

SlimPulse - Gamma Ray

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

Recorded Mode, Composite Log

Schlumberger

Company: Noble Energy

Well: Oscar Y10-72HN

Field: Wattenberg

County: Weld

State: Colorado

Country: USA

Section: 10 APIN: 0512337941

Township: 2N Rig Name: H&P 277

Range: 64W Rig Type: Top Drive

FL: NAD83 Colorado State Plane, Northern Zone, US Feet

FL1: Latitude: N 40° 9' 7.99" Northing: 1299776.84 ftUS

FL2: Longitude: W 104° 31' 51.78" Easting: 3270843.53 ftUS

Log Measured From: - Kelly Bushing: 4952.00 ft

Drill Floor: 4928.00 ft

Permanent Datum: - Mean Sea Level

Acquisition Dates: 08-Nov-2014 – 17-Nov-2014

Other Services:

Log Interval: 1156(ft) to 14445(ft)

Directional Drilling

Index Types: Measured Depth

Surveys / Continuous D&I

Index Scales: 1:1200 1" / 100', 1:240 5" / 100'

Downhole Temperature

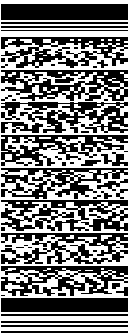
Depth Source: Driller's Depth

Downhole Shocks

Depth Sensor: PASON

Print Type: Final

Spud Date: 27-Oct-2014



Disclaimer

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Borehole Size/Casing Record						
Bit						
Bit Size (in)	13.75	8.75	6.125			
Top Driller (ft)	0	1600	7170			
Bottom Driller (ft)	1600	7170	14445			
Casing						
Size (in)	9.625	7				
Weight (lbm/ft)	36	26				
Inner Diameter (in)	8.921	6.276				
Grade	J55	P110				
Top Driller (ft)	0	1150				
Bottom Driller (ft)	1150	7163				

Operational Run Summary						
Parameter (unit)	Run001	Run002				
Date Log Started	08-Nov-2014	13-Nov-2014				
Time Log Started	15:58:33	07:18:30				
Date Log Finished	10-Nov-2014	17-Nov-2014				
Time Log Finished	16:42:40	07:11:26				
Bit Size (in)	8.750	6.125				
Bit Start Depth (ft)	1156.00	7170.00				
Bit Stop Depth (ft)	7170.00	14445.00				
Top Log Interval (ft)	1156.00	7107.00				
Bottom Log Interval (ft)	7107.00	14395.00				
Max Hole Deviation (deg)	80.71	94.58				
Azimuth of Max Deviation (deg)	3.85	357.47				
Logging Unit Number	Command Center	Command Center				
Logging Unit Location	Zone 2	Zone 2				
Recorded By	C. Welty	C. Welty				
Witnessed By	Cliff	Cliff				
Service Order Number	14CCO0657	14CCO0657				

Borehole Fluids						
Parameter(unit)	Run001	Run002				
Fluid Type	Water	Oil				
Fluid Name	Salt Brine					
Fluid Name		Diesel				
Max Recorded Temperatures (degF)	177.8	244.4				

degF)						
Source of Sample	Active Tank	Active Tank				
Salinity (ppm)	2100	64000				
Density (lbm/gal)	Zoned	Zoned				
Funnel Viscosity (s)	46	62				
Fluid Loss (cm3)						
PH	9.7	0				
Source RMF						
RMC	Pressed	Pressed				
RM @ Meas Temp (ohm.m@degF)	0.2 @ 68	N/A				
RMF @ Meas Temp (ohm.m@degF)	0.15 @ 68	N/A				
RMC @ Meas Temp (ohm.m@degF)		N/A				
RM @ BHT (ohm.m@degF)	0.07 @ 212	N/A				
RMF @ BHT (ohm.m@degF)	0.05 @ 212	N/A				
RMC @ BHT (ohm.m@degF)	NaN @ 212	N/A				
Electricity Stability (V)		252				
Oil/Water		63/37 (1.67)				
Total Solid (%)	8.1	7				
High Gravity Solids (%)	4.4	4.1				

Zoned Borehole Fluids

Run001

Parameter	Value	Start
Density	8.9	11/8/2014 3:58:33 PM
Density	9.3	11/9/2014 2:30:00 AM
Density	10	11/9/2014 2:00:00 PM
Density	10.5	11/10/2014 2:00:00 AM

Run002

Parameter	Value	Start
Density	9.3	11/13/2014 7:18:30 AM
Density	9.55	11/14/2014 1:00:00 PM
Density	9.5	11/15/2014 2:30:00 AM
Density	9.4	11/15/2014 1:30:00 PM
Density	9.5	11/16/2014 2:30:00 AM

Remarks and Equipment Summary

Data presented is from tool memory and acquired while drilling from 1156 ft to 14445 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
Run Objective: Drill the vertical and curve to the landing point	Run Objective: Drill lateral to well TD
Bit to Gamma Ray: 62.62 ft Bit to D&I: 59.59 ft	Bit to Gamma Ray: 49.07 ft Bit to D&I: 46.04 ft
Drilled from: 1156 ft to 7170 ft Logged from: 1156 ft to 7107 ft	Drilled from: 7170 ft to 14445 ft Logged from: 7107 ft to 14395 ft
SlimPulse Software: 110C01	SlimPulse Software: 110C01
SlimPulse D&I calibrated on: Sep 21, 2014 SlimPulse GR calibrated on: Sep 21, 2014	SlimPulse D&I calibrated on: Oct 16, 2014 SlimPulse GR calibrated on: Oct 28, 2014
Reason for POOH: Section TD	Reason for POOH: Well TD
PathFinder a Schlumberger Co. Personnel:	PathFinder a Schlumberger Co. Personnel:

Run001: Toolstring

Run002: Toolstring

Equip name
Flex DC: 6 3/4"[2
]:DR18671

Length
139.2

MP name
NMFC

Offset

Flex DC: 6 3/4"[1
]:DR20317

108.14

NMFC

Equip name
Flt Sub: 4 3/4":D
R13563

Length
128.1

MP name
NMFloat

Offset

NMDC: 4 3/4"[2
]:DR21166

124.6

NMDC

SPULSE-GEN:DR8 77.04
945
FLOWSUB:DR22497
SPCOLLAR:DR8945
SPMA:318
SPEC:H686
SPBA:Q01500
UBHO:675U291

NMDC: 4 3/4"[1] 94.48
:DR28105

NMDC

GR

62.62

SPULSE-GEN:DR2 63.37
3997
FLOWSUB:DR22486
SPCOLLAR:DR23997
SPMA:528
SPEC:6189
SPBA:Q02200
UBHO:475U127

D&I

59.59

GR

49.07

D&I

46.04

Flt Sub: 6 3/4":D 41.3
R21309

NM FLOAT

NMDC: 6 3/4":DR 38.06
13223

NM Pony

Motor:FH70B005 26.9
6

G2 Fixed

Motor 27.44

PF G2 Motor

Bit:JJ9530

0.7

Smith SDI519 HPX

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

Bit:JK0004

0.61

MDI513 UBPX

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

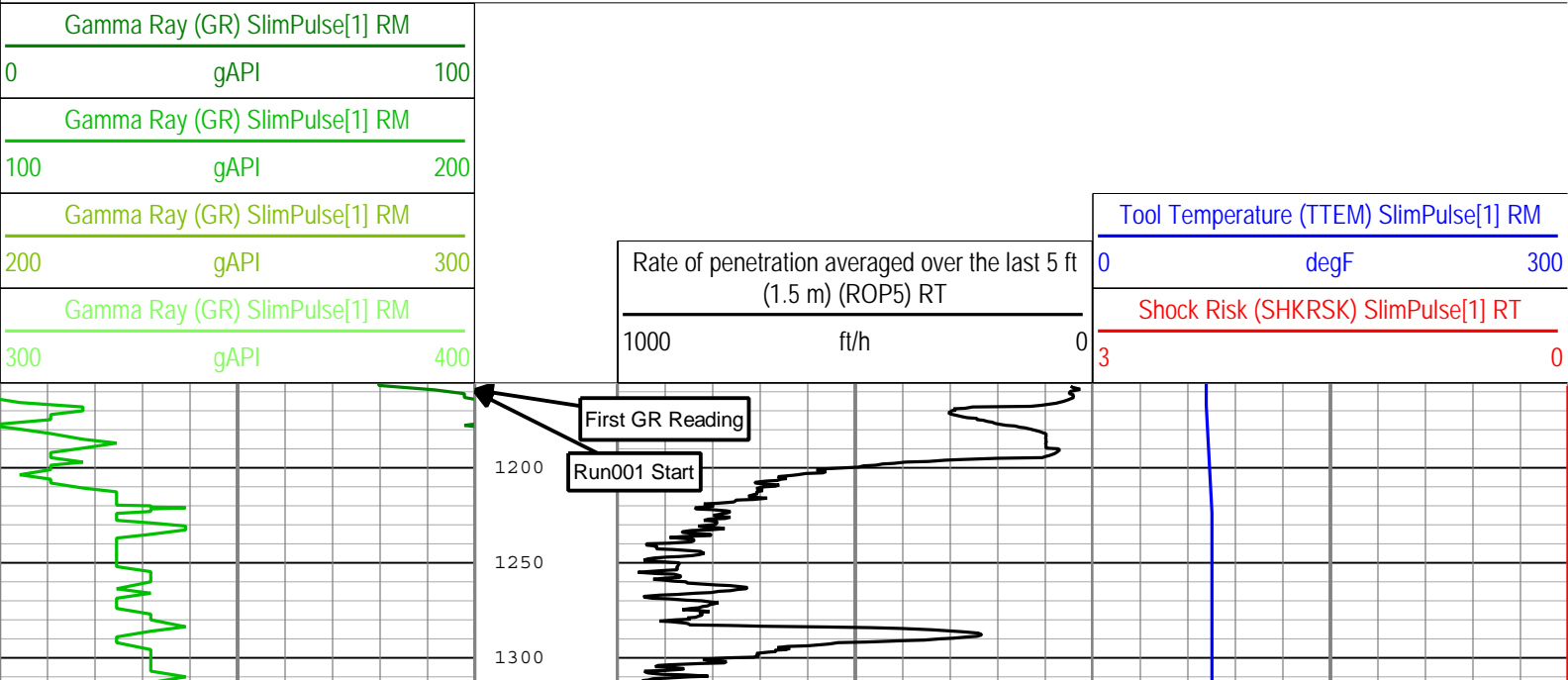
Software Version			
Acquisition System		Version	
MaxWell		4.0.9163.3000	
Application Patch		Patch-SP-10767_26570-4.0.9163.3001	
		Patch-Hotfix_MRT_SP4-27464-4.0.9575.3002	
Tool Elements	Description	Software Version	Firmware Version
DRILLING_SURFACE	DRILLING_SURFACE	4.0.9469.3000	
SPEC	SlimPulse Electronics Cartridge	4.0.9469.3000	

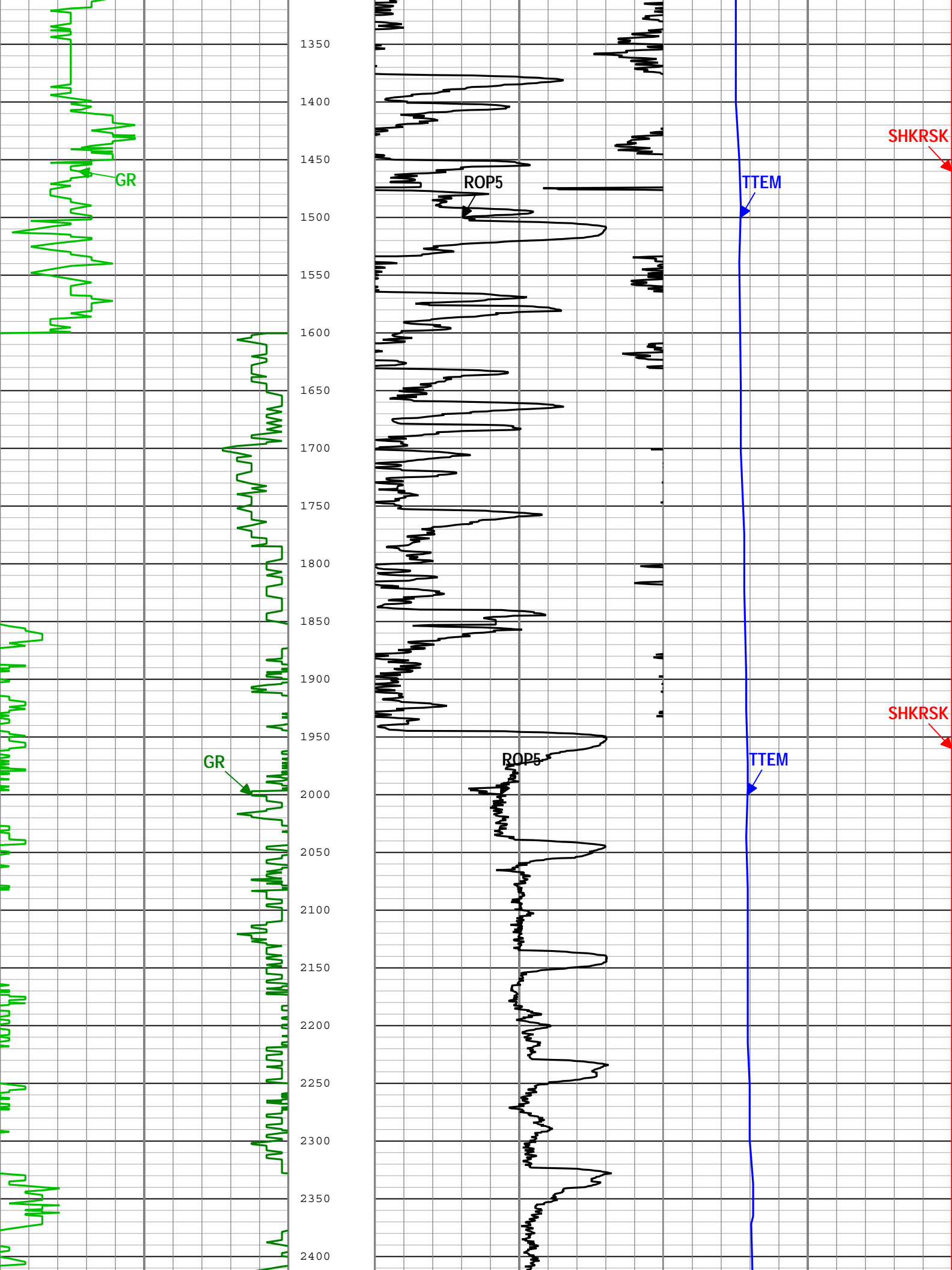
Composite Summary							
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Include Parallel Data
Run001	Drilling	Down	1156.00 ft	7169.92 ft	08-Nov-2014 6:14:47 PM	10-Nov-2014 4:42:40 PM	No
Run002	Drilling	Down	7169.00 ft	14445.25 ft	13-Nov-2014 7:18:30 AM	17-Nov-2014 7:11:26 AM	No
Run002	Ream Down 1	Down	7067.75 ft	7170.00 ft	13-Nov-2014 12:12:04 PM	13-Nov-2014 3:15:09 PM	No

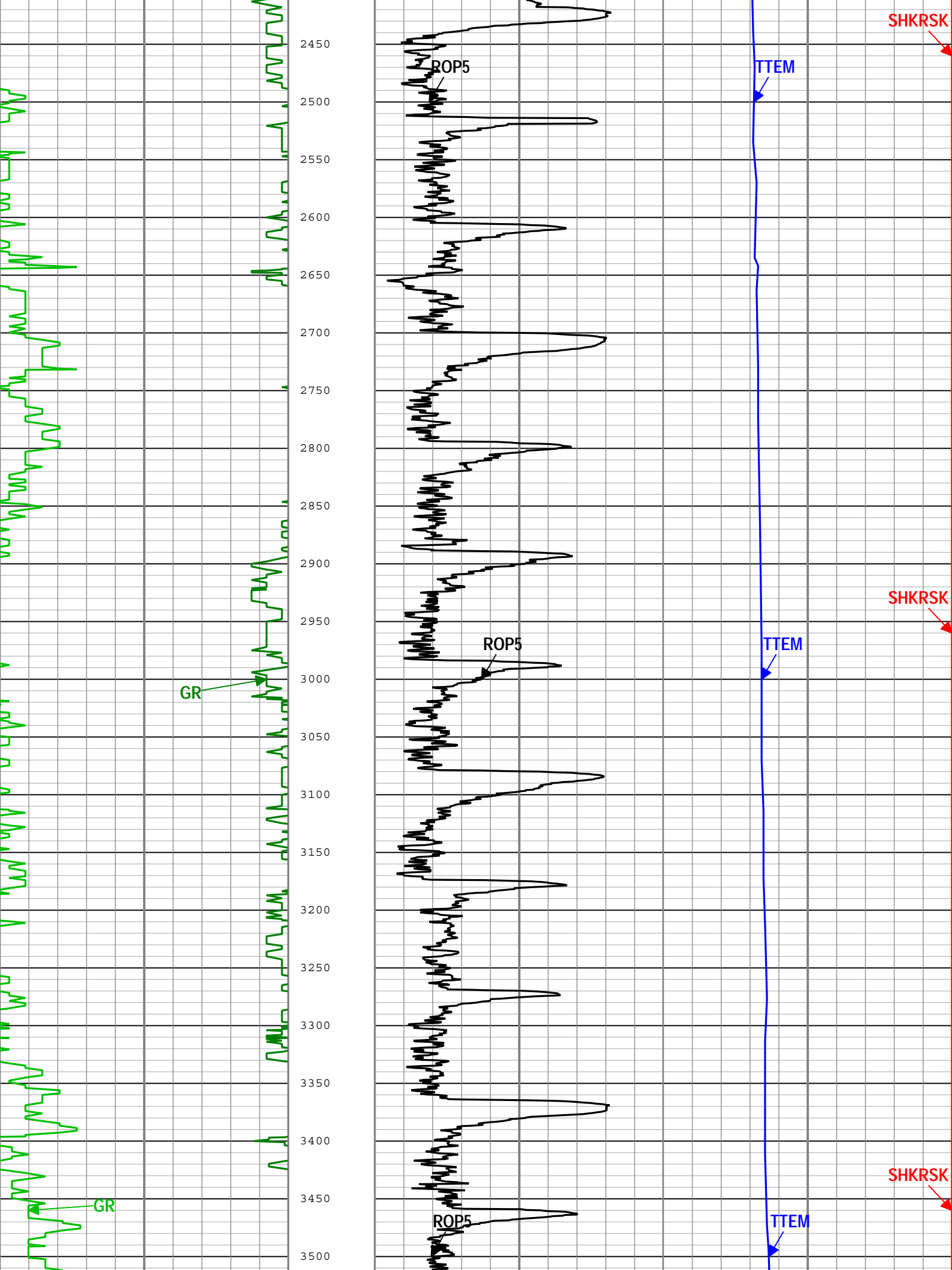
All depths are referenced to toolstring zero

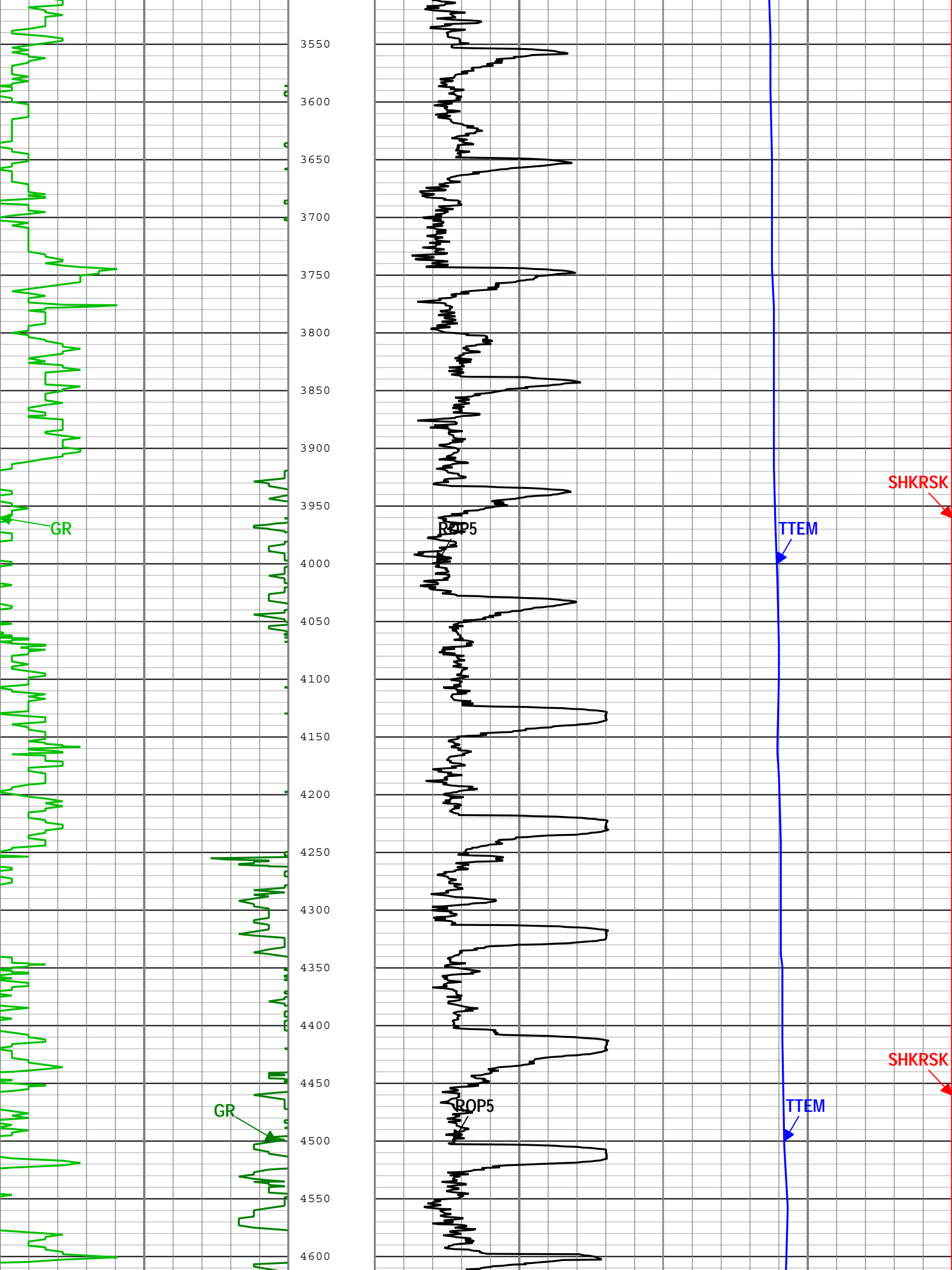
Log	Company:Noble Energy Well:Oscar Y10-72HN Well Composite:S308
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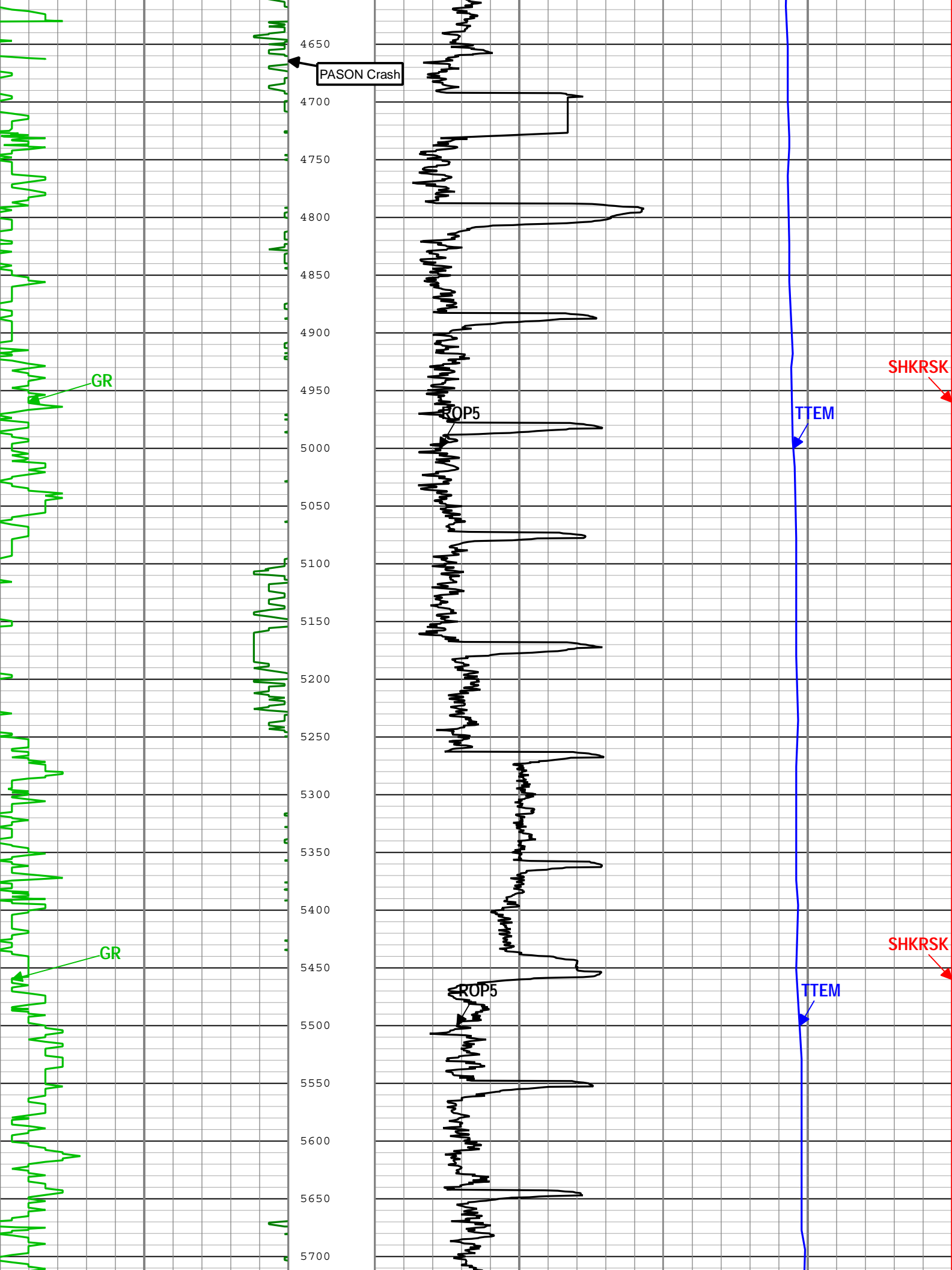
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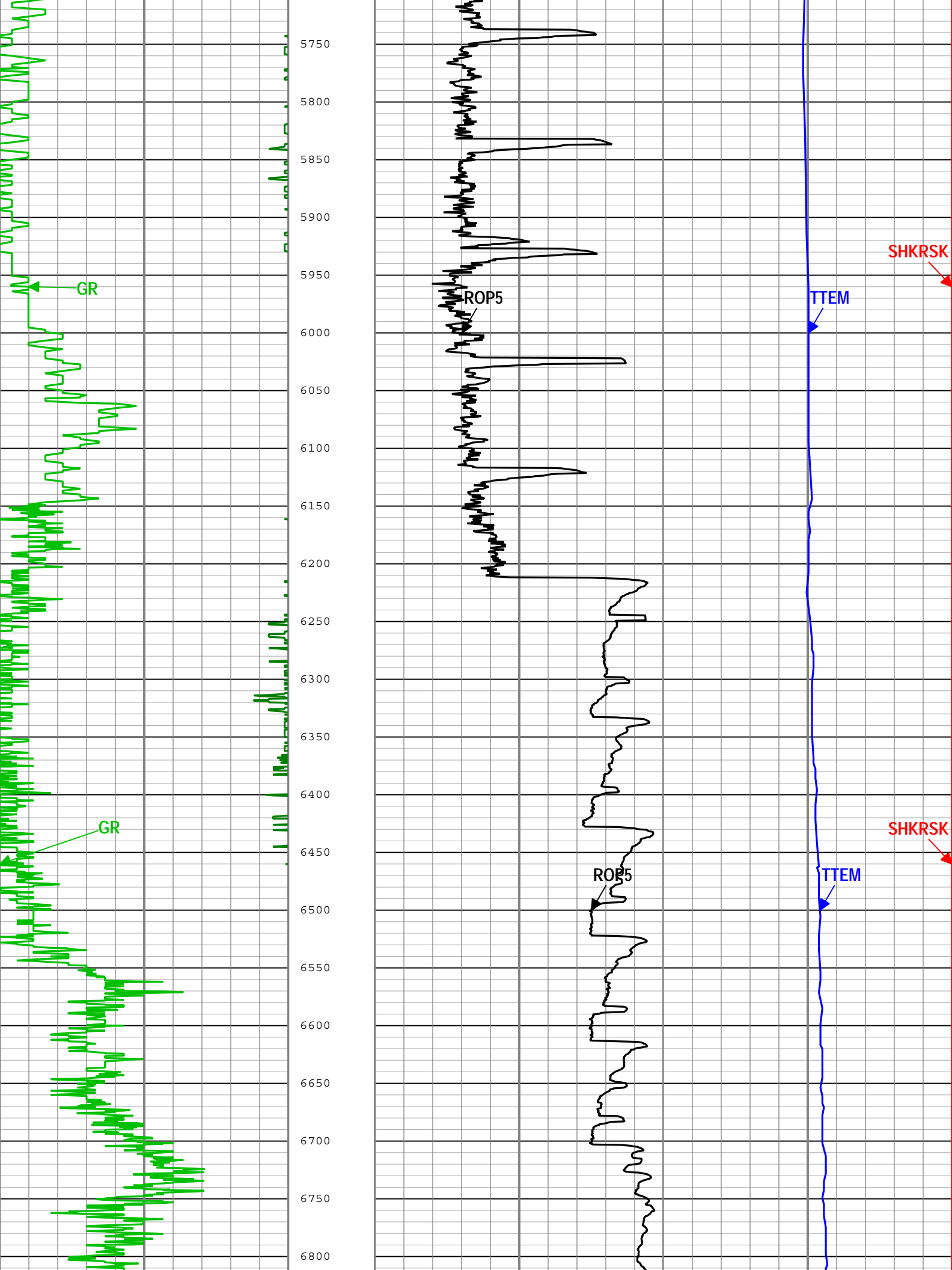


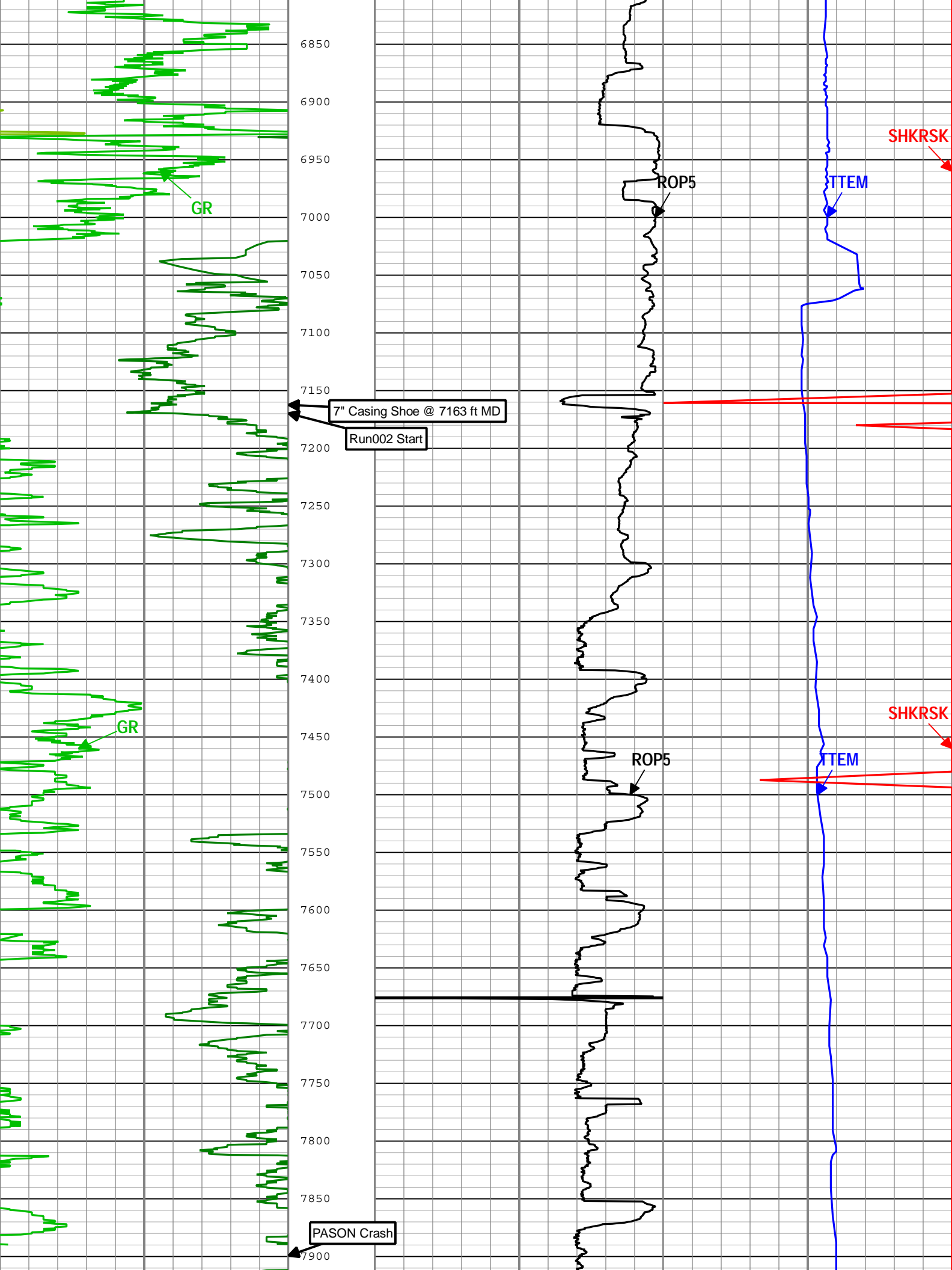


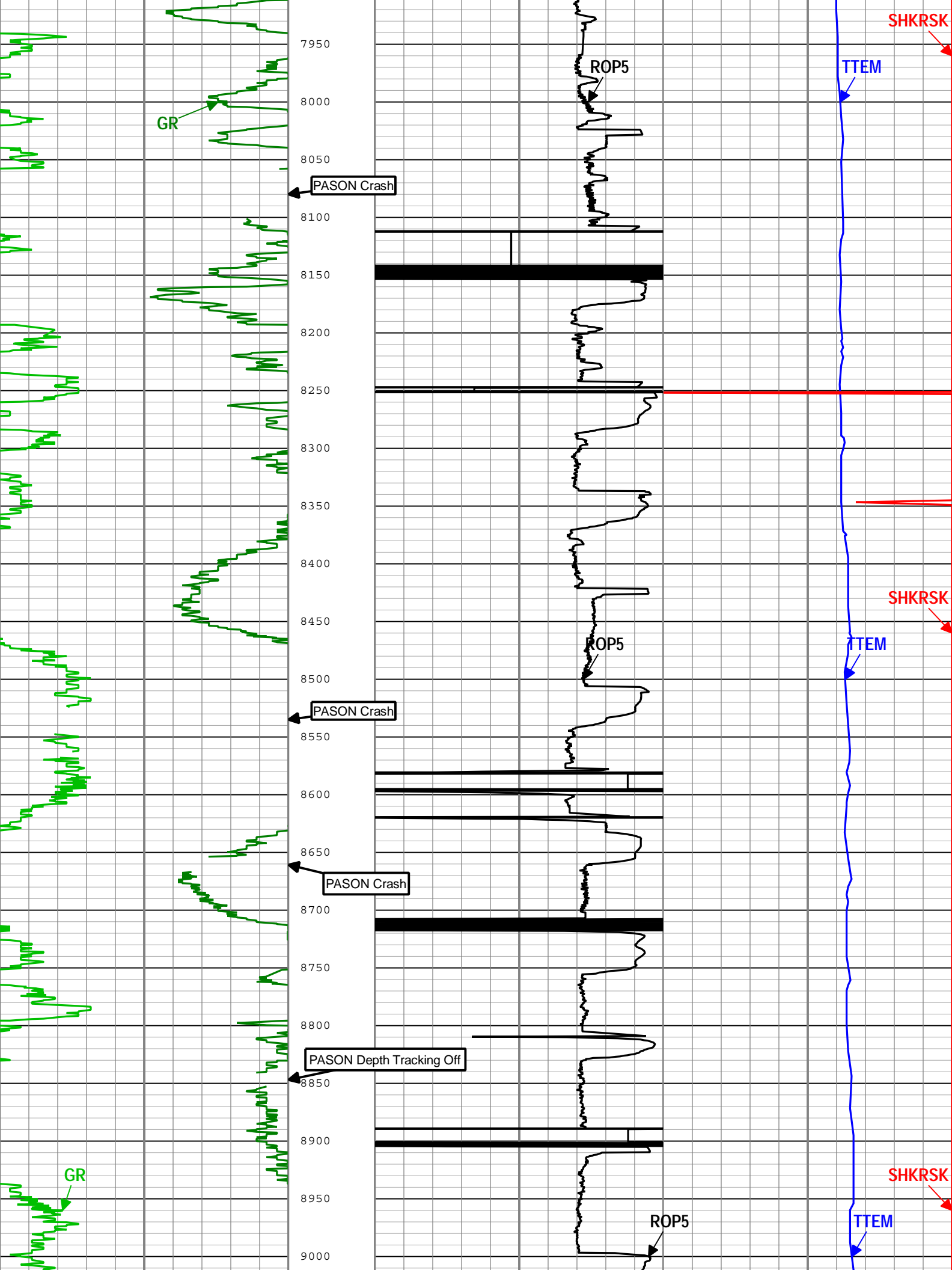


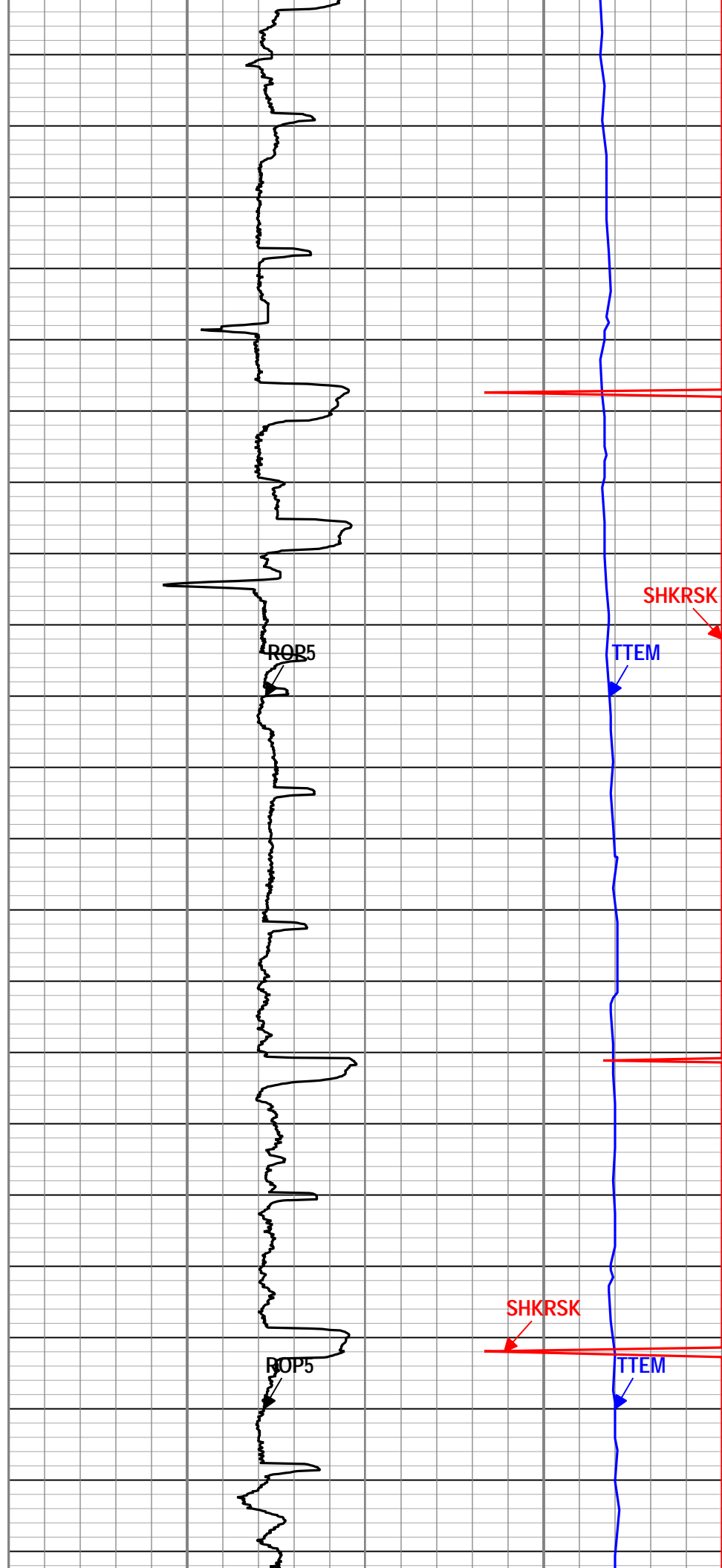
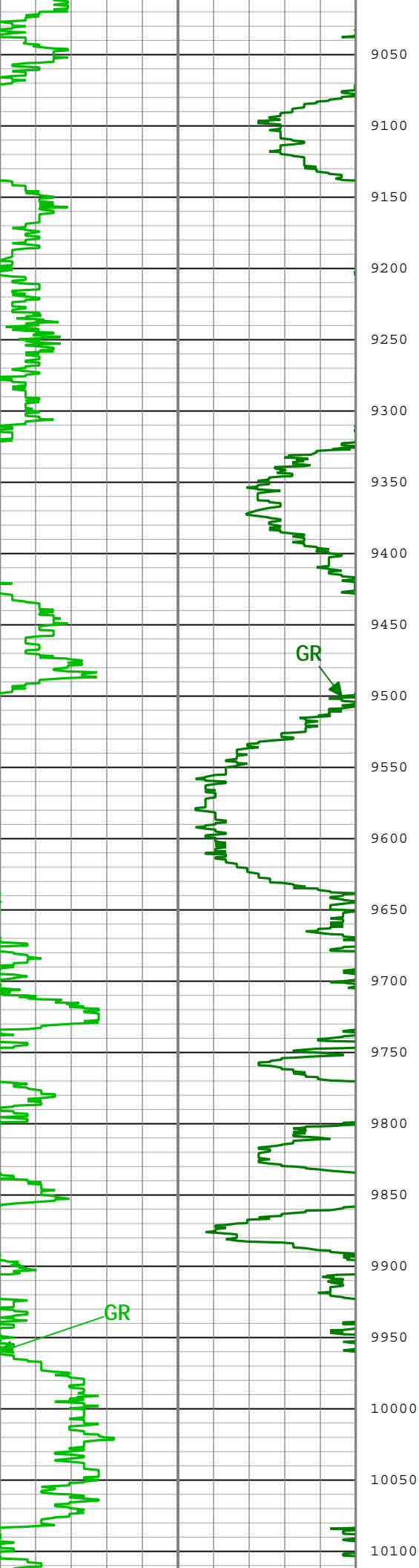


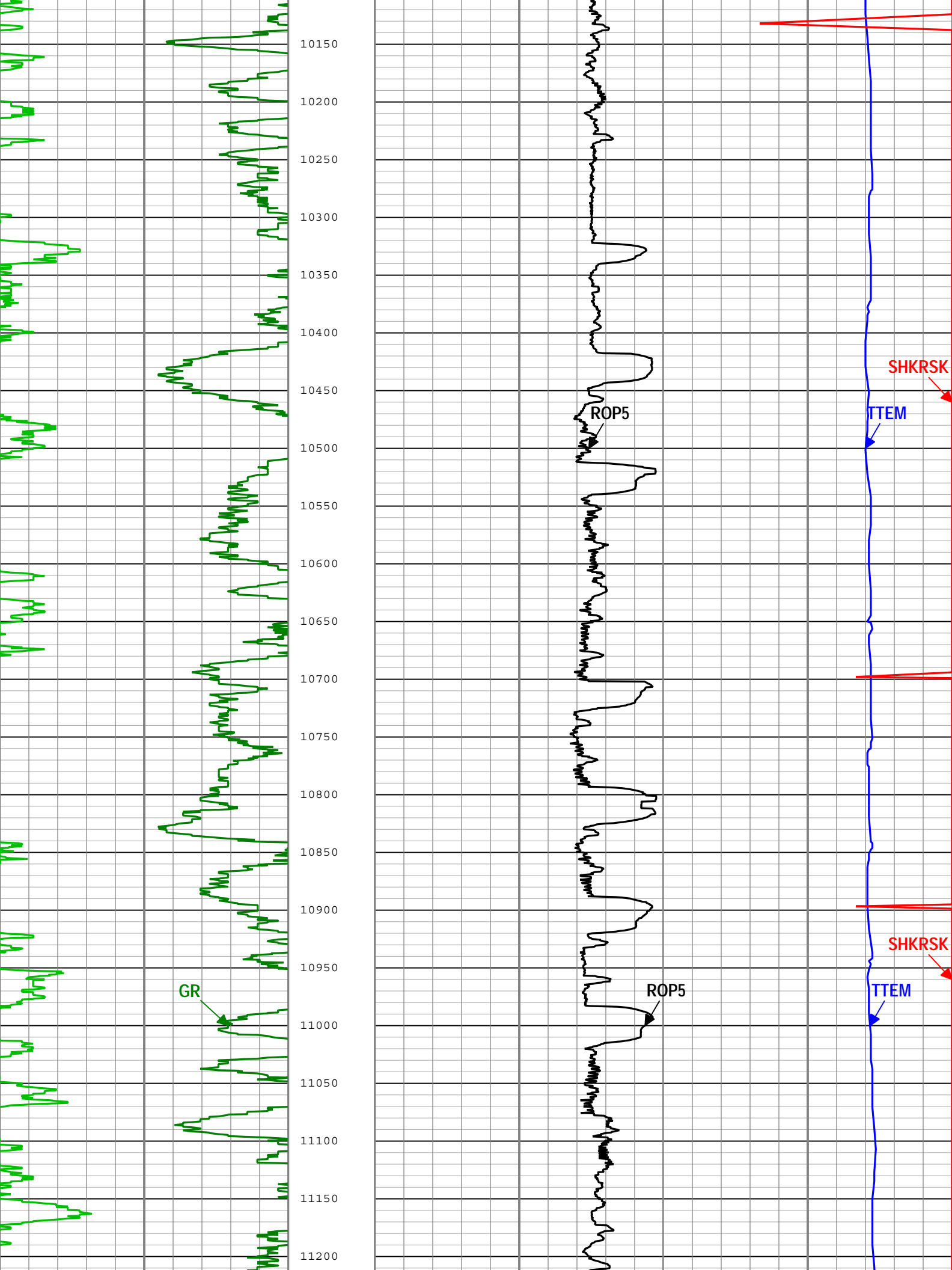


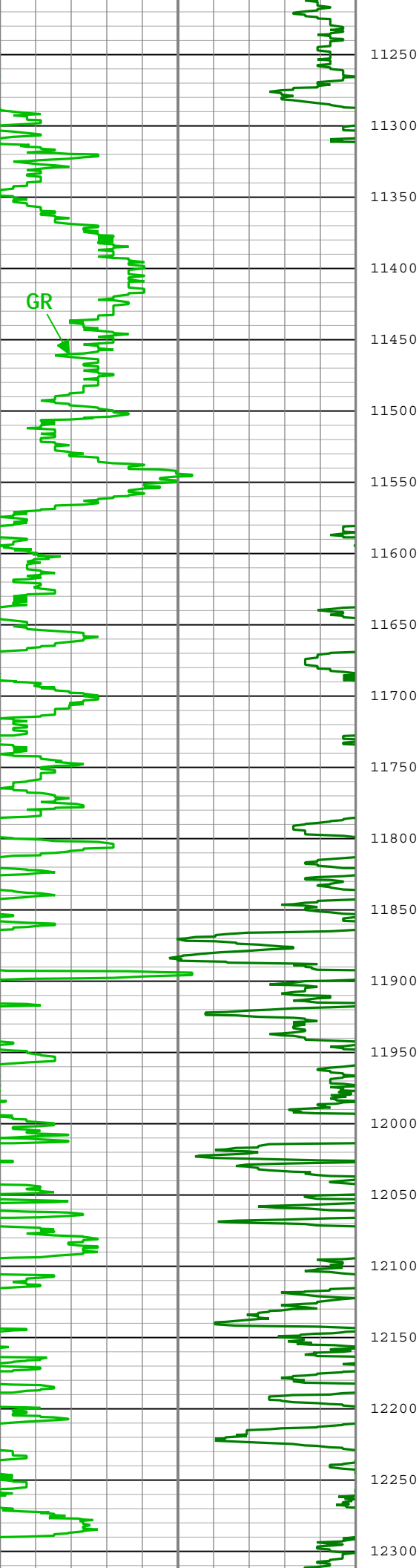












11250

11300

11350

11400

11450

11500

11550

11600

11650

11700

11750

11800

11850

11900

11950

12000

12050

12100

12150

12200

12250

12300

ROP5

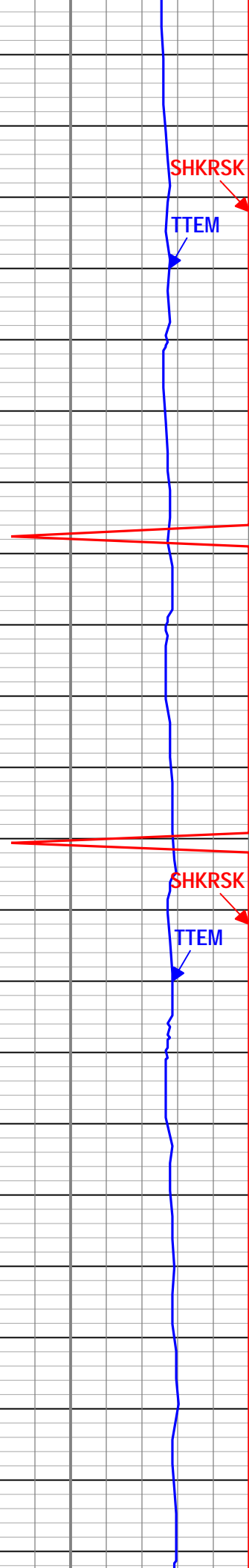
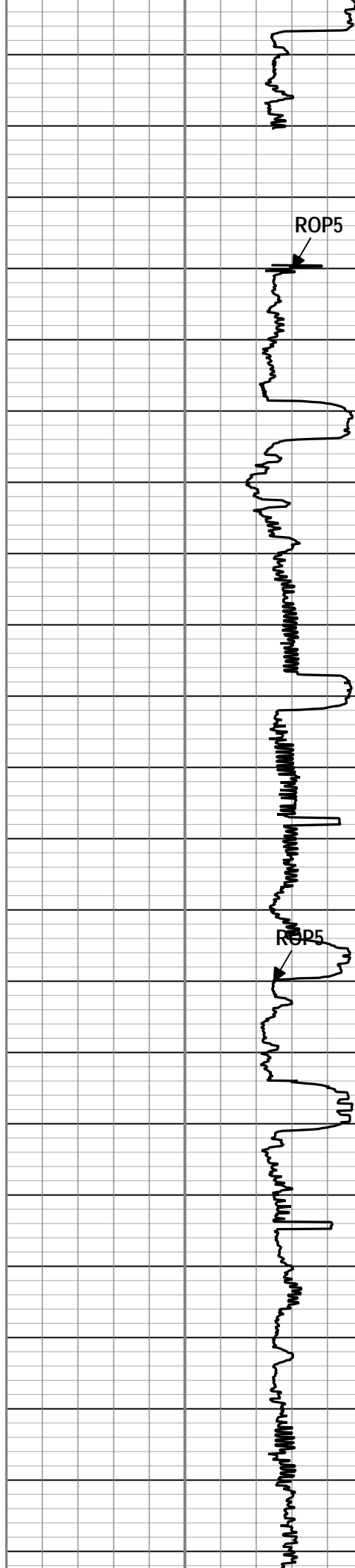
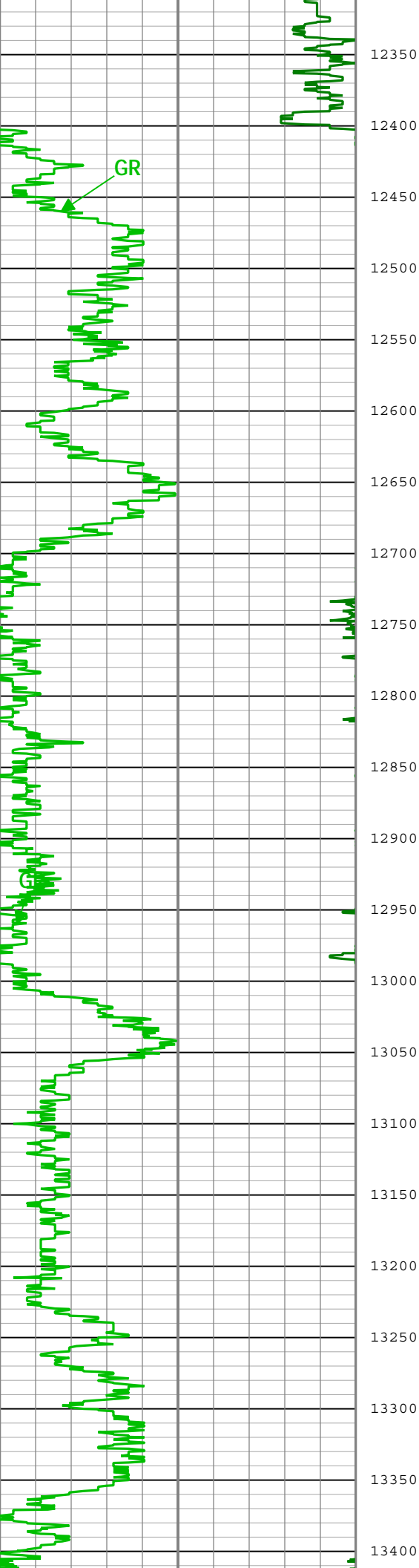
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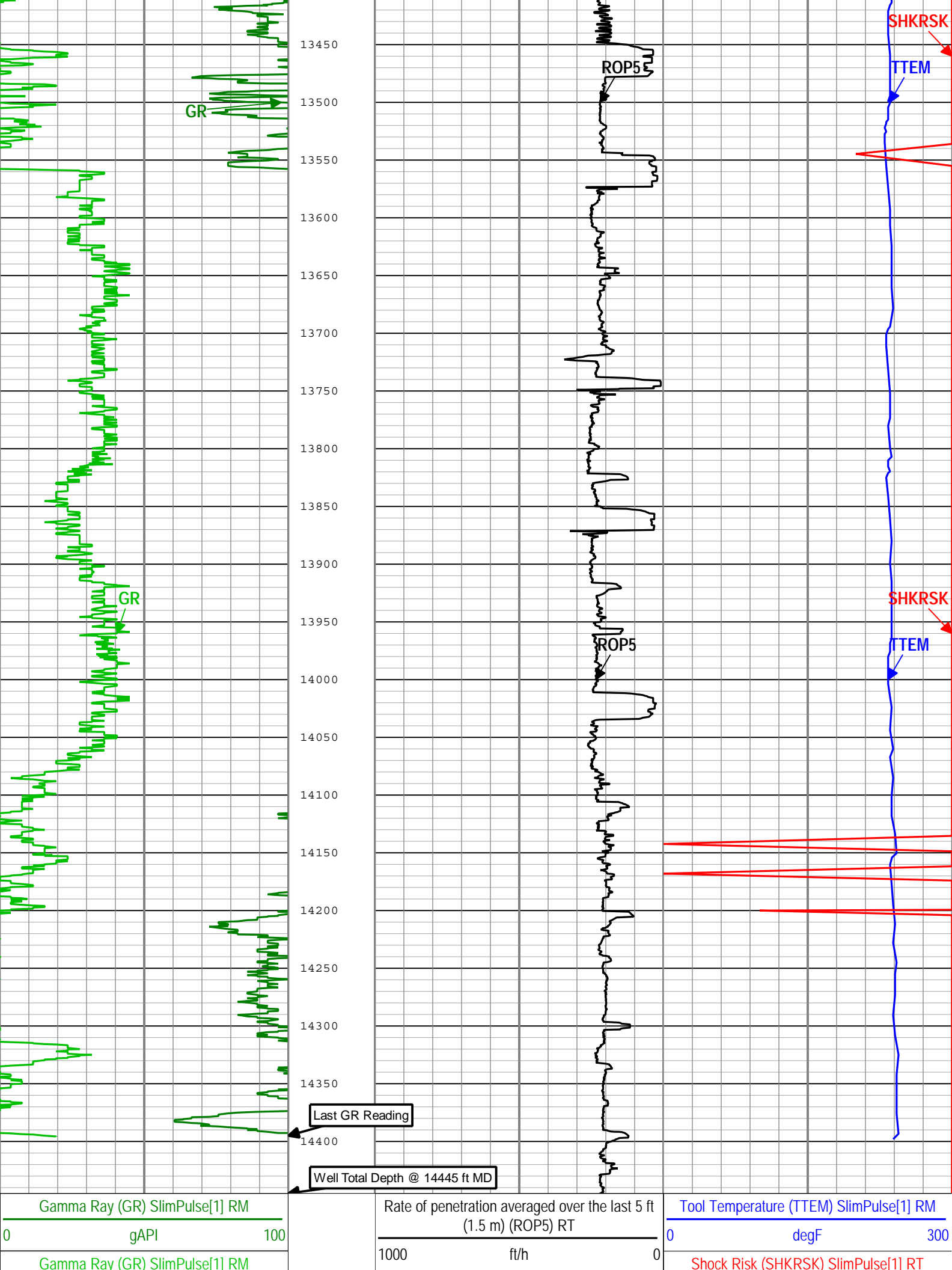
TTEM

TTEM

SHKRSK

SHKRSK





100	gAPI	200	3	0
Gamma Ray (GR) SlimPulse[1] RM				
200	gAPI	300		
Gamma Ray (GR) SlimPulse[1] RM				
300	gAPI	400		
Description: SlimPulse Gamma Ray 1 Format: Log (Final MD Log) Index Scale: 1 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 18-Nov-2014 08:51:54				

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	13.75	1156		1600	
BS	8.75	1600		7169.92	
All depth are actual.					
Run001Time Zoned Parameters					
Pass Drilling					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	8.9	08-Nov-2014 18:14:47	09-Nov-2014 02:30:00	1156	3458.75
DFD	9.3	09-Nov-2014 02:30:00	09-Nov-2014 14:00:00	3458.75	6427.58
DFD	10	09-Nov-2014 14:00:00	10-Nov-2014 02:00:00	6427.58	7066.67
DFD	10.5	10-Nov-2014 02:00:00	10-Nov-2014 16:42:40	7066.67	7169.92
All depth are at tool zero.					
Run002: 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		
Run002Depth Zoned Parameters					
Parameter	Value	Start (ft)		Stop (ft)	
BS	8.75	6939.65		7170	
BS	6.125	7170		14445	
All depth are actual.					
Run002Time Zoned Parameters					
Pass Drilling					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	9.3	13-Nov-2014 07:18:30	14-Nov-2014 13:00:00	7169	9561.33
DFD	9.55	14-Nov-2014 13:00:00	15-Nov-2014 02:30:00	9561.33	10983
DFD	9.5	15-Nov-2014 02:30:00	15-Nov-2014 13:30:00	10983	12040.33
DFD	9.4	15-Nov-2014 13:30:00	16-Nov-2014 02:30:00	12040.33	13086.75
DFD	9.5	16-Nov-2014 02:30:00	17-Nov-2014 07:11:26	13086.75	14445.25

Pass Ream Down 1

DFD	9.3	13-Nov-2014 12:13:59	13-Nov-2014 15:15:09	7067.75	7169.57
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All depth are at tool zero.

Tool Control Parameters

Well Composite

Software Version

Acquisition System			Version		
MaxWell			4.0.9163.3000		
Application Patch			Patch-SP-10767_26570-4.0.9163.3001		
			Patch-Hotfix_MRT_SP4-27464-4.0.9575.3002		
Tool Elements	Description	Software Version		Firmware Version	
DRILLING_SURFACE	DRILLING_SURFACE	4.0.9469.3000			
SPEC	SlimPulse Electronics Cartridge	4.0.9469.3000			

Composite Summary

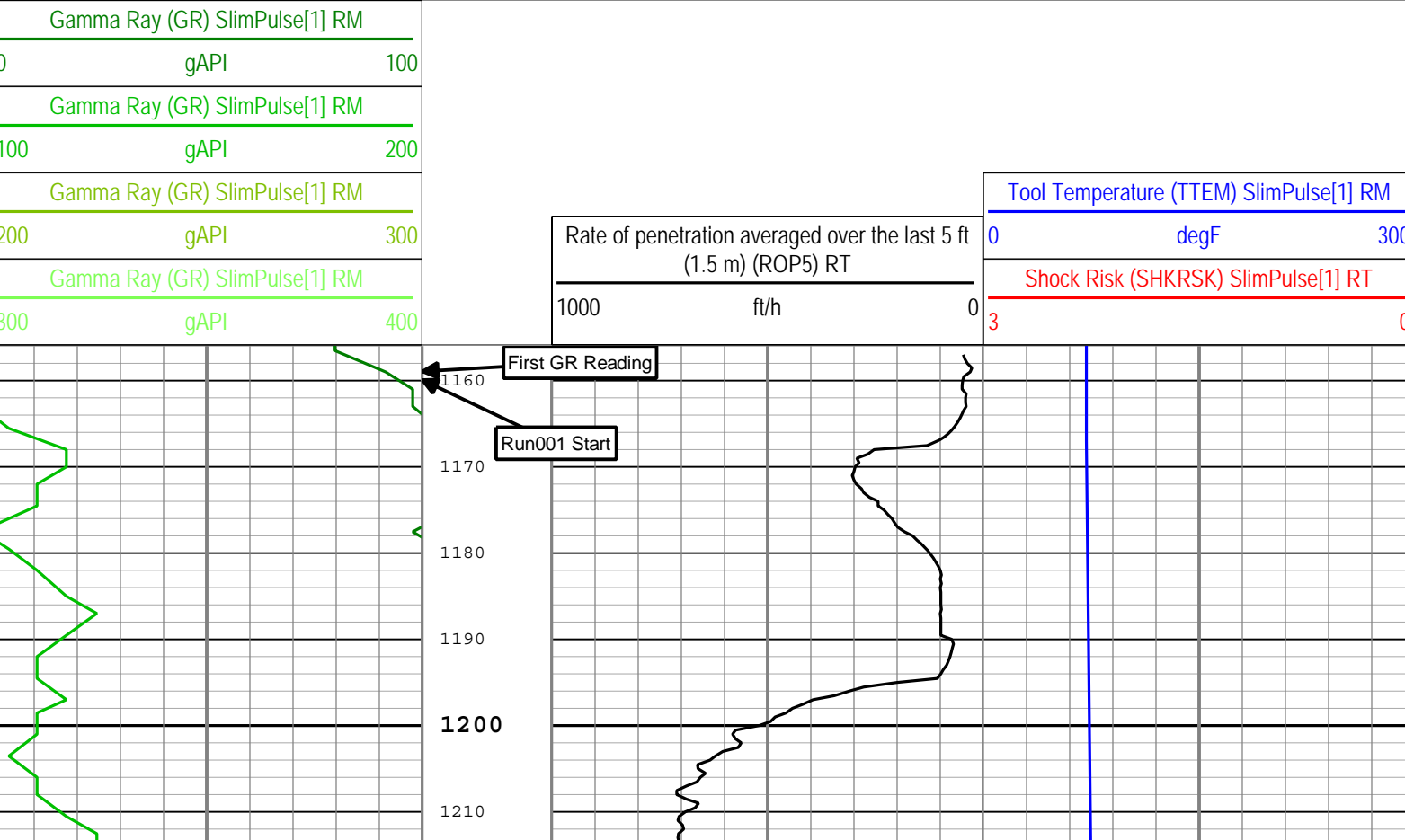
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Include Parallel Data
Run001	Drilling	Down	1156.00 ft	7169.92 ft	08-Nov-2014 6:14:47 PM	10-Nov-2014 4:42:40 PM	No
Run002	Drilling	Down	7169.00 ft	14445.25 ft	13-Nov-2014 7:18:30 AM	17-Nov-2014 7:11:26 AM	No
Run002	Ream Down 1	Down	7067.75 ft	7170.00 ft	13-Nov-2014 12:12:04 PM	13-Nov-2014 3:15:09 PM	No

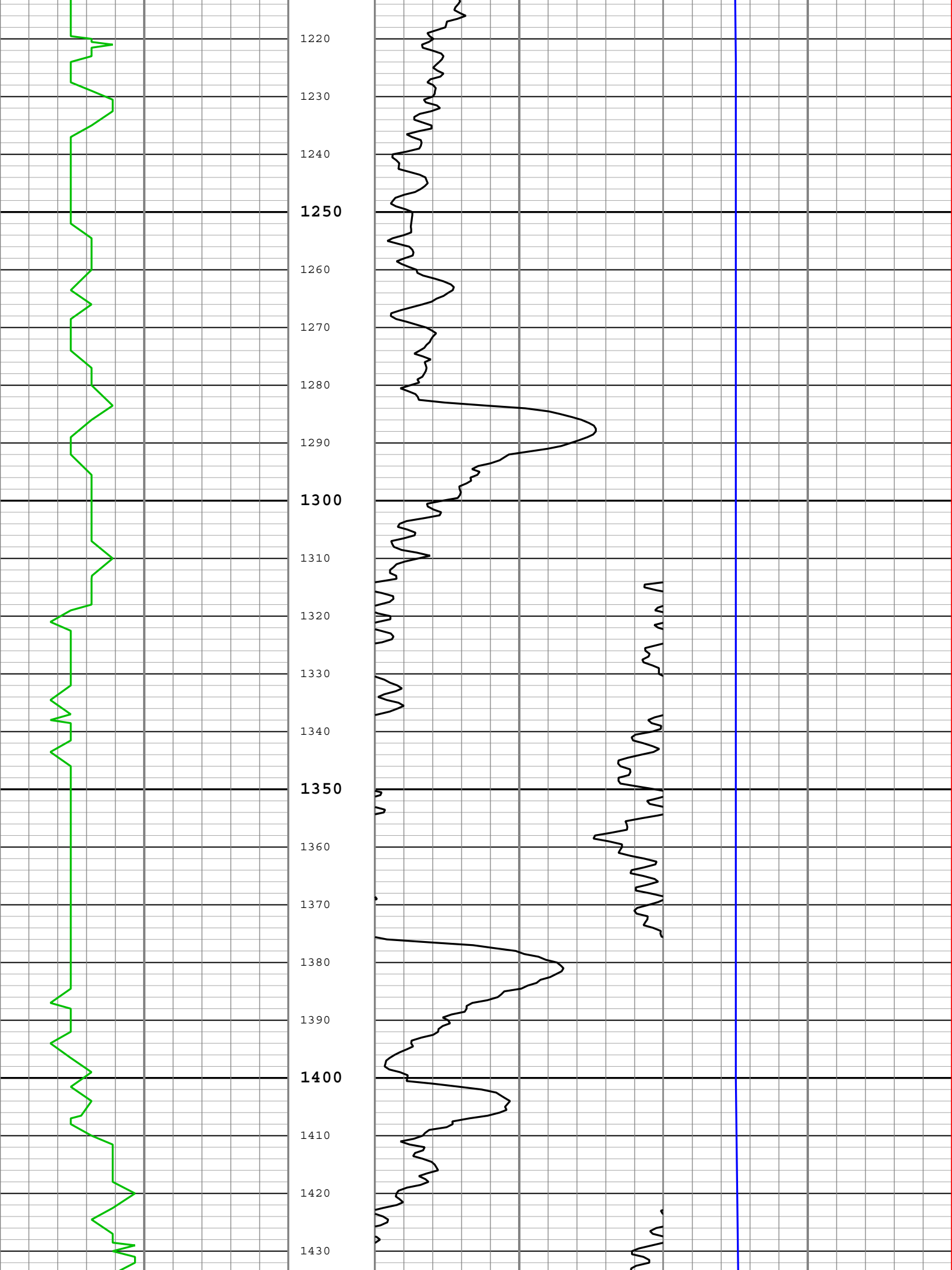
All depths are referenced to toolstring zero

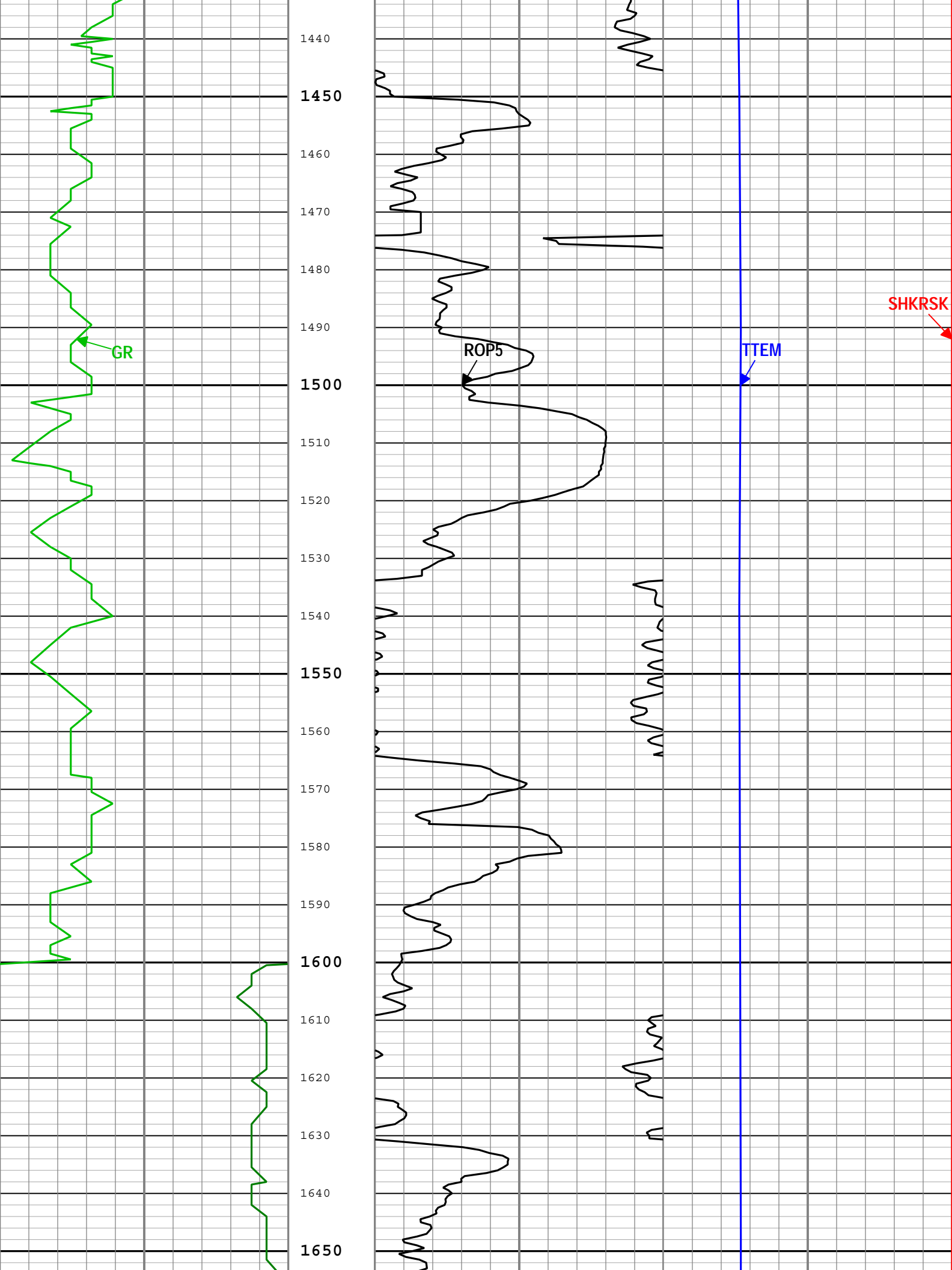
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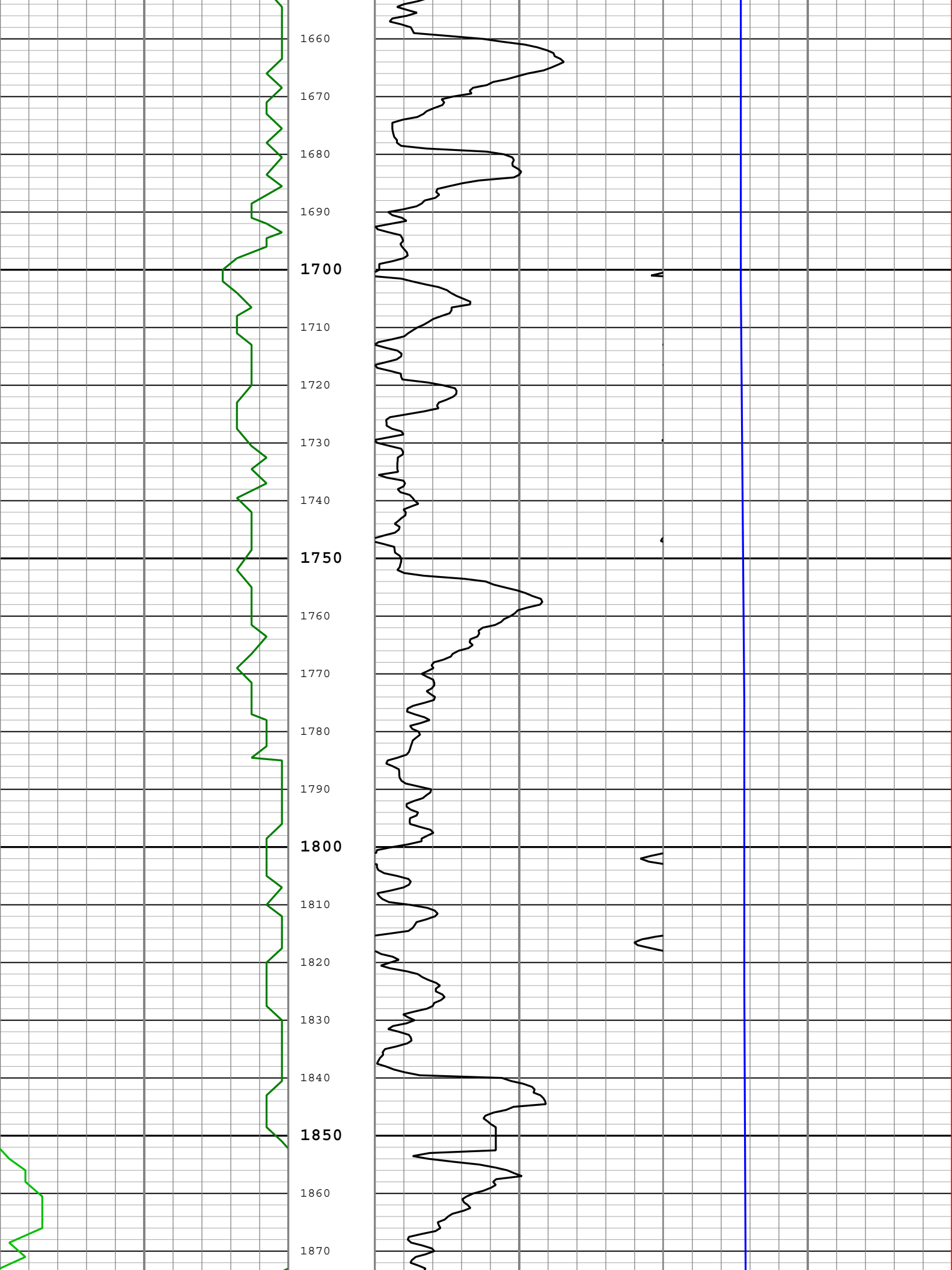
Company:Noble Energy Well:Oscar Y10-72HN
Well Composite:S308

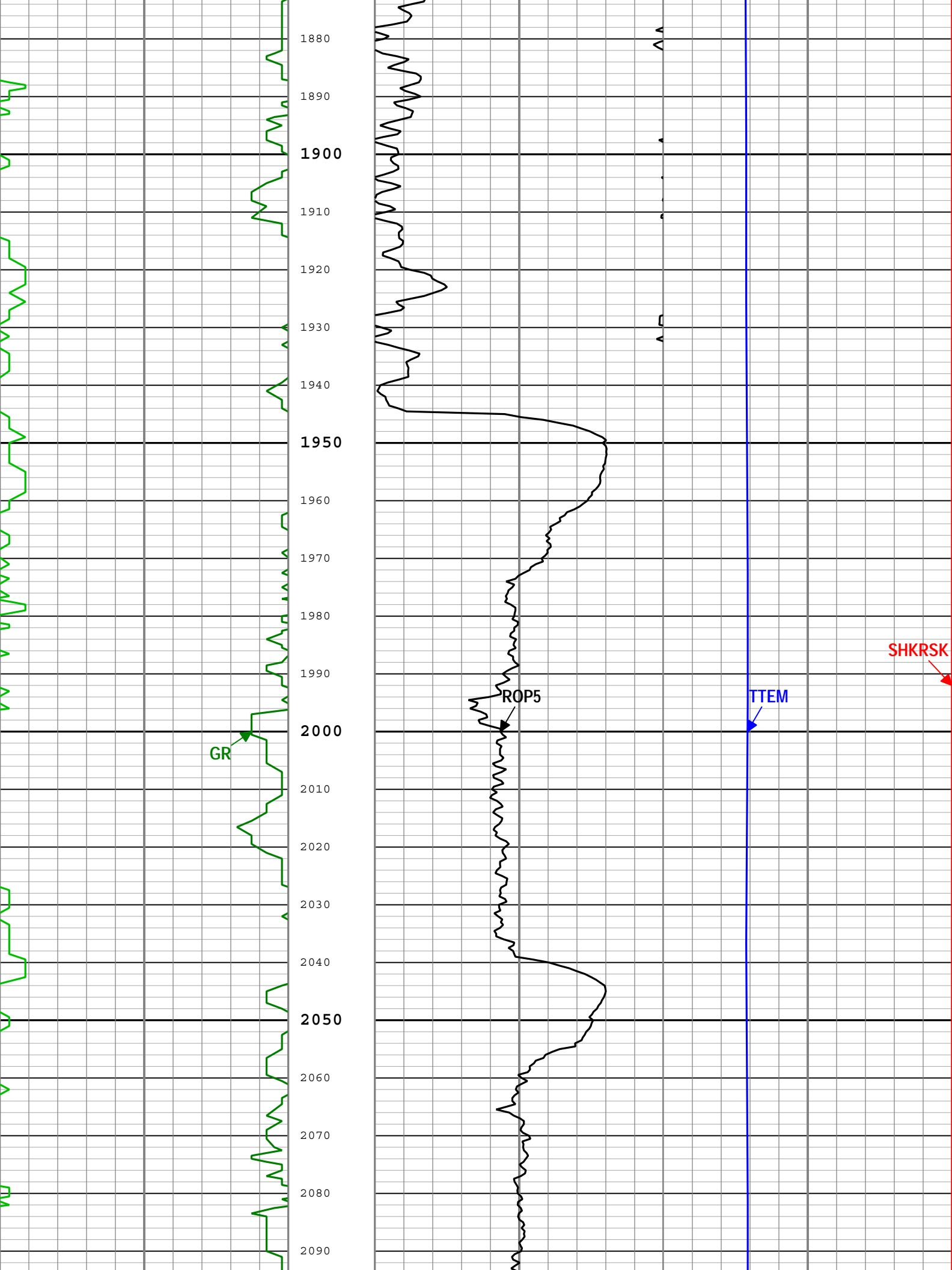
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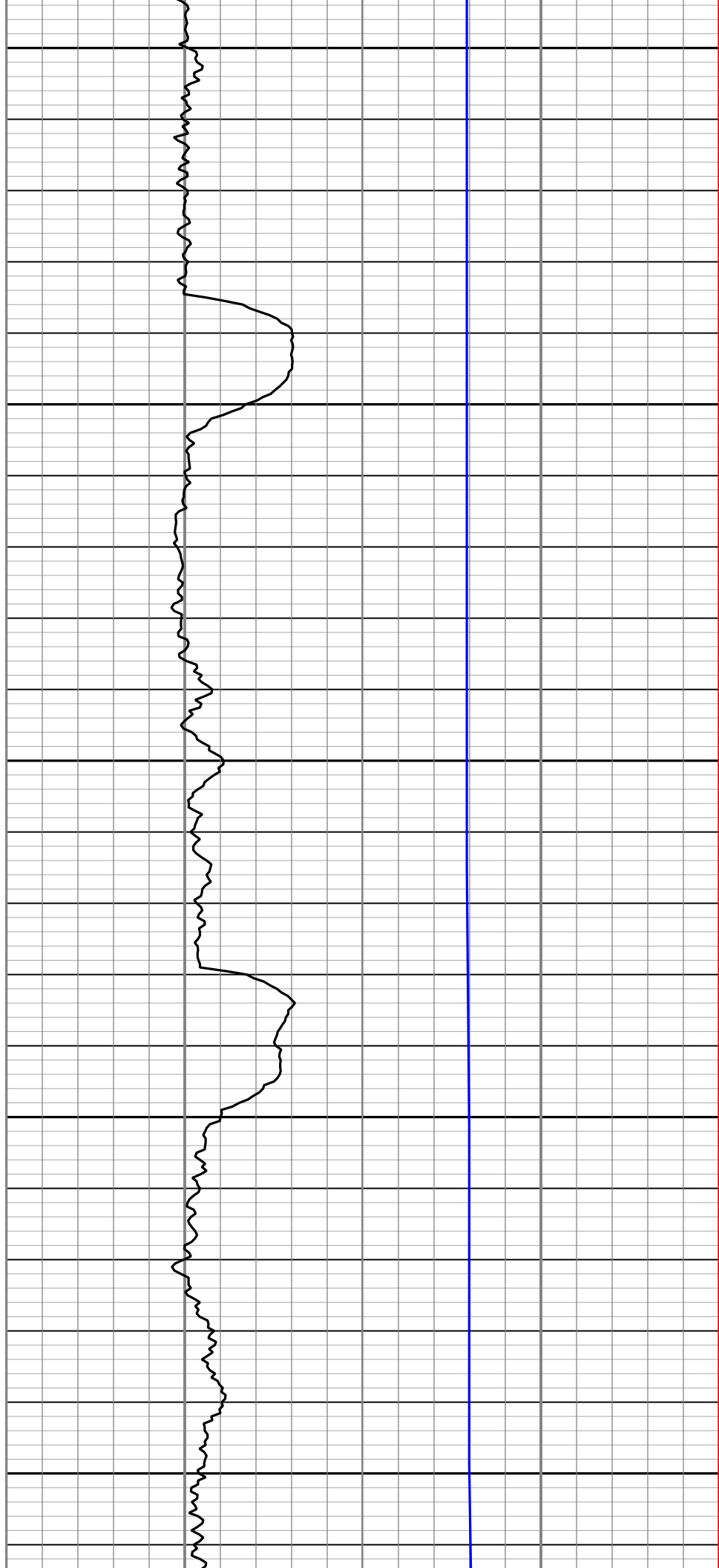
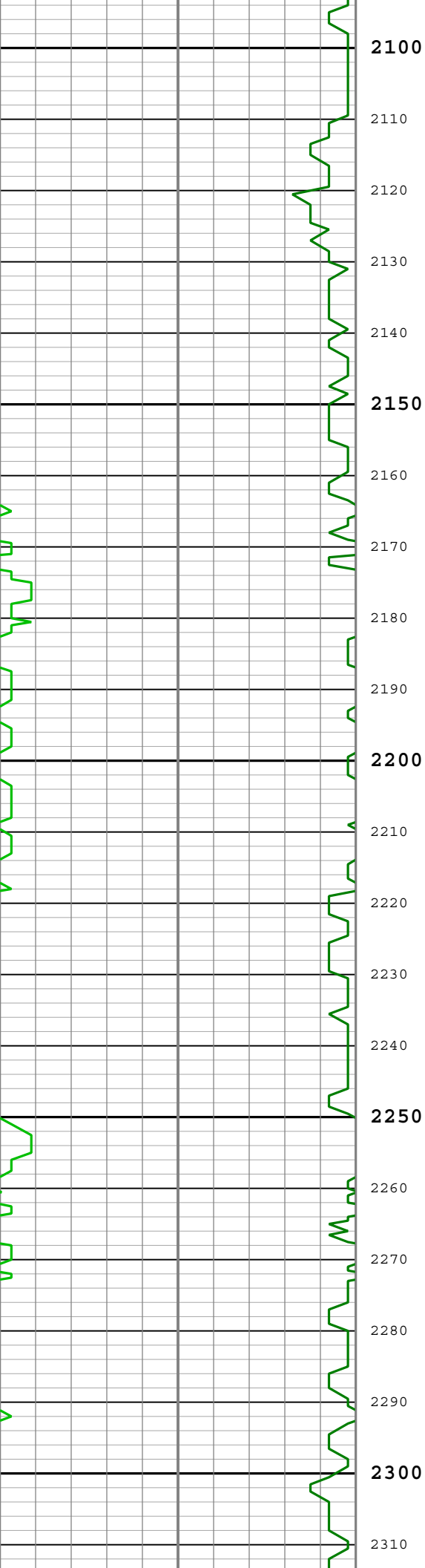


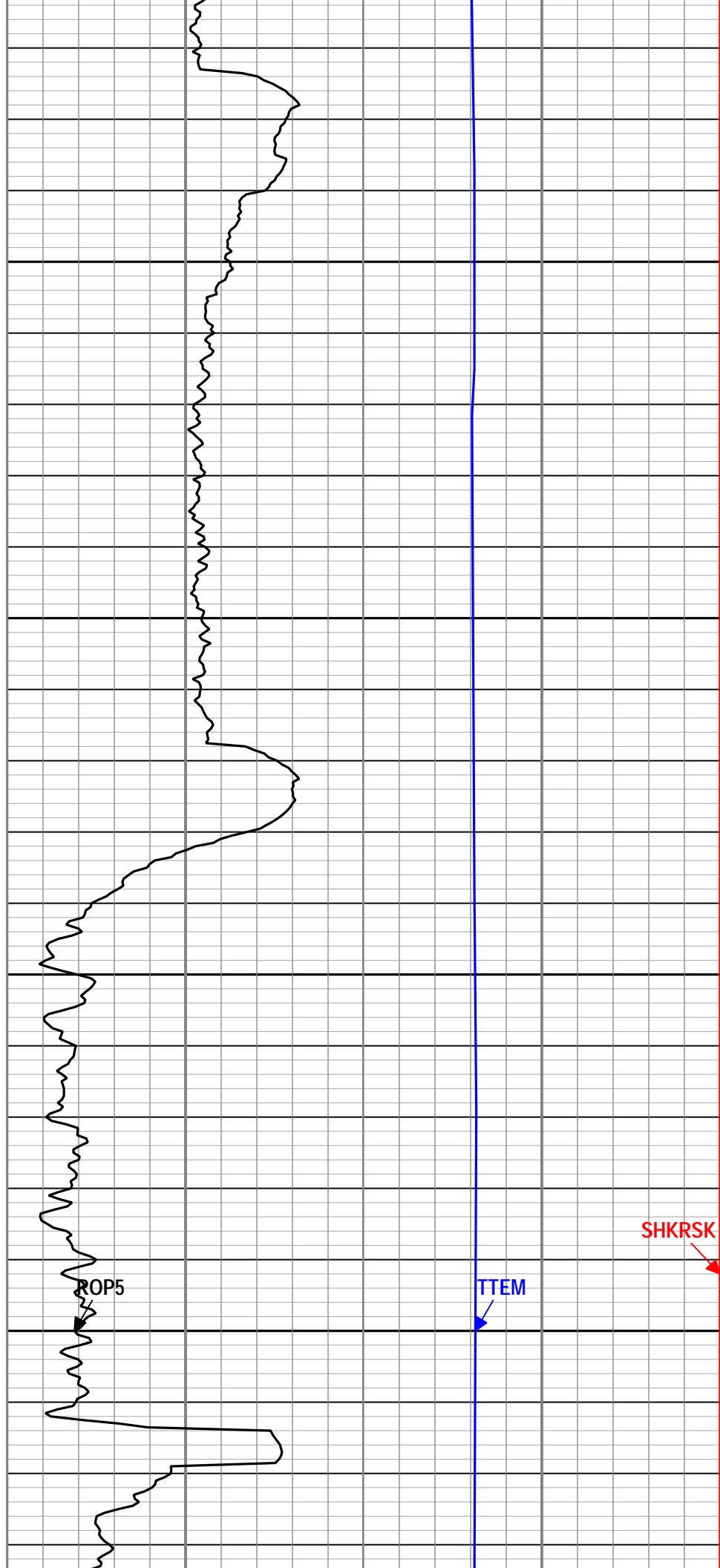
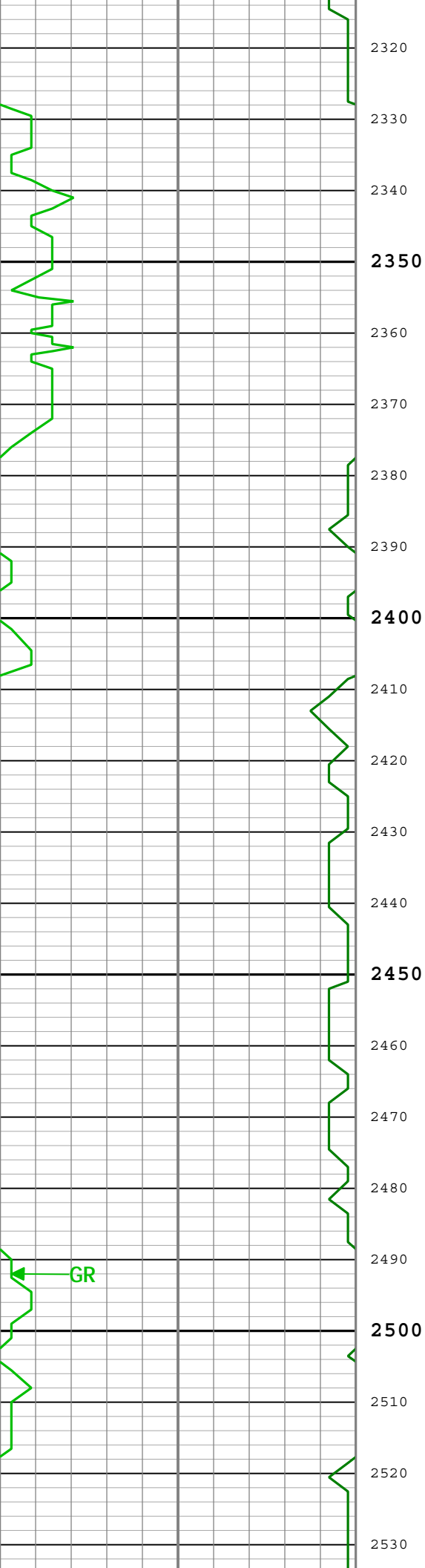


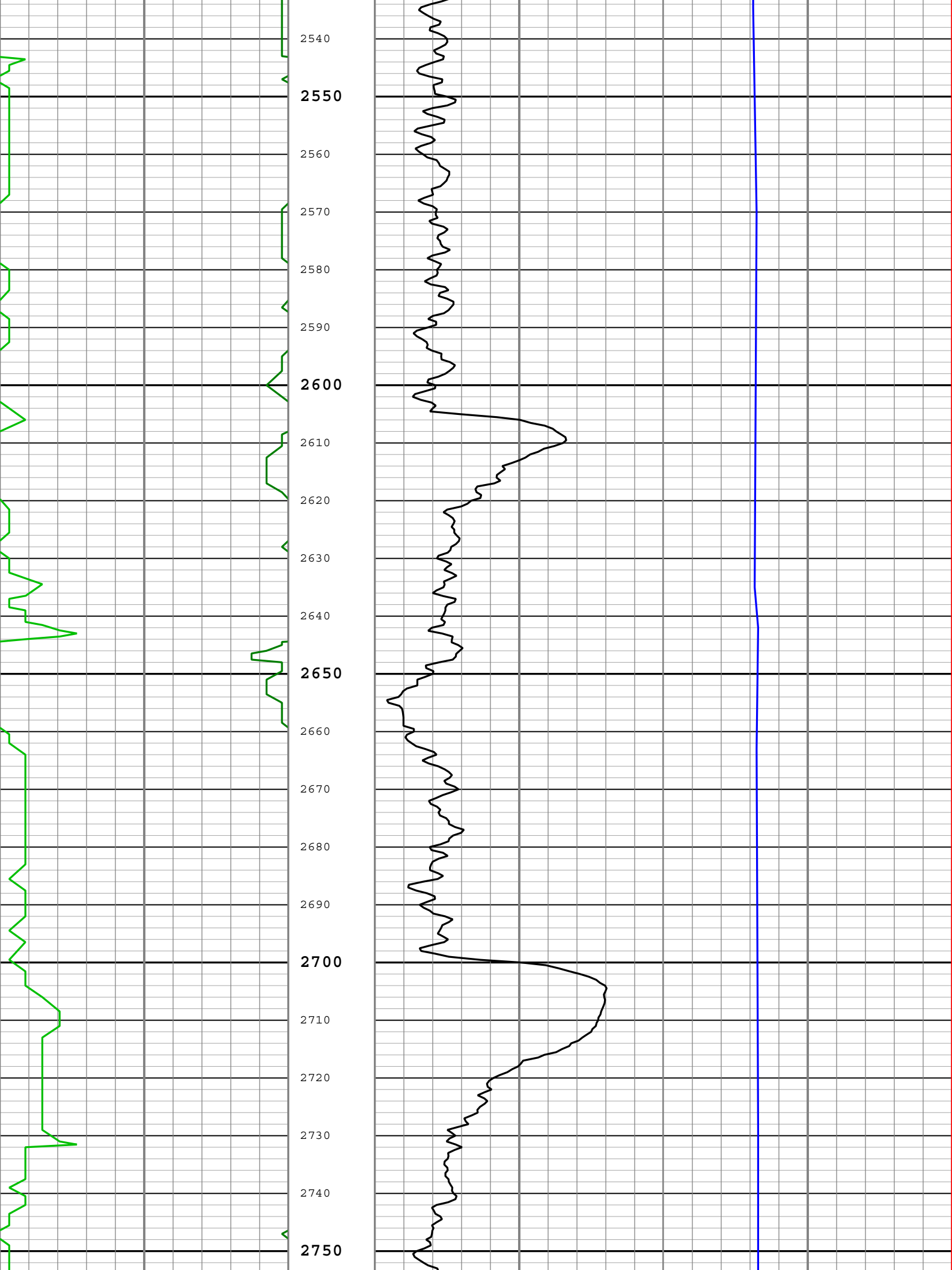


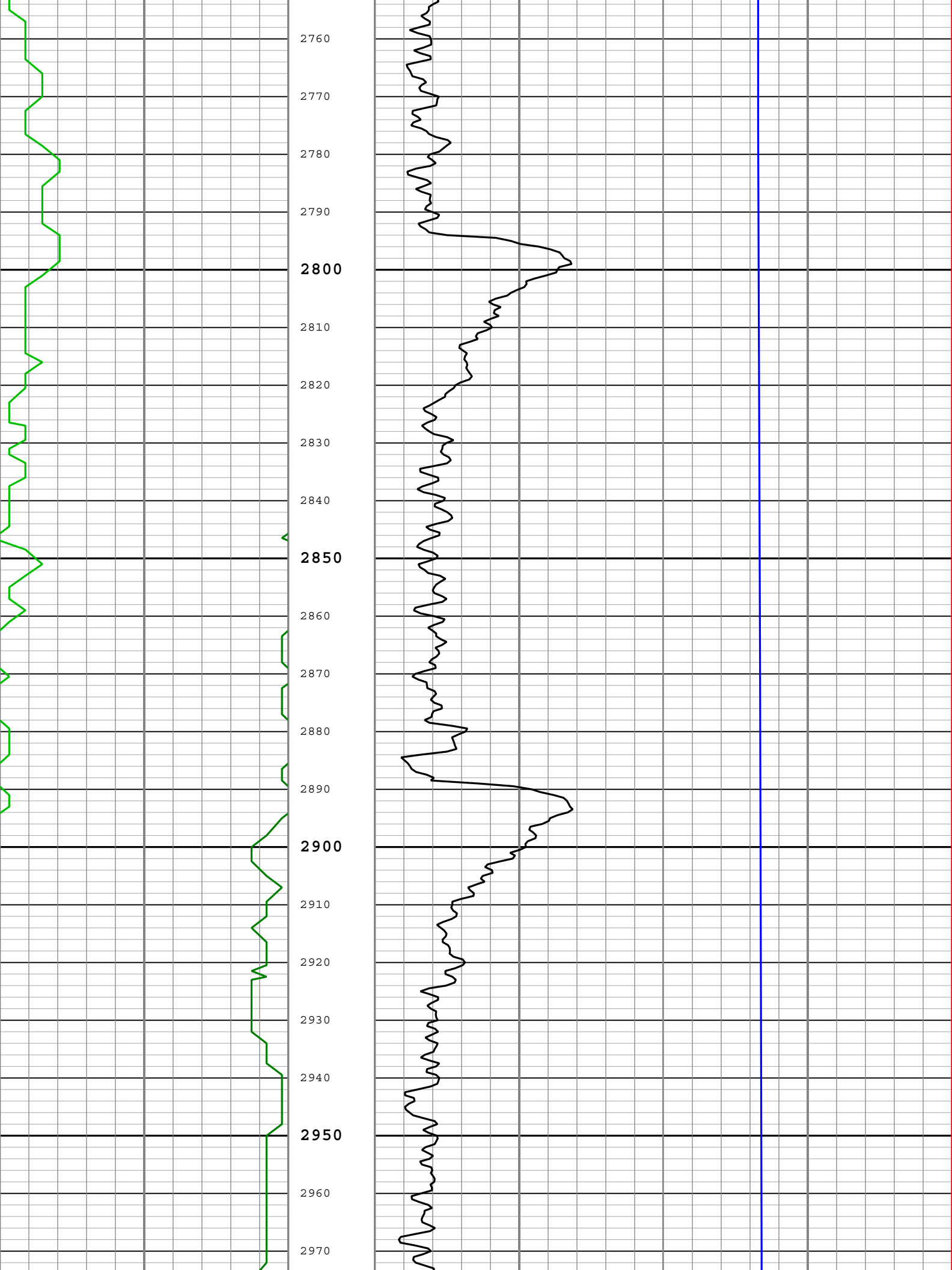


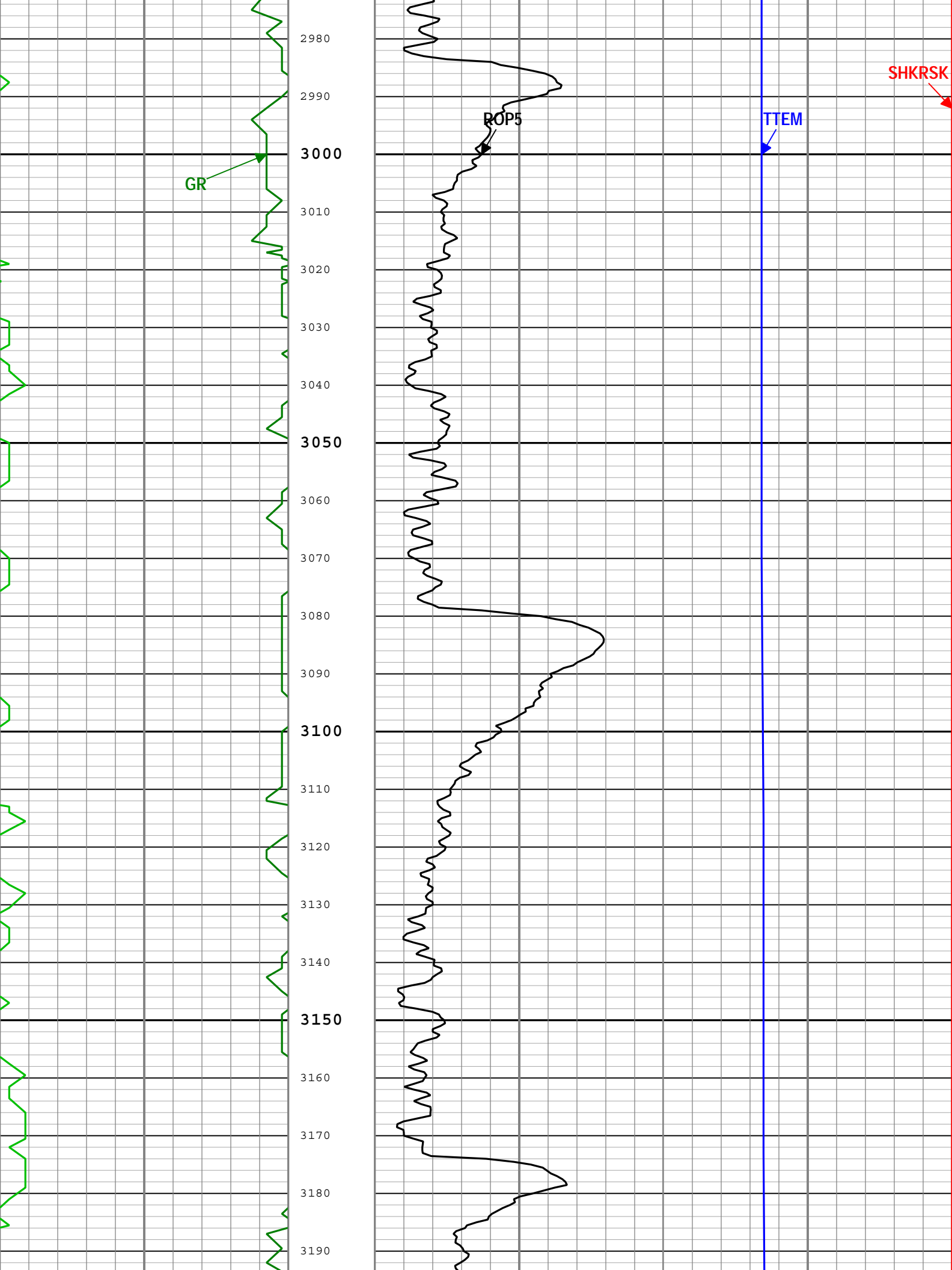


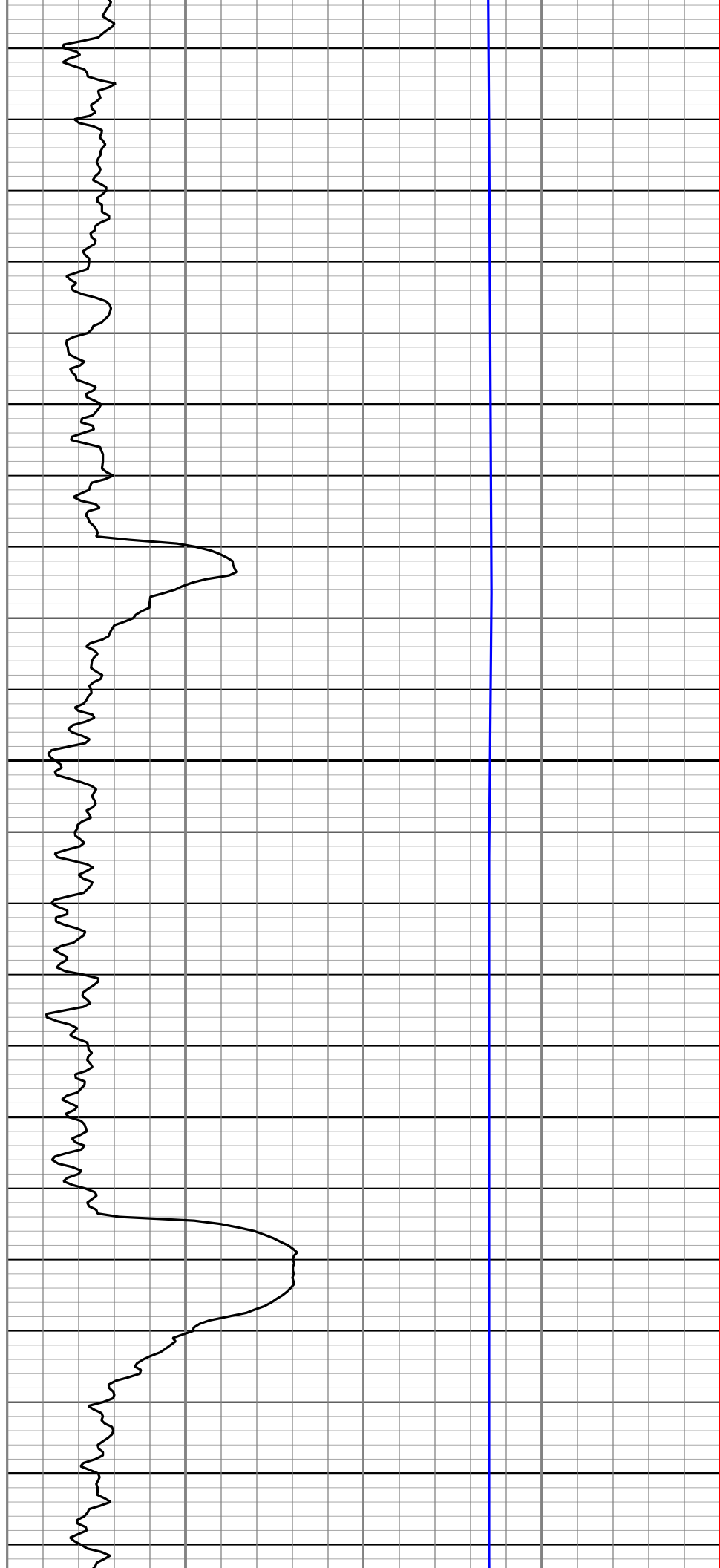
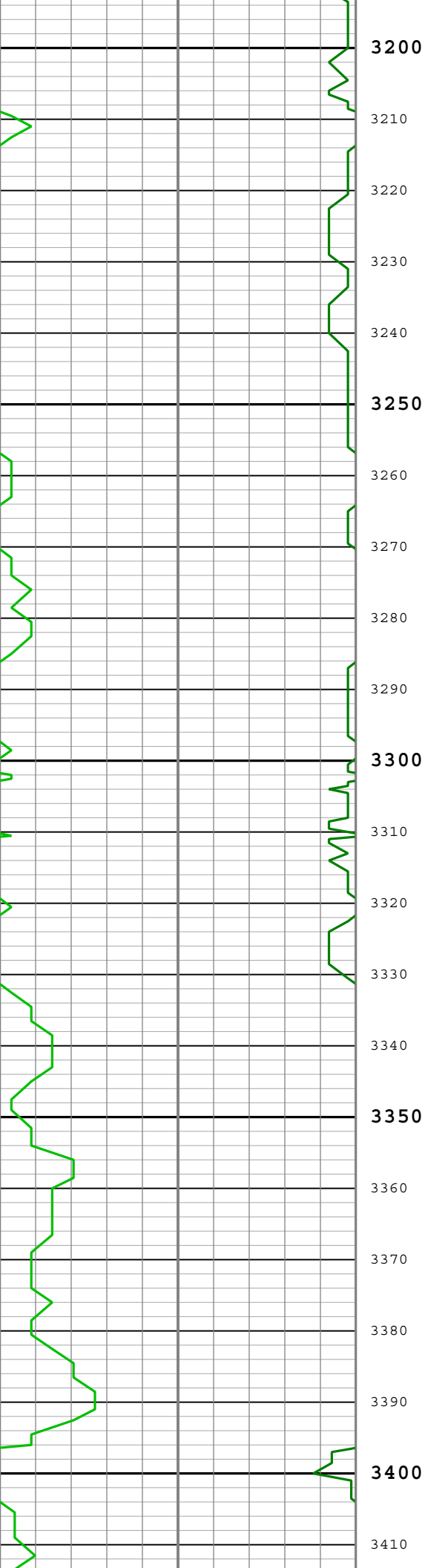


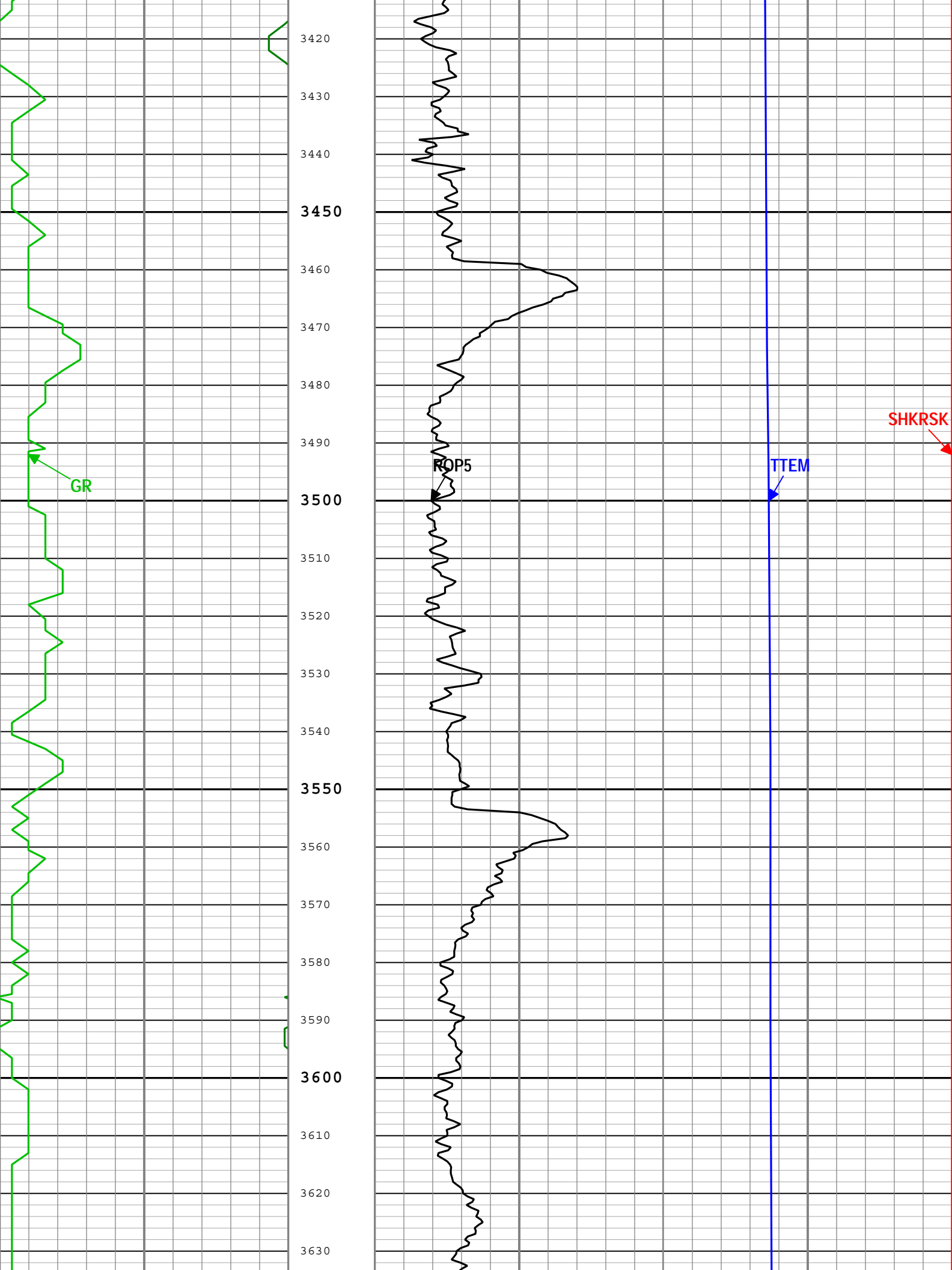


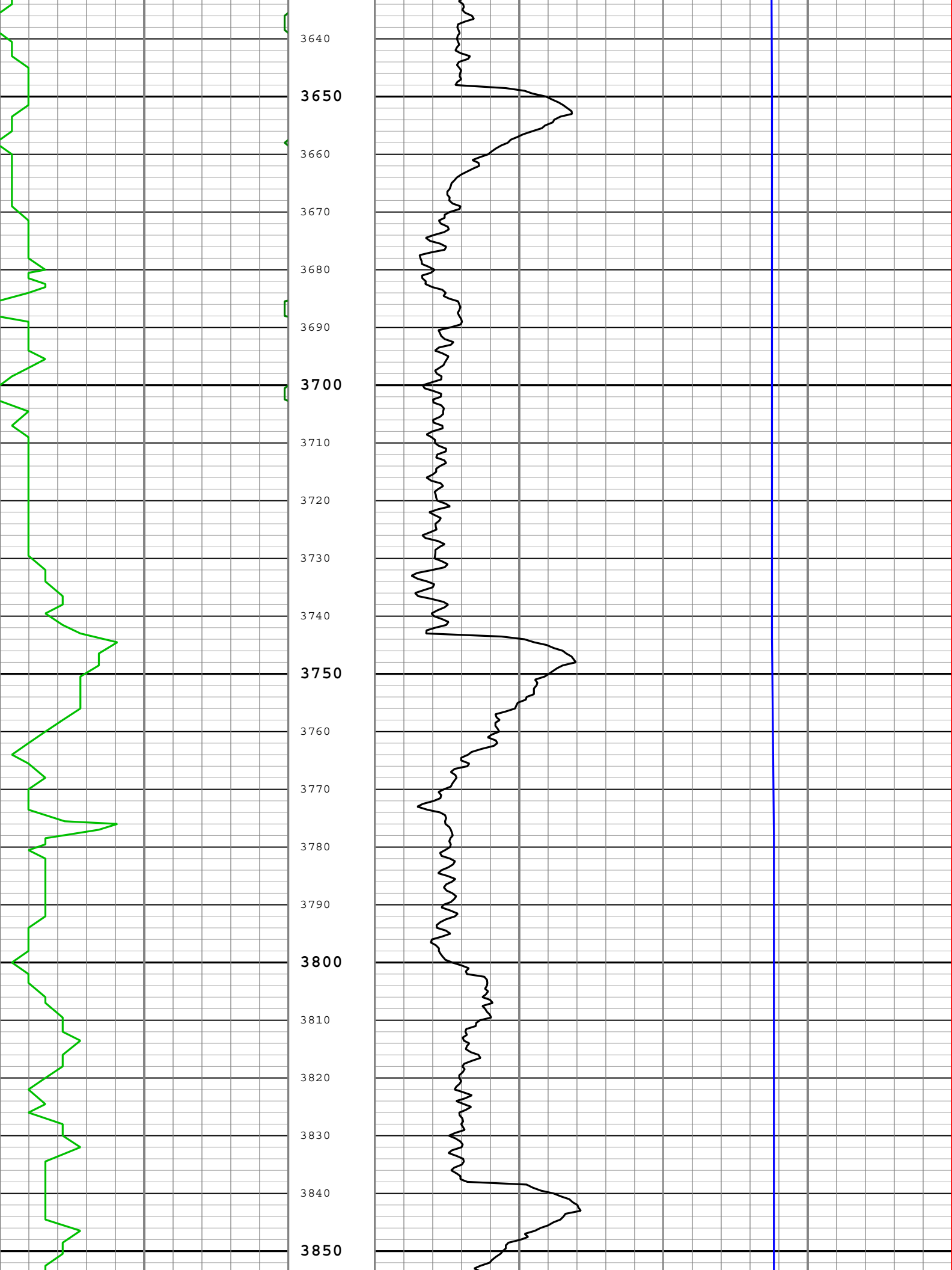


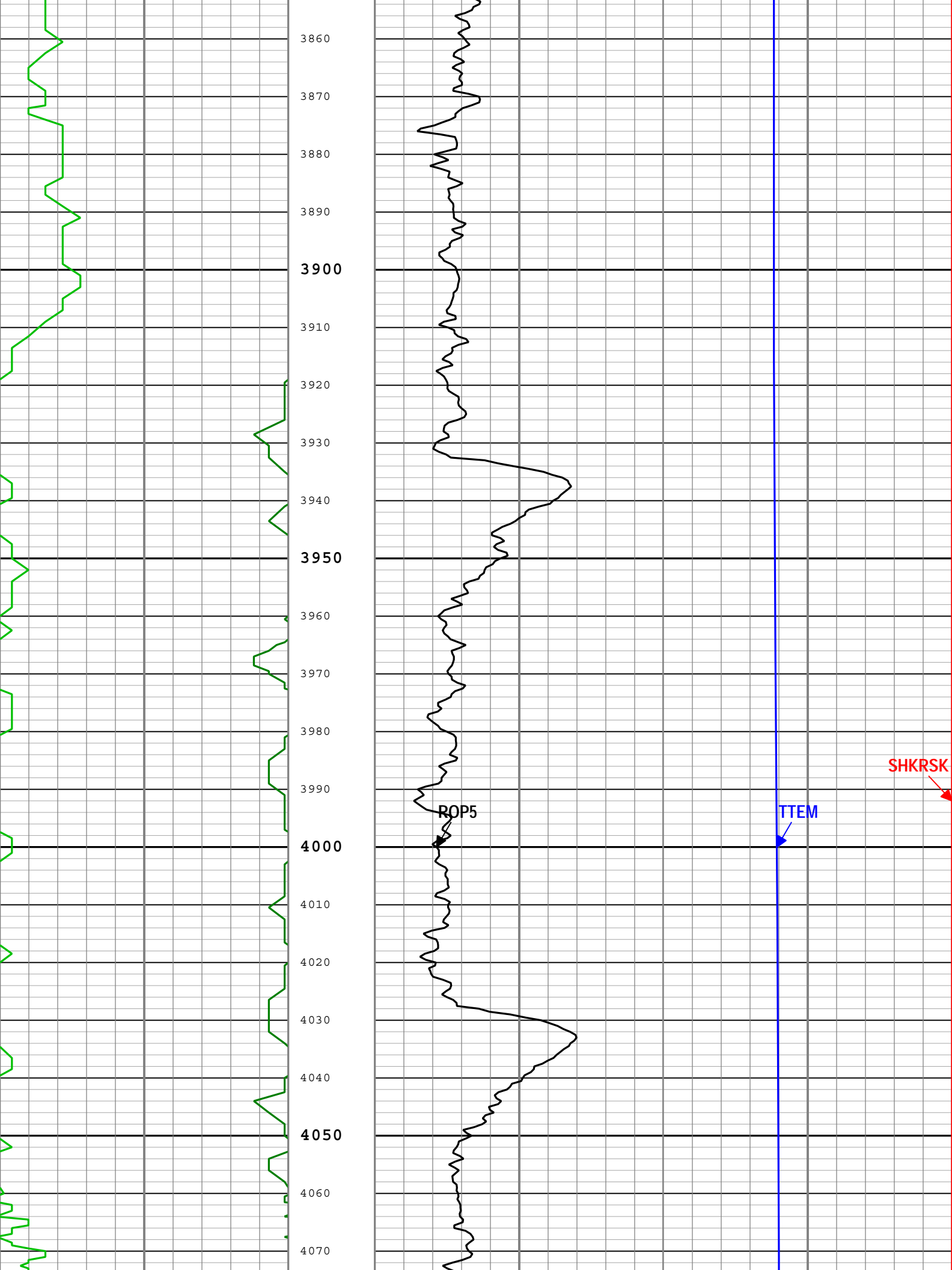


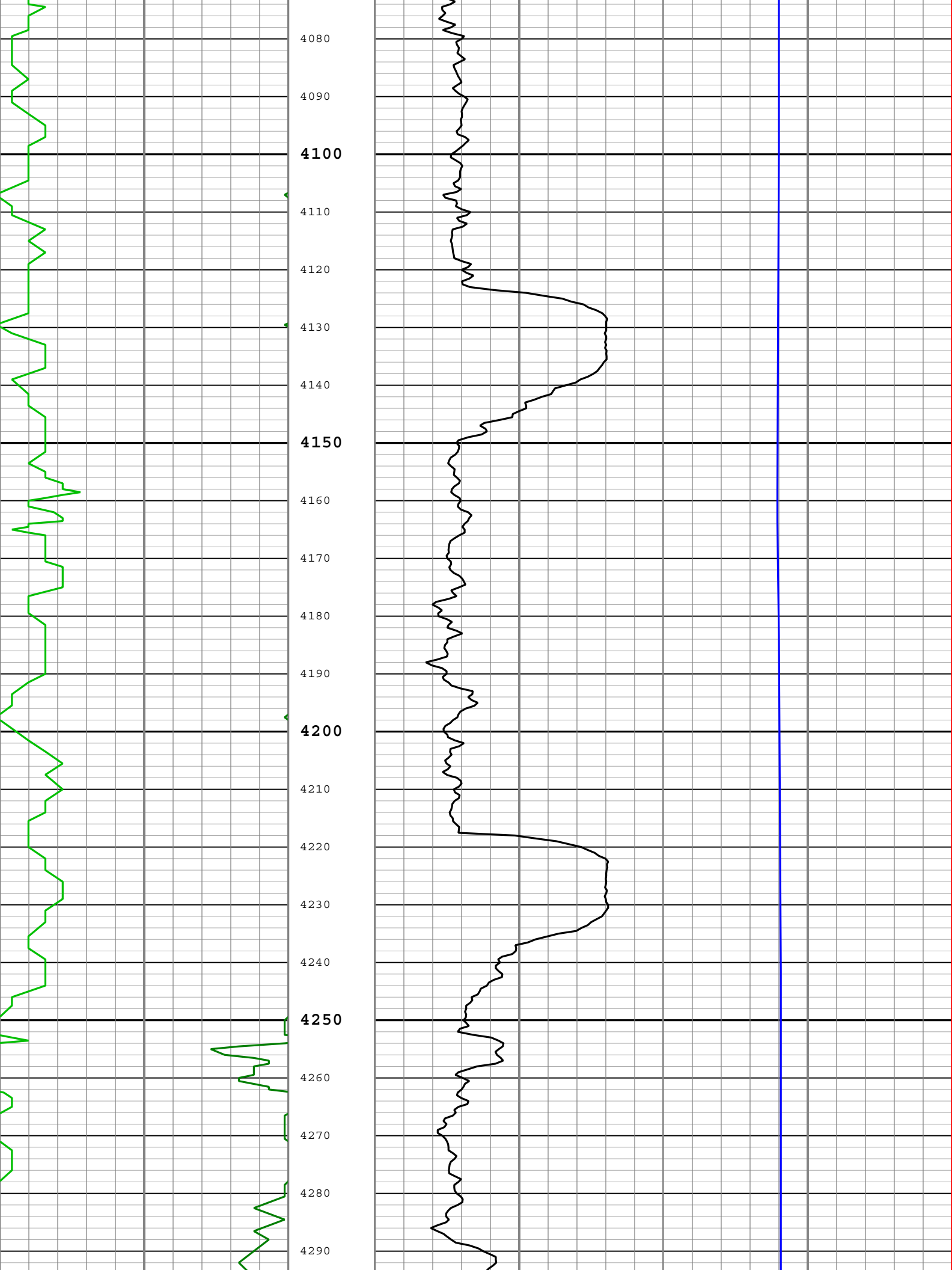


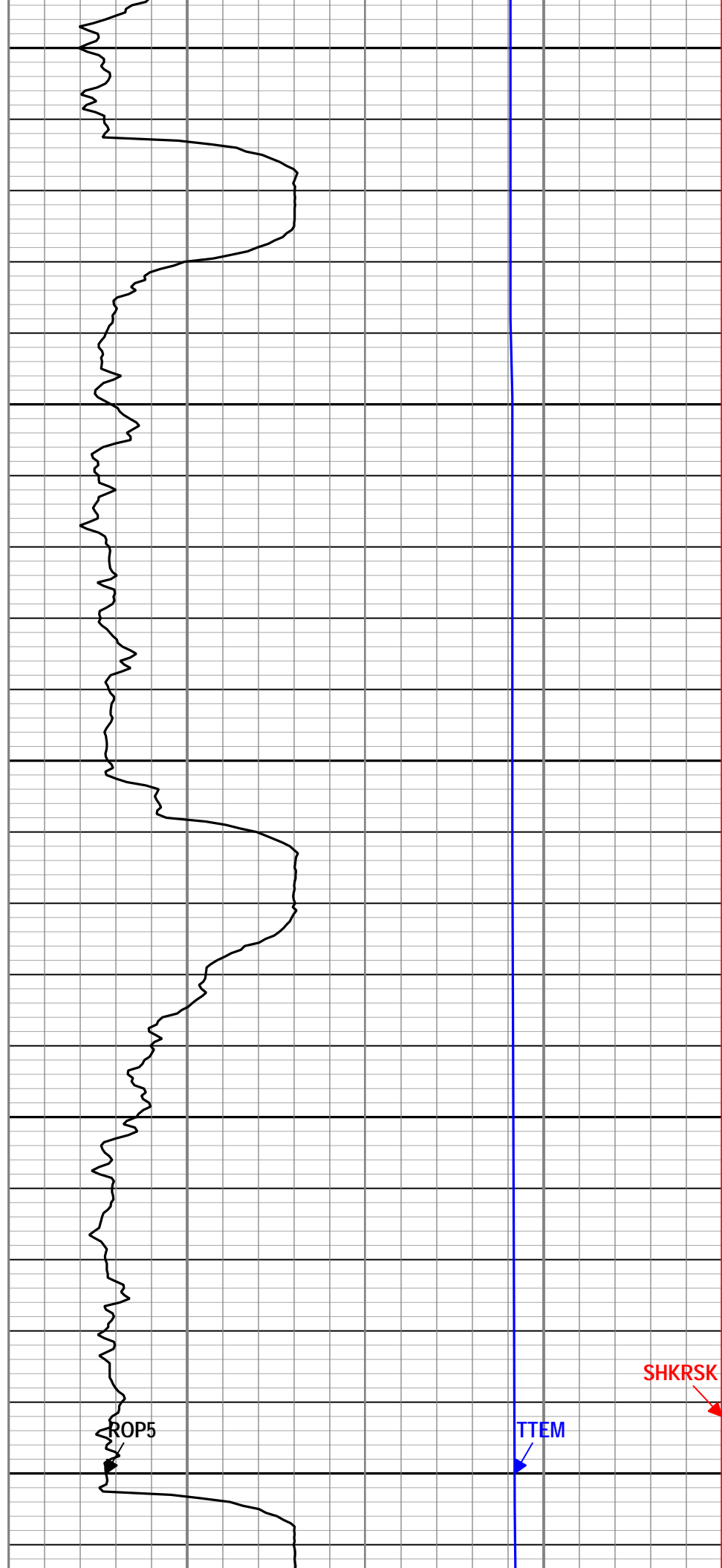
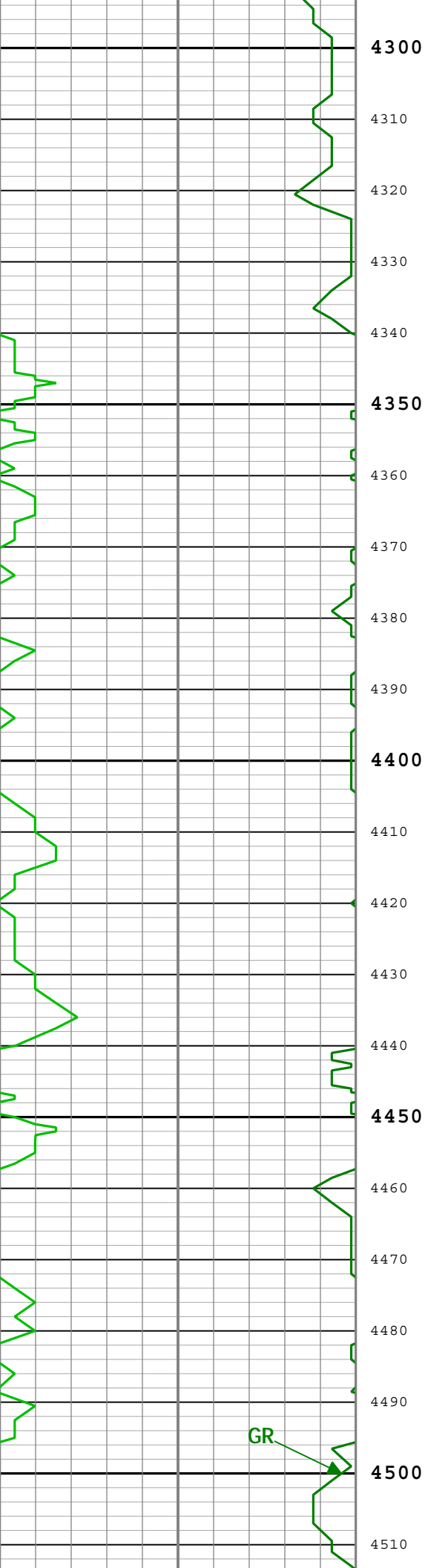


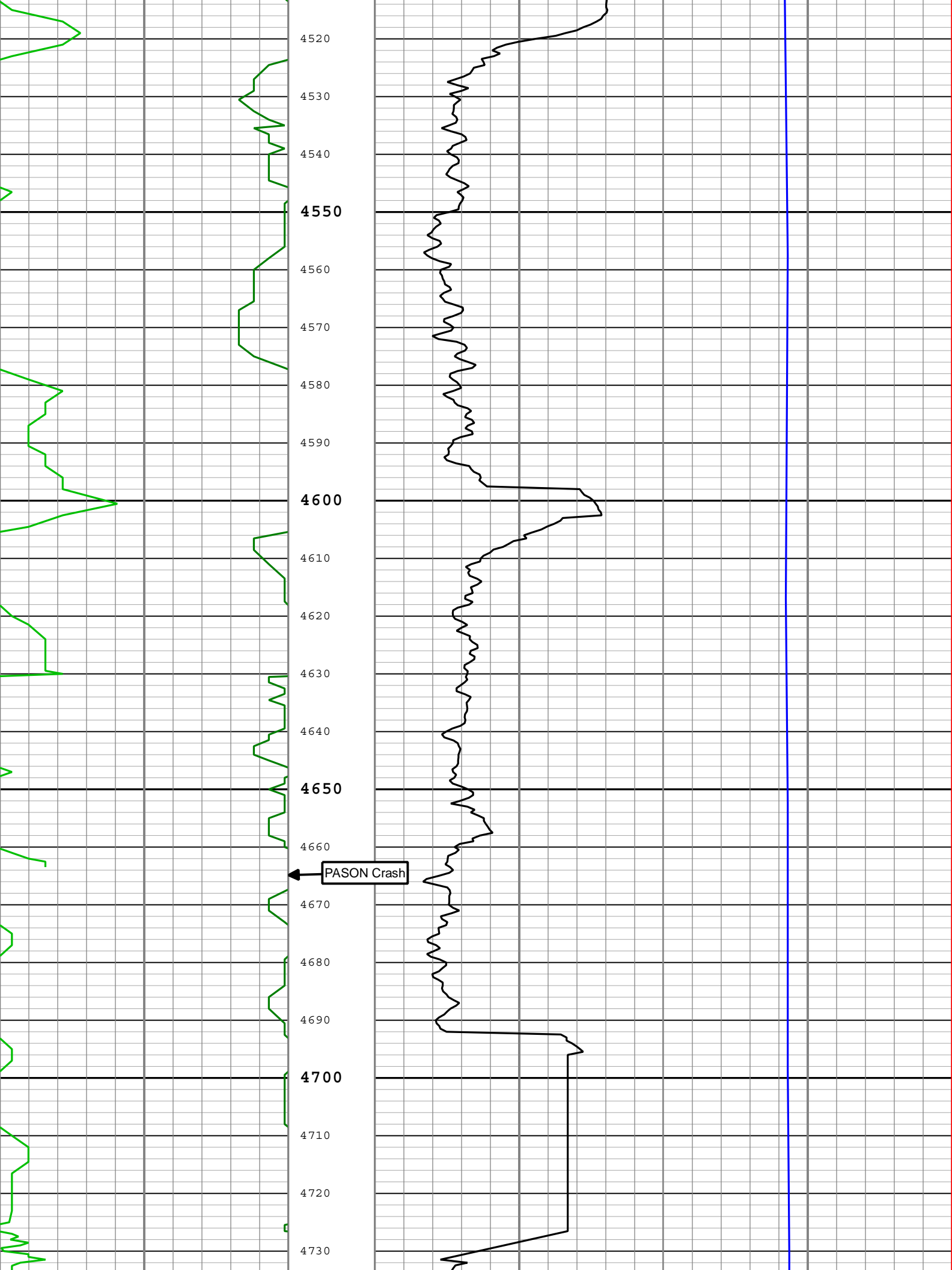


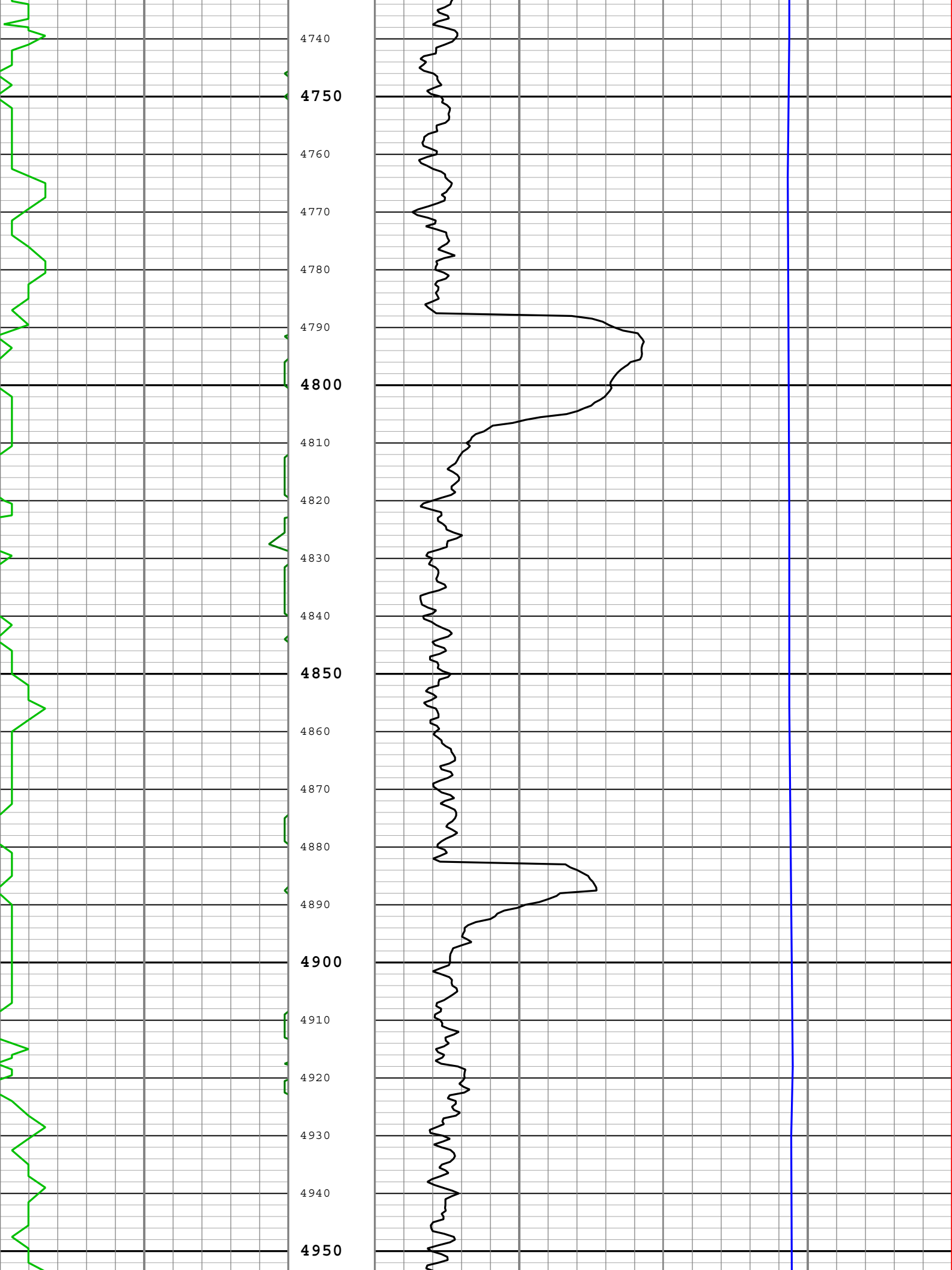


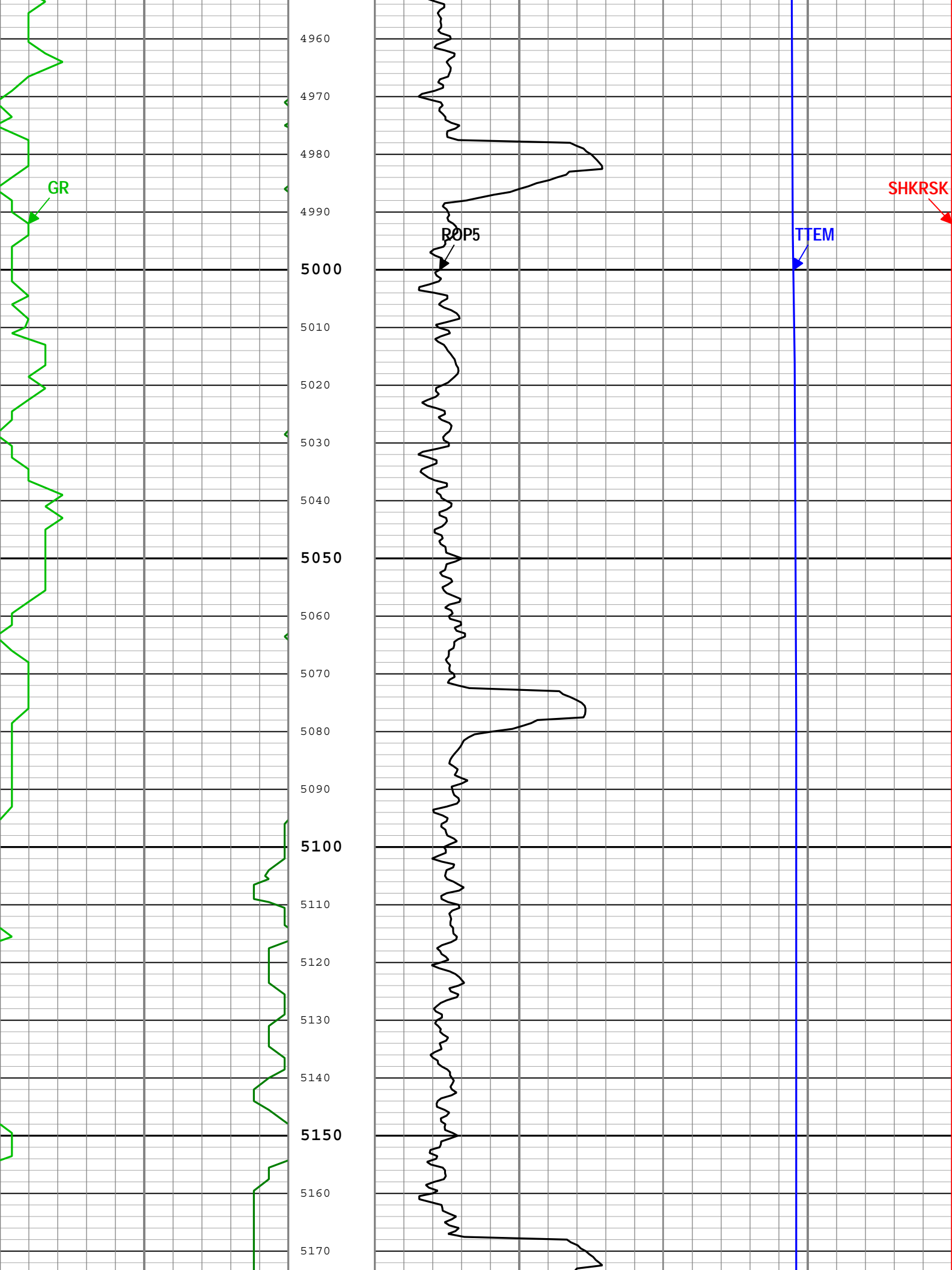


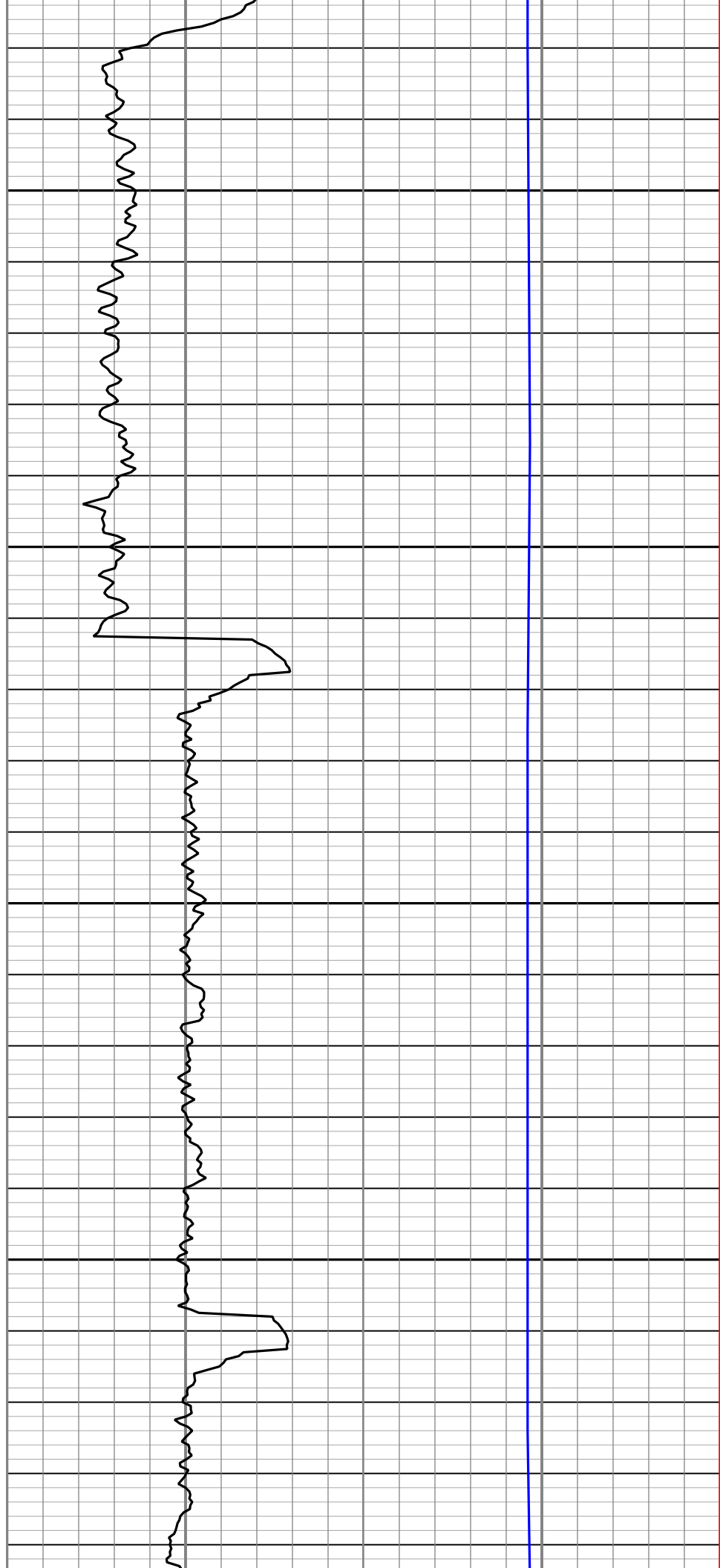
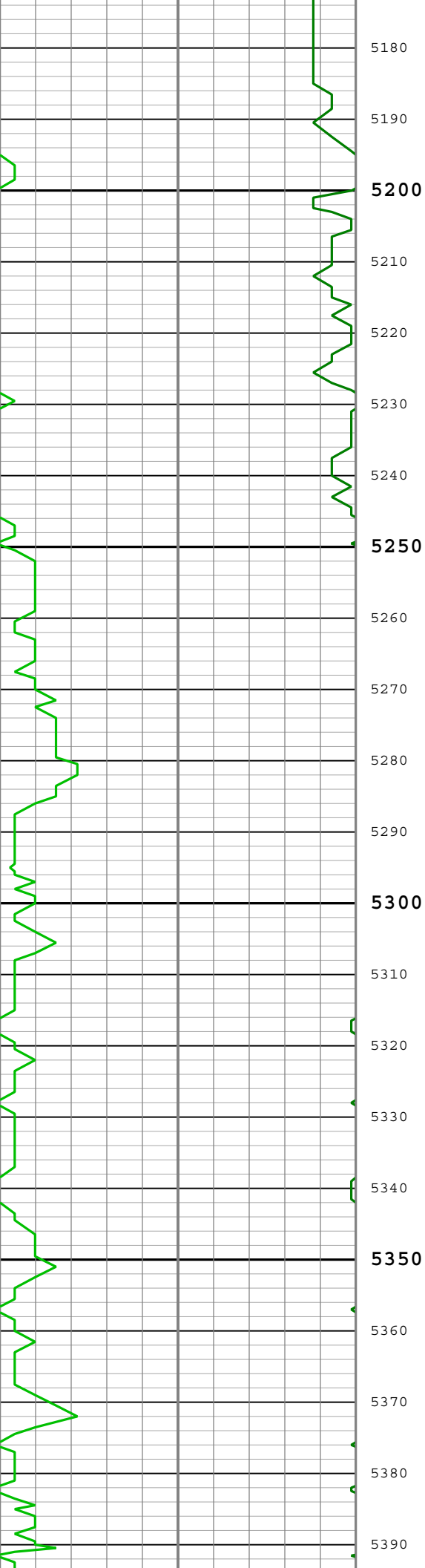


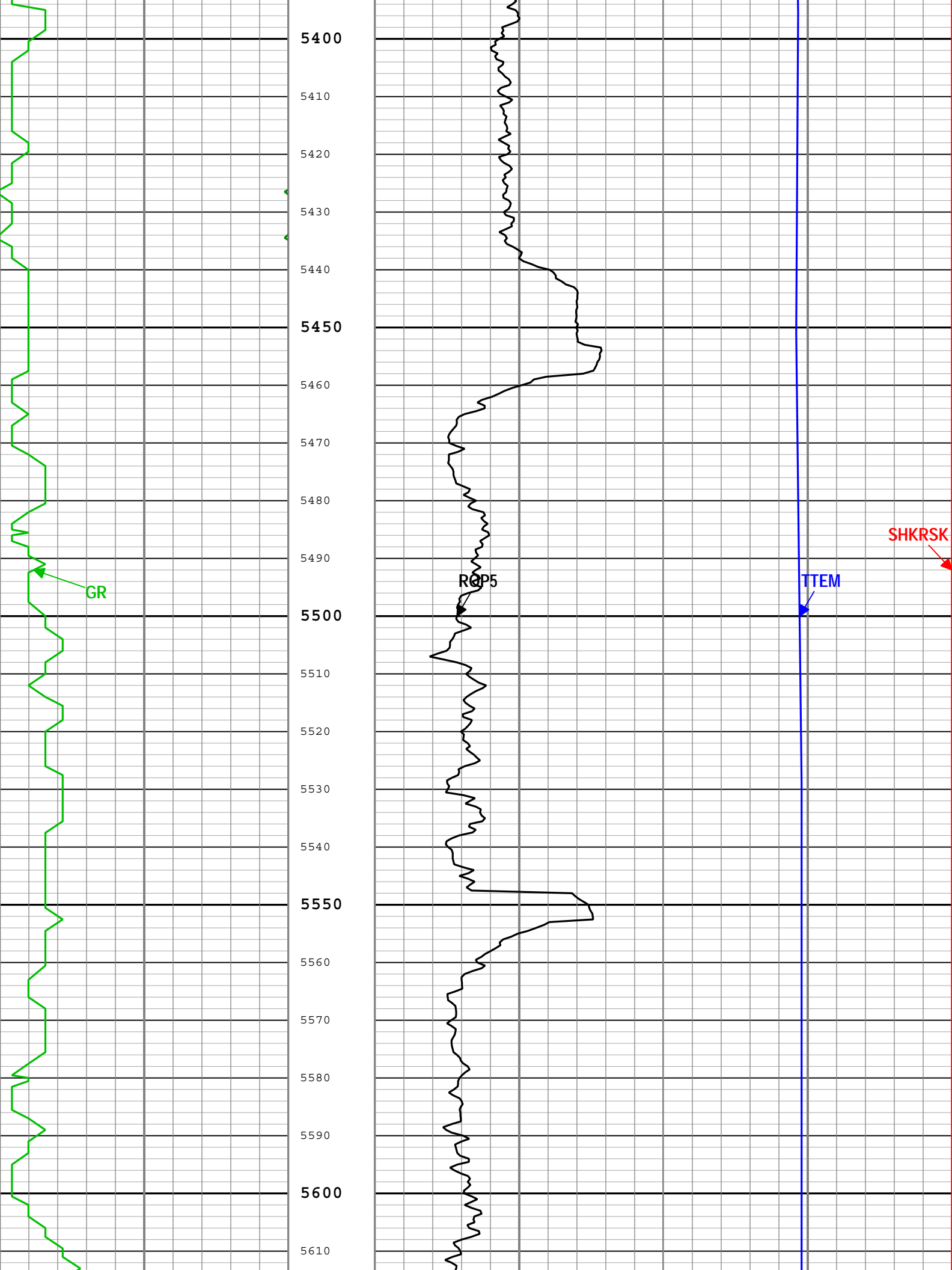


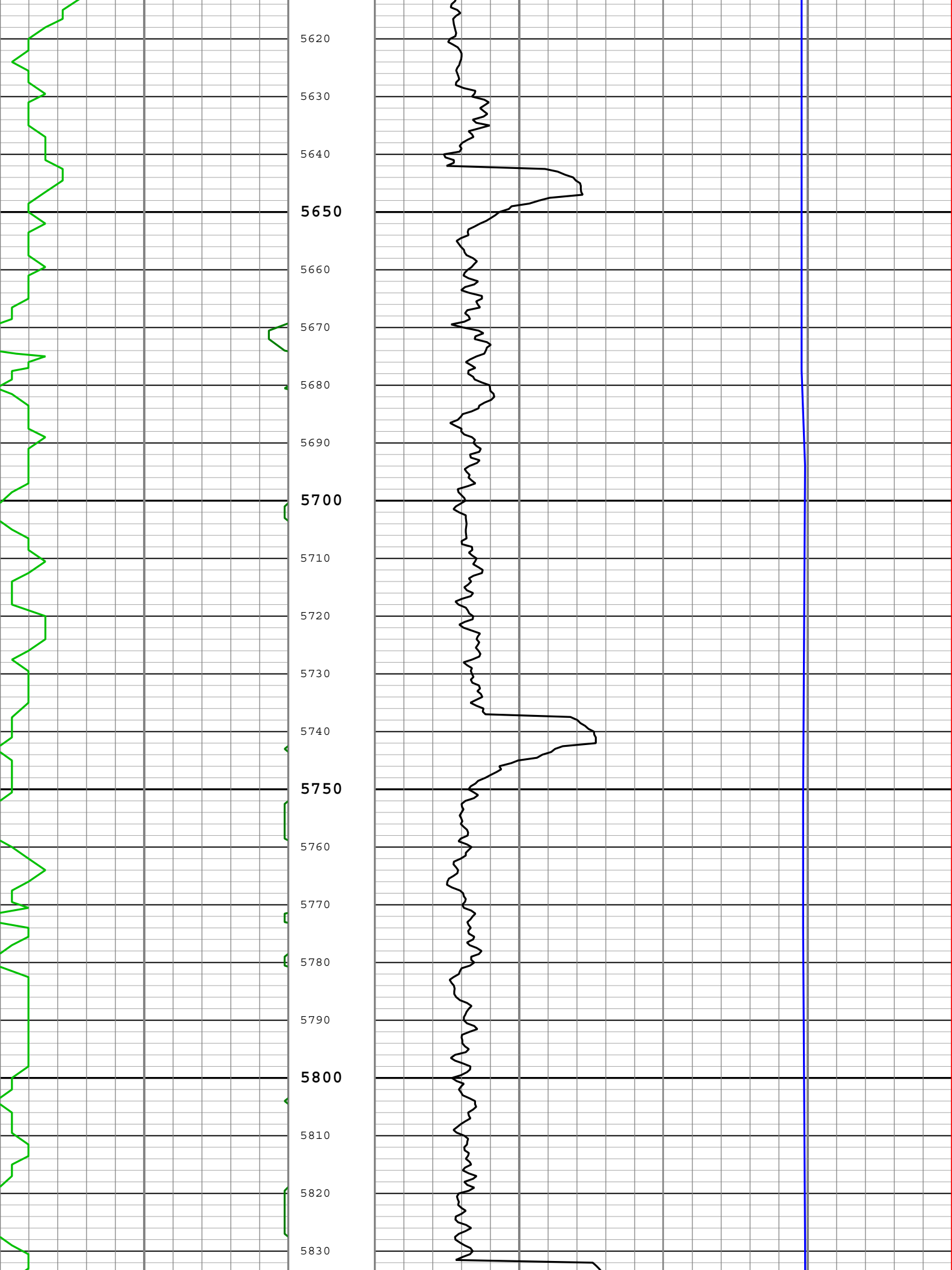


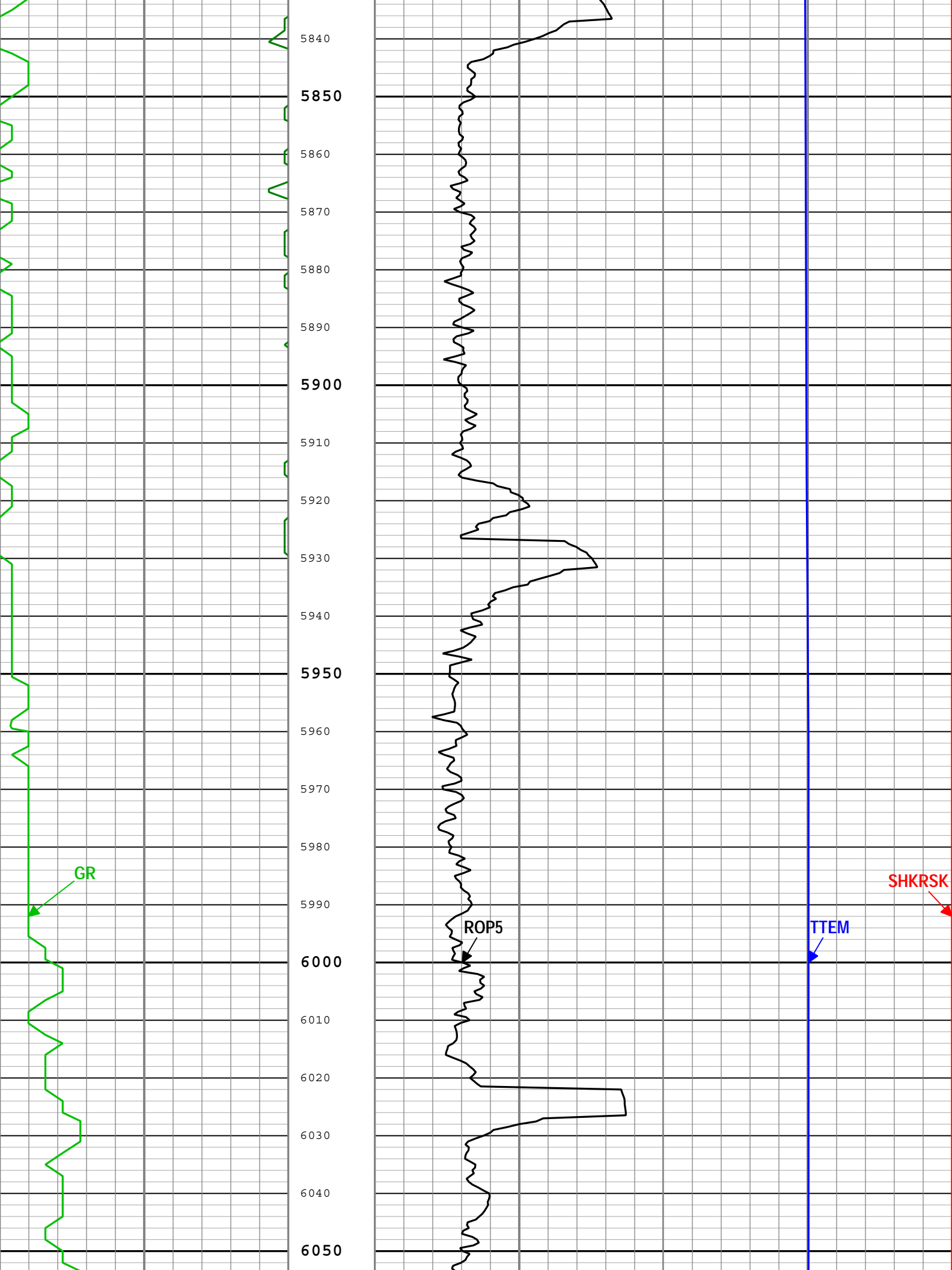


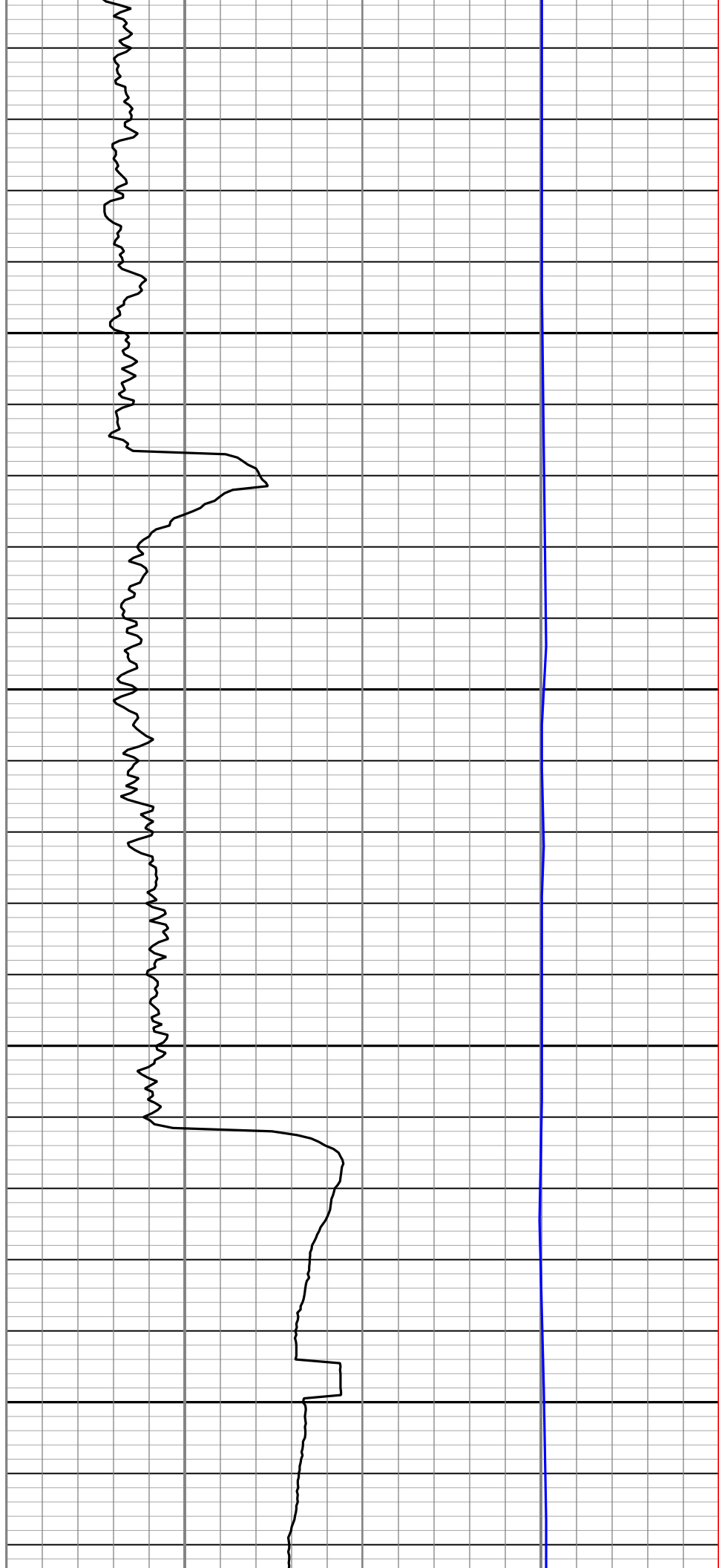
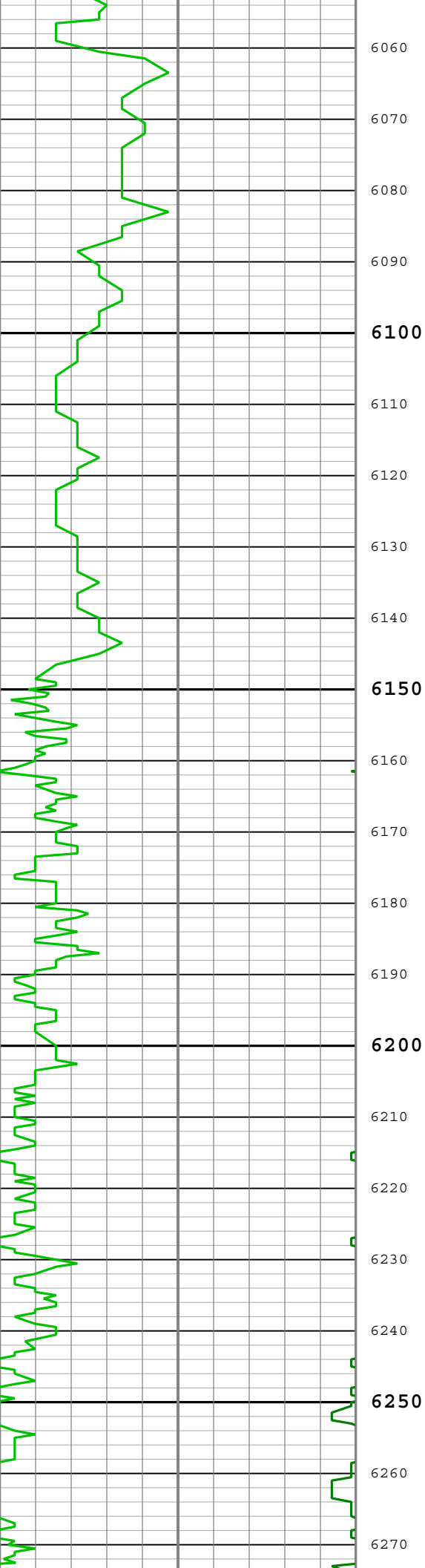


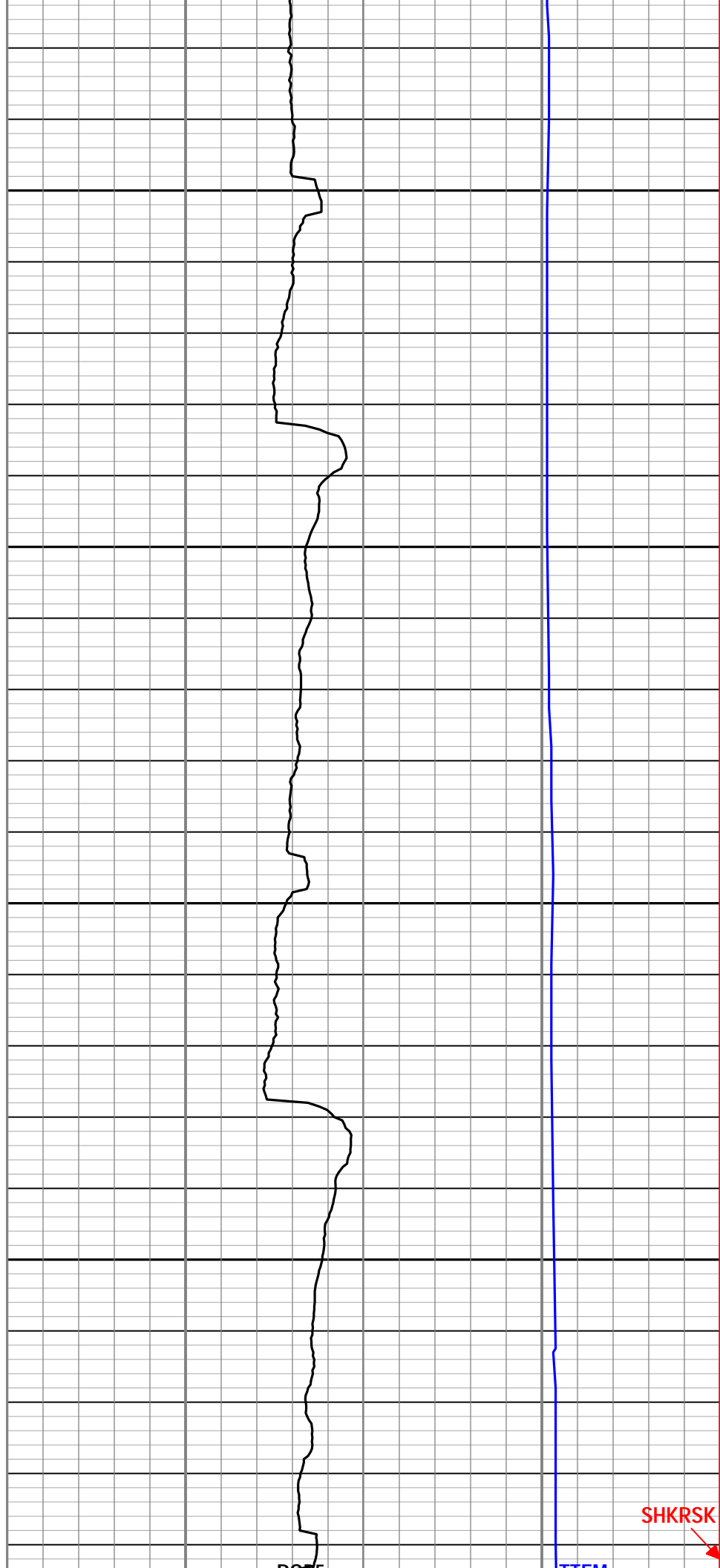
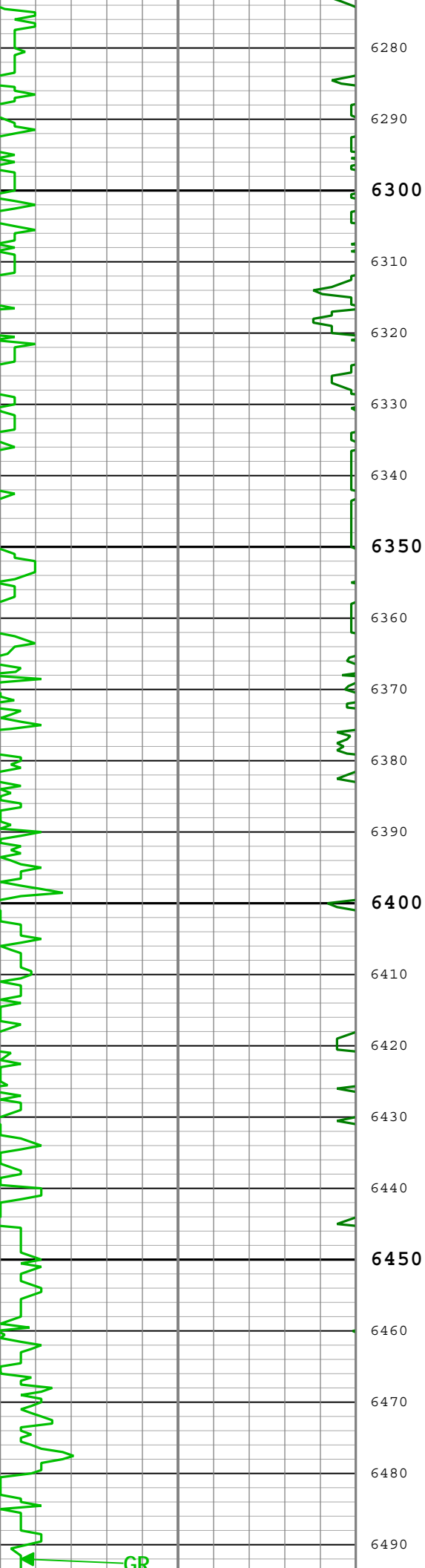


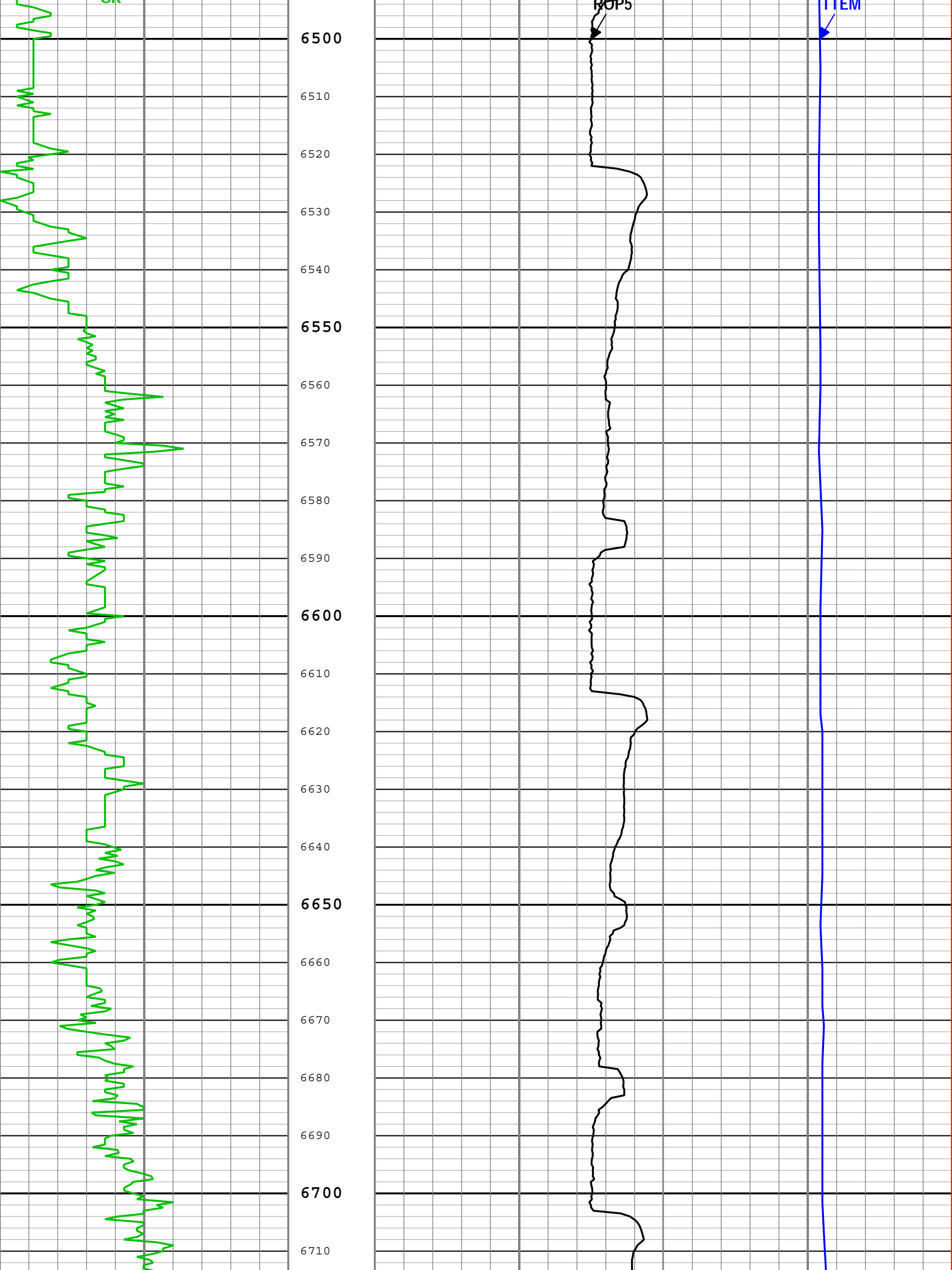


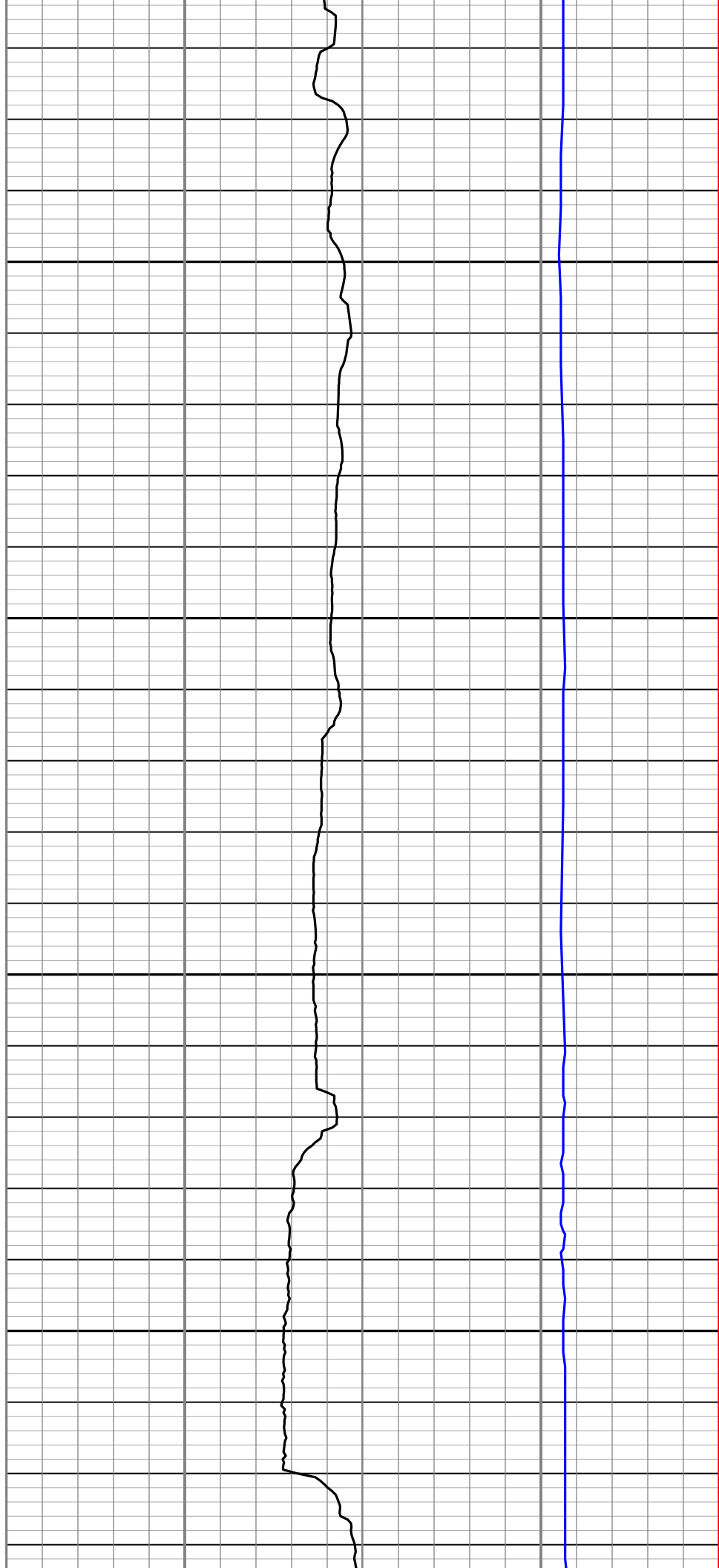
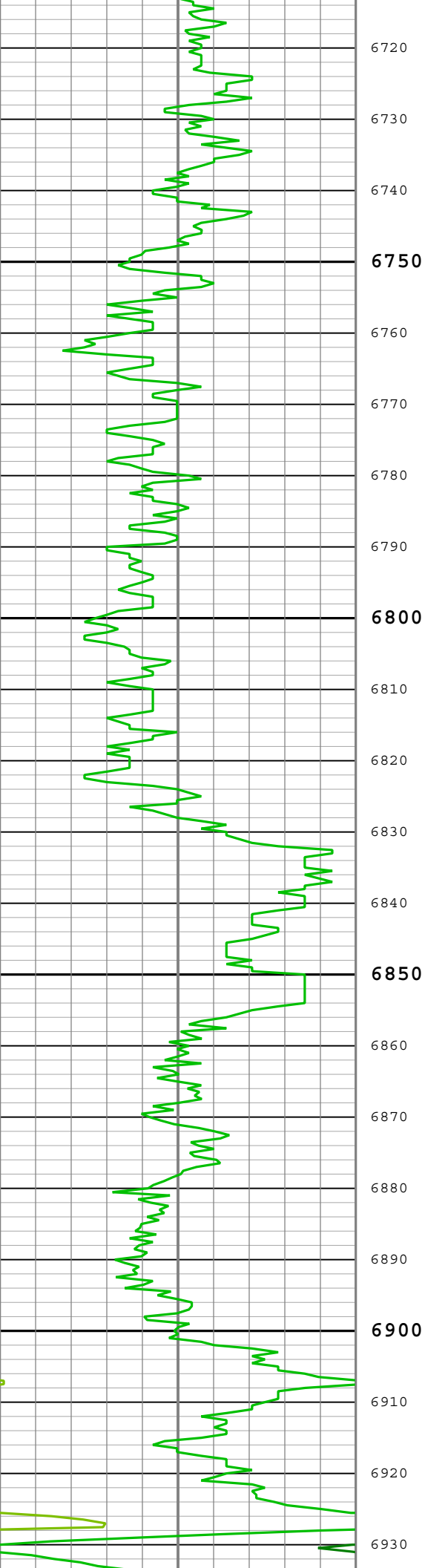


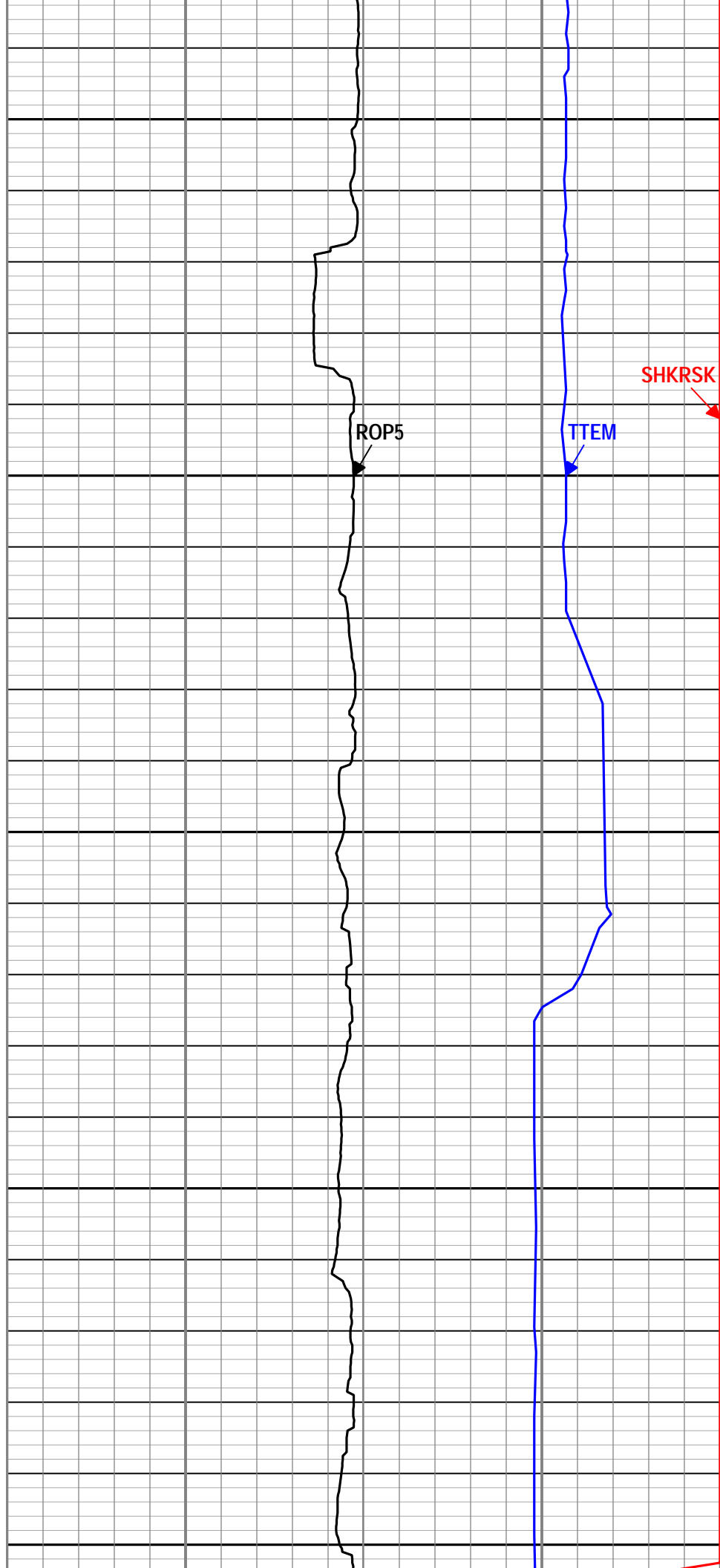
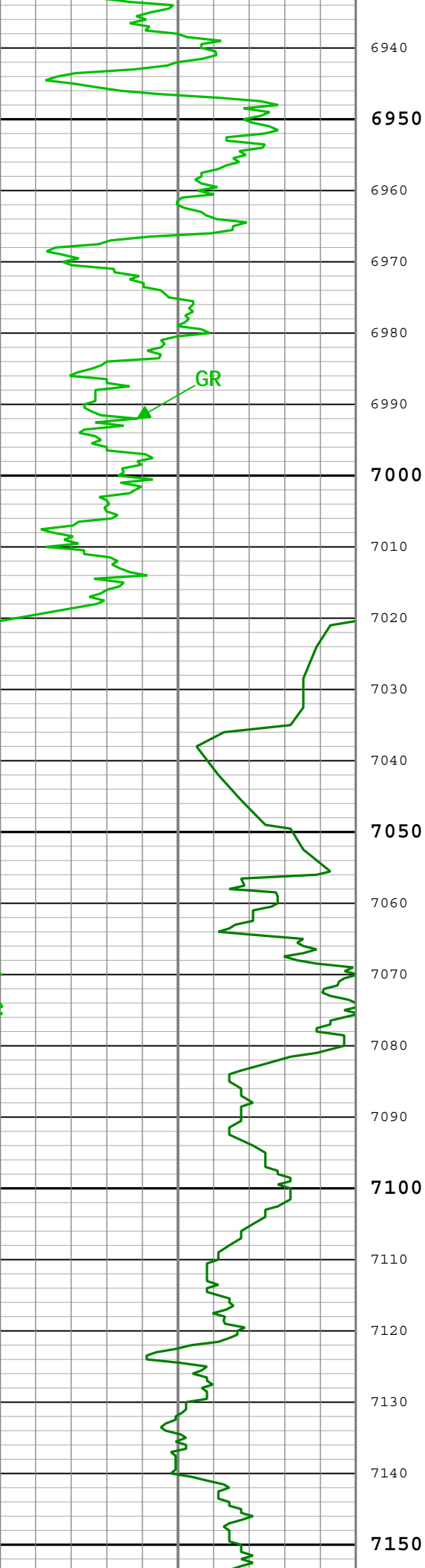


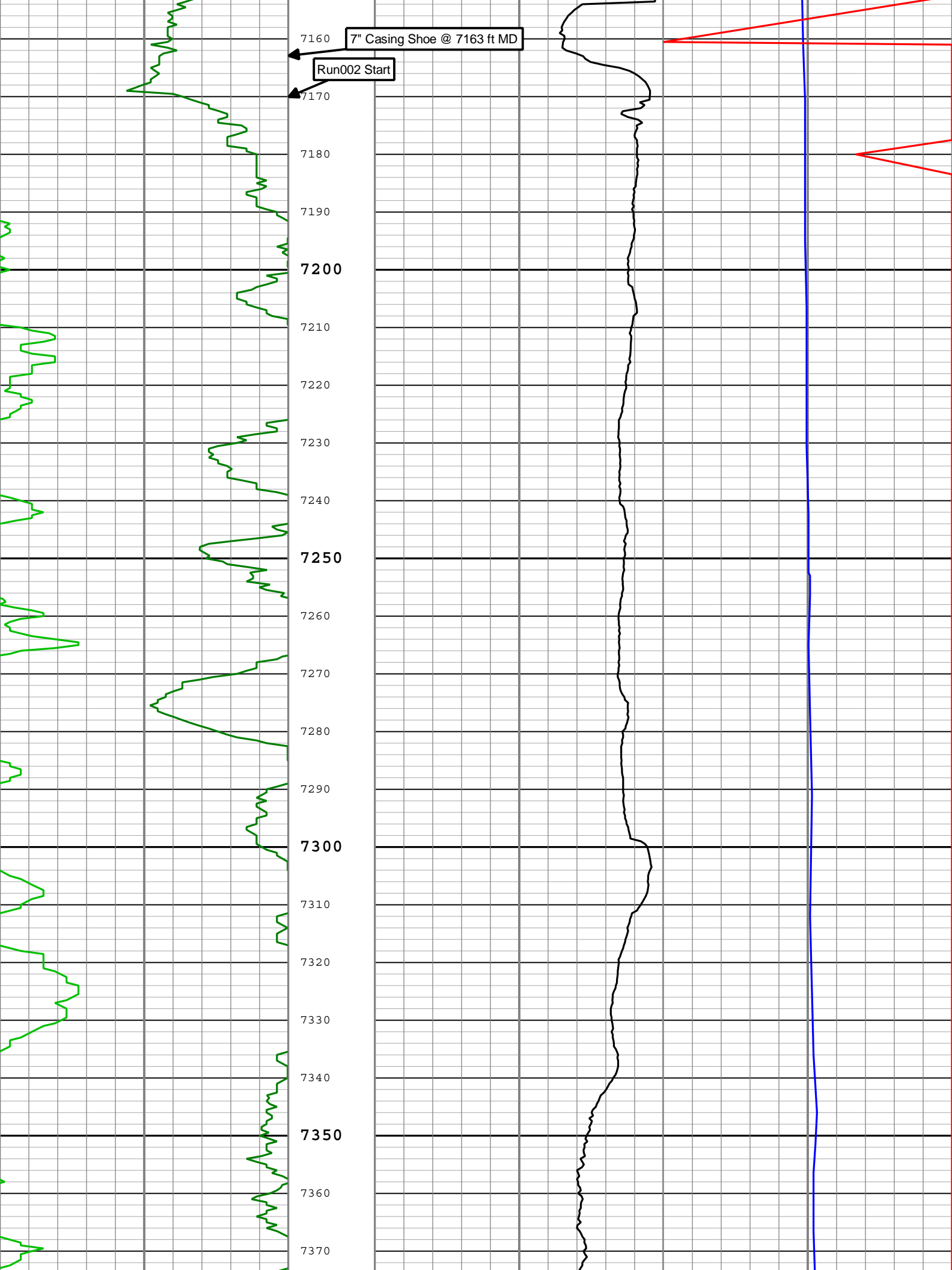


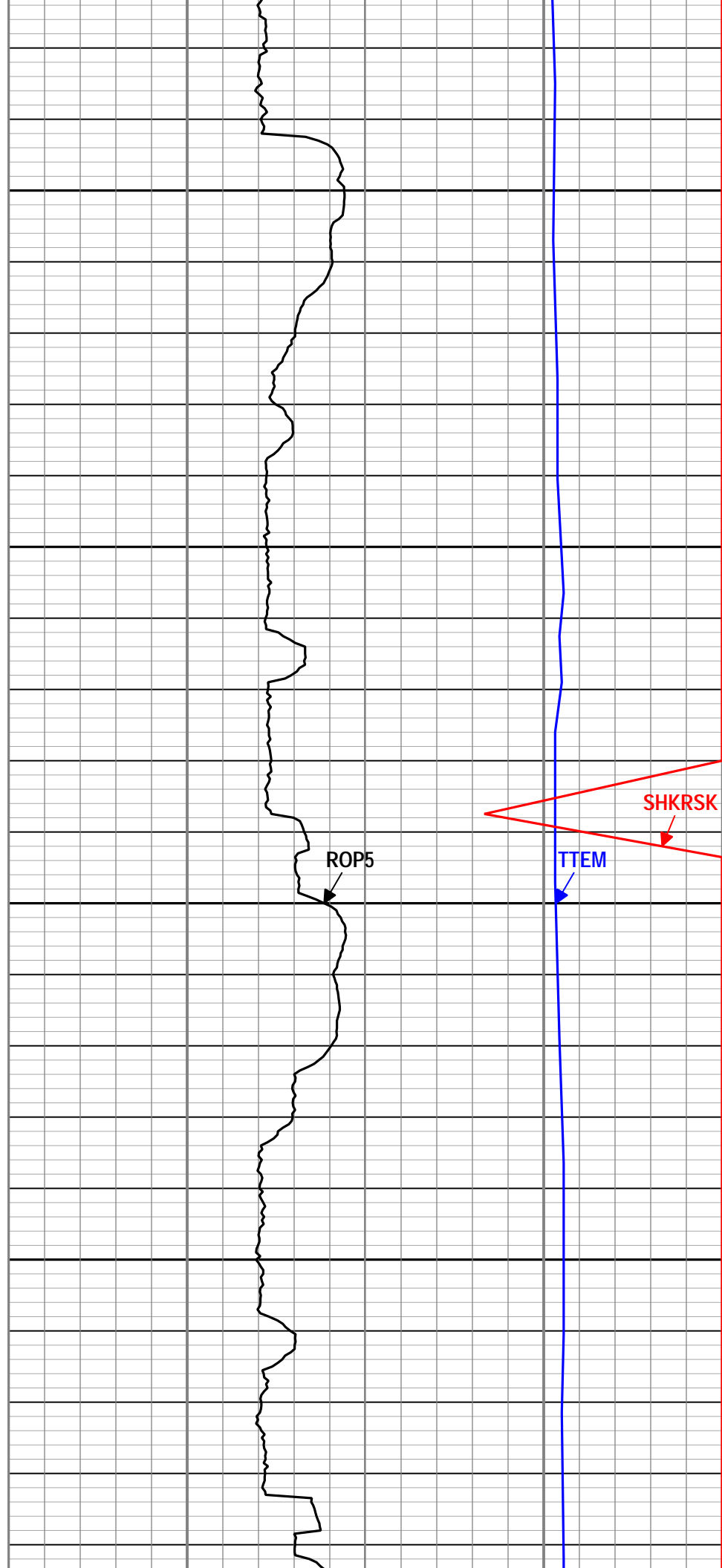
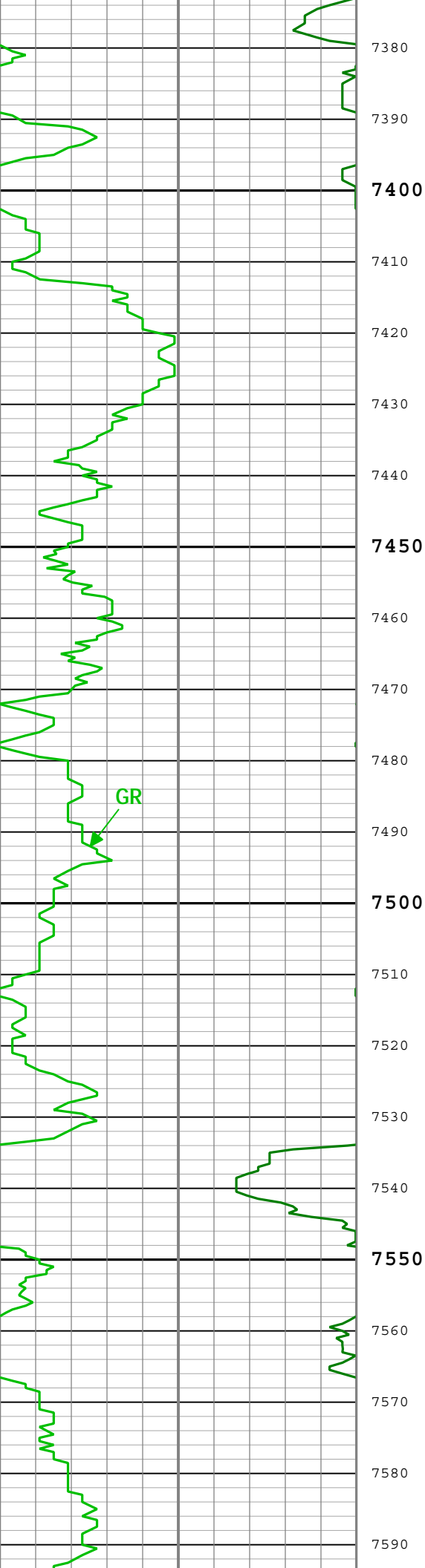


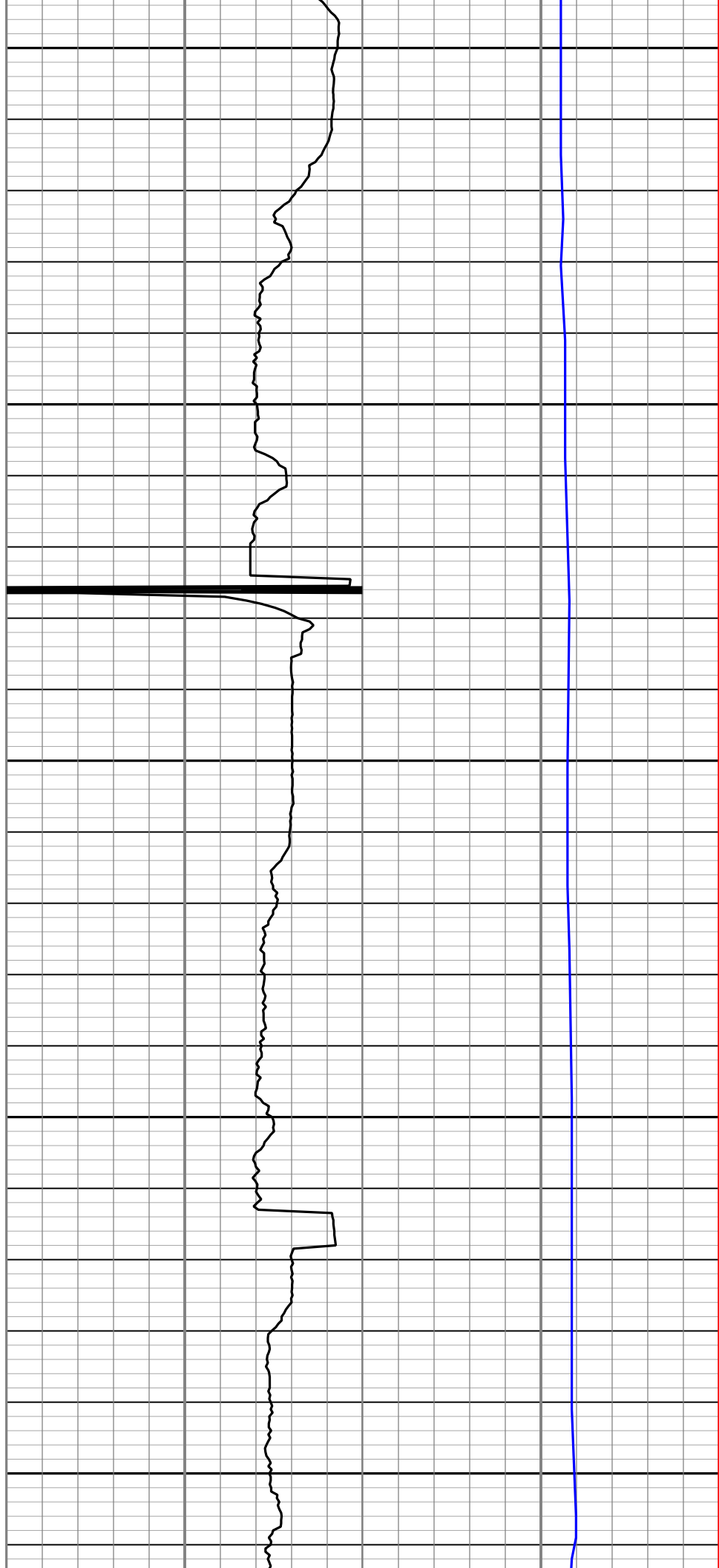
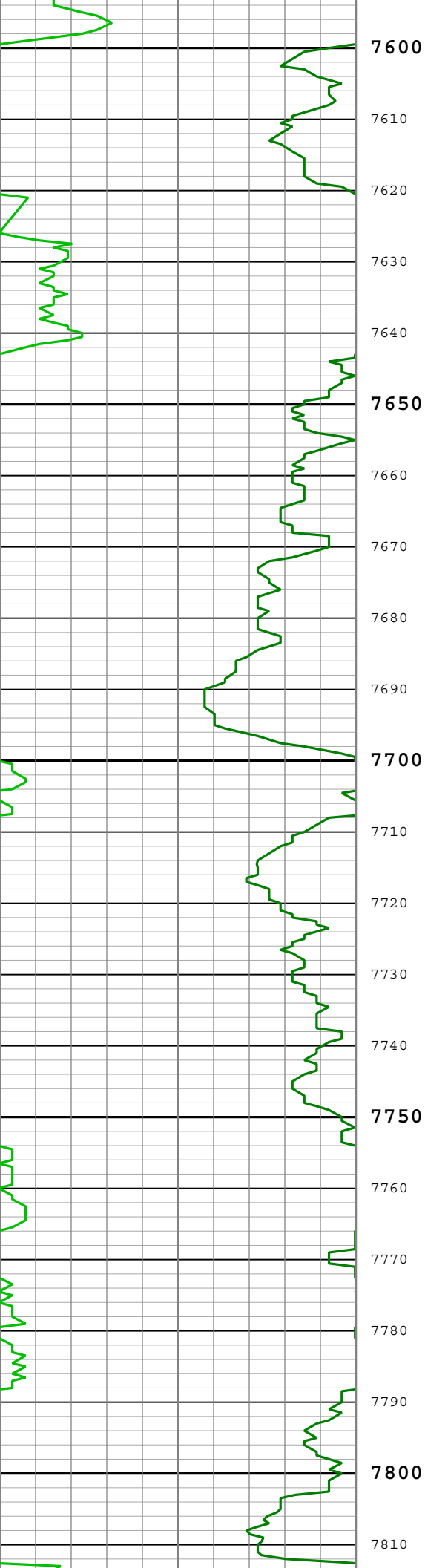


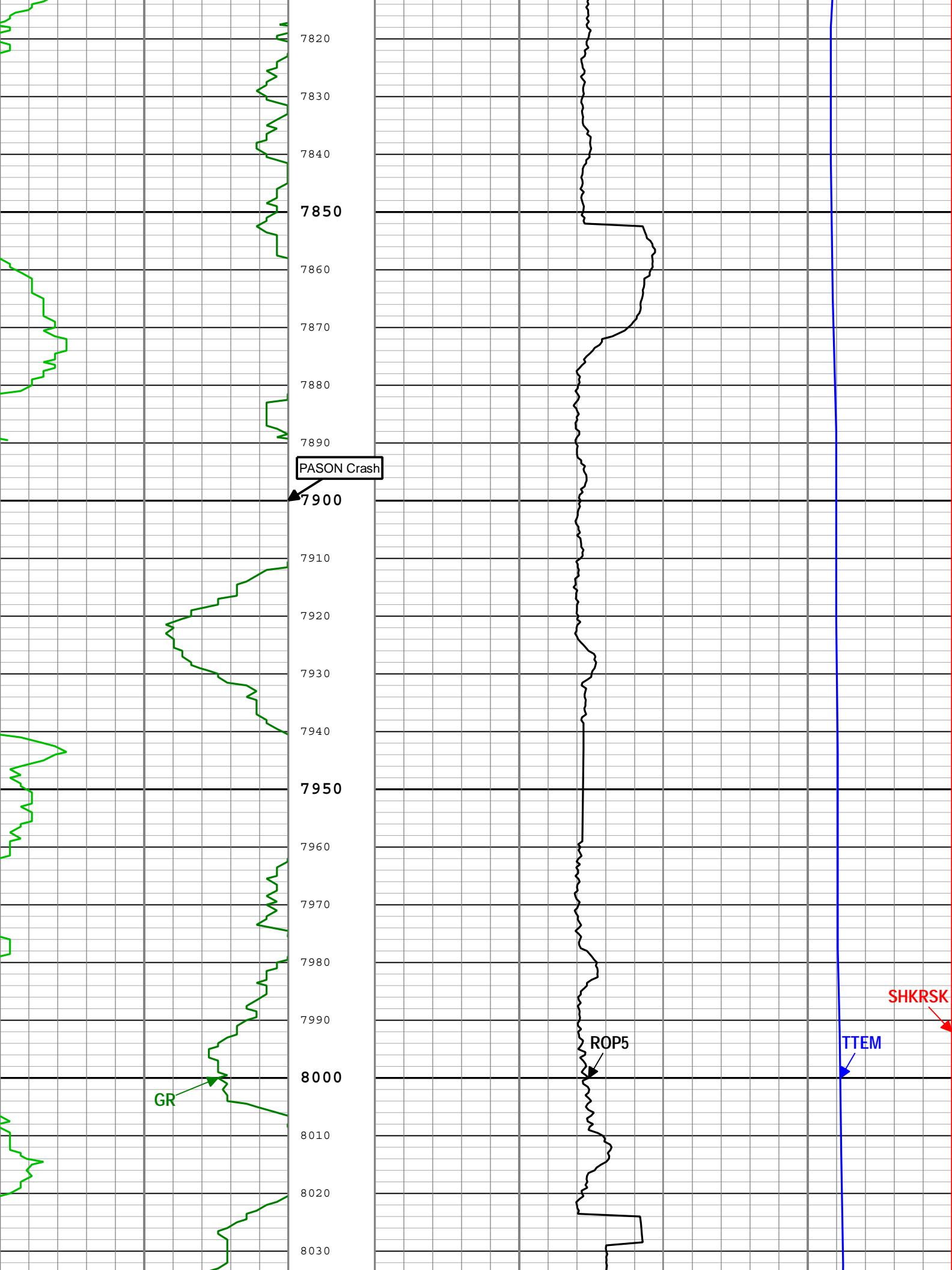


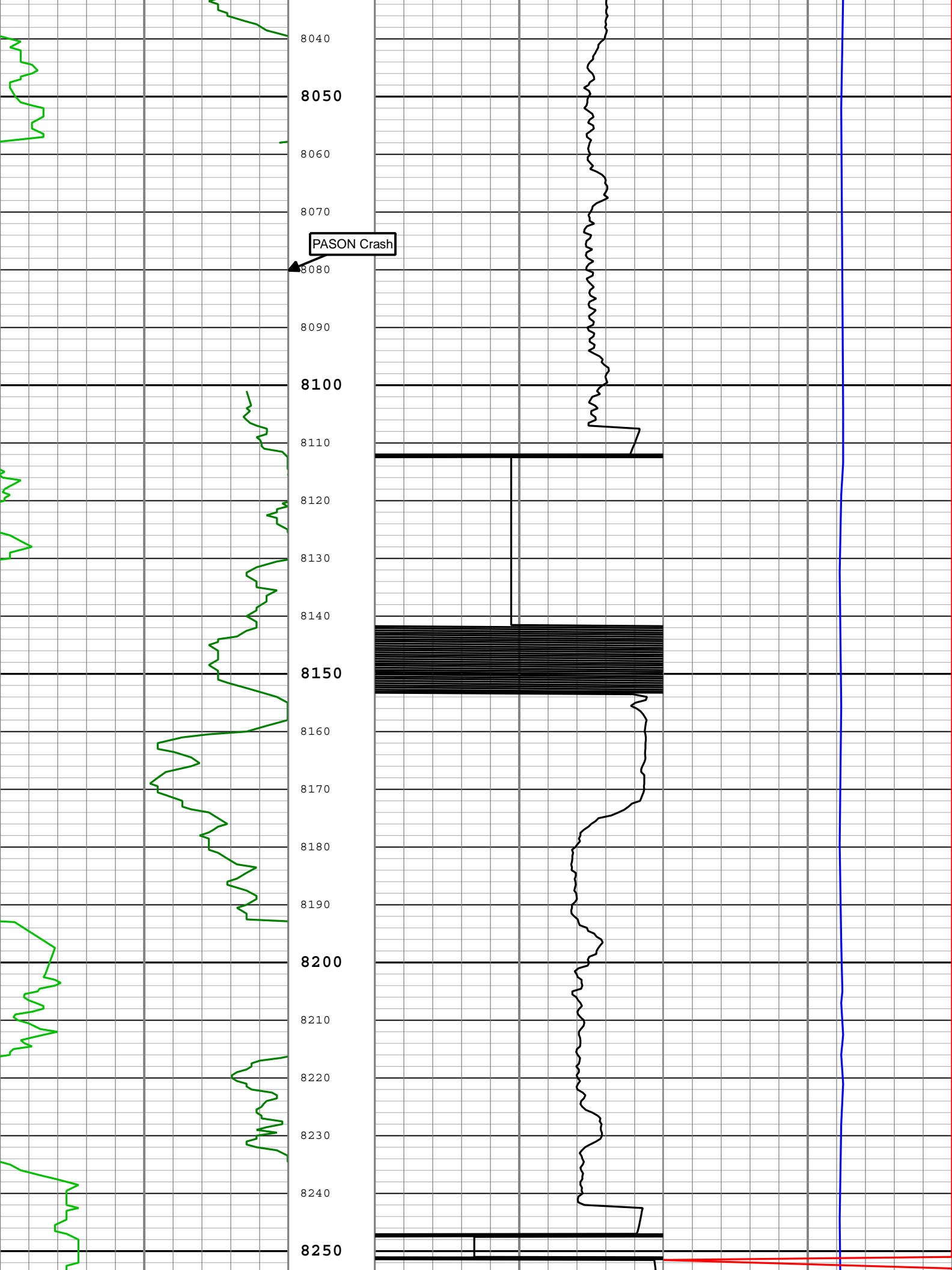


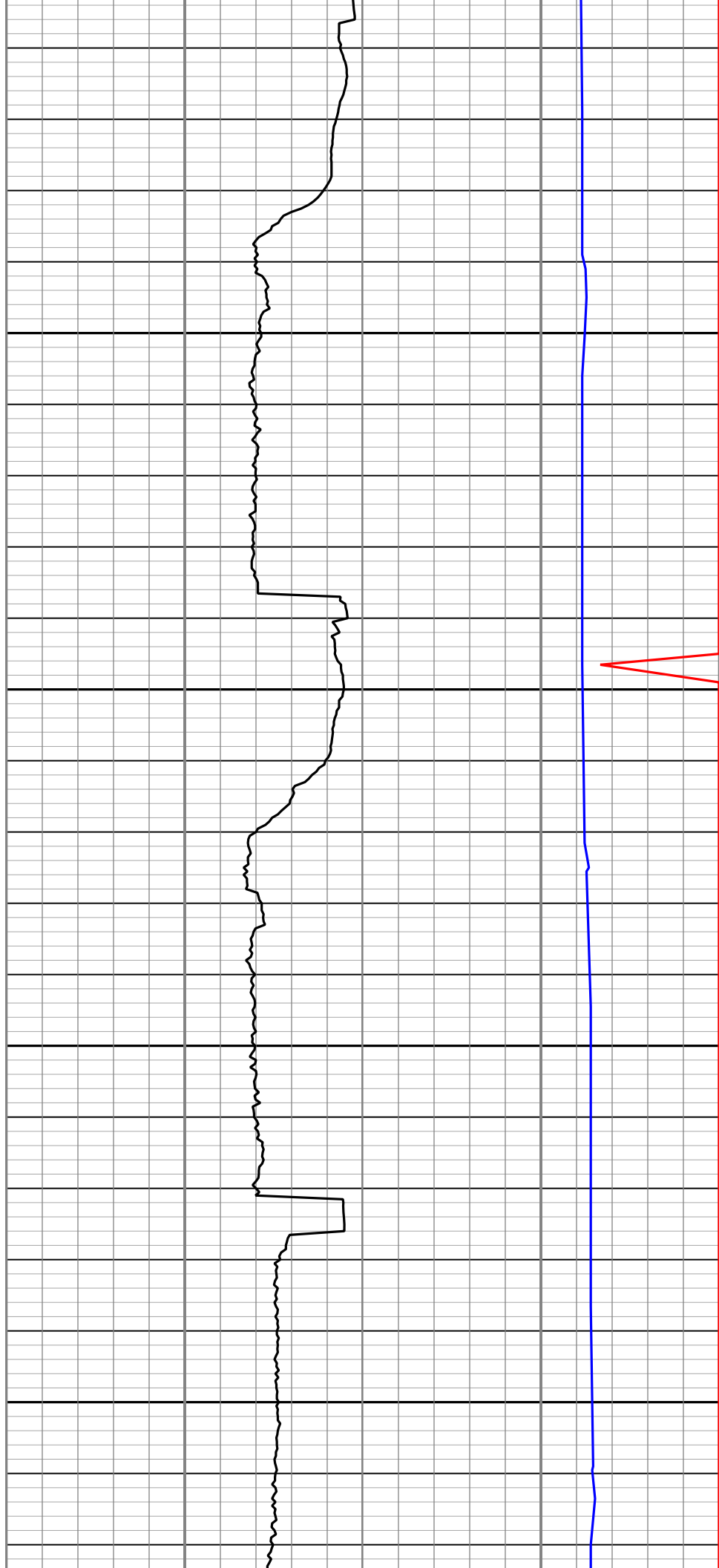
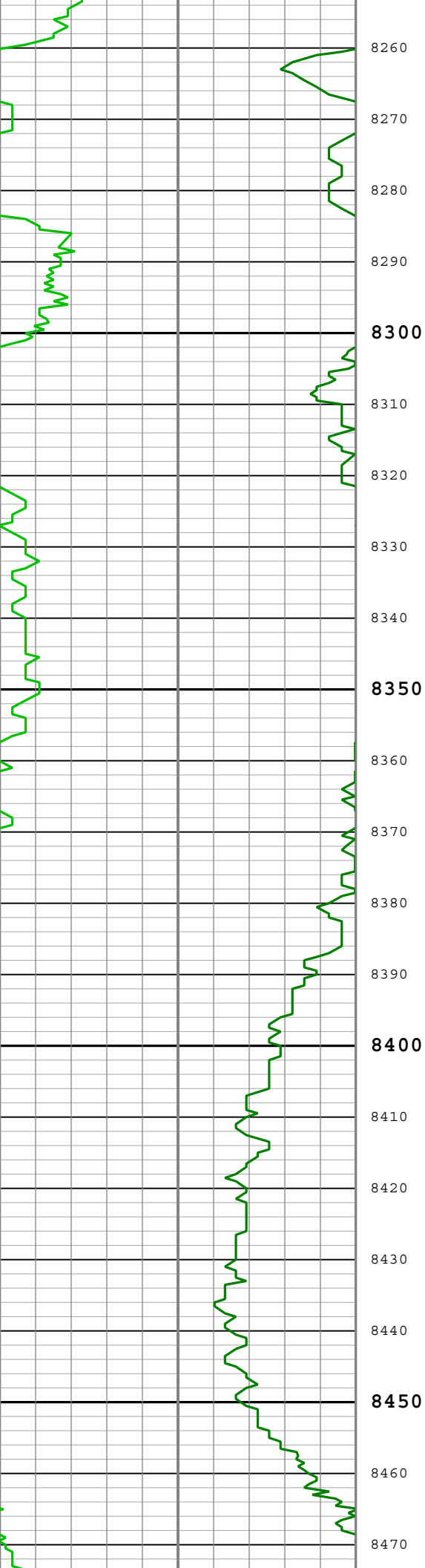


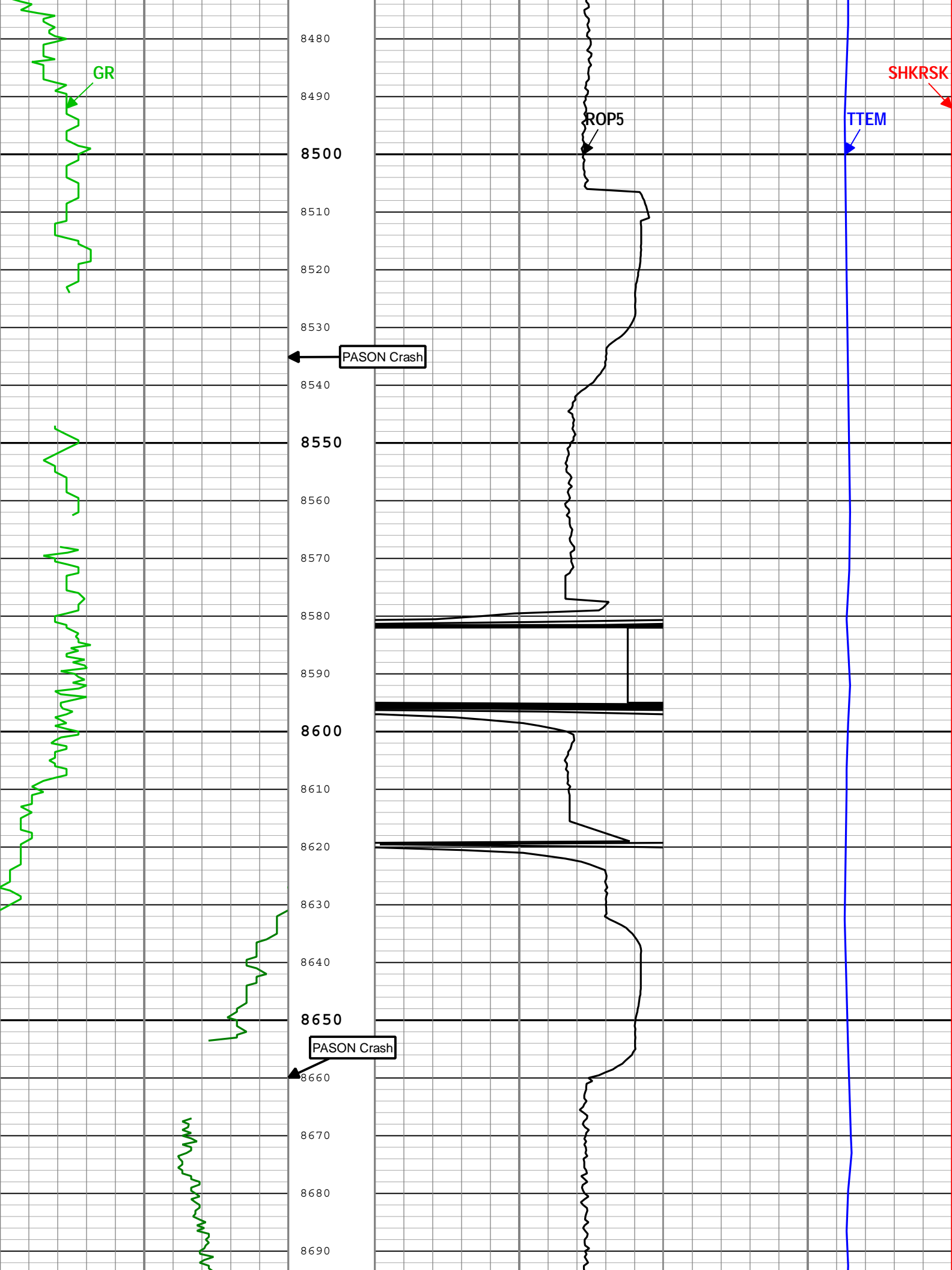


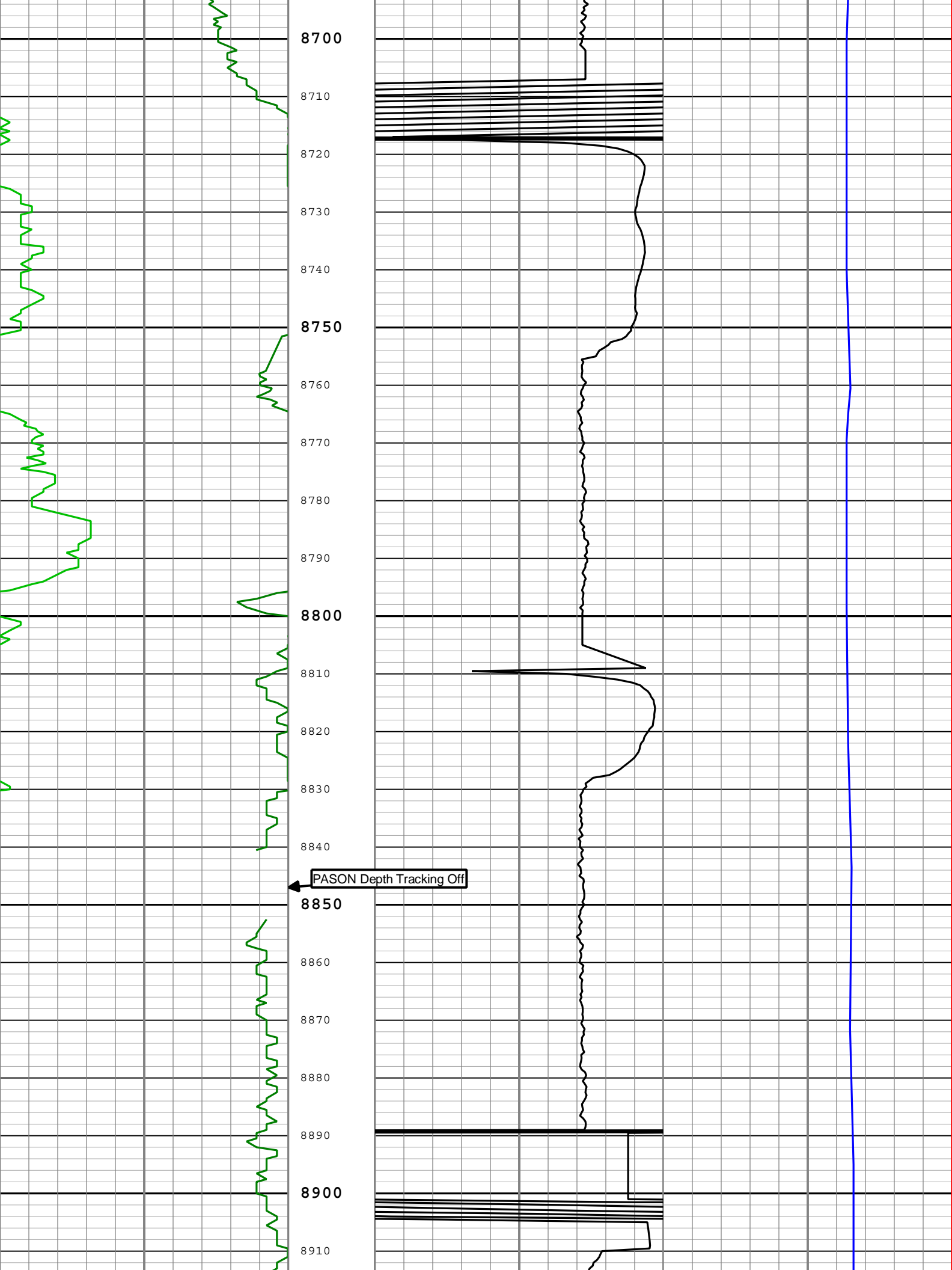


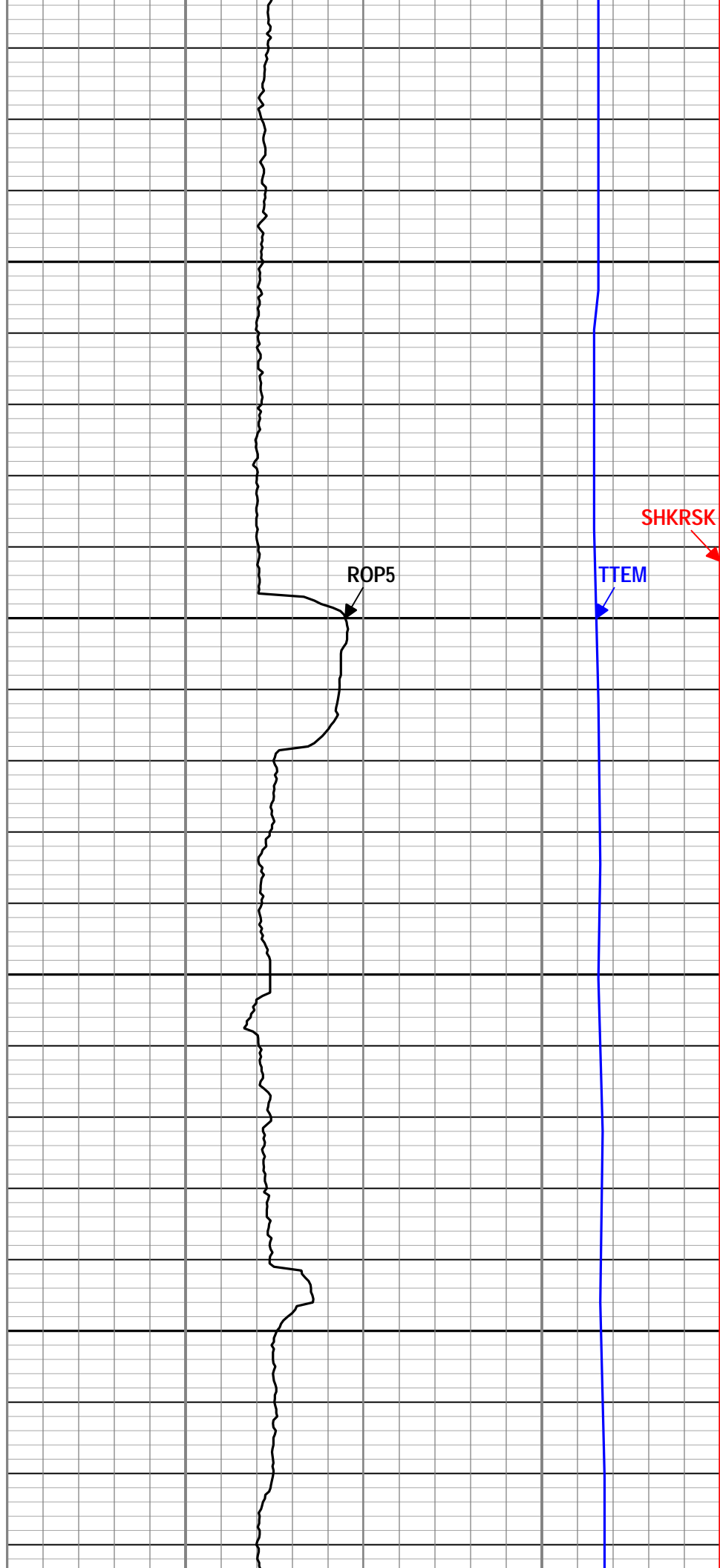
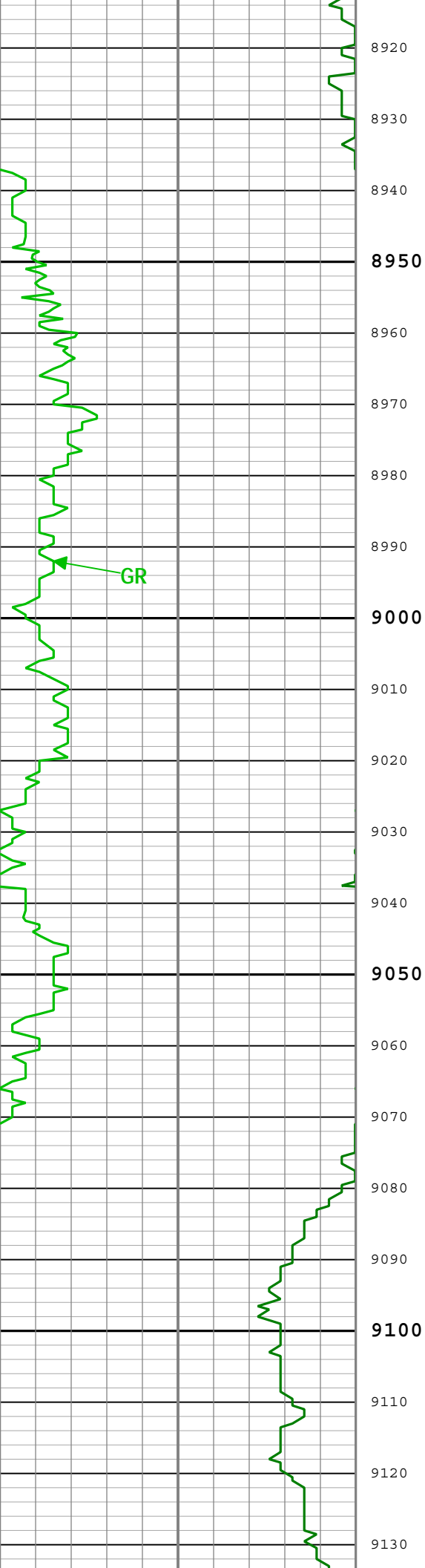


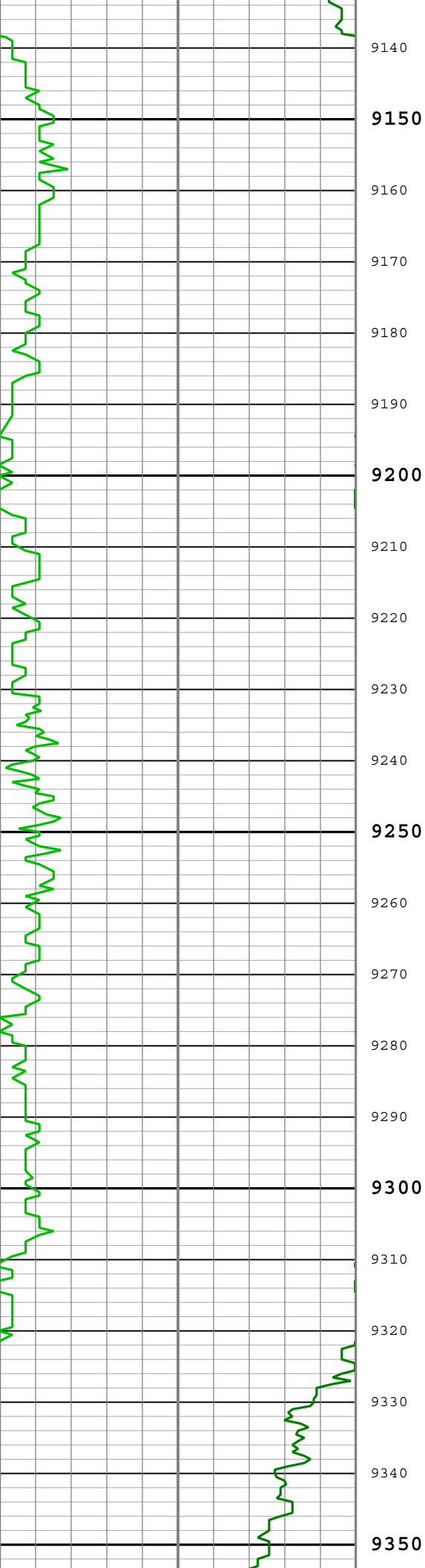


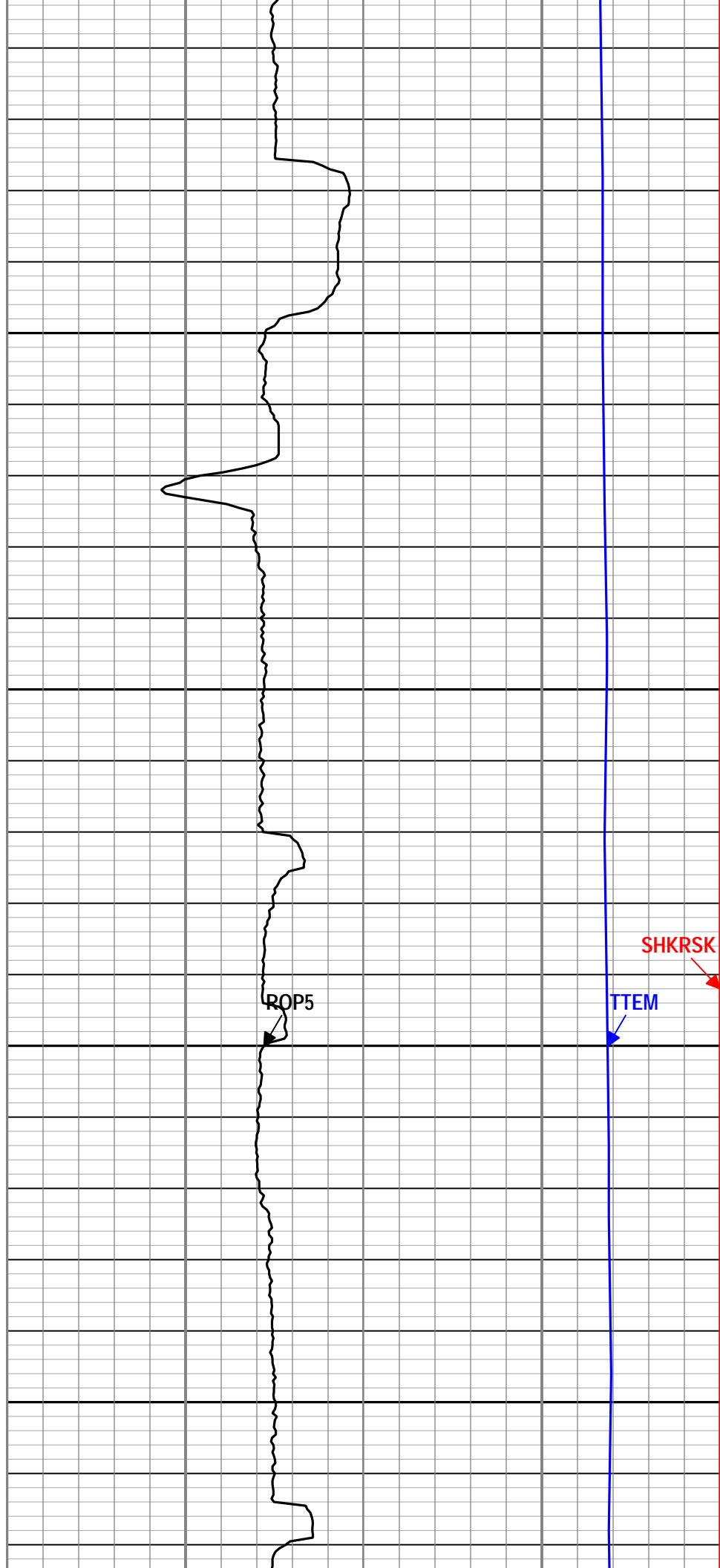
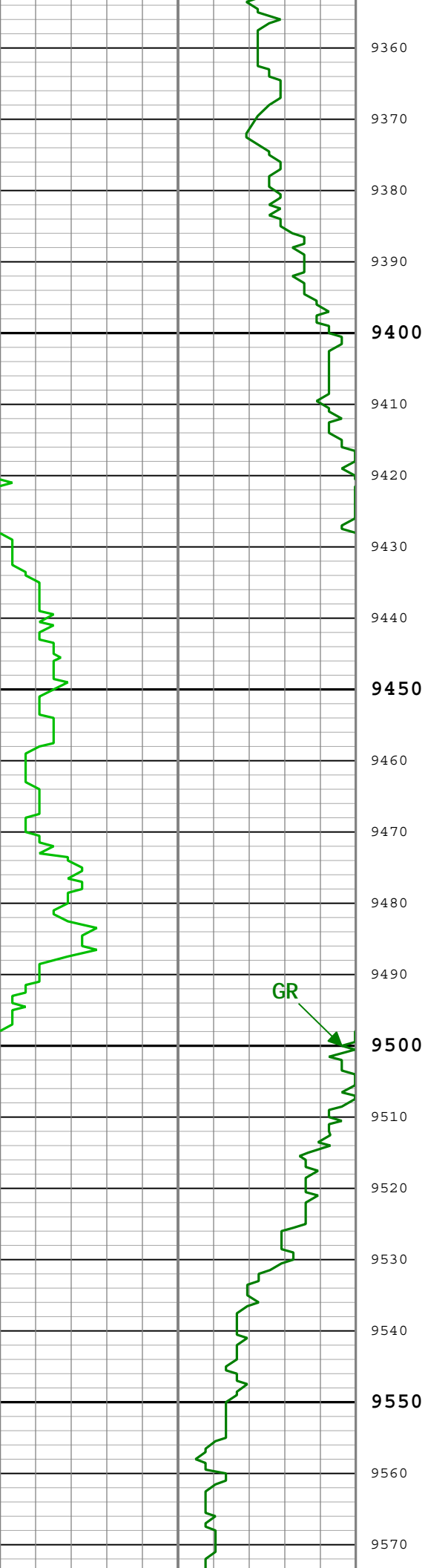


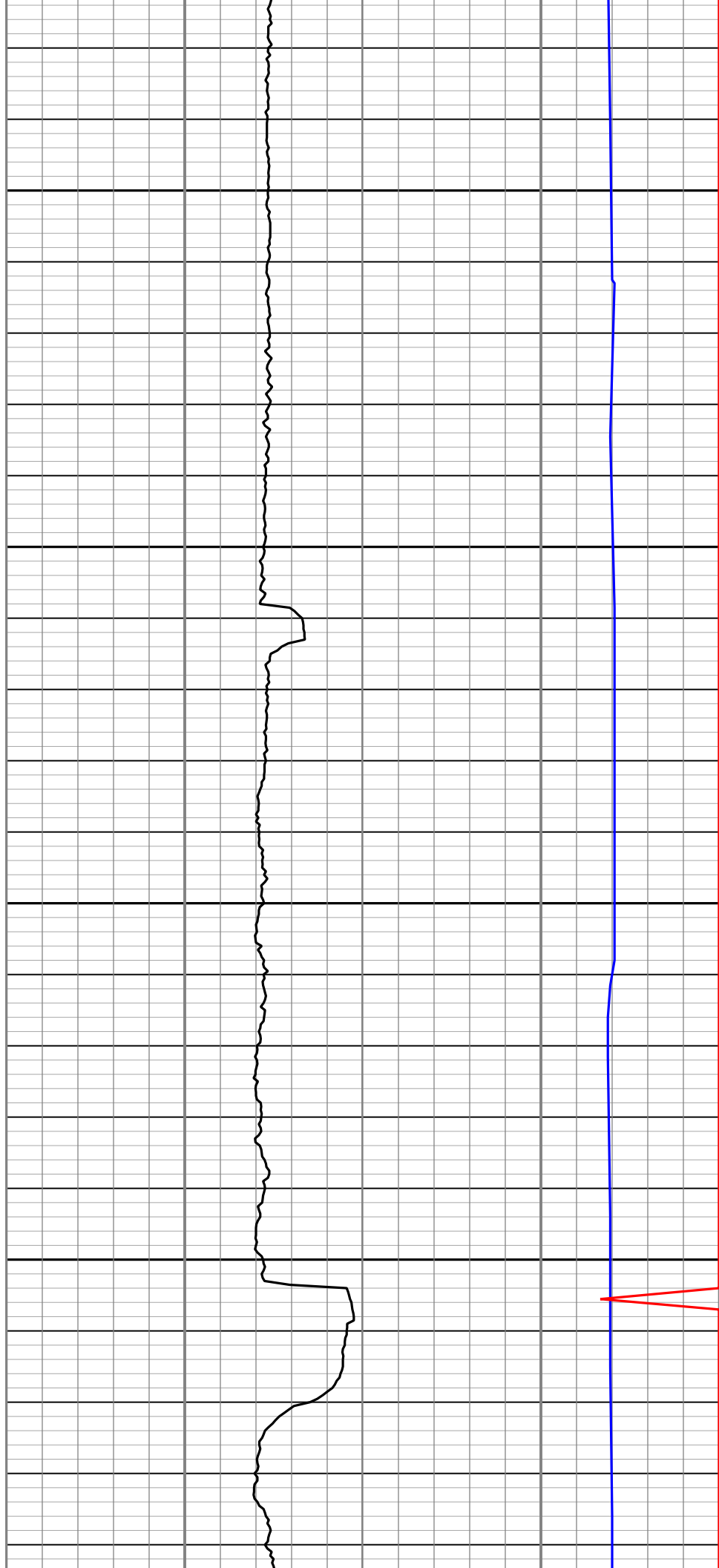
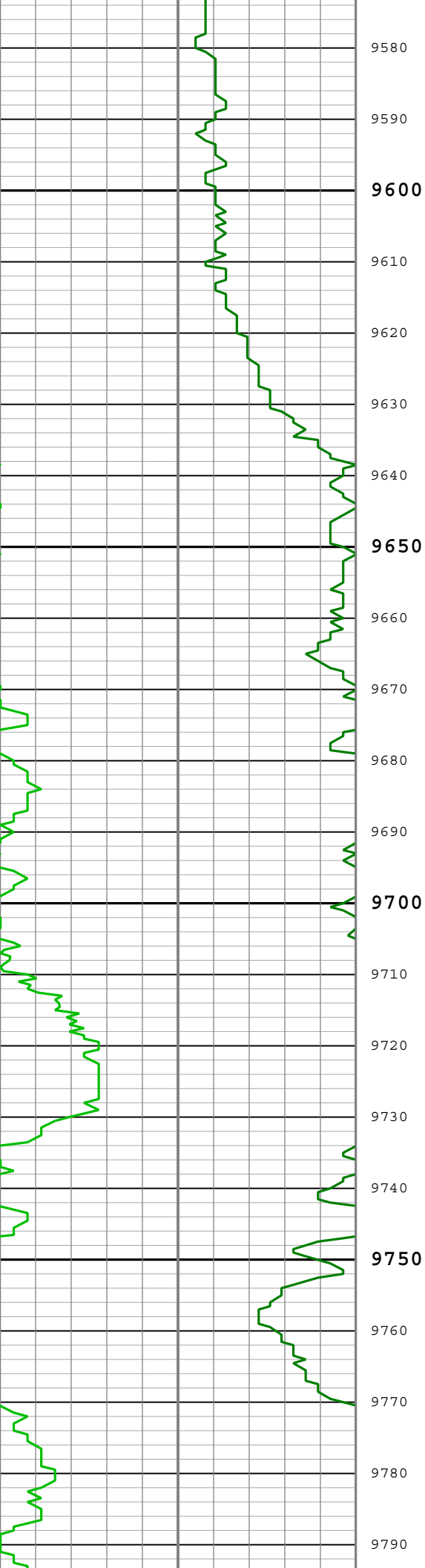


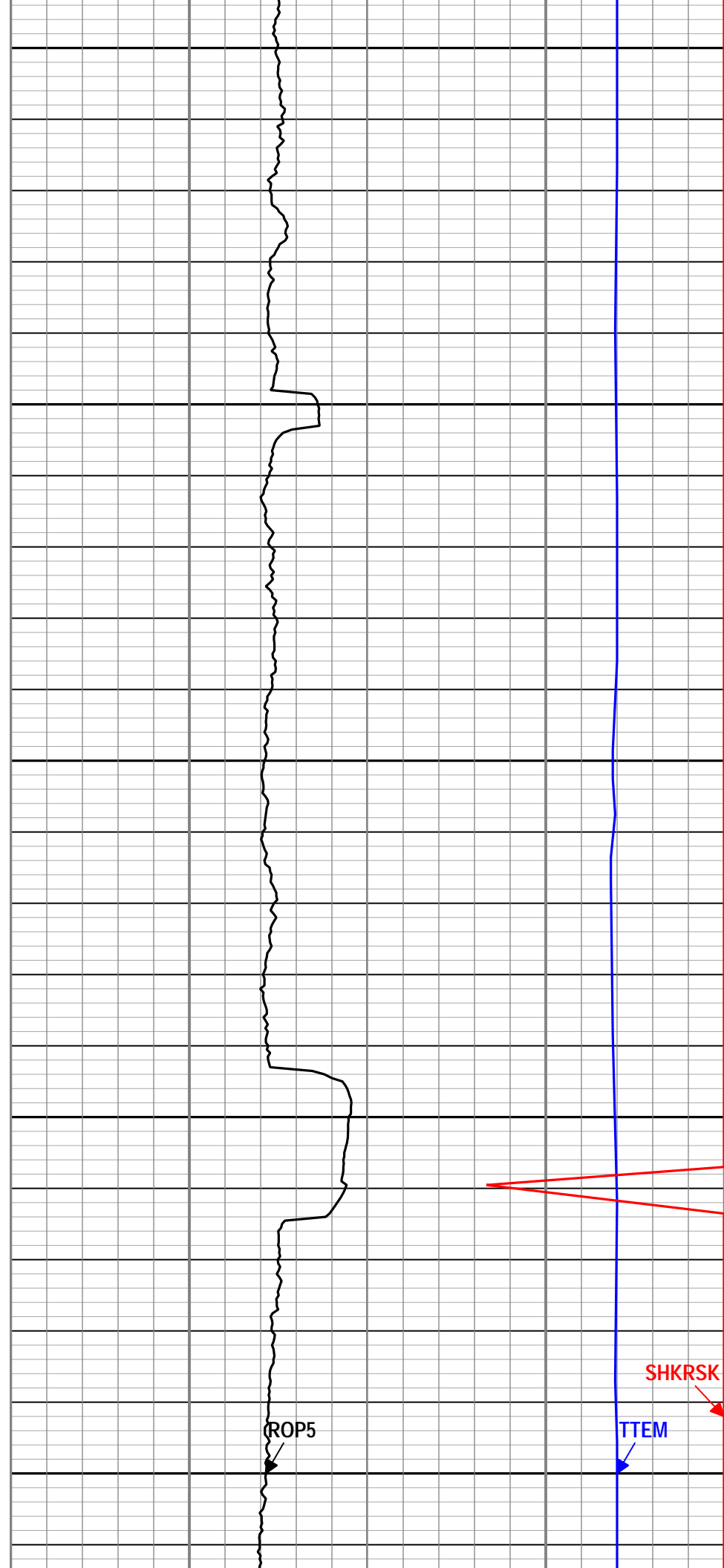
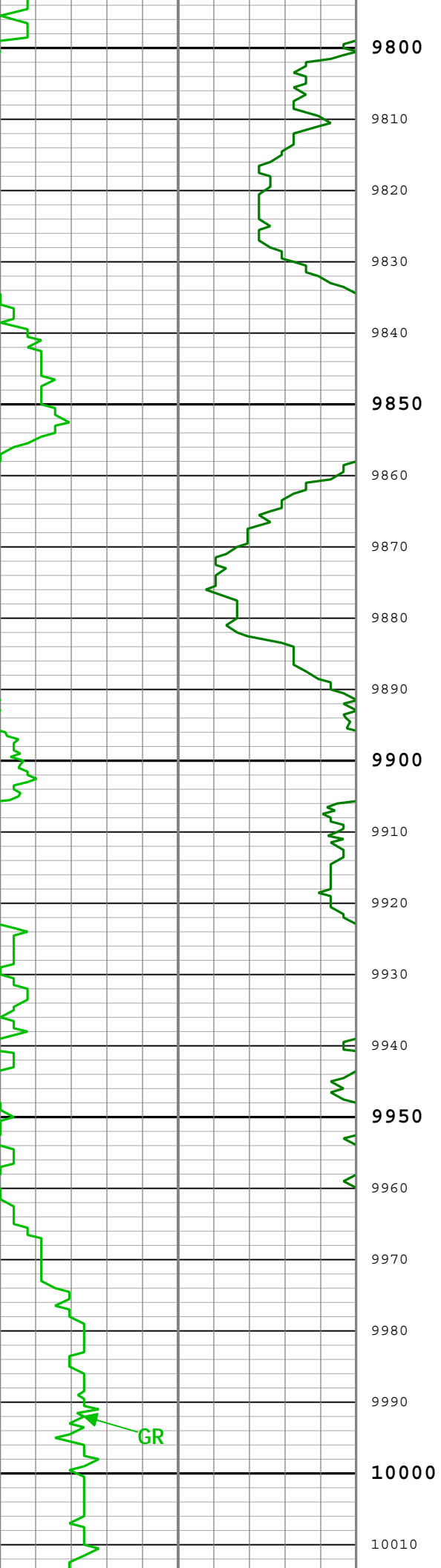


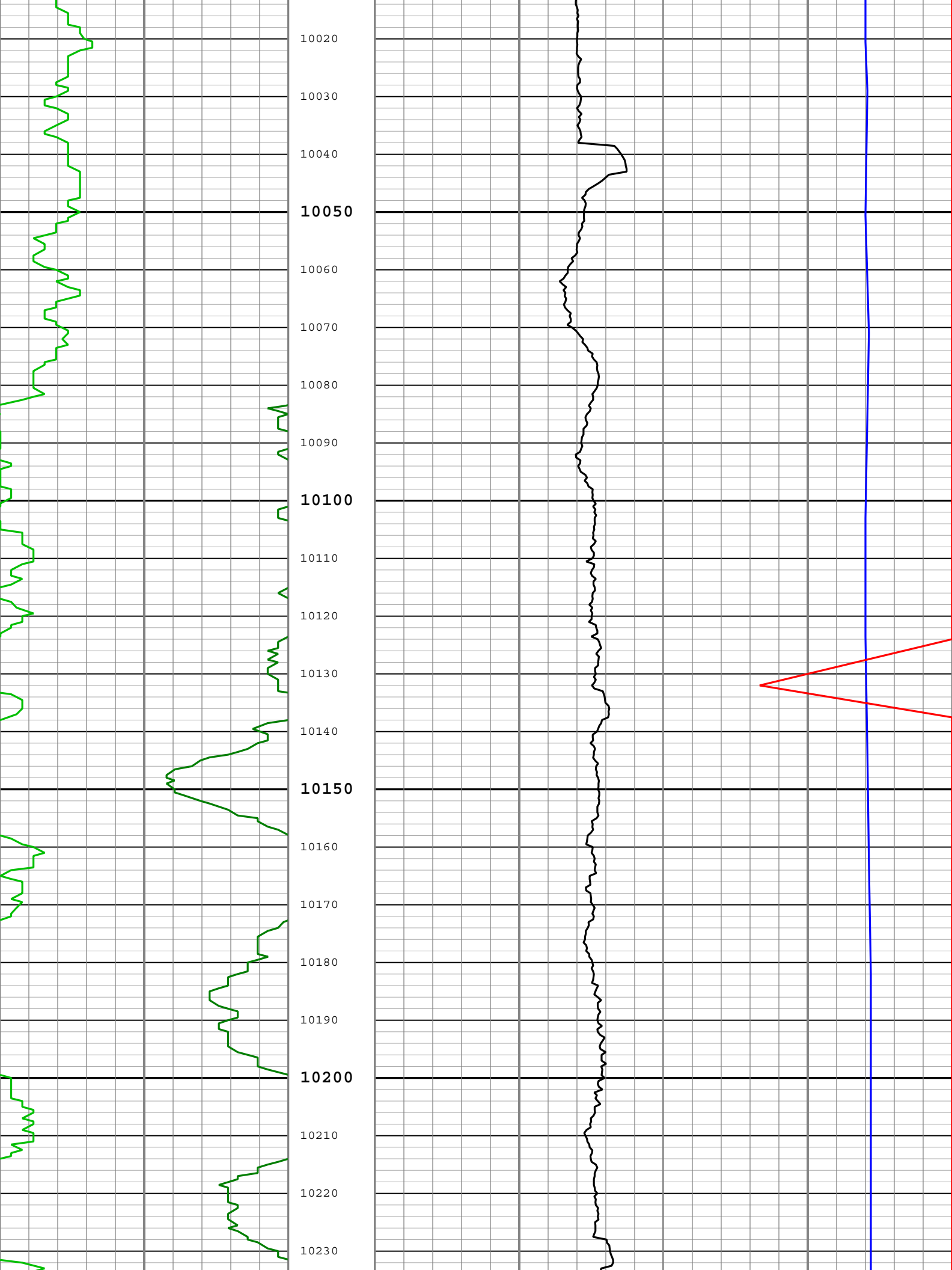


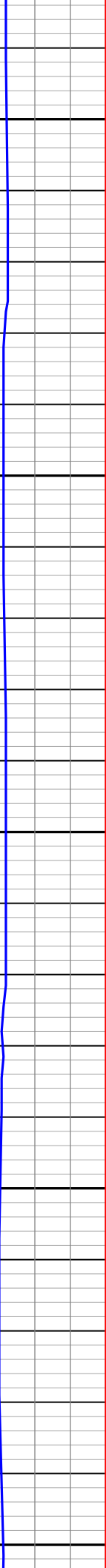
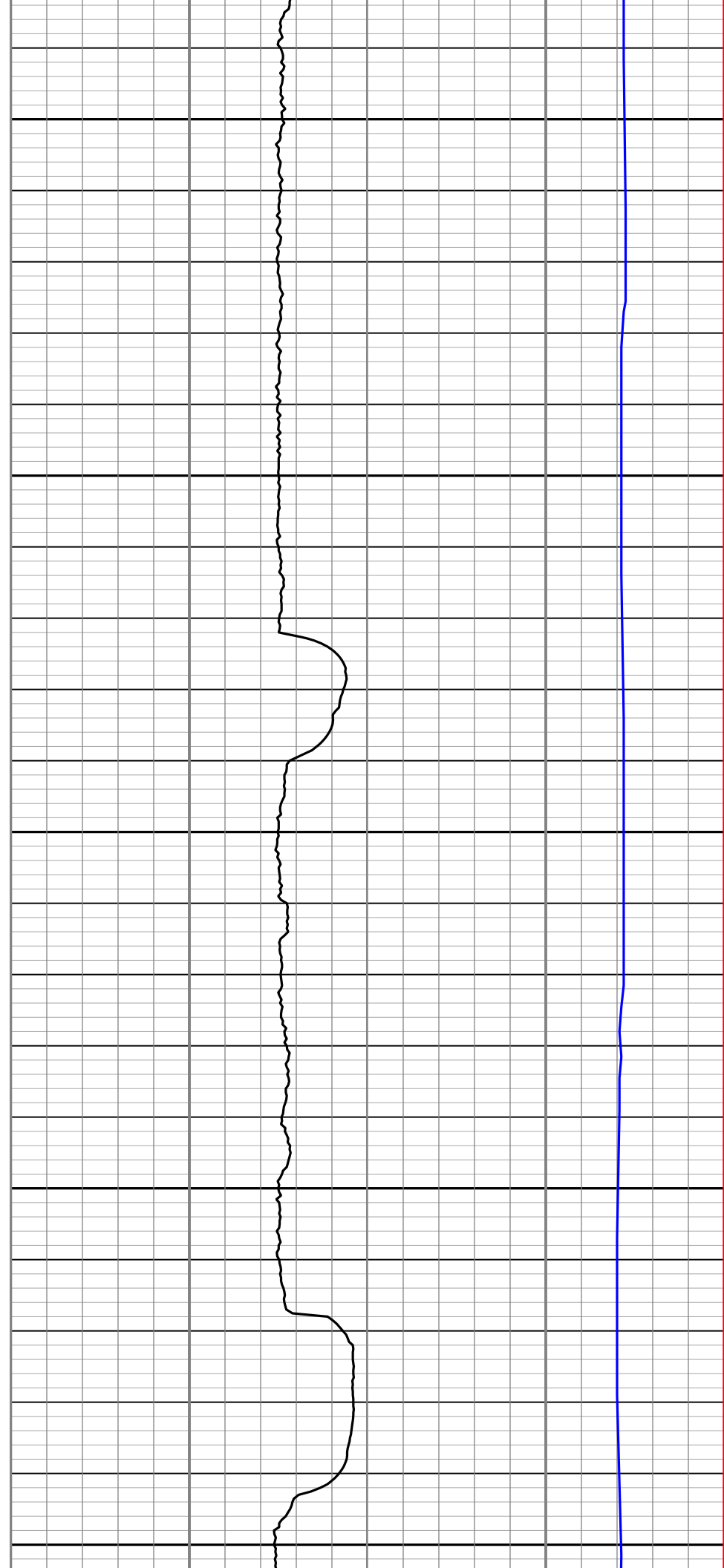
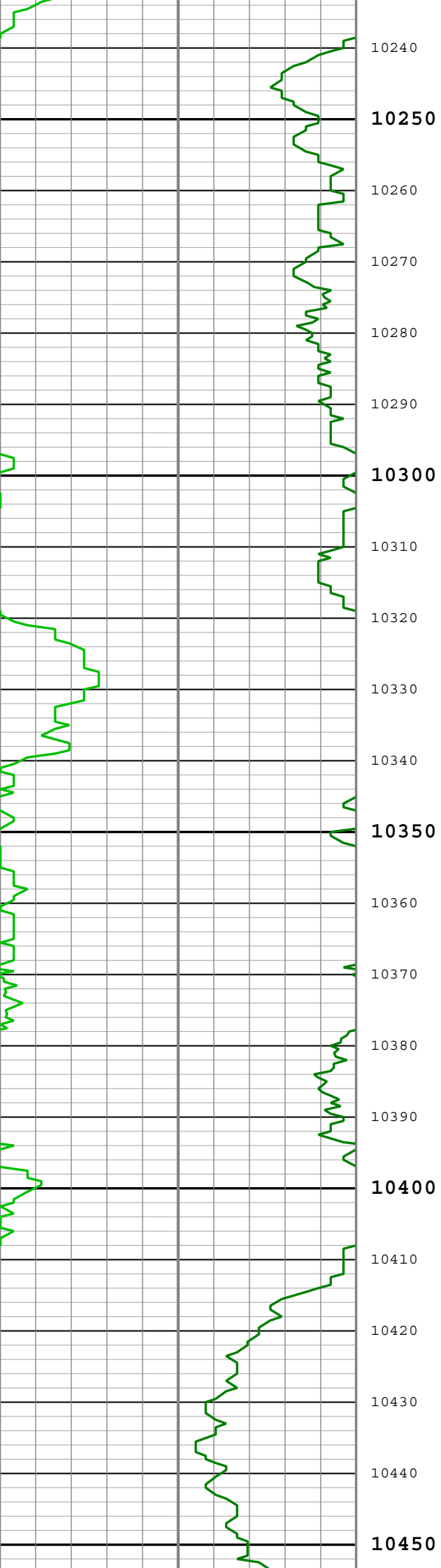


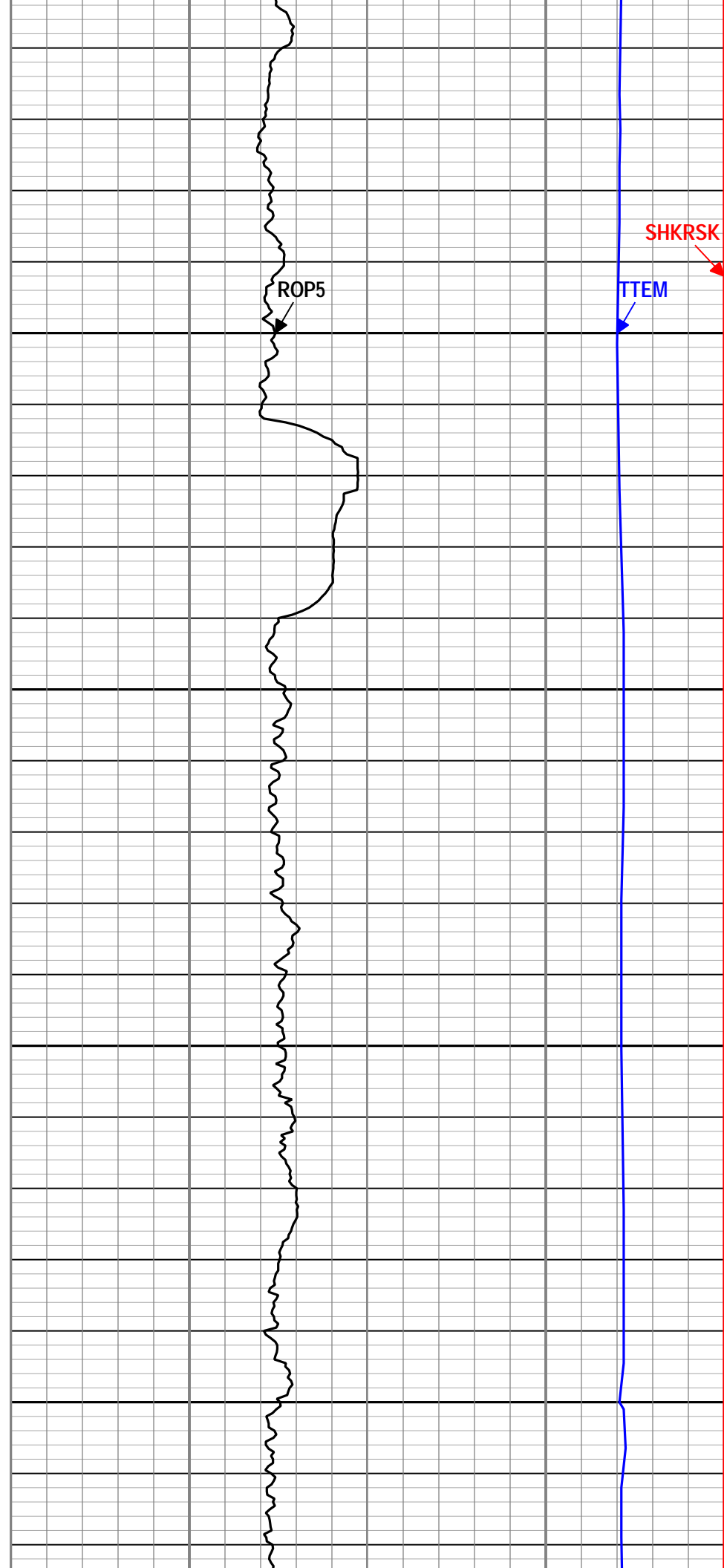
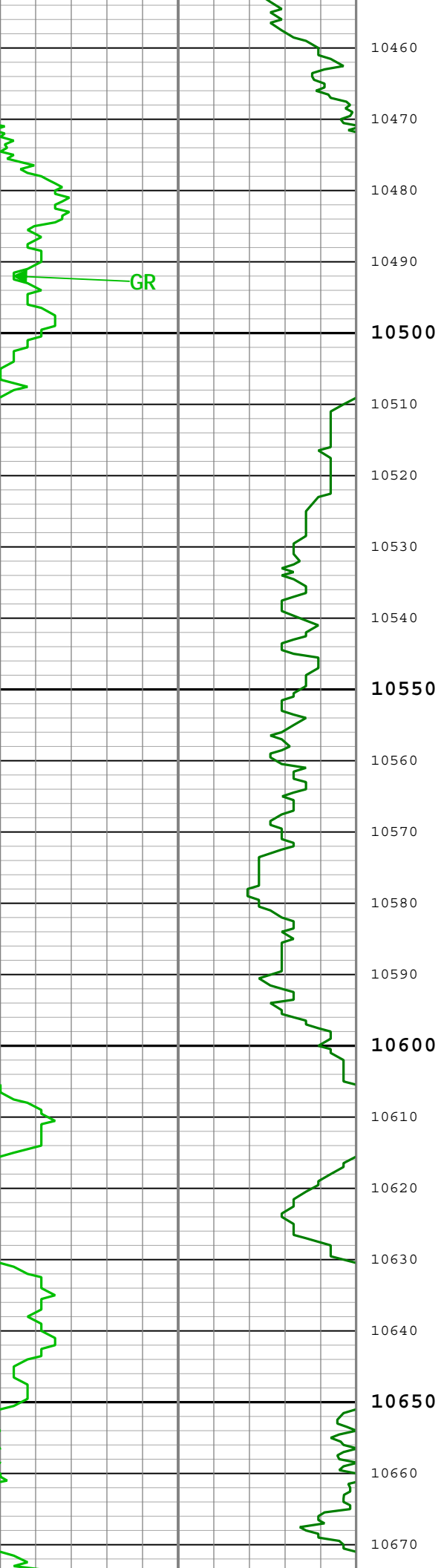


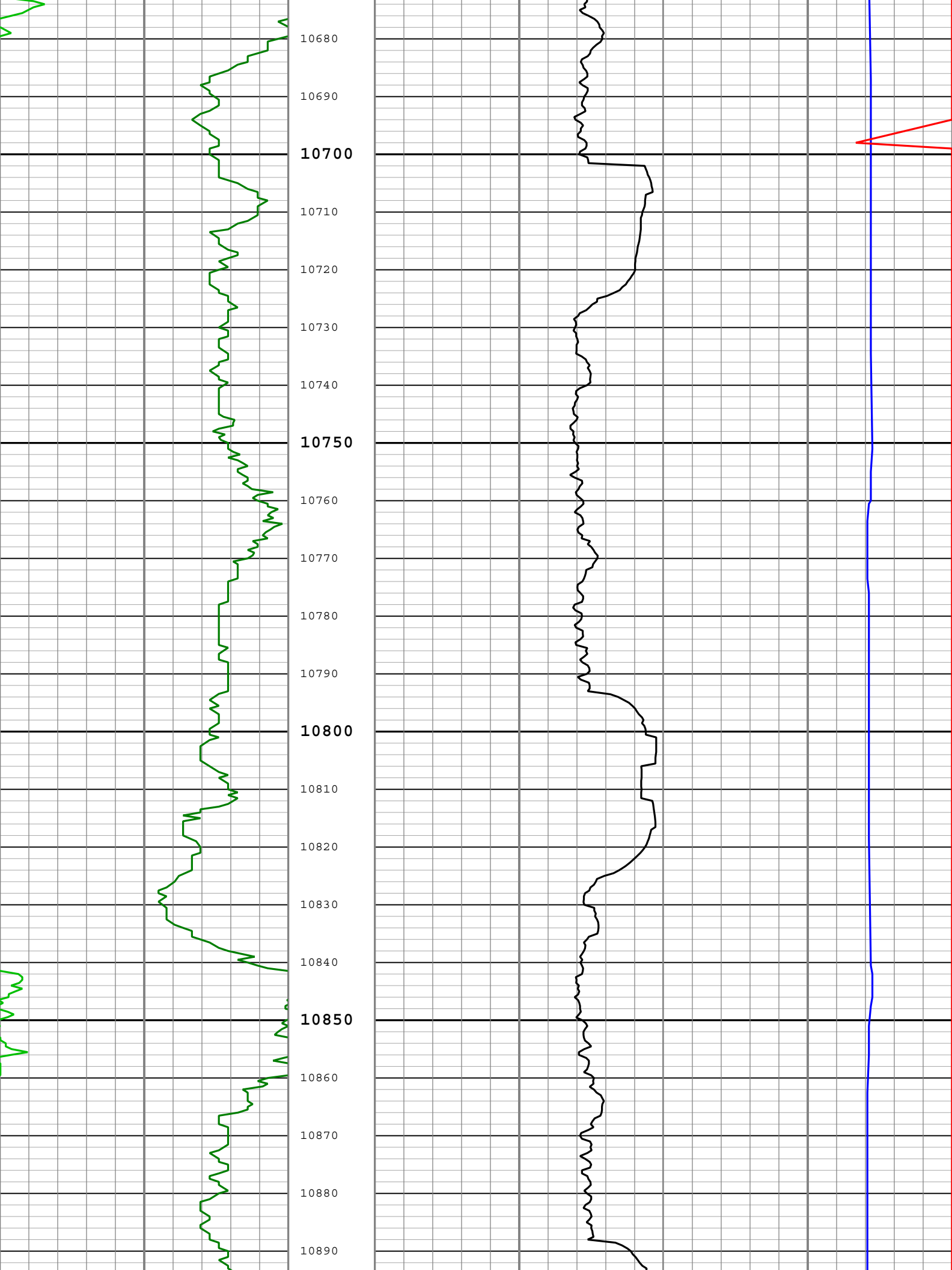


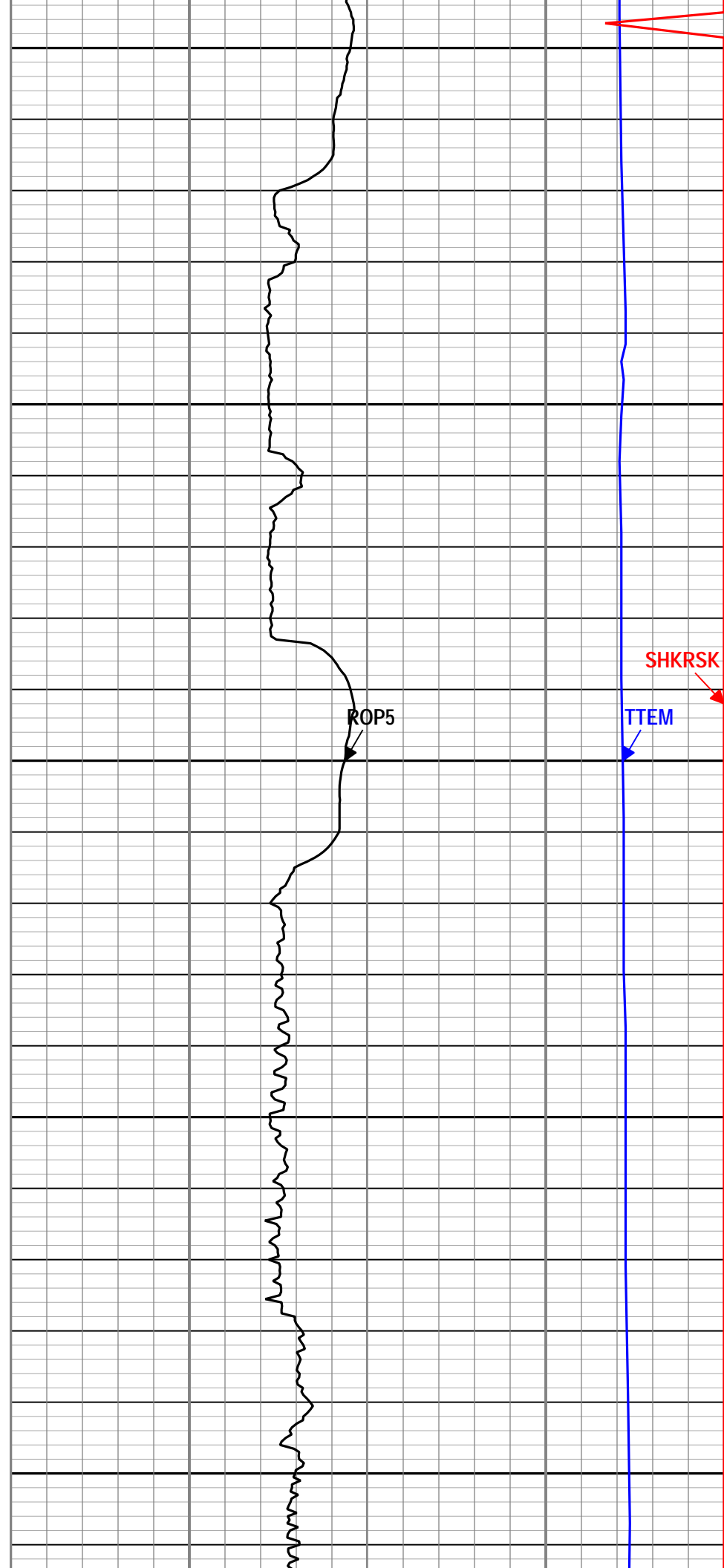
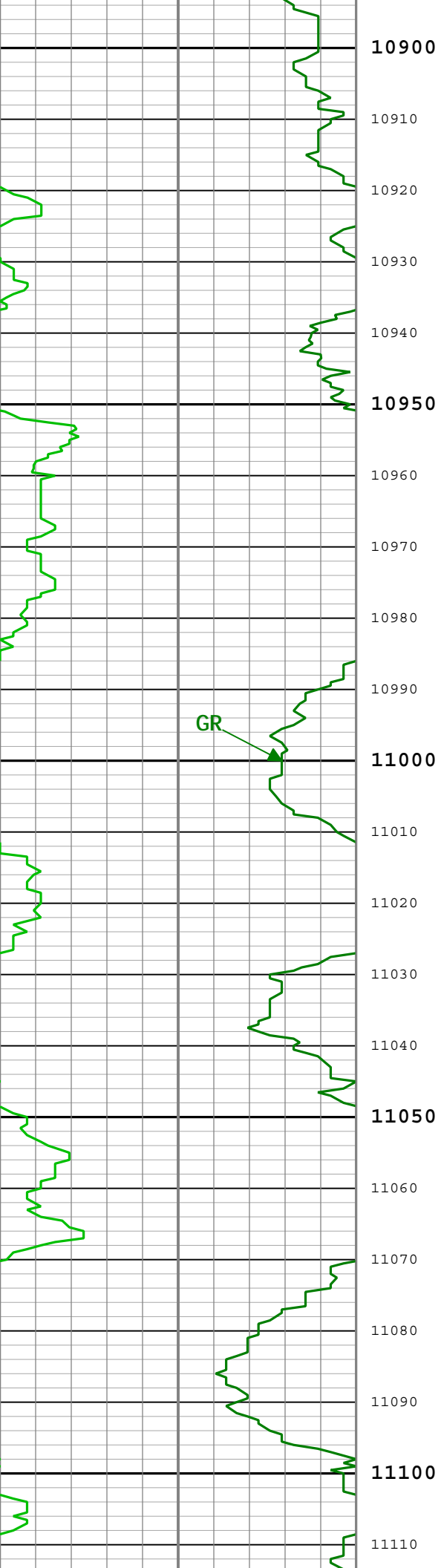


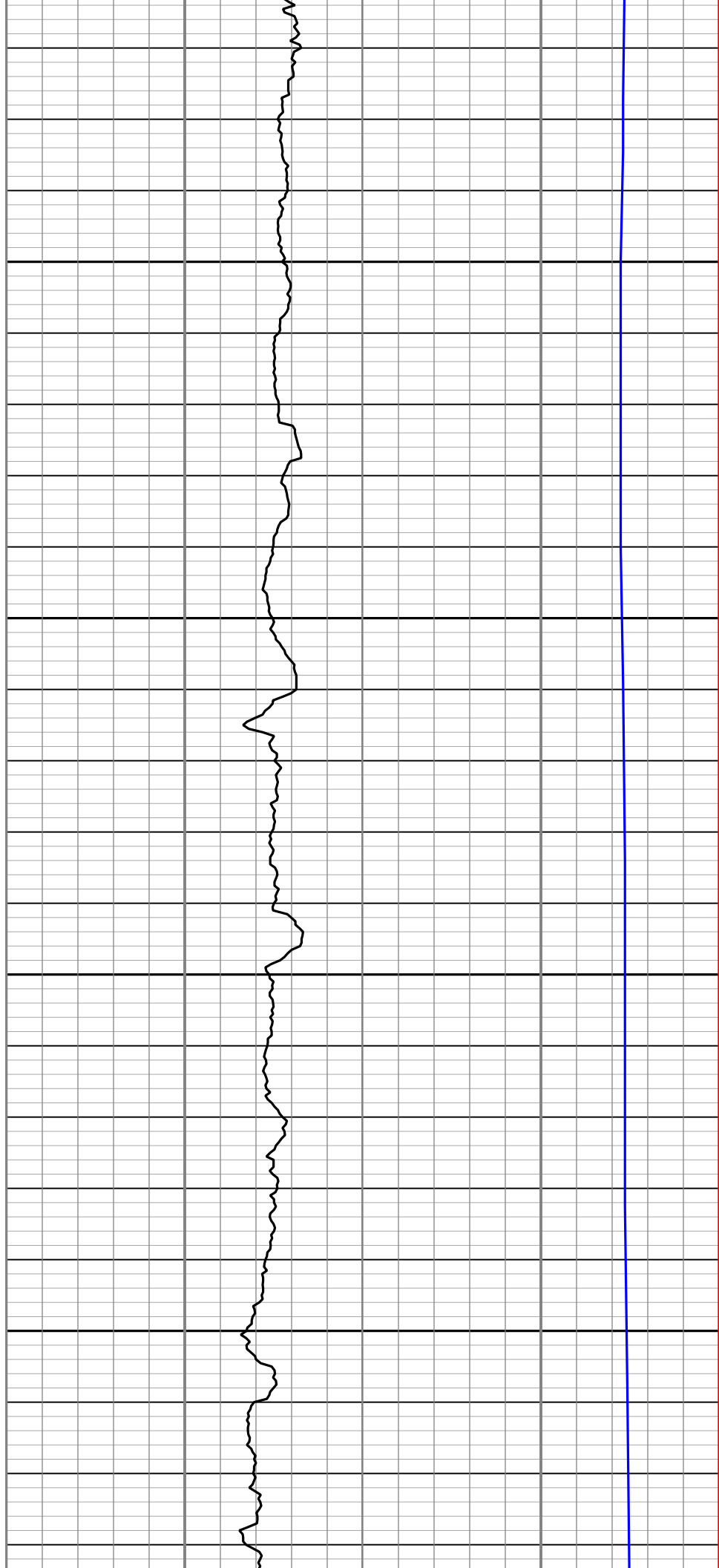
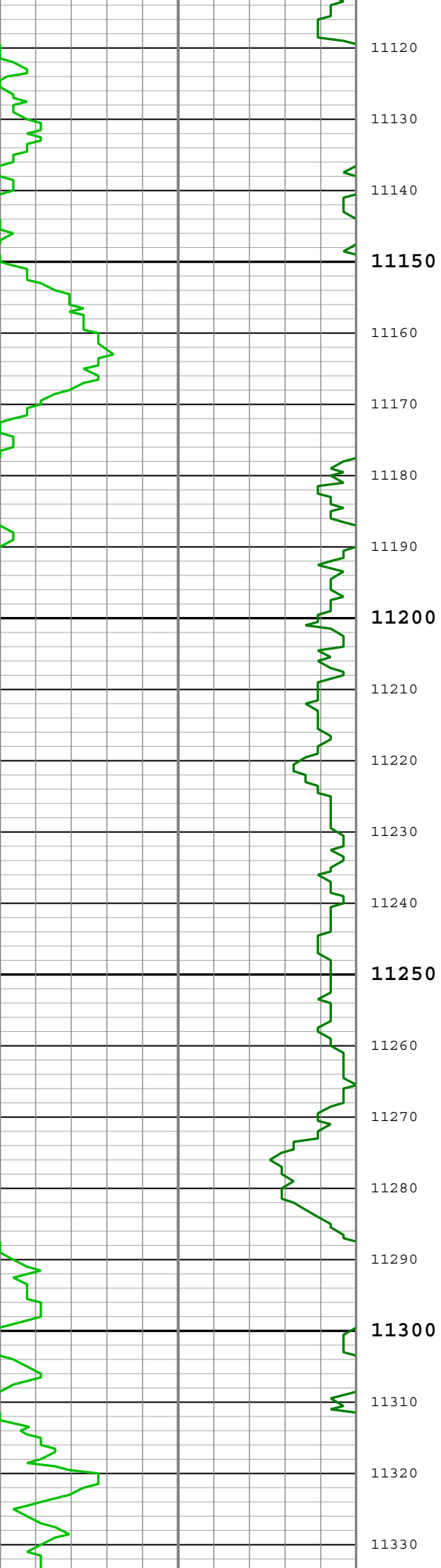


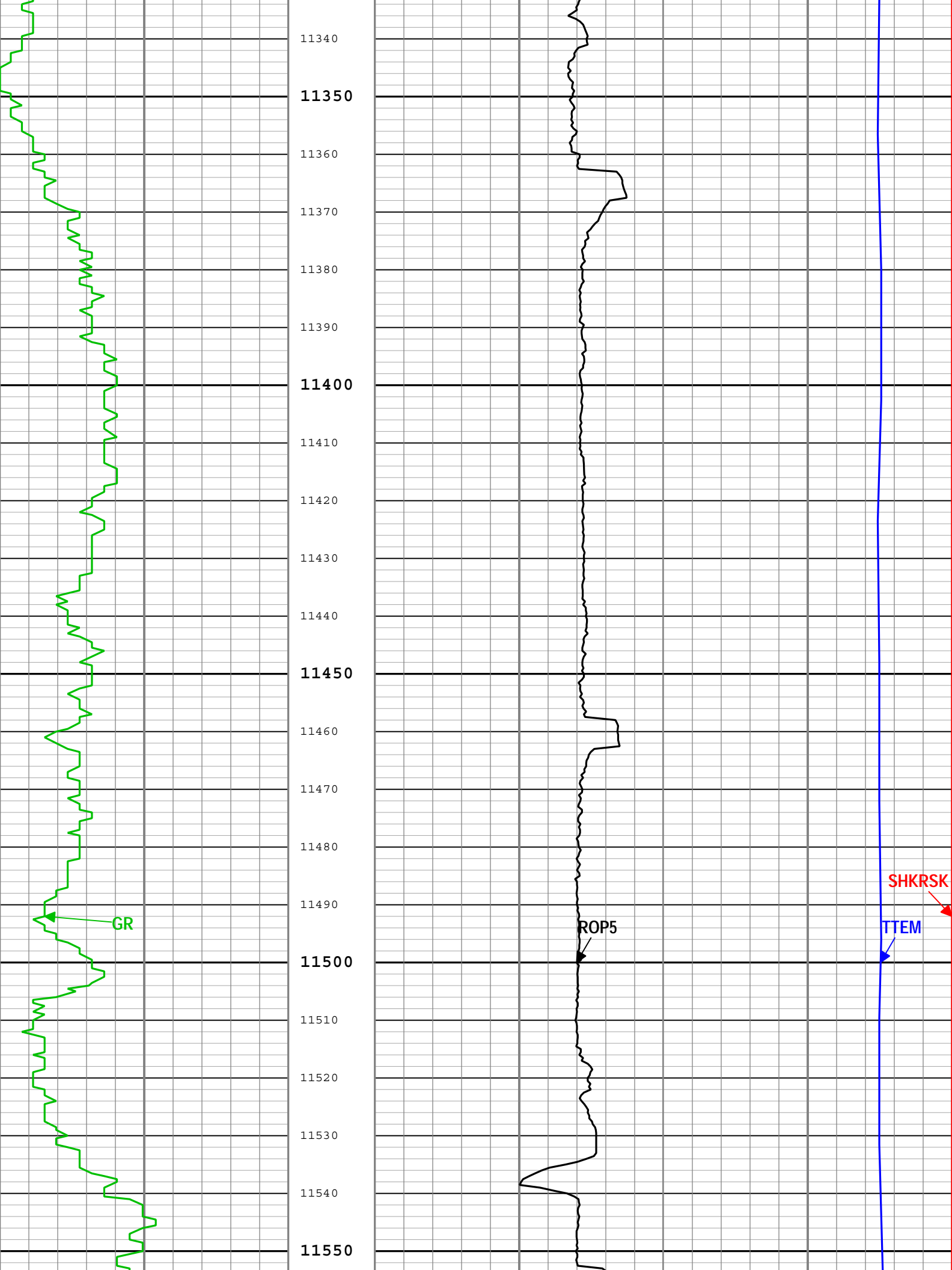


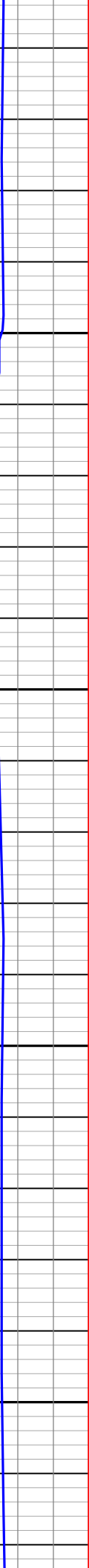
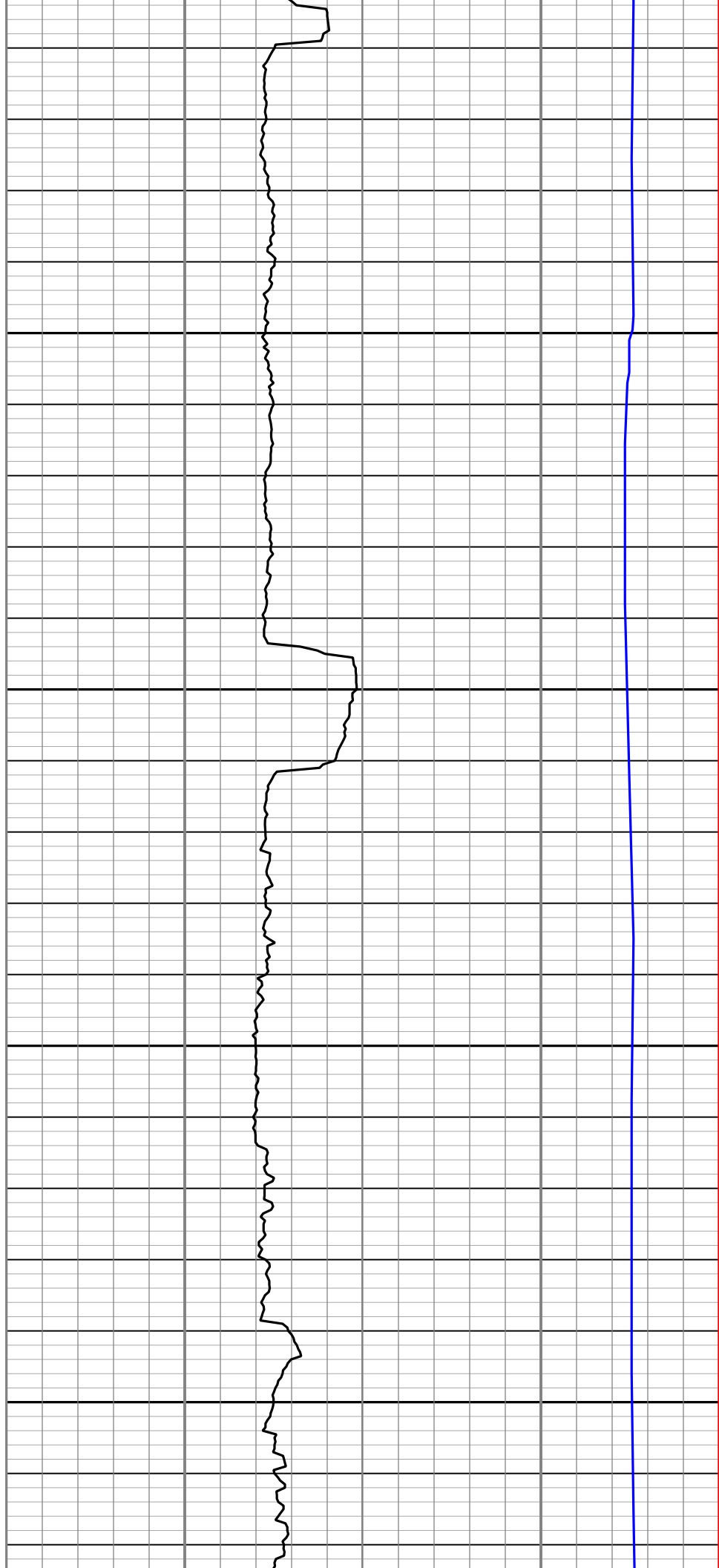
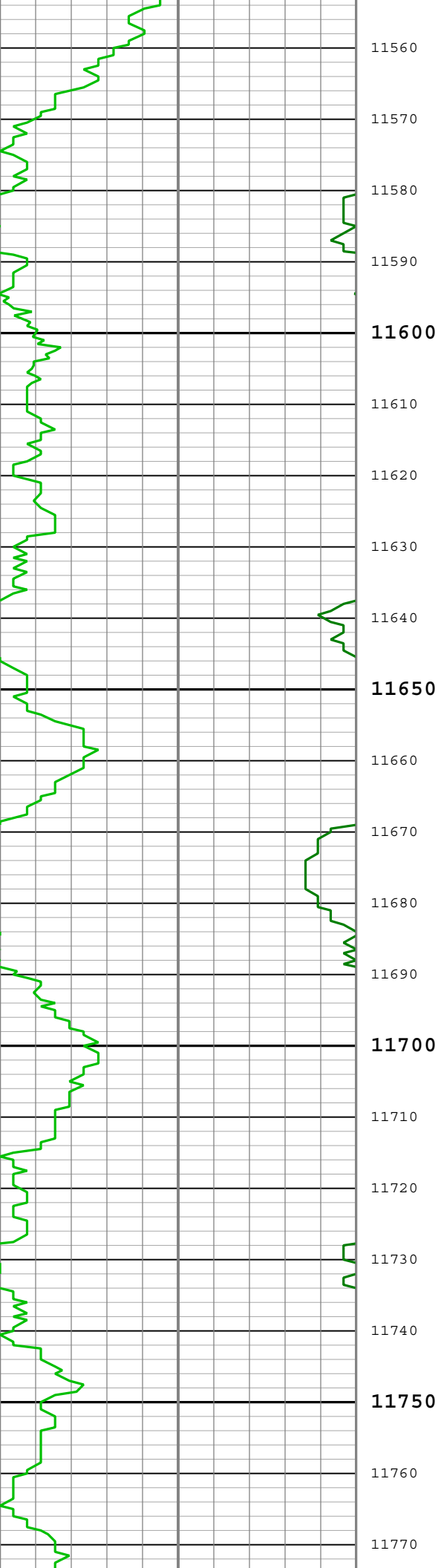


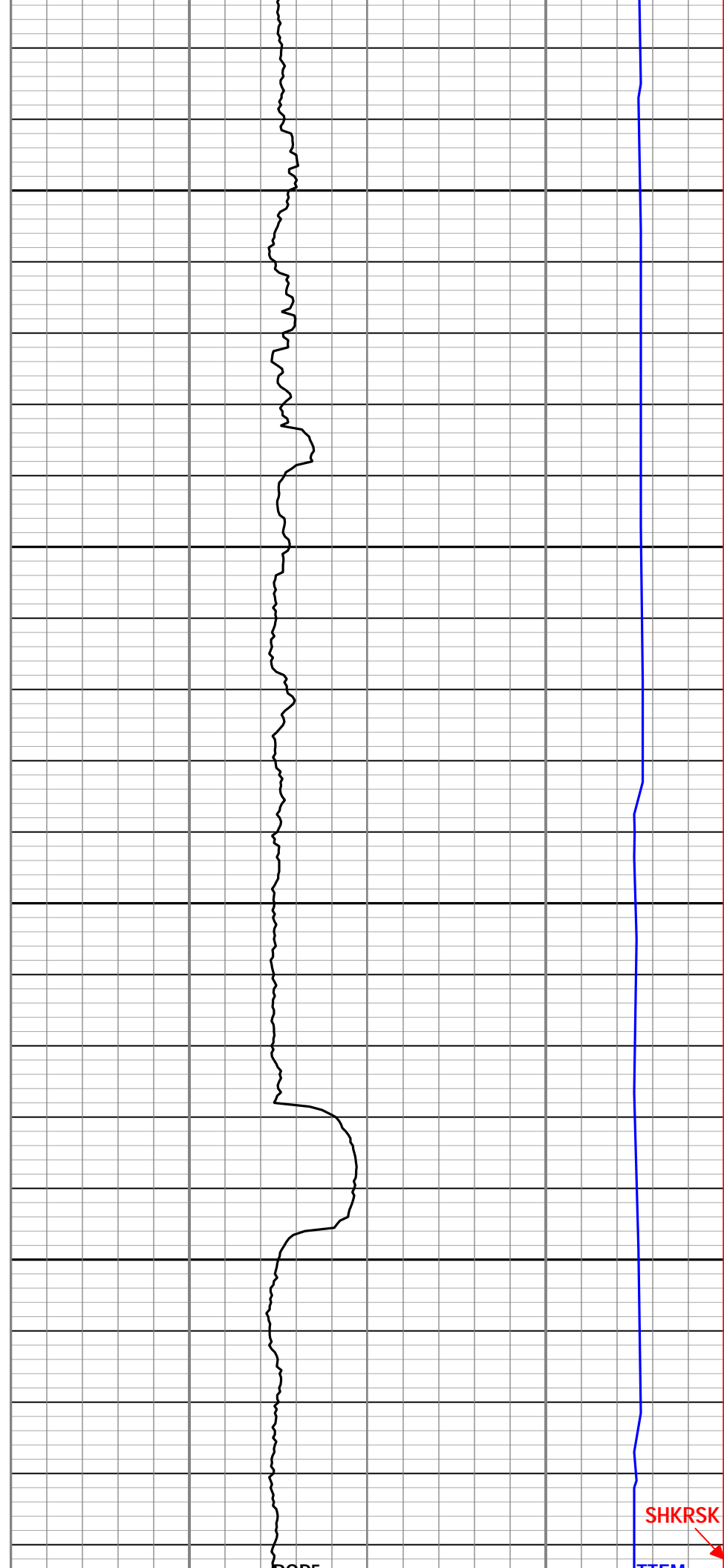
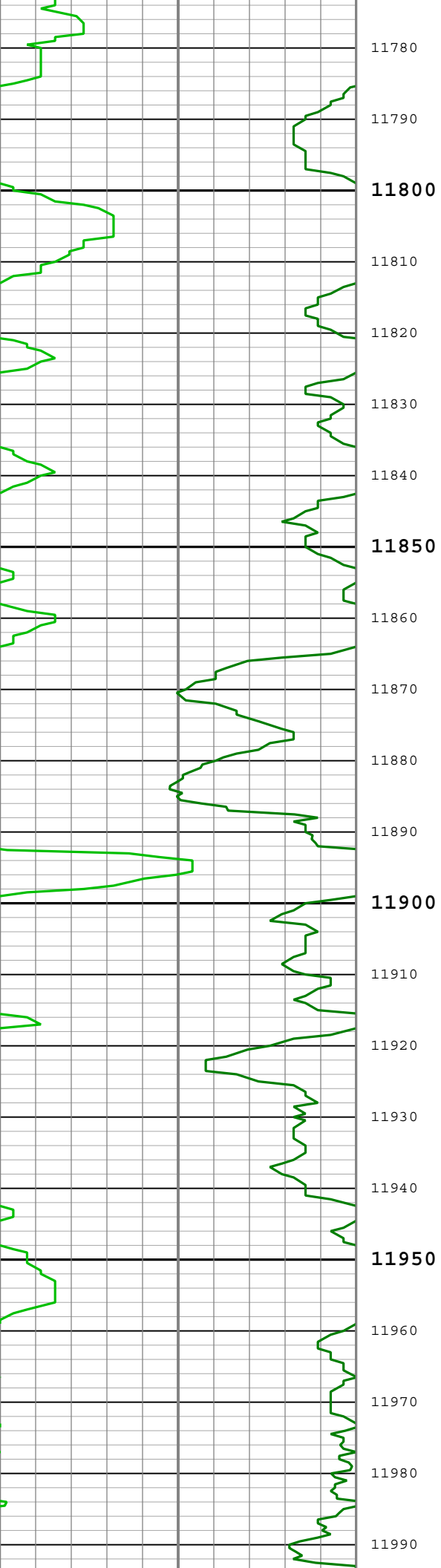




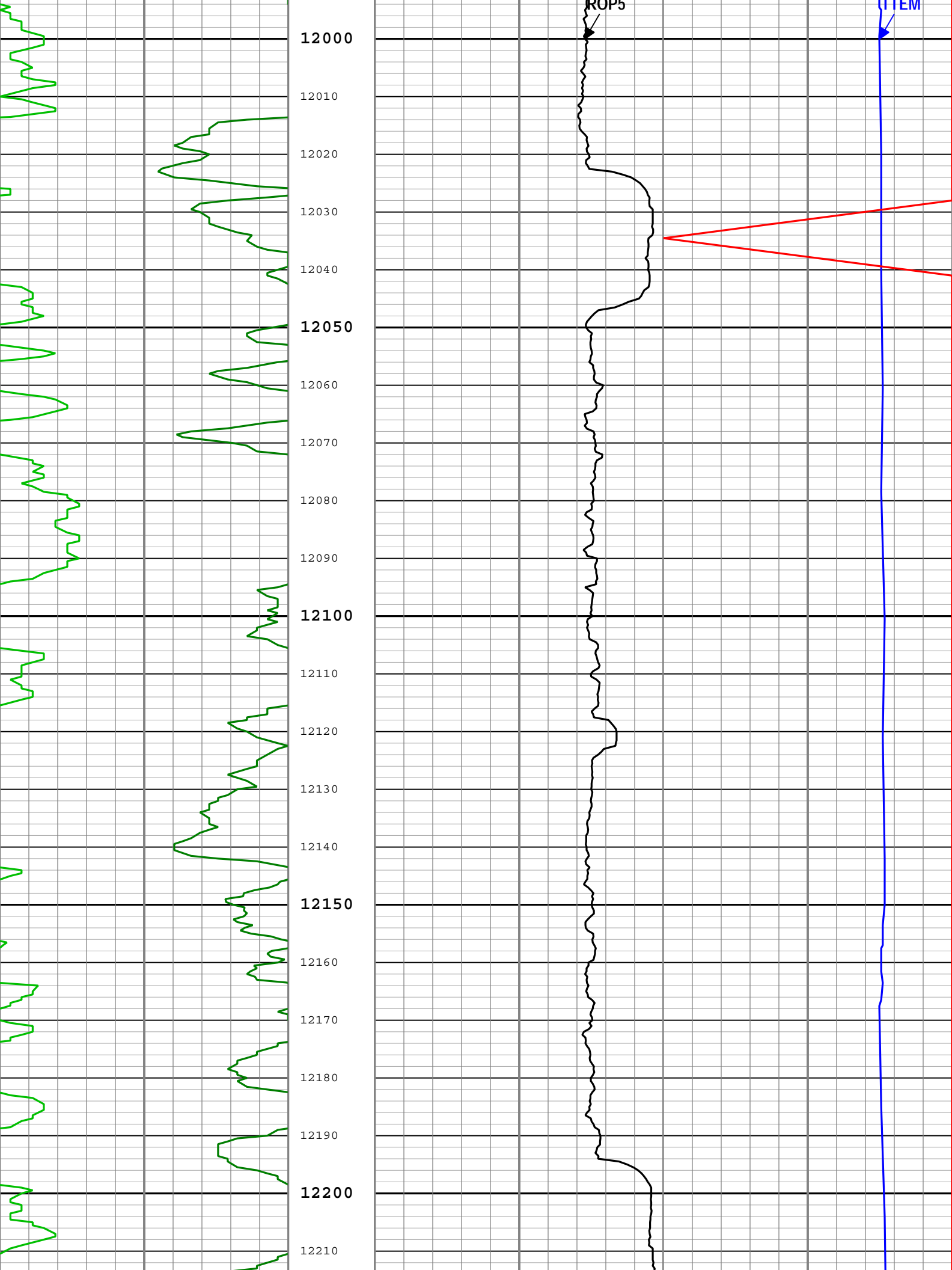


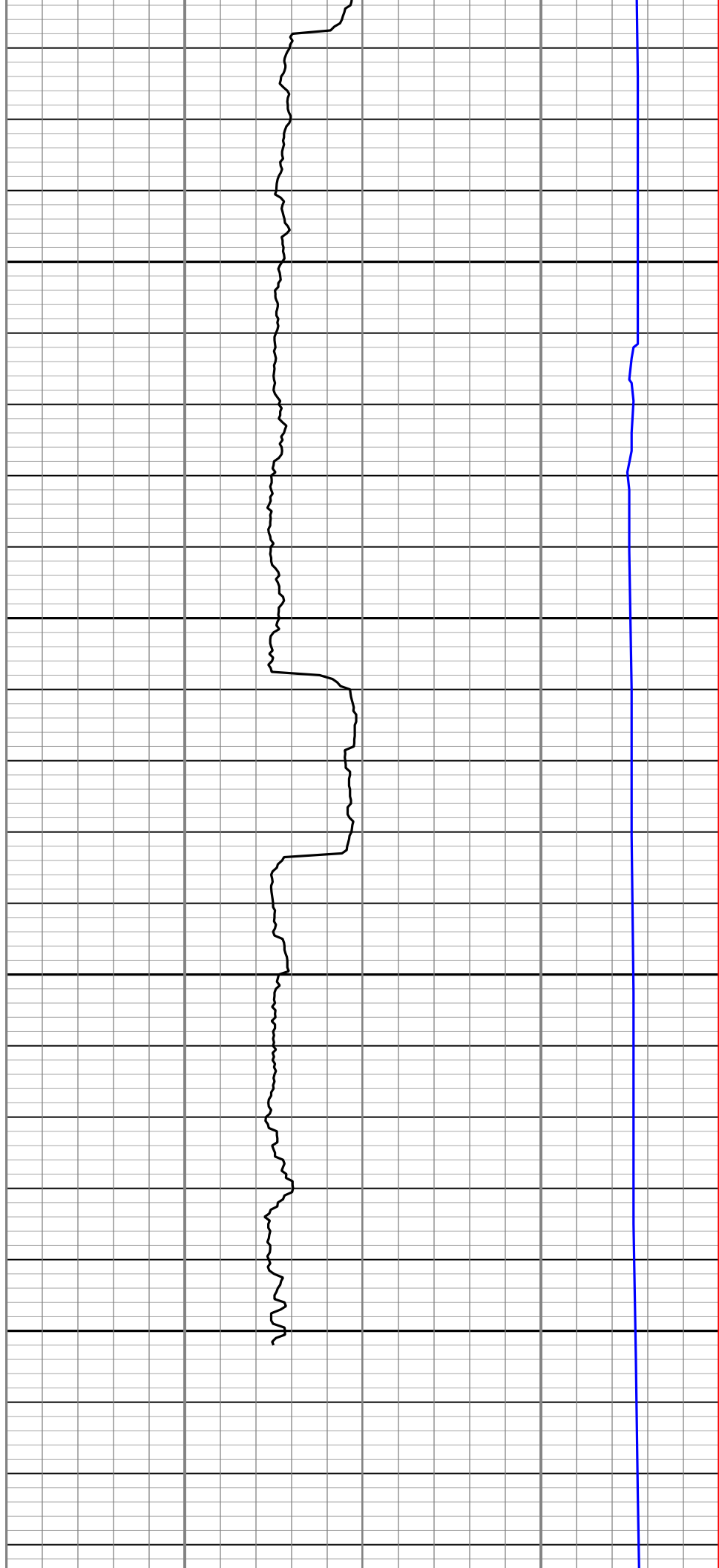
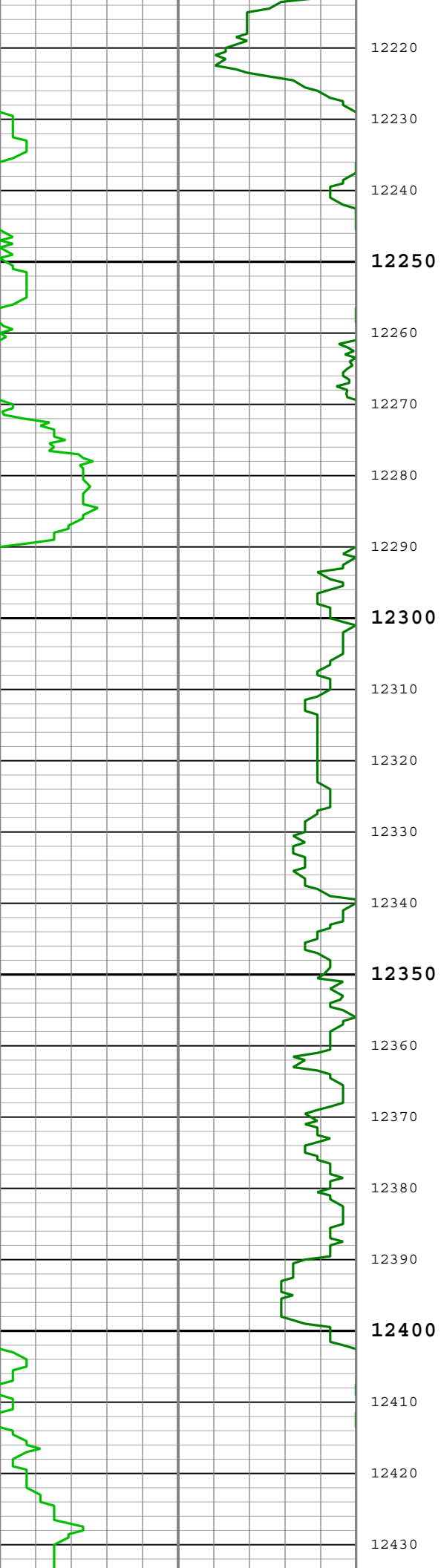


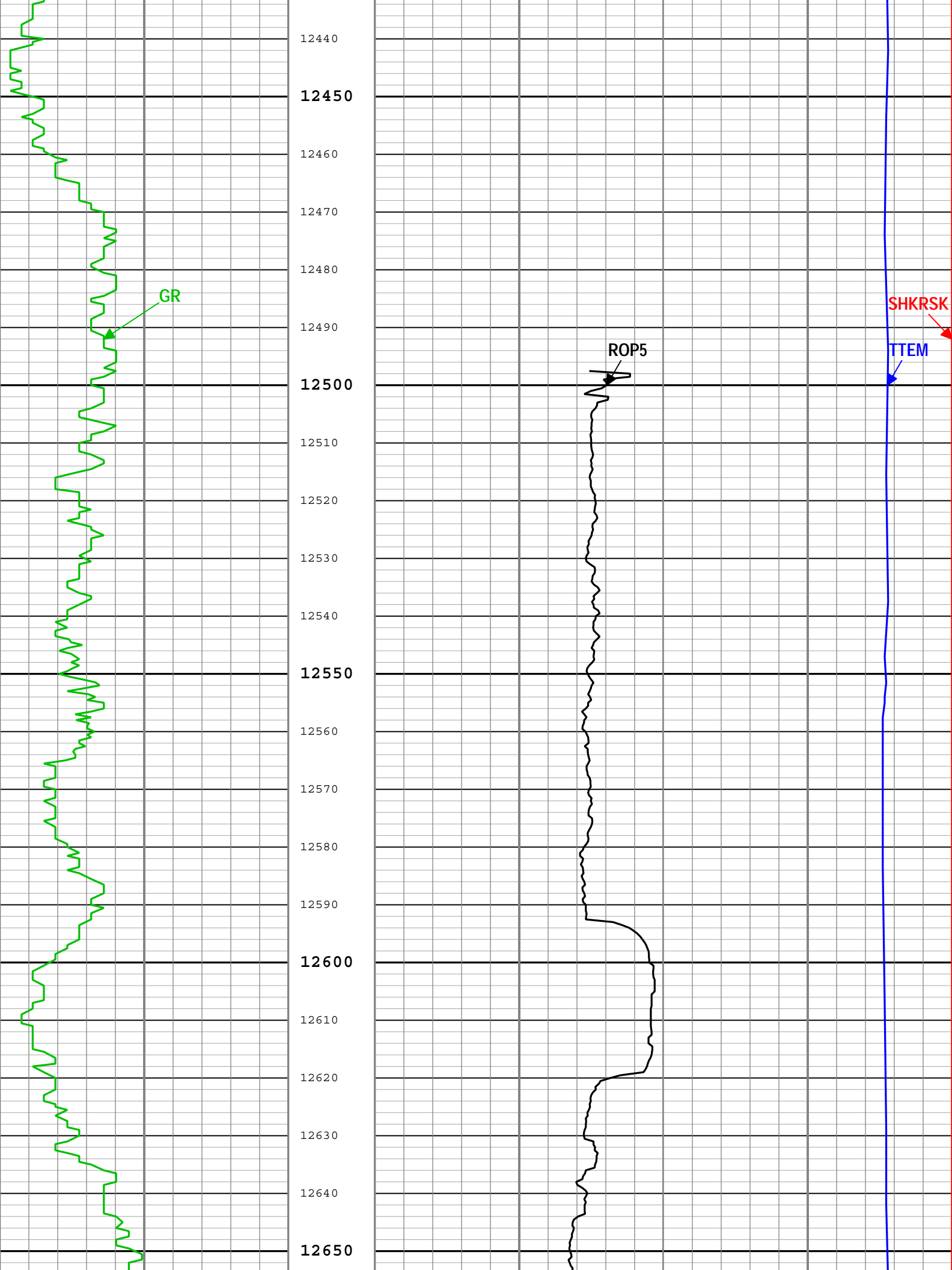


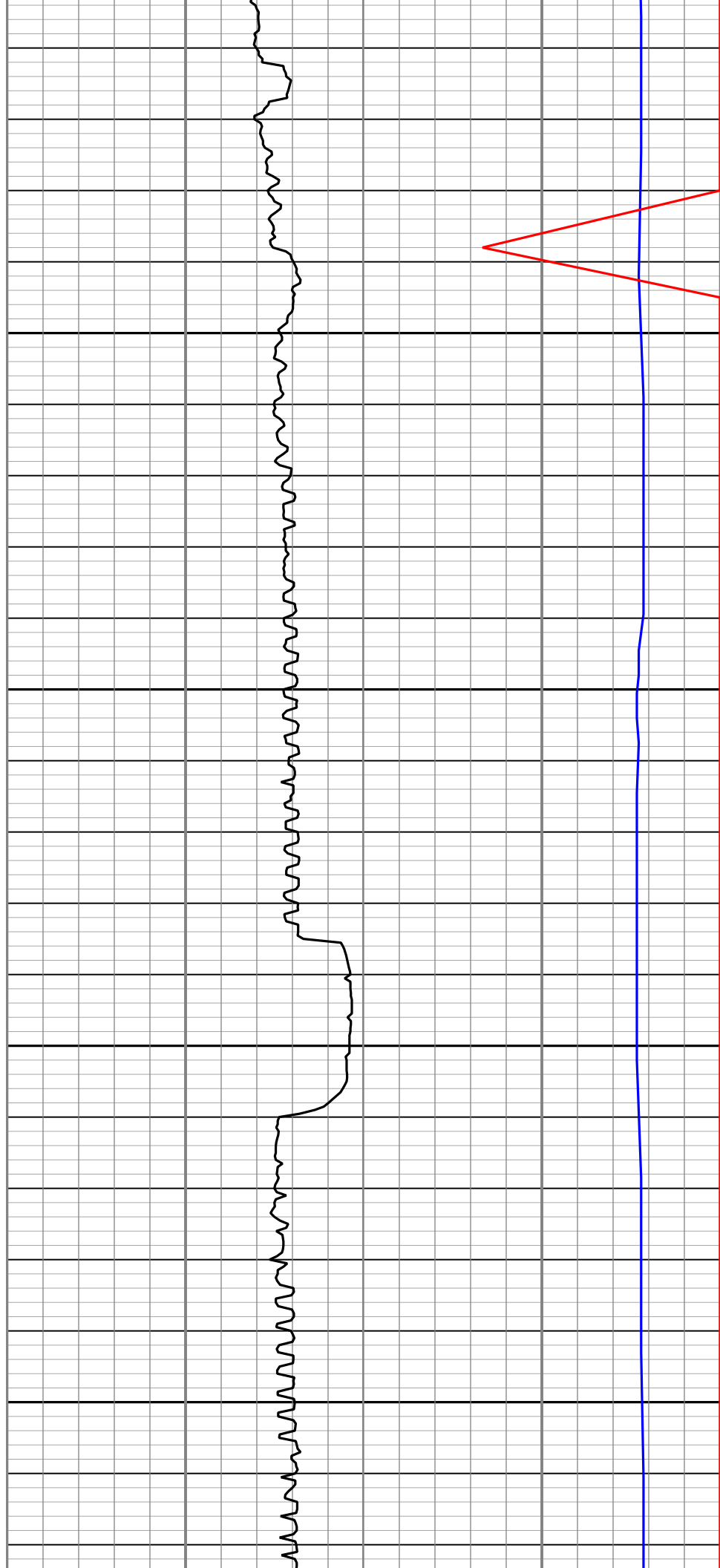
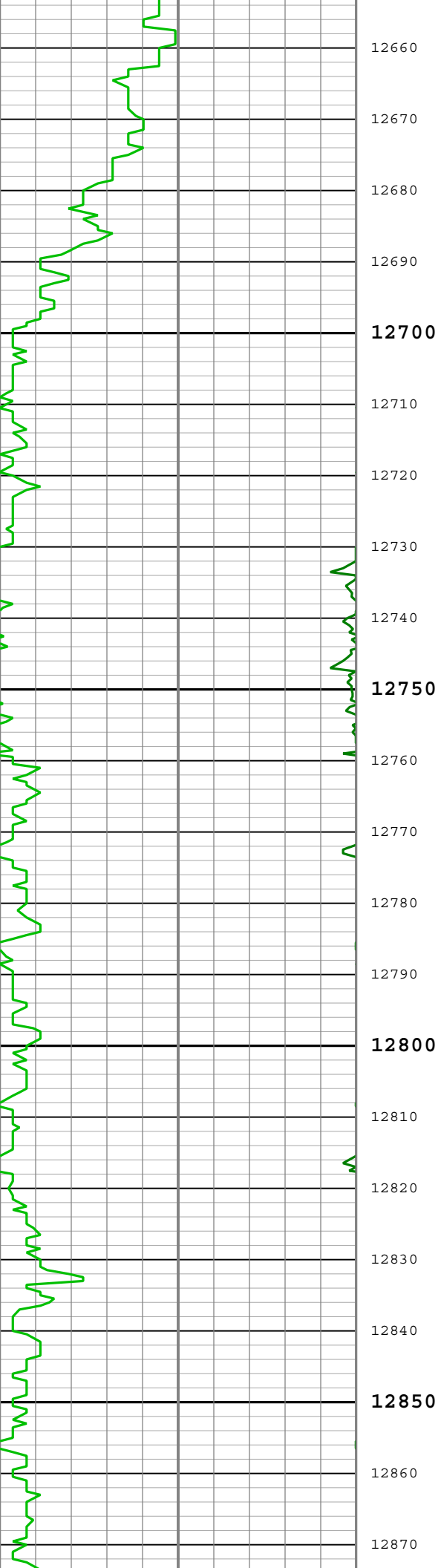


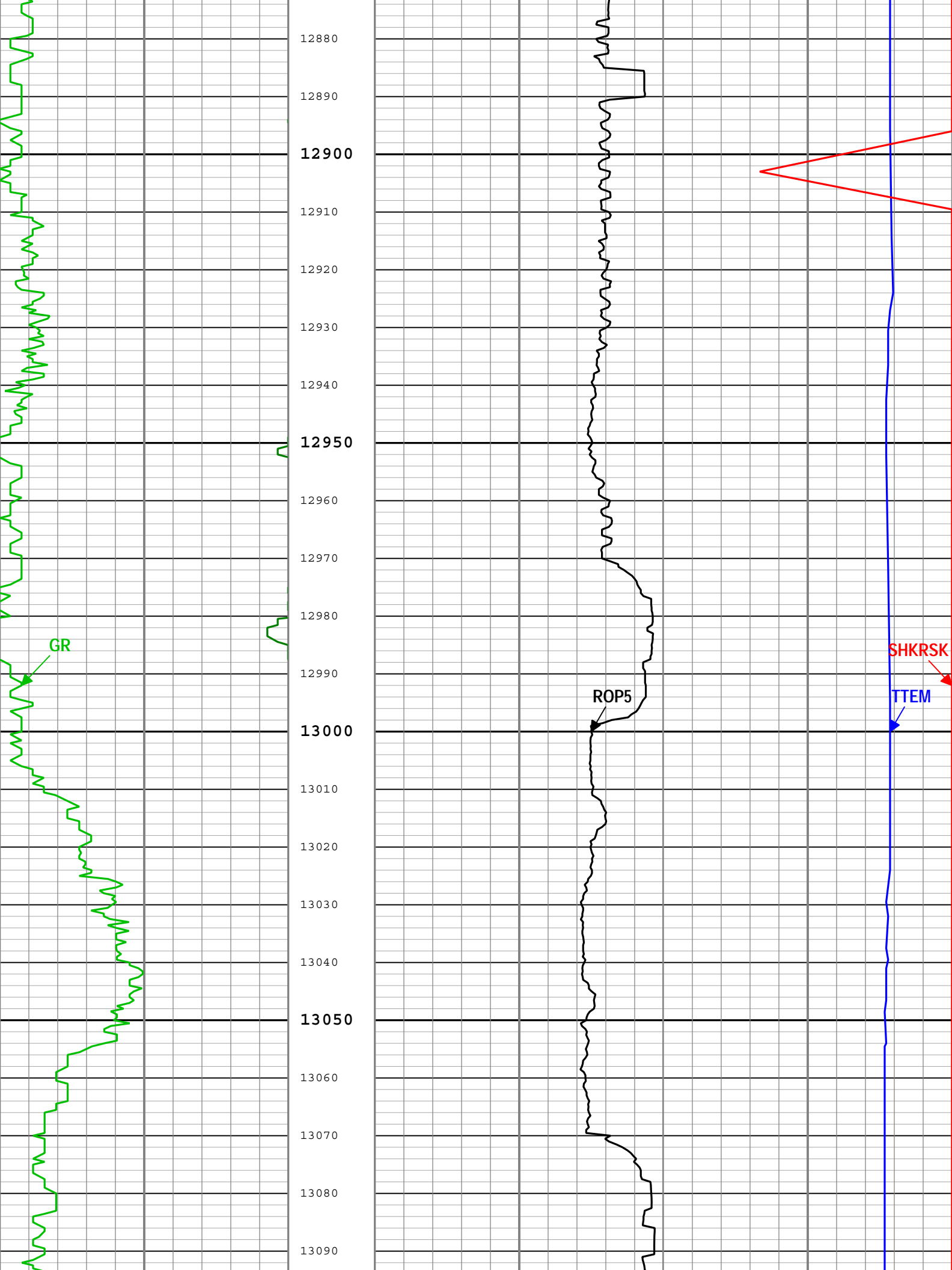
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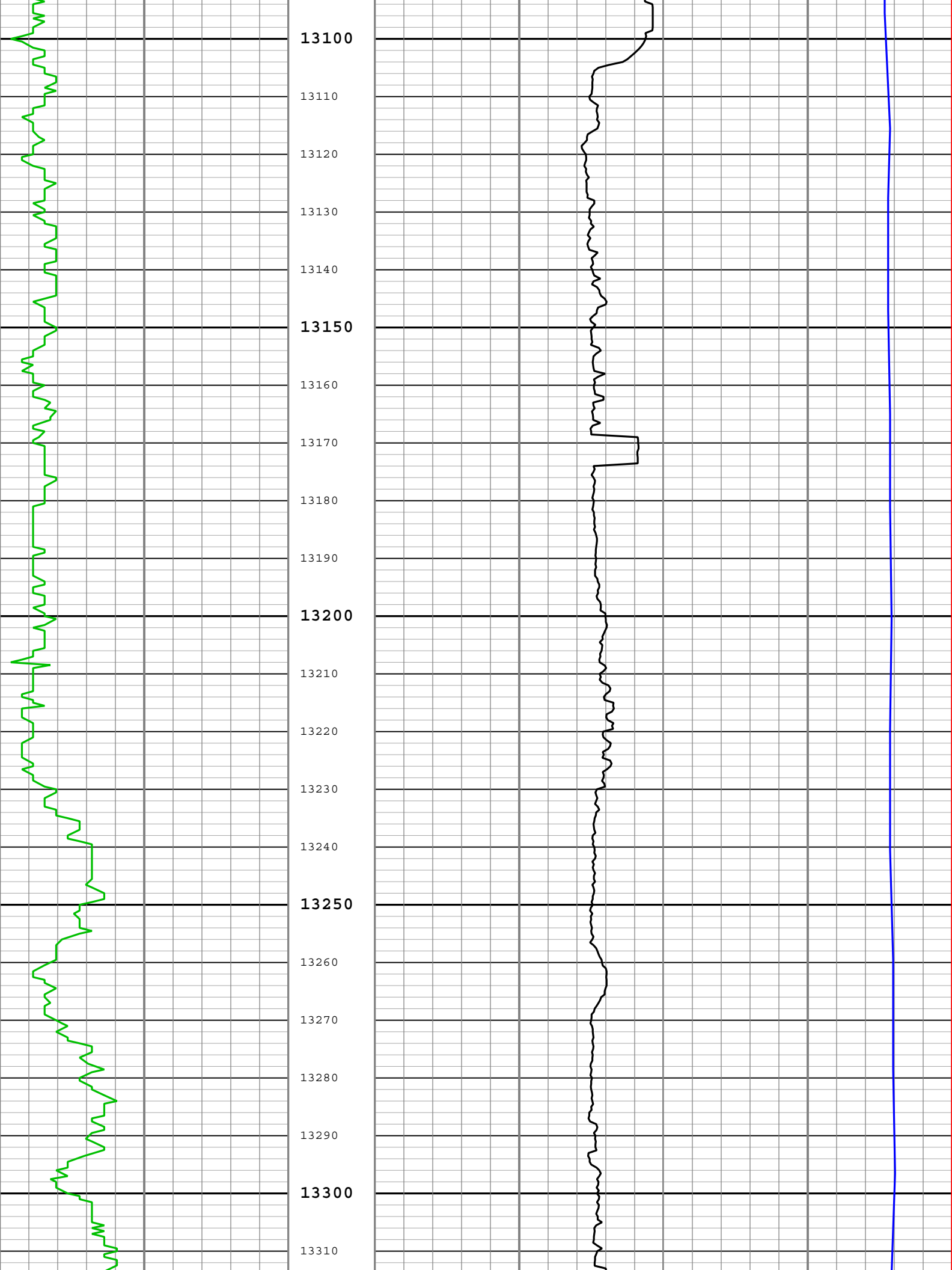


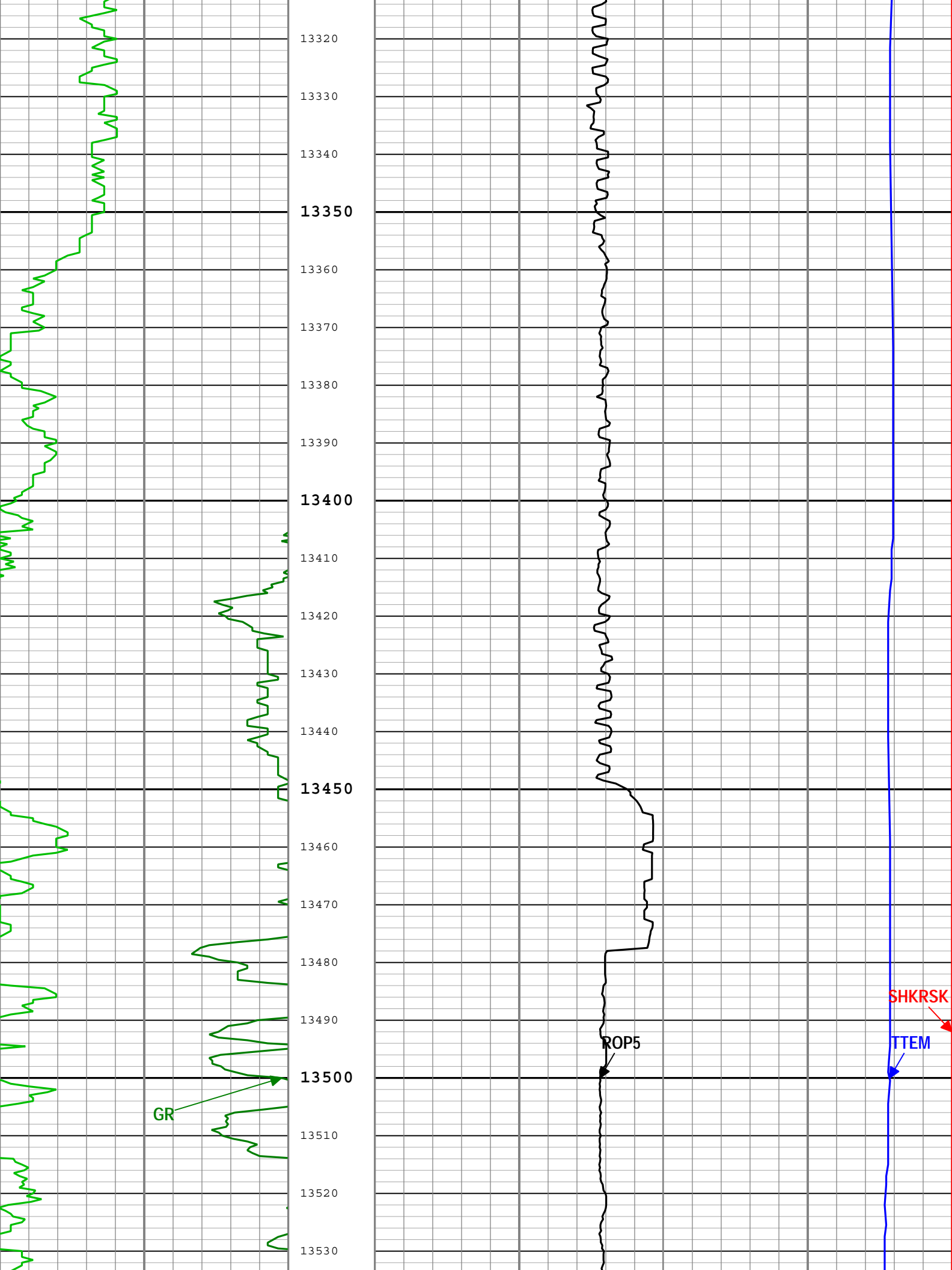


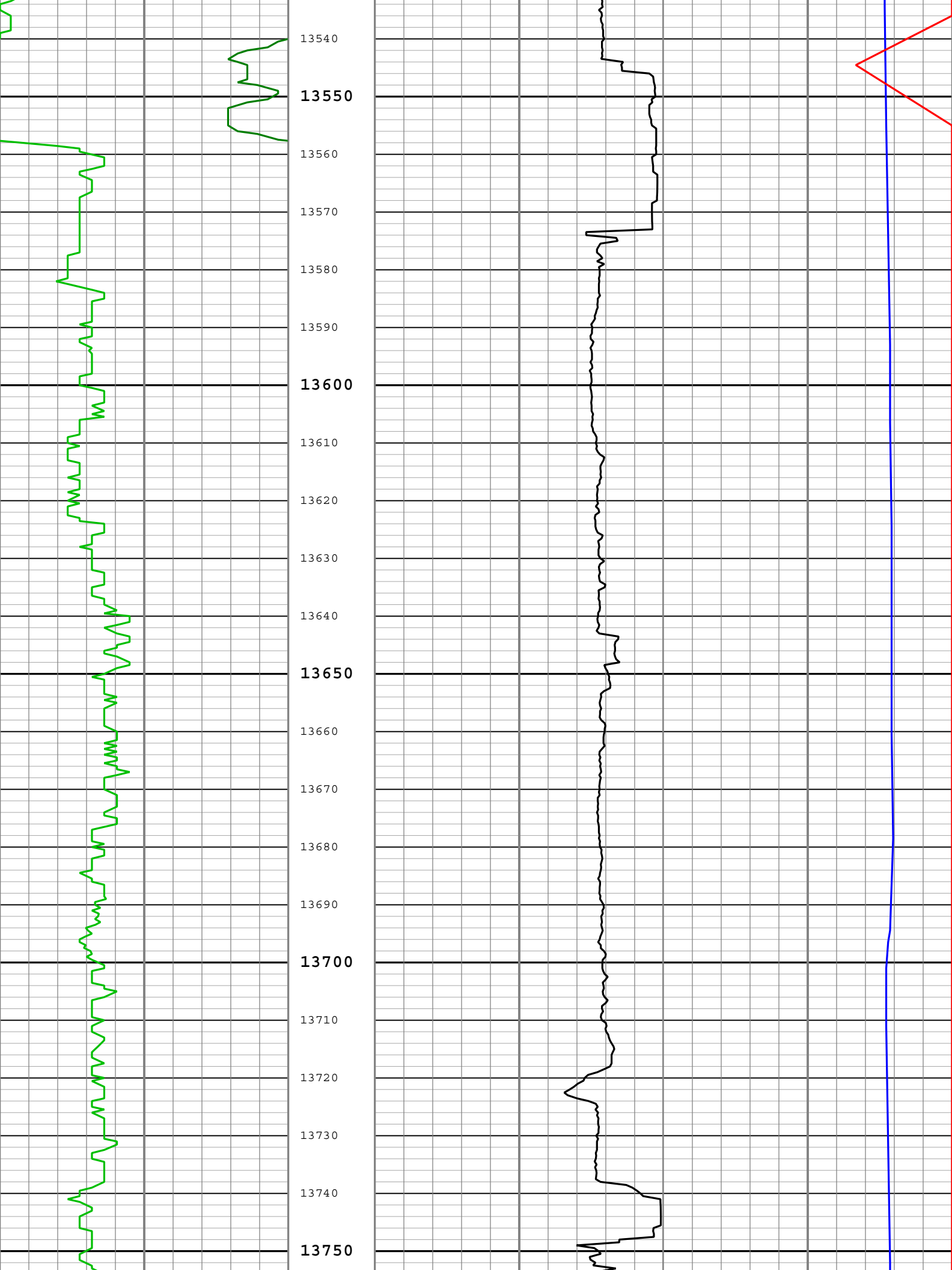


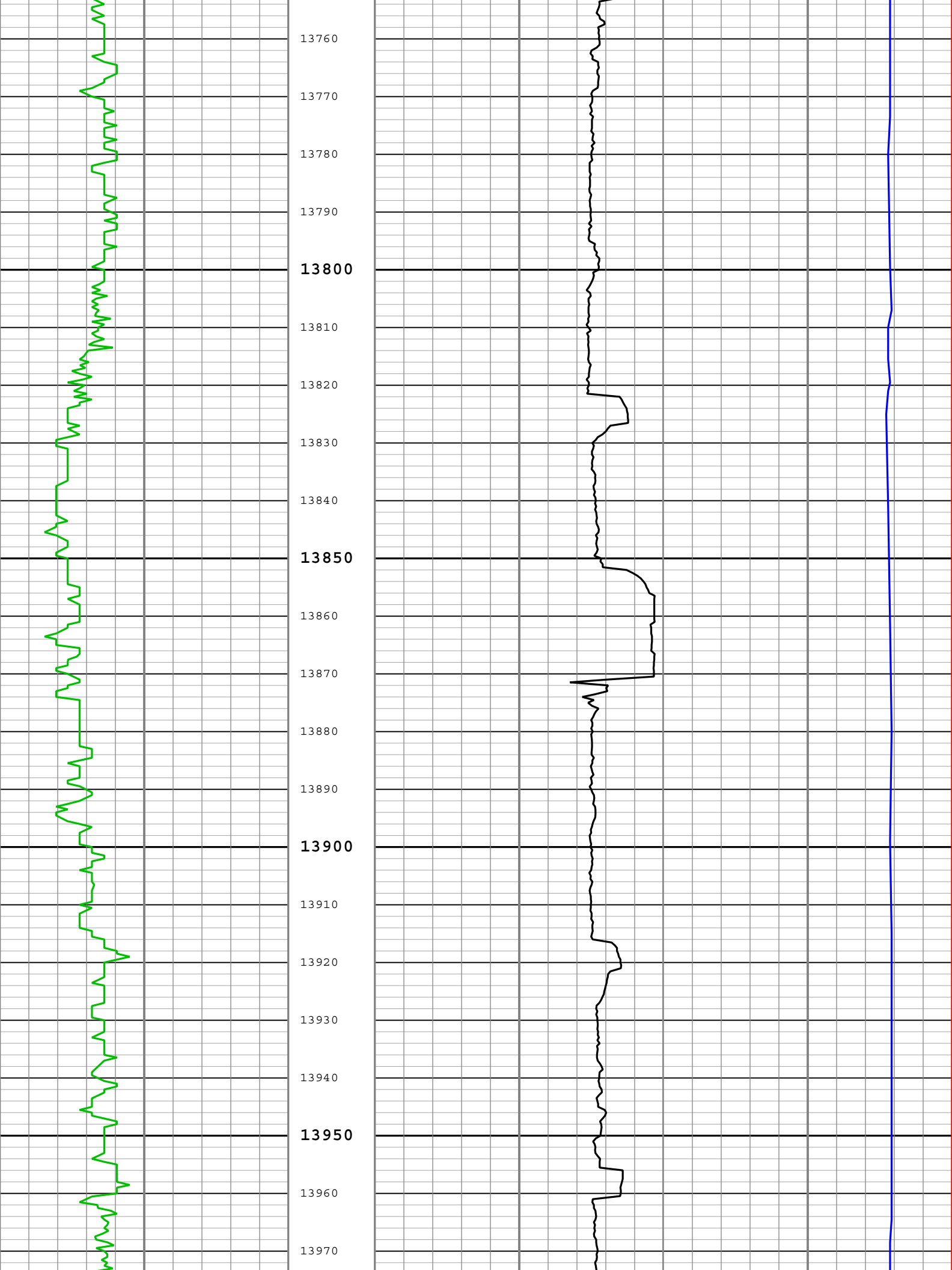


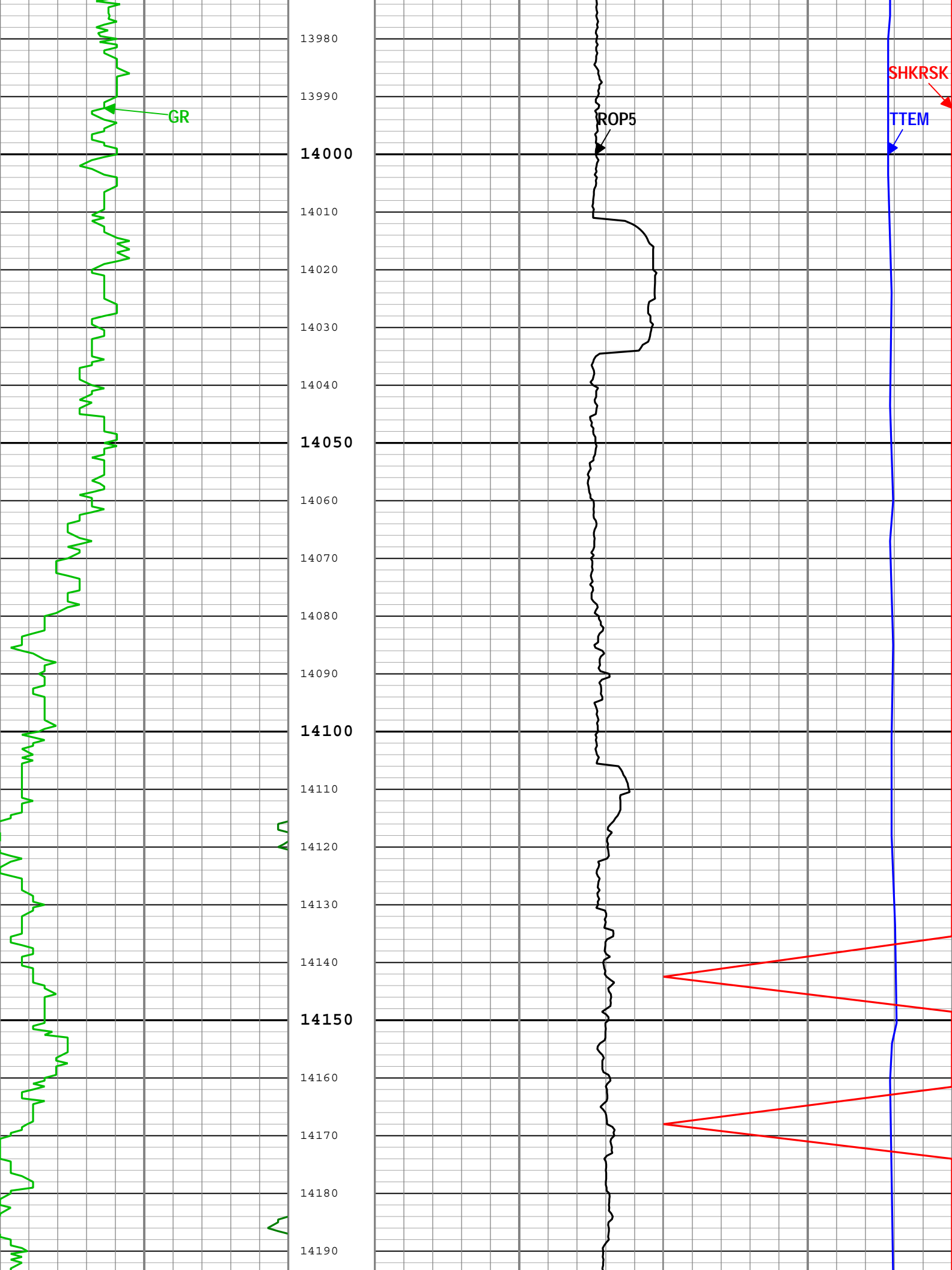


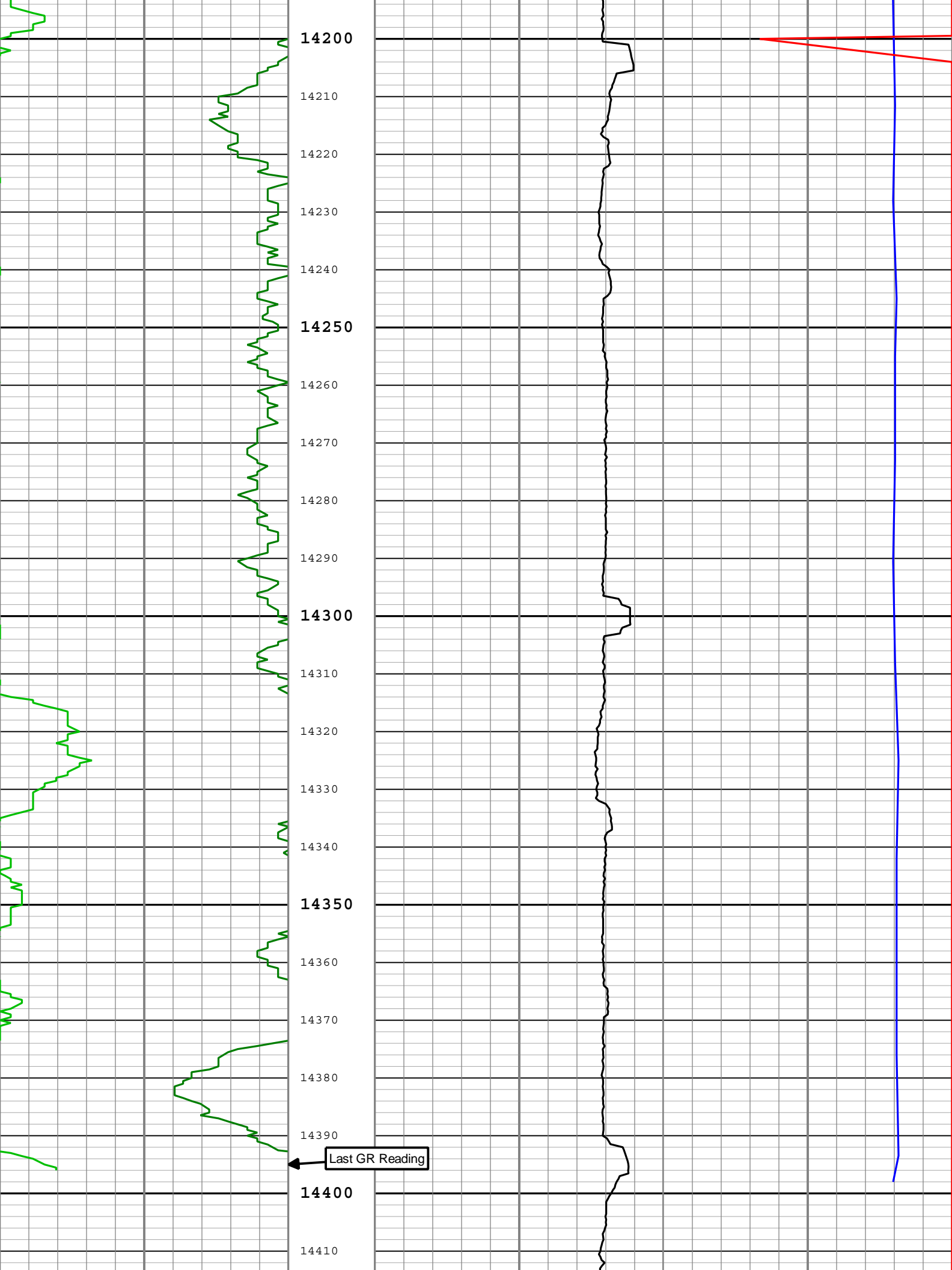


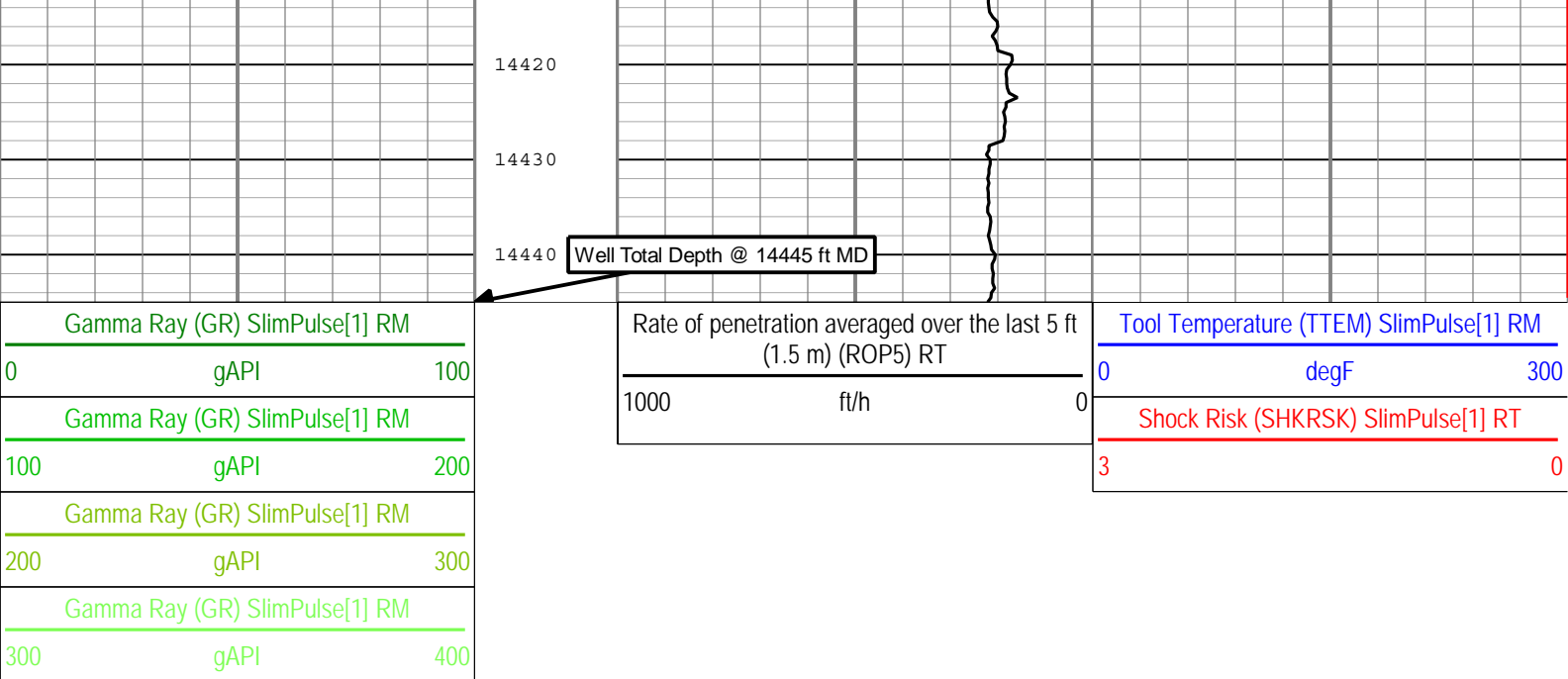












Description: SlimPulse Gamma Ray 1 Format: Log (Final MD Log) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 18-Nov-2014 08:51:56

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	13.75	1156	1600
BS	8.75	1600	7169.92

All depth are actual.

Run001Time Zoned Parameters

Pass Drilling

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	8.9	08-Nov-2014 18:14:47	09-Nov-2014 02:30:00	1156	3458.75
DFD	9.3	09-Nov-2014 02:30:00	09-Nov-2014 14:00:00	3458.75	6427.58
DFD	10	09-Nov-2014 14:00:00	10-Nov-2014 02:00:00	6427.58	7066.67
DFD	10.5	10-Nov-2014 02:00:00	10-Nov-2014 16:42:40	7066.67	7169.92

All depth are at tool zero.

Run002: 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	

Run002Depth Zoned Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	8.75	6939.65	7170
BS	6.125	7170	14445

All depth are actual.

Run002Time Zoned Parameters

Pass Drilling

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	9.3	13-Nov-2014 07:18:30	14-Nov-2014 13:00:00	7169	9561.33
DFD	9.55	14-Nov-2014 13:00:00	15-Nov-2014 02:30:00	9561.33	10983
DFD	9.5	15-Nov-2014 02:30:00	15-Nov-2014 13:30:00	10983	12040.33
DFD	9.4	15-Nov-2014 13:30:00	16-Nov-2014 02:30:00	12040.33	13086.75
DFD	9.5	16-Nov-2014 02:30:00	17-Nov-2014 07:11:26	13086.75	14445.25

Pass Ream Down 1

DFD	9.3	13-Nov-2014 12:13:59	13-Nov-2014 15:15:09	7067.75	7169.57
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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	H686
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GRGain - Gamma Ray: Blanket

Master (Time Frame File): 12:00:00 21-Sep-2014


Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Gamma Ray Calibration Gain		Master	1.0000	0.9000	1.0590	1.1000	

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

Primary Equipment :	Elec. cartridge, 150C max with GR	SPEC	6189
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GRGain - Gamma Ray: Blanket

Master (Time Frame File): 12:00:00 28-Oct-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Gamma Ray Calibration Gain		Master	1.0000	0.9000	1.0309	1.1000	

Company: Noble Energy

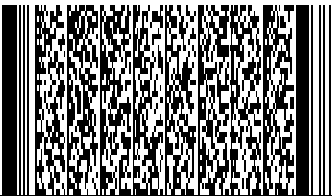
Well: Oscar Y10-72HN

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