



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

phone 918.925.9739

fax 866.534.4559

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: Alfredo Sanchez & Hannah Blatchford
Log Interval: 6750' MD to 11805' MD
Start Date: August 25, 2013
Release Date: August 29, 2013

Well Information

Well Name: Wells Ranch USX
AA13-68-1HN Horizontal
Location: 18-T6N-R62W

County: Weld Co.
State: Colorado

Drilling Rig: H&P 321
Total Depth: 11805' MD
TD Date: August 29, 2013
Formation: Niobrara C Chalk
KB Elevation: 4,881'
GR Elevation: 4,851'
API Number: 05-123-37078-0000

TG (Units) 

C1 (units)

C2 (units) 

C3 (units) 

C4 

1800

GAS SCALE: -100u TO 1800u
(200 UNITS/DIVISION)

TG, C1-C4

DRILLING ON WATER
BASED MUD

-100

CONNECTIONS MARKED
WITH RED TRIANGLES

Connections

Cut	Slide/Rotate
-----	--------------

ROP and Gamma

ROP (Ft/Hr) _____

Gamma (API) _____

ROP (Feet/Hr)
Gamma (API)

ROP SCALE: 0 TO 600

GAMMA SCALE: 0 TO 300

SLIDE=RED
ROTATE=WHITE

[illegible]

Depth

Photographs

Niobrara B Chalk (6750' MD - 6780' MD)

Niobrara B Chalk (6780' MD - 6810' MD)

Niobrara B Marl (6810' MD - 6840' MD)

Lithology %

6400 TVD

NOBLE ENERGY
WELLS RANCH
AA13-68-1HN HORIZONTAL
18-T6N-R62W
WELD CO., CO
H&P 321

NIOBRARA B CHALK
6748' MD. 6626' TVD

NIOBRARA B MARL
6811' MD, 6659' TVD

LOGGERS:
ALFREDO SANCHEZ
HANNAH BLATCHFORD

COMMENCED LOGGING @ 6750' MD ON
8/25/13 W/BIT#2 SIZE 8.75 SMITH SDI611 MPX IN @
5959' MD

6750'-6780': CHK: 55% VLTGY-MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT CHK FRMWK, IMBD PYR, FRE BENT, OCC FREE CAL, FREE SH MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRYL RNC

6780'-6810': CHK: 60% V/LTGY-MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWK, IMBD PYRC SPEC, FREE BENT, ABNT FREE CAL, FRE SH, MOD GYSHBLK STN, 10% LTOP FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

6810'-6840: MRL: 45% MEDDRKGY-
DRKGY, BLKY TO SUBBLKY, FXLI
TO CHLKY, FRM TO FRI, CHK
FRMWRK, IMBD CAL, FREE CAL,
FREE PYR, FREE BENT, MOD
GRYSHBLK STN, 10% LTOR FLOR,
FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

6840'-6870':48% MEDDRKGY -
DRKGY, BLKY TO SUBBLKY, FXLN
TO CHLKY, FRM TO FRI, CHK
FRMWRK, IMBD CAL, FREE CAL,
TRC FREE PYR, TRC FREE BENT,
MOD GRYSHLK STN, 10% LTOR
FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

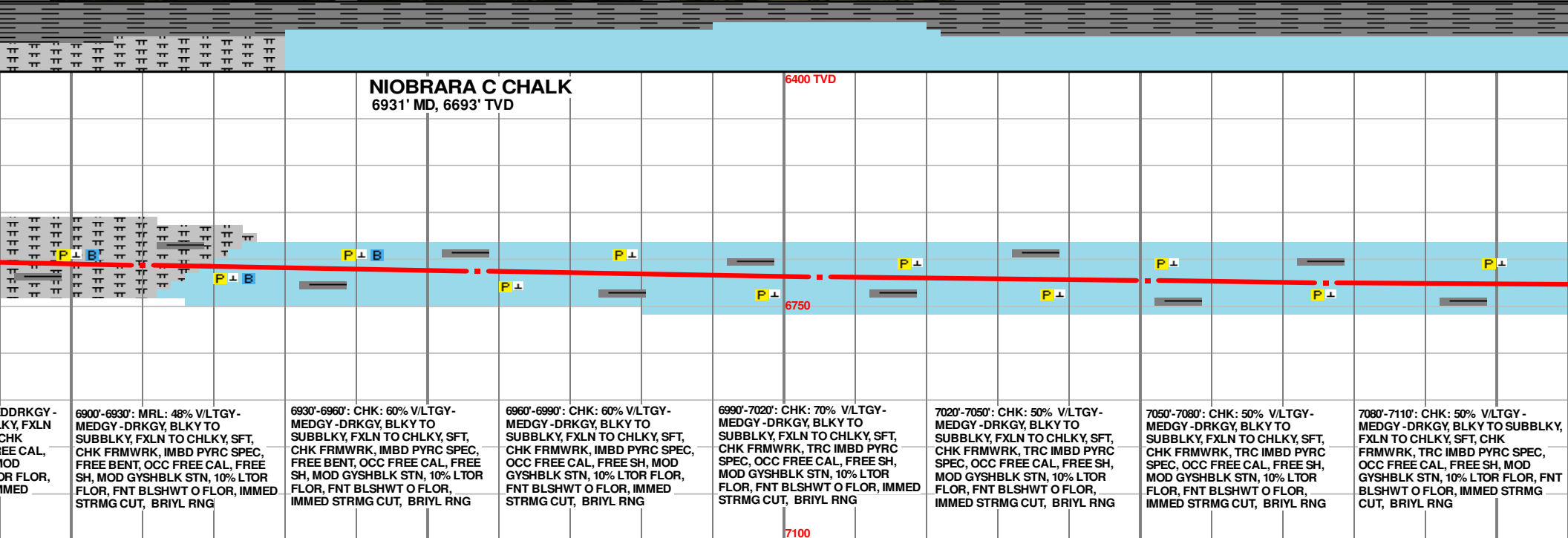
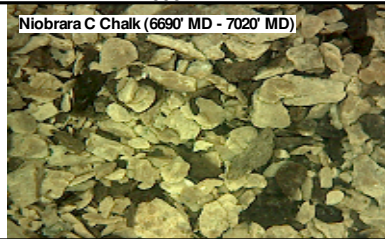
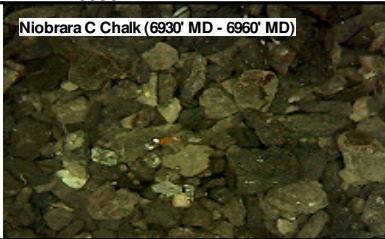
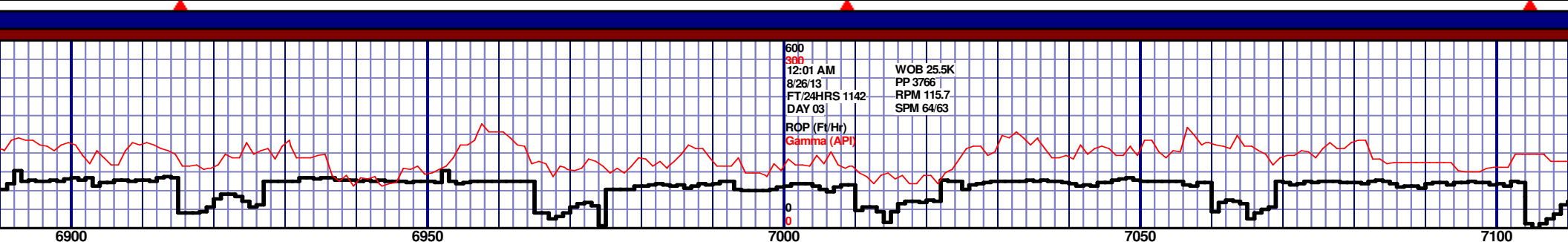
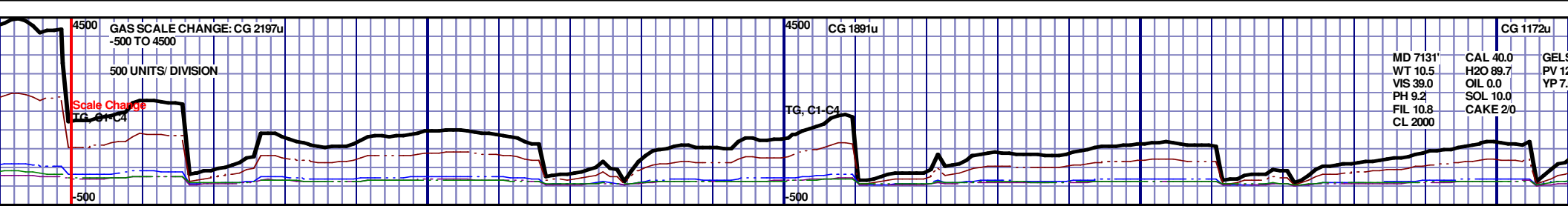
6870'-6900': MRL: 45% ME
DRKG, BLKY TO SUBBL
TO CHLKY, FRM TO FRI, C
FRMWRK, IMBD CAL, FR
FREE PYR, FREE BENT, M
GRYSHBLK STN, 10% LTC
D FNT BLSHWT O FLOR, IM
STRMG CUT. BRIYL RNG

Survey Data

MD 6767 TVD 6637.46
INC 56.22 AZ 269.98
VS 499.91

MD 6815 TVD 6661.05
INC 64.83 AZ 268.43
VS 541.66

MD 6862 TVD 6677.72
INC 73.6 AZ 268.1
VS 585.55



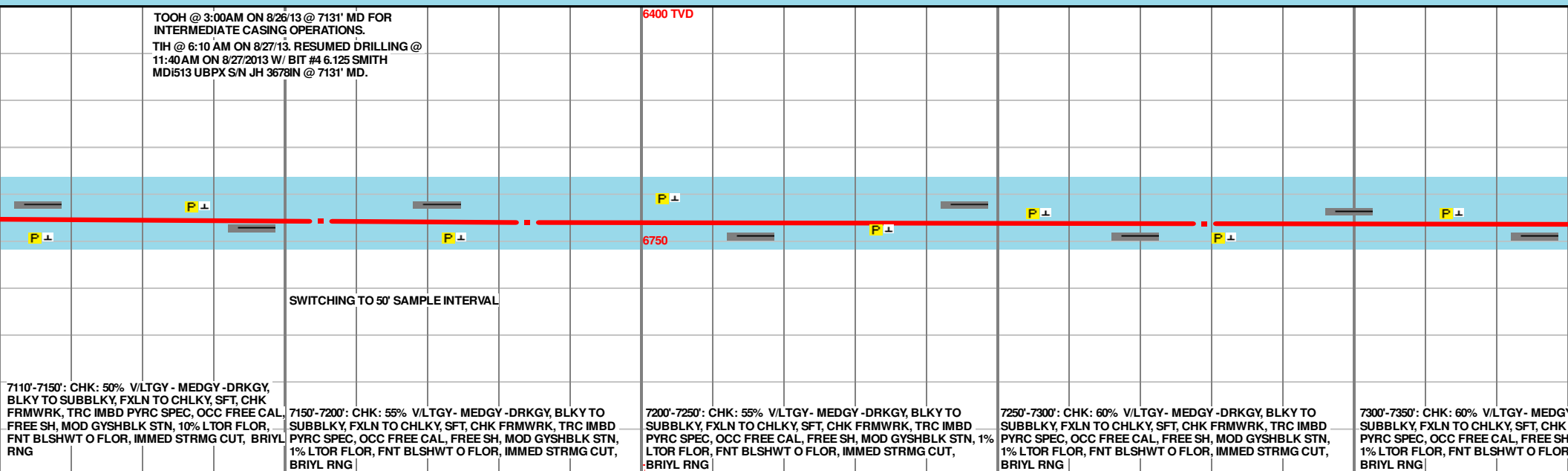
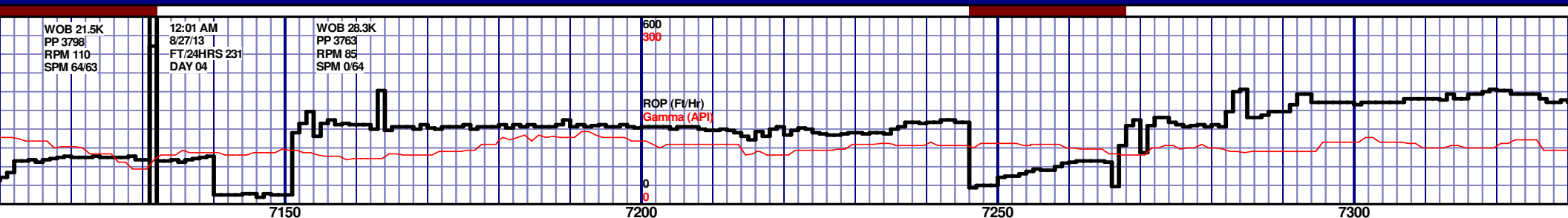
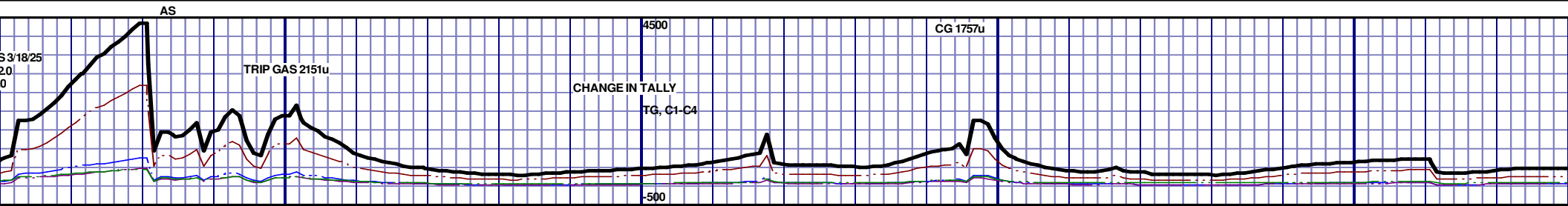
MD 6910 TVD 6689.47
INC 78.04 AZ 268.68
VS 632.07

MD 6957 TVD 6698.33
INC 80.23 AZ 269.07
VS 678.23

MD 7005 TVD 6705.94
INC 81.52 AZ 270.81
VS 725.61

MD 7051 TVD 6711.89
INC 83.62 AZ 271.15
VS 771.2

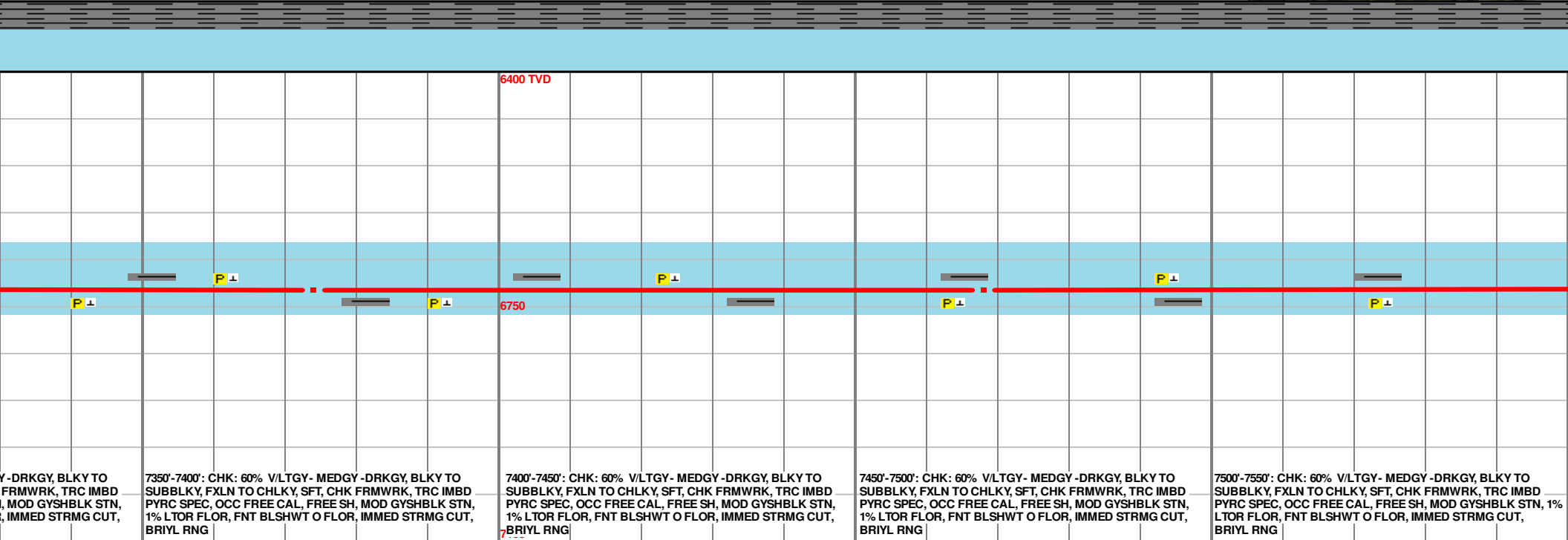
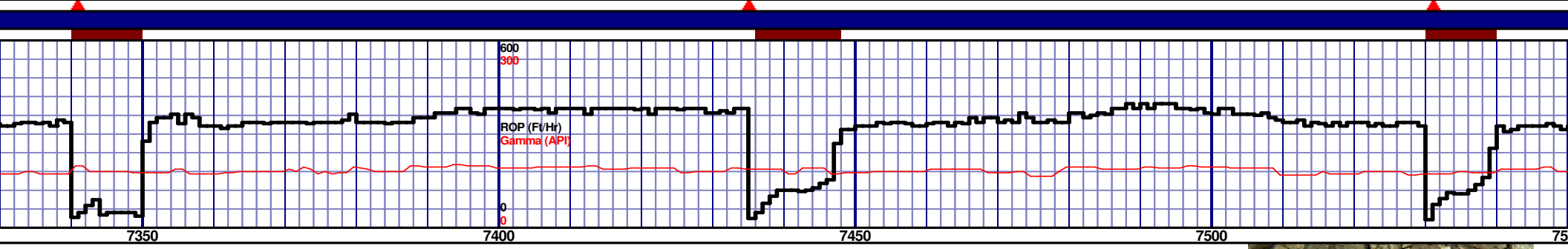
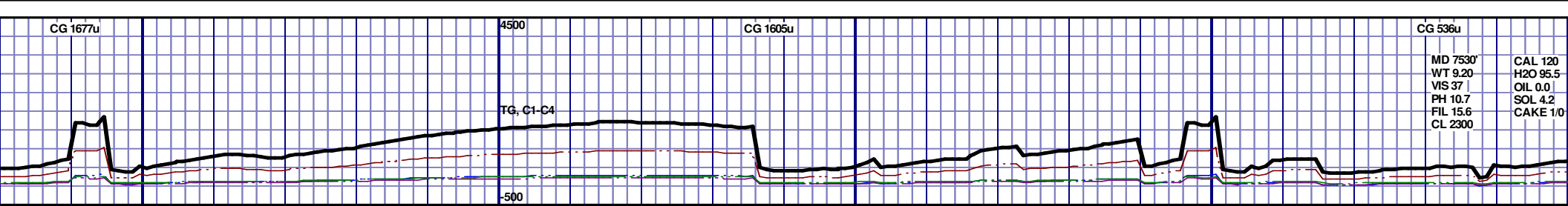
MD 7076 TVD 6714.43
INC 84.72 AZ 270.93
VS 796.06



MD 7155 TVD 6720.3
INC 86.76 AZ 272.76
VS 874.75

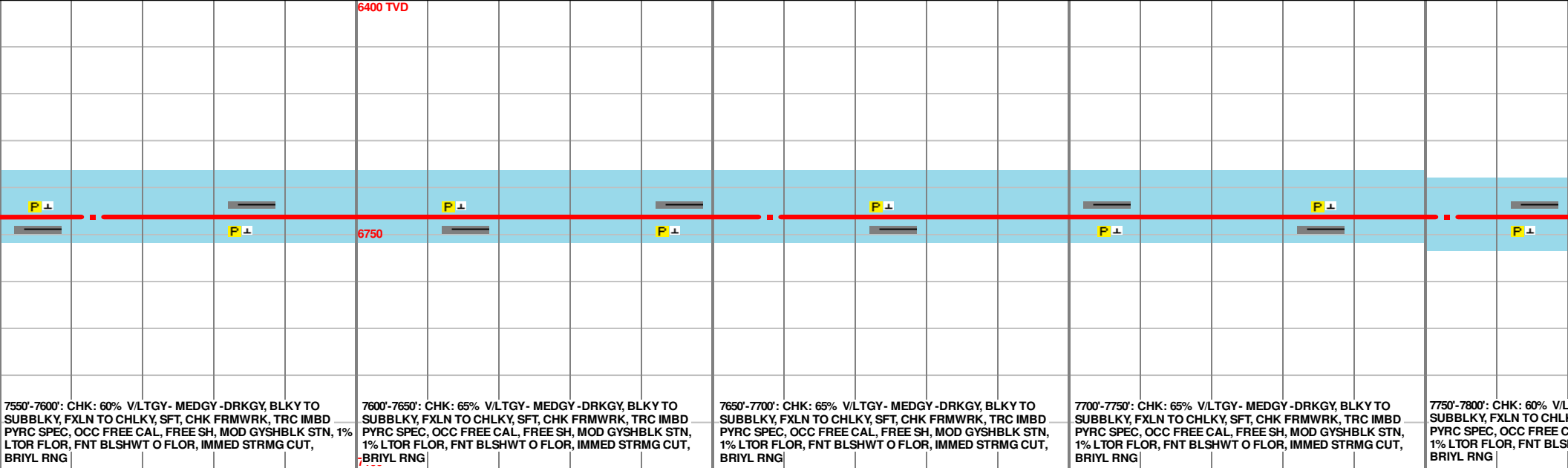
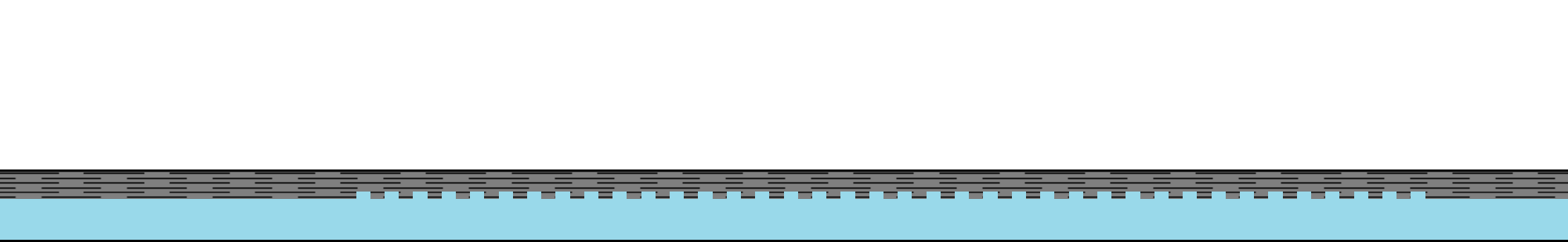
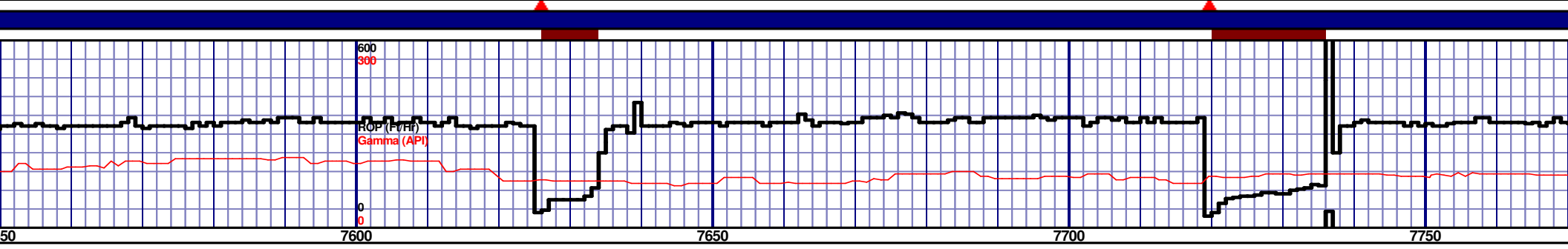
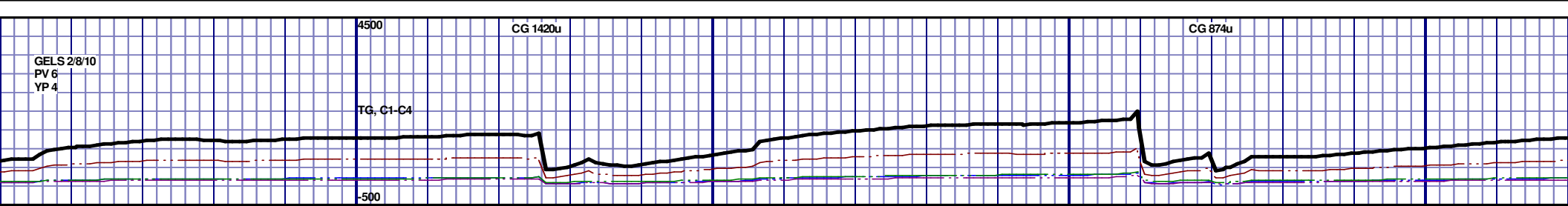
MD 7184 TVD 6721.87
INC 87.04 AZ 271.38
VS 903.73

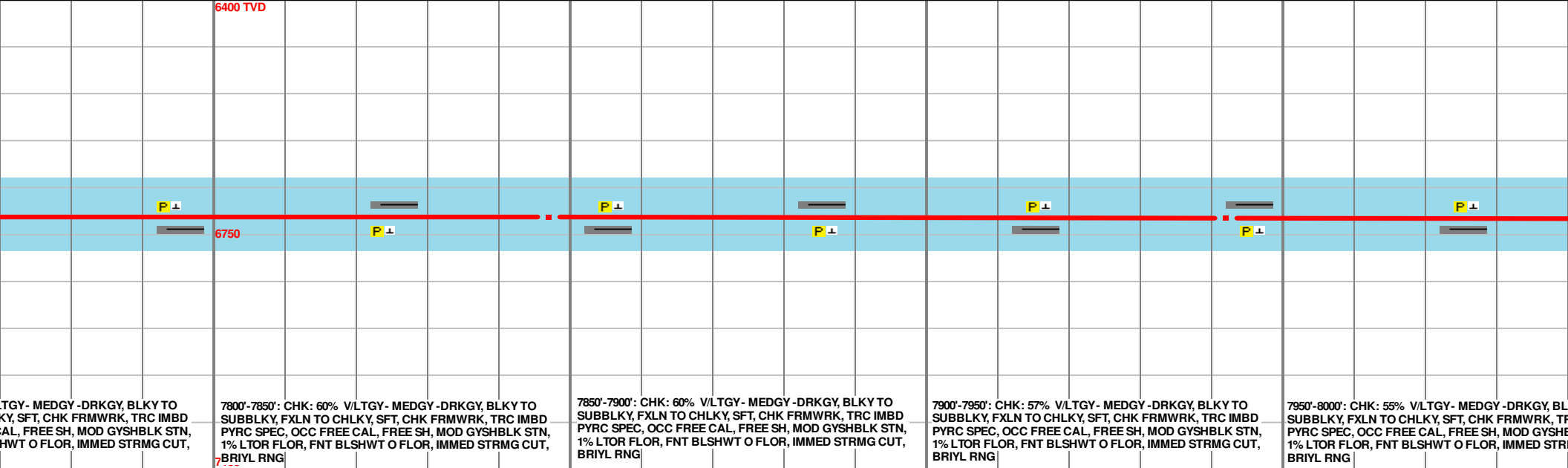
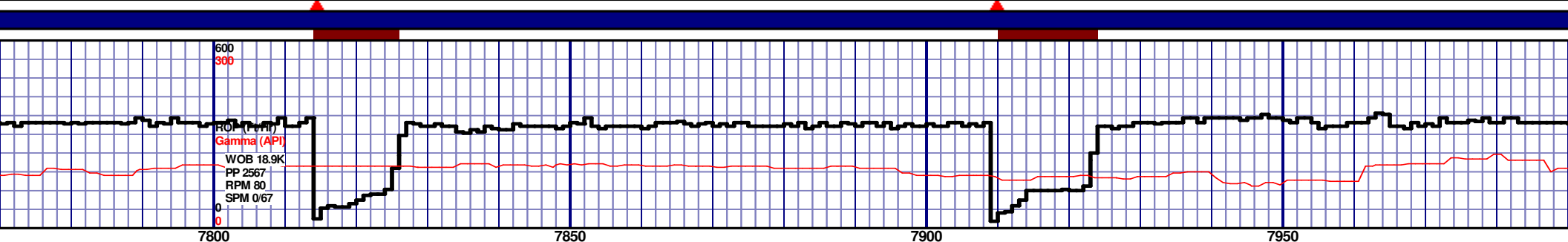
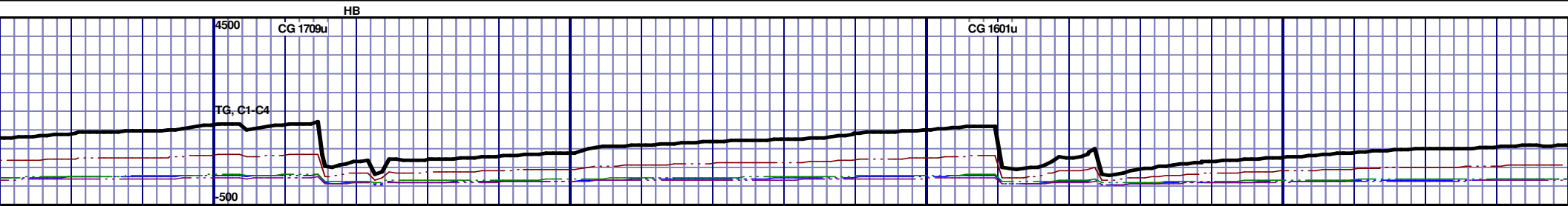
MD 7279 TVD 6724.07
INC 90.31 AZ 267.32
VS 998.67

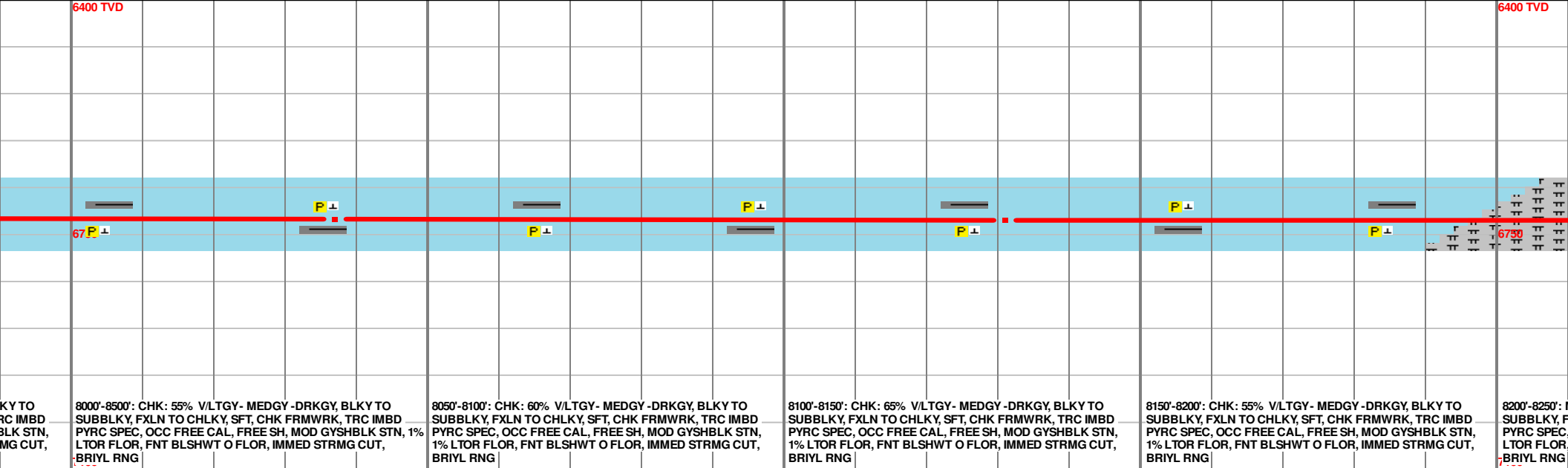
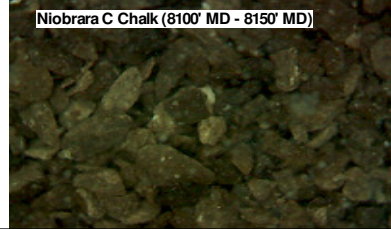
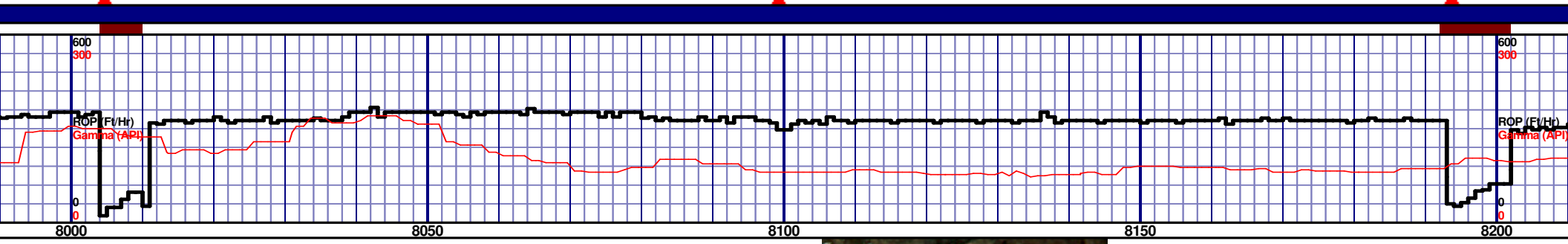
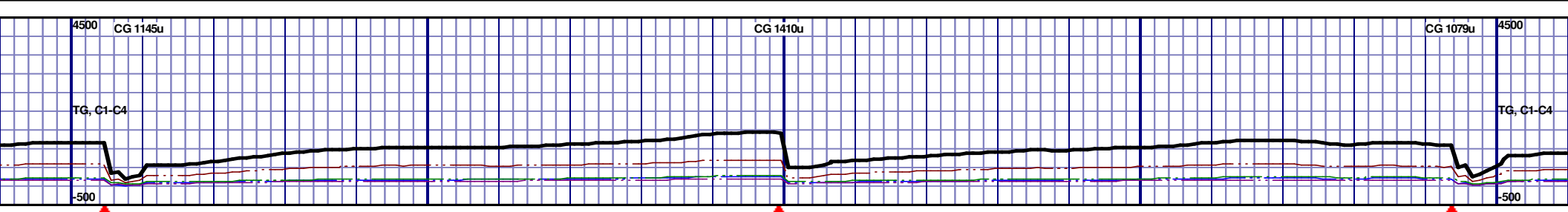


MD 7374 TVD 6724.68
INC 88.95 AZ 267.13
VS 1093.61

MD 7468 TVD 6725.04
INC 90.62 AZ 269.78
VS 1187.59







8000'-8500': CHK: 55% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

8050'-8100': CHK: 60% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

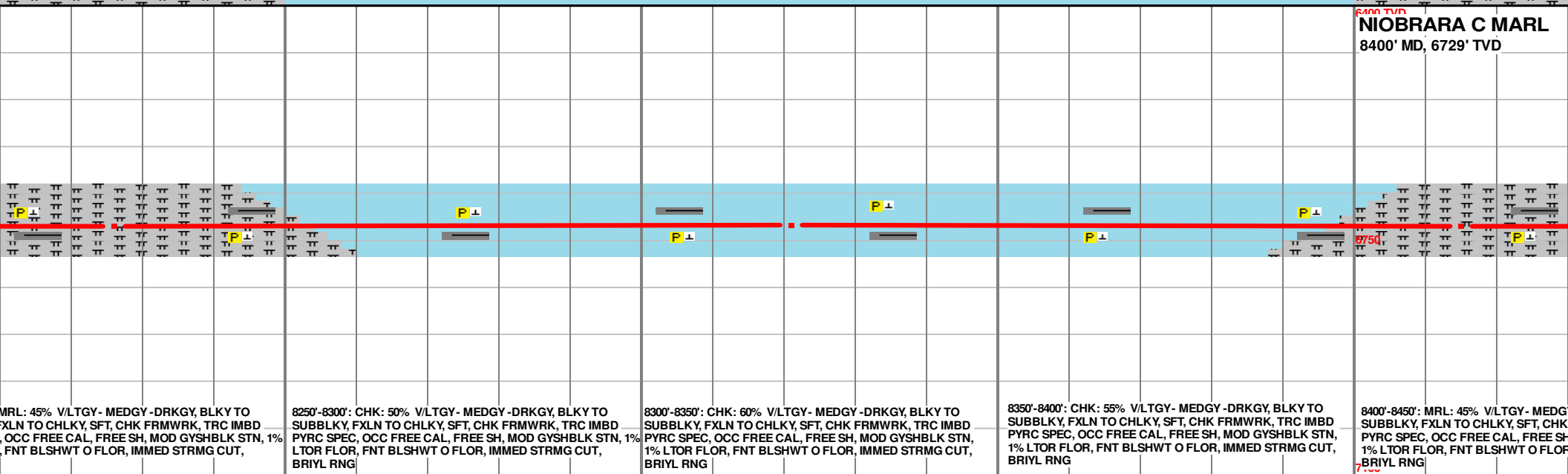
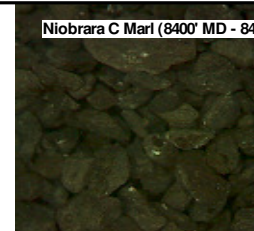
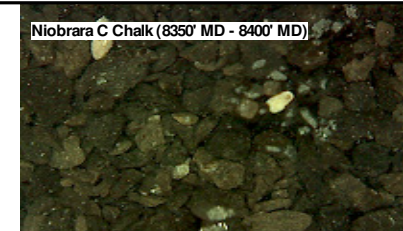
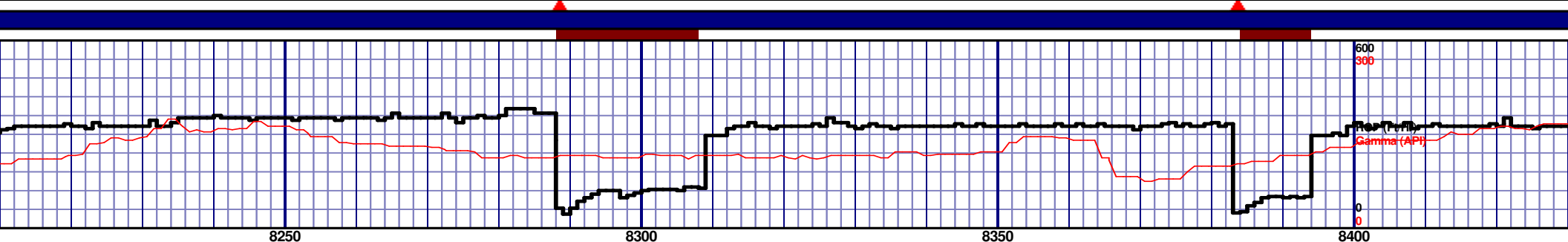
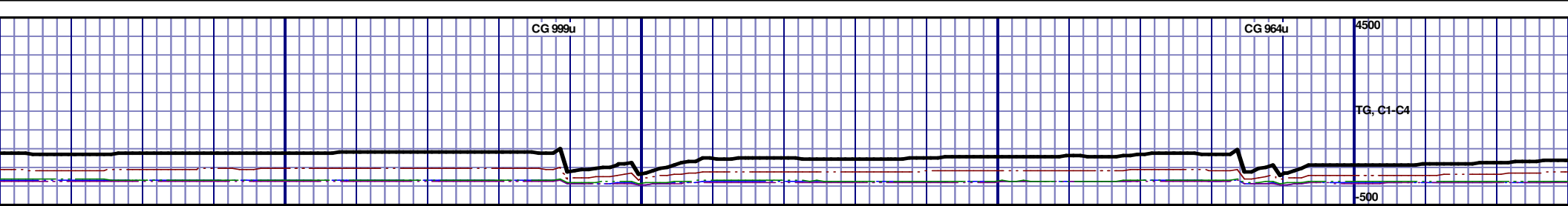
8100'-8150': CHK: 65% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

8150'-8200': CHK: 55% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

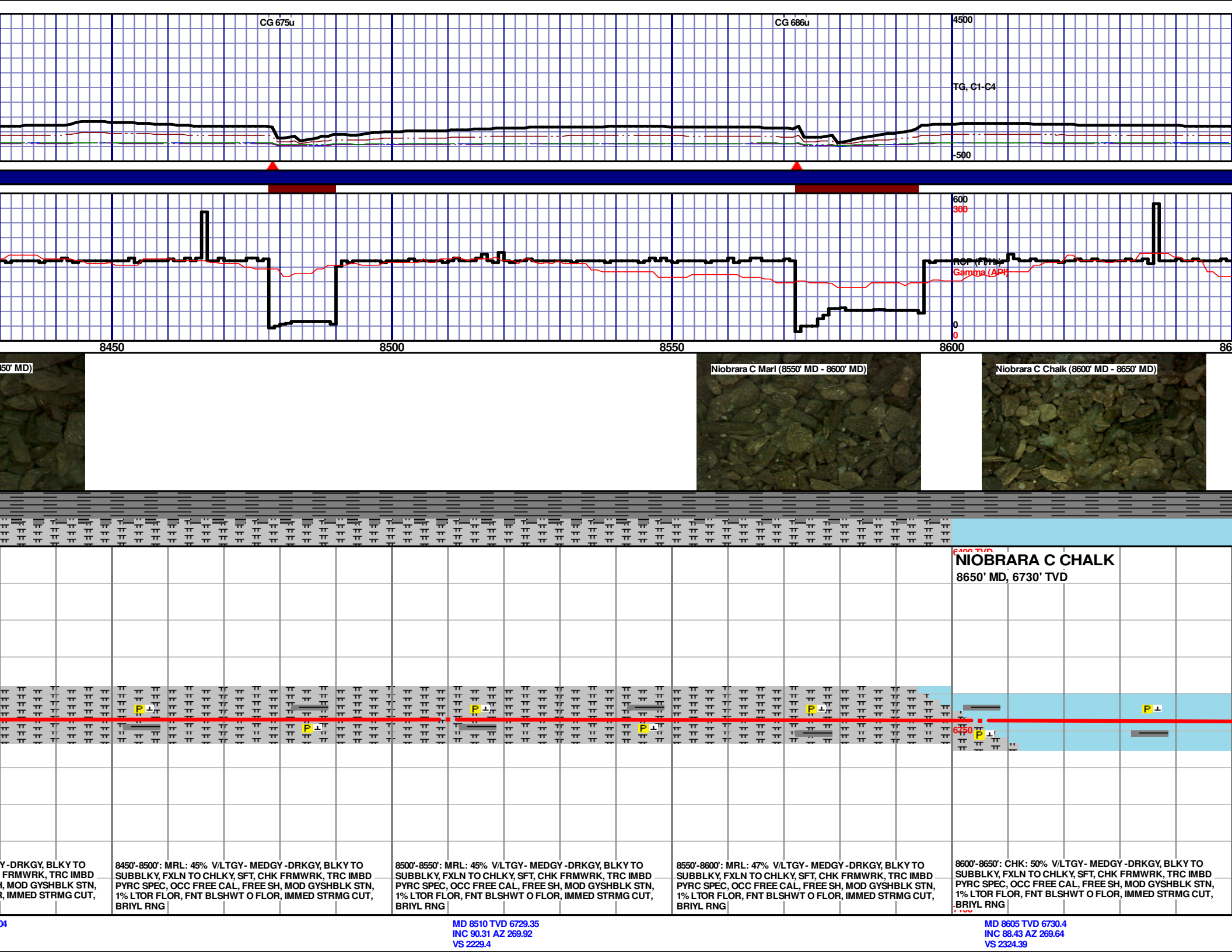
8200'-8250': SUBBLKY, F FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

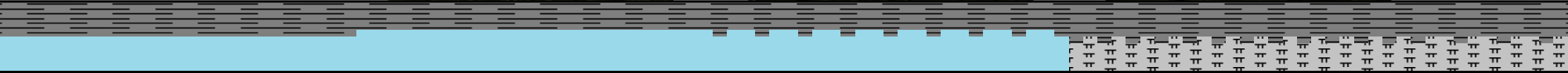
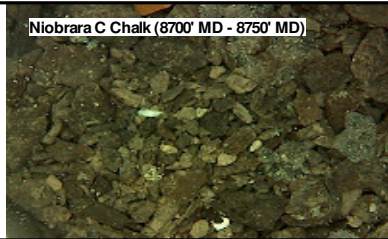
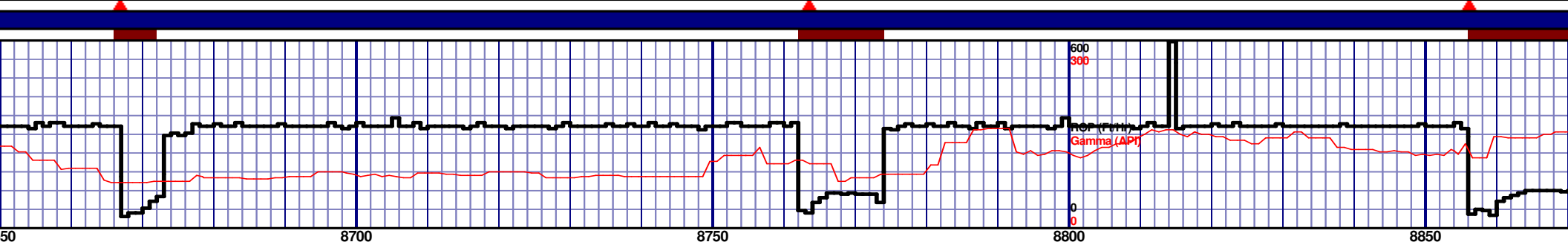
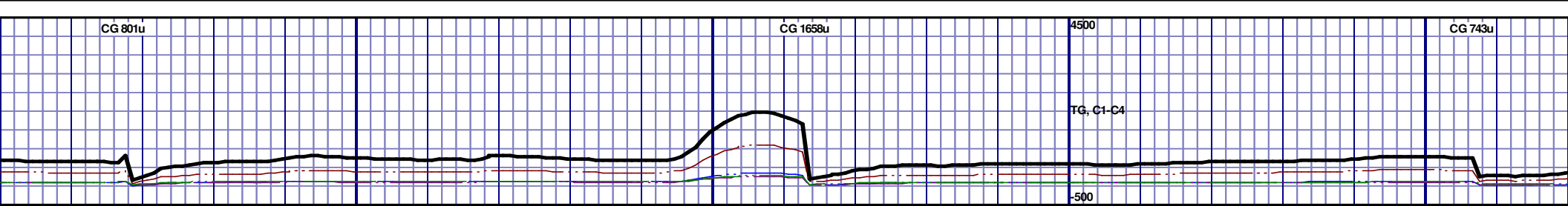
MD 8037 TVD 6727.13
INC 88.27 AZ 270.66
VS 1756.53

MD 8131 TVD 6728.82
INC 89.66 AZ 270.77
VS 1850.48

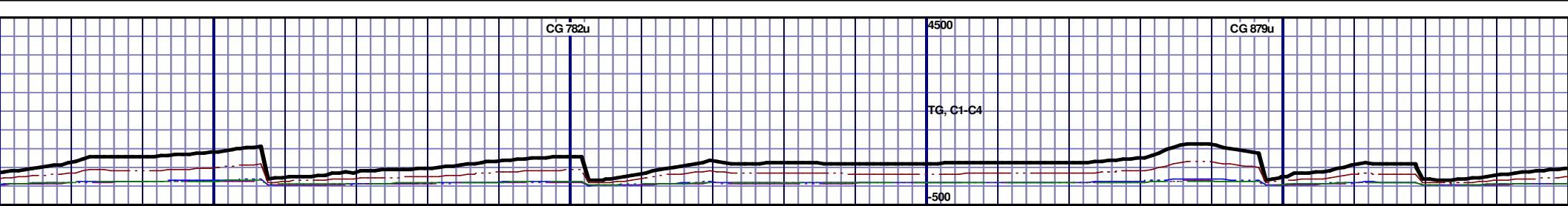


NIORRARA C MARL
8400' MD, 6729' TVD



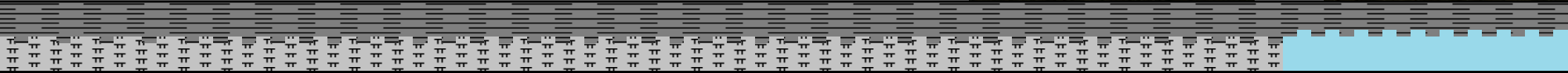
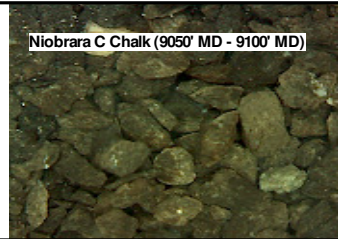
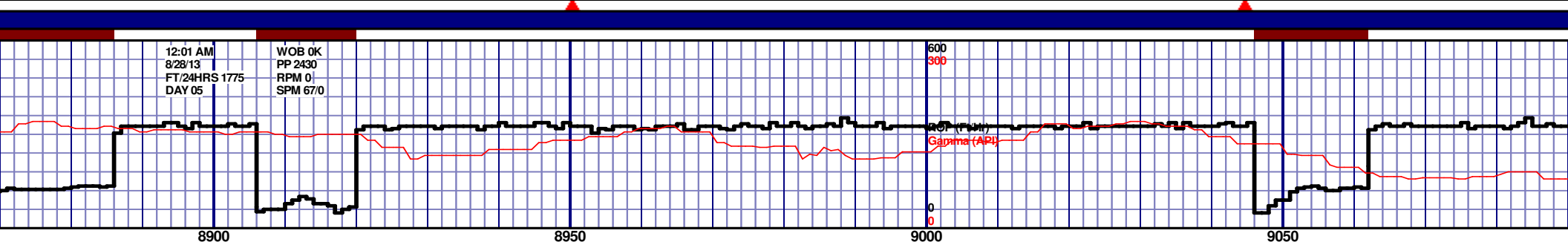


8650'-8700': CHK: 50% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG					8700'-8750': CHK: 60% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG					8750'-8800': CHK: 57% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG					8800'-8850': MRL: 45% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG					8850'-8900': MRL: 47% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG				
MD 8700 TVD 6733.6 INC 87.72 AZ 269.46 VS 2419.33					MD 8795 TVD 6733.75 INC 92.1 AZ 269.41 VS 2514.31																			

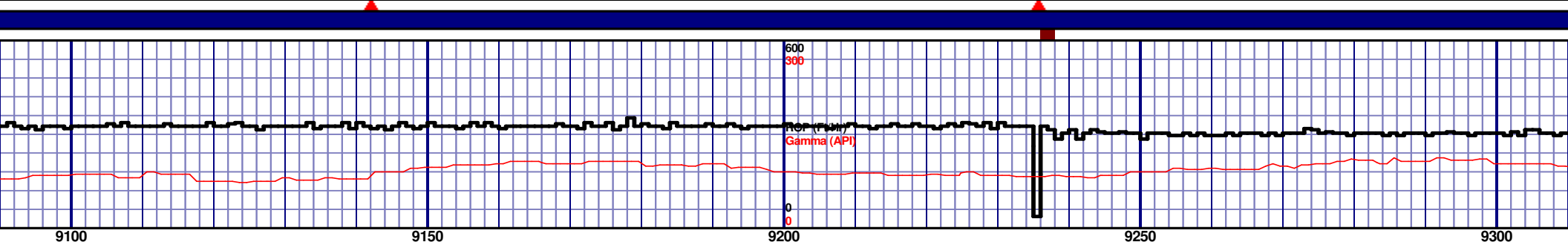
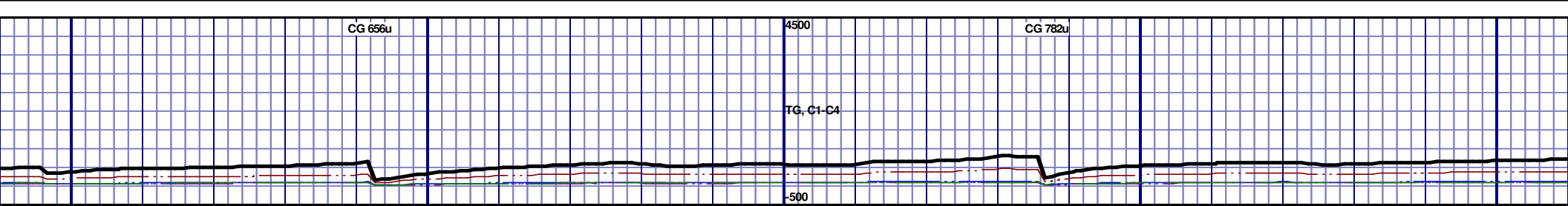


12:01 AM
8/28/13
FT/24HRS 1775
DAY 05

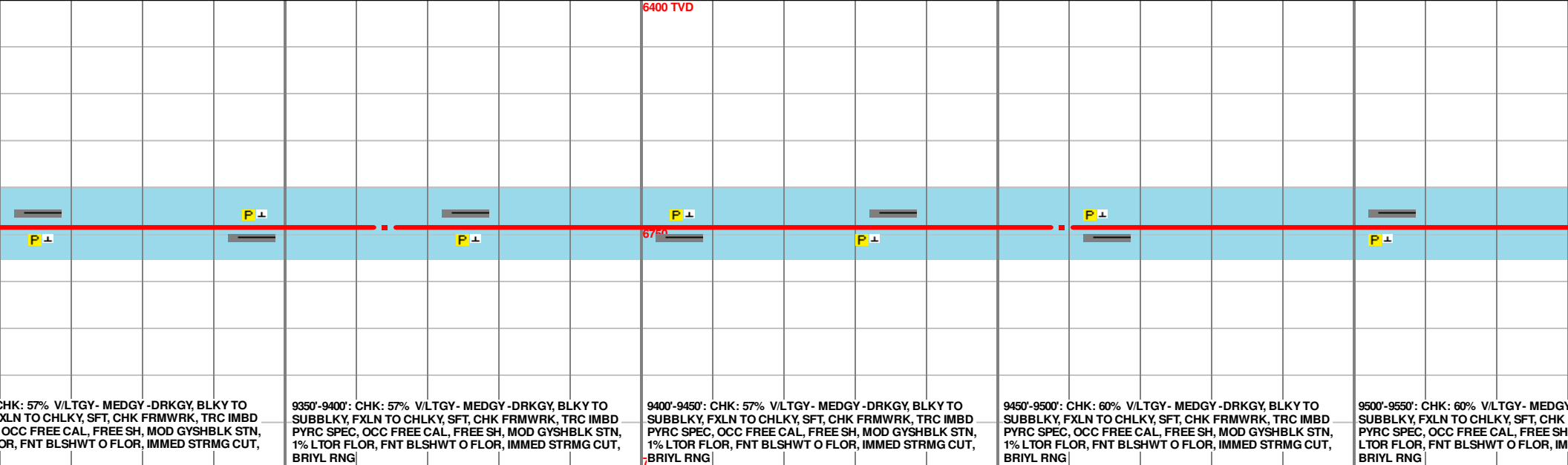
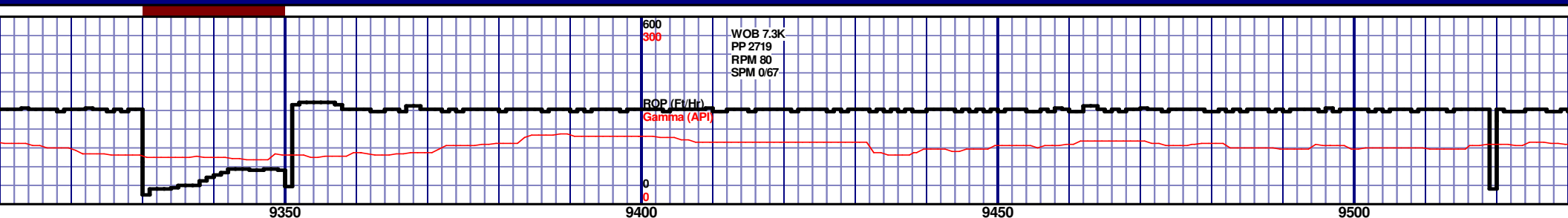
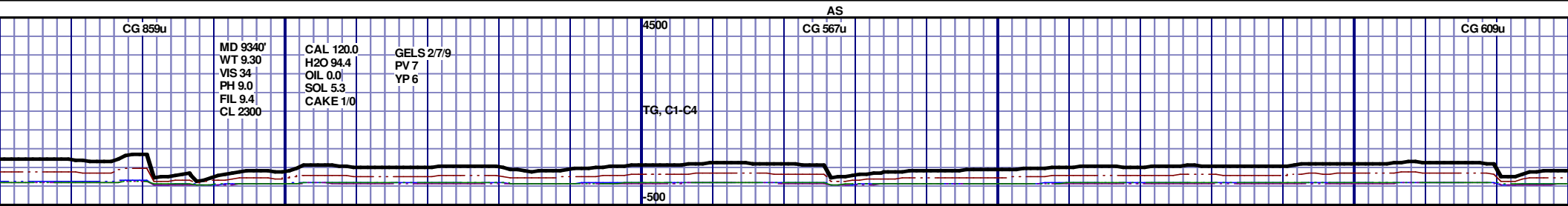
WOB OK
PP 2430
RPM 0
SPM 67.0



				6400 TVD	NIOBRARA C CHALK 9050' MD, 6737' TVD			
				6750				
				7				

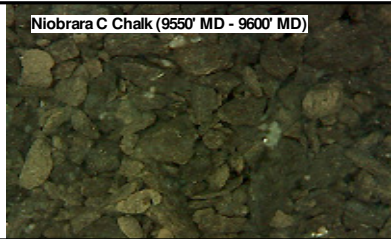
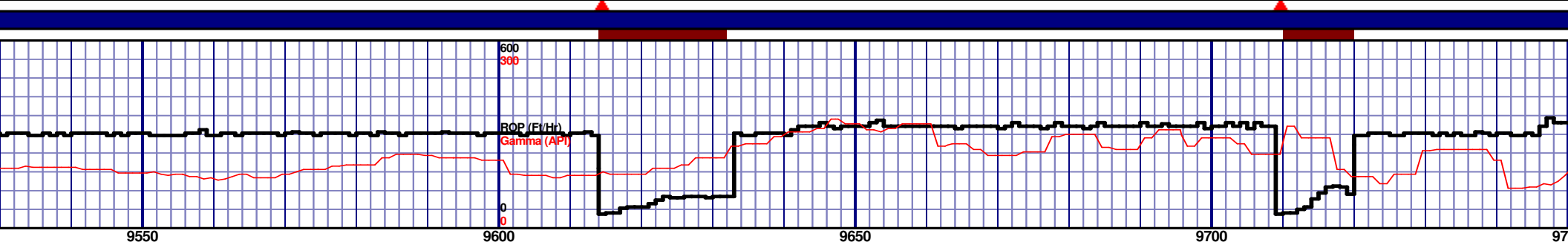
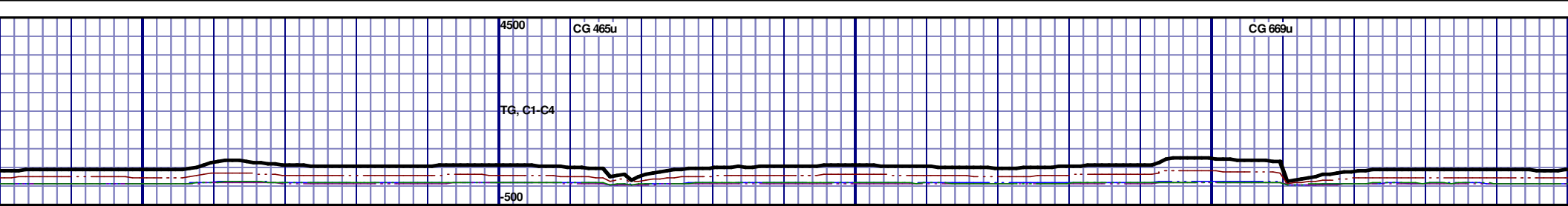


					6400 TVD									

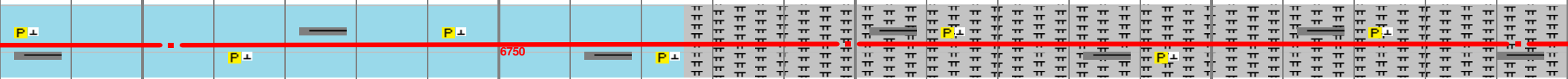


MD 9364 TVD 6738.94
INC 89.01 AZ 269.17
VS 3083.1

MD 9459 TVD 6740.27
INC 89.38 AZ 269.25
VS 3178.09



6400 TVD
NIOBRARA B MARL
9625' MD, 6739' TVD



9550'-9600': CHK: 60% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

9600'-9650': MRL: 50% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

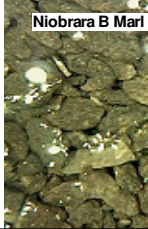
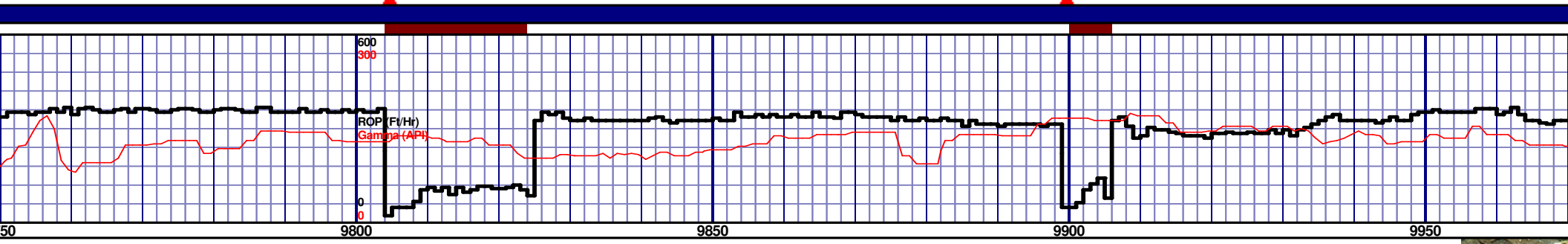
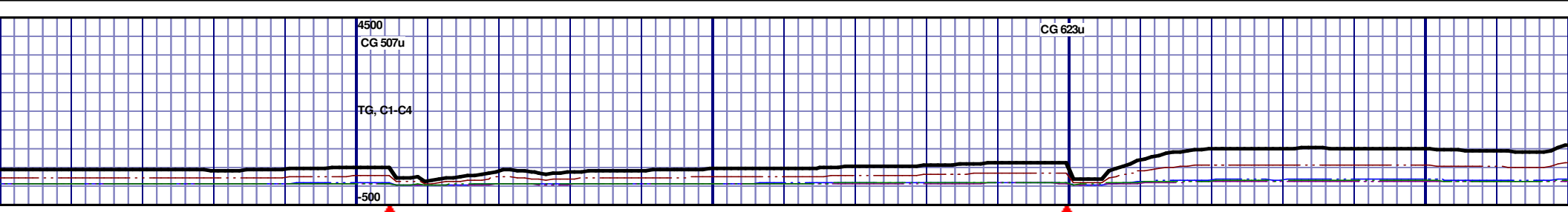
9650'-9700': MRL: 50% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

9700'-9750': MRL: 50% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, TRC IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

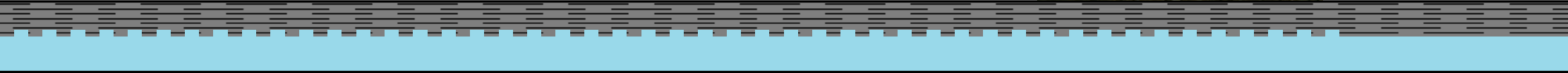
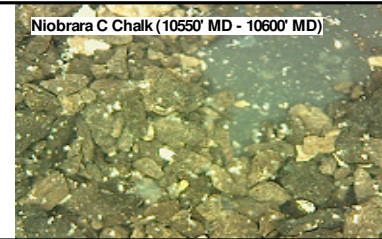
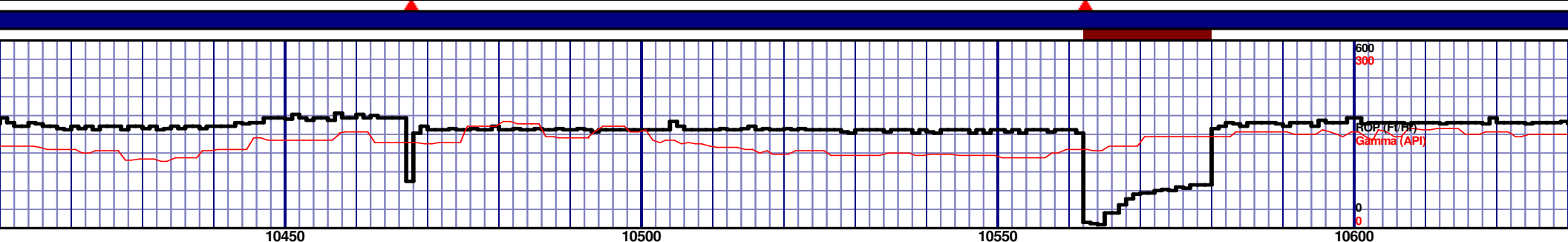
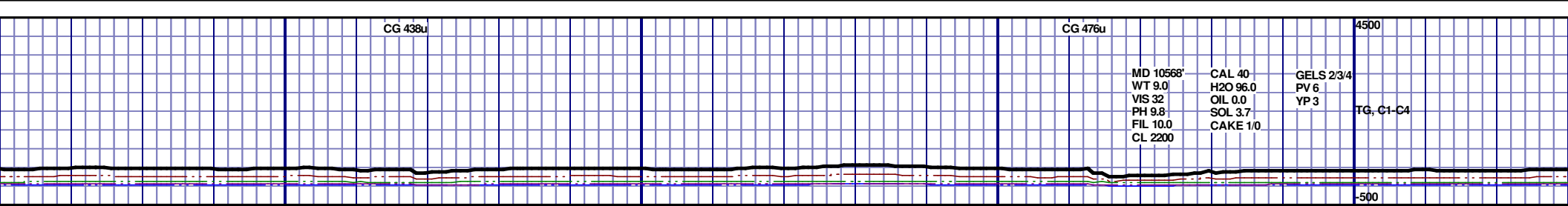
MD 9554 TVD 6739.66
INC 91.36 AZ 270.31
VS 3273.08

MD 9649 TVD 6738.36
INC 90.22 AZ 268.84
VS 3368.06

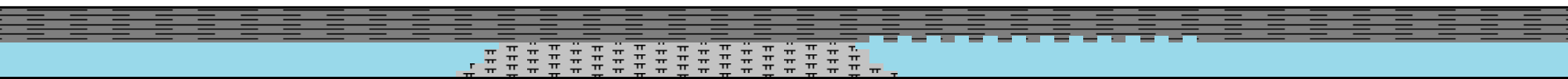
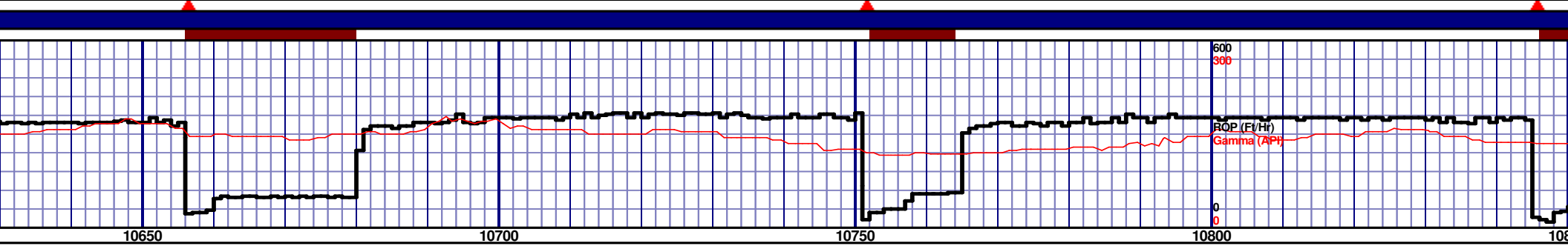
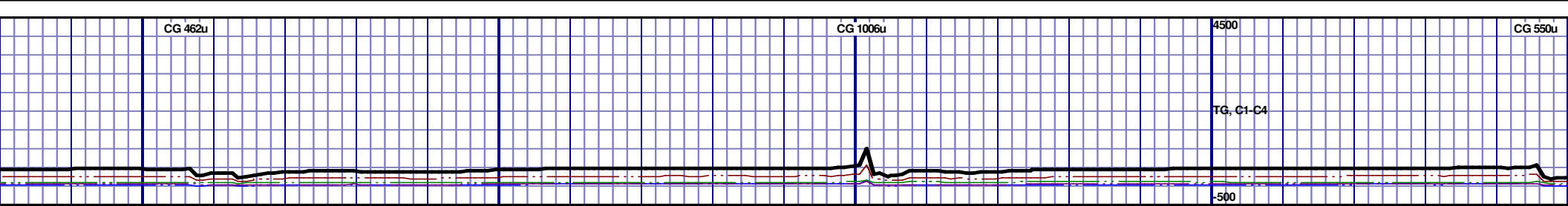
MD 9743
INC 91.5
VS 3463.06



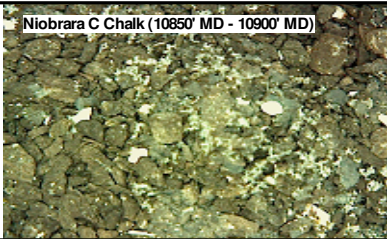
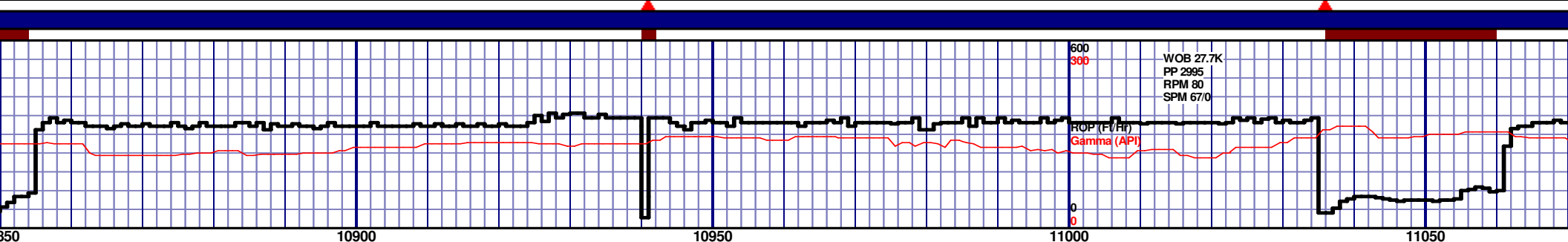
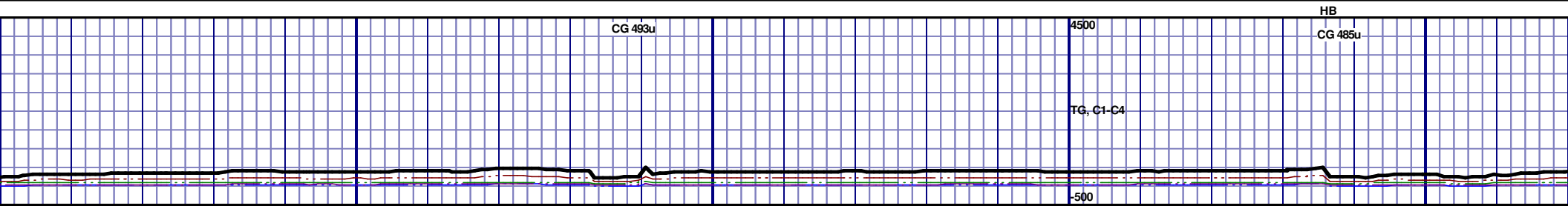
6400 TVD									
6350									
7100									
9750'-9800': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, FREE SH, TT - PP POR, MOD GRYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG									
9800'-9850': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, FREE SH, TT - PP POR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG									
9850'-9900': MRL: 50% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, FREE SH, TT - PP POR, MOD GRYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG									
9900'-9950': MRL: 50% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, FREE SH, TT - PP POR, MOD GRYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG									
9950'-10000': MRL: 50% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, FREE SH, TT - PP POR, MOD GRYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG									



																				6400 TVD



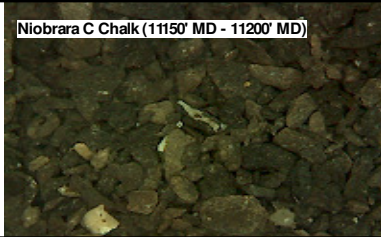
					6400 TVD				



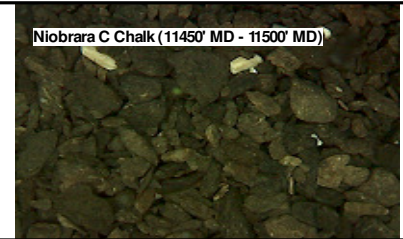
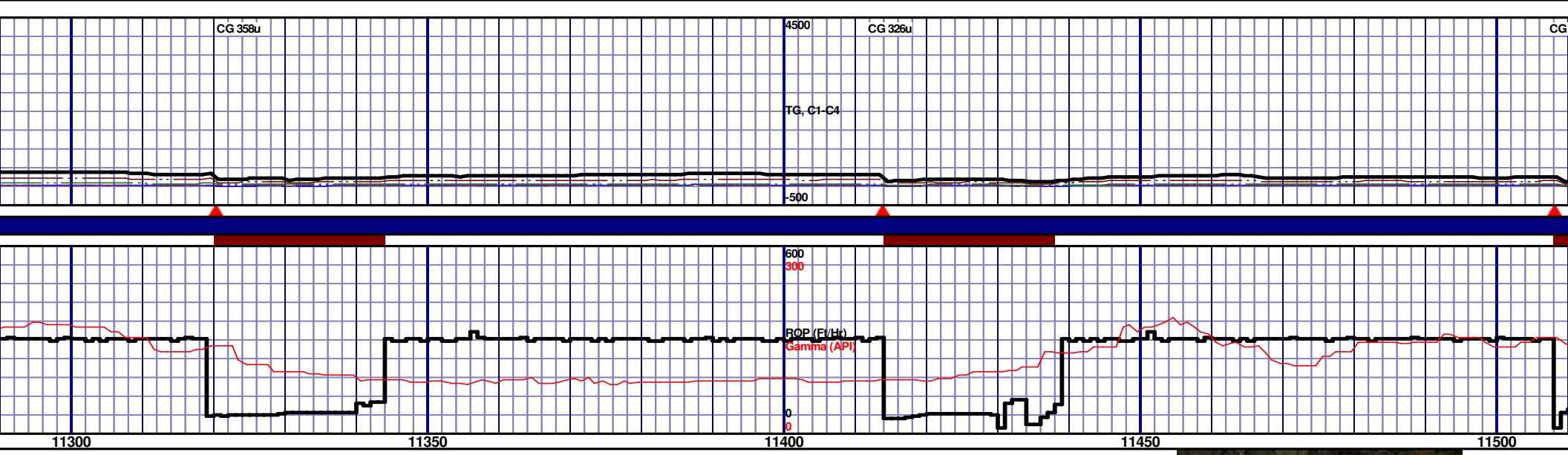
6400 TVD					6700					7100				
P ± B					P ± B					P ± B				
10850'-10900': CHK: 55% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG					10900'-10950': CHK: 55% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG					10950'-11000': CHK: 50% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG				
11000'-11050': CHK: 50% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG					11050'-11100': CHK: 50% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG					11100'-11150': CHK: 50% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG				

MD 10882 TVD 6748.69
INC 88.86 AZ 270.19
VS 4600.8

MD 10977 TVD 6749.18
INC 90.55 AZ 269.88
VS 4695.79



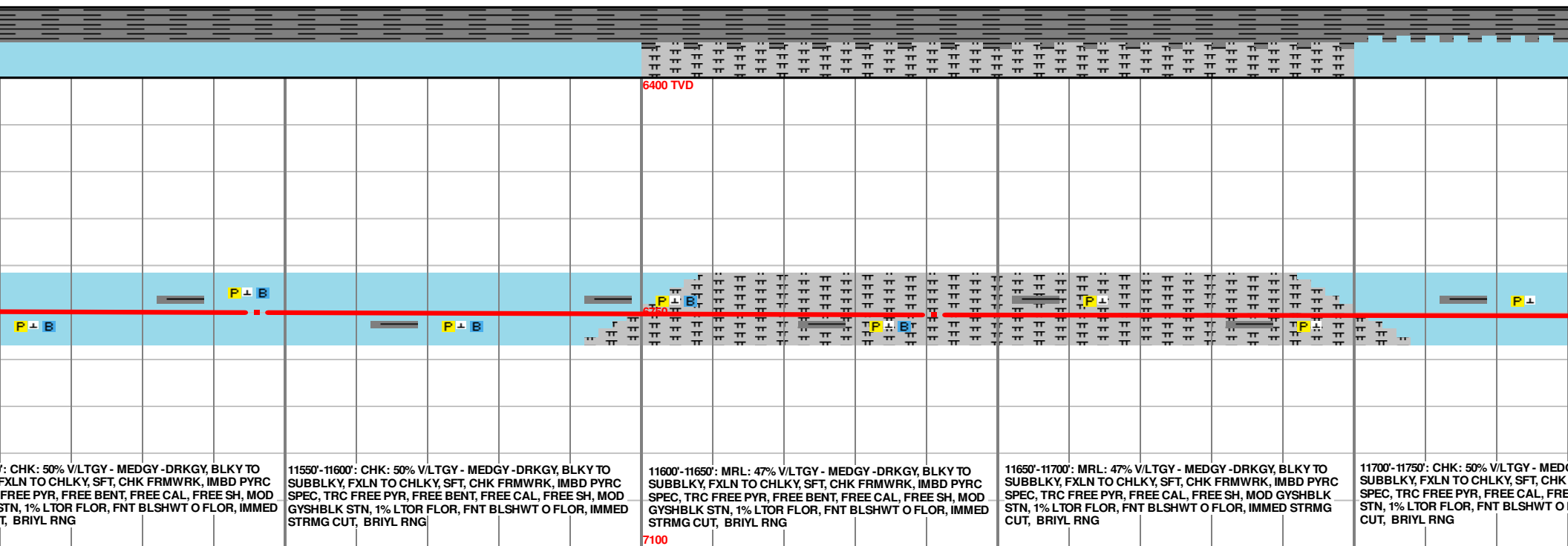
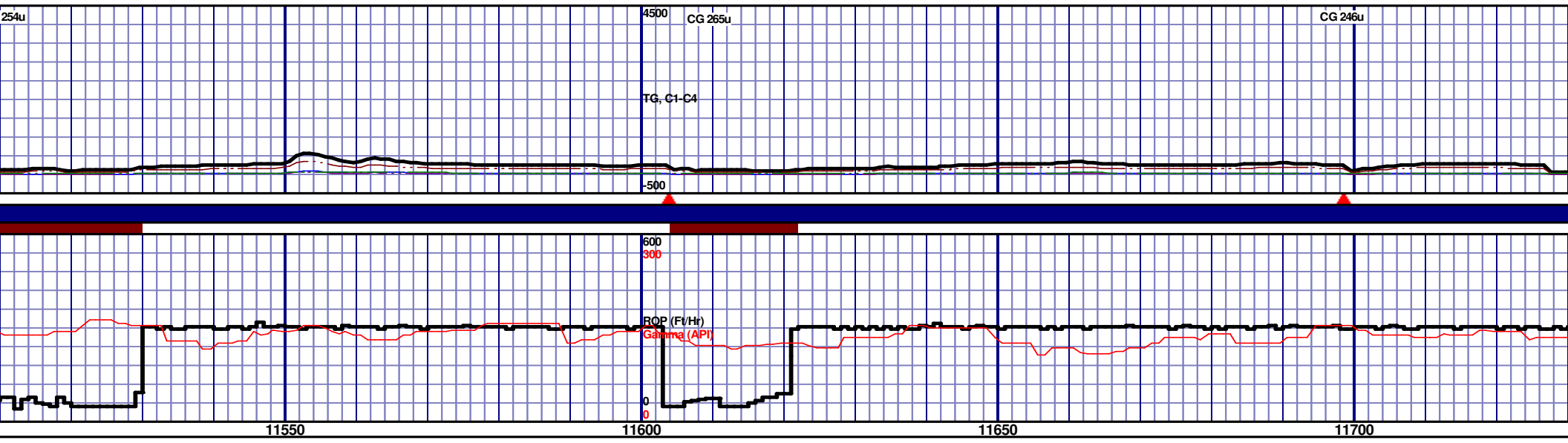
MD 11072 TVD 6748.95 INC 89.72 AZ 270.83 VS 4790.76	MD 11166 TVD 6748.52 INC 90.8 AZ 271.06 VS 4884.72	MD 11261 TVD 6746.76 INC 91.32 AZ 268.31 VS 4979.69
---	--	---



6400 TVD					6750					7100				
P ⊥					P ⊥					P ⊥ B				
P ⊥					P ⊥					P ⊥ B				
BLKY TO IMBD PYRC STN, 1% CUT,					11300'-11350': CHK: 55% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, ABDT FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG					11350'-11400': CHK: 60% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, ABDT FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG				
					11400'-11450': CHK: 55% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, ABDT FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG					11450'-11500': CHK: 55% V/LTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, ABDT FREE CAL, FREE SH, MOD GYSHBLK STN, 1% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG				
					11500'-11550': SUBBLKY, SPEC, TRC GYSHBLK S STRMG CUT									

MD 11356 TVD 6745.51
INC 90.18 AZ 268.31
VS 5074.67

MD 11451 TVD 6746.73
INC 88.34 AZ 265.32
VS 5169.56



MD 11546 TVD 6750.13
INC 87.56 AZ 267.59
VS 5264.39

MD 11641 TVD 6753.38
INC 88.52 AZ 270.26
VS 5359.32

