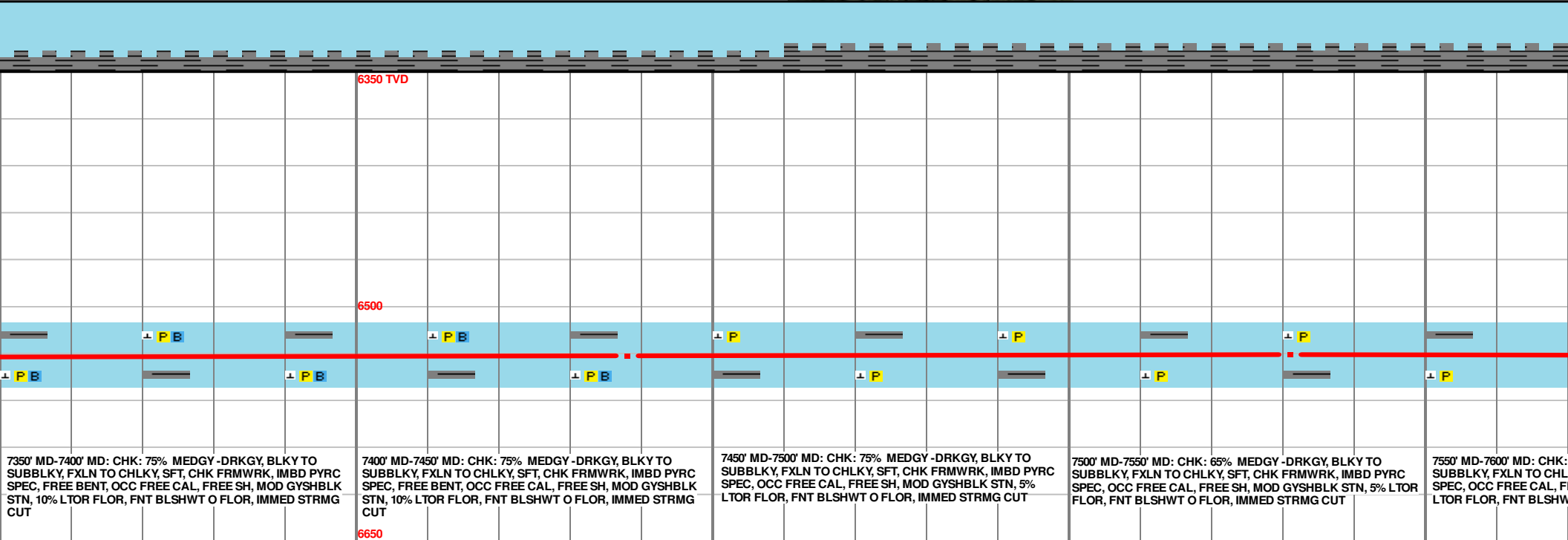
MD 6849 TVD 6510  
INC 81.33 AZ 100.52  
VS 483.26







WOB 21.6K  
PP 3915  
RPM 80  
SPM 67/0



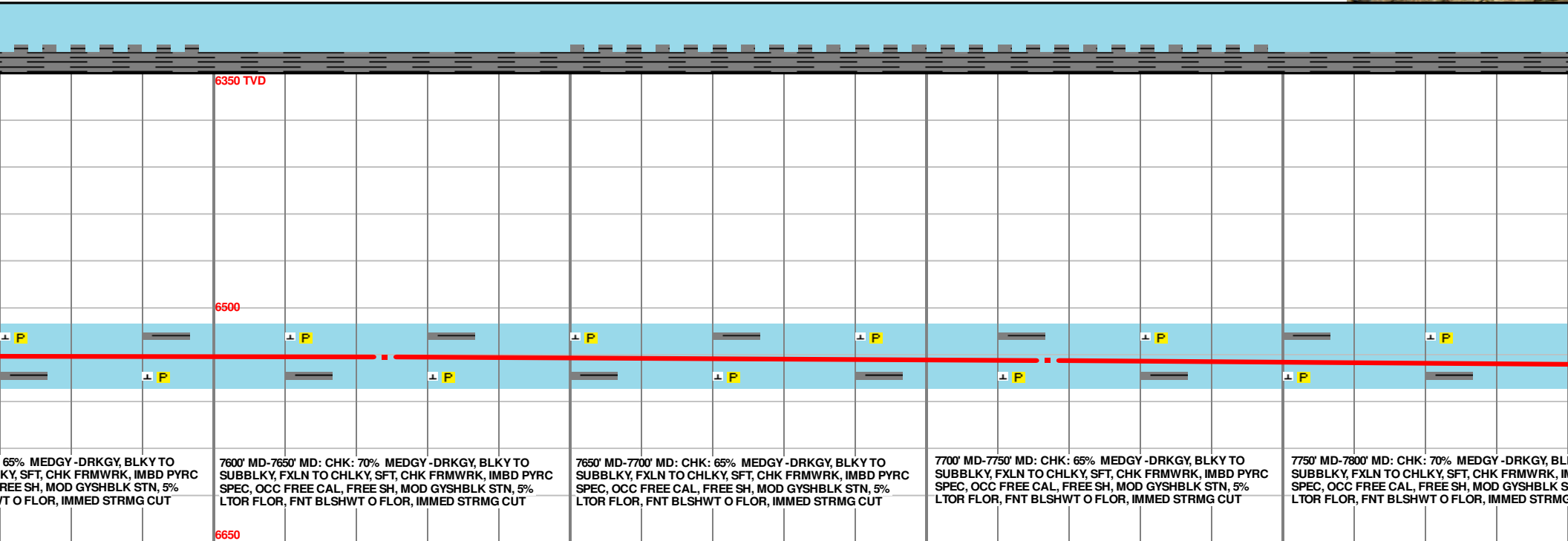
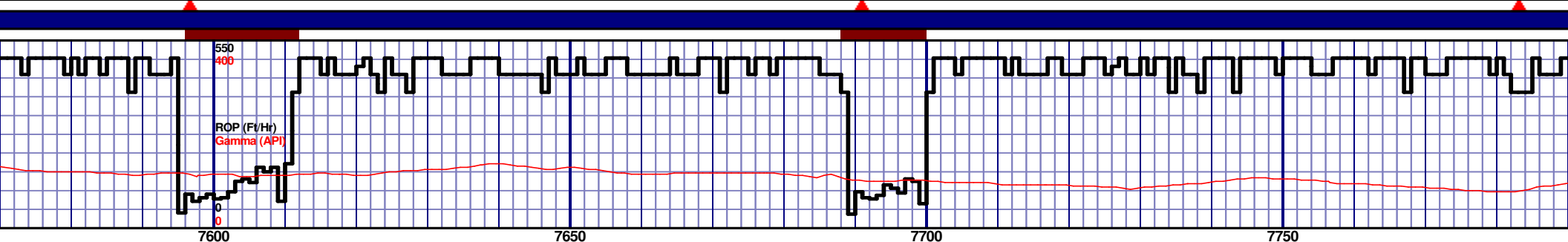
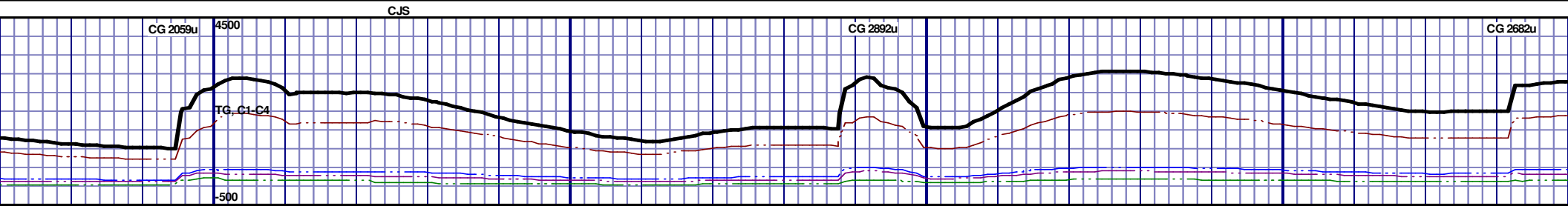
7350' MD-7400' MD: CHK: 75% MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT

7400' MD-7450' MD: CHK: 75% MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT

7450' MD-7500' MD: CHK: 75% MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT

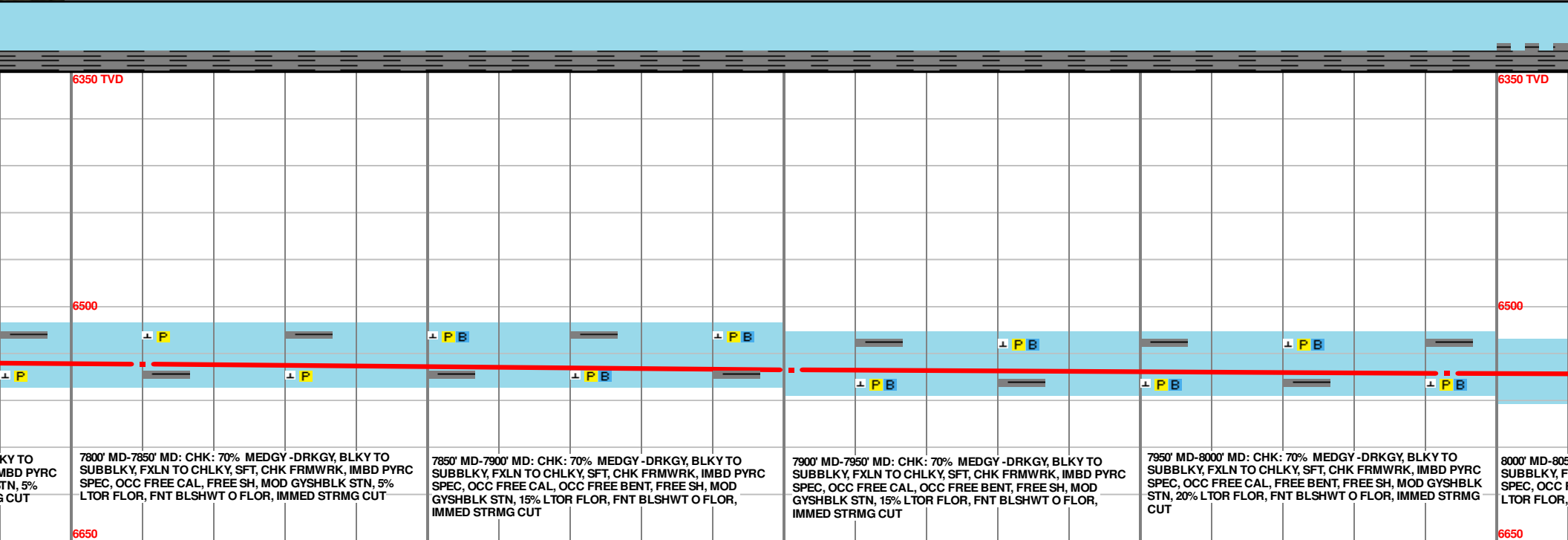
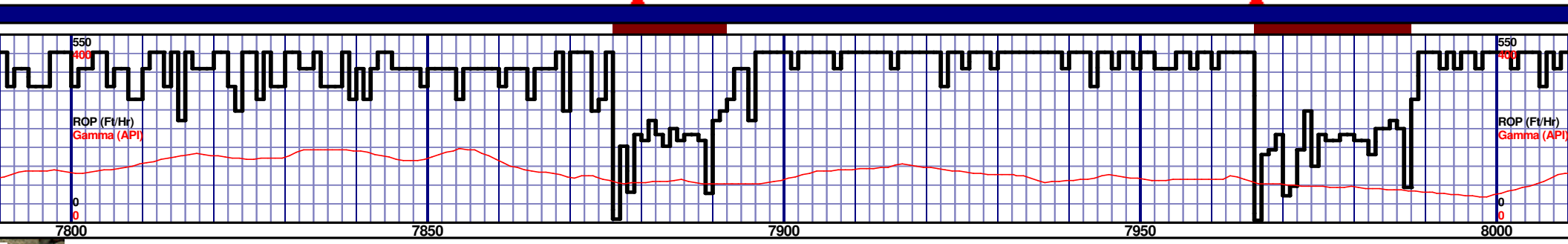
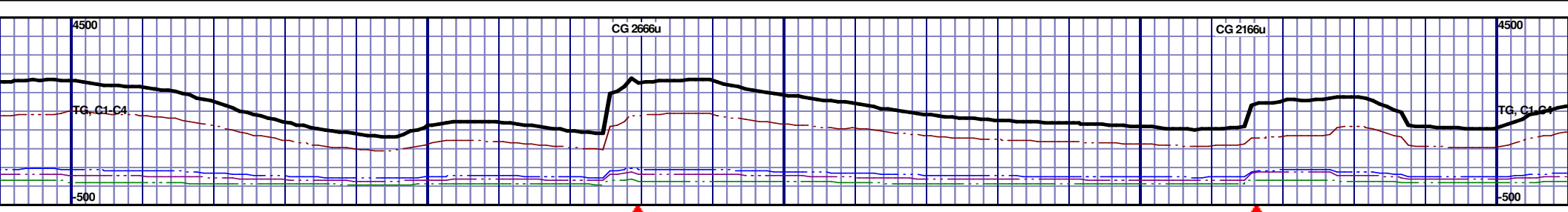
7500' MD-7550' MD: CHK: 65% MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT

7550' MD-7600' MD: CHK: SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FNT BLSHWT O FLOR, IMMED STRMG CUT



MD 7624 TVD 6531.8  
INC 89.54 AZ 87.18  
VS 1244.42

MD 7717 TVD 6533.55  
INC 88.3 AZ 85.93  
VS 1334.73



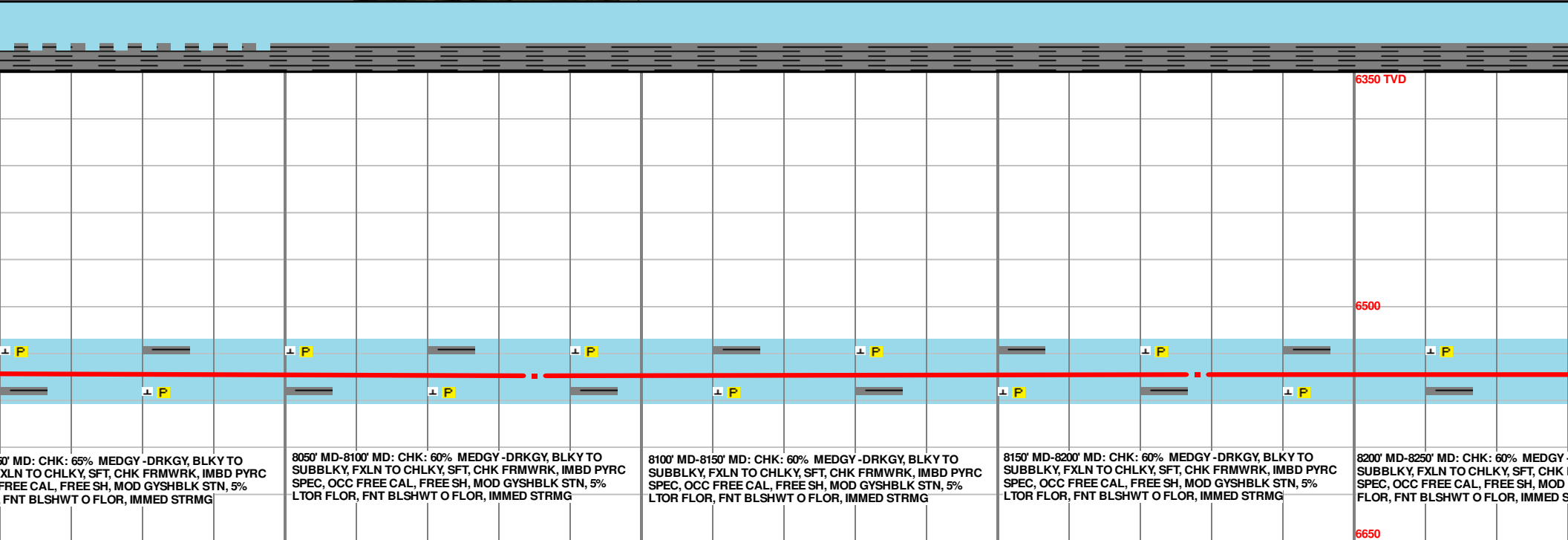
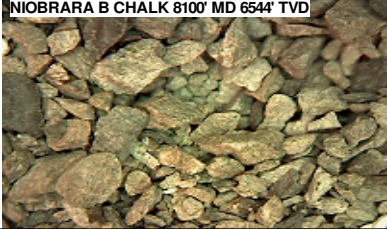
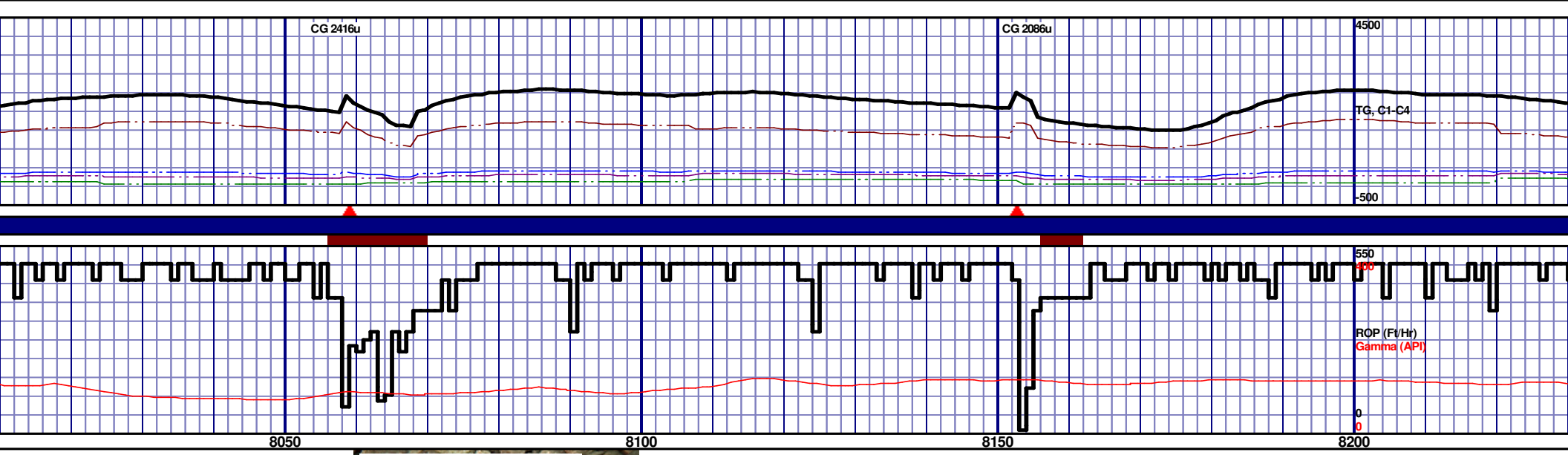
7800' MD-7850' MD: CHK: 70% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT	7850' MD-7900' MD: CHK: 70% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, OCC FREE BENT, FREE SH, MOD GYSHBLK STN, 15% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT	7900' MD-7950' MD: CHK: 70% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, OCC FREE BENT, FREE SH, MOD GYSHBLK STN, 15% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT	7950' MD-8000' MD: CHK: 70% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE BENT, FREE SH, MOD GYSHBLK STN, 20% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT	8000' MD-8050' MD: CHK: 70% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE BENT, FREE SH, MOD GYSHBLK STN, 20% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT
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MD 7810 TVD 6536.94  
INC 87.53 AZ 84.88  
VS 1424.55

MD 7901 TVD 6540.57  
INC 87.9 AZ 85.86  
VS 1512.41

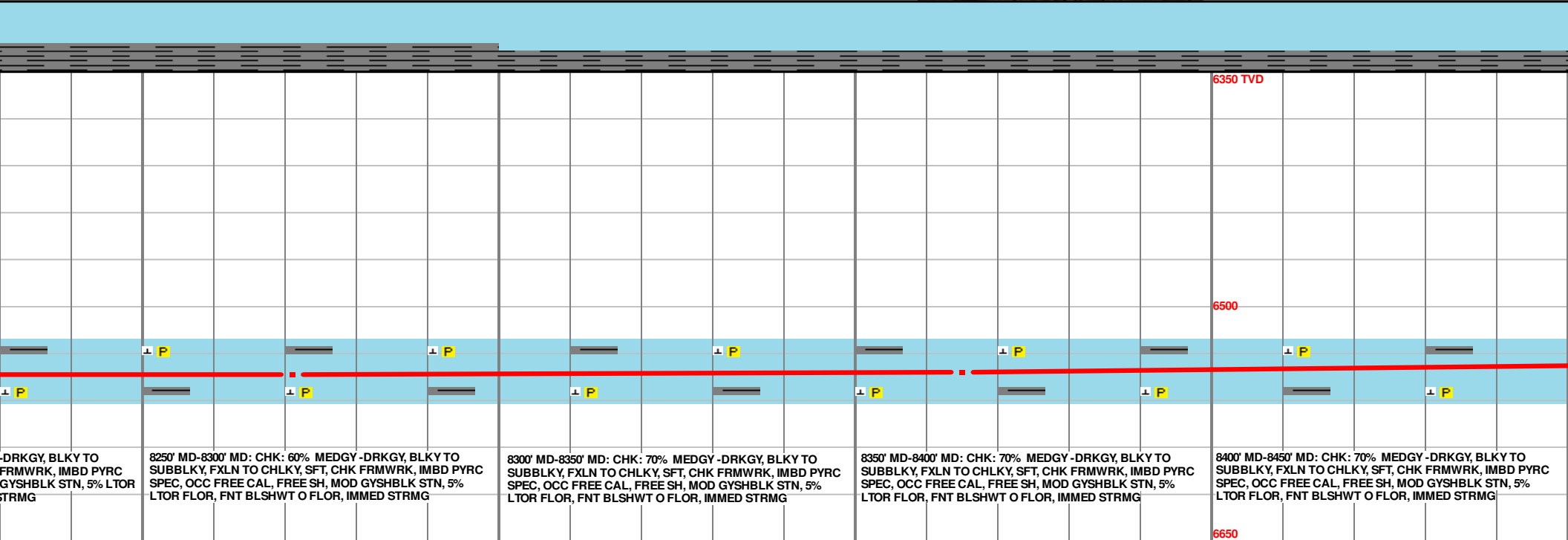
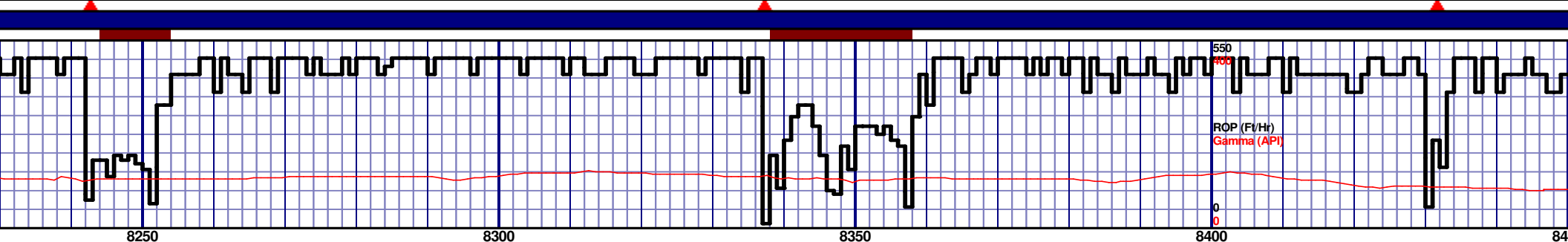
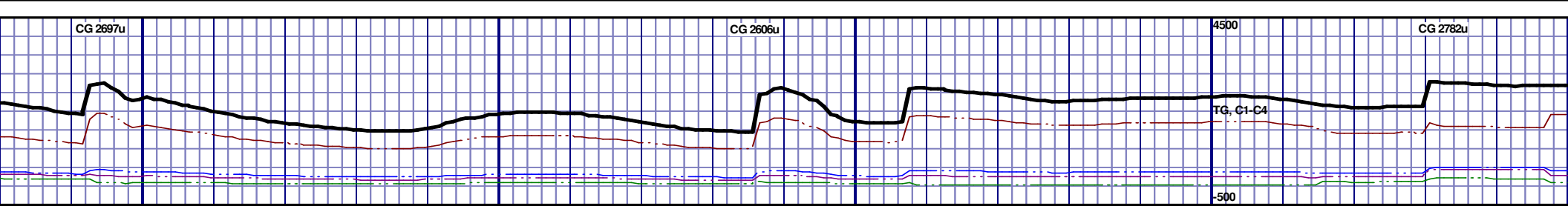
MD 7993 TVD 6543.12  
INC 88.92 AZ 87.73  
VS 1601.82





MD 8085 TVD 6543.89  
INC 90.12 AZ 87.65  
VS 1691.6

MD 8178 TVD 6543.57  
INC 90.28 AZ 86.44  
VS 1782.12



-DRKGY, BLKY TO FRMWK, IMBD PYRC GYSHBLK STN, 5% LTOR STRMG

8250' MD-8300' MD: CHK: 60% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

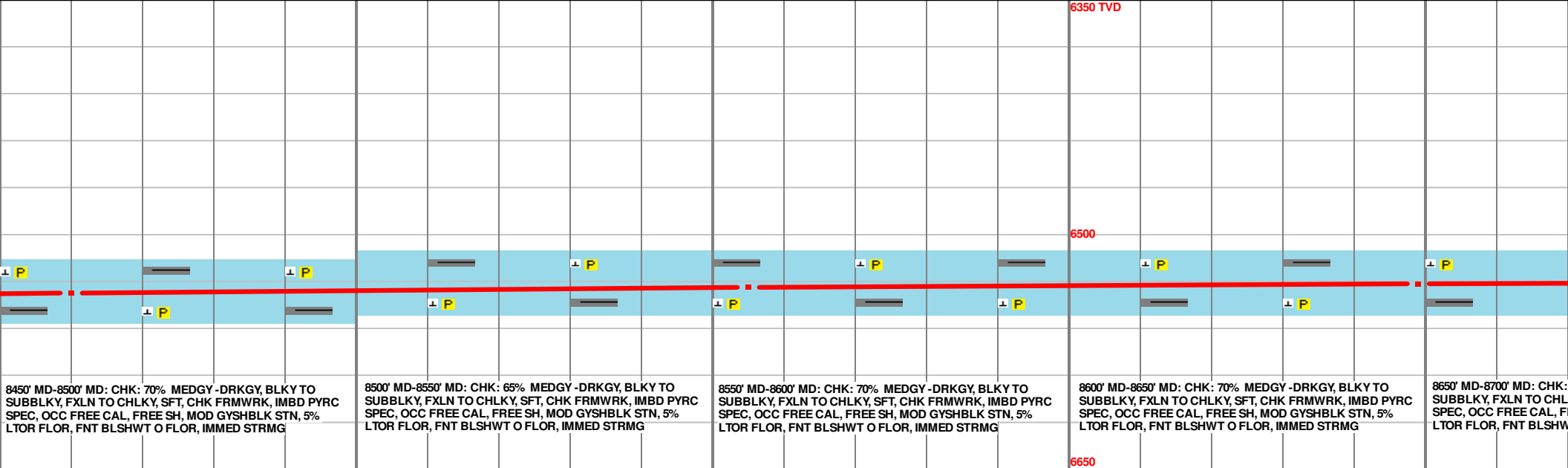
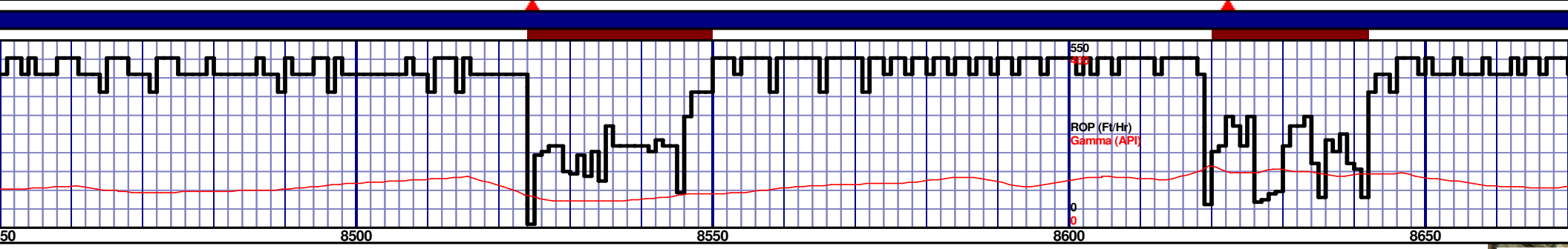
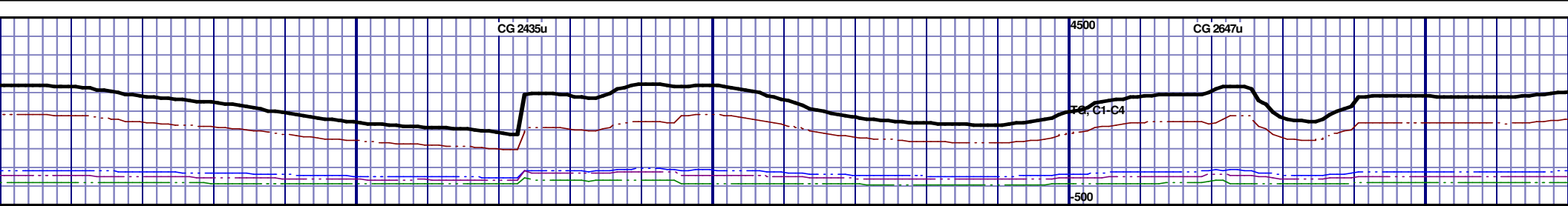
8300' MD-8350' MD: CHK: 70% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

8350' MD-8400' MD: CHK: 70% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

8400' MD-8450' MD: CHK: 70% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

MD 8271 TVD 6543.49  
INC 89.94 AZ 83.18  
VS 1871.73

MD 8365 TVD 6541.84  
INC 91.94 AZ 86.23  
VS 1962.24



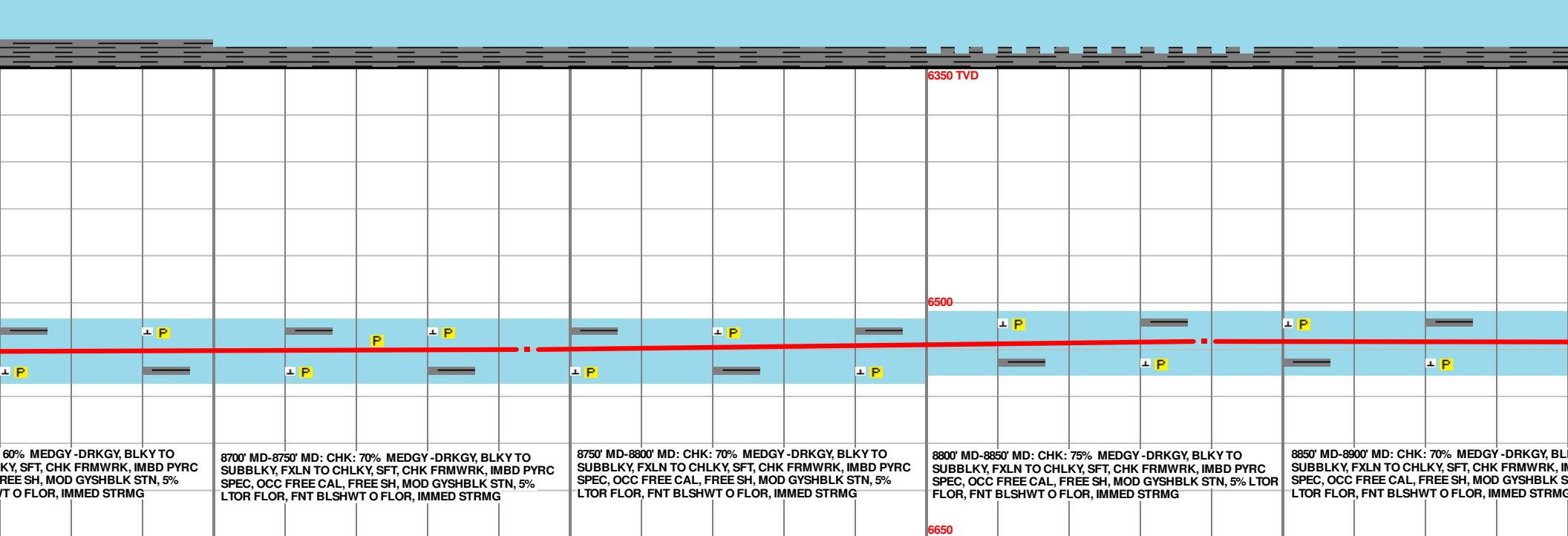
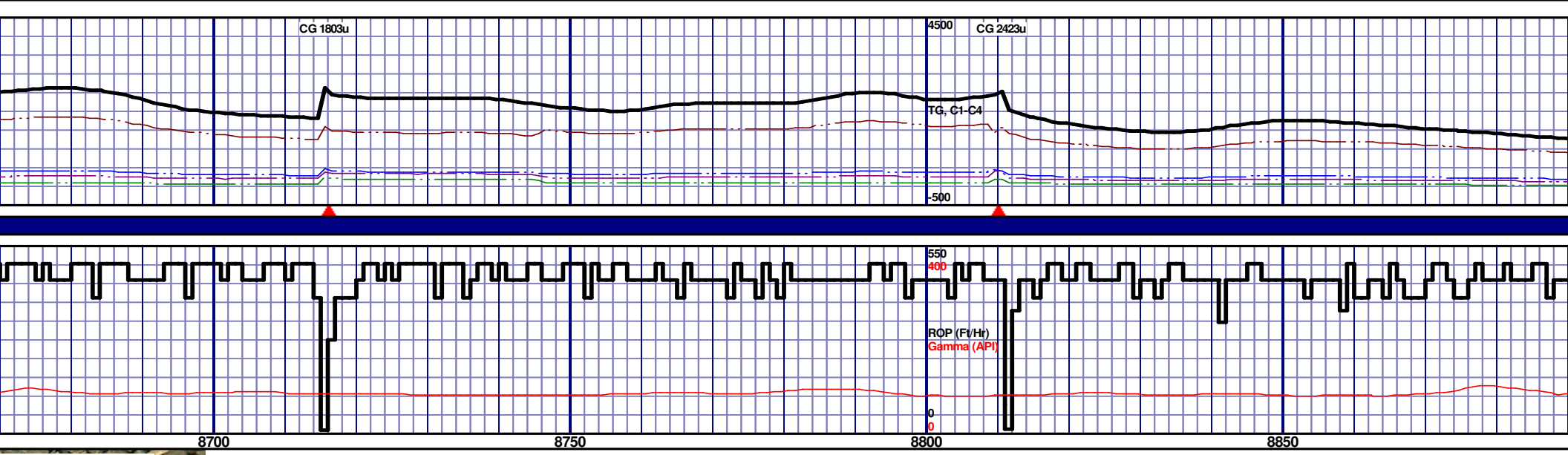
8450' MD-8500' MD: CHK: 70% MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

8500' MD-8550' MD: CHK: 65% MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

8550' MD-8600' MD: CHK: 70% MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

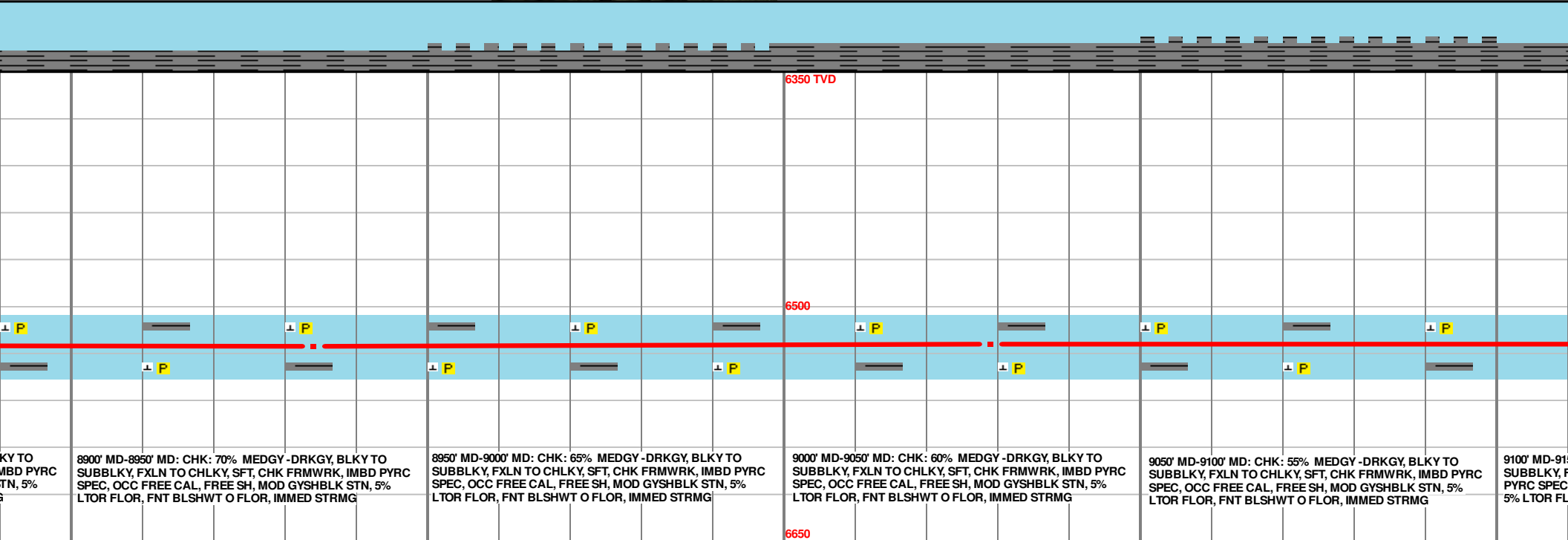
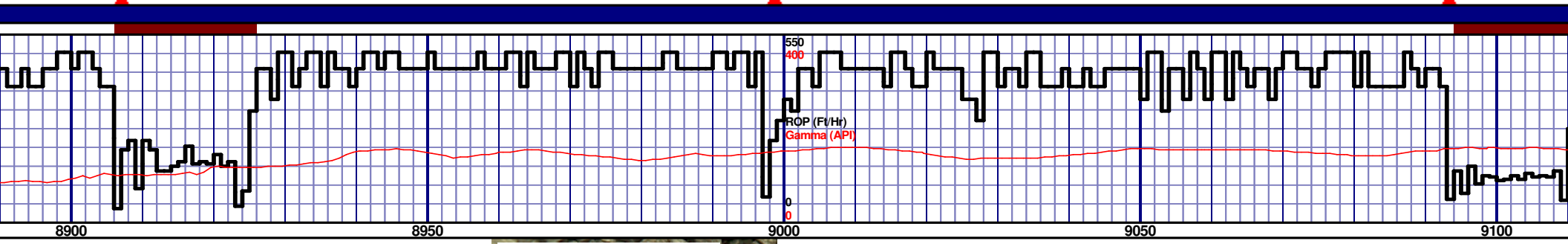
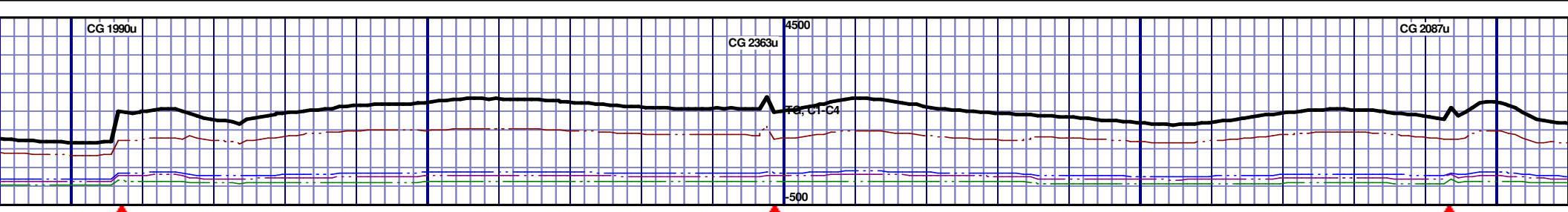
8600' MD-8650' MD: CHK: 70% MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

8650' MD-8700' MD: CHK: SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, F



MD 8744 TVD 6530.33  
INC 90.96 AZ 88.08  
VS 2331.14

MD 8839 TVD 6524.85  
INC 92.31 AZ 88.69  
VS 2355.28



8900' MD-8950' MD: CHK: 70% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

8950' MD-9000' MD: CHK: 65% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

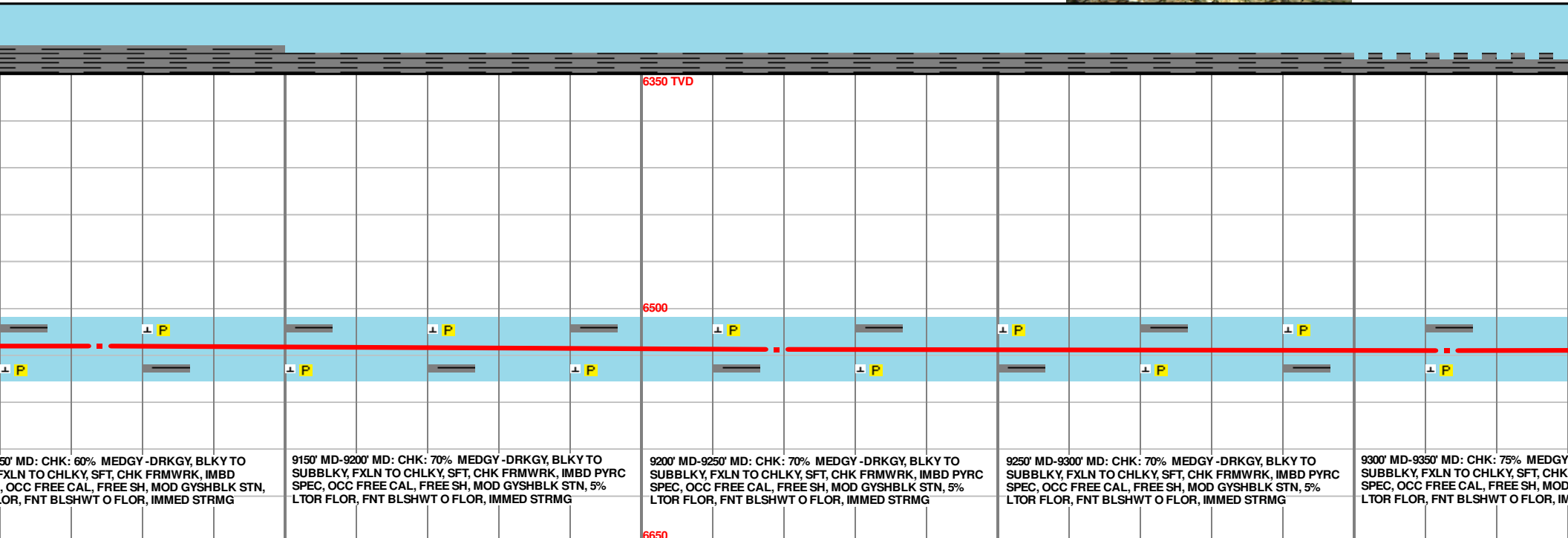
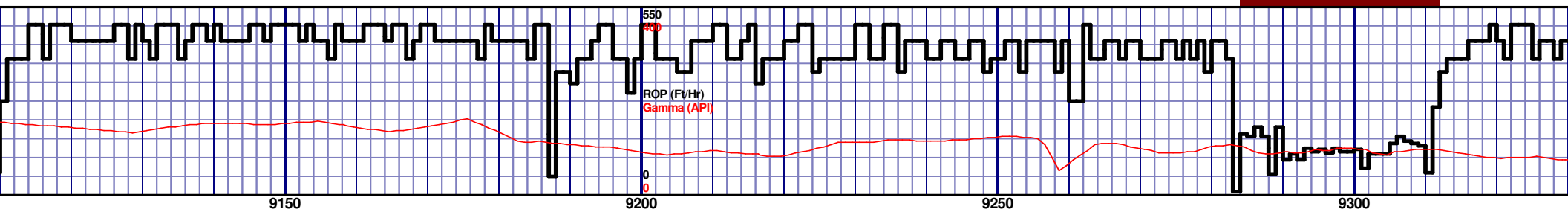
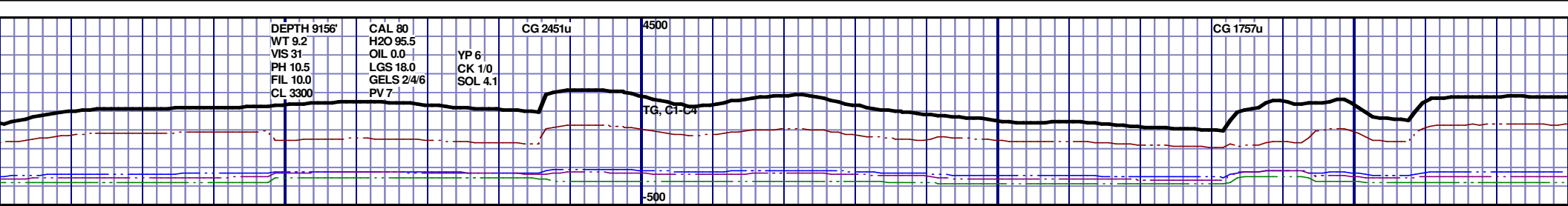
9000' MD-9050' MD: CHK: 60% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

9050' MD-9100' MD: CHK: 55% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

9100' MD-9150' MD: CHK: 50% MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

MD 8934 TVD 6525.63  
INC 90.09 AZ 87.33  
VS 2516.85

MD 9029 TVD 6524.07  
INC 91.79 AZ 87.24  
VS 2609.39



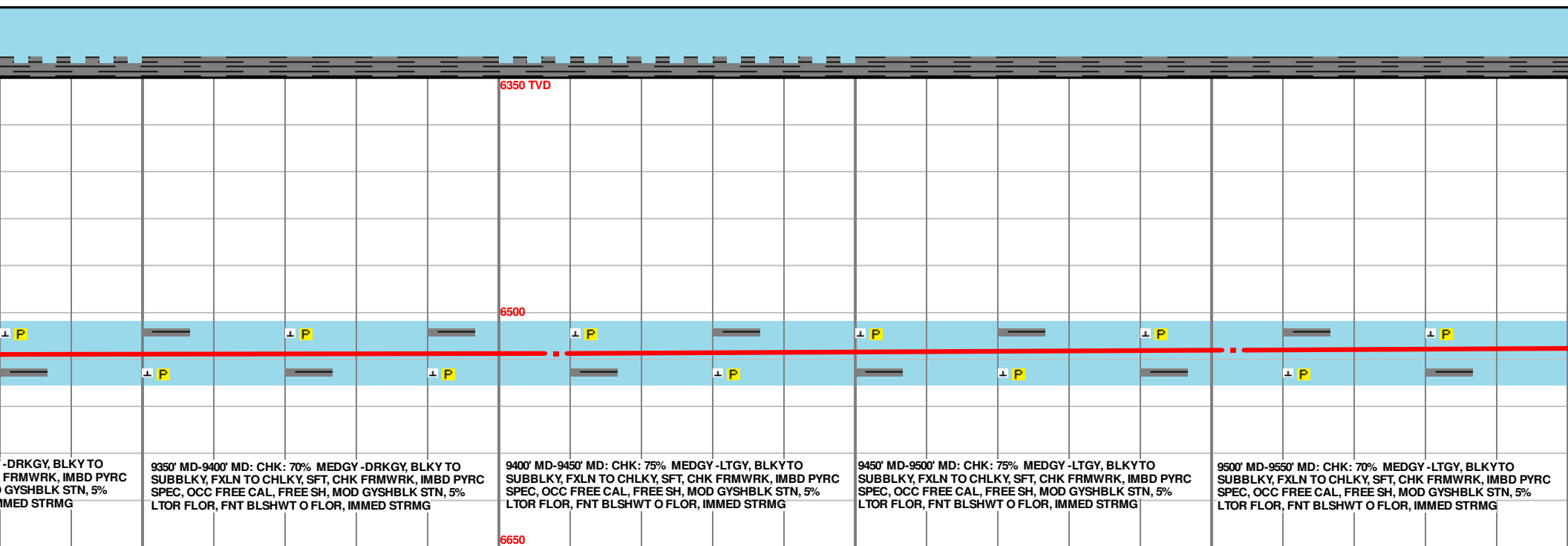
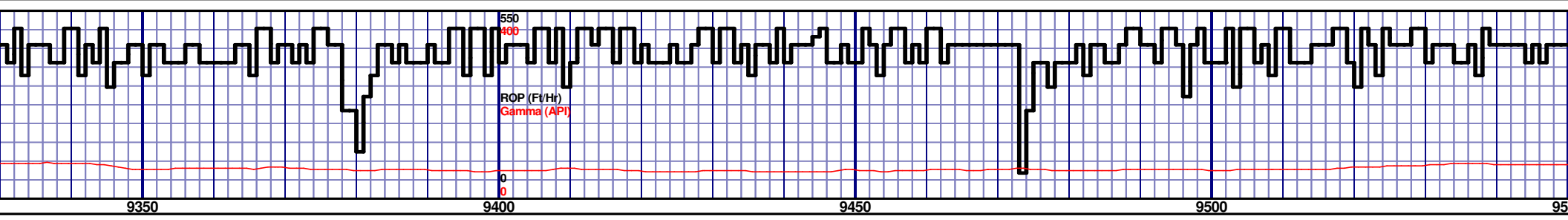
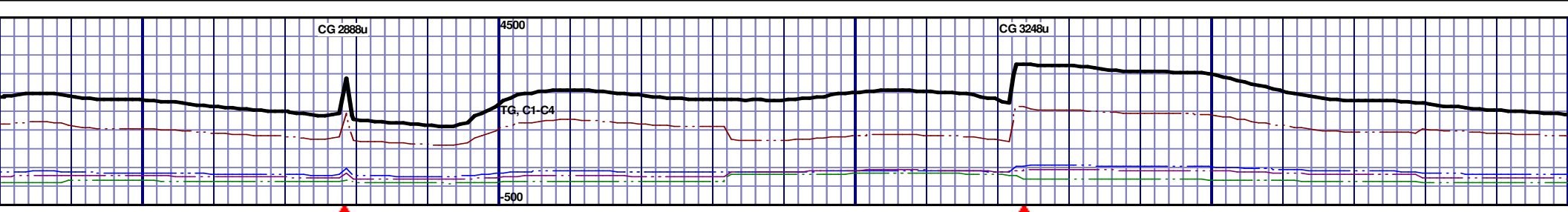
50' MD: CHK: 60% MEDGY-DRKGY, BLKY TO  
FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD  
SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN,  
LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

9150' MD-9200' MD: CHK: 70% MEDGY-DRKGY, BLKY TO  
SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC  
SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5%  
LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

9200' MD-9250' MD: CHK: 70% MEDGY-DRKGY, BLKY TO  
SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC  
SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5%  
LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

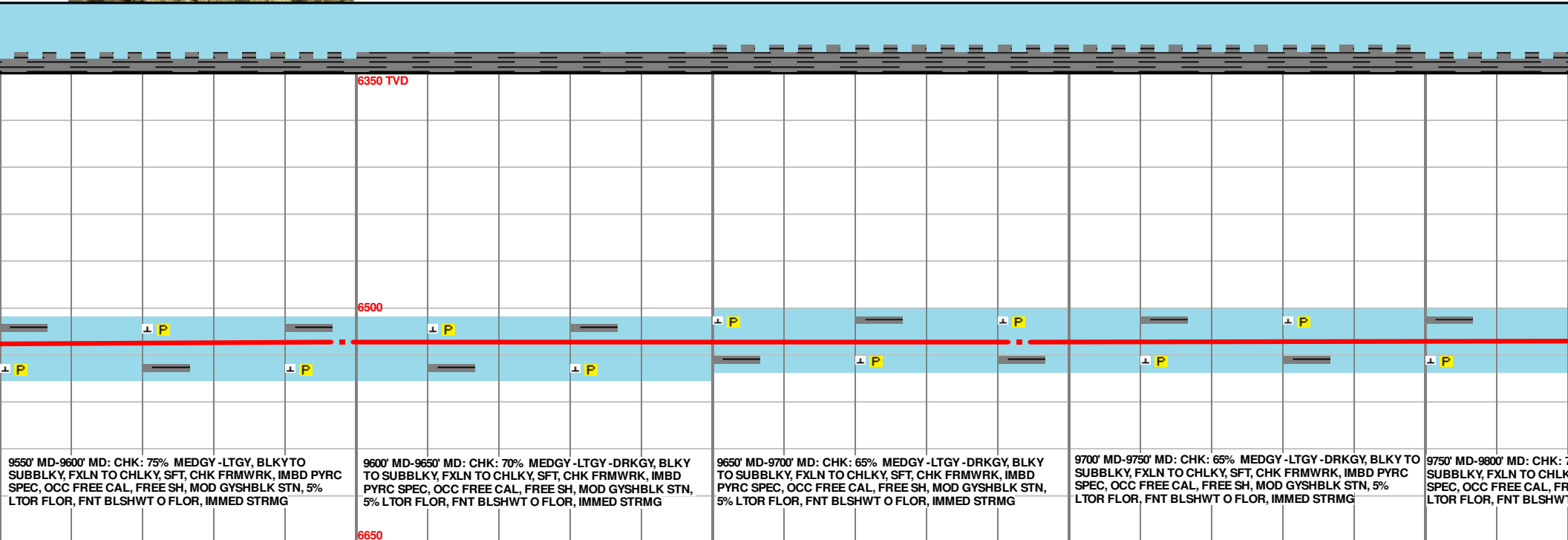
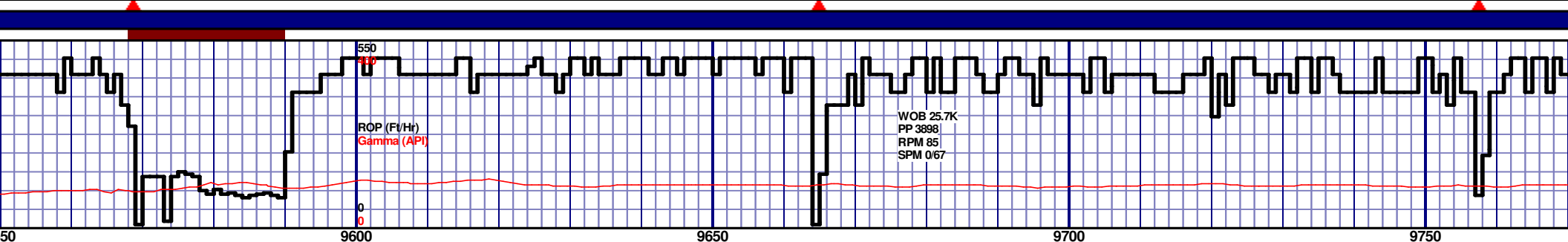
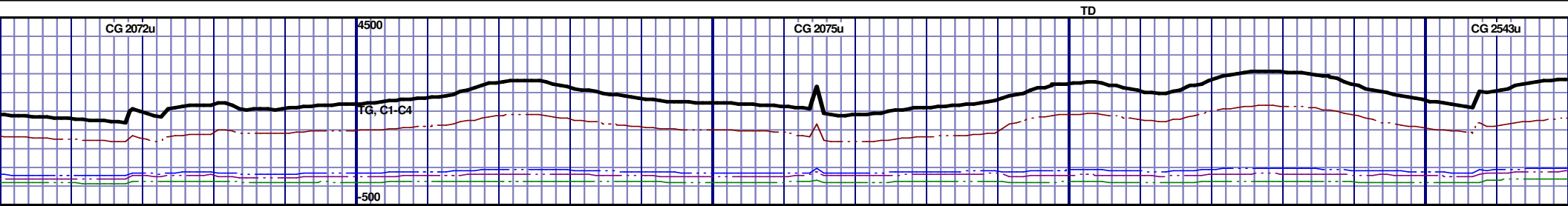
9250' MD-9300' MD: CHK: 70% MEDGY-DRKGY, BLKY TO  
SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC  
SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5%  
LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG

9300' MD-9350' MD: CHK: 75% MEDGY-DRKGY, BLKY TO  
SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC  
SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5%  
LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG



MD 9408 TVD 6526.45  
INC 90.77 AZ 89.04  
VS 2978.56

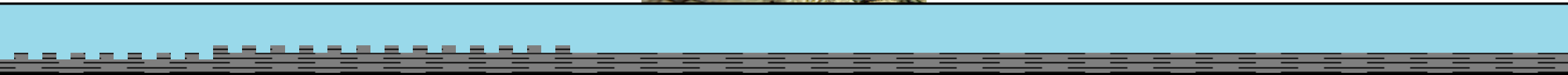
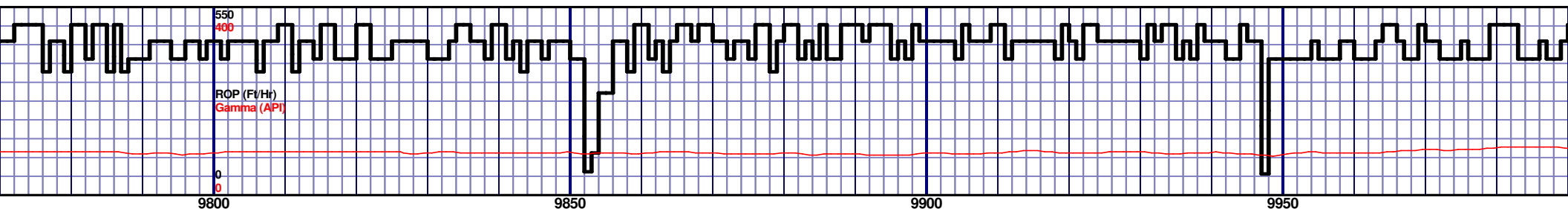
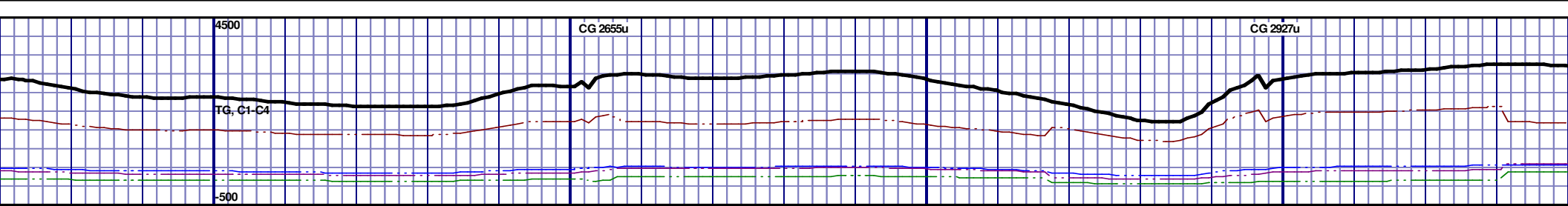
MD 9503 TVD 6524.15  
INC 92 AZ 89.24  
VS 3071.74



MD 9598 TVD 6522  
INC 90.59 AZ 89.89  
VS 3165.05

MD 9693 TVD 6521.42  
INC 90.12 AZ 89.44  
VS 3258.42



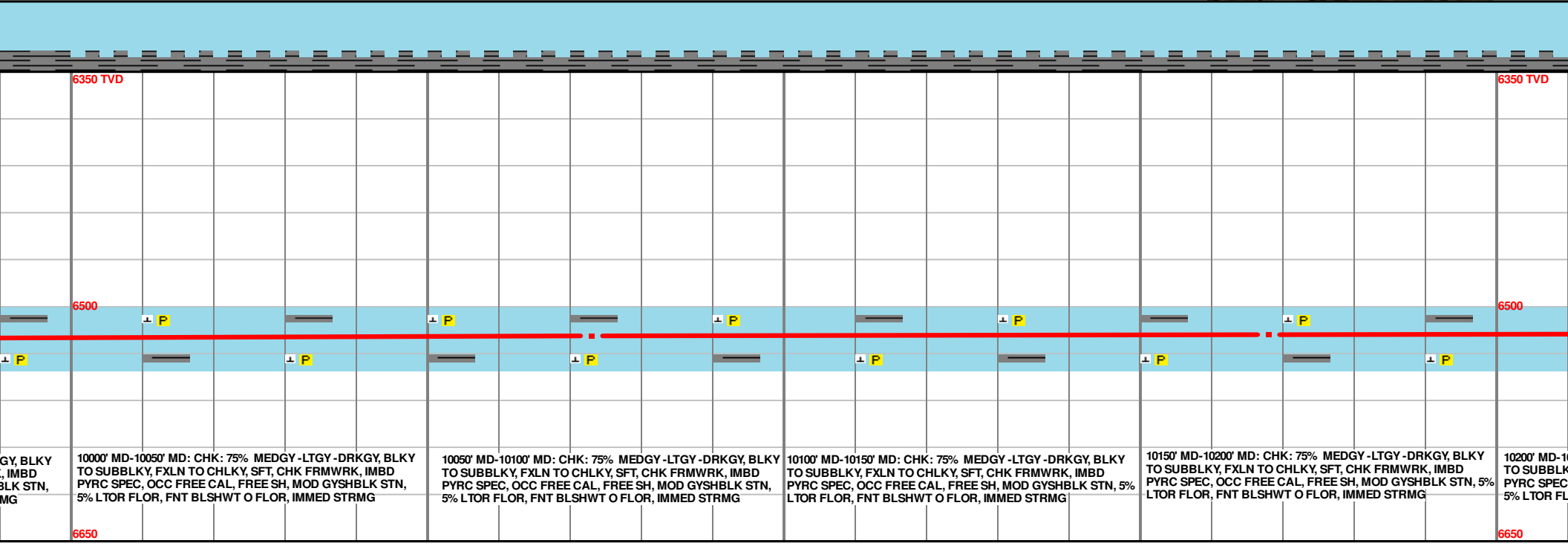
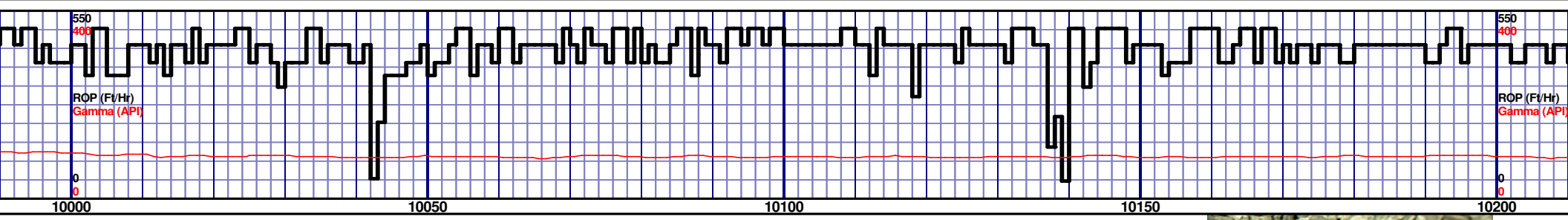
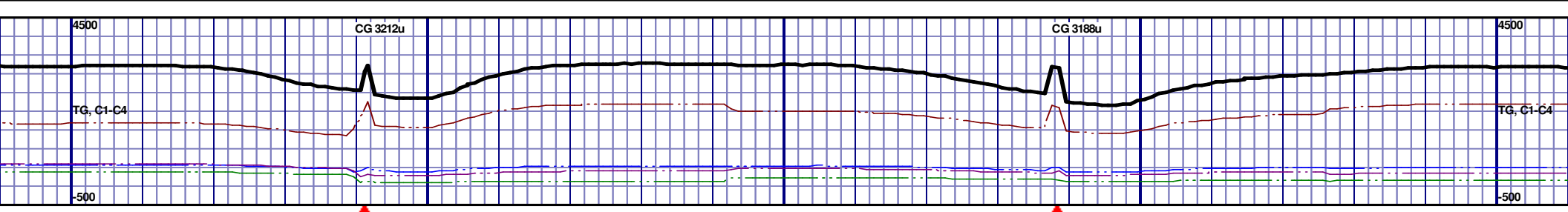


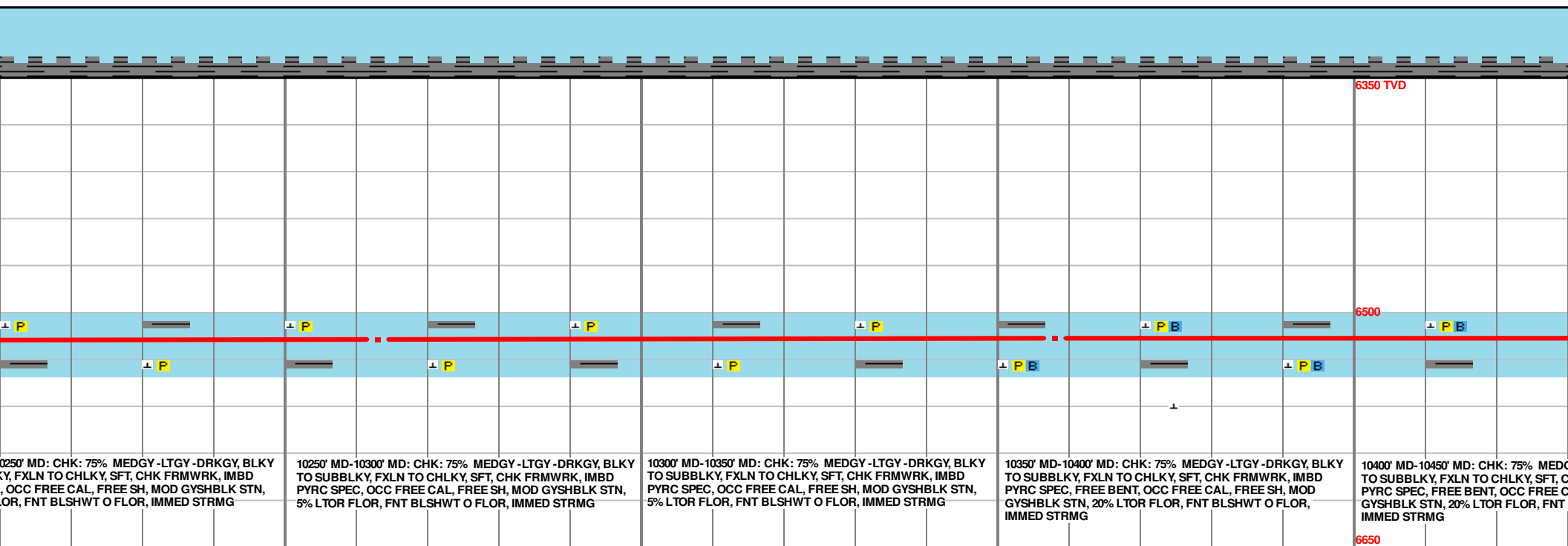
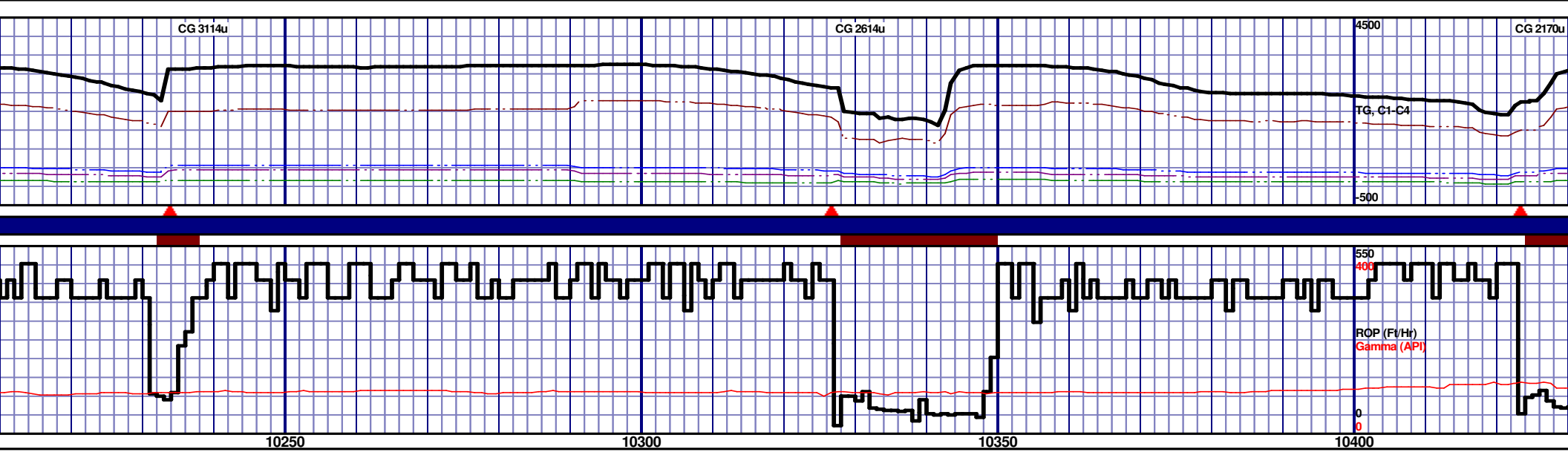
6350 TVD									
6500									
6650									
75% MEDGY -LTGY -DRKGY, BLKY TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG									
9800 MD-9850' MD: CHK: 65% MEDGY -LTGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG									
9850' MD-9900' MD: CHK: 70% MEDGY -LTGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG									
9900' MD-9950' MD: CHK: 70% MEDGY -LTGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG									
9950' MD-10000' MD: CHK: 70% MEDGY -LTGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG									

MD 9788 TVD 6520.99  
INC 90.4 AZ 90.02  
VS 3351.8

MD 9883 TVD 6520.53  
INC 90.15 AZ 89.29  
VS 3445.17

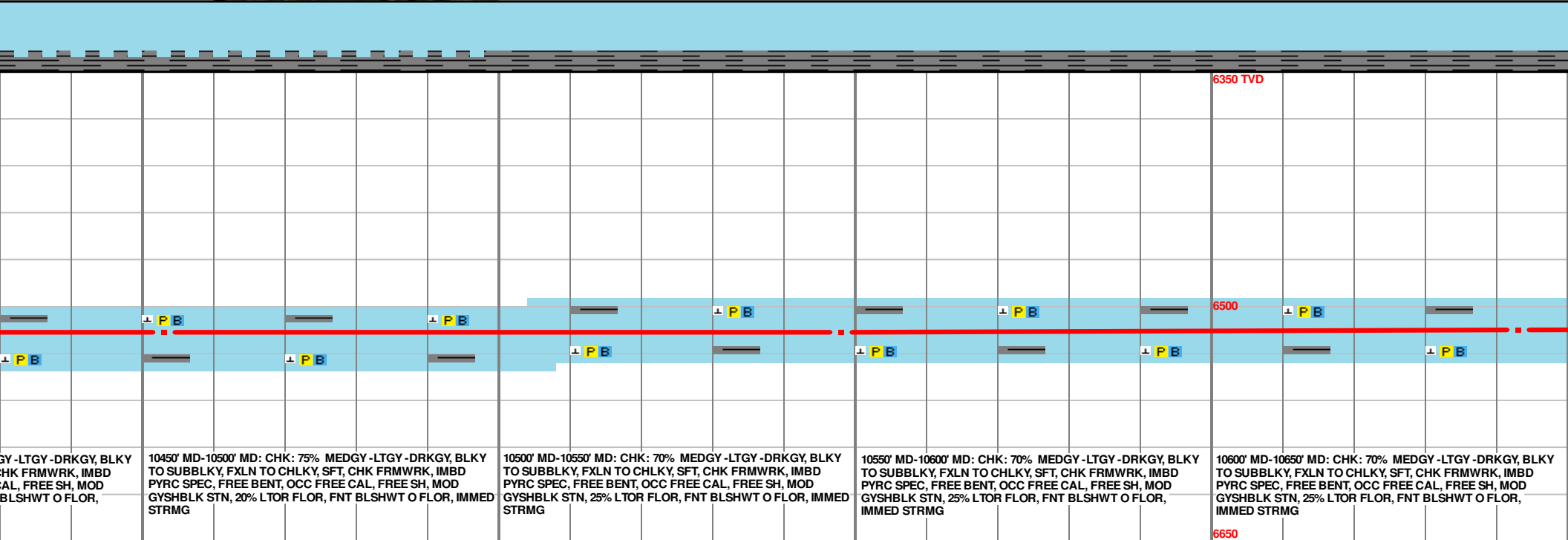
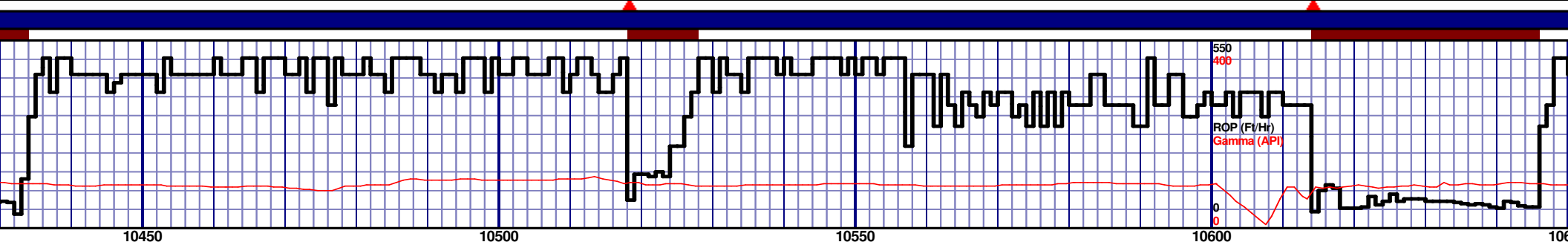
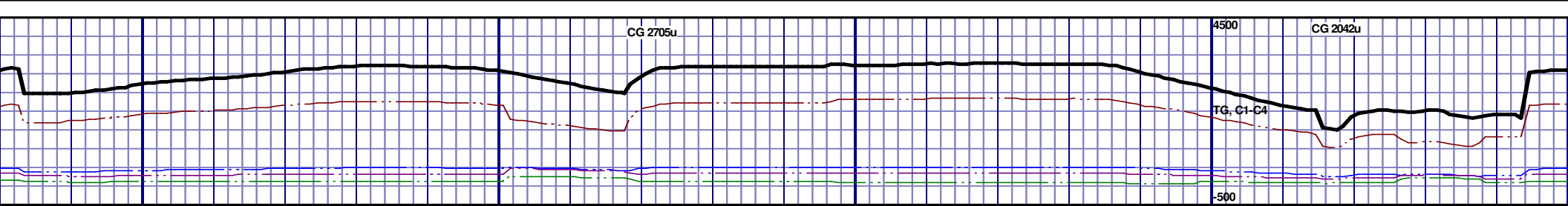
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INC 90.49 AZ 90.02  
VS 3538.55





MD 10263 TVD 6517.07  
INC 90.56 AZ 92.35  
VS 3819.72

MD 10358 TVD 6516.68  
INC 89.91 AZ 90.57  
VS 3913.59

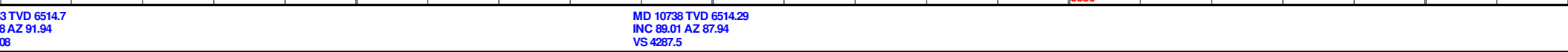
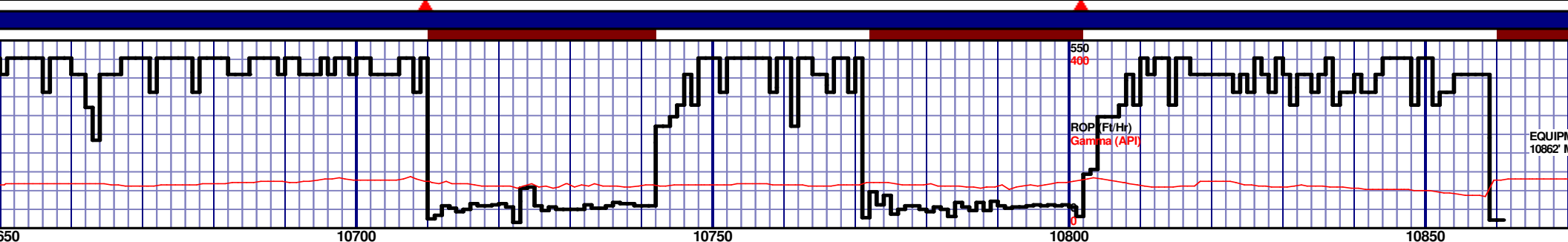


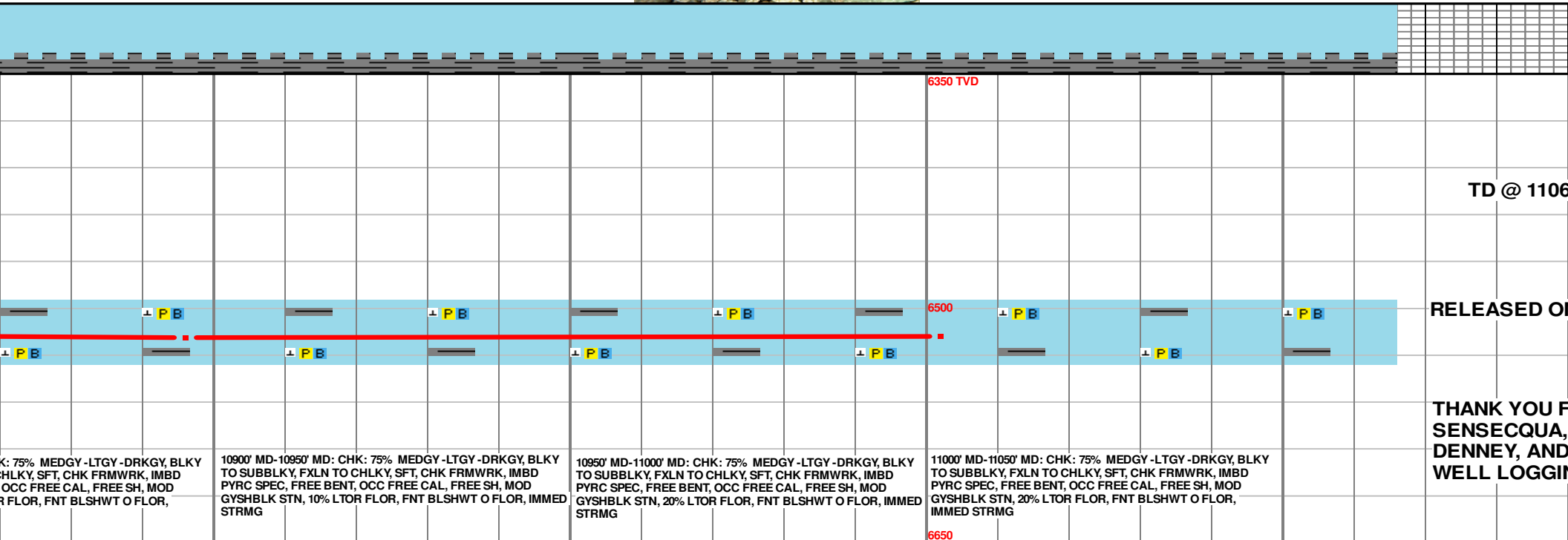
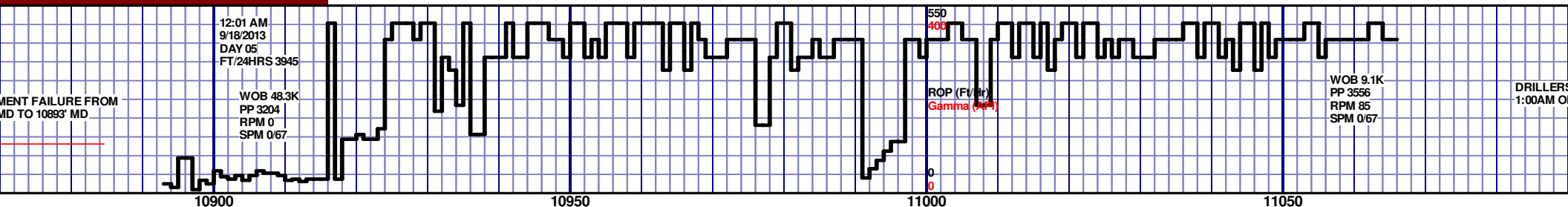
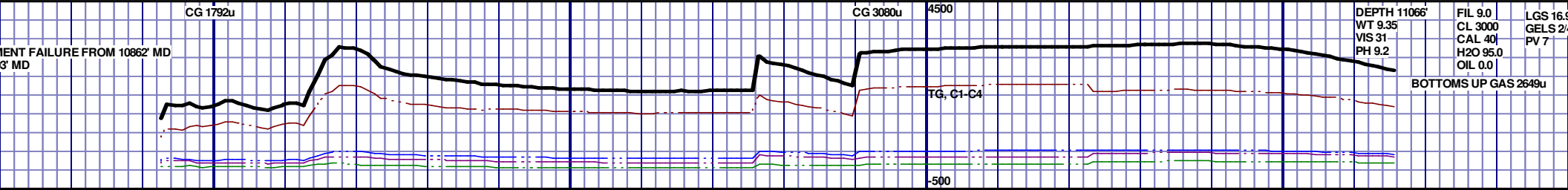
MD 10453 TVD 6516.55 INC 90.25 AZ 88.78 VS 4006.96	MD 10450' MD-10500' MD: CHK: 75% MEDGY-LTGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 20% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG	MD 10500' MD-10550' MD: CHK: 70% MEDGY-LTGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 25% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG	MD 10550' MD-10600' MD: CHK: 70% MEDGY-LTGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 25% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG	MD 10600' MD-10650' MD: CHK: 70% MEDGY-LTGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 25% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG
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MD 10453 TVD 6516.55  
INC 90.25 AZ 88.78  
VS 4006.96

MD 10548 TVD 6516.14  
INC 90.25 AZ 90.39  
VS 4100.3

MD 1064  
INC 91.4  
VS 4194





MD 10896 TVD 6518.94  
INC 87.62 AZ 84.78  
VS 4440.76

MD 11002 TVD 6518.35  
INC 91.11 AZ 84.37  
VS 4542.15
