Schlumberger

Company: Cascade Petroleum LLC

Well: Gaede 9S-55W-8-16

Field: Wildcat

County: Lincoln State: Colorado

Platform Express

CMR

Combinable Magnetic Resonance

County: Lincoln
Field: Wildcat
Location: NWNE Sec8 T9S R55W
Well: Gaede 9S-55W-8-16
Company: Cascade Petroleum LLC

Location:			
NWNE Sec8 T9S R55W SHL: 530; FNL, 2520' FEL	Elev.:	K.B.	5602.00 ft
		G.L.	5587.00 ft
		D.F.	5601.00 ft

Permanent Datum:	Ground Level	Elev.:	5587.00 f
Log Measured From:	Kelly Bushing	15.00 ft	above Perm.Datum
Drilling Measured From:	Kelly Bushing		

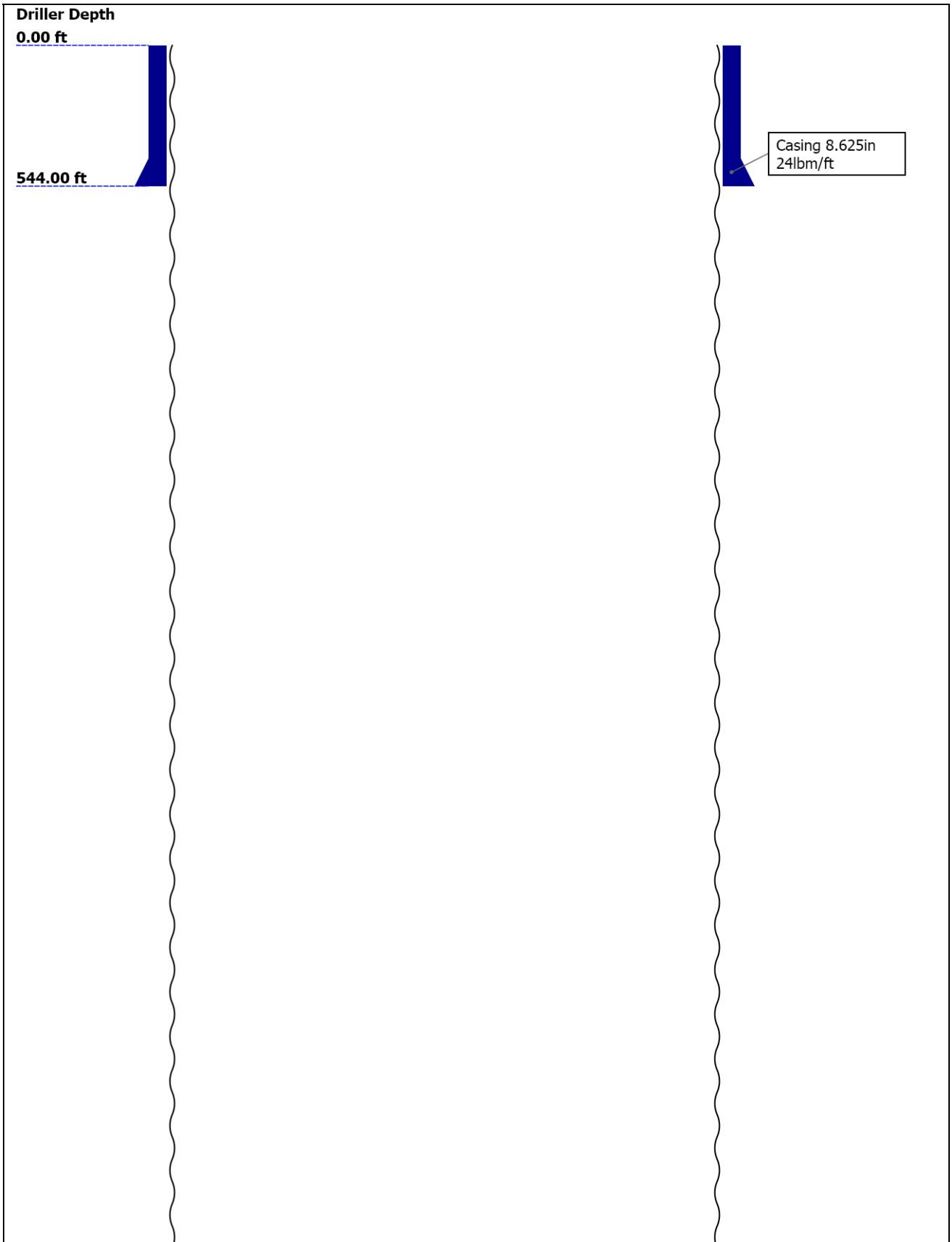
API Serial No.	Section:	Township:	Range:
05-073-06665	8	9S	55W

Logging Date			10-Nov-2014			
Run Number			ONE			
Depth Driller			8556.00 ft			
Schlumberger Depth			8568.00 ft			
Bottom Log Interval			8568.00 ft			
Top Log Interval			3000.00 ft			
Casing Driller Size @ Depth			8.625 in @ 544.00 ft			
Casing Schlumberger			544 ft			
Bit Size			7.875 in			
Type Fluid In Hole			Water			
MUD	Density	Viscosity	8.9 lbm/gal	65 s		
	Fluid Loss	PH	4.8 cm3	8.6		
	Source of Sample		Active Tank			
RM @ Meas Temp			0.2 ohm.m @ 68 degF			
RMF @ Meas Temp			0.15 ohm.m @ 68 degF			
RMC @ Meas Temp						
Source RMF	RMC			Pressed		
RM @ BHT	RMF @ BHT		0.07 @ 194	0.06 @ 194		
Max Recorded Temperatures			194 degF			
Circulation Stopped	Time		09-Nov-2014	16:30:00		
Logger on Bottom	Time		10-Nov-2014	04:13:39		
Unit Number	Location:		2135	Fort Morgan		
Recorded By			B Makinson			
Witnessed By			Jim Weir			

Disclaimer

Contents

Well Sketch



Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	7.875					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	8556					
Bottom Logger (ft)	8568					
Casing						
Size (in)	8.625					
Weight (lbm/ft)	24					
Inner Diameter (in)	8.097					
Grade	N80					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	544					
Bottom Logger (ft)	544					

Remarks and Equipment Summary

ONE: Toolstring

Equip name	Length	MP name	Offset
LEH-QT	73.17		
LEH-QT			
EDTC-B:8328	70.25		
EDTH-B			
EDTG-A			
EDTC-B:8328			
		CTEM	66.75
		ACCZ	0.00
		HV	0.00
		Gamma Ray	64.88
		TelStatus	63.75
PPC-B:8352	63.75		
PPC-B:8352			
		PPC-B Calipers	62.61

ONE: Remarks

- This is first run in well.
- Toolstring run as per tool sketch.
- Neutron corrections applied: hole size, standoff.
- Matrix: Limestone, MDEN: 2.71
- Down log stretch correction: 13.8 ft.
- Cement volume calculated assuming 5.5 in future casing.
- Caliper check in casing. Cali Shift 0.5 in to read casing ID of 8.097 in.
- Mud resistivity measured from AIT AMF.

CMRT-B:144 57.24
CMRC:78
CMRH:78
CMRS:144

CMRT 43.59

AH-184[2] 41.65

AH-184[1] 39.65

HGNS-H:4810 37.65
HGNH
NPV-N
NSR-F:5215
HGNS-H:4810
HACCZ-H:5955
HMCA-H

Temperature 37.62

GR 36.91

CNL Porosity 30.57

HMCA 28.24

HGNS 28.24

Accelerometer 0.00

HDRS-H 28.24
ECH-MEB
HRCC-H
HRMS-H
HRGD-H:3760
Long Spacing
GPV-Q
GSR-J:5471
Short Spacing
Backscatter

HRCC 24.24

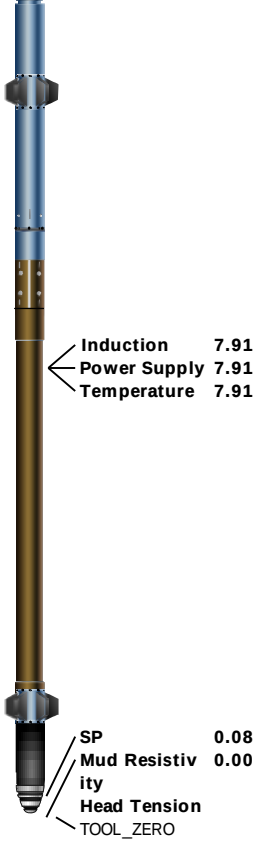
MCFL 18.81

Caliper 18.33

TLD Density 17.94

AIT-M:181 16.00

AMIS:181
AMRM:181



Lengths are in ft
Maximum Outer Diameter = 9.000 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

Depth Summary

	ONE		
Depth Measuring Device			
Type	IDW-JA		
Serial Number	6433		
Calibration Date	23-Sep-2014		
Calibrator Serial Number			
Calibration Cable Type	7-46 PXS		
Wheel Correction 1	-3		
Wheel Correction 2	-2		
Tension Device			
Type	CMTD-B/A		
Serial Number	1919		
Calibration Date	07-Nov-2014		
Calibrator Serial Number	441345A		
Number of Calibration Points	10		
Calibration Root Mean Square Error	13		
Calibration Peak Error	24		
Logging Cable			
Type	7-46P-XS		
Serial Number	U711057		
Length	24000.00 ft		
Conveyance Type	Wireline		
Rig Type	Single		

ONE:Depth Control Parameters		Depth Control Remarks
Log Sequence	First Log In the Well	All Schlumberger depth control procedures followed.
Rig Up Length At Surface		IDW used as primary depth control.
Rig Up Length At Bottom		Z-Chart used as secondary depth control.
Rig Up Length Correction		
Stretch Correction	13.80 ft	

Tool Zero Check At Surface

ONE

Main Pass - CMR LQC

Software Version

Acquisition System	Version
MaxWell	4.0.9163.3000
Application Patch	Patch-SP-10767_18214-4.0.9163.3001
	Patch-NPD_NEXT_C_Fld2-20493-4.0.9434.3002
	Patch-Hotfix_Task_Tree_GDI_SP2-20806-4.0.9434.3002
	Patch-Hotfix_MDT_18214-22198-4.0.9434.3002

Tool Elements	Description	Software Version	Firmware Version
CMRS	CMRT sonde consists of magnets to create a permanent magnetic field as well as an antenna and necessary circuitry to generate an oscillating magnetic field	4.0.9360.3000	

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[5]:Up	Up	348.49 ft	8588.12 ft	10-Nov-2014 4:56:43 AM	10-Nov-2014 9:20:17 AM	ON	14.40 ft	Yes

All depths are referenced to toolstring zero

Log

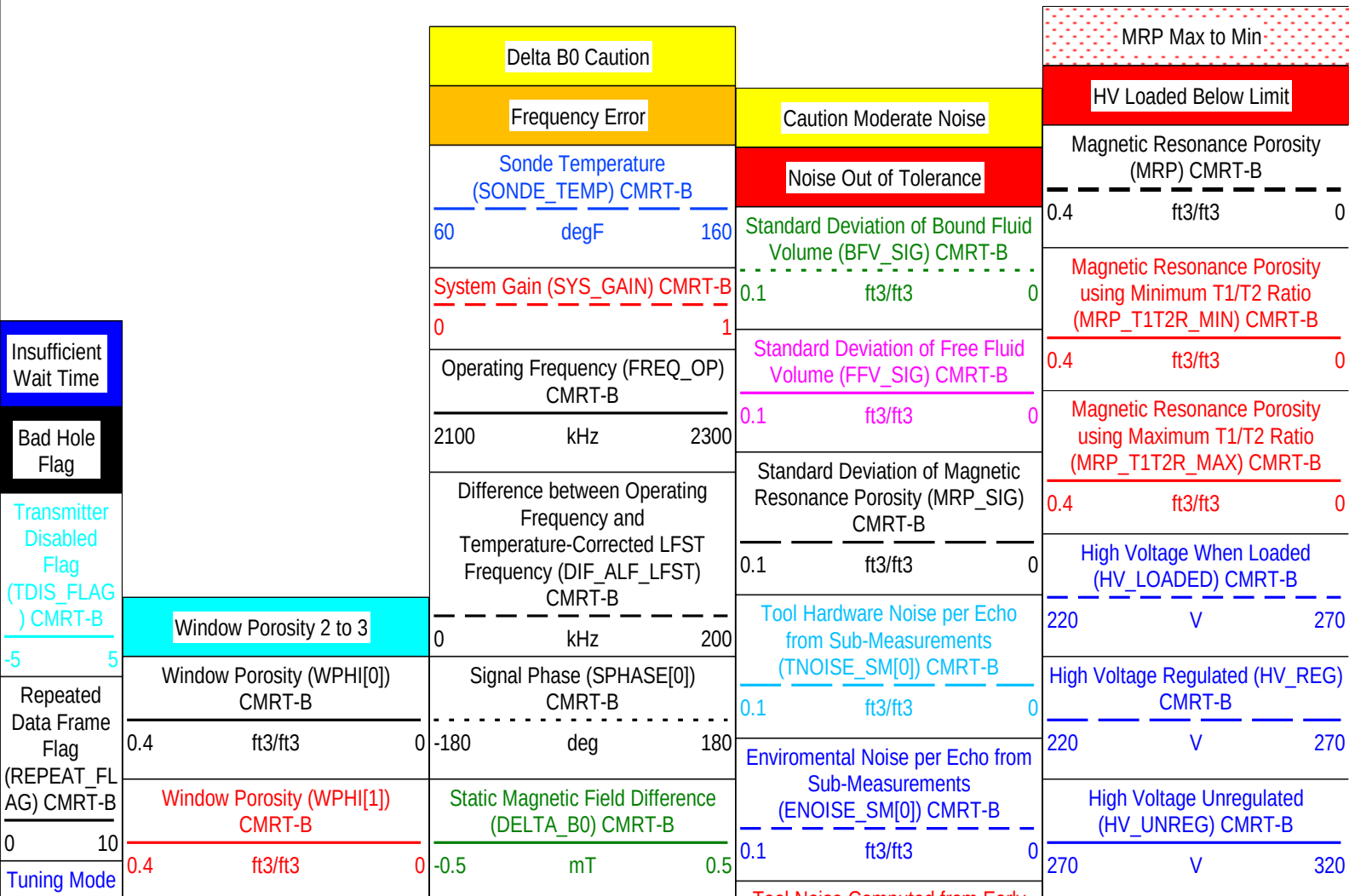
Company:Cascade Petroleum LLC Well:Gaede 9S-55W-8-16

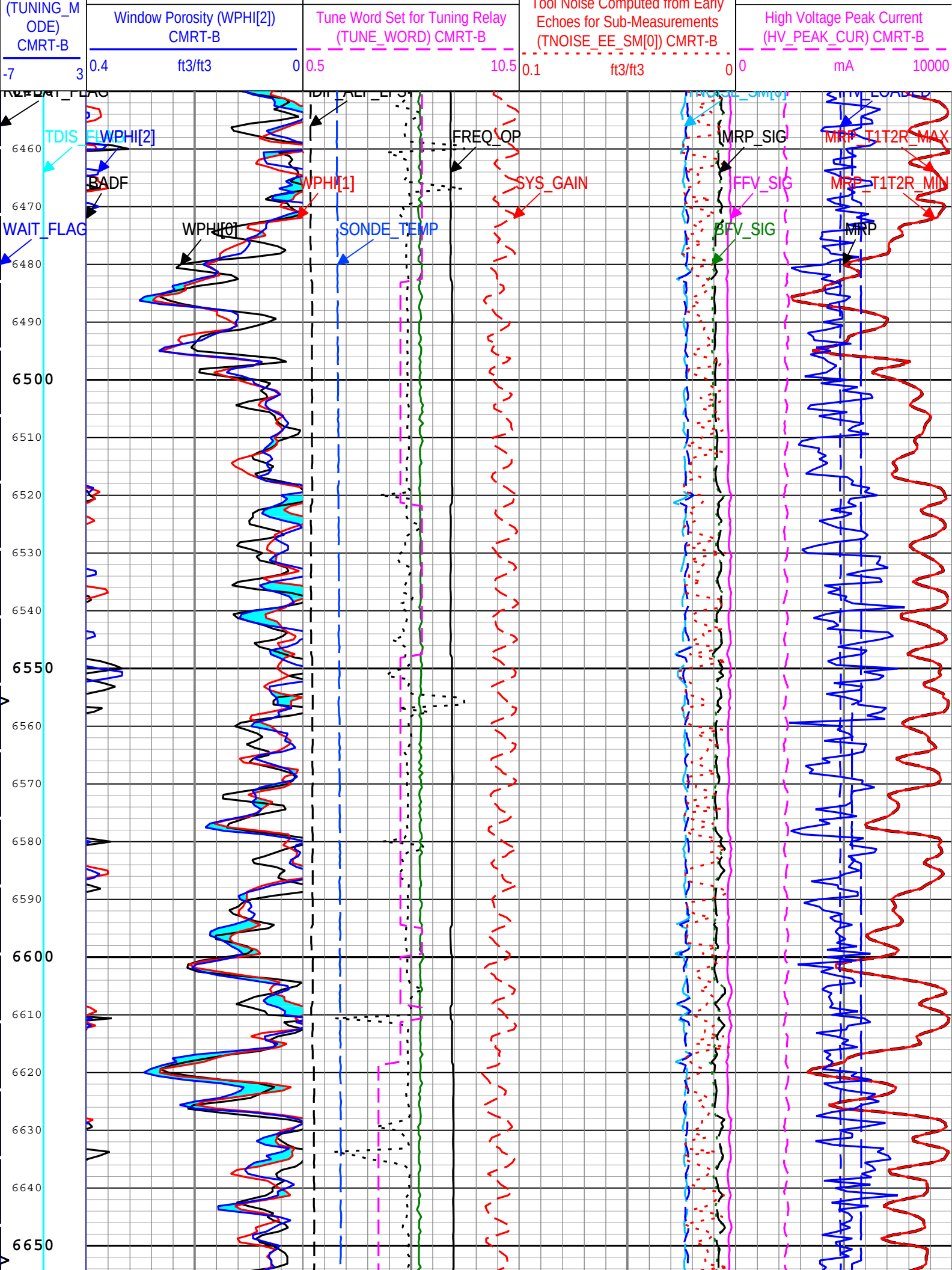
ONE: Log[5]:Up:S008

Description: CMRT Depth Log LQC Format Format: Log (CMRT Depth Log LQC) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth

Creation Date: 10-Nov-2014 10:20:31

TIME_1900 - Time Marked every 60.00 (s)




(TUNING_MODE) CMRT-B
-7
3
Window Porosity (WPHI[2]) CMRT-B
0.4
ft3/ft3
0
Tune Word Set for Tuning Relay (TUNE_WORD) CMRT-B
0.5
10.5
Tool Noise Computed from Early Echoes for Sub-Measurements (TNOISE_EE_SM[0]) CMRT-B
0.1
ft3/ft3
0
High Voltage Peak Current (HV_PEAK_CUR) CMRT-B
0
mA
10000
TDIS_FL
WPHI[2]
BADF
WAIT_FLAG
WPHI[1]
WPHI[0]
FREQ_OP
SONDE_TEMP
SYS_GAIN
MRP_SIG
FFV_SIG
BFV_SIG
MRP_T1T2R_MAX
MRP_T1T2R_MIN
MRP
6460
6470
6480
6490
6500
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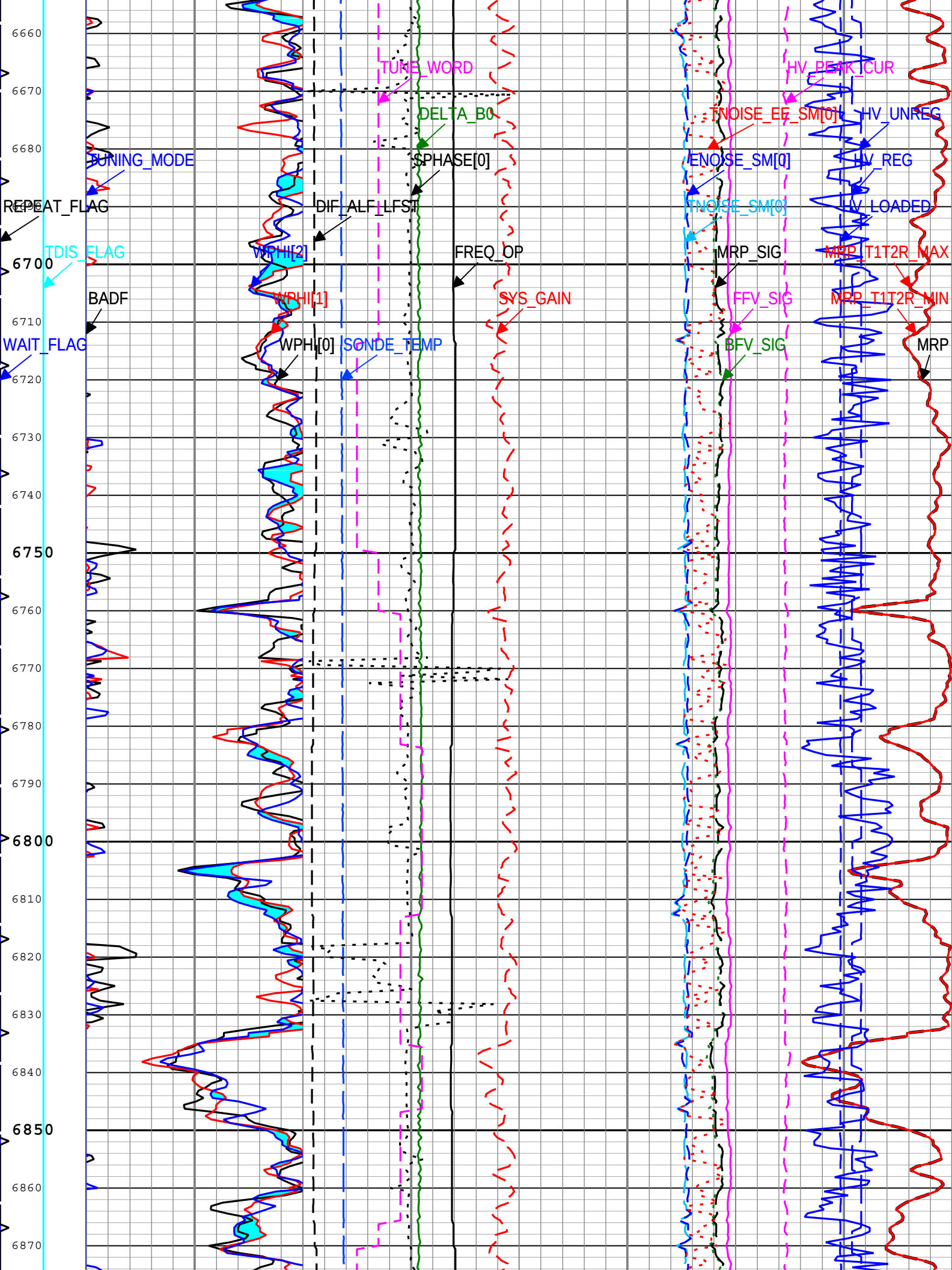
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TUNE_WORD
DELTA_B0
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TUNING_MODE
REPEAT_FLAG
DIF_ALF_LFST
TDIS_FLAG
WPHI[2]
FREQ_OP
BADF
WPHI[1]
SYS_GAIN
WAIT_FLAG
WPHI[0]
SONDE_TEMP
HV_PEAK_CUR
TNOISE_EE_SM[0]
HV_UNREG
ENOISE_SM[0]
HV_REG
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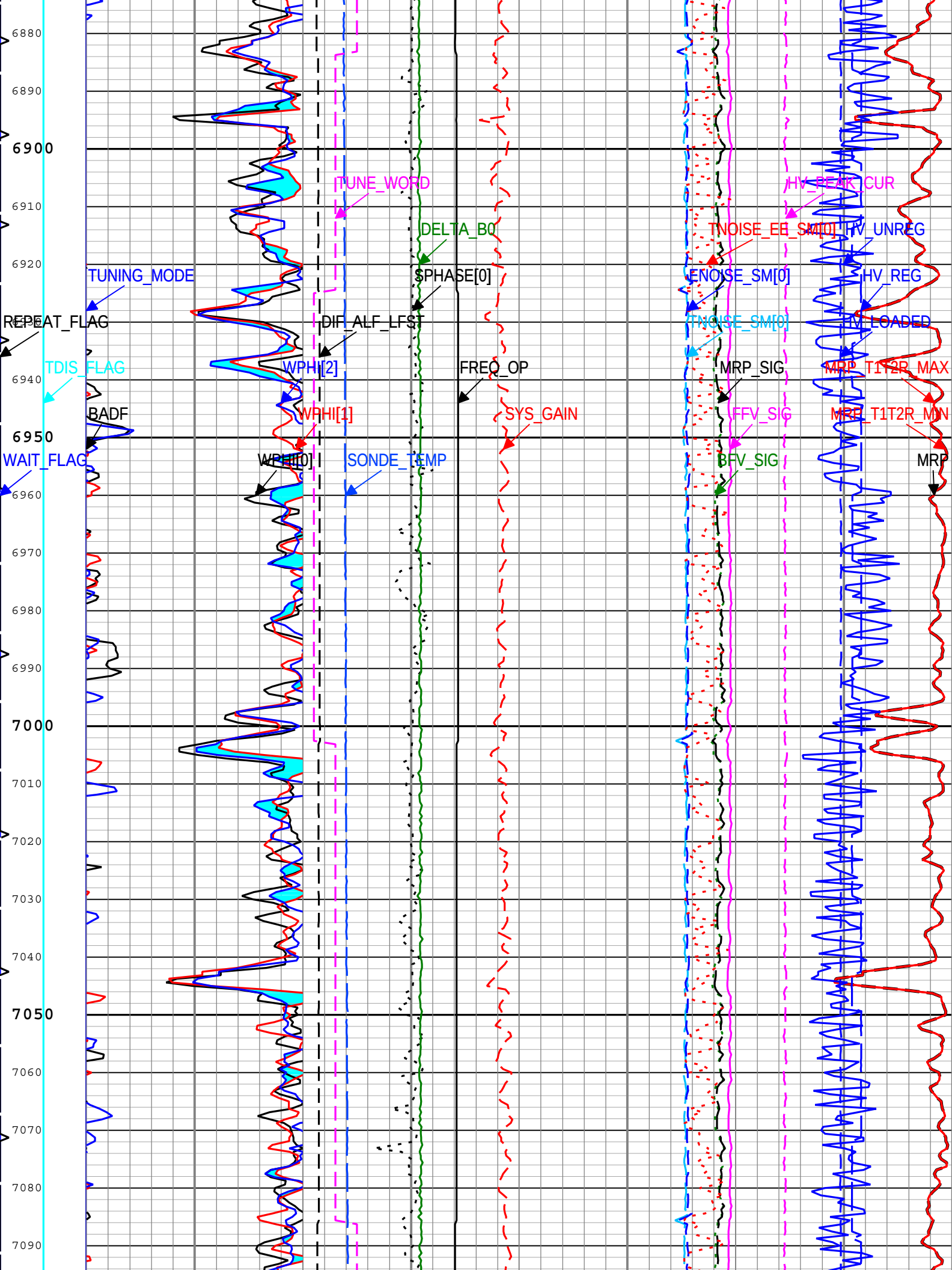
MRP_T1T2R_MIN
BFV_SIG
MRP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7070
7080
7090
TUNE_WORD
DELTA_B0
SPHASE[0]
DIF_ALF_LFST
WPHI[2]
WPHI[1]
WPHI[0]
FREQ_OP
SYS_GAIN
SONDE_TEMP
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ENOISE_SM[0]
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MRP_SIG
FFV_SIG
BFV_SIG
HV_UNREG
HV_REG
HV_LOADED
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MRP_T1T2R_MIN
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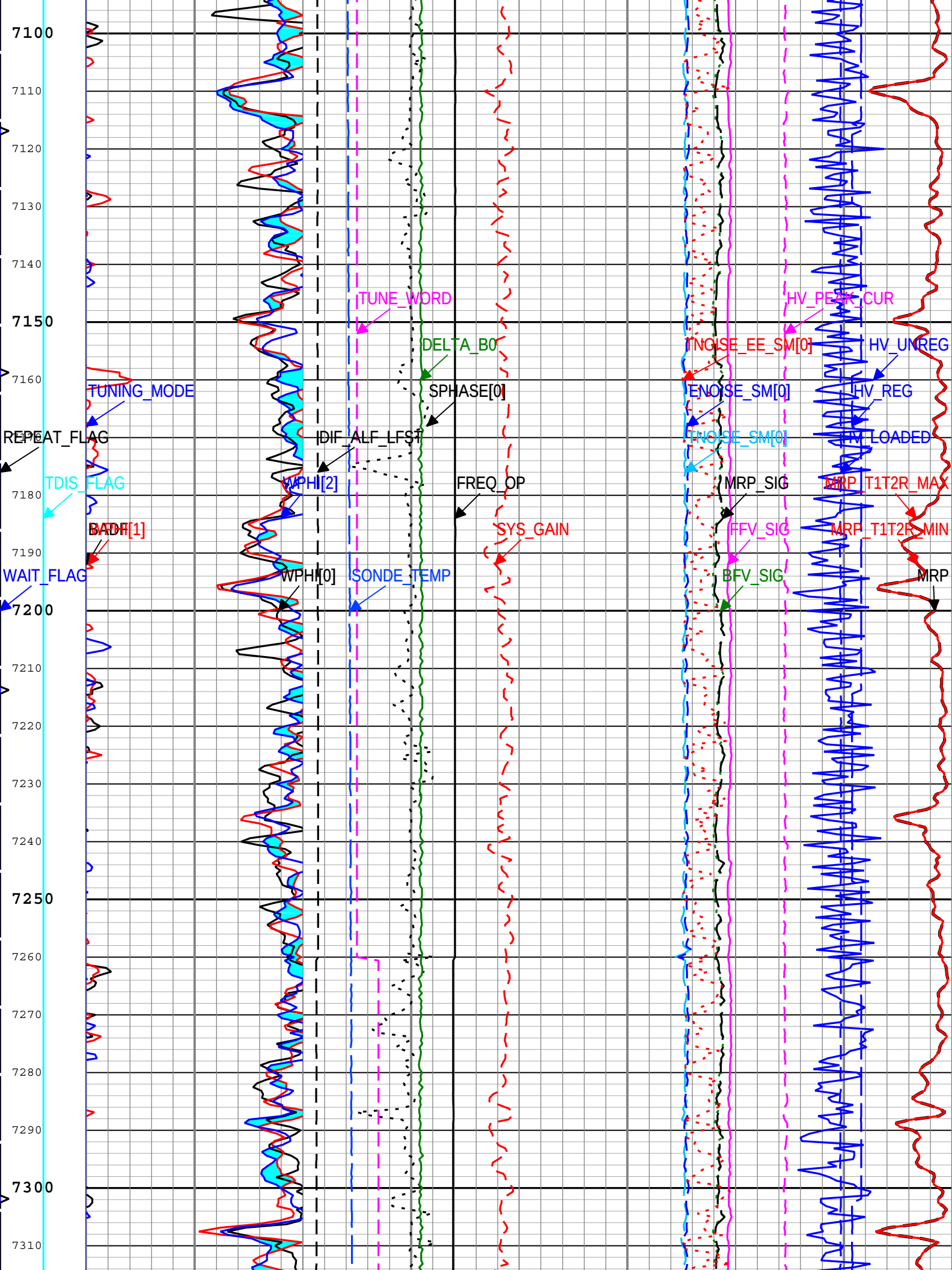
REPEAT_FLAG
TDIS_FLAG
BADF
WAIT_FLAG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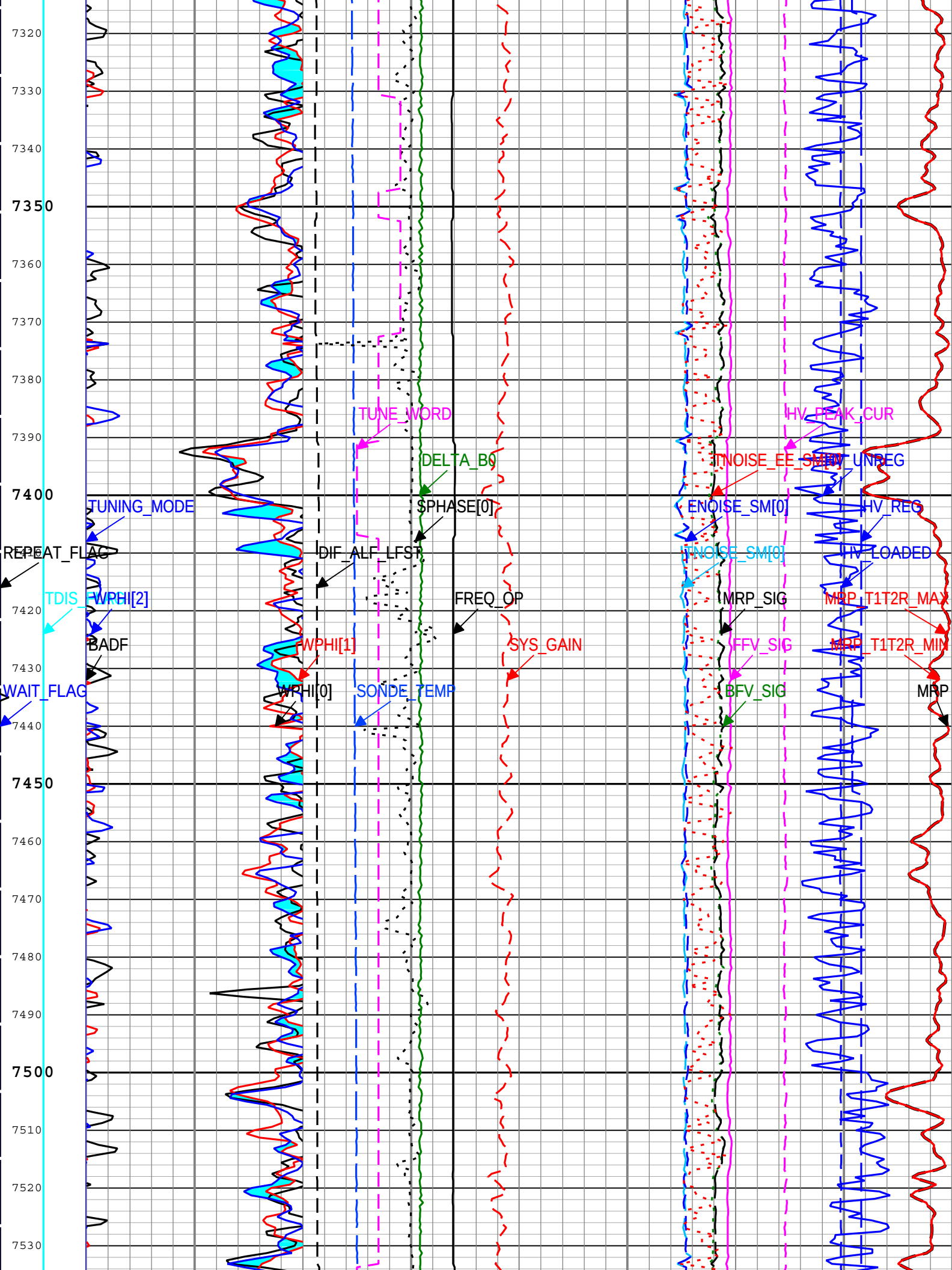
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HV_PEAK_CUR
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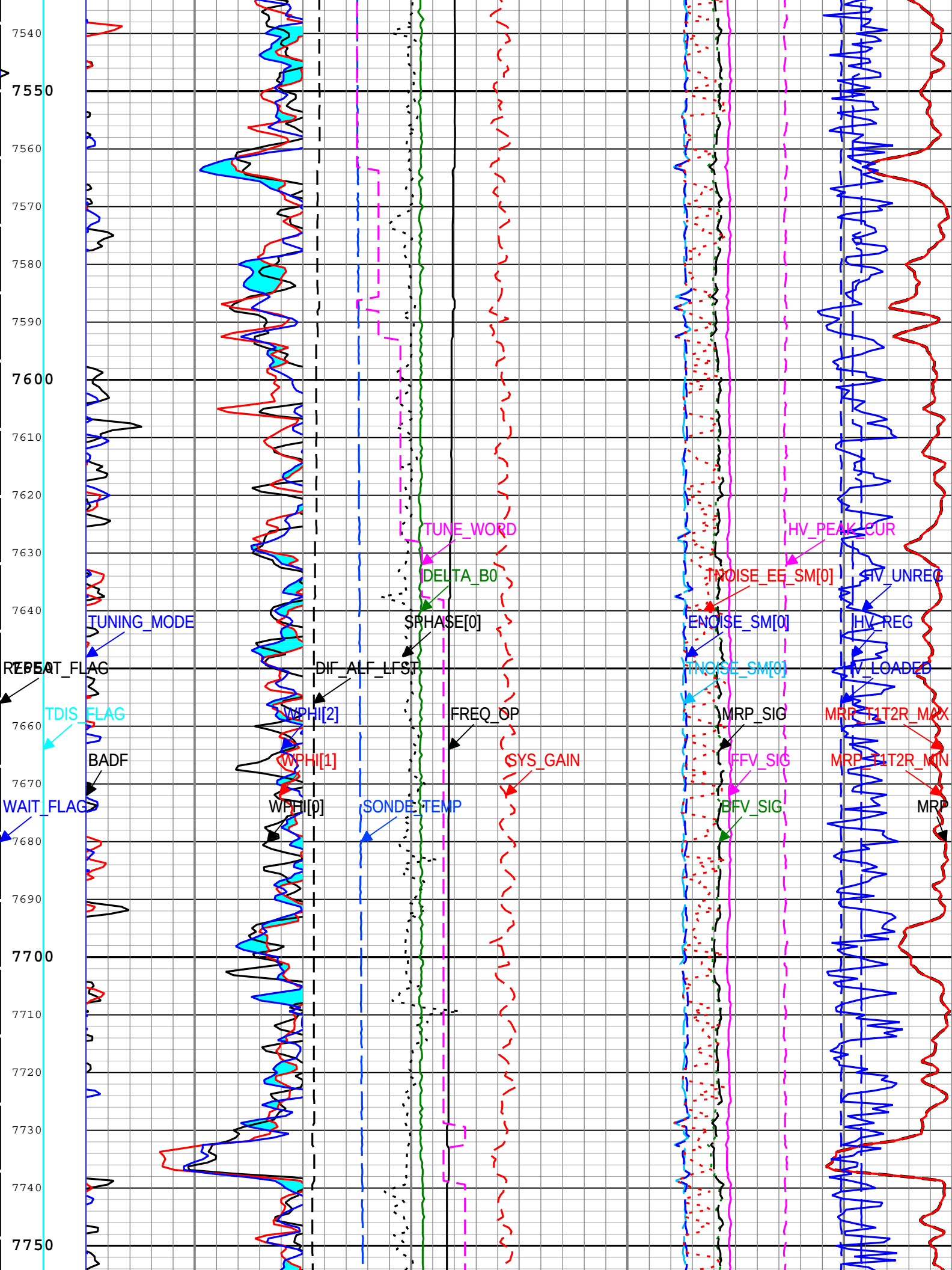
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FREQ_OP
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HV_PEAK_CUR
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FFV_SIG
BFV_SIG
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HV_REG
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WPHI[1]
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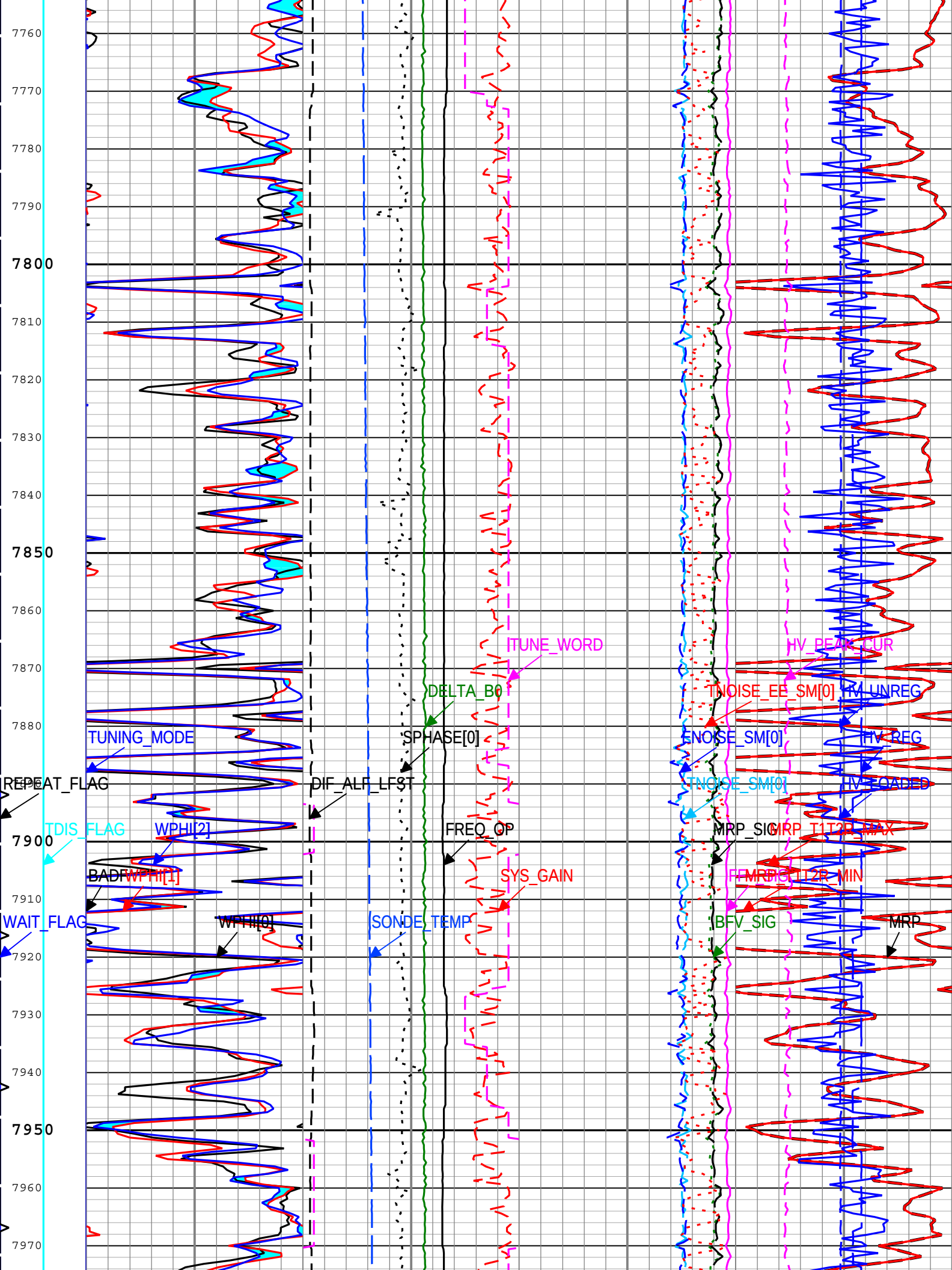
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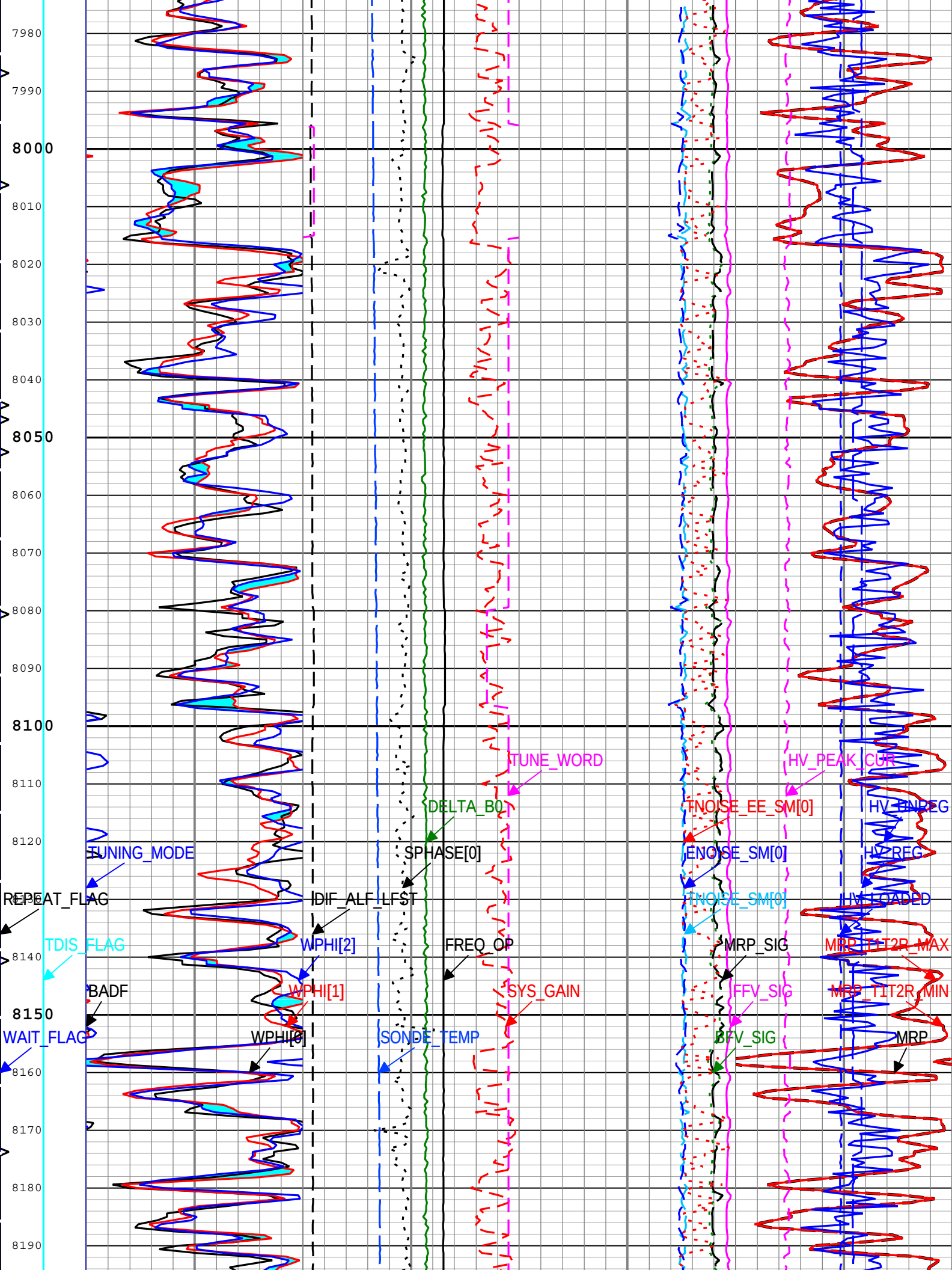
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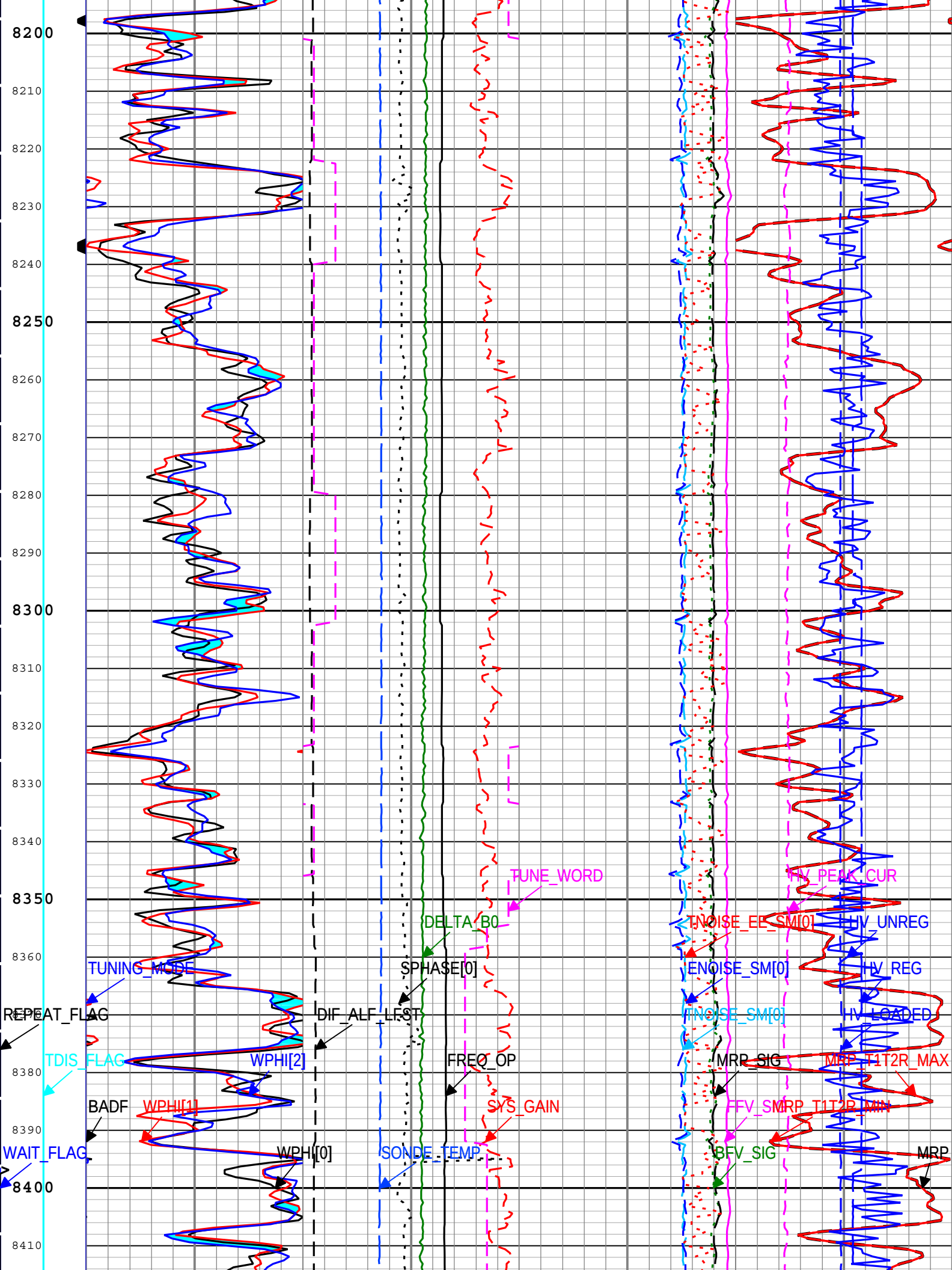
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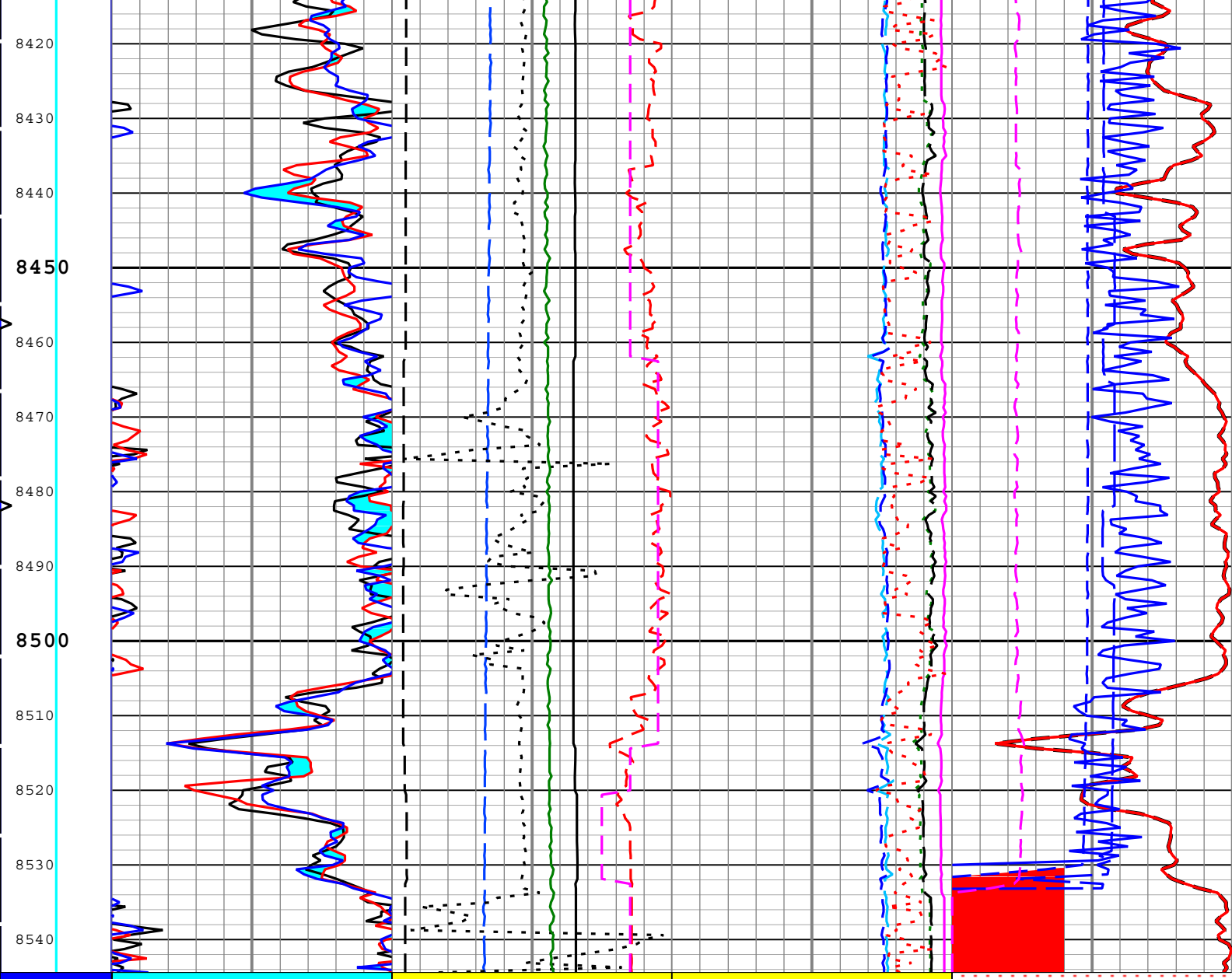


Insufficient Wait Time

Bad Hole Flag

Transmitter Disabled Flag (TDIS_FLAG) CMRT-B
-5 5

Repeated Data Frame Flag (REPEAT_FLAG) CMRT-B
0 10

Tuning Mode (TUNING_MODE) CMRT-B
-7 3

Window Porosity 2 to 3

Window Porosity (WPHI[0]) CMRT-B
0.4 ft3/ft3 0

Window Porosity (WPHI[1]) CMRT-B
0.4 ft3/ft3 0

Window Porosity (WPHI[2]) CMRT-B
0.4 ft3/ft3 0

Delta B0 Caution

Frequency Error

Sonde Temperature (SONDE_TEMP) CMRT-B
60 degF 160

System Gain (SYS_GAIN) CMRT-B
0 1

Operating Frequency (FREQ_OP) CMRT-B
2100 kHz 2300

Difference between Operating Frequency and Temperature-Corrected LFST Frequency (DIF_ALF_LFST) CMRT-B
0 kHz 200

Signal Phase (SPHASE[0]) CMRT-B
-180 deg 180

Caution Moderate Noise

Noise Out of Tolerance

Standard Deviation of Bound Fluid Volume (BFV_SIG) CMRT-B
0.1 ft3/ft3 0

Standard Deviation of Free Fluid Volume (FFV_SIG) CMRT-B
0.1 ft3/ft3 0

Standard Deviation of Magnetic Resonance Porosity (MRP_SIG) CMRT-B
0.1 ft3/ft3 0

Tool Hardware Noise per Echo from Sub-Measurements (TNOISE_SM[0]) CMRT-B
0.1 ft3/ft3 0

Enviromental Noise per Echo from Sub-Measurements (ENOISE_SM[0]) CMRT-B

MRP Max to Min

HV Loaded Below Limit

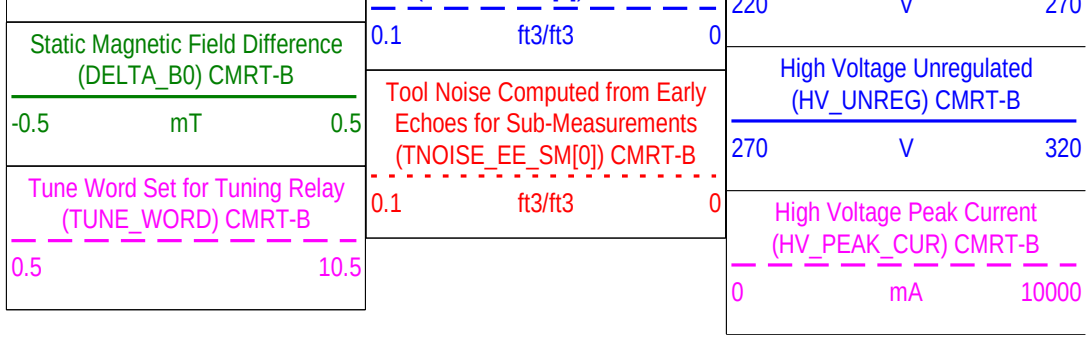
Magnetic Resonance Porosity (MRP) CMRT-B
0.4 ft3/ft3 0

Magnetic Resonance Porosity using Minimum T1/T2 Ratio (MRP_T1T2R_MIN) CMRT-B
0.4 ft3/ft3 0

Magnetic Resonance Porosity using Maximum T1/T2 Ratio (MRP_T1T2R_MAX) CMRT-B
0.4 ft3/ft3 0

High Voltage When Loaded (HV_LOADED) CMRT-B
220 V 270

High Voltage Regulated (HV_REG) CMRT-B



TIME_1900 - Time Marked every 60.00 (s)

Description: CMRT Depth Log LQC Format Format: Log (CMRT Depth Log LQC) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 10-Nov-2014 10:20:31

Channel Processing Parameters

Parameter	Description	Tool	Value	Unit
GAMMA_REG	Regularization Factors	CMRT-B	[1.5, 1.5, 0, 0, 0, 0]	
JOBID	Job Identification	WLSESSION	Cascade	
NSTACK	Number of Stacking Levels	CMRT-B	3	
POLC_SW	Polarization Correction Switch	CMRT-B	No	
T1CUT	T1 Cutoff between BFV and FFV	CMRT-B	50	ms
T1T2R_IN	T1/T2 Ratio Input	CMRT-B	2	
T1T2R_MAX	T1/T2 Ratio Maximum	CMRT-B	3	
T1T2R_MIN	T1/T2 Ratio Minimum	CMRT-B	1	
T2CUT	T2 Cutoff between BFV and FFV	CMRT-B	100	ms
T2CUT_TAPER	Start of Tapered T2 Cutoff	CMRT-B	25	ms

Tool Control Parameters

Parameter	Description	Tool	Value	Unit
ACQ_METHOD_OPT	Acquisition Method Option	CMRT-B	SEQ	
ALF_PHDIF_AVE	Average of Auto-Larmor-Frequency Phase Difference during LFST	CMRT-B	12.83	deg
ALF_PHDIF_STD	Standard Deviation of Auto-Larmor-Frequency Phase Difference during LFST	CMRT-B	0.27	deg
DHC_VERS	DH Controller Code Version	CMRT-B	17	
DLSR	Depth Log Sample Rate	CMRT-B	7.5	in
DSP_VERS	DH Signal Processing Code Version	CMRT-B	14	
EPM_OPT	Enhanced Precision Mode Option	CMRT-B	On	
FREQ_OP_PREV	Operating Frequency, prior to new LFST, at LFST Temperature	CMRT-B	2240	kHz
LFST_CFREQ	LFST Central Frequency	CMRT-B	2240	kHz
LFST_FREQ	LFST Frequency	CMRT-B	2238	kHz
LFST_TEMP	LFST Temperature	CMRT-B	156.8	degF
LFST_TEMP_DEL	LFST Temperature Variation	CMRT-B	38.82	degF
LFST_TT_OFFSET	LFST Tune Table Offset	CMRT-B	-2.5	kHz
LOG_DIRECTION	Logging Direction	CMRT-B	Up	
LOG_MODE_CMR	Logging Mode for CMR	CMRT-B	DEPTH_B_MODE_EXPERT	
LOG_SPEED	Optimal Logging Speed	CMRT-B	700	ft/h
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	840	ft/h
MAX_TOOL_SPEED	Maximum service speed allowed for, or attained by, a logging tool.	CMRT-B	840	ft/h
NECH_V	Number of Echo Amplitudes Vector	CMRT-B	[5000, 30, 0, 0, 0, 0]	
NWT	Number of Wait Times	CMRT-B	2	
PT_V	Polarization Times Vector	CMRT-B	[6.49, 0.02, 0, 0, 0, 0]	s
RPTN_V	Number of Repetitions Vector	CMRT-B	[1, 10, 0, 0, 0, 0]	
SLSR	Station Log Sample Rate	CMRT-B	0	s
TE_V	Echo Spacings Vector	CMRT-B	[200, 200, 0, 0, 0, 0]	us

WT_V	Wait Times Vector	CMRT-B	[1.95, 0.02, 0, 0, 0, 0]	s

ONE

Main Pass - CMR Log

Software Version

Acquisition System	Version
MaxWell	4.0.9163.3000
Application Patch	Patch-SP-10767_18214-4.0.9163.3001
	Patch-NPD_NEXT_C_Fld2-20493-4.0.9434.3002
	Patch-Hotfix_Task_Tree_GDI_SP2-20806-4.0.9434.3002
	Patch-Hotfix_MDT_18214-22198-4.0.9434.3002

Computation	Description	Version
HENVIR	Computation Ensemble for the HGNS Neutron environmental corrections	4.0.9360.3000

Tool Elements	Description	Software Version	Firmware Version
CMRS	CMRT sonde consists of magnets to create a permanent magnetic field as well as an antenna and necessary circuitry to generate an oscillating magnetic field	4.0.9360.3000	
HRGD-H	HILT Resistivity Gamma-Ray Density Device, 150 degC	4.0.9385.3000	3.0
HGNS-H	HILT Gamma-Ray and Neutron Sonde, 150 degC	4.0.9385.3000	2.0

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[5]:Up	Up	348.49 ft	8588.12 ft	10-Nov-2014 4:56:43 AM	10-Nov-2014 9:20:17 AM	ON	14.40 ft	Yes

All depths are referenced to toolstring zero

Log

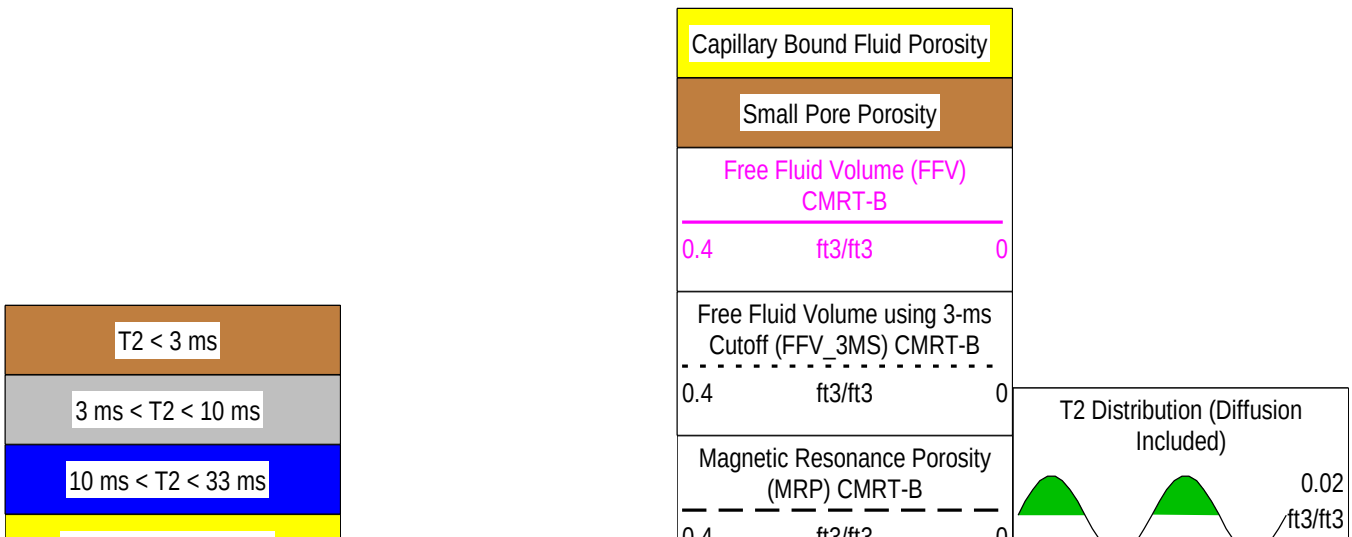
Company:Cascade Petroleum LLC Well:Gaede 9S-55W-8-16 ONE: Log[5]:Up:S008

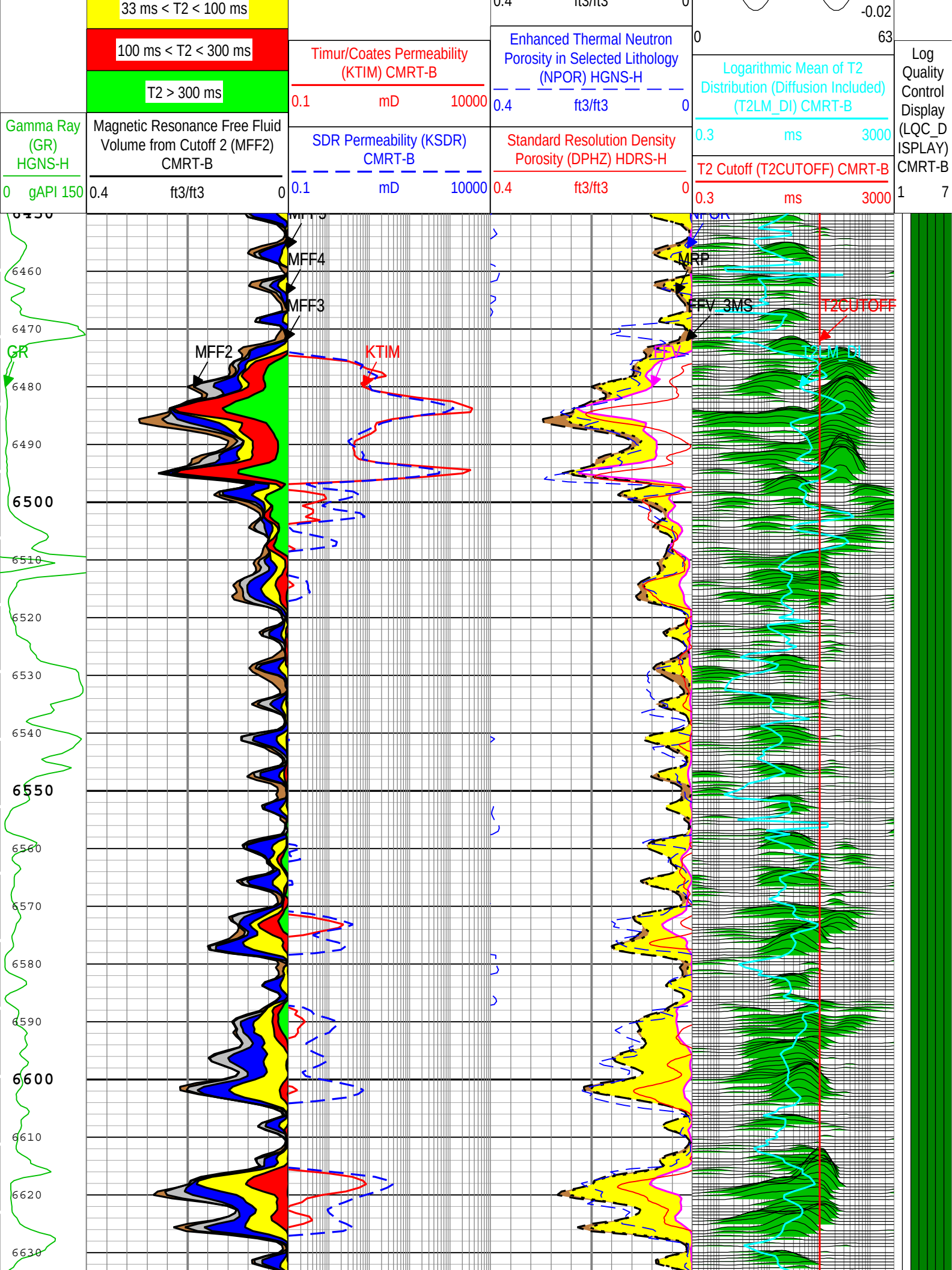
Description: CMRT Depth Log Main Format Format: Log (CMRT Depth Log Main) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 10-Nov-2014 10:20:36

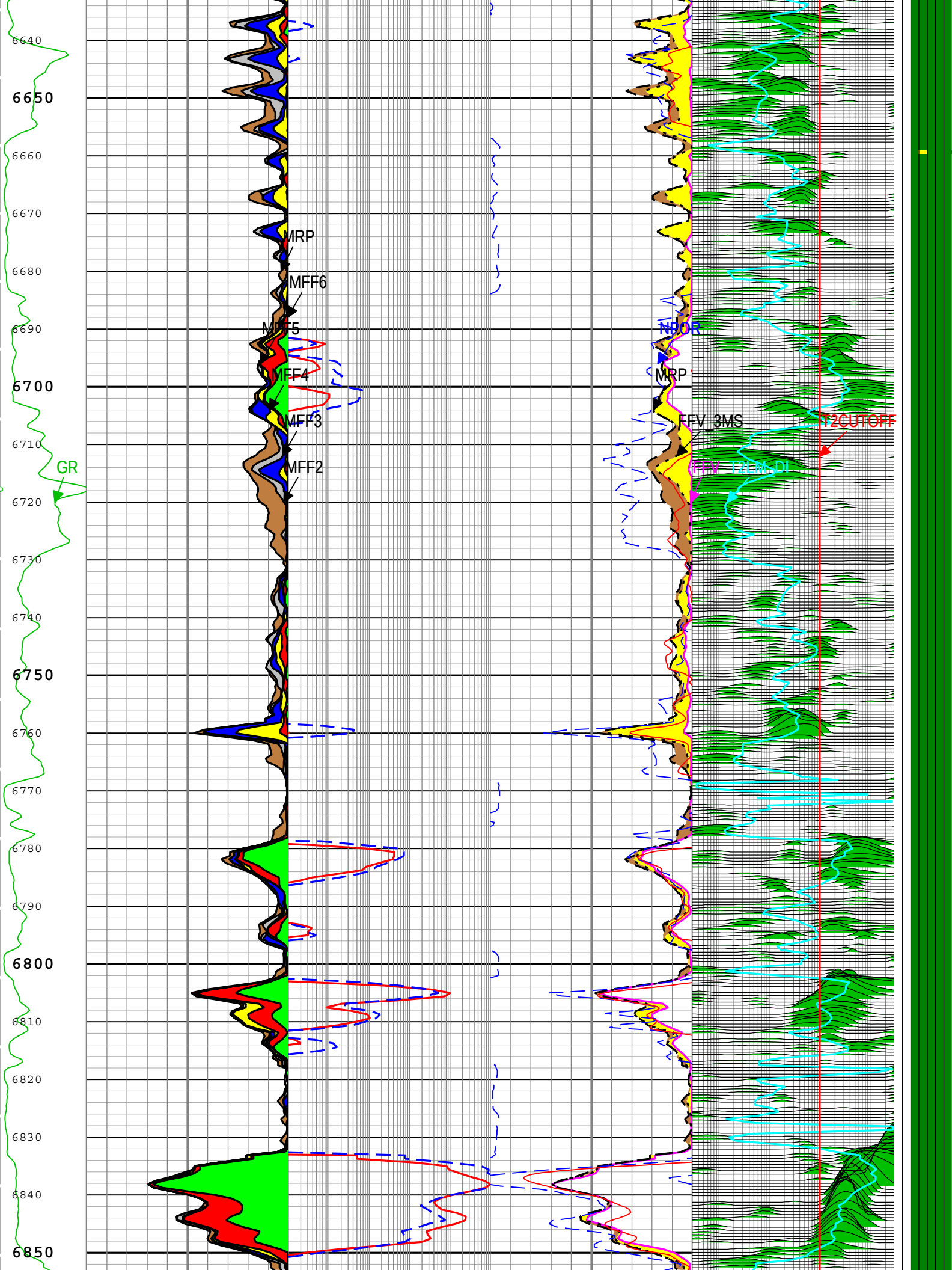
Log Quality Control Display (LQC_DISPLAY) CMRT-B

1 - BHS - Bad Hole Flag :	Good	Bad			
2 - IWT - Wait Time :	OK	Insufficient			
3 - DB0 - Delta B0 :	OK	Warning	Error		
4 - EEN - Early Echo Noise :	OK	Warning	Error		
5 - HVL - High Voltage :	Normal	Too Low			
6 - ATS - Auto Tuning :	ALF	Ant	Temp	Off	
7 - ATTS - AT Tracking :	OK	Warning			

TIME_1900 - Time Marked every 60.00 (s)




33 ms < T2 < 100 ms
100 ms < T2 < 300 ms
T2 > 300 ms
Gamma Ray (GR) HGNS-H
0 gAPI 150
Magnetic Resonance Free Fluid Volume from Cutoff 2 (MFF2) CMRT-B
0.4 ft3/ft3 0
Timur/Coates Permeability (KTIM) CMRT-B
0.1 mD 10000
SDR Permeability (KSDR) CMRT-B
0.1 mD 10000
Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H
0.4 ft3/ft3 0
Standard Resolution Density Porosity (DPHZ) HDRS-H
0.4 ft3/ft3 0
-0.02
0 63
Logarithmic Mean of T2 Distribution (Diffusion Included) (T2LM_DI) CMRT-B
0.3 ms 3000
T2 Cutoff (T2CUTOFF) CMRT-B
0.3 ms 3000
Log Quality Control Display (LQC_DISPLAY) CMRT-B
1 7
MFF4
MFF3
MFF2
KTIM
MRP
FFV_3MS
T2CUTOFF
T2LM_DI
GR
6460
6470
6480
6490
6500
6510
6520
6530
6540
6550
6560
6570
6580
6590
6600
6610
6620
6630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6660
6670
6680
6690
6700
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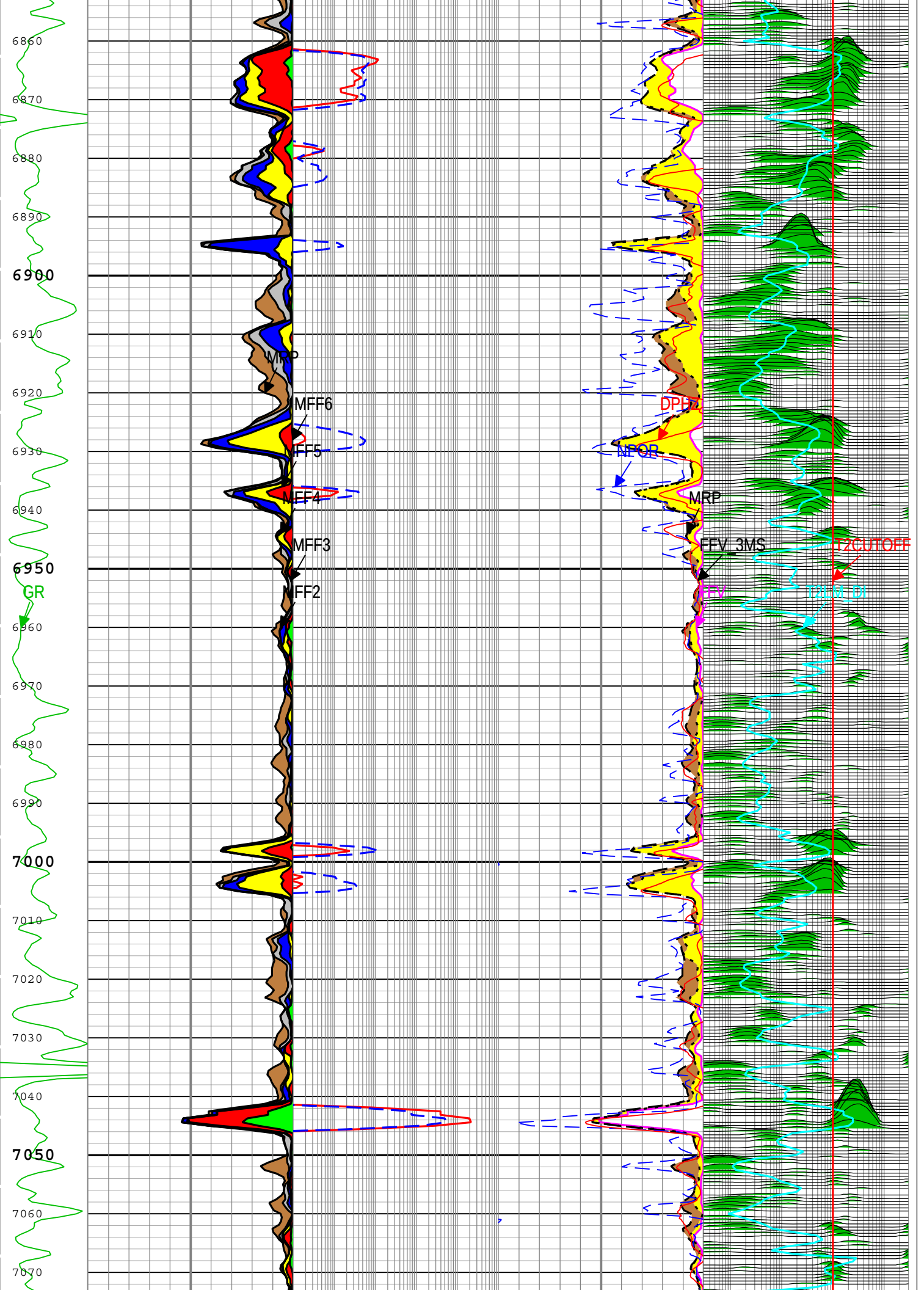
6720
6730
6740
6750
6760
6770
6780
6790
6800
6810
6820
6830
6840
6850
MRP
MFF6
MFF5
MFF4
MFF3
MFF2
GR
NPOR
MRP
FFV_3MS
T2CUTOFF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6980
6990
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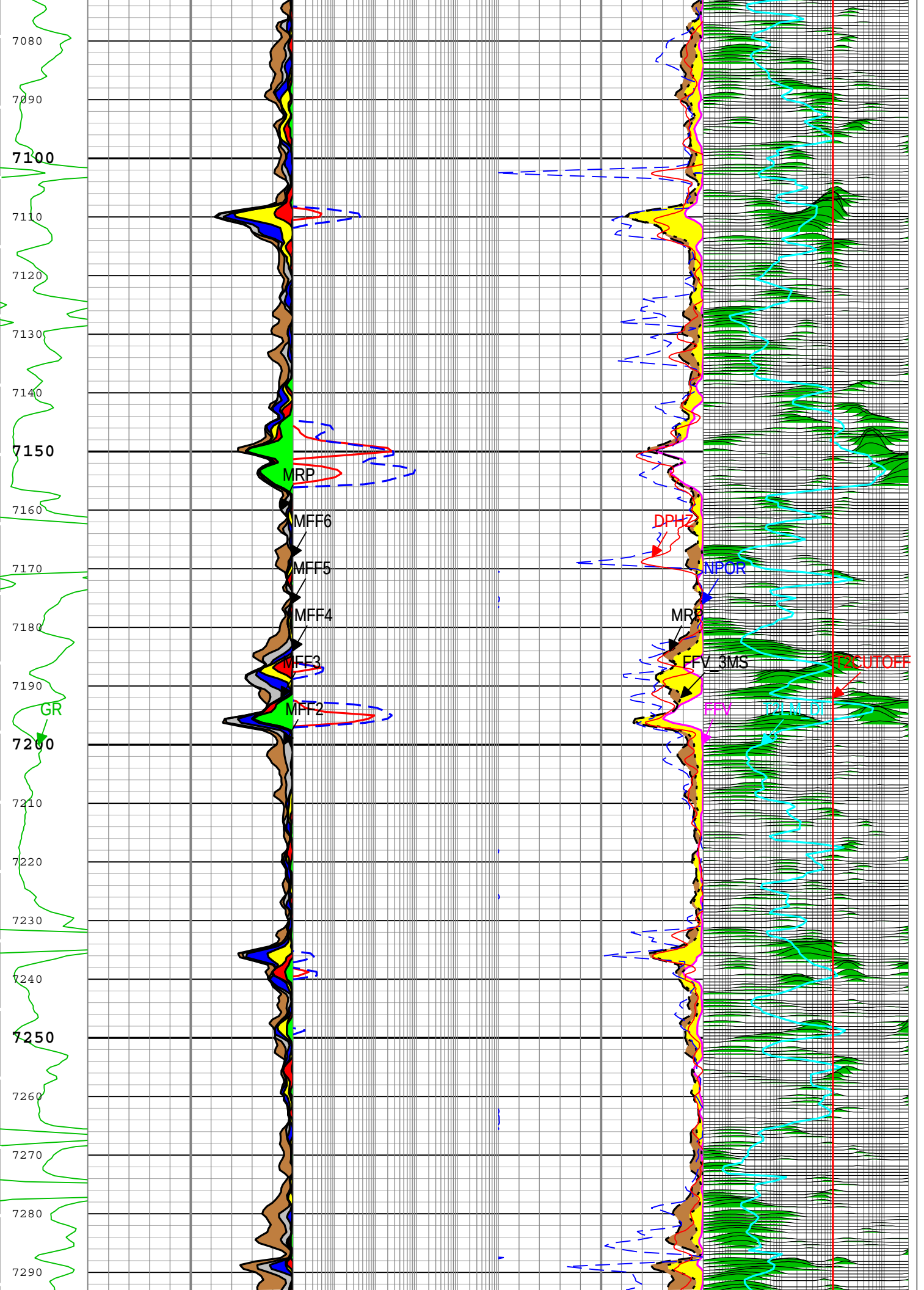
7010
7020
7030
7040
7050
7060
7070
GR
MRP
MFF6
MFF5
MFF4
MFF3
MFF2
DPHZ
NPOR
MRP
FFV_3MS
T2CUTOFF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7110
7120
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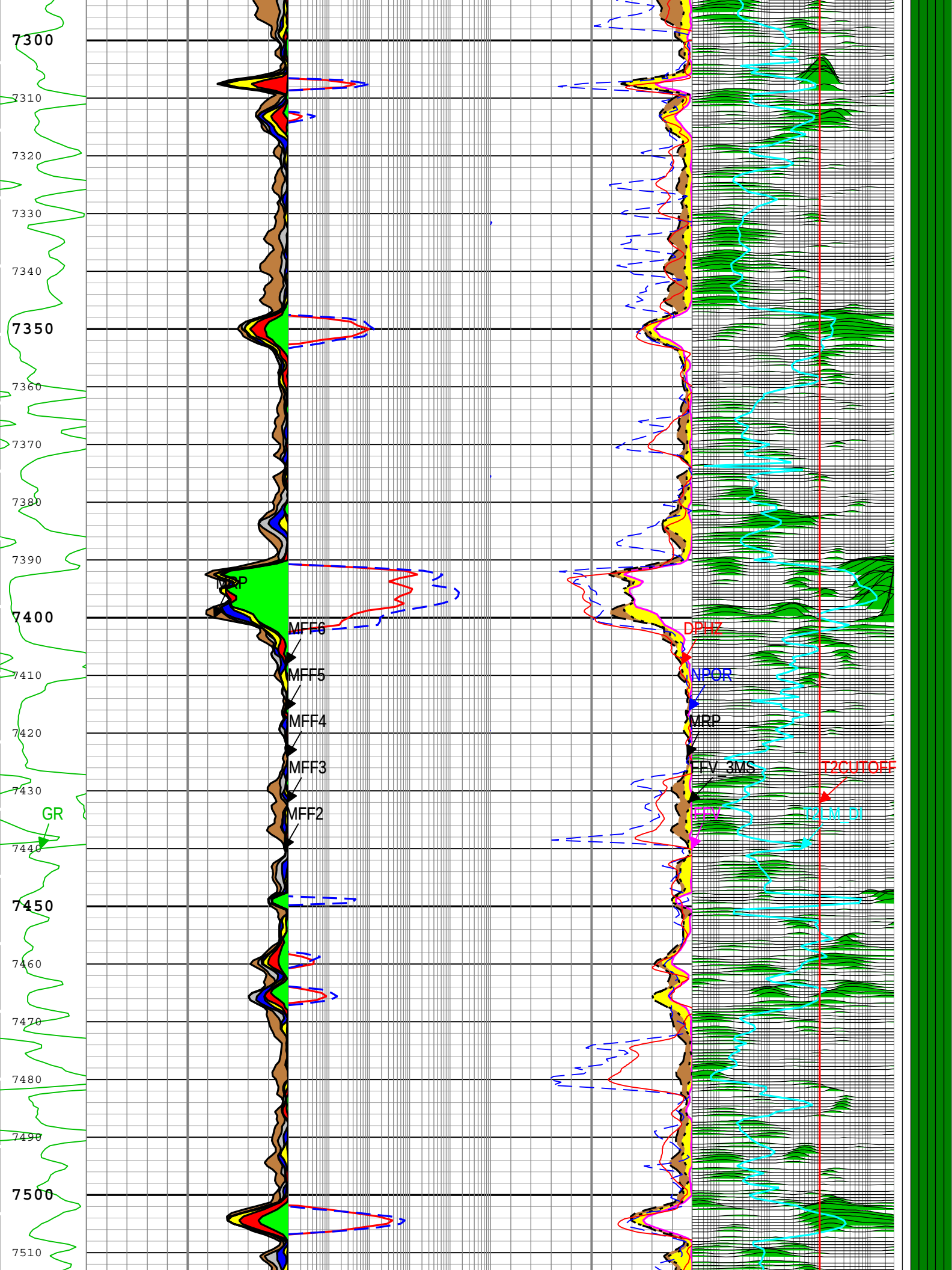
7170
7180
7190
7200
7210
7220
7230
7240
7250
7260
7270
7280
7290
GR
MRP
MFF6
MFF5
MFF4
MFF3
MFF2
DPHZ
NPOR
MRP
FFV_3MS
FFV
T2CUTOFF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7310
7320
7330
7340
7350
7360
7370
7380
7390
7400
7410
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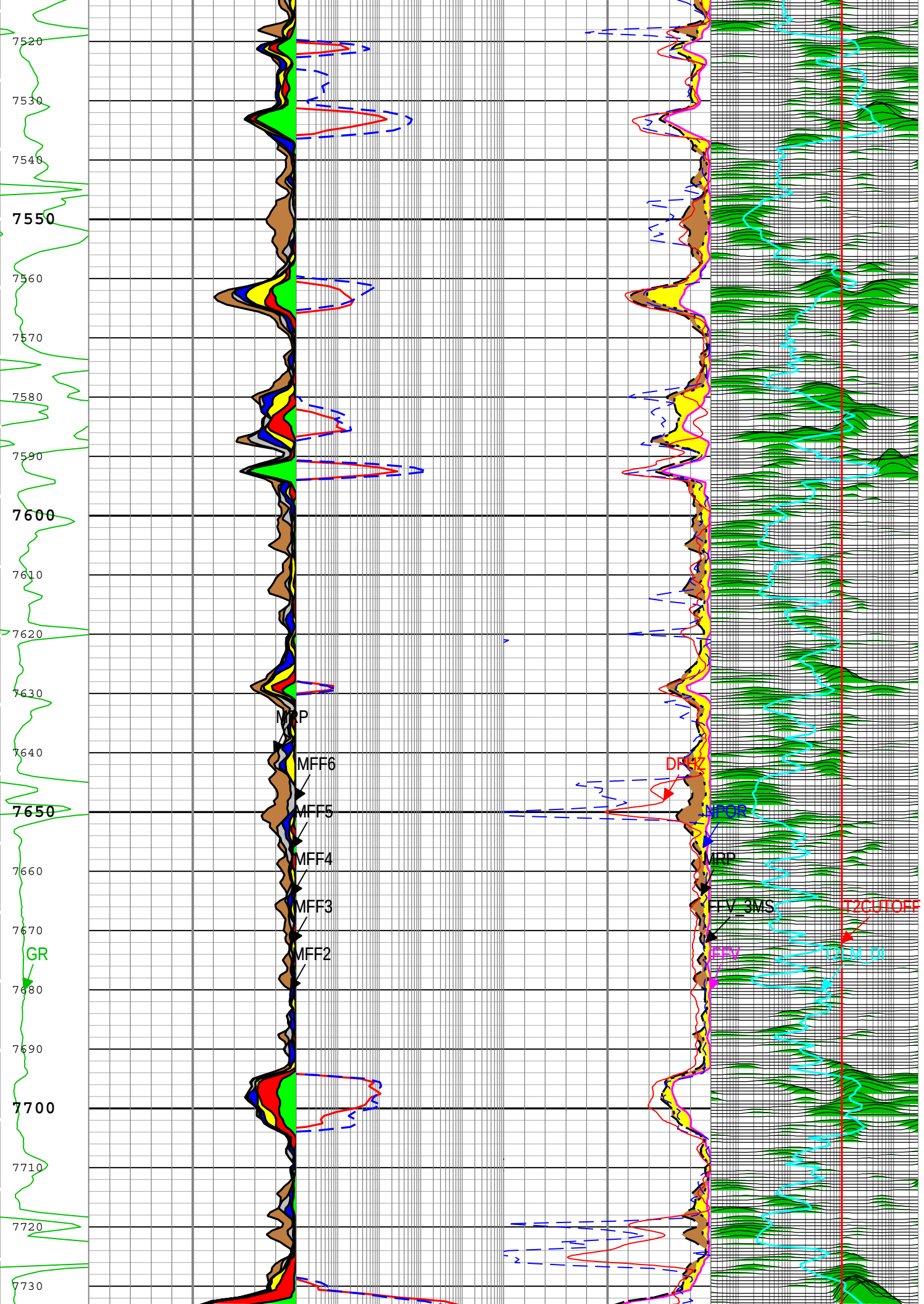
7450
7460
7470
7480
7490
7500
7510
MRP
MFF6
MFF5
MFF4
MFF3
MFF2
GR
DPHZ
NPOR
MRP
FFV_3MS
FFV
T2CUTOFF
CBW_DI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7590
7600
7610
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7640
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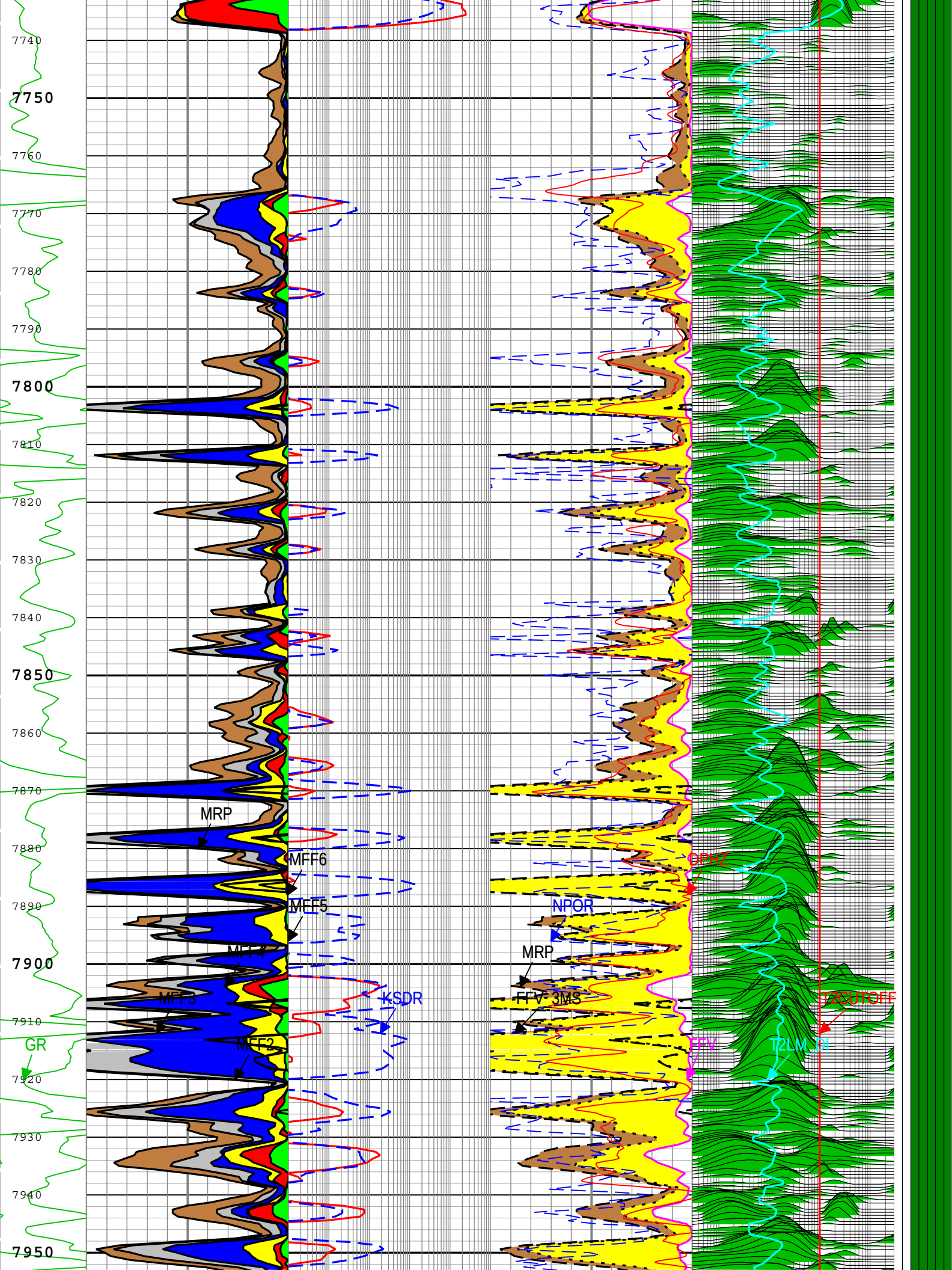
7660
7670
7680
7690
7700
7710
7720
7730
MRP
MFF6
MFF5
MFF4
MFF3
MFF2
GR
DPHZ
NPOR
MRP
EFV_3MS
T2CUTOFF
T2LM_P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7910
7920
7930
7940
7950
MRP
MFF6
MFF5
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MFF3
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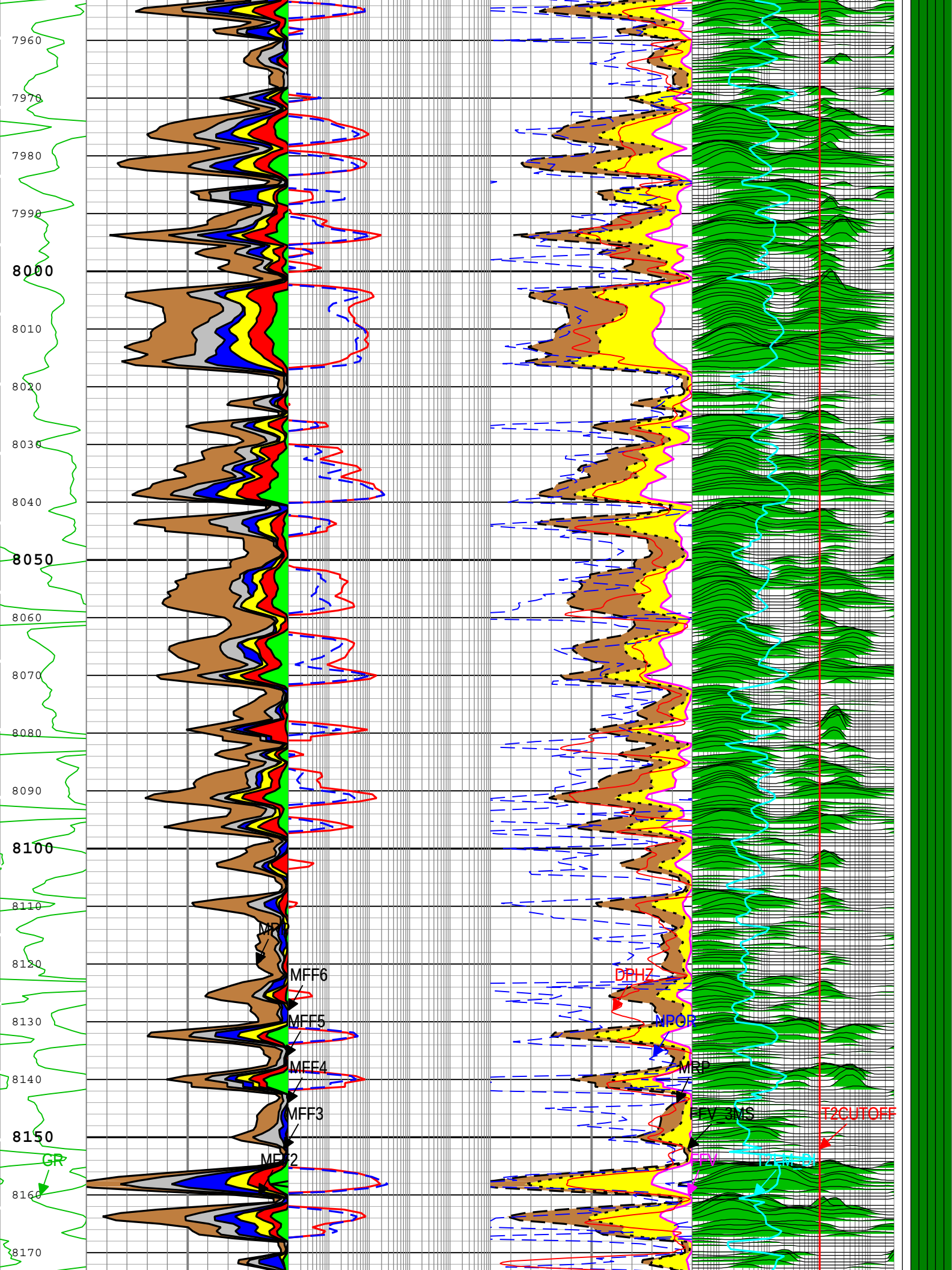
KSDR
GR
NPOR
MRP
FFV
3MS
CPHZ
T2LM
T2CUTOFF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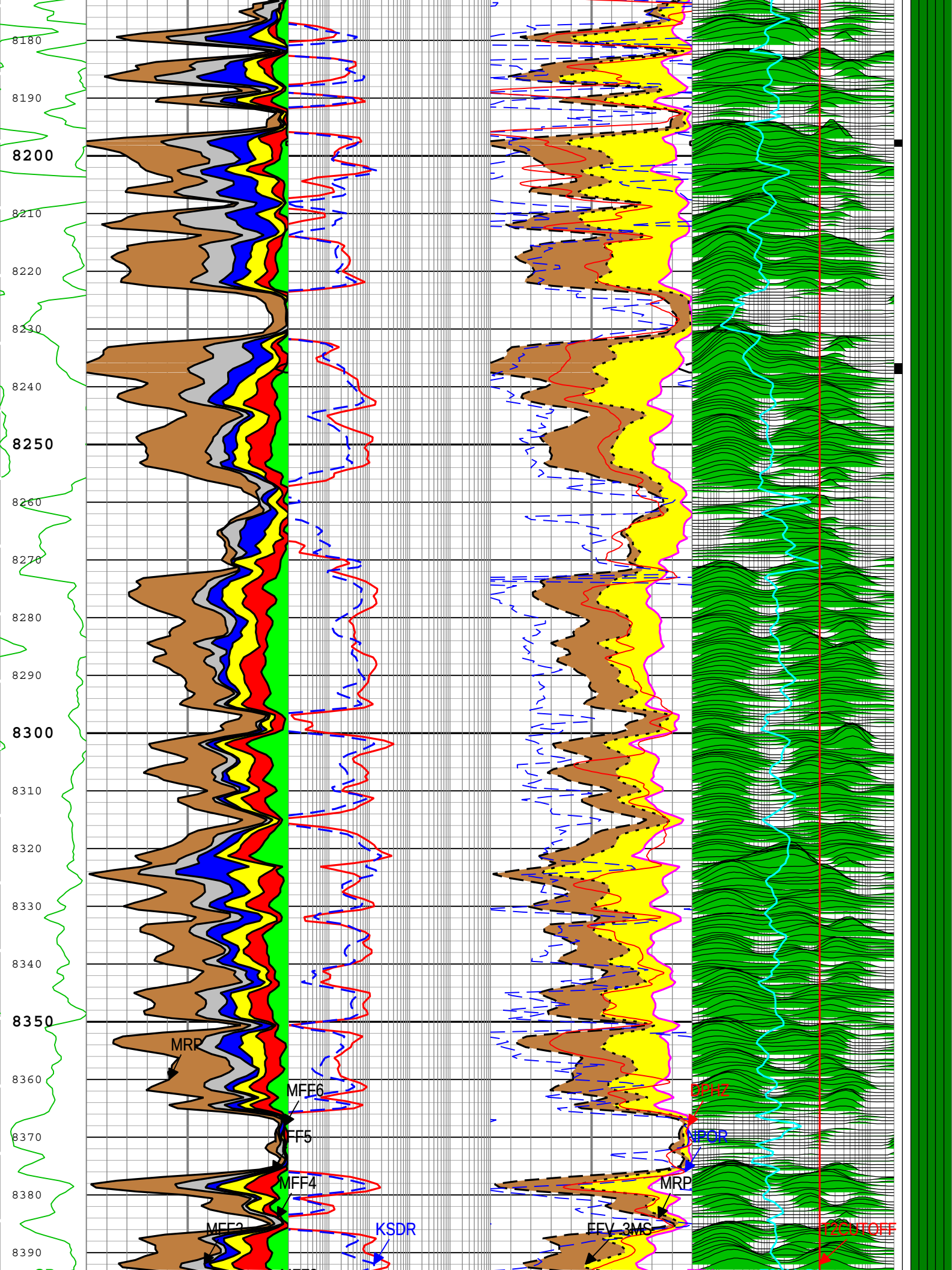
7970
7980
7990
8000
8010
8020
8030
8040
8050
8060
8070
8080
8090
8100
8110
8120
8130
8140
8150
8160
8170
MFF6
MFF5
MFF4
MFF3
MFF2
GR
DPHZ
NPOR
MRP
FFV_3MS
T2CUTOFF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8380
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MFF5
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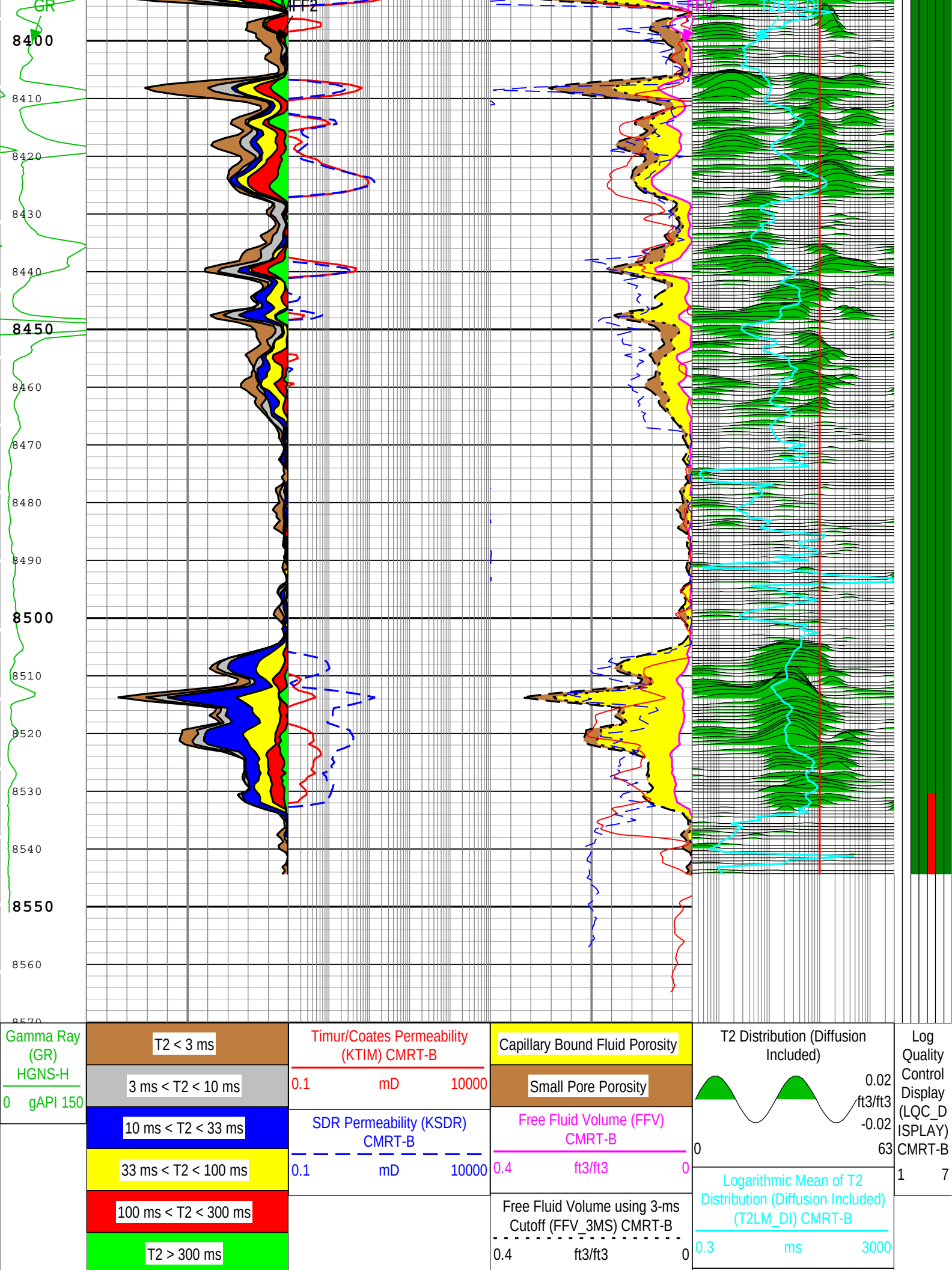
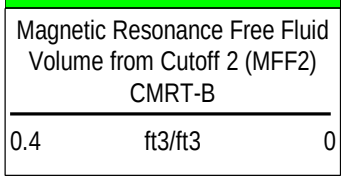
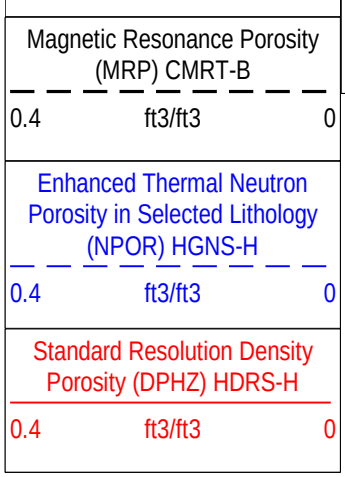
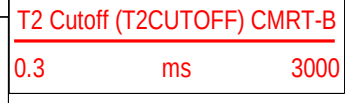
MFF3
KSDR
UPHZ
NPOR
MRP
FFV_3MS
RZCUTOFF


GR
MFF2
8400
8410
8420
8430
8440
8450
8460
8470
8480
8490
8500
8510
8520
8530
8540
8550
8560
8570
Gamma Ray (GR) HGNS-H
0 gAPI 150
T2 < 3 ms
3 ms < T2 < 10 ms
10 ms < T2 < 33 ms
33 ms < T2 < 100 ms
100 ms < T2 < 300 ms
T2 > 300 ms
Timur/Coates Permeability (KTIM) CMRT-B
0.1 mD 10000
SDR Permeability (KSDR) CMRT-B
0.1 mD 10000
Capillary Bound Fluid Porosity
Small Pore Porosity
Free Fluid Volume (FFV) CMRT-B
0.4 ft3/ft3 0
Free Fluid Volume using 3-ms Cutoff (FFV_3MS) CMRT-B
0.4 ft3/ft3 0
T2 Distribution (Diffusion Included)
0.02 ft3/ft3 -0.02
0 63
Logarithmic Mean of T2 Distribution (Diffusion Included) (T2LM_DI) CMRT-B
0.3 ms 3000
Log Quality Control Display (LQC_DISPLAY) CMRT-B
1 7







TIME_1900 - Time Marked every 60.00 (s)

Log Quality Control Display (LQC_DISPLAY) CMRT-B

1 - BHS - Bad Hole Flag :	Good	Bad		
2 - IWT - Wait Time :	OK	Insufficient		
3 - DB0 - Delta B0 :	OK	Warning	Error	
4 - EEN - Early Echo Noise :	OK	Warning	Error	
5 - HVL - High Voltage :	Normal	Too Low		
6 - ATS - Auto Tuning :	ALF	Ant	Temp	Off
7 - ATTS - AT Tracking :	OK	Warning		

Description: CMRT Depth Log Main Format Format: Log (CMRT Depth Log Main) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 10-Nov-2014 10:20:36

Channel Processing Parameters

Parameter	Description	Tool	Value	Unit
BARI	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BHT	Bottom Hole Temperature	Borehole	194	degF
BS	Bit Size	WLSESSION	7.875	in
BSAL	Borehole Salinity	Borehole	1400	ppm
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.5	in
CBLO	Casing Bottom (Logger)	WLSESSION	544	ft
CDEN	Cement Density	HGNS-H	2	g/cm3
DFD	Drilling Fluid Density	Borehole	8.9	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DHC	Density Hole Correction	HDRS-H	Bit Size	
FD	Fluid Density	Borehole	1	g/cm3
FSAL	Formation Salinity	Borehole	0	ppm
GAMMA_REG	Regularization Factors	CMRT-B	[1.5, 1.5, 0, 0, 0, 0]	
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	AMF	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	CTEM	
HSCO	Hole Size Correction Option	HGNS-H	Yes	
JOBID	Job Identification	WLSESSION	Cascade	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	LIMESTONE	
MDEN	Matrix Density for Density Porosity	Borehole	2.71	g/cm3
MFST	Mud Filtrate Sample Temperature	Borehole	68	degF
NSTACK	Number of Stacking Levels	CMRT-B	3	
POLC_SW	Polarization Correction Switch	CMRT-B	No	

RMFS	Resistivity of Mud Filtrate Sample	Borehole	0.15	ohm.m
SOCO	Standoff Correction Option	HGNS-H	Yes	
T1CUT	T1 Cutoff between BFV and FFV	CMRT-B	50	ms
T1T2R_IN	T1/T2 Ratio Input	CMRT-B	2	
T1T2R_MAX	T1/T2 Ratio Maximum	CMRT-B	3	
T1T2R_MIN	T1/T2 Ratio Minimum	CMRT-B	1	
T2CUT	T2 Cutoff between BFV and FFV	CMRT-B	100	ms
T2CUT_TAPER	Start of Tapered T2 Cutoff	CMRT-B	25	ms

Tool Control Parameters

Parameter	Description	Tool	Value	Unit
ACQ_METHOD_OPT	Acquisition Method Option	CMRT-B	SEQ	
ALF_PHDIF_AVE	Average of Auto-Larmor-Frequency Phase Difference during LFST	CMRT-B	12.83	deg
ALF_PHDIF_STD	Standard Deviation of Auto-Larmor-Frequency Phase Difference during LFST	CMRT-B	0.27	deg
DHC_VERS	DH Controller Code Version	CMRT-B	17	
DLSR	Depth Log Sample Rate	CMRT-B	7.5	in
DSP_VERS	DH Signal Processing Code Version	CMRT-B	14	
EPM_OPT	Enhanced Precision Mode Option	CMRT-B	On	
FREQ_OP_PREV	Operating Frequency, prior to new LFST, at LFST Temperature	CMRT-B	2240	kHz
HMCA_BRD_TYPE	HMCA Board Type	HGNS-H	1	
HRGD_BRD_TYPE	HRGD Board Type	HDRS-H	WITH_HET	
LFST_CFREQ	LFST Central Frequency	CMRT-B	2240	kHz
LFST_FREQ	LFST Frequency	CMRT-B	2238	kHz
LFST_TEMP	LFST Temperature	CMRT-B	156.8	degF
LFST_TEMP_DEL	LFST Temperature Variation	CMRT-B	38.82	degF
LFST_TT_OFFSET	LFST Tune Table Offset	CMRT-B	-2.5	kHz
LOG_DIRECTION	Logging Direction	CMRT-B	Up	
LOG_MODE_CMR	Logging Mode for CMR	CMRT-B	DEPTH_B_MODE_EXPERT	
LOG_SPEED	Optimal Logging Speed	CMRT-B	700	ft/h
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	840	ft/h
MAX_TOOL_SPEED	Maximum service speed allowed for, or attained by, a logging tool.	CMRT-B	840	ft/h
NECH_V	Number of Echo Amplitudes Vector	CMRT-B	[5000, 30, 0, 0, 0, 0]	
NWT	Number of Wait Times	CMRT-B	2	
PT_V	Polarization Times Vector	CMRT-B	[6.49, 0.02, 0, 0, 0, 0]	s
RPTN_V	Number of Repetitions Vector	CMRT-B	[1, 10, 0, 0, 0, 0]	
SLSR	Station Log Sample Rate	CMRT-B	0	s
TE_V	Echo Spacings Vector	CMRT-B	[200, 200, 0, 0, 0, 0]	us
WT_V	Wait Times Vector	CMRT-B	[1.95, 0.02, 0, 0, 0, 0]	s

Calibration Report

CMRT-B (Combinable Magnetic Resonance Tool - BA/BB/VA/BAH) Calibration - Run ONE

Primary Equipment :

CMRT Normal Pressure Sonde	CMRS	144

Auxiliary Equipment :

CMRT Cartridge Element 30kpsi	CMRC	78

CMRT Water Bottle Calibration - Water Bottle Calibration

Master (EEPROM): 12:30:00 24-Oct-2014 Before (Measured): 14:54:13 08-Nov-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Reciprocal of the MC Amplitude Corrected to 25 degC		Master	0.030	0.020	0.037	0.040
		Before	0.030	0.020	0.038	0.040
		Before-Master	-----	-----	0.001	-----

Test Loop Amplitude During MC		Master	2350.000	1500.000	1700.978	3200.000	
		Before	2350.000	1500.000	1667.468	3200.000	
		Before-Master	-----	-----	-33.510	-----	
Oper Freq During MC	kHz	Master	2240.000	2130.000	2272.000	2350.000	
		Before	2240.000	2130.000	2278.600	2350.000	
		Before-Master	-----	-----	6.600	-----	
Sonde Temp During MC	degF	Master	80.600	50.000	71.166	111.200	
		Before	80.600	50.000	60.607	111.200	
		Before-Master	-----	-----	-10.559	-----	
Noise Per Echo - 0	ft3/ft3	Master	-----	-----	-----	-----	
		Before	0.100	0	0.033	0.200	
		Before-Master	-----	-----	-----	-----	
Signal-to-Noise Ratio for MC - 0		Master	-----	-----	-----	-----	
		Before	675.000	350.000	798.817	1000.000	
		Before-Master	-----	-----	-----	-----	
Log Mean of the T2 Dist - 0	ms	Master	-----	-----	-----	-----	
		Before	52.500	45.000	61.819	60.000	
		Before-Master	-----	-----	-----	-----	

Company: Cascade Petroleum LLC

Schlumberger

Well: Gaede 9S-55W-8-16

Field: Wildcat

County: Lincoln

State: Colorado

Platform Express

CMR

Combinable Magnetic Resonance