

Company: TEP Rocky Mountain LLC

Well: Federal RWF 442-18

Field: Rulison

County: Garfield State: Colorado

County: Garfield
Field: Rulison
Location: 17-6S-94W
Well: Federal RWF 442-18
Company: TEP Rocky Mountain LLC

ThruBit
Triple Combo

17-6S-94W		Elev.:	K.B.	6198.00 ft
			G.L.	6174.00 ft
			D.F.	6198.00 ft
Permanent Datum:	Ground Level	Elev.:	6174.00 f	
Log Measured From:	Kelly Bushing	24.00 ft	above Perm.Datum	
Drilling Measured From:	Kelly Bushing			
API Serial No.	Section:	Township:	Range:	
05-045-24035	17	6S	94W	
Location:				

Logging Date 20-May-2019

Run Number ThruBit

Depth Driller 9112.00 ft

Schlumberger Depth 9112.00 ft

Bottom Log Interval 9070.00 ft

Top Log Interval 1108.00 ft

Casing Driller Size @ Depth 9.625 in @ 1108.00 ft

Casing Schlumberger 1108 ft

Bit Size 8.75 in

Type Fluid In Hole Water

Density 11.5 lbm/gal 44 s

Fluid Loss PH 8.2

MUD Source of Sample Flowline

RM @ Meas Temp 1.48 ohm.m @ 68 degF

RMF @ Meas Temp 1.26 ohm.m @ 90 degF

RMC @ Meas Temp 1.7 ohm.m @ 90 degF

Source RMF RMC Calculated Calculated

RM @ BHT RMF @ BHT 0.51 @ 212 0.56 @ 212

Max Recorded Temperatures 173.9 degF

Circulation Stopped 20-May-2019 05:00:00

Logger on Bottom 20-May-2019 07:31:00

Unit Number Location: osic-a12 2161 ft moigan

Recorded By L. Awalt

Witnessed By Garret

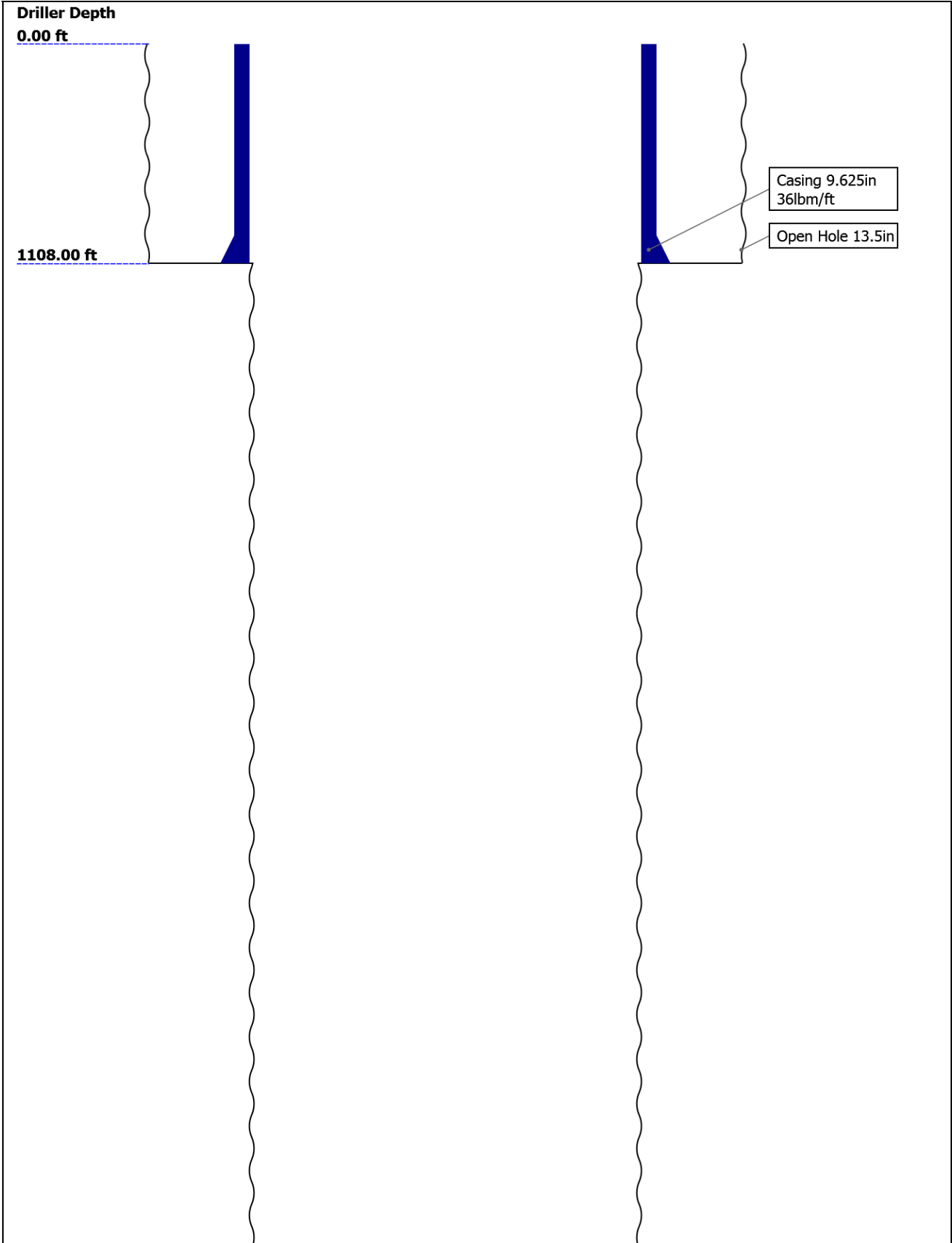
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Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	13.5	8.75				
Top Driller (ft)	0	1108				
Top Logger (ft)	0	1108				
Bottom Driller (ft)	1108	9112				
Bottom Logger (ft)	1108	9112				
Casing						
Size (in)	9.625					
Weight (lbm/ft)	36					
Inner Diameter (in)	8.921					
Grade	N/A					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	1108					
Bottom Logger (ft)	1108					

Remarks and Equipment Summary

Thru-bit: Toolstring				Thru-bit: Remarks	
Equip name	Length	MP name	Offset	Thank you for choosing Schlumberger	
PEH-EFA	67.02			Log run for formation evaluation	
				Tools run as per tool sketch	
AH-317-TB	64.66			Log correlated to Csg Shoe @ 1108	
TBCCL-A	63.59			Matrix: Lime Stone 2.71 g/cc	
TBCCL-A				Crew: Tyler Mozena, Jake Quinn	
TBDOT-BA	61.88	CCL	61.88		
TBHO-BA	58.4				

SAH-TB 52.45

TBSB-BA:1 50.12
TBSB-BA:1

TMG-A:71 43.99
TMG-A:71

Status 43.99
Gamma-Ray 43.19

TILE-AB 37.86

Status 37.86

TBN-B:58 33.36
TBN-B:58
NNLS-EWA:5975

Neutron Porosity 31.05

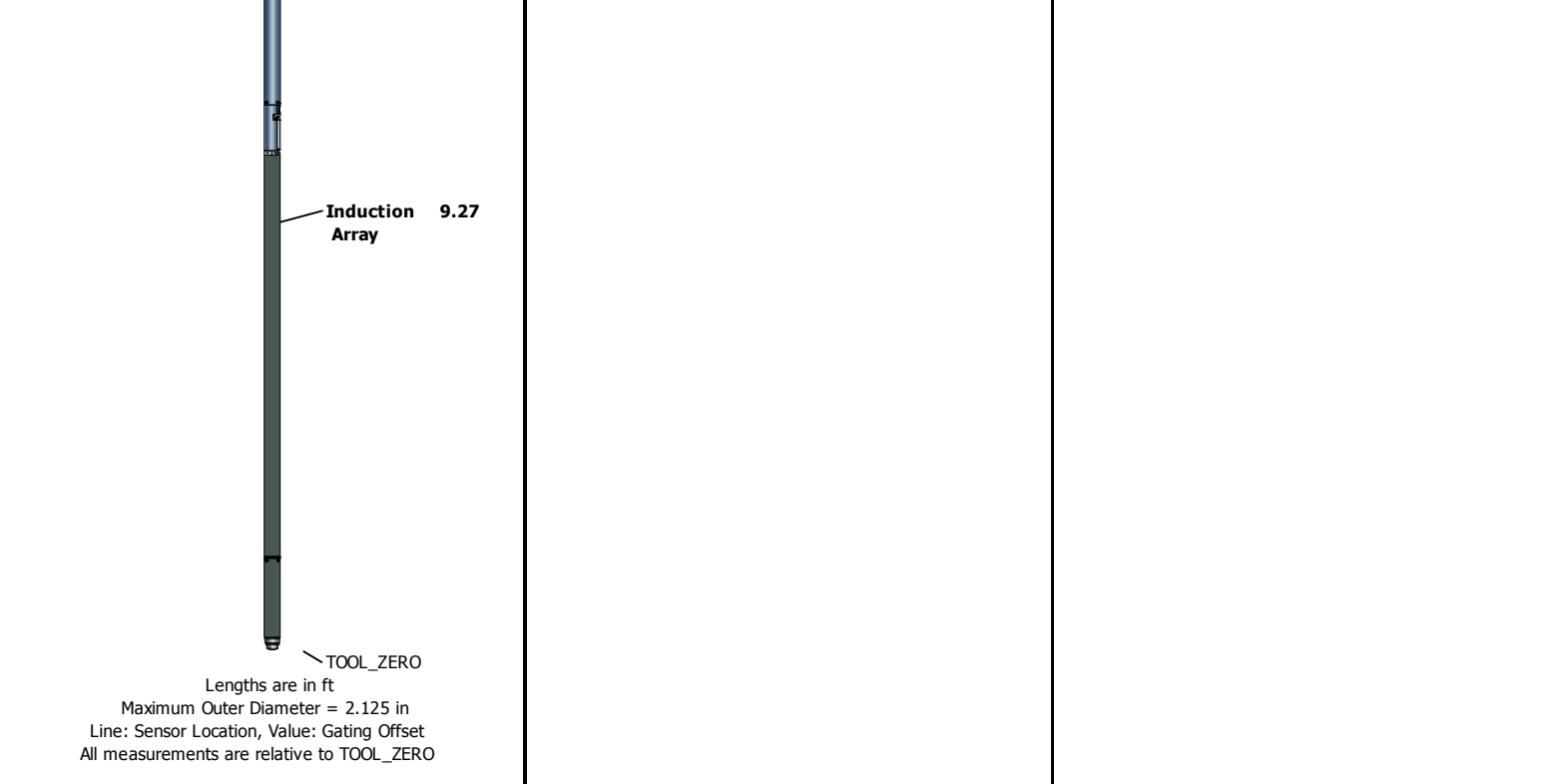
TBD-B:43 28.59
TBD-B:43
GGLS-FZ:3398

Density Log 20.07
Caliper 19.94
Density S 19.68

KAH-TB[2] 18.11

KAH-TB[1] 16.7

TBIT-A:47 15.28
TBIT-A:47



ThruBit

Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
ICV	Integrated Cement Volume	GCSE_UP_PASS, FCD	2823.44	ft3
IHV	Integrated Hole Volume	GCSE_UP_PASS	3703.91	ft3

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
ThruBit	Log[56]:Up	Up	229.62 ft	9164.08 ft	20-May-2019 7:56:13 AM	20-May-2019 6:19:40 PM	ON	122.09 ft	Yes

All depths are referenced to toolstring zero

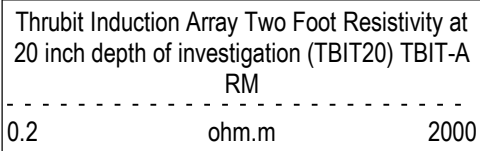
Log

Company:TEP Rocky Mountain LLC Well:Federal RWF 442-18
ThruBit: Log[56]:Up:S006

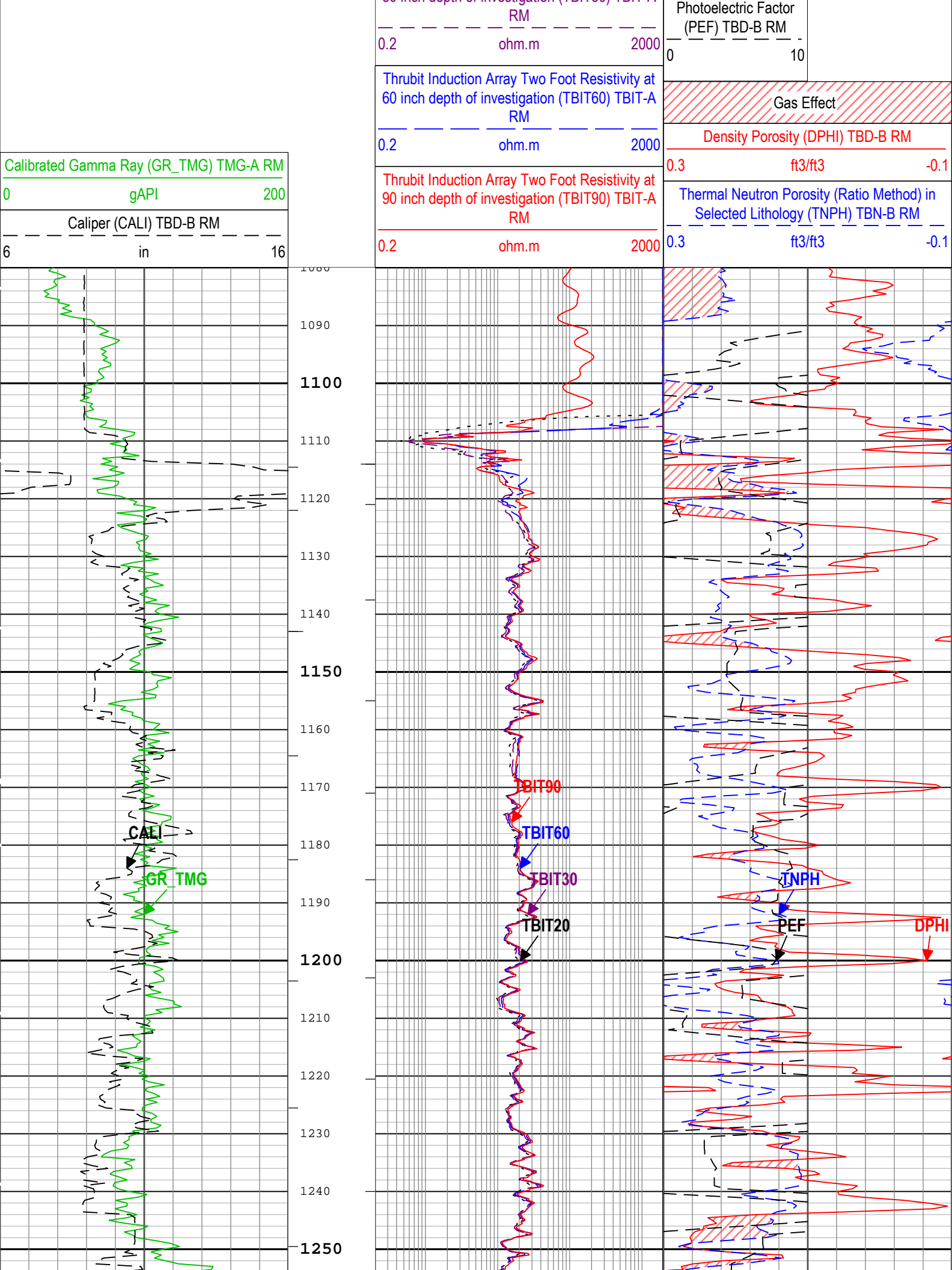
Description: ThruBit_TCOM_RM Format: Log (ThruBit_TCOM_RM) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 20-May-2019 18:32:30

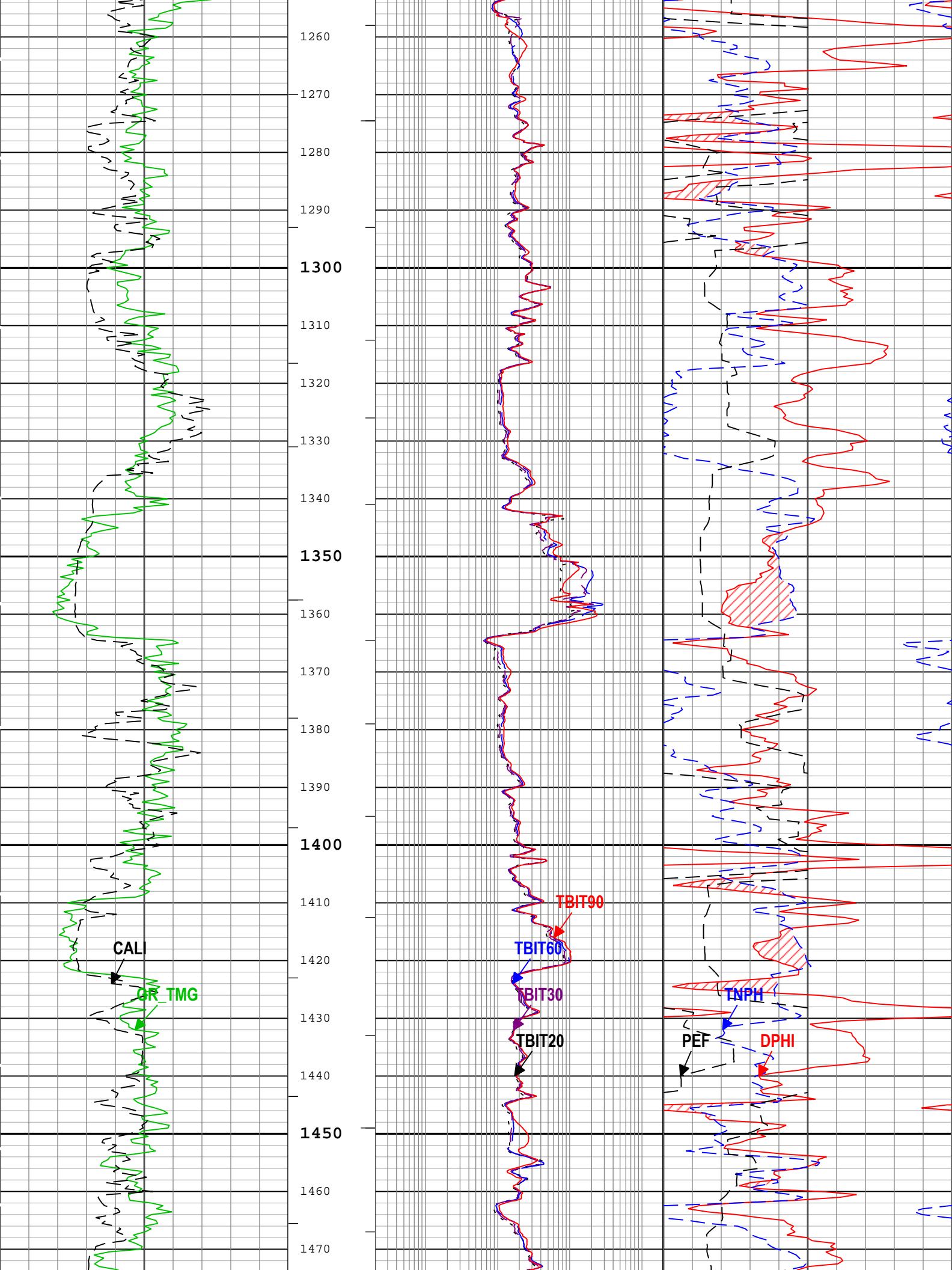
TIME_1900 - Time Marked every 60.00 (s)

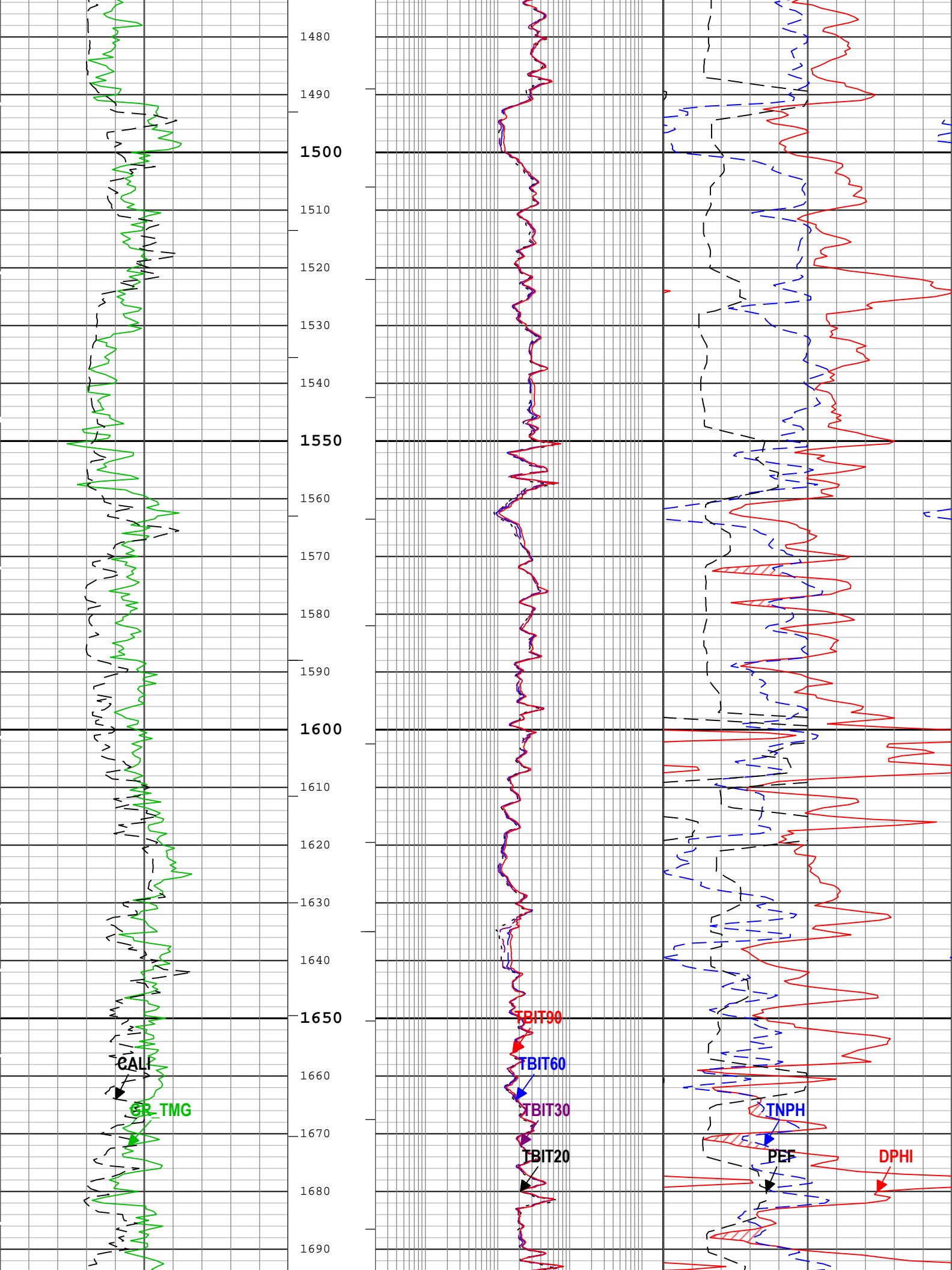
- IHV_RM - Integrated Hole Volume every 10.00 (ft3)
- IHV_RM - Integrated Hole Volume every 100.00 (ft3)
- ICV_RM - Integrated Cement Volume every 10.00 (ft3)
- ICV_RM - Integrated Cement Volume every 100.00 (ft3)

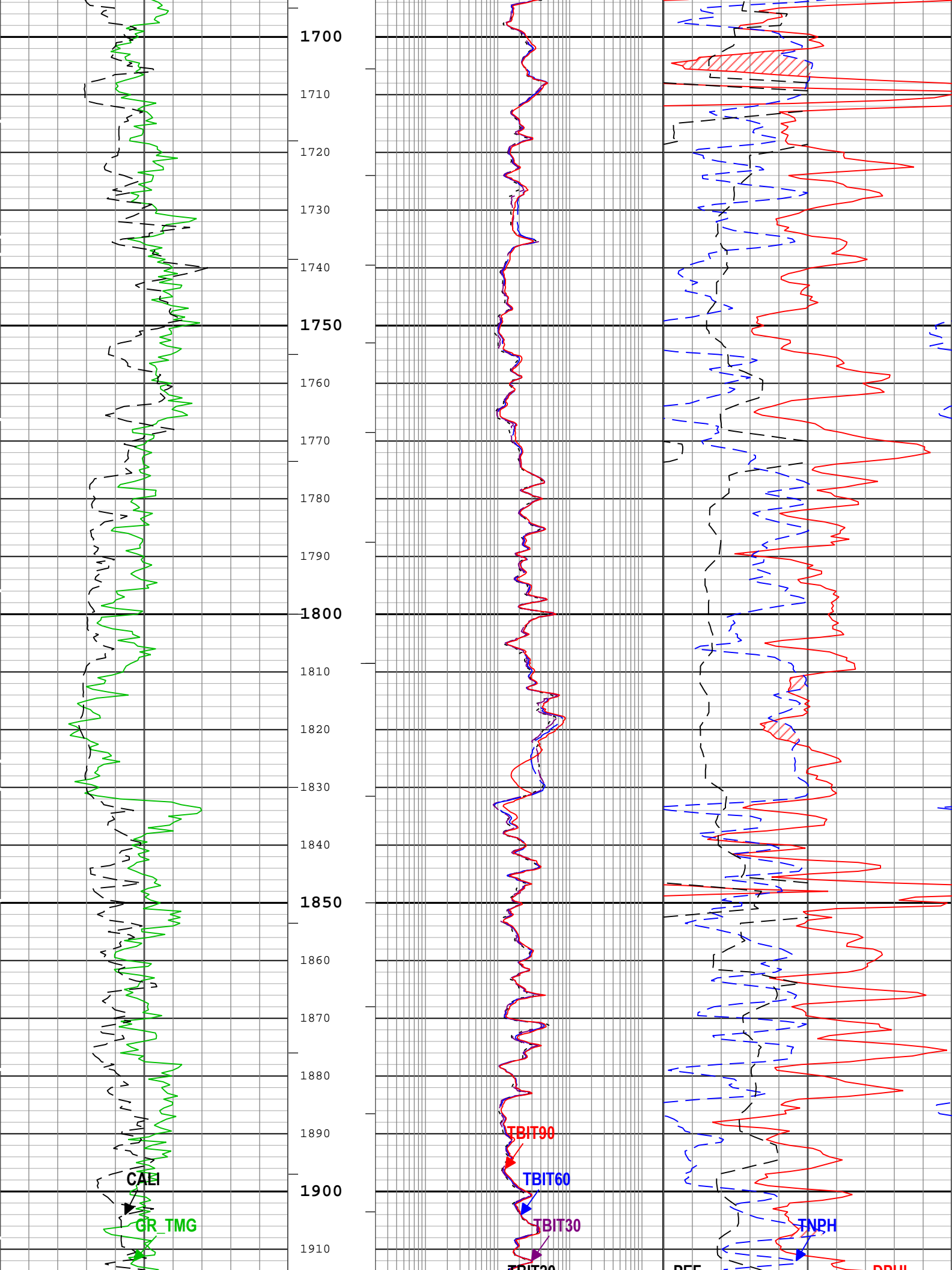


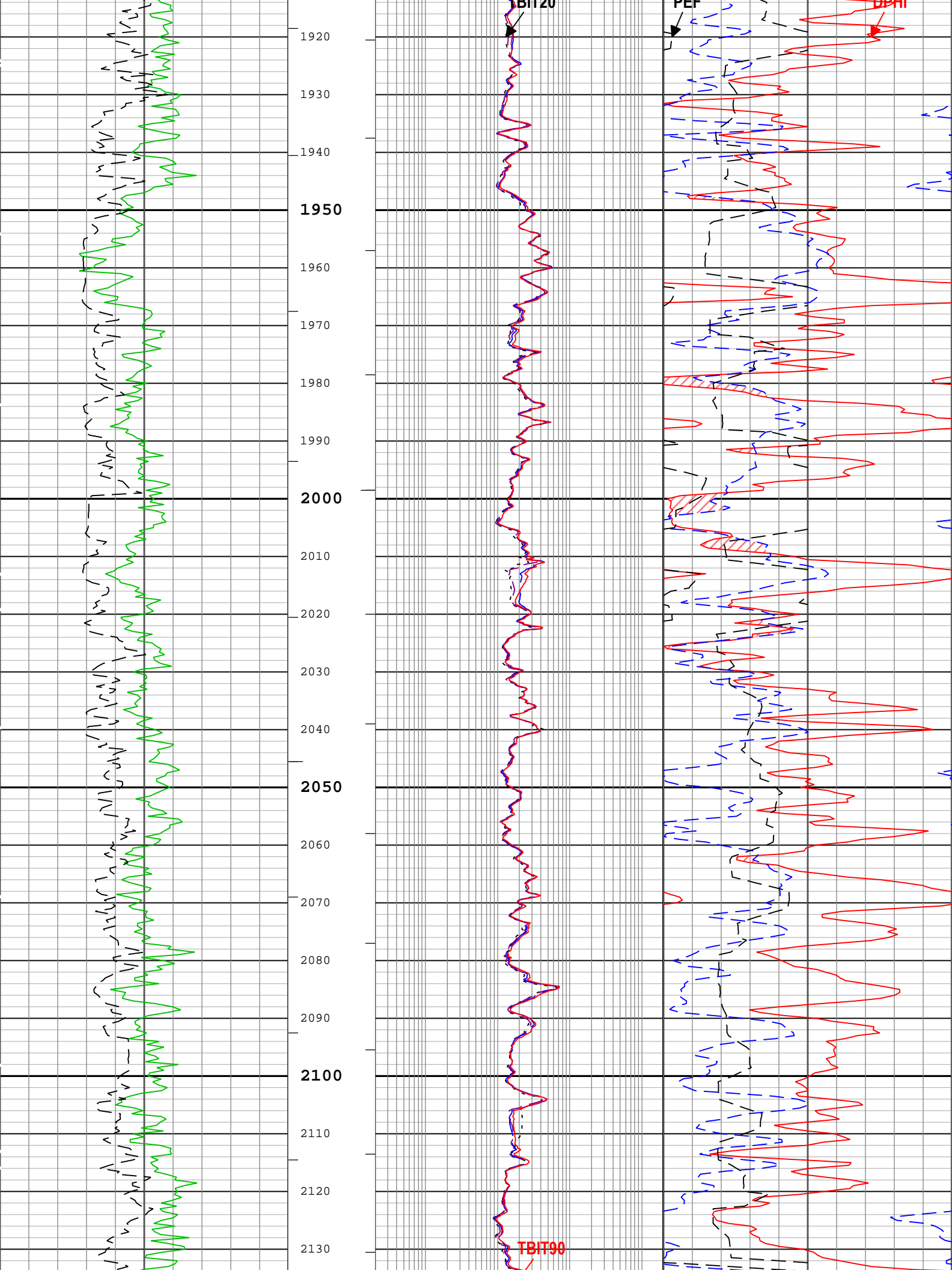
ThruBit Induction Array Two Foot Resistivity at 30 inch depth of investigation (TBIT30) TBIT-A

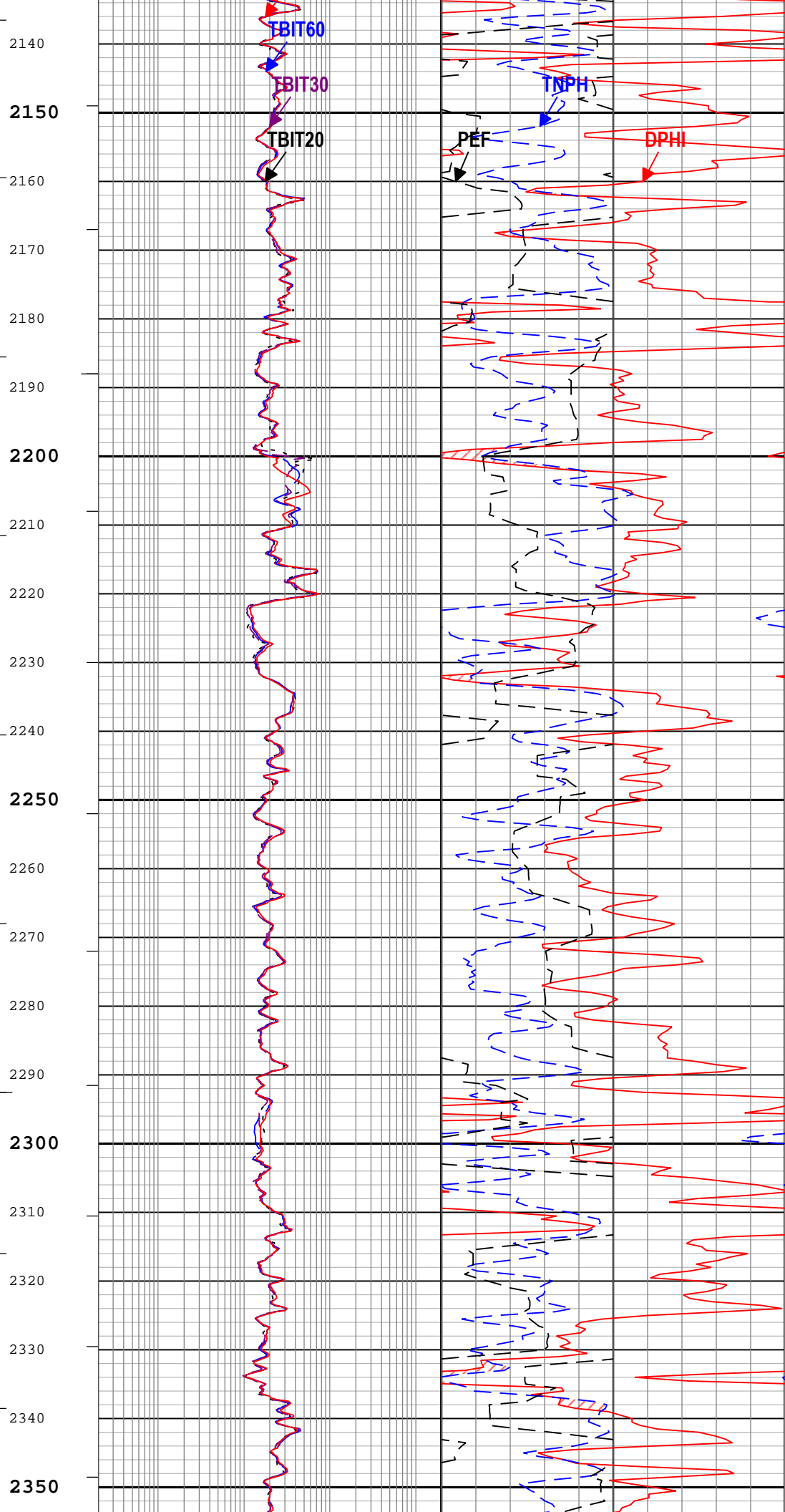
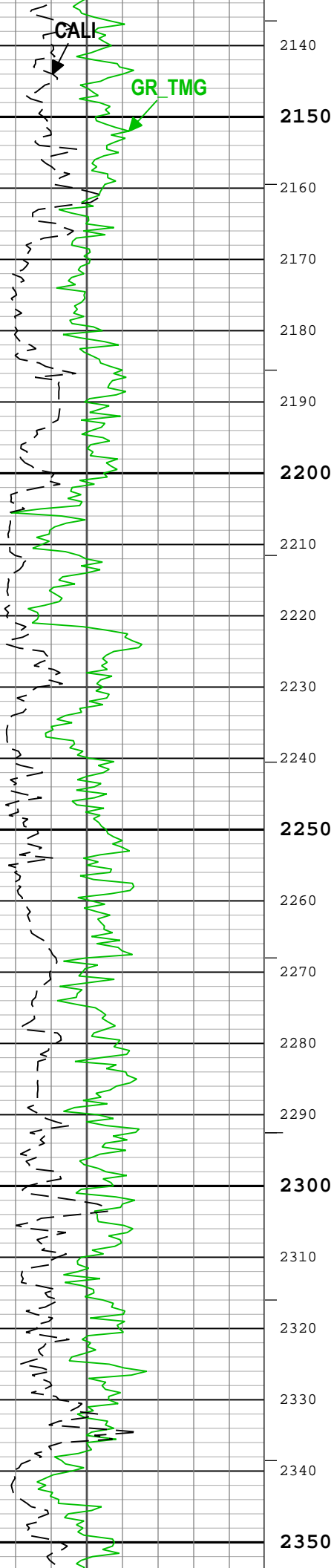


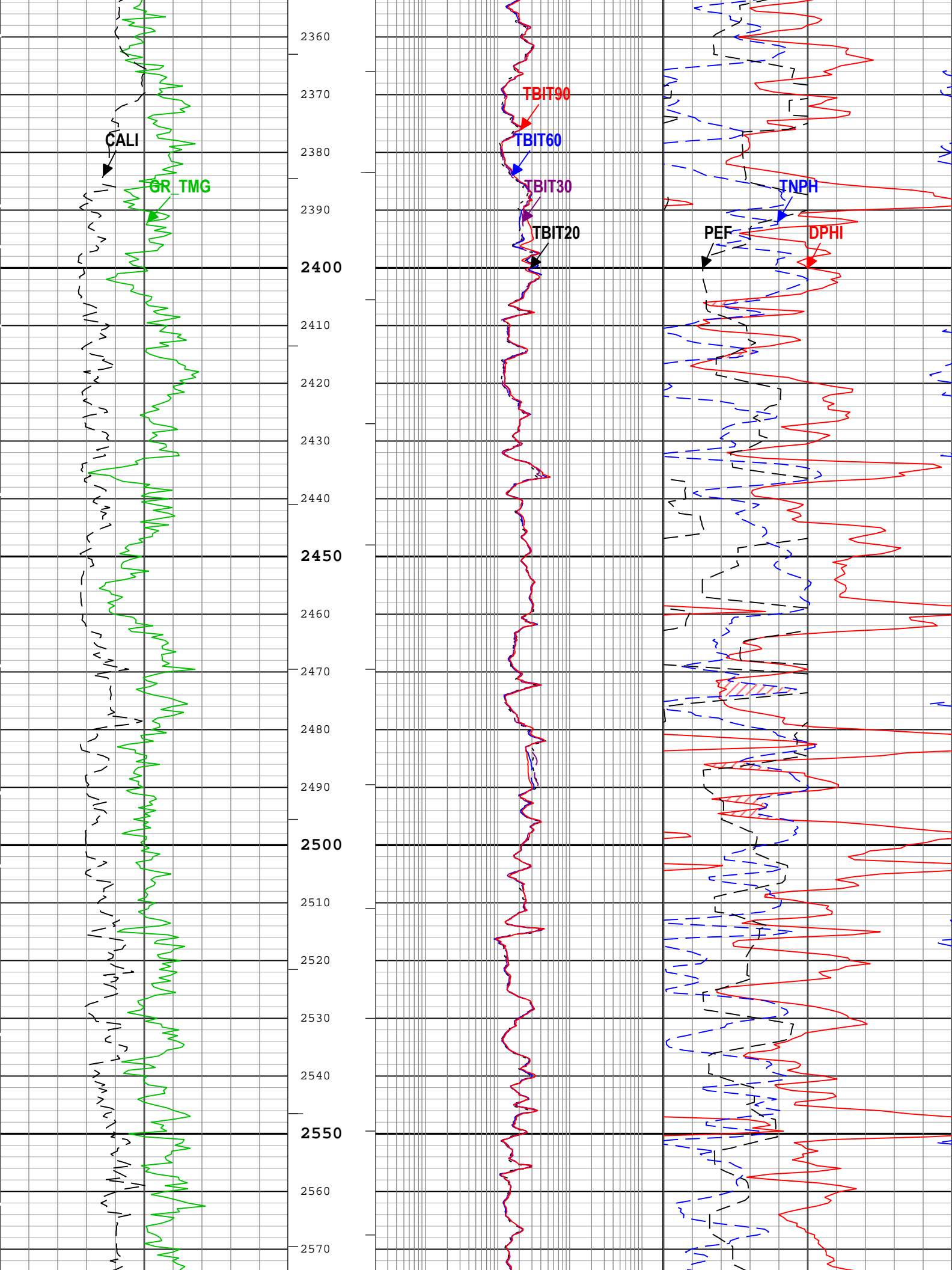


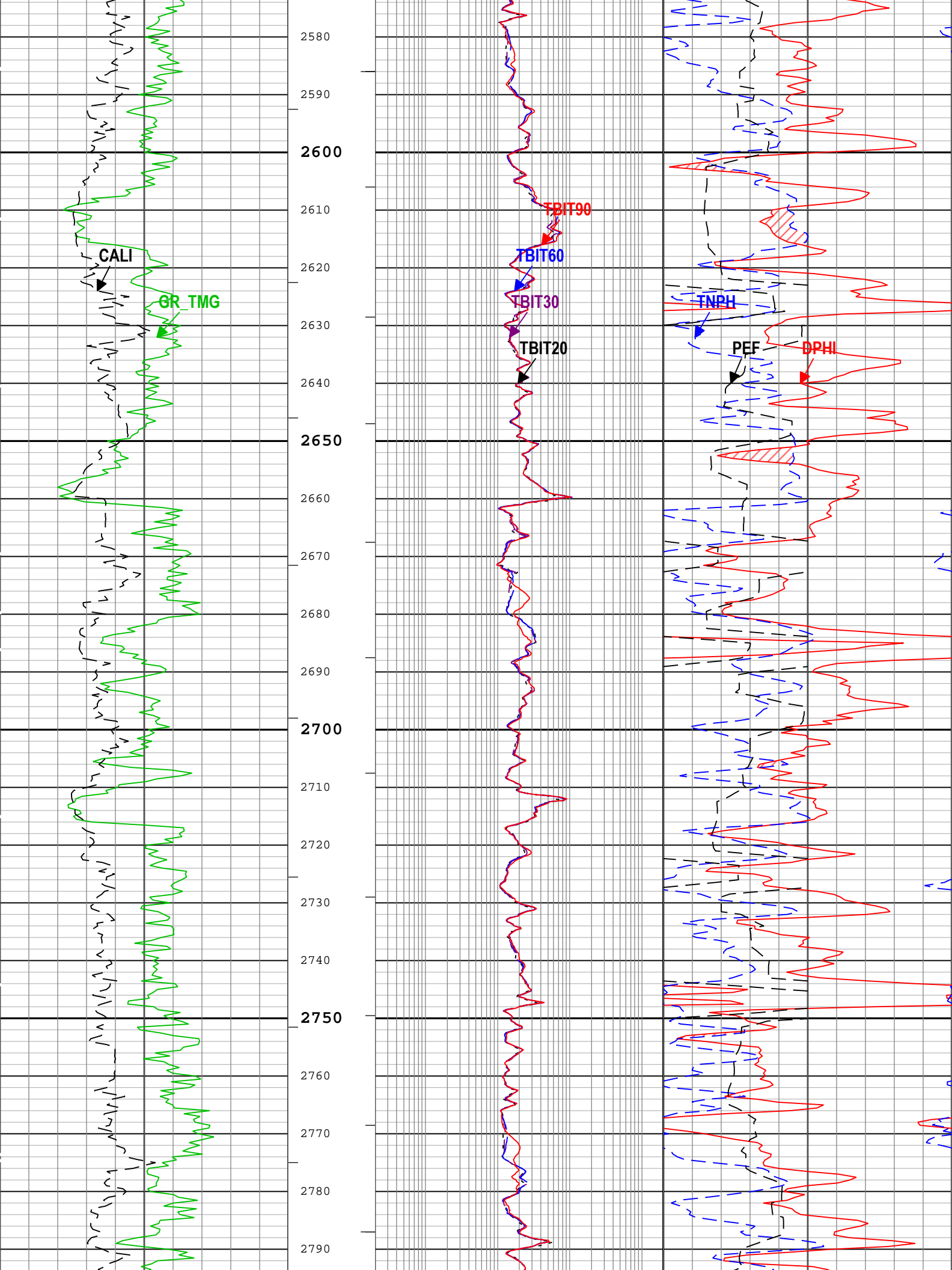


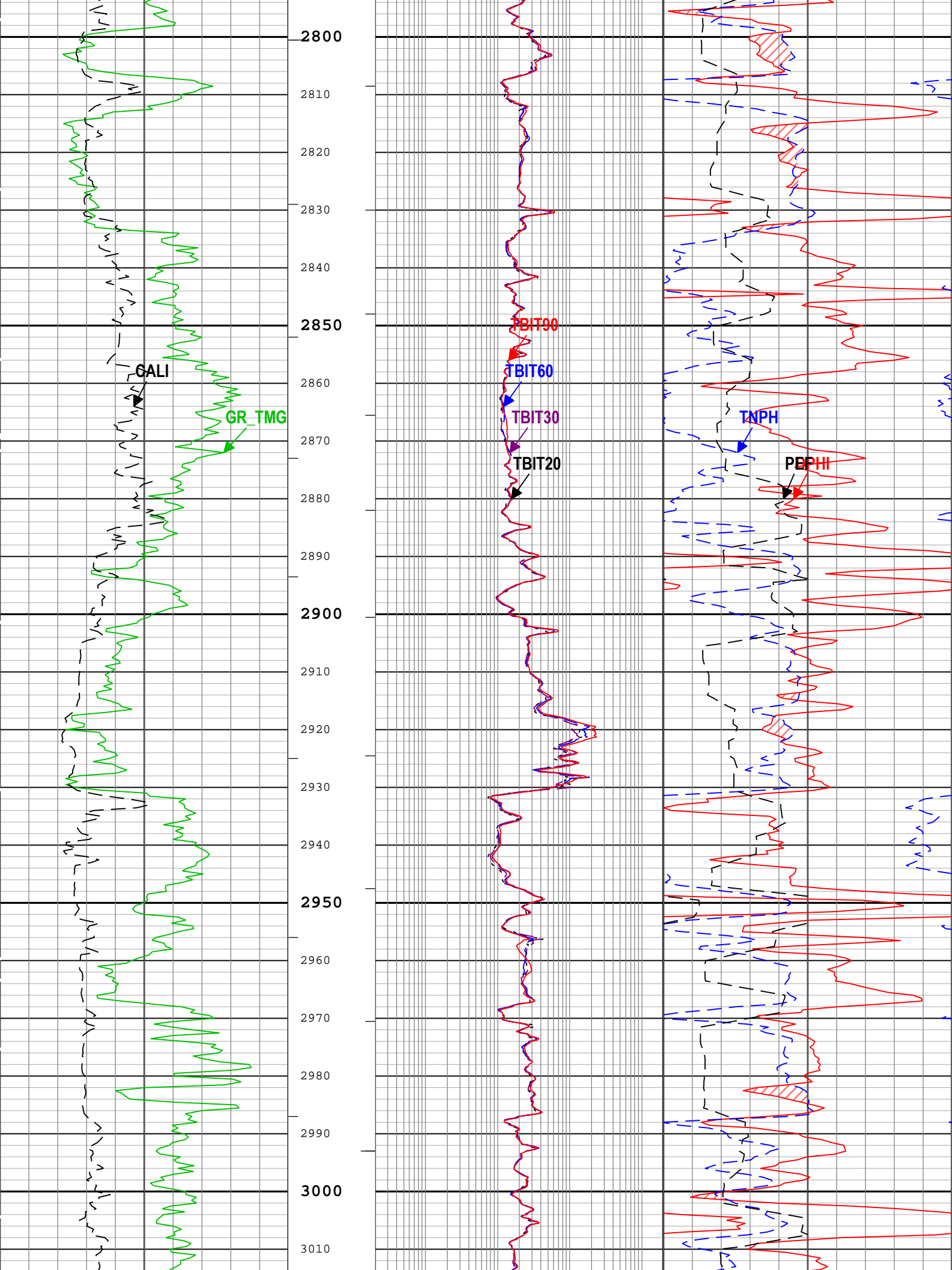


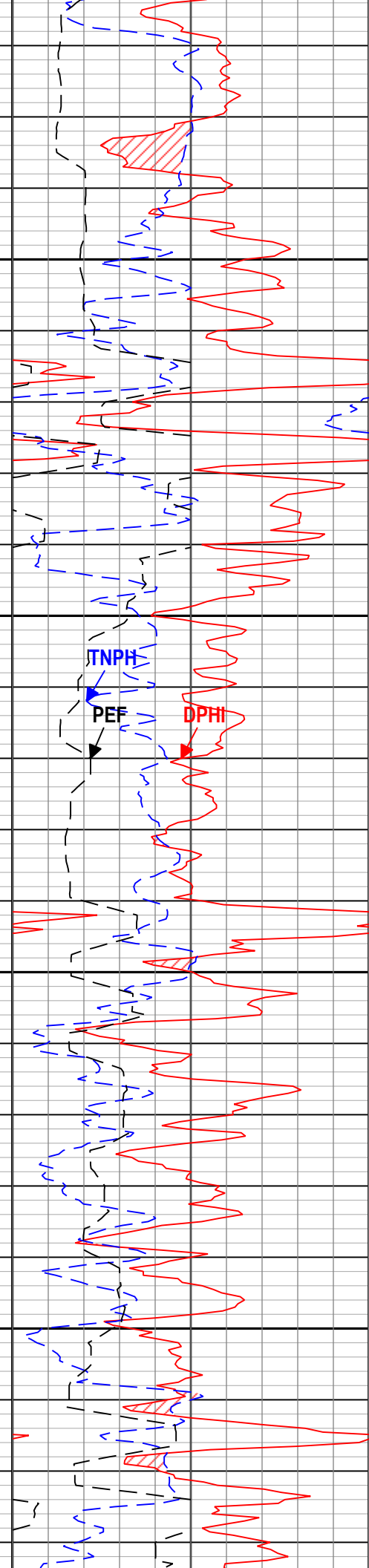
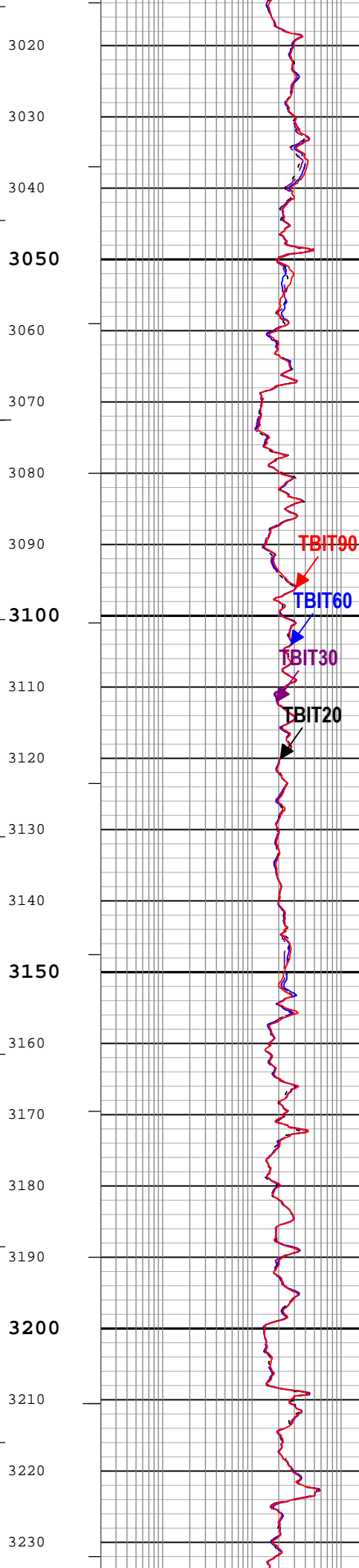
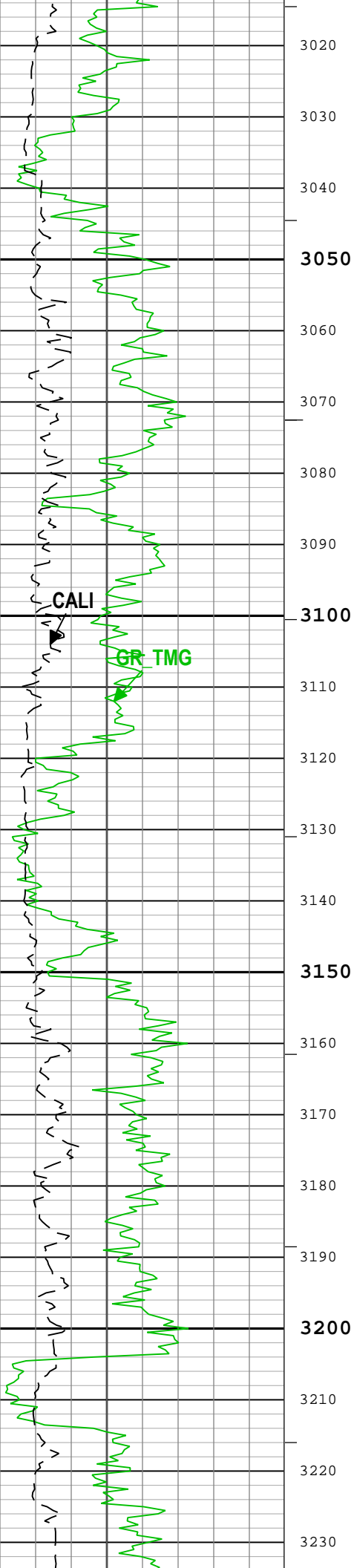


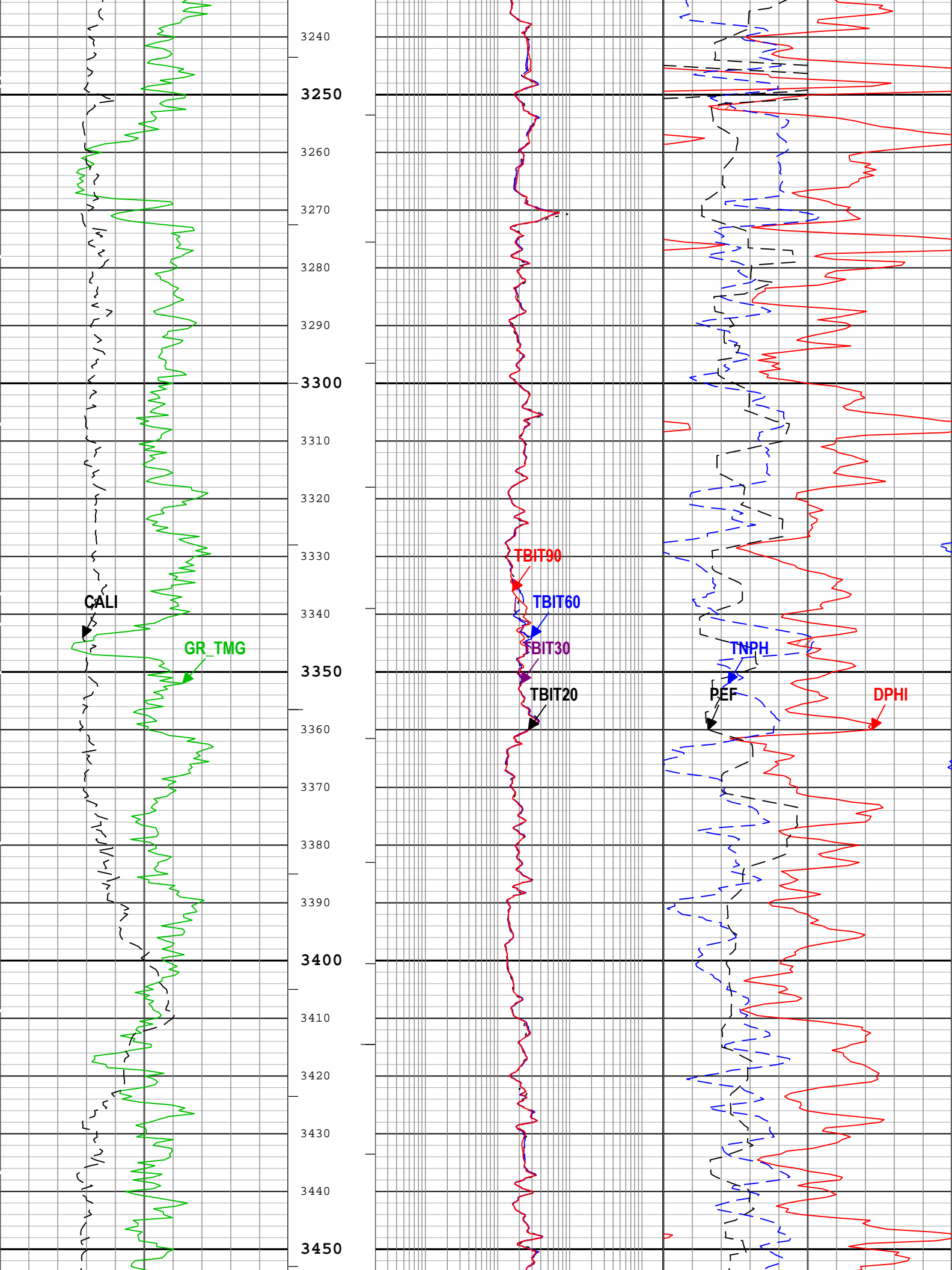


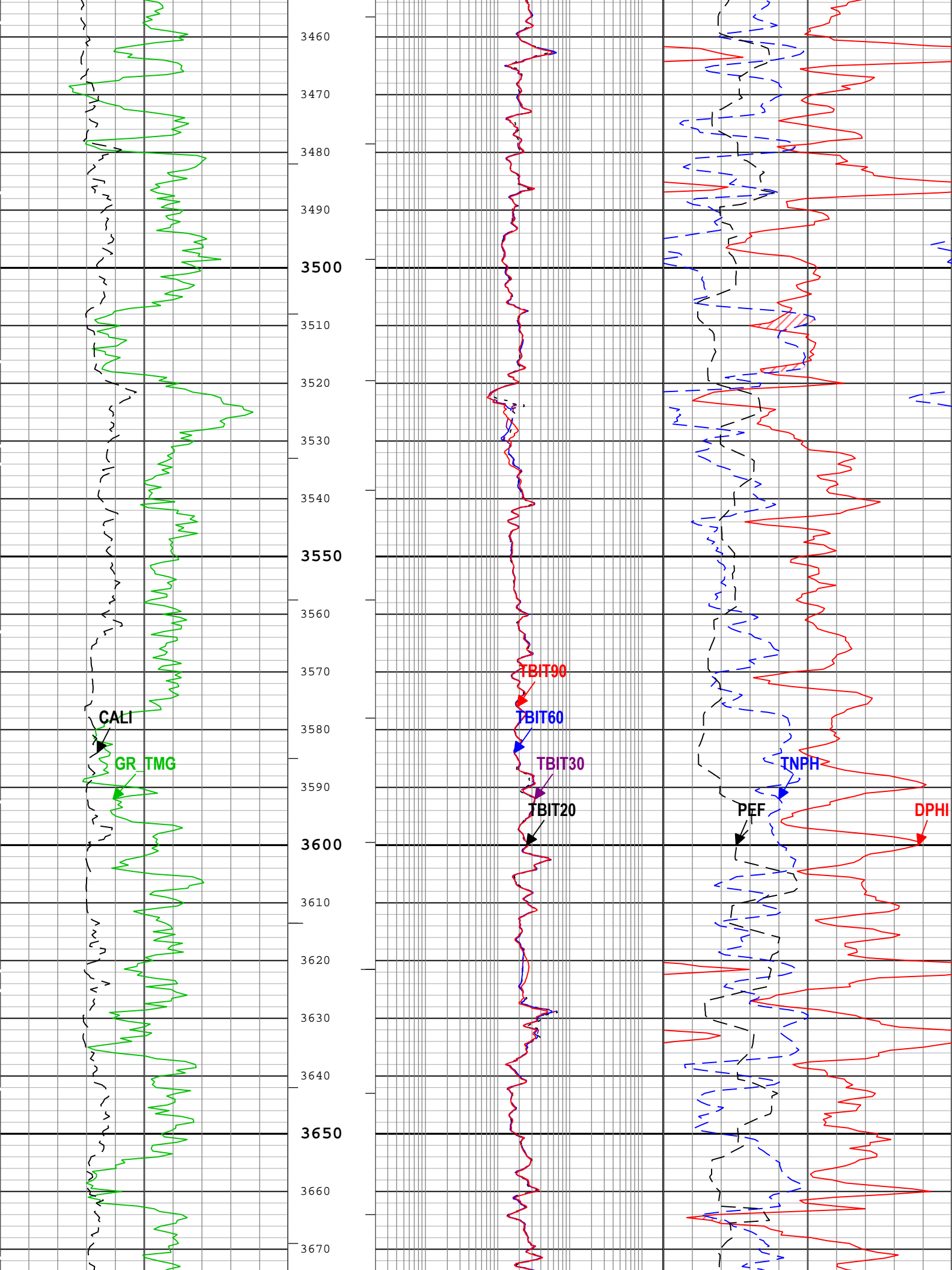


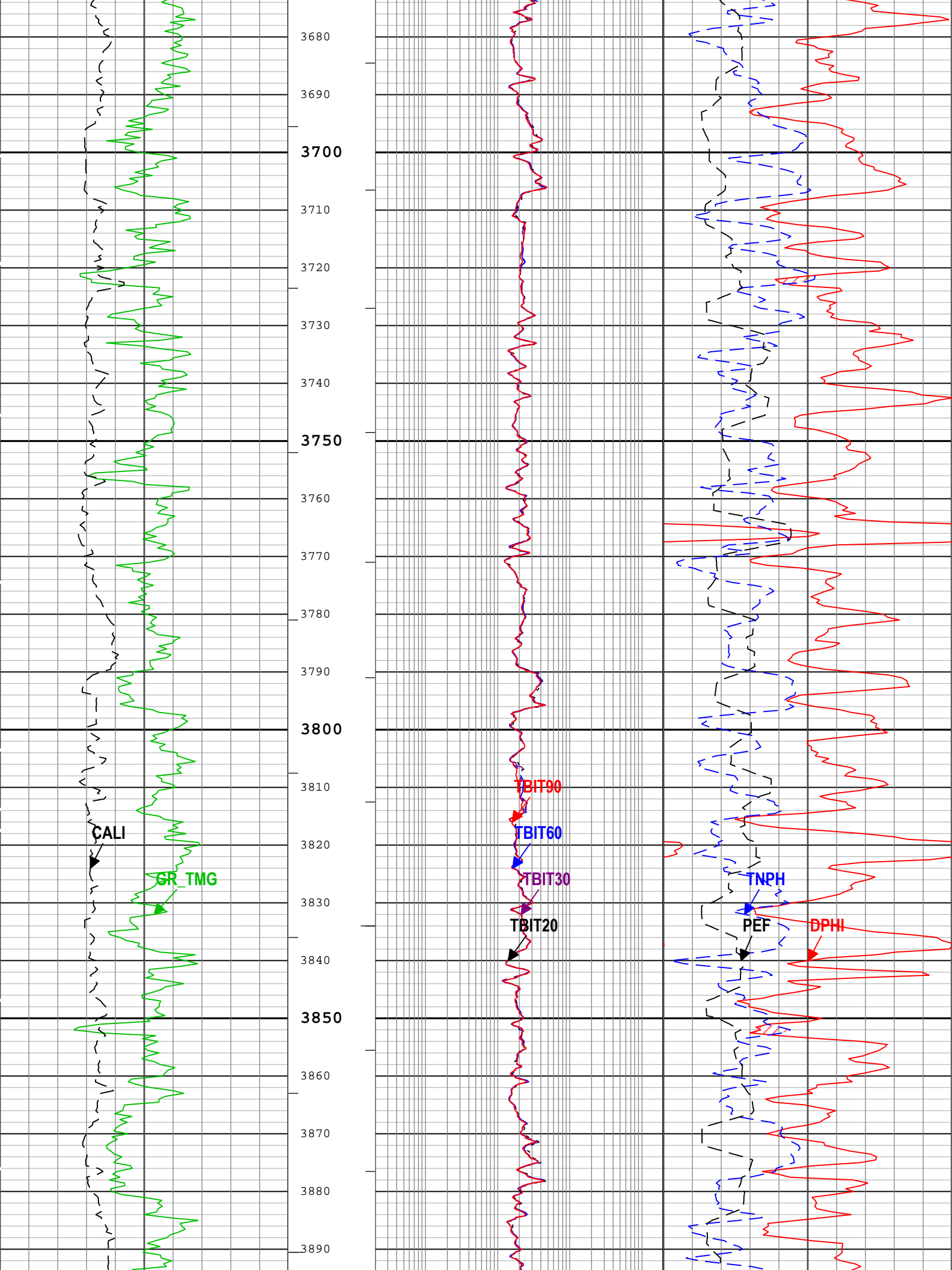


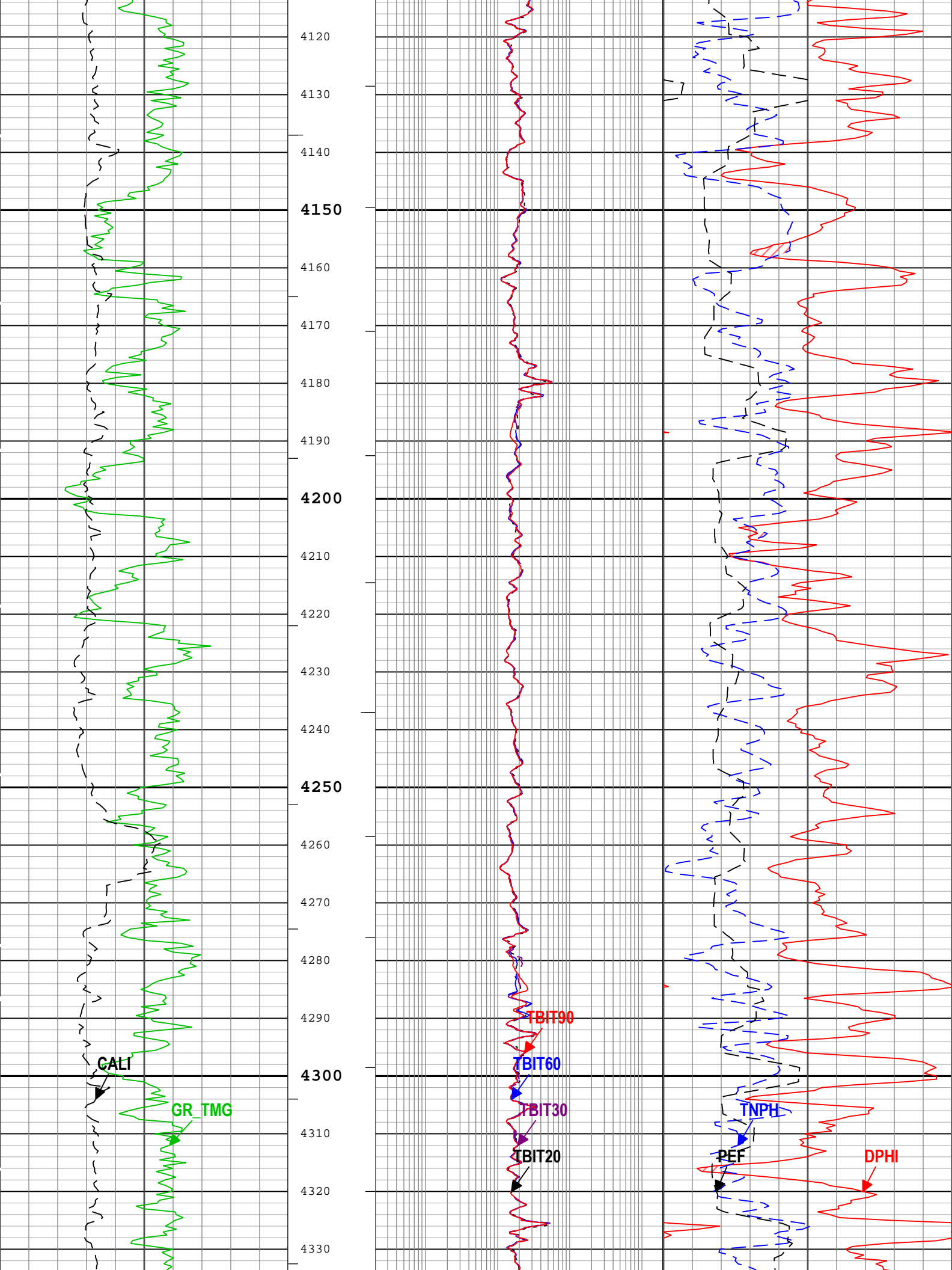


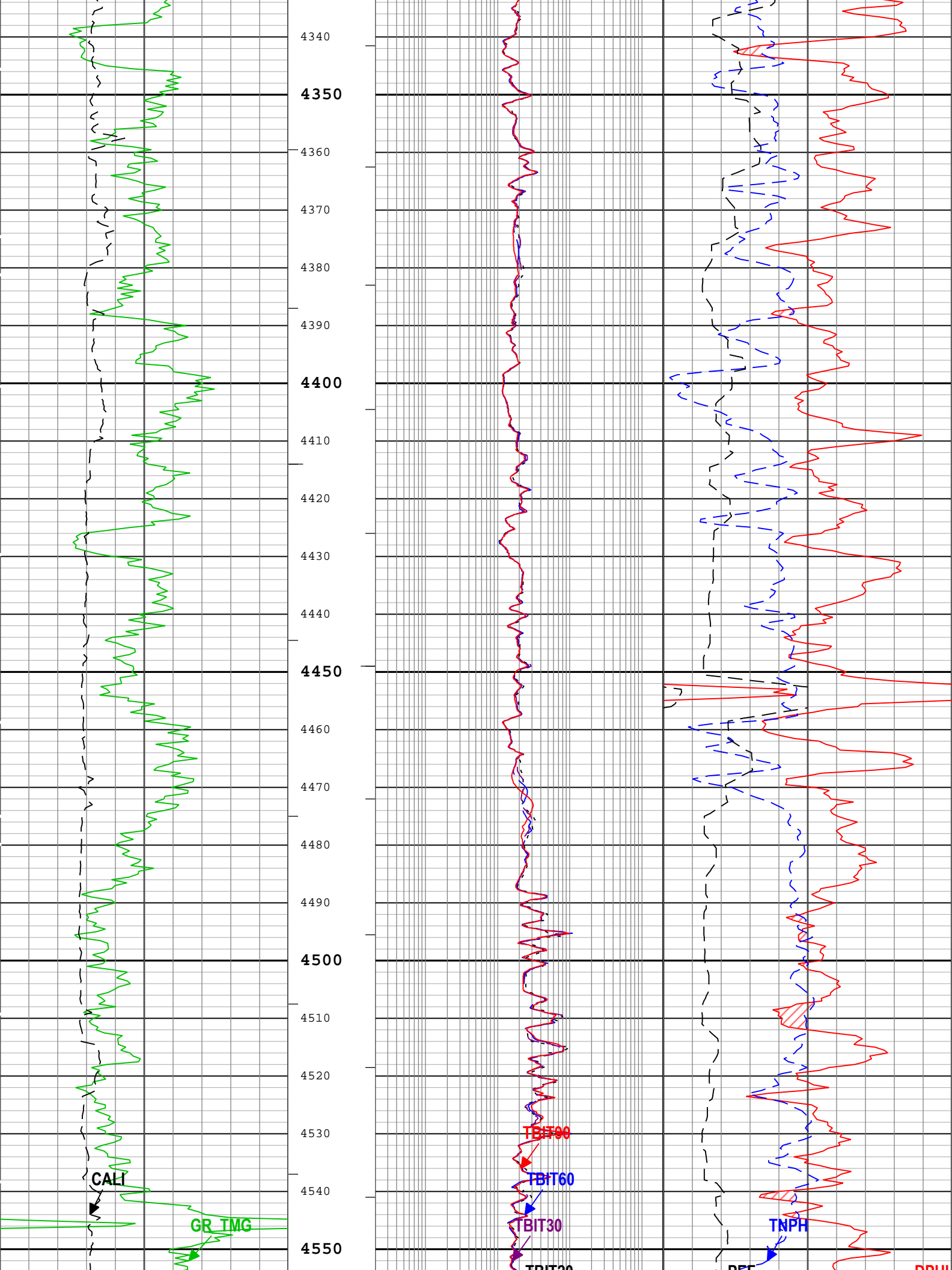


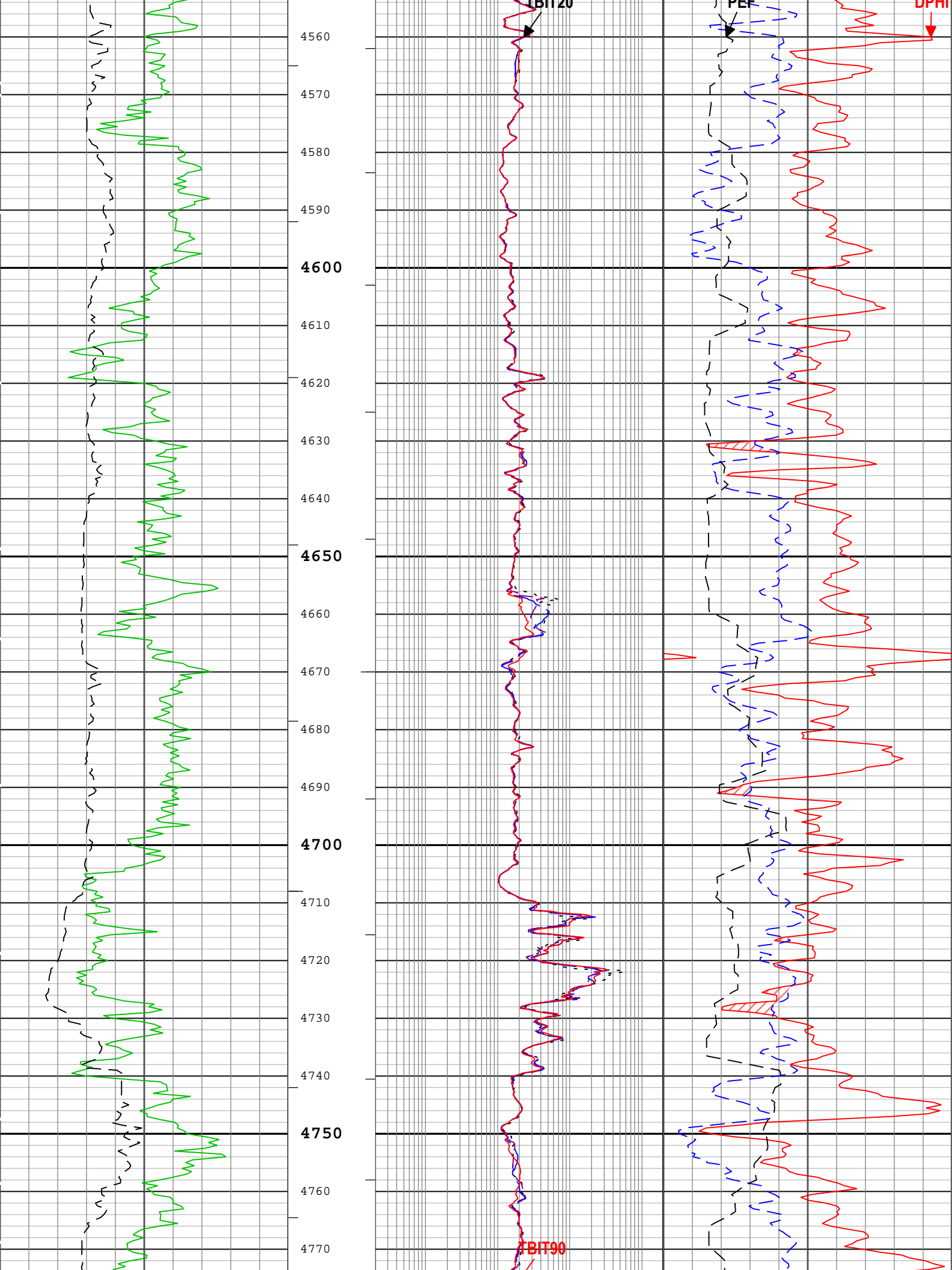


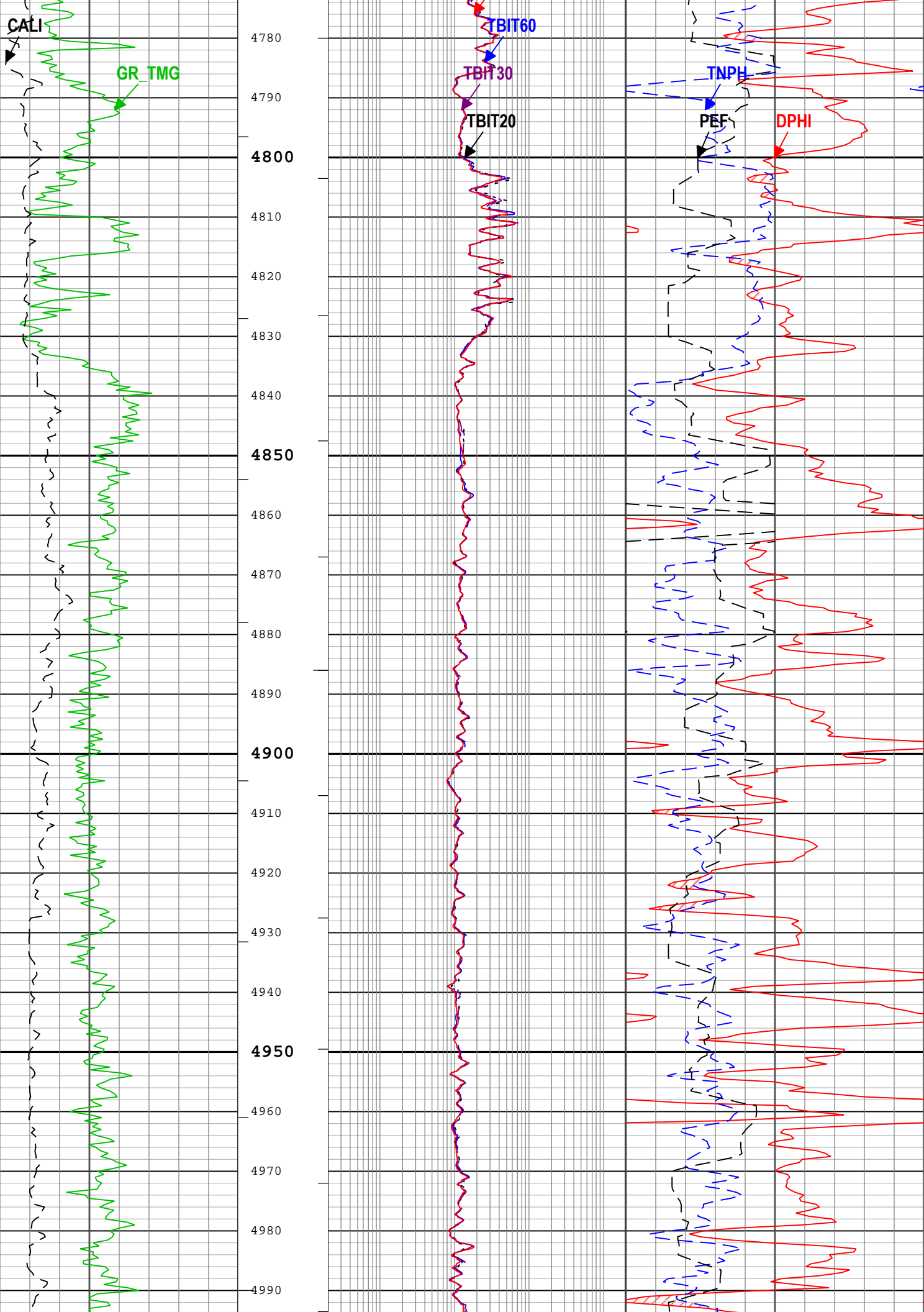


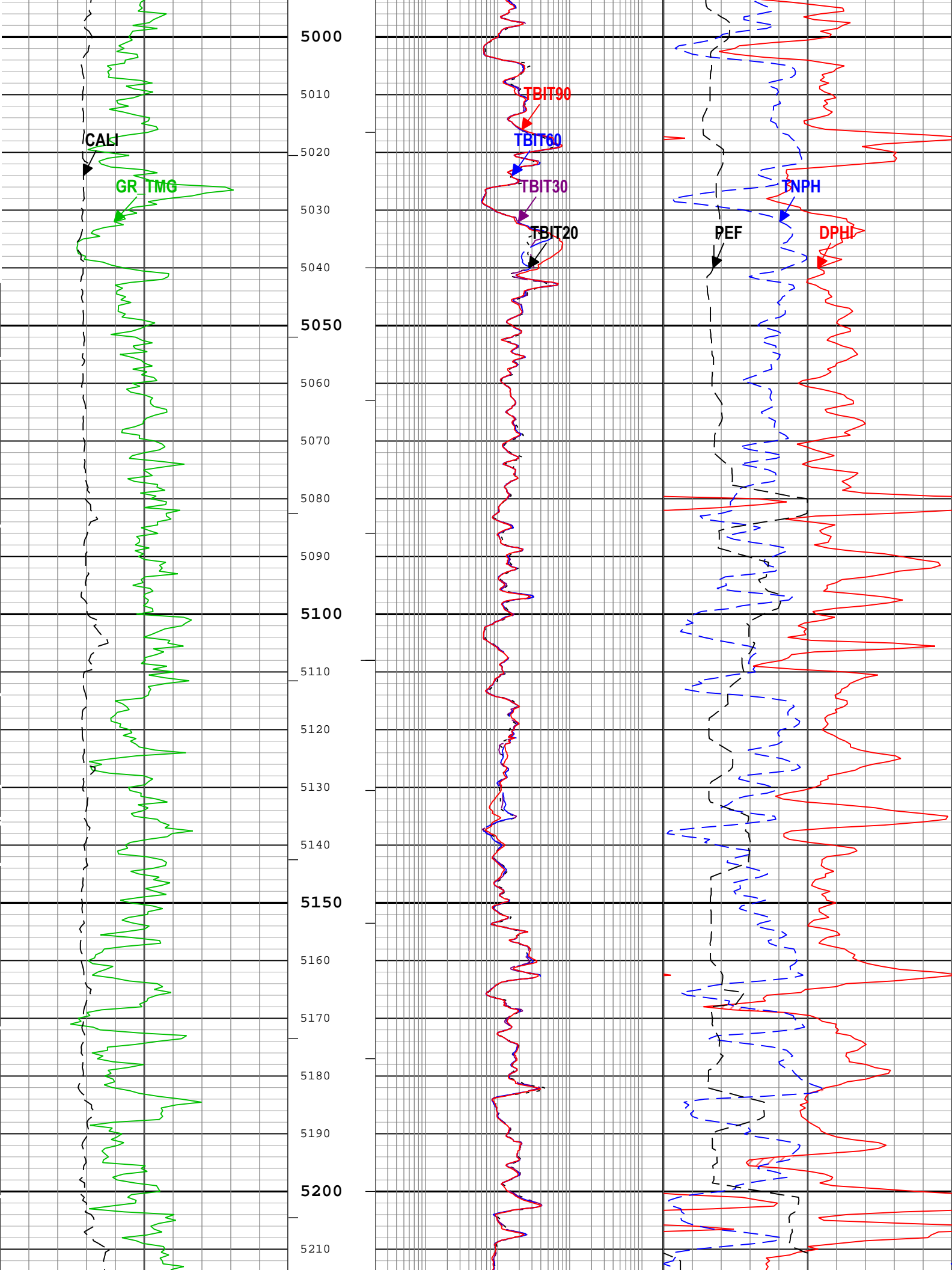


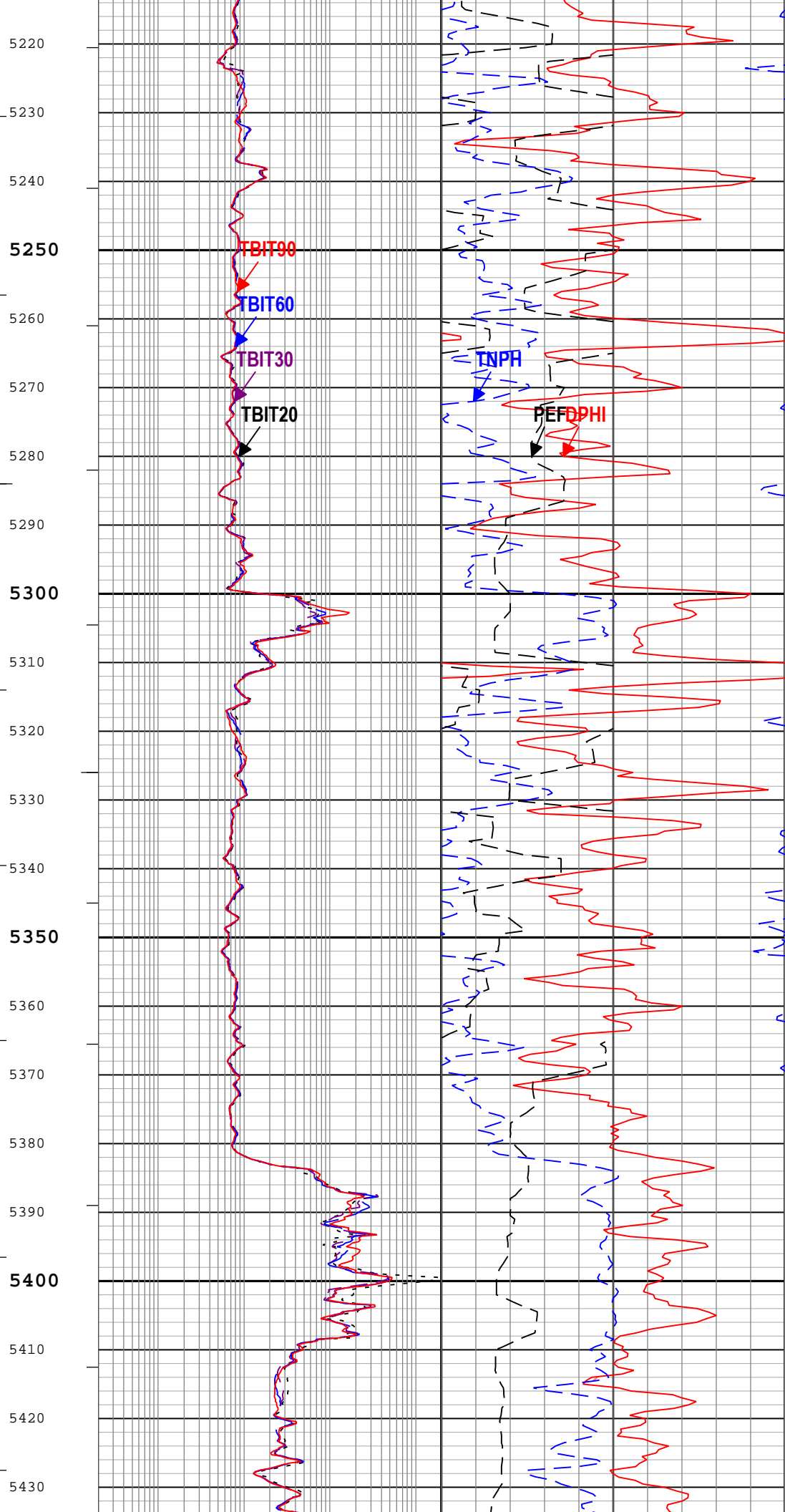
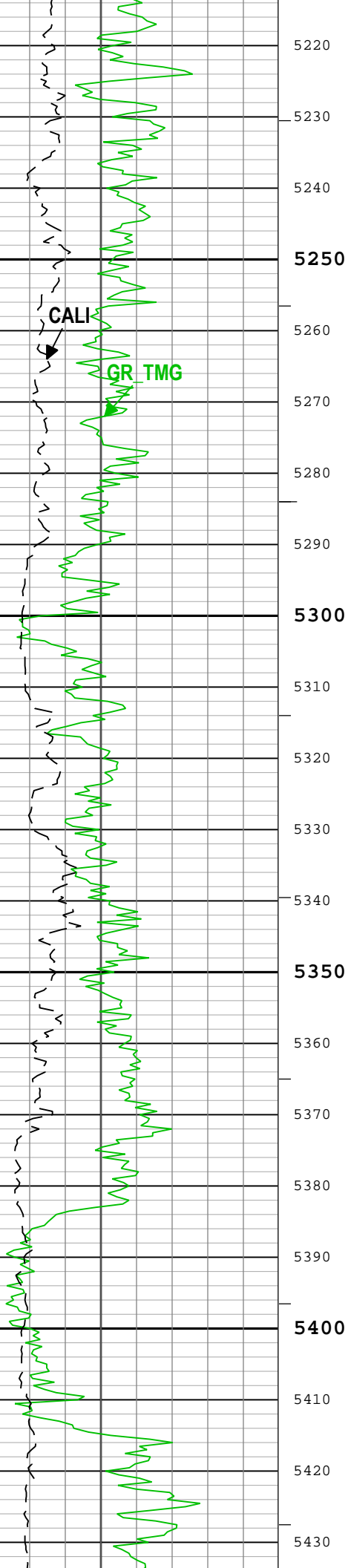


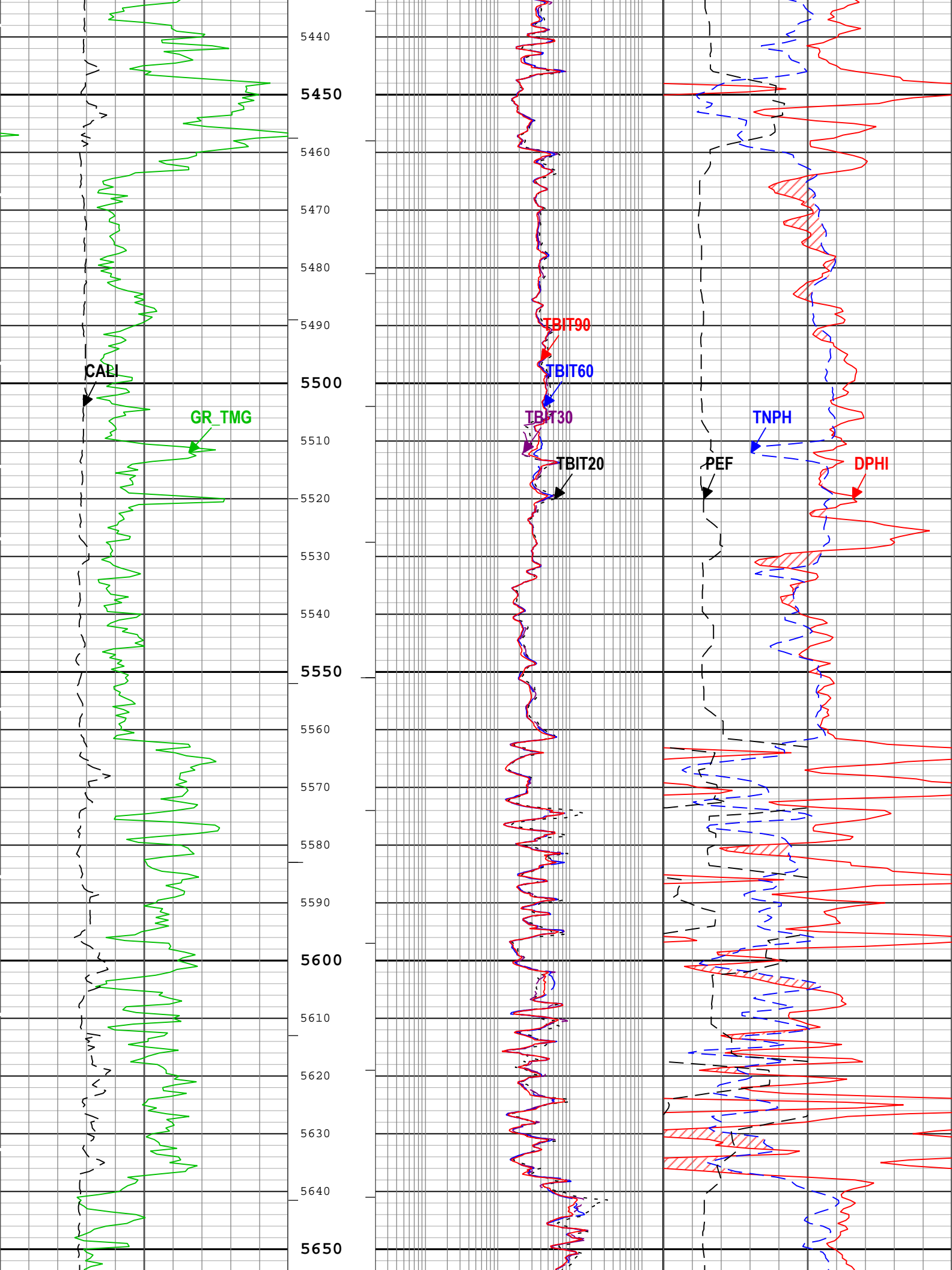


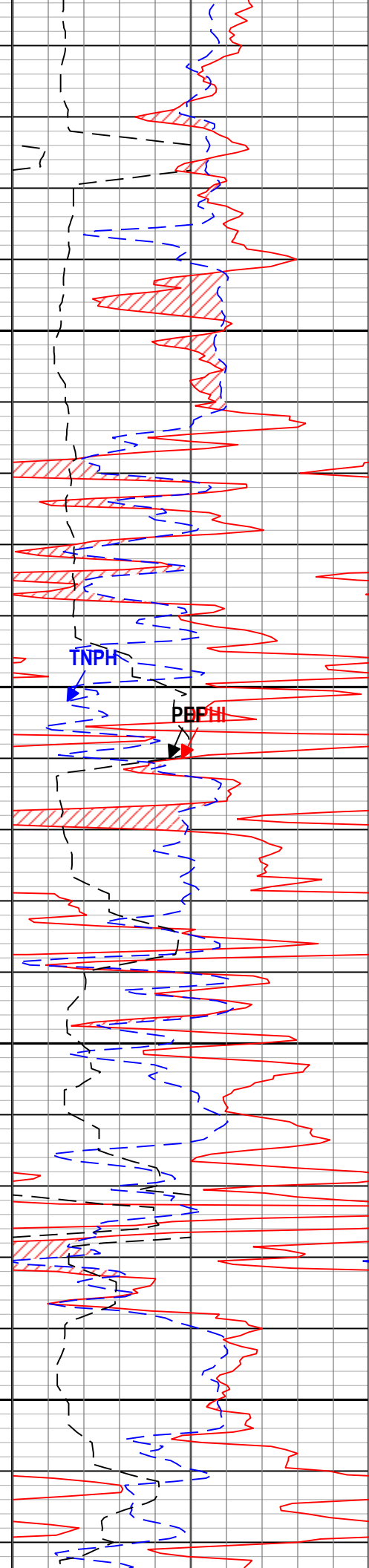
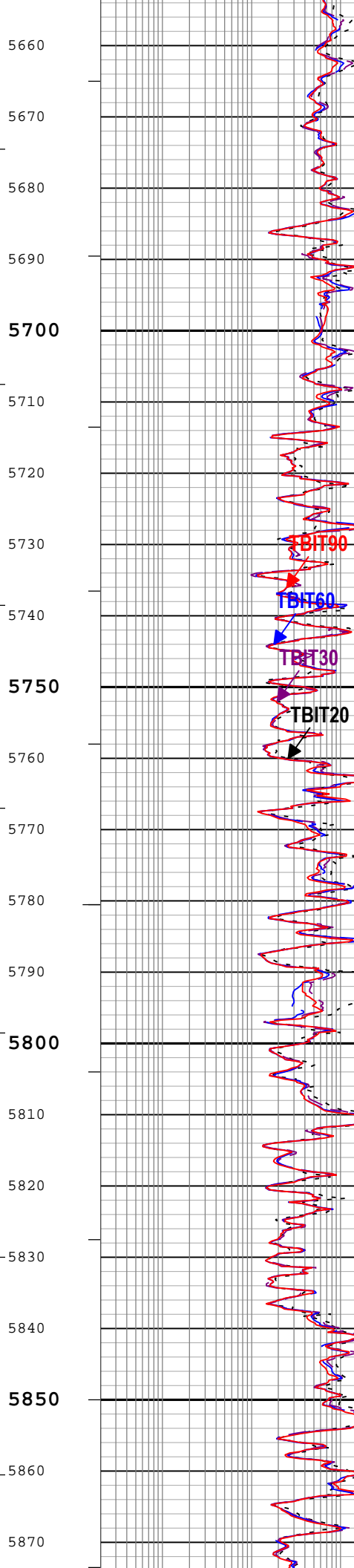
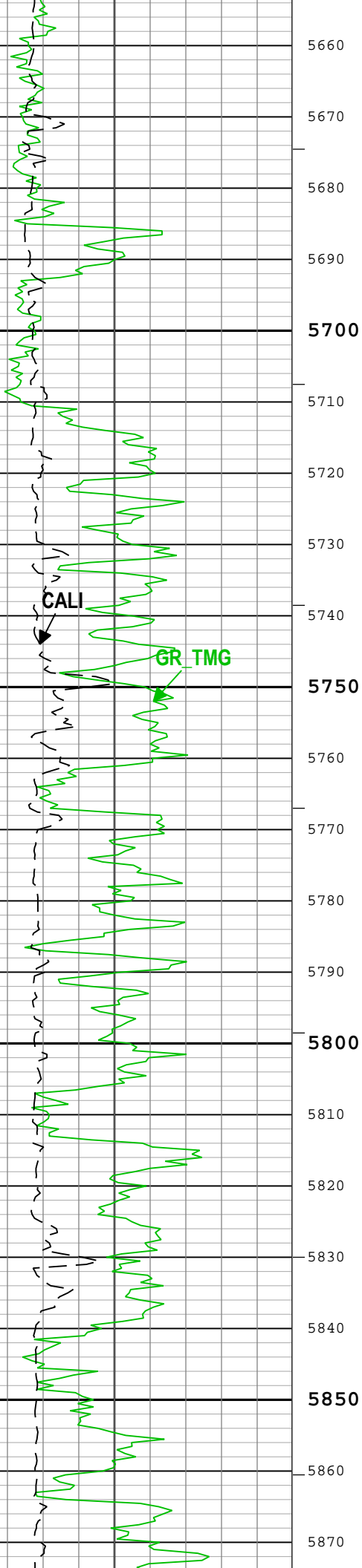


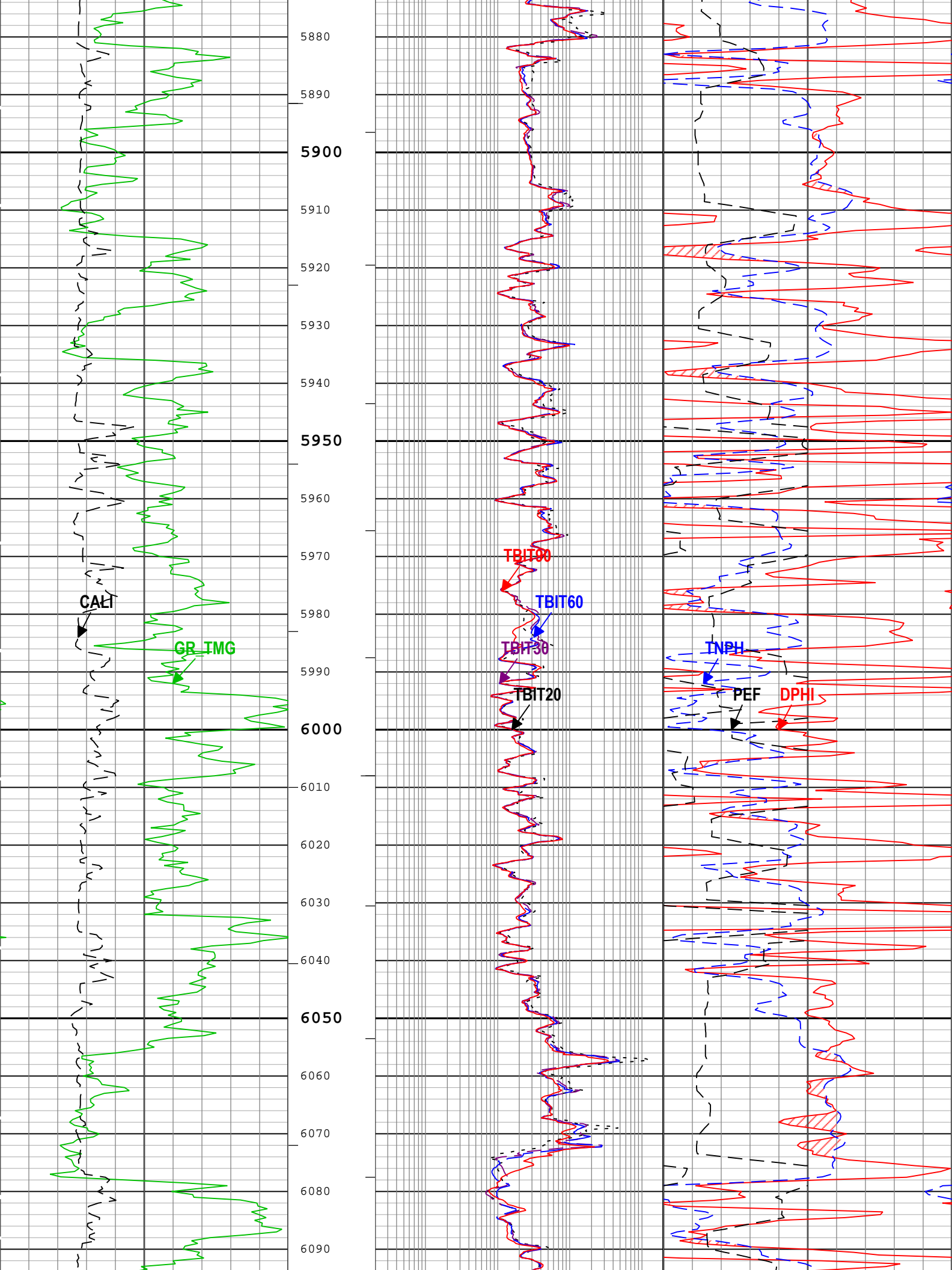


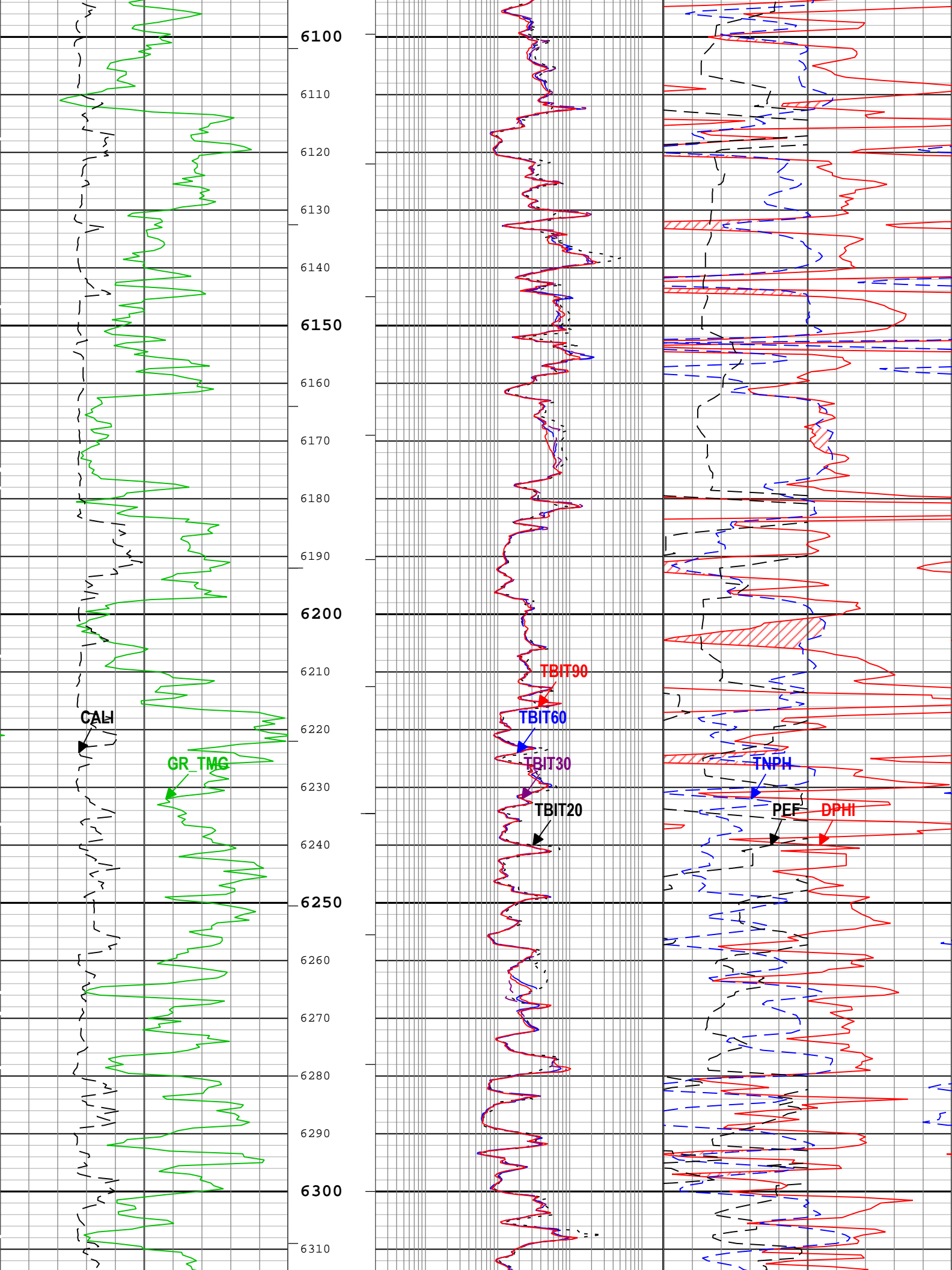


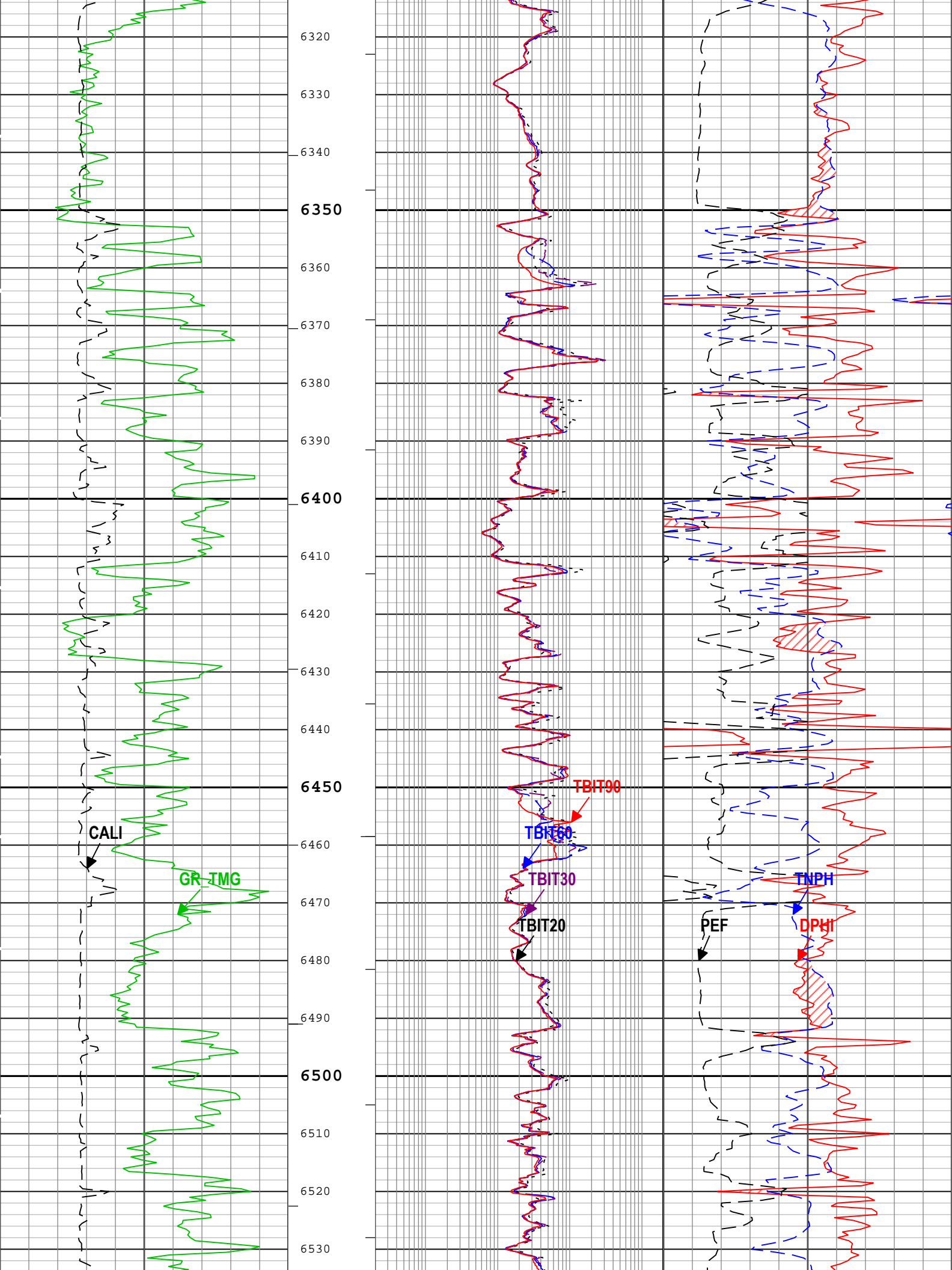


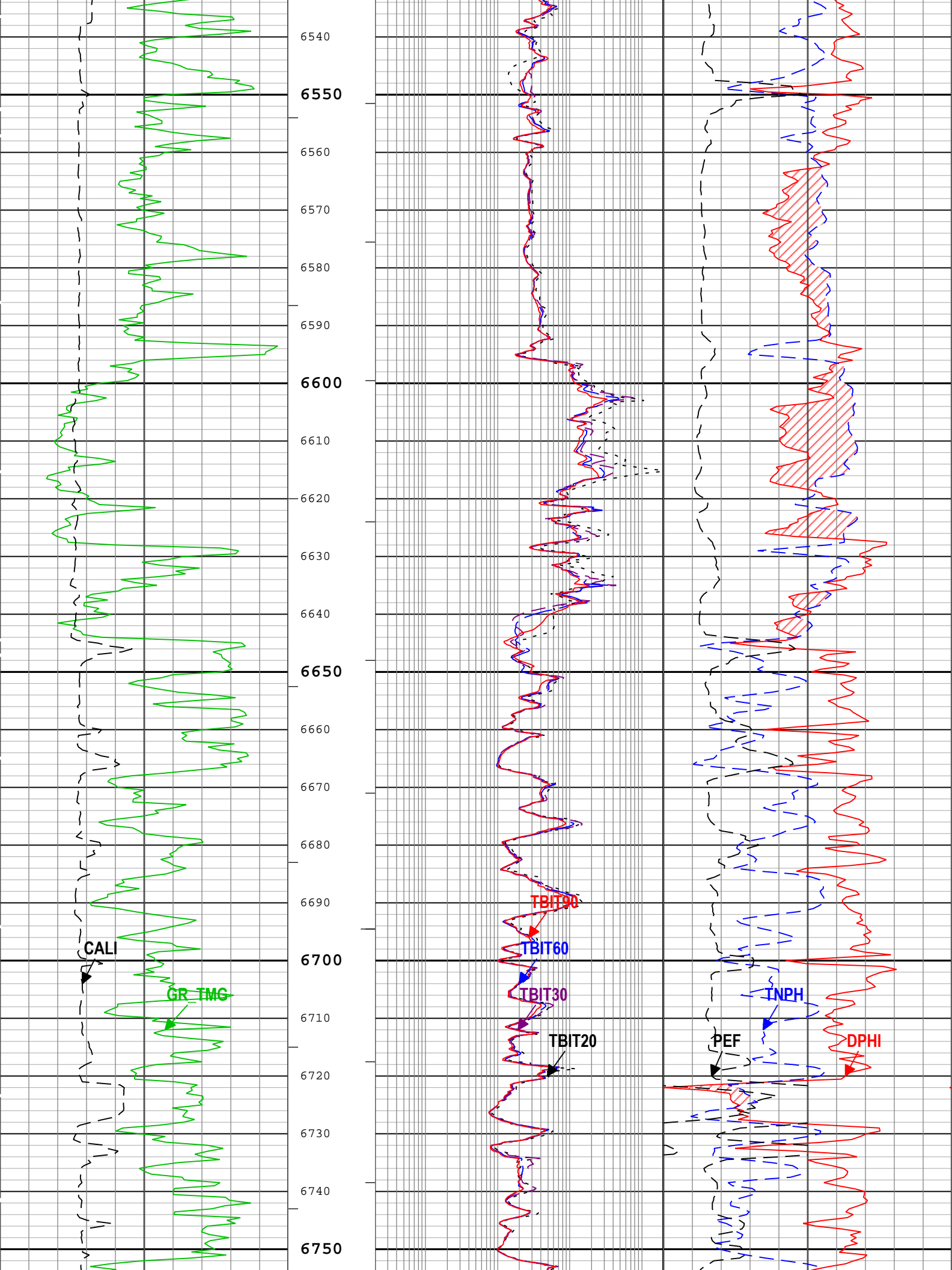


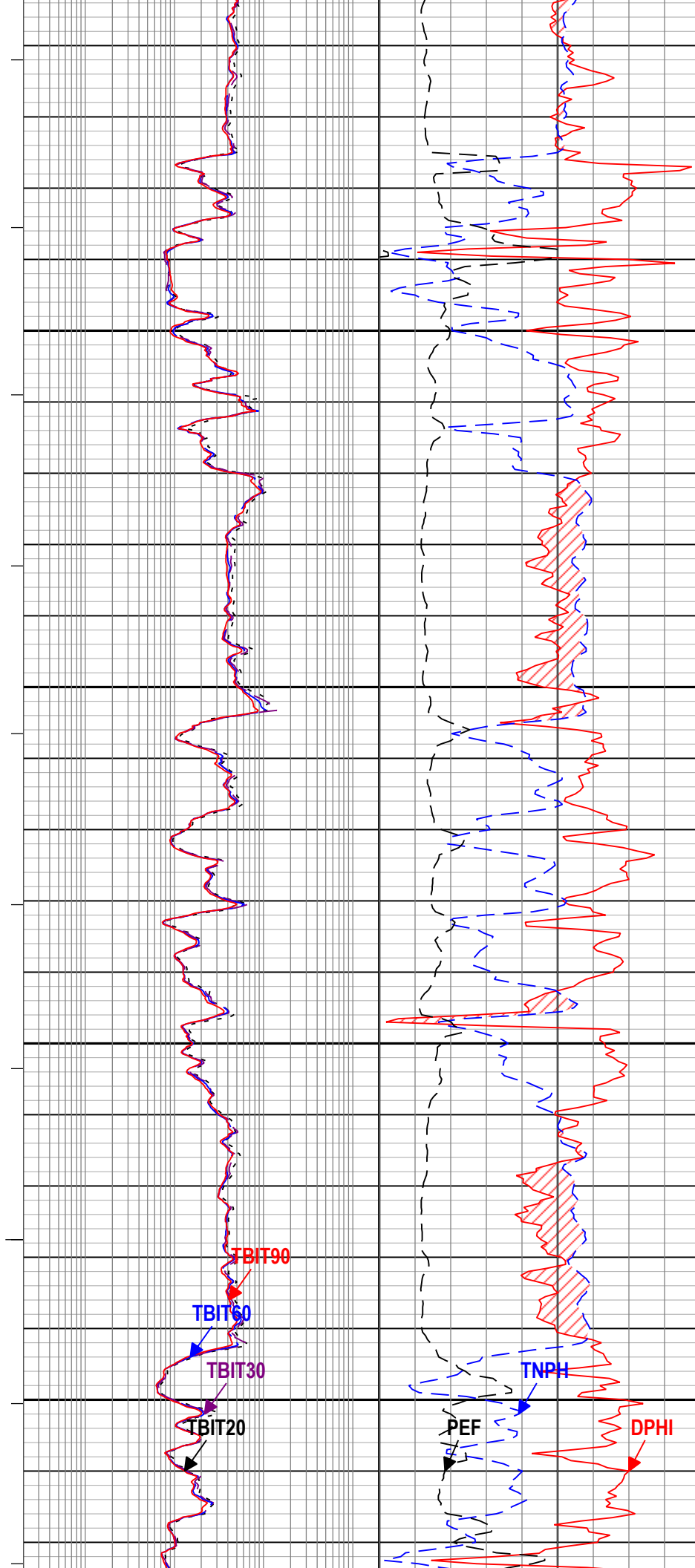
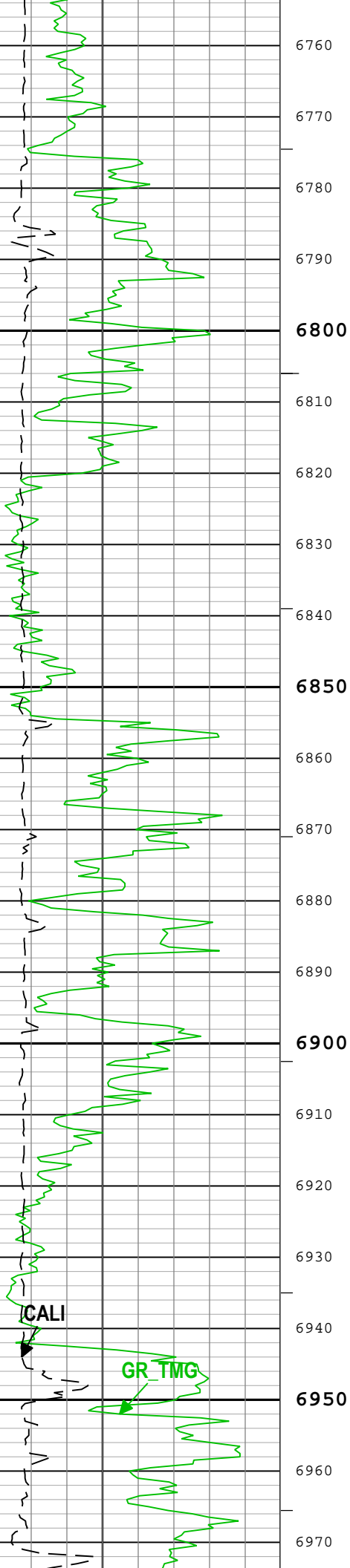


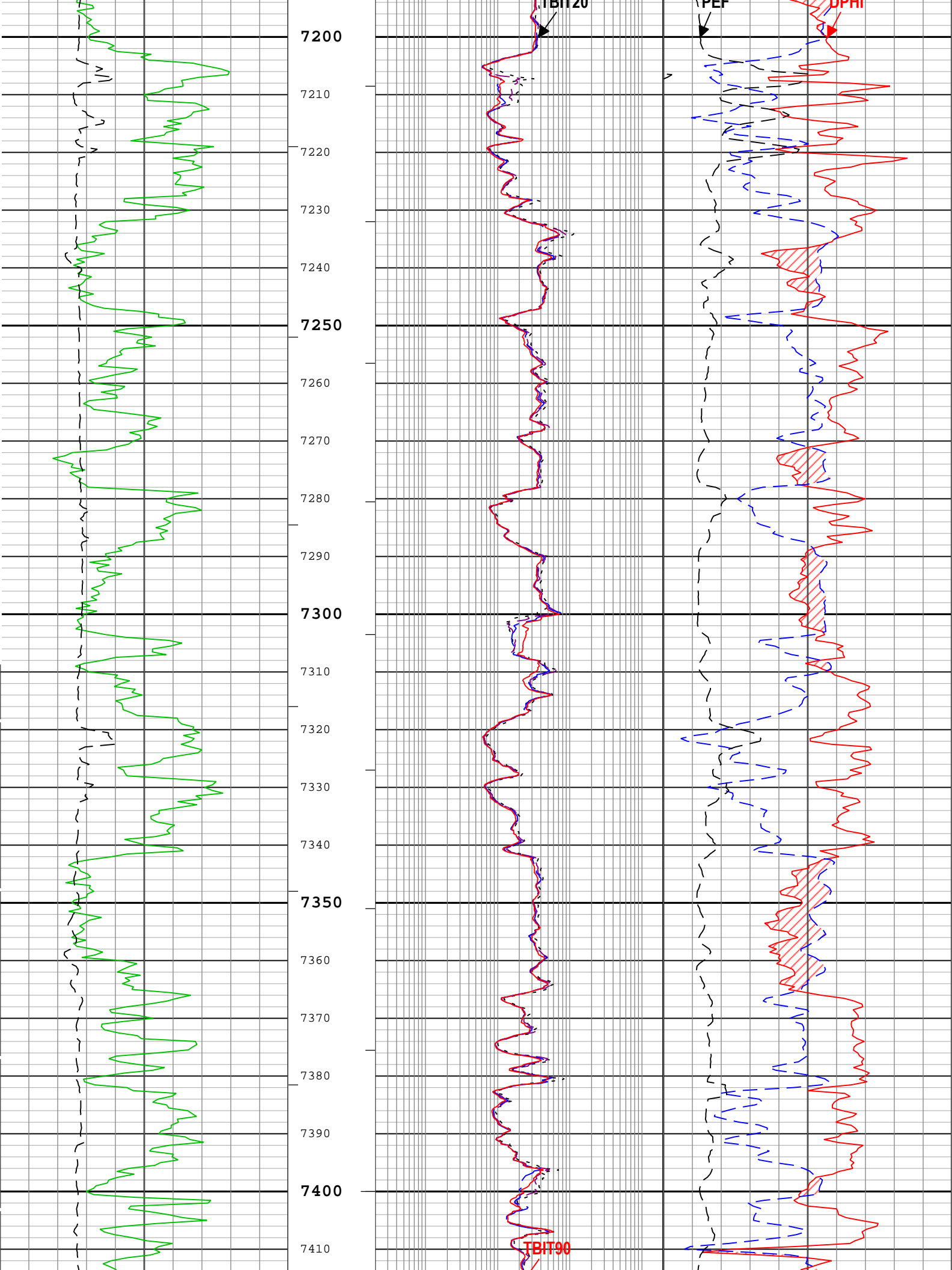


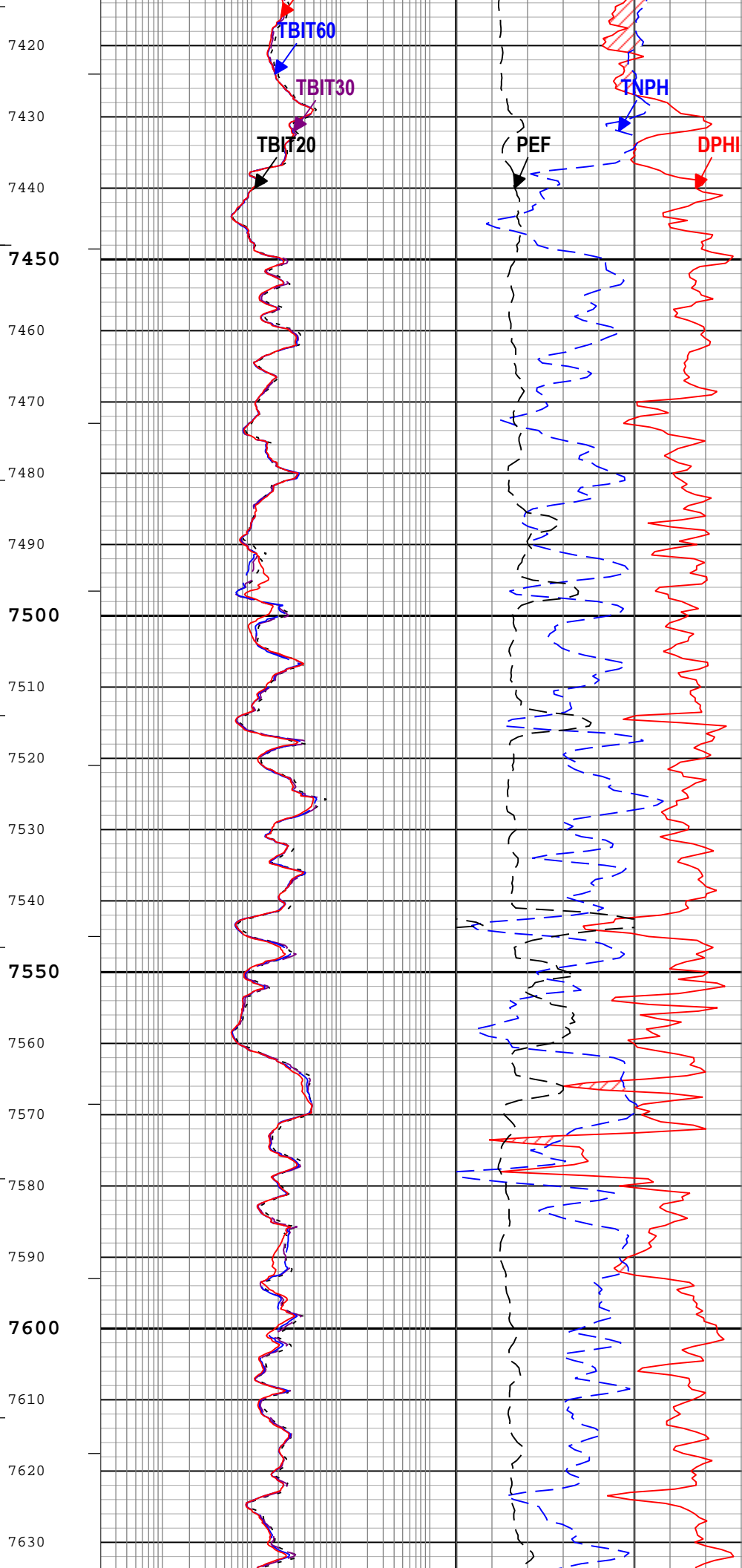
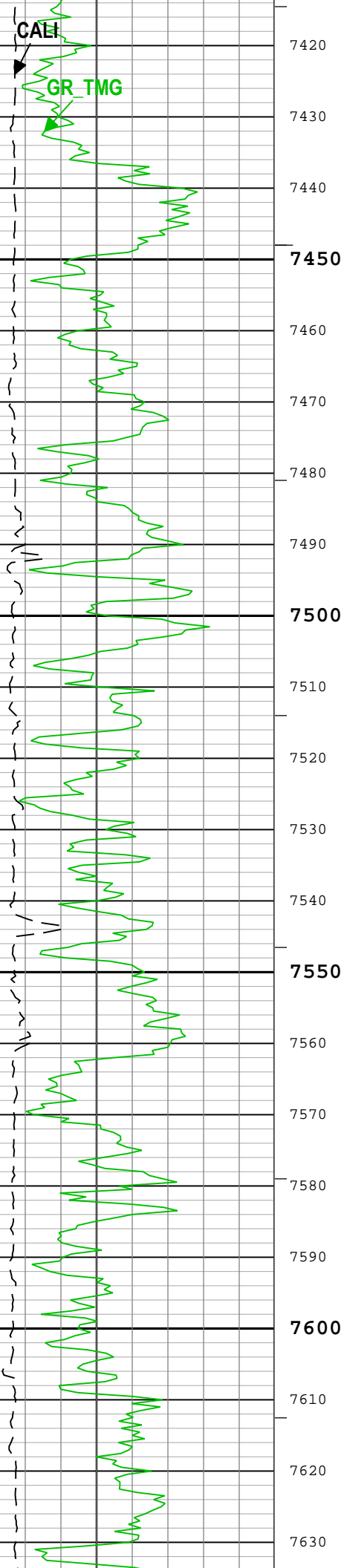


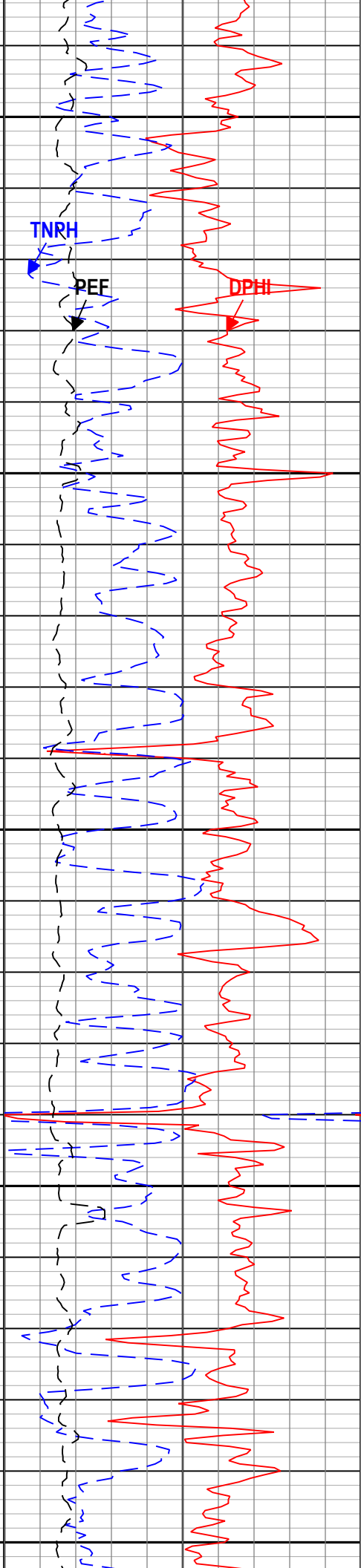
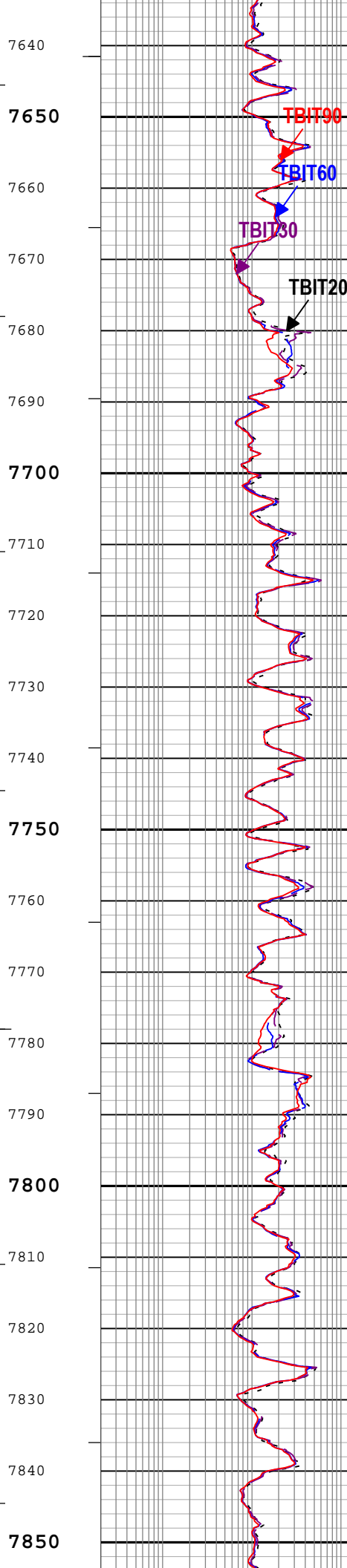
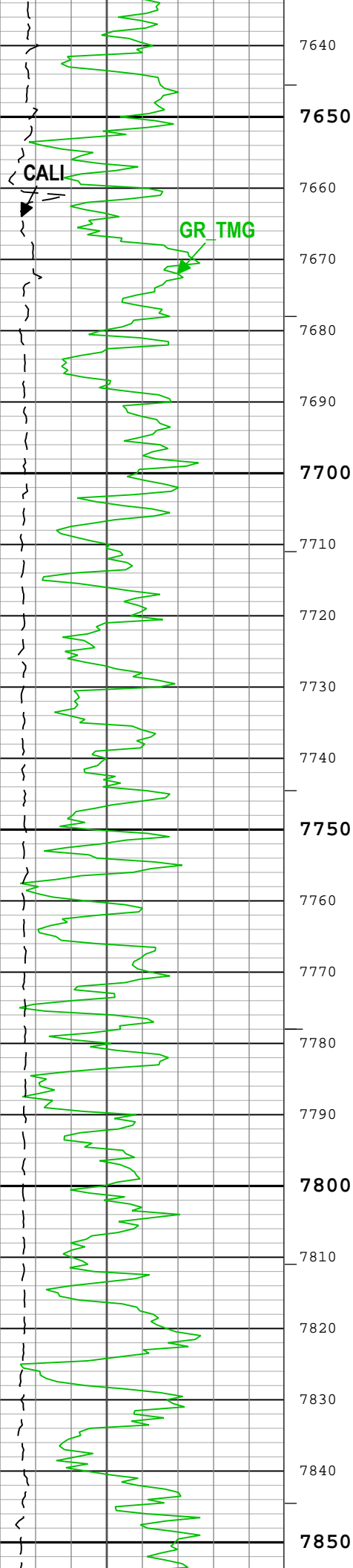


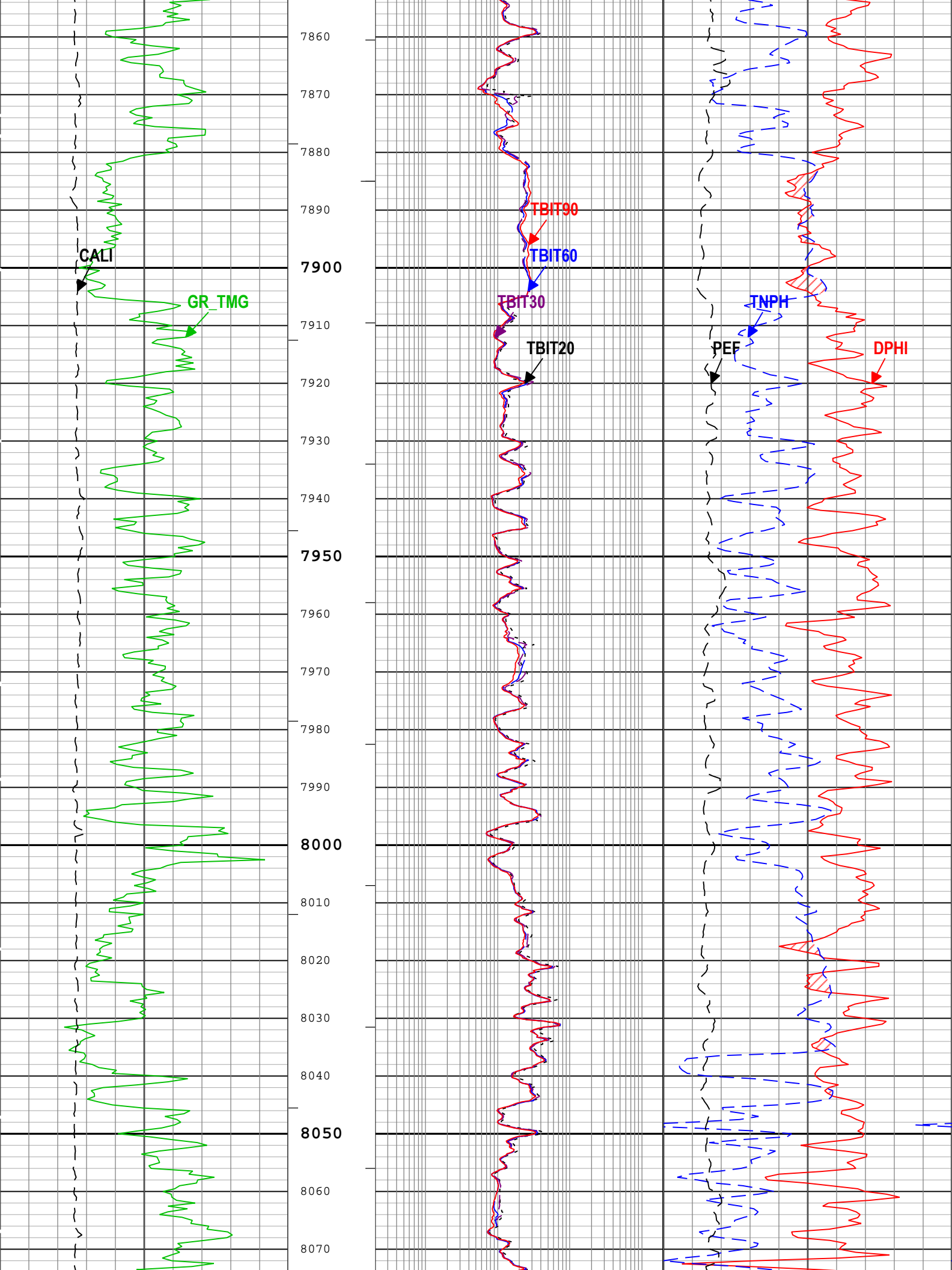


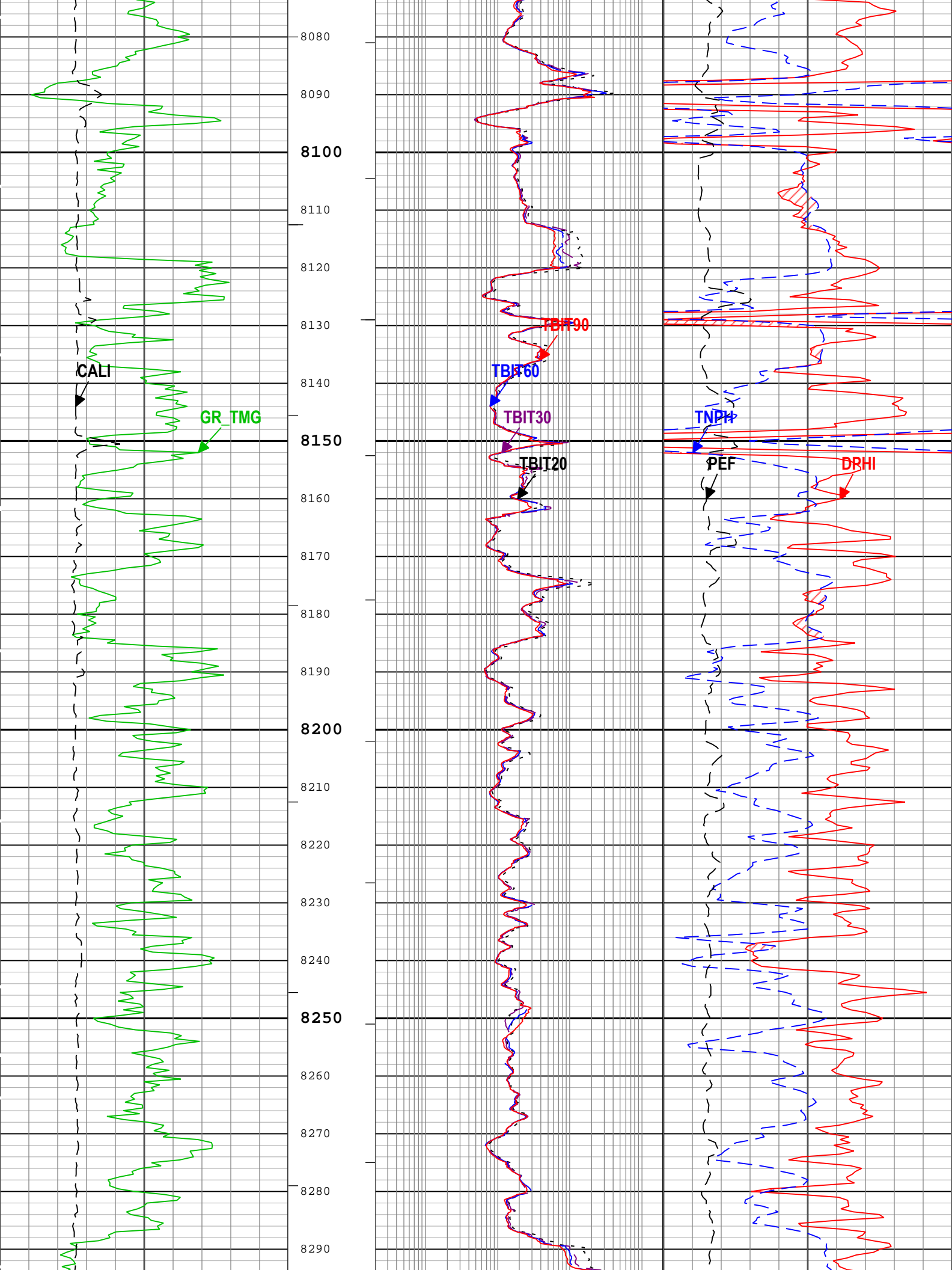


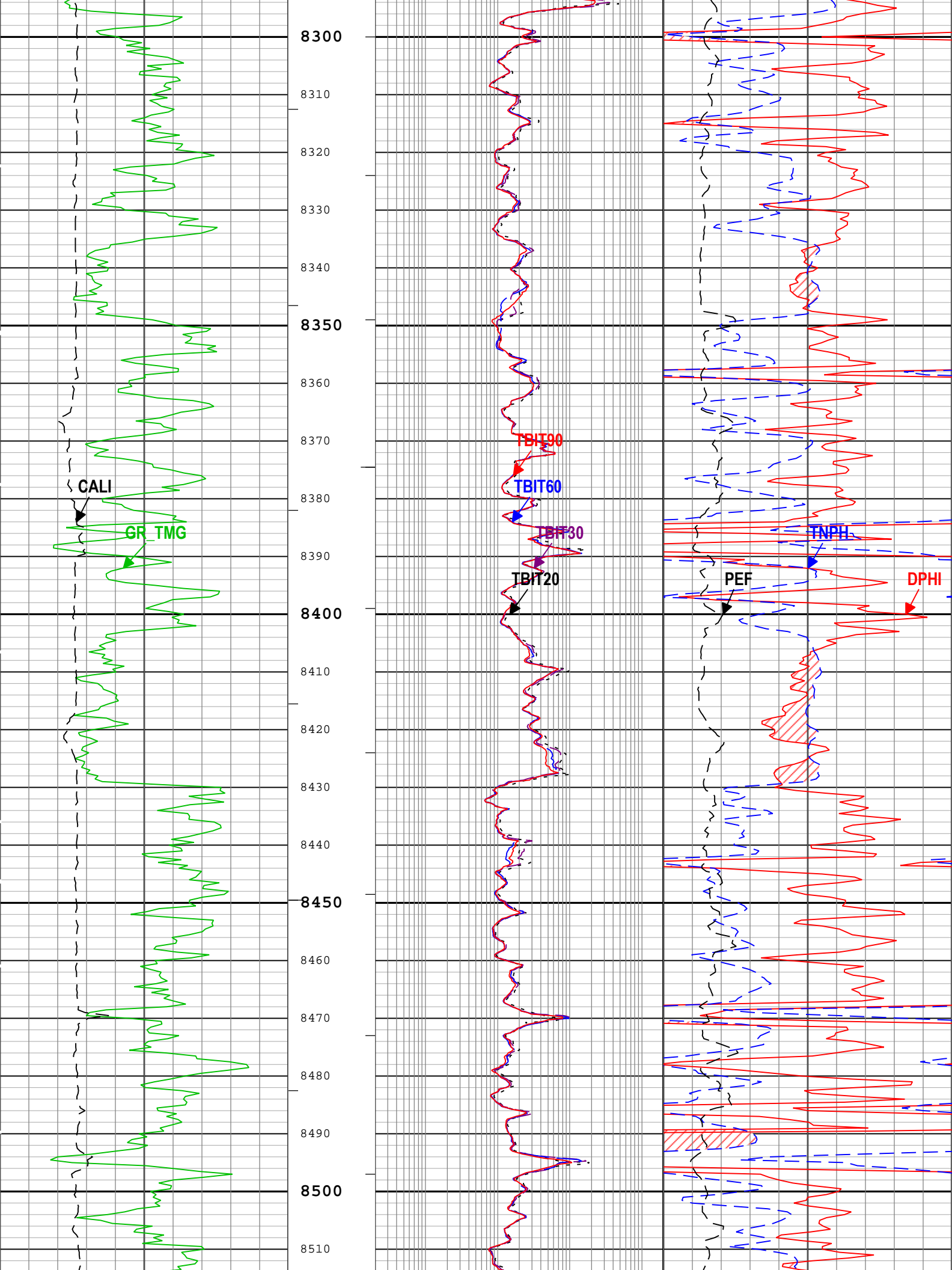


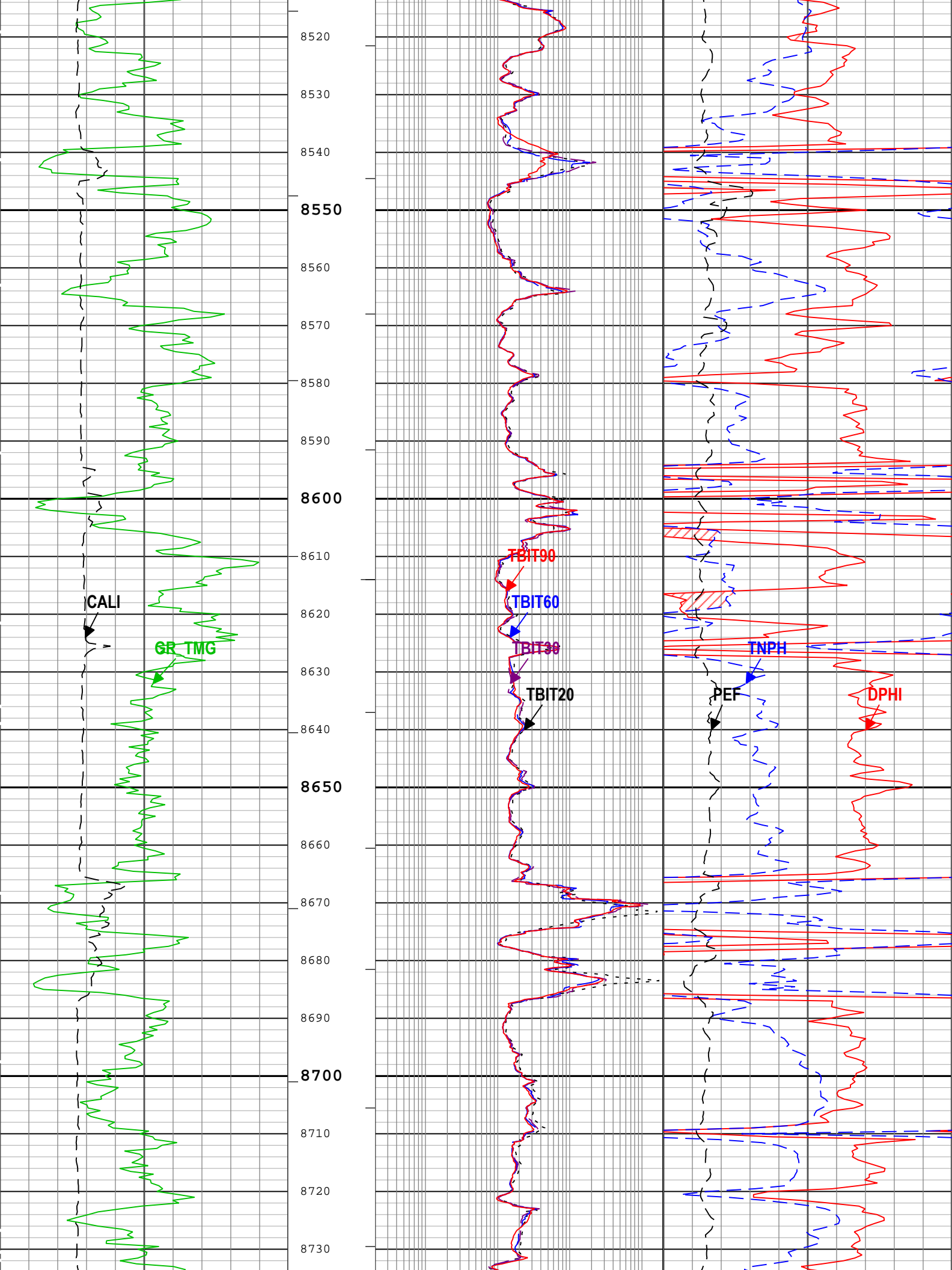


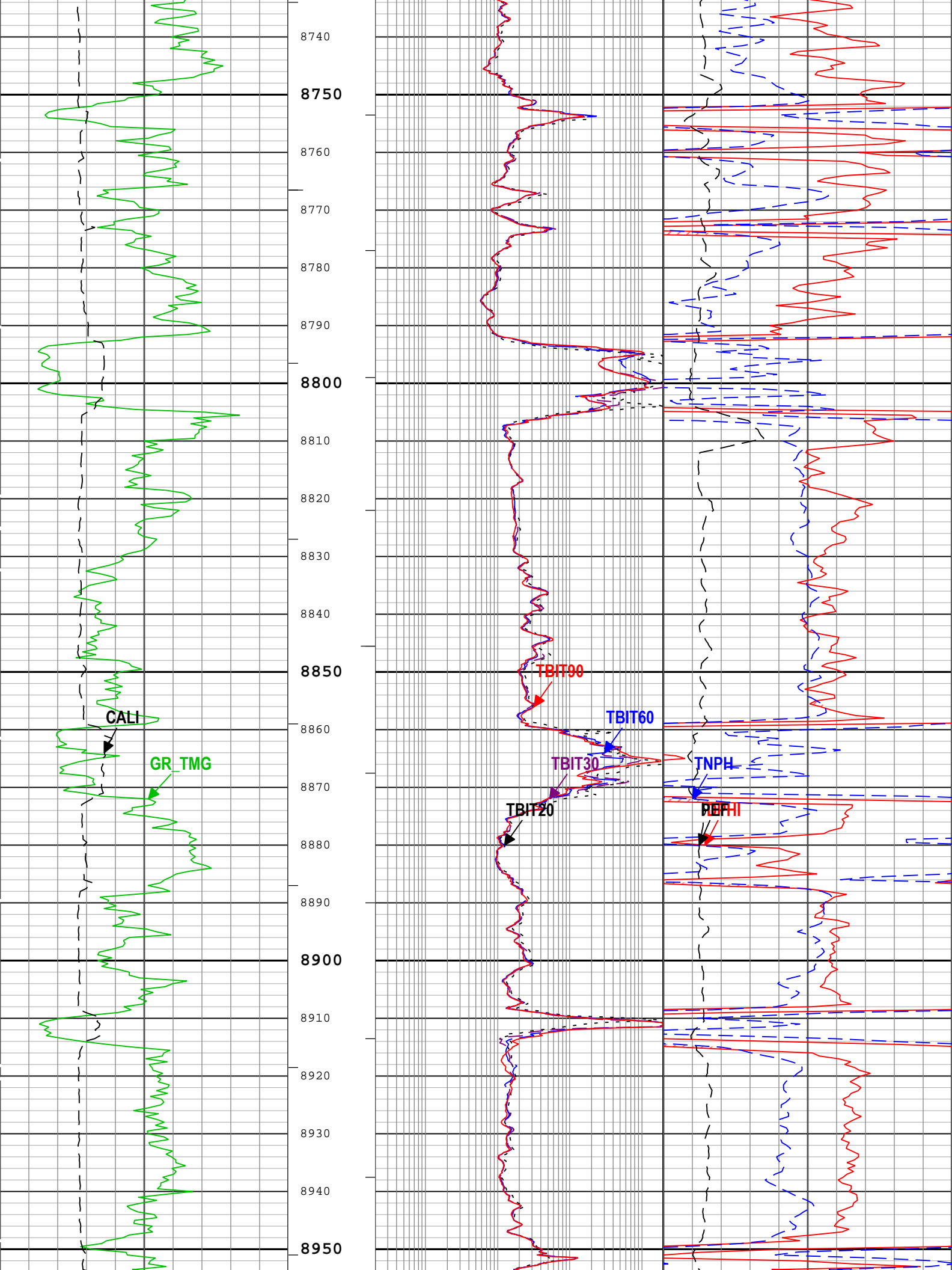


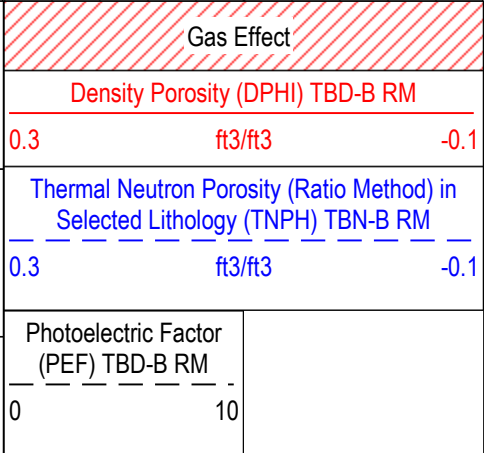
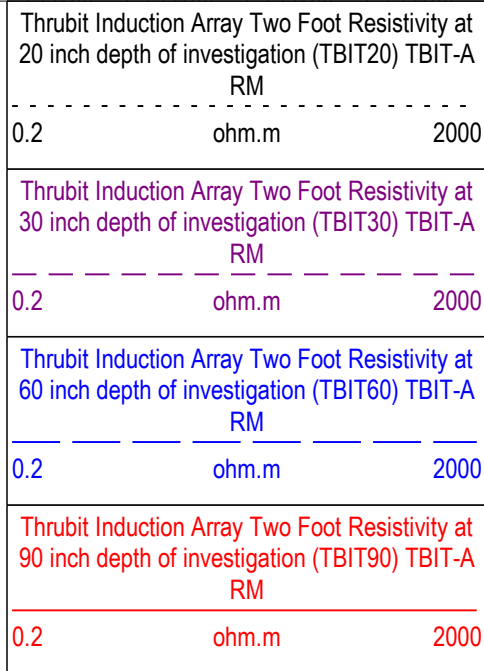
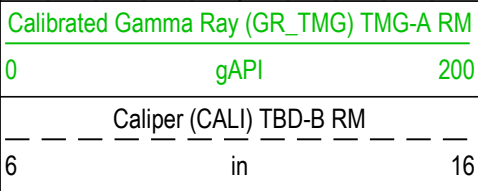
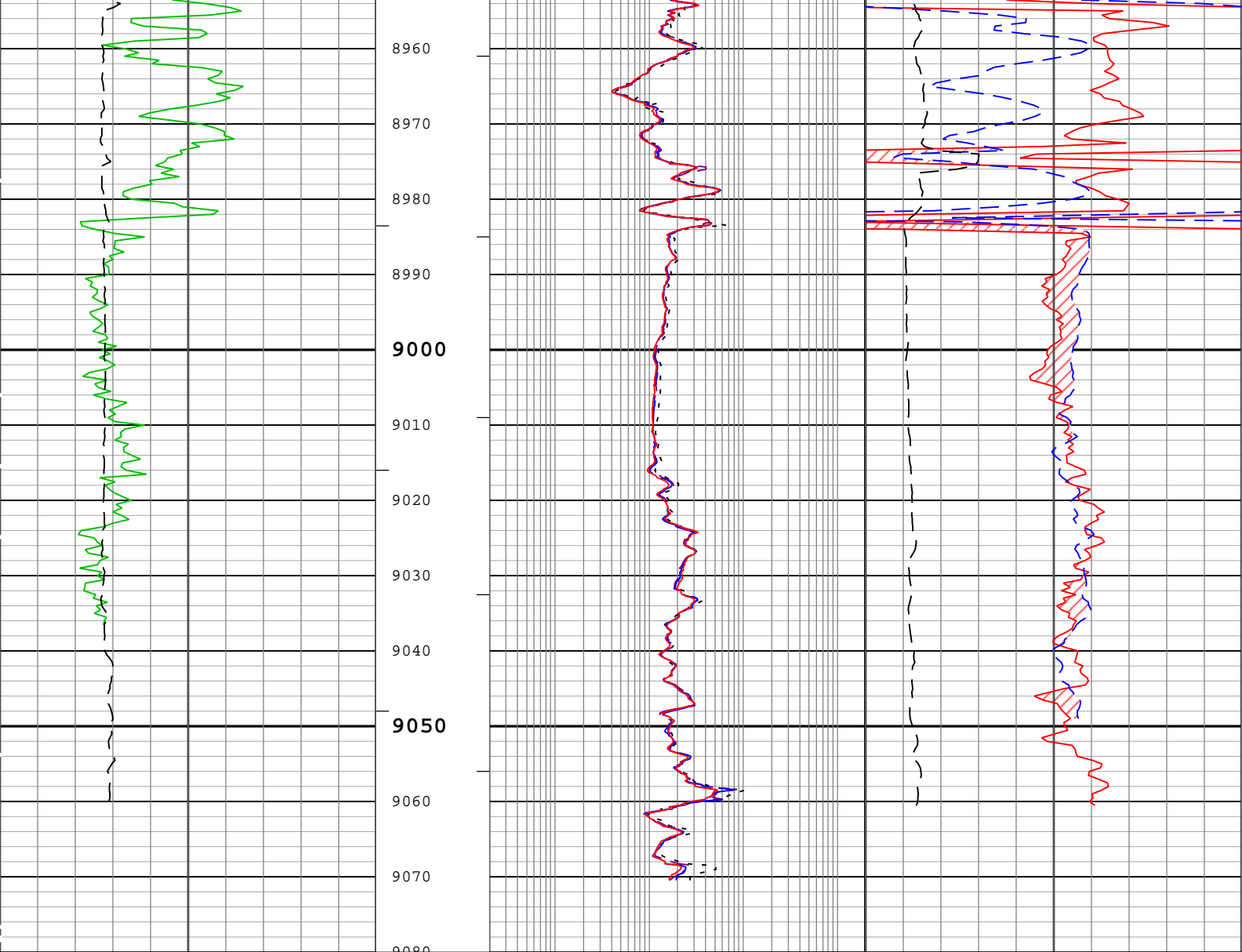












— ICV_RM - Integrated Cement Volume every 100.00 (ft3)

— ICV_RM - Integrated Cement Volume every 10.00 (ft3)

— IHV_RM - Integrated Hole Volume every 100.00 (ft3)

— IHV_RM - Integrated Hole Volume every 10.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

Channel Processing Parameters

Thrubit: Parameters

Parameter	Description	Tool	Value	Unit
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
BSAL	Borehole Salinity	Borehole	1500	ppm
BSCO	Borehole Salinity Correction Option	TBN-B	No	
CALI_SHIFT	CALI Supplementary Offset	TBD-B	-0.279	in
CBLO	Casing Bottom (Logger)	WLSESSION	1108	ft
CQCO	Cement Quality Correction Option	TBN-B	No	
CSAL	Cement Salinity	TBN-B	0	ppm
CSCOR	Cement Salinity Correction Option	TBN-B	No	
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	9.625	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	11.5	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DHC	Density Hole Correction	TBD-B	Bit Size	
ECCO	Eccentricity Coorection Option	TBN-B	No	
FCD	Future Casing (Outer) Diameter	WLSESSION	4.5	in
FD	Fluid Density	Borehole	1	g/cm3
FSAL	Formation Salinity	Borehole	0	ppm
FSCO	Formation Salinity Correction Option	TBN-B	No	
GCSE_UP_PASS_RM	Generalized Caliper Selection for WLRM Log Up Passes	Borehole_RM	CALI(RM)	
HSCOT	Hole Size Correction Option (None, Bit Size, Density Caliper, GCSE)	TBIT-A	GCSE	
HSCOT	Hole Size Correction Option (None, Bit Size, Density Caliper, GCSE)	TBN-B	GCSE	
TBN_WPRE	Well Pressure for Horizontal Section	TBN-B	0	psi
TBI_TC_OP	Induction Temperature Correction Option	TBIT-A	Lower	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	LIMESTONE	
MDEN	Matrix Density for Density Porosity	Borehole	2.71	g/cm3
MWCO	Mud Weight Correction Option	TBN-B	No	
PTCO	Pressure Temperature Correction Option	TBN-B	No	
SOCN	Standoff Distance	TBN-B	0.125	in
SOCO	Standoff Correction Option	TBN-B	No	
TBD_SPIKE_REJECT	Spike Detection Option	TBD-B	Correct	
TBD_SPIKE_THRESHOLD	Attenuation Change Threshold for Spike Detection	TBD-B	5	%
TBI_REPL_ARRAY_DEST	Thrubit Induction Array to Replace	TBIT-A	None	
TBI_REPL_ARRAY_SOURCE	Thrubit Induction Array to Replace with	TBIT-A	None	
TBI_RMUD_SRC	TBI Mud Resistivity Source for Borehole Correction	TBIT-A	Data_Channel_RMUD	
TBN_ALGO	TBN Porosity Algorithm Option	TBN-B	Schmid_McKeon	

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	13.5	1080	1108
BS	8.75	1108	9080

All depth are actual.

Tool Control Parameters

Company:	TEP Rocky Mountain LLC	Schlumberger
Well:	Federal RWF 442-18	
Field:	Rulison	
County:	Garfield	
State:	Colorado	

ThruBit
Triple Combo