



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: Andrew Christiano & Hannah Blatchford
Log Interval: 6700' MD to 10976' MD
Start Date: October 01, 2013
Release Date: October 04, 2013

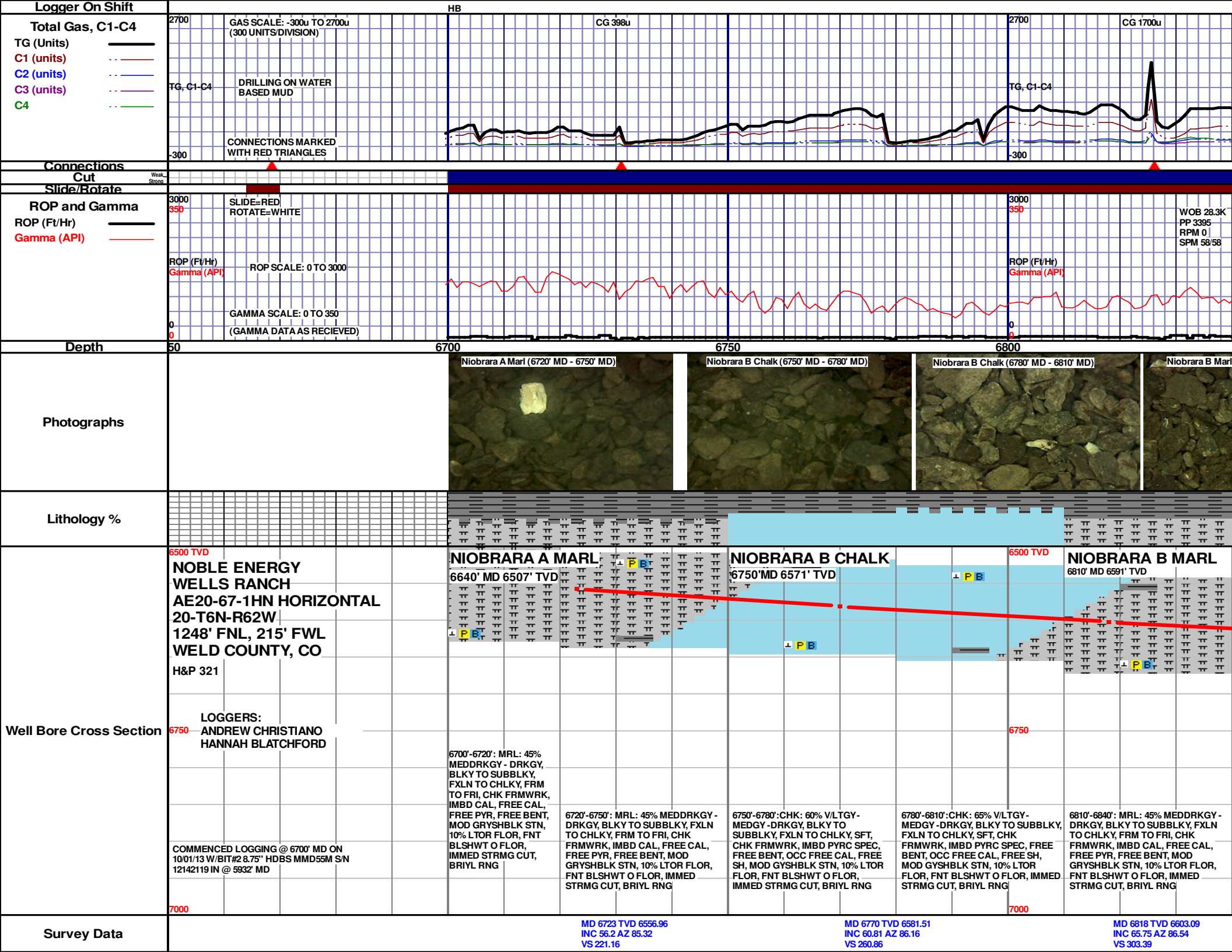
Well Information

Well Name: Wells Ranch
AE20-67-1HN Horizontal

Location: 20-T6N-R62W
1248' FNL, 215' FWL

County: Weld Co.
State: Colorado

Drilling Rig: H&P 321
Total Depth: 10976' MD
TD Date: October 04, 2013
Formation: Niobrara C Chalk
KB Elevation: 4870'
GR Elevation: 4840'
API Number: 05-123-37214-0000



Logger On Shift

Total Gas, C1-C4

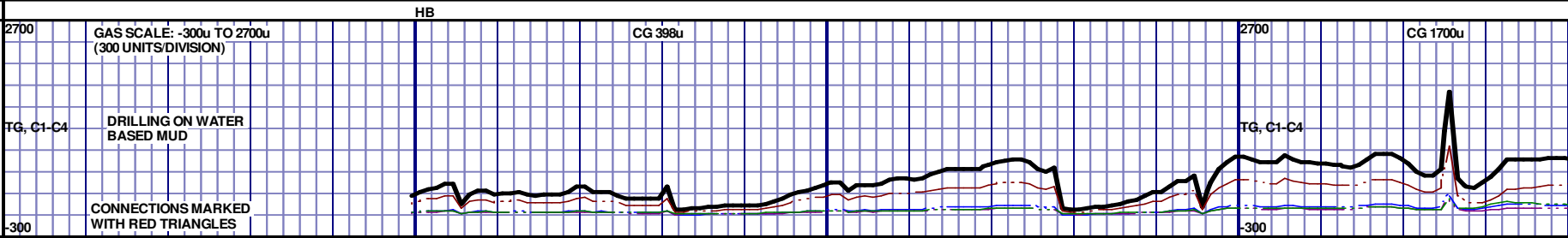
TG (Units) ———

C1 (units) - - - -

C2 (units) - - - -

C3 (units) - - - -

C4 (units) - - - -



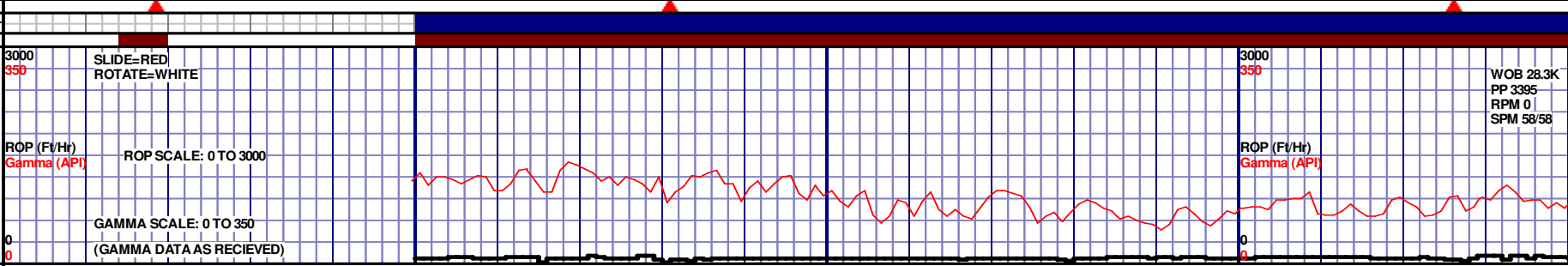
Connections Cut

Slide/Rotate

ROP and Gamma

ROP (Ft/Hr) ———

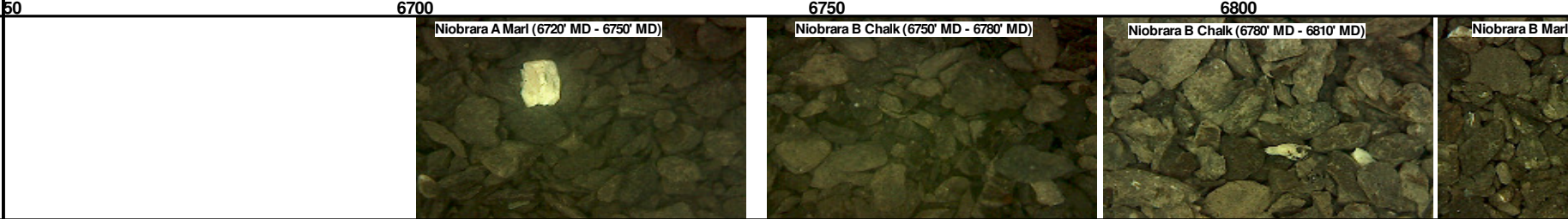
Gamma (API) - - - -



Depth

50

Photographs



Lithology %



Well Bore Cross Section

6500 TVD

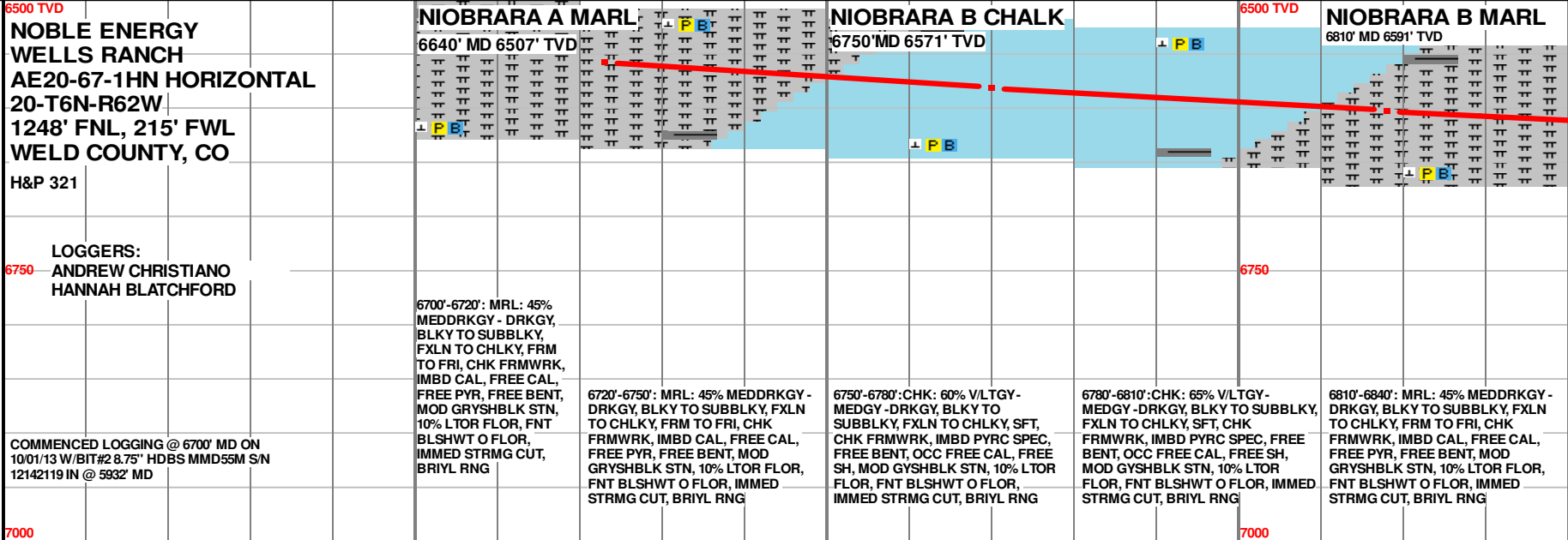
NOBLE ENERGY WELLS RANCH AE20-67-1HN HORIZONTAL 20-T6N-R62W 1248' FNL, 215' FWL WELD COUNTY, CO H&P 321

LOGGERS: ANDREW CHRISTIANO HANNAH BLATCHFORD

6750

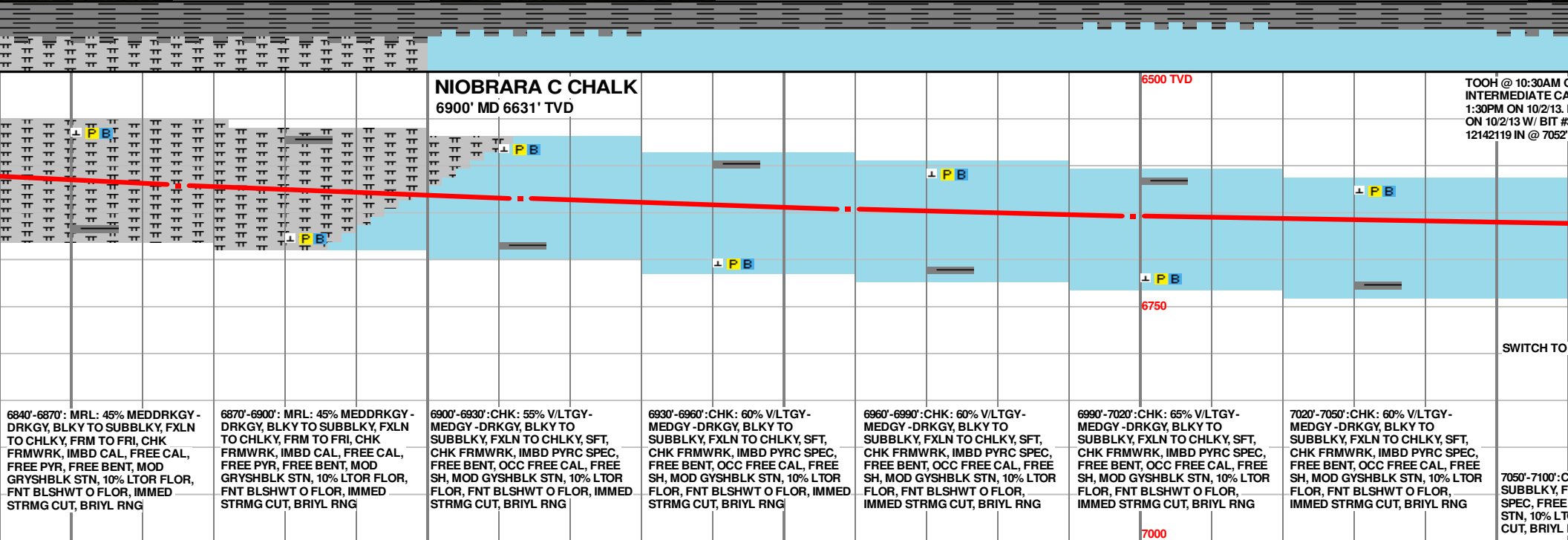
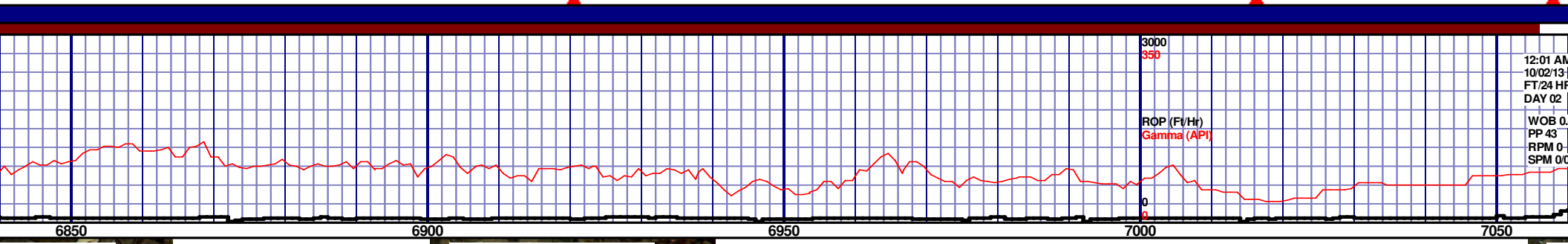
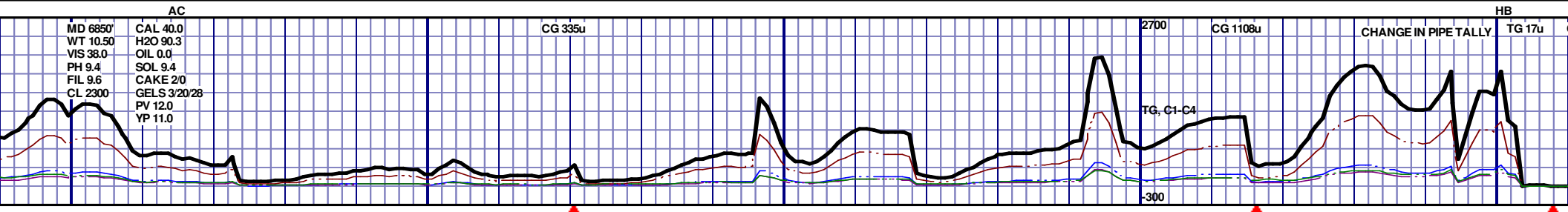
COMMENCED LOGGING @ 6700' MD ON 10/01/13 W/BIT#2 8.75" HDBS MMD55M S/N 12142119 IN @ 5932' MD

7000



Survey Data





MD 6865 TVD 6620.74
 INC 70.14 AZ 87.98
 VS 346.68

MD 6913 TVD 6635.46
 INC 74.12 AZ 90
 VS 392.21

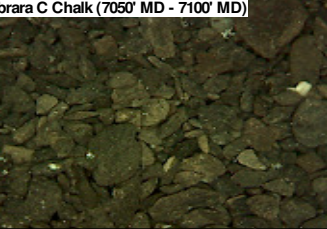
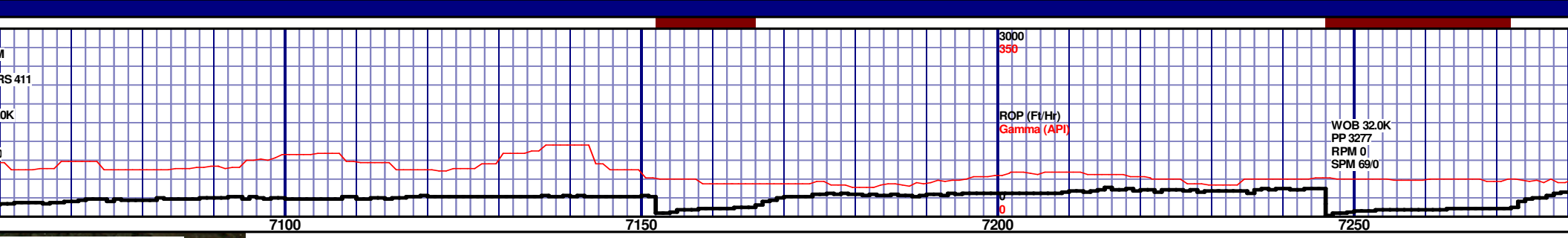
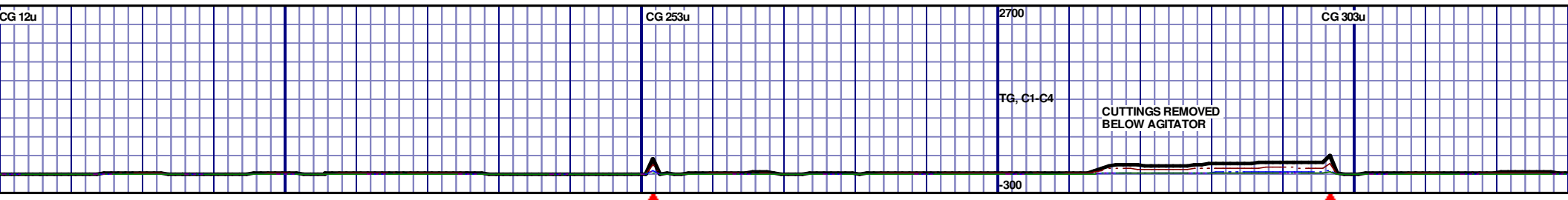
MD 6959 TVD 6646.67
 INC 77.68 AZ 90.18
 VS 436.74

MD 6999 TVD 6654.16
 INC 80.71 AZ 89.73
 VS 475.95

TOOH @ 10:30AM
 INTERMEDIATE CA
 1:30PM ON 10/2/13.
 ON 10/2/13 W/ BIT #
 12142119 IN @ 7052'

SWITCH TO

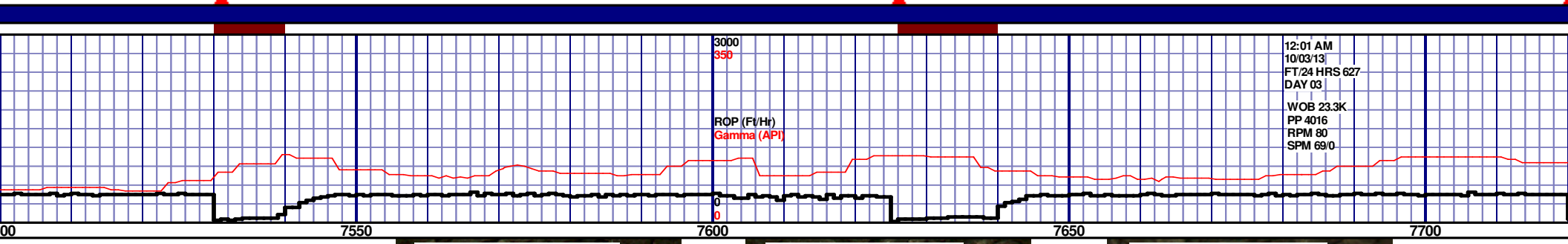
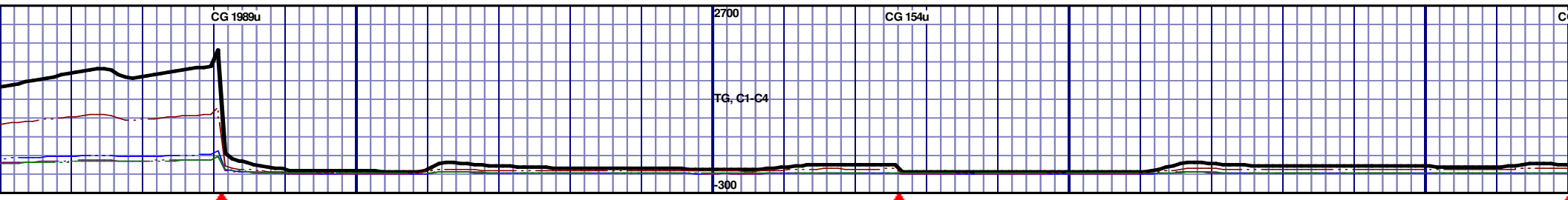
7050'-7100': C
 SUBBLKY, F
 STN, 10% LT
 CUT, BRIYL



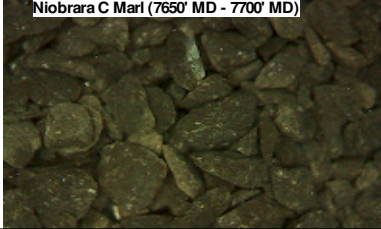
<p>ON 10/1/13 @ 7052' MD FOR SING OPERATIONS. TIH @ RESUMED DRILLING @ 6:45 PM 3.6.125 HDBSMMD55M S/N MD.</p>			<p>6500 TVD</p>	
<p>50' SAMPLE INTERVAL</p>	<p>7100'-7150': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD PYRC BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>7150'-7200': CHK: 60% VLTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>7200'-7250': CHK: 55% VLTGY - MEDGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>7250'-7300': CHK: 60% VLTGY - MEDGY SUBBLKY, FXLN TO CHLKY, SFT, CHK SPEC, OCC FREE CAL, FREE SH, MOD LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>

MD 7089 TVD 6665.13
 INC 85.29 AZ 89.56
 VS 565.06

MD 7184 TVD 6672.07
 INC 86.32 AZ 89.12
 VS 659.55



12:01 AM
 10/03/13
 FT/24 HRS 627
 DAY 03
 WOB 23.3K
 PP 4016
 RPM 80
 SPM 69.0

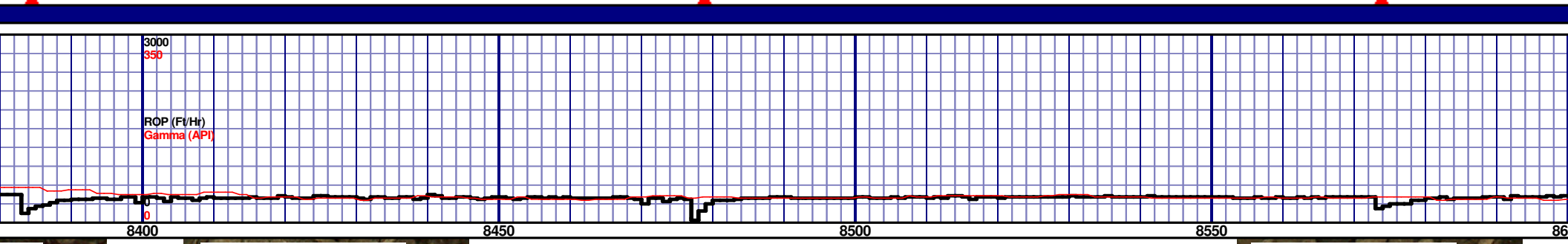
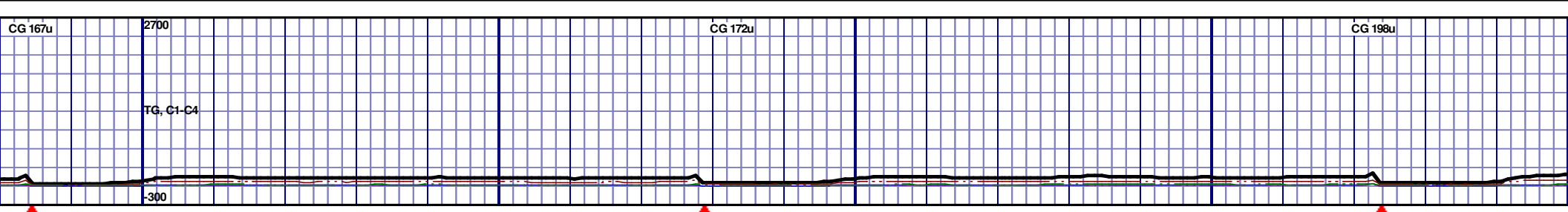


NIOBRARA C MARL
 7594' MD 6672' TVD

<p>7500'-7550':CHK: 60% VLTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>7550'-7600':CHK: 55% VLTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>7600'-7650': MRL: 50% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>7650'-7700': MRL: 50% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>7700'-7750': MRL: 40% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>
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MD 7563 TVD 6671.9
 INC 91.17 AZ 88.25
 VS 1036.55

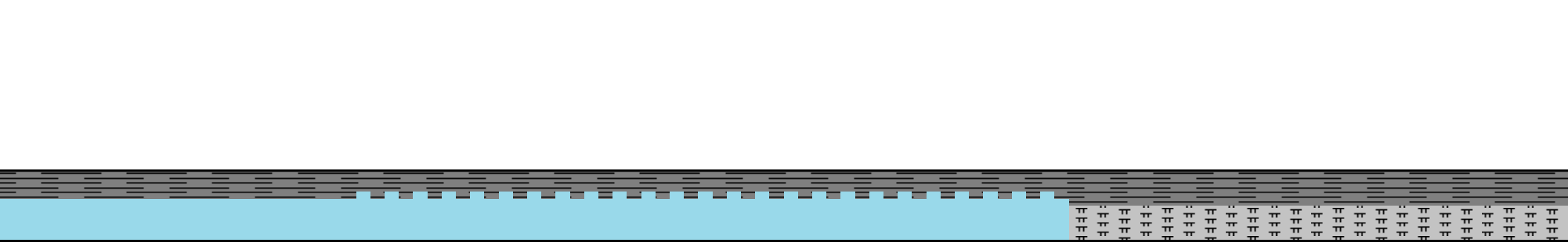
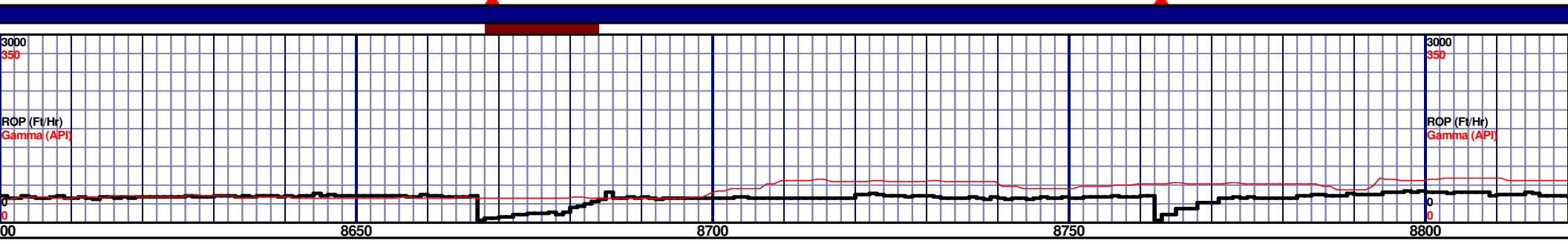
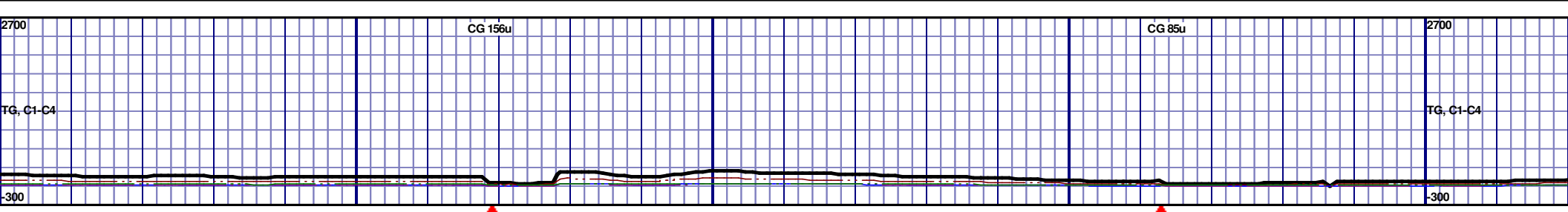
MD 7658 TVD 6670.65
 INC 90.34 AZ 87.5
 VS 1131.08



<p>6500 TVD</p> <p>NIOBRARA C CHALK</p> <p>8400' MD 6673' TVD</p>											
<p>6750</p>											
<p>7000</p>											
<p>8400'-8450':CHK: 55% VLTGY- 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</p>			<p>8450'-8500':CHK: 60% VLTGY- 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</p>			<p>8500'-8550':CHK: 60% VLTGY- 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</p>			<p>8550'-8600':CHK: 55% VLTGY- 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</p>		

MD 8416 TVD 6673.64
 INC 89.2 AZ 88.27
 VS 1885.49

MD 8511 TVD 6674.05
 INC 90.31 AZ 88.39
 VS 1980.1

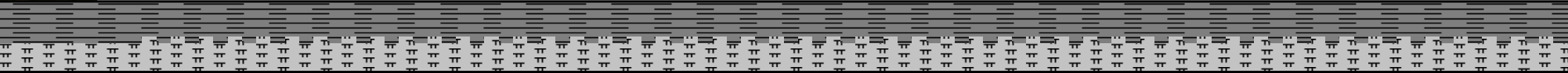
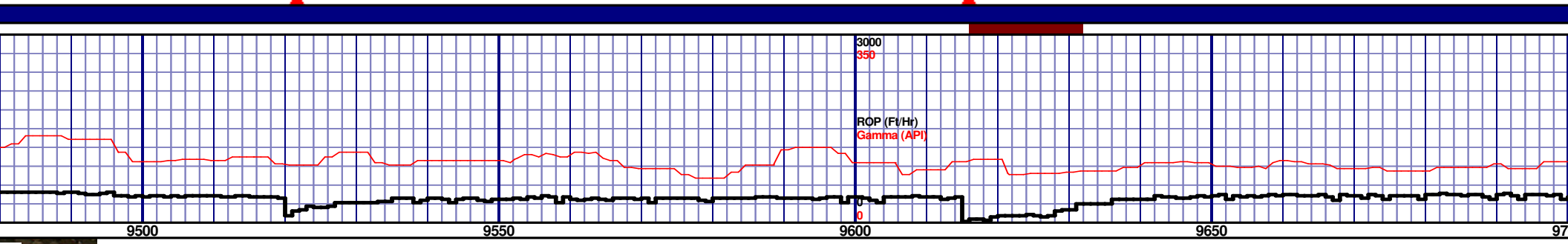
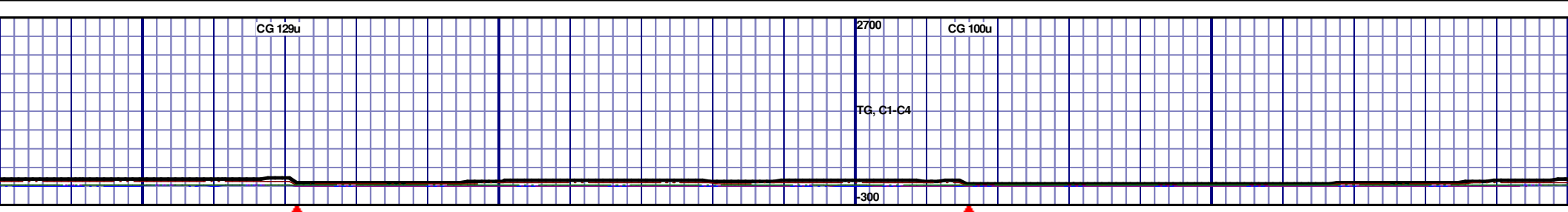


<p>6500 TVD</p> <p>6750</p> <p>8600'-8650':CHK: 60% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>8650'-8700':CHK: 65% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>8700'-8750':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, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>8750'-8800': MRL: 50% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>8800'-8850': MRL: 50% ME SUBBLKY, FXLN TO CHLKY, IMBD CAL, FREE CAL, TRC GRYSHBLK STN, 10% LTOR IMMED STRMG CUT, BRIYL RNG</p> <p>7000</p>
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MD 8606 TVD 6673.08
 INC 90.86 AZ 88.9
 VS 2074.76

MD 8701 TVD 6672.95
 INC 89.29 AZ 87.99
 VS 2169.39

MD 8795 TVD 6674.24
 INC 89.14 AZ 87.82
 VS 2262.93



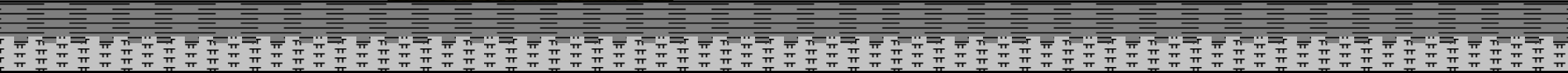
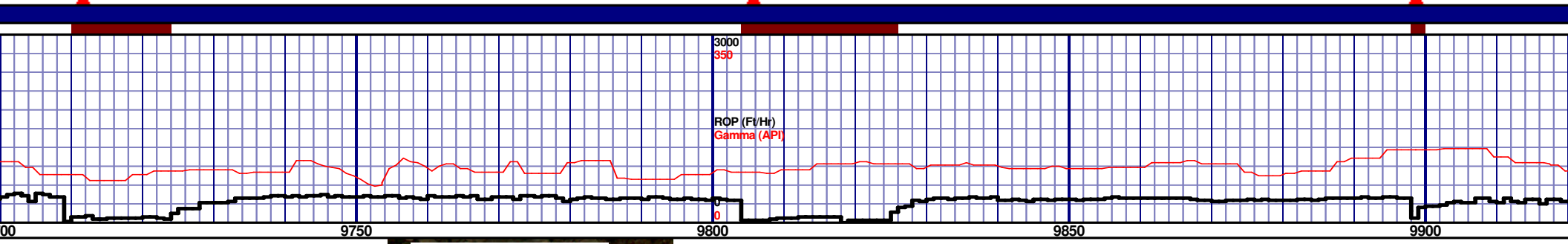
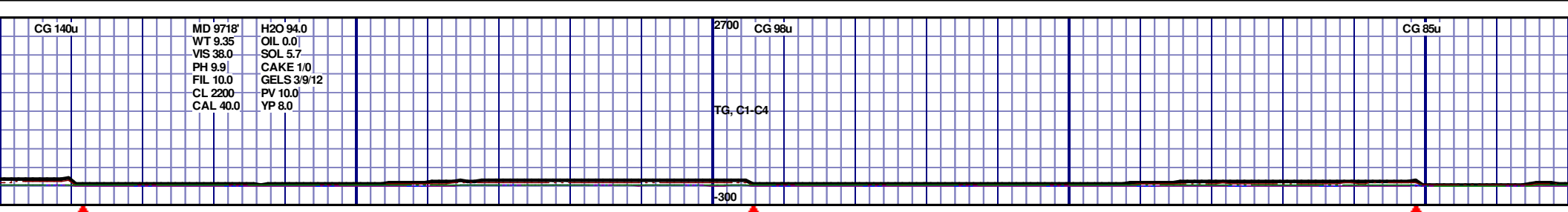
			6500 TVD	
<p>DRKGY, BLKY TO SUBBLKY, FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT,</p>	<p>9500'-9550': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>9550'-9600': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>9600'-9650': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>9650'-9700': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>

MD 9554 TVD 6679.06
 INC 89.11AZ 87.88
 VS 3018.48

MD 9649 TVD 6680.13
 INC 89.6 AZ 88.31
 VS 3113.05

6750

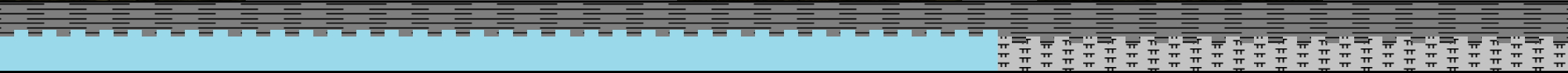
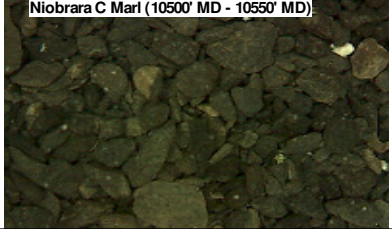
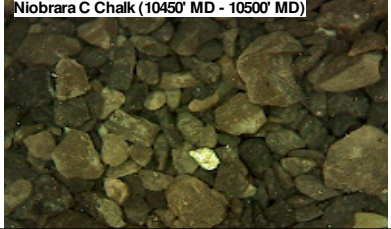
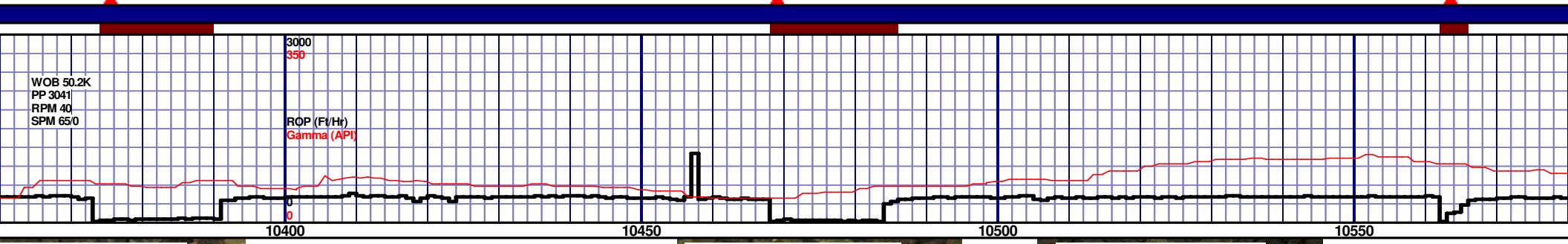
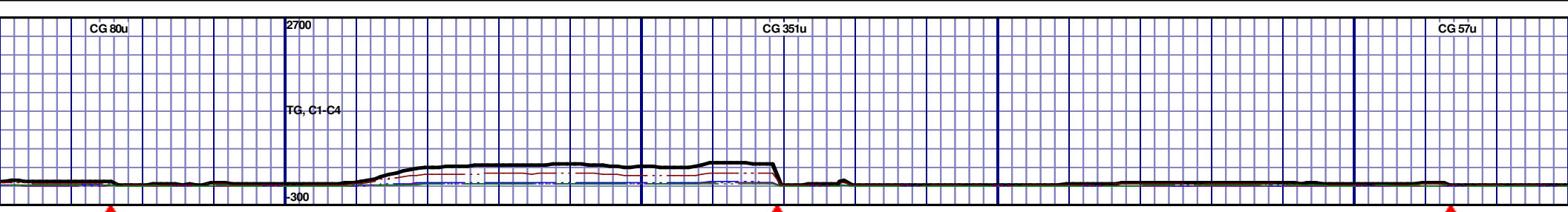
7000



		6500 TVD		
<p>9700'-9750': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>9750'-9800': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	6750	<p>9800'-9850': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>9850'-9900': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>

MD 9744 TVD 6680.9
 INC 89.48 AZ 89.65
 VS 3207.75

MD 9838 TVD 6680.02
 INC 91.6 AZ 89.68
 VS 3301.53



<p>6500 TVD</p>	<p>10400'-10450':CHK: 55% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>10450'-10500':CHK: 55% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>NIORRARA C MARL 10512' MD 6678' TVD</p>	<p>10550'-10600': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>
<p>7000</p>	<p>10400'-10450':CHK: 55% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>10450'-10500':CHK: 55% V/LTGY- MEDGY-DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT, CHK FRMWRK, IMBD PYRC SPEC, TRC FREE BENT, OCC FREE CAL, FREE SH, MOD GYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>10500'-10550': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>	<p>10550'-10600': MRL: 45% MEDDRKGY - DRKGY, BLKY TO SUBBLKY, FXLN TO CHLKY, FRM TO FRI, CHK FRMWRK, IMBD CAL, FREE CAL, TRC FREE BENT, TRC IMBD PYR, MOD GRYSHBLK STN, 10% LTOR FLOR, FNT BLSHWT O FLOR, IMMED STRMG CUT, BRIYL RNG</p>

MD 10407 TVD 6678.79
INC 89.48 AZ 89.53
VS 3868.09

MD 10502 TVD 6678.36
INC 91.05 AZ 90.66
VS 3962.92

