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WWW.HZMUD.COM/25

Customer Information

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

Geologist: Cassidy Miller
Noble Energy Inc.

Mud Logging Details

Logger: Hannah Blatchford &
Rob Gulliksen
Log Interval: 6650' MD to 10911' MD
Start Date: October 18, 2013
Release Date: October 21, 2013

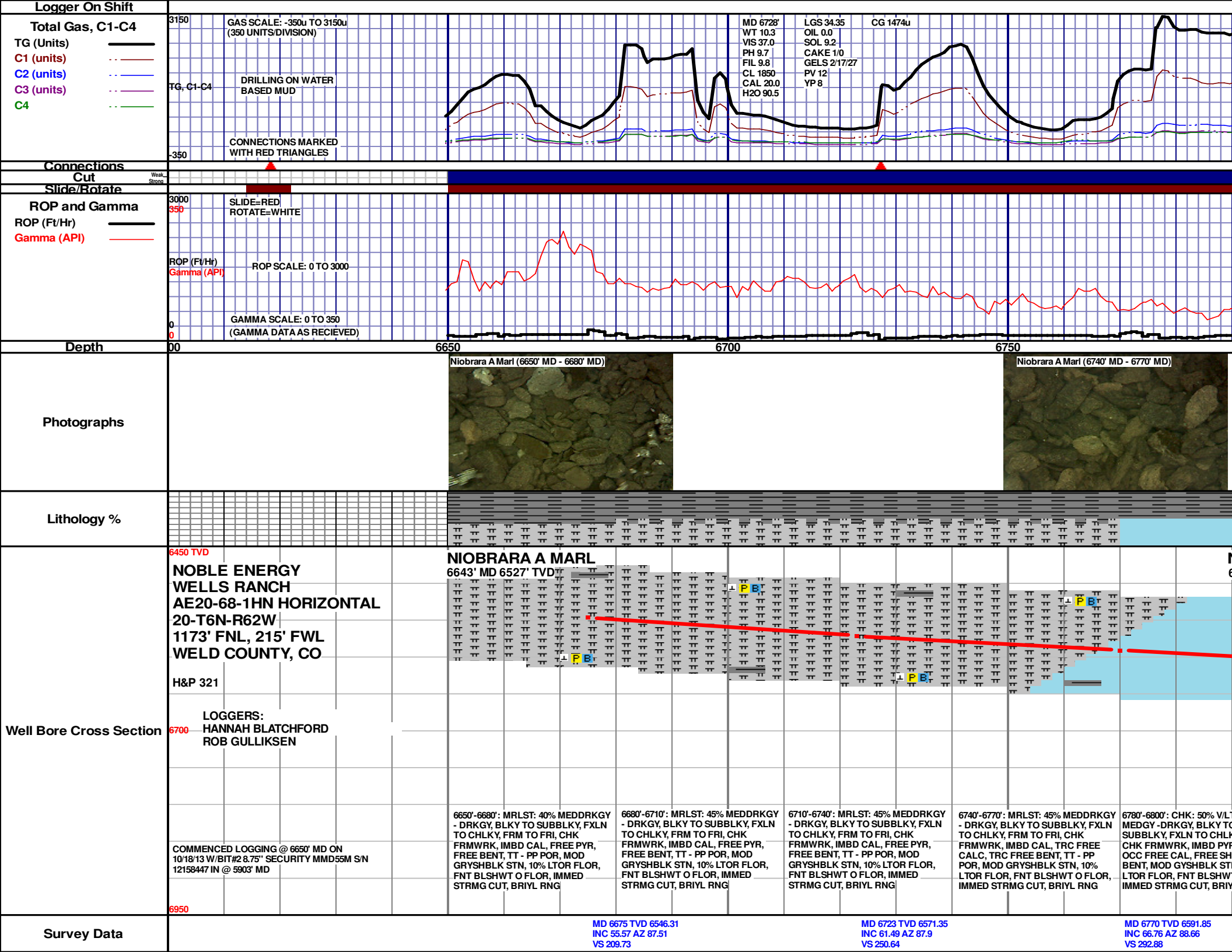
Well Information

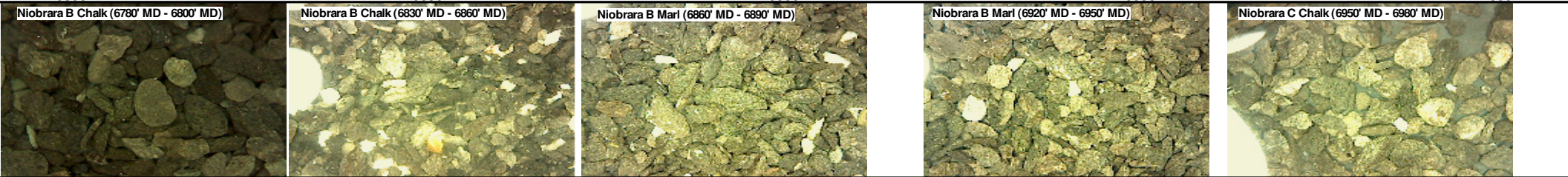
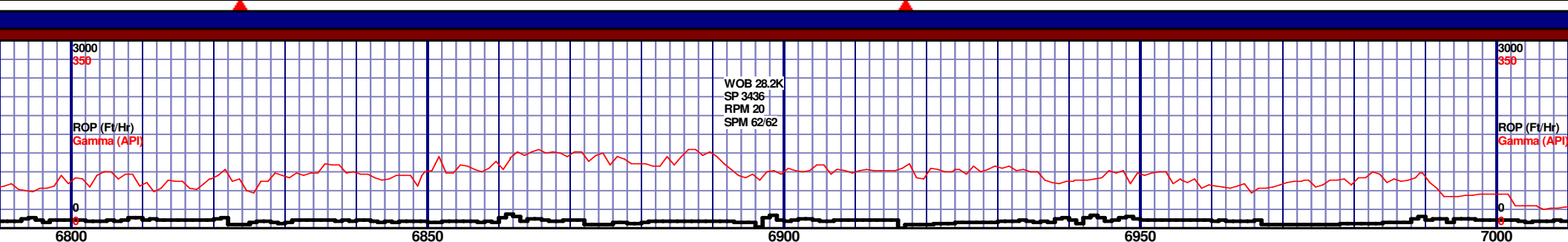
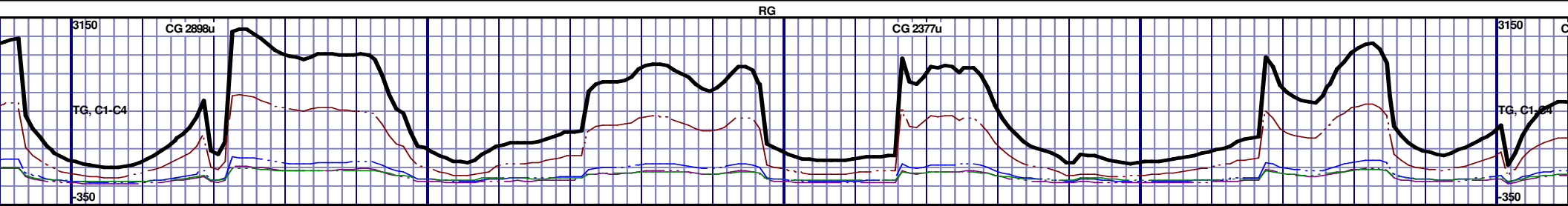
Well Name: Wells Ranch
AE20-68-1HN Horizontal

Location: 20-T6N-R62W
1173' FNL, 215' FWL

County: Weld Co.
State: Colorado

Drilling Rig: H&P 321
Total Depth: 10911' MD
TD Date: October 21, 2013
Formation: Niobrara C Chalk
KB Elevation: 4871'
GR Elevation: 4841'
API Number: 05-123-37217-0000





NIOBRARA B CHALK		NIOBRARA B MARL				NIOBRARA C CHALK	
6789' MD 6599' TVD		6869' MD 6626' TVD				6960' MD 6645' TVD	
6800'-6830': CHK: 50% V/LTGY-MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG		6860'-6890': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, ABDT FREE CAL, ABDT FREE BENT, TT - PP POR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG				6950'-6980': CHK: 60% V/LTGY-MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG	
6830'-6860': CHK: 55% V/LTGY-MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, ABDT FREE CAL, FREE SH, ABDT FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG		6890'-6920': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, ABDT FREE CAL, ABDT FREE BENT, TT - PP POR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG				6980'-7010': CHK: 55% V/LTGY-MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG	
6950		6950				6950	

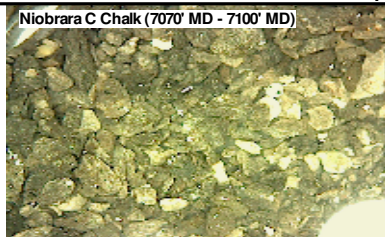
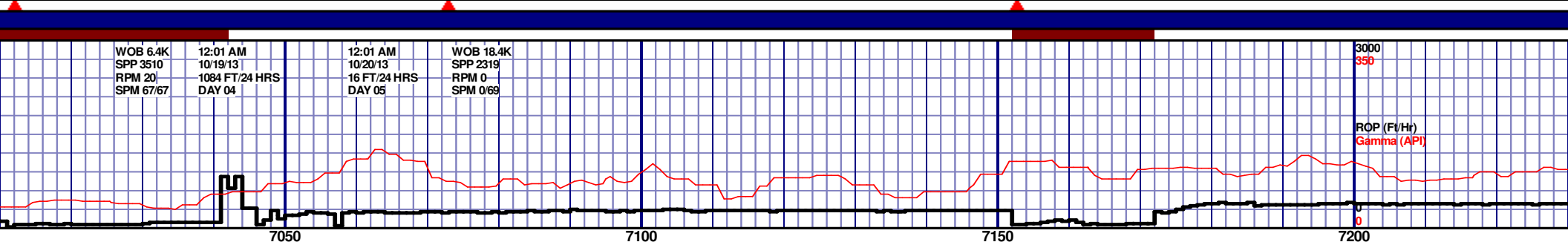
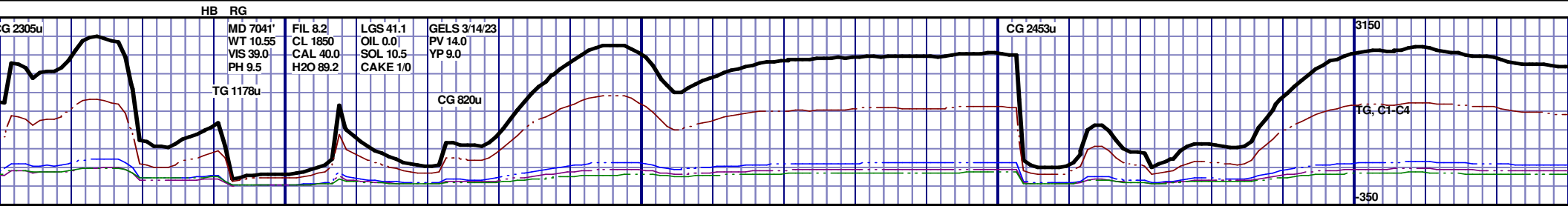
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INC 68.91 AZ 89.88
VS 337.25

MD 6865 TVD 6624.94
INC 73.91 AZ 91.32
VS 381.62

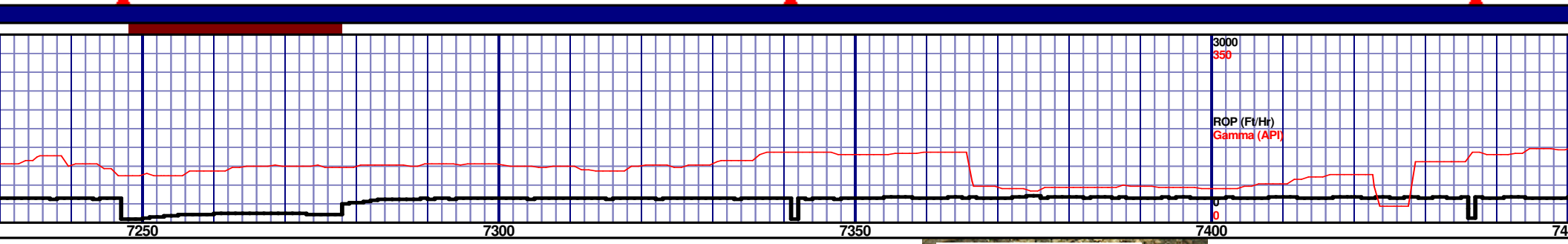
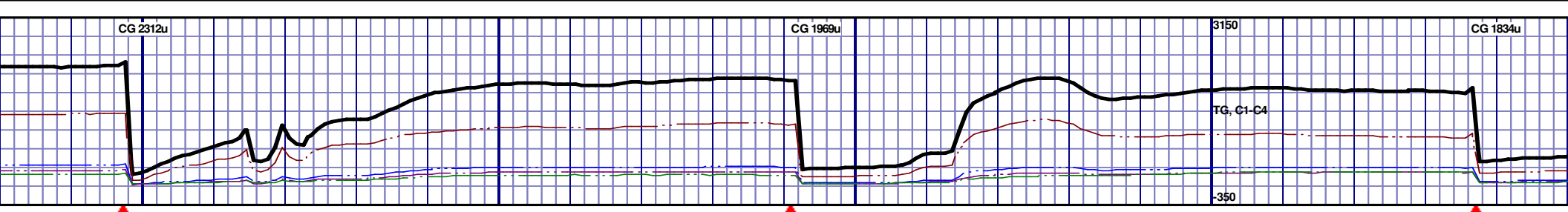
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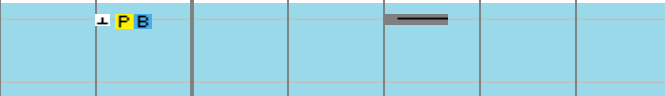
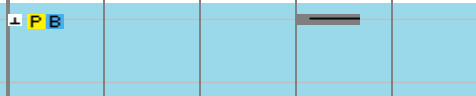
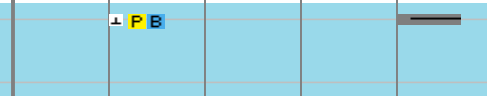
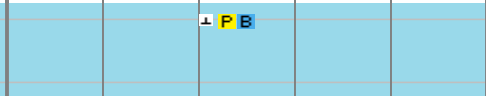
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INC 81.3 AZ 91.33
VS 472.98

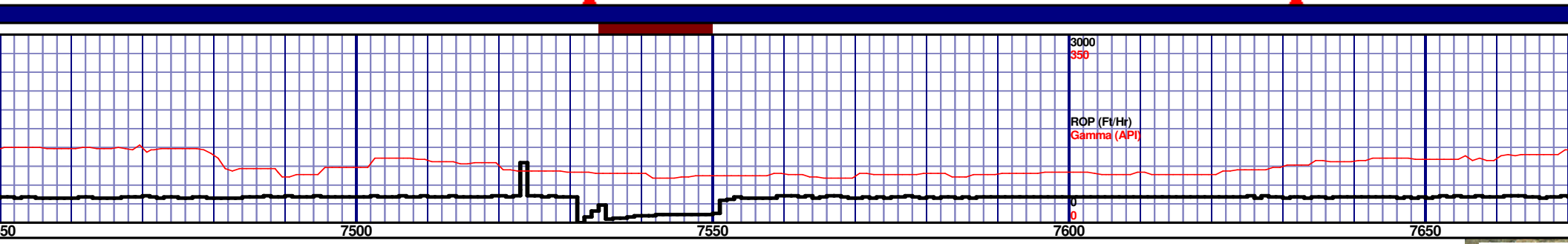
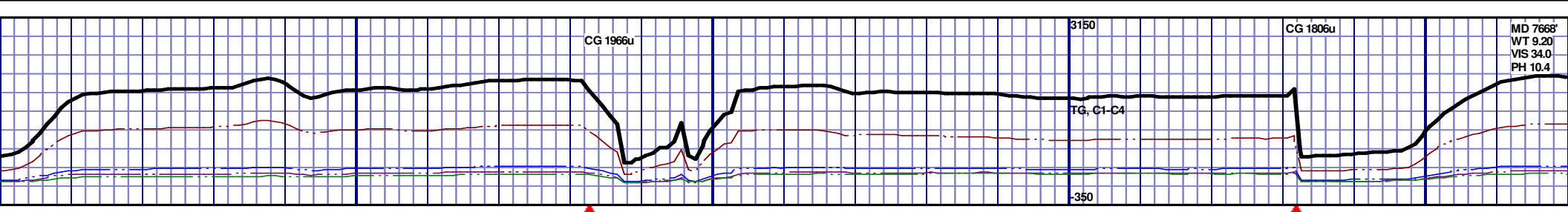
MD 6987 TVD 6648.57
INC 82.94 AZ 90.14
VS 500.62



TOOH @ 7:45PM ON 10/18/13 @ 7041' MD FOR INTERMEDIATE CASING OPERATIONS. TIH @ 7:45 PM ON 10/19/13. RESUMED DRILLING @ 11:45PM ON 10/19/13 W/ BIT #3 6.125" SMITH SDI513 UBXP S/N JH4565 IN @ 7041' MD.										6450 TVD
<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>										
SWITCHED TO 50' SAMPLE INTERVAL.										6700
7010'-7040': CHK: 50% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG										
7040'-7070': CHK: 50% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG										
7070'-7100': CHK: 50% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG										
7100'-7150': CHK: 65% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG										
7150'-7200': CHK: 65% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG										
7200'-7250': CHK: 60% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG										6950



															6450 TVD				
																			

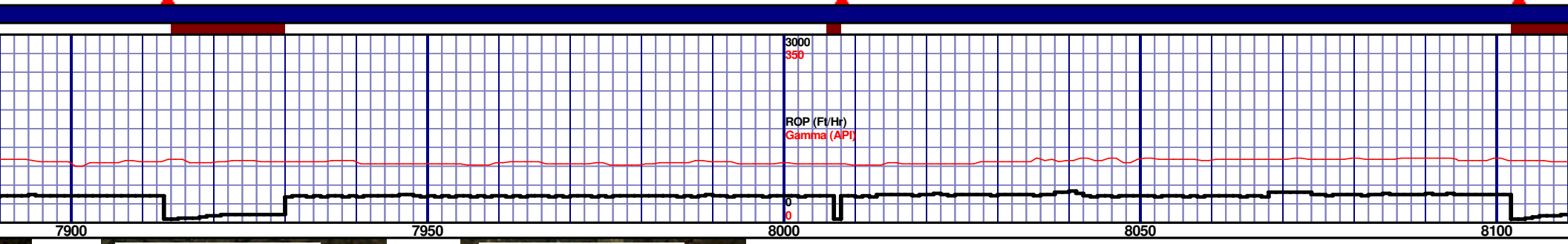
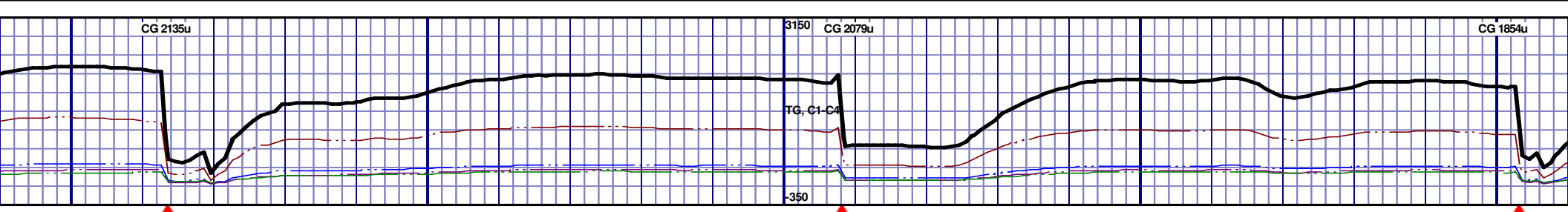


<p>7450'-7500': CHK: 60% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>7500'-7550': CHK: 60% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>7550'-7600': CHK: 60% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>7600'-7650': CHK: 60% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>7650'-7700': CHK: 50% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, TRC FREE BENT, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>
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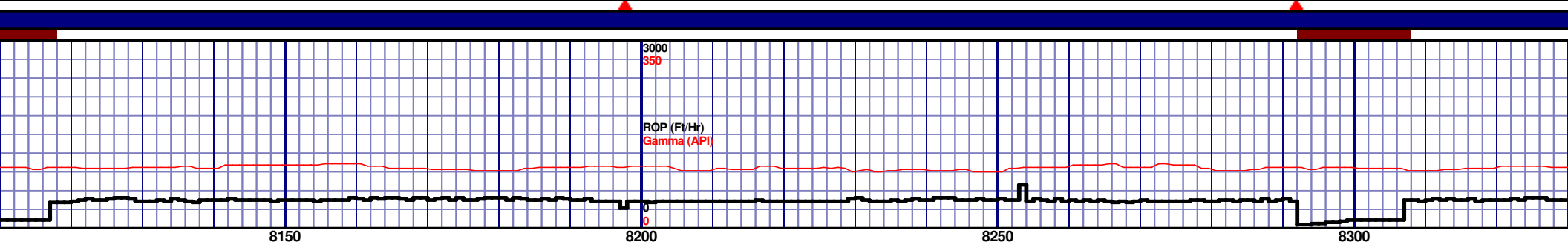
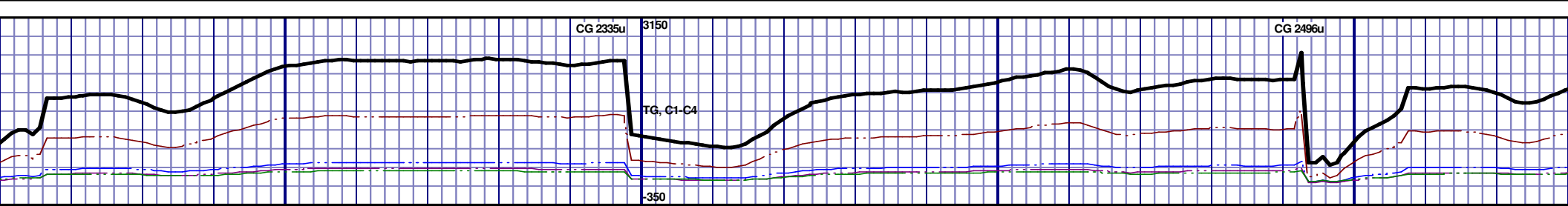
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INC 91.79 AZ 87.57
VS 963.09

MD 7566 TVD 6661.93
INC 90.46 AZ 90.11
VS 1077.94

MD 7661 TVD 6661.93
INC 91.36 AZ 90.11
VS 1172.64



NIOBRARA C CHALK 7900' MD 6659' TVD					6450 TVD					

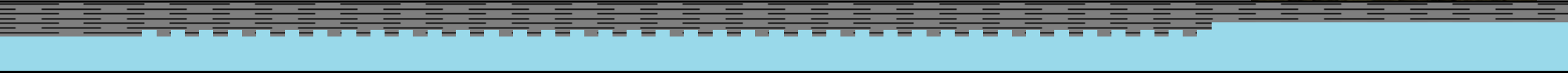
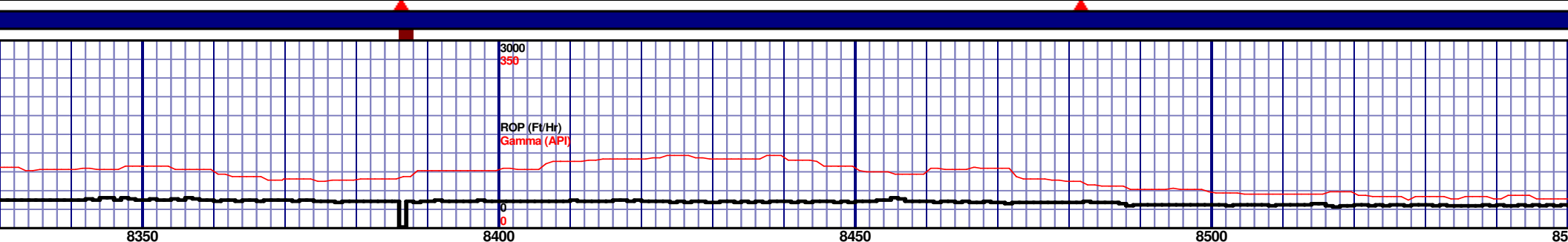
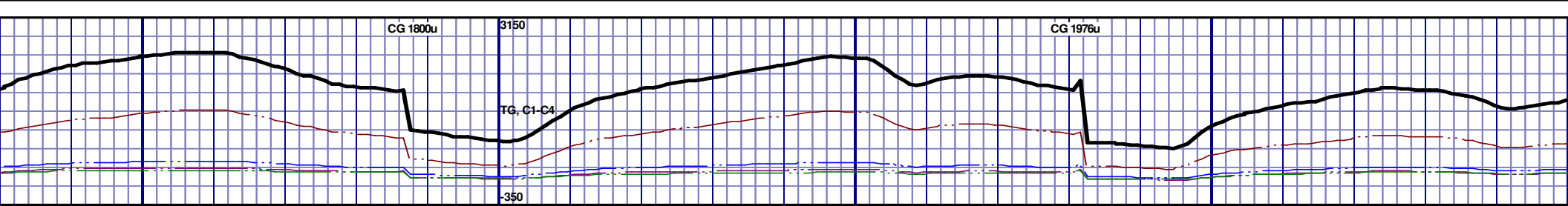


6450 TVD				
6790				
6950				
8150'-8200': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD PYRC CAL, ABDT FREE CAL, TRC IMBD PYR, TRC FREE BENT, TT - PP POR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG				
8200'-8250': MRLST: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, ABDT FREE CAL, TRC IMBD PYR, TRC FREE BENT, TT - PP POR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG				
8250'-8300': CHK: 50% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, ABDT FREE BENT, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG				
8300'-8350': CHK: 50% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, ABDT FREE BENT, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG				

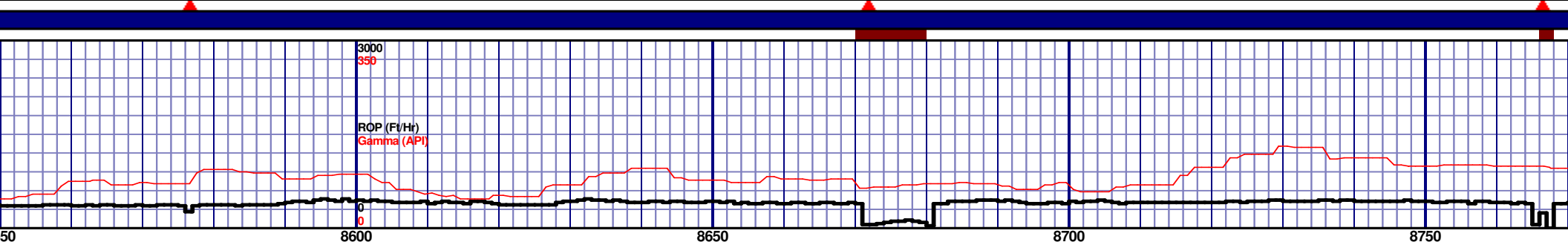
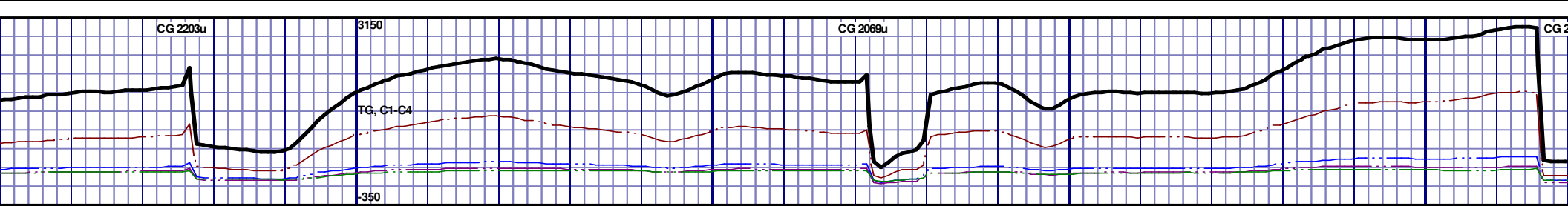
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INC 90.71 AZ 88.74
VS 1646.04

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INC 89.35 AZ 87.91
VS 1739.96

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INC 91.11 AZ 88.74
VS 1839.96



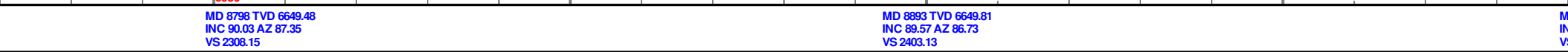
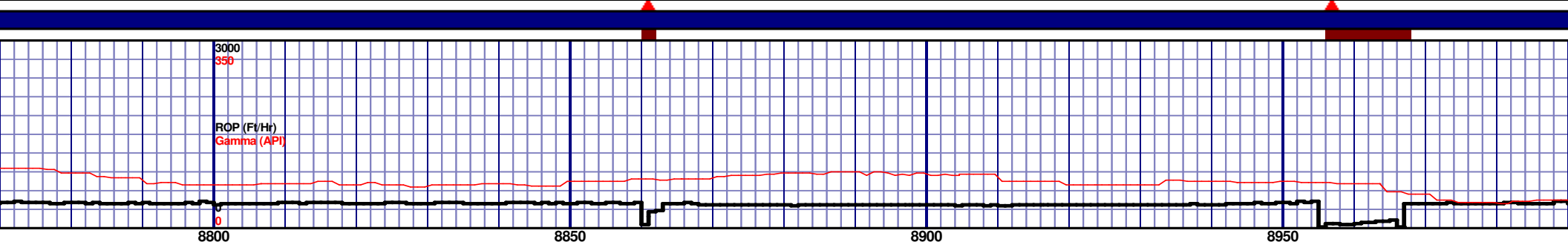
				6450 TVD							

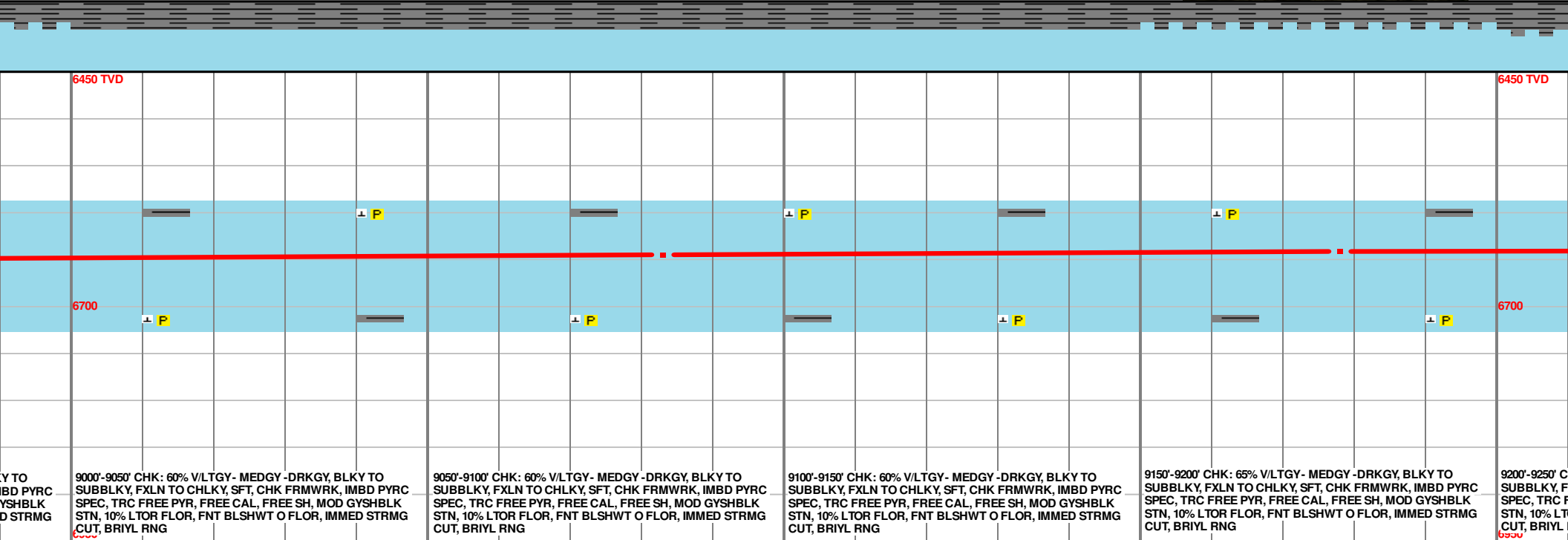
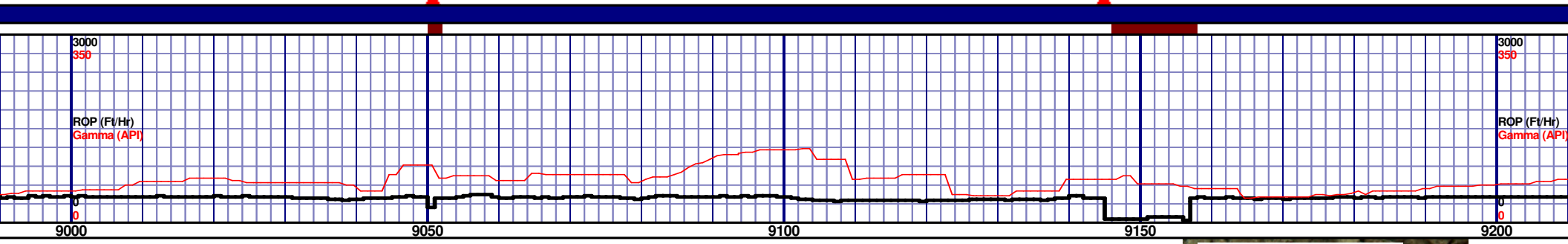
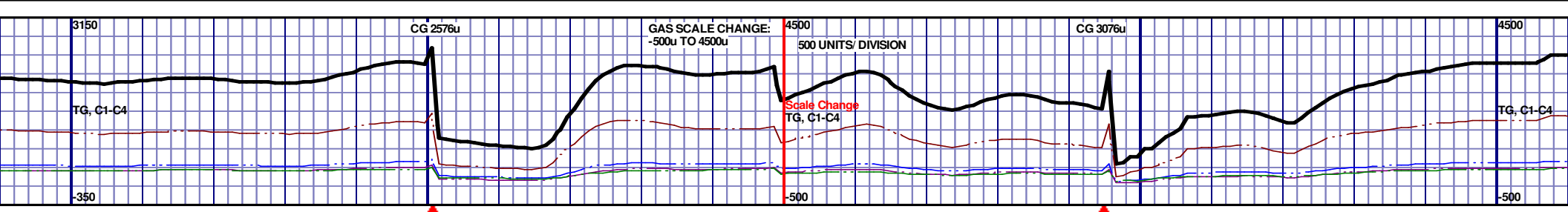


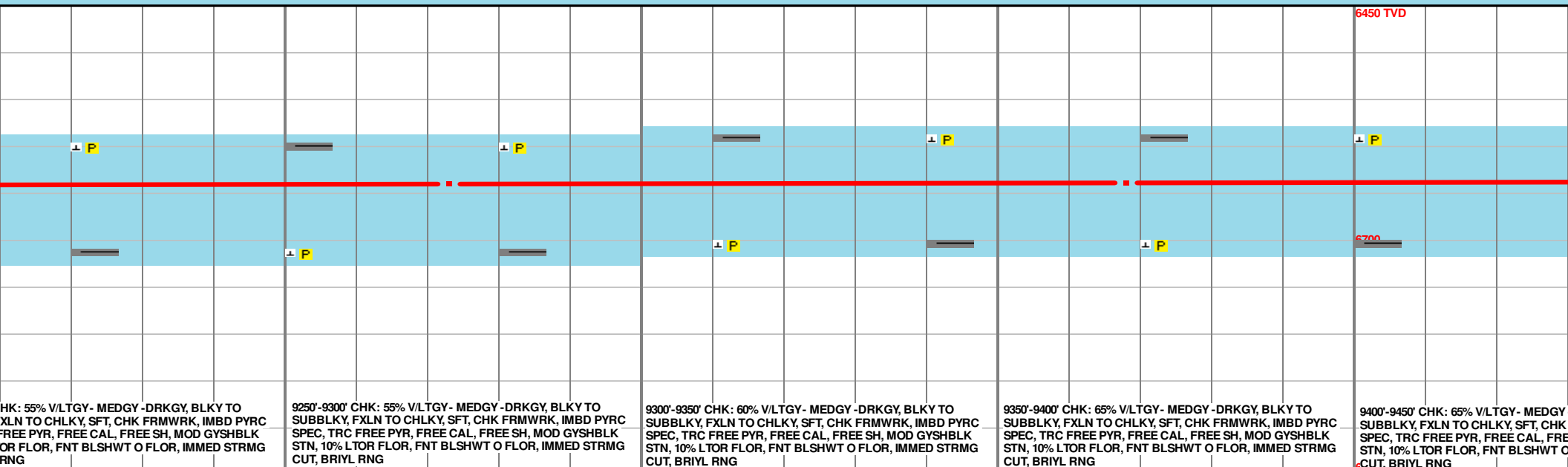
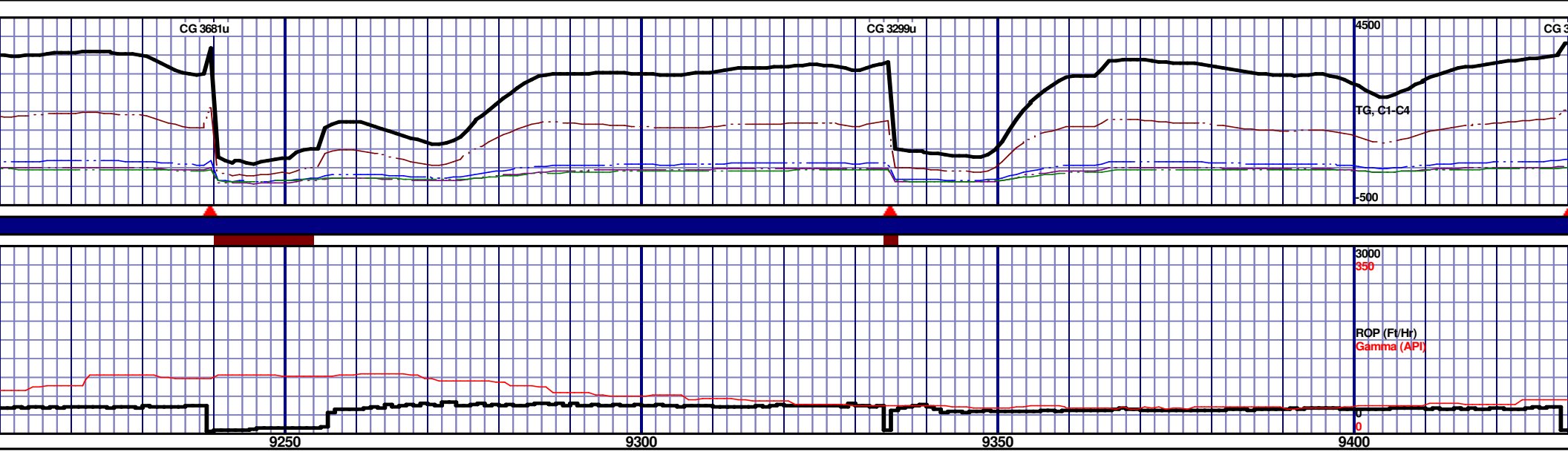
<p>8550'-8600' CHK: 65% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>8600'-8650' CHK: 60% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>8650'-8700' CHK: 60% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>8700'-8750' CHK: 55% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, TRC FREE BENT, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>8750'-8800' CHK: 55% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, TRC FREE BENT, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>
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INC 91.48 AZ 89.36
VS 2119.35

MD 8704 TVD 6649.86
INC 90.43 AZ 88.37
VS 2214.21

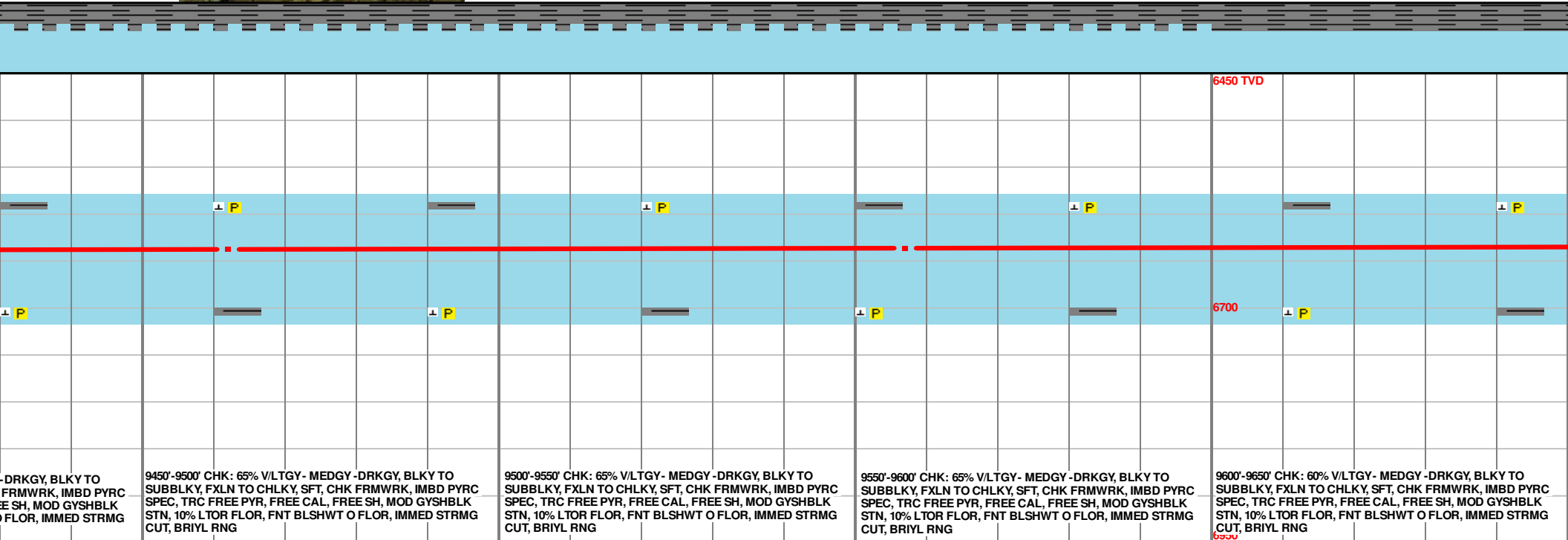
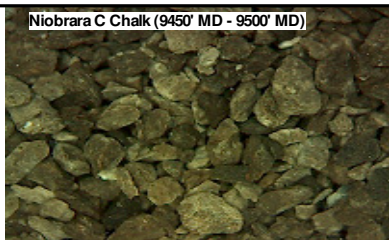
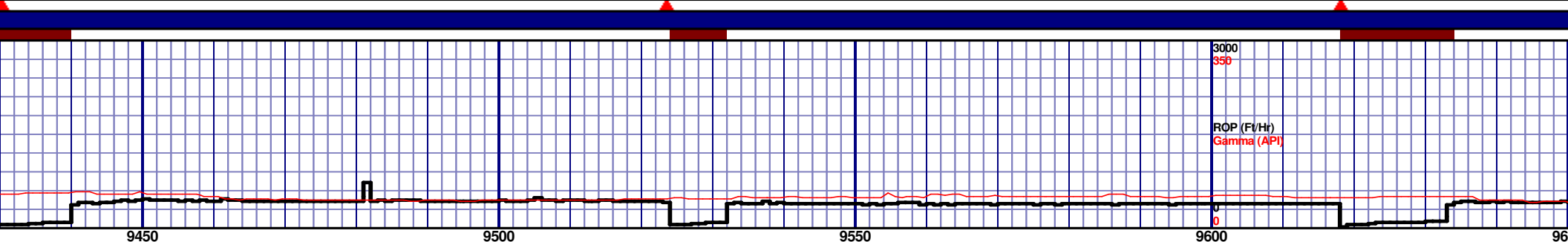
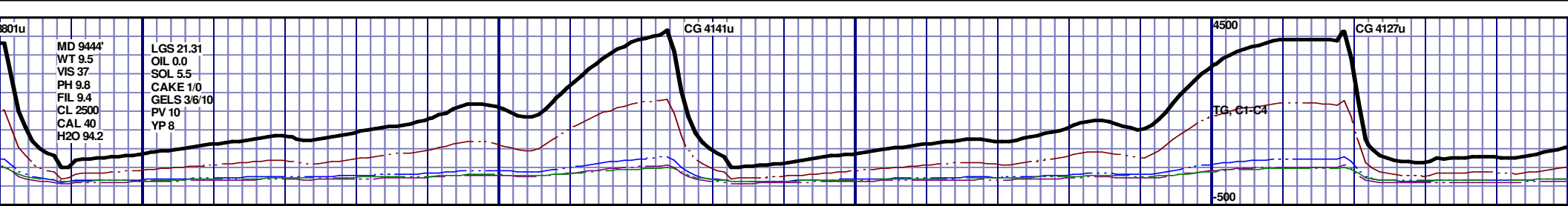






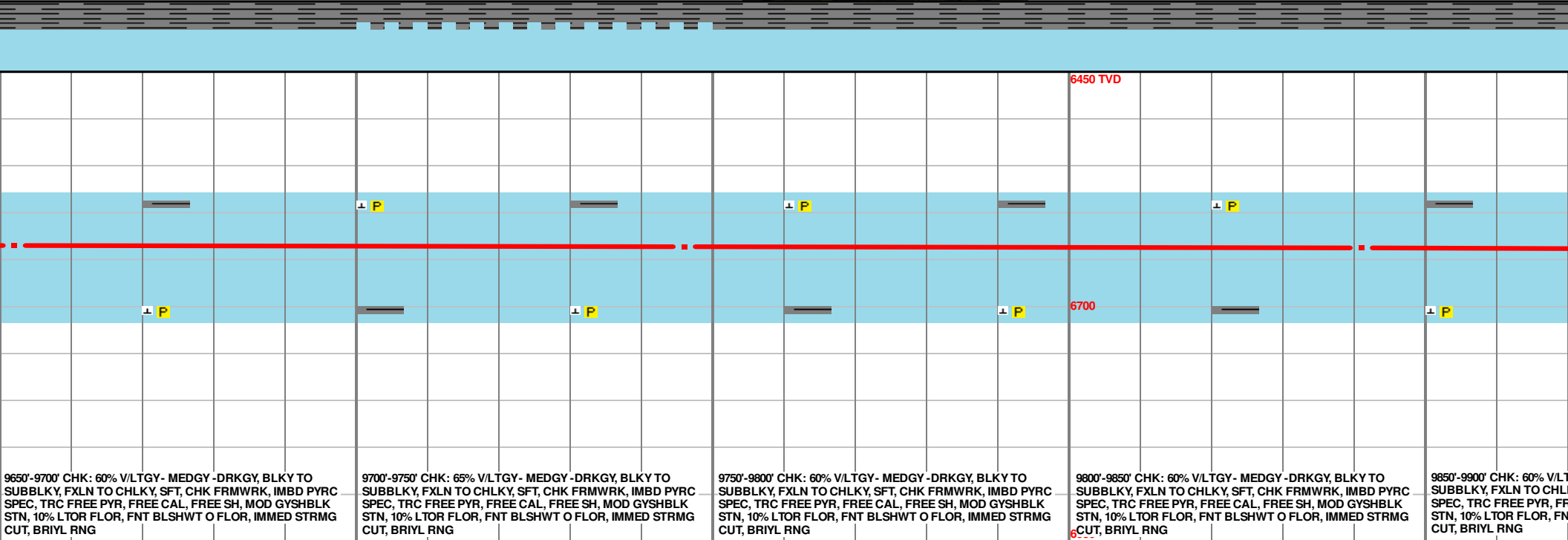
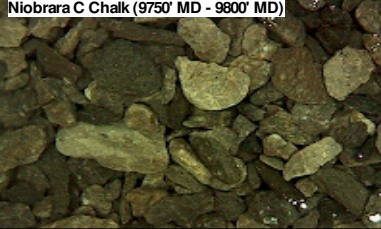
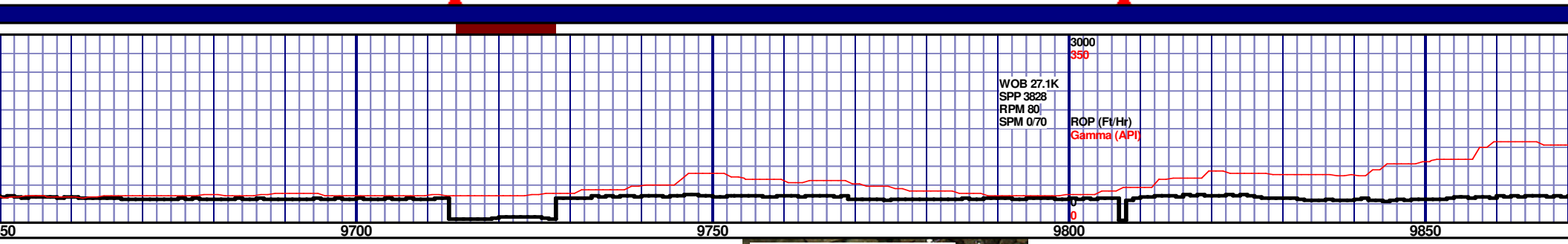
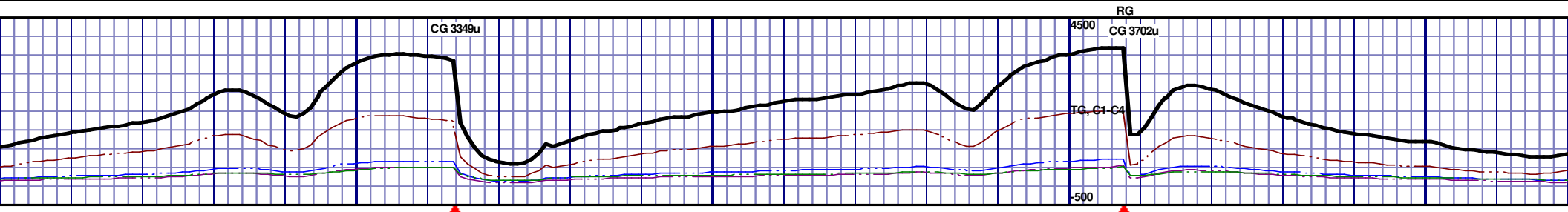
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INC 90.03 AZ 89.12
VS 2782.66

MD 9368 TVD 6638.69
INC 91.14 AZ 88.94
VS 2877.51

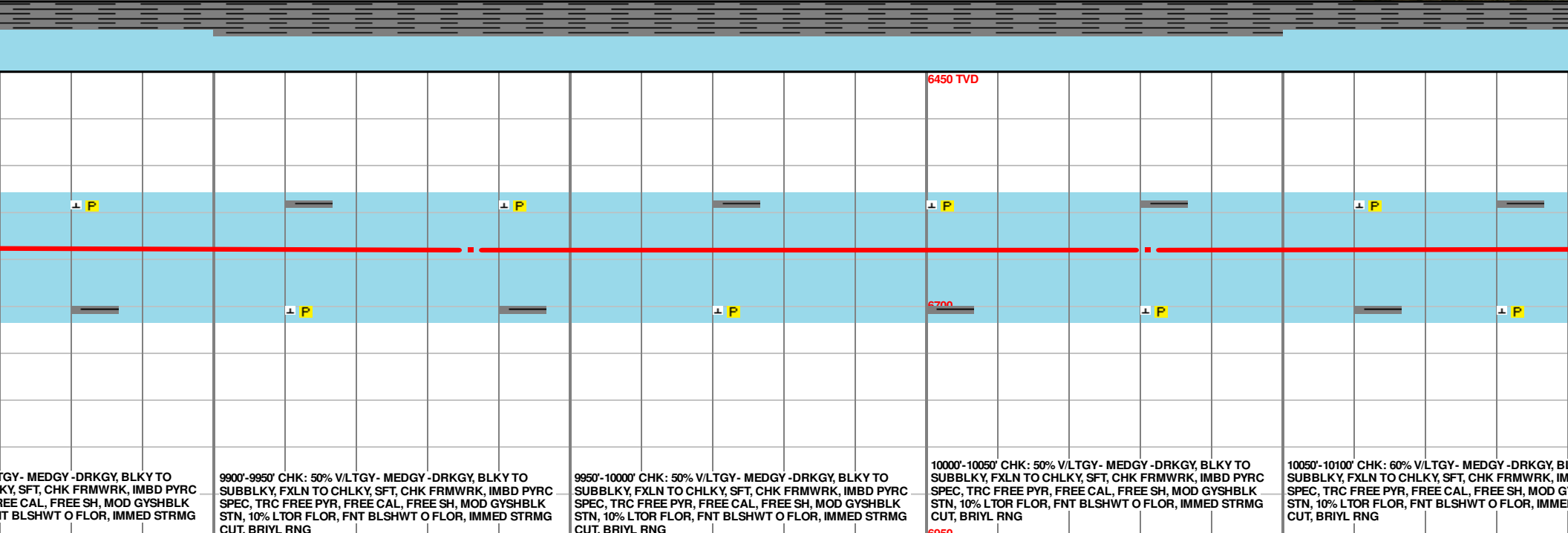
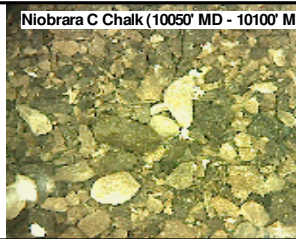
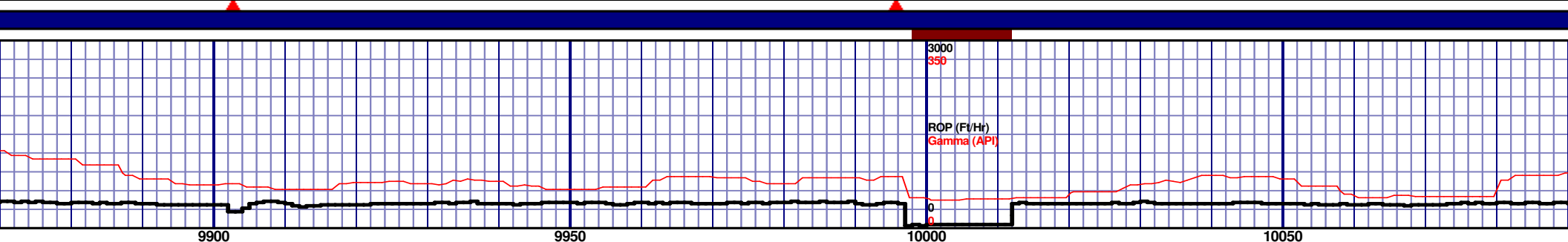
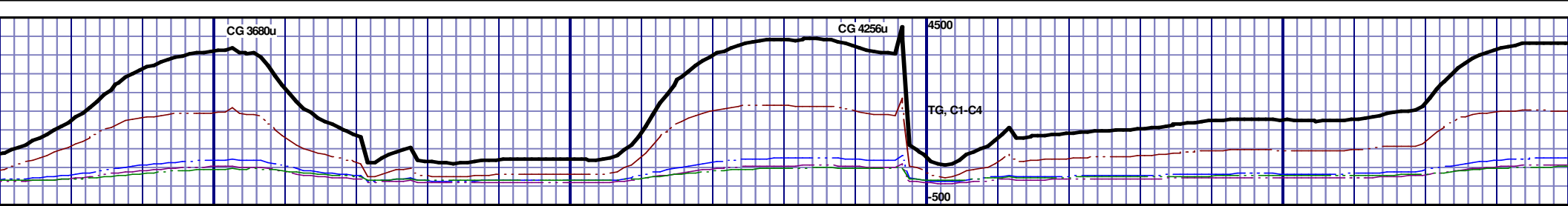


MD 9462 TVD 6637.53
INC 90.28 AZ 88.92
VS 2971.38

MD 9557 TVD 6636.61
INC 90.83 AZ 87.49
VS 3066.3

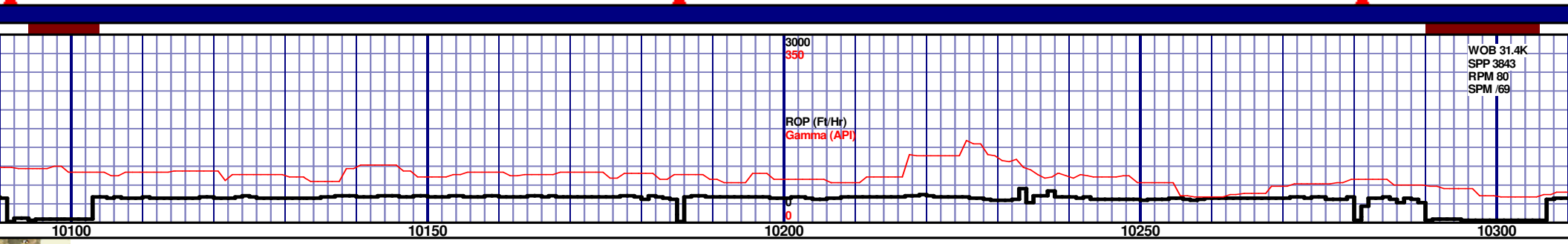
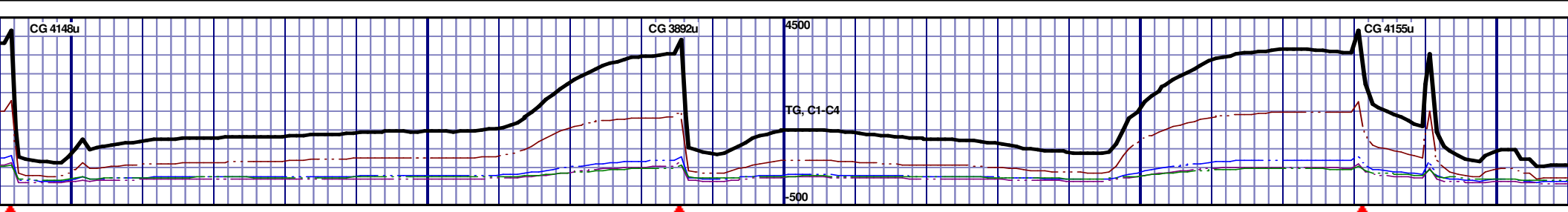


MD 9652 TVD 6635.49 INC 90.52 AZ 87.7 VS 3161.25	MD 9746 TVD 6635.81 INC 89.08 AZ 87.47 VS 3255.21	MD 9841 TVD 6637.5 INC 88.89 AZ 87.14 VS 3350.17
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MD 9936 TVD 6639.55
INC 88.64 AZ 86.85
VS 3445.13

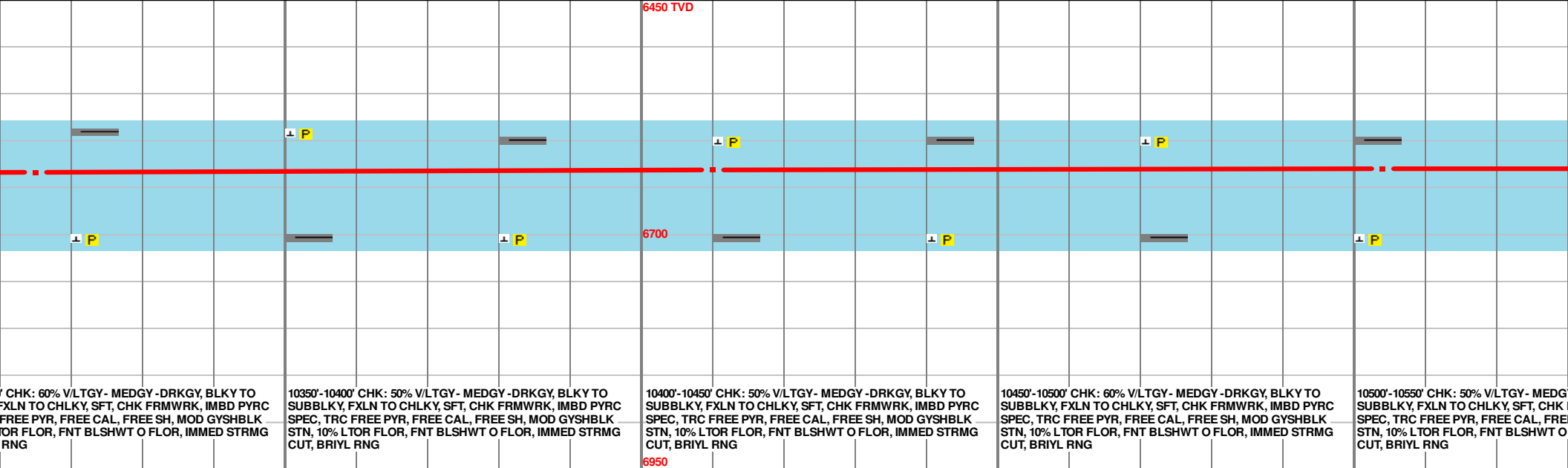
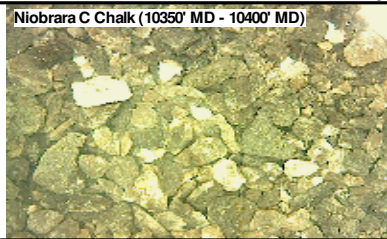
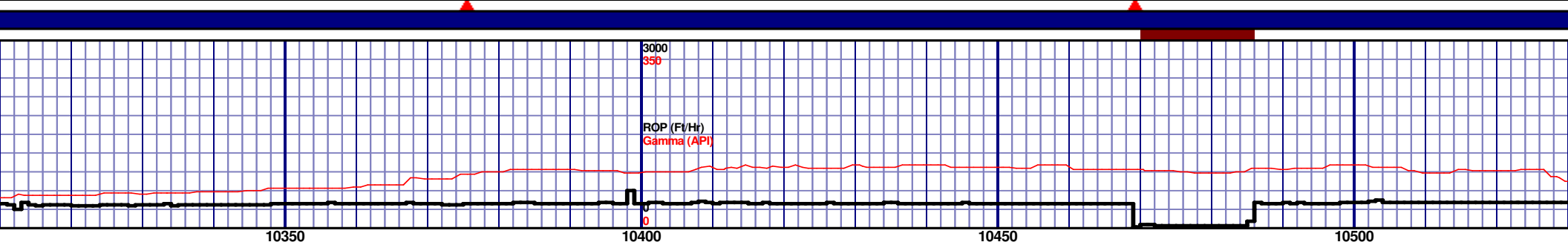
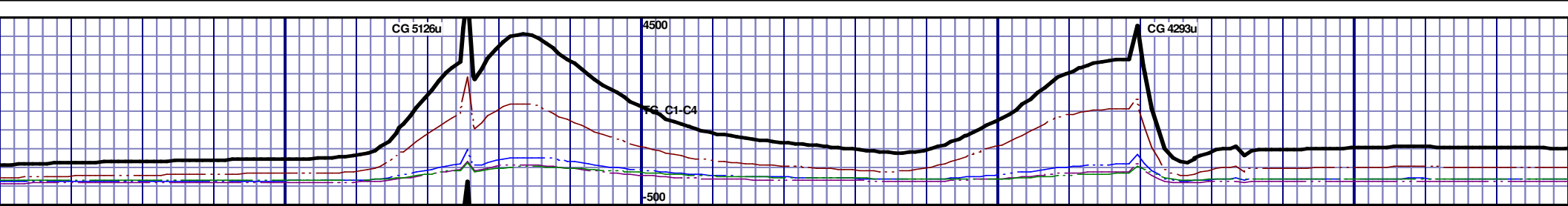
MD 10031 TVD 6640.52
INC 90.19 AZ 87.75
VS 3540.09

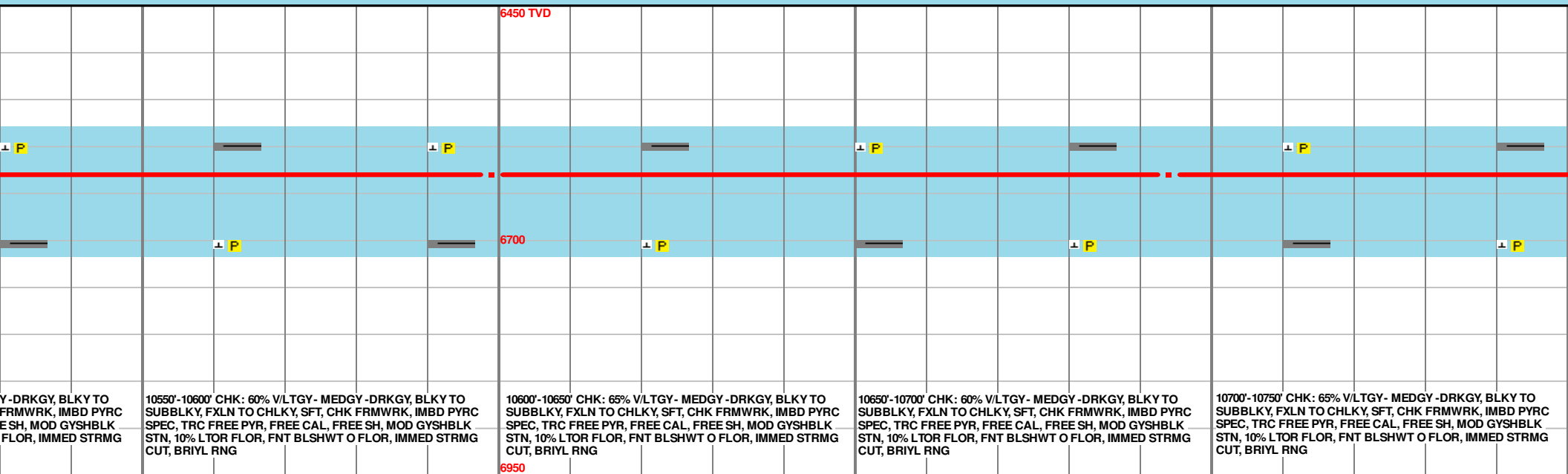
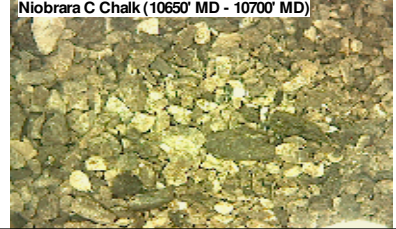
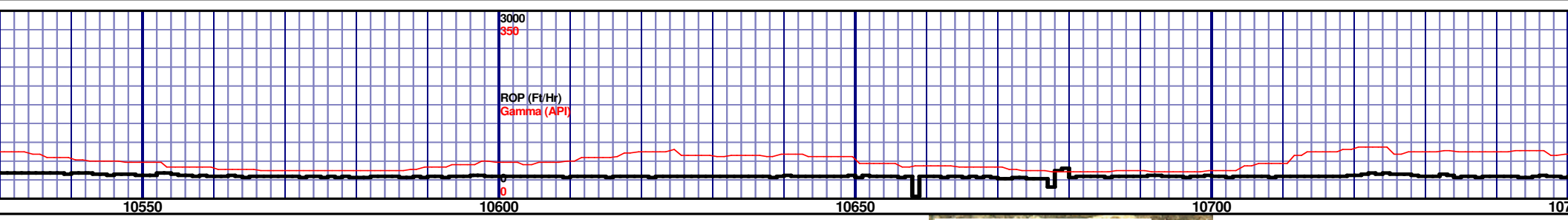
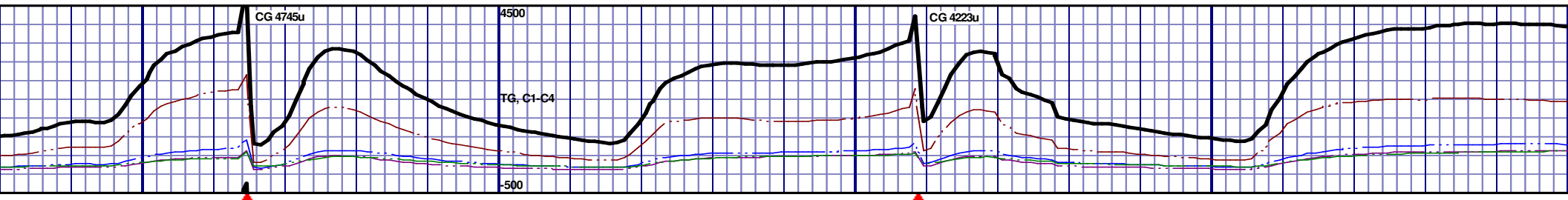


			6450 TVD					
			6700					
			6950					
10050'-10100' CHK: 60% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG			10150'-10200' CHK: 55% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG			10200'-10250' CHK: 60% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG		
						10250'-10300' CHK: 60% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG		
						10300'-10350' SUBBLKY, F...		

MD 10126 TVD 6638.98
INC 91.67 AZ 89.66
VS 3634.97

MD 10220 TVD 6635.8
INC 92.22 AZ 88.96
VS 3728.75





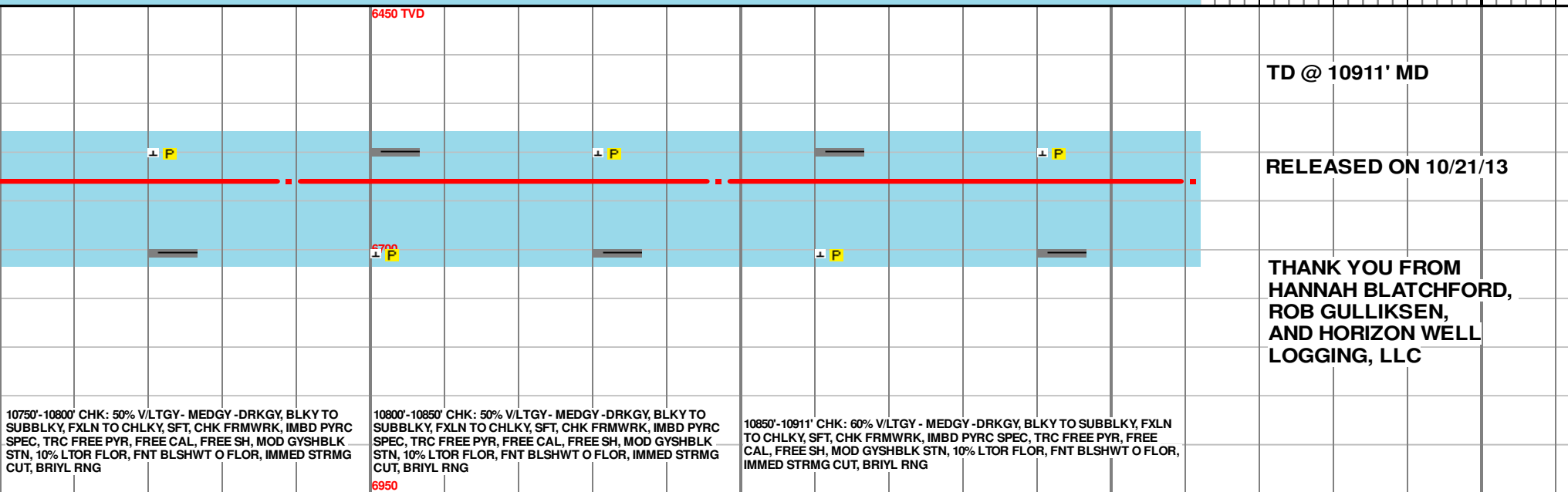
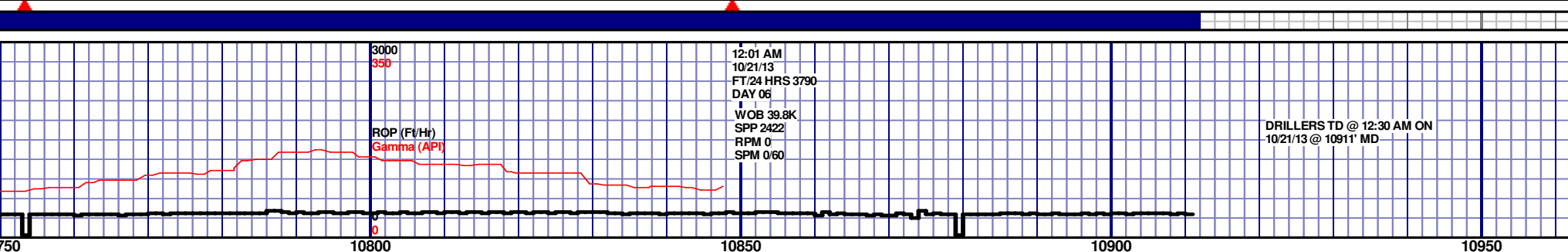
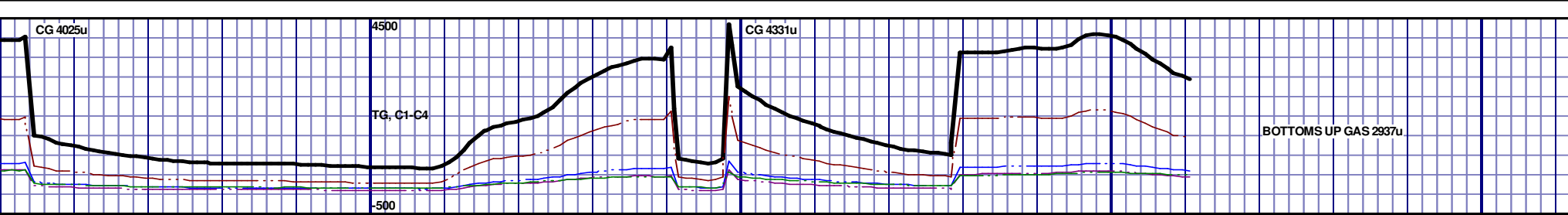
Y-DRKGY, BLKY TO FRMWRK, IMBD PYRC E SH, MOD GYSHBLK FLOR, IMMED STRMG CUT, BRIYL RNG

10550'-10600' CHK: 60% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

10600'-10650' CHK: 65% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

10650'-10700' CHK: 60% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

10700'-10750' CHK: 65% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE PYR, FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG



MD 10789 TVD 6630.29
INC 89.94 AZ 87.14
VS 4296.96

MD 10847 TVD 6630.27
INC 90.09 AZ 87.19
VS 4354.95

PTB: MD 10911 TVD 6630.18
INC 90.09 AZ 87.19
VS 4418.96