

Company: Nighthawk Production LLC

Well: Salen 14-35

Field: Wildcat

County: Washington State: Colorado

Platform Express
Triple Combo

County:	Washington
Field:	Wildcat
Location:	SHL: 792' FSL & 2214' FWL
Well:	Salen 14-35
Company:	Nighthawk Production LLC
Location:	
SHL: 792' FSL & 2214' FWL	Elev.: K.B. 5175.00 ft G.L. 5160.00 ft D.F. 5174.00 ft
Permanent Datum:	Ground Level
Log Measured From:	Kelly Bushing
Drilling Measured From:	Kelly Bushing
API Serial No. 05-121-11045	Section: 35
	Township: 5S
	Range: 54W

Logging Date	26-Sep-2014
Run Number	One
Depth Driller	8310.00 ft
Schlumberger Depth	8321.00 ft
Bottom Log Interval	8320.00 ft
Top Log Interval	365.00 ft
Casing Driller Size @ Depth	8.625 in @ 361.00 ft
Casing Schlumberger	365 ft
Bit Size	7.875 in
Type Fluid In Hole	LSND
Density	9.3 lbm/gal
Fluid Loss	PH 5.6 cm3 9
Source of Sample	Active Tank
RM @ Meas Temp	1.04 ohm.m @ 68 degF
RMF @ Meas Temp	0.78 ohm.m @ 75 degF
RMC @ Meas Temp	1.31 ohm.m @ 75 degF
Source RMF	Calculated
RM @ BHT	0.38 @ 198 0.31 @ 198
Max Recorded Temperatures	198 degF
Circulation Stopped	26-Sep-2014 00:30:00
Logger on Bottom	26-Sep-2014 11:20:43
Unit Number	3030
Recorded By	Kevin Crow
Witnessed By	Lynn Gibbs

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.

Contents

- 1. Header
- 2. Disclaimer
- 3. Contents
- 4. Operational Run Summary
- 5. Borehole Fluids
- 6. Remarks and Equipment Summary
- 7. Depth Summary
- 8. Composite 1 5" Triple Combo
 - 8.1 Integration Summary
 - 8.2 Software Version
 - 8.3 Composite Summary
 - 8.4 Log (KM 5in Triple Combo)
 - 8.5 Parameter Listing
- 9. Calibration Report
- 10. Tail

Operational Run Summary

Parameter (unit)	One					
Date Log Started	26-Sep-2014					
Time Log Started	10:19:36					
Date Log Finished	26-Sep-2014					
Time Log Finished	16:59:01					
Top Log Interval (ft)	365.00					
Bottom Log Interval (ft)	8320.00					
Total Depth (ft)	8321.00					
Max Hole Deviation (deg)	0.00					
Azimuth of Max Deviation (deg)	0.00					
Bit Size (in)	7.875					
Logging Unit Number	3030					
Logging Unit Location	Fort Morgan					
Recorded By	Kevin Crow					
Witnessed By	Lynn Gibbs					
Service Order Number	CAU6-00124					

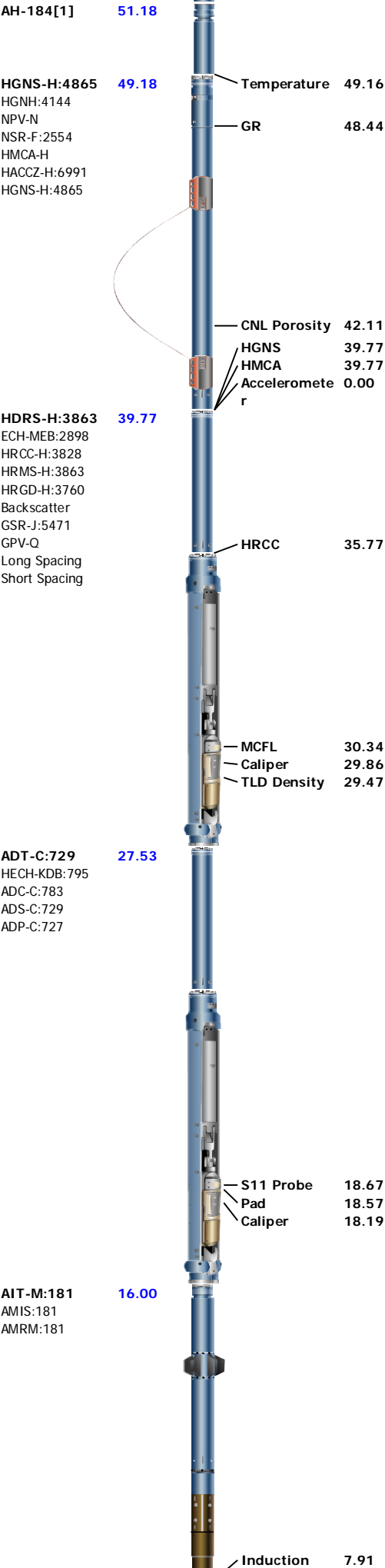
Borehole Fluids

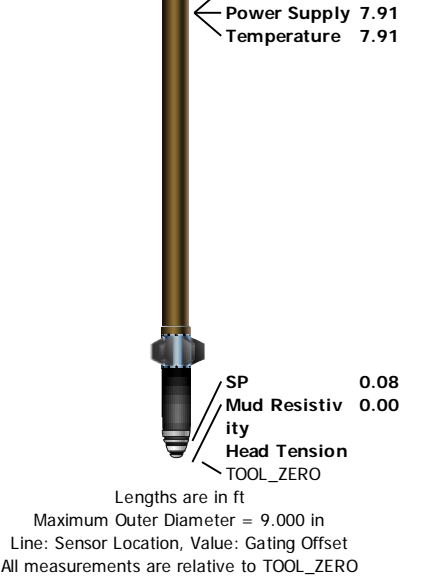
Parameter(unit)	One					
Fluid Type	Water					
Fluid Name	LSND					
Max Recorded Temperatures (degF)	198					
Source of Sample	Active Tank					
Salinity (ppm)	0					
Density (lbm/gal)	9.3					
Funnel Viscosity (s)	78					
Fluid Loss (cm3)	5.6					
PH	9					
Date/Time Circulation Stopped	26-Sep-2014 00:30:00					
Date Logger on Bottom	26-Sep-2014					
Time Logger on Bottom	11:20:43					
Source RMF	Calculated					
RMC	Calculated					
RM @ Meas Temp (ohm.m@degF)	1.04 @ 68					
RMF @ Meas Temp (ohm.m@degF)	0.78 @ 75					

RMC @ Meas Temp (ohm.m@degF)	1.31 @ 75					
RM @ BHT (ohm.m@degF)	0.38 @ 198					
RMF @ BHT (ohm.m@degF)	0.31 @ 198					
RMC @ BHT (ohm.m@degF)	0.52 @ 198					
Total Solid (%)						
High Gravity Solids (%)						

Remarks and Equipment Summary

One : Toolstring				One : Remarks
Equip name	Length	MP name	Offset	All toolstrings ran as per tool sketch
LEH-QT LEH-QT	84.7			Repeat pass performed from td to 7000 ft as per client request
EDTC-B:9296 EDTH-B:9347 EDTG-B EDTC-B:9296	81.78			HGNS and cmr ran eccentralized using bowspring and powered caliper
				AIT ran in compute standoff mode with 1" standoffs
				Matrix=Limestone, MDen=2.71 g/cc
		CTEM	78.28	
		ACCZ	0.00	
		HV	0.00	
		Gamma Ray	76.41	
		TelStatus	75.28	
PPC-B:8193 PPC-B:8193	75.28			
		PPC-B Caliper s	74.14	
CMRT-F:202 CMRC:3 CMRH:78 CMRS:202	68.77			
		CMRT	55.12	
AH-184[2]	53.18			

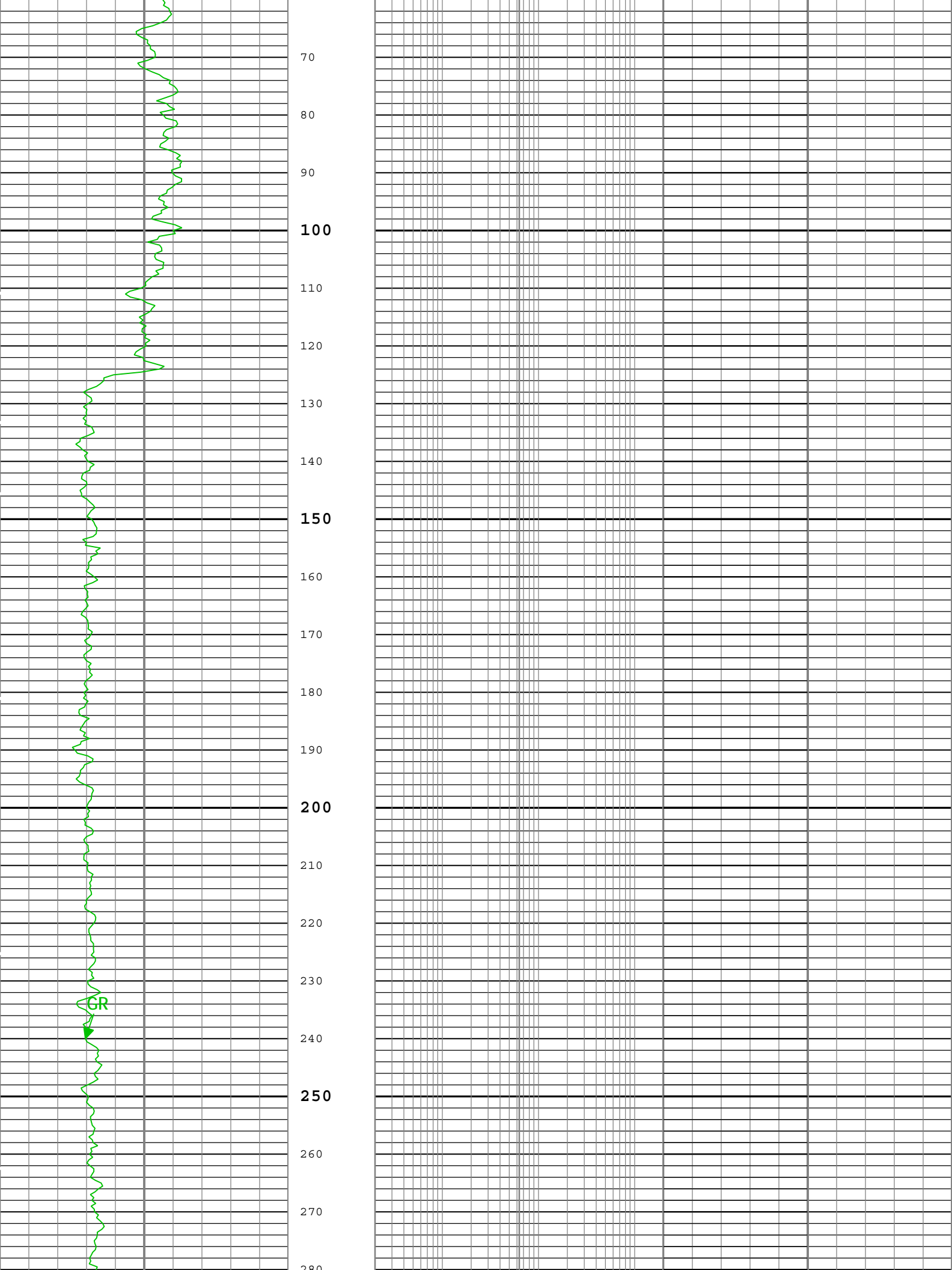


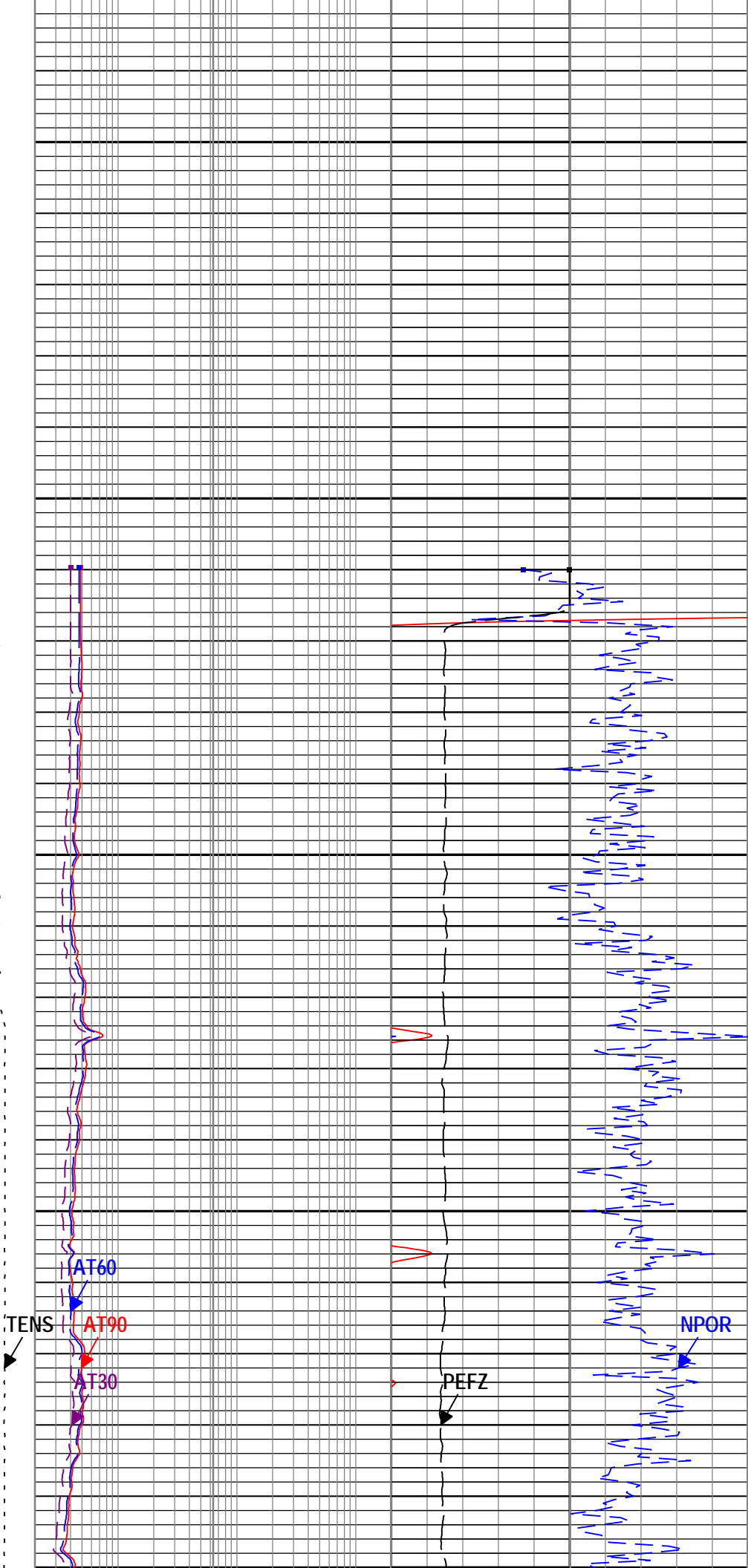
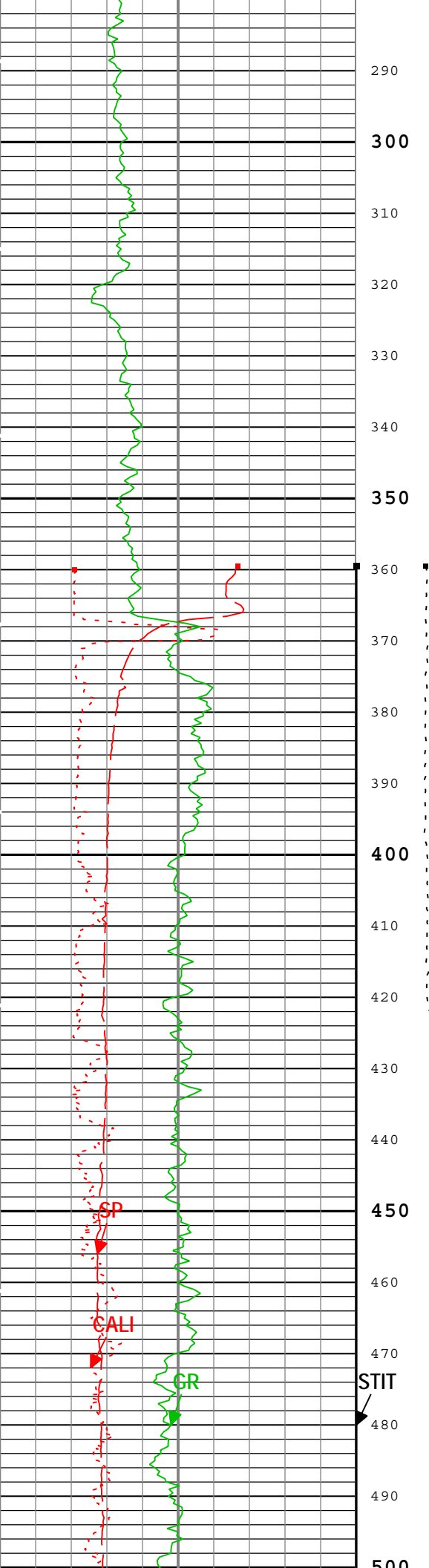
			
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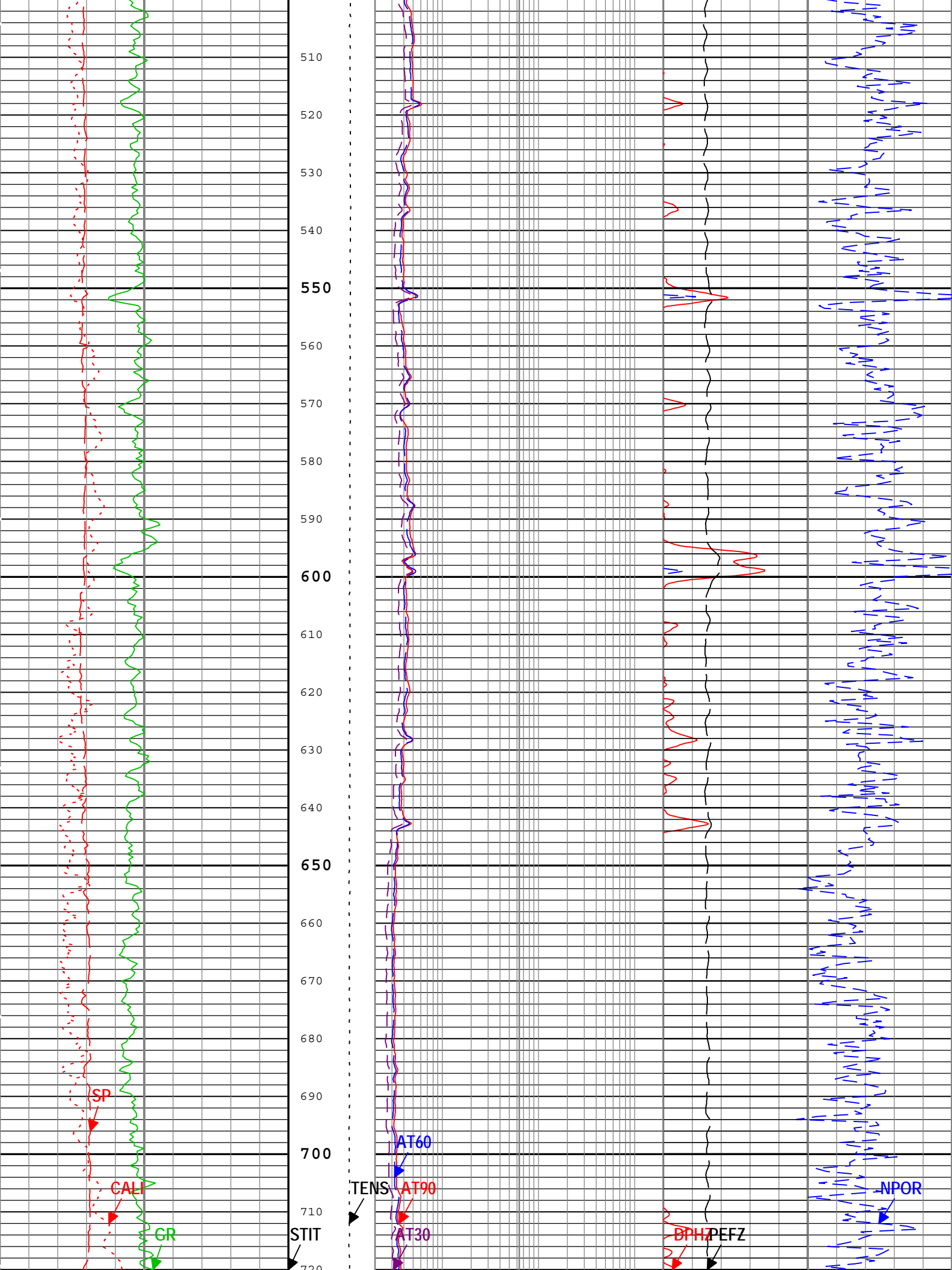
Depth Summary			
	One		
Depth Measuring Device			
Type	IDW-JA		
Serial Number	6428		
Calibration Date	21-Apr-2014		
Calibrator Serial Number			
Calibration Cable Type	7-39 PLXS		
Wheel Correction 1	-5		
Wheel Correction 2	-4		
Tension Device			
Type	CMTD-B/A		
Serial Number	2858		
Calibration Date	09-Aug-2014		
Calibrator Serial Number	78135A		
Number of Calibration Points	10		
Calibration Root Mean Square Error	24		
Calibration Peak Error	49		
Logging Cable			
Type	7-39P-LXS		
Serial Number	F7132711		
Length	18500.00 ft		
Conveyance Type	Wireline		
Rig Type			
One :Depth Control Parameters		Depth Control Remarks	
Log Sequence	First Log In the Well	All Schlumberger Depth Control Procedures Followed IDW used as primary depth control device Z-Chart used as secondary depth control.	
Rig Up Length At Surface			
Rig Up Length At Bottom			
Rig Up Length Correction			
Stretch Correction			
Tool Zero Check At Surface			
Composite 1			
5" Triple Combo			

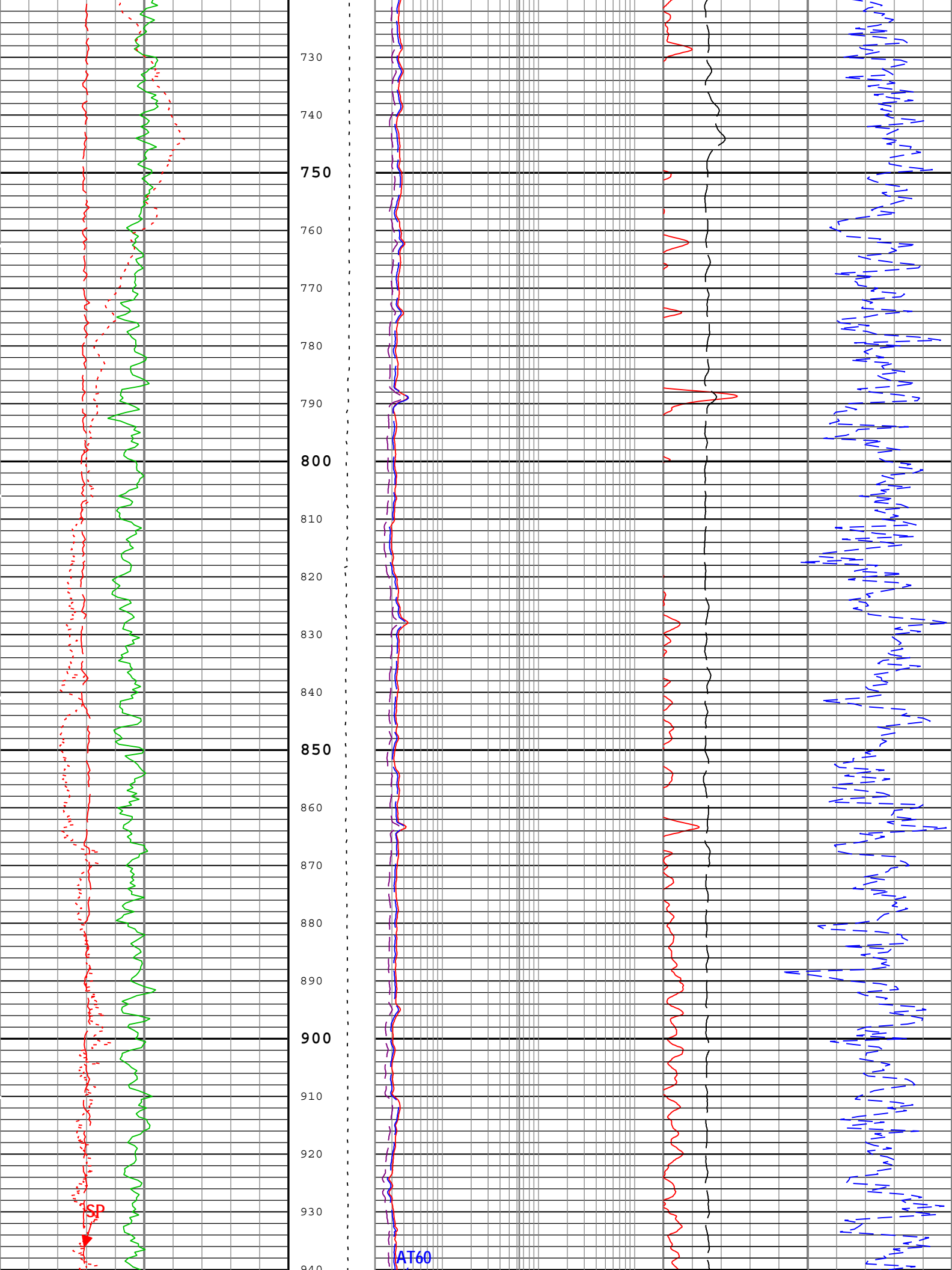
Software Version	
Acquisition System	Version
MaxWell	4.0.9163.3000
Application Patch	Patch SP 10767_18214_4.0.0163.3001

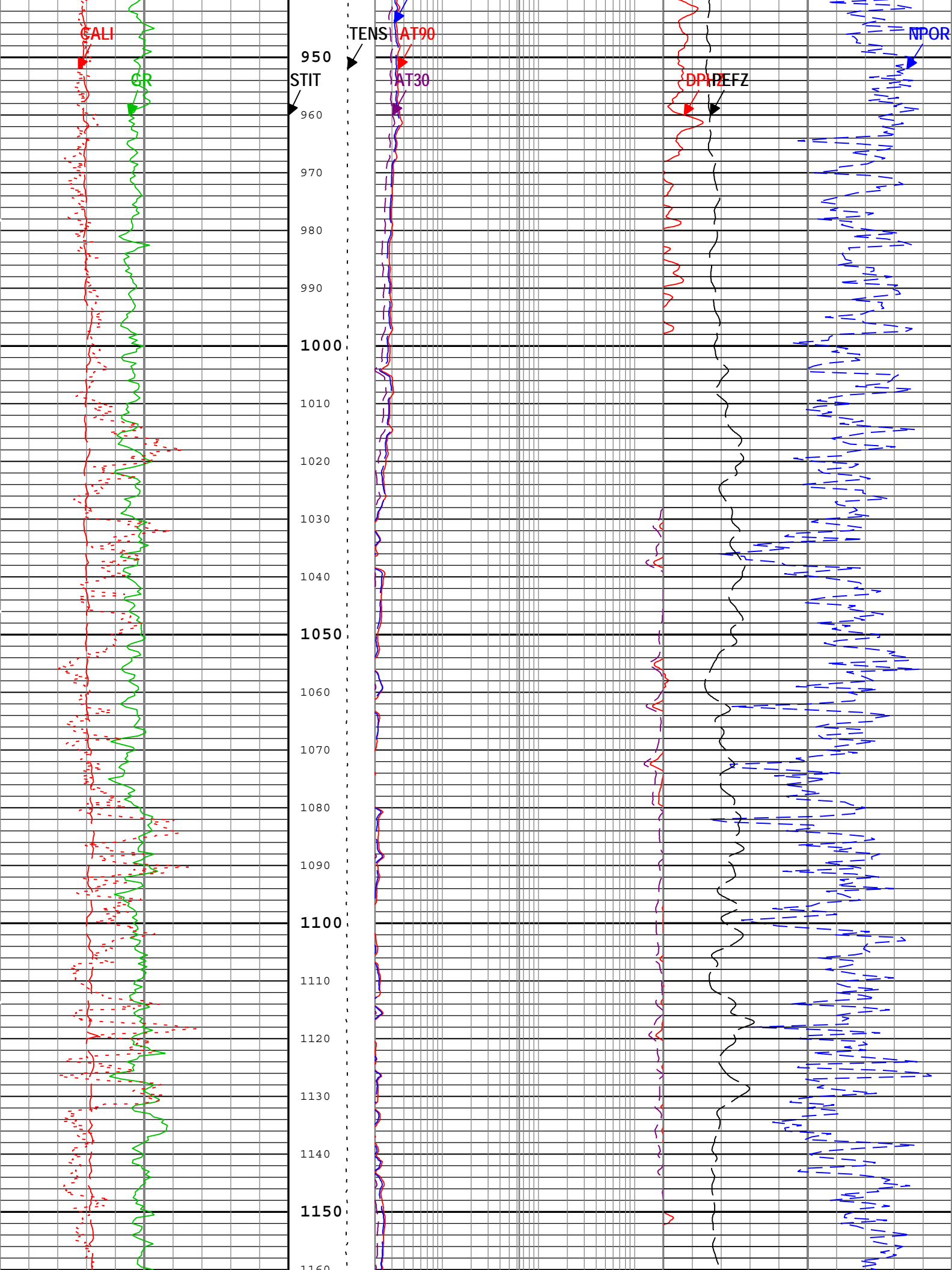
0.3	m3/m3	-0.1
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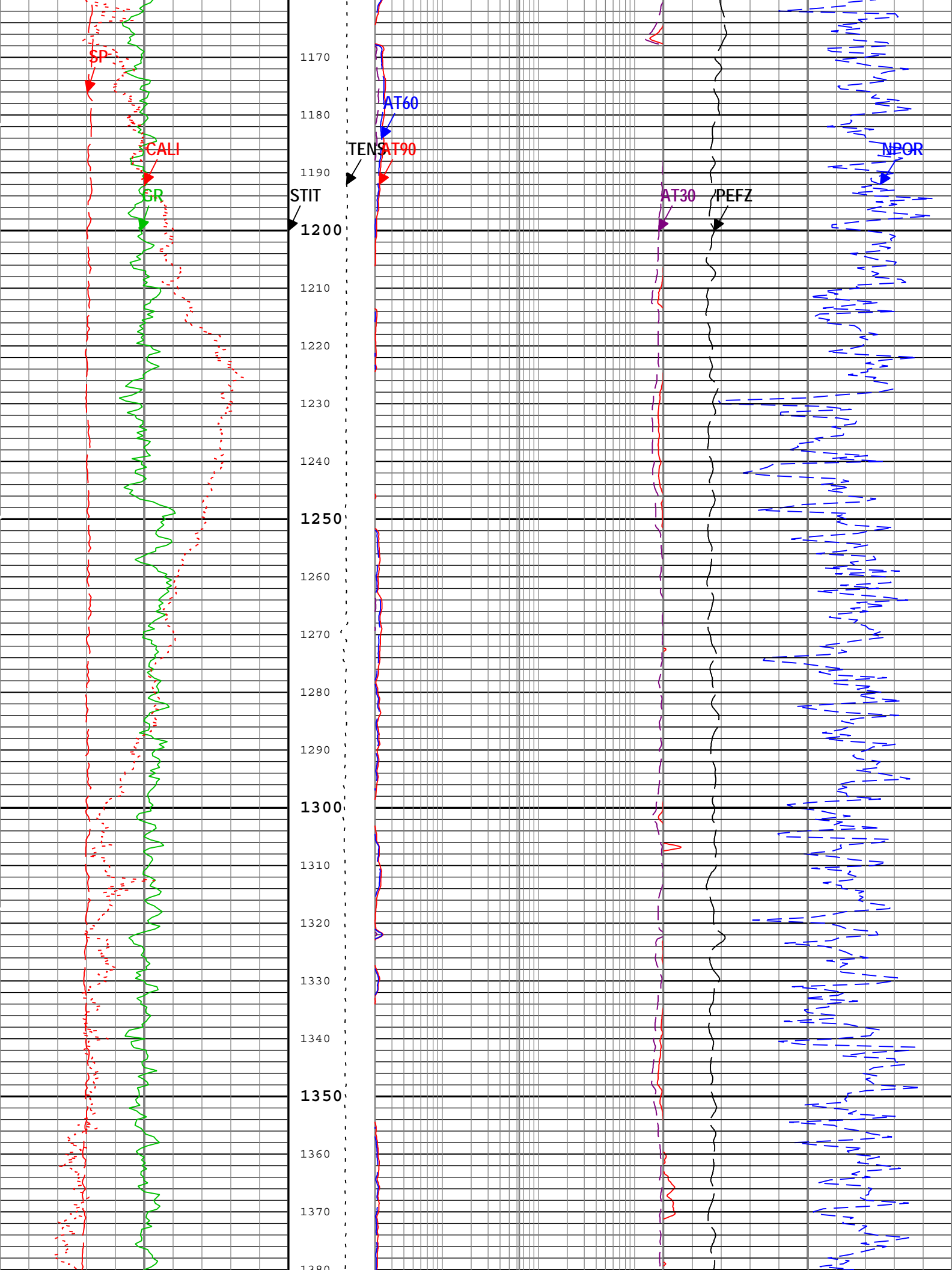


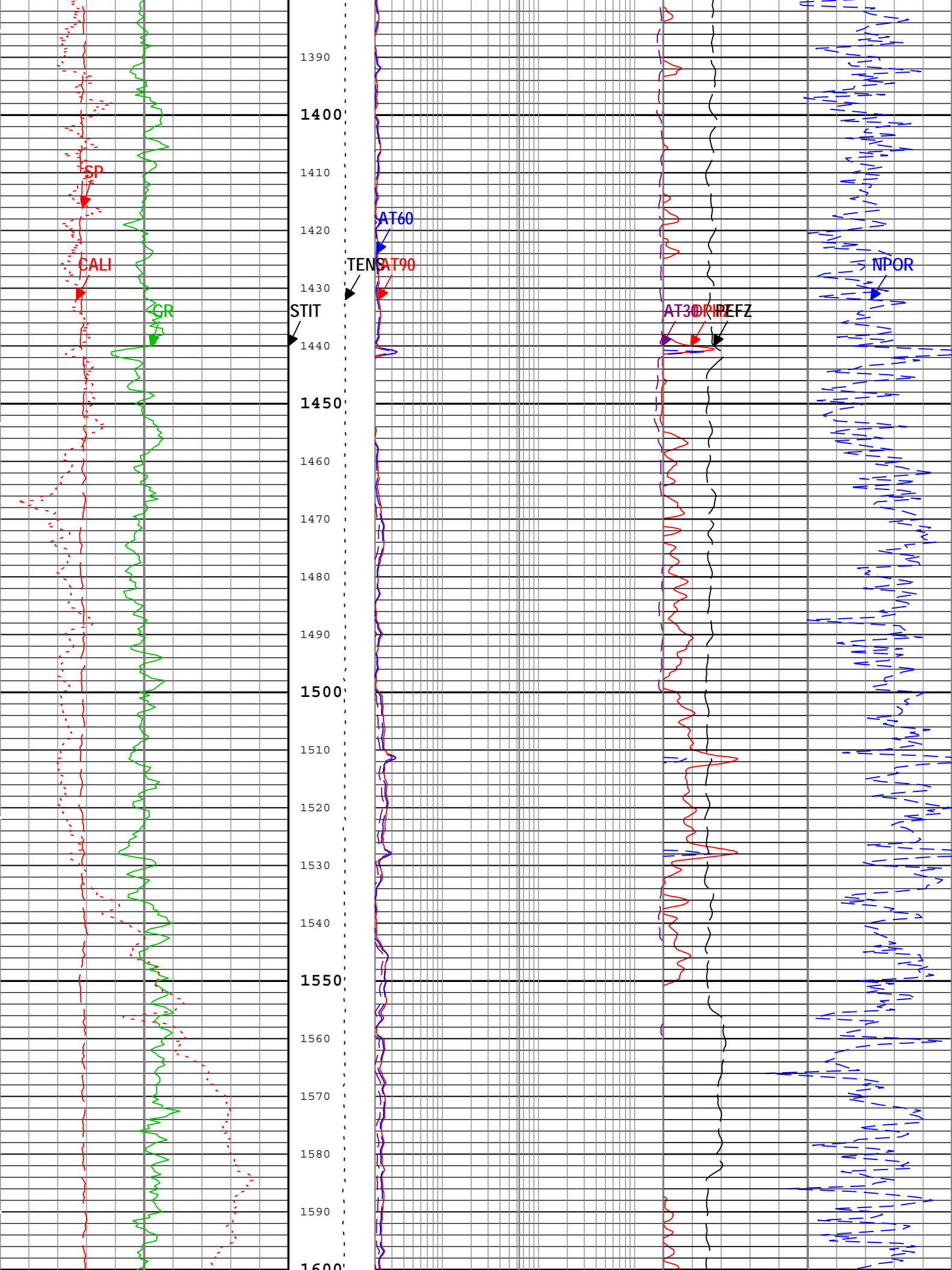


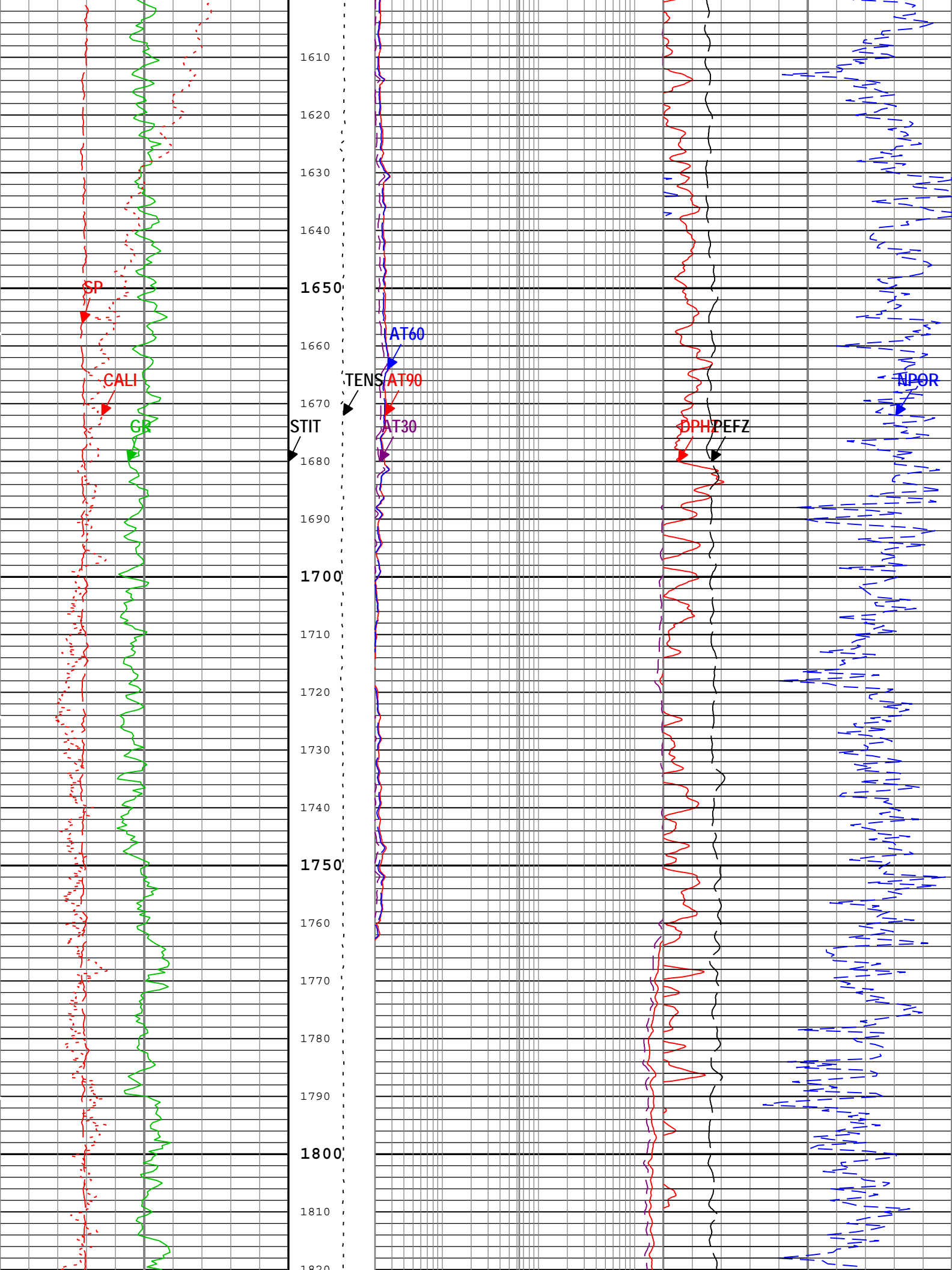


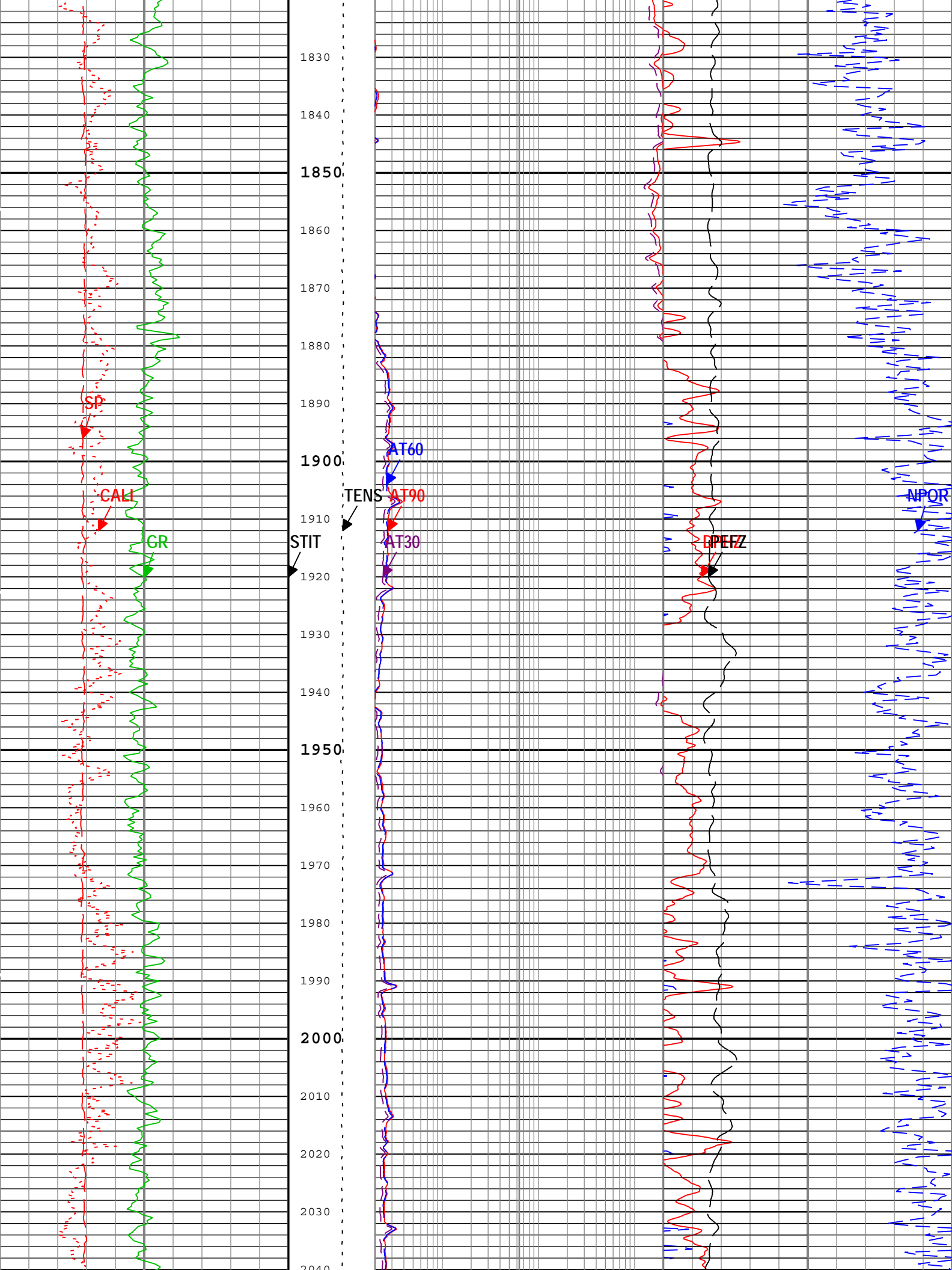


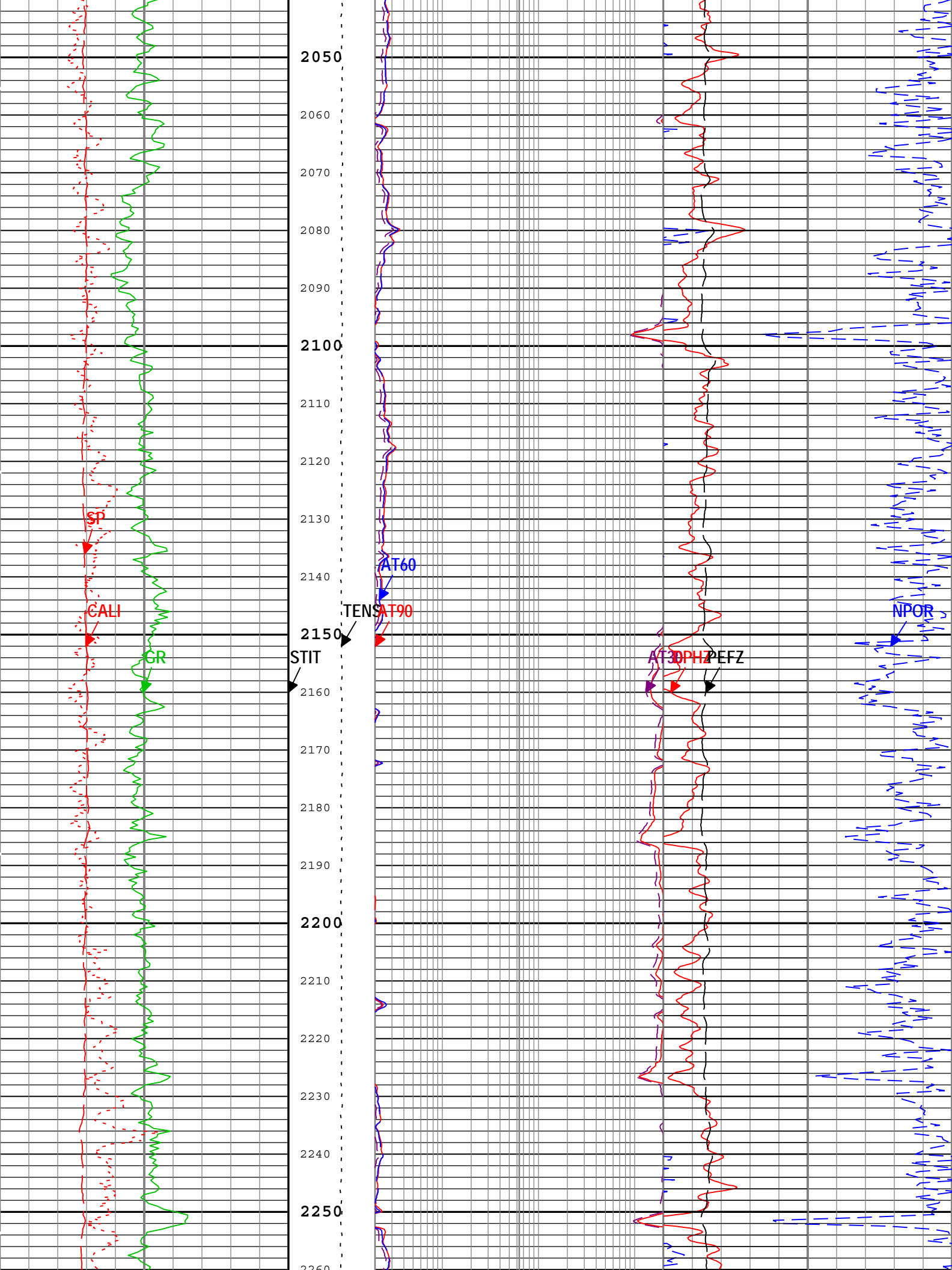


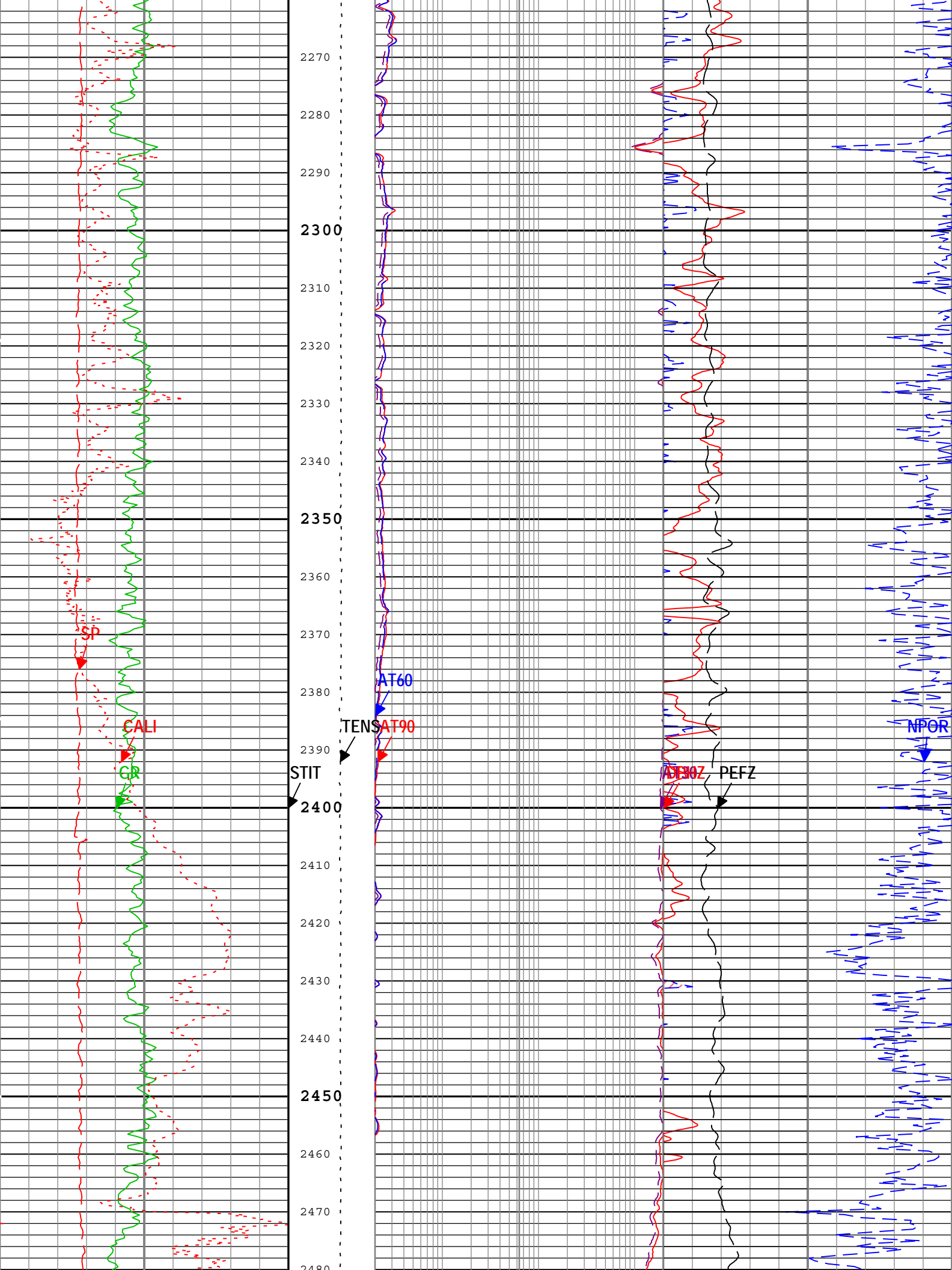


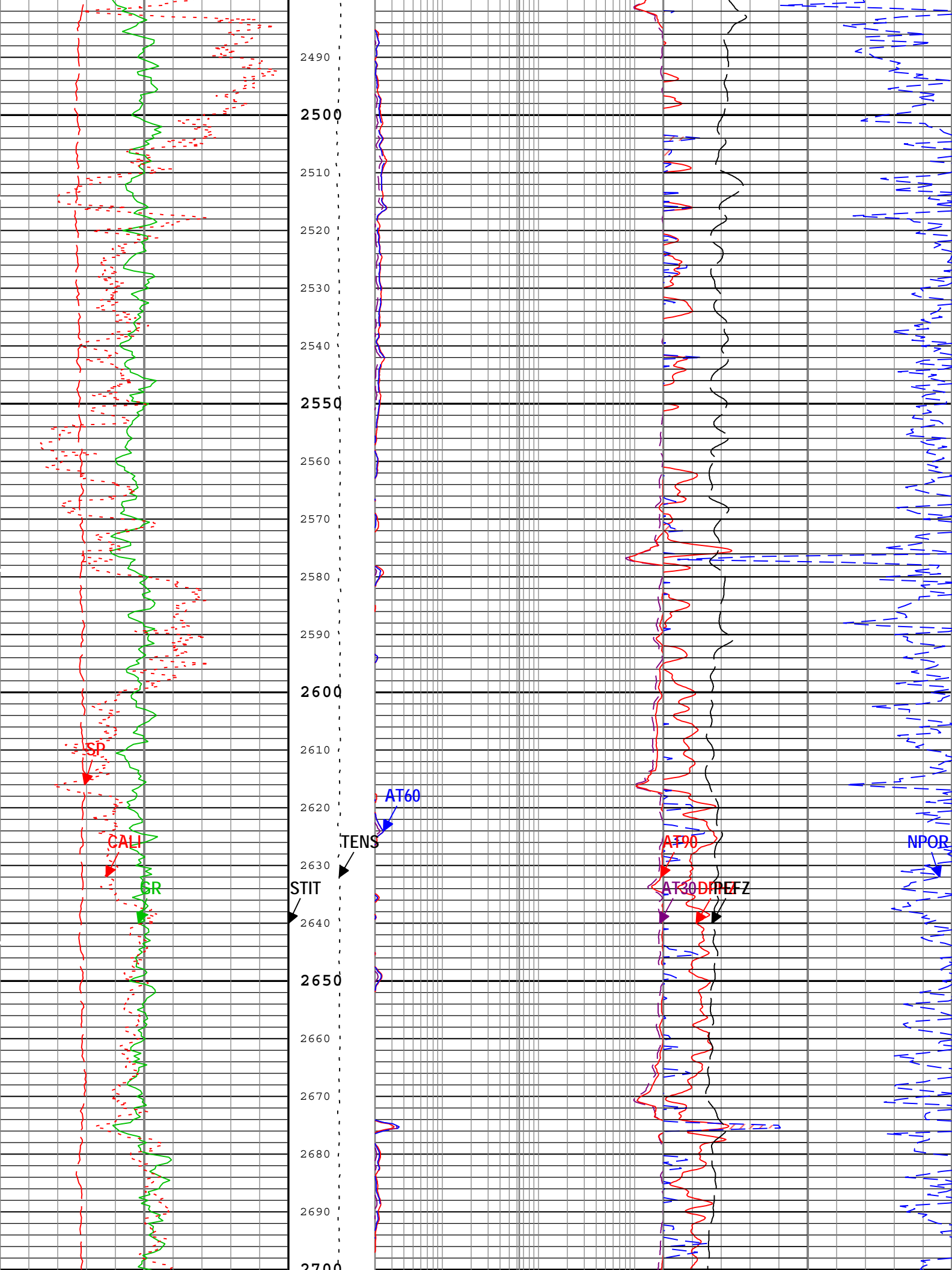


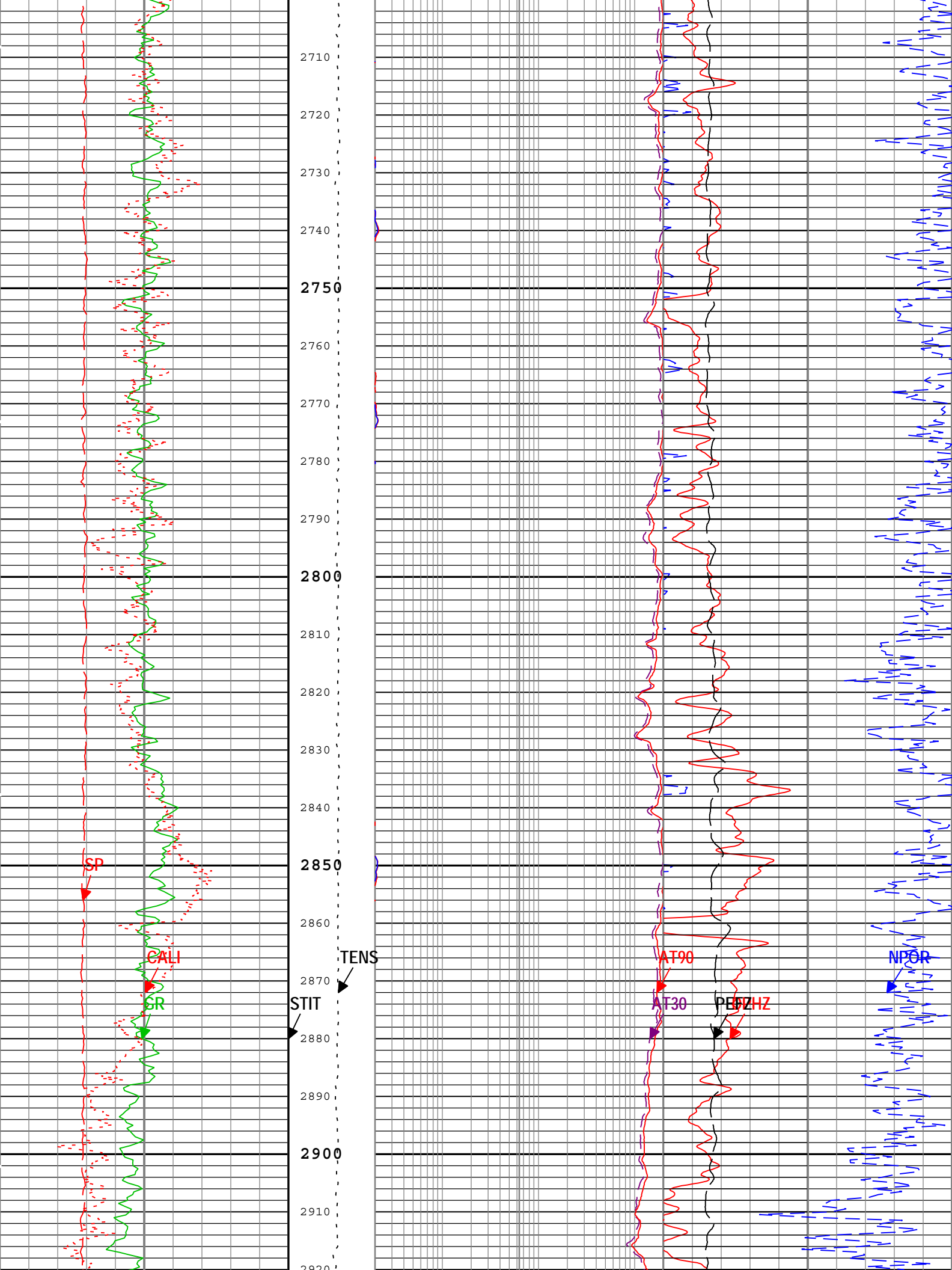


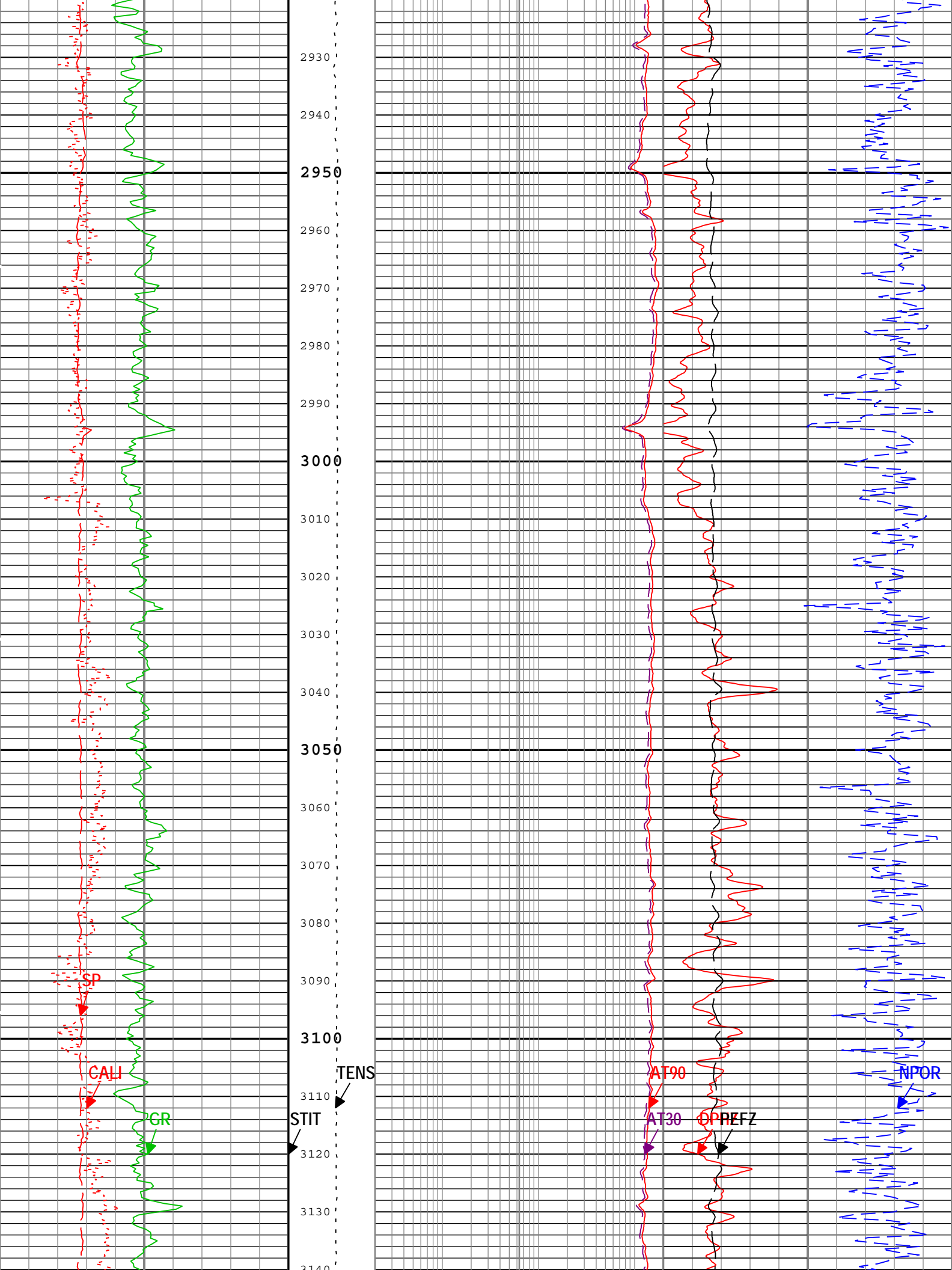


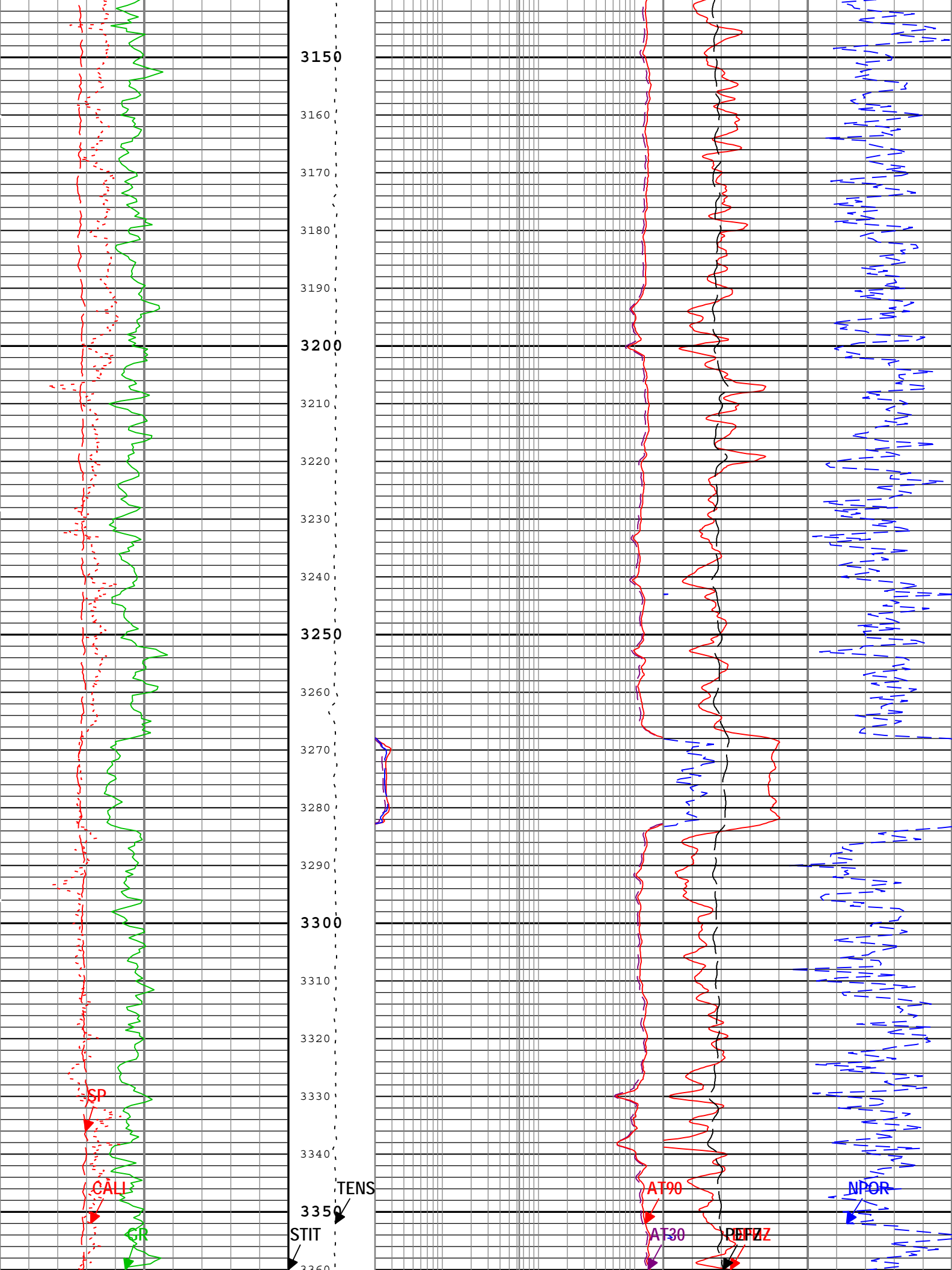


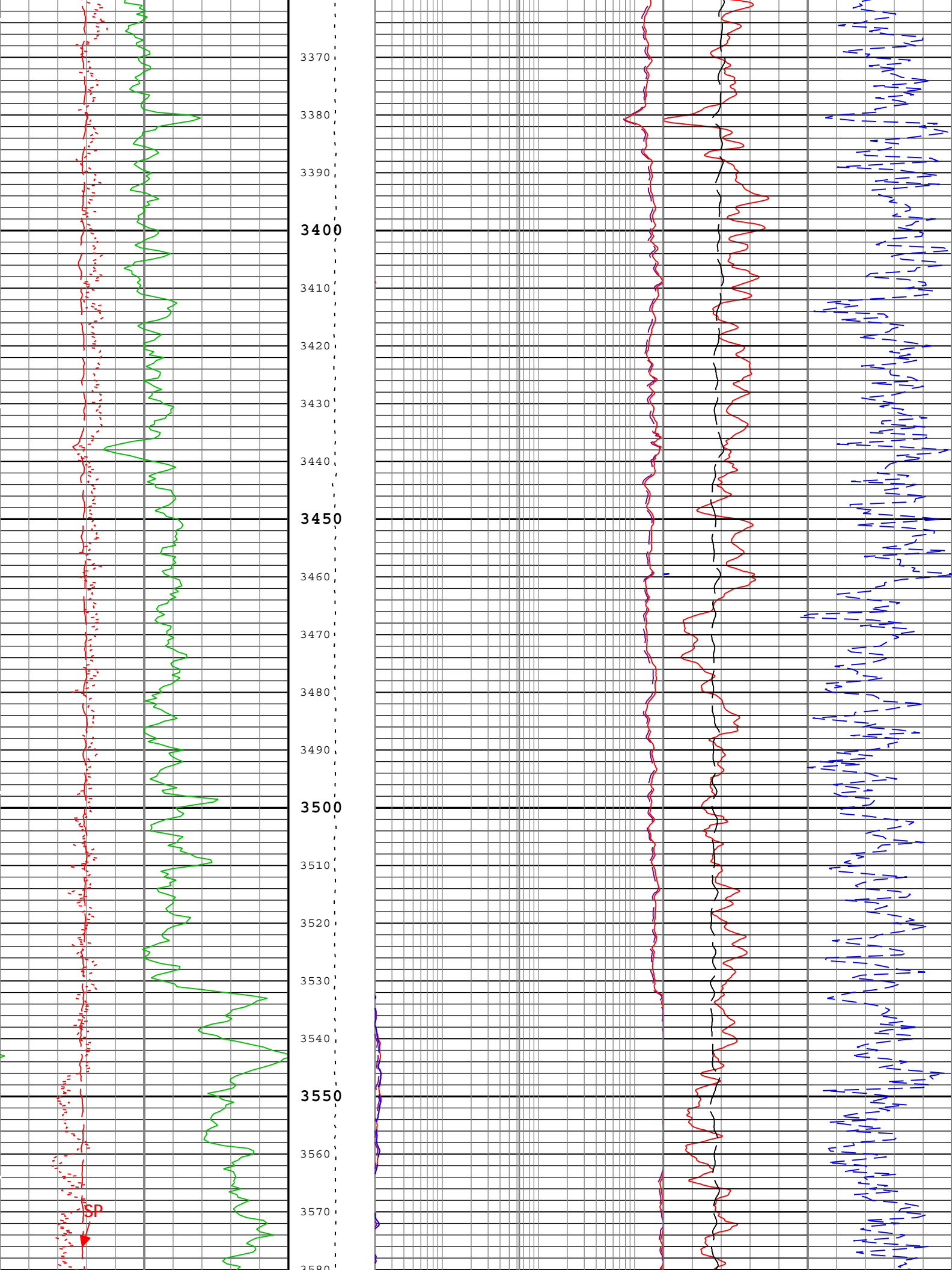


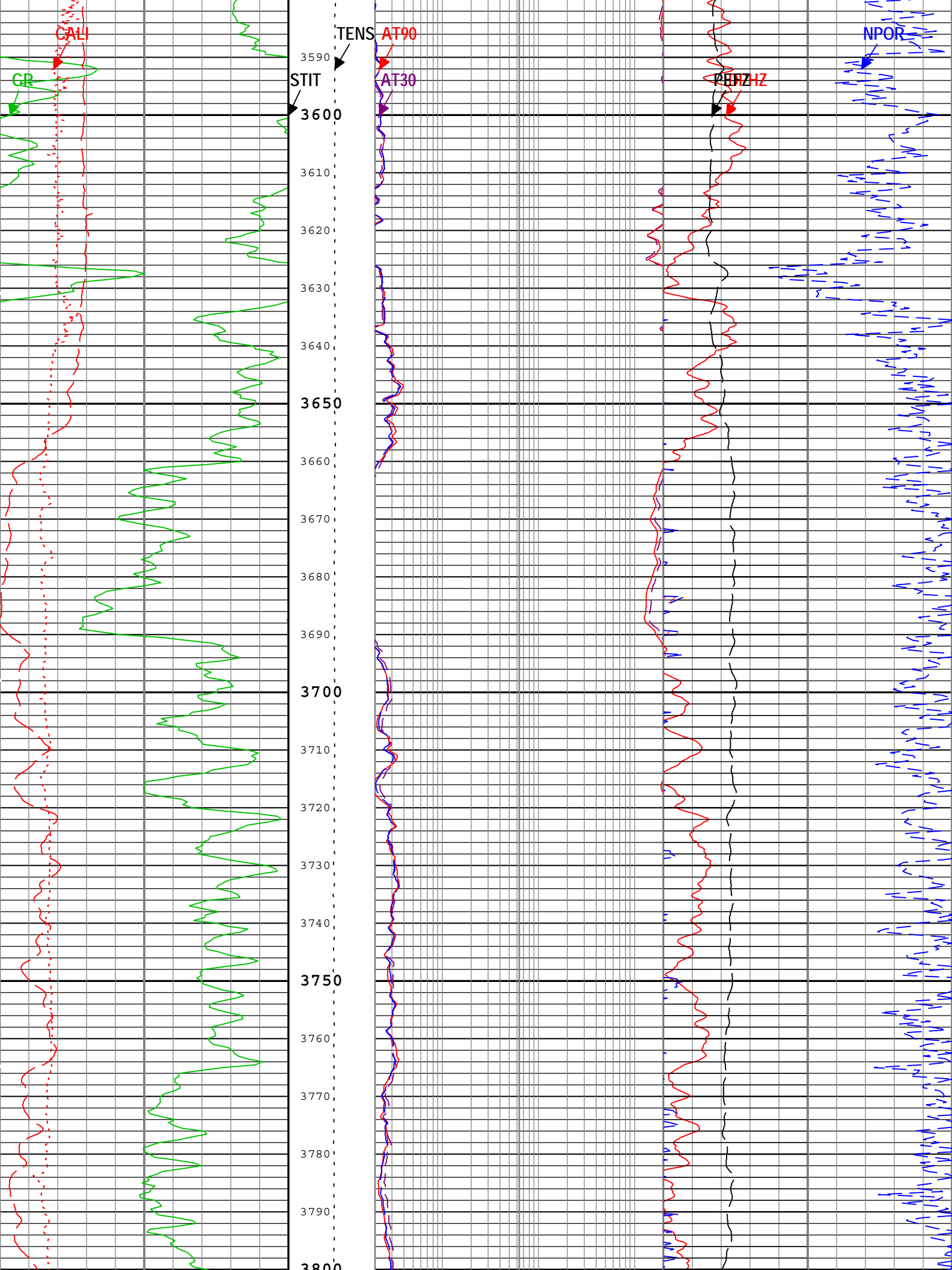


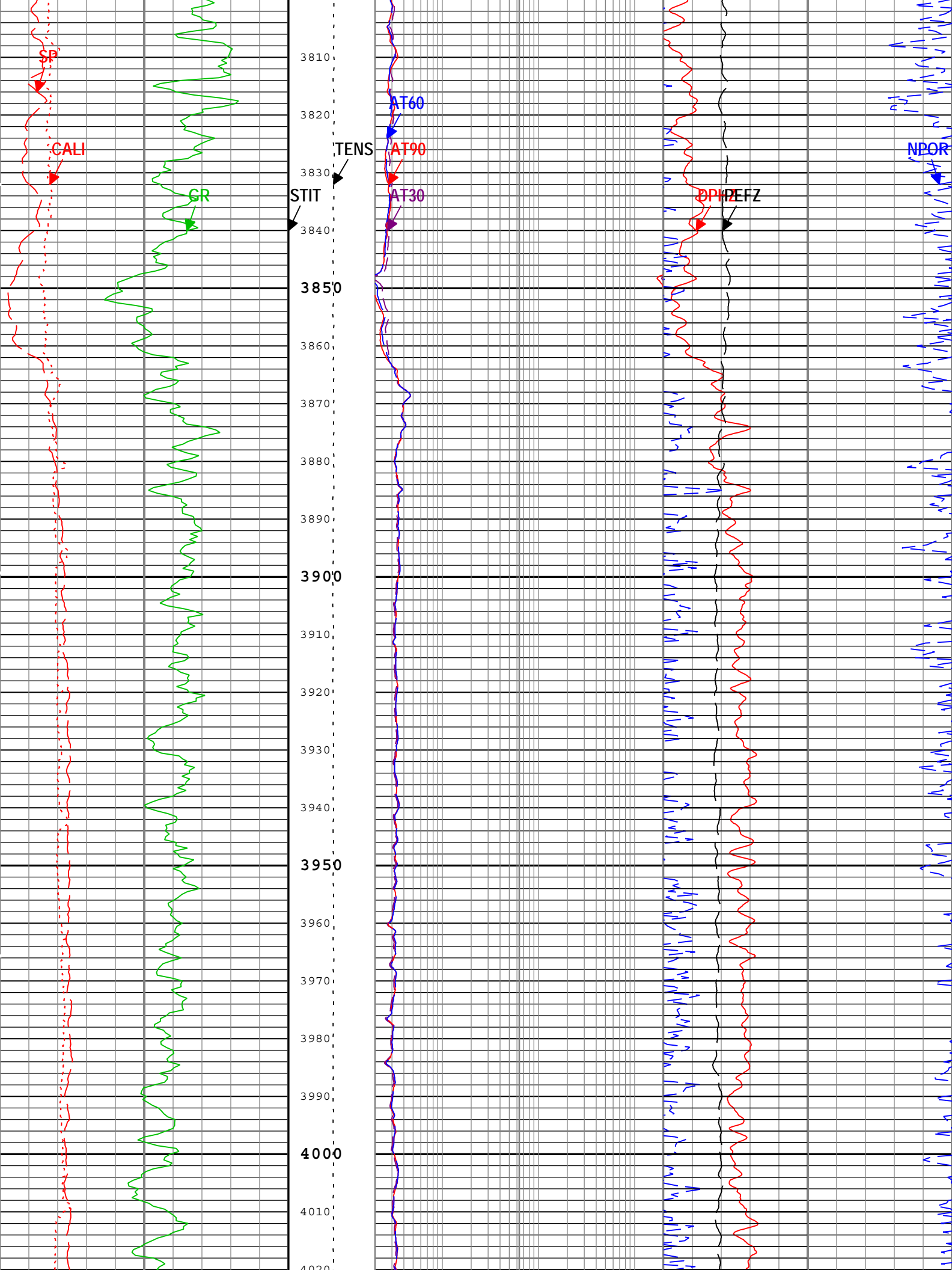


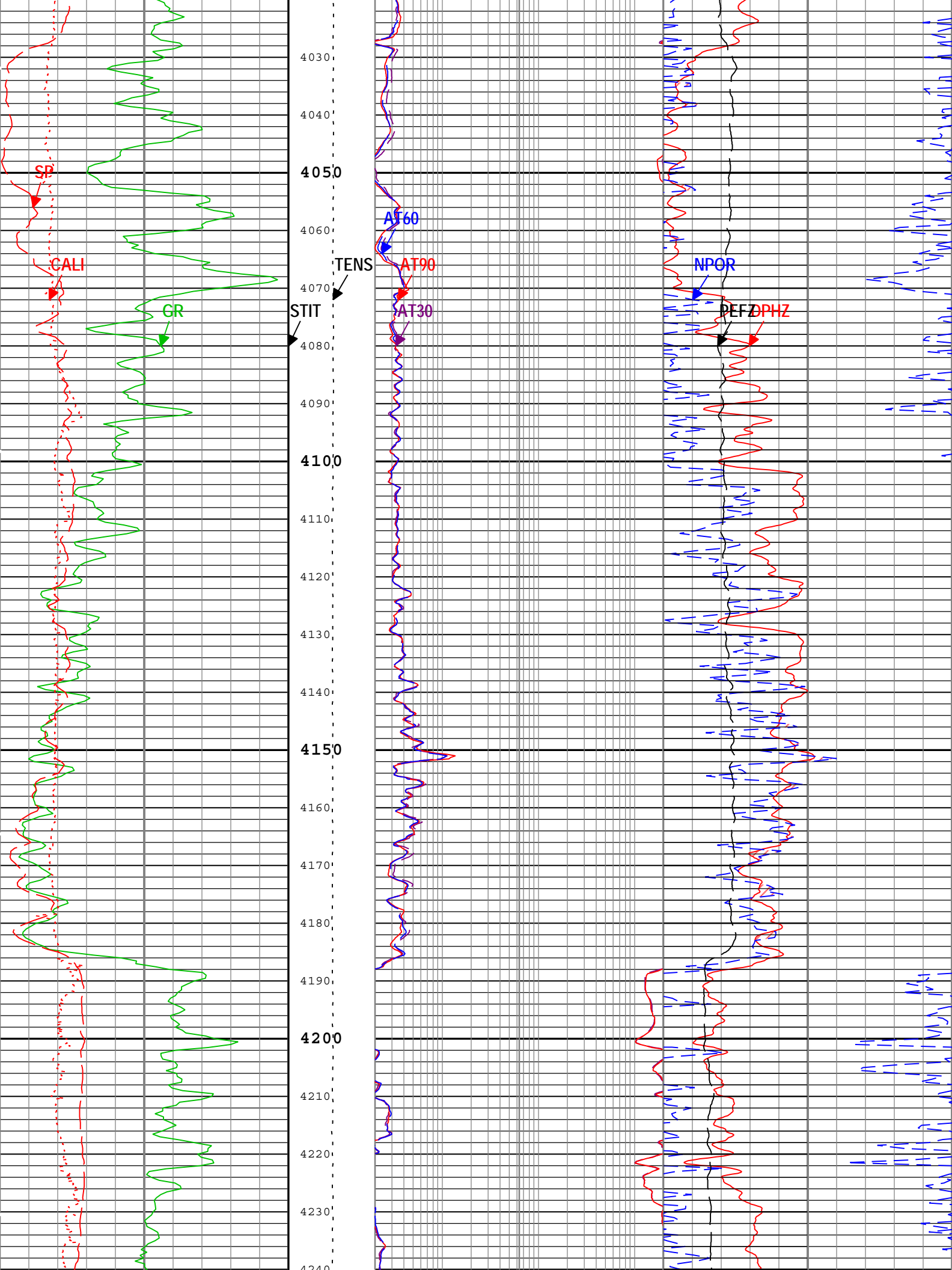


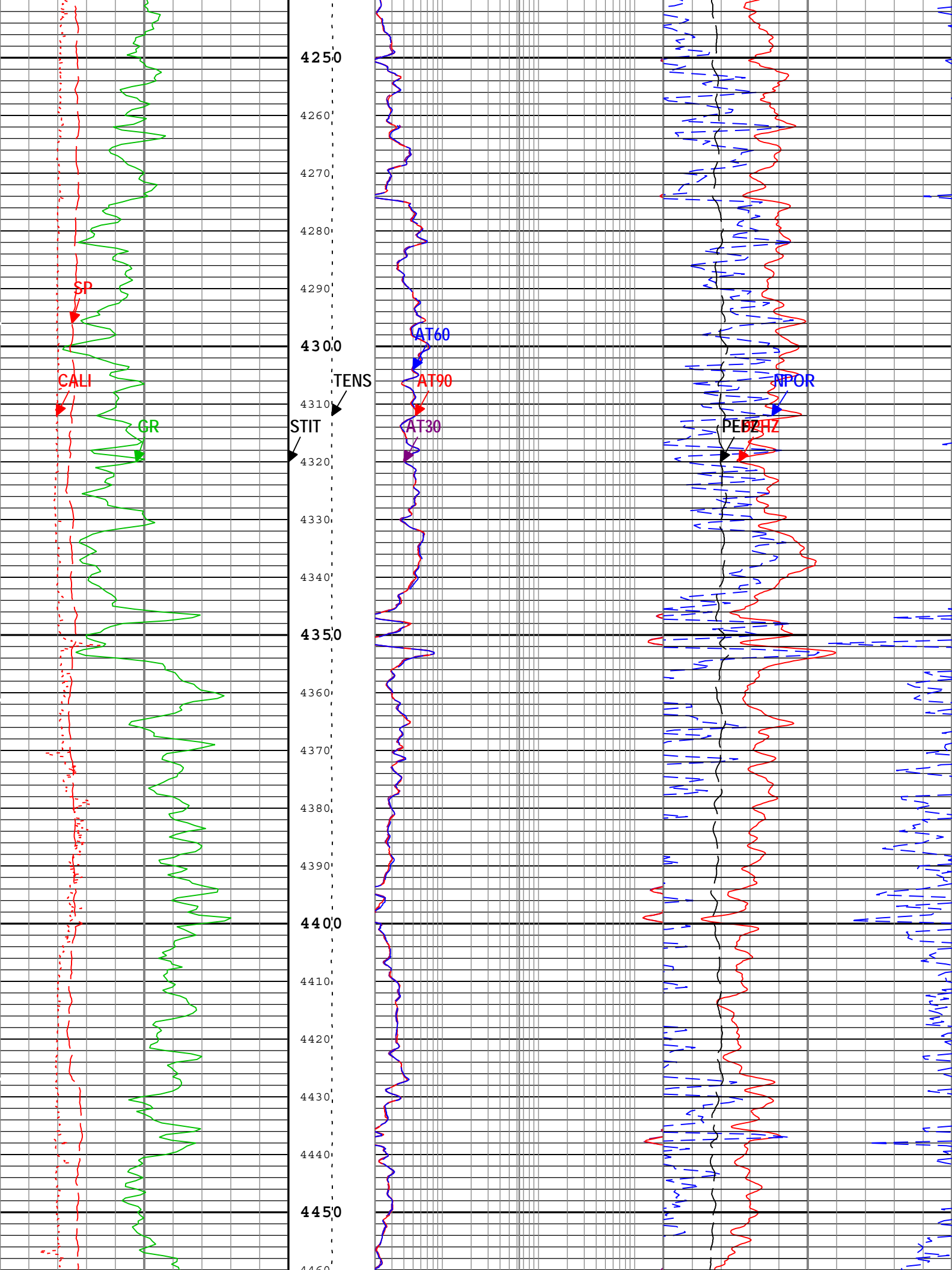


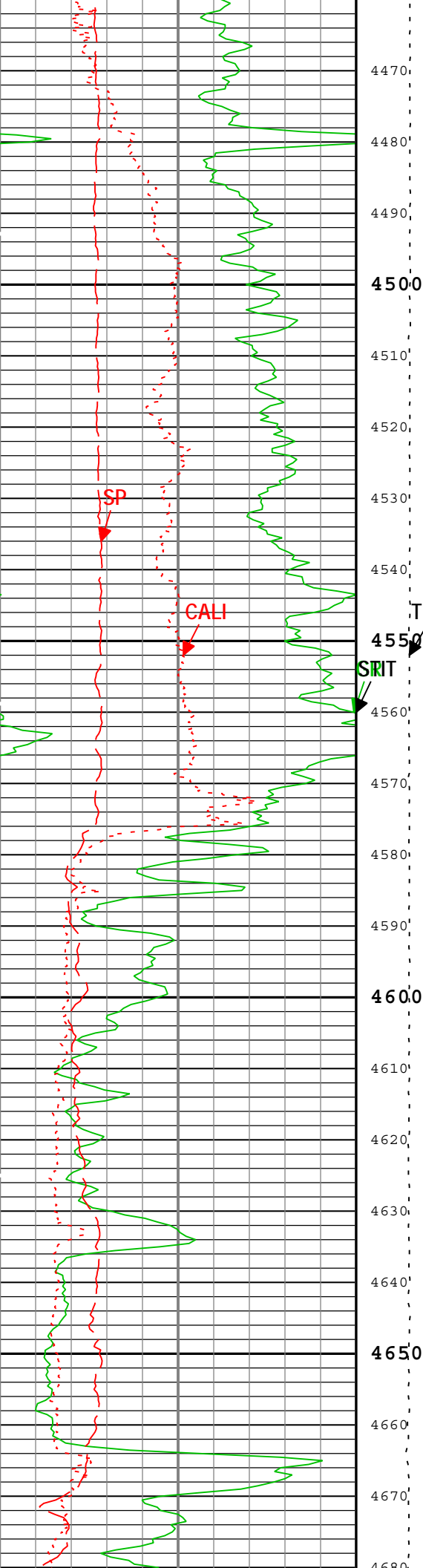






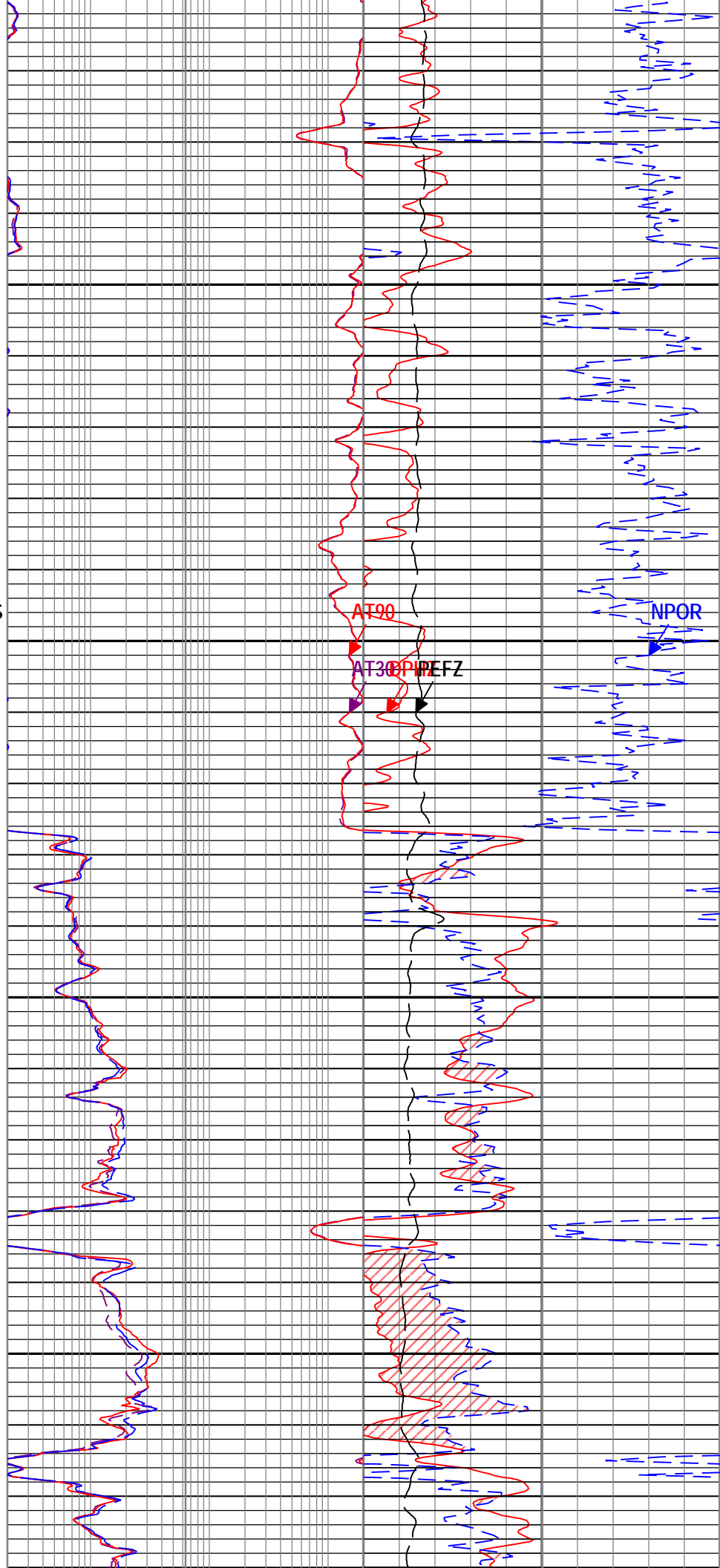


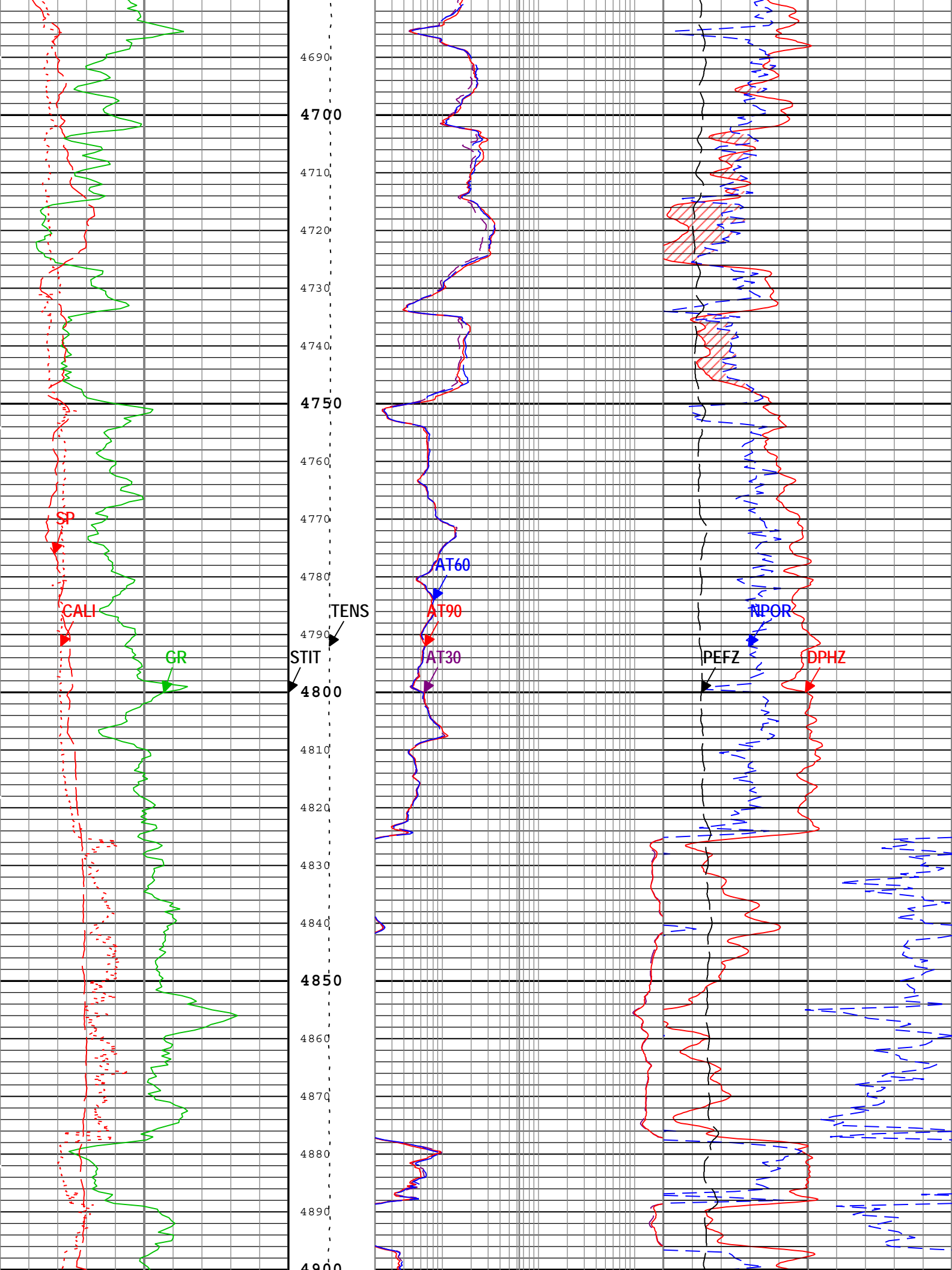


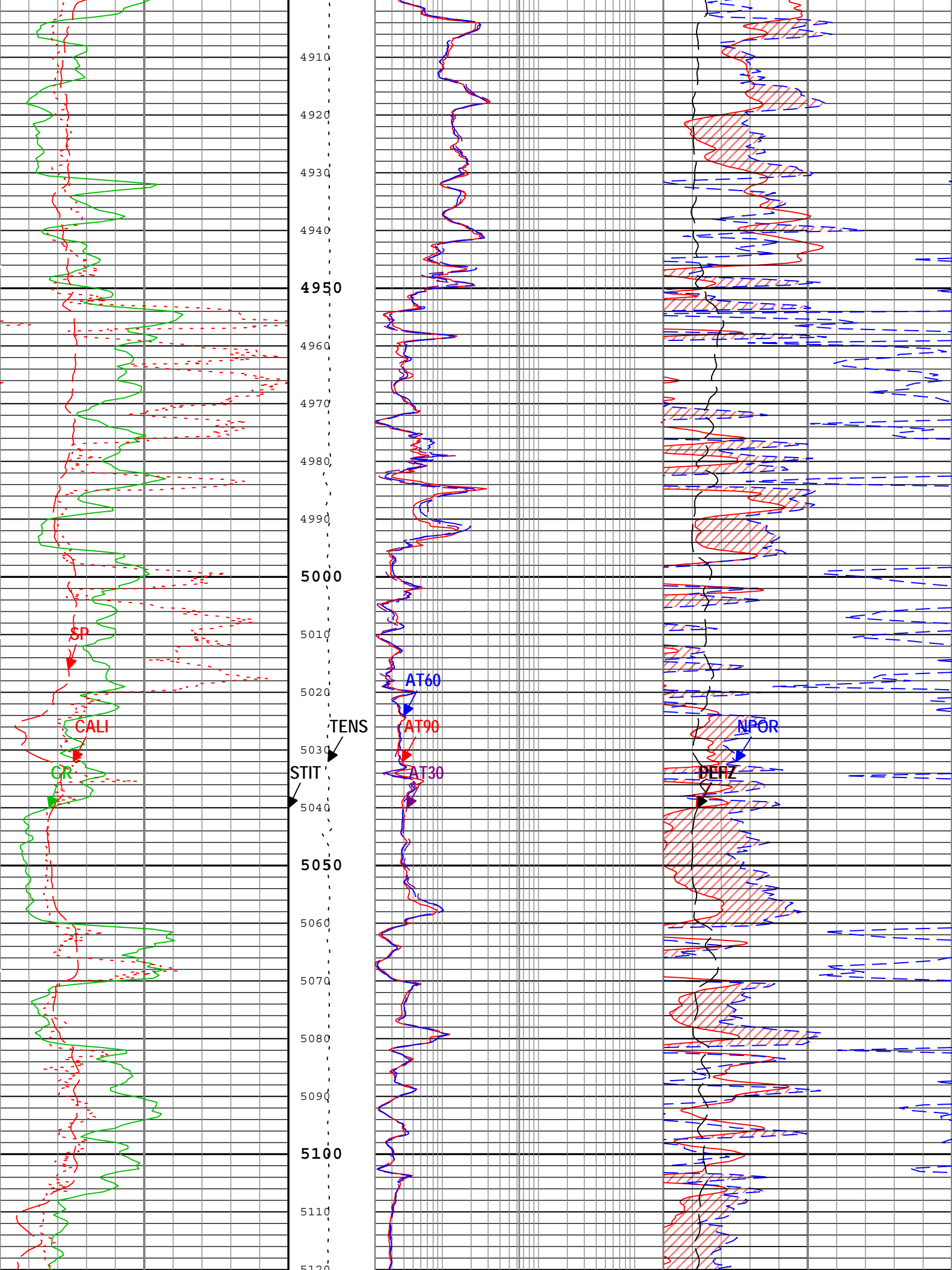


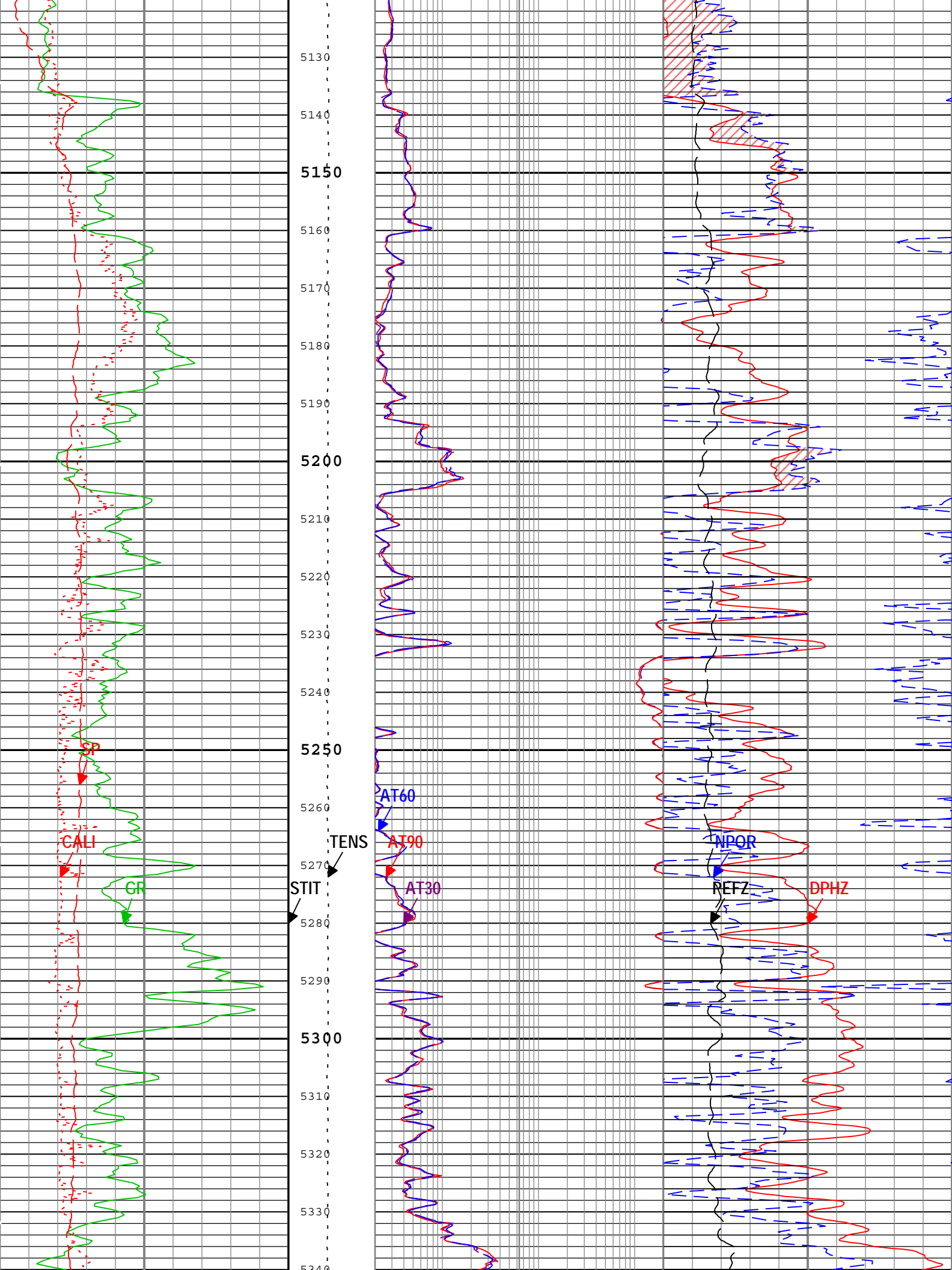
TENS

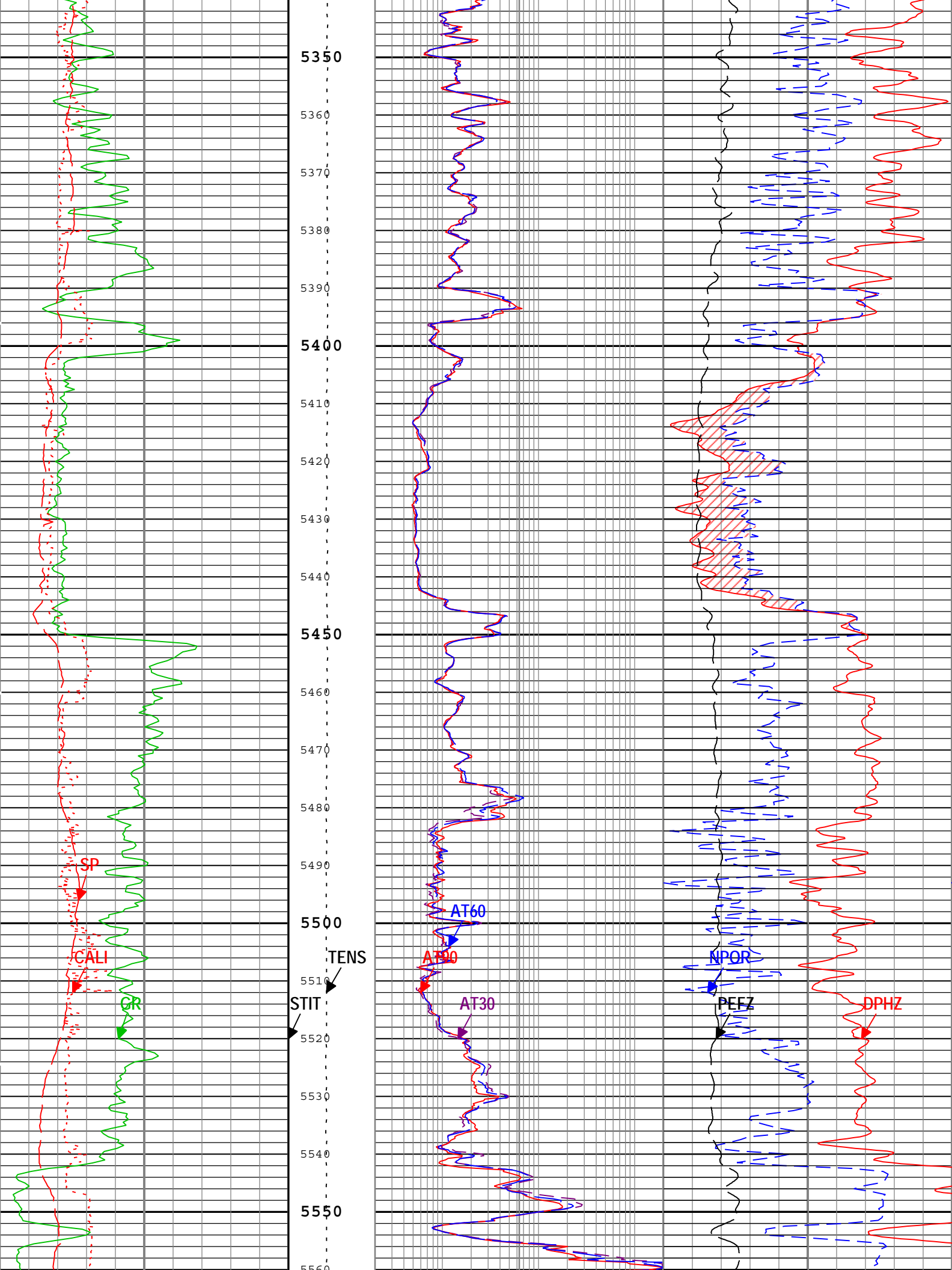
SRIT

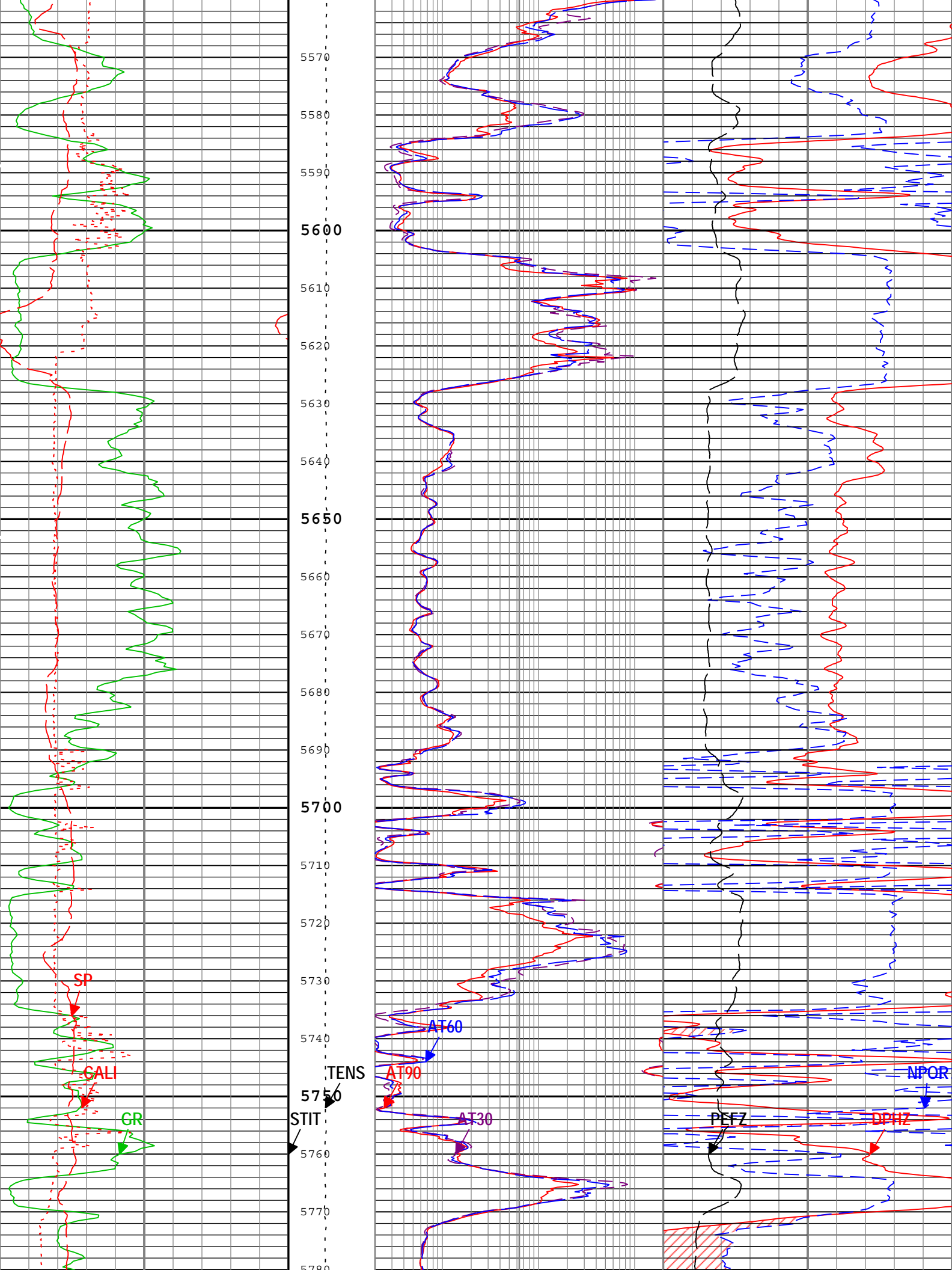


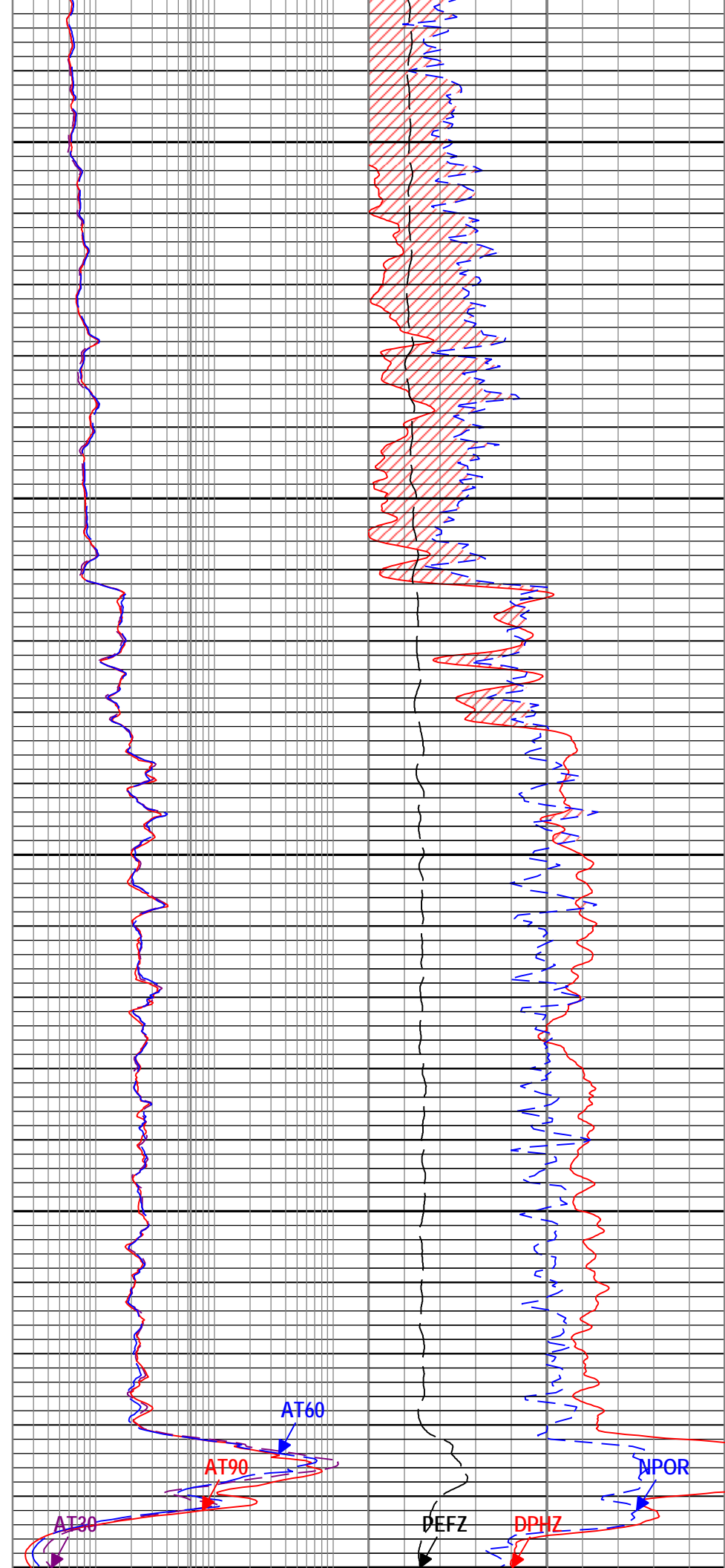
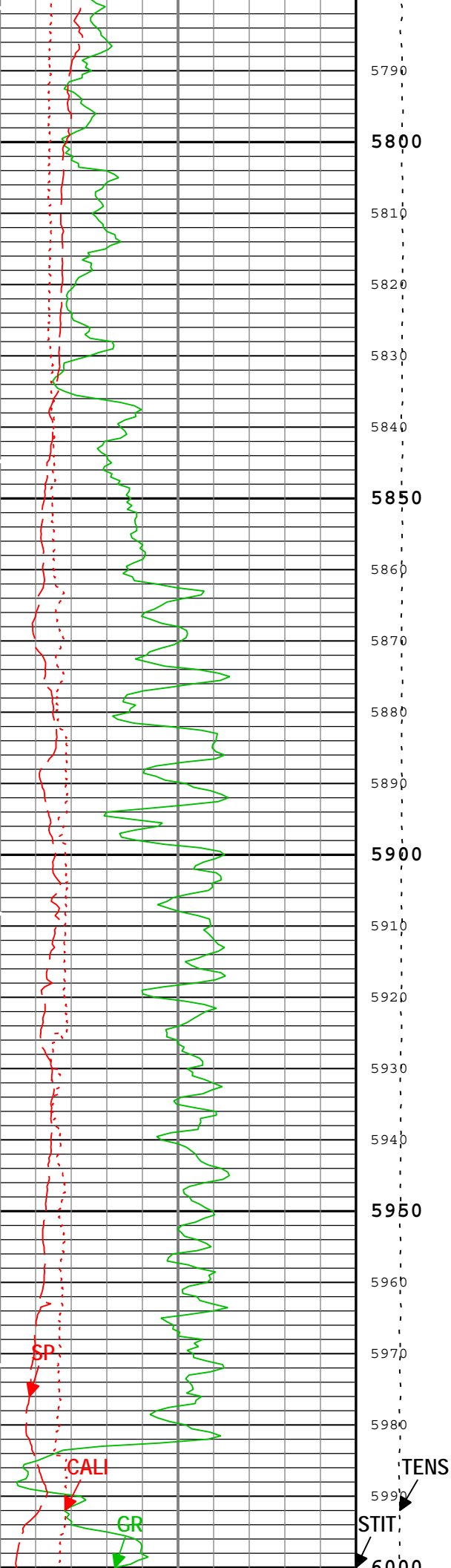


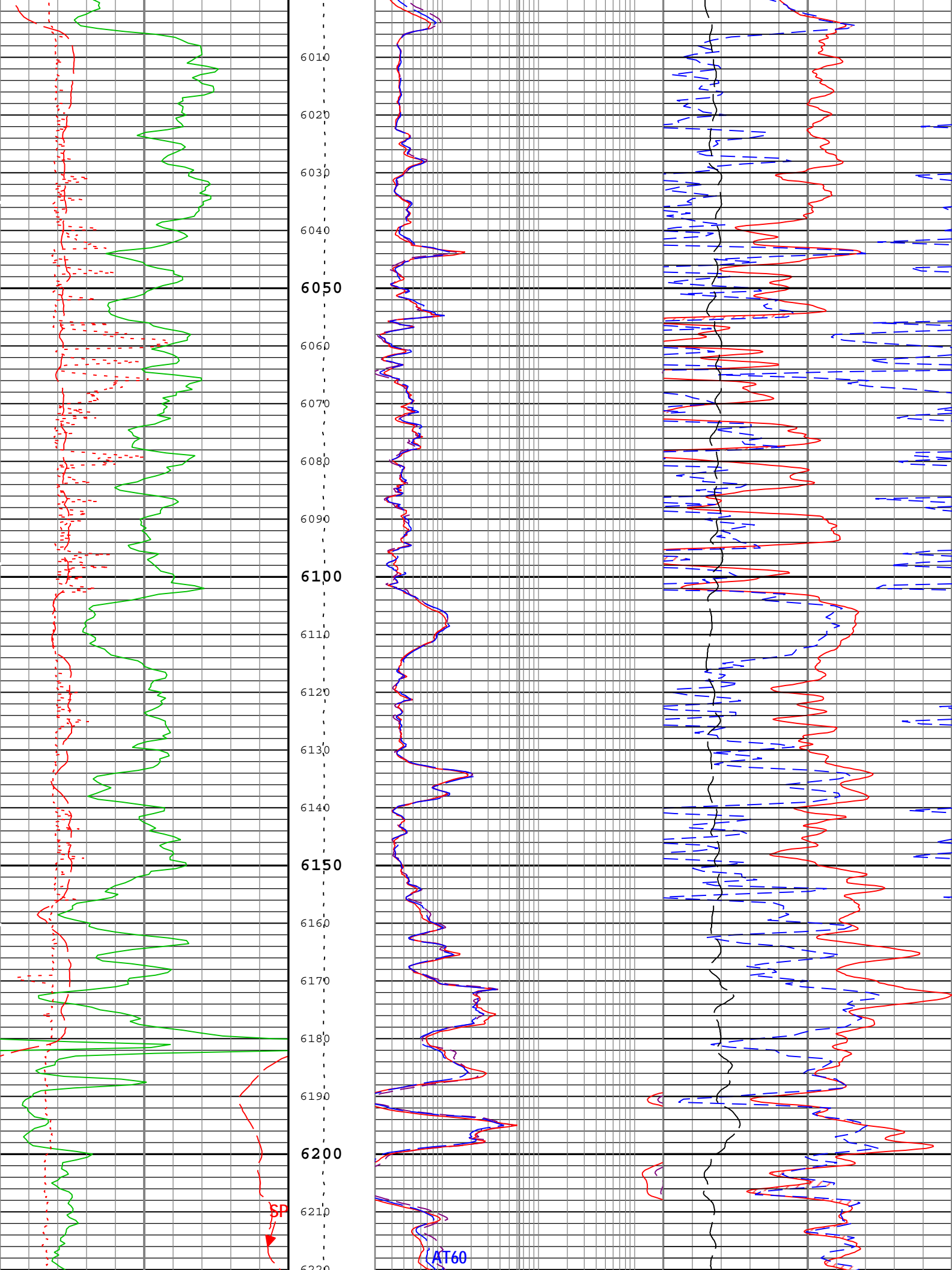


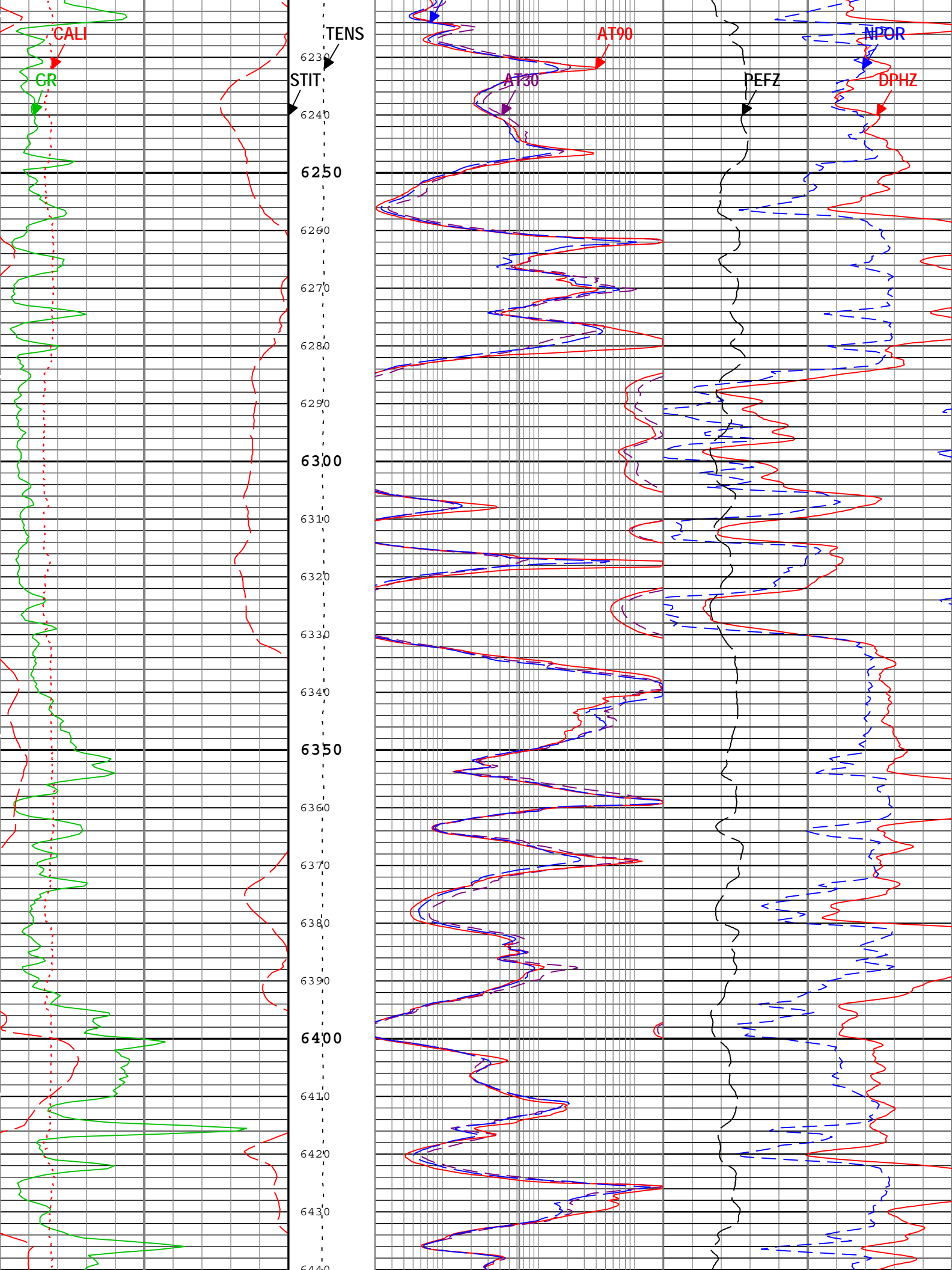


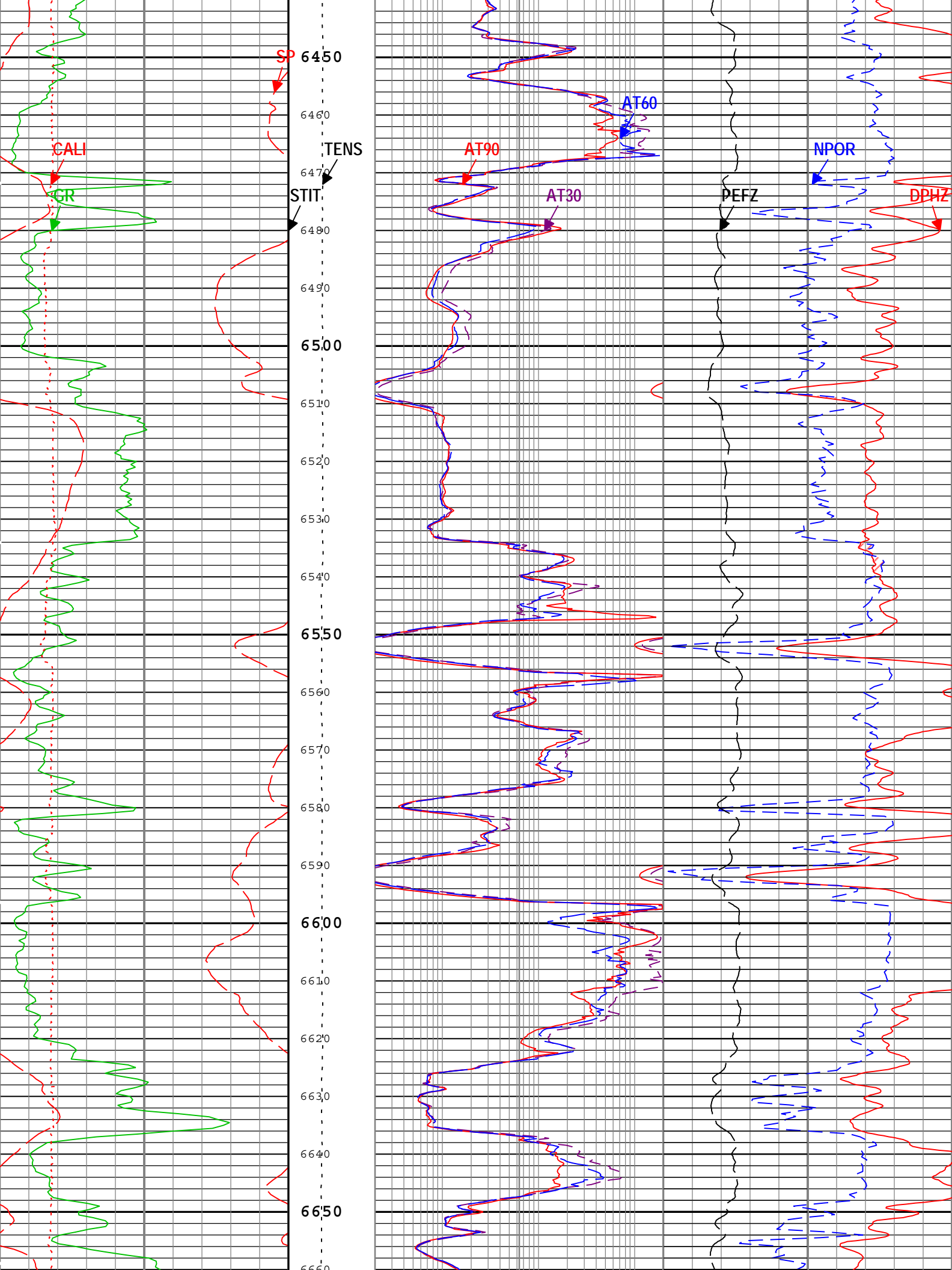


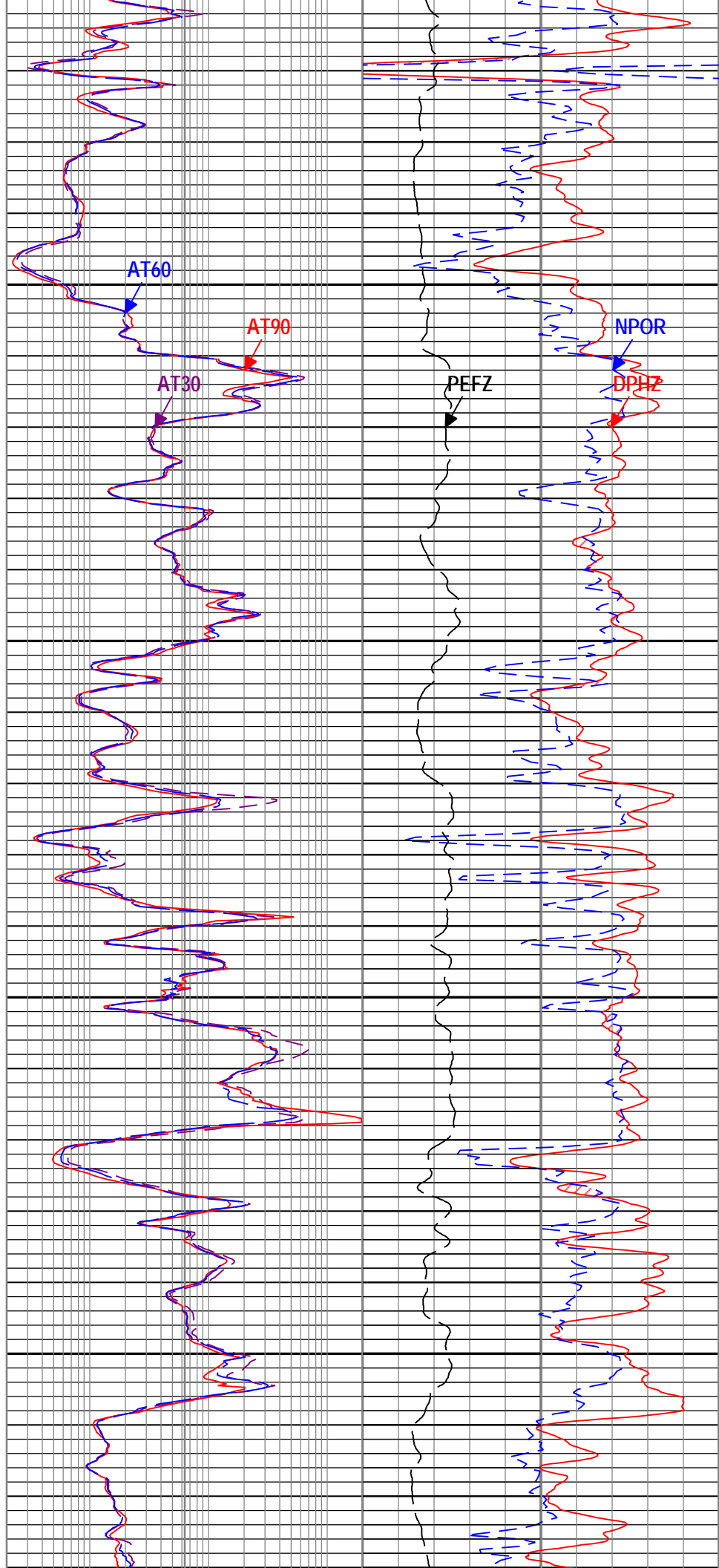
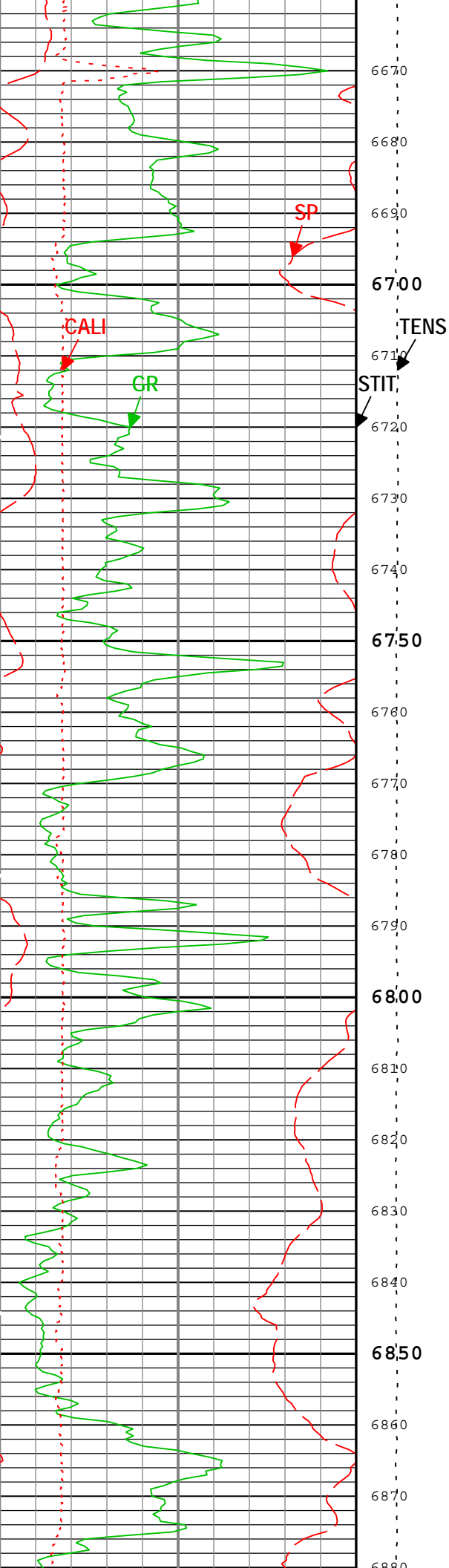


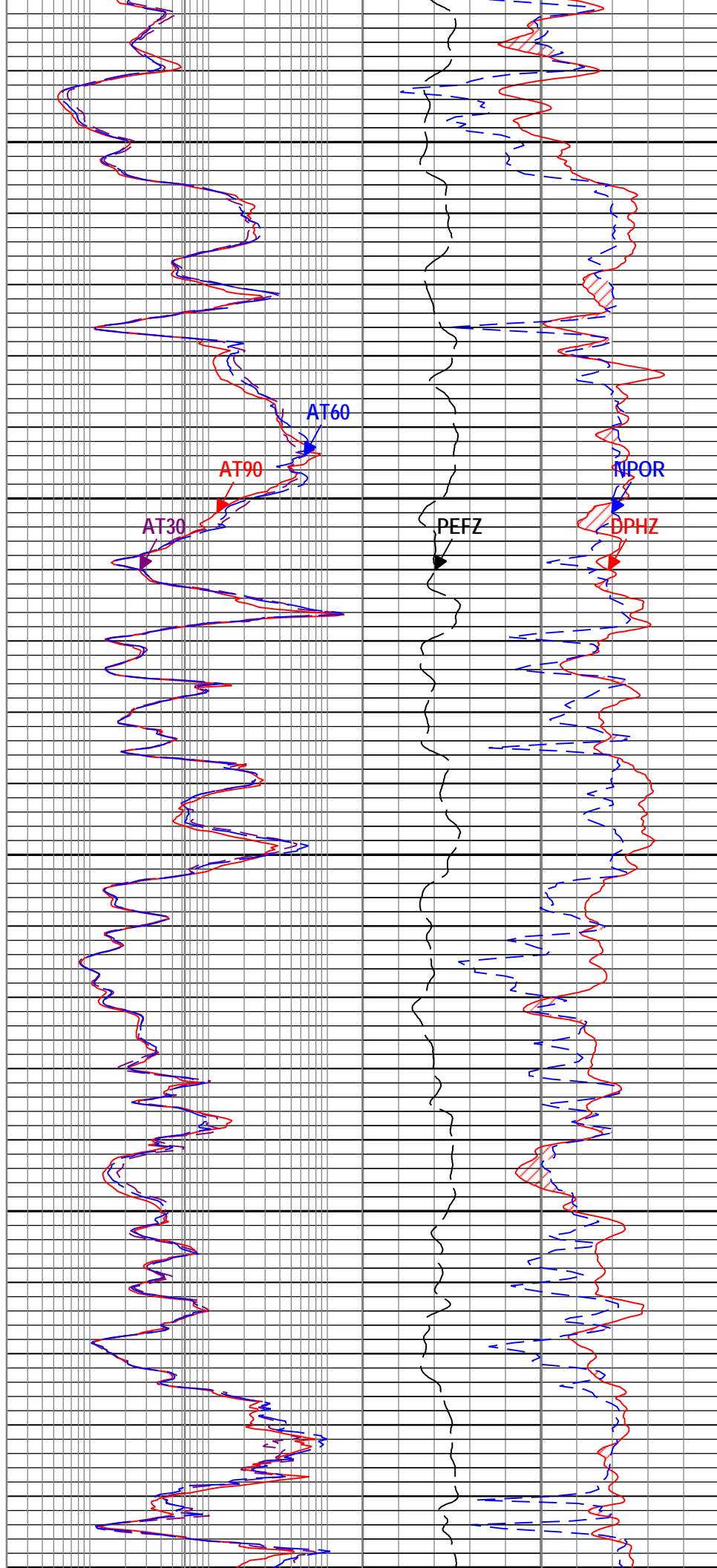
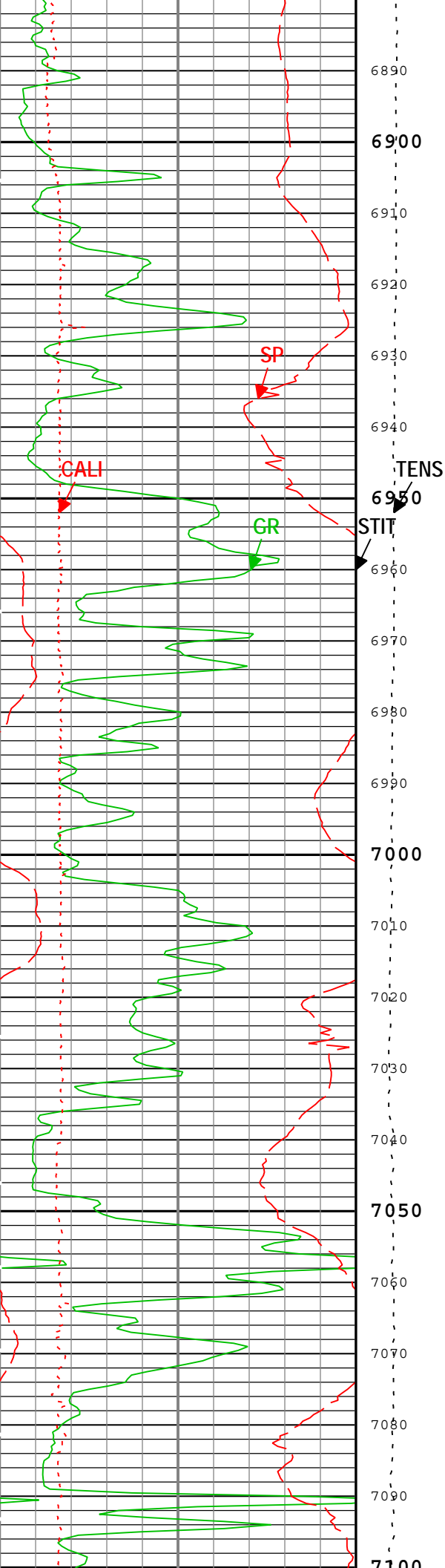


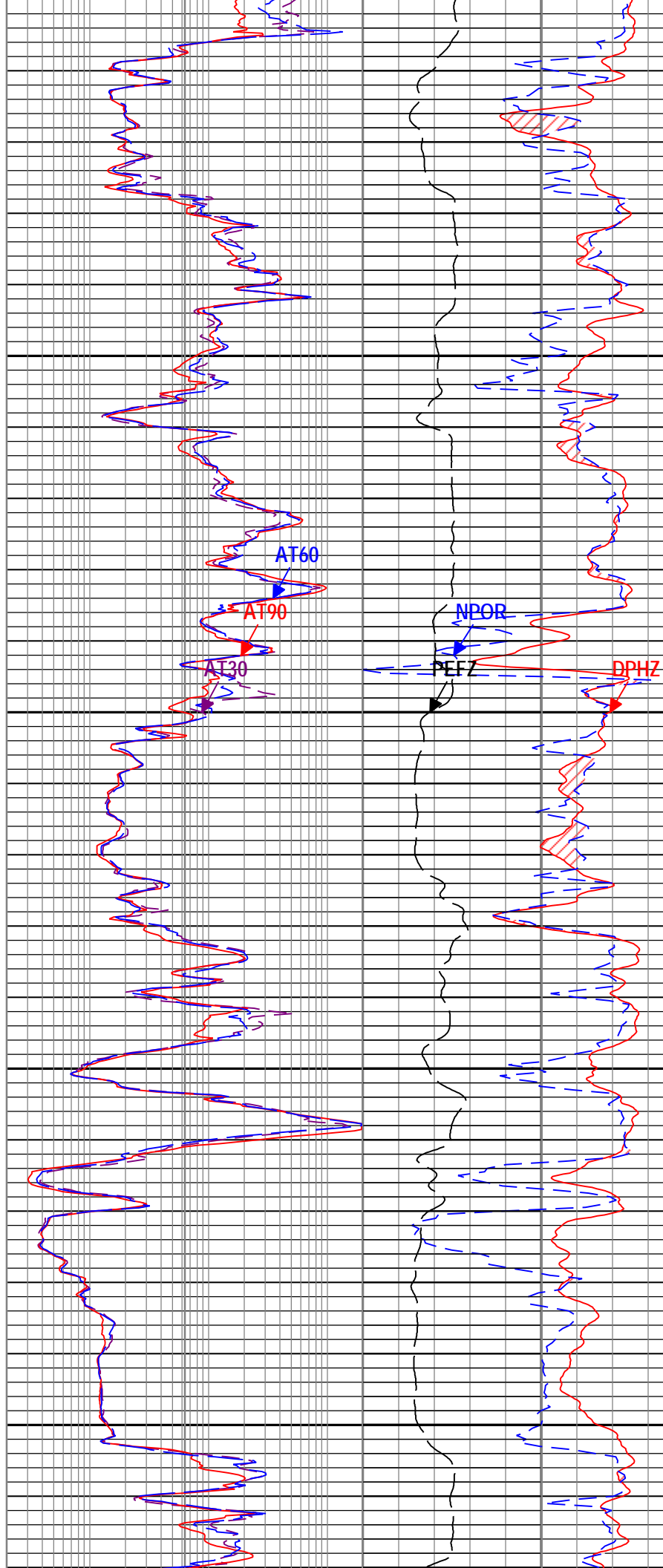
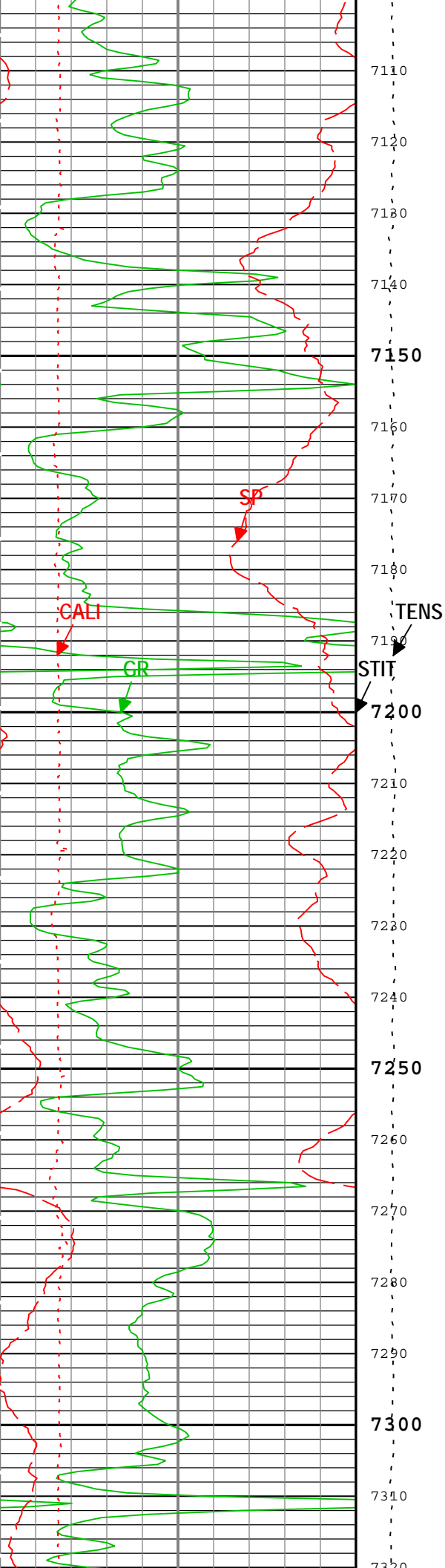


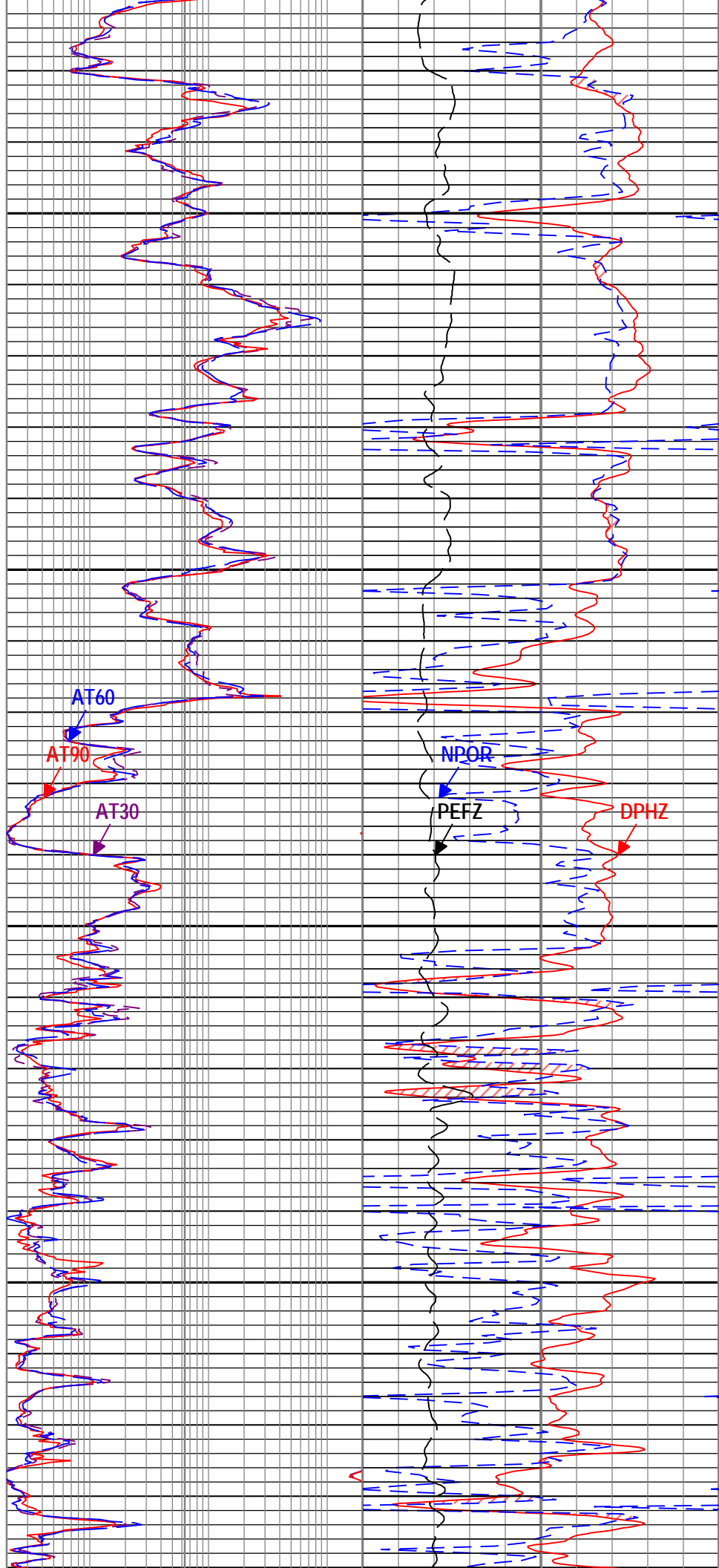
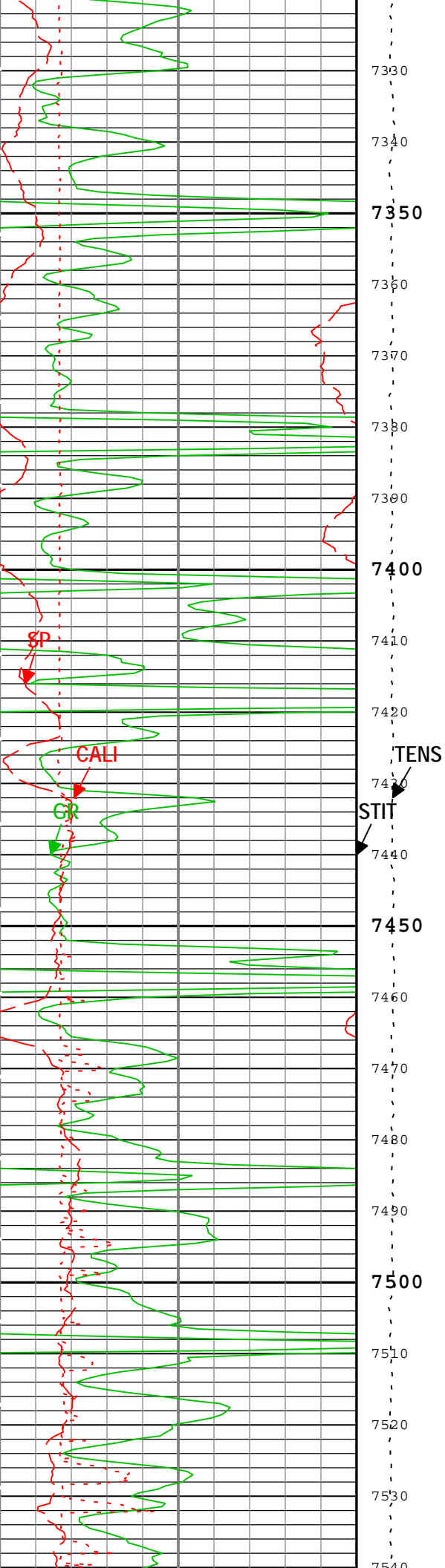


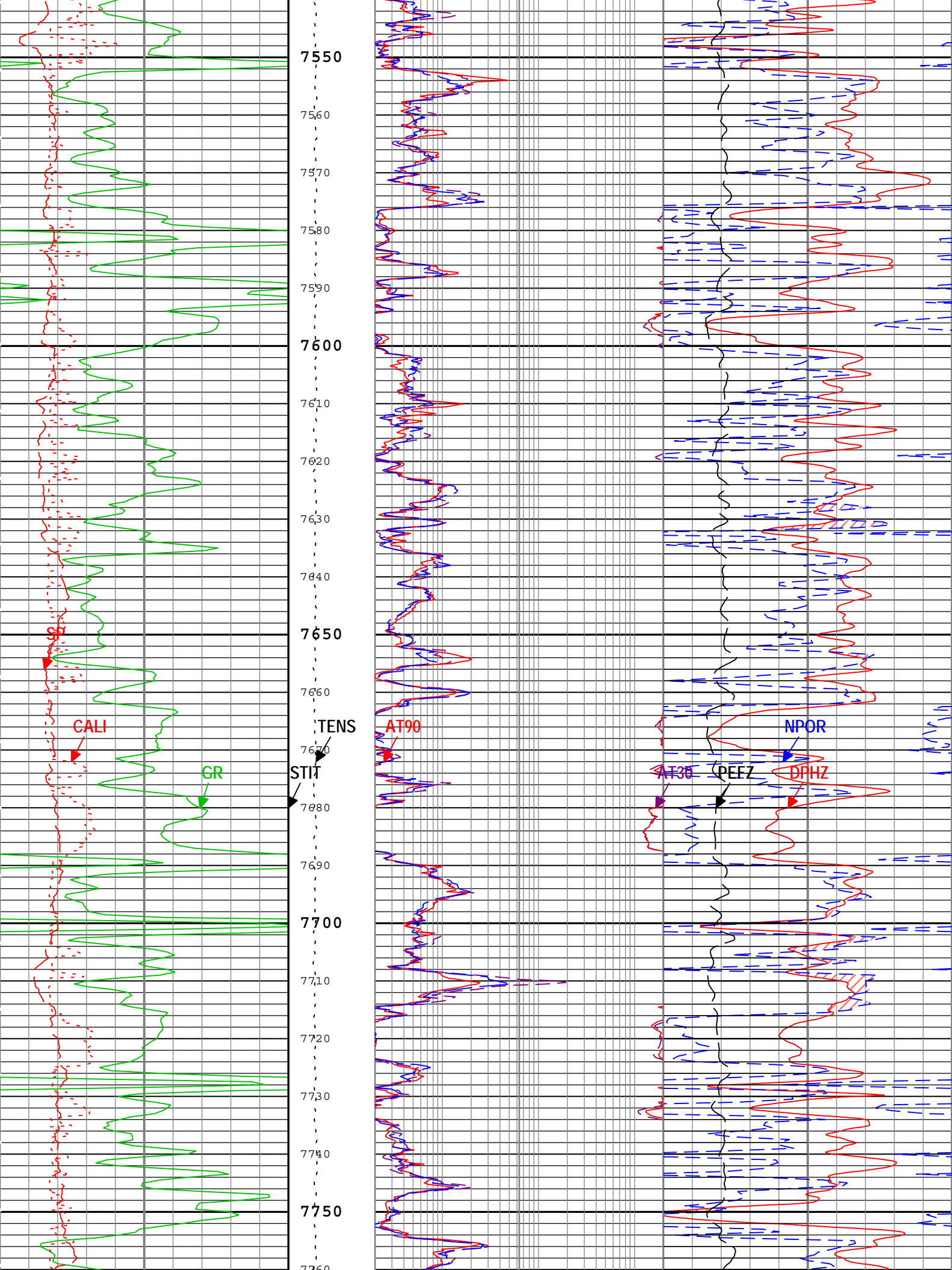


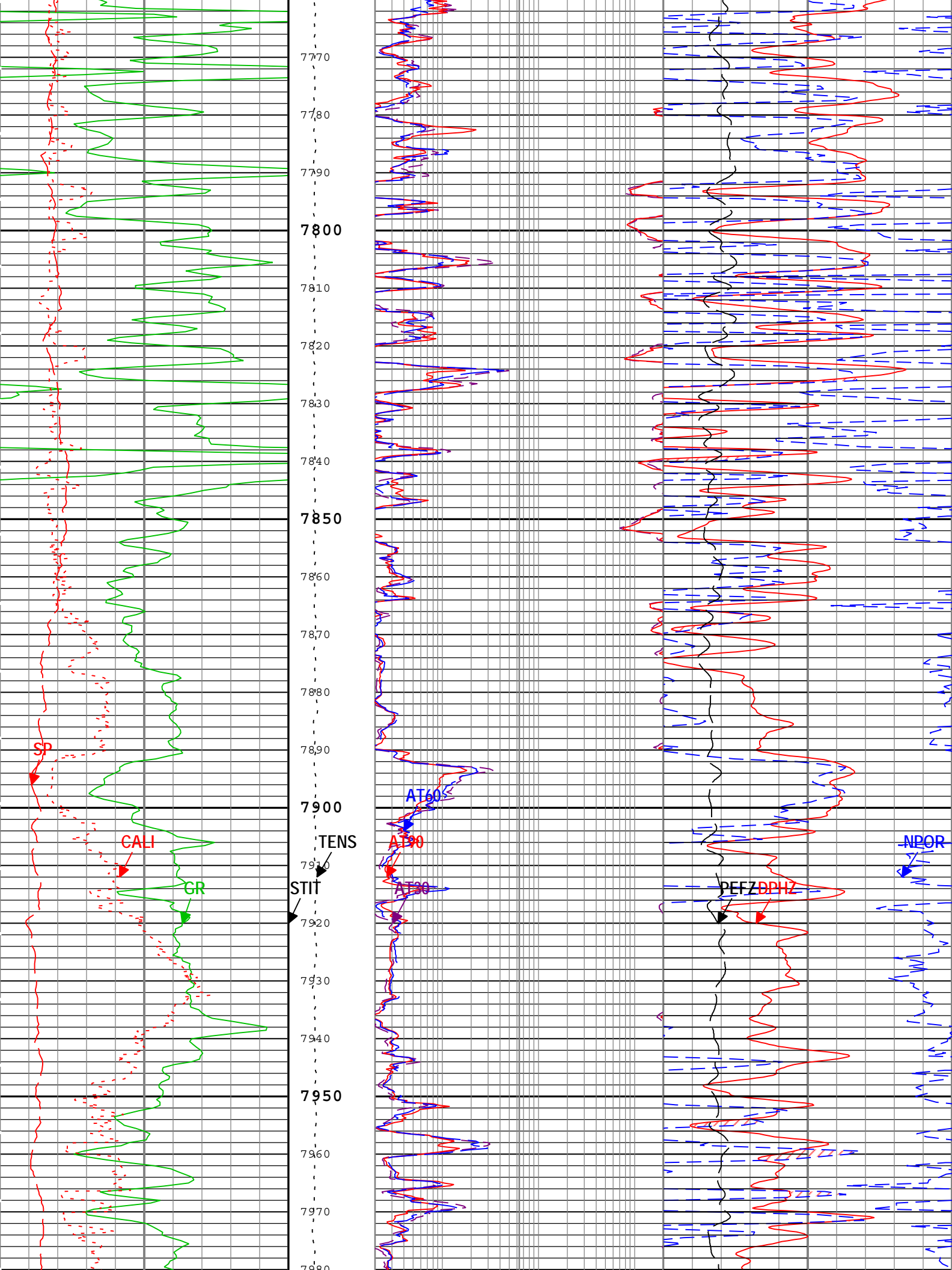


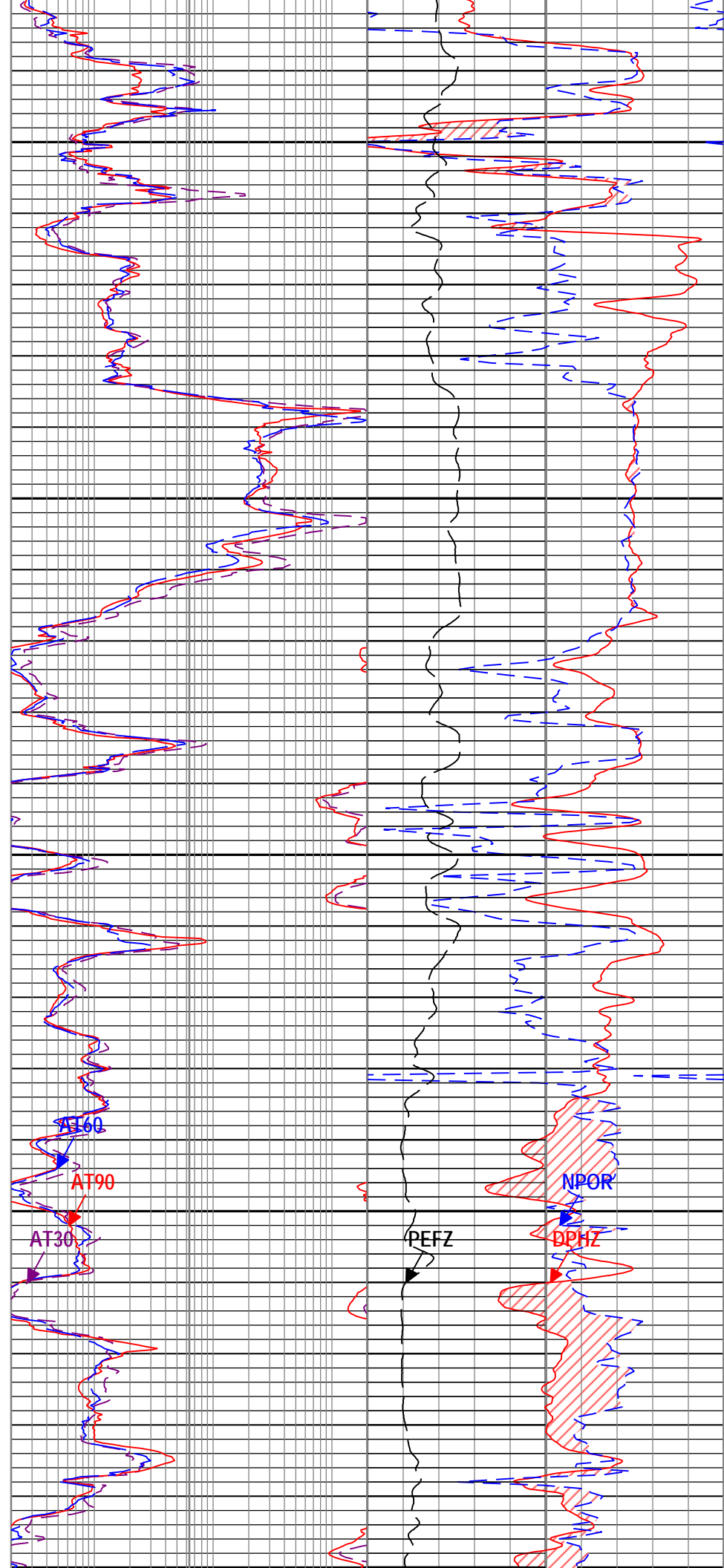
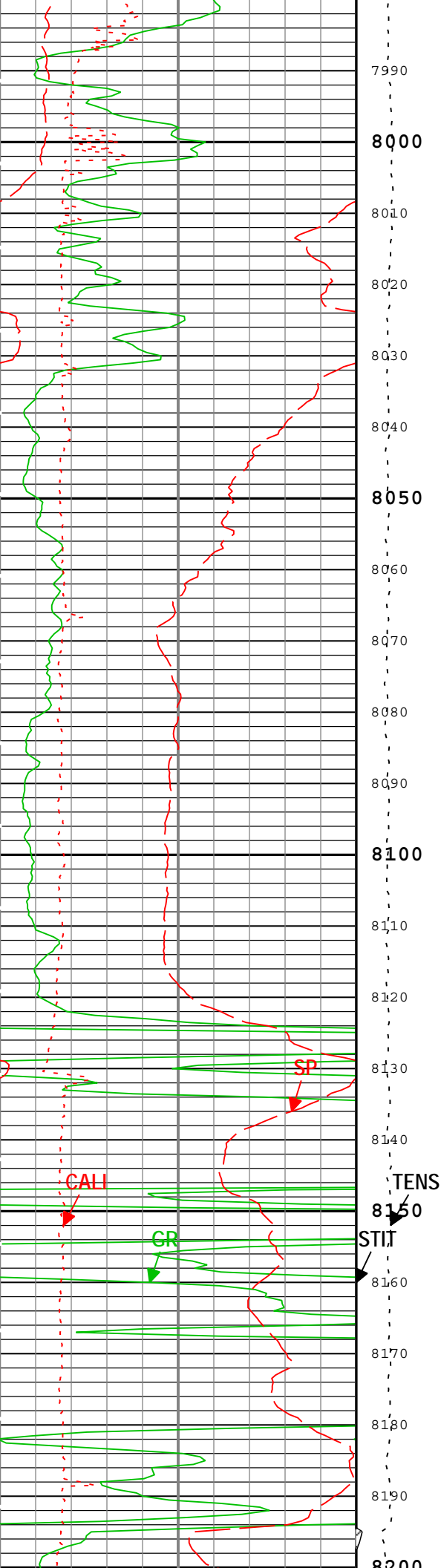


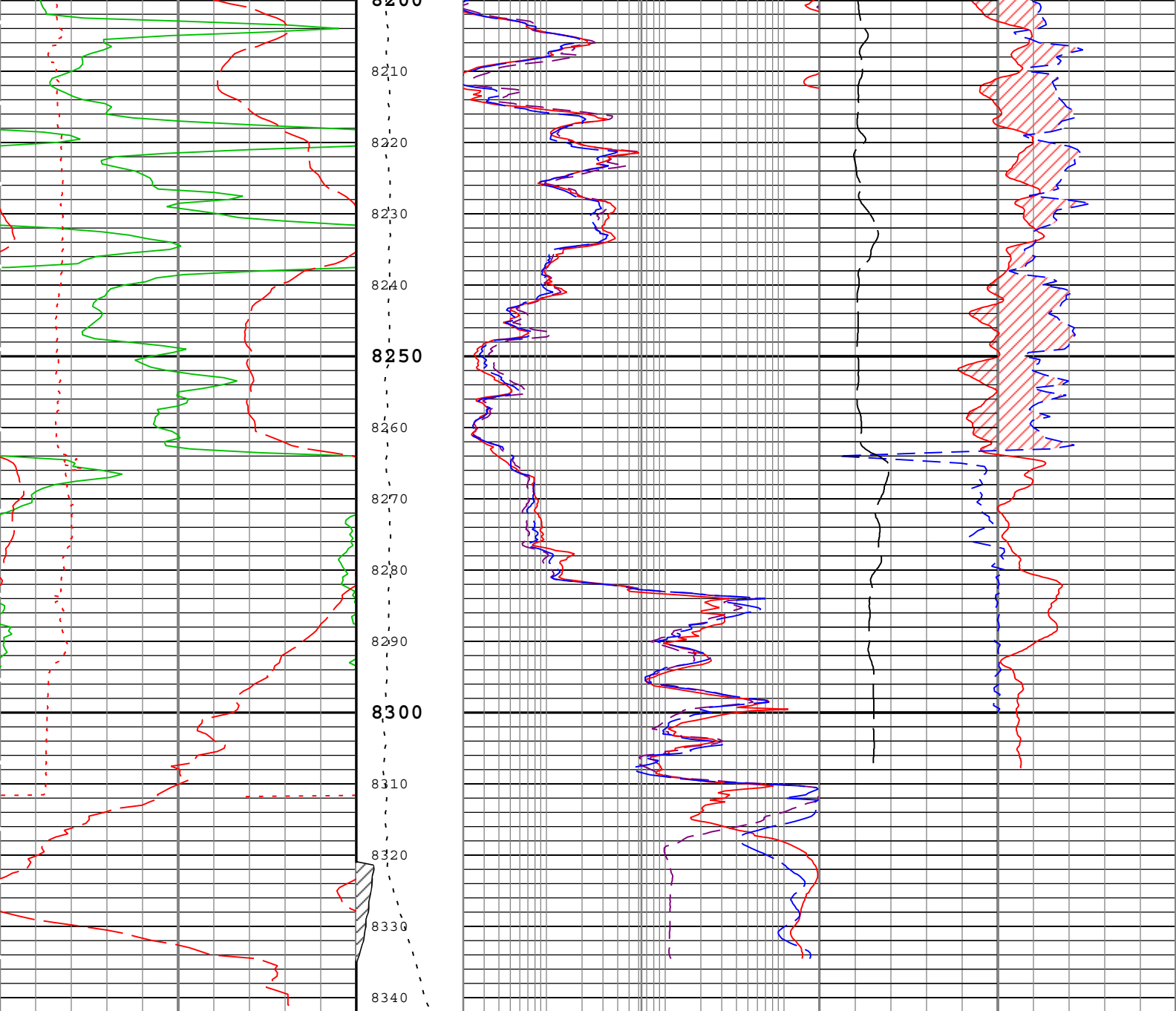












Gamma Ray Back up			Stuck Tool Indicator, Total (STIT)	Array Induction Two Foot Resistivity A30 (AT30) AIT_SpliceGroup[1]			Gas Effect		
Gamma Ray (GR) HGNS[1]				2 ohm.m 2000			NPOR Backup		
0	gAPI		200	0	ft	50			
Caliper (CALI) HDRS[1]			Cable Tension (TENS)	Array Induction Two Foot Resistivity A90 (AT90) AIT_SpliceGroup[1]			Standard Resolution Density Porosity (DPHZ) HDRS[1]		
6	in			16	2 ohm.m 2000			0.3 ft3/ft3 -0.1	
Spontaneous Potential (SP) AIT_SpliceGroup[1]			6000 lbf	Array Induction Two Foot Resistivity A60 (AT60) AIT_SpliceGroup[1]			Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS[1]		
0	mV			200	2 ohm.m 2000			0.3 m3/m3 -0.1	
							Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS[1]		
							0 10		

TIME_1900 - Time Marked every 60.00 (s)

Channel Processing Parameters

One : Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Standoff	
ACDE	Array Induction Casing Detection Enable	AIT-M	Yes	
ASTA	Array Induction Tool Standoff	AIT-M	1	in
BARI	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BHT	Bottom Hole Temperature	Borehole	198	degF
BS	Bit Size	WLSESSION	7.875	in
BSAL	Borehole Salinity	Borehole	0	ppm
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0	in
CBLO	Casing Bottom (Logger)	WLSESSION	365	ft
CDEN	Cement Density	HGNS-H	2	g/cm3
DFD	Drilling Fluid Density	Borehole	9.3	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DFT_WATER	Drilling Fluid Water Type	Borehole	LSND	
DHC	Density Hole Correction	HDRS-H	Bit Size	
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	75	degF
RMFS	Resistivity of Mud Filtrate Sample	Borehole	0.78	ohm.m
SOCO	Standoff Correction Option	HGNS-H	Yes	
SPDR	SP Drift Per Foot	AIT-M	0	mV/ft
TD	Total Measured Depth	Borehole	8321	ft

Tool Control Parameters

One : 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	840	ft/h

Calibration Report

AIT-M (Array Induction Tool - M) Calibration - Run One

Primary Equipment :			
File code for AIT-MA Sonde Tool Element	AMIS	181	
Auxiliary Equipment :			
File code for AIT Bottom Nose Tool Element	AMRM	181	

AIT Sonde Calibration - Test Loop Gain

Master (EEPROM):		23:01:59 22-Sep-2014						
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	
Test Loop Gain - 0		Master	1.000	0.950	1.041	1.050	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	
Test Loop Phase - 0	deg	Master	0	2.000	1.905	2.000	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	

		Before	-----	131.000	-173.078	-109.000	
		Before-Master	-----	-----	-0.113	-----	
Thru Cal Mag - 4	V	Master	-----	0.804	1.233	1.876	
		Before	-----	0.804	1.234	1.876	
		Before-Master	-----	-----	0.001	-----	
Thru Cal Phase - 4	deg	Master	-----	125.000	178.761	-115.000	
		Before	-----	125.000	178.644	-115.000	
		Before-Master	-----	-----	-0.117	-----	
Thru Cal Mag - 5	V	Master	-----	1.176	1.795	2.744	
		Before	-----	1.176	1.795	2.744	
		Before-Master	-----	-----	0.000	-----	
Thru Cal Phase - 5	deg	Master	-----	122.000	177.104	-118.000	
		Before	-----	122.000	176.982	-118.000	
		Before-Master	-----	-----	-0.122	-----	
Thru Cal Mag - 6	V	Master	-----	1.176	1.794	2.744	
		Before	-----	1.176	1.795	2.744	
		Before-Master	-----	-----	0.001	-----	
Thru Cal Phase - 6	deg	Master	-----	121.000	177.111	-119.000	
		Before	-----	121.000	176.989	-119.000	
		Before-Master	-----	-----	-0.122	-----	
Thru Cal Mag - 7	V	Master	-----	0.846	1.294	1.974	
		Before	-----	0.846	1.294	1.974	
		Before-Master	-----	-----	0.000	-----	
Thru Cal Phase - 7	deg	Master	-----	115.000	176.348	-125.000	
		Before	-----	115.000	176.207	-125.000	
		Before-Master	-----	-----	-0.141	-----	
SPA Zero	mV	Master		-50.000	0.145	50.000	
		Before		-50.000	0.231	50.000	
		Before-Master	-----	-----	0.086	-----	
SPA Plus	mV	Master		941.000	992.483	1040.000	
		Before		941.000	992.681	1040.000	
		Before-Master	-----	-----	0.198	-----	
Temperature Zero	V	Master		-0.050	0.000	0.050	
		Before		-0.050	0.000	0.050	
		Before-Master	-----	-----	0.000	-----	
Temperature Plus	V	Master		0.870	0.919	0.960	
		Before		0.870	0.919	0.960	
		Before-Master	-----	-----	0.000	-----	

HDRS-H (HILT Density and Rxo Sonde, 150 degC) Calibration - Run One							
Primary Equipment :							
	HILT High-Resolution Control Cartridge, 150 degC		HRCC-H		3828		
	HILT Resistivity Gamma-Ray Density Device, 150 degC		HRGD-H		3760		
Auxiliary Equipment :							
	HRDD Backscatter Detector		Backscatter				
	HRDD Long Spacing Detector		Long Spacing				
	HRDD Short Spacing Detector		Short Spacing				
	Cesium 137 Gamma-Ray Logging Source		GSR-J		5471		
	HILT High-Resolution Control Cartridge, 150 degC		HRCC-H		3828		
	HILT High-Resolution Mechanical Sonde, 150 degC		HRMS-H		3863		
Calibration Parameter :							
	Small Ring Size (Caliper Calibration Small Ring)		8.00				
	Large Ring Size (Caliper Calibration Large Ring)		12.00				

HDRS Caliper Calibration - Caliper Accumulations							
Before (Measured):	17:05:28 25-Sep-2014						
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Small Ring	in	Before	8.00	6.00	8.17	10.00	
Large Ring	in	Before	12.00	9.00	12.48	15.00	

HDRS Density Calibration - Inversion Results							
Master (EEPROM):	14:43:16 09-Sep-2014						
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	

HGNS-H (HILT Gamma-Ray and Neutron Sonde, 150 degC) Calibration - Run One

Primary Equipment :			
HILT Gamma-Ray and Neutron Sonde, 150 degC	HGNS-H	4865	
Auxiliary Equipment :			
HGNS Accelerometer, 150 degC	HACCZ-H	6991	
AmBe Neutron Logging Source	NSR-F	2554	
Calibration Parameter :			
Water Temperature			
Housing Size			
JIG-BKG (Jig minus background reference)	165		

HGNS Accelerometer Calibration - Accelerometer Accumulations

Before (Measured):	10:22:08 26-Sep-2014						
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
AZ Vertical Measurement	ft/s2	Before	32.2	31.5	31.7	32.8	

HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM):	00:00:00 15-May-2007						
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Accelerometer Manufacturer		Master			QAT_160		
Accelerometer Reference Temperature	degF	Master		30.2	77.0	122.0	
Accelerometer Coefficients - 0		Master	----	----	-4298.000	----	
Accelerometer Coefficients - 1		Master	----	----	50.180	----	
Accelerometer Coefficients - 2		Master	----	----	-0.002	----	
Accelerometer Coefficients - 3		Master	----	----	0.000	----	
Accelerometer Coefficients - 4		Master	----	----	2.754	----	
Accelerometer Coefficients - 5		Master	----	----	0.000	----	
Accelerometer Coefficients - 6		Master	----	----	0.000	----	
Accelerometer Coefficients - 7		Master	----	----	0.000	----	
Accelerometer Coefficients - 8		Master	----	----	300.500	----	
Accelerometer Coefficients - 9		Master	----	----	0.994	----	

HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM):	14:29:32 23-Jul-2014	Before (Measured):	16:55:33 25-Sep-2014				
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Near Zero Measurement	1/s	Master	0	5.0	27.5	40.0	
		Before	0	5.0	27.5	40.0	
		Before-Master	----	-4.1	0.0	4.1	
Far Zero Measurement	1/s	Master	0	5.0	28.9	40.0	
		Before	0	5.0	27.6	40.0	
		Before-Master	----	-4.3	-1.3	4.3	
Near Plus Measurement	1/s	Master	6031.0	4700.0	5764.0	6900.0	
		Before	----	----	----	----	
		Before-Master	----	----	----	----	
Far Plus Measurement	1/s	Master	2793.0	1900.0	2396.0	2900.0	
		Before	----	----	----	----	
		Before-Master	----	----	----	----	
Near Corrected Plus Measurement	1/s	Master		4700.0	5720.0	6900.0	
		Before	----	----	----	----	
		Before-Master	----	----	----	----	
Far Corrected Plus Measurement	1/s	Master		1900.0	2356.0	2900.0	
		Before	----	----	----	----	
		Before-Master	----	----	----	----	

HGNS Gamma-Ray Calibration - Gamma-Ray Accumulations

Before (Measured):	17:06:09 25-Sep-2014						
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RGR Zero Measurement	gAPI	Before	30.0	0	75.8	120.0	
RGR Plus Measurement	gAPI	Before	185.4	157.1	180.4	206.3	
GR Calibration Gain		Before	0.89	0.80	0.91	1.05	

Company:	Nighthawk Production LLC	Schlumberger
Well:	Salen 14-35	
Field:	Wildcat	
County:	Washington	
State:	Colorado	
Platform Express		
Triple Combo		