



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

phone 918.925.9739

fax 866.534.4559

WWW.HZMUD.COM

Customer Information

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

Geologist: Renee Clackler
Noble Energy Inc.

Mud Logging Details

Logger: Sam Stelzer &
Scott Haney

Log Interval: 6630' MD to 15870' MD

Start Date: July 20, 2015

Release Date: July 24, 2015

Well Information

Well Name: 70 Ranch State BB18-675
Horizontal

Location: 17-T5N-R63W
1489' FNL, 600' FEL

County: Weld
State: Colorado

Drilling Rig: H&P 321

Total Depth: 15870' MD

TD Date: July 24, 2015

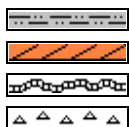
Formation: Niobrara B

KB Elevation: 4710'

GR Elevation: 4680'

API Number: 05-123-41532-0000

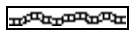
ROCK TYPES



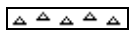
Siltysh



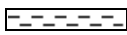
Anhy



Bent



Cht



Clyst



Coal



Congl



Dol



Gyp



Cmnt



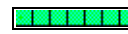
Lmst



Meta



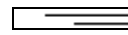
Mrlst



Salt



Shale



Shcol



Shgy



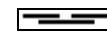
Slst



Ss



Till



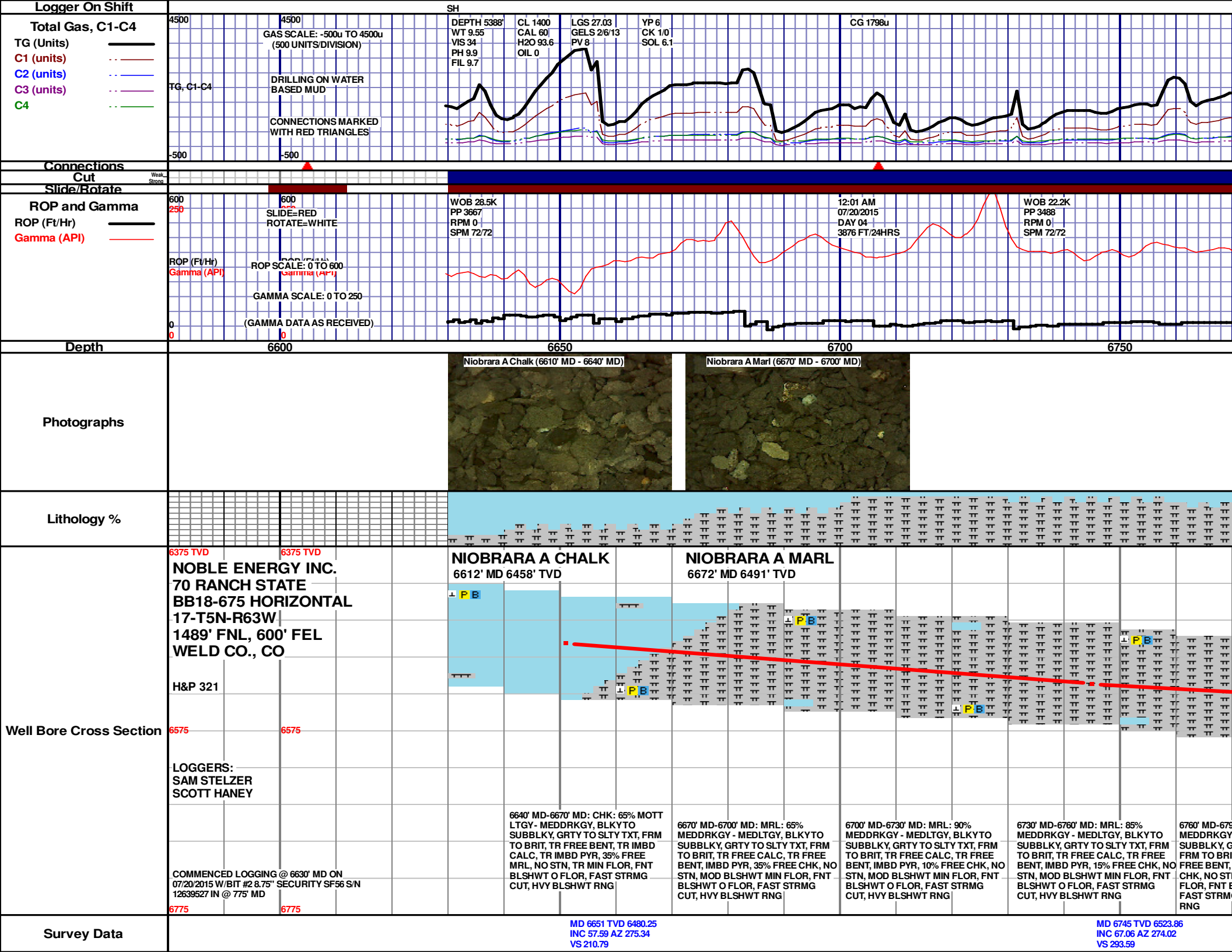
Carbonaceous s

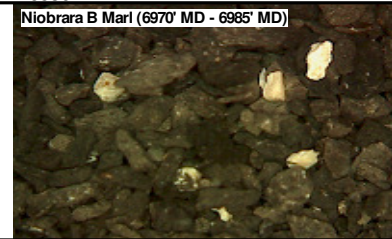
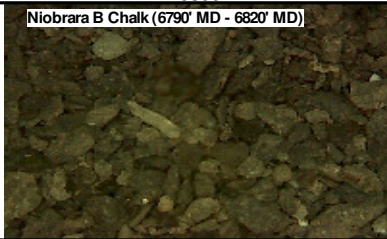
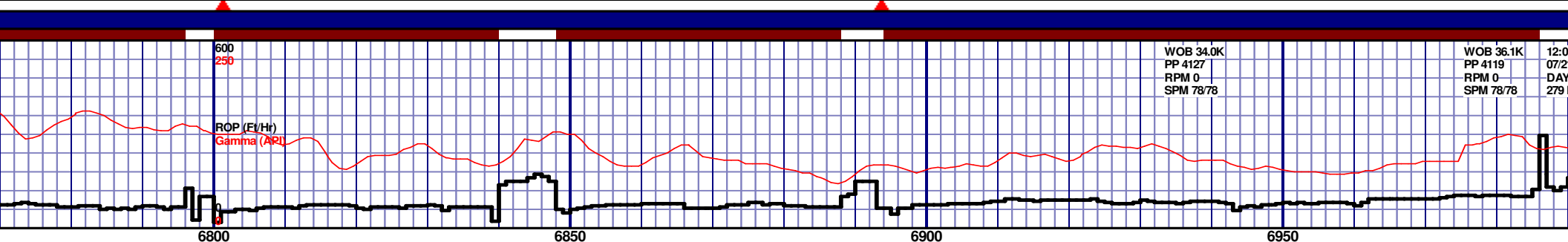
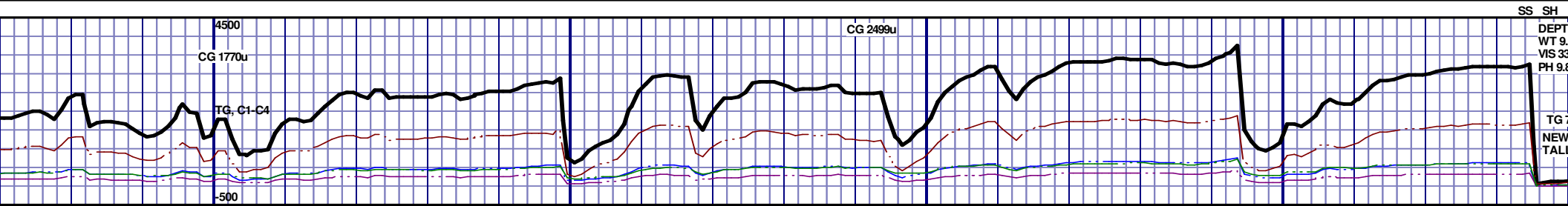


Chk



Nosmpl





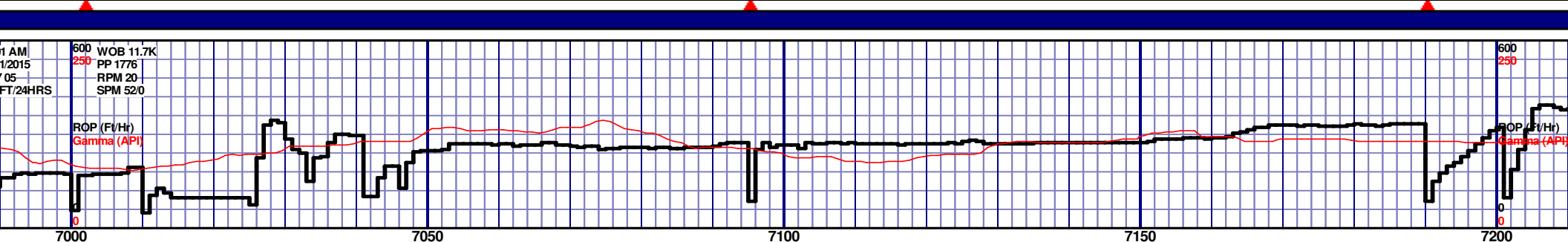
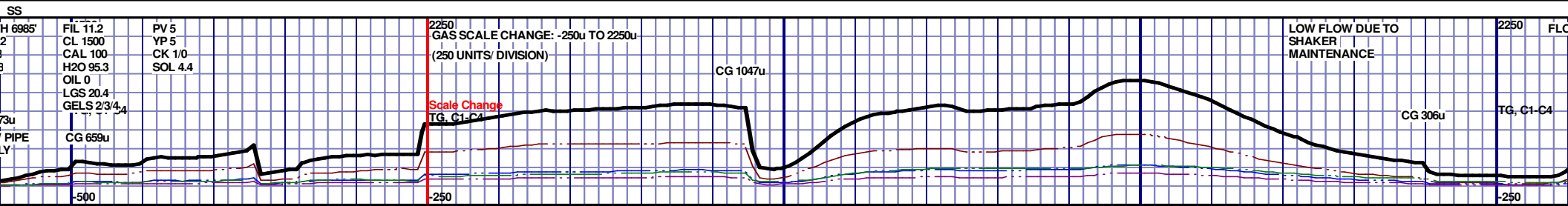
6375 TVD										6575									
NIOBRARA B CHALK										NIOBRARA B MARL									
6819' MD 6548' TVD										6980' MD 6511' TVD									
6790' MD-6820' MD: CHK: 75% MOTT LTGY- MEDDRKGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, FREE CALC, TR IMBD PYR, 25% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG										6820' MD-6850' MD: CHK: 85% MOTT LTGY- MEDDRKGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, FREE CALC, TR IMBD PYR, 15% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG									
6850' MD-6880' MD: CHK: 90% MOTT LTGY- MEDDRKGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, ABNT IMBD CALC, FREE CALC, TR IMBD PYR, 10% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG										6880' MD-6910' MD: CHK: 85% MOTT LTGY- MEDDRKGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, ABNT IMBD CALC, FREE CALC, TR IMBD PYR, 15% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG									
6910' MD-6940' MD: CHK: 80% MOTT LTGY- MEDDRKGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, ABNT IMBD CALC, FREE CALC, TR IMBD PYR, 20% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG										6930' MD-6970' MD: CHK: 80% MOTT LTGY- MEDDRKGY, BLKYTO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, ABNT IMBD CALC, FREE CALC, TR IMBD PYR, 20% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG									
6970' MD-6985' MD: CHK: MOTT LTGY- MEDGY, BLKYTO SUBBLKY, CHLKY, FRM TO BRIT, TR FREE BENT, ABNT IMBD CALC, ABNT FREE PYR W/ TR FREE BENT, FREE MRL TR GYSHBLK BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG																			

MD 6793 TVD 6540.81
INC 71.57 AZ 272.44
VS 338.38

MD 6840 TVD 6554.07
INC 75.65 AZ 271.76
VS 383.41

MD 6888 TVD 6564.47
INC 79.31 AZ 271.69
VS 430.22

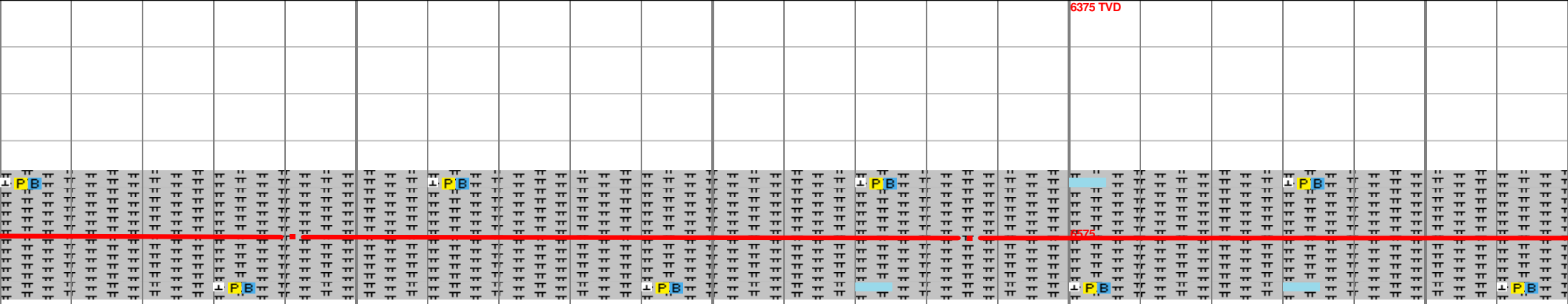
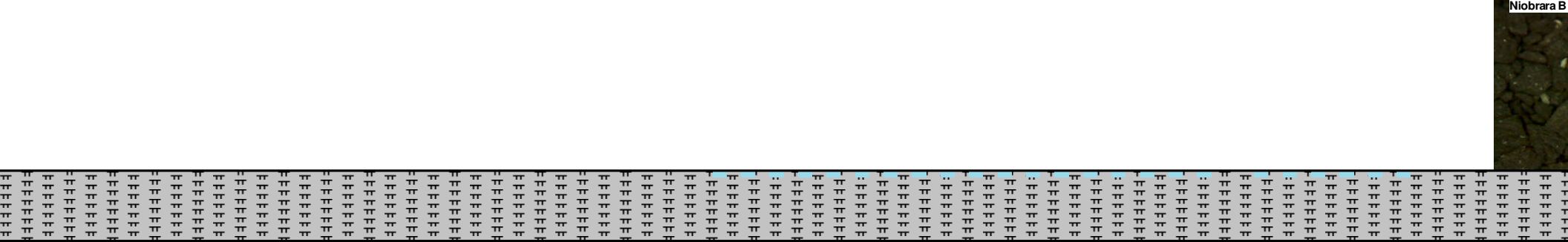
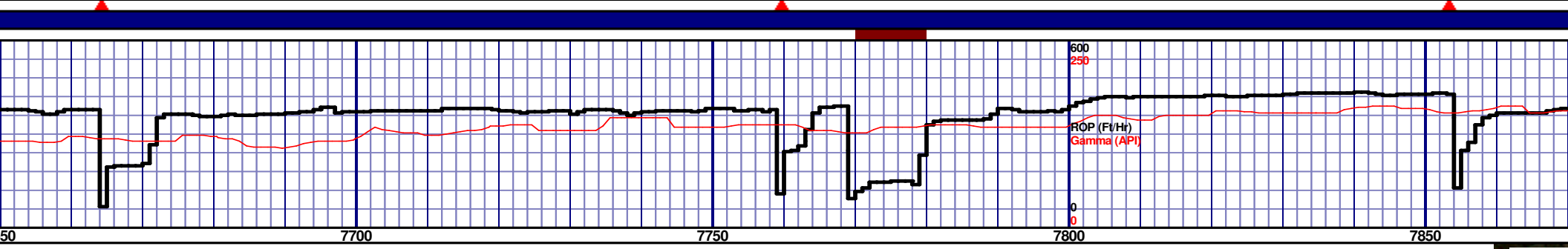
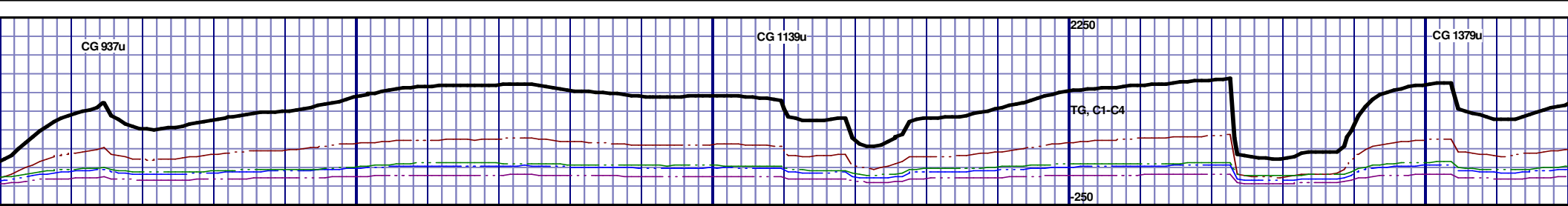
MD 6930 TVD 6570.67
INC 83.33 AZ 270.79
VS 500.88



ARA B MARL 6574' TVD @ 7:00 AM ON 07/20/15 @ 6985' MD FOR MEDIATE CASING OPERATIONS. 2:40 AM 07/21/2015. RESUMED DRILLING @ M ON 07/21/2015 W/BIT #3 6.125" SMITH 3 UBPX S/N JK0494 IN @ 6985' MD					SWITCHING TO 50FT SAMPLE INTERVAL					6375 TVD				
6985' MD-7050' MD: MRL: 80% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC & IMBD PYR, ABNT FREE CALC & ABNT FREE BENT, 20% FREE CHK, TR GRYSHBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG					7050' MD-7100' MD: MRL: 85% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC & IMBD PYR, ABNT FREE CALC & ABNT FREE BENT, 15% FREE CHK, TR GRYSHBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG					7100' MD-7150' MD: MRL: 80% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC & IMBD PYR, ABNT FREE CALC & ABNT FREE BENT, 20% FREE CHK, TR GRYSHBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG				
7150' MD-7200' MD: MRL: 90% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC & IMBD PYR, ABNT FREE CALC & ABNT FREE BENT, 10% FREE CHK, TR GRYSHBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG					7200' MD-7250' MD: MRL: 90% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC & IMBD PYR, ABNT FREE CALC & ABNT FREE BENT, 10% FREE CHK, TR GRYSHBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG					6775				

MD 7029 TVD 6576.77
INC 89.6 AZ 269.42
VS 599.54

MD 7123 TVD 6576.85
INC 90.31 AZ 269.12
VS 693.37



7650' MD-7700' MD: MRL: 100% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC & IMBD PYR, ABNT FREE CALC & ABNT FREE BENT, TR GRYSBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	7700' MD-7750' MD: MRL: 100% MEDDRKGY, BLKY, CHALKY, FRM TO BRIT, IMBD CALC & IMBD PYR, ABNT FREE CALC & ABNT FREE BENT, TR GRYSBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	7750' MD-7800' MD: MRL: 95% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR IMBD CALC & IMBD PYR, ABNT FREE CALC & ABNT FREE BENT, 5% FREE CHK, TR GRYSBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	7800' MD-7850' MD: MRL: 95% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR IMBD CALC & IMBD PYR, ABNT FREE CALC & ABNT FREE BENT, 5% FREE CHK, TR GRYSBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	7850' MD-7900' MD: MRL: 95% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR IMBD CALC & IMBD PYR, ABNT FREE CALC & ABNT FREE BENT, 5% FREE CHK, TR GRYSBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG
--	---	---	---	---

MD 7691 TVD 6576.75
INC 88.8 AZ 269.09
VS 1260.73

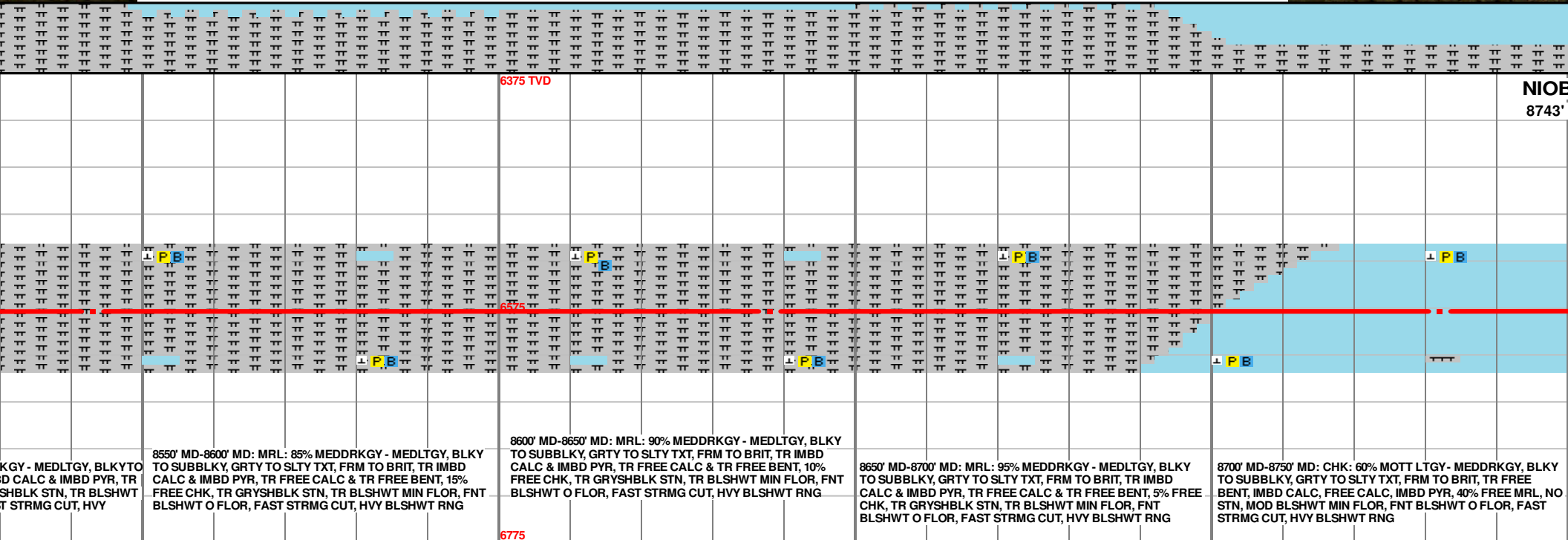
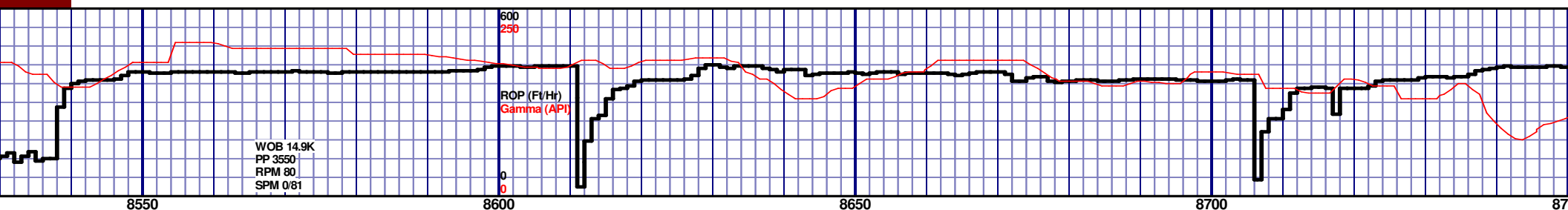
MD 7786 TVD 6577.82
INC 89.91 AZ 269.69
VS 1355.57

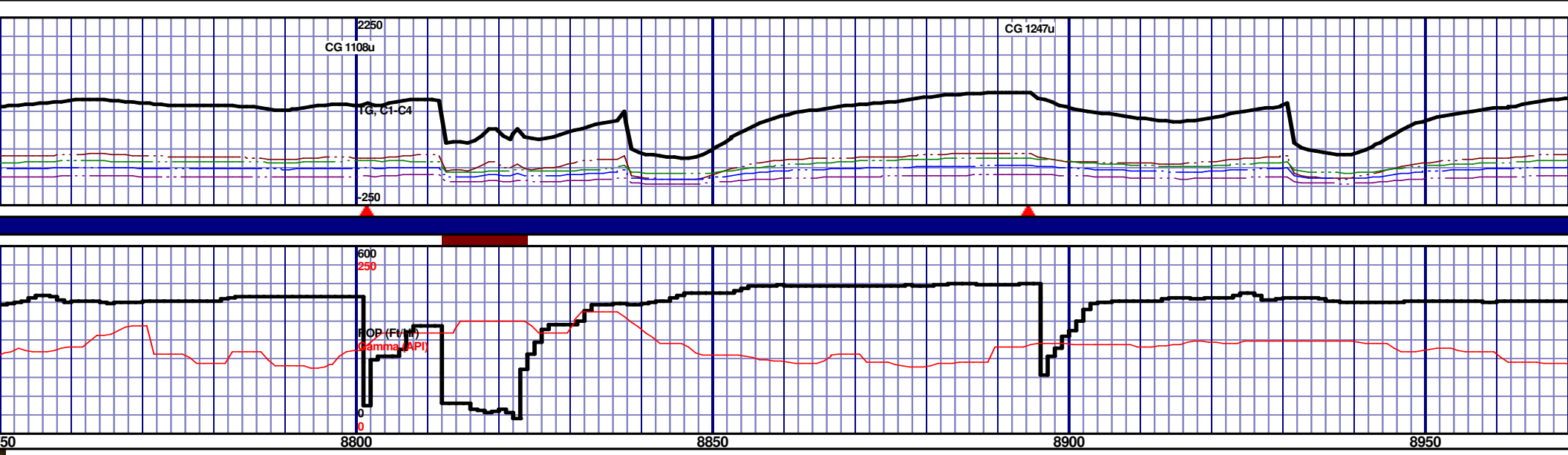
[illegible]



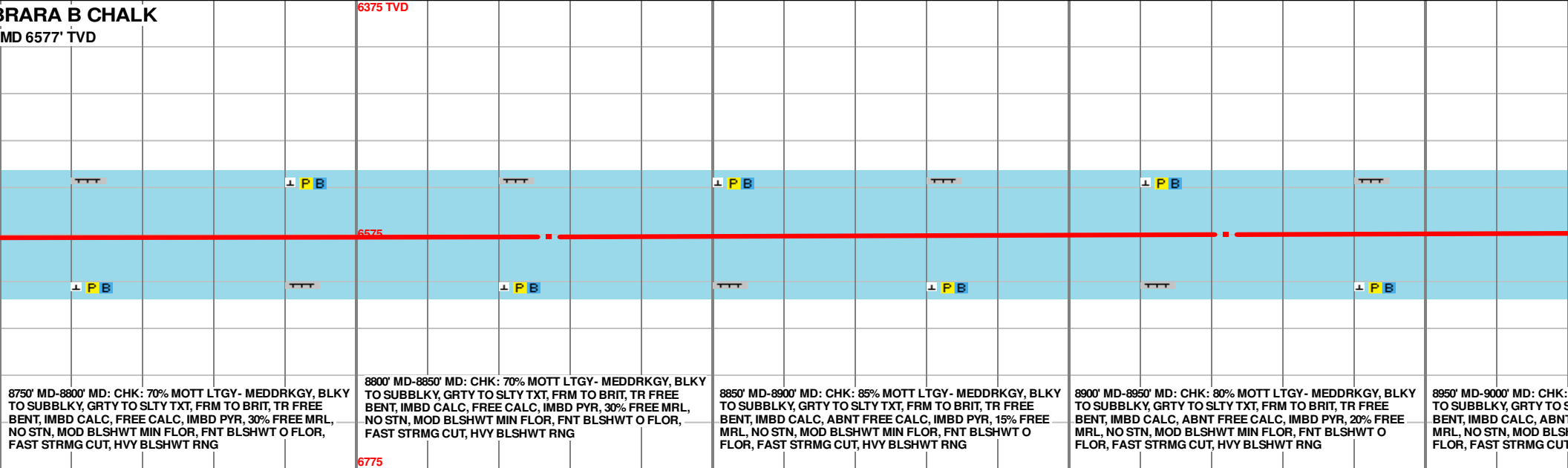
<p>50' MD: MRL: 100% MEDDRKGY - MEDLTGY, BLKY CHALKY, FRM TO BRIT, IMBD CALC & IMBD FREE CALC & TR FREE BENT, TR GRYSHLK STN, TR MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, VT RNG</p>	<p>8350' MD-8400' MD: MRL: 95% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR IMBD CALC & IMBD PYR, TR FREE CALC & TR FREE BENT, 5% FREE CHK, TR GRYSHLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG</p>	<p>8450' MD-8500' MD: MRL: 100% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, CHALKY, FRM TO BRIT, IMBD CALC & IMBD PYR, TR FREE CALC & TR FREE BENT, TR GRYSHLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG</p>	<p>8500' MD-8550' MD: MRL: 100% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, CHALKY, FRM TO BRIT, IMBD CALC & IMBD PYR, TR FREE CALC & TR FREE BENT, TR GRYSHLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG</p>
--	--	--	--

MD 8449 TVD 6578.61
INC 89.91 AZ 269.42
VS 2017.2





RRARA B CHALK
MD 6577' TVD



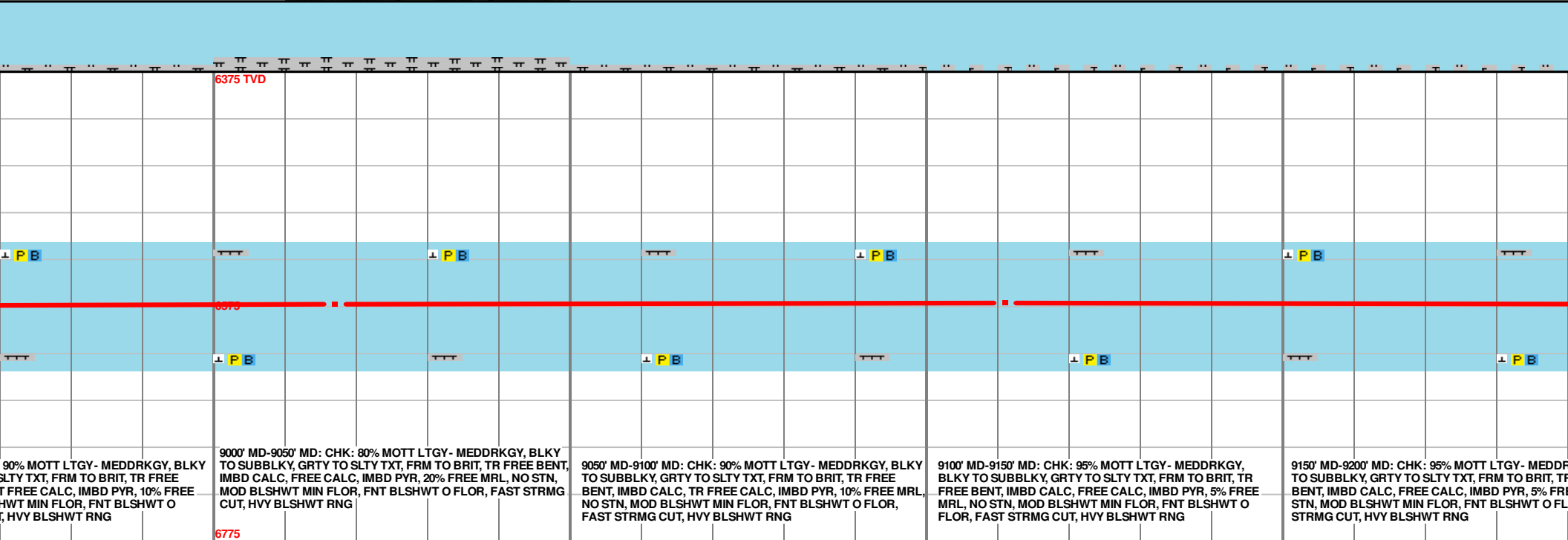
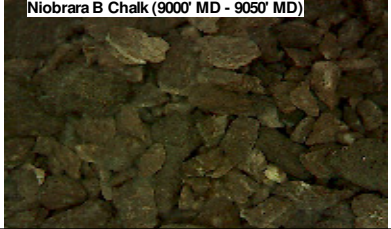
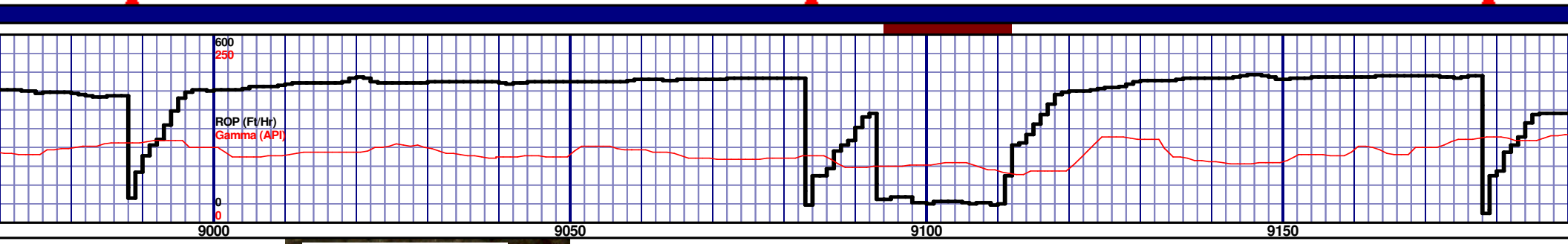
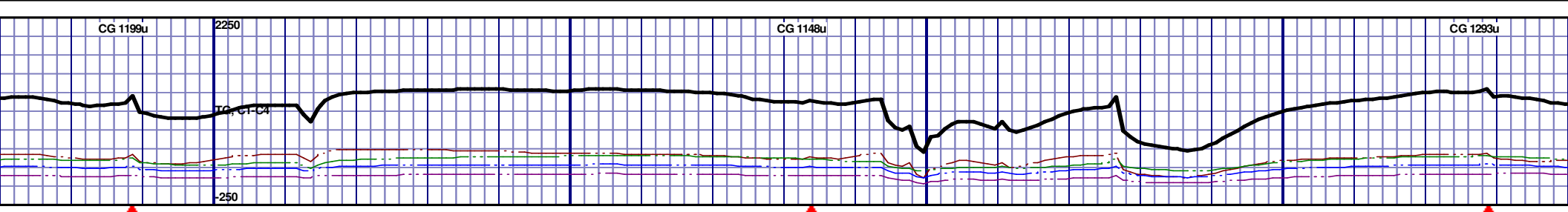
8750' MD-8800' MD: CHK: 70% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, FREE CALC, IMBD PYR, 30% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

8800' MD-8850' MD: CHK: 70% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, FREE CALC, IMBD PYR, 30% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

8850' MD-8900' MD: CHK: 85% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, ABNT FREE CALC, IMBD PYR, 15% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

8900' MD-8950' MD: CHK: 80% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, ABNT FREE CALC, IMBD PYR, 20% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

8950' MD-9000' MD: CHK: TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, ABNT FREE CALC, IMBD PYR, 20% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG



90% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, FREE CALC, IMBD PYR, 10% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

9000' MD-9050' MD: CHK: 80% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, FREE CALC, IMBD PYR, 20% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

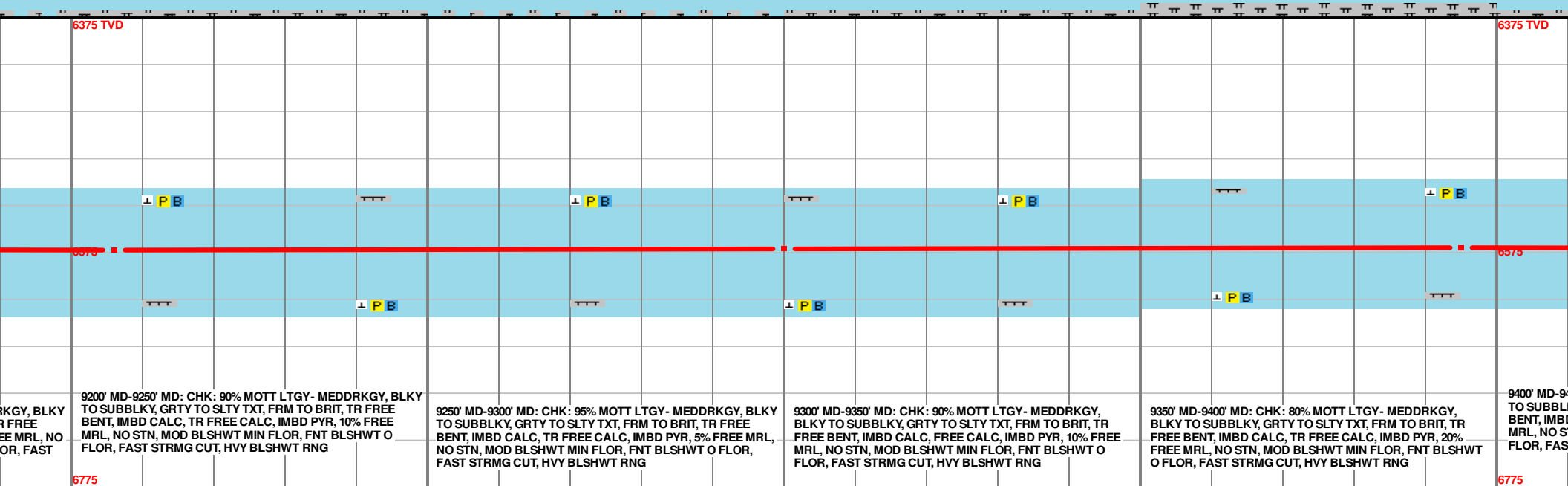
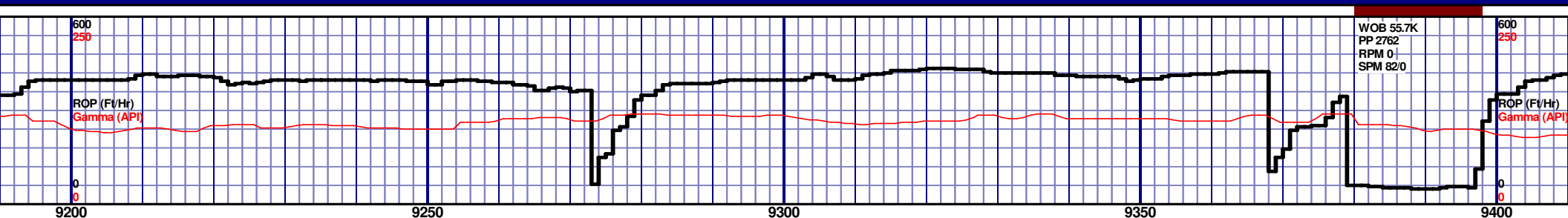
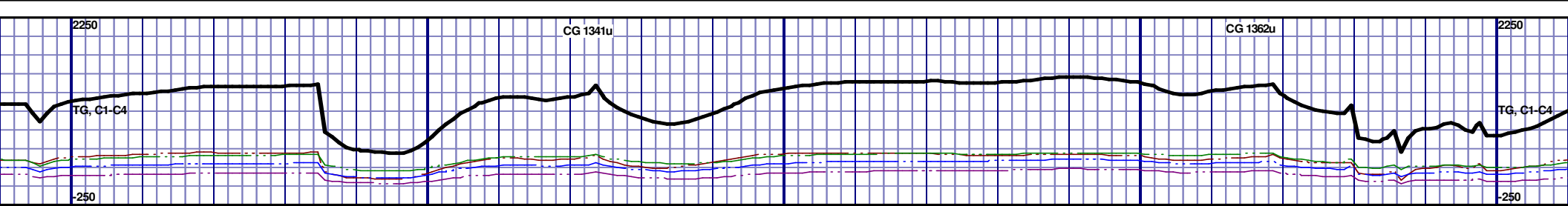
9050' MD-9100' MD: CHK: 90% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 10% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

9100' MD-9150' MD: CHK: 95% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, FREE CALC, IMBD PYR, 5% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

9150' MD-9200' MD: CHK: 95% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, FREE CALC, IMBD PYR, 5% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

MD 9017 TVD 6573.24
INC 91.48 AZ 268.25
VS 2584.03

MD 9111 TVD 6572.38
INC 89.57 AZ 269.06
VS 2677.79



9200' MD-9250' MD: CHK: 90% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 10% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

9250' MD-9300' MD: CHK: 95% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 5% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

9300' MD-9350' MD: CHK: 90% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, FREE CALC, IMBD PYR, 10% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

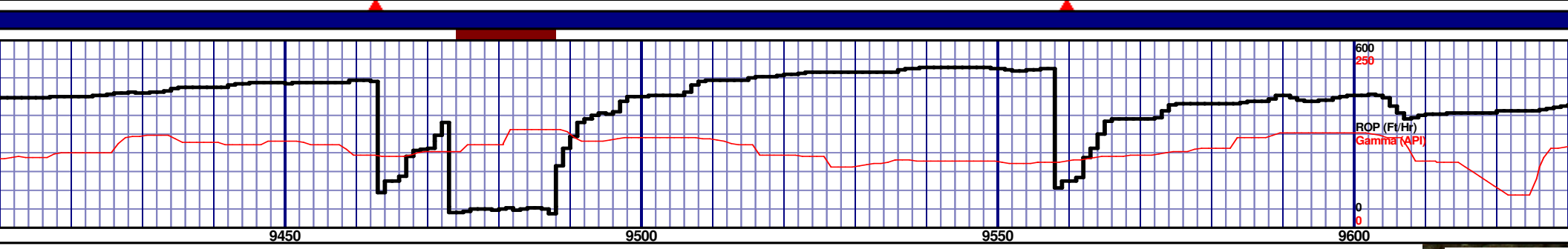
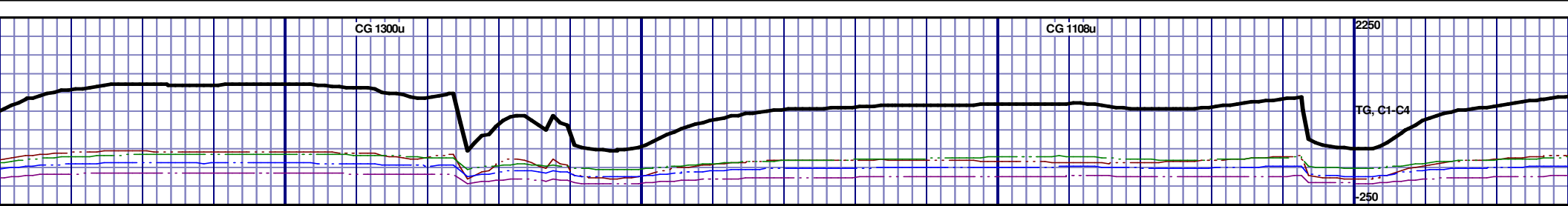
9350' MD-9400' MD: CHK: 80% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 20% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

9400' MD-9450' MD: CHK: 80% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 20% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

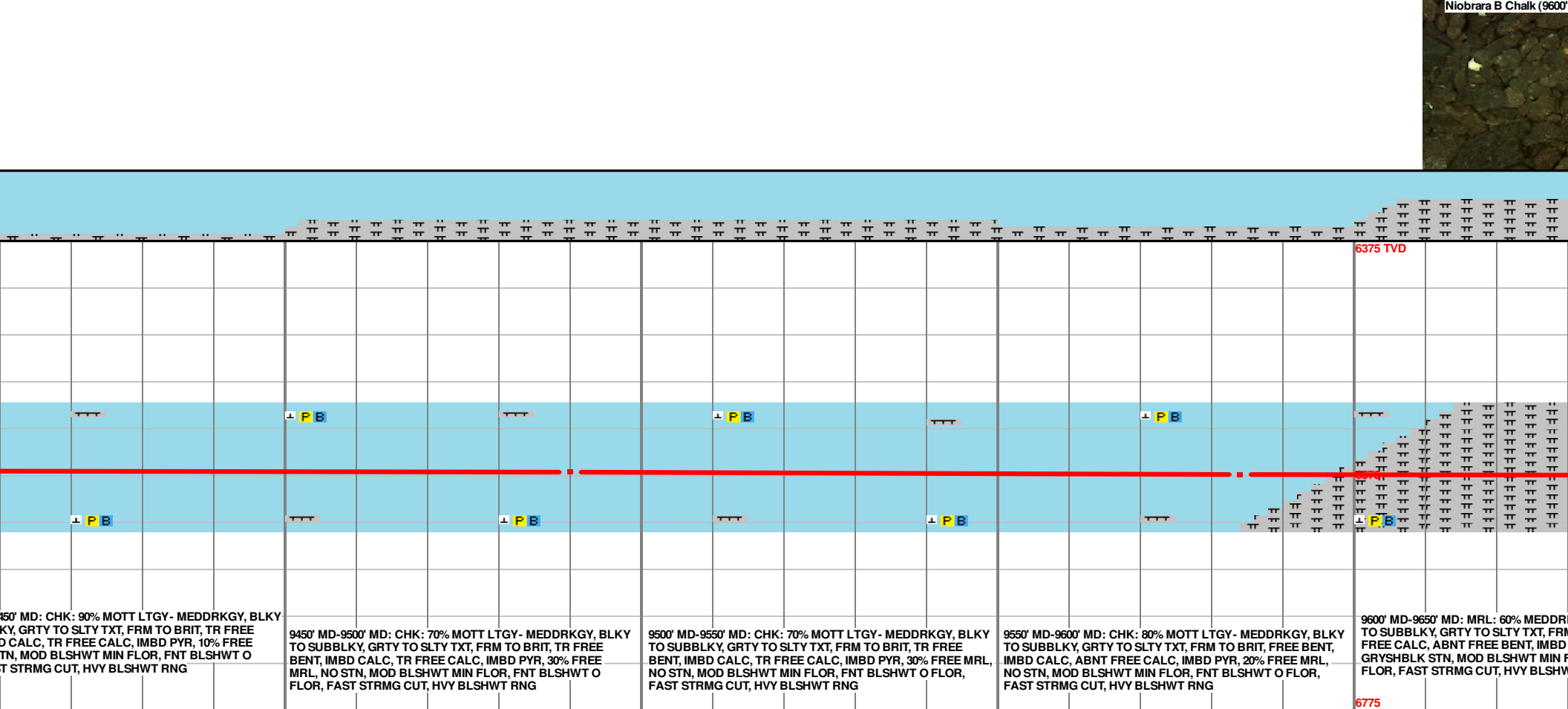
MD 9206 TVD 6572.81
INC 89.91 AZ 268.52
VS 2772.57

MD 9300 TVD 6571.69
INC 91.45 AZ 268.81
VS 2866.33

MD 9395 TVD 6570.1
INC 89.51 AZ 268.65
VS 2961.09



Niobrara B Chalk (9600')



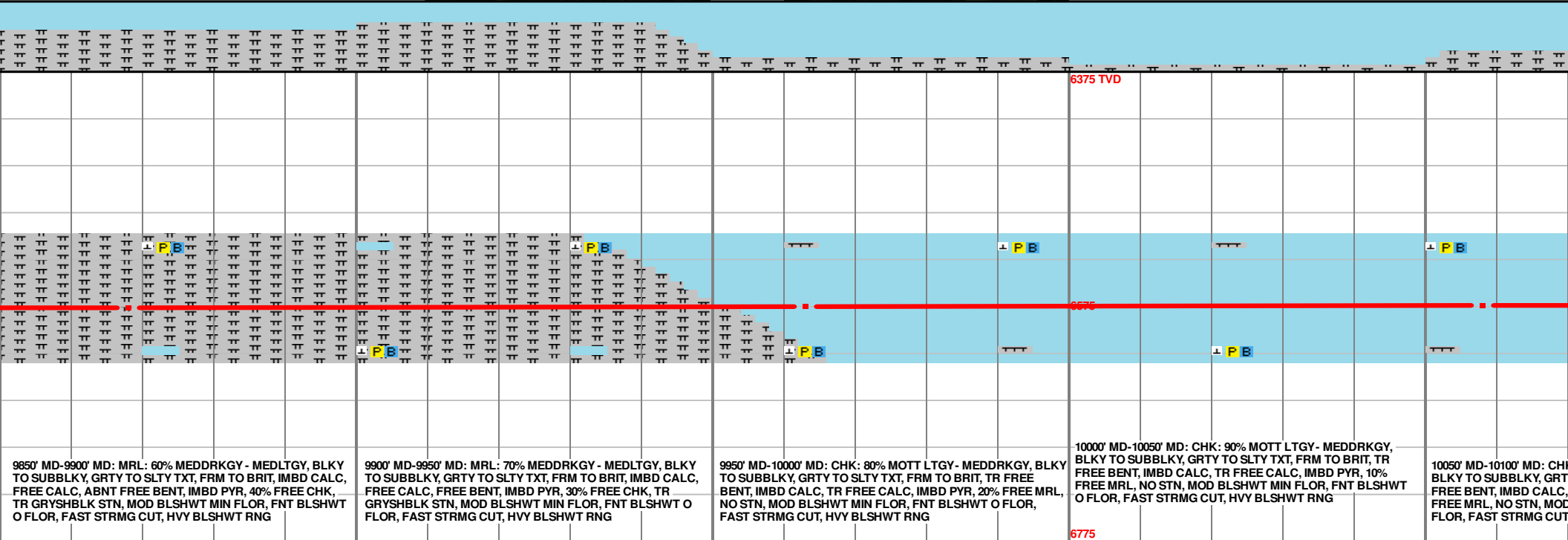
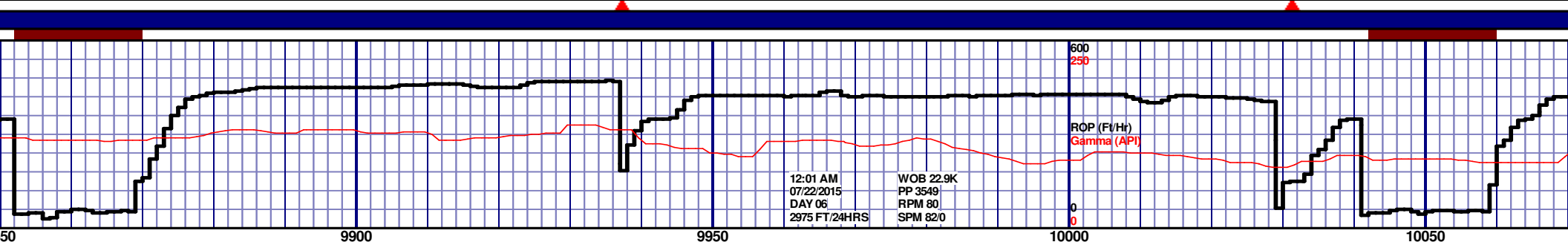
9450' MD: CHK: 90% MOTT LTGY- MEDDRKGY, BLKY
KY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE
O CALC, TR FREE CALC, IMBD PYR, 10% FREE
TN, MOD BLSHWT MIN FLOR, FNT BLSHWT O
T STRMG CUT, HVY BLSHWT RNG

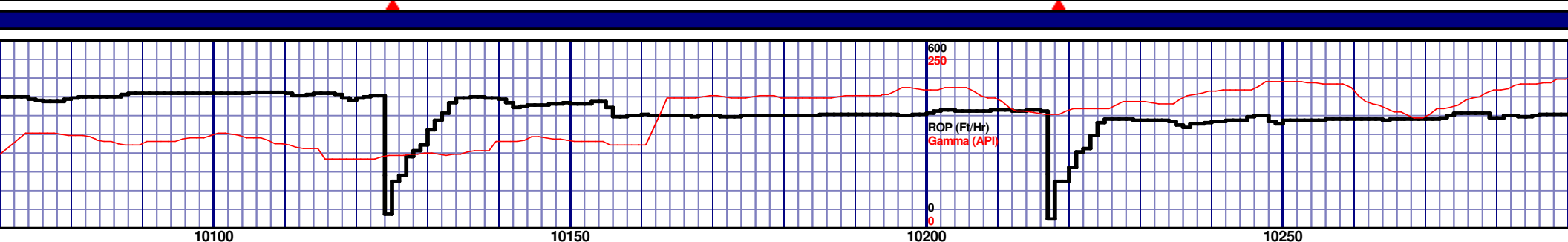
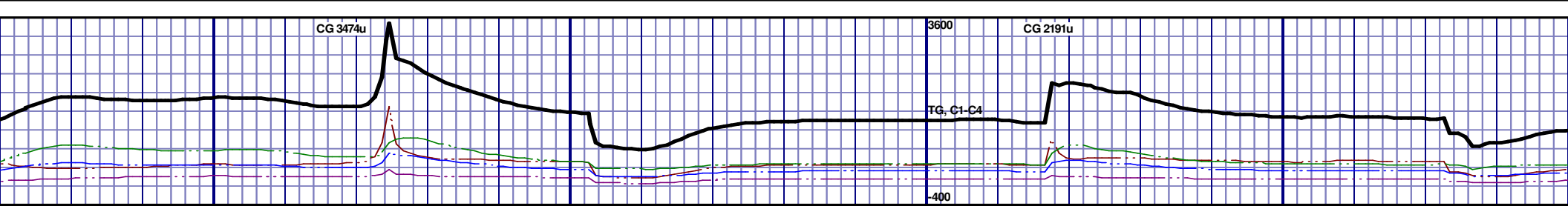
9450' MD-9500' MD: CHK: 70% MOTT LTGY- MEDDRKGY, BLKY
TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE
BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 30% FREE
MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O
FLOR, FAST STRMG CUT, HVY BLSHWT RNG

9500' MD-9550' MD: CHK: 70% MOTT LTGY- MEDDRKGY, BLKY
TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE
BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 30% FREE MRL,
NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR,
FAST STRMG CUT, HVY BLSHWT RNG

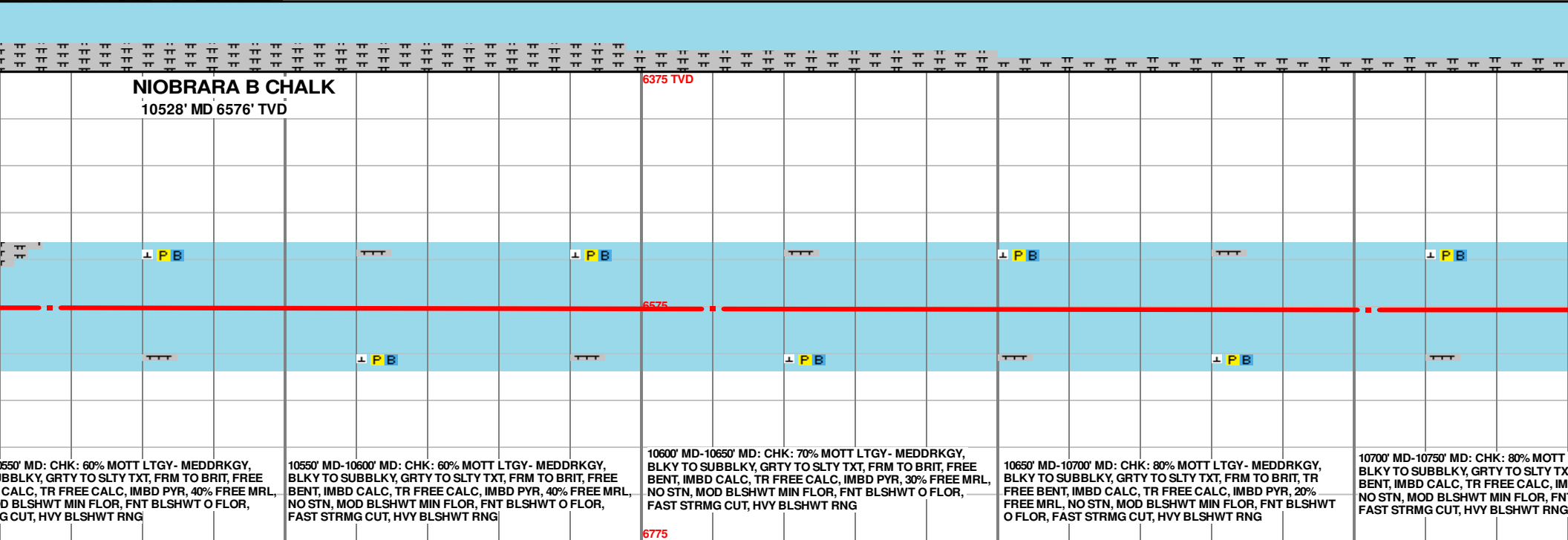
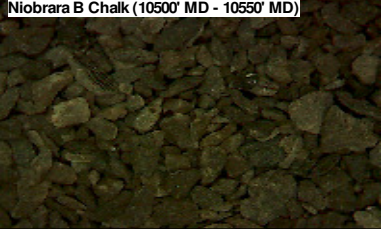
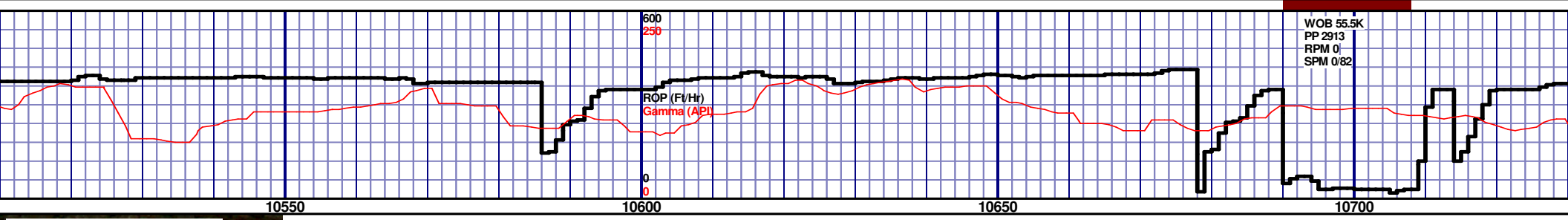
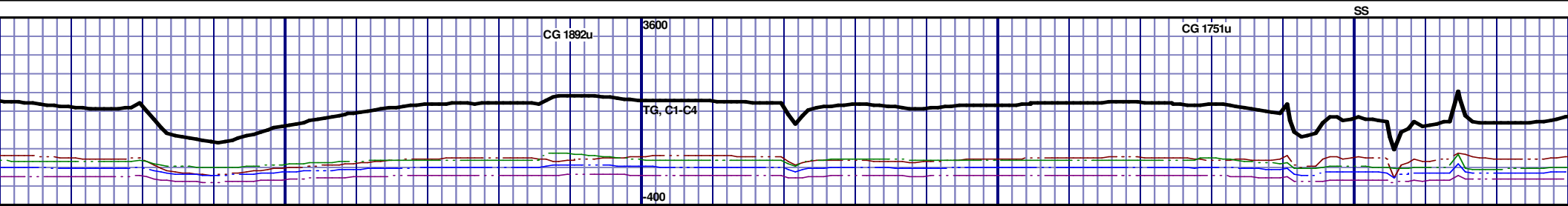
9550' MD-9600' MD: CHK: 80% MOTT LTGY- MEDDRKGY, BLKY
TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, FREE BENT,
IMBD CALC, ABNT FREE CALC, IMBD PYR, 20% FREE MRL,
NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR,
FAST STRMG CUT, HVY BLSHWT RNG

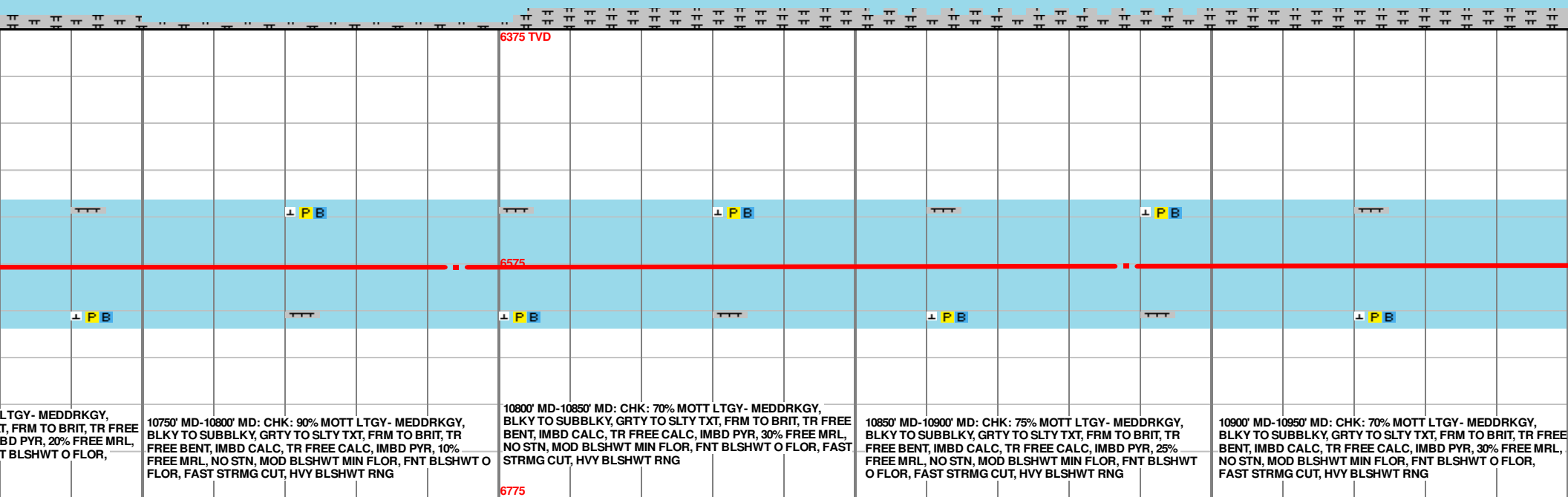
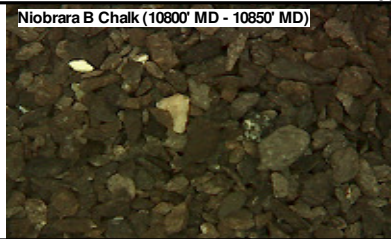
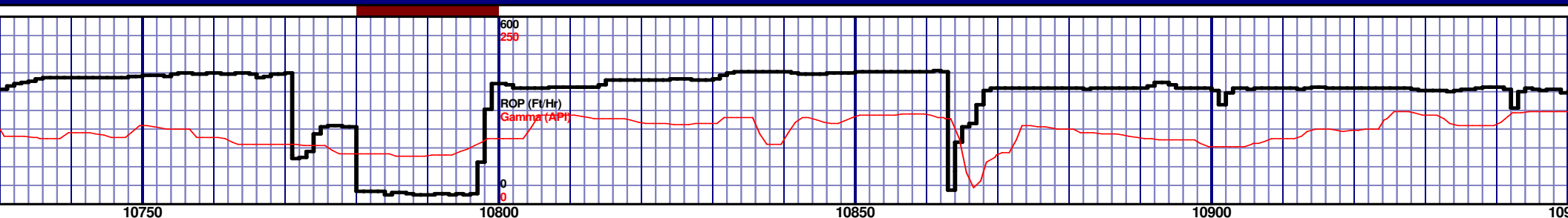
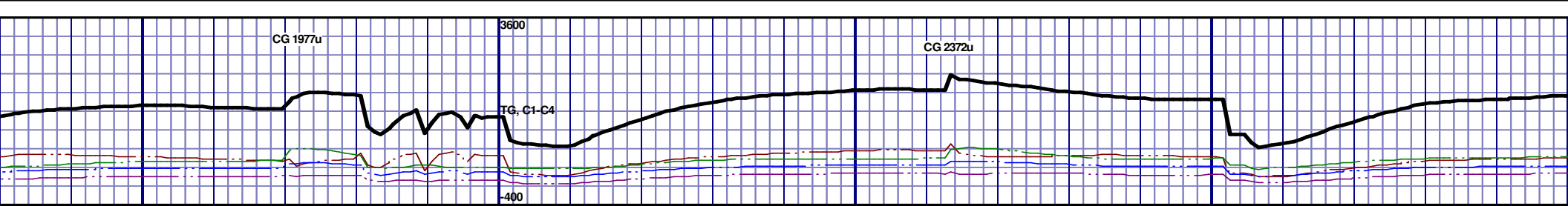
9600' MD-9650' MD: MRL: 60% MEDDR
TO SUBBLKY, GRTY TO SLTY TXT, FRM
FREE CALC, ABNT FREE BENT, IMBD
GRYSHBLK STN, MOD BLSHWT MIN F
FLOR, FAST STRMG CUT, HVY BLSHW





				NIOBRARA A MARL 10163' MD 6574' TVD				6375 TVD			





LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 10% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

10750' MD-10800' MD: CHK: 90% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 30% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

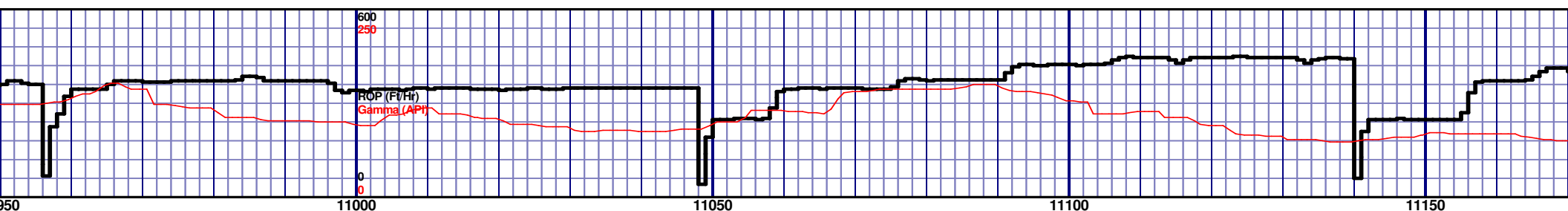
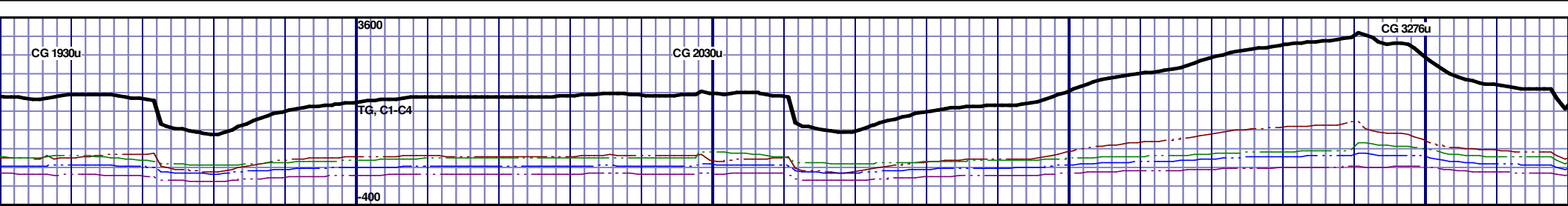
10800' MD-10850' MD: CHK: 70% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 30% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

10850' MD-10900' MD: CHK: 75% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 25% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

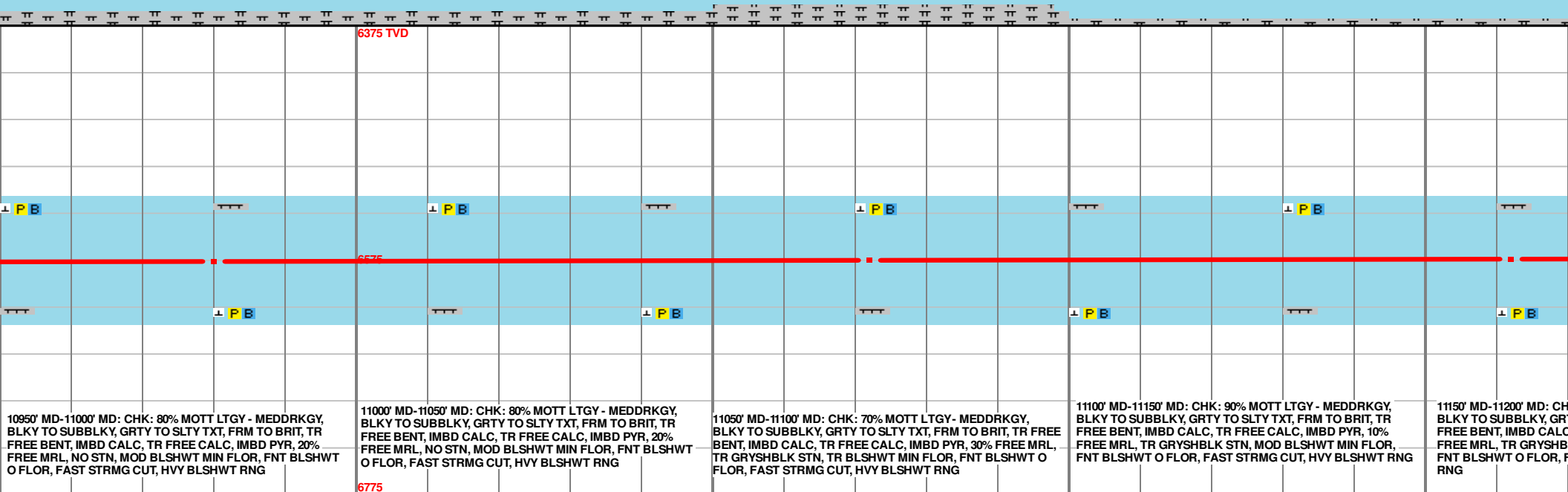
10900' MD-10950' MD: CHK: 70% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 30% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

MD 10794 TVD 6578.13
INC 90.77 AZ 271.4
VS 4357.98

MD 10888 TVD 6576.94
INC 90.68 AZ 270.76
VS 4451.93



Niobrara B Chalk (11100' MD - 11150' MD)



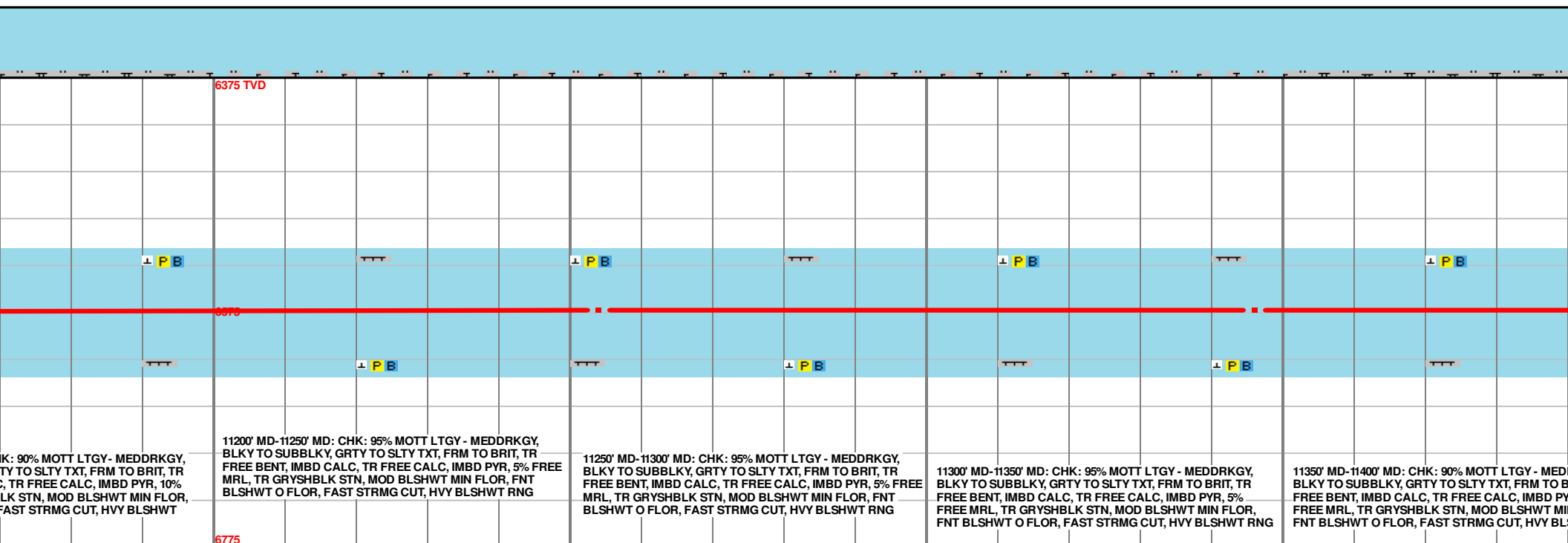
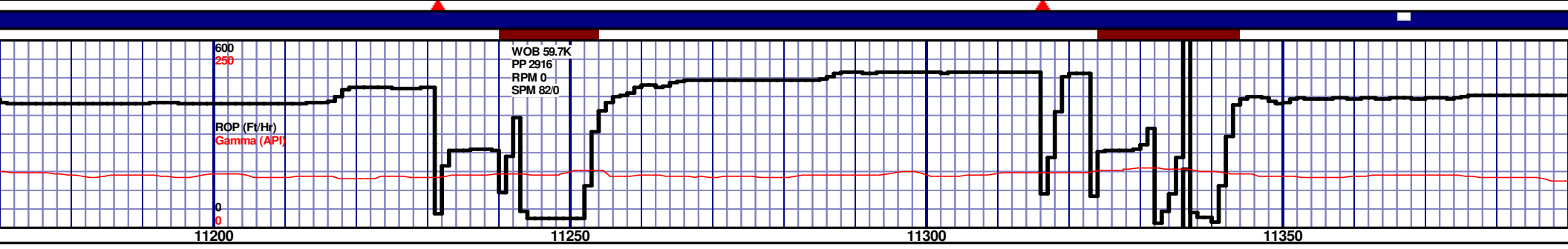
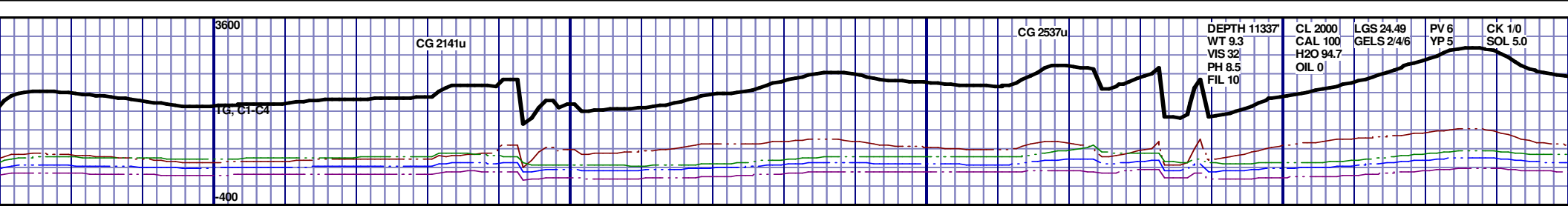
10950' MD-11000' MD: CHK: 80% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 20% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

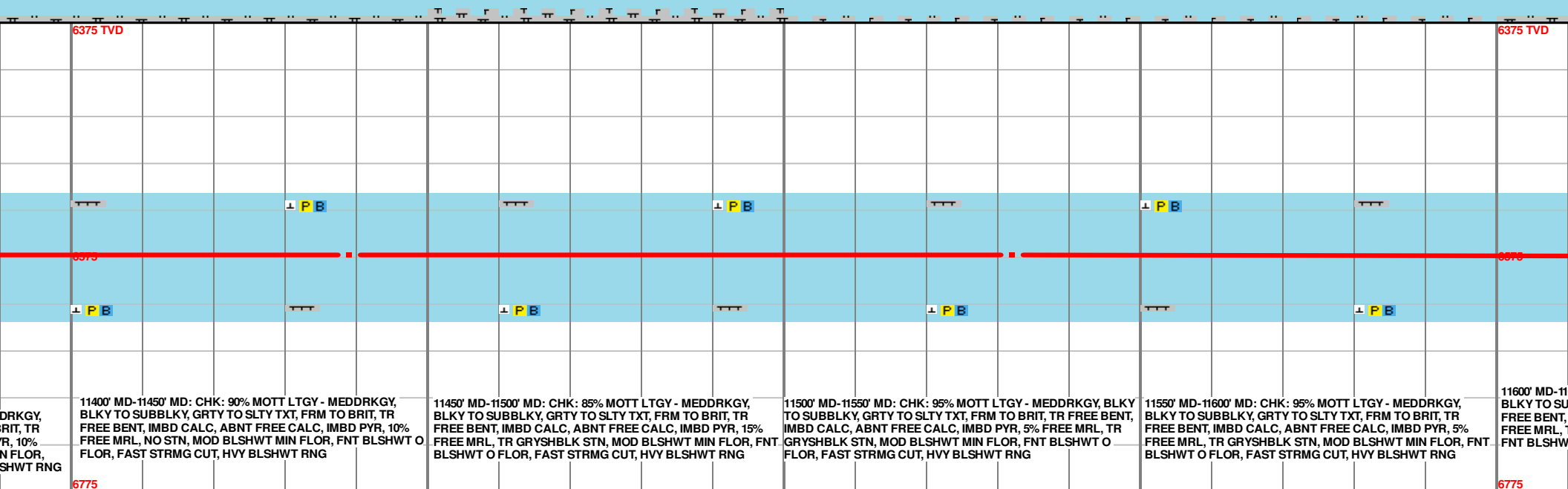
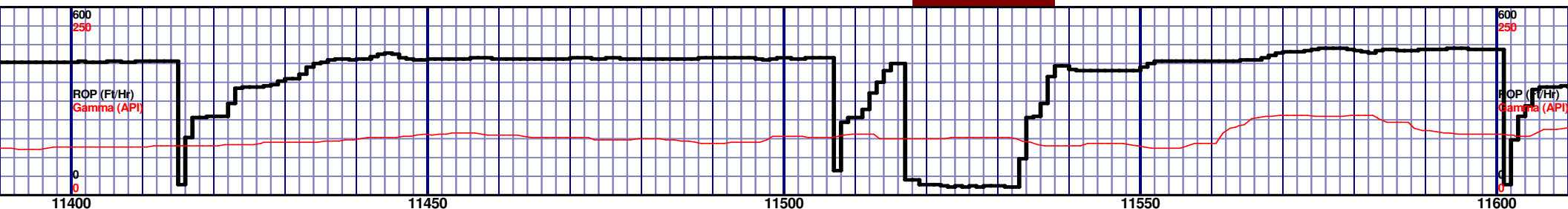
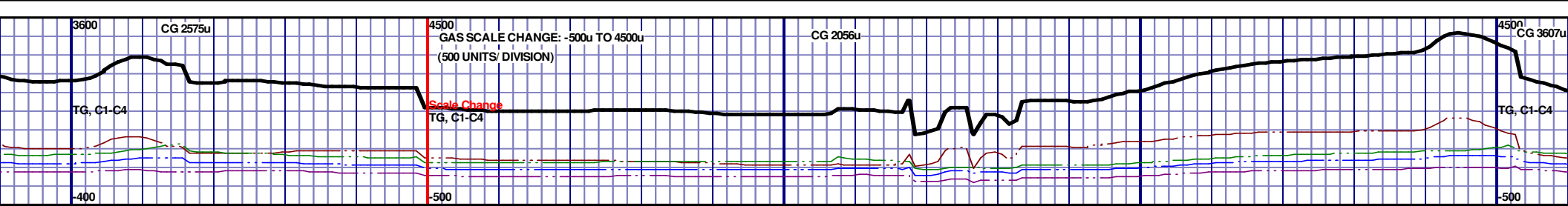
11000' MD-11050' MD: CHK: 80% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 20% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

11050' MD-11100' MD: CHK: 70% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 30% FREE MRL, TR GRYSBLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

11100' MD-11150' MD: CHK: 90% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 10% FREE MRL, TR GRYSBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

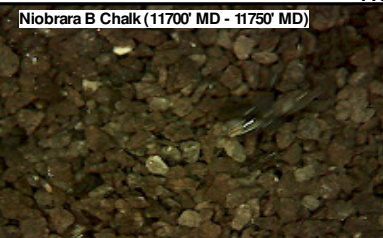
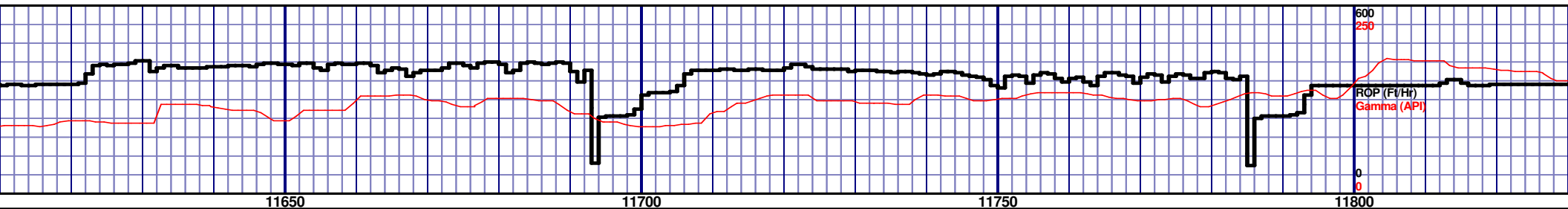
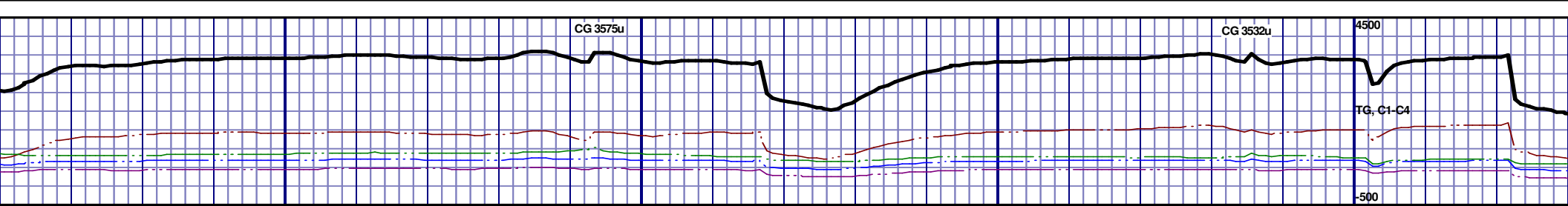
11150' MD-11200' MD: CHK: 90% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 10% FREE MRL, TR GRYSBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG



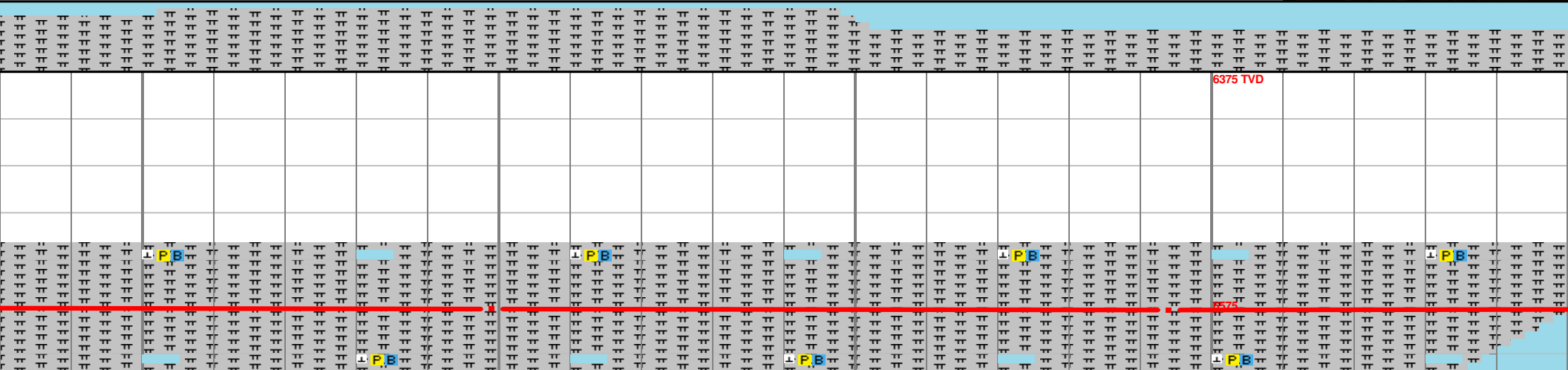
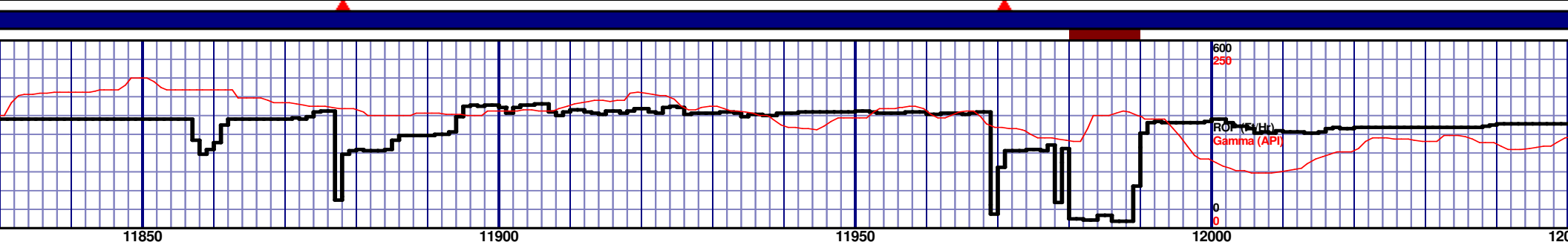


MD 11439 TVD 6572.51
INC 90.8 AZ 270.84
VS 5002.46

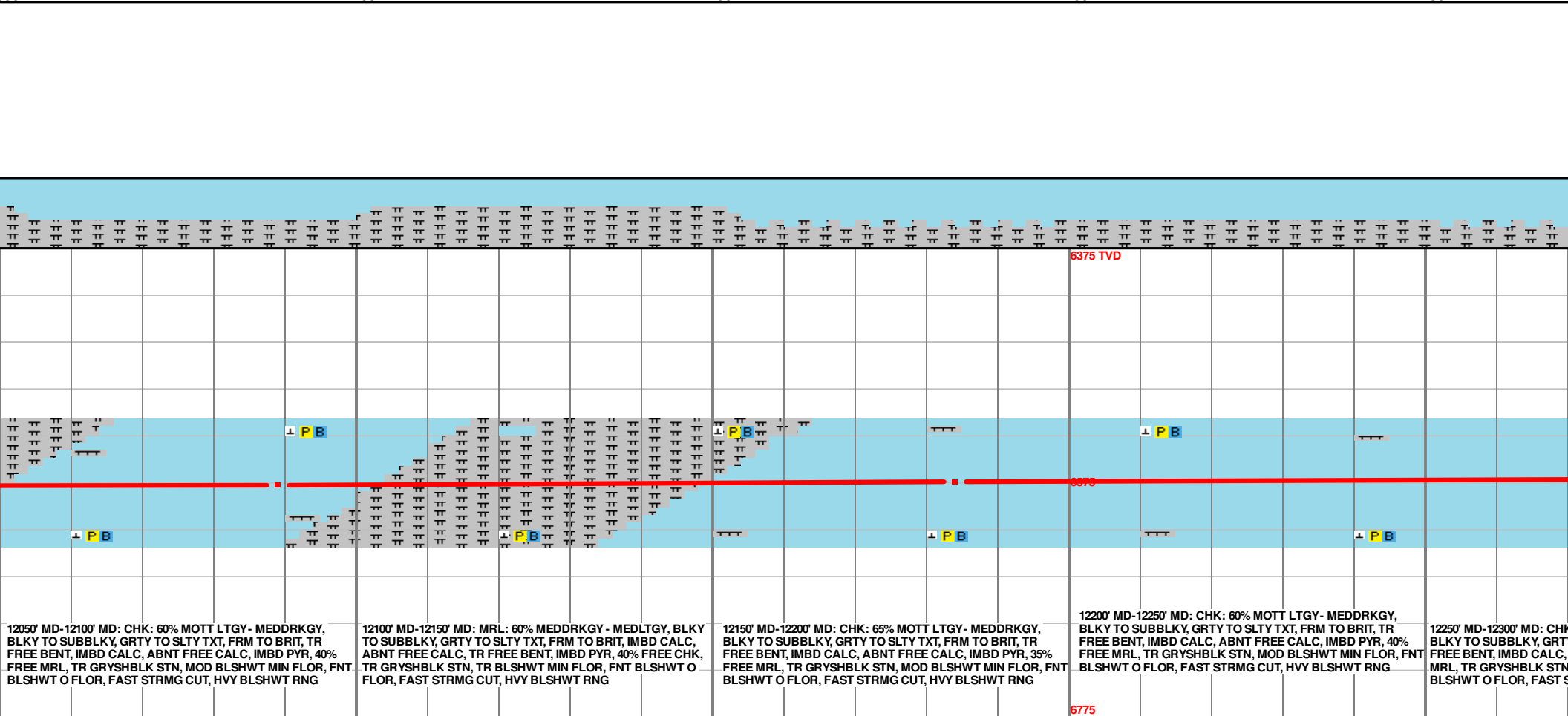
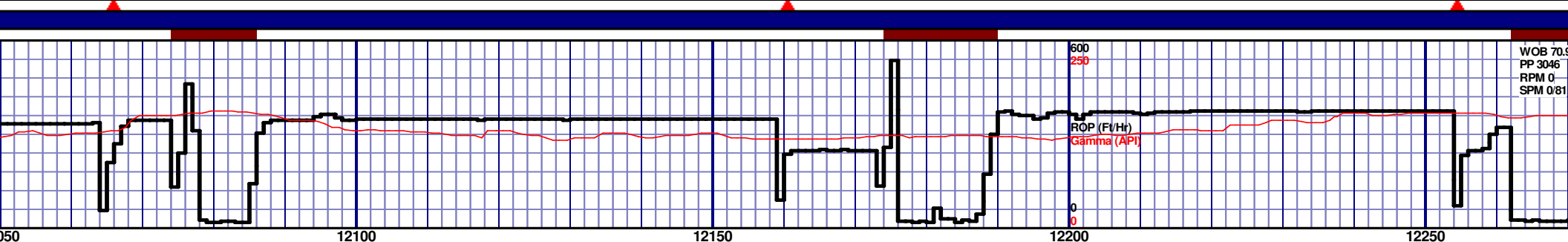
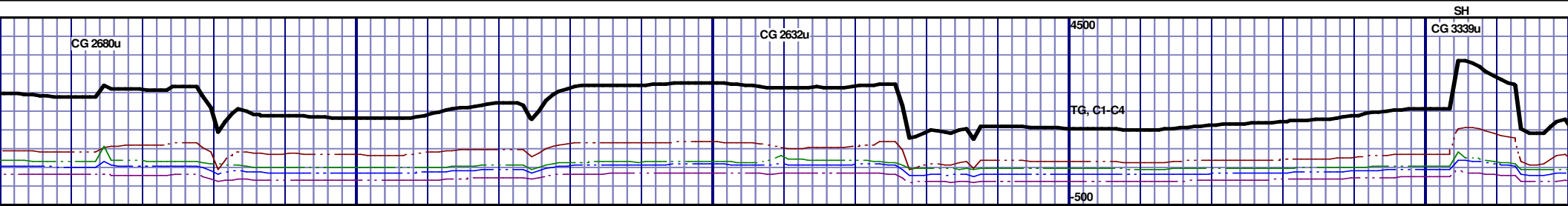
MD 11532 TVD 6572.74
INC 88.92 AZ 270.29
VS 5095.39



650' MD: CHK: 90% MOTT LTGY - MEDDRKGY, IMBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR IMBD CALC, ABNT FREE CALC, IMBD PYR, 10% TR GRYSBLK STN, MOD BLSHWT MIN FLOR, FNT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG				11650' MD-11700' MD: CHK: 65% MOTT LTGY - MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, ABNT FREE CALC, IMBD PYR, 35% FREE MRL, TR GRYSBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG				11700' MD-11750' MD: MRL: 60% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, ABNT FREE CALC, TR FREE BENT, IMBD PYR, 40% FREE CHK, TR GRYSBLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG				11750' MD-11800' MD: MRL: 70% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, ABNT FREE CALC, TR FREE BENT, IMBD PYR, 30% FREE CHK, TR GRYSBLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG				11800' MD-11850' MD: MRL: 80% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, ABNT FREE CALC, TR FREE BENT, IMBD PYR, 20% FREE CHK, TR GRYSBLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG			
MD 11624 TVD 6574.2 INC 89.26 AZ 270.12 VS 5187.29				MD 11715 TVD 6575.38 INC 89.26 AZ 269.85 VS 5278.19				MD 11807 TVD 6576.24 INC 89.66 AZ 269.94 VS 5370.07				MD 11850' TVD 6577.24 INC 89.66 AZ 269.94 VS 5370.07				MD 11900' TVD 6578.24 INC 89.66 AZ 269.94 VS 5370.07			

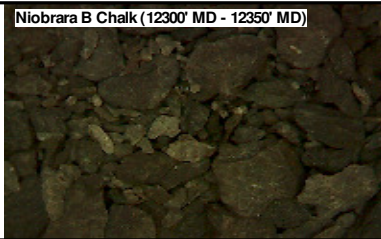
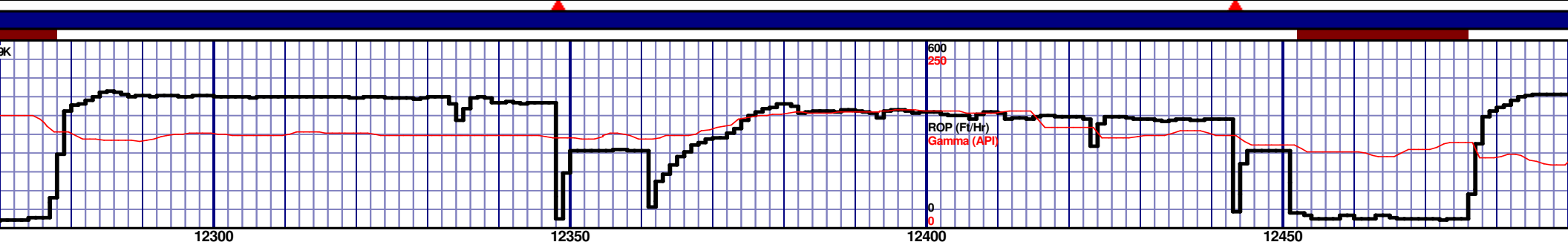
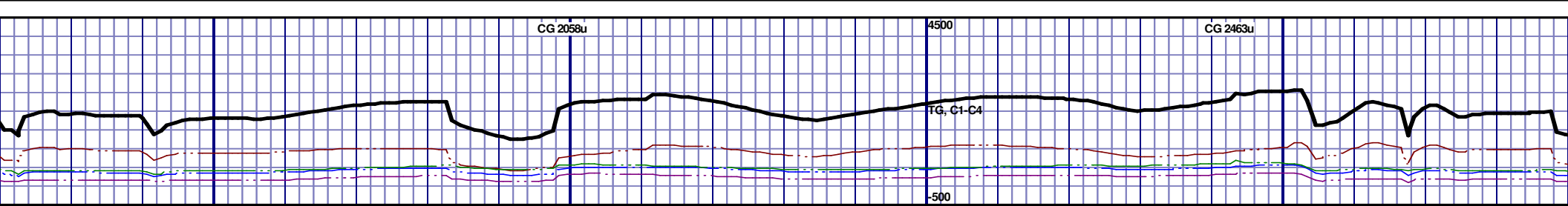


DRKGY - MEDLTGY, BLKY M TO BRIT, IMBD CALC, IMBD PYR, 20% FREE CHK, O FLOR, FNT BLSHWT O VT RNG	11850' MD-11900' MD: MRL: 90% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, ABNT FREE CALC, TR FREE BENT, IMBD PYR, 10% FREE CHK, TR GRYSHLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	11900' MD-11950' MD: MRL: 90% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, ABNT FREE CALC, TR FREE BENT, IMBD PYR, 10% FREE CHK, TR GRYSHLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	11950' MD-12000' MD: MRL: 60% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, ABNT FREE CALC, TR FREE BENT, IMBD PYR, 40% FREE CHK, TR GRYSHLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	12000' MD-12050' MD: MRL: 60% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, ABNT FREE CALC, TR FREE BENT, IMBD PYR, 40% FREE CHK, TR GRYSHLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG
---	--	--	--	--

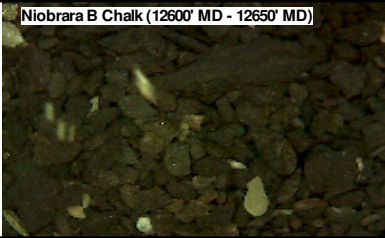


MD 12089 TVD 6577
INC 91.2 AZ 267.84
VS 5651.35

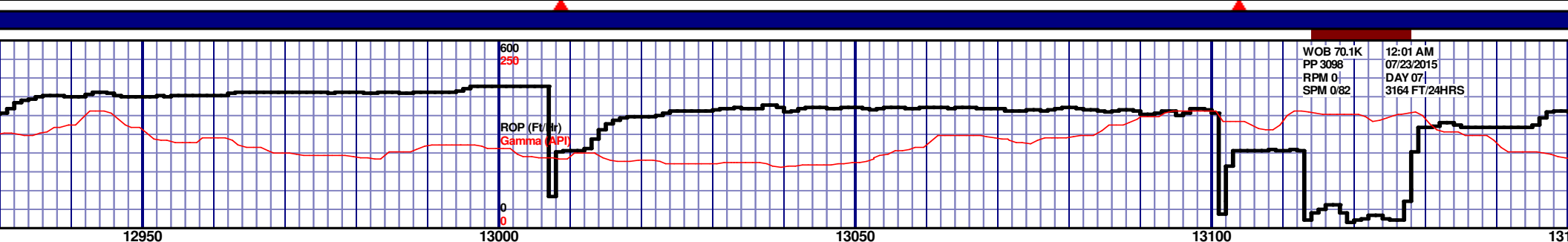
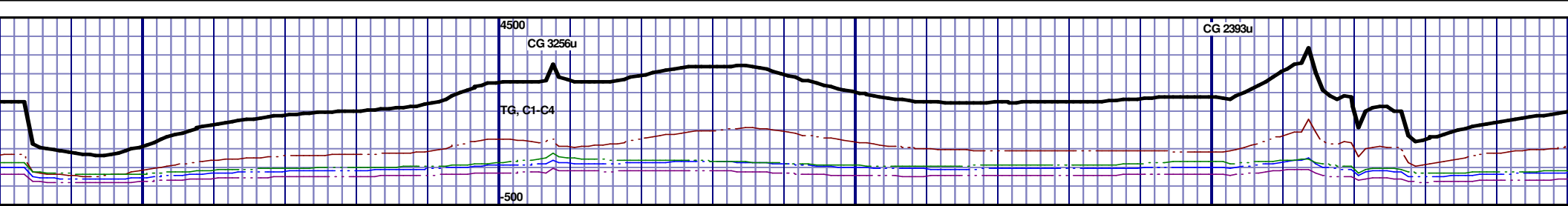
MD 12184 TVD 6574.39
INC 91.94 AZ 269.97
VS 5746.1



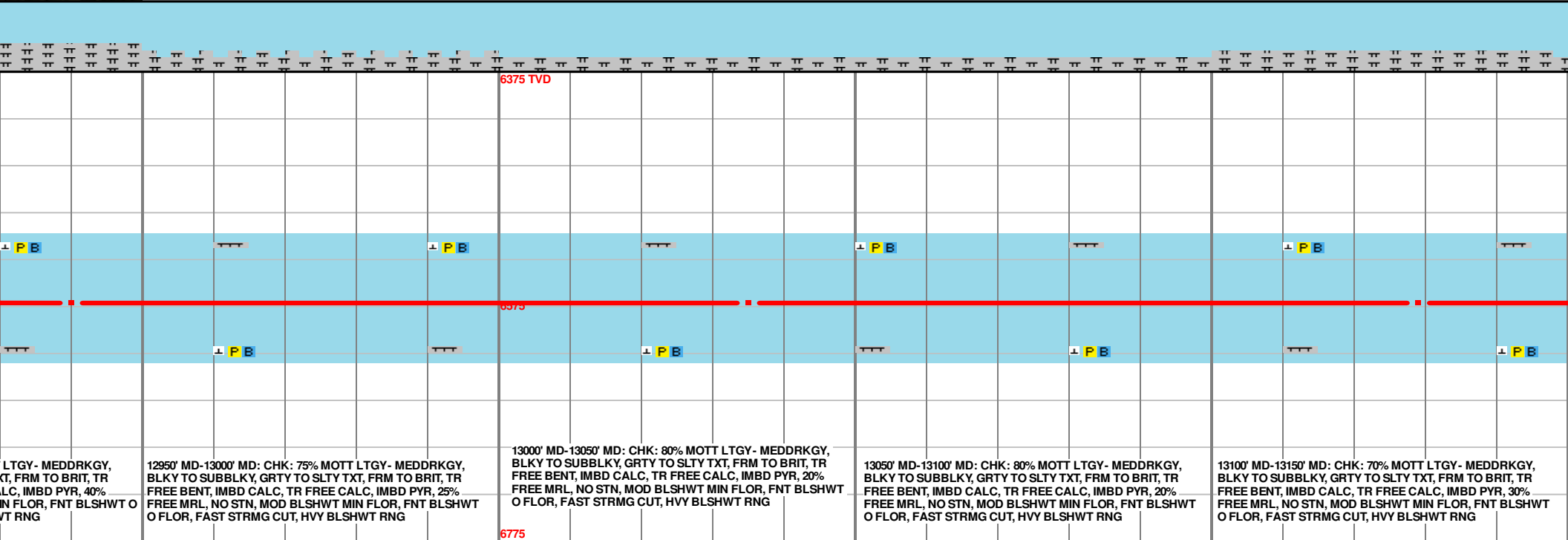
12300' MD-12350' MD: CHK: 60% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, FREE CALC, TR FREE BENT, IMBD PYR, 40% FREE CHK, TR GRYSHBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG											
12350' MD-12400' MD: MRL: 60% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, FREE CALC, TR FREE BENT, IMBD PYR, 40% FREE CHK, TR GRYSHBLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG											
12400' MD-12450' MD: MRL: 65% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, FREE CALC, TR FREE BENT, IMBD PYR, 35% FREE CHK, TR GRYSHBLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG											
12450' MD-12500' MD: MRL: 60% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, FREE CALC, TR FREE BENT, IMBD PYR, 40% FREE CHK, TR GRYSHBLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG											

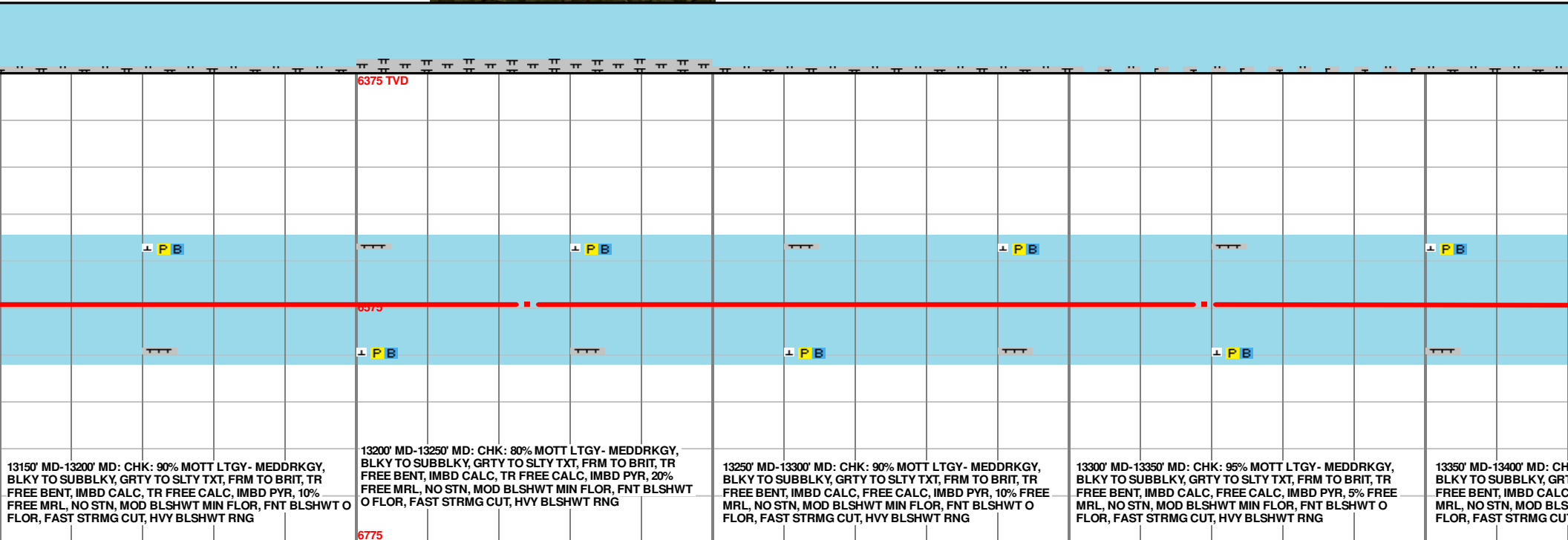
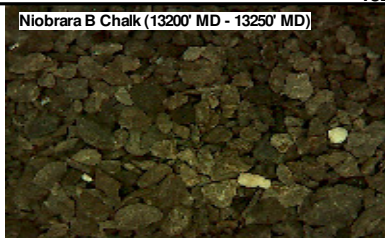
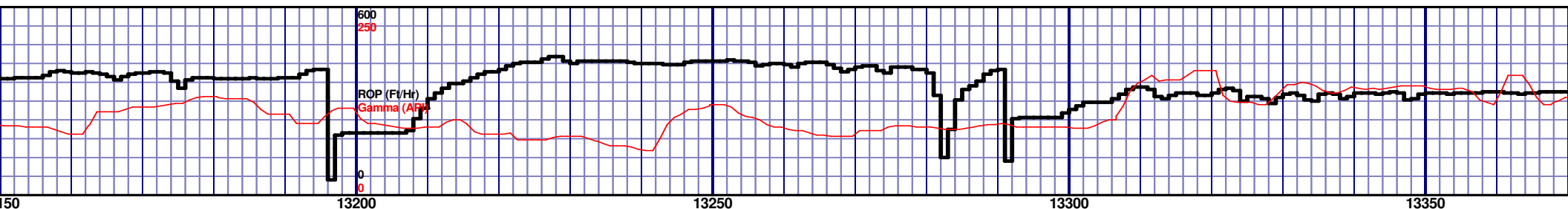
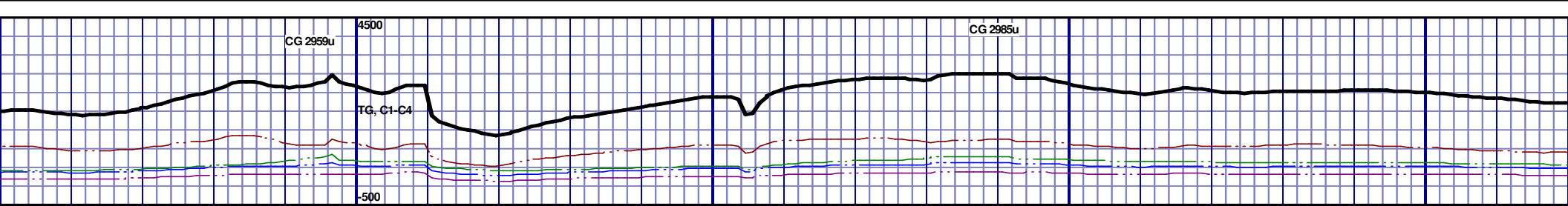


12500' MD-12550' MD: MRL: 60% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, IMBD CALC, FREE CALC, TR FREE BENT, IMBD PYR, 40% FREE CHK, TR GRYSHLBK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	12550' MD-12600' MD: MRL: 70% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, IMBD CALC, TR FREE CALC, TR FREE BENT, IMBD PYR, 30% FREE CHK, TR GRYSHLBK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	12600' MD-12650' MD: MRL: 70% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, IMBD CALC, FREE CALC, TR FREE BENT, IMBD PYR, 30% FREE CHK, TR GRYSHLBK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	12650' MD-12700' MD: MRL: 90% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, IMBD CALC, TR FREE CALC, TR FREE BENT, IMBD PYR, 10% FREE CHK, TR GRYSHLBK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	12700' MD-12750' MD: MRL: 90% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GR TY TO SLTY TXT, FRM TO BRIT, IMBD CALC, TR FREE CALC, TR FREE BENT, IMBD PYR, 10% FREE CHK, TR GRYSHLBK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG
---	--	---	--	--



WOB 70.1K 12:01 AM
PP 3098 07/23/2015
RPM 0 DAY 07
SPM 0/82 3164 FT/24HRS





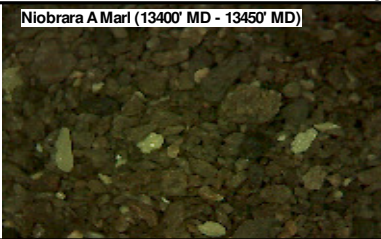
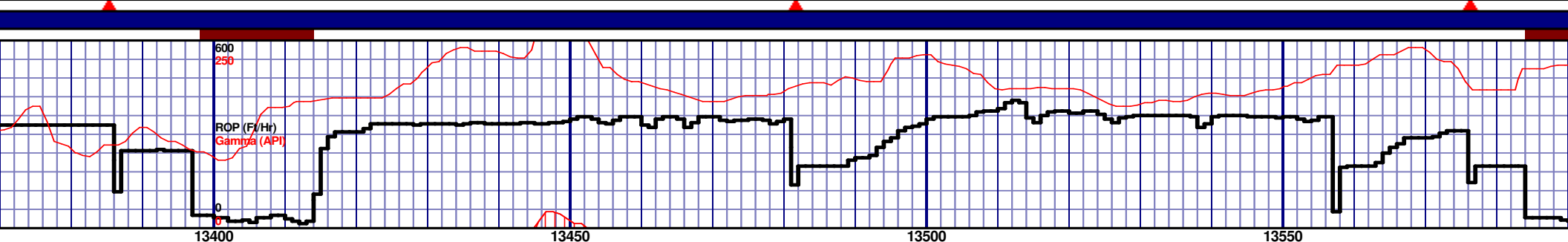
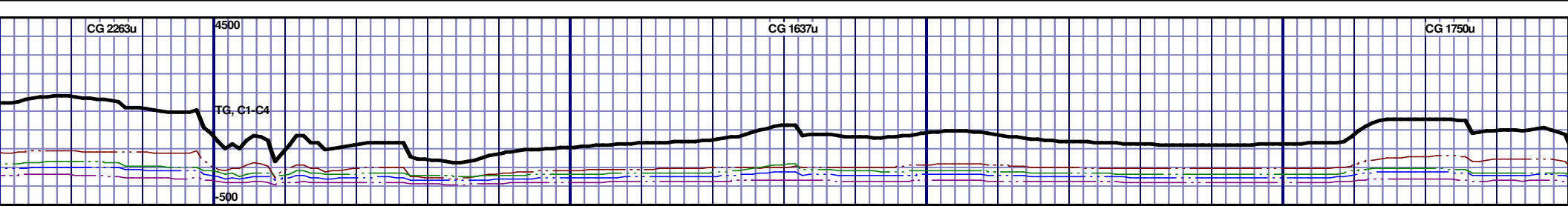
13150' MD-13200' MD: CHK: 90% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 10% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

13200' MD-13250' MD: CHK: 80% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, TR FREE CALC, IMBD PYR, 20% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

13250' MD-13300' MD: CHK: 90% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, FREE CALC, IMBD PYR, 10% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

13300' MD-13350' MD: CHK: 95% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, FREE CALC, IMBD PYR, 5% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

13350' MD-13400' MD: CHK: 95% MOTT LTGY- MEDDRKGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, TR FREE BENT, IMBD CALC, FREE CALC, IMBD PYR, 5% FREE MRL, NO STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG



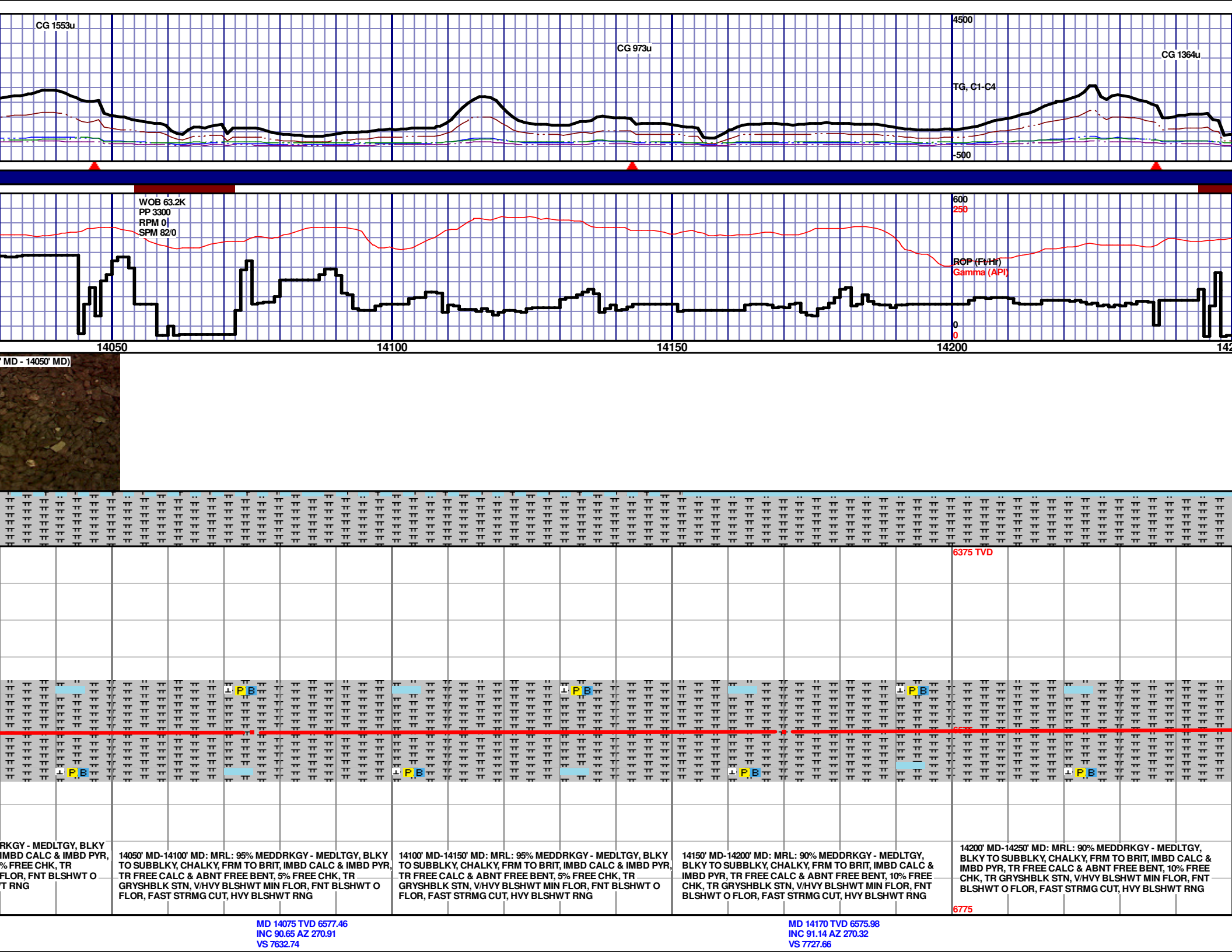
6375 TVD										6775									
NIORRARA A MARL																			
13404' MD 6573' TVD																			
13400' MD-13450' MD: MRL: 60% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, FREE CALC, ABNT FREE BENT, IMBD PYR, 40% FREE CHK, TR GRYSBLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG										13450' MD-13500' MD: MRL: 95% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, FREE CALC, ABNT FREE BENT, IMBD PYR, 5% FREE CHK, TR GRYSBLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG									
13500' MD-13550' MD: MRL: 95% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, FREE CALC, ABNT FREE BENT, IMBD PYR, 5% FREE CHK, TR GRYSBLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG										13550' MD-13600' MD: MRL: 90% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, GRTY TO SLTY TXT, FRM TO BRIT, IMBD CALC, FREE CALC, ABNT FREE BENT, IMBD PYR, 10% FREE CHK, TR GRYSBLK STN, TR BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG									

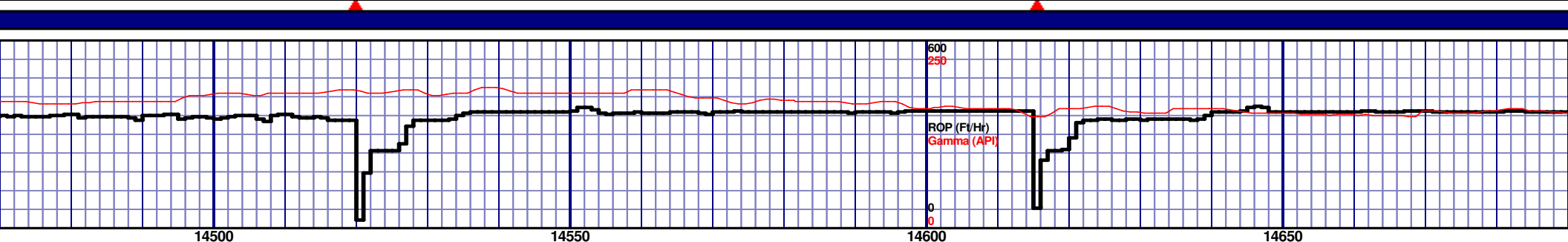
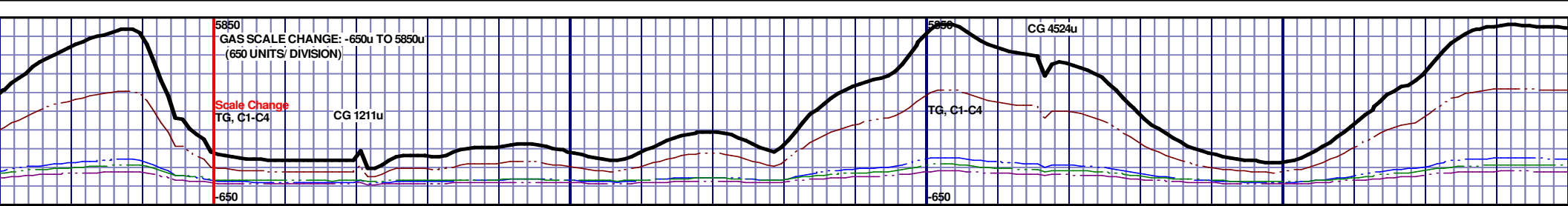
MD 13413 TVD 6573.19
INC 88.64 AZ 269.11
VS 6972.26

MD 13508 TVD 6576
INC 87.97 AZ 269.27
VS 7067.04



Niobrara A Marl (14000)

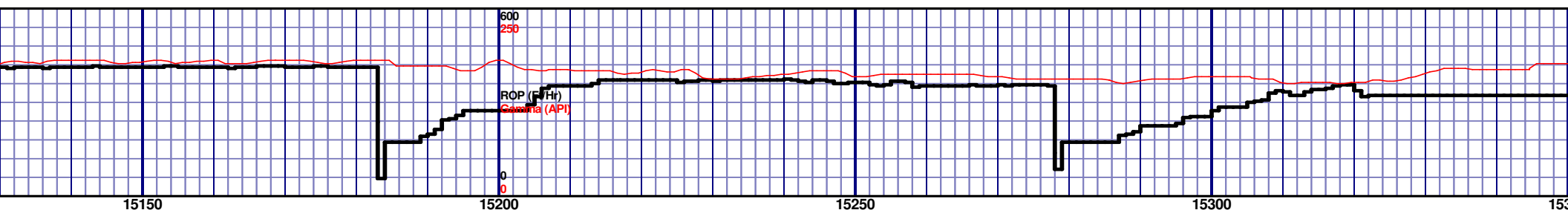


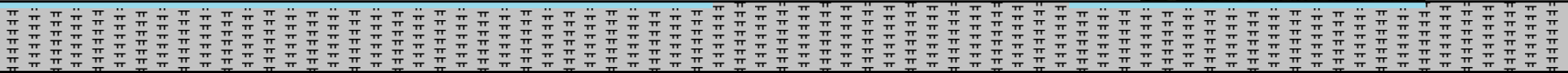
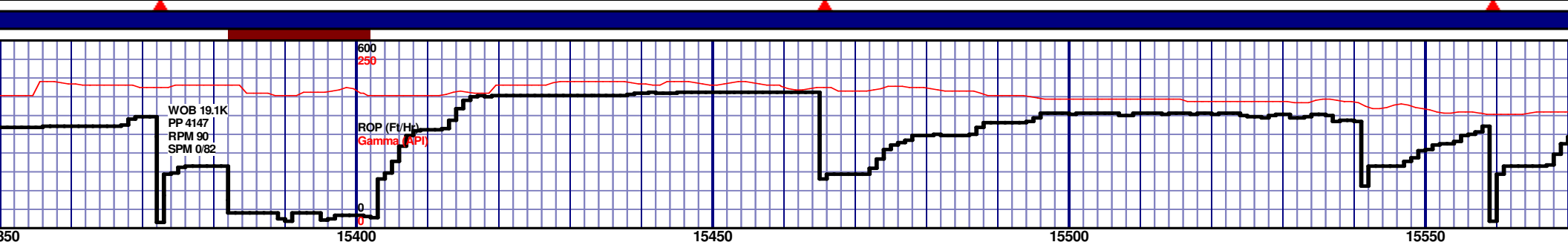


14500' MD-14550' MD: MRL: 95% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, CHALKY, FRM TO BRIT, IMBD CALC & IMBD PYR, TR FREE CALC & ABNT FREE BENT, 5% FREE CHK, TR GRYSBLK STN, V/HVY BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	14550' MD-14600' MD: MRL: 100% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, CHALKY, FRM TO BRIT, IMBD CALC & IMBD PYR, TR FREE CALC & ABNT FREE BENT, TR GRYSBLK STN, V/HVY BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	14600' MD-14650' MD: MRL: 100% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, CHALKY, FRM TO BRIT, IMBD CALC & IMBD PYR, TR FREE CALC & FREE BENT, TR GRYSBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG	14650' MD-14700' MD: MRL: 90% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, CHALKY, FRM TO BRIT, IMBD CALC & IMBD PYR, TR FREE CALC & FREE BENT, 10% FREE CHK, TR GRYSBLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG
--	--	---	--

MD 14548 TVD 6573.4
INC 90.25 AZ 270.51
VS 8105.48

MD 14642 TVD 6572.33
INC 91.05 AZ 270.21
VS 8199.4

[illegible]



MD 15398 TVD 6572.18 INC 89.32 AZ 270.74 VS 8954.78	MD 15493 TVD 6573.13 INC 89.54 AZ 270.79 VS 9049.72
---	---



L: 100% MEDDRKGY - MEDLTGY,
ALKY, FRM TO BRIT, IMBD CALC &
C & FREE BENT, TR GRYSBLK STN,
RC, FNT BLSHWT O FLOR, FAST
VT RNG

15600' MD-15650' MD: MRL: 95% MEDDRKGY - MEDLTGY, BLKY TO SUBBLKY, CHALKY, FRM TO BRIT, TR IMBD CALC, TR IMBD PYR, FREE CALC, TR FREE BEN, 5% FREE CHK, TR GRYSHLK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT O FLOR, FAST STRMG CUT, HVY BLSHWT RNG

15650' MD-15700' MD: MRL: 95% MEDDRKGY - MEDLTGY,
BLKY TO SUBBLKY, CHALKY, FRM TO BRIT, TR IMBD CALC,
TR IMBD PYR, TR FREE CALC, TR FREE BENT, 5% FREE CHK,
TR GRYSHLBK STN, MOD BLSHWT MIN FLOR, FNT BLSHWT
O FLOR. FAST STRMG CUT. HVY BLSHWT RNG

15700' MD-15750' MD: MRL: 90% MEDDRKGY - MEDLTGY,
BLKY TO SUBBLKY, CHALKY, FRM TO BRIT, TR IMBD CALC,
TR IMBD PYR, TR FREE CALC, TR FREE BENT, 10% FREE
CHK, TR GRYSHBLK STN, MOD BLSHWT MIN FLOR, FNT
BLSHWT O FLOR. FAST STRMG CUT, HVB BLSHWT RNG

15750' MD-15800' MD: MRL: 90% MEDDRKGY - MED
TO SUBBLKY, CHALKY, FRM TO BRIT, TR IMBD CAL
IMBD PYR, TR FREE CALC, TR FREE BENT, 10% FR
GRYSHBLK STN, MOD BLSHWT MIN FLOR, FNT BL
FLOR. FAST STRMG CUT. HVY BLSHWT RNG

