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[WWW.HZMUD.COM/25](http://WWW.HZMUD.COM/25)

### Customer Information

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

**Geologist:** Renee Clackler  
Noble Energy Inc.

### Mud Logging Details

**Logger:** Ross Apodaca &  
Dan King  
**Log Interval:** 6450' MD to 11873' MD  
**Start Date:** May 20, 2014  
**Release Date:** May 23, 2014

### Well Information

**Well Name:** Wells Ranch  
AE30-63-1AHNA HZ

**Location:** 29-6N-62W  
1010' FSL, 65' FWL

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

**Drilling Rig:** H&P 277  
**Total Depth:** 11873' MD  
**TD Date:** May 23, 2014  
**Formation:** Niobrara A Marl  
**KB Elevation:** 4776'  
**GR Elevation:** 4752'  
**API Number:** 05-123-38690-0000

**Total Gas, C1-C4**

(Units) —————

(units) . . . . .

(units) . . . . .

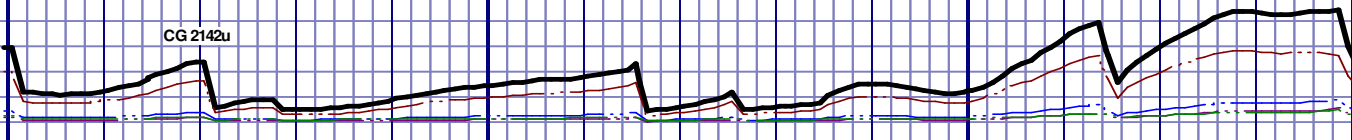
(units) . . . . .

          . . . . .

8100	GAS SCALE: -900u TO 8100u (900 UNITS/DIVISION)
	DRILLING ON WATER BASED MUD
TG, C1-C4	
	CONNECTIONS MARKED WITH RED TRIANGLES
-900	

DEPTH 6442'	CL 1600	GELS 6/11/17
WT 10.50	CAL 80	PV 18
VIS 50	H2O 89.2	YP 18
PH 9.6	OIL 0.0	CK 1/0
FIL 6.4	LGS 44.46	SOL 10.5

CG 3535u



## Connections

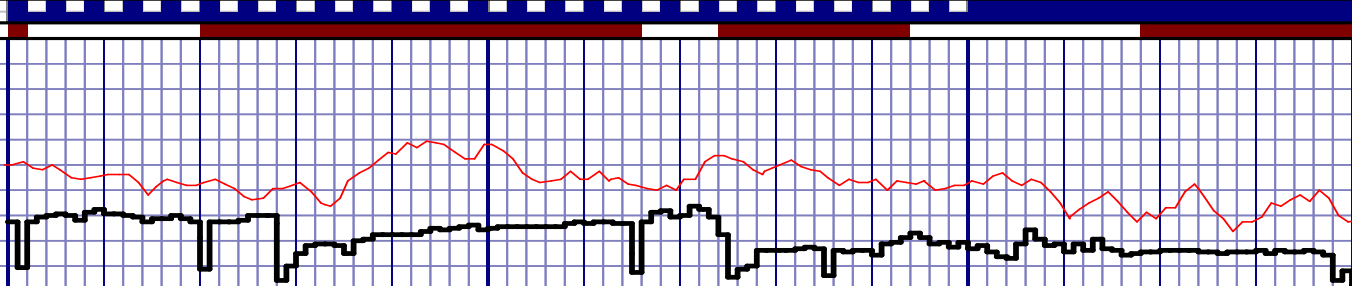
Cut	Slide/Rotate
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**ROP and Gamma**

ROP (Ft/Hr) \_\_\_\_\_

Gamma (API) \_\_\_\_\_

900	SLIDE=RED	WOB 36.0K
200	ROTATE=WHITE	PP 3310
		RPM 0
		SPM 55/55
ROP (Ft/Hr)	ROP SCALE: 0 TO 900	
Gamma (API)		
	GAMMA SCALE: 0 TO 200	
	(GAMMA DATA AS RECEIVED)	



## Depth

00

## Photographs



Lithology %

6250 TVD  
NOBLE ENERGY INC  
WELLS RANCH  
AE30-63-1AHNA HZ  
29-6N-62W  
1010' FSL, 65' FWL  
WELD CO., CO

H&amp;P 277

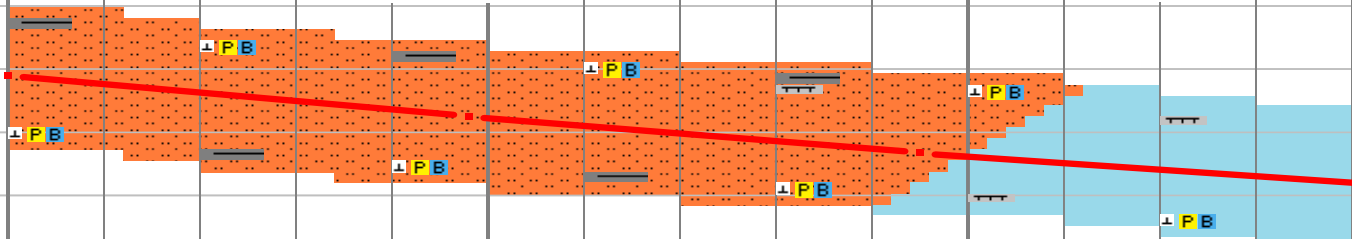
LOGGERS:  
ROSS APODACA  
DAN KING

COMMENCED LOGGING @ 6450' MD ON  
5/20/2014 @ 2:15 PM W/ BIT #3, 8.75", SMITH SD1513,  
(S/N) JJ1254 IN @ 5795' MD.

**TEEPEE BUTTES**  
5663' MD 5647' TVD

**SHARON SPRINGS**  
6489' MD 6355' TVD

**NIOBRARA A CHALK**  
6561' MD 6390' TVD



6460' - 6490': SLTST: 65% LTGY -MEDLTGY, FRI, FN  
TO MED GRN, WSRTD, CALC CMT, IMBD PYR,  
FREE SH, FREE BENT, INTG POR, NO STN, NO MIN  
FLOR. BLUE STRM CUT. YLW RNG

6490'- 6520': SLTST: 70% LTGY  
-MEDLTGY, FRI, FN TO MED GRN,  
WSRTD, CALC CMT, IMBD PYR, FREE  
SH, FREE BENT, INTG POR, NO STN,  
NO MIN FLOR, BLUE STRM CUT, YLW  
RNG

6520'- 6550': SLTST: 60% LTGY  
-MEDLTGY, FRI, FN TO MED GRN,  
WSRTD, CALC CMT, IMBD PYR,  
FREE MARL, TRC FREE SH, FREE  
BENT, INTG POR, NO STN, NO MIN  
FLOR, IMMED BLUE STRM CUT,  
YLW RNG

6550'-6580': CHK: 80% (CaCO3 70%)  
 PRED LTGY- MEDGY- TR GYSHBLK,  
 BLKY TO SUBBLKY, FXLN TO CHLKY,  
 SFT TO FRM, IMBD CALC, SCAT  
 FREE PYR, TRC FREE BENT, 20%  
 FREE MARL, MOD GYSHBLK STN,  
 10% MIN FLOR, IMMED BLUE STRM  
 CUT. YLW RING

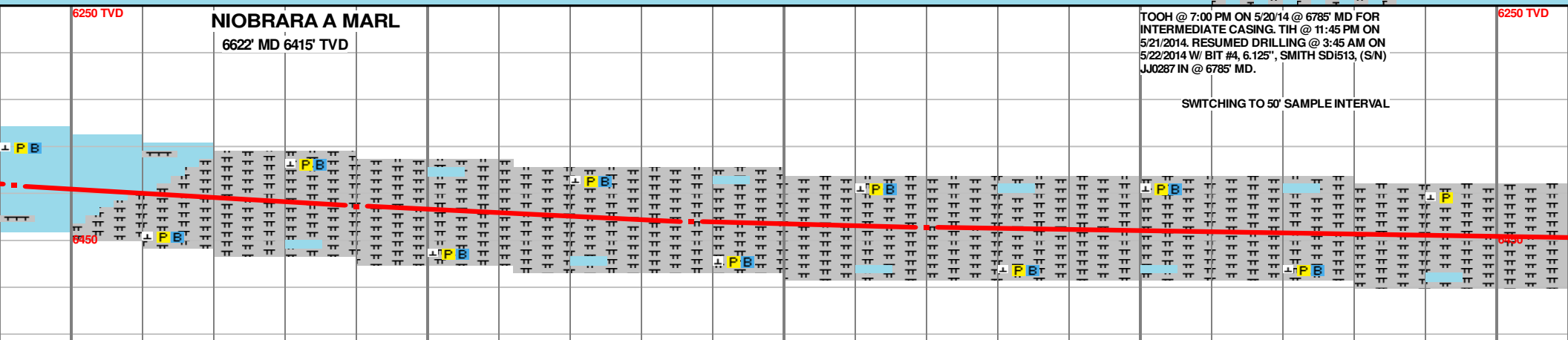
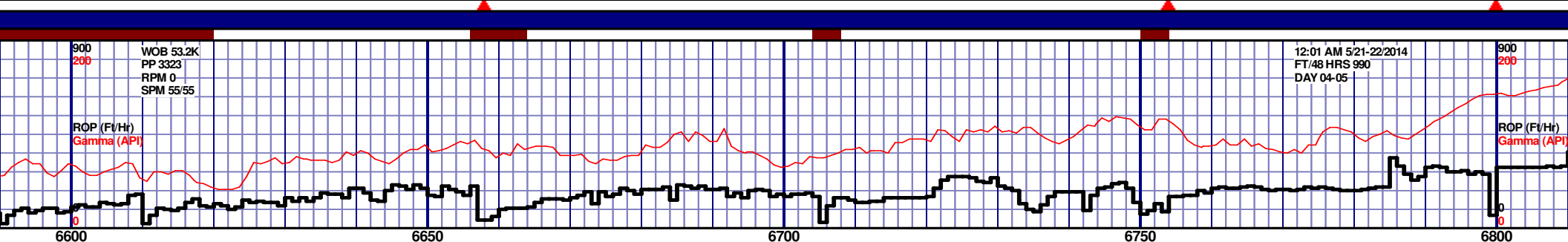
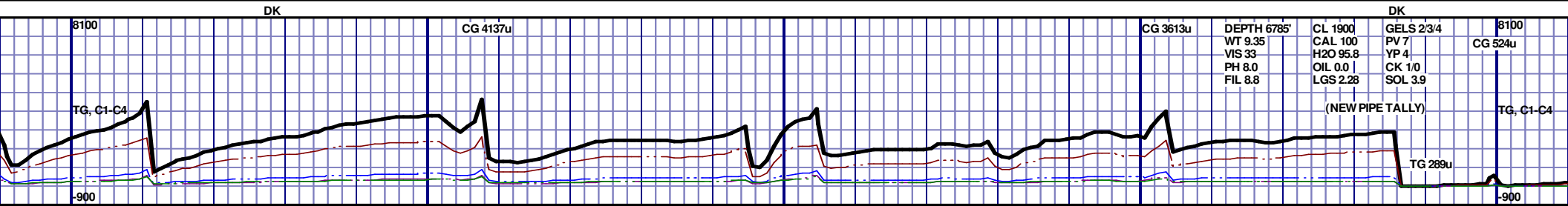
6580'-6610': C  
PRED LTGY.  
BLKY TO SU  
CHLKY, SFT  
SCAT FREE  
15% FREE M  
STN, 10% MI  
STRM CUT, Y

## Survey Data

MD 6450 TVD 6333.78  
INC 55.31 AZ 272.59  
VS 407.02

MD 6498 TVD 6359.87  
INC 58.83 AZ 270.83  
VS 447.27

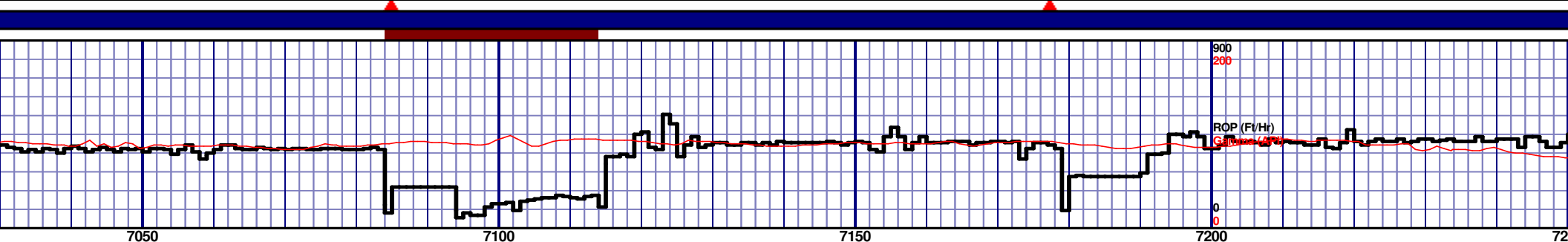
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VS 488.29

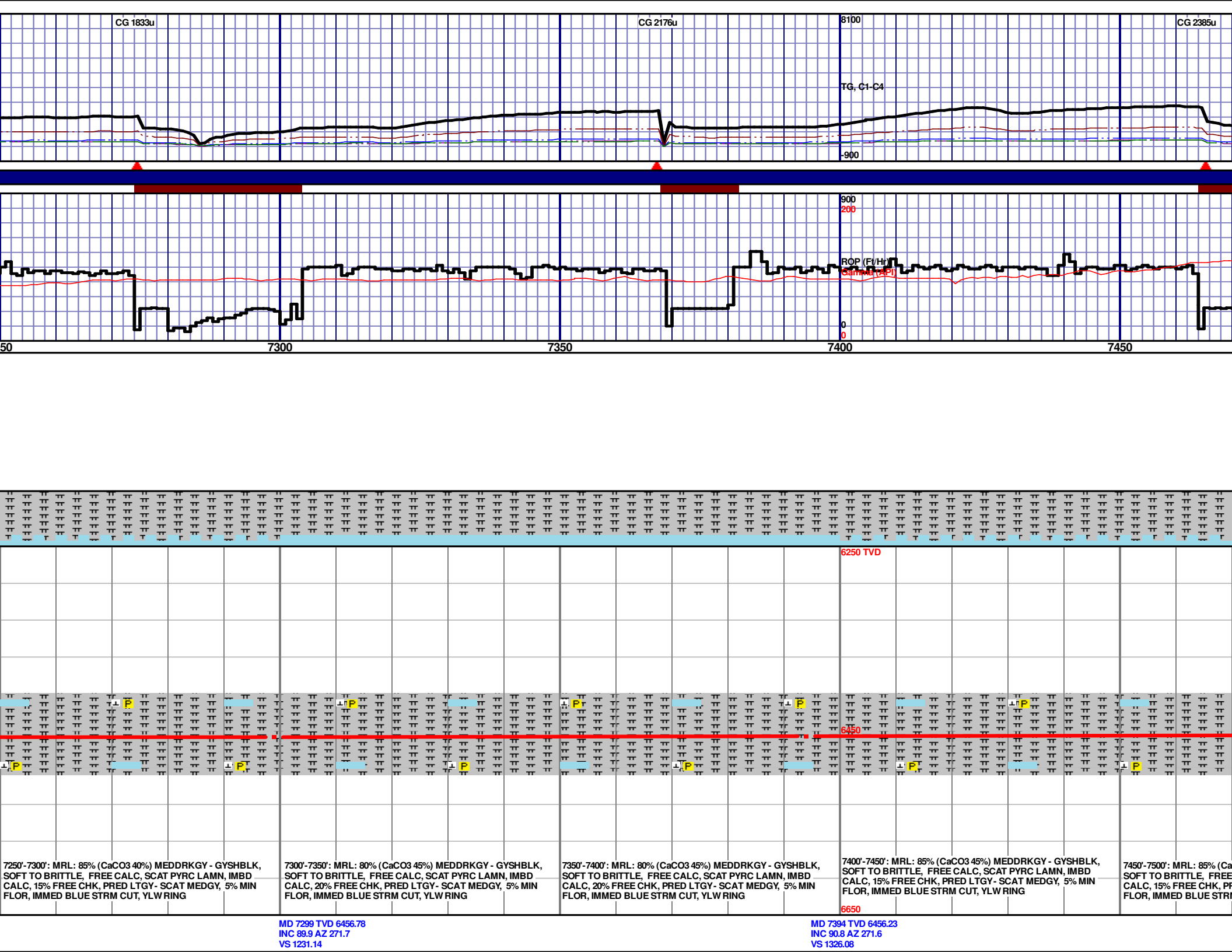


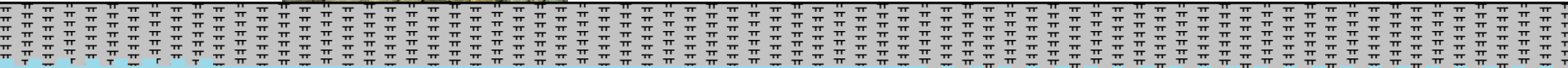
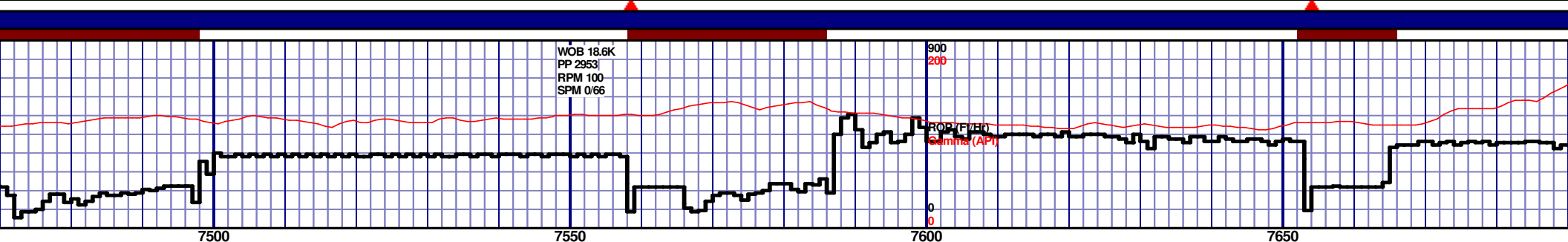
CHK: 85% (CaCO3 75%) MEDGY - TR GYSHBLK, IMBD BLK, FXLN TO TO FRM, IMBD CALC, PYR, TRC FREE BENT, ARL, MOD GYSHBLK N FLOR, IMMED BLUE YLWRING	6610'-6640': MRL: 65% (CaCO3 50%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, FREE BENT, 15% FREE CHK, PRED LTGY - SCAT MEDGY, 10% MIN FLOR, IMMED BLUE STRM CUT, YLW RING	6640'-6670': MRL: 85% (CaCO3 45%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, FREE BENT, 15% FREE CHK, PRED LTGY - SCAT MEDGY, 10% MIN FLOR, IMMED BLUE STRM CUT, YLW RING	6670'-6700': MRL: 90% (CaCO3 40%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, FREE BENT, 10% FREE CHK, PRED LTGY - SCAT MEDGY, 10% MIN FLOR, IMMED BLUE STRM CUT, YLW RING	6700'-6730': MRL: 90% (CaCO3 45%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, FREE BENT, 10% FREE CHK, PRED LTGY - SCAT MEDGY, 10% MIN FLOR, IMMED BLUE STRM CUT, YLW RING	6730'-6760': MRL: 90% (CaCO3 45%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, FREE BENT, 10% FREE CHK, PRED LTGY - SCAT MEDGY, 10% MIN FLOR, IMMED BLUE STRM CUT, YLW RING	6760'-6785': MRL: 95% (CaCO3 40%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, FREE BENT, 5% FREE CHK, PRED LTGY - SCAT MEDGY, 10% MIN FLOR, IMMED BLUE STRM CUT, YLW RING	6785'-6850': MRL: 90% (CaCO3 40%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, FREE BENT, 5% FREE CHK, PRED LTGY - SCAT MEDGY, 10% MIN FLOR, IMMED BLUE STRM CUT, YLW RING
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<p>6500'-6550': MRL: 95% (CaCO3 40%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, 5% FREE CHK, PRED LTGY - SCAT MEDGY, 5% MIN FLOR, IMMED BLUE STRM CUT, YLW RING</p>	<p>6550'-6600': MRL: 85% (CaCO3 50%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, 15% FREE CHK, PRED LTGY - SCAT MEDGY, 5% MIN FLOR, IMMED BLUE STRM CUT, YLW RING</p>	<p>6600'-6650': MRL: 95% (CaCO3 40%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, 5% FREE CHK, PRED LTGY - SCAT MEDGY, 5% MIN FLOR, IMMED BLUE STRM CUT, YLW RING</p>	<p>6650'-7000': MRL: 80% (CaCO3 40%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, 20% FREE CHK, PRED LTGY - SCAT MEDGY, 5% MIN FLOR, IMMED BLUE STRM CUT, YLW RING</p>	<p>7000'-7050': MRL: 80% (CaCO3 40%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, 20% FREE CHK, PRED LTGY - SCAT MEDGY, 5% MIN FLOR, IMMED BLUE STRM CUT, YLW RING</p>
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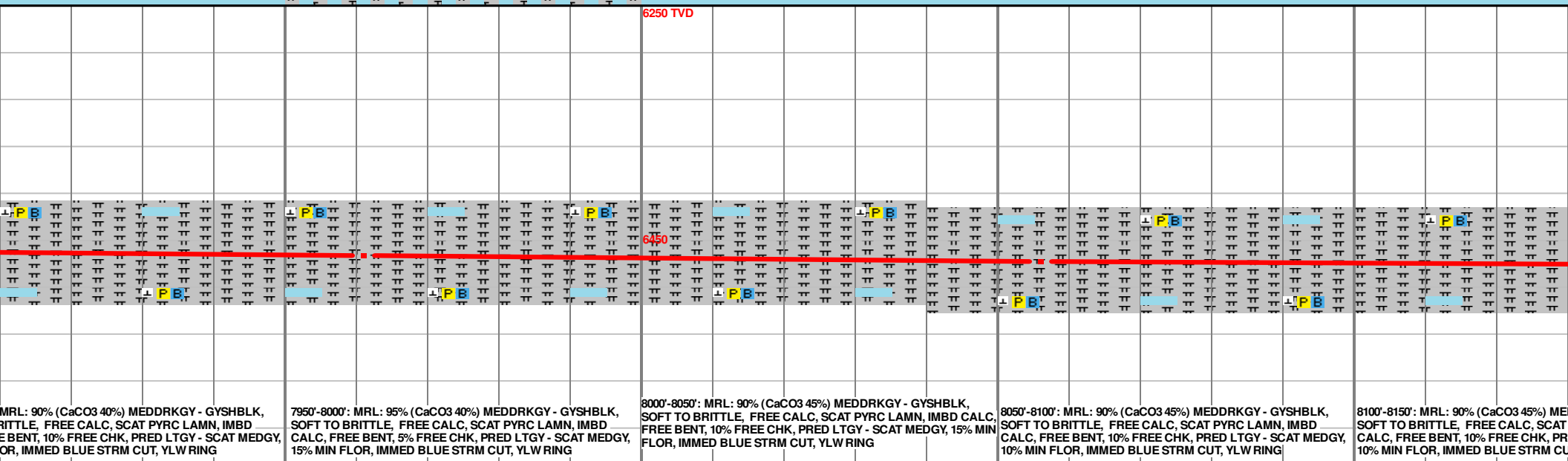
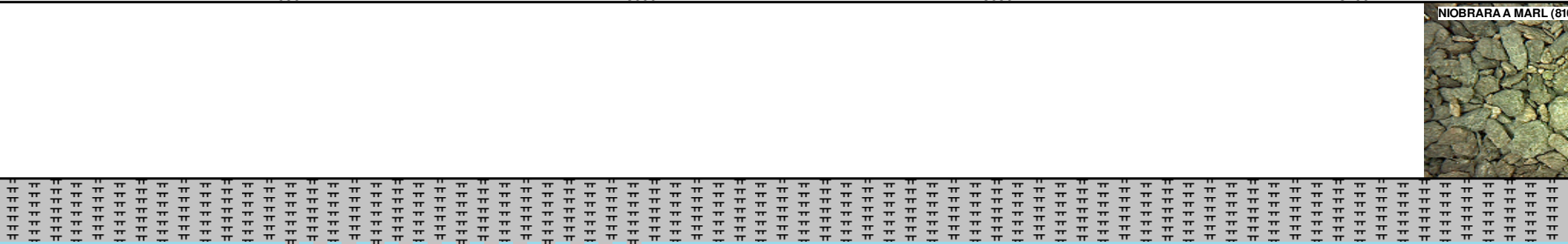
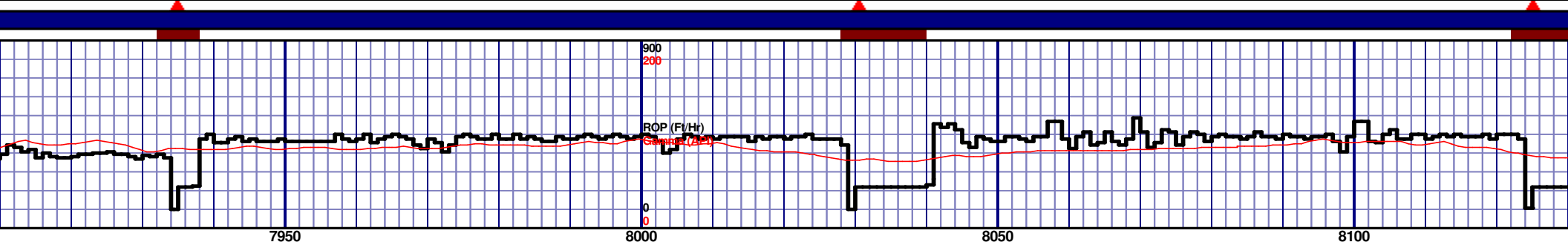


MD 7488 TVD 6455.36 INC 90.3 AZ 270.7 VS 1420.05	MD 7583 TVD 6455.71 INC 89.3 AZ 268.9 VS 1515.05	MD 7677 TVD 6455.71 INC 90.8 AZ 268.9 VS 1609.03
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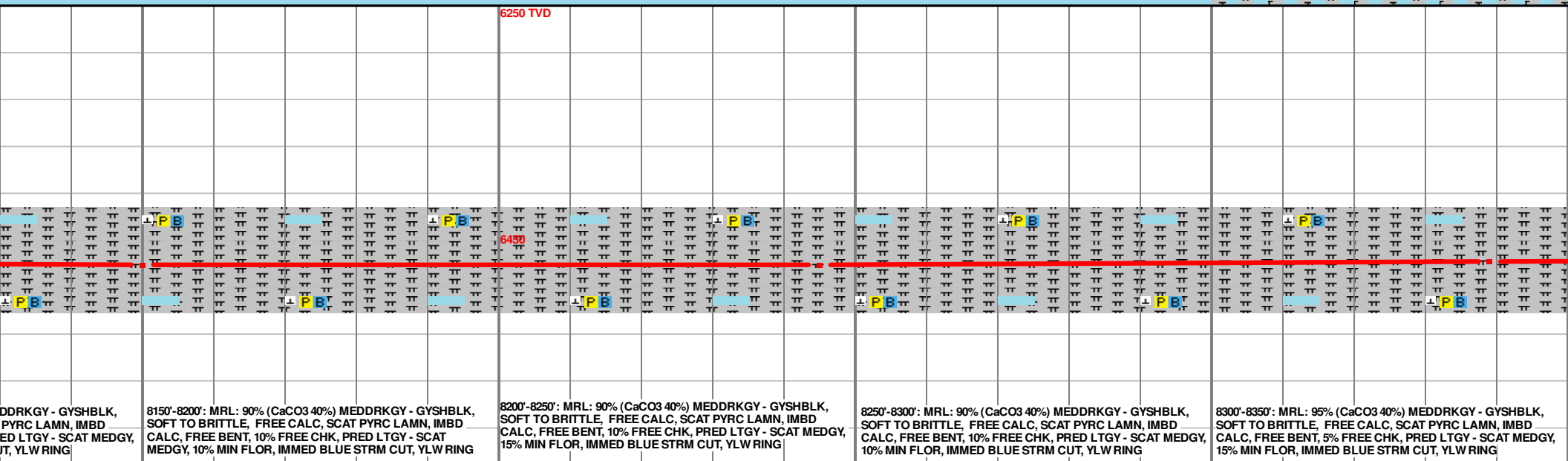
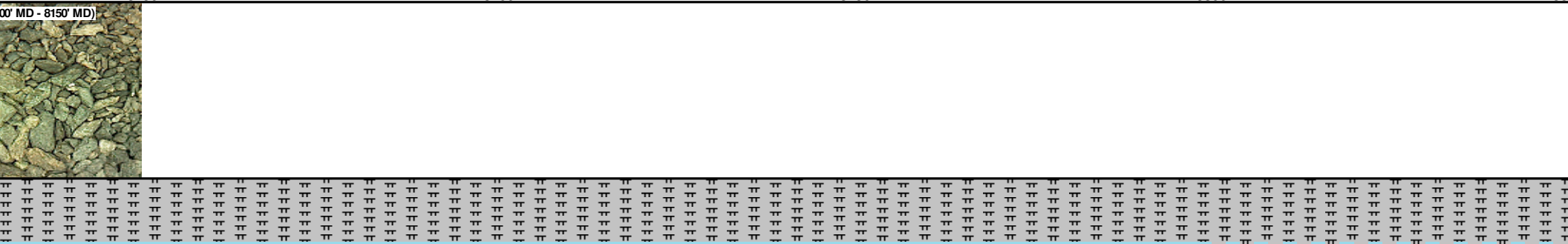
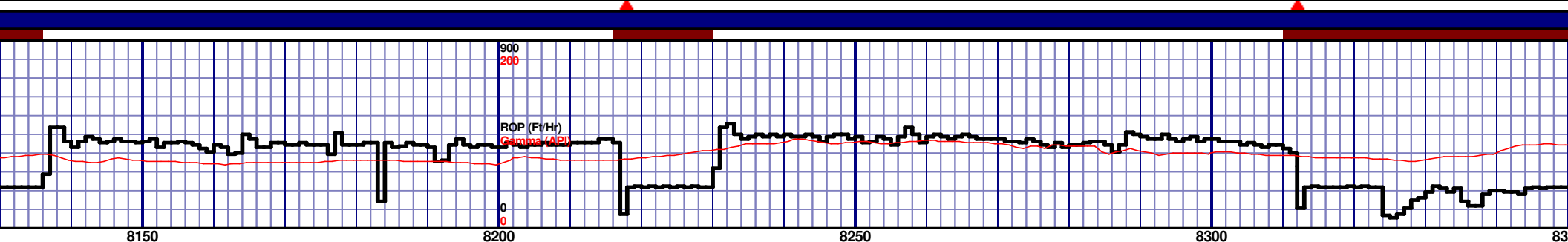


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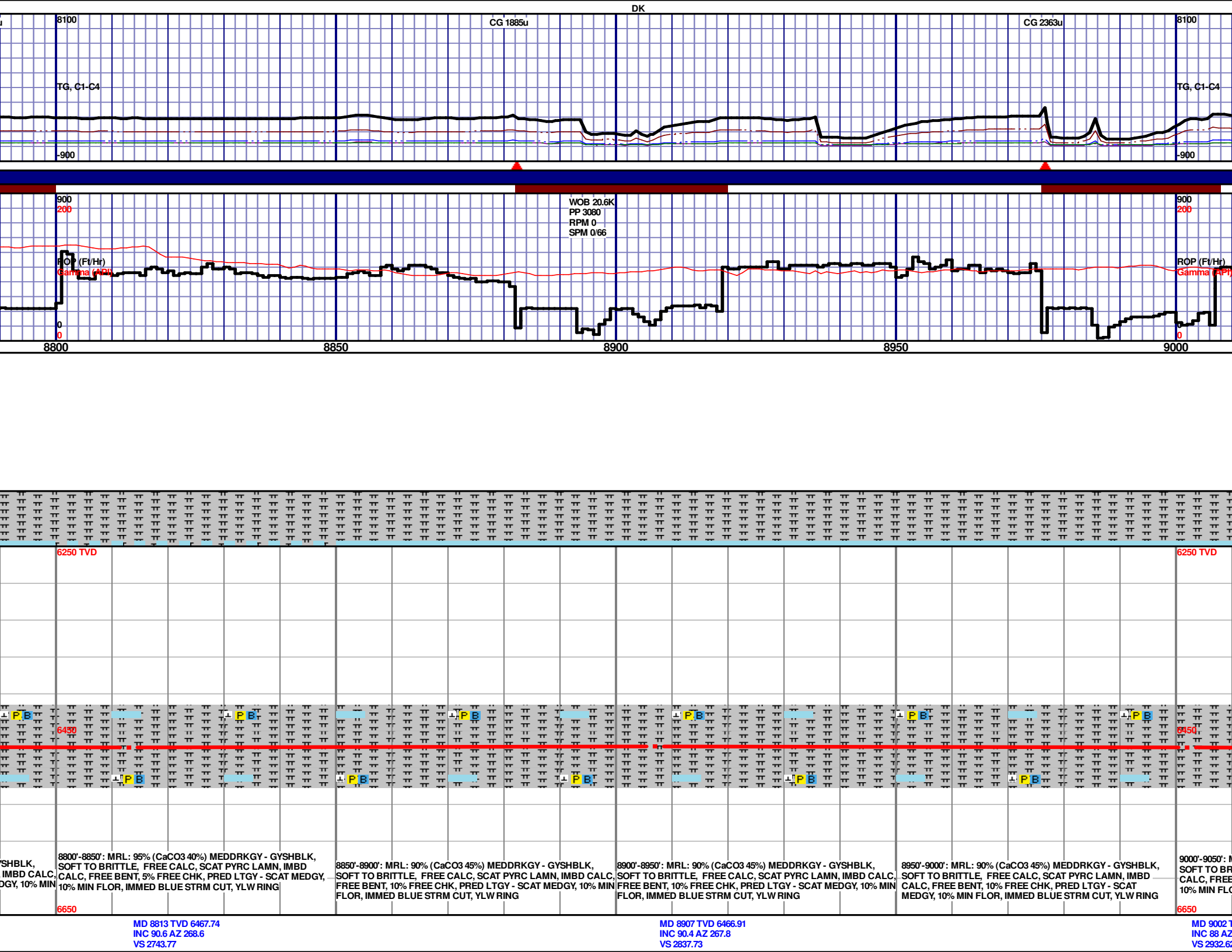
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INC 87.6 AZ 266.5  
VS 1987.37

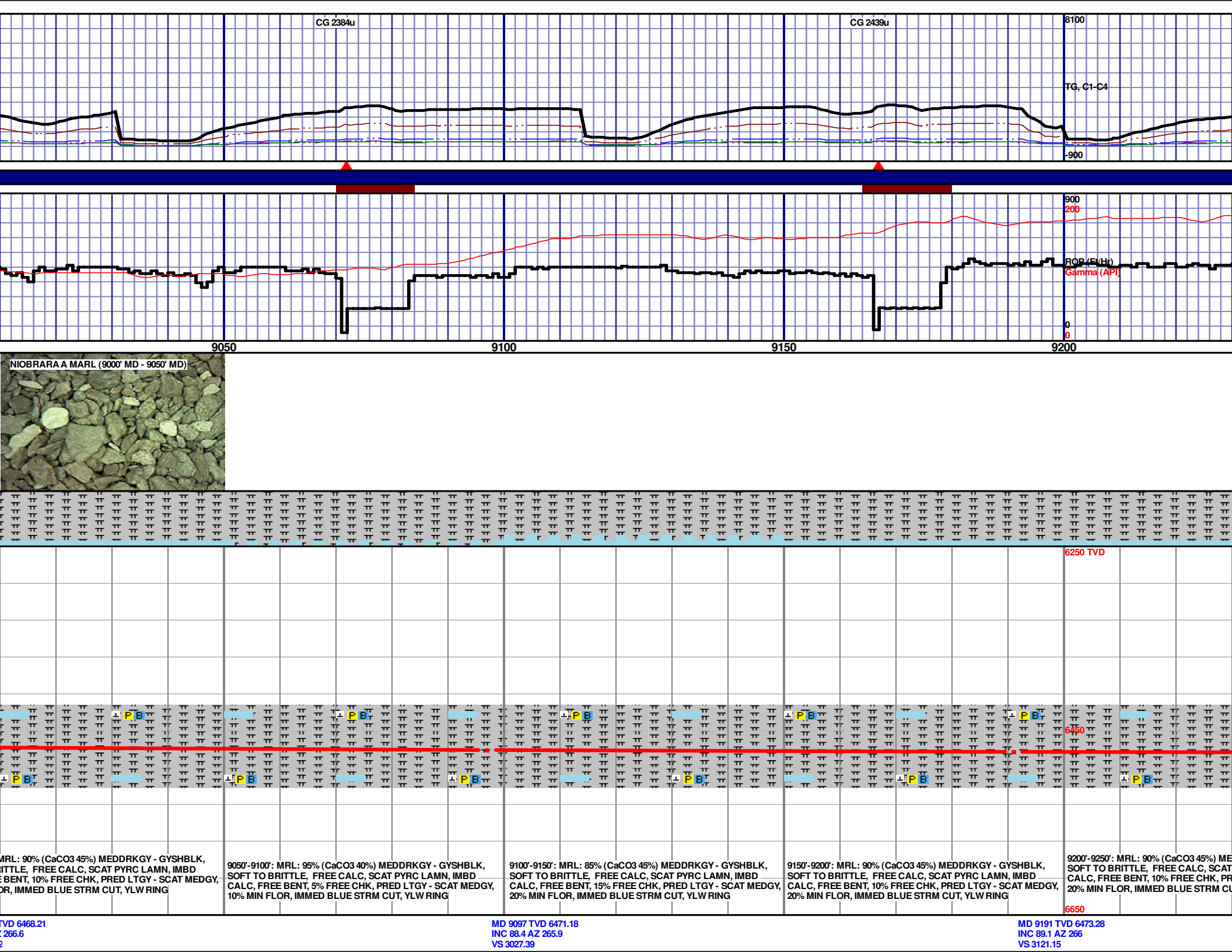


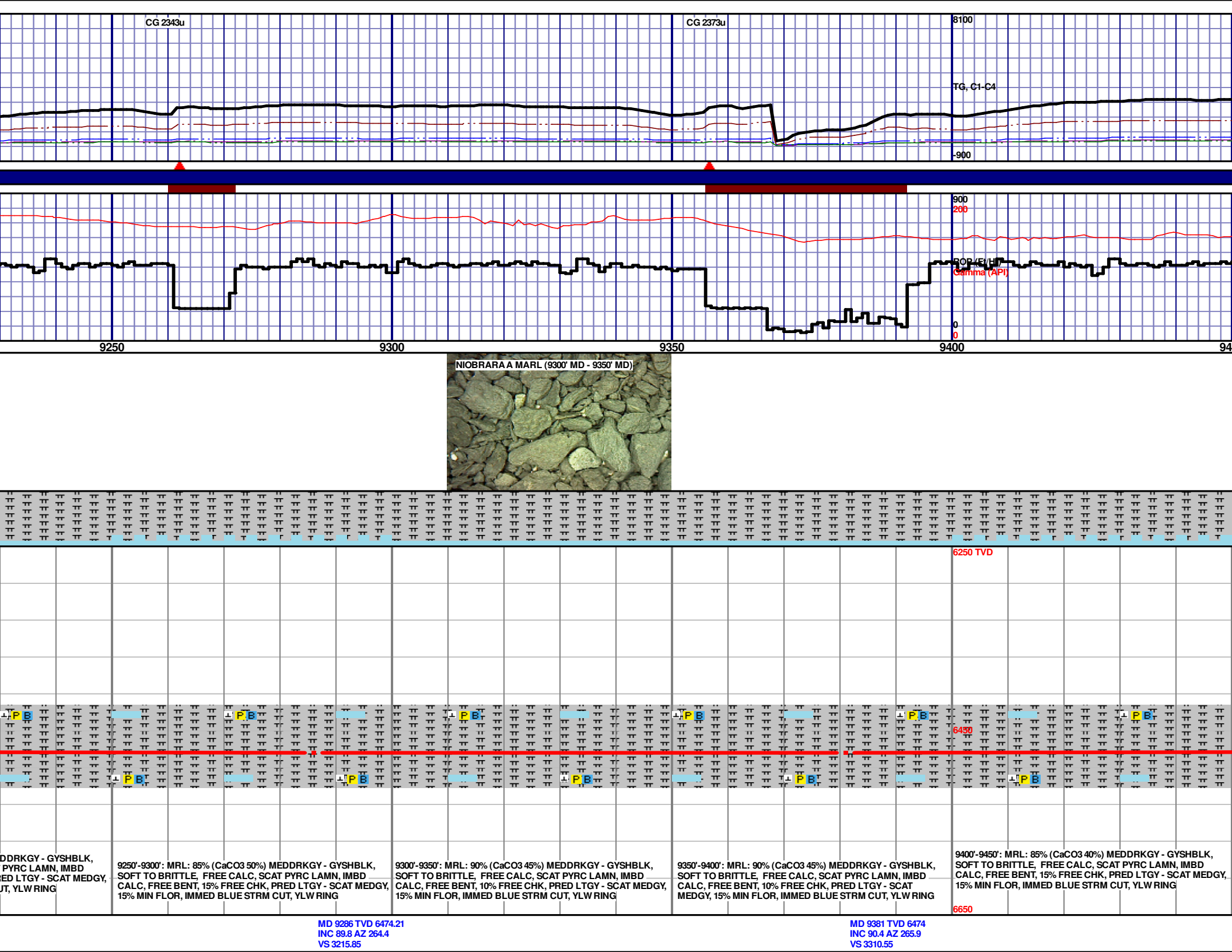


8550'-8600': MRL: 90% (Ca  
C, SOFT TO BRITTLE, FREE  
IN CALC, FREE BENT, 10% F  
5% MIN FLOR, IMMED BL

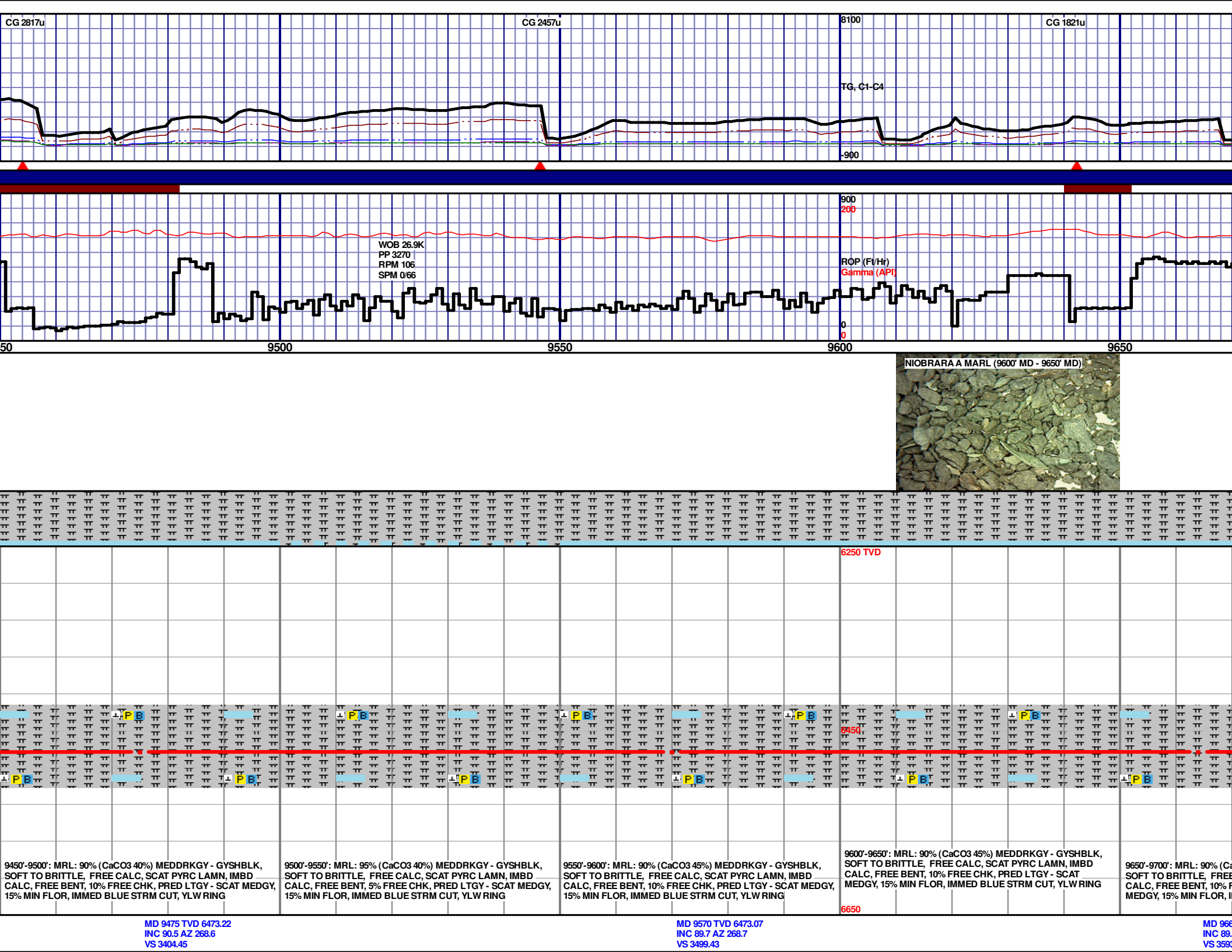


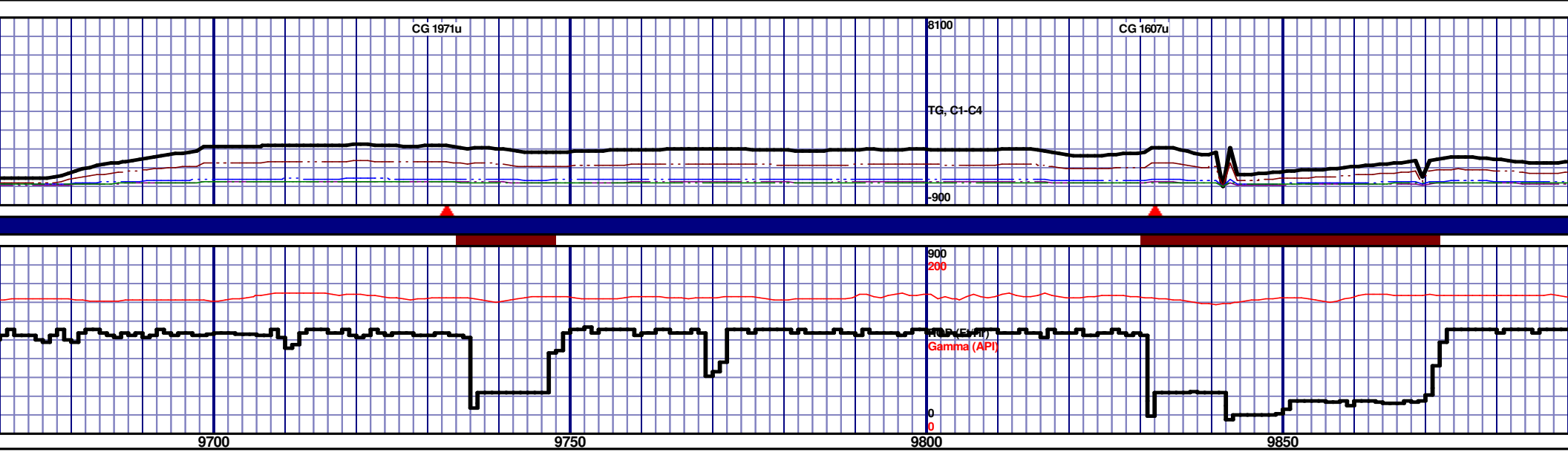












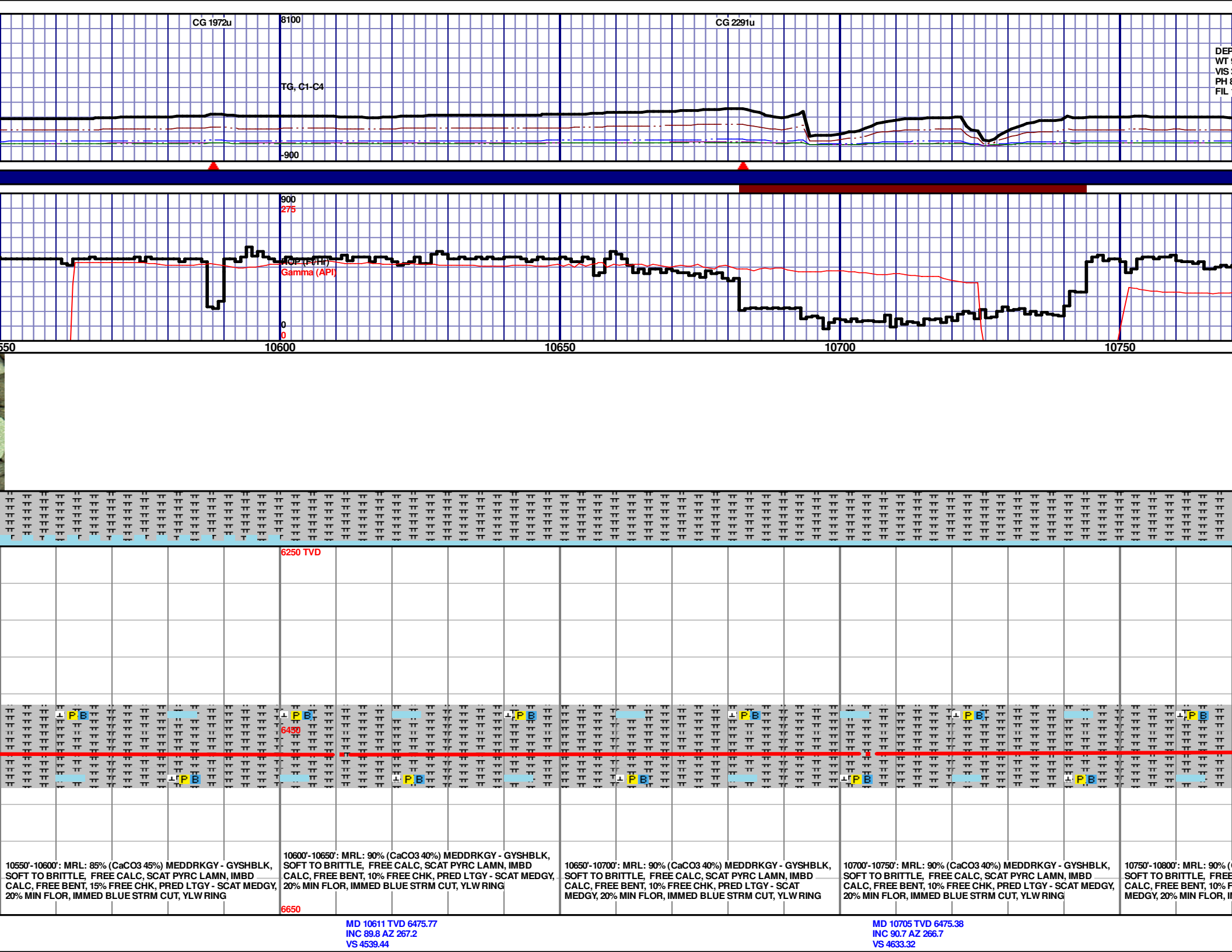
9700'-9750': MRL: 85% (CaCO3 50%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, FREE BENT, 15% FREE CHK, PRED LTGY - SCAT MEDGY, 15% MIN FLOR, IMMED BLUE STRM CUT, YLW RING									
9750'-9800': MRL: 90% (CaCO3 45%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, FREE BENT, 10% FREE CHK, PRED LTGY - SCAT MEDGY, 15% MIN FLOR, IMMED BLUE STRM CUT, YLW RING									
9800'-9850': MRL: 85% (CaCO3 45%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, FREE BENT, 15% FREE CHK, PRED LTGY - SCAT MEDGY, 10% MIN FLOR, IMMED BLUE STRM CUT, YLW RING									
9850'-9900': MRL: 90% (CaCO3 40%) MEDDRKGY - GYSHBLK, SOFT TO BRITTLE, FREE CALC, SCAT PYRC LAMN, IMBD CALC, FREE BENT, 10% FREE CHK, PRED LTGY - SCAT MEDGY, 15% MIN FLOR, IMMED BLUE STRM CUT, YLW RING									

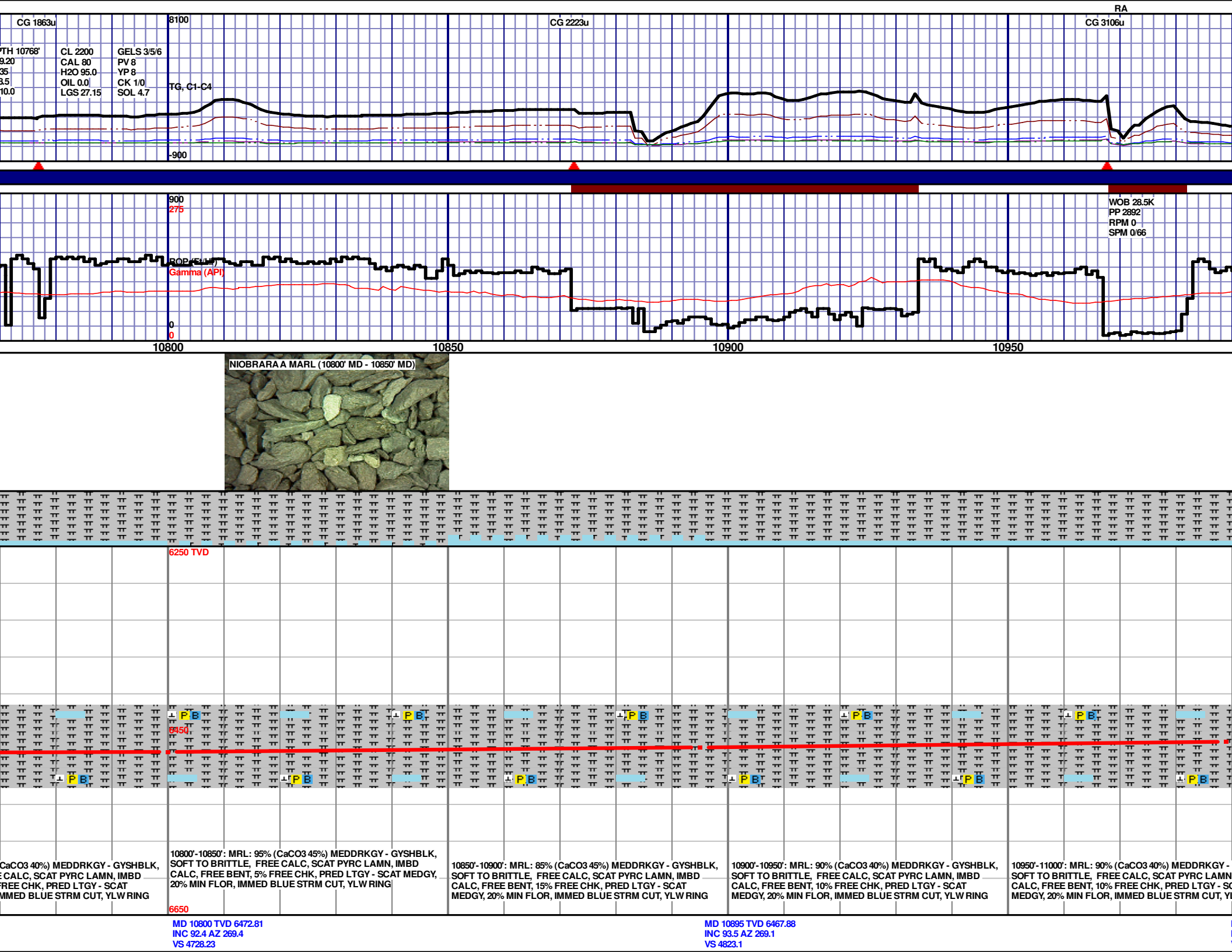




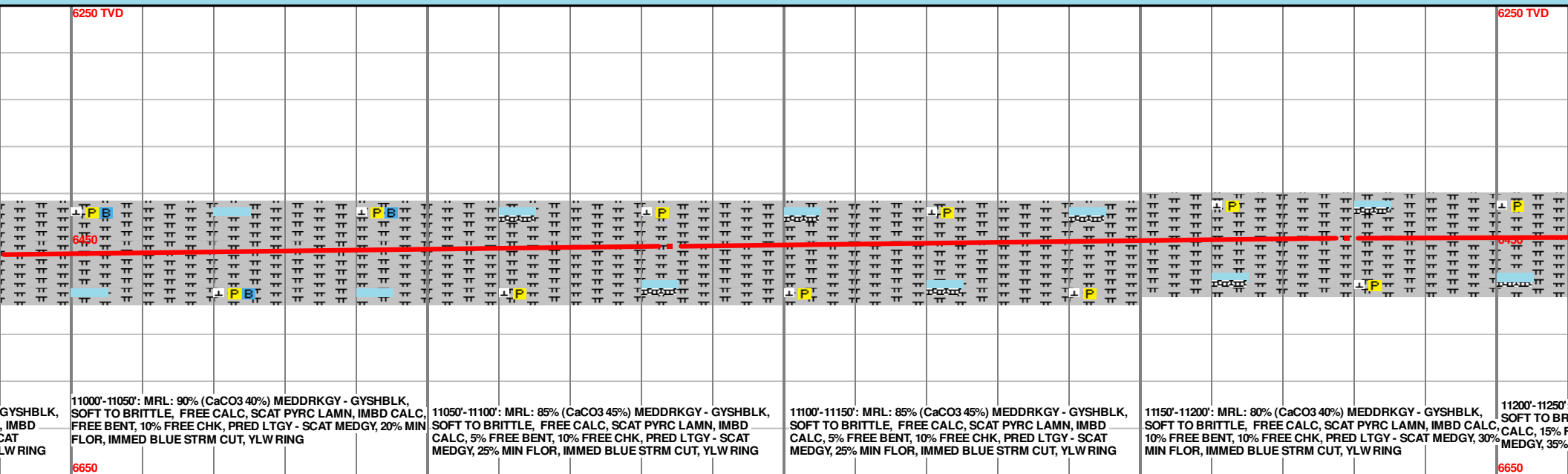
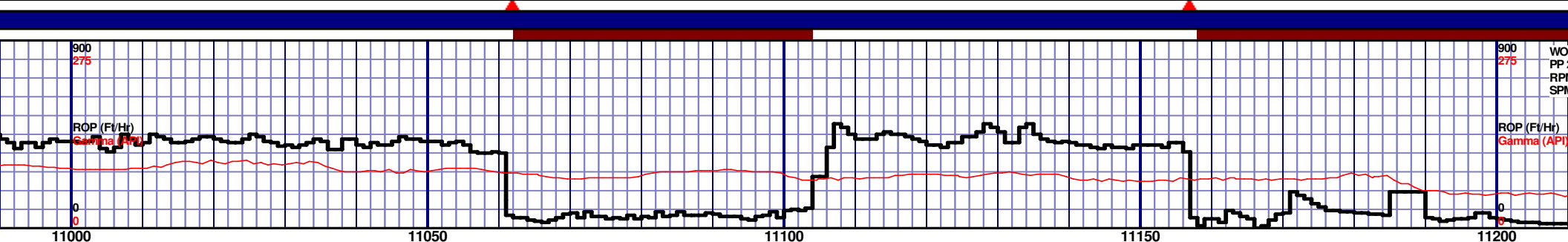


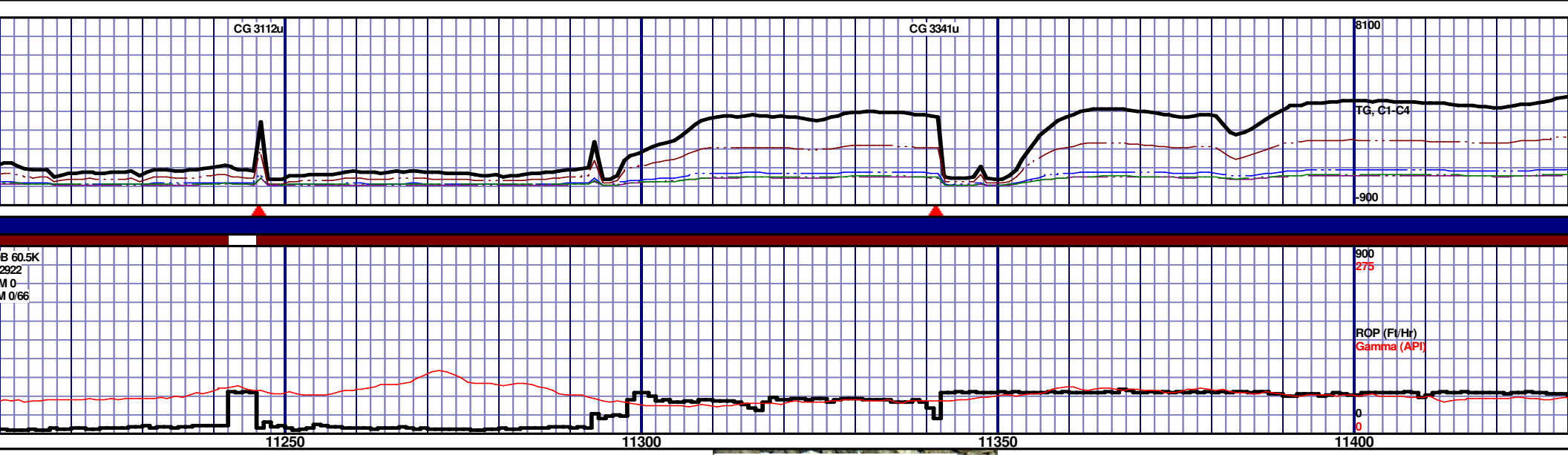
10327 TVD 6475.65	MD 10421 TVD 6475.5	MD 10516 TVD 6475.46
90 AZ 268	INC 90.2 AZ 266.8	INC 89.8 AZ 266.7
4255.77	VS 4349.69	VS 4444.55





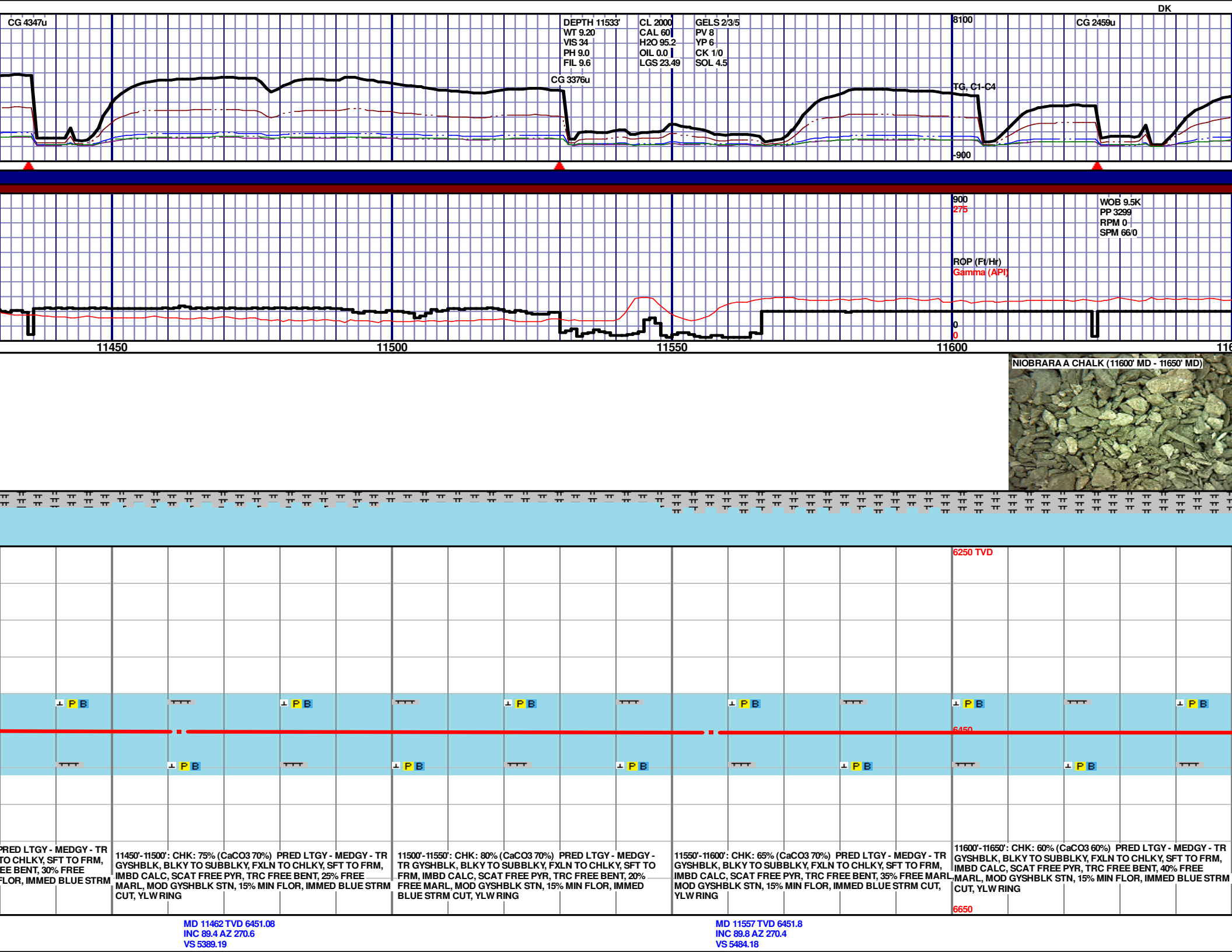


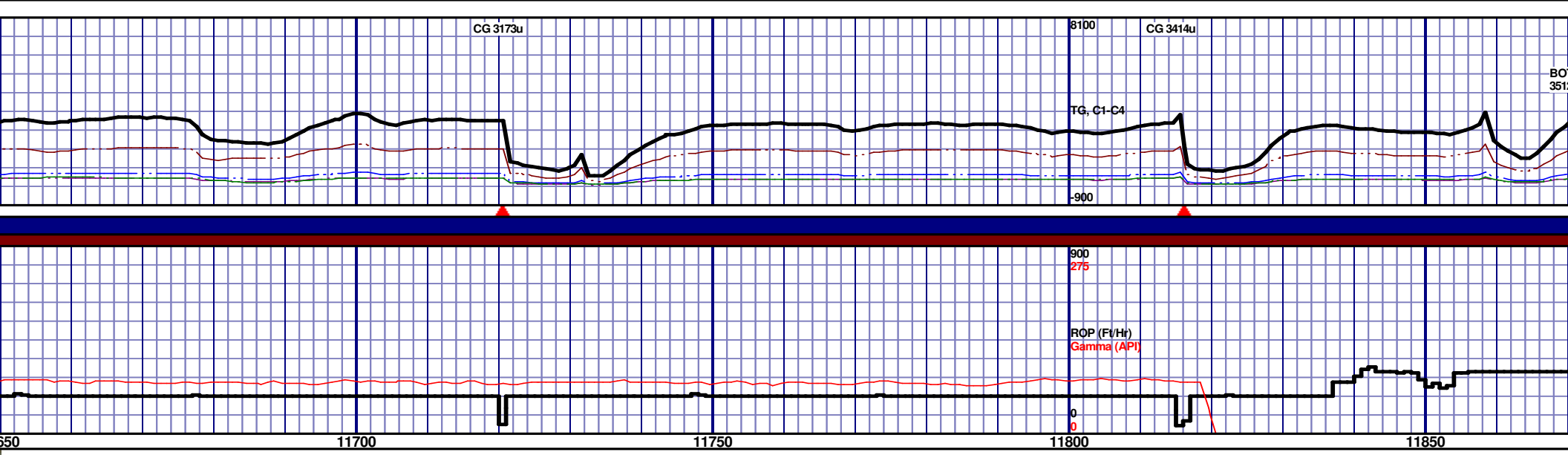




**NIOBARARA A CHALK**  
11307' MD 6447' TVD

												6250 TVD			





11650'-11700': CHK: 55% (CaCO3 60%) PRED LTGY - MEDGY - TR GYSHBLK, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT TO FRM, IMBD CALC, SCAT FREE PYR, TRC FREE BENT, 45% FREE MARL, MOD GYSHBLK STN, 15% MIN FLOR, IMMED BLUE STRM CUT, YLWRING

<p>11650'-11700': CHK: 55% (CaCO3 60%) PRED LTGY - MEDGY - TR GYSHBLK, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT TO FRM, IMBD CALC, SCAT FREE PYR, TRC FREE BENT, 45% FREE MARL, MOD GYSHBLK STN, 15% MIN FLOR, IMMED BLUE STRM CUT, YLWRING</p>	<p>11700'-11750': CHK: 55% (CaCO3 60%) PRED LTGY - MEDGY - TR GYSHBLK, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT TO FRM, IMBD CALC, SCAT FREE PYR, TRC FREE BENT, 45% FREE MARL, MOD GYSHBLK STN, 15% MIN FLOR, IMMED BLUE STRM CUT, YLWRING</p>	<p>11750'-11800': CHK: 55% (CaCO3 60%) PRED LTGY - MEDGY - TR GYSHBLK, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT TO FRM, IMBD CALC, SCAT FREE PYR, TRC FREE BENT, 45% FREE MARL, MOD GYSHBLK STN, 15% MIN FLOR, IMMED BLUE STRM CUT, YLWRING</p>	<p>11800'-11850': CHK: 55% (CaCO3 60%) PRED LTGY - MEDGY - TR GYSHBLK, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT TO FRM, IMBD CALC, SCAT FREE PYR, TRC FREE BENT, 45% FREE MARL, MOD GYSHBLK STN, 15% MIN FLOR, IMMED BLUE STRM CUT, YLWRING</p>	<p>11850'-11873': CHK: 70% (C 65%) PRED LTGY - MEDGY - TR GYSHBLK, BLKY TO SUBBLKY, FXLN TO CHLKY, SFT TO FRM, IMBD CALC, SCAT FREE PYR, TRC FREE BENT, 45% FREE MARL, MOD GYSHBLK STN, 15% MIN FLOR, IMMED BLUE STRM CUT, YLWRING</p>
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TTOMS UP GAS

2u

WOB 20.4K

PP 3553

RPM 100

SPM 66'0

DRILLERS TD @ 11873'

MD @ 6:00 PM ON

5/23/2014

11900

TD @ 11873' MD

RELEASED 5/23/2014

THANK YOU FROM  
ROSS APODACA,  
DAN KING, AND  
HORIZON WELL  
LOGGING, LLC

CaCO3

Y - TR

BLKY,

FRM,

PYR,

EE

IN, 15%

STRM

TB: MD 11873 TVD 6451.53

INC 90.7 AZ 270.7

VS 5800.16