

SlimPulse - Gamma Ray

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

Recorded Mode, Composite Log



Company: Noble Energy

Well: Rohn State LD03-65-1HN

Field: Wattenberg

County: Weld

State: Colorado

Country: USA

Section:	04	UWID:	05-123-37467-00
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' 43.75" Northing: 1530763.19 ftUS
FL2:	Longitude: W 103° 51' 40.86" Easting: 3453804.84 ftUS



Permanent Datum: - Mean Sea Level

Acquisition Dates:	26-Aug-2014 -- 31-Aug-2014	Other Services:
Log Interval:	1224.00(ft) to 10270.00(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:	24-Aug-2014	



Disclaimer

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Borehole Size/Casing Record

Bit						
Bit Size (in)	13.5	8.75	6.125			
Top Driller (ft)	0	1224	6086			
Bottom Driller (ft)	1224	6086	10270			
Casing						
Size (in)	9.625	7				
Weight (lbm/ft)	36	32				
Inner Diameter (in)	8.921	6.094				
Grade	J55	P110				
Top Driller (ft)	0	1213				
Bottom Driller (ft)	1213	6074				

Operational Run Summary

Parameter (unit)	Run001	Run002	Run003			
Date Log Started	25-Aug-2014	27-Aug-2014	29-Aug-2014			
Time Log Started	10:00:07	03:39:40	15:12:52			
Date Log Finished	26-Aug-2014	28-Aug-2014	31-Aug-2014			
Time Log Finished	23:19:28	07:16:20	16:03:32			
Bit Size (in)	8.750	8.750	6.125			
Bit Start Depth (ft)	1224.00	5133.00	6085.00			
Bit Stop Depth (ft)	5133.00	6085.00	10270.00			
Top Log Interval (ft)	1175.00	5083.00	6028.00			
Bottom Log Interval (ft)	5083.00	6028.00	10205.00			
Max Hole Deviation (deg)	0.00	84.60	93.06			
Azimuth of Max Deviation (deg)	0.00	90.06	92.29			
Logging Unit Number	Command Center	Command Center	Command Center			
Logging Unit Location	Zone 2	Zone 2	Zone 2			
Recorded By	P. Michels	P. Michels	C. Welty			
Witnessed By	T. Pingle	T. Pingle	T. Pingle			
Service Order Number	14CCO0609	14CCO0609	14CCO0609			

Borehole Fluids

Parameter(unit)	Run001	Run002	Run003			
Fluid Type	Water	Water	Water			
Fluid Name	Salt Brine	Salt Brine	Salt Brine			
Max Recorded Temperatures (degF)	148.1	163.4	218.3			
Source of Sample	Active Tank	Active Tank	Active Tank			

Salinity (ppm)	907.5	907.5	1155			
Density (lbm/gal)	Zoned	Zoned	Zoned			
Funnel Viscosity (s)	29	47	42			
Fluid Loss (cm3)						
PH	11.9	9.3	9.3			
Source RMF						
RMC	Pressed	Pressed	Pressed			
RM @ Meas Temp (ohm.m@degF)	0.2 @ 68	0.2 @ 68	0.2 @ 68			
RMF @ Meas Temp (ohm.m@degF)	0.15 @ 68	0.15 @ 68	0.15 @ 68			
RMC @ Meas Temp (ohm.m@degF)						
RM @ BHT (ohm.m@degF)	0.07 @ 212	0.07 @ 212	0.07 @ 212			
RMF @ BHT (ohm.m@degF)	0.05 @ 212	0.05 @ 212	0.05 @ 212			
RMC @ BHT (ohm.m@degF)	NaN @ 212	NaN @ 212	NaN @ 212			
Total Solid (%)	1.8	8.8	6.7			
High Gravity Solids (%)	0.7	7.5	3.5			

Zoned Borehole Fluids

Run001

Parameter	Value	Start
Density	9	8/25/2014 10:00:07 AM
Density	8.65	8/26/2014 3:00:00 AM
Density	8.85	8/26/2014 1:00:00 PM

Run002

Parameter	Value	Start
Density	9.35	8/27/2014 3:39:40 AM
Density	10.5	8/27/2014 2:00:00 PM

Run003

Parameter	Value	Start
Density	9.7	8/29/2014 3:12:52 PM
Density	9.9	8/30/2014 3:00:00 AM
Density	9.7	8/30/2014 1:00:00 PM
Density	9.75	8/31/2014 3:00:00 AM

Remarks and Equipment Summary

Data presented is from tool memory and acquired while drilling from 1224.00 ft to 10270.00 ft.

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.

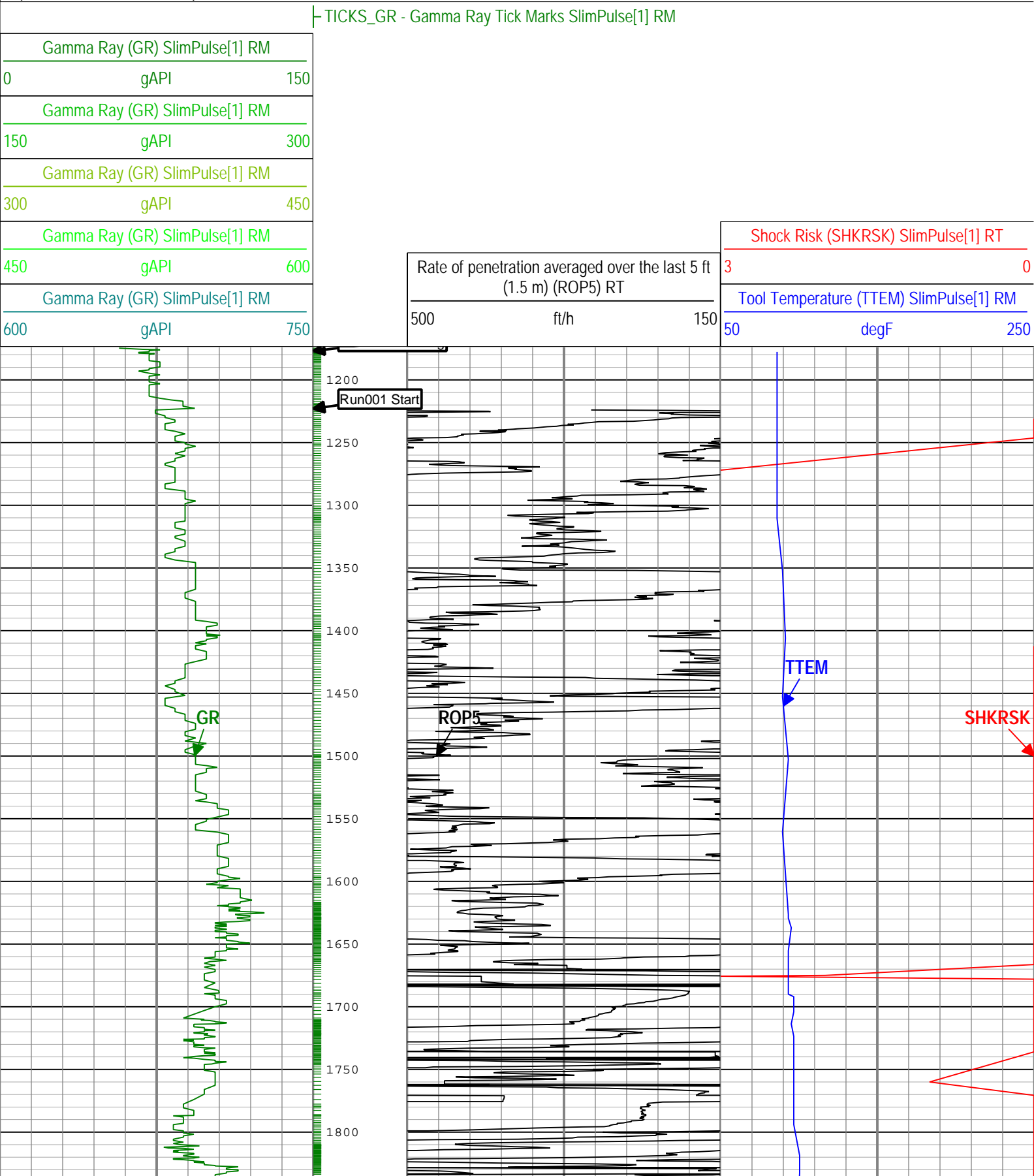
Run001: Remarks	Run002: Remarks	Run003: Remarks
Run Objective: Drill vertical to KOP	Run Objective: Drill curve to the landing point	Run Objective: Drill lateral to well TD
Bit to Gamma Ray: 49.15 ft Bit to D&I: 46.12 ft	Bit to Gamma Ray: 57.83 ft Bit to D&I: 54.80 ft	Bit to Gamma Ray: 66.49 ft Bit to D&I: 63.46 ft
Drilled from: 1223.00 ft to 5130.00 ft Logged from: 1175.00 ft to 5083.00 ft	Drilled from: 5130.00 ft to 6085.00 ft Logged from: 5083.00 ft to 6028.00 ft	Drilled from: 6085.00 ft to 10270.00 ft Logged from: 6028.00 ft to 10205.00 ft
SlimPulse Software: v11.0C00 SlimPulse D&I calibrated on: 1-May-2014 SlimPulse GR calibrated on: 7-May-2014	SlimPulse Software: v11.0C00 SlimPulse D&I calibrated on: 13-Dec-2012 SlimPulse GR calibrated on: 2-Apr-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: Ruben Guerrero & Jordan Timbs MWD: Tim Pingle & Paul Michaels	PathFinder a Schlumberger Co. Personnel: DD: Ruben Guerrero & Jordan Timbs MWD: Tim Pingle Paul Michaels,	PathFinder a Schlumberger Co. Personnel: DD: Ruben Guerrero & Jordan Timbs MWD: Tim Pingle & Chad Welty
Reason for POOH: Section TD	Reason for POOH: Section TD	Reason for POOH: Well TD

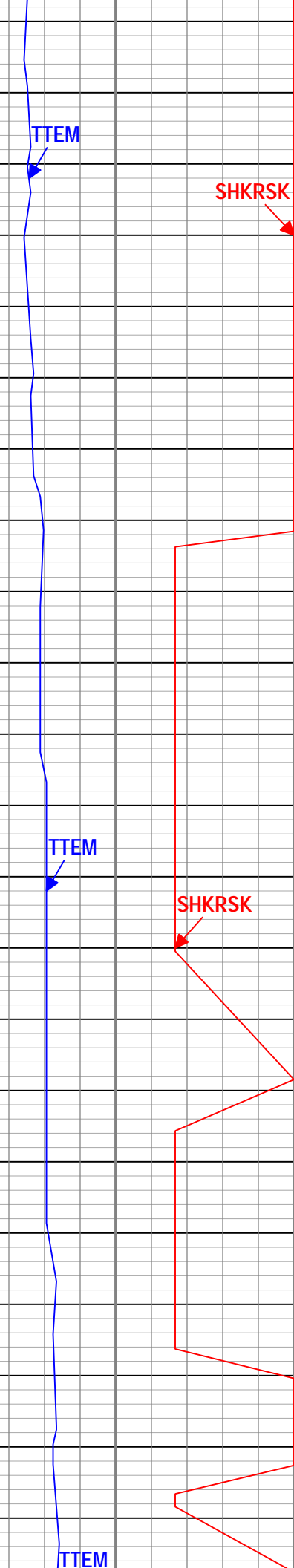
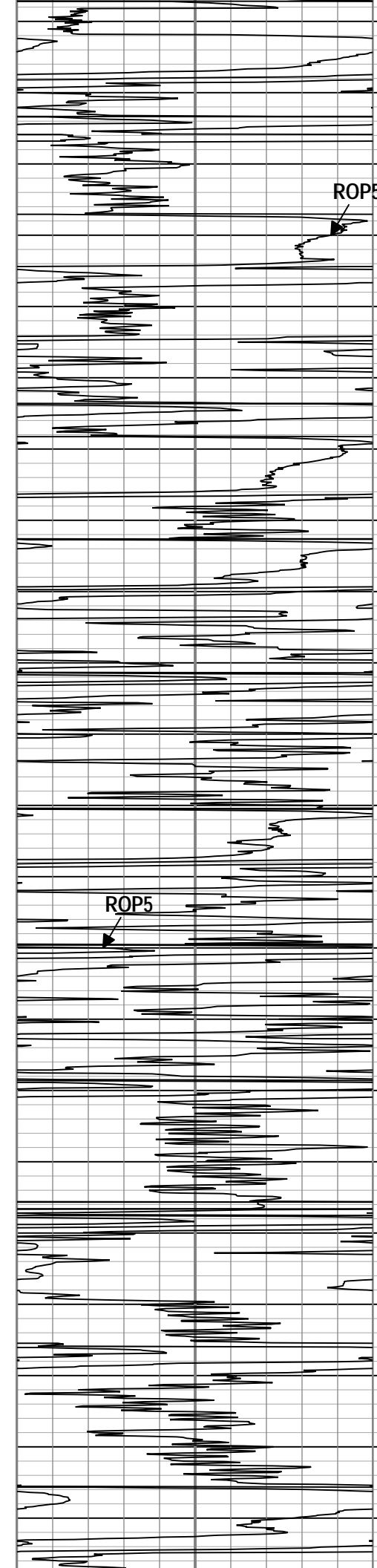
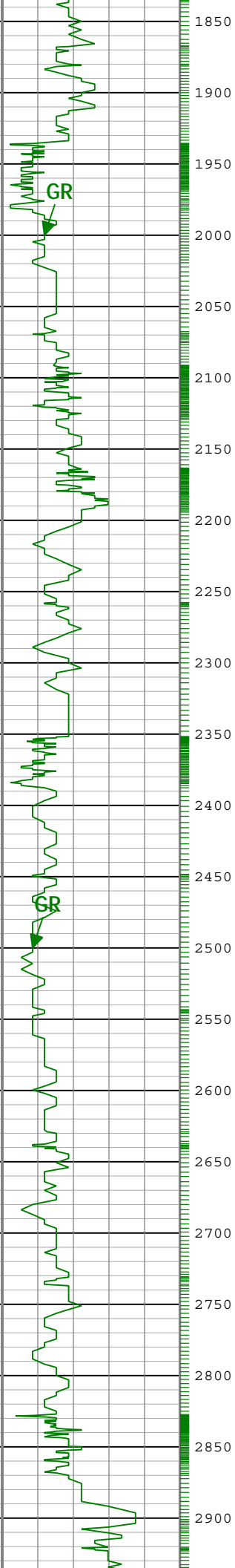
Run002	Drilling	Down	5130.00 ft	6086.75 ft	27-Aug-2014 8:19:52 AM	28-Aug-2014 7:16:20 AM	No
Run003	Drilling	Down	6000.33 ft	10272.25 ft	29-Aug-2014 4:29:47 PM	31-Aug-2014 4:03:32 PM	No

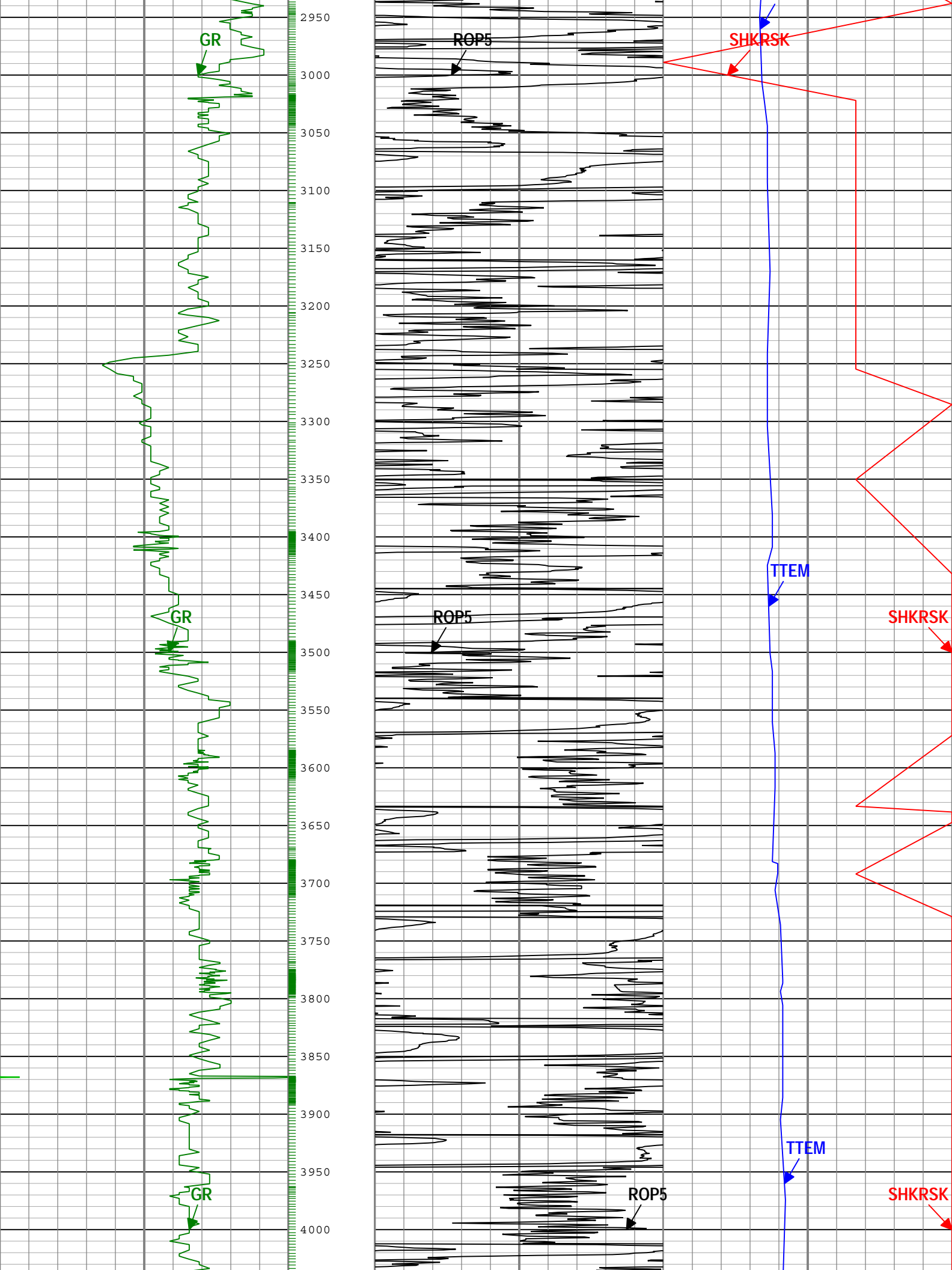
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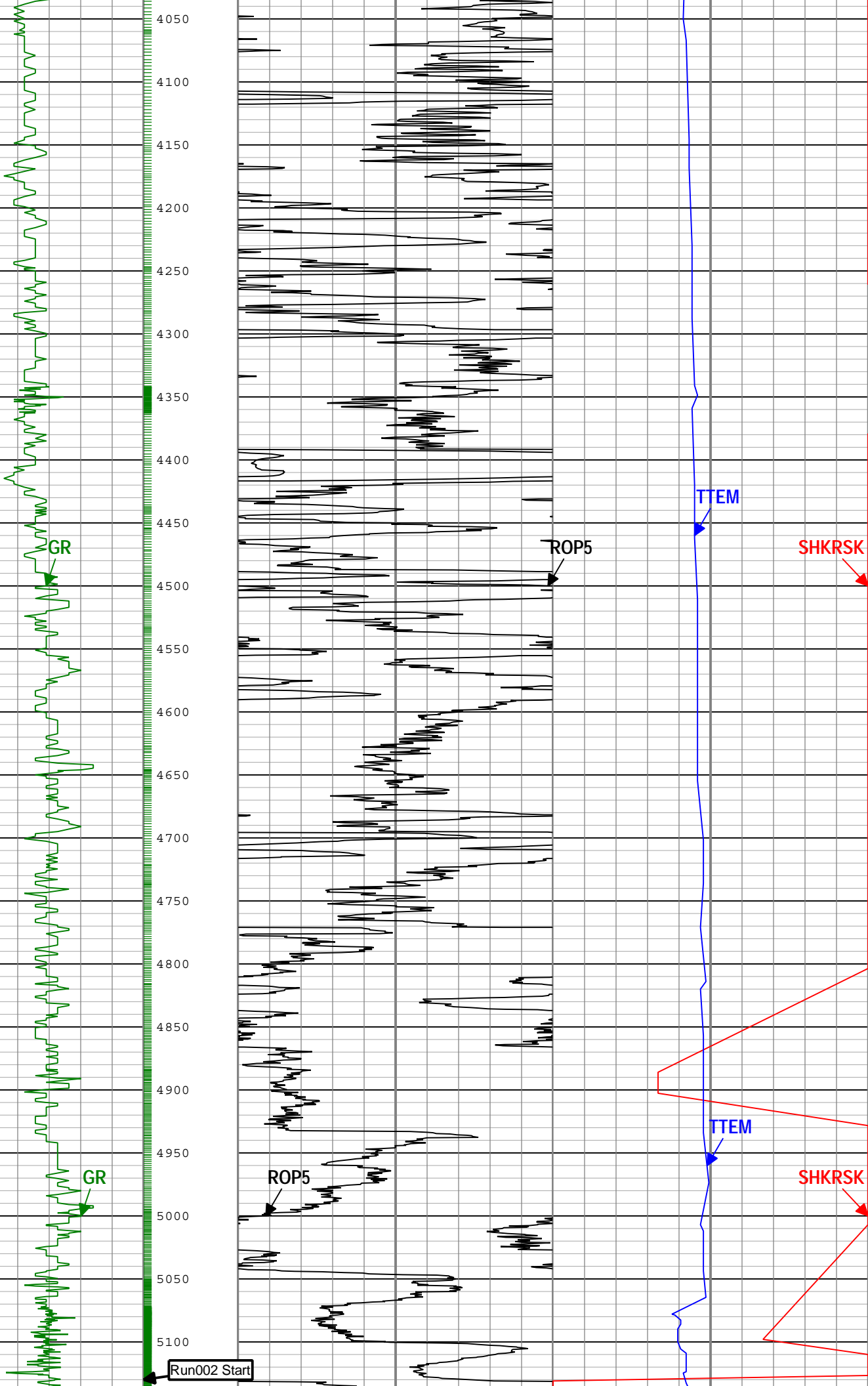
Log	Company:Noble Energy	Well:Rohn State LD03-65-1HN
		Well Composite:S167

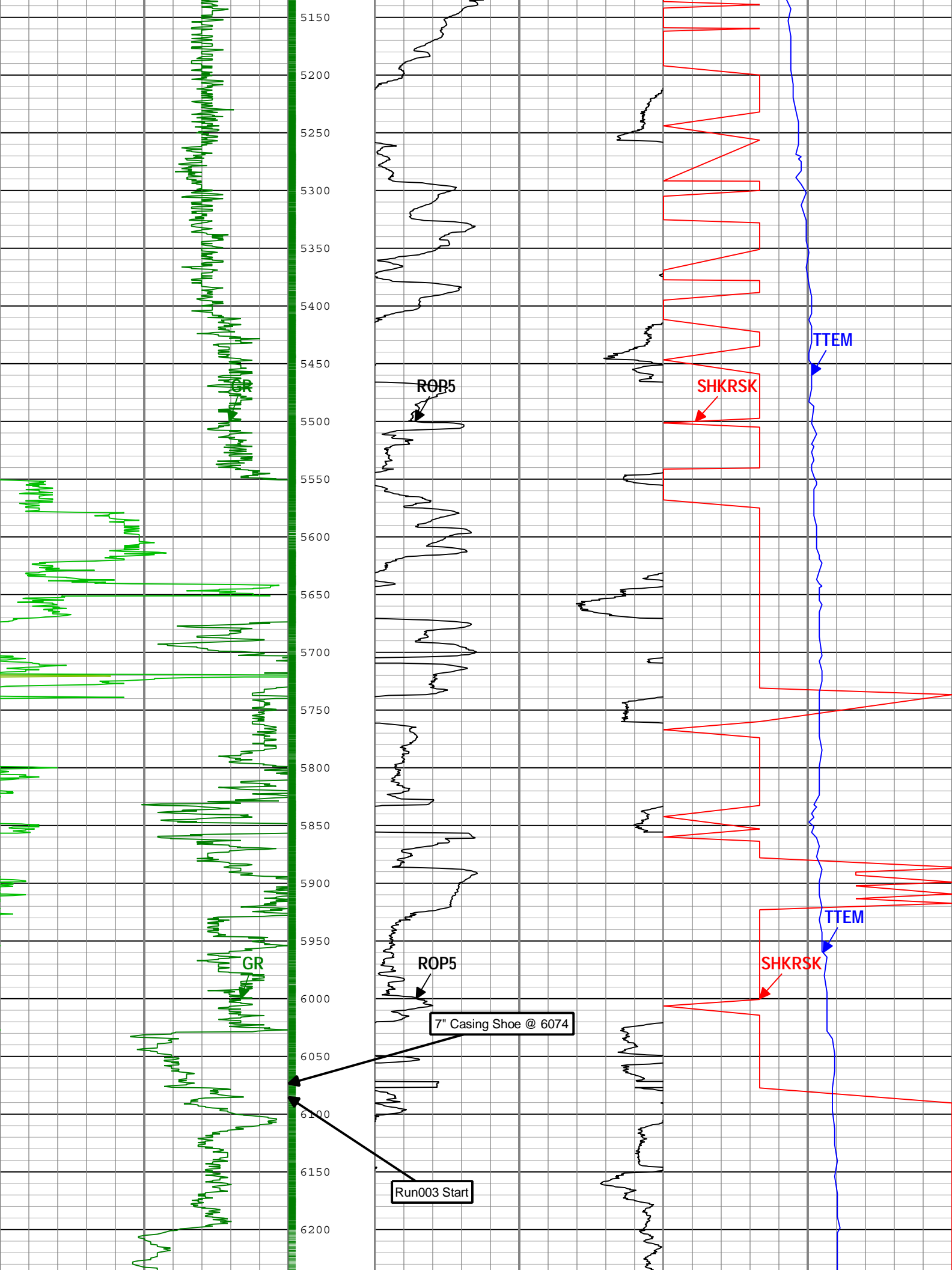
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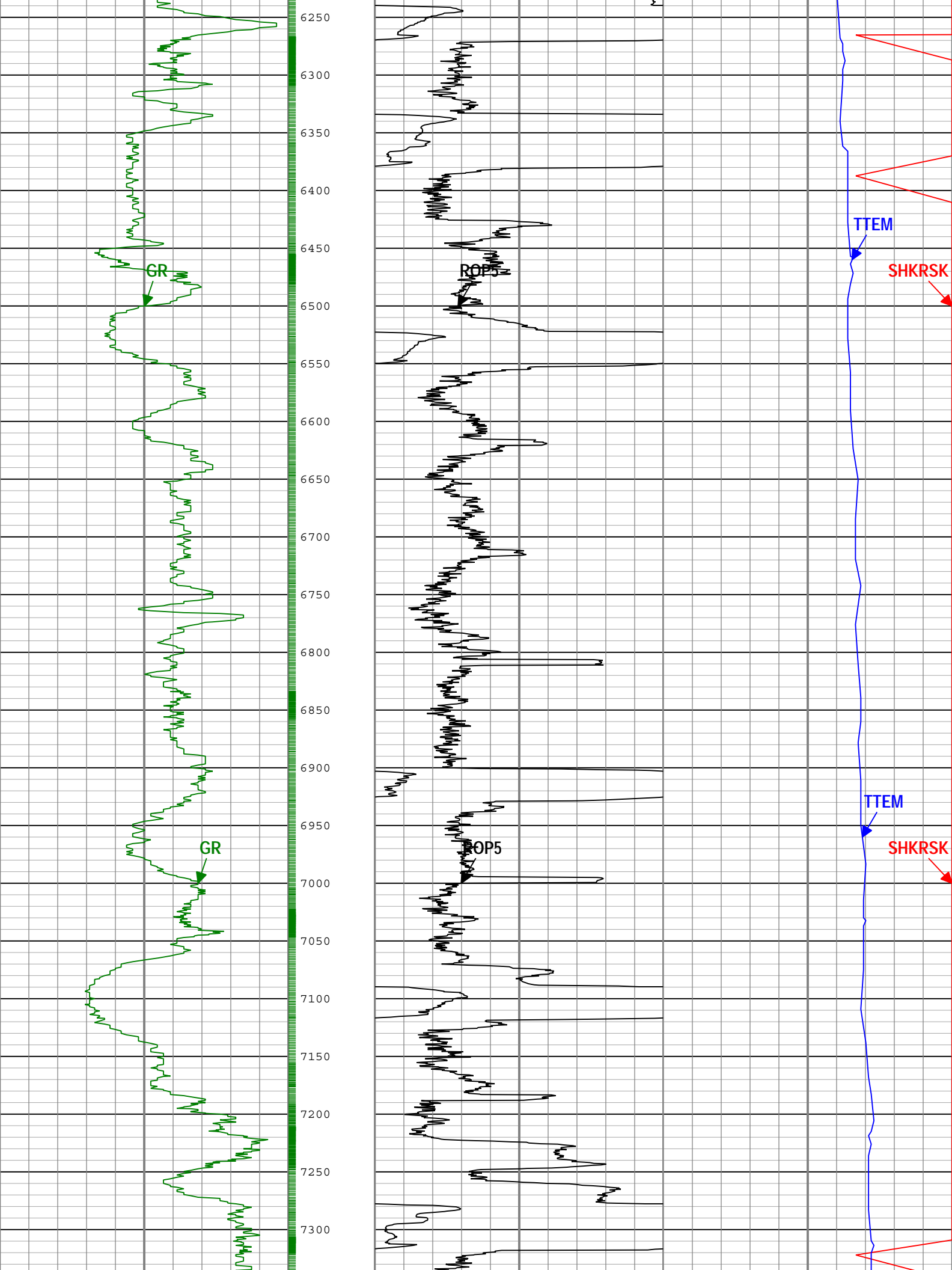


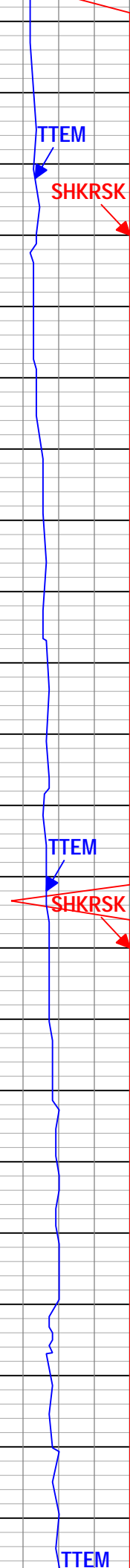
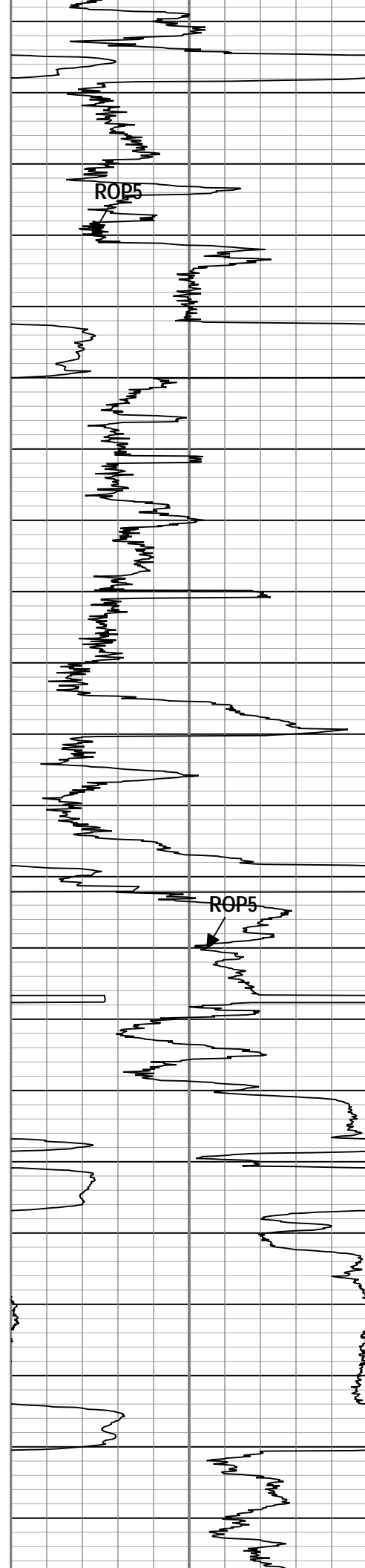
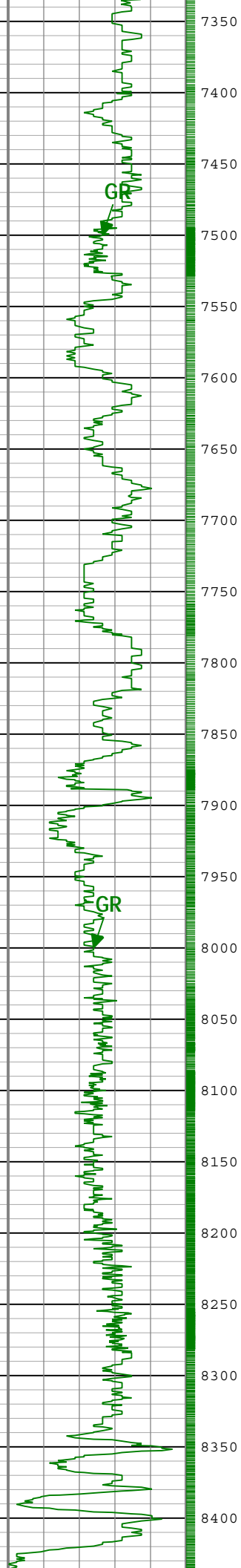


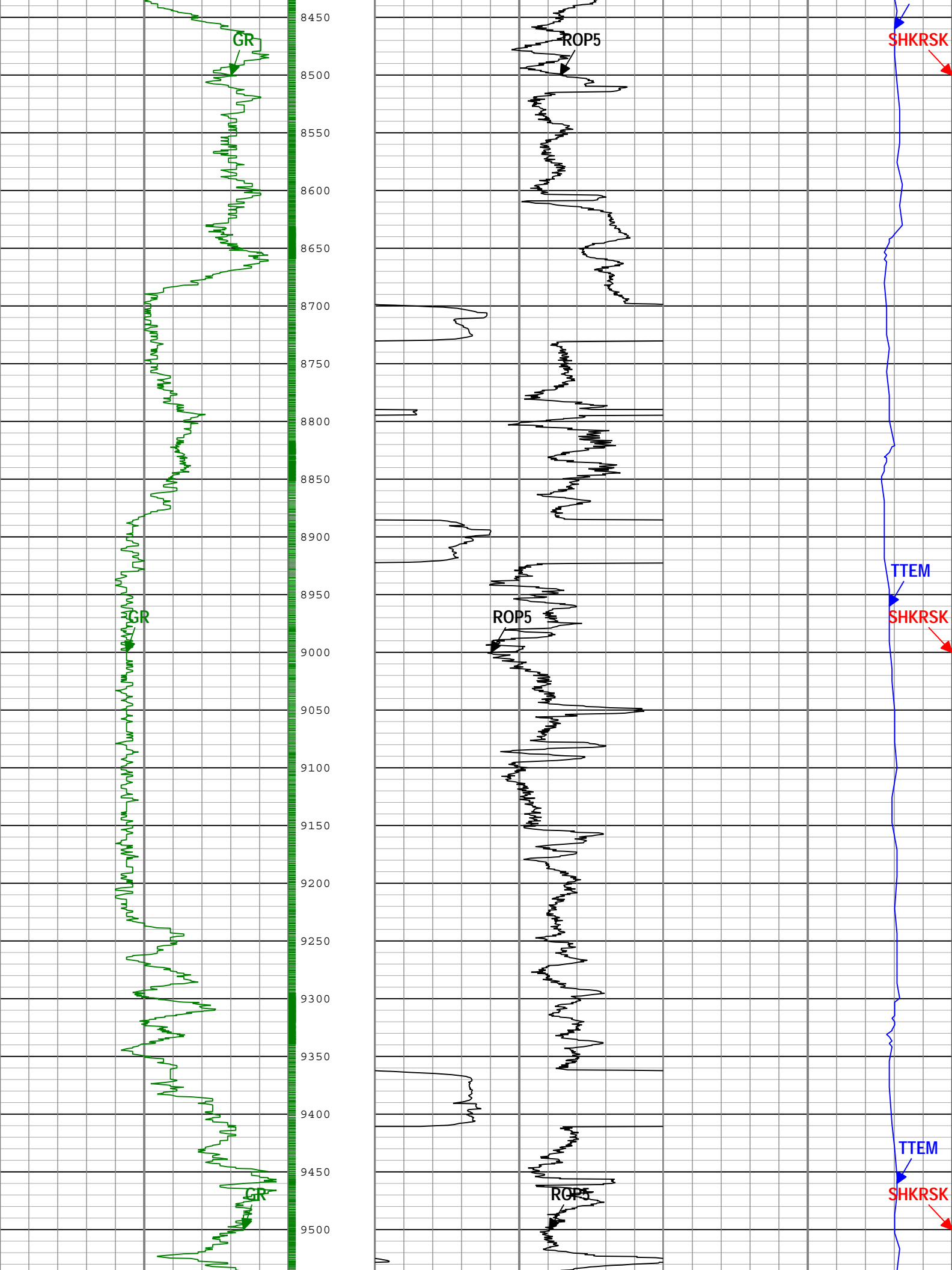


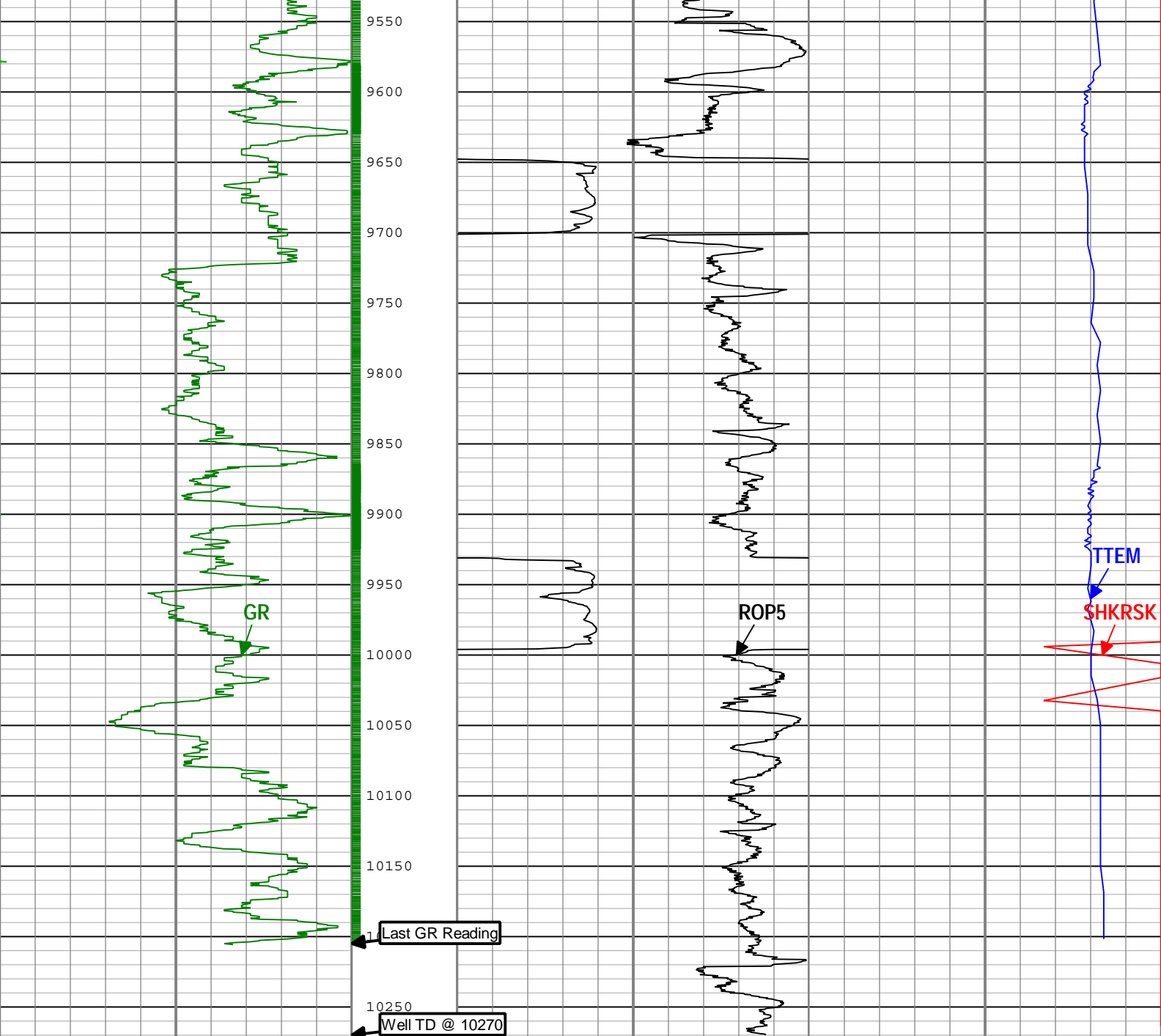












Gamma Ray (GR) SlimPulse[1] RM		
0	gAPI	150
Gamma Ray (GR) SlimPulse[1] RM		
150	gAPI	300
Gamma Ray (GR) SlimPulse[1] RM		
300	gAPI	450
Gamma Ray (GR) SlimPulse[1] RM		
450	gAPI	600
Gamma Ray (GR) SlimPulse[1] RM		
600	gAPI	750

Rate of penetration averaged over the last 5 ft (1.5 m) (ROP5) RT	
500	ft/h
	150

Shock Risk (SHKRSK) SlimPulse[1] RT	
3	0
Tool Temperature (TTEM) SlimPulse[1] RM	
50	degF
	250

└ 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: 25-Sep-2014 16:08:13

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	1174	1223
BS	8.75	1223	5133

All depth are actual.

Run001Time Zoned Parameters

Pass Drilling

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	9	26-Aug-2014 00:59:17	26-Aug-2014 03:00:00	1223.25	1674.92
DFD	8.65	26-Aug-2014 03:00:00	26-Aug-2014 13:00:00	1674.92	3729
DFD	8.85	26-Aug-2014 13:00:00	26-Aug-2014 23:19:28	3729	5133

All depth are at tool zero.

Run002: Parameters

Parameter	Description	Tool	Value	Unit
BS	Bit Size	DNMSESSION	8.75	in
DFD	Drilling Fluid Density	Borehole	Time Zoned	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

Run002Time Zoned Parameters

Pass Drilling

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	9.35	27-Aug-2014 08:19:52	27-Aug-2014 14:00:00	5130	5465.58
DFD	10.5	27-Aug-2014 14:00:00	28-Aug-2014 07:16:20	5465.58	6086.75

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	Time Zoned	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

Run003Depth Zoned Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	8.75	5919.51	6086
BS	6.125	6086	10270

All depth are actual.

Run003Time Zoned Parameters

Pass Drilling

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	9.7	29-Aug-2014 16:29:47	30-Aug-2014 03:00:00	6000.33	7406
DFD	9.9	30-Aug-2014 03:00:00	30-Aug-2014 13:00:00	7406	8709.83
DFD	9.7	30-Aug-2014 13:00:00	31-Aug-2014 03:00:00	8709.83	9937.5
DFD	9.75	31-Aug-2014 03:00:00	31-Aug-2014 16:03:32	9937.5	10272.25

All depth are at tool zero.

Tool Control Parameters

Well Composite

5 in / 100 ft Measured Depth

Composite Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Include Parallel Data
Run001	Drilling	Down	1223.25 ft	5133.00 ft	26-Aug-2014 12:59:17 AM	26-Aug-2014 11:19:28 PM	No
Run002	Drilling	Down	5130.00 ft	6086.75 ft	27-Aug-2014 8:19:52 AM	28-Aug-2014 7:16:20 AM	No
Run003	Drilling	Down	6000.33 ft	10272.25 ft	29-Aug-2014 4:29:47 PM	31-Aug-2014 4:03:32 PM	No

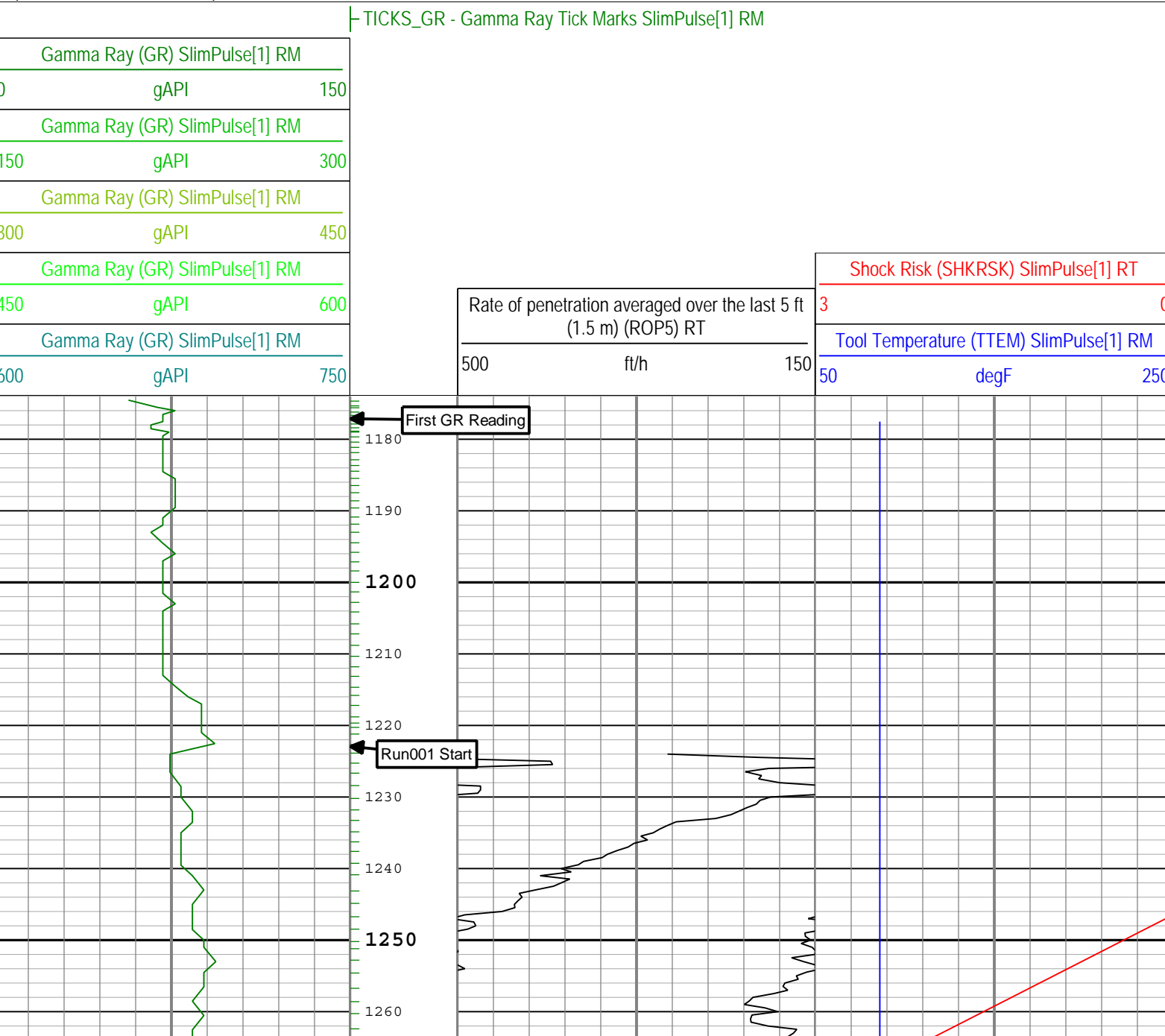
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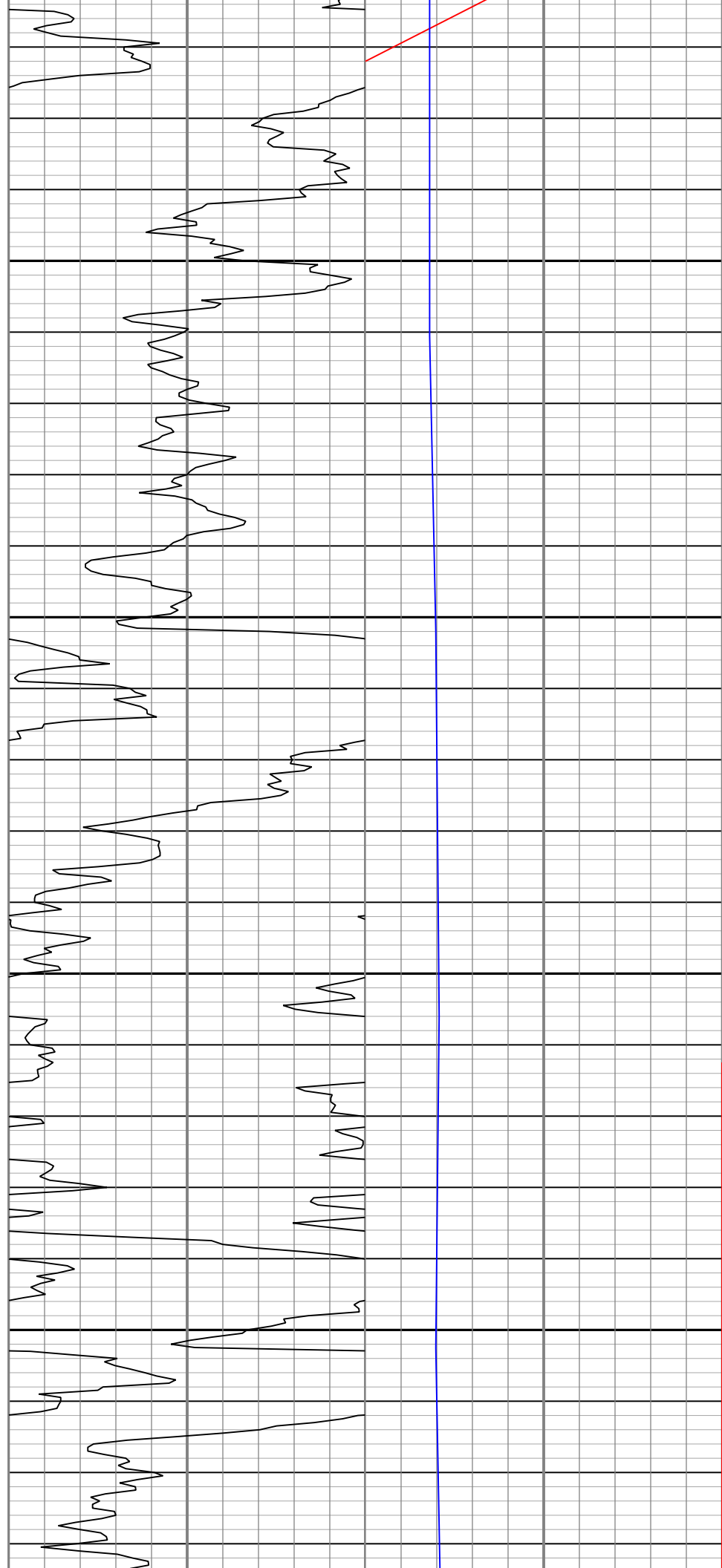
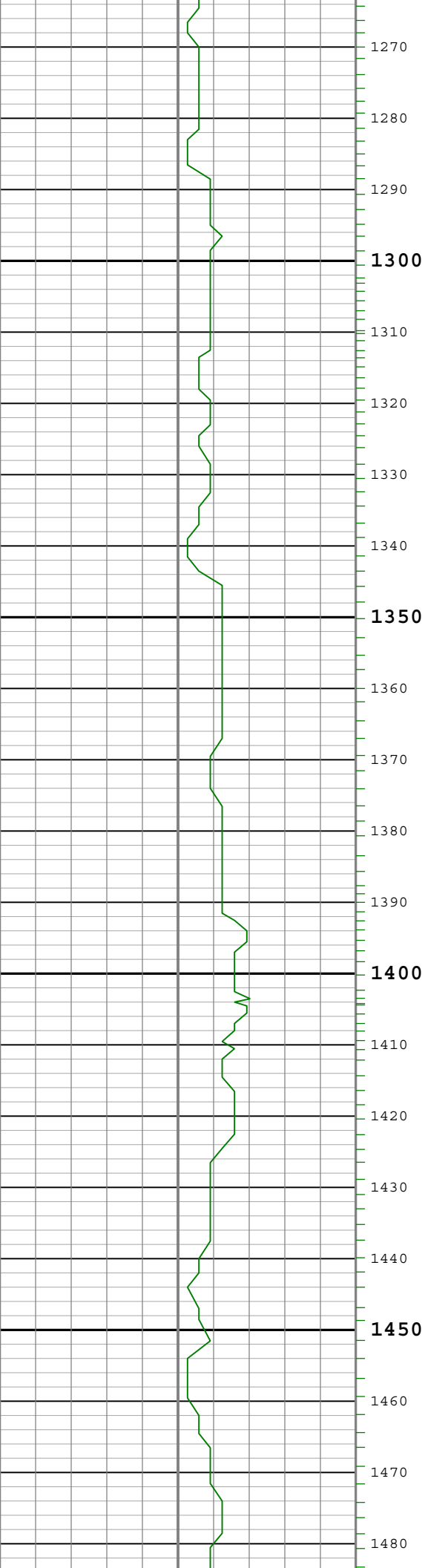
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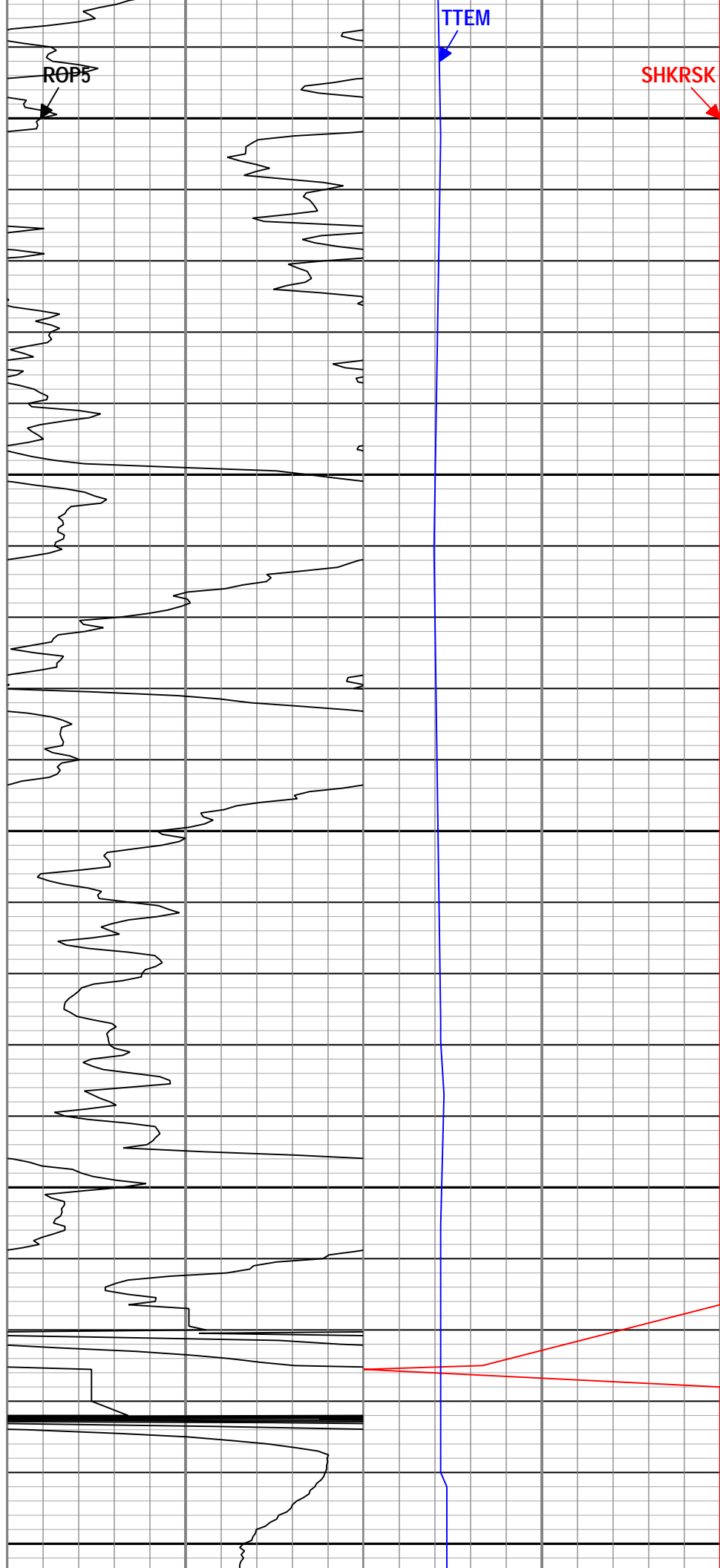
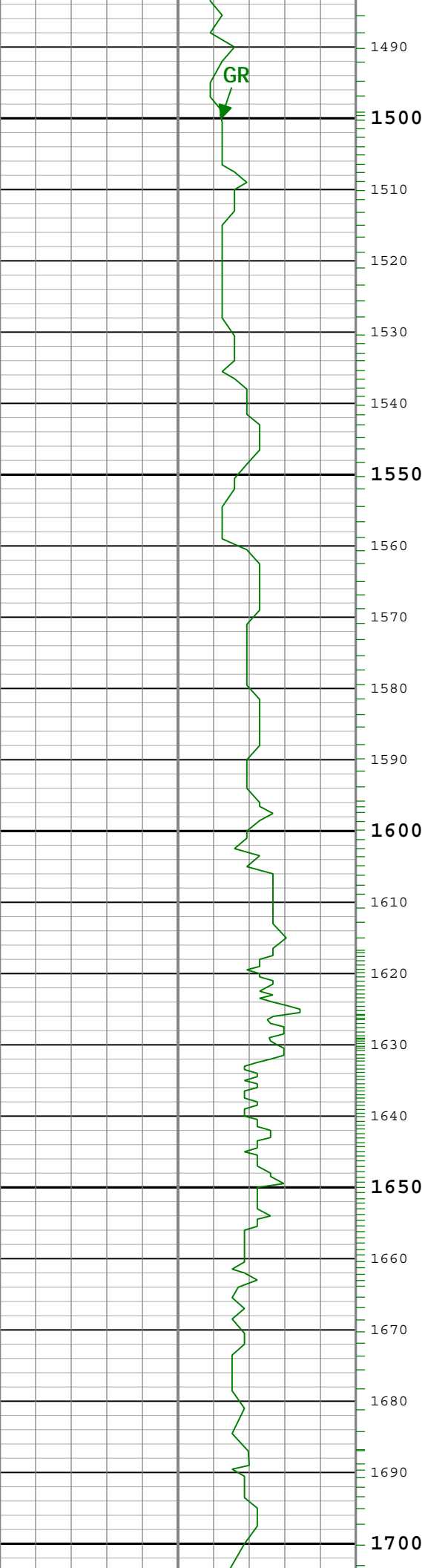
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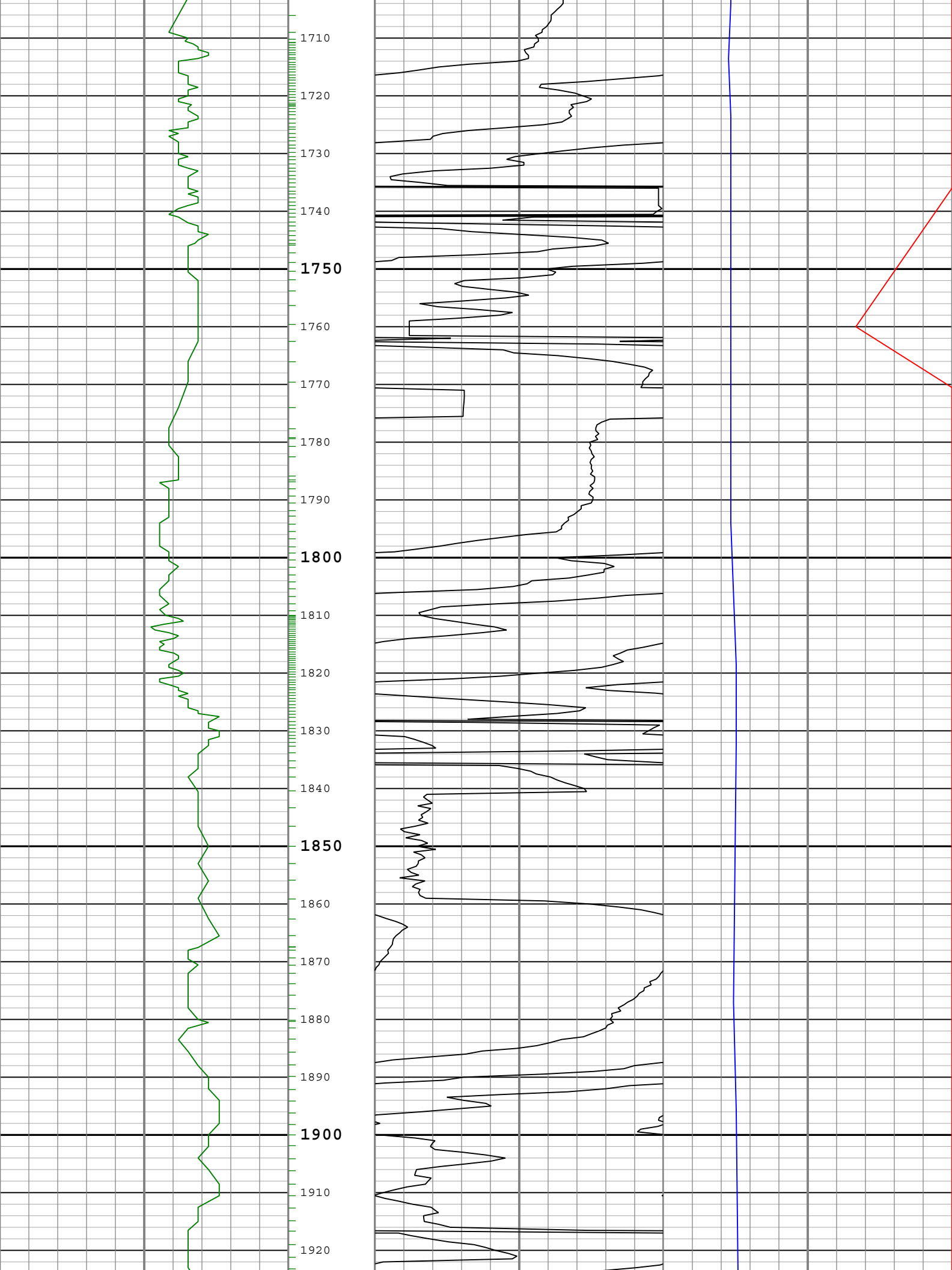
Well Composite:S167

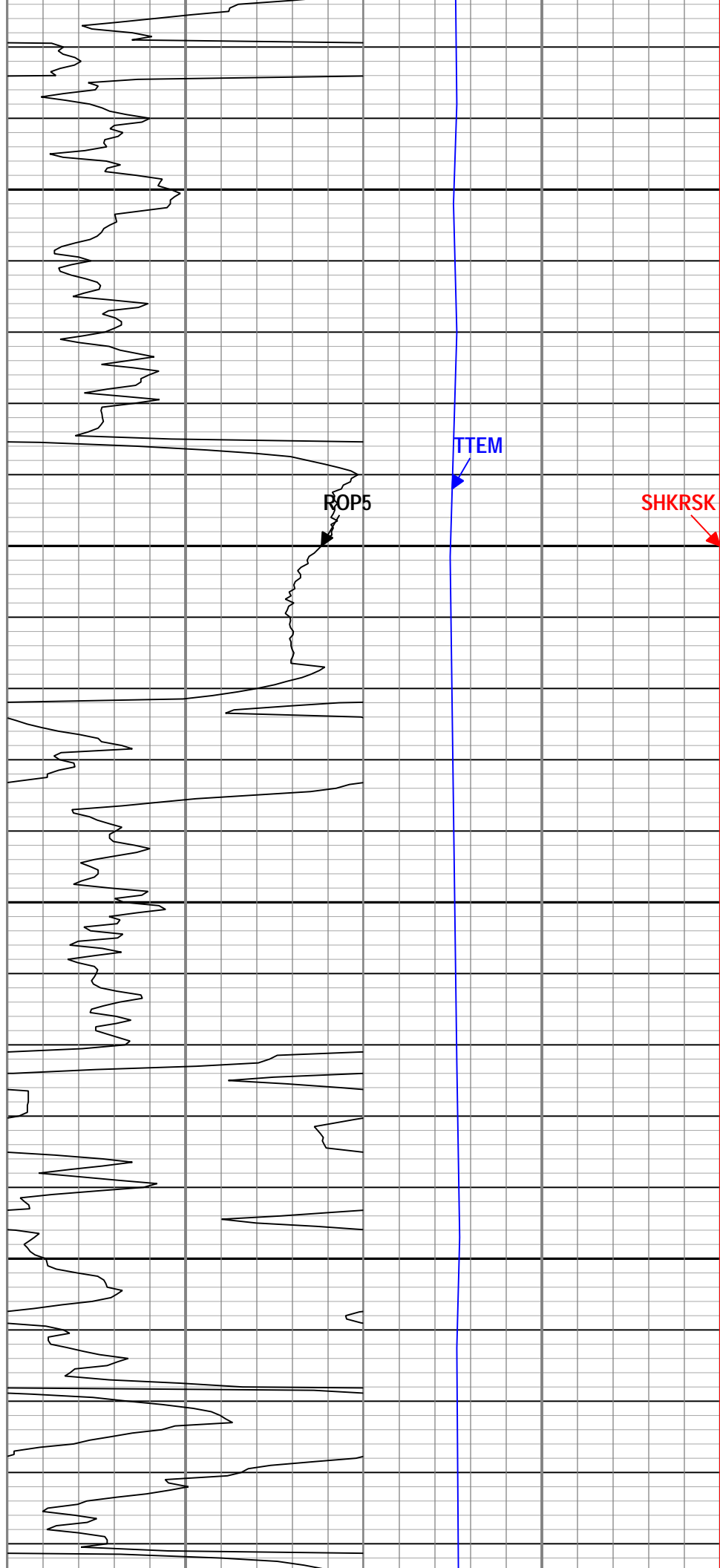
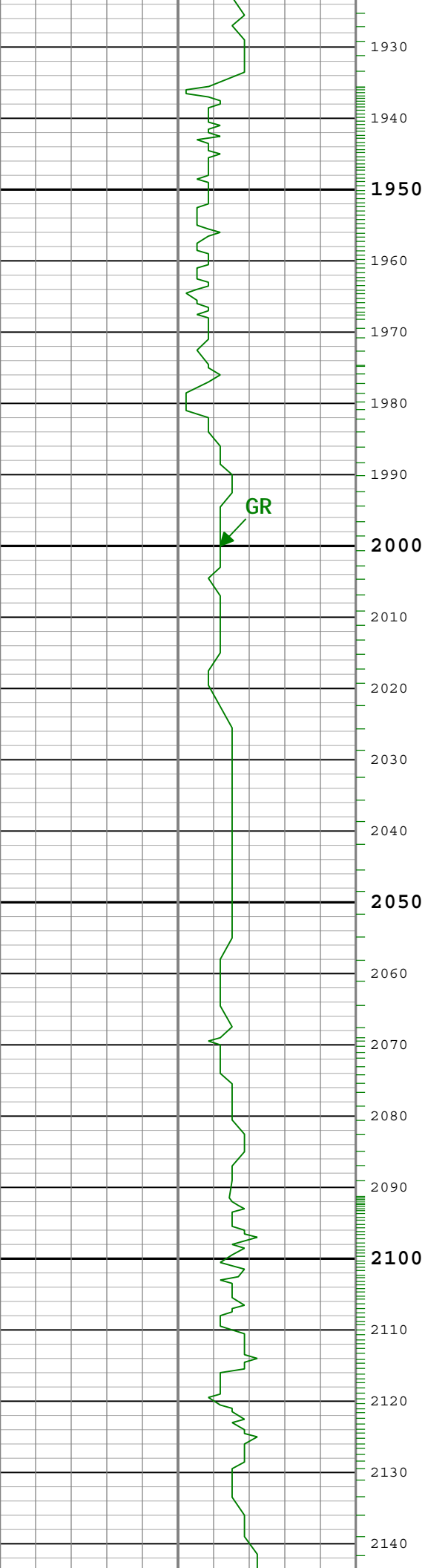
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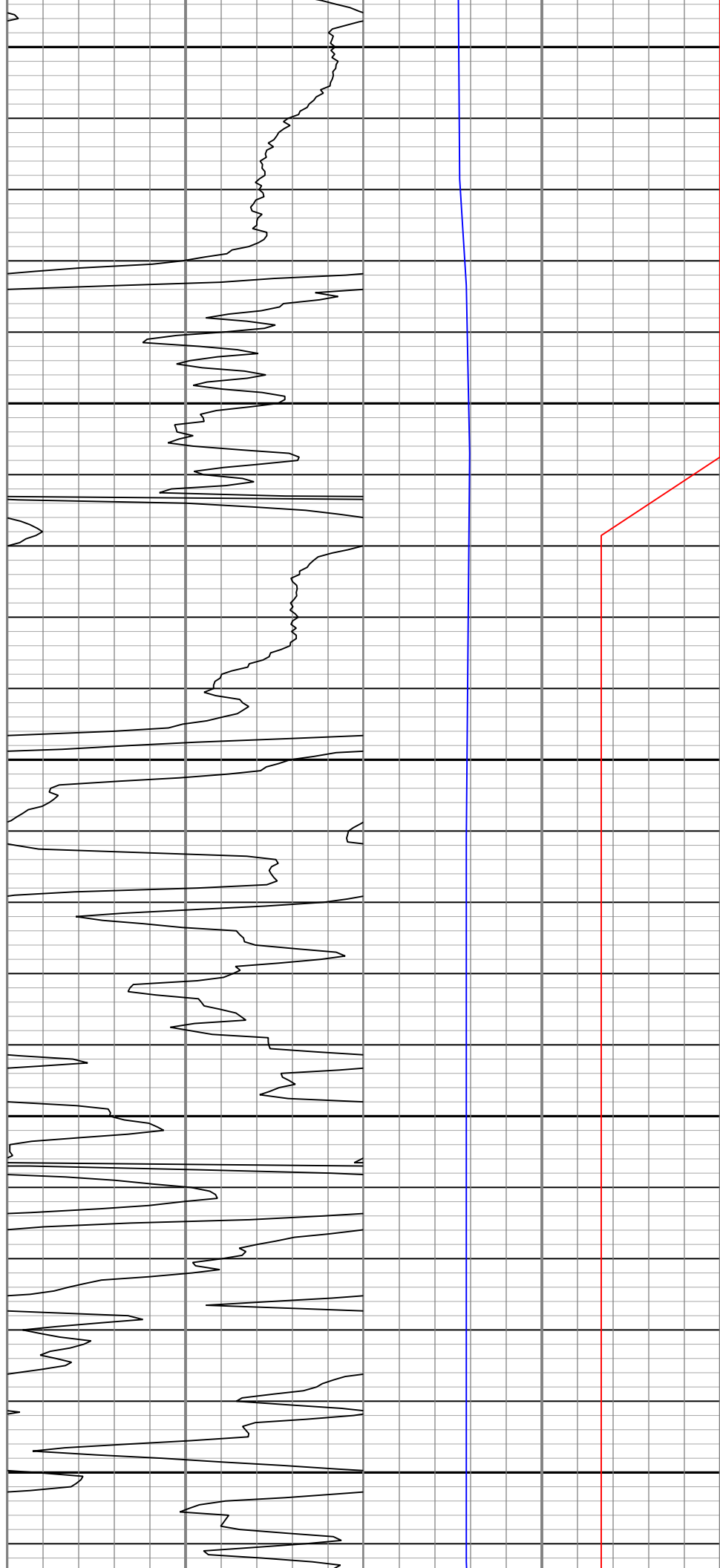
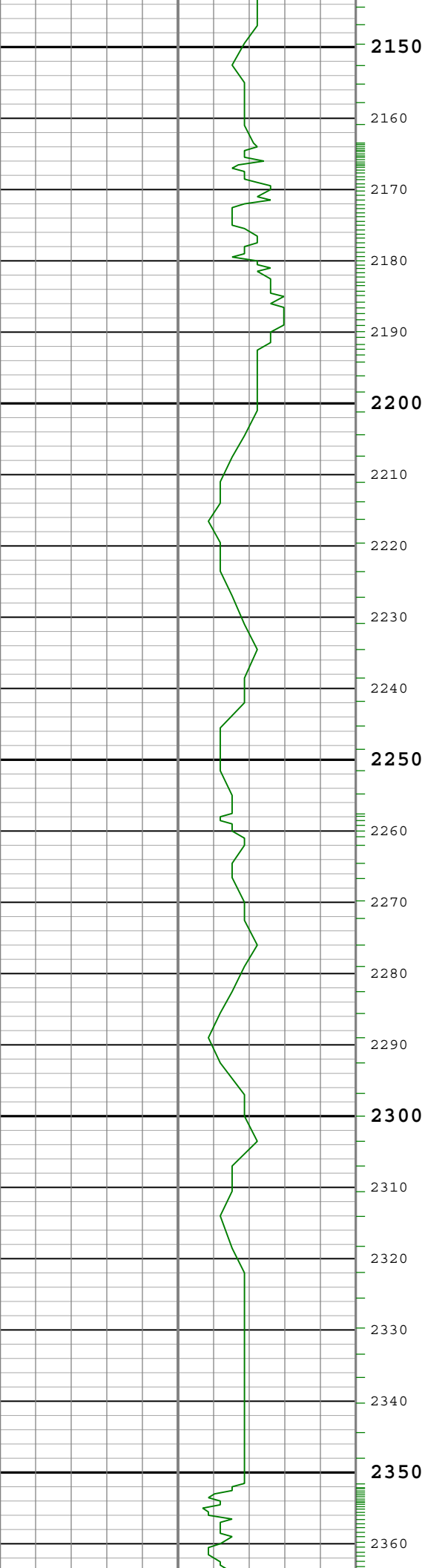


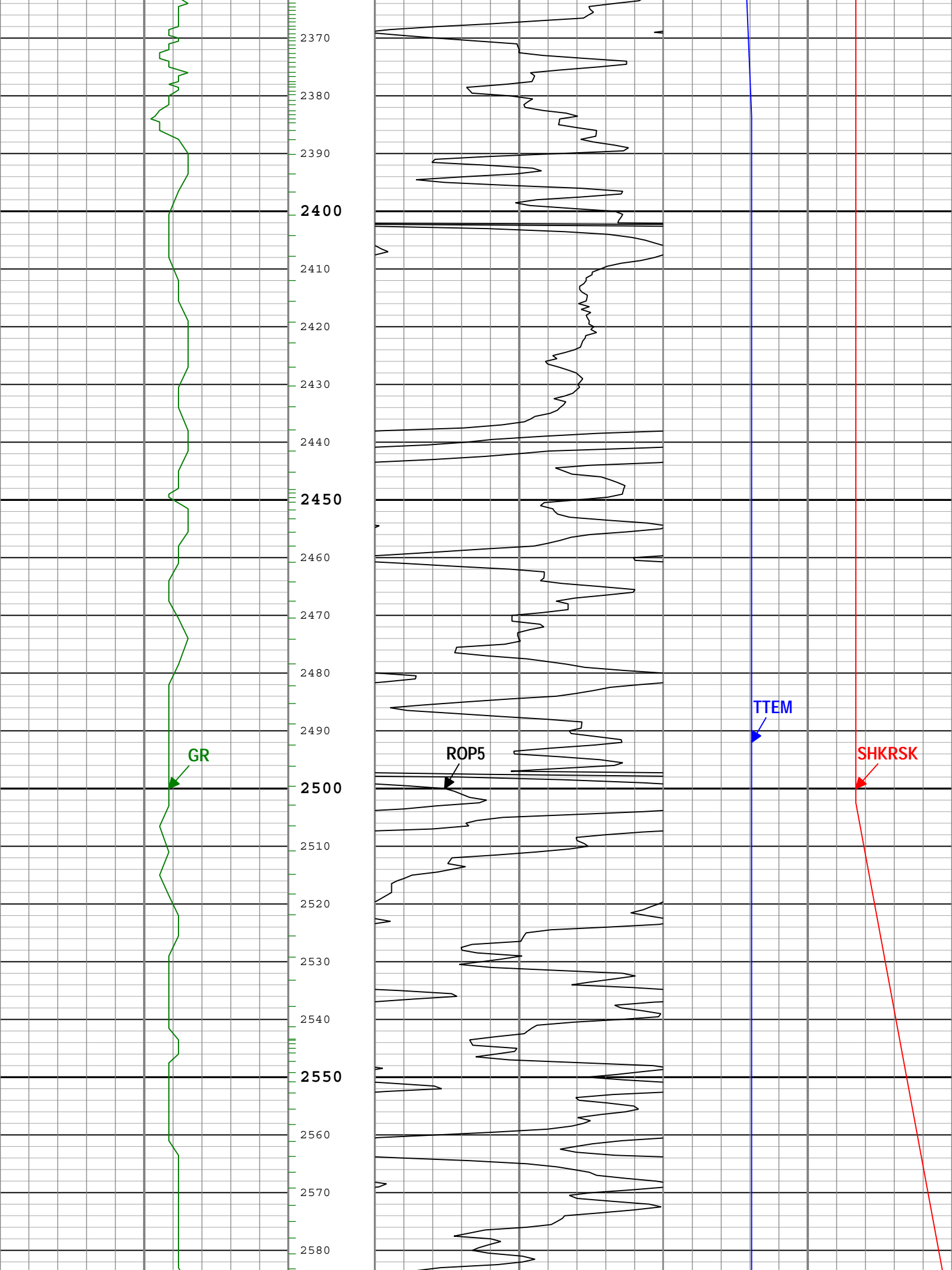


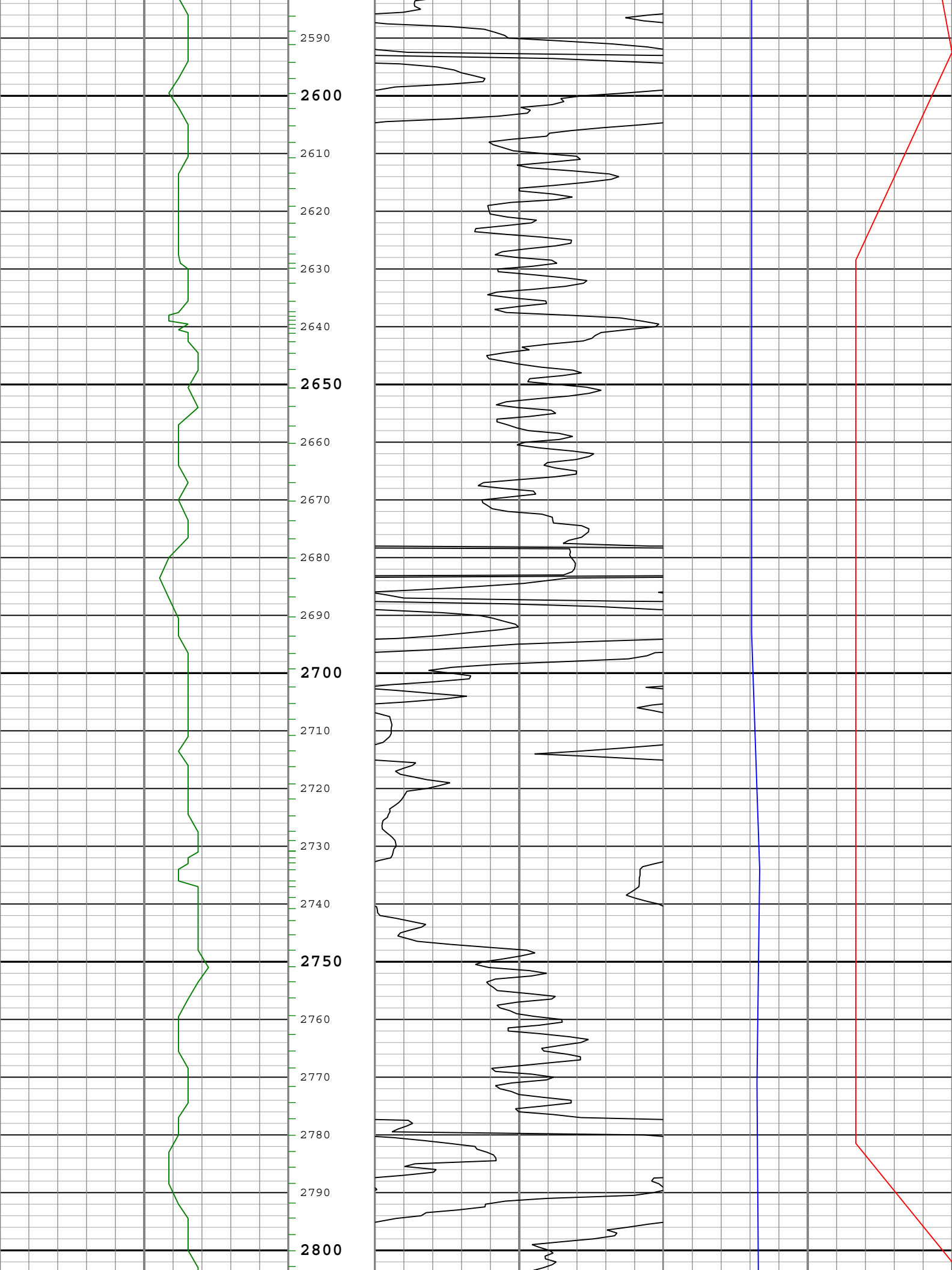


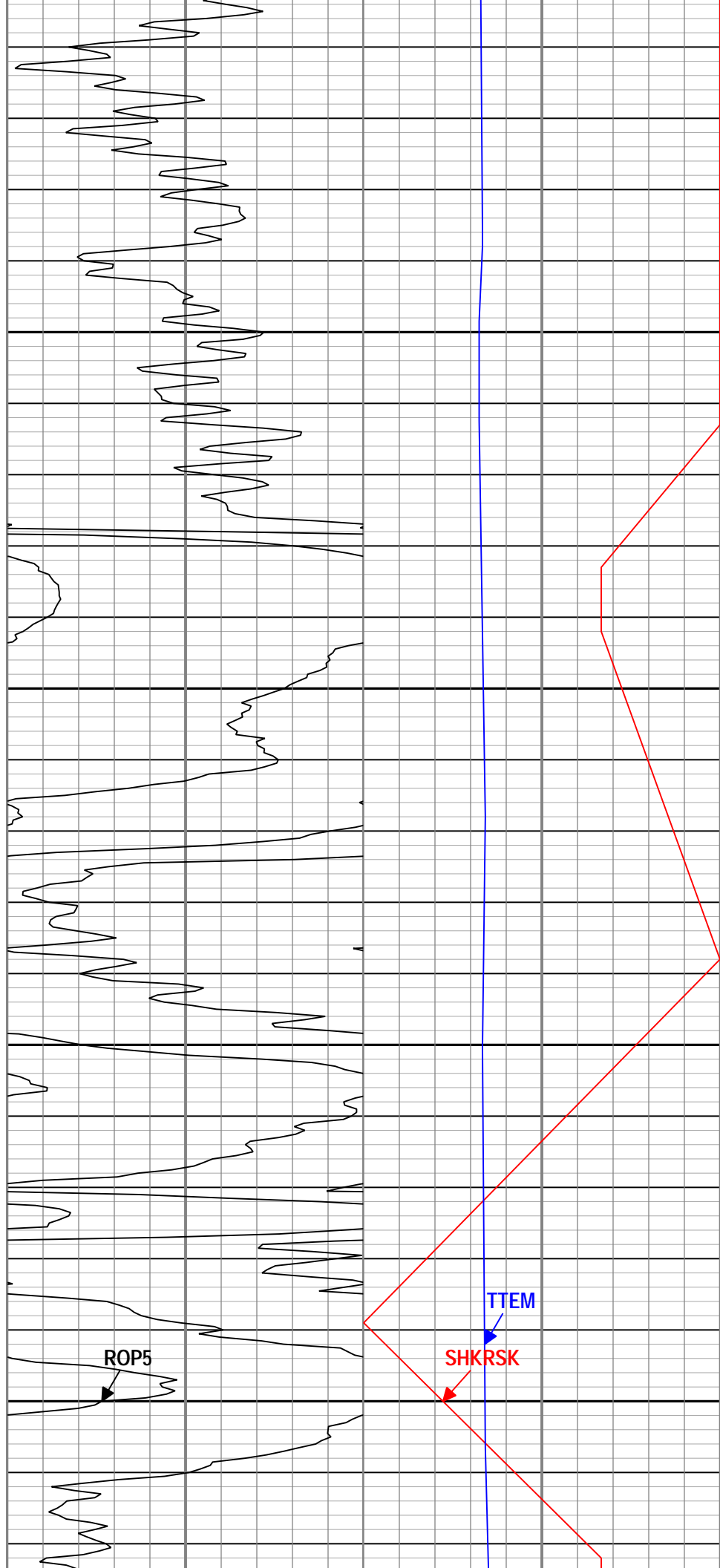
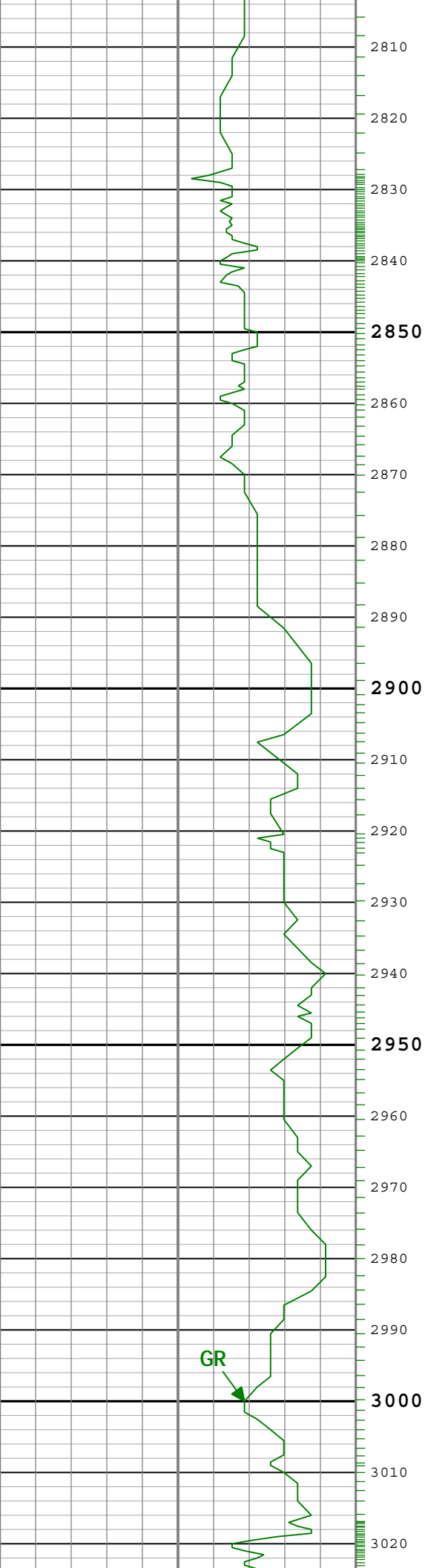


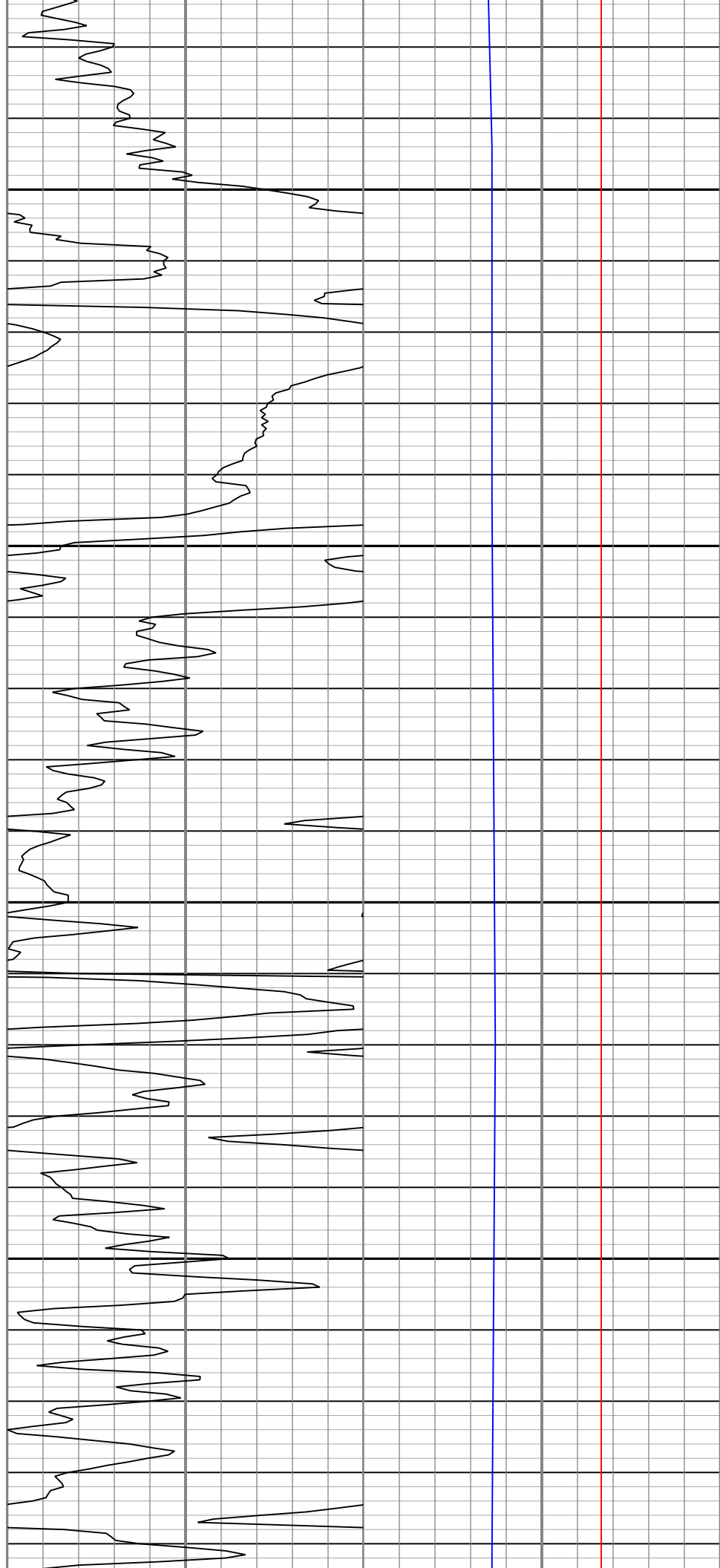
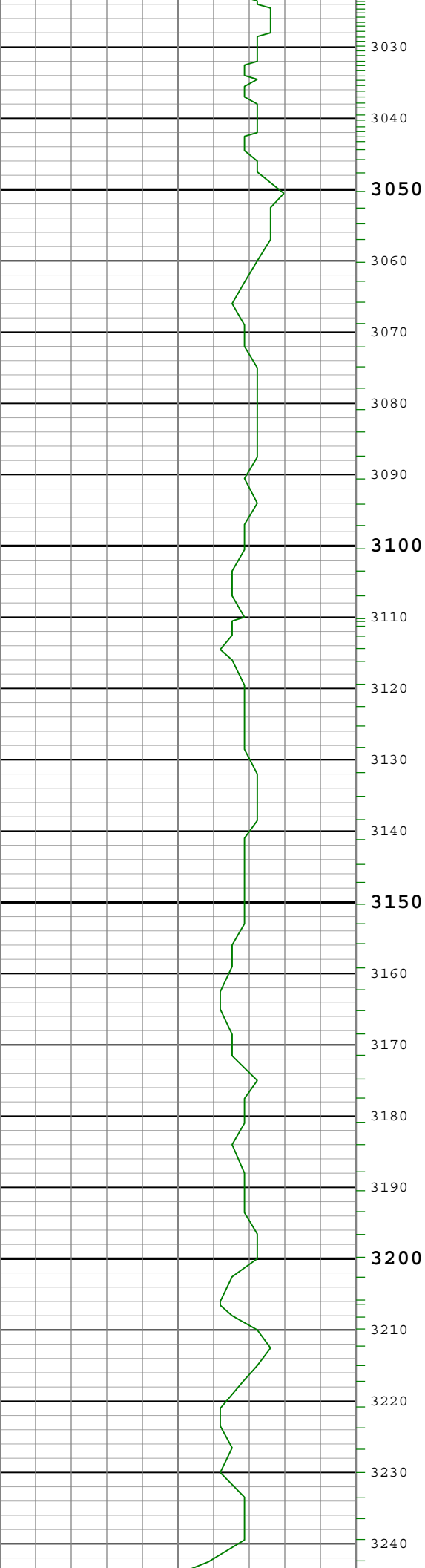


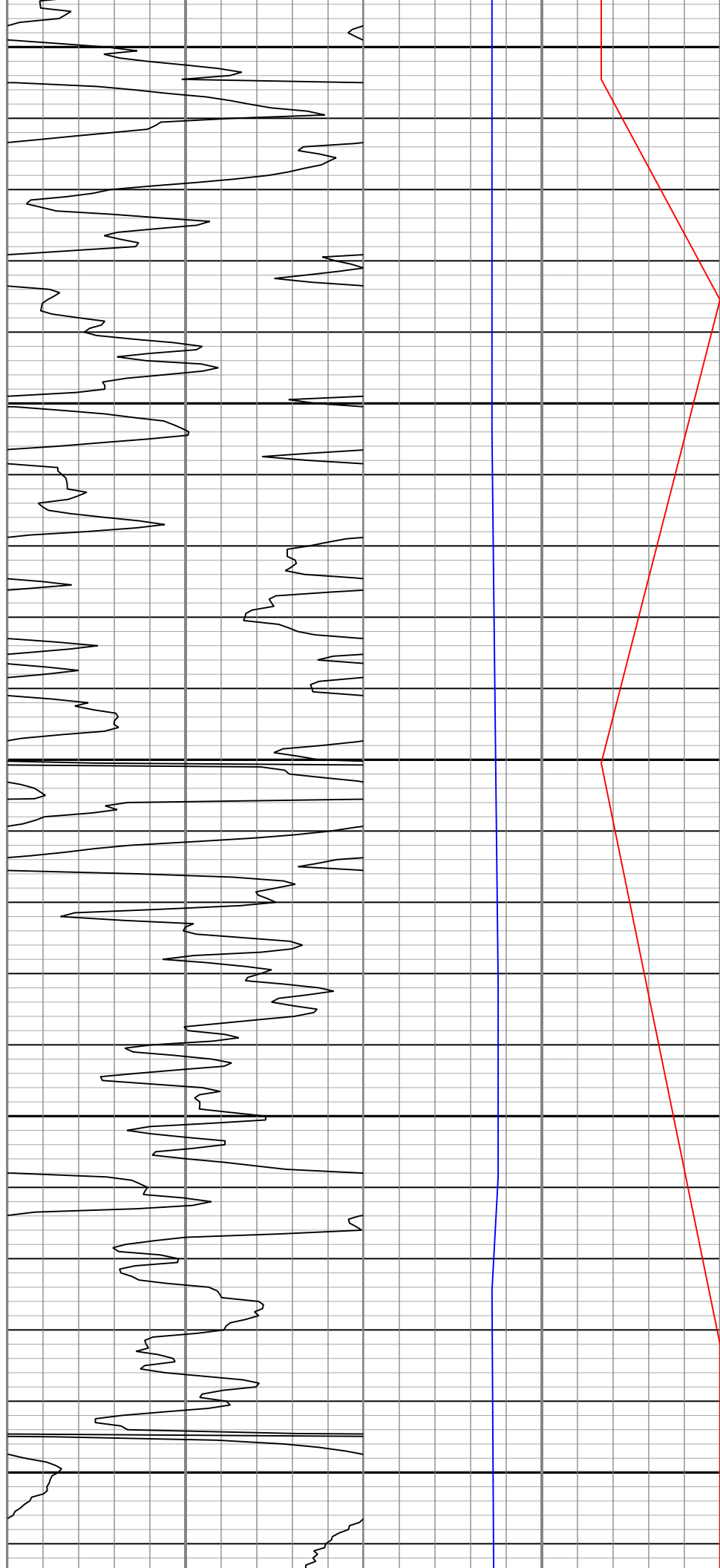
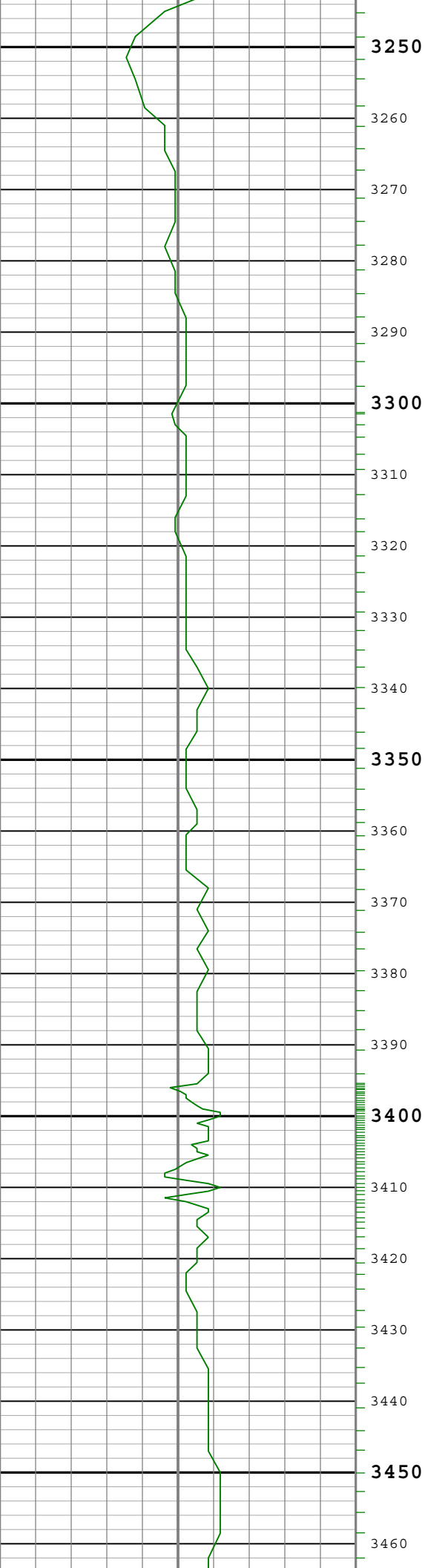


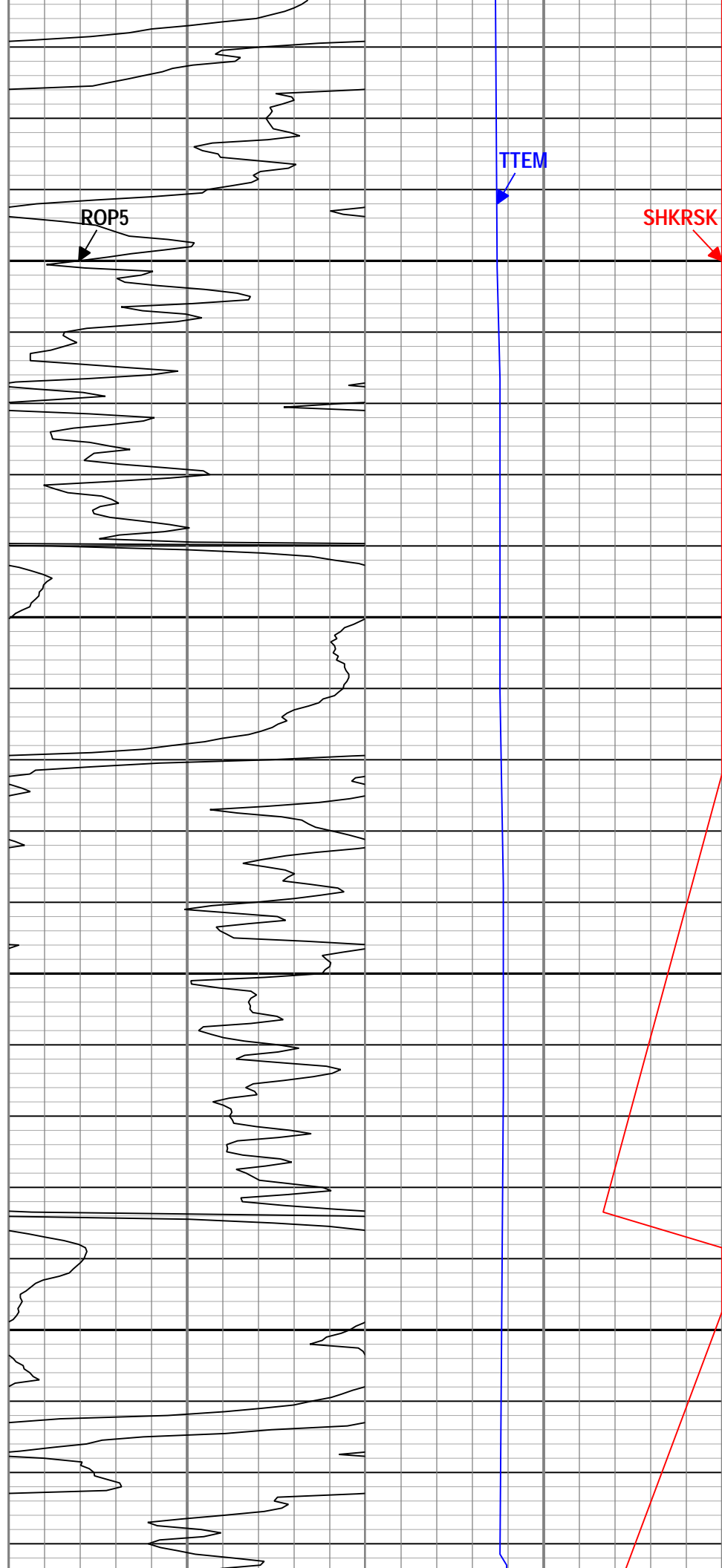
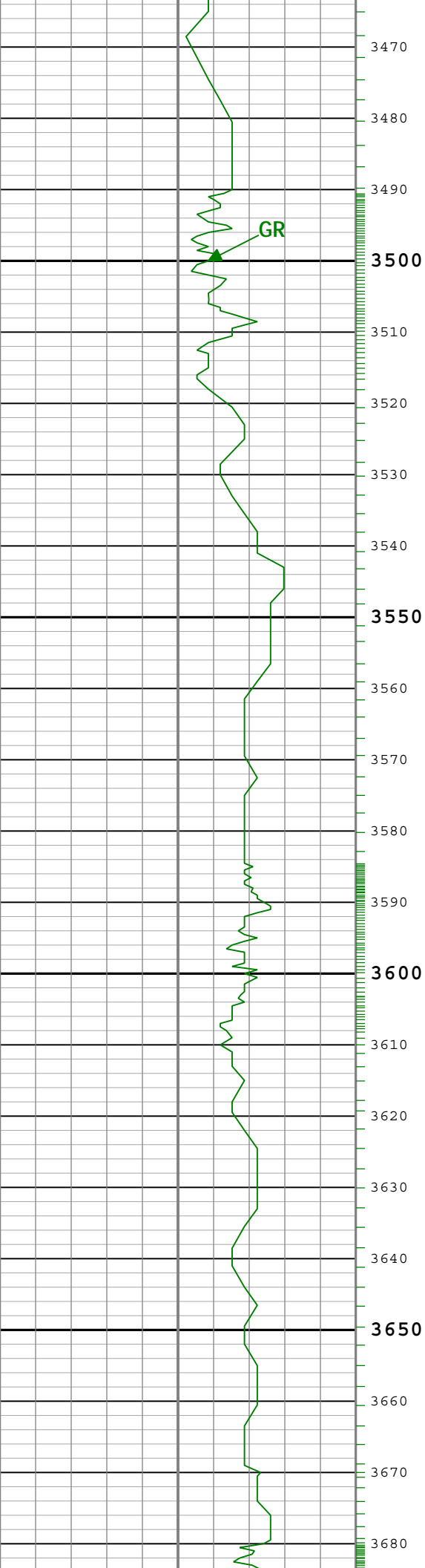


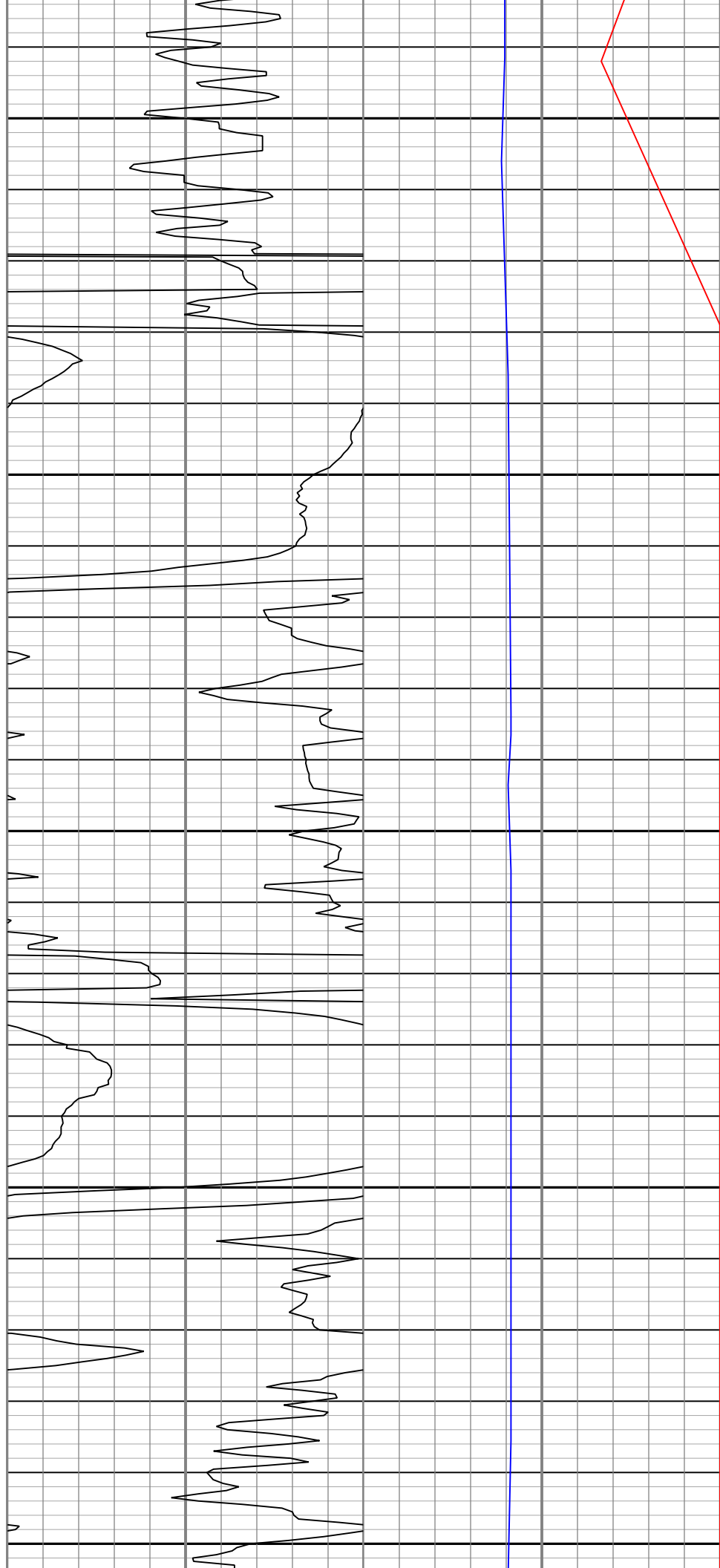
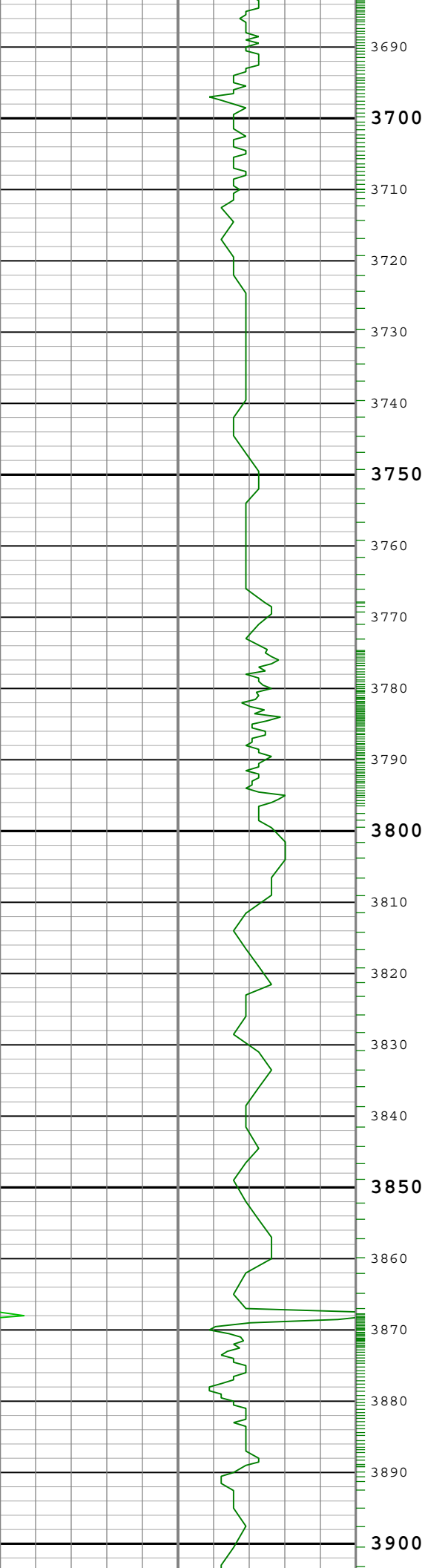


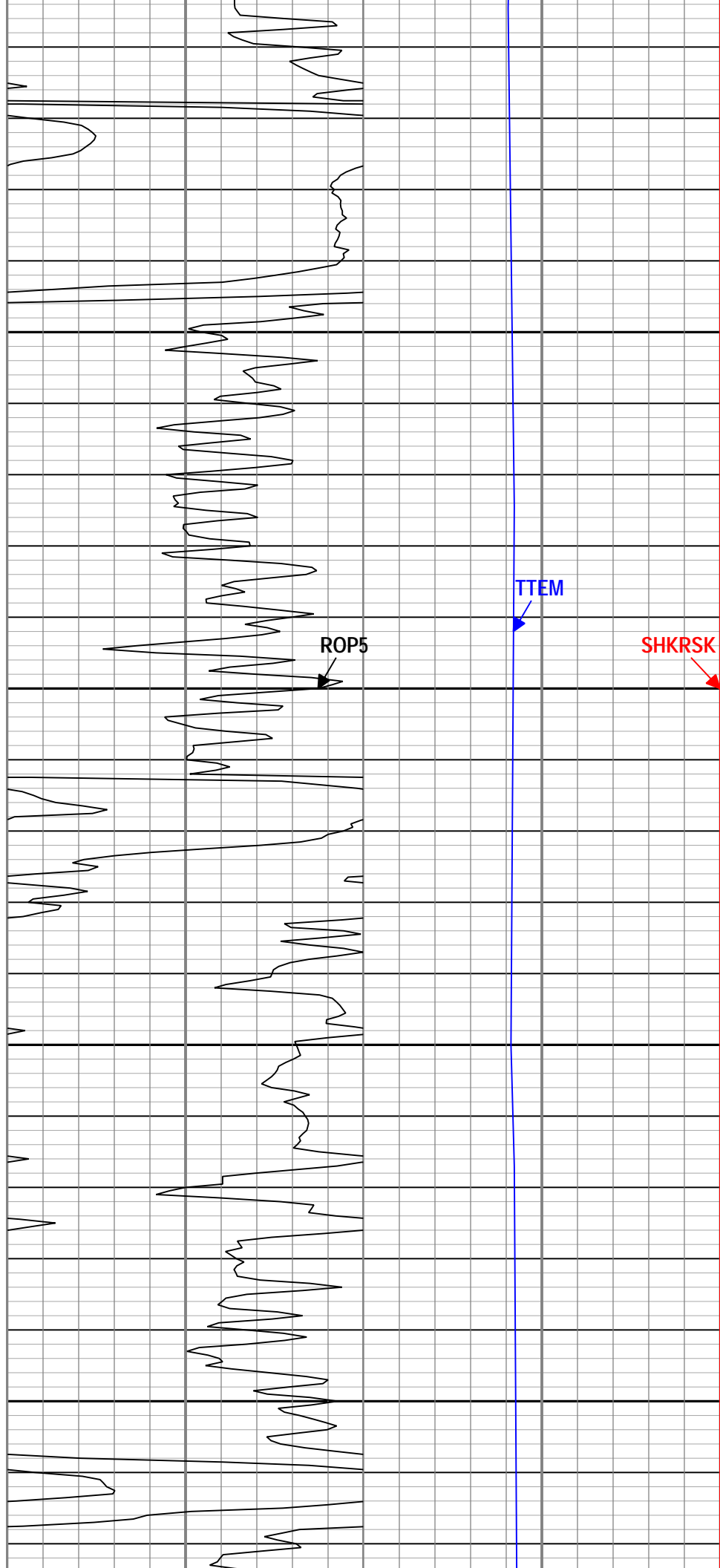
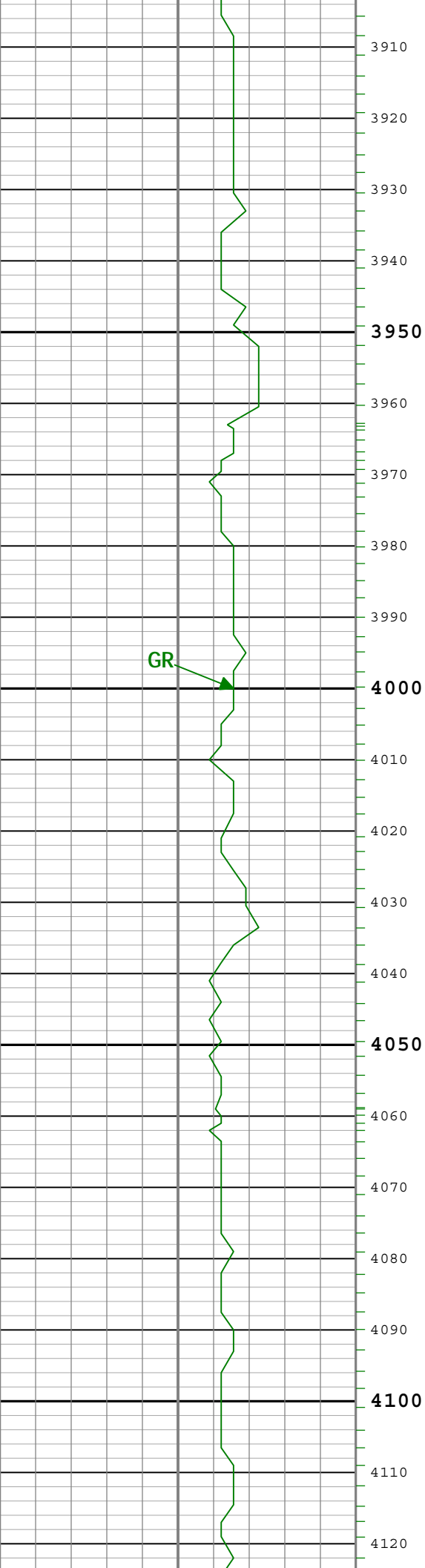


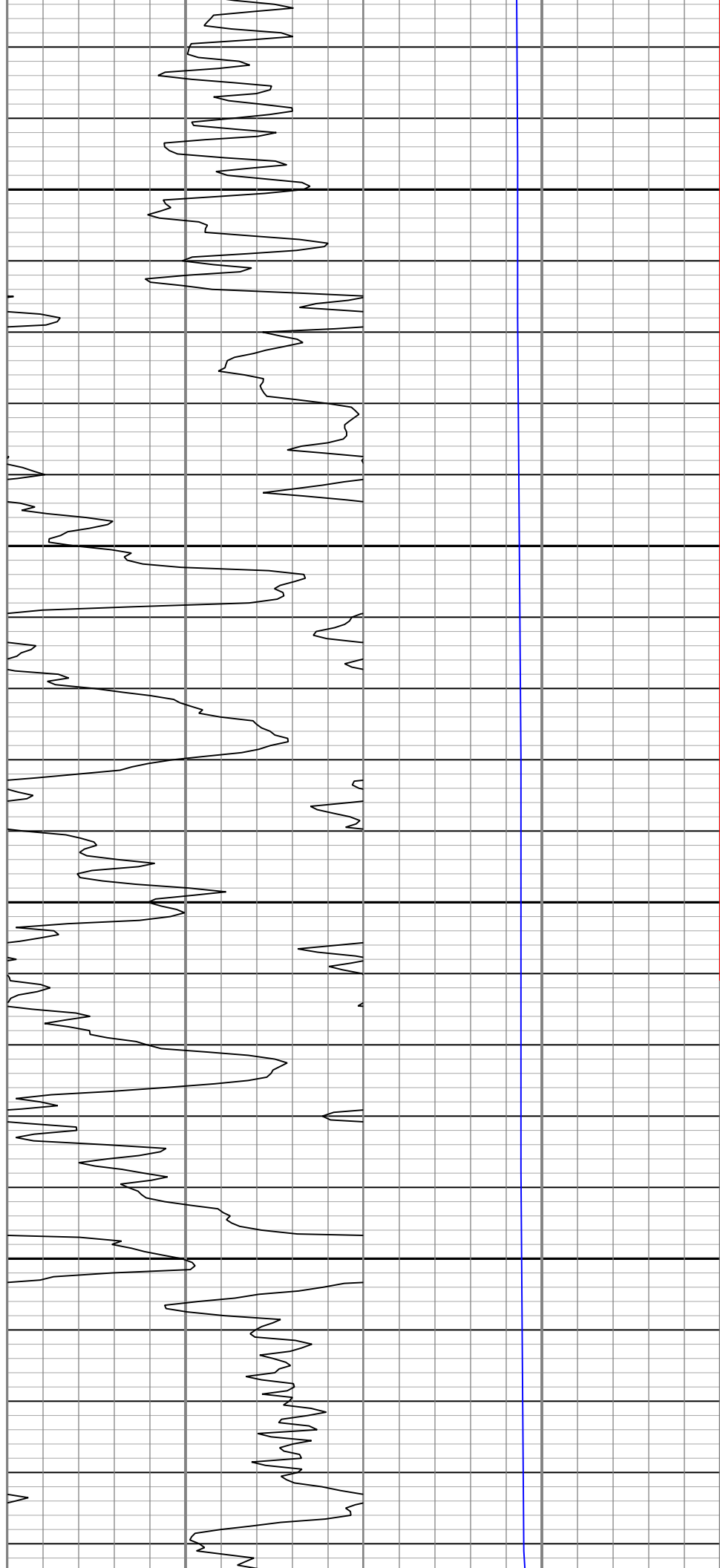
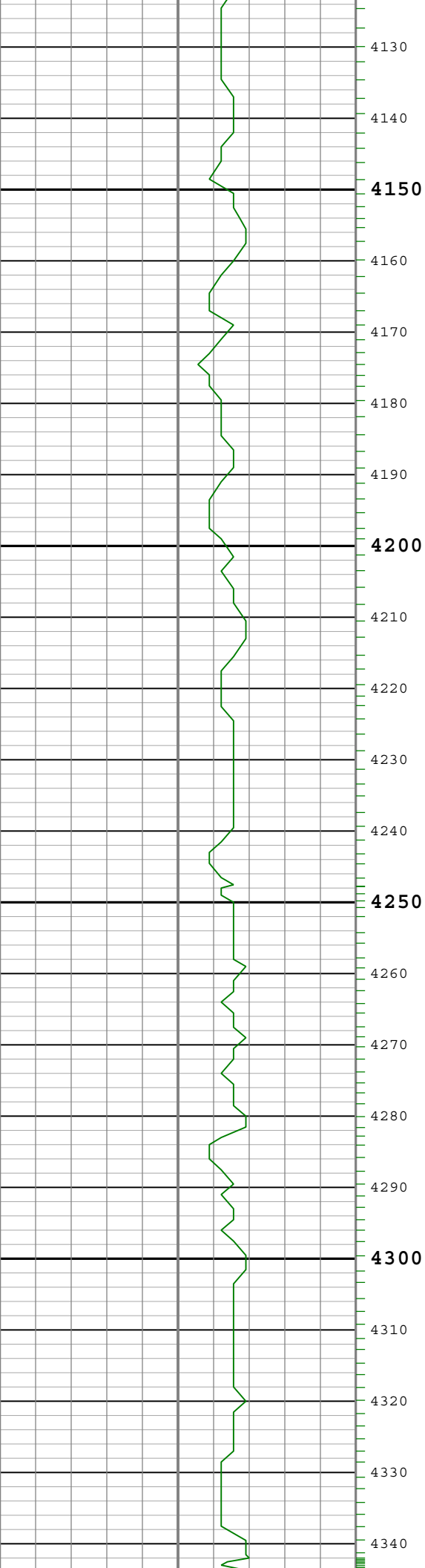


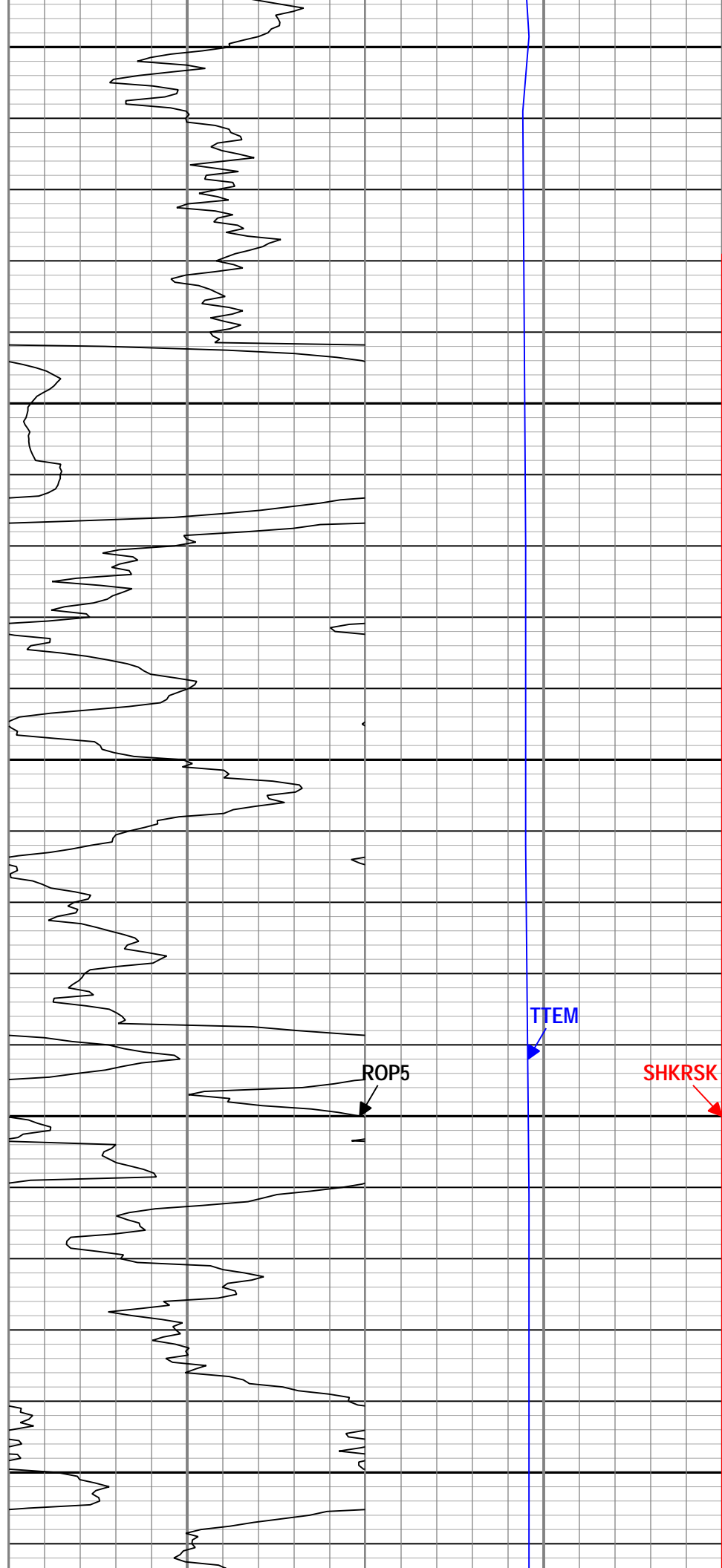
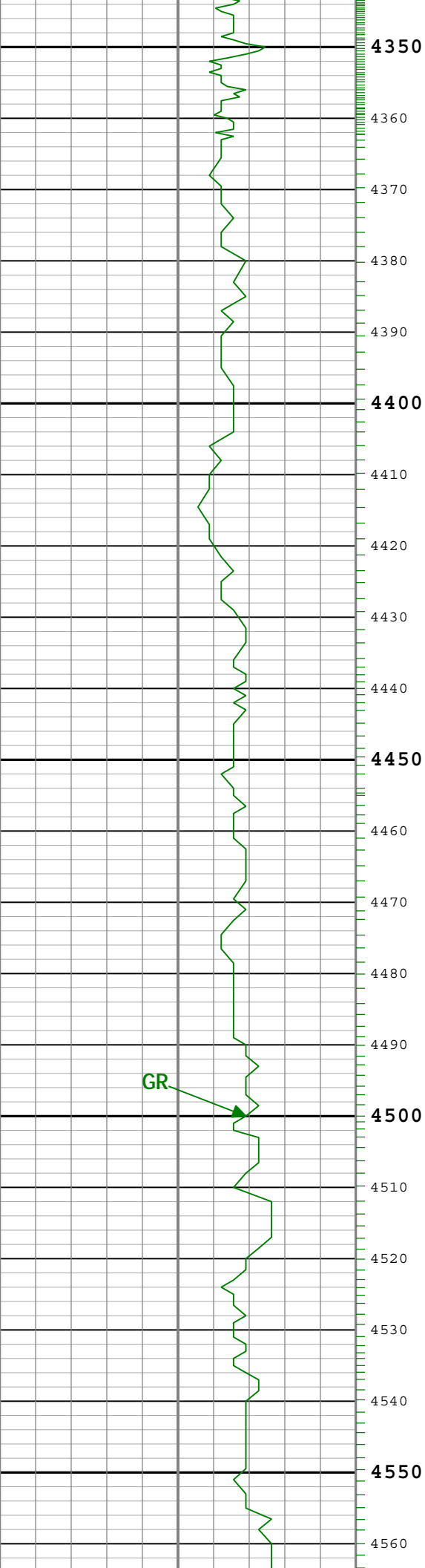


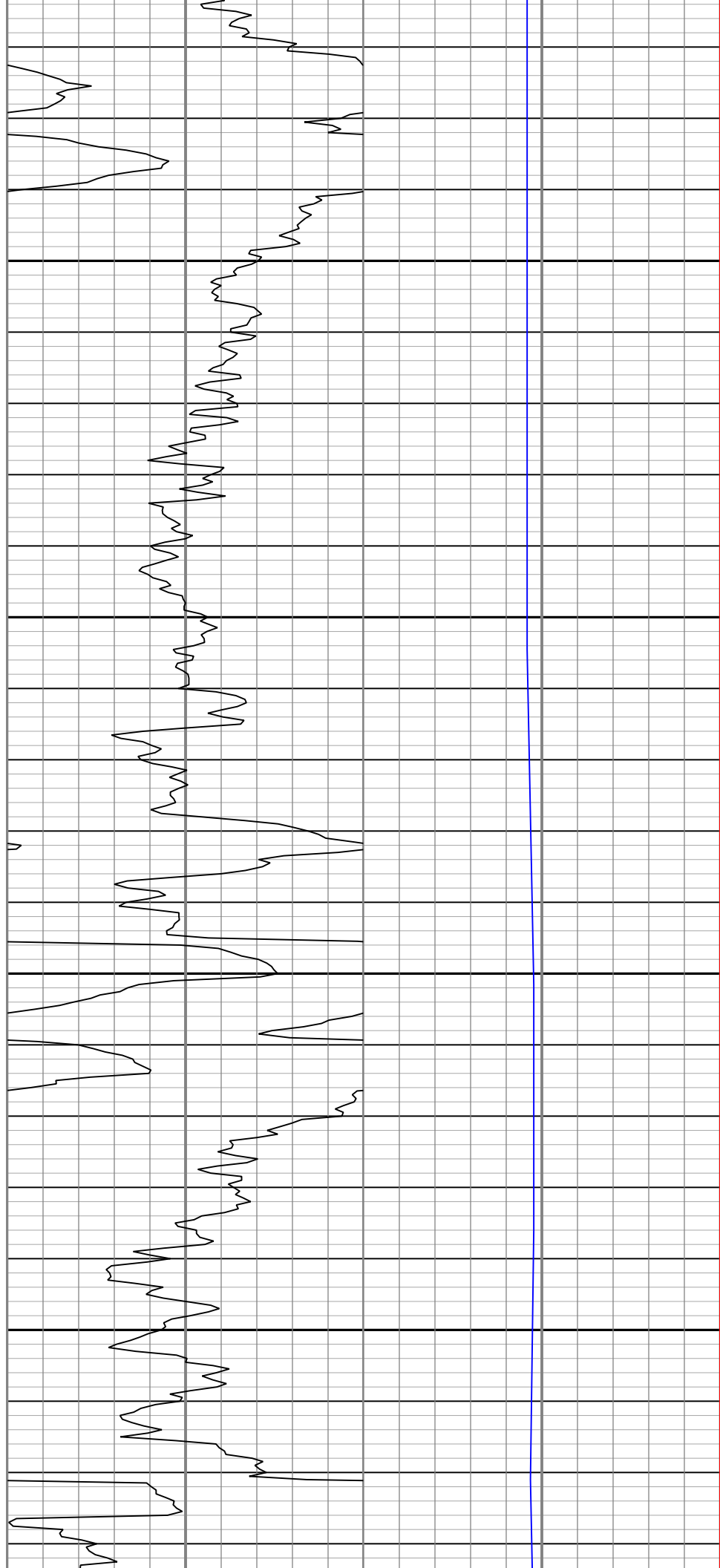
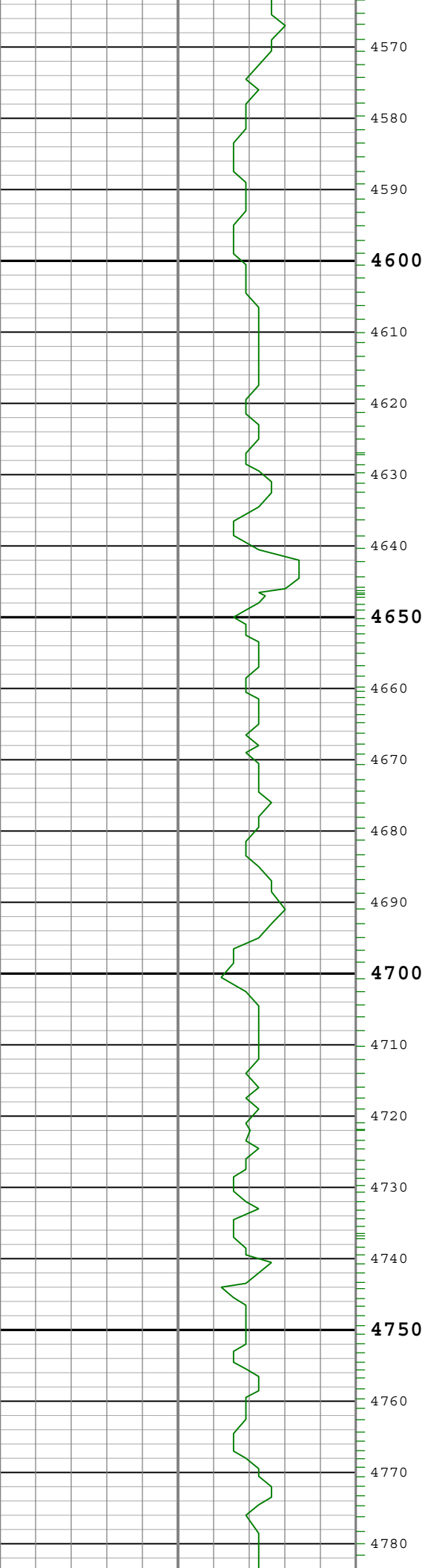


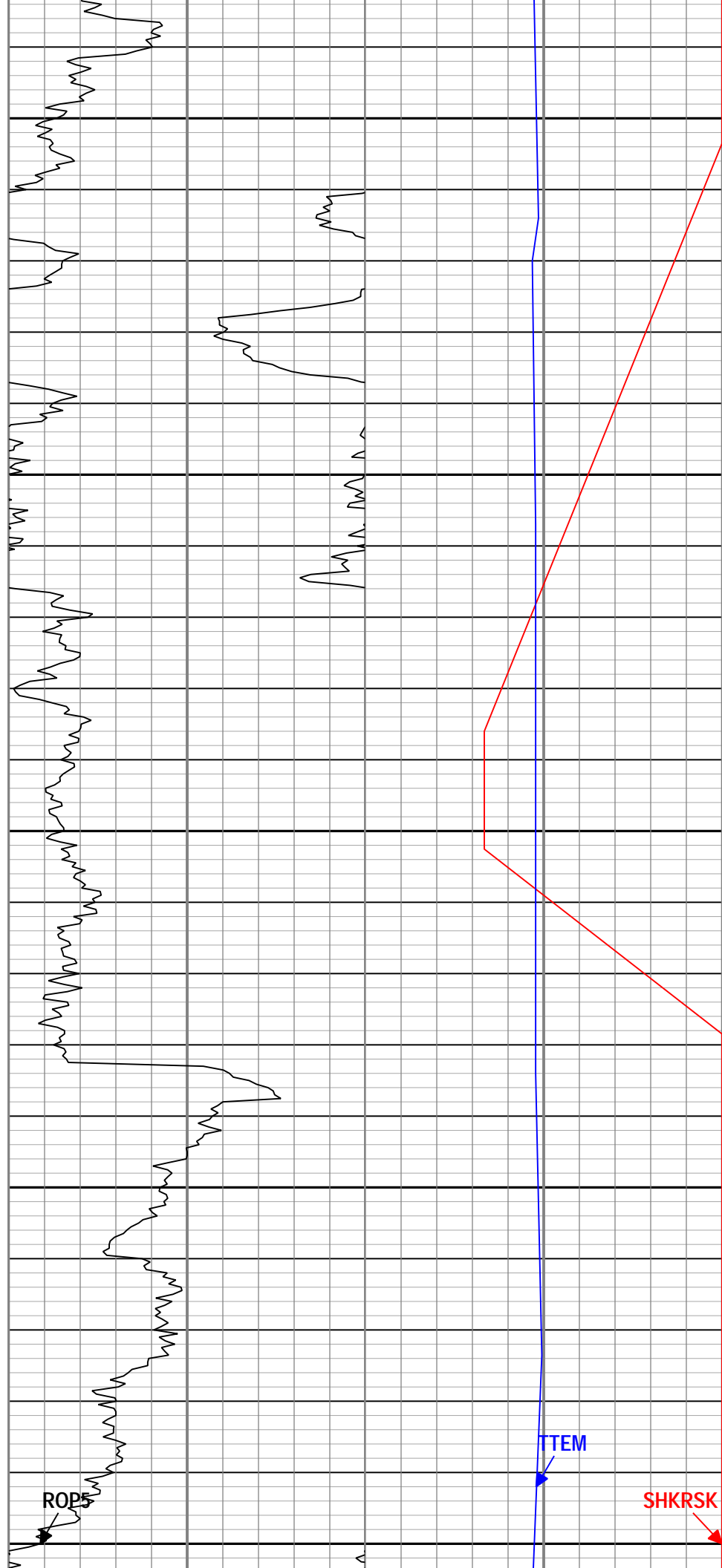
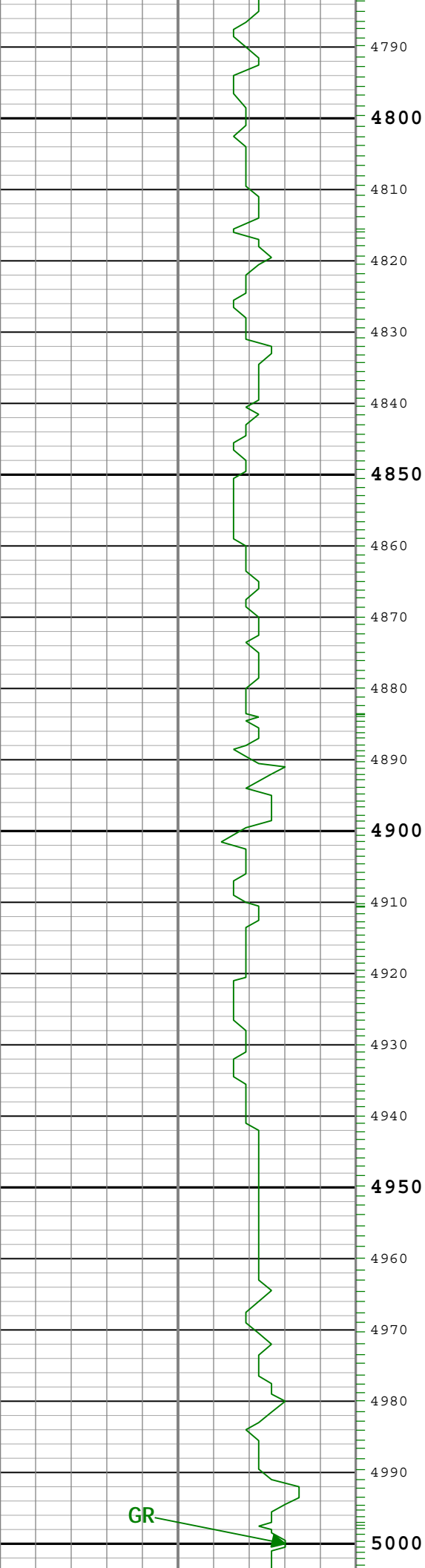


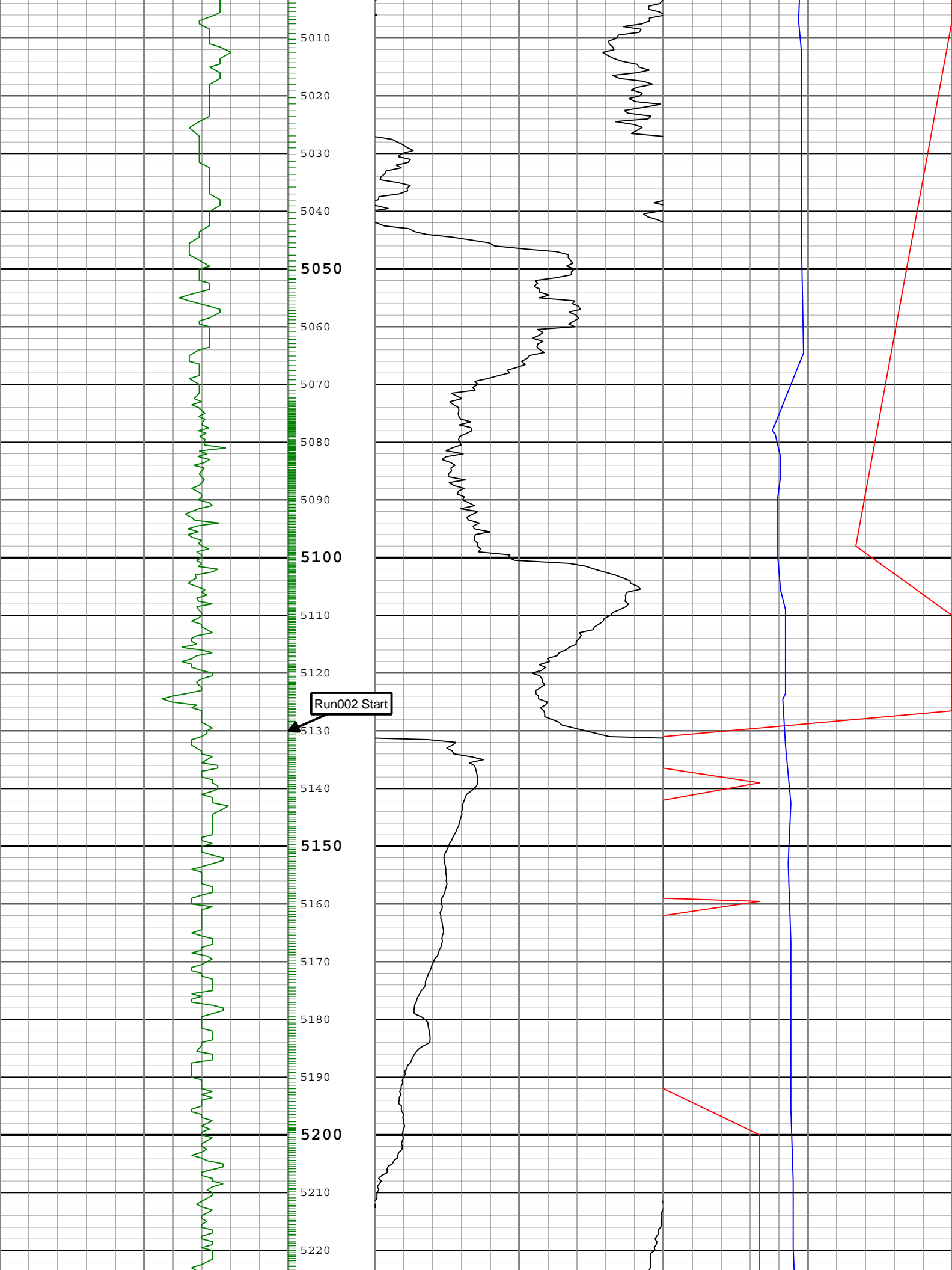


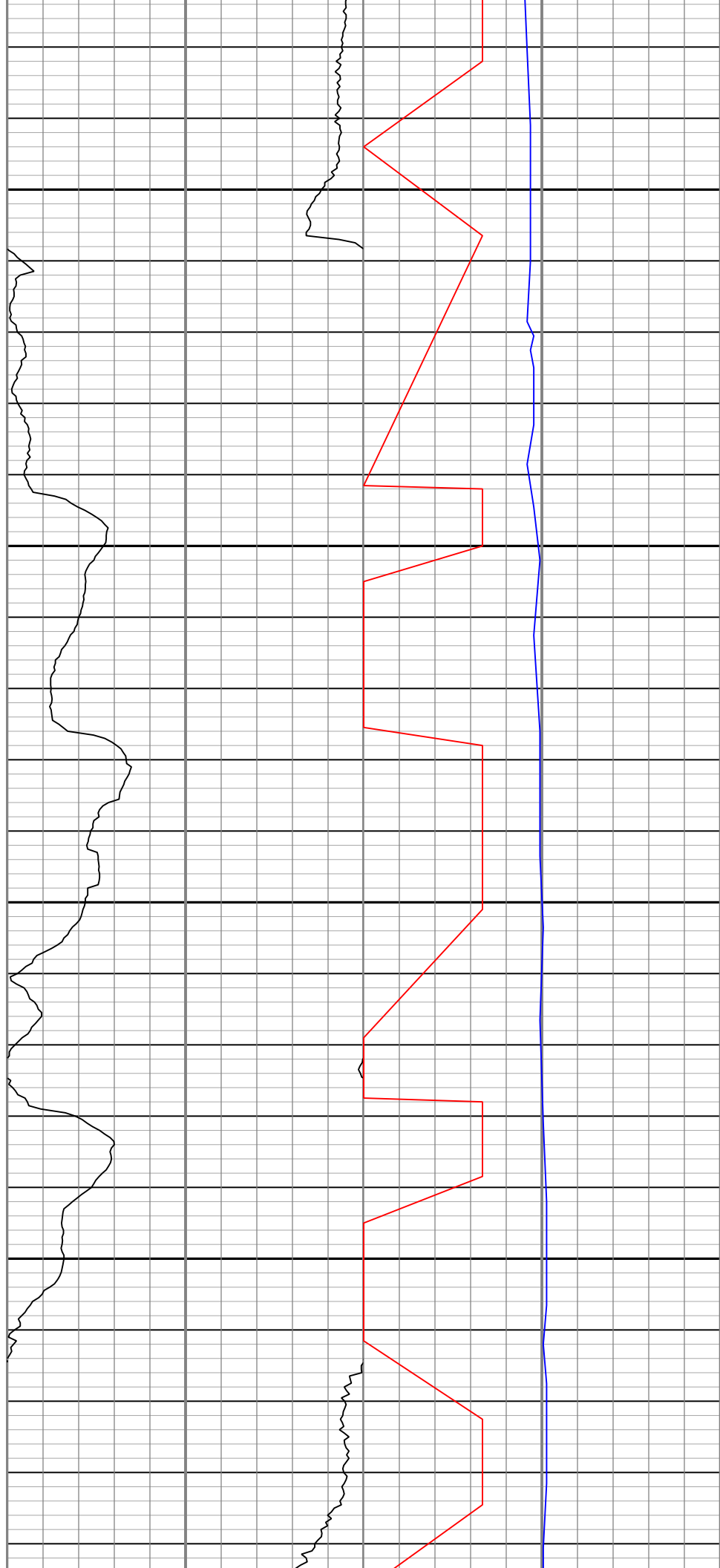
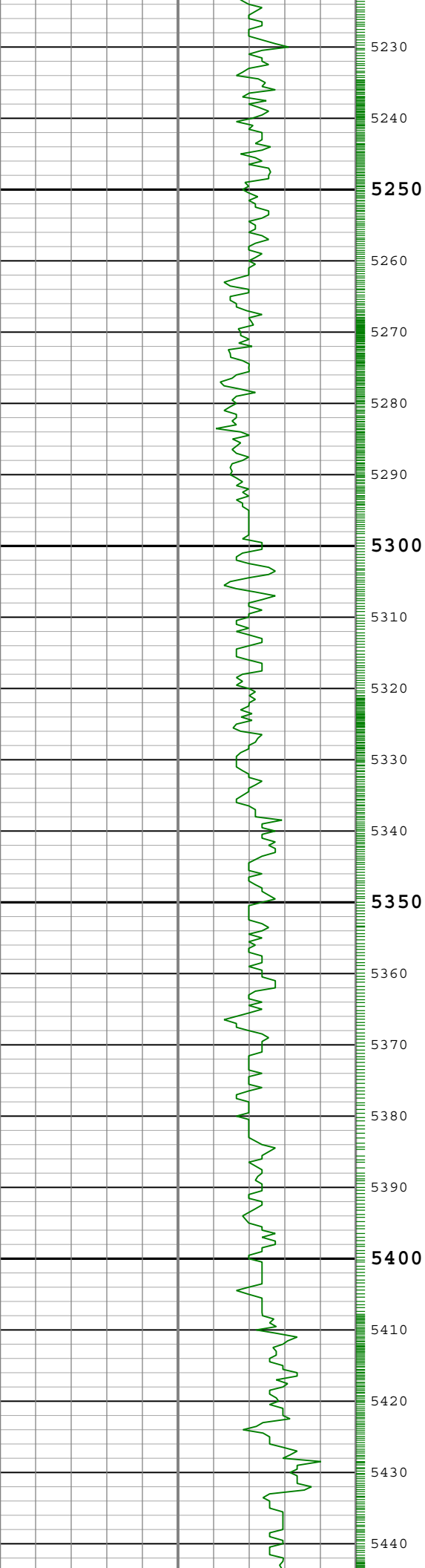


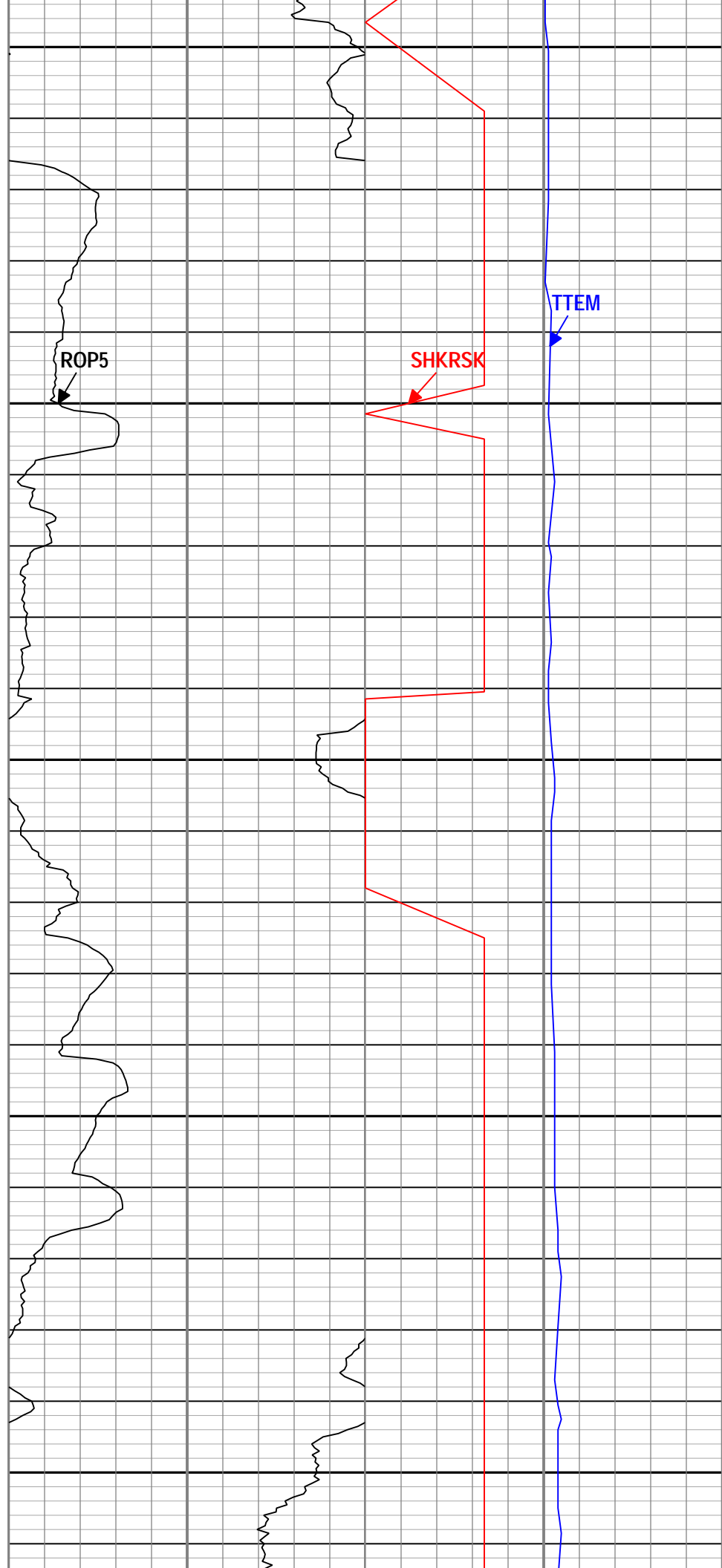
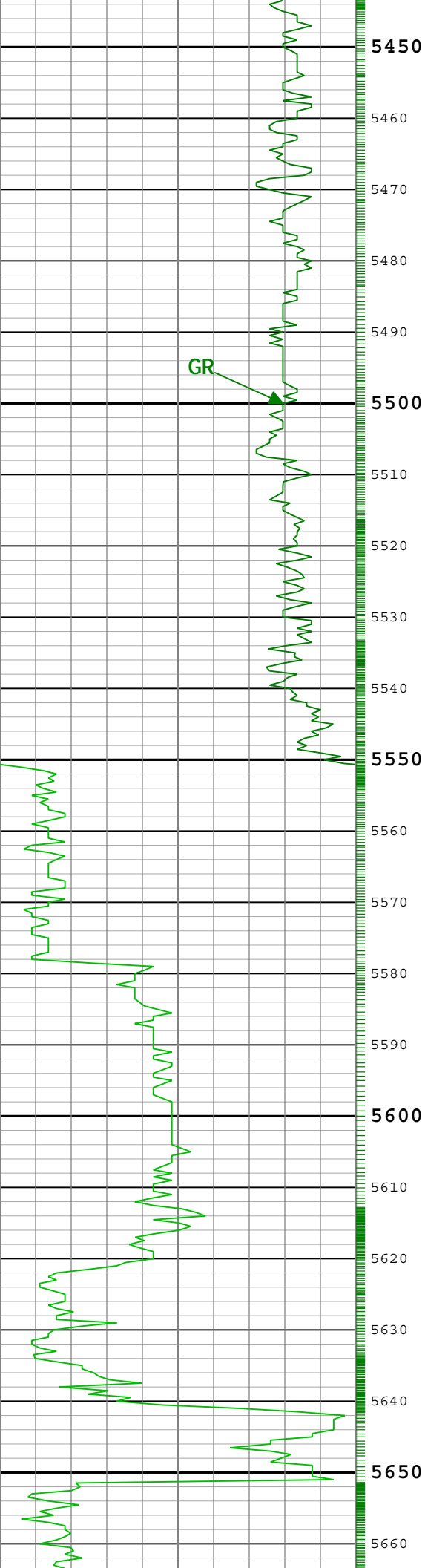


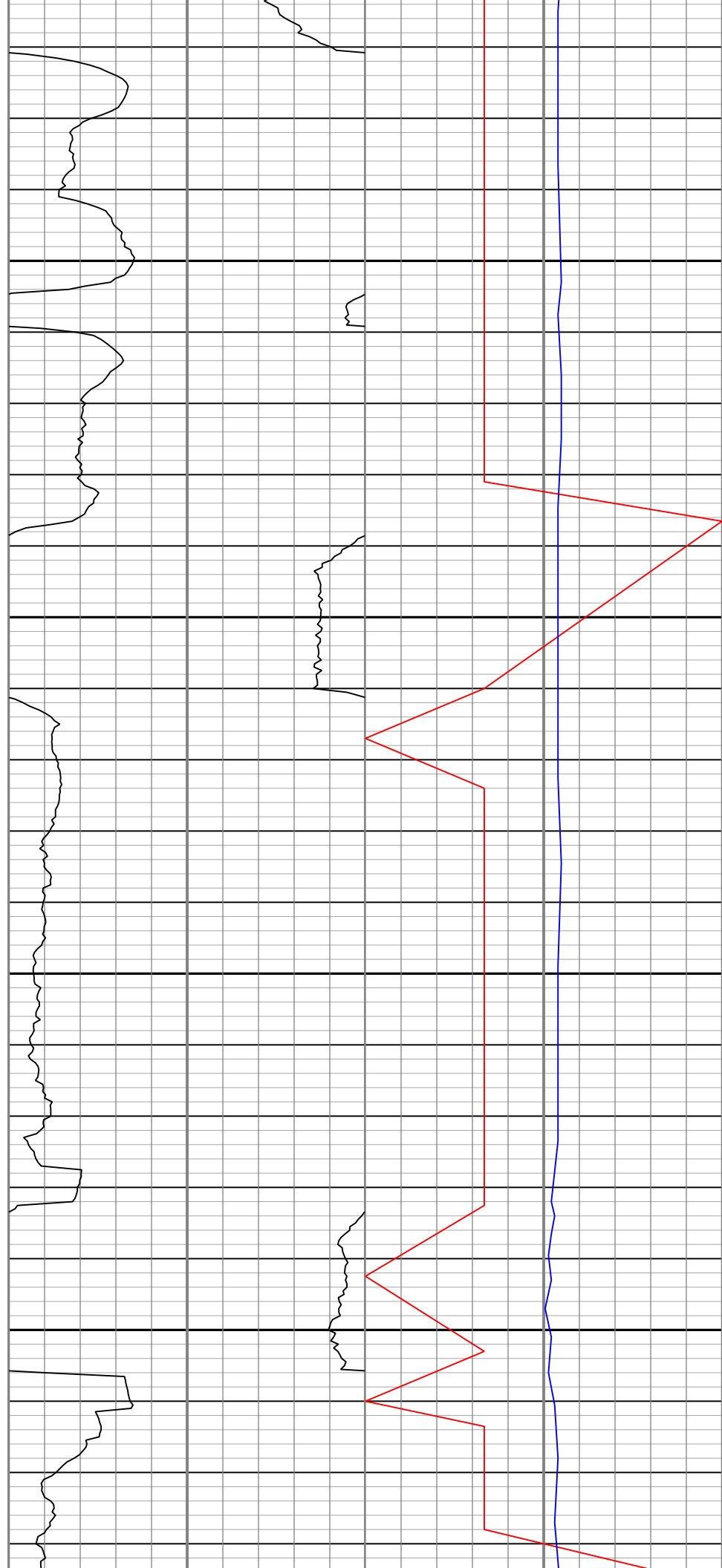
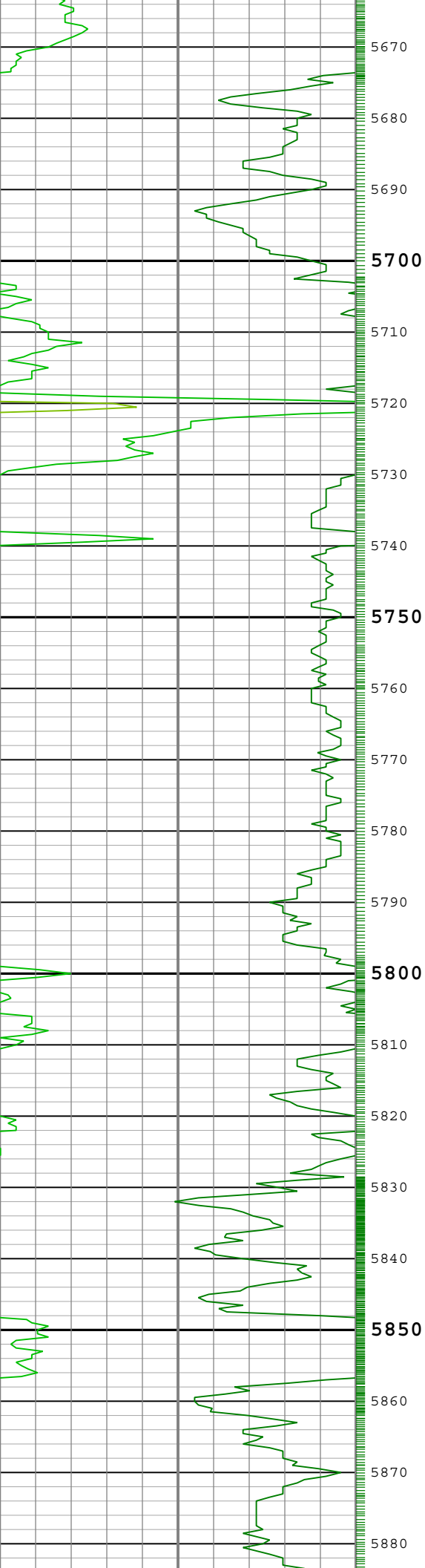


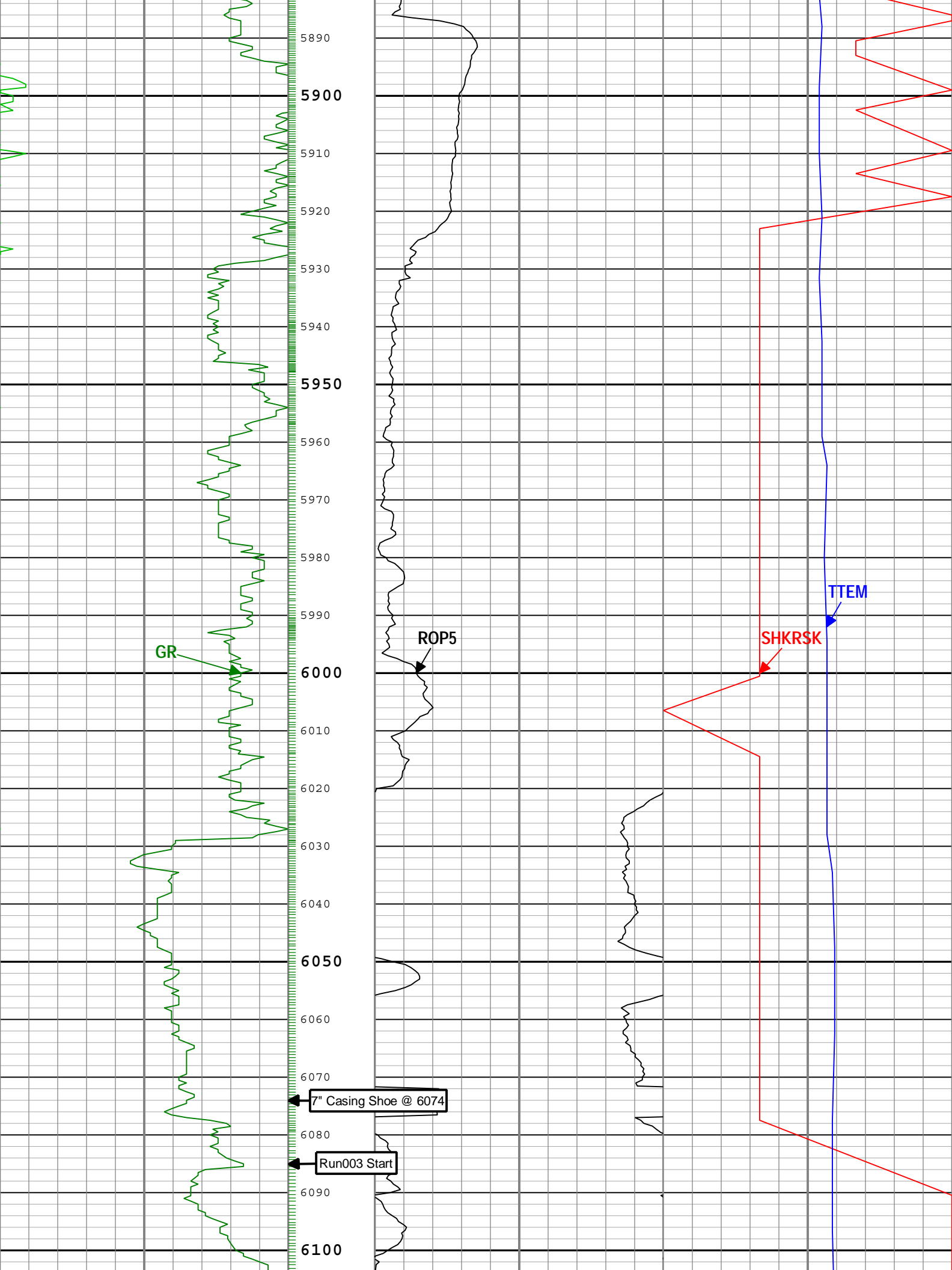


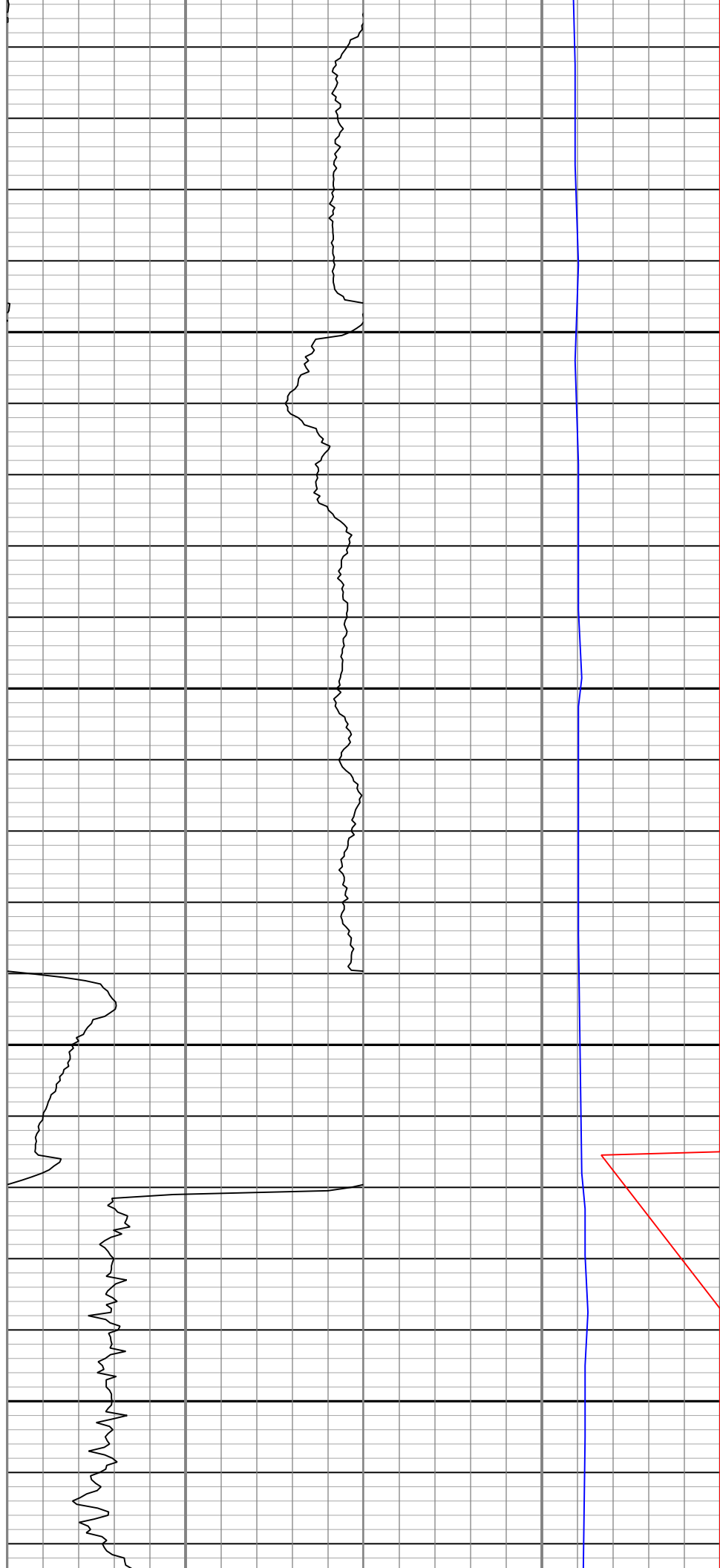
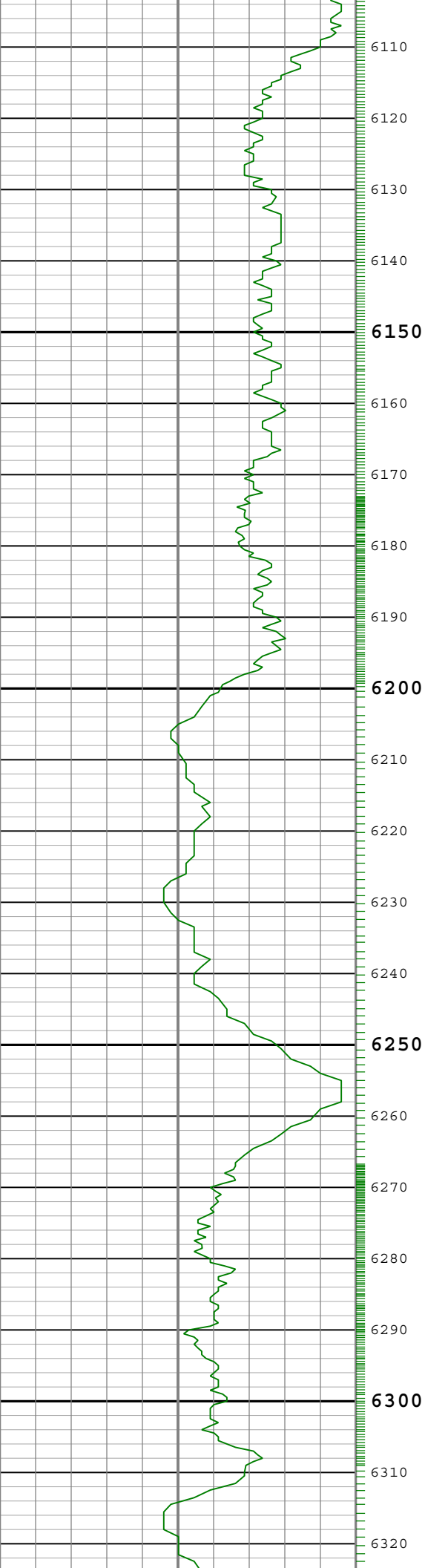


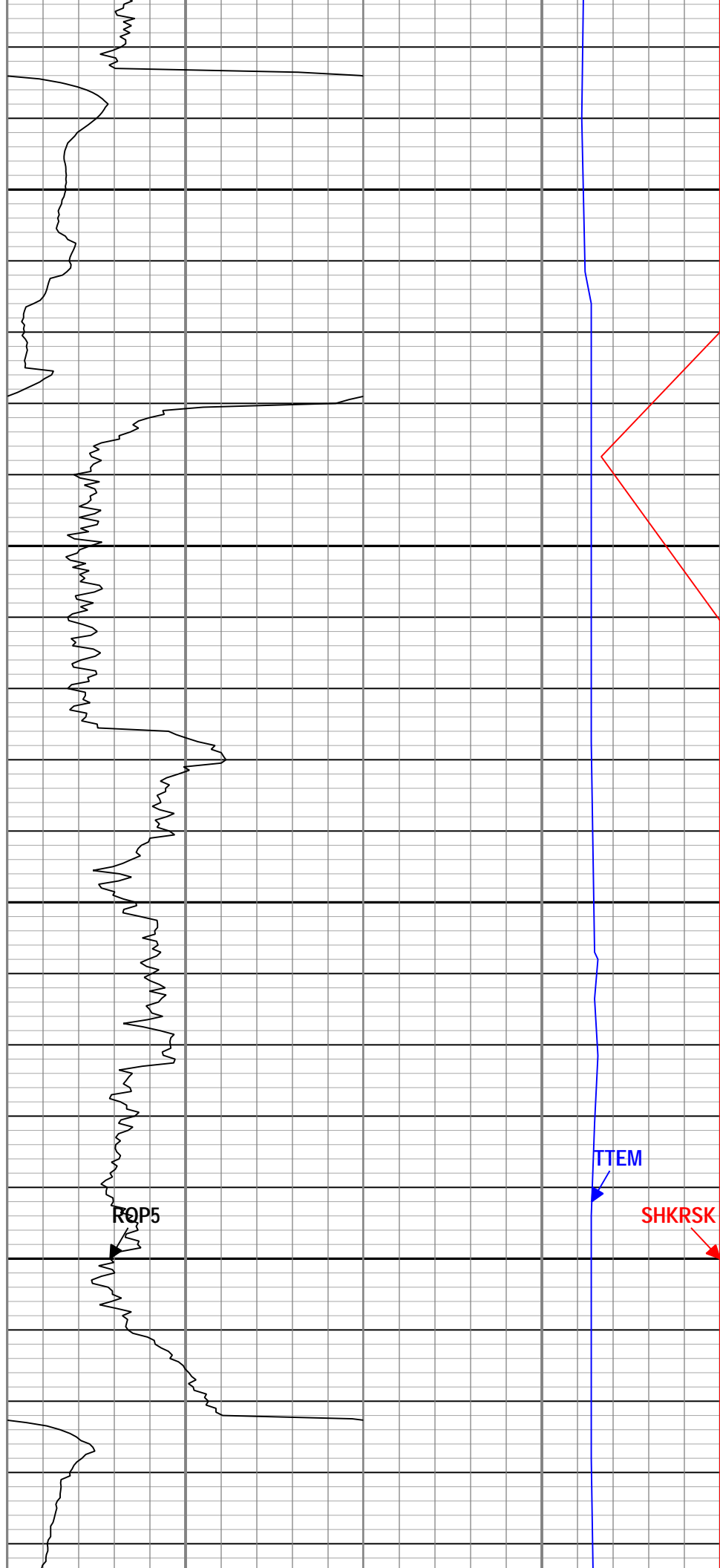
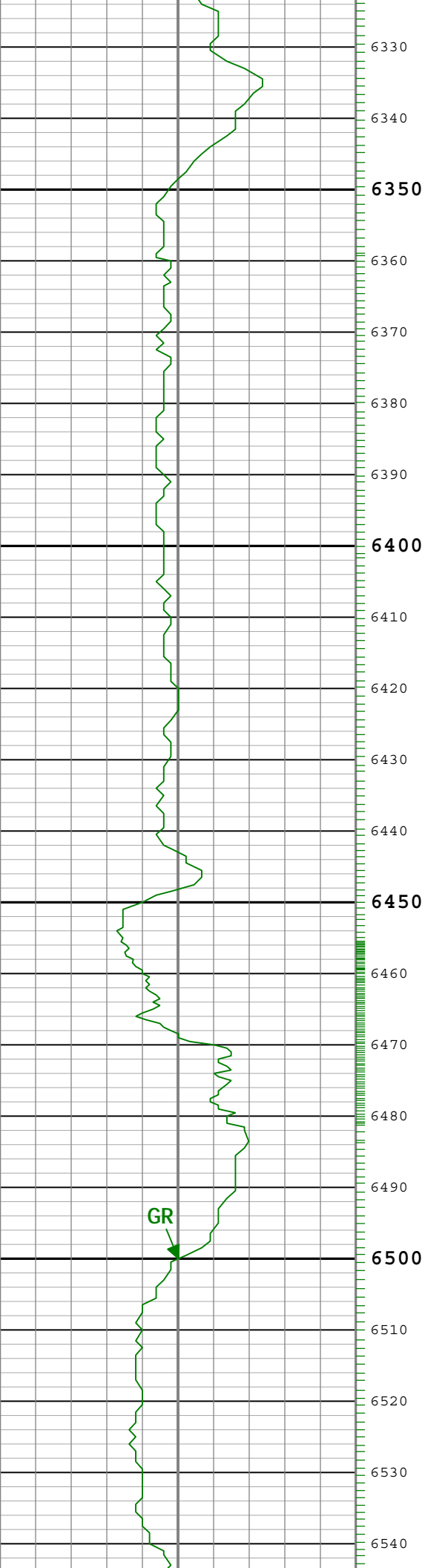


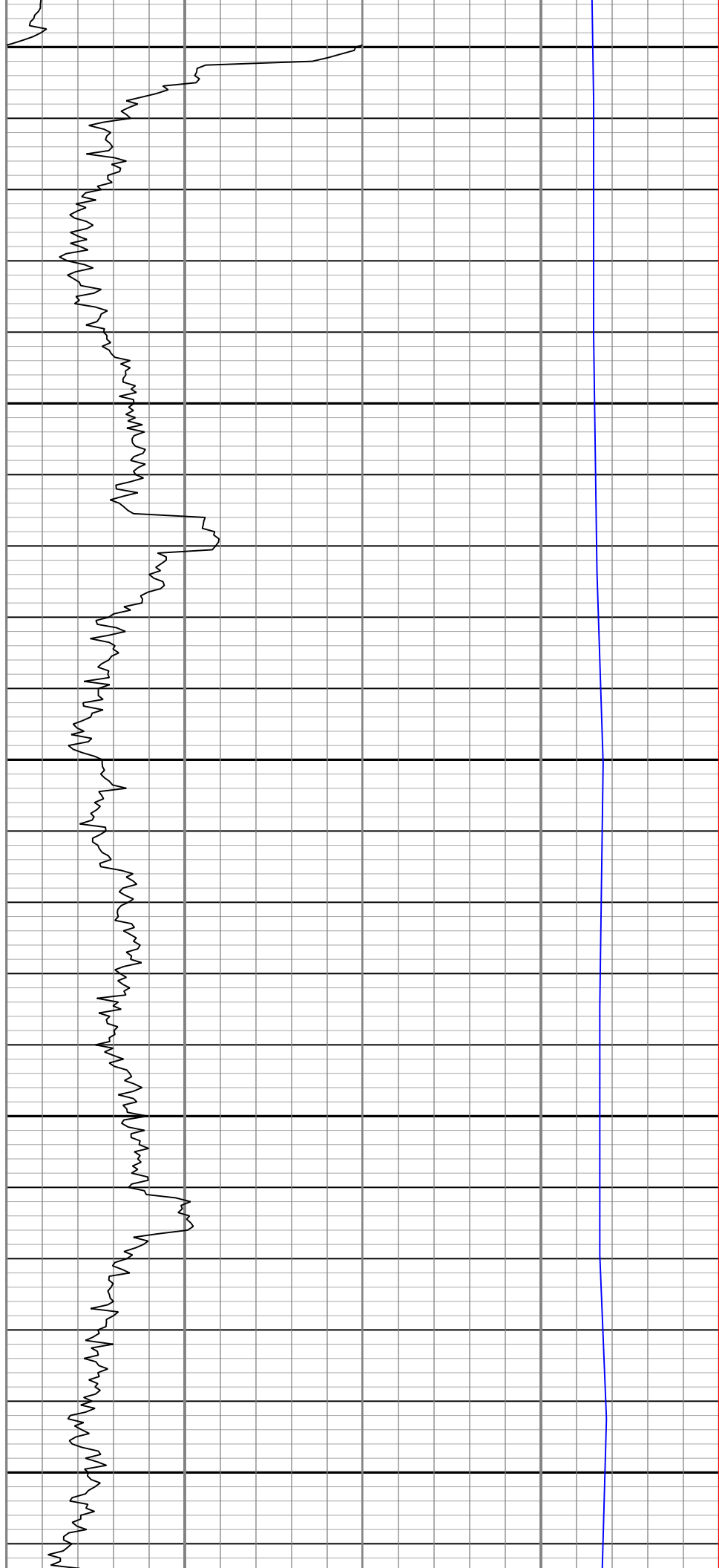
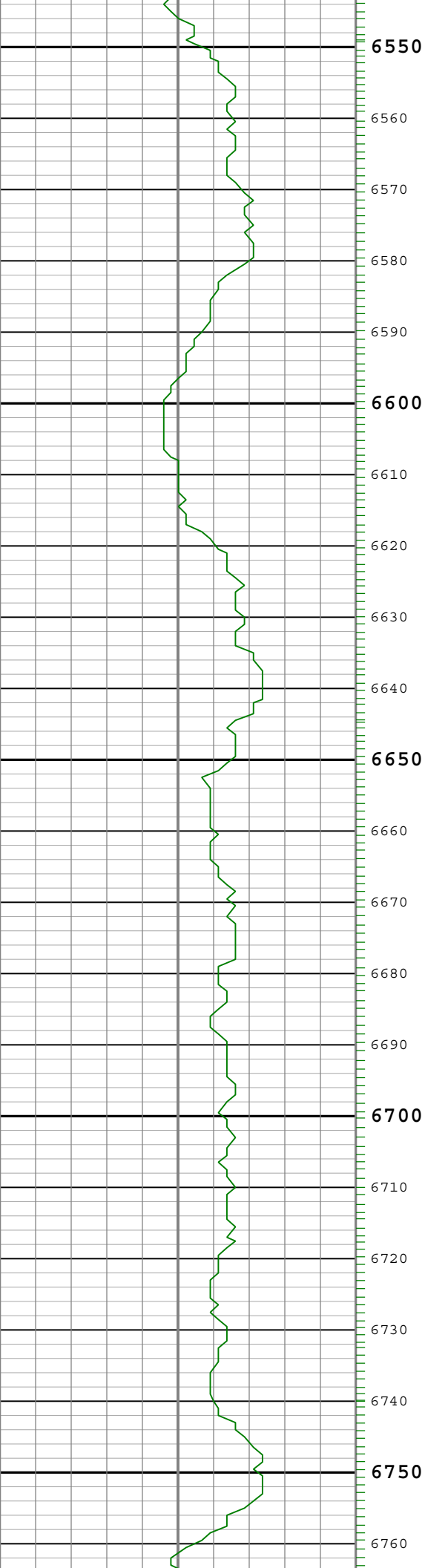


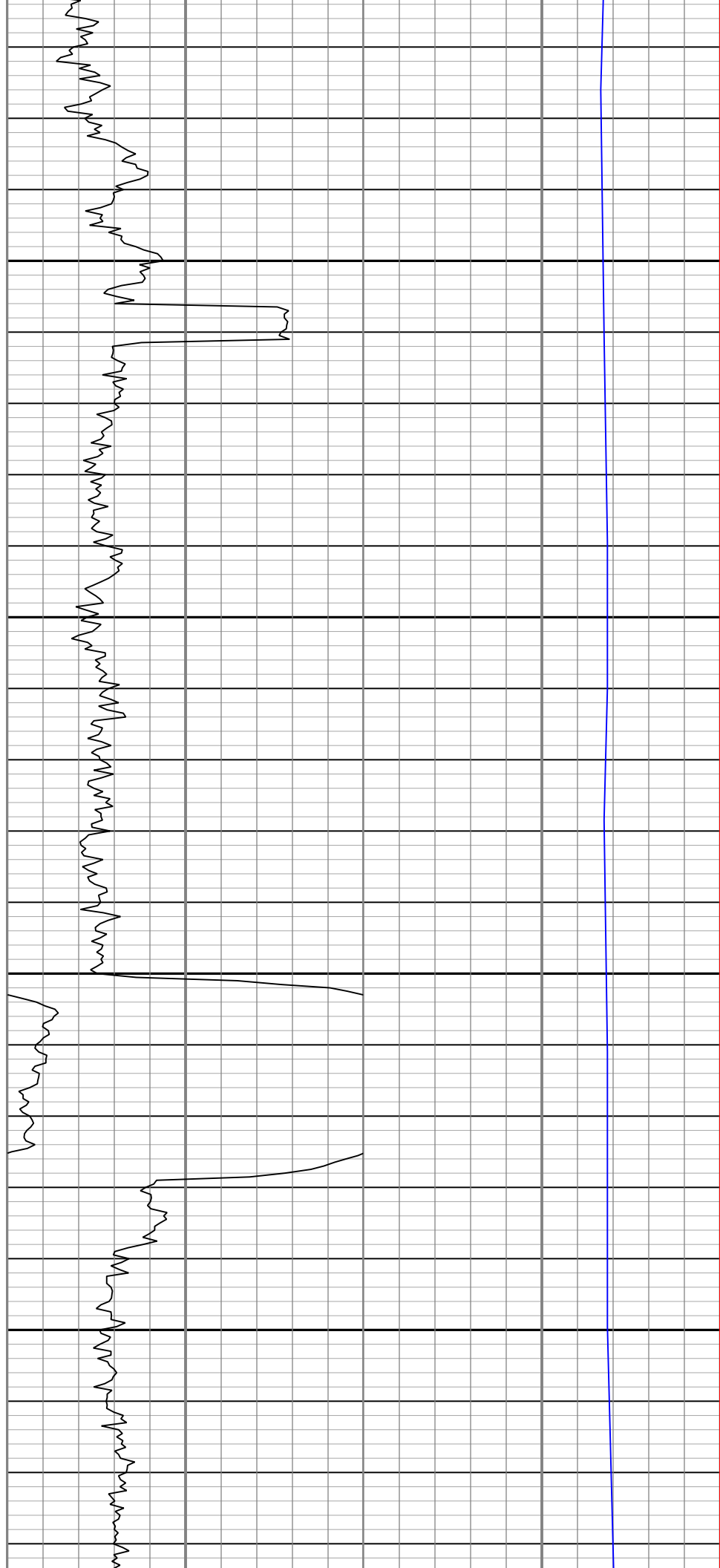
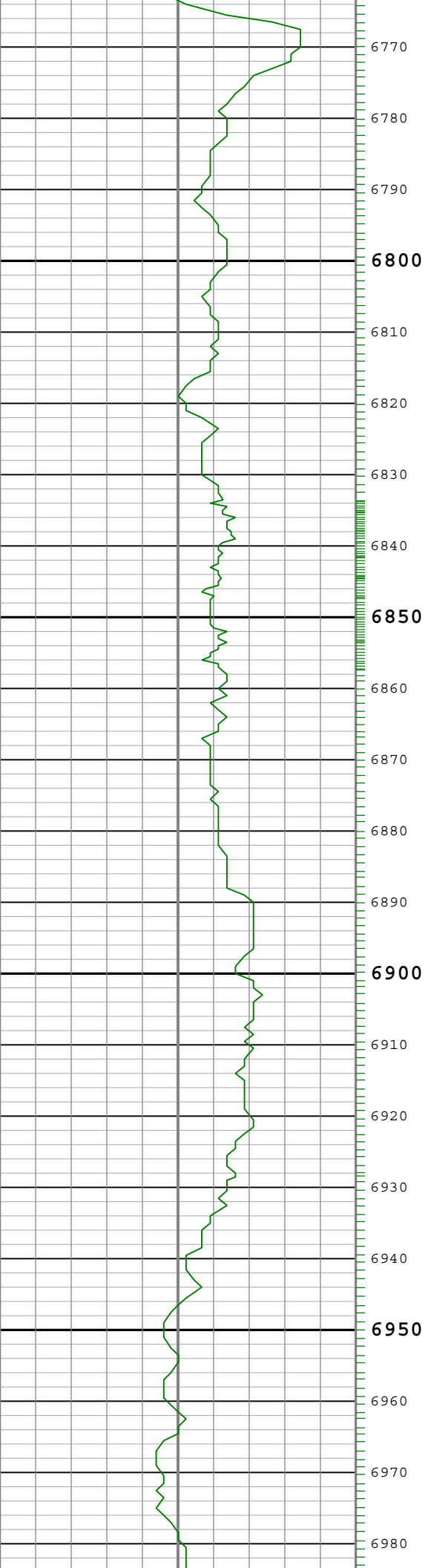


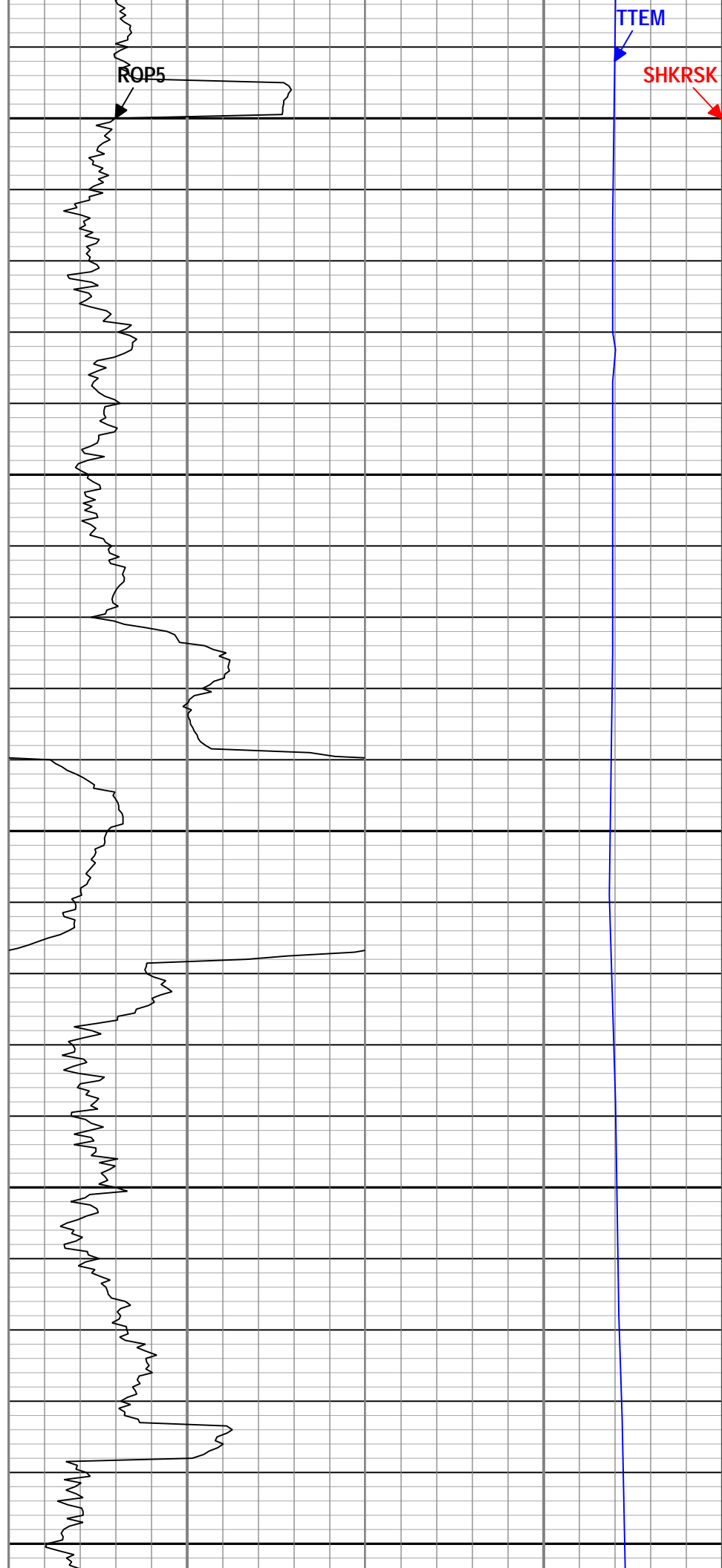
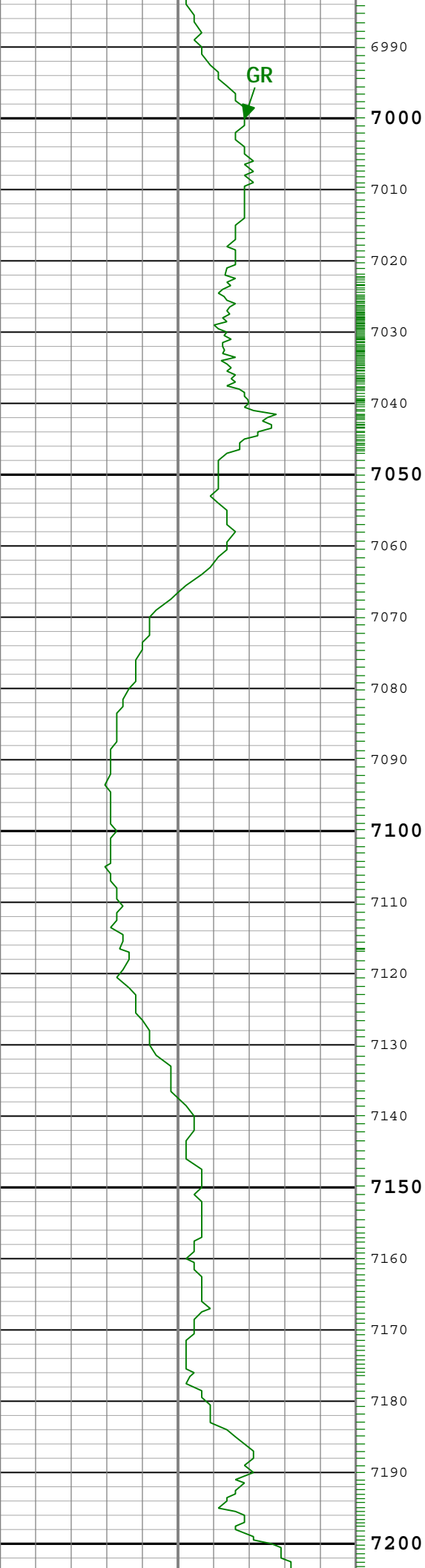


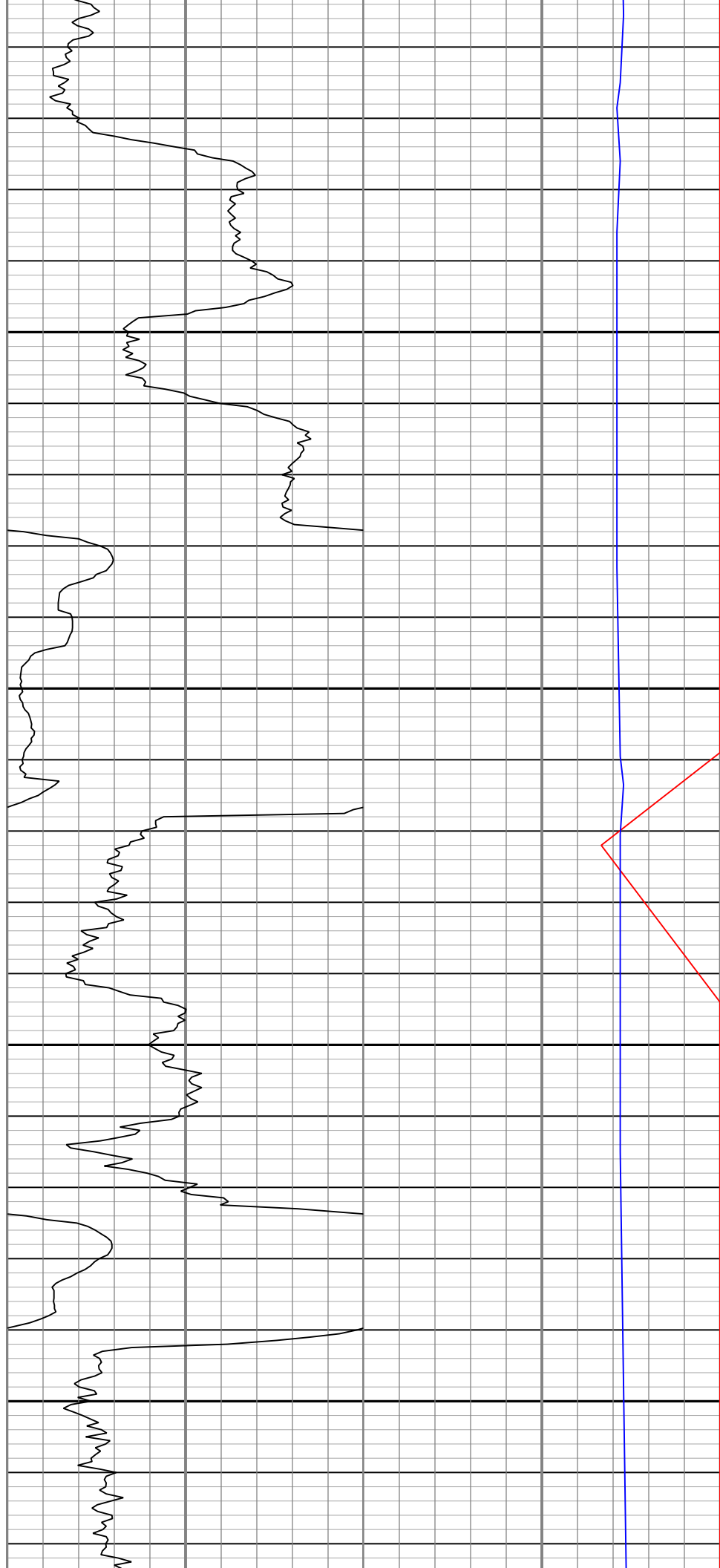
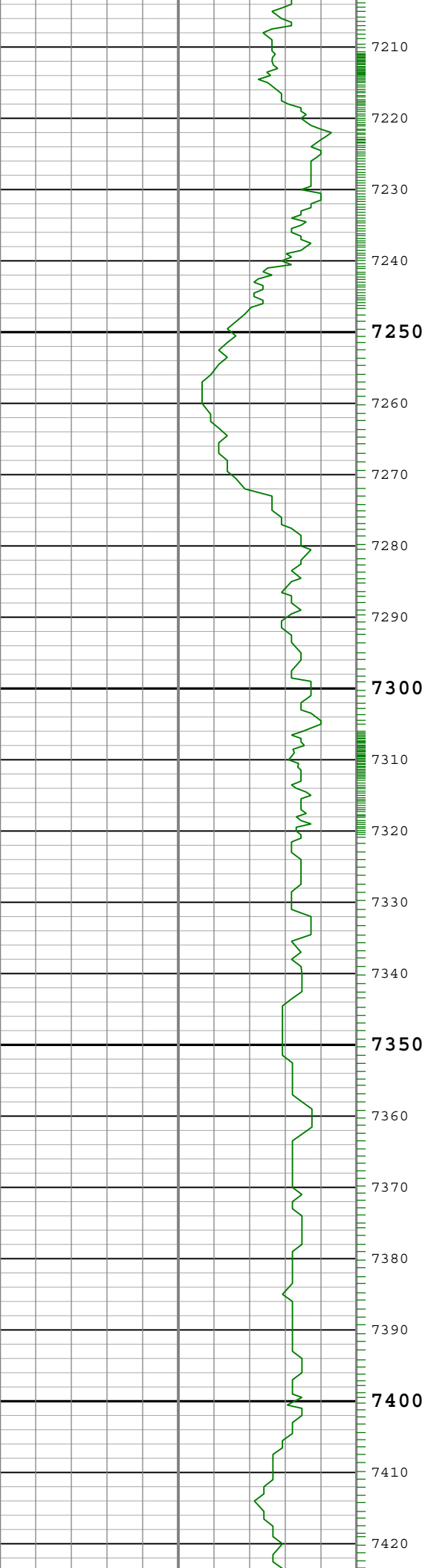


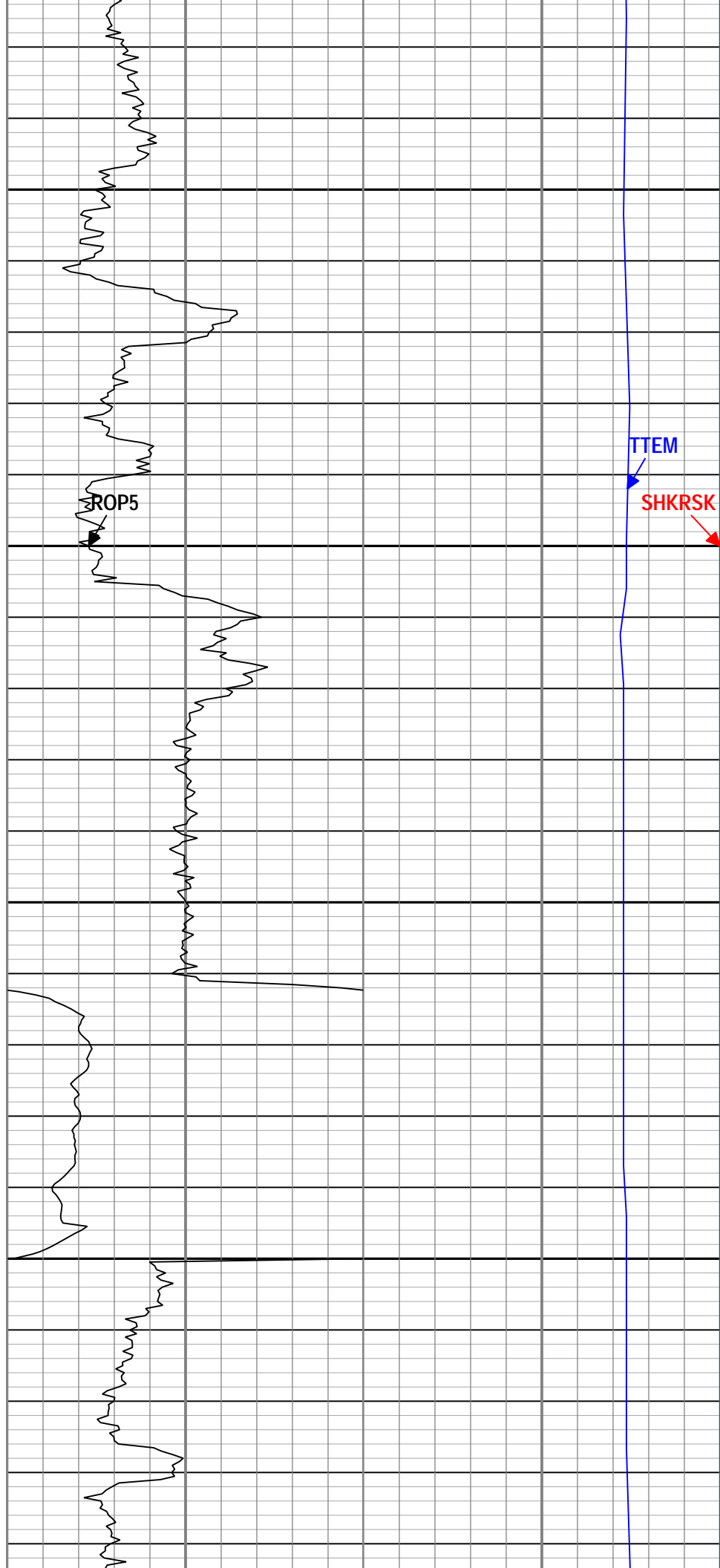
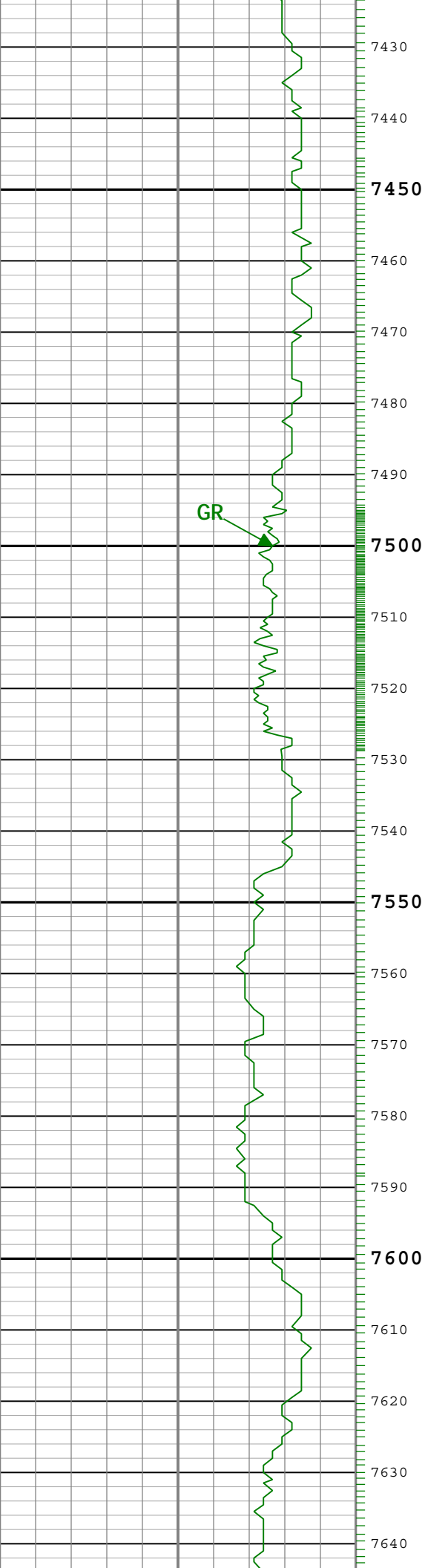


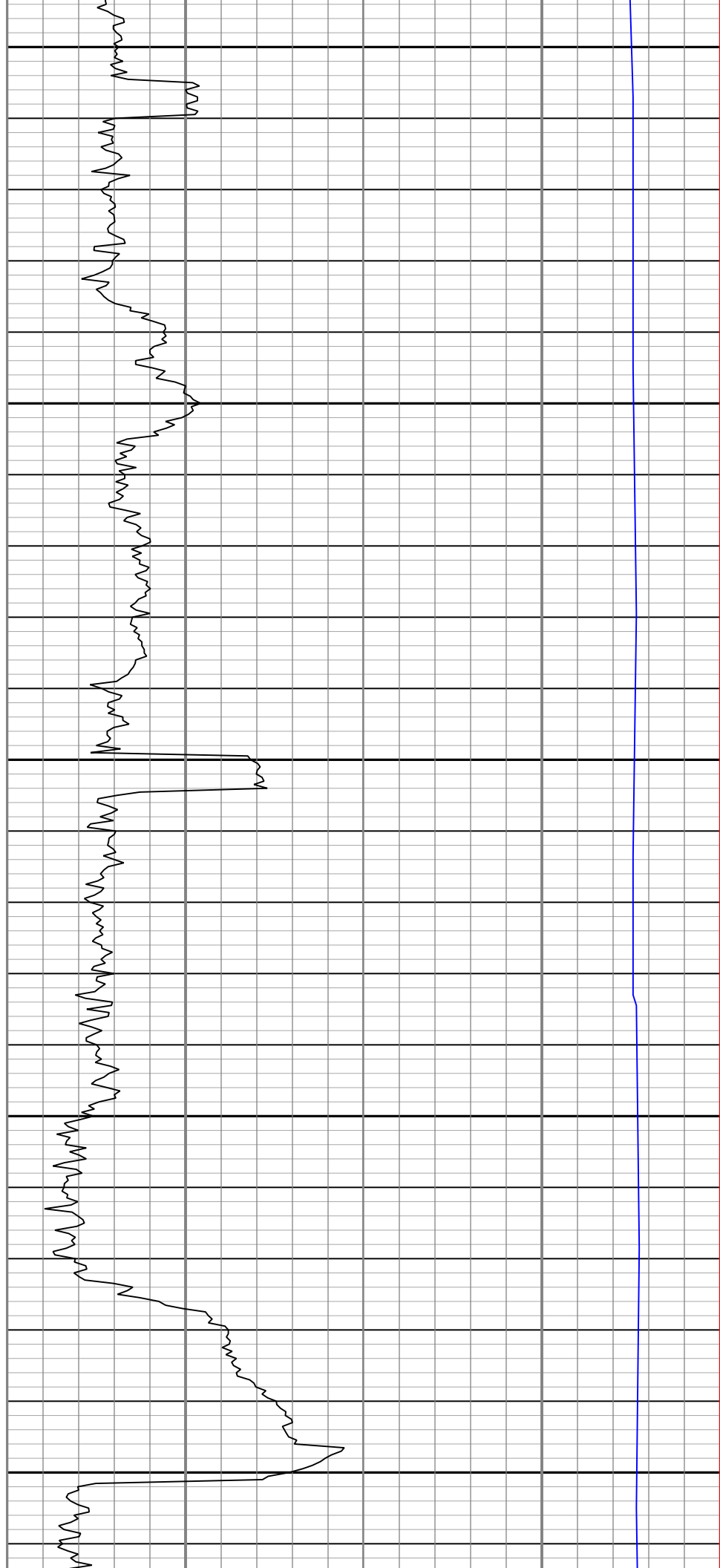
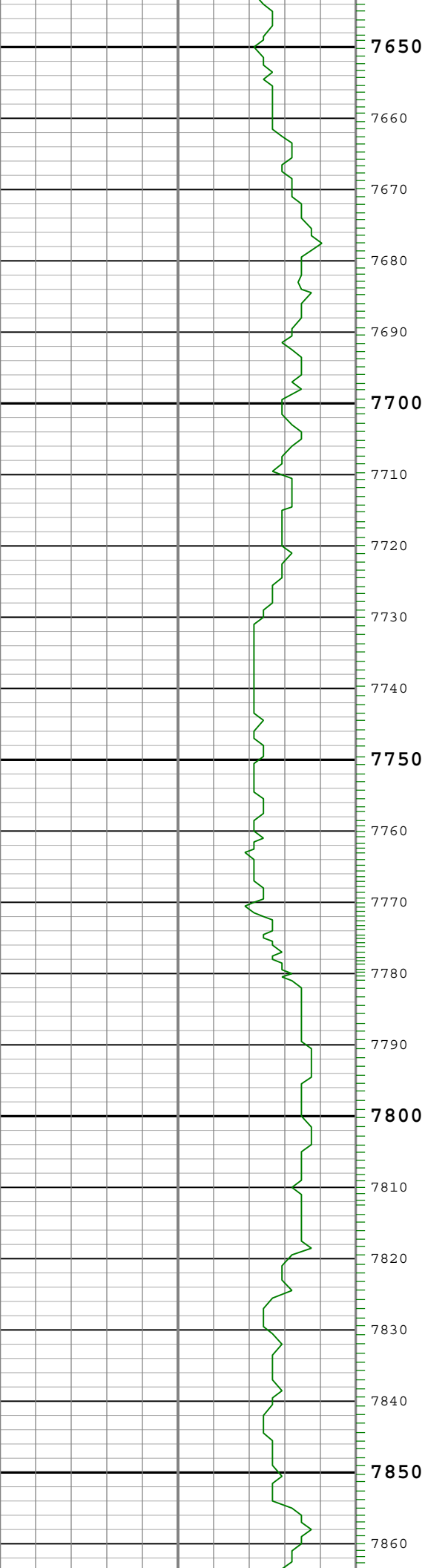


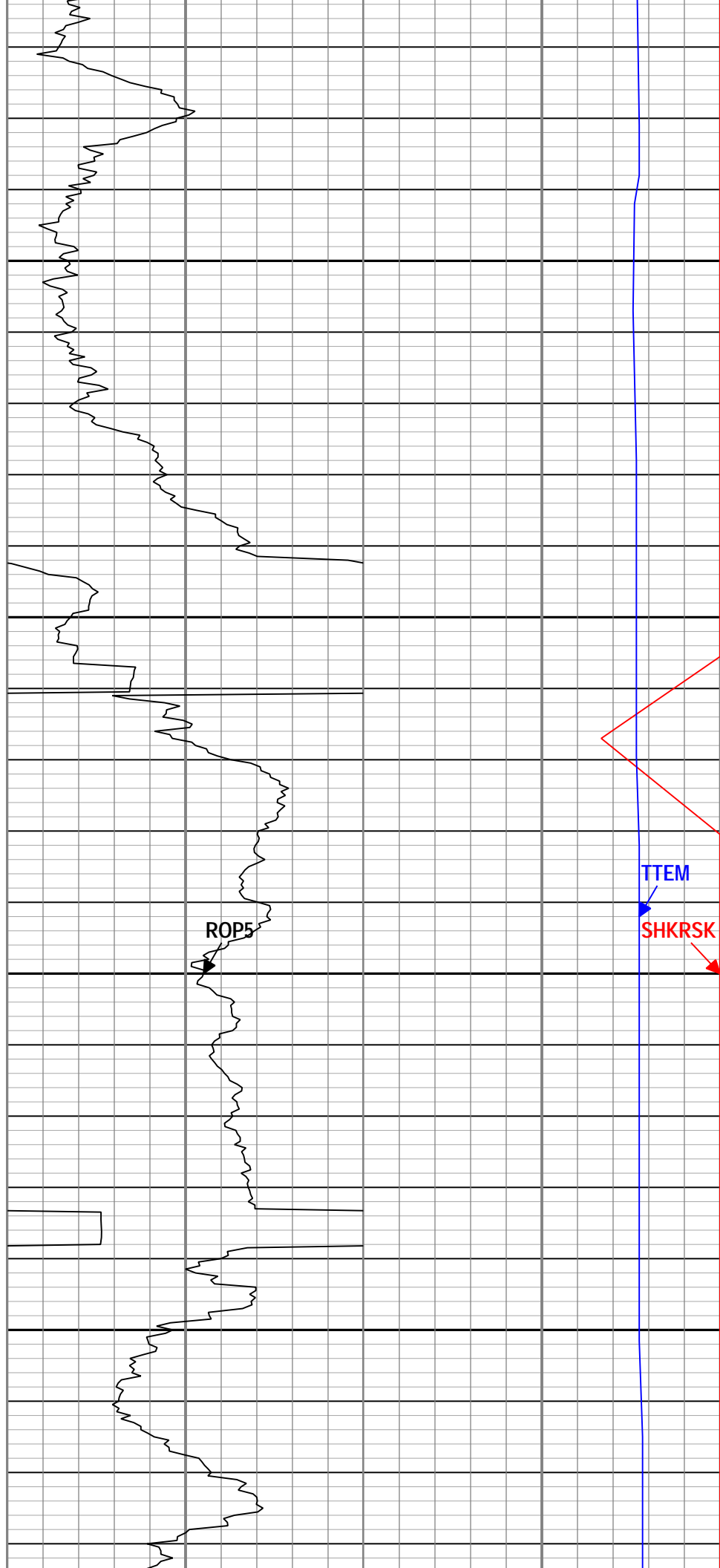
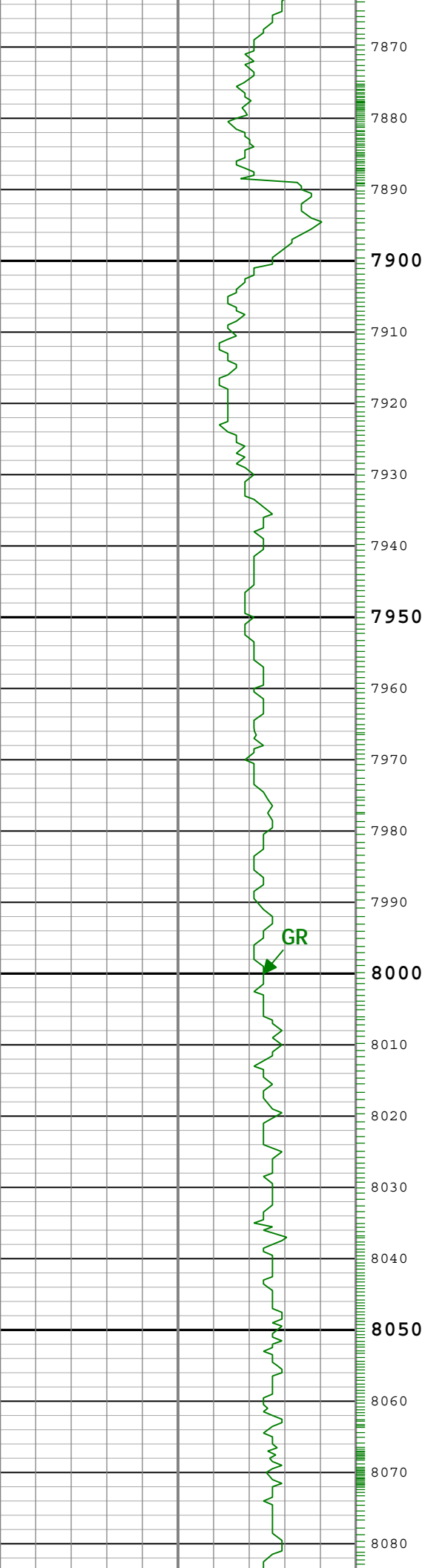


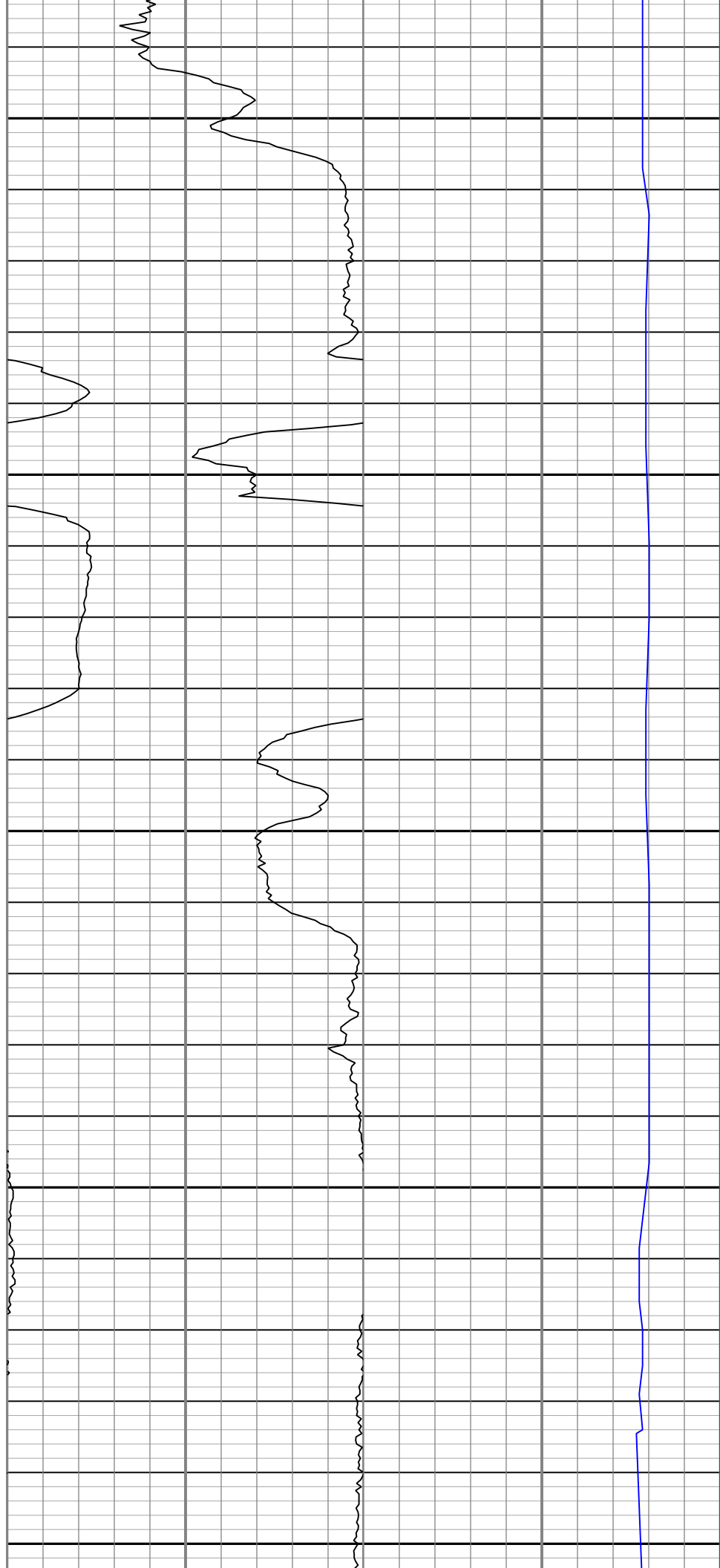
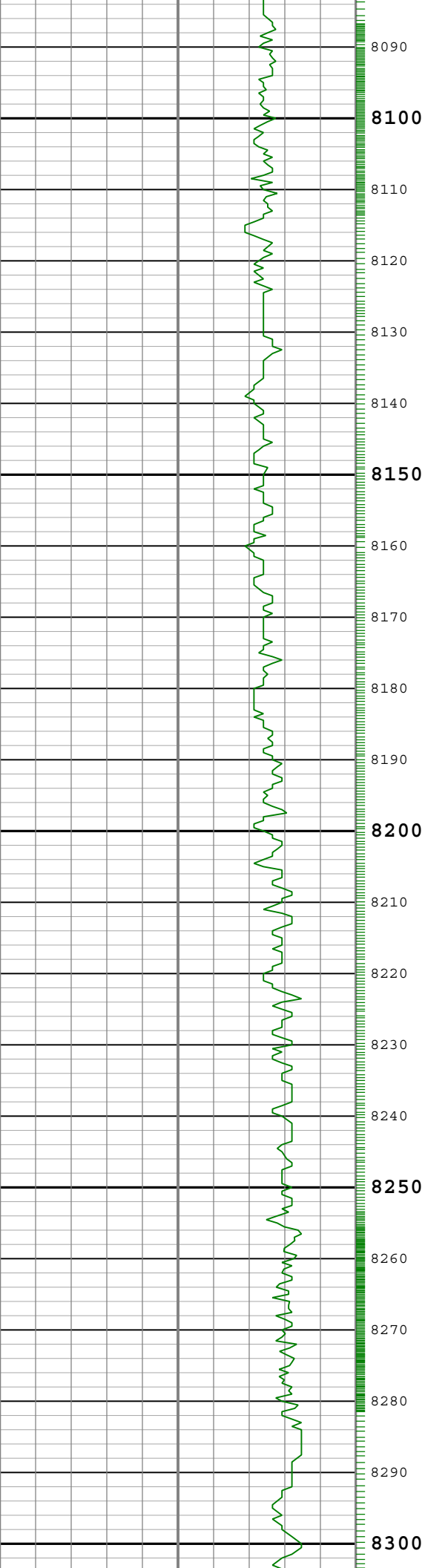


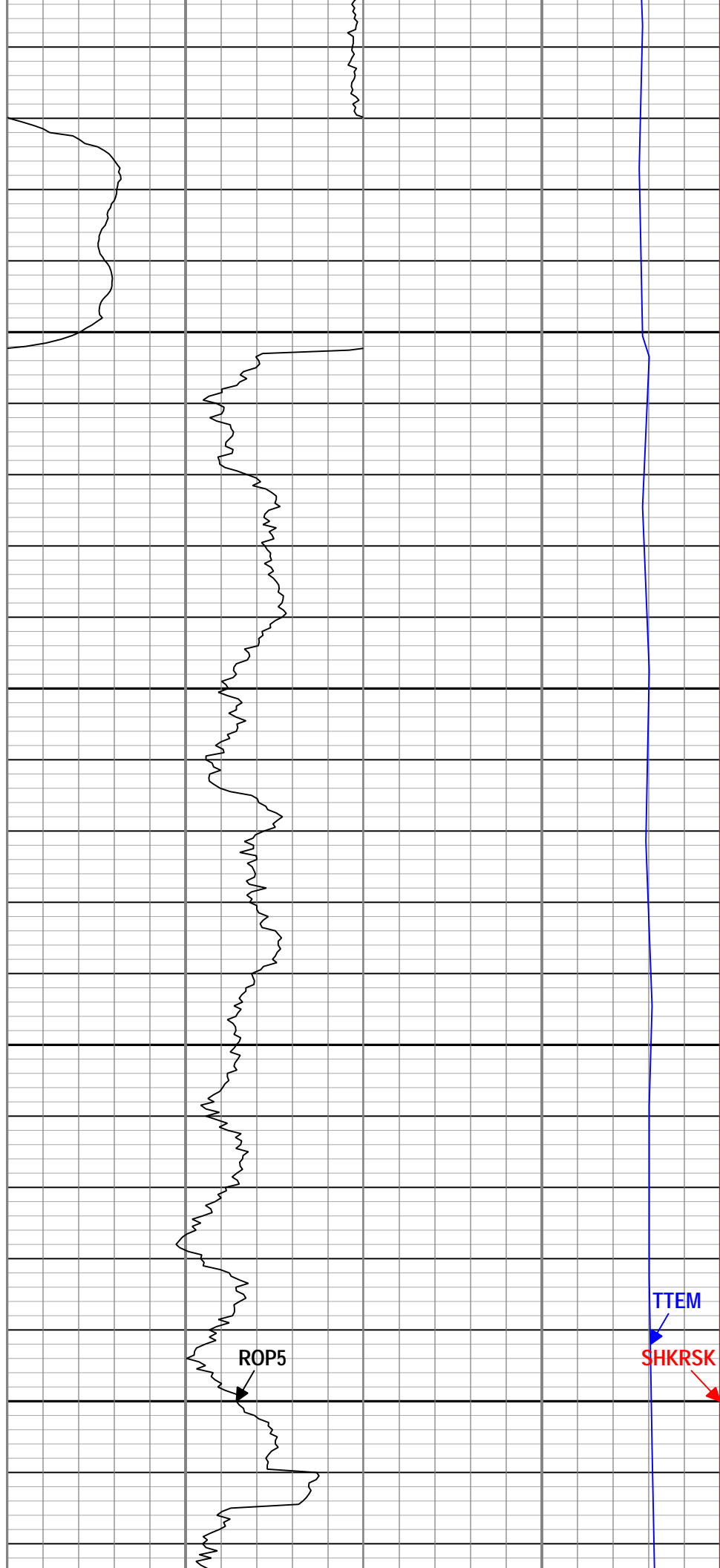
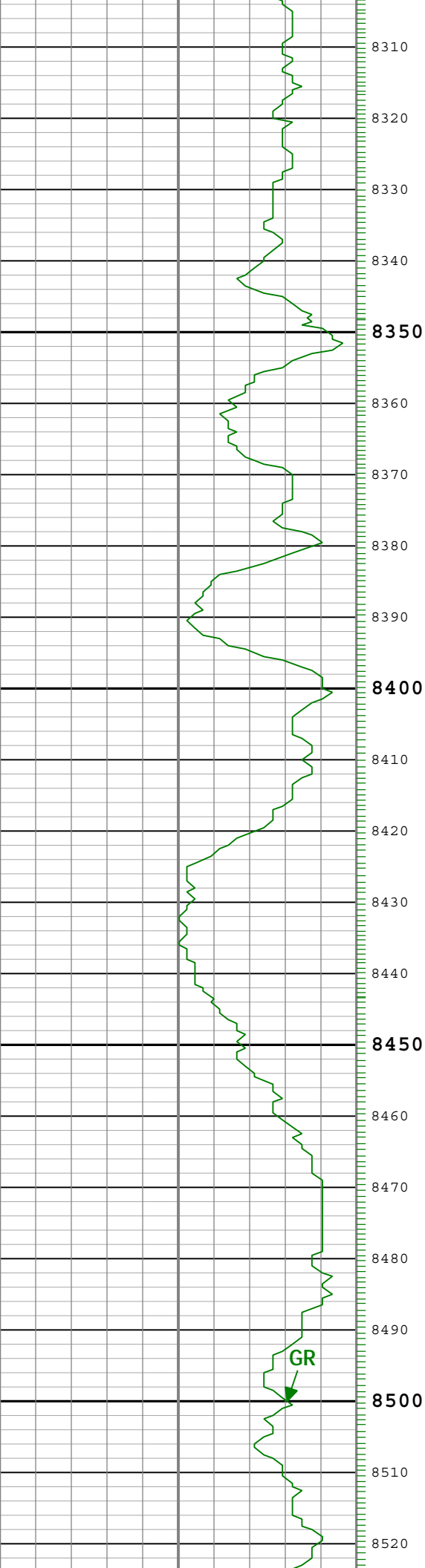


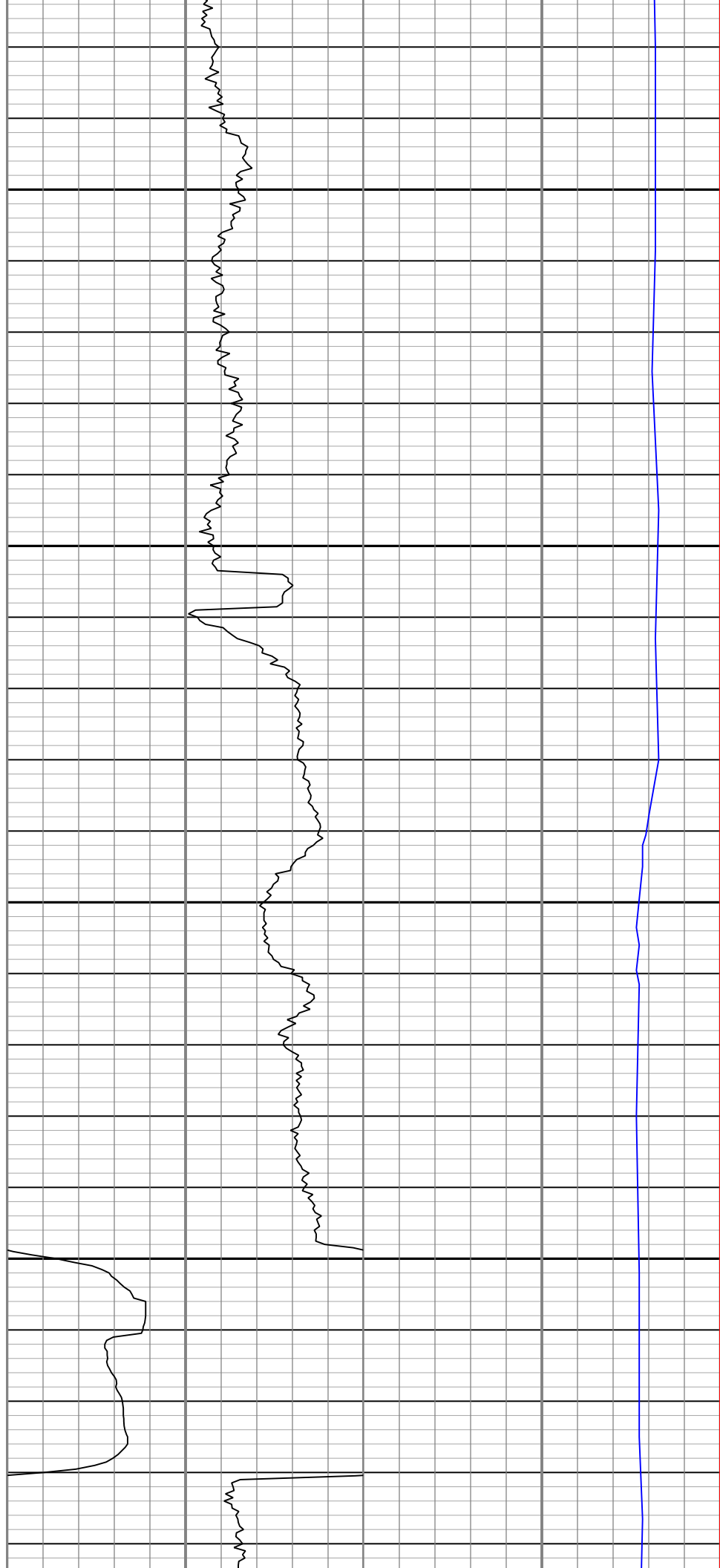
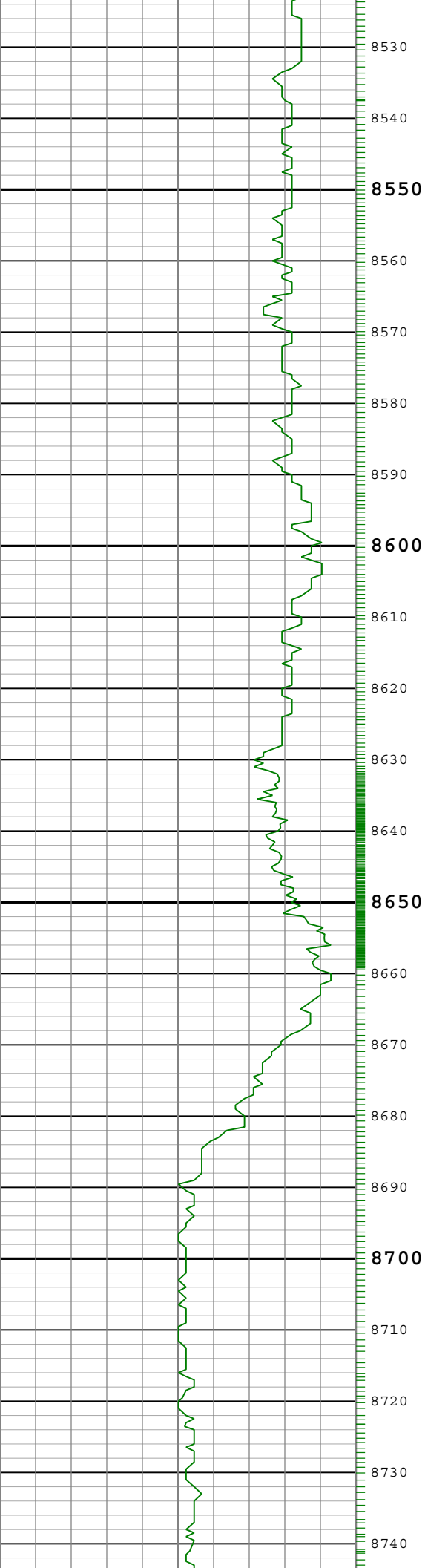


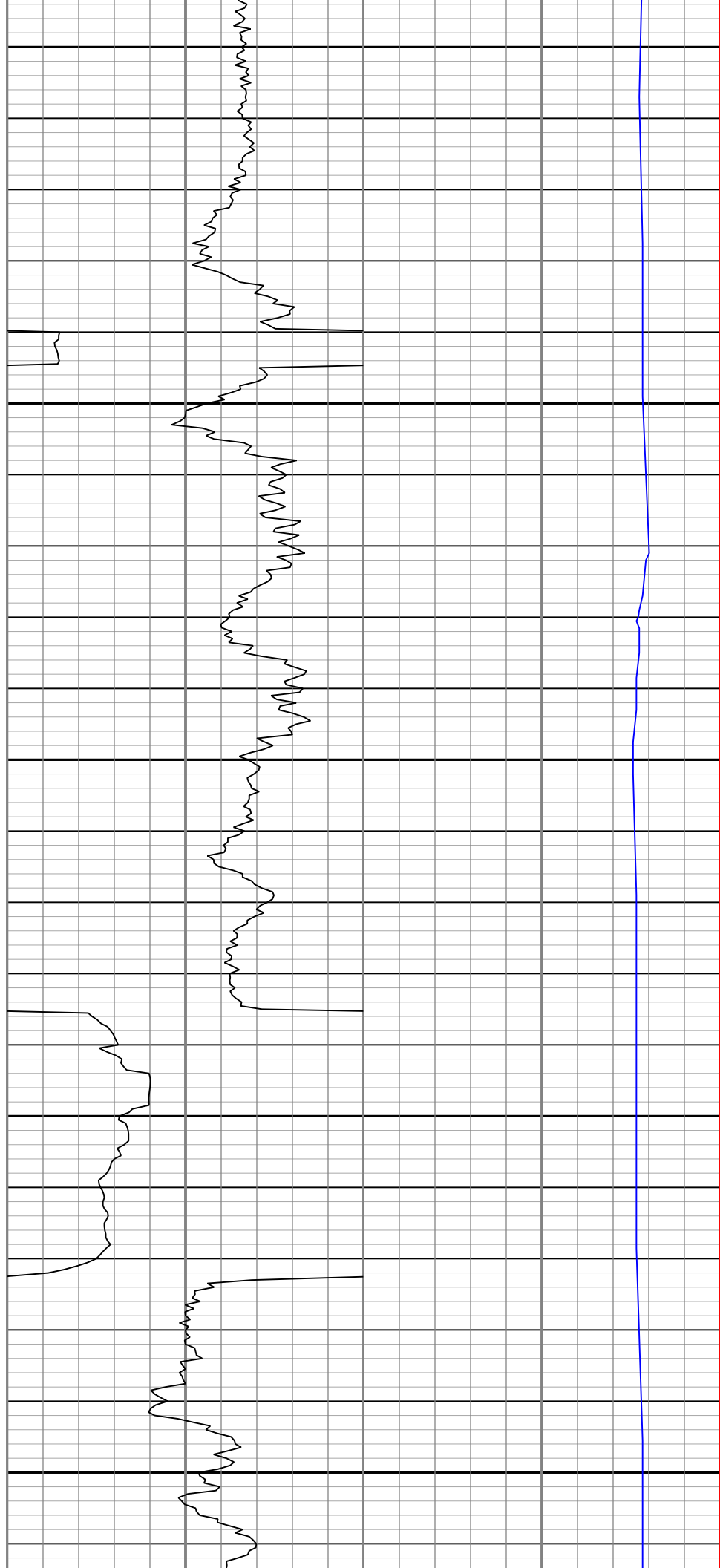
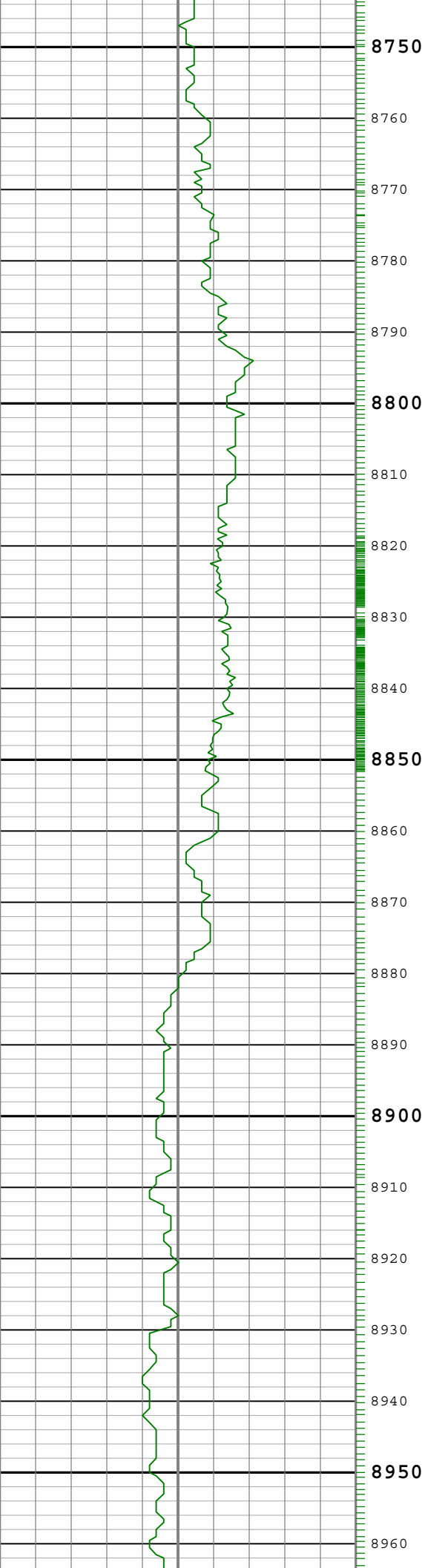


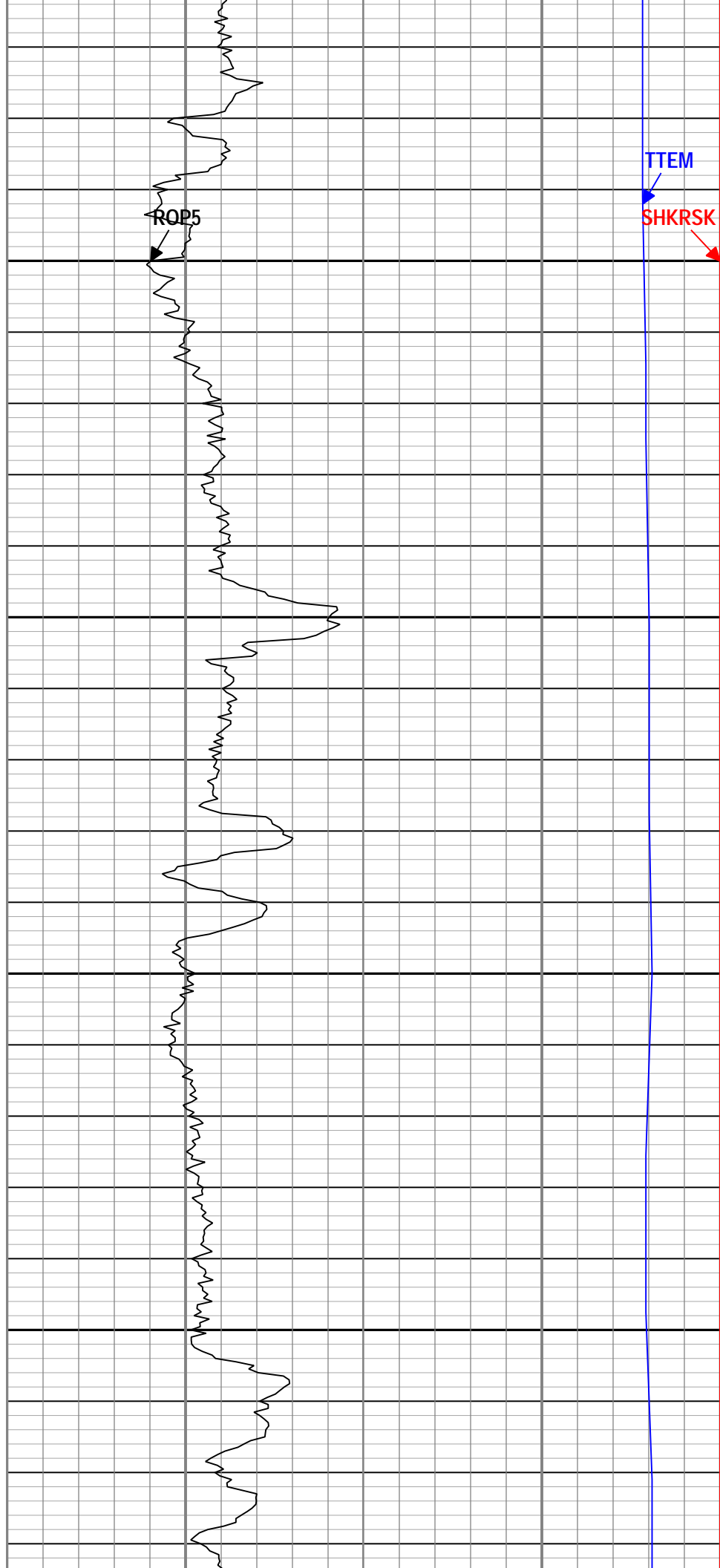
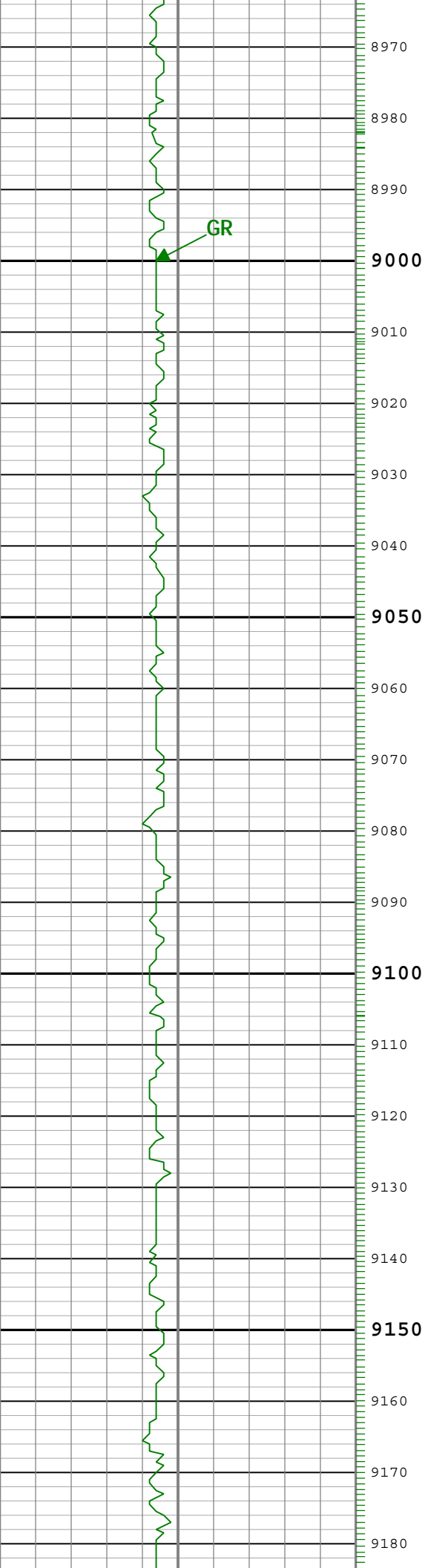


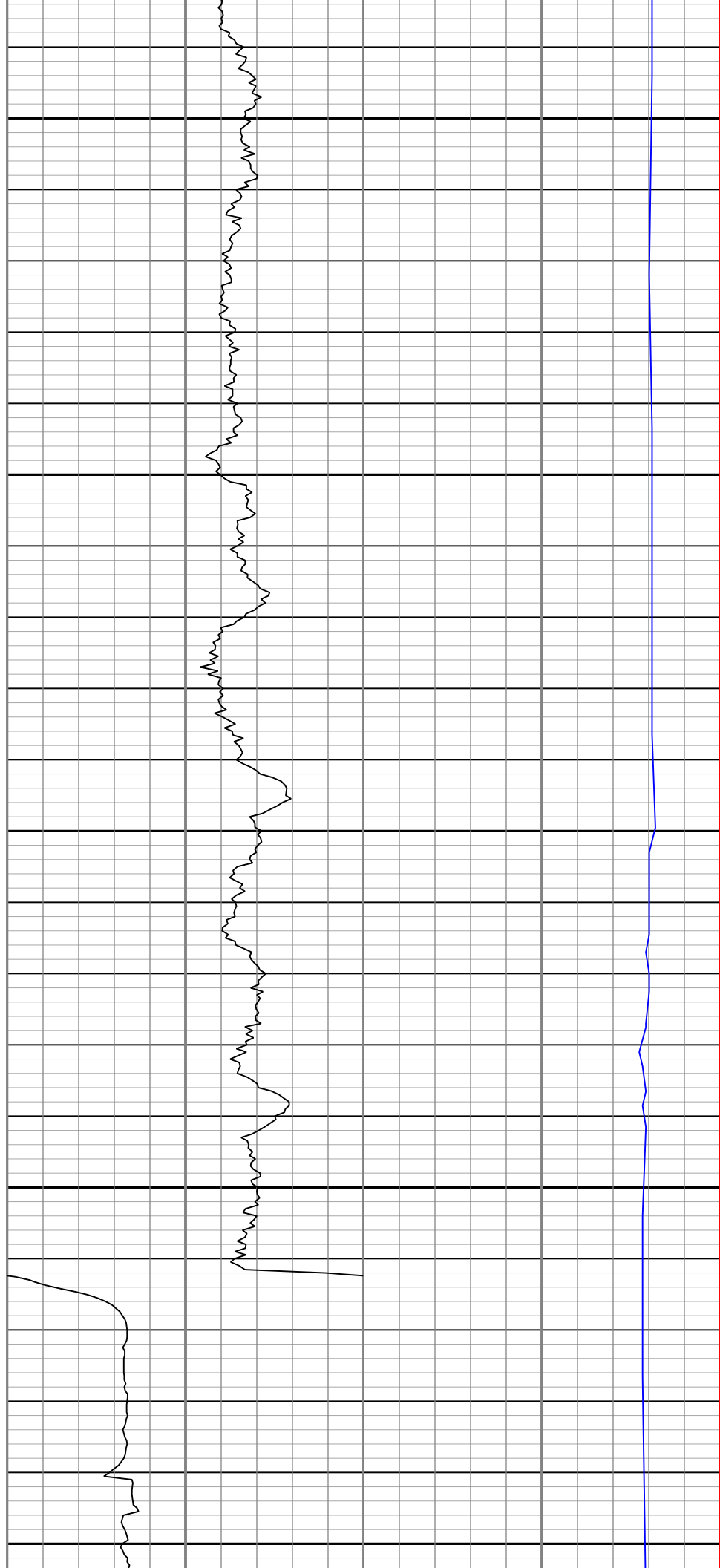
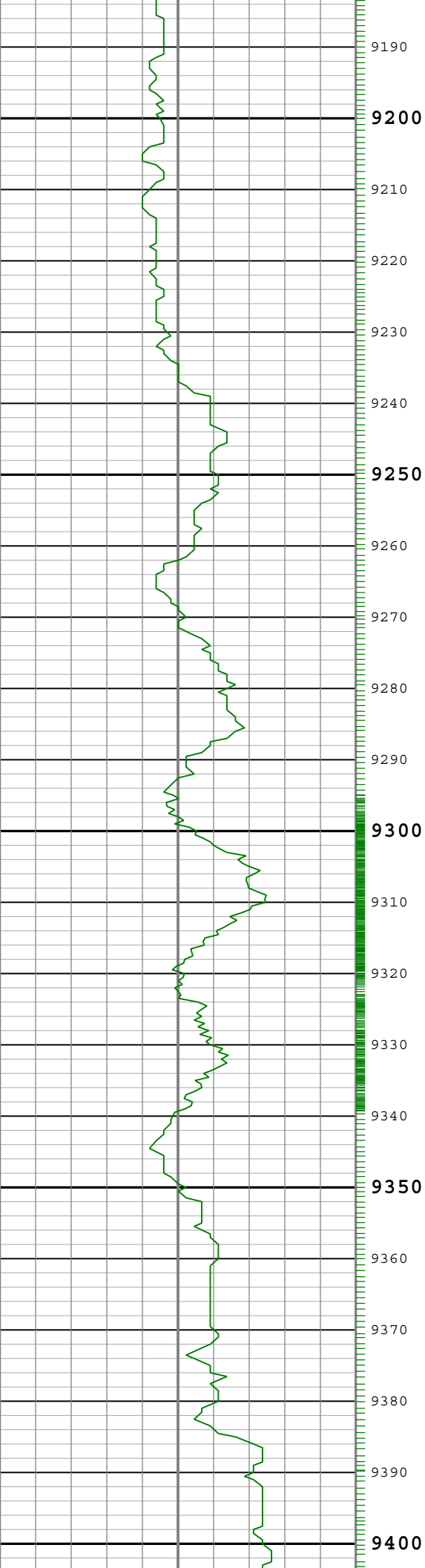


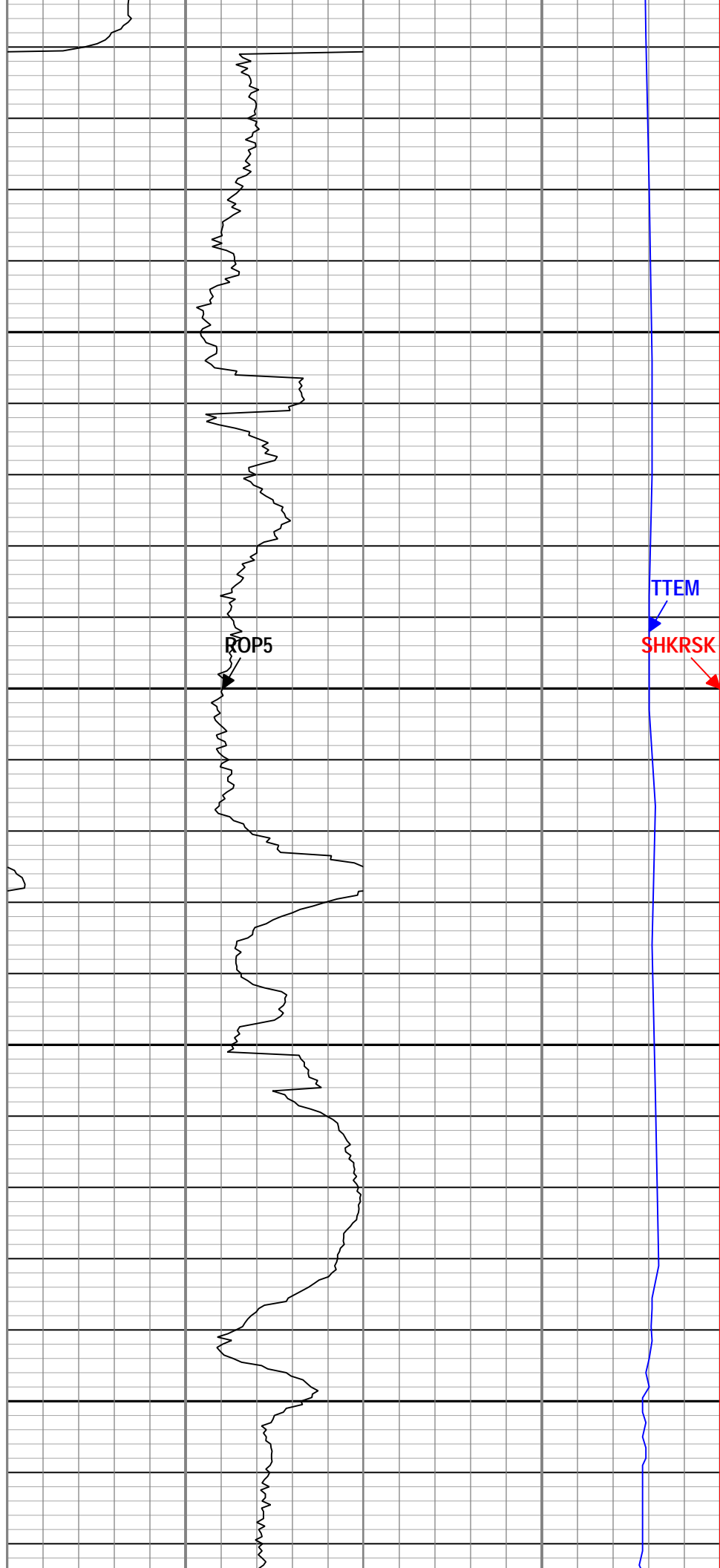
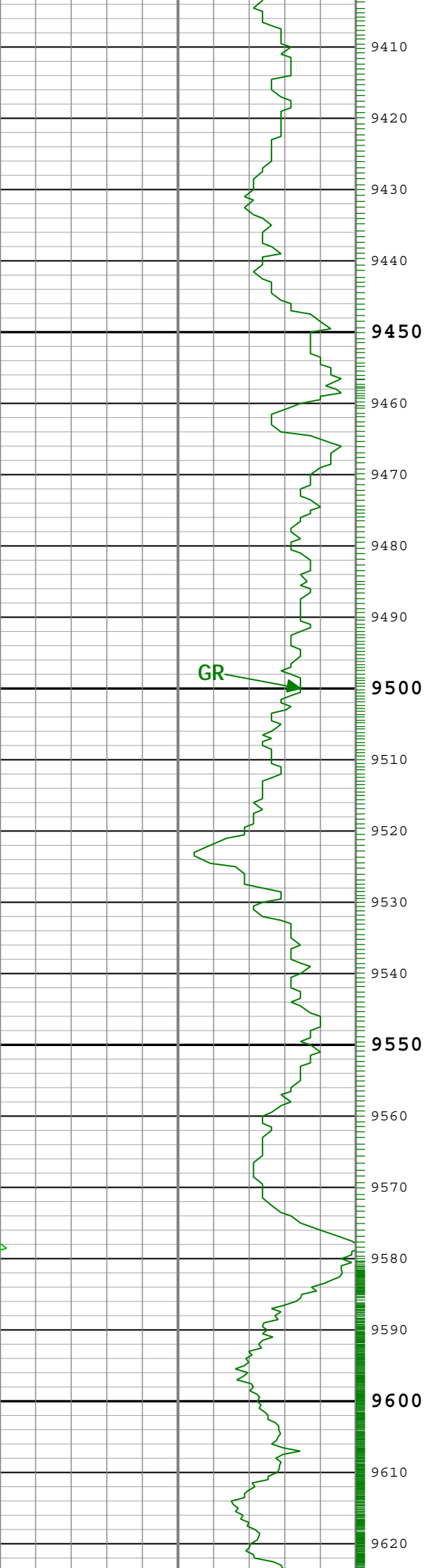


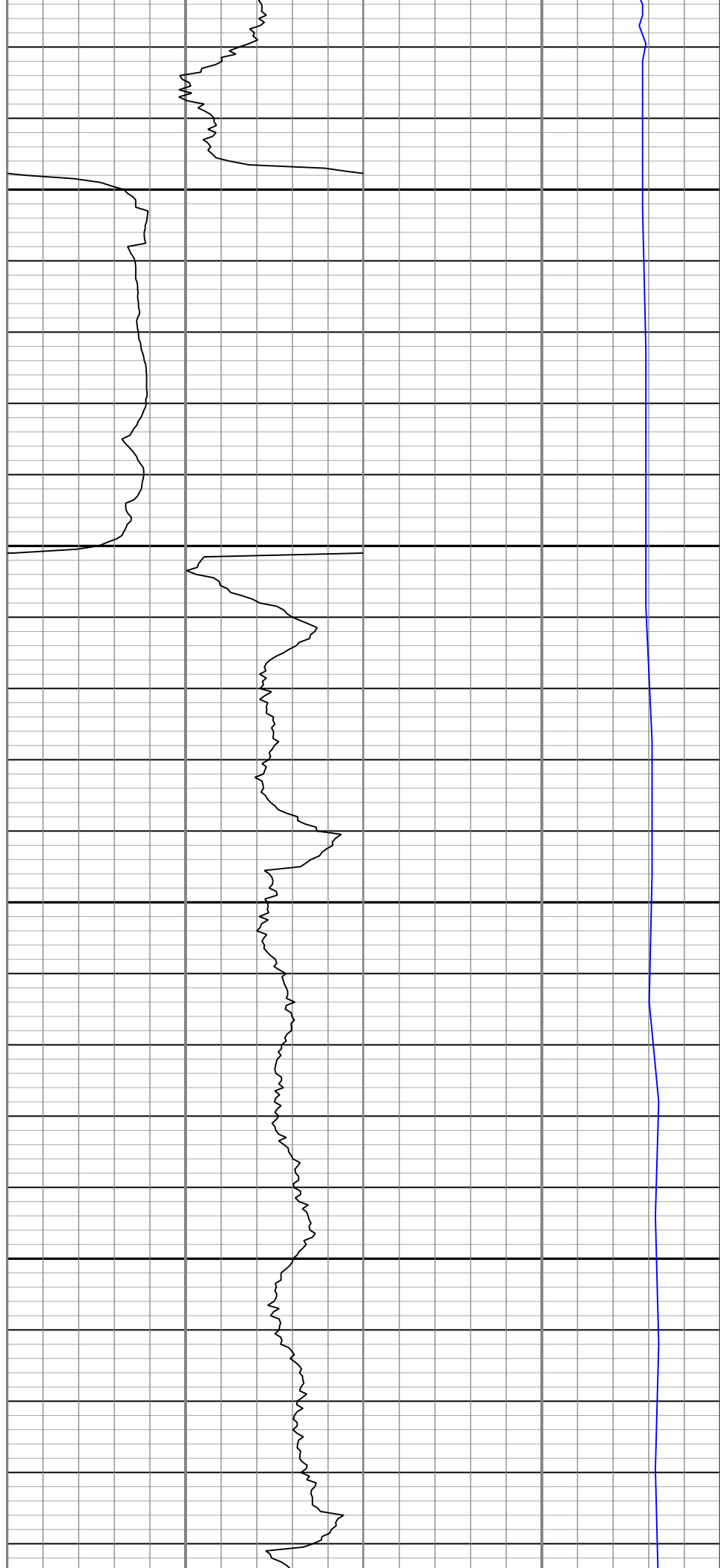
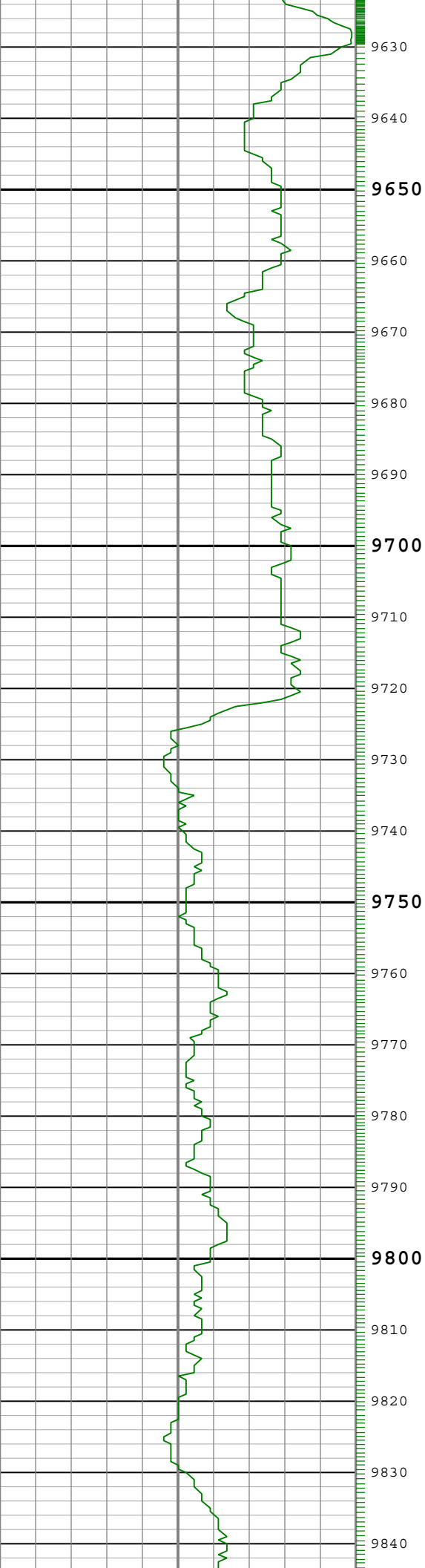


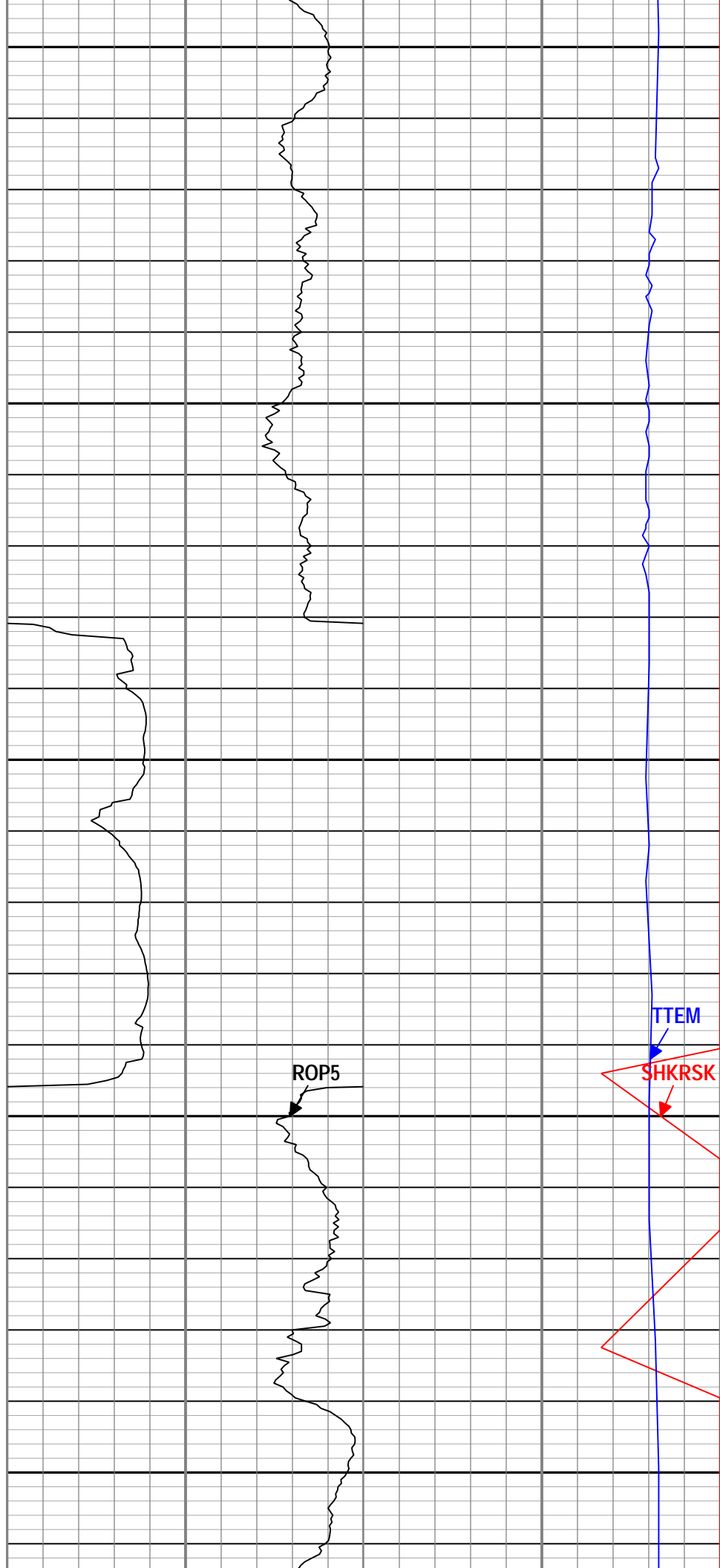
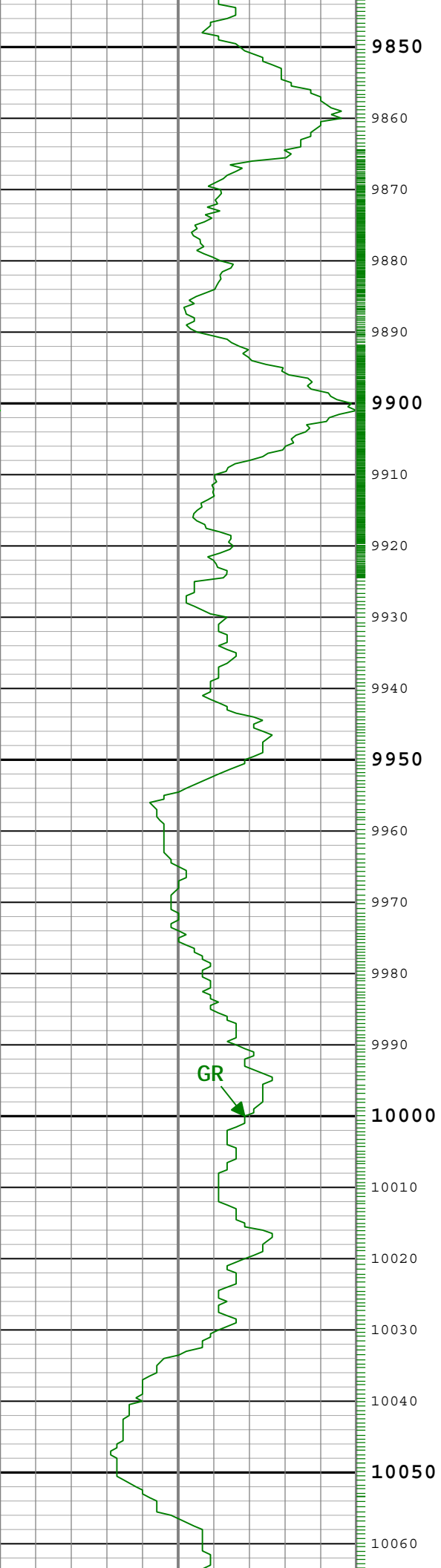


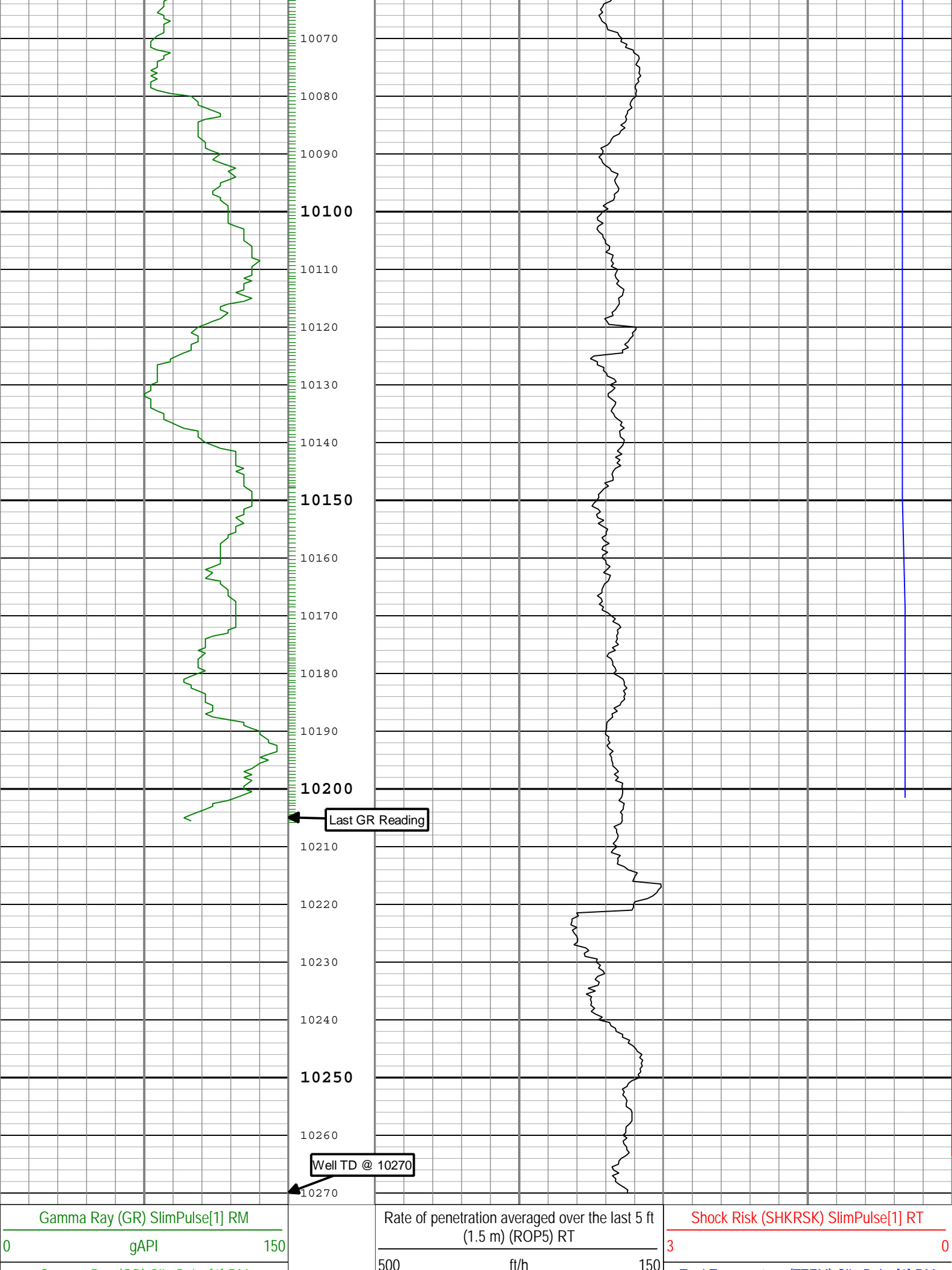












Gamma Ray (GR) SlimPulse[1] RM			Tool Temperature (TTEM) SlimPulse[1] RM		
150	gAPI	300	50	degF	250
Gamma Ray (GR) SlimPulse[1] RM					
300	gAPI	450			
Gamma Ray (GR) SlimPulse[1] RM					
450	gAPI	600			
Gamma Ray (GR) SlimPulse[1] RM					
600	gAPI	750			
└ TICKS_GR - Gamma Ray Tick Marks SlimPulse[1] 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: 25-Sep-2014 16:08:15

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	1174	1223
BS	8.75	1223	5133

All depth are actual.

Run001Time Zoned Parameters

Pass Drilling

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	9	26-Aug-2014 00:59:17	26-Aug-2014 03:00:00	1223.25	1674.92
DFD	8.65	26-Aug-2014 03:00:00	26-Aug-2014 13:00:00	1674.92	3729
DFD	8.85	26-Aug-2014 13:00:00	26-Aug-2014 23:19:28	3729	5133

All depth are at tool zero.

Run002: Parameters

Parameter	Description	Tool	Value	Unit
BS	Bit Size	DNMSESSION	8.75	in
DFD	Drilling Fluid Density	Borehole	Time Zoned	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

Run002Time Zoned Parameters

Pass Drilling

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	9.35	27-Aug-2014 08:19:52	27-Aug-2014 14:00:00	5130	5465.58
DFD	10.5	27-Aug-2014 14:00:00	28-Aug-2014 07:16:20	5465.58	6086.75

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	Time Zoned	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

Run003Depth Zoned Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	8.75	5919.51	6086
BS	6.125	6086	10270
All depth are actual.			

Run003Time Zoned Parameters

Pass Drilling

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	9.7	29-Aug-2014 16:29:47	30-Aug-2014 03:00:00	6000.33	7406
DFD	9.9	30-Aug-2014 03:00:00	30-Aug-2014 13:00:00	7406	8709.83
DFD	9.7	30-Aug-2014 13:00:00	31-Aug-2014 03:00:00	8709.83	9937.5
DFD	9.75	31-Aug-2014 03:00:00	31-Aug-2014 16:03:32	9937.5	10272.25
All depth are at tool zero.					

Tool Control Parameters

Calibration Report

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

Primary Equipment :

Elec. cartridge, 150C max with GR

SPEC

6028

GRGain - Gamma Ray: Blanket

Master (Time Frame File): 12:00:00 07-May-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Gamma Ray Calibration Gain		Master	1.0000	0.9000	1.0518	1.1000	

SPULSE-GEN (SlimPulse with Generic Collar) Calibration - Run Run002

Primary Equipment :

Elec. cartridge, 150C max with GR

SPEC

6061

GRGain - Gamma Ray: Blanket

Master (Time Frame File): 12:00:00 02-Apr-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit				
Gamma Ray Calibration Gain		Master	1.0000	0.9000	1.0572	1.1000				

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

Primary Equipment :

Elec. cartridge, 150C max with GR

SPEC

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 LD03-65-1HN

Field: Wattenberg

County: Weld

State: Colorado

Country: USA



