HORIZON
WELL LOGGING
GEO-STEERING

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: **Cassidy Miller**
Noble Energy Inc.

Mud Logging Details

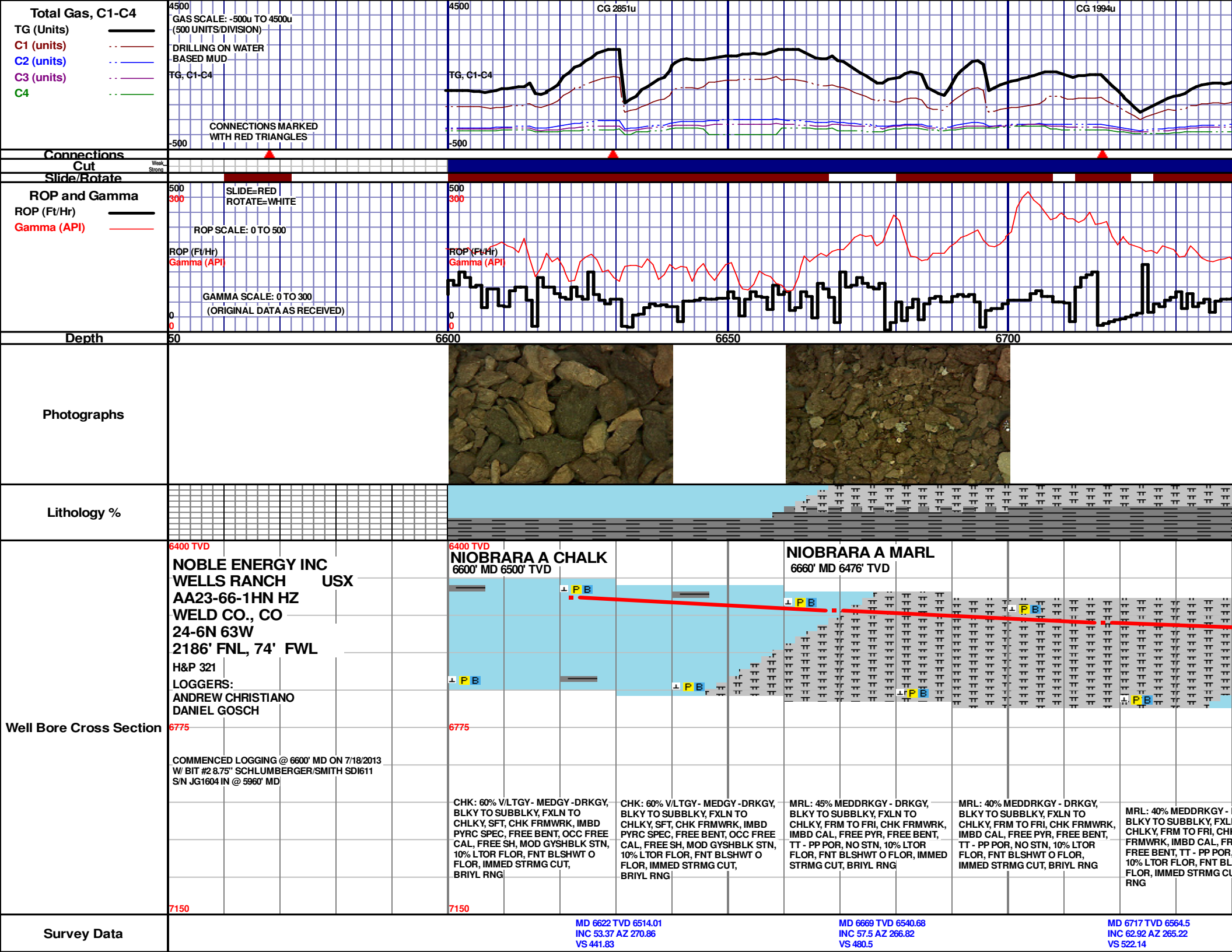
Logger: **Andrew Christiano & Daniel Gosch**
Log Interval: **6600' MD to 11078' MD**
Start Date: **July 18, 2013**
Release Date: **July 22, 2013**

Well Information

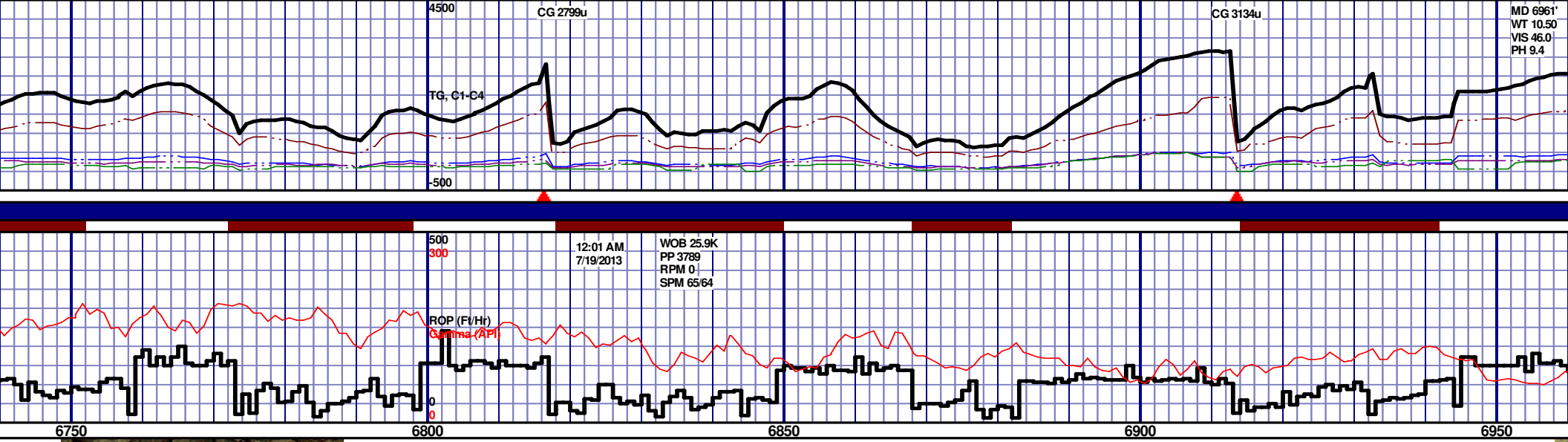
Well Name: **Wells Ranch USX AA23-65HN HZ**
Location: **24-6N 63W**
2186' FNL, 74' FWL

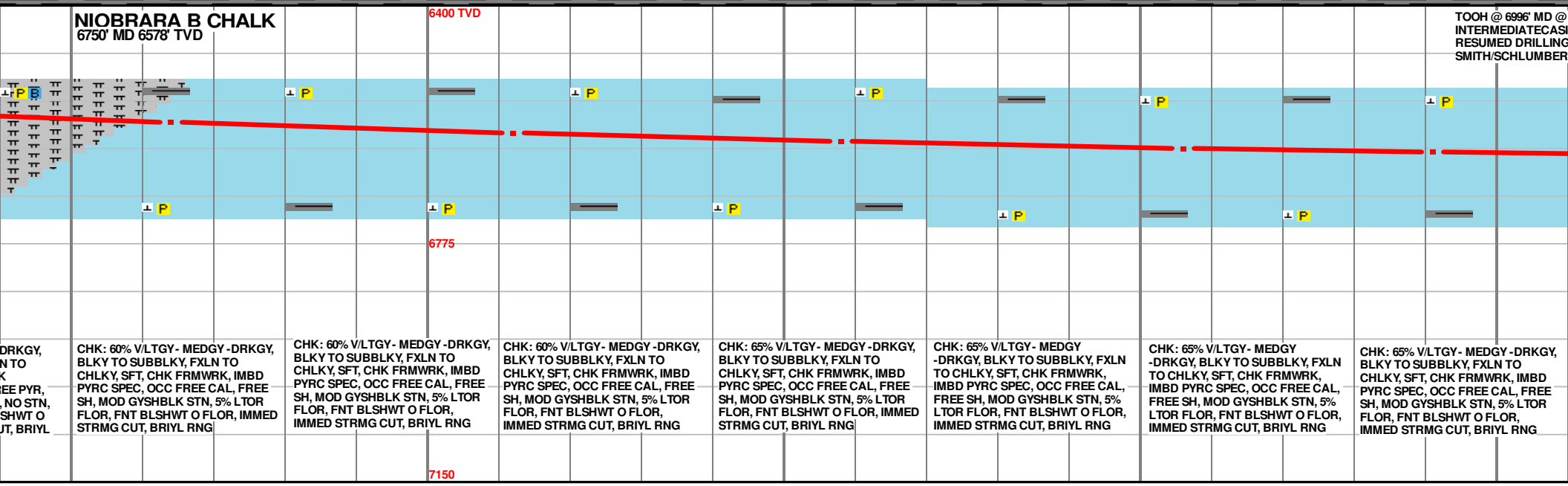
County: **Weld**
State: **Colorado**

Drilling Rig: **H&P 321**
Total Depth: **11078' MD**
TD Date: **JULY 22, 2013**
Formation: **Niobrara B Chalk**
KB Elevation: **4838'**
GR Elevation: **4808'**
API Number: **05-123-37024**



Total Gas, C1-C4
TG (Units)
C1 (units)
C2 (units)
C3 (units)
C4
4500
GAS SCALE: -500u TO 4500u
(500 UNITS/DIVISION)
DRILLING ON WATER
BASED MUD
TG, C1-C4
CONNECTIONS MARKED
WITH RED TRIANGLES
-500
CG 2851u
CG 1994u
Connections
Cut
Weak
Strong
Slide/Rotate
ROP and Gamma
ROP (Ft/Hr)
Gamma (API)
500
300
SLIDE=RED
ROTATE=WHITE
ROP SCALE: 0 TO 500
GAMMA SCALE: 0 TO 300
(ORIGINAL DATA AS RECEIVED)
0
Depth
50
6600
6650
6700
Photographs
Lithology %
Well Bore Cross Section
6400 TVD
NOBLE ENERGY INC
WELLS RANCH USX
AA23-66-1HN HZ
WELD CO., CO
24-6N 63W
2186' FNL, 74' FWL
H&P 321
LOGGERS:
ANDREW CHRISTIANO
DANIEL GOSCH
6775
COMMENCED LOGGING @ 6600' MD ON 7/18/2013
W/ BIT #2 8.75" SCHLUMBERGER/SMITH SDI611
S/N JG1604 IN @ 5960' MD
7150
NIOBRARA A CHALK
6600' MD 6500' TVD
NIOBRARA A MARL
6660' MD 6476' TVD
P B
CHK: 60% 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, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
CHK: 60% 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, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 40% MEDDRKGY - BLKY TO SUBBLKY, FXL CHLKY, FRM TO FRI, CHI FRMWRK, IMBD CAL, FR FREE BENT, TT - PP POR, 10% LTOR FLOR, FNT BL FLOR, IMMED STRMG CU RNG
Survey Data
MD 6622 TVD 6514.01
INC 53.37 AZ 270.86
VS 441.83
MD 6669 TVD 6540.68
INC 57.5 AZ 266.82
VS 480.5
MD 6717 TVD 6564.5
INC 62.92 AZ 265.22
VS 522.14





DRKGY, N TO K EE PYR, NO STN, SHWT O UT, BRIYL

CHK: 60% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

CHK: 60% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

CHK: 60% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

CHK: 65% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

CHK: 65% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

CHK: 65% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

CHK: 65% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

MD 6764 TVD 6584.28
INC 67.26 AZ 266.9
VS 564.75

MD 6812 TVD 6600.96
INC 72.06 AZ 267.03
VS 609.74

MD 6858 TVD 6613.6
INC 76.03 AZ 266.77
VS 653.95

MD 6906 TVD 6624.23
INC 78.4 AZ 267.99
VS 700.78

MD 6941 TVD 6630.65
INC 80.43 AZ 268.47
VS 735.18

FIL 8.8
CL 1800
CAL 40.0
H2O 89.5

OIL 0.0
SOL 10.2
CAKE 2/0

GELS 4/30/41
PV 15.0
YP 13.0

PIPE TALLY CHANGED

TG 2712u

TG, C1-C4

4500

-500

MD 6996'
WT 10.5
VIS 42.0
PH 8.9
FIL 7.8
CL 1800
CAL 60.0

H2O 90.0
OIL 0.0
SOL 9.7
CAKE 2/0
GELS 4/21/27
PV 14.0
YP 11.0

CG 2145u

CG 2131u

500
300

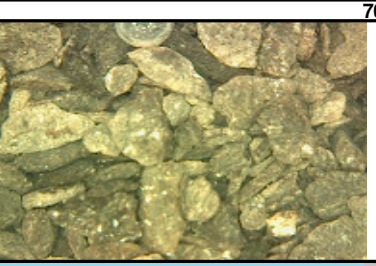
WOB 38.5K
PP 2464
RPM 25
SPM 0/64

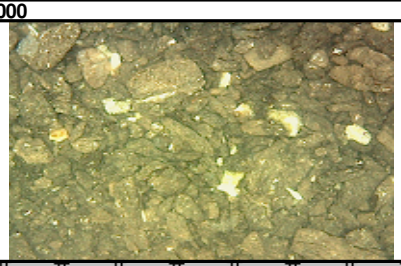
12:01AM
7/20/13

ROP (Ft/Hr)
Gamma (API)

0
0

7000
7050
7100
7150





5:00AM ON 7/19/13 FOR
NG OPERATIONS. TIH @ 8:15AM ON 7/20/13.
@ 2:30PM ON 7/20/13 W/ BIT #3 6.125'
GER MDIZ513UBPX IN @ 6996' MD.

6400 TVD

NIOBRARA B MARL

6990' MD 6638' TVD

6775

SAMPLE INTERVAL CHANGED TO 50'

CHK: 65% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

7150

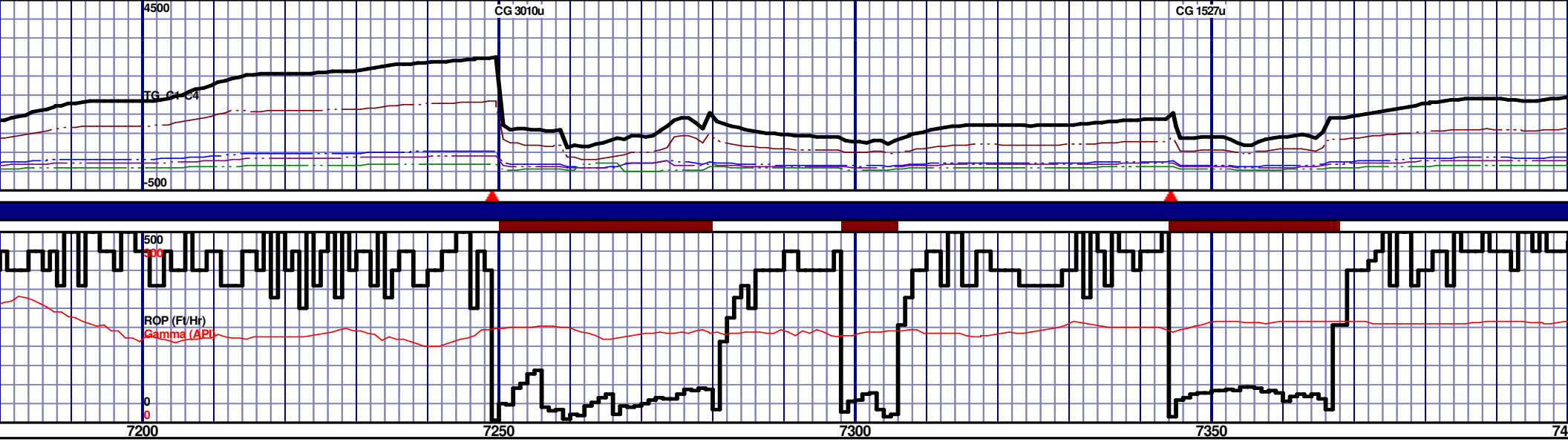
MD 7020 TVD 6641.01
INC 84.51 AZ 270.2
VS 813.44

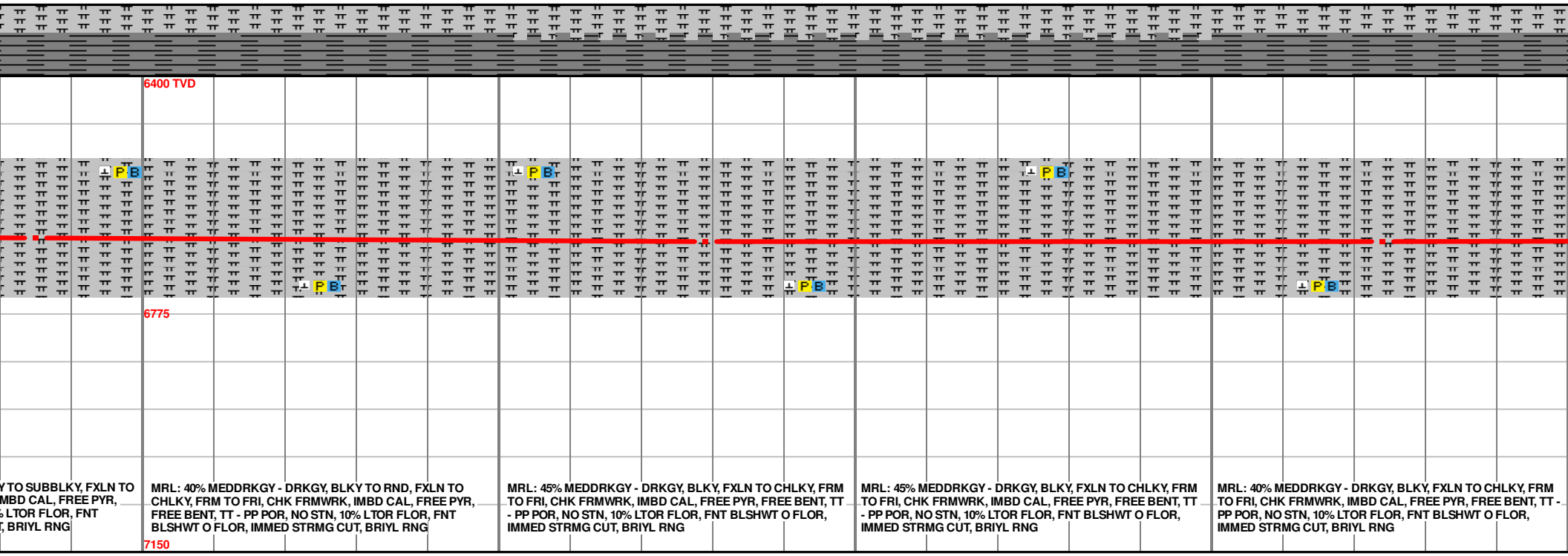
MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

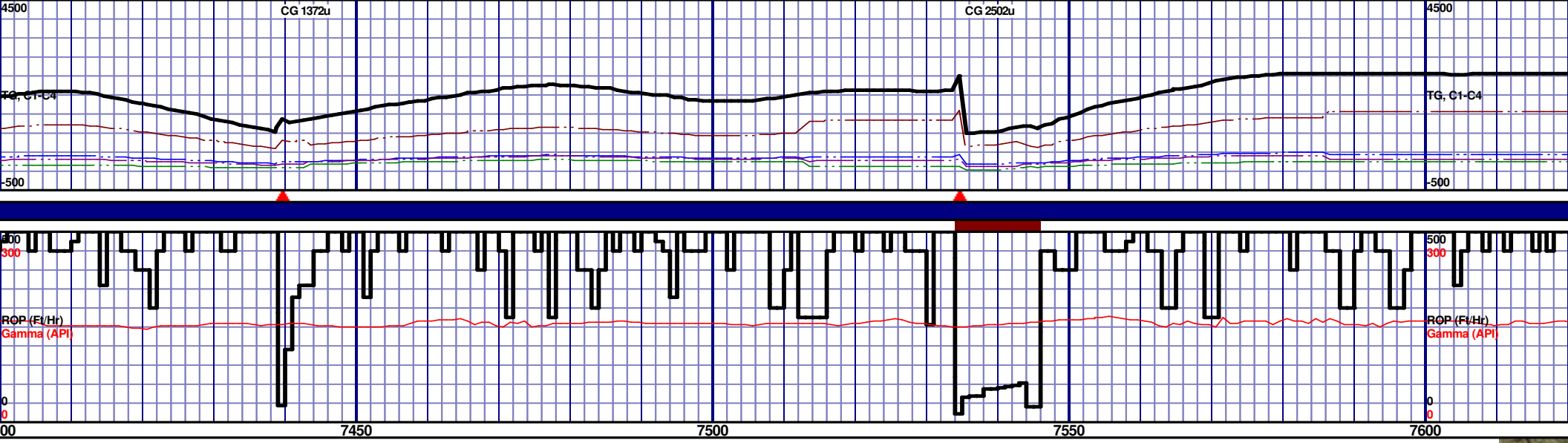
MD 7090 TVD 6647.74
INC 84.45 AZ 269.24
VS 883.07

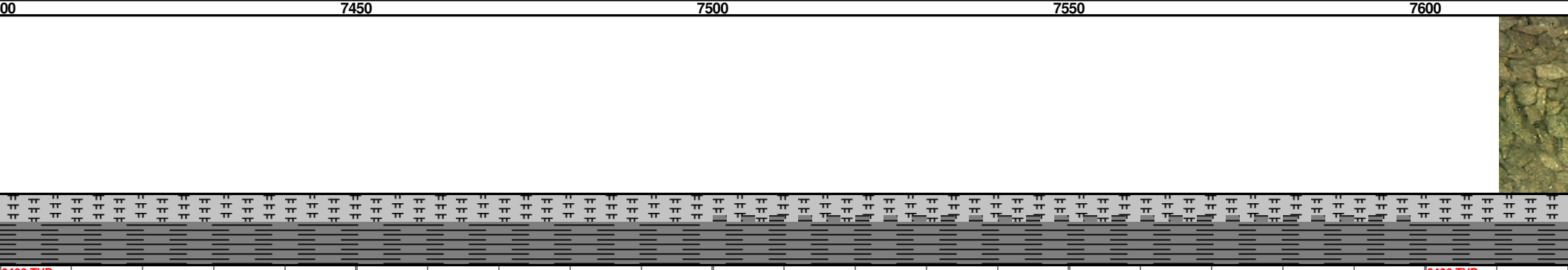
MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

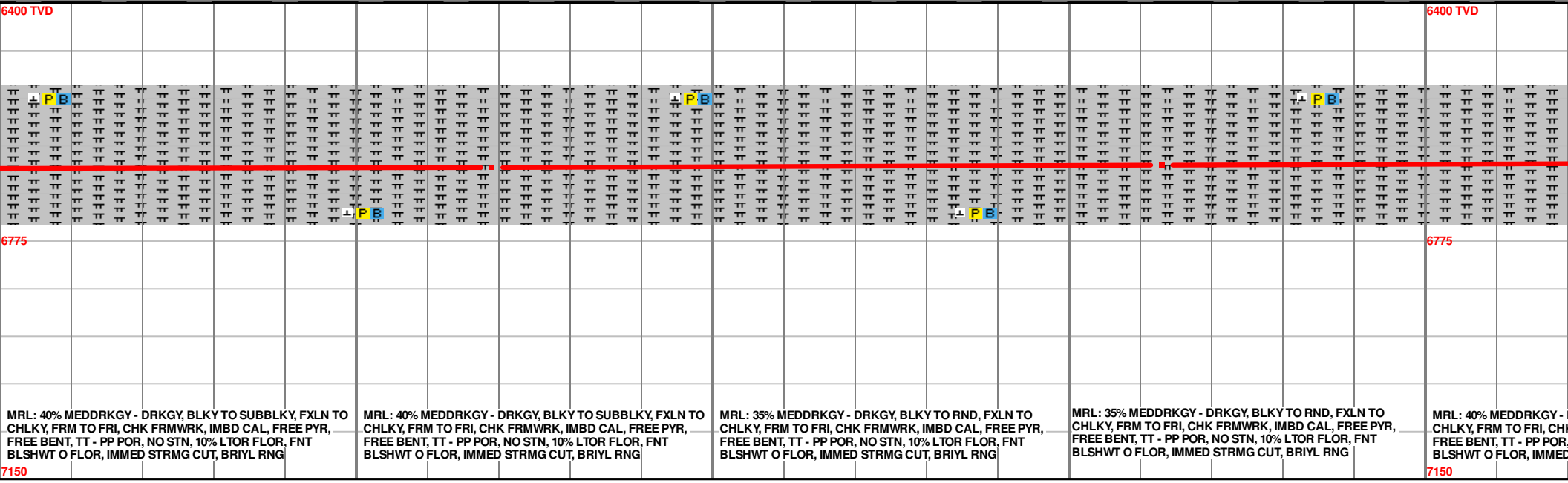
MRL: 40% MEDDRKGY - DRKGY, BLKY
CHLKY, FRM TO FRI, CHK FRMWRK,
FREE BENT, TT - PP POR, NO STN, 10%
BLSHWT O FLOR, IMMED STRMG CUT


4500
CG 3010u
CG 1527u
TG_C1-C4
-500
500
300
ROP (Ft/Hr)
Gamma (API)
0
0
7200
7250
7300
7350
74


6400 TVD
6775
7150
Y TO SUBBLKY, FXLN TO
MBD CAL, FREE PYR,
% LTOR FLOR, FNT
T, BRIYL RNG
MRL: 40% MEDDRKGY - DRKGY, BLKY TO RND, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 45% MEDDRKGY - DRKGY, BLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 45% MEDDRKGY - DRKGY, BLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 40% MEDDRKGY - DRKGY, BLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MD 7185 TVD 6655.62
INC 86.04 AZ 269.36
VS 977.69
MD 7279 TVD 6660.25
INC 88.3 AZ 269.46
VS 1071.52
MD 7374 TVD 6660.38
INC 91.54 AZ 270.38
VS 1166.42

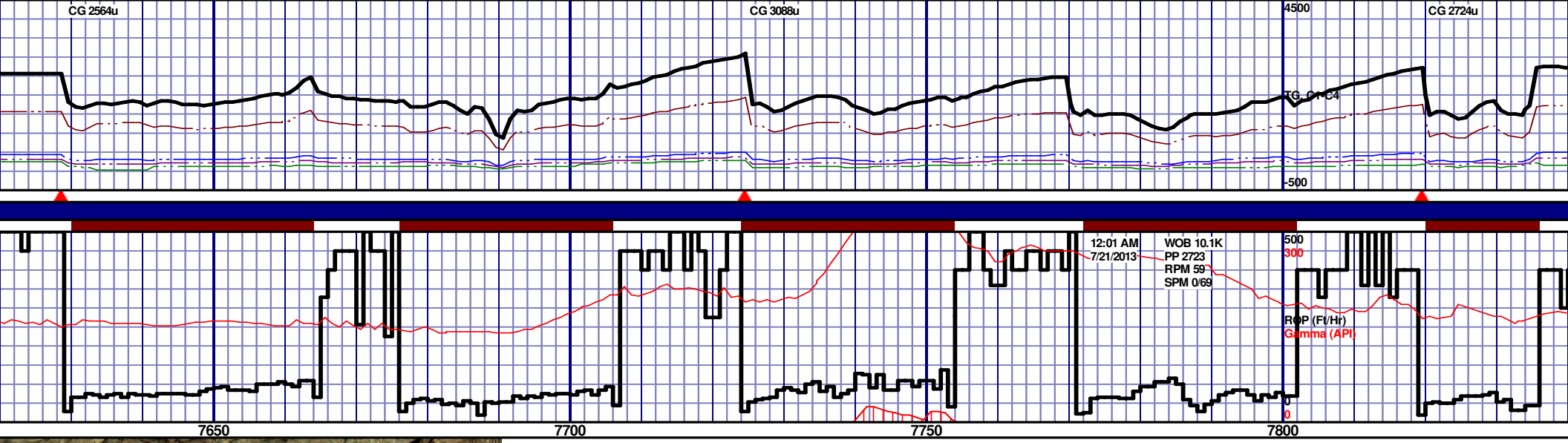


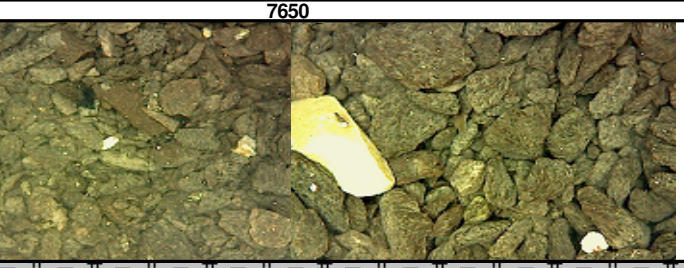


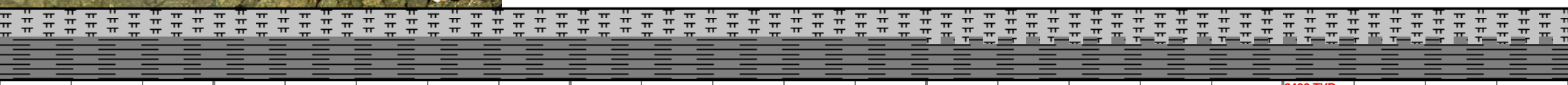


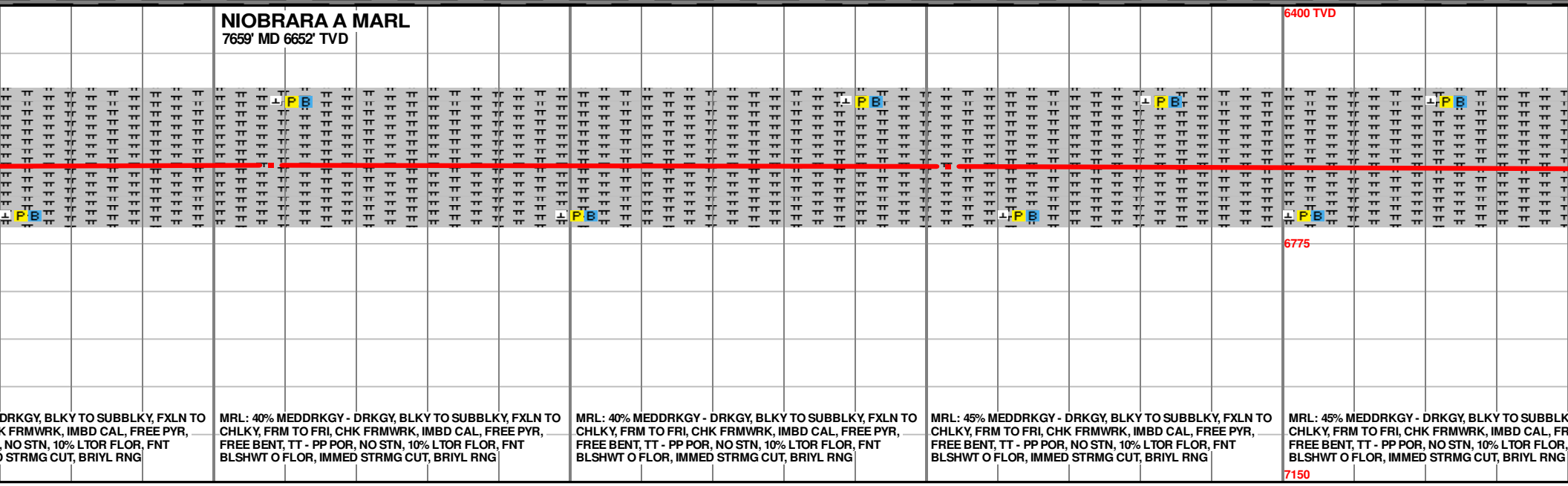
MD 7469 TVD 6657.85
INC 91.51 AZ 271.28
VS 1261.23

MD 7563 TVD 6654.73
INC 92.28 AZ 281
VS 1354.01









DRKGY, BLKY TO SUBBLKY, FXLN TO
K FRMWRK, IMBD CAL, FREE PYR,
, NO STN, 10% LTOR FLOR, FNT
O STRMG CUT, BRIYL RNG

MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

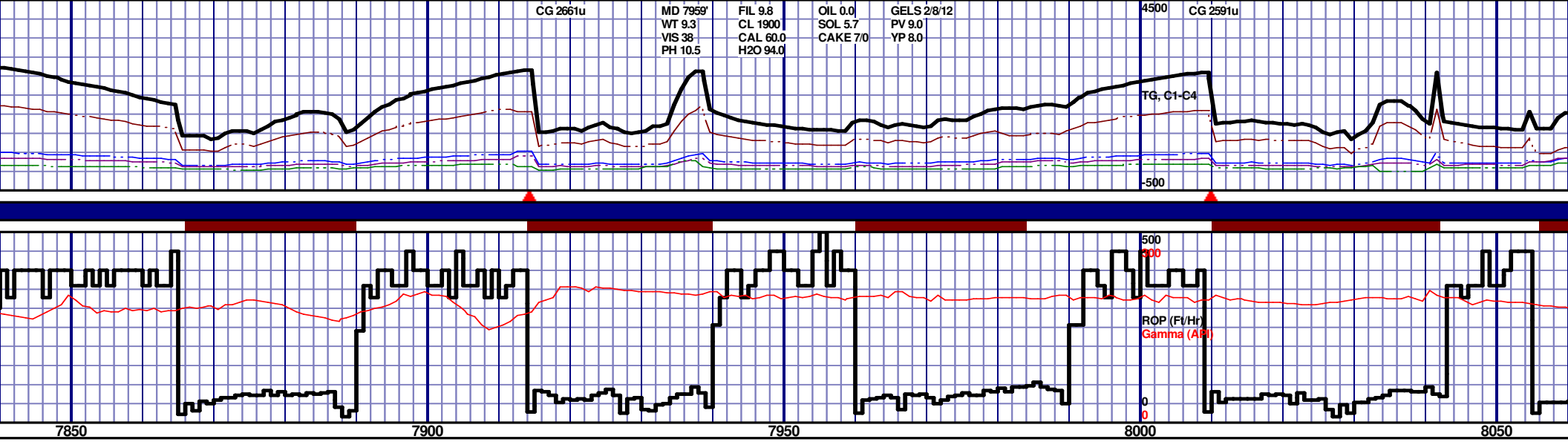
MD 7658 TVD 6652.05
INC 90.96 AZ 287.47
VS 1444.91

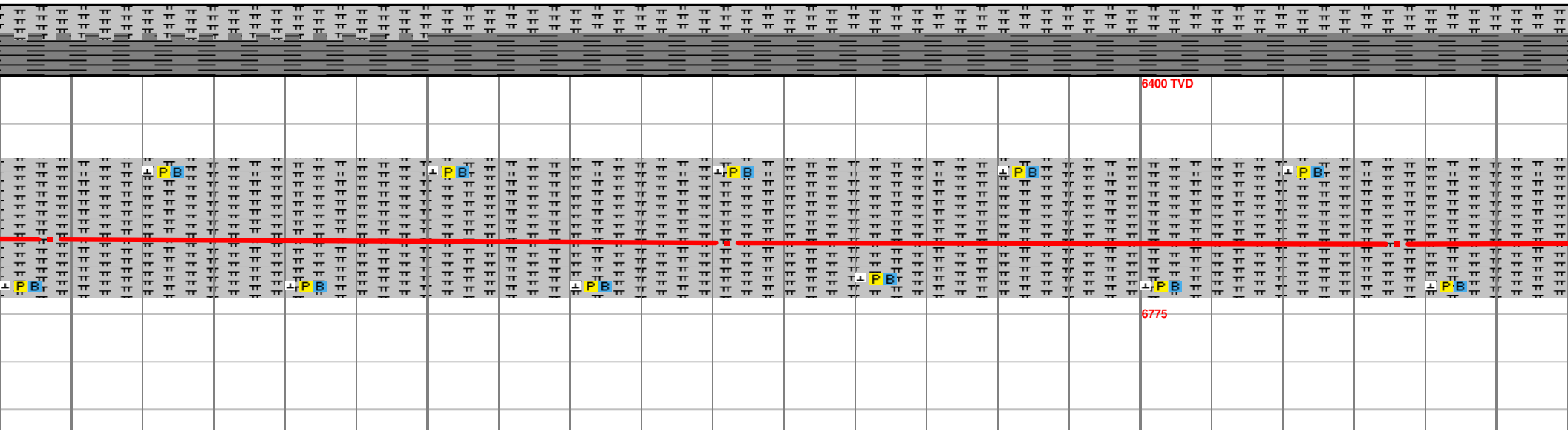
MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

MD 7753 TVD 6652.89
INC 88.03 AZ 282.01
VS 1535.61

MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLK
CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FR
FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR,
BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG





MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

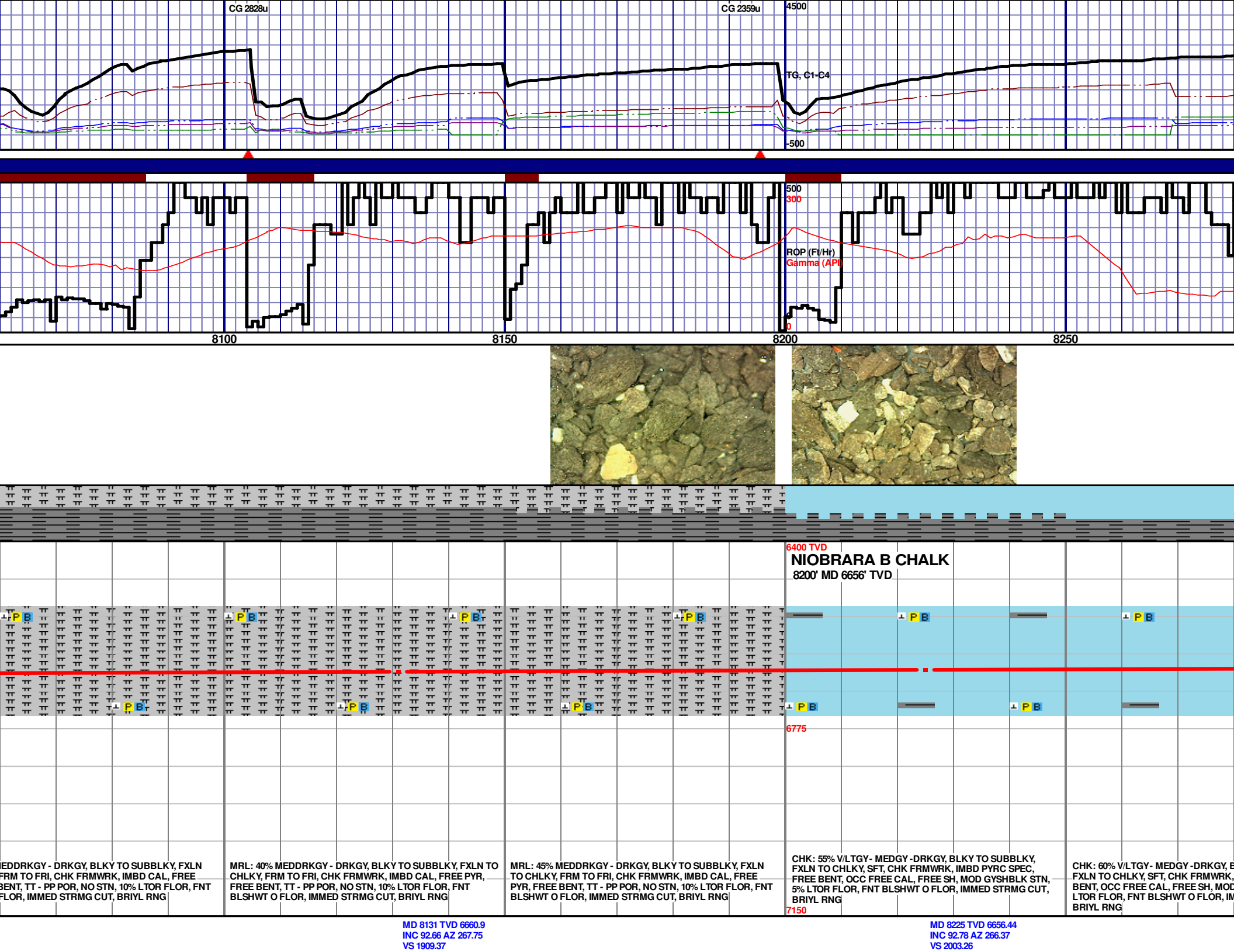
MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

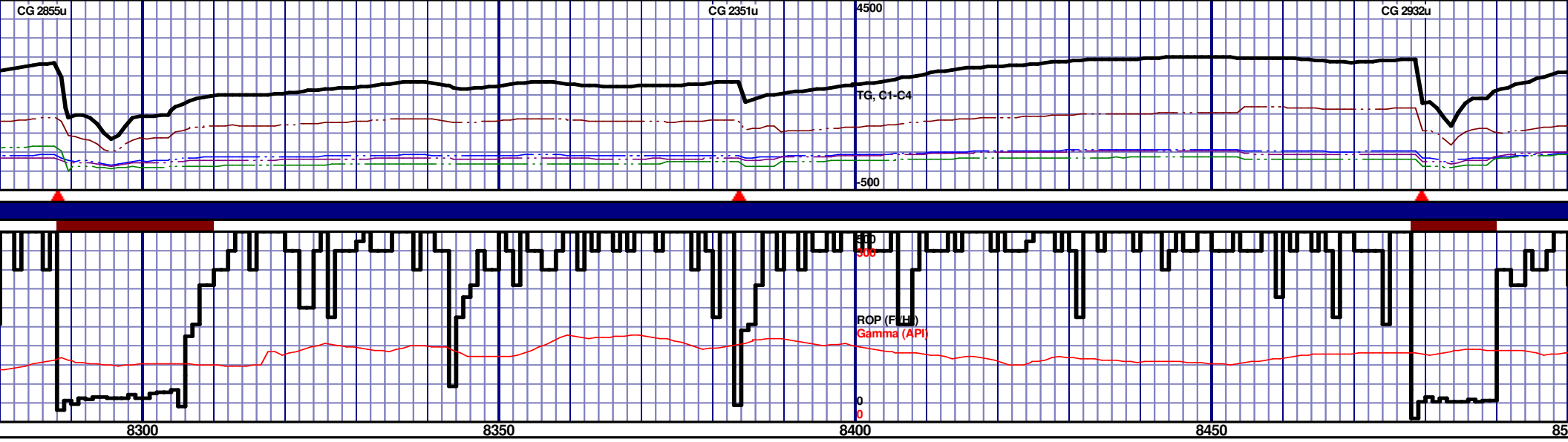
MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

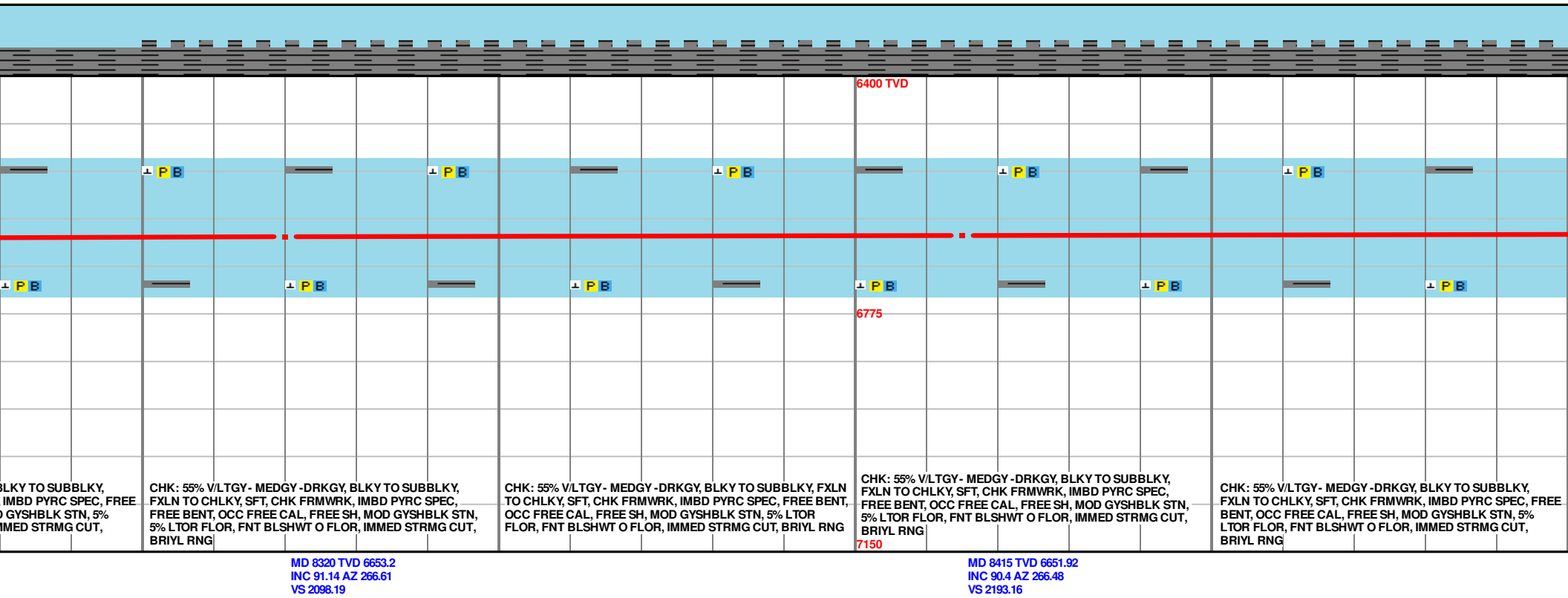
MD 7847 TVD 6657.57
INC 86.27 AZ 277.9
VS 1627.27

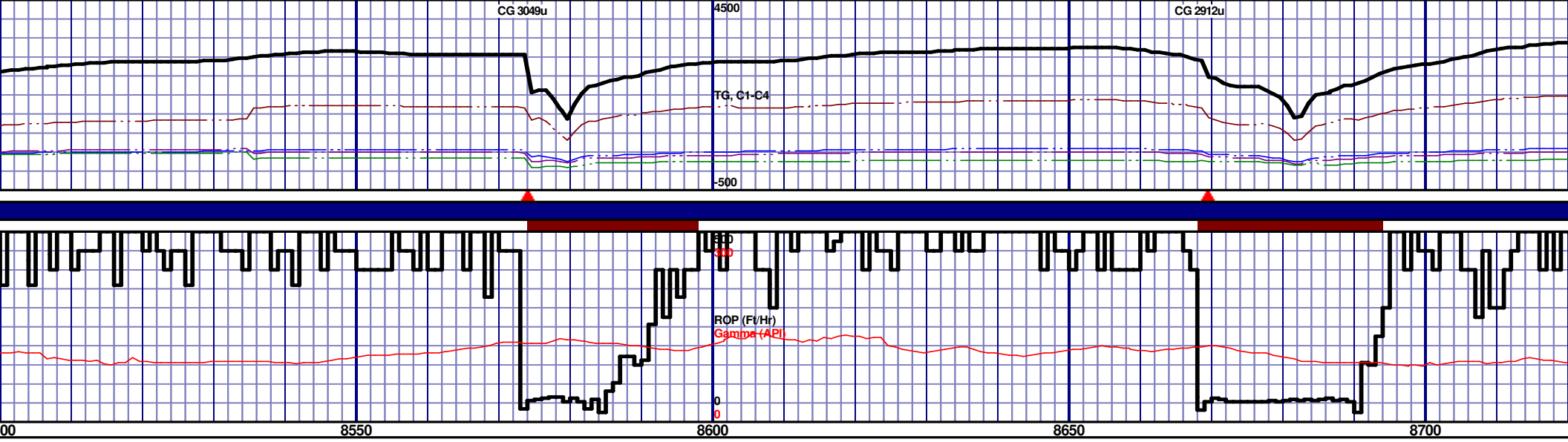
MD 7942 TVD 6662.58
INC 87.69 AZ 275.21
VS 1720.95

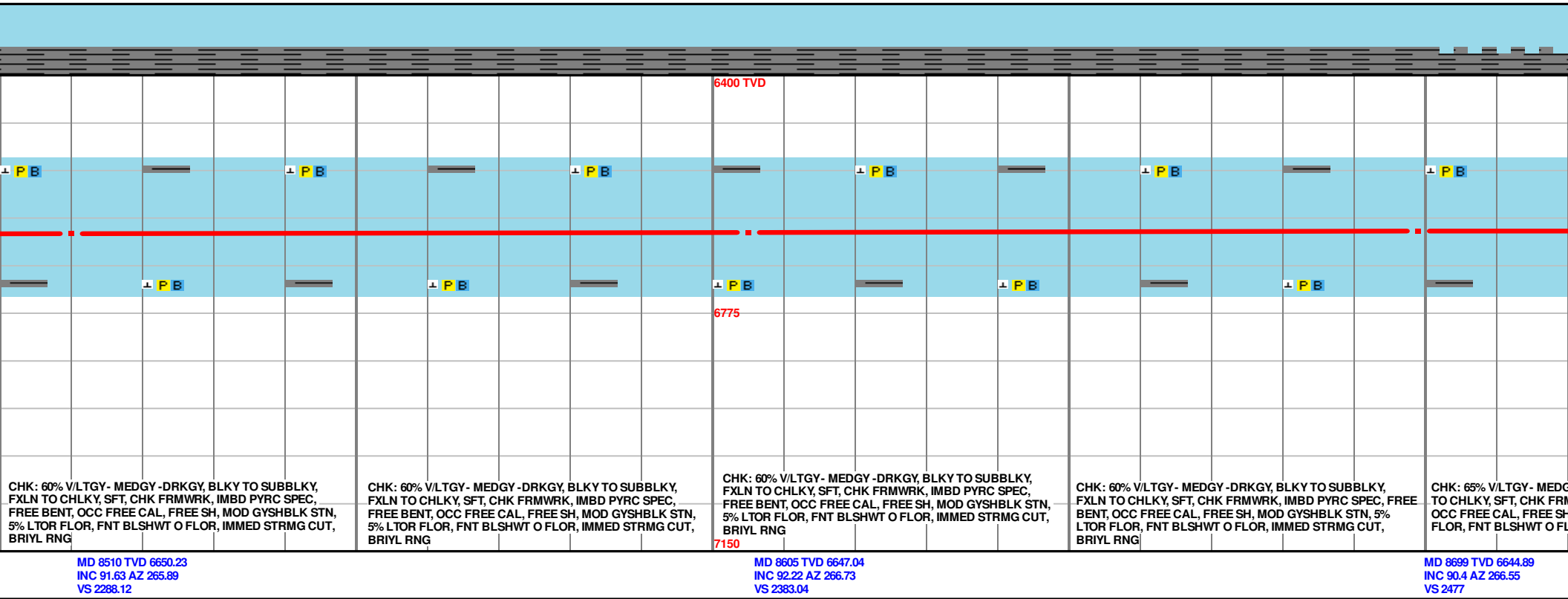
MD 8036 TVD 6663.79
INC 90.83 AZ 270.85
VS 1814.48

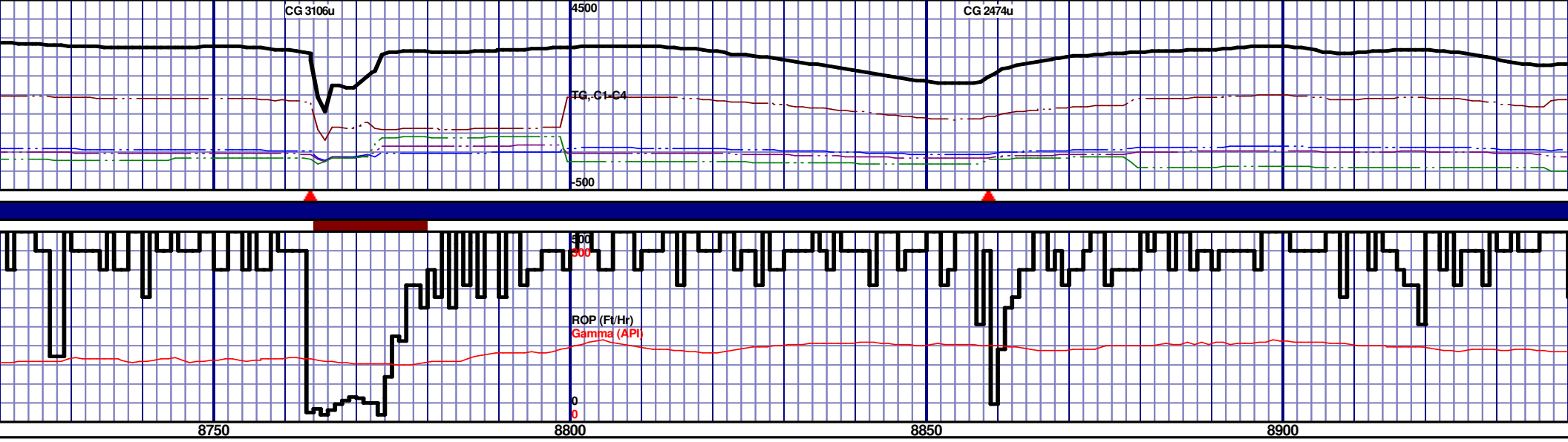

CG 2828u
CG 2359u
4500
TG, C1-C4
-500
500
300
ROP (Ft/Hr)
Gamma (API)
0
8100
8150
8200
8250
6400 TVD
NIOBRARA B CHALK
8200' MD 6656' TVD
6775
7150
EDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN
FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE
BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT
FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO
CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR,
FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT
BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN
TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE
PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT
BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
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,
5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT,
BRIYL RNG
CHK: 60% V/LTGY- MEDGY -DRKGY, B
FXLN TO CHLKY, SFT, CHK FRMWRK,
BENT, OCC FREE CAL, FREE SH, MOD
LTOR FLOR, FNT BLSHWT O FLOR, IM
BRIYL RNG
MD 8131 TVD 6660.9
INC 92.66 AZ 267.75
VS 1909.37
MD 8225 TVD 6656.44
INC 92.78 AZ 266.37
VS 2003.26

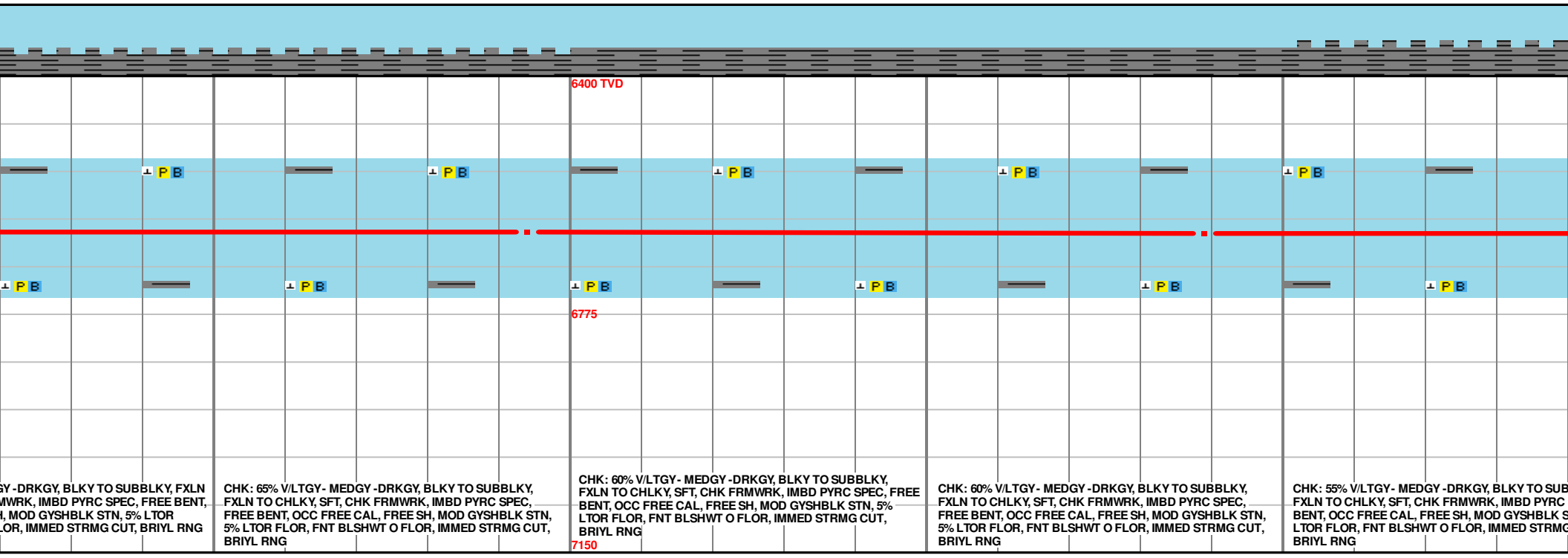

CG 2855u
CG 2351u
CG 2932u
4500
TG, C1-C4
-500
600
300
ROP (F/HR)
Gamma (API)
0
0
8300
8350
8400
8450
85

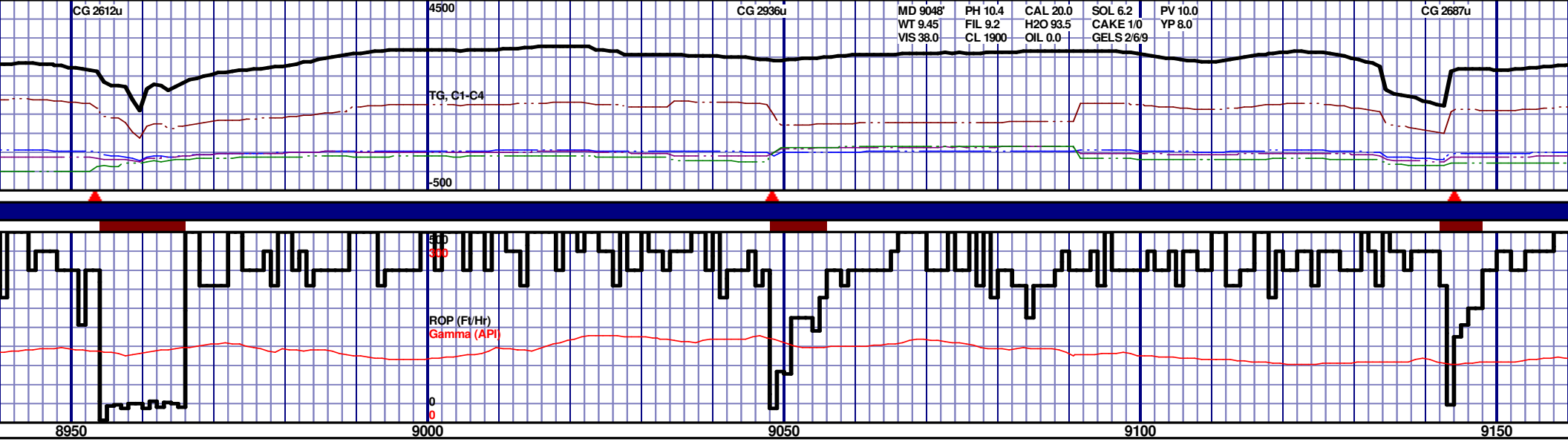

6400 TVD
6775
7150
P B
CHK: 55% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MD 8320 TVD 6653.2
INC 91.14 AZ 266.61
VS 2098.19
MD 8415 TVD 6651.92
INC 90.4 AZ 266.48
VS 2193.16

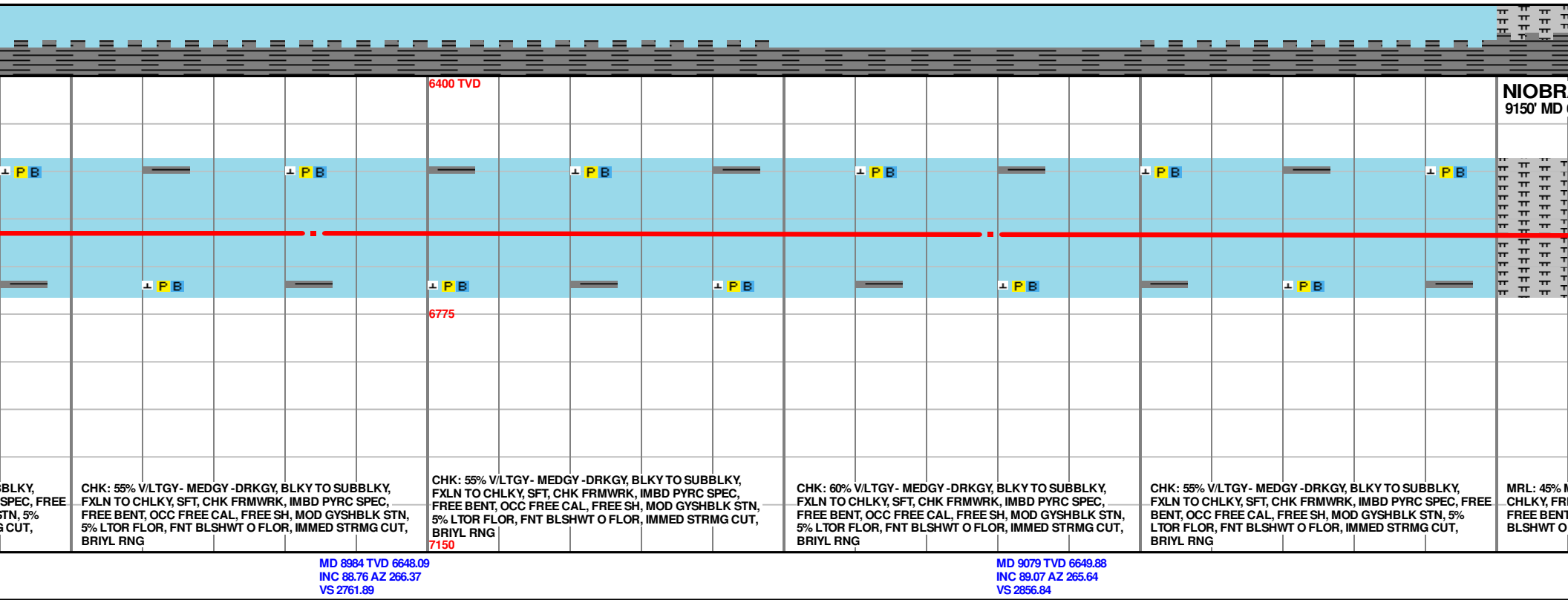

CG 3049u
CG 2912u
4500
TG, C1-C4
-500
ROP (Ft/Hr)
Gamma (API)
0
0
00
8550
8600
8650
8700

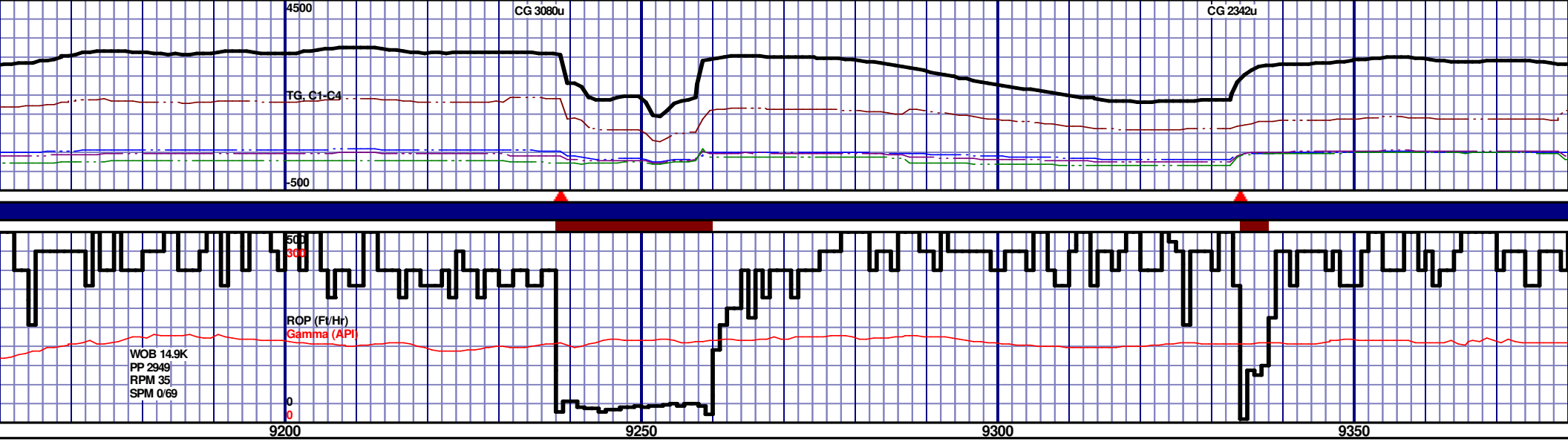

6400 TVD
6775
7150
CHK: 60% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
CHK: 60% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
CHK: 60% 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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
CHK: 60% 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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
CHK: 65% V/LTGY- MEDG
TO CHLKY, SFT, CHK FRM
OCC FREE CAL, FREE SH
FLOR, FNT BLSHWT O FL
MD 8510 TVD 6650.23
INC 91.63 AZ 265.89
VS 2288.12
MD 8605 TVD 6647.04
INC 92.22 AZ 266.73
VS 2383.04
MD 8699 TVD 6644.89
INC 90.4 AZ 266.55
VS 2477

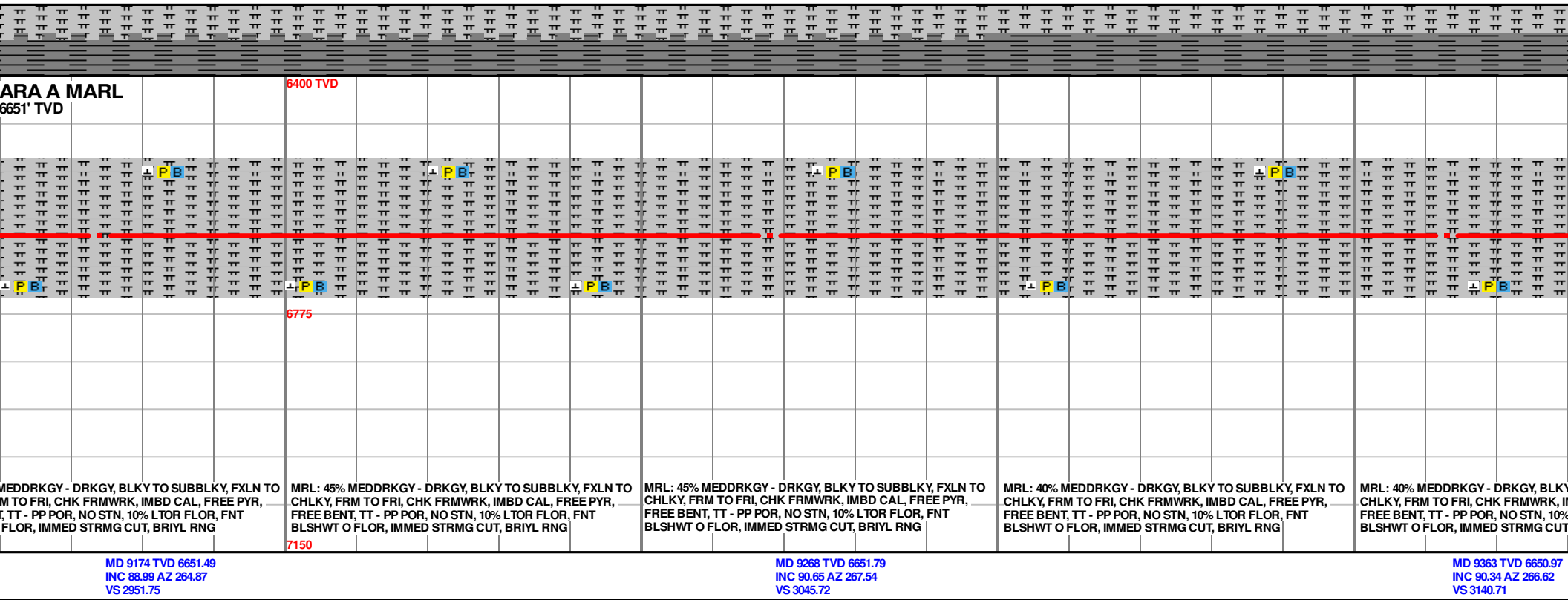

CG 3106u
4500
TG, C1-C4
-500
CG 2474u
500
300
ROP (Ft/Hr)
Gamma (API)
0
0
8750
8800
8850
8900

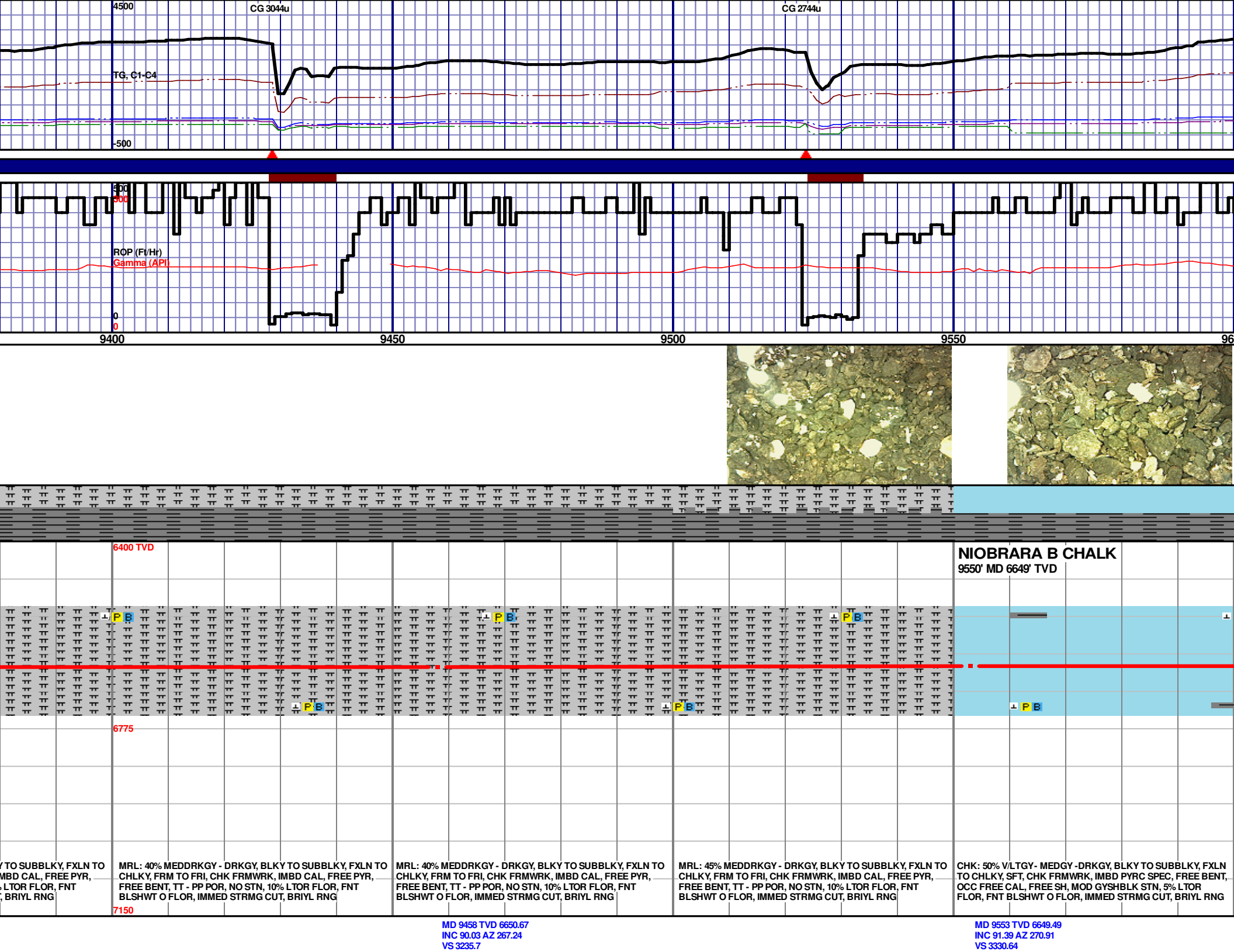

6400 TVD
6775
7150
GY -DRKGY, BLKY TO SUBBLKY, FXLN MWRK, IMBD PYRC SPEC, FREE BENT, H, MOD GYSHBLK STN, 5% LTOR LOR, IMMED STRMG CUT, BRIYL RNG
CHK: 65% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
CHK: 60% 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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
CHK: 60% 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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
CHK: 55% V/LTGY- MEDGY -DRKGY, BLKY TO SUB FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK S LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG BRIYL RNG
MD 8794 TVD 6645.63
INC 88.71 AZ 266.12
VS 2571.97
MD 8889 TVD 6646.89
INC 89.78 AZ 265.9
VS 2666.93

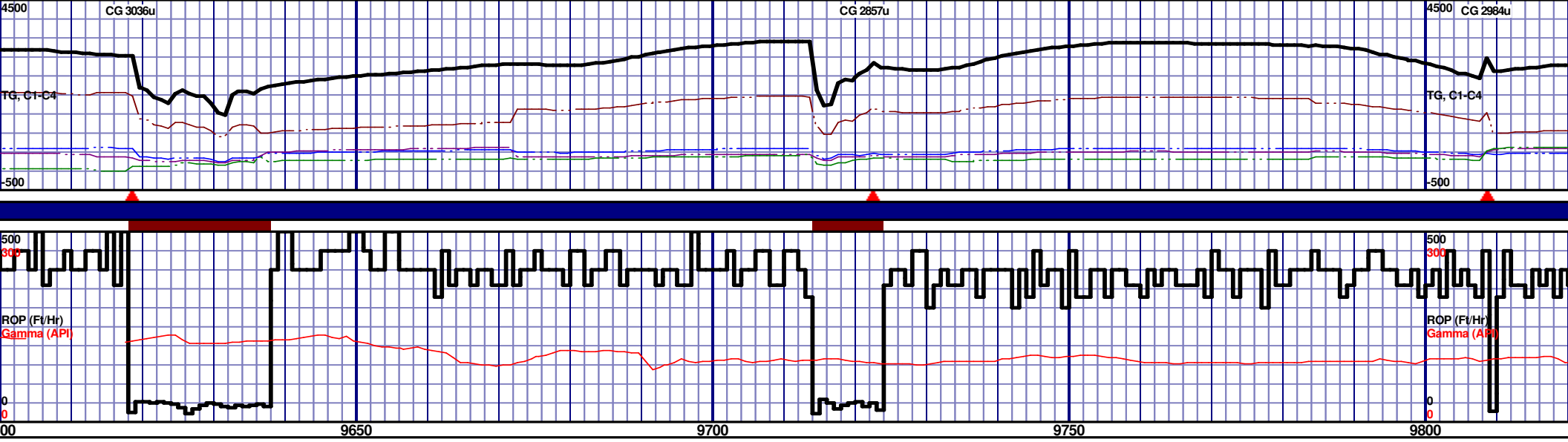

CG 2612u
4500
CG 2936u
MD 9048'
WT 9.45
VIS 38.0
PH 10.4
FIL 9.2
CL 1900
CAL 20.0
H2O 93.5
OIL 0.0
SOL 6.2
CAKE 1/0
GELS 2/6/9
PV 10.0
YP 8.0
CG 2687u
TG, C1-C4
-500
500
300
ROP (Ft/Hr)
Gamma (API)
0
0
8950
9000
9050
9100
9150

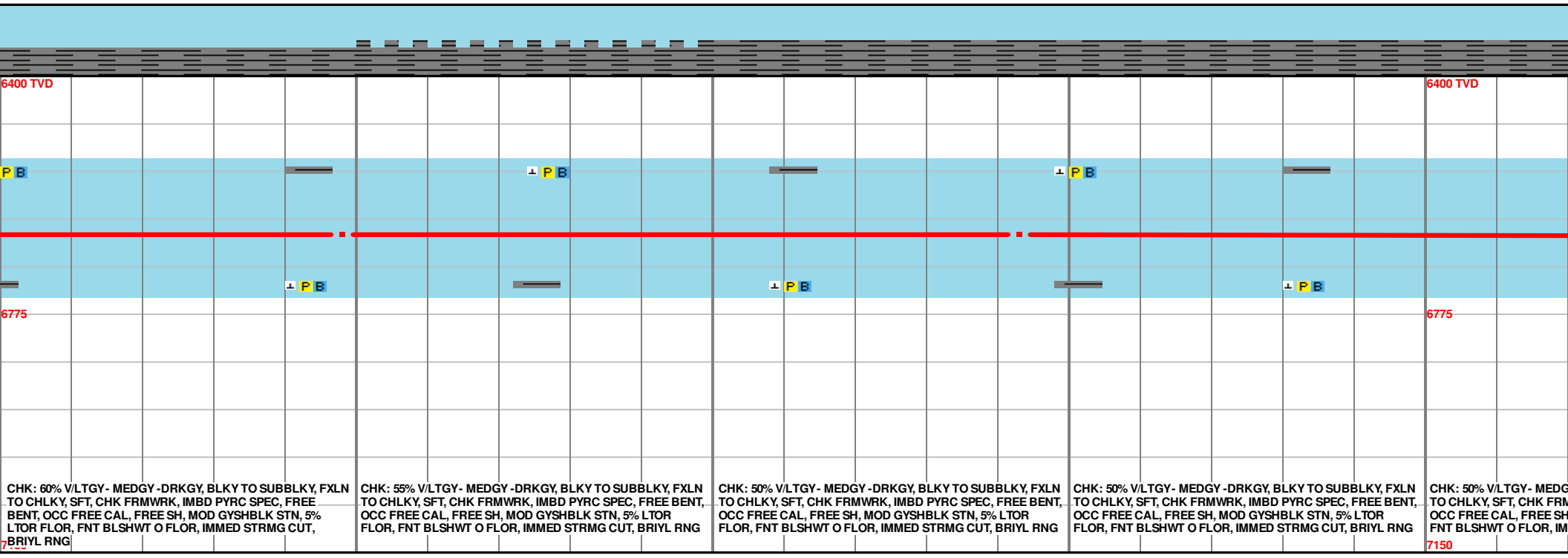

6400 TVD
NIOBR
9150' MD
6775
CHK: 55% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
7150
CHK: 55% V/LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
CHK: 60% 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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MD 8984 TVD 6648.09
INC 88.76 AZ 266.37
VS 2761.89
MD 9079 TVD 6649.88
INC 89.07 AZ 265.64
VS 2856.84

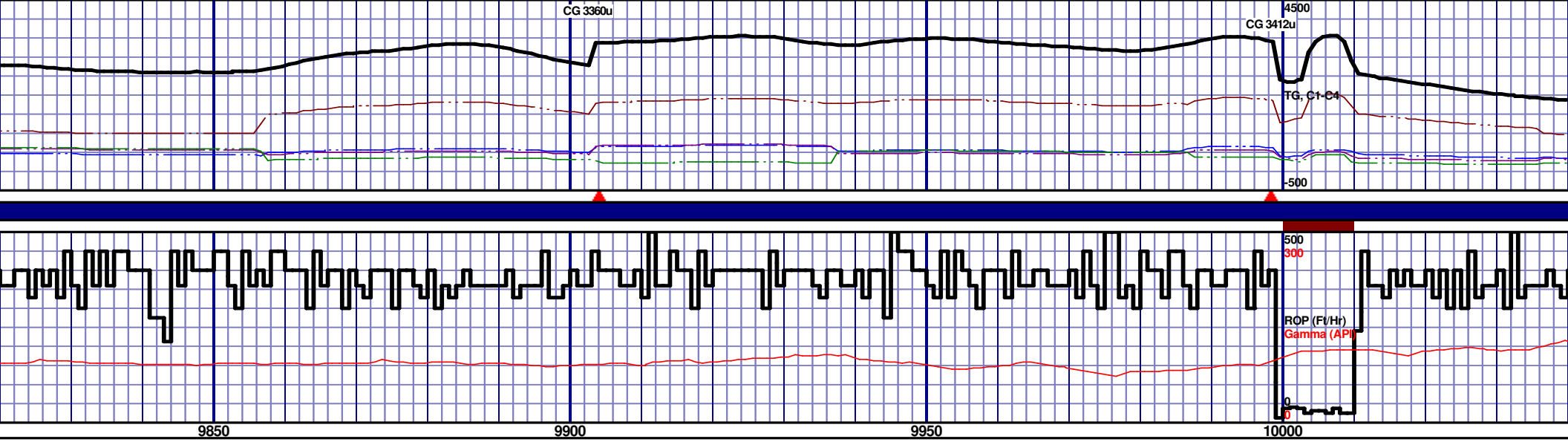

4500
CG 3080u
CG 2342u
TG, C1-C4
-500
500
300
ROP (Ft/Hr)
Gamma (API)
WOB 14.9K
PP 2949
RPM 35
SPM 0/69
0
0
9200
9250
9300
9350

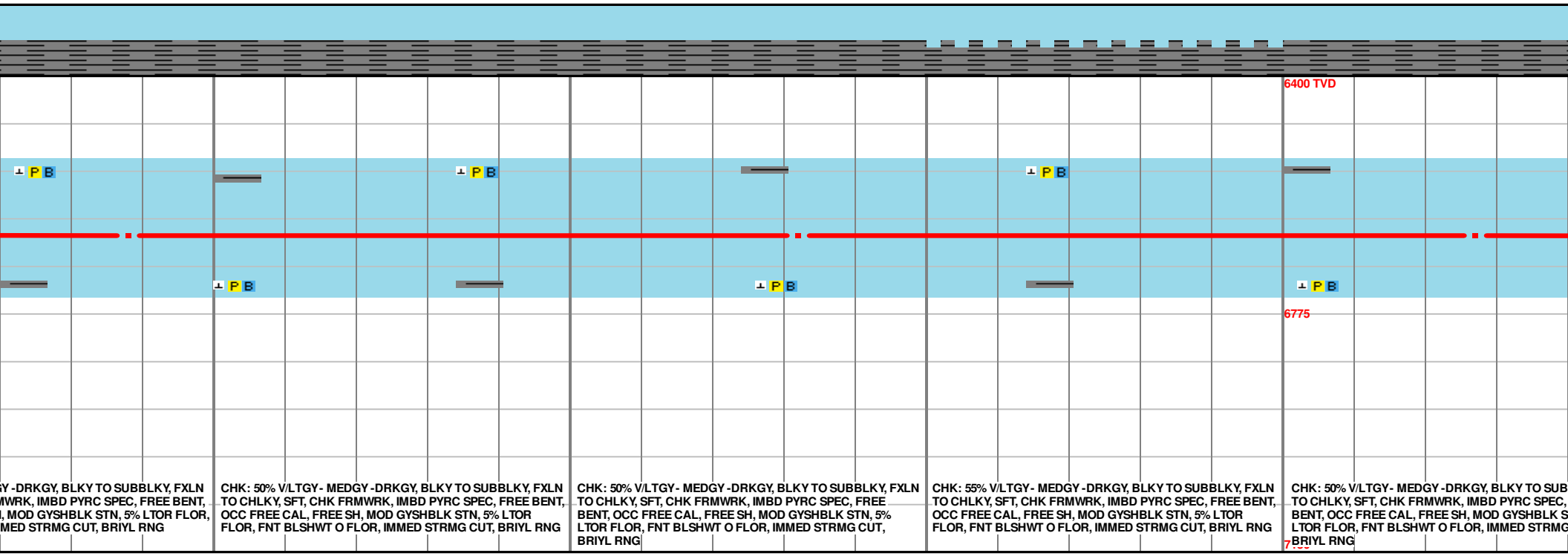

ARA A MARL
6651' TVD
6400 TVD
6775
7150
MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO
M TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR,
T, TT - PP POR, NO STN, 10% LTOR FLOR, FNT
FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO
CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR,
FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT
BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO
CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR,
FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT
BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO
CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR,
FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT
BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 40% MEDDRKGY - DRKGY, BLKY
CHLKY, FRM TO FRI, CHK FRMWRK, I
FREE BENT, TT - PP POR, NO STN, 10%
BLSHWT O FLOR, IMMED STRMG CUT
MD 9174 TVD 6651.49
INC 88.99 AZ 264.87
VS 2951.75
MD 9268 TVD 6651.79
INC 90.65 AZ 267.54
VS 3045.72
MD 9363 TVD 6650.97
INC 90.34 AZ 266.62
VS 3140.71

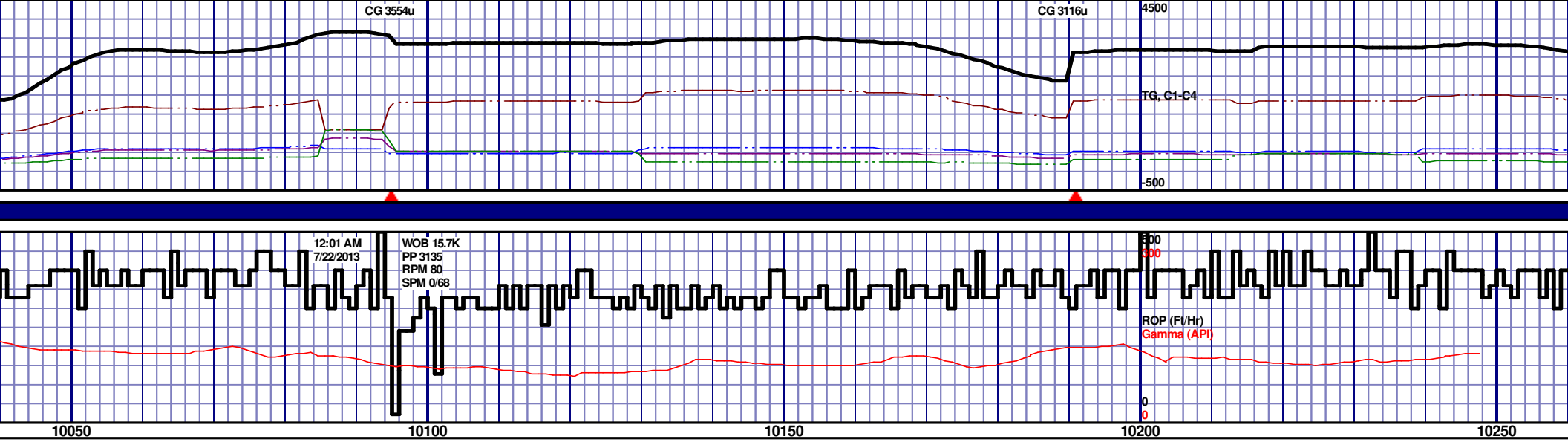

4500
CG 3044u
CG 2744u
TG, C1-C4
-500
300
300
ROP (Ft/Hr)
Gamma (API)
0
0
9400
9450
9500
9550
96
6400 TVD
NIOBRARA B CHALK
9550' MD 6649' TVD
6775
7150
MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MD 9458 TVD 6650.67
INC 90.03 AZ 267.24
VS 3235.7
MD 9553 TVD 6649.49
INC 91.39 AZ 270.91
VS 3330.64

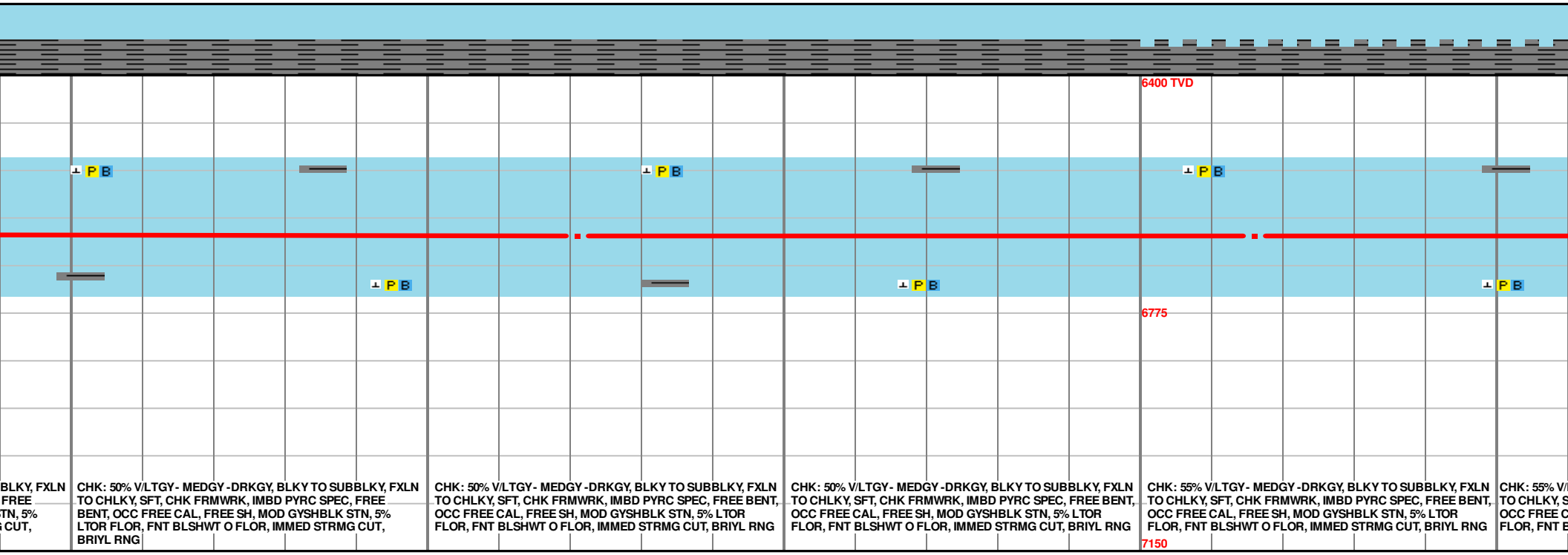

4500
CG 3036u
CG 2857u
4500
CG 2984u
TG, C1-C4
TG, C1-C4
-500
-500
500
300
ROP (Ft/Hr)
Gamma (API)
0
0
500
300
ROP (Ft/Hr)
Gamma (API)
0
0
00
9650
9700
9750
9800


6400 TVD
6400 TVD
P B
P B
P B
P B
P B
6775
6775
CHK: 60% 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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
CHK: 50% V/LTGY- MEDG
TO CHLKY, SFT, CHK FRM
OCC FREE CAL, FREE SH
FNT BLSHWT O FLOR, IM
7150
MD 9648 TVD 6648.52
INC 89.78 AZ 270.58
VS 3425.48
MD 9743 TVD 6649.54
INC 88.98 AZ 269.3
VS 3520.39


CG 3360u
4500
CG 3412u
TG, C1-C4
-500
500
300
ROP (Ft/Hr)
Gamma (API)
0
0
9850
9900
9950
10000


6400 TVD
6775
-DRKGY, BLKY TO SUBBLKY, FXLN
WRK, IMBD PYRC SPEC, FREE BENT,
, MOD GYSHBLK STN, 5% LTOR FLOR,
MED STRMG CUT, BRIYL RNG
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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
CHK: 50% V/LTGY- MEDGY -DRKGY, BLKY TO SUB
TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC,
BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK S
LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG
BRIYL RNG
MD 9838 TVD 6650.93
INC 89.35 AZ 268.83
VS 3615.35
MD 9932 TVD 6651.2
INC 90.31 AZ 268.64
VS 3709.32
MD 10027 TVD 66
INC 88.86 AZ 267
VS 3804.31





BLKY, FXLN FREE TN, 5% CUT,

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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

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, 5% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG

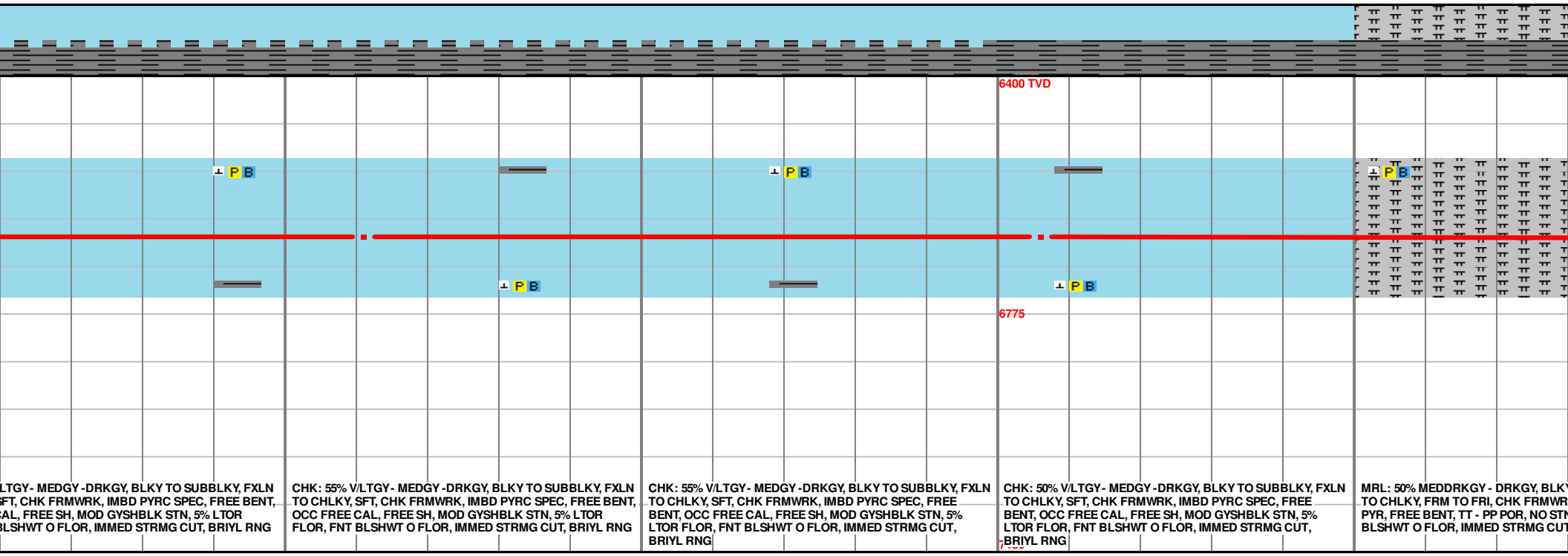
CHK: 55% V/ TO CHLKY, S OCC FREE C FLOR, FNT B

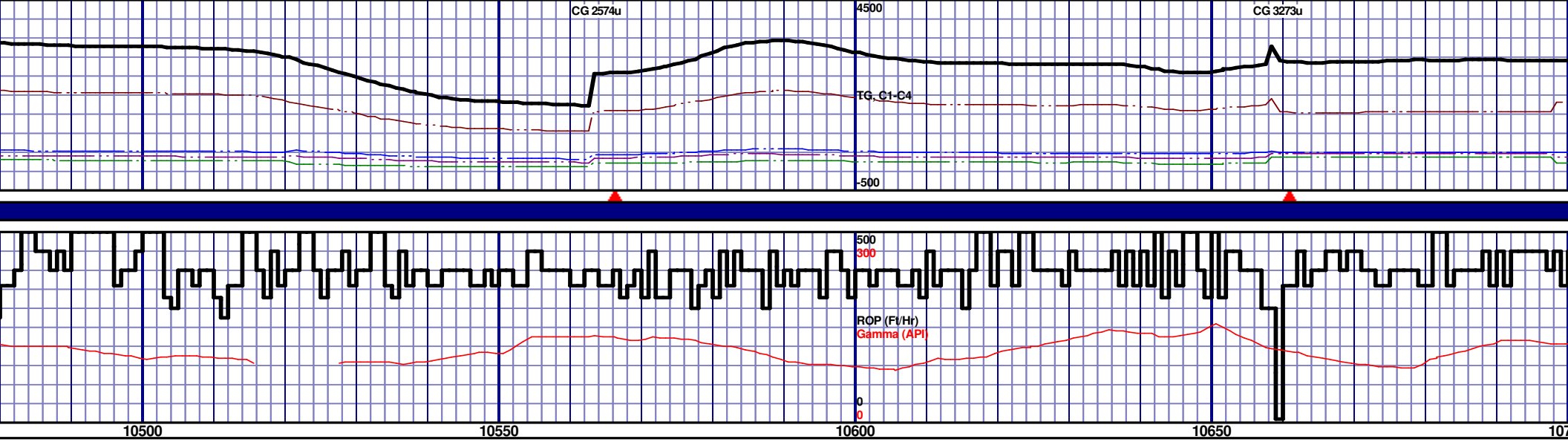
651.9
.87

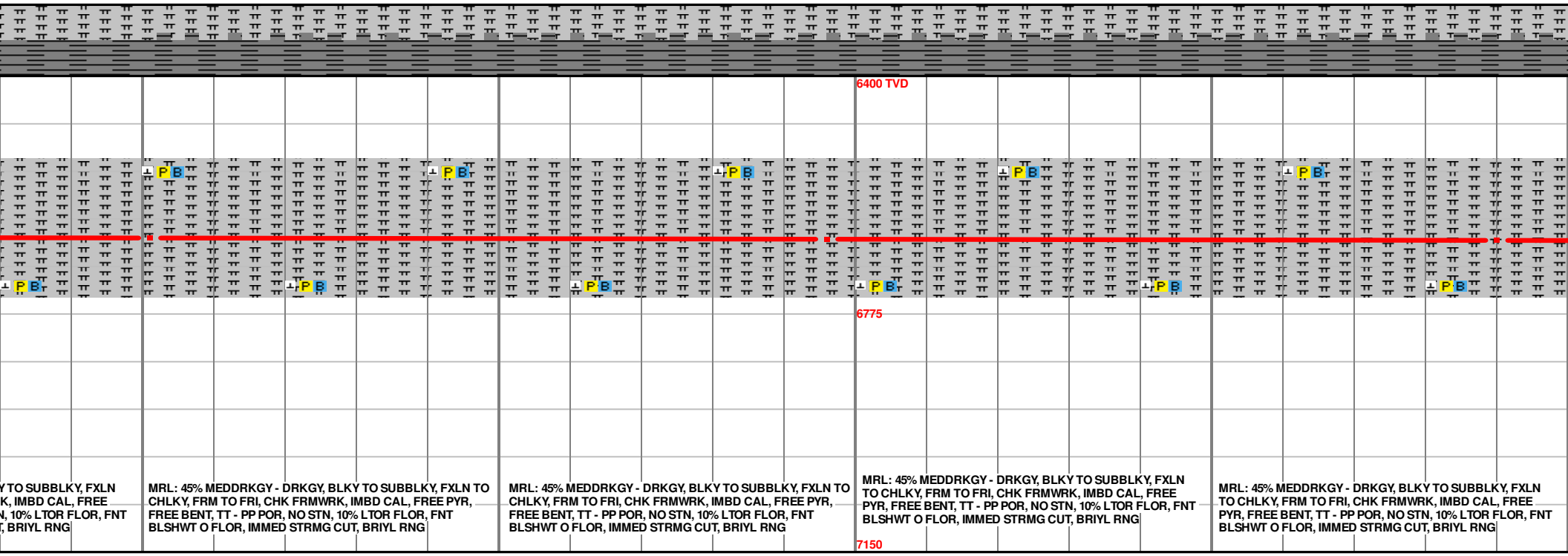
MD 10121 TVD 6653.11
INC 89.66 AZ 268.03
VS 3898.3

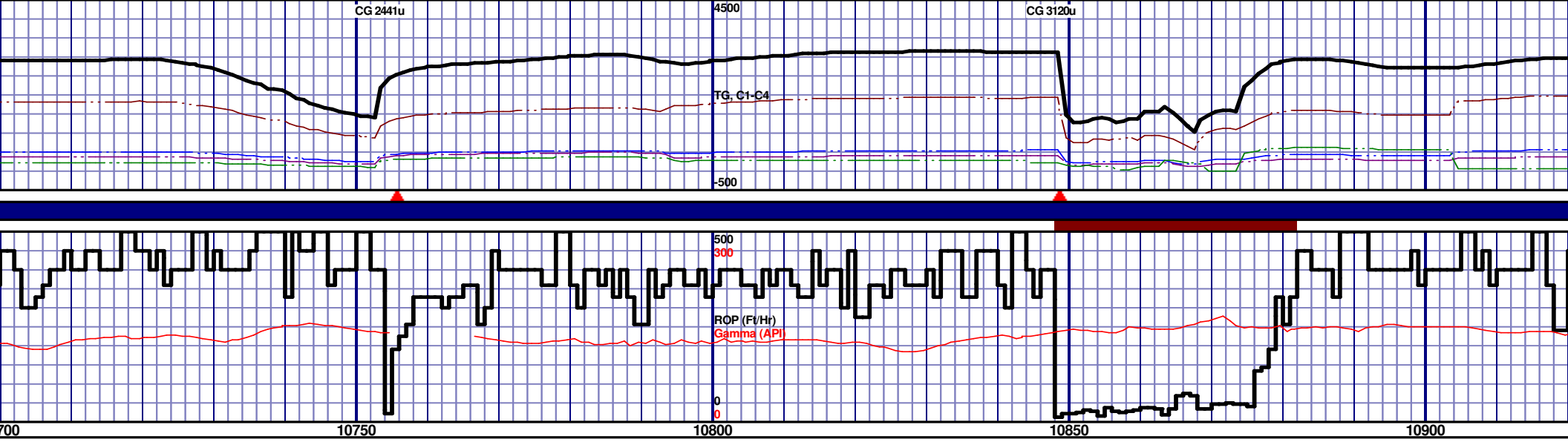
MD 10216 TVD 6653.47
INC 89.91 AZ 267.89
VS 3993.3

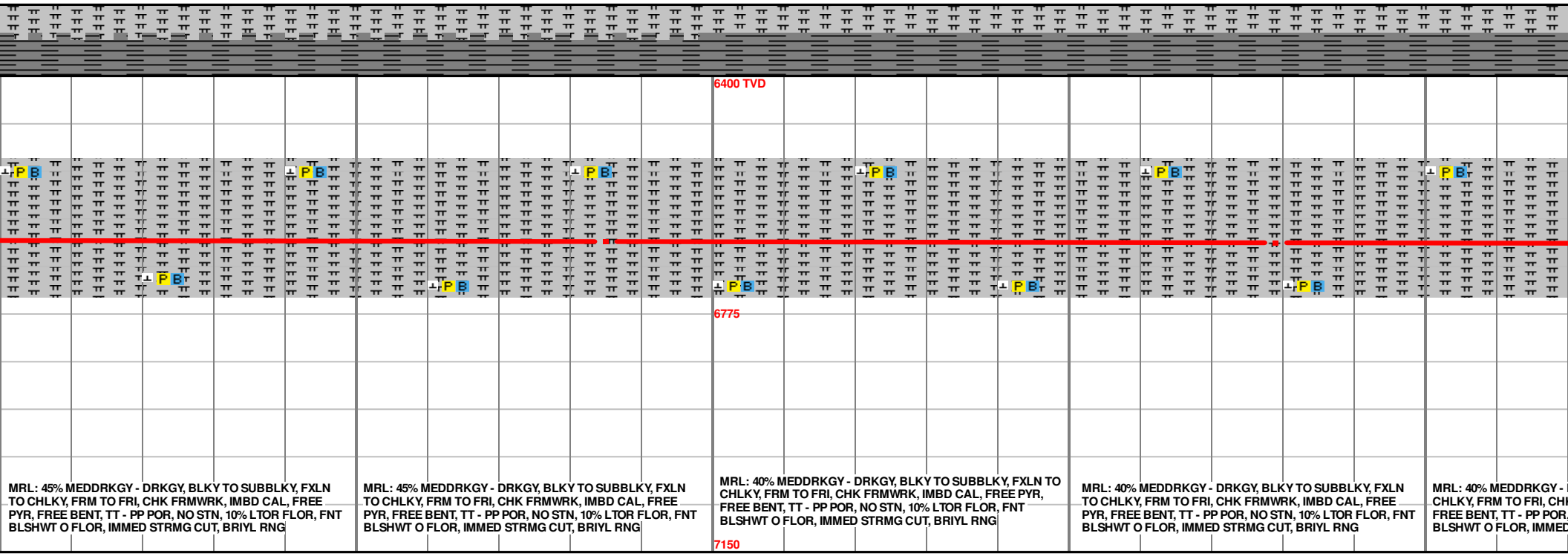
CG 2826u
CG 3314u
4500
MD 10468'
WT 9.30
VIS 42.0
PH 9.7
FIL 8.8
CL 1900
CAL 20.0
H2O 94.0
OIL 0.0
SOL 5.7
CAKE 2/0
GELS 3/7/10
PV 11.0
YP 11.0
CG 2844u
TG, C1-C4
-500
500
300
ROP (Ft/Hr)
Gamma (API)
WOB 5.4K
PP 3038
RPM 80
SPM 0/69
0
10300
10350
10400
10450


6400 TVD
6775
P B
LTGY- MEDGY -DRKGY, BLKY TO SUBBLKY, FXLN
SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT,
CAL, FREE SH, MOD GYSHBLK STN, 5% LTOR
BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
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, 5% LTOR
FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
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, 5%
LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT,
BRIYL RNG
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, 5%
LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT,
BRIYL RNG
MRL: 50% MEDDRKGY - DRKGY, BLKY
TO CHLKY, FRM TO FRI, CHK FRMWR
PYR, FREE BENT, TT - PP POR, NO STN
BLSHWT O FLOR, IMMED STRMG CUT
MD 10311 TVD 6653.14
INC 90.49 AZ 266.79
VS 4088.29
MD 10406 TVD 6653.77
INC 88.74 AZ 267.29
VS 4183.28


CG 2574u
CG 3273u
4500
TG, C1-C4
-500
500
300
ROP (Ft/Hr)
Gamma (API)
0
0
10500
10550
10600
10650


6400 TVD
6775
7150
MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MD 10501 TVD 6655.71
INC 88.92 AZ 267.29
VS 4278.26
MD 10596 TVD 6657.25
INC 89.23 AZ 266.73
VS 4373.25
MD 10690 TV
INC 88.89 AZ
VS 4467.22

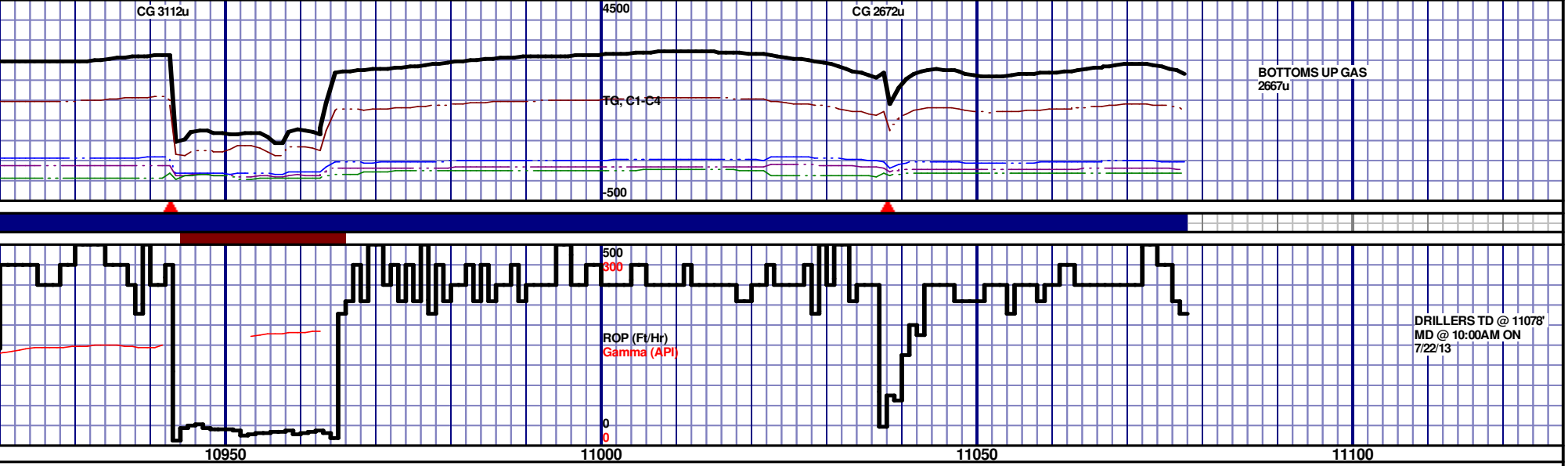


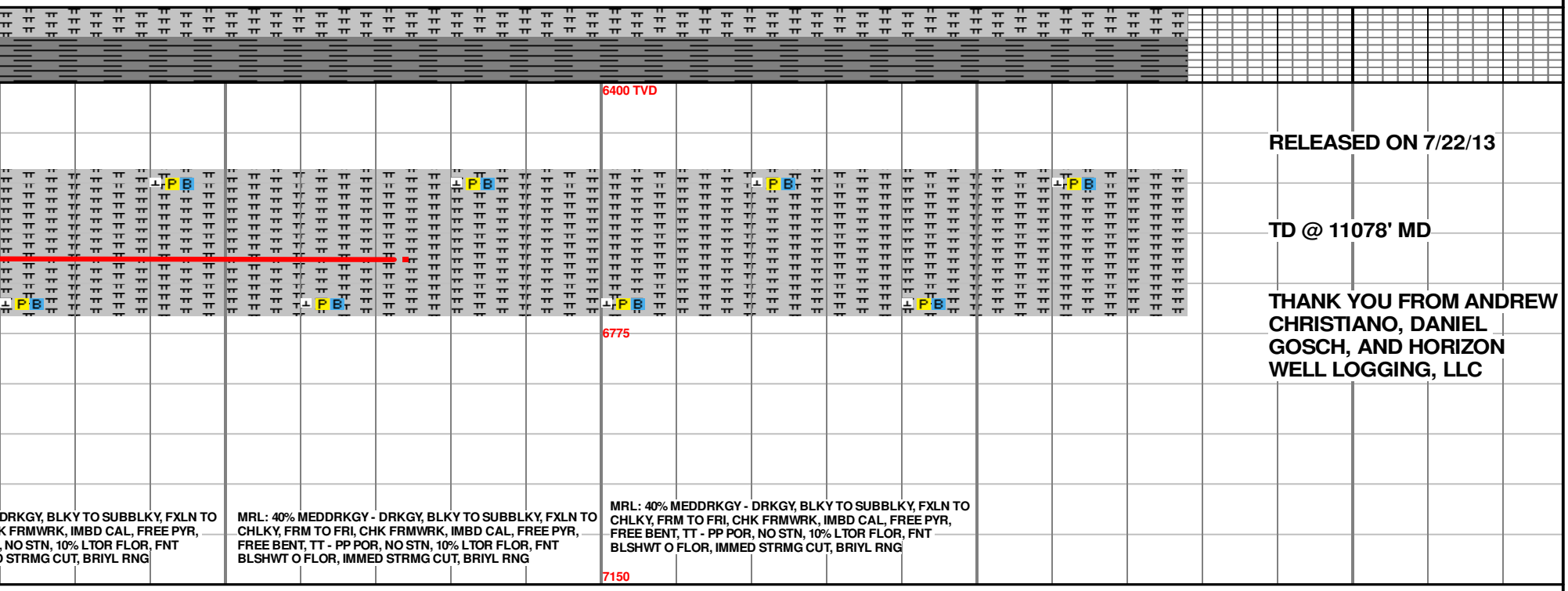


VD 6658.79
Z 266.12

MD 10785 TVD 6661.09
INC 88.33 AZ 265.14
VS 4562.13

MD 10879 TVD 6663.22
INC 89.08 AZ 266.64
VS 4656.07


CG 3112u
4500
CG 2672u
BOTTOMS UP GAS
2667u
TG, C1-C4
-500
500
300
ROP (Ft/Hr)
Gamma (API)
0
0
DRILLERS TD @ 11078'
MD @ 10:00AM ON
7/22/13
10950
11000
11050
11100


6400 TVD
6775
7150
RELEASED ON 7/22/13
TD @ 11078' MD
THANK YOU FROM ANDREW CHRISTIANO, DANIEL GOSCH, AND HORIZON WELL LOGGING, LLC
DRKGY, BLKY TO SUBBLKY, FXLN TO
K FRMWRK, IMBD CAL, FREE PYR,
, NO STN, 10% LTOR FLOR, FNT
O STRMG CUT, BRIYL RNG
MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, FREE BENT, TT - PP POR, NO STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG
MD 10974 TVD 6664.44
INC 89.45 AZ 267.68
VS 4751.06