

SlimPulse - Gamma Ray

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

Recorded Mode, Composite Log

Schlumberger

Company: Noble Energy

Well: Rohn State LD03-63HN

Field: Wattenberg

County: Weld

State: Colorado

Country: USA

Section: 04 APIN: 05-123-37453

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' 42.636" Northing: 1530650.261 ft US

FL2: Longitude: W 103° 51' 40.86" Easting: 3453806.929 ft US

Log Measured From: - Kelly Bushing: 4729.00 ft

Ground Level/Drill Floor: 4705.00 ft

Permanent Datum: - Mean Sea Level

Acquisition Dates: 21-Sep-2014 -- 27-Sep-2014

Other Services:

Log Interval: 12 13.00(ft) to 10 168.00(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: 20-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.

Contents

1. Header
2. Disclaimer
3. Contents
4. Borehole Size/Casing/Tubing Record
5. Operational Run Summary
6. Borehole Fluids
7. Remarks and Equipment Summary
8. Well Composite 1 in / 100 ft Measured Depth Log
 - 8.1 Integration Summary
 - 8.2 Composite Summary
 - 8.3 Log (SlimPulse Gamma Ray Final MD)
 - 8.4 Parameter Listing
9. Well Composite 5 in / 100 ft Measured Depth
 - 9.1 Integration Summary
 - 9.2 Composite Summary
 - 9.3 Log (SlimPulse Gamma Ray Final MD)
 - 9.4 Parameter Listing

10. Calibration Report
11. Tail

Borehole Size/Casing Record

Bit						
Bit Size (in)	13.5	8.75	6.125			
Top Driller (ft)	24	1213	6030			
Bottom Driller (ft)	1213	6030	10168			
Casing						
Size (in)	9.58	7				
Weight (lbm/ft)	36	26				
Inner Diameter (in)	8.921	6.276				
Grade	J55	N/A				
Top Driller (ft)	24	24				
Bottom Driller (ft)	1213	6020				

Operational Run Summary

Parameter (unit)	Run001	Run002	Run003			
Date Log Started	21-Sep-2014	22-Sep-2014	25-Sep-2014			
Time Log Started	19:27:54	22:19:19	01:29:03			
Date Log Finished	22-Sep-2014	23-Sep-2014	27-Sep-2014			
Time Log Finished	16:44:12	23:12:20	17:26:55			
Bit Size (in)	8.750	8.750	6.125			
Bit Start Depth (ft)	1213.00	5071.00	6030.00			
Bit Stop Depth (ft)	5071.00	6030.00	10168.00			
Top Log Interval (ft)	1213.00	5009.00	5970.00			
Bottom Log Interval (ft)	5009.00	5970.00	10101.00			
Max Hole Deviation (deg)	10.94	80.47	93.03			
Azimuth of Max Deviation (deg)	153.78	89.36	90.23			
Logging Unit Number	Command Center	Command Center	Command Center			
Logging Unit Location	Zone 2	Zone 2	Zone 2			
Recorded By	Dennis Lipcovski	Dennis Lipcovski	Dennis Lipcovski			
Witnessed By	Maria Valles	Maria Valles	Maria Valles			
Service Order Number	14CCO0653	14CCO0653	14CCO0653			

Borehole Fluids

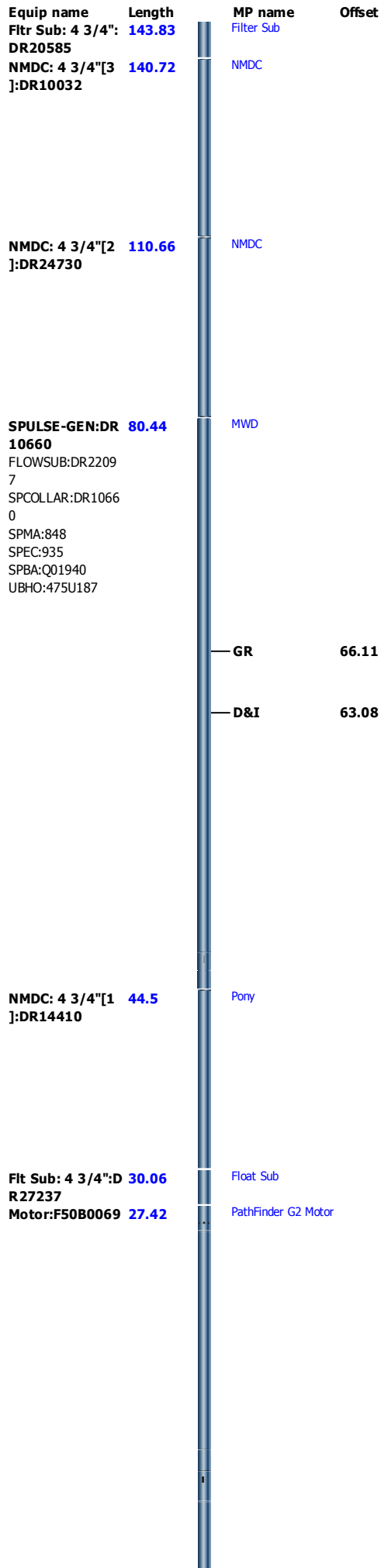
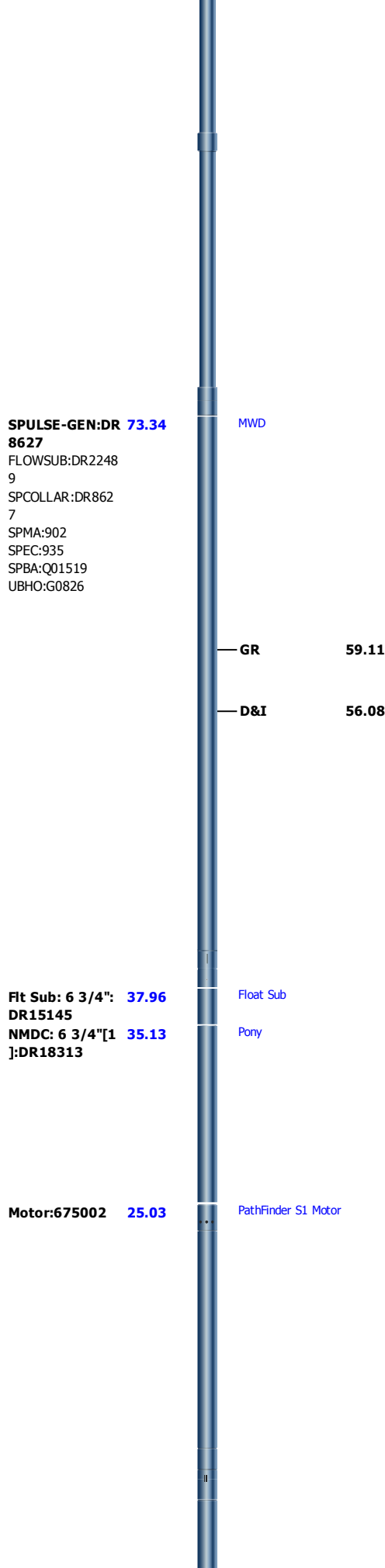
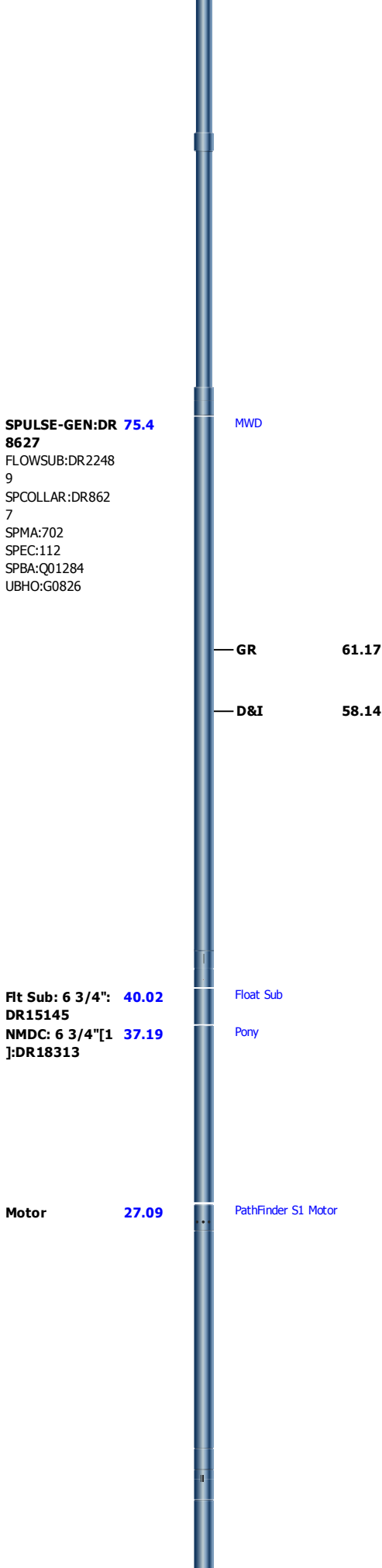
Parameter(unit)	Run001	Run002	Run003			
Fluid Type	Water	Water	Water			
Max Recorded Temperatures (degF)	96	120	120			
Source of Sample	Active Tank	Active Tank	Active Tank			
Salinity (ppm)	34972.17	34972.17	34972.17			

Density (lbm/gal)	9.5	Zoned	10.5			
Funnel Viscosity (s)	29	44	40			
Fluid Loss (cm3)						
PH	12.1	10.3	9.7			
Source RMF	Pressed	Pressed	Pressed			
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 (%)	2.2	4.2	10.8			
High Gravity Solids (%)	1.3	1.5	7.3			

Run002

Remarks and Equipment Summary

Run001: Remarks	Run002: Remarks	Run003: Remarks
Run Objective: Drill Vertical and Curve Section	Run Objective: Drill Vertical and Curve Section	Run Objective: Drill Lateral Section.
Bit to GR: 61.17 ft. Bit to D&I: 58.14 ft.	Bit to GR: 59.11 ft. Bit to D&I: 56.08 ft.	Bit to GR: 66.11 ft. Bit to D&I: 63.08 ft.
Drilled from: 1213 ft MD to 5071 ft MD. Logged from: 1213 ft MD to 5009 ft MD.	Drilled from: 5071 ft MD to 6030 ft MD. Logged from: 5009 ft MD to 5970 ft MD.	Drilled from: 6030 ft MD to 10168 ft MD. Logged from: 5970 ft MD to 10101 ft MD.
SlimPulse Software: v11.0C00 SlimPulse D&I calibrated on: 13-Aug-2013 SlimPulse GR calibrated on: 4-March-2014	SlimPulse Software: v11.0C00 SlimPulse D&I calibrated on: 1-May-2014 SlimPulse GR calibrated on: 11-May-2014	SlimPulse Software: v11.0C00 SlimPulse D&I calibrated on: 1-May-2014 SlimPulse GR calibrated on: 11-May-2014
PathFinder a Schlumberger Co. Personnel: DD: Jordan Timbs & Tony Butler. MWD: Dennis Lipcovski & Maria Valles.	PathFinder a Schlumberger Co. Personnel: DD: Jordan Timbs, Kenneth Perry & Tony Butler. MWD: Dennis Lipcovski & Maria Valles.	PathFinder a Schlumberger Co. Personnel: DD: Jordan Timbs, Kenneth Perry & Tony Butler. MWD: Dennis Lipcovski, Chad Welty & Maria Valles.
Reason for POOH: Pulled out of hole to change MWD.	Reason for POOH: Finished Curve Section.	Reason for POOH: Well TD.



Generic PDC Bit **0.7**
:JJ1353

SMITH:MDI519

TOOL_ZERO

Lengths are in ft

Maximum Outer Diameter = 8.750 in

Line: Sensor Location, Value: Gating Offset

All measurements are relative to TOOL_ZERO

Generic PDC Bit **0.63**
:JJ1749

SMITH:MDI519

TOOL_ZERO

Lengths are in ft

Maximum Outer Diameter = 8.750 in

Line: Sensor Location, Value: Gating Offset

All measurements are relative to TOOL_ZERO

Generic PDC Bit: **0.55**
JJ5085

SMITH:SDI513

TOOL_ZERO

Lengths are in ft

Maximum Outer Diameter = 6.125 in

Line: Sensor Location, Value: Gating Offset

All measurements are relative to TOOL_ZERO

Well Composite

1 in / 100 ft Measured Depth Log

Composite Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Include Parallel Data
Run001	Drilling	Down	1213.08 ft	5071.00 ft	21-Sep-2014 11:51:22 PM	22-Sep-2014 4:44:12 PM	No
Run002	Drilling	Down	5071.25 ft	6032.50 ft	23-Sep-2014 2:35:30 AM	23-Sep-2014 11:12:20 PM	No
Run002	Ream Down 1	Down	4686.08 ft	5071.17 ft	23-Sep-2014 12:47:21 AM	23-Sep-2014 2:35:30 AM	No
Run003	Drilling	Down	6030.00 ft	10168.92 ft	25-Sep-2014 7:40:49 AM	27-Sep-2014 5:26:55 PM	No

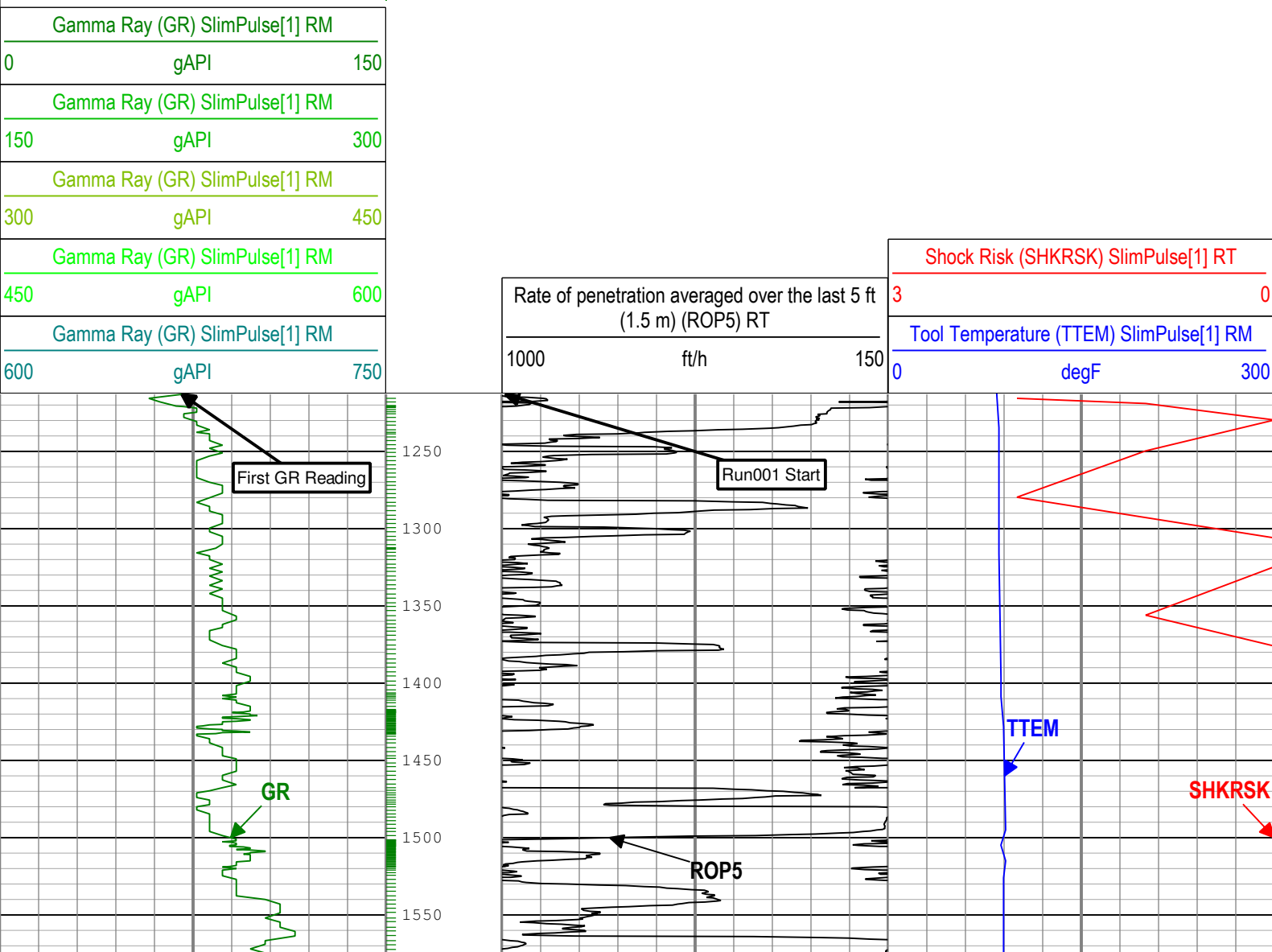
All depths are referenced to toolstring zero

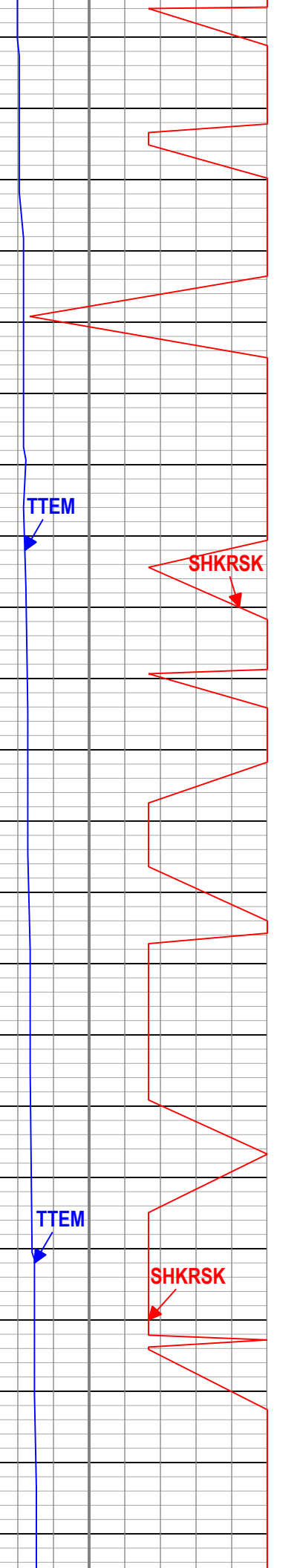
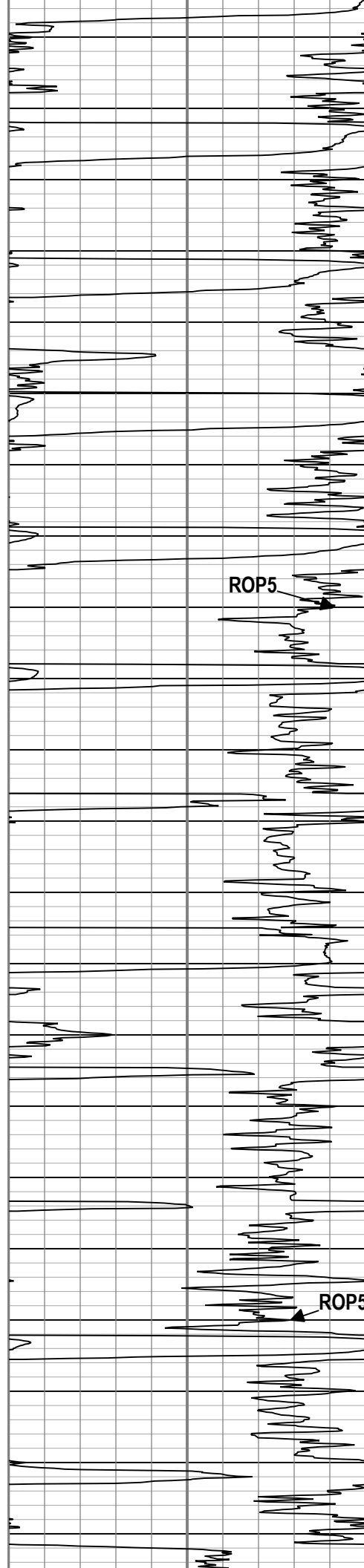
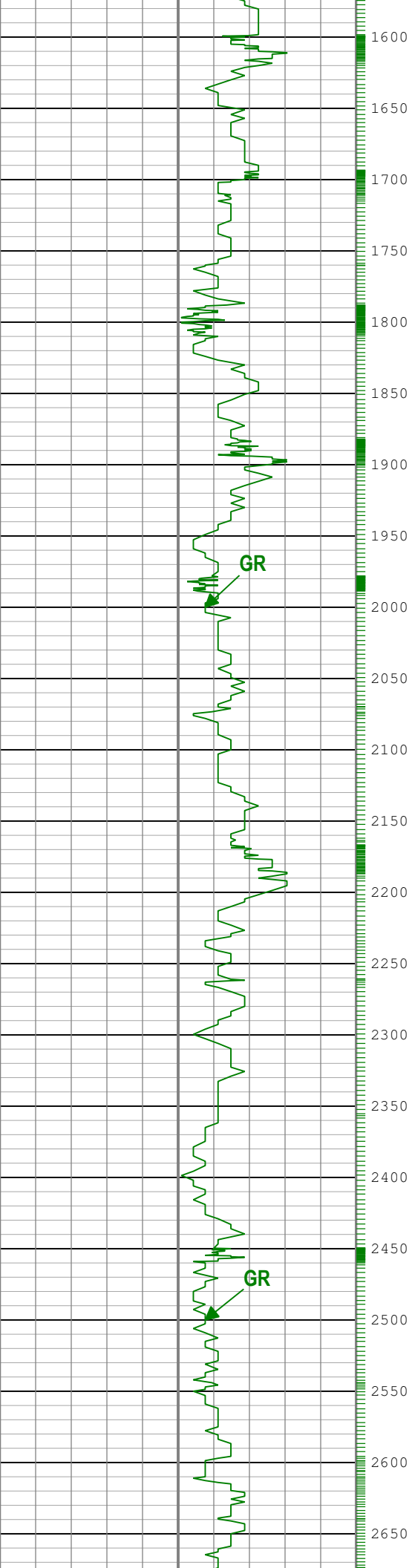
Log

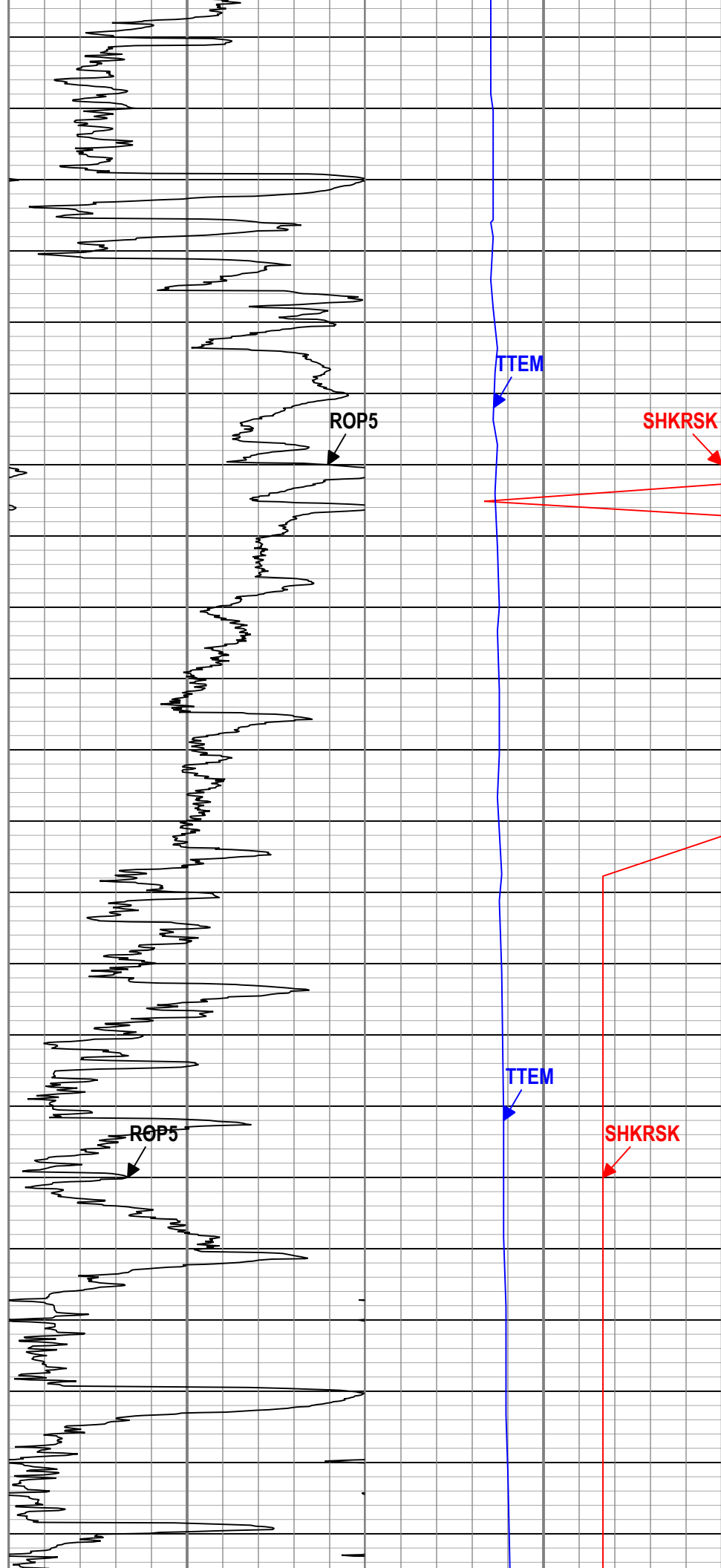
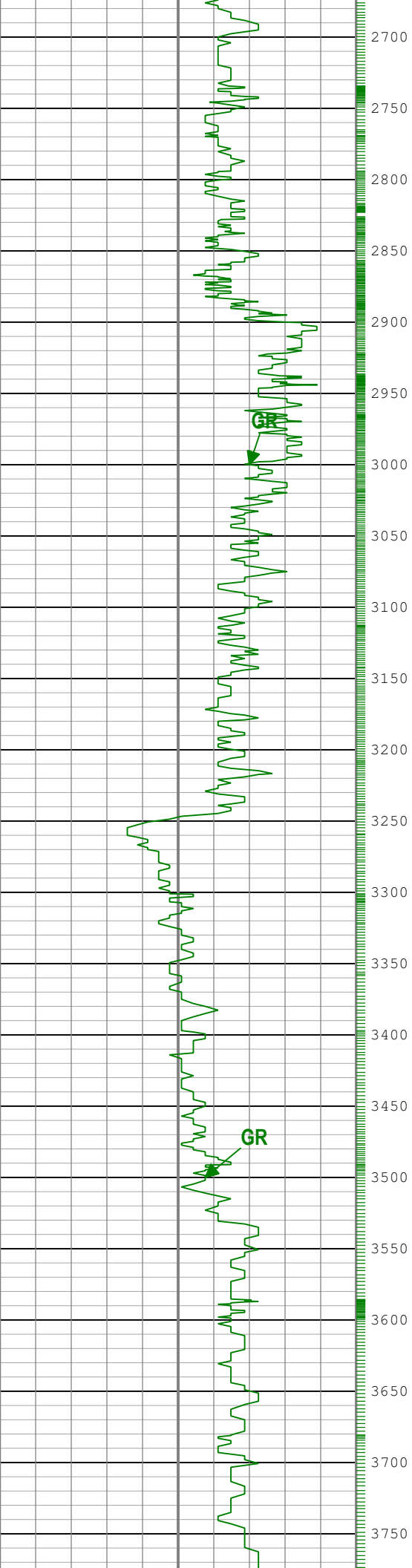
Company:Noble Energy Well:Rohn State LD03-63HN
Well Composite:S130

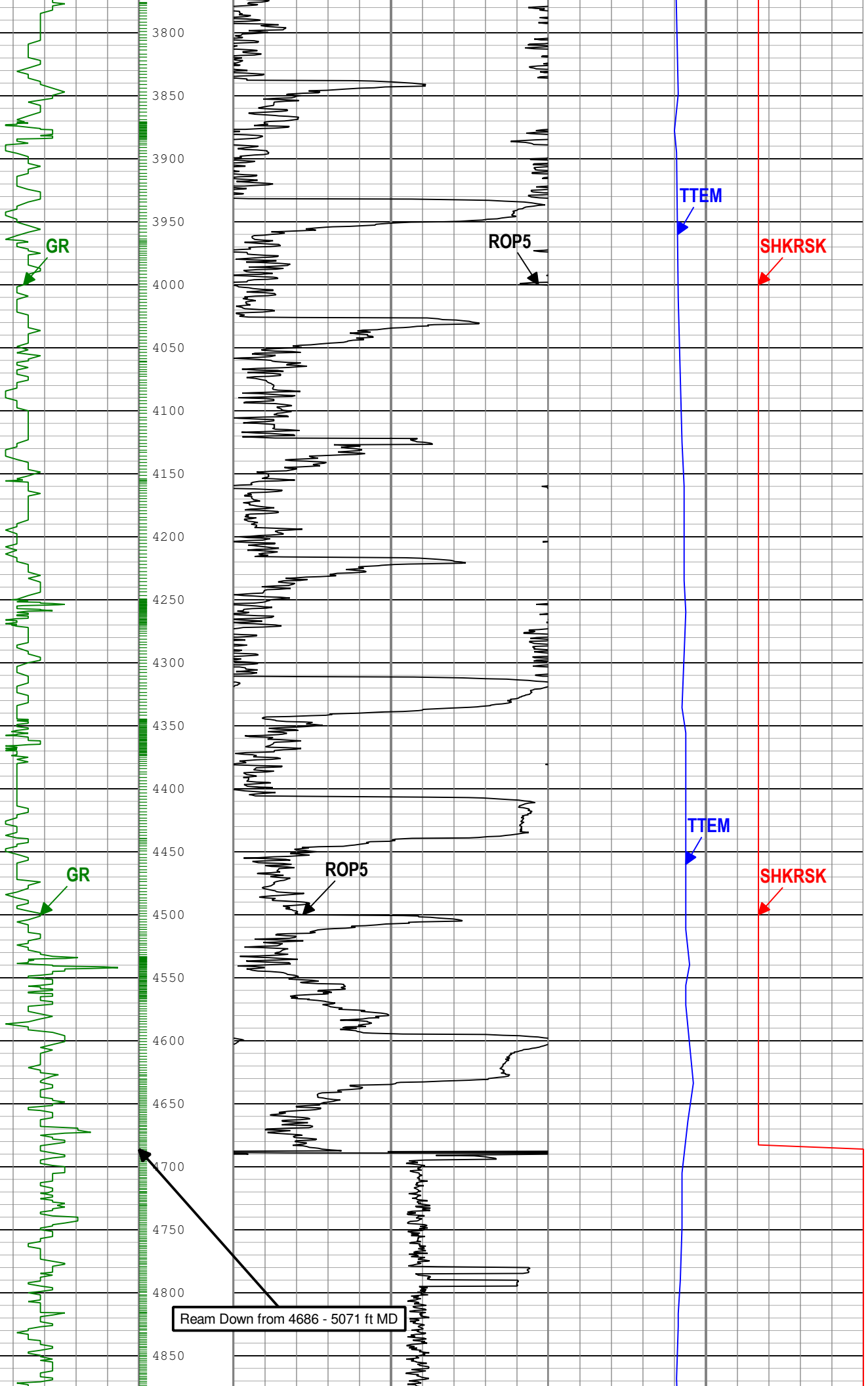
Description: SlimPulse Gamma Ray 1 Format: Log (SlimPulse Gamma Ray Final MD) Index Scale: 1 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 29-Sep-2014 11:02:55

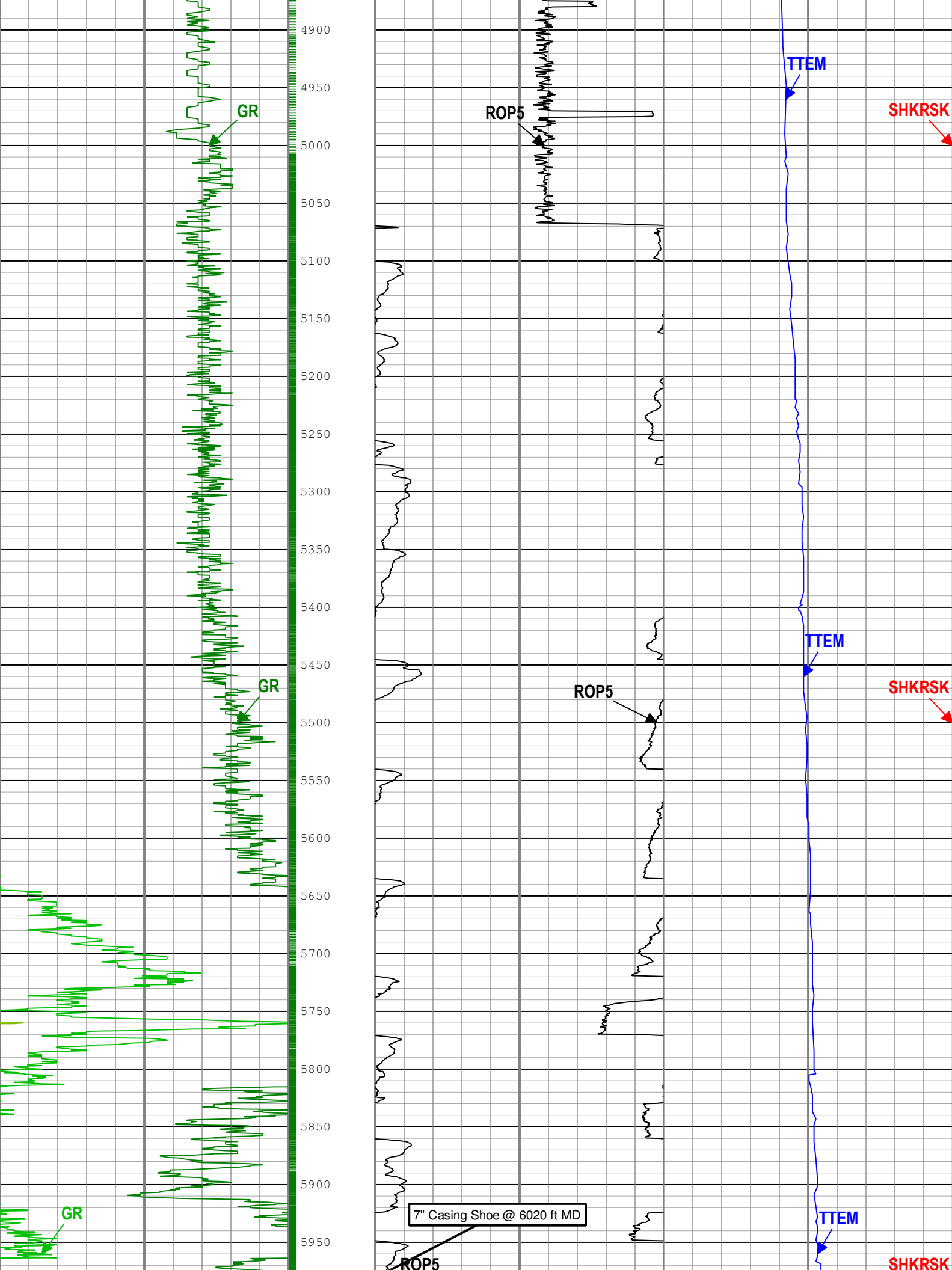
TICKS_GR - Gamma Ray Tick Marks SlimPulse[1] RM

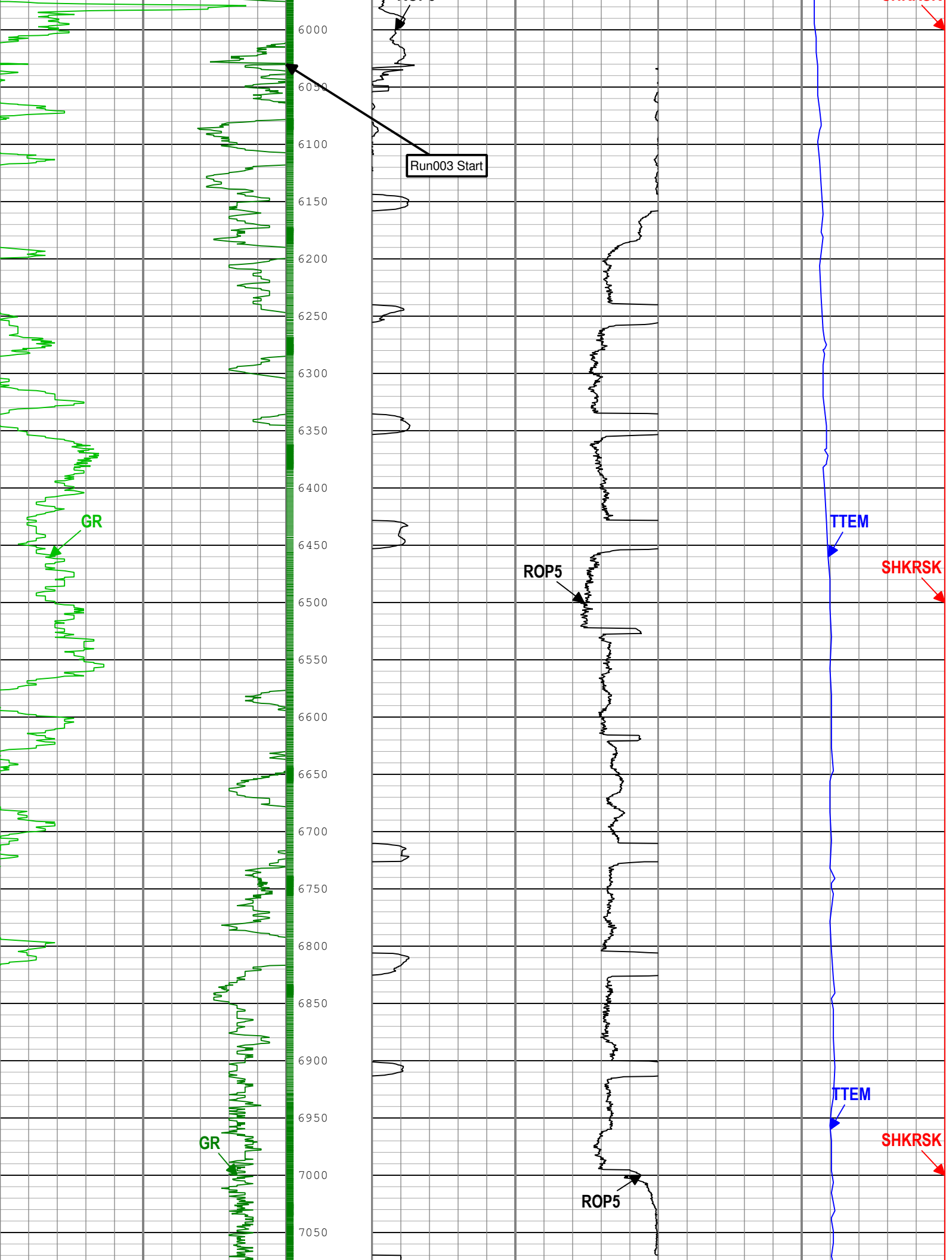


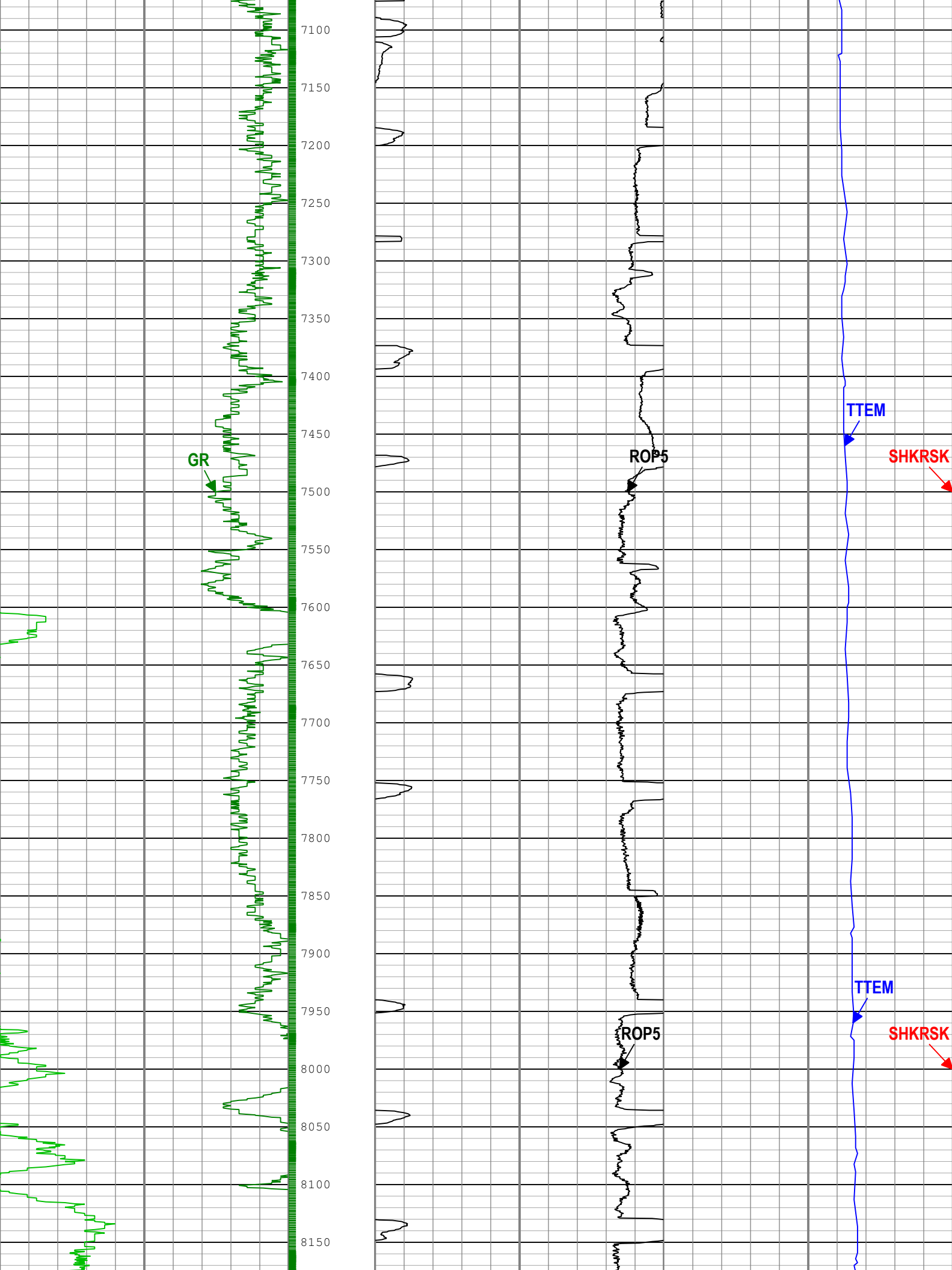


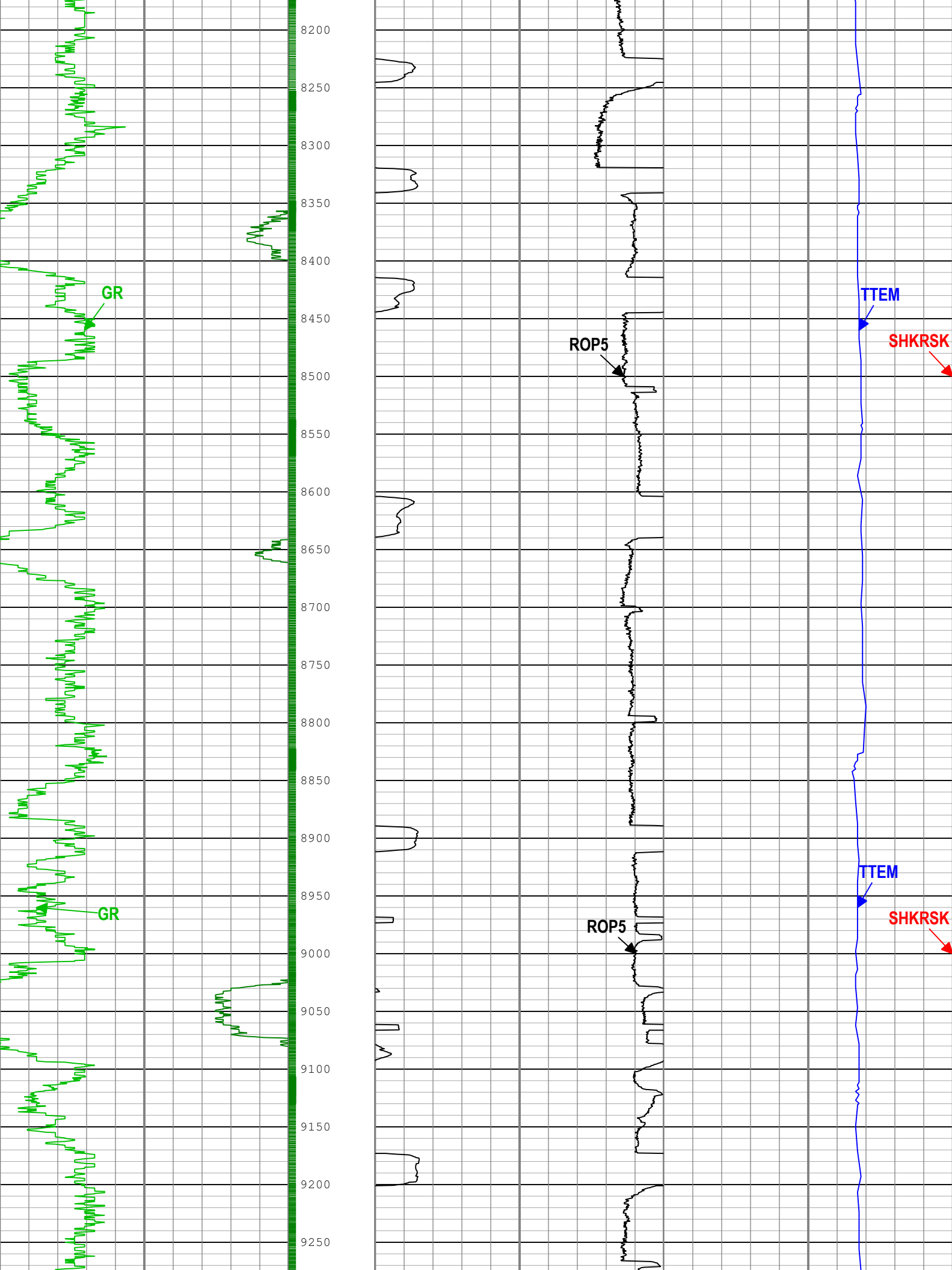


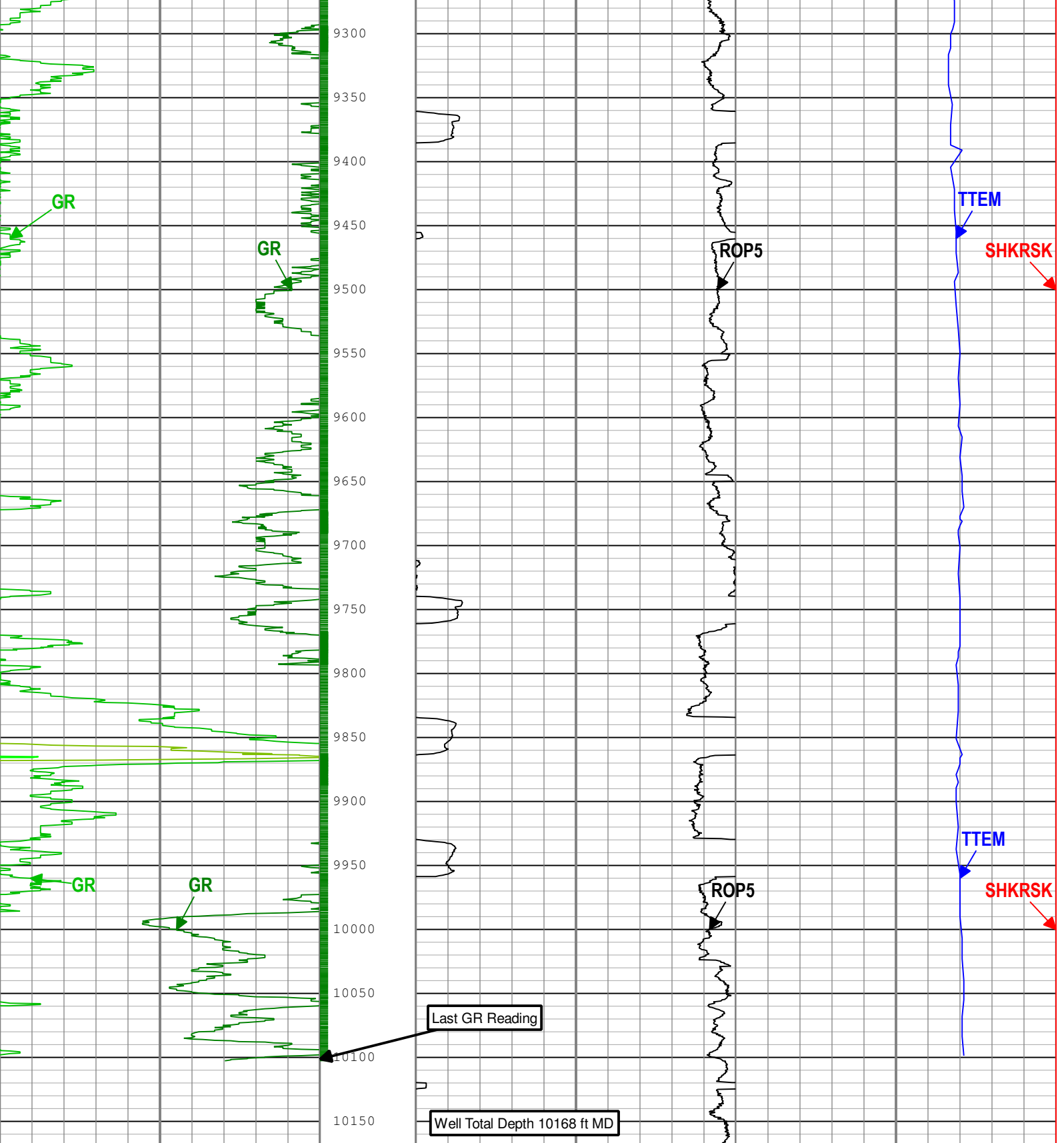












Gamma Ray (GR) SlimPulse[1] RM		
0	gAPI	150
Gamma Ray (GR) SlimPulse[1] RM		
150	gAPI	300
Gamma Ray (GR) SlimPulse[1] RM		
300	gAPI	450
Gamma Ray (GR) SlimPulse[1] RM		
450	gAPI	600

Rate of penetration averaged over the last 5 ft (1.5 m) (ROP5) RT		
1000	ft/h	150

Shock Risk (SHKRSK) SlimPulse[1] RT		
3		0
Tool Temperature (TTEM) SlimPulse[1] RM		
0	degF	300

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: 1 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 29-Sep-2014 11:02:55							
Channel Processing Parameters							
Run001: Parameters							
Parameter	Description	Tool	Value	Unit			
BS	Bit Size	DNMSESSION	Depth Zoned	in			
DFD	Drilling Fluid Density	Borehole	9.5	lbm/gal			
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT				
Run001Depth Zoned Parameters							
Parameter	Value	Start (ft)		Stop (ft)			
BS	13.5	1213		1213			
BS	8.75	1213		5071			
All depth are actual.							
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 Ream Down 1							
Parameter	Value	Start Time	Stop Time	Start Depth (ft)		Stop Depth (ft)	
DFD	9.5	23-Sep-2014 00:47:42	23-Sep-2014 02:35:30	4686.08		5071.17	
Pass Drilling							
DFD	9.5	23-Sep-2014 02:35:30	23-Sep-2014 07:57:54	5071.25		5454.08	
DFD	10.5	23-Sep-2014 07:57:54	23-Sep-2014 23:12:20	5454.08		6032.5	
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	10.5	lbm/gal			
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT				
Run003Depth Zoned Parameters							
Parameter	Value	Start (ft)		Stop (ft)			
BS	8.75	5886.17		6030			
BS	6.125	6030		10168			
All depth are actual.							
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

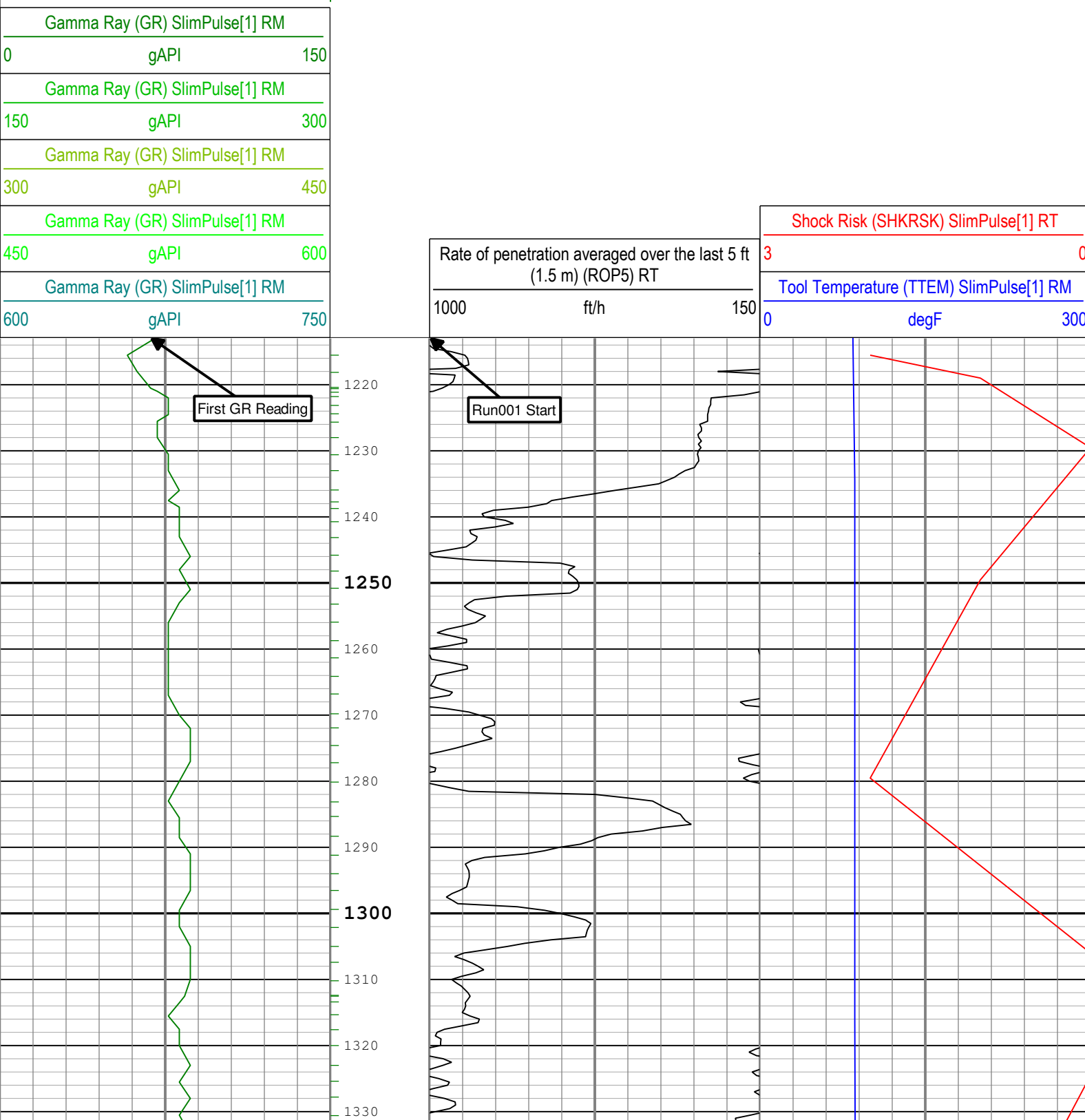
Run001	Drilling	Down	1213.08 ft	5071.00 ft	21-Sep-2014 11:51:22 PM	22-Sep-2014 4:44:12 PM	No
Run002	Drilling	Down	5071.25 ft	6032.50 ft	23-Sep-2014 2:35:30 AM	23-Sep-2014 11:12:20 PM	No
Run002	Ream Down 1	Down	4686.08 ft	5071.17 ft	23-Sep-2014 12:47:21 AM	23-Sep-2014 2:35:30 AM	No
Run003	Drilling	Down	6030.00 ft	10168.92 ft	25-Sep-2014 7:40:49 AM	27-Sep-2014 5:26:55 PM	No

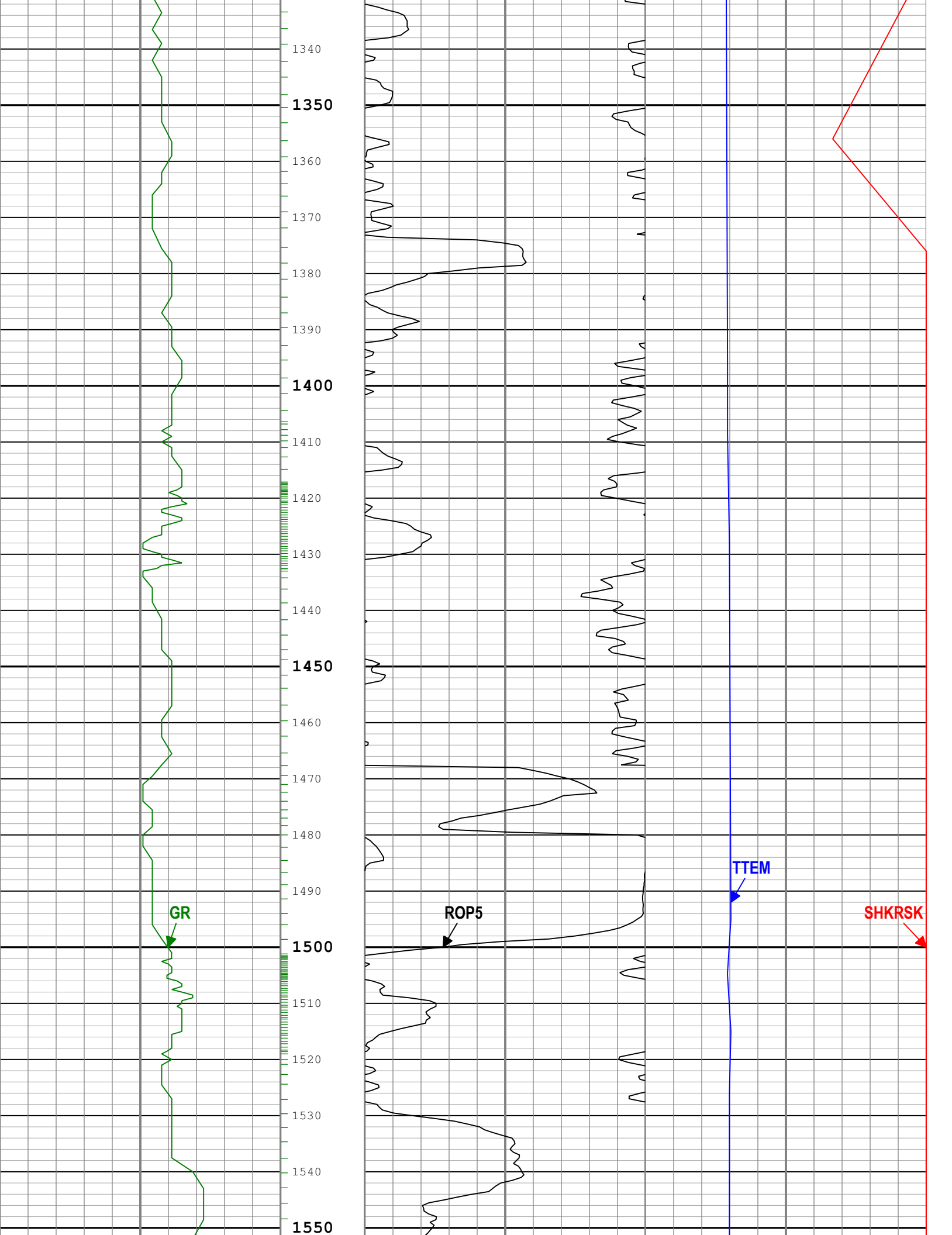
All depths are referenced to toolstring zero

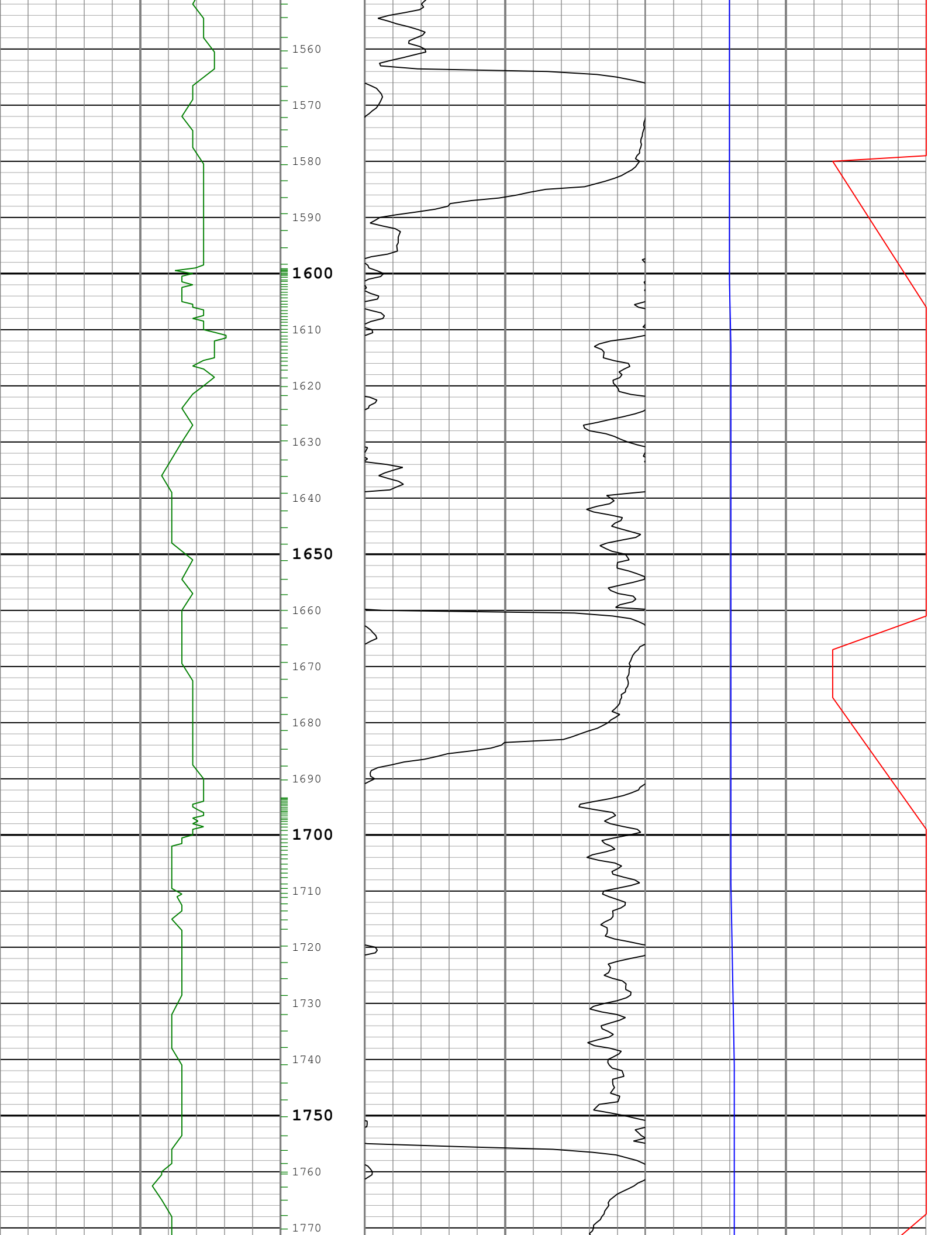
Log	Company:Noble Energy	Well:Rohn State LD03-63HN
	Well Composite:S130	

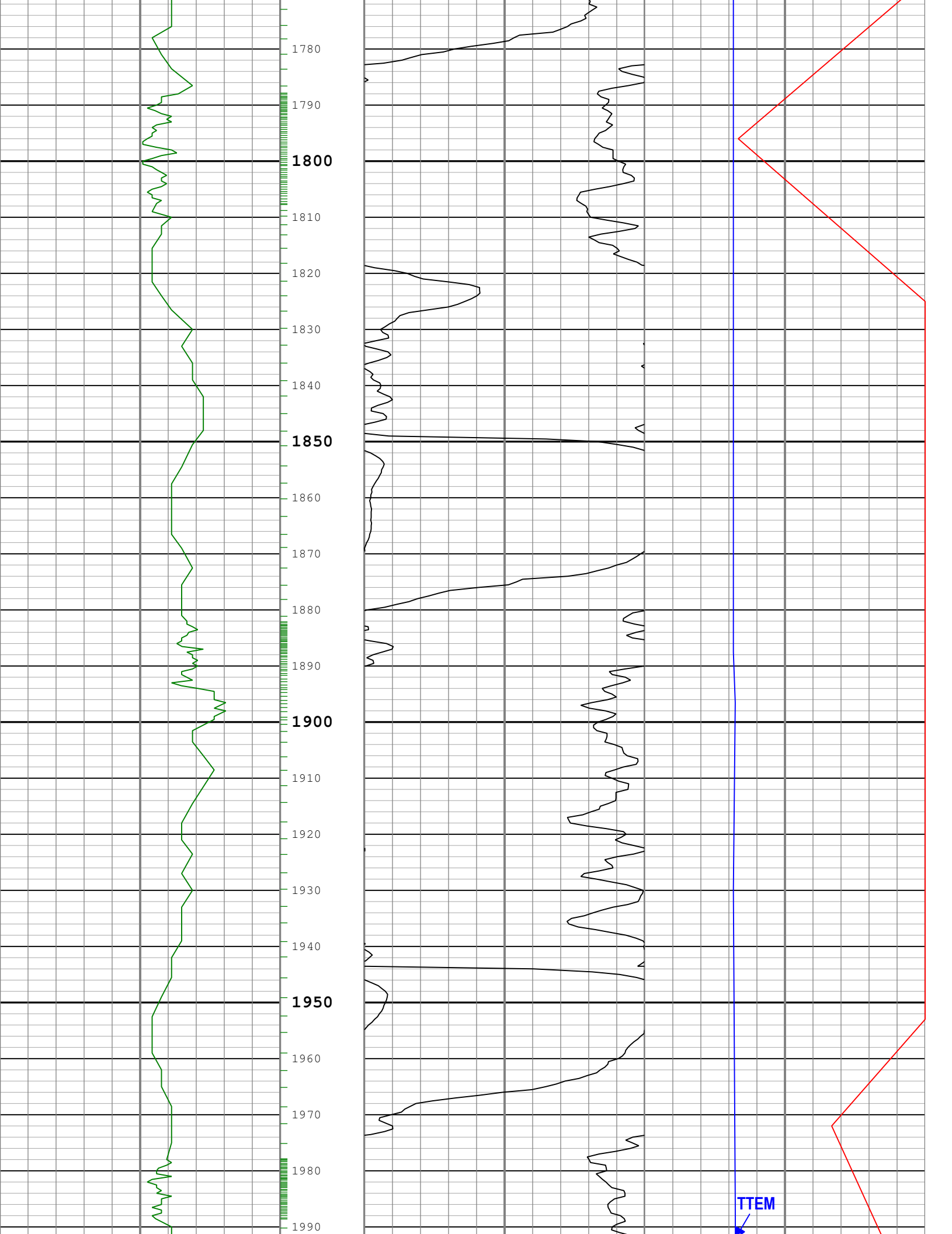
Description: SlimPulse Gamma Ray 1 Format: Log (SlimPulse Gamma Ray Final MD) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured
Depth Creation Date: 29-Sep-2014 11:02:57

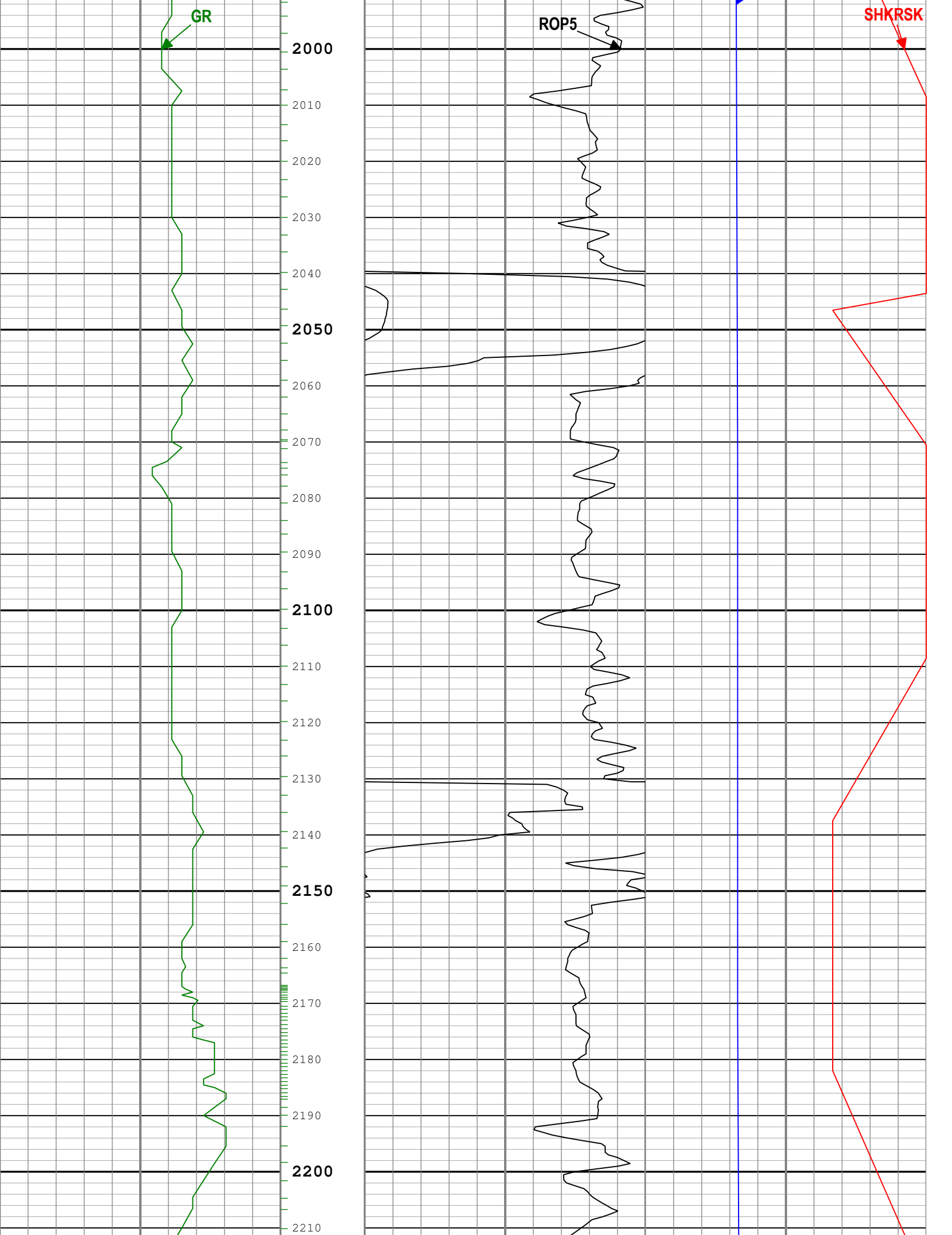
TICKS_GR - Gamma Ray Tick Marks SlimPulse[1] RM

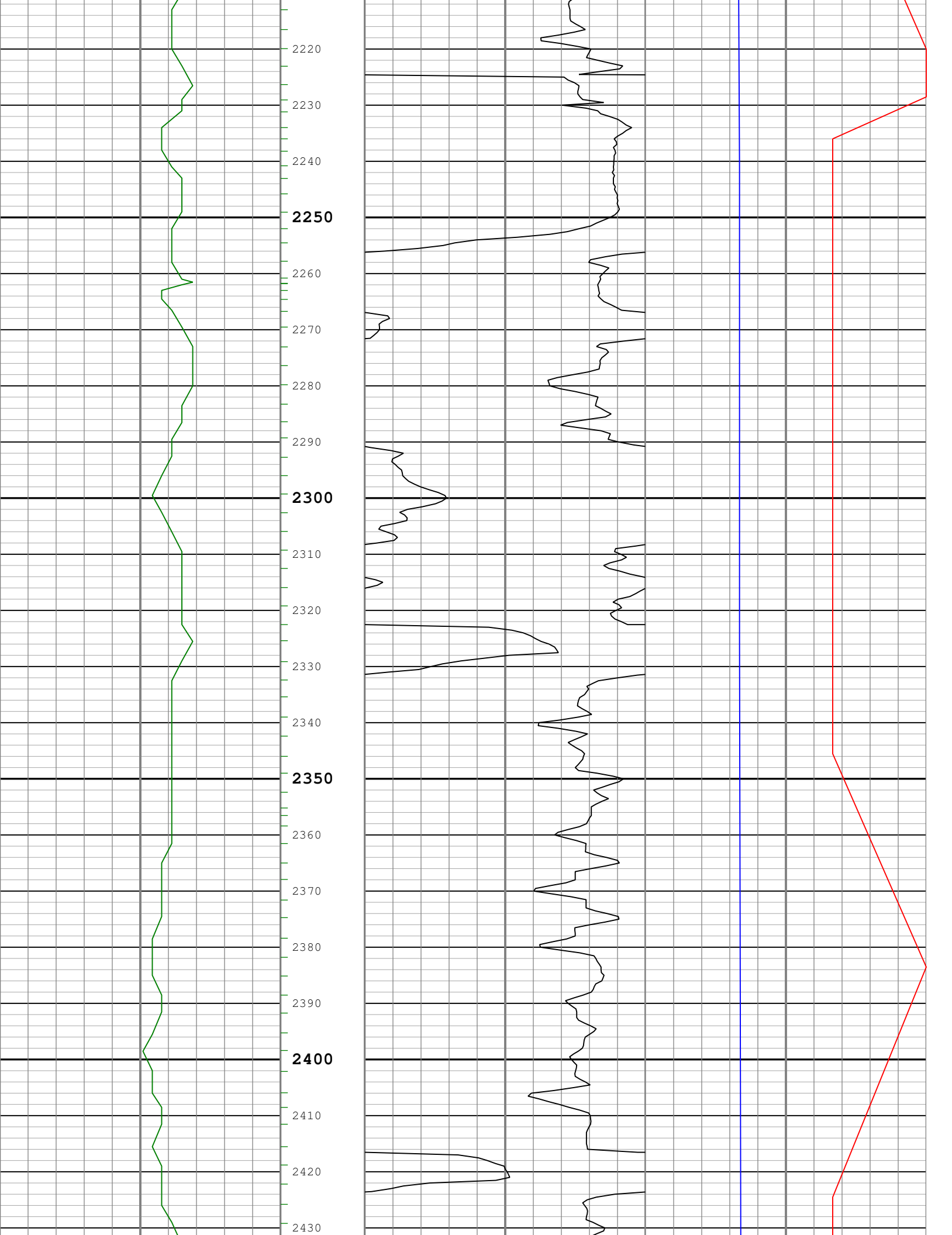


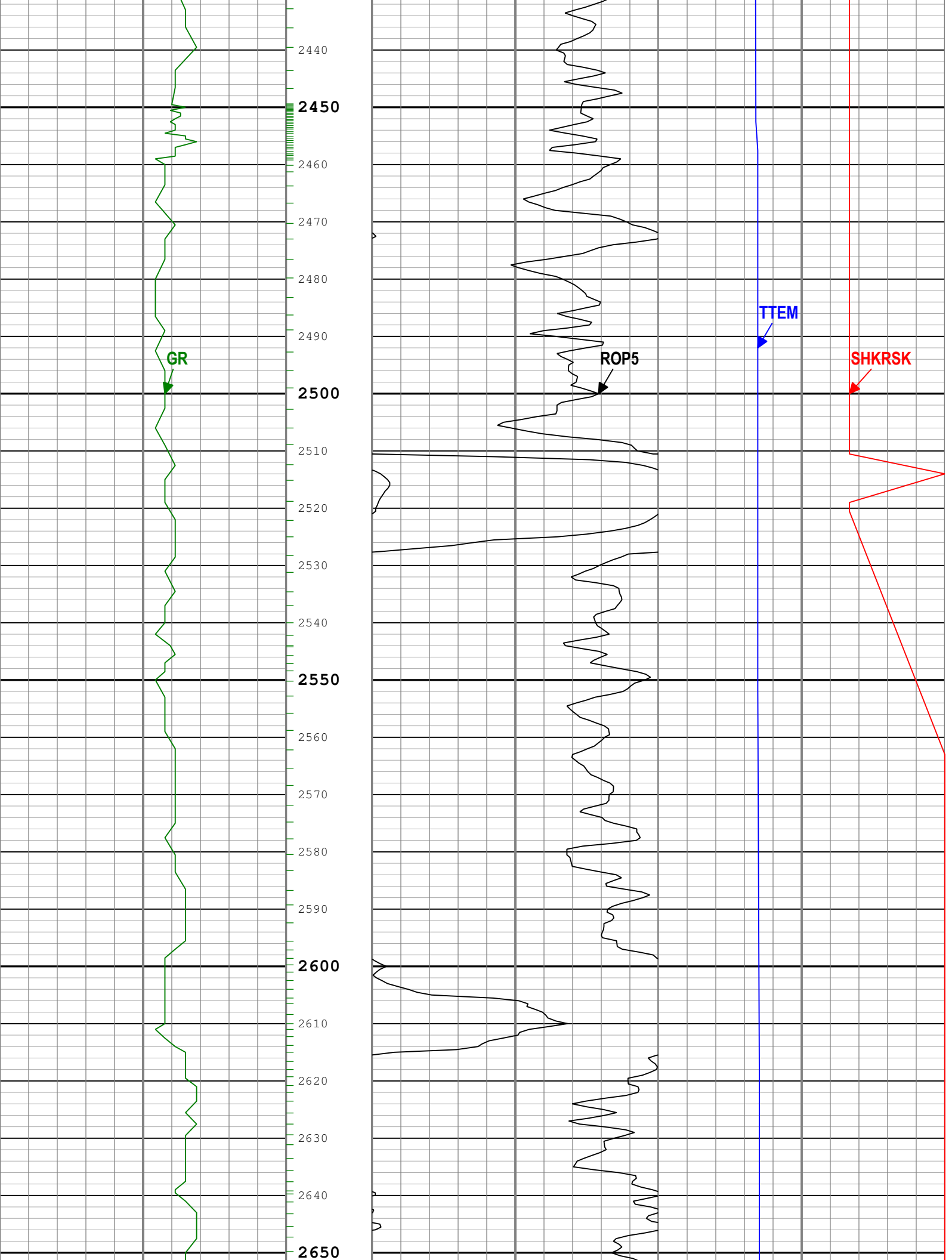


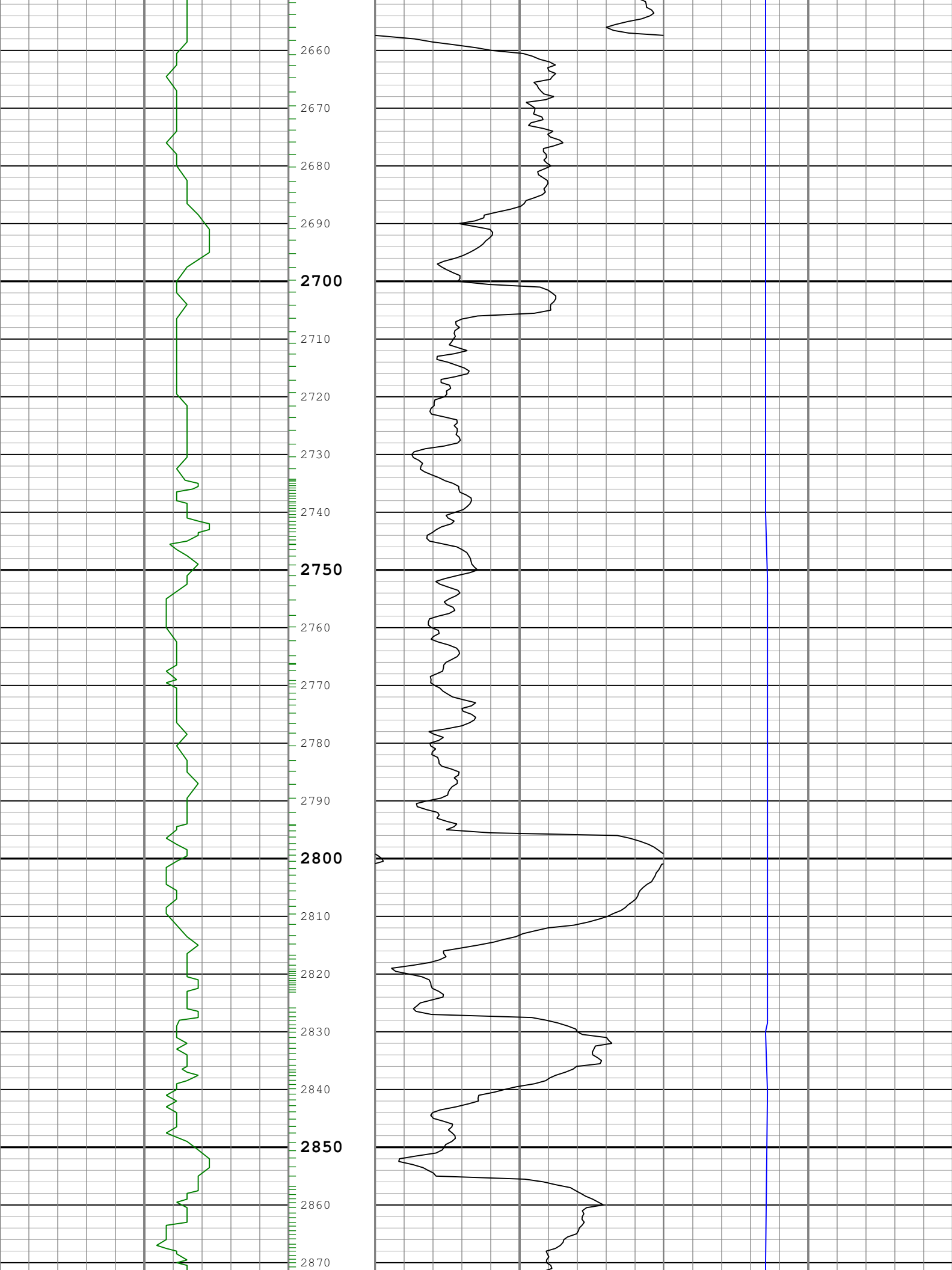


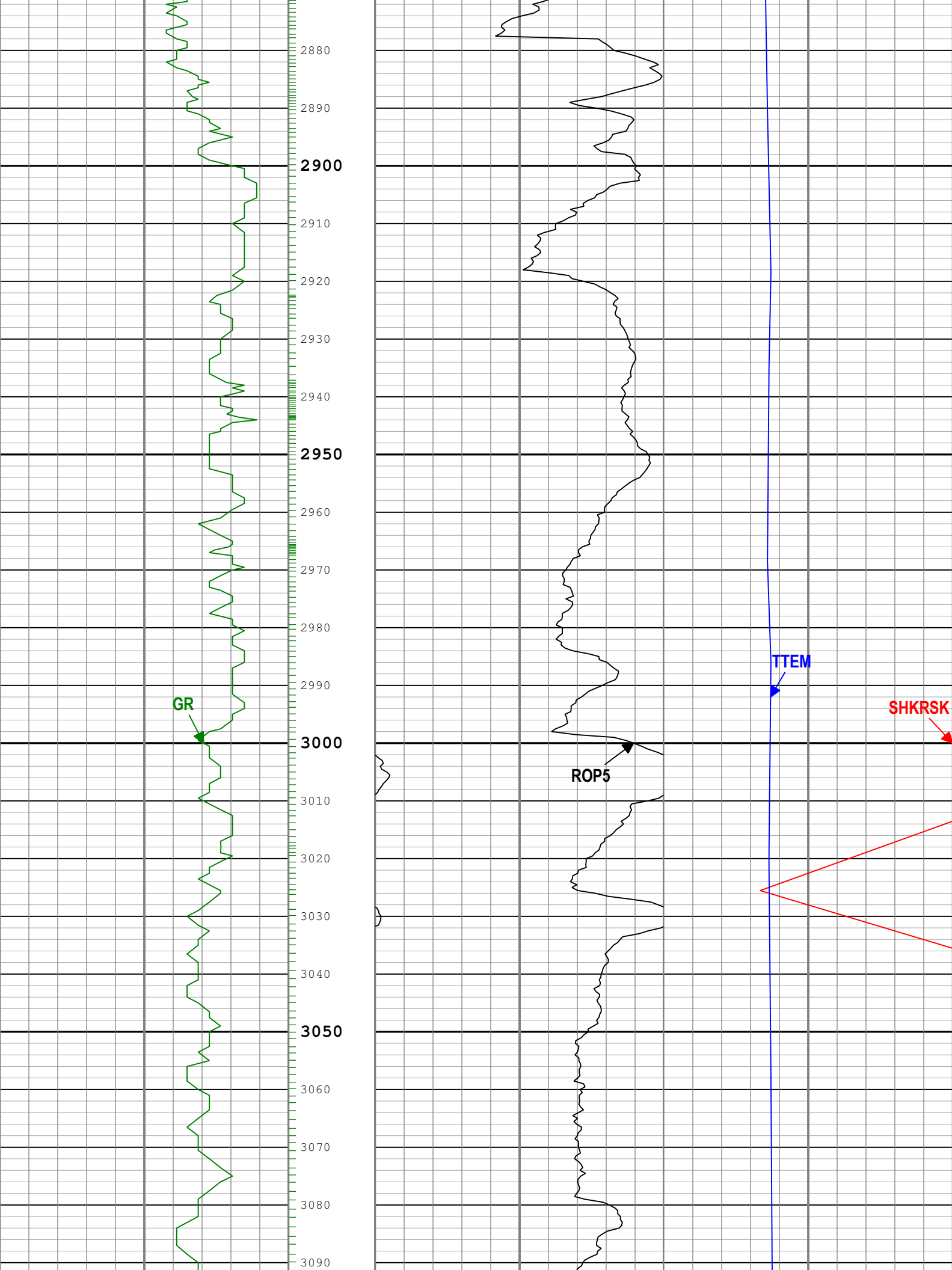


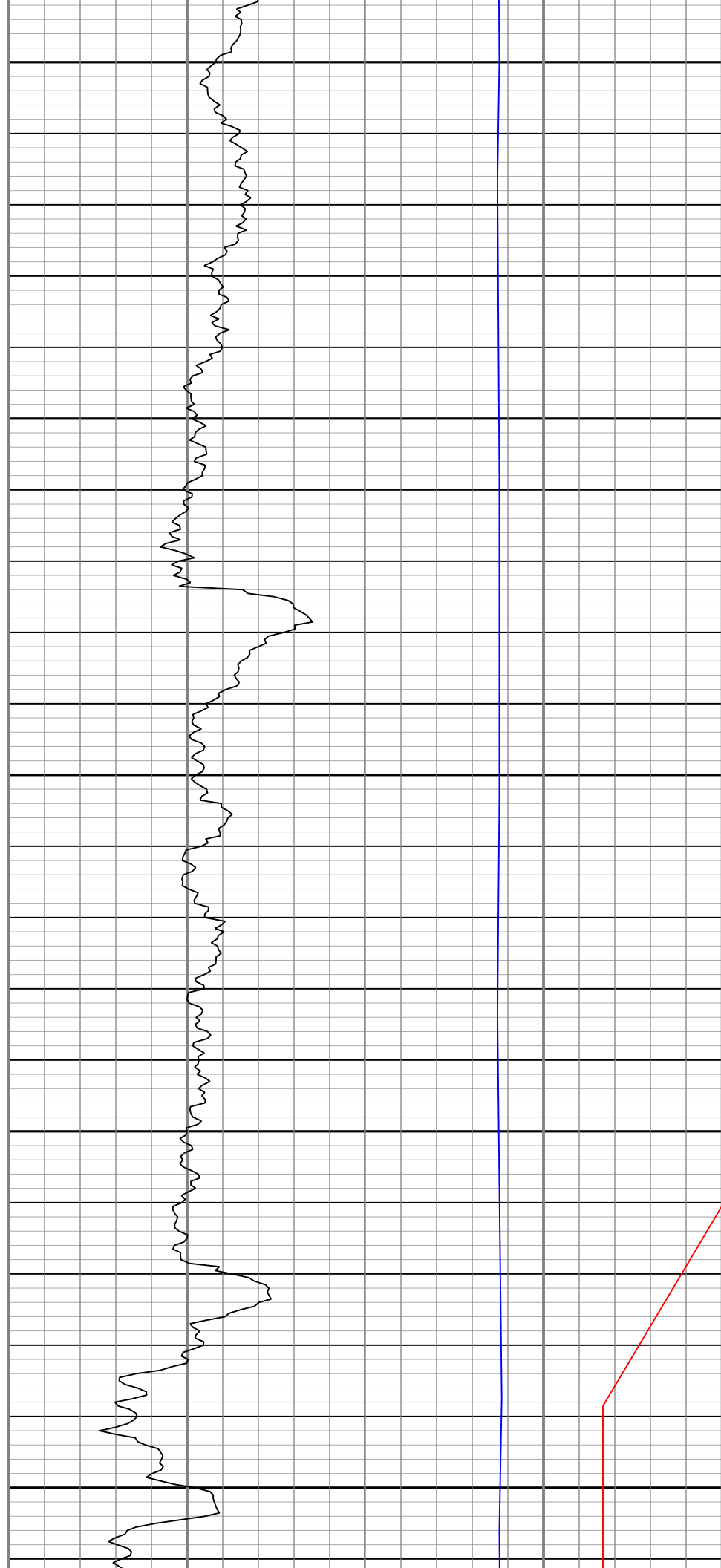
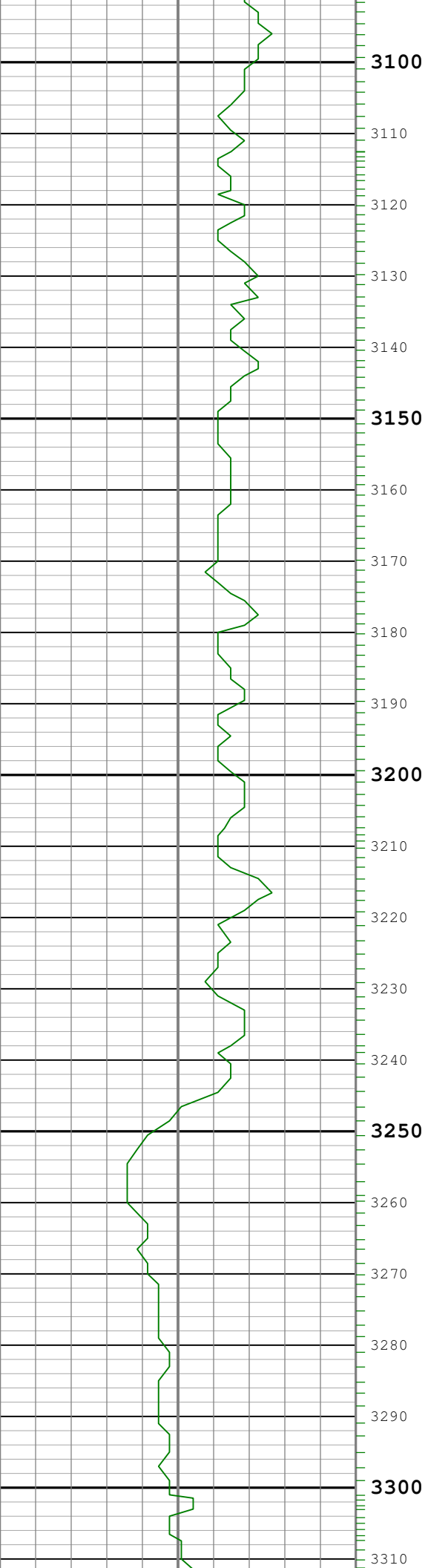


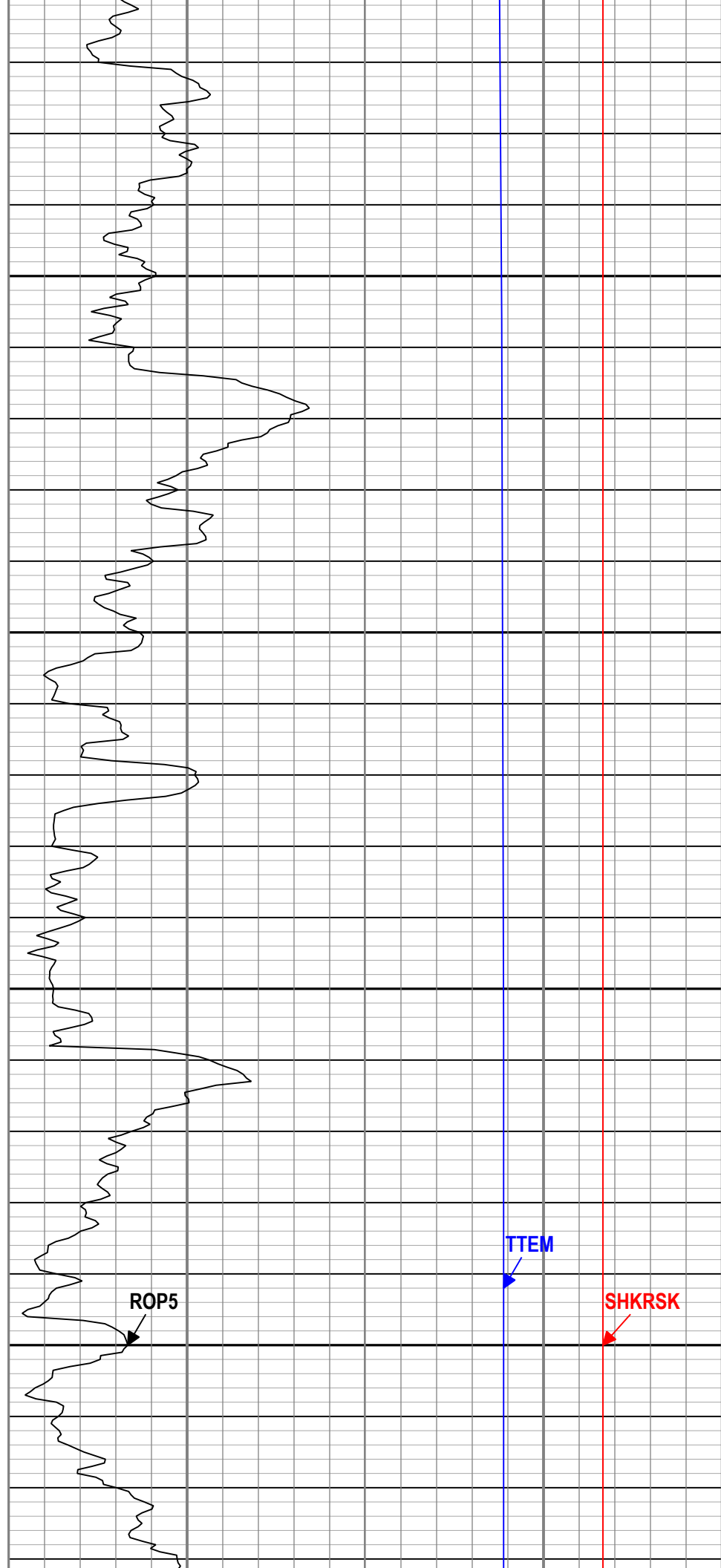
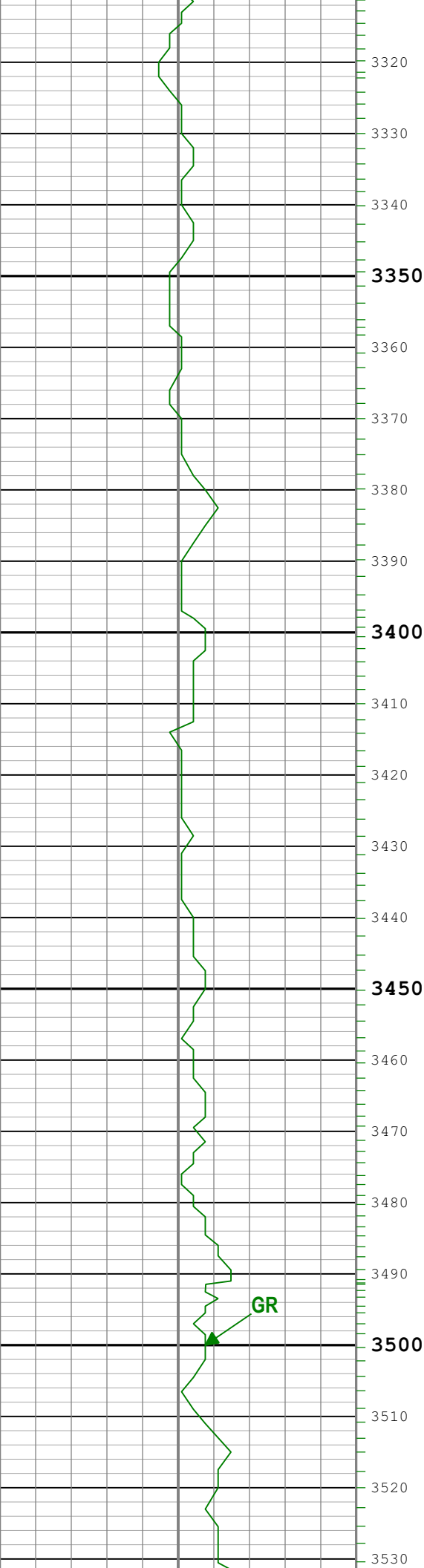


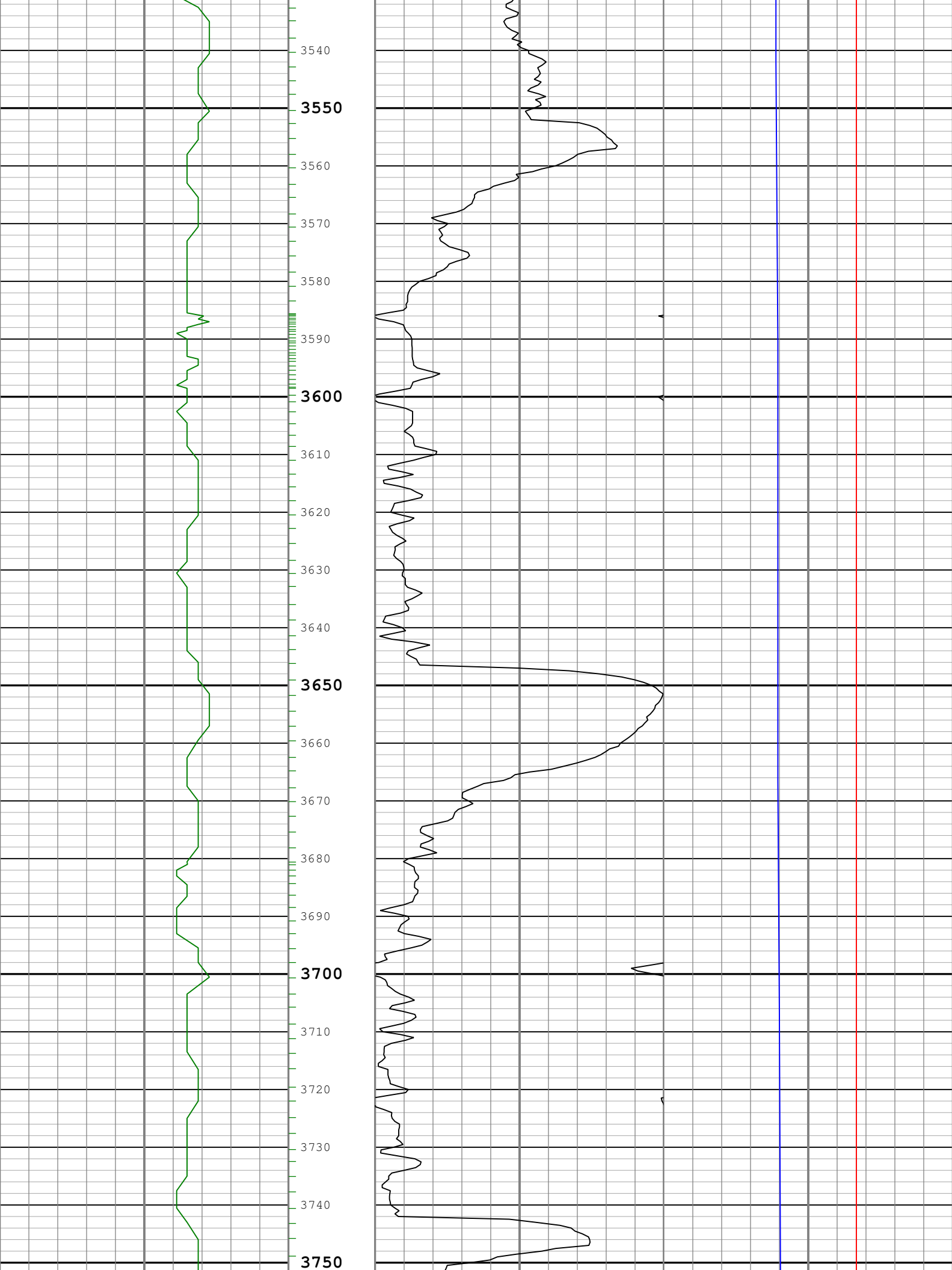


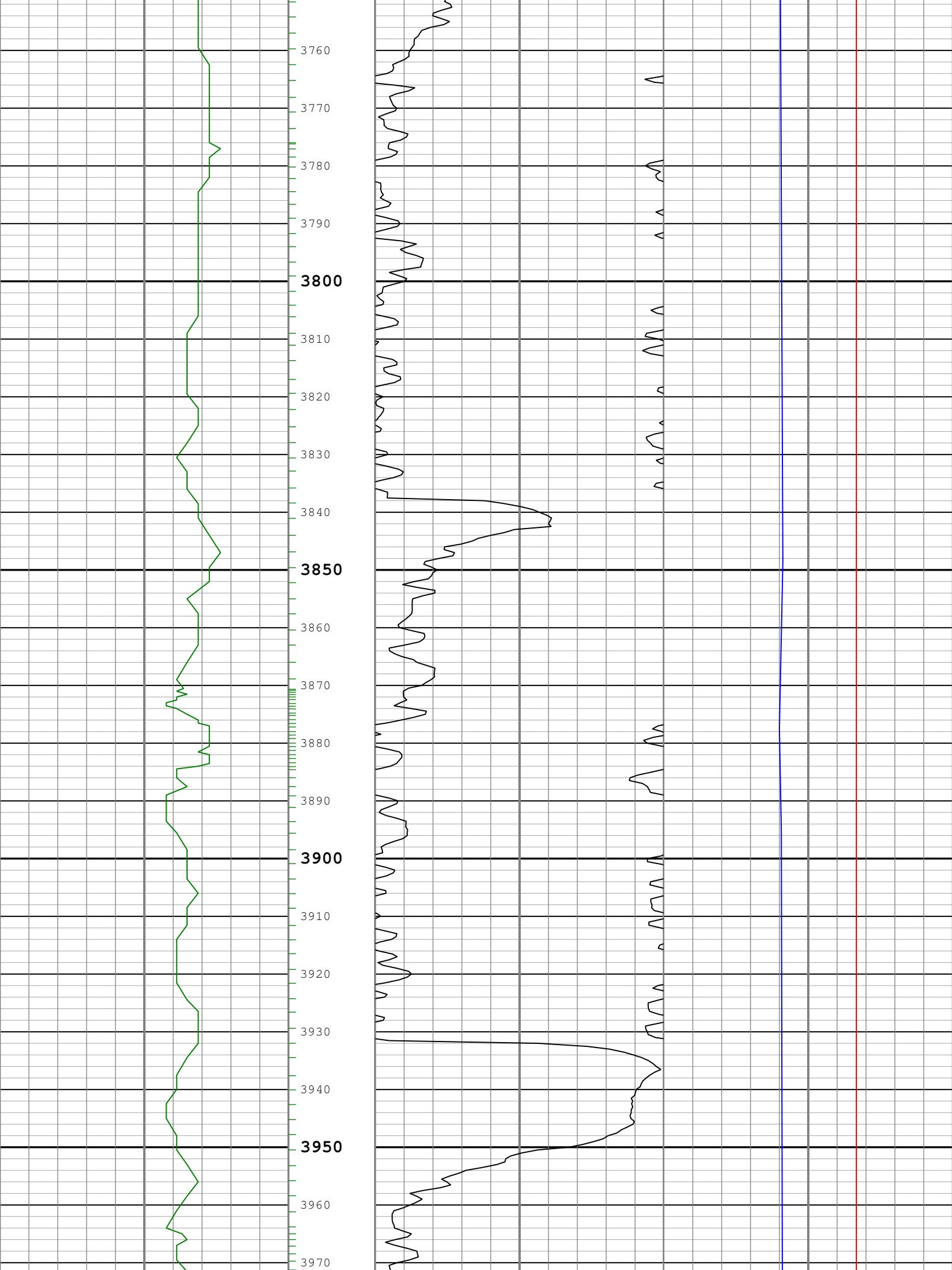


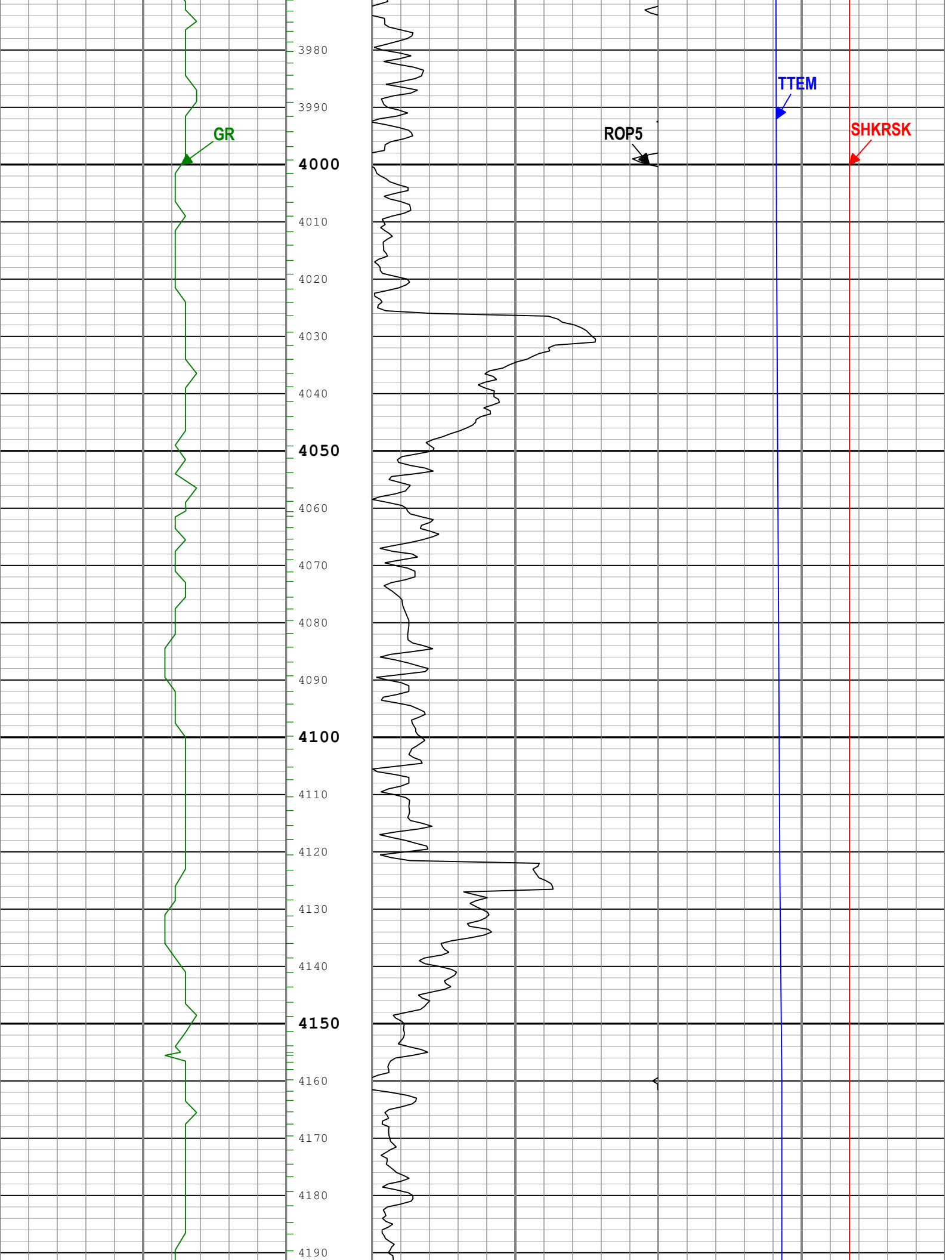


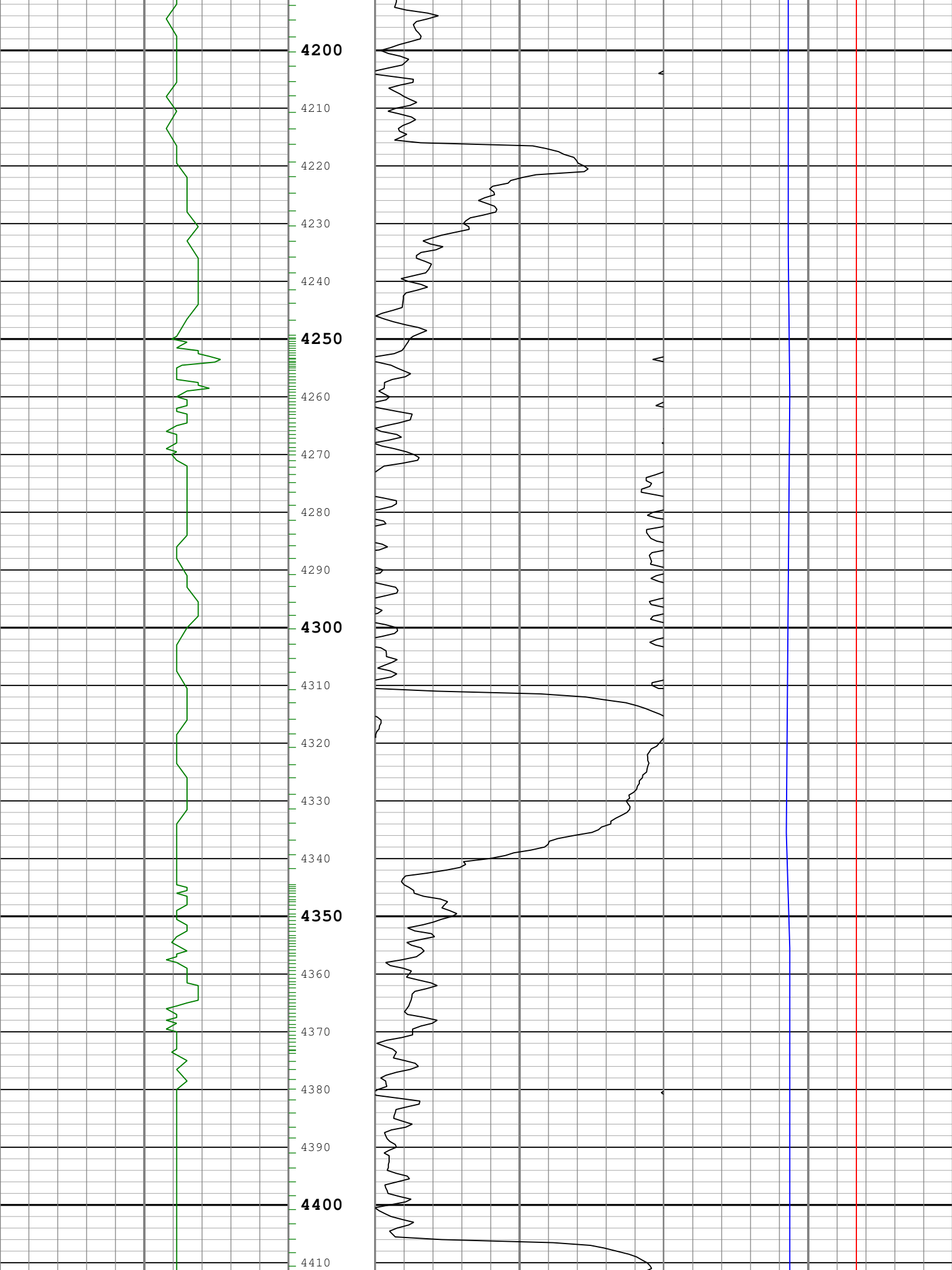


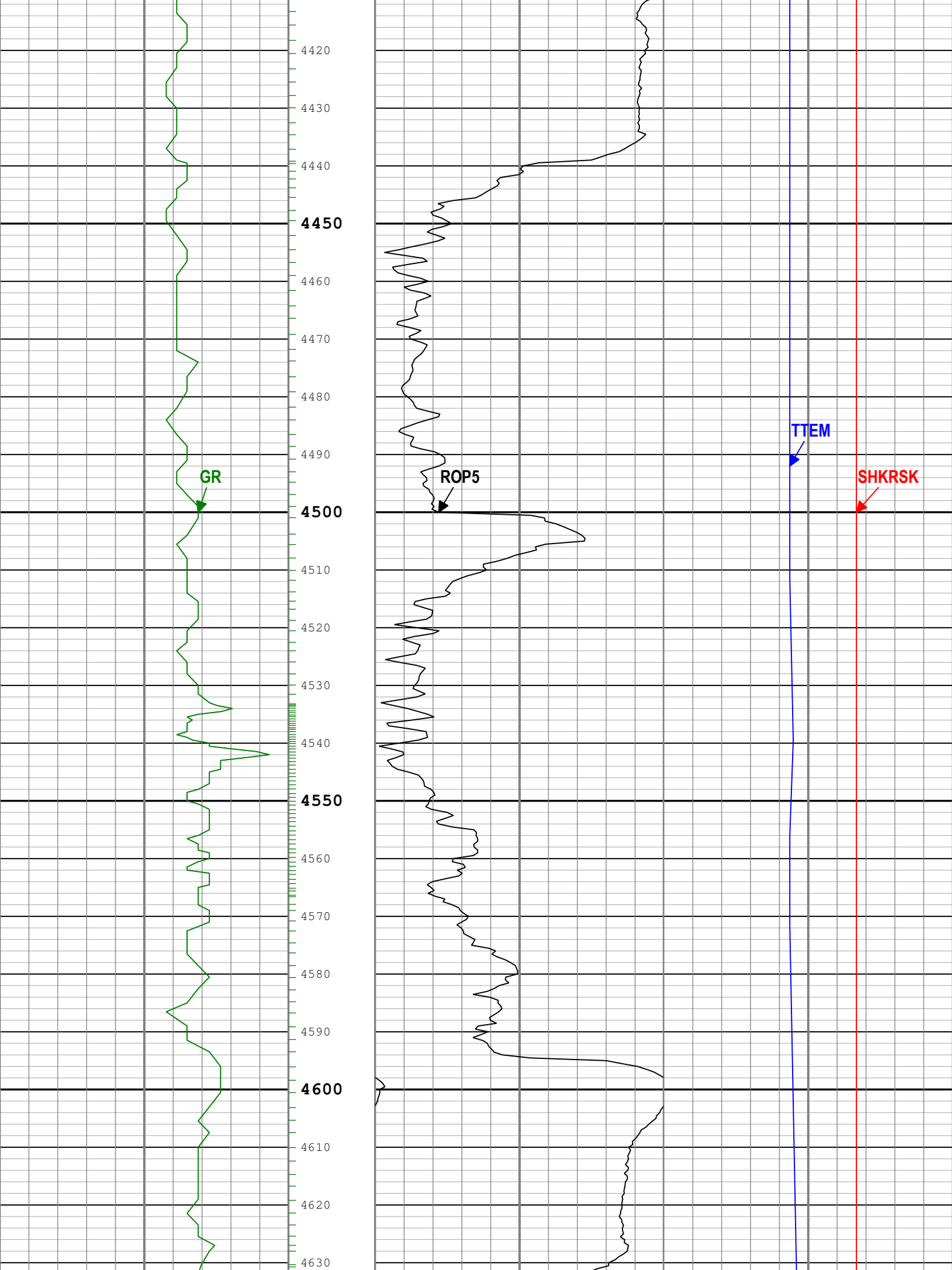


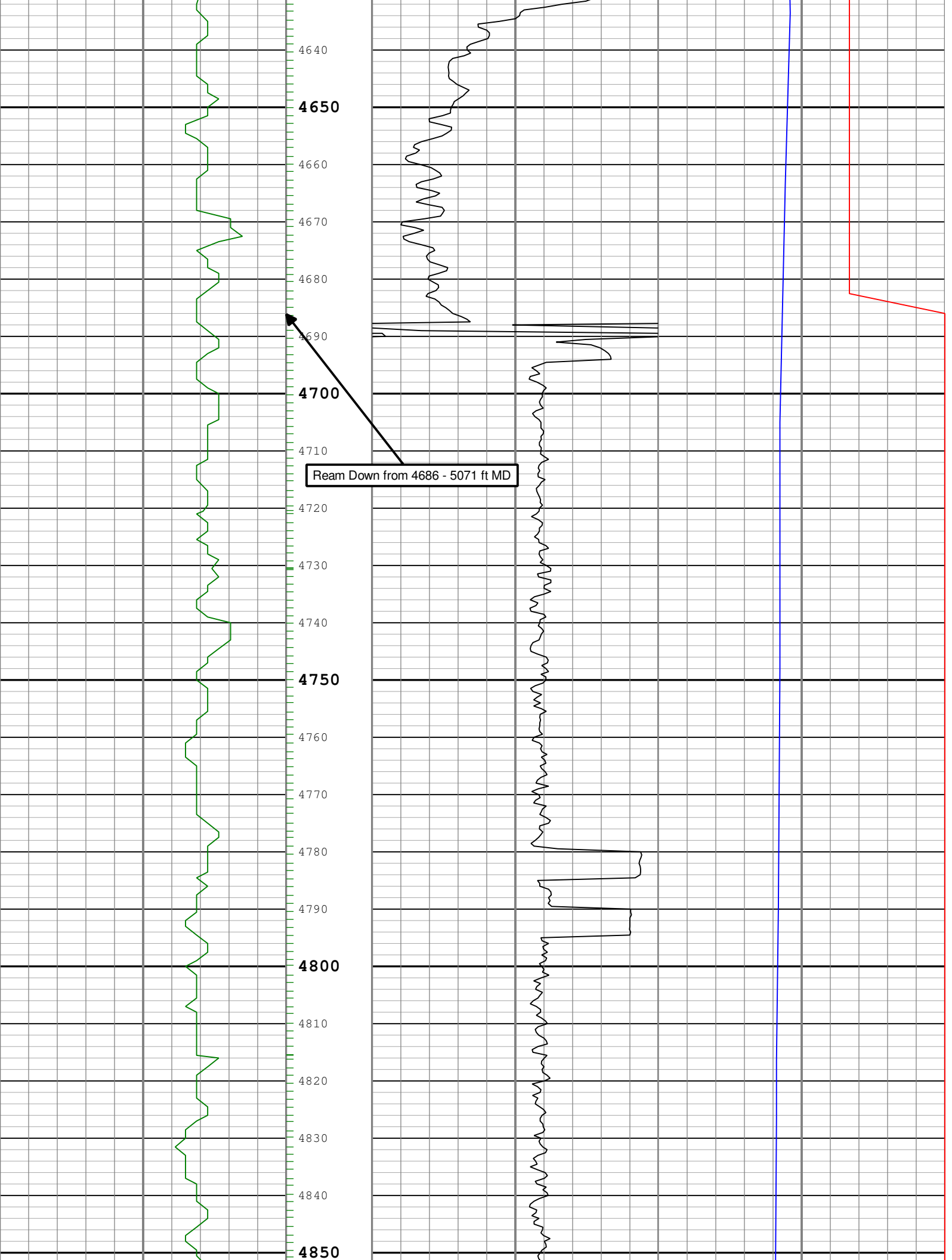


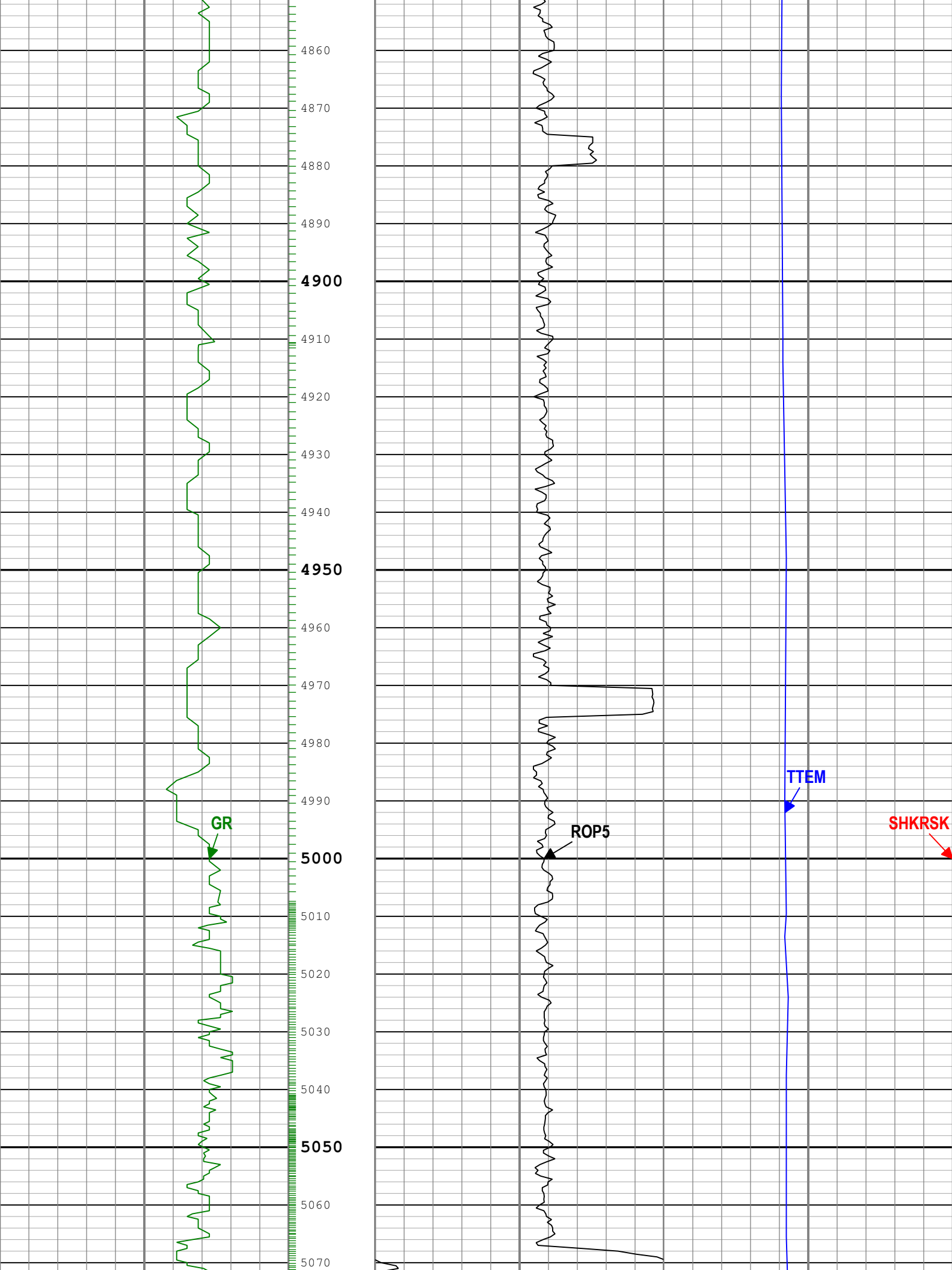


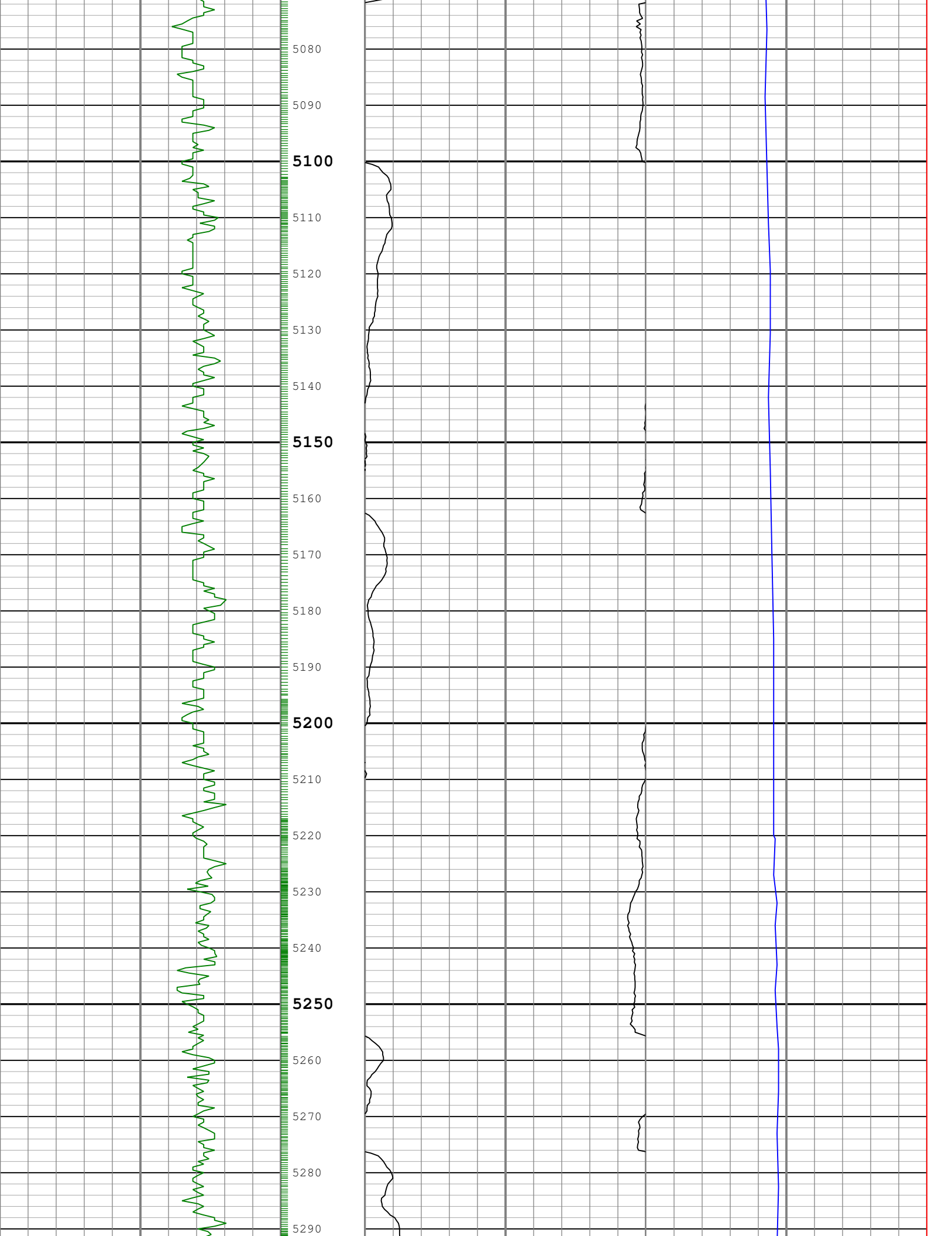


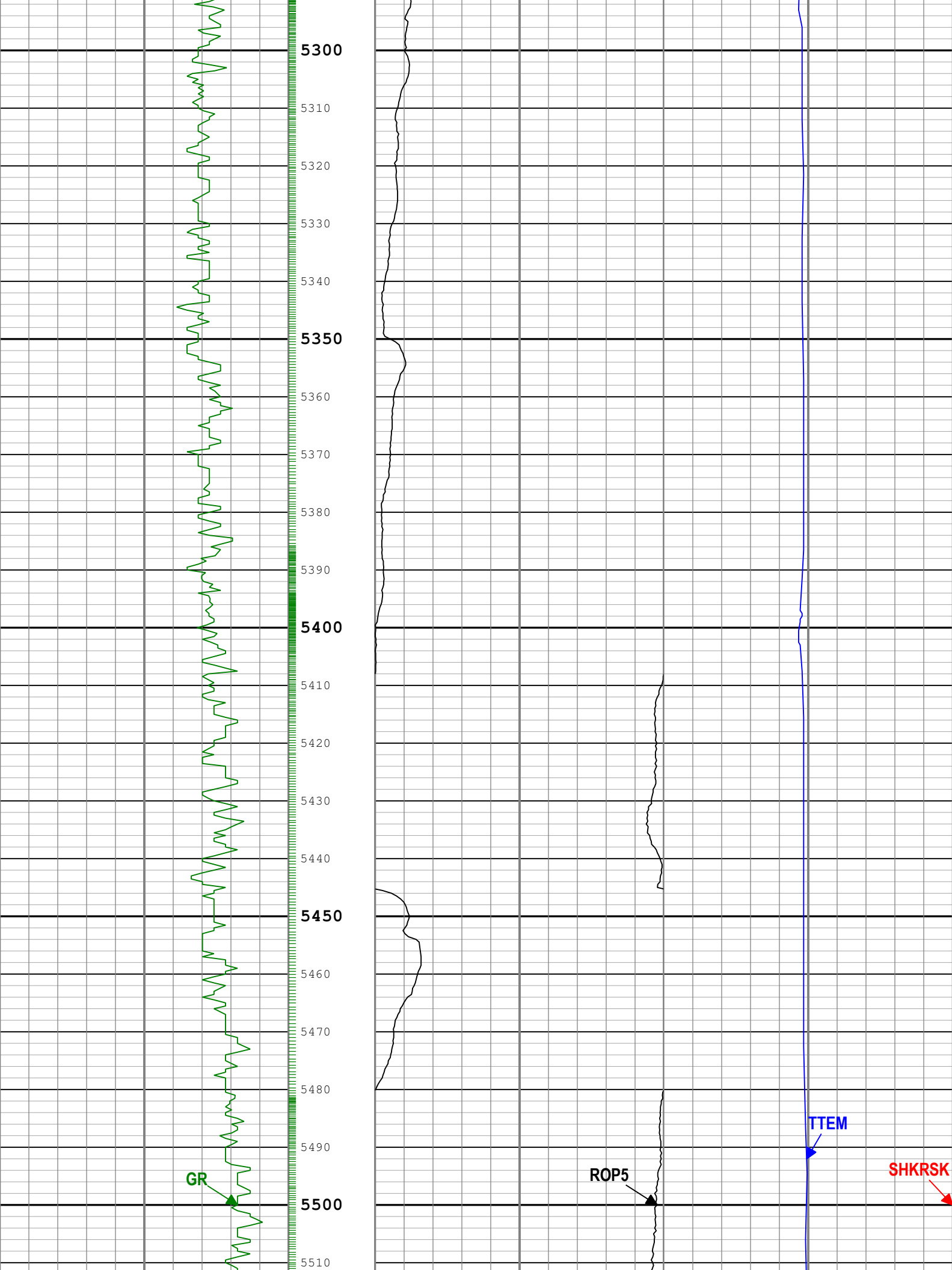


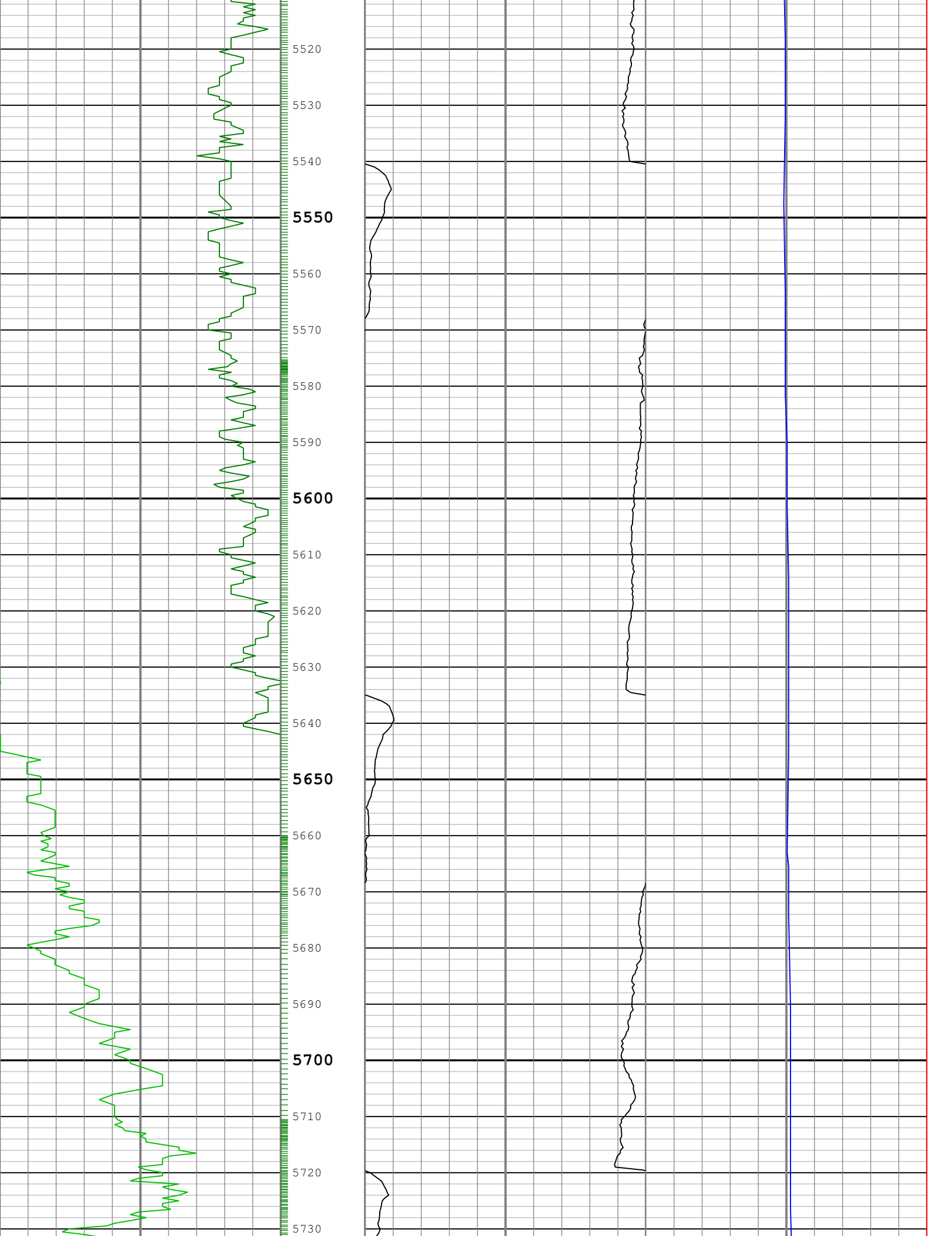


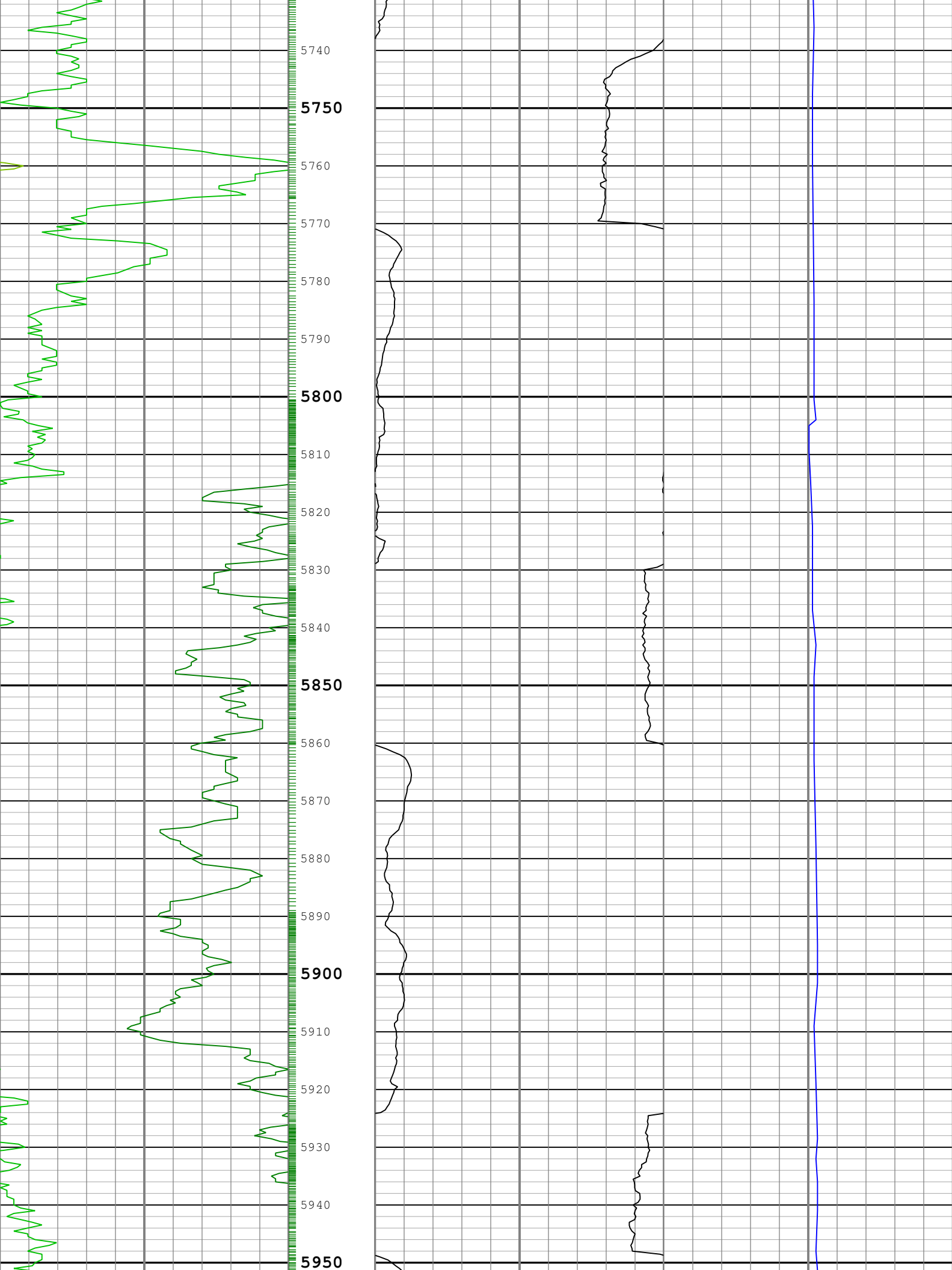


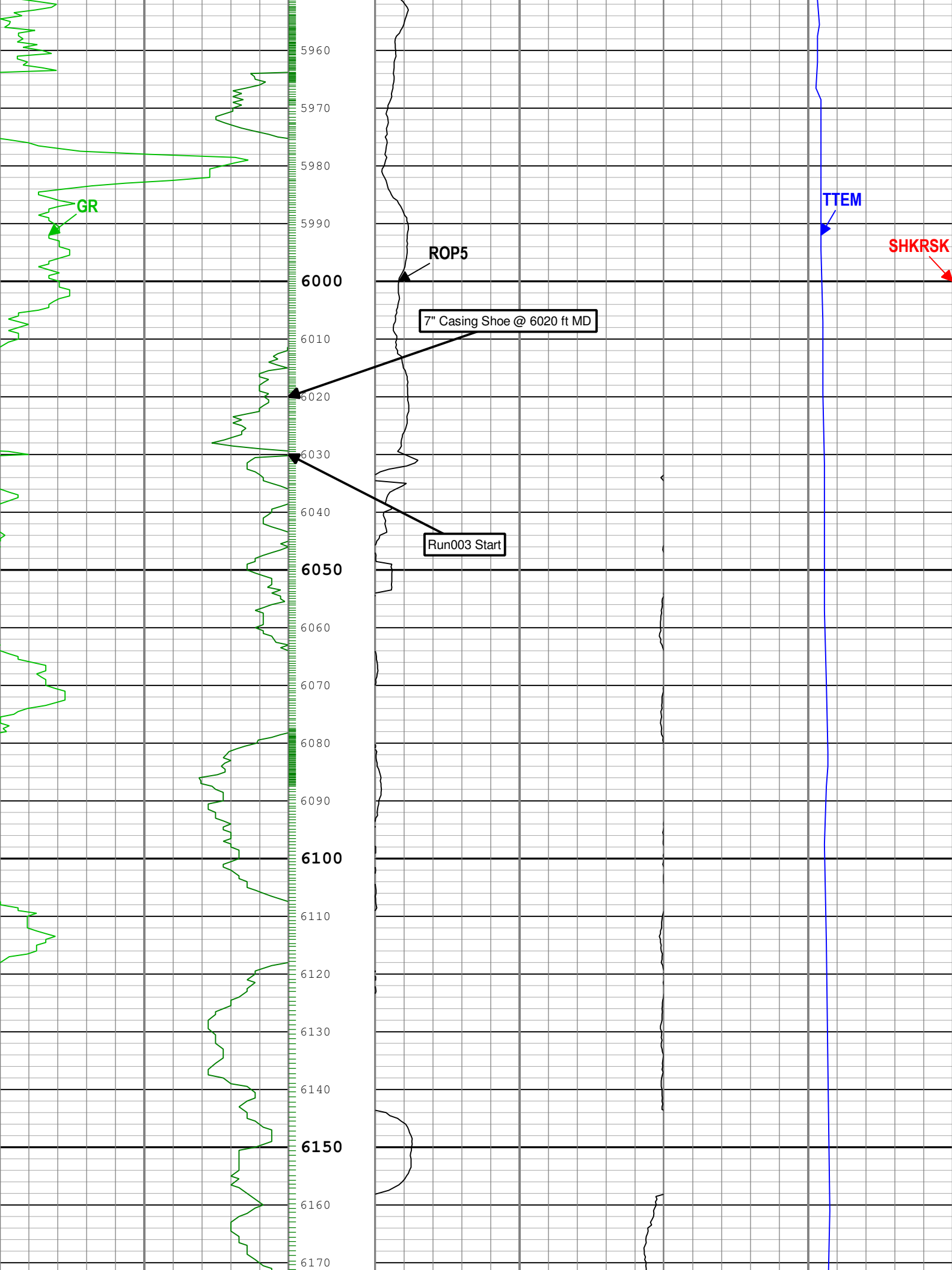


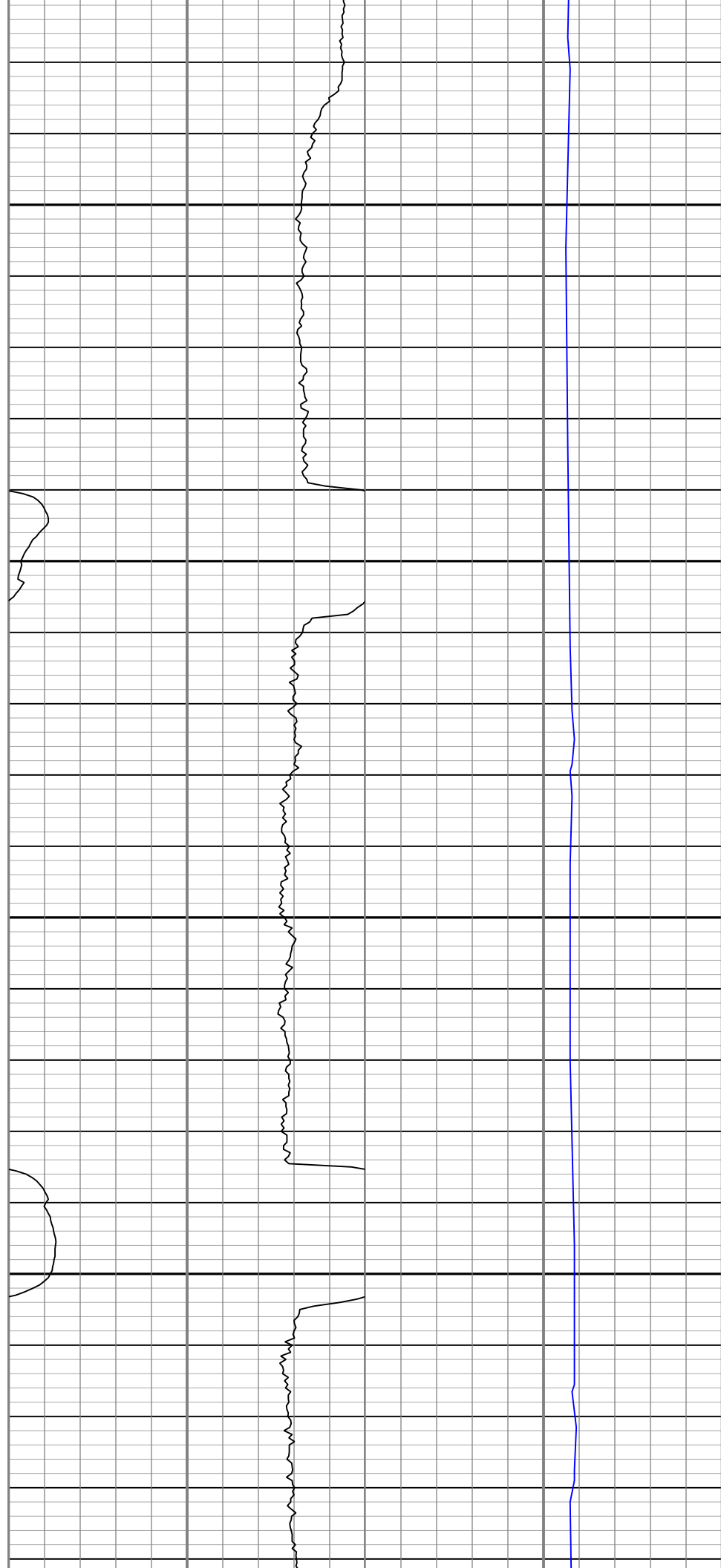


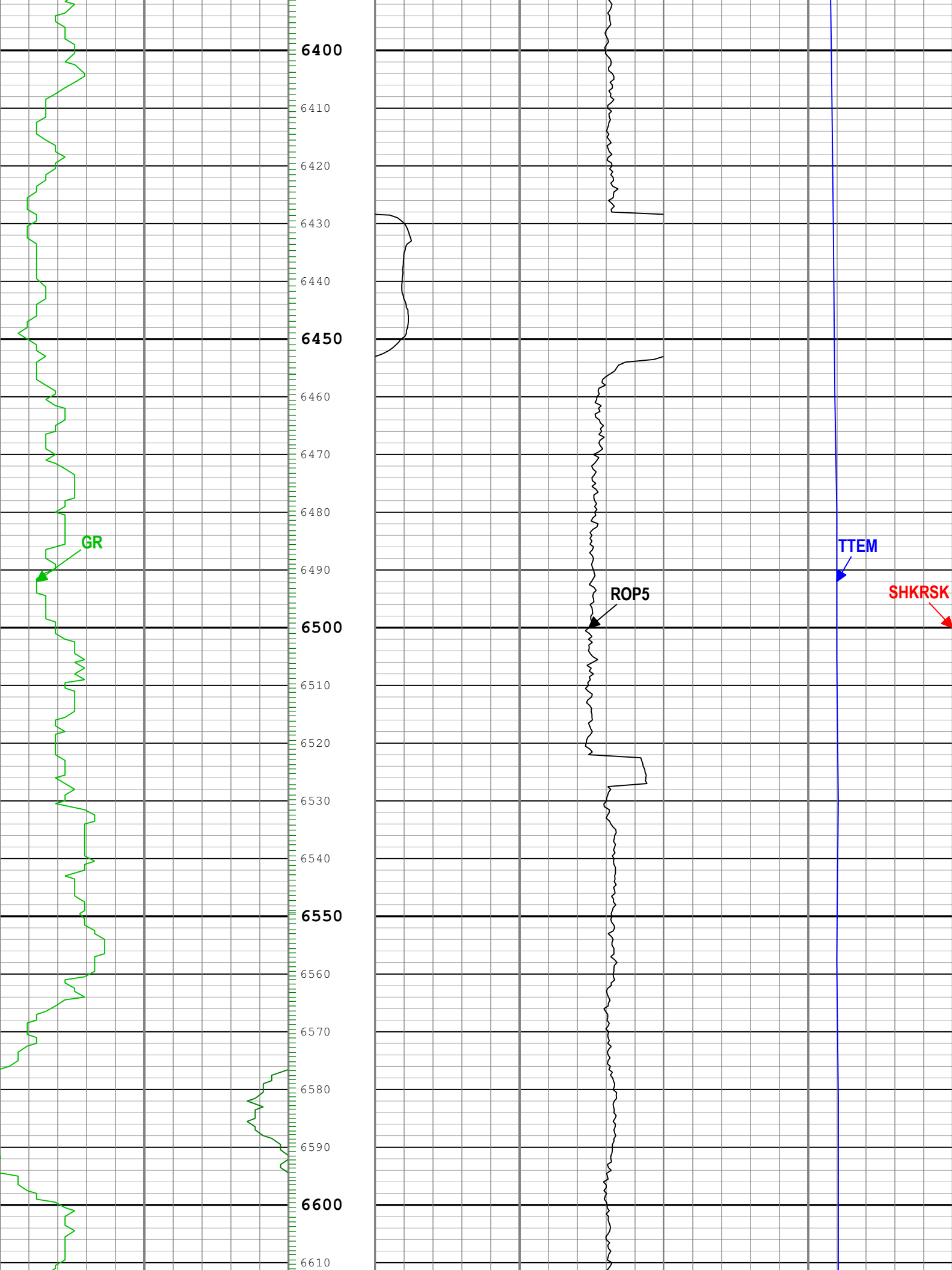


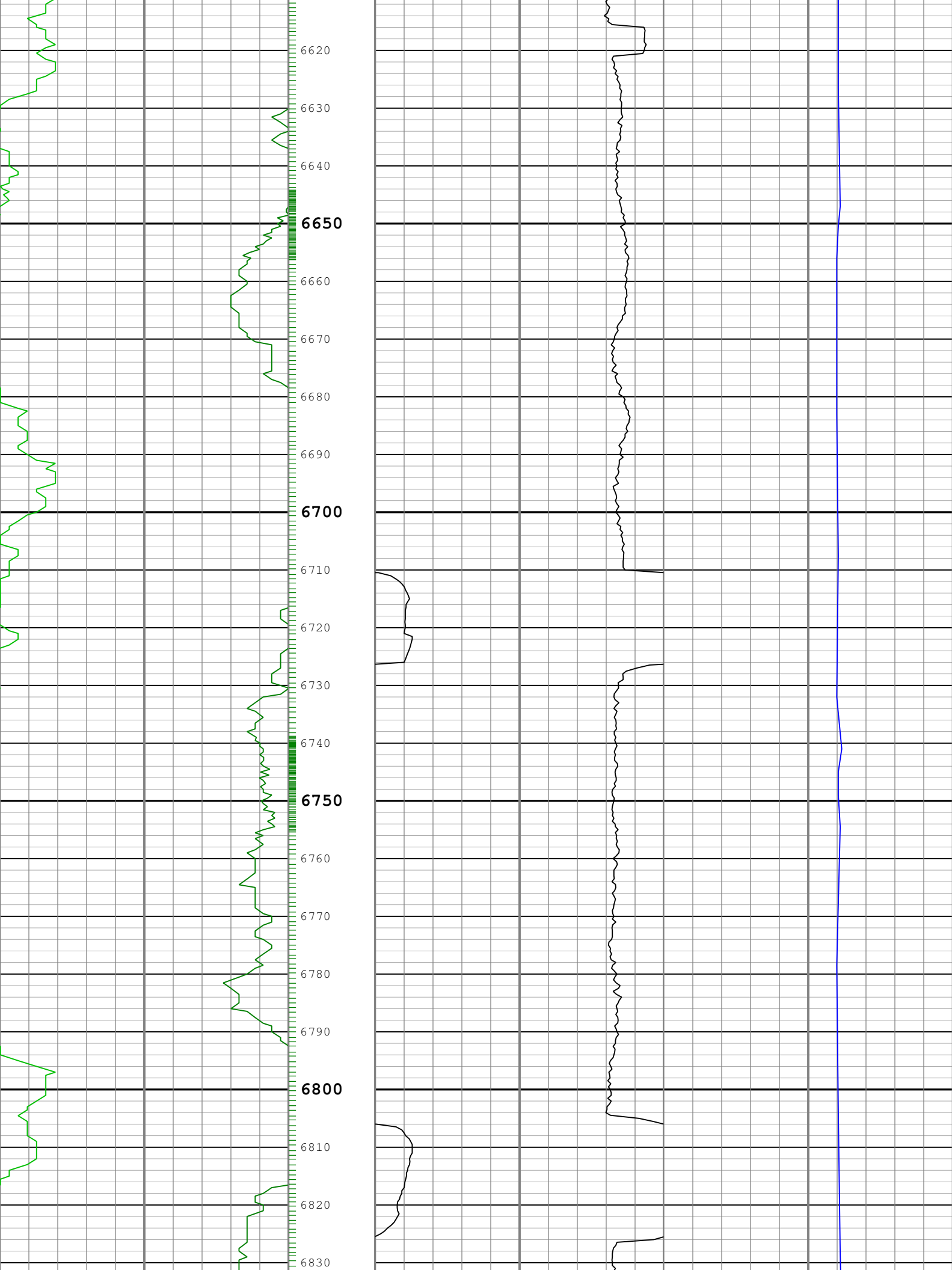


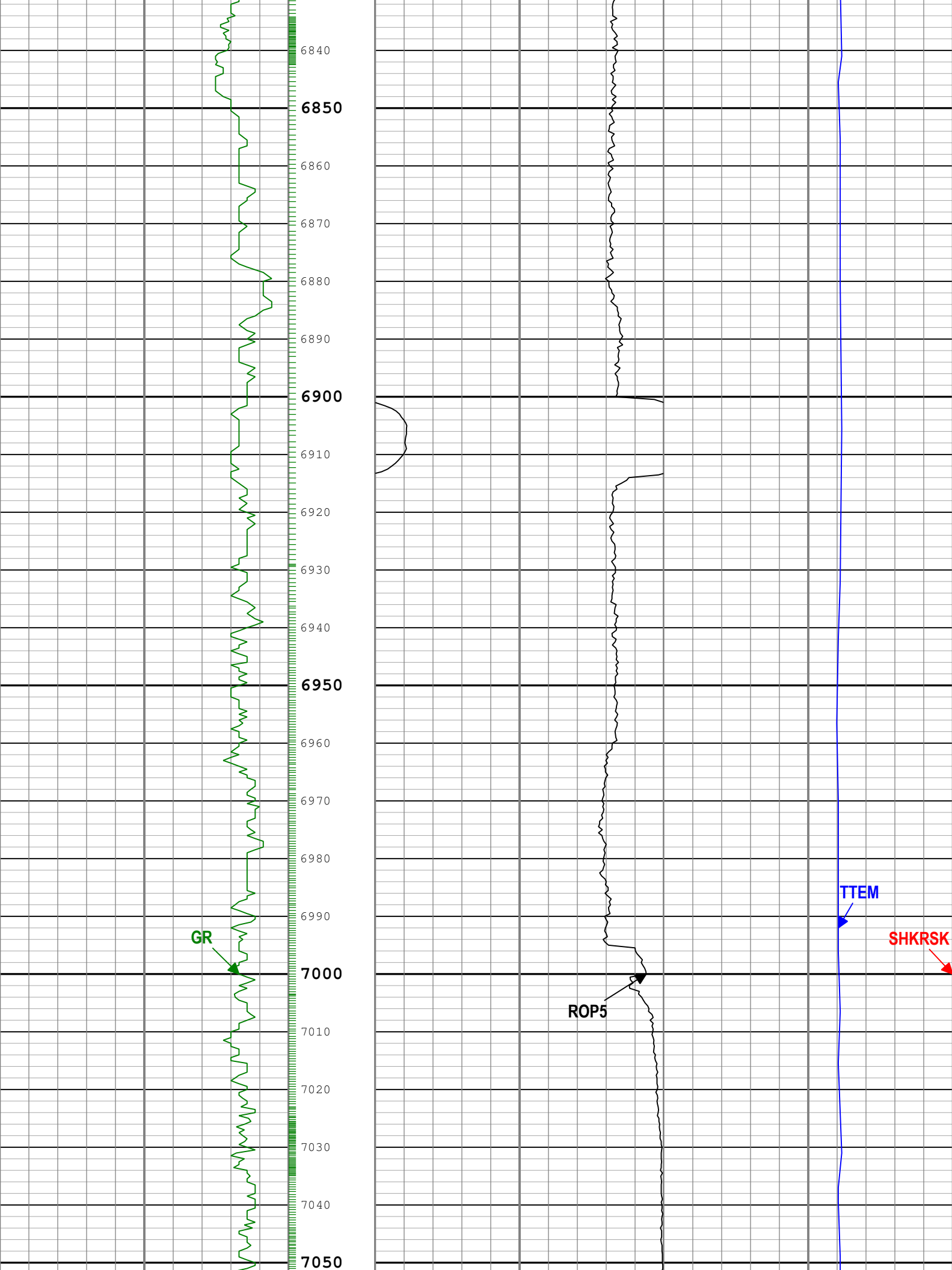


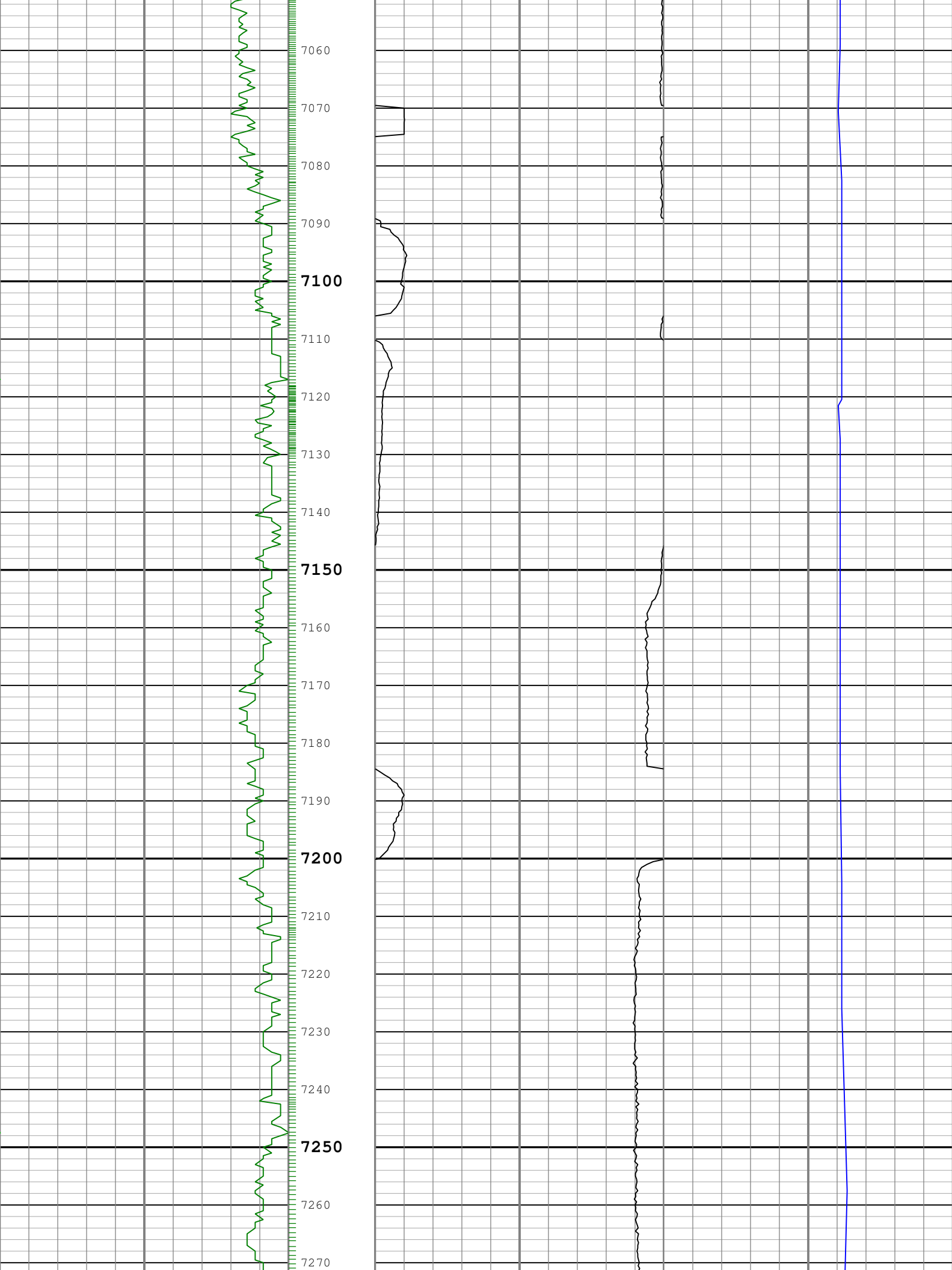


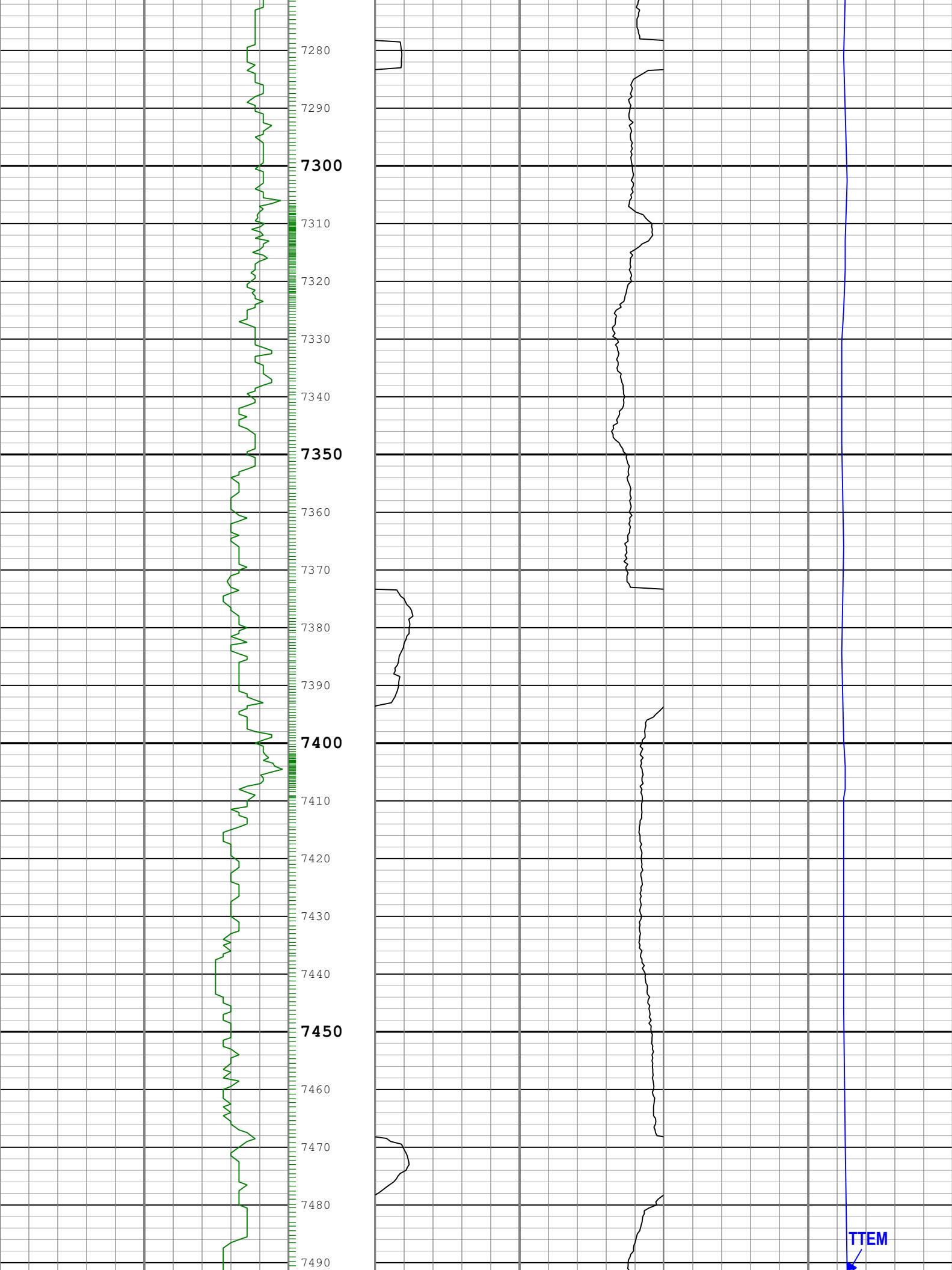


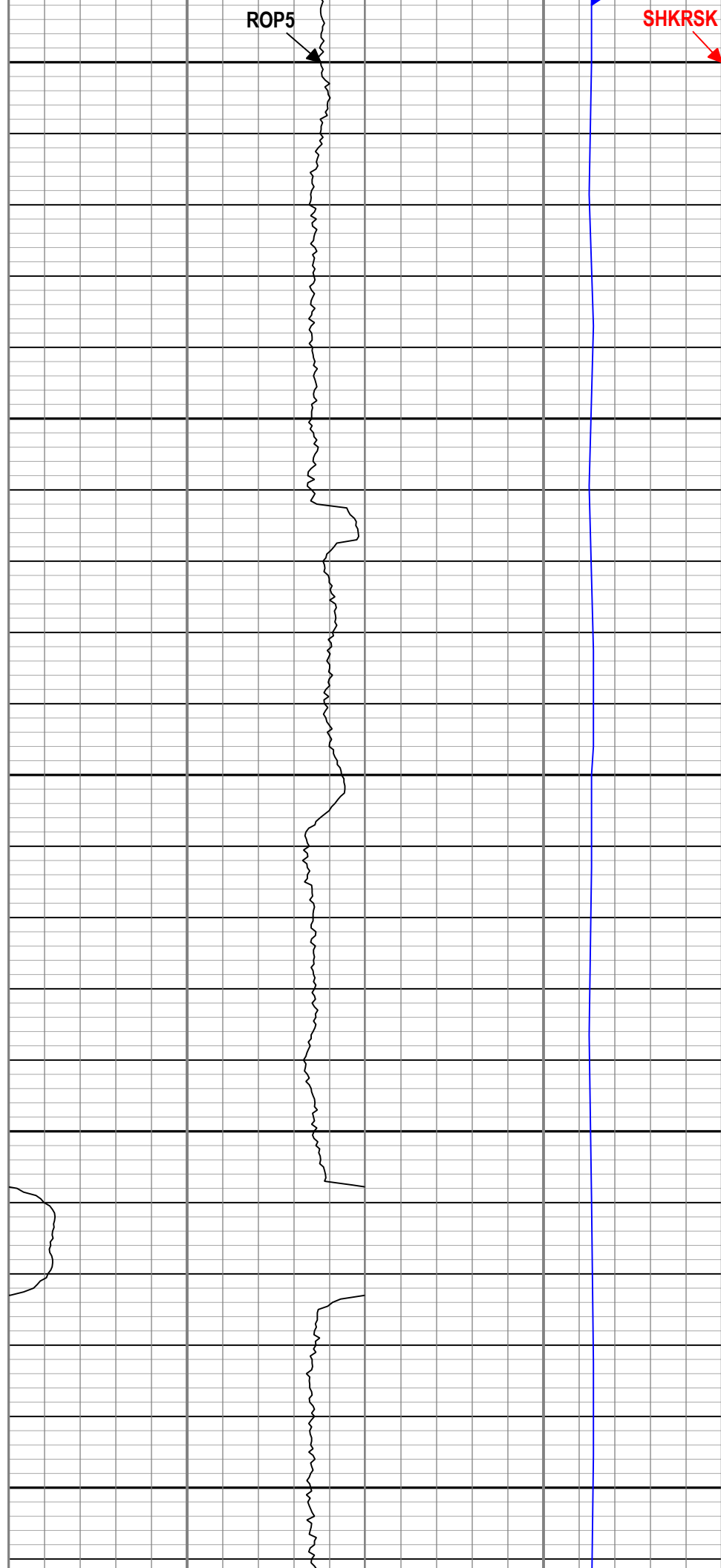
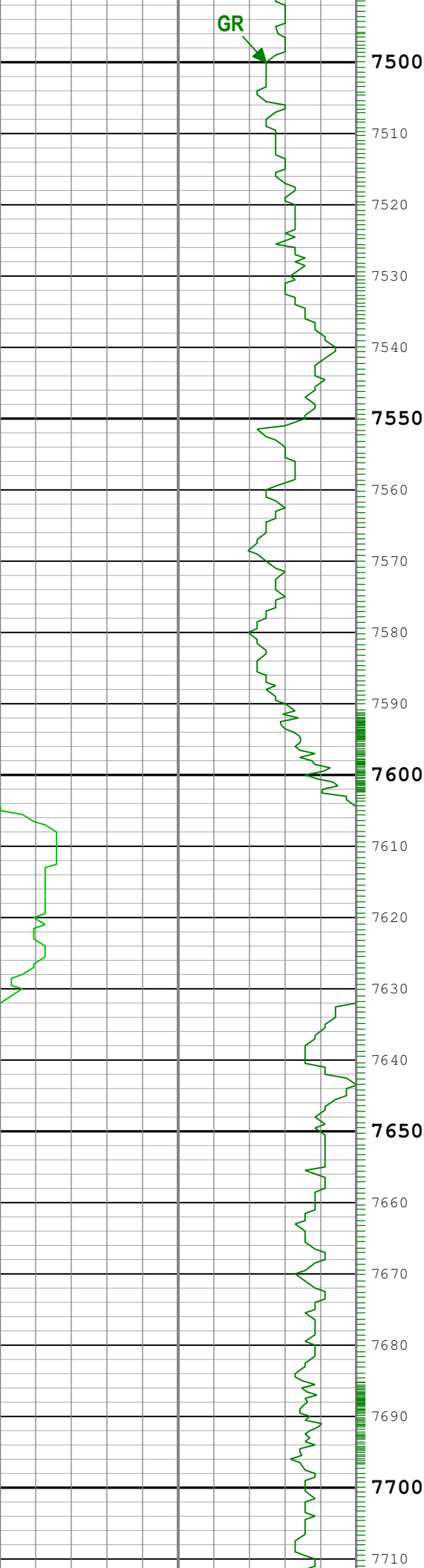


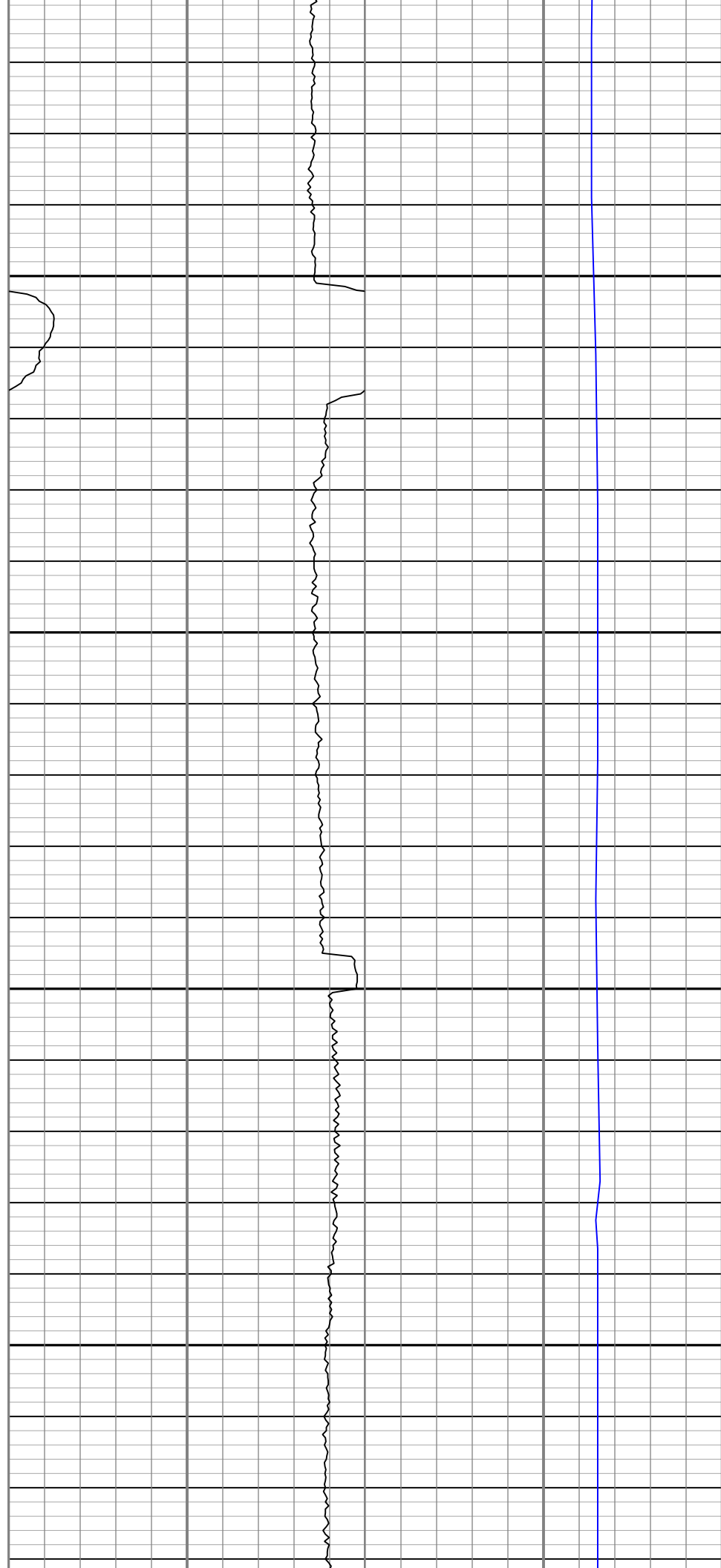
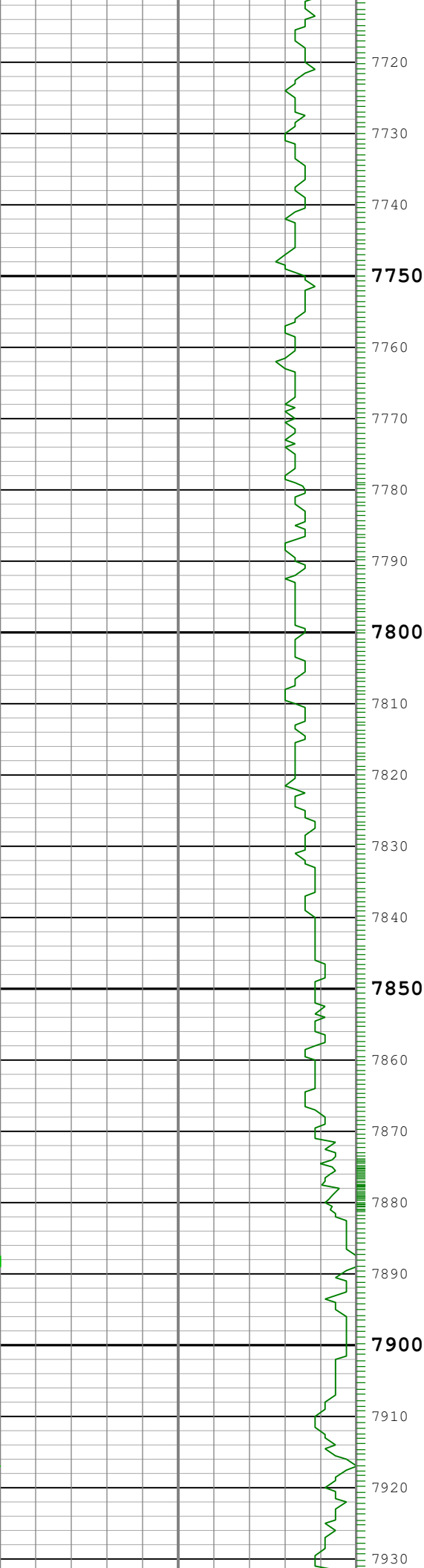


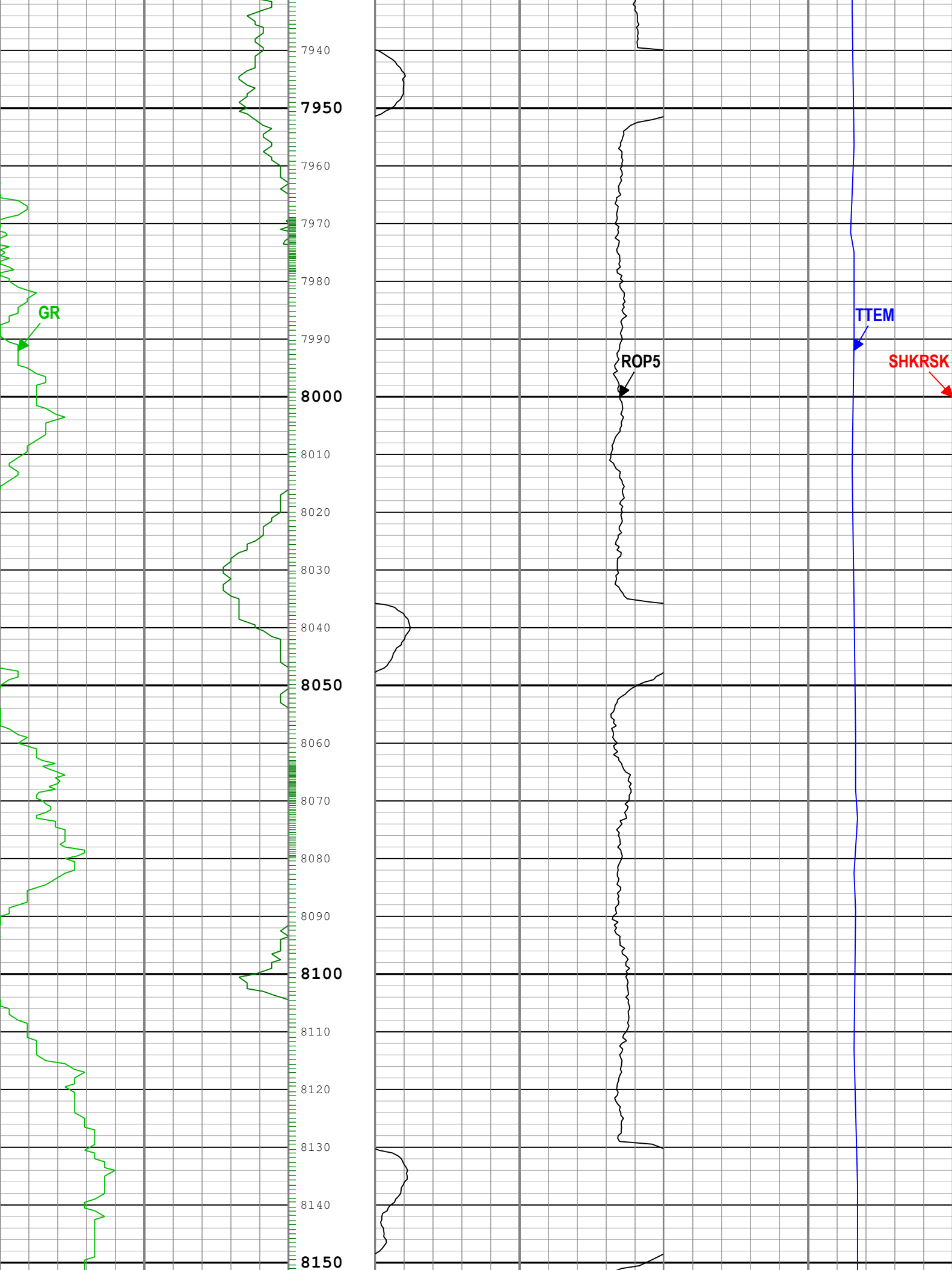


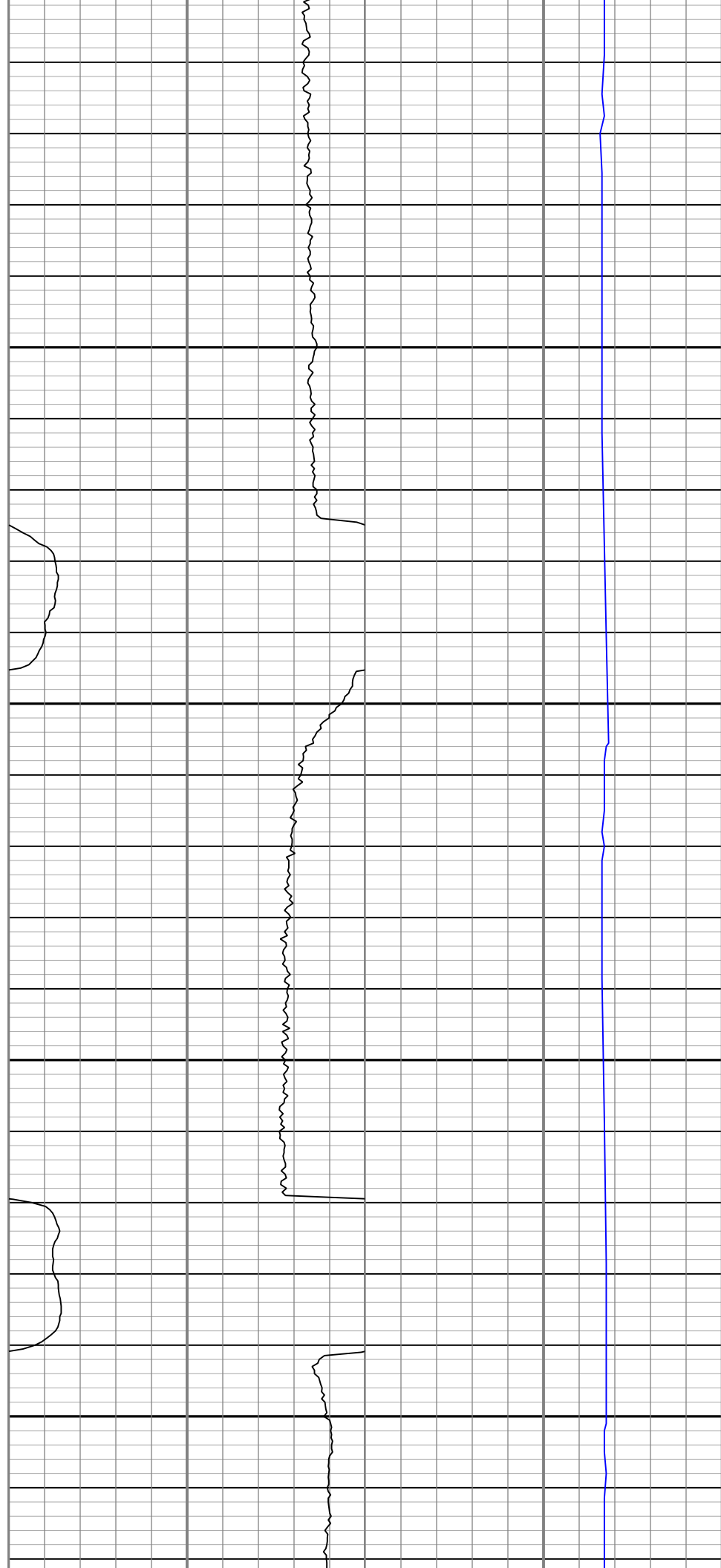
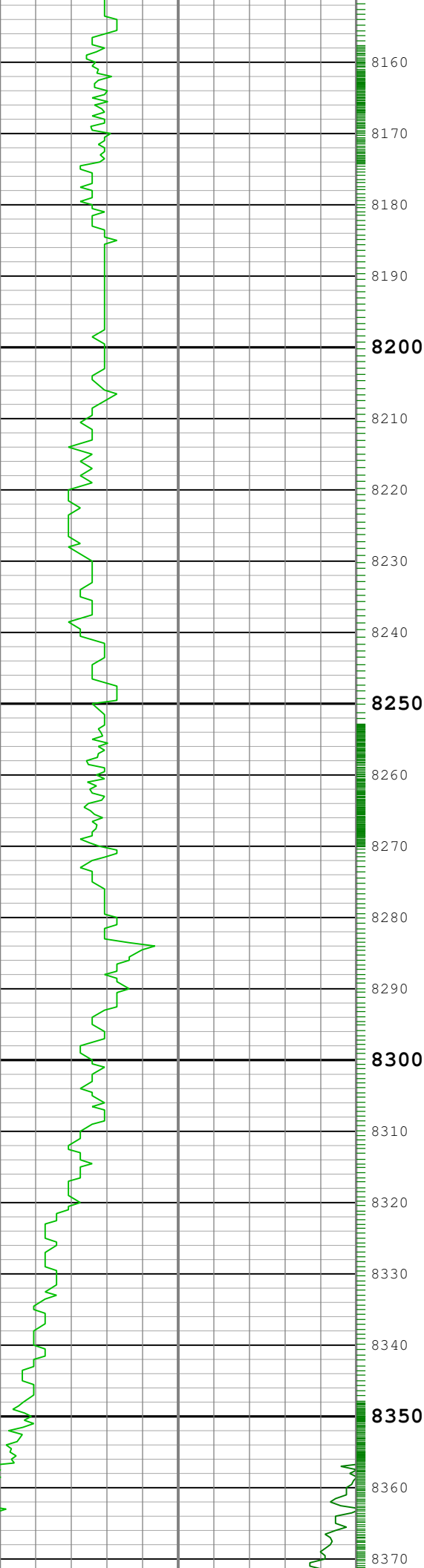


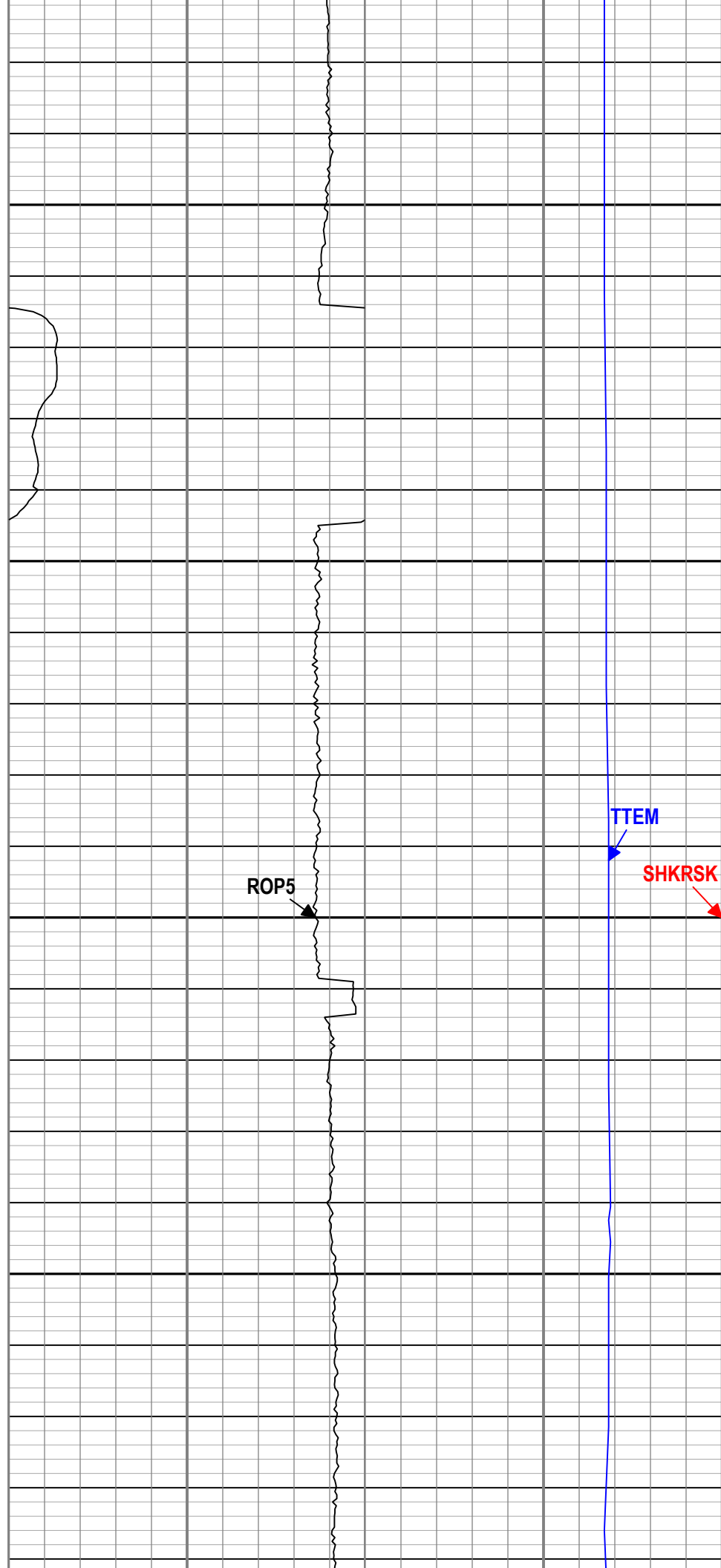
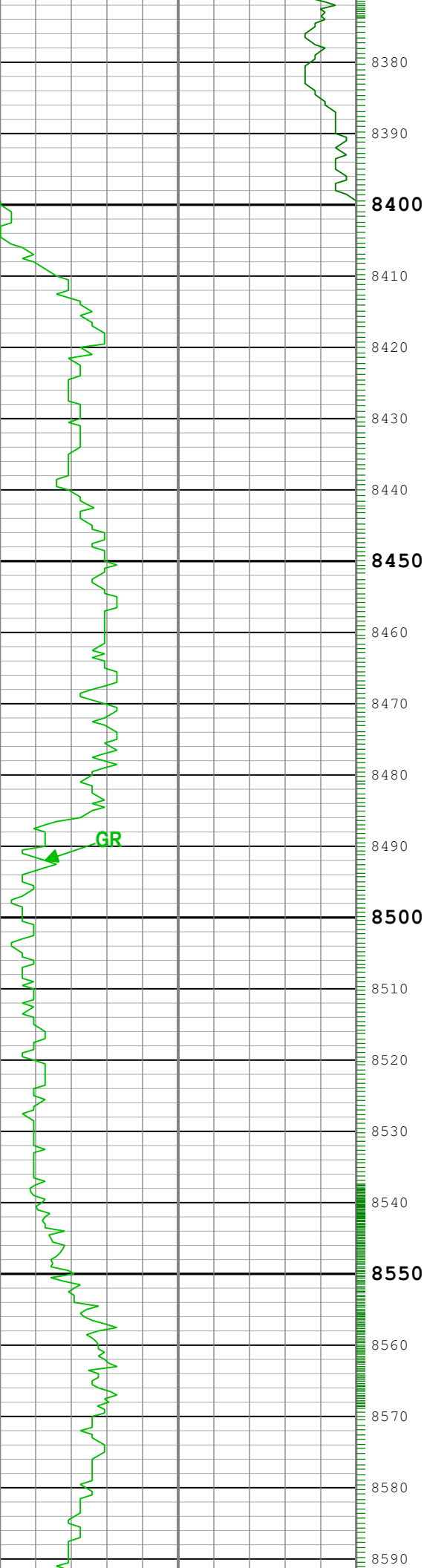


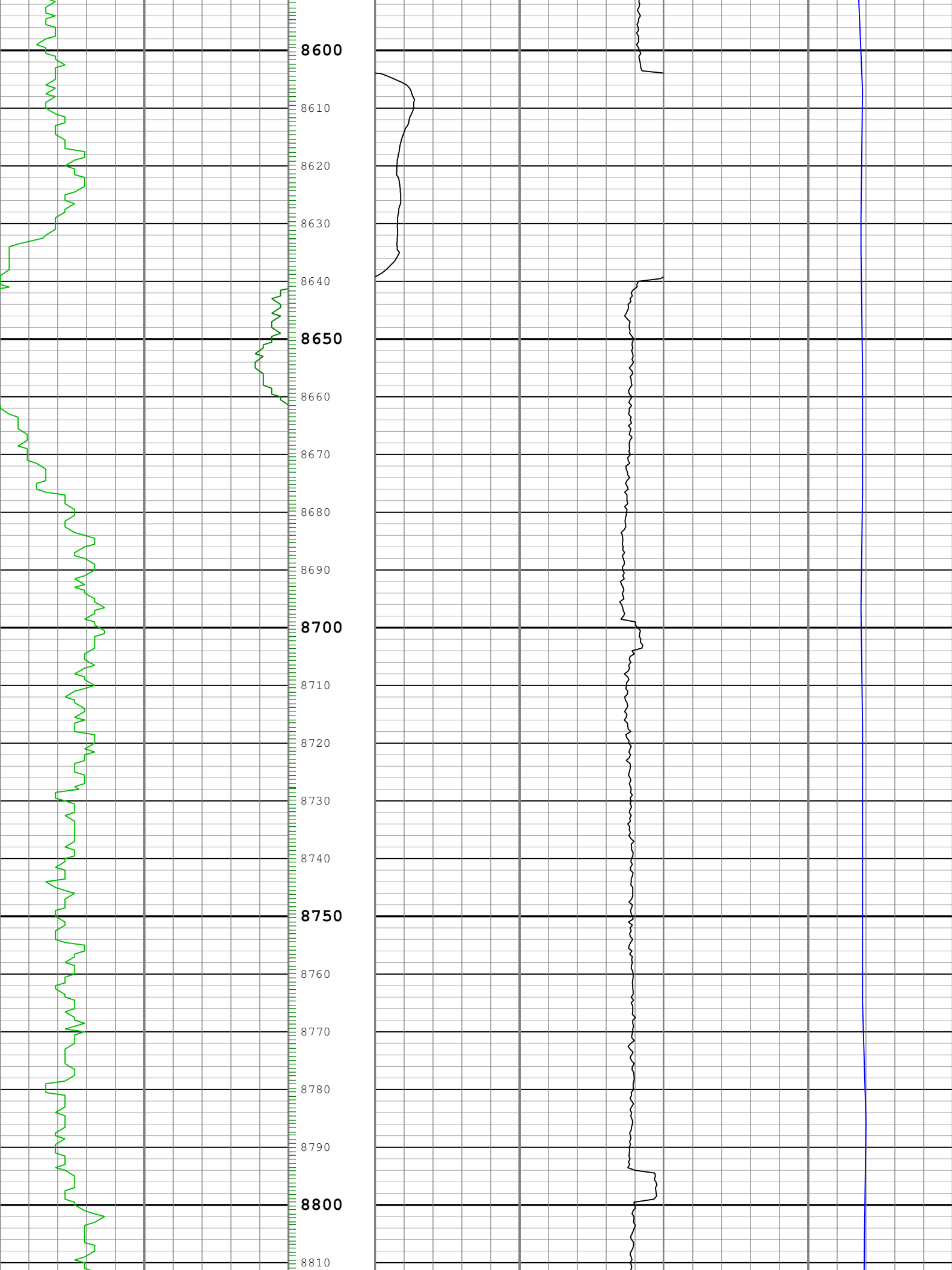


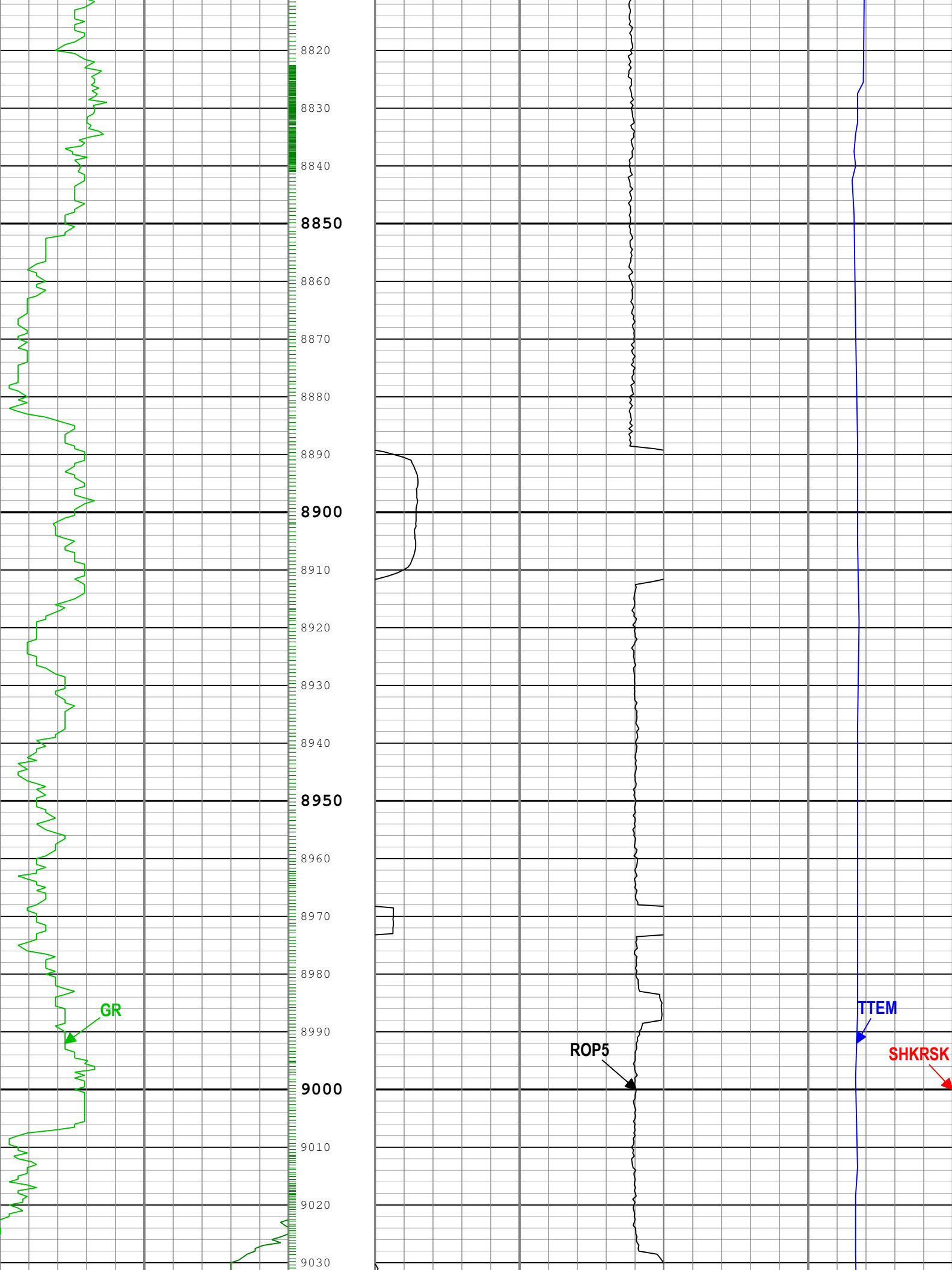


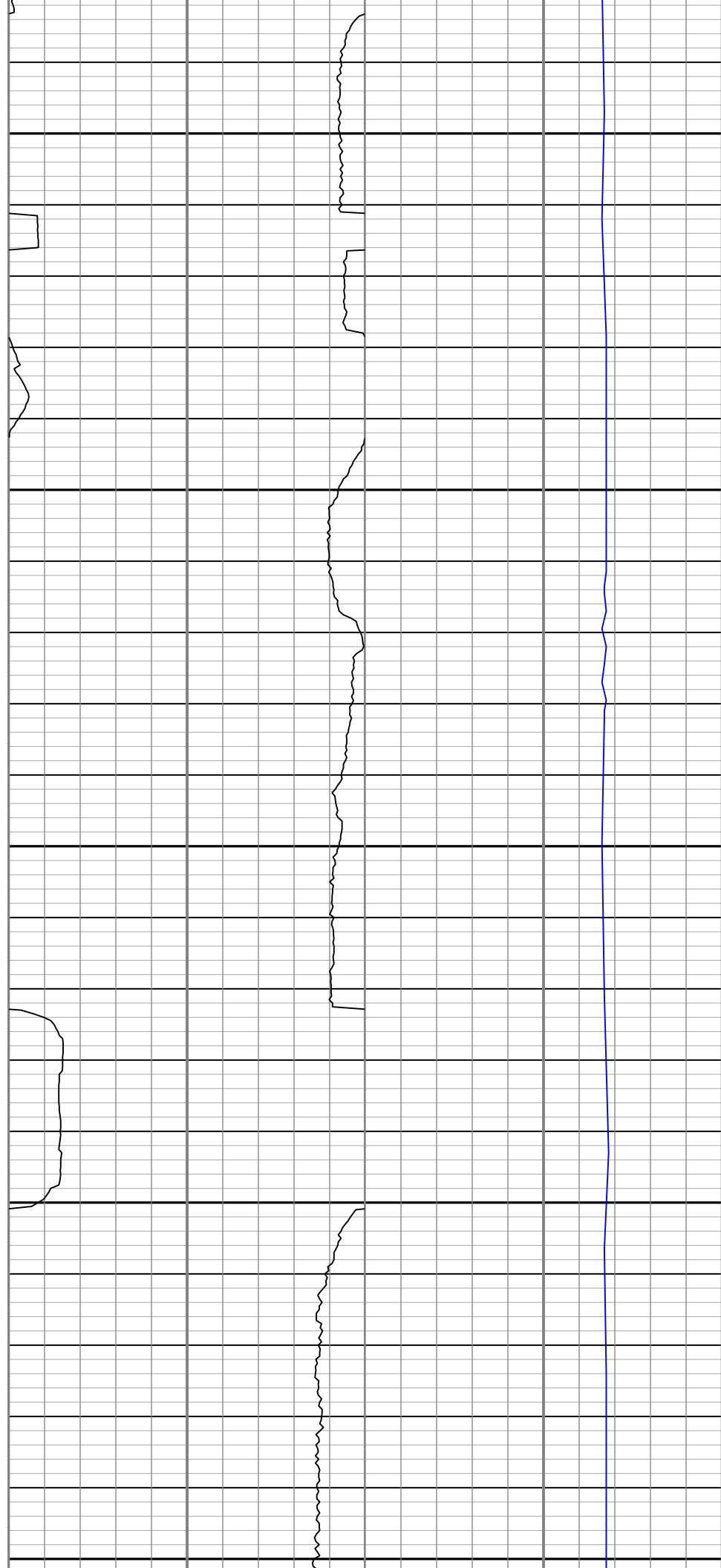
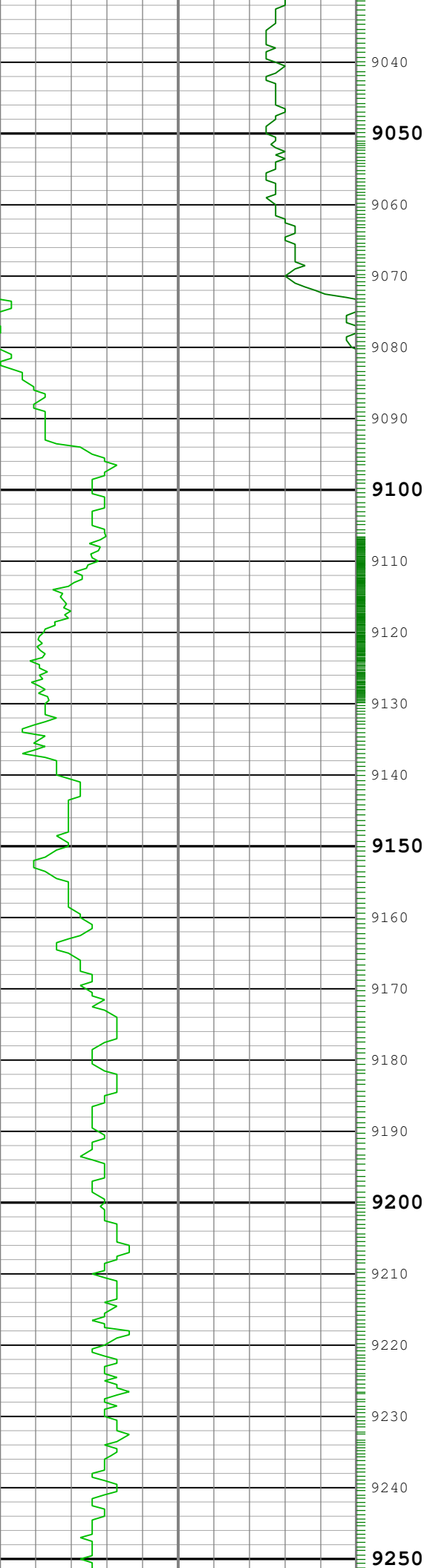


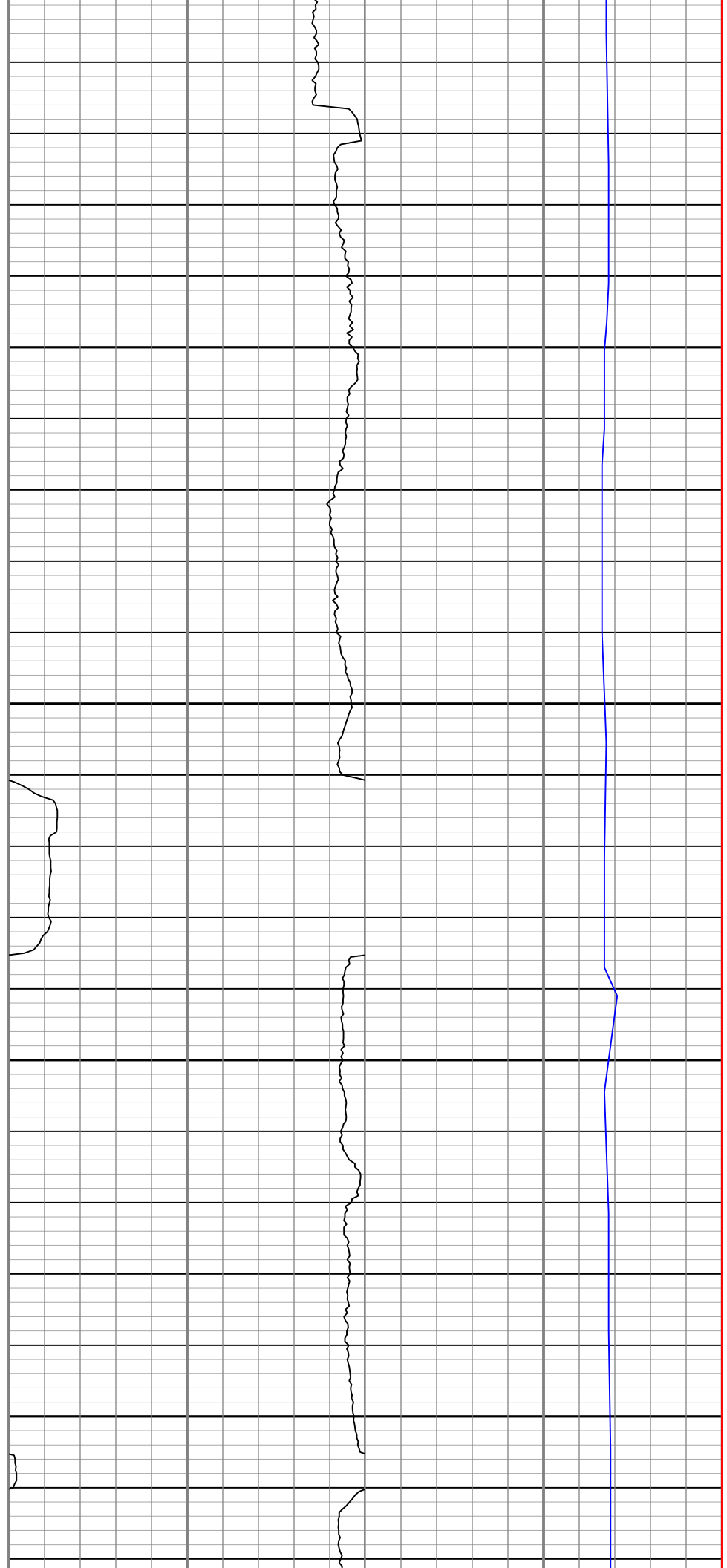
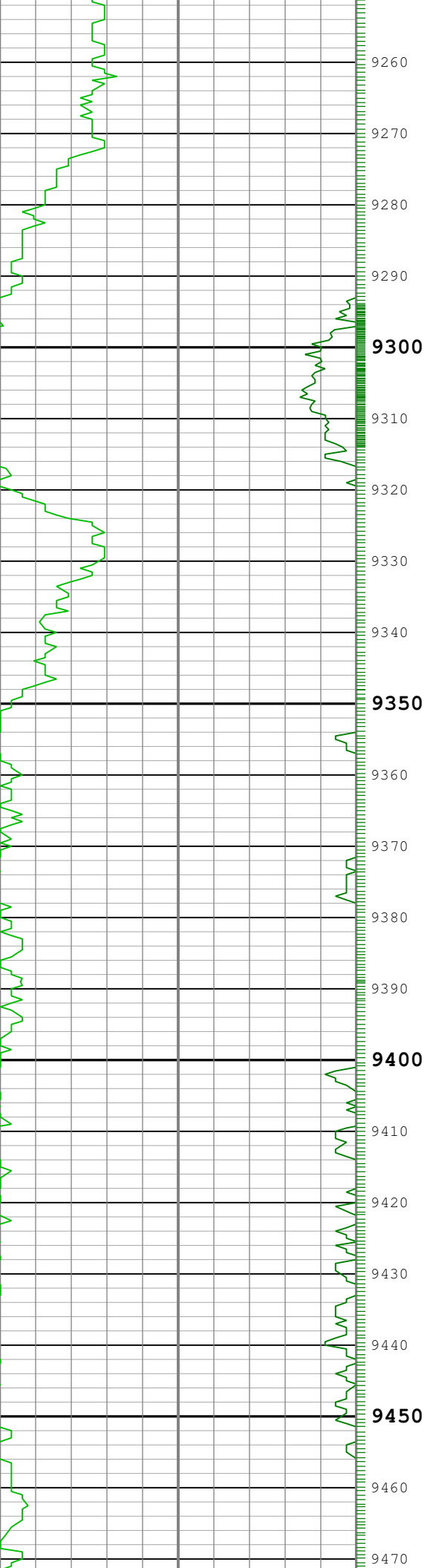


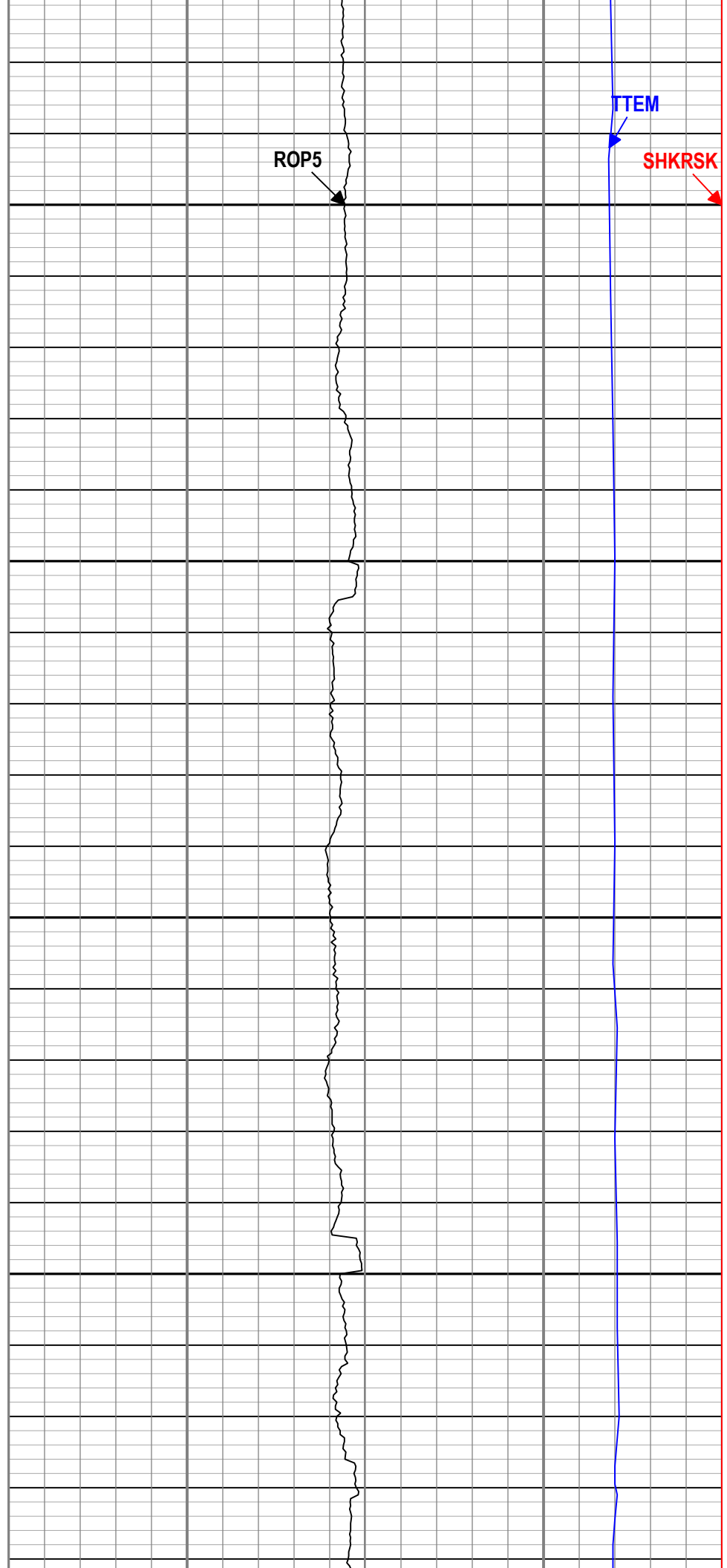
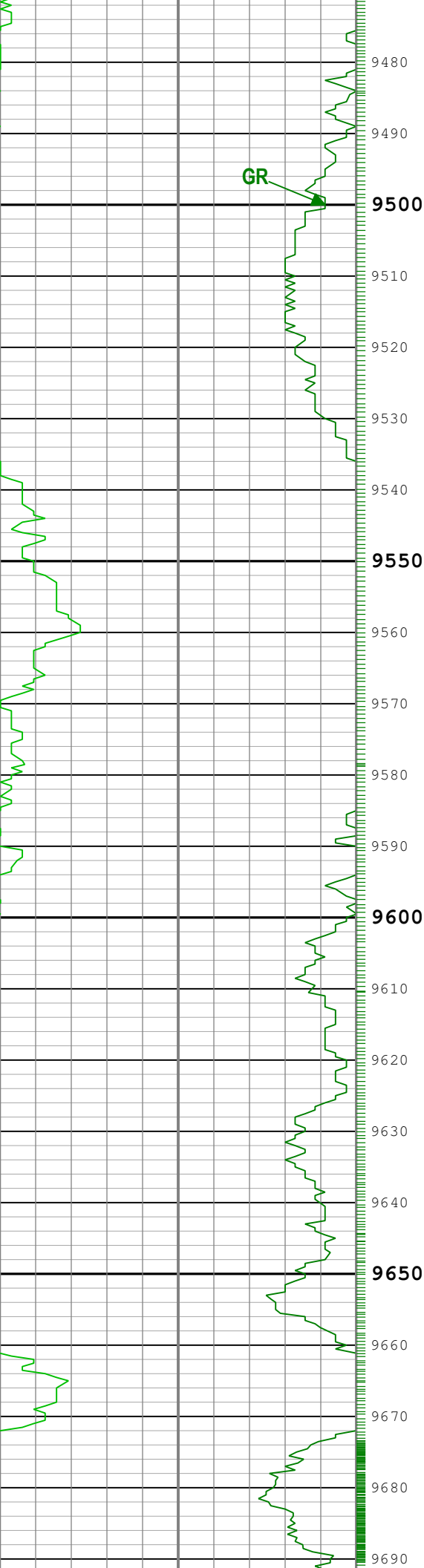


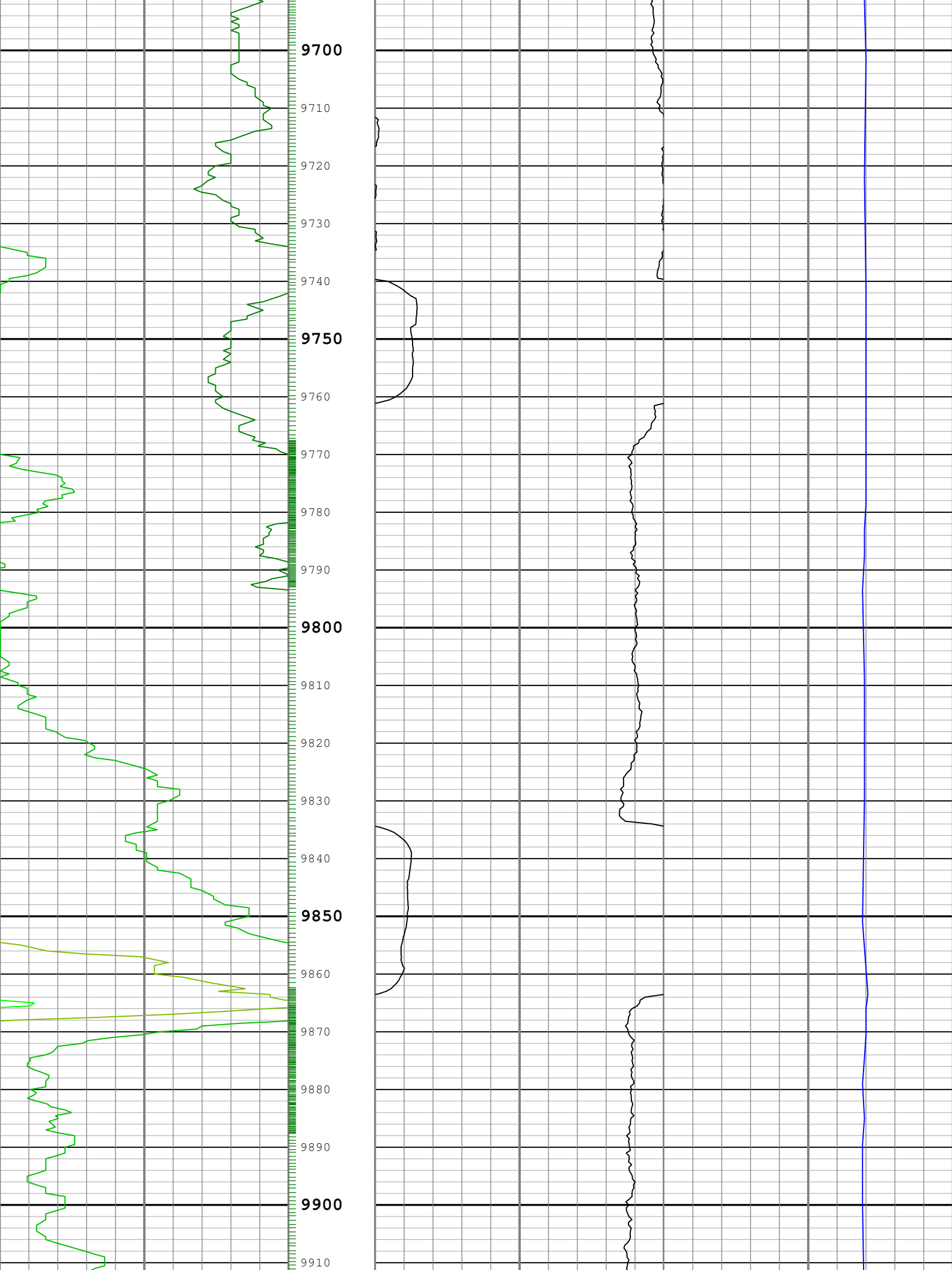


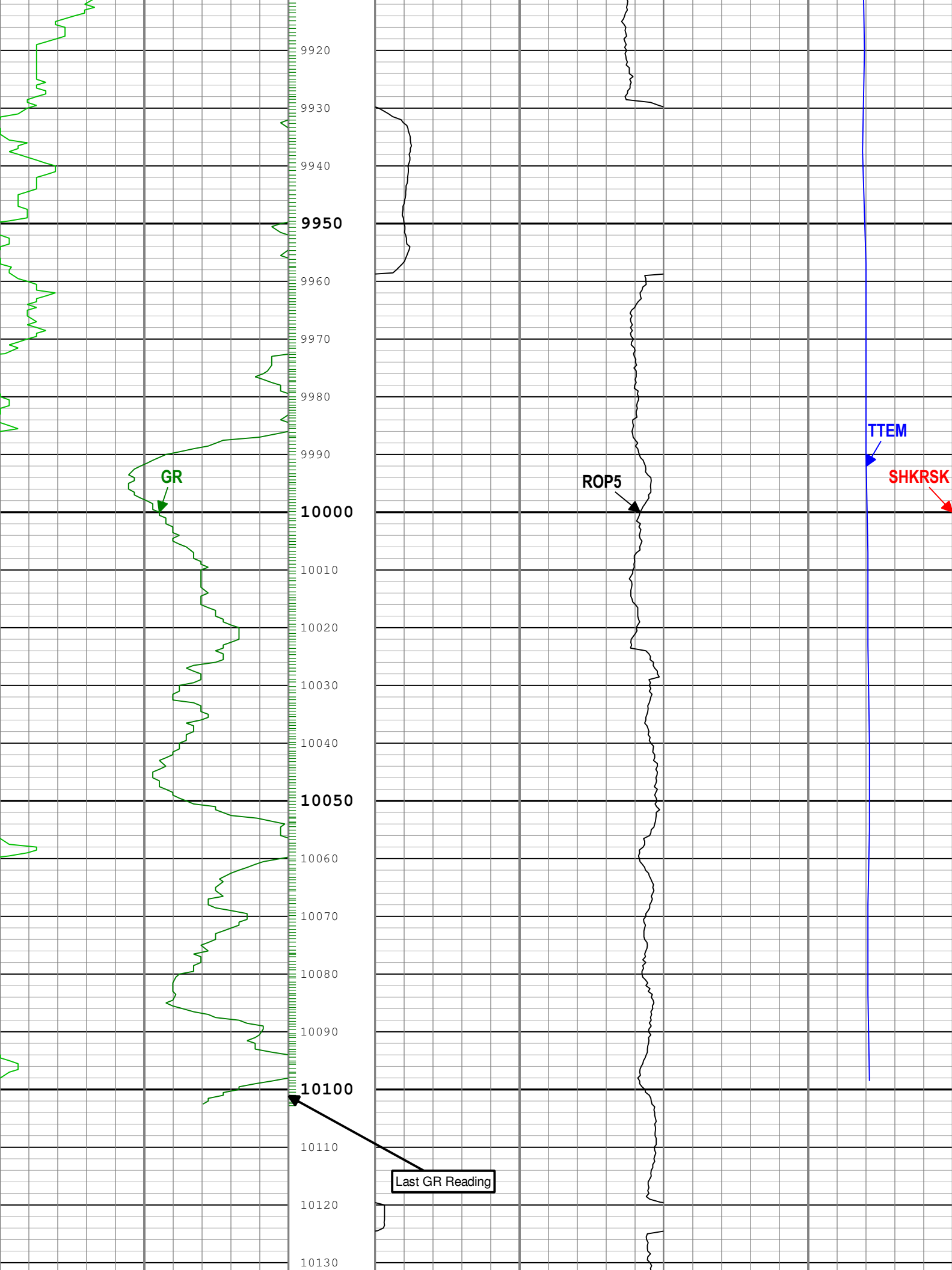


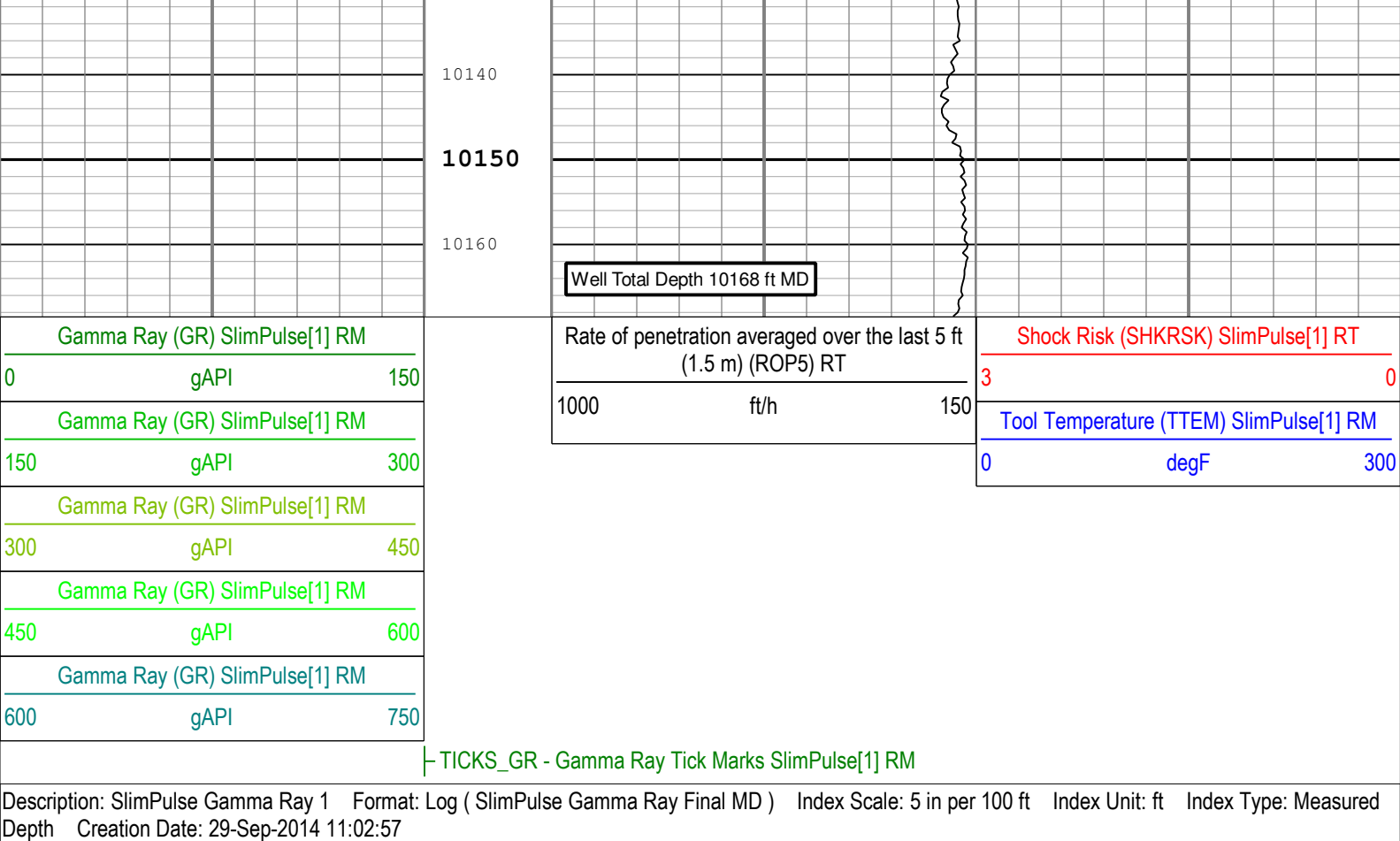












Channel Processing Parameters					
Run001: Parameters					
Parameter	Description	Tool	Value	Unit	
BS	Bit Size	DNMSESSION	Depth Zoned	in	
DFD	Drilling Fluid Density	Borehole	9.5	lbm/gal	
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT		
Run001Depth Zoned Parameters					
Parameter	Value	Start (ft)	Stop (ft)		
BS	13.5	1213	1213		
BS	8.75	1213	5071		
All depth are actual.					
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 Ream Down 1					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	9.5	23-Sep-2014 00:47:42	23-Sep-2014 02:35:30	4686.08	5071.17
Pass Drilling					
DFD	9.5	23-Sep-2014 02:35:30	23-Sep-2014 07:57:54	5071.25	5454.08
DFD	10.5	23-Sep-2014 07:57:54	23-Sep-2014 23:12:20	5454.08	6032.5
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	10.5	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

Run003Depth Zoned Parameters			
Parameter	Value	Start (ft)	Stop (ft)
BS	8.75	5886.17	6030
BS	6.125	6030	10168

All depth are actual.

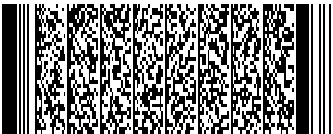
Tool Control Parameters	
Calibration Report	

SPULSE-GEN (SlimPulse with Generic Collar) Calibration - Run Run001							
Primary Equipment :							
Elec. cartridge, 150C max with GR			SPEC		112		
GRGain - Gamma Ray: Blanket							
Master (Time Frame File):		12:00:00 05-Sep-2014					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div></div>
Gamma Ray Calibration Gain		Master	1.0000	0.9000	1.0395	1.1000	<div><div></div><div></div><div></div><div></div></div>

SPULSE-GEN (SlimPulse with Generic Collar) Calibration - Run Run002							
Primary Equipment :							
Elec. cartridge, 150C max with GR			SPEC		935		
GRGain - Gamma Ray: Blanket							
Master (Time Frame File):		12:00:00 01-May-2014					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div></div>
Gamma Ray Calibration Gain		Master	1.0000	0.9000	1.0906	1.1000	<div><div></div><div></div><div></div><div></div></div>

SPULSE-GEN (SlimPulse with Generic Collar) Calibration - Run Run003							
Primary Equipment :							
Elec. cartridge, 150C max with GR			SPEC		935		
GRGain - Gamma Ray: Blanket							
Master (Time Frame File):		12:00:00 01-May-2014					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div></div>
Gamma Ray Calibration Gain		Master	1.0000	0.9000	1.0906	1.1000	<div><div></div><div></div><div></div><div></div></div>

Company:	Noble Energy
Well:	Rohn State LD03-63HN
Field:	Wattenberg
County:	Weld
State:	Colorado
Country:	USA



SlimPulse - Gamma Ray

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

Recorded Mode, Composite Log