

Company: Nighthawk Production LLC

Well: Silverton 16-10

Field: Jolly Ranch

County: Lincoln State: Colorado

Compensated Neutron  
Litho DensityCounty: Lincoln  
Field: Jolly Ranch  
Location: Lat/Long : 39.539/-103.42  
Well: Silverton 16-10  
Company: Nighthawk Production LLC

Location:		Lat/Long : 39.539/-103.42	Elev.:	K.B.	5242.00 ft
		SHL : 1183 FSL X 922' FEL SESE		G.L.	5227.00 ft
				D.F.	5241.00 ft
		Permanent Datum:	Ground Level	Elev.:	5227.00 f
Log Measured From:		Kelly Bushing		15.00 ft	above Perm.Datum
Drilling Measured From:		Kelly Bushing			
API Serial No.	Section:	Township:	Range:		
05-073-06528-00	10	6S	54W		

Logging Date 12-Jun-2013

Run Number Run 1

Depth Driller 8450.00 ft

Schlumberger Depth 8460.00 ft

Bottom Log Interval 8460.00 ft

Top Log Interval 345.00 ft

Casing Driller Size @ Depth 8.625 in @ 334.00 ft

Casing Schlumberger 345 ft

Bit Size 7.875 in

Type Fluid In Hole Chemical Gel

Density Viscosity 9 lbm/gal 68 s

Fluid Loss PH 7.3

Source of Sample Flowline

RM @ Meas Temp 0.58 ohm.m @ 80 degF

RMF @ Meas Temp 0.44 ohm.m @ 80 degF

RMC @ Meas Temp 0.72 ohm.m @ 80 degF

Source RMF RMC Calculated

RM @ BHT RMF @ BHT 0.25 @ 196 0.19 @ 196

Max Recorded Temperatures 196 degF 196 196

Circulation Stopped 12-Jun-2013 13:30:00

Logger on Bottom Time 13-Jun-2013 21:40:23

Unit Number Location: 2135 Fort Morgan

Recorded By Arvin Shi

Witnessed By Anders Elgend / Jim Wier

## Disclaimer

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

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Well Sketch

Driller Depth

0.00 ft

334.00 ft

Casing 8.625in  
24lbm/ft



## Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	7.875					
Top Driller ( ft )	334					
Top Logger ( ft )	345					
Bottom Driller ( ft )	8450					
Bottom Logger ( ft )	8460					
Casing						
Size ( in )	8.625					
Weight ( lbm/ft )	24					
Inner Diameter ( in )	8.099					
Top Driller ( ft )	0					
Top Logger ( ft )	0					
Bottom Driller ( ft )	334					
Bottom Logger ( ft )	345					

## Operational Run Summary

Parameter ( unit )	Run 1					
Date Log Started	12-Jun-2013					
Time Log Started	22:42:13					
Date Log Finished	14-Jun-2013					
Time Log Finished	00:03:34					
Top Log Interval ( ft )	345.00					
Bottom Log Interval ( ft )	8460.00					
Total Depth ( ft )	8460.00					
Max Hole Deviation ( deg )	NaN					
Azimuth of Max Deviation ( deg )	NaN					
Bit Size ( in )	7.875					
Logging Unit Number	2135					
Logging Unit Location	Fort Morgan					
Recorded By	Arvin Shi					
Witnessed By	Anders Elgerd / Jim Wier					
Service Order Number	C6VJ-00060					

Remarks and Equipment Summary				
Run 1: Toolstring				Run 1: Remarks
Equip name	Length	MP name	Offset	All Schlumberger depth measurement policies followed
LEH-QT	97.73			
LEH-QT				
AH-369	94.82			
EDTC-B:8593	93.39			
EDTH-B:8625				
EDTG-B:77756				
EDTC-B:8593				
		CTEM	89.89	
		ACCZ	0.00	
		HV	0.00	
		Gamma Ray	88.02	
		TelStatus	86.89	
		Temperature	86.87	
HGNS-H:4865	86.89			
HGNH:4817				
NPV-N				
NSR-F:2554		GR	86.15	
HMCA-H				
HACCZ-H:6991				
HGNS-H:4865				
		CNL Porosity	79.82	
		HGNS	77.48	
		HMCA	77.48	
		Accelerometer	0.00	
HDRS-H:3863	77.48			
ECH-MEB:2898				
HRCC-H:3828				
HRMS-H:3863				
Backscatter				
Short Spacing				
GPV-Q				
GSR-J:5471		HRCC	73.48	
Long Spacing:28620				
HRGD-H:3870				
		MCFL	68.05	
		Caliper	67.57	
		TLD Density	67.18	
HRLT-B	65.24			
HRUH-B				
HRUC-B				
HRLS-B				
HRLH-B				
HRLC-B				
AH-270				

Resistivity 53.47

AH-184[2]:28 41.04  
29

MAST-B:8506 39.04  
ECH-SF:8081  
MAPC-BA:8081  
MAMS-CA:8506

MAMS 23.6

AH-184[1]:75 18.00  
7

AIT-H:398 16.00  
AHIS:398  
AHRM



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

Depth Control Parameters	Run 1		
Conveyance Type	Wireline		
Rig Type	Land		
Depth Measuring Device	Run 1		
Type	IDW-B		
Wheel Correction 1	-7		
Wheel Correction 2	-5		
Tension Device	Run 1		
Type	CMTD-B/A		
Calibration Date	17-May-2013		
Calibrator Serial Number	78135		
Calibration Points	10		
Calibration RMS	13		
Calibration Peak Error	24		
Logging Cable	Run 1		
Type	7-46NT-XS		
Logging Cable Length ( ft )	24000.00		

## Run 1

Porosity 5" = 100'

## Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
IHV	Integrated Hole Volume	GCSE_UP_PASS	3114.58	ft3
ICV	Integrated Cement Volume	GCSE_UP_PASS, FCD	1772.78	ft3

## Software Version

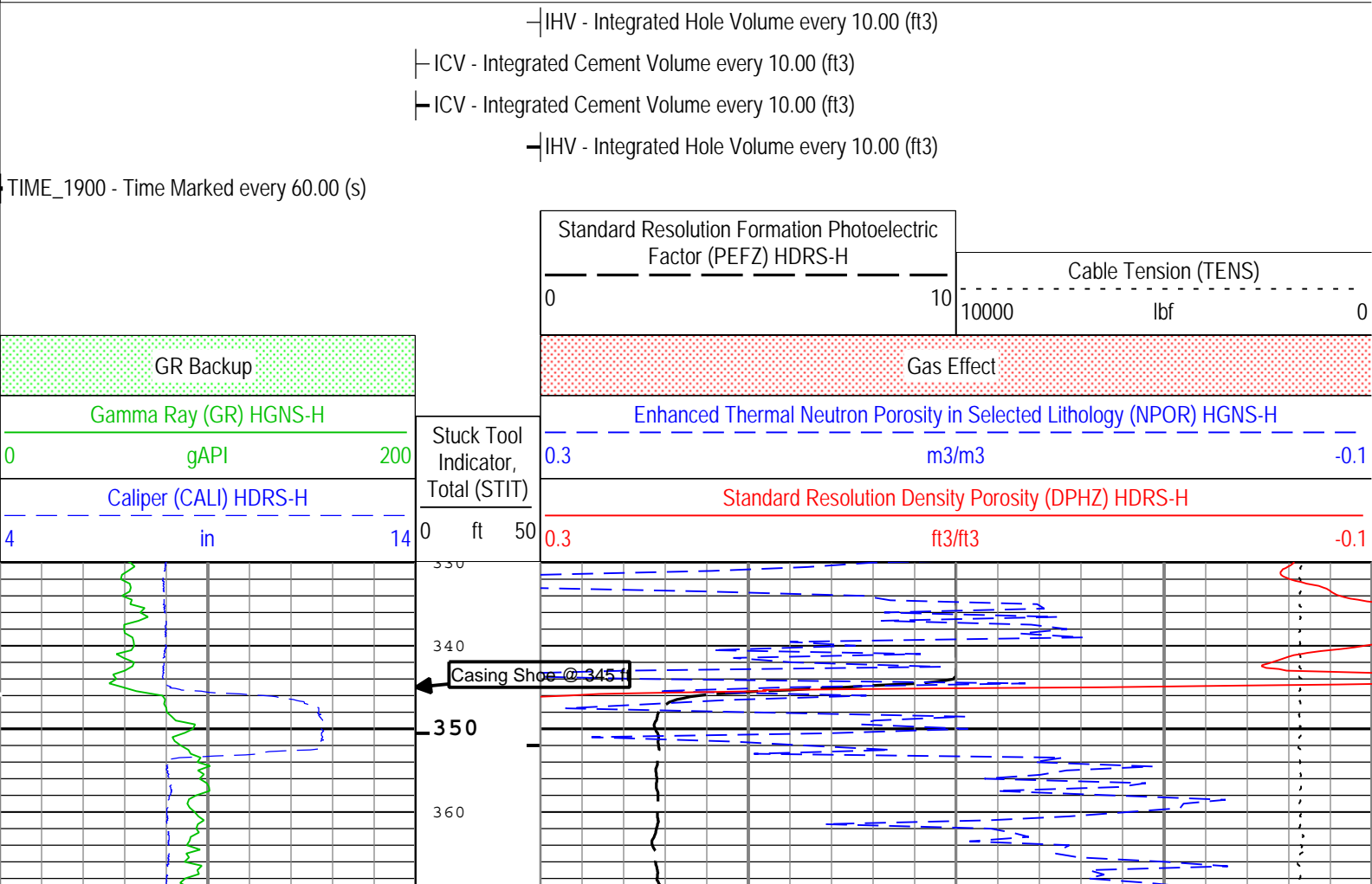
Acquisition System		Version
MaxWell		3.1.9755.0
Application Patch		SP-20130325-3.1.9755.1799
Computation	Description	Version
Borehole	Borehole Ensemble provides common Borehole Parameters and Channels	3.1.9755.1799

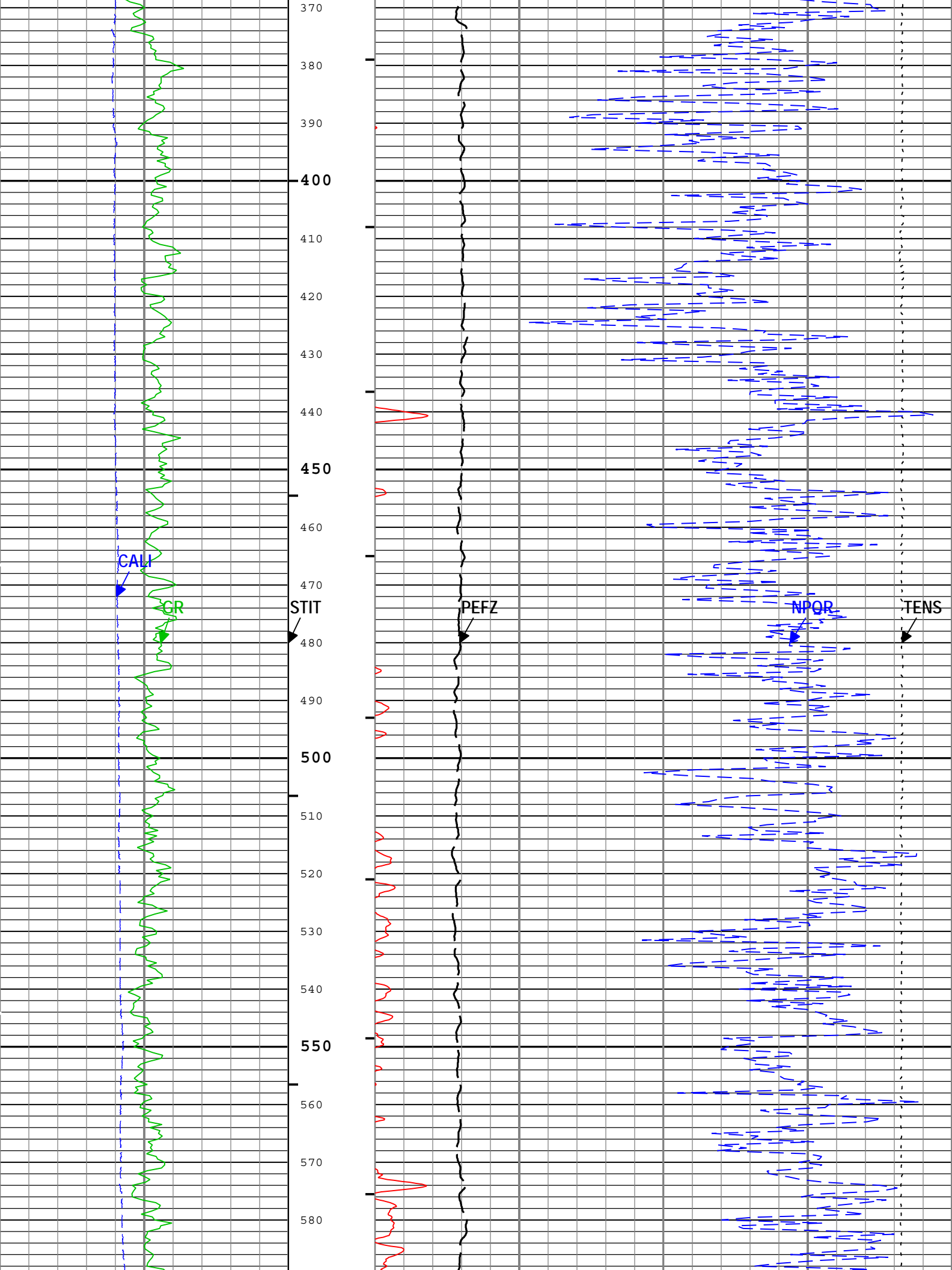
HENVIR	Computation Ensemble for the HGNS Neutron environmental corrections		3.1.9755.0
DepthCorrection	DepthCorrection		3.1.9755.1799
Tool Elements	Description	Software Version	Firmware Version
HRCC-H	HILT High-Resolution Control Cartridge, 150 degC	3.1.9755.0	2.0
HRGD-H	HILT Resistivity Gamma-Ray Density Device, 150 degC	3.1.9755.0	3.0
HGNS-H	HILT Gamma-Ray and Neutron Sonde, 150 degC	3.1.9755.0	2.0

Pass Summary								
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Depth Shift	Include Parallel Data
Run 1	Log[7]:Up	Up	105.88 ft	8480.06 ft	13-Jun-2013 9:41:24 PM	14-Jun-2013 12:02:54 AM	0.00 ft	
All depths are referenced to toolstring zero								
Log	Run 1: Log[7]:Up							

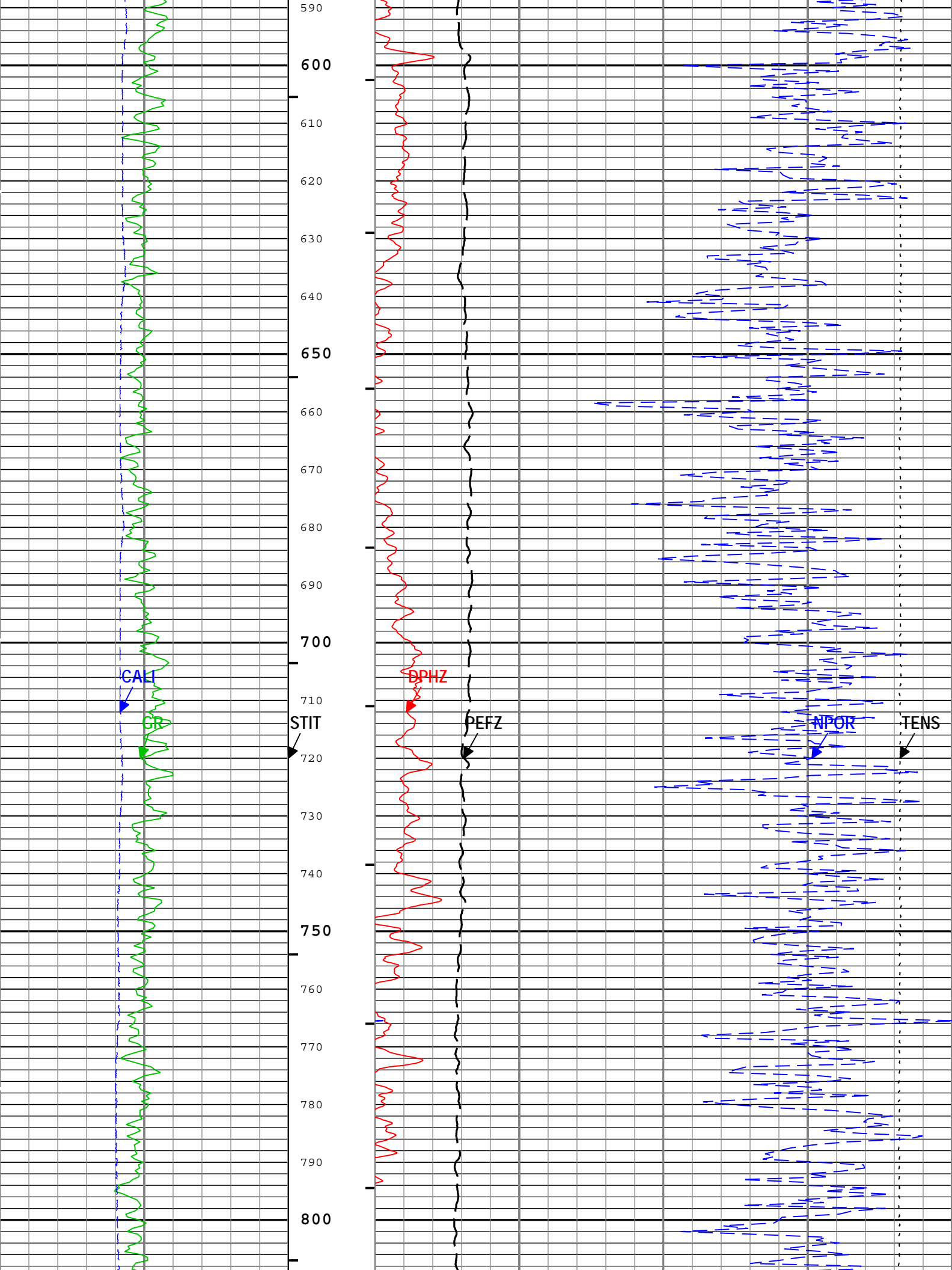
Description: HGNS standard resolution porosities for Platform Express    Format: Log ( 5in Porosity )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 14-Jun-2013 00:58:08

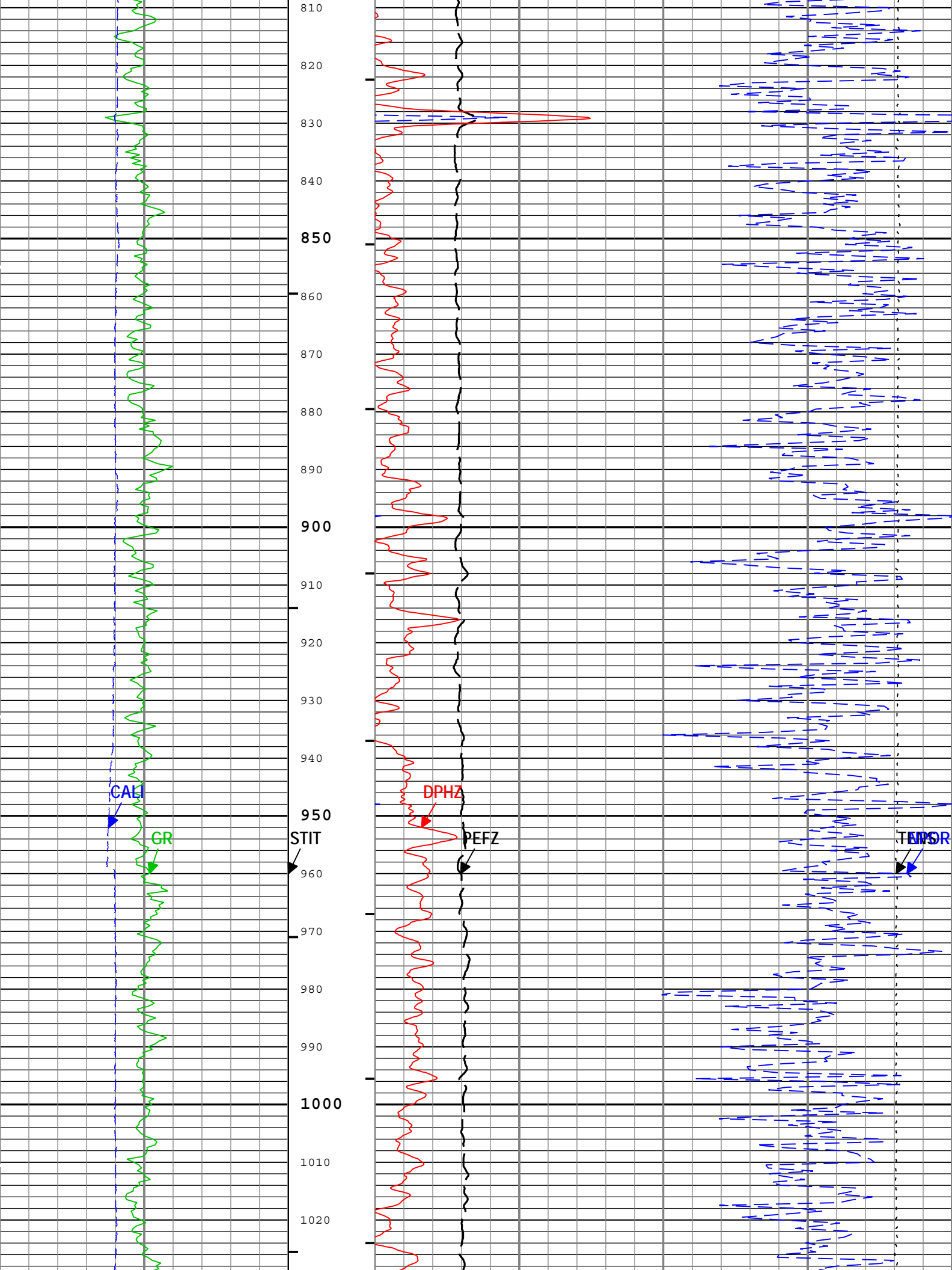
Channel	Source	Sampling
CALI	HDRS-H:HRCC-H:HRCC-H	1in
DPHZ	HDRS-H:HRMS-H:HRGD-H	2in
GR	HGNS-H:HGNS-H:HGNS-H	6in
ICV	Borehole	6in
IHV	Borehole	6in
NPOR	HGNS-H:HGNS-H:HGNS-H	6in
PEFZ	HDRS-H:HRMS-H:HRGD-H	2in
STIT	DepthCorrection	6in
TENS	WLWorkflow	1in
TIME_1900	WLWorkflow	0.1in

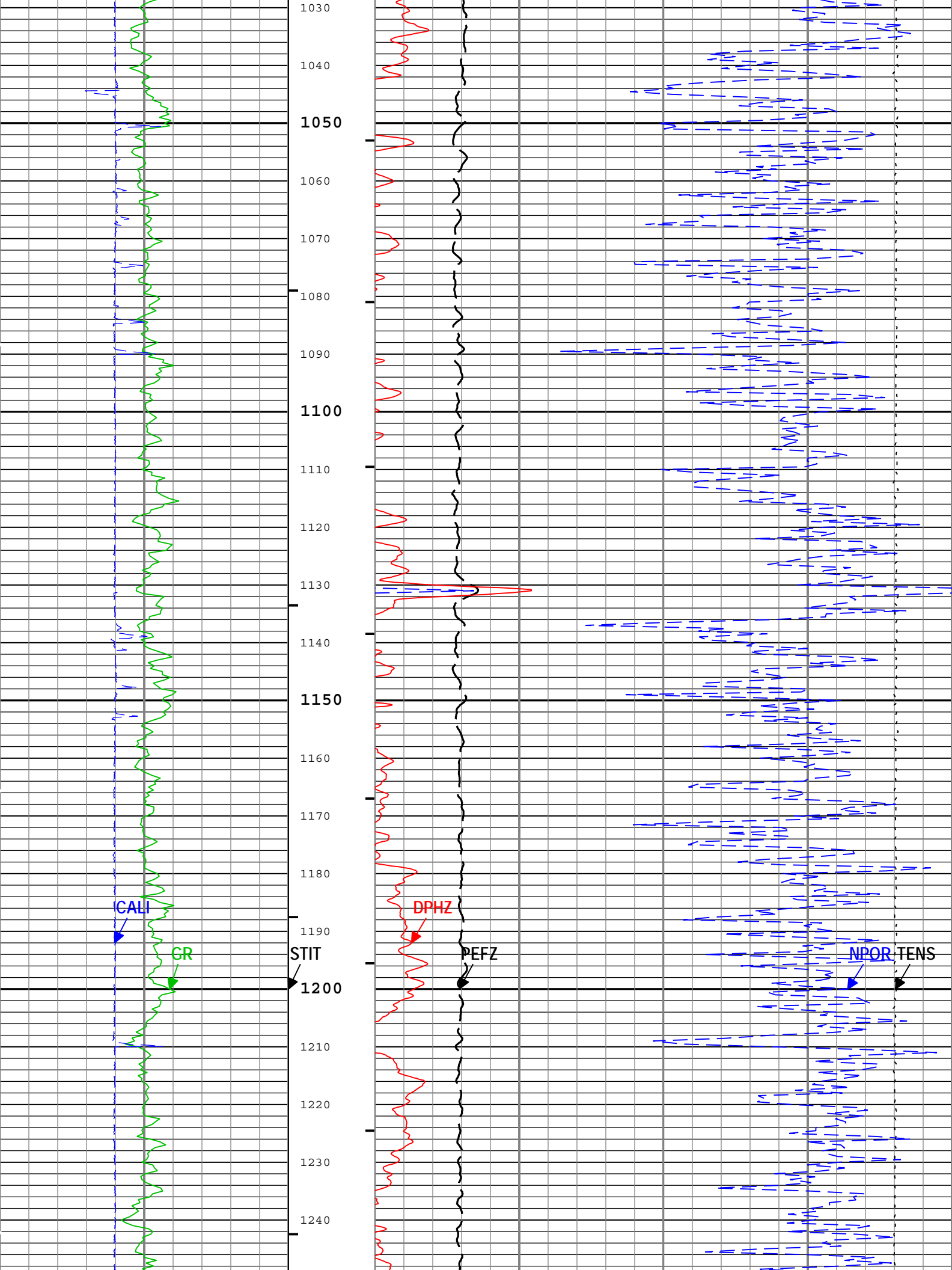


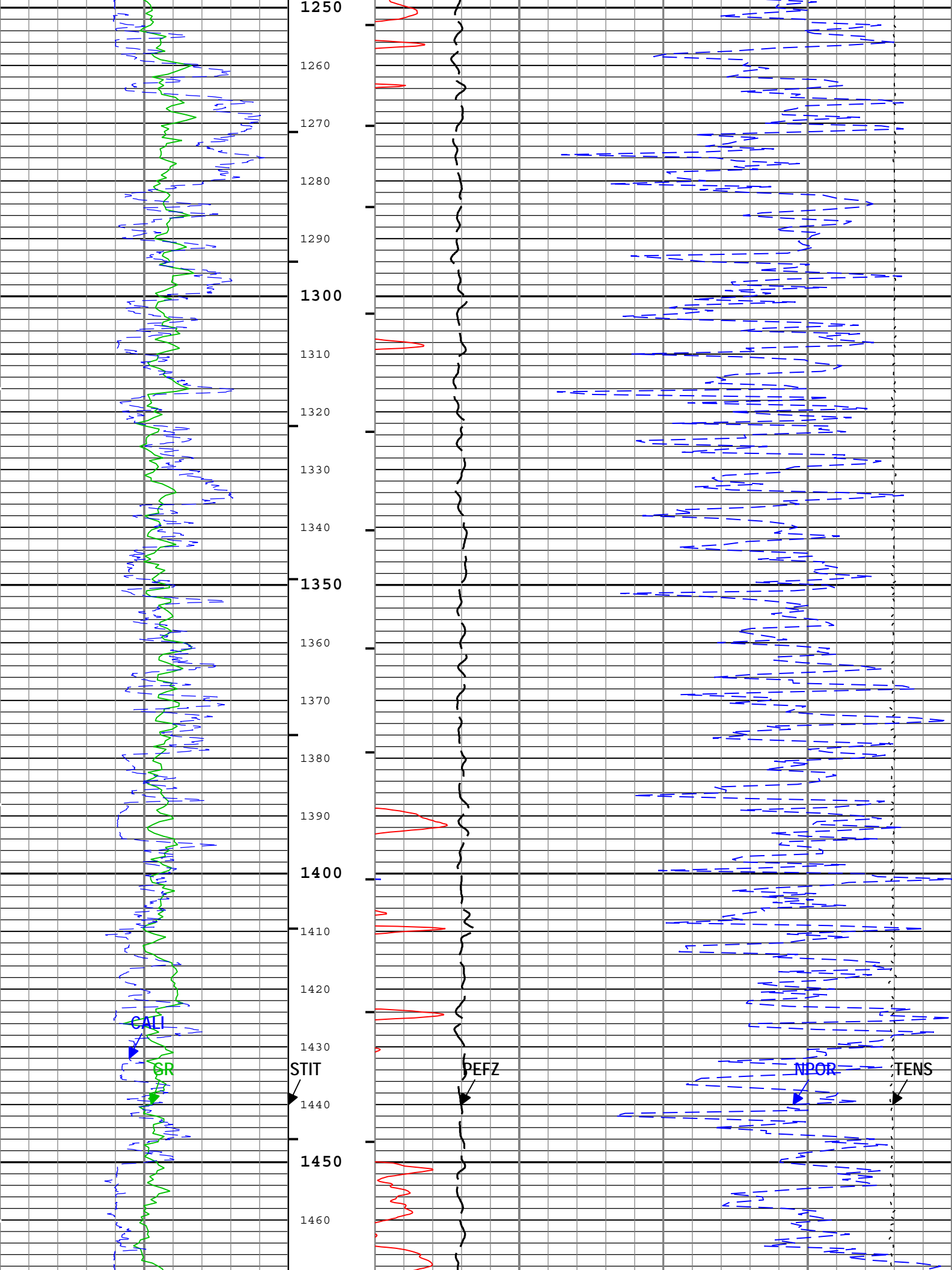


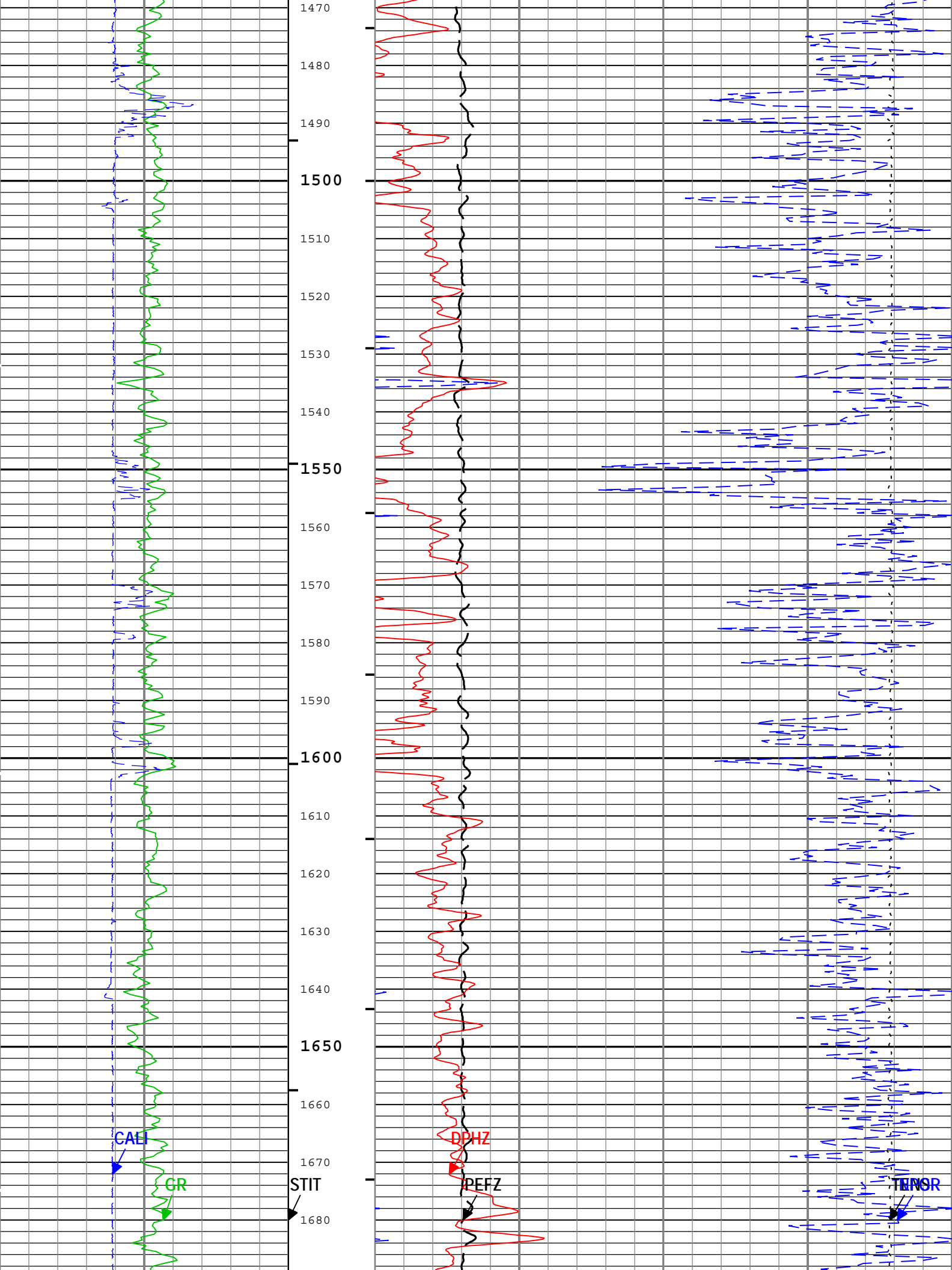


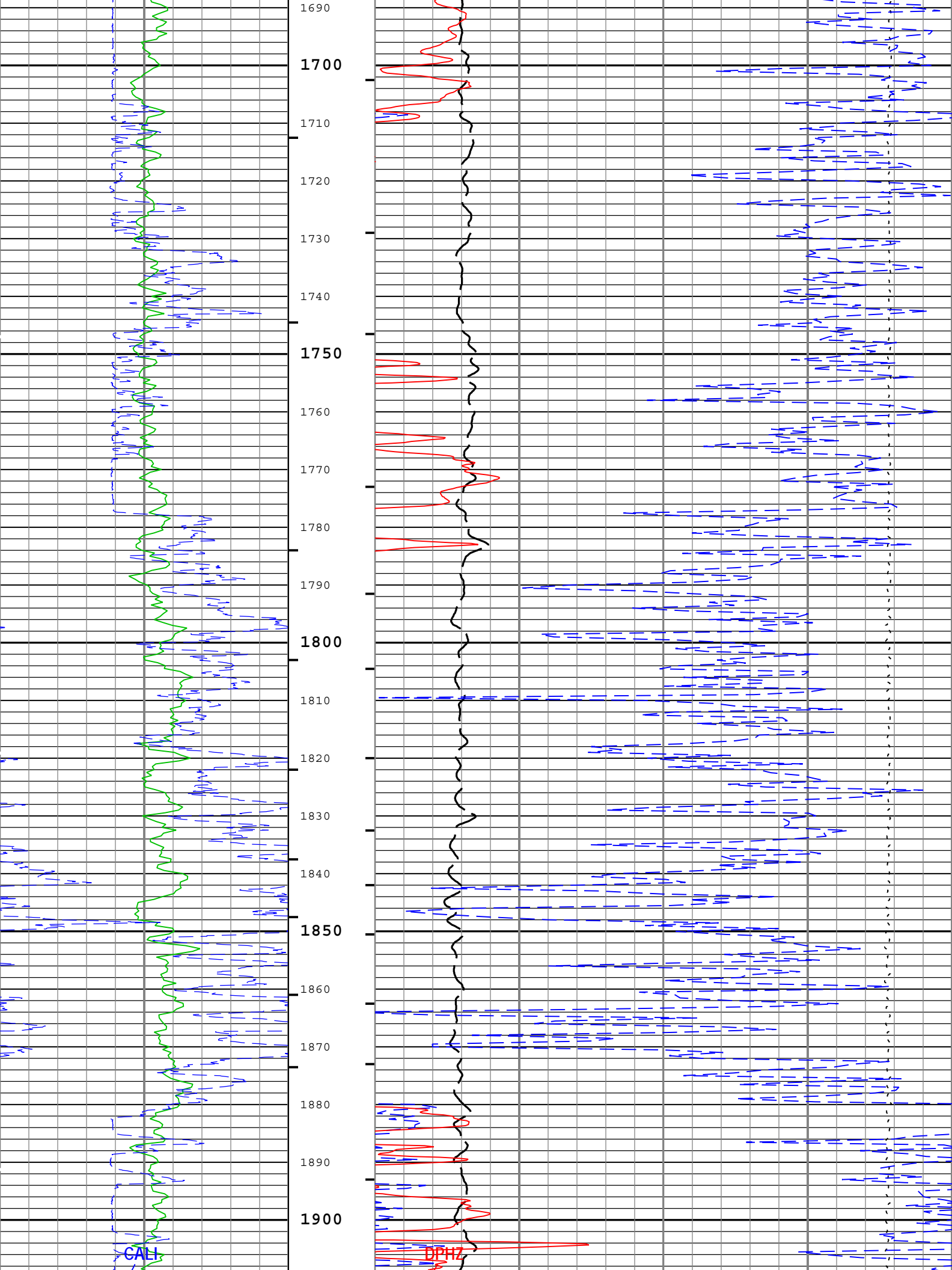


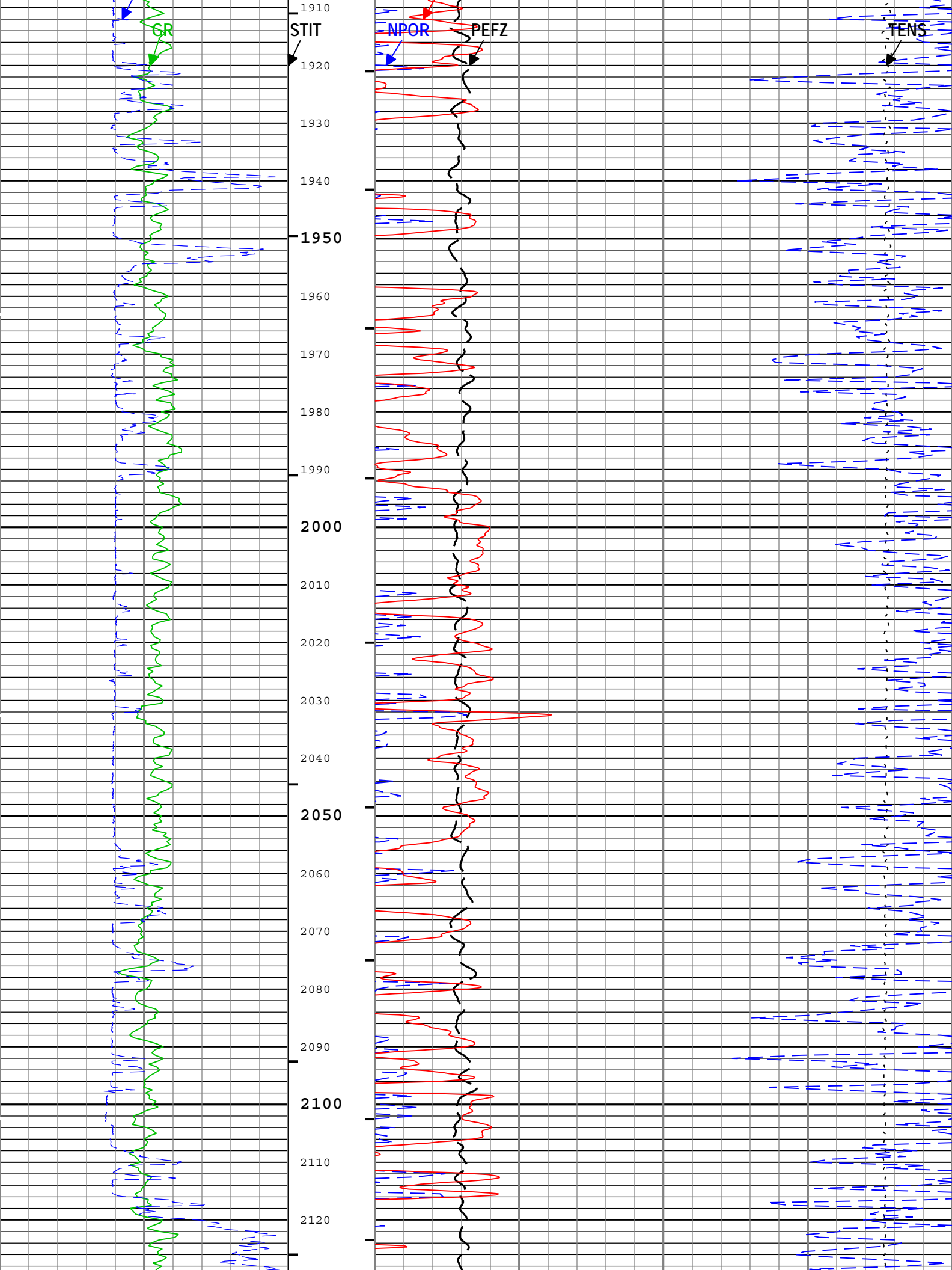


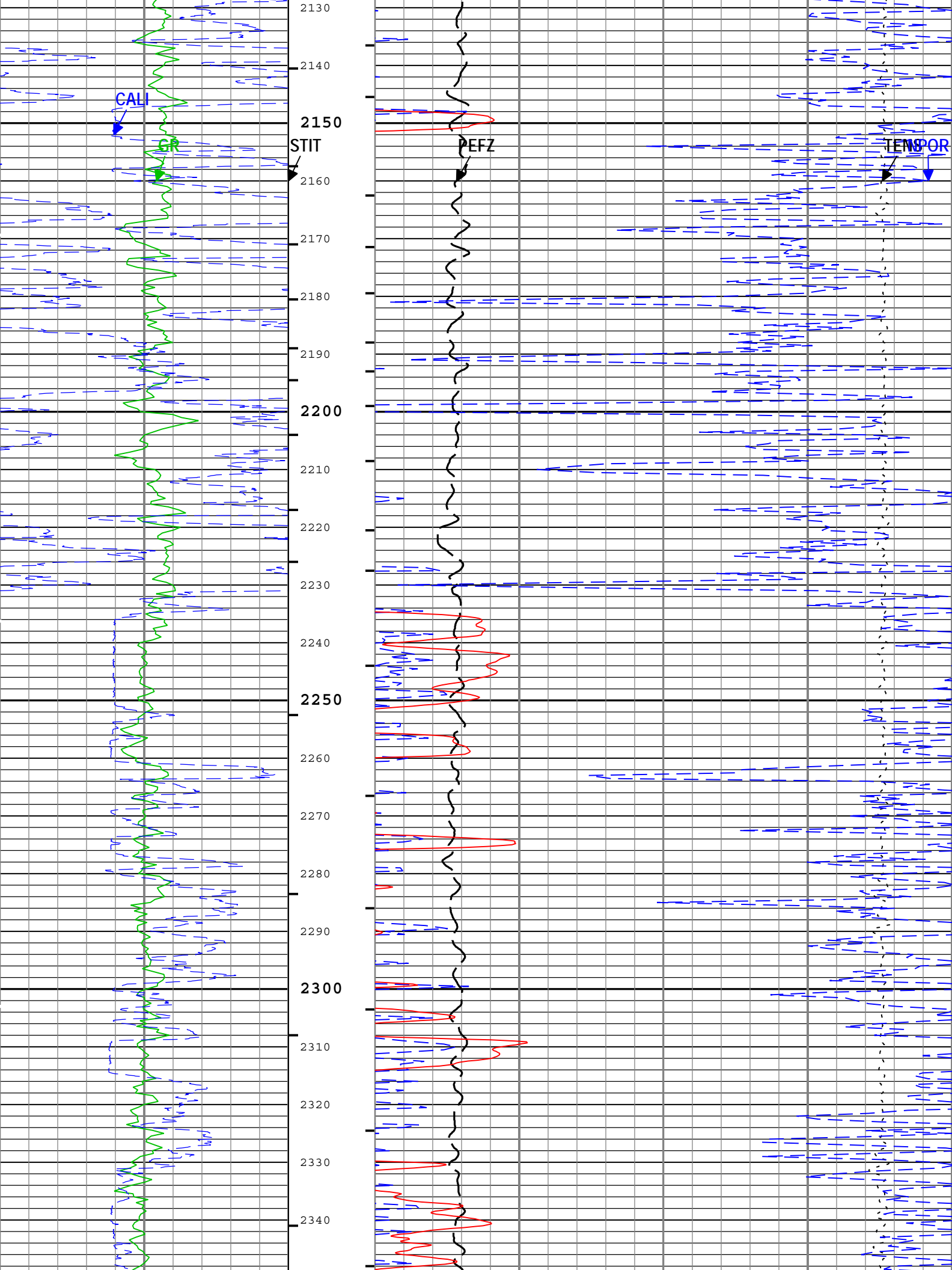




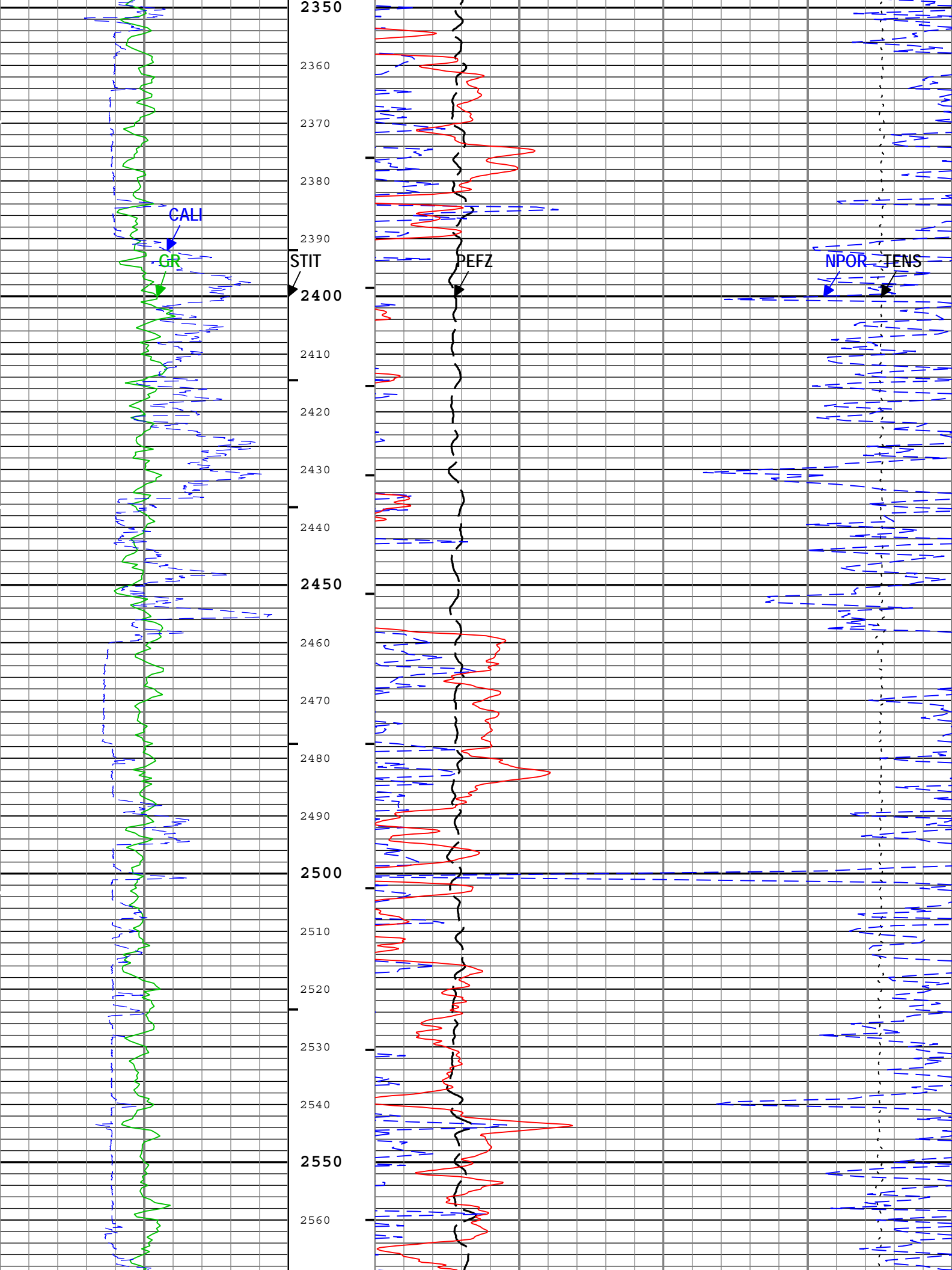


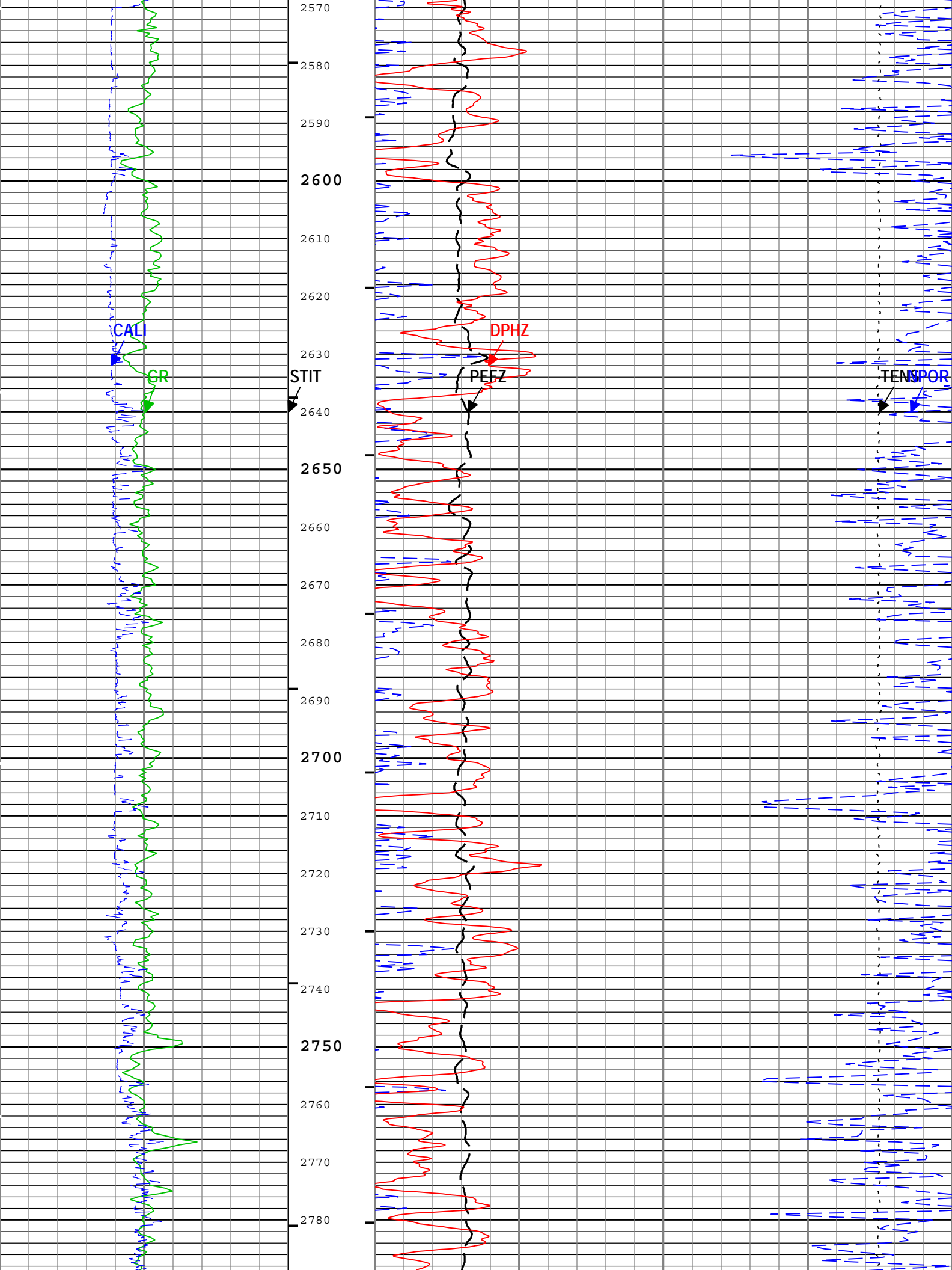


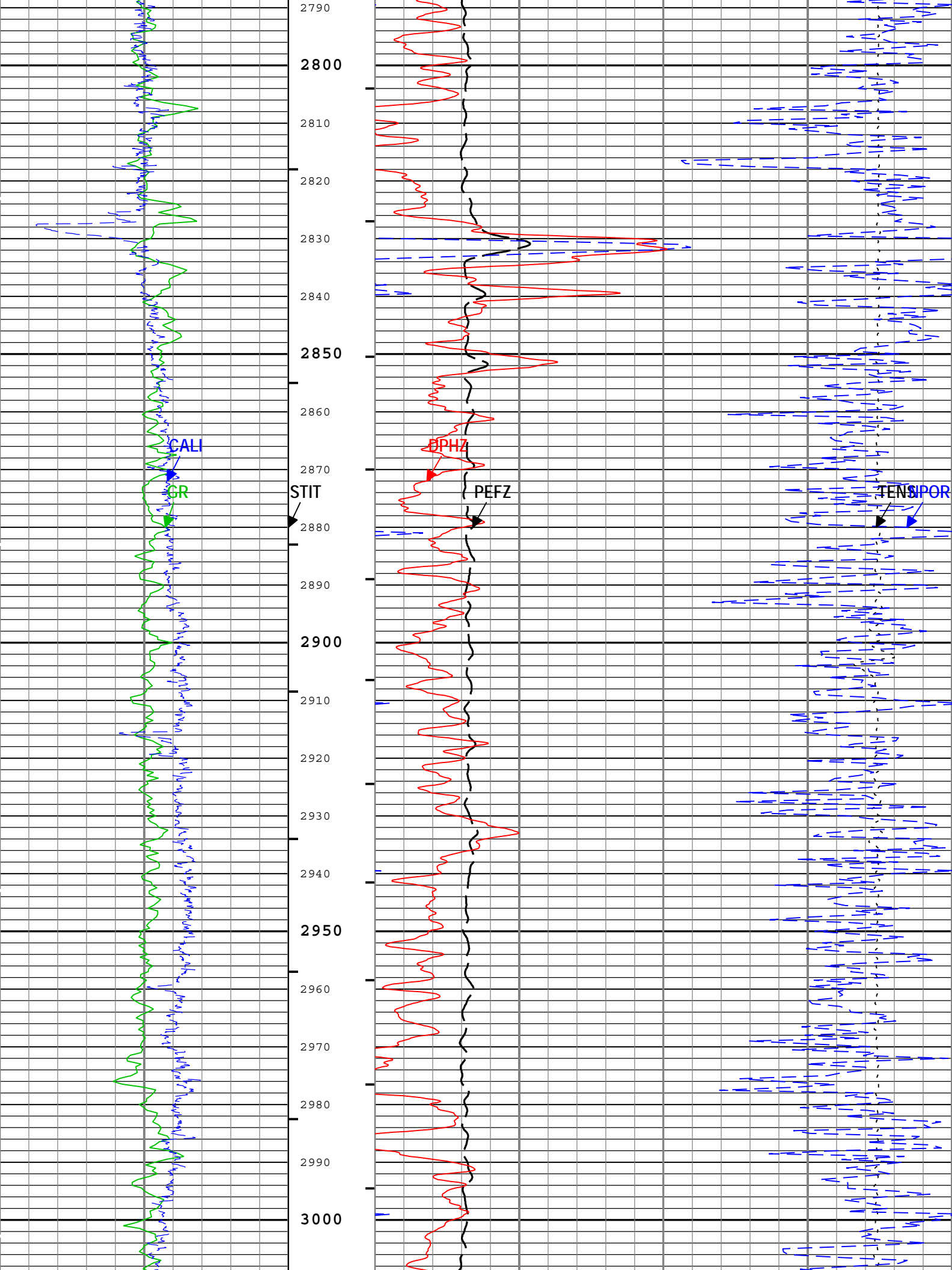


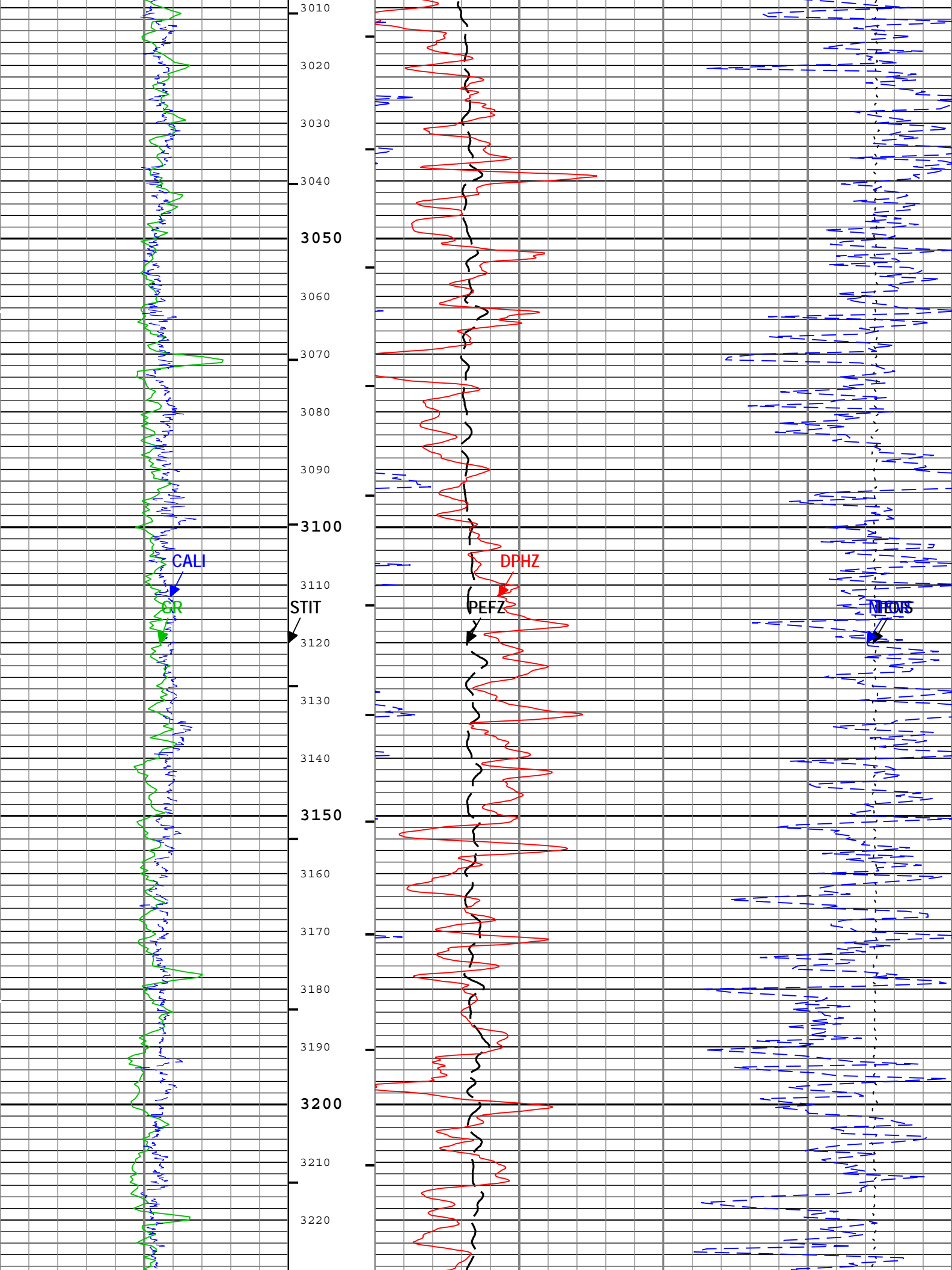


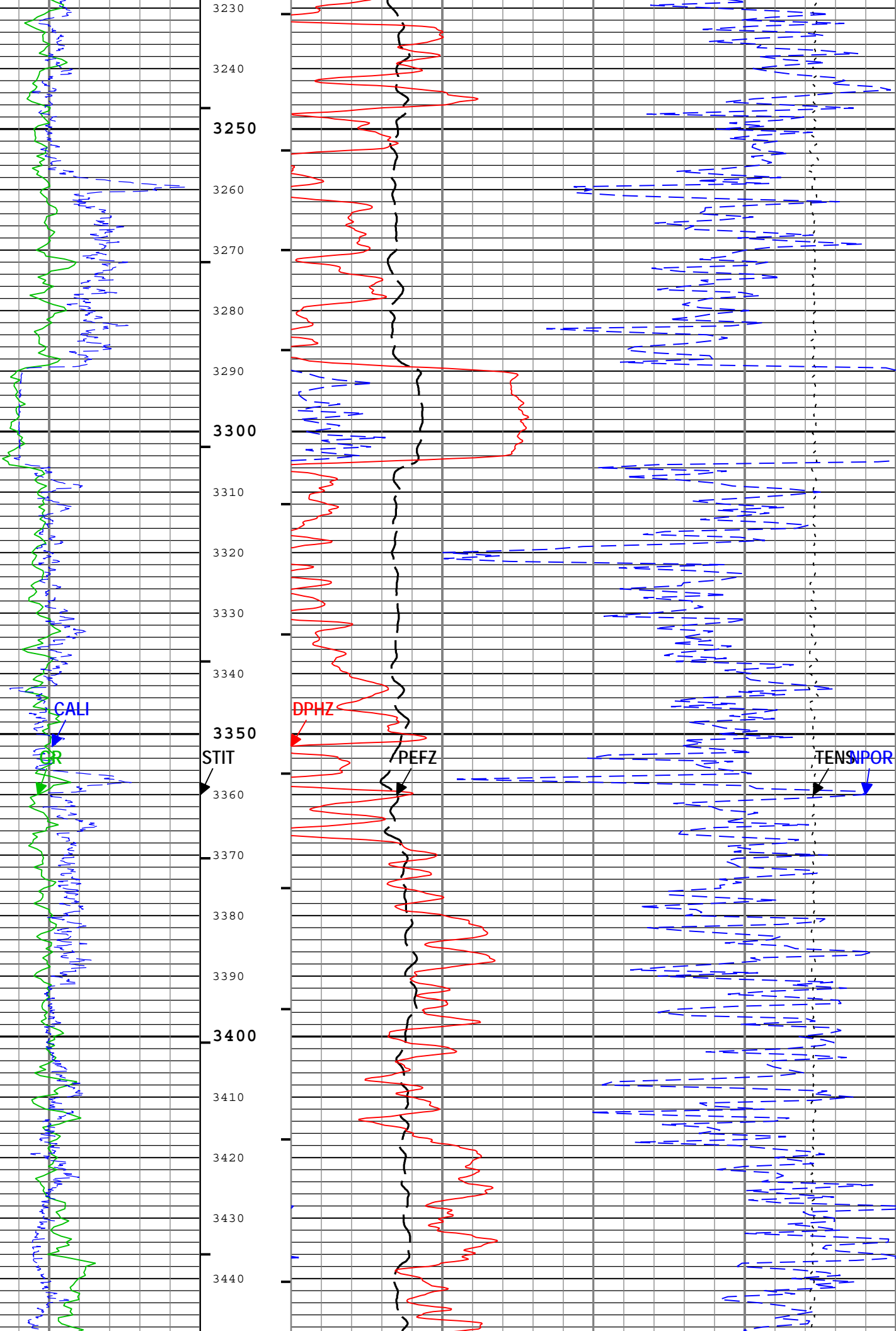


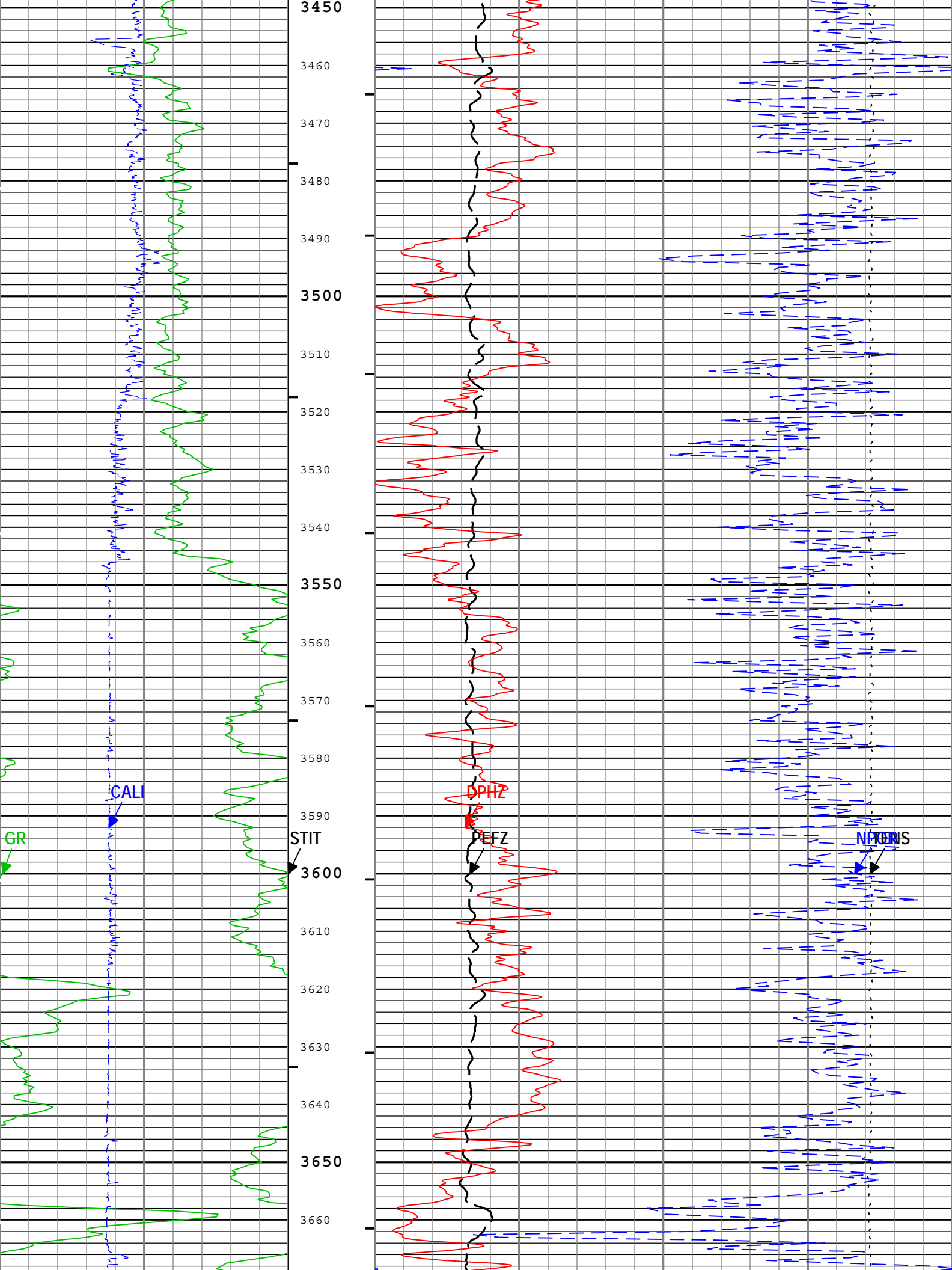


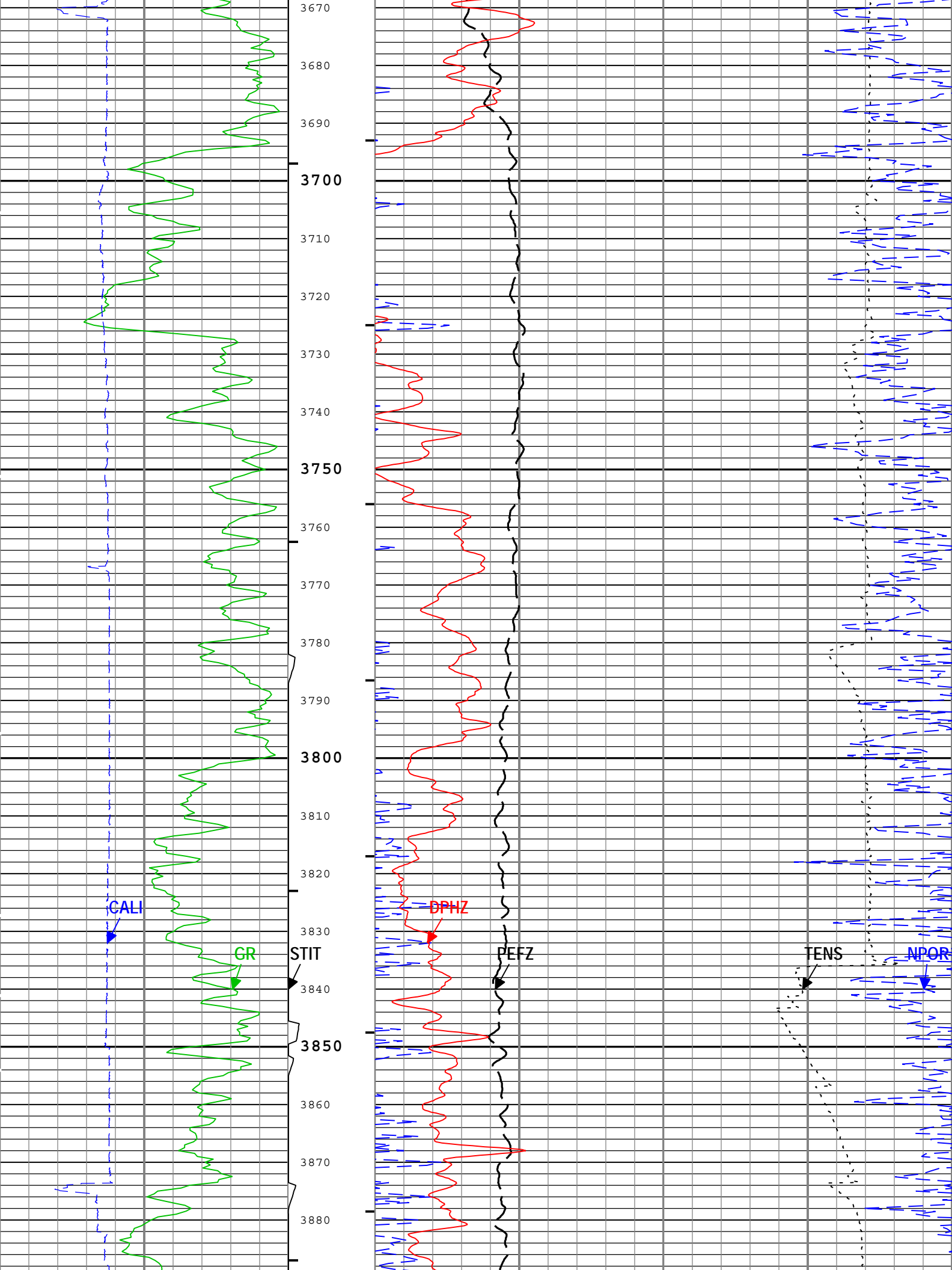


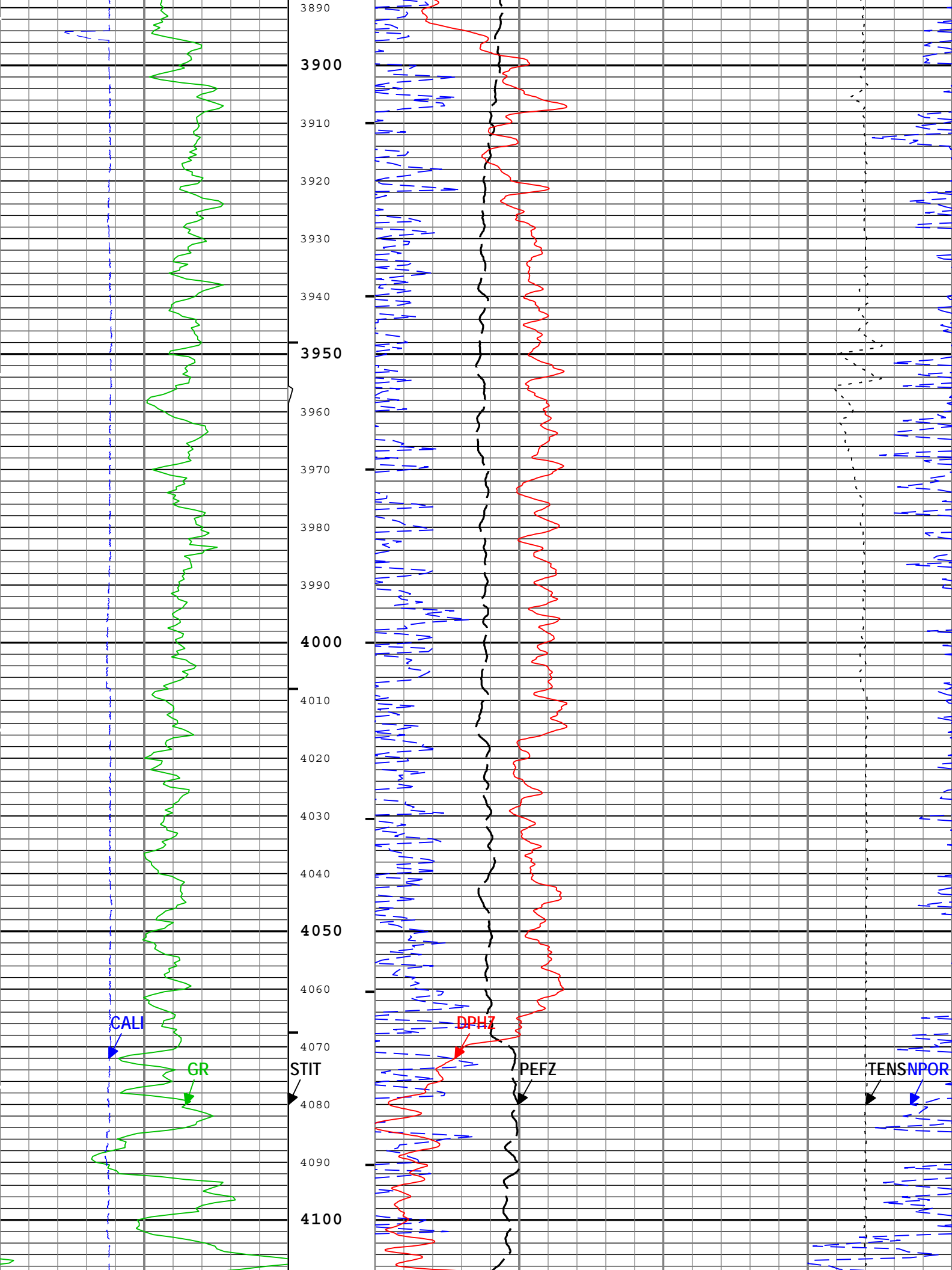




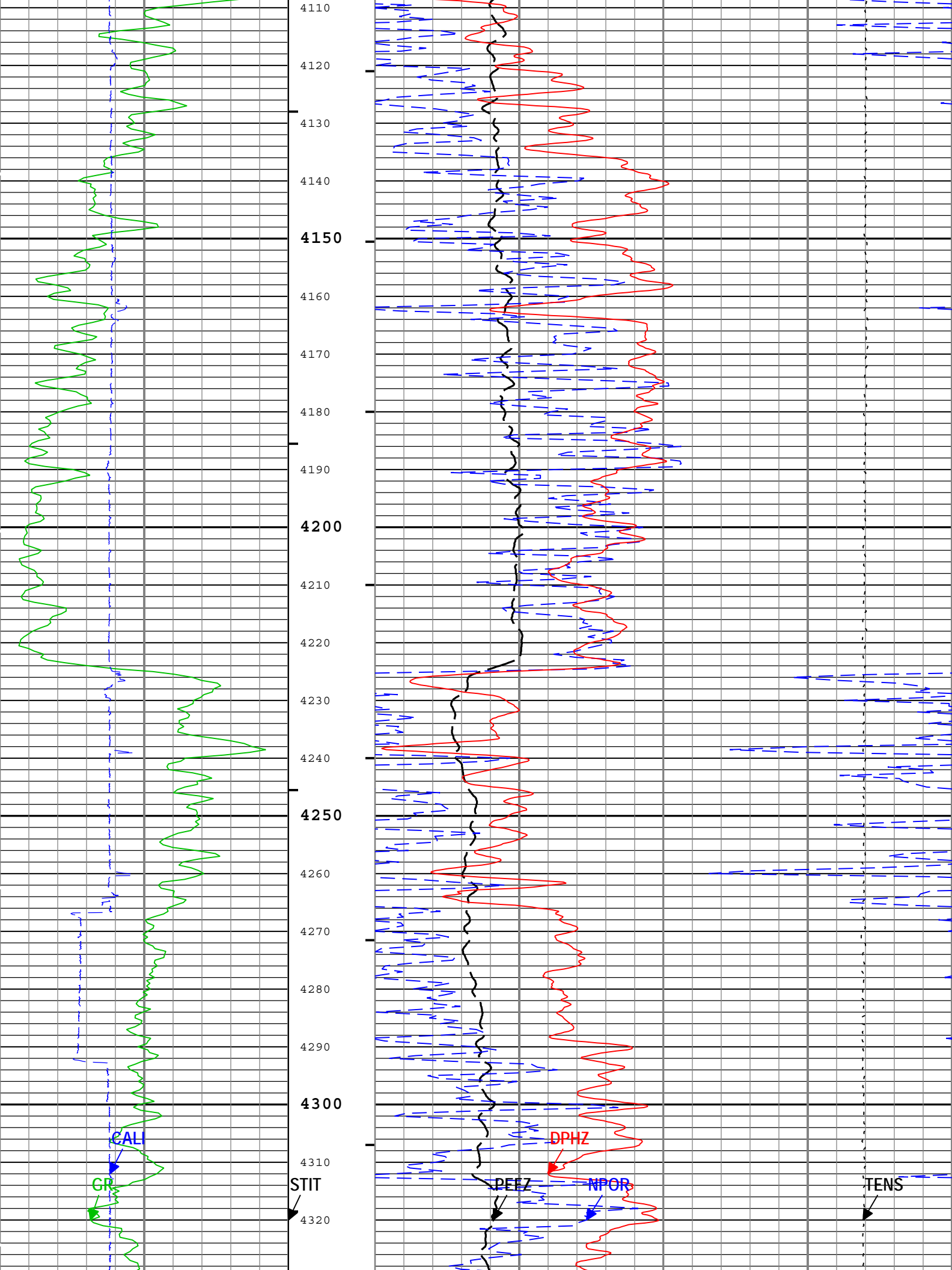


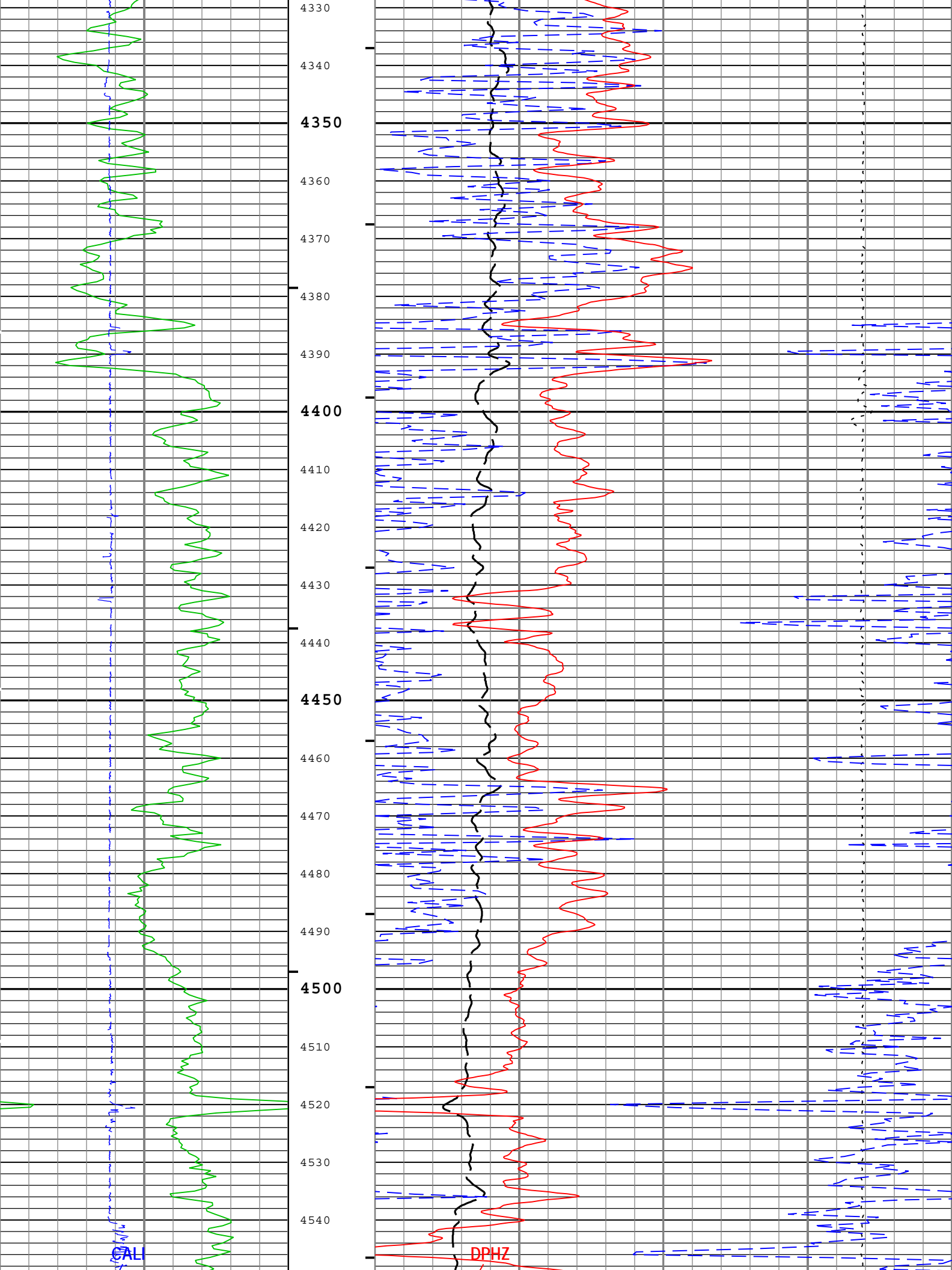


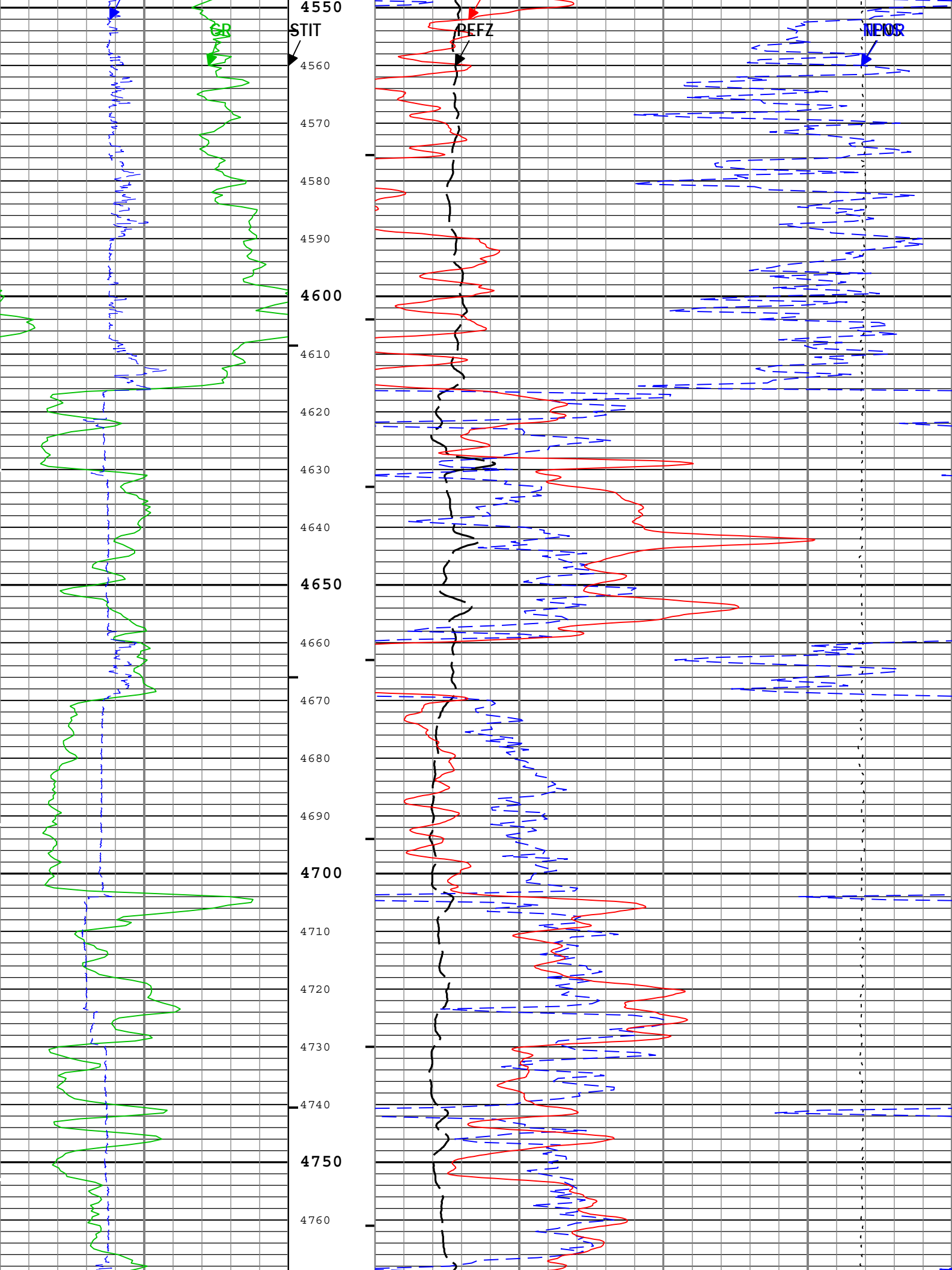


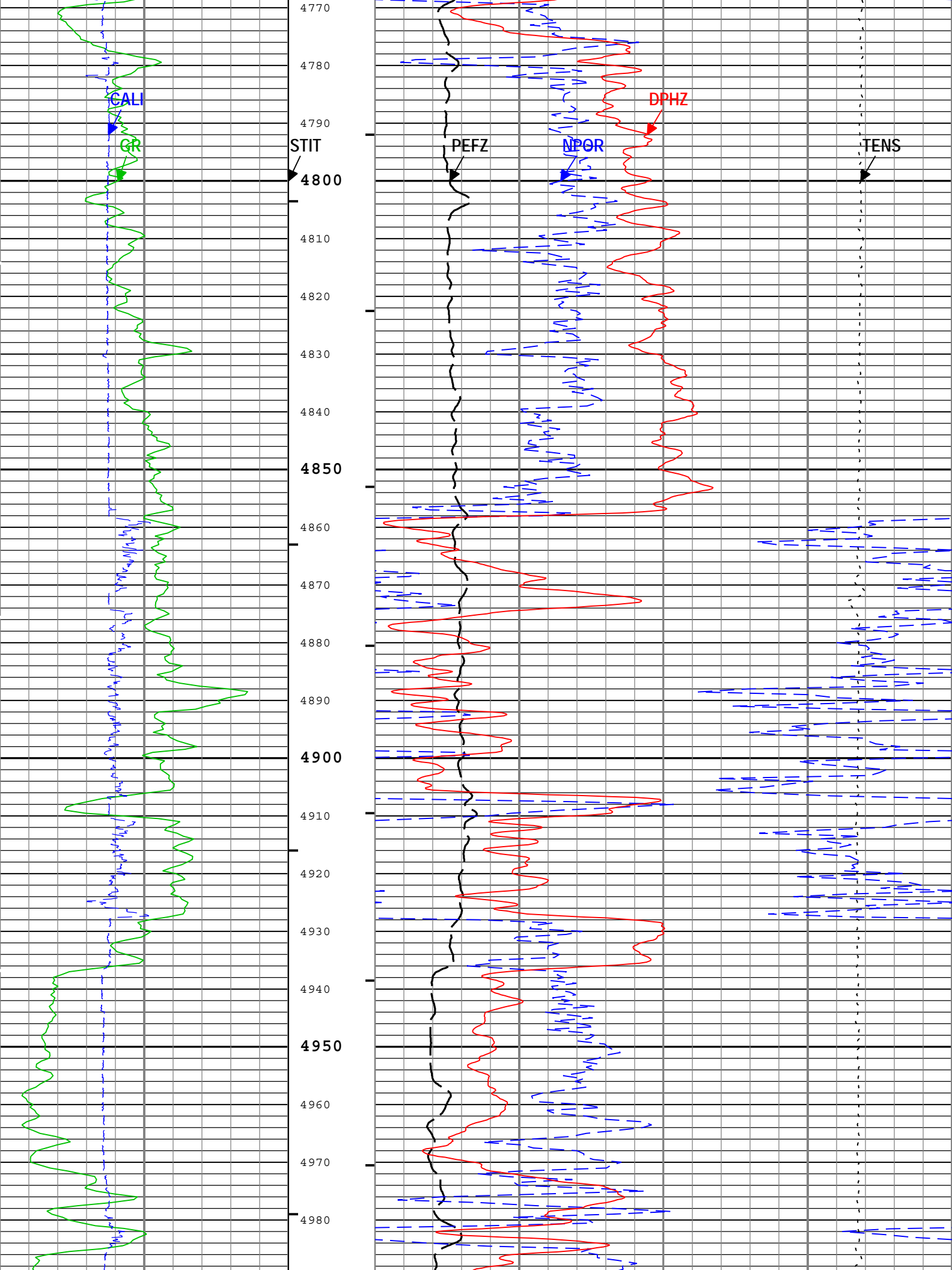


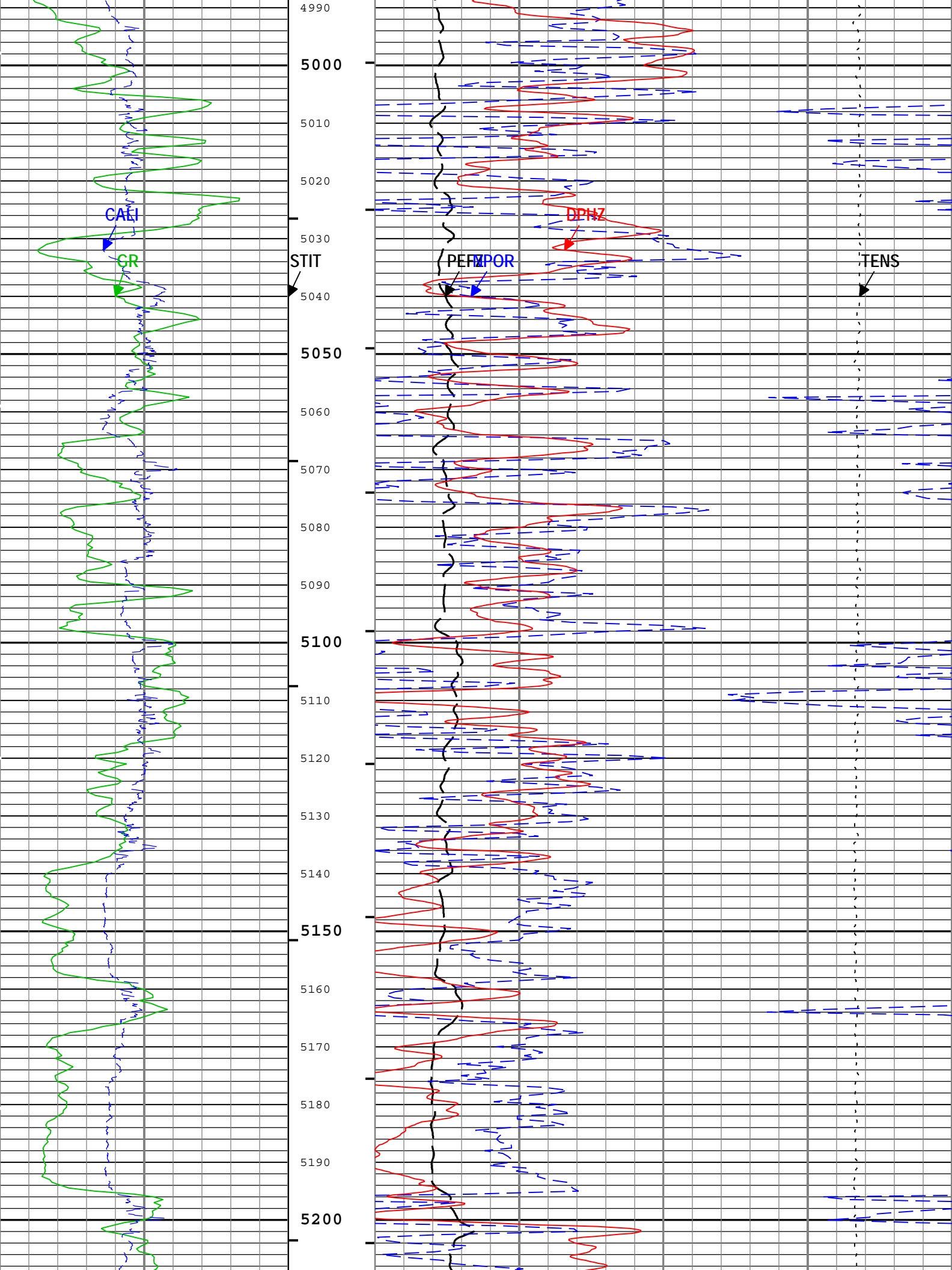


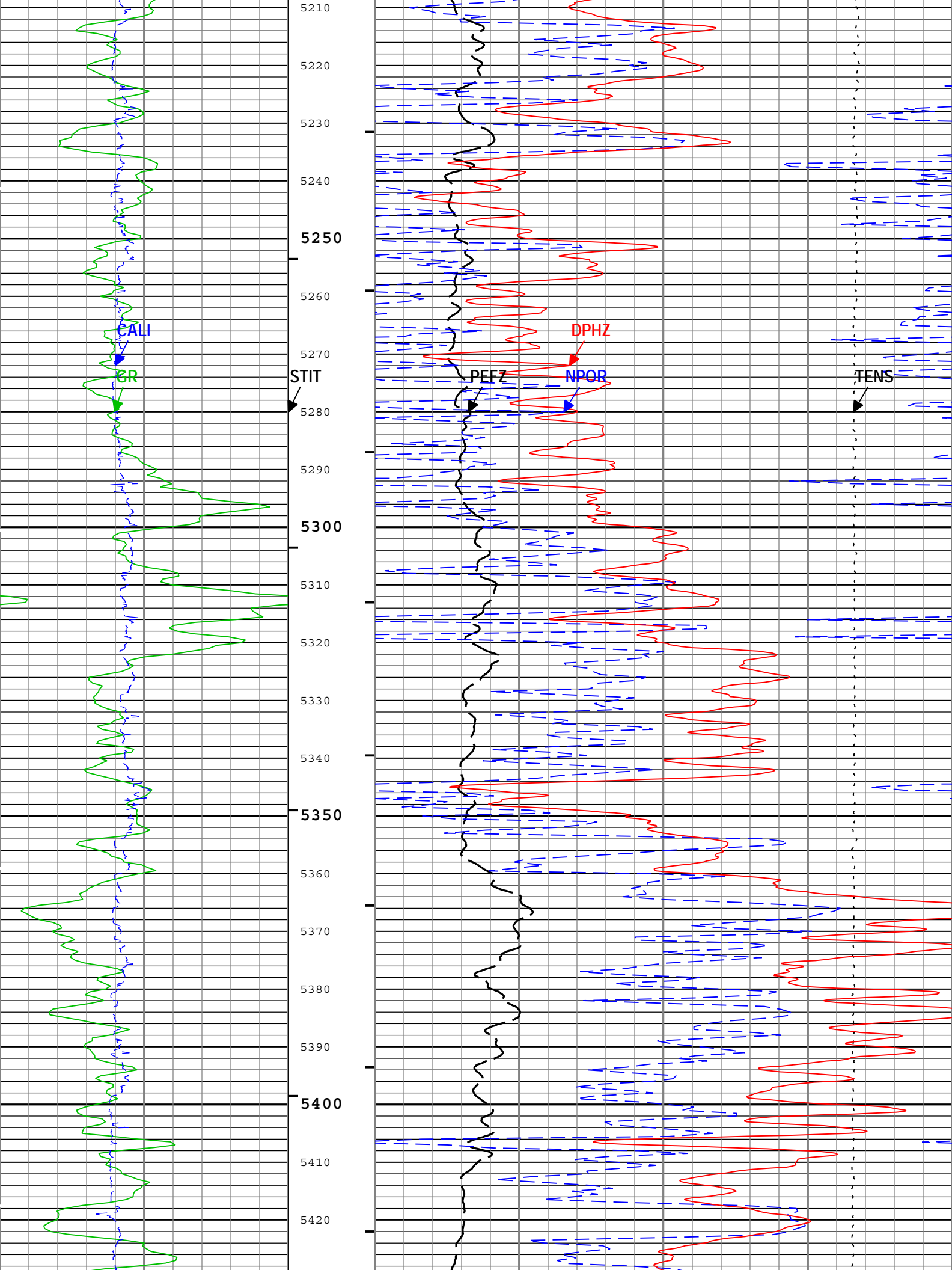


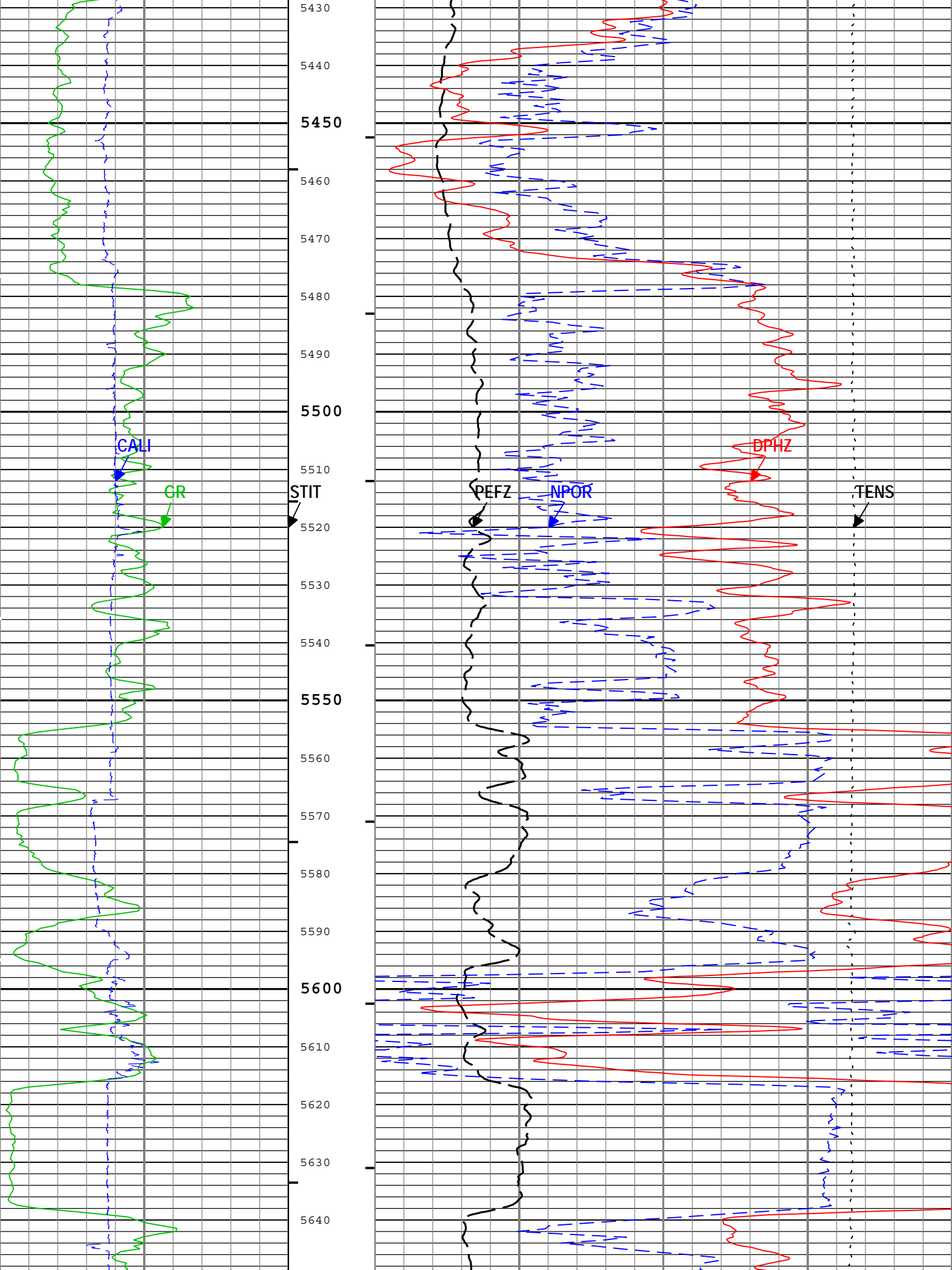


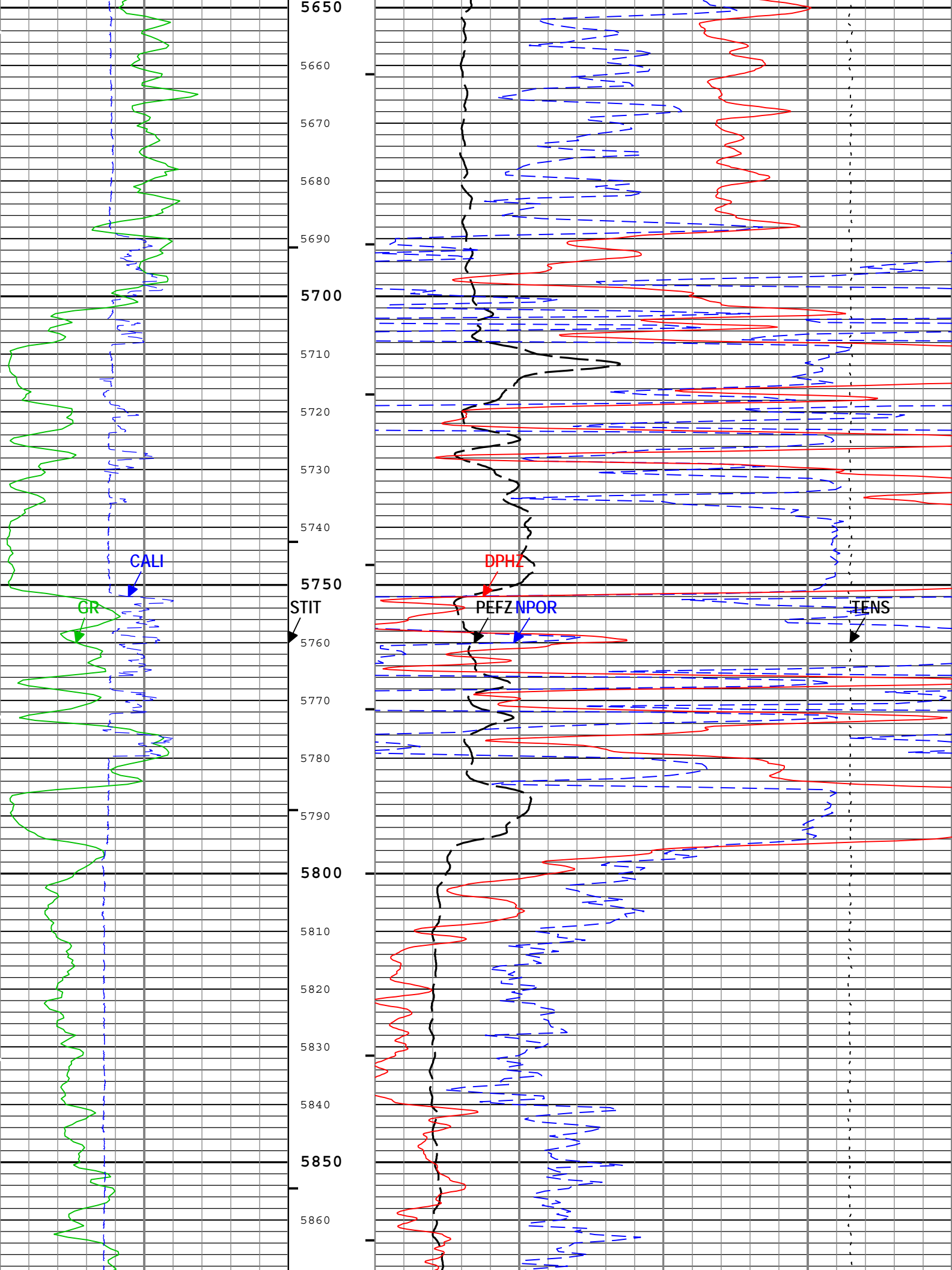




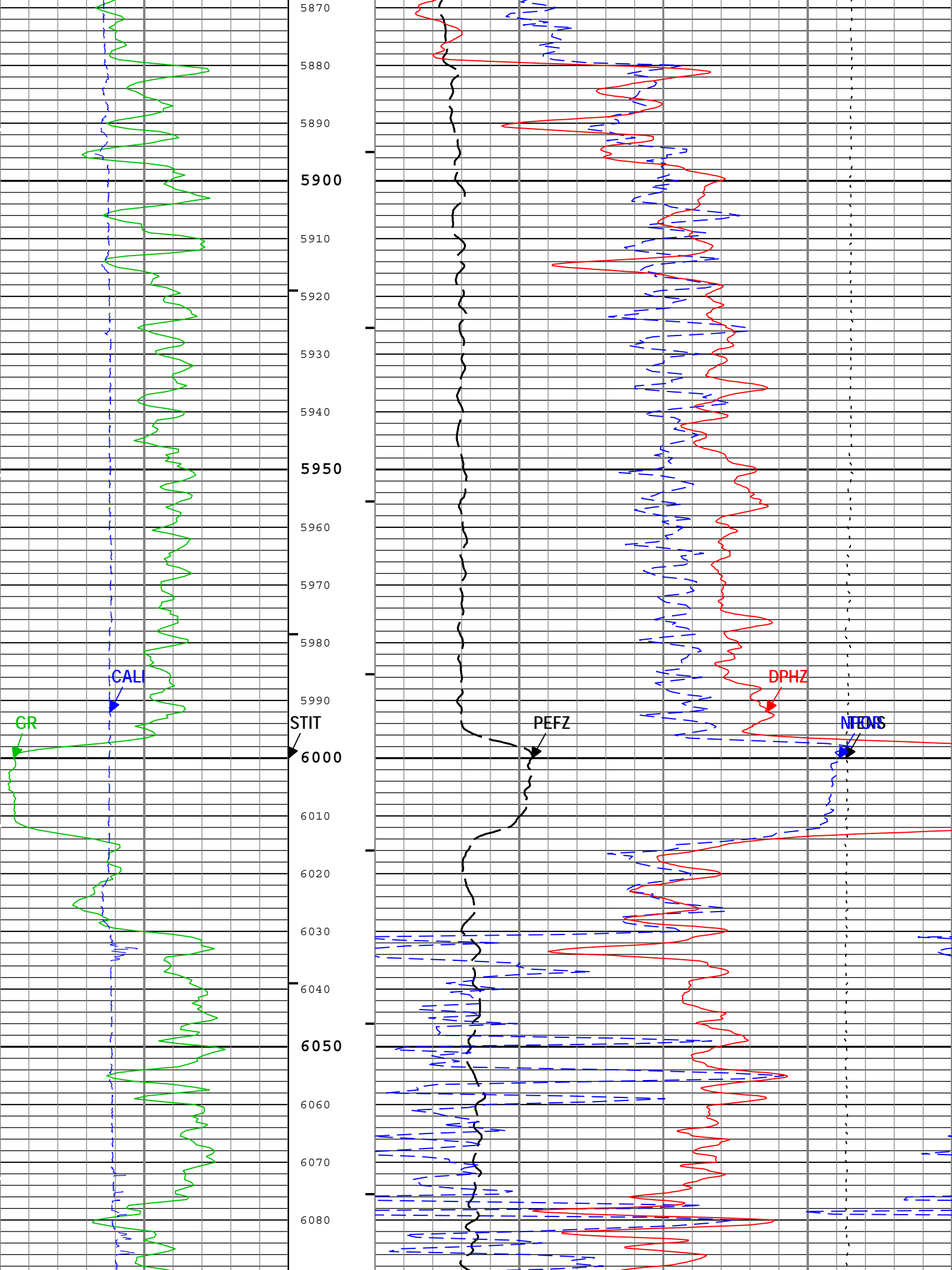


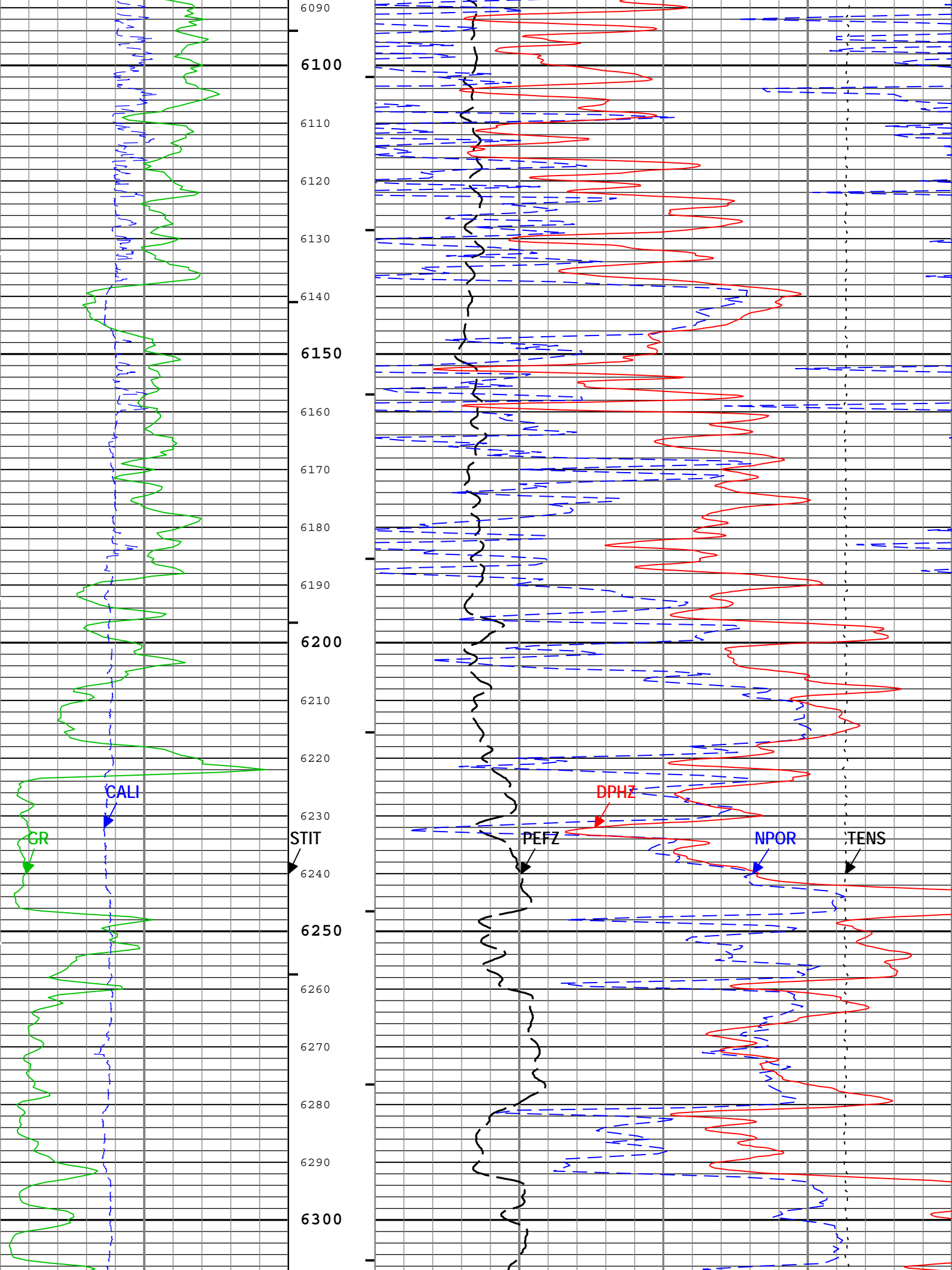


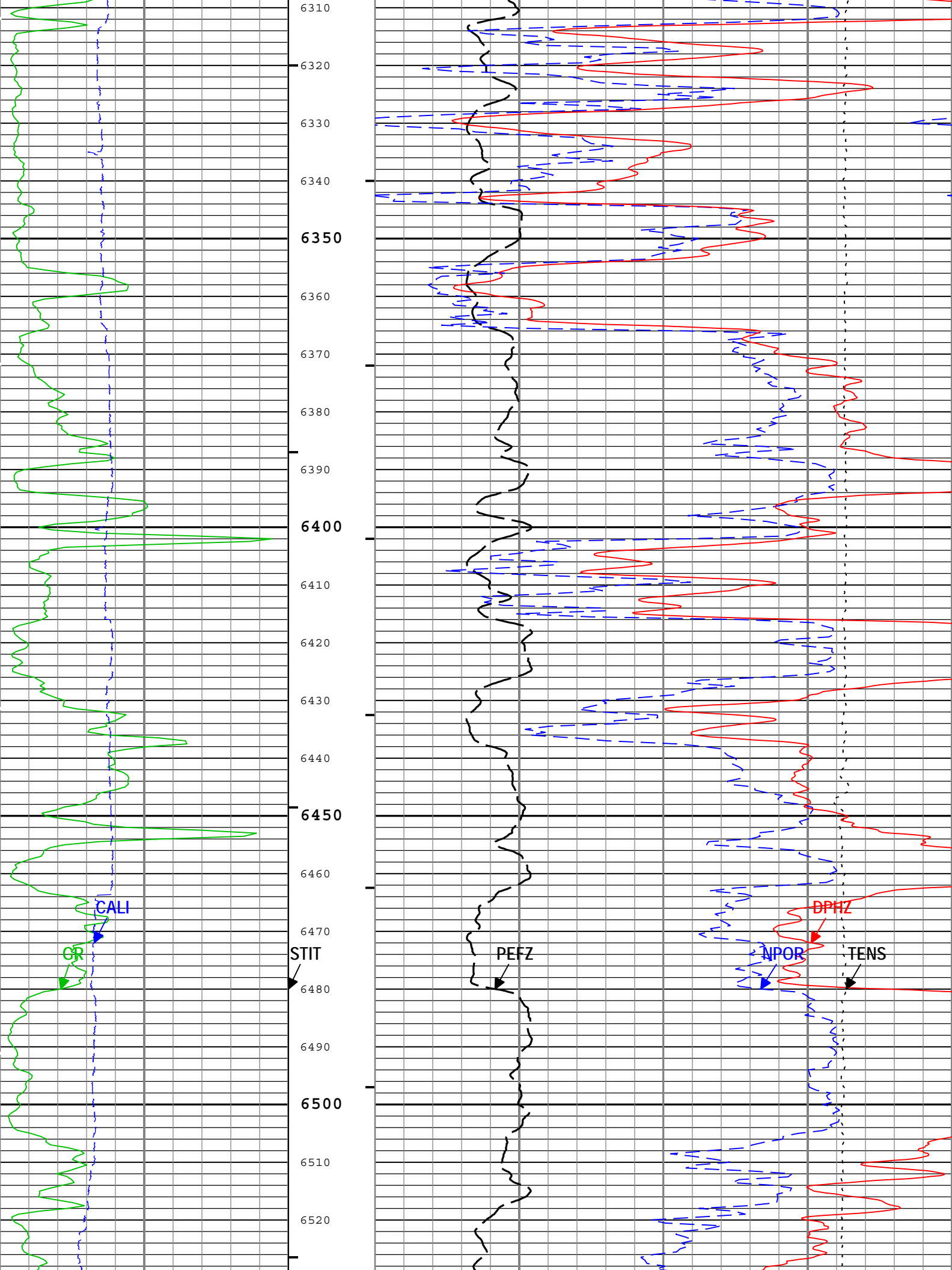


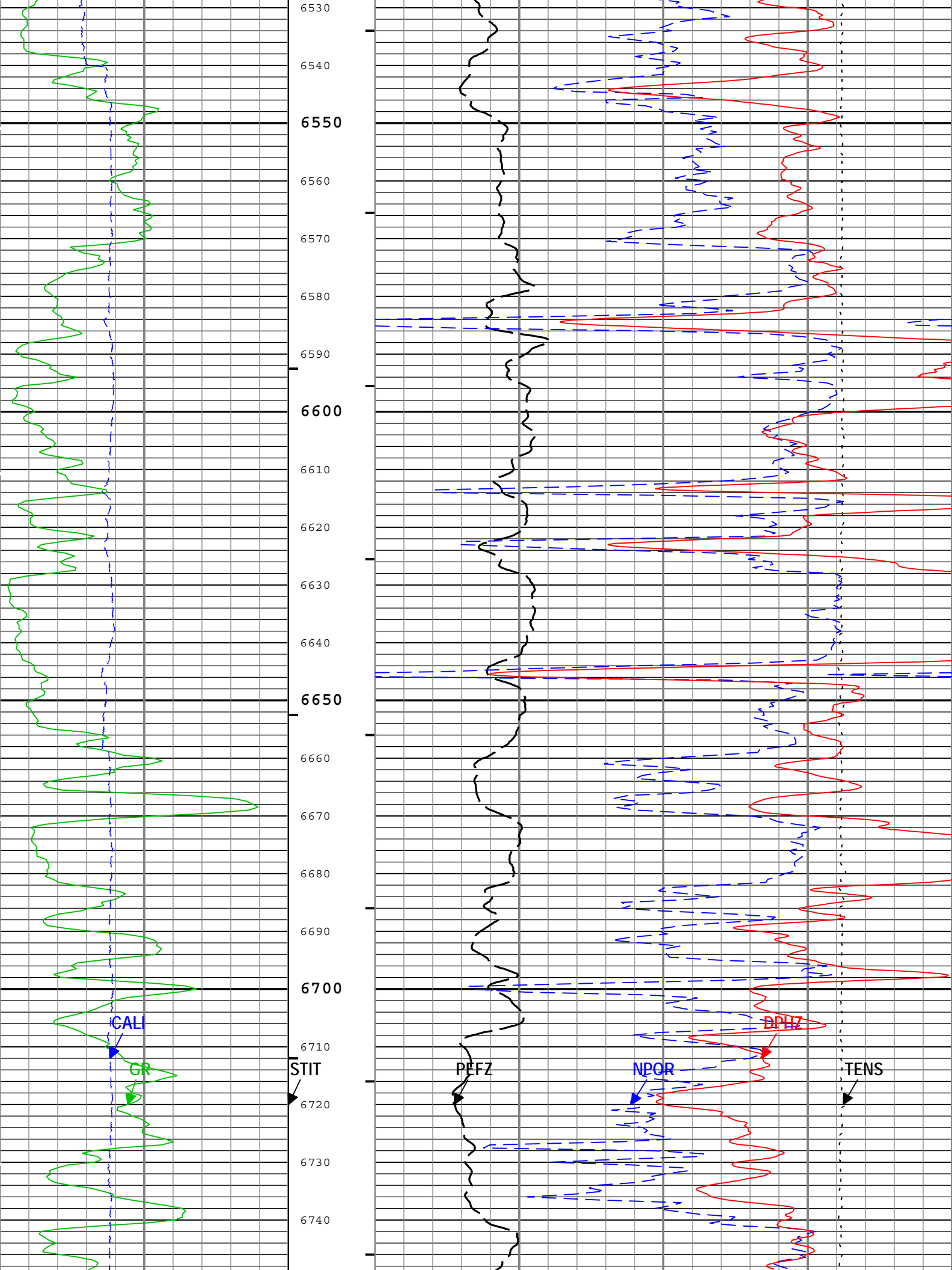


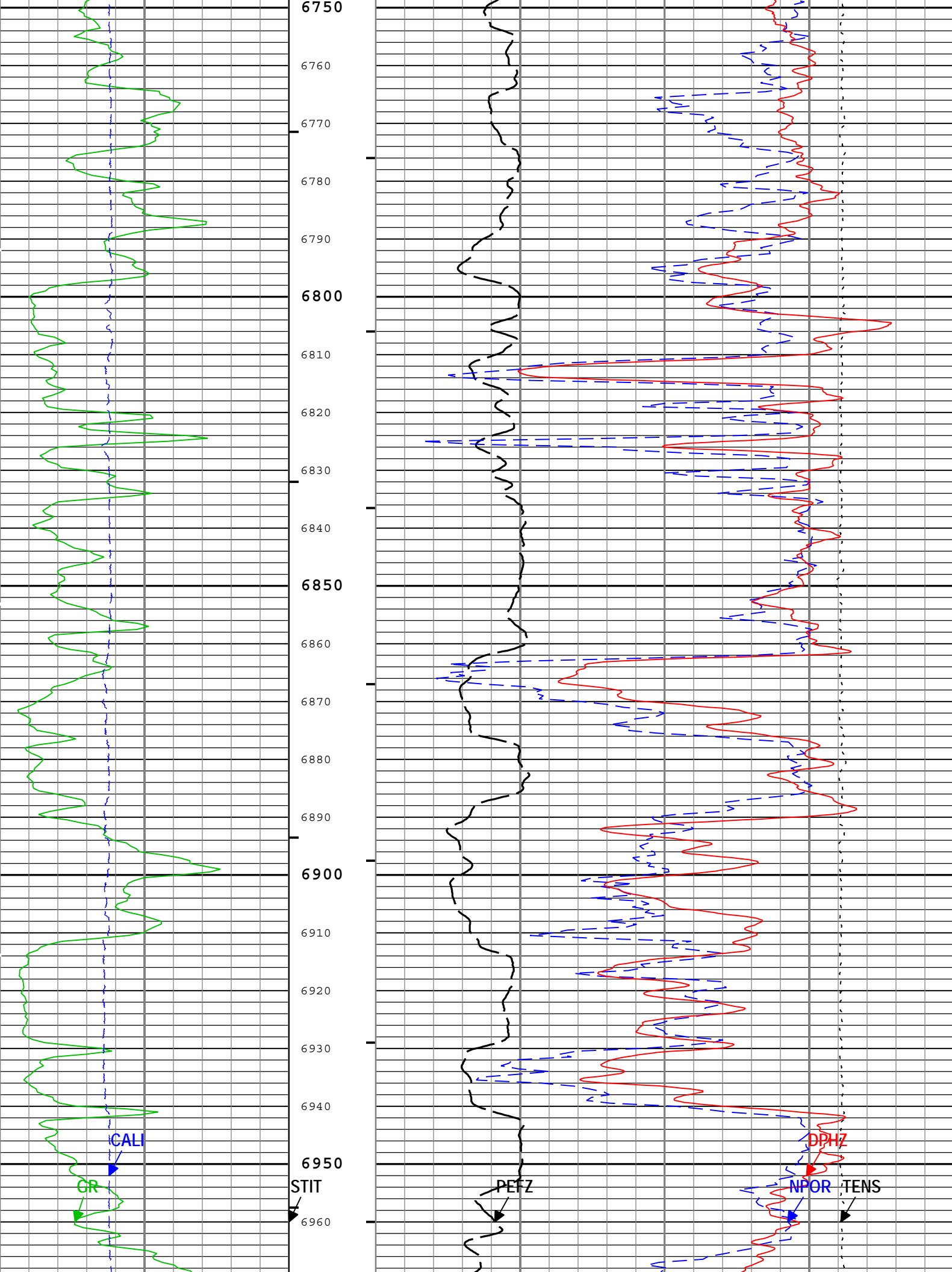


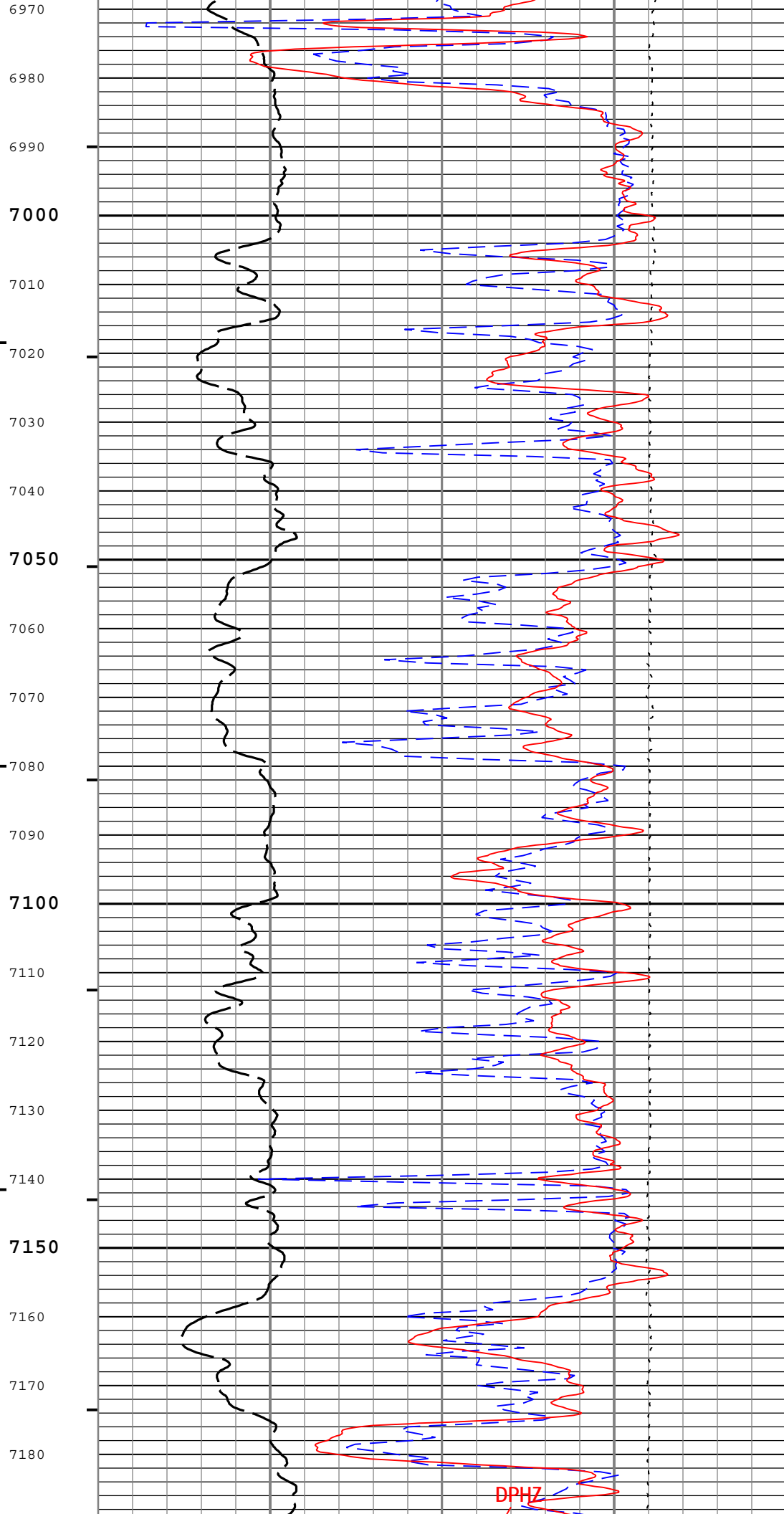
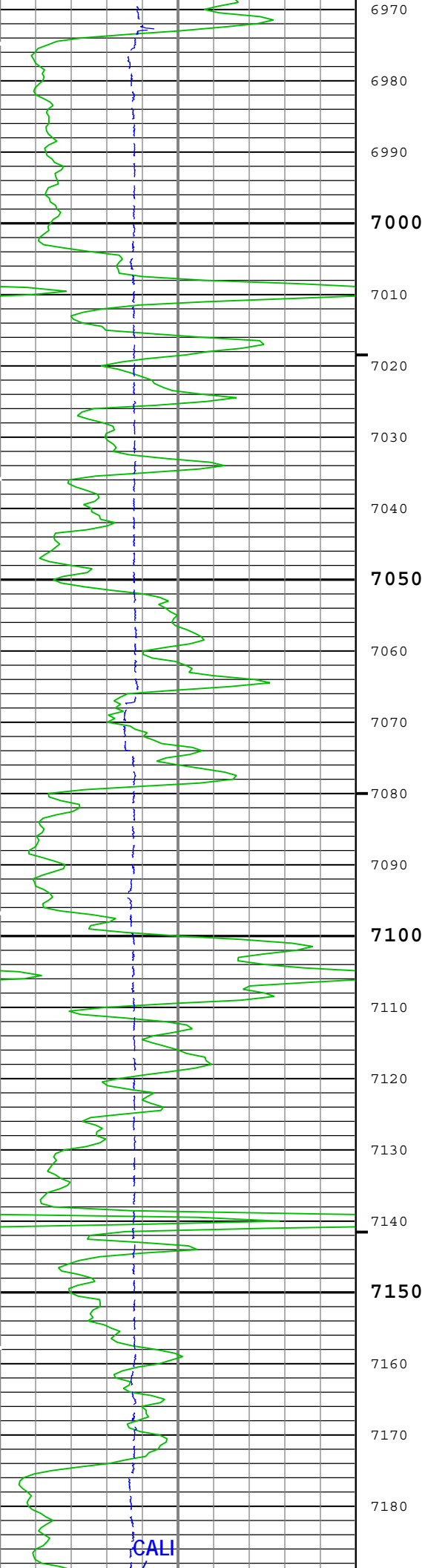


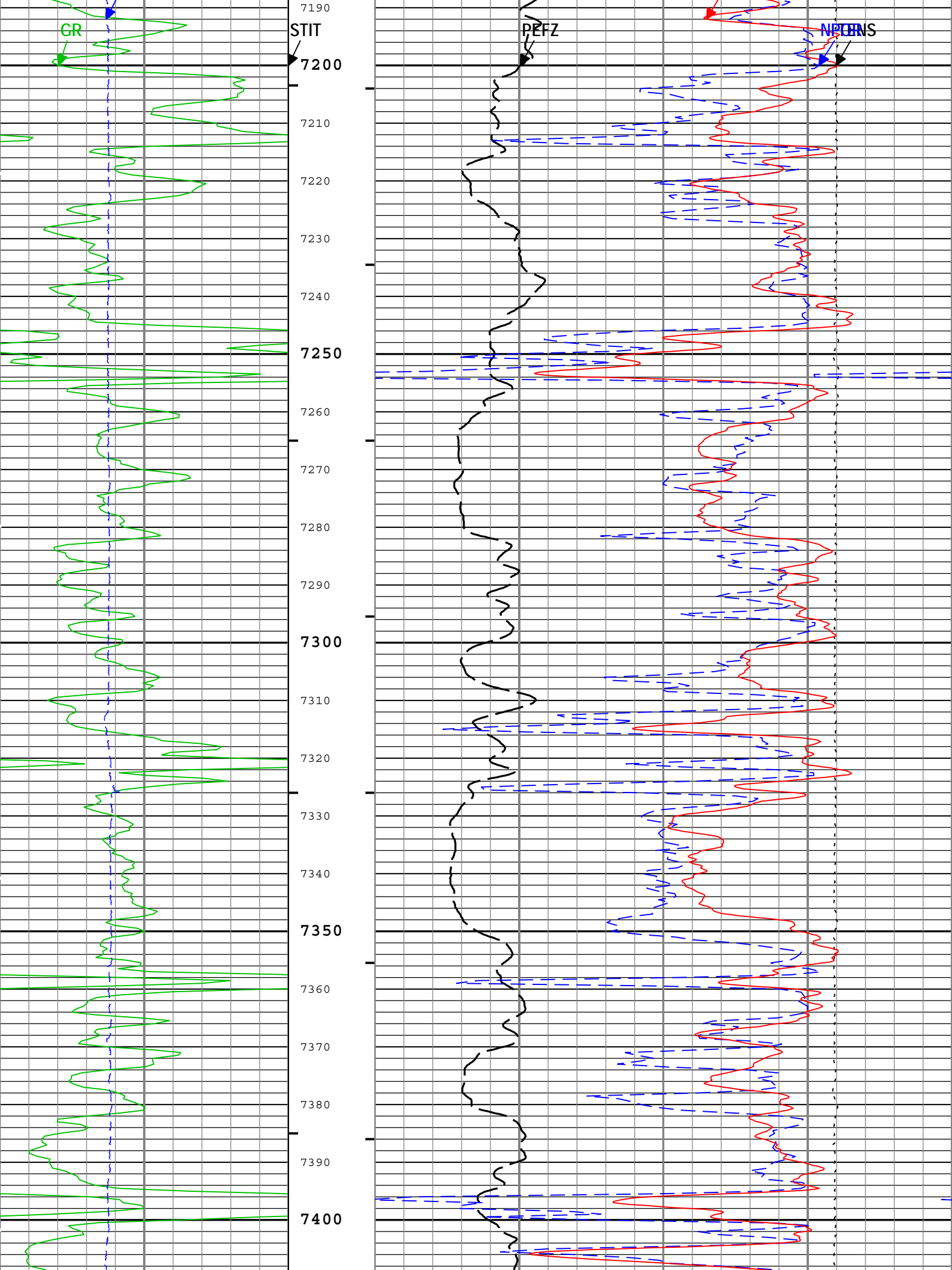


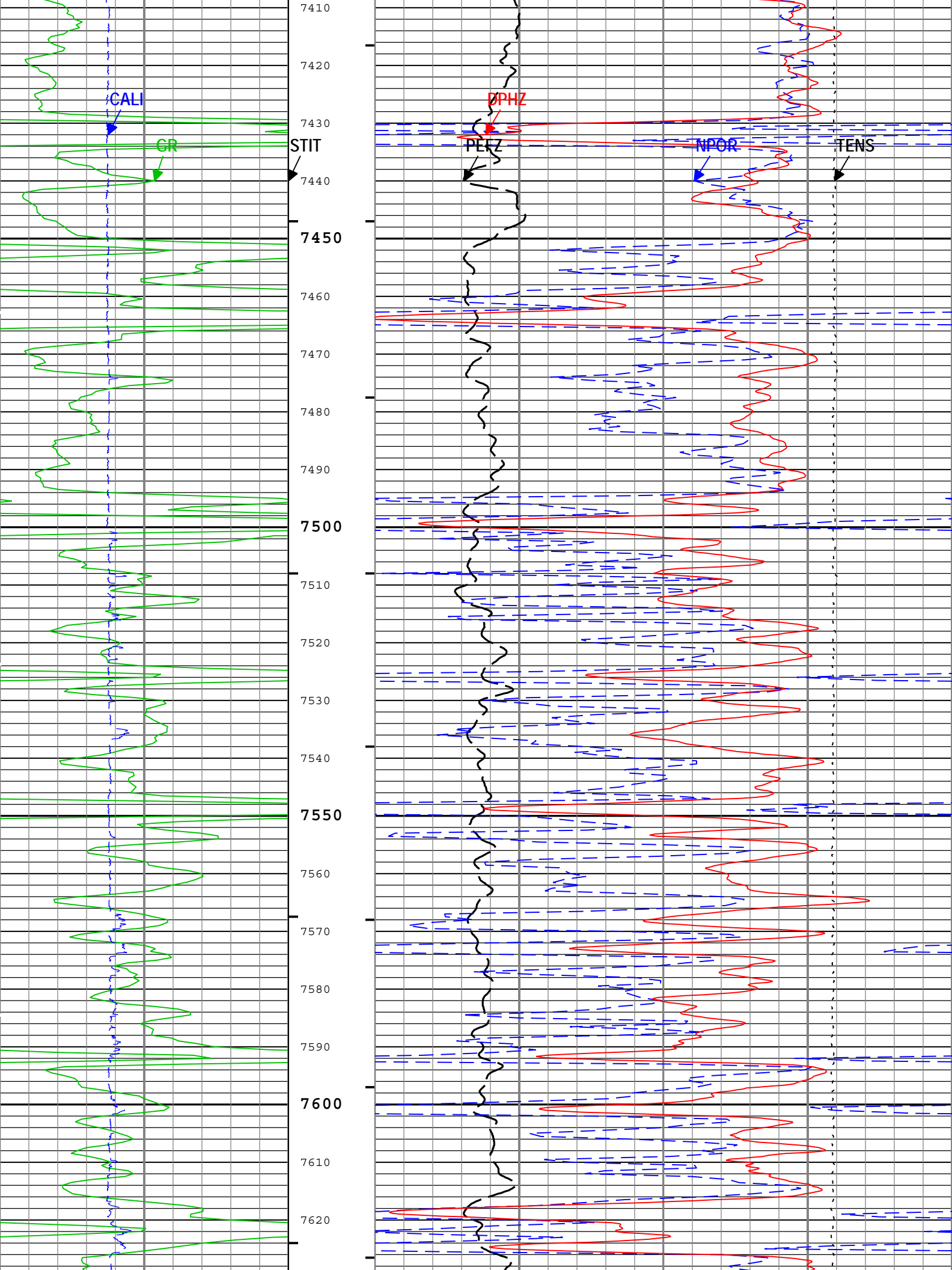




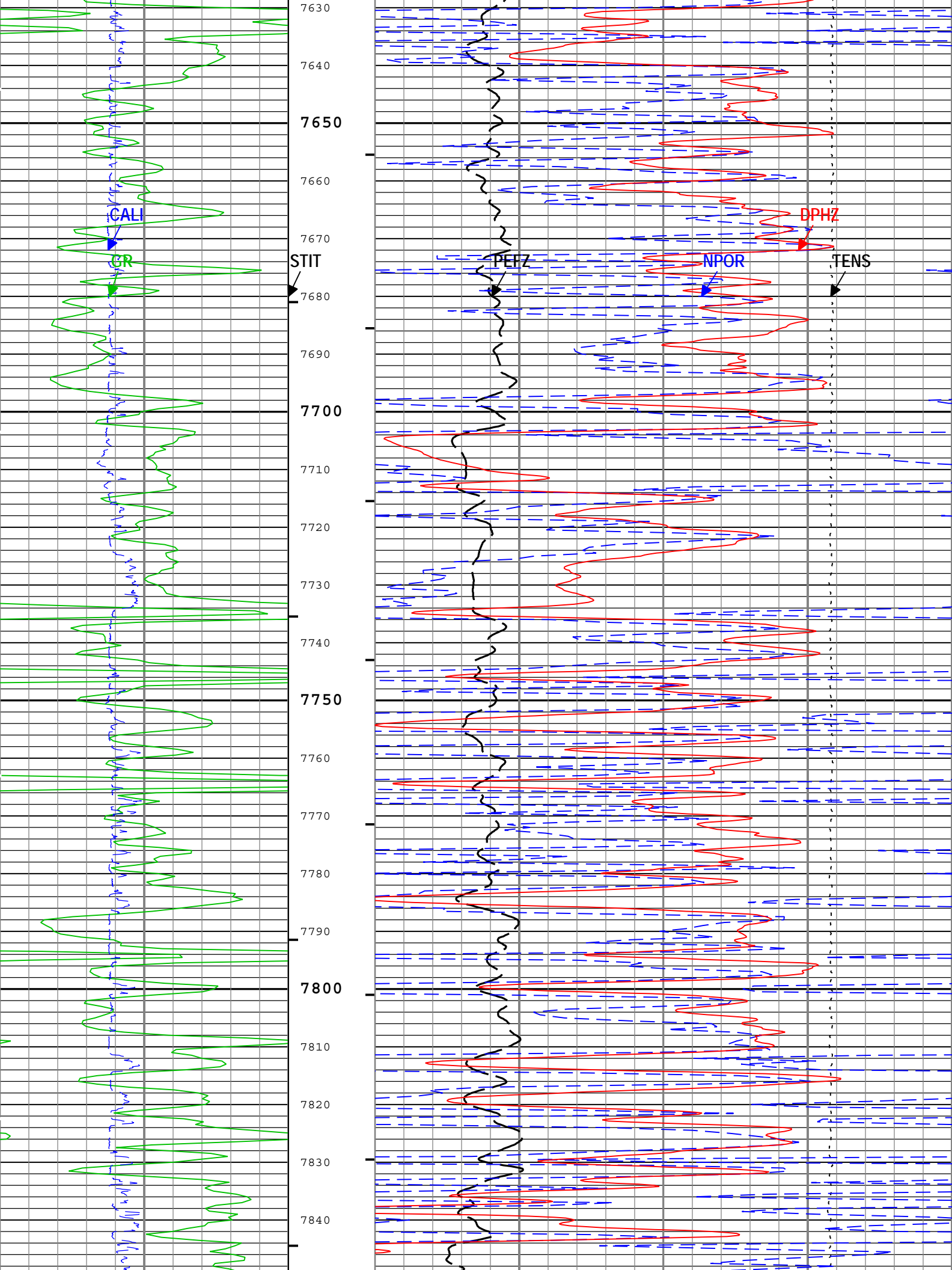


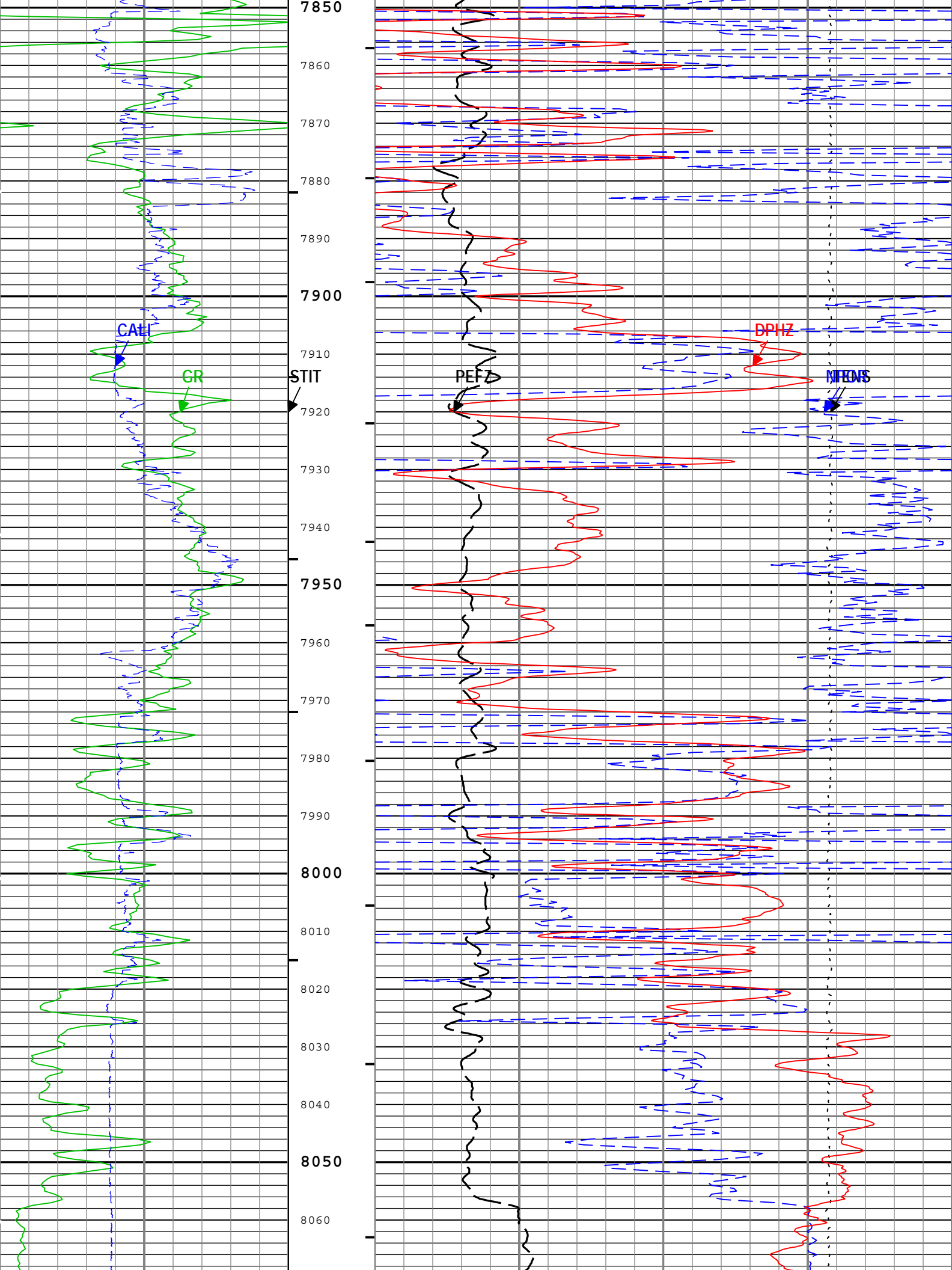


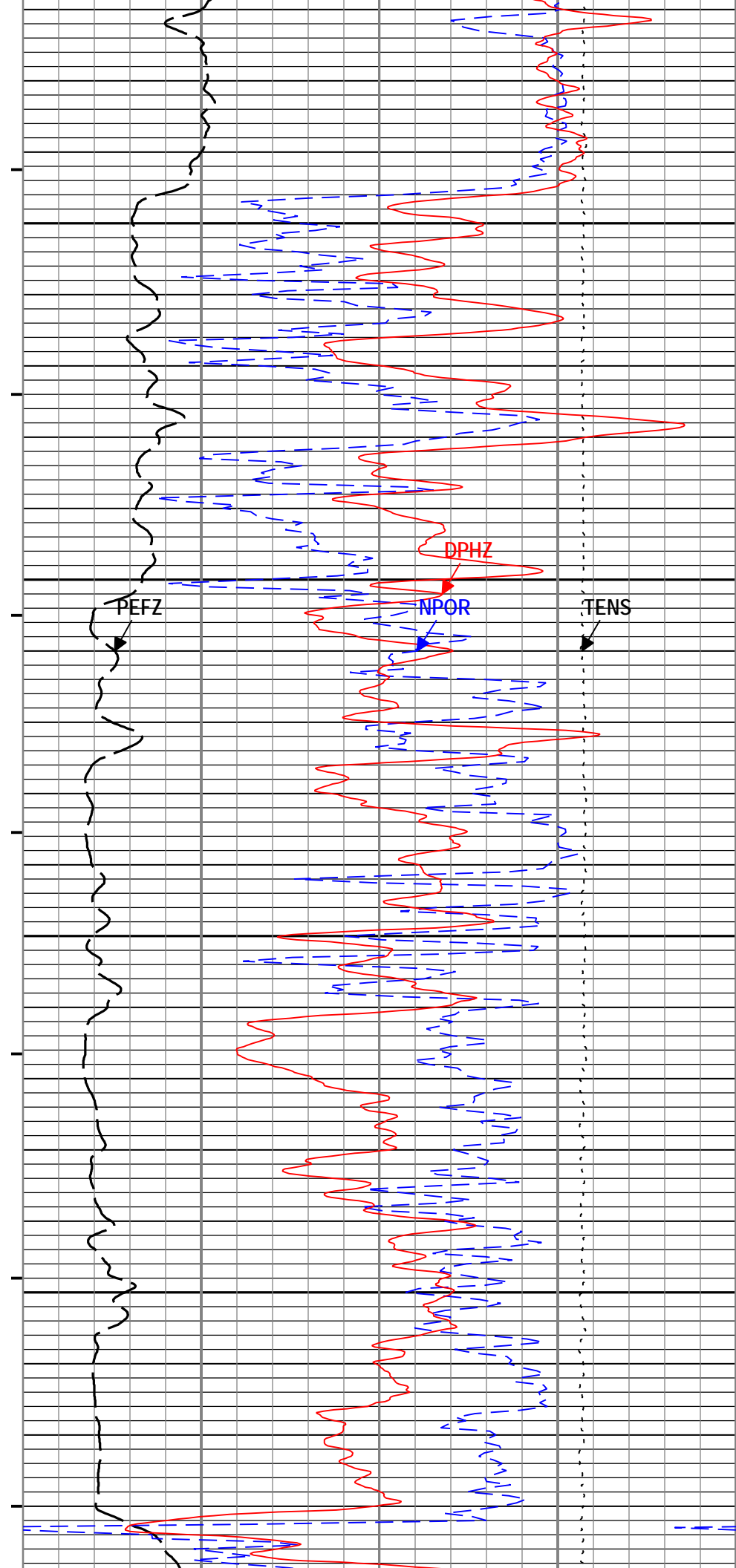
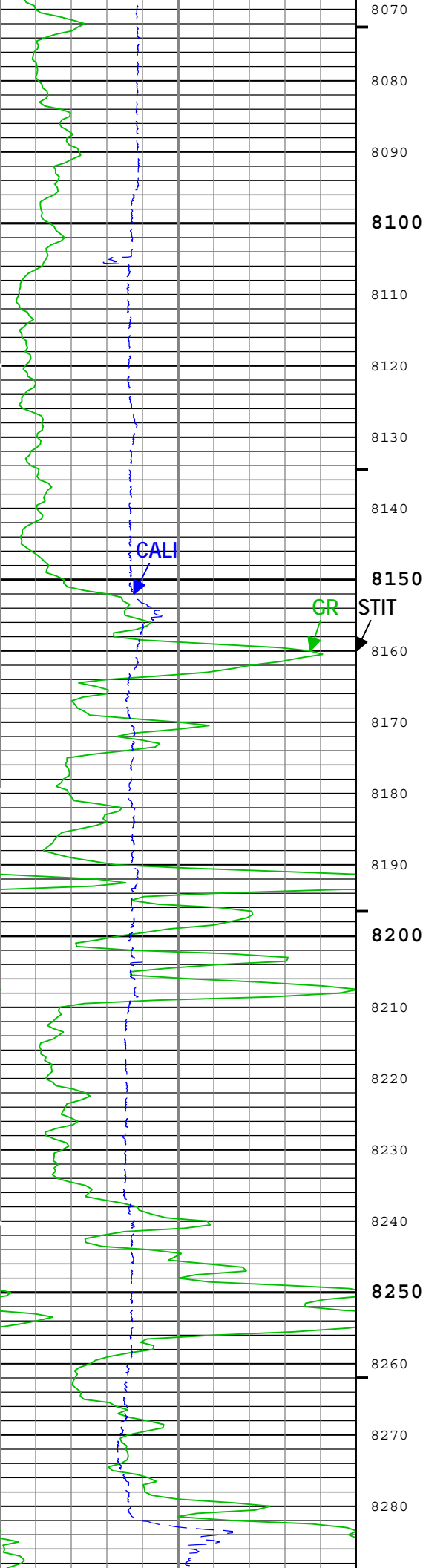


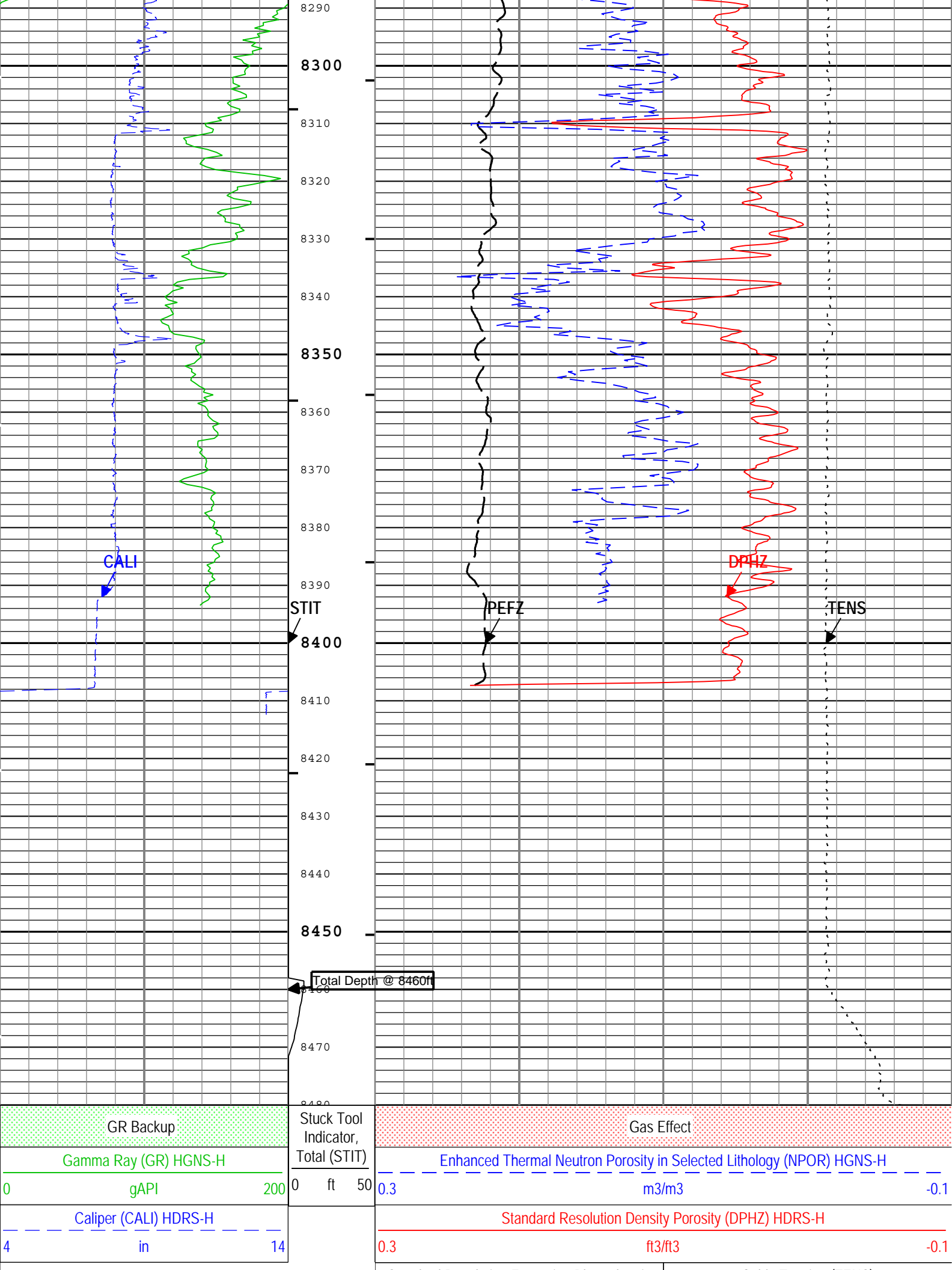












Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H

010

Cable Tension (TENS)

10000lbf0

TIME\_1900 - Time Marked every 60.00 (s)

—IHV - Integrated Hole Volume every 10.00 (ft3)

—ICV - Integrated Cement Volume every 10.00 (ft3)

—ICV - Integrated Cement Volume every 10.00 (ft3)

—IHV - Integrated Hole Volume every 10.00 (ft3)

Description: HGNS standard resolution porosities for Platform Express    Format: Log ( 5in Porosity )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 14-Jun-2013 00:58:08

Channel Processing Parameters				
Parameter	Description	Tool	Value	Unit
BARI	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
BSAL	Borehole Salinity	Borehole	9358.74	ppm
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.07	in
CBLO	Casing Bottom (Logger)	WLSESSION	345	ft
CDEN	Cement Density	HGNS-H	2	g/cm3
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	8.625	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	9	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DFT_WATER	Drilling Fluid Water Type	Borehole	Chemical Gel	
DHC	Density Hole Correction	HDRS-H	Bit Size	
FCD	Future Casing (Outer) Diameter	WLSESSION	5.5	in
FD	Fluid Density	Borehole	1	g/cm3
FSAL	Formation Salinity	Borehole	0	ppm
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	
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	80	degF
RMFS	Resistivity of Mud Filtrate Sample	Borehole	0.44	ohm.m
SOCO	Standoff Correction Option	HGNS-H	Yes	
TD	Total Measured Depth	Borehole	8460	ft

Depth Zone Parameters			
Parameter	Value	Start ( ft )	Stop ( ft )
BS	0	330	345
BS	7.875	345	8480.08
All depth are actual.			

Tool Control Parameters				
Parameter	Description	Tool	Value	Unit
HMCA_BRD_TYPE	HMCA Board Type	HGNS-H	1	
HRGD_BRD_TYPE	HRGD Board Type	HDRS-H	WITH_HET	

MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h
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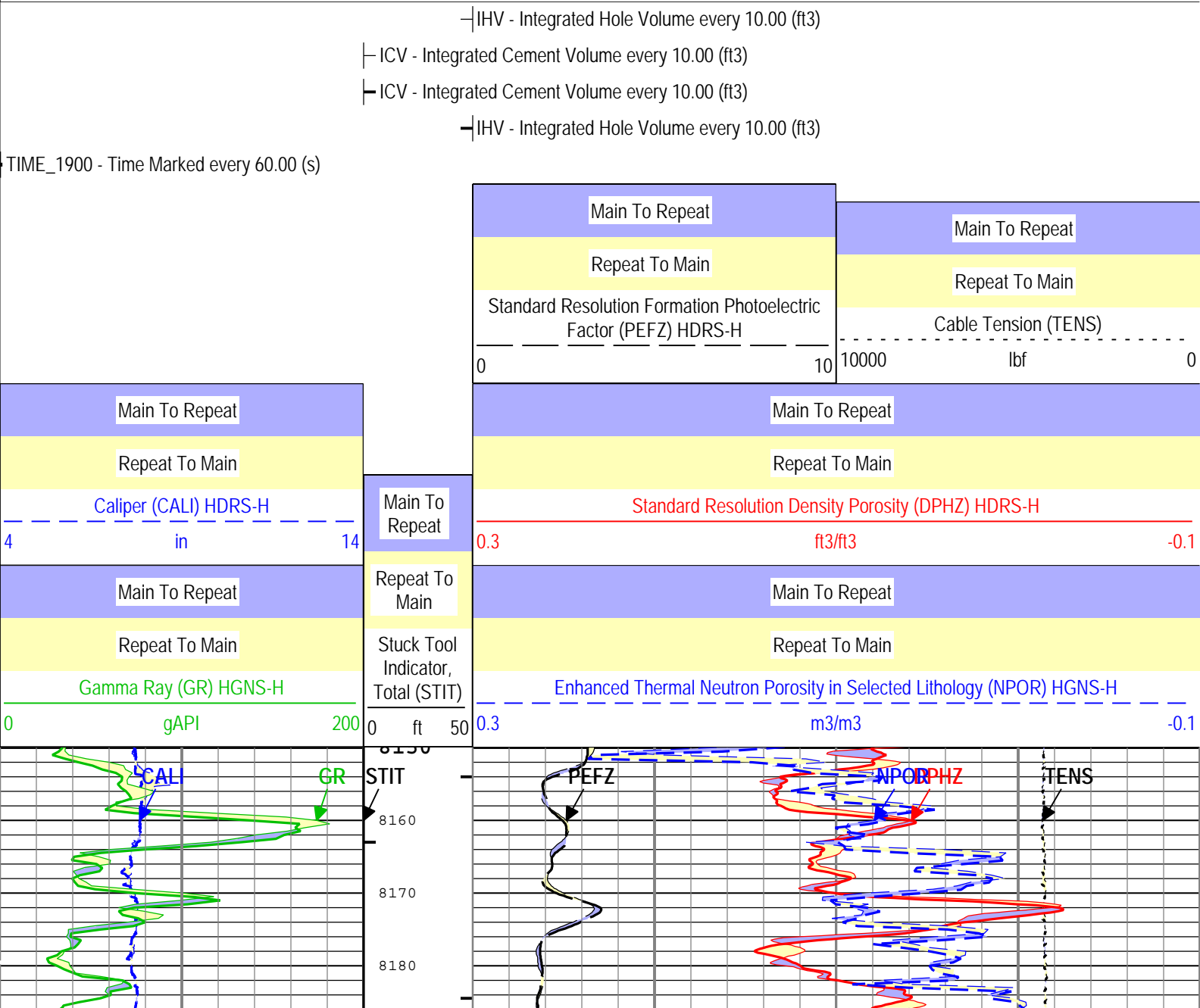
Run 1

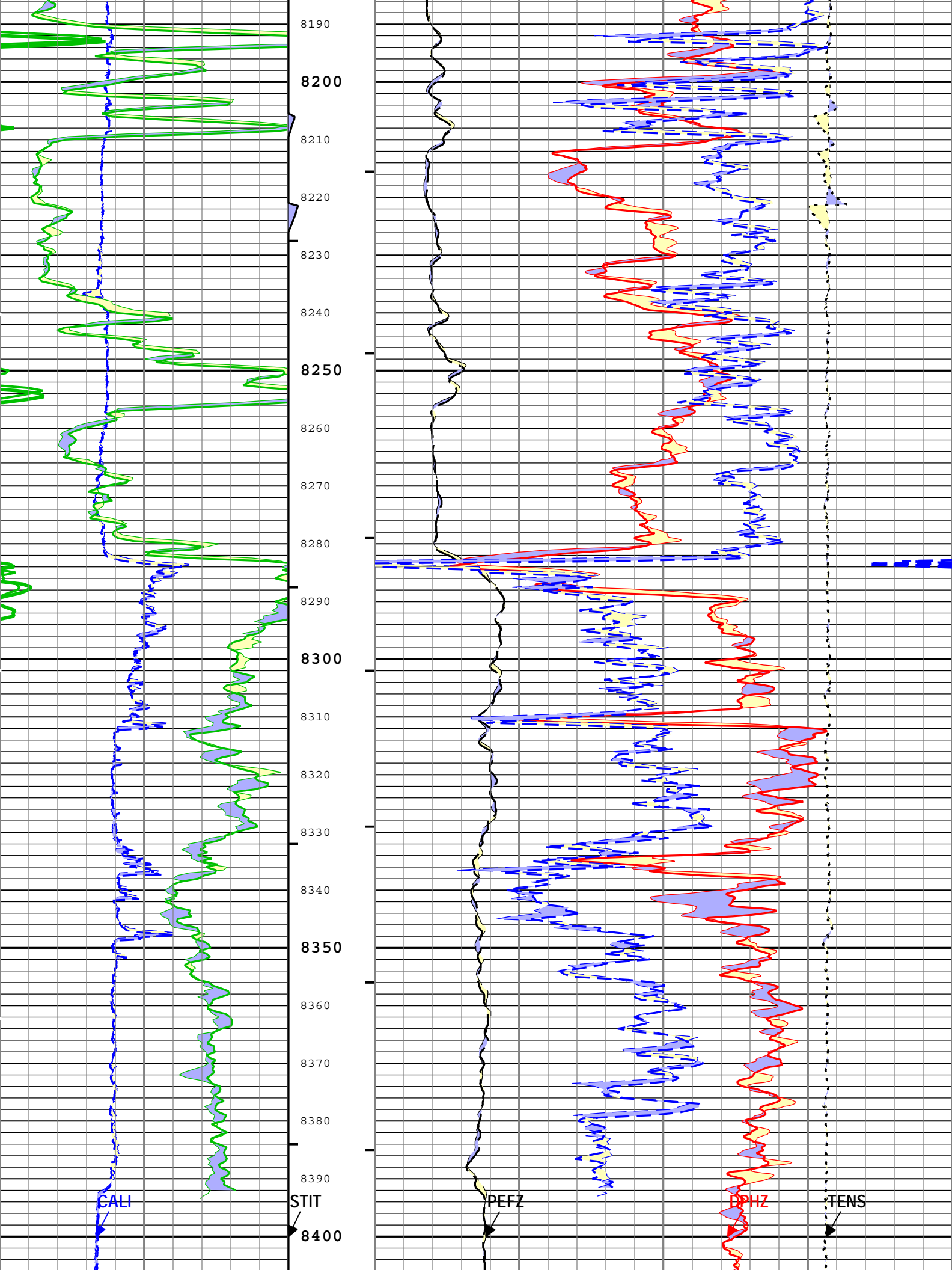
Porosity 5" = 100'

Pass Summary								
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Depth Shift	Include Parallel Data
Run 1	Log[6]:Up	Up	7723.11 ft	8478.38 ft	13-Jun-2013 9:20:08 PM	13-Jun-2013 9:35:05 PM	7.00 ft	
Run 1	Log[7]:Up	Up	105.88 ft	8480.06 ft	13-Jun-2013 9:41:24 PM	14-Jun-2013 12:02:54 AM	0.00 ft	
All depths are referenced to toolstring zero								
Log						Run 1: Log[7]:Up		

Description: HGNS standard resolution porosities for Platform Express    Format: Log ( 5in Porosity RA\_1 )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 14-Jun-2013 00:58:14

Channel	Source	Sampling
ICV	Borehole	6in
IHV	Borehole	6in
TIME_1900	WLWorkflow	0.1in





## Compensated Neutron Litho Density



