



7136 South Yale Avenue, Suite 414  
Tulsa, Oklahoma 74136-6378

phone 918.925.9739

fax 866.534.4559

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

### Customer Information

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

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

### Mud Logging Details

**Logger:** Joe Klumpstra &  
Sam Stelzer  
**Log Interval:** 6580' MD to 11987' MD  
**Start Date:** April 12, 2014  
**Release Date:** April 15, 2014

### Well Information

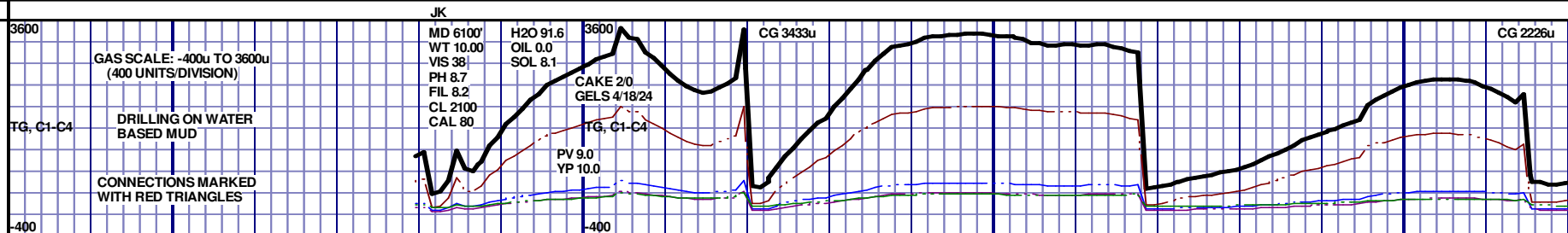
**Well Name:** Wells Ranch AE30-65-1HNC  
Horizontal

**Location:** 29-T6N-R62W  
1978' FSL, 65' FWL

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

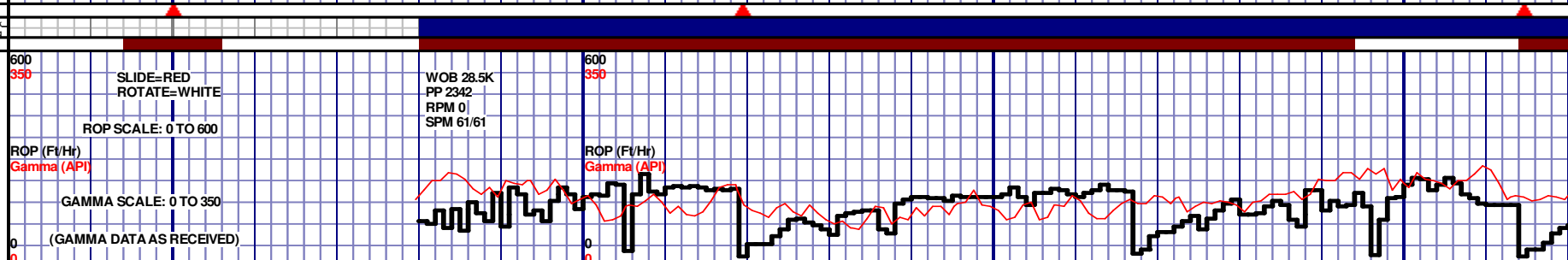
**Drilling Rig:** H&P 321  
**Total Depth:** 11987' MD  
**TD Date:** April 15, 2014  
**Formation:** Niobrara C Chalk  
**KB Elevation:** 4787'  
**GR Elevation:** 4757'  
**API Number:** 05-123-38646-0000

1 (units) ———  
 2 (units) ———  
 3 (units) ———  
 4 (units) ———



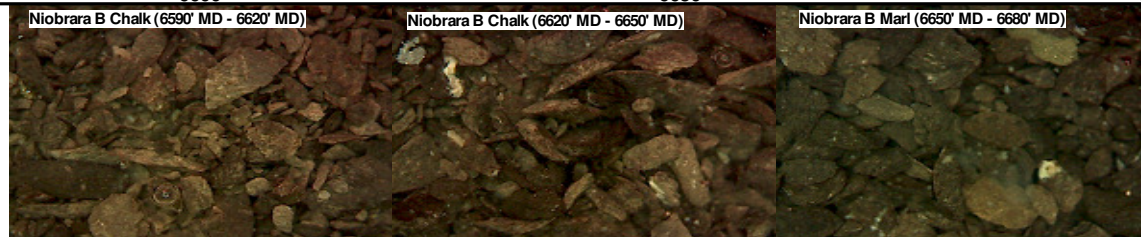
**Slide/Rotate**

OP (Ft/Hr) \_\_\_\_\_  
gamma (API) \_\_\_\_\_

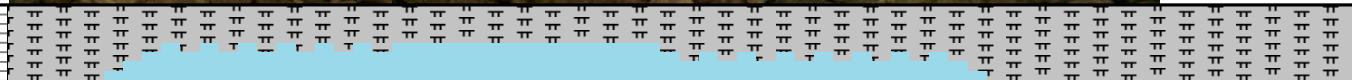


## Depth

## Photographs



Lithology %



6400 TVD  
NOBLE ENERGY  
WELLS RANCH  
AE30-65-1HNC  
HORIZONTAL  
29-T6N-R62W  
1978' FSL, 65' FWL  
WELD COUNTY, CO  
LOGGERS:  
JOE KLUMPSTRA  
SAM STELZER

6650

H&amp;P 321

COMMENCED LOGGING @ 6580' MD ON  
4/12/2014 W/BIT #2 8.75" SMITH SDi519 HPX S/N  
JJ1355. IN @ 5914' MD

**NIOBRARA B CHALK**  
6596' MD 6493' TVD

**NIOBRARA B MARL**  
6662' MD 6526' TVD

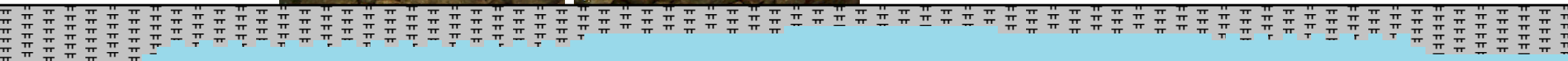
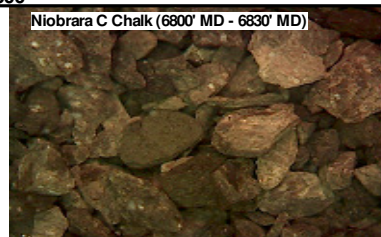
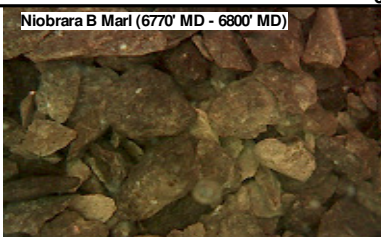
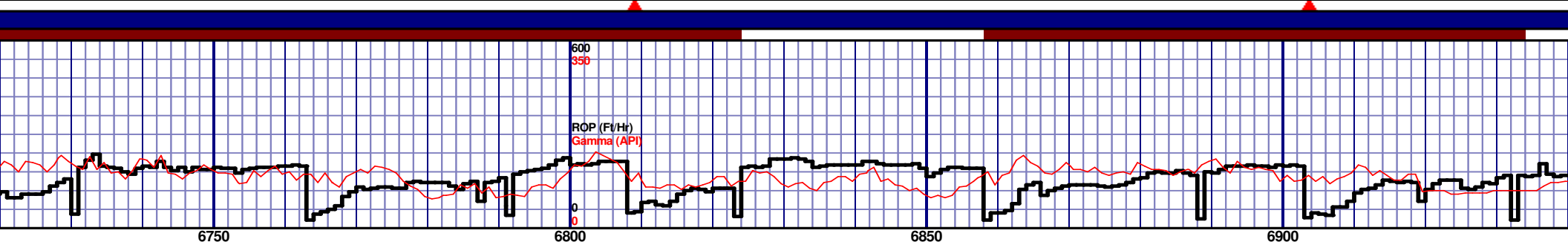
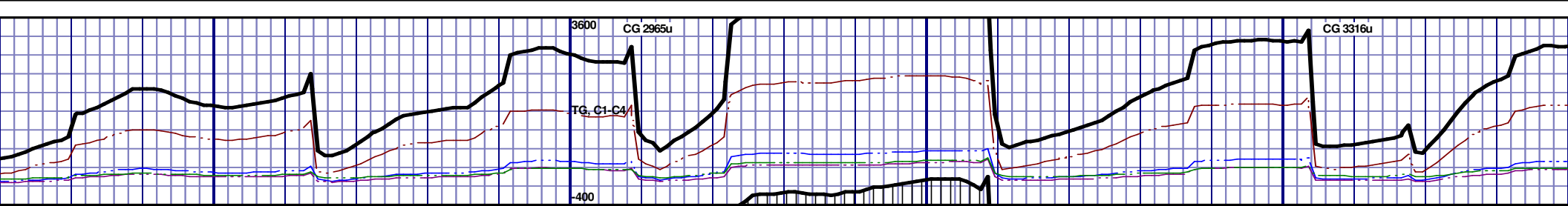
### Well Bore Cross Section

## Survey Data

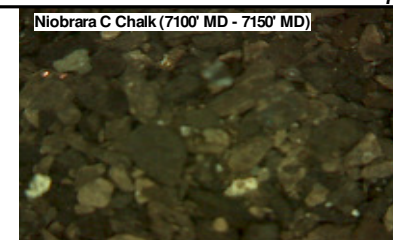
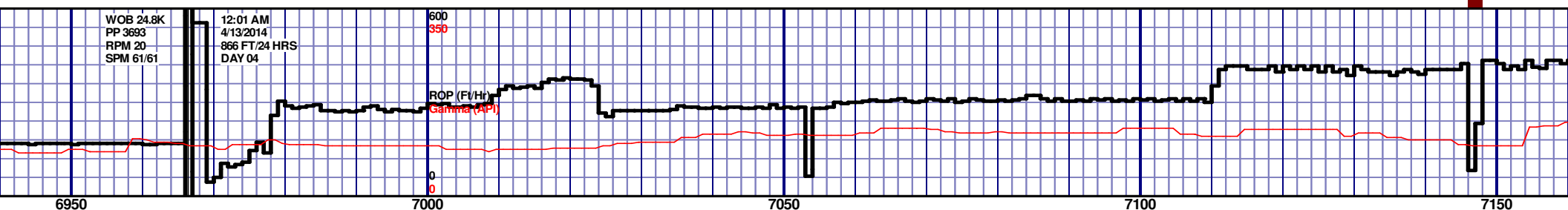
MD 6613 TVD 6502.81  
INC 56.97 AZ 268.86  
VS 465.98

MD 6660 TVD 6525.36  
INC 65.63 AZ 267.54  
VS 507.09

MD 6708 TVD 63  
INC 71.52 AZ 26  
VS 551.62



NIOBRARA C CHALK 6802' MD 6568' TVD							
6750-6770': MRST: 80% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, IMBD PYR, FREE BENT, TRC FREE CALC, 20% FREE CHK, NO STN, 15% FLOR, NO O FLOR, IMMG CUT, BRIYL RNG	6770'-6770': MRST: 55% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, IMBD PYR, FREE BENT, TRC FREE CALC, IMBD CALC, 45% FREE CHK, NO STN, 15% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG	6770'-6800': MRST: 55% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, IMBD PYR, FREE BENT, TRC FREE CALC, IMBD CALC, 45% FREE CHK, NO STN, 15% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG	6800'-6830': CHK: 60% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD CALC, IMBD PYR, 40% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG	6830'-6860': CHK: 70% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD CALC, IMBD PYR, 30% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG	6860'-6890': CHK: 60% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD CALC, IMBD PYR, 40% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG	6890'-6920': CHK: 55% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD CALC, IMBD PYR, 45% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG	6920'-6950': MRST: 70% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, IMBD PYR, FREE BENT, TRC FREE CALC, IMBD CALC, 30% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG



TOOH @ 4:00 PM ON 04/12/14 @ 6966' MD FOR  
INTERMEDIATE CASING OPERATIONS. TIH @ 1:45  
PM ON 04/13/14. RESUMED DRILLING @ 6:00 PM  
ON 04/13/14 W/ BIT #3 6.125" SMITH SDI513UBPX  
S/N JH1356 IN @ 6966' MD

6400 TVD

6650

6900

MD 6992 TVD 6586.59  
INC 90.31 AZ 267.1  
VS 830.21

6950'-7000': CHK: 70% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD  
CALC, IMBD PYR, 30% FREE MRL, NO STN, 5% FLOR, NO O  
FLOR, IMMED STRMG CUT. BRIYL RNG

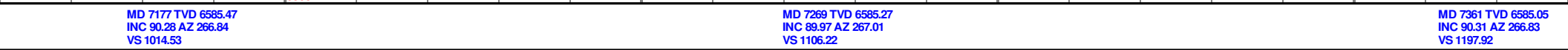
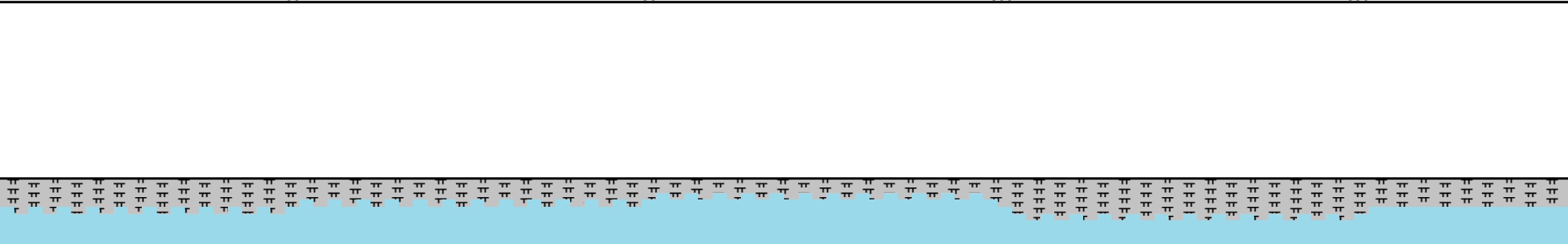
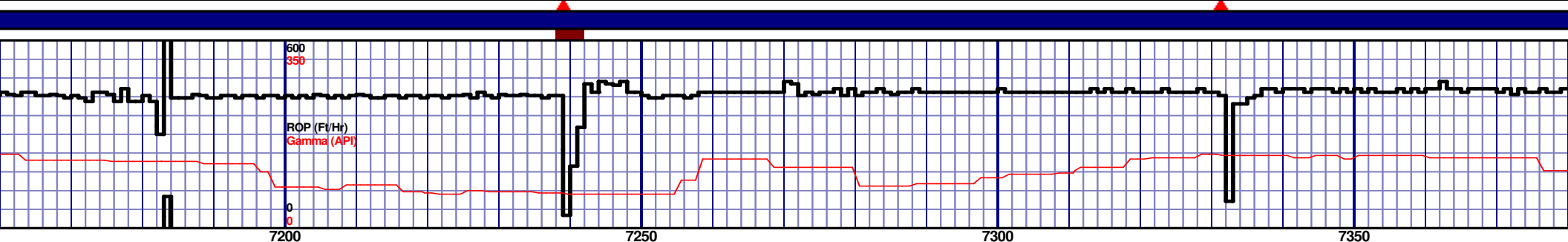
7000'-7050': MRST: 70% MEDDRKGY - MEDLTGY, BLKY TO  
SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD PYR, FREE  
BENT, TRC FREE CALC, IMBD CALC, 30% FREE CHK, NO STN,  
5% FLOR. NO Q FLOR. IMMED STRMG CUT. BRIYL RNG

7050'-7100': MRST: 70% MEDDRKGY - MEDLTGY, BLKY TO  
SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD PYR, FREE  
BENT, TRC FREE CALC, IMBD CALC, 30% FREE CHK, NO STN,  
5% FLOR. NO O FLOR. IMMED STRMG CUT. BRIYL RNG

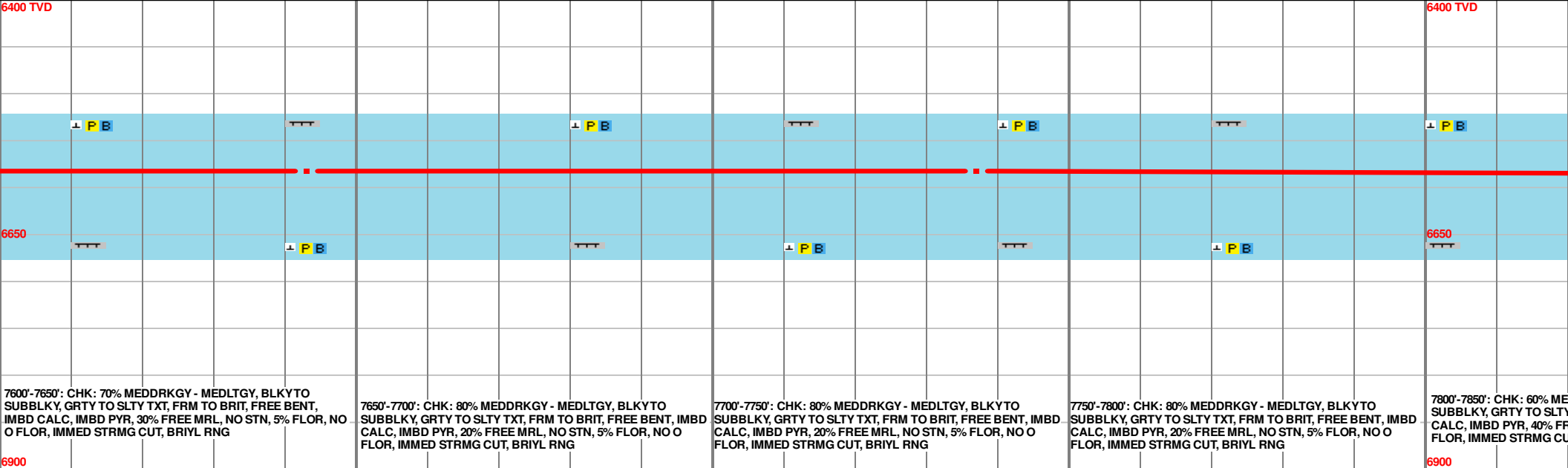
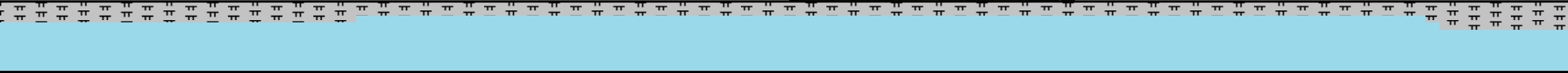
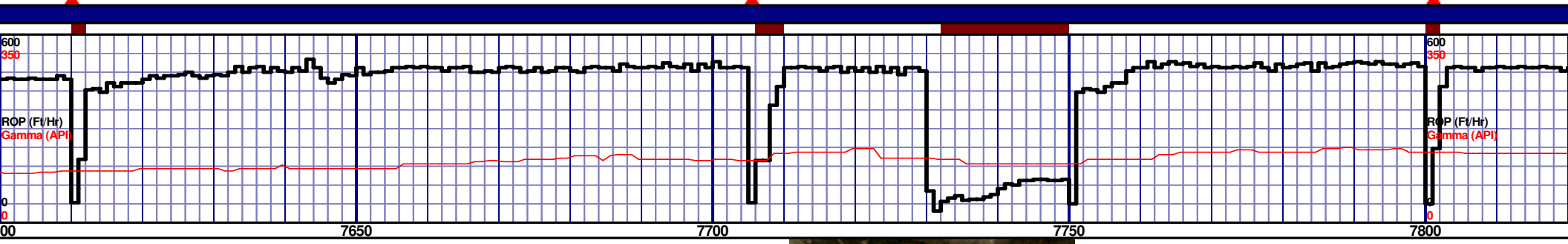
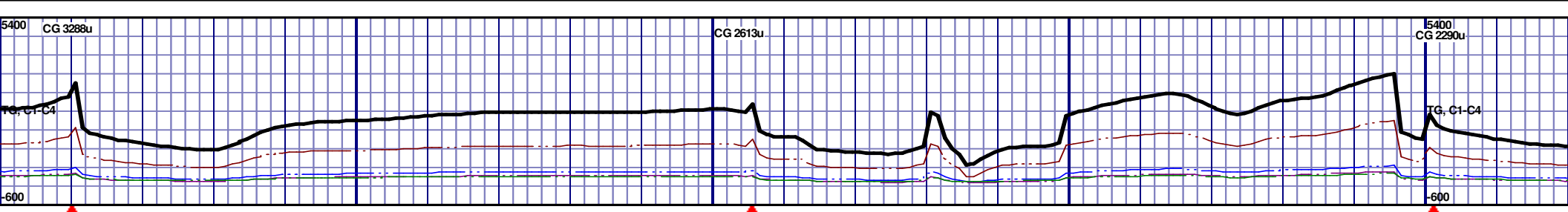
7100'-7150': CHK: 65% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT,  
IMBD CALC, IMBD PYR, 35% FREE MRL, NO STN, 5% FLOR,  
NO O FLOR. IMMED STRMG CUT. BRIYL RNG

7150'-7200': C  
SUBBLKY, G  
IMBD CALC  
O FLOR. IMM

MD 7085 TVD 6586.02  
INC 90.4 AZ 266.41  
VS 922.88







7600'-7650': CHK: 70% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT,  
IMBD CALC, IMBD PYR, 30% FREE MRL, NO STN, 5% FLOR, NO O  
FLOR, IMMED STRMG CUT, BRIYL RNG

7650'-7700': CHK: 80% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD  
CALC, IMBD PYR, 20% FREE MRL, NO STN, 5% FLOR, NO O  
FLOR, IMMED STRMG CUT, BRIYL RNG

7700'-7750': CHK: 80% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD  
CALC, IMBD PYR, 20% FREE MRL, NO STN, 5% FLOR, NO O  
FLOR, IMMED STRMG CUT, BRIYL RNG

7750'-7800': CHK: 80% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD  
CALC, IMBD PYR, 20% FREE MRL, NO STN, 5% FLOR, NO O  
FLOR, IMMED STRMG CUT, BRIYL RNG

7800'-7850': CHK: 60% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD  
CALC, IMBD PYR, 40% FREE MRL, NO STN, 5% FLOR, NO O  
FLOR, IMMED STRMG CUT, BRIYL RNG

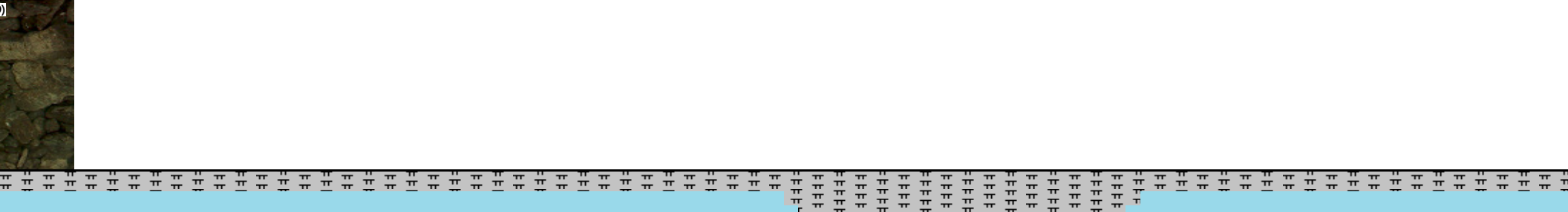
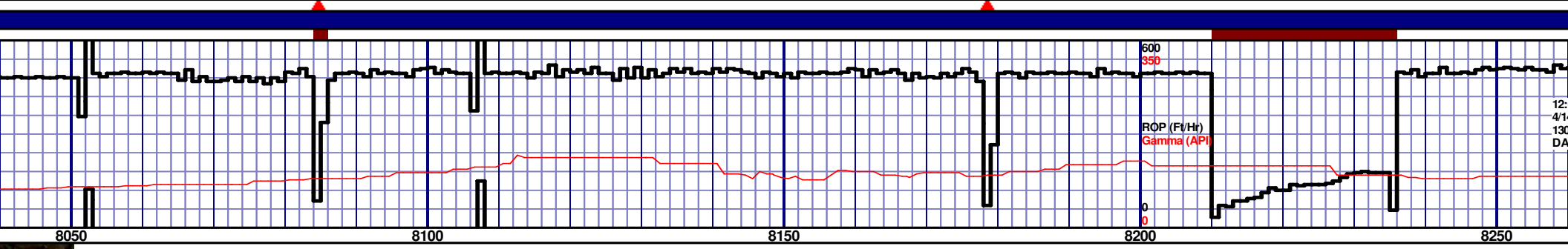
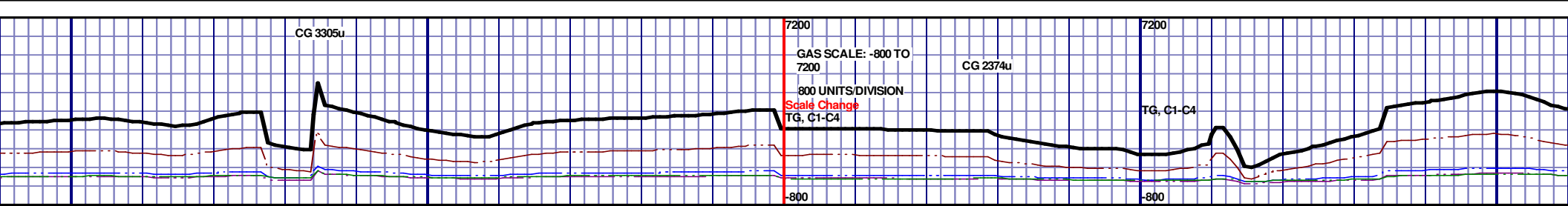
MD 7643 TVD 6582.34  
INC 90.65 AZ 270.54  
VS 1479.34

MD 7737 TVD 6582.24  
INC 89.48 AZ 270.79  
VS 1573.33

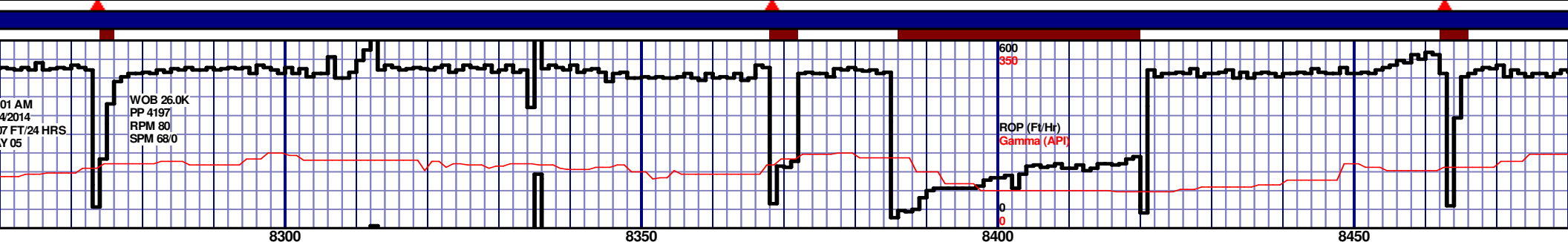
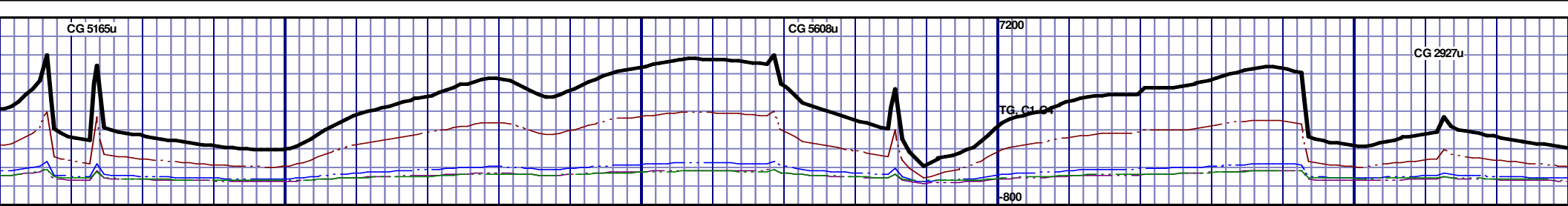








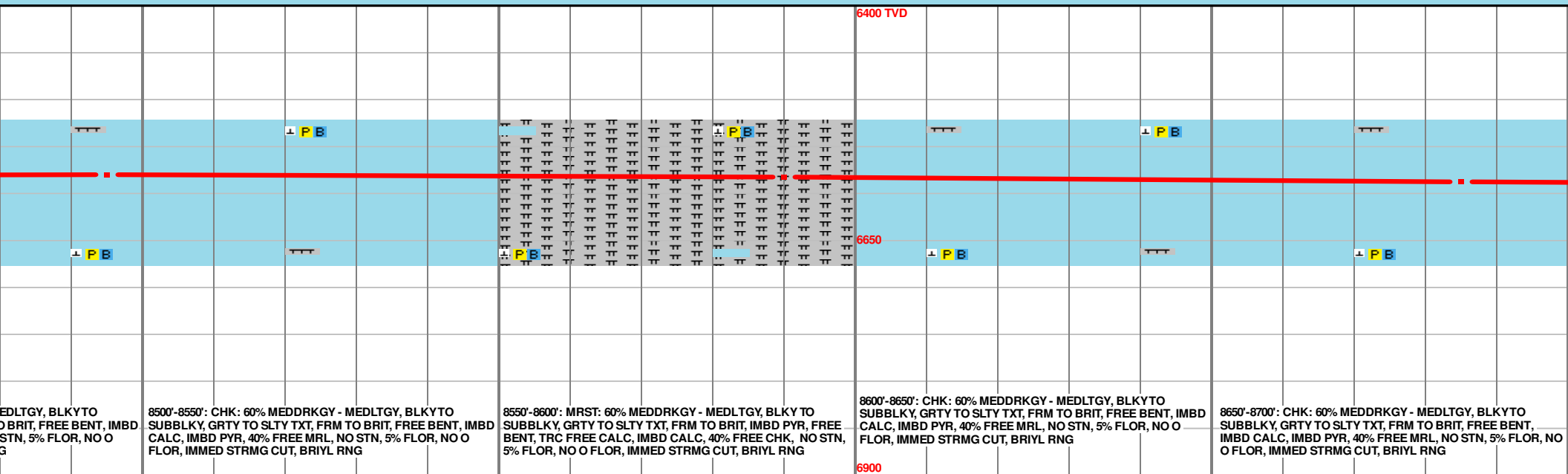
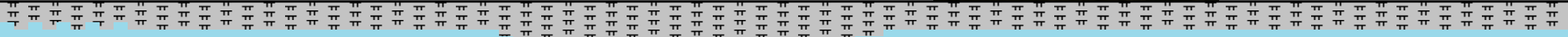
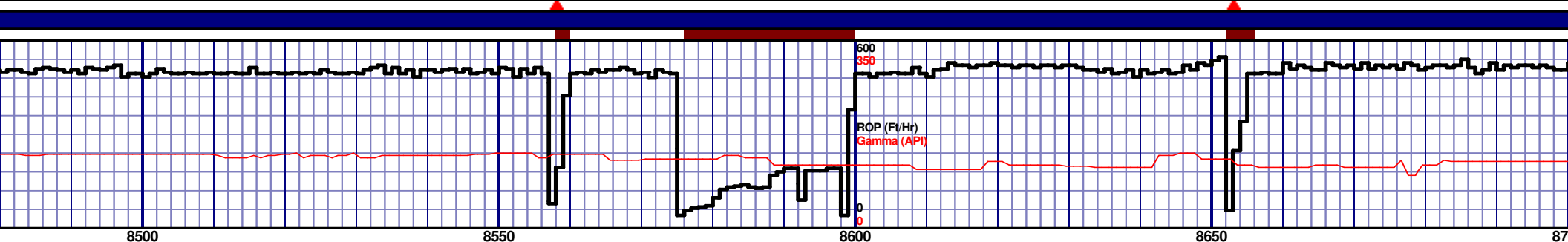
<p>8050'-8100': CHK: 70% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD CALC, IMBD PYR, 30% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>8100'-8150': CHK: 70% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD CALC, IMBD PYR, 30% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>8150'-8200': MRST: 60% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD PYR, FREE BENT, TRC FREE CALC, IMBD CALC, 40% FREE CHK, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>8200'-8250': CHK: 70% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD CALC, IMBD PYR, 30% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>8250'-8300': CHK: 70% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD CALC, IMBD PYR, 30% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>
--	--	--	--	--

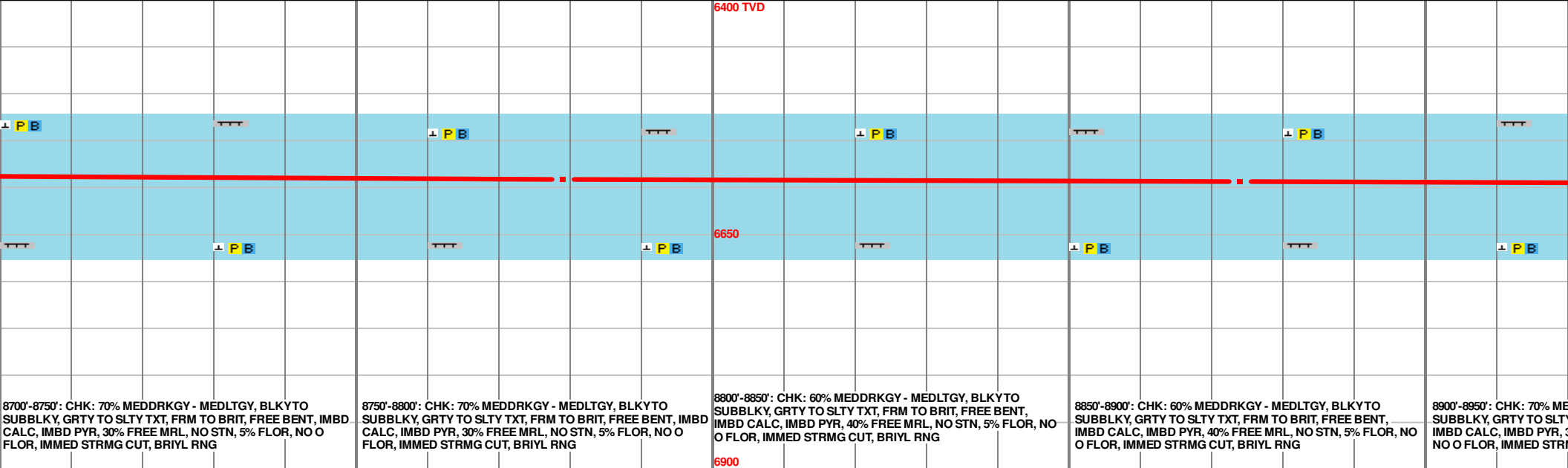
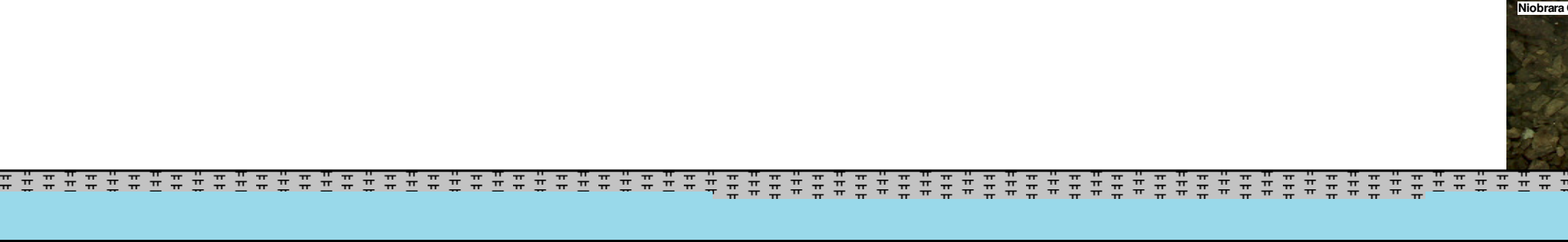
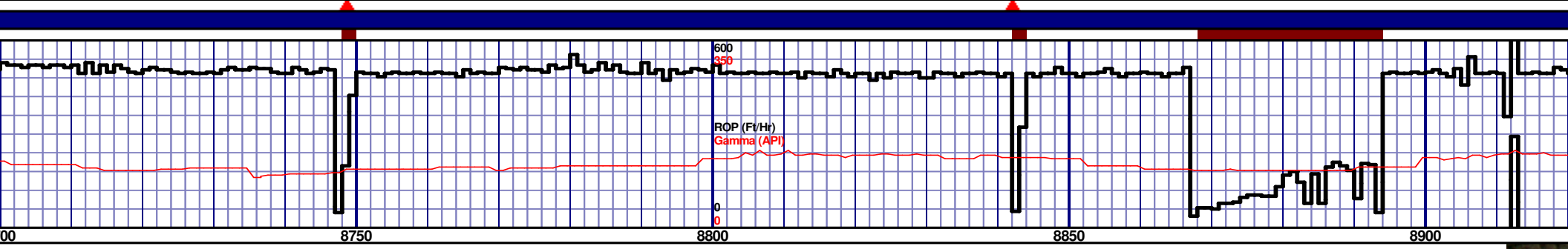
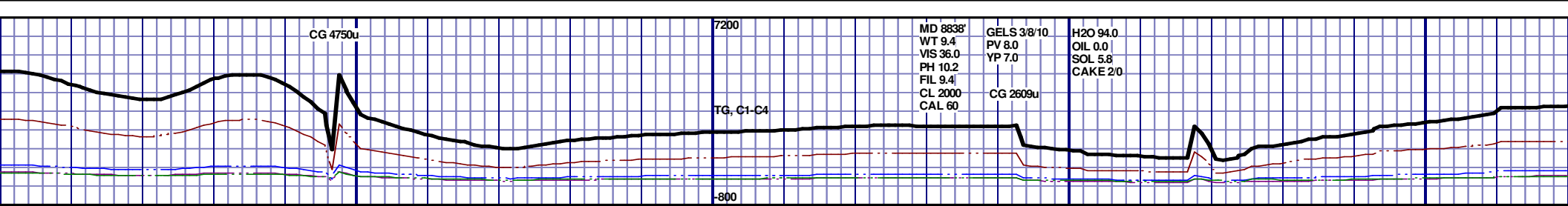


8300'-8350': CHK: 70% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD CALC, IMBD PYR, 30% FREE MRL, NO STN, 5% FLOR, NO O D STRMG CUT, BRIYL RNG		8350'-8400': CHK: 90% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD CALC, IMBD PYR, 10% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG		8400'-8450': CHK: 80% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD CALC, IMBD PYR, 20% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG		8450'-8500': CHK: 65% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD CALC, IMBD PYR, 35% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG	
---	--	---	--	---	--	---	--

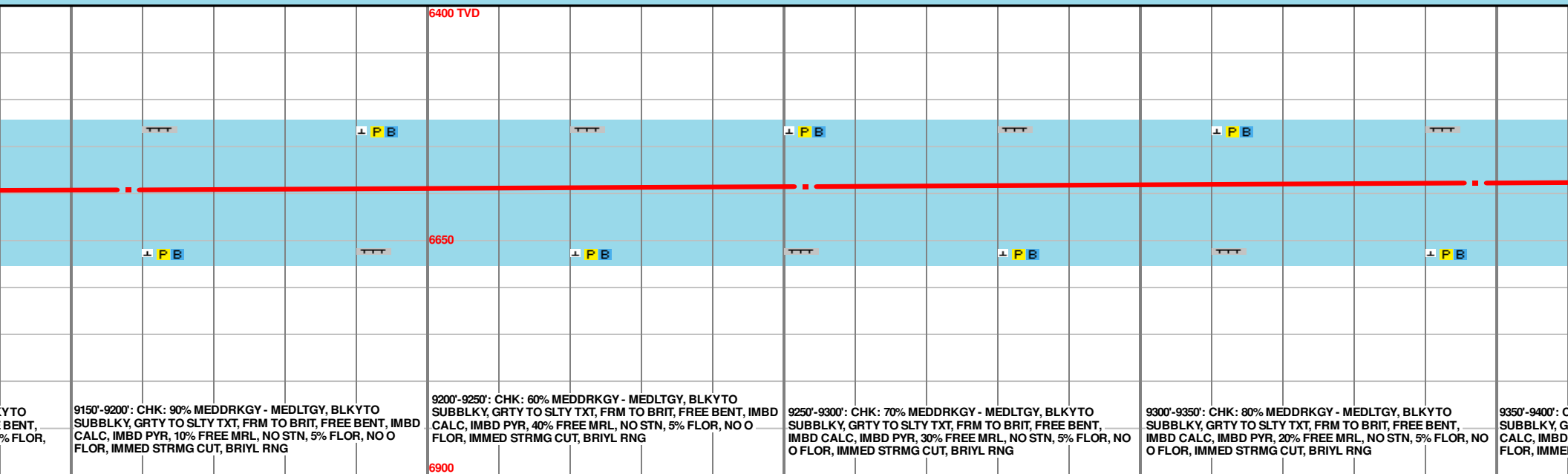
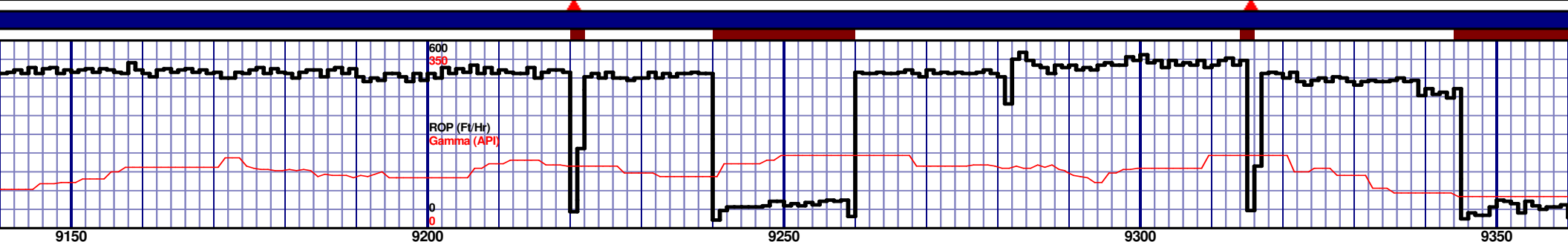
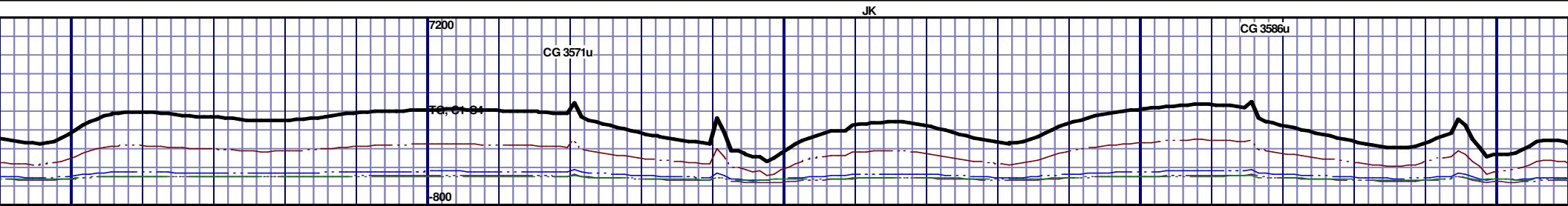
MD 8305 TVD 6583.87  
INC 92.37 AZ 268.54  
VS 2139.47

MD 8400 TVD 6580.84  
INC 91.29 AZ 270.93  
VS 2234.37





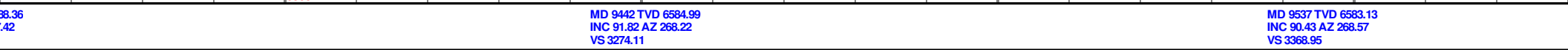
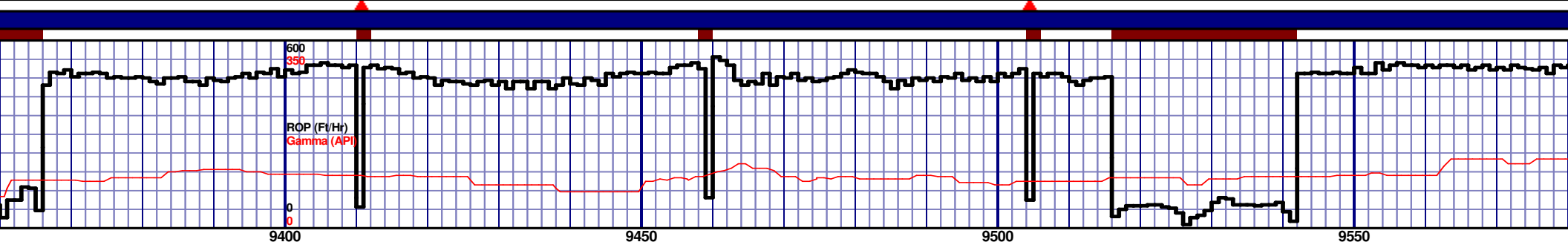




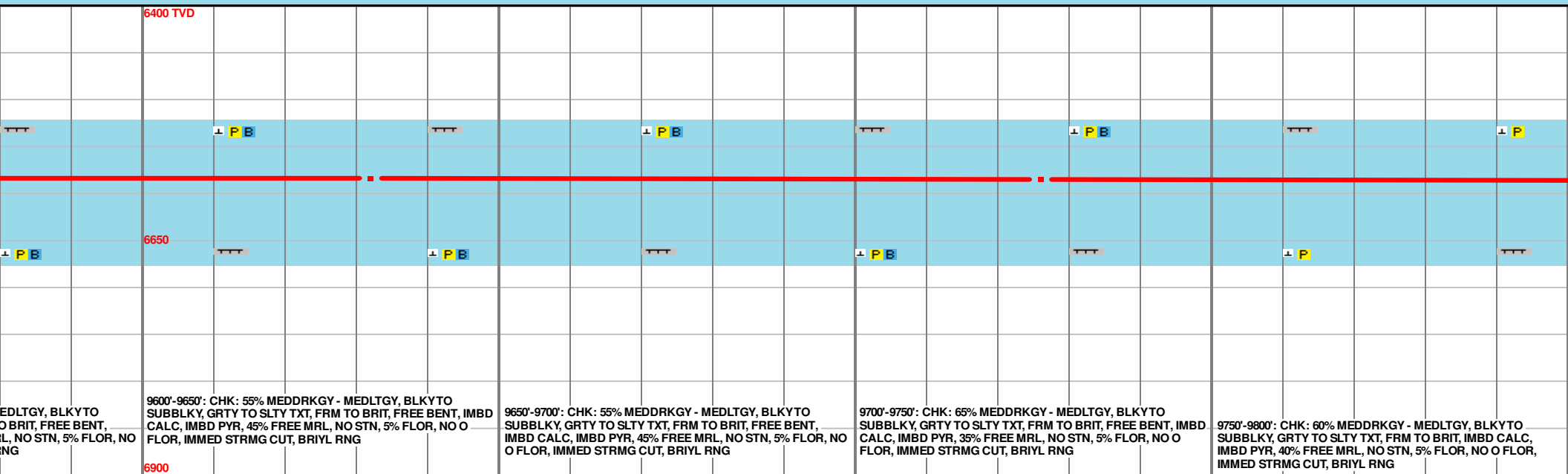
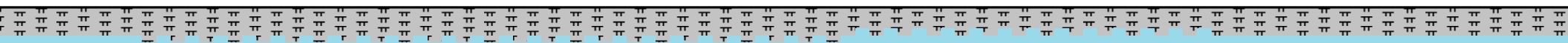
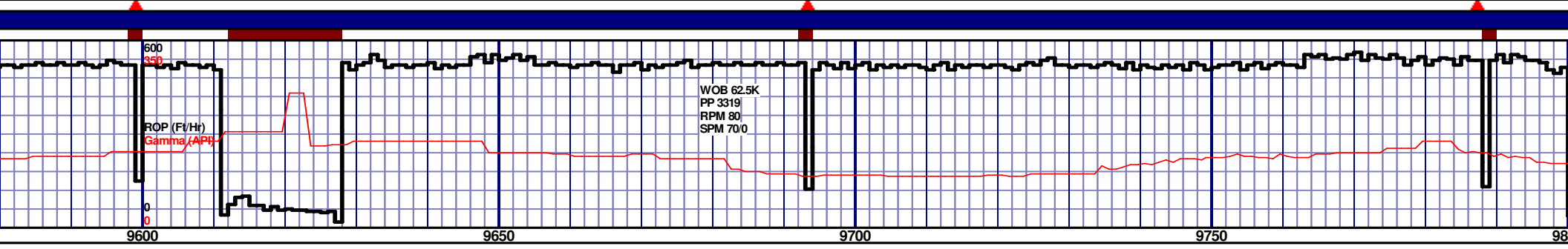
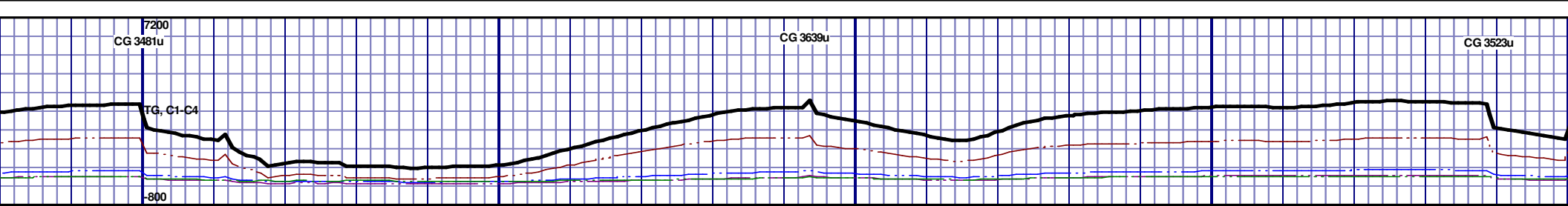
MD 9158 TVD 6595.93  
INC 92.25 AZ 266.05  
VS 2991.11

MD 9253 TVD 6592.13  
INC 92.34 AZ 267.56  
VS 3085.7

MD 9347 TVD 6592.13  
INC 92.25 AZ 267.56  
VS 3179.38





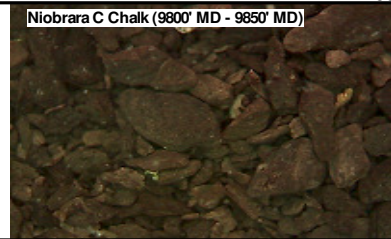
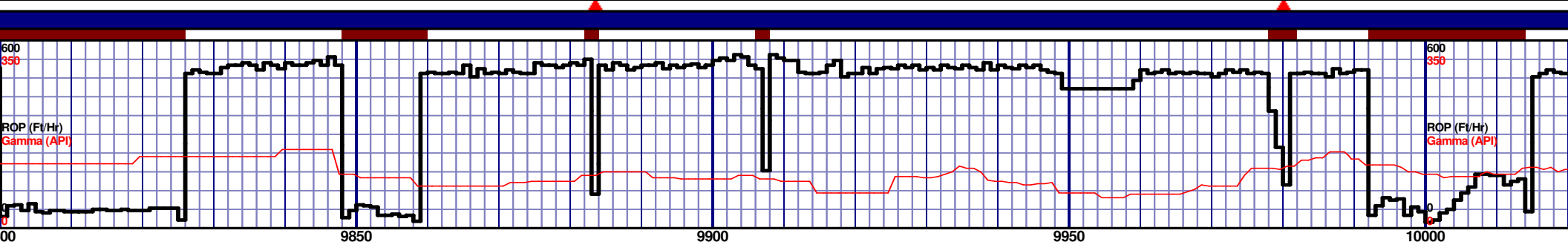
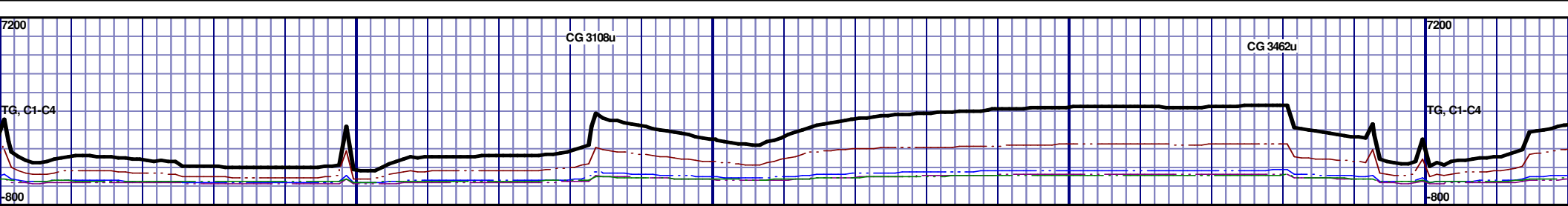


9600'-9650': CHK: 55% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD  
CALC, IMBD PYR, 45% FREE MRL, NO STN, 5% FLOR, NO O  
FLOR, IMMED STRMG CUT, BRIYL RNG

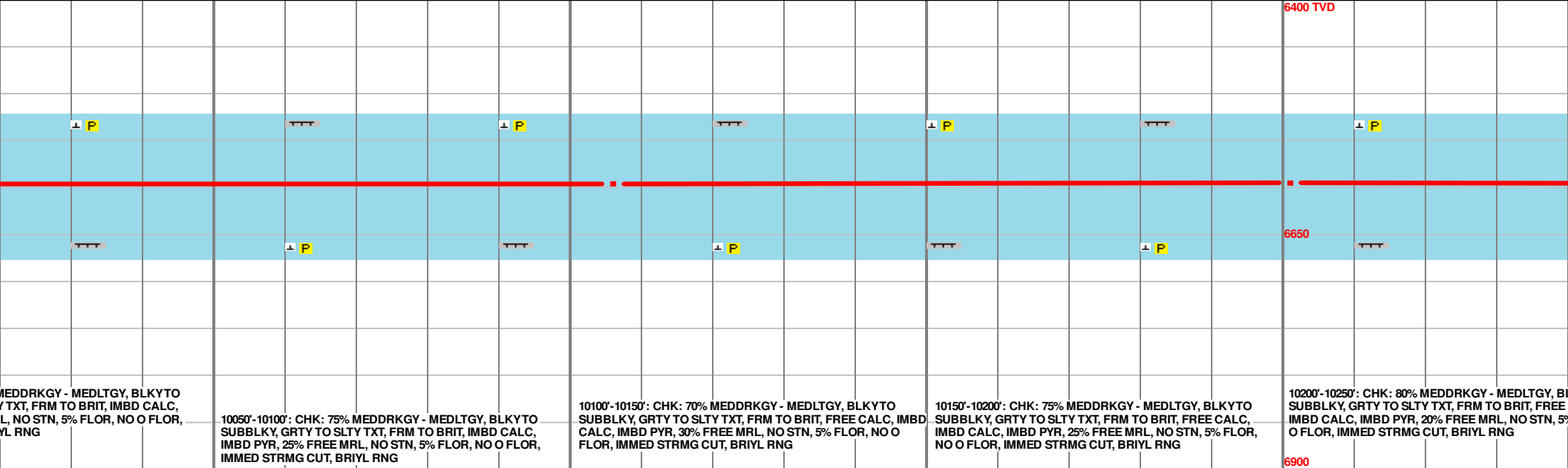
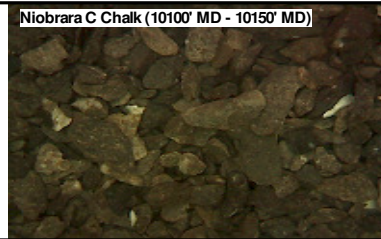
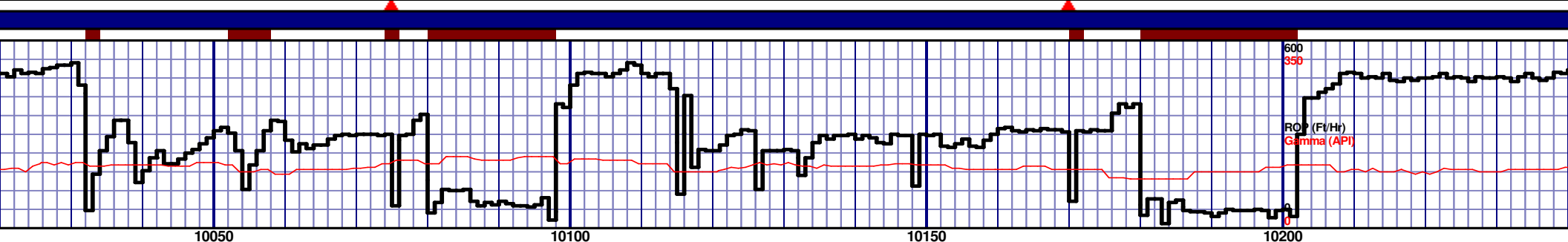
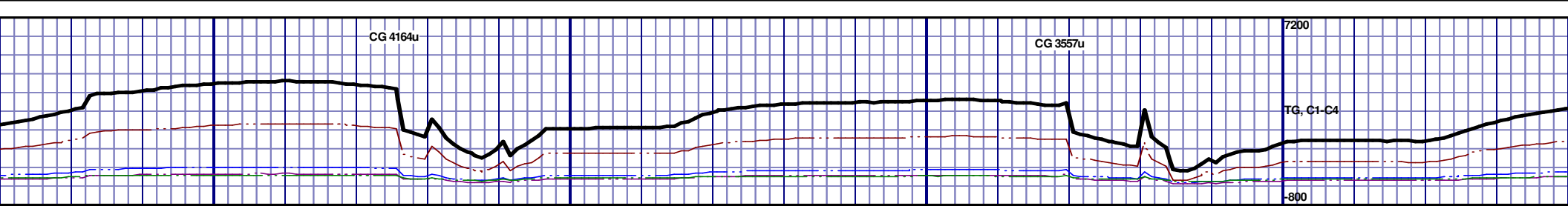
9650'-9700': CHK: 55% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, FREE BENT,  
IMBD CALC, IMBD PYR, 45% FREE MRL, NO STN, 5% FLOR, NO  
O FLOR, IMMED STRMG CUT, BRIYL RNG

9700'-9750': CHK: 65% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, FREE BENT, IMBD  
CALC, IMBD PYR, 35% FREE MRL, NO STN, 5% FLOR, NO O  
FLOR, IMMED STRMG CUT, BRIYL RNG

9750'-9800': CHK: 60% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, IMBD CALC,  
IMBD PYR, 40% FREE MRL, NO STN, 5% FLOR, NO O FLOR,  
IMMED STRMG CUT, BRIYL RNG



6400 TVD												6400 TVD											



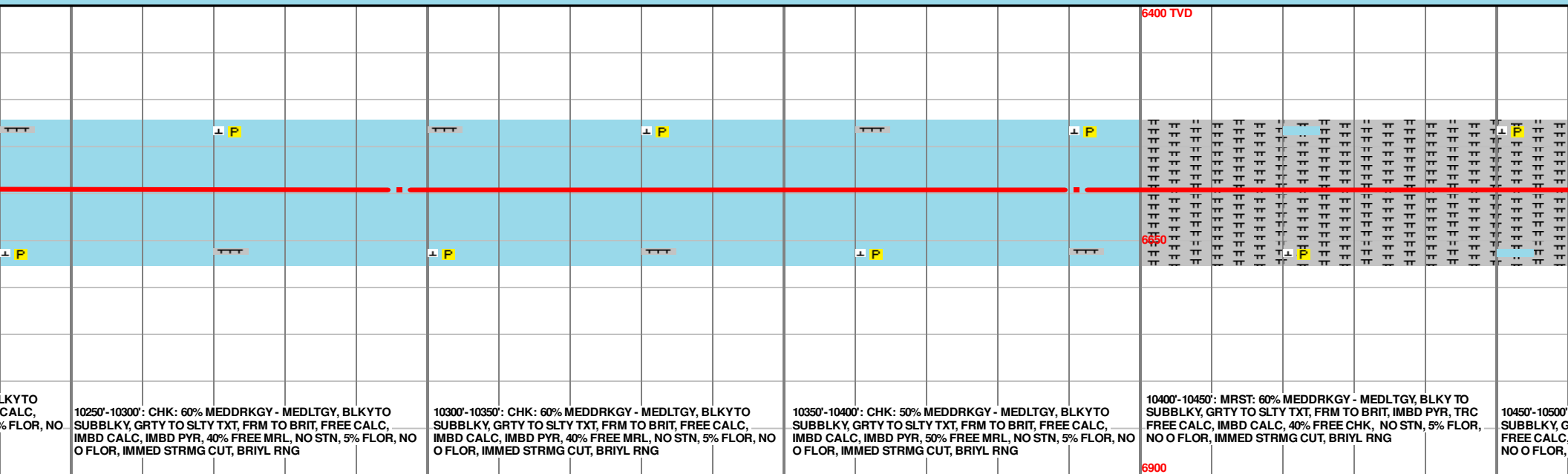
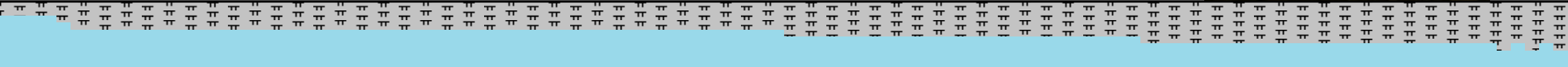
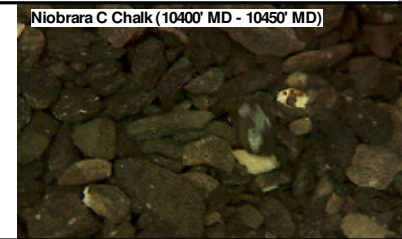
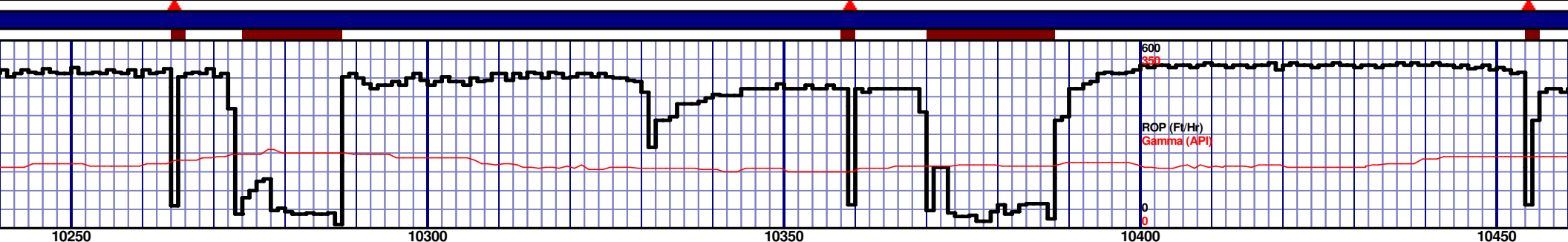
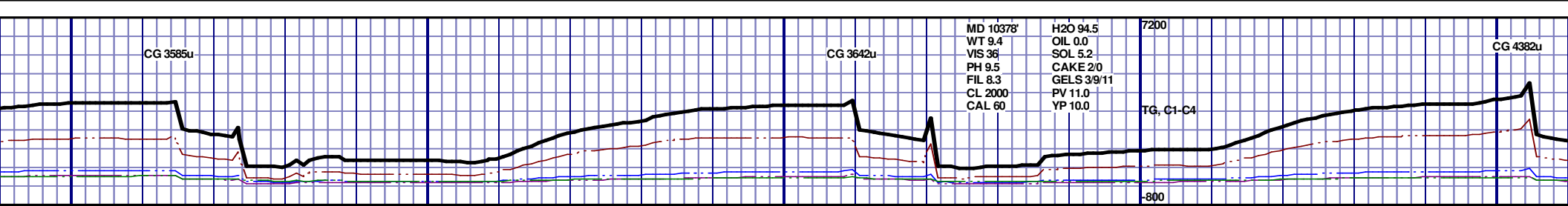
MEDDRKGY - MEDLTGY, BLKYTO  
Y TXT, FRM TO BRIT, IMBD CALC,  
L, NO STN, 5% FLOR, NO O FLOR,  
YL RNG

10050'-10100': CHK: 75% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC,  
IMBD PYR, 25% FREE MRL, NO STN, 5% FLOR, NO O FLOR,  
IMMED STRMG CUT, BRIYL RNG

10100'-10150': CHK: 70% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE CALC, IMBD  
CALC, IMBD PYR, 30% FREE MRL, NO STN, 5% FLOR, NO O  
FLOR, IMMED STRMG CUT, BRIYL RNG

10150'-10200': CHK: 75% MEDDRKGY - MEDLTGY, BLKYTO  
SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE CALC,  
IMBD CALC, IMBD PYR, 25% FREE MRL, NO STN, 5% FLOR,  
NO O FLOR, IMMED STRMG CUT, BRIYL RNG

10200'-10250': CHK: 80% MEDDRKGY - MEDLTGY, B  
SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE  
IMBD CALC, IMBD PYR, 20% FREE MRL, NO STN, 5%  
O FLOR, IMMED STRMG CUT, BRIYL RNG

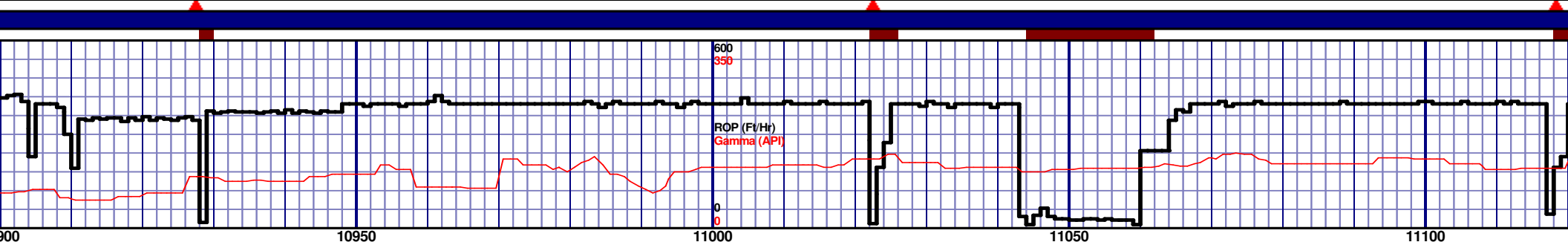
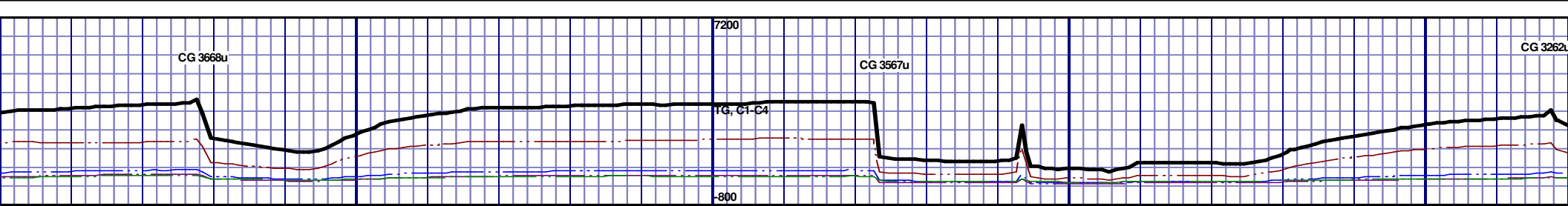


MD 10296 TVD 6595.9  
INC 89.38 AZ 269.37  
VS 4125.87

MD 10391 TVD 6596.42  
INC 90 AZ 268.54  
VS 4220.76







10900' 10950' 10950' 11000' 11000' 11050' 11050' 11100' 11100' 11150'

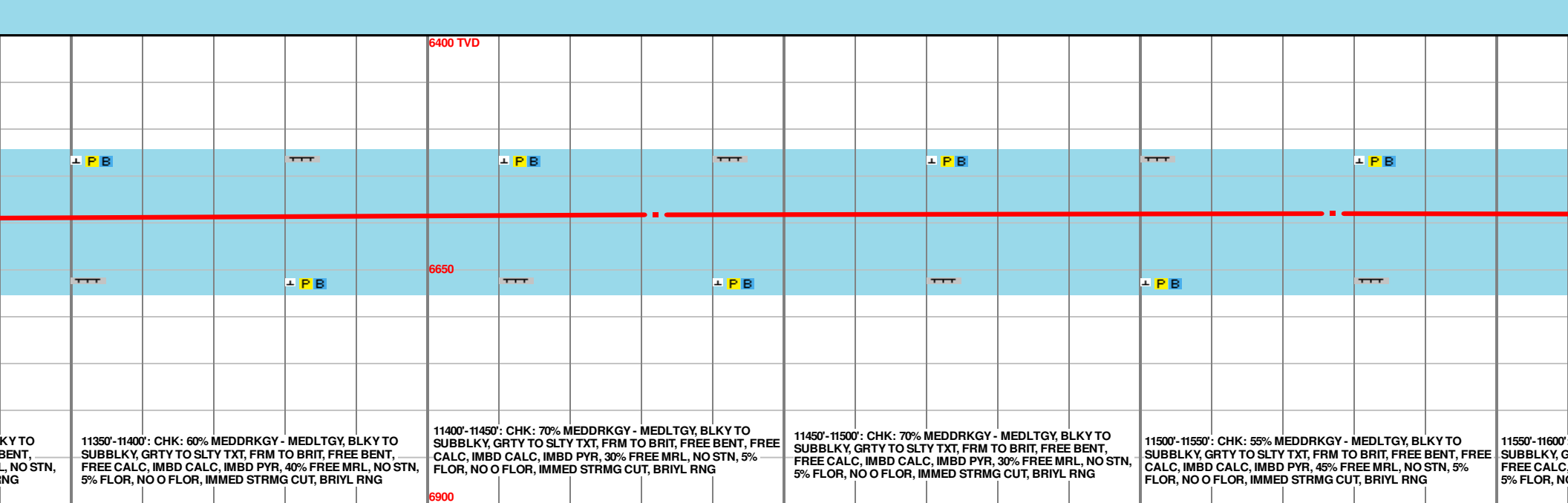
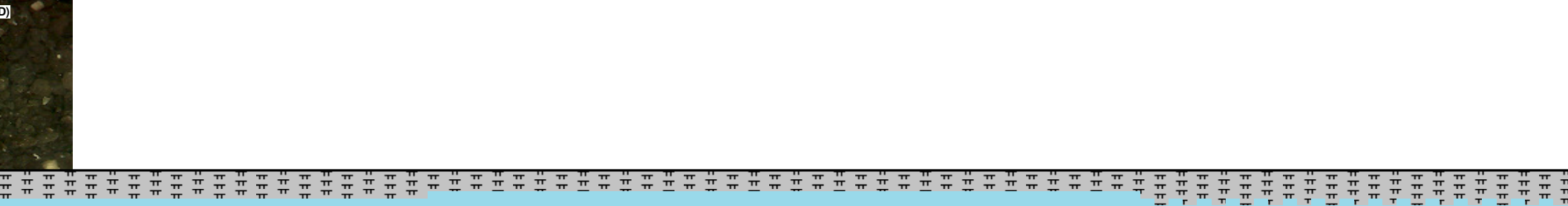
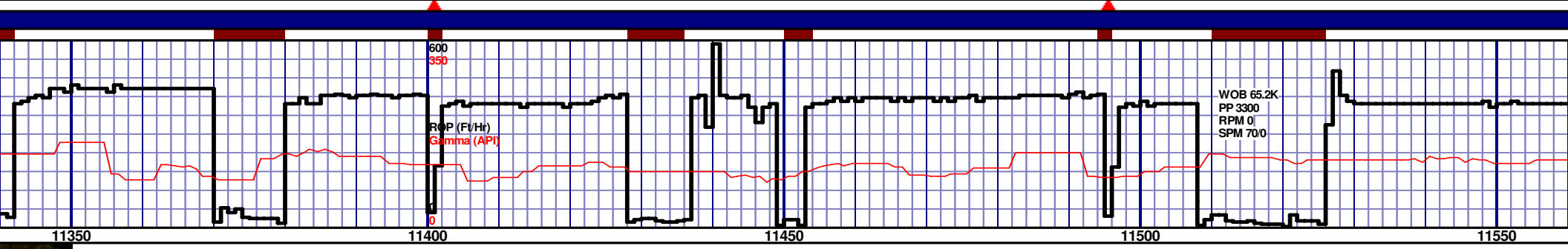
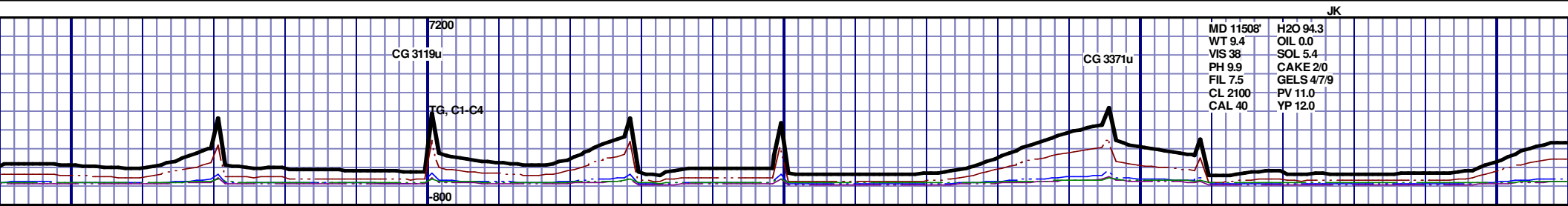
10900'-10950': CHK: 60% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE CALC, IMBD CALC, IMBD PYR, 40% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG		10950'-11000': CHK: 60% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, FREE CALC, IMBD CALC, IMBD PYR, 40% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG		11000'-11050': CHK: 60% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, FREE CALC, IMBD CALC, IMBD PYR, 40% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG		11050'-11100': CHK: 60% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, FREE CALC, IMBD CALC, IMBD PYR, 40% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG		11100'-11150': CHK: 60% MEDDRKGY - MEDLTGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, FREE CALC, IMBD CALC, IMBD PYR, 40% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG	
---	--	--	--	--	--	--	--	--	--

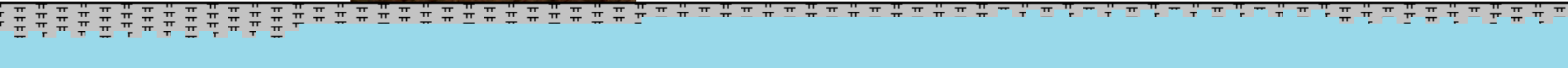
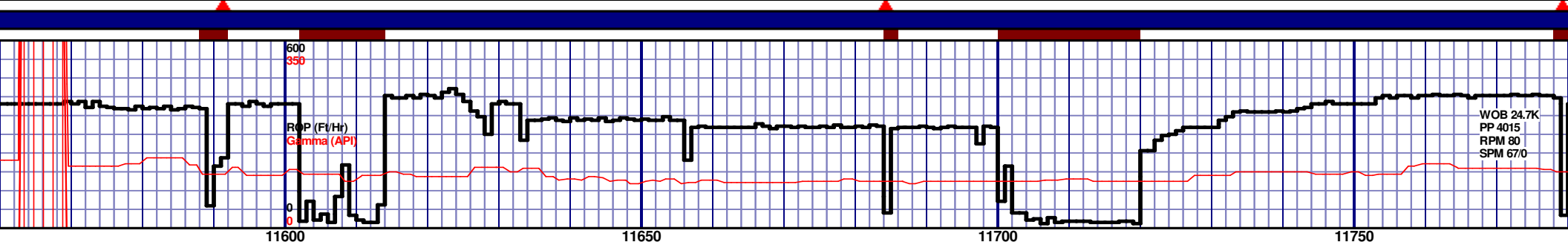
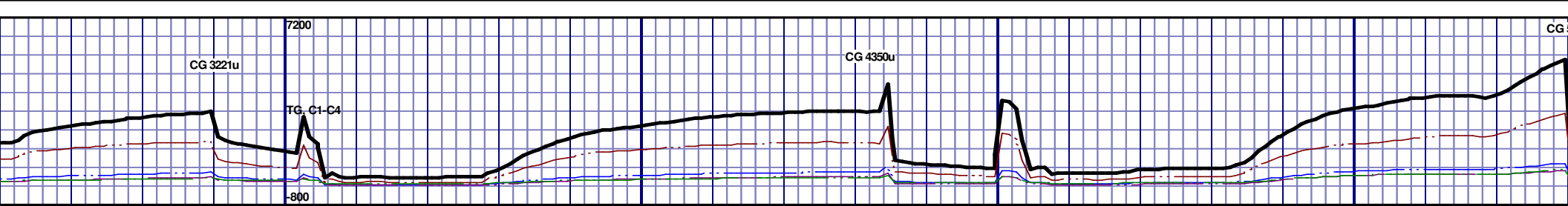
MD 10959 TVD 6600.57  
INC 88.06 AZ 264.69  
VS 4786.33

MD 11054 TVD 6603.84  
INC 87.99 AZ 266.2  
VS 4880.72

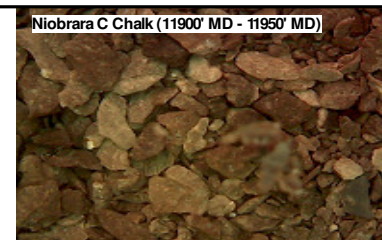
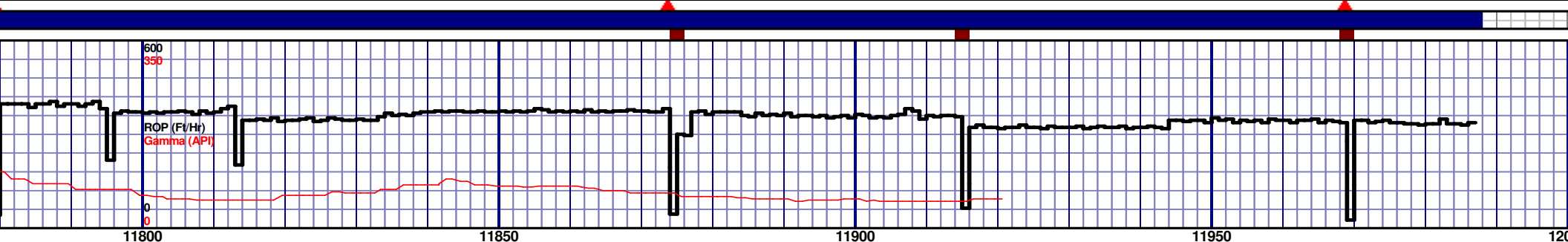
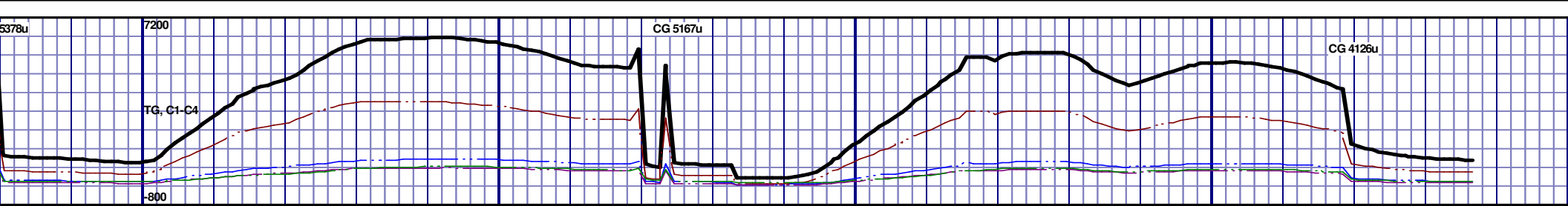








<p>6400 TVD</p> <p>6650</p> <p>6900</p> <p>CHK: 55% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, FREE CALC, IMBD CALC, IMBD PYR, 30% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>11600'-11650': CHK: 70% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, FREE CALC, IMBD CALC, IMBD PYR, 20% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>11650'-11700': CHK: 80% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, FREE CALC, IMBD CALC, IMBD PYR, 20% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>11700'-11750': CHK: 85% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, FREE CALC, IMBD CALC, IMBD PYR, 15% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>11750'-11800': CHK: 75% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, FREE CALC, IMBD CALC, IMBD PYR, 20% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>
---	--	--	--	--



<p>6400 TVD</p>	<p>11800'-11850': CHK: 85% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, FREE CALC, IMBD CALC, IMBD PYR, 15% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>11850'-11900': CHK: 90% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, FREE CALC, IMBD CALC, IMBD PYR, 10% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>11900'-11950': CHK: 95% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, FREE CALC, IMBD CALC, IMBD PYR, 5% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>11950'-11987': CHK: 90% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT, FREE CALC, IMBD CALC, IMBD PYR, 10% FREE MRL, NO STN, 5% FLOR, NO O FLOR, IMMED STRMG CUT, BRIYL RNG</p>
-----------------	--	--	---	--

