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#### Customer Information

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

Geologist: **Cassidy Miller**  
Noble Energy Inc.

#### Mud Logging Details

Logger: **Ryan Bleess & Alec Walker**

Log Interval: 7010' MD to 11410' MD

Start Date: February 22, 2013

Release Date: February 27, 2013

#### Well Information

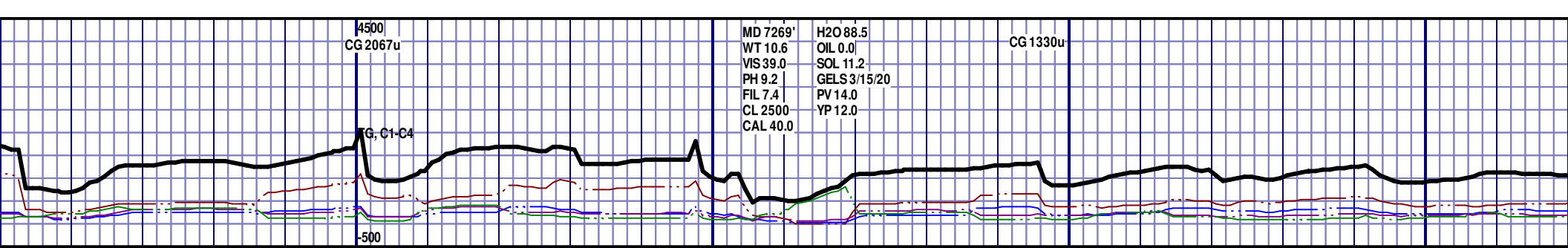
Well Name: **Knaub PC G04-64-1HN HZ**

Location: **4-4N-65W**  
2253' FSL, 290' FWL

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

Drilling Rig: **H&P 321**  
Total Depth: **11410' MD**  
TD Date: **February 26, 2013**  
Formation: **Niobrara C**  
KB Elevation: **4678'**  
GR Elevation: **4708'**  
API Number: **05-123-36286**

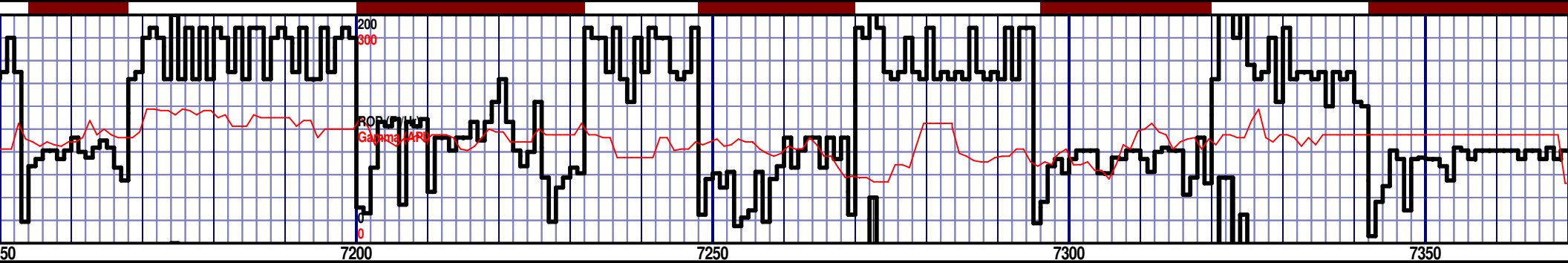




MD 7269'  
WT 10.6  
VIS 39.0  
PH 9.2  
FIL 7.4  
CL 2500  
CAL 40.0

H2O 88.5  
OIL 0.0  
SOL 11.2  
GELS 3/15/20  
PV 14.0  
YP 12.0

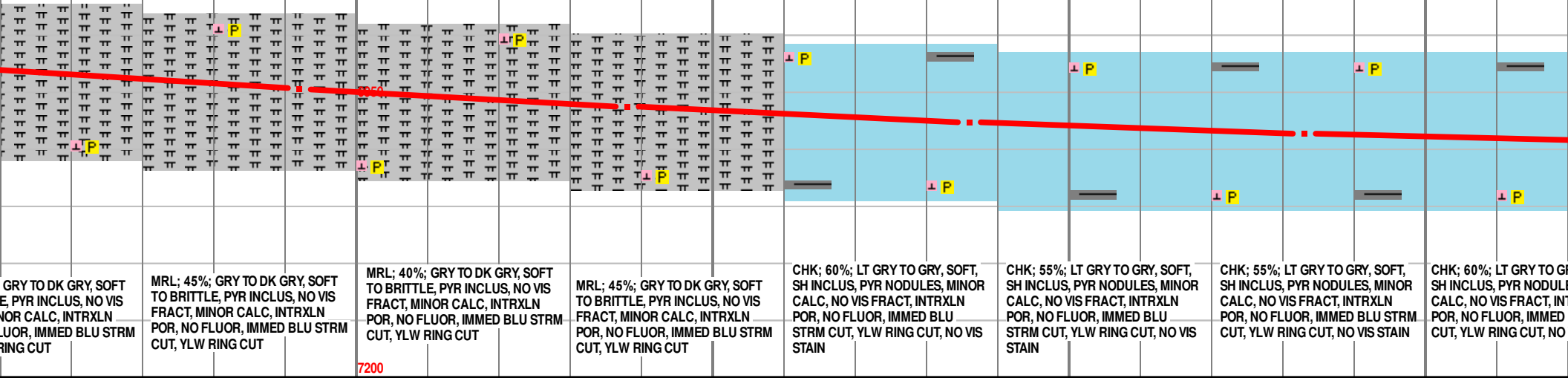
CG 1330u



ARA B MARL  
6925' TVD

6700 TVD

NIOBARRA C CHALK  
7260' MD 6969' TVD



GRY TO DK GRY, SOFT  
E, PYR INCLUS, NO VIS  
FRAC, MINOR CALC, INTRXLN  
POR, NO FLUOR, IMMED BLU STRM  
CUT, YLW RING CUT

MRL; 45%; GRY TO DK GRY, SOFT  
TO BRITTLE, PYR INCLUS, NO VIS  
FRAC, MINOR CALC, INTRXLN  
POR, NO FLUOR, IMMED BLU STRM  
CUT, YLW RING CUT

MRL; 40%; GRY TO DK GRY, SOFT  
TO BRITTLE, PYR INCLUS, NO VIS  
FRAC, MINOR CALC, INTRXLN  
POR, NO FLUOR, IMMED BLU STRM  
CUT, YLW RING CUT

MRL; 45%; GRY TO DK GRY, SOFT  
TO BRITTLE, PYR INCLUS, NO VIS  
FRAC, MINOR CALC, INTRXLN  
POR, NO FLUOR, IMMED BLU STRM  
CUT, YLW RING CUT

CHK; 60%; LT GRY TO GRY, SOFT,  
SH INCLUS, PYR NODULES, MINOR  
CALC, NO VIS FRAC, INTRXLN  
POR, NO FLUOR, IMMED BLU  
STRM CUT, YLW RING CUT, NO VIS  
STAIN

CHK; 55%; LT GRY TO GRY, SOFT,  
SH INCLUS, PYR NODULES, MINOR  
CALC, NO VIS FRAC, INTRXLN  
POR, NO FLUOR, IMMED BLU  
STRM CUT, YLW RING CUT, NO VIS  
STAIN

CHK; 55%; LT GRY TO GRY, SOFT,  
SH INCLUS, PYR NODULES, MINOR  
CALC, NO VIS FRAC, INTRXLN  
POR, NO FLUOR, IMMED BLU STRM  
CUT, YLW RING CUT, NO VIS STAIN

CHK; 60%; LT GRY TO GRY, SOFT,  
SH INCLUS, PYR NODULES, MINOR  
CALC, NO VIS FRAC, INTRXLN  
POR, NO FLUOR, IMMED BLU STRM  
CUT, YLW RING CUT, NO VIS STAIN

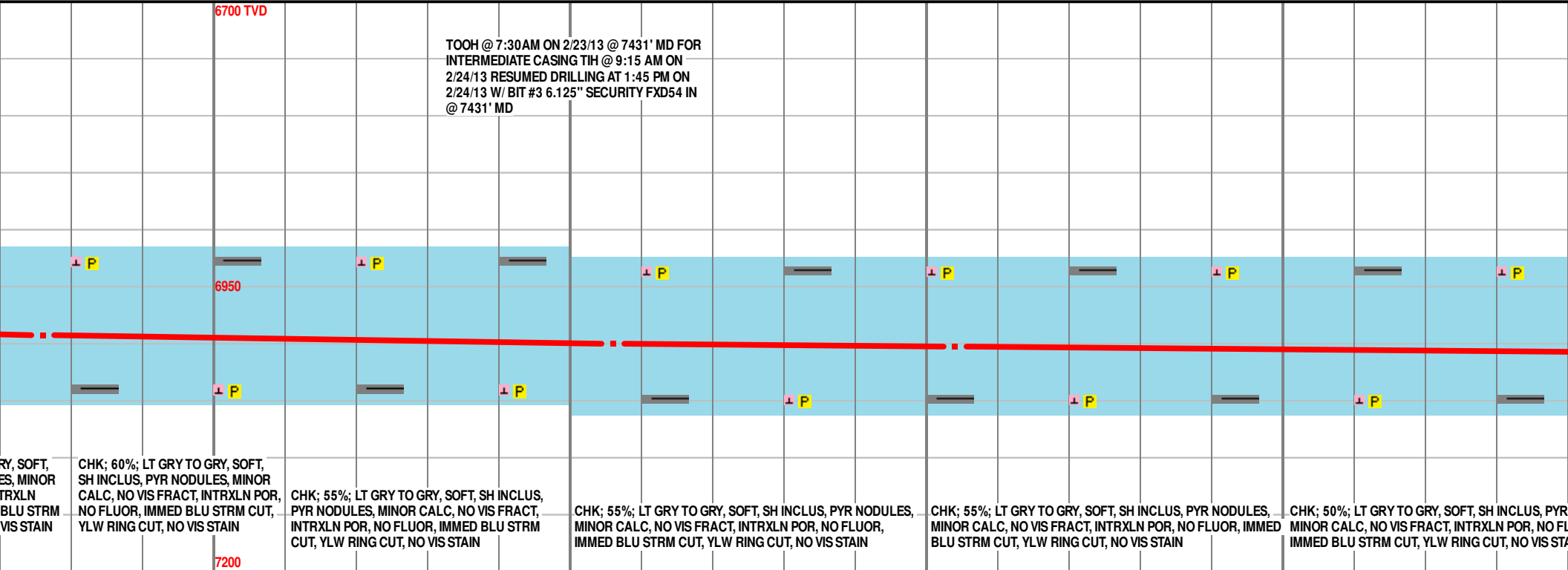
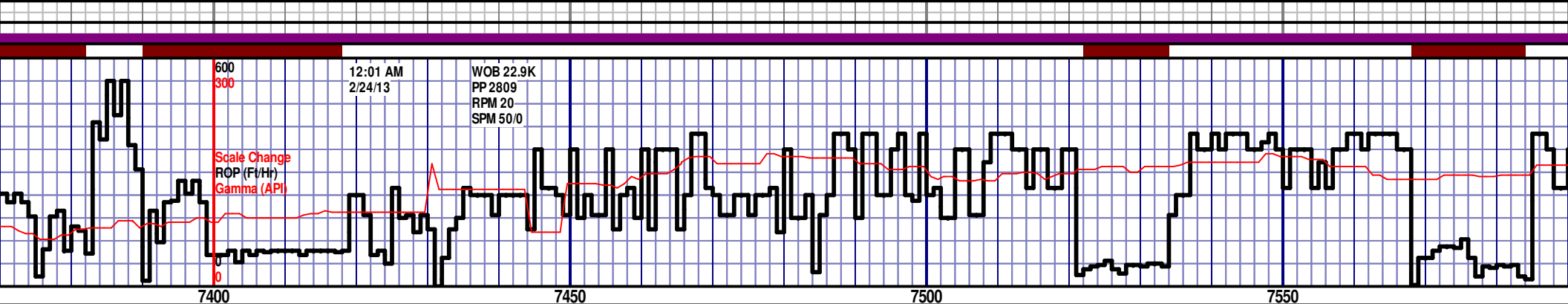
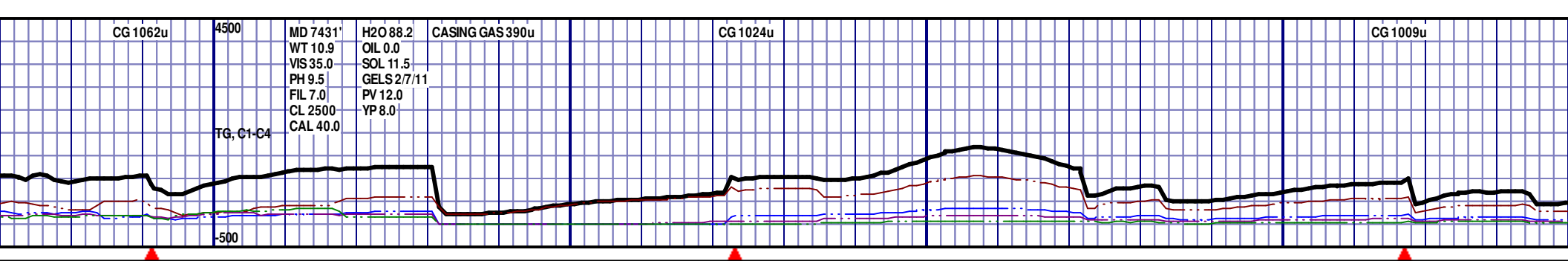
MD 7244 TVD 6927.59  
INC 67.53 AZ 101.42  
VS 346.59

MD 7192 TVD 6947.12  
INC 67.45 AZ 99.8  
VS 346.39

MD 7238 TVD 6962.94  
INC 72.29 AZ 98.04  
VS 389.56

MD 7286 TVD 6976.03  
INC 76.04 AZ 97.72  
VS 435.68

MD 7333 TVD 6985.68  
INC 80.28 AZ 96.22  
VS 481.71



RY, SOFT, ES, MINOR TRXLN BLU STRM VIS STAIN

CHK; 60%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

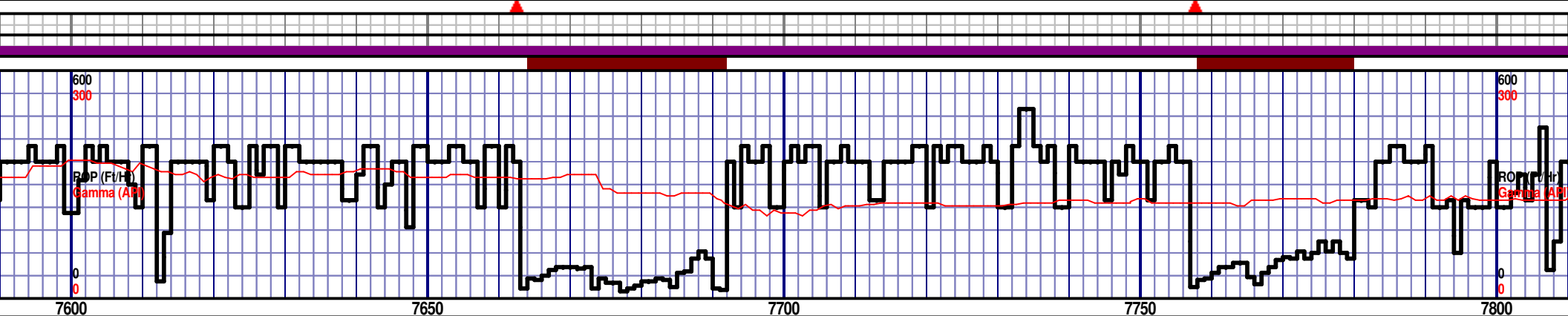
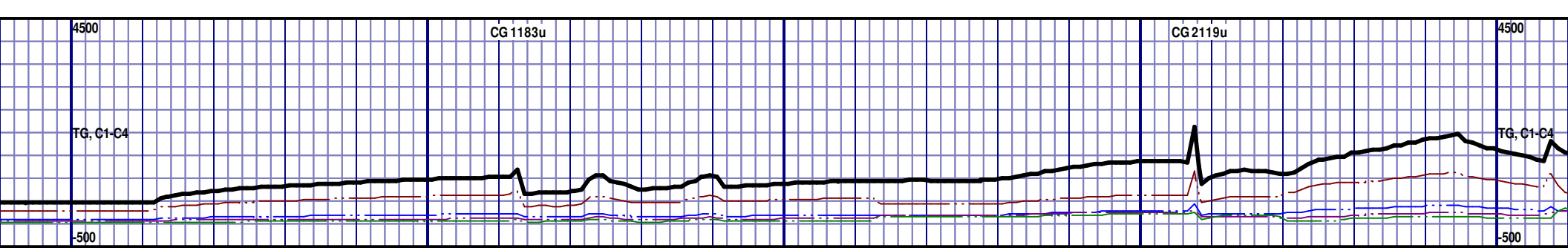
CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

MD 7376 TVD 6992.11  
INC 82.53 AZ 91.36  
VS 524.09

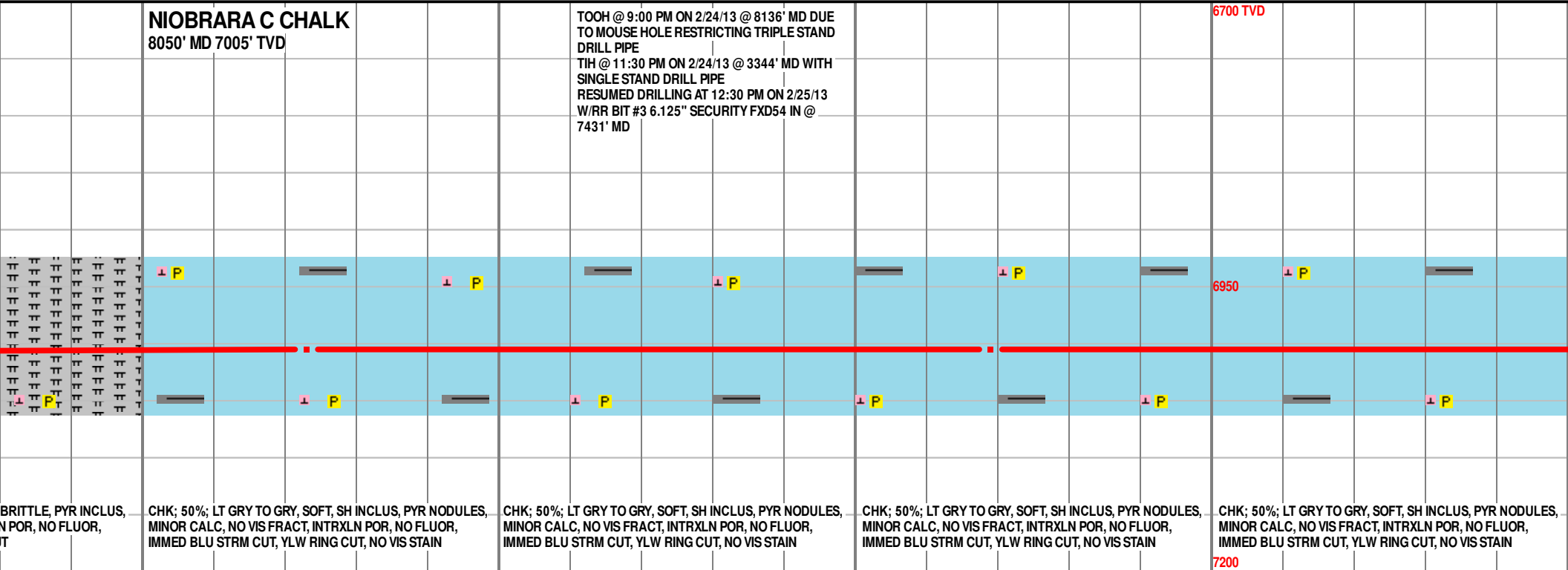
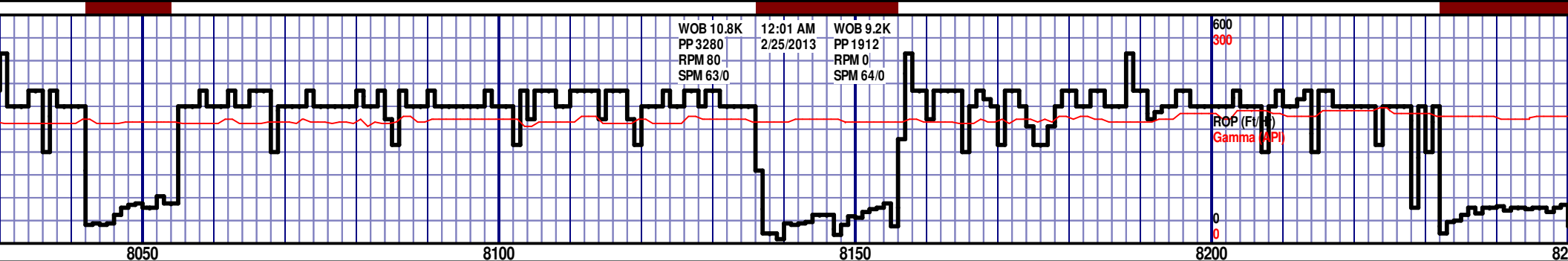
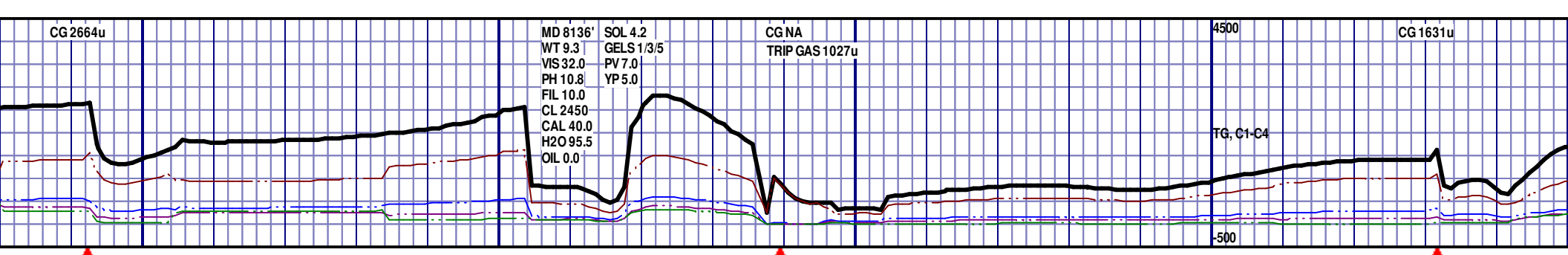
MD 7456 TVD 6999.45  
INC 86.95 AZ 86.21  
VS 602.66

MD 7504 TVD 7001.98  
INC 87 AZ 85.93  
VS 649.54



NIOBRARA C MARL 7600' MD 7007' TVD					6700 TVD				
<div>6930</div> <div>7200</div>					<div>6950</div>				
NODULES, FLUOR, MAIN									
MRL; 45%; GRY TO DK GRY, SOFT TO BRITTLE, PYR INCLUS, NO VIS FRACT, MINOR CALC, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT					MRL; 40%; GRY TO DK GRY, SOFT TO BRITTLE, PYR INCLUS, NO VIS FRACT, MINOR CALC, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT				
MD 7599 TVD 7007.39 INC 86.47 AZ 88.47 VS 742.67					MD 7694 TVD 7010.68 INC 88.92 AZ 88.98 VS 863.34				
					MD 7789 TVD 7011.19 INC 90.46 AZ 90.04 VS 930.28				

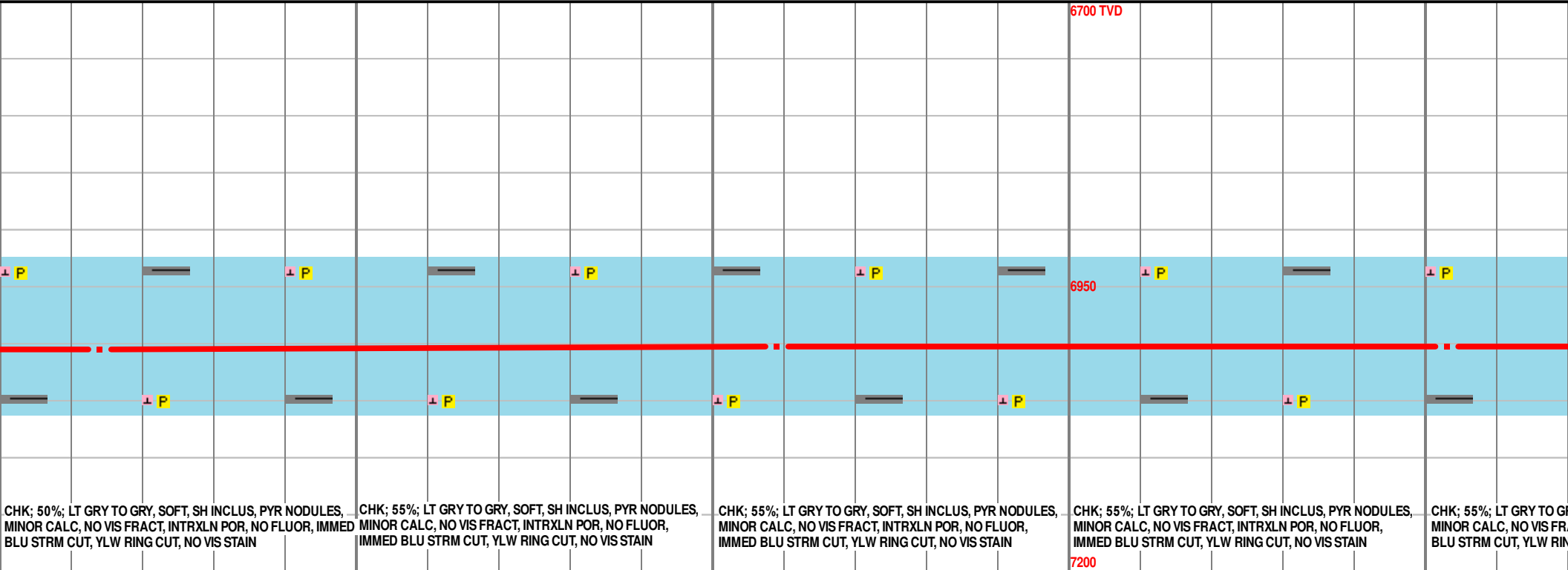
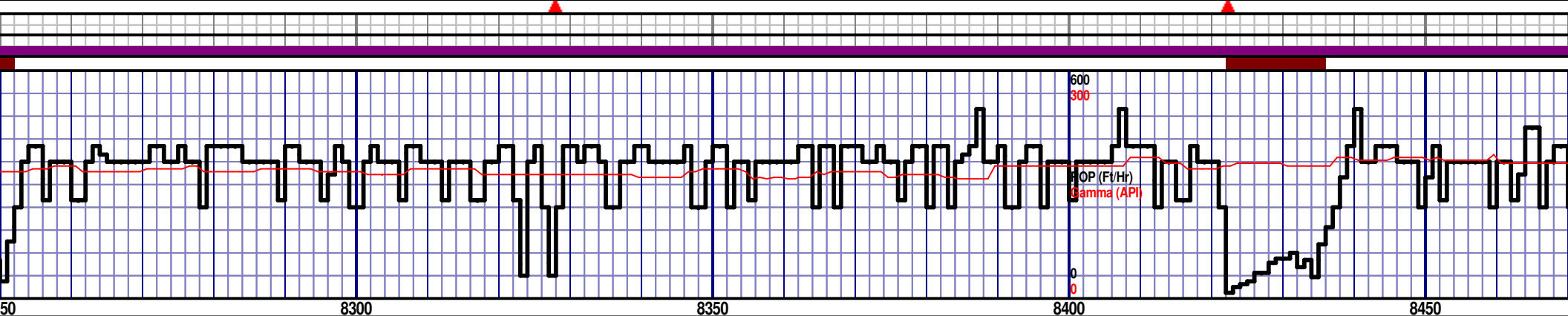
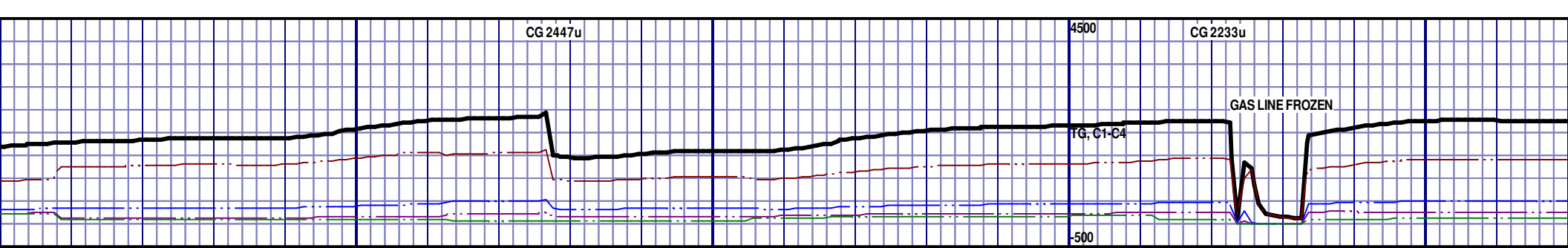




BRITTLE, PYR INCLUS, N POR, NO FLUOR, IT  
CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN  
CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN  
CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN  
CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

MD 8073 TVD 7004.93  
INC 90.52 AZ 90.7  
VS 1212.01

MD 8169 TVD 7004.95  
INC 89.45 AZ 91.23  
VS 1307.27



CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED  
BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED  
BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED  
BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED  
BLU STRM CUT, YLW RING CUT, NO VIS STAIN

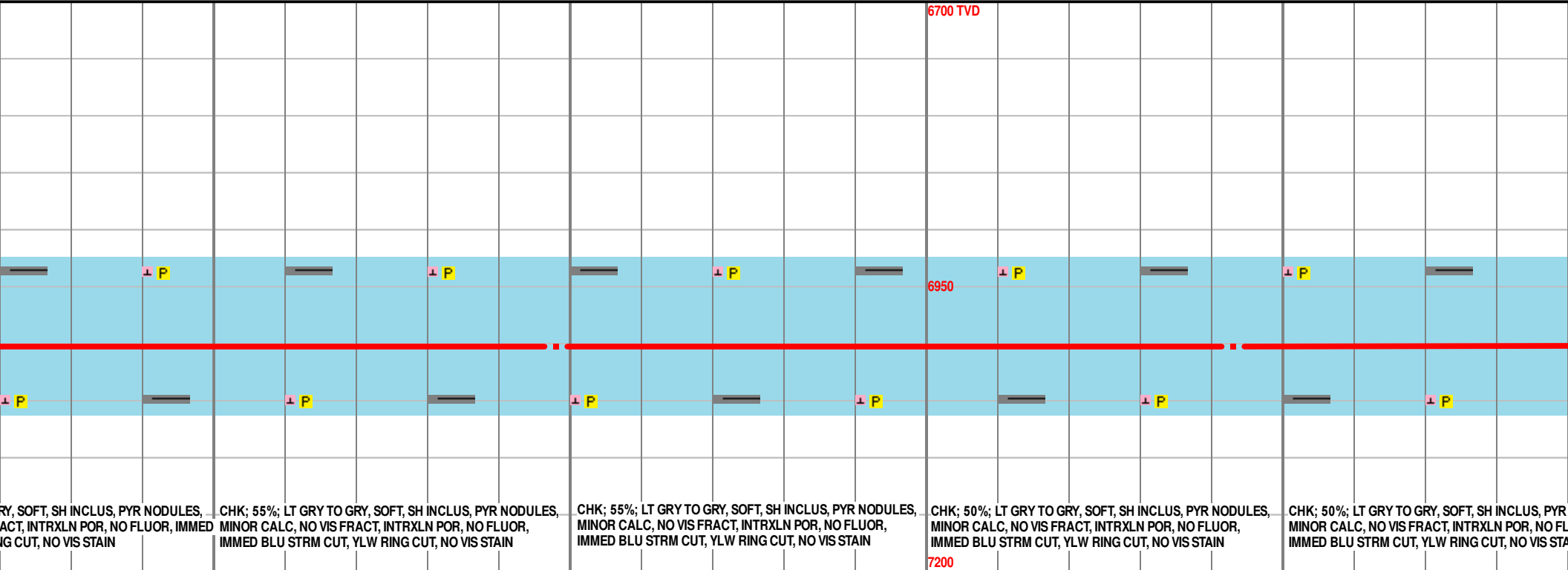
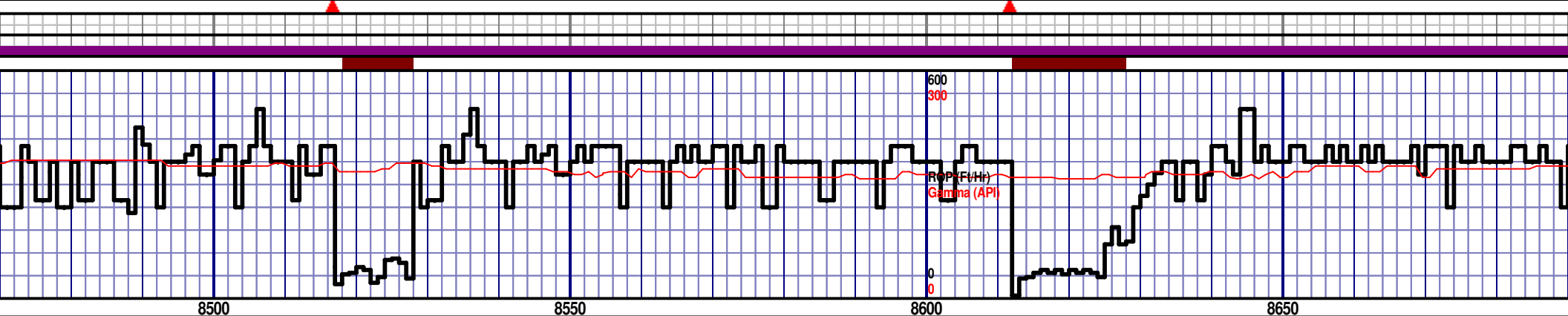
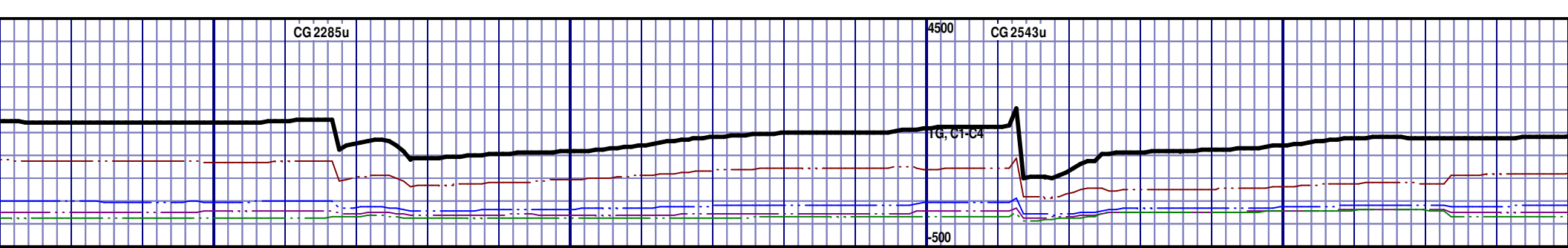
CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED  
BLU STRM CUT, YLW RING CUT, NO VIS STAIN

MD 8264 TVD 7004.72  
INC 90.83 AZ 91.33  
VS 1401.59

MD 8359 TVD 7003.03  
INC 91.2 AZ 90.75  
VS 1495.86

MD 8453 TVD 7002.1  
INC 89.91 AZ 90.91  
VS 1589.1





RY, SOFT, SH INCLUS, PYR NODULES,  
ACT, INTRXLN POR, NO FLUOR, IMMED  
NG CUT, NO VIS STAIN

CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

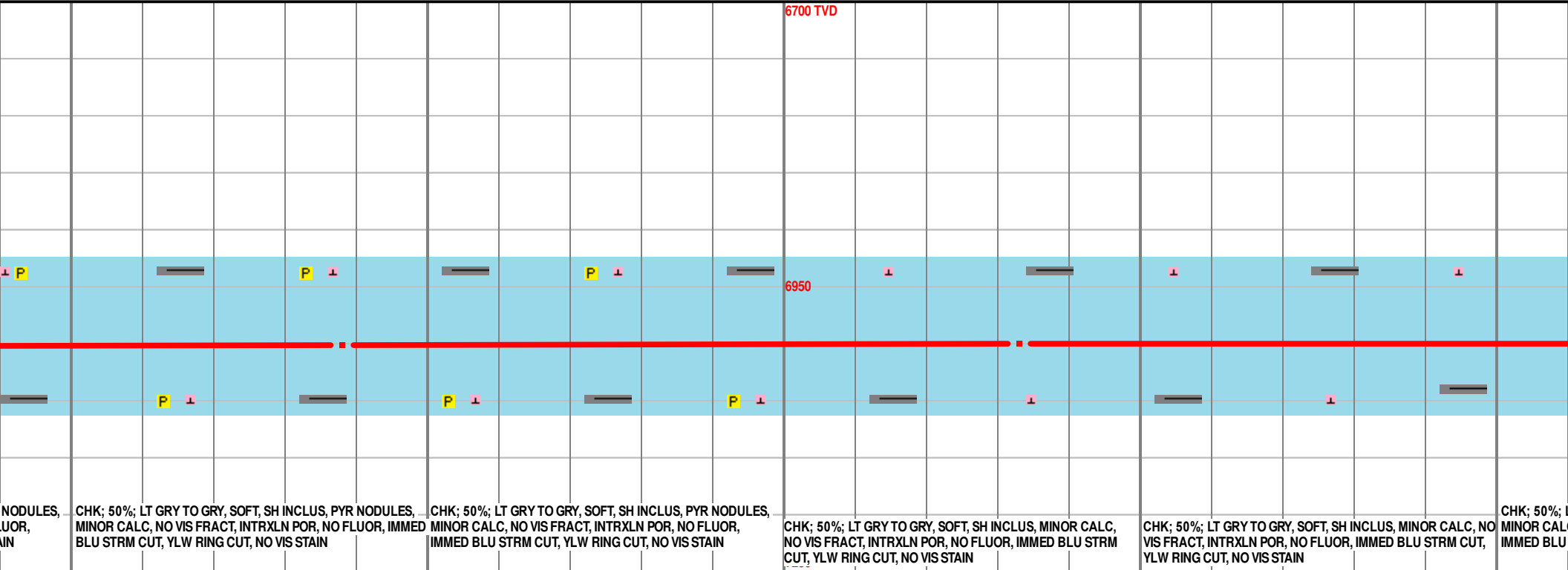
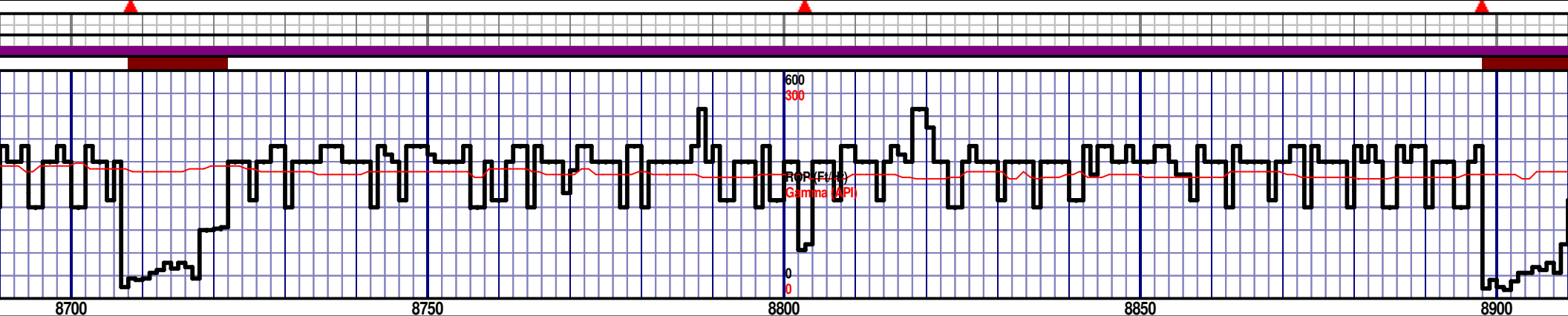
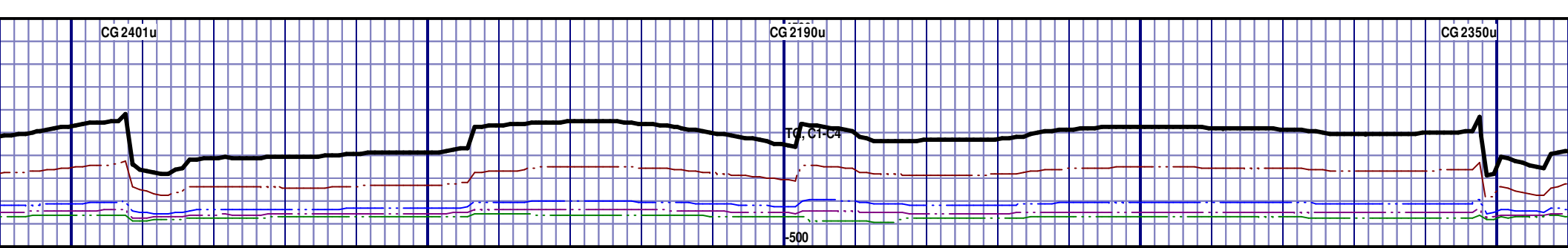
CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

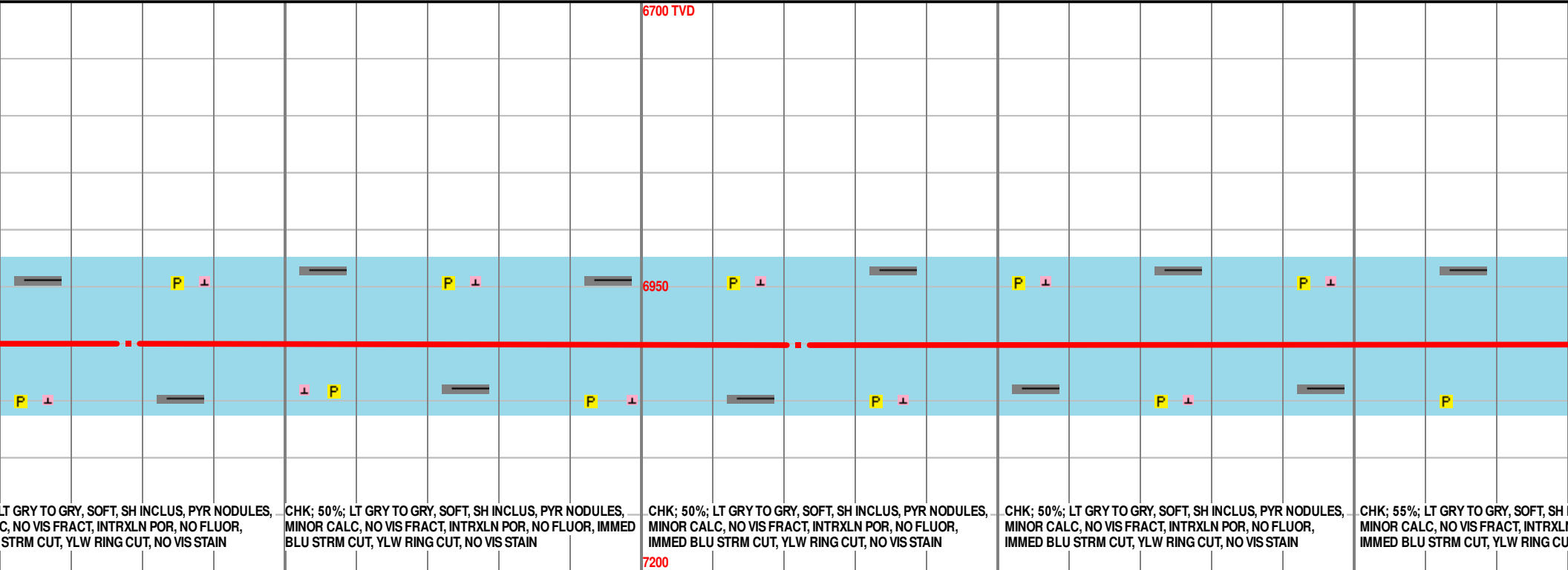
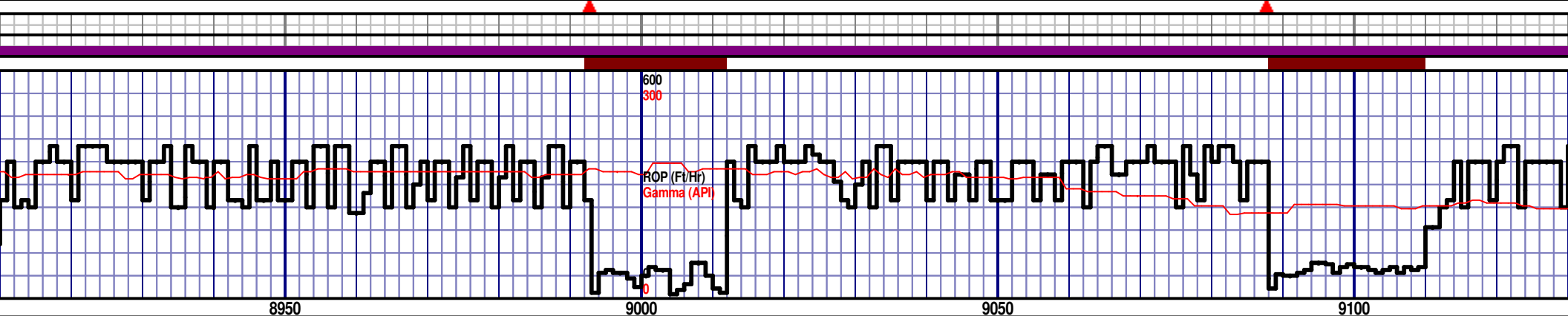
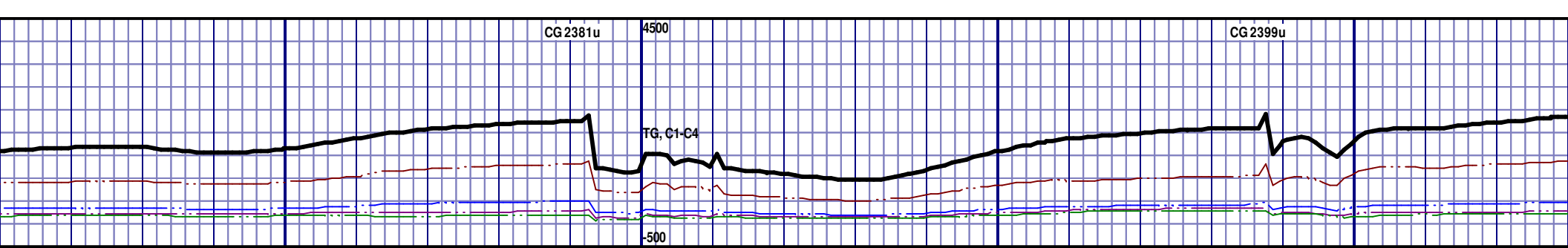
MD 8548 TVD 7002.3  
INC 89.88 AZ 90.87  
VS 1683.35

MD 8643 TVD 7002.45  
INC 89.94 AZ 91.29  
VS 1777.64



MD 8738 TVD 7001.64  
INC 91.05 AZ 91.1  
VS 1871.92

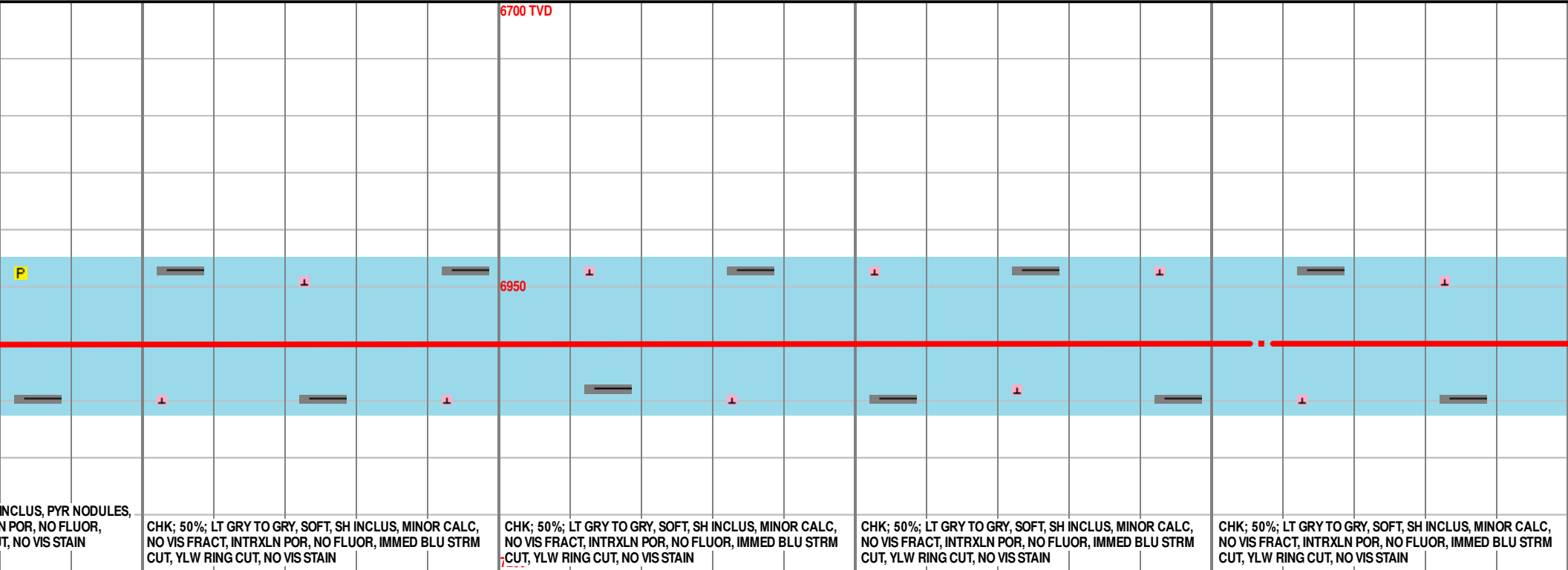
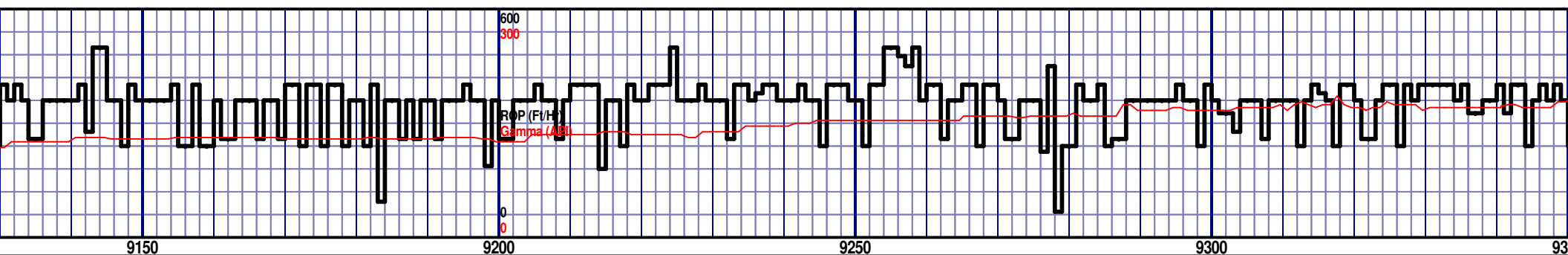
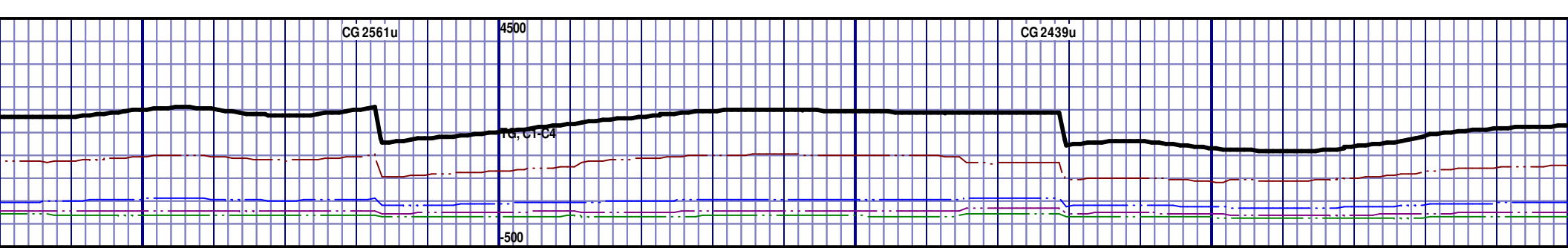
MD 8833 TVD 7000.45  
INC 90.37 AZ 90.24  
VS 1966.14



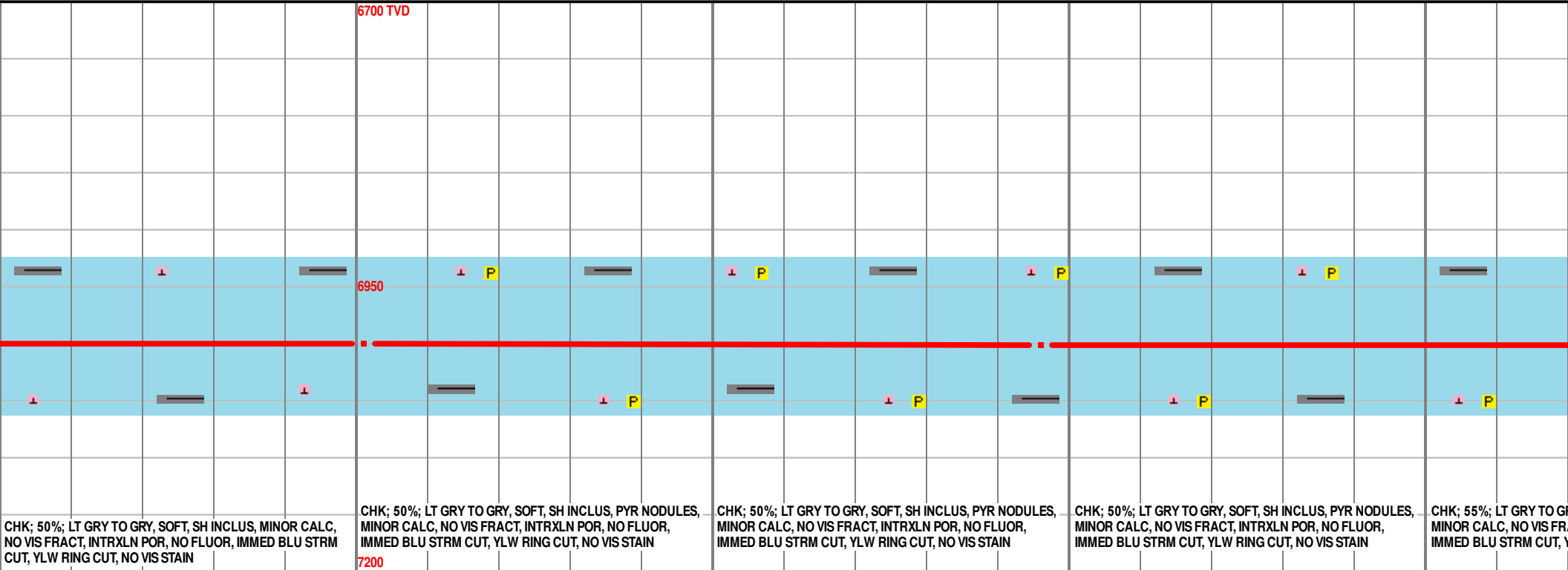
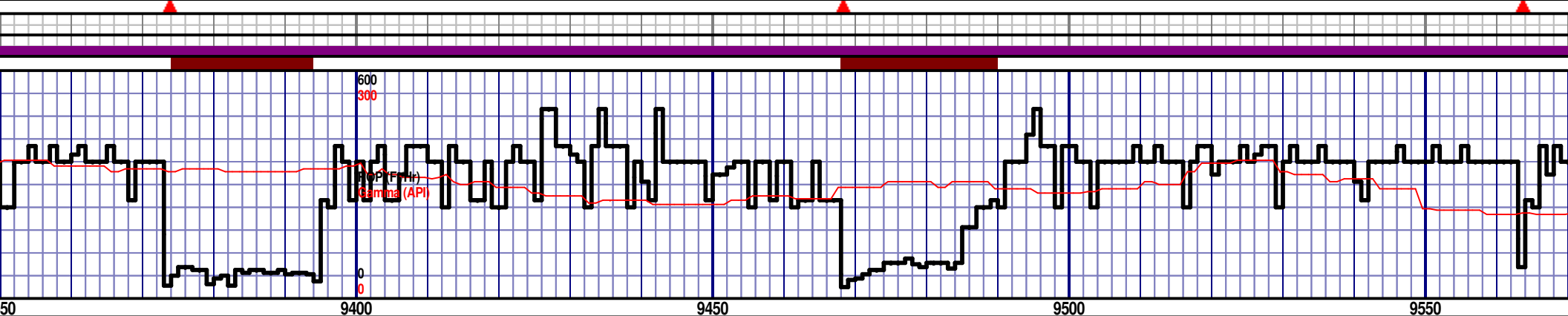
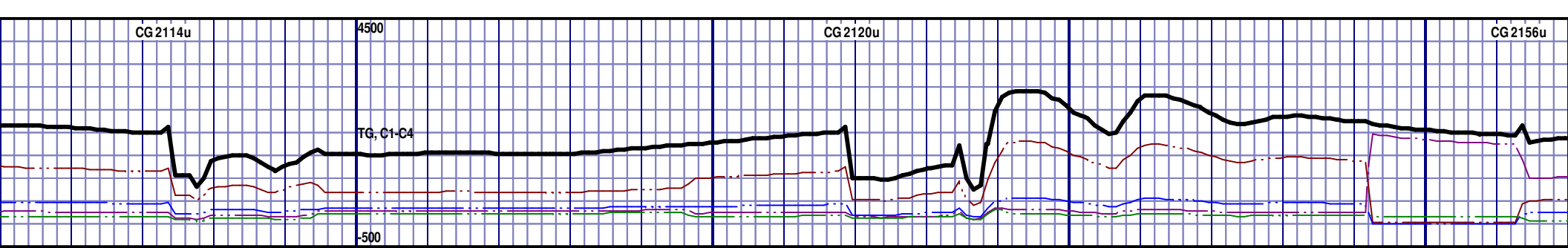
LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

MD 8928 TVD 6999.97  
INC 90.22 AZ 89.72  
VS 2060.19

MD 9022 TVD 7000.95  
INC 88.58 AZ 90.24  
VS 2153.24



MD 9307 TVD 7000.33  
INC 90.37 AZ 89.14  
VS2435.7



CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, MINOR CALC,  
NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM  
CUT, YLW RING CUT, NO VIS STAIN

CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

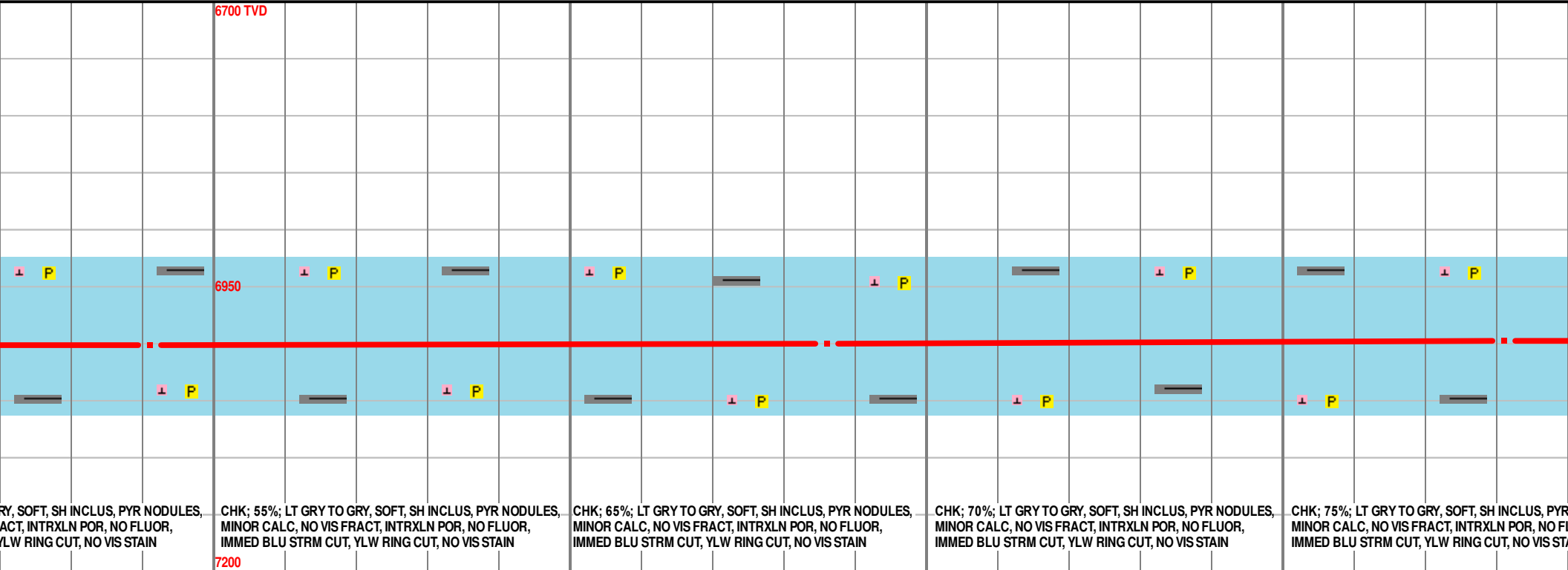
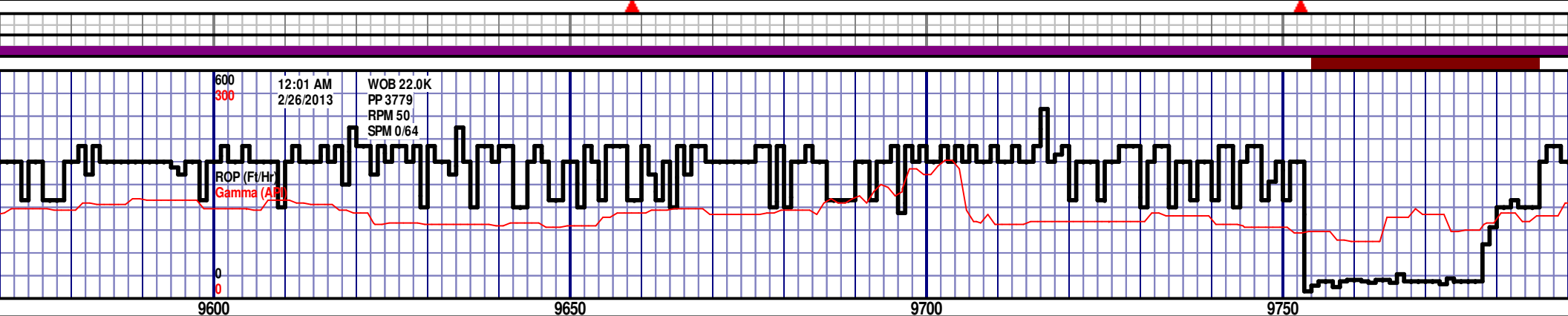
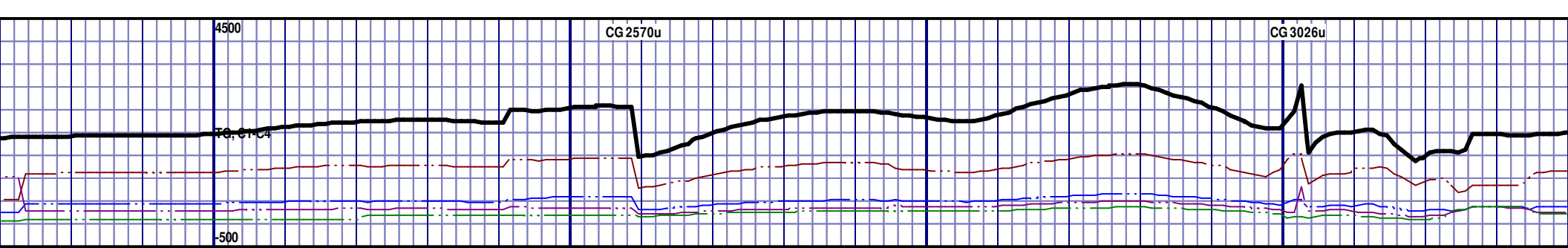
CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

MD 9401 TVD 7000.51  
INC 89.41 AZ 90.35  
VS 2528.7

MD 9496 TVD 7000.89  
INC 90.12 AZ 90.85  
VS 2622.89



RY, SOFT, SH INCLUS, PYR NODULES,  
ACT, INTRXLN POR, NO FLUOR,  
YLW RING CUT, NO VIS STAIN

CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 65%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 70%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

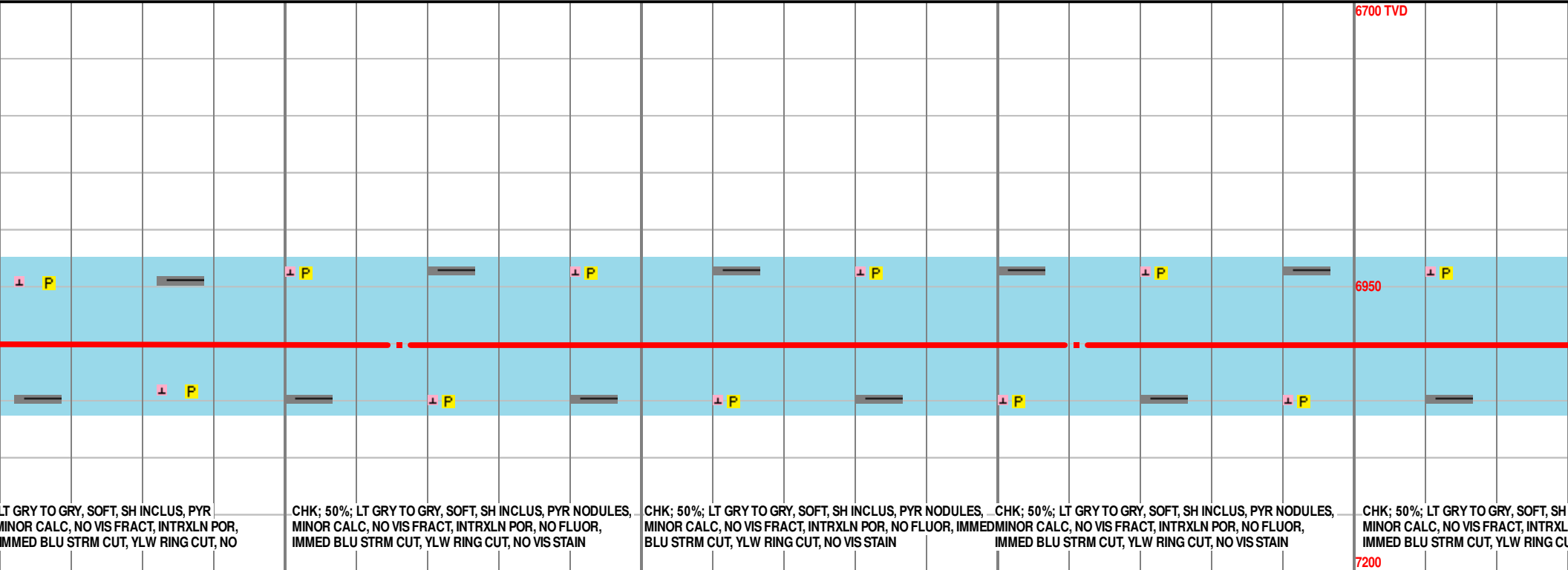
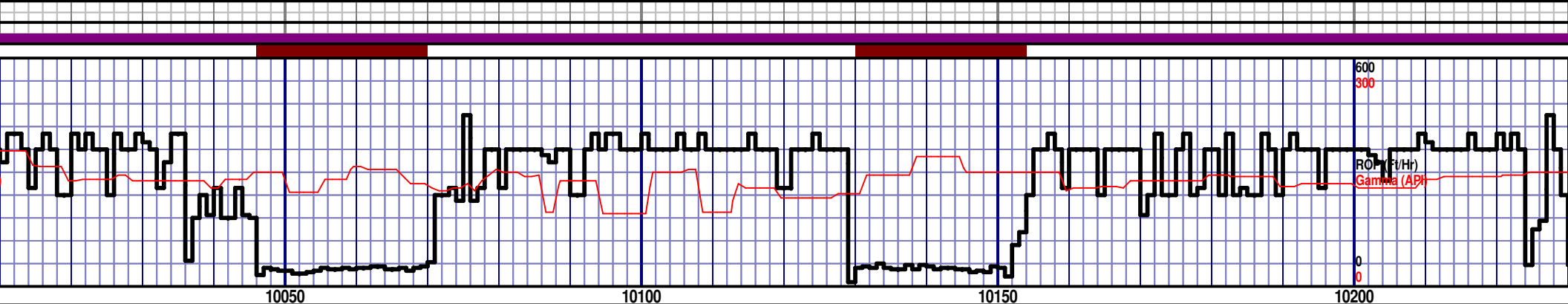
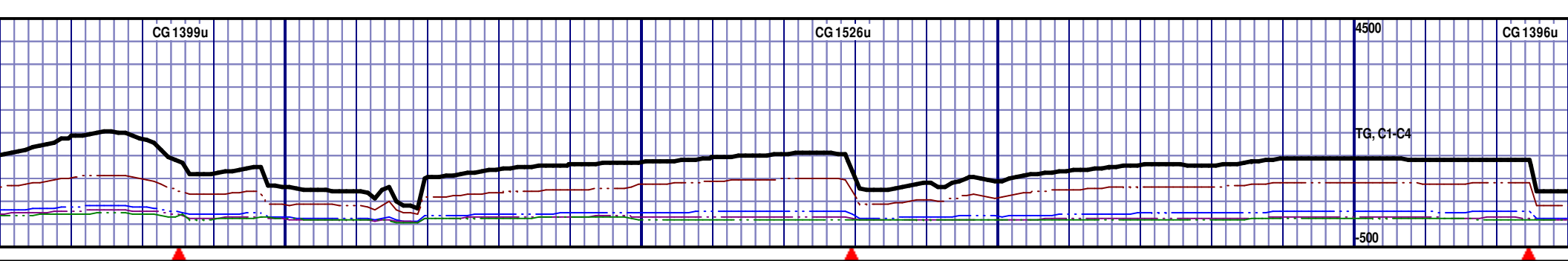
CHK; 75%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

MD 9591 TVD 7000.74  
INC 90.06 AZ 90.57  
VS 2717.1

MD 9686 TVD 6999.72  
INC 91.17 AZ 89.23  
VS 2811.12

MD 9781 TVD 6999.72  
INC 90.77 AZ 89.23  
VS 2905.24





LT GRY TO GRY, SOFT, SH INCLUS, PYR  
MINOR CALC, NO VIS FRACT, INTRXLN POR,  
IMMED BLU STRM CUT, YLW RING CUT, NO

CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED  
BLU STRM CUT, YLW RING CUT, NO VIS STAIN

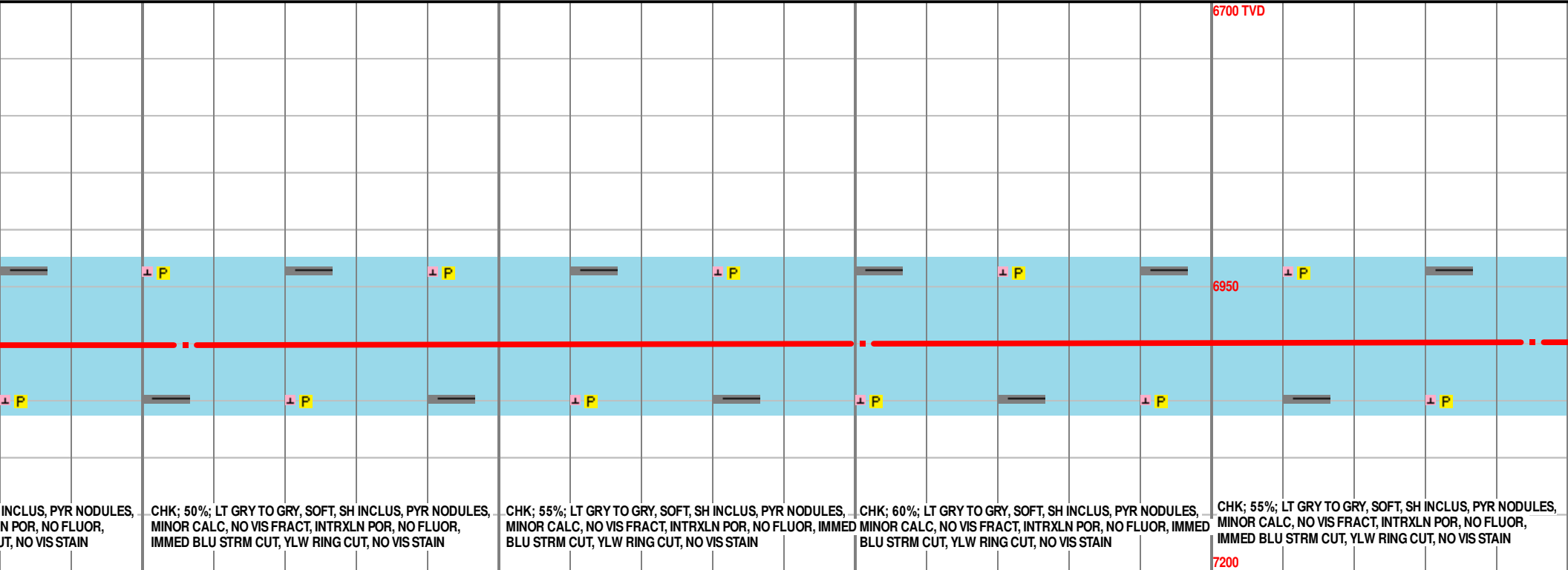
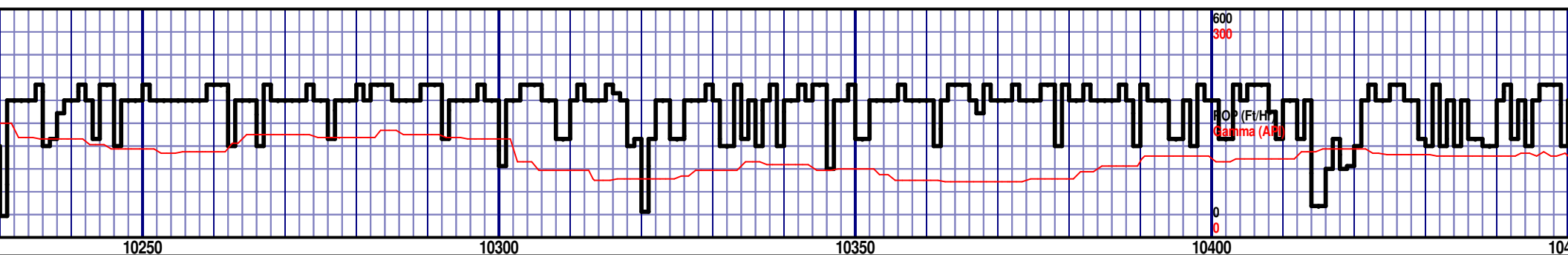
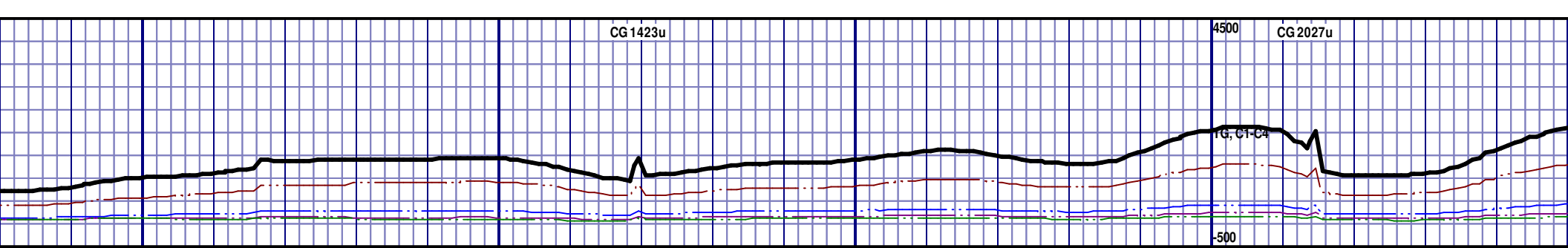
CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR,  
IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 50%; LT GRY TO GRY, SOFT, SH  
MINOR CALC, NO VIS FRACT, INTRXLN  
IMMED BLU STRM CUT, YLW RING CUT

MD 10066 TVD 7001.85  
INC 89.29 AZ 90.98  
VS 3187.85

MD 10161 TVD 7001.8  
INC 90.77 AZ 91.3  
VS 3282.15





INCLUS, PYR NODULES, N POR, NO FLUOR, UT, NO VIS STAIN

CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

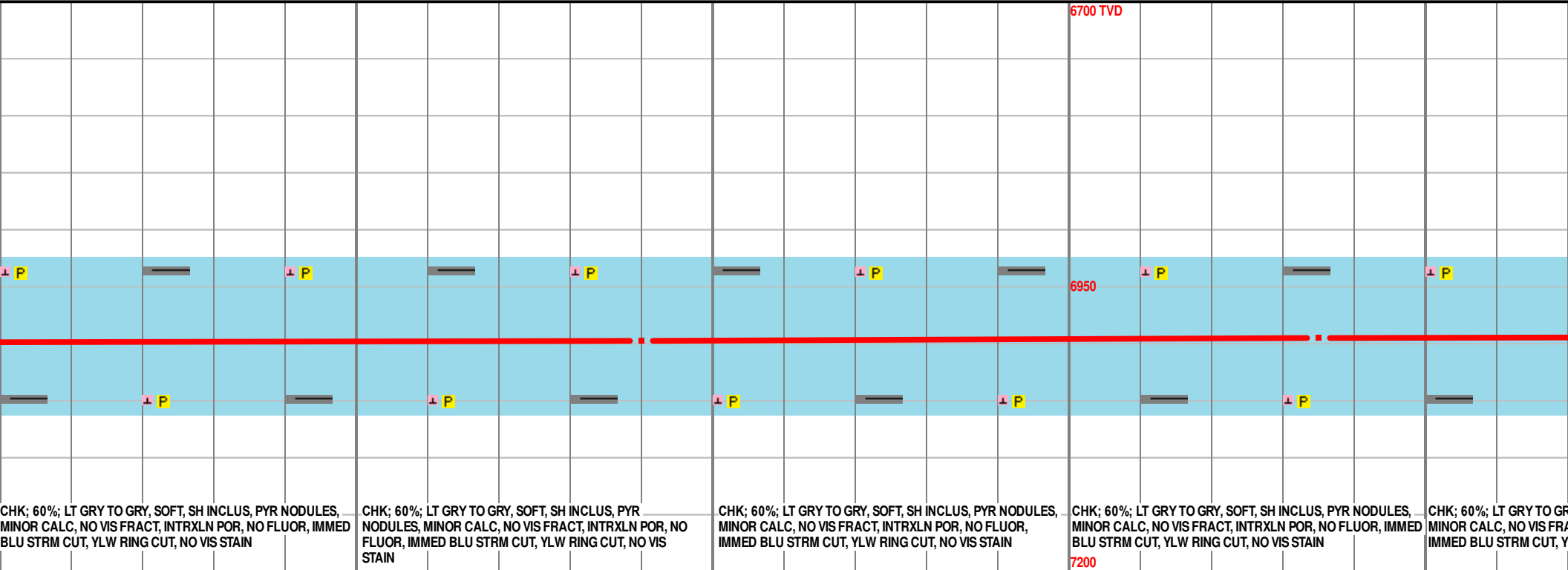
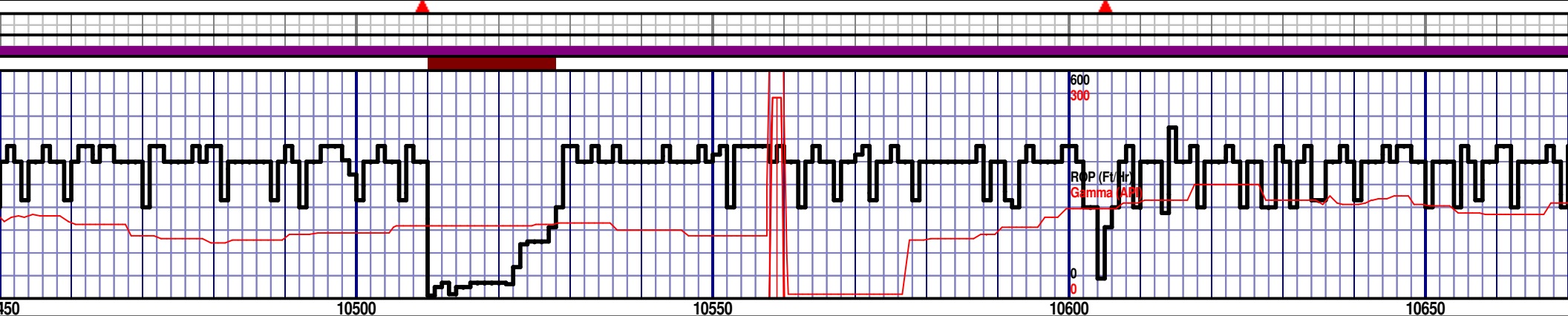
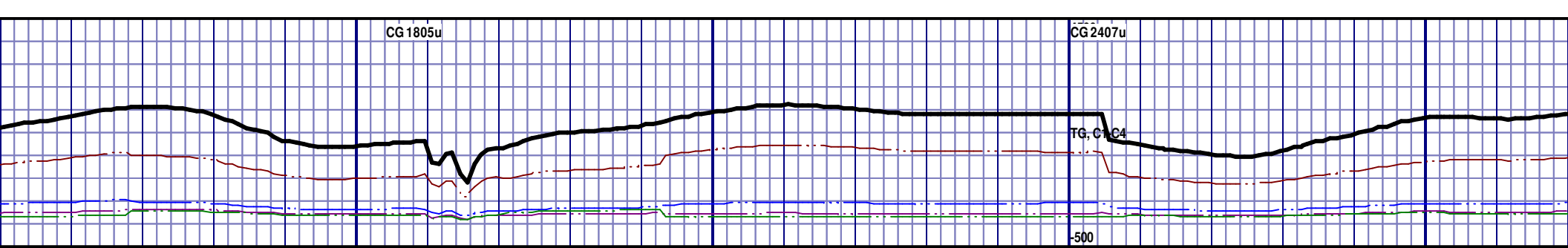
CHK; 60%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

MD 10256 TVD 7000.83  
INC 90.4 AZ 90.67  
VS 3376.42

MD 10351 TVD 7000.19  
INC 90.37 AZ 90.03  
VS 3470.55

MD 10456 TVD 7000.19  
INC 90.37 AZ 90.03  
VS 3470.55



CHK; 60%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED  
BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 60%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED  
BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 60%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED  
BLU STRM CUT, YLW RING CUT, NO VIS STAIN

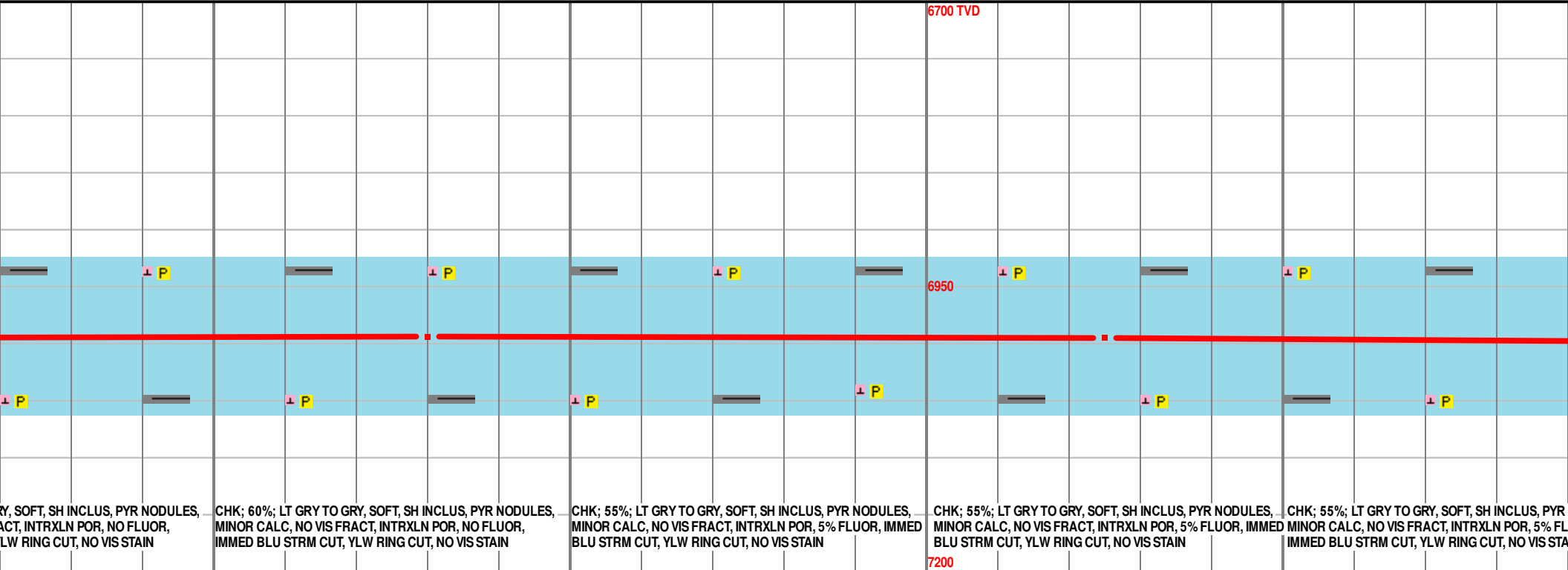
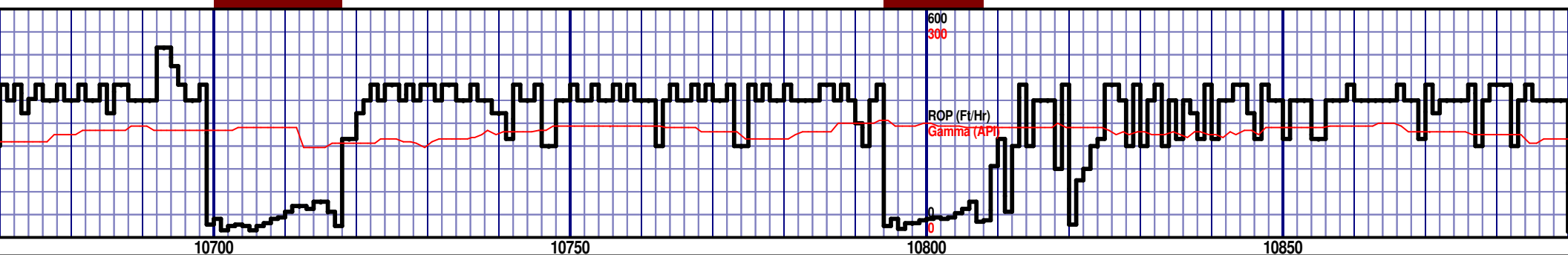
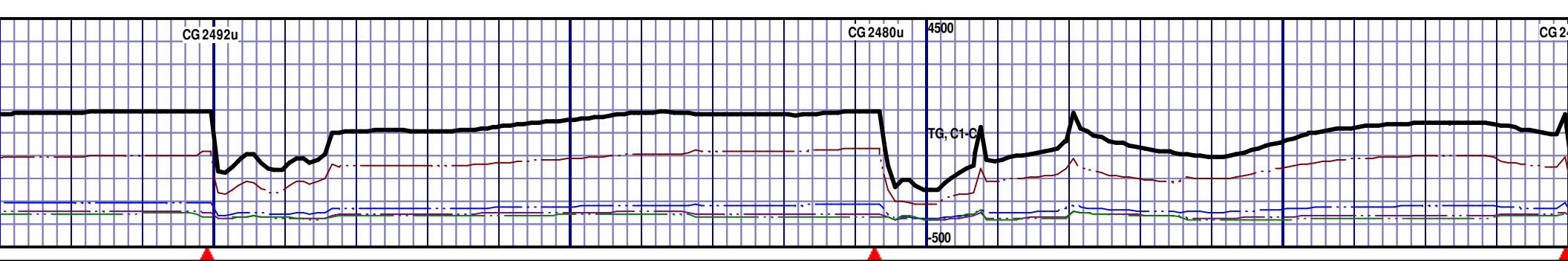
CHK; 60%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED  
BLU STRM CUT, YLW RING CUT, NO VIS STAIN

CHK; 60%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES,  
MINOR CALC, NO VIS FRACT, INTRXLN POR, NO FLUOR, IMMED  
BLU STRM CUT, YLW RING CUT, NO VIS STAIN

MD 10445 TVD 6998.98  
INC 90.86 AZ 89.45  
VS 3657.62

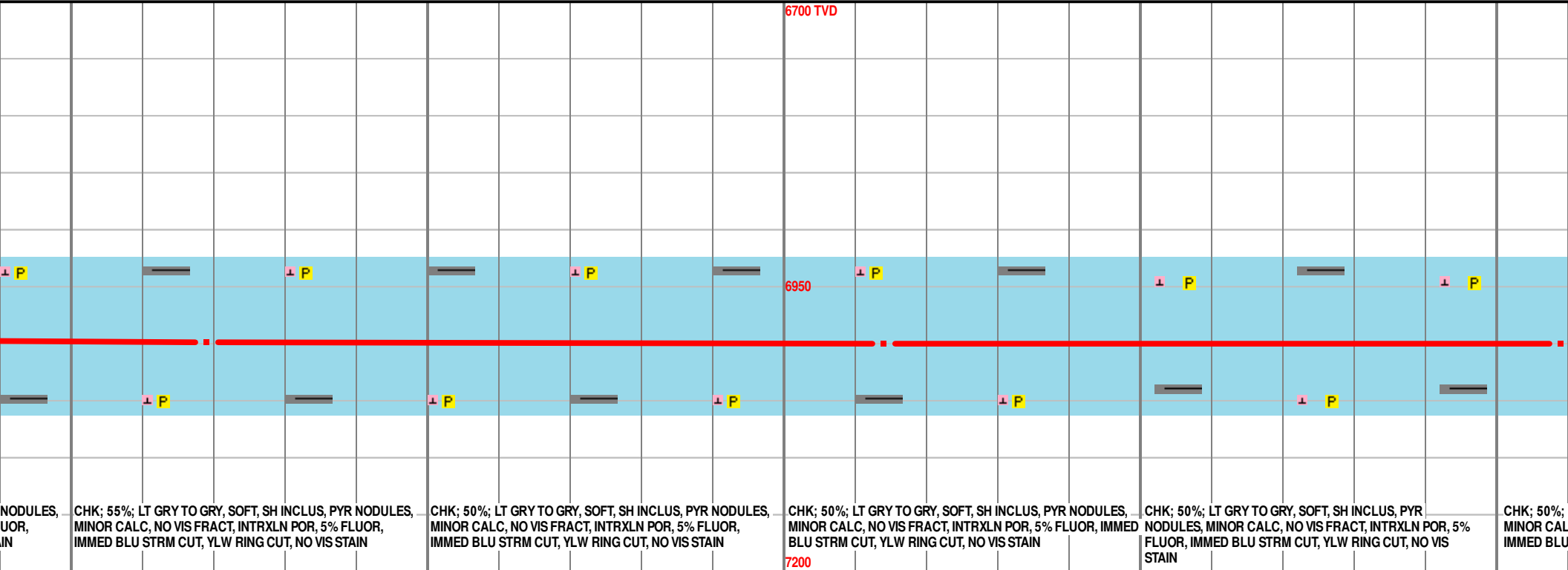
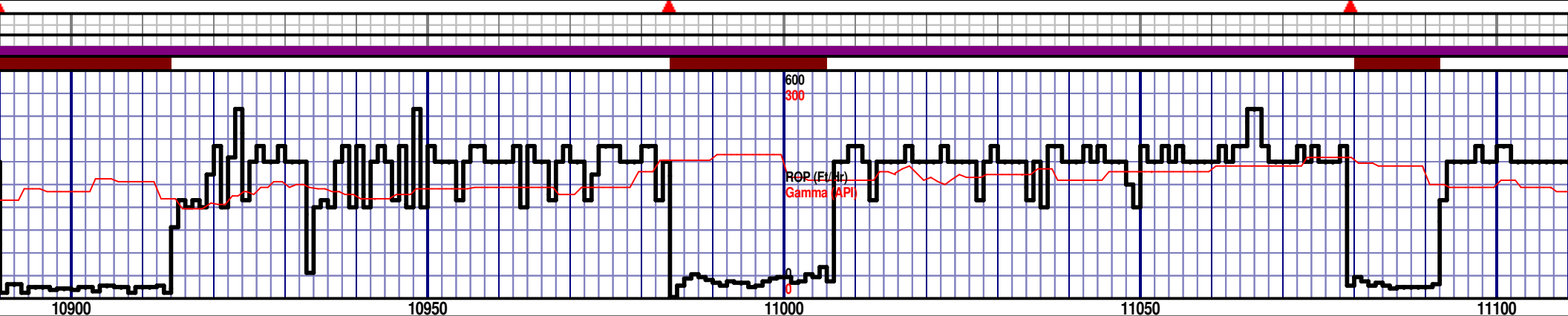
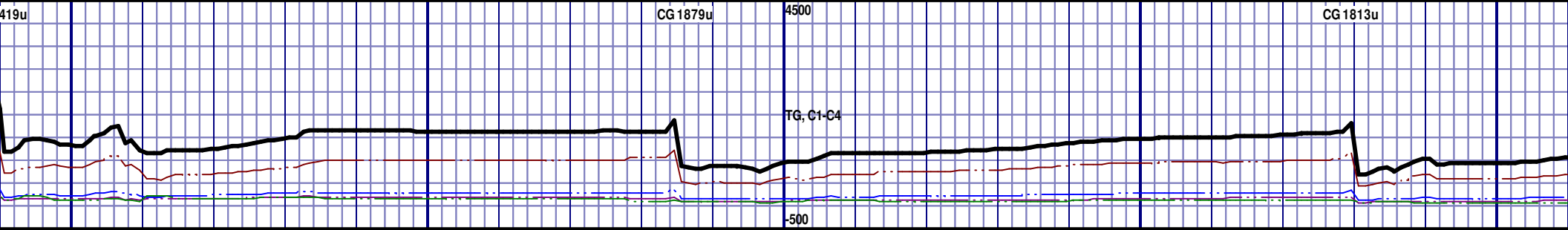
MD 10540 TVD 6997.35  
INC 90.86 AZ 90.86  
VS 3657.62

MD 10635 TVD 6995.35  
INC 91.54 AZ 89.61  
VS 3751.7



MD 10730 TVD 6993.69  
INC 90.46 AZ 90.51  
VS 3845.76

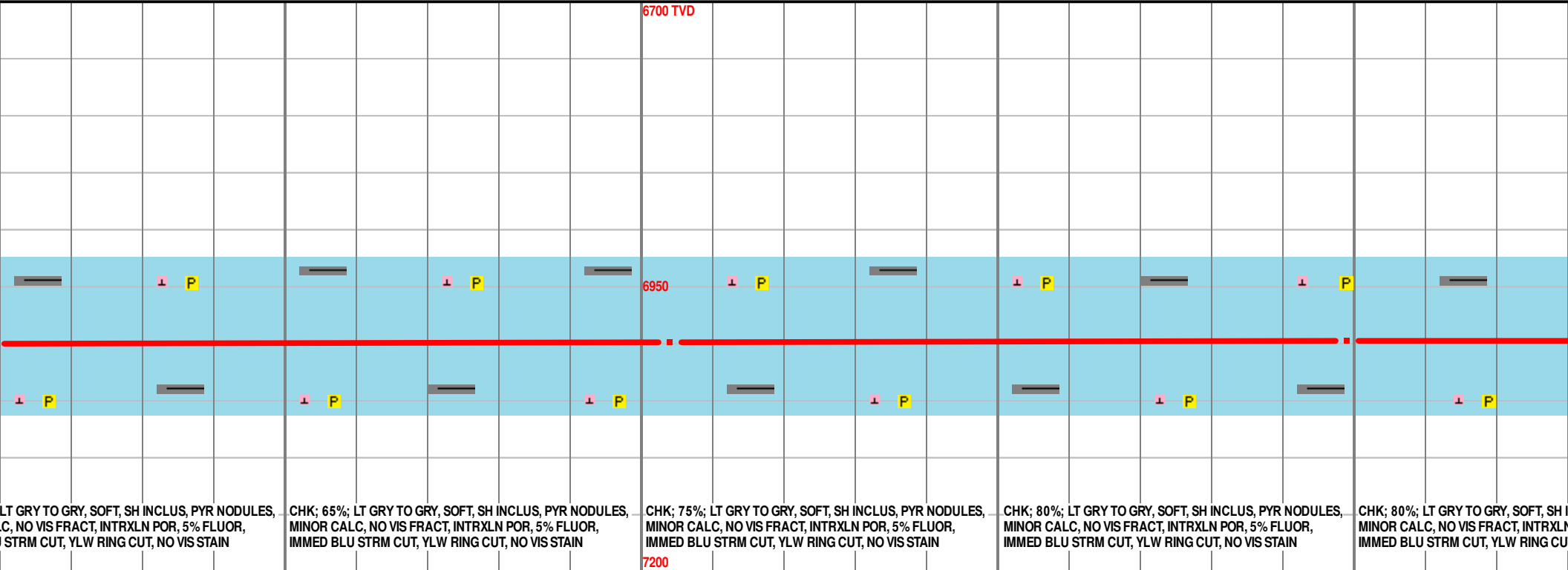
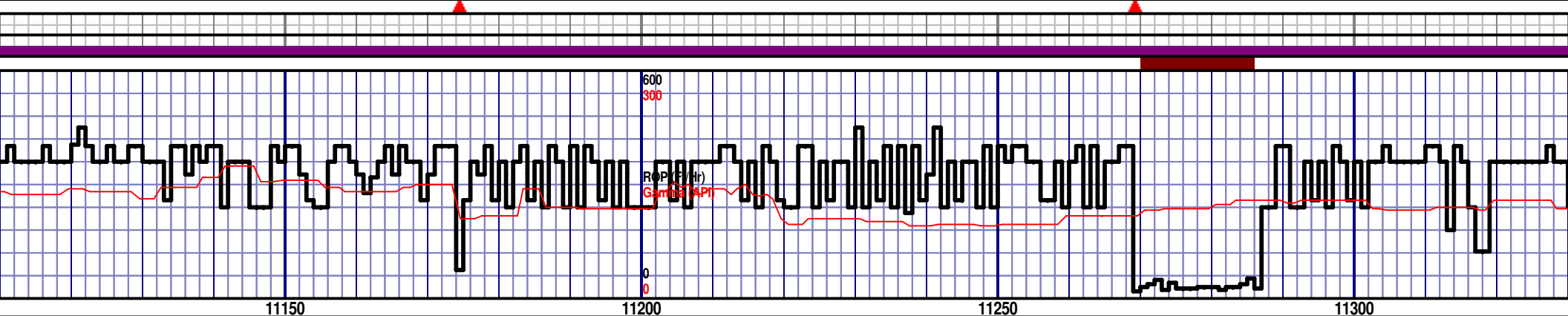
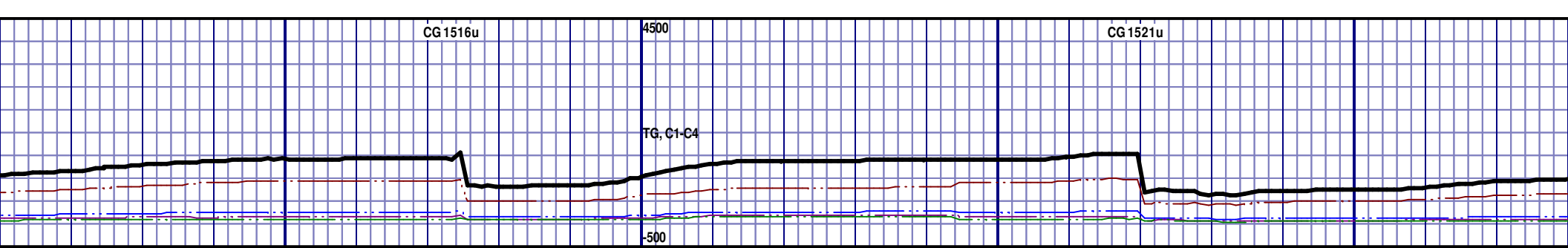
MD 10825 TVD 6995.45  
INC 87.56 AZ 88.46  
VS 3939.66



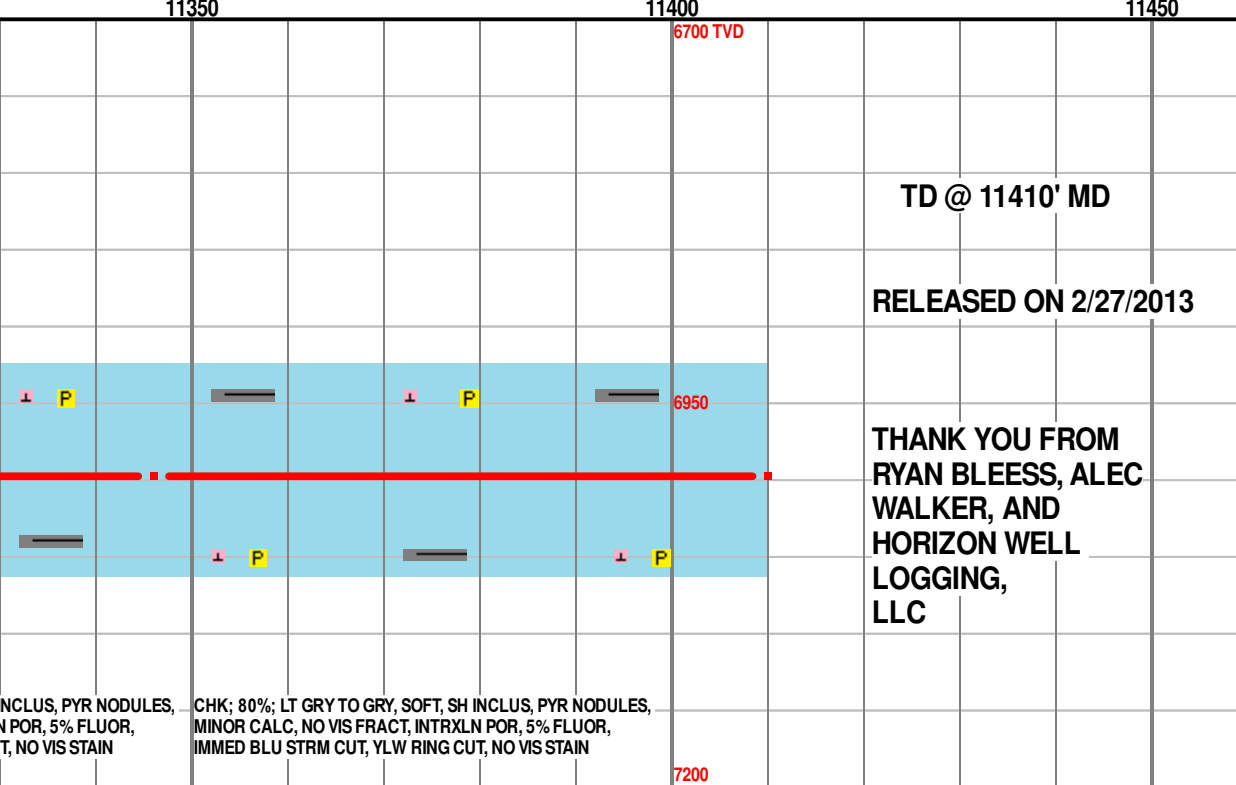
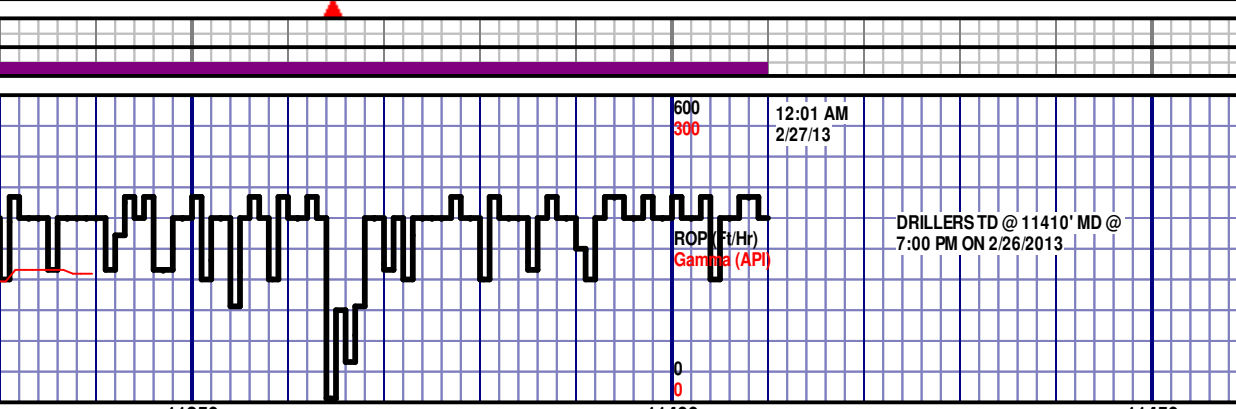
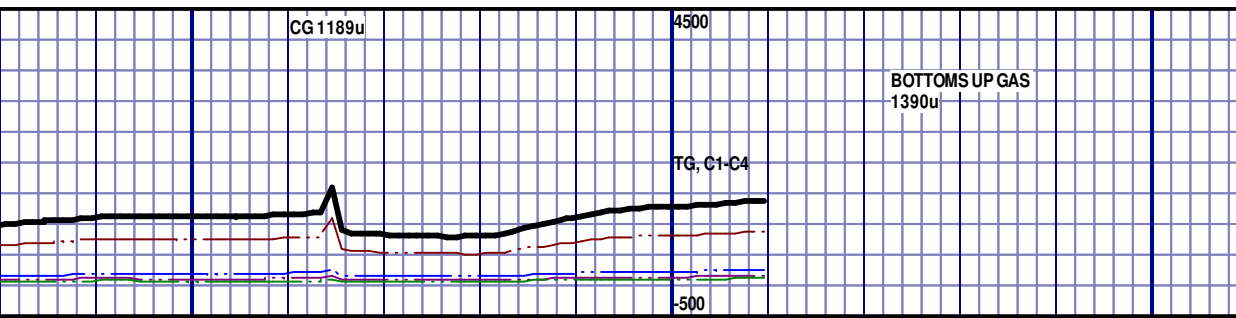
NODULES, UOR, IN  
CHK; 55%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, 5% FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN  
CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, 5% FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN  
CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, 5% FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN  
CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, 5% FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN  
CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, 5% FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN  
CHK; 50%; LT GRY TO GRY, SOFT, SH INCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, 5% FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

MD 10919 TVD 6998.42  
INC 88.67 AZ 90.02  
VS 4032.49

MD 11014 TVD 6999.56  
INC 89.94 AZ 90.91  
VS 4126.63



MD 11109 TVD 6999.52 INC 90.12 AZ 90.85 VS 4220.88	MD 11204 TVD 6998.46 INC 91.14 AZ 89.3 VS 4314.94	MD 11299 TVD 6997.74 INC 89.72 AZ 90.17 VS 4408.93
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NCLUS, PYR NODULES, MINOR CALC, NO VIS FRACT, INTRXLN POR, 5% FLUOR, IMMED BLU STRM CUT, YLW RING CUT, NO VIS STAIN

THANK YOU FROM  
RYAN BLEESS, ALEC  
WALKER, AND  
HORIZON WELL  
LOGGING,  
LLC