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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:** Tom Wacholz &  
Scott Haney  
**Log Interval:** 5520' MD to 10448' MD  
**Start Date:** January 4, 2015  
**Release Date:** January 7, 2015

### Well Information

**Well Name:** Gradishar State  
LD11-73-1AHN Horizontal  
**Location:** 2-T9N-R58W  
330' FSL, 1100' FEL

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

**Drilling Rig:** H&P 343  
**Total Depth:** 10448' MD  
**TD Date:** January 7, 2015  
**Formation:** Niobrara B Chalk  
**KB Elevation:** 4685'  
**GR Elevation:** 4661'  
**API Number:** 05-123-39809-0000

**Total Gas, C1-C4**

TG (Units) 

C1 (units) 

C2 (units) 

C3 (units) 

C4 (units) 

3150

GAS SCALE: -350u TO 3150u  
(350 UNITS/DIVISION)

DRILLING ON WATER BASED MUD

TG, C1-C4

CONNECTIONS MARKED  
WITH RED TRIANGLES

-350

DEPTH 5509'	CAL 0	PV 15
WT 10.70	H2O 89.0	YP 15
VIS 42	OIL 0.3	CK 1/0
PH 9.6	LGS 25.3	SOL 10.5
FIL 6.8	GEL 5/45/72	
CL 1900		

Connections
Cut
Slide/Rotate

**ROP and Gamma**

ROP (Ft/Hr) \_\_\_\_\_

Gamma (API) \_\_\_\_\_

600  
350

SLIDE=RED  
ROTATE=WHITE

ROP SCALE: 0 TO 600

ROP (F/H)  
Gamma (API)

GAMMA SCALE: 0 TO 350  
ORIGINAL DATA AS RECEIVED

0  
0

WOB 14.2K  
PP 3970  
RPM 0  
SPM 79/78

WOB 15.7K  
PP 3997  
RPM 0  
SPM 79/78

ROP (F/Hr)  
Gamma (API)

WOB 19.0K  
PP 4293  
RPM 30  
SPM 79/78

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**Depth**

5500

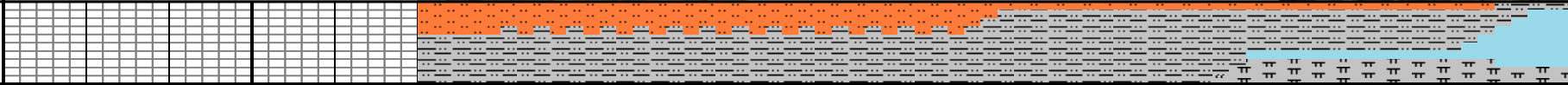
5550

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## Photographs



Lithology %



### Well Bore Cross Section

5325 TVD

**NOBLE ENERGY INC.**  
**GRADISHAR STATE LD11-73-1AHN**  
**HORIZONTAL**  
**2-T9N-R58W**  
**330' FSL, 1100' FEL**  
**WELD CO., CO**

H&P 343

5475

**LOGGERS:**  
**TOM WACHOLZ**  
**SCOTT HANEY**

COMMENCED LOGGING @ 5520' MD @ 6:00 AM ON  
01/04/2015 W/BIT #2, SIZE 8.75", SMITH SDI519, (S/N) JJ7995 IN @  
1231' MD.

5625

**TEEPEE BUTTES**  
 4560' MD 4512' TVD

Map details include:  
 - Elevation contours from 4500' to 5500' feet.  
 - Spot heights: 4512' TVD, 4560' MD, 5530' MD, 5560' MD.  
 - Proposed road layout: 5530' MD - 5560' MD: SLTYSH: 65% LTGY - MEDGY, PRED SUBBLKYTO SUBSPLT, SLTY TO F TXT, FREE CALC, IMBD PYR, FREE SLTST, NO STN, NO FLOR, FNT BLSHW O FLOR, MOD LZY CUT, LT BRIYLRNG.

5560' MD-5590' MD: SLTYSH: 65%  
 LTGY- MEDGY, PRED SUBBLKY TO  
 SUBSPLT, SLTY TO F TXT, FREE  
 CALC, IMBD PYR, FREE SLTST, NO  
 STN, NO FLOR, FNT BLSHW O  
 FLOR, MOD LZ Y CUT, LT BRIYLRNG

5590' MD-5590' MD: SLTYSH: 65%  
 LTGY- MEDGY, PRED SUBBLKY TO  
 SUBSPLT, SLTY TO F TXT, FREE  
 CALC, IMBD PYR, FREE SLTST, NO  
 STN, NO FLOR, FNT BLSHW O  
 FLOR, MOD LZ Y CUT, LT BRIYLRNG

5325 TVD

SHARON SPRINGS

5624' MD 5440' TVD

5475

5650' MD-5650' MD: SLTYSH: 50%

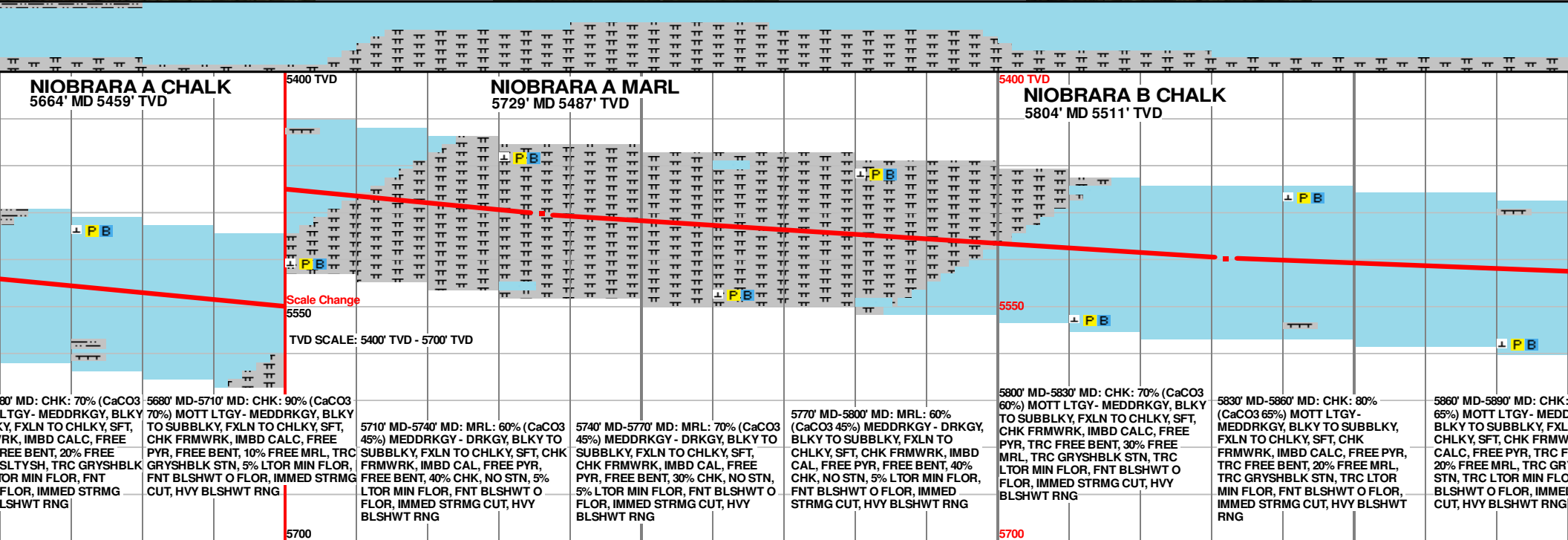
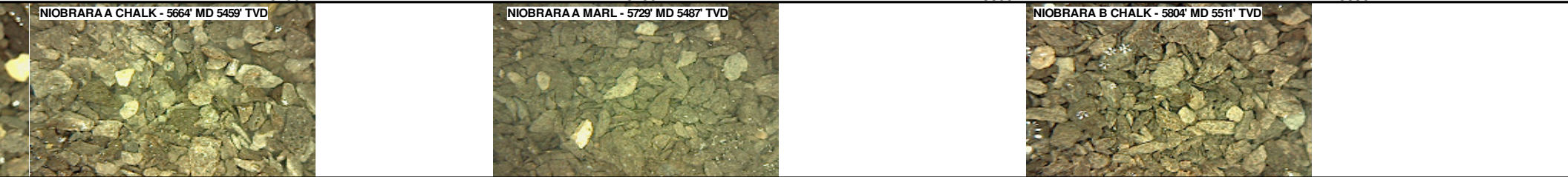
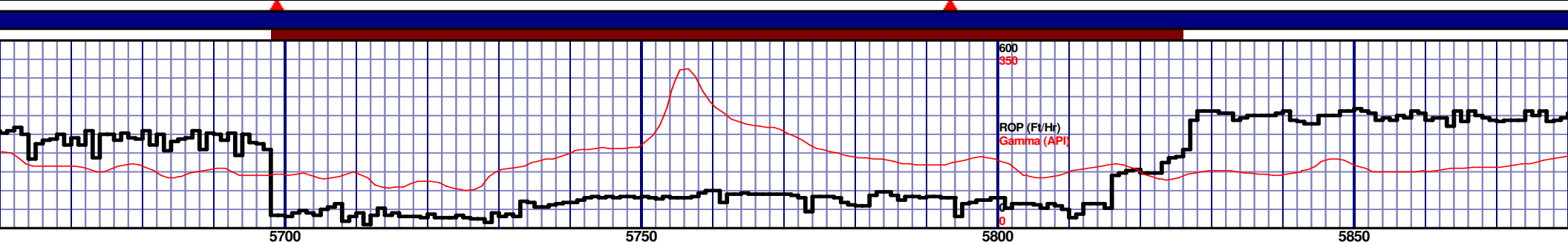
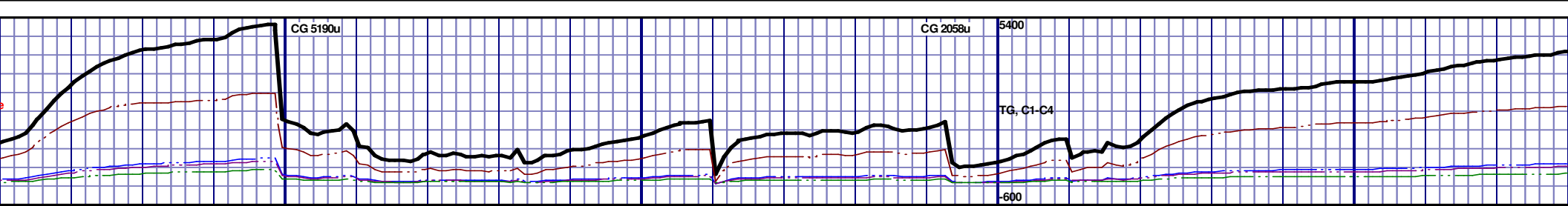
5620' MD-5650' MD: SLTYSH: 50%

## Survey Data

MD 5546 TVD 5399.48  
INC 52.8 AZ 179.69  
VS 466.44

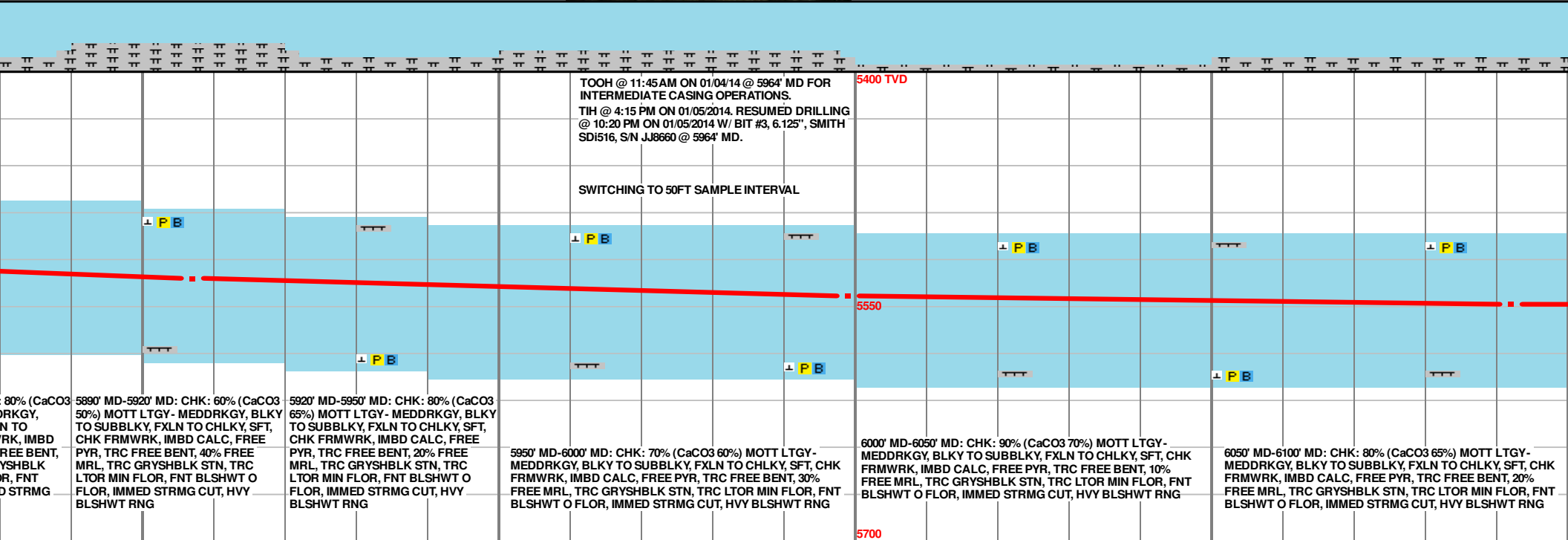
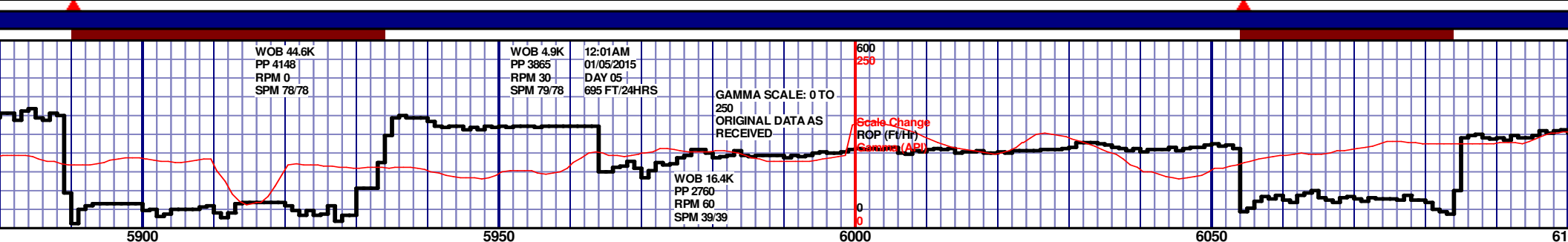
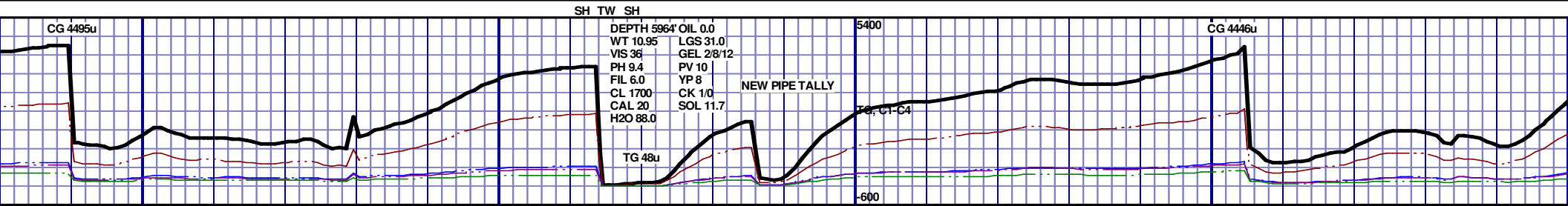
MD 5594 TVD 5425.85  
INC 60.5 AZ 180.86  
VS 506.29

MD 5642 TVD 5449.19  
INC 61.3 AZ 180.91  
VS 548.04



MD 5736 TVD 5490.46  
INC 66.6 AZ 180.59  
VS 632.07

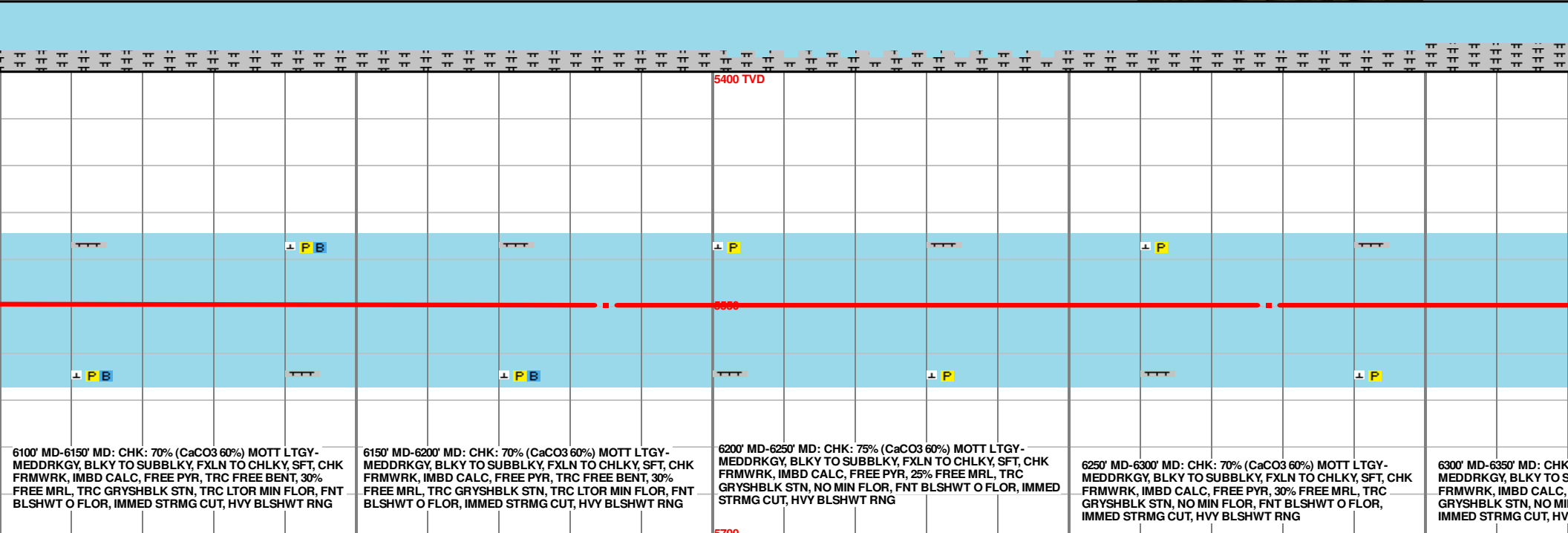
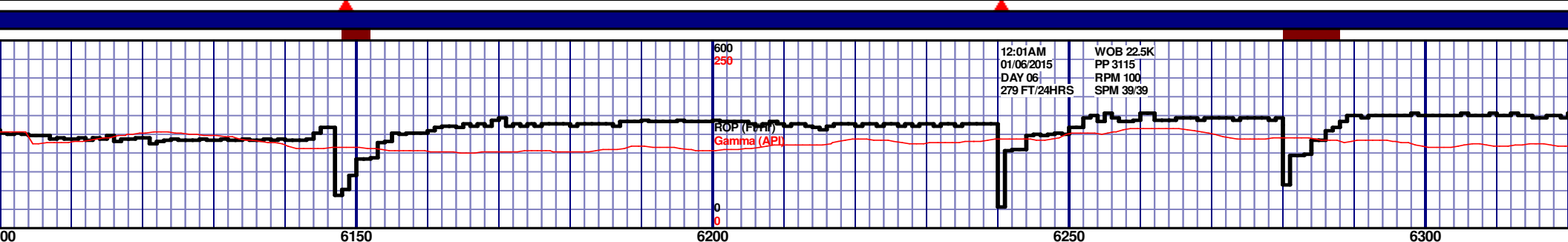
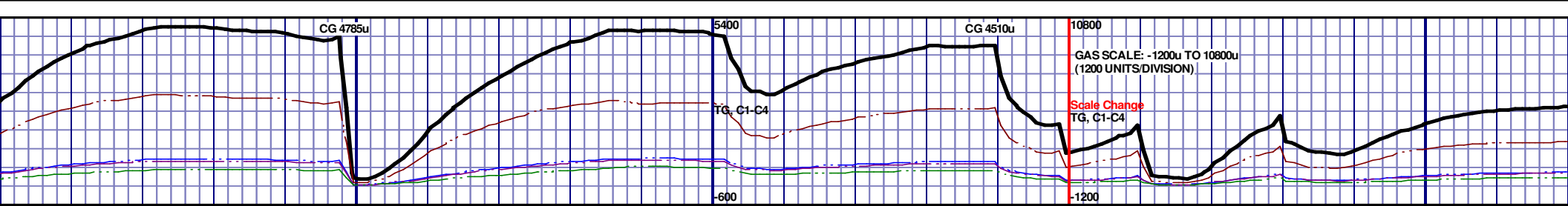
MD 5832 TVD 5519.36  
INC 78.3 AZ 178.83  
VS 722.84

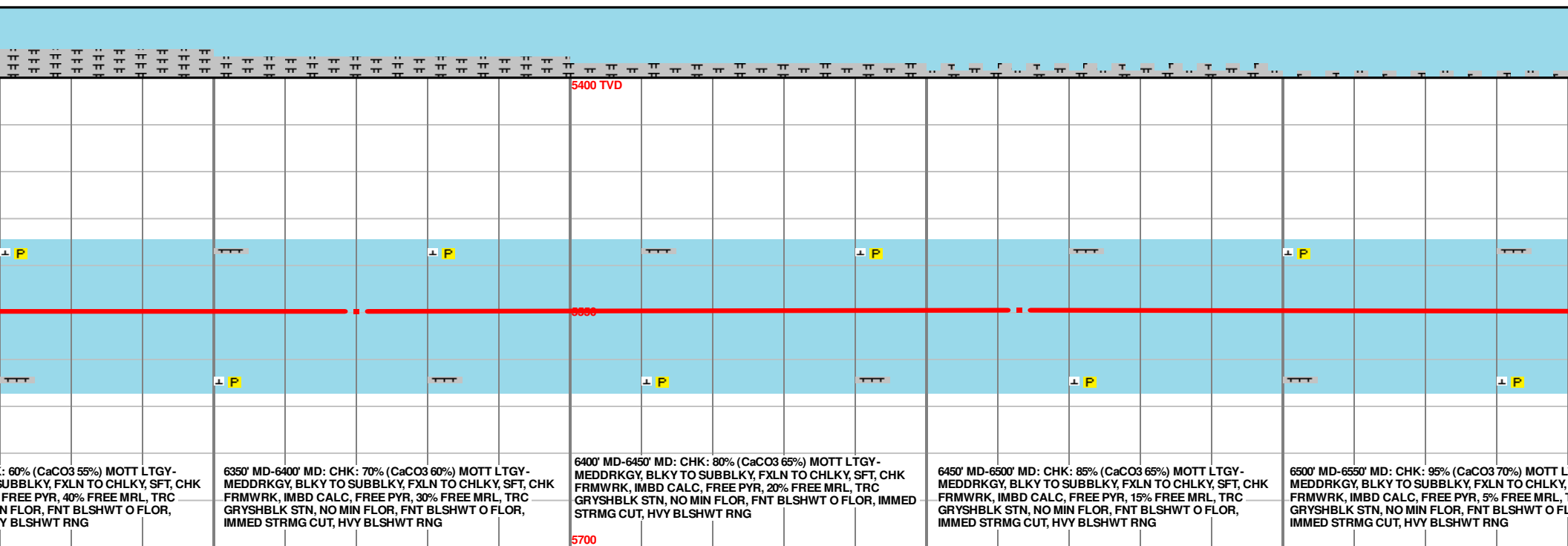
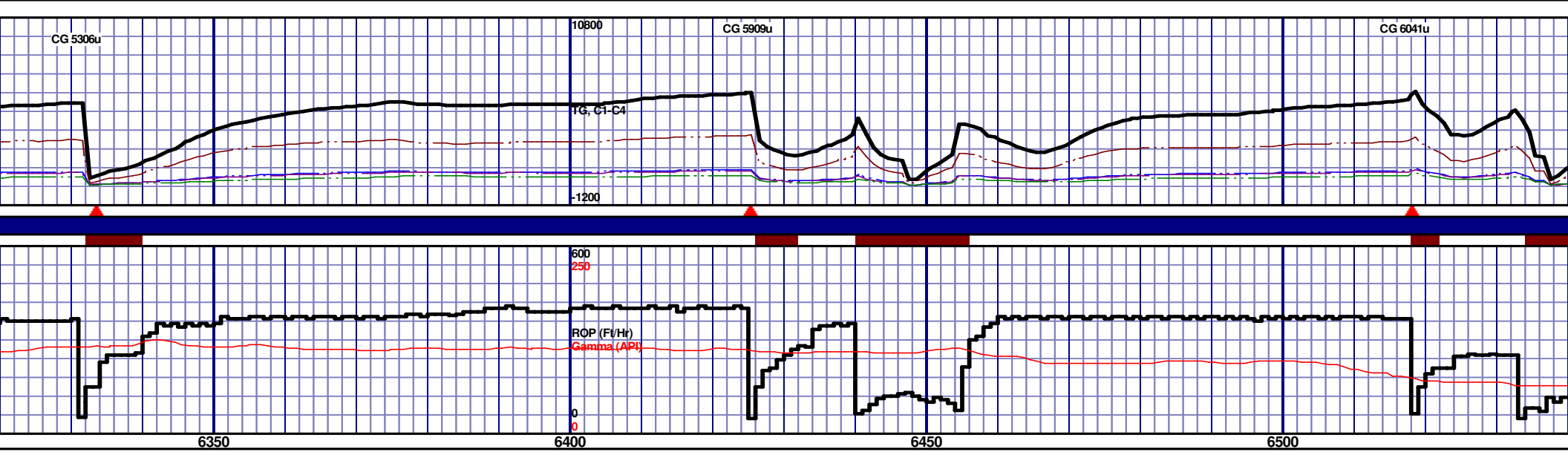


MD 5907 TVD 5532.36  
INC 81.74 AZ 178.4  
VS 796.03

MD 5999 TVD 5543.32  
INC 84.57 AZ 178.14  
VS 886.48

MD 6092  
INC 88.98  
VS 978.47

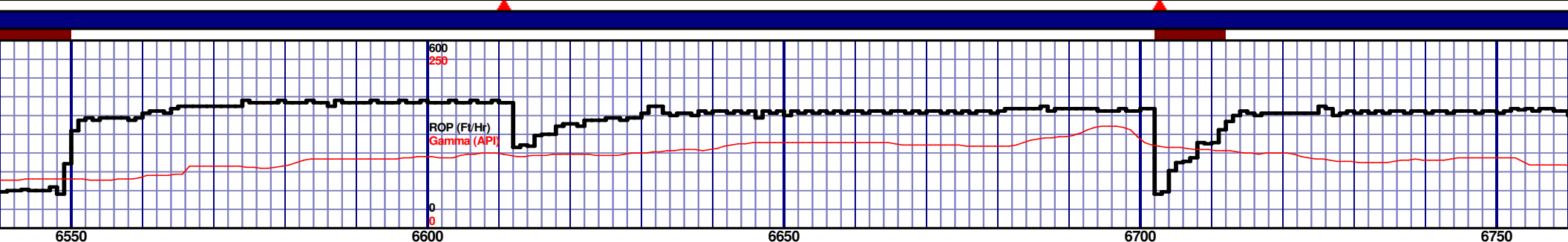
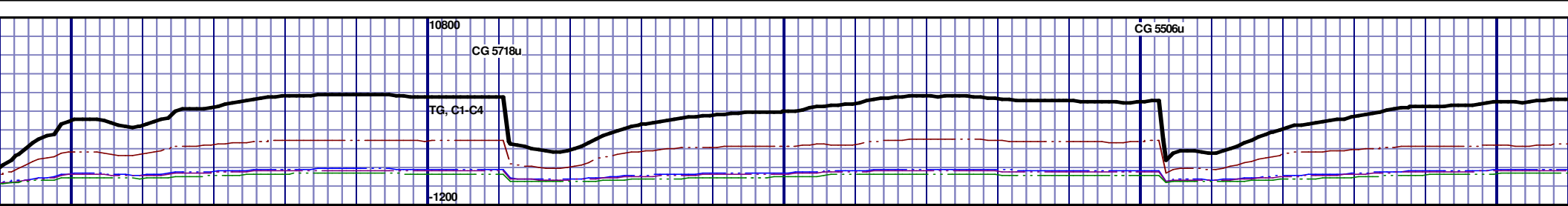




MD 6370 TVD 5549.22  
INC 89.51 AZ 178.45  
VS 1254.5

MD 6463 TVD 5548.87  
INC 90.92 AZ 181.29  
VS 1346.91



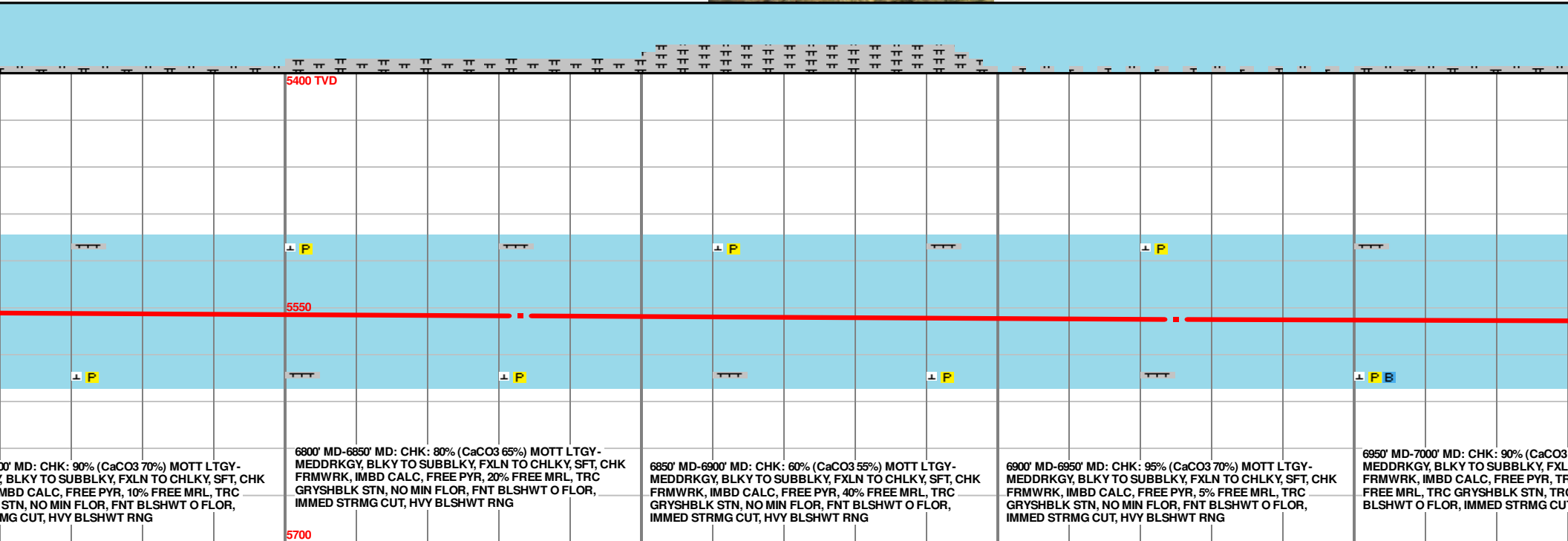
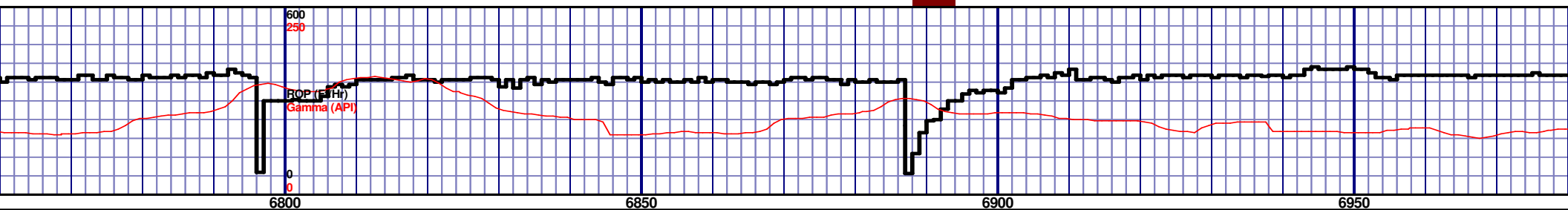
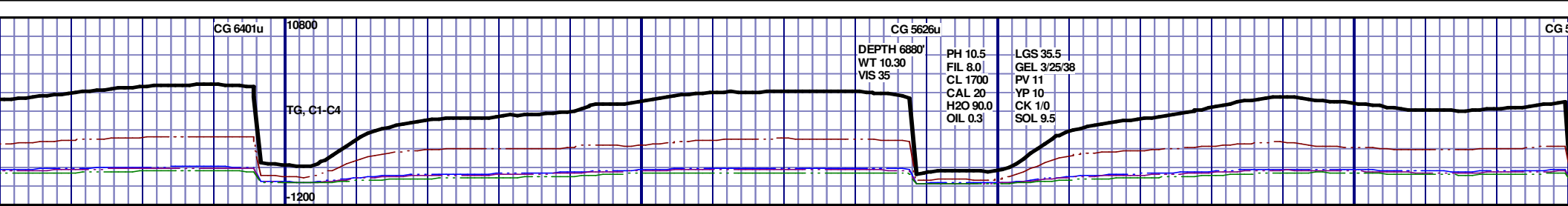


5400 TVD									
5550									
5700									
6550' MD-6600' MD: CHK: 90% (CaCO3 70%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, 10% FREE MRL, TRC GRYSBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG					6600' MD-6650' MD: CHK: 90% (CaCO3 70%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, 10% FREE MRL, TRC GRYSBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG				
6650' MD-6700' MD: CHK: 70% (CaCO3 60%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, 30% FREE MRL, TRC GRYSBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG					6700' MD-6750' MD: CHK: 90% (CaCO3 70%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, 10% FREE MRL, TRC GRYSBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG				
6750' MD-6800' MD: CHK: 90% (CaCO3 70%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, 10% FREE MRL, TRC GRYSBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									

MD 6555 TVD 5549.12  
INC 88.77 AZ 181.53  
VS 1438.57

MD 6648 TVD 5551.1  
INC 88.8 AZ 180.9  
VS 1531.19

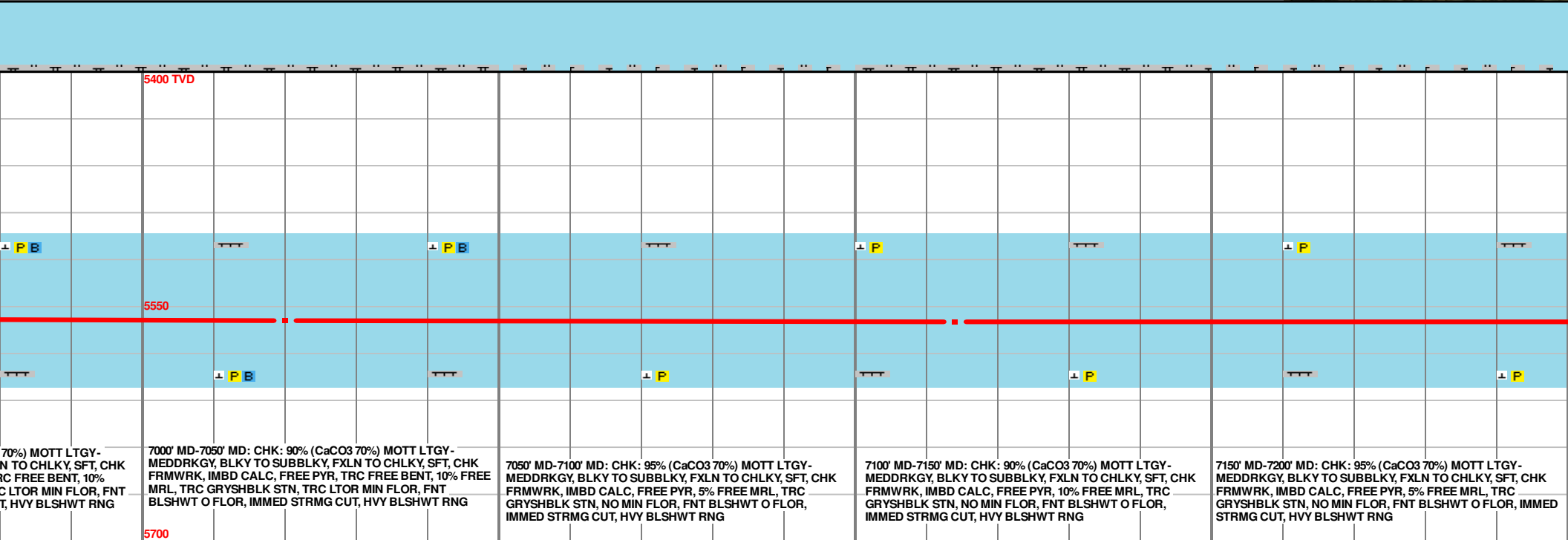
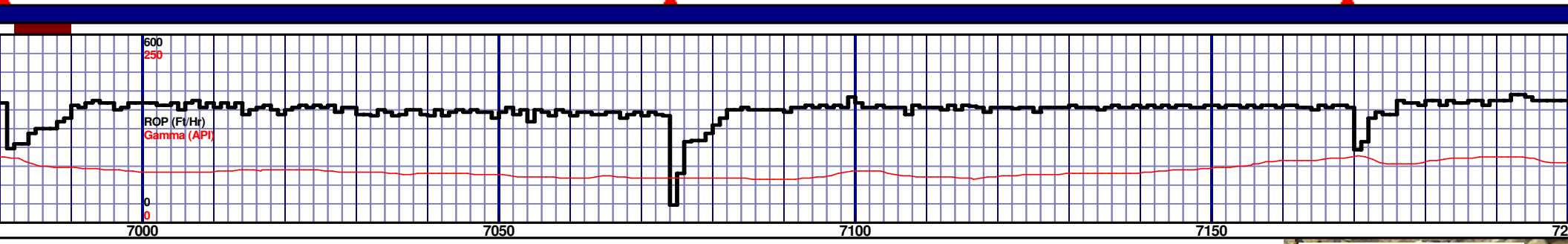
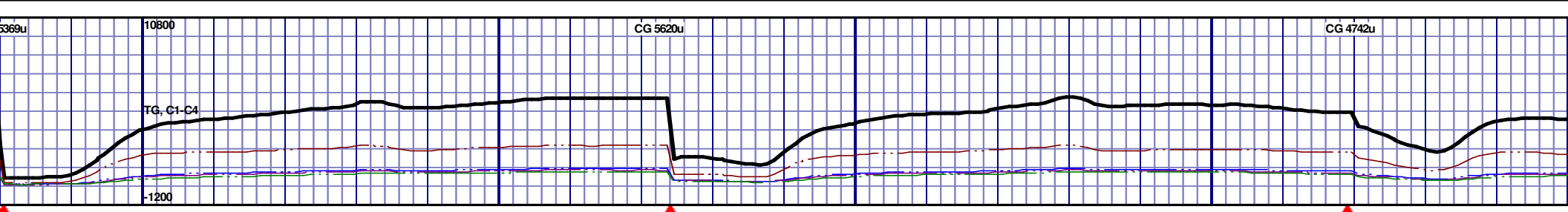
MD 6740 TVD 5553.15  
INC 88.64 AZ 180.85  
VS 1622.76



MD 6833 TVD 5555.33  
INC 88.67 AZ 180.27  
VS 1715.27

MD 6925 TVD 5557.31  
INC 88.86 AZ 179.88  
VS 1806.71





7000' MD-7050' MD: CHK: 90% (CaCO3 70%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, 10% FREE MRL, TRC GRYSHBLK STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG

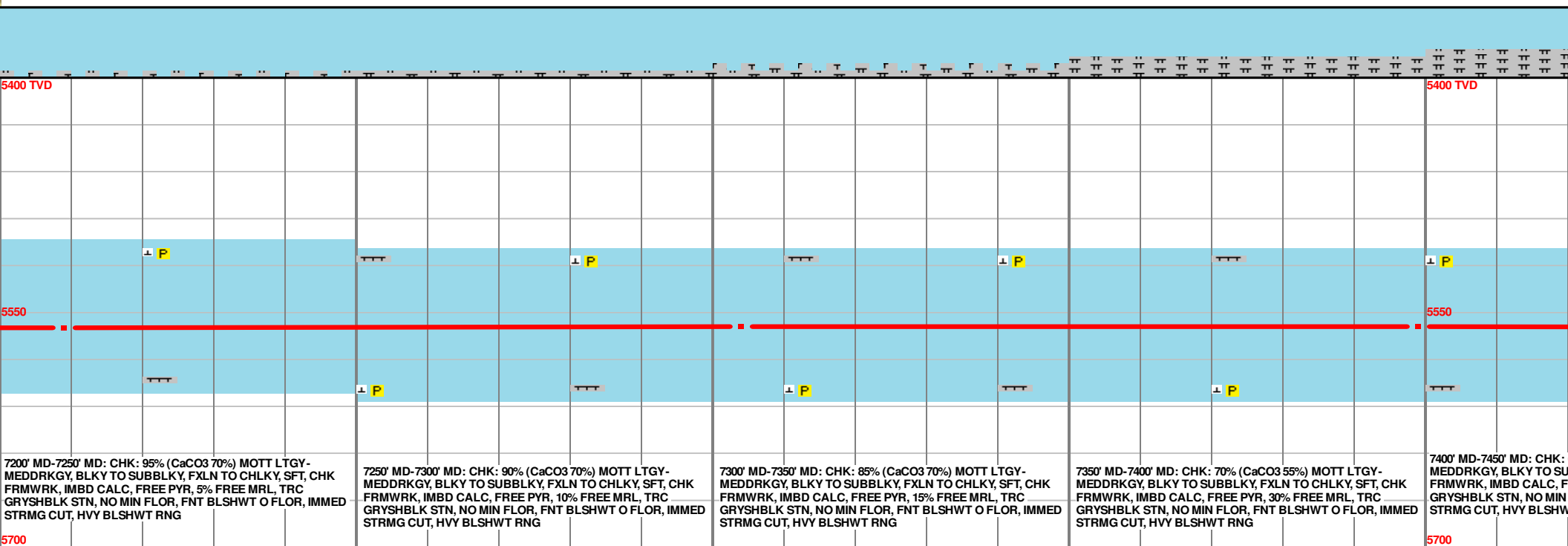
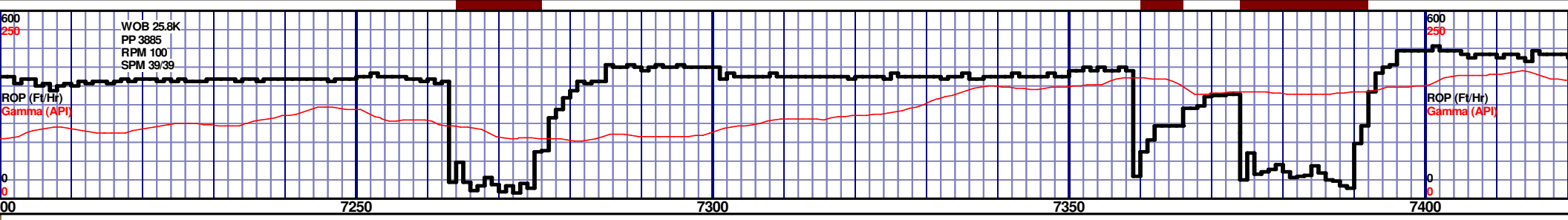
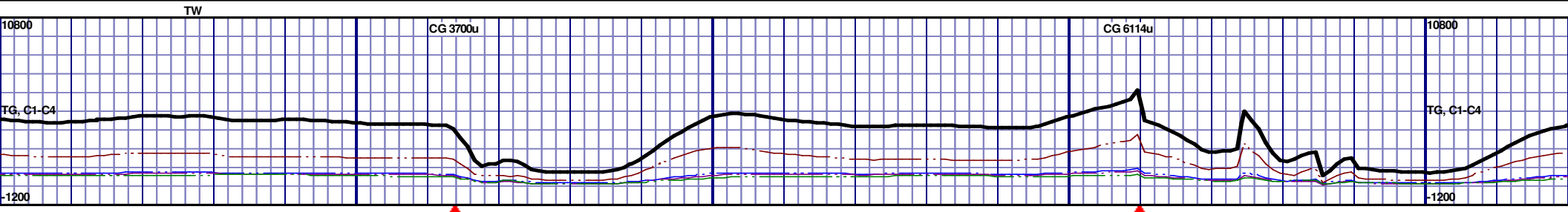
7050' MD-7100' MD: CHK: 95% (CaCO3 70%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, 5% FREE MRL, TRC GRYSHBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG

7100' MD-7150' MD: CHK: 90% (CaCO3 70%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, 10% FREE MRL, TRC GRYSHBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG

7150' MD-7200' MD: CHK: 95% (CaCO3 70%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, 5% FREE MRL, TRC GRYSHBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG

MD 7020 TVD 5559.12  
INC 88.95 AZ 180.07  
VS 1901.12

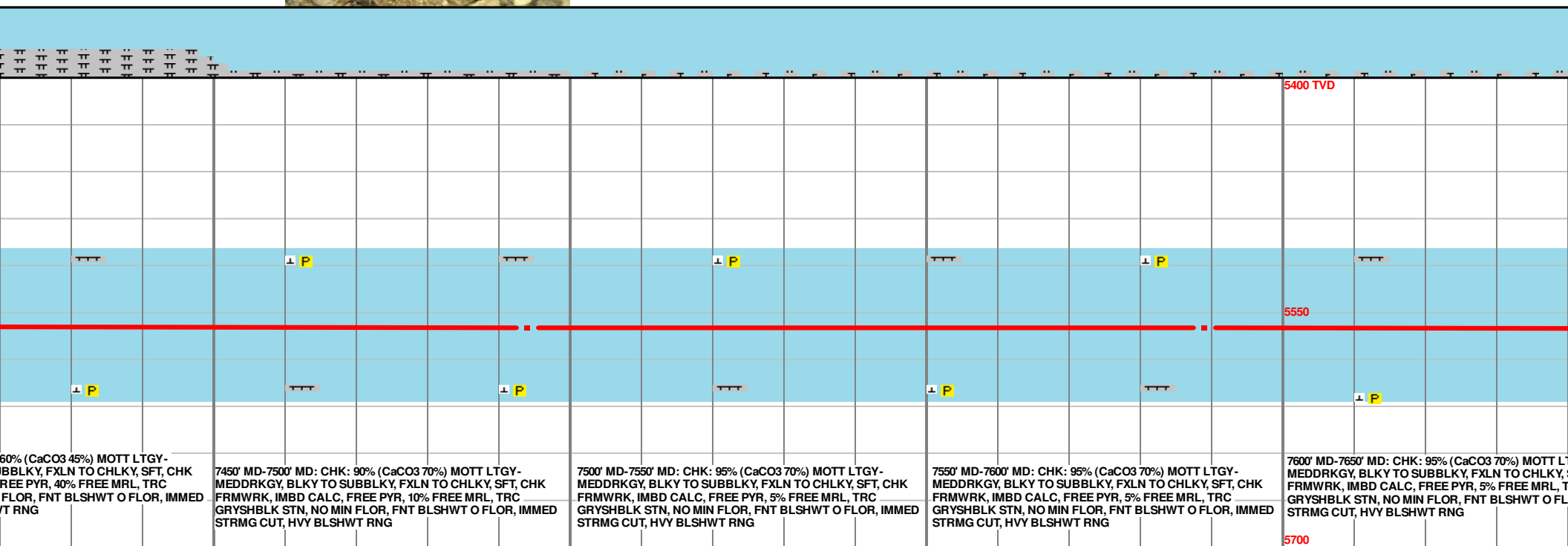
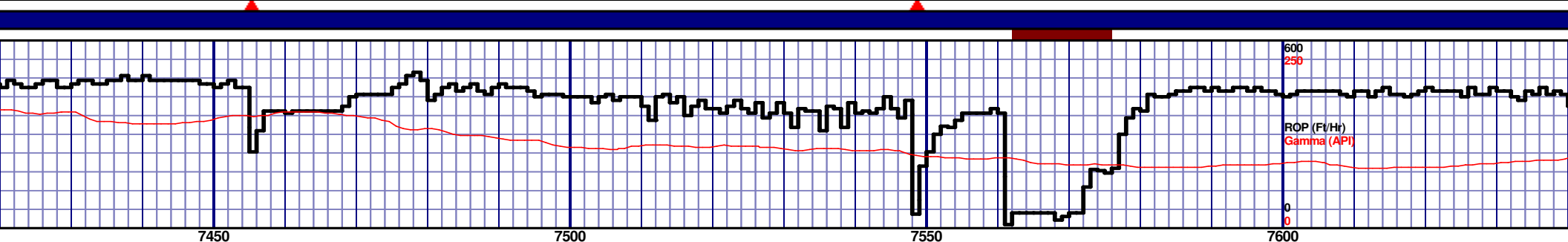
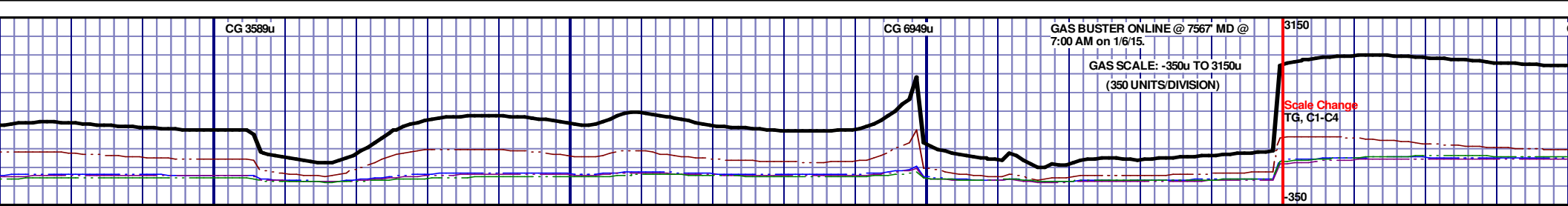
MD 7114 TVD 5560.1  
INC 89.85 AZ 180.63  
VS 1994.62



MD 7209 TVD 5559.77  
INC 90.56 AZ 180.73  
VS 2089.16

MD 7304 TVD 5558.7  
INC 90.74 AZ 180.74  
VS 2183.71

MD 7399 TVD 5558.7  
INC 89.26 AZ 180.49  
VS 2278.25



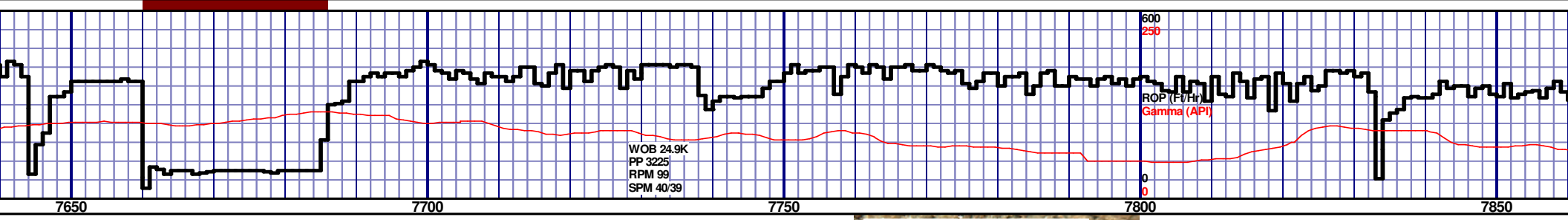
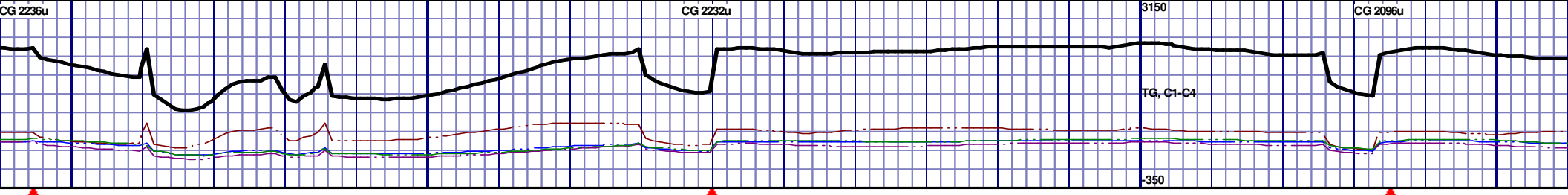
60% (CaCO<sub>3</sub> 45%) MOTT LTGY-  
IBBLKY, FXLN TO CHLKY, SFT, CHK  
FREE PYR, 40% FREE MRL, TRC  
FLOR, FNT BLSHWT O FLOR, IMMED  
T RNG

7450' MD-7500' MD: CHK: 90% (CaCO<sub>3</sub> 70%) MOTT LTGY-  
MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK  
FRMWRK, IMBD CALC, FREE PYR, 10% FREE MRL, TRC  
GRYSHBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED  
STRMG CUT, HVY BLSHWT RNG

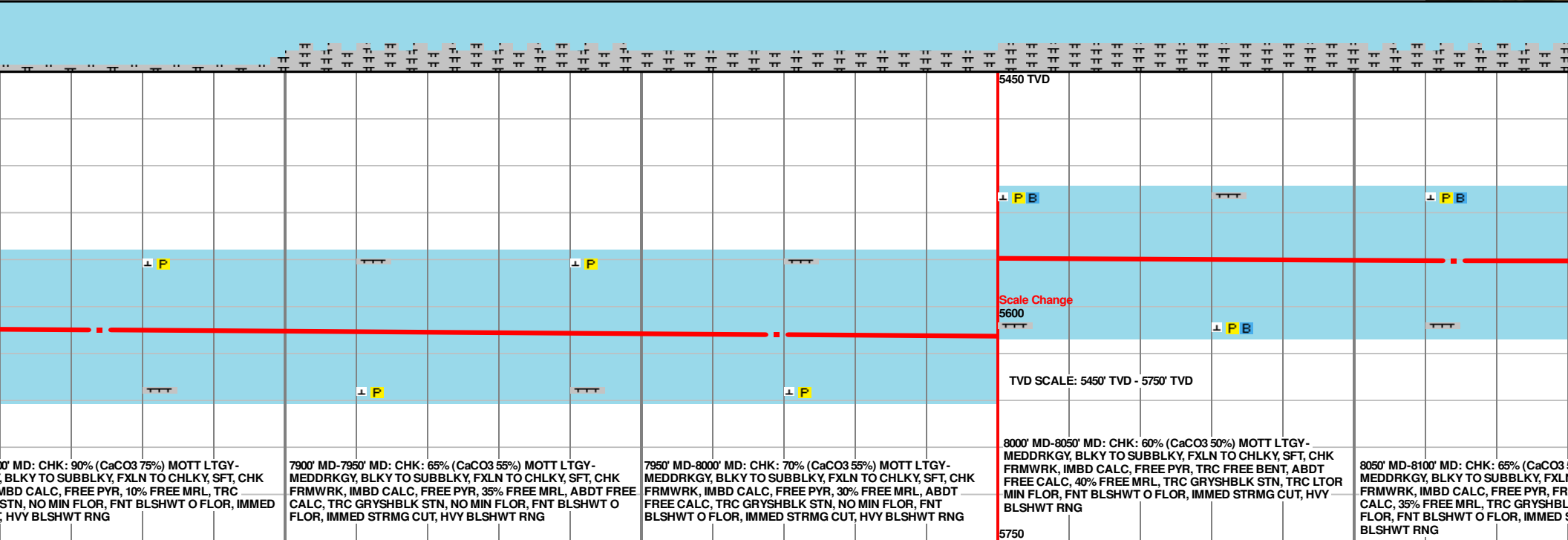
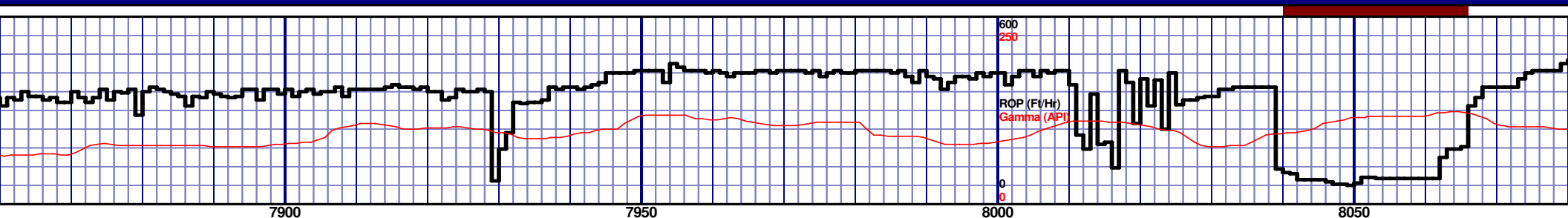
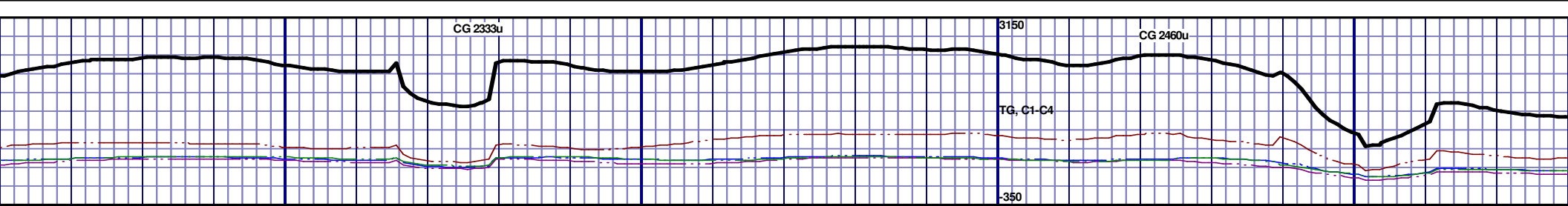
7500' MD-7550' MD: CHK: 95% (CaCO<sub>3</sub> 70%) MOTT LTGY-  
MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK  
FRMWRK, IMBD CALC, FREE PYR, 5% FREE MRL, TRC  
GRYSHBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED  
STRMG CUT, HVY BLSHWT RNG

7550' MD-7600' MD: CHK: 95% (CaCO<sub>3</sub> 70%) MOTT LTGY-  
MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK  
FRMWRK, IMBD CALC, FREE PYR, 5% FREE MRL, TRC  
GRYSHBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED  
STRMG CUT, HVY BLSHWT RNG

7600' MD-7650' MD: CHK: 95% (CaCO<sub>3</sub> 70%) MOTT LTGY-  
MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK  
FRMWRK, IMBD CALC, FREE PYR, 5% FREE MRL, TRC  
GRYSHBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED  
STRMG CUT, HVY BLSHWT RNG



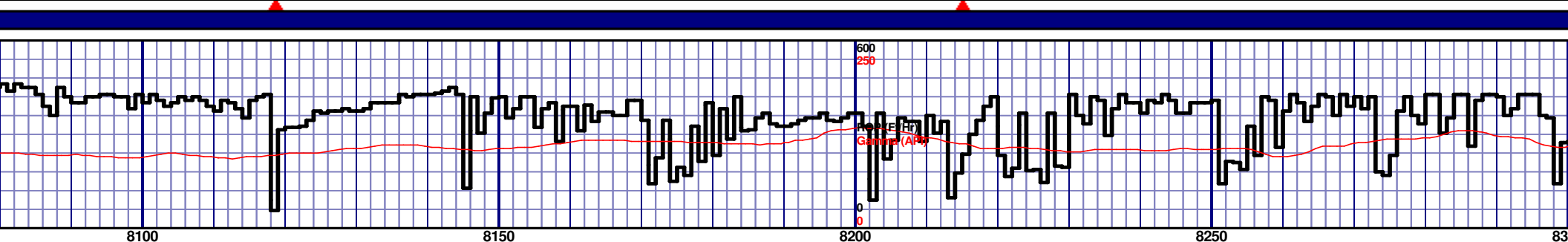
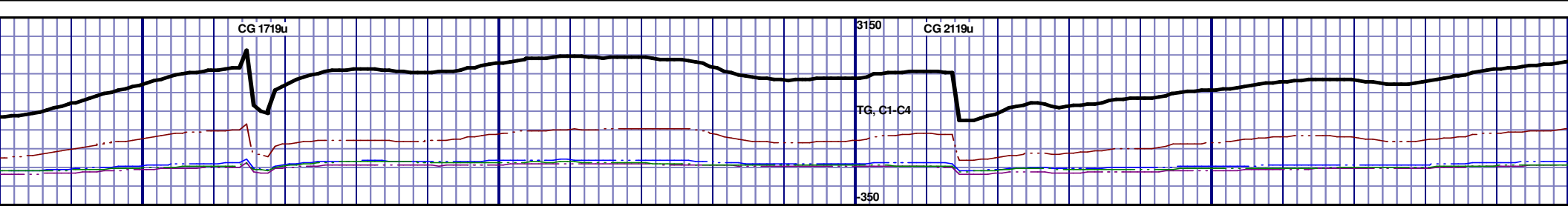
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MD 7874 TVD 5564.75  
INC 88.18 AZ 177.5  
VS 2749.99

MD 7969 TVD 5568.28  
INC 87.56 AZ 176.87  
VS 2843.74

MD 8064 TVD 5570.76  
INC 89.41 AZ 179.18  
VS 2937.71

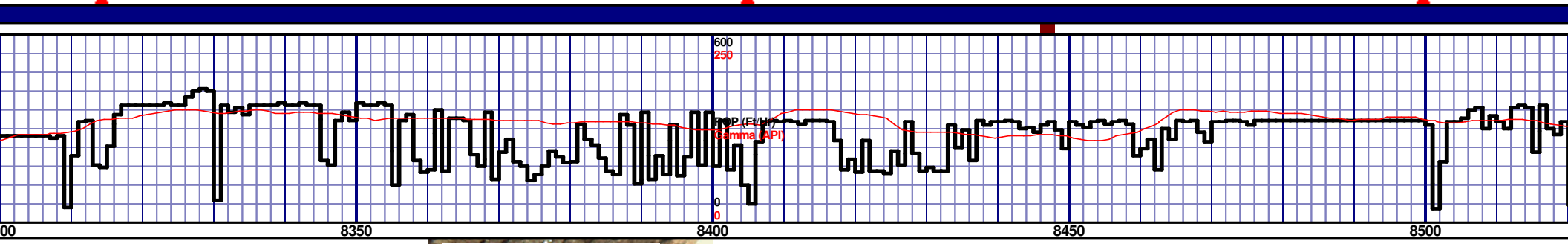


NIOBRARA B MARL 8125' MD 5571' TVD										5450 TVD									
5600										5750									
050' MD - 8100' MD: MRL: 70% (CaCO3 35%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, ABDT FREE CALC, TRC FREE BENT, 30% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG										8100' MD-8150' MD: MRL: 70% (CaCO3 45%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, ABDT FREE CALC, TRC FREE BENT, 30% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
8150' MD-8200' MD: MRL: 95% (CaCO3 35%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, ABDT FREE CALC, TRC FREE BENT, 5% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG										8200' MD-8250' MD: MRL: 70% (CaCO3 35%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, ABDT FREE CALC, TRC FREE BENT, 30% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
8250' MD-8300' MD: MRL: 70% (CaCO3 35%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, ABDT FREE CALC, TRC FREE BENT, 30% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG										8250' MD-8300' MD: MRL: 70% (CaCO3 35%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, ABDT FREE CALC, TRC FREE BENT, 30% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									

MD 8160 TVD 5571.84  
INC 89.32 AZ 179.79  
VS 3033.03

MD 8255 TVD 5573.45  
INC 88.74 AZ 179.54  
VS 3127.39

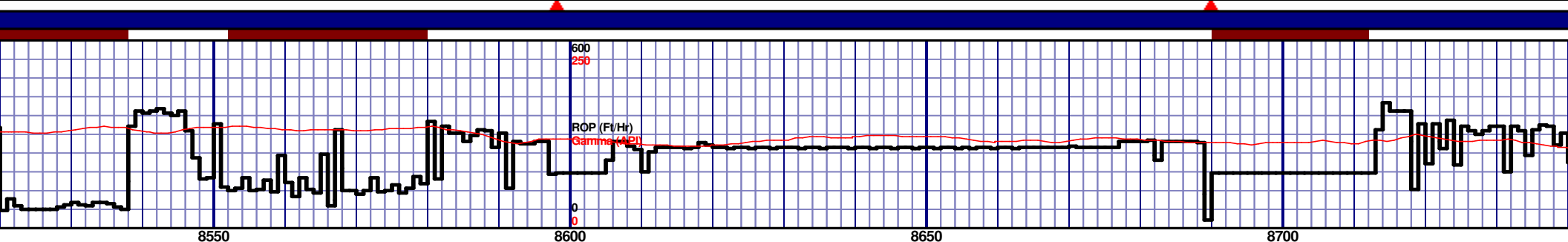
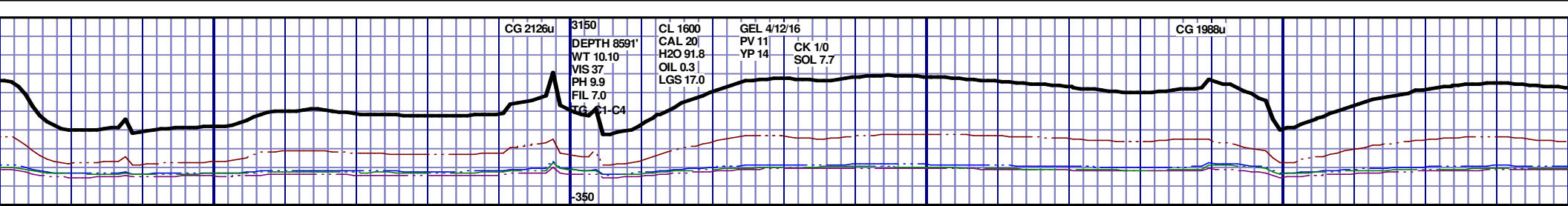




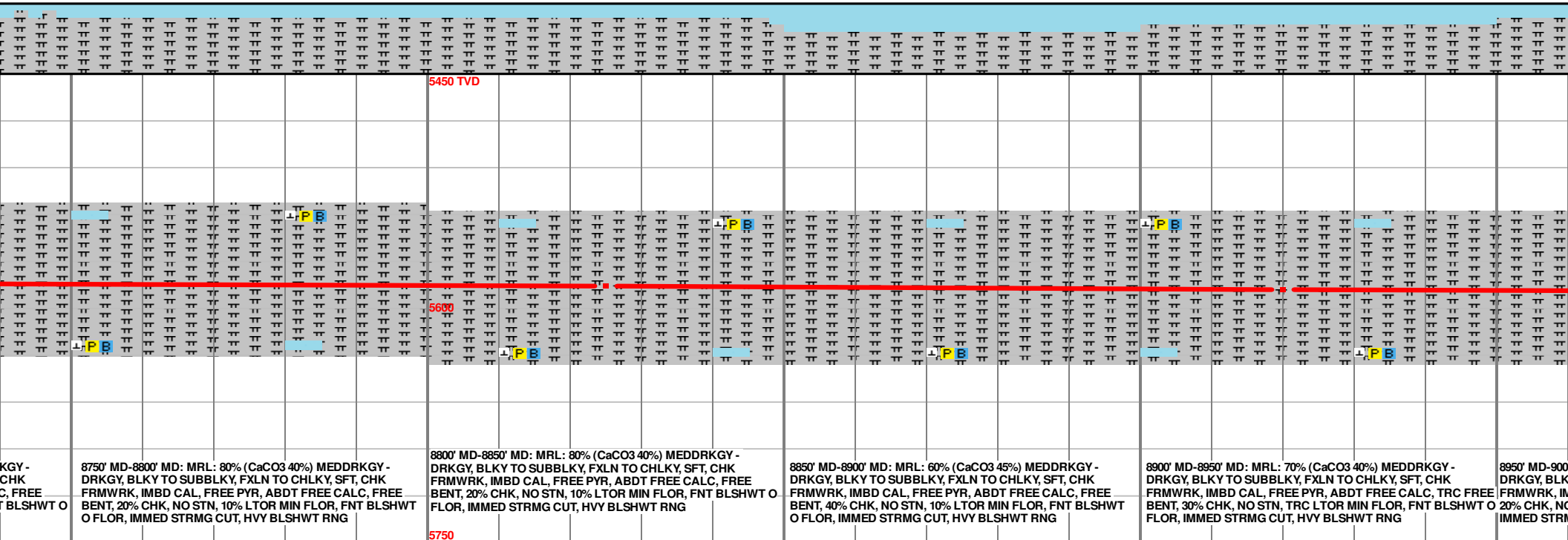
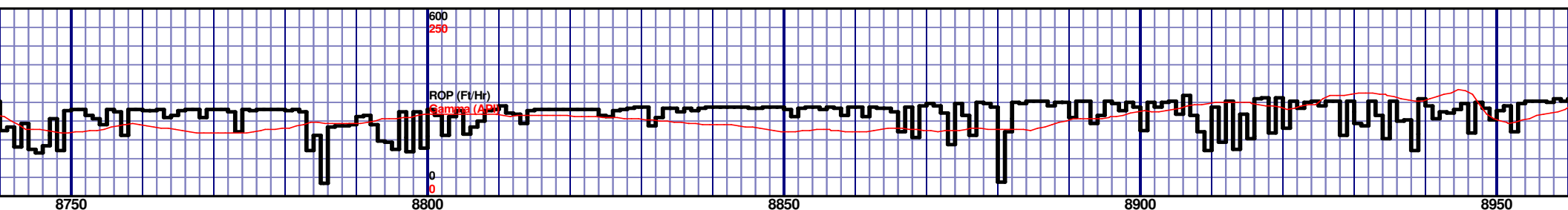
8300' MD-8350' MD: MRL: 90% (CaCO3 35%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, ABDT FREE CALC, TRC FREE BENT, 10% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
8350' MD-8400' MD: MRL: 80% (CaCO3 40%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, ABDT FREE CALC, TRC FREE BENT, 20% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
8400' MD-8450' MD: MRL: 80% (CaCO3 40%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, FREE CALC, TRC FREE BENT, 20% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
8450' MD-8500' MD: MRL: 90% (CaCO3 35%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, FREE CALC, TRC FREE BENT, 10% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
8500' MD-8550' MD: MRL: DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, FREE CALC, TRC FREE BENT, 10% CHK, NO STN, 5% LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									

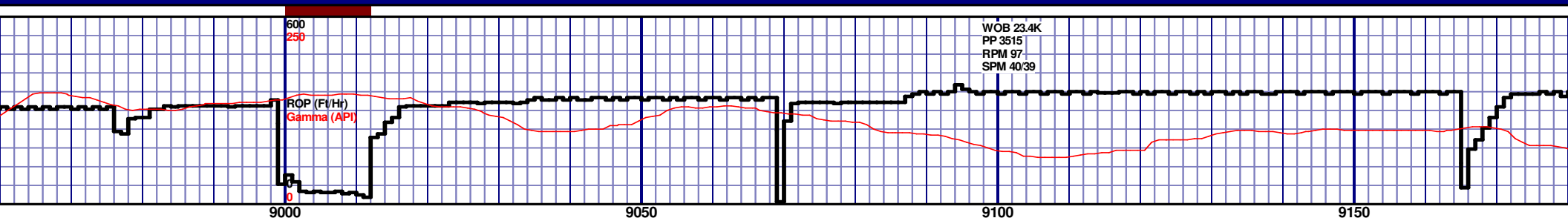
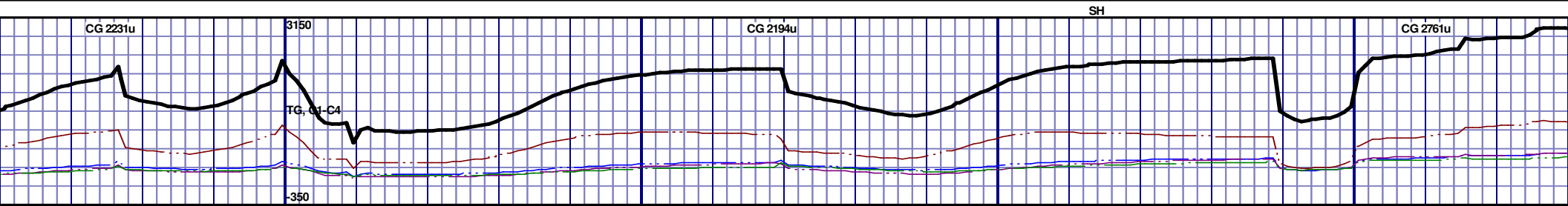
MD 8350 TVD 5575.88  
INC 88.34 AZ 179.16  
VS 3221.67

MD 8445 TVD 5578.82  
INC 88.12 AZ 179.58  
VS 3315.93



95% (CaCO3 35%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, FREE CALC, FREE BENT, 5% MIN FLOR, FNT BLSHWT O FLOR, BLSHWT RNG	8550' MD-8600' MD: MRL: 90% (CaCO3 35%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, FREE CALC, FREE BENT, 10% CHK, NO STN, 5% LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG	8600' MD-8650' MD: MRL: 95% (CaCO3 35%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, FREE CALC, FREE BENT, 5% CHK, NO STN, 10% LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG	8650' MD-8700' MD: MRL: 95% (CaCO3 35%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, FREE CALC, FREE BENT, 5% CHK, NO STN, 10% LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG	8700' MD-8750' MD: MRL: 85% (CaCO3 40%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, ABTD FREE CALC, FREE BENT, 15% CHK, NO STN, 10% LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG
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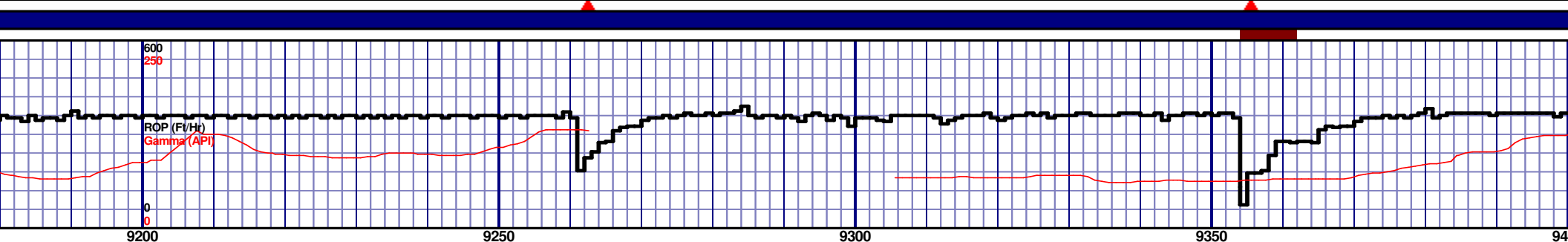
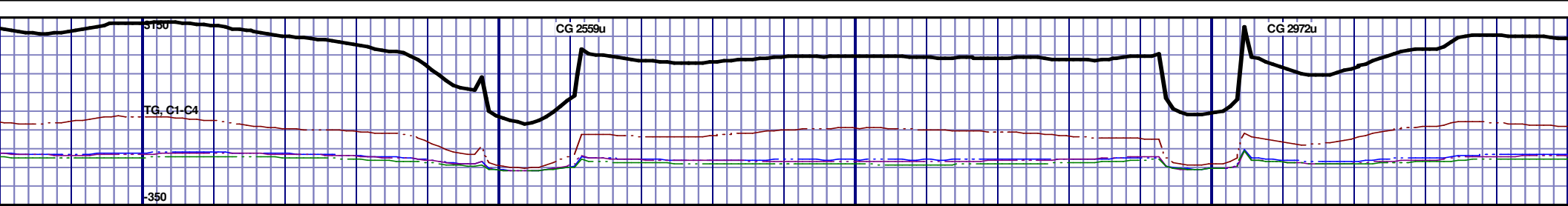




5450 TVD									
NIOBRARA B CHALK 9083' MD 5589' TVD									
FAULT EXPECTED AT ~8600' MD CAME IN NEAR 9020' MD.									
9000' MD-9050' MD: MRL: 60% (CaCO3 40%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, TRC FREE CALC, TRC FREE BENT, 40% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
9050' MD-9100' MD: CHK: 70% (CaCO3 55%) MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, TRC FREE CALC, 30% FREE MRL, TRC GRYSBLK STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
9100' MD-9150' MD: CHK: 80% (CaCO3 60%) MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, TRC FREE CALC, 20% FREE MRL, TRC GRYSBLK STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
9150' MD-9200' MD: CHK: 90% (CaCO3 70%) MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, TRC FREE CALC, 10% FREE MRL, TRC GRYSBLK STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									

MD 9015 TVD 5589.38  
INC 89.82 AZ 178.94  
VS 3880.74

MD 9110 TVD 5589.56  
INC 89.97 AZ 178.97  
VS 3974.97

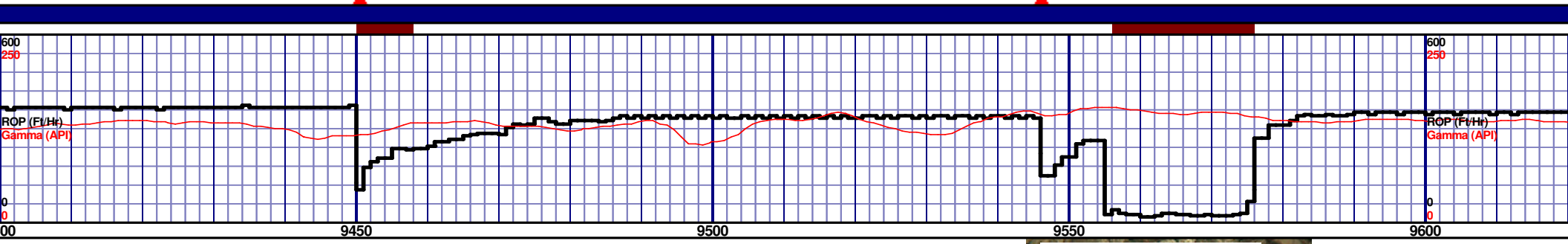
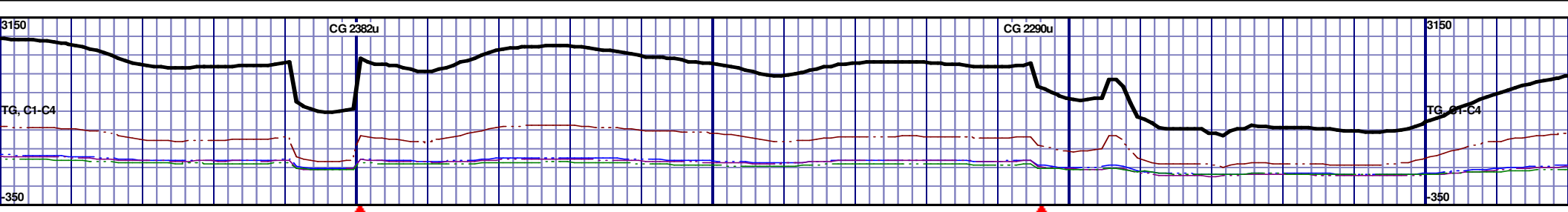


5450 TVD									
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5600									
<div>1 PB</div> <div>1 PB</div> <div>1 PB</div> <div>1 PB</div> <div>1 PB</div> <div>1 PB</div> <div>1 PB</div> <div>1 PB</div> <div>1 PB</div> <div>1 PB</div>									
9200' MD-9250' MD: CHK: 95% (CaCO3 70%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, TRC FREE CALC, 5% FREE MRL, TRC GRYSBLK STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
9250' MD-9300' MD: CHK: 80% (CaCO3 60%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, TRC FREE CALC, 20% FREE MRL, TRC GRYSBLK STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
9300' MD-9350' MD: CHK: 70% (CaCO3 55%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, TRC FREE CALC, 30% FREE MRL, TRC GRYSBLK STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
9350' MD-9400' MD: CHK: 70% (CaCO3 55%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, TRC FREE CALC, 30% FREE MRL, TRC GRYSBLK STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
5750									

MD 9205 TVD 5589.76  
INC 89.78 AZ 178.35  
VS 4069.13

MD 9300 TVD 5589.97  
INC 89.97 AZ 178.24  
VS 4163.21

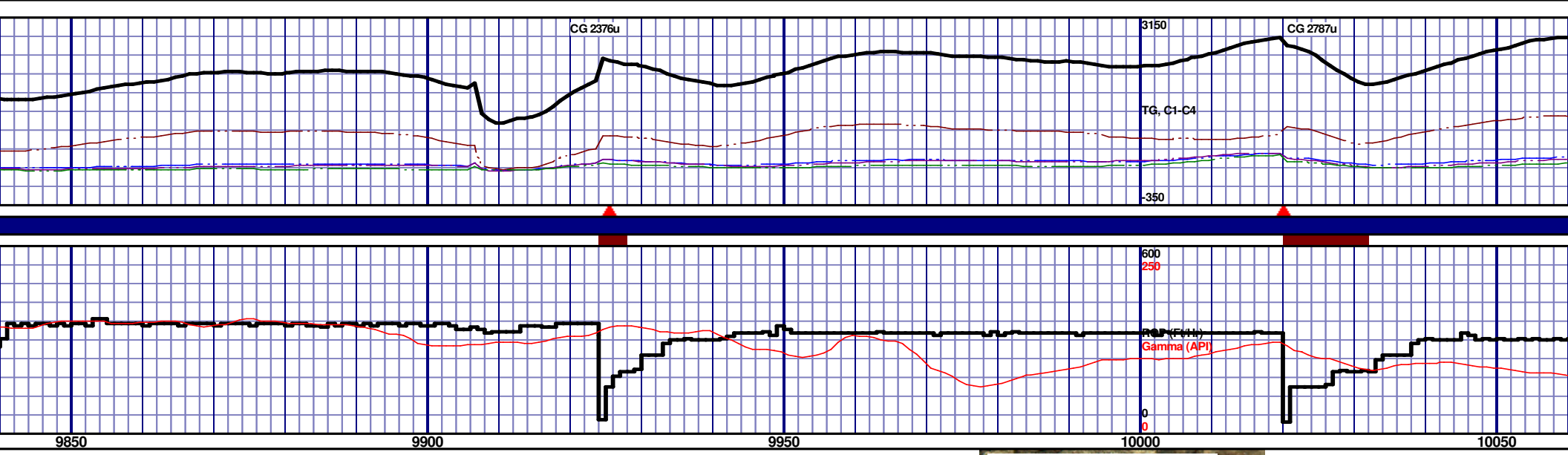
MD 9400 TVD 5589.97  
INC 89.97 AZ 178.24  
VS 4163.21



5450 TVD									
9400' MD-9450' MD: CHK: 80% (CaCO3 60%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, TRC FREE CALC, 20% FREE MRL, TRC GRYSBLK STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
9450' MD-9500' MD: CHK: 60% (CaCO3 55%) MOTT LTGY-MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, TRC FREE CALC, 40% FREE MRL, TRC GRYSBLK STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
9500' MD-9550' MD: MRL: 60% (CaCO3 5%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, TRC FREE CALC, TRC FREE BENT, 40% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
9550' MD-9600' MD: MRL: 65% (CaCO3 40%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, TRC FREE CALC, TRC FREE BENT, 35% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
9600' MD-9650' MD: MRL: 60% (CaCO3 40%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, TRC FREE CALC, TRC FREE BENT, 35% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
5750									



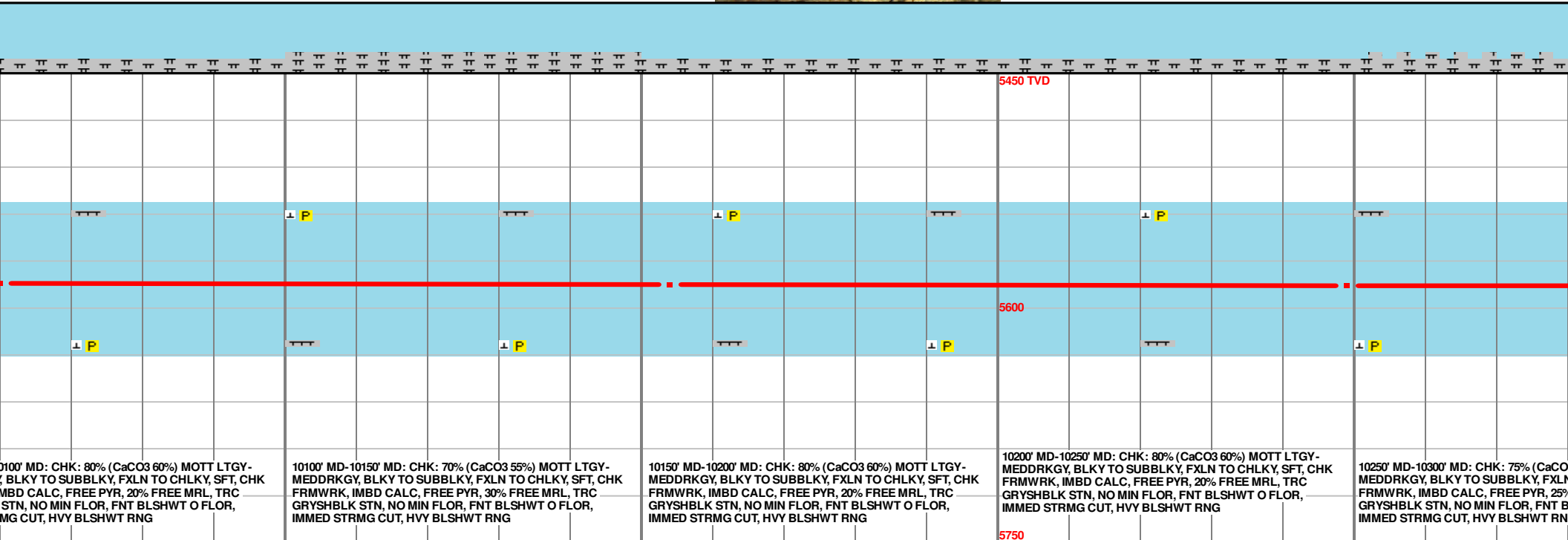
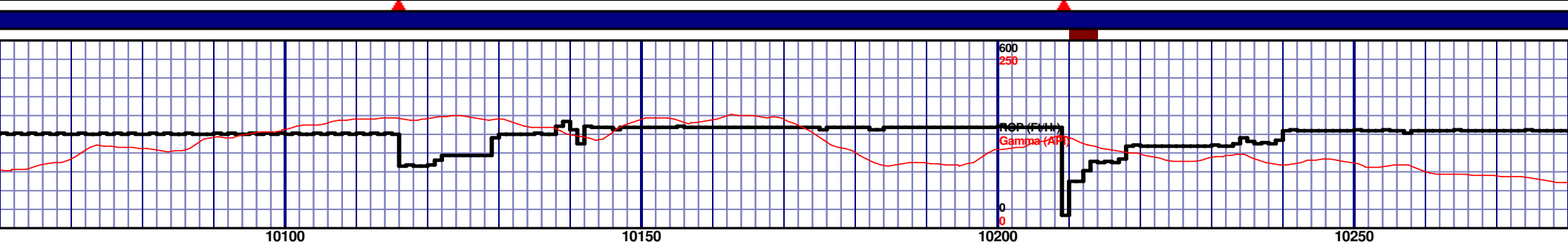
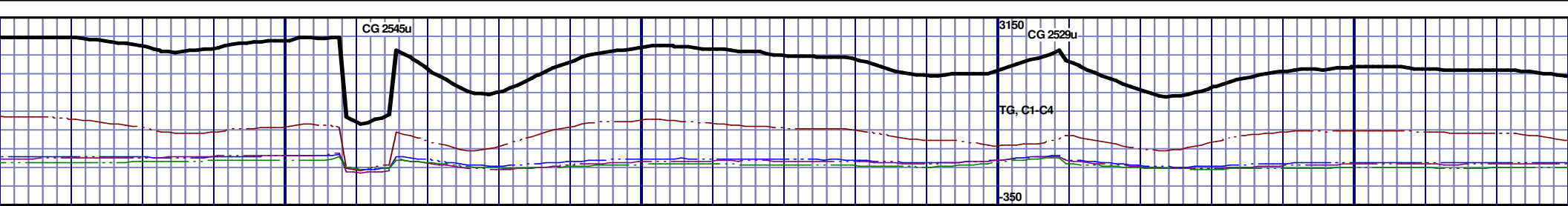


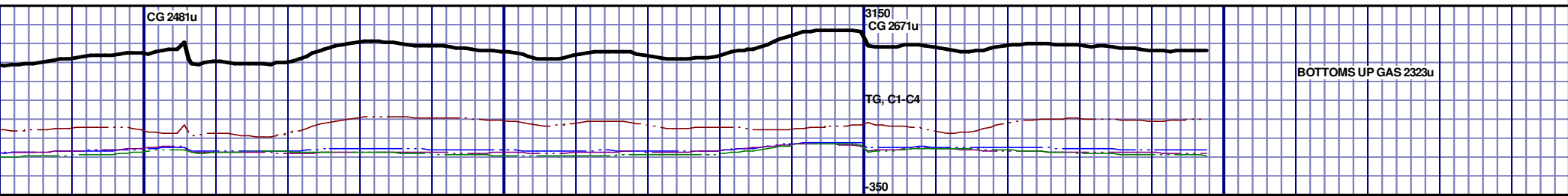


NIOBARRA B CHALK - 9977' MD 5584' TVD									
5450 TVD									
NIOBARRA B CHALK									
9977' MD 5584' TVD									
5600									
5750									
9850' MD-9900' MD: MRL: 80% (CaCO3 40%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, TRC FREE CALC, TRC FREE BENT, 20% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
9900' MD-9950' MD: MRL: 60% (CaCO3 45%) MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CAL, FREE PYR, TRC FREE CALC, TRC FREE BENT, 40% CHK, NO STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
9950' MD-10000' MD: CHK: 75% (CaCO3 60%) MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, TRC FREE CALC, 25% FREE MRL, TRC GRYSBLK STN, TRC LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
10000' MD-10050' MD: CHK: 80% (CaCO3 60%) MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, 20% FREE MRL, TRC GRYSBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									
10050' MD-10100' MD: CHK: 80% (CaCO3 60%) MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD CALC, FREE PYR, 20% FREE MRL, TRC GRYSBLK STN, NO MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY BLSHWT RNG									

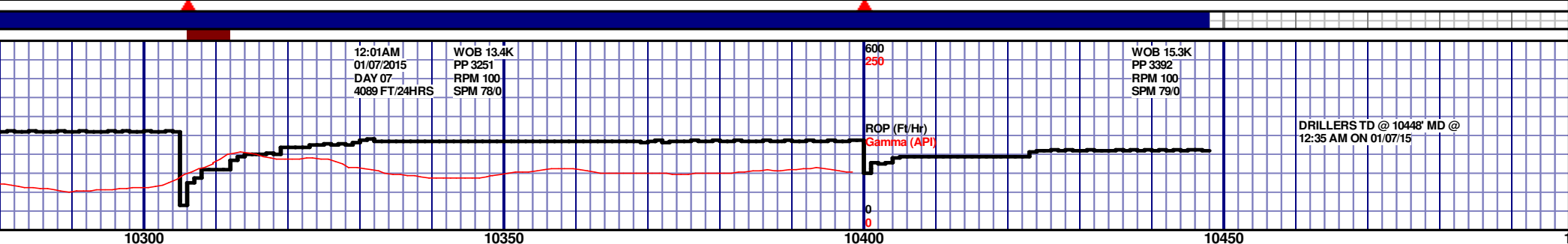
MD 9870 TVD 5583.31  
INC 89.97 AZ 180.24  
VS 4728.1

MD 9965 TVD 5583.72  
INC 89.54 AZ 179.97  
VS 4822.55





BOTTOMS UP GAS 2323u

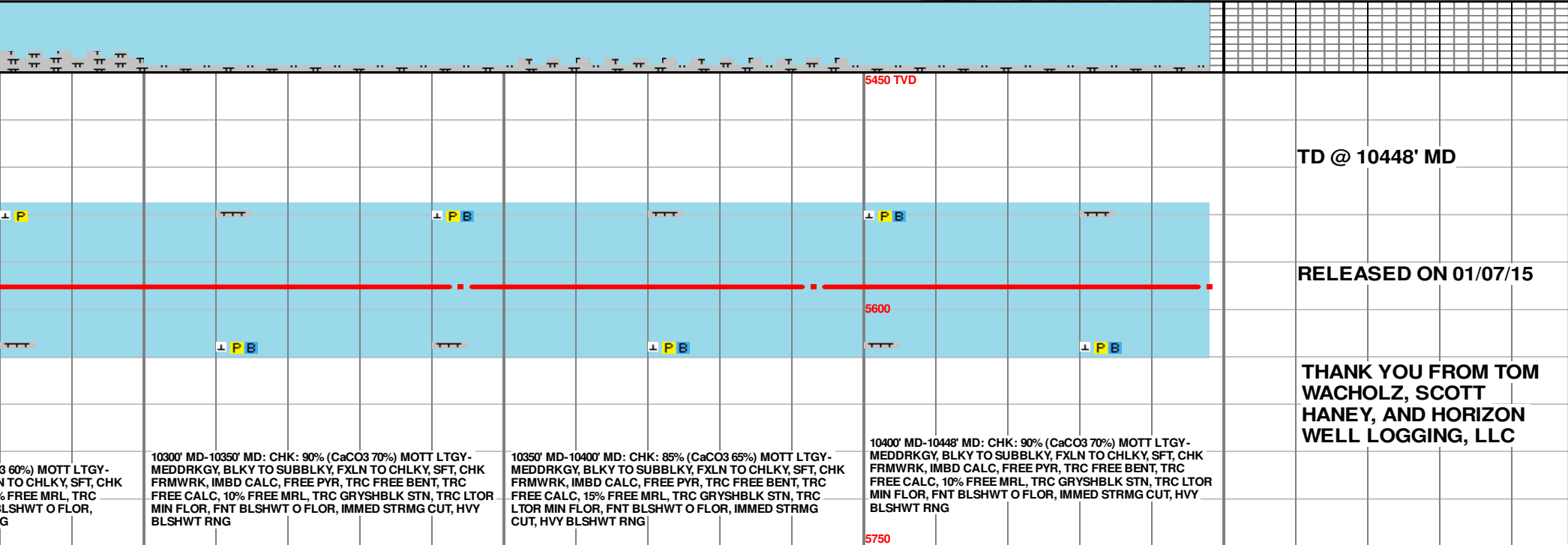


12:01AM  
01/07/2015  
DAY 07  
4089 FT/24HRS

WOB 13.4K  
PP 3251  
RPM 100  
SPM 78/0

WOB 15.3K  
PP 3392  
RPM 100  
SPM 79/0

DRILLERS TD @ 10448' MD @  
12:35 AM ON 01/07/15



TD @ 10448' MD

RELEASED ON 01/07/15

THANK YOU FROM TOM  
WACHOLZ, SCOTT  
HANEY, AND HORIZON  
WELL LOGGING, LLC

3 60%) MOTT LTGY-  
N TO CHLKY, SFT, CHK  
% FREE MRL, TRC  
BLSHWT O FLOR,  
G

10300' MD-10350' MD: CHK: 90% (CaCO3 70%) MOTT LTGY-  
MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK  
FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, TRC  
FREE CALC, 10% FREE MRL, TRC GRYSBLK STN, TRC LTOR  
MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY  
BLSHWT RNG

10350' MD-10400' MD: CHK: 85% (CaCO3 65%) MOTT LTGY-  
MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK  
FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, TRC  
FREE CALC, 15% FREE MRL, TRC GRYSBLK STN, TRC  
LTOR MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG  
CUT, HVY BLSHWT RNG

10400' MD-10448' MD: CHK: 90% (CaCO3 70%) MOTT LTGY-  
MEDDRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK  
FRMWRK, IMBD CALC, FREE PYR, TRC FREE BENT, TRC  
FREE CALC, 10% FREE MRL, TRC GRYSBLK STN, TRC LTOR  
MIN FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, HVY  
BLSHWT RNG

MD 10344 TVD 5585.69  
INC 89.81 AZ 179.18  
VS 5198.9

MD 10393 TVD 5585.87  
INC 89.75 AZ 178.52  
VS 5247.49

PTB MD 10448 TVD 5586.11  
INC 89.75 AZ 178.52  
VS 5301.98