

Company: Noble Energy Inc

Well: Bison Ridge Y22-719

Field: Wattenberg

County: Weld State: Colorado

RESEVOIR SATURATION TOOL  
NEUTRON LOG  
GAMMA RAY / CCL / TEMPERATURE / PRESSURE

County: Weld  
Field: Wattenberg  
Location: NWSE Sec. 10, T2N, R64W  
Well: Bison Ridge Y22-719  
Company: Noble Energy Inc

Location:		NWSE Sec. 10, T2N, R64W		Elev.: K.B. 4953.00 ft	
SHL: 2640' FSL & 589' FEL		Lat/Long: 40.15182 / -104.5352		G.L. 4923.00 ft	
Permanent Datum:		Ground Level		Elev.: 4923.00 f	
Log Measured From:		Kelly Bushing		30.00 ft above Perm.Datum	
Drilling Measured From:		Kelly Bushing			
API Serial No.	Section:	Township:	Range:		
05-123-45369	10	2N	64W		

Logging Date 28-Sep-2018

Run Number TWO

Depth Driller 17193.00 ft

Schlumberger Depth 17193.00 ft

Bottom Log Interval 6595.00 ft

Top Log Interval 200.00 ft

Casing Fluid Type Crude or Produced Oil

Salinity

Density 7.5 lbm/gal

Fluid Level 0.00 ft

BIT/CASING/TUBING STRING

Bit Size 8.50 in

From 2041.00 ft

To 17193.00 ft

Casing/Tubing Size 2.375 in

Weight 4.70 lbm/ft

Grade 180

From 0.00 ft

To 7070.60 ft

Max Recorded Temperatures 213 degF

Logger on Bottom 28-Sep-2018 08:54:00

Unit Number 9108 Location: Fort Morgan, CO

Recorded By A.BLOCHOWICZ

Witnessed By SHELDON KELLEY

Disclaimer

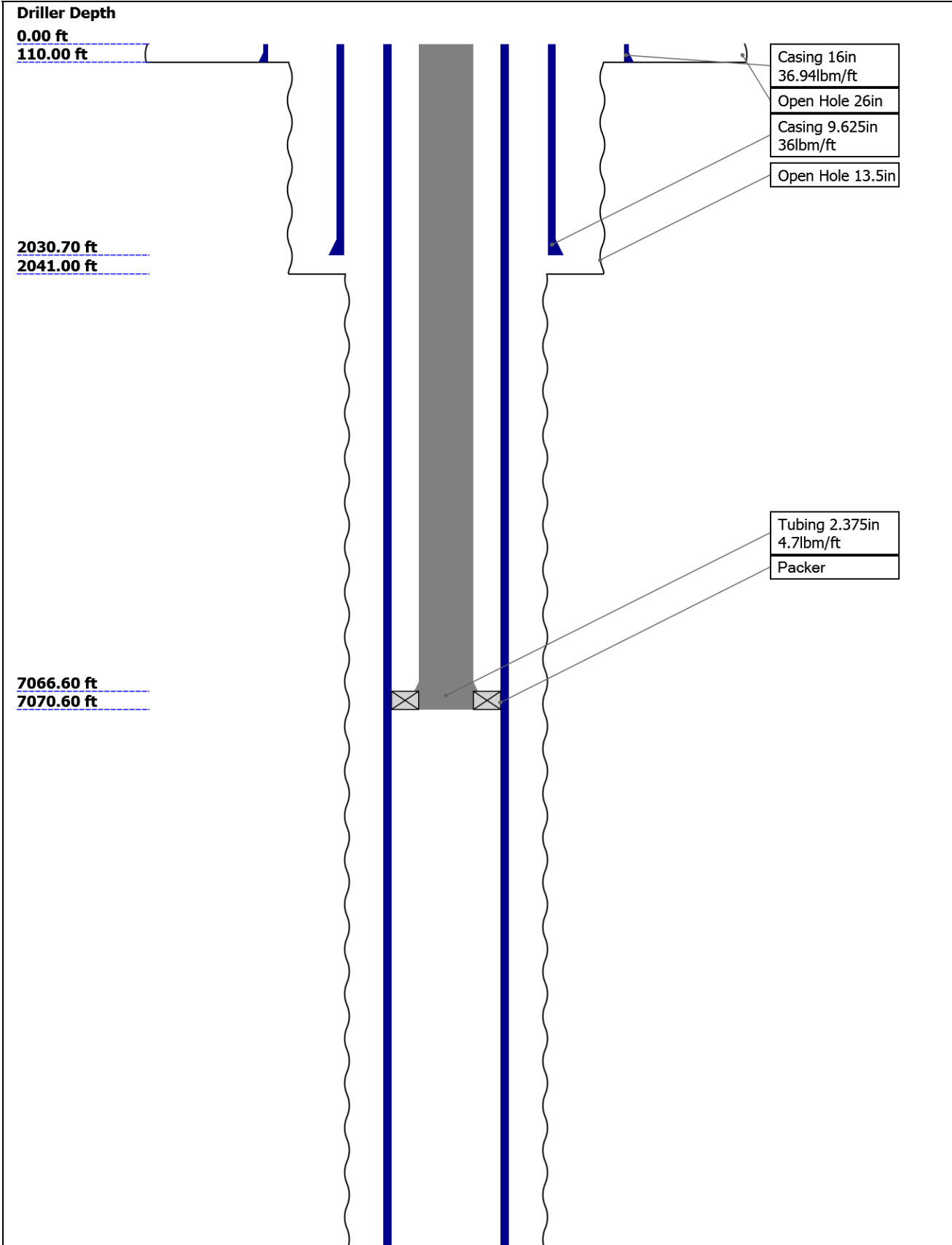
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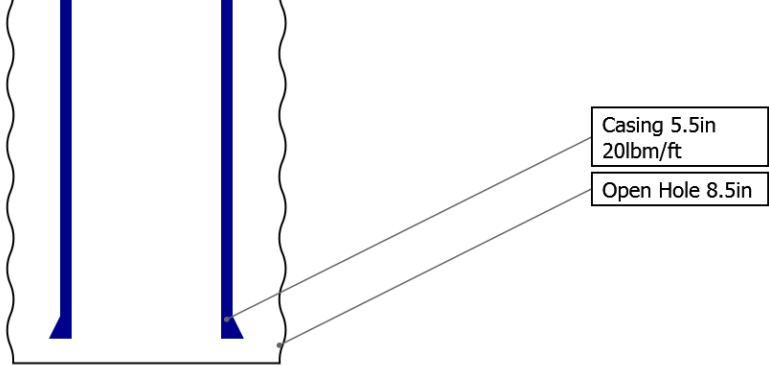
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Well Sketch




17183.20 ft  
17193.00 ft



Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	26	13.5	8.5			
Top Driller ( ft )	0	110	2041			
Top Logger ( ft )	0	110	2041			
Bottom Driller ( ft )	110	2041	17193			
Bottom Logger ( ft )	110	2041	17193			
Casing						
Size ( in )	16	9.625	5.5			
Weight ( lbm/ft )	36.94	36	20			
Inner Diameter ( in )	15.572	8.921	4.778			
Grade	N/A	J55	P110			
Top Driller ( ft )	0	0	0			
Top Logger ( ft )	0	0	0			
Bottom Driller ( ft )	110	2030.7	17183.2			
Bottom Logger ( ft )	110	2030.7	17183.2			
Tubing						
Size ( in )	2.375					
Weight ( lbm/ft )	4.7					
Inner Diameter ( in )	1.995					
Grade	L80					
Top Driller ( ft )	0					
Top Logger ( ft )	0					
Bottom Driller ( ft )	7070.6					
Bottom Logger ( ft )	7070.6					

Remarks and Equipment Summary

TWO: Toolstring				TWO: Remarks	
Equip name	Length	MP name	Offset	Thank you for choosing Schlumberger!	
PEH-E	45.4			Tool string run as per tool sketch and client logging program.	
AH-38	43.71			Matrix: Limestone	
EQF-43[2]	43.43			1.875" gauge ring run prior to RST.	
				Log correlated to GR curve spike at 4715.5' from SLB USIT Log.	

EQF-43[1] 37.43

PSTP-A:1872 31.43

PSC-A  
PSTC-A:1863  
PBMS-A:1872  
Sapphire 10kPS  
I:1872

GR 27.73  
PSTC 27.43  
PSTC Tool S 0.00  
tring Bottom  
Temperatur 24.64  
e  
Sapphire Pre 24.53  
ssure  
CCL 23.92  
PBMS 23.17

RST-C:597 23.17

RSCH-A:437  
RSC-E:551  
RSS-A:488  
MNTR-F:1352-5  
1352  
RSXH-A:578  
RSX-E:597

RSC-E 16.81

Far 14.05  
Near 13.55

BNS-P 0.14

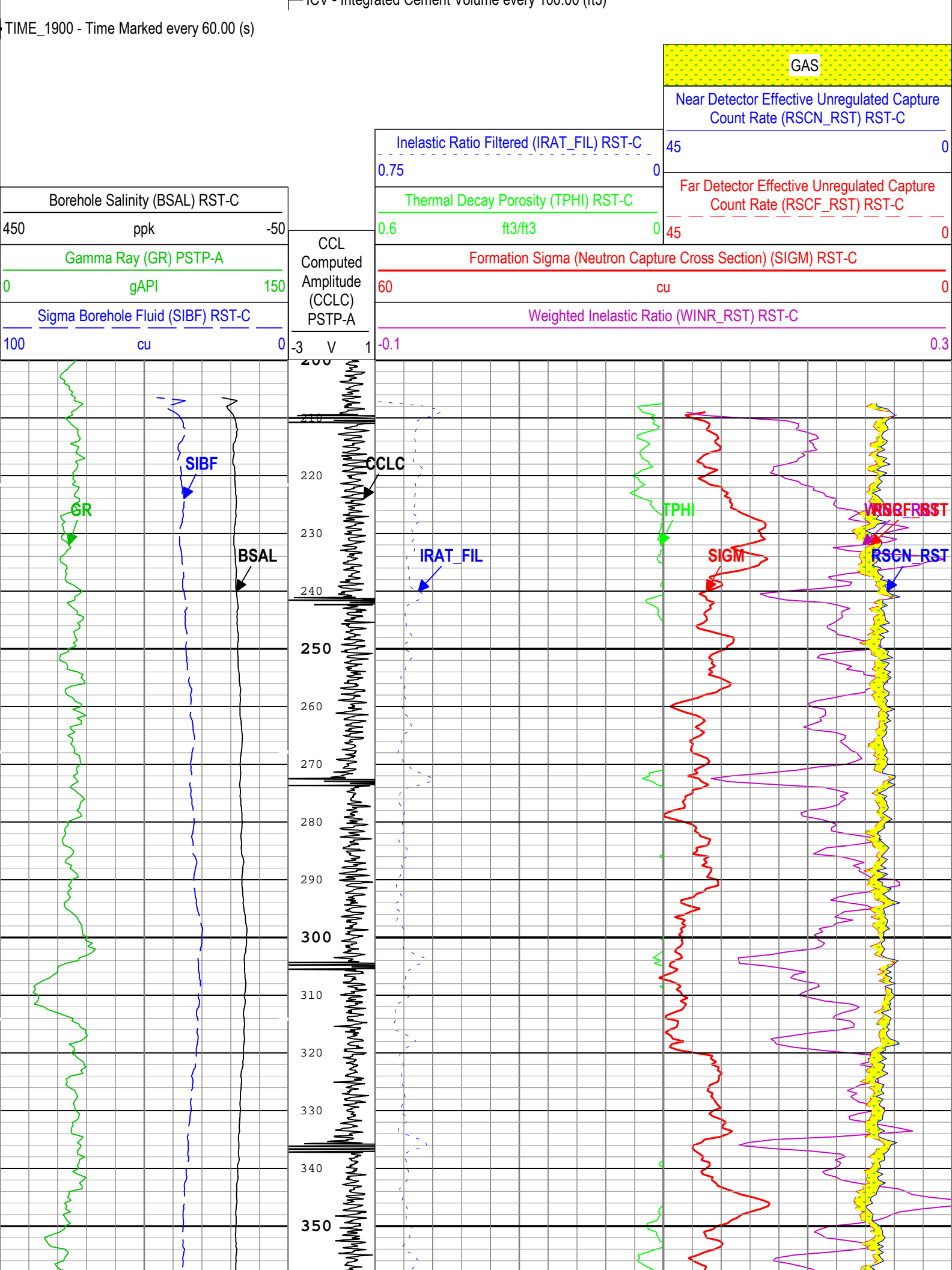
RSX-E 0.14

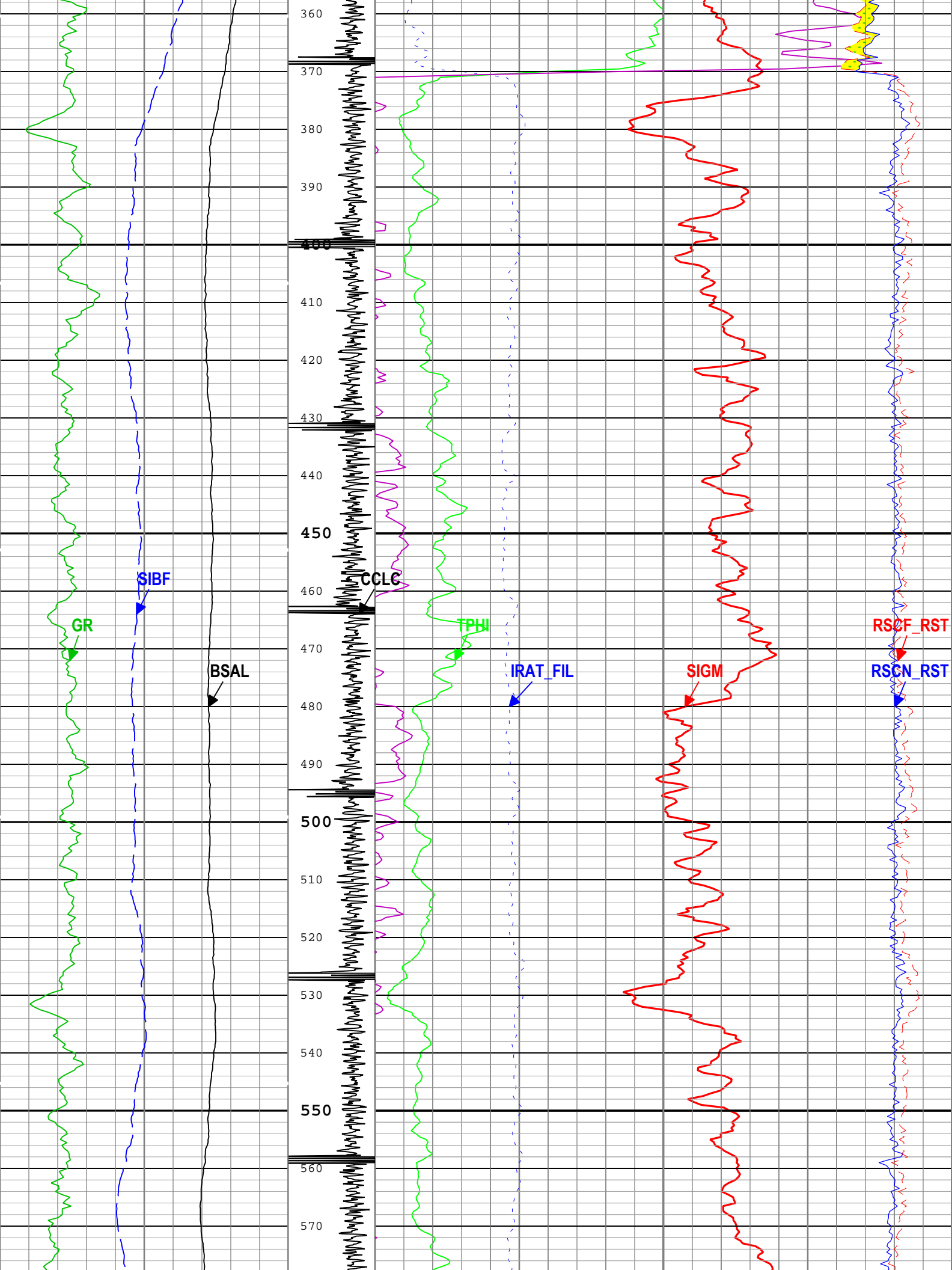
TOOL\_ZERO

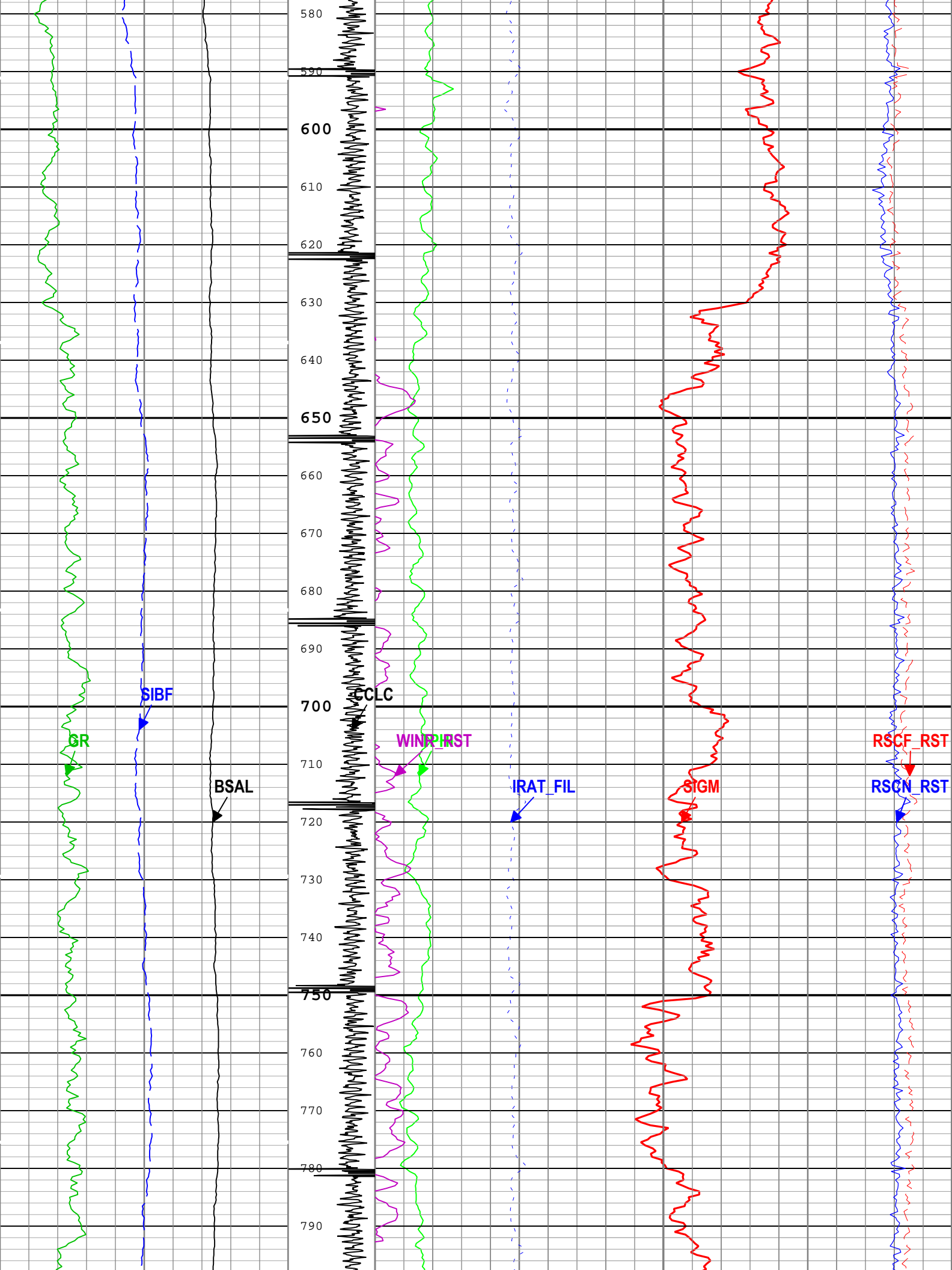
Lengths are in ft  
Maximum Outer Diameter = 1.720 in  
Line: Sensor Location, Value: Gating Offset  
All measurements are relative to TOOL\_ZERO

Depth Summary			
	TWO		
Depth Measuring Device			
Type	IDW-JA		
Serial Number	6455		

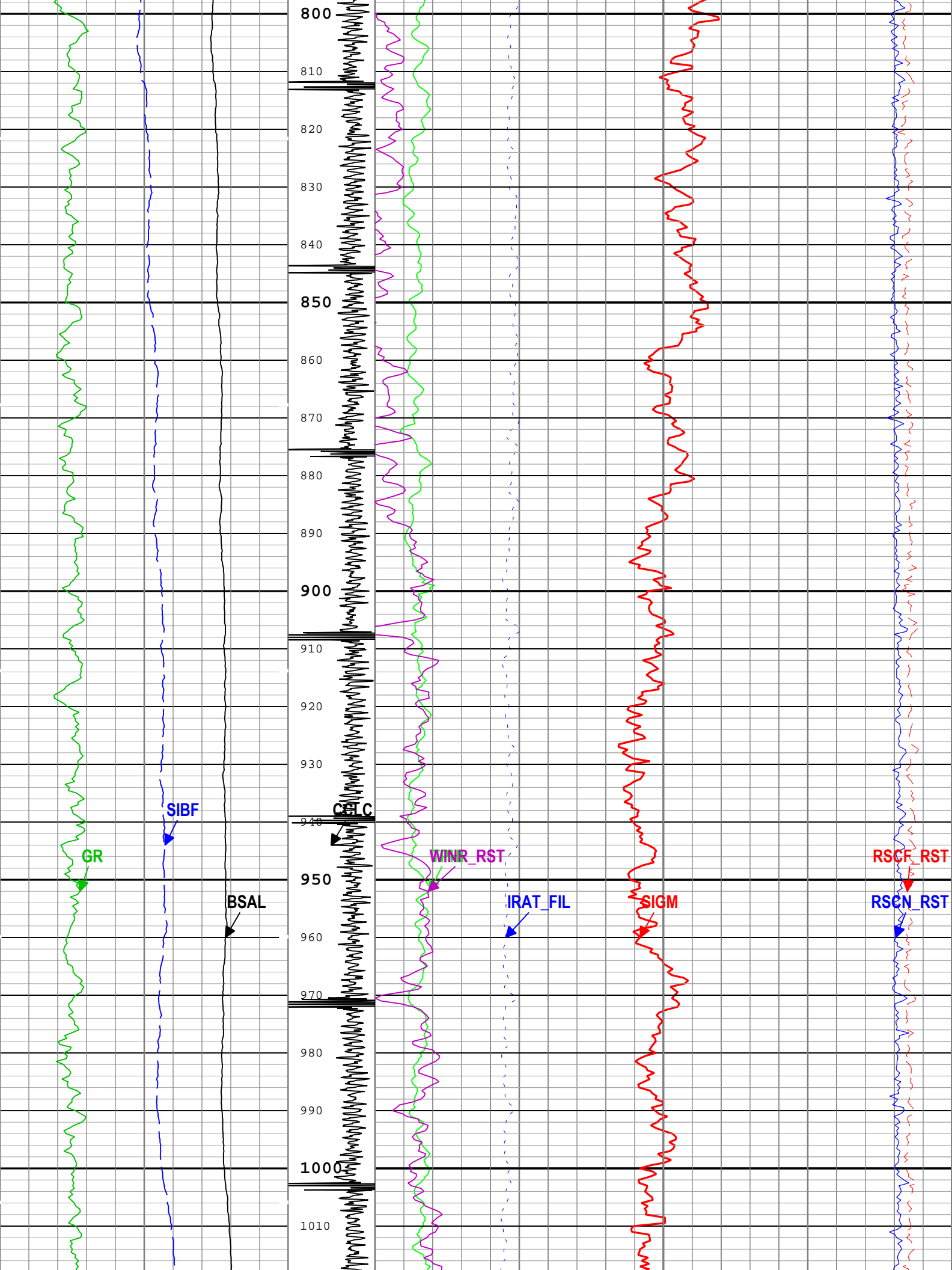
<ul style="list-style-type: none"> <li>— IHV - Integrated Hole Volume every 10.00 (ft3)</li> <li>— IHV - Integrated Hole Volume every 100.00 (ft3)</li> <li>— ICV - Integrated Cement Volume every 10.00 (ft3)</li> <li>— TIME_1900 - Elapsed time since midnight, 30 December 1899 every 60.00 (s)</li> <li>— ICV - Integrated Cement Volume every 100.00 (ft3)</li> </ul>
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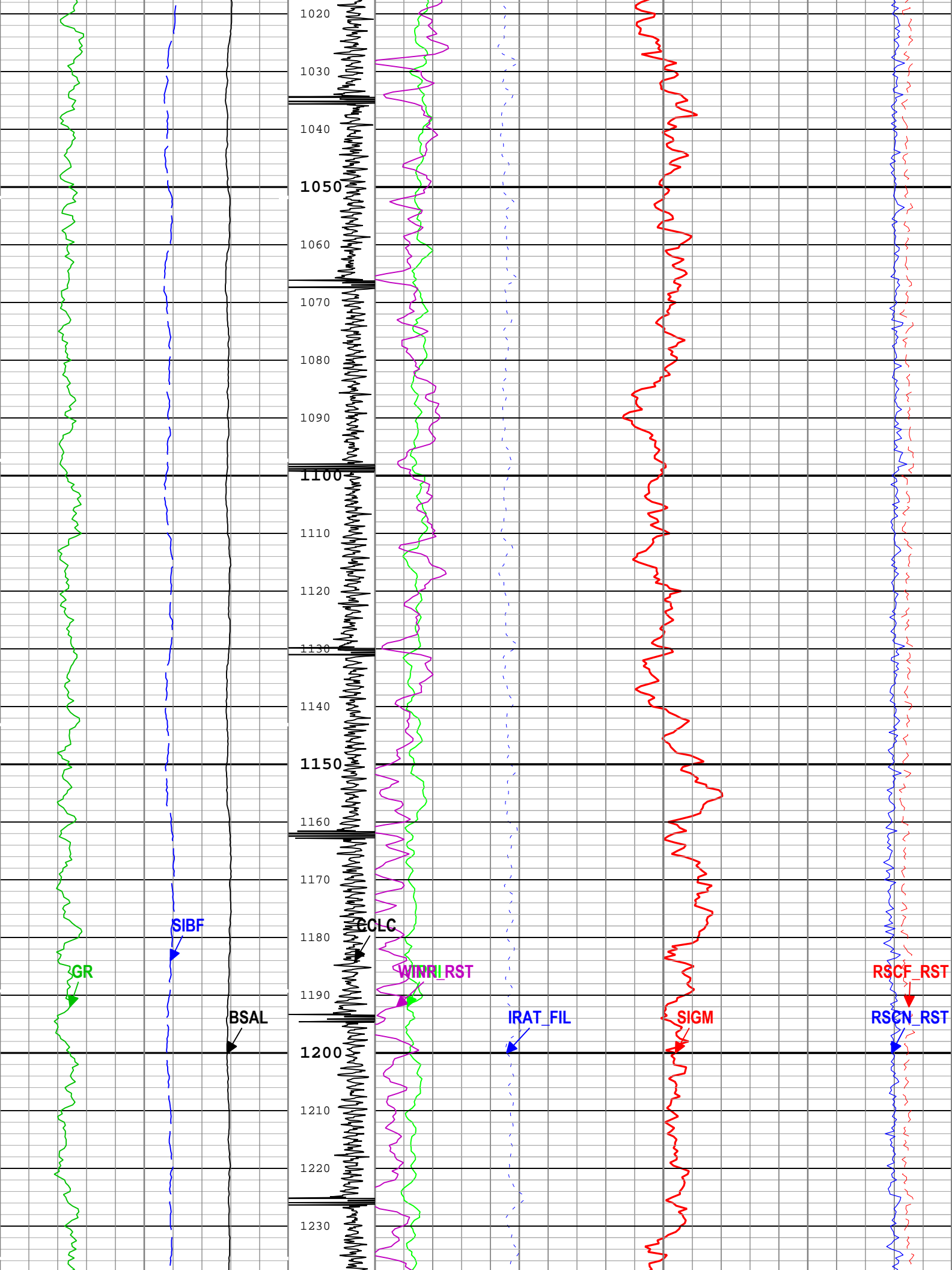


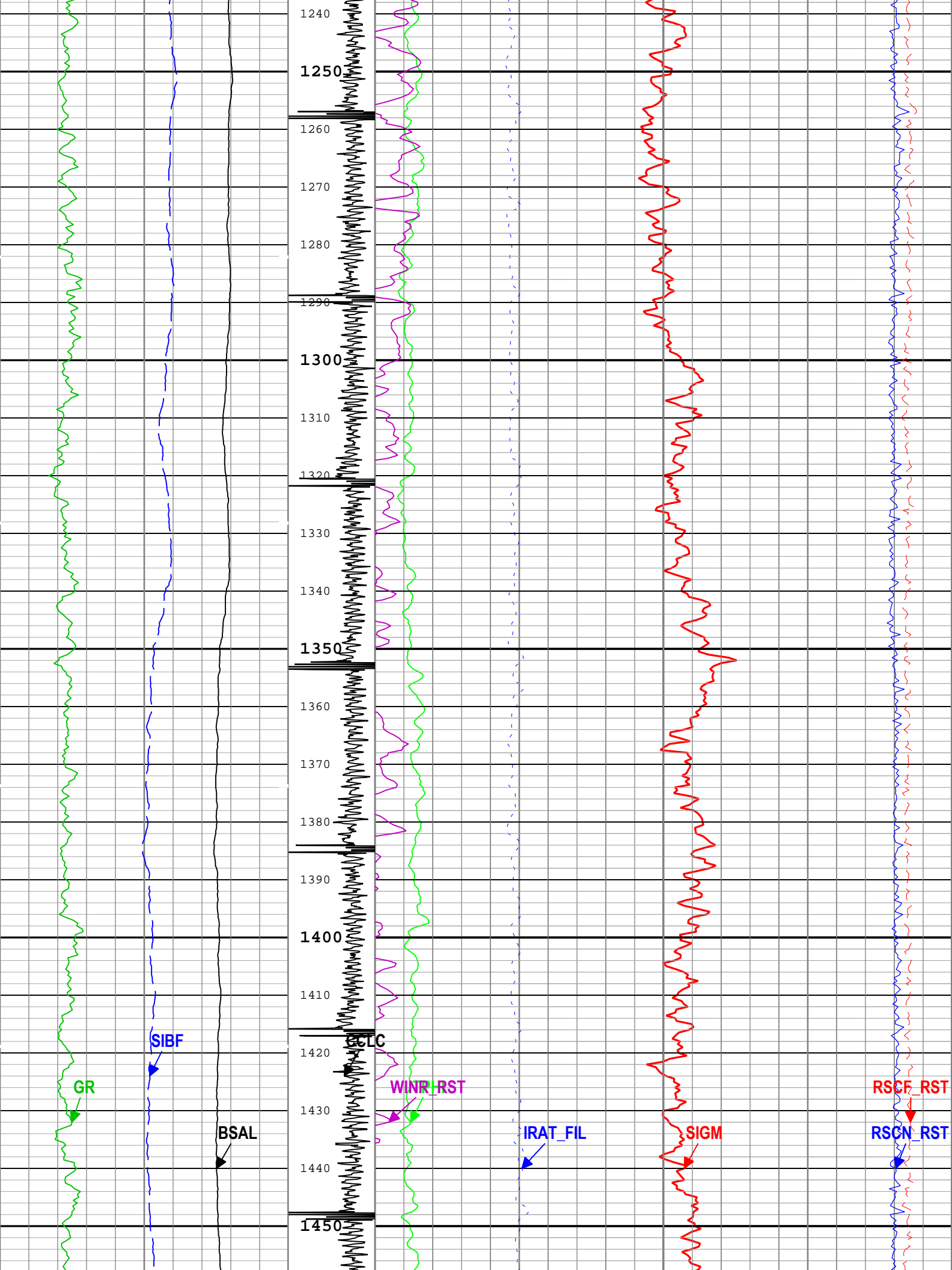


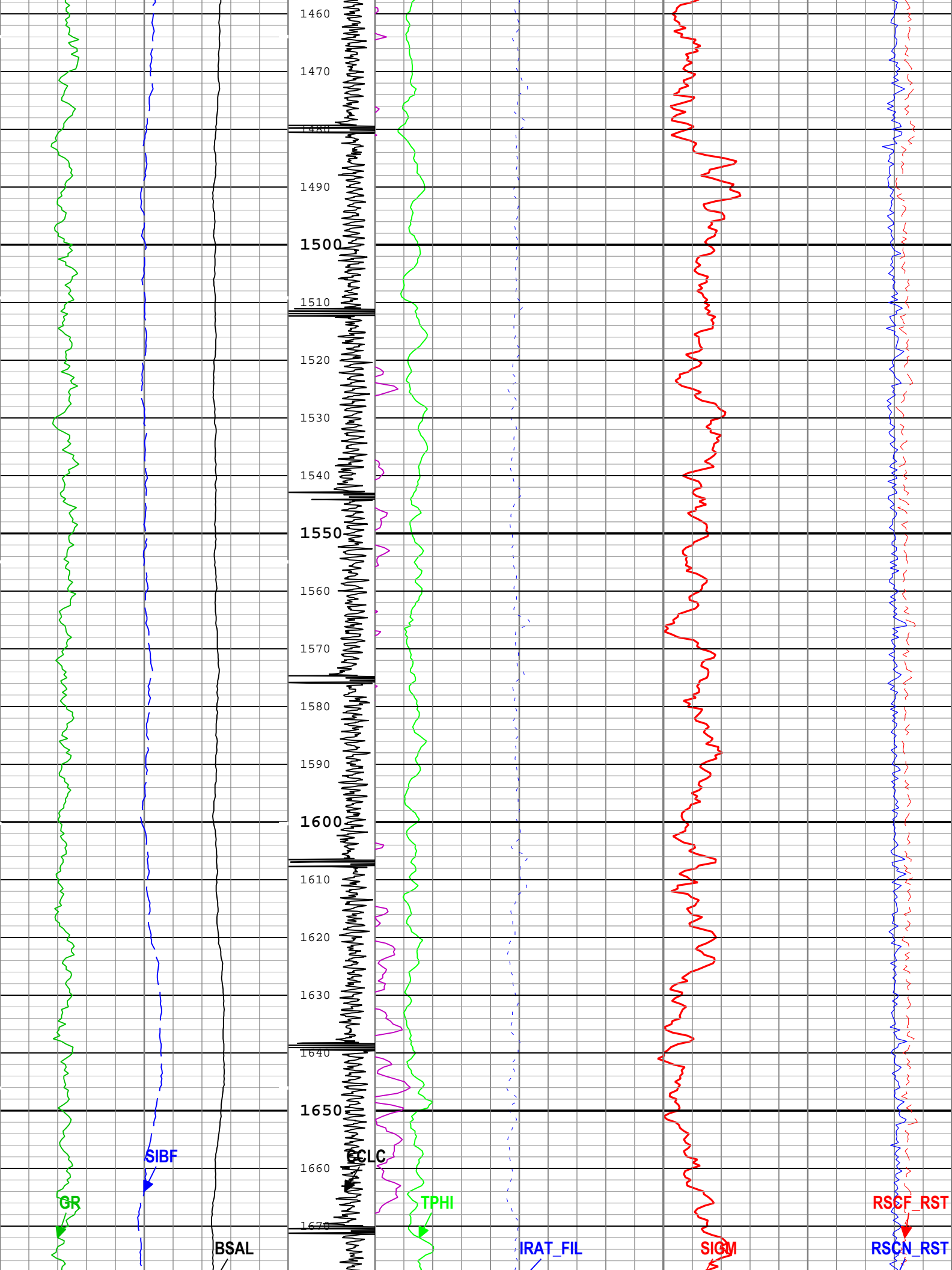


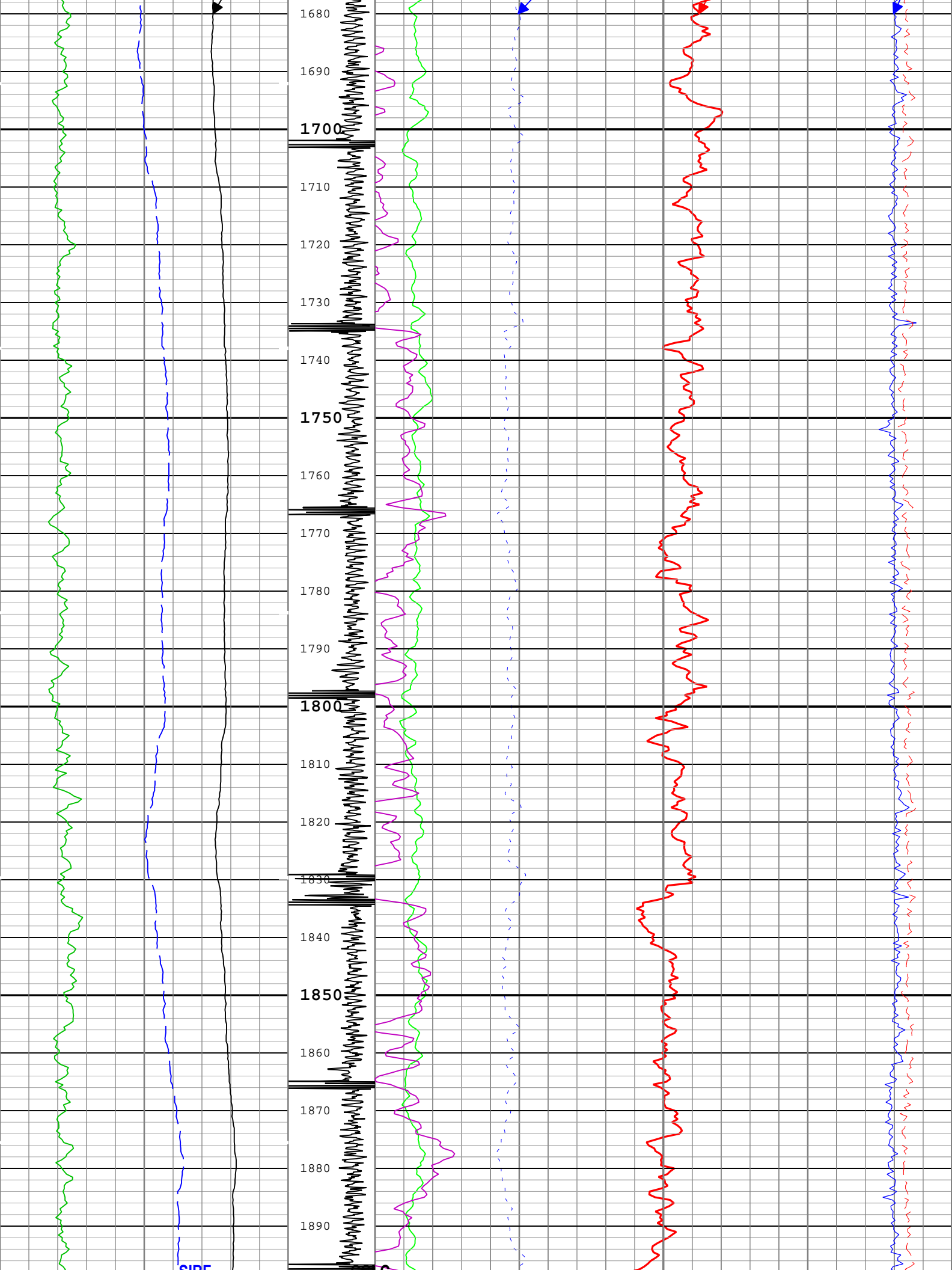


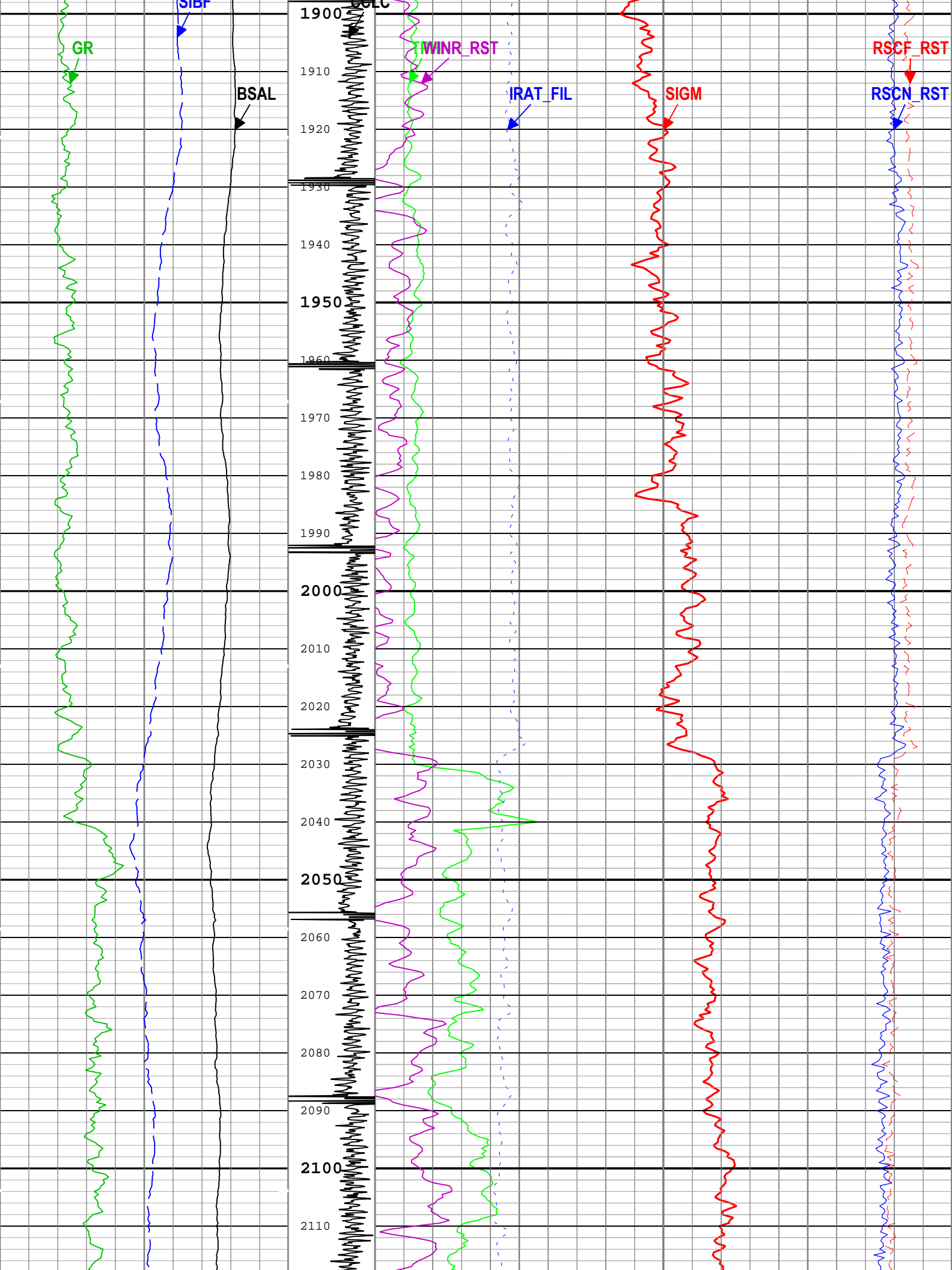


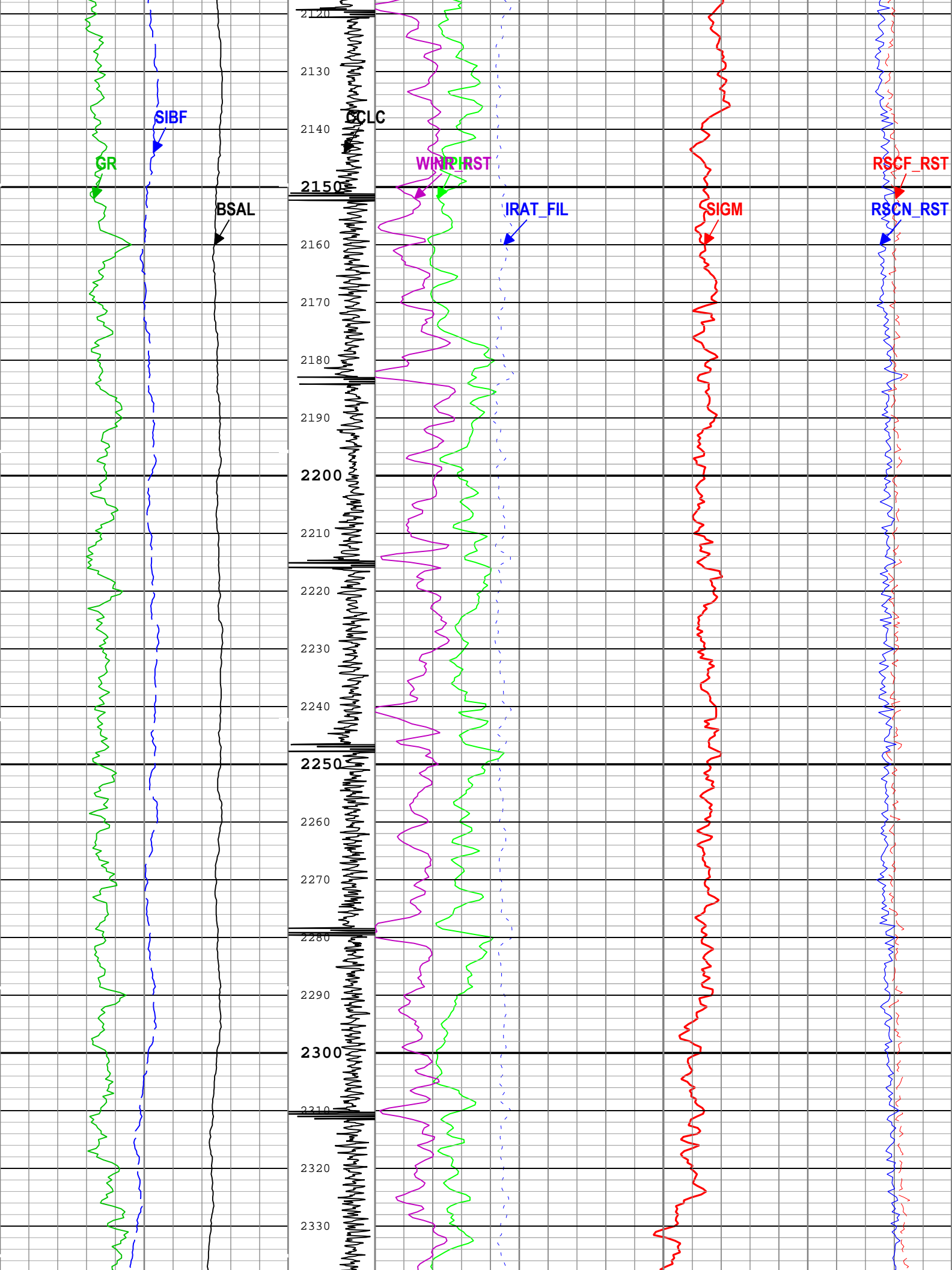


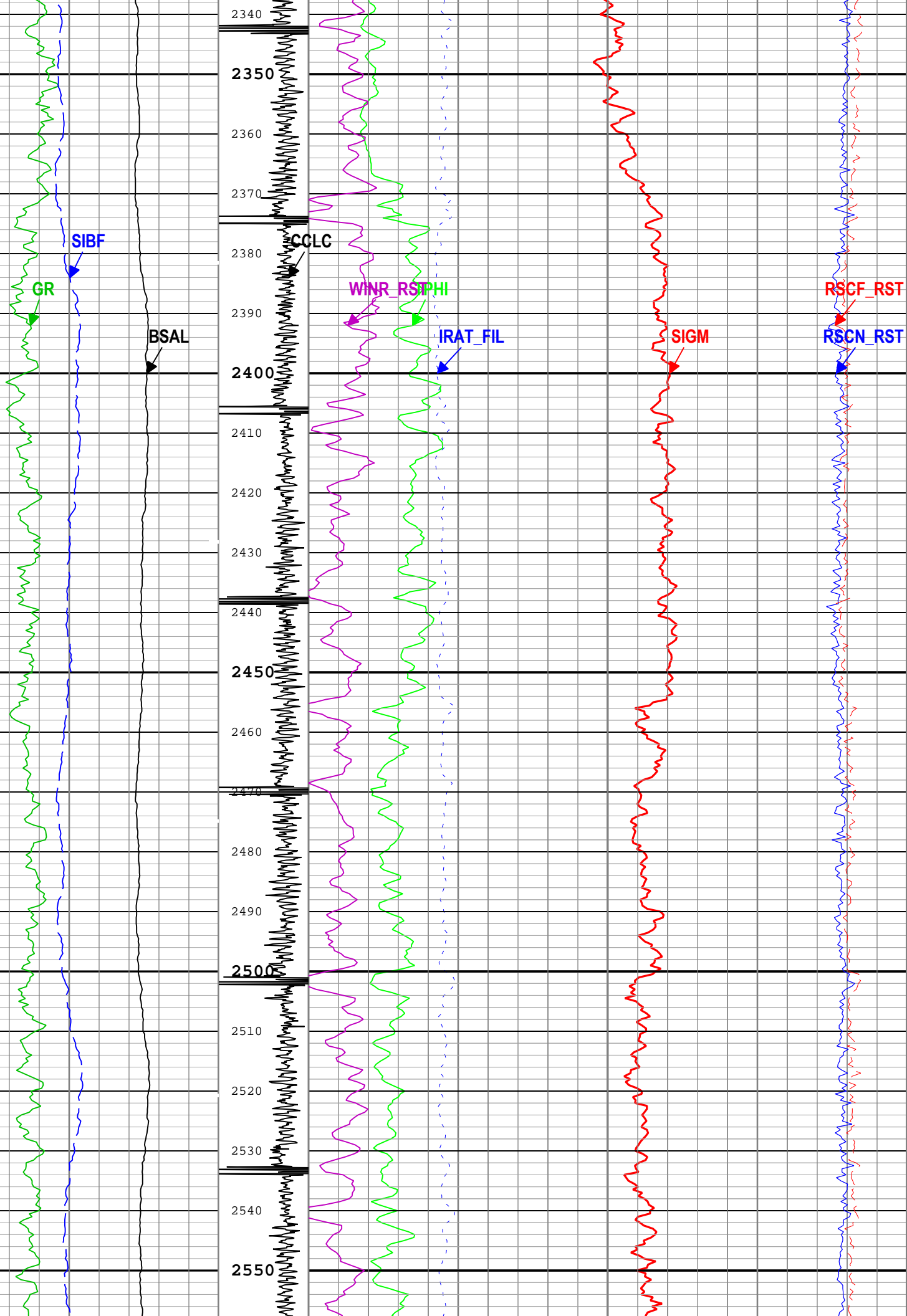




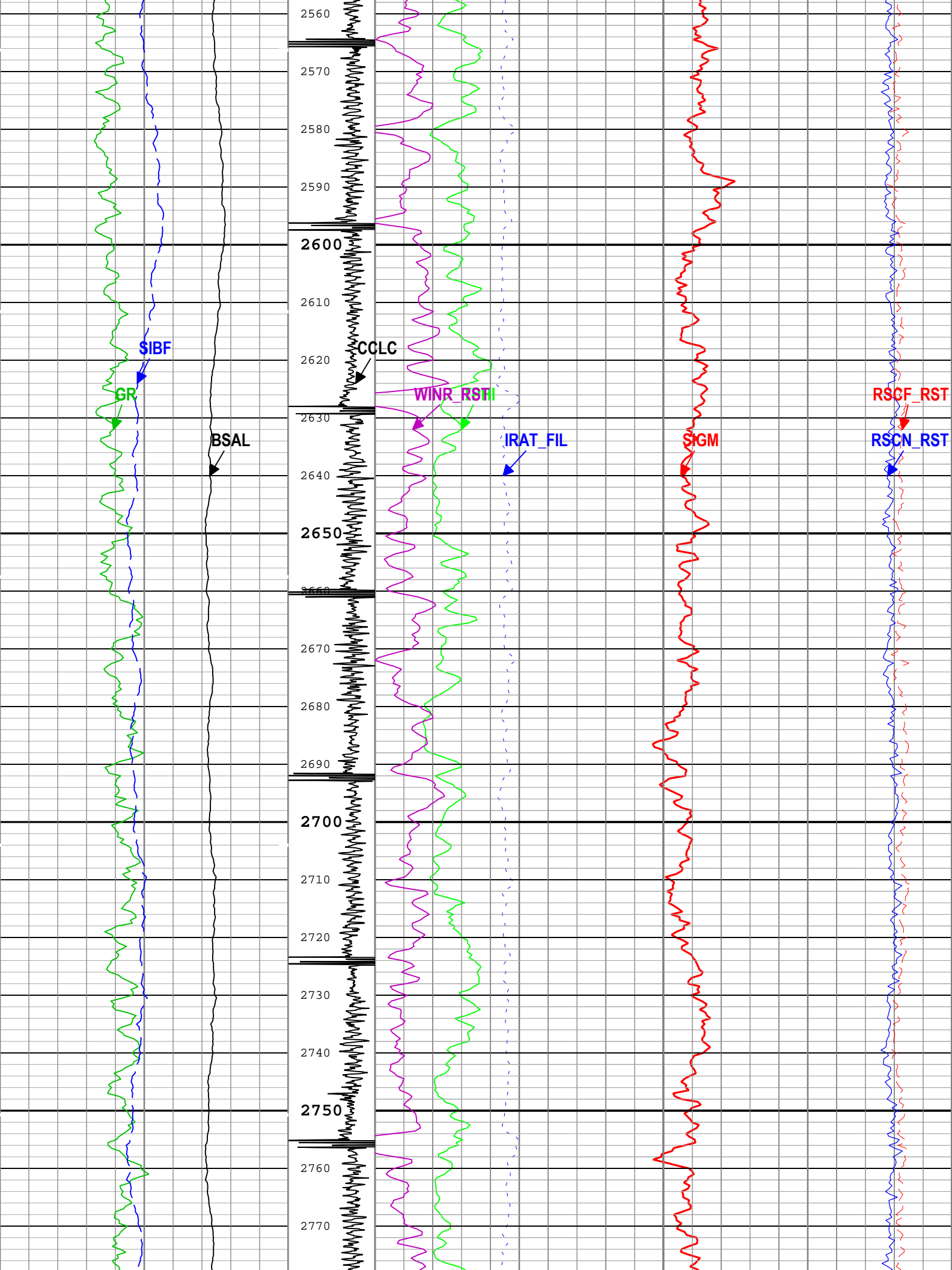


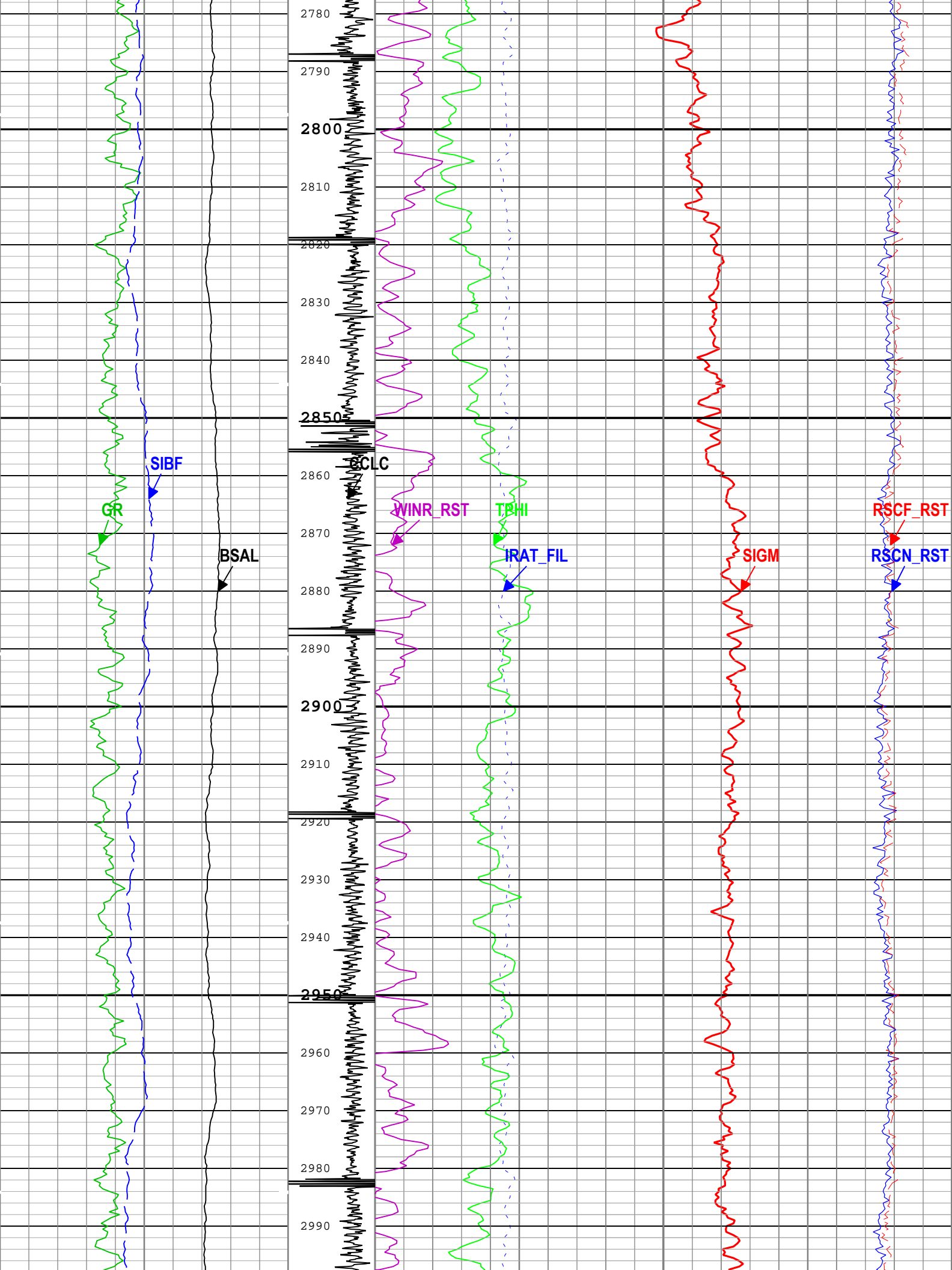


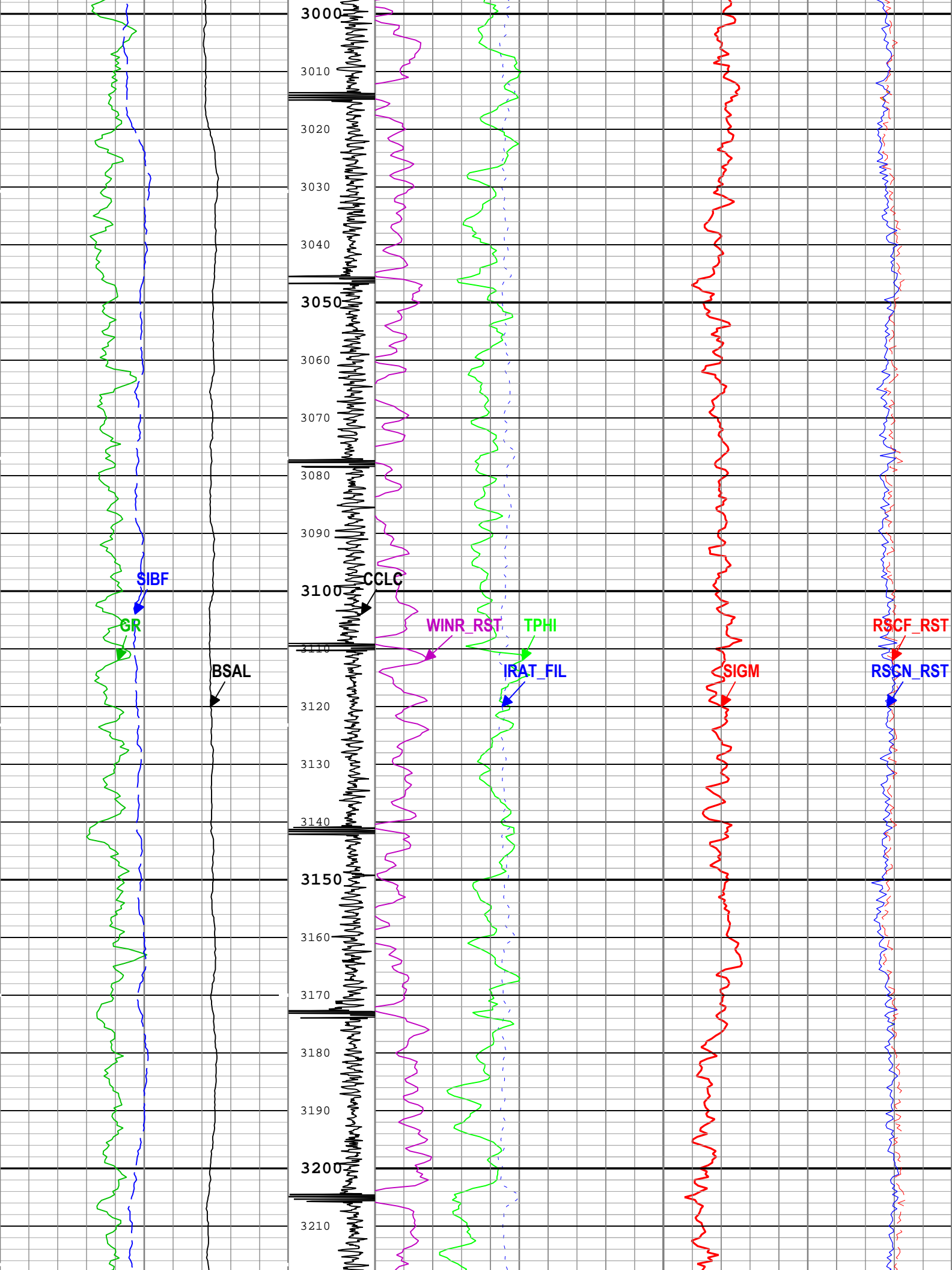


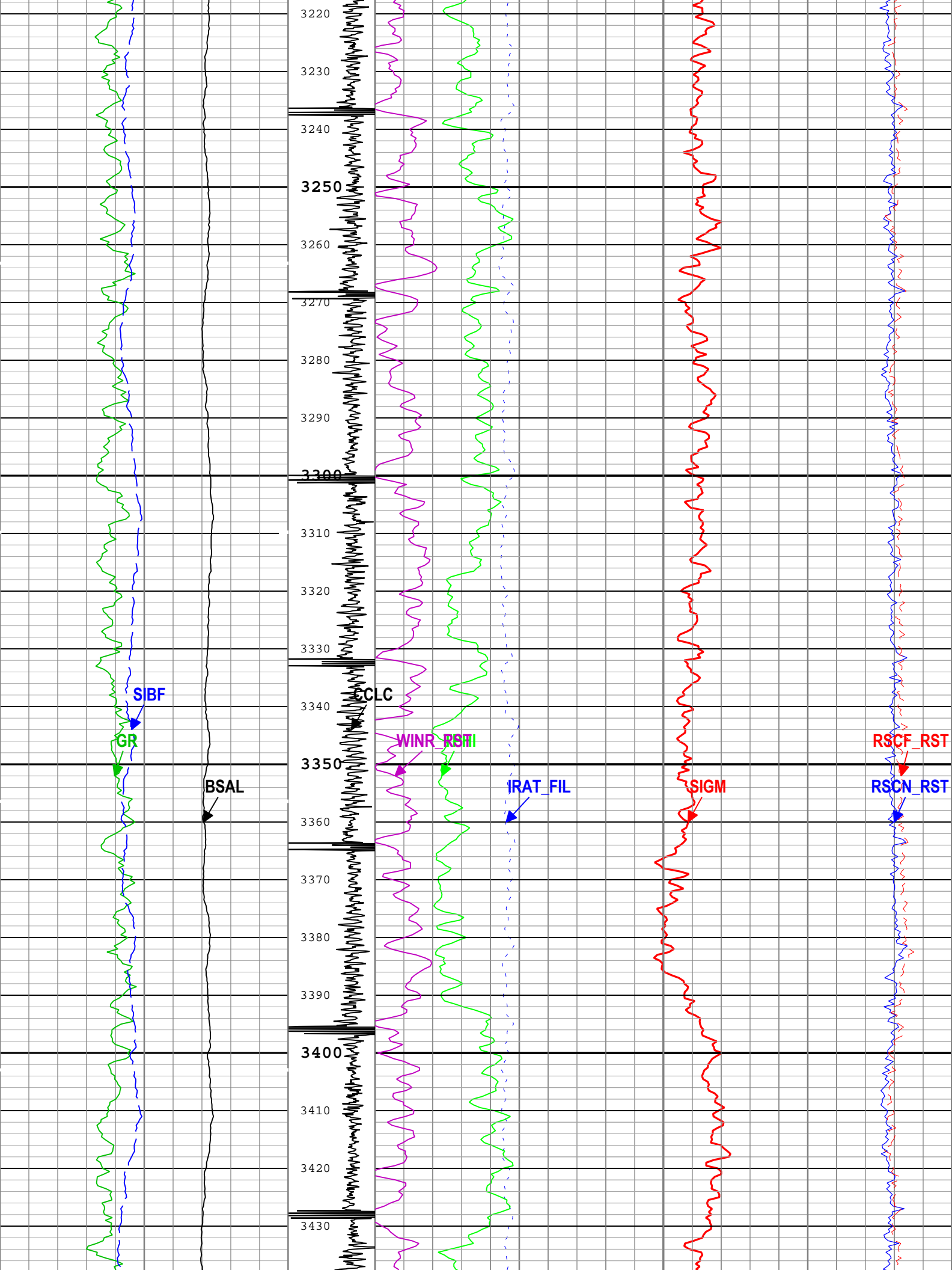


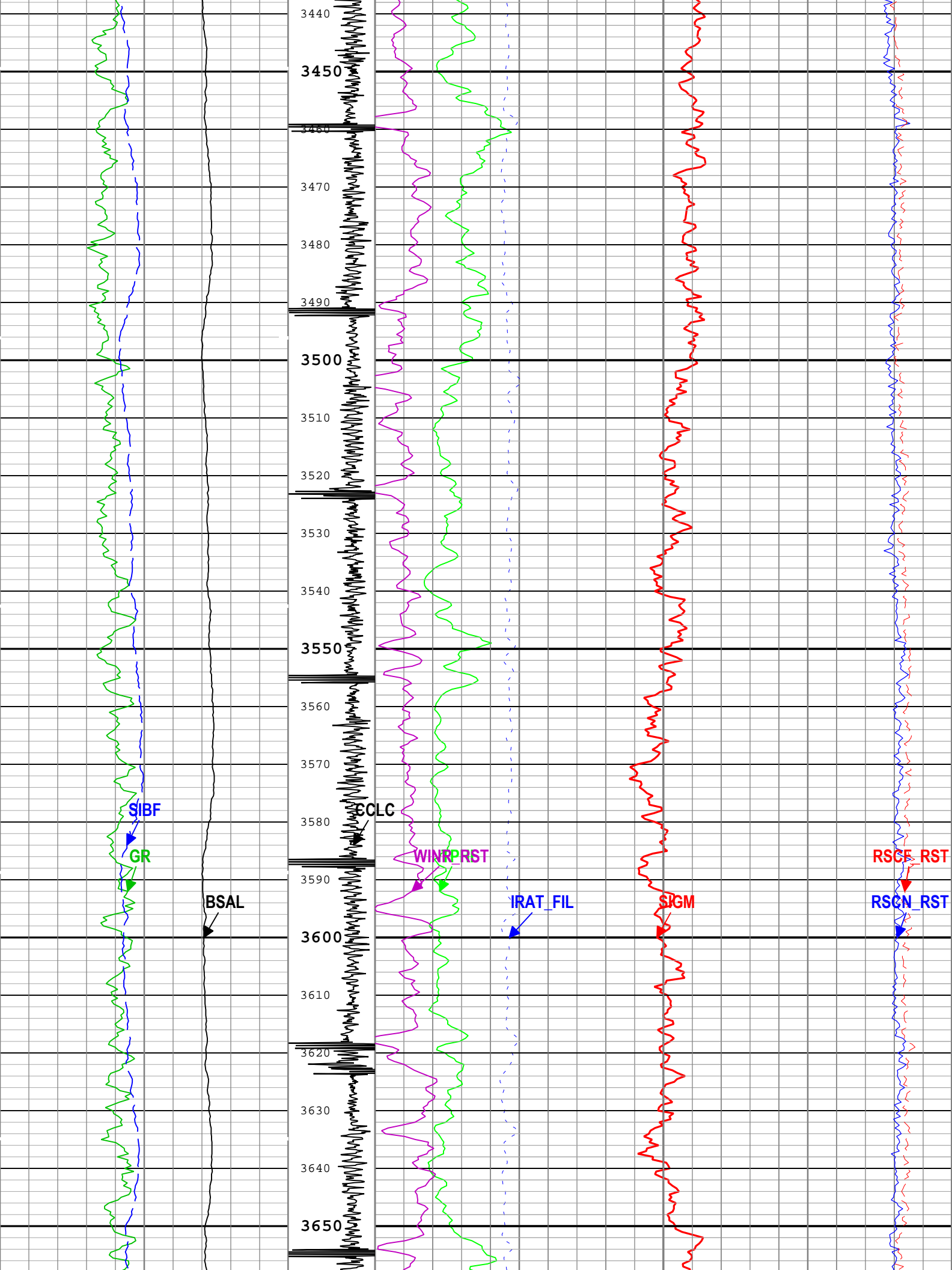


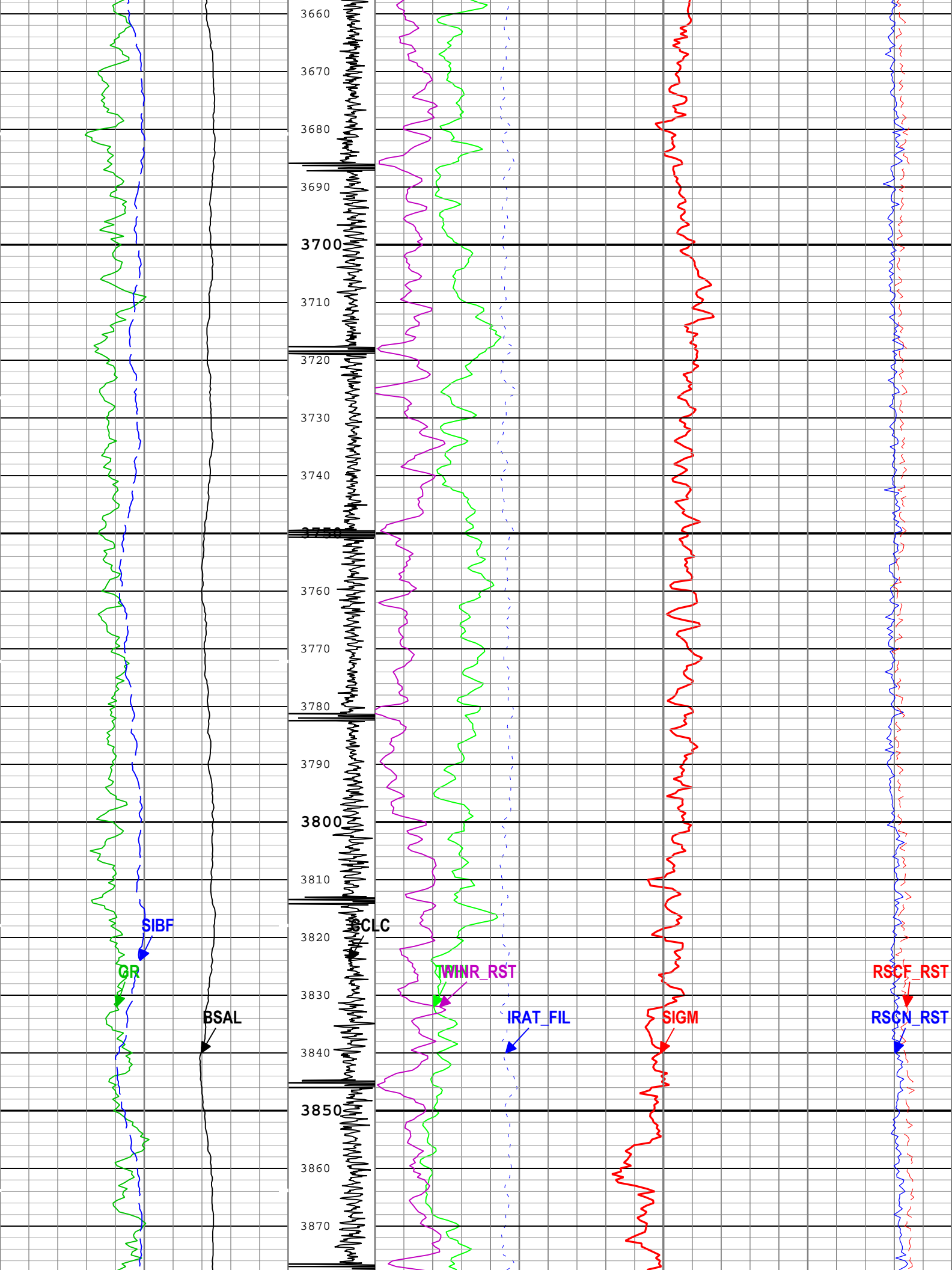


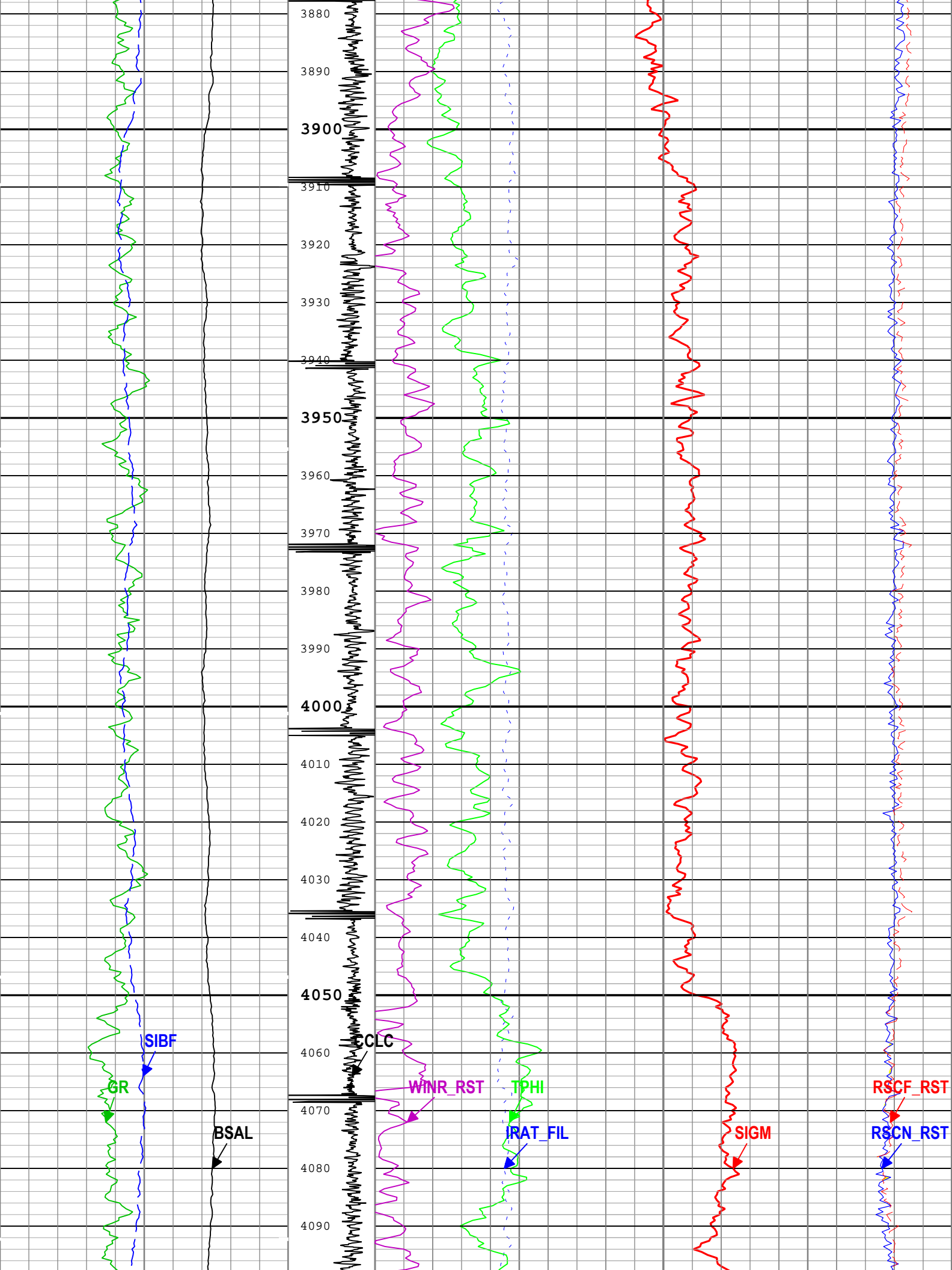


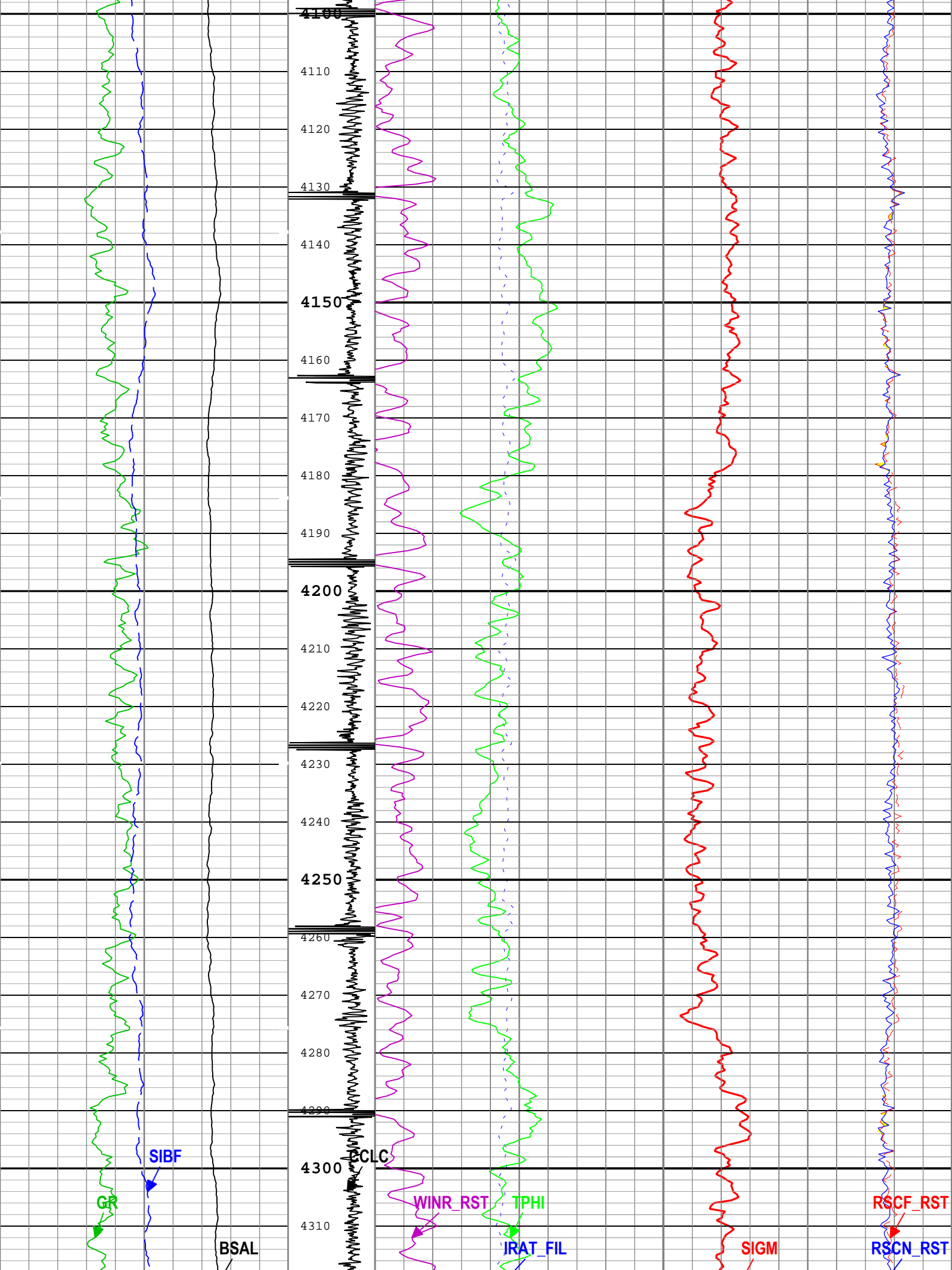




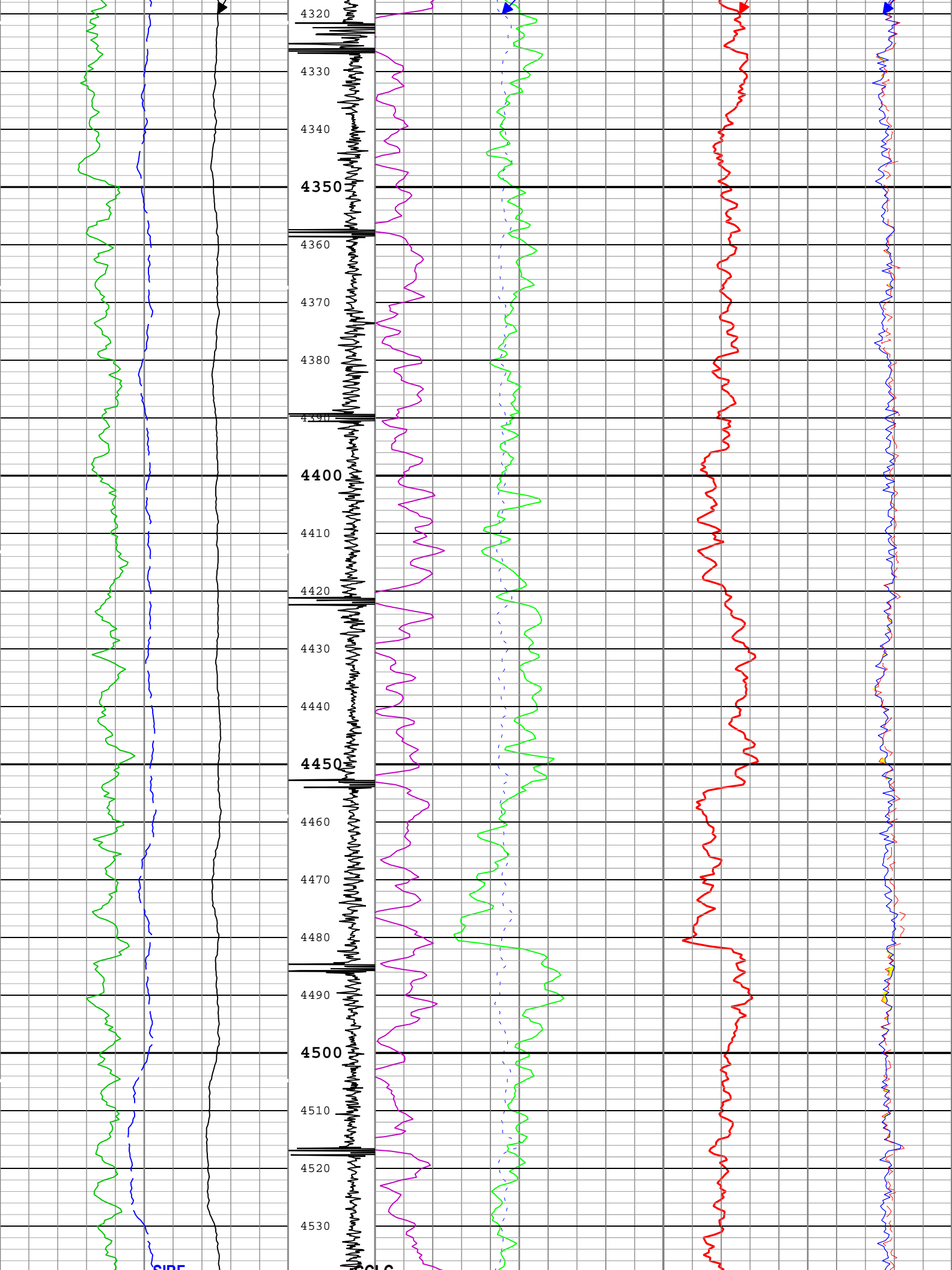


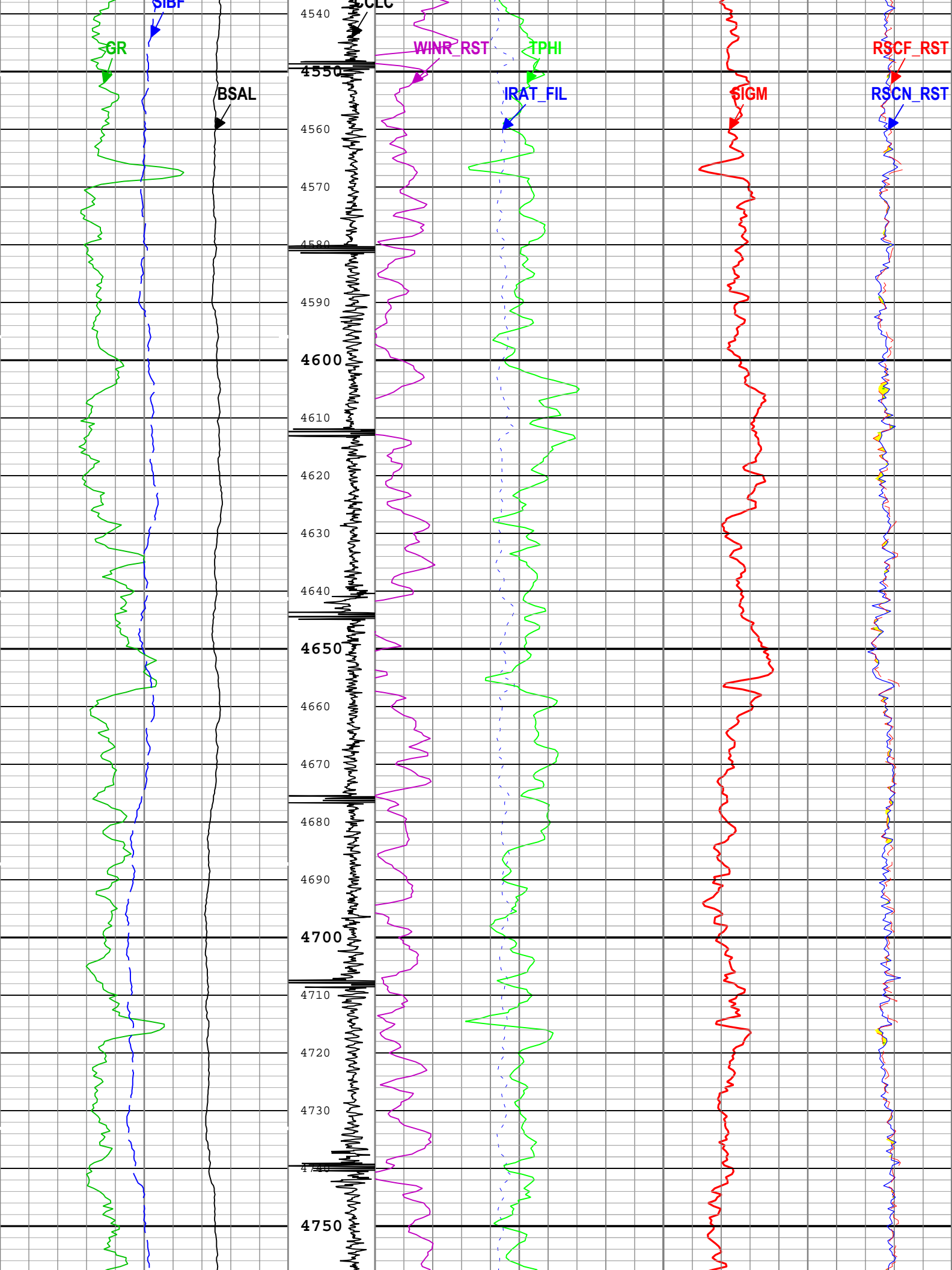


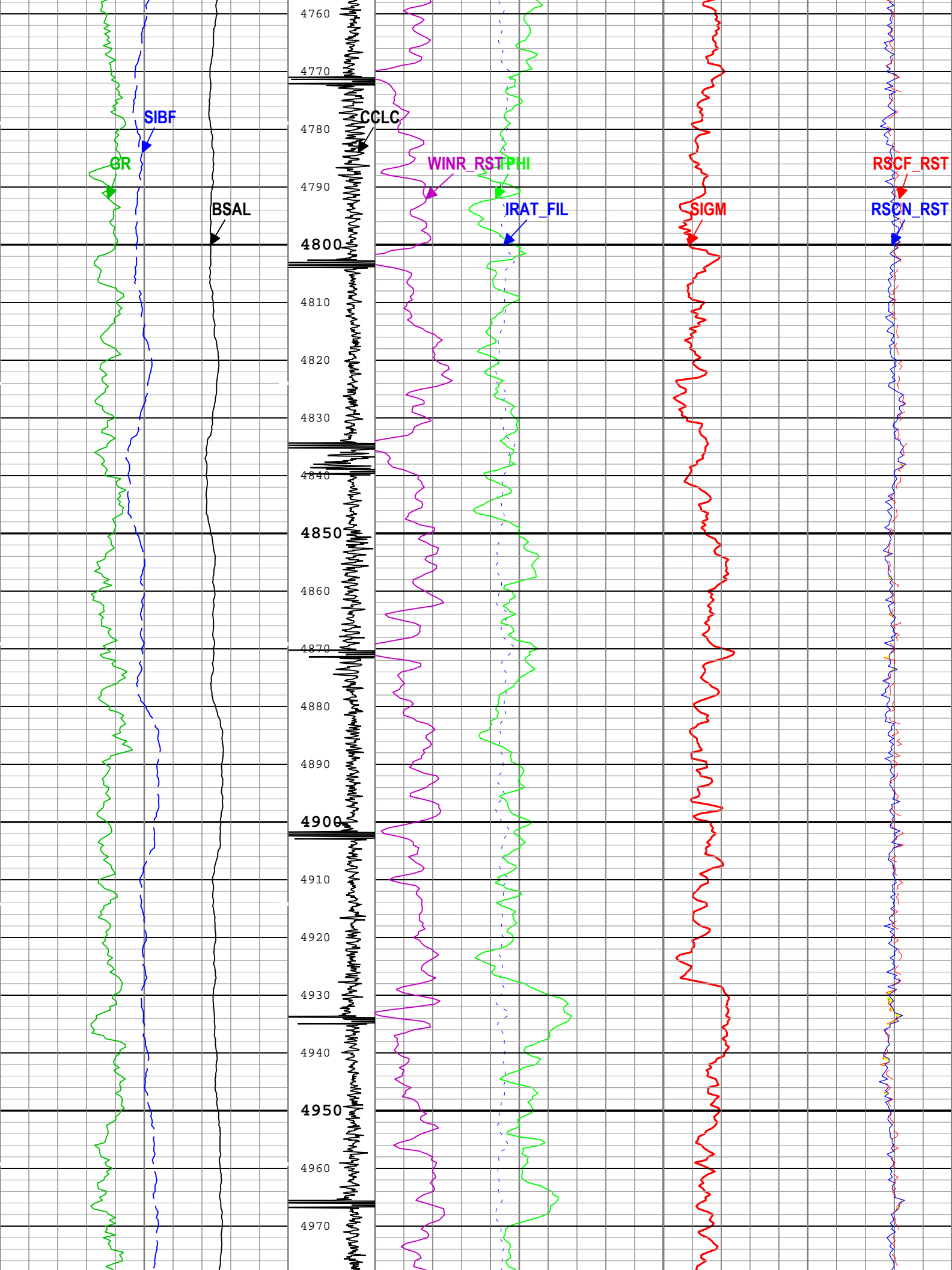


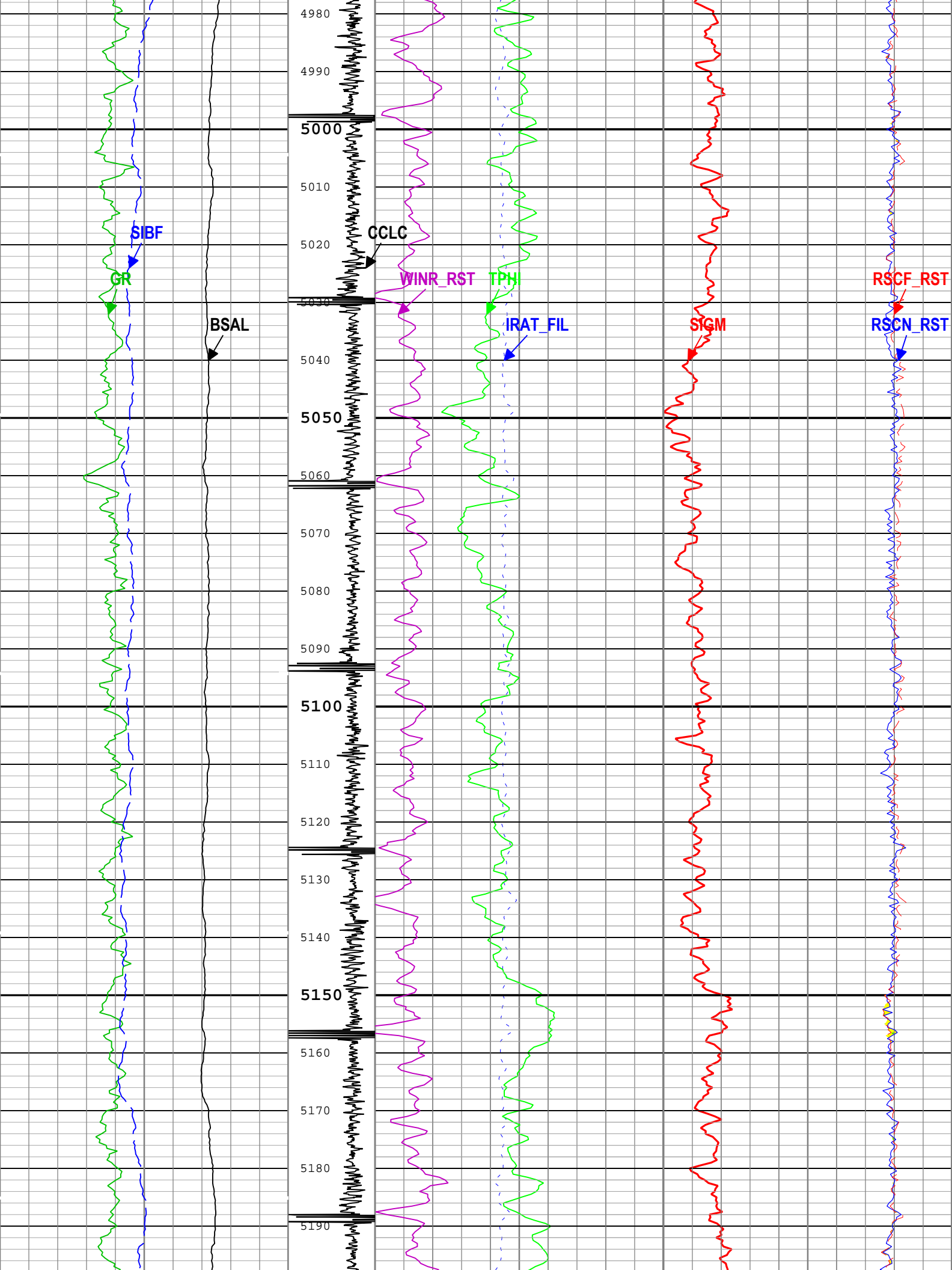


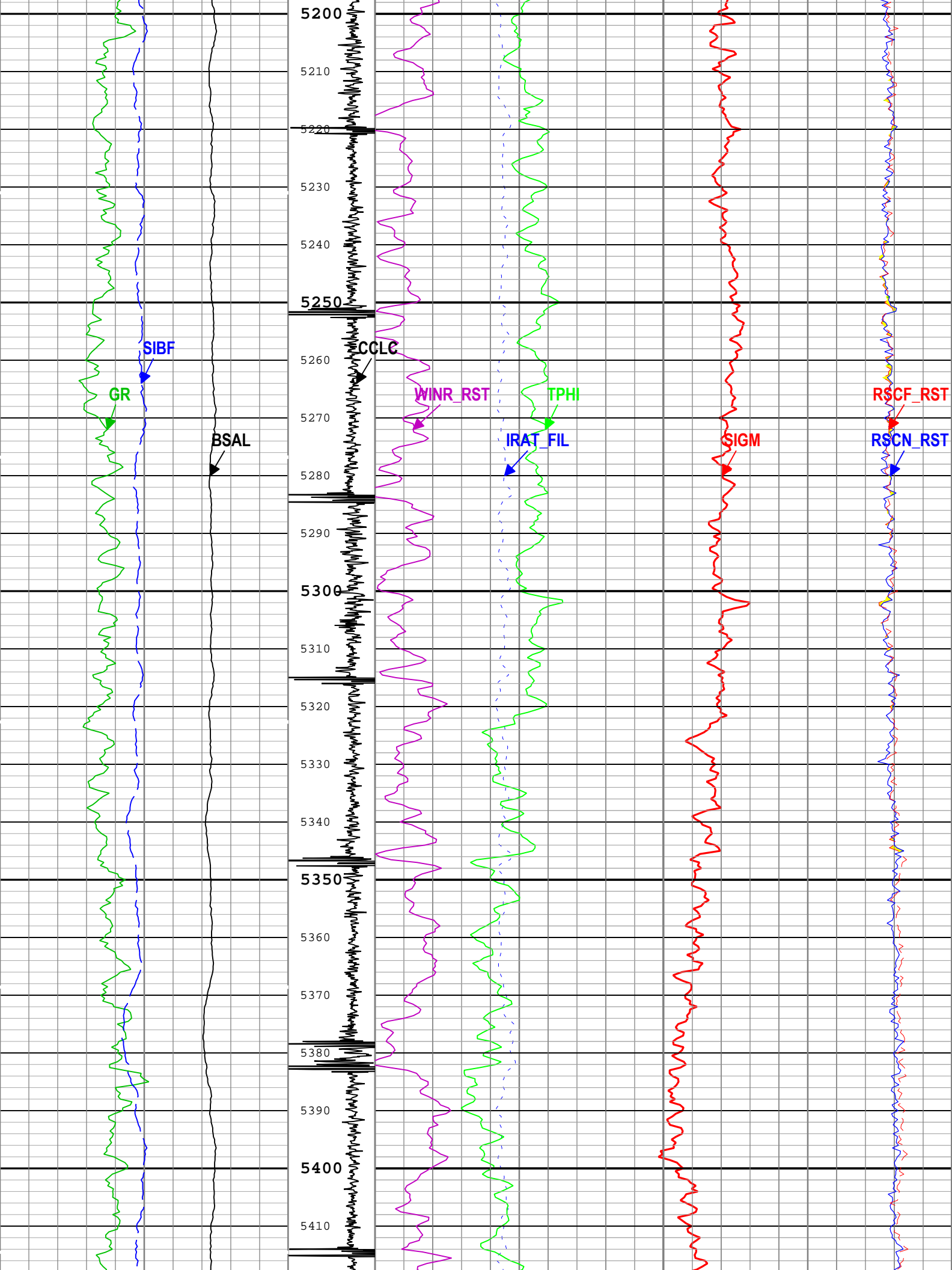


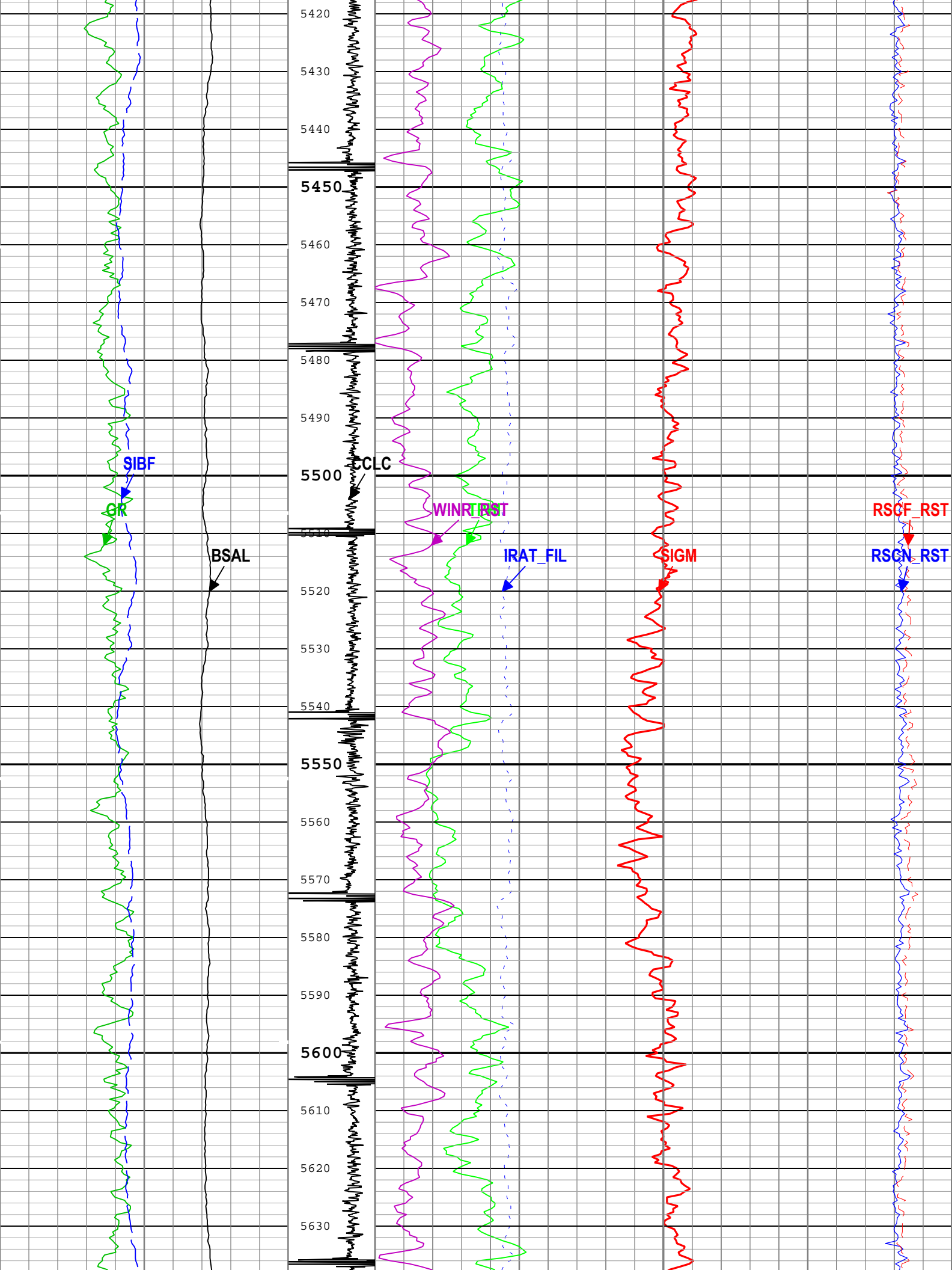


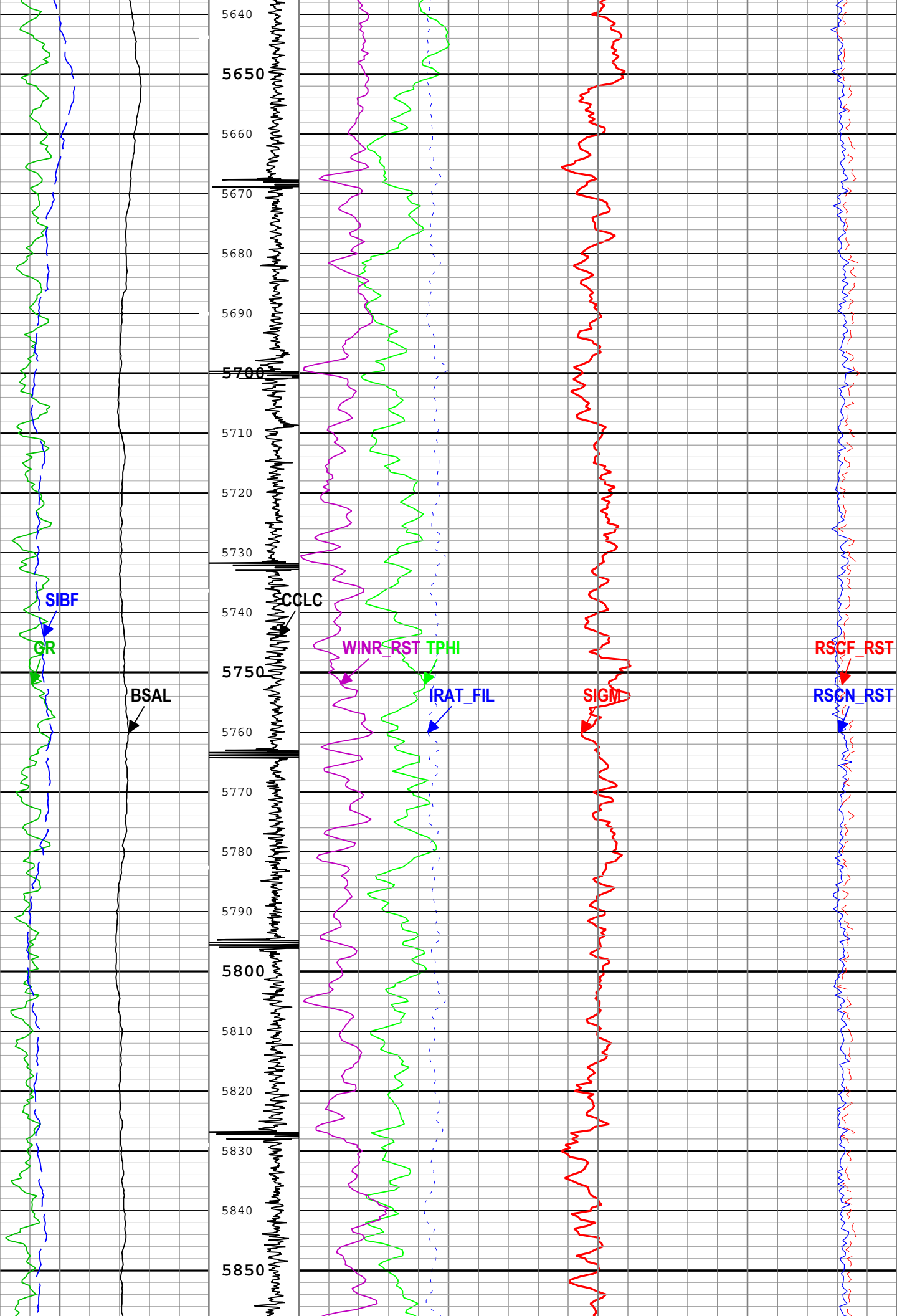


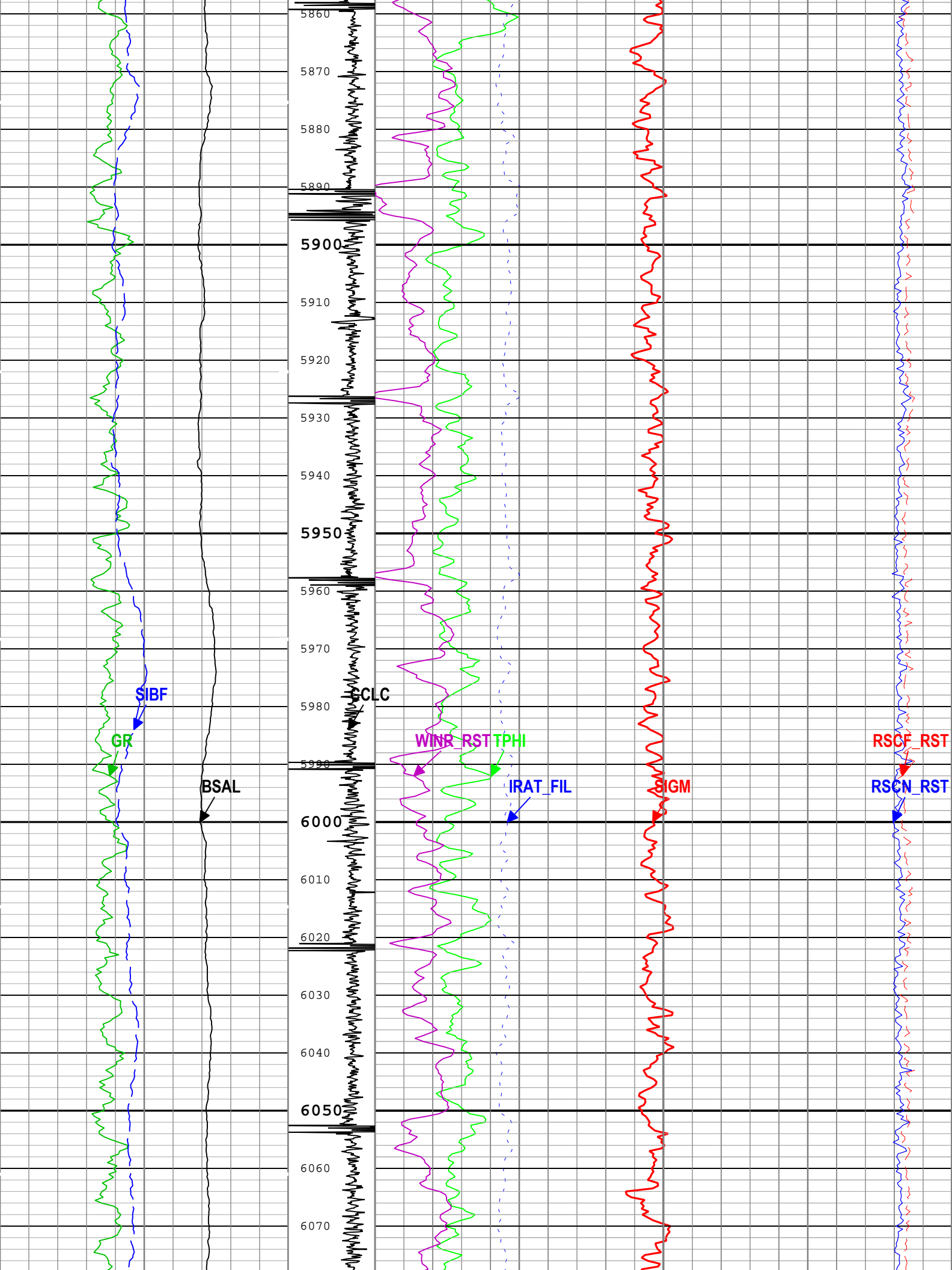




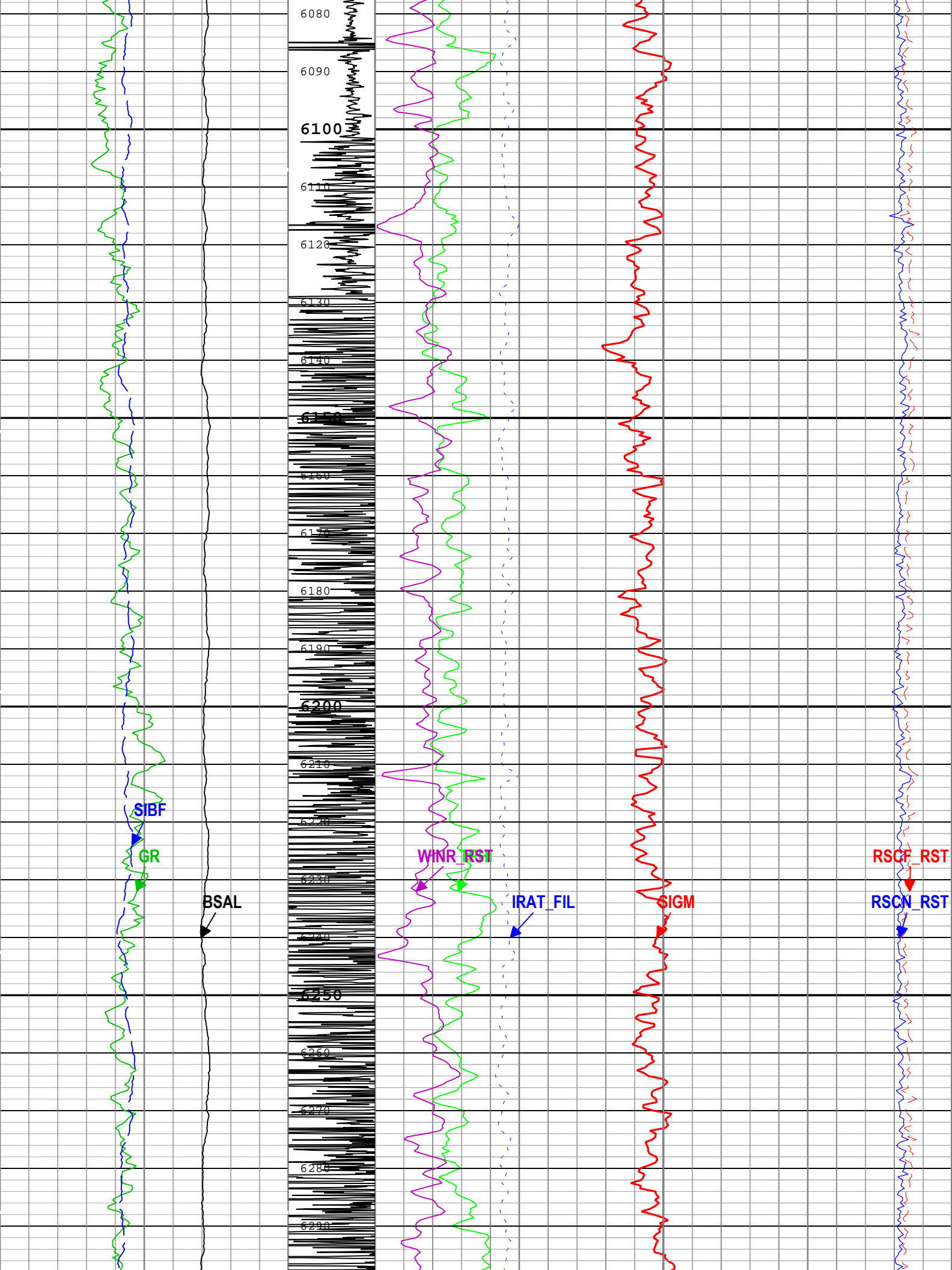


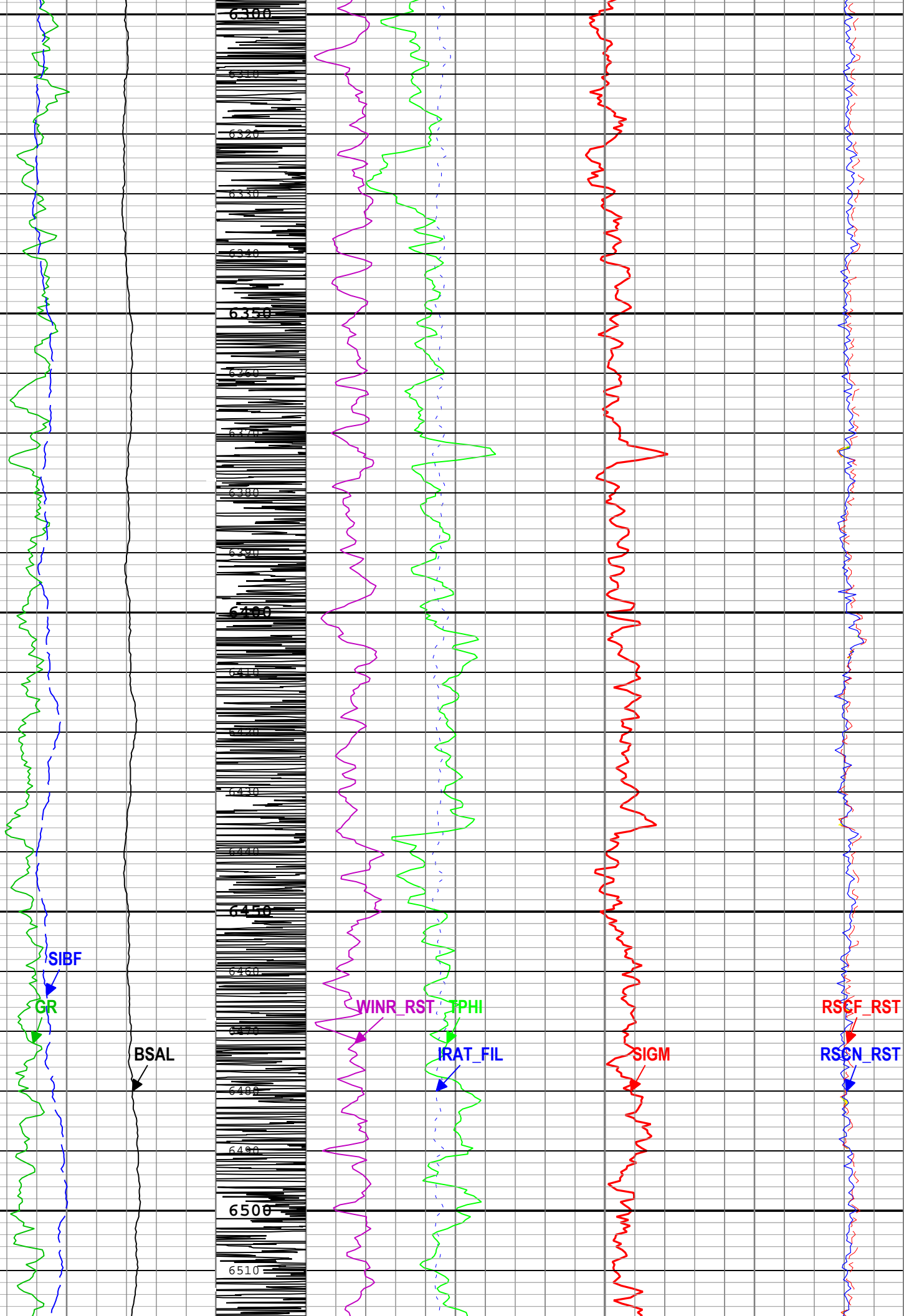


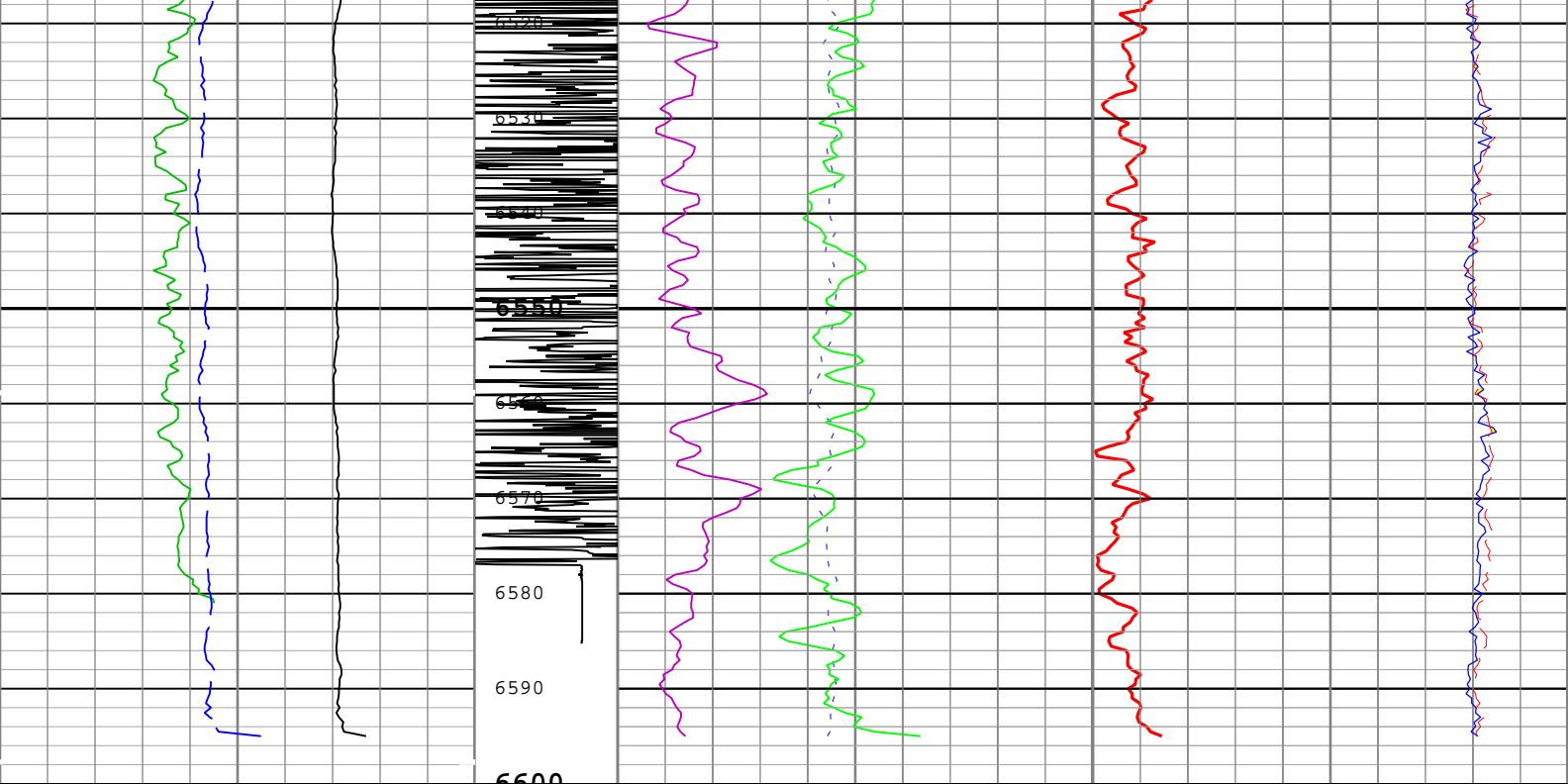












Borehole Salinity (BSAL) RST-C			Formation Sigma (Neutron Capture Cross Section) (SIGM) RST-C		
450	ppk	-50	60	cu	0
Gamma Ray (GR) PSTP-A			Weighted Inelastic Ratio (WINR_RST) RST-C		
0	gAPI	150	-0.1		0.3
Sigma Borehole Fluid (SIBF) RST-C			Inelastic Ratio Filtered (IRAT_FIL) RST-C		
100	cu	0	0.75		0
			Thermal Decay Porosity (TPHI) RST-C		
			0.6	ft3/ft3	0
			Near Detector Effective Unregulated Capture Count Rate (RSCN_RST) RST-C		
			45		0
			Far Detector Effective Unregulated Capture Count Rate (RSCF_RST) RST-C		
			45		0

TIME\_1900 - Time Marked every 60.00 (s)

— ICV - Integrated Cement Volume every 100.00 (ft3)

— TIME\_1900 - Elapsed time since midnight, 30 December 1899 every 60.00 (s)

— ICV - Integrated Cement Volume every 10.00 (ft3)

— IHV - Integrated Hole Volume every 100.00 (ft3)

— IHV - Integrated Hole Volume every 10.00 (ft3)

Description: RST SIGMA Answer    Format: Log ( RST SIGMA )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 28-Sep-2018 11:50:12

## Channel Processing Parameters

### TWO: Parameters

Parameter	Description	Tool	Value	Unit
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	Depth Zoned	in
BSAL	Borehole Salinity	Borehole	0	ppm
BSALOPT	Borehole Salinity Option	RST-C	Unknown	
DFT_CATEGORY	Drilling Fluid Type	Borehole	Oil	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	LIMESTONE	

## Depth Zone Parameters

Parameter	Value	Start ( ft )	Stop ( ft )
BS	13.5	200	2041
BS	8.5	2041	6600

All depth are actual.

## Tool Control Parameters

### TWO: Parameters

Parameter	Description	Tool	Value	Unit
PCCG	PSP Downhole CCL Gain	PSTP-A	Time Zoned	
RST_DLM	Depth Log Mode	RST-C	Sigma	

### Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
PCCG	36 dB	28-Sep-2018 08:54:26	28-Sep-2018 09:11:59	6609.18	6152.75
PCCG	24 dB	28-Sep-2018 09:11:59	28-Sep-2018 09:12:35	6152.75	6126.11
PCCG	12 dB	28-Sep-2018 09:12:35	28-Sep-2018 11:33:04	6126.11	205.35

All depth are at tool zero.

## TWO

## Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

## Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
TWO	Log[4]:Up	Up	205.35 ft	6609.18 ft	28-Sep-2018 8:54:26 AM	28-Sep-2018 11:33:04 AM	ON	7.52 ft	No

All depths are referenced to toolstring zero

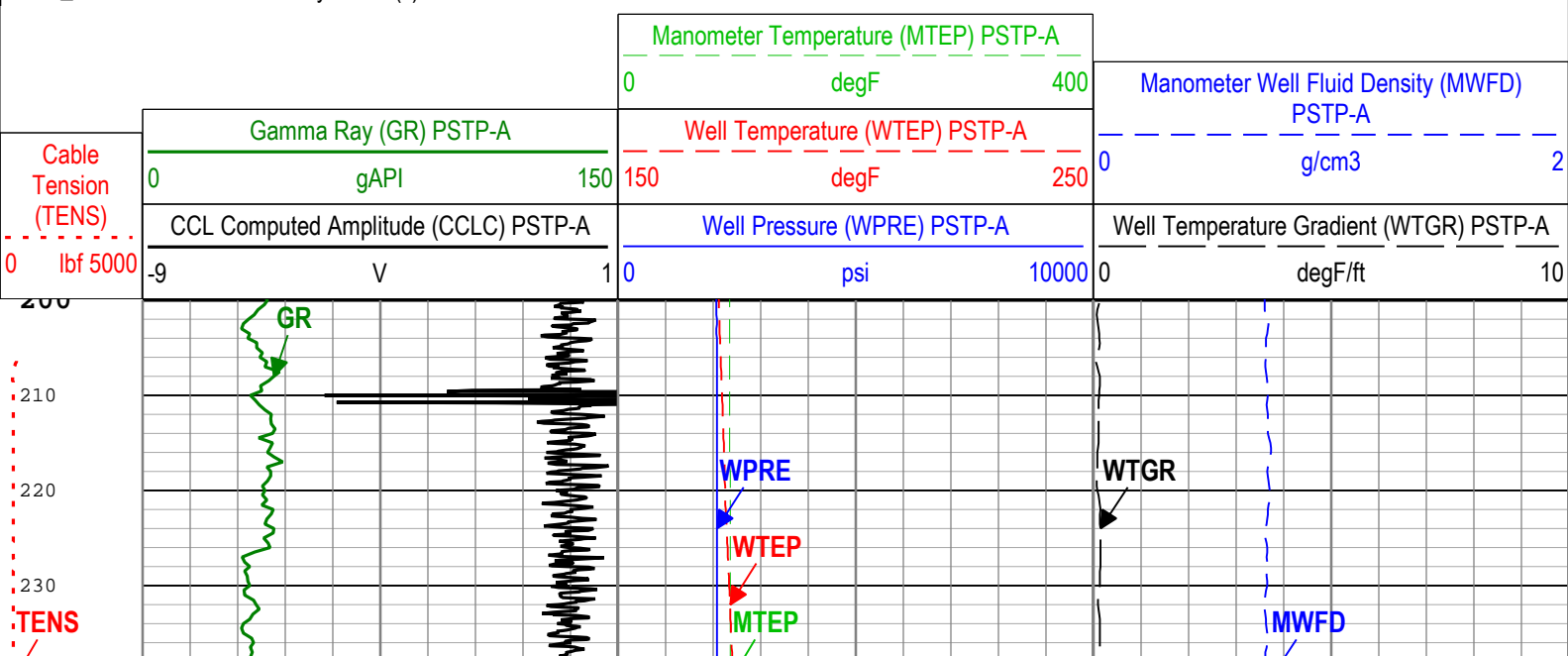
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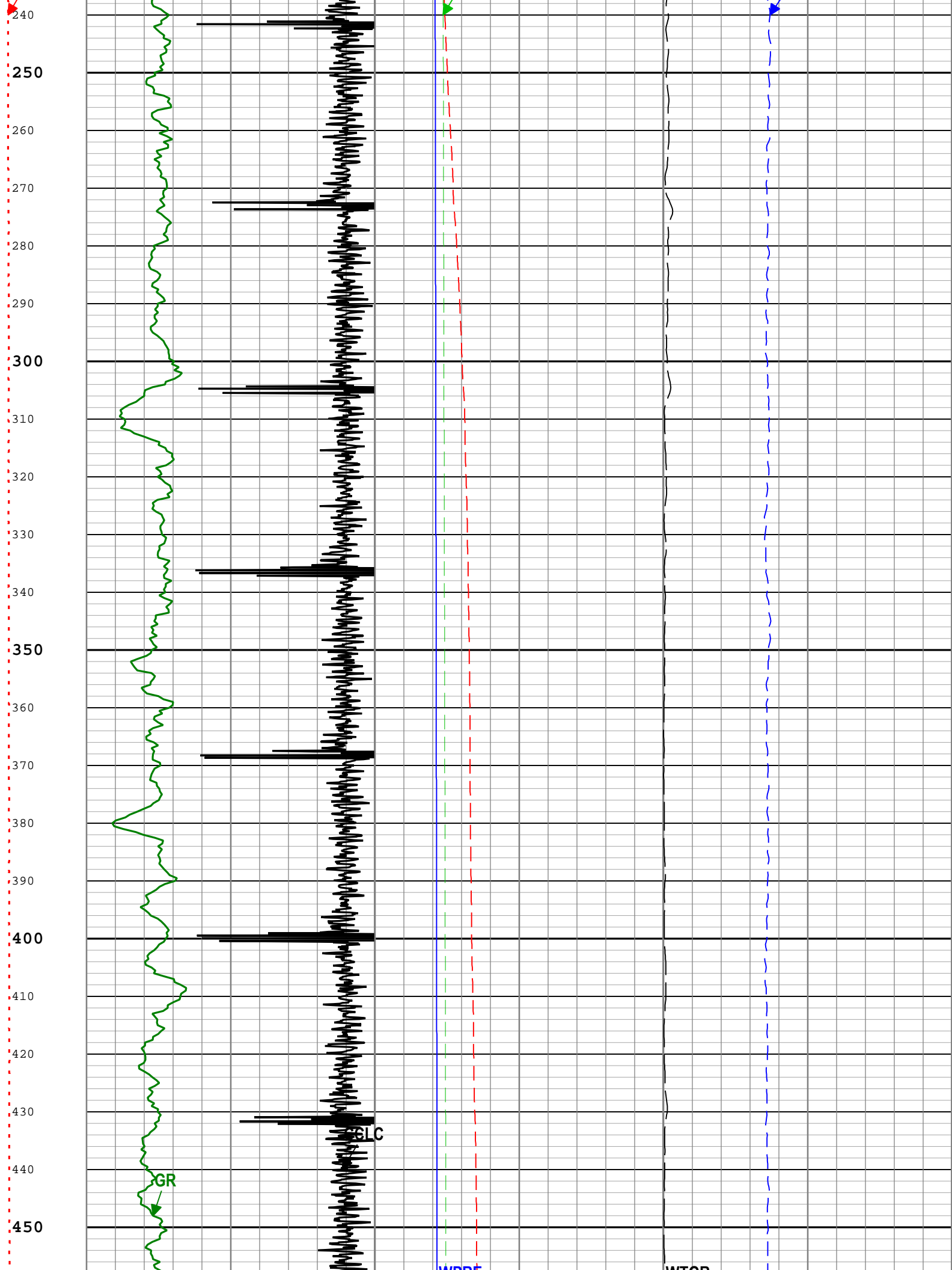
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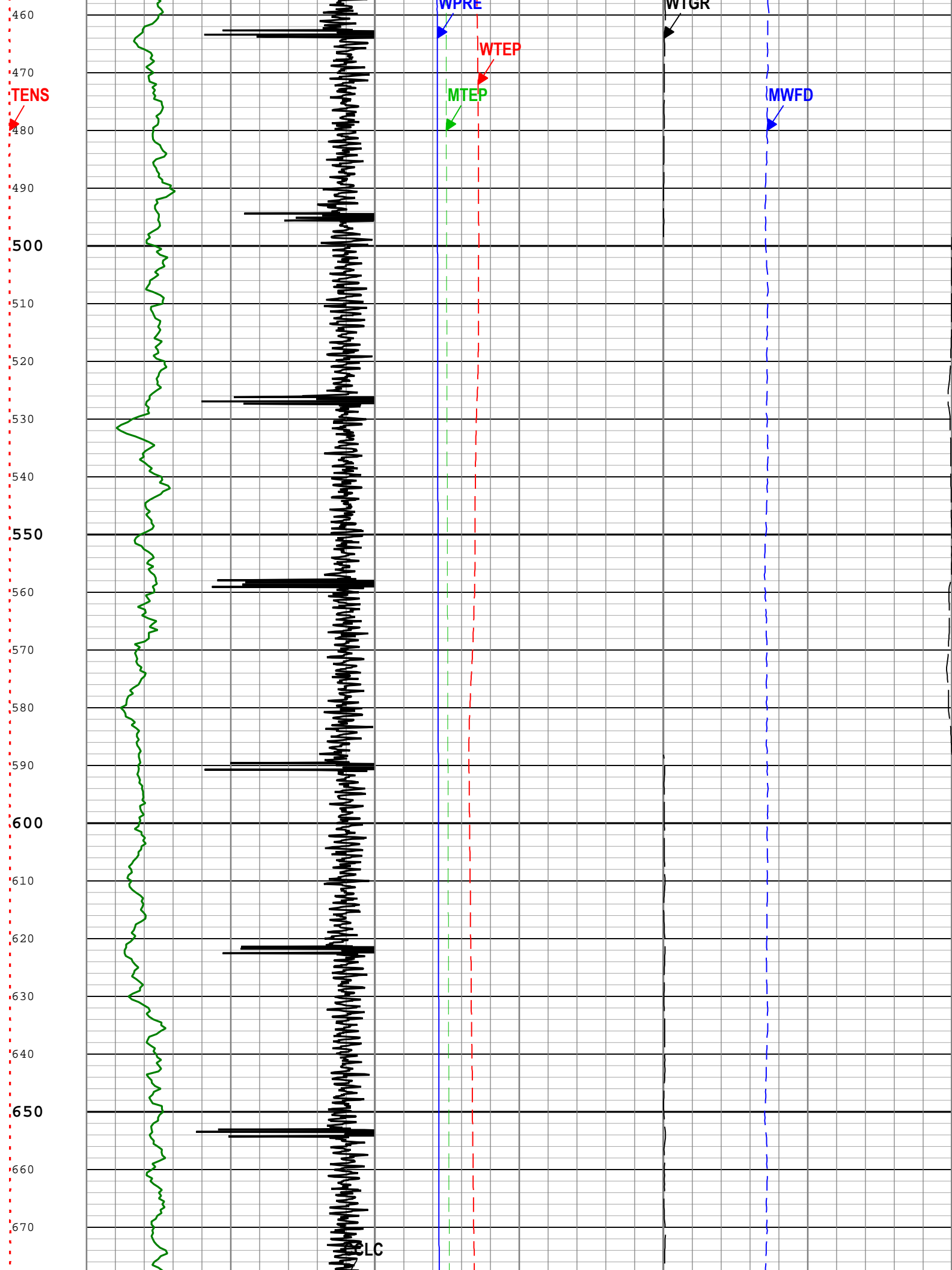
TWO: Log[4]:Up:S006

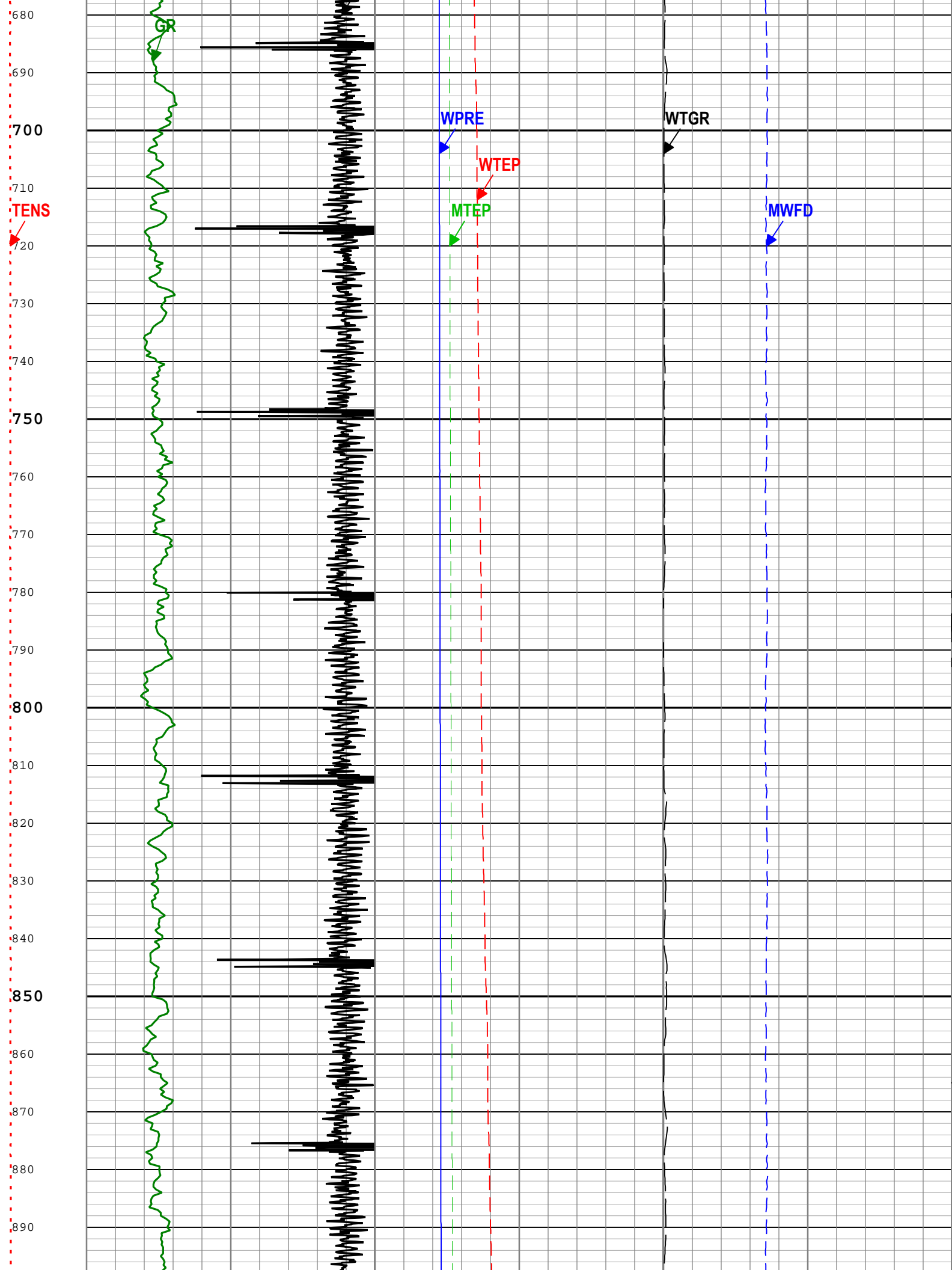
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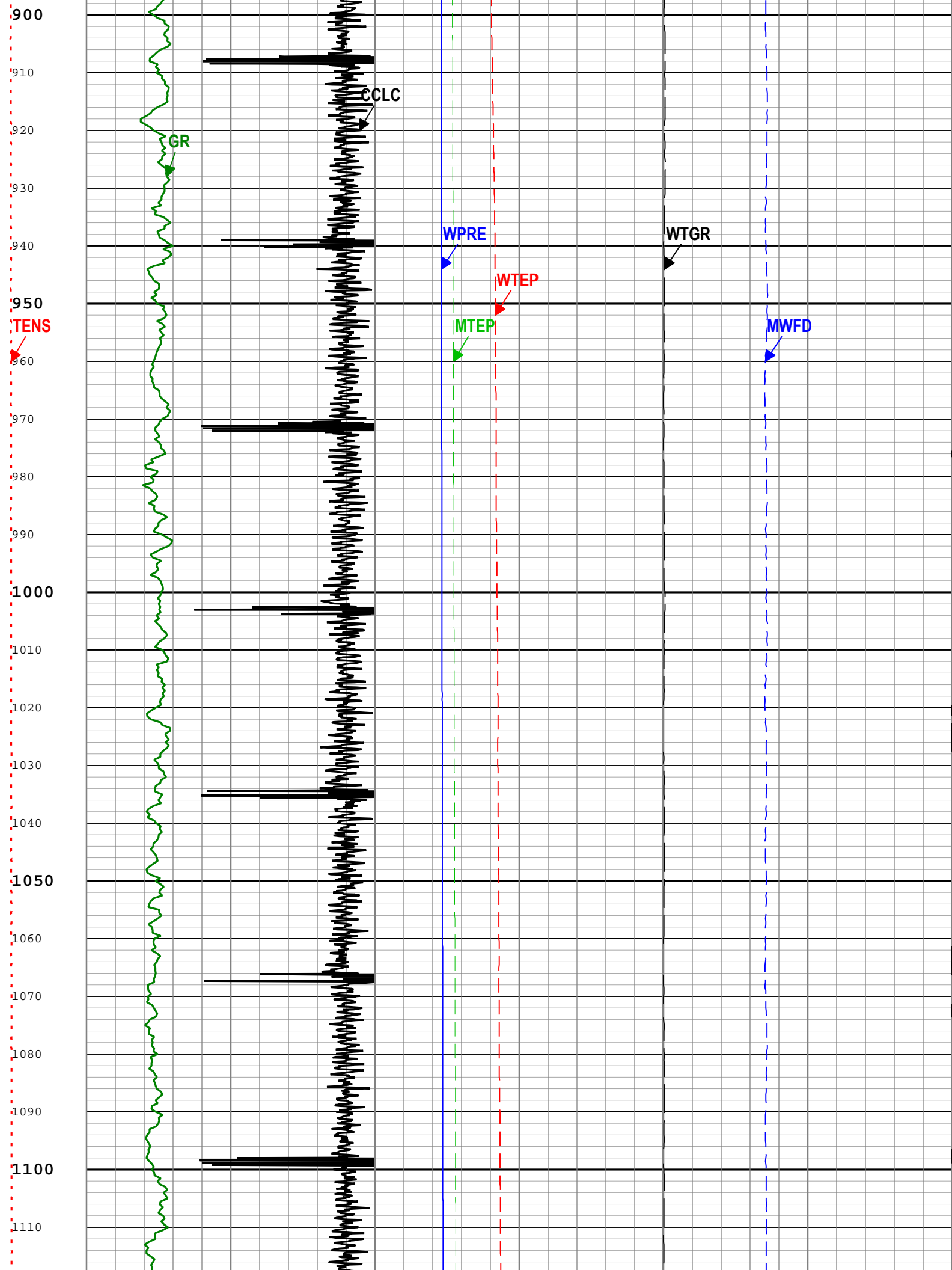
TIME\_1900 - Time Marked every 60.00 (s)



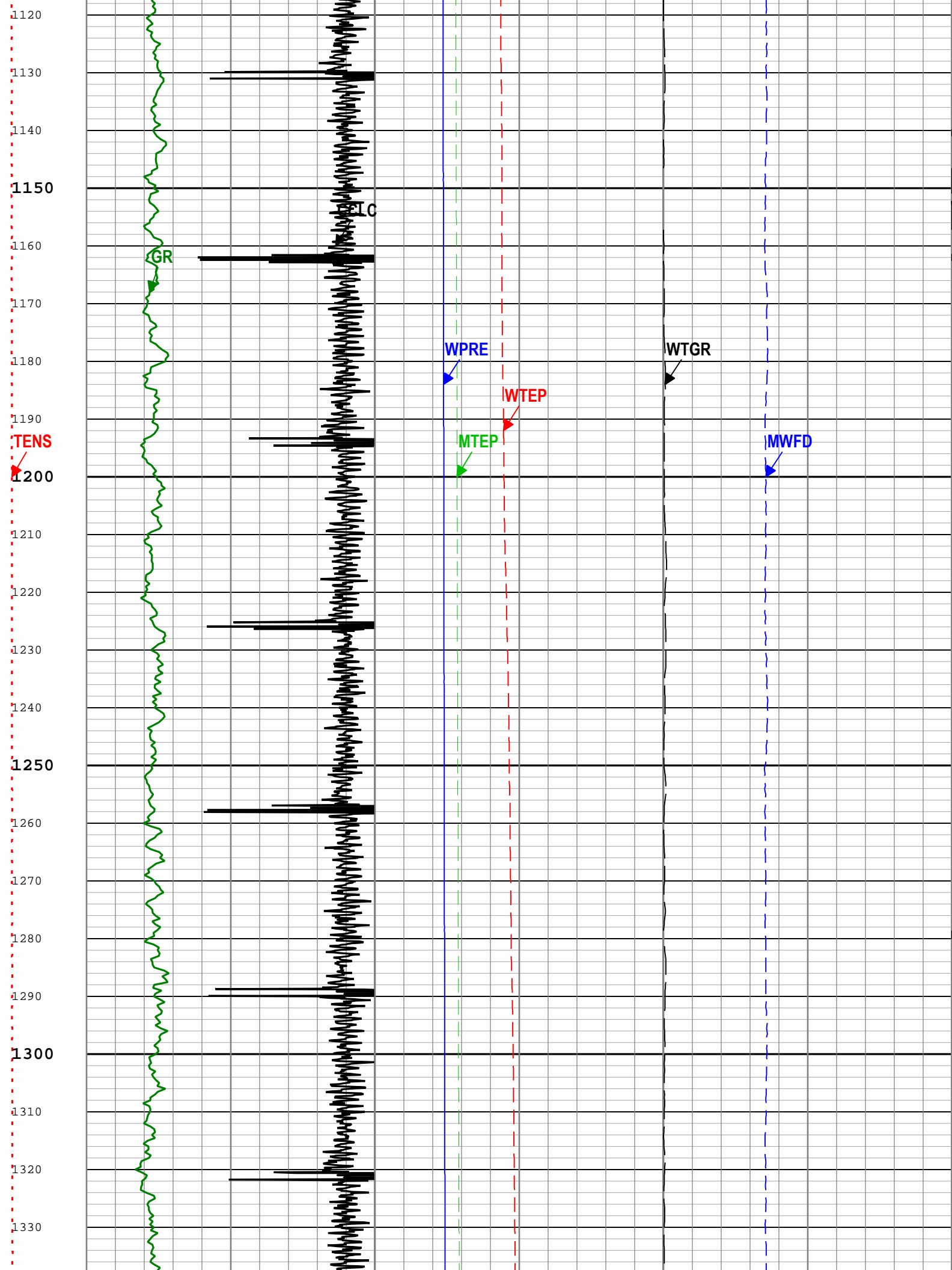


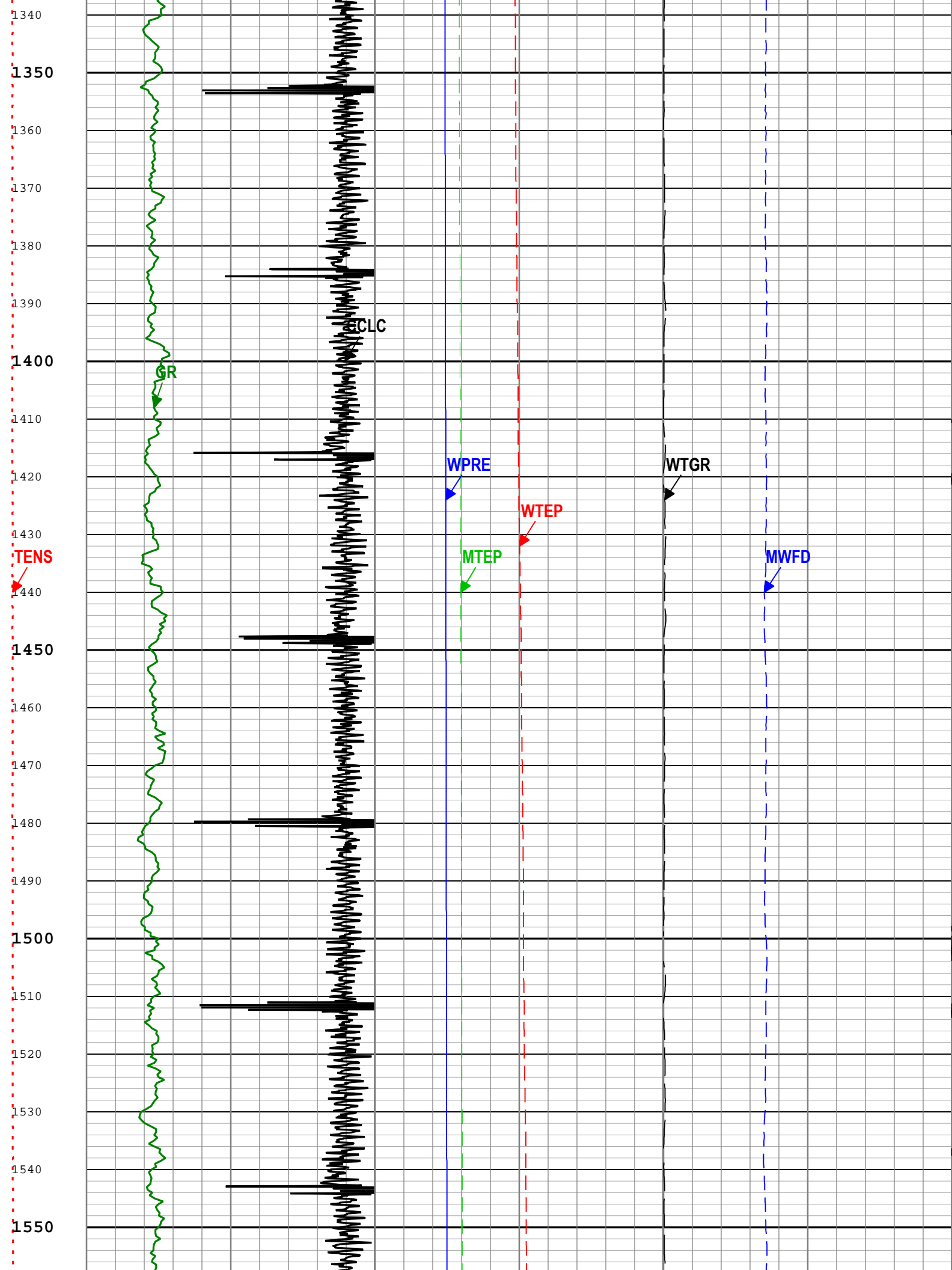


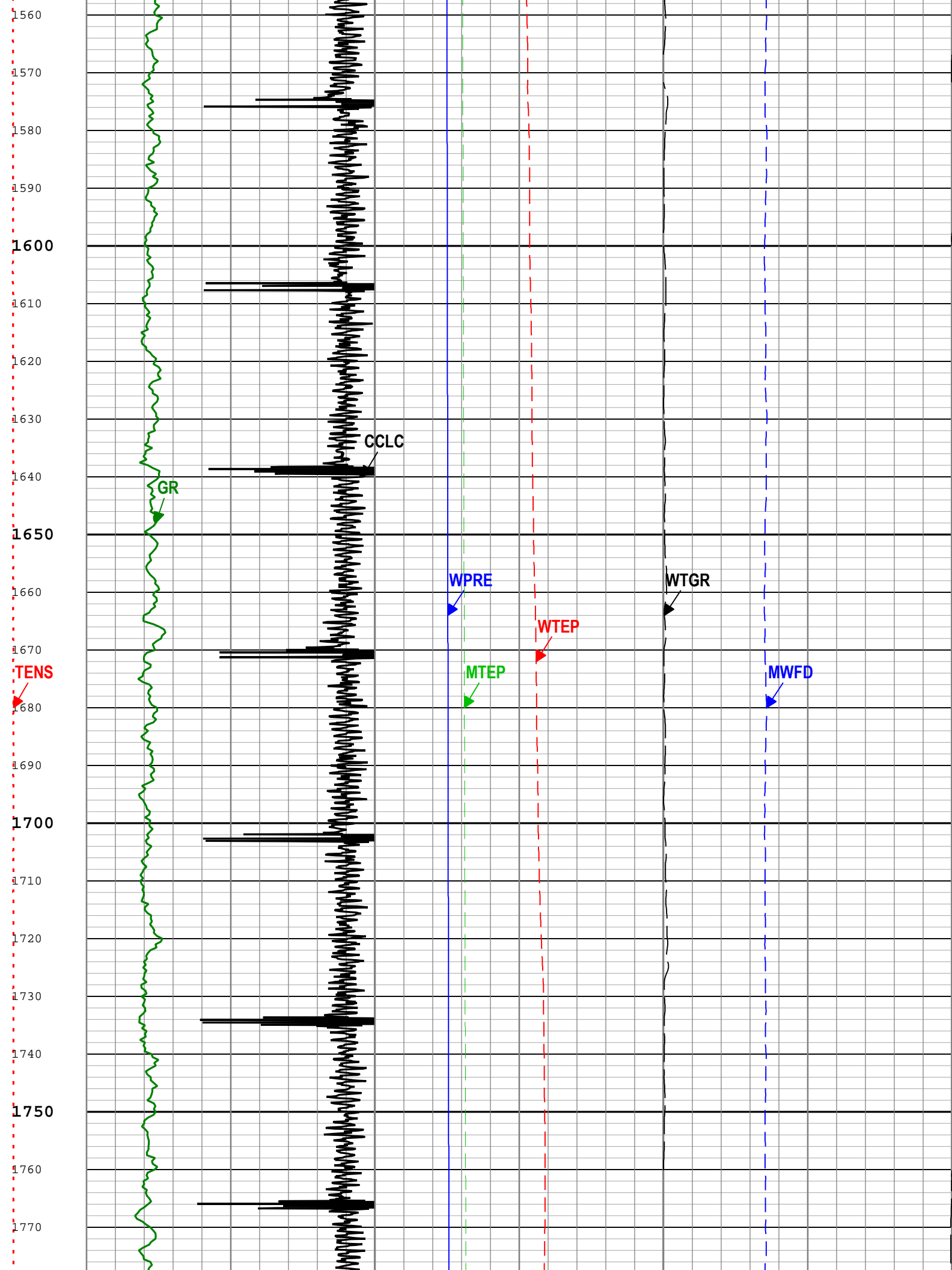


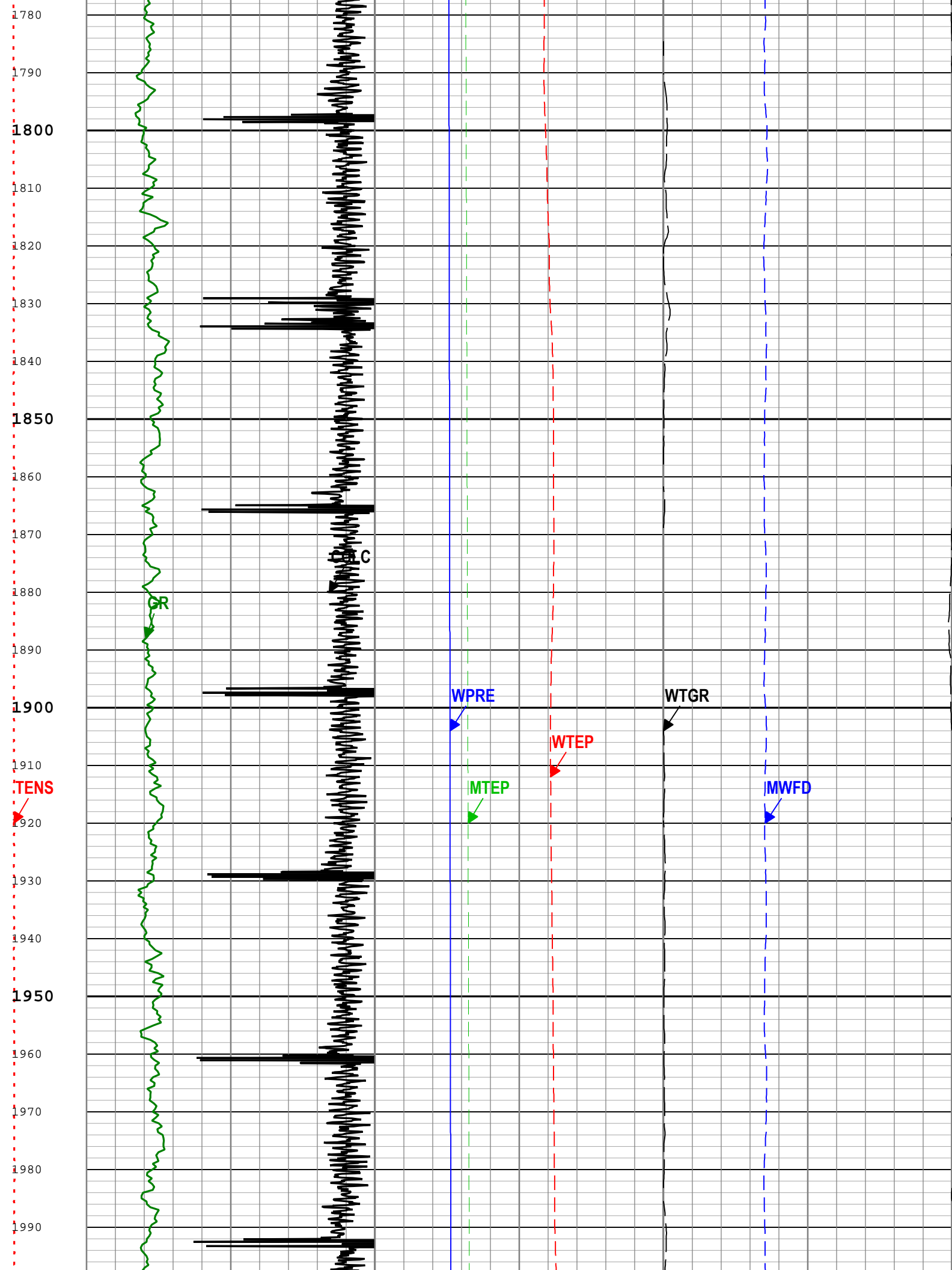


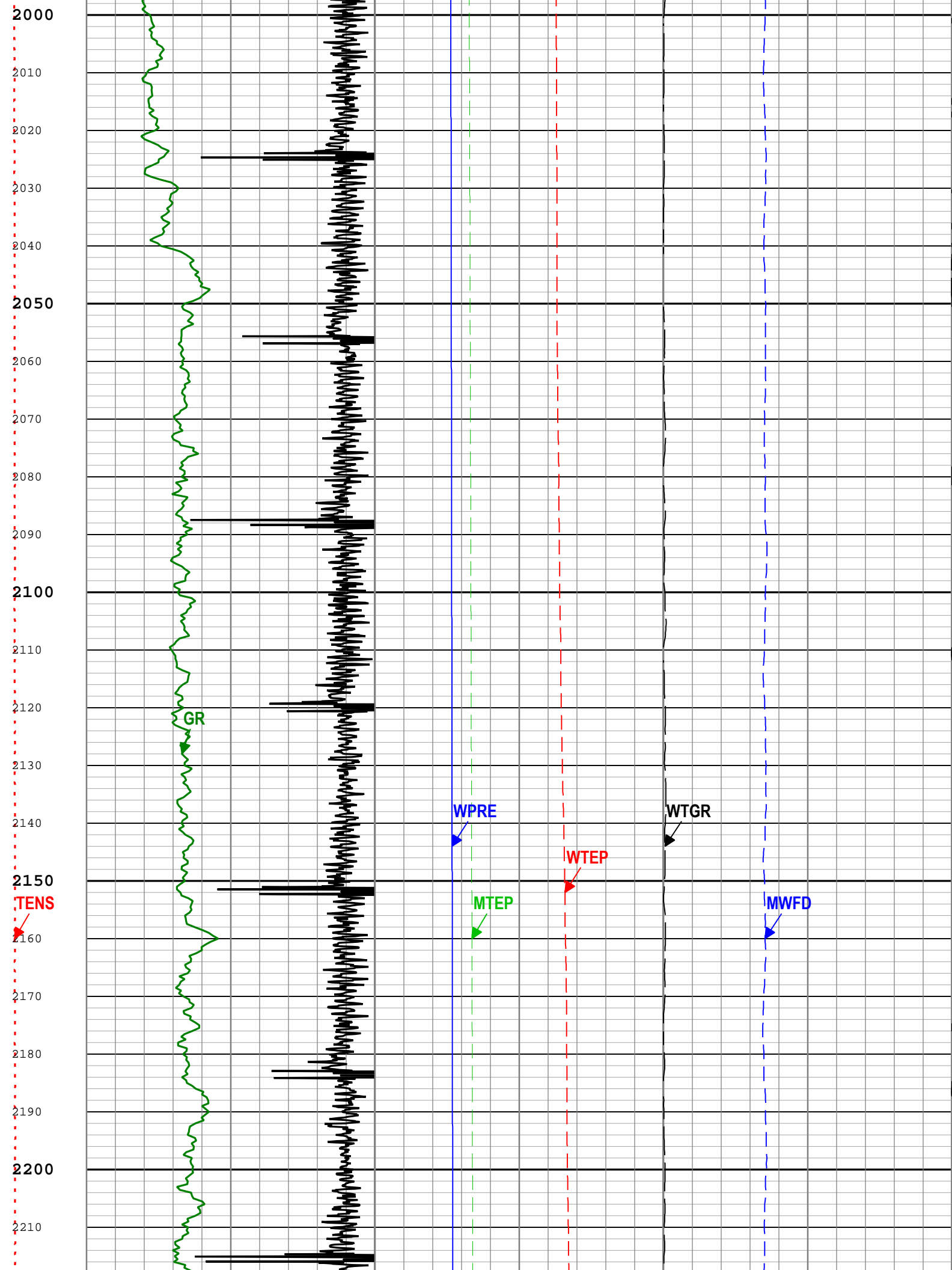


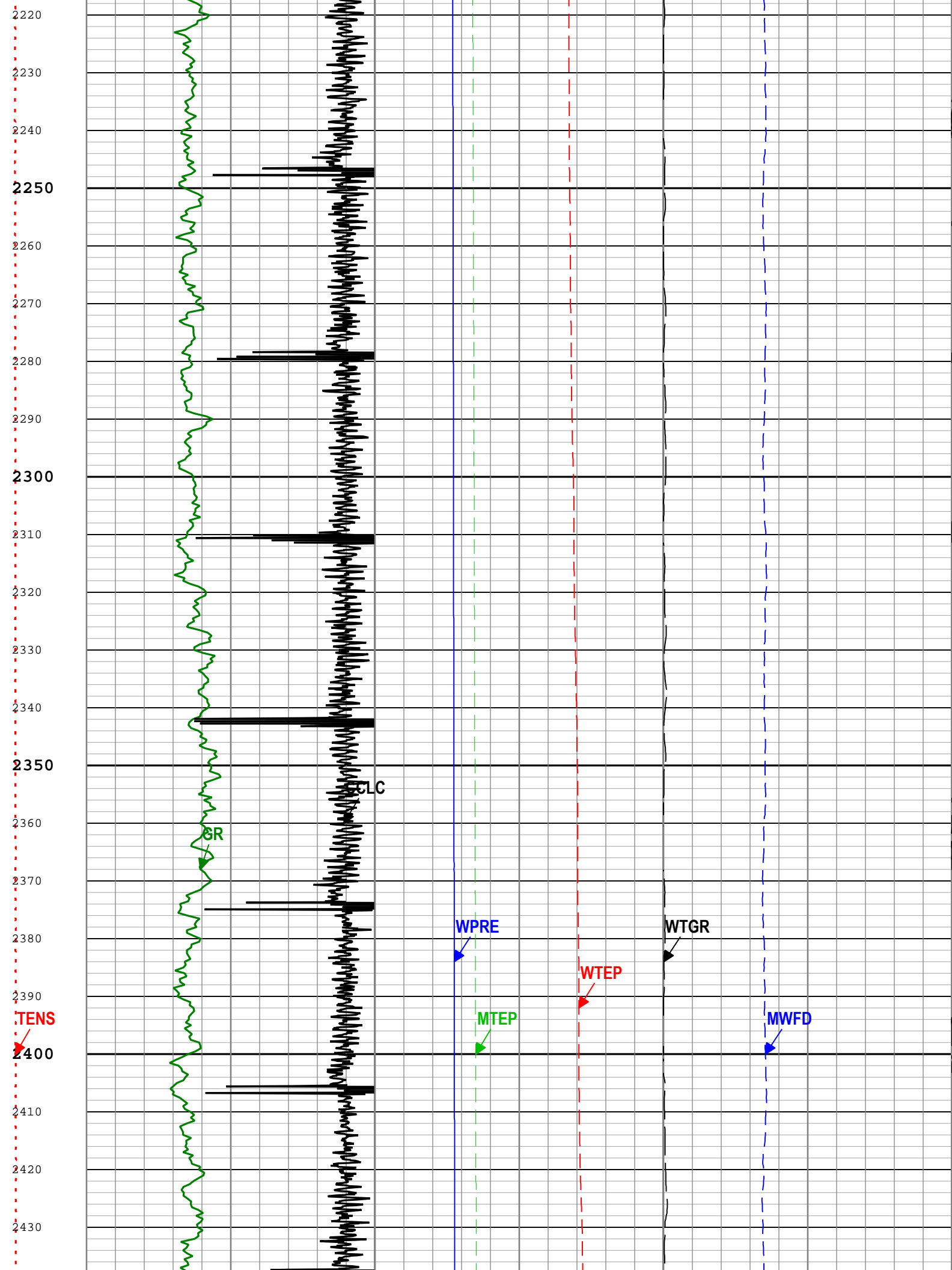


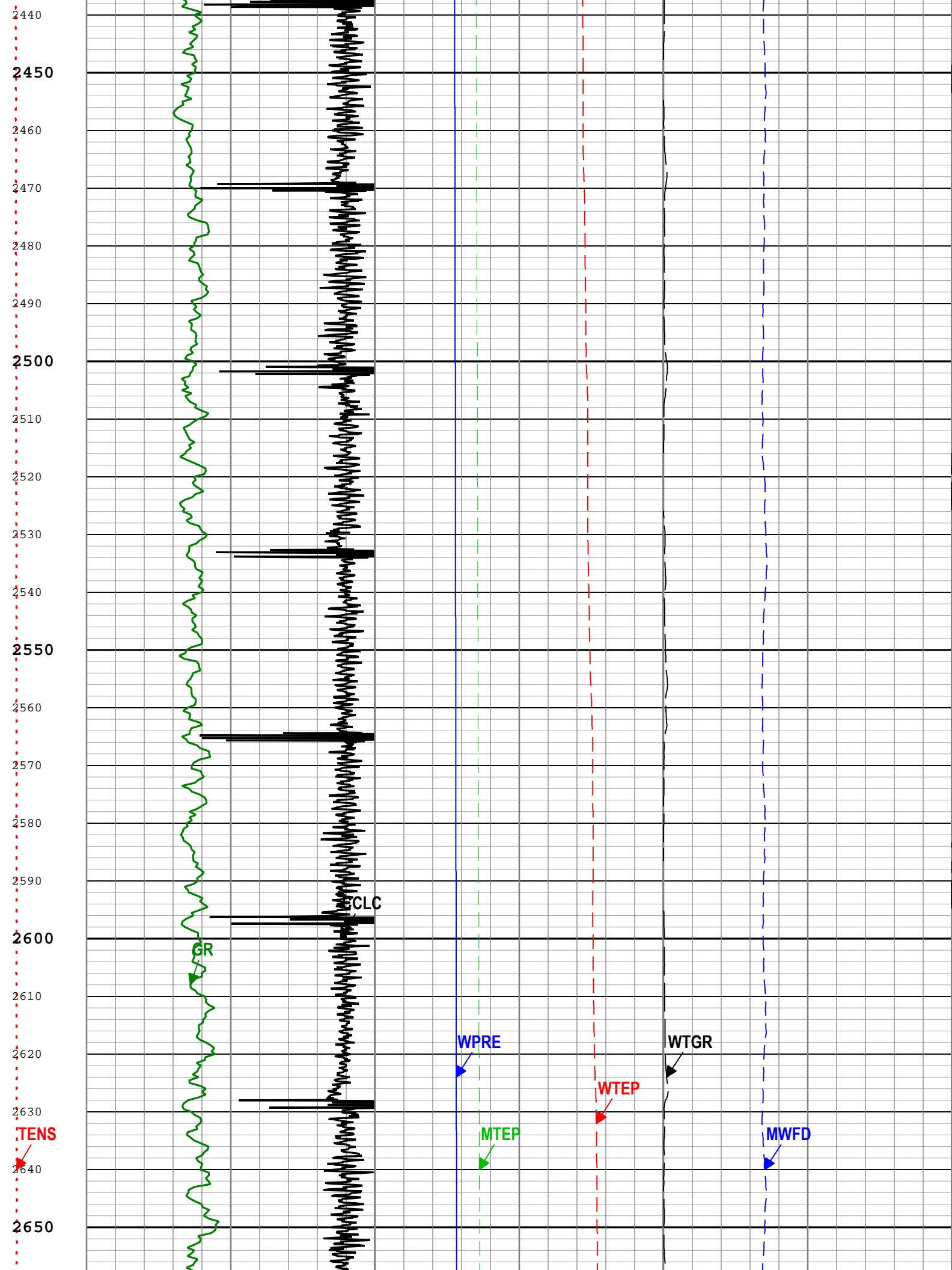


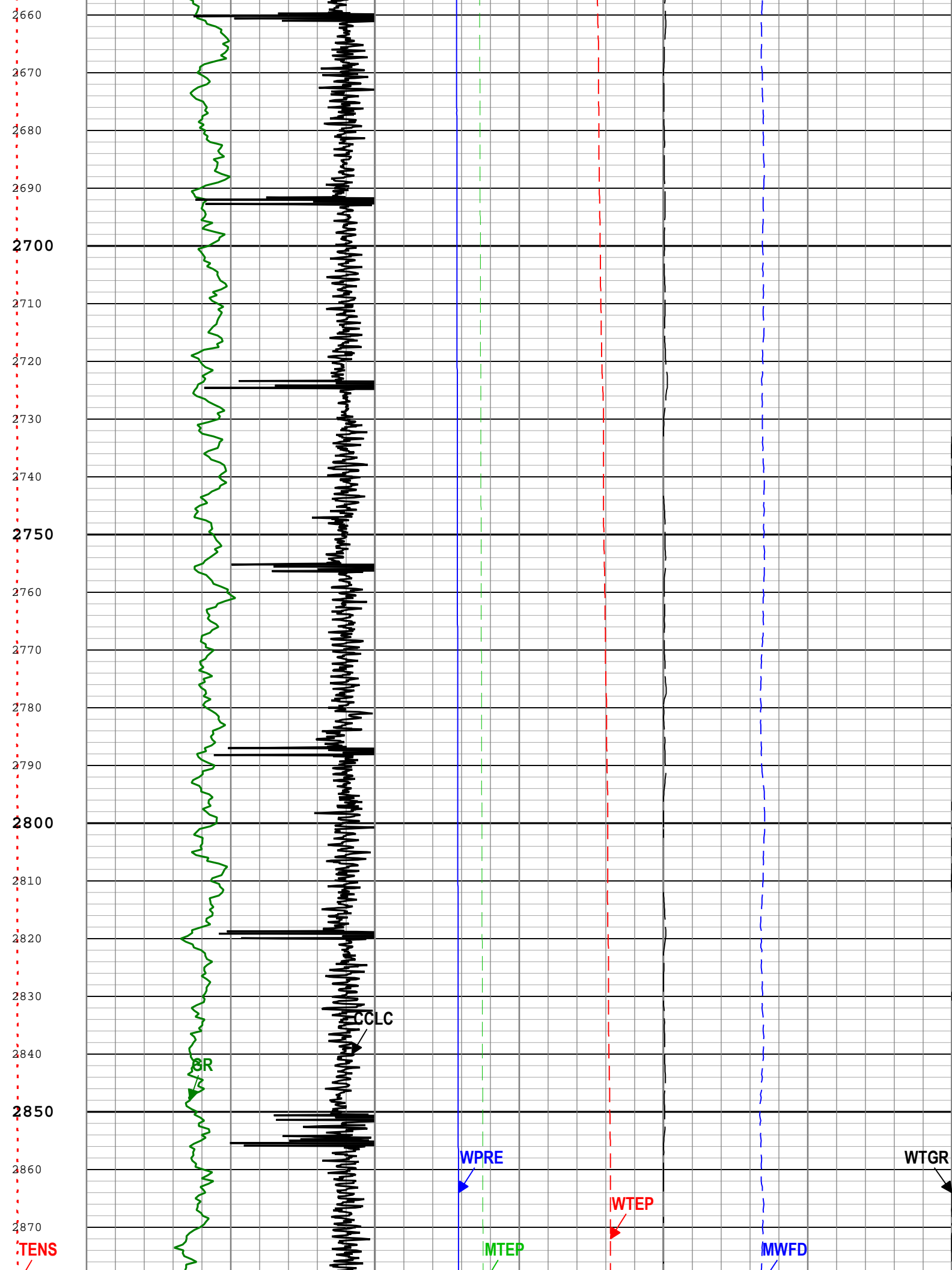




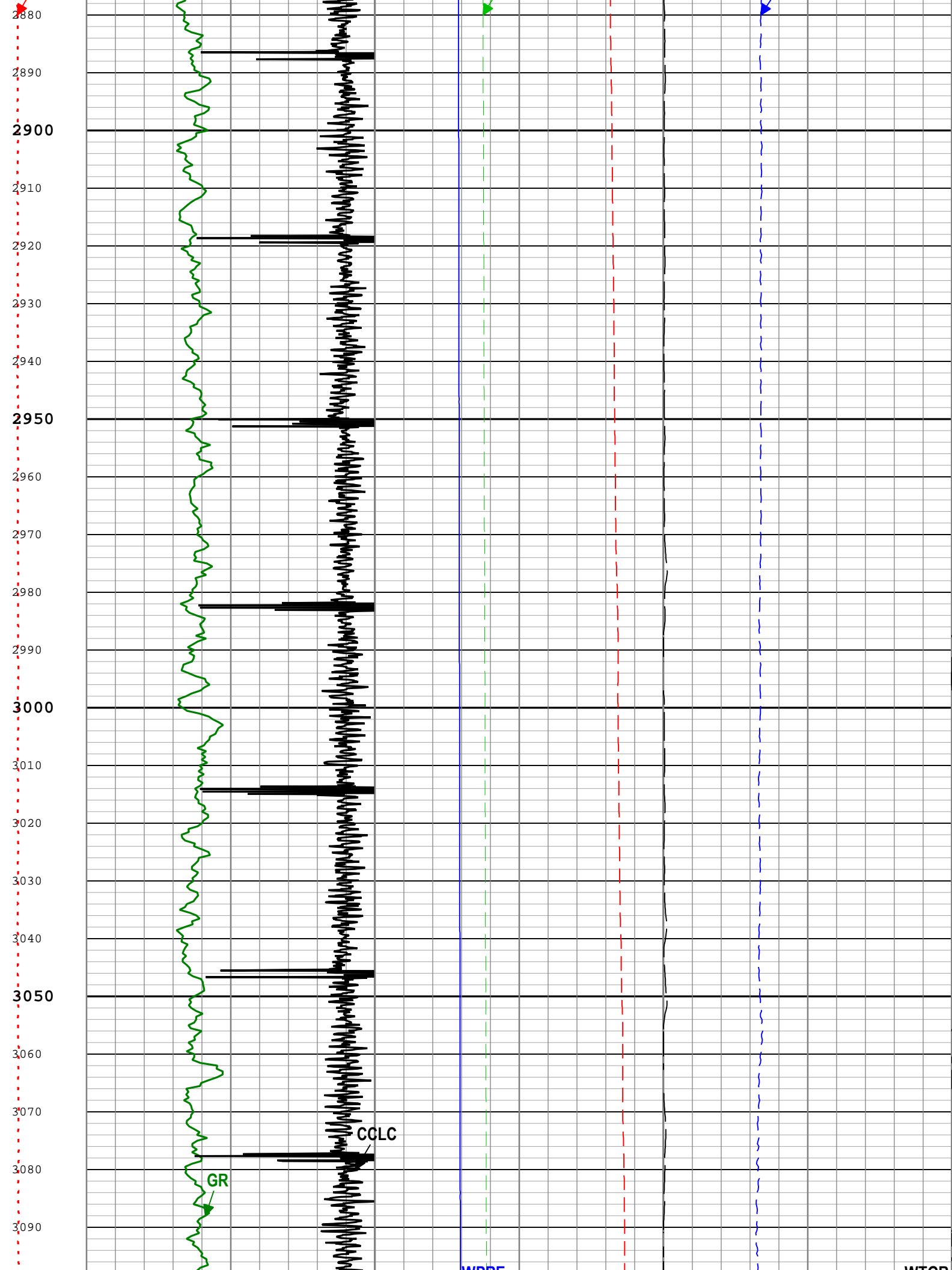


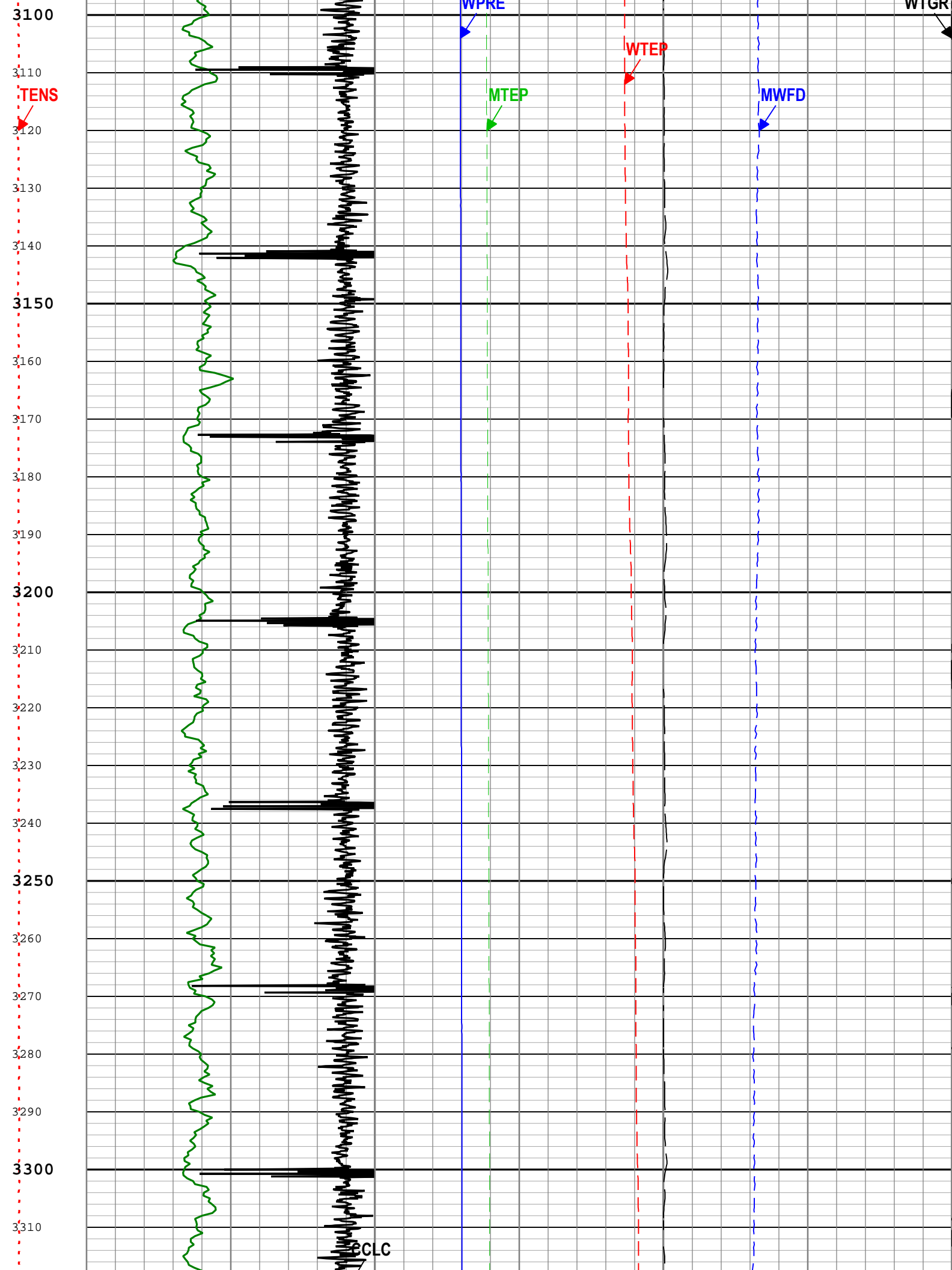


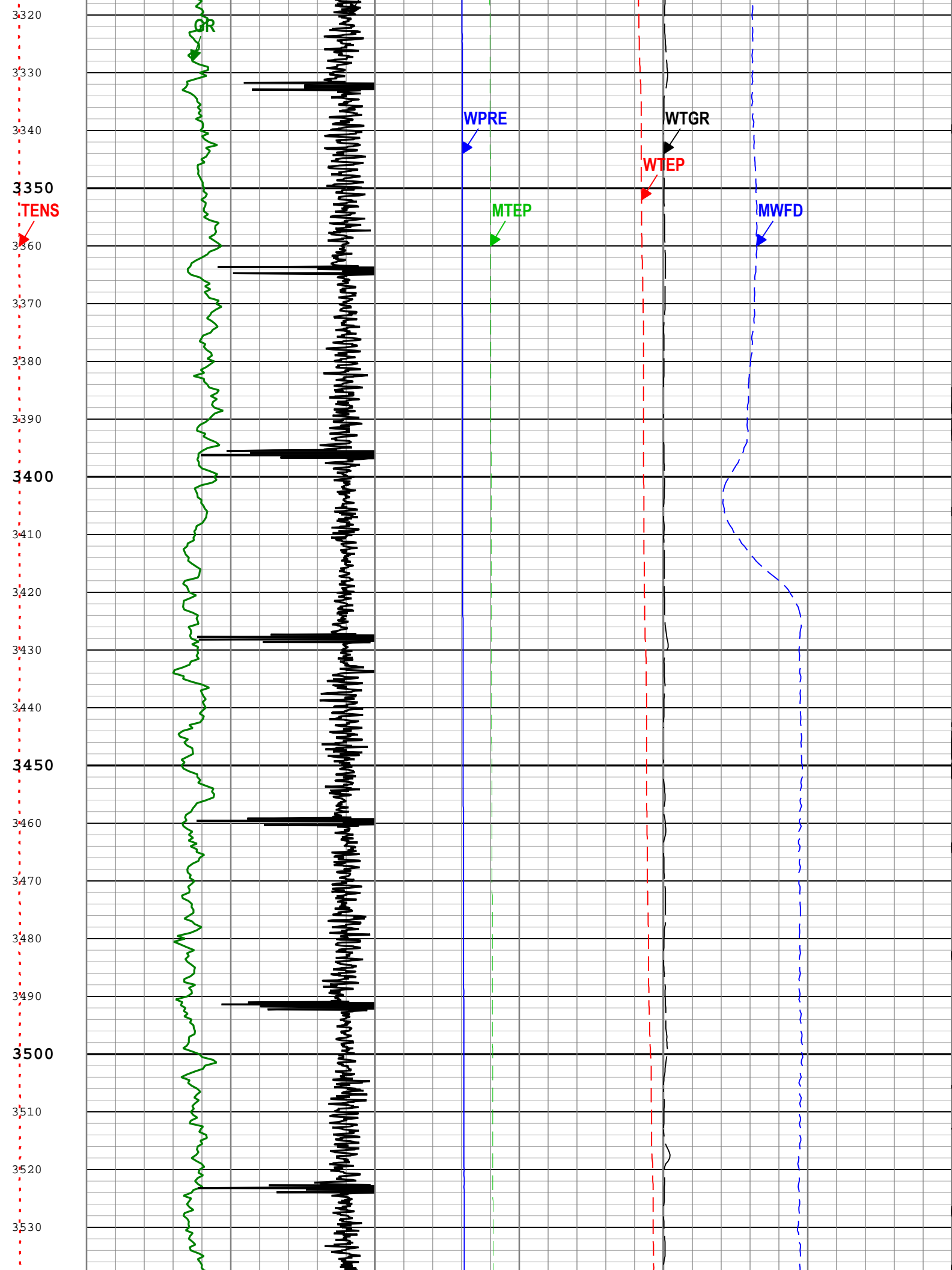


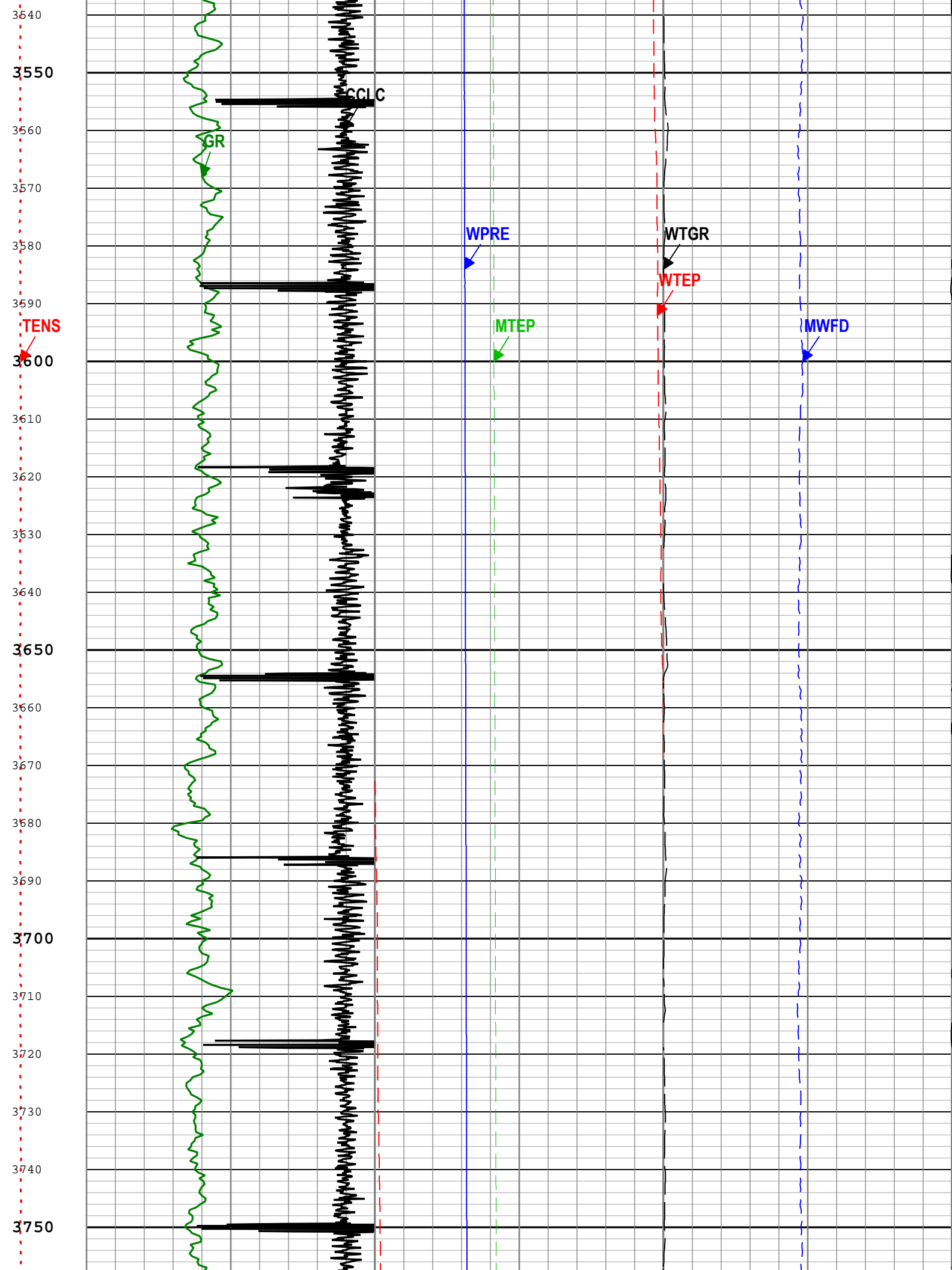


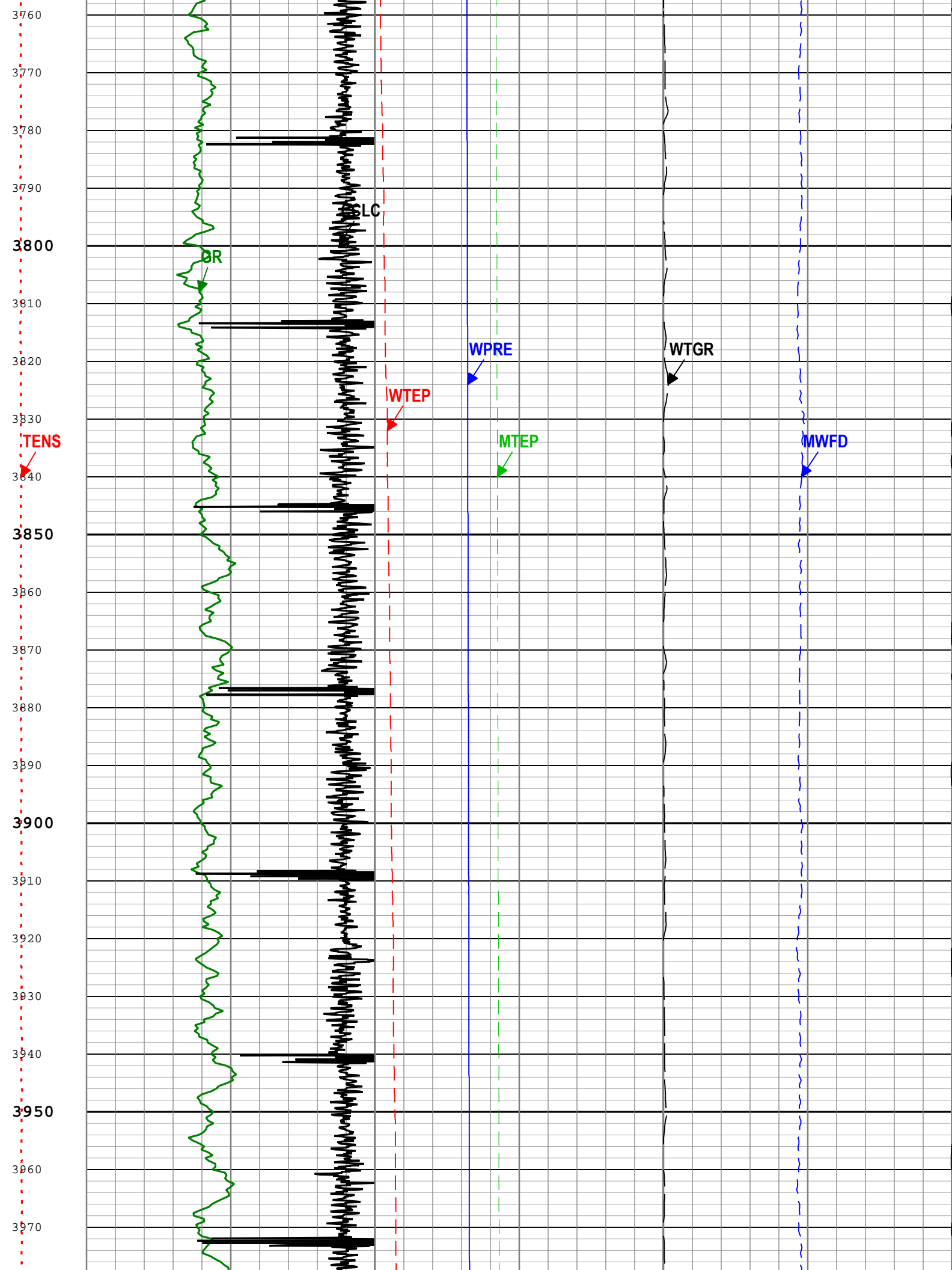


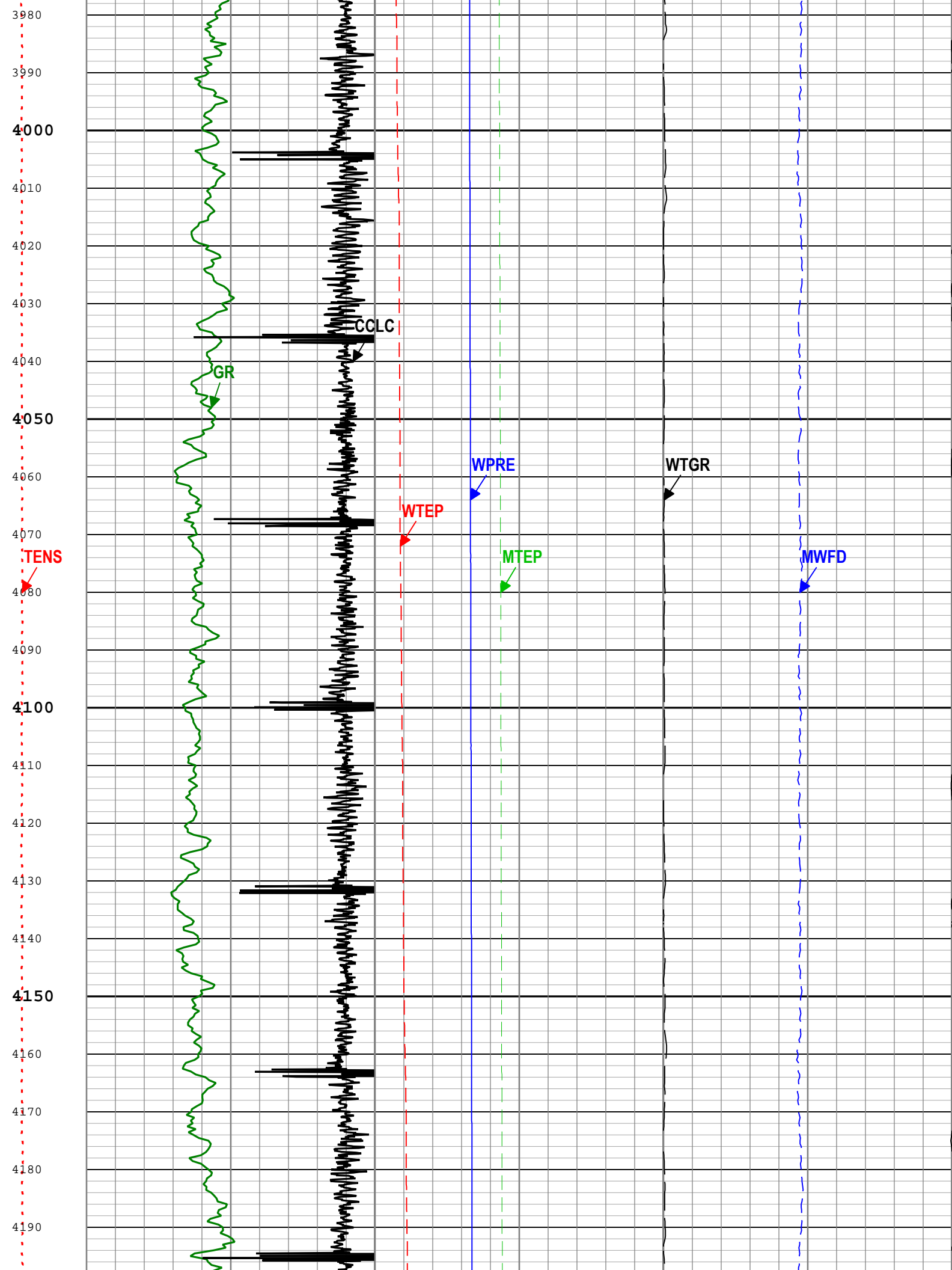


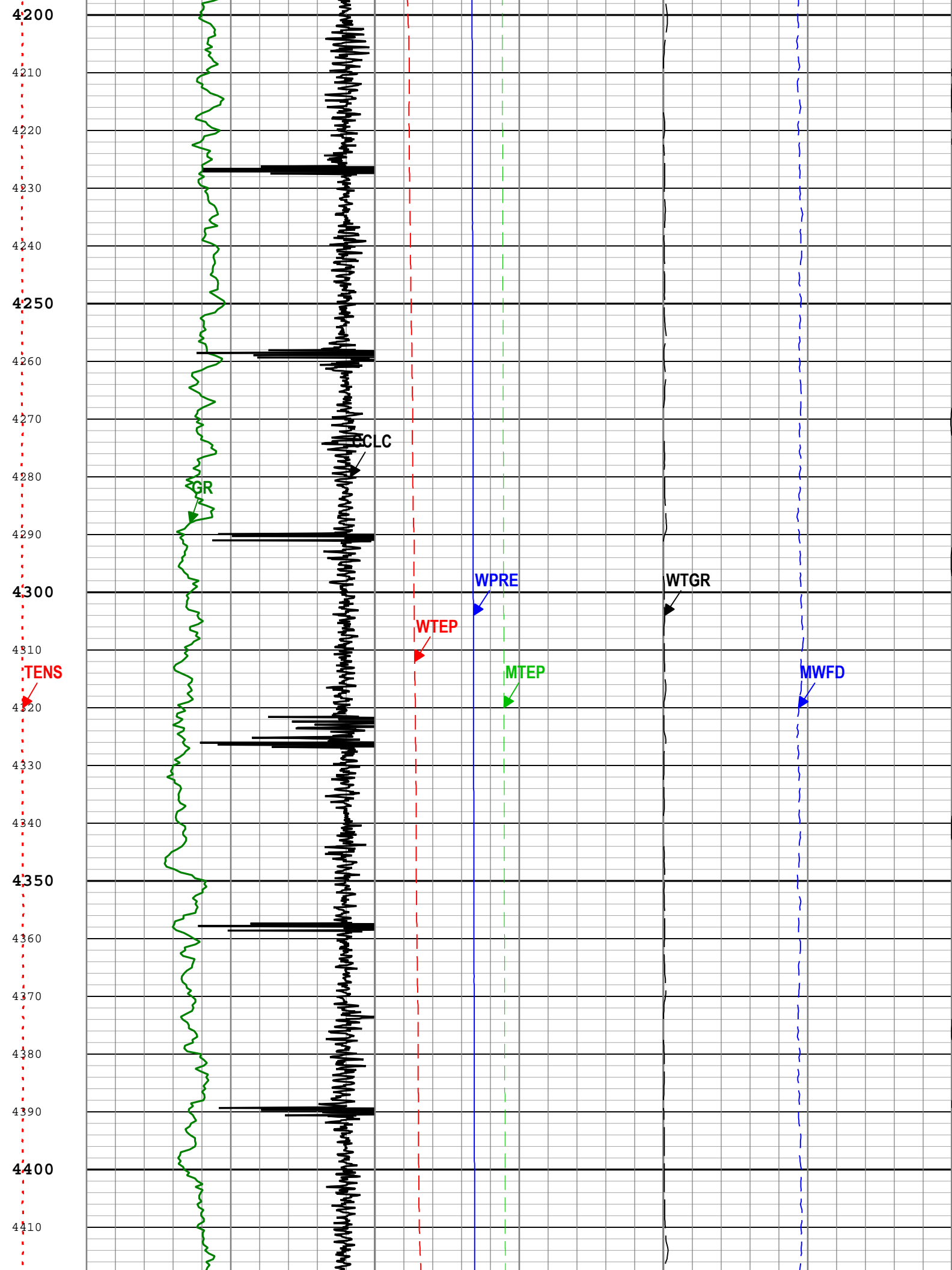


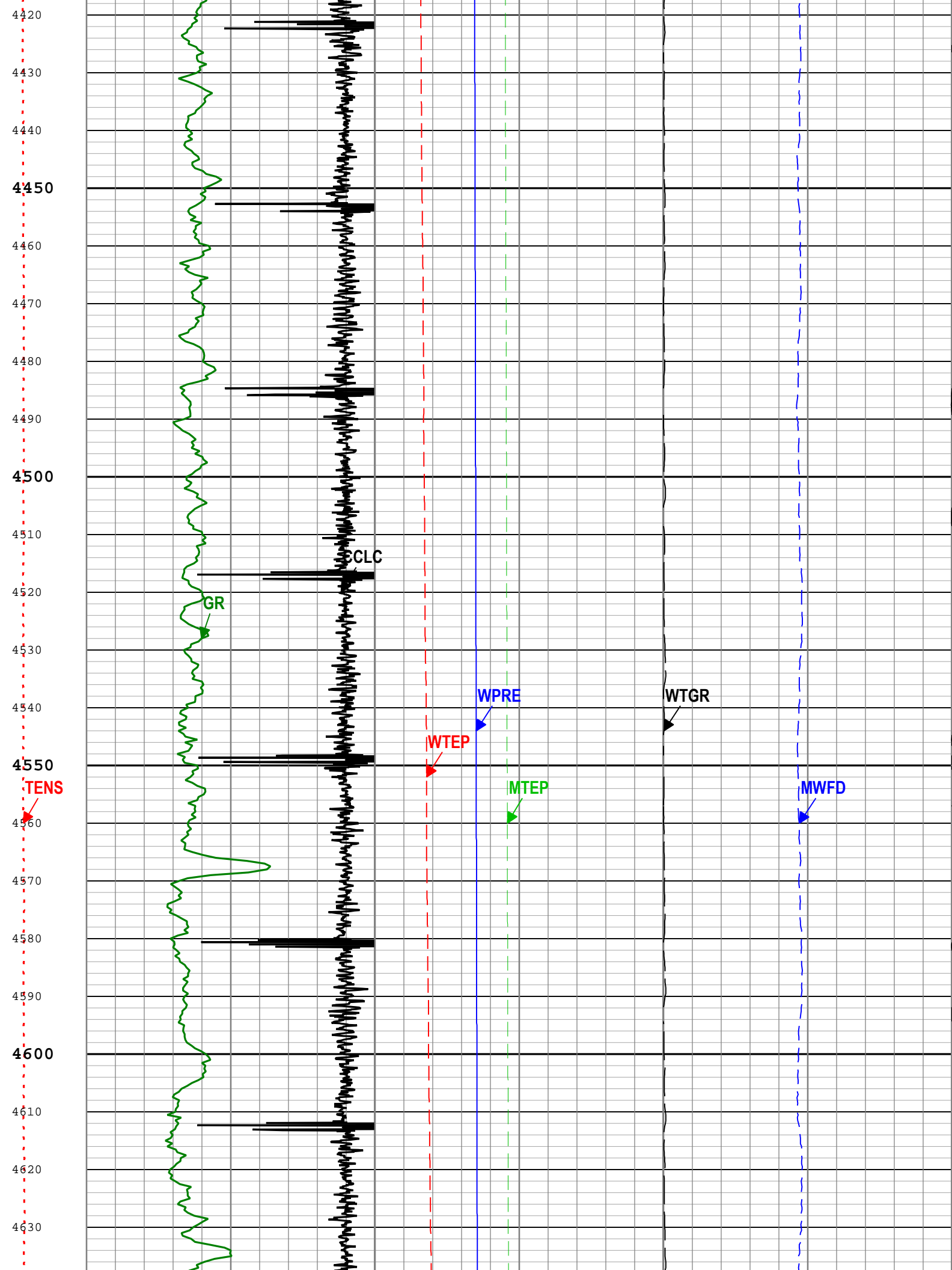




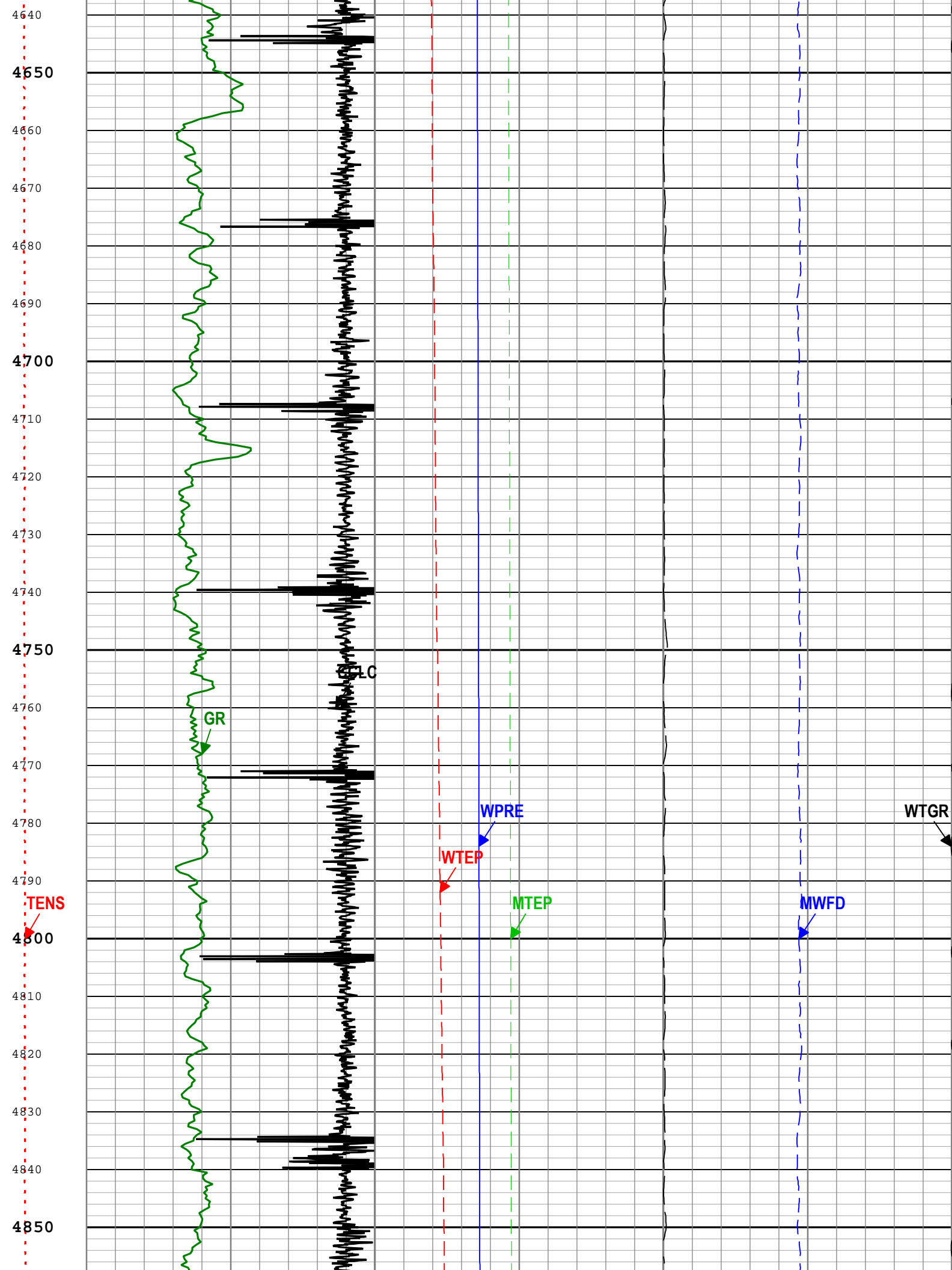


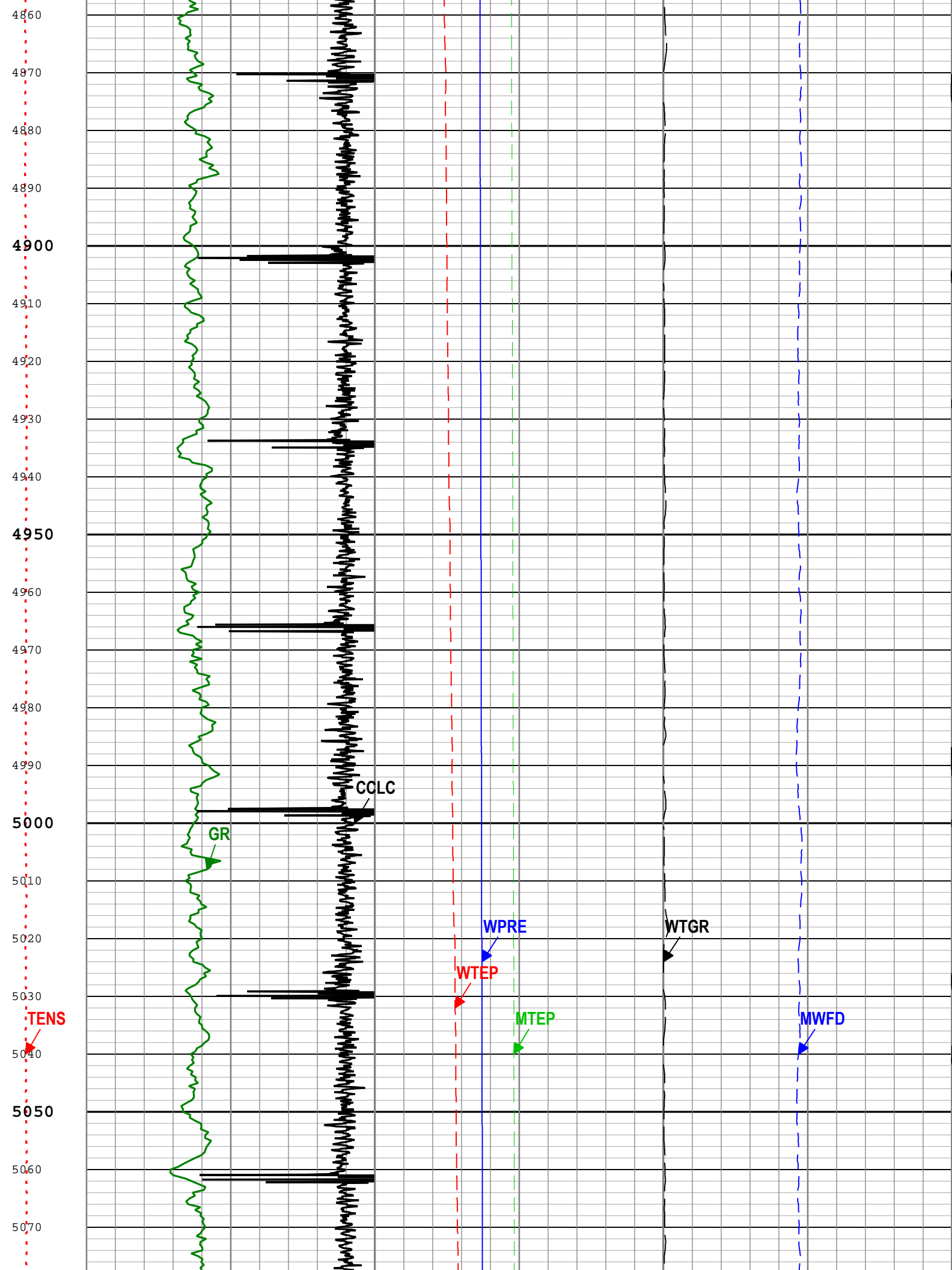


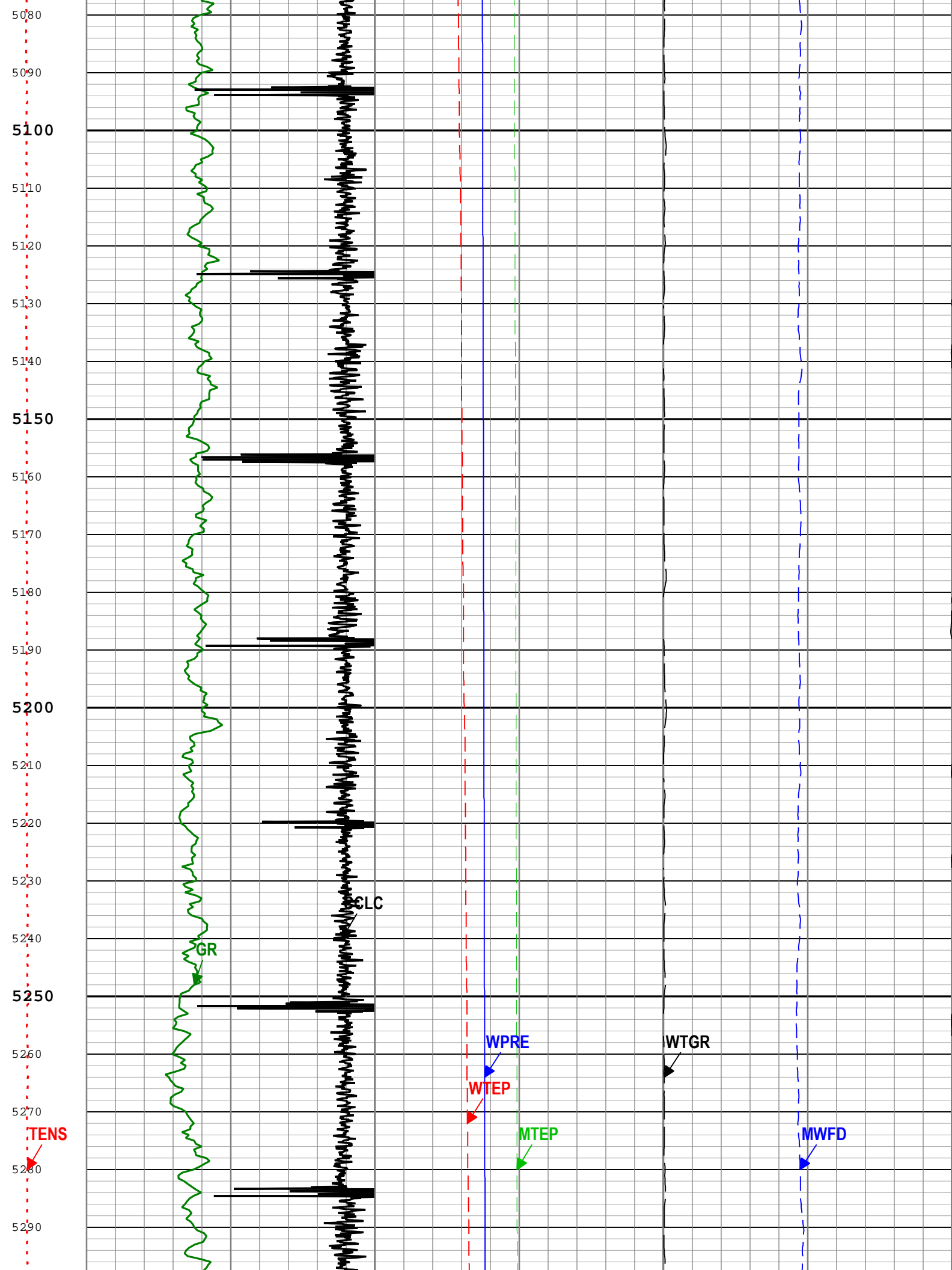


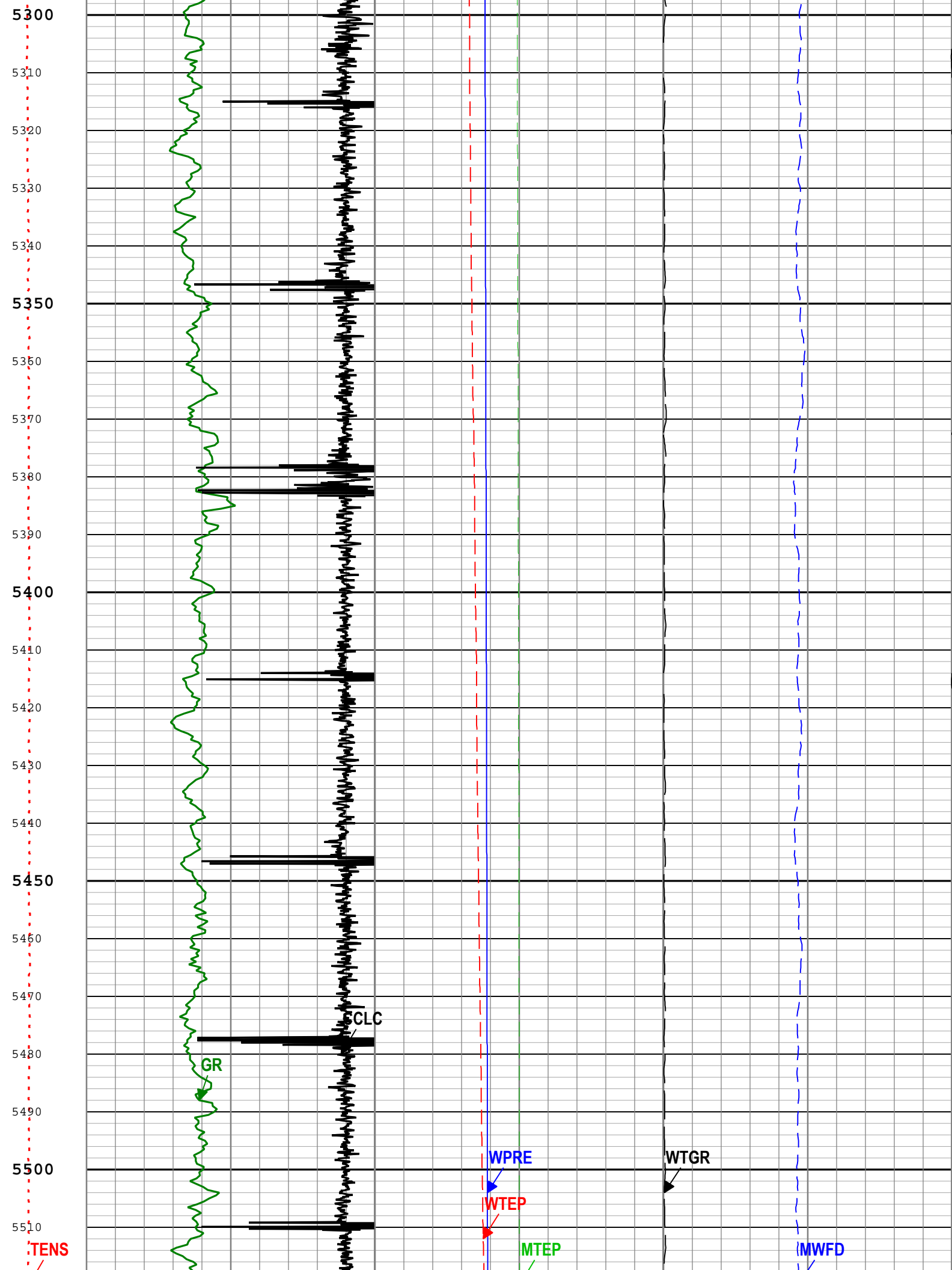


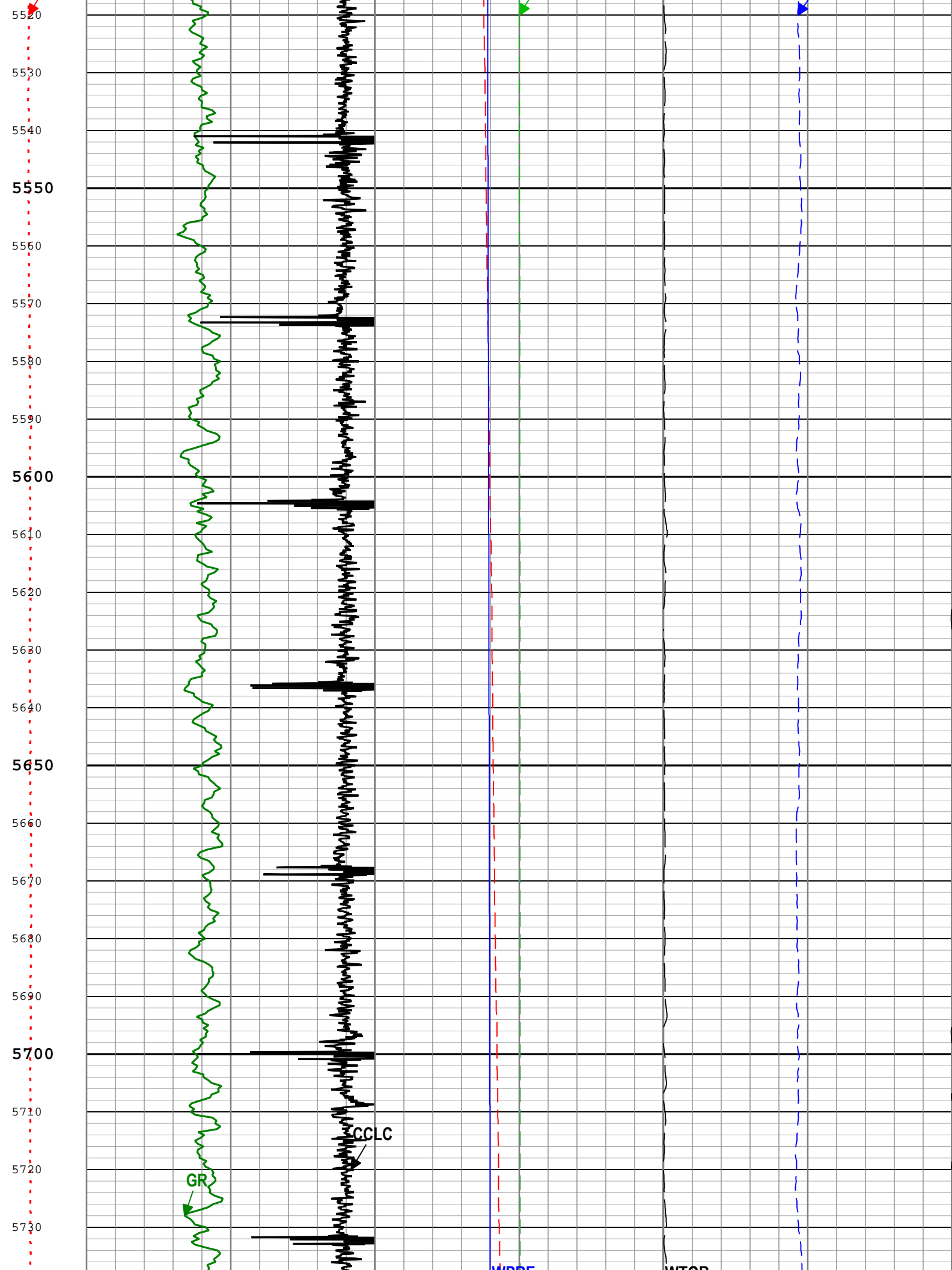


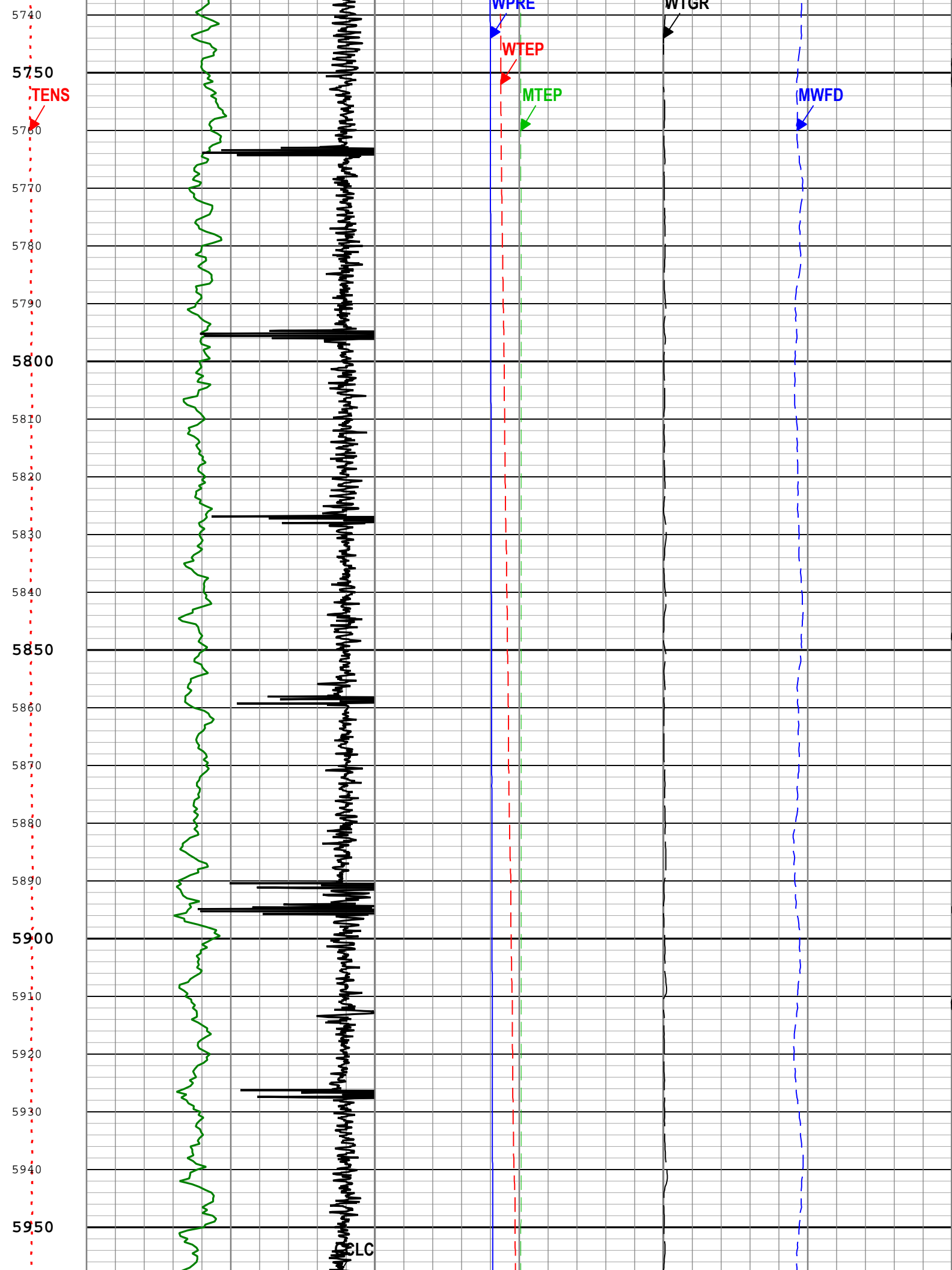


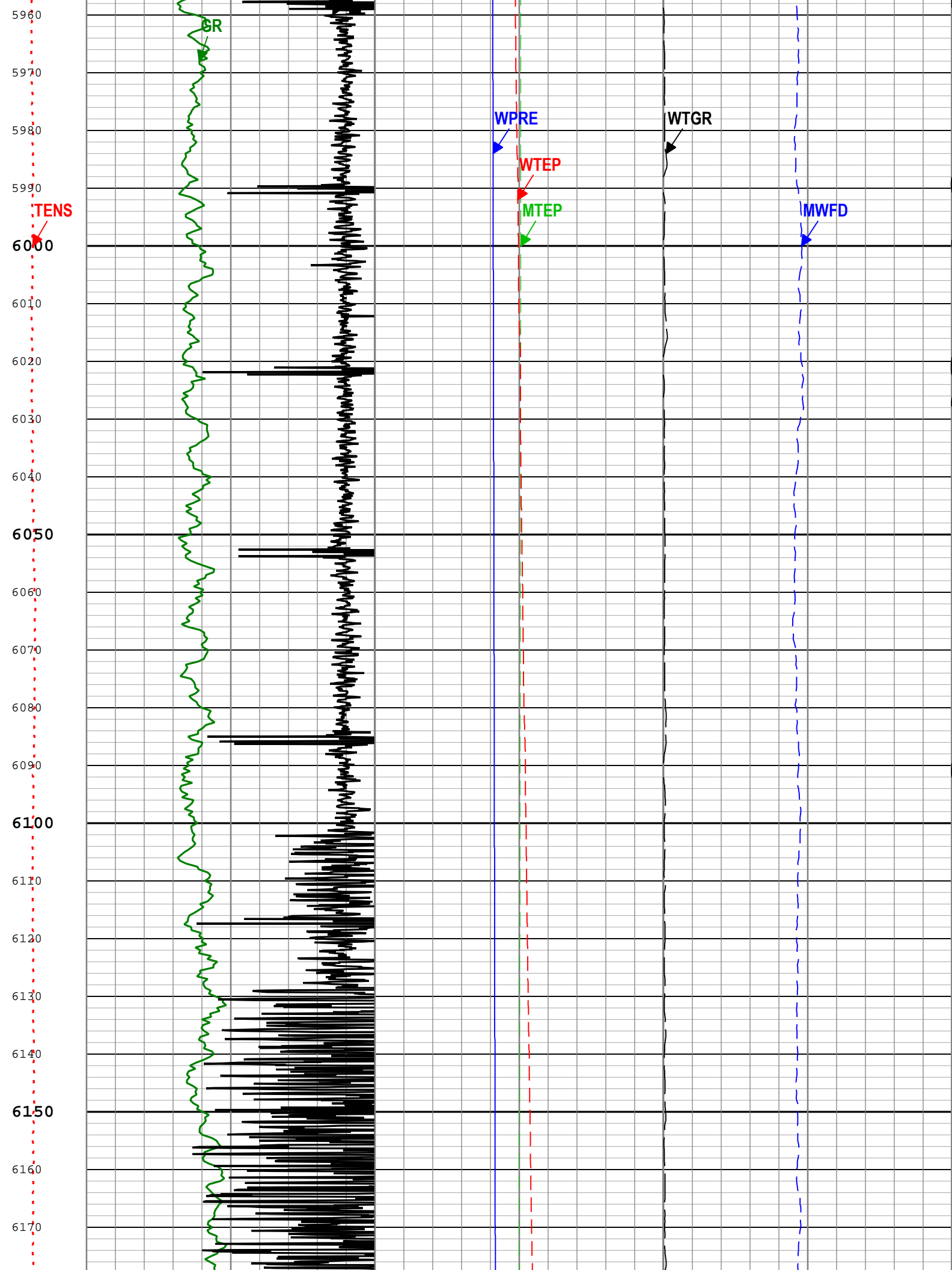


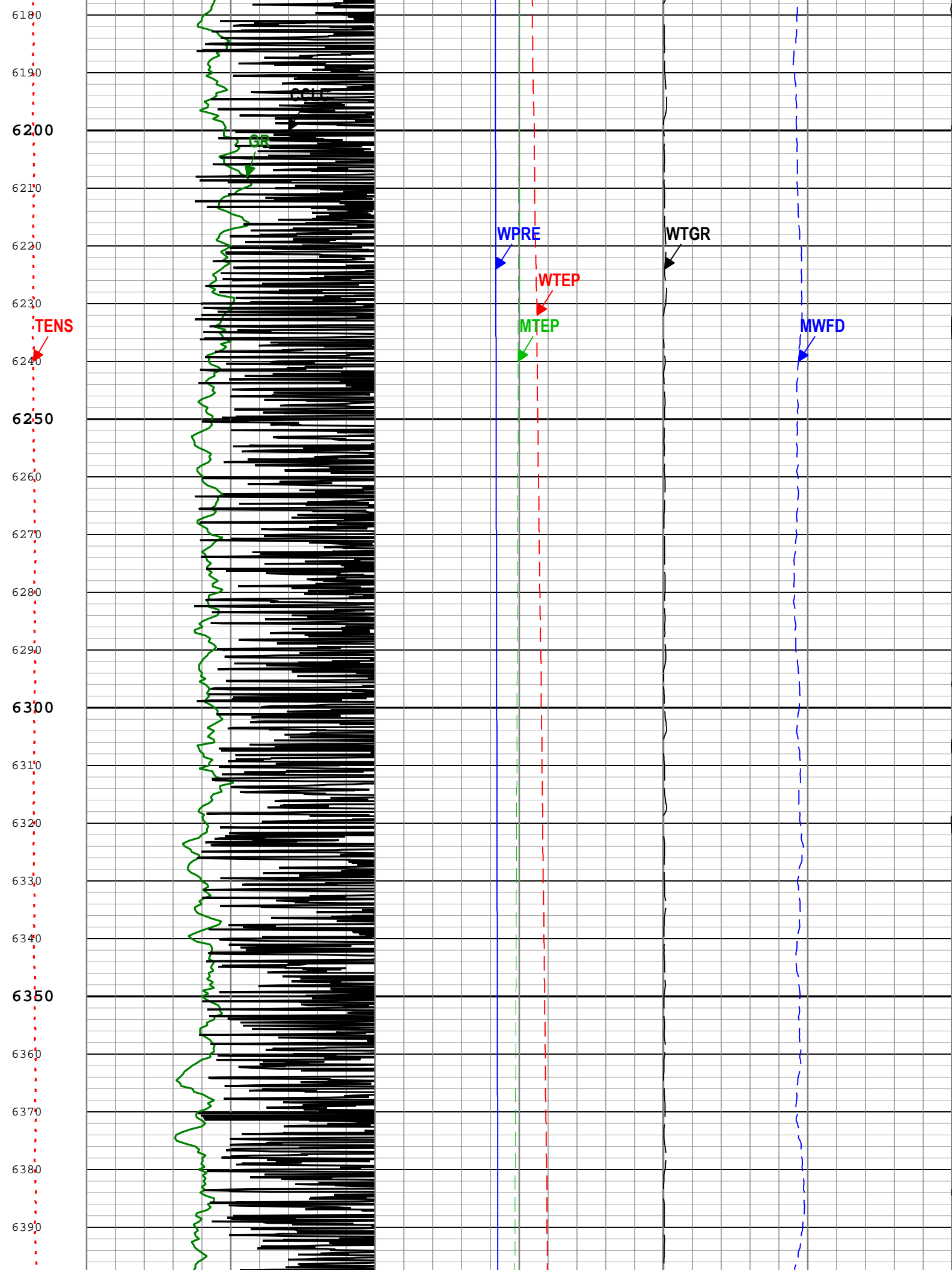




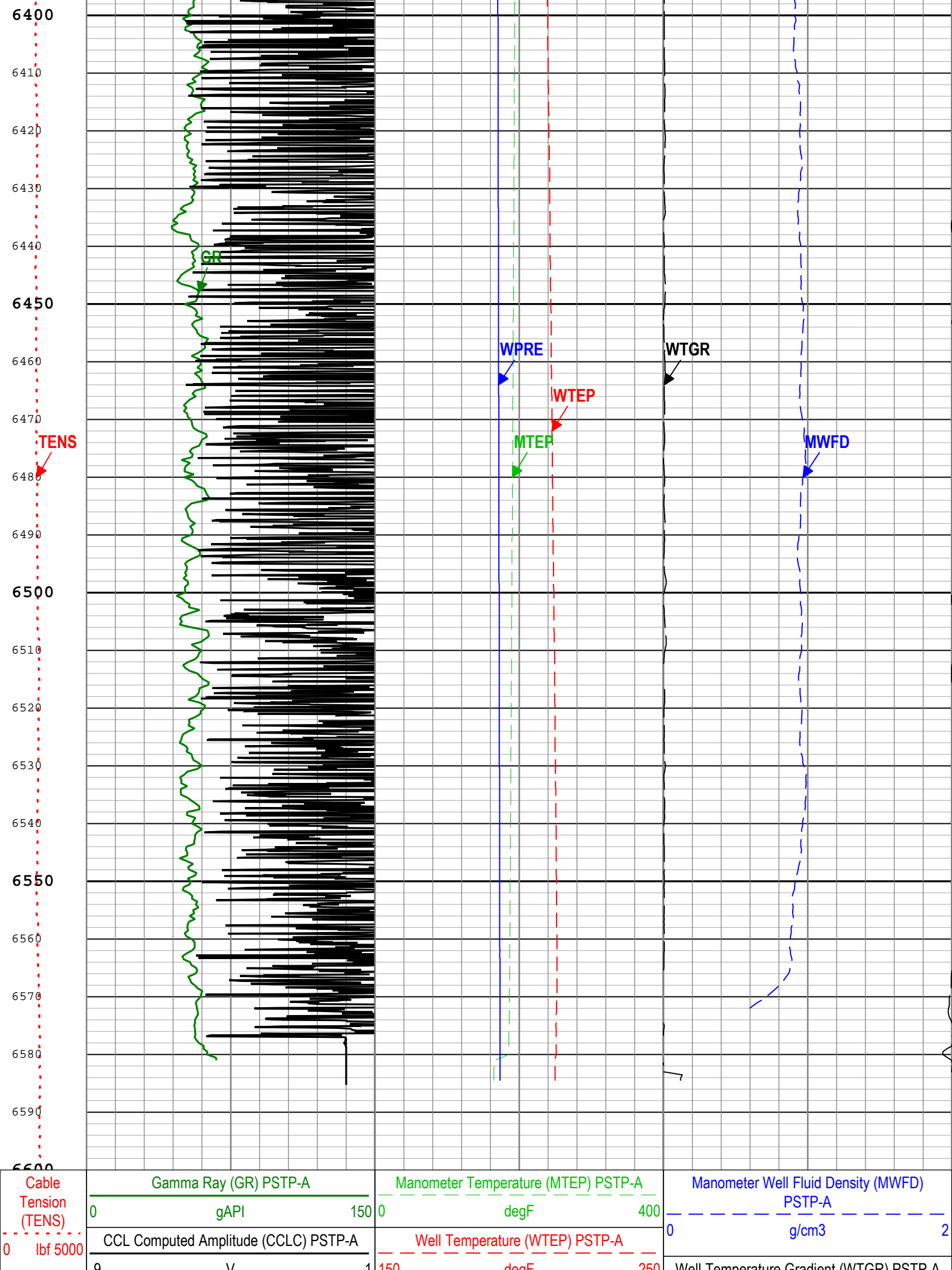












All depth are at tool zero.

Company:	Noble Energy Inc	Schlumberger
Well:	Bison Ridge Y22-719	
Field:	Wattenberg	
County:	Weld	
State:	Colorado	

RESEVOIR SATURATION TOOL  
NEUTRON LOG

