



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

phone 918.925.9739

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WWW.HZMUD.COM/25

Customer Information

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

Geologist: Cassidy Miller
Noble Energy Inc.

Mud Logging Details

Logger: Andrew Christiano &
Joseph Klumpstra
Log Interval: 6650' MD to 10886' MD
Start Date: October 24, 2013
Release Date: October 27, 2013

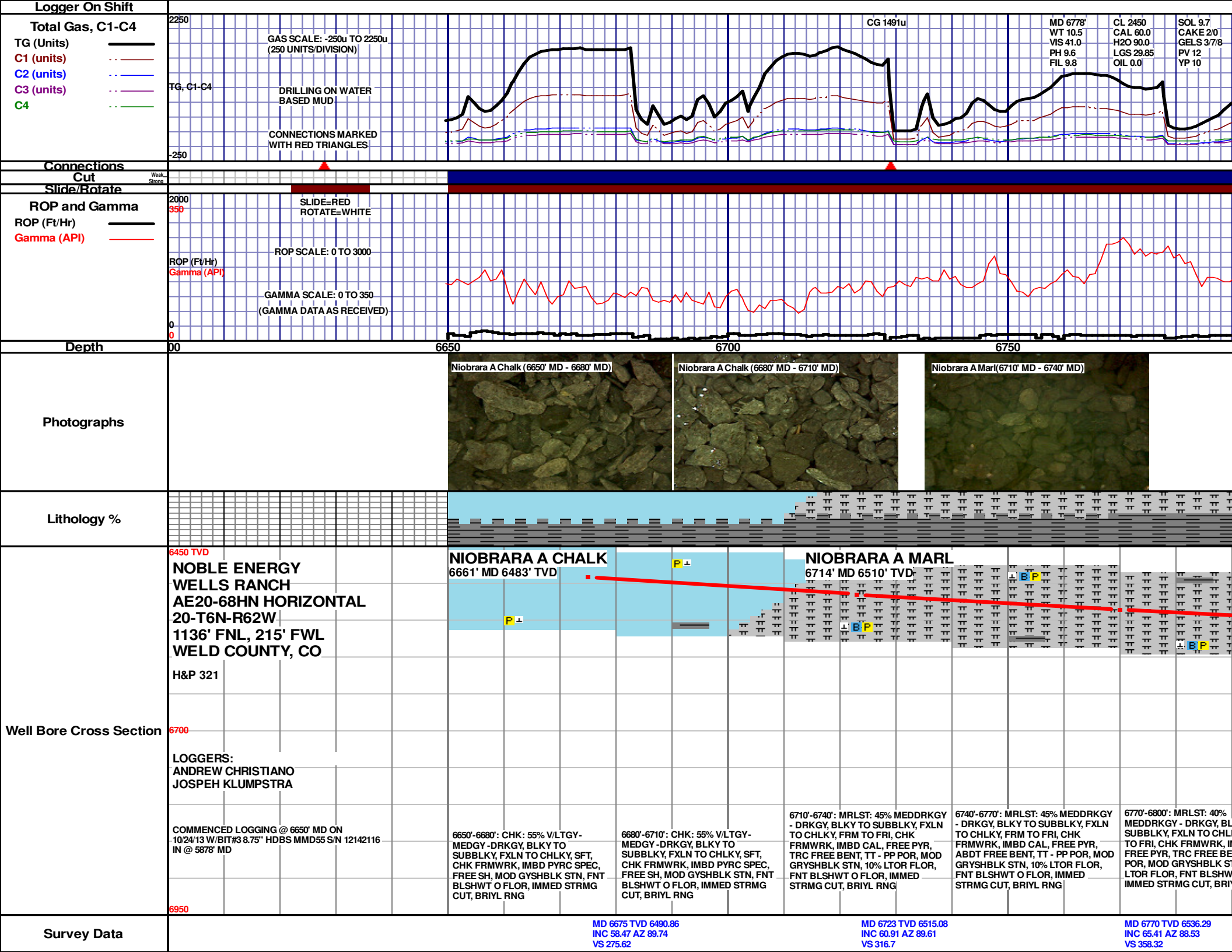
Well Information

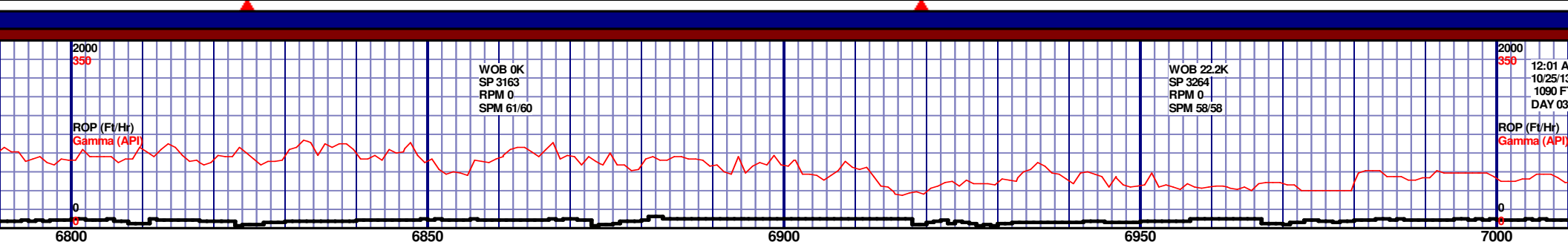
Well Name: Wells Ranch
AE20-68HN Horizontal

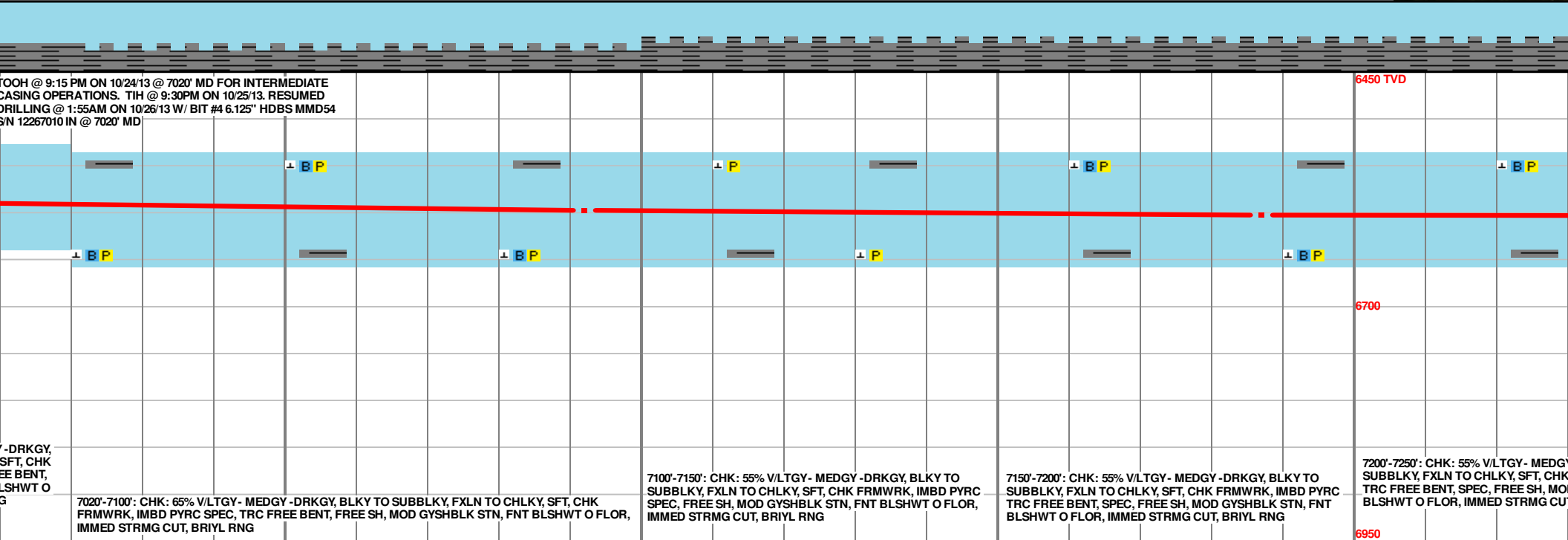
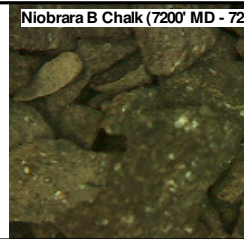
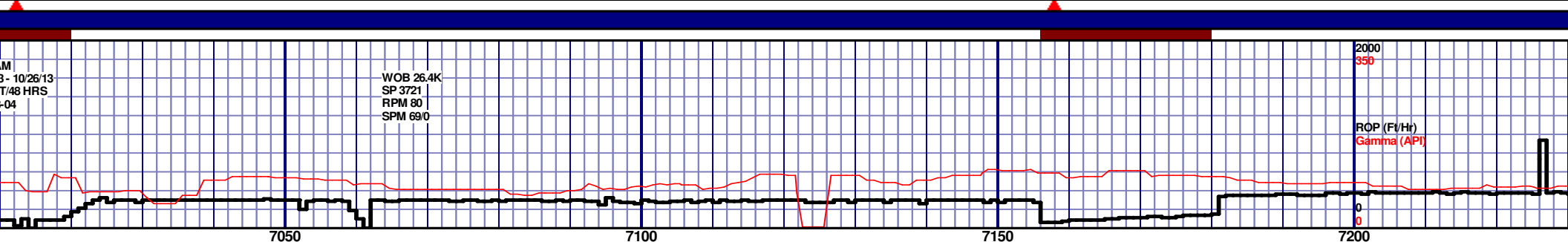
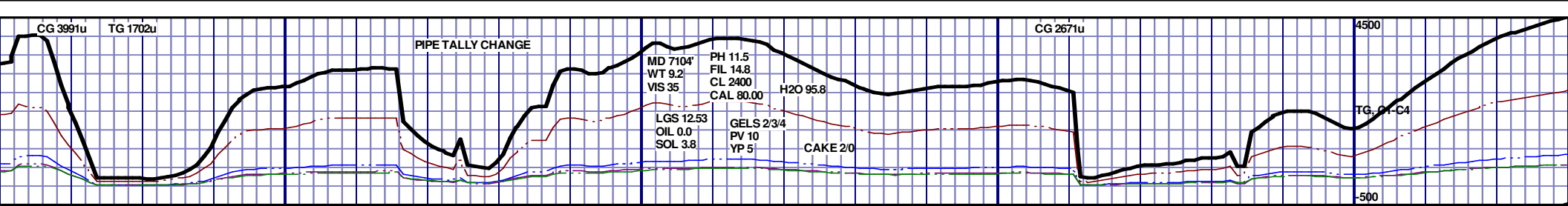
Location: 20-T6N-R62W
1136' FNL, 215' FWL

County: Weld Co.
State: Colorado

Drilling Rig: H&P 321
Total Depth: 10886' MD
TD Date: October 27, 2013
Formation: Niobrara B Chalk
KB Elevation: 4870'
GR Elevation: 4840'
API Number: 05-123-37216-0000

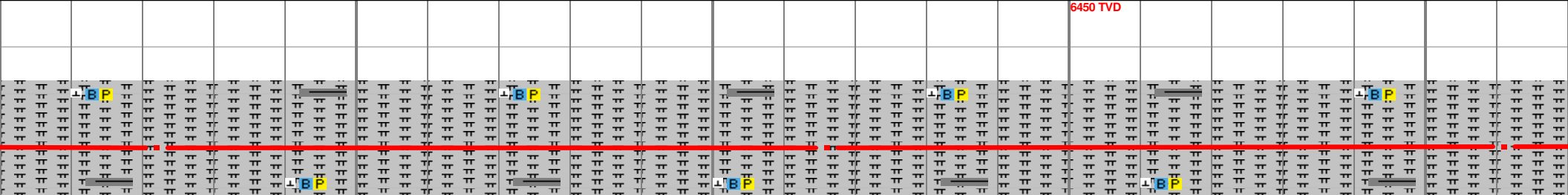
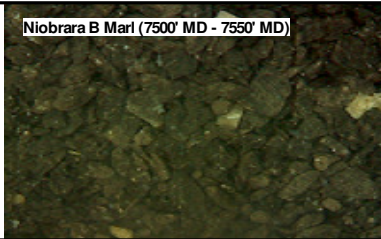
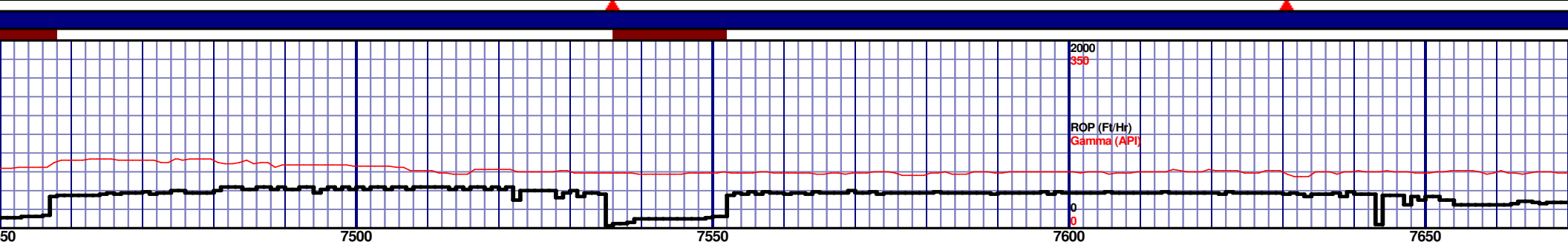
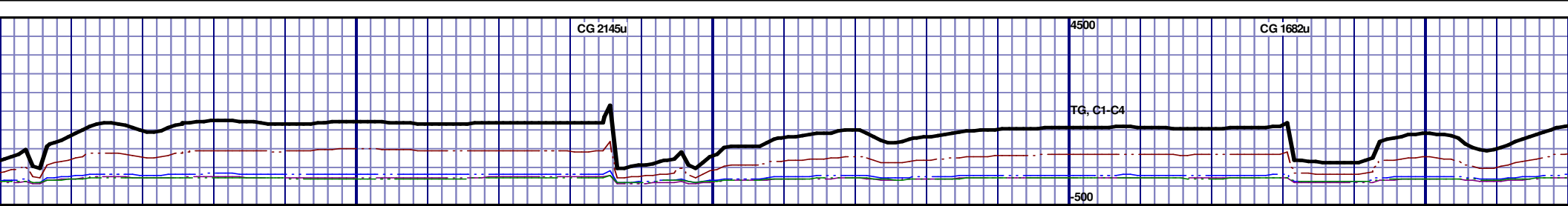






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INC 86.26 AZ 88.19
VS 670.63

MD 7187 TVD 6602.02
INC 88.98 AZ 88.97
VS 764.94

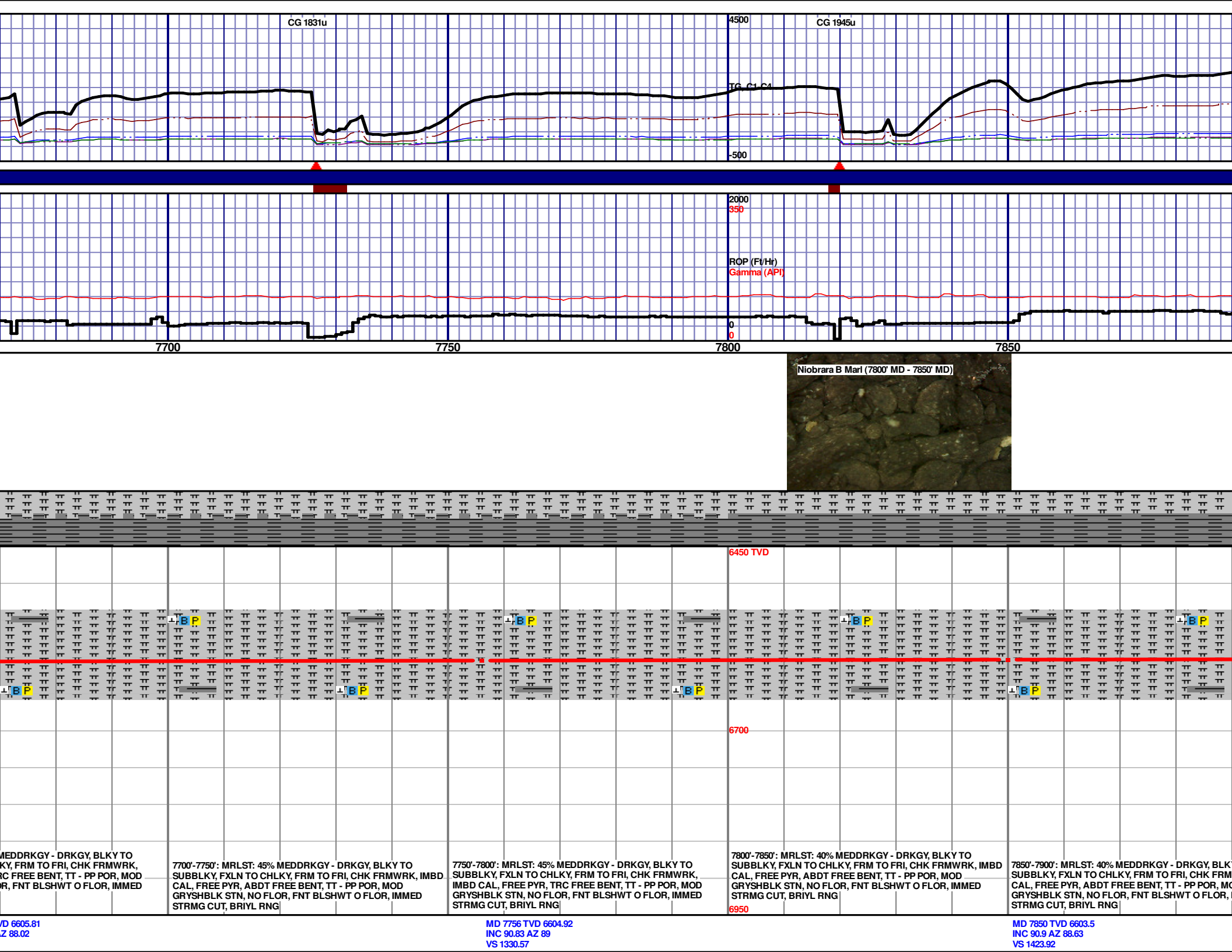


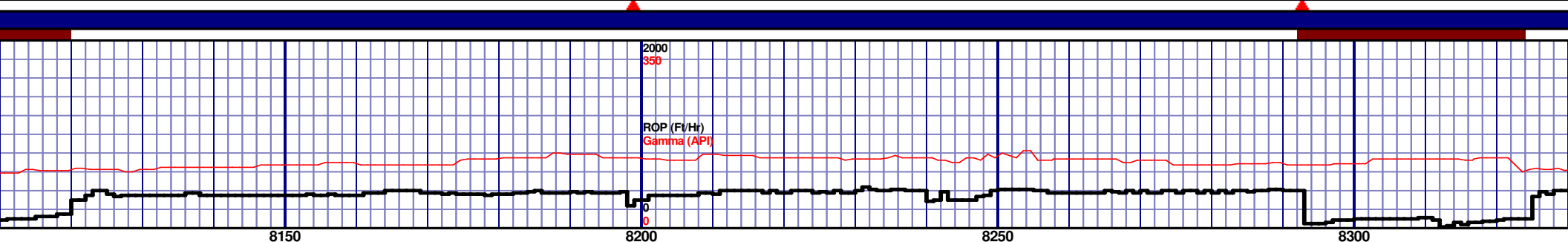
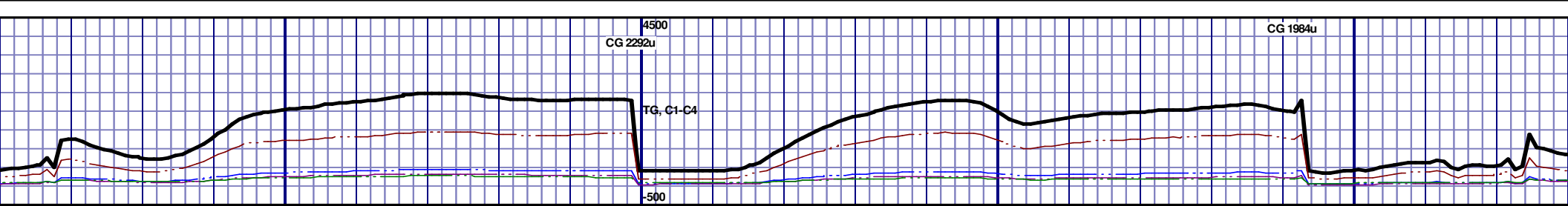
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|--|--|--|--|--|
| <p>7450'-7500': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, TRC FREE BENT, TT - PP POR, MOD GRYSHLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p> | <p>7500'-7550': MRLST: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, TRC FREE BENT, TT - PP POR, MOD GRYSHLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p> | <p>7550'-7600': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, TRC FREE BENT, TT - PP POR, MOD GRYSHLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p> | <p>7600'-7650': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, TRC FREE BENT, TT - PP POR, MOD GRYSHLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p> | <p>7650'-7700': MRLST: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, TRC FREE BENT, TT - PP POR, MOD GRYSHLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p> |
|--|--|--|--|--|

MD 7472 TVD 6607.46
INC 89.08 AZ 87.95
VS 1048.23

MD 7566 TVD 6607.12
INC 91.33 AZ 88.37
VS 1141.7

MD 7661 TVD 6607.12
INC 90.25 AZ 88.37
VS 1236.7



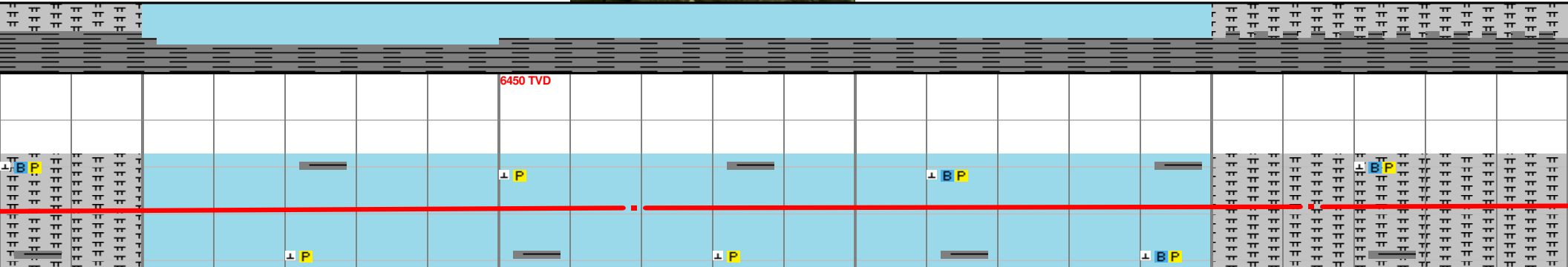
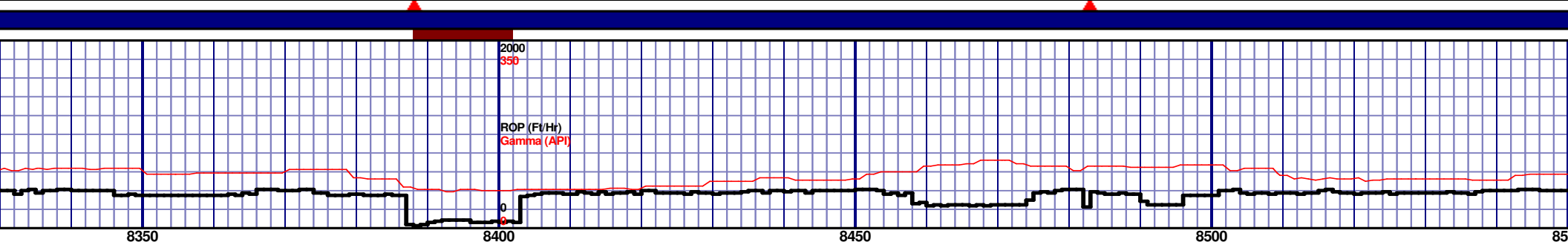
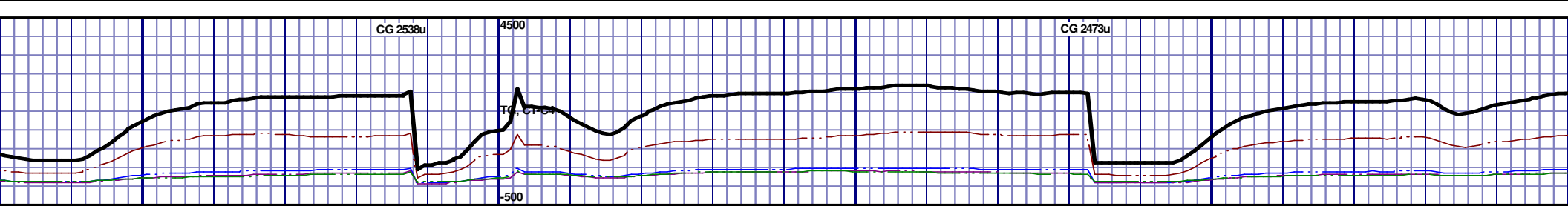


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|---|---|--|--|---|
| <p>MRLST: 40% MEDDRKGY - DRKGY, BLKY TO FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, FREE PYR, ABDT FREE BENT, TT - PP POR, MOD STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p> | <p>8150'-8200': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, TRC FREE BENT, TT - PP POR, MOD GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p> | <p>8200'-8250': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, ABDT FREE BENT, TT - PP POR, MOD GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p> | <p>8250'-8300': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, ABDT FREE BENT, TT - PP POR, MOD GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p> | <p>8300'-8350': MRLST: 40% MEDDRKGY - SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, ABDT FREE BENT, TT - PP POR, MOD GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p> |
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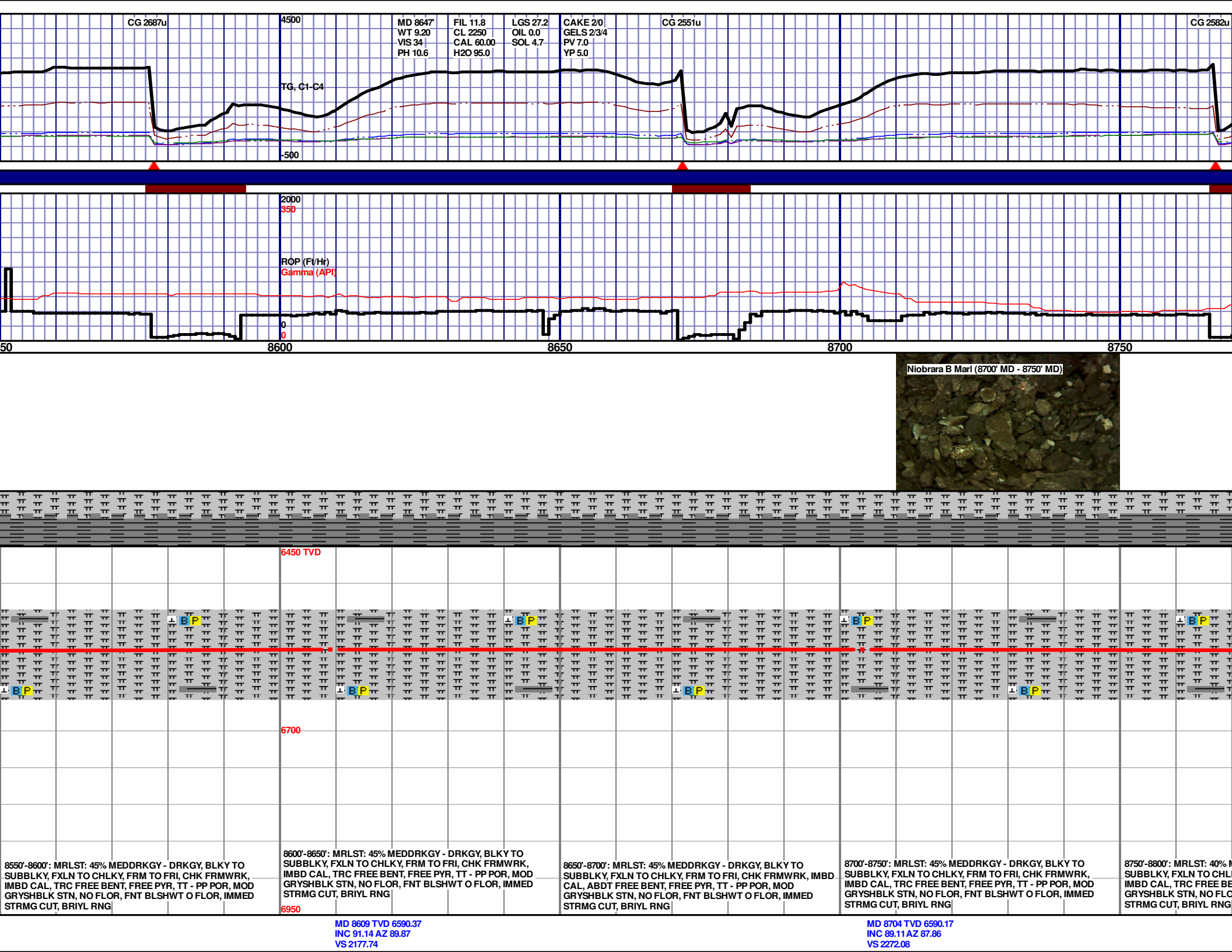
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INC 91.26 AZ 87.1
VS 1706.15

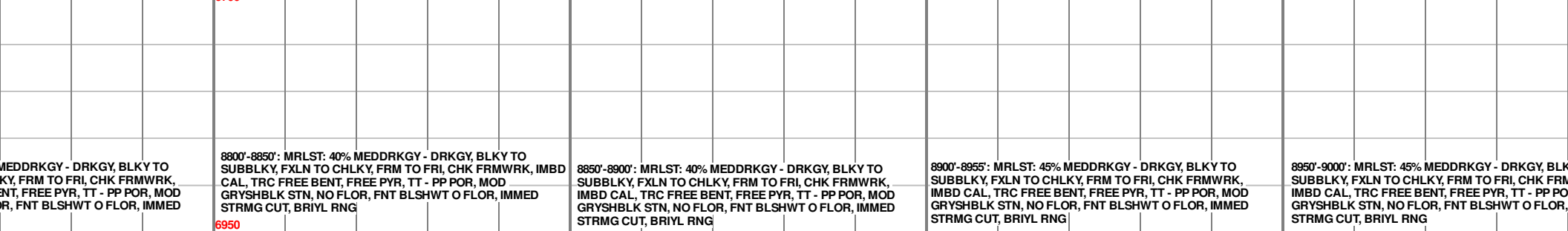
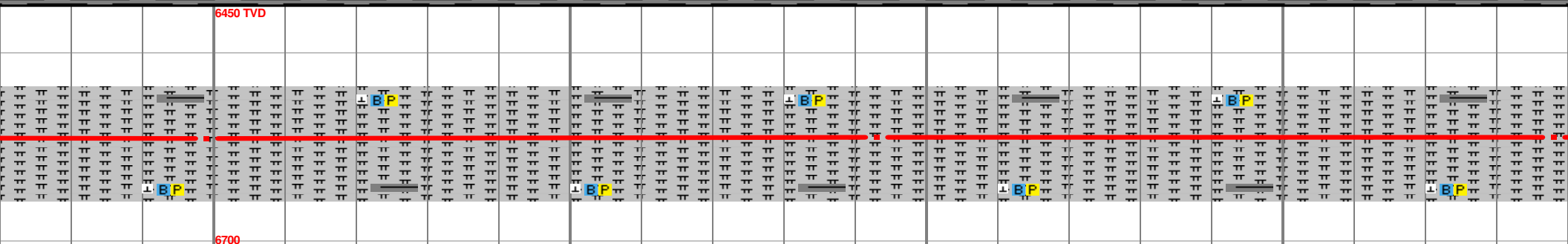
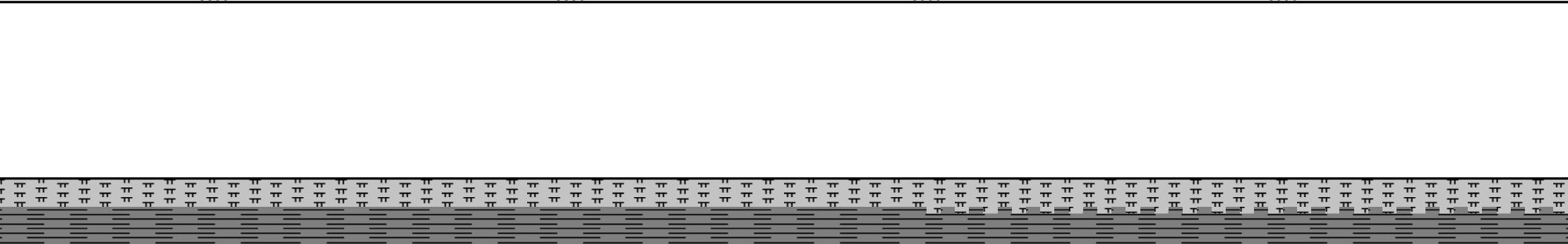
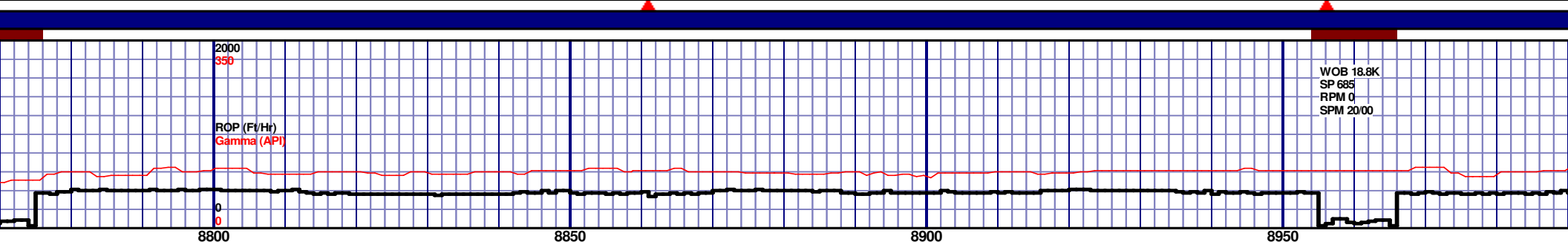
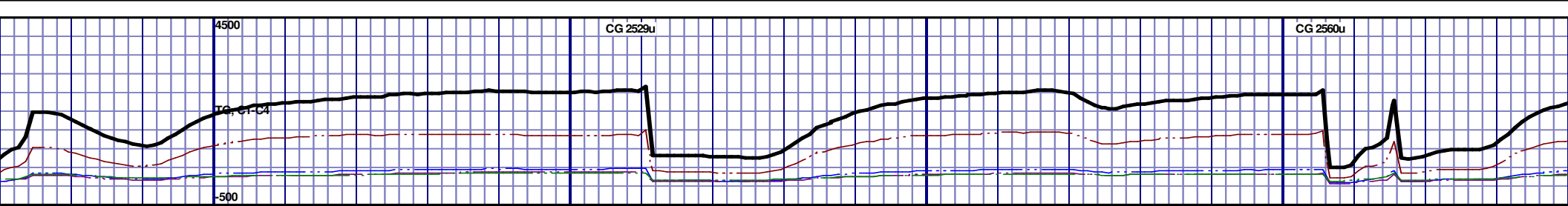
MD 8230 TVD 6599.81
INC 89.81 AZ 85.53
VS 1800.89

MD 832
INC 92.
VS 189



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|---|--|--|---|--|
| DRKGY, BLKY TO FRI, CHK FRMWRK, INT, TT - PP POR, MOD IWT O FLOR, IMMED | 8350'-8400': CHALK: 60% MEDDRKGY - LTGY, BLKYTO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, TT - PP POR, MOD GRYSBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG | 8400'-8450': CHALK: 50% MEDDRKGY - LTGY, BLKYTO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE PYR, TT - PP POR, MOD GRYSBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG | 8450'-8500': CHALK: 50% MEDDRKGY - LTGY, BLKYTO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD GRYSBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG | 8500'-8550': MRLST: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, ABDT FREE BENT, FREE PYR, TT - PP POR, MOD GRYSBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG |
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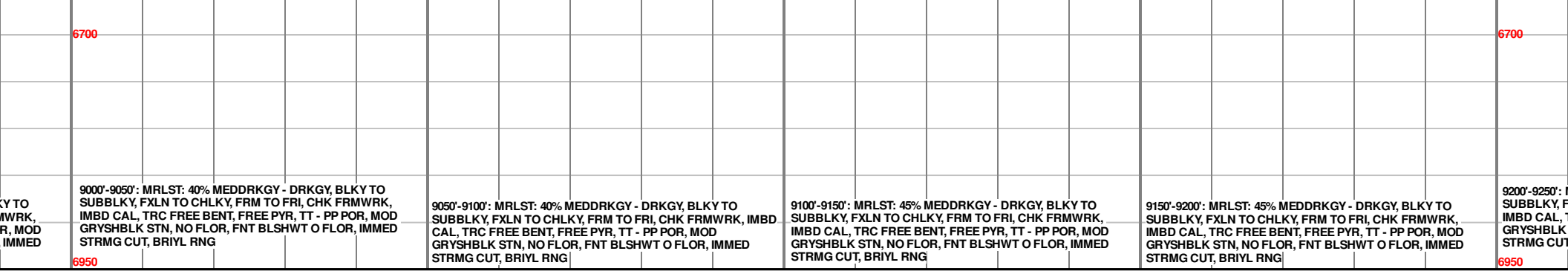
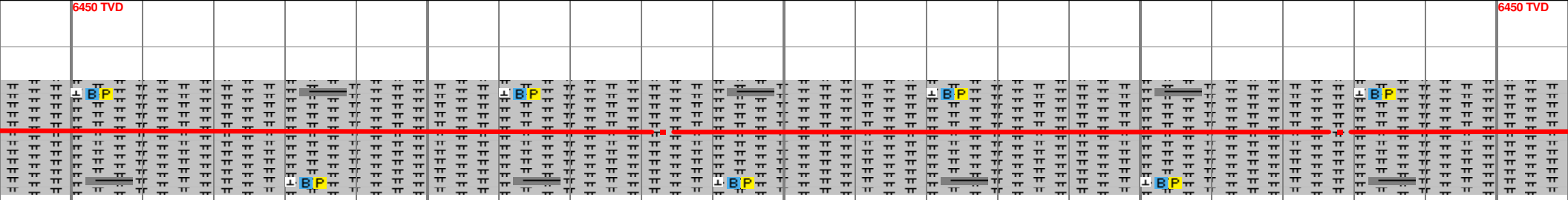
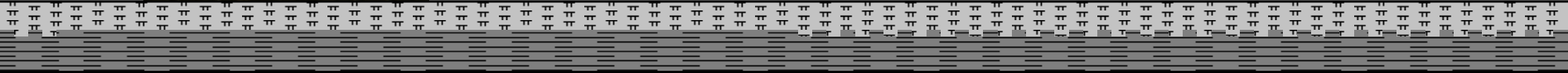
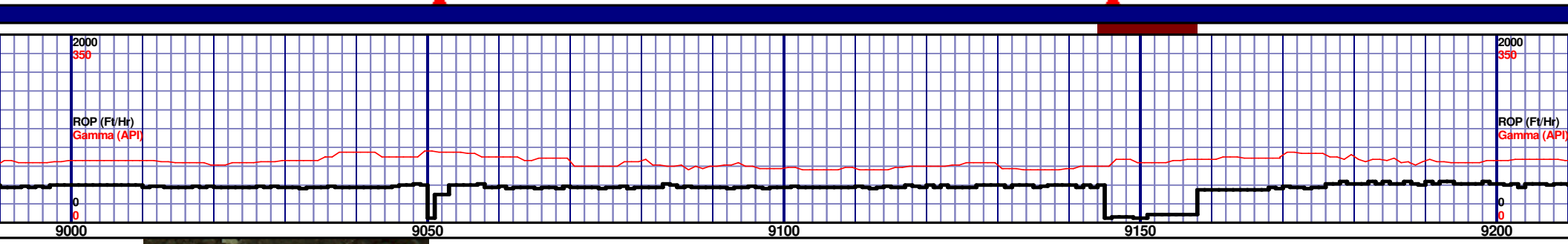
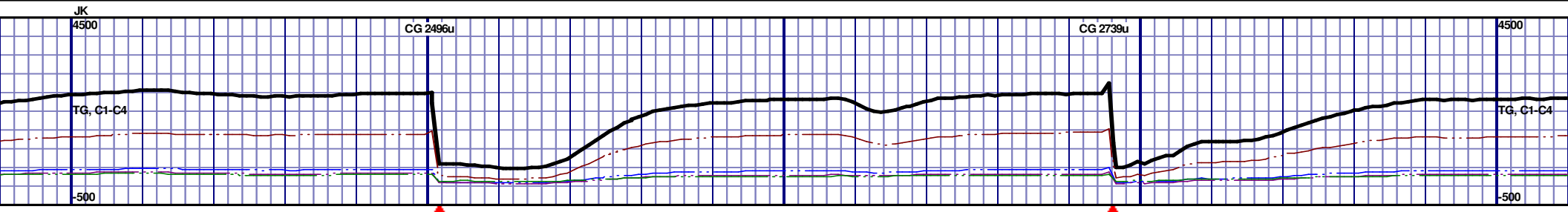


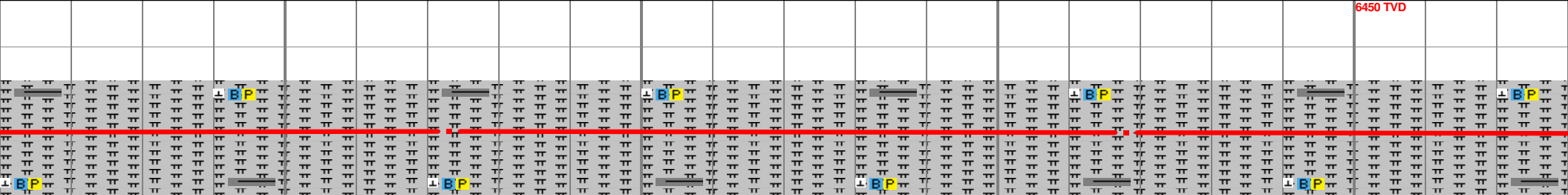
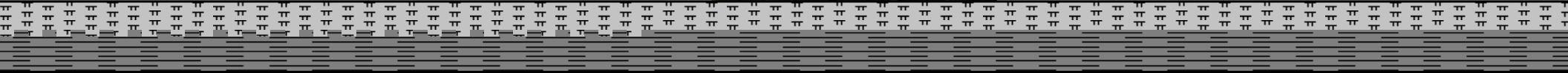
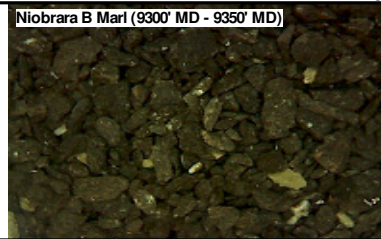
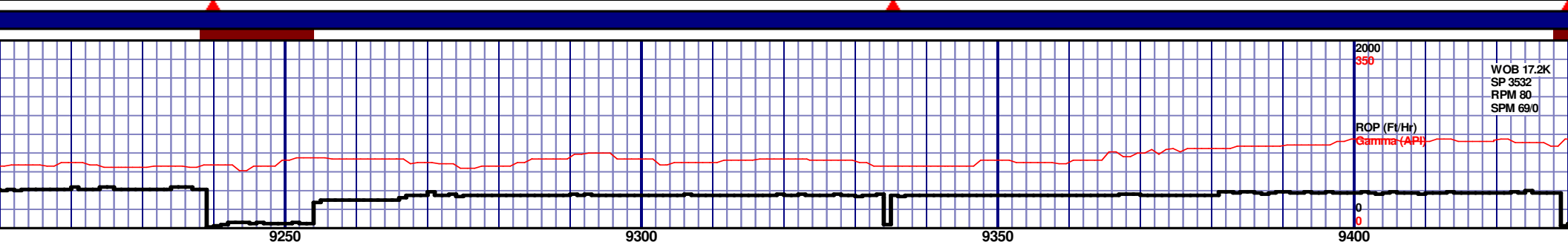
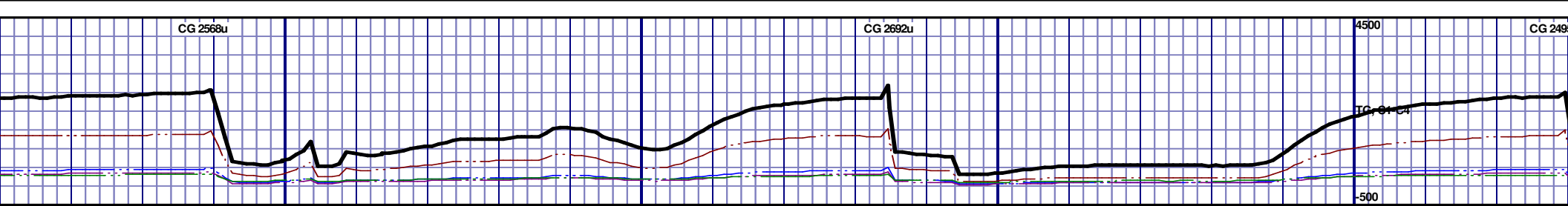
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INC 89.91 AZ 89.29
VS 2366.47

MD 8893 TVD 6590.21
INC 91.02 AZ 89.68
VS 2459.7

MD 8950 TVD 6590.21
INC 91.02 AZ 89.68
VS 2459.7

MD 9000 TVD 6590.21
INC 91.02 AZ 89.68
VS 2459.7





MRLST: 45% MEDDRKGY - DRKGY, BLKY TO
FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK,
TRC FREE BENT, FREE PYR, TT - PP POR, MOD
GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

9250'-9300': MRLST: 45% MEDDRKGY - DRKGY, BLKY TO
SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK,
IMBD CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD
GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

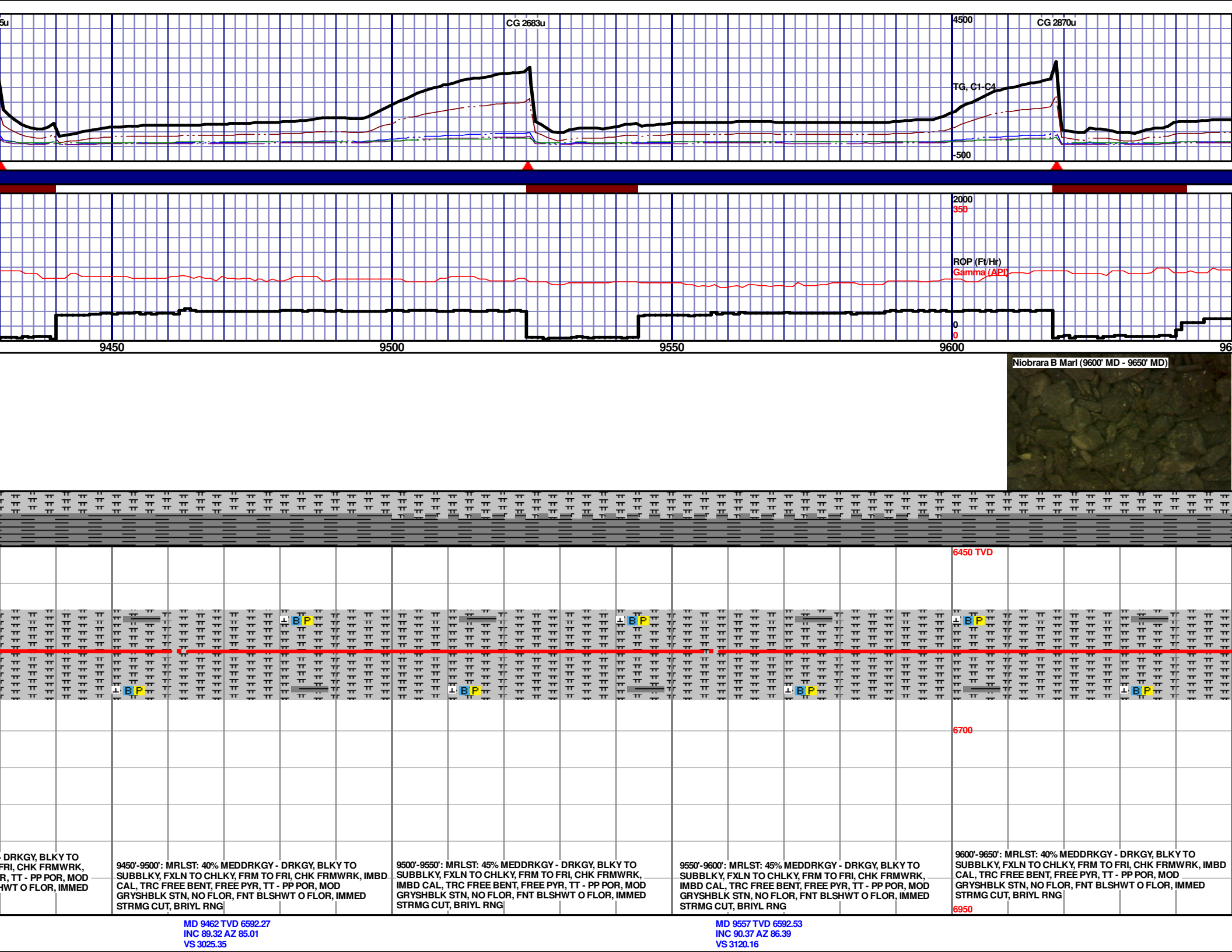
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SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK,
IMBD CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD
GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

9350'-9400': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO
SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK,
IMBD CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD
GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

9400'-9450': MRLST: 40% MEDDRKGY -
SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK,
IMBD CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD
GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

MD 9273 TVD 6590.13
INC 90.06 AZ 85.83
VS 2836.65

MD 9368 TVD 6590.9
INC 89.01 AZ 85.2
VS 2931.48



CG 2683u

CG 2670u

TG, C1-C4

ROP (Ft/Hr)
Gamma (API)

Niobrara B Marl (9600' MD - 9650' MD)

6450 TVD

6700

6950

DRKGY, BLKY TO
FRI, CHK FRMWRK,
R, TT - PP POR, MOD
HWT O FLOR, IMMED

9450'-9500': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO
SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD
CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD
GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

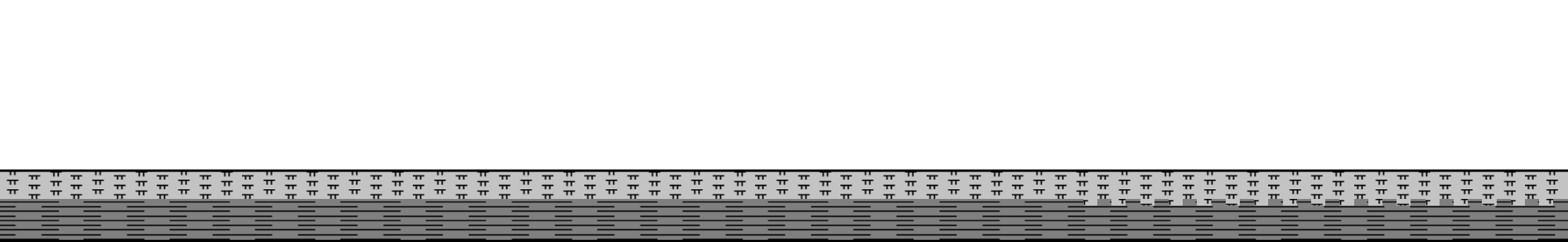
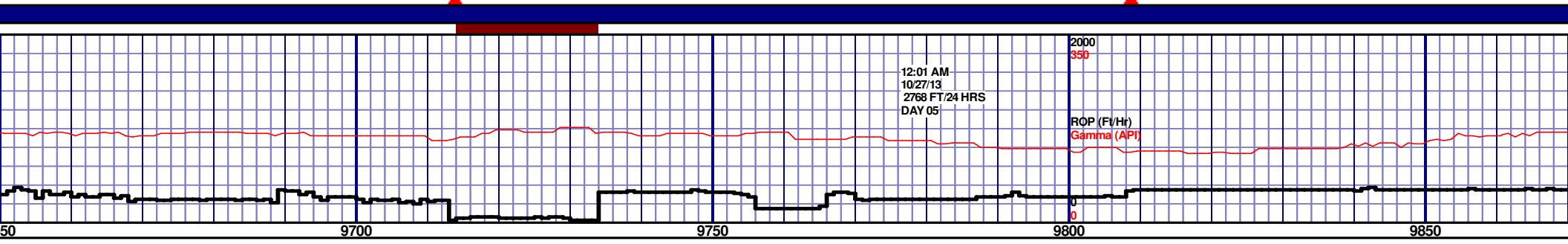
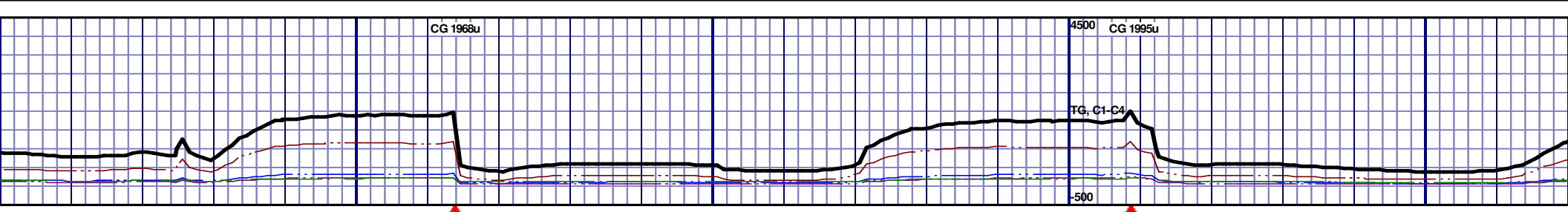
9500'-9550': MRLST: 45% MEDDRKGY - DRKGY, BLKY TO
SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK,
IMBD CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD
GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

9550'-9600': MRLST: 45% MEDDRKGY - DRKGY, BLKY TO
SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK,
IMBD CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD
GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

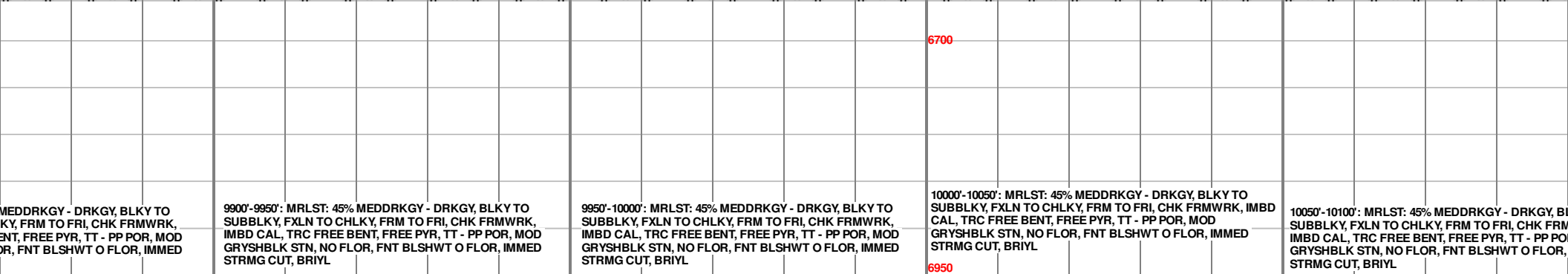
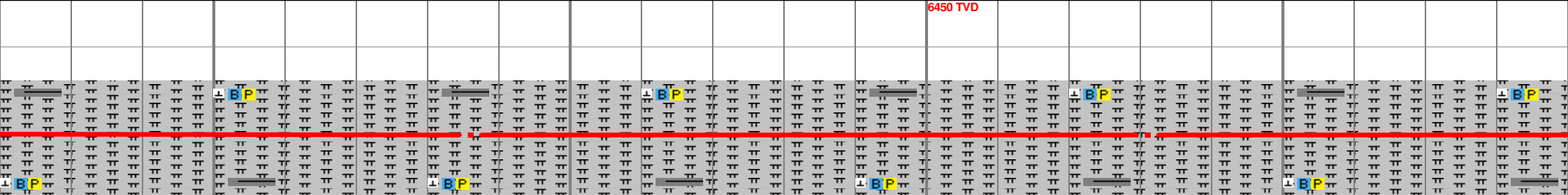
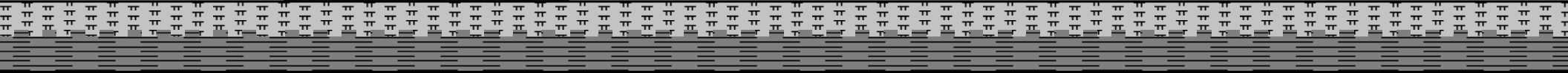
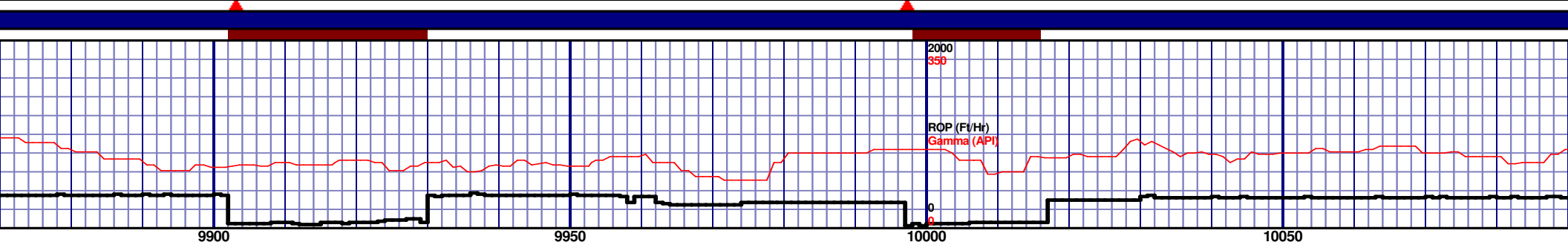
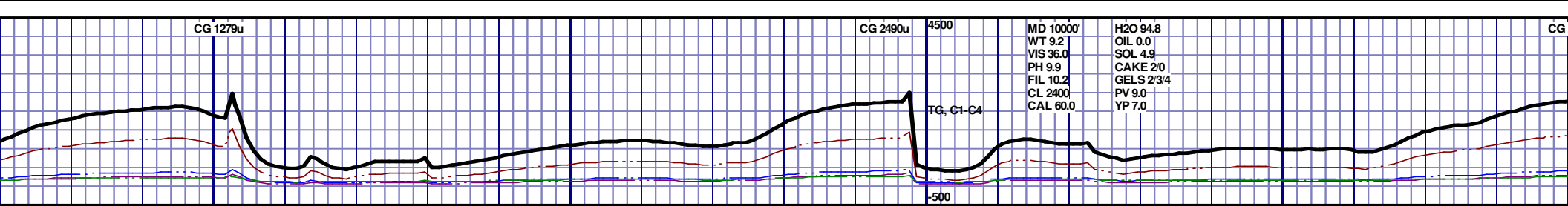
9600'-9650': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO
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CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD
GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

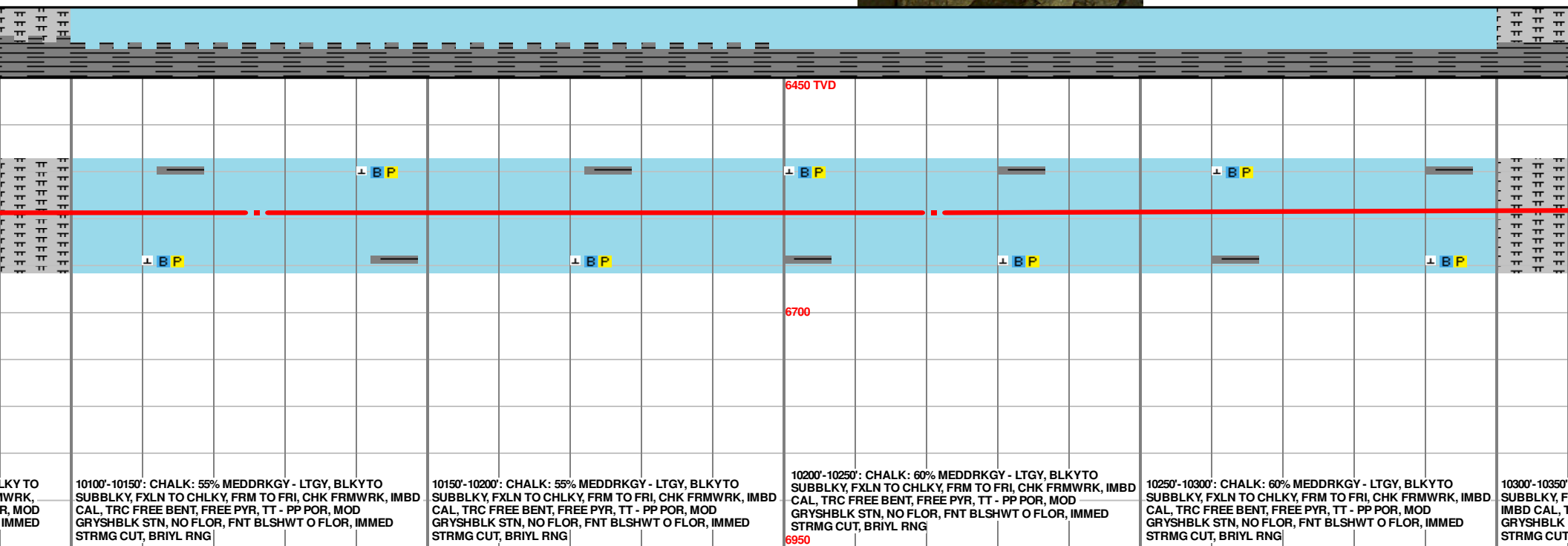
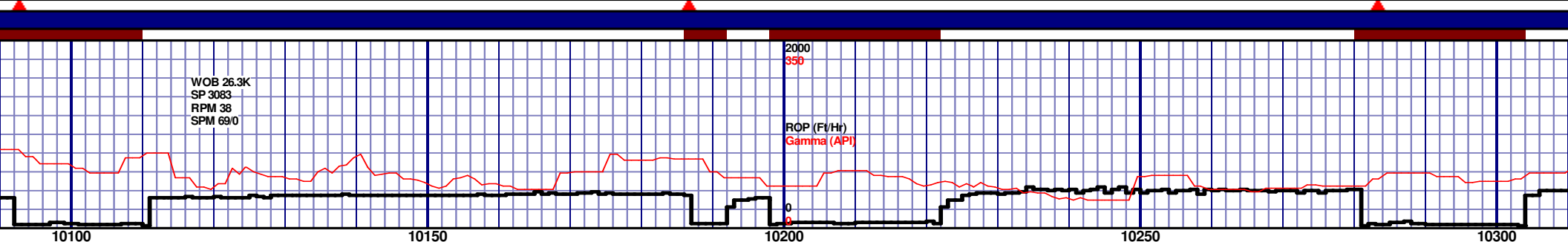
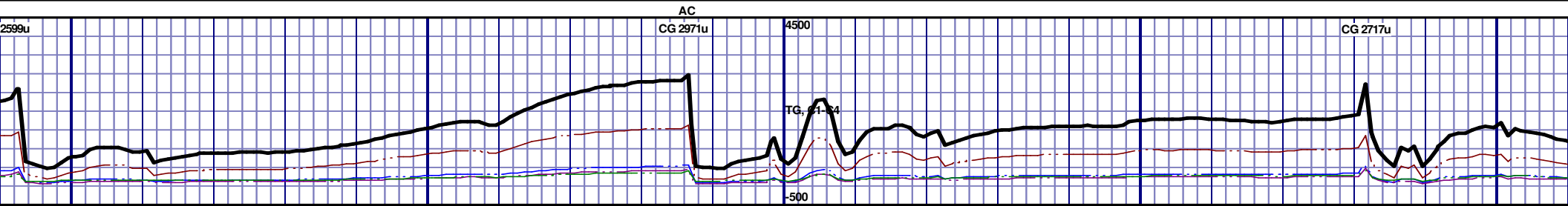
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INC 89.32 AZ 85.01
VS 3025.35

MD 9557 TVD 6592.53
INC 90.37 AZ 86.39
VS 3120.16



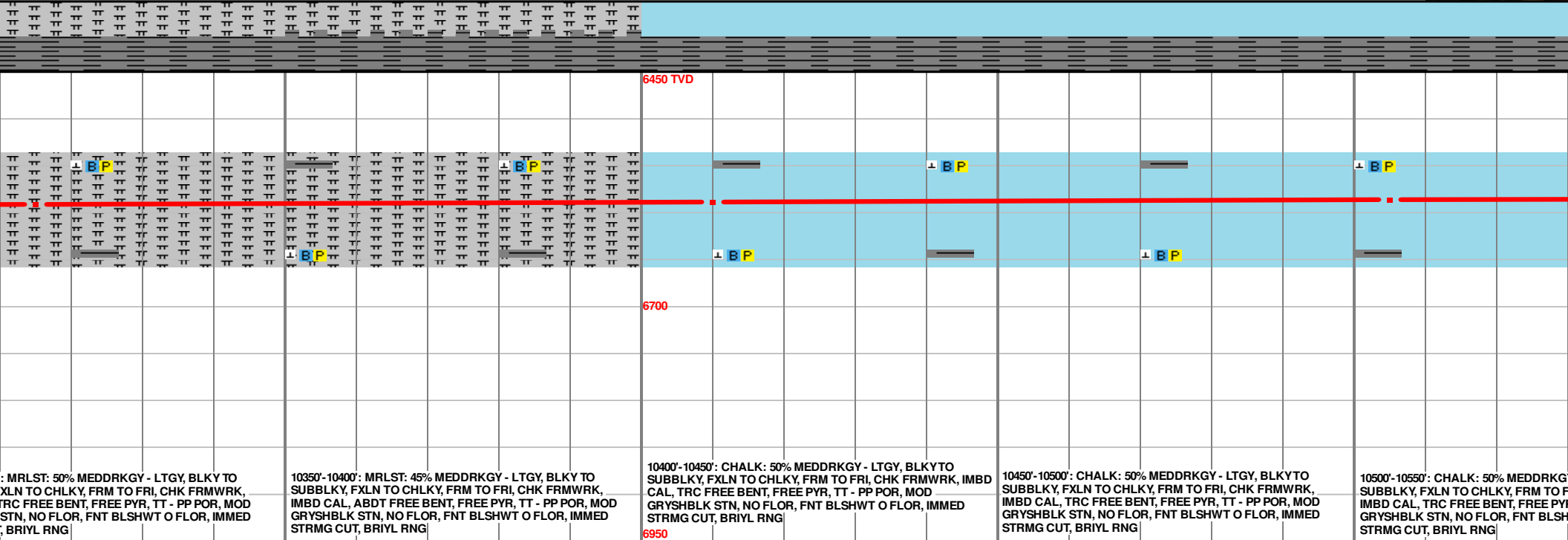
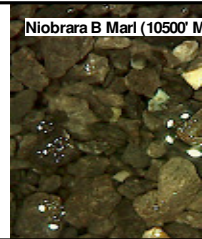
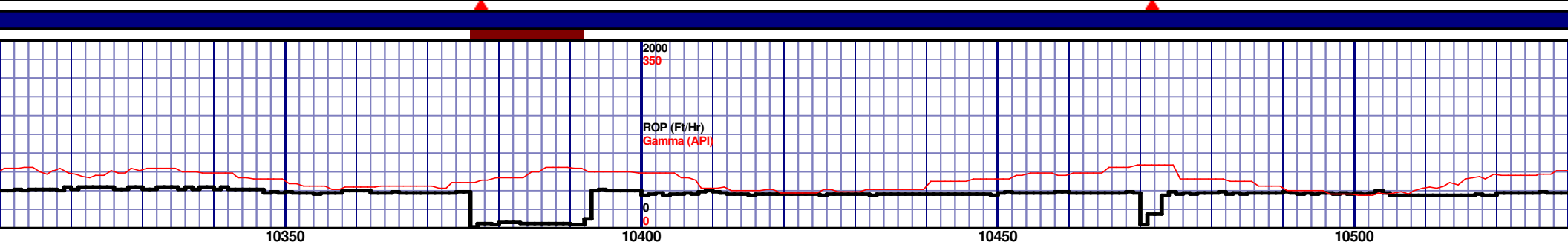
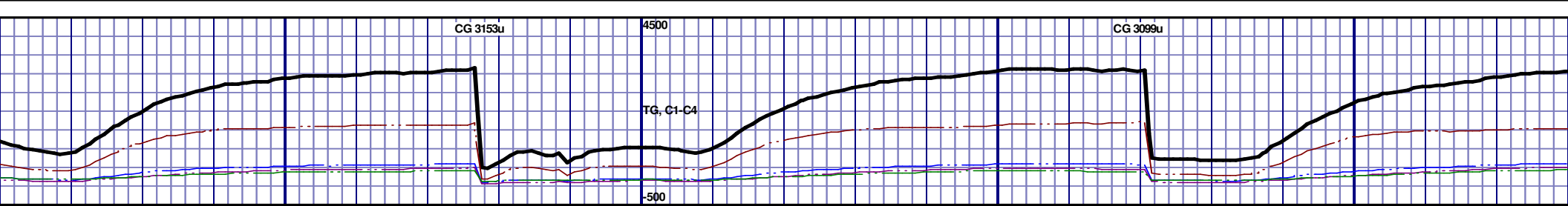
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| 9650'-9700': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD GRYSHLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG | | | | | | | | | | | | | | | | | | | | | | | | |
| 9700'-9750': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD GRYSHLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG | | | | | | | | | | | | | | | | | | | | | | | | |
| 9750'-9800': MRLST: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD GRYSHLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG | | | | | | | | | | | | | | | | | | | | | | | | |
| 9800'-9850': MRLST: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD GRYSHLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL | | | | | | | | | | | | | | | | | | | | | | | | |
| 9850'-9900': MRLST: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, TRC FREE BENT, FREE PYR, TT - PP POR, MOD GRYSHLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL | | | | | | | | | | | | | | | | | | | | | | | | |

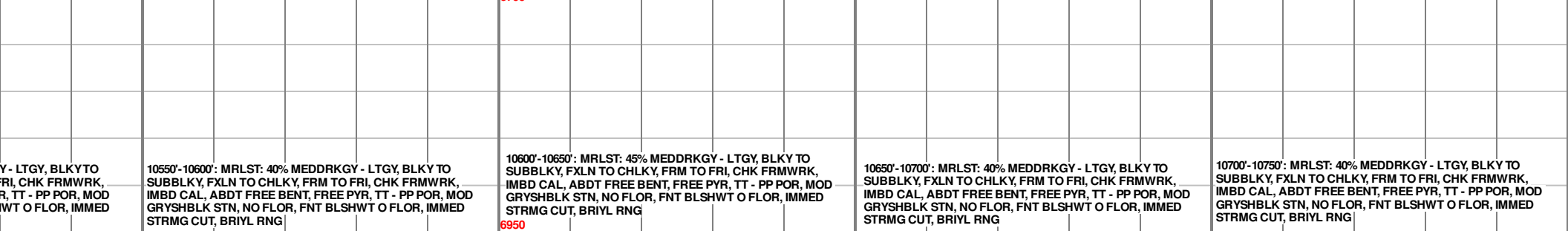
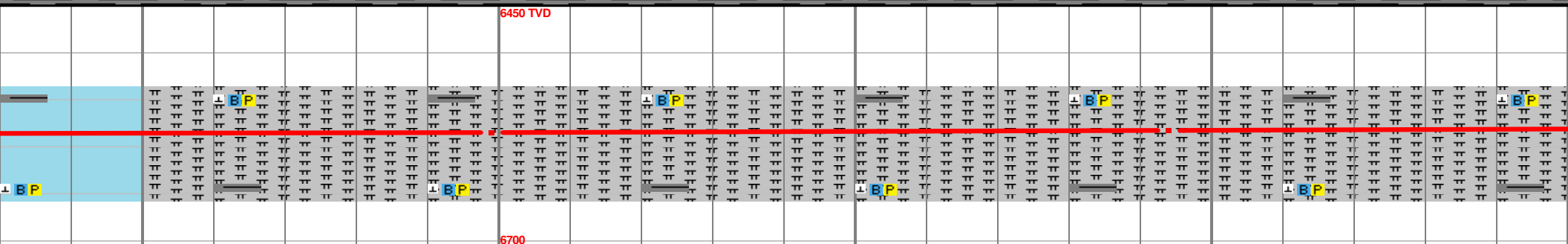
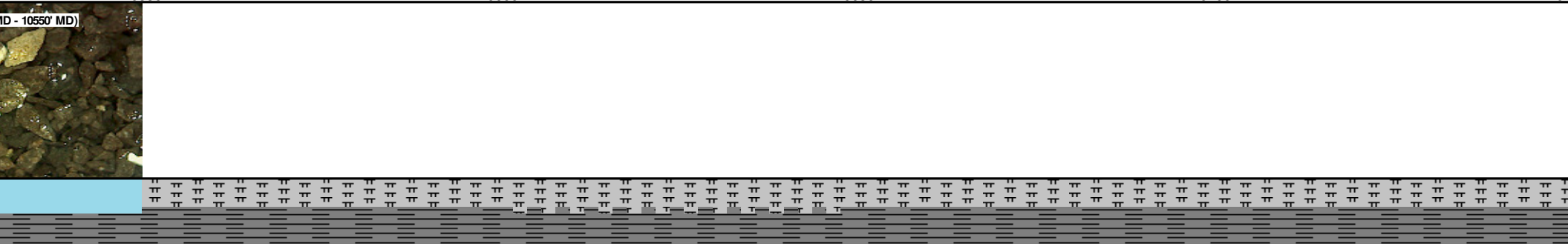
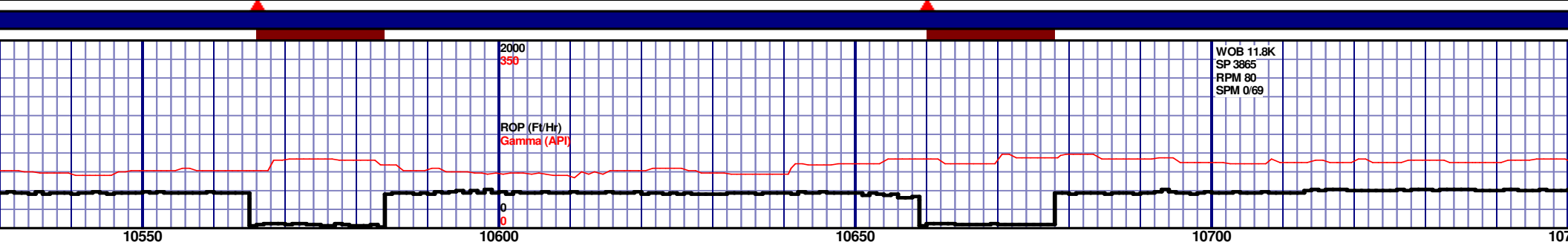
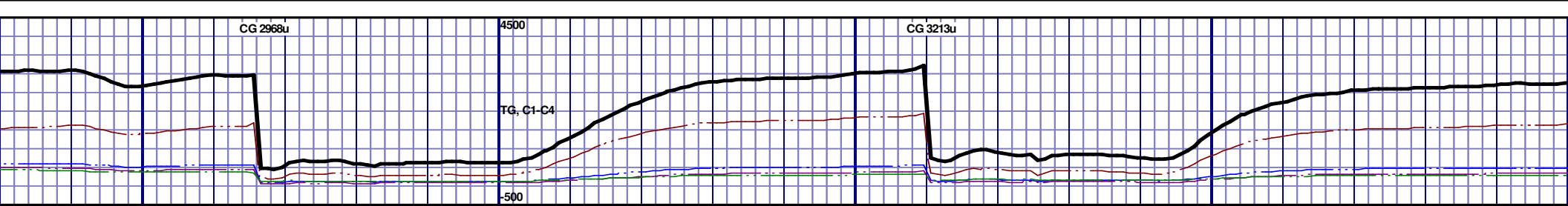




MD 10126 TVD 6593.94
INC 90.09 AZ 89.13
VS 3686.14

MD 10221 TVD 6593.3
INC 90.68 AZ 88.23
VS 3780.51





Y - LTGY, BLKY TO
FRI, CHK FRMWRK,
R, TT - PP POR, MOD
WWT O FLOR, IMMED

10550'-10600': MRLST: 40% MEDDRKGY - LTGY, BLKY TO
SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK,
IMBD CAL, ABDT FREE BENT, FREE PYR, TT - PP POR, MOD
GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

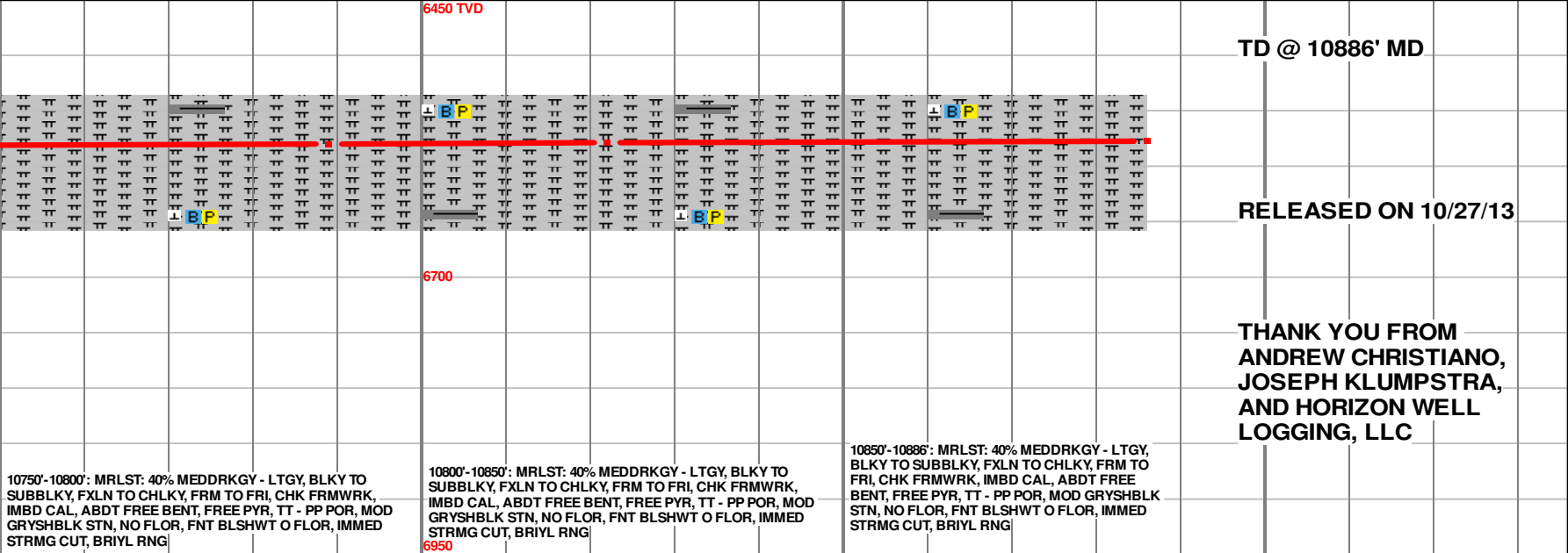
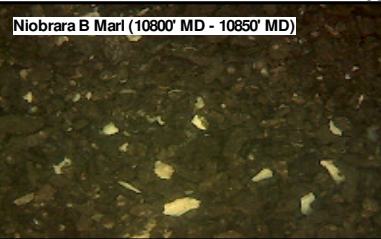
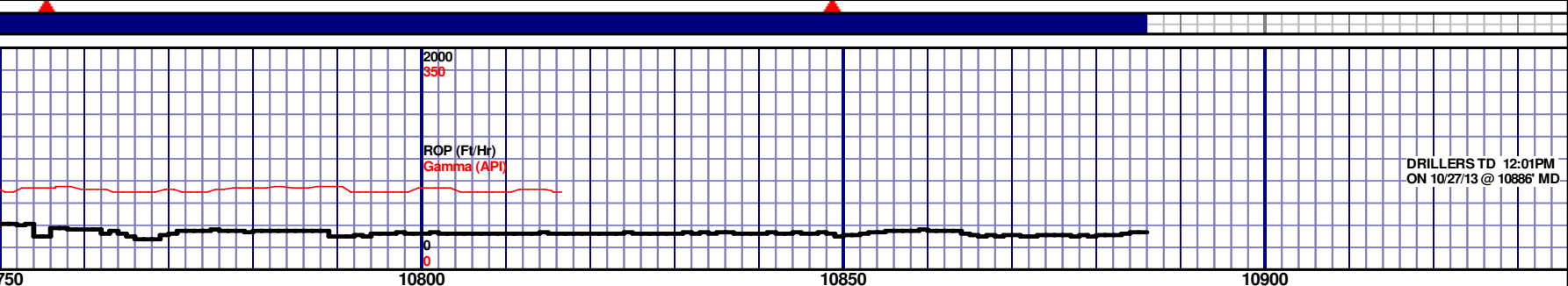
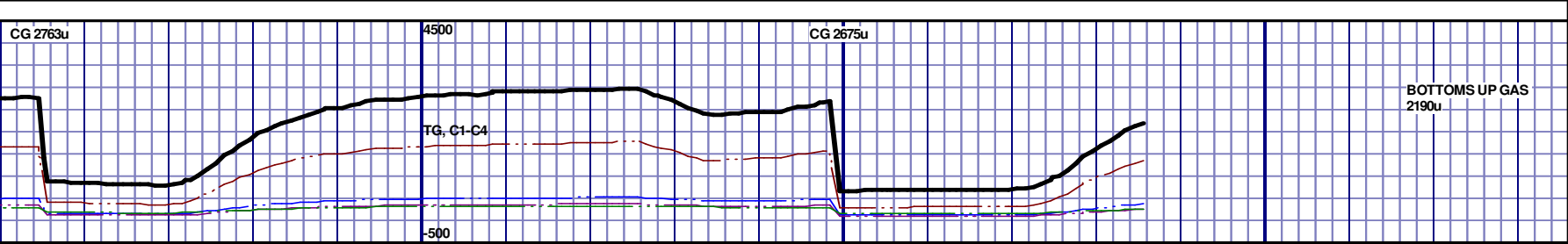
10600'-10650': MRLST: 45% MEDDRKGY - LTGY, BLKY TO
SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK,
IMBD CAL, ABDT FREE BENT, FREE PYR, TT - PP POR, MOD
GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

10650'-10700': MRLST: 40% MEDDRKGY - LTGY, BLKY TO
SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK,
IMBD CAL, ABDT FREE BENT, FREE PYR, TT - PP POR, MOD
GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

10700'-10750': MRLST: 40% MEDDRKGY - LTGY, BLKY TO
SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK,
IMBD CAL, ABDT FREE BENT, FREE PYR, TT - PP POR, MOD
GRYSHBLK STN, NO FLOR, FNT BLSHWT O FLOR, IMMED
STRMG CUT, BRIYL RNG

MD 10599 TVD 6585.28
INC 90.46 AZ 89.94
VS 4155.66

MD 10694 TVD 6583.08
INC 92.19 AZ 88.53
VS 4249.9



THANK YOU FROM
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JOSEPH KLUMPSTRA,
AND HORIZON WELL
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