

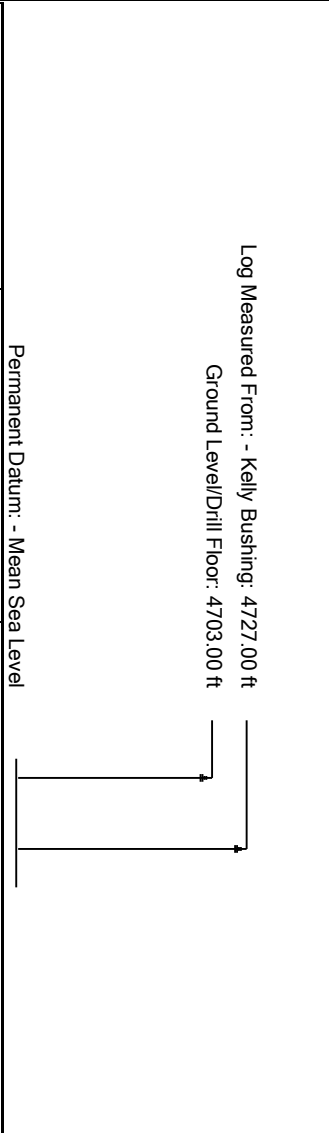
SlimPulse - Gamma Ray

1 in / 100 ft & 5 in / 100 ft Measured Depth

Recorded Mode, Composite Log

Schlumberger

Company:	Noble Energy		
Well:	Rohn State LD03-64-1HN		
Field:	Wattenberg		
County:	Weld		
State:	Colorado		
Country:	USA		
Section:	04	APIN:	05-123-37462
Township:	09N	Rig Name:	H&P 277
Range:	58W	Rig Type:	Top Drive
FL:	NAD 83 Colorado State Plane, Northern Zone, US Feet		
FL1:	Latitude: N 40° 46' 43.00" Northing: 1530686.69 ft US		
FL2:	Longitude: W 103° 51' 40.86" Easting: 3453806.26 ft US		



Acquisition Dates:	12-Sep-2014 – 18-Sep-2014	Other Services:	
Log Interval:	1226.00(ft) to 10075.00(ft)	Directional Drilling	
Index Types:	Measured Depth	Surveys / Continuous D&I	
Index Scales:	1:1200 1" / 100', 1:240 5" / 100'	Downhole Temperature	
Depth Source:	Driller's Depth	Downhole Shocks	
Depth Sensor:	PASON		
Print Type:	Final		
Spud Date:	11-Sep-2014		



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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 - Parameter Listing

10. Calibration Report
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Borehole Size/Casing Record

Bit						
Bit Size (in)	13.5	8.75	6.125			
Top Driller (ft)	0	1226	6067			
Bottom Driller (ft)	1226	6067	10142			
Casing						
Size (in)	9.625	7				
Weight (lbm/ft)	35	32				
Inner Diameter (in)	8.934	6.094				
Grade	J55	P110				
Top Driller (ft)	0	0				
Bottom Driller (ft)	1216	6057				

Operational Run Summary

Parameter (unit)	Run001	Run003				
Date Log Started	12-Sep-2014	16-Sep-2014				
Time Log Started	20:10:13	12:14:36				
Date Log Finished	14-Sep-2014	18-Sep-2014				
Time Log Finished	03:12:21	20:46:55				
Bit Size (in)	8.750	6.125				
Bit Start Depth (ft)	1226.00	6067.00				
Bit Stop Depth (ft)	6067.00	10142.00				
Top Log Interval (ft)	1166.00	6006.00				
Bottom Log Interval (ft)	6006.00	10075.00				
Max Hole Deviation (deg)	81.38	92.92				
Azimuth of Max Deviation (deg)	86.61	89.92				
Logging Unit Number	Command Center	Command Center				
Logging Unit Location	Zone 2	Zone 2				
Recorded By	Chad Welty	Chad Welty				
Witnessed By	Maria Valles	Maria Valles				
Service Order Number	14CCO0652	14CCO0652				


Borehole Fluids

Parameter(unit)	Run001	Run003				
Fluid Type	Water	Water				
Fluid Name	Fresh Water	Fresh Water				
Max Recorded Temperatures (degF)	82	118				
Source of Sample	Active Tank	Active Tank				

Salinity (ppm)	1150	1400				
Density (lbm/gal)	Zoned	10.85				
Funnel Viscosity (s)	44	36				
Fluid Loss (cm3)						
PH	9.6	9.5				
Source RMF	Pressed	Pressed				
RMC	Pressed	Pressed				
RM @ Meas Temp (ohm.m@degF)	0.2 @ 68	0.2 @ 68				
RMF @ Meas Temp (ohm.m@degF)	0.15 @ 68	0.15 @ 68				
RMC @ Meas Temp (ohm.m@degF)						
RM @ BHT (ohm.m@degF)	0.07 @ 212	0.07 @ 212				
RMF @ BHT (ohm.m@degF)	0.05 @ 212	0.05 @ 212				
RMC @ BHT (ohm.m@degF)	NaN @ 212	NaN @ 212				
Total Solid (%)	6.7	10.7				
High Gravity Solids (%)	4	8.3				

Zoned Borehole Fluids		
Run001		
Parameter	Value	Start
Density	8.75	9/12/2014 8:10:13 PM
Density	8.7	9/13/2014 2:30:00 AM
Density	9.75	9/13/2014 2:30:00 PM

Remarks and Equipment Summary	
Data presented is from tool memory and acquired while drilling from 1226 ft MD to 10142 ft MD	
Depth Reference: Driller's Depth.	
Environmental Corrections: Gamma Ray is corrected for bit size, mud weight, and tool collar thickness. Barite and Potassium in the mud affect Gamma Ray readings.	
Run002 has a casing failure with no new footage drilled.	
Run001: Remarks	Run003: Remarks
Run Objective: Drill Vertical and Curve Section	Run Objective: Drill Lateral Section.
Bit to GR: 60.69 ft. Bit to D&I: 57.66 ft.	Bit to GR: 66.08 ft. Bit to D&I: 63.05 ft.
Drilled from: 1226 ft MD to 6067 ft MD. Logged from: 1166 ft MD to 6006 ft MD.	Drilled from: 6067 ft MD to 10142 ft MD. Logged from: 6006 ft MD to 10075 ft MD.
SlimPulse Software: v11.0C00 SlimPulse D&I calibrated on: 16-Aug-2013 SlimPulse GR calibrated on: 24-May-2014	SlimPulse Software: v11.0C00 SlimPulse D&I calibrated on: 16-Aug-2013 SlimPulse GR calibrated on: 24-May-2014
PathFinder a Schlumberger Co. Personnel: DD: Jordan Timbs & Mike Hicks MWD: Chad Welty & Maria Valles	PathFinder a Schlumberger Co. Personnel: DD: Jordan Timbs & Mike Hicks MWD: Chad Welty, Maria Valles, Dennis Lipcovski
Reason for POOH: Curve Section TD.	Reason for POOH: Well TD.

Run001: Toolstring	Run003: Toolstring
<div> <div> <div>Equip name</div> <div>Length</div> <div>MP name</div> <div>Offset</div> </div> <div> <div> <div>Fltr Sub: 6 3/4"</div> <div>140.33</div> </div> <div> <div>:DR19520</div> <div>Flex DC: 6 3/4"[</div> <div>2]:DR18673</div> </div> <div> <div>Filter sub</div> <div>NMFC</div> </div> </div>  </div>	

Flex DC: 6 3/4"[106.05
1]:DR18671

NFC

Equip name	Length	MP name	Offset
Filtr Sub: 4 3/4": DR20585	143.8	Filter Sub	
NMDC: 4 3/4"[3]:DR10032	140.69	NMDC	

NMDC: 4 3/4"[2]:DR24730	110.63	NMDC	
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SPULSE-GEN:DR 75.00
8627
FLOWSUB:DR2248
9
SPCOLLAR:DR862
7
SPMA:359
SPEC:893
SPBA
UBHO:675U175

MWD

SPULSE-GEN:DR 80.41
10660
FLOWSUB:DR2209
7
SPCOLLAR:DR1066
0
SPMA:2084
SPEC:939
SPBA:Q01347
UBHO:475U187

— GR 60.77

— D&I 57.74

— GR 66.08

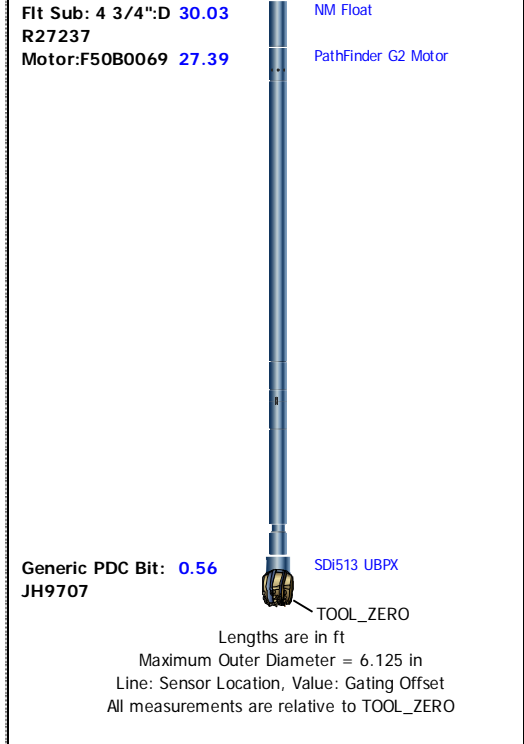
— D&I 63.05

Fit Sub: 6 3/4": 40.1
DR15145
NMDC: 6 3/4":D 37.27
R18313

Float Sub

Pony

NMDC: 4 3/4"[1]:DR14410	44.47	NMPC	
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1 in / 100 ft Measured Depth Log

Composite Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Include Parallel Data
Run001	Drilling	Down	1258.75 ft	6069.42 ft	12-Sep-2014 9:53:45 PM	14-Sep-2014 3:12:21 AM	No
Run003	Drilling	Down	6017.50 ft	10144.25 ft	16-Sep-2014 12:14:36 PM	18-Sep-2014 8:46:55 PM	No

All depths are referenced to toolstring zero

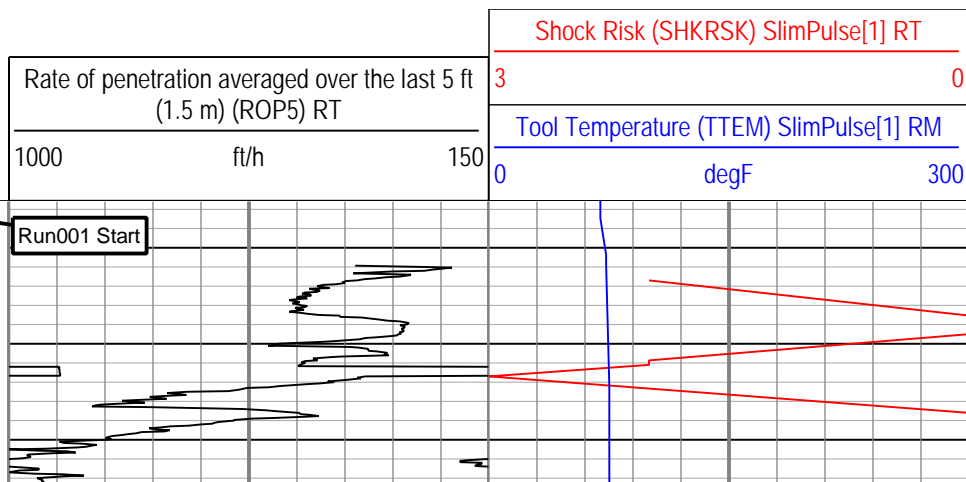
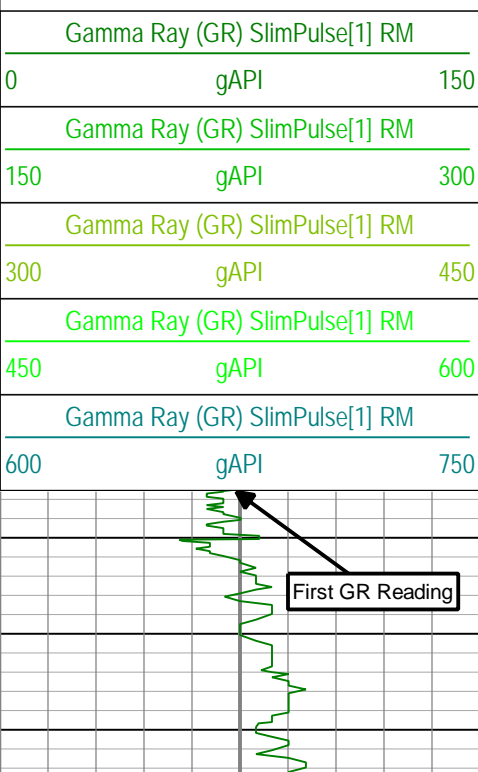
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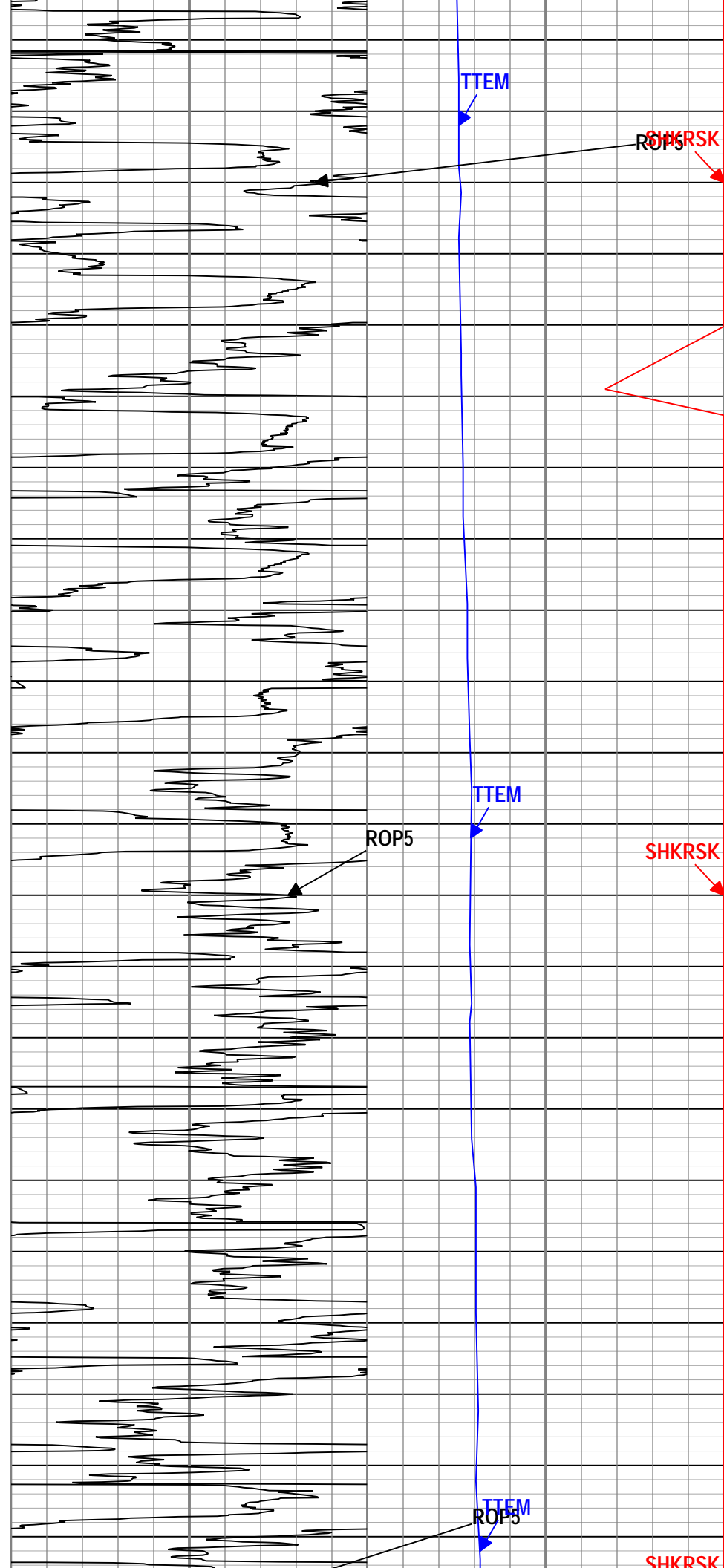
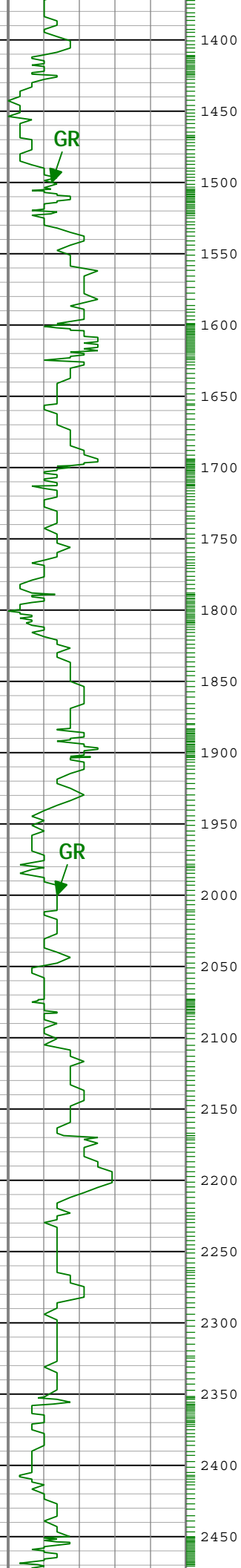
Company:Noble Energy Well:Rohn State LD03-64-1HN

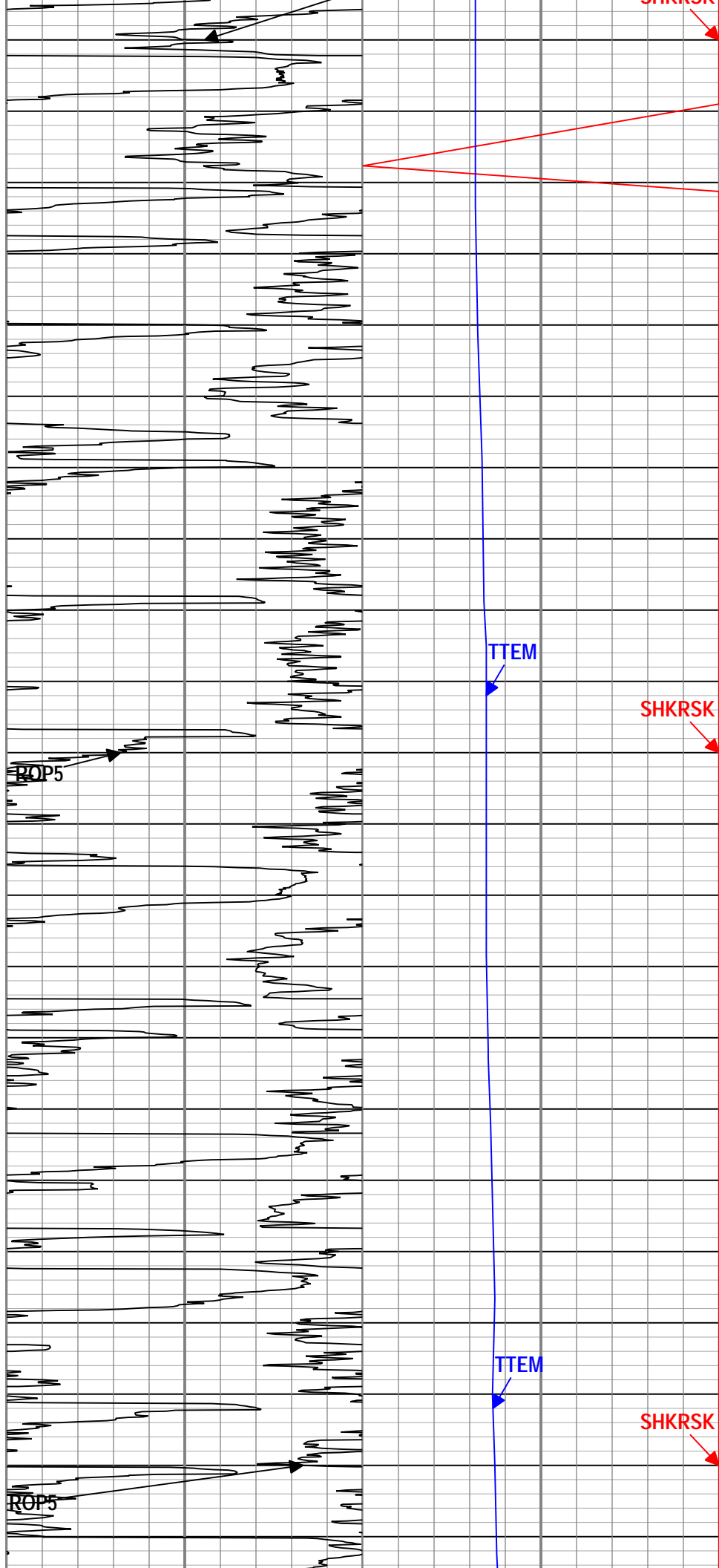
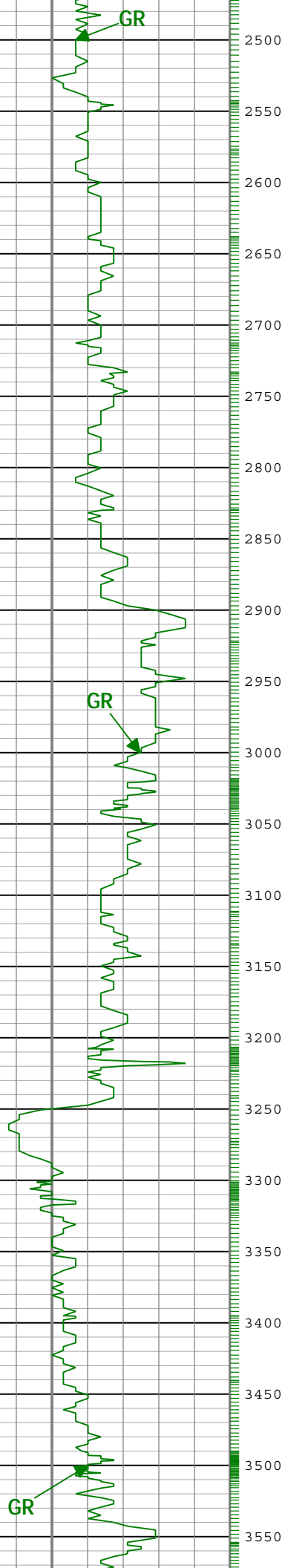
Composite 1:S116

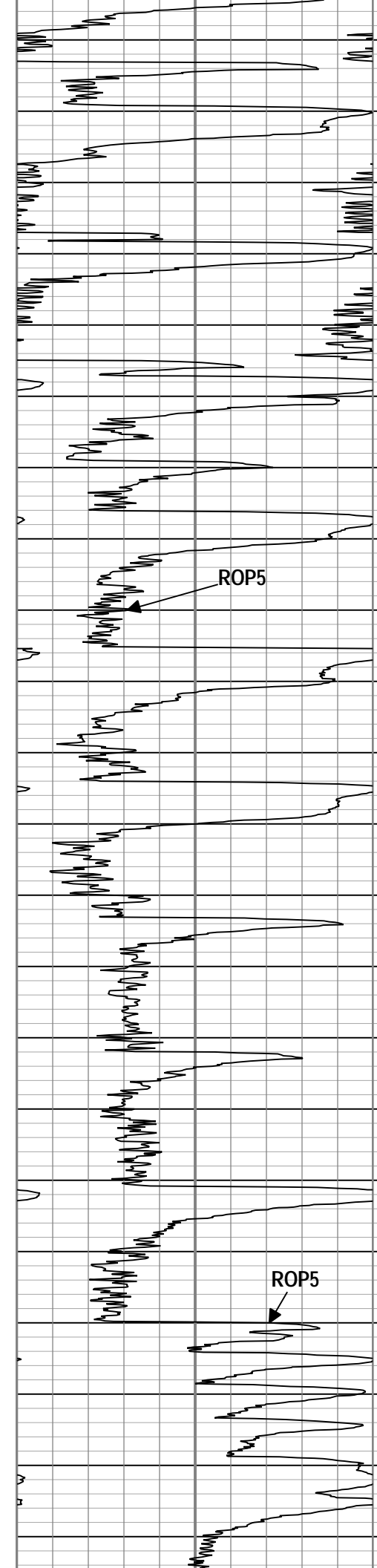
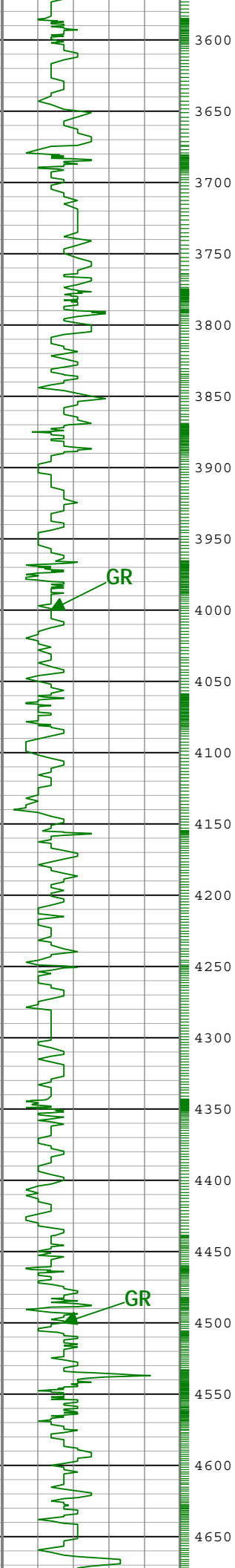
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Depth Creation Date: 22-Sep-2014 15:02:05

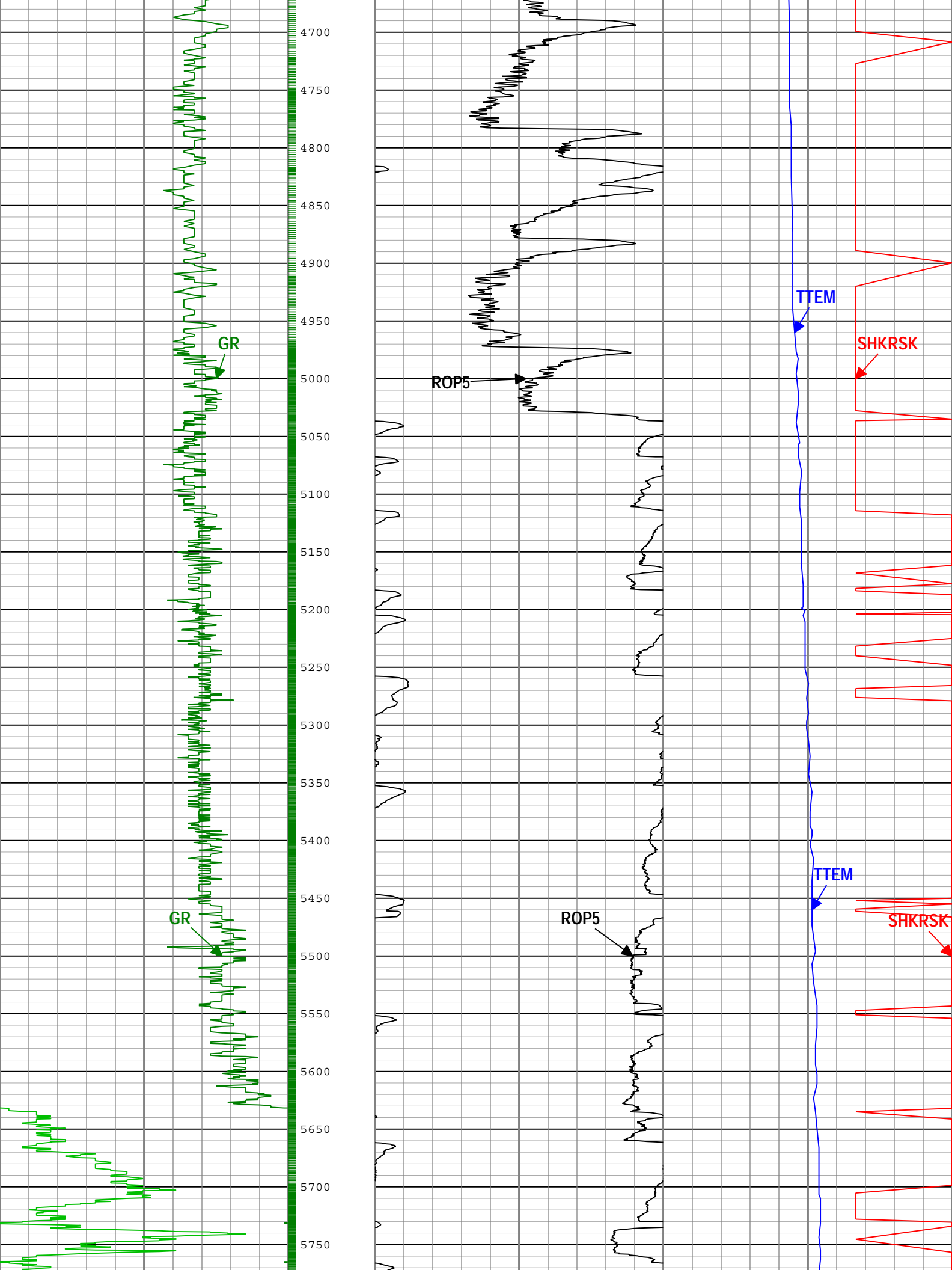
|TICKS_GR - Gamma Ray Tick Marks SlimPulse[1] RM

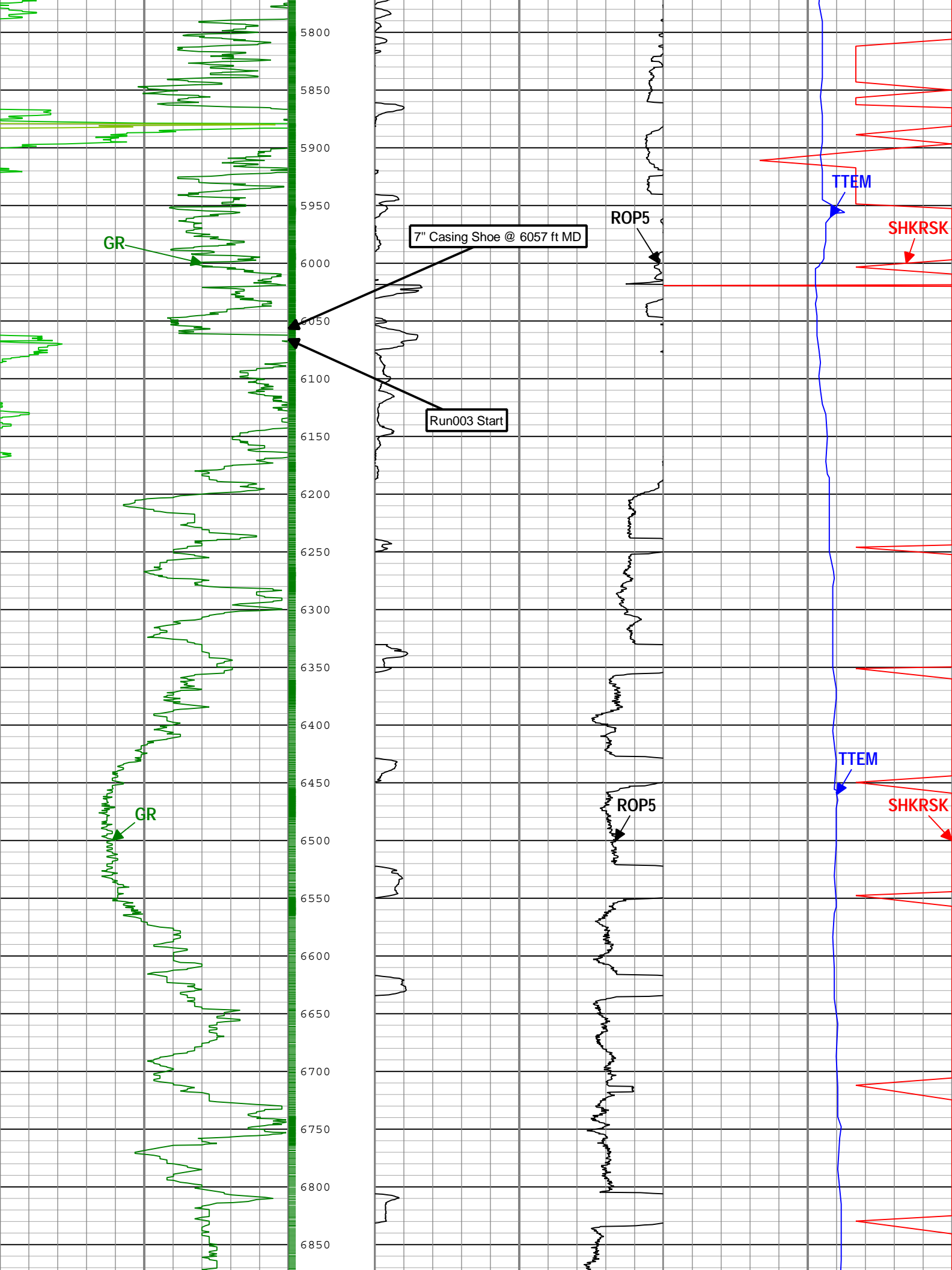


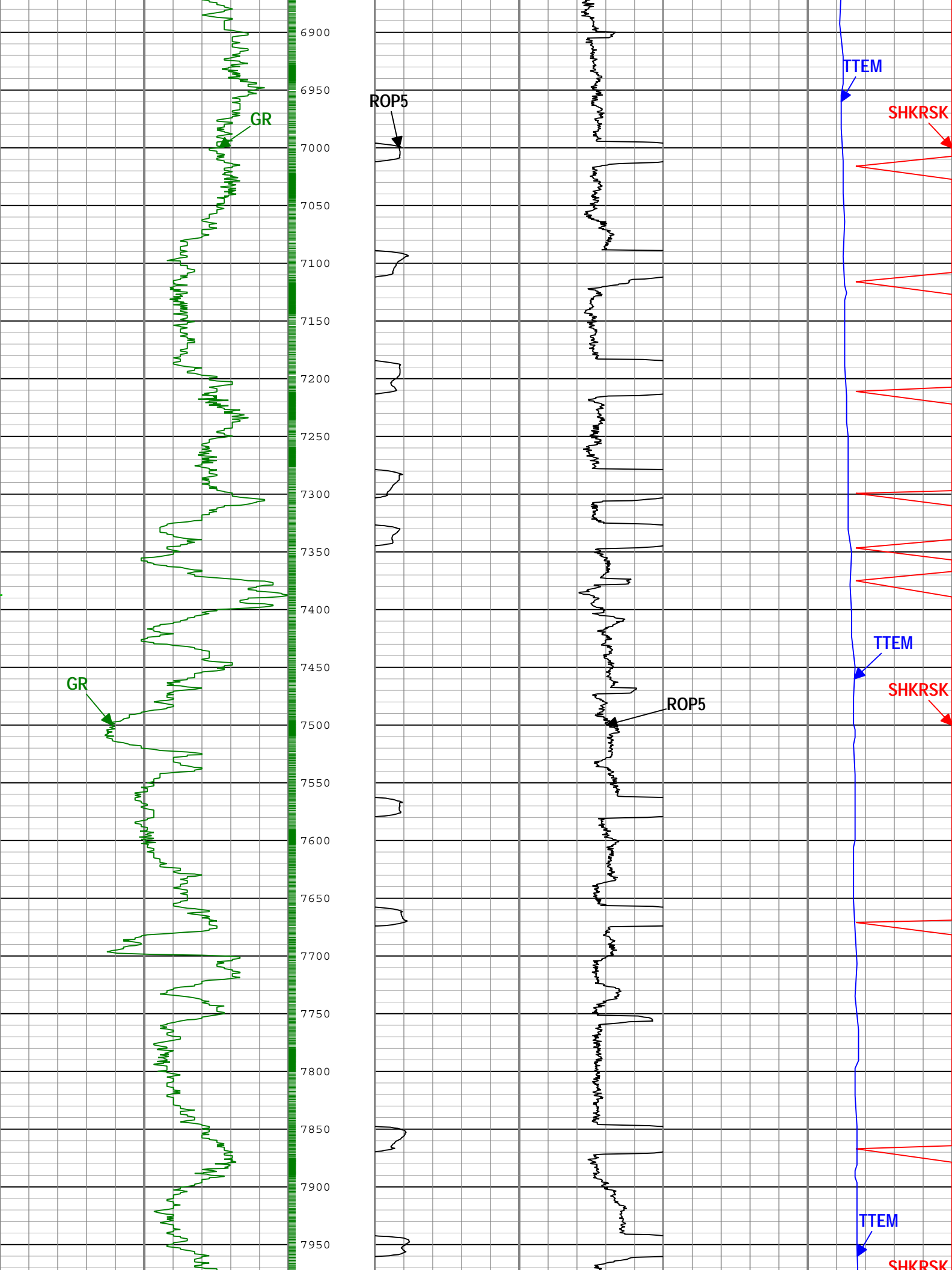


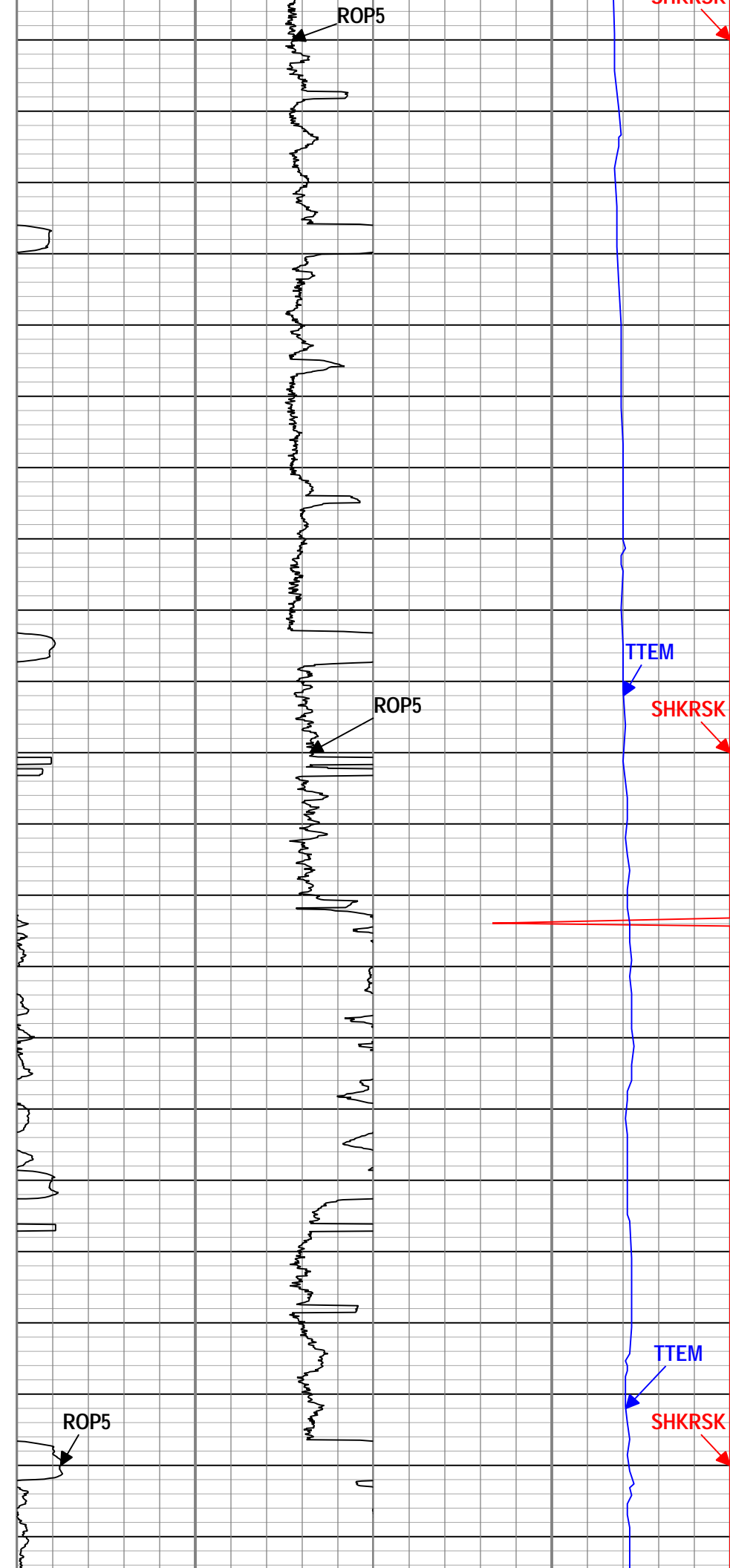
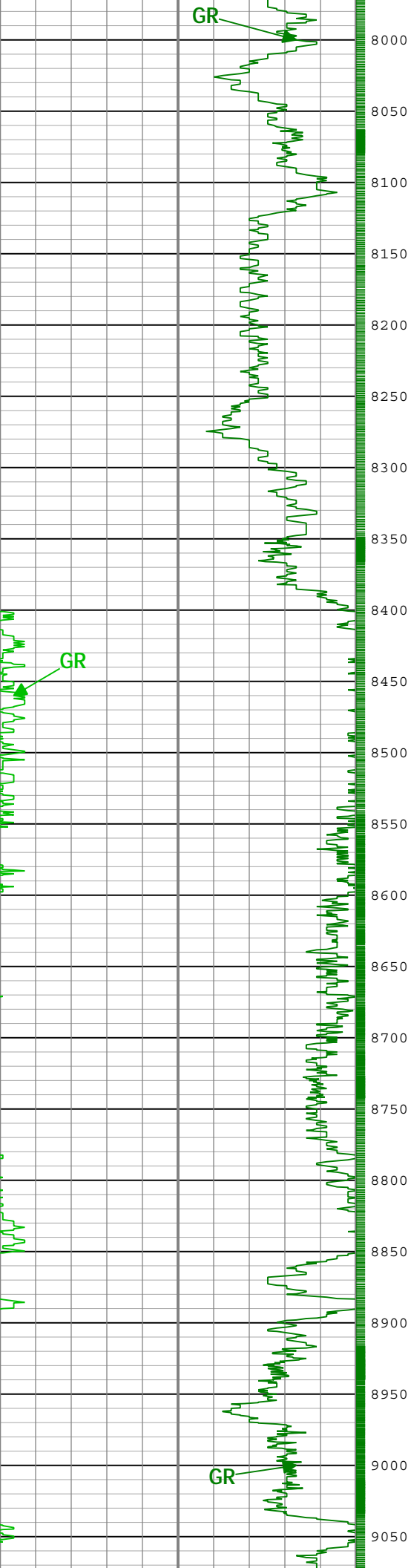


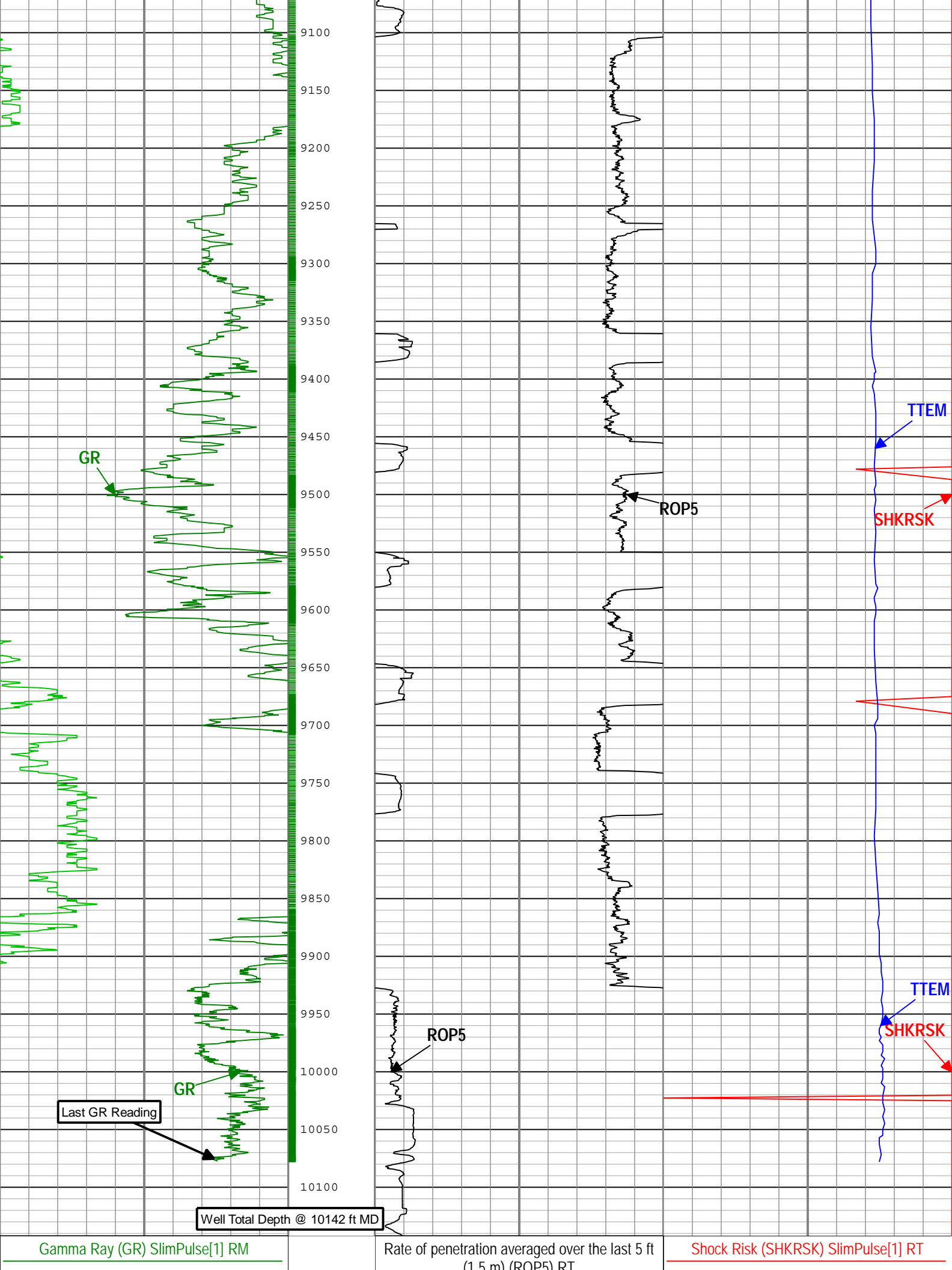












0	gAPI	150
Gamma Ray (GR) SlimPulse[1] RM		
150	gAPI	300
Gamma Ray (GR) SlimPulse[1] RM		
300	gAPI	450
Gamma Ray (GR) SlimPulse[1] RM		
450	gAPI	600
Gamma Ray (GR) SlimPulse[1] RM		
600	gAPI	750

(1.5 in) (RCF) RM
1000 ft/h 150

3	Tool Temperature (TTEM) SlimPulse[1] RM	0
0	degF	300

└ TICKS_GR - Gamma Ray Tick Marks SlimPulse[1] RM

Description: SlimPulse Gamma Ray 1 Format: Log (SlimPulse Gamma Ray Final MD) Index Scale: 1 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 22-Sep-2014 15:02:05

Channel Processing Parameters	
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Run001: Parameters				
Parameter	Description	Tool	Value	Unit
BS	Bit Size	DNMSESSION	Depth Zoned	in
DFD	Drilling Fluid Density	Borehole	Time Zoned	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

Run001Depth Zoned Parameters			
Parameter	Value	Start (ft)	Stop (ft)
BS	13.5	1226	1226
BS	8.75	1226	6067
BS	6.125	6067	6069.42
All depth are actual.			

Run001Time Zoned Parameters

Pass Drilling					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	8.75	12-Sep-2014 21:53:45	13-Sep-2014 02:30:00	1258.75	2417.83
DFD	8.7	13-Sep-2014 02:30:00	13-Sep-2014 14:30:00	2417.83	5182.33
DFD	9.75	13-Sep-2014 14:30:00	14-Sep-2014 03:12:21	5182.33	6069.42
All depth are at tool zero.					

Run003: Parameters				
Parameter	Description	Tool	Value	Unit
BS	Bit Size	DNMSESSION	Depth Zoned	in
DFD	Drilling Fluid Density	Borehole	10.85	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

Run003Depth Zoned Parameters			
Parameter	Value	Start (ft)	Stop (ft)
BS	8.75	5873.7	6067
BS	6.125	6067	10142
All depth are actual.			

Tool Control Parameters	
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Composite 1

5 in / 100 ft Measured Depth

Composite Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Include Parallel Data
Run001	Drilling	Down	1258.75 ft	6069.42 ft	12-Sep-2014 9:53:45 PM	14-Sep-2014 3:12:21 AM	No
Run003	Drilling	Down	6017.50 ft	10144.25 ft	16-Sep-2014 12:14:36 PM	18-Sep-2014 8:46:55 PM	No

All depths are referenced to toolstring zero

Log

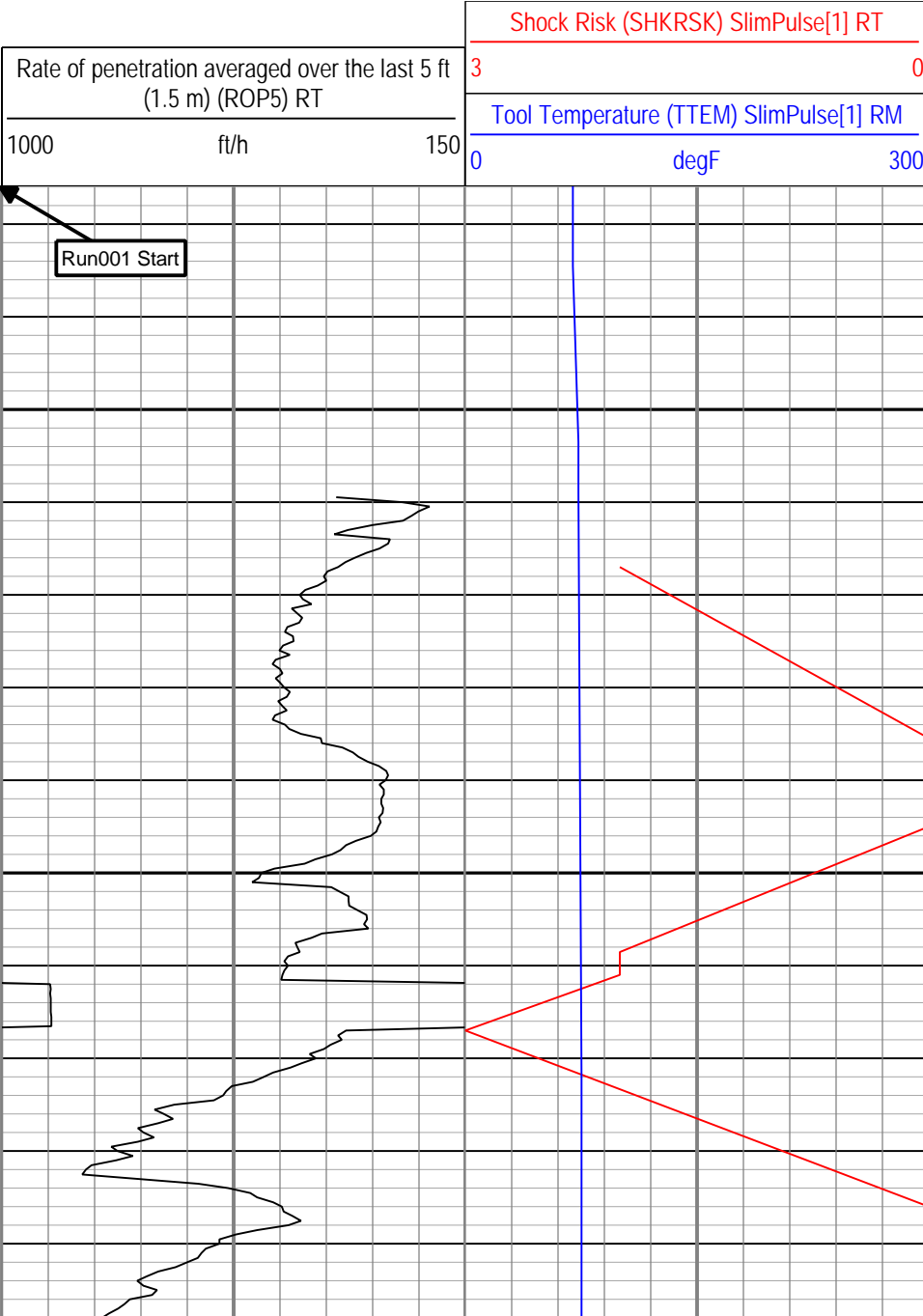
Company:Noble Energy Well:Rohn State LD03-64-1HN

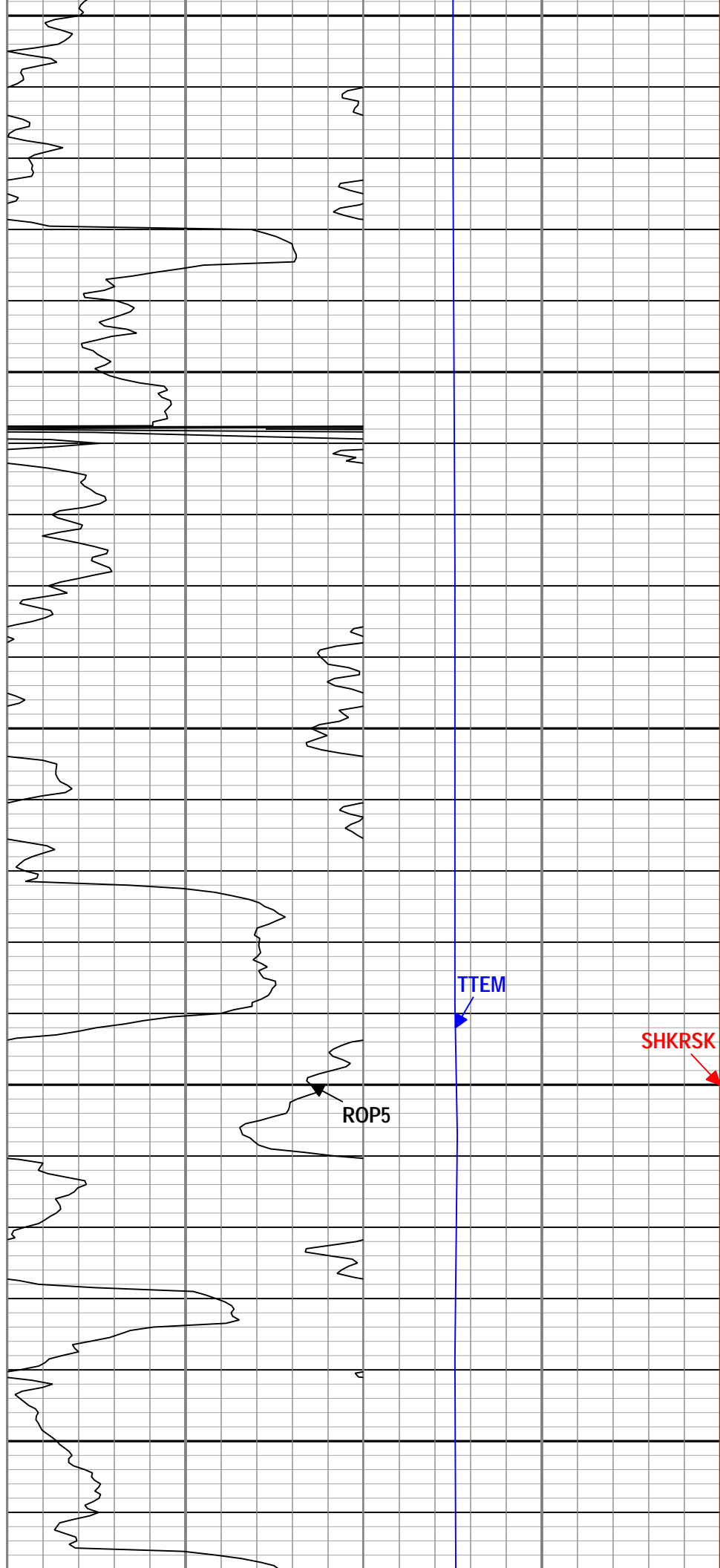
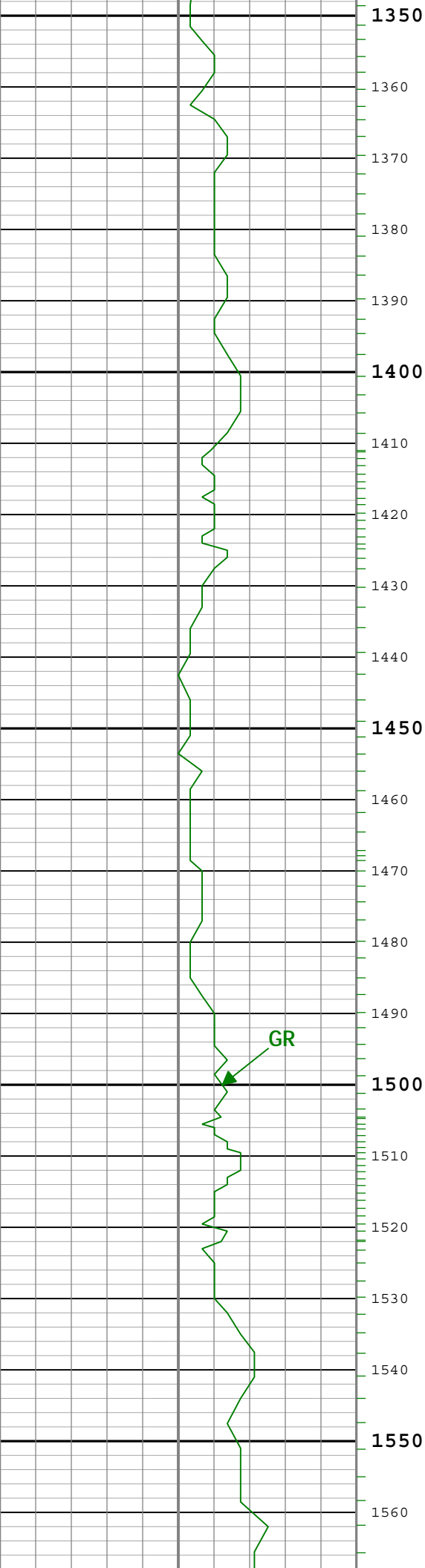
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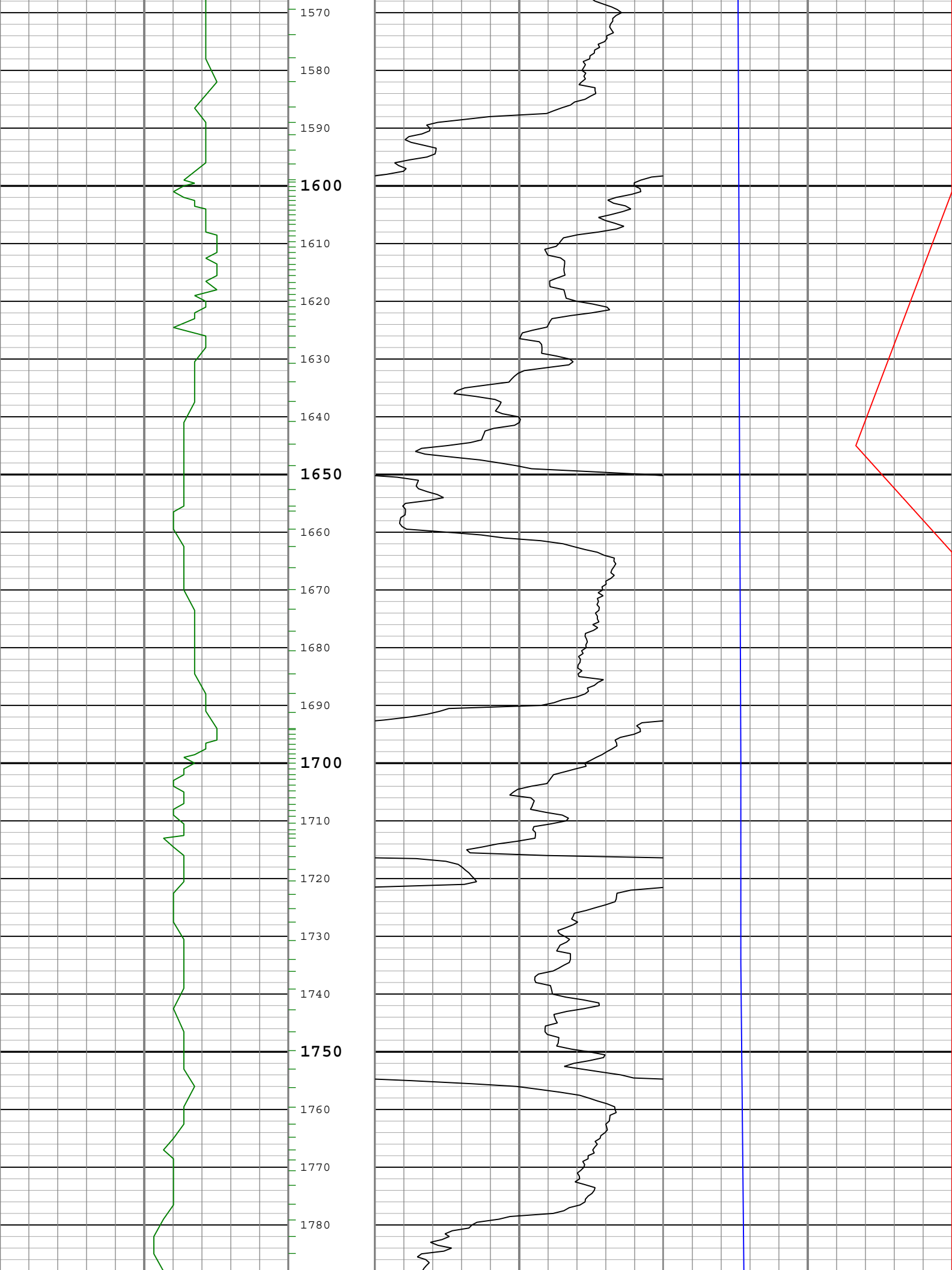
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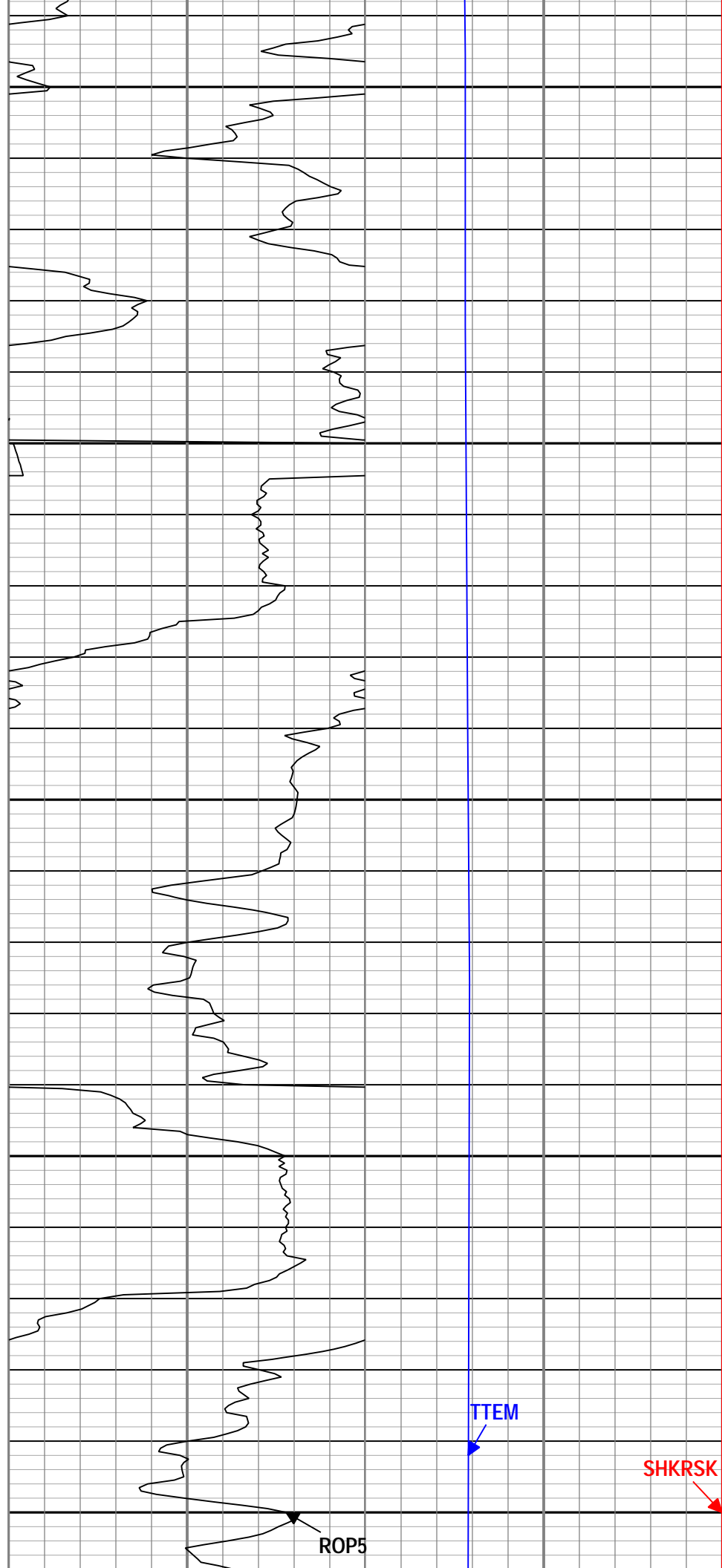
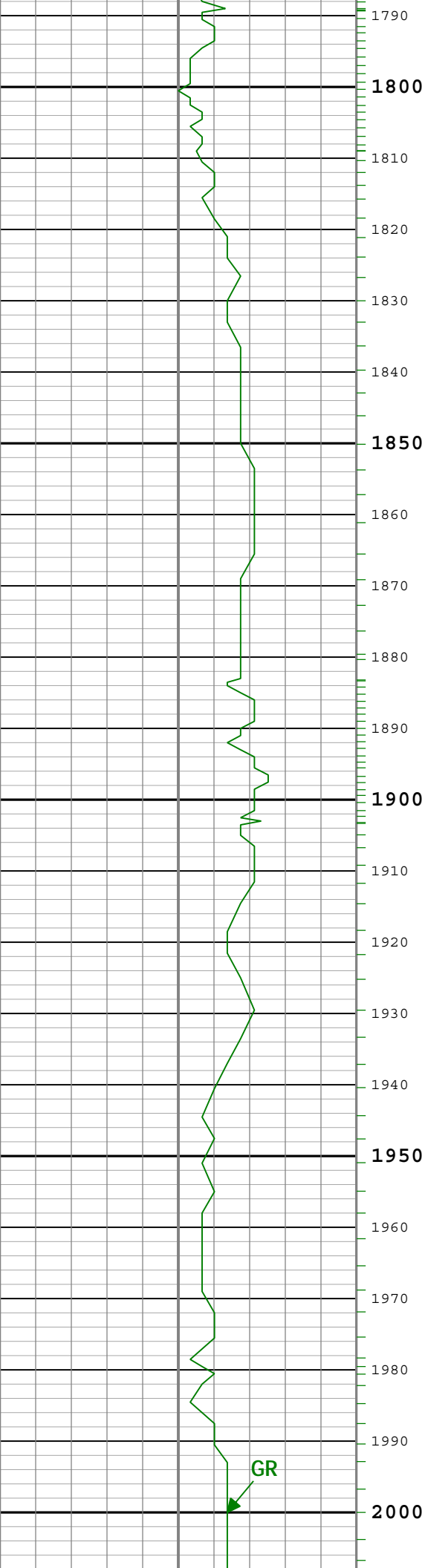
TICKS_GR - Gamma Ray Tick Marks SlimPulse[1] RM

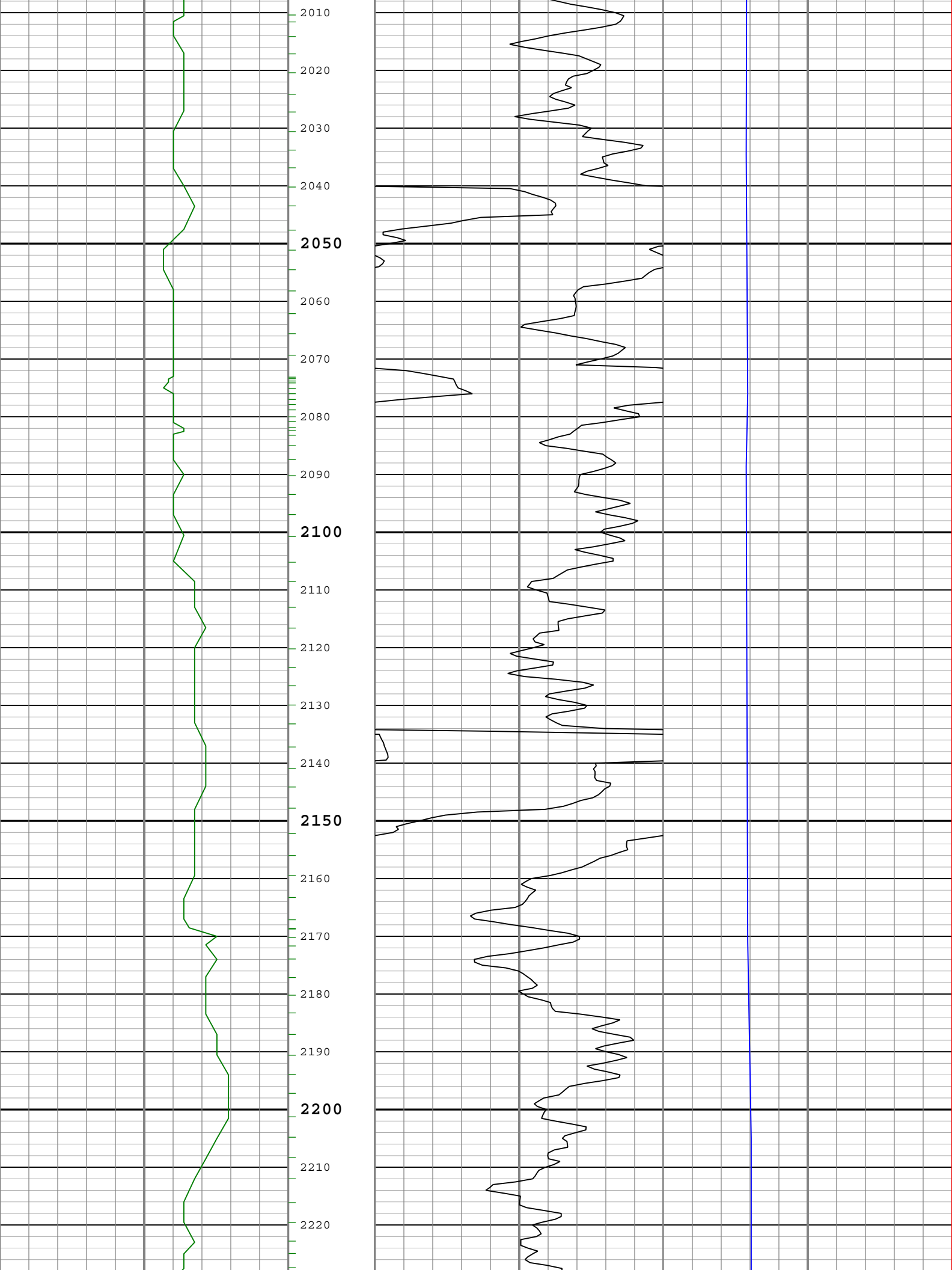
Gamma Ray (GR) SlimPulse[1] RM		
0	gAPI	150
Gamma Ray (GR) SlimPulse[1] RM		
150	gAPI	300
Gamma Ray (GR) SlimPulse[1] RM		
300	gAPI	450
Gamma Ray (GR) SlimPulse[1] RM		
450	gAPI	600
Gamma Ray (GR) SlimPulse[1] RM		
600	gAPI	750

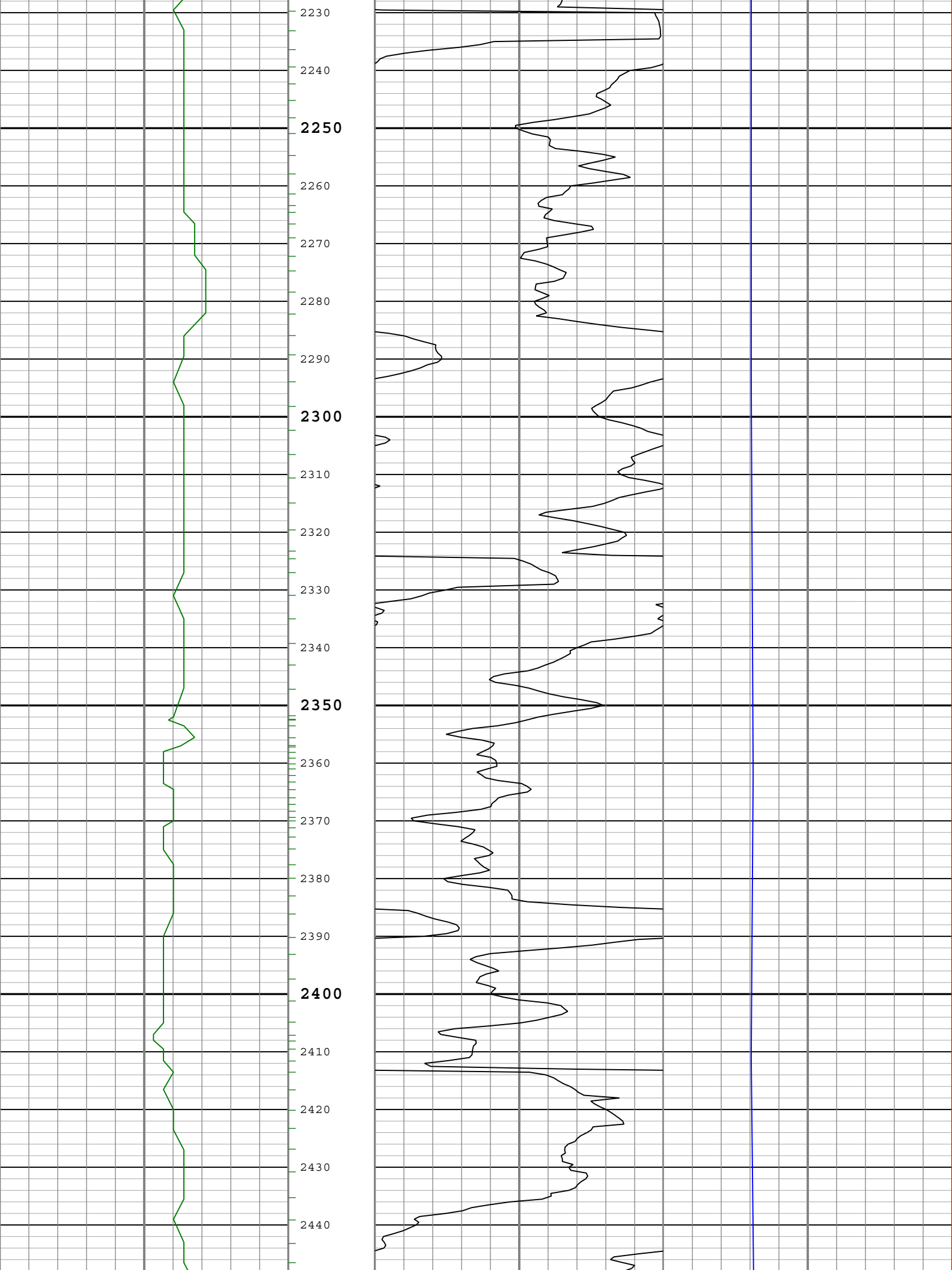


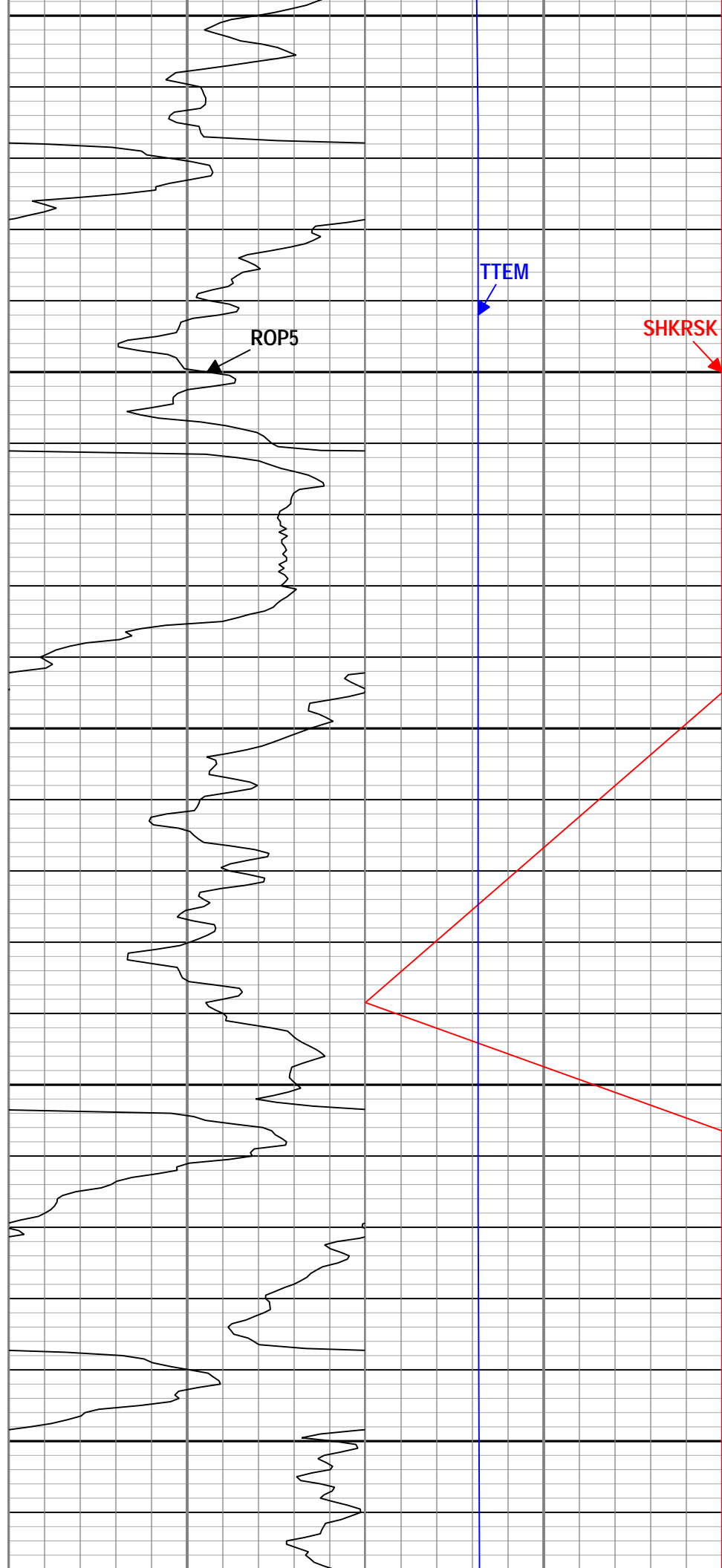
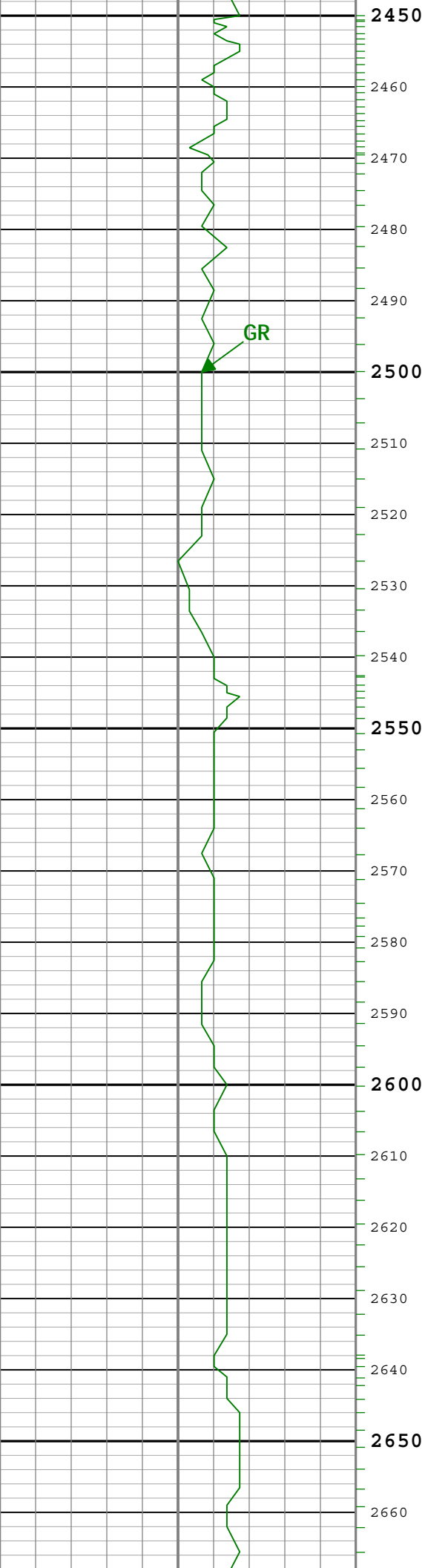


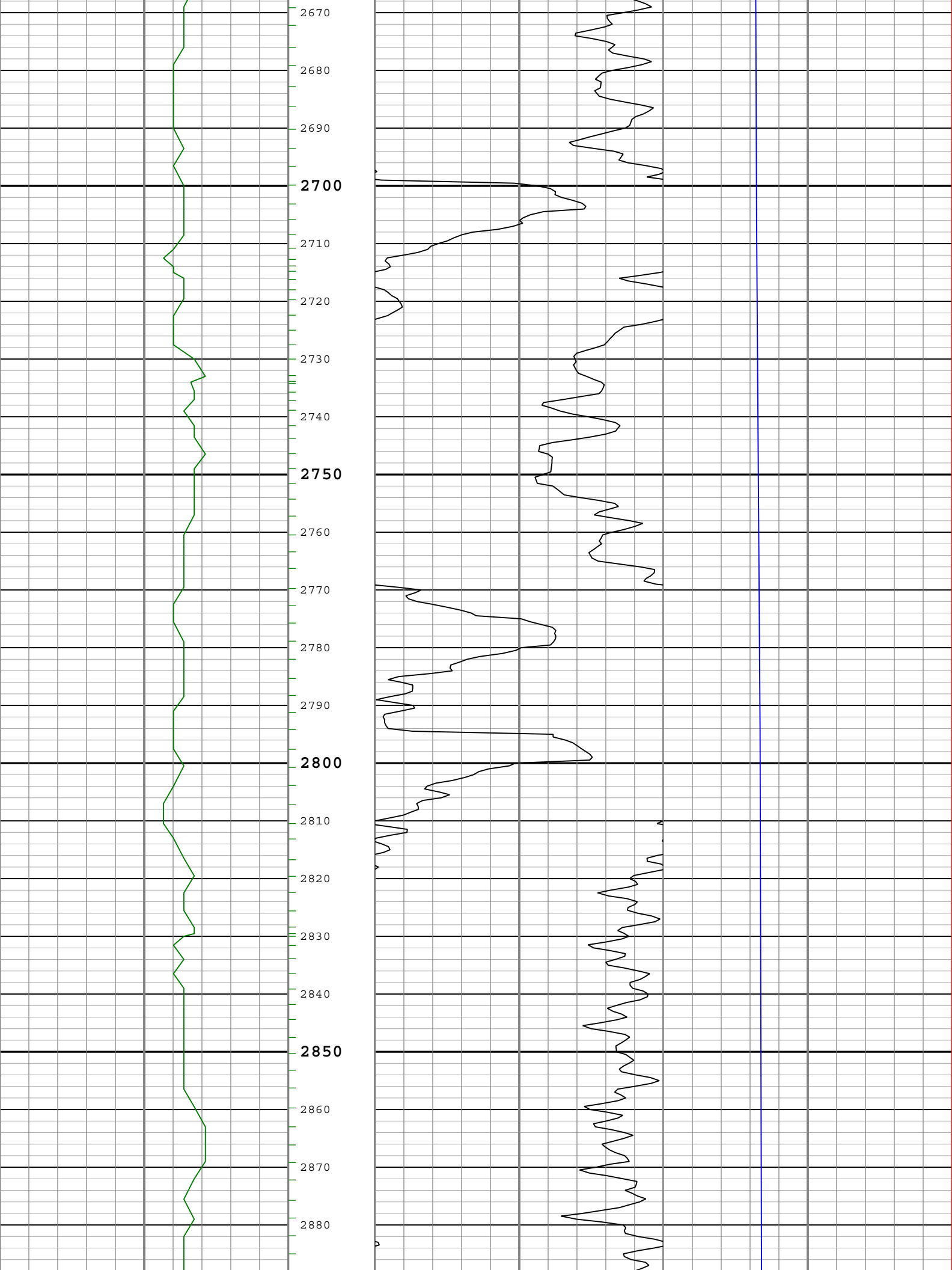


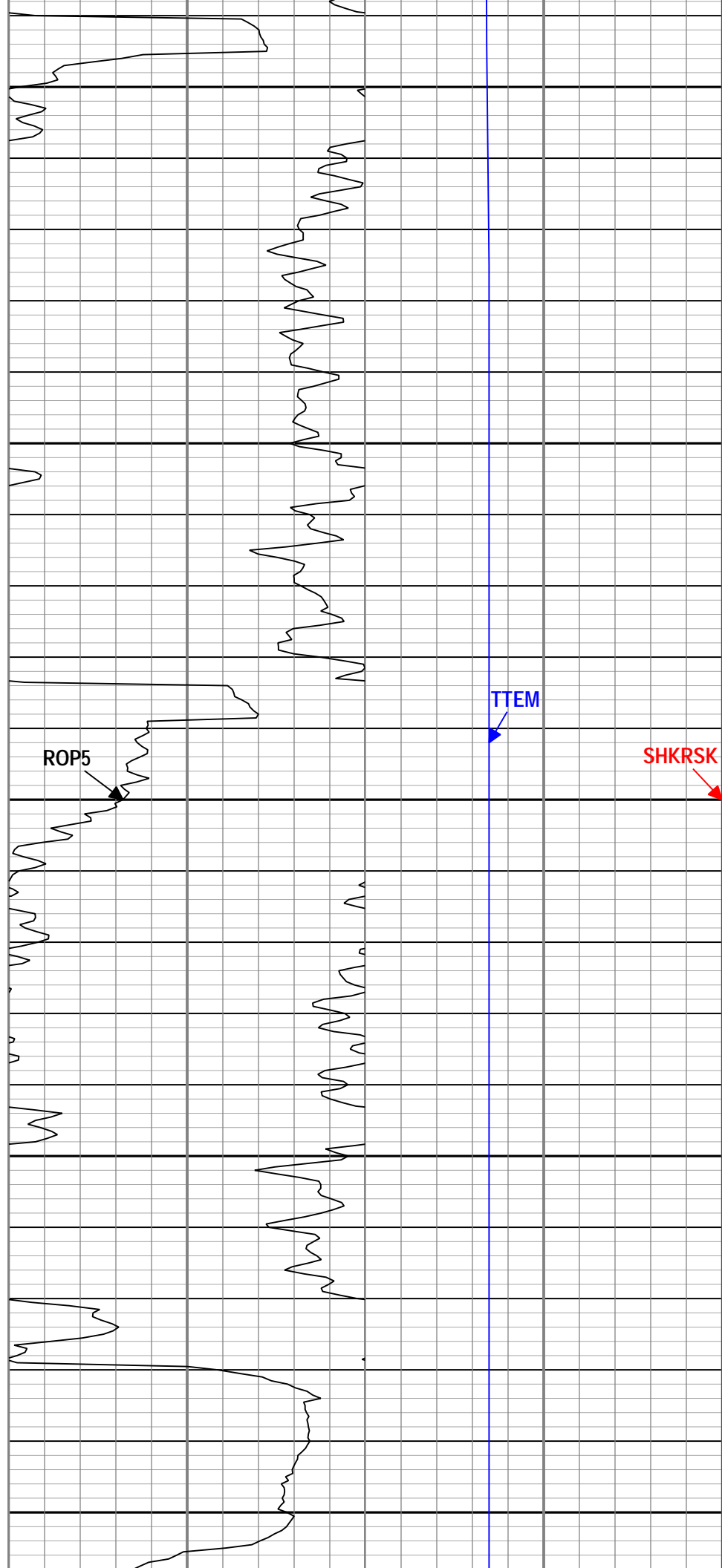
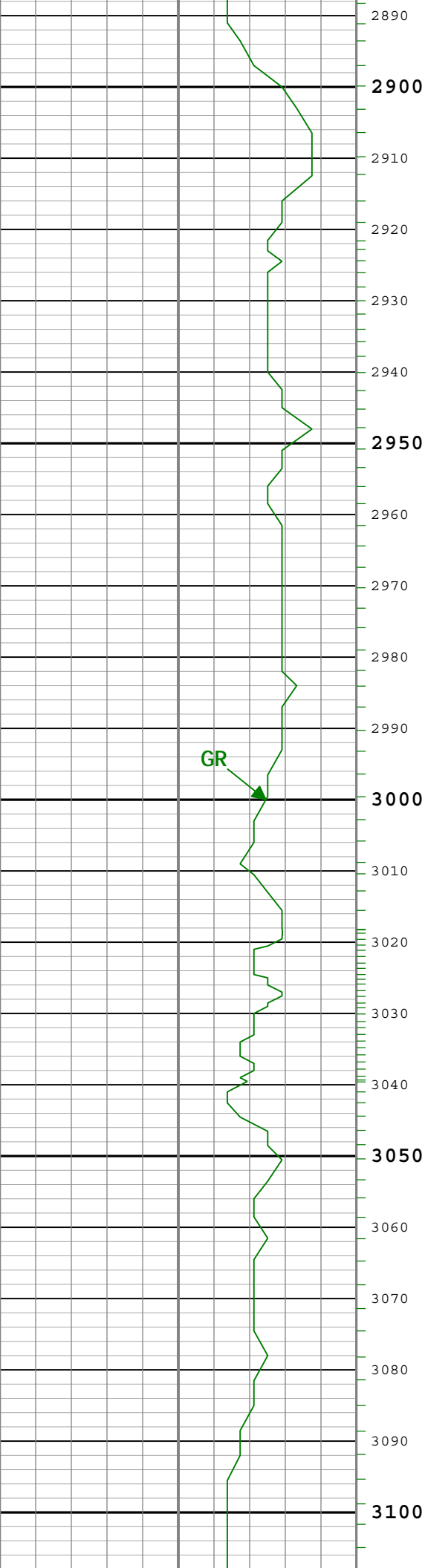


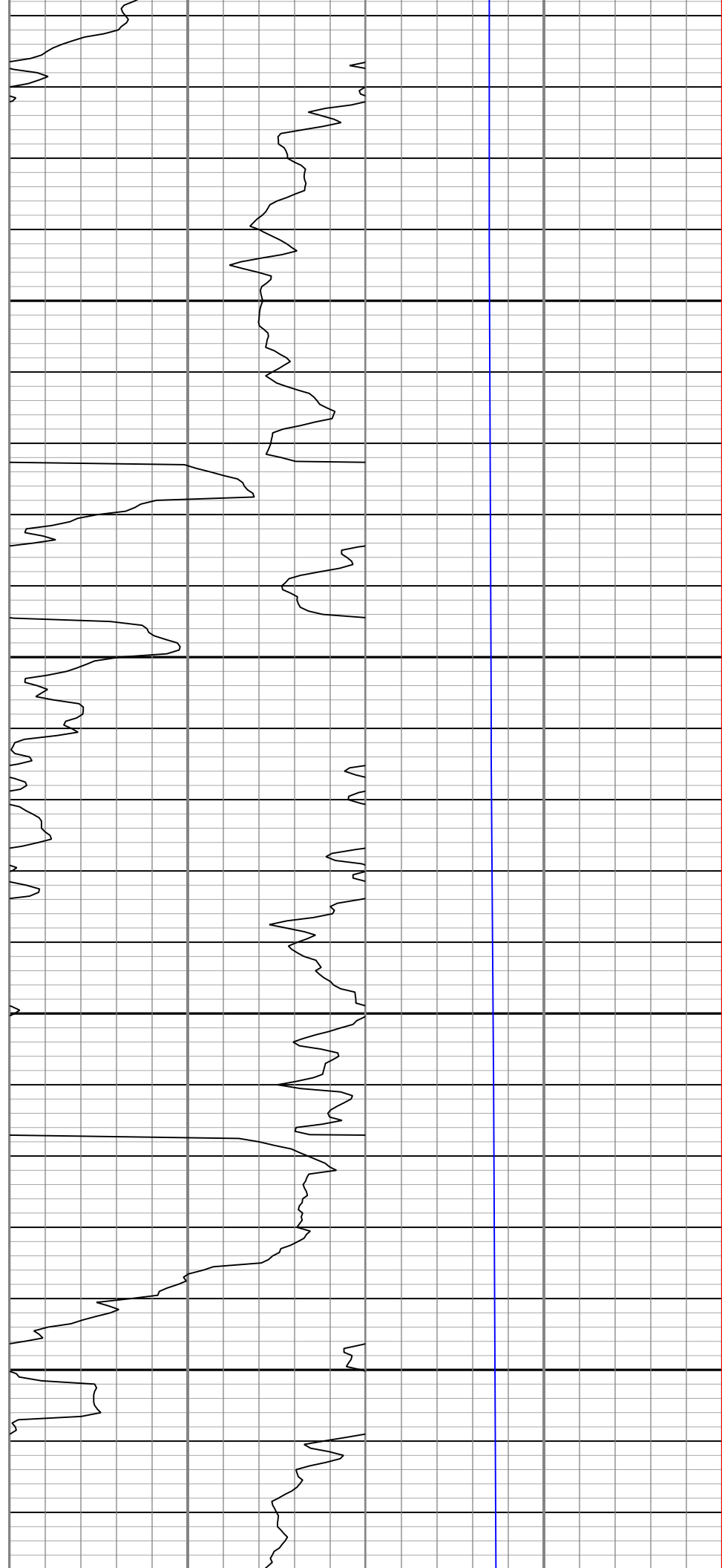
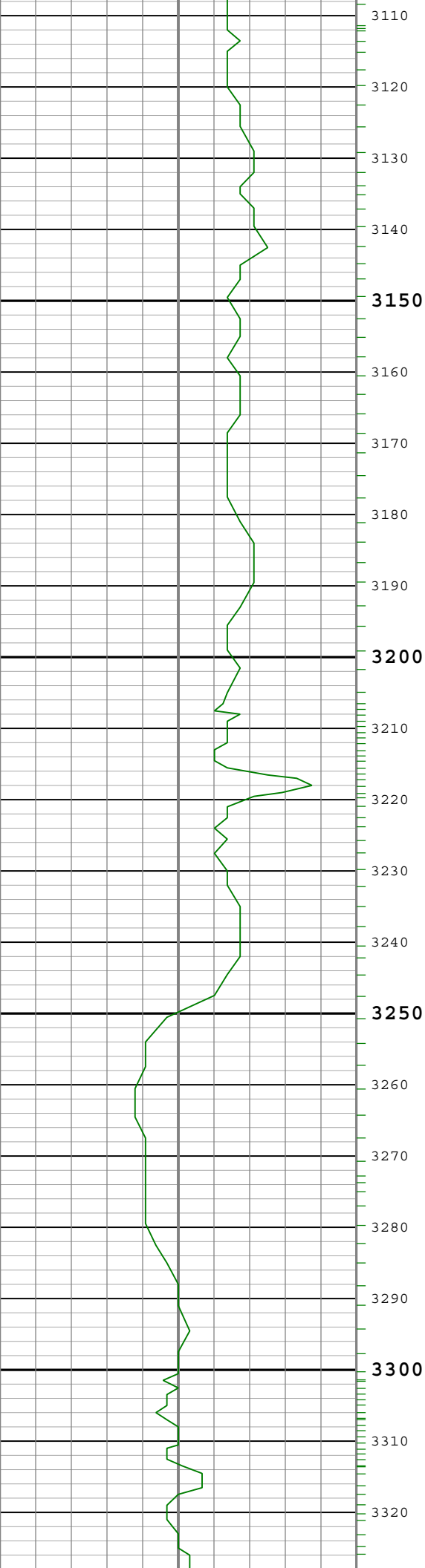


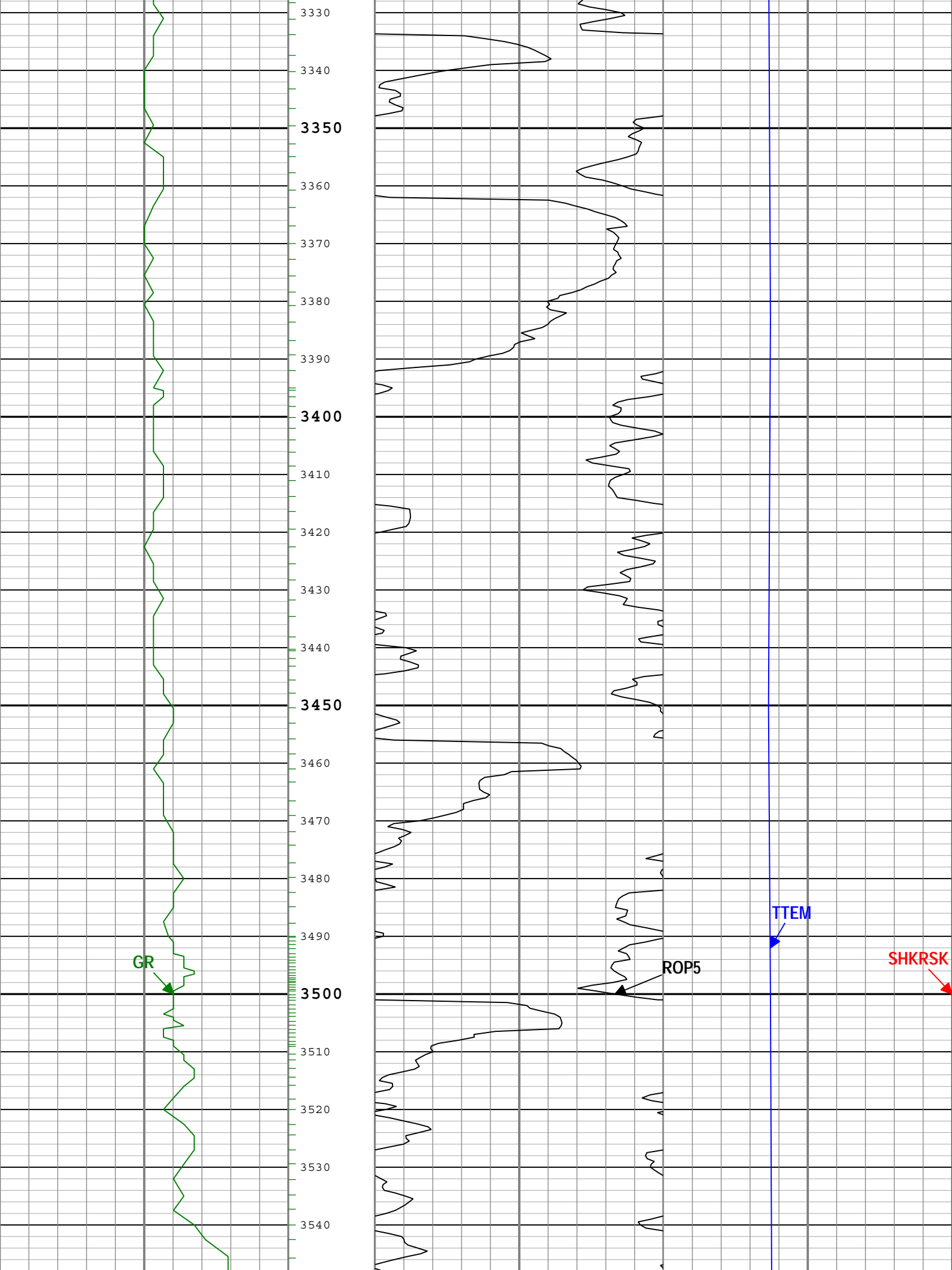


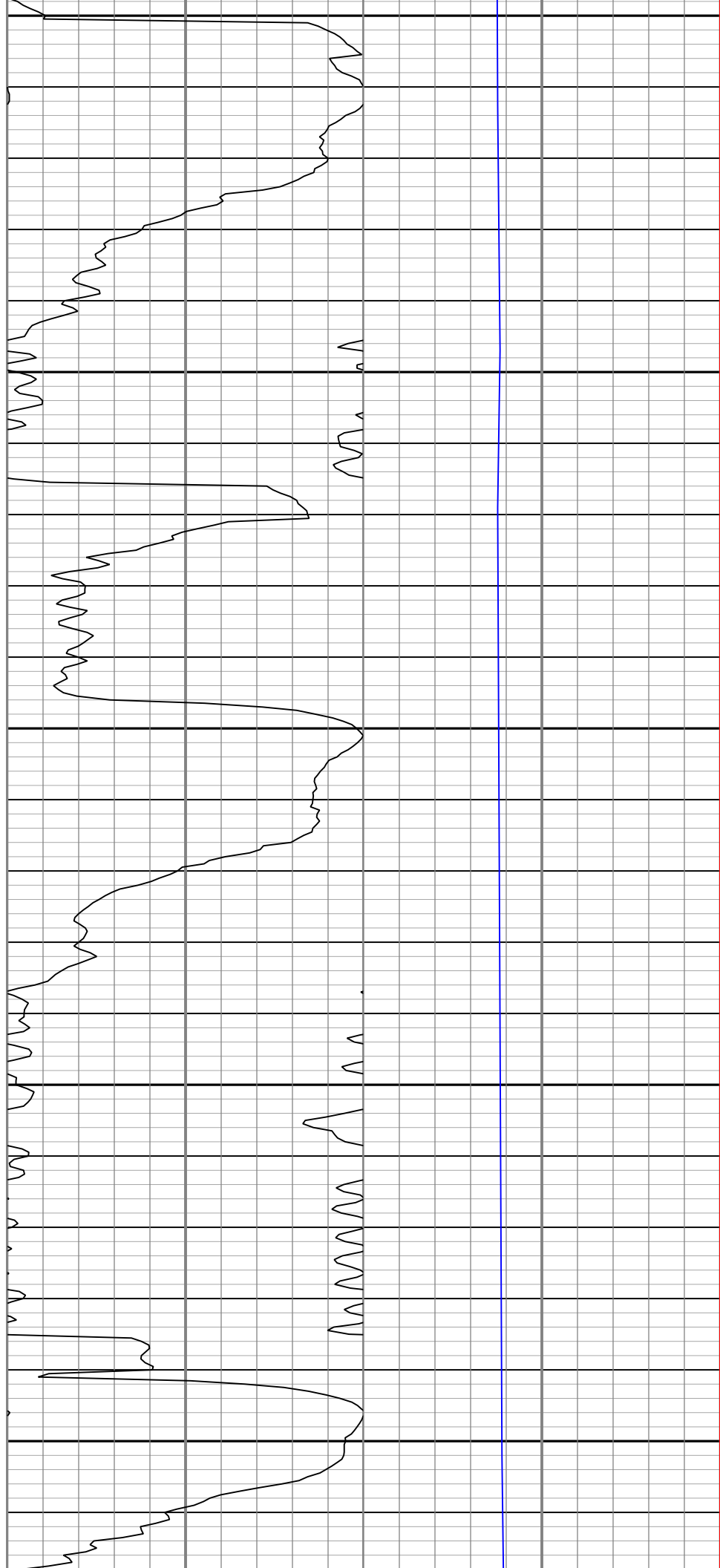
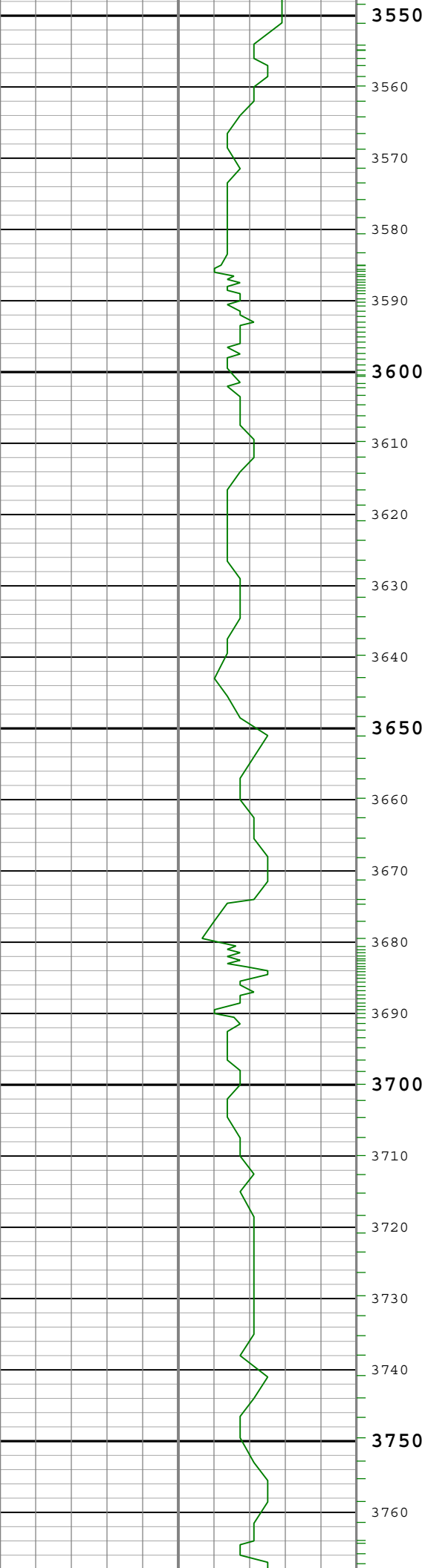


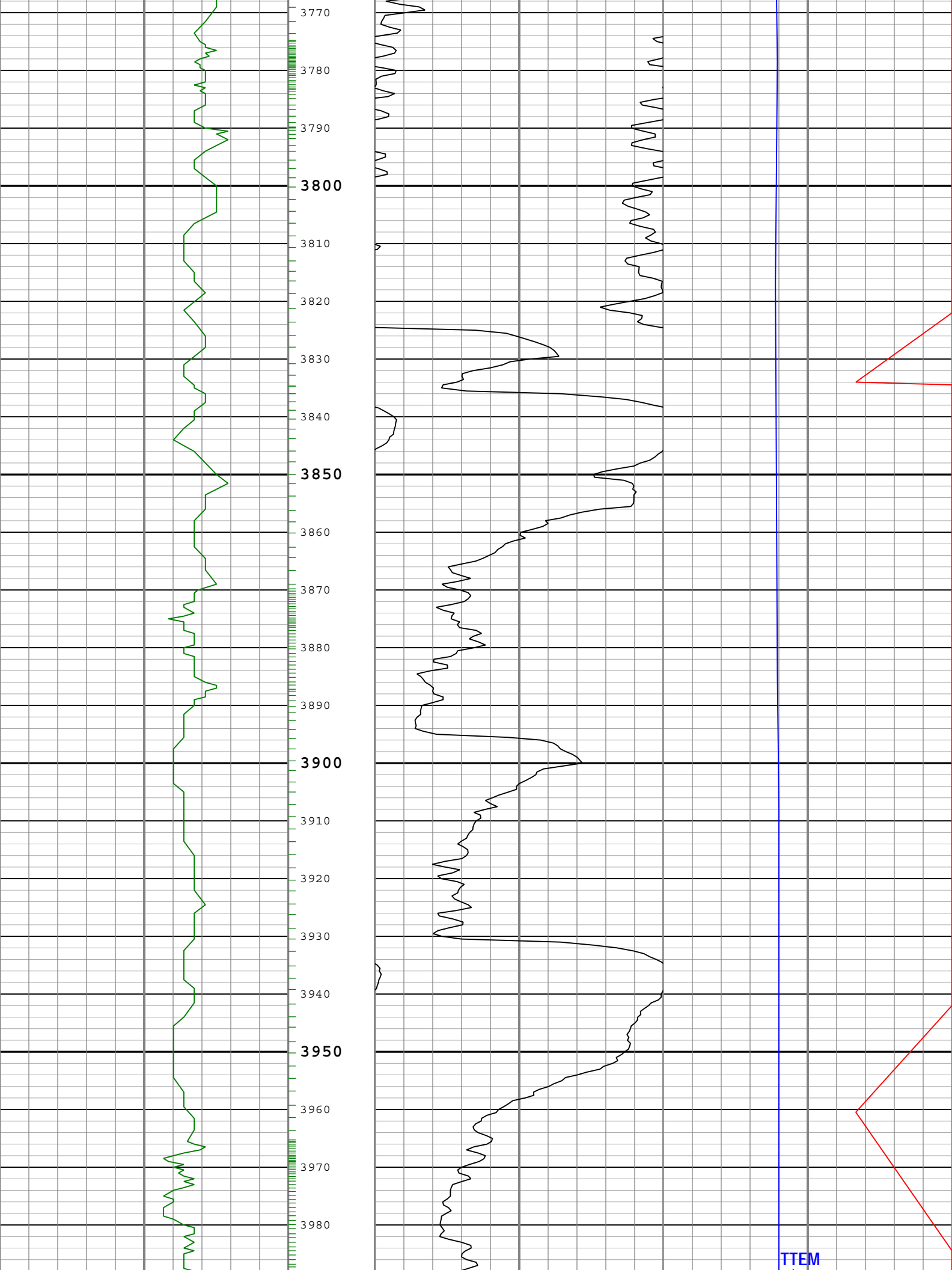


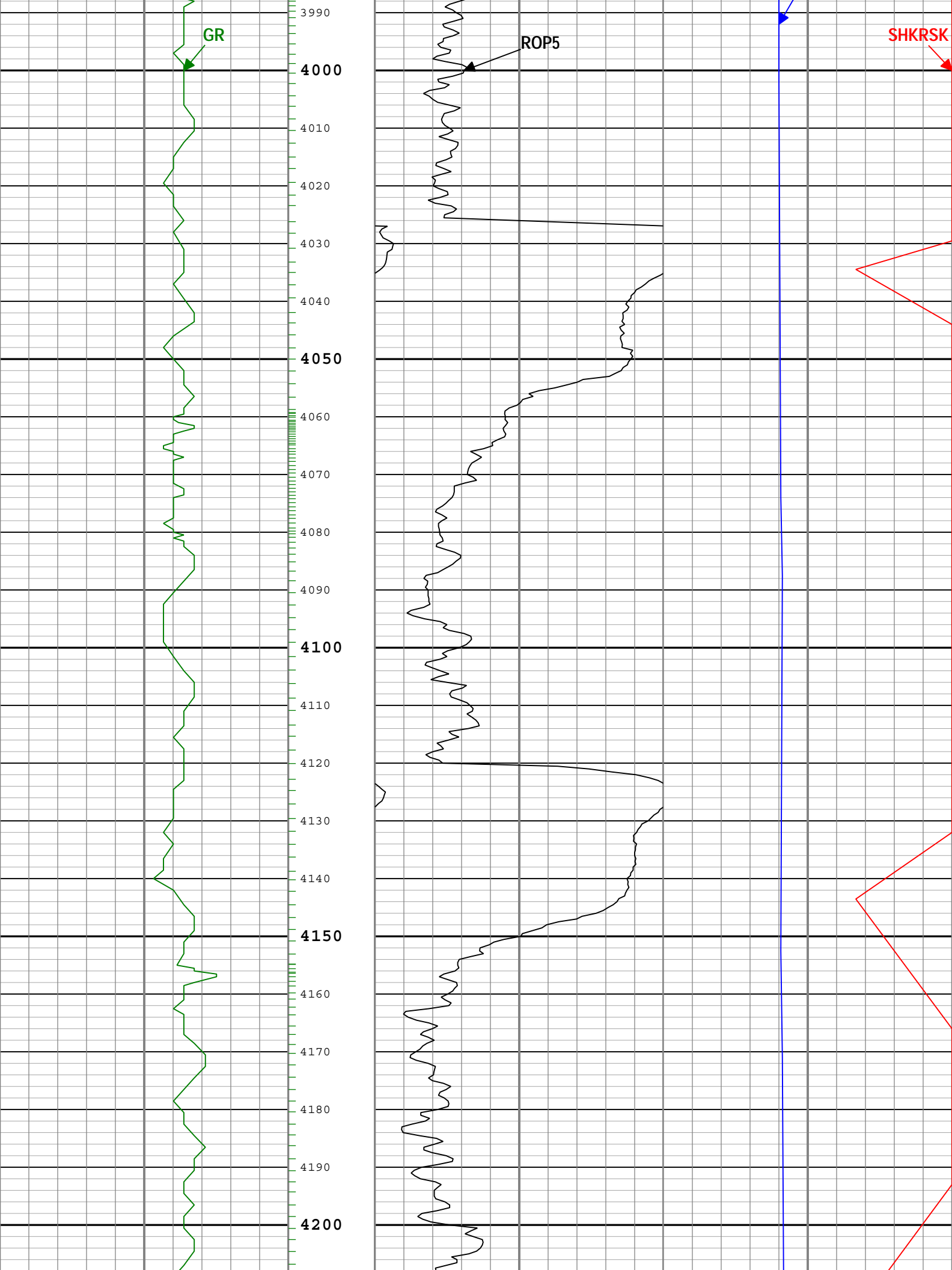


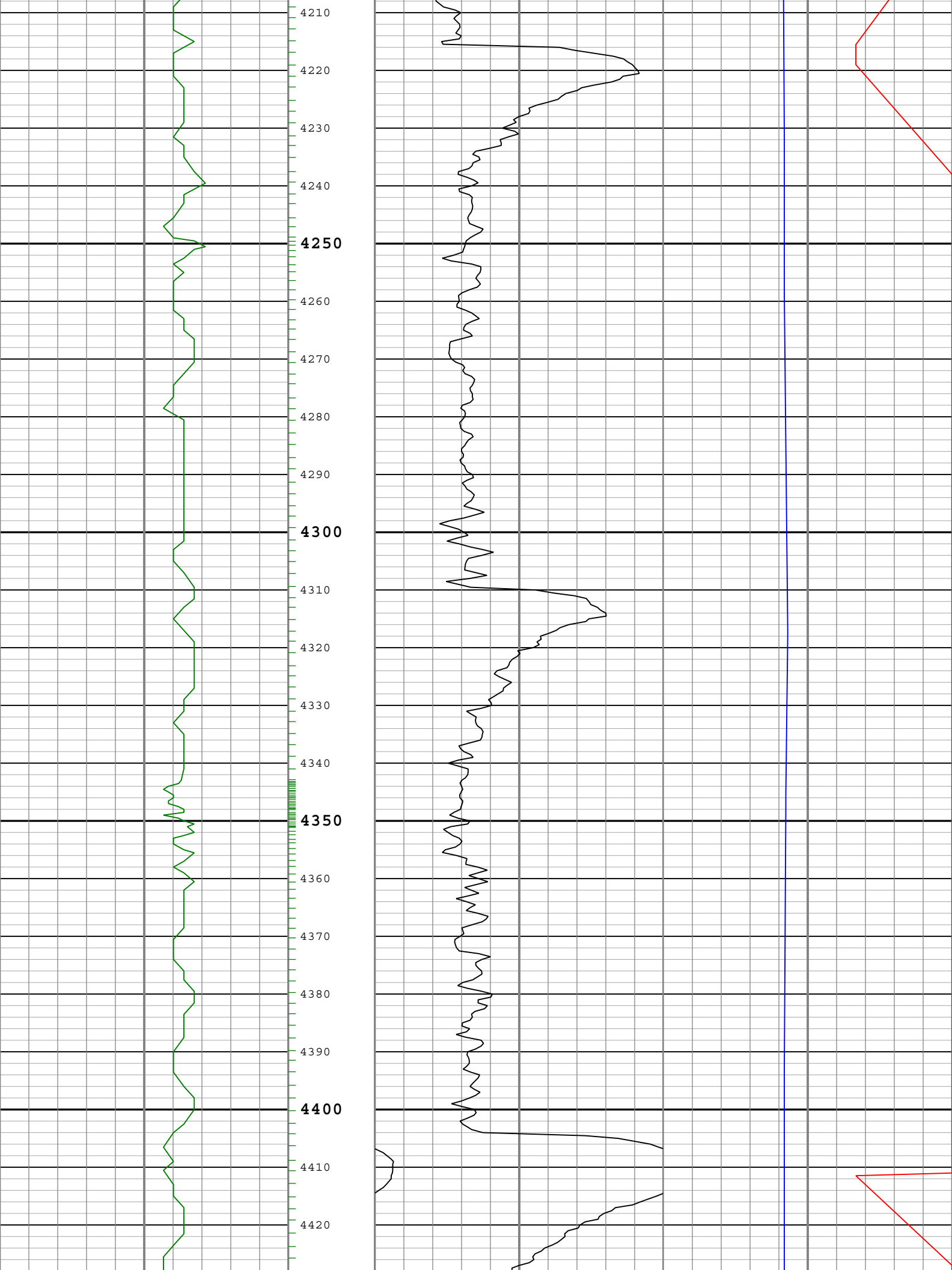


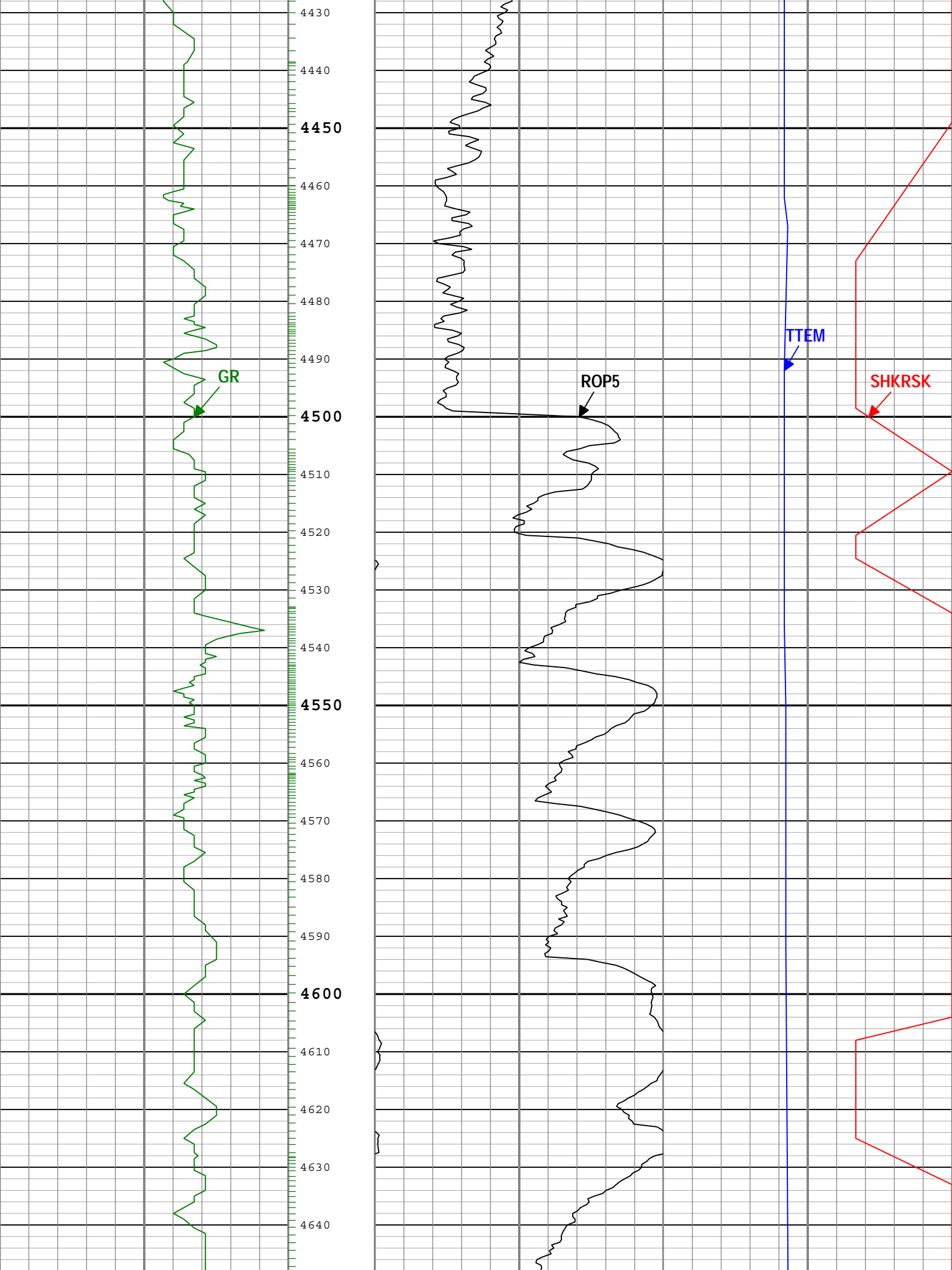


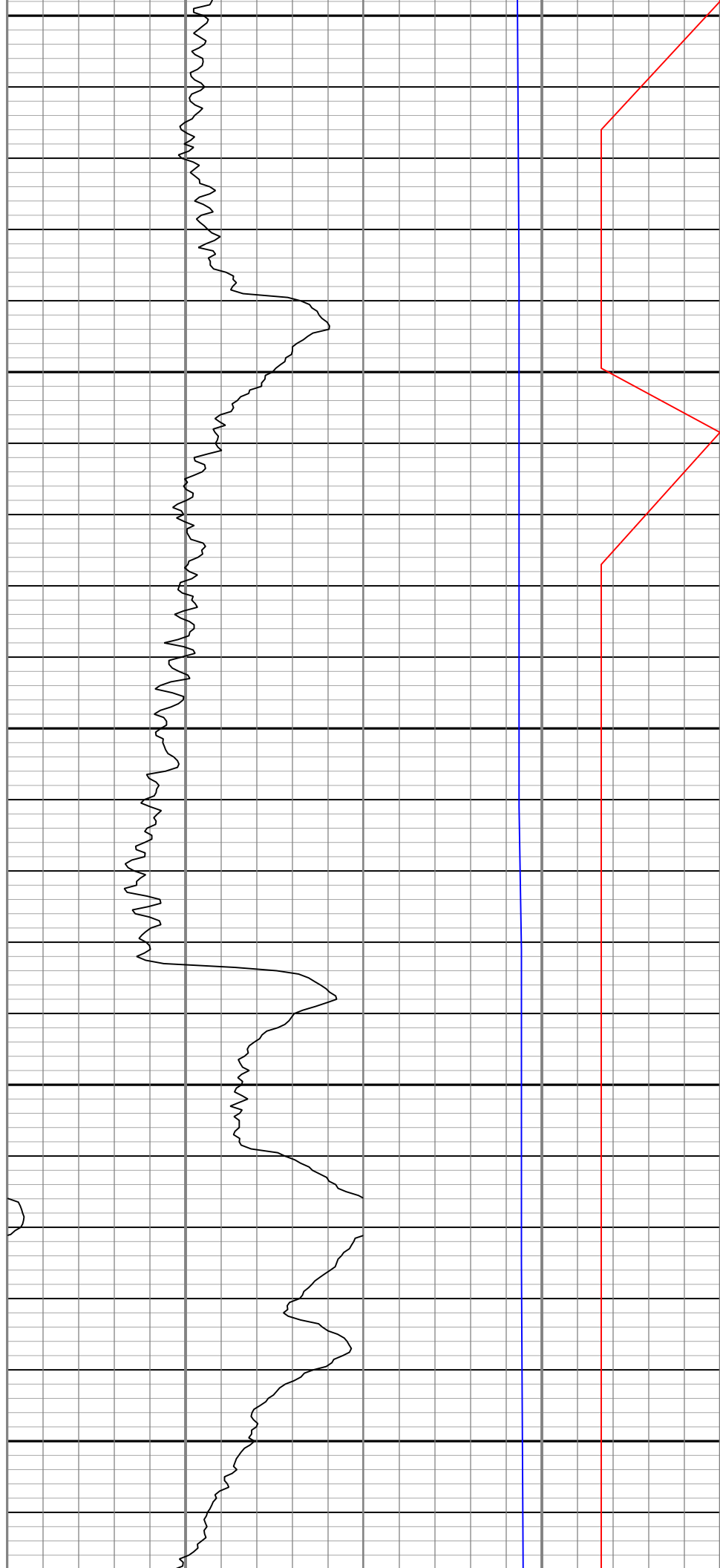
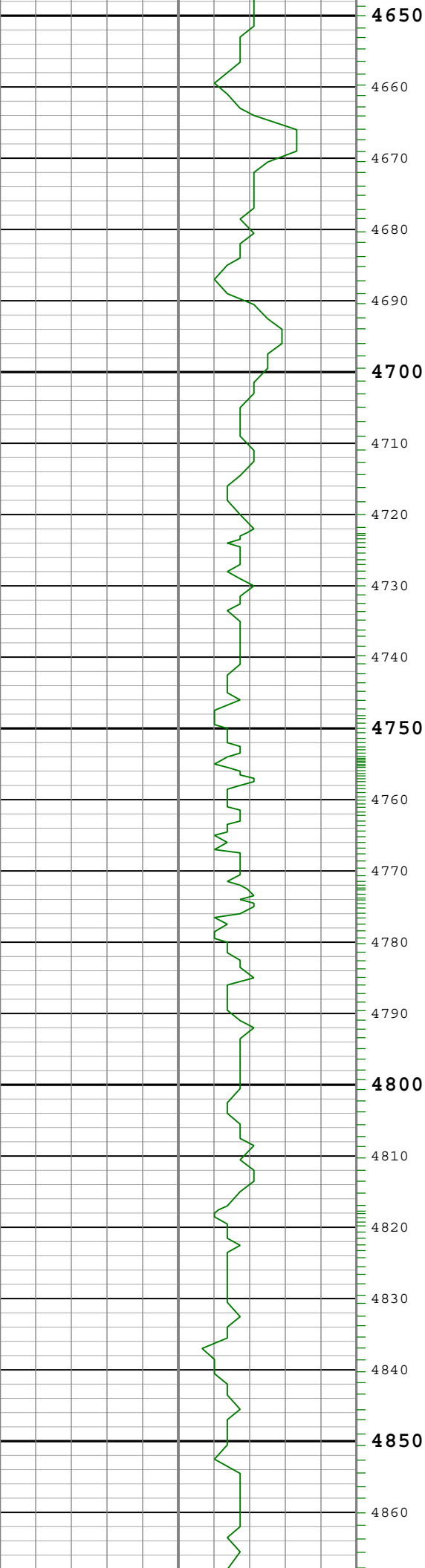


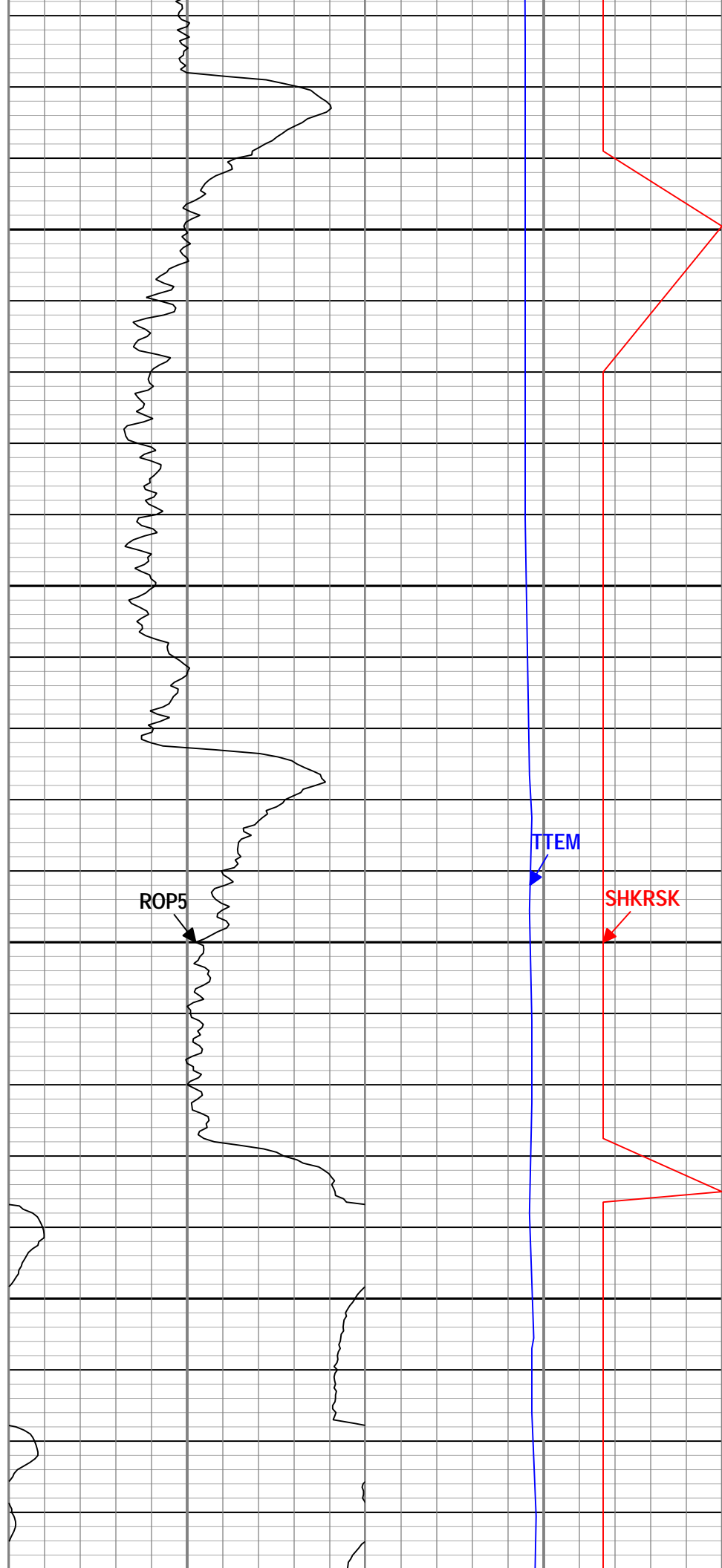
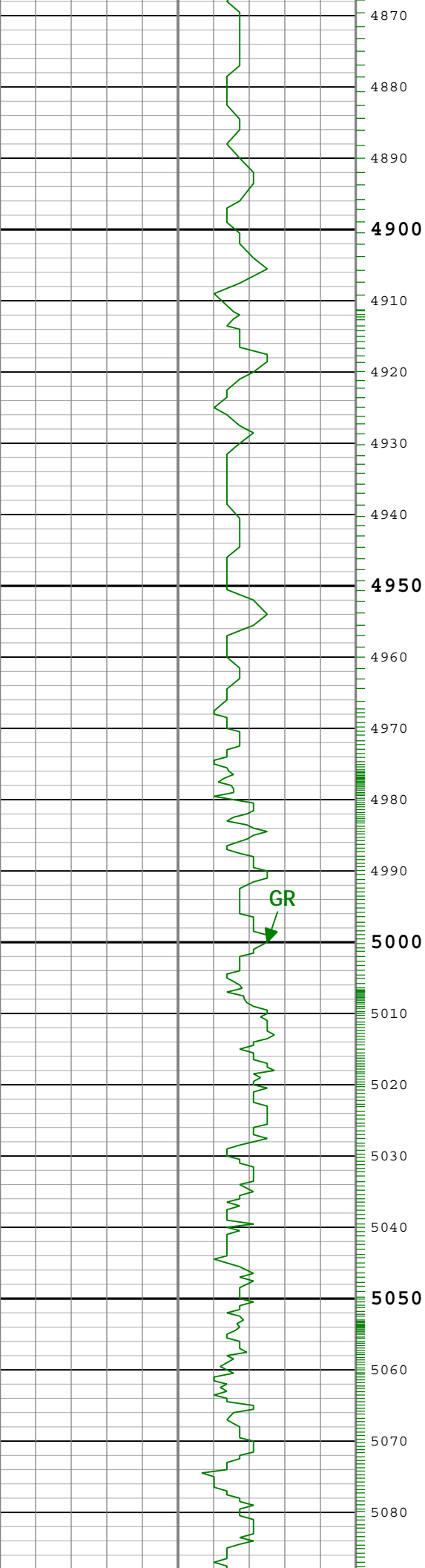


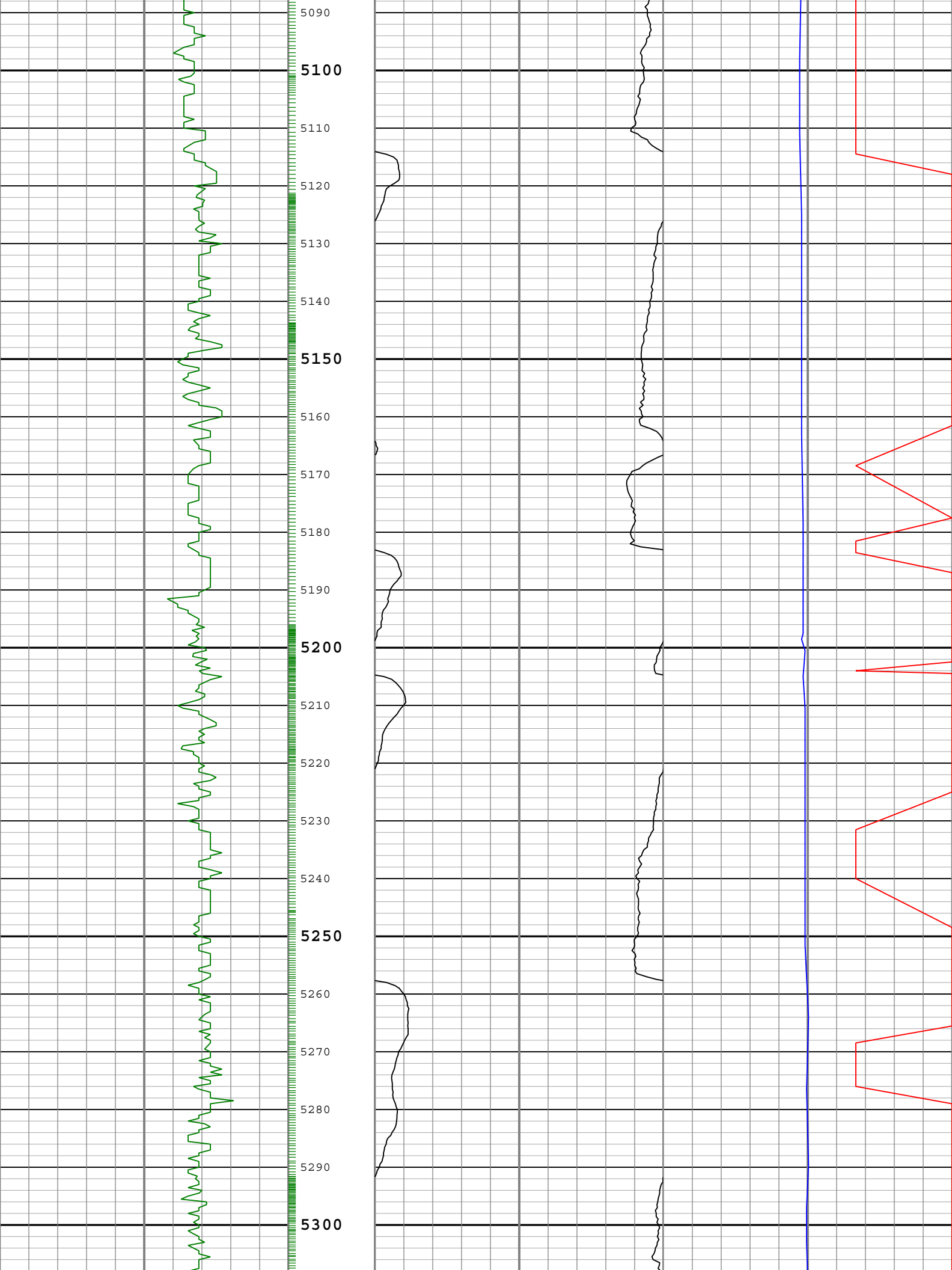


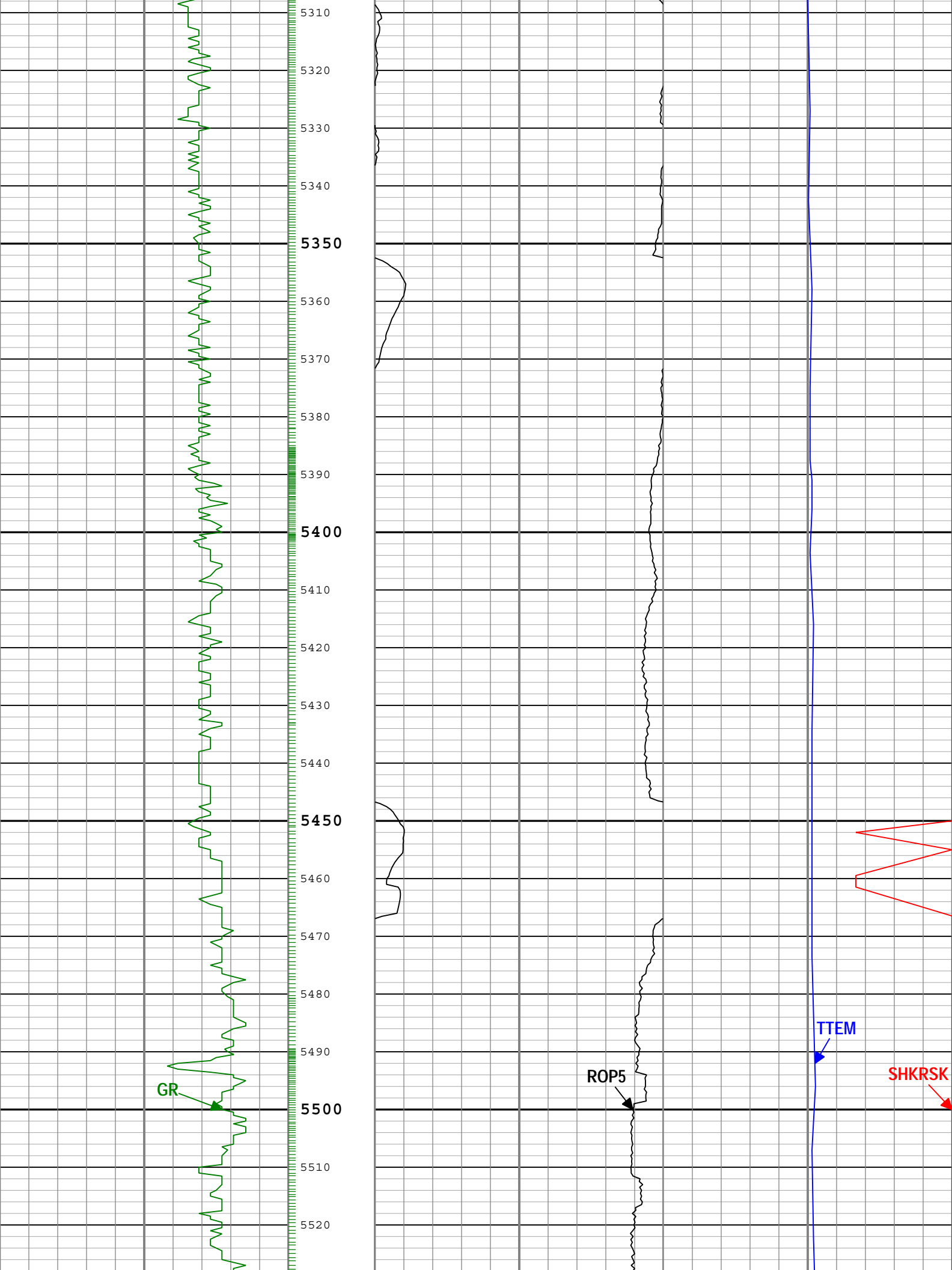


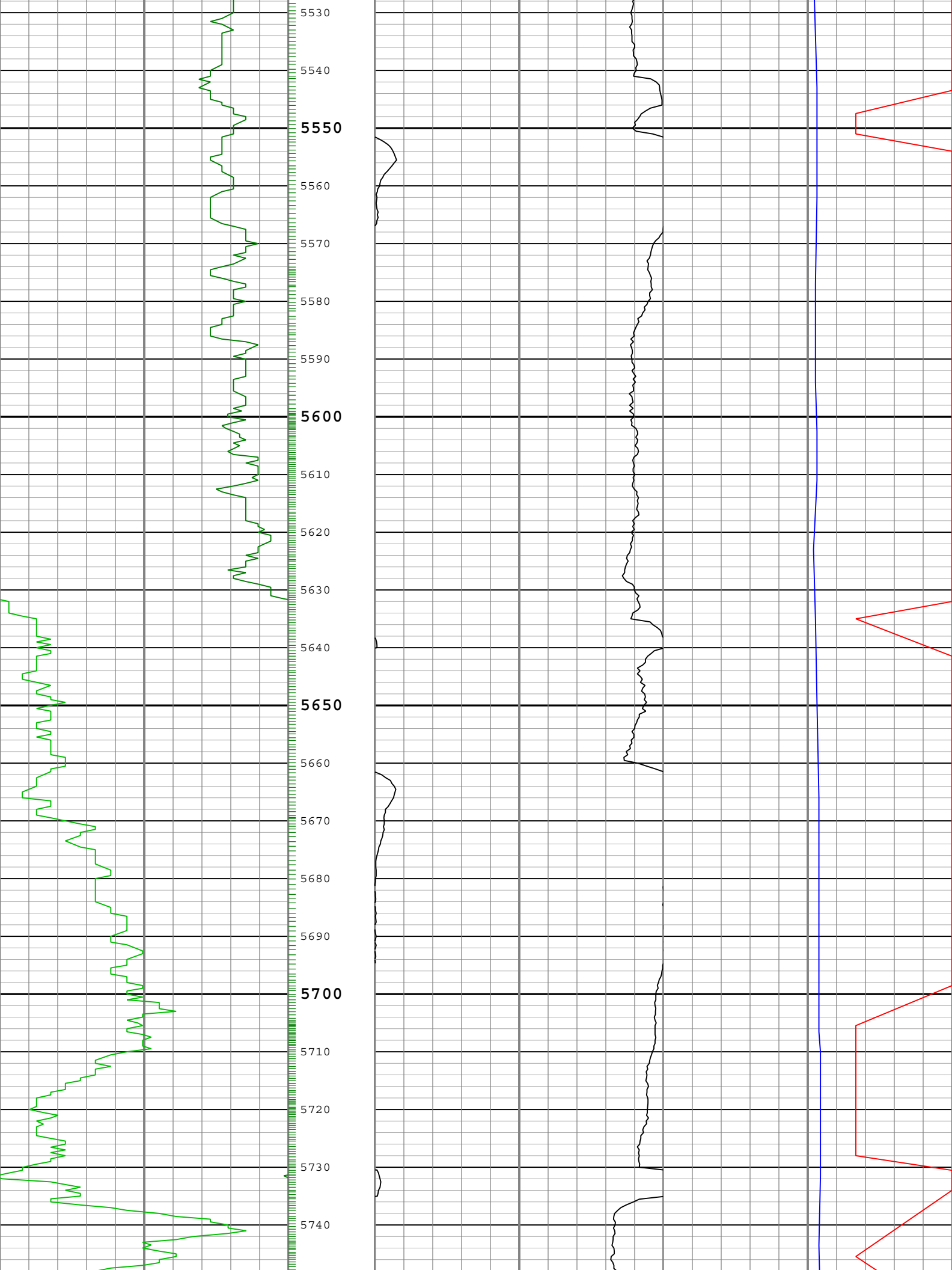


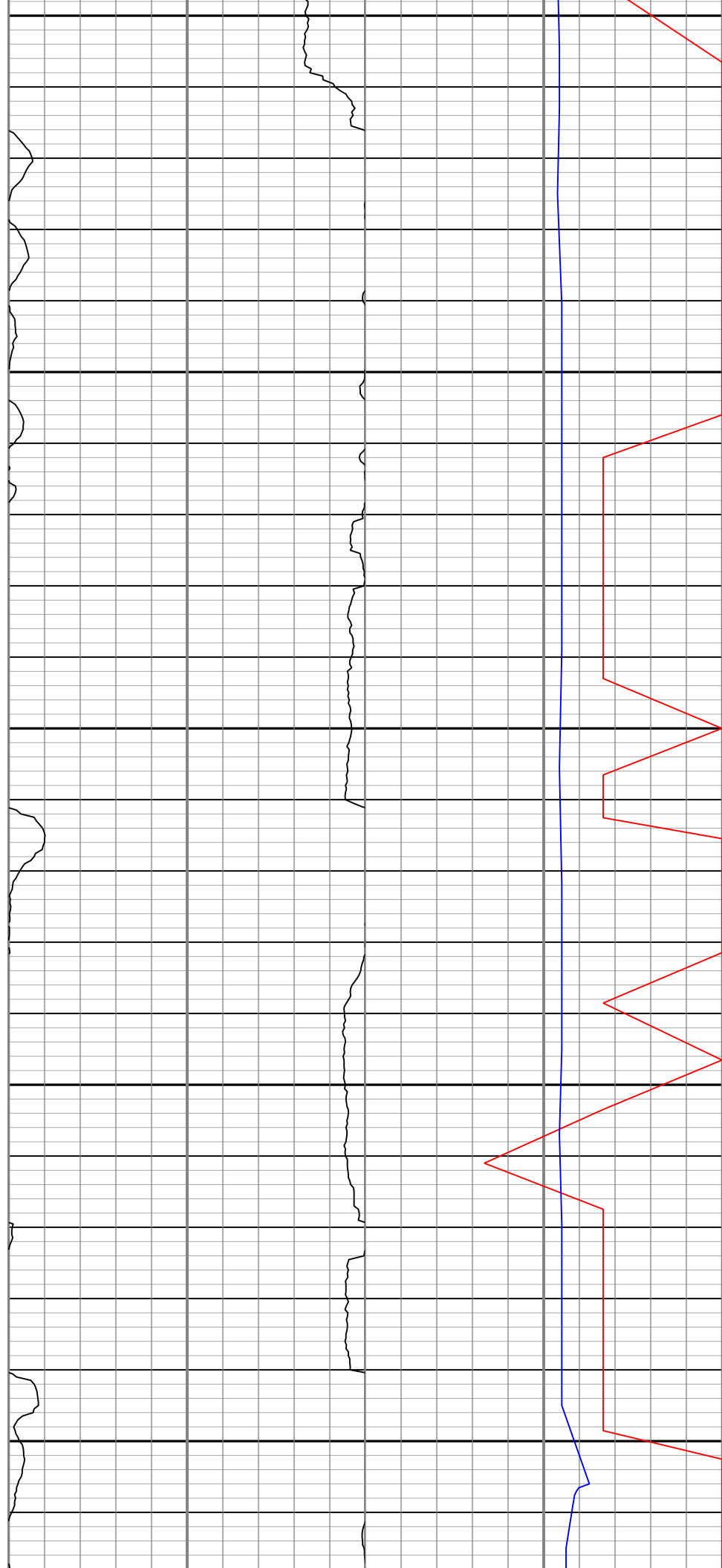
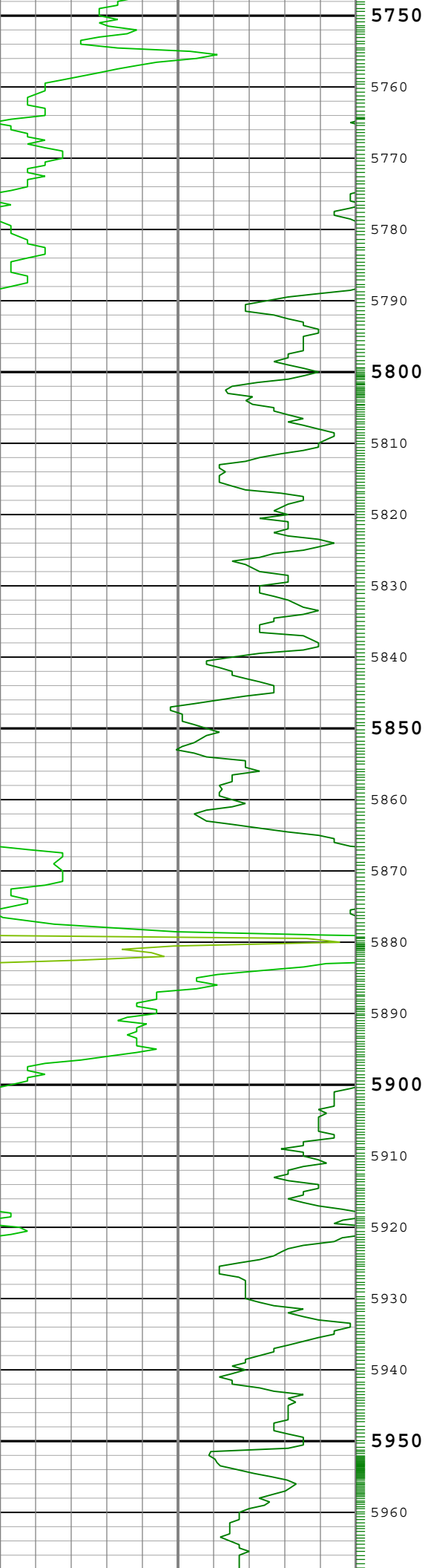


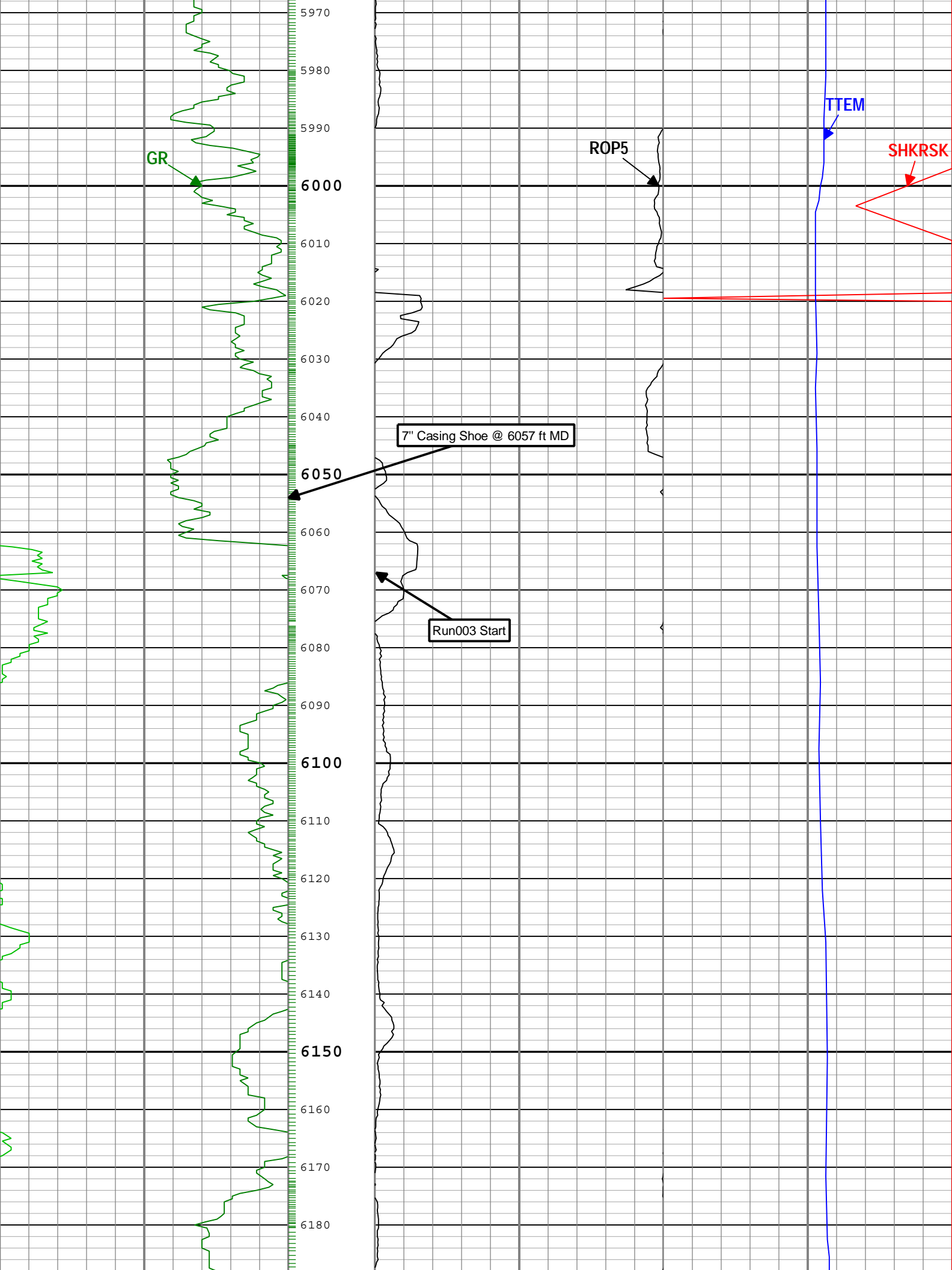


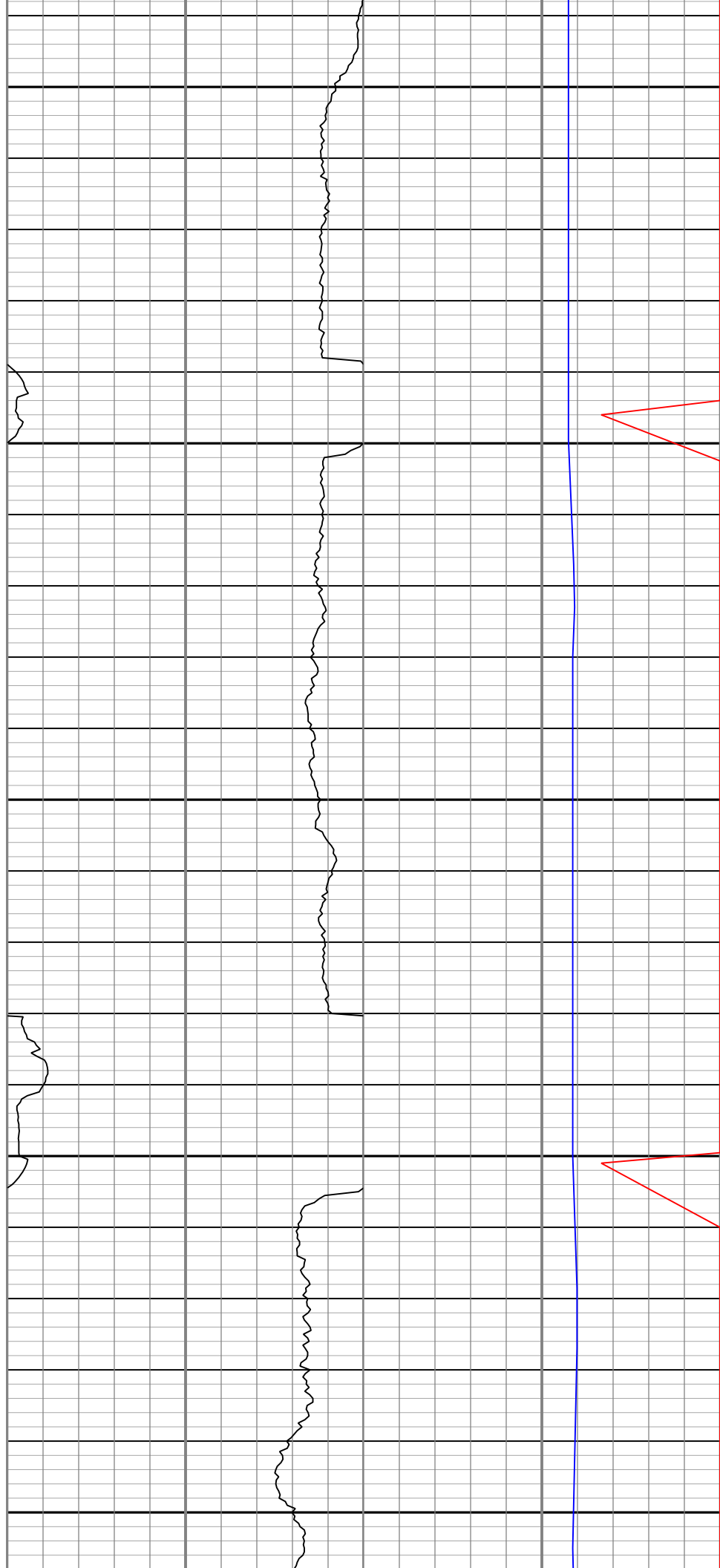
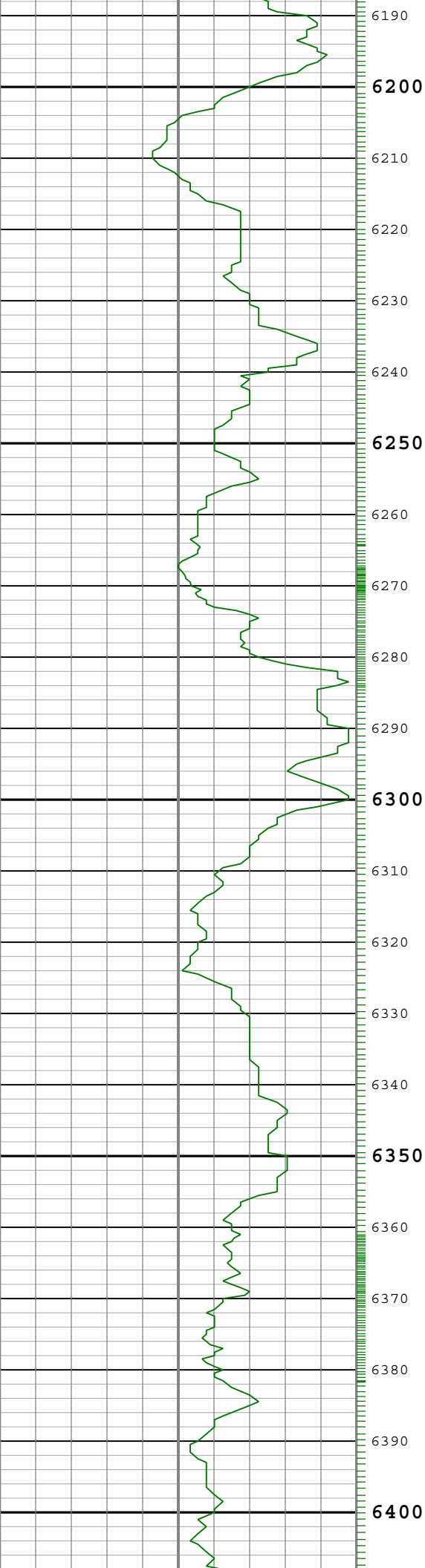


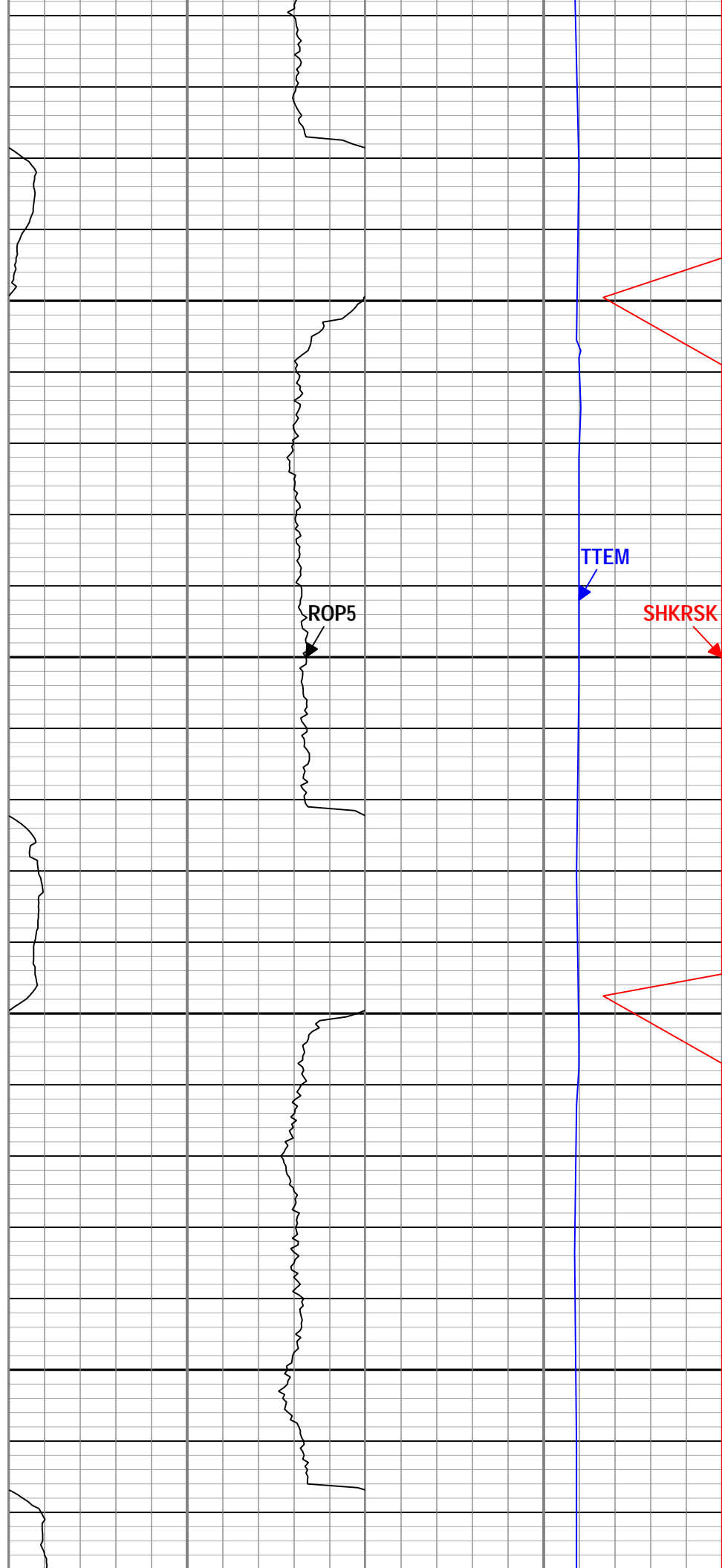
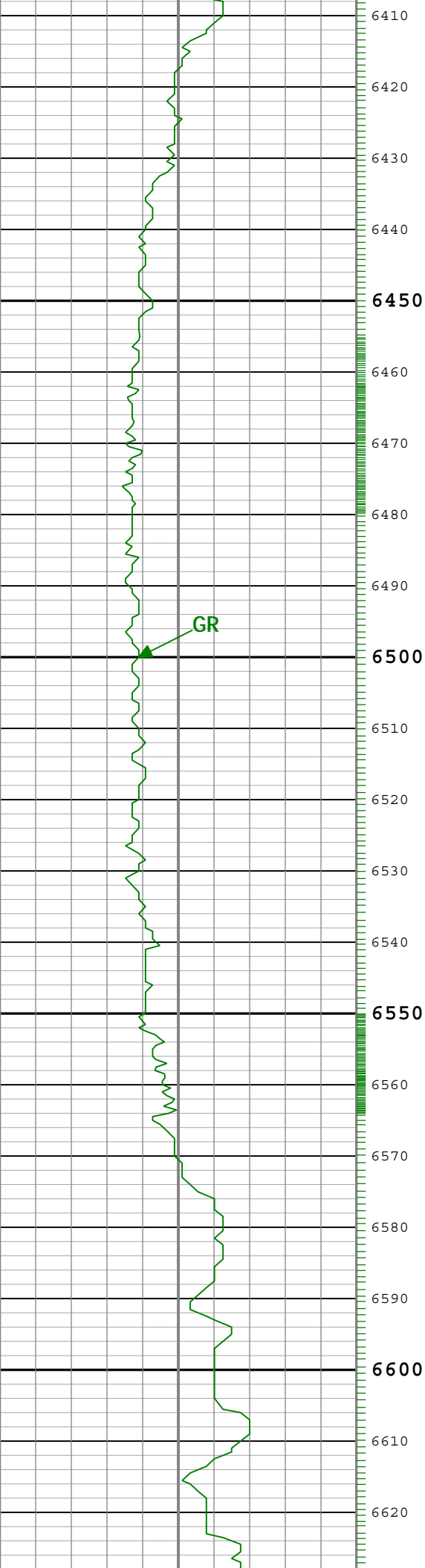


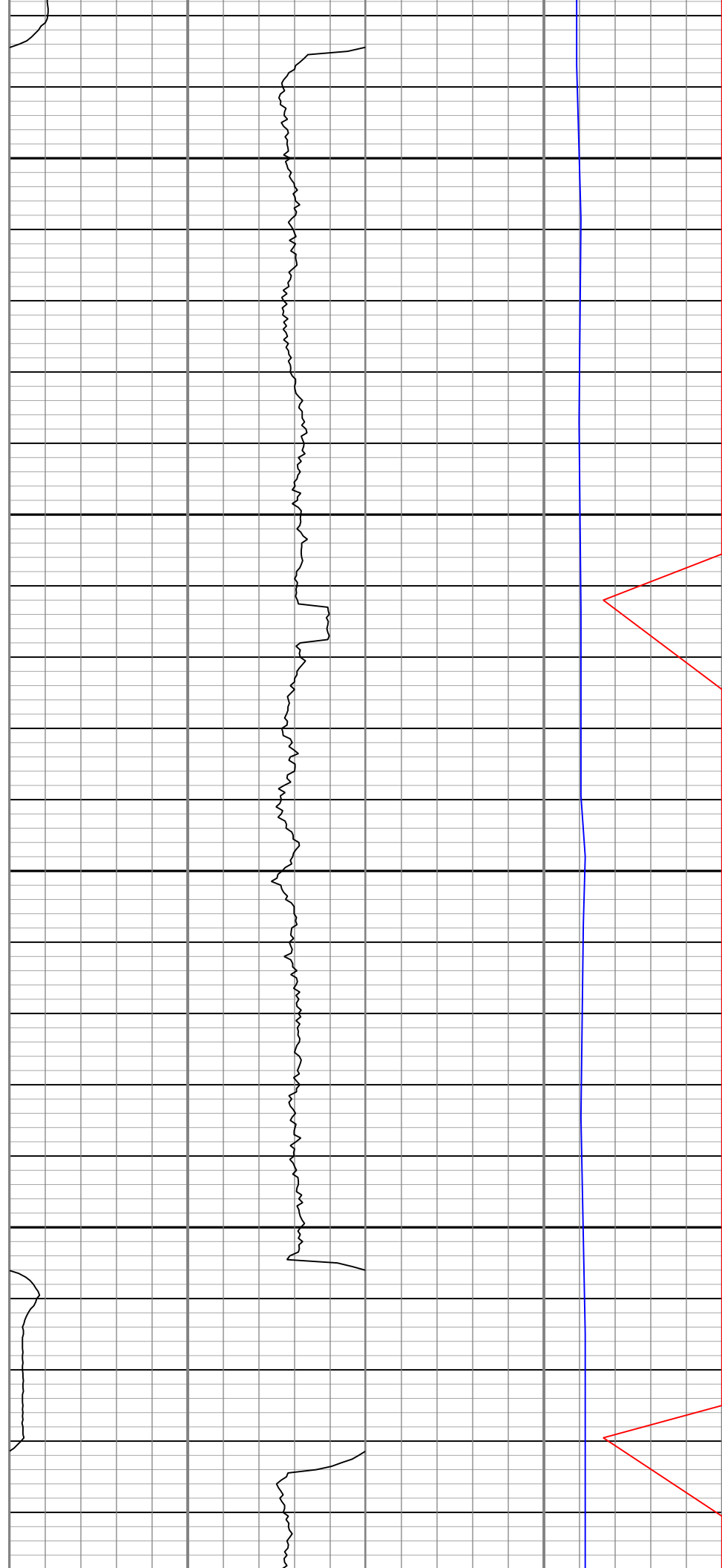
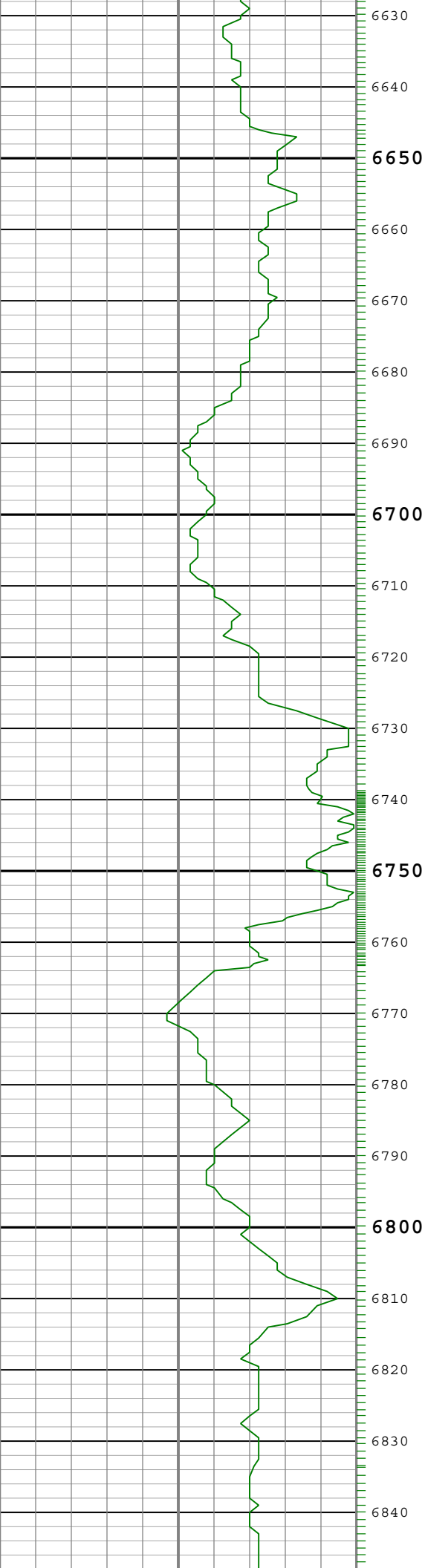


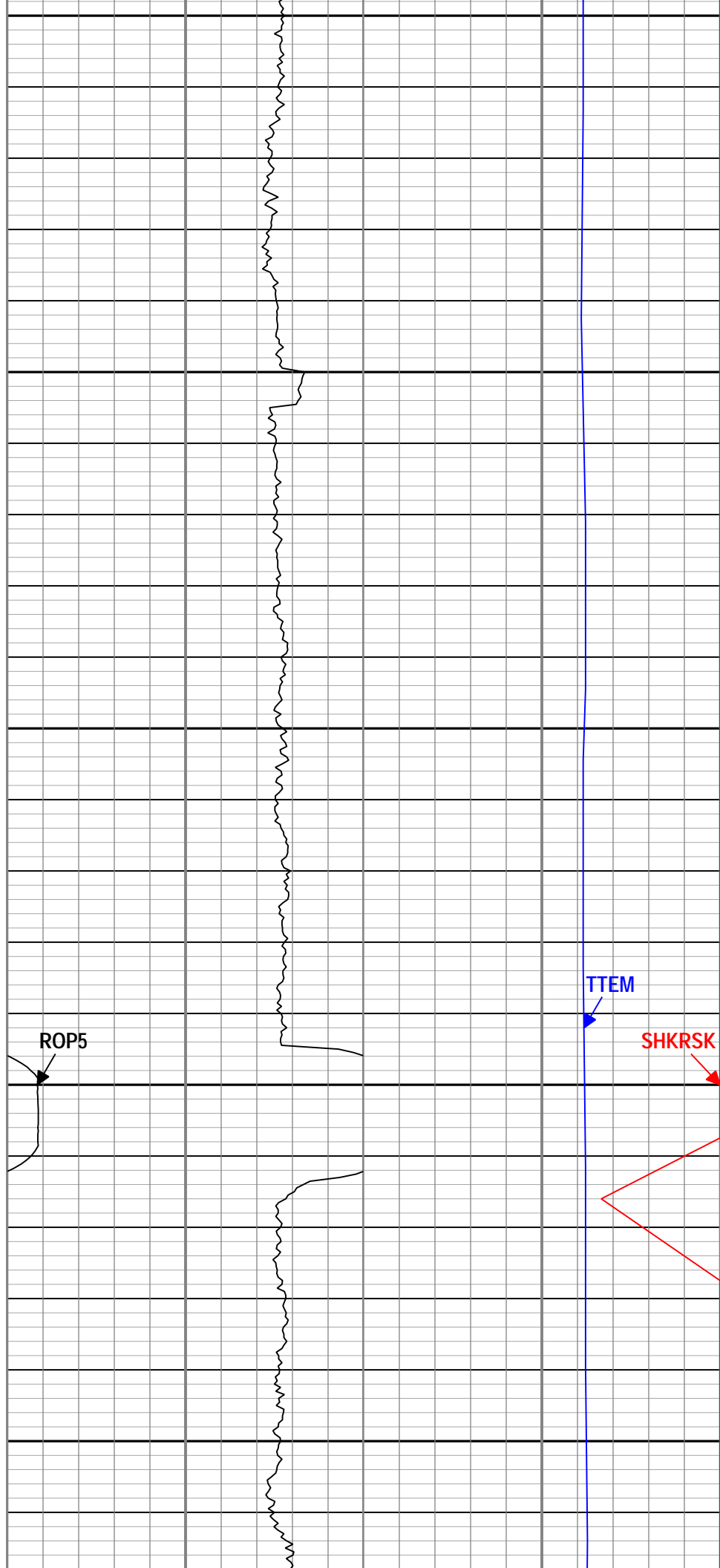
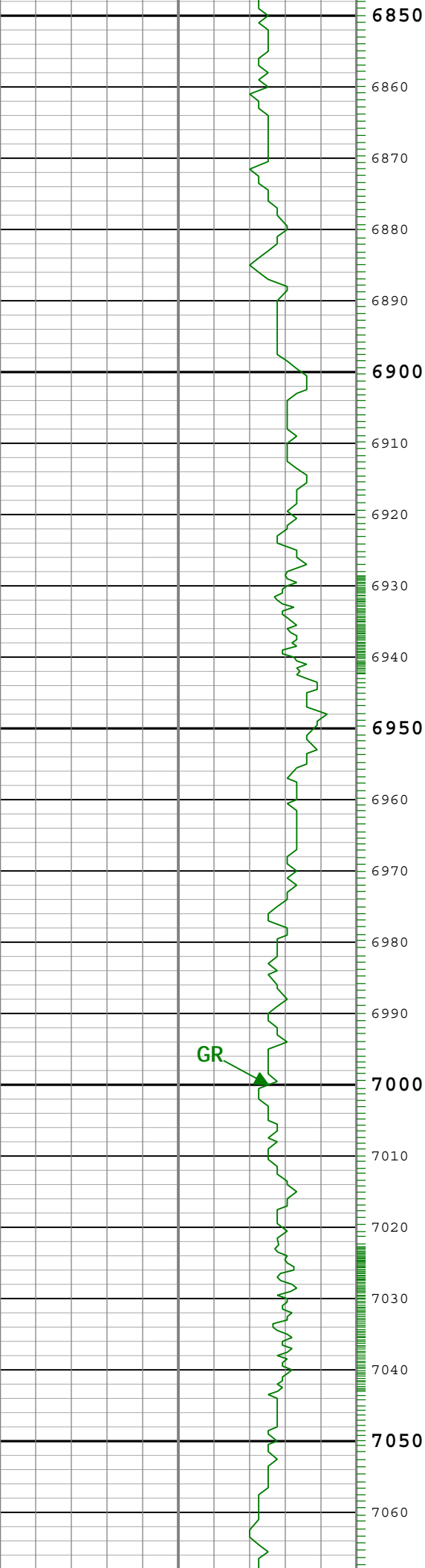


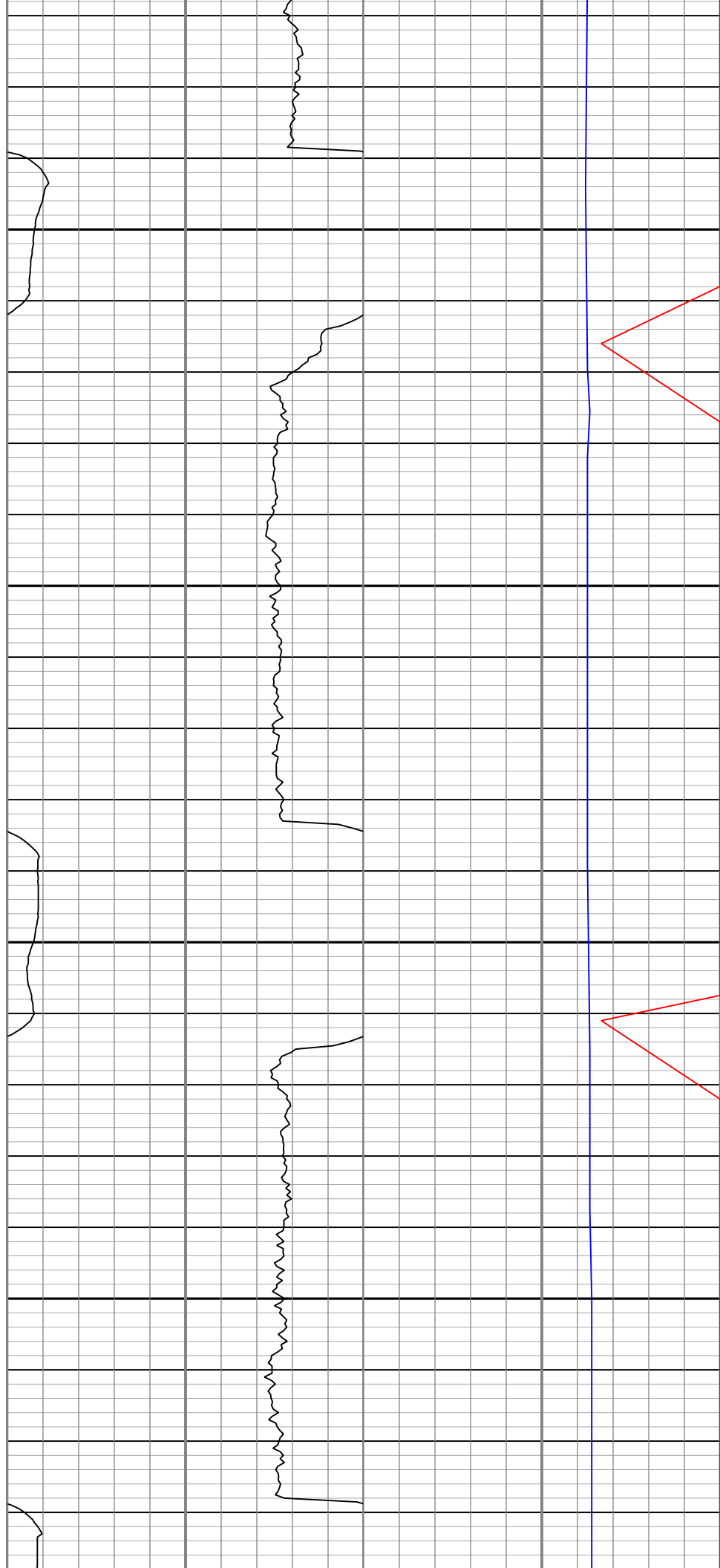
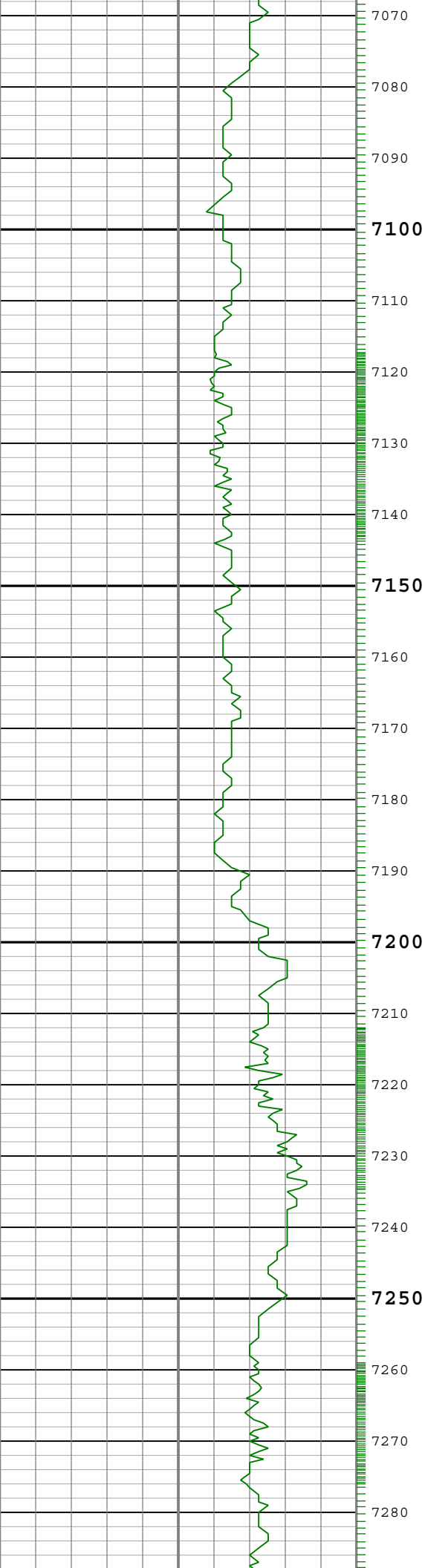


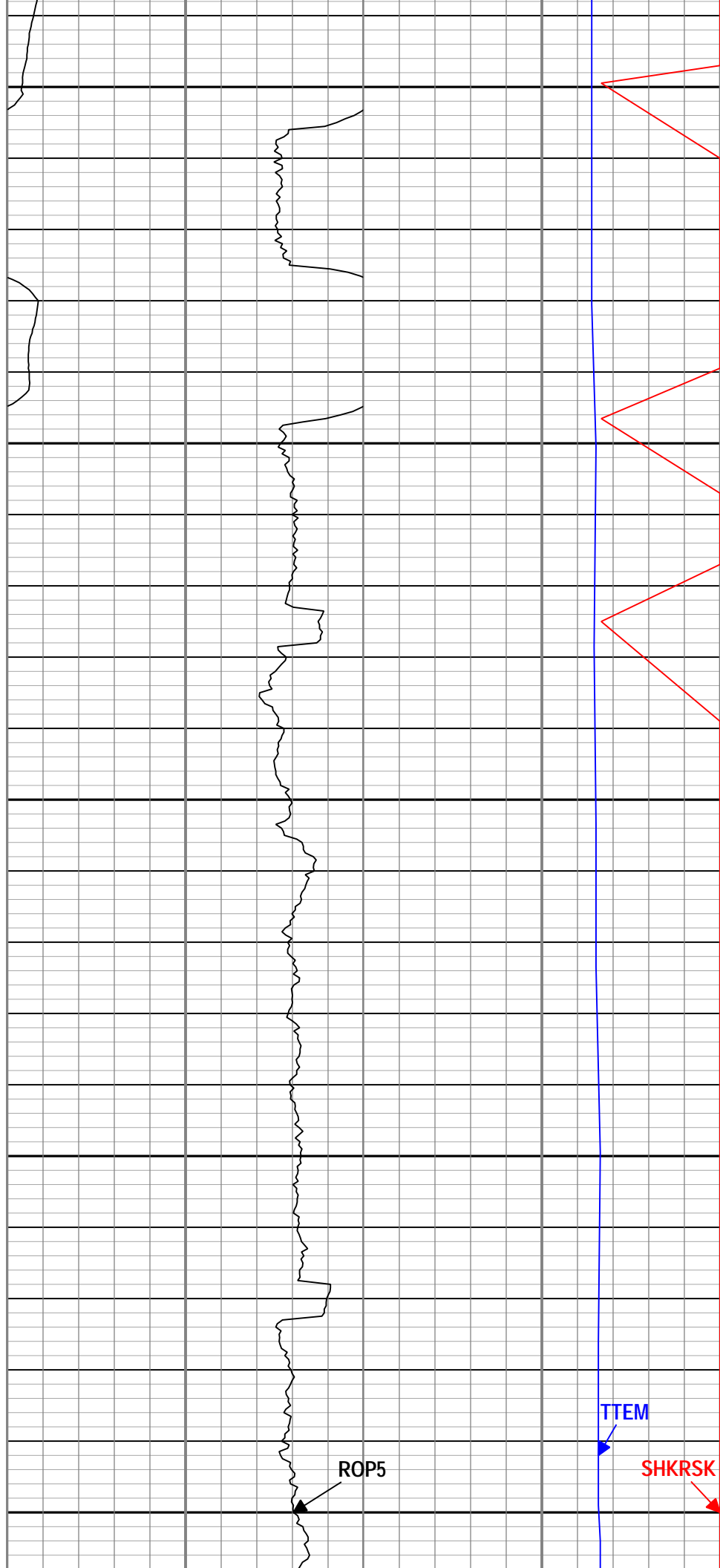
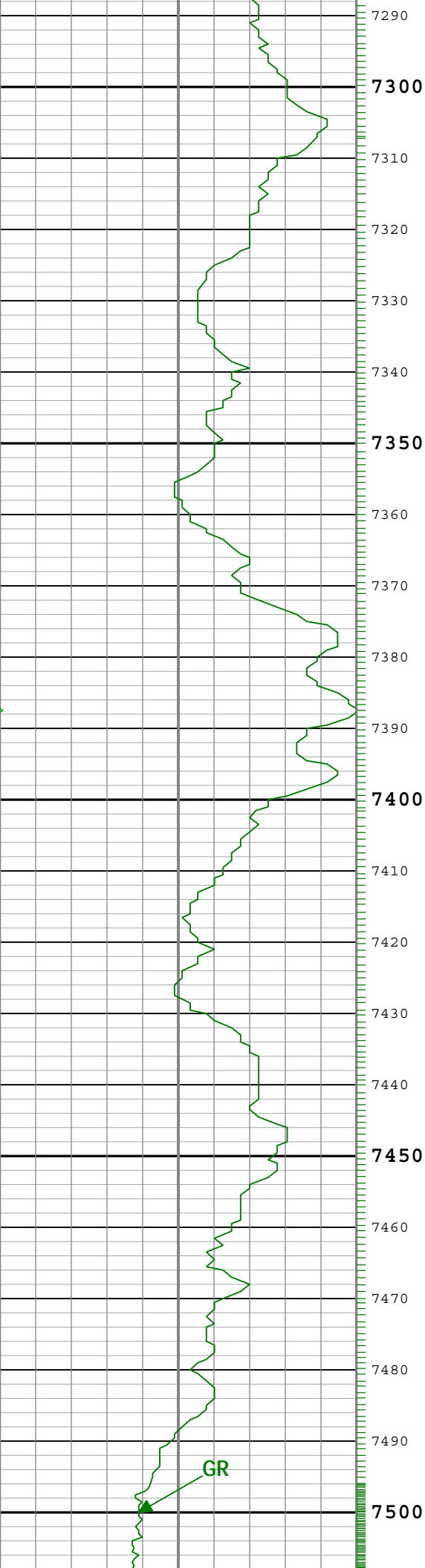


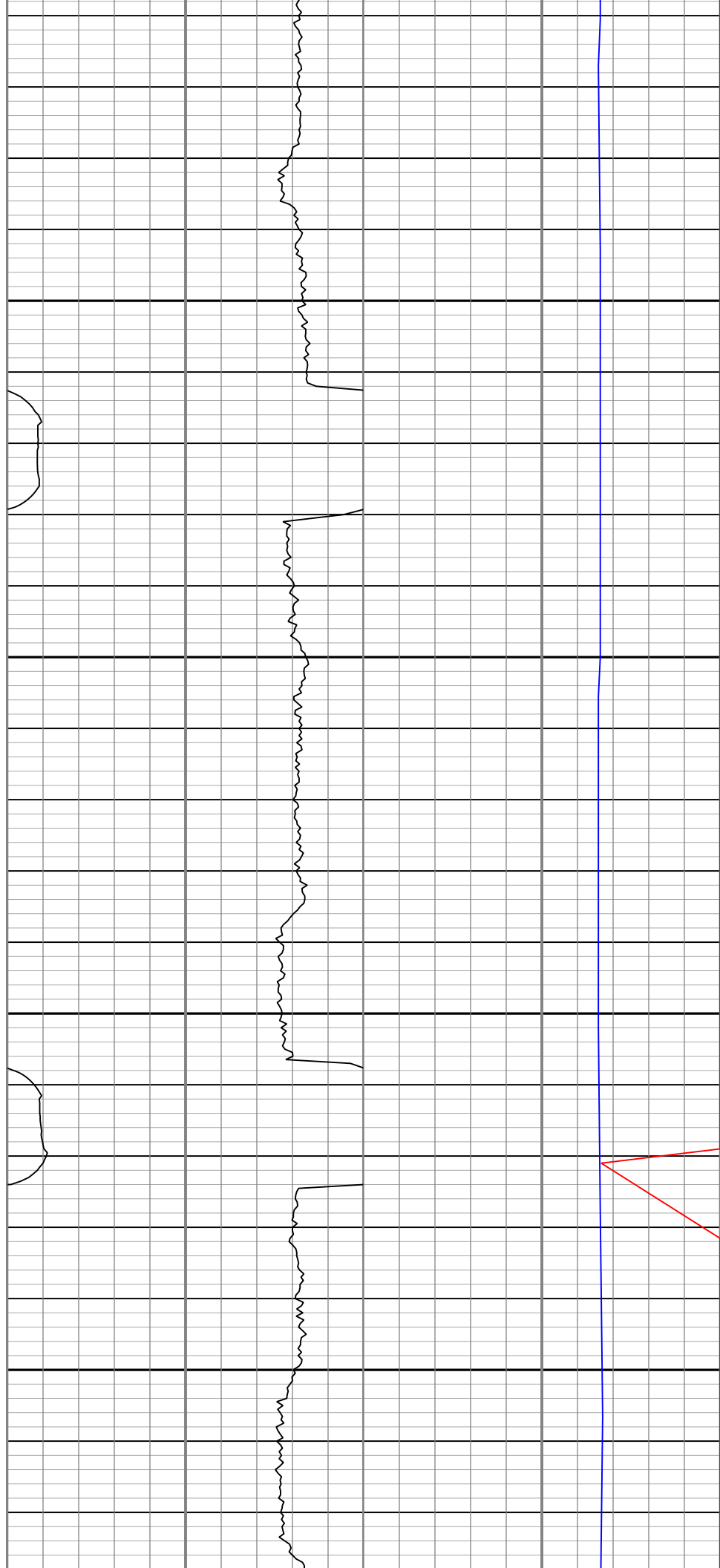
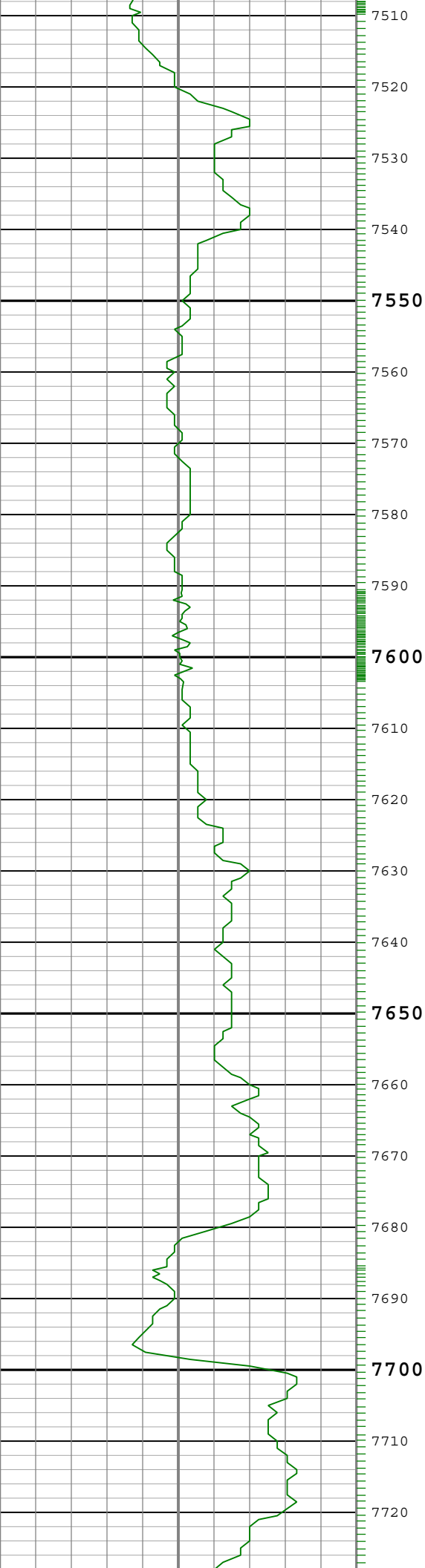


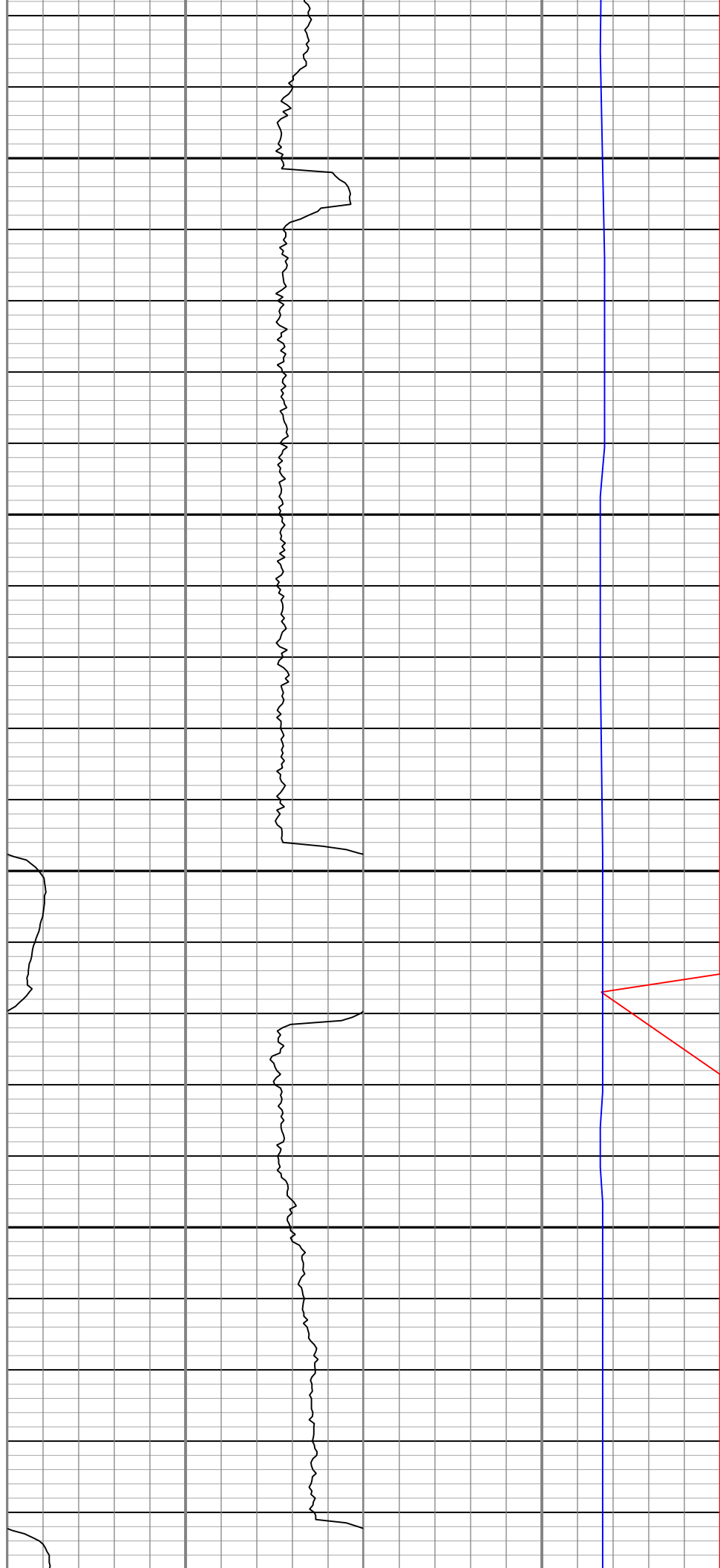
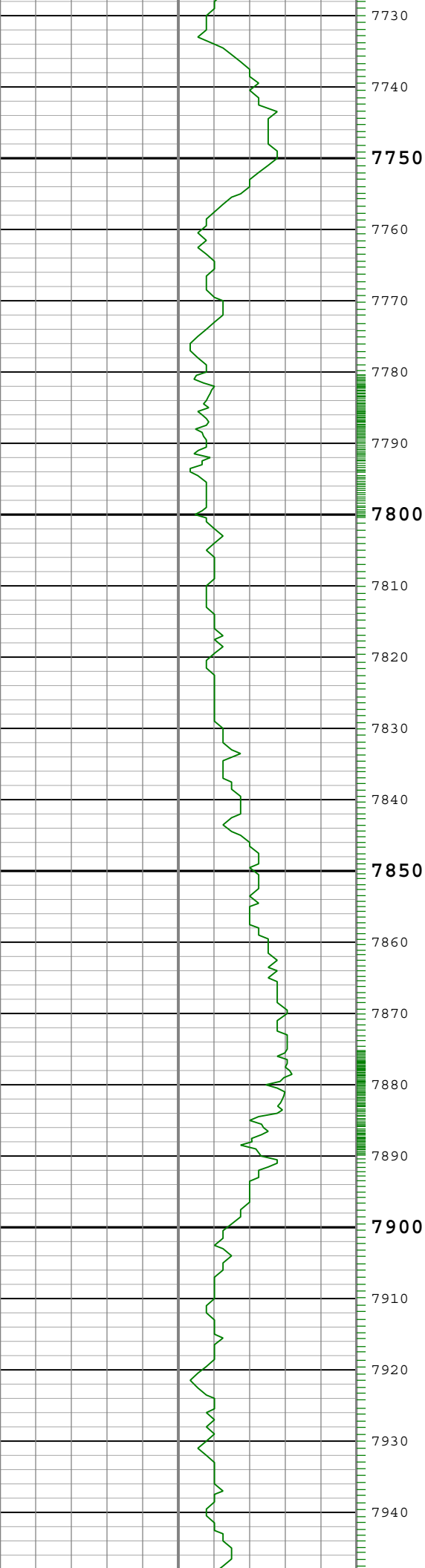


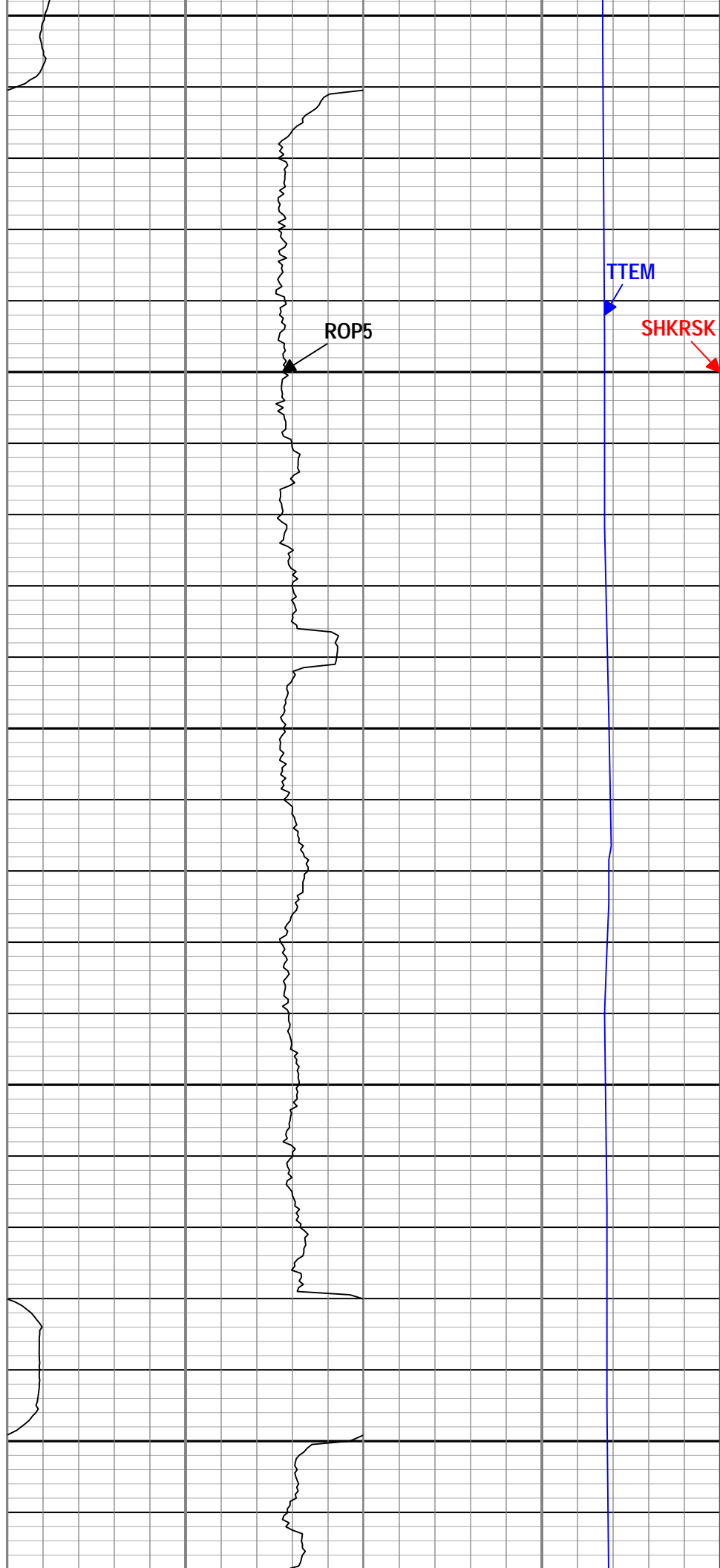
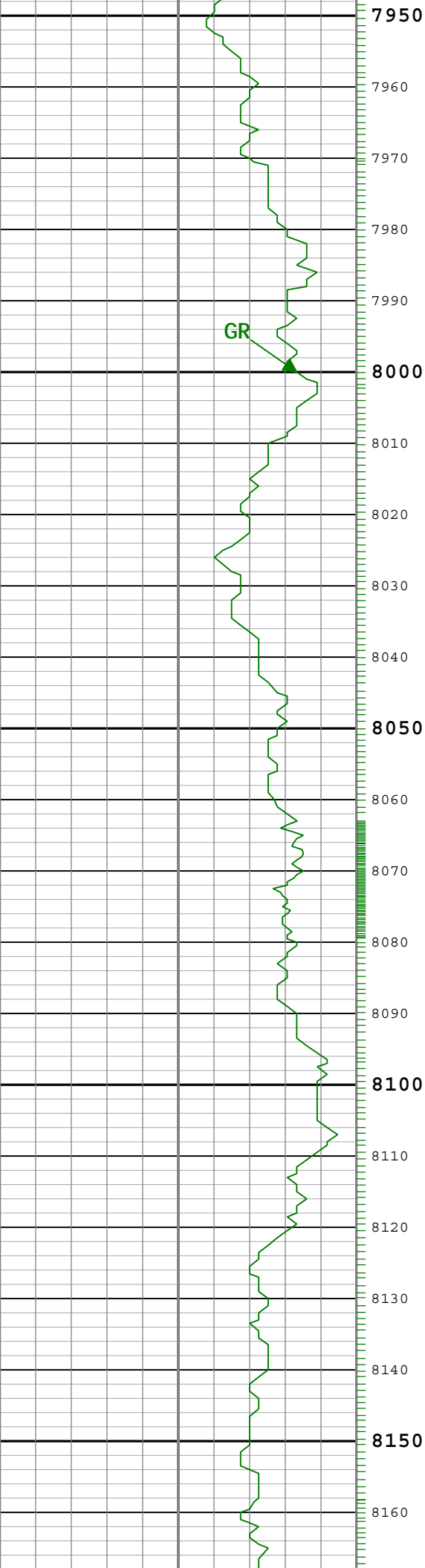


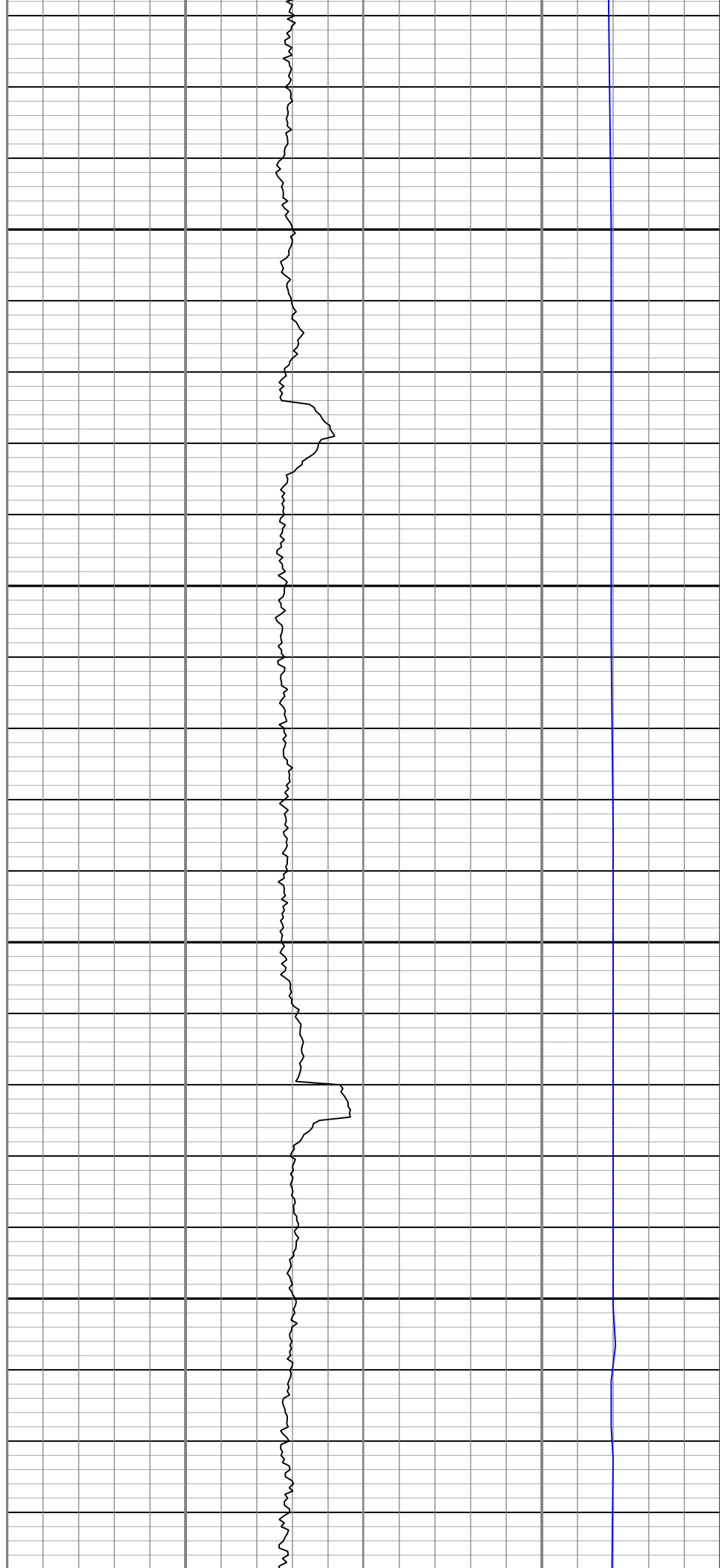
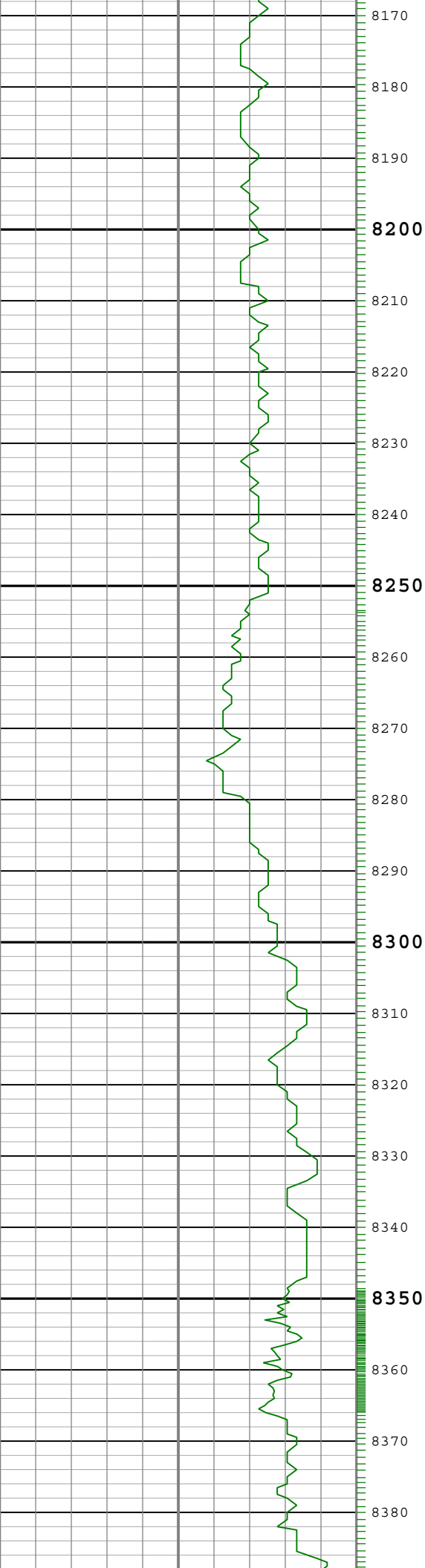


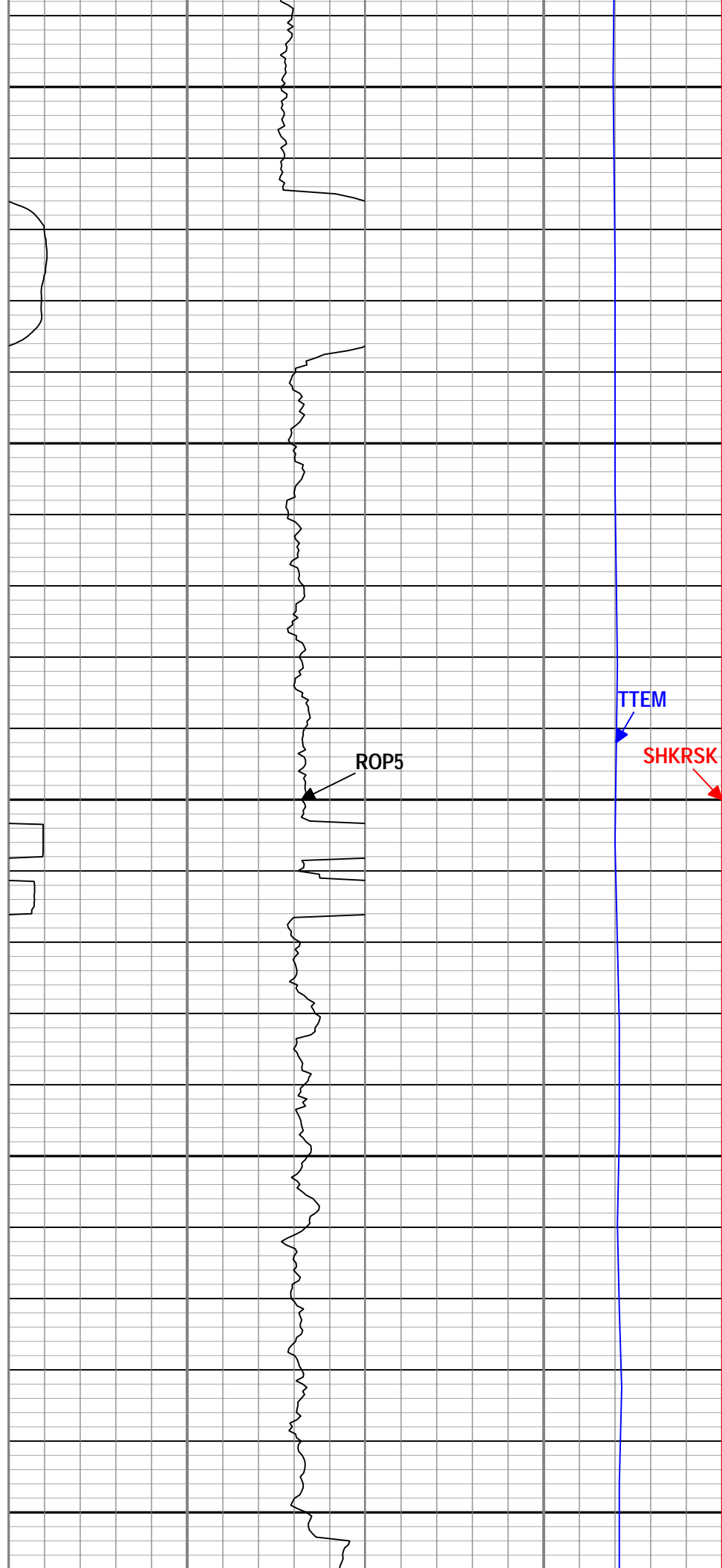
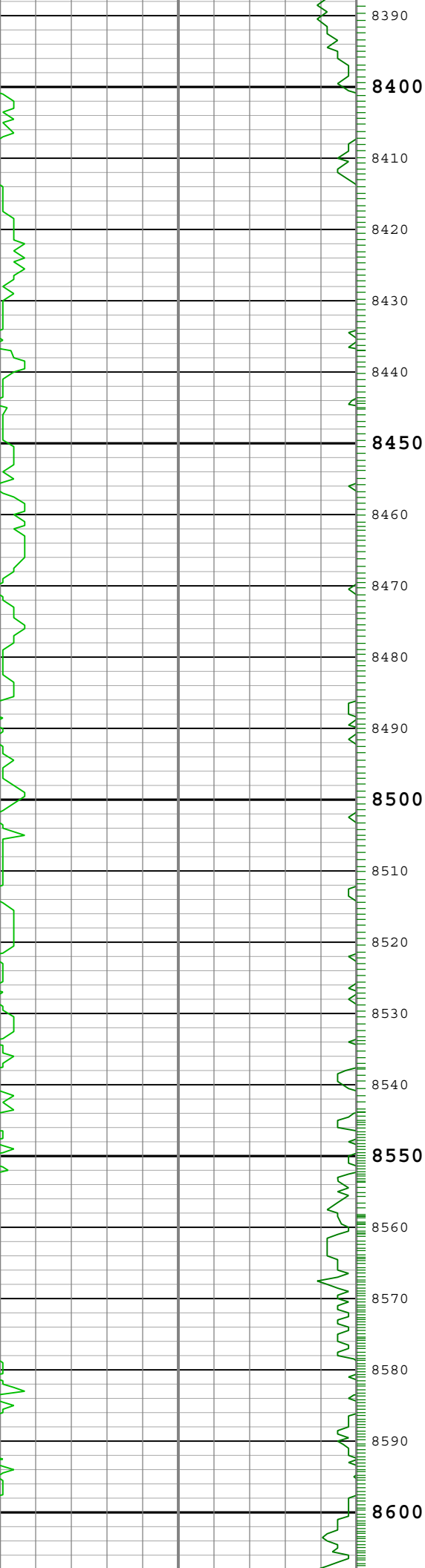


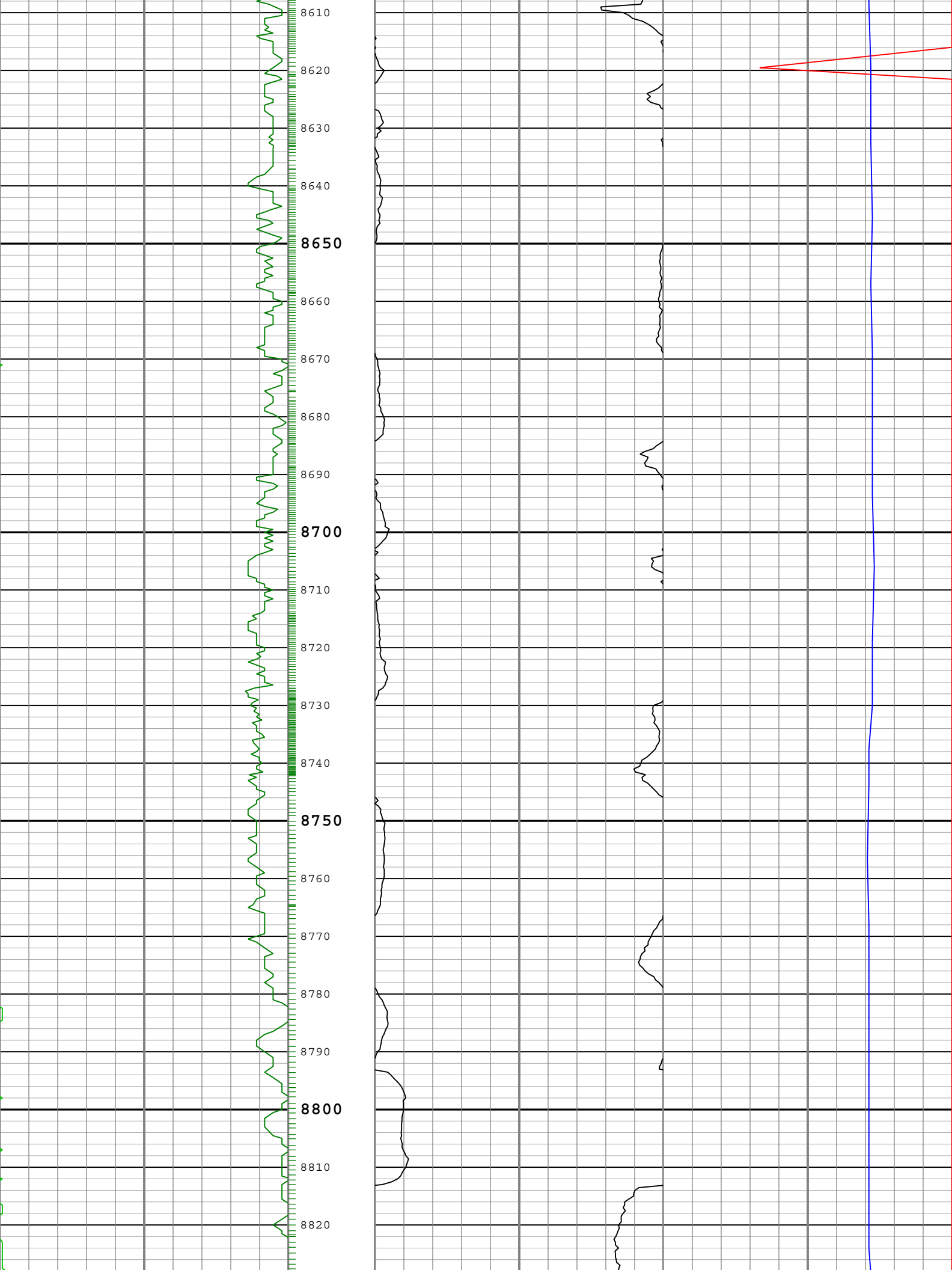


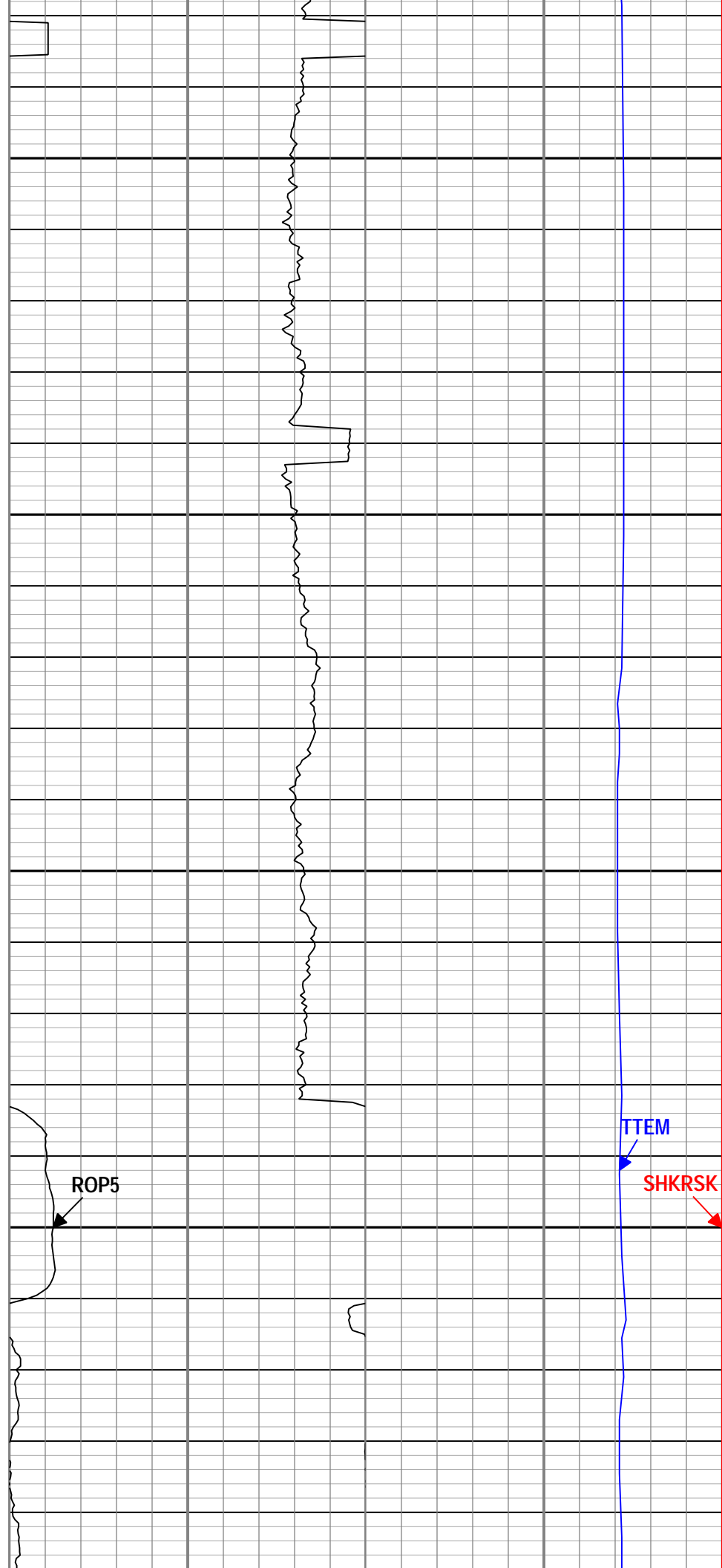
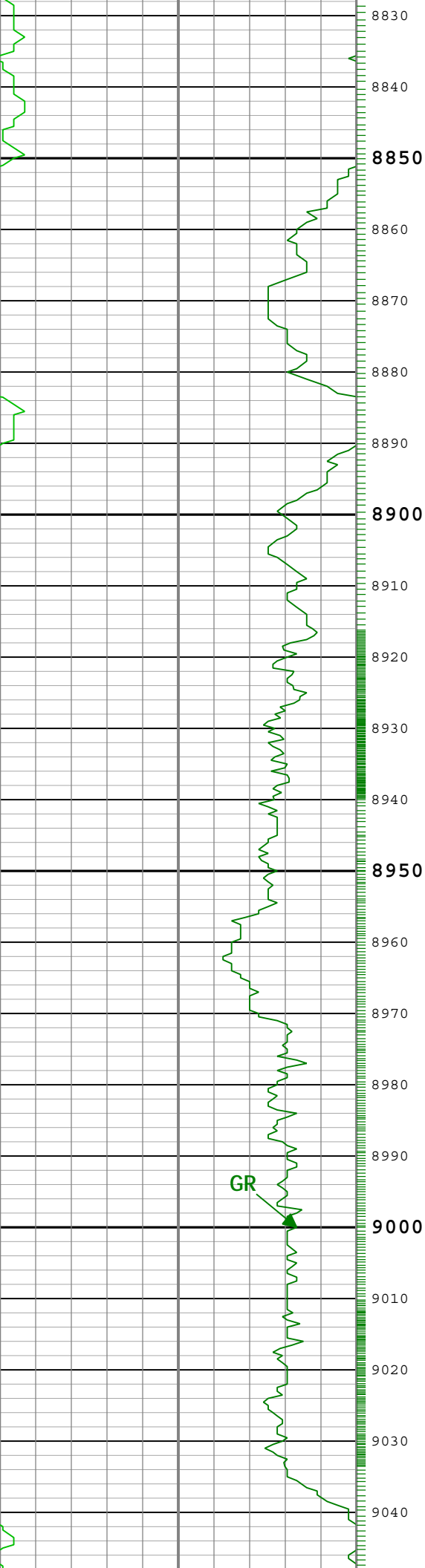


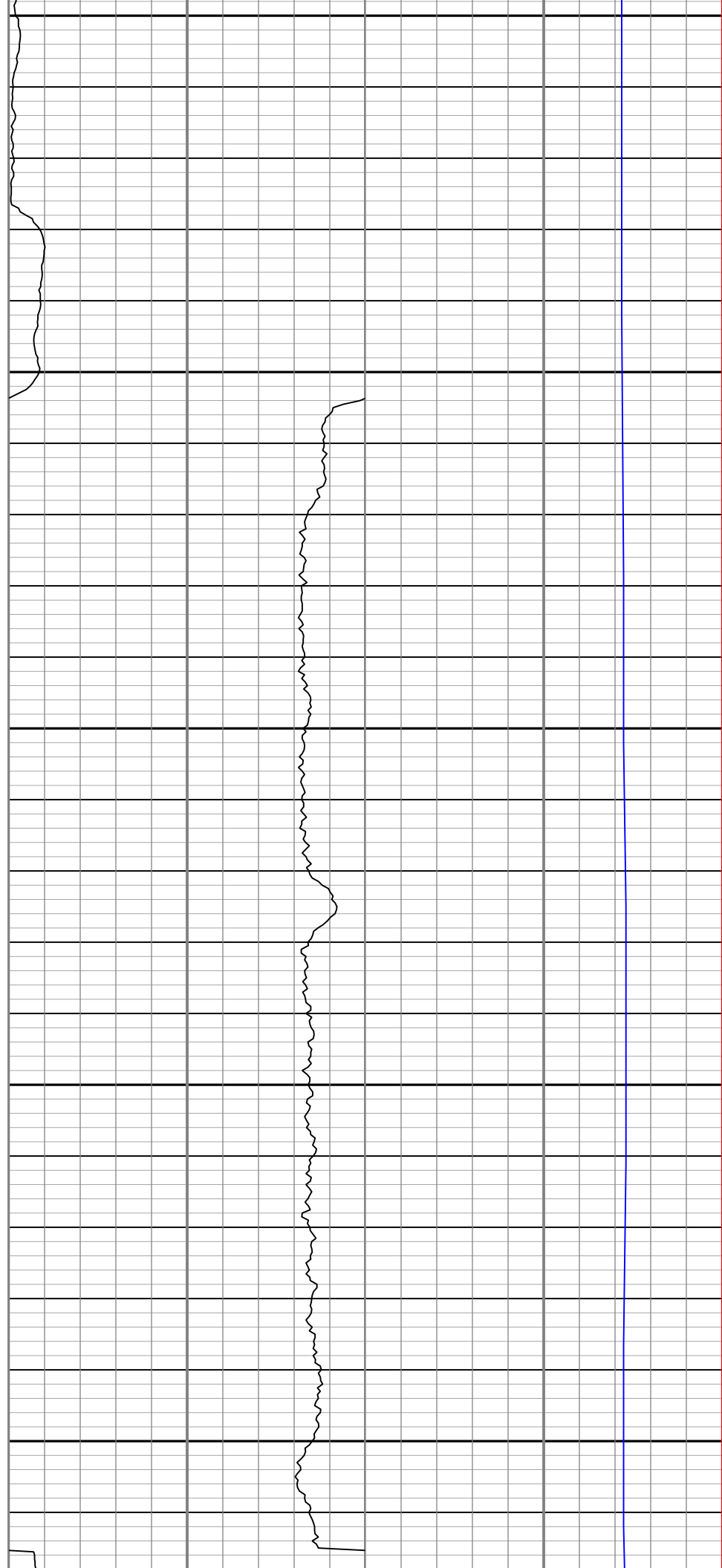
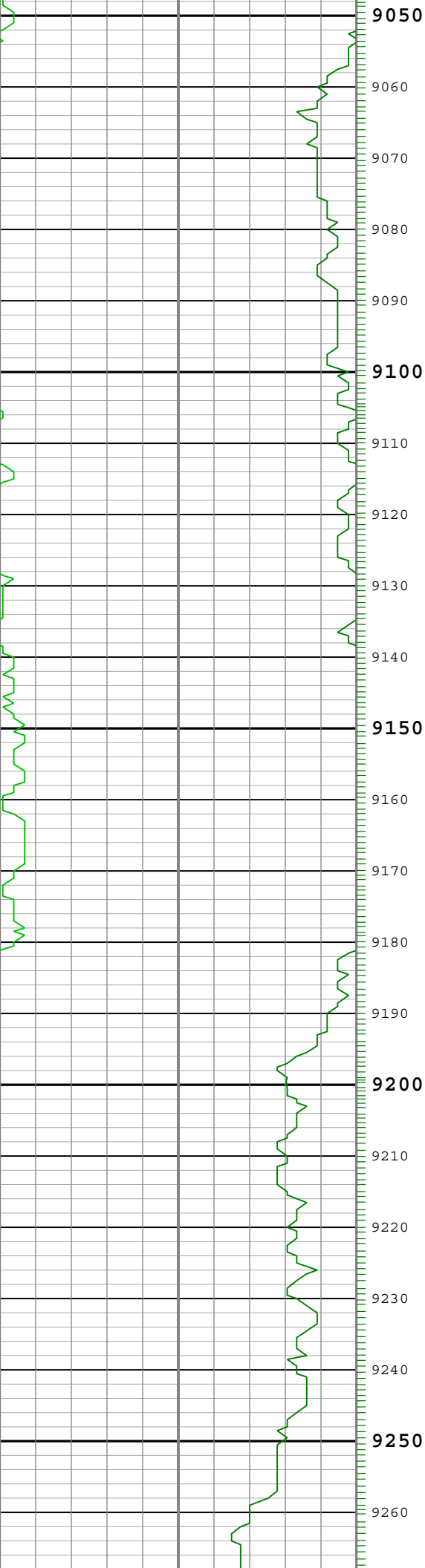


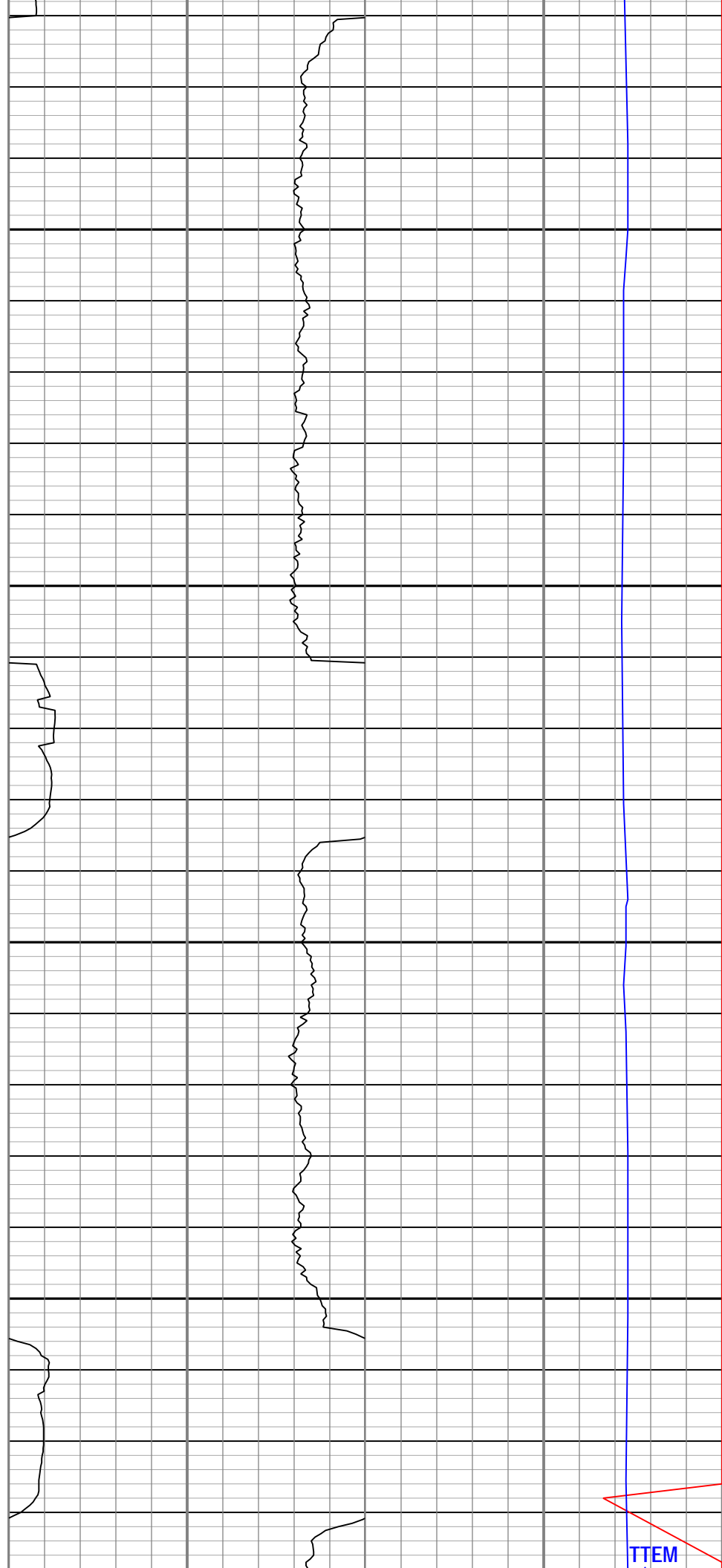
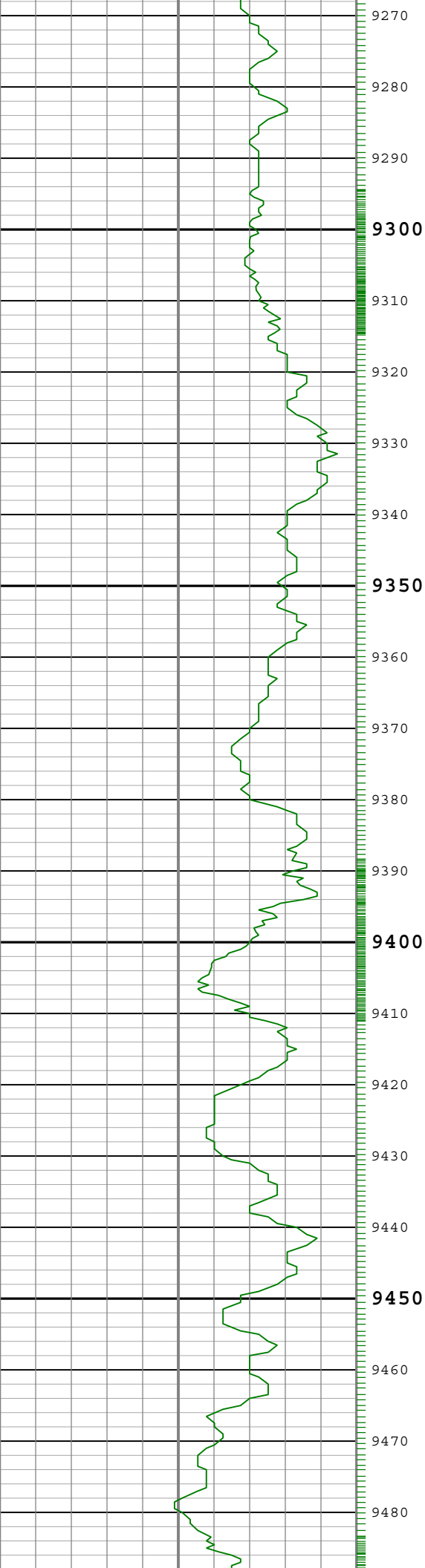




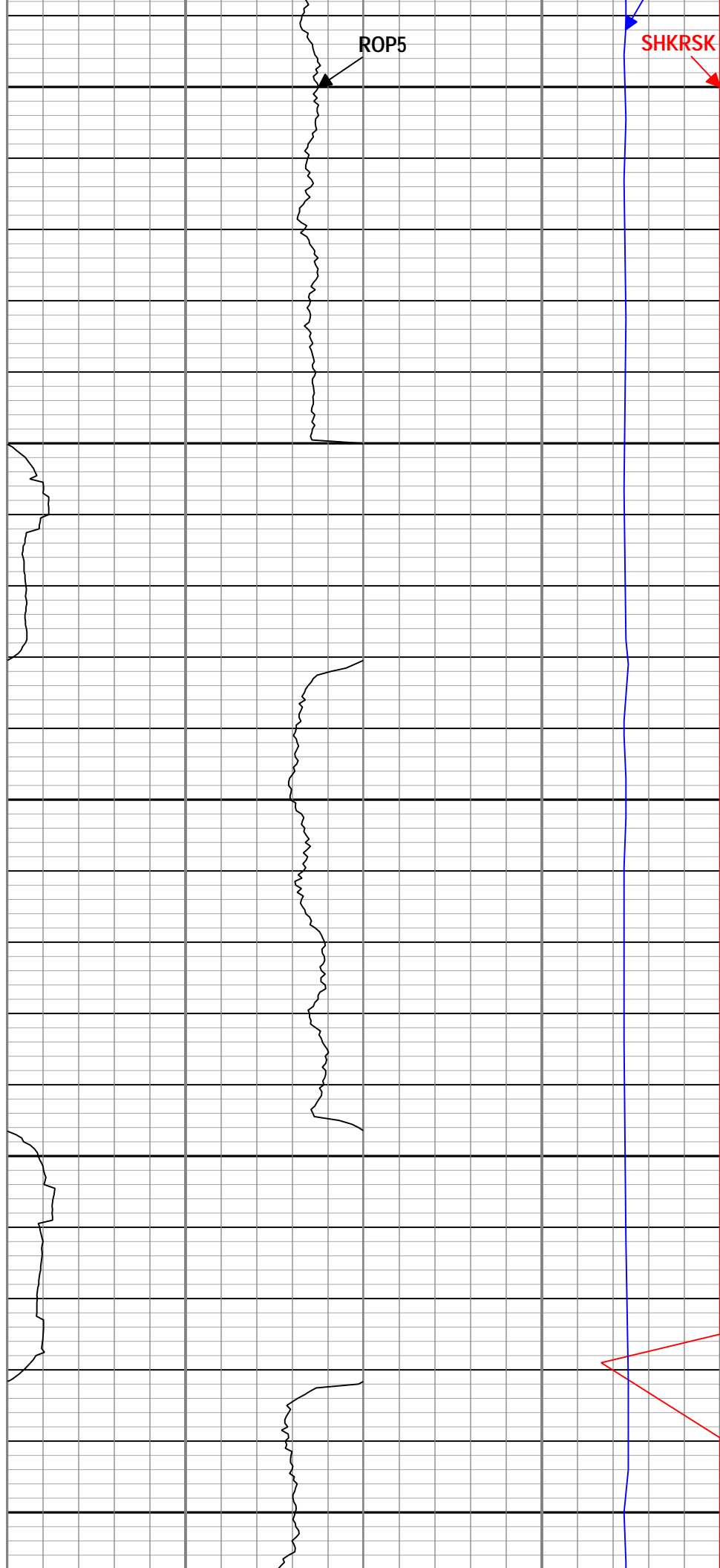
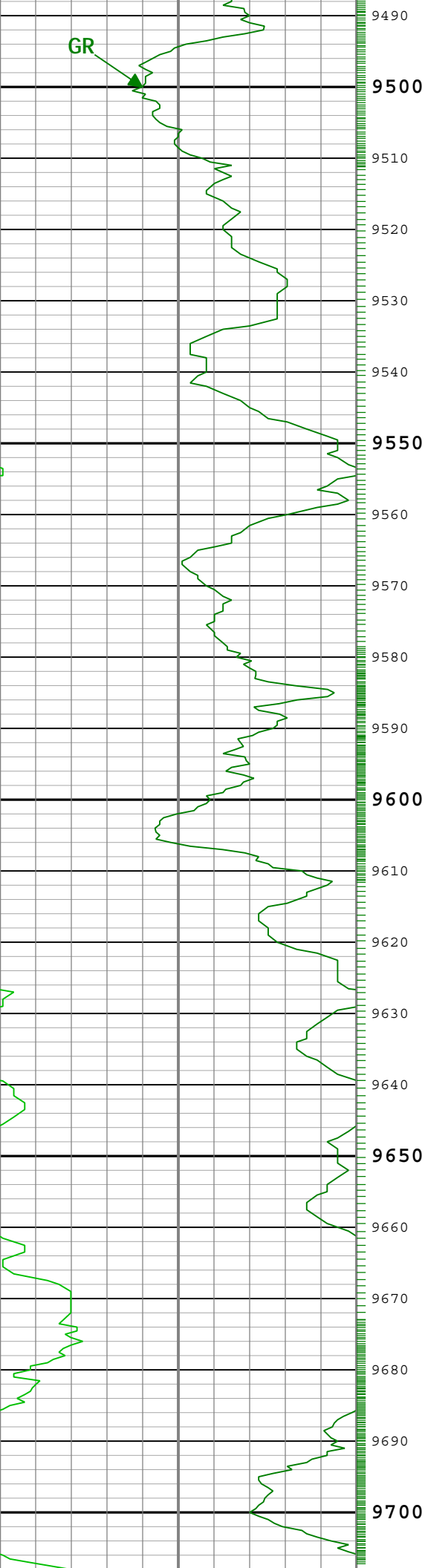


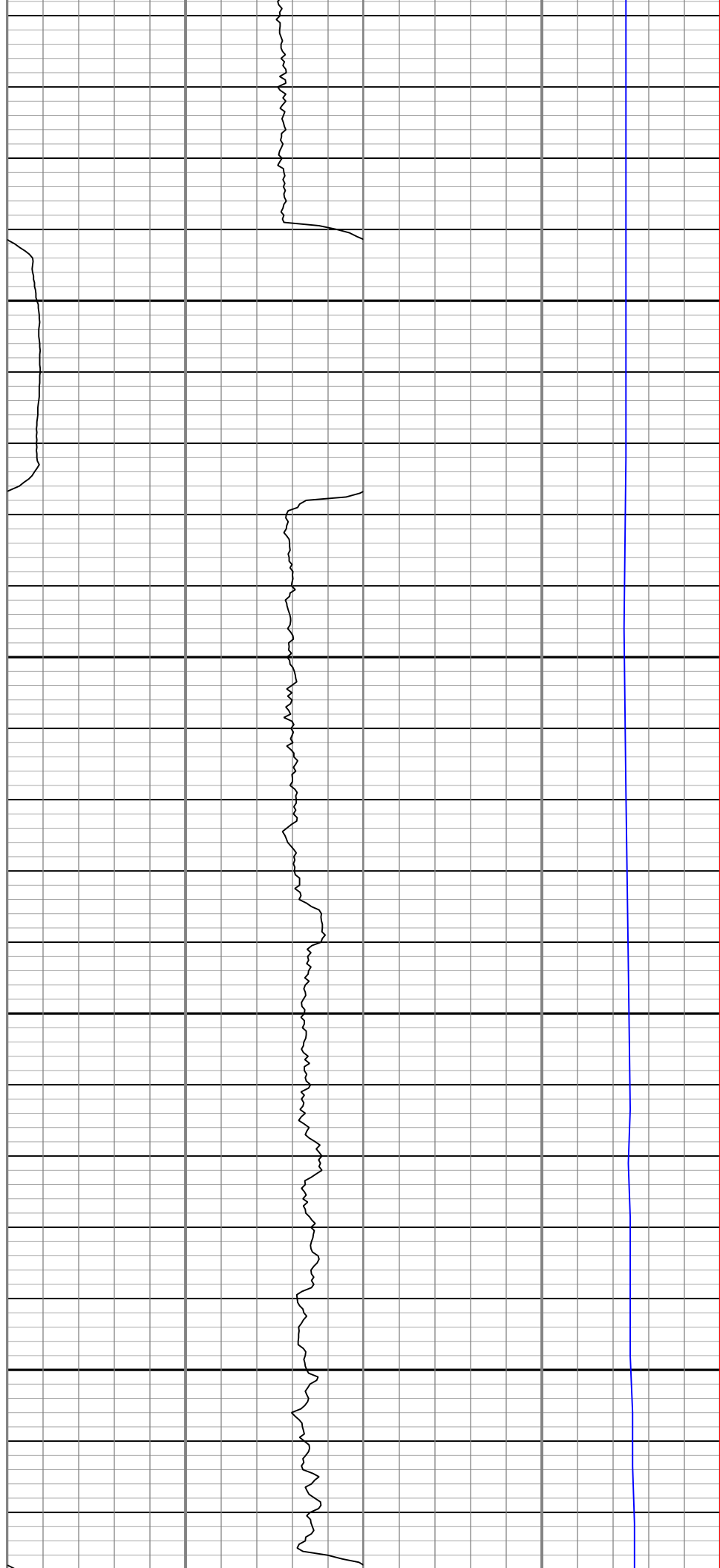
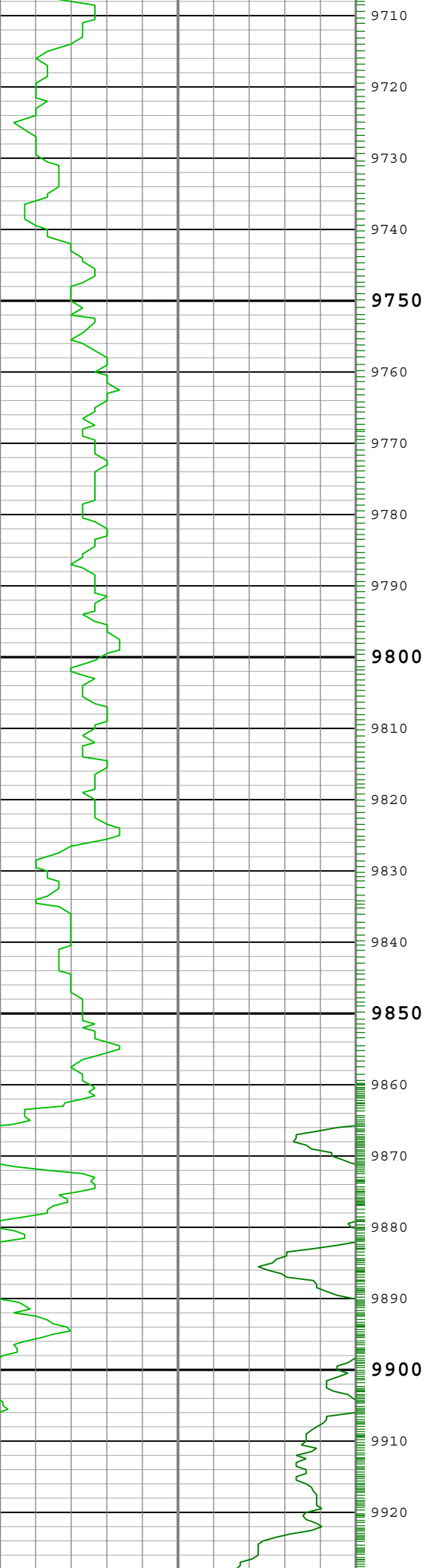


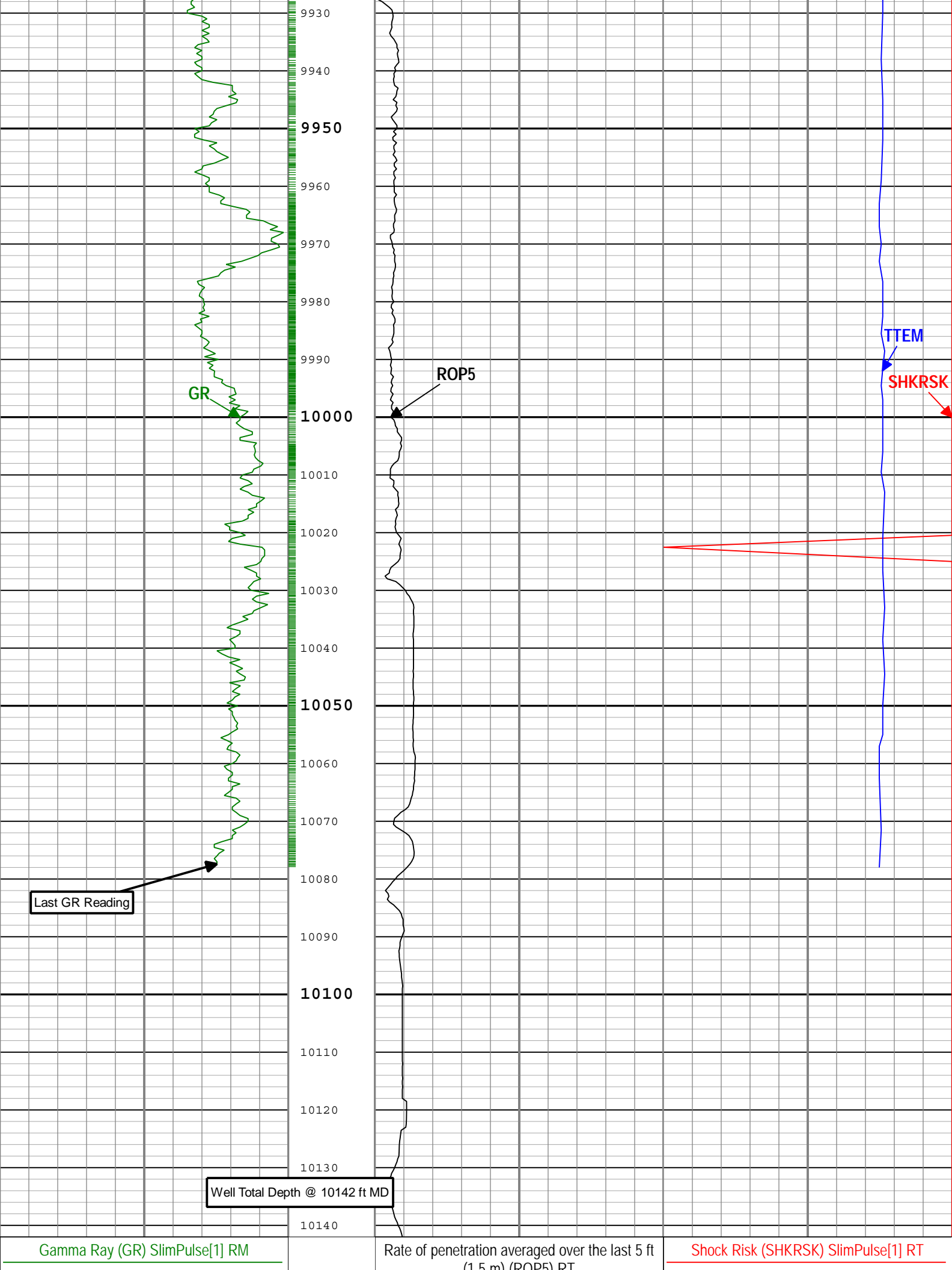




TTEM







Last GR Reading

ROP5

TTEM

SHKRSK

Well Total Depth @ 10142 ft MD

Gamma Ray (GR) SlimPulse[1] RM

Rate of penetration averaged over the last 5 ft
(1.5 m) (ROP5) RT

Shock Risk (SHKRSK) SlimPulse[1] RT

0	gAPI	150	(1.5 m) (ROP) RM	3	degF	0
Gamma Ray (GR) SlimPulse[1] RM			1000	ft/h	150	Tool Temperature (TTEM) SlimPulse[1] RM
150	gAPI	300				
Gamma Ray (GR) SlimPulse[1] RM						
300	gAPI	450				
Gamma Ray (GR) SlimPulse[1] RM						
450	gAPI	600				
Gamma Ray (GR) SlimPulse[1] RM						
600	gAPI	750				

└ TICKS_GR - Gamma Ray Tick Marks SlimPulse[1] RM

Description: SlimPulse Gamma Ray 1 Format: Log (SlimPulse Gamma Ray Final MD) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured
Depth Creation Date: 22-Sep-2014 15:02:06

Channel Processing Parameters

Run001: Parameters

Parameter	Description	Tool	Value	Unit
BS	Bit Size	DNMSESSION	Depth Zoned	in
DFD	Drilling Fluid Density	Borehole	Time Zoned	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

Run001Depth Zoned Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	13.5	1226	1226
BS	8.75	1226	6067
BS	6.125	6067	6069.42

All depth are actual.

Run001Time Zoned Parameters

Pass Drilling

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	8.75	12-Sep-2014 21:53:45	13-Sep-2014 02:30:00	1258.75	2417.83
DFD	8.7	13-Sep-2014 02:30:00	13-Sep-2014 14:30:00	2417.83	5182.33
DFD	9.75	13-Sep-2014 14:30:00	14-Sep-2014 03:12:21	5182.33	6069.42

All depth are at tool zero.

Run003: Parameters

Parameter	Description	Tool	Value	Unit
BS	Bit Size	DNMSESSION	Depth Zoned	in
DFD	Drilling Fluid Density	Borehole	10.85	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

Run003Depth Zoned Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	8.75	5873.7	6067
BS	6.125	6067	10142

All depth are actual.

Tool Control Parameters

Calibration Report

SPULSE-GEN (SlimPulse with Generic Collar) Calibration - Run Run001

Primary Equipment :

GRGain - Gamma Ray: Blanket

Master (Time Frame File): 12:00:00 24-May-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Gamma Ray Calibration Gain		Master	1.0000	0.9000	1.0645	1.1000	

SPULSE-GEN (SlimPulse with Generic Collar) Calibration - Run Run003

Primary Equipment :

Elec. cartridge, 150C max with GR

SPEC

939

GRGain - Gamma Ray: Blanket

Master (Time Frame File): 12:00:00 24-May-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Gamma Ray Calibration Gain		Master	1.0000	0.9000	1.0645	1.1000	

Company: Noble Energy**Well:** Rohn State LD03-64-1HN**Field:** Wattenberg**County:** Weld**State:** Colorado**Country:** USA**Schlumberger****SlimPulse - Gamma Ray**

1 in / 100 ft & 5 in / 100 ft Measured Depth

Recorded Mode, Composite Log