

Company: Nighthawk Production LLC

Well: Big Sky 4-11

Field: Wildcat

County: Lincoln State: Colorado

Platform Express

Sonic

County: Lincoln  
 Field: Wildcat  
 Location: NWNW  
 Well: Big Sky 4-11  
 Company: Nighthawk Production LLC

Location:		NWNW	Elev.:	K.B. 5208.00 ft
Permanent Datum:		SHL: 615' FNL X 622' FWL	G.L. 5193.00 ft	D.F. 5207.00 ft
Log Measured From:			5193.00 f above Perm. Datum	
Drilling Measured From:				
API Serial No.	Section:	11	Township:	6S
05-073-06523-0000			Range:	54W

Logging Date	12-May-2013
Run Number	1
Depth Driller	8350.00 ft
Schlumberger Depth	8342.00 ft
Bottom Log Interval	8334.00 ft
Top Log Interval	308.00 ft
Casing Driller Size @ Depth	8.625 in @ 300.00 ft
Casing Schlumberger	309 ft
Bit Size	7.875 in
Type Fluid In Hole	Fresh Water
Density	9.2 lbm/gal
Viscosity	90 s
Fluid Loss	8 cm3
PH	7.3
Source of Sample	Active Tank
RM @ Meas Temp	0.53 ohm.m @ 60 degF
RMF @ Meas Temp	0.4 ohm.m @ 60 degF
RMC @ Meas Temp	0.81 ohm.m @ 60 degF
Source RMF	Calculated
RM @ BHT	0.18 @ 190
RMF @ BHT	0.14 @ 190
Source RMF	Calculated
Max Recorded Temperatures	190 degF
Circulation Stopped	11-May-2013 21:00:00
Logger on Bottom	12-May-2013 15:00:00
Unit Number	2223
Location:	Danifil Kholin
Recorded By	Fort Morgan
Witnessed By	Anders Elgerd

## 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

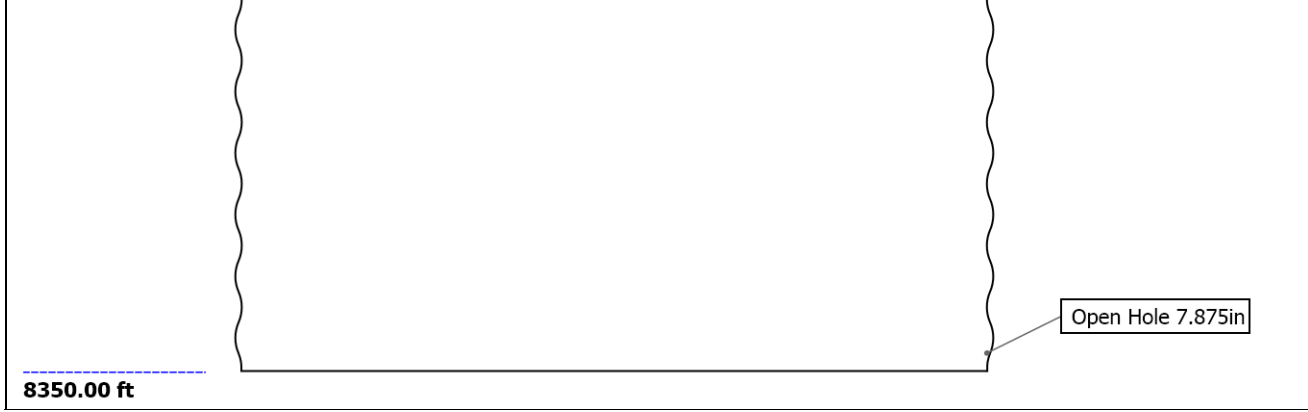
Driller Depth

0.00 ft

300.00 ft

Casing 8.625in  
24lbm/ft





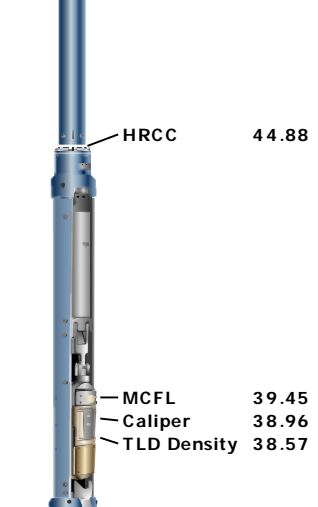
## Borehole Size/Casing/Tubing Record

Bit					
Bit Size ( in )	7.875				
Top Driller ( ft )	0				
Top Logger ( ft )	0				
Bottom Driller ( ft )	8350				
Bottom Logger ( ft )	8342				
Casing					
Size ( in )	8.625				
Weight ( lbm/ft )	24				
Inner Diameter ( in )	8.099				
Grade	N80				
Top Driller ( ft )	0				
Top Logger ( ft )	0				
Bottom Driller ( ft )	300				
Bottom Logger ( ft )	309				

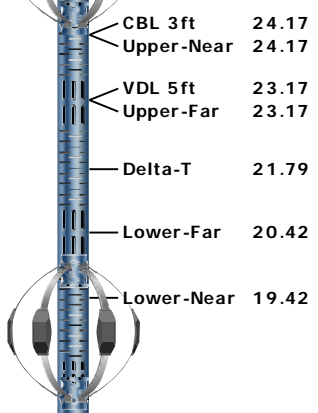
## Remarks and Equipment Summary

1: Toolstring				1: Remarks
Equip name	Length	MP name	Offset	Toolstring run as per toolsketch.
LEH-QT:2493	64.21			HGNS run without bowspring as per client request due to hole conditions
LEH-QT:2493				Matrix: Limestone, 2.71 g/cc
DTC-H:10530	61.29			Crew: Troy Ocanas, Jay Musgrave
ECH-KC		CTEM	60.39	
DTC-H:10530		HV	0.00	
		TeIStatus	58.29	
		ToolStatus	58.29	
HGNS-H:863	58.29	Temperatur	58.26	
HGNH:2883		e		
NSR-F:5069		GR	57.55	
NPV-N				
HGNS-H:863				
HMCA H				
HACCZ-H:452				
		CNL Porosit	51.21	
		y		
		HMCA	48.88	
		HGNS	48.88	
		Accelerome	0.00	
		ter		
HDRS-H:1754	48.88			
ECH-MEB:1922				

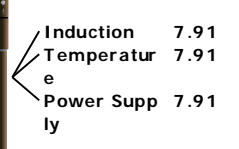
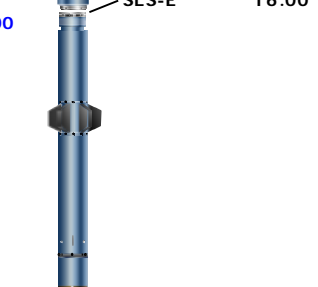
HRCC-H:791  
 HRMS-H:1754  
 Short Spacing  
 GSR-J:5094  
 Long Spacing  
 HRGD-H:1849  
 GPV-Q  
 Backscatter



**DSL T-H:8151 36.64**  
 ECH-KH:8232  
 DSLC-H:8151  
 SLS-E:297



**AIT-H:398 16.00**  
 AHIS:398  
 AHRM:398





SP 0.08  
 Mud Resistivity 0.00  
 Head Tension  
 TOOL\_ZERO

Lengths are in ft

Maximum Outer Diameter = 5.000 in

Line: Sensor Location, Value: Gating Offset

All measurements are relative to TOOL\_ZERO

## Depth Summary

<b>Depth Control Parameters</b>	<b>1</b>		
Conveyance Type	Wireline		
Log Sequence	This is first run in the hole.		
Stretch Correction ( ft )	6.12		
Rig Type	Land		
<b>Depth Remark Parameters</b>	<b>1</b>		
Depth Remark 1	All Schlumberger Depth Control		
Depth Remark 2	IDW used as primary depth control.		
Depth Remark 3	Z-chart used as secondary depth		
<b>Depth Measuring Device</b>	<b>1</b>		
Type	IDW-B		
Serial Number	1918		
Calibration Date	22-Apr-2013		
Calibration Cable Type	7-46 AXS		
Wheel Correction 1	-8		
Wheel Correction 2	-9		
<b>Tension Device</b>	<b>1</b>		
Type	CMTD-B/A		
Serial Number	1274		
Calibration Date	30-apr-2013		
Calibrator Serial Number	78135A		
Calibration Points	10		
Calibration RMS	36		
Calibration Peak Error	77		
<b>Logging Cable</b>	<b>1</b>		
Type	7-46A-XS		
Serial Number	U711126		
Logging Cable Length ( ft )	24000.00		

1

5" Sonic

## Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
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## Software Version

<b>Acquisition System</b>	<b>Version</b>
MaxWell	3.1.9755.0
Application Patch	SP-20121102-3.1.9755.1422

Computation	Description	Version
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Sonic Openhole Ensemble	Sonic Openhole Ensemble	3.1.9755.1422	
DepthCorrection	DepthCorrection	3.1.9755.0	
<b>Tool Elements</b>	<b>Description</b>	<b>Software Version</b>	<b>Firmware Version</b>
HGNS-H	HILT Gamma-Ray and Neutron Sonde, 150 degC	3.1.9755.0	2.0
SLS-E	Sonic Logging Sonde E supports 3'-5'BHC DT and CBL/VDL	3.1.9755.1422	4.0

## Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Depth Shift	Include Parallel Data
1	Main[3]:Up	Up	208.80 ft	8359.06 ft	12-May-2013 3:21:28 PM	12-May-2013 5:46:55 PM	0.00 ft	

All depths are referenced to toolstring zero

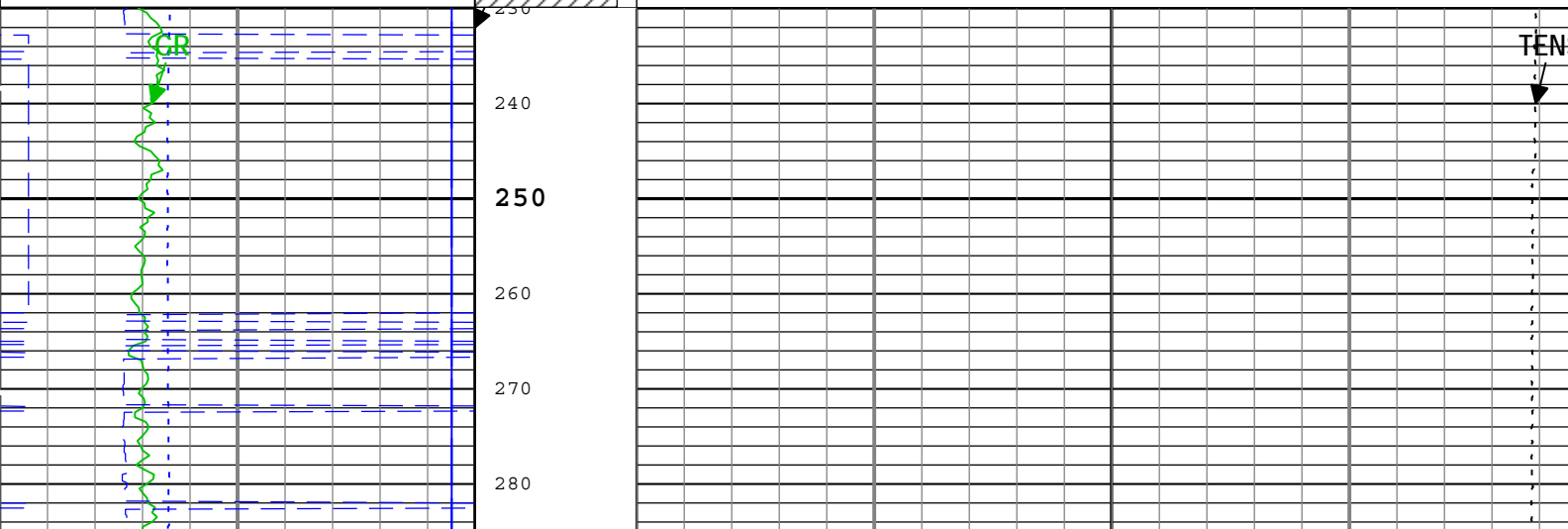
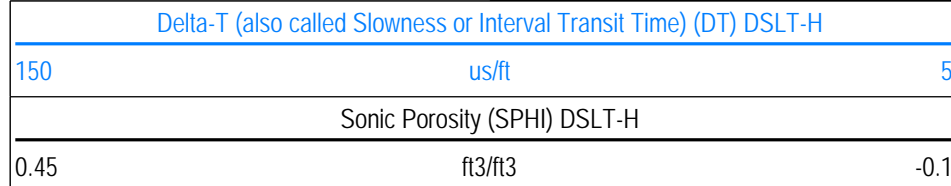
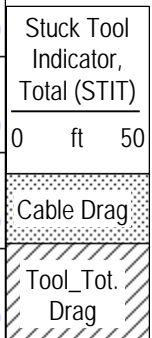
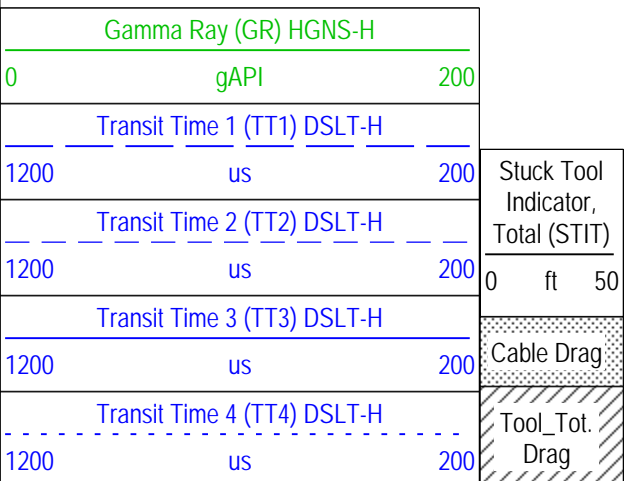
## Log

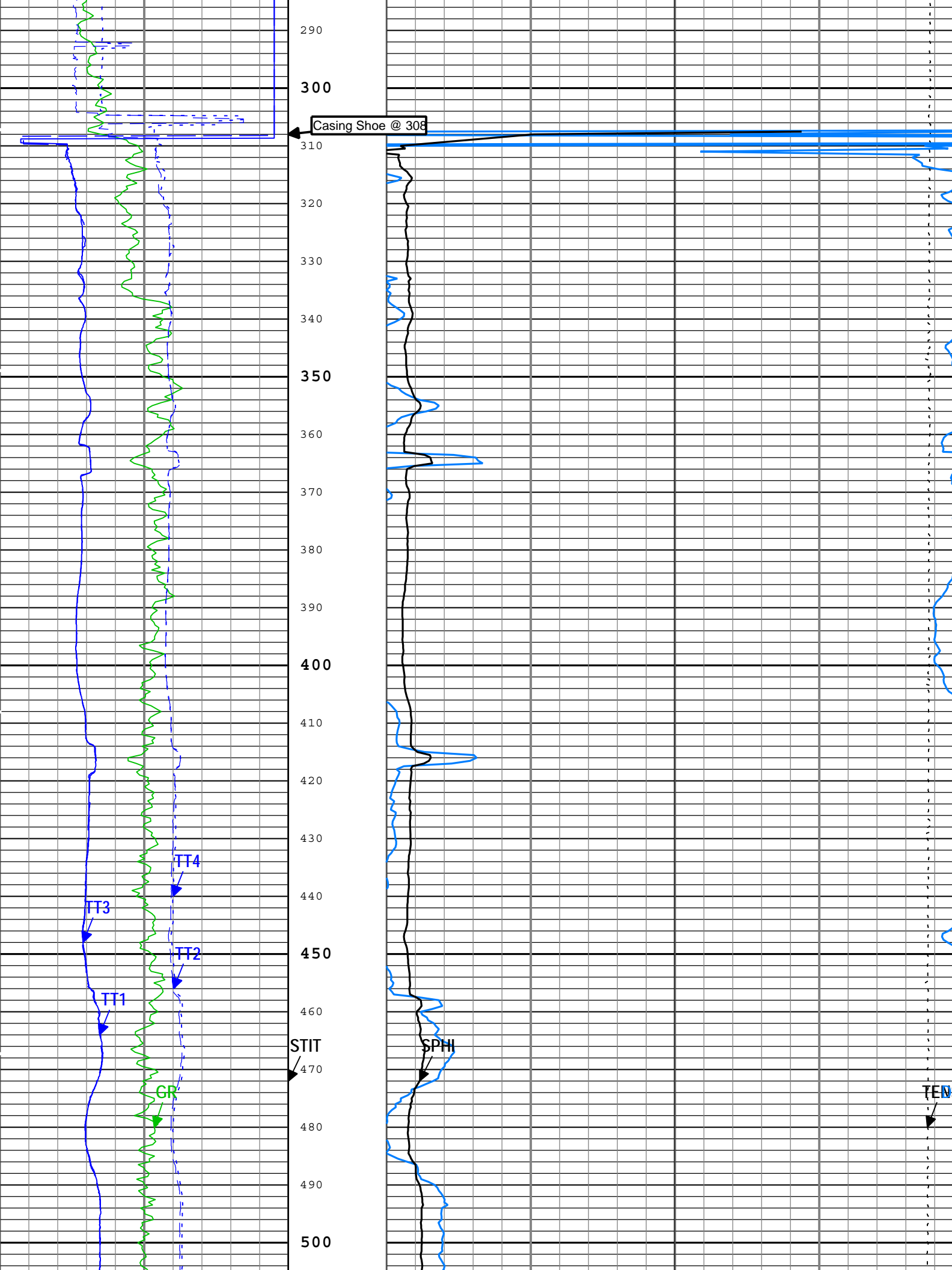
1: Main[3]:Up

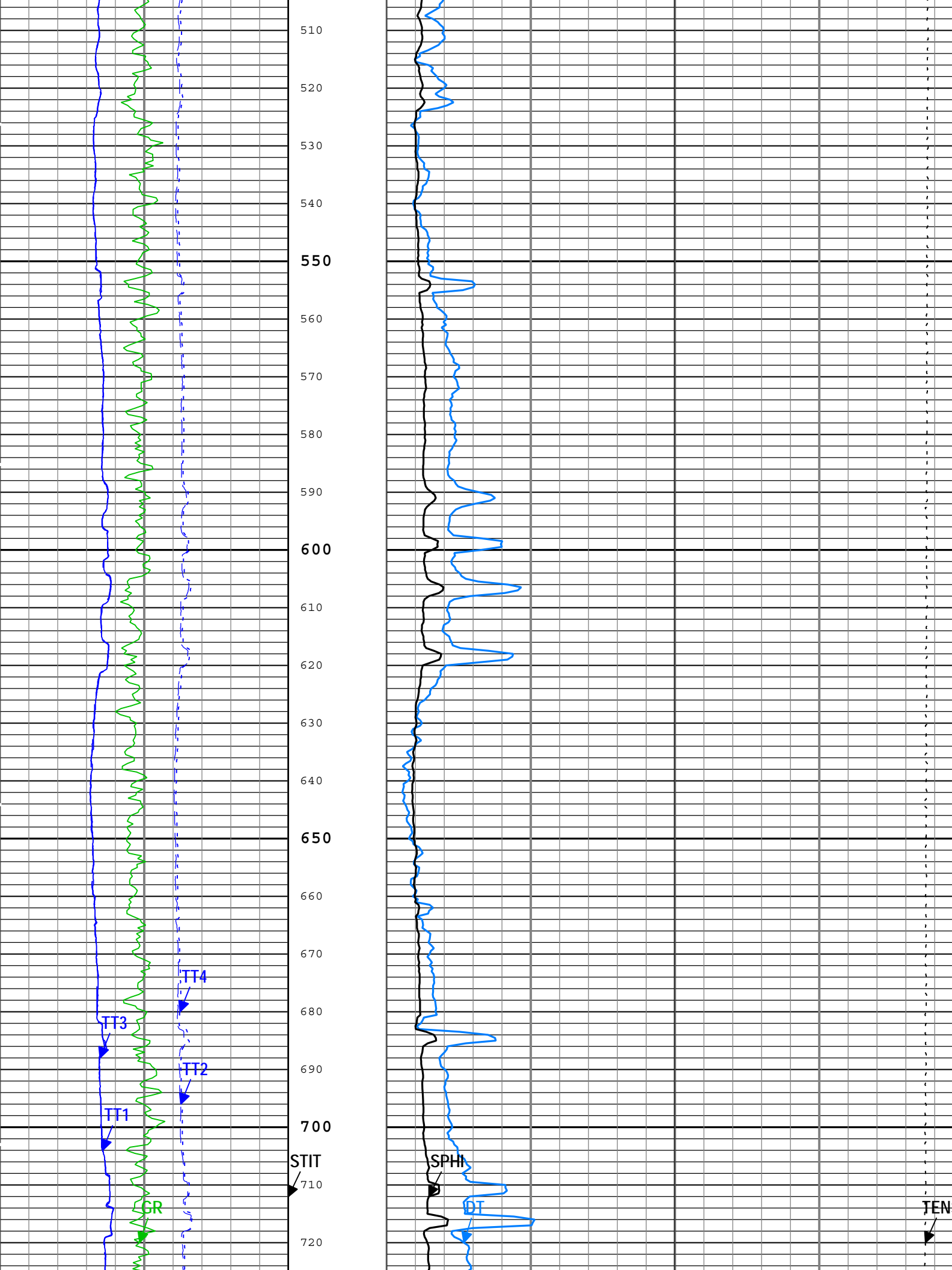
Description: DSST P&S Format: Log ( EMD Sonic DSST ) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 12-May-2013 18:22:15

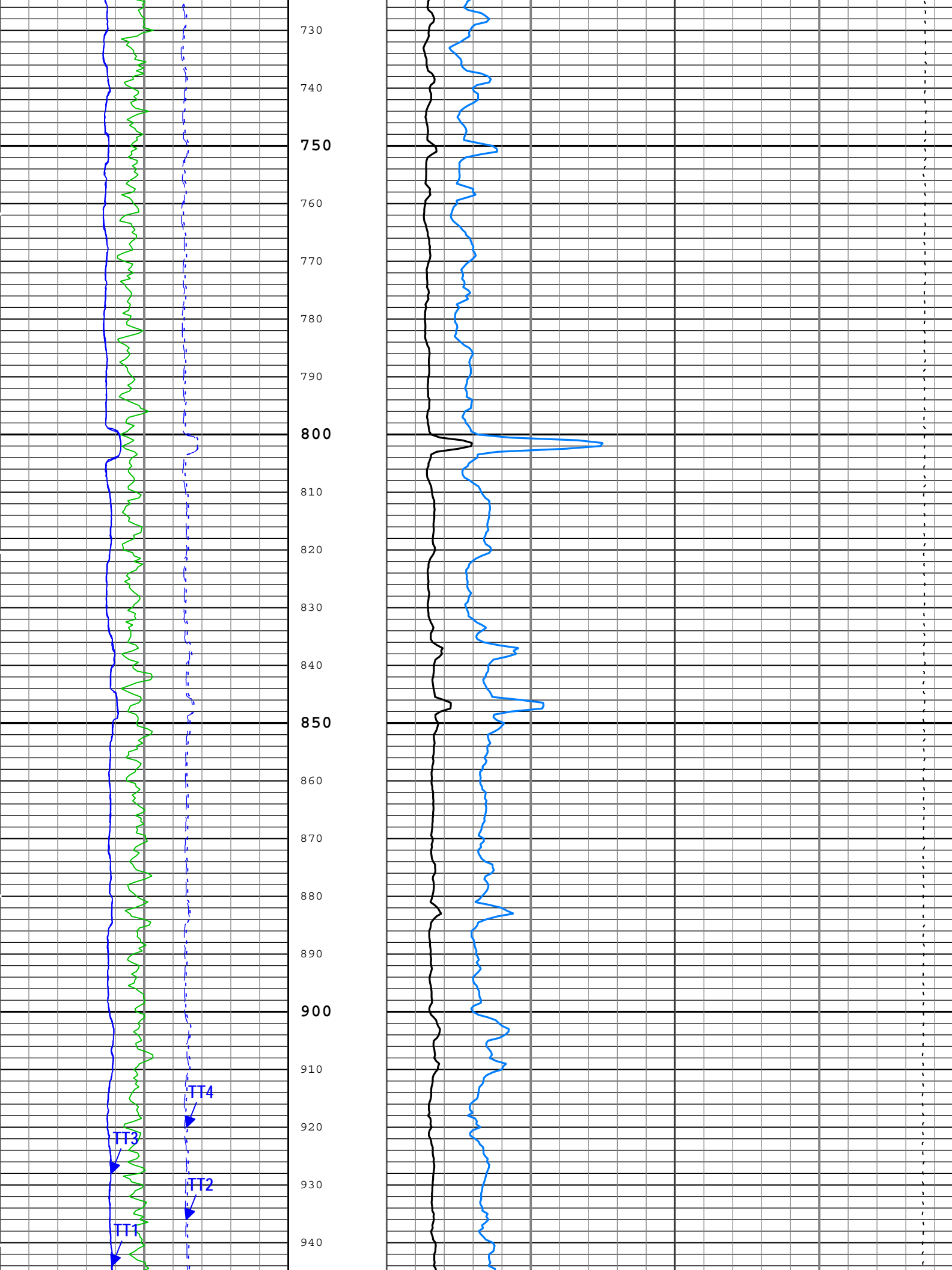
Channel	Source	Sampling
DT	DSLT-H:SLS-E:SLS-E	6in
GR	HGNS-H:HGNS-H:HGNS-H	6in
SPHI	DSLT-H:SLS-E:SLS-E	6in
STIT	DepthCorrection	6in
TENS	WLWorkflow	1in
TIME_1900	WLWorkflow	0.1in
TT1	DSLT-H:SLS-E:SLS-E	2in
TT2	DSLT-H:SLS-E:SLS-E	2in
TT3	DSLT-H:SLS-E:SLS-E	2in
TT4	DSLT-H:SLS-E:SLS-E	2in

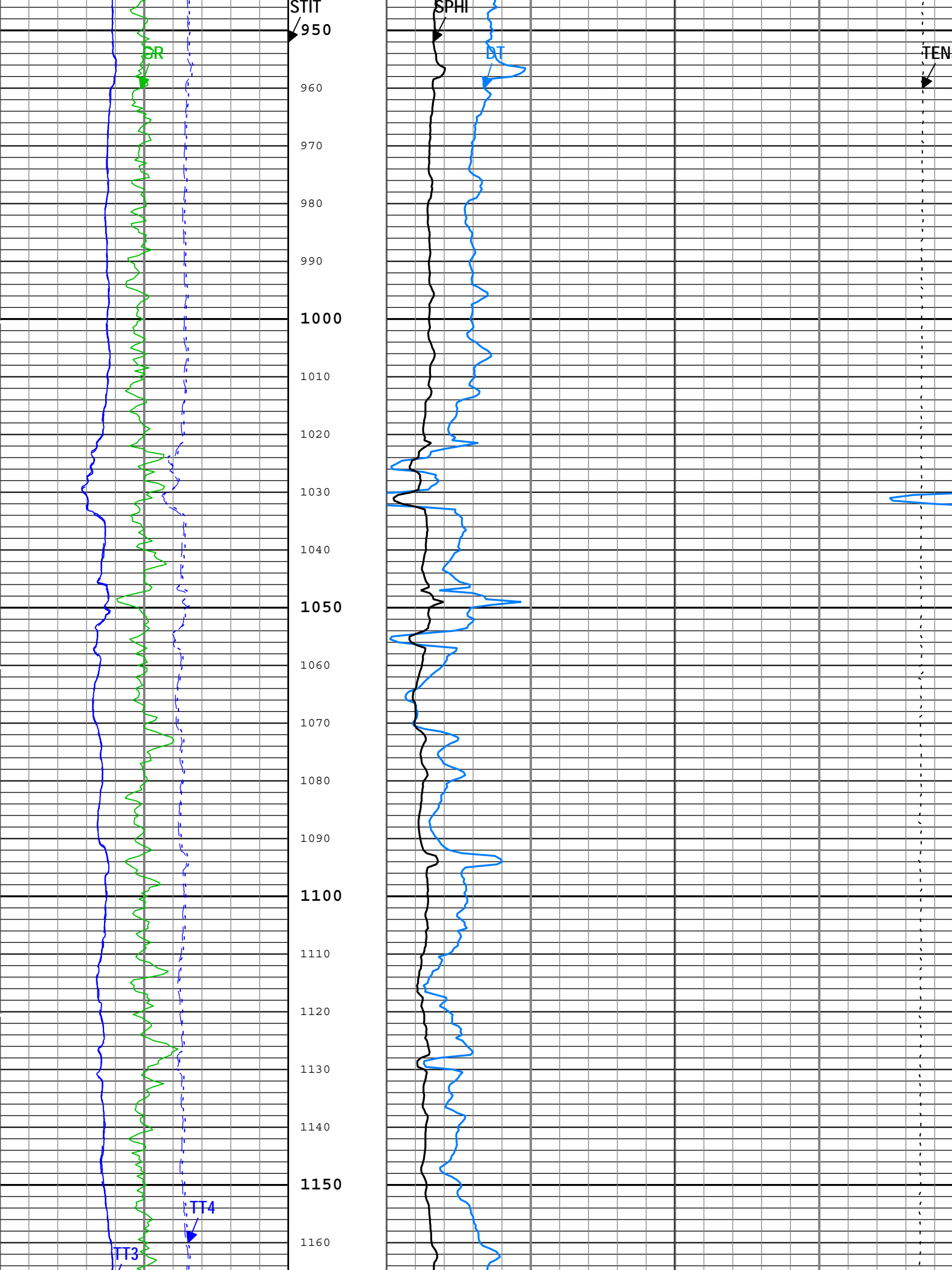
TIME\_1900 - Time Marked every 60.00 (s)

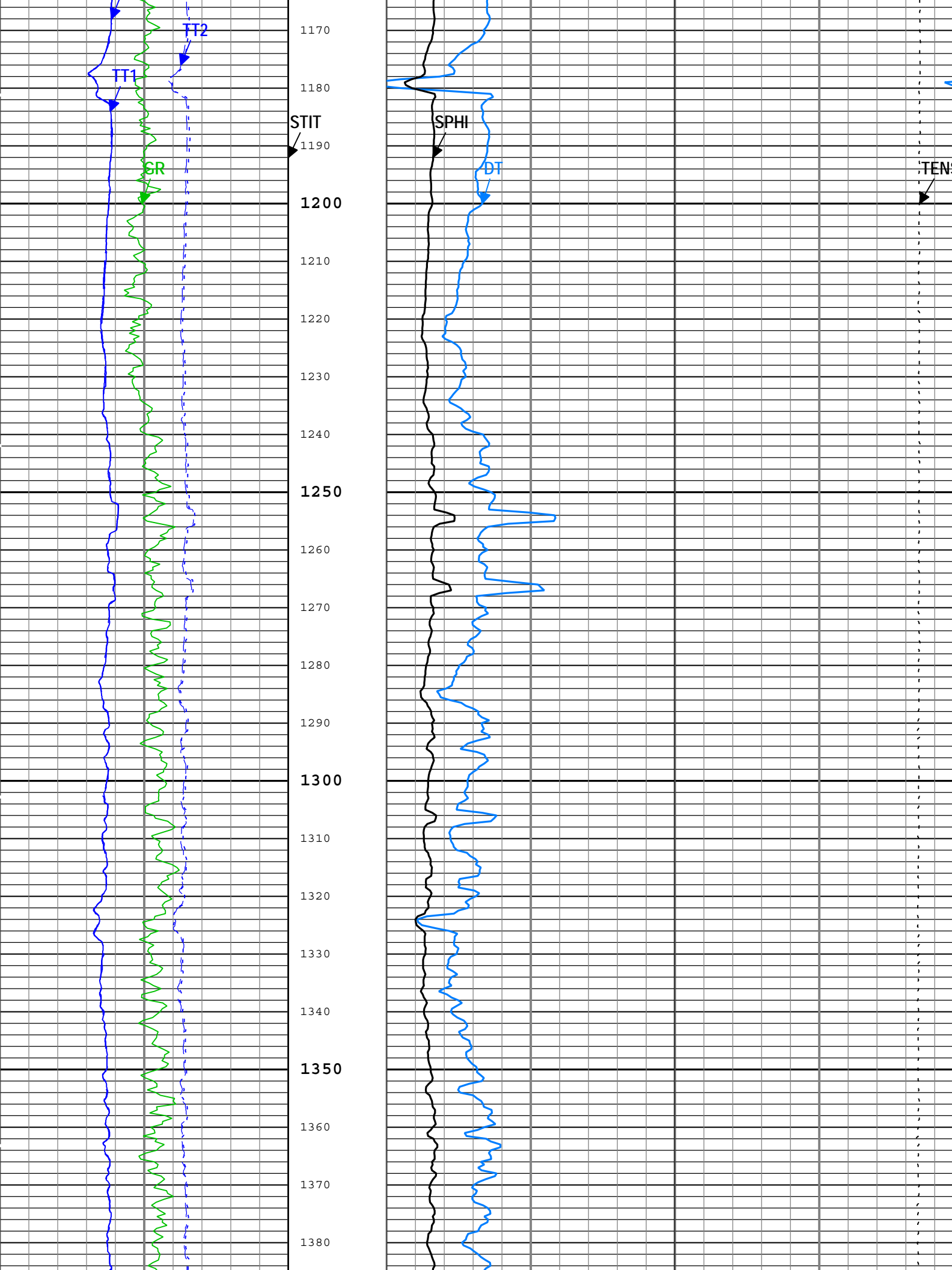


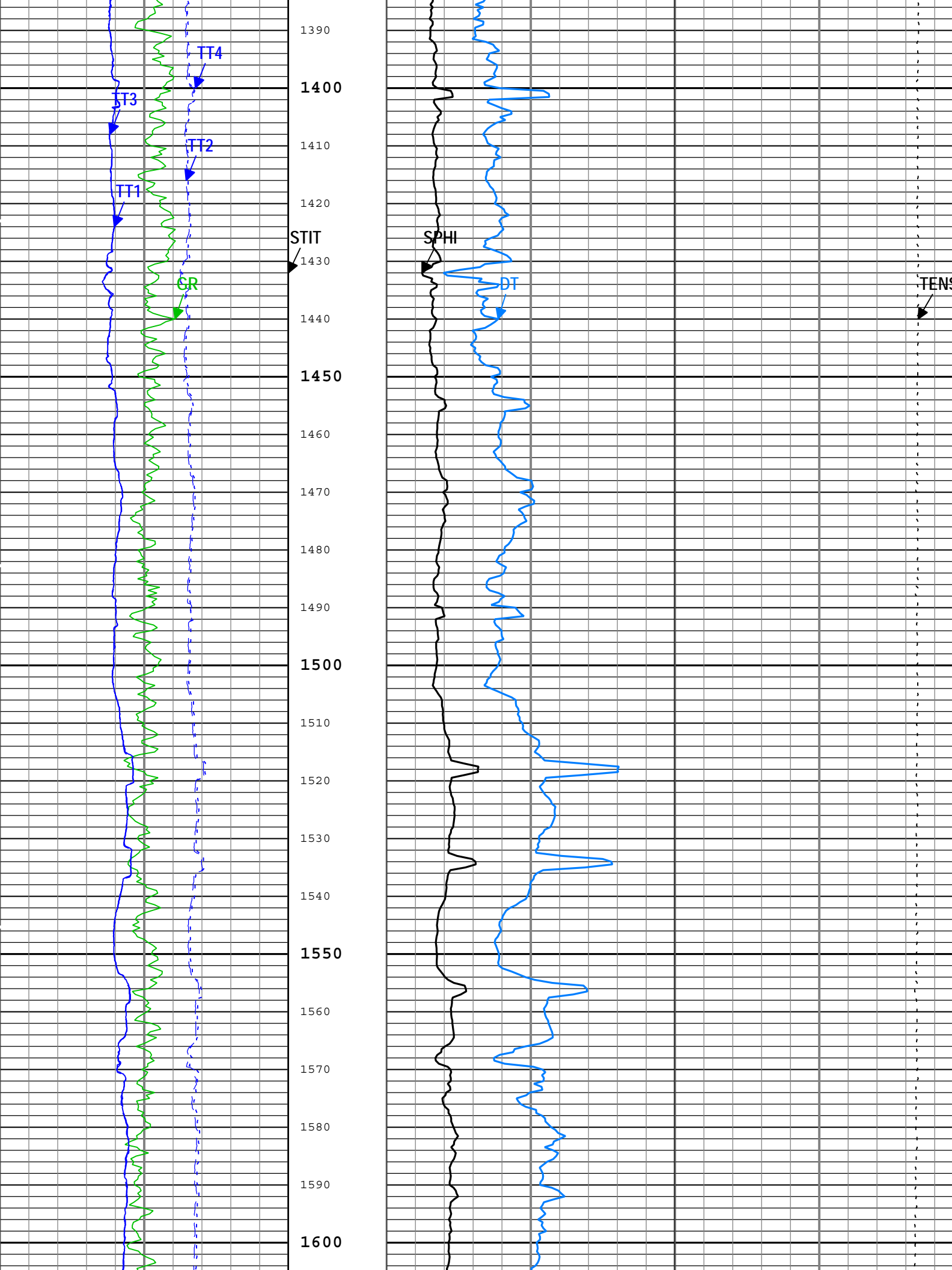


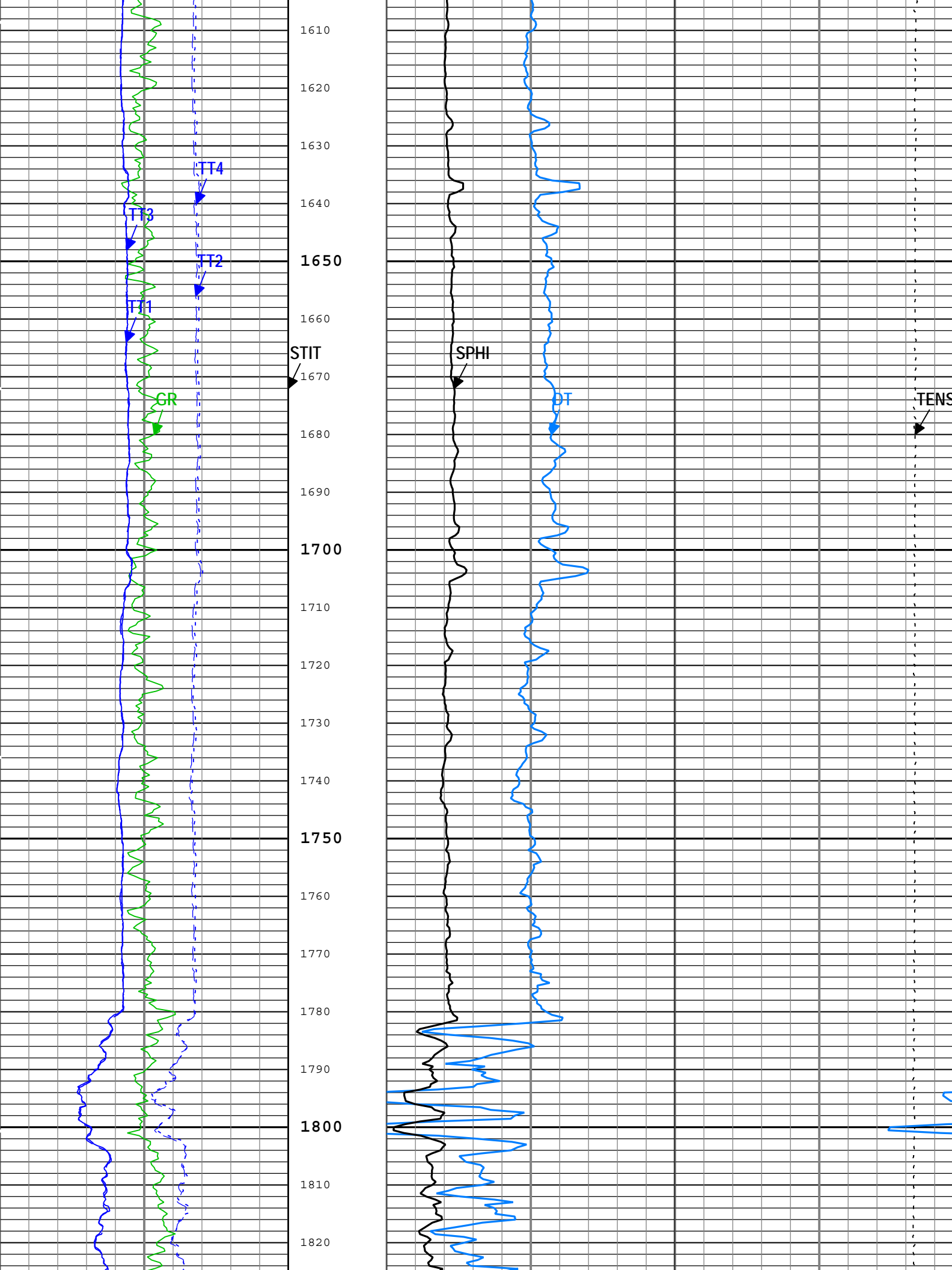


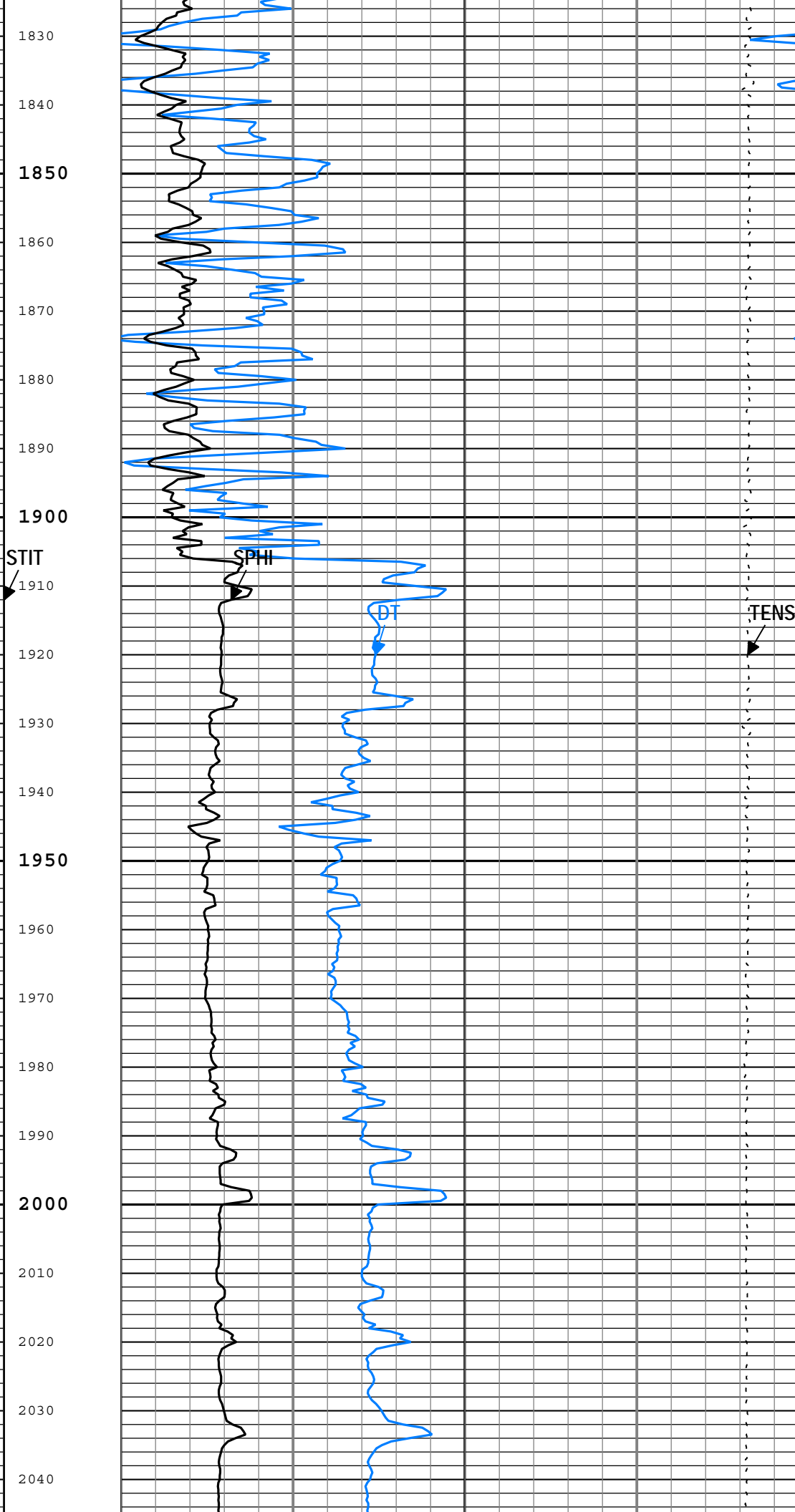
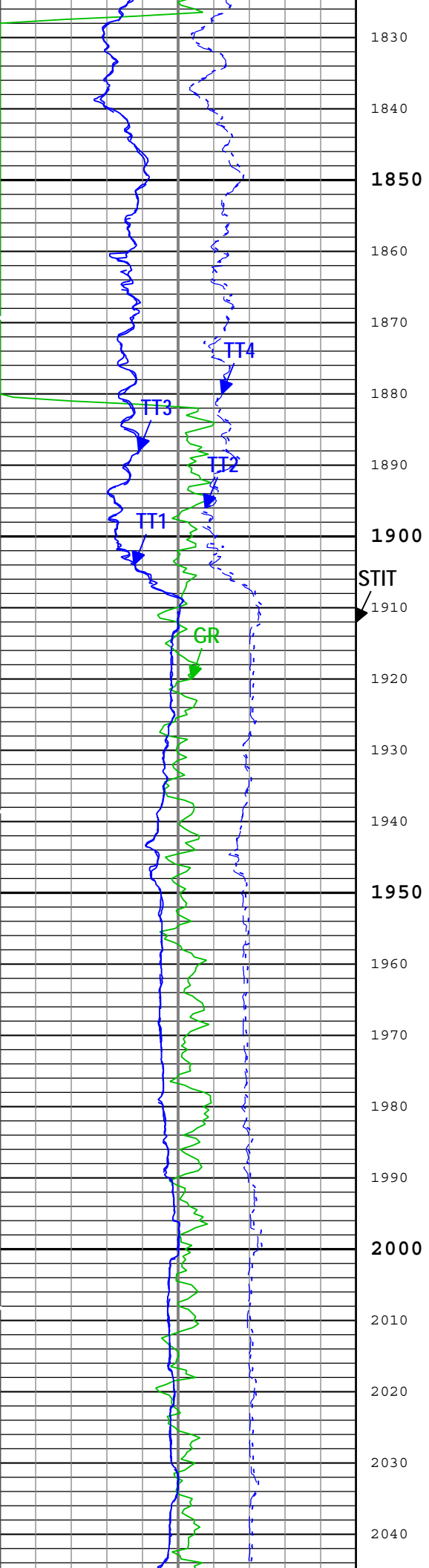


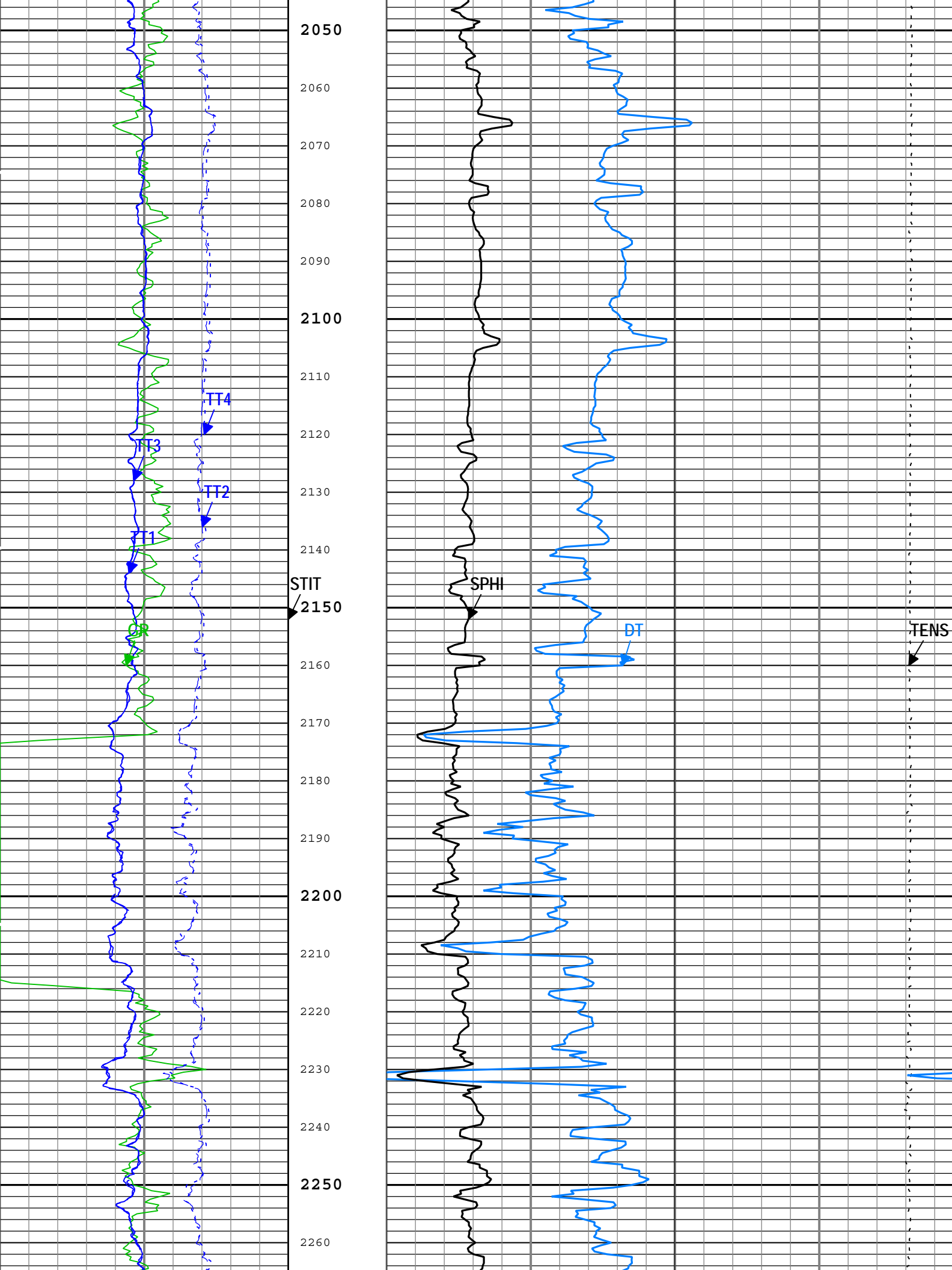


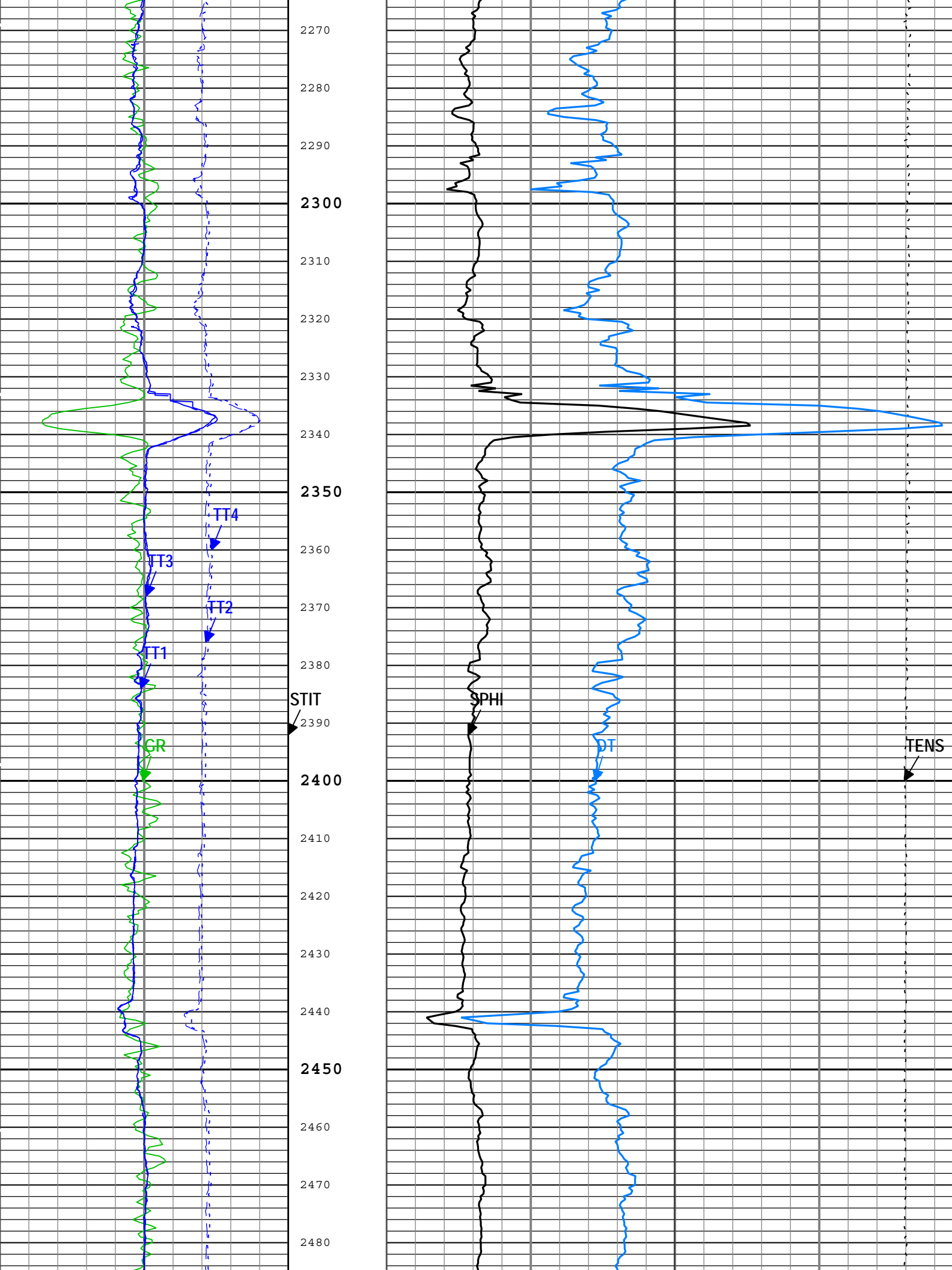


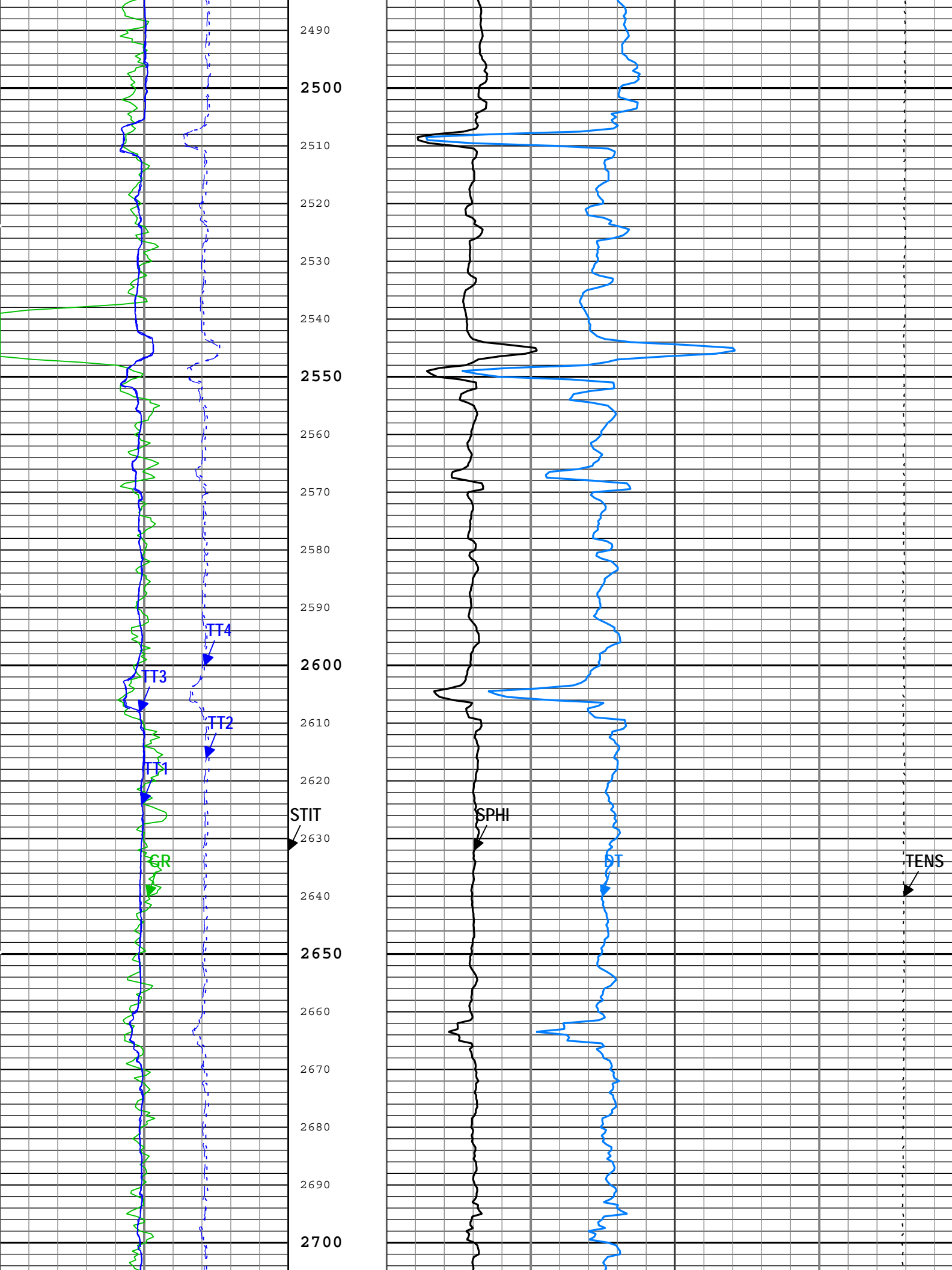


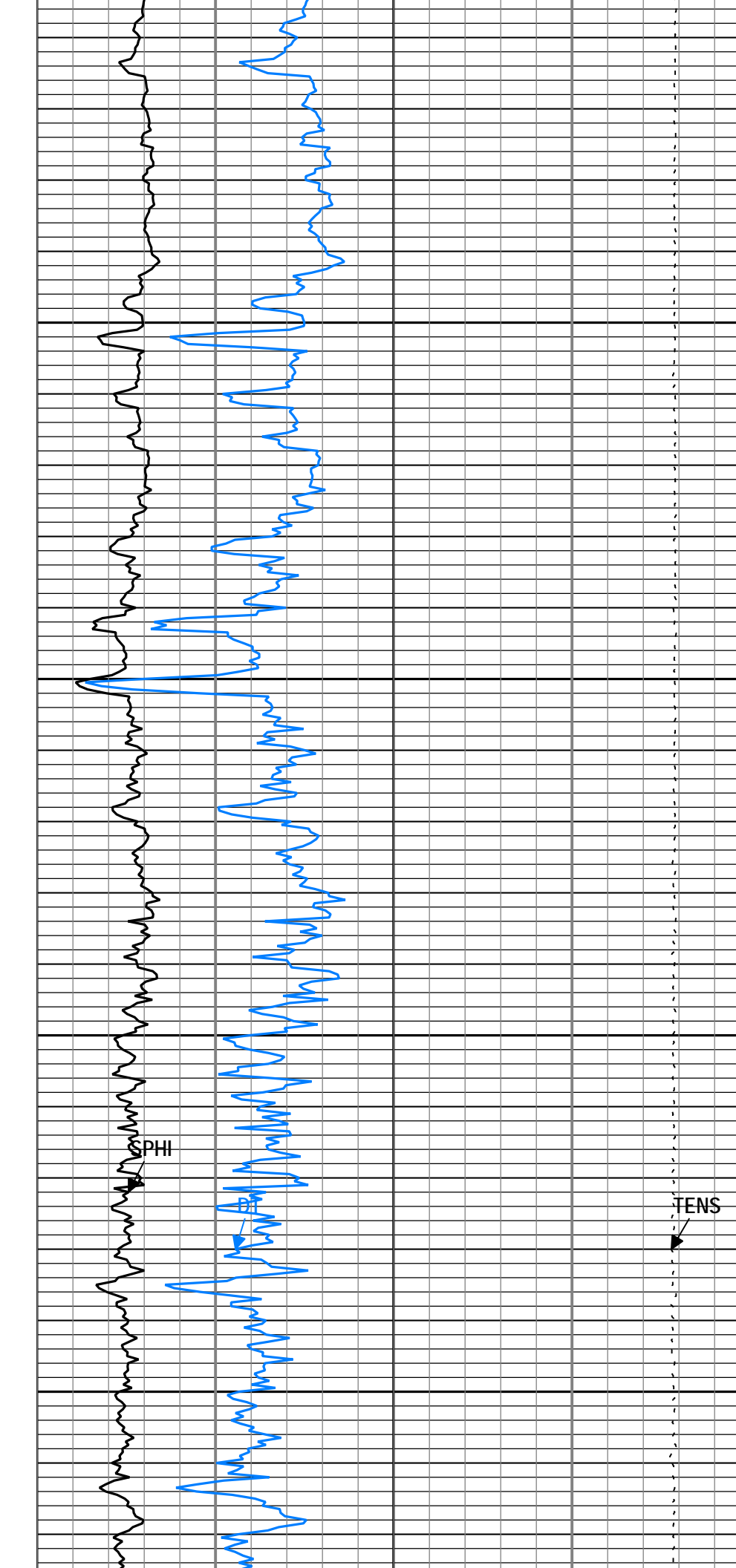
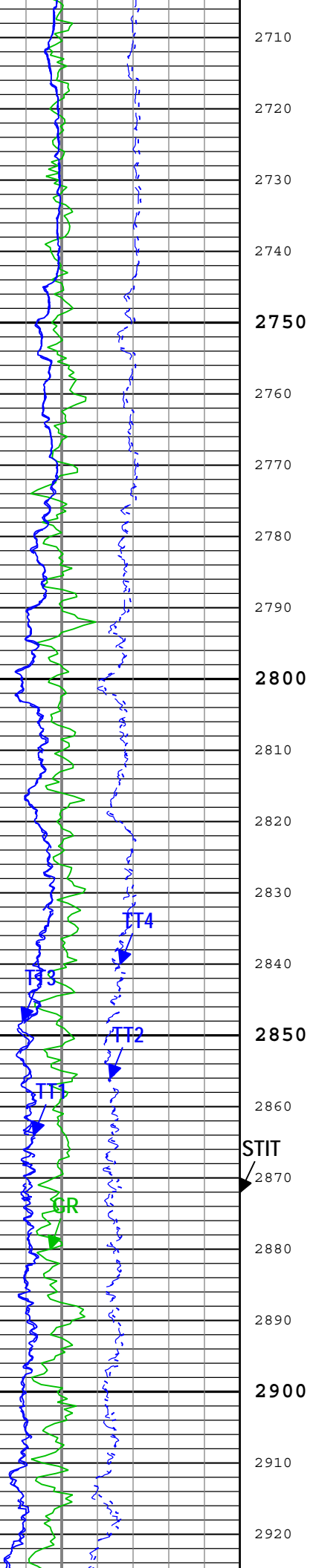




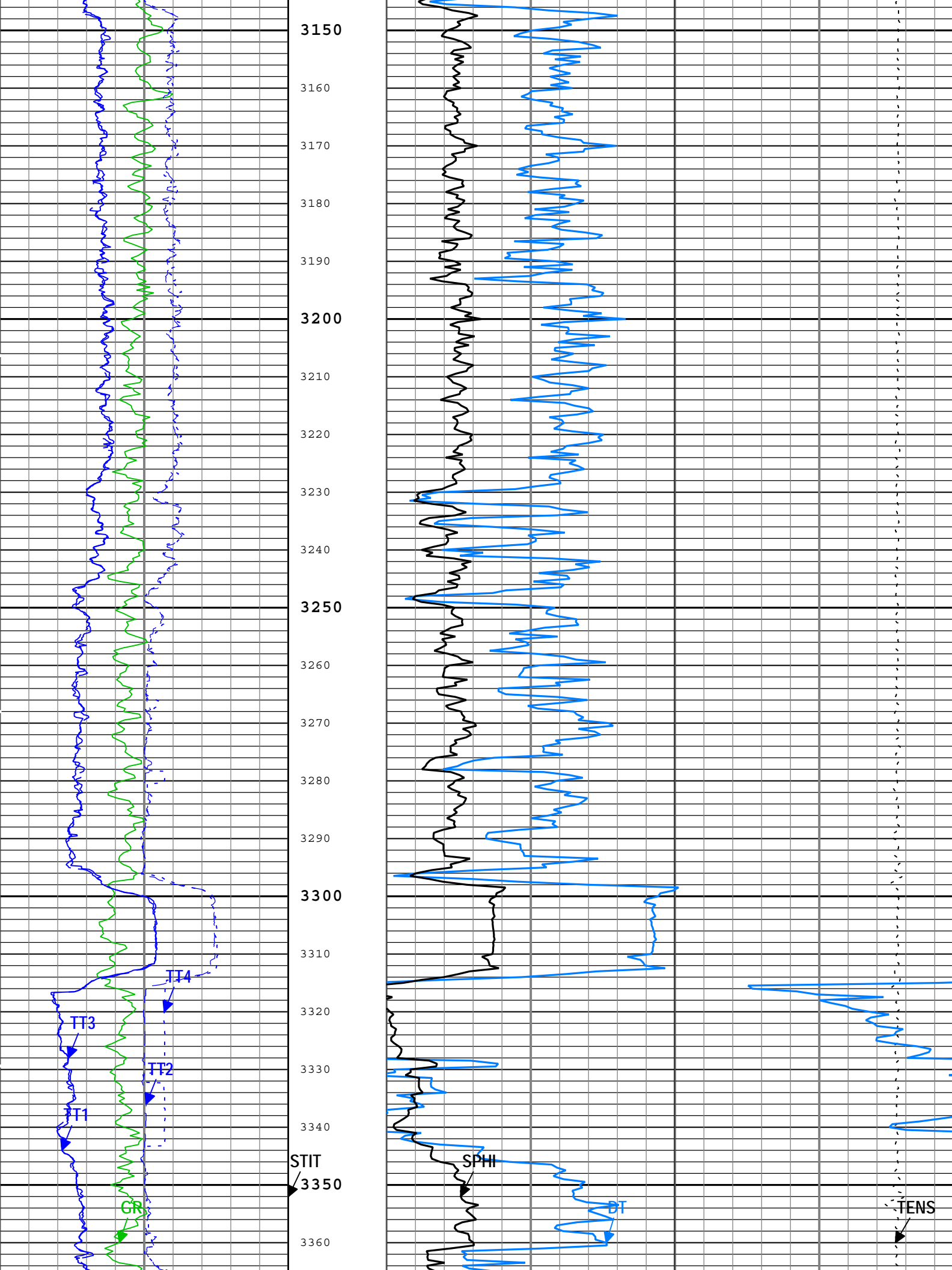


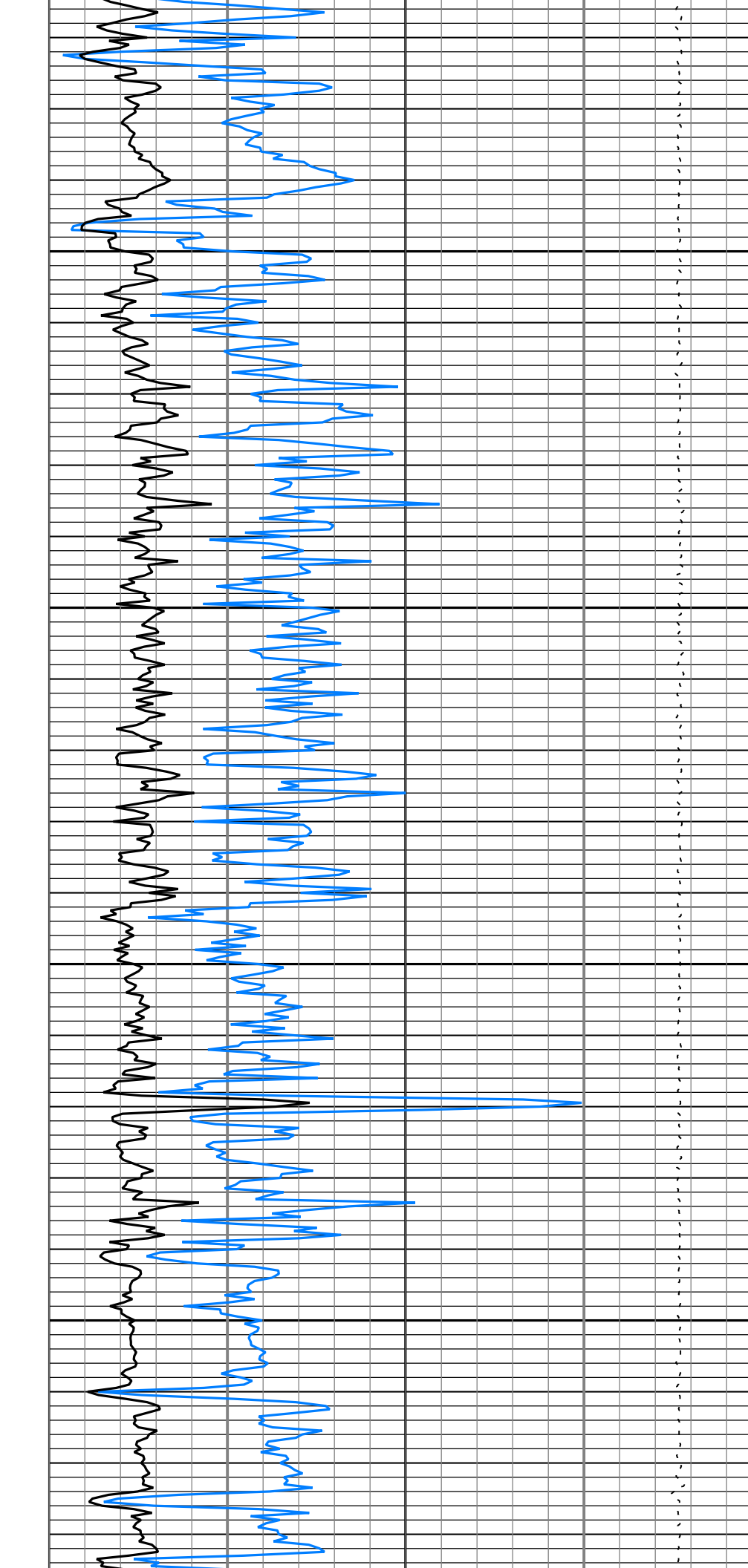
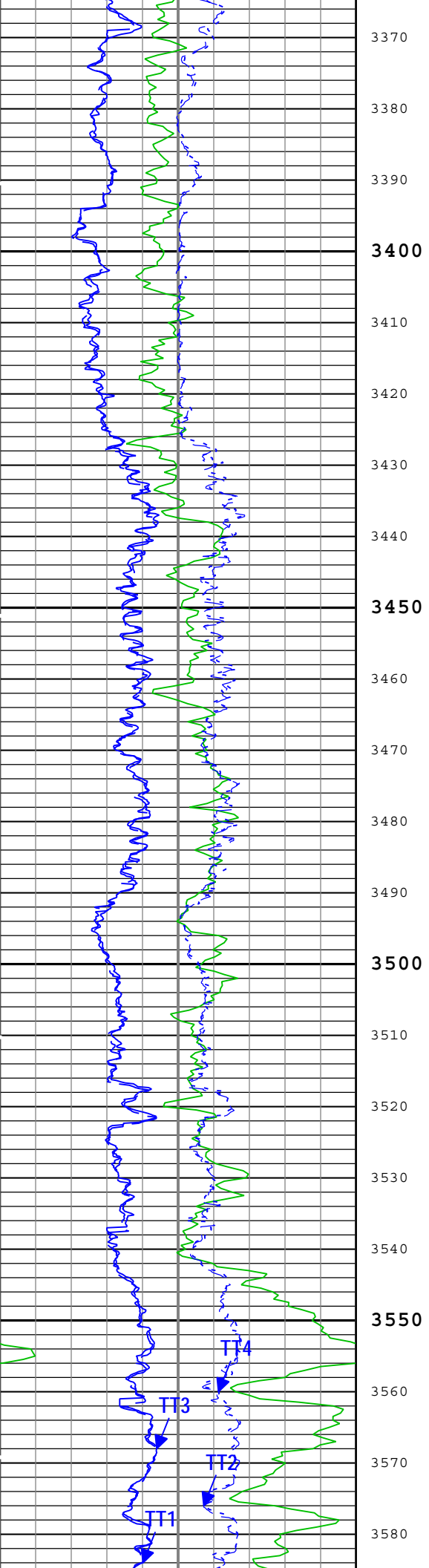


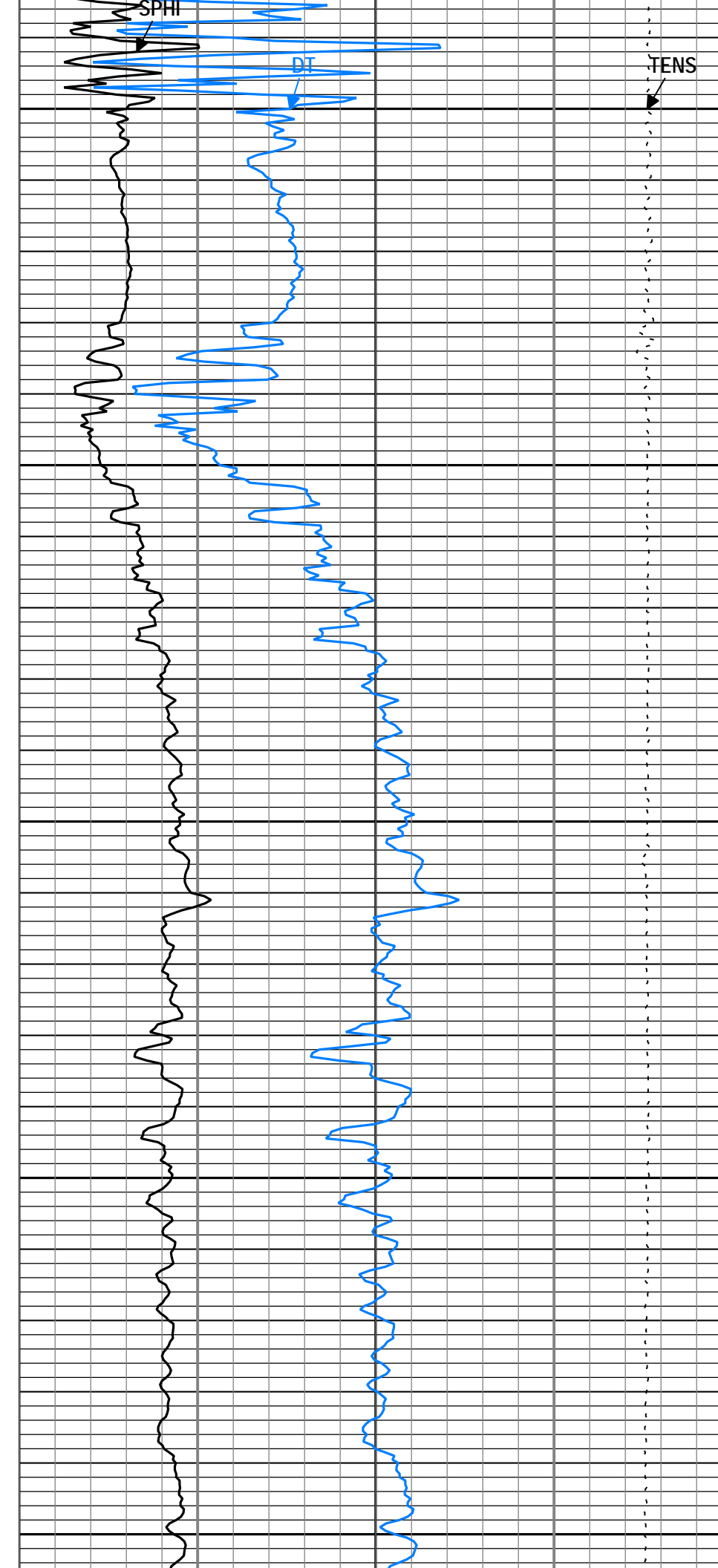
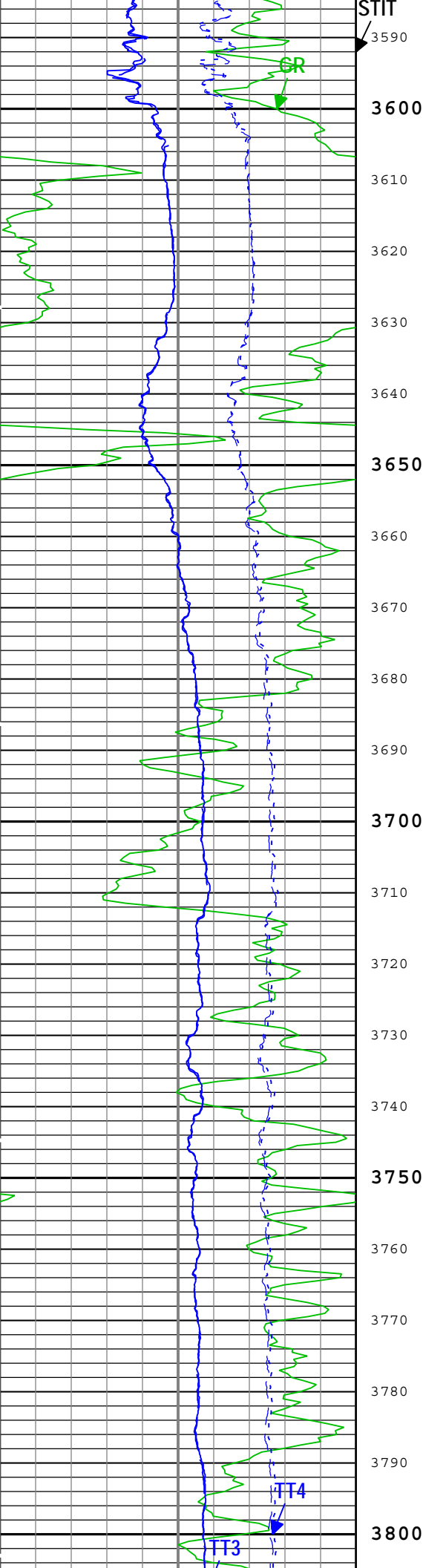


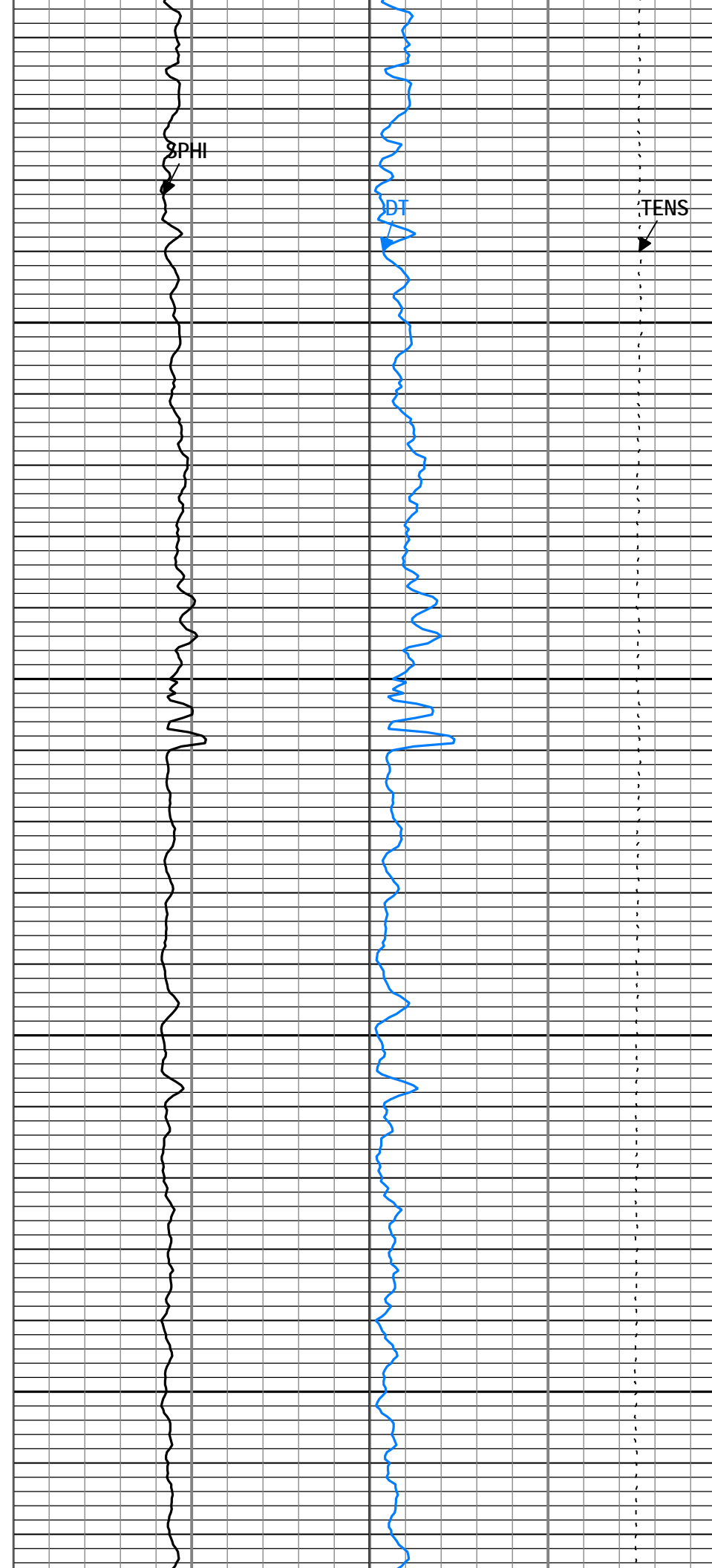
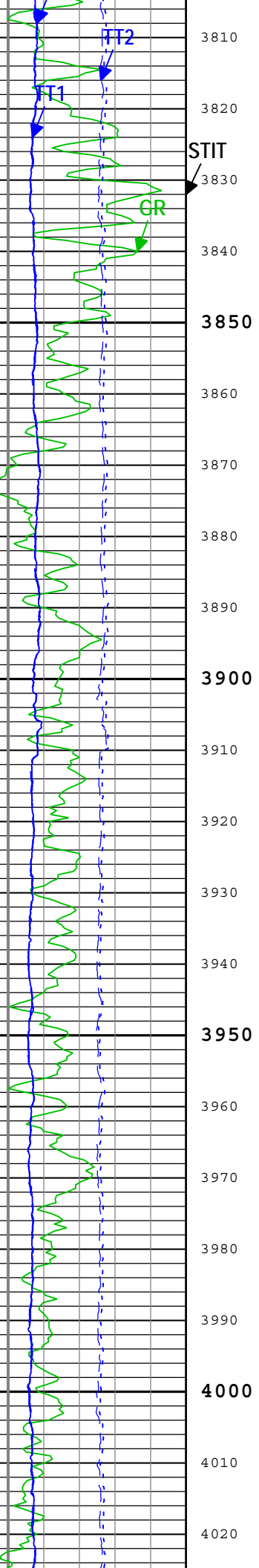


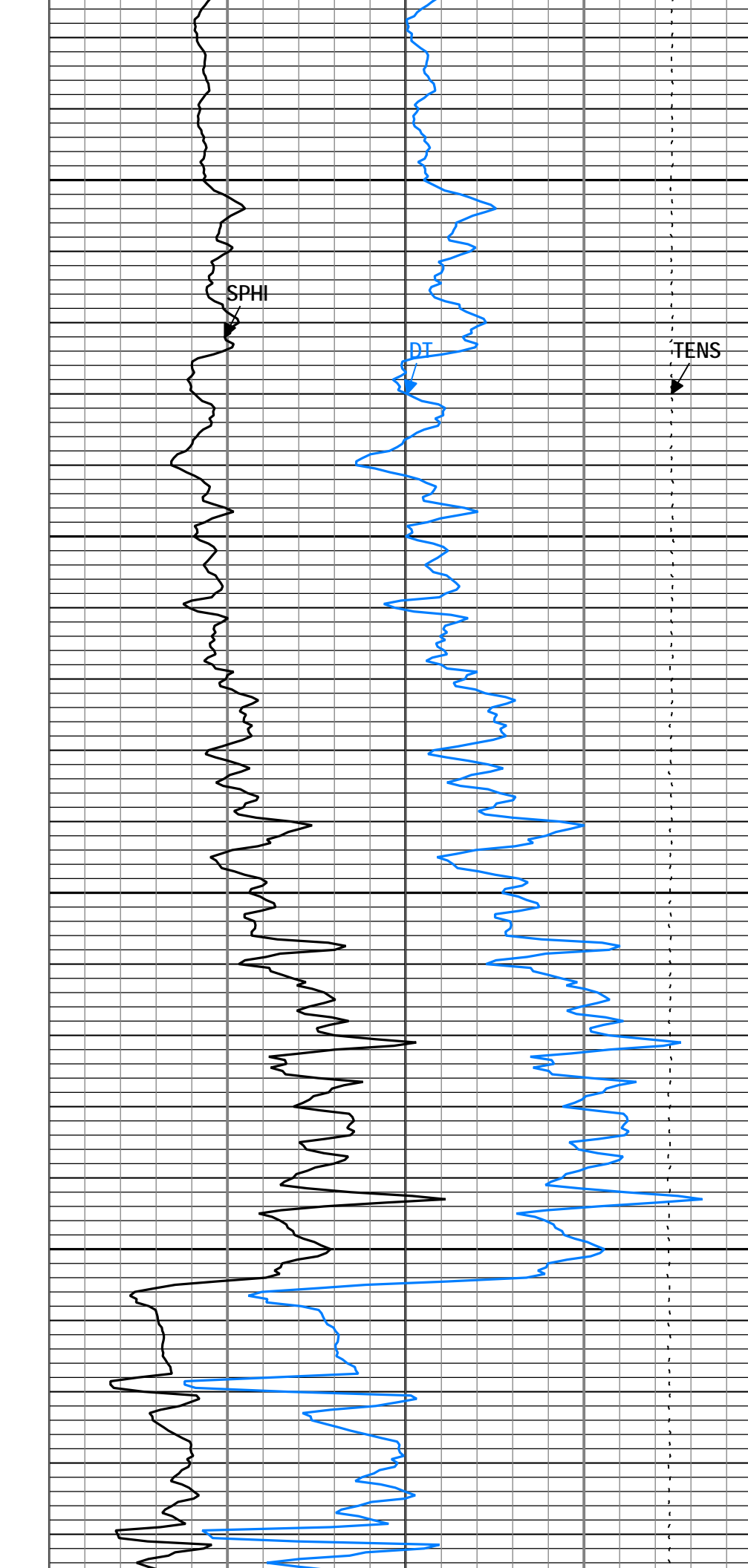
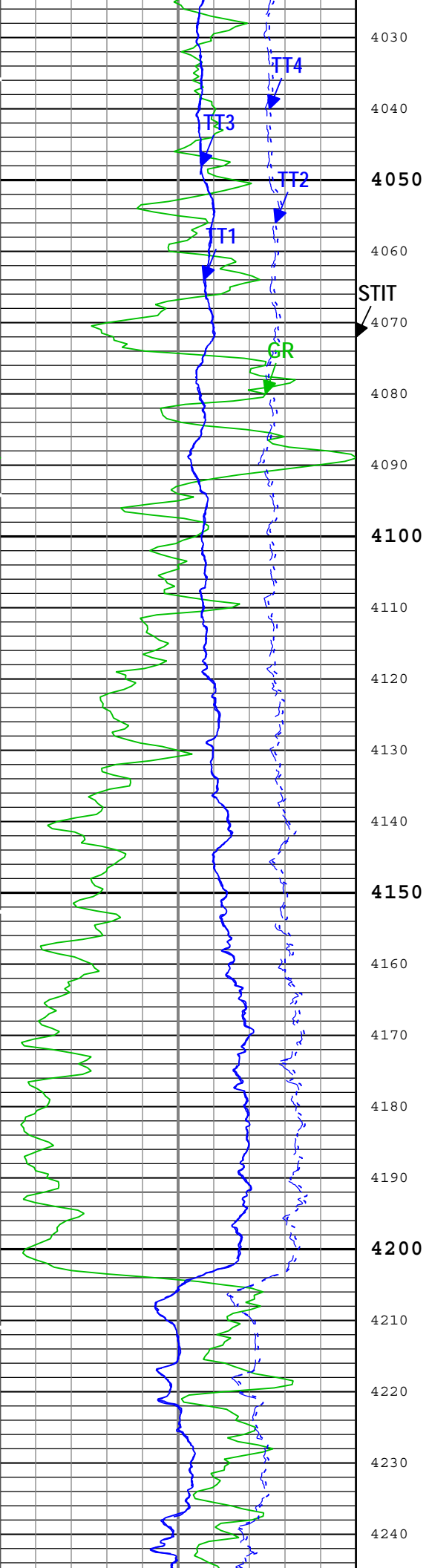


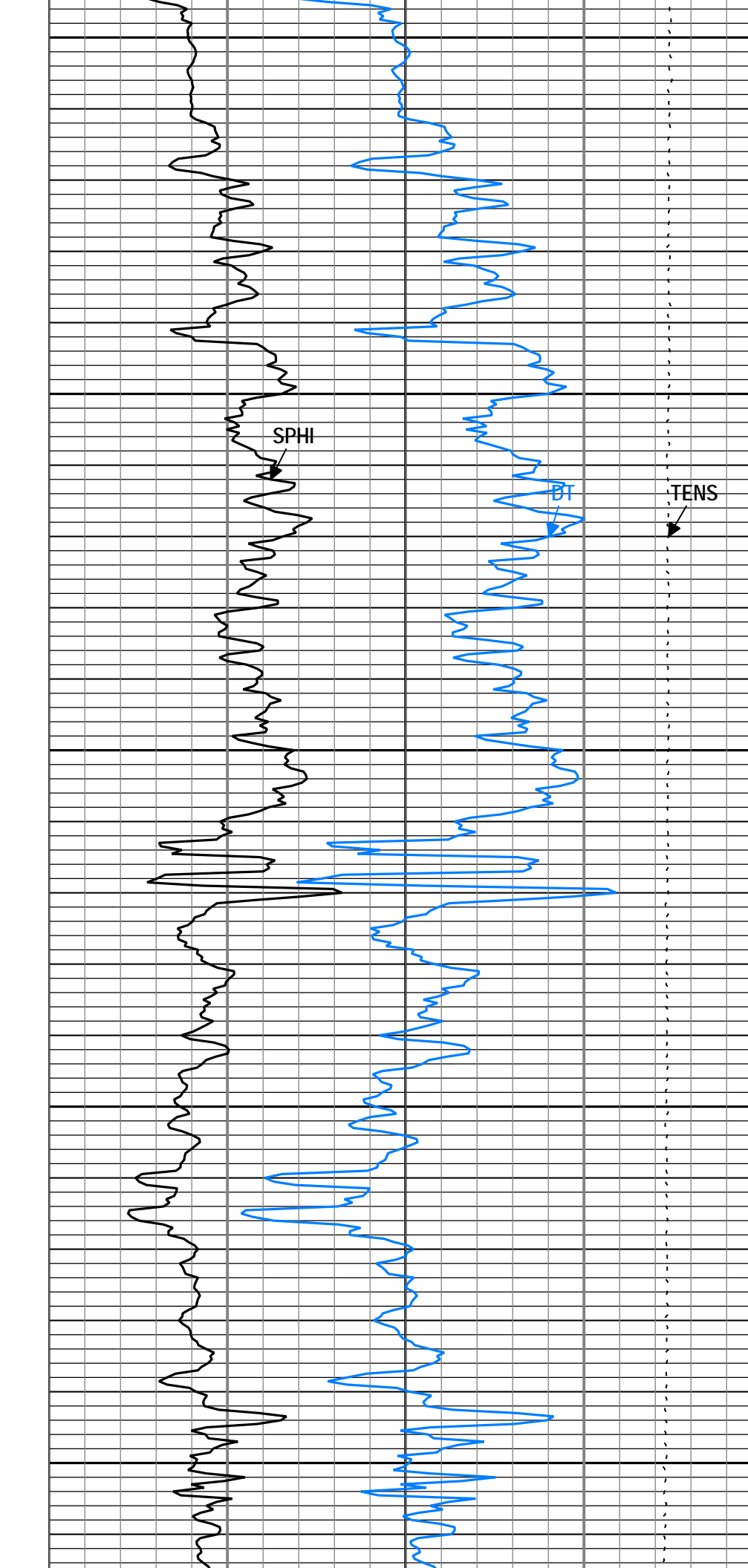
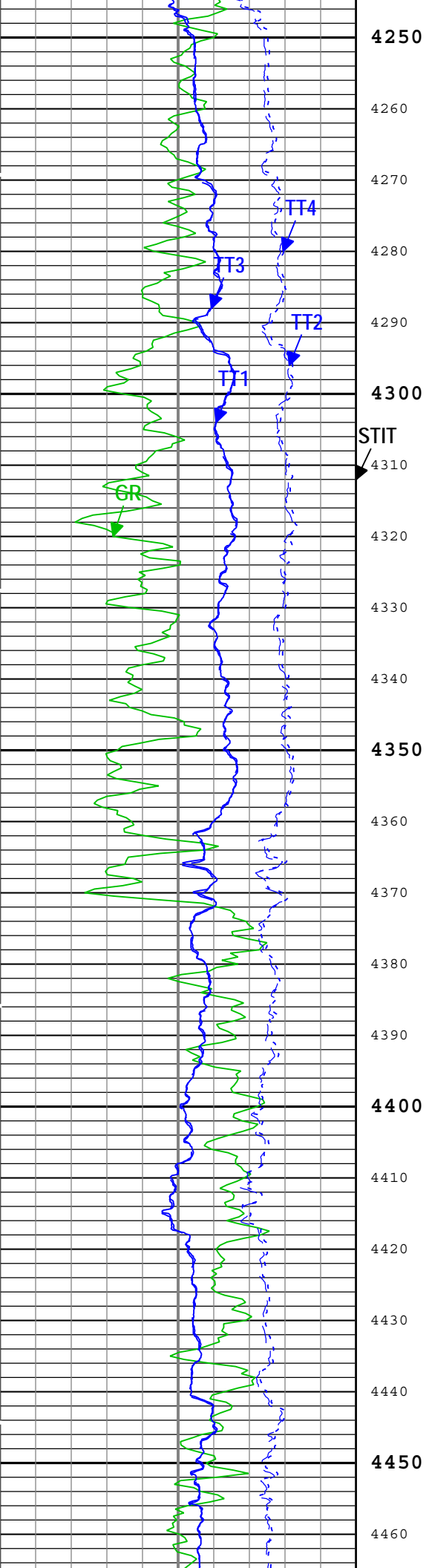


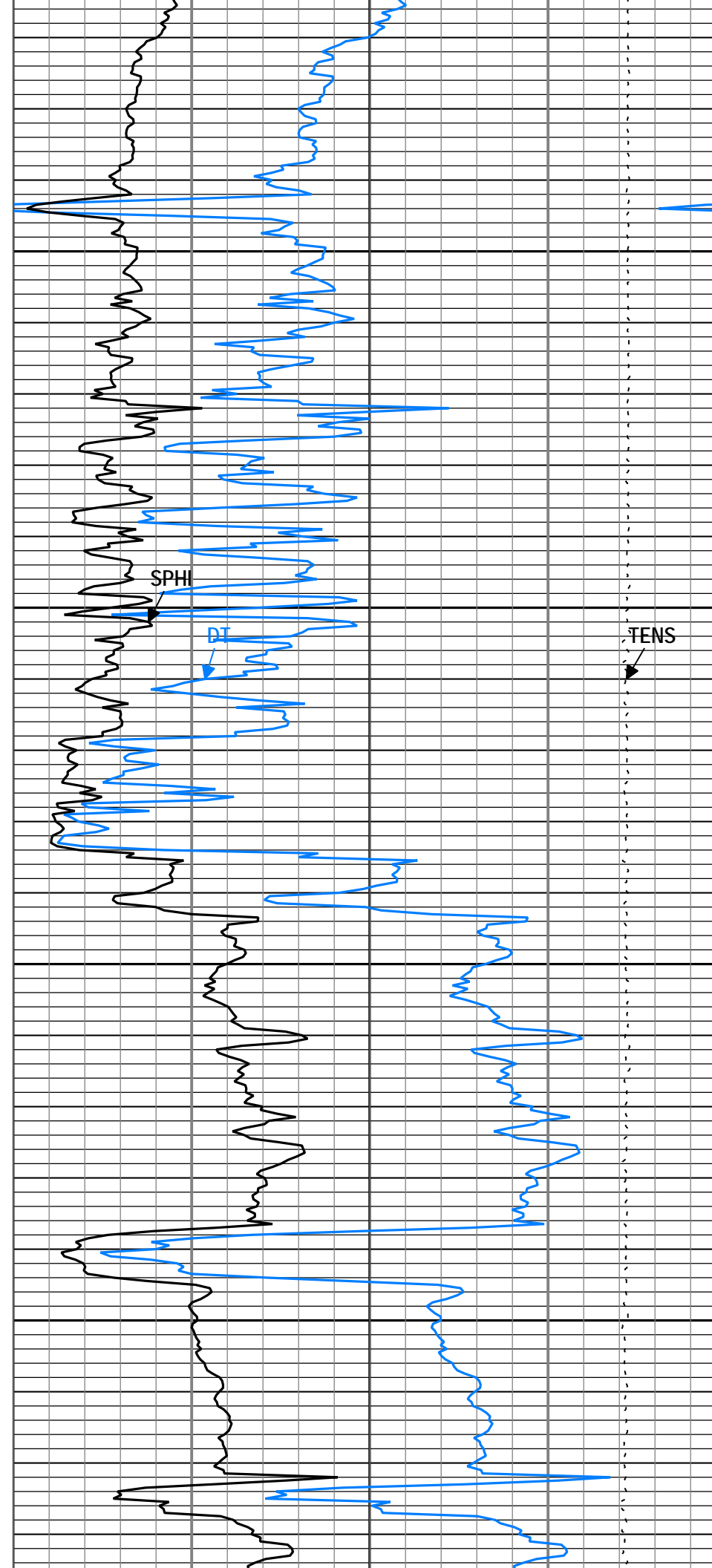
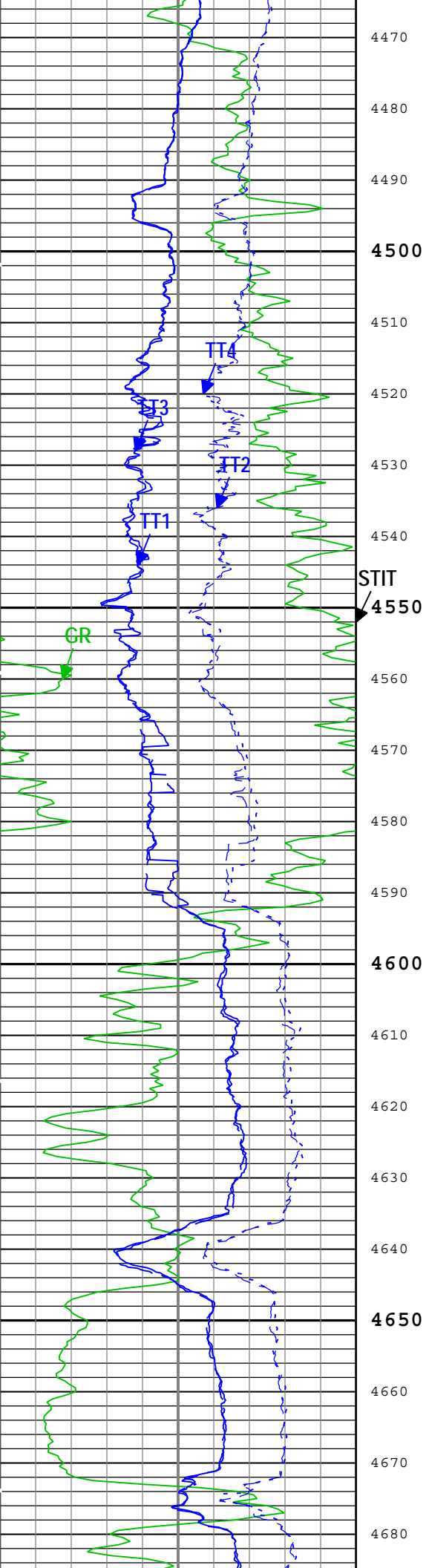


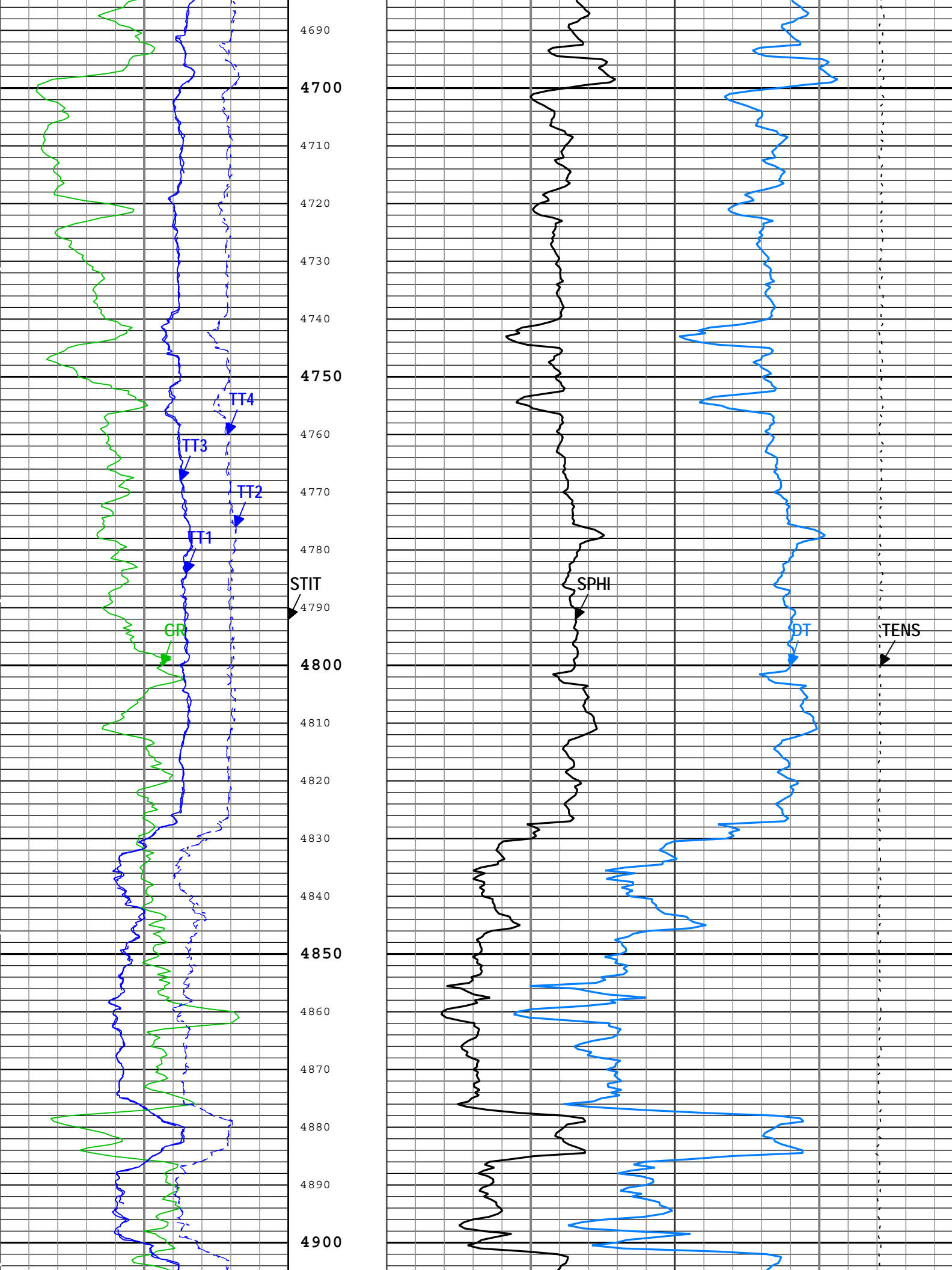


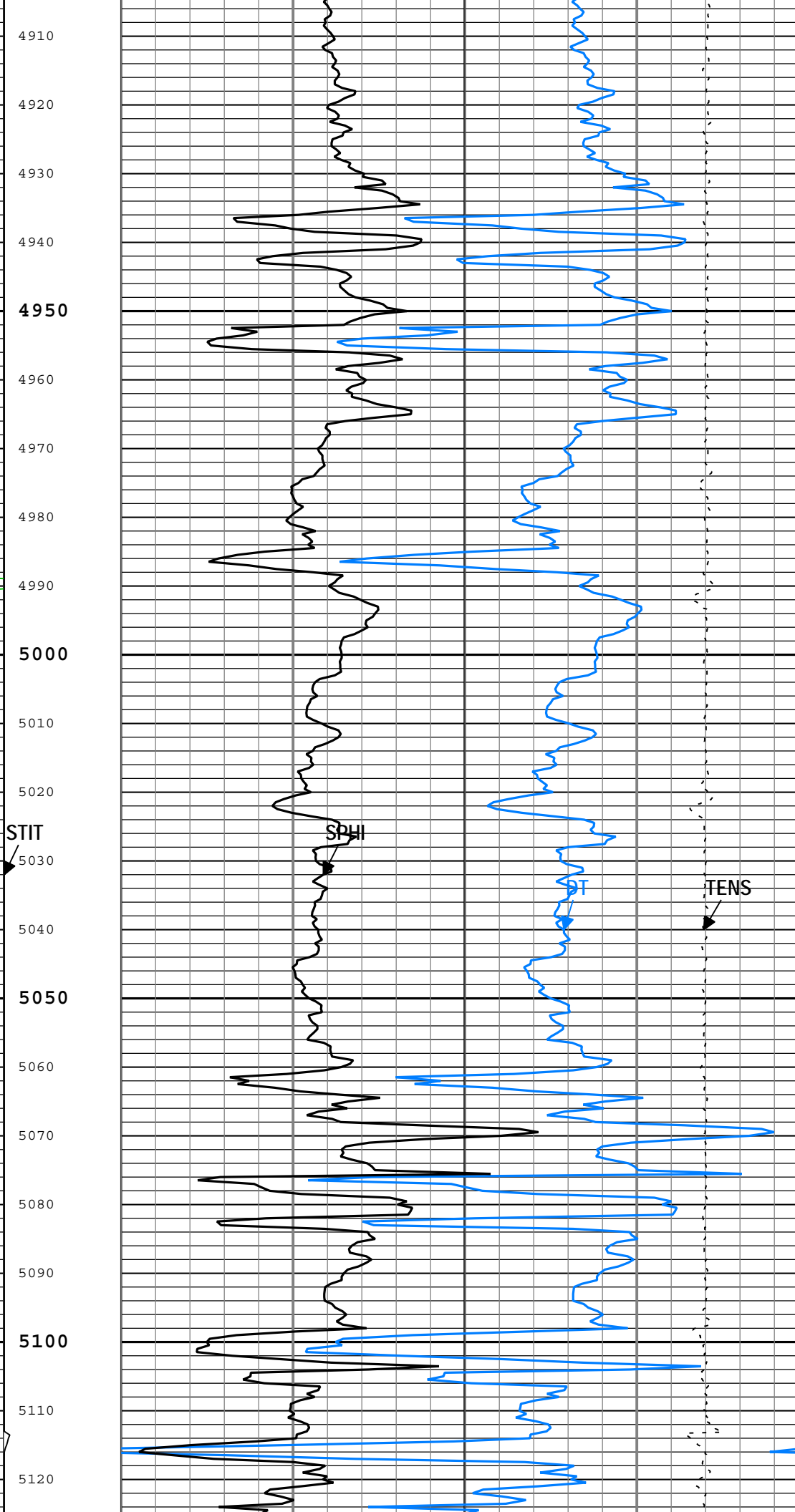
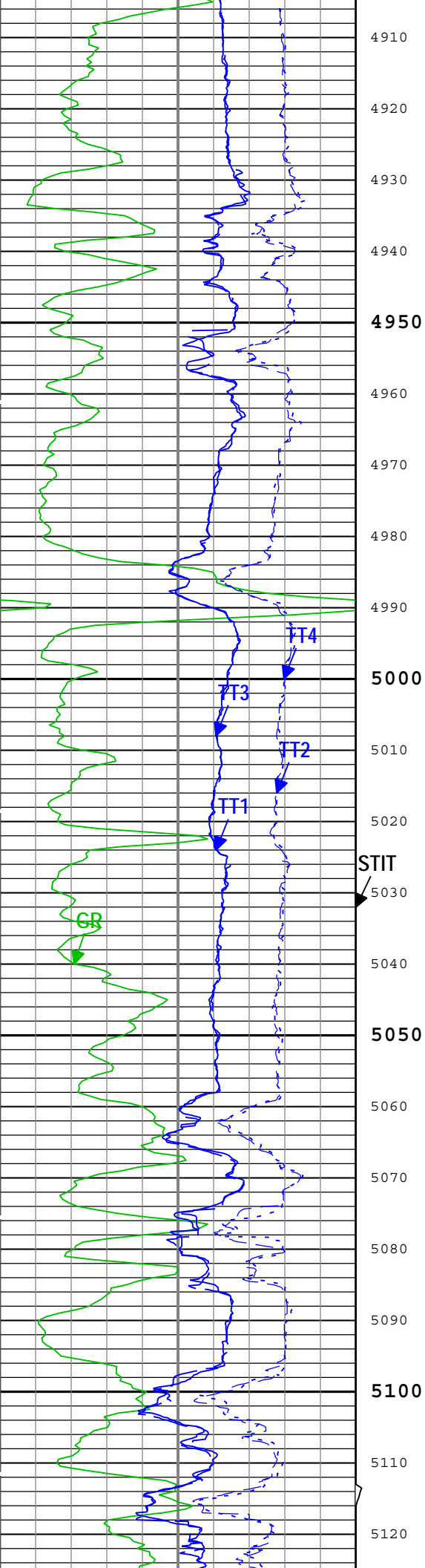


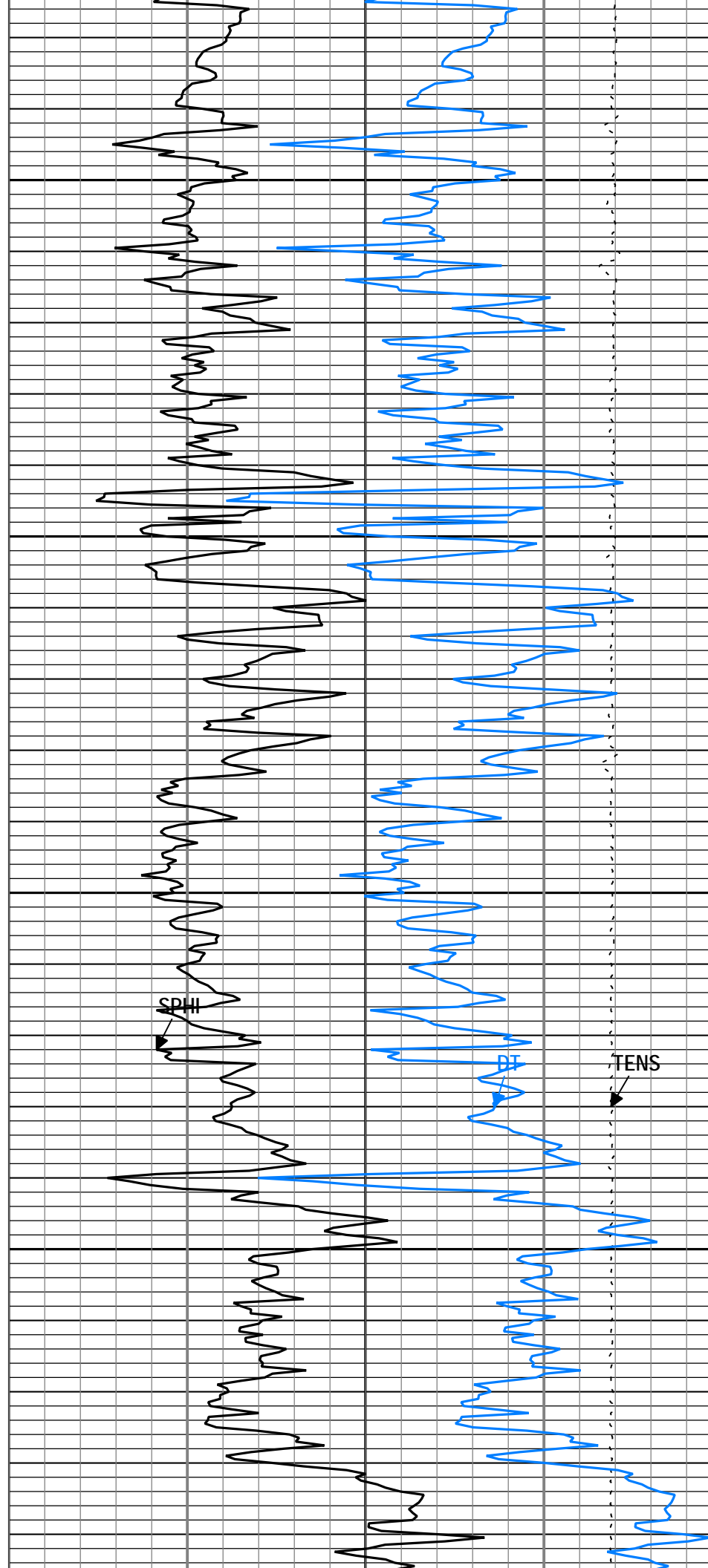
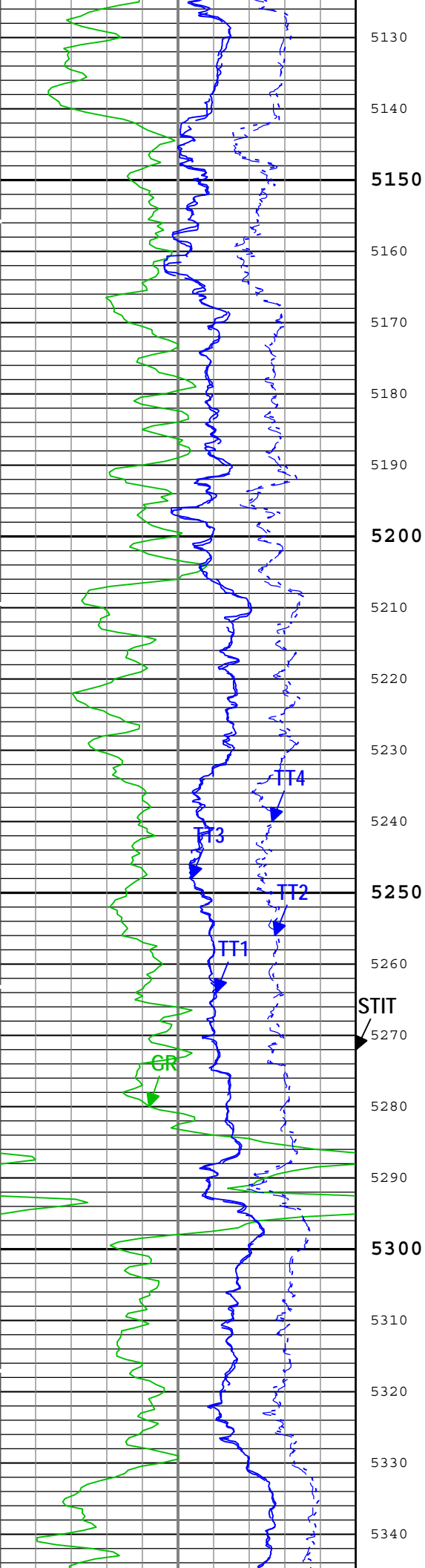


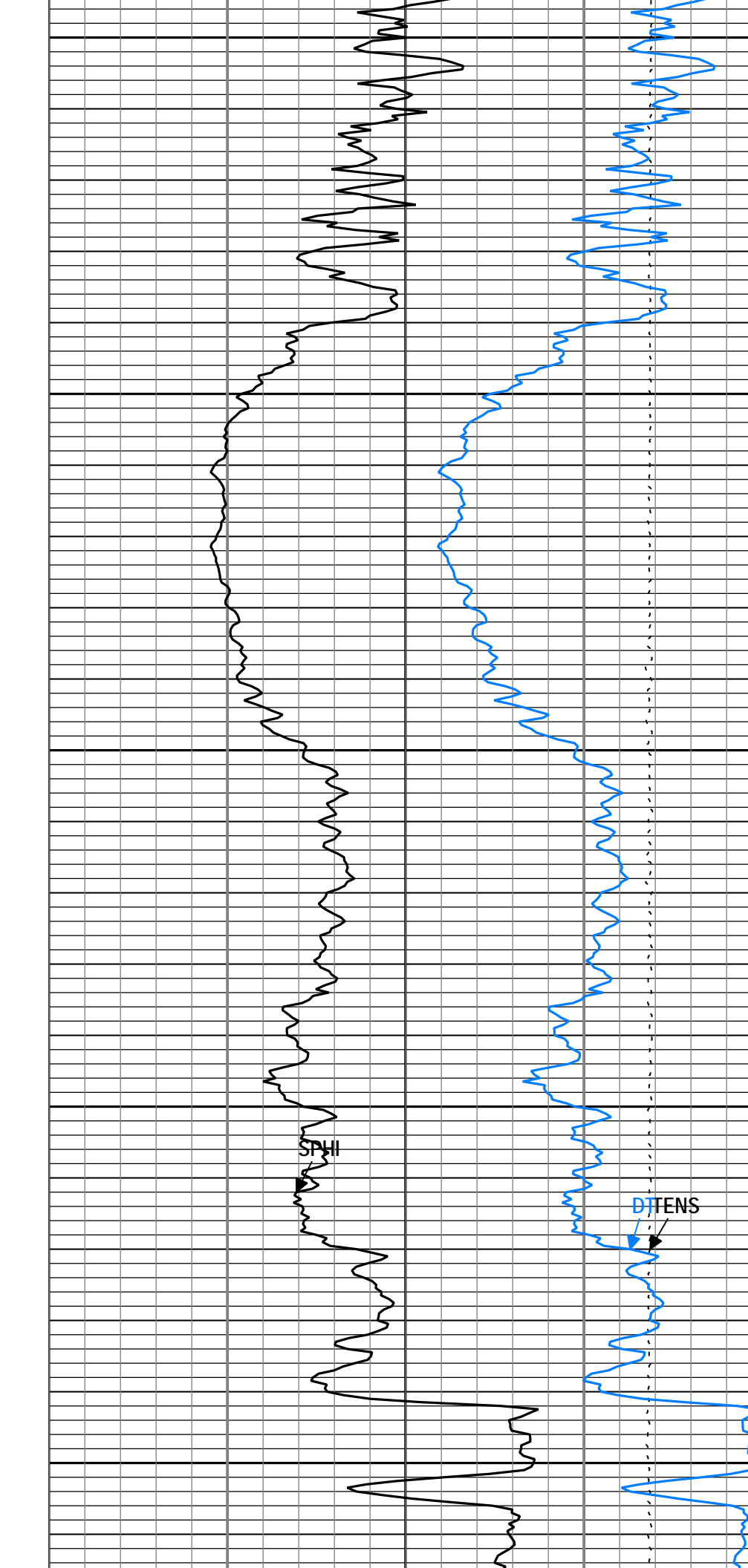
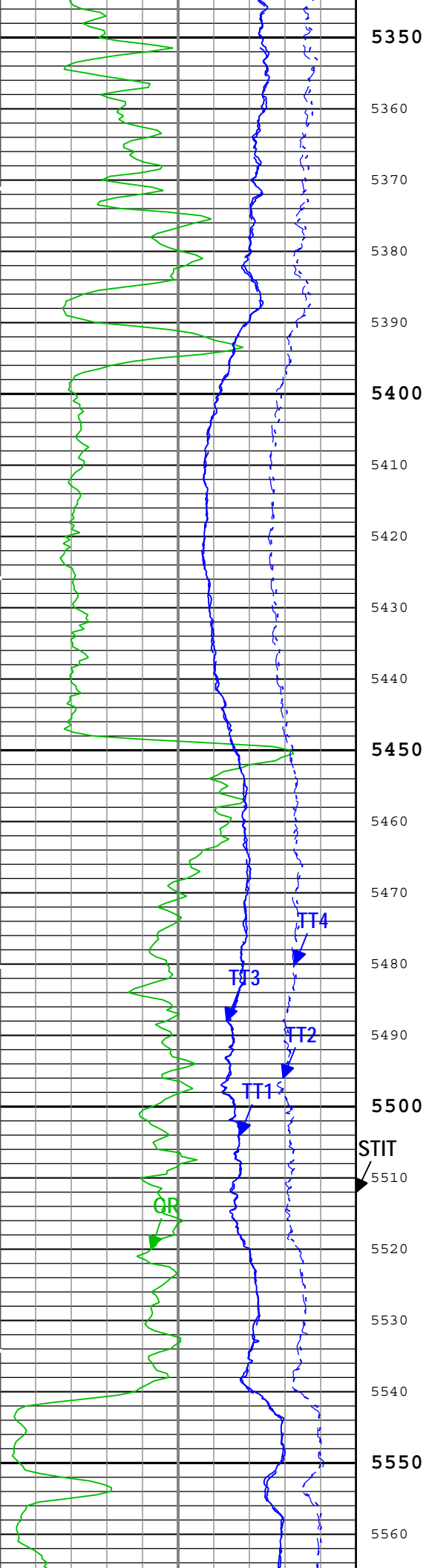


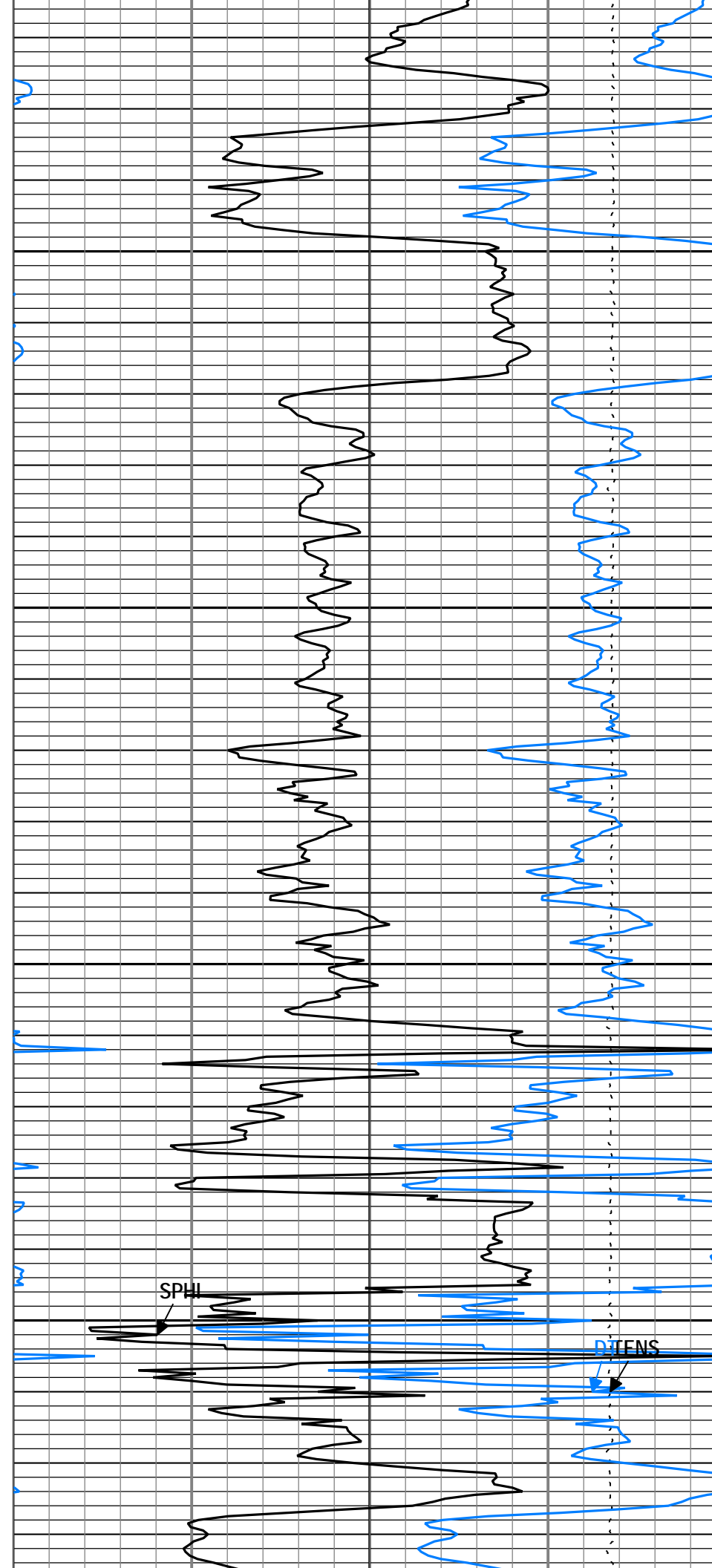
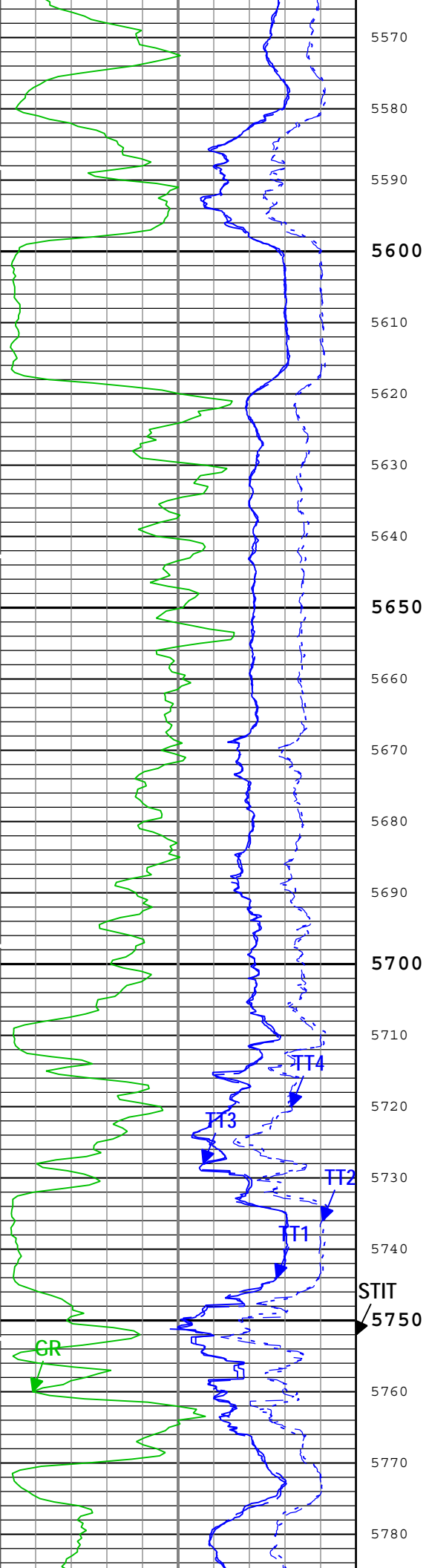


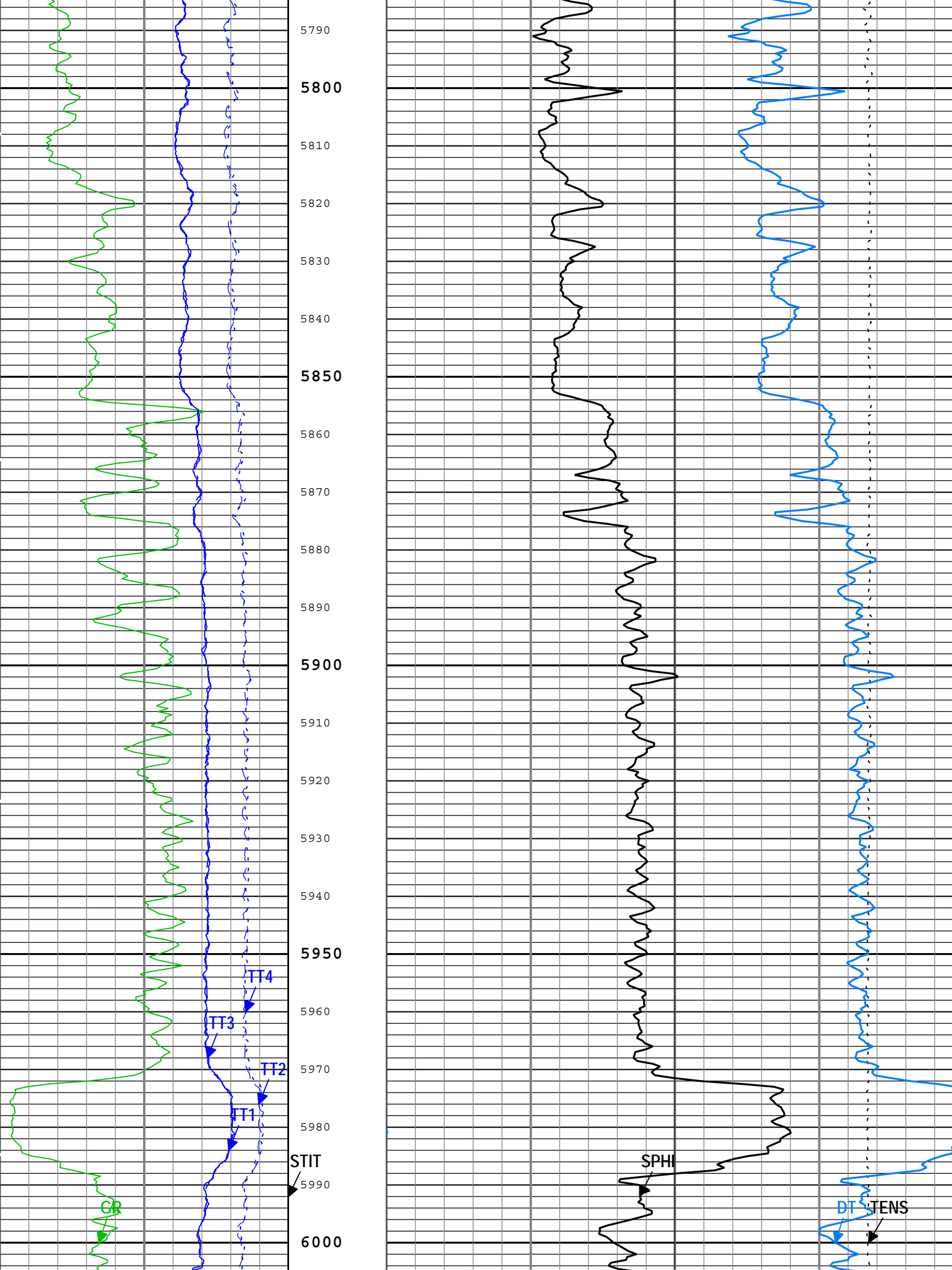


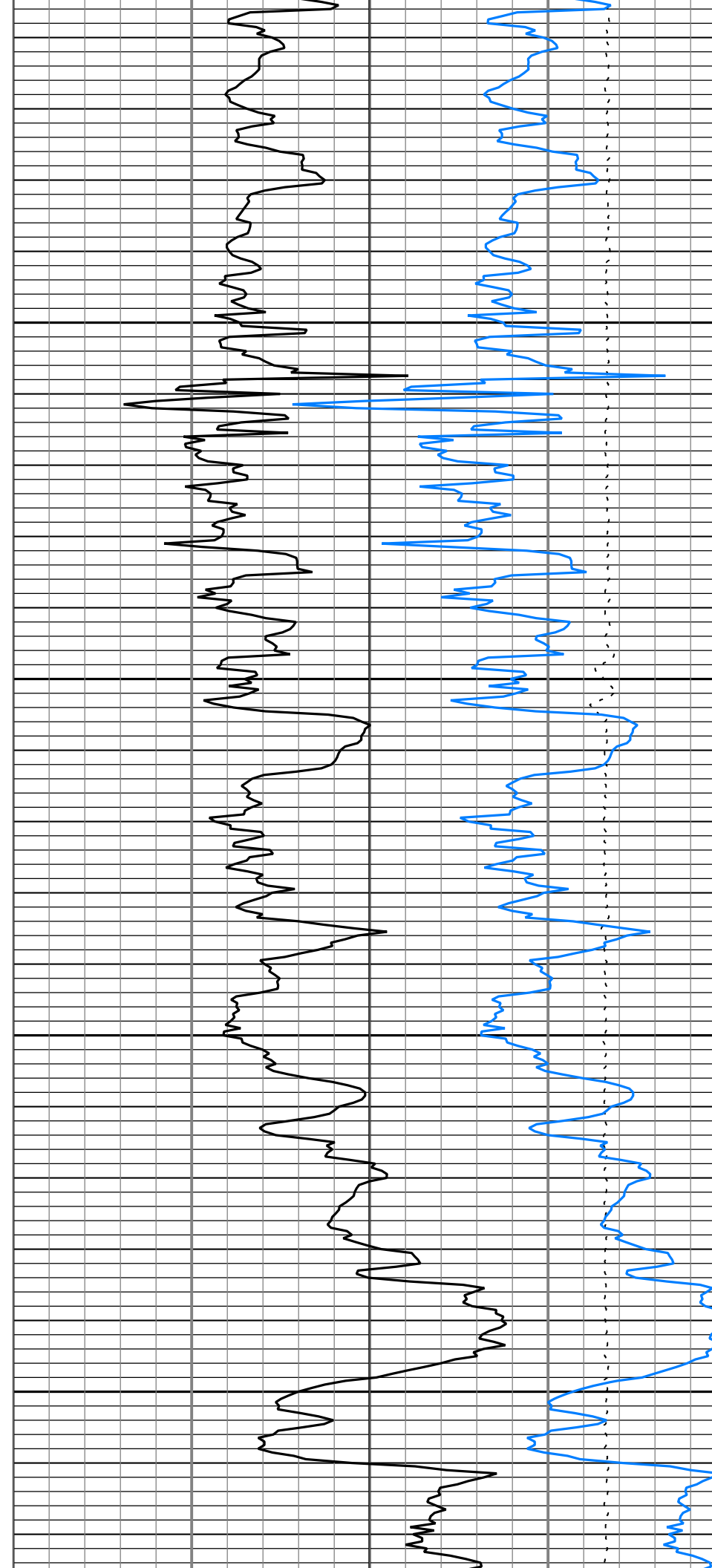
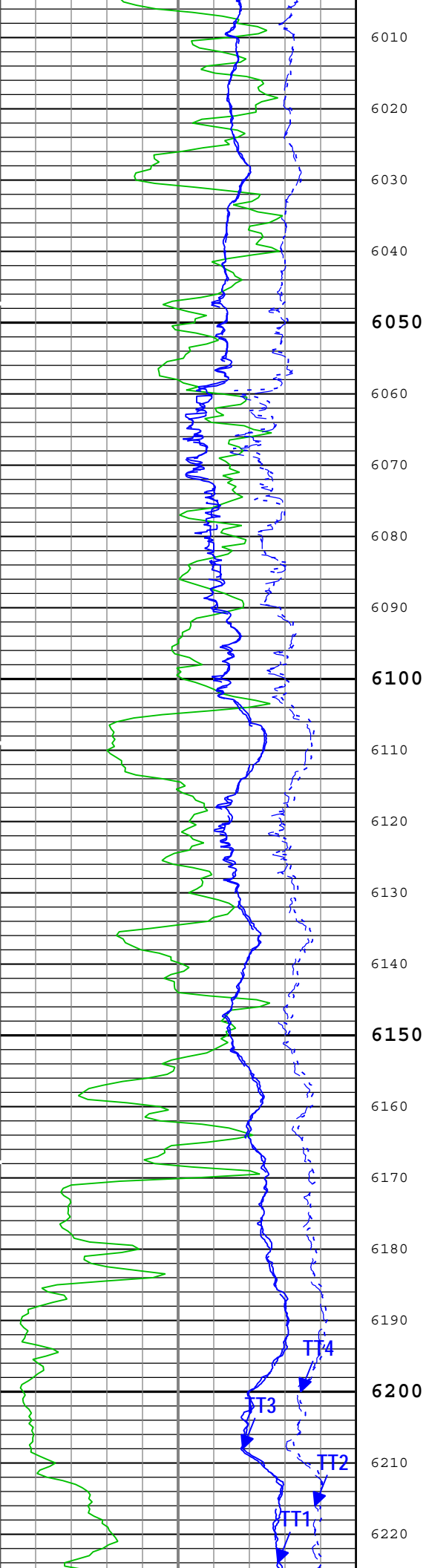


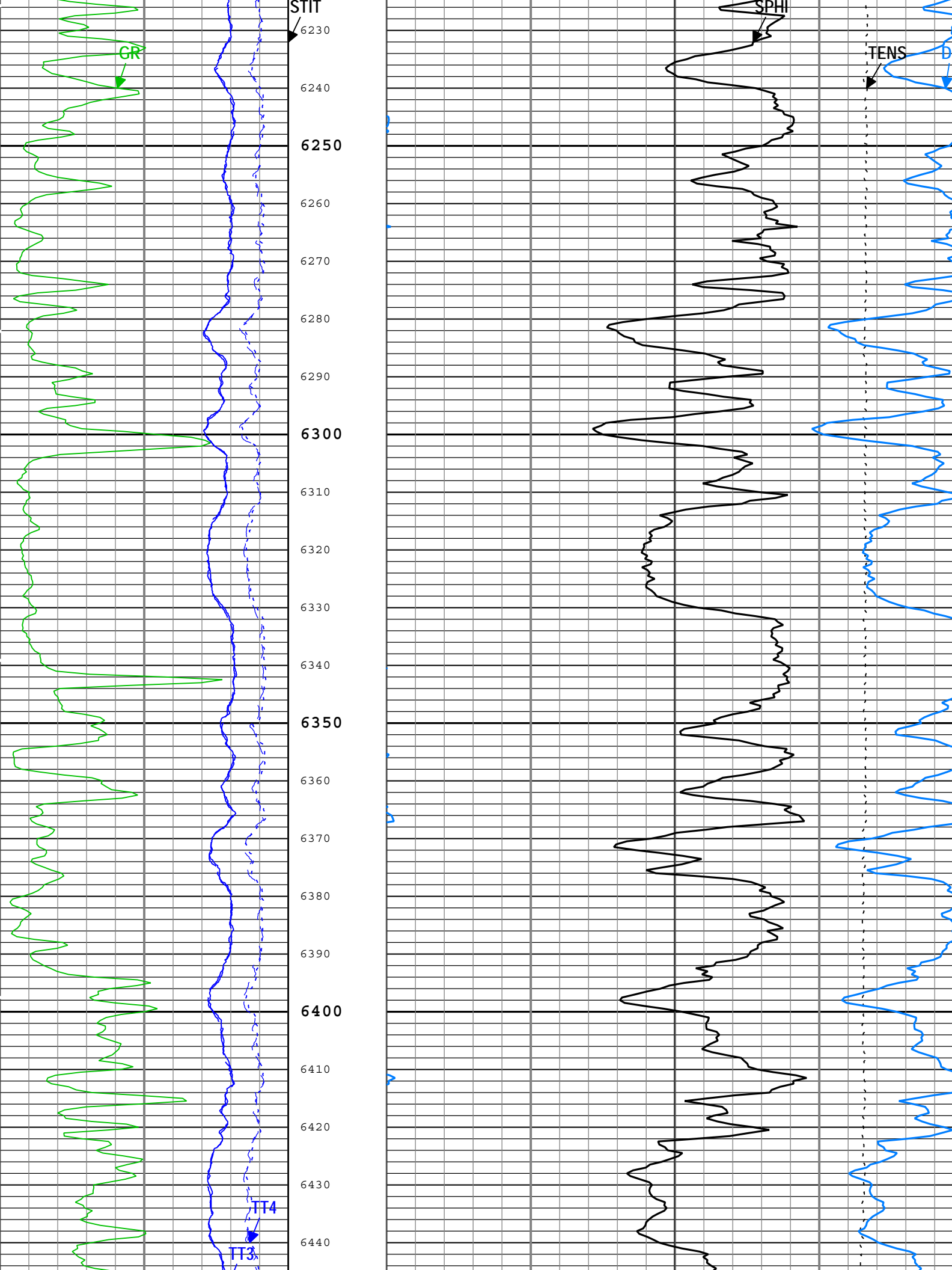


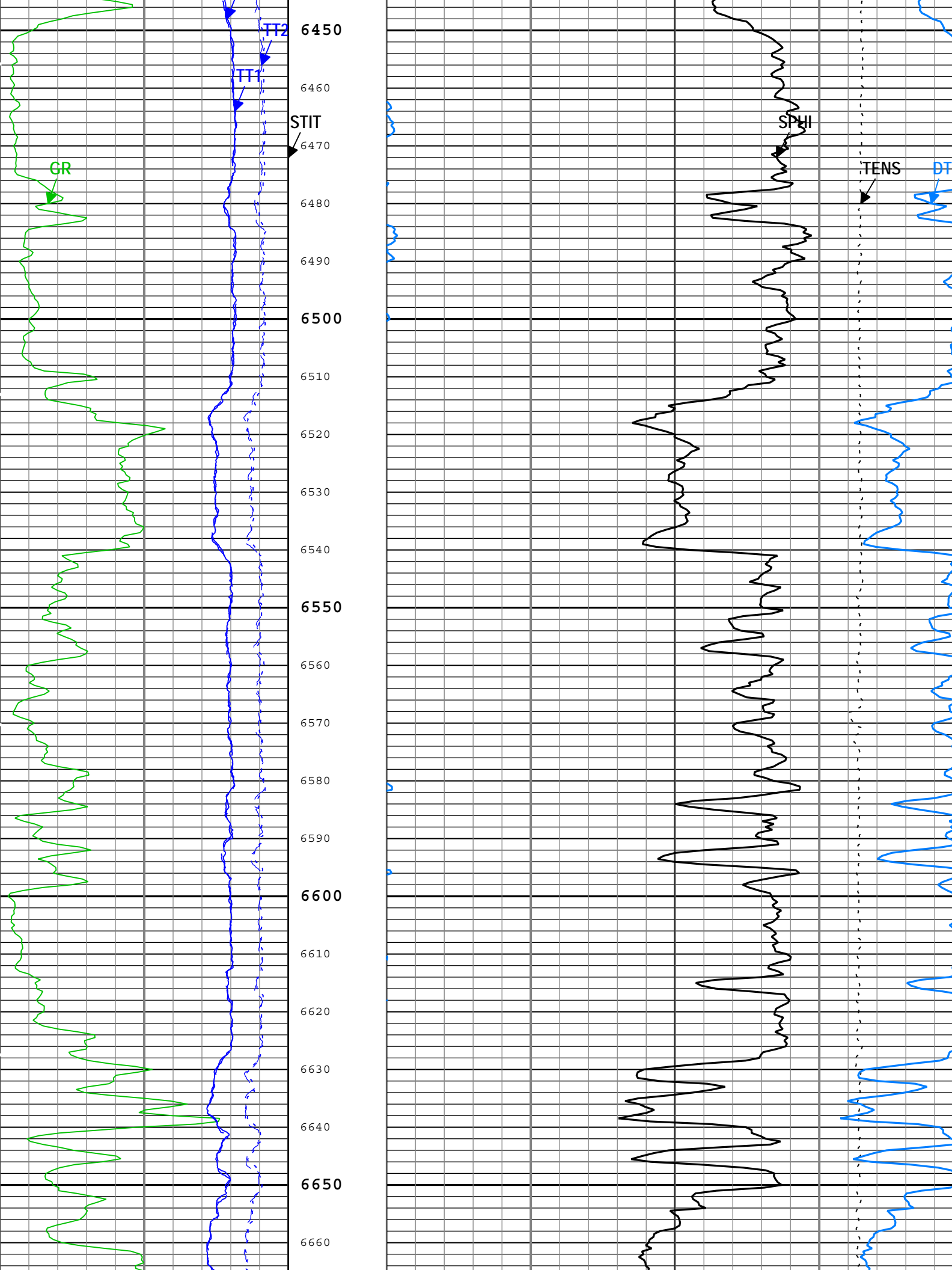


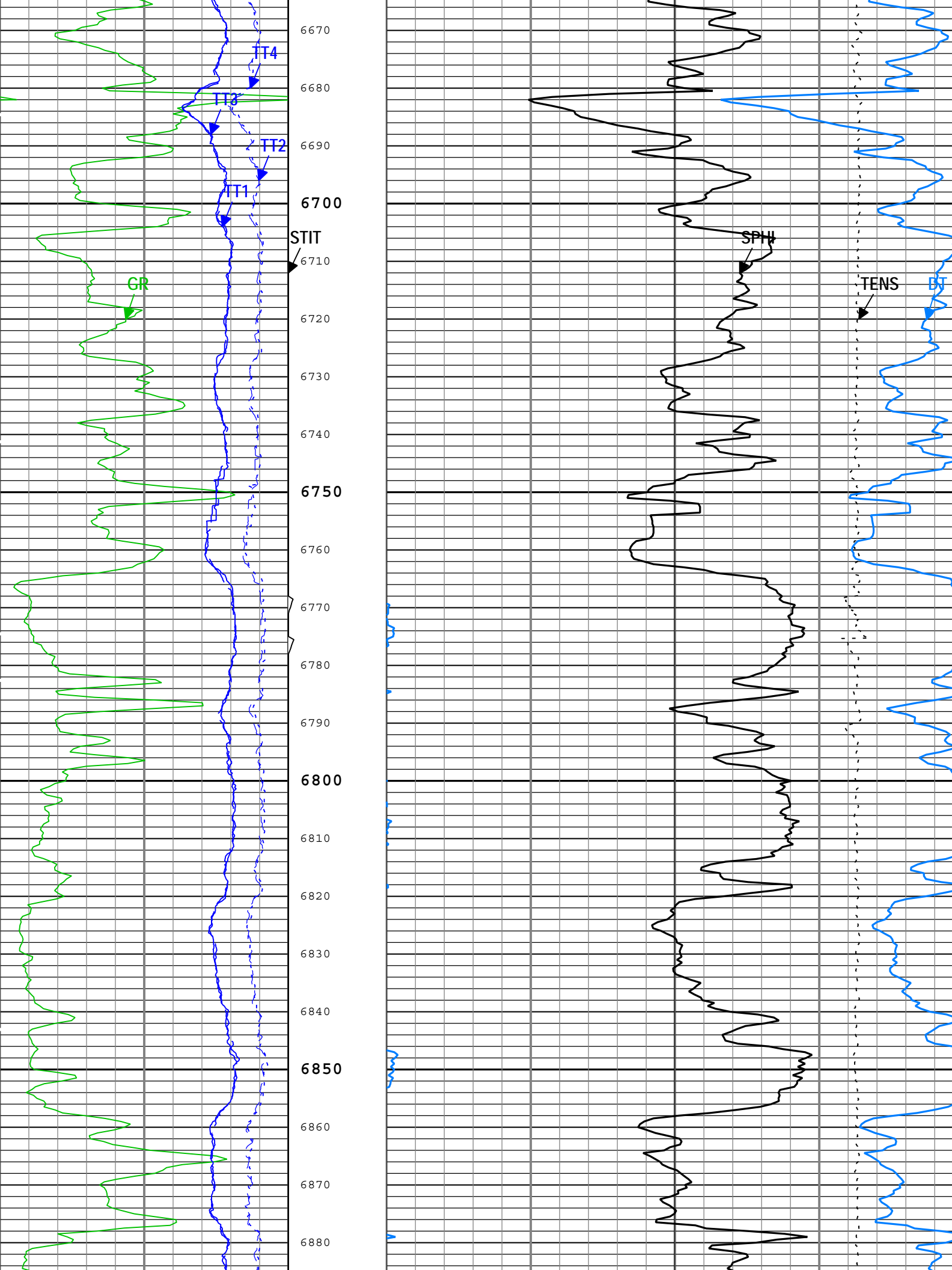


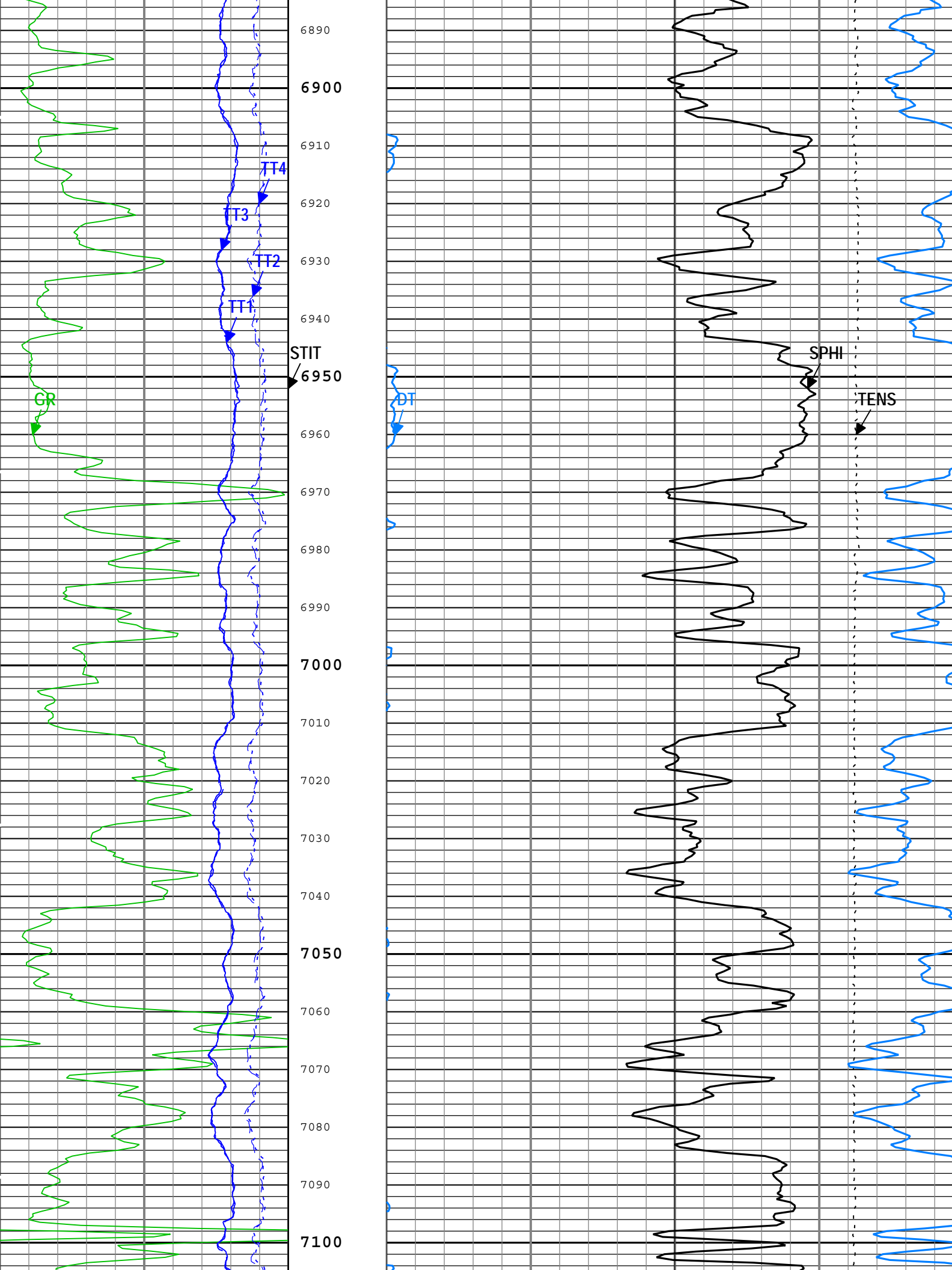


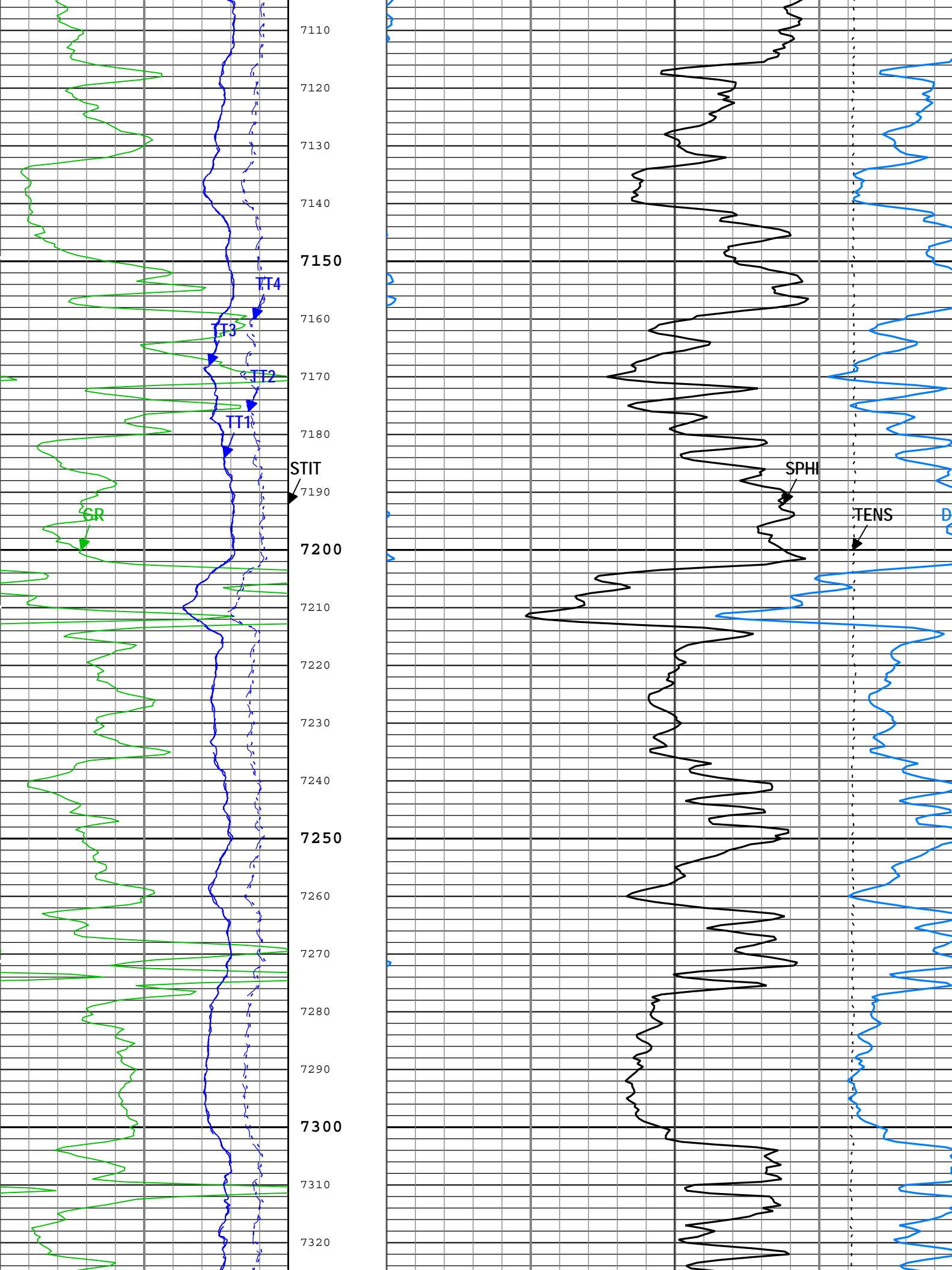


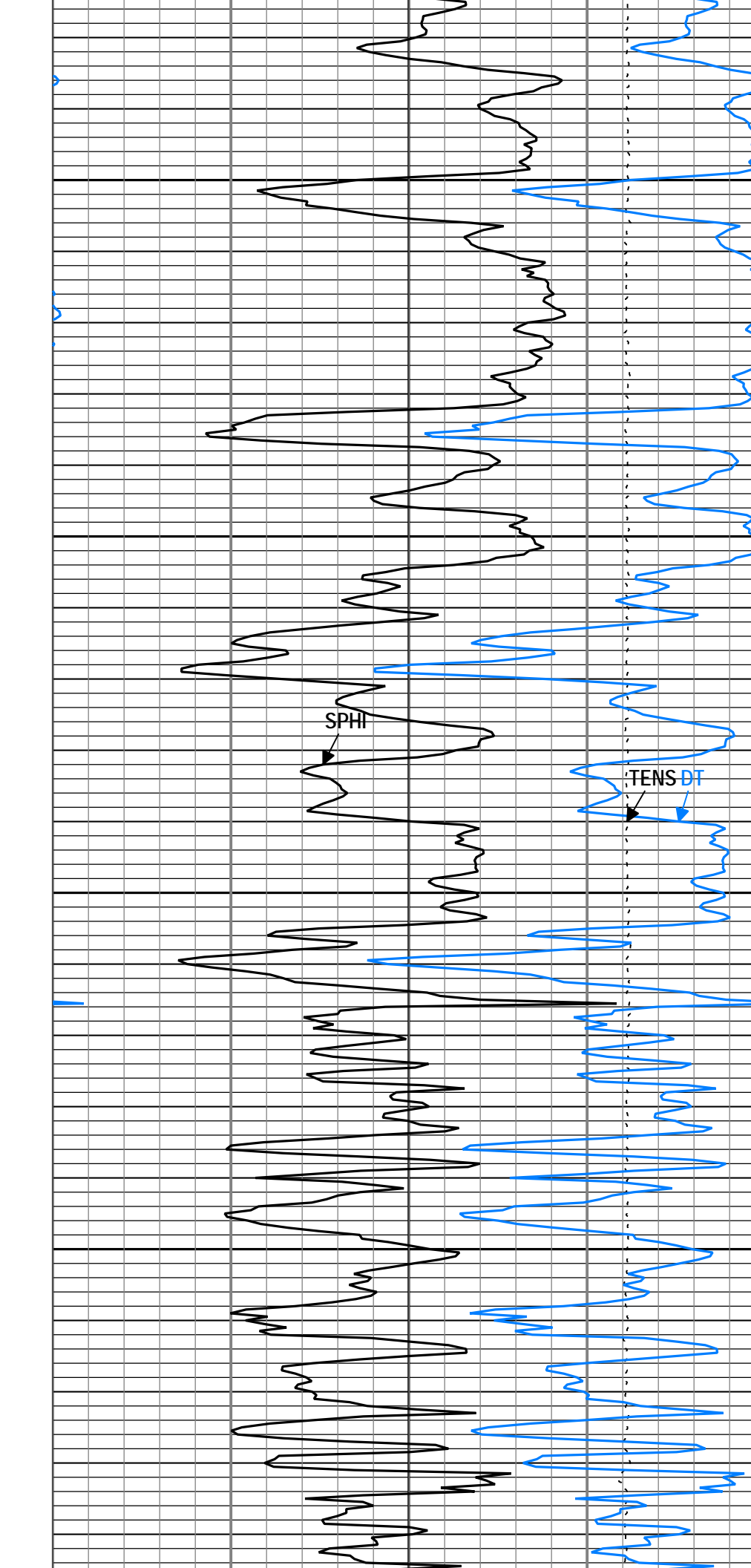
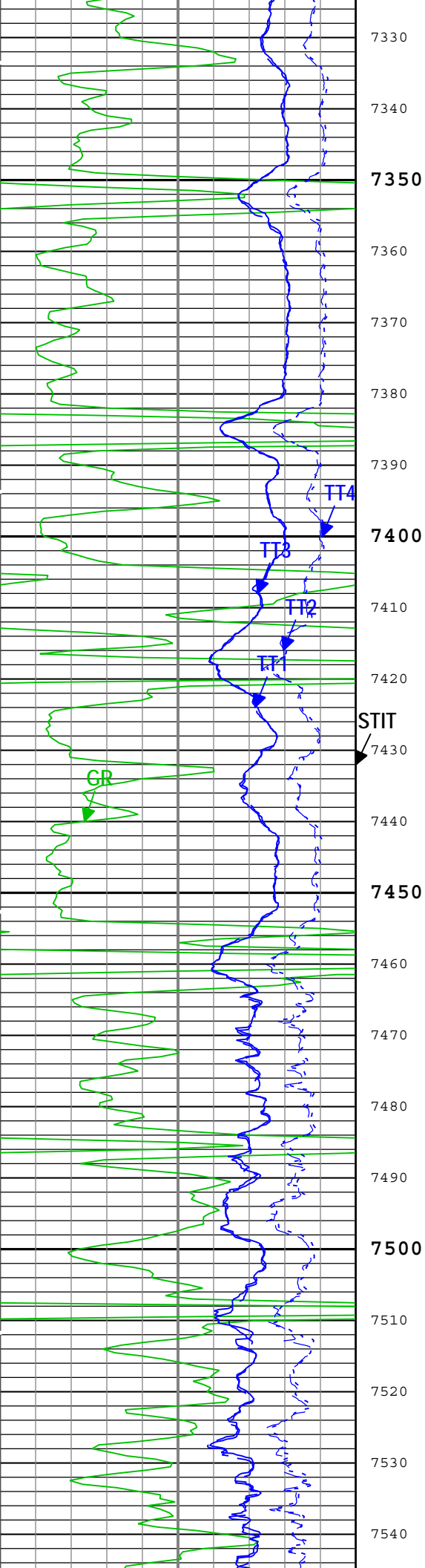


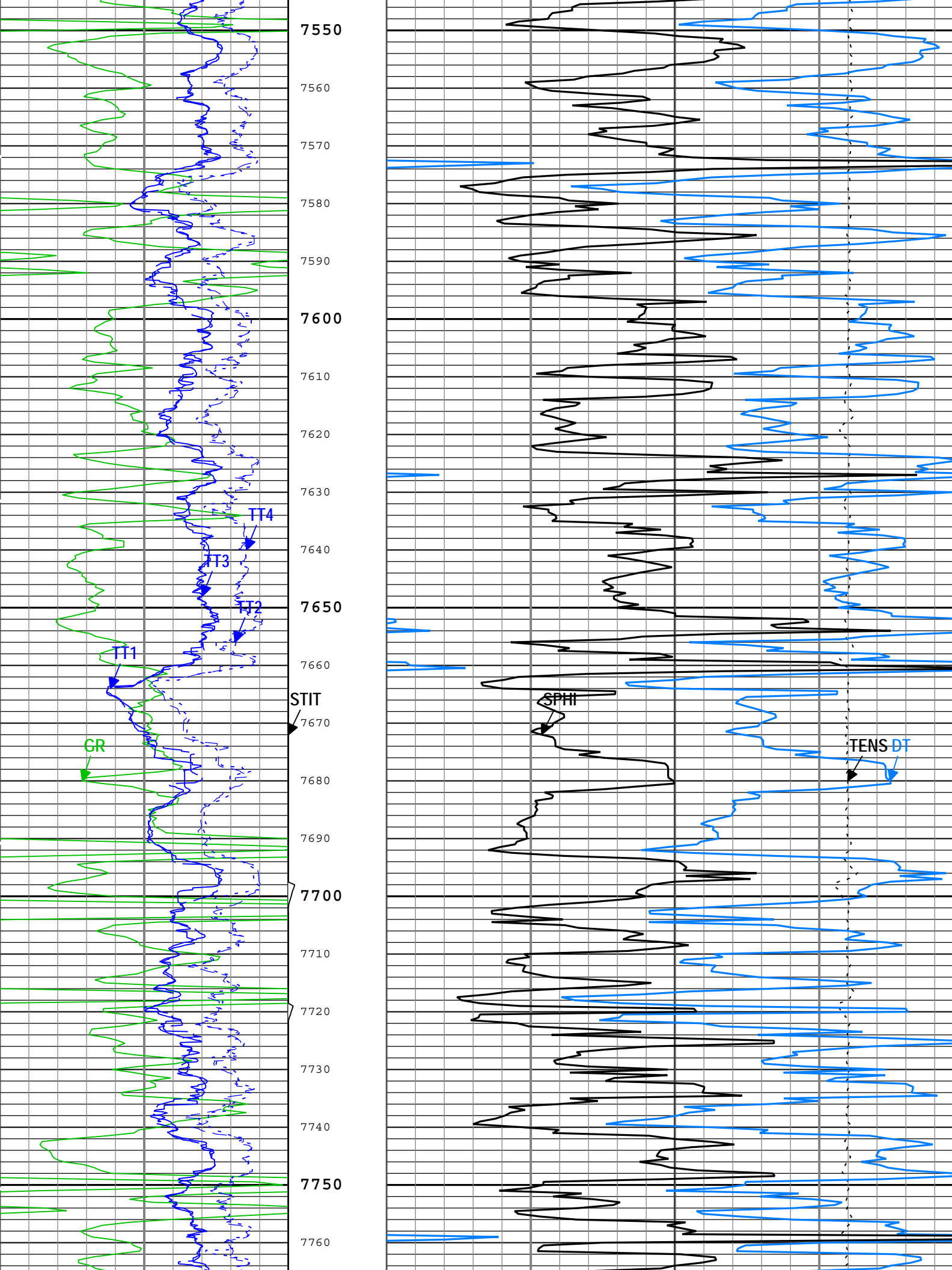


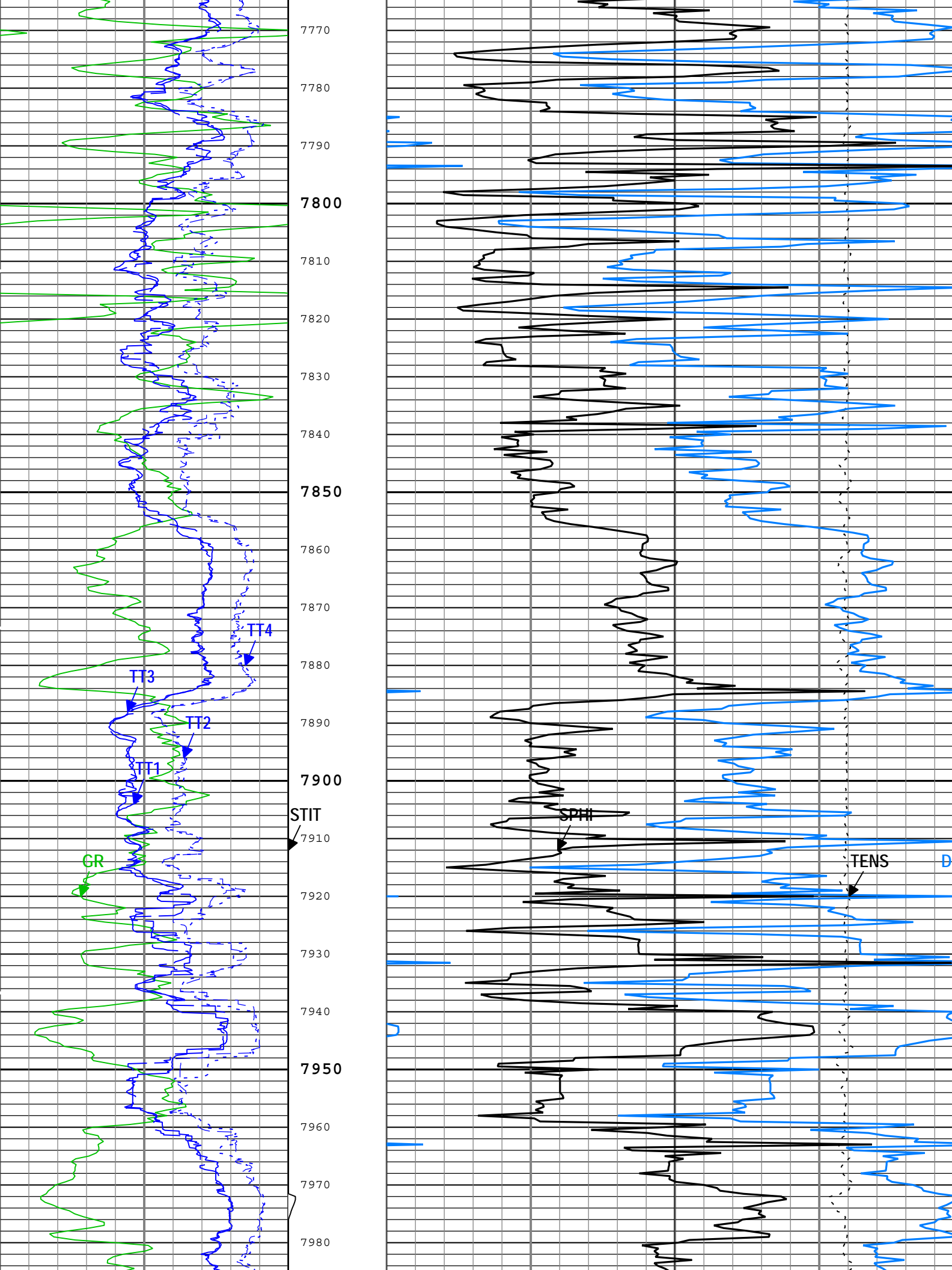


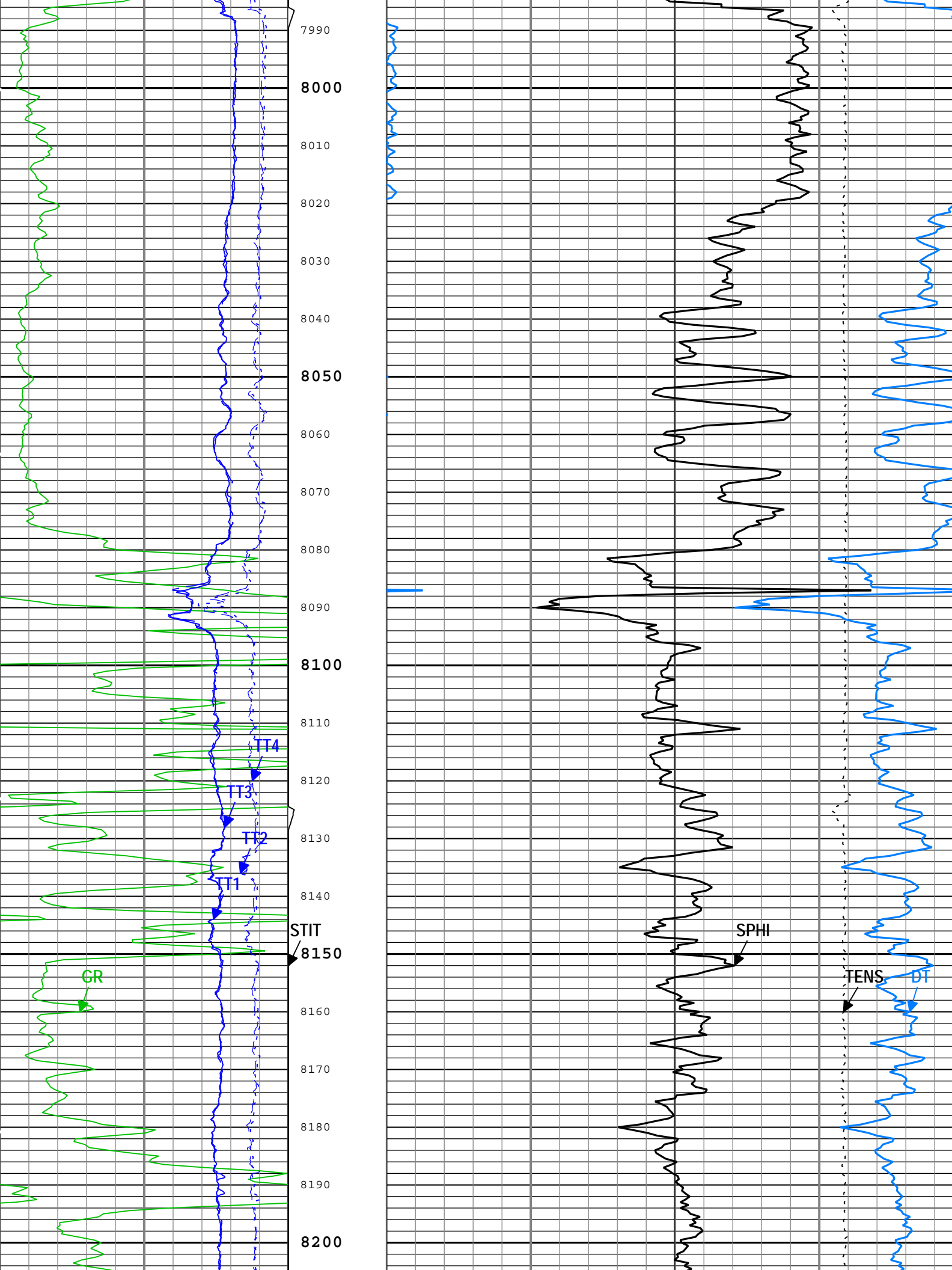


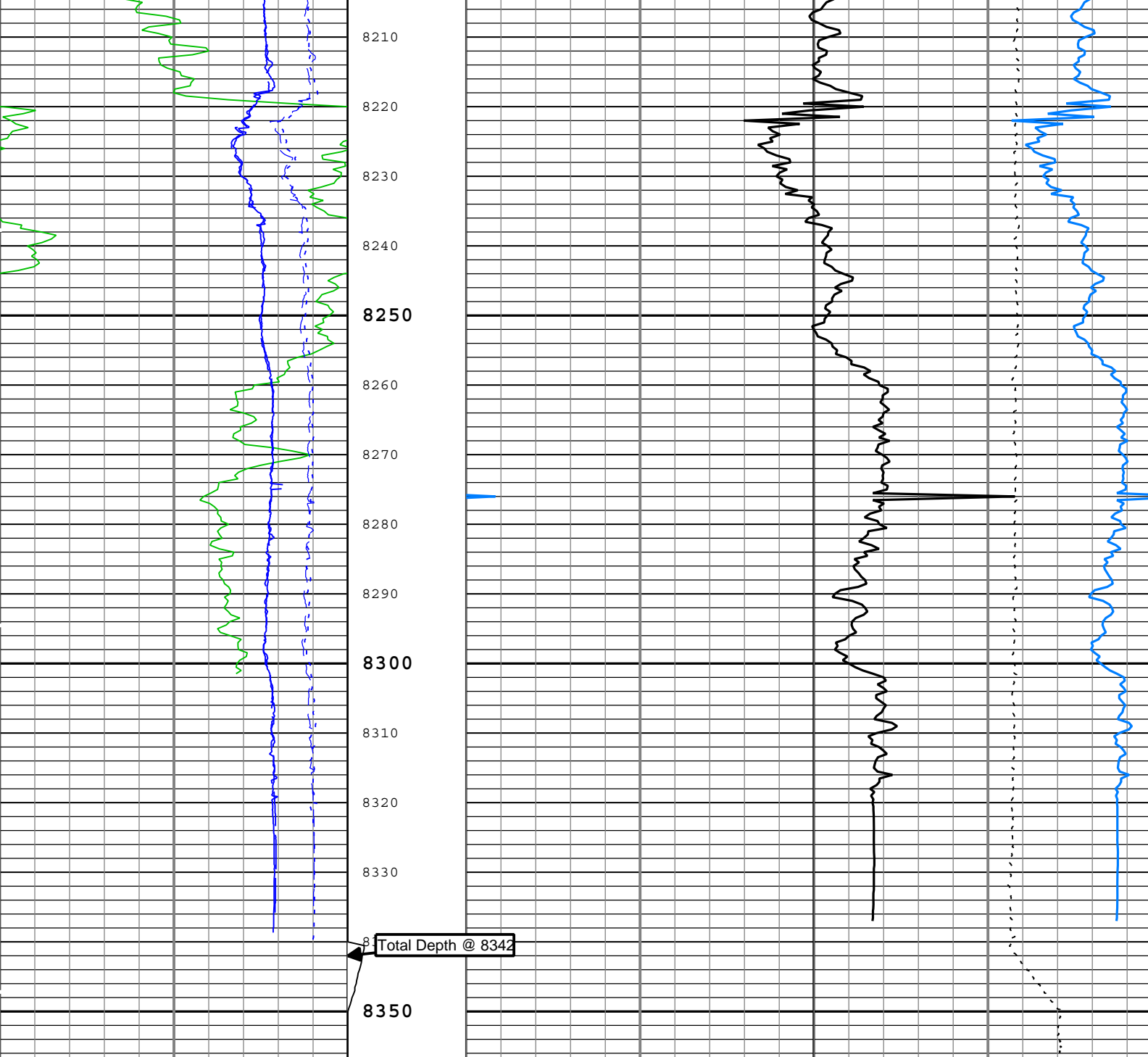












Total Depth @ 8342

Gamma Ray (GR) HGNS-H		
0	gAPI	200
Transit Time 1 (TT1) DSLT-H		
1200	us	200
Transit Time 2 (TT2) DSLT-H		
1200	us	200
Transit Time 3 (TT3) DSLT-H		
1200	us	200
Transit Time 4 (TT4) DSLT-H		
1200	us	200

Stuck Tool Indicator, Total (STIT)
0 ft 50
Cable Drag
Tool_Tot. Drag

Delta-T (also called Slowness or Interval Transit Time) (DT) DSLT-H		
150	us/ft	5
Sonic Porosity (SPHI) DSLT-H		
0.45	ft3/ft3	-0.1
Cable Tension (TENS)		10000 lbf

TIME\_1900 - Time Marked every 60.00 (s)

## 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	7.875	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0	in
CBLO	Casing Bottom (Logger)	WLSESSION	309	ft
CDEN	Cement Density	HGNS-H	2	g/cm3
CDTS	Correction for Delta-T Shale, Empirical	Borehole	100	us/ft
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DETE	Delta-T Detection	DSLTH	E2	
DFD	Drilling Fluid Density	Borehole	9.2	lbm/gal
DTCM	Delta-T Computation Mode	DSLTH	Full	
DTF	Delta-T Fluid	Borehole	189	us/ft
DTM	Delta-T Matrix	Borehole	47.5	us/ft
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	
MAHTR	Manual High Threshold Reference for first arrival detection	DSLTH	120	
MNHTR	Minimum High Threshold Reference for first arrival detection	DSLTH	100	
NMSG	Near Minimum Sliding Gate	DSLTH	140	us
SGAD	Sliding Gate Status	DSLTH	On	
SOCO	Standoff Correction Option	HGNS-H	Yes	
SPFS	Sonic Porosity Formula	Borehole	Raymer-Hunt	
SPSO	Sonic Porosity Source	DSLTH	DT	
TD	Total Measured Depth	Borehole	8342	ft

## Tool Control Parameters

Parameter	Description	Tool	Value	Unit
DSLTH_MODE	DSLTH Acquisition Mode	DSLTH	BHC	
DSLTH_RATE	DSLTH Firing Rate	DSLTH	15 Hz	
DTFS	DSLTH Telemetry Frame Size	DSLTH	536	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h

Company: Nighthawk Production LLC

Well: Big Sky 4-11

Field: Wildcat

County: Lincoln

State: Colorado



Platform Express

Sonic