

SlimPulse - Gamma Ray

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

Recorded Mode, Composite Log



Company: Noble Energy

Well: Heartland G25-72-1HN

Field: Wattenberg

County: Weld

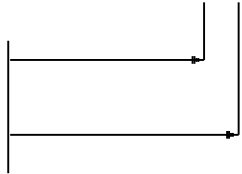
State: Colorado

Country: U.S.A

Section:	25	APIN:	05-123-39557-00
Township:	04 N	Rig Name:	Precision 828
Range:	65 W	Rig Type:	Top Drive
FL:	NAD83 Colorado State Plane, Northern Zone, US Feet		
FL1:	N 40° 16' 36.228", Northing 1344918.097 ftUS		
FL2:	W 104° 36' 13.140", Easting 3250092.424 ftUS		

Log Measured From: - Drill Floor: 4858.00 ft
Ground Level: 4842.00 ft

Permanent Datum: - Mean Sea Level



Acquisition Dates:

30-Jul-2014 -- 06-Aug-2014

Other Services:

Log Interval:

675.00(ft) to 16939.00(ft)

Surveys / Continuous D&I

Index Types:

Measured Depth

Downhole Shocks

Index Scales:

1:600 2" / 100'; 1:240 5" / 100'

Downhole Temperature

Depth Source:

Driller's Depth

Directional Drilling

Depth Sensor:

PASON

Print Type:

Final

Spud Date:

25-Jul-2014



Disclaimer

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

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9.4 Log (EOW_MD)	
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Borehole Size/Casing Record						
Bit						
Bit Size (in)	13.75	8.75	6.125			
Top Driller (ft)	0	718	7409			
Bottom Driller (ft)	718	7409	16939			
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	0				
Bottom Driller (ft)	708	7400				

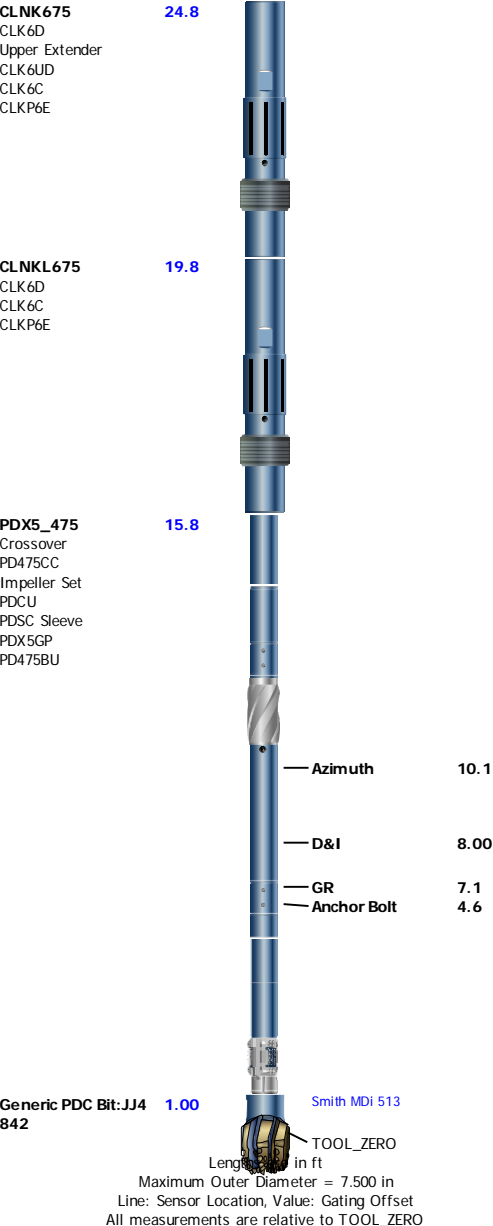
Operational Run Summary						
Parameter (unit)	Run001					
Date Log Started	30-Jul-2014					
Time Log Started	21:27:37					
Date Log Finished	06-Aug-2014					
Time Log Finished	00:07:34					
Bit Size (in)	6.125					
Bit Start Depth (ft)	7409.00					
Bit Stop Depth (ft)	16939.00					
Top Log Interval (ft)	7380.00					
Bottom Log Interval (ft)	16939.00					
Max Hole Deviation (deg)	92.54					
Azimuth of Max Deviation (deg)	358.38					
Logging Unit Number	Command Center					
Logging Unit Location	Zone 2					
Recorded By	P. Michels					
Witnessed By	J. Leslie					
Service Order Number	14CCO0545					

Borehole Fluids						
Parameter(unit)	Run001					
Fluid Type	Water					
Fluid Name	Fresh Water					
Max Recorded Temperatures (degF)	273.2					
Source of Sample	Active Tank					

Salinity (ppm)	700					
Density (lbm/gal)	Zoned					
Funnel Viscosity (s)	41					
Fluid Loss (cm3)	8.6					
PH	9.5					
Source RMF	Pressed					
RMC	Pressed					
RM @ Meas Temp (ohm.m@degF)	0.2 @ 68					
RMF @ Meas Temp (ohm.m@degF)	0.15 @ 68					
RMC @ Meas Temp (ohm.m@degF)						
RM @ BHT (ohm.m@degF)	0.05 @ 273.2					
RMF @ BHT (ohm.m@degF)	0.04 @ 273.2					
RMC @ BHT (ohm.m@degF)	NaN @ 273.2					
Total Solid (%)	5.5					
High Gravity Solids (%)	4					

Zoned Borehole Fluids		
Run001		
Parameter	Value	Start
Density	8.8	7/30/2014 9:27:37 PM
Density	9.5	7/31/2014 3:00:00 AM
Density	9.55	8/2/2014 3:00:00 AM
Density	9.85	8/3/2014 3:00:00 AM
Density	9.4	8/4/2014 2:00:00 AM

Remarks and Equipment Summary			
Run001: Toolstring		Run001: Remarks	
<div> <div> <div>Equip name</div> <div>SPULSE-GEN:DR11354</div> <div>FLOWSUB: DR18321</div> <div>SPCOLLAR: DR11354</div> <div>SPMA: 609</div> <div>SPEC: 6045</div> <div>SPBA: 01730</div> <div>UBHO: 475U141</div> </div> <div> <div>Length</div> <div>56.94</div> </div> <div> <div>MP name</div> <div></div> </div> <div> <div>Offset</div> <div></div> </div> </div>		Data presented is from tool memory and acquired while drilling from 7409 ft MD to16939 ft MD.	
		Depth Reference: Driller's Depth	
		Gamma ray corrected for bit size, mud weight, and tool collar thickness. Barite and Potassium in the mud affect Gamma Ray readi	
		Run Objective: Drill out cement, then drill lateral section to well TD.	
		Bit to D&I: 41.03 ft Bit to GR: 44.06 ft	
		Drilled from: 7409 ft MD to 16939 ft MD Logged from: 7380 ft MD to 16939 ft MD	
		SlimPulse Software Version 11.0c-00	
		SlimPulse D&I Calibrated:18-Feb-2013 SlimPulse GR Calibrated: 28-Jul-2014	
		Pathfinder a Schlumberger Co. Personnel: MWD: Paul Michels & Jessica Leslie DD: John Perry & Charles Ogu	
		Reason for POOH: Well TD	



UDComposite 1

Software Version

Acquisition System	Version
MaxWell	4.0.9163.3000
Application Patch	Patch-SP-10767_22480-4.0.9163.3001
	Patch-NPD_ADN8D_SP3-23661-4.0.9530.3002
	Patch-Hotfix_overwrite_survey_for_petrolink-23199-4.0.9530.3002
	Patch-Hotfix_MRT_SP3-23306-4.0.9530.3002
	Patch-Hotfix_ECO_SP3-23896-4.0.9530.3002

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	7423.25 ft	16939.33 ft	30-Jul-2014 11:33:30 PM	06-Aug-2014 12:07:34 AM	No

All depths are referenced to toolstring zero

Log

Company:Noble Energy Well:Heartland G25-72-1HN

UDComposite 1:S249

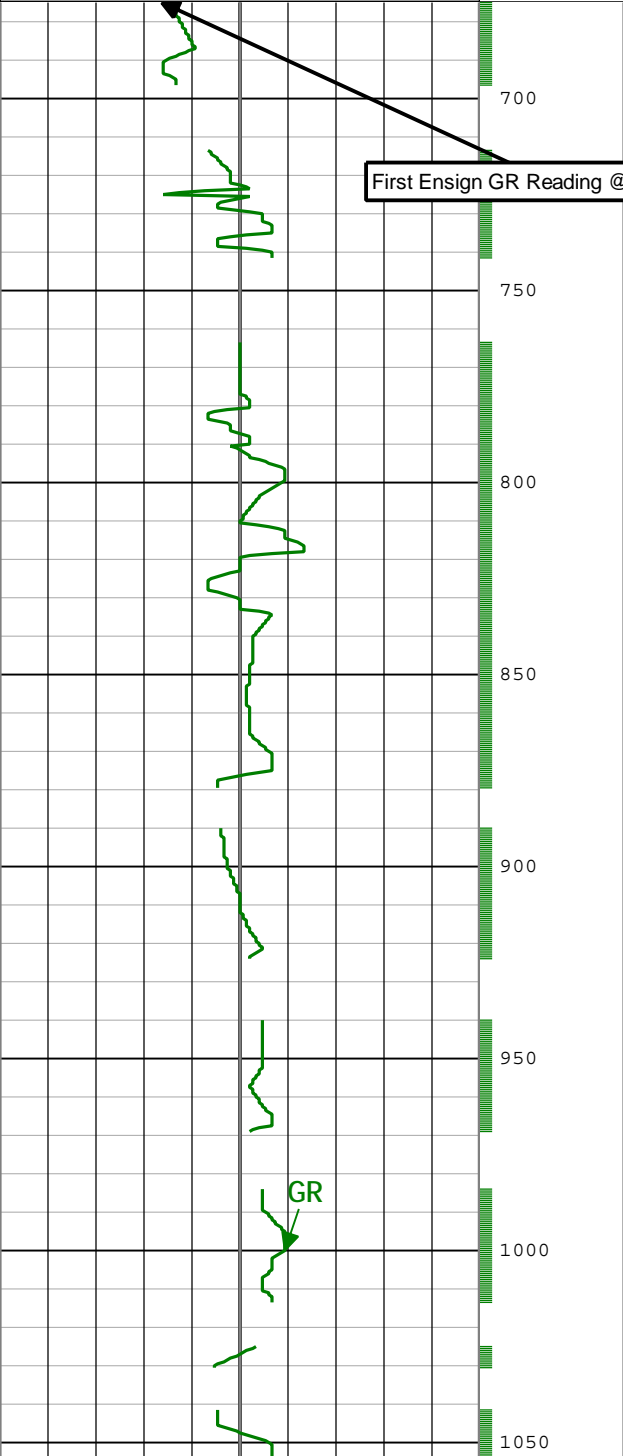
Description: Format: Log (EOW_MD) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 12-Aug-2014 13:51:46

GR - Gamma Ray 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

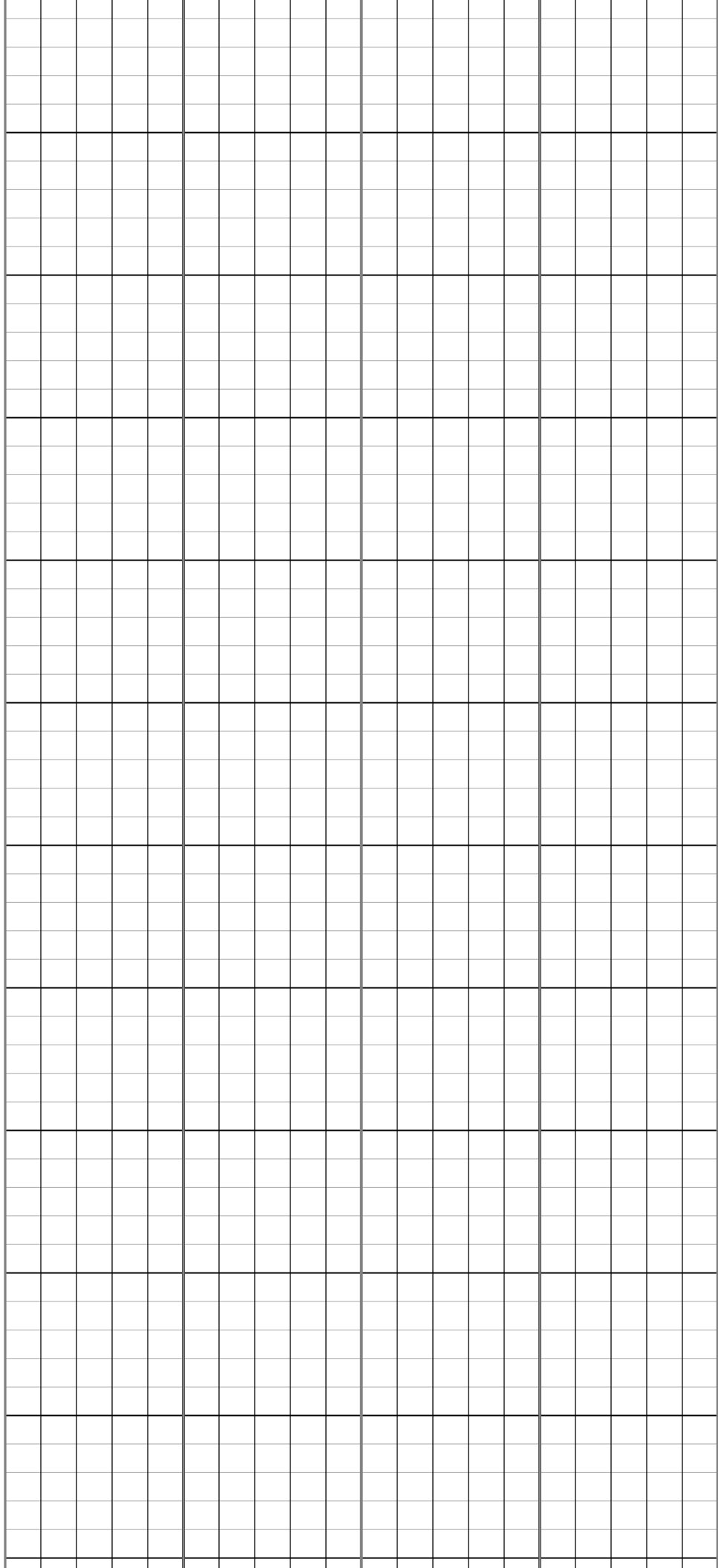
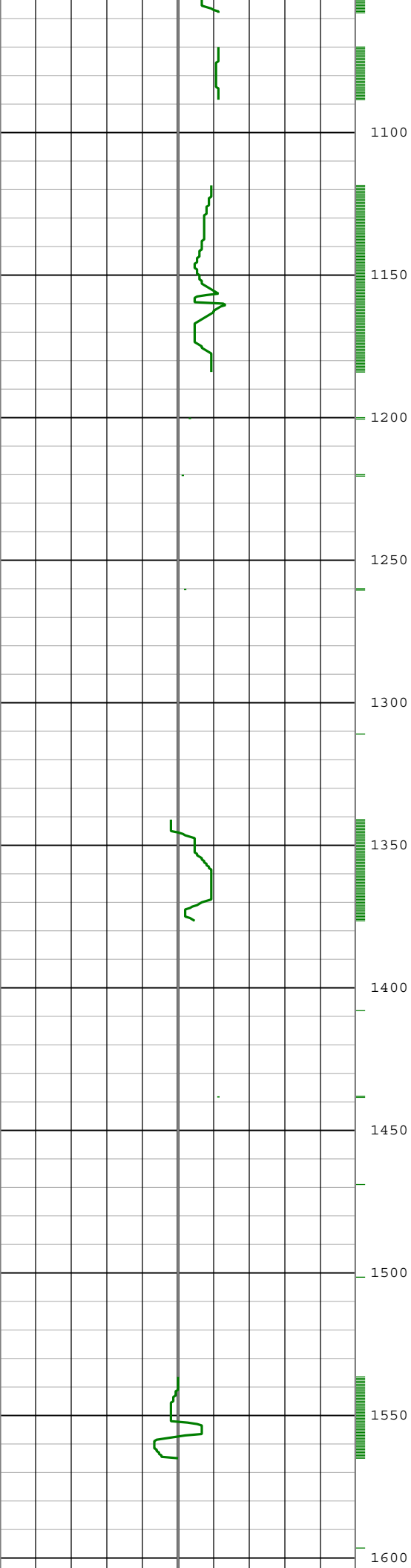
Rate of penetration averaged over the last 5 ft (1.5 m) (ROP5) RT		
300	ft/h	0

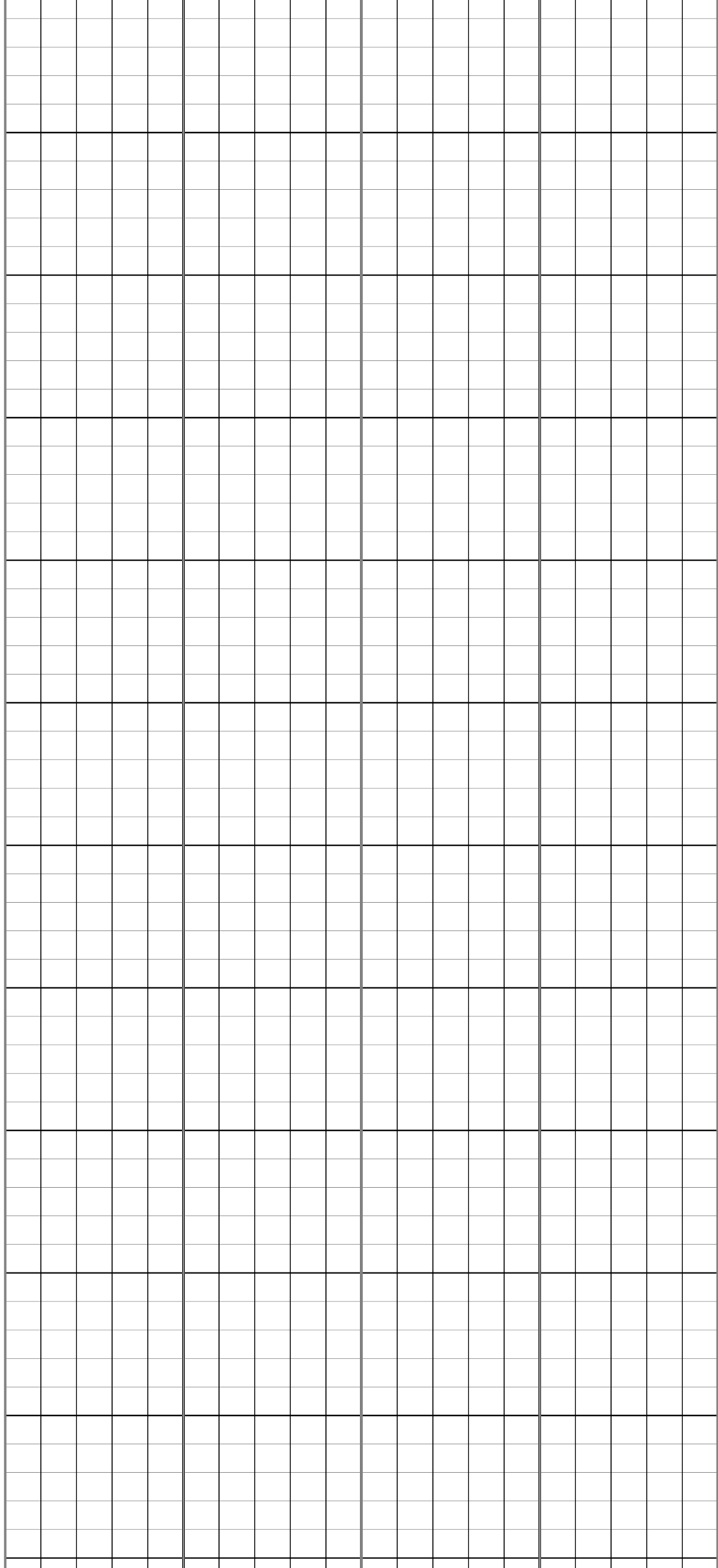
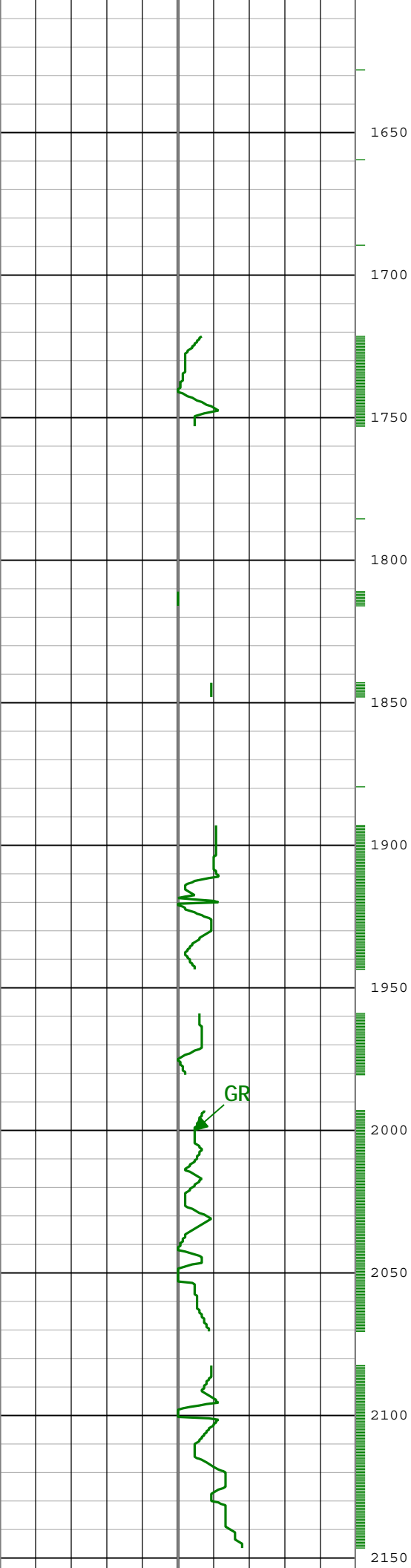
Shock Risk (SHKRSK) SlimPulse[1] RT		
3		0
Direction and Inclination Sensor Temperature (TEMP_DNI) SlimPulse[1] RT		
100	degF	300

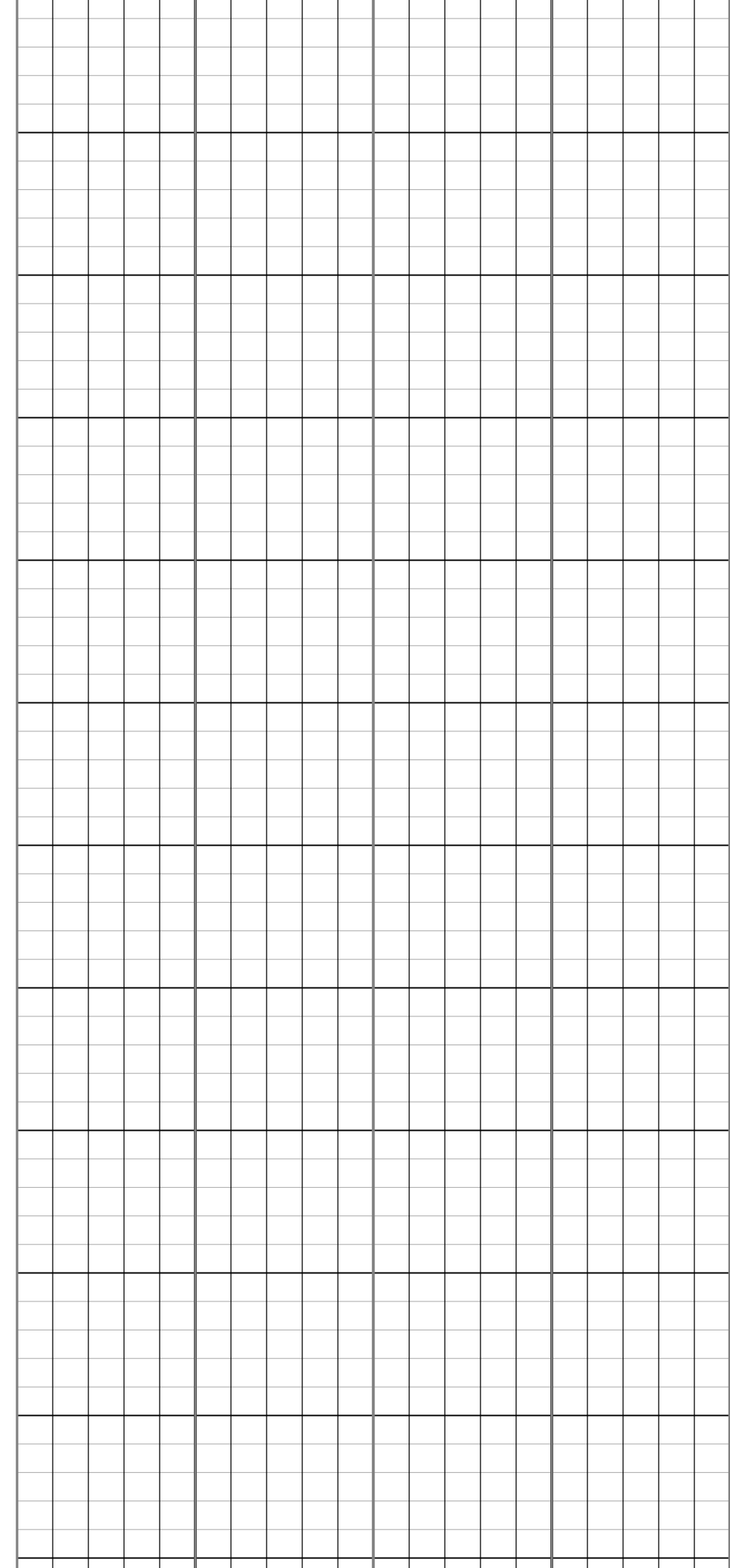
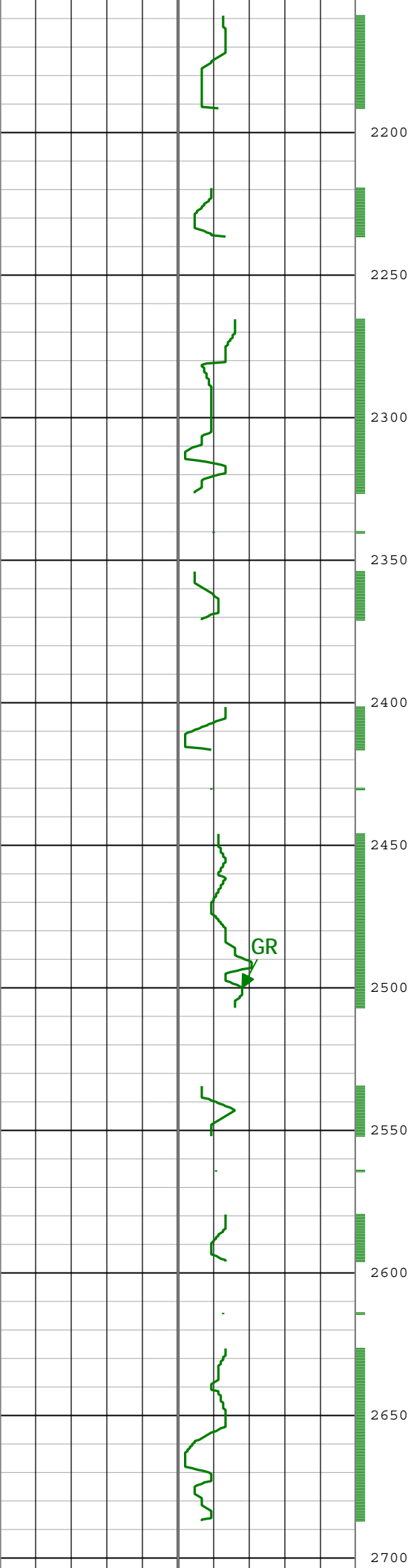


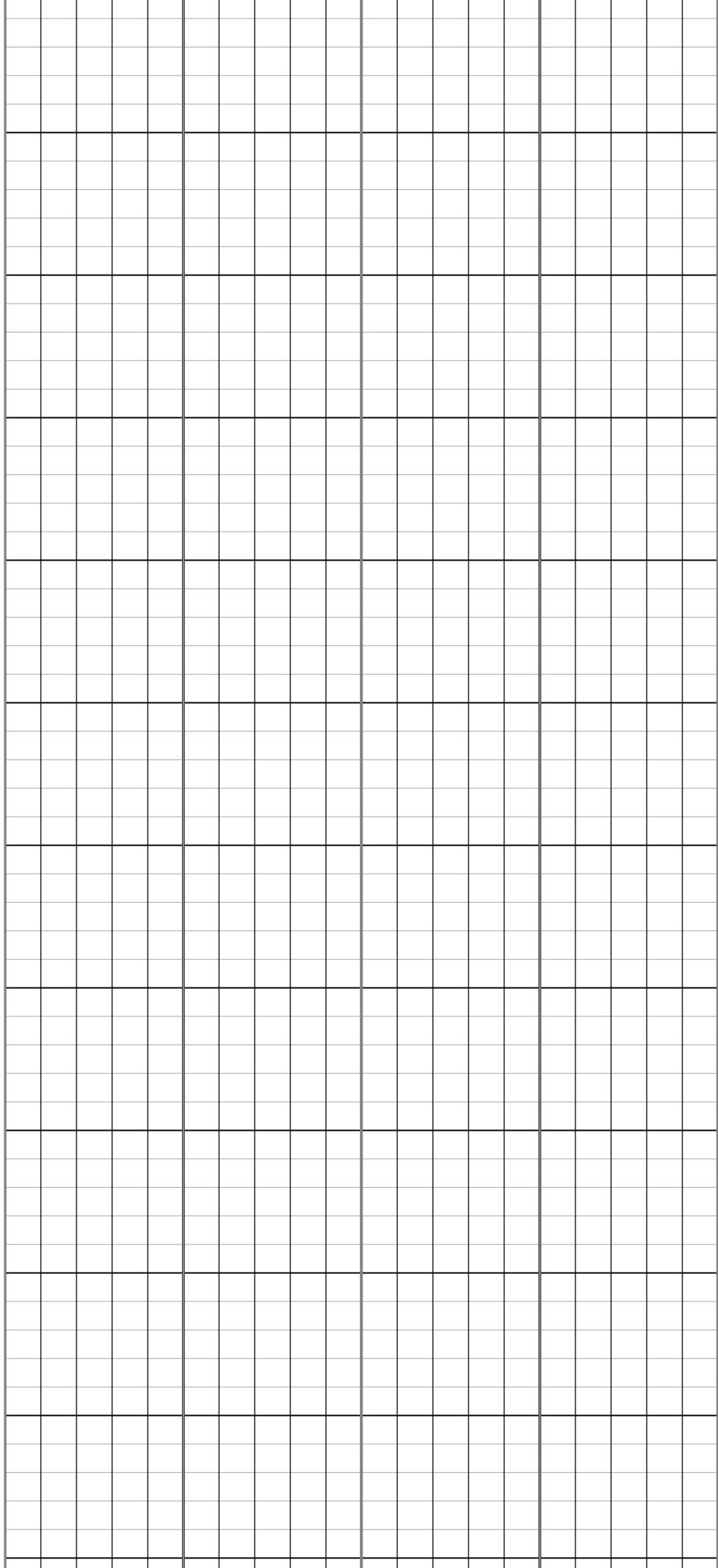
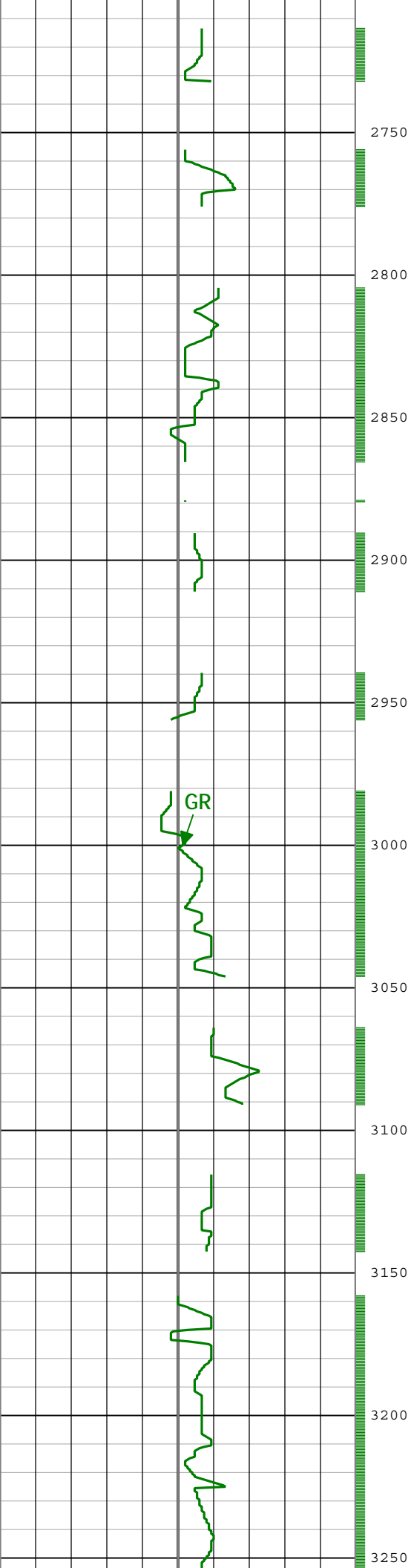
First Ensign GR Reading @ 675 ft MD

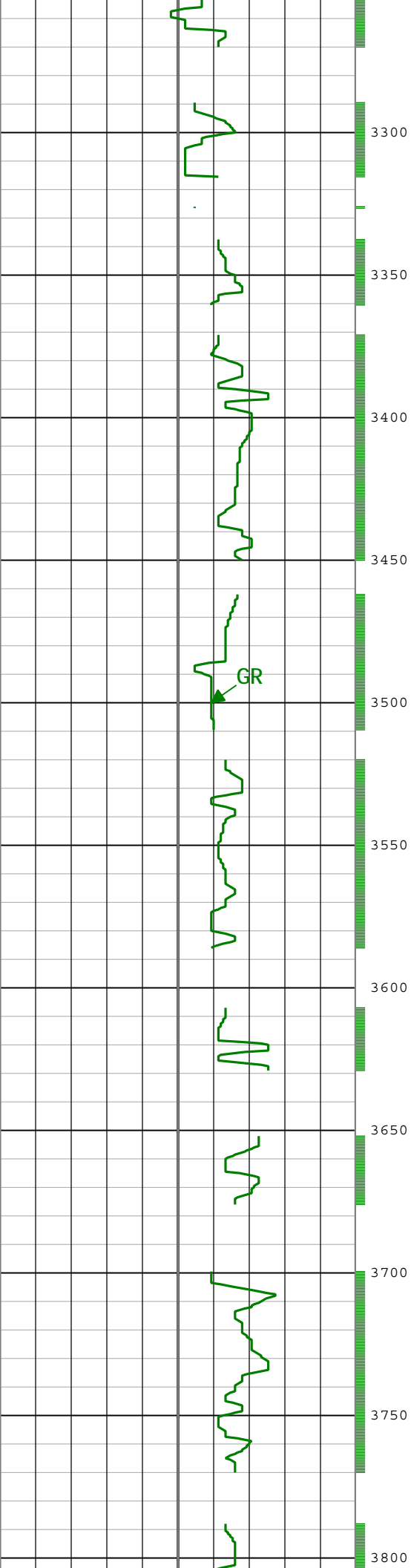
GR

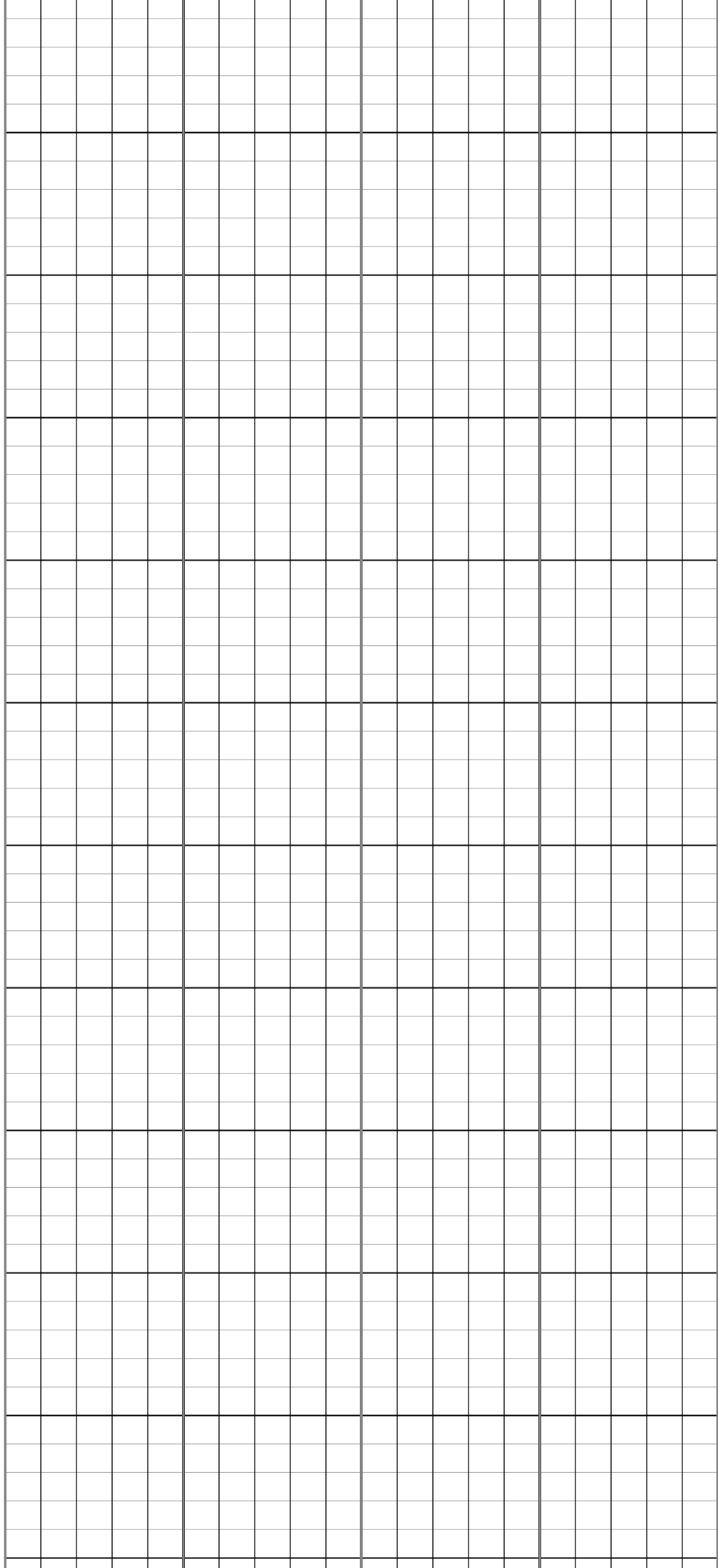
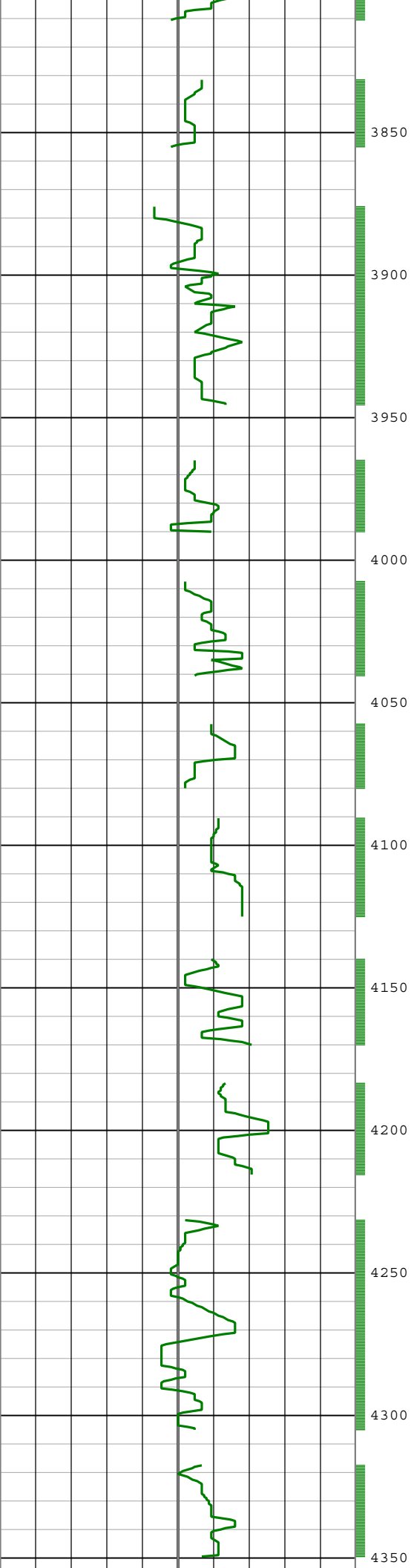


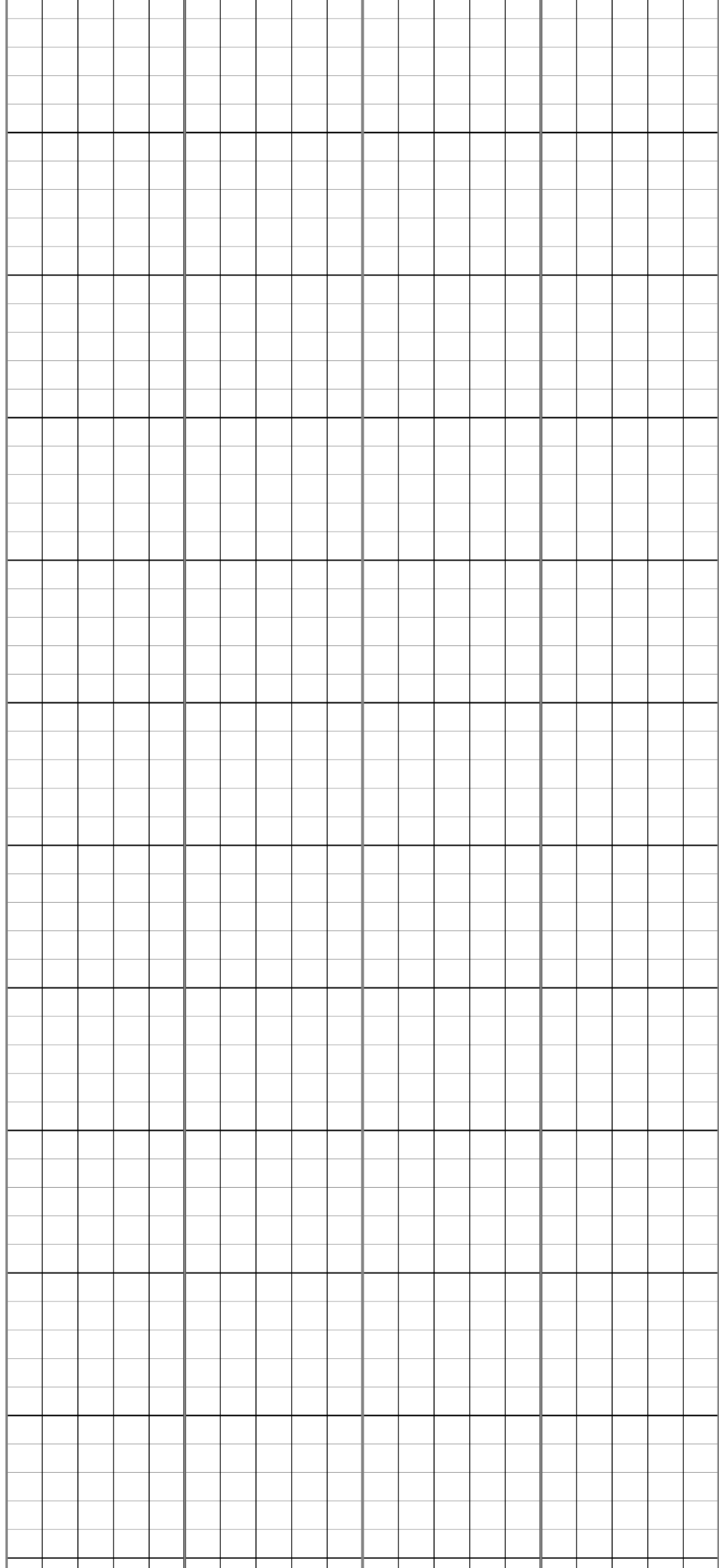
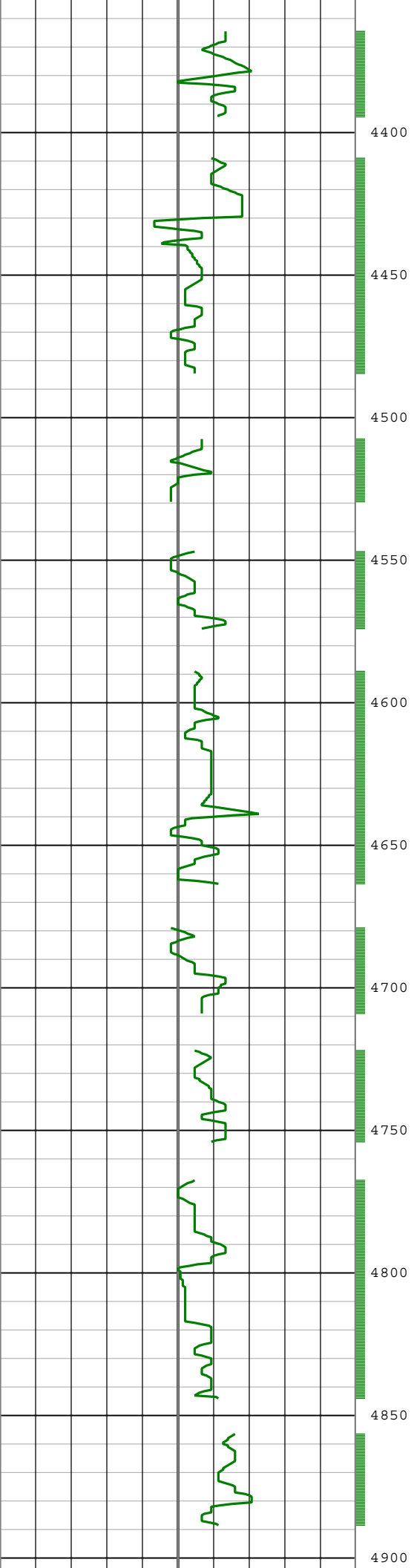


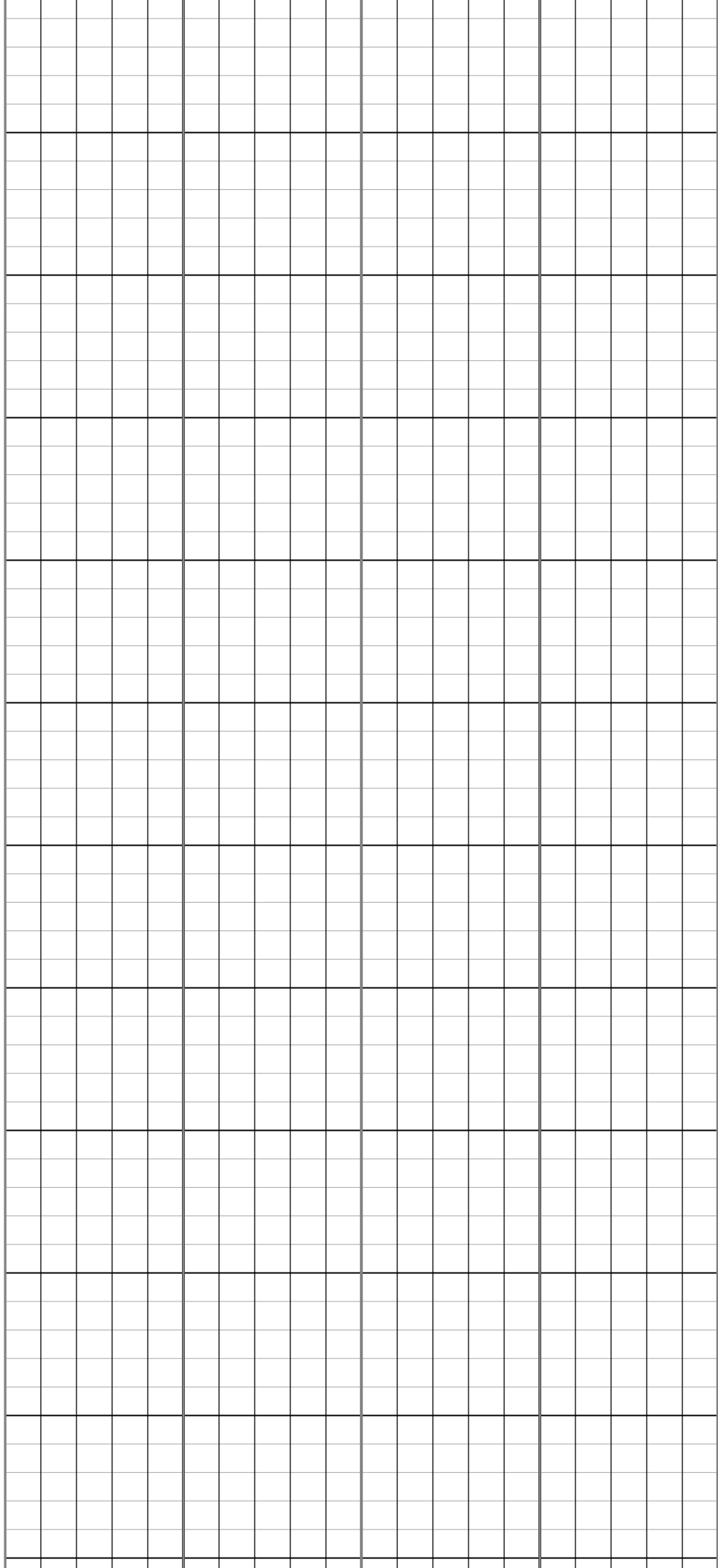
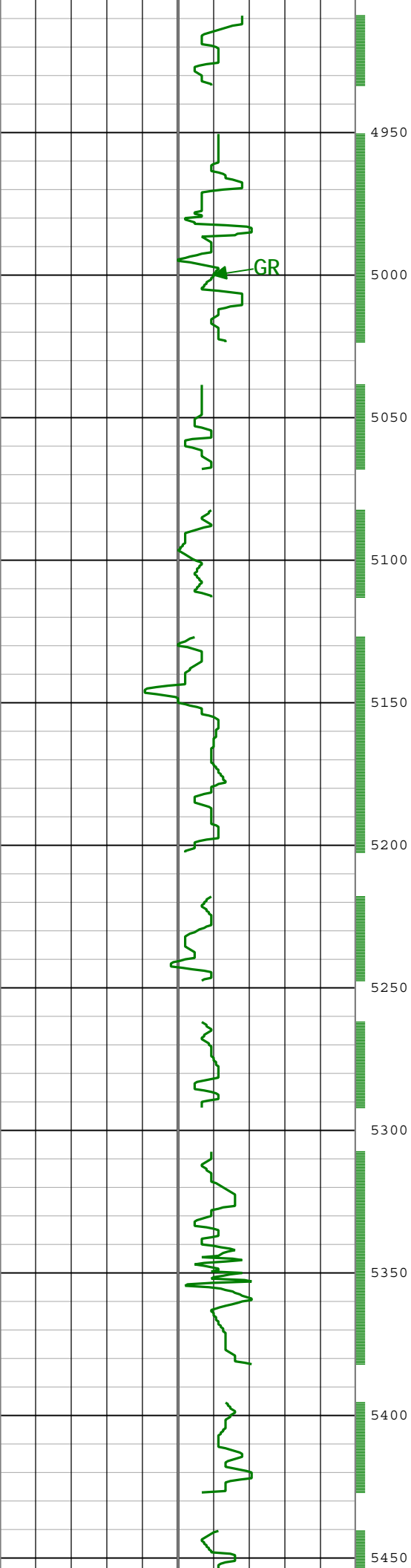


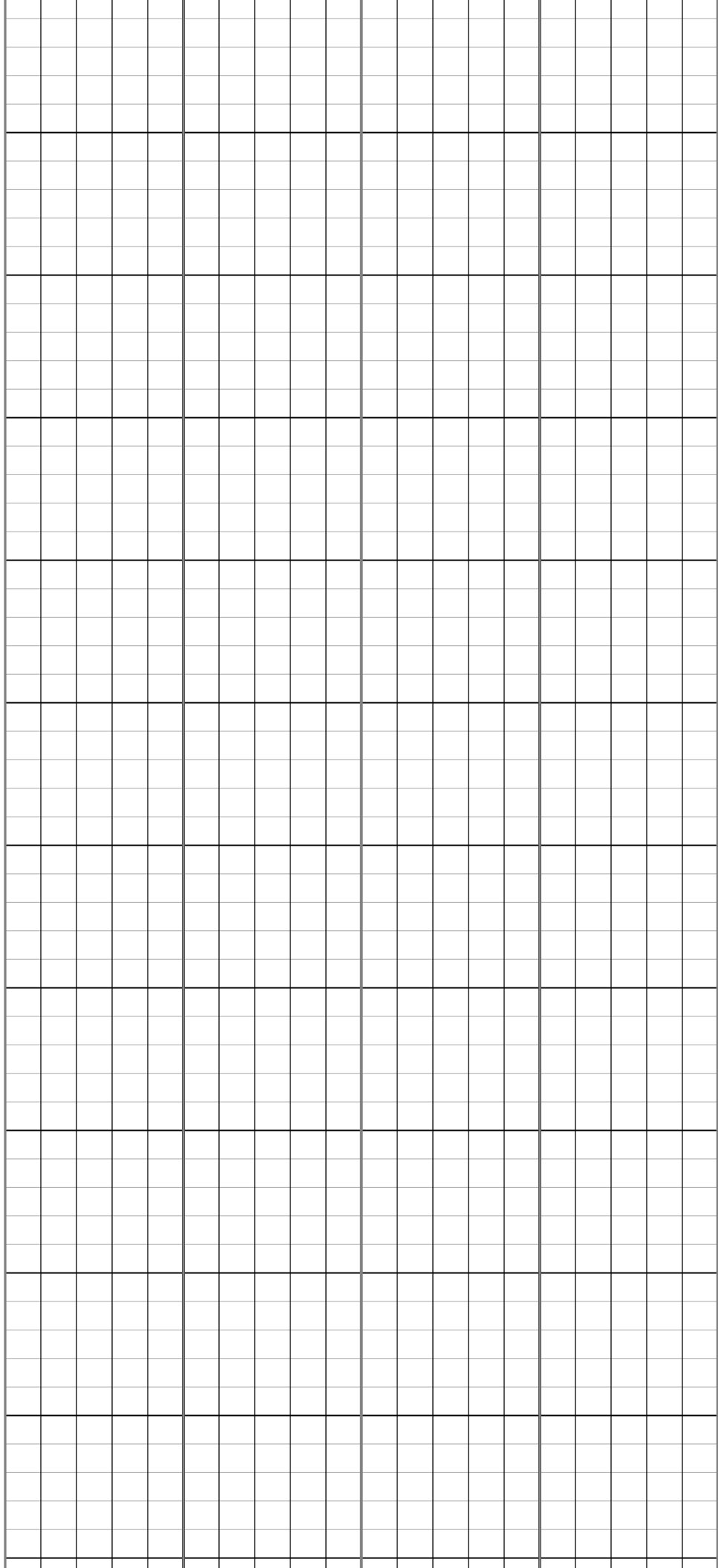
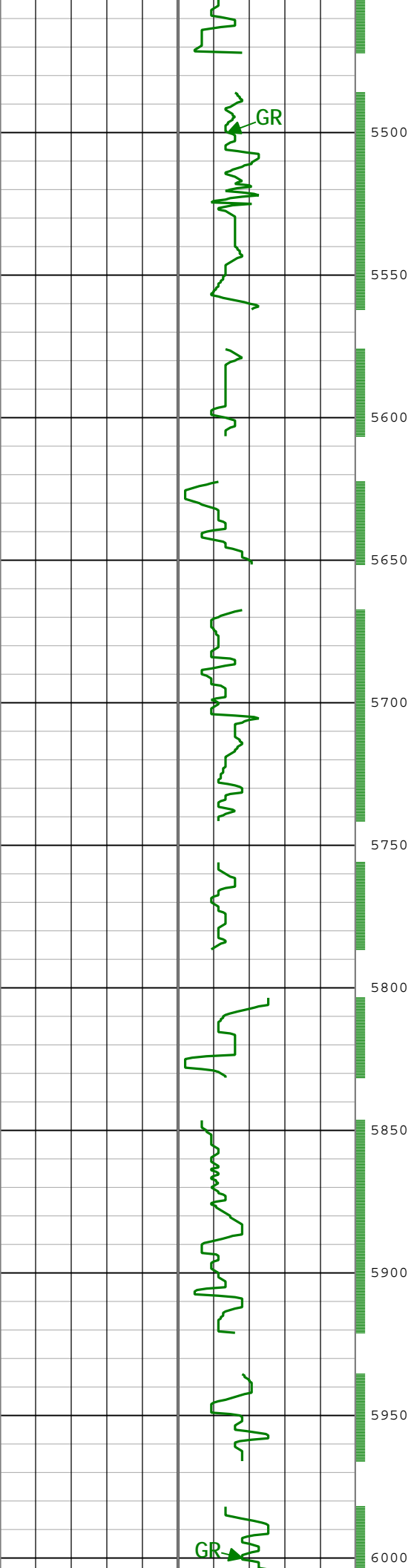


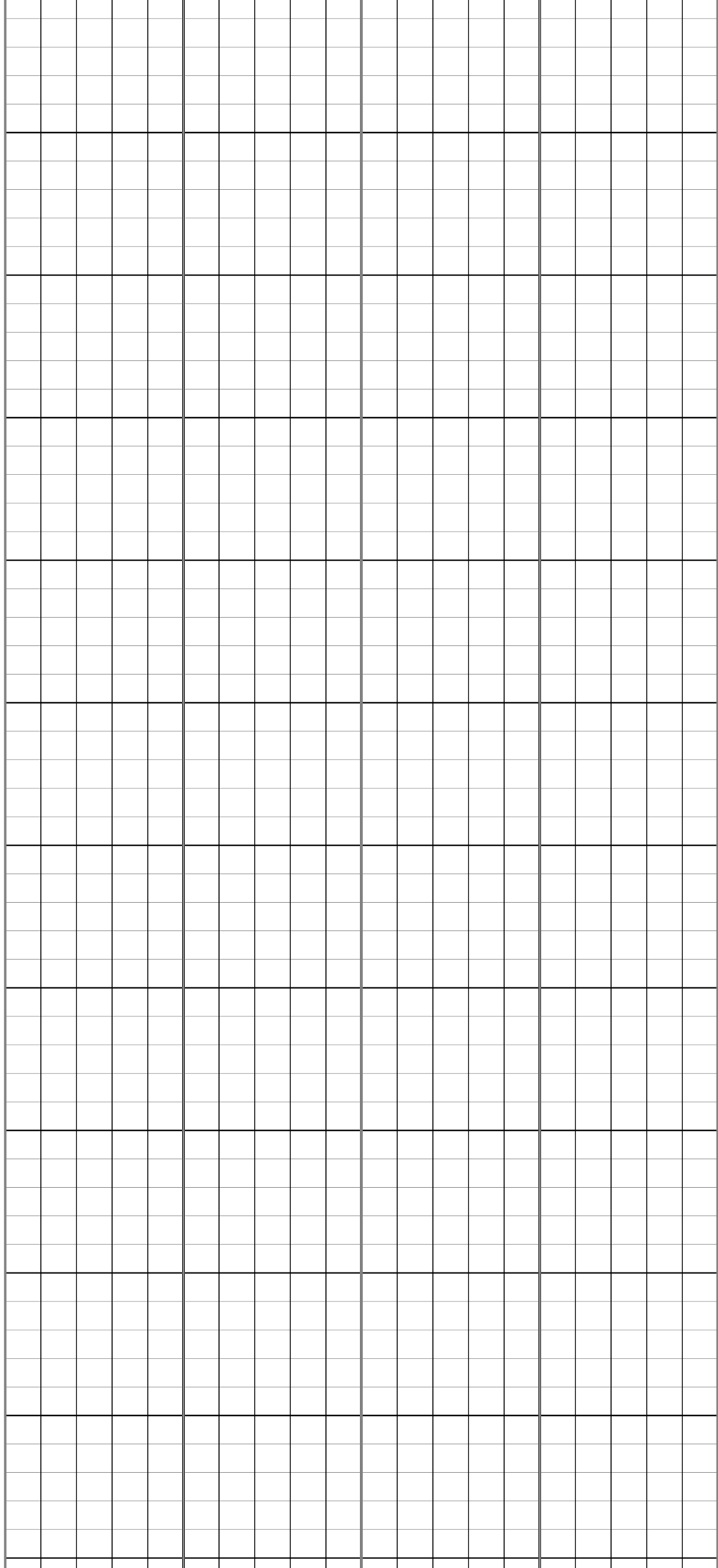
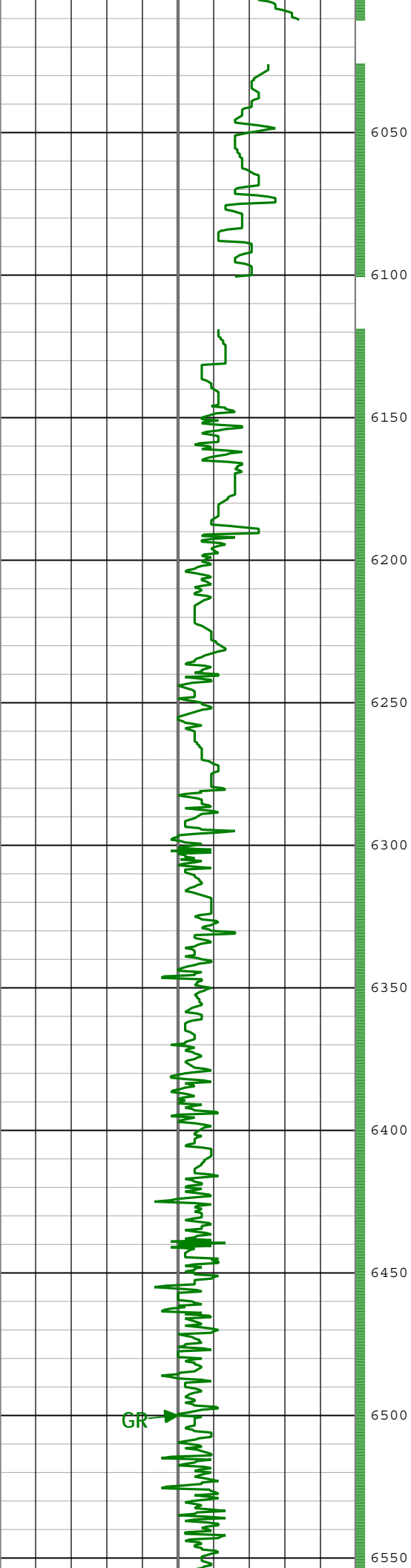


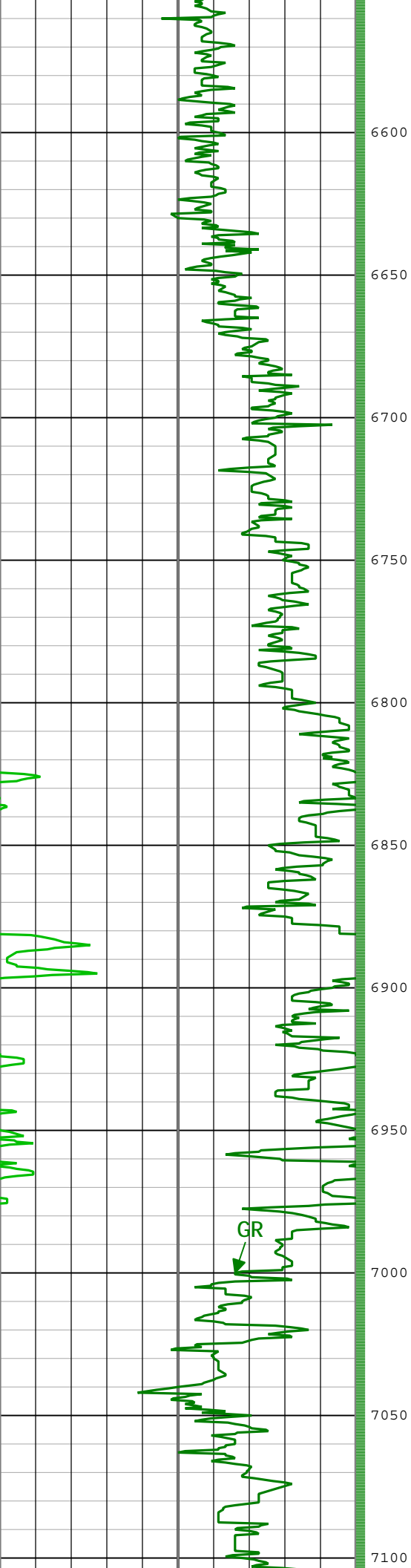


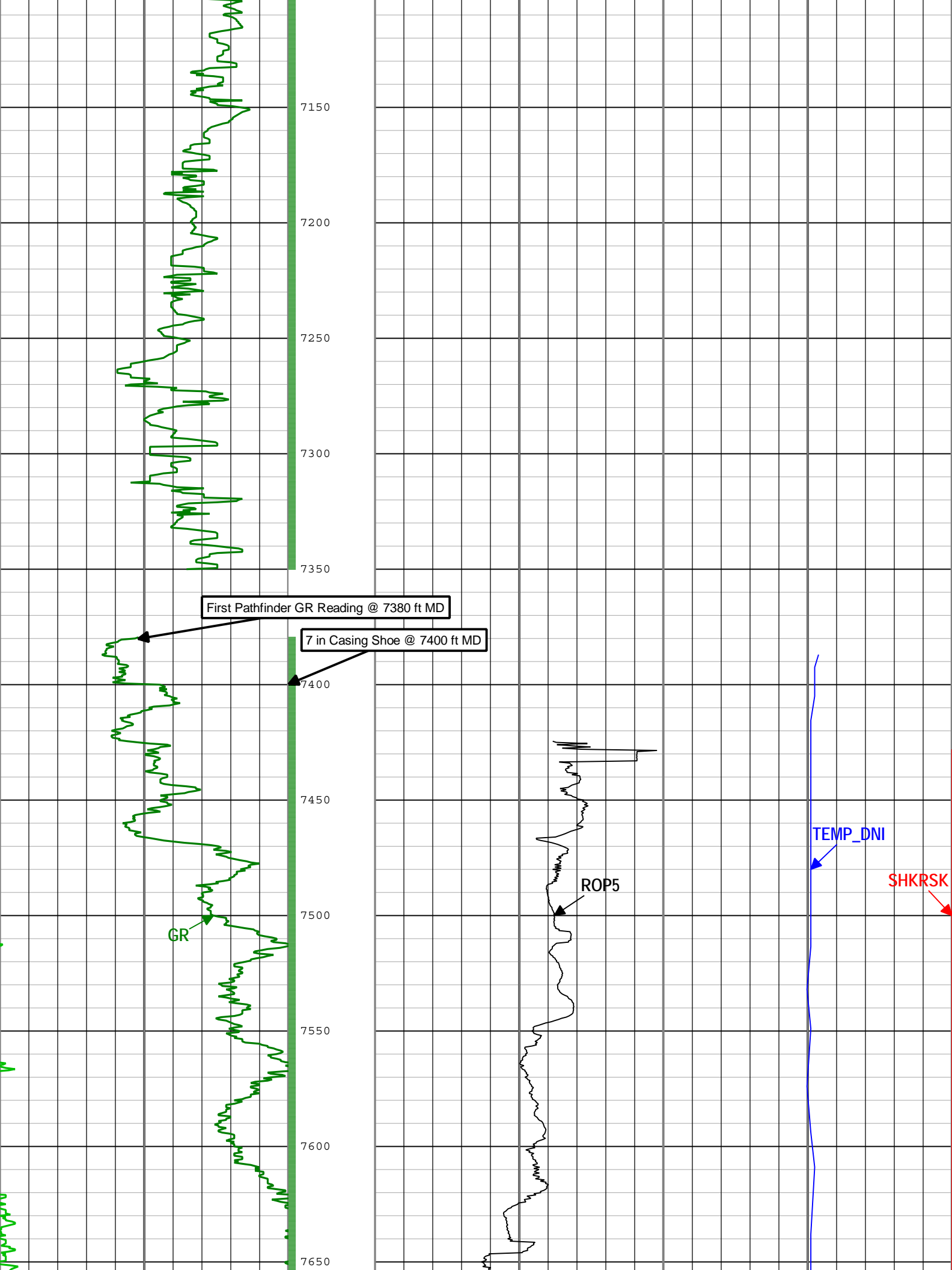


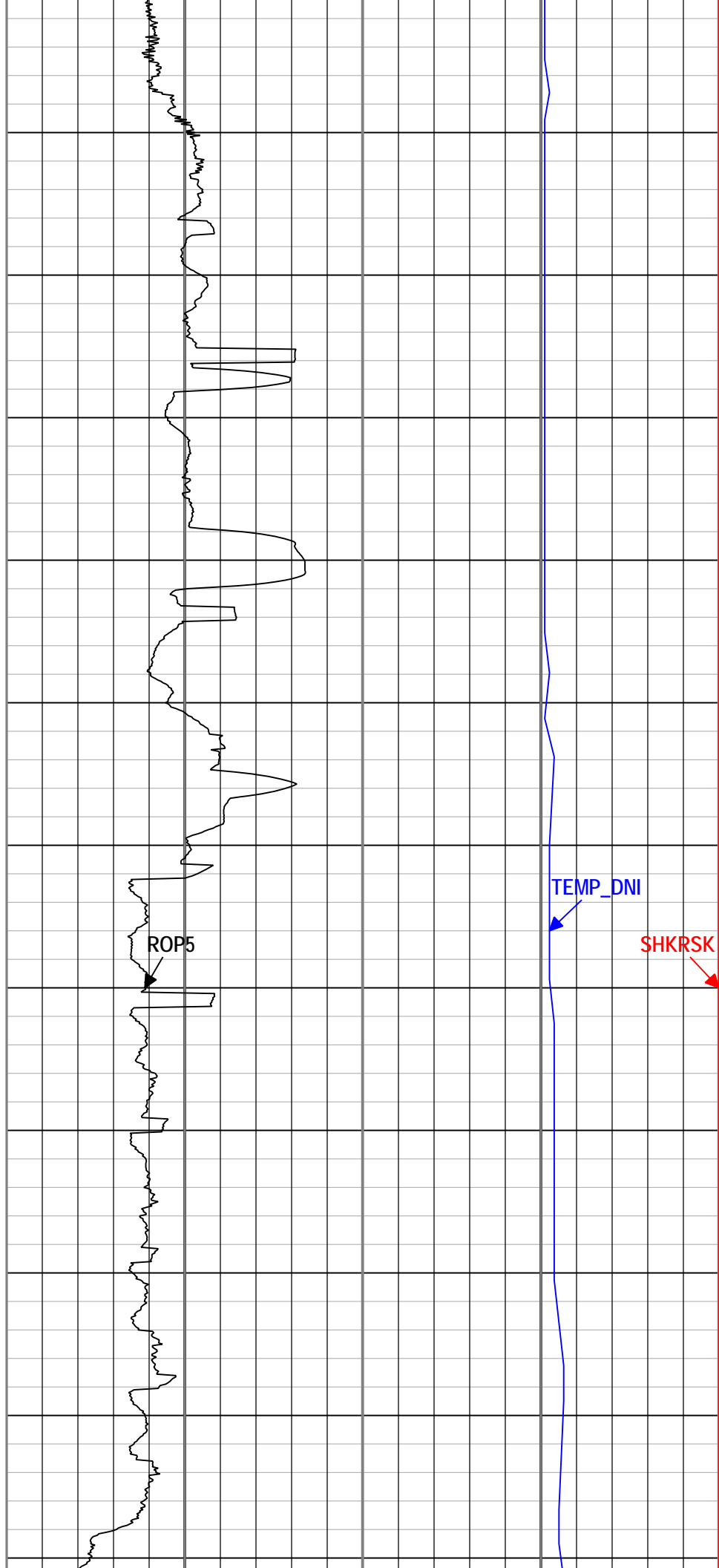
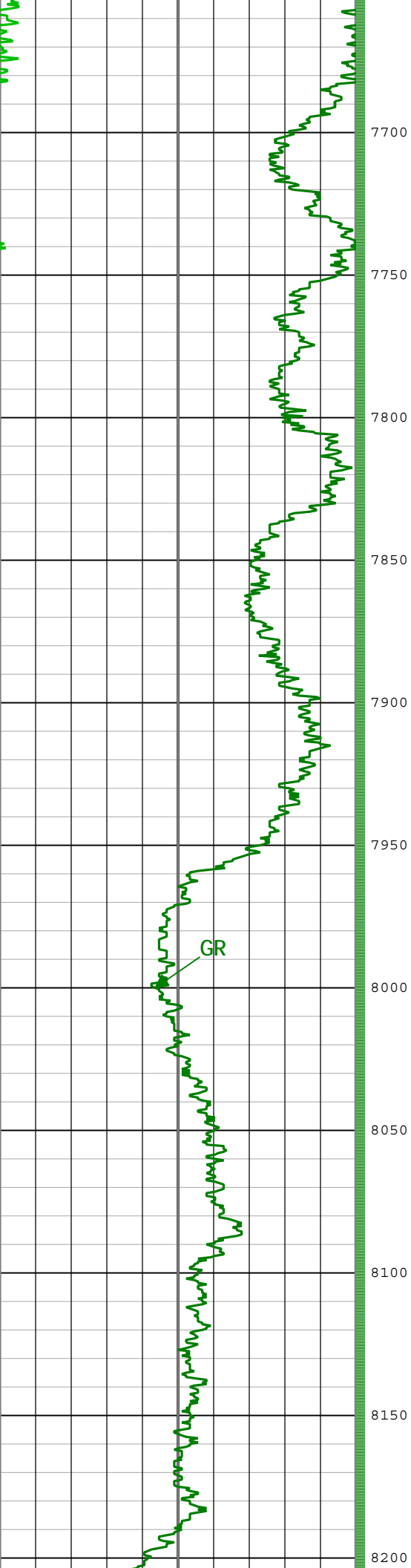


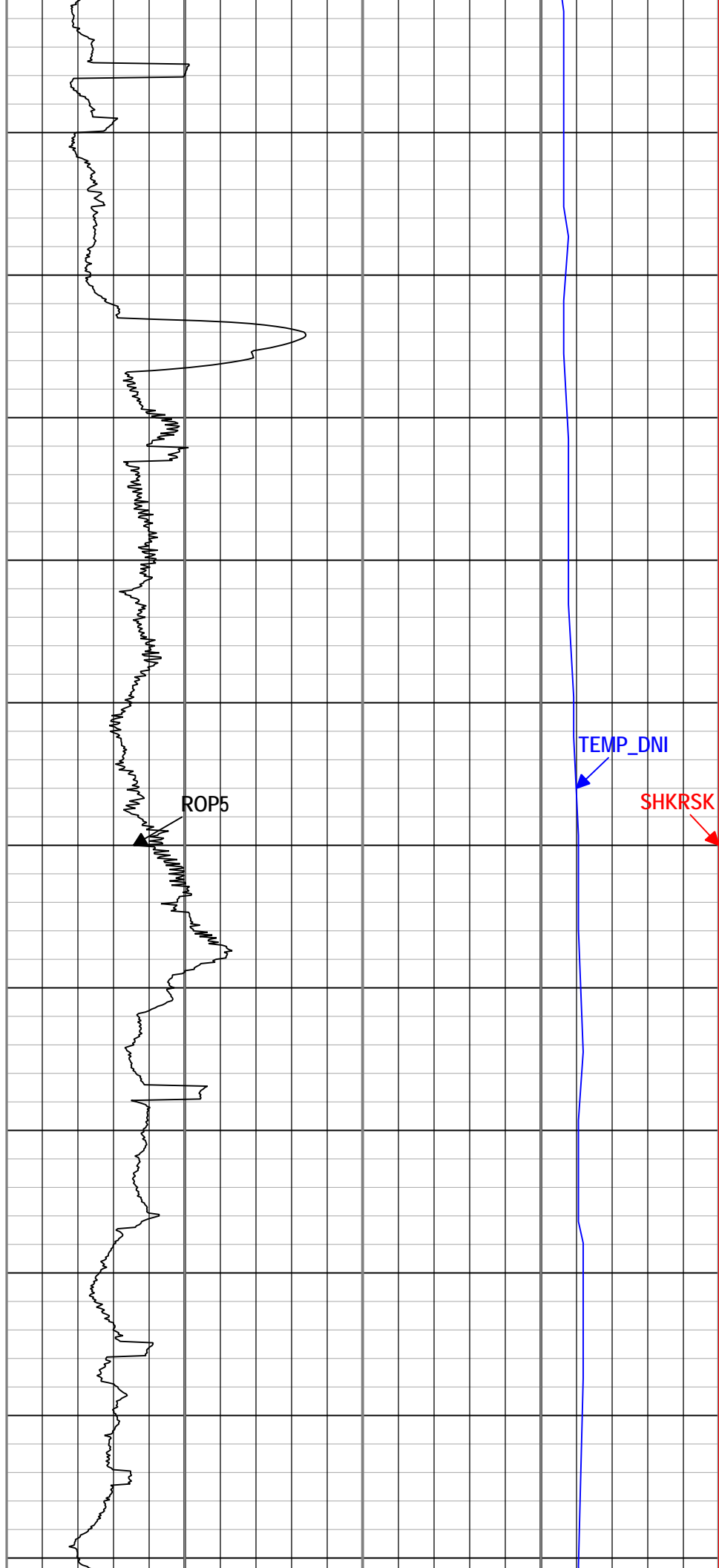
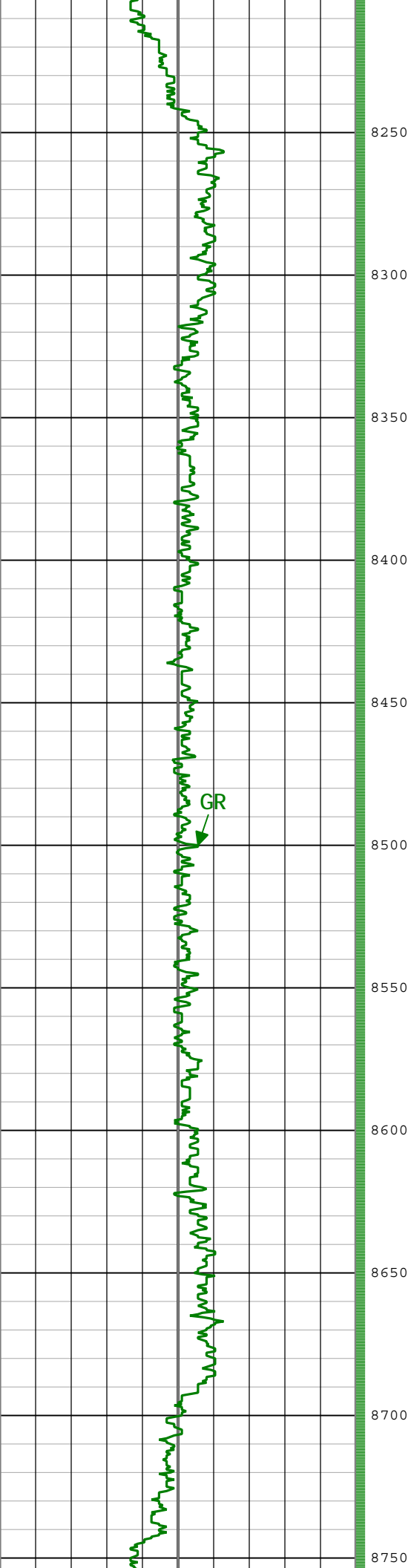


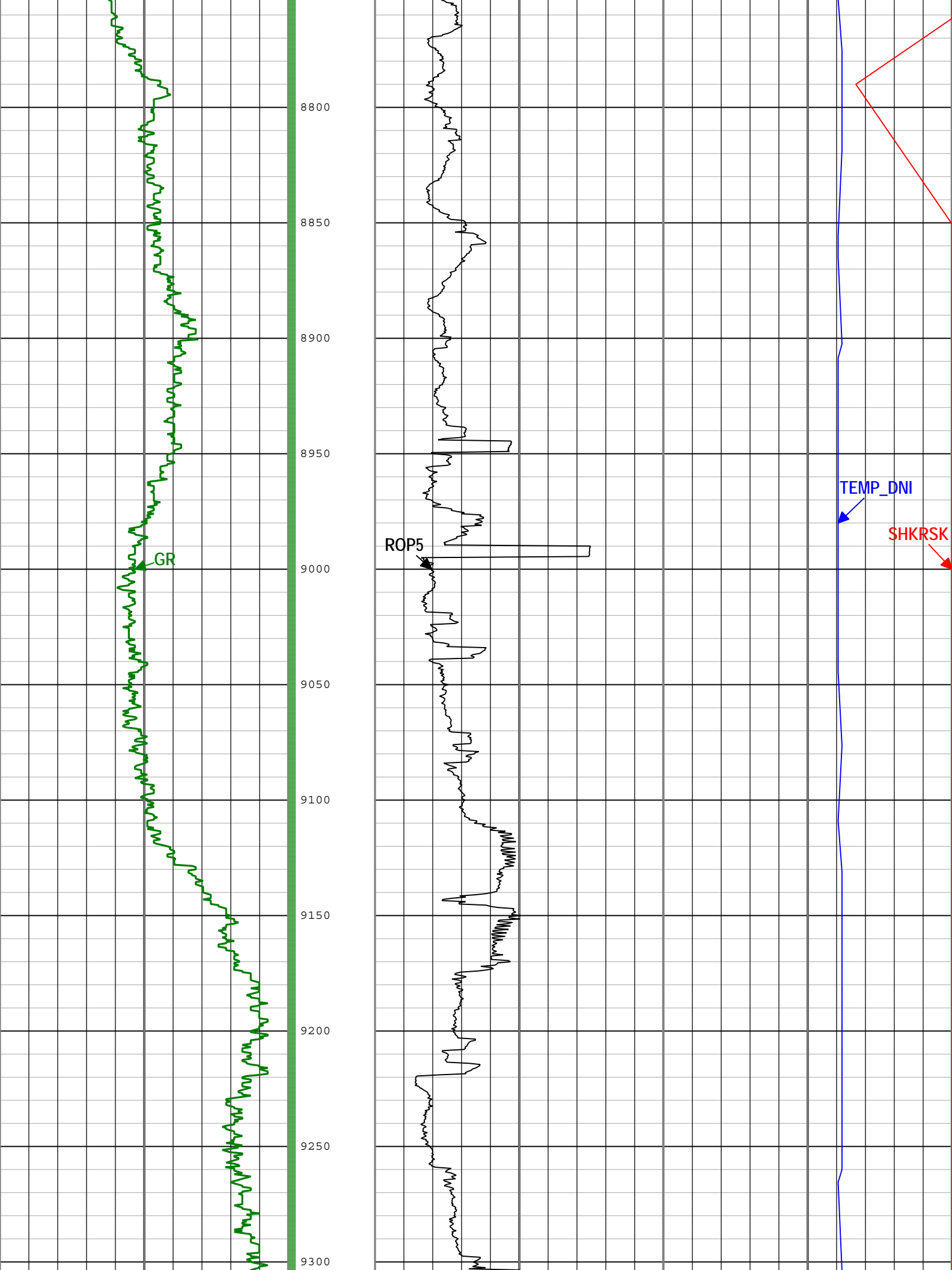


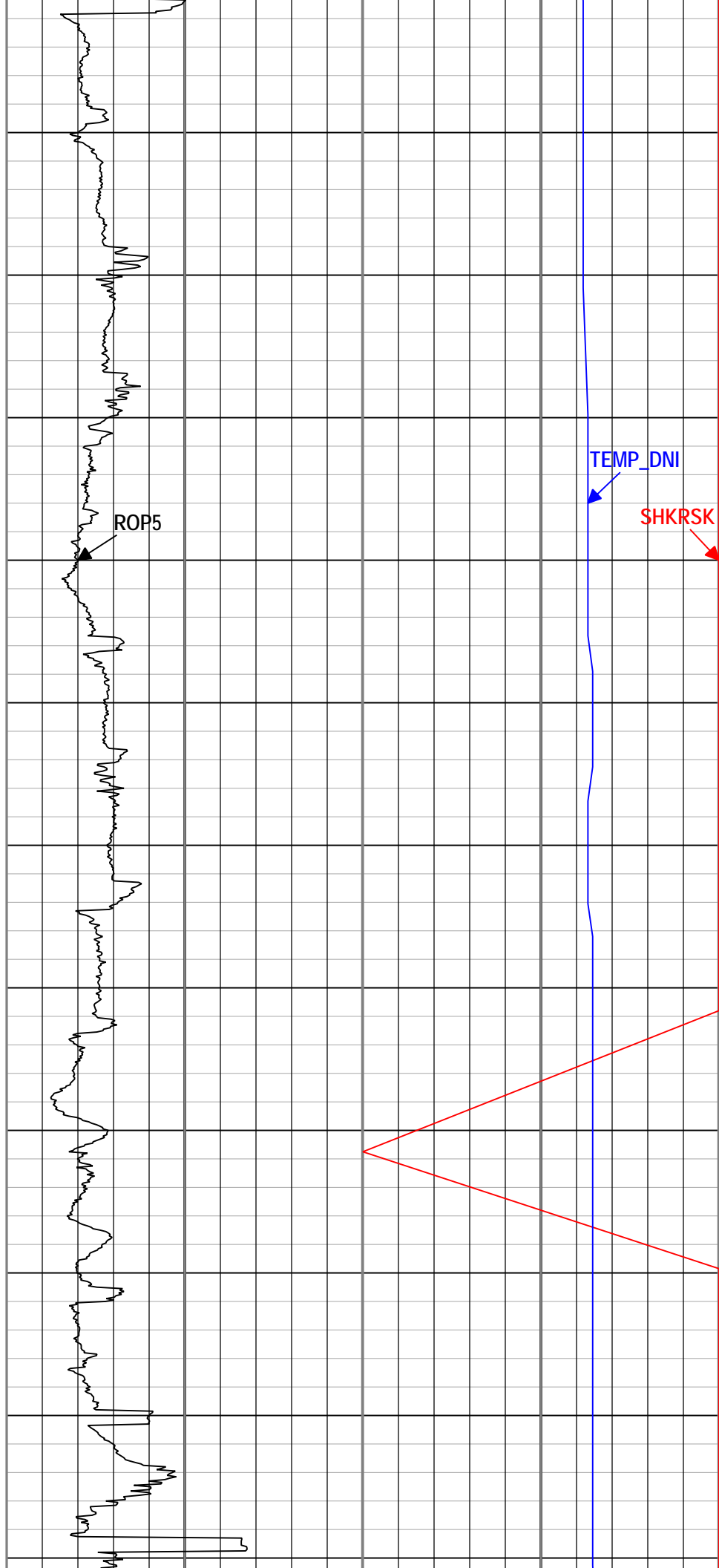
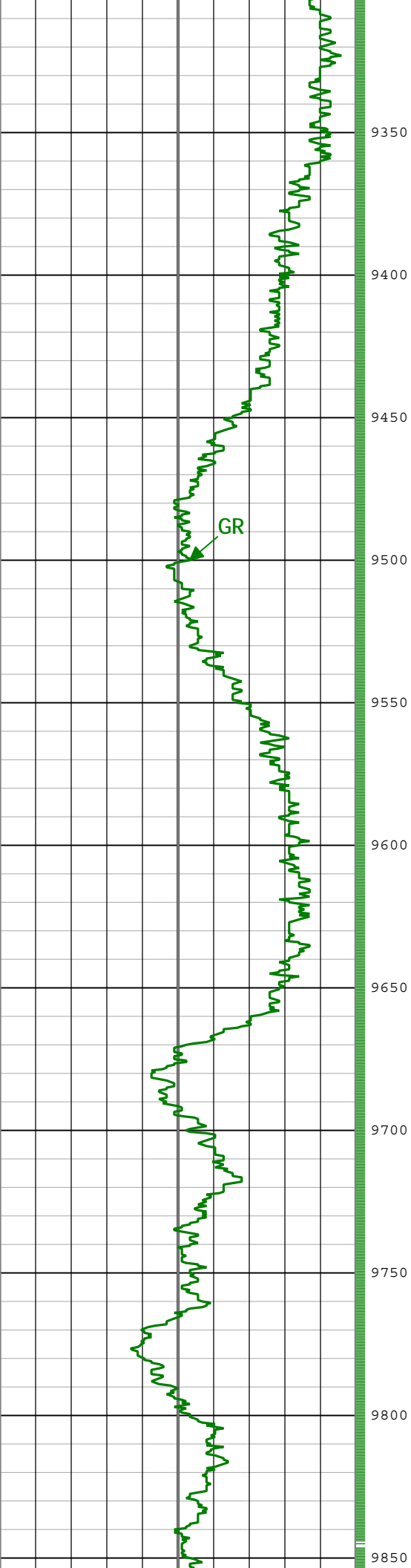


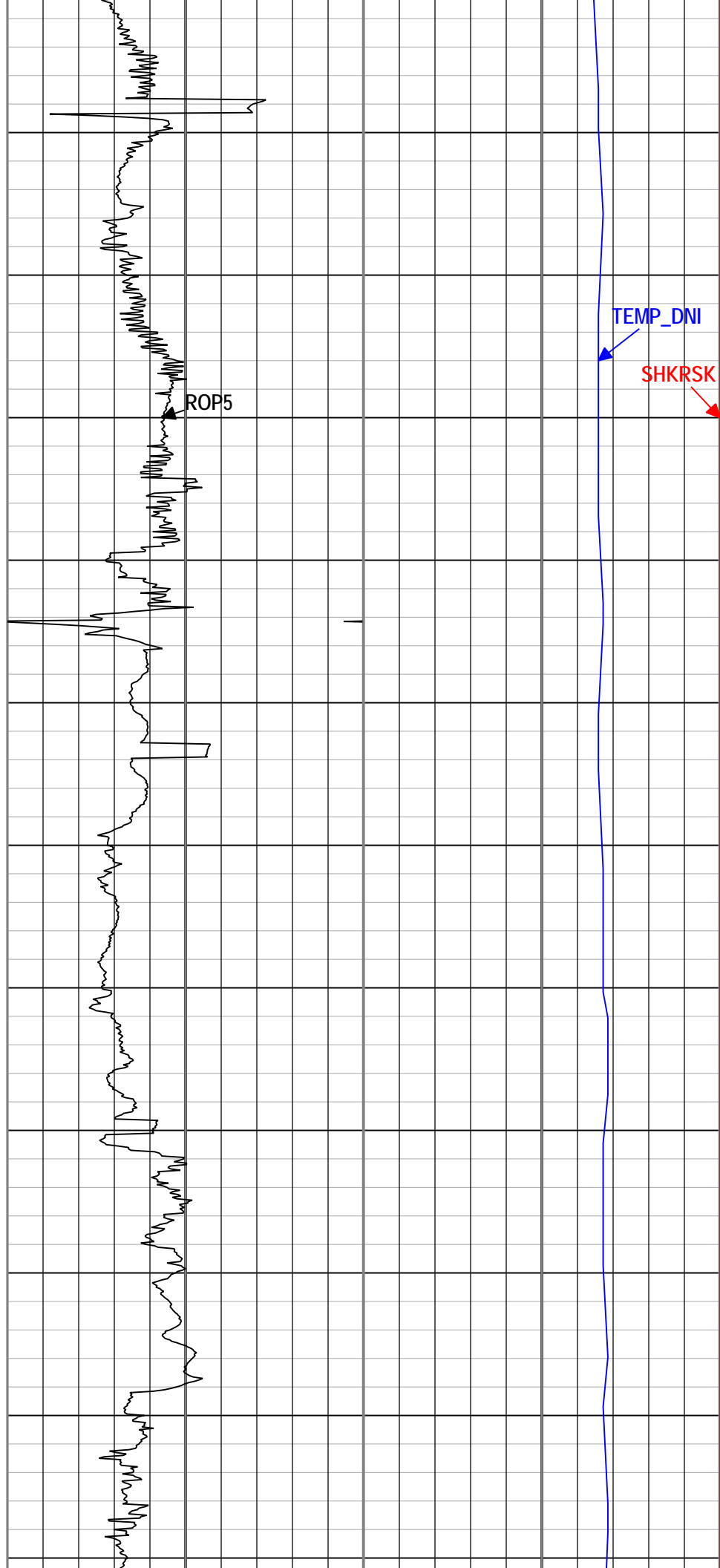
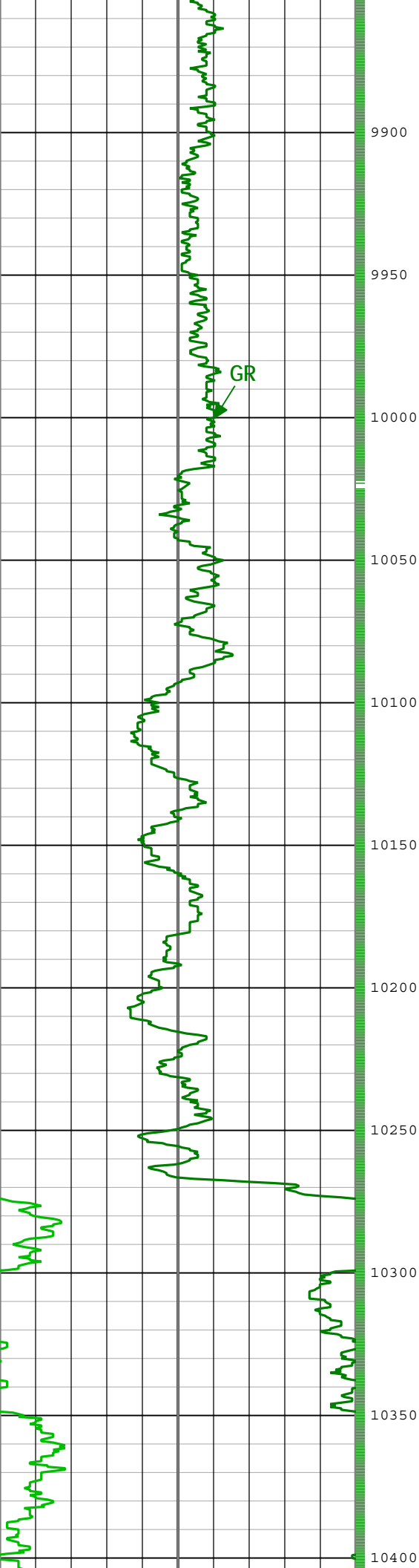


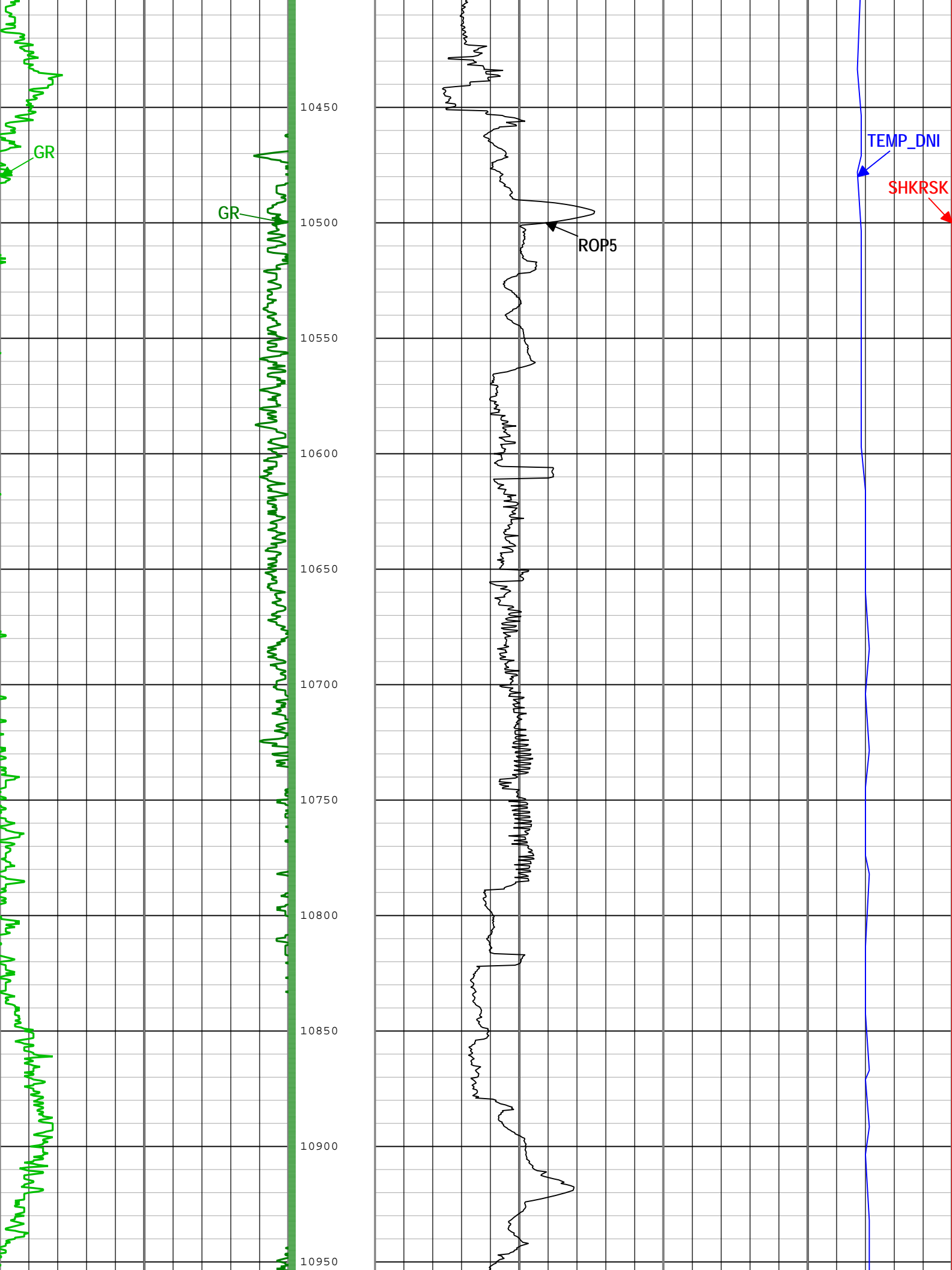


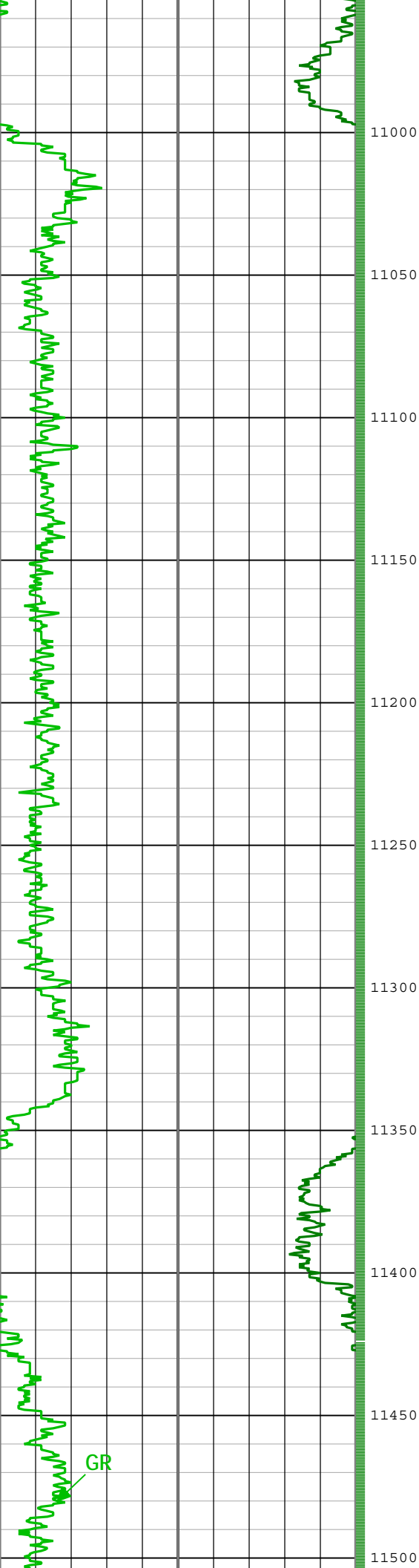




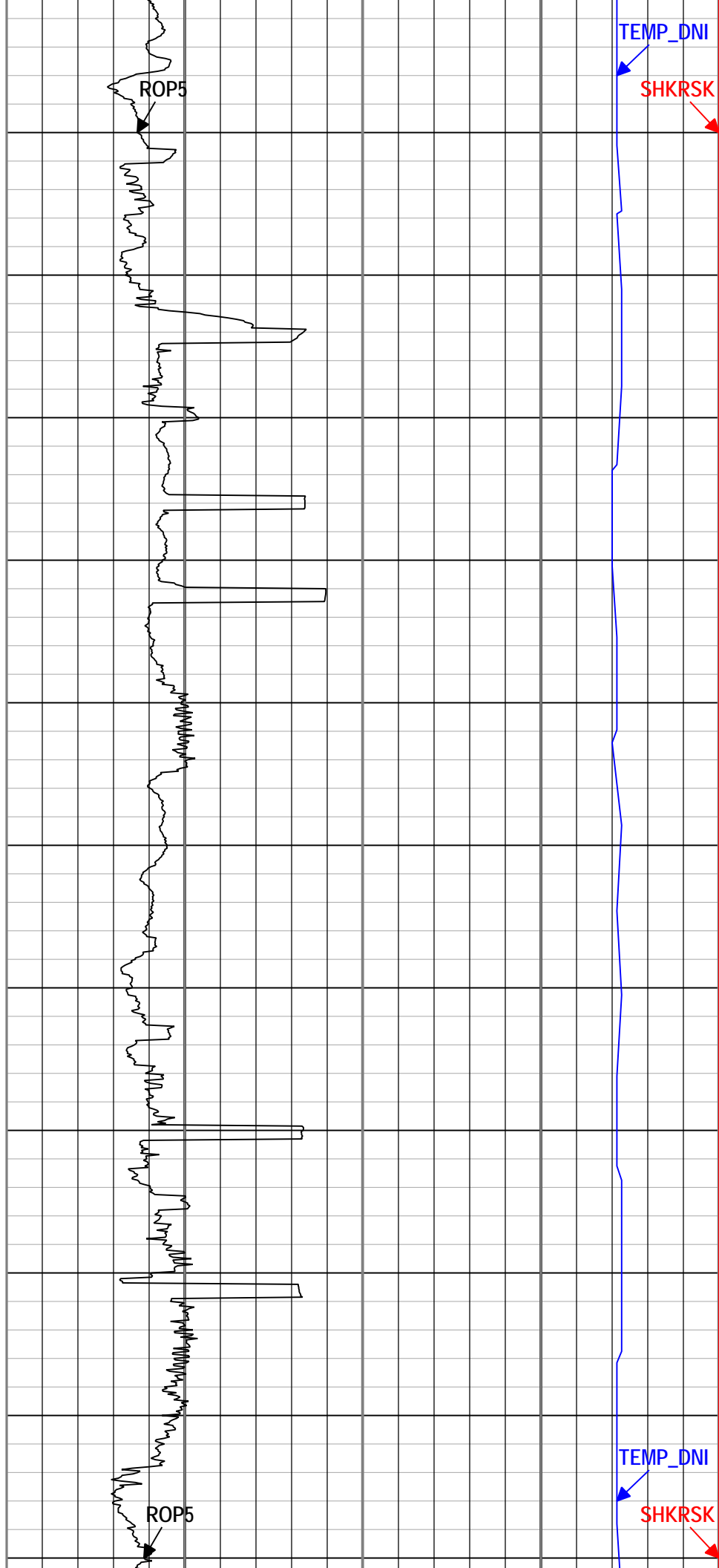


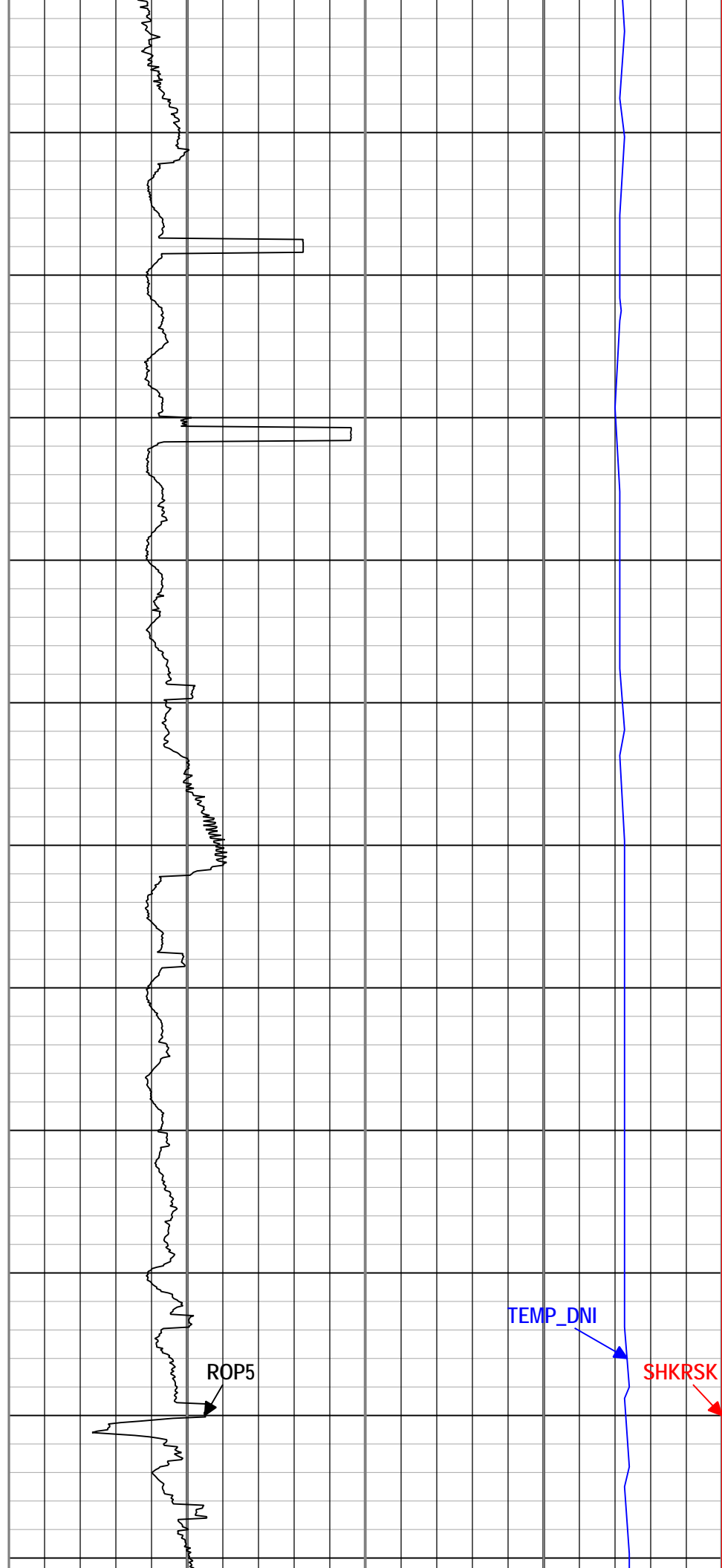
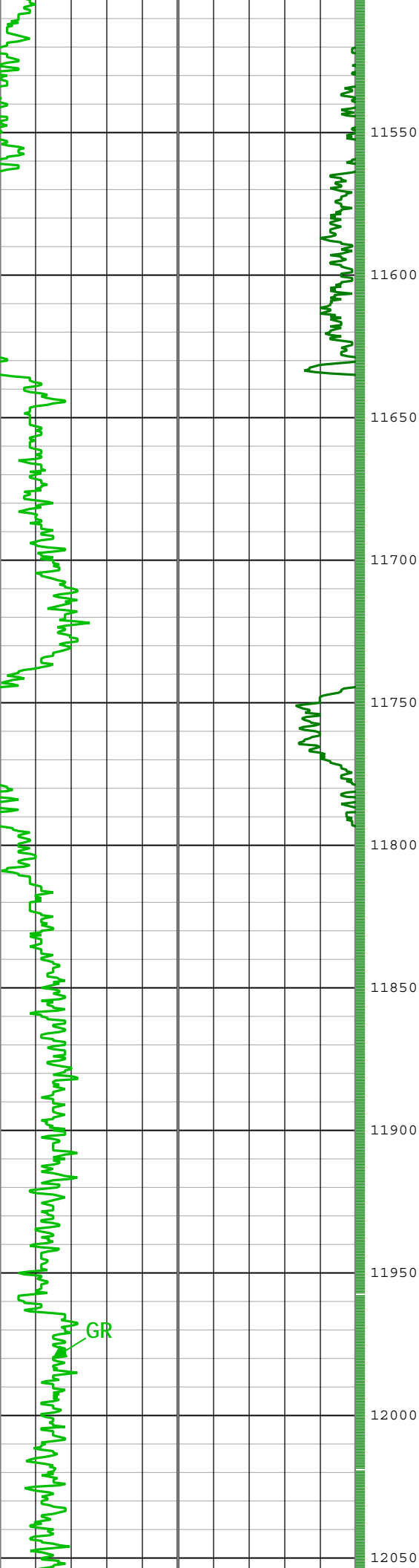


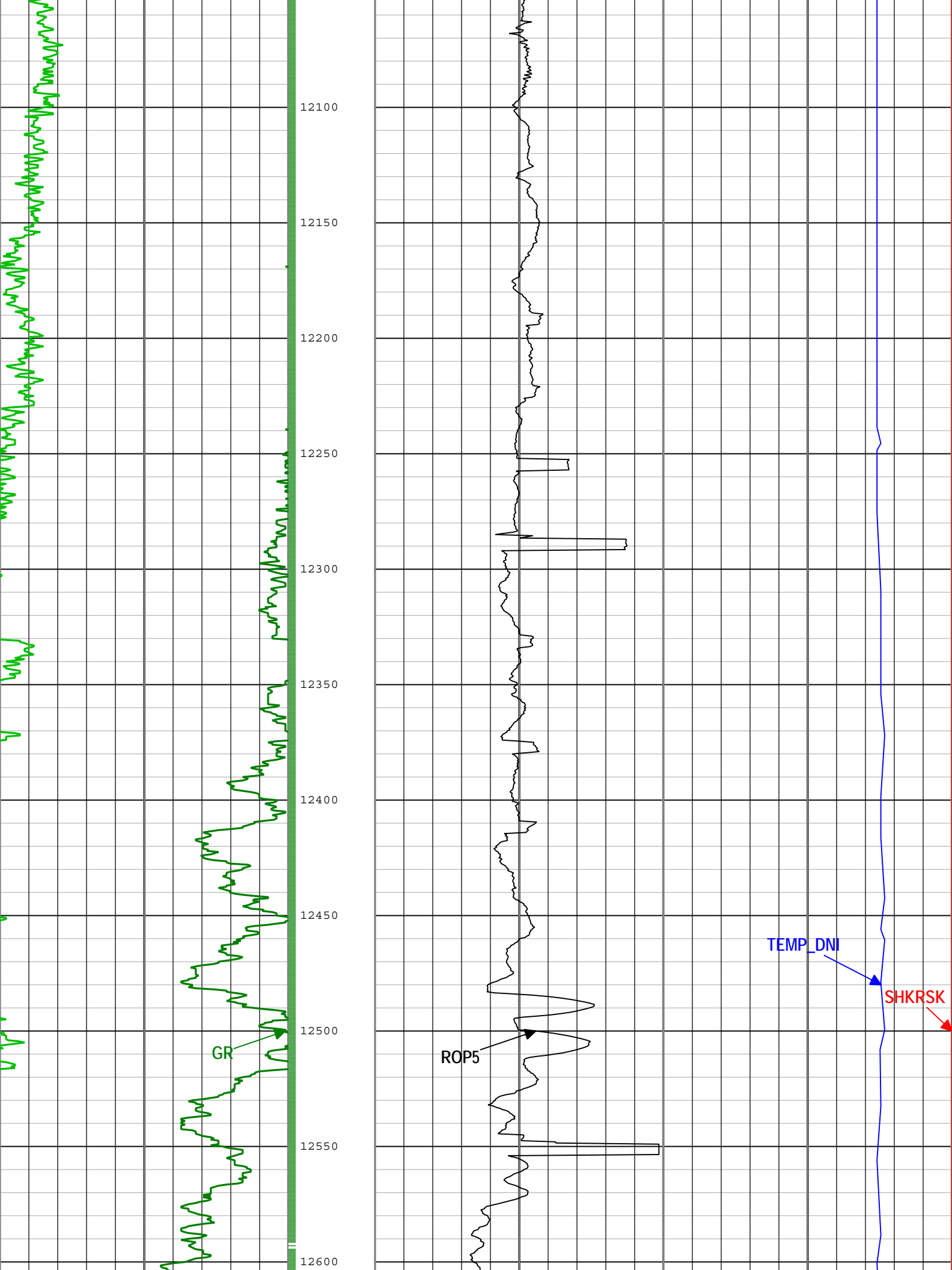


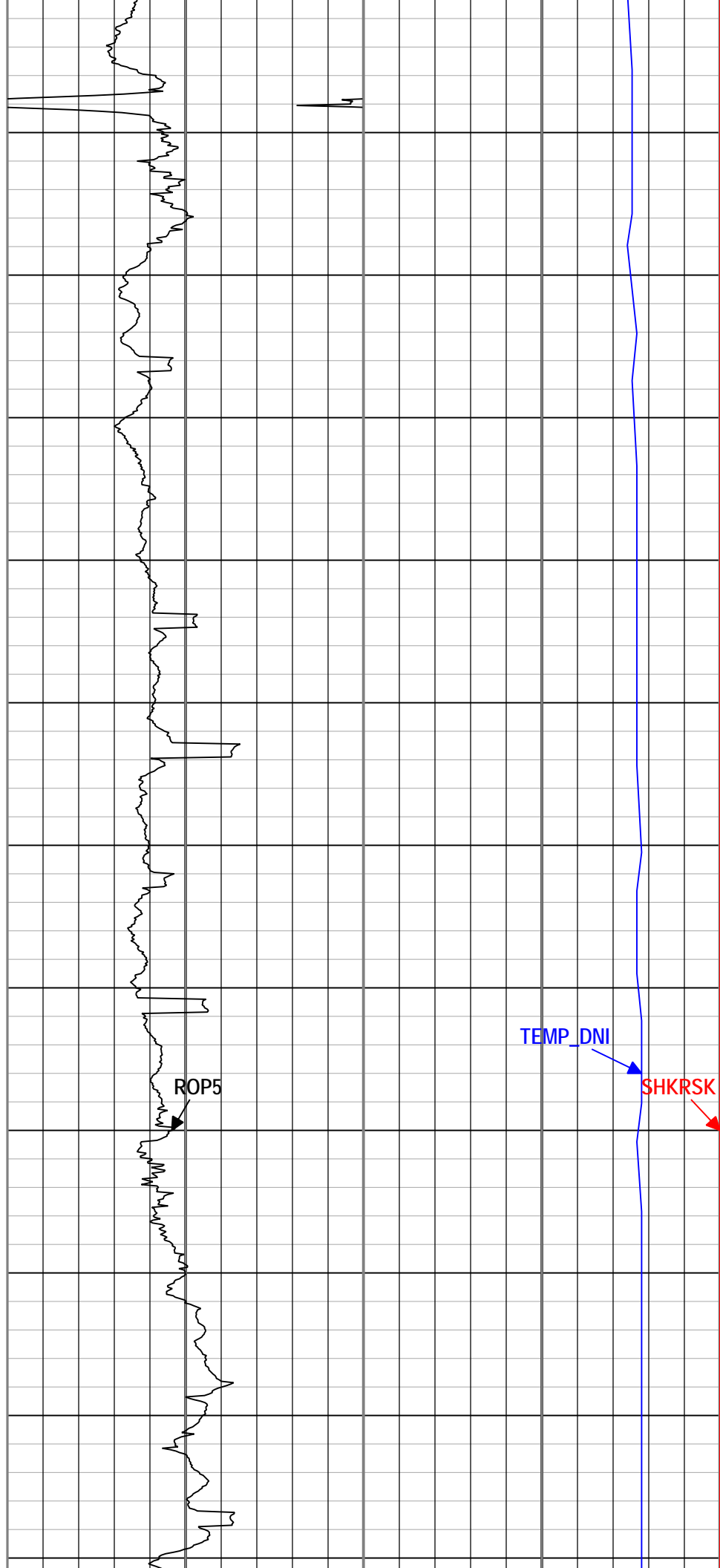
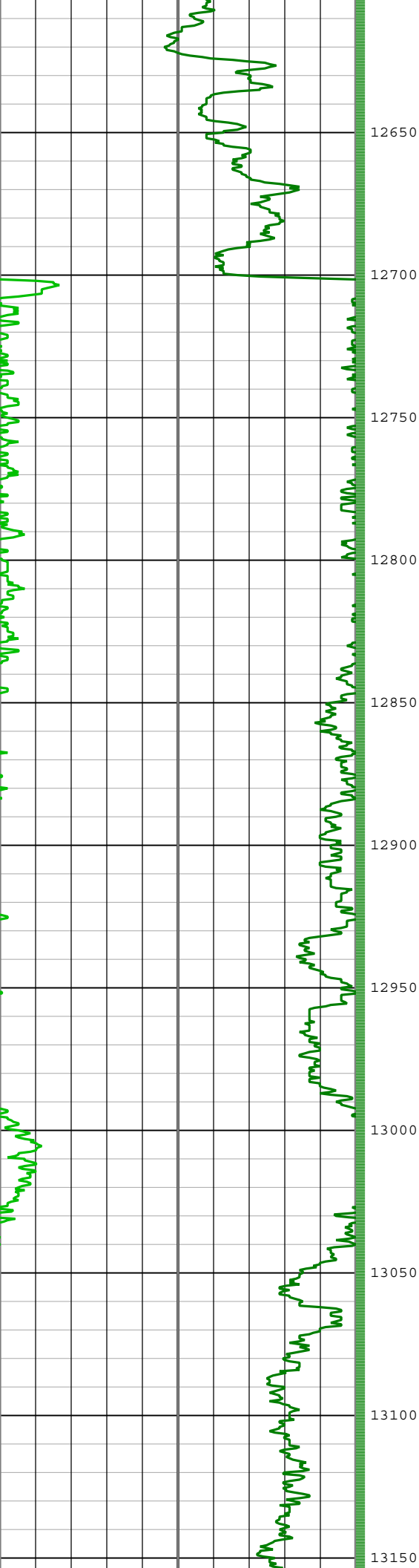


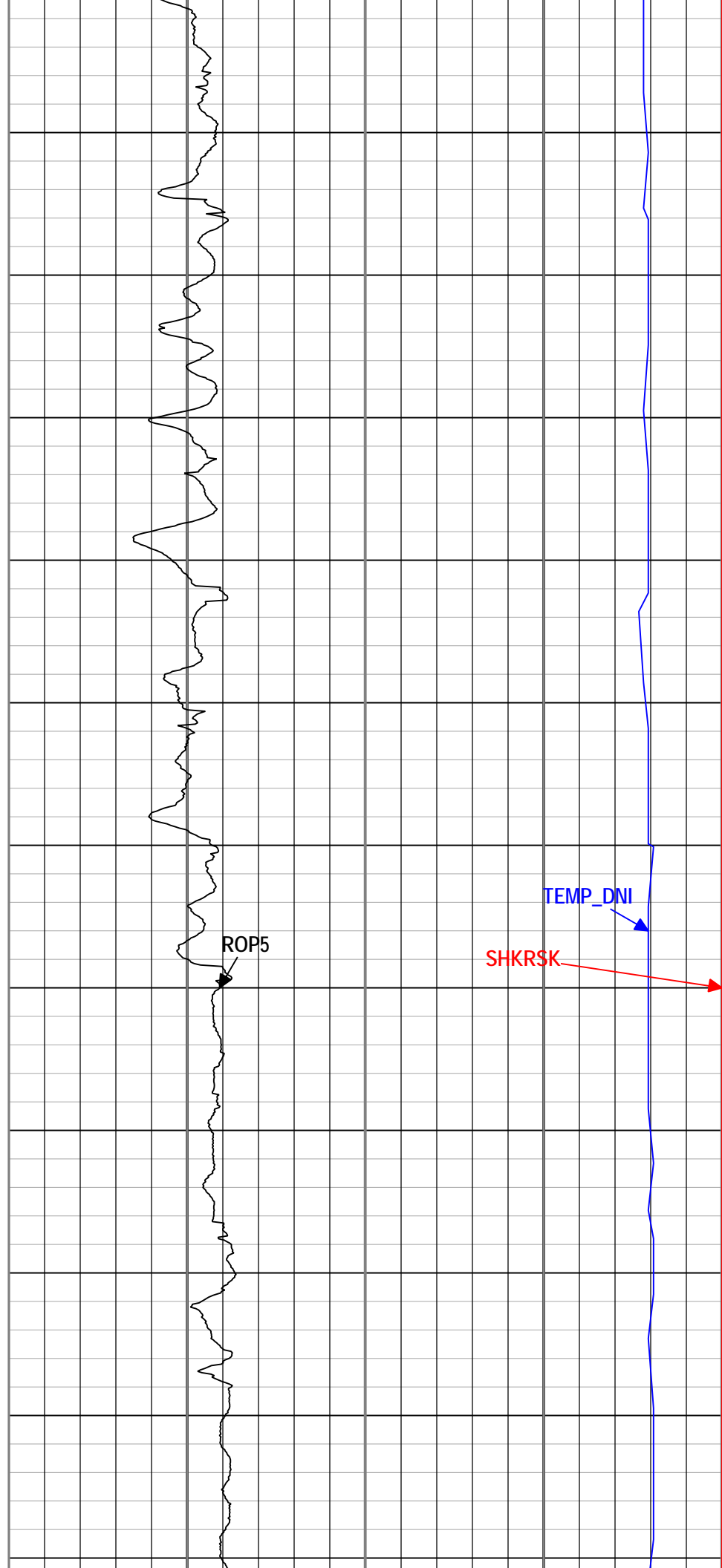
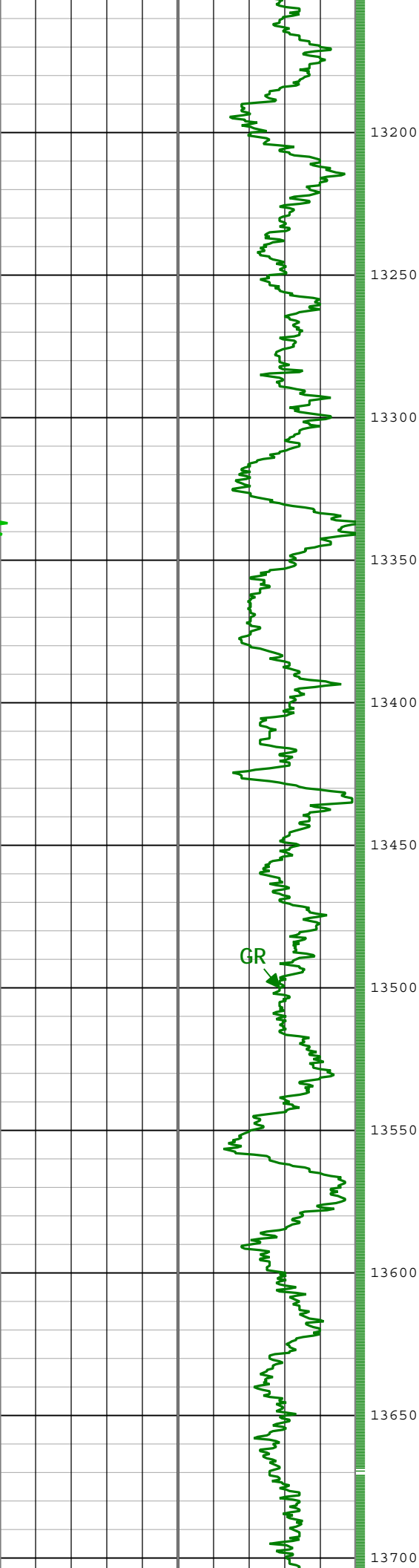
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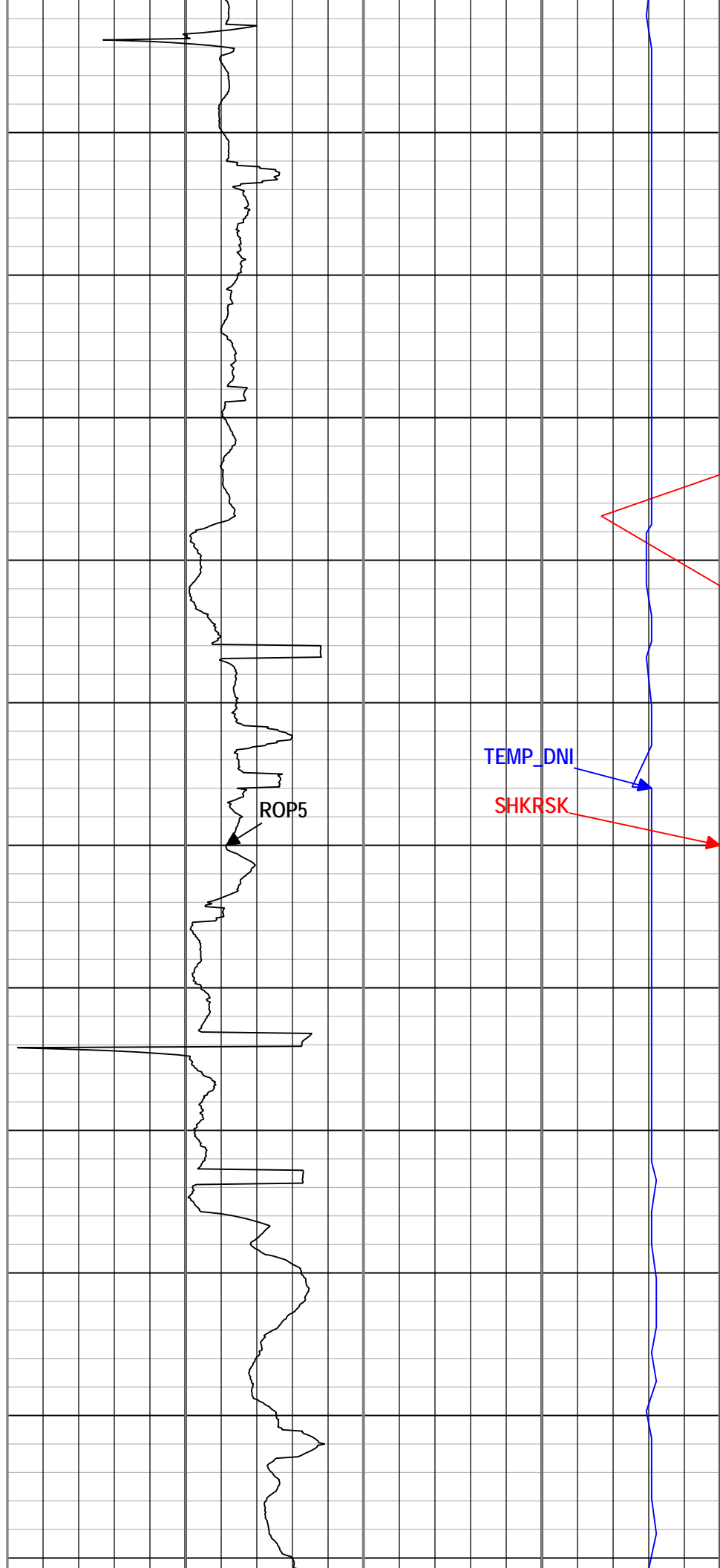
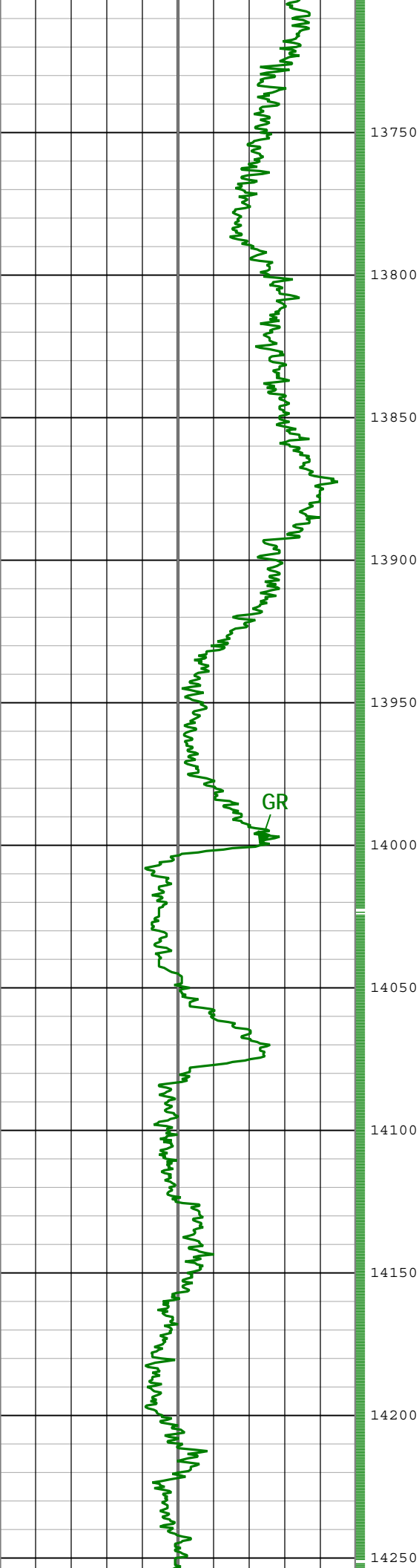


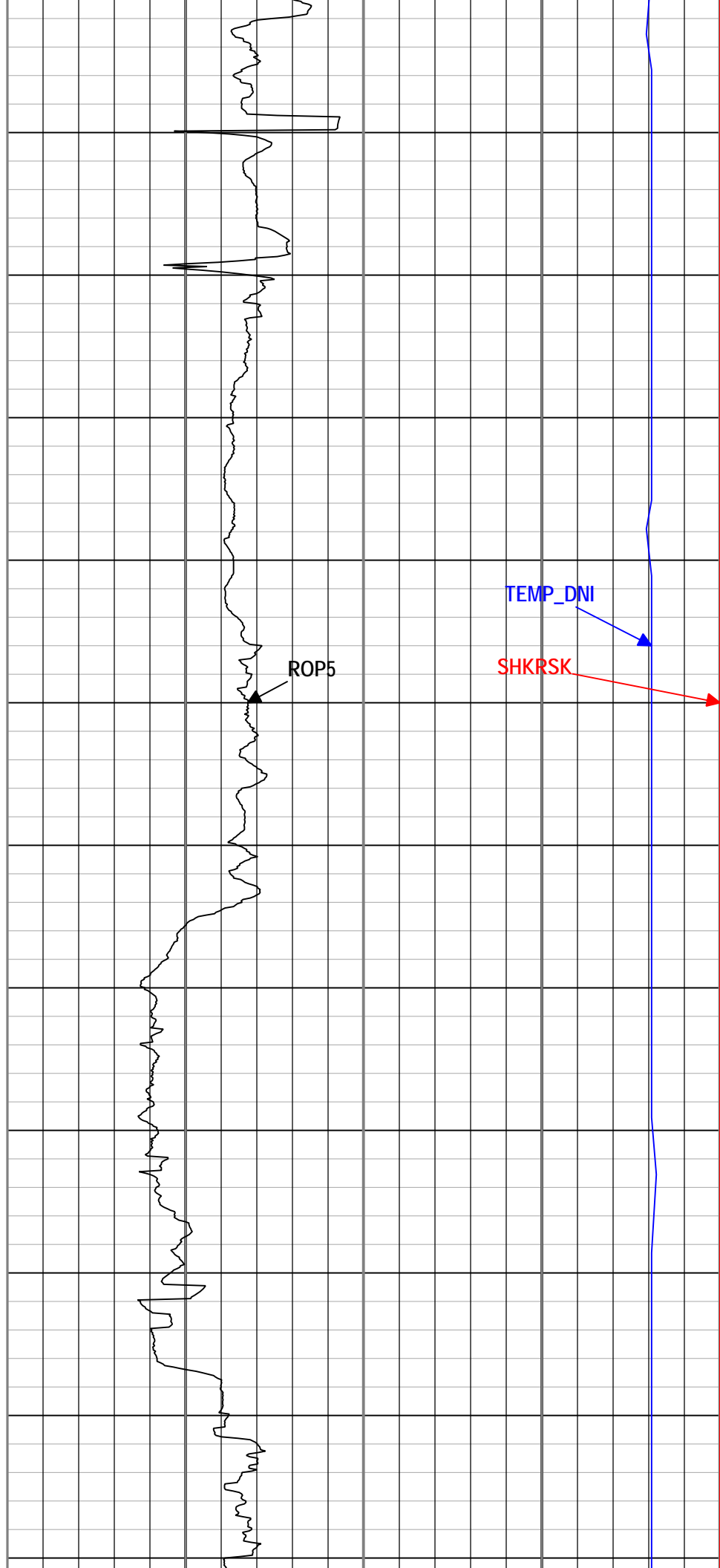
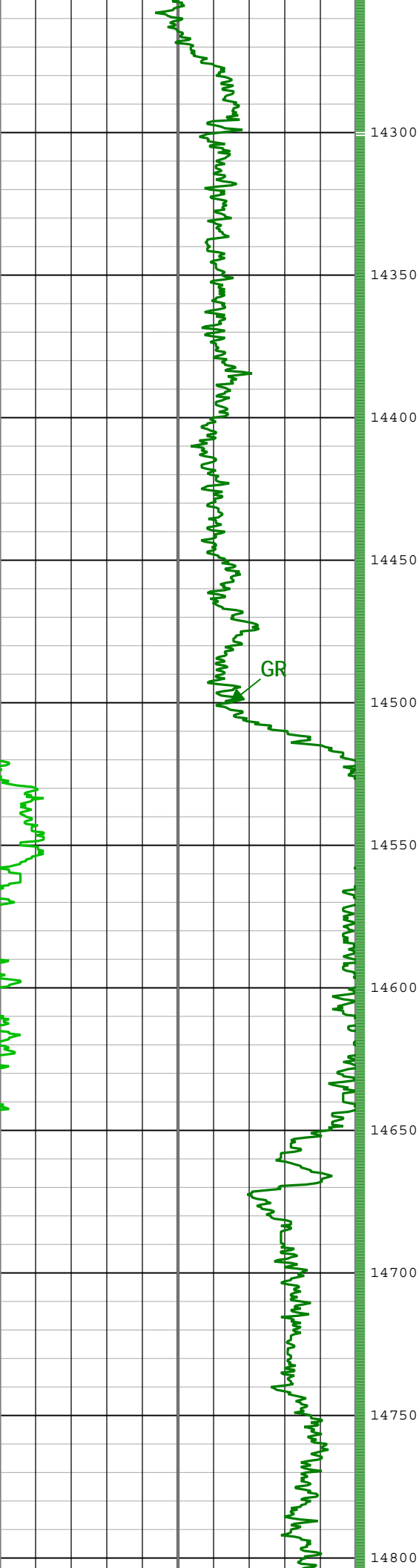


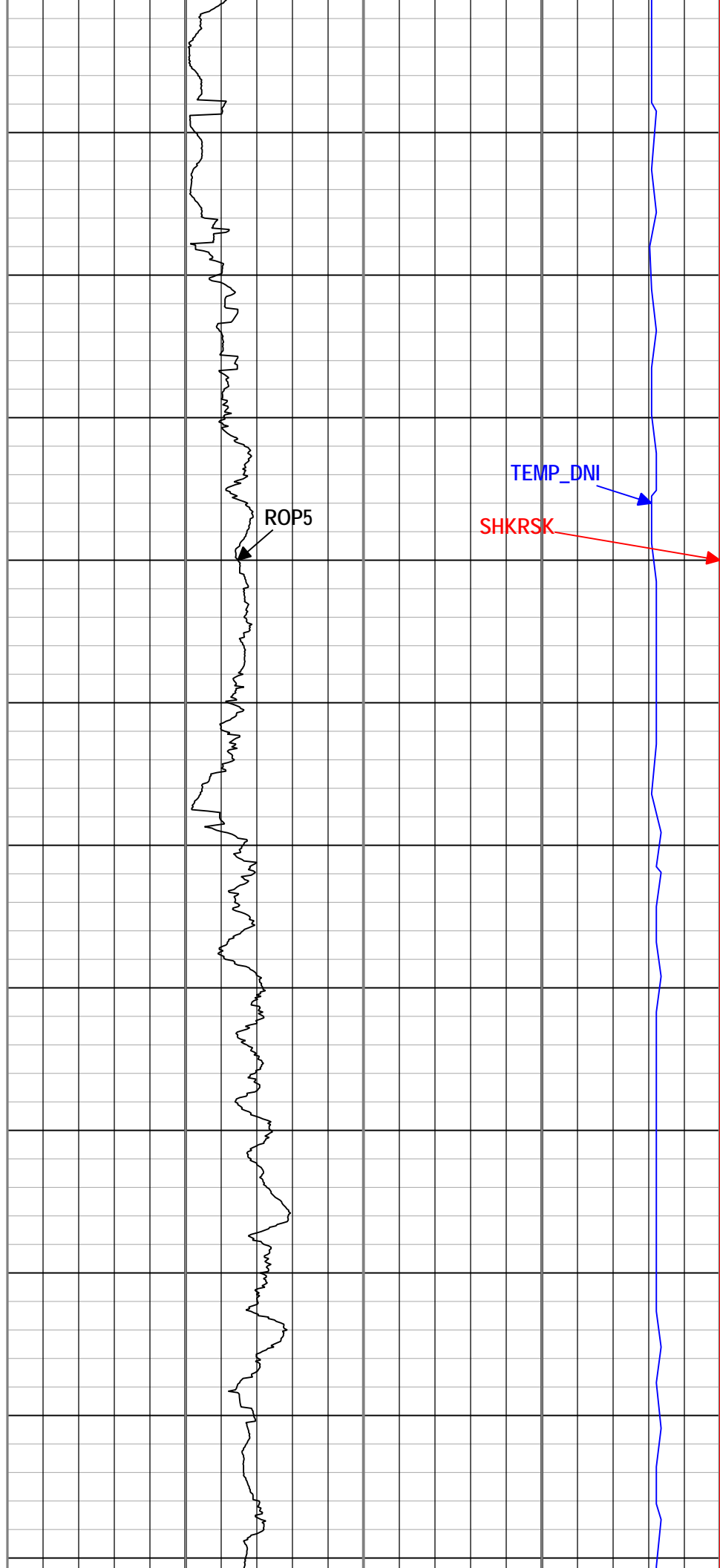
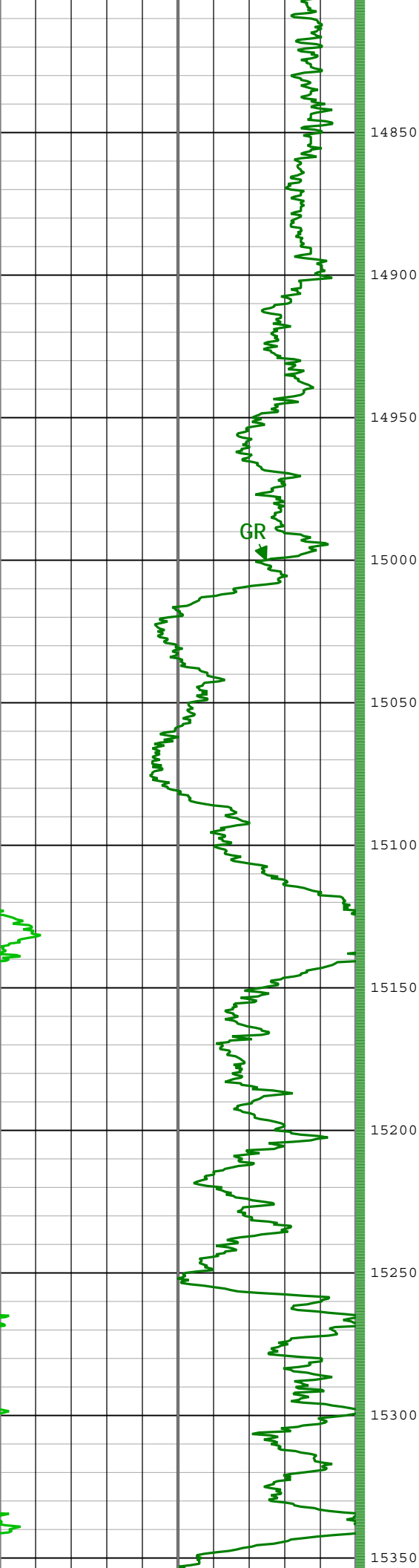


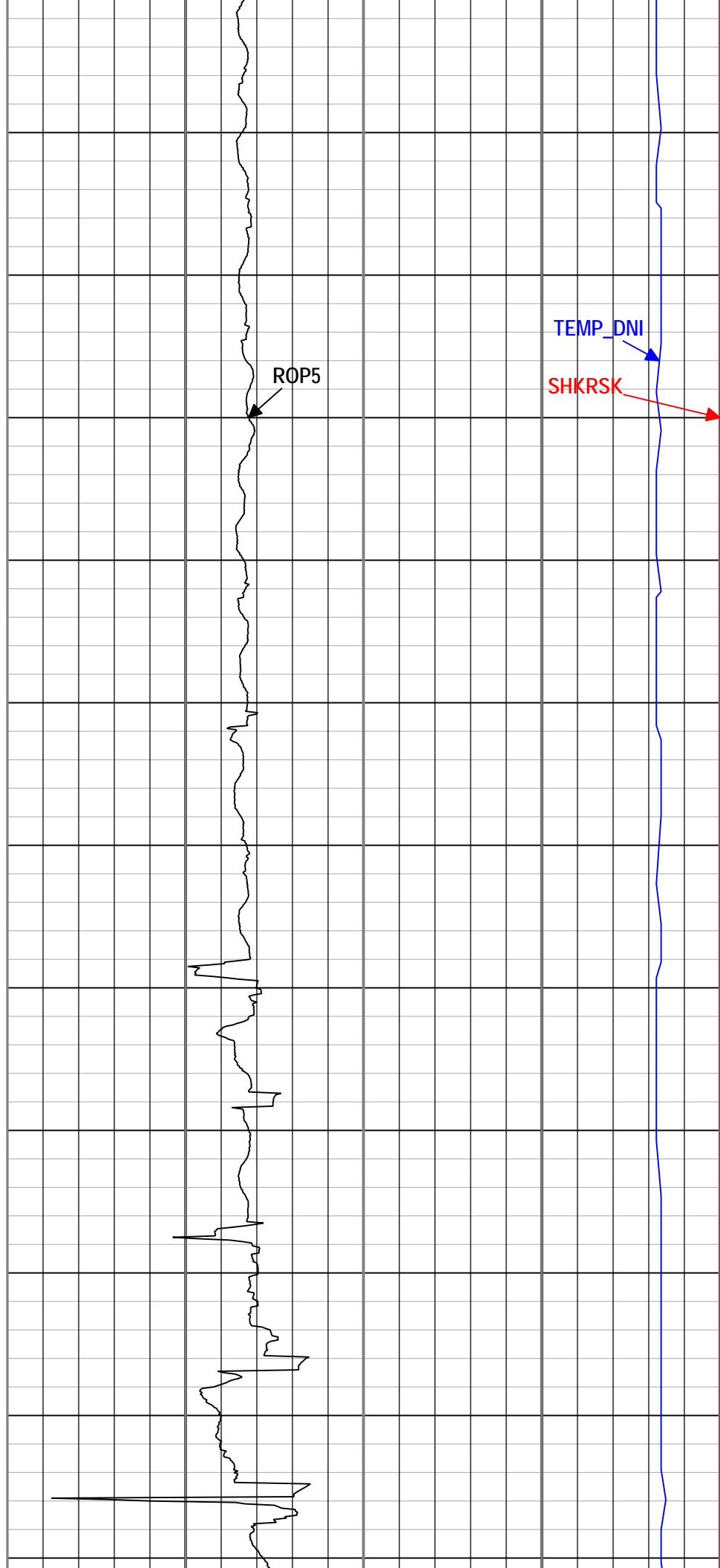
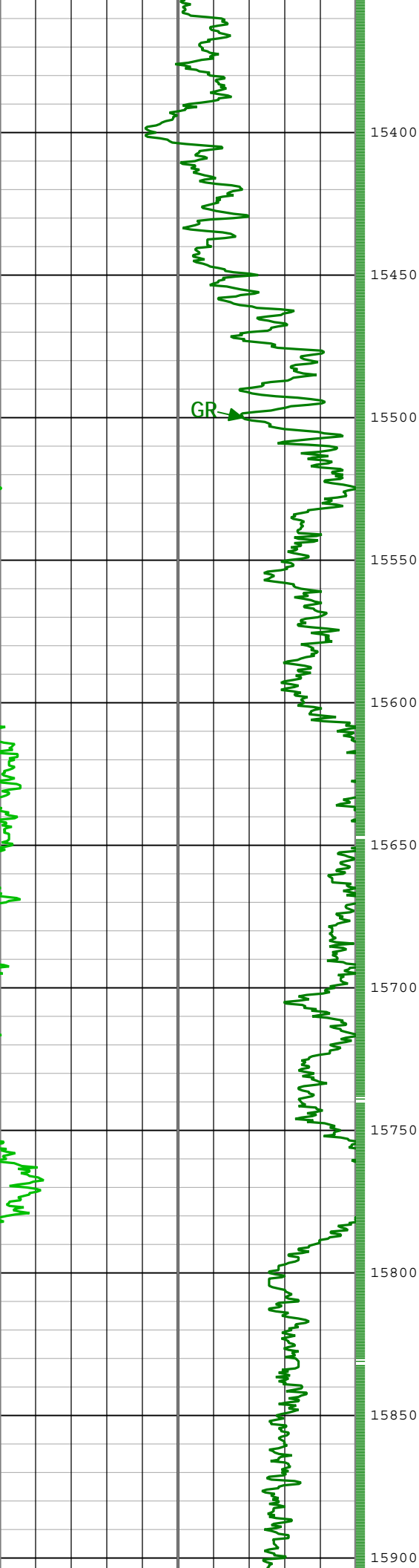


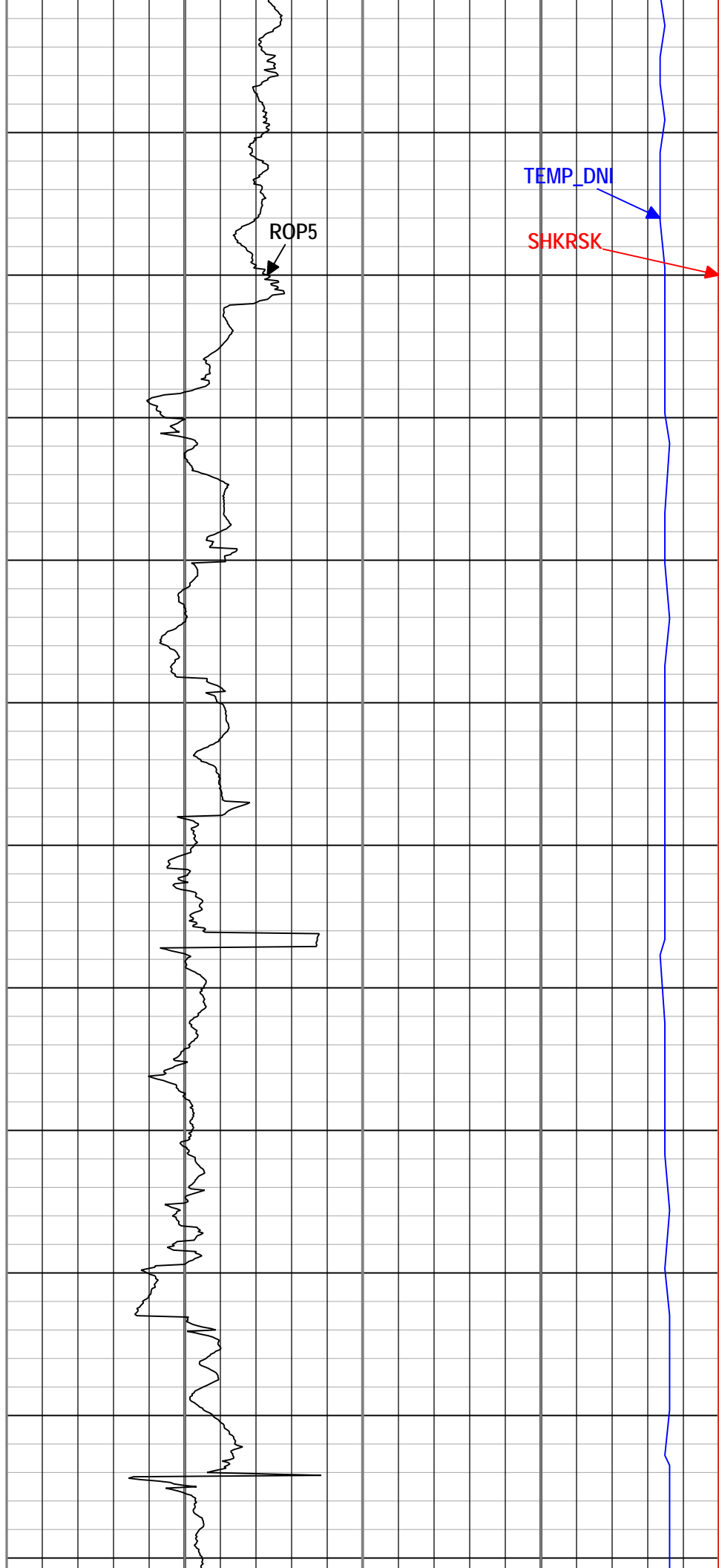
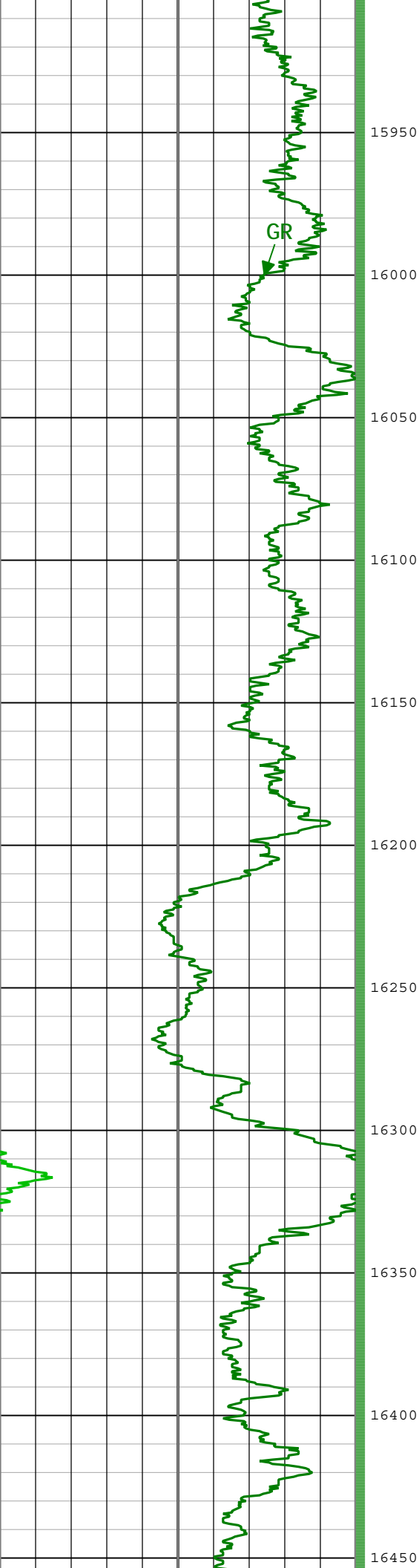


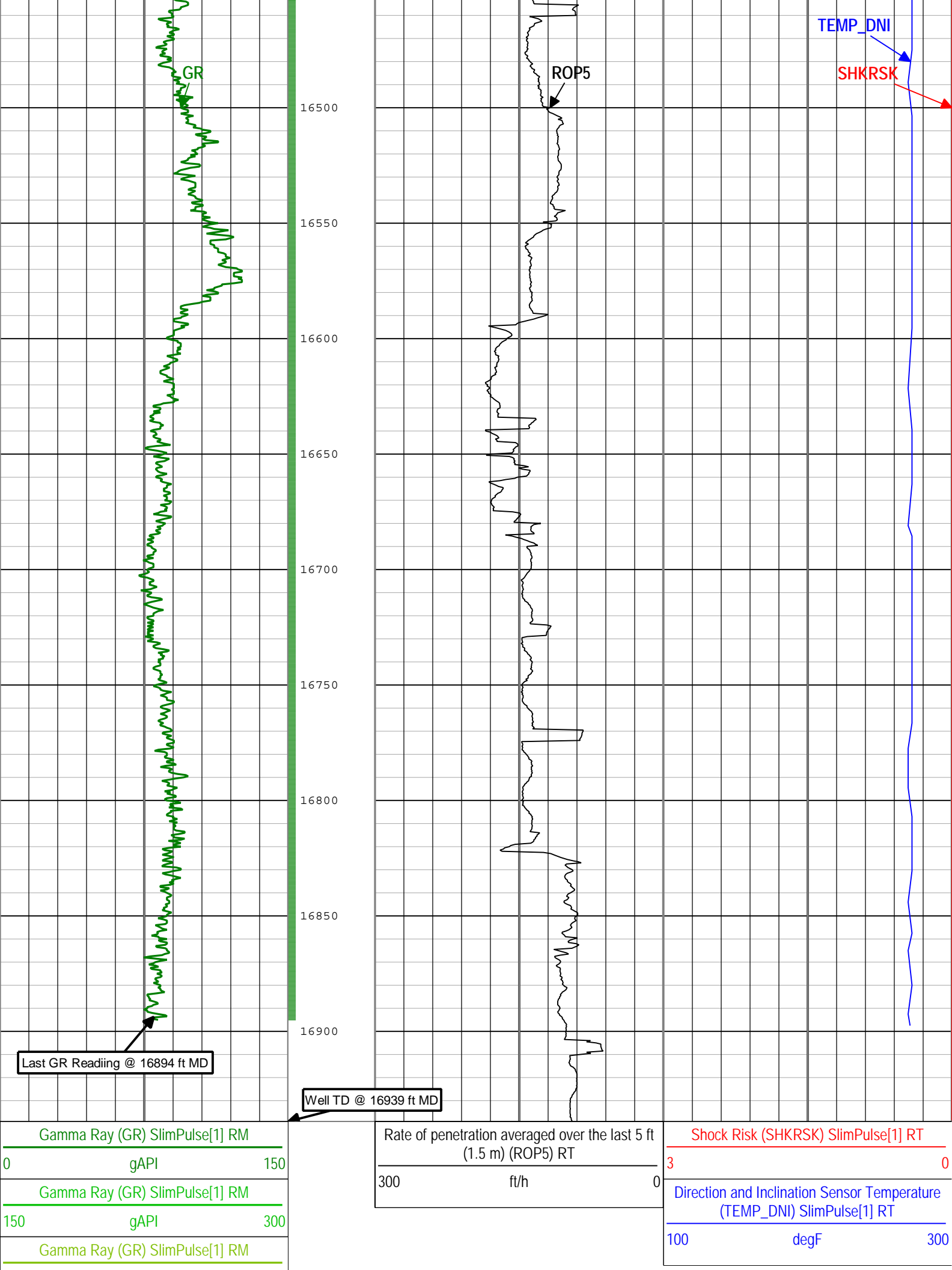




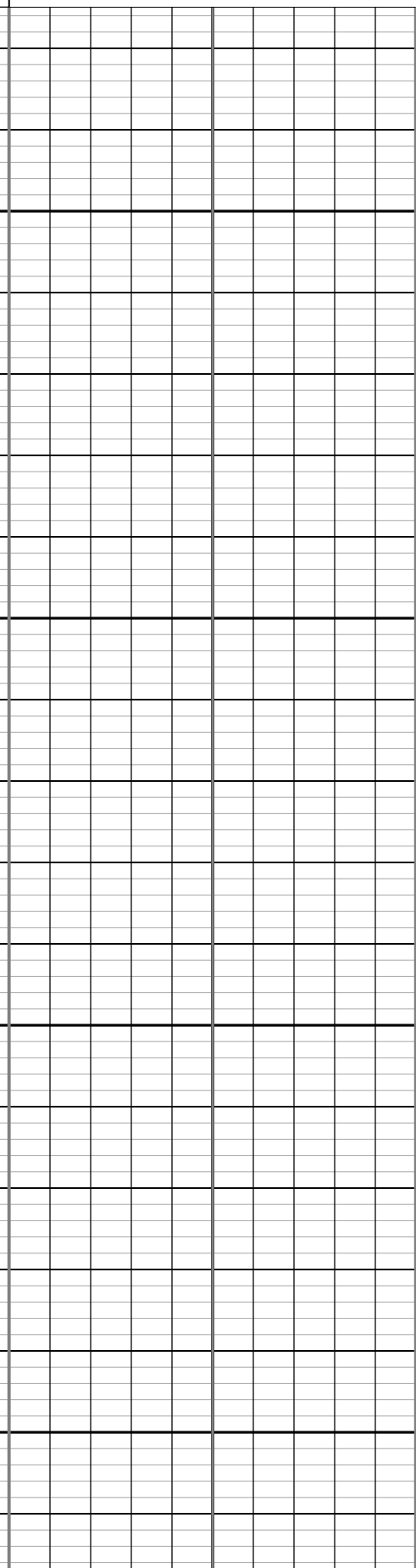
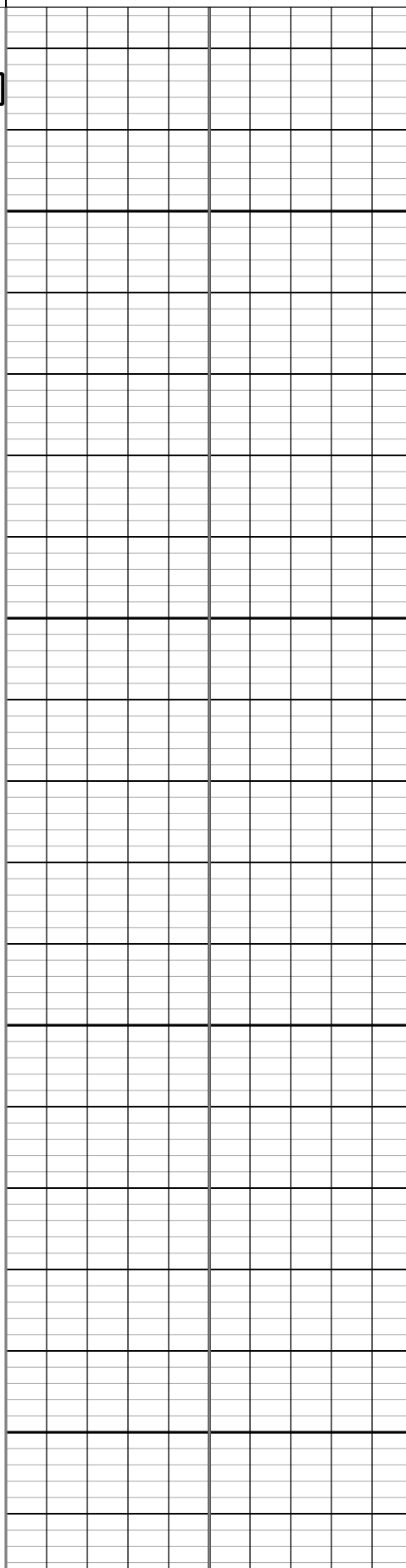
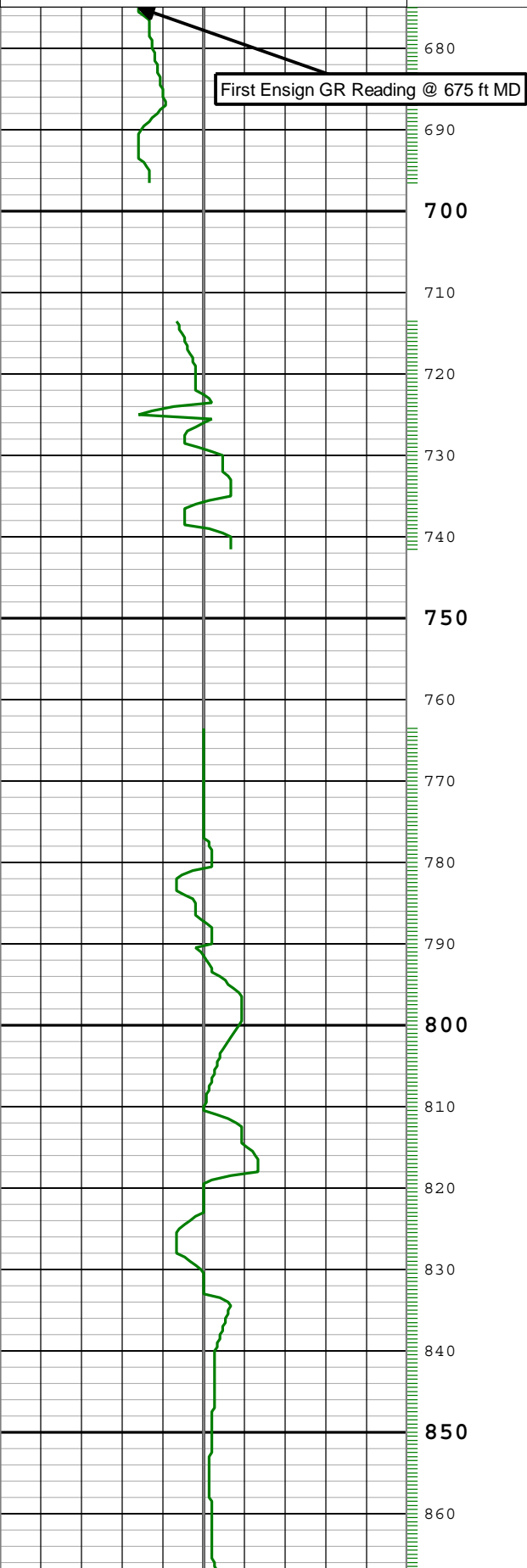


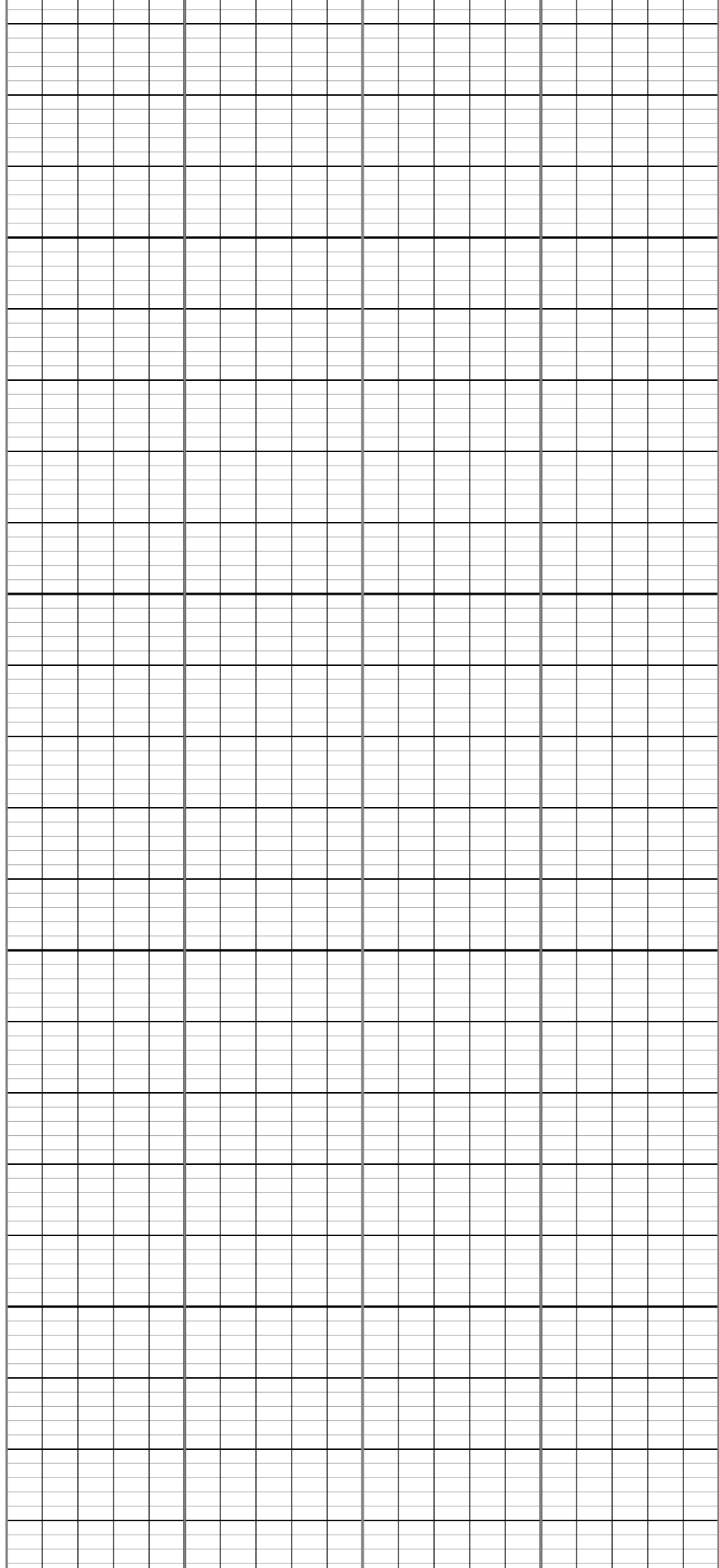
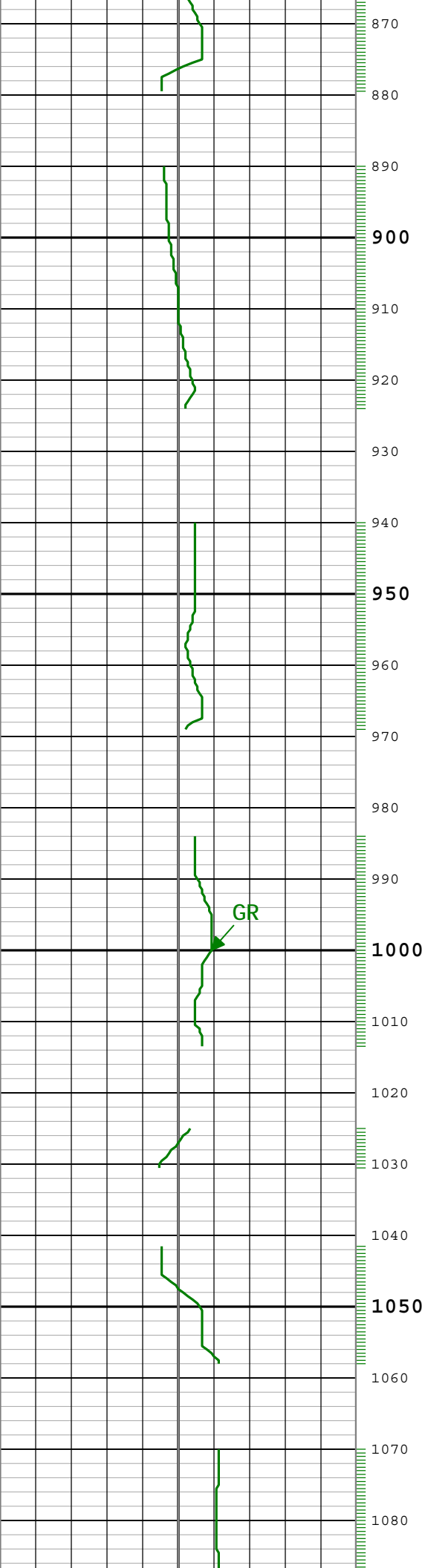


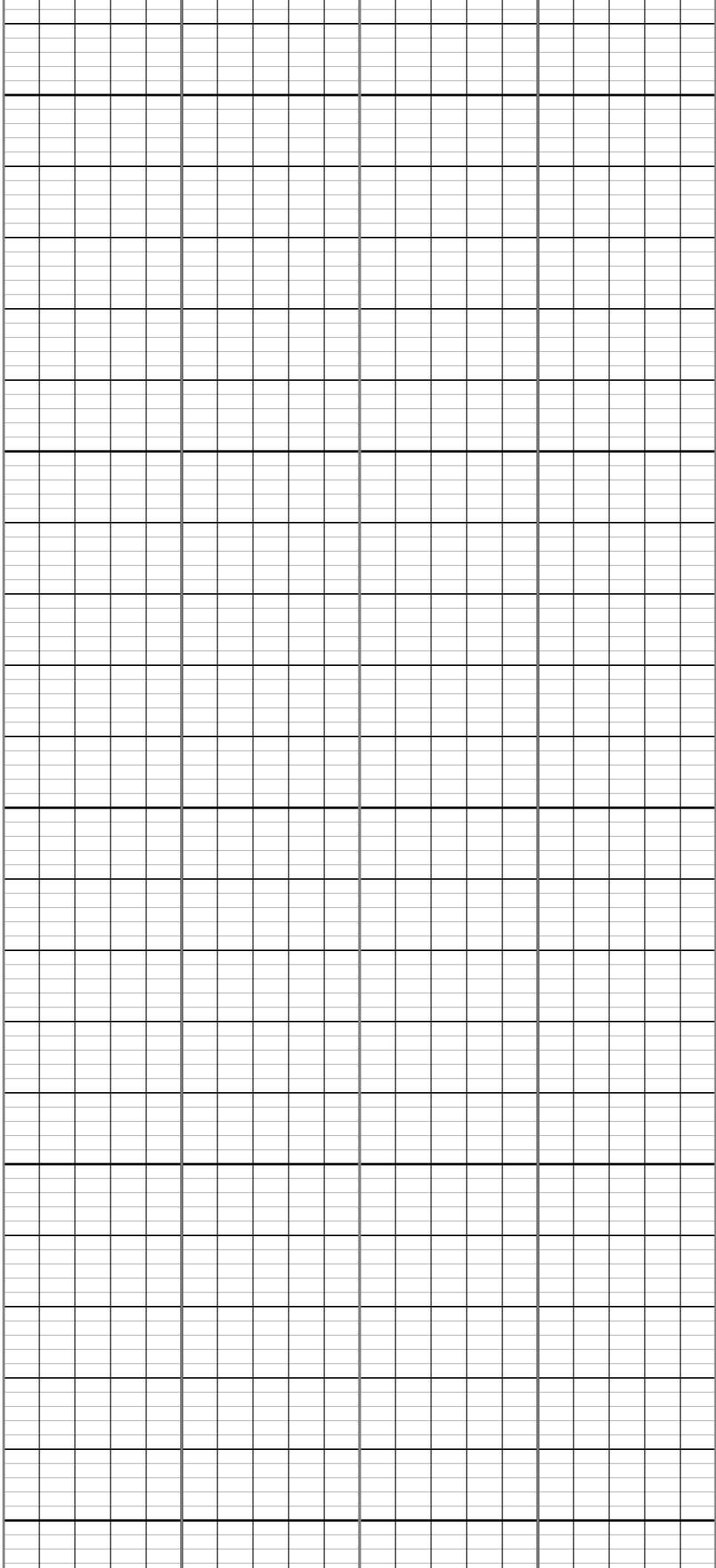
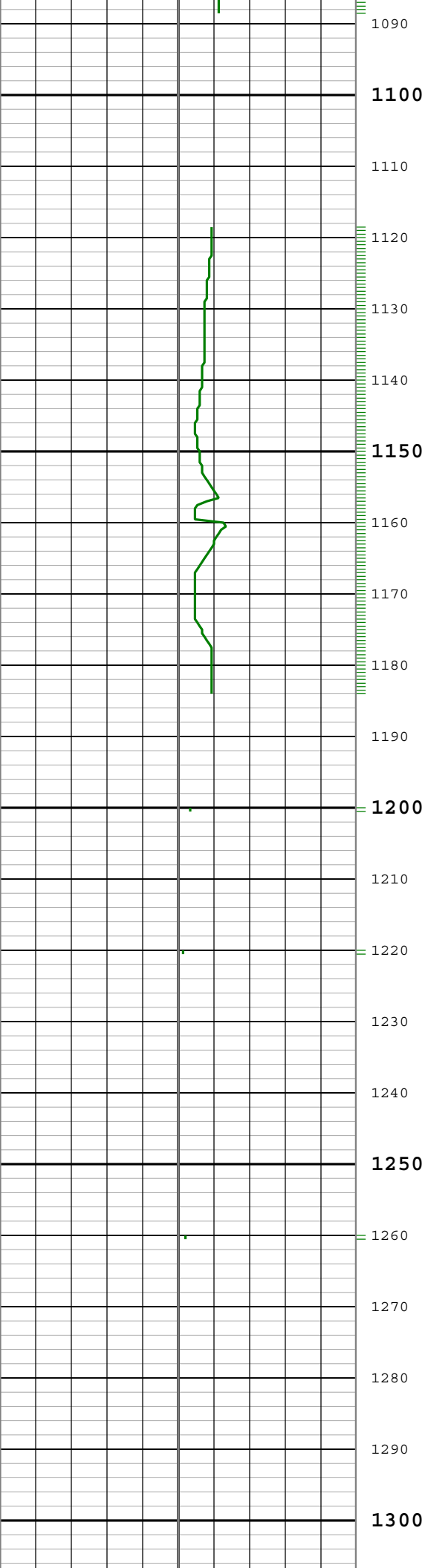


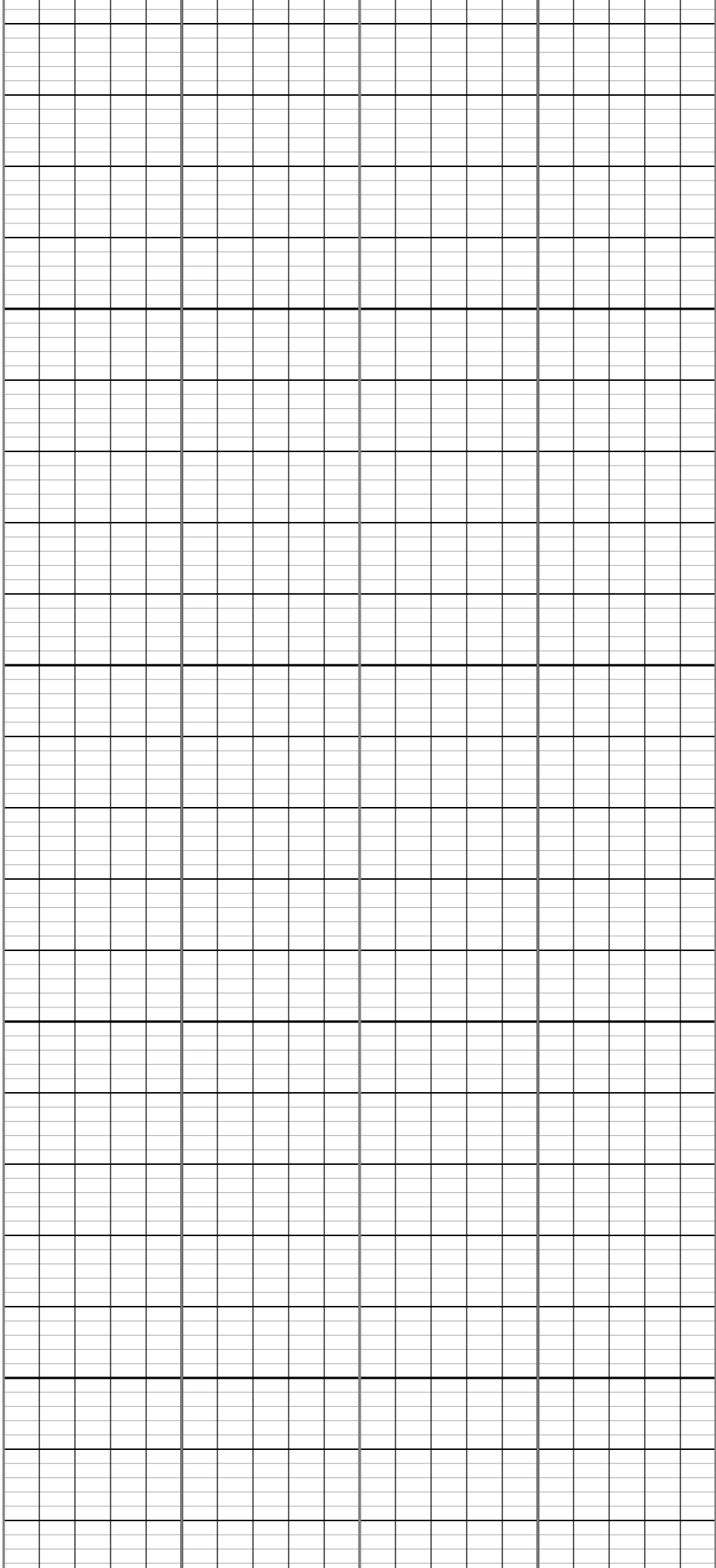
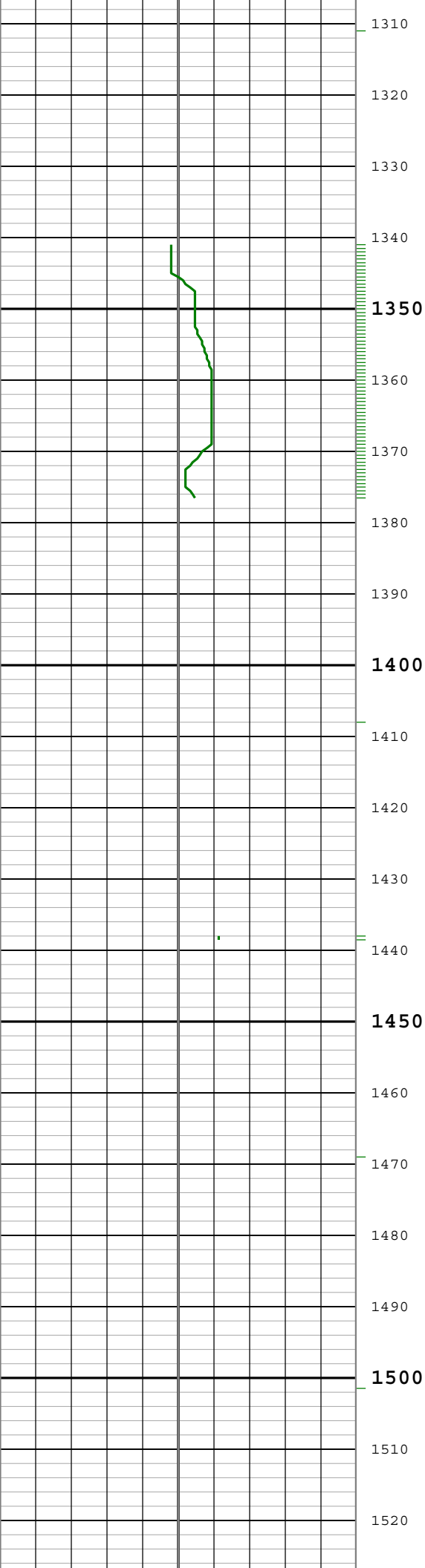


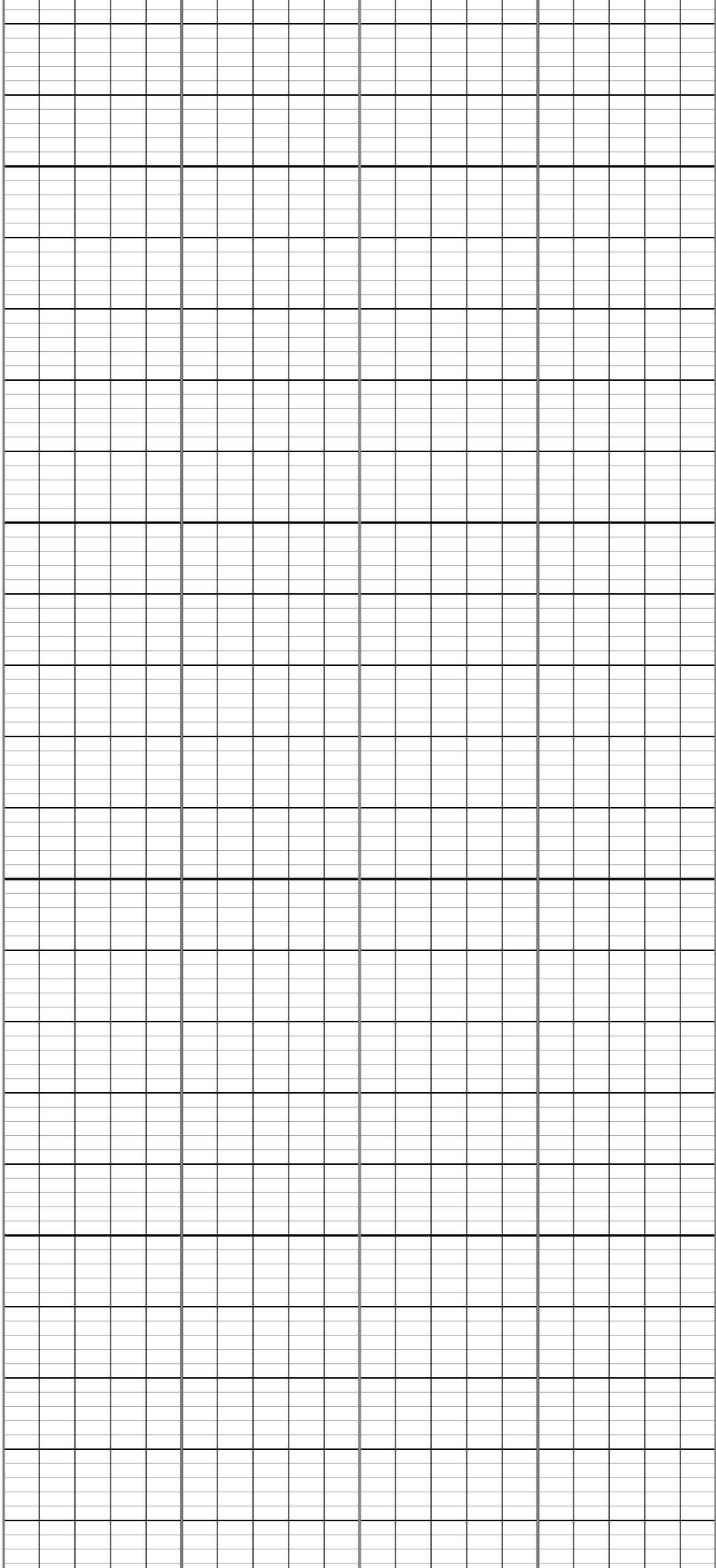
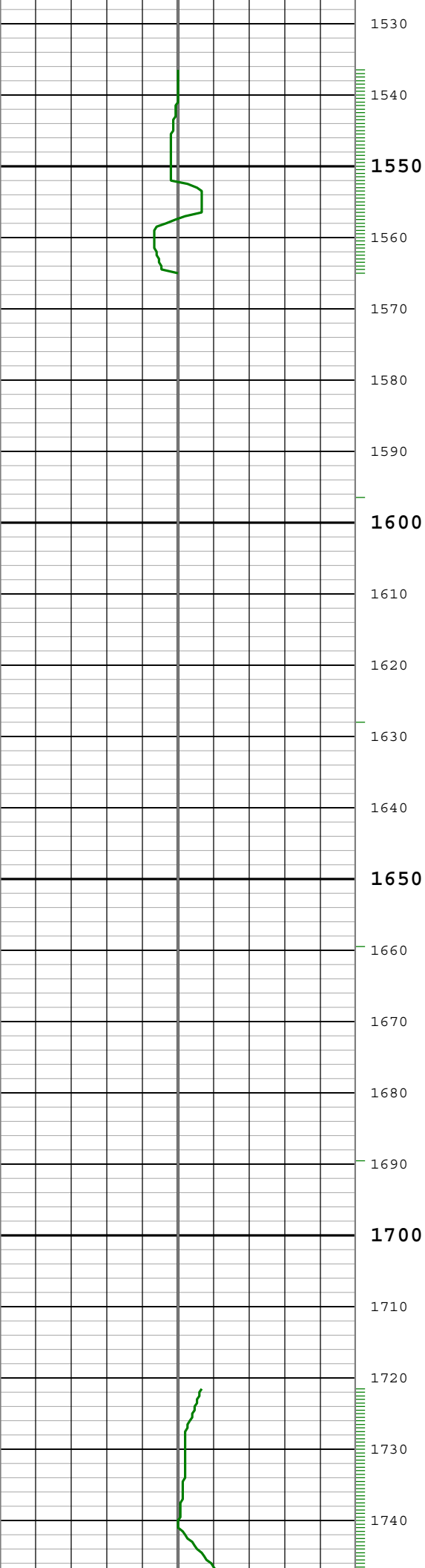
300	gAPI	450	└ GR - Gamma Ray SlimPulse[1] RM				
Description: Format: Log (EOW_MD) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 12-Aug-2014 13:51:46							
Channel Processing Parameters							
Run001: Parameters							
Parameter	Description			Tool	Value		Unit
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	8.75		7366.31		7409		
BS	6.125		7409		16939		
All depth are actual.							
Run001Time Zoned Parameters							
Pass Drilling							
Parameter	Value		Start Time	Stop Time	Start Depth (ft)		Stop Depth (ft)
DFD	9.5		30-Jul-2014 23:33:30	02-Aug-2014 03:00:00	7423.25		12062.67
DFD	9.55		02-Aug-2014 03:00:00	03-Aug-2014 03:00:00	12062.67		14159.67
DFD	9.85		03-Aug-2014 03:00:00	04-Aug-2014 02:00:00	14159.67		15736.92
DFD	9.4		04-Aug-2014 02:00:00	06-Aug-2014 00:07:34	15736.92		16939.33
All depth are at tool zero.							
Tool Control Parameters							
UDComposite 1							
Software Version							
Acquisition System				Version			
MaxWell				4.0.9163.3000			
Application Patch				Patch-SP-10767_22480-4.0.9163.3001			
				Patch-NPD_ADN8D_SP3-23661-4.0.9530.3002			
				Patch-Hotfix_overwrite_survey_for_petrolink-23199-4.0.9530.3002			
				Patch-Hotfix_MRT_SP3-23306-4.0.9530.3002			
				Patch-Hotfix_ECO_SP3-23896-4.0.9530.3002			
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	7423.25 ft	16939.33 ft	30-Jul-2014 11:33:30 PM	06-Aug-2014 12:07:34 AM	No
All depths are referenced to toolstring zero							
Log				Company:Noble Energy		Well:Heartland G25-72-1HN	
UDComposite 1:S249							
Description: Format: Log (EOW_MD) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 12-Aug-2014 13:51:49							
				└ GR - Gamma Ray SlimPulse[1] RM			
G - GR (GR) SlimPulse[1] RM							

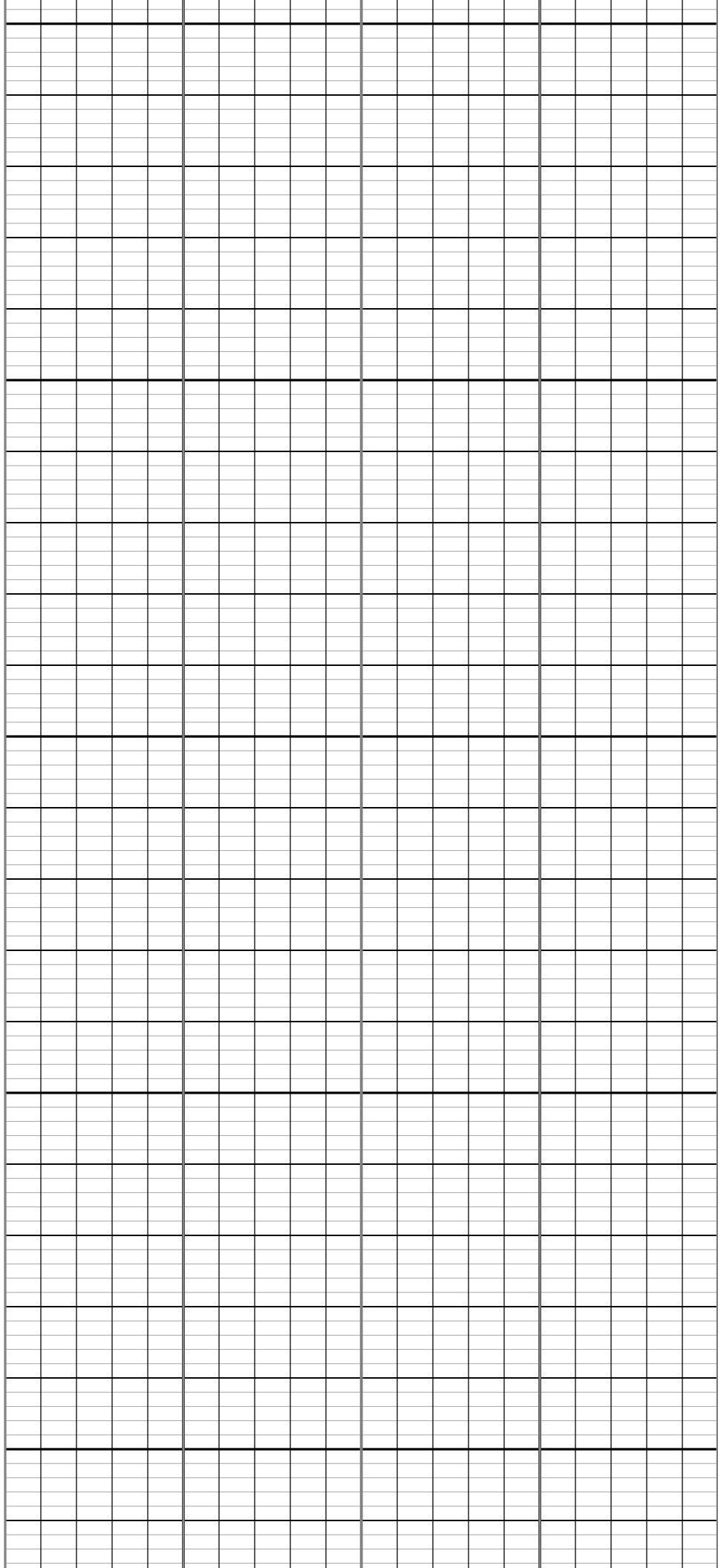
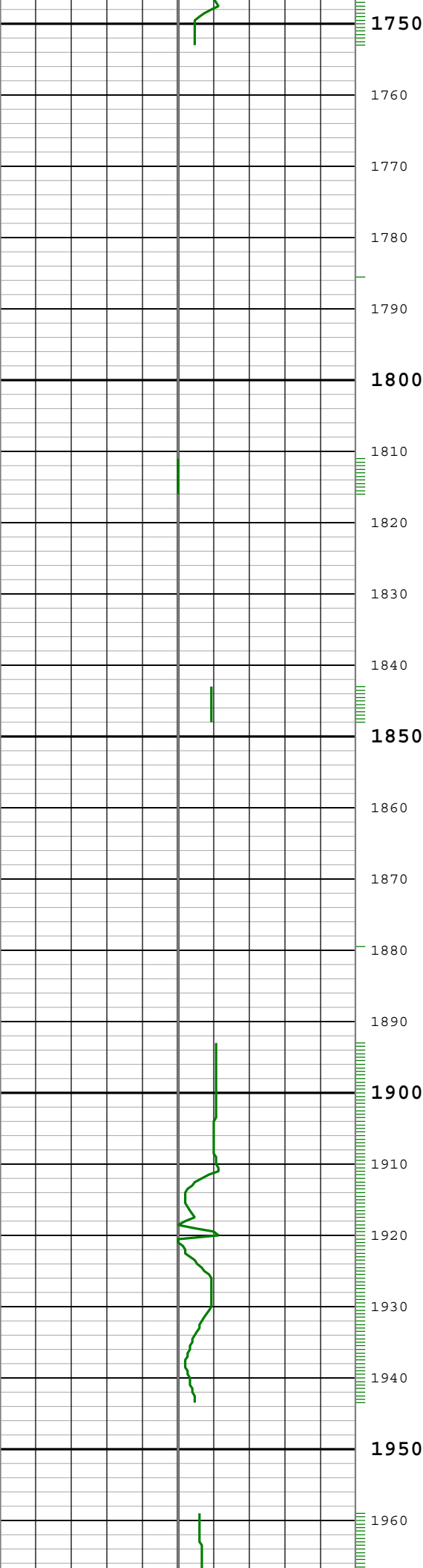


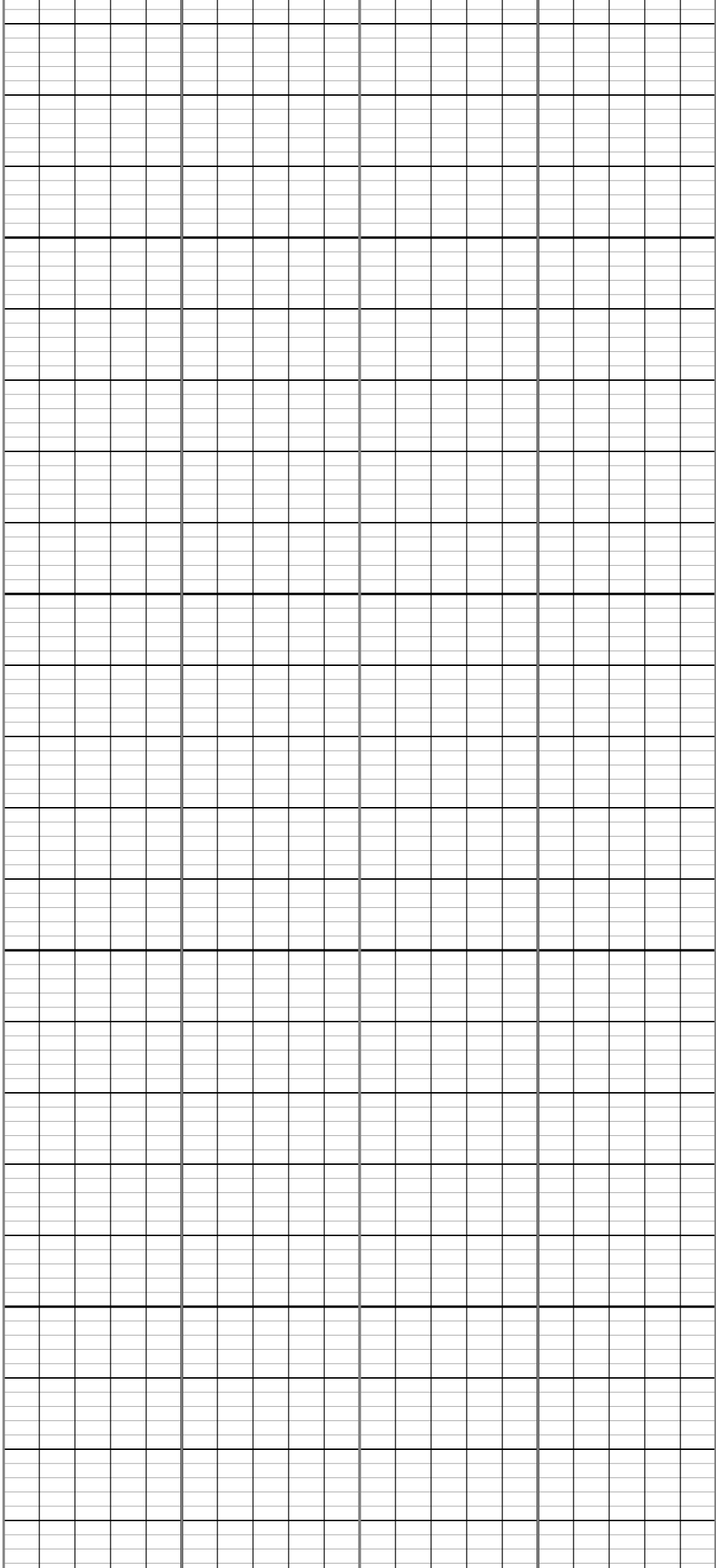
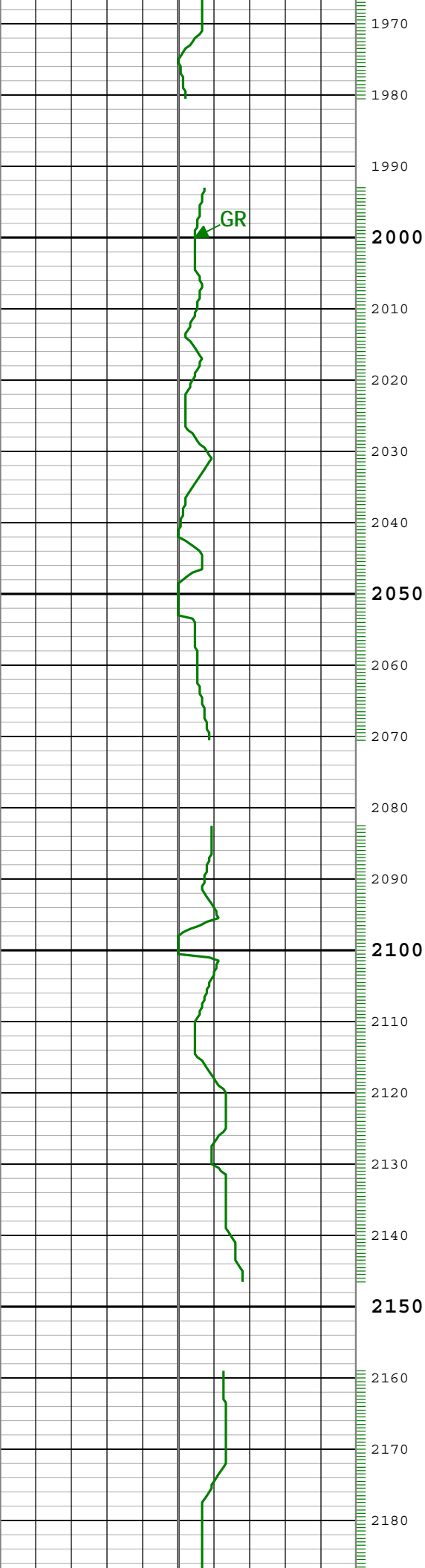


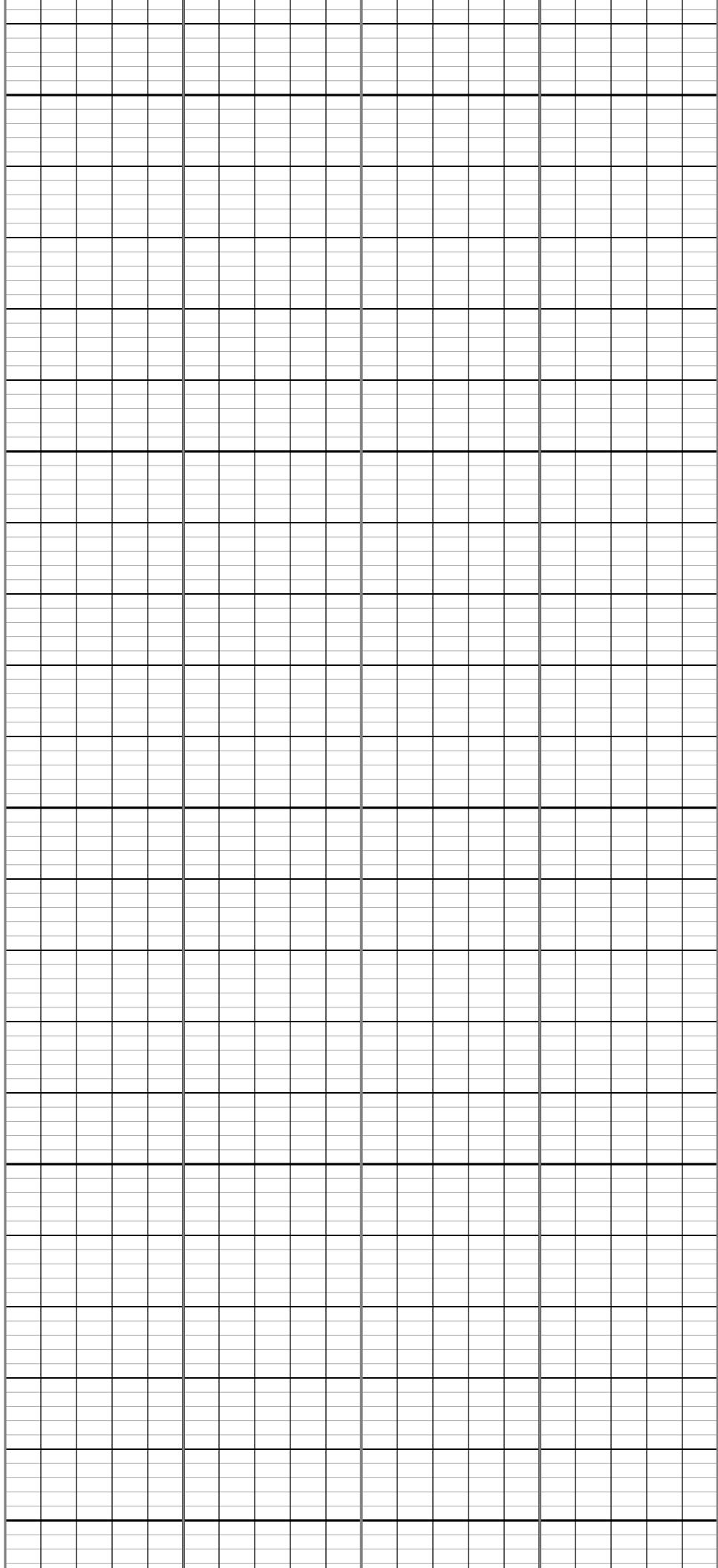
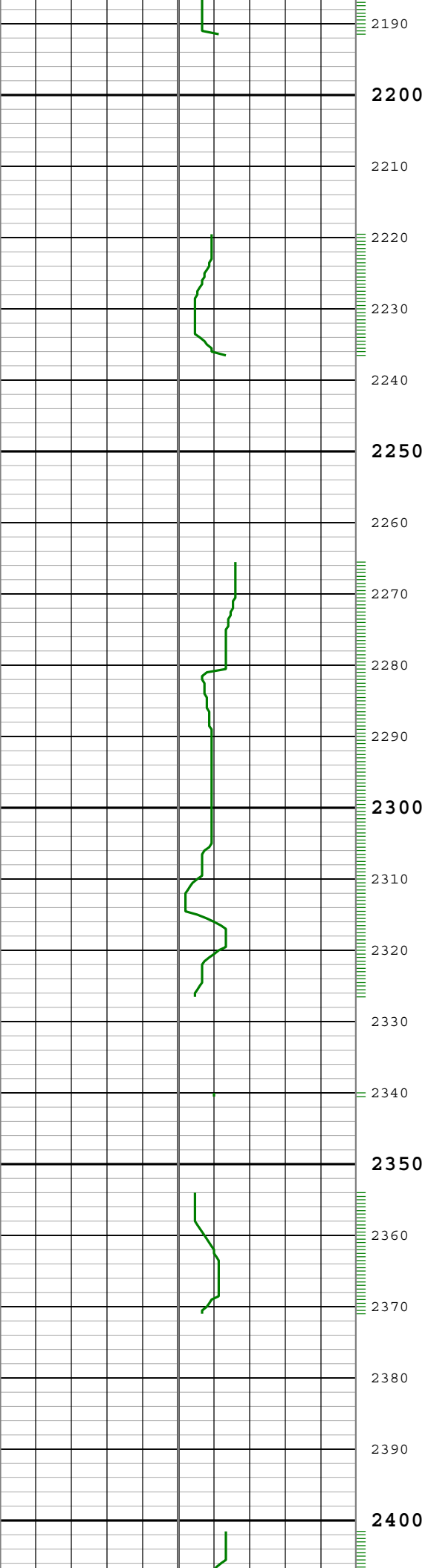


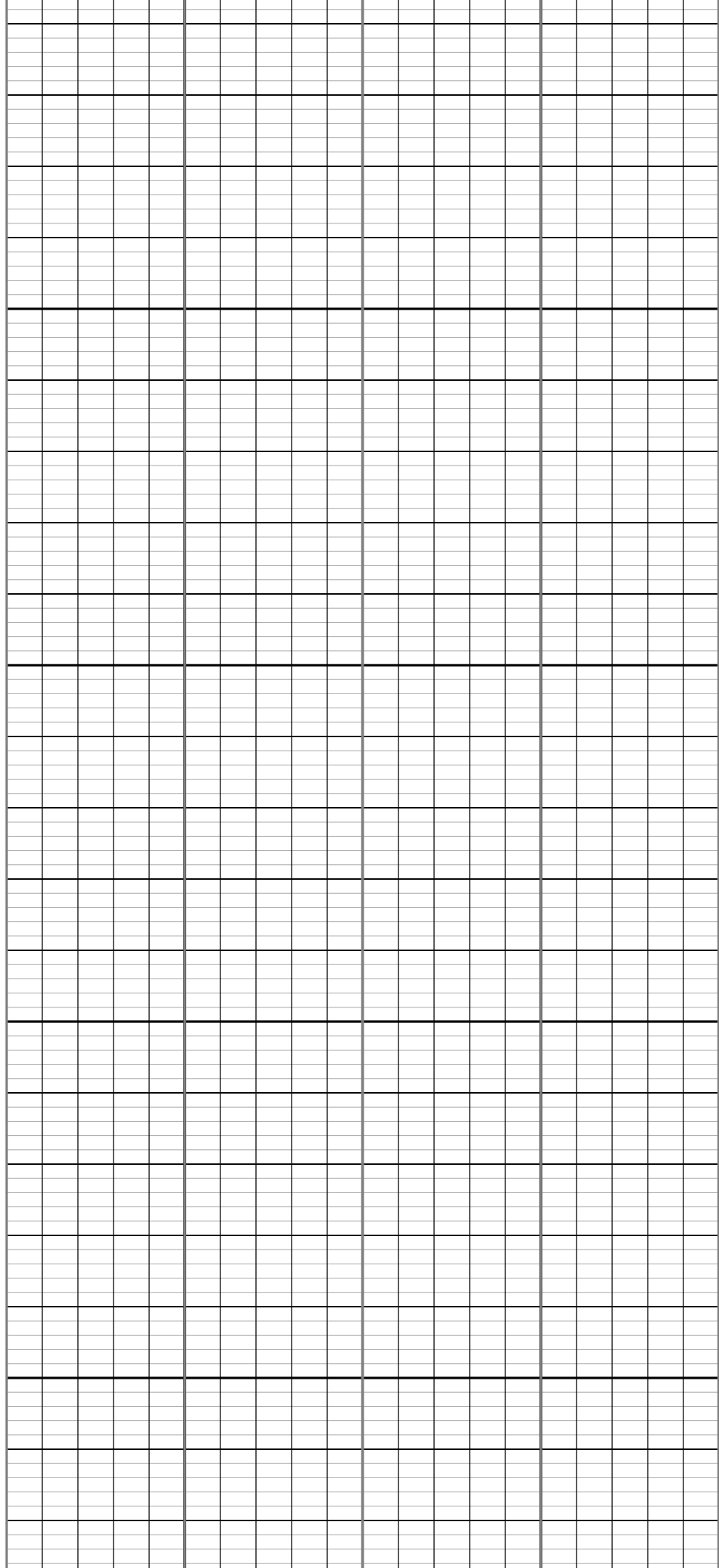
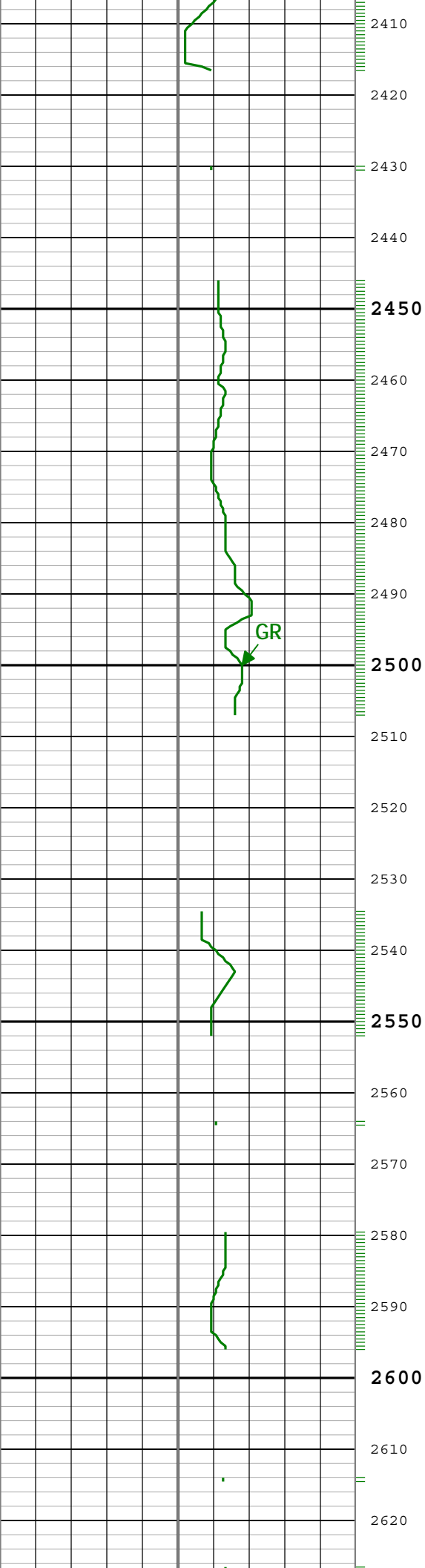


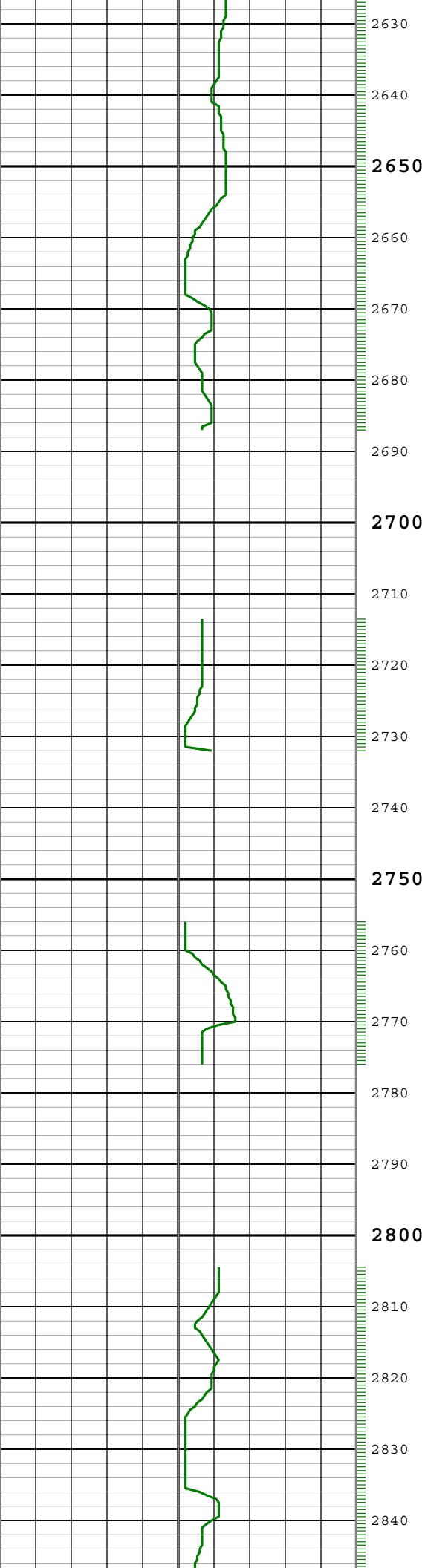


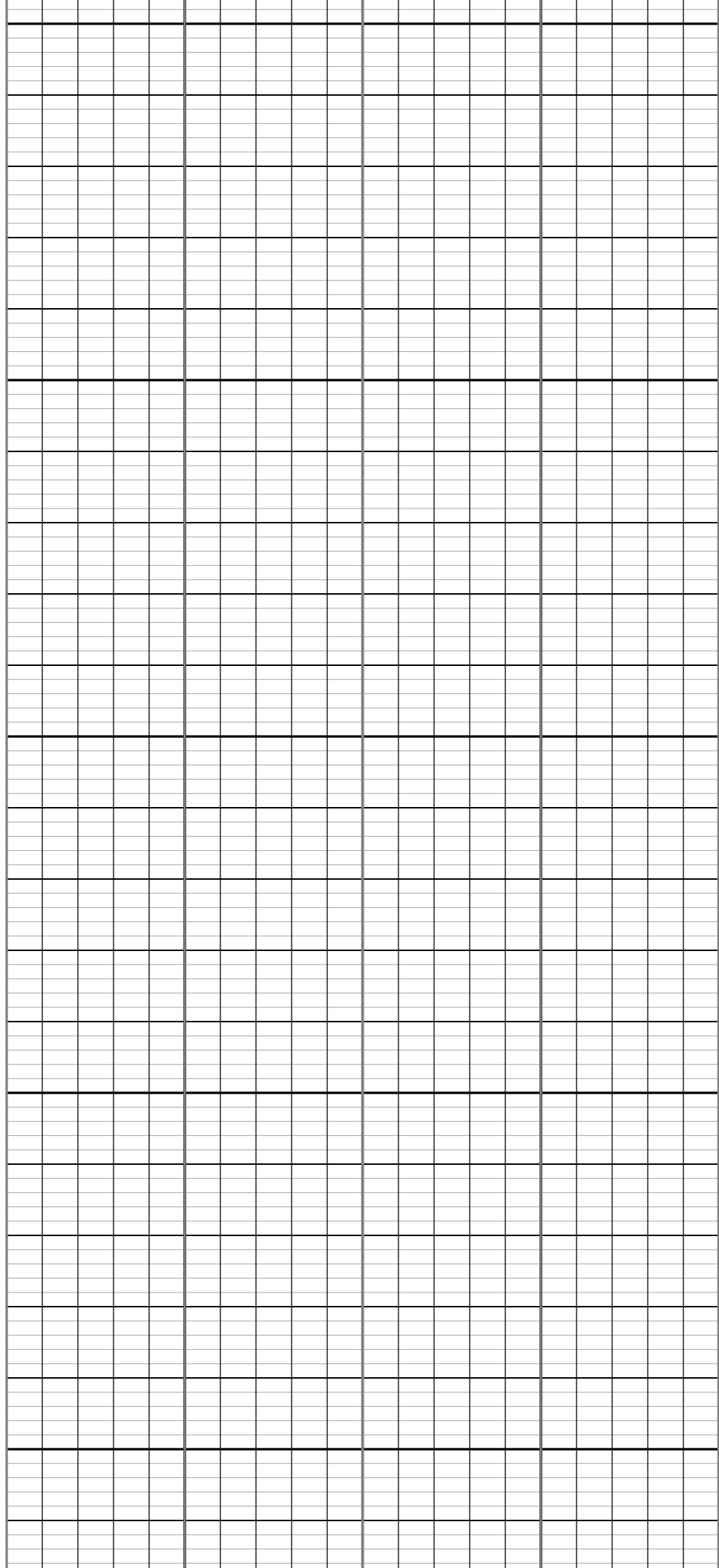
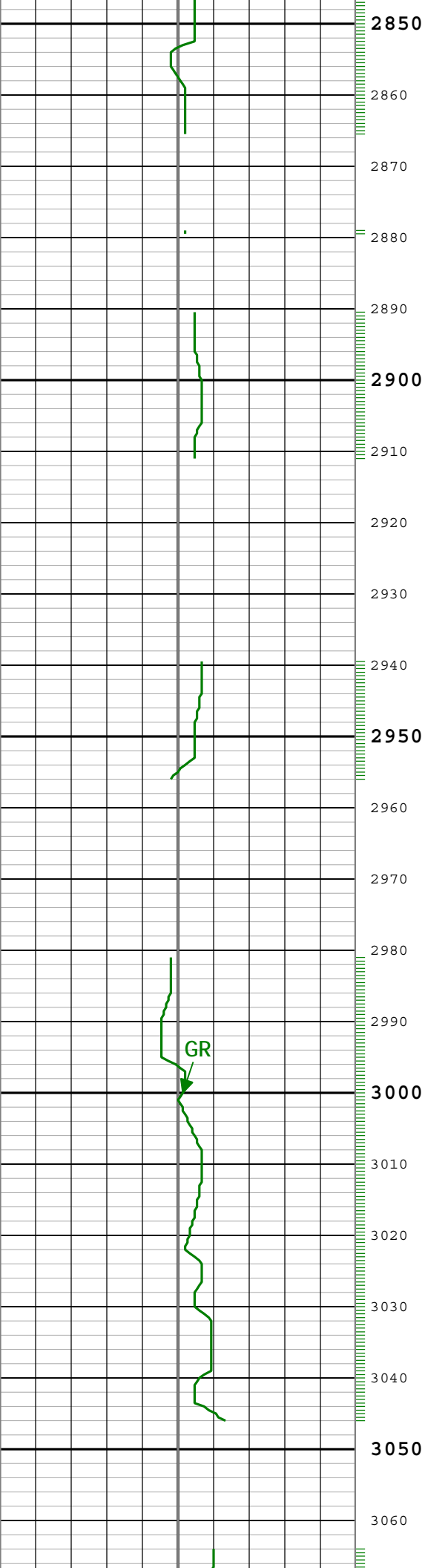


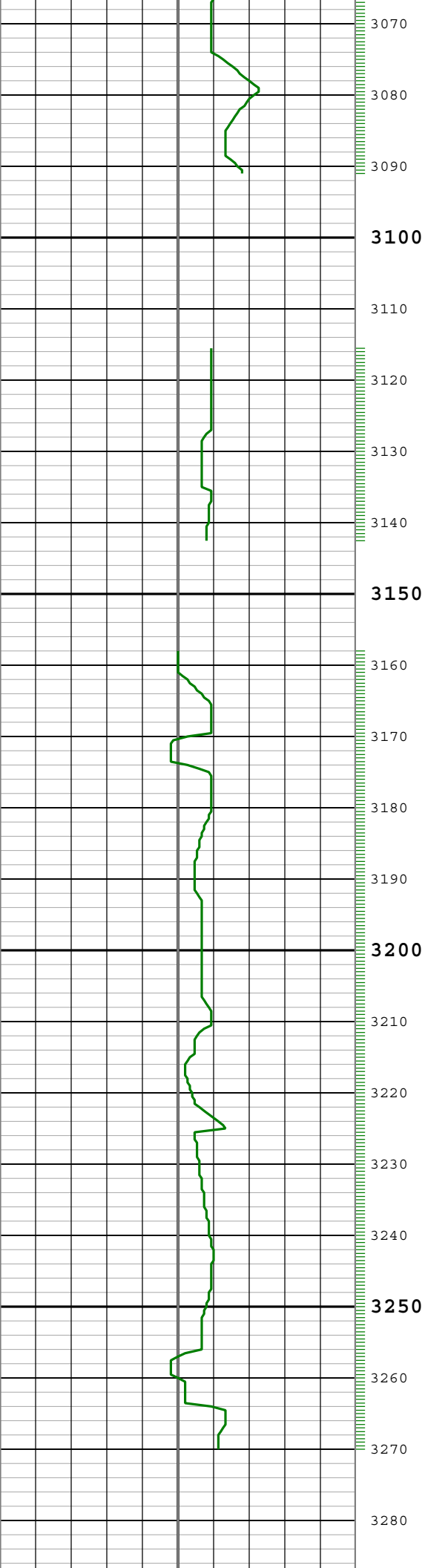


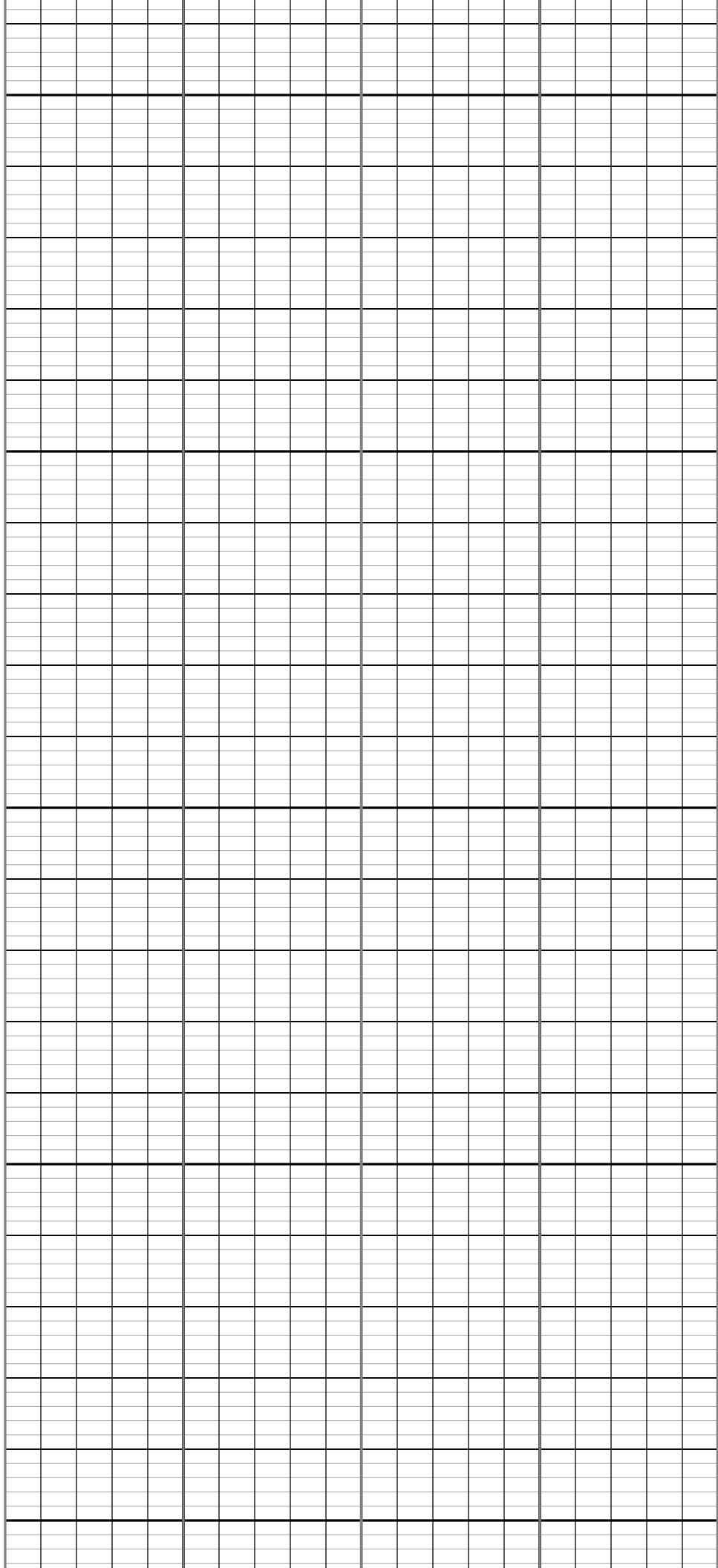
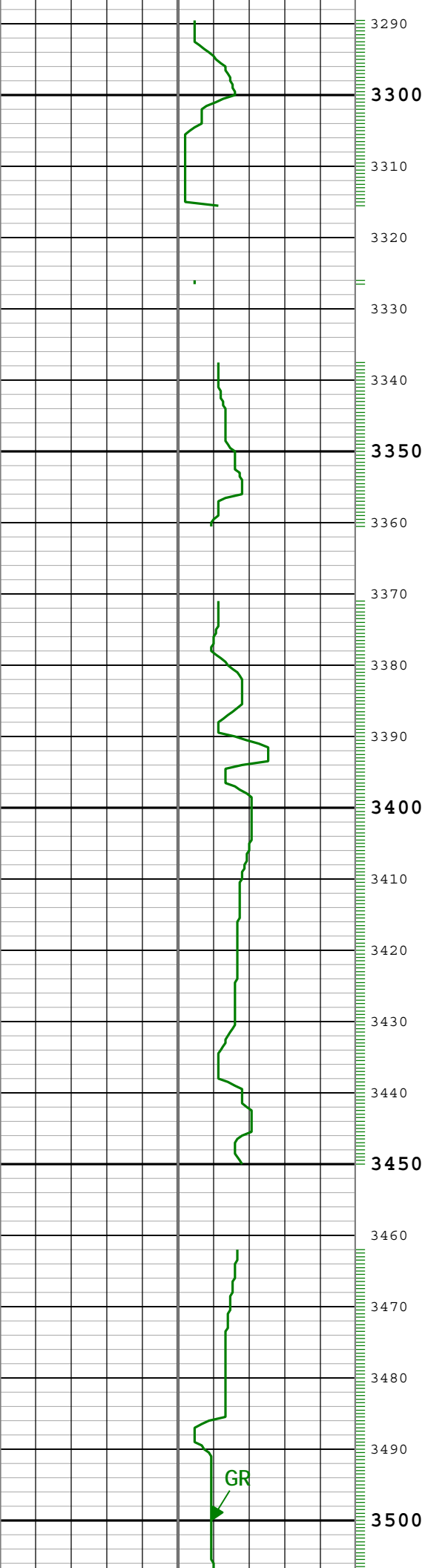


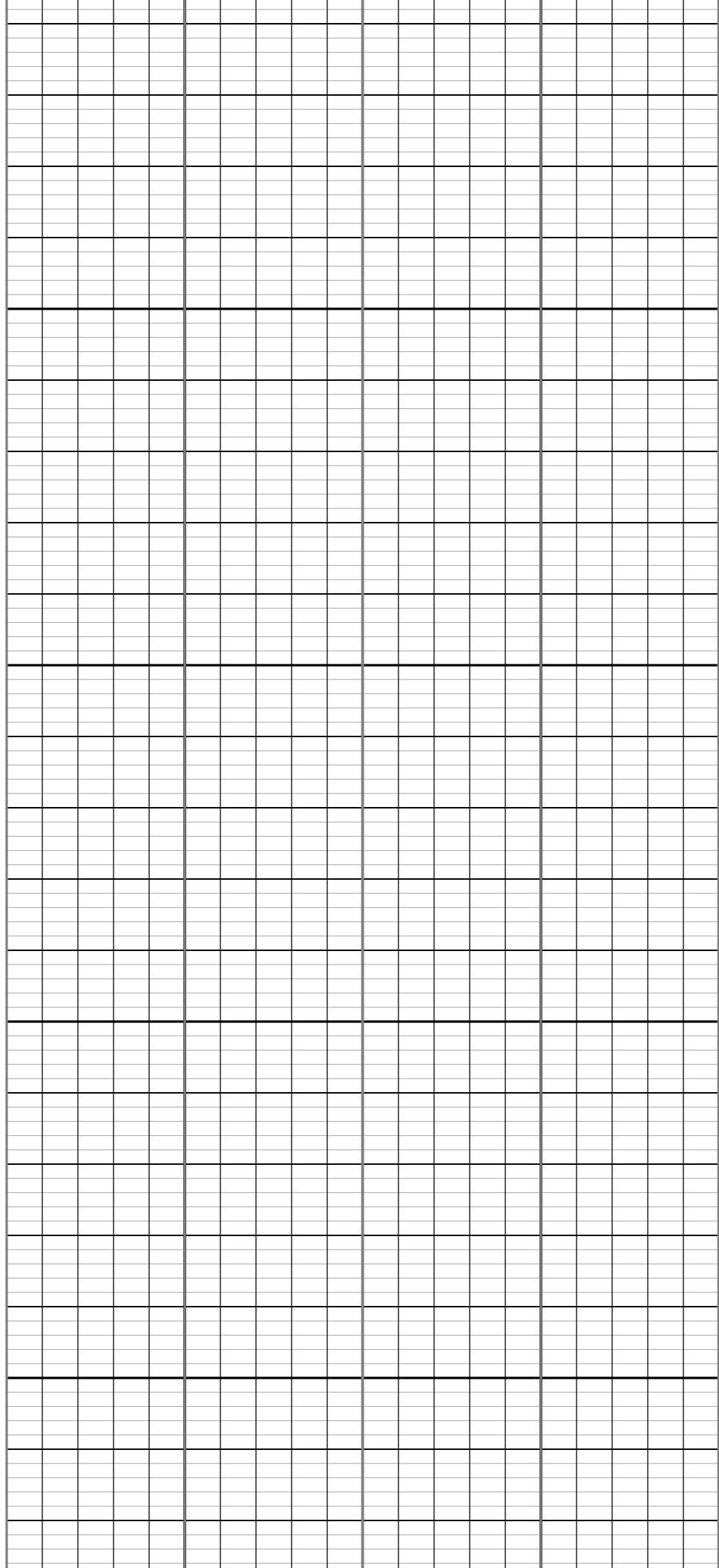
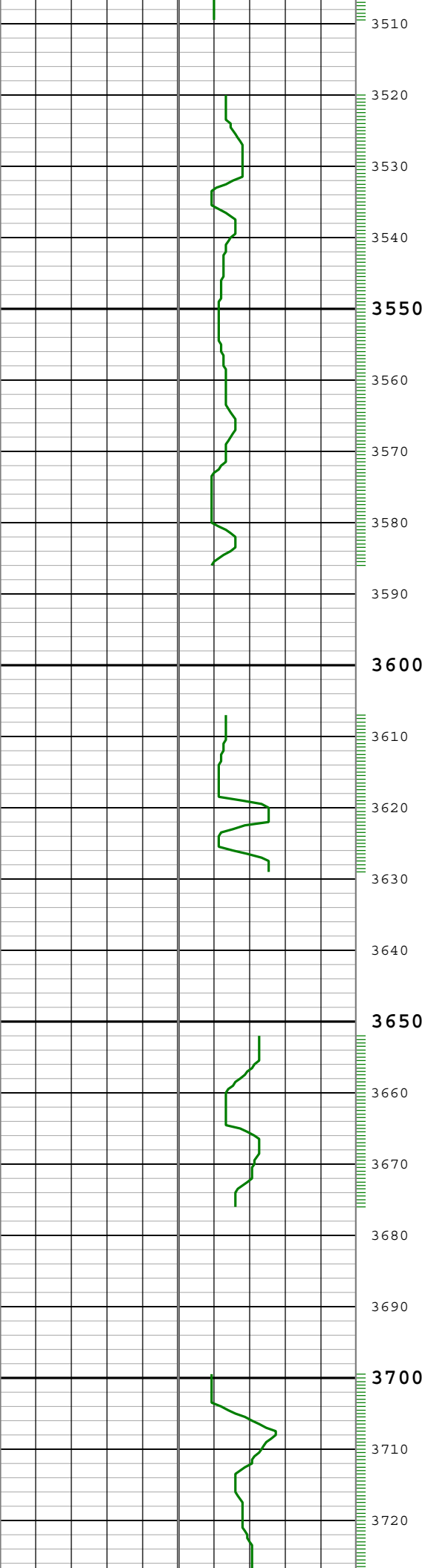


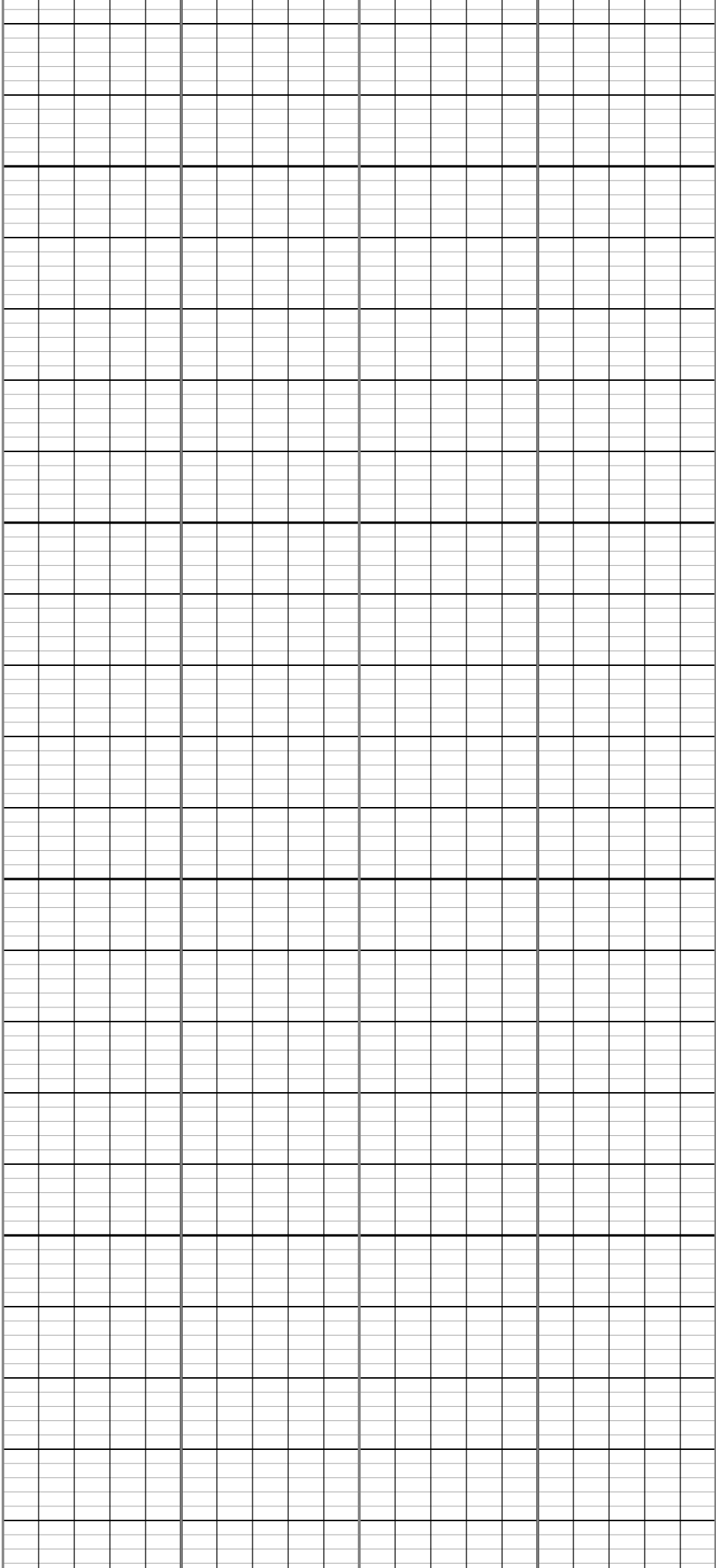
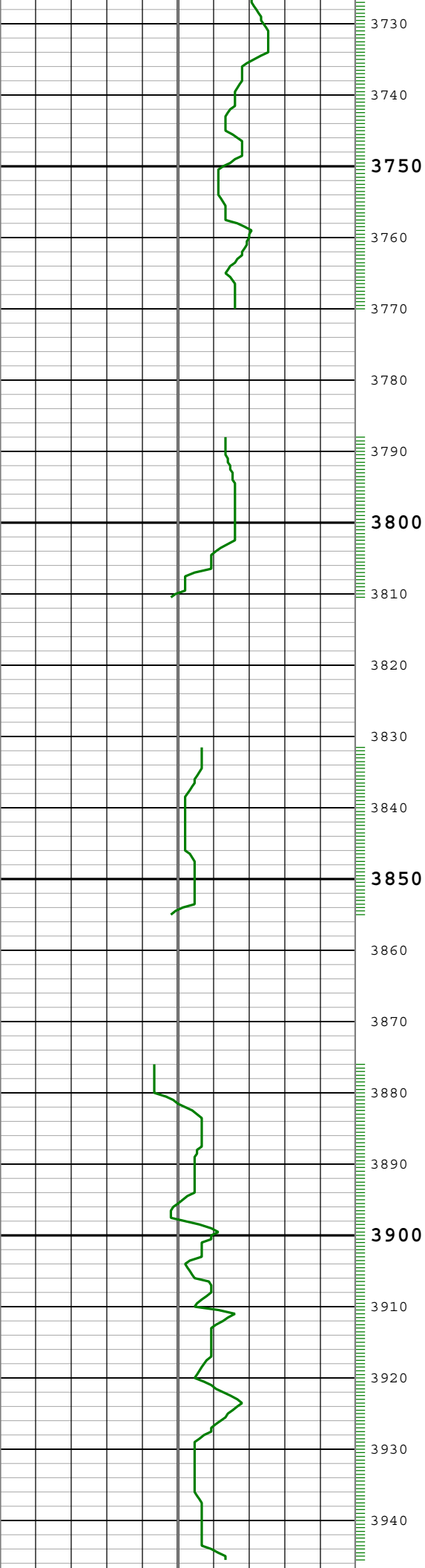


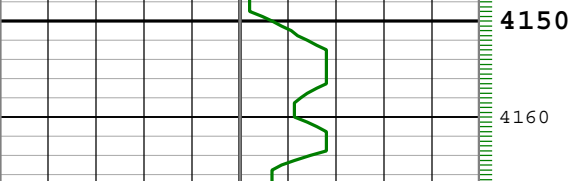
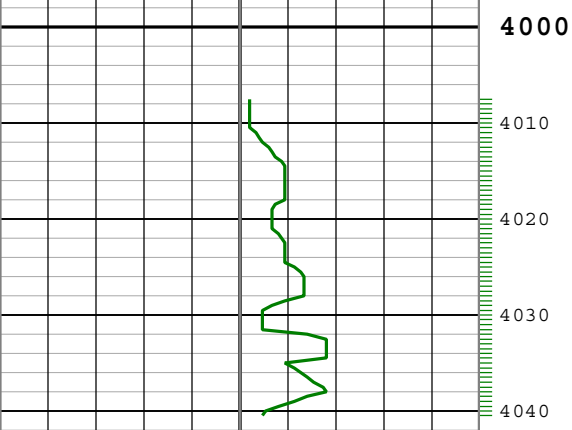
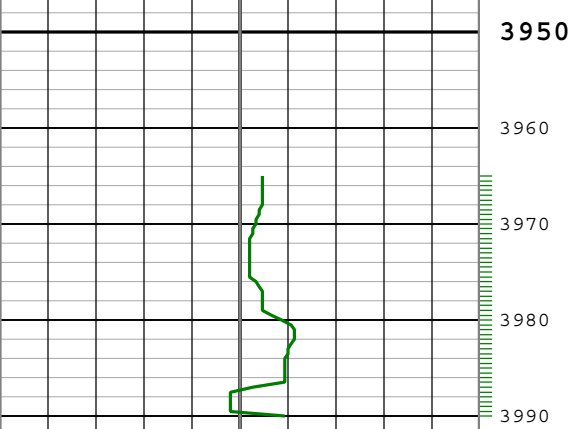


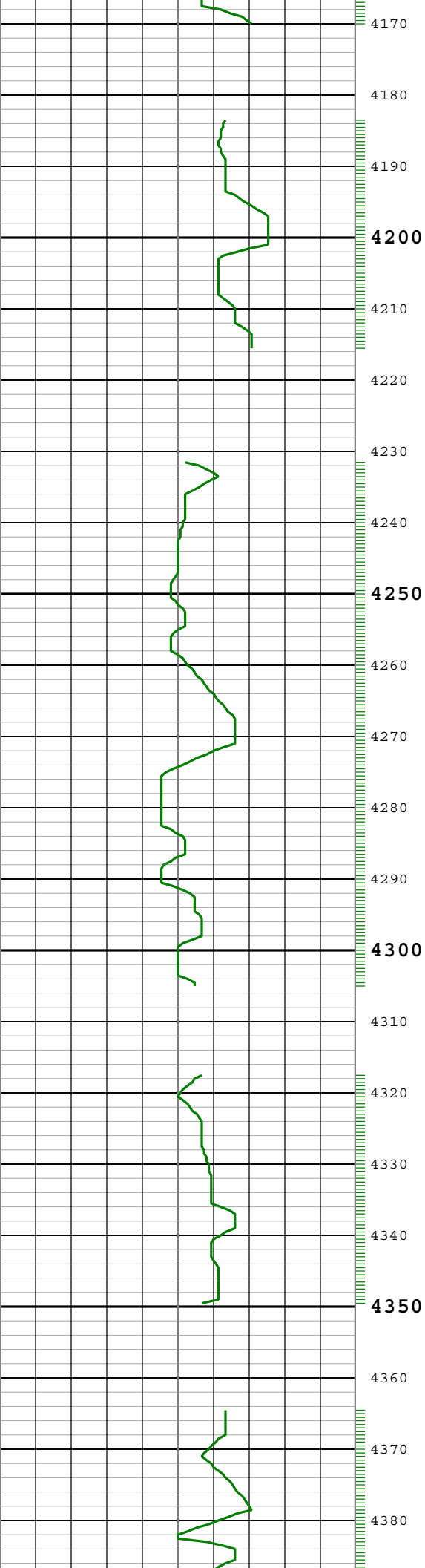


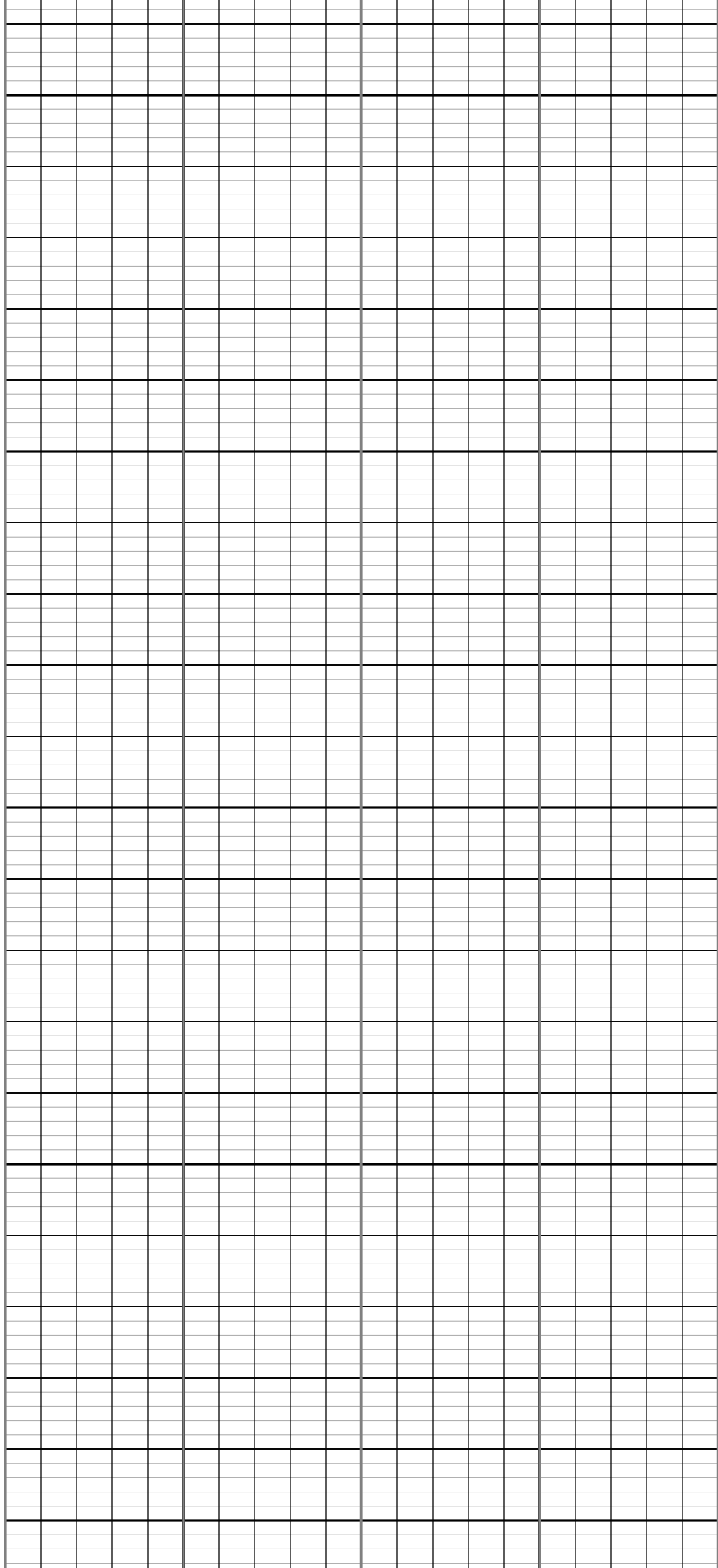
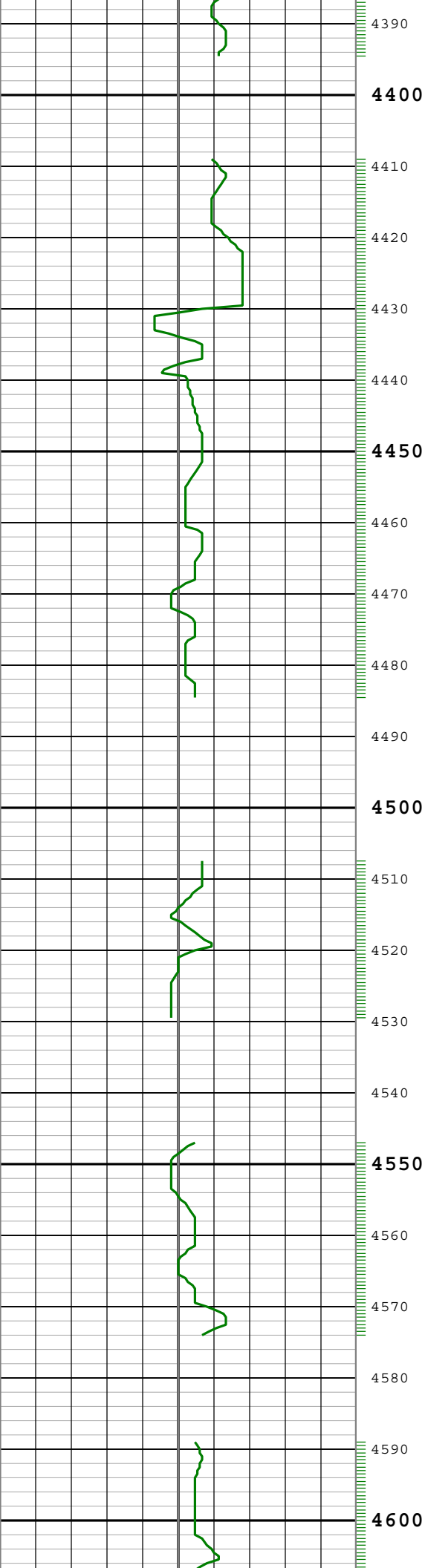


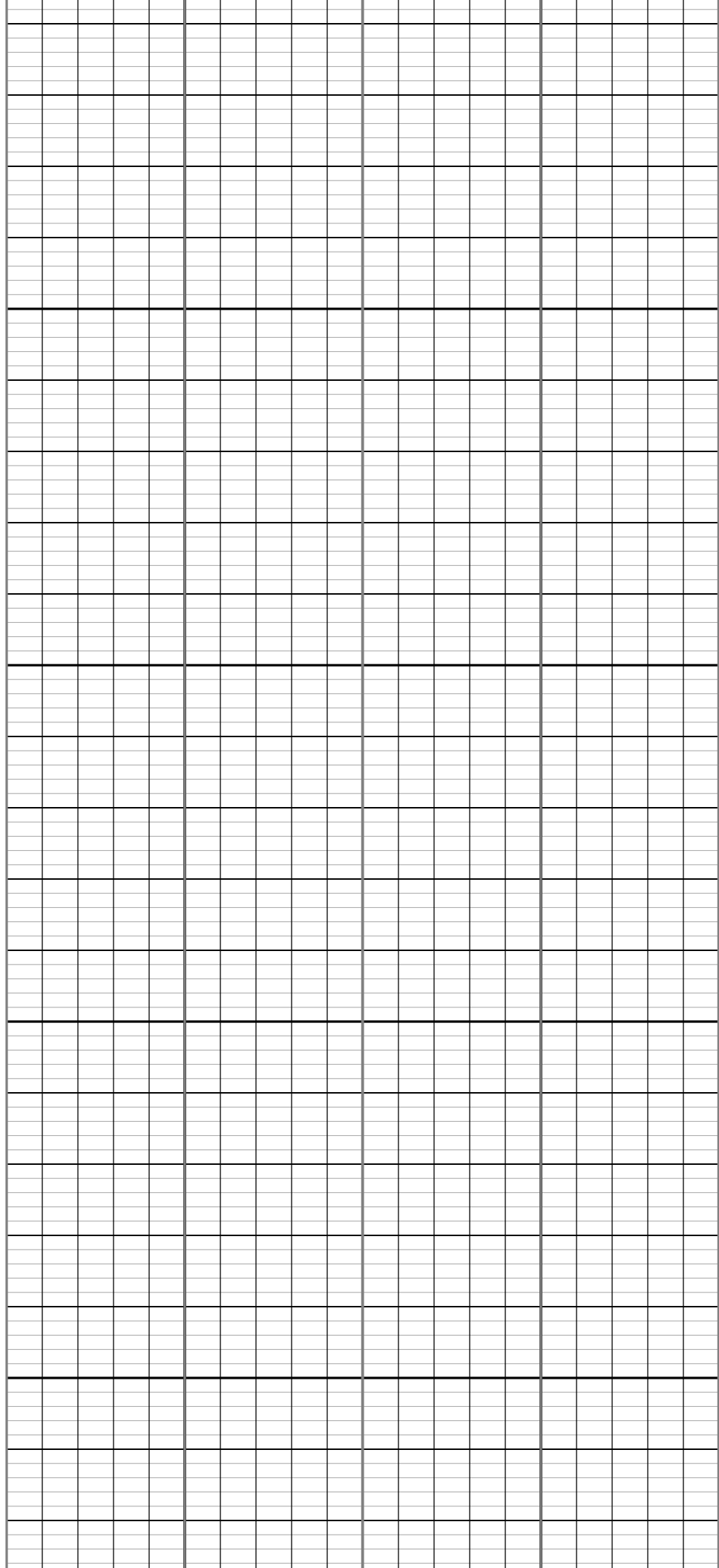
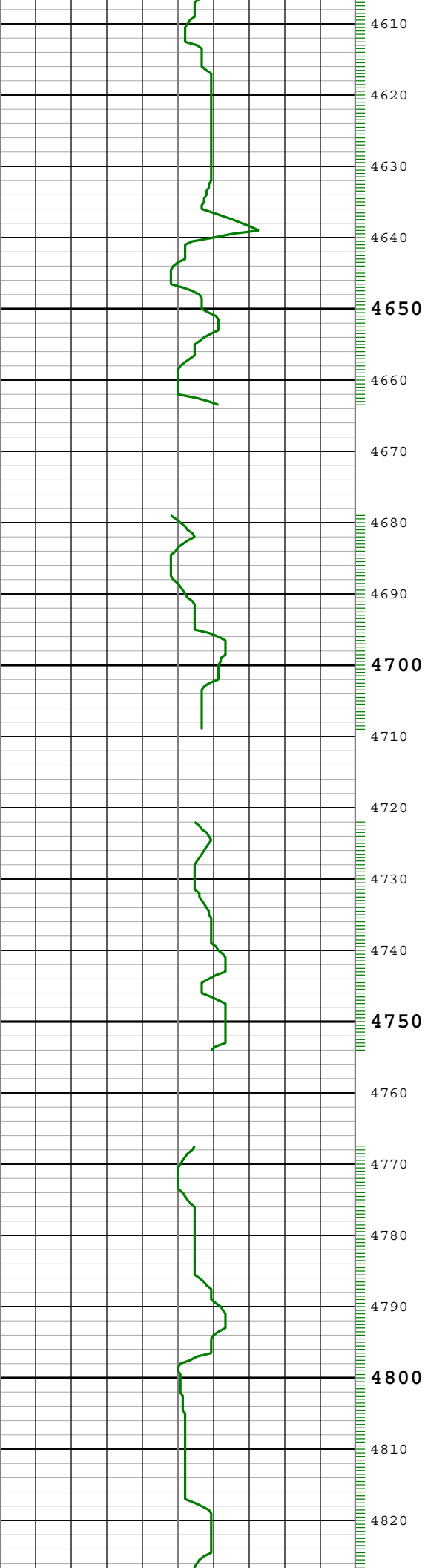


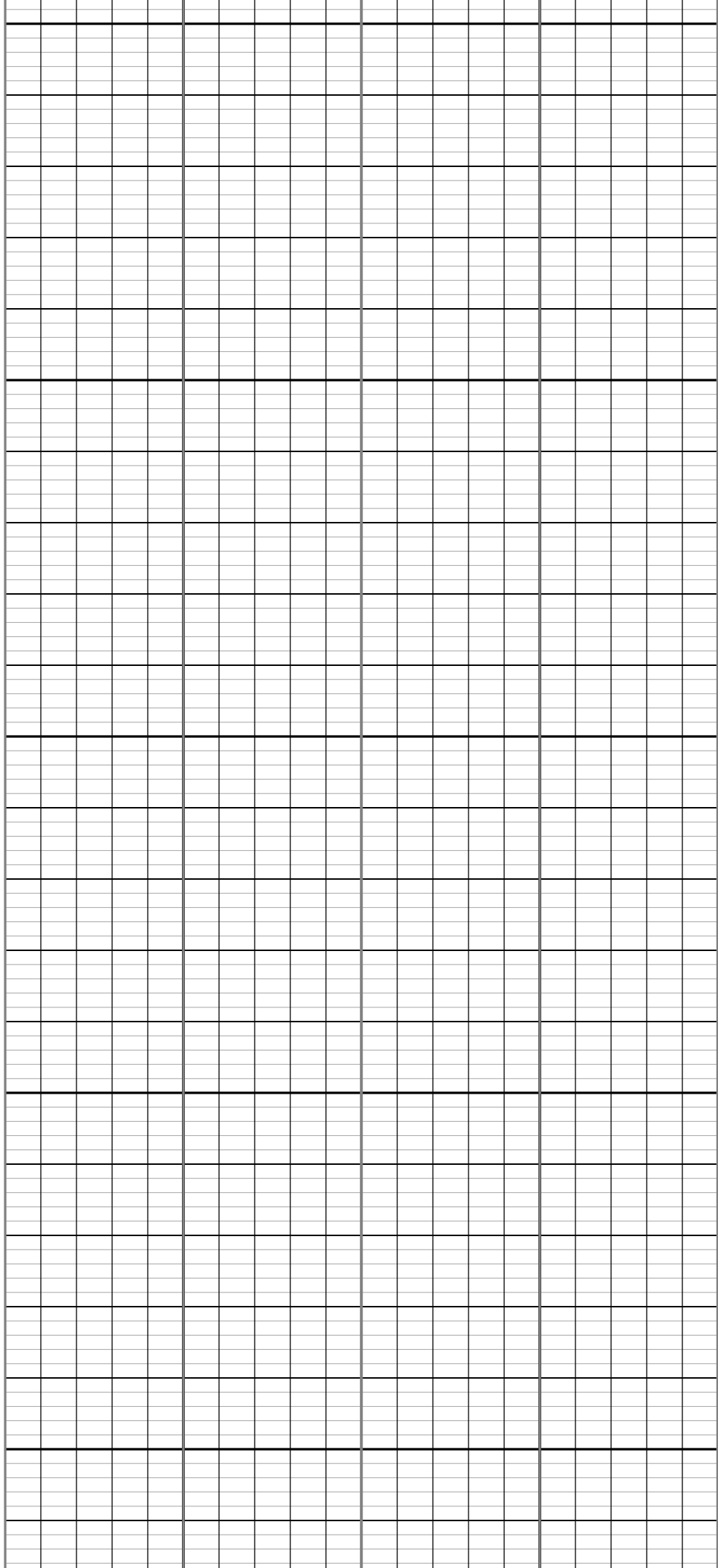
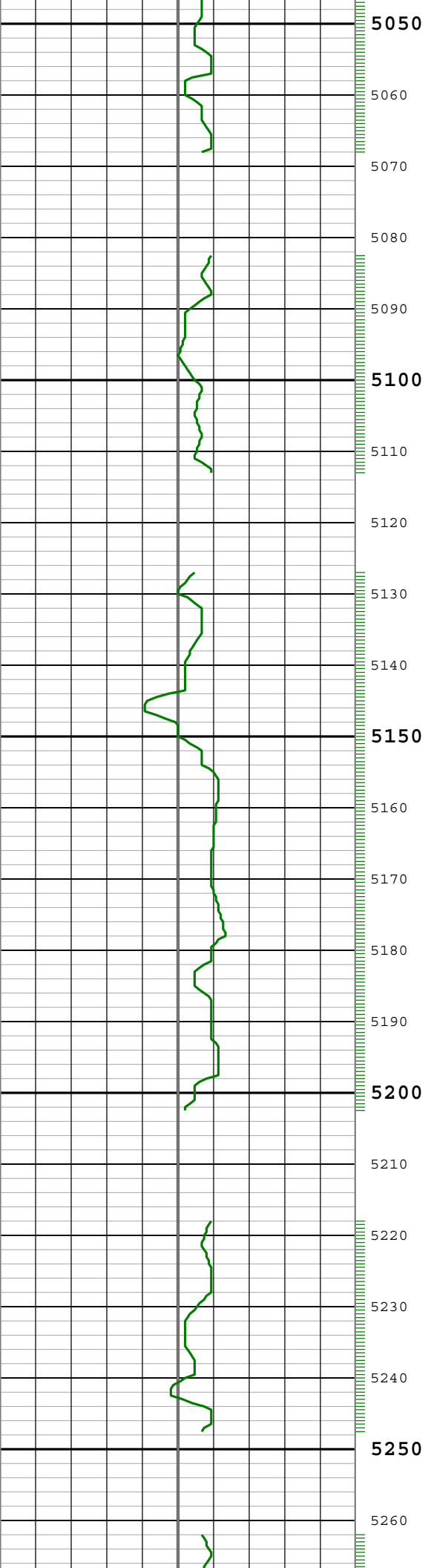


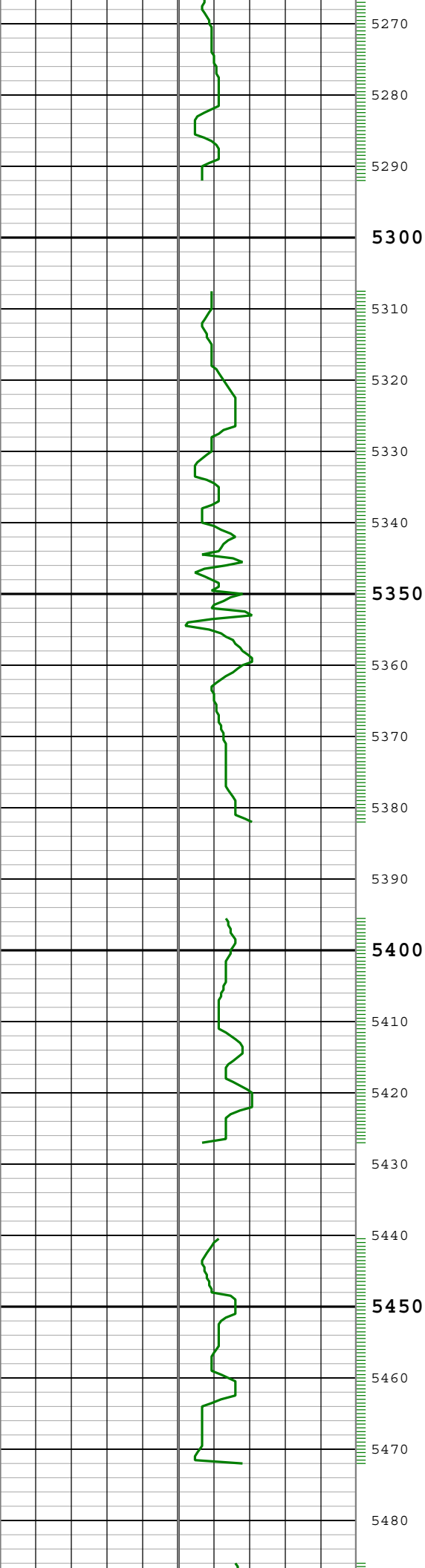


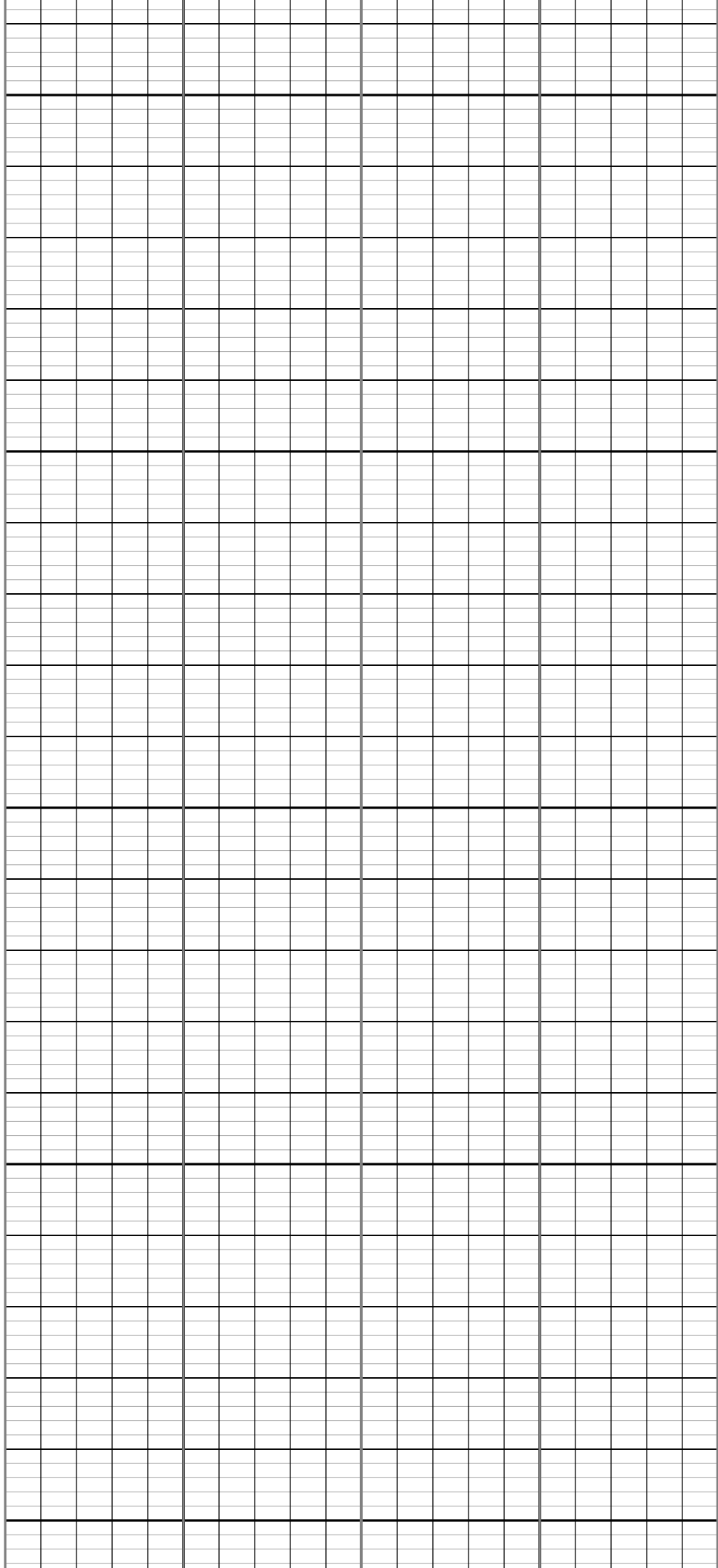
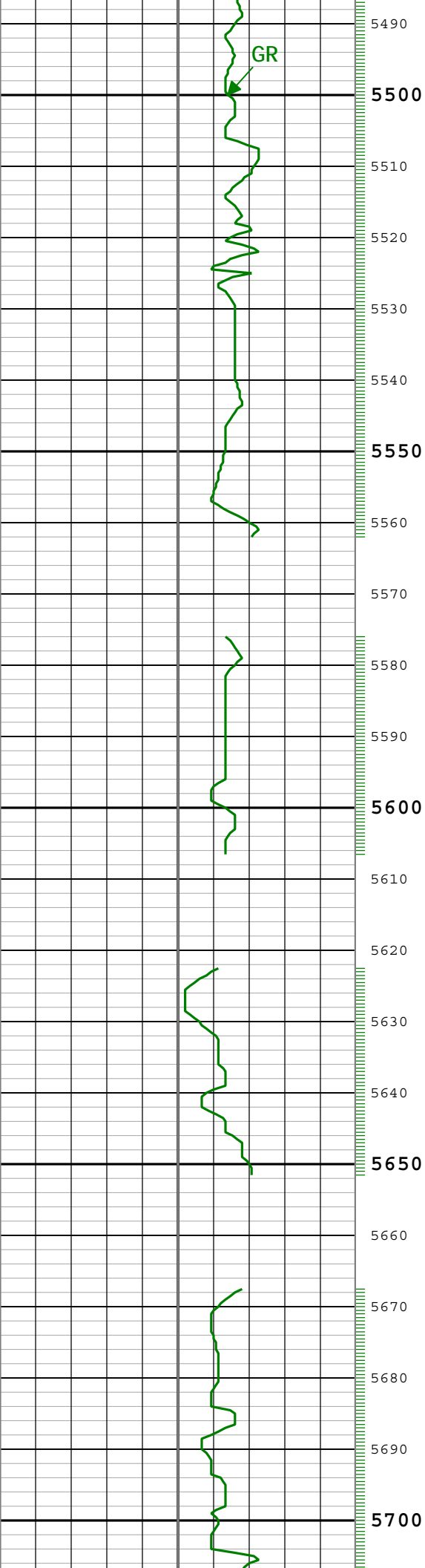


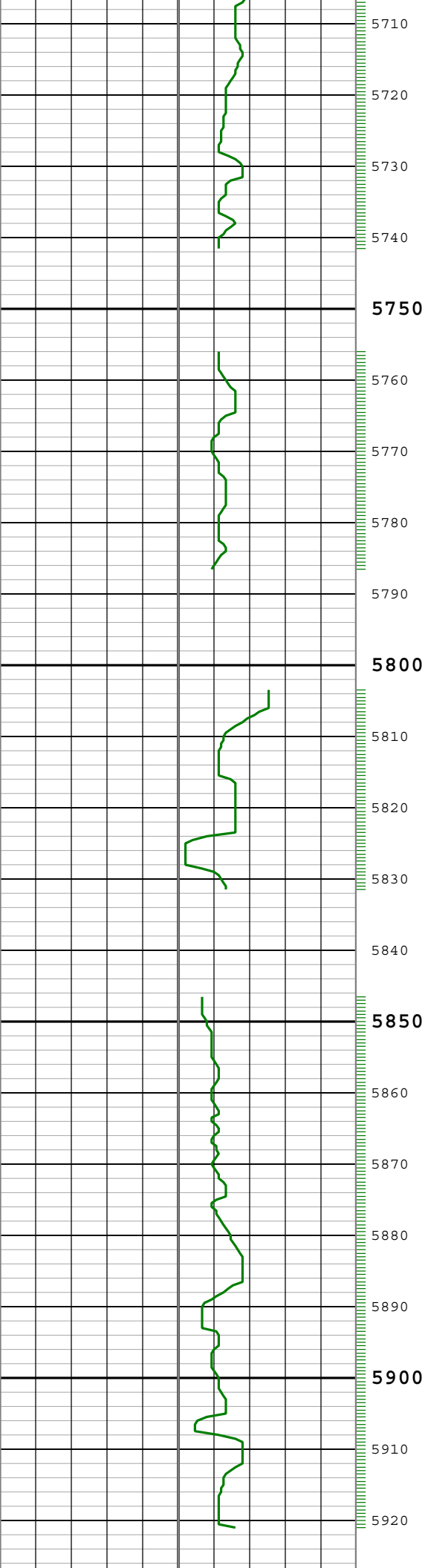


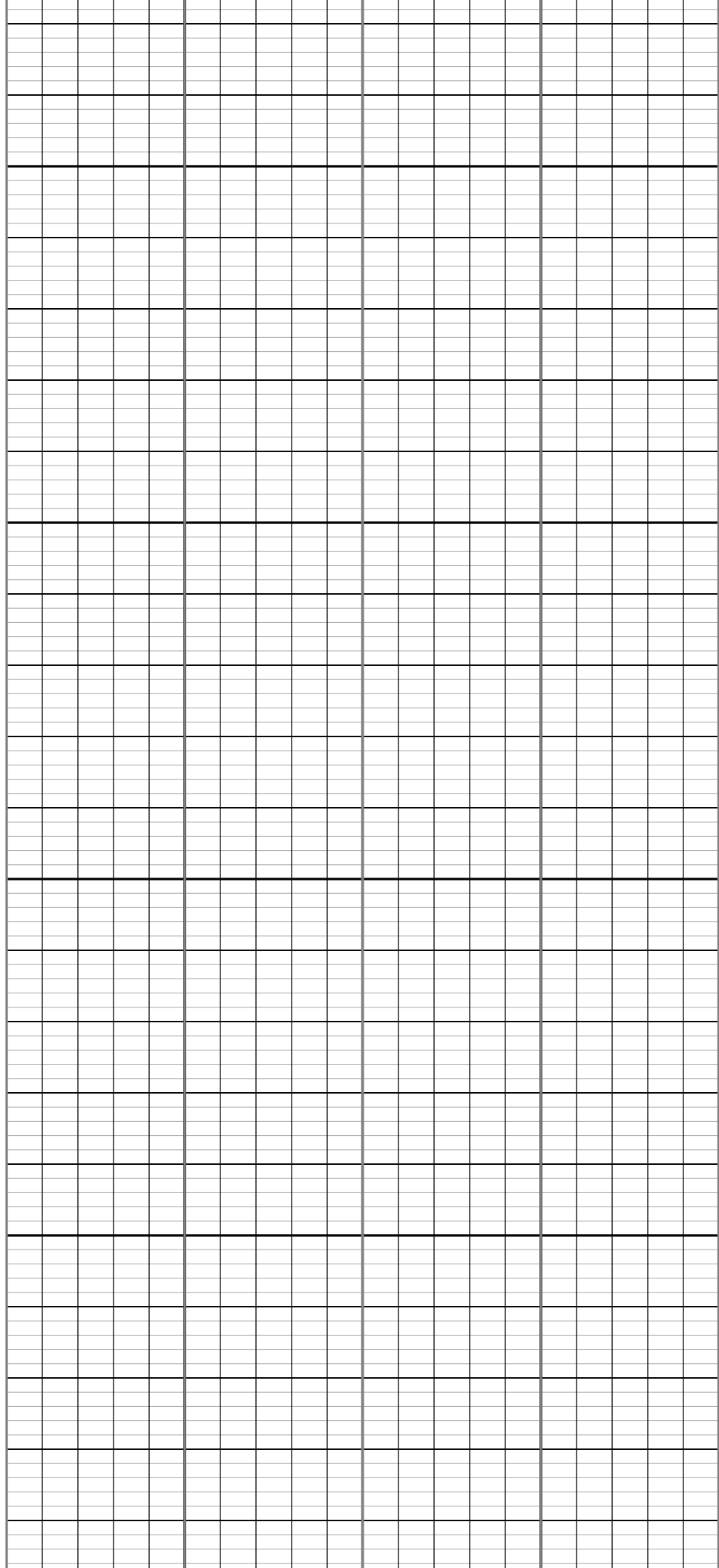
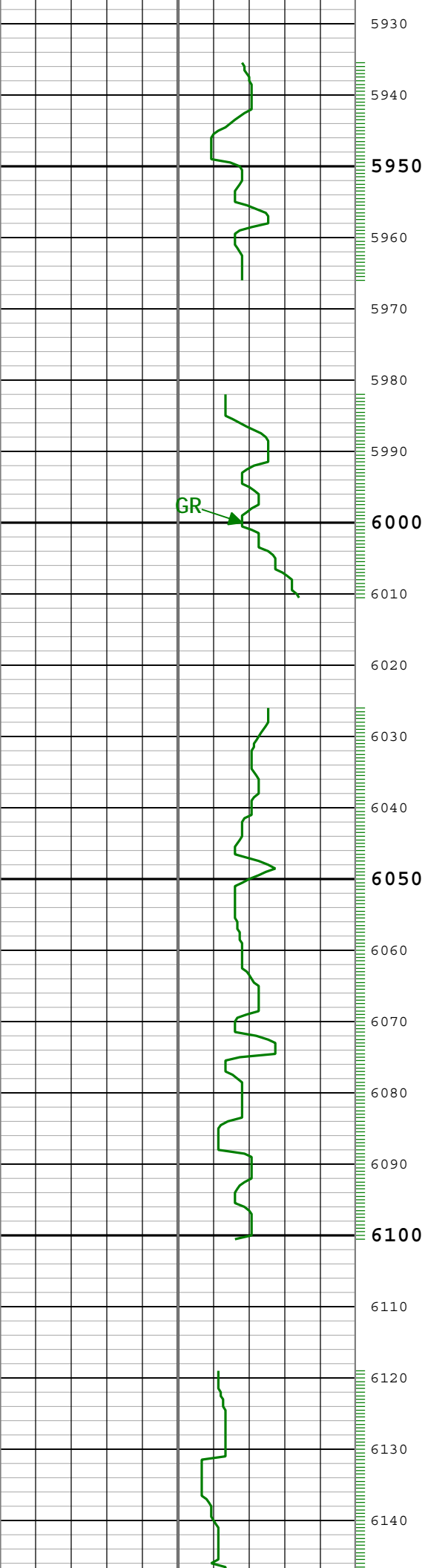


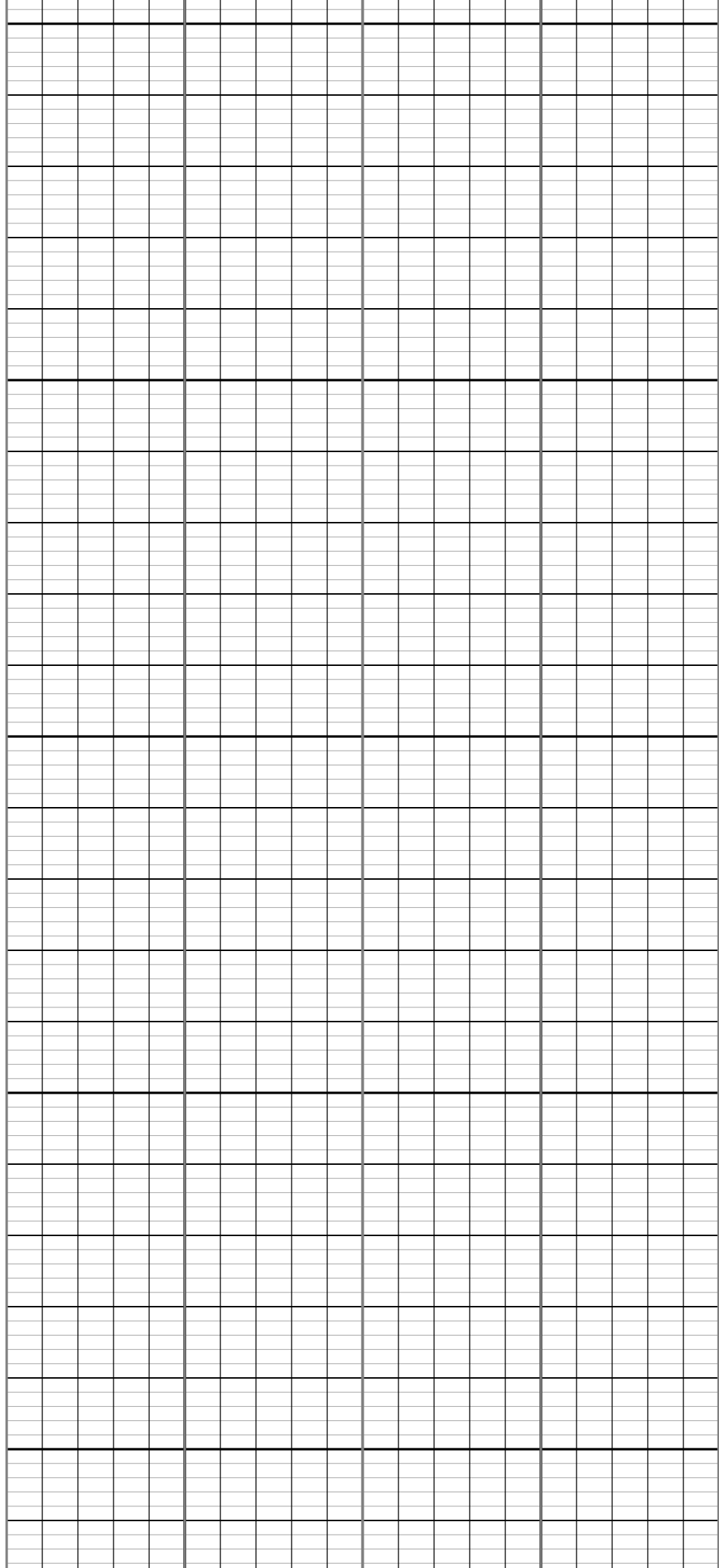
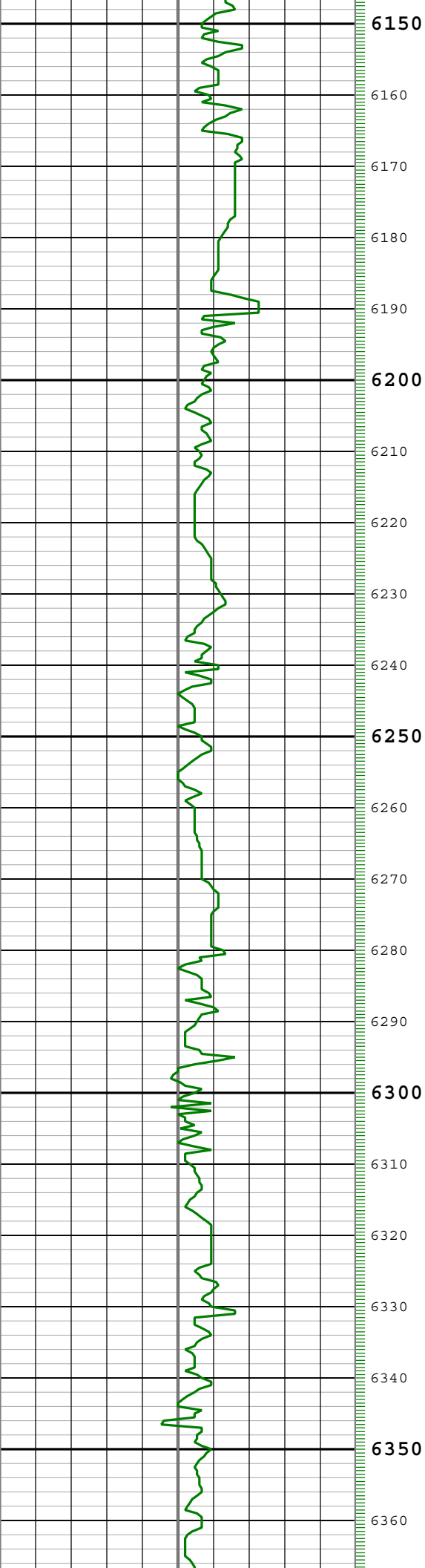


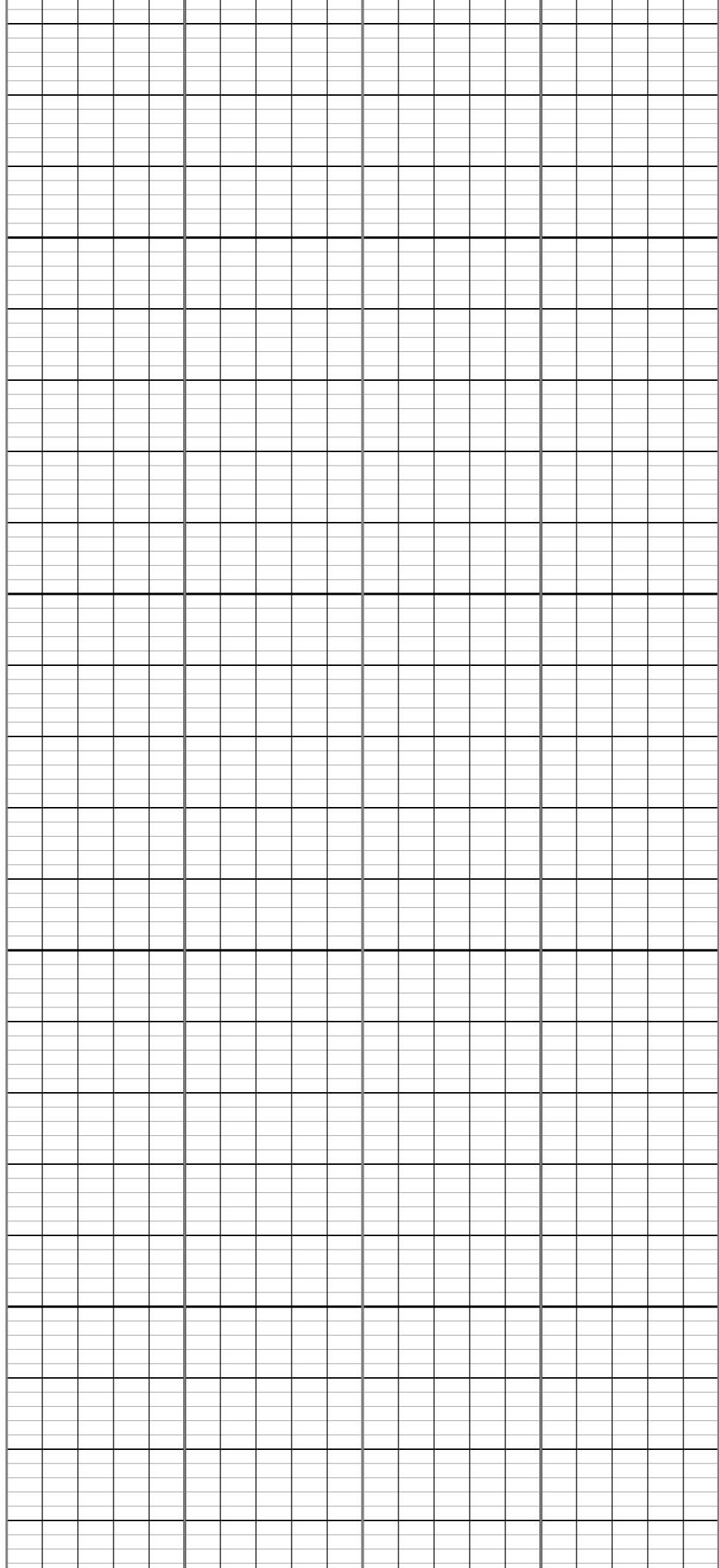
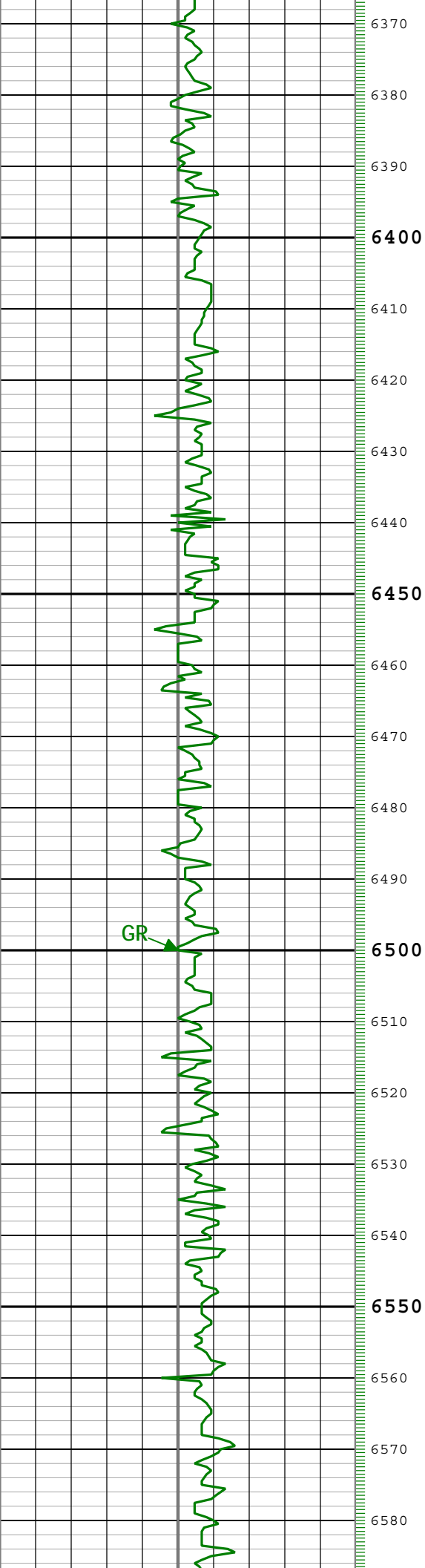


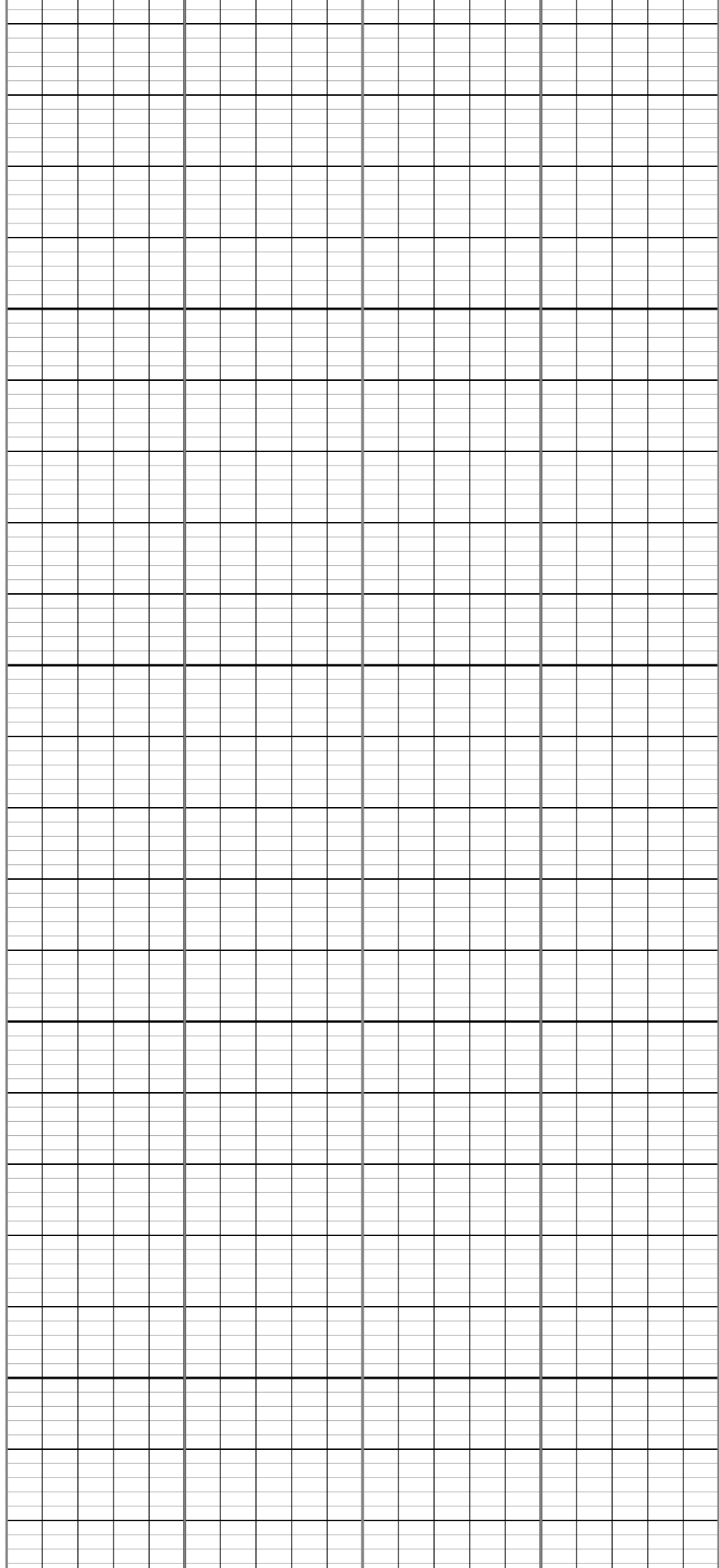
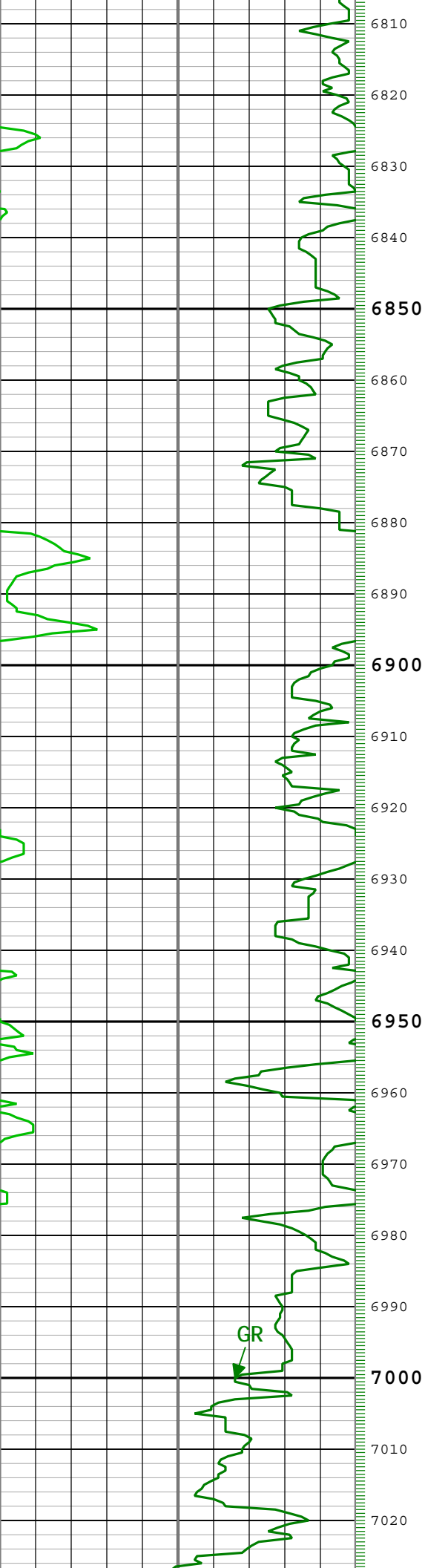


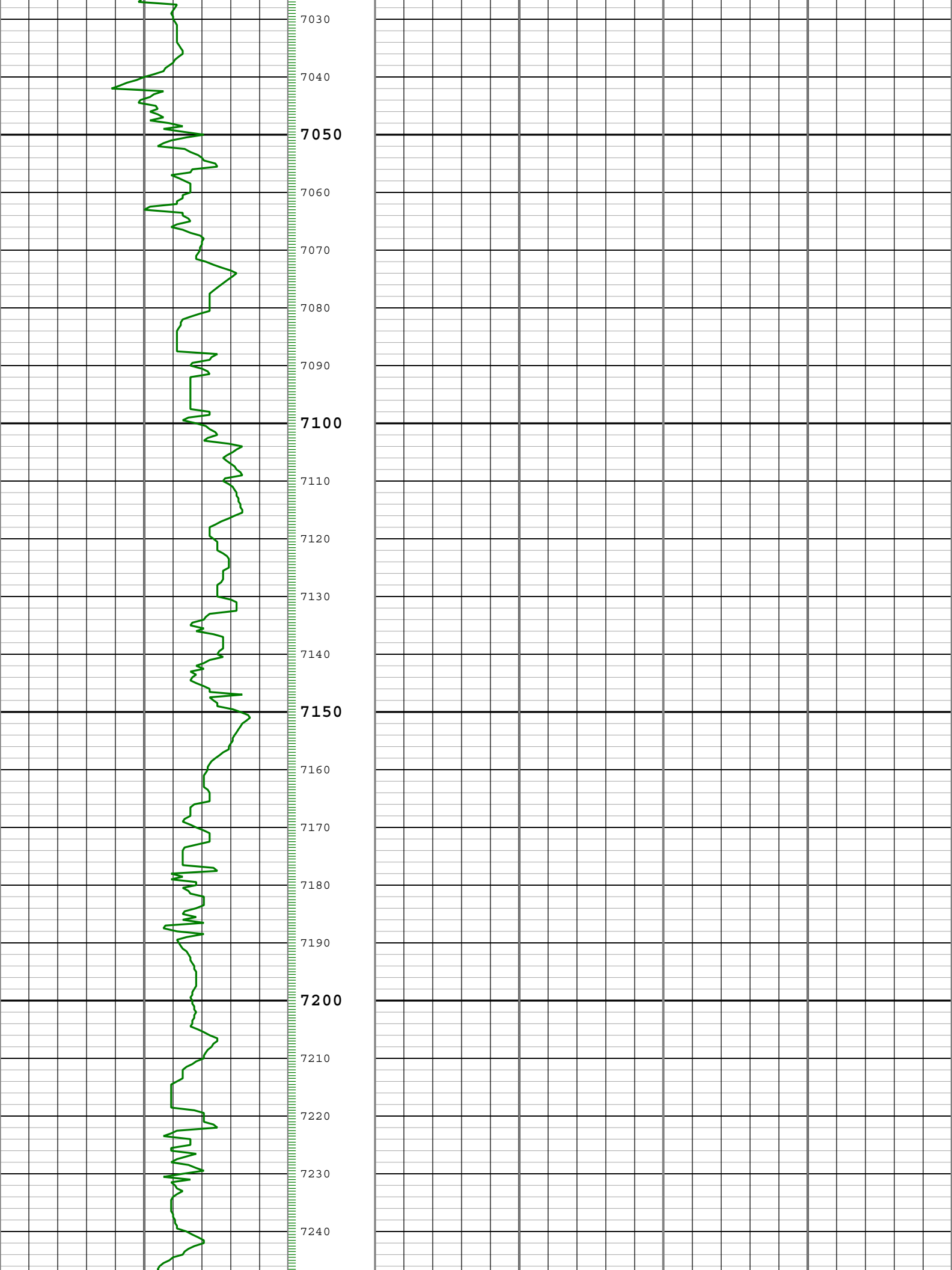


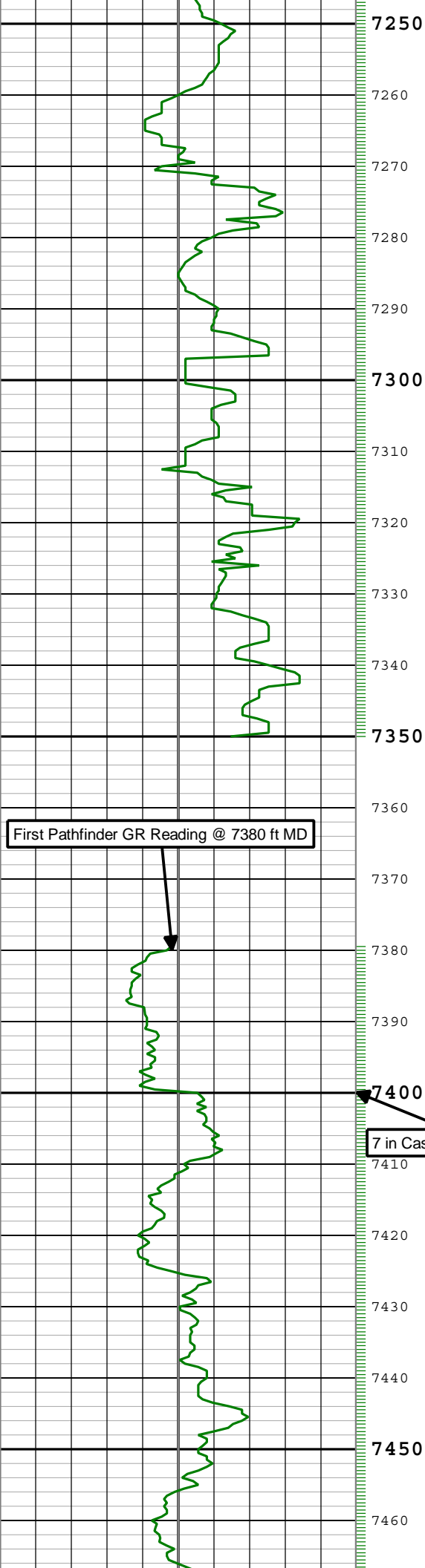




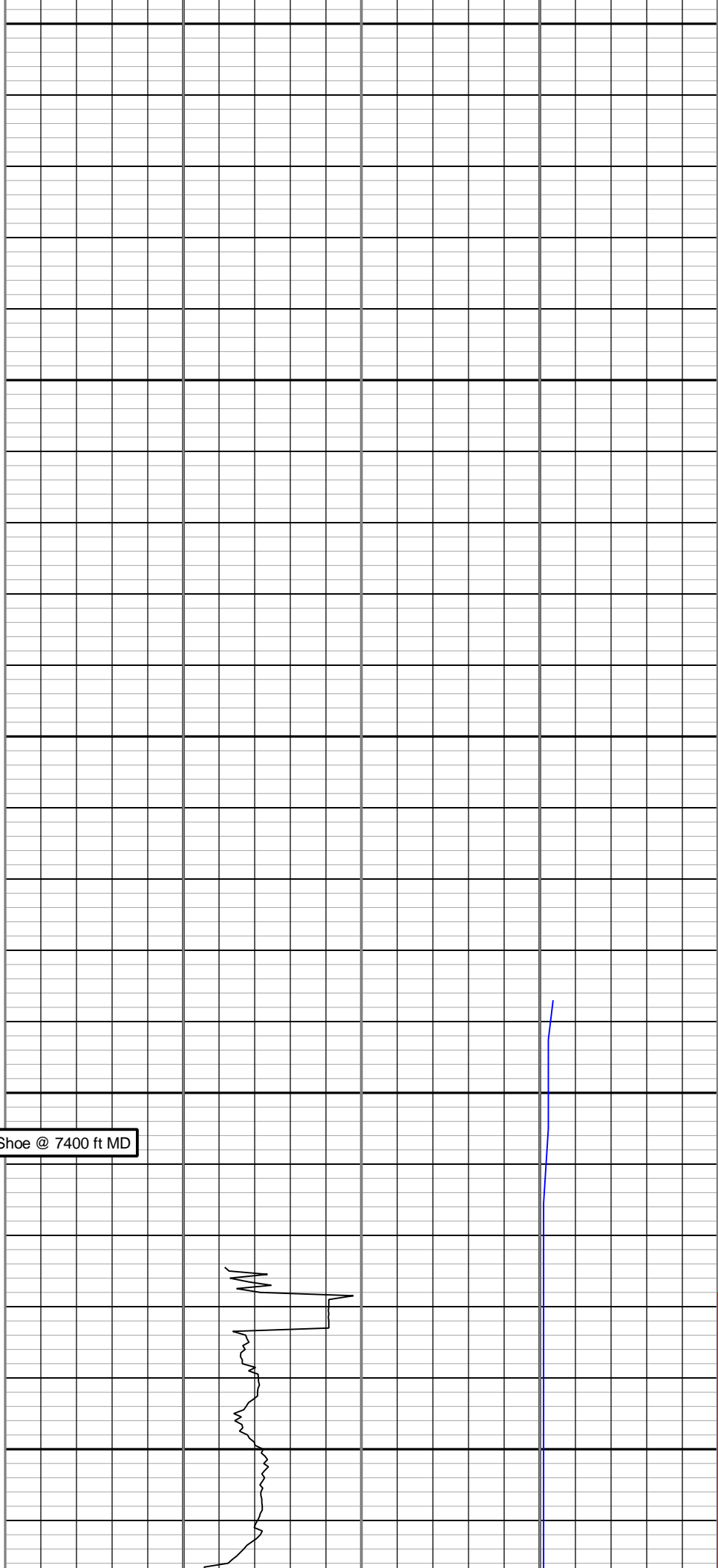


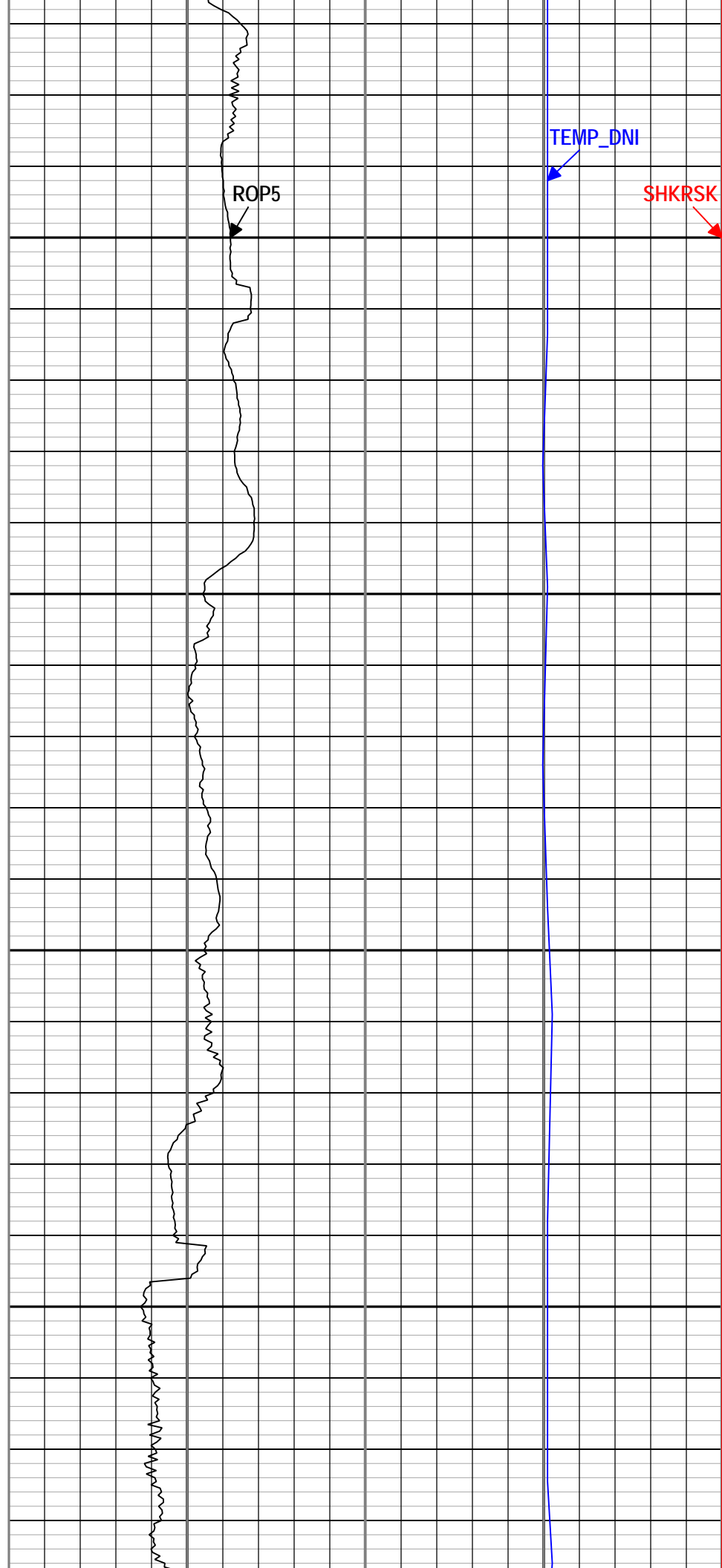
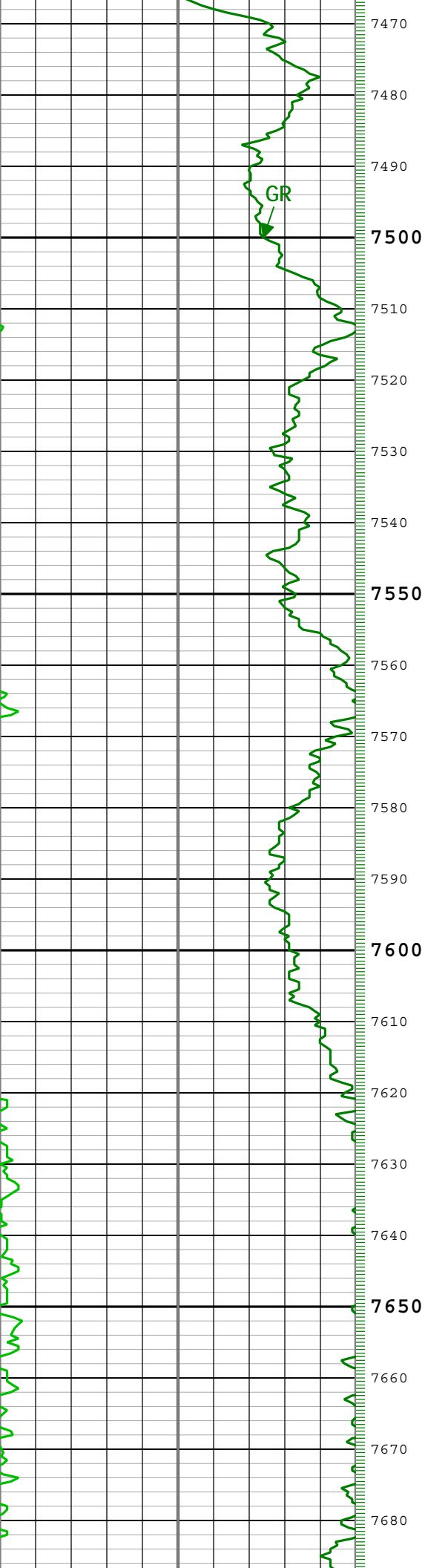


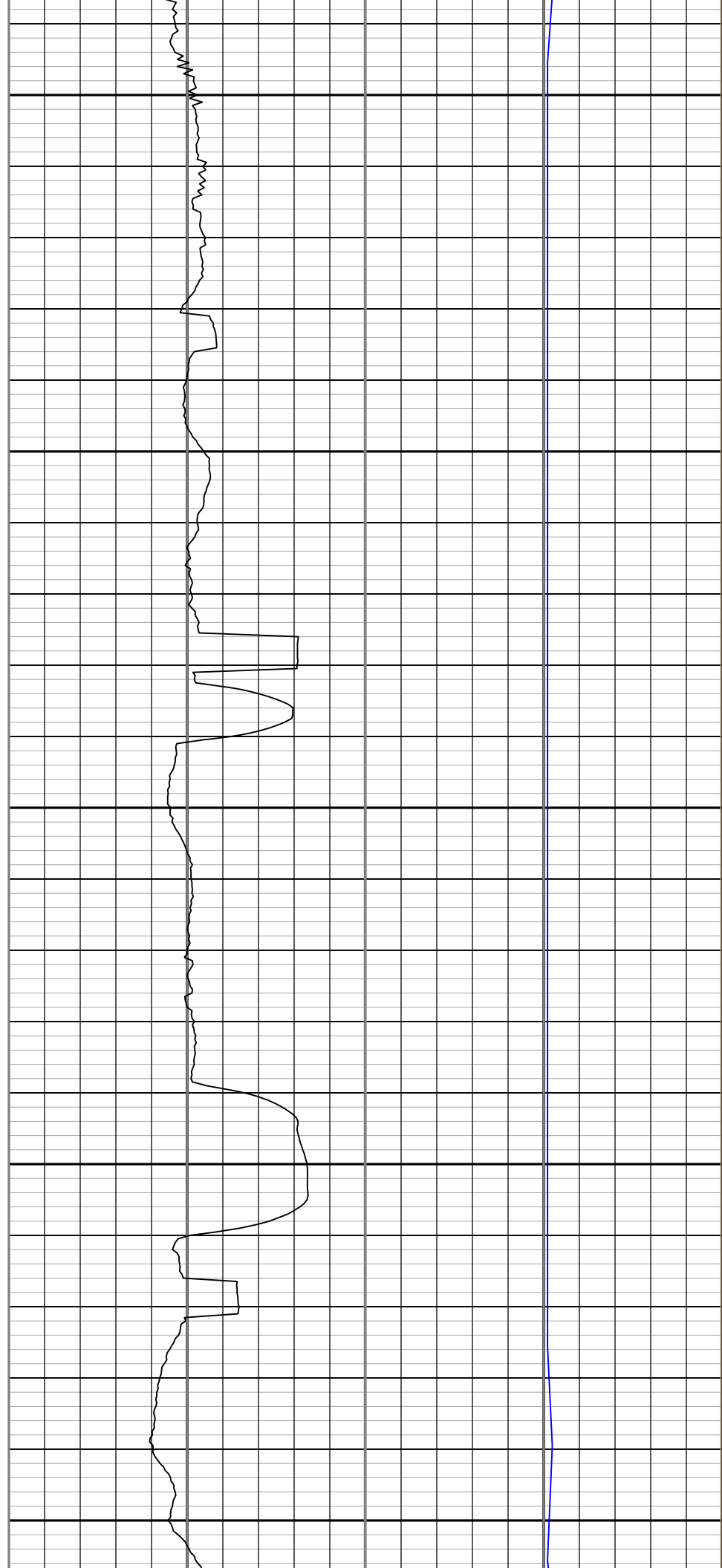
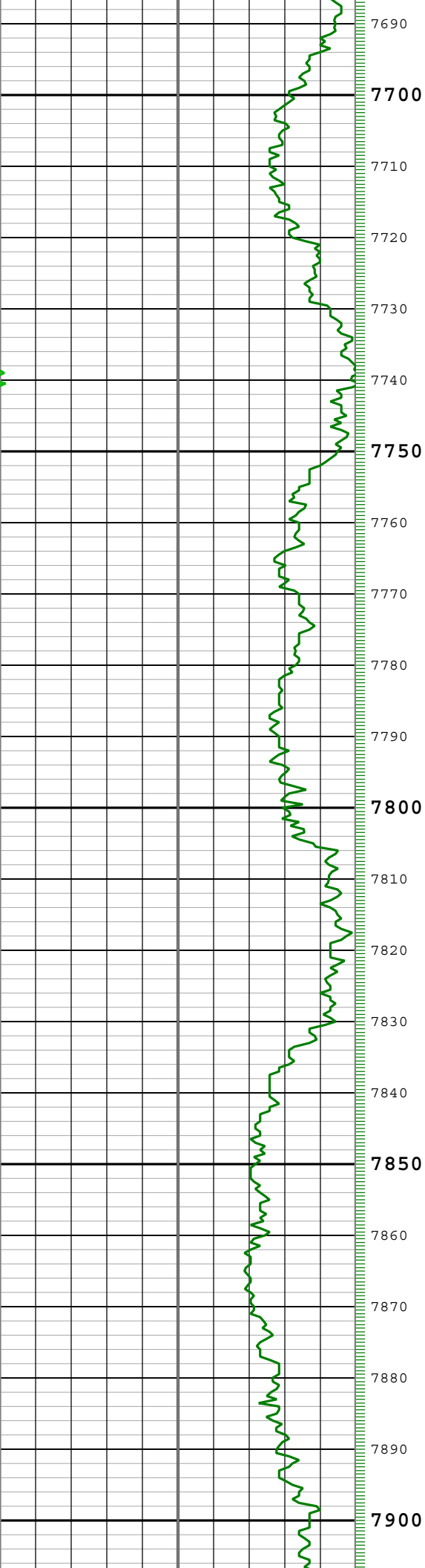


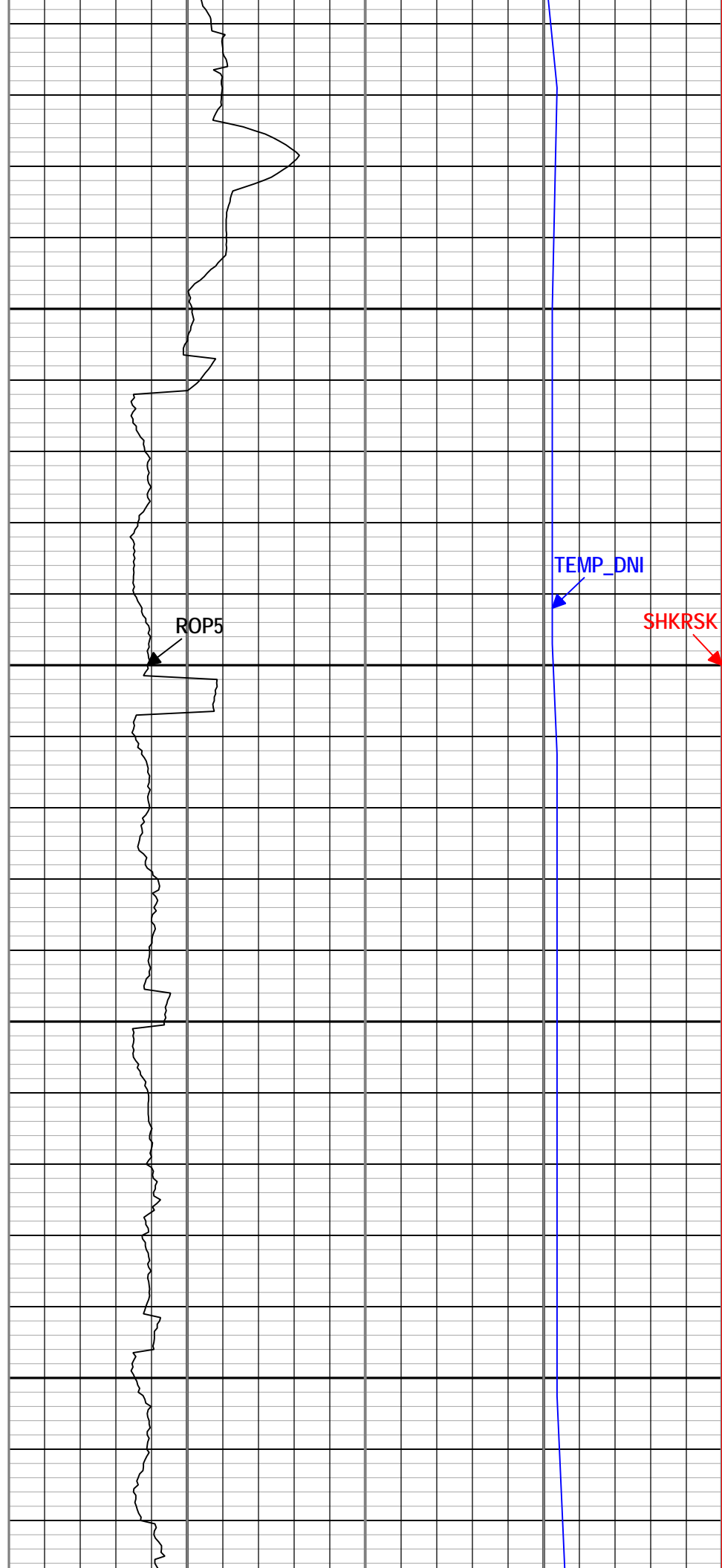
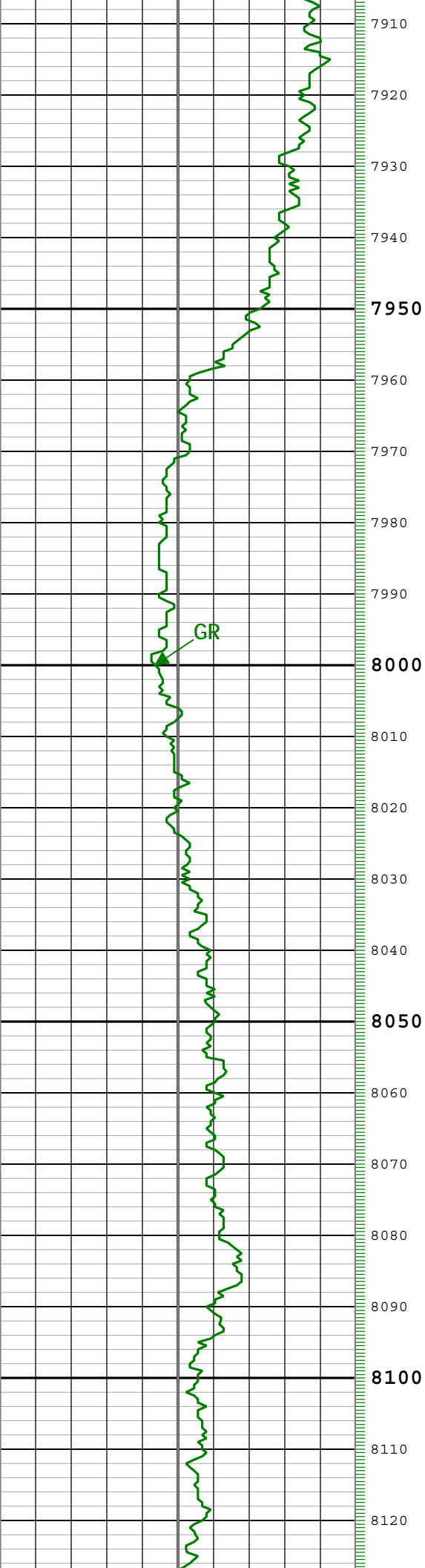


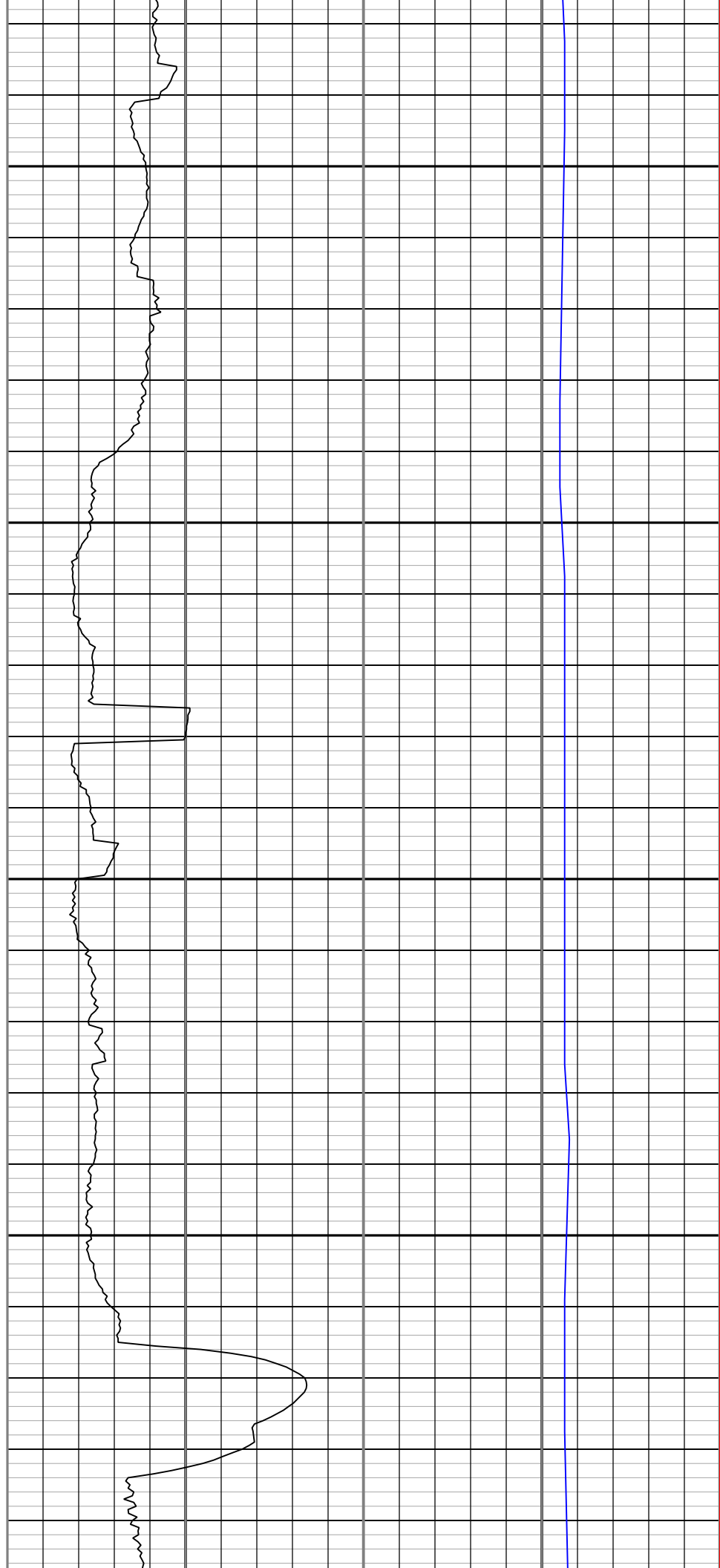
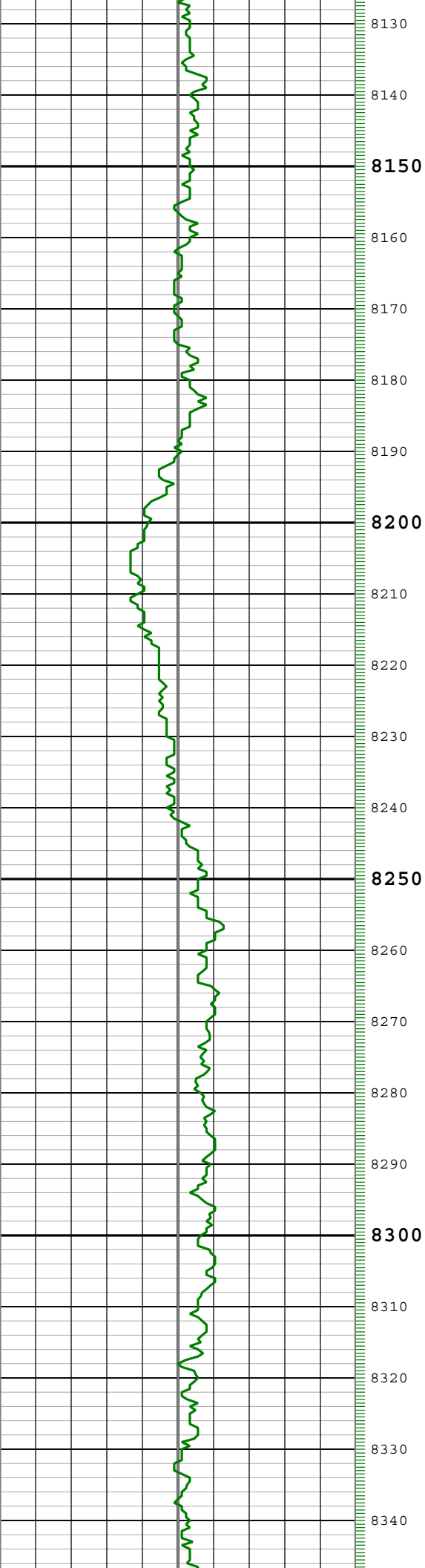
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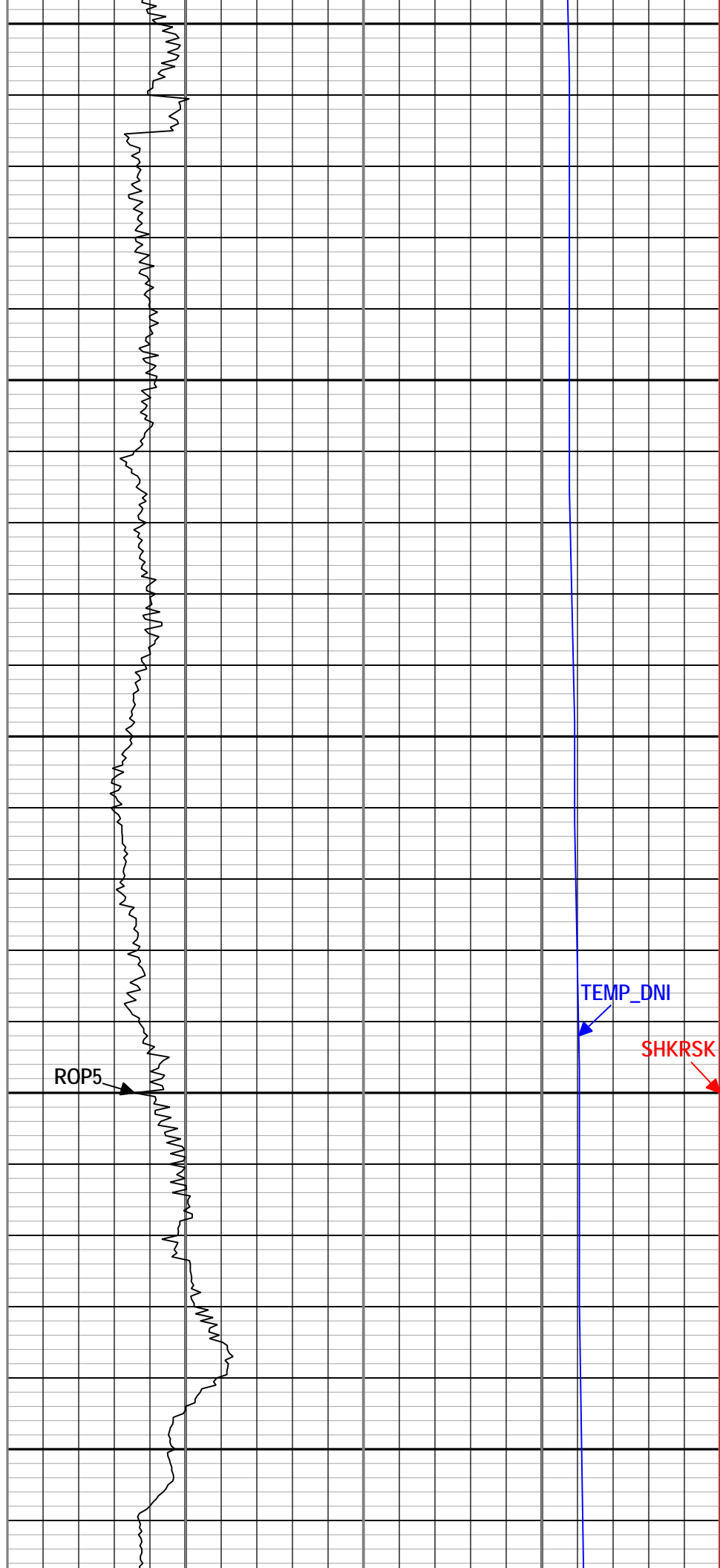
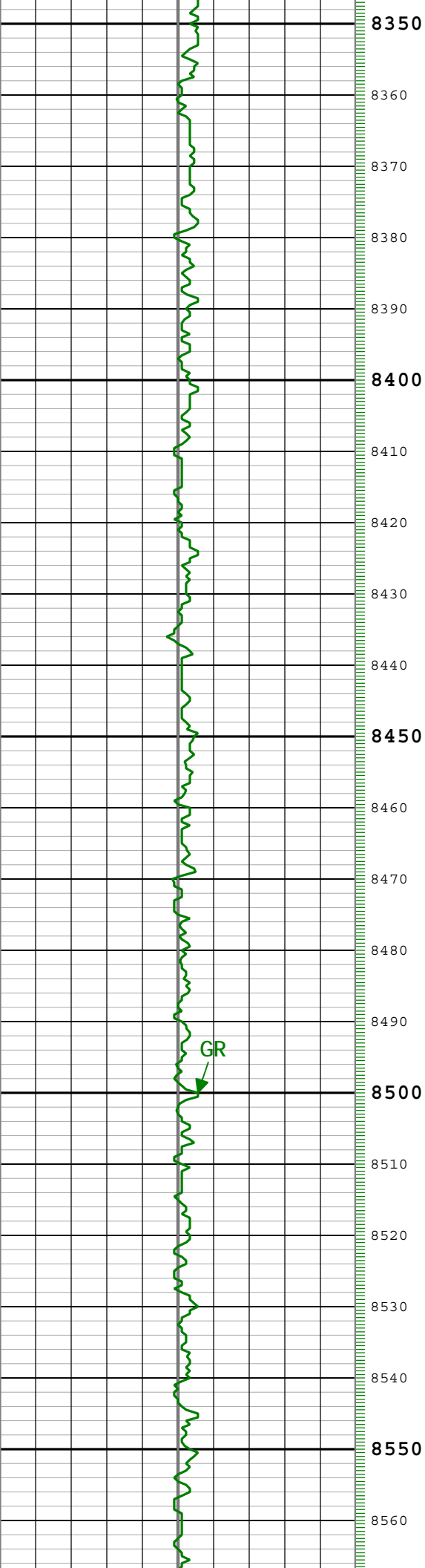


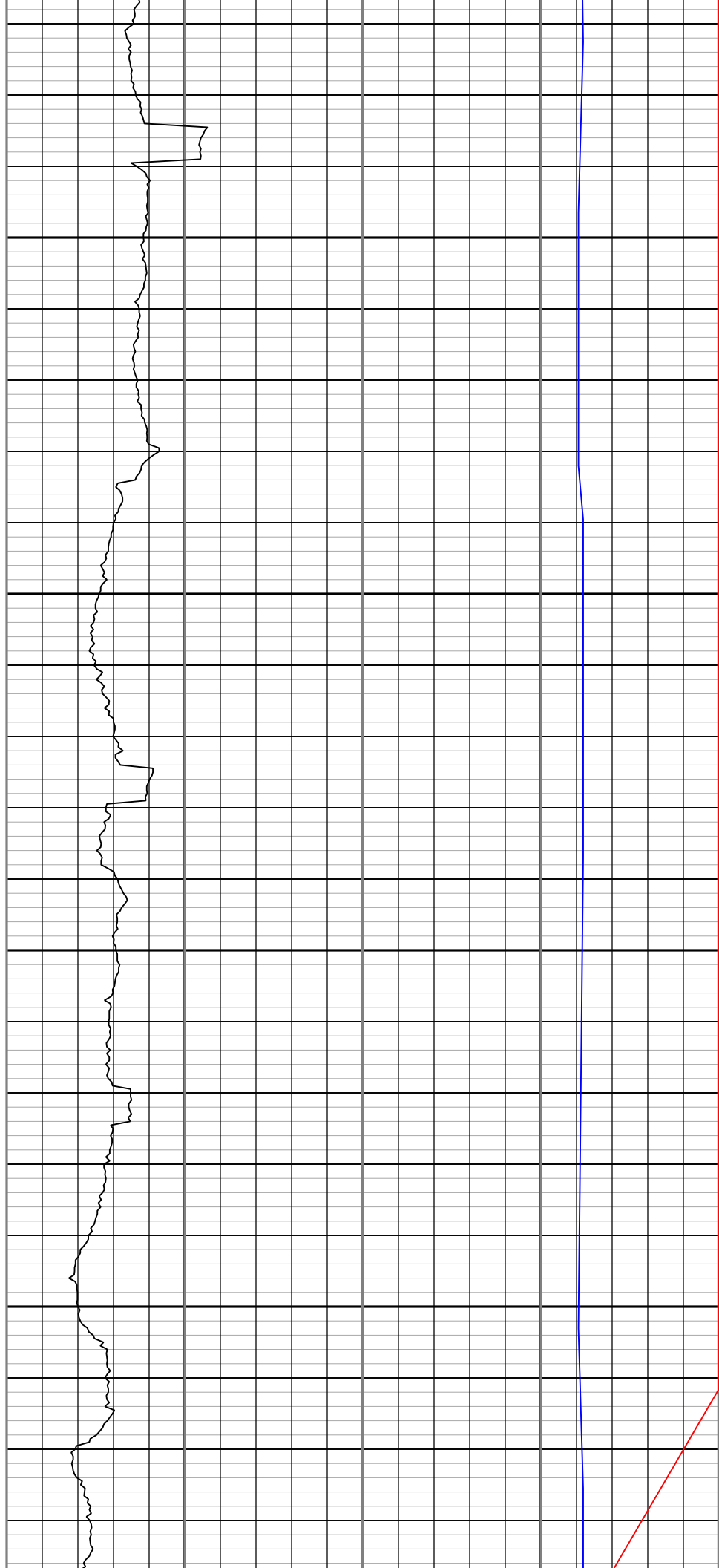
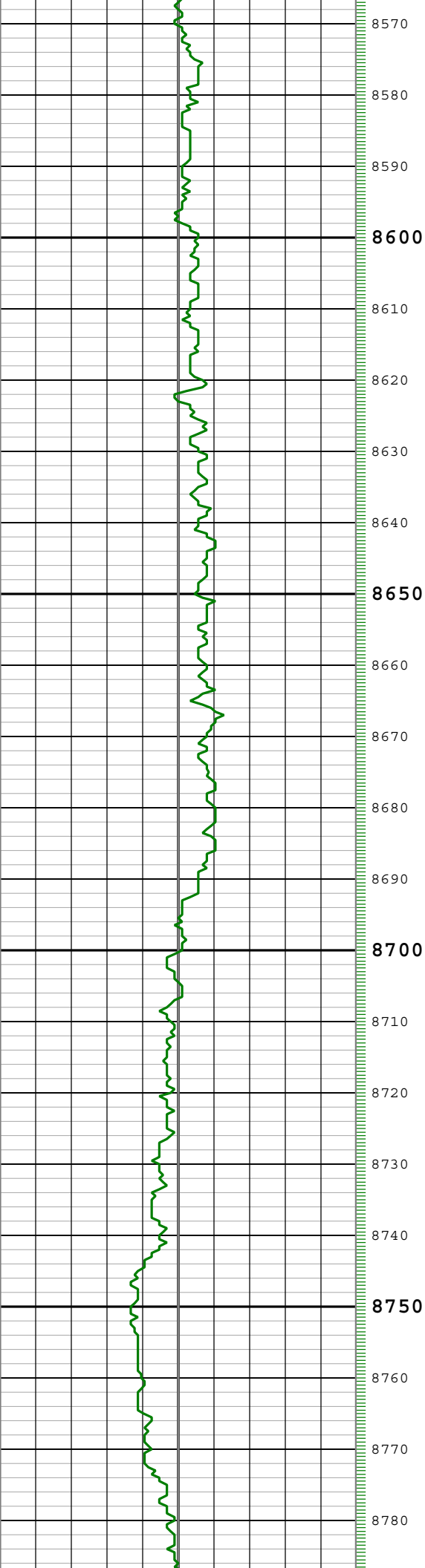


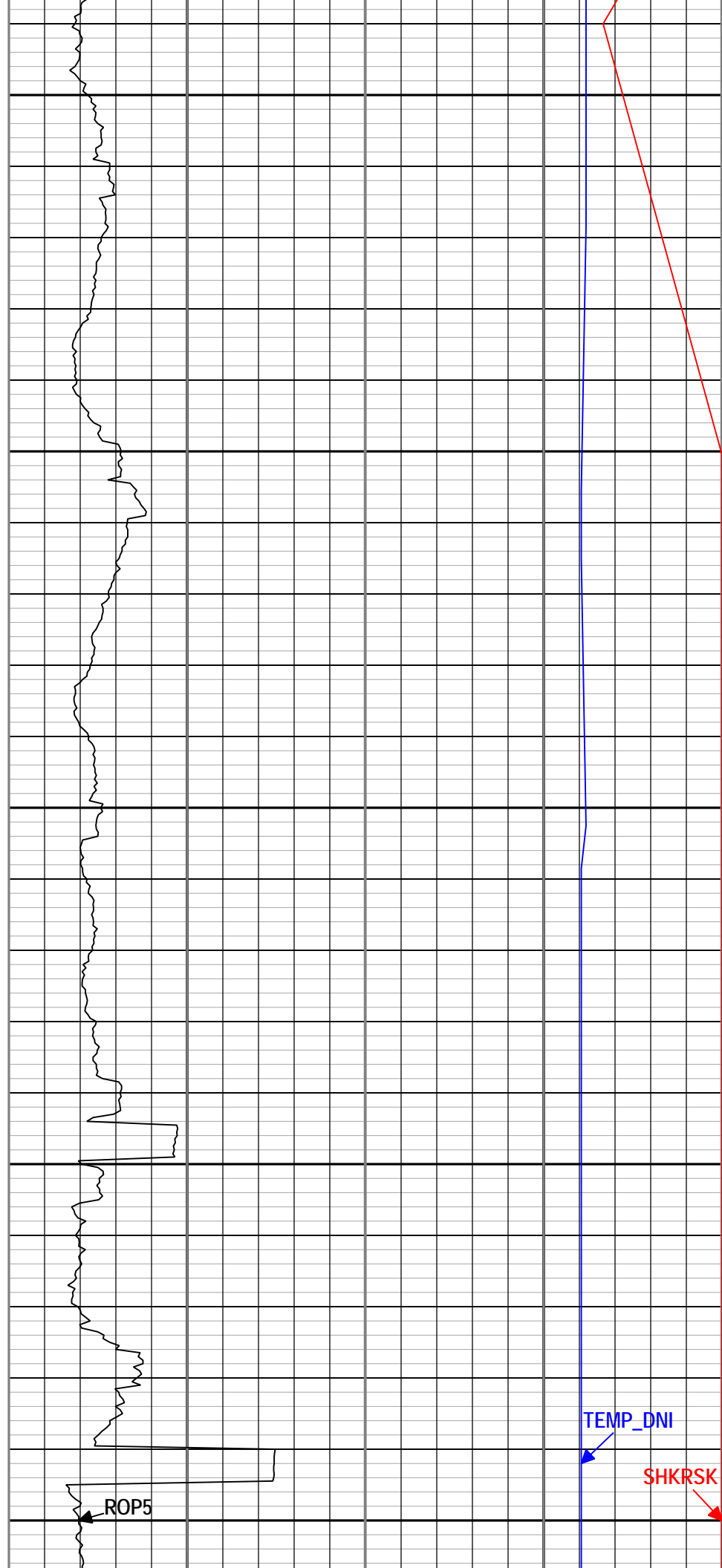
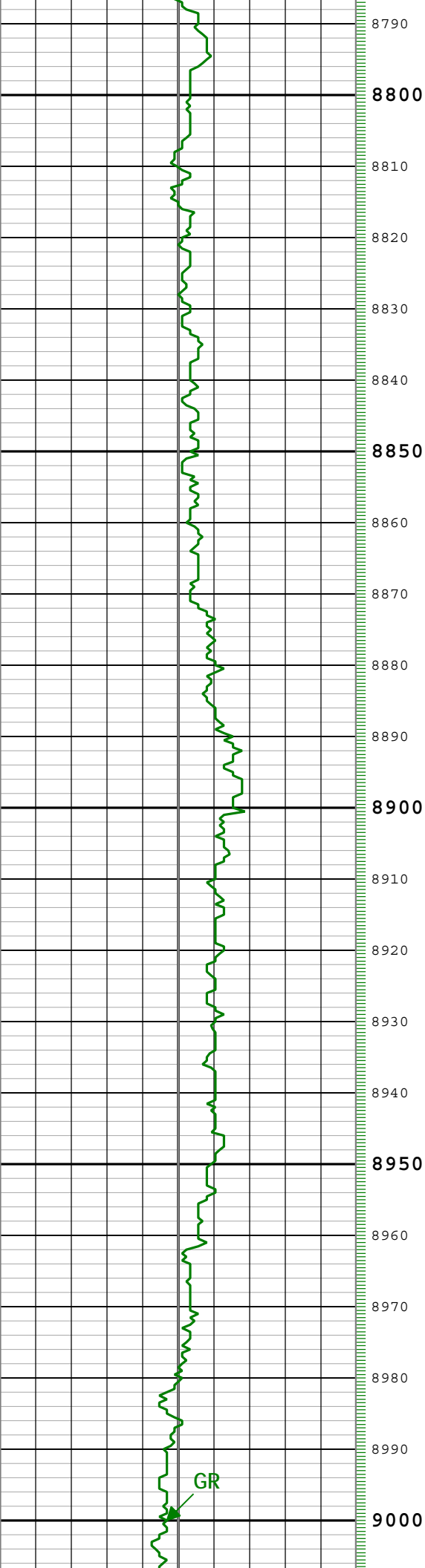


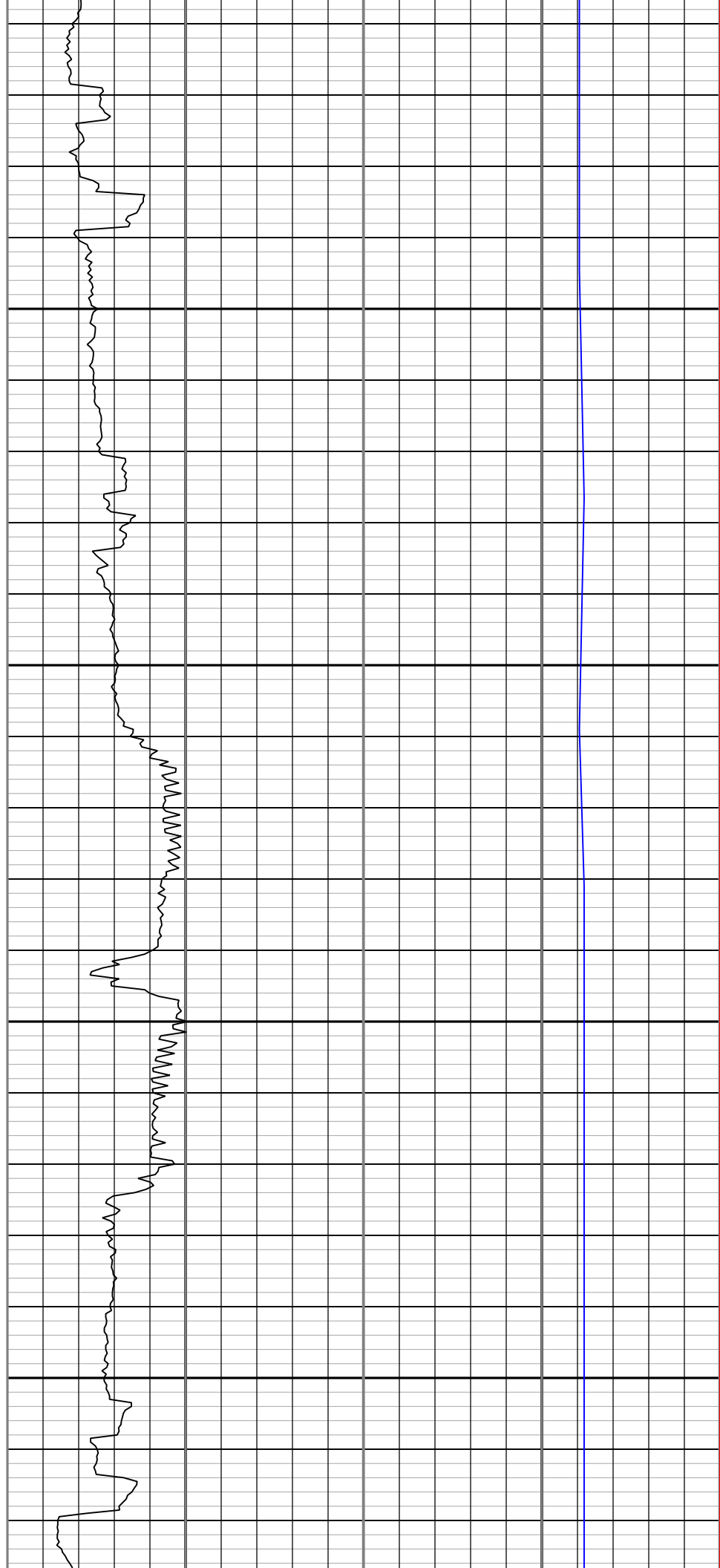
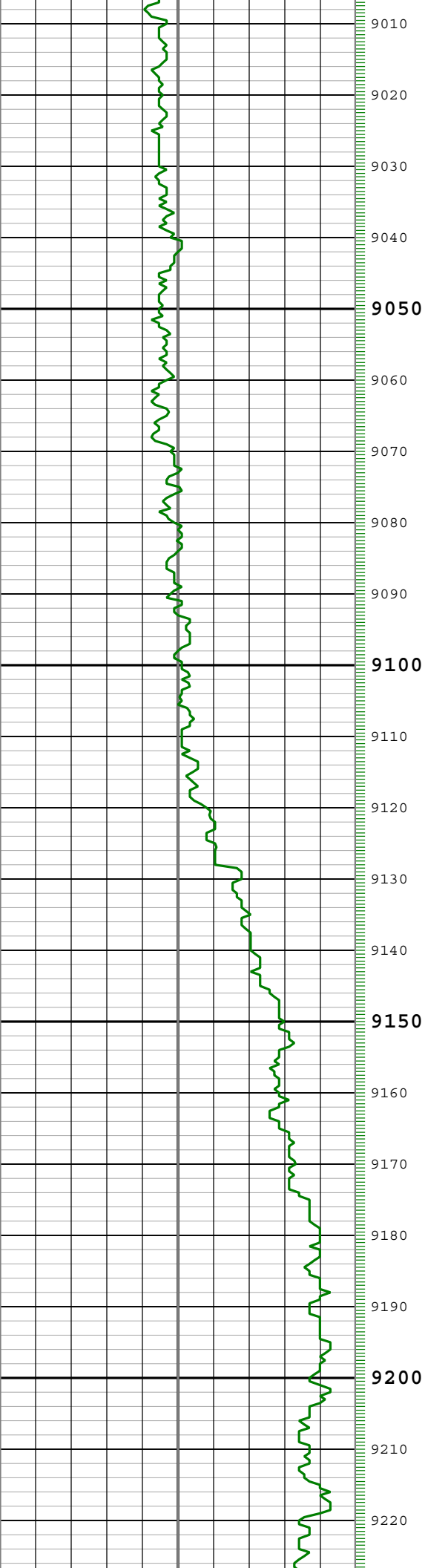


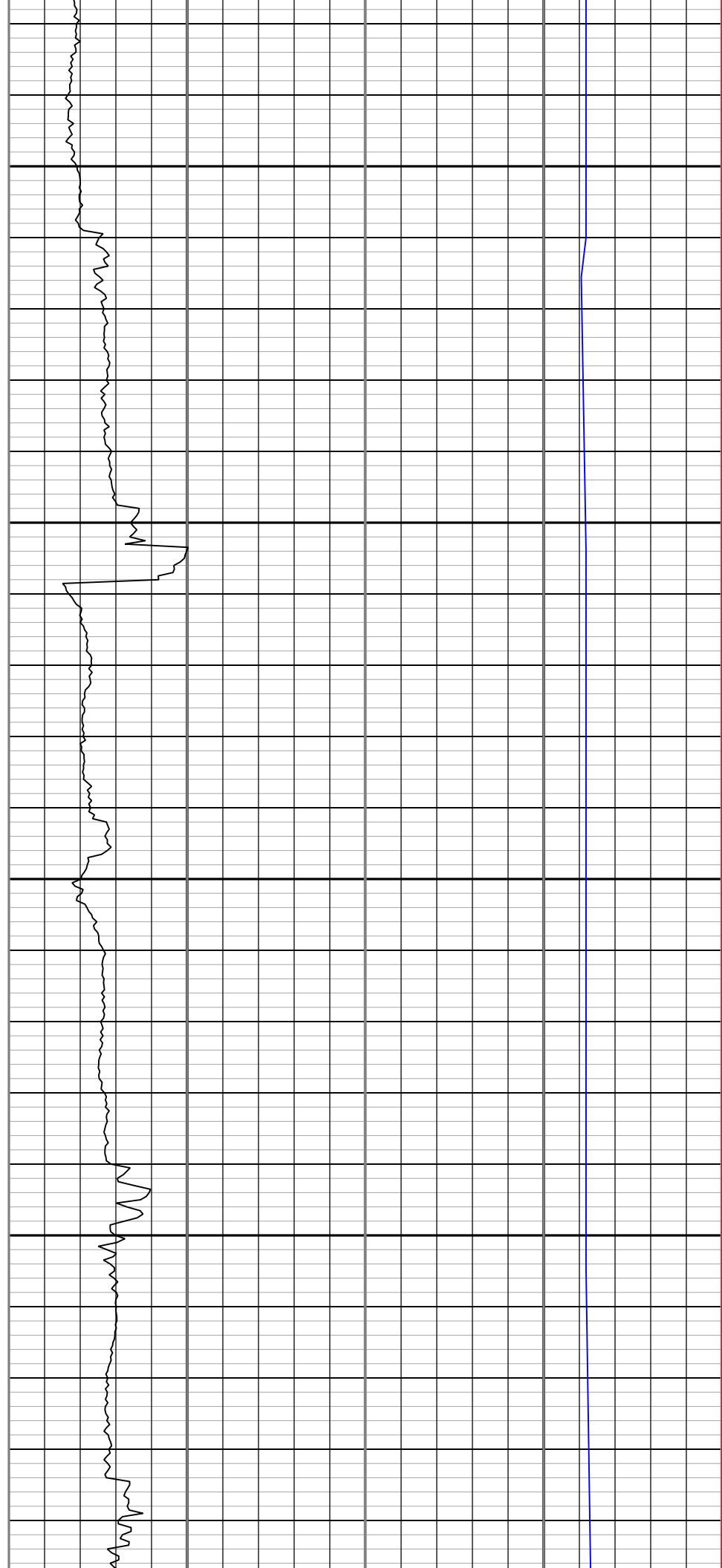
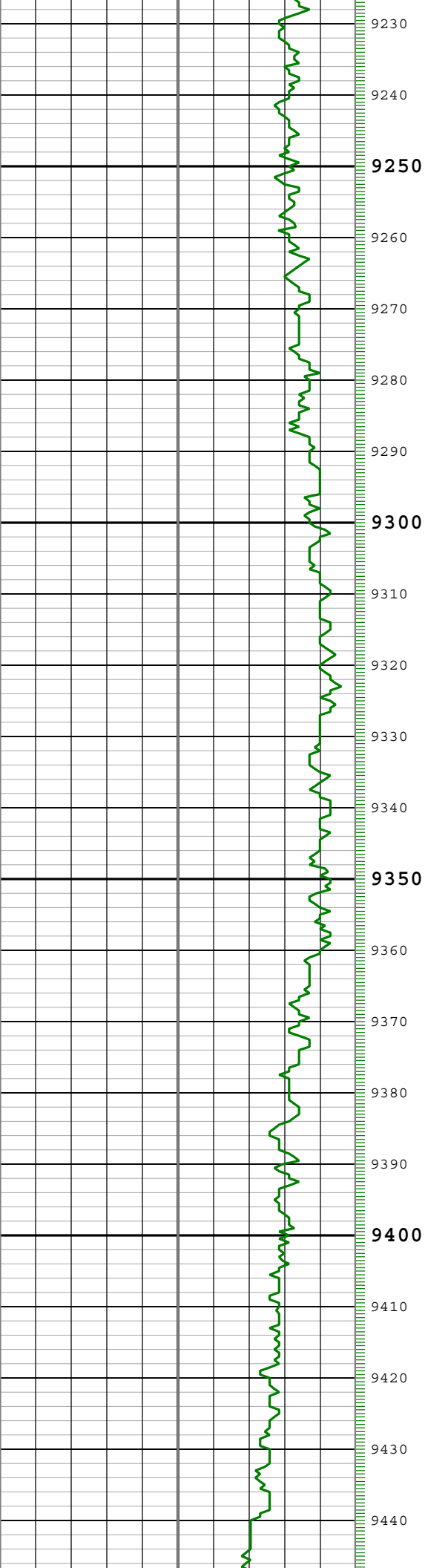


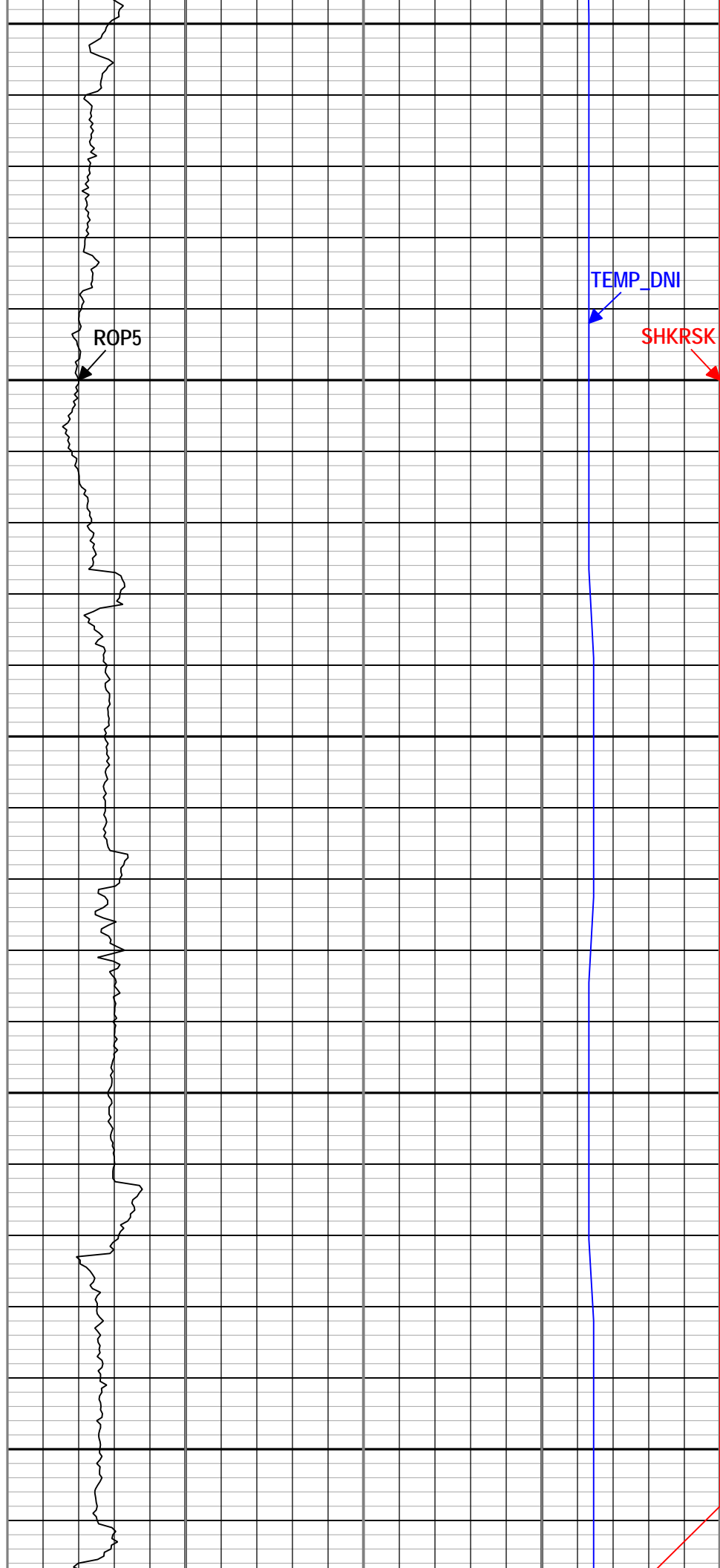
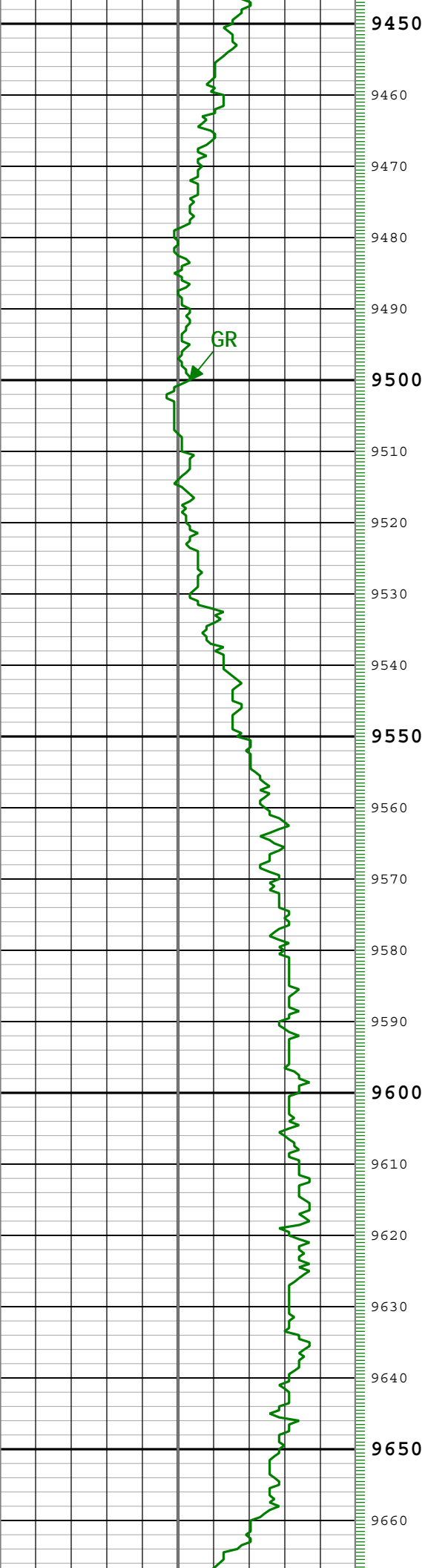


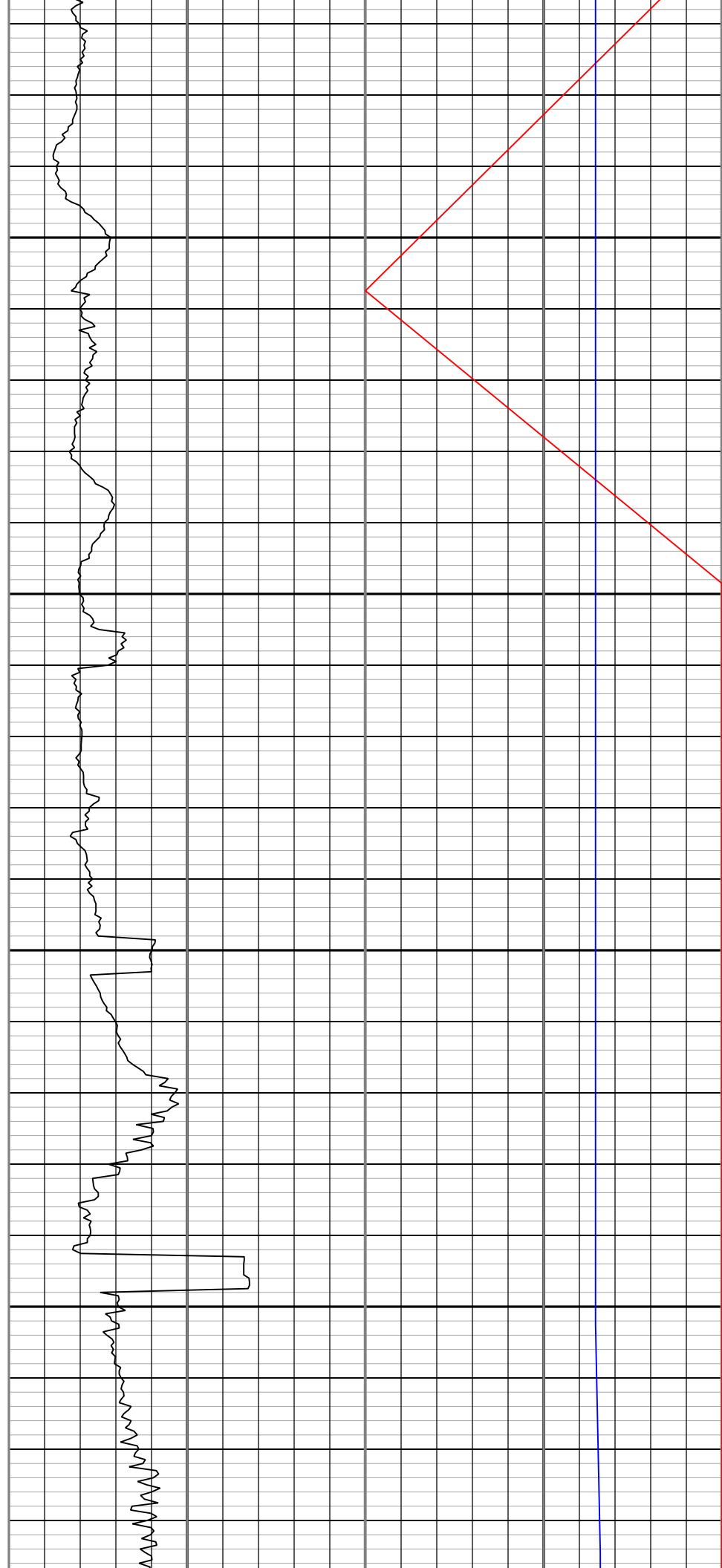
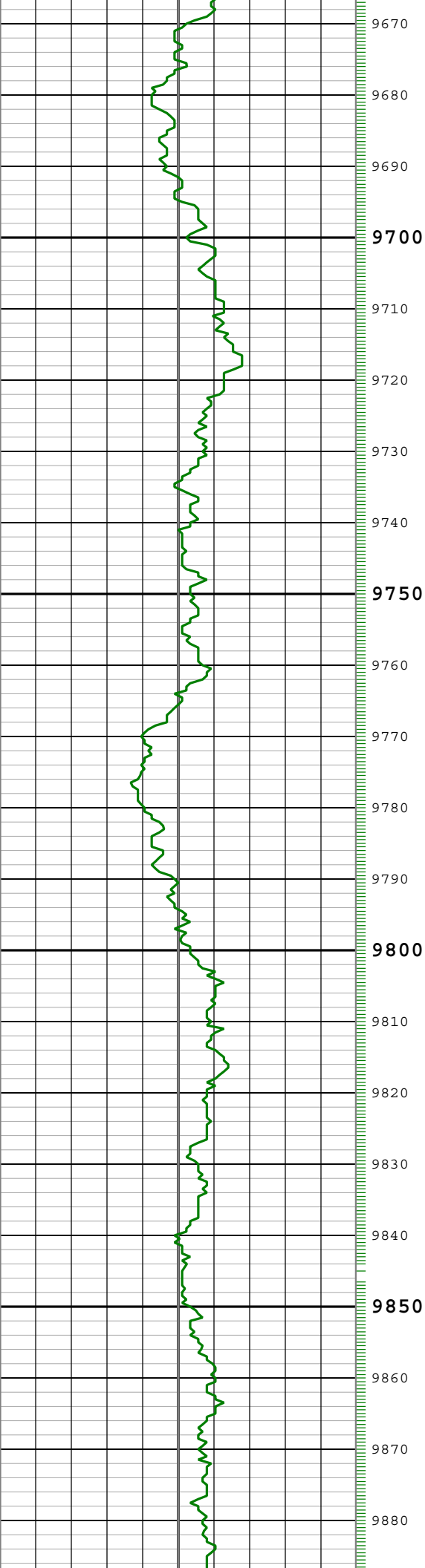


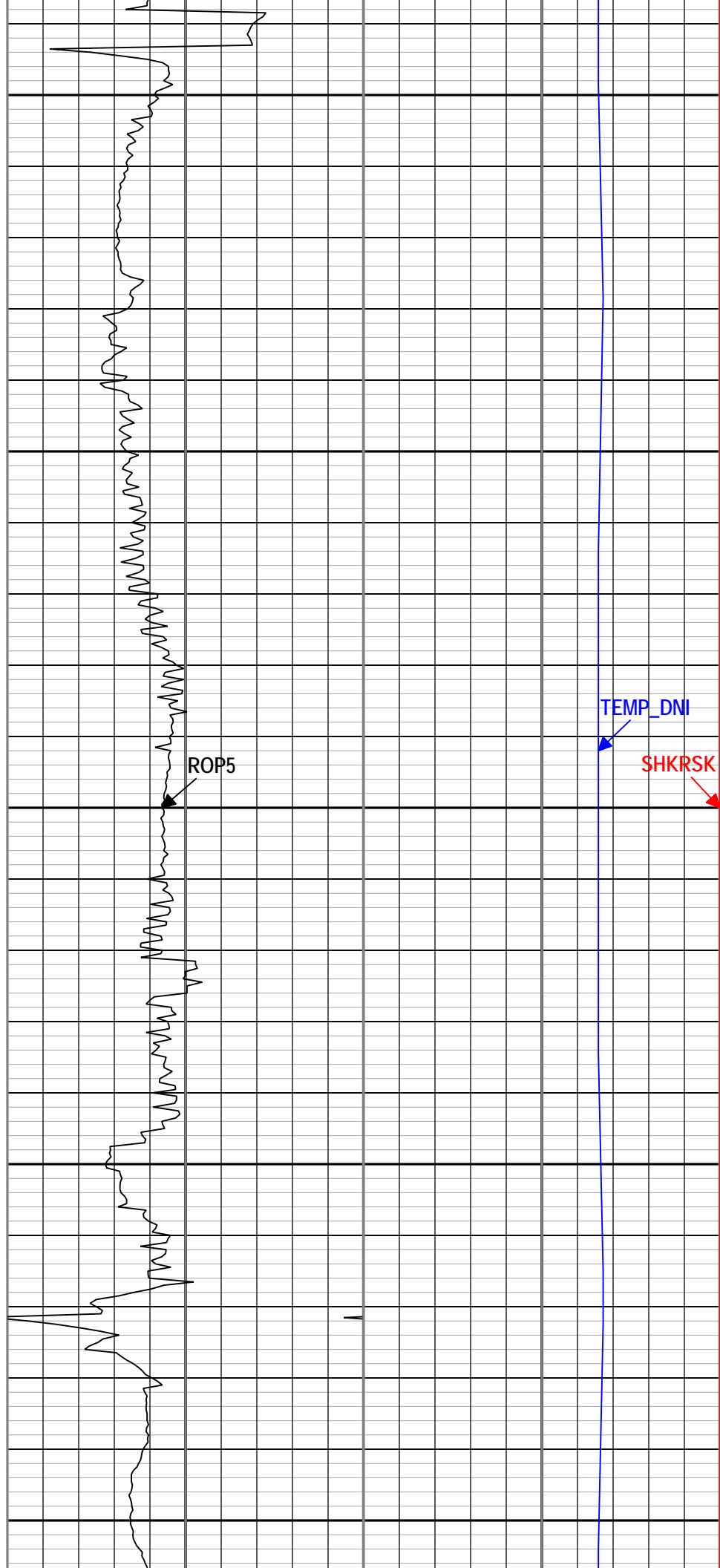
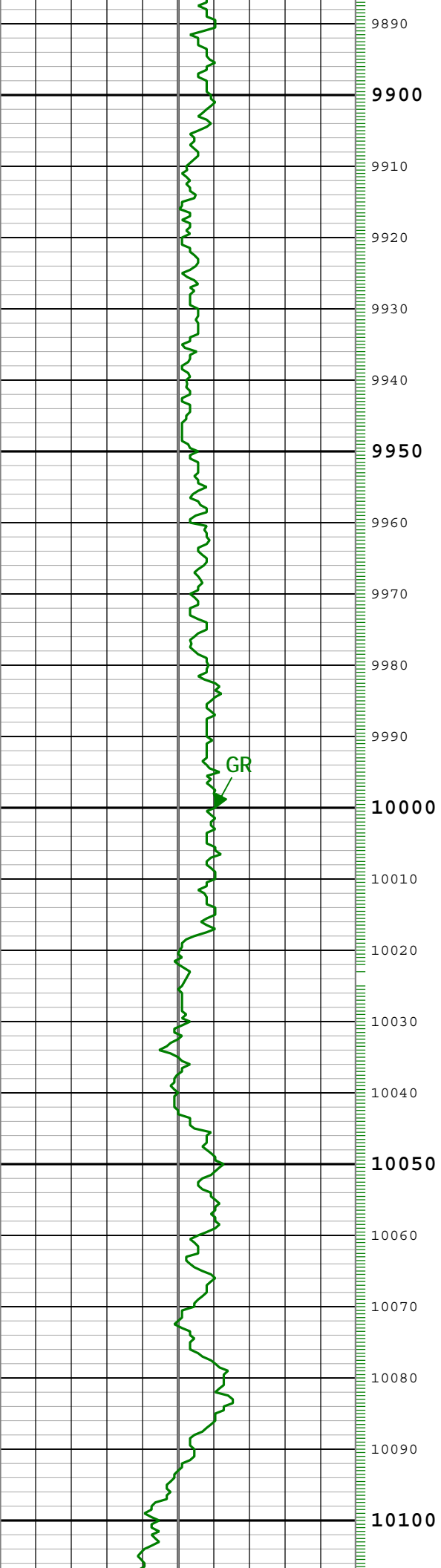


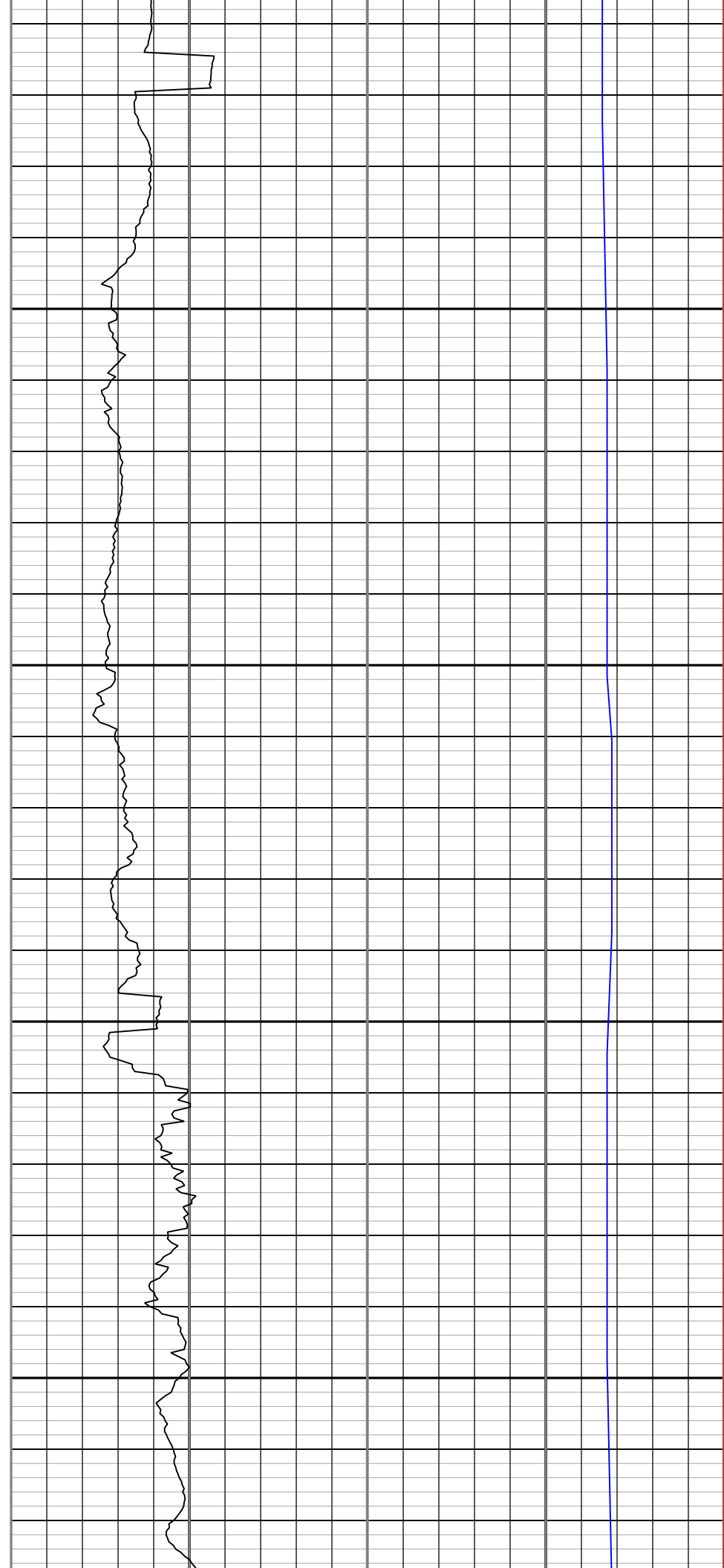
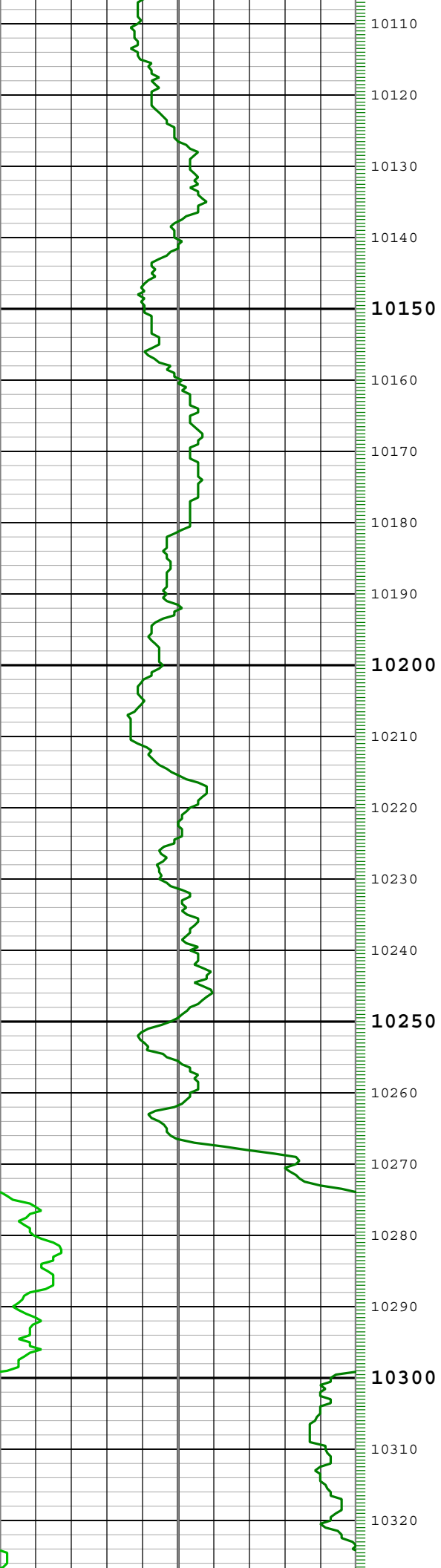


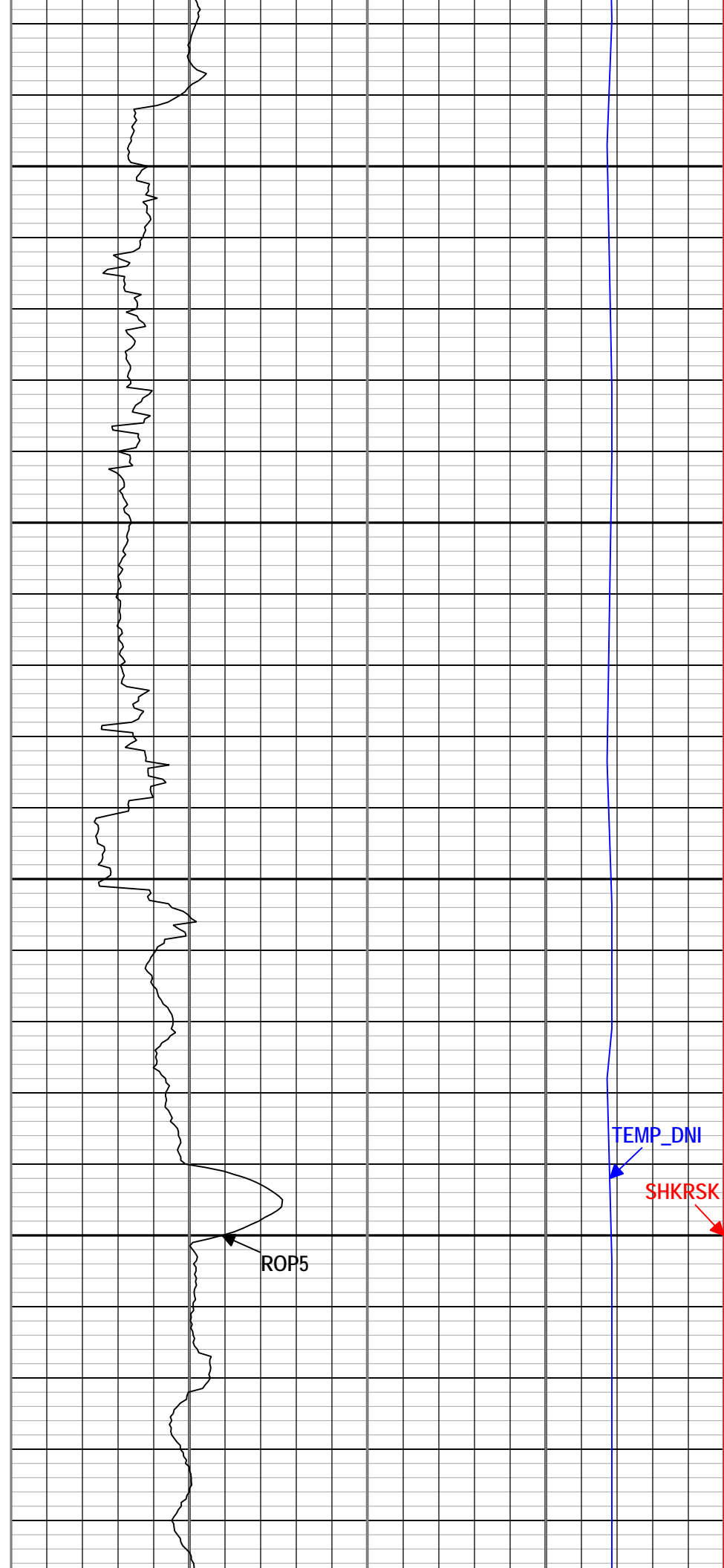
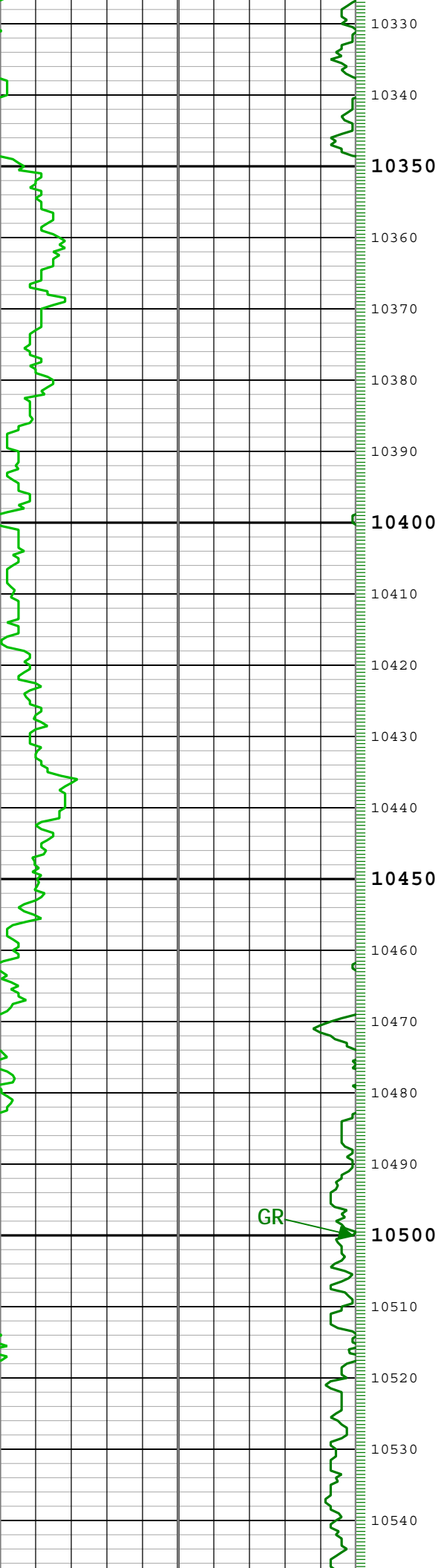


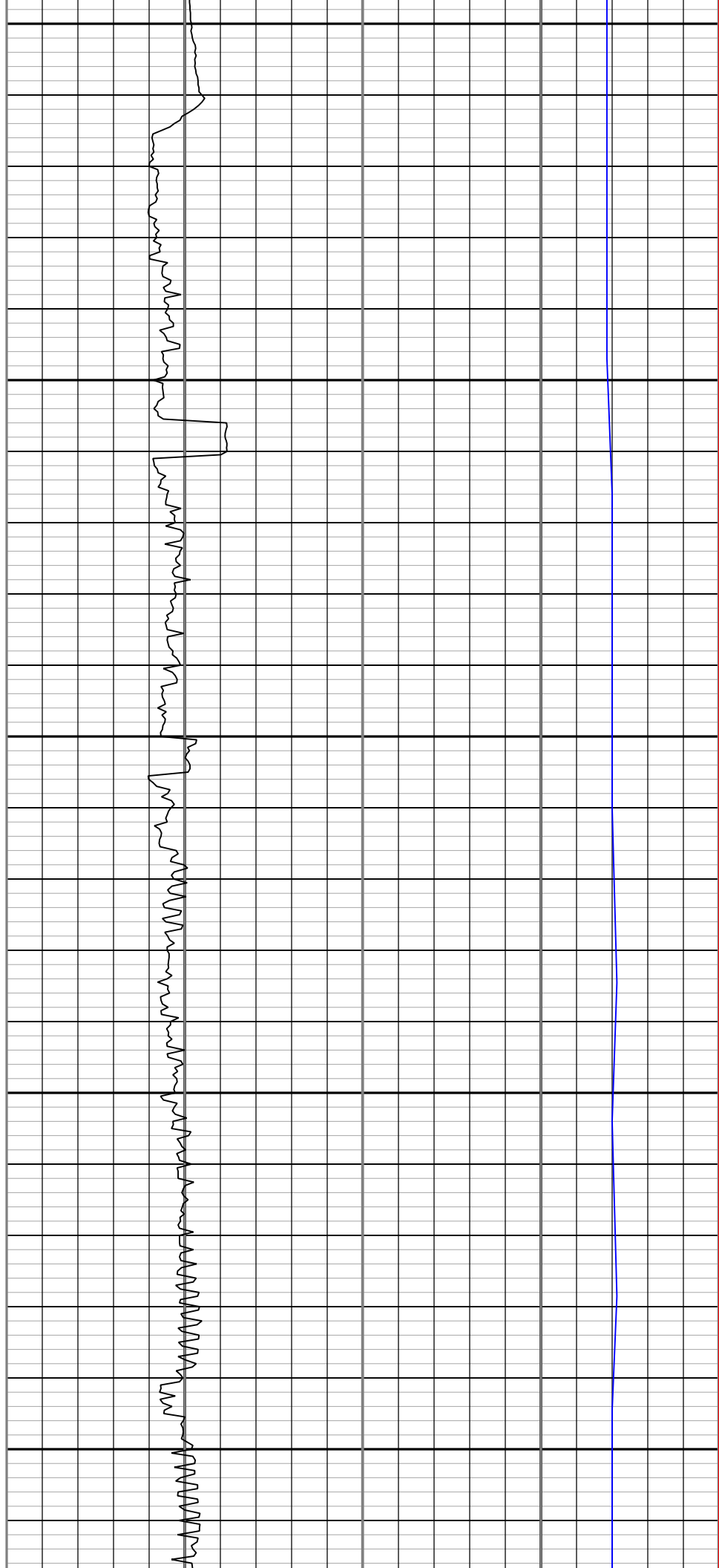
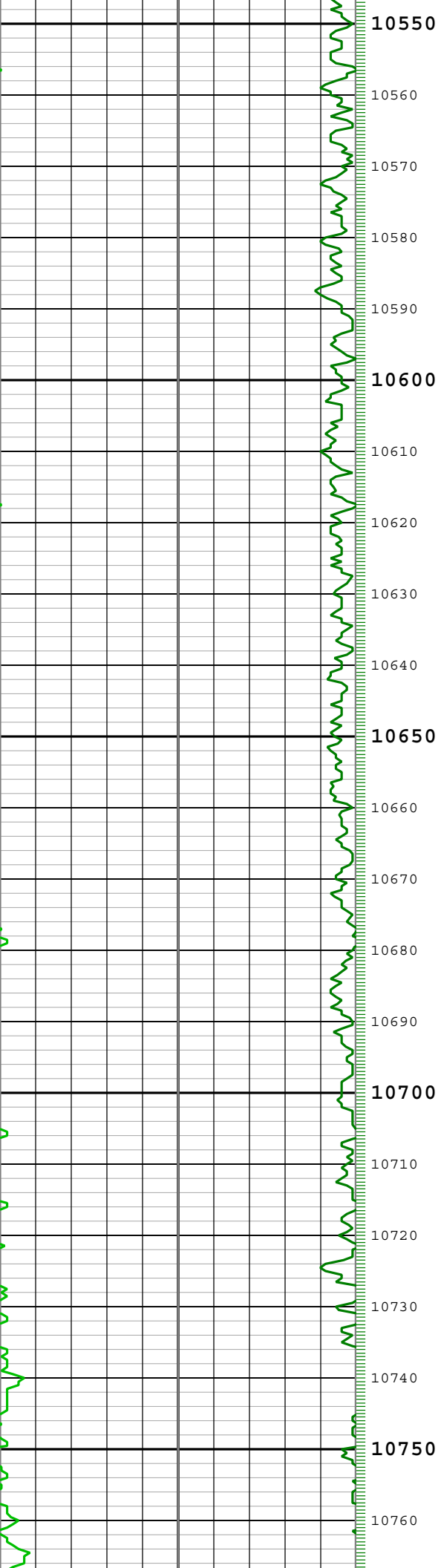


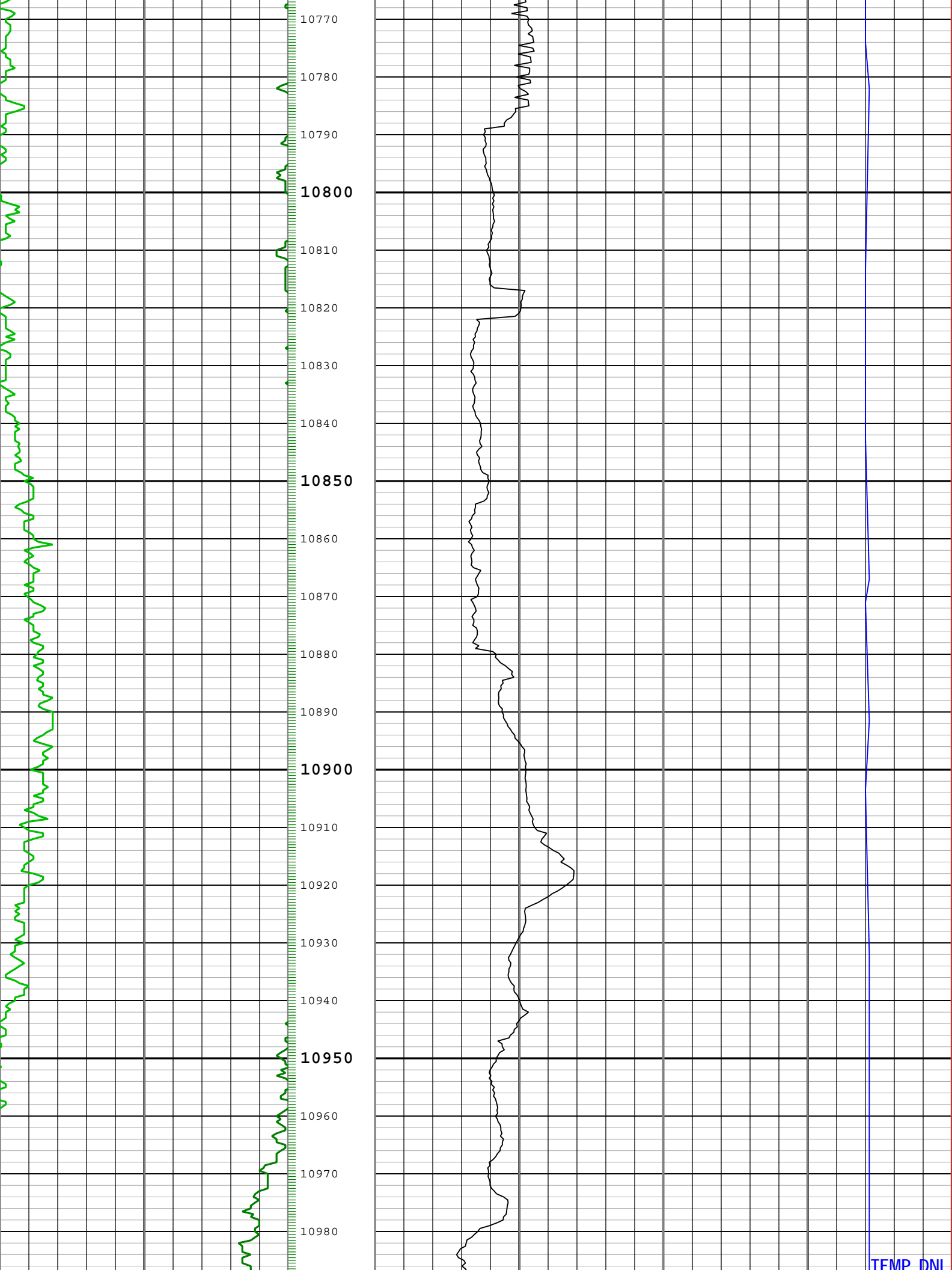


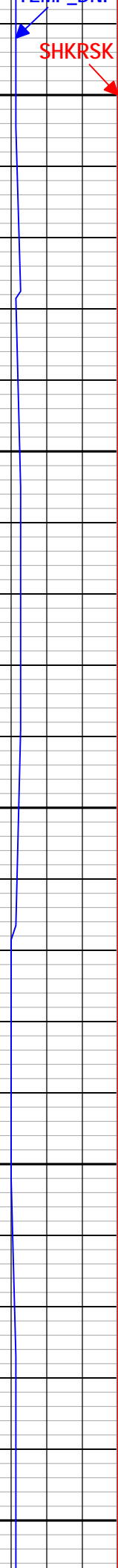
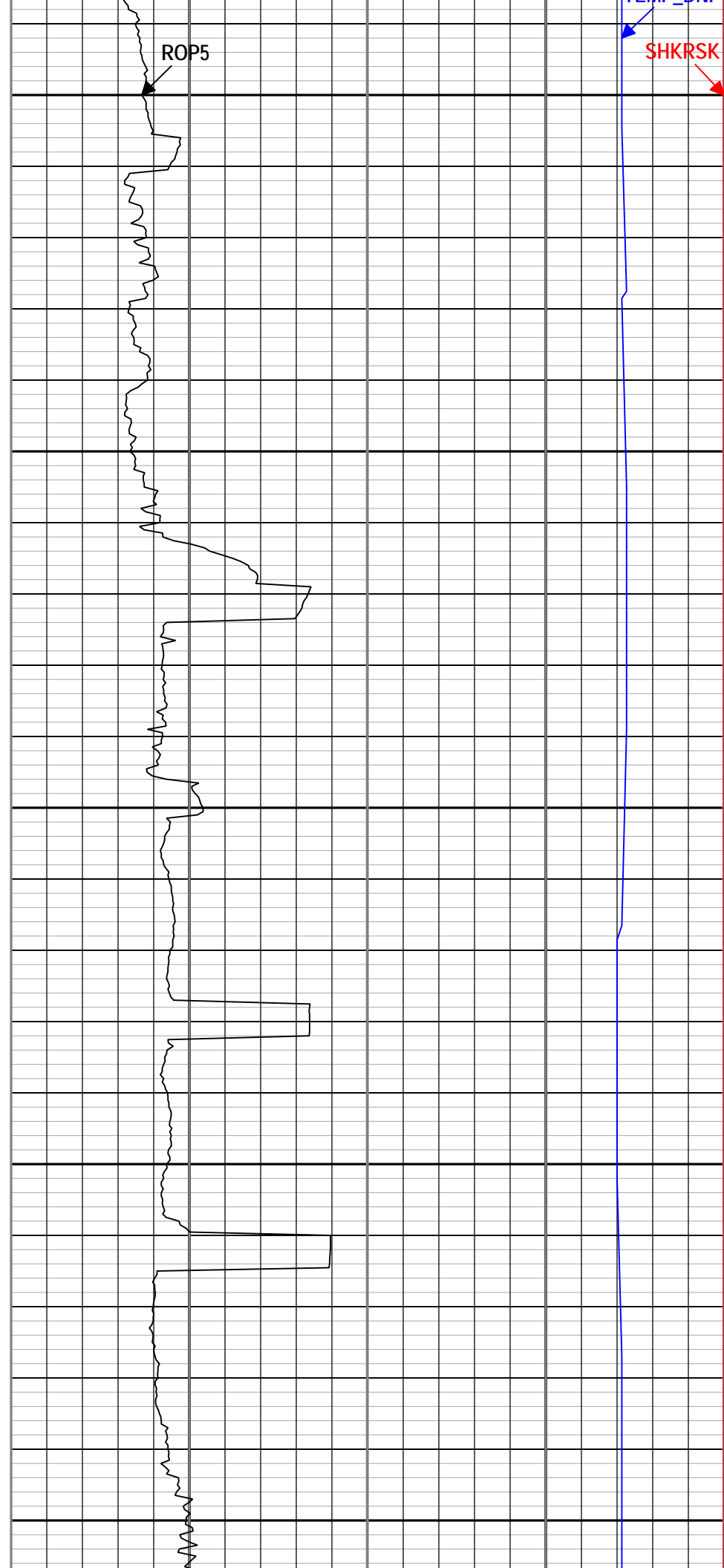
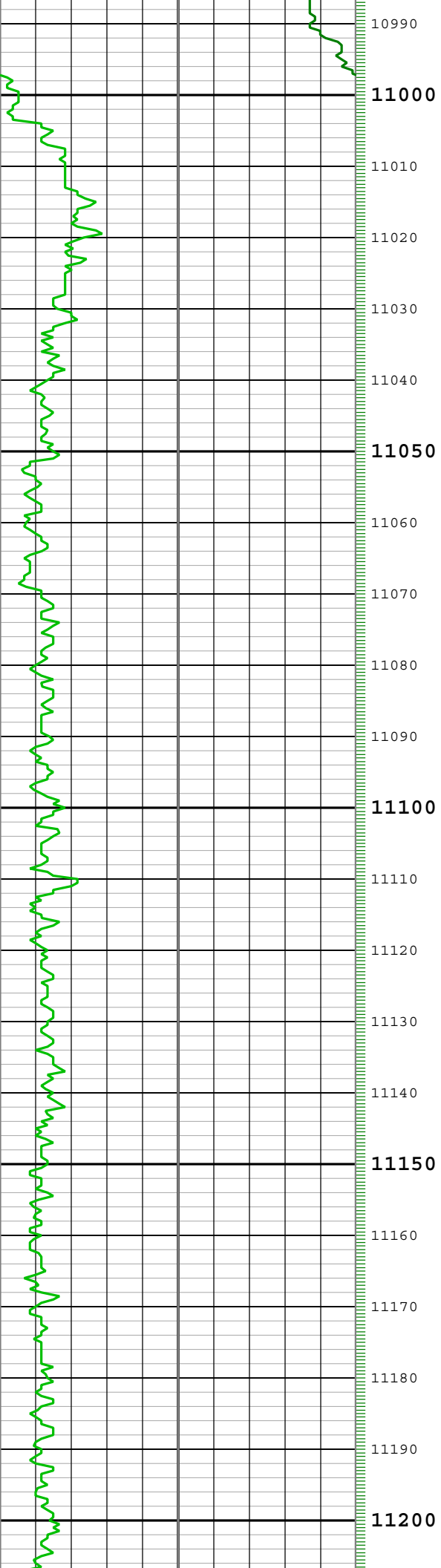


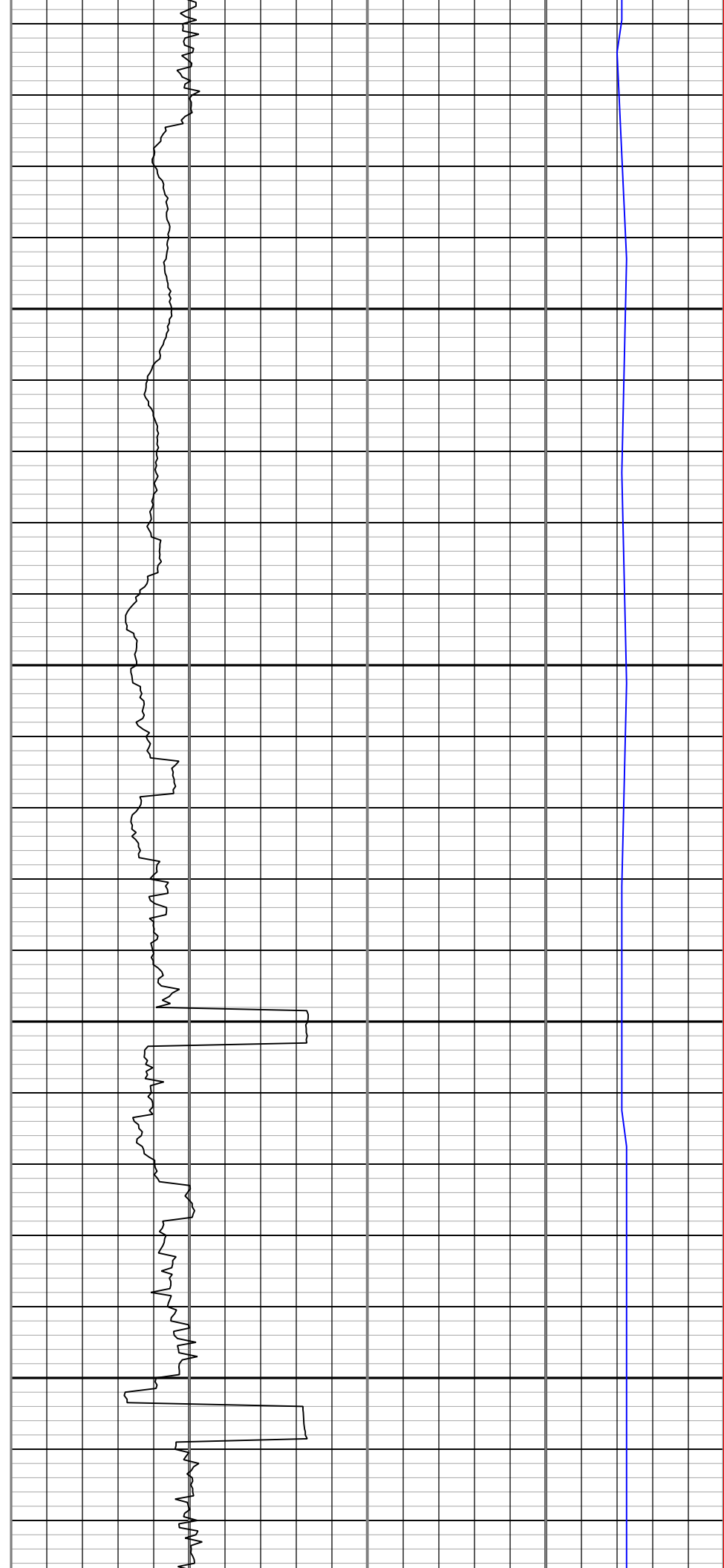
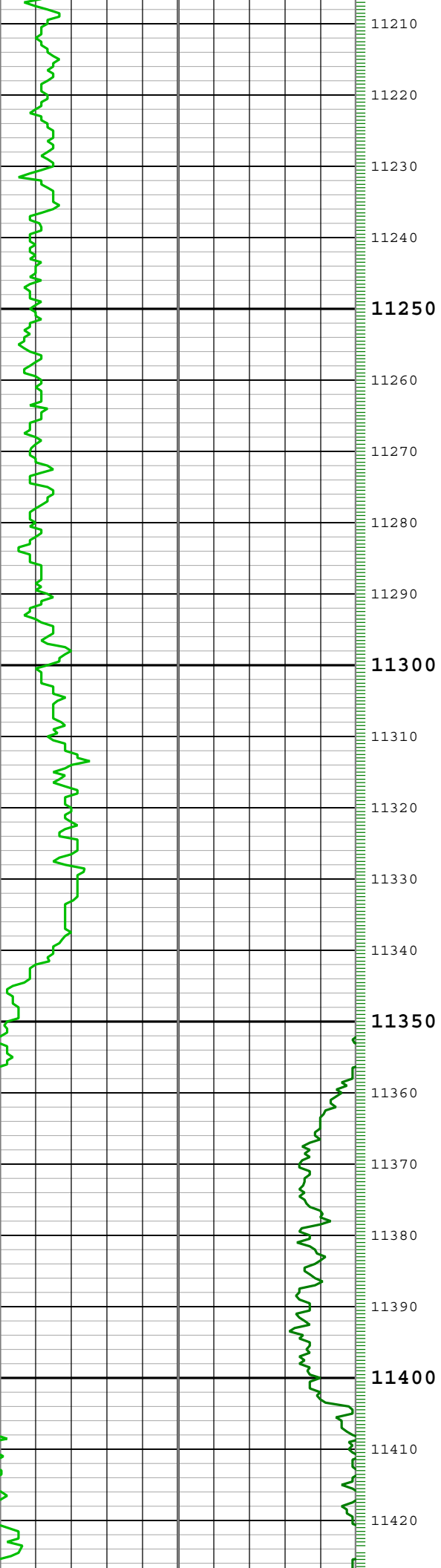


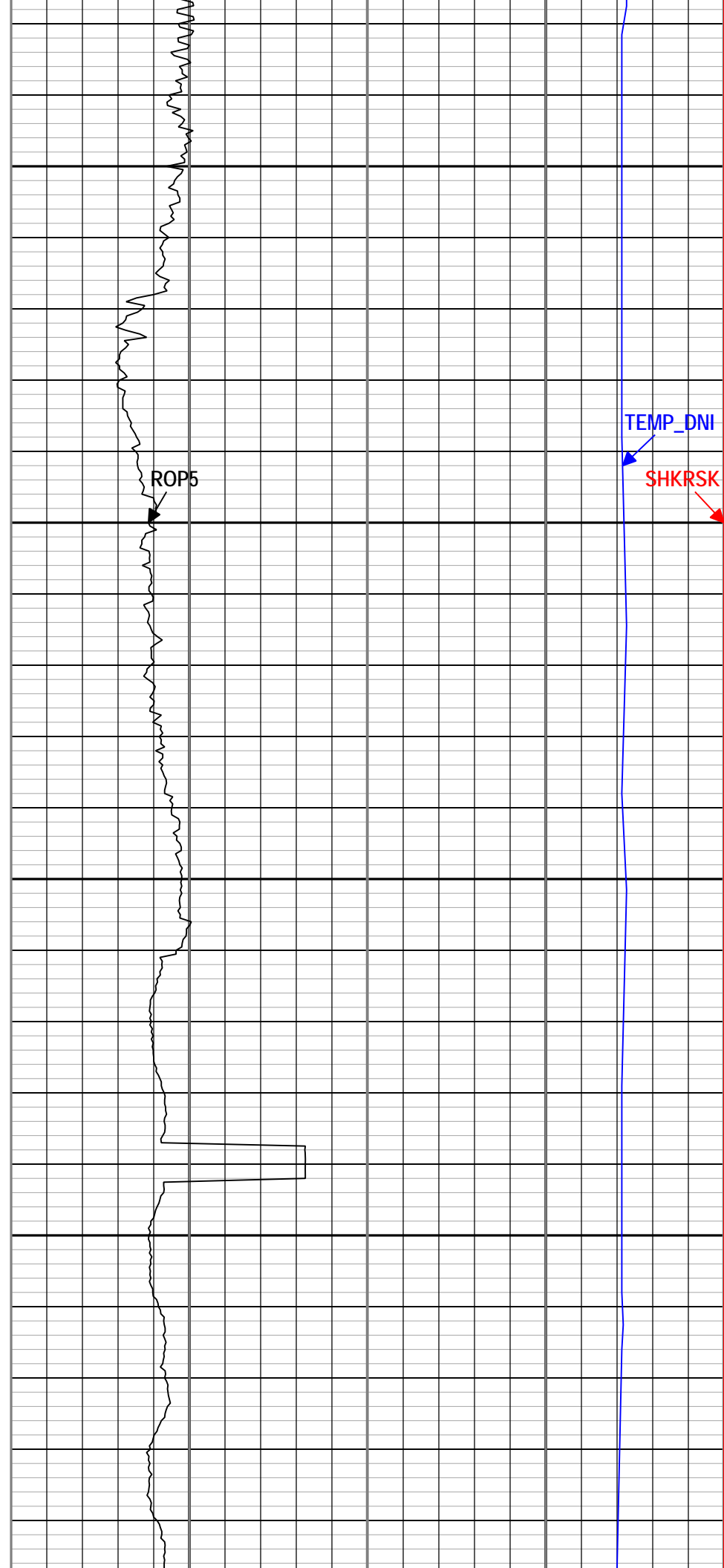
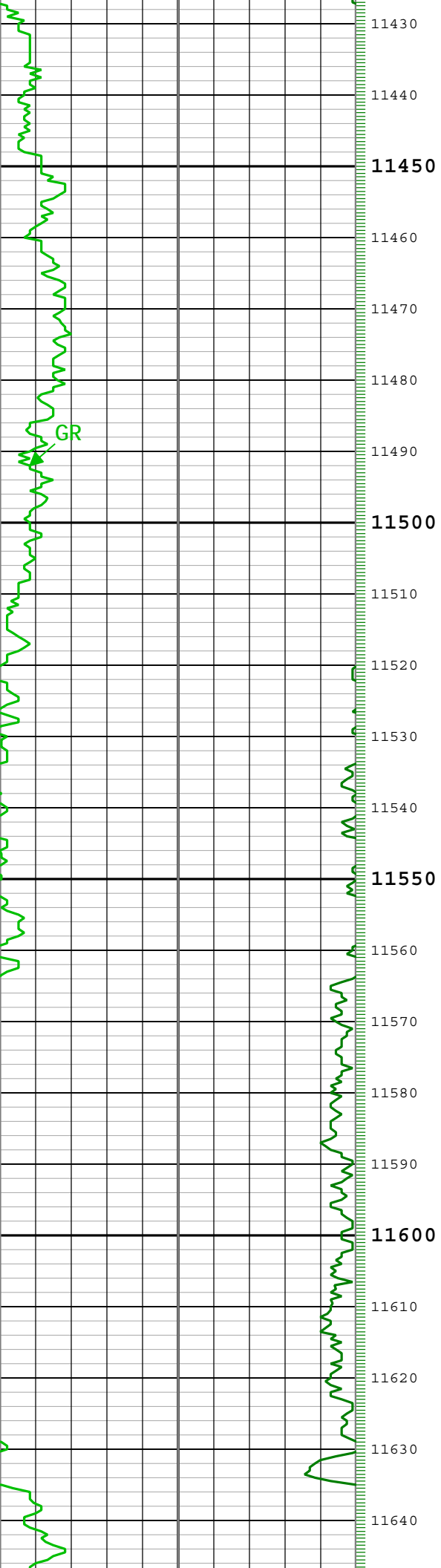


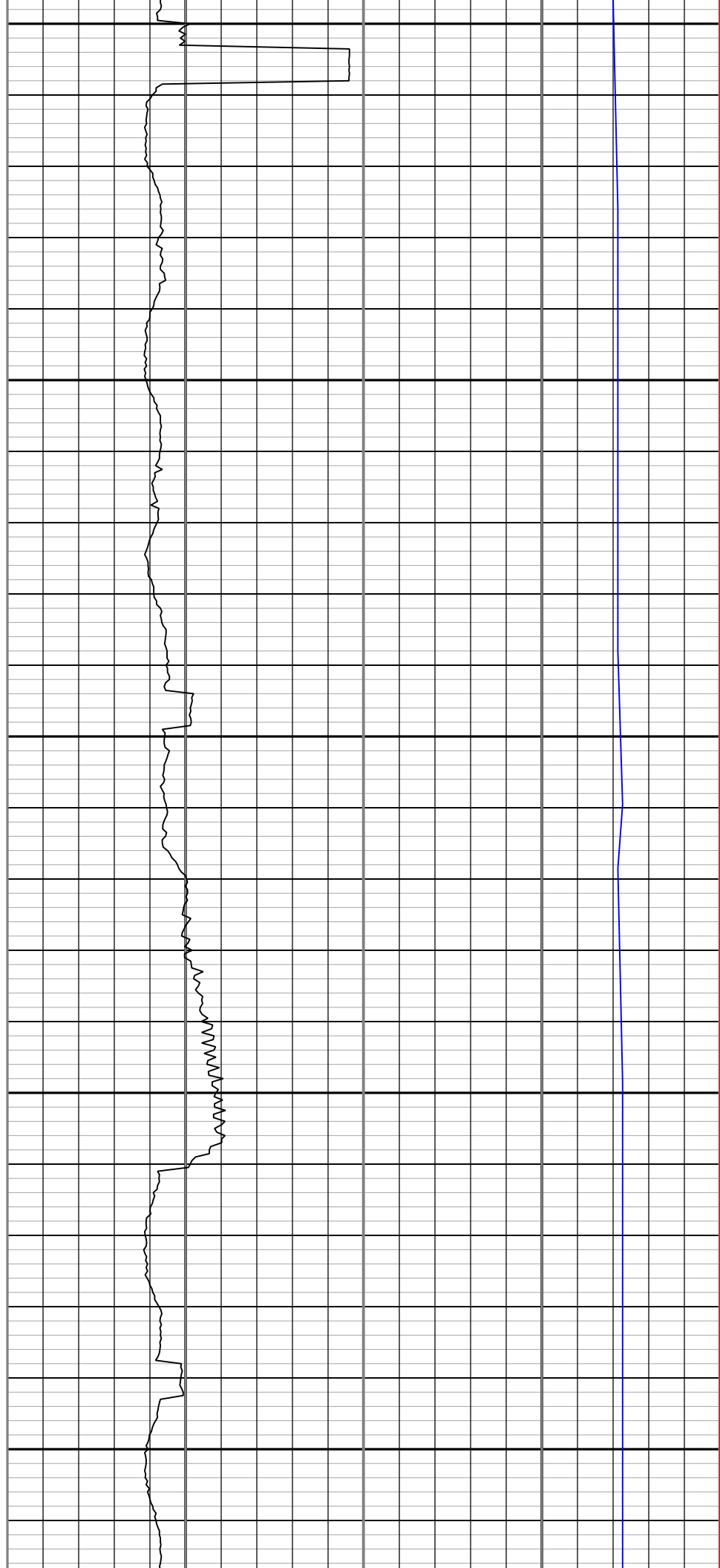
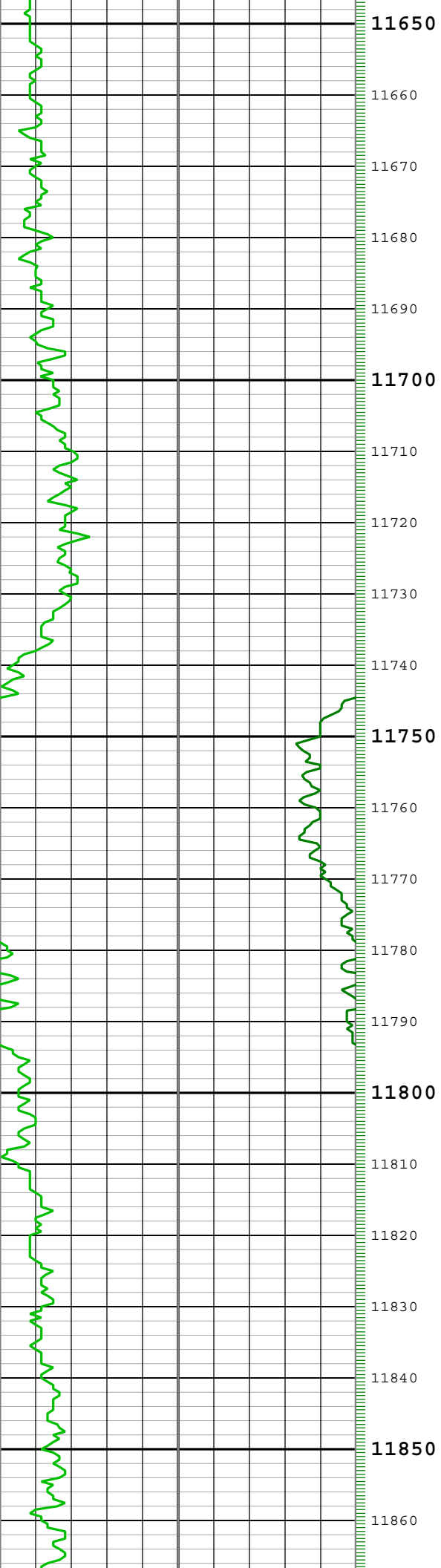


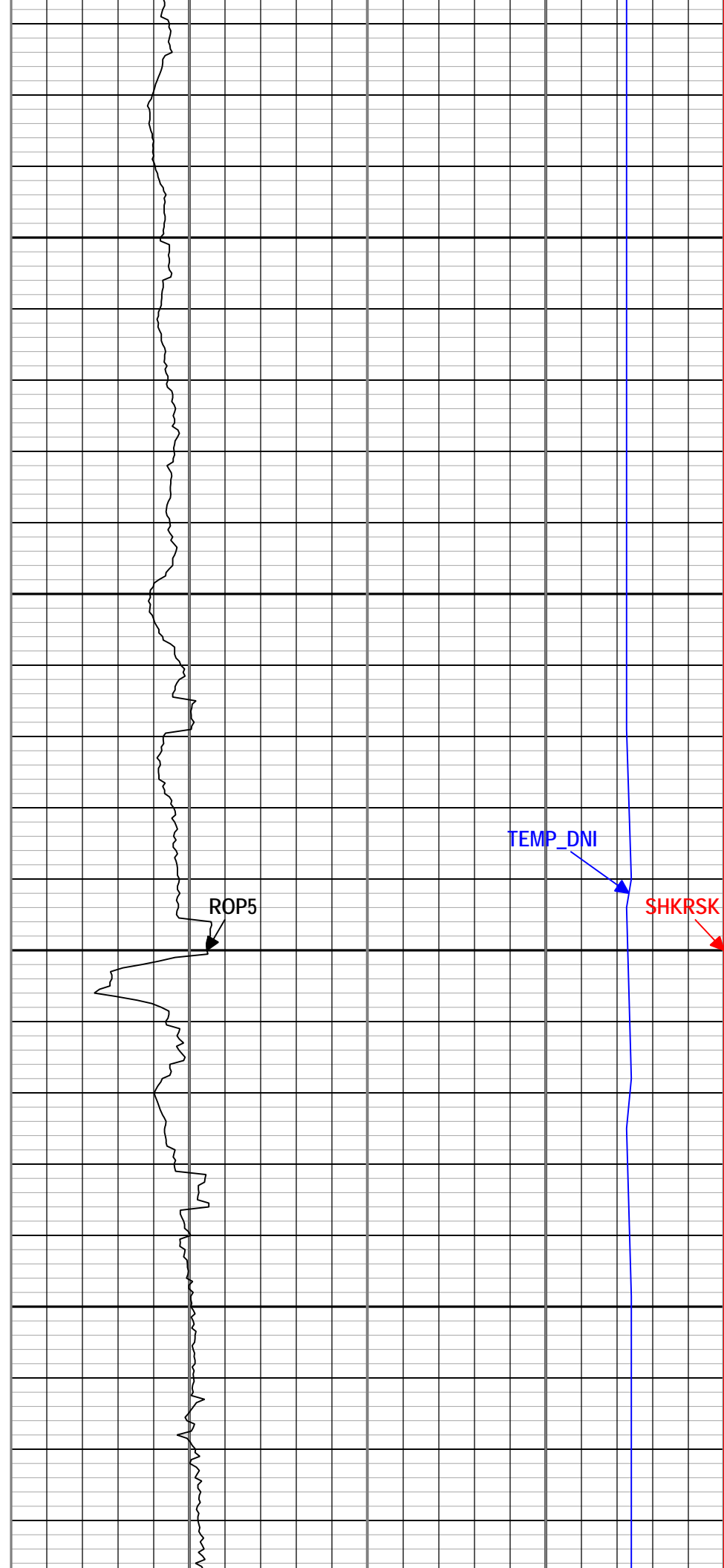
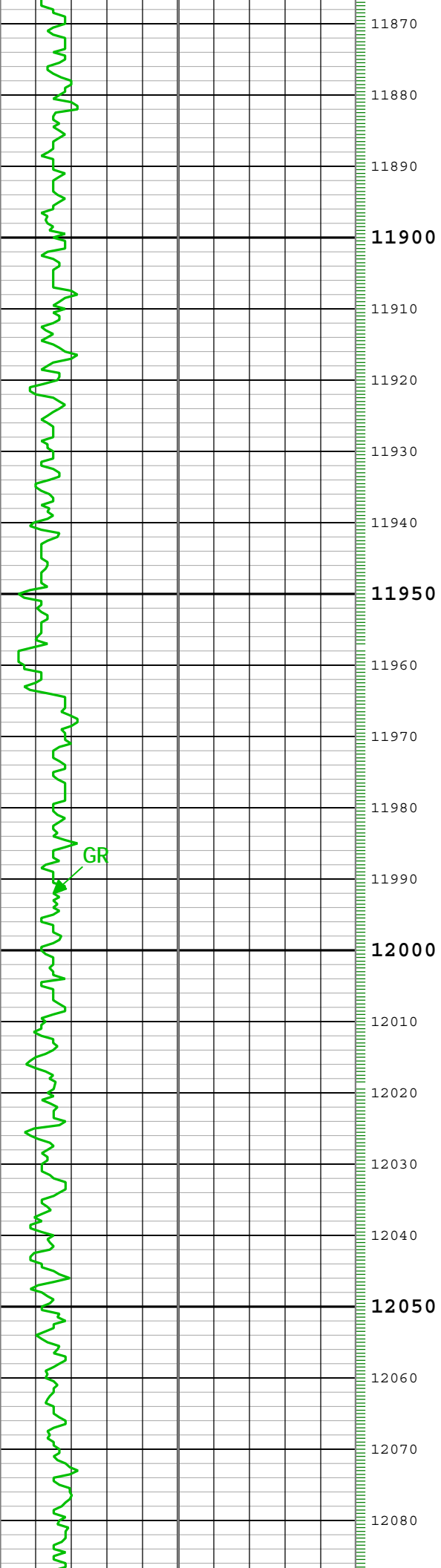


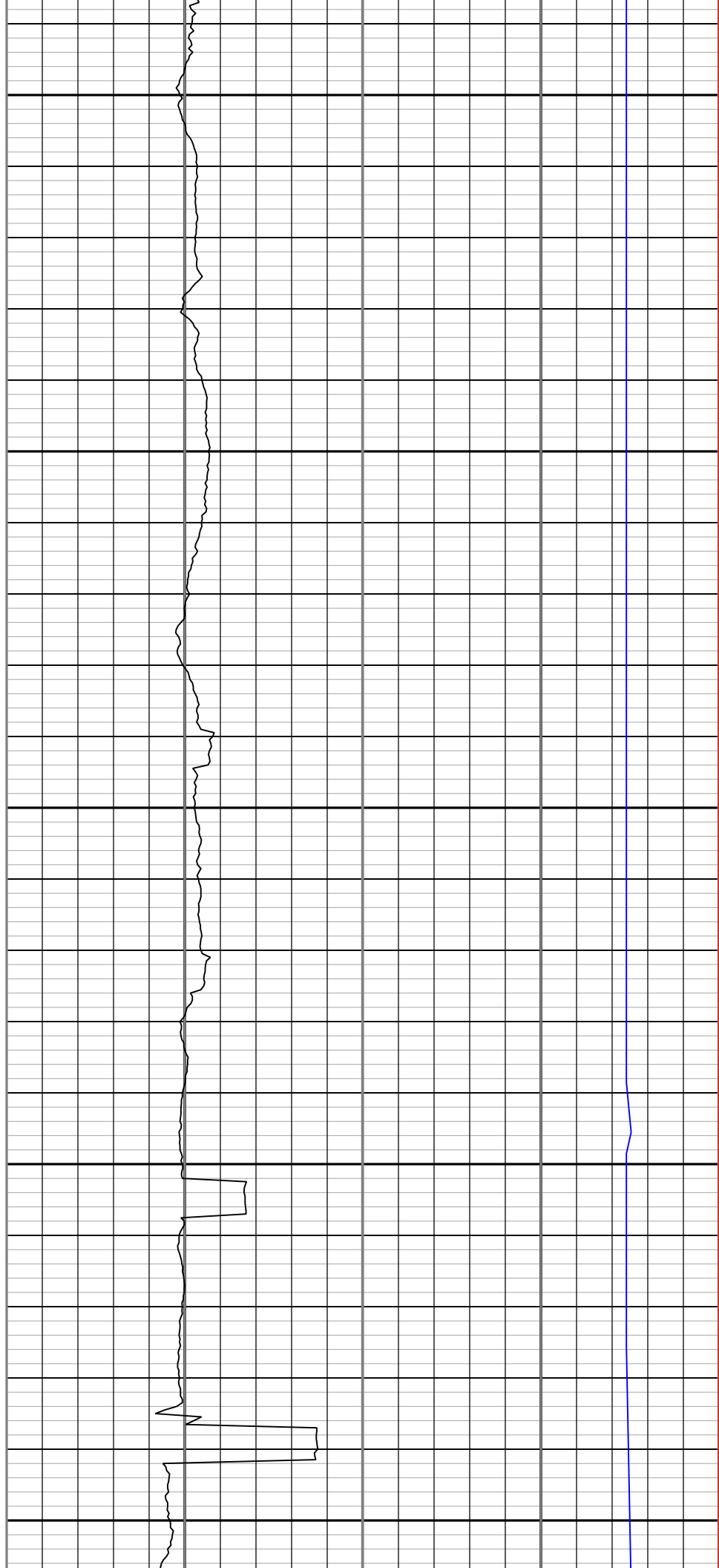
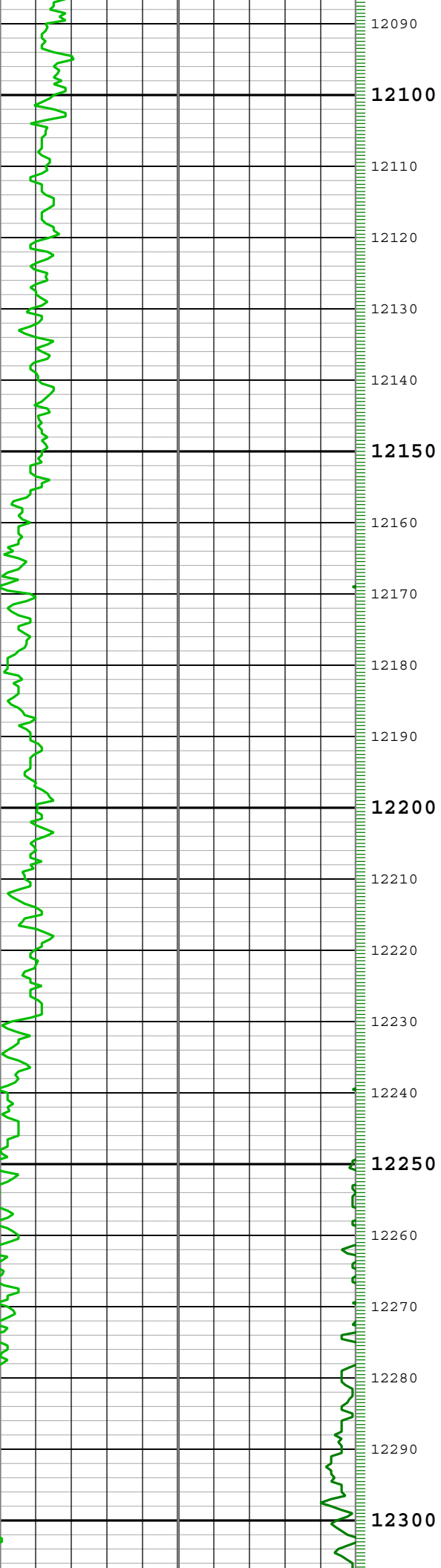


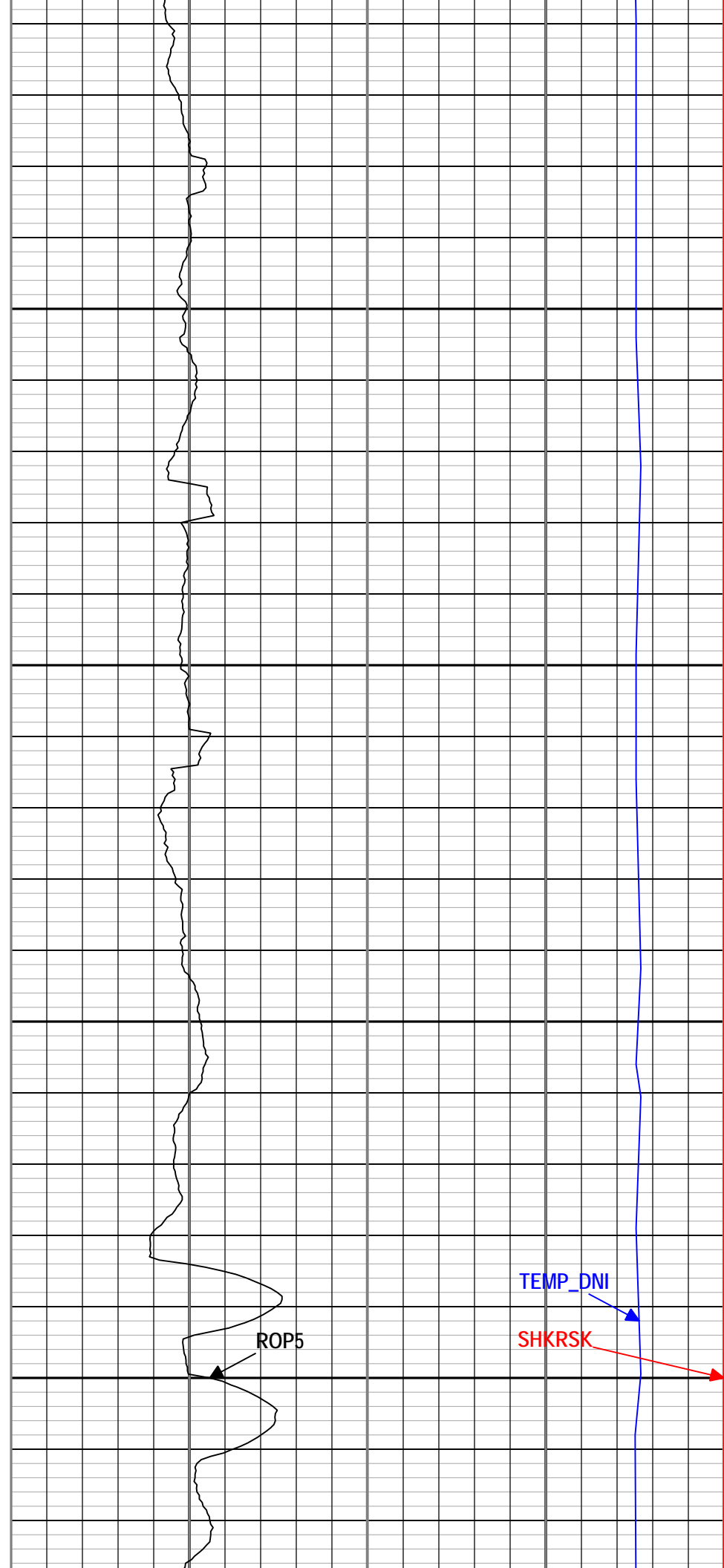
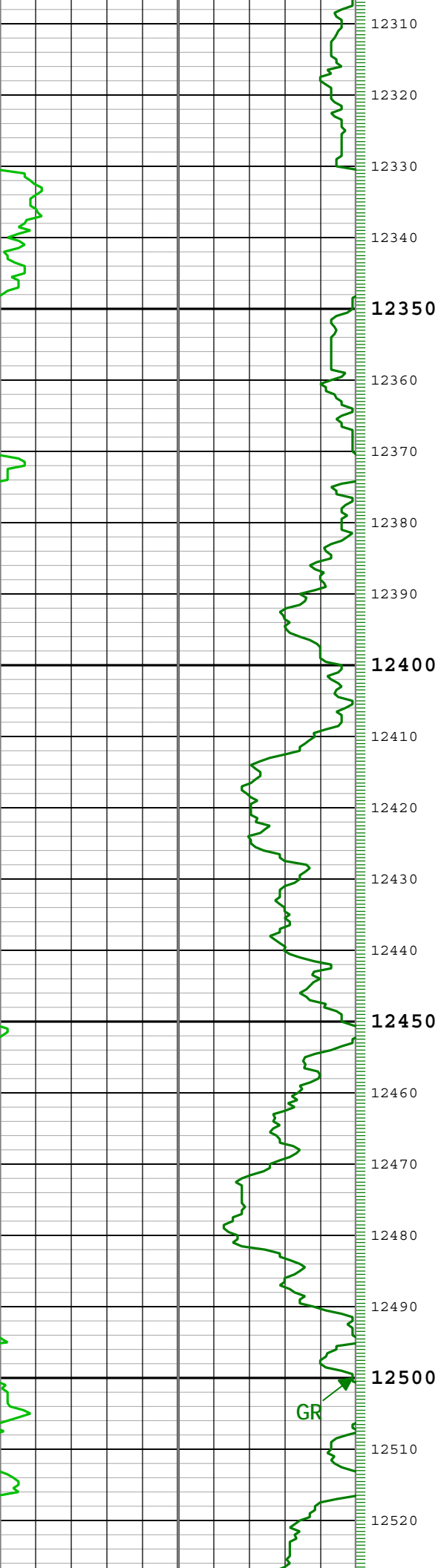


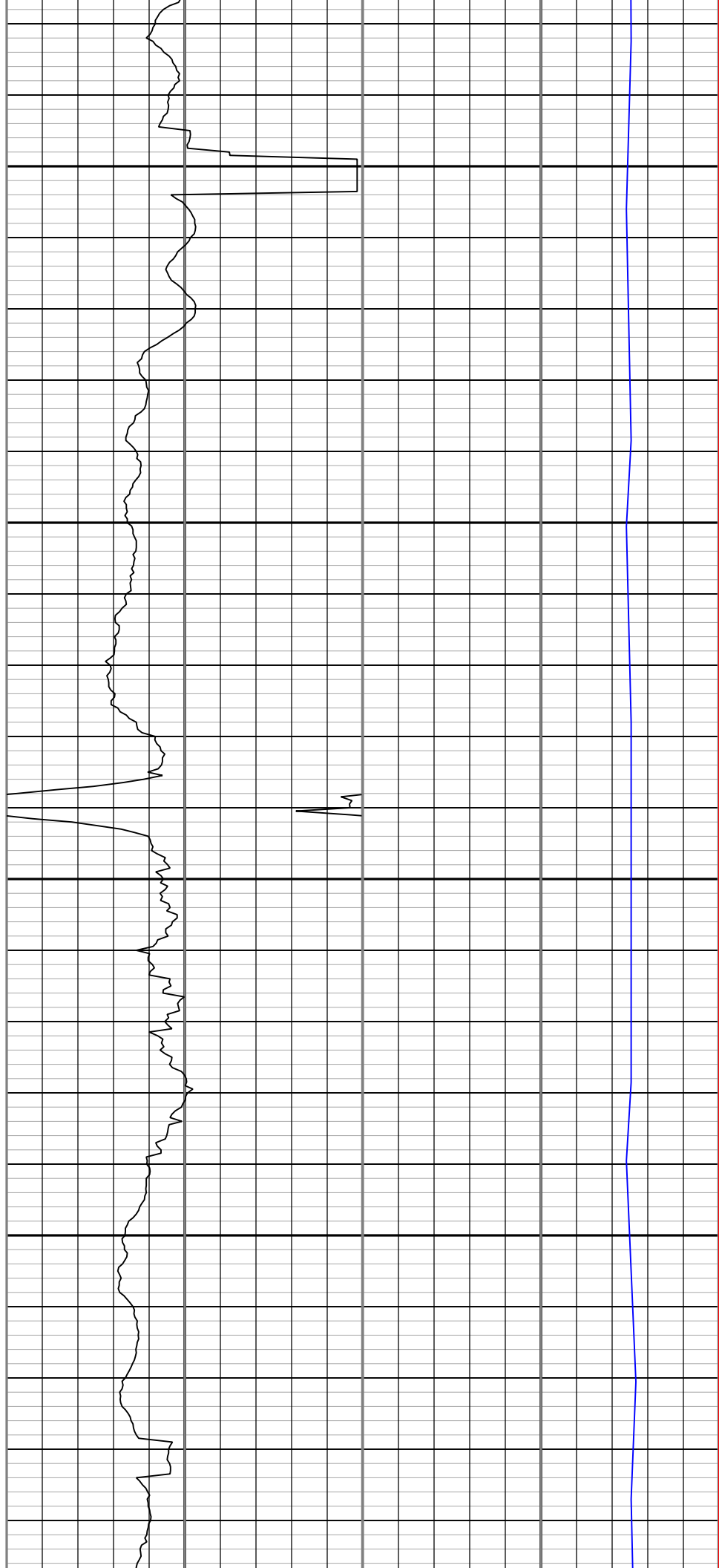
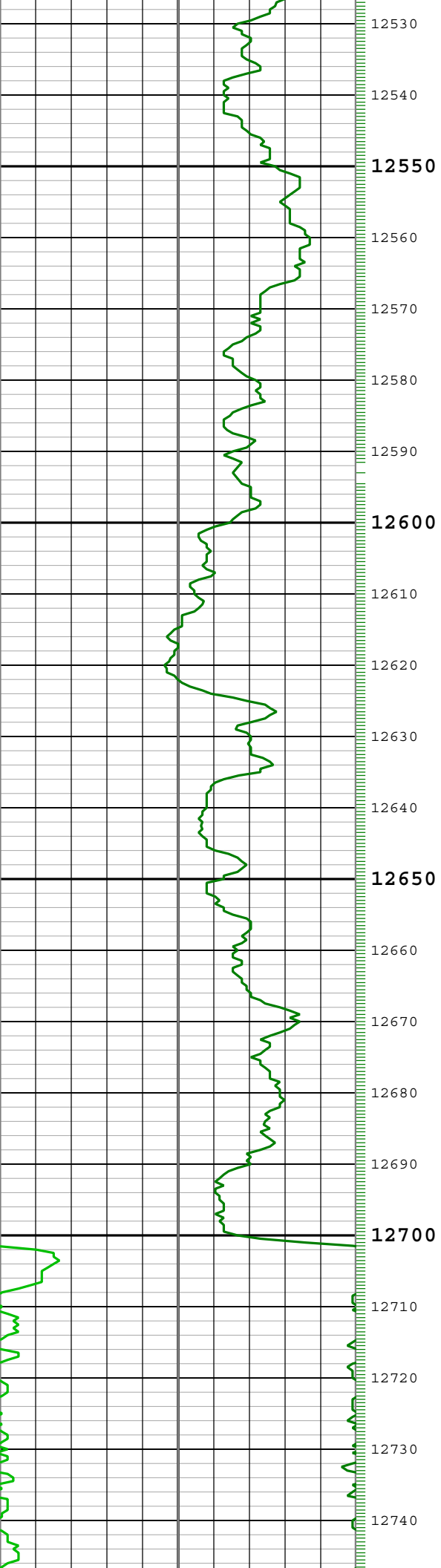


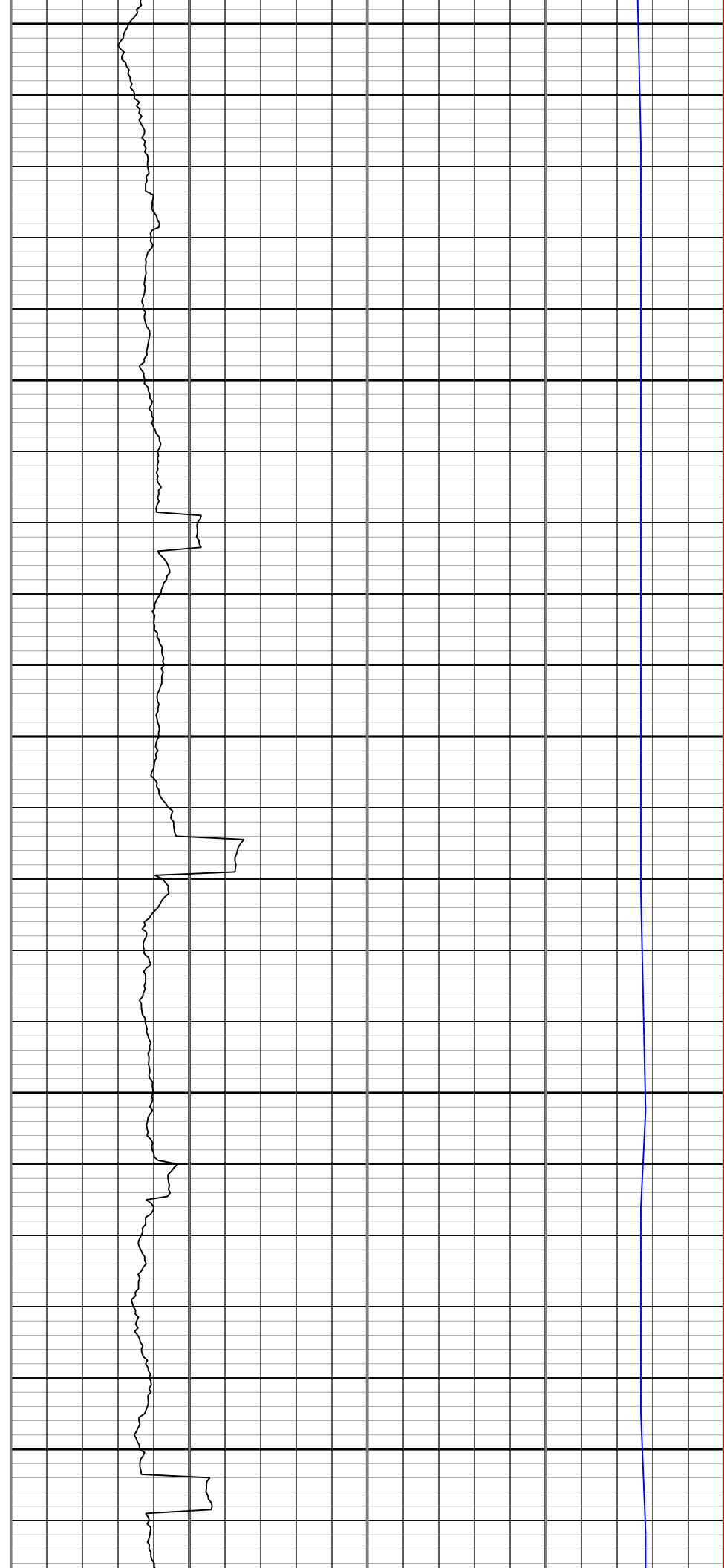
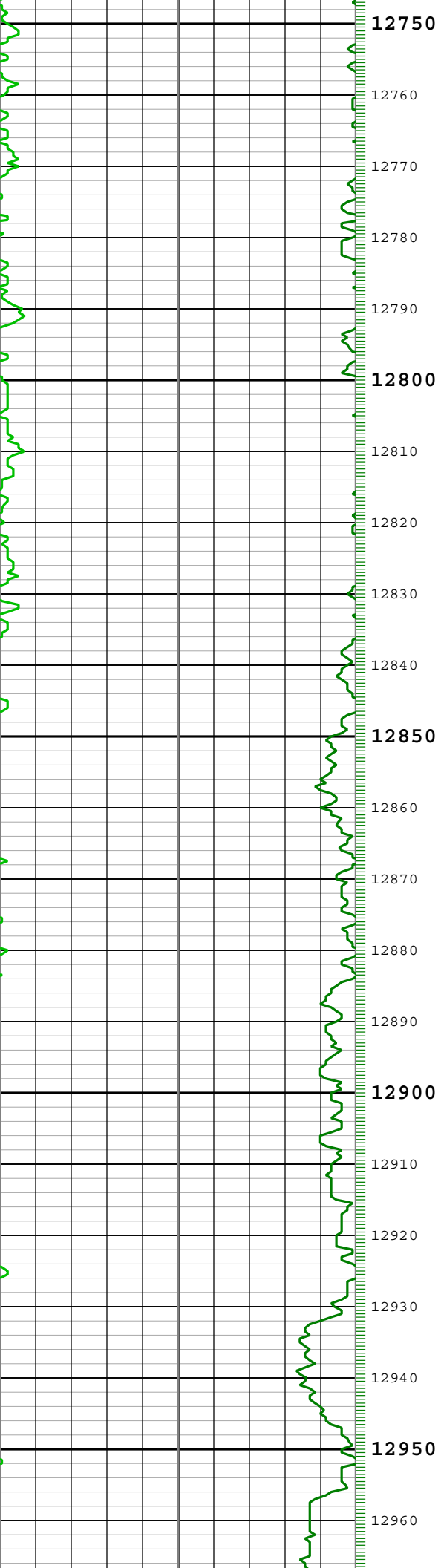


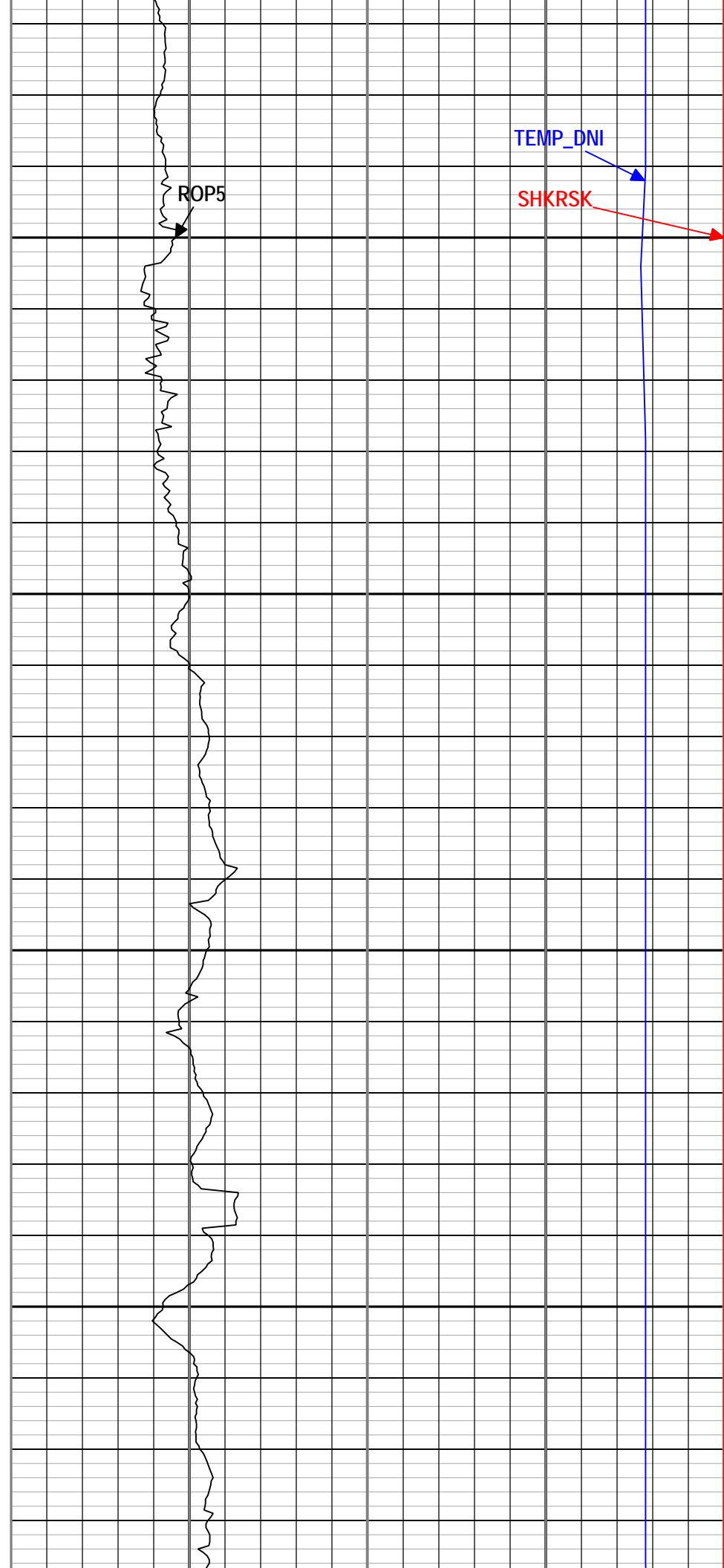
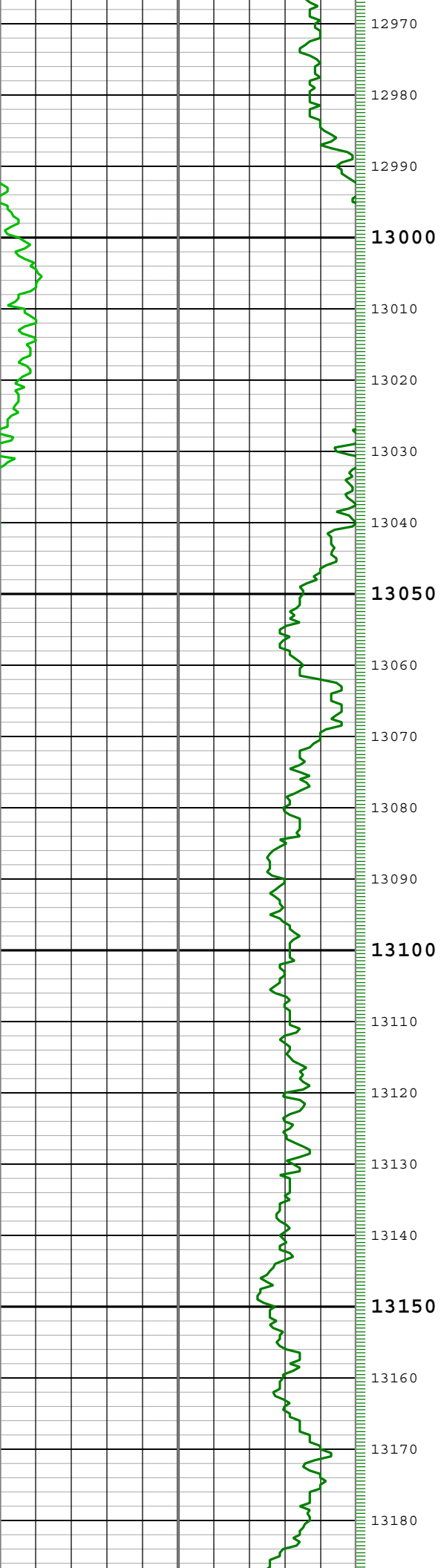


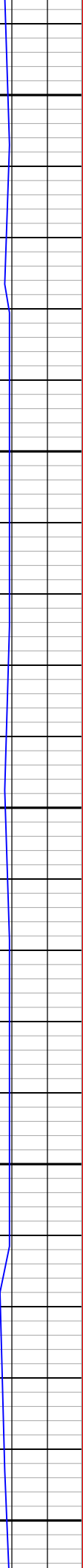
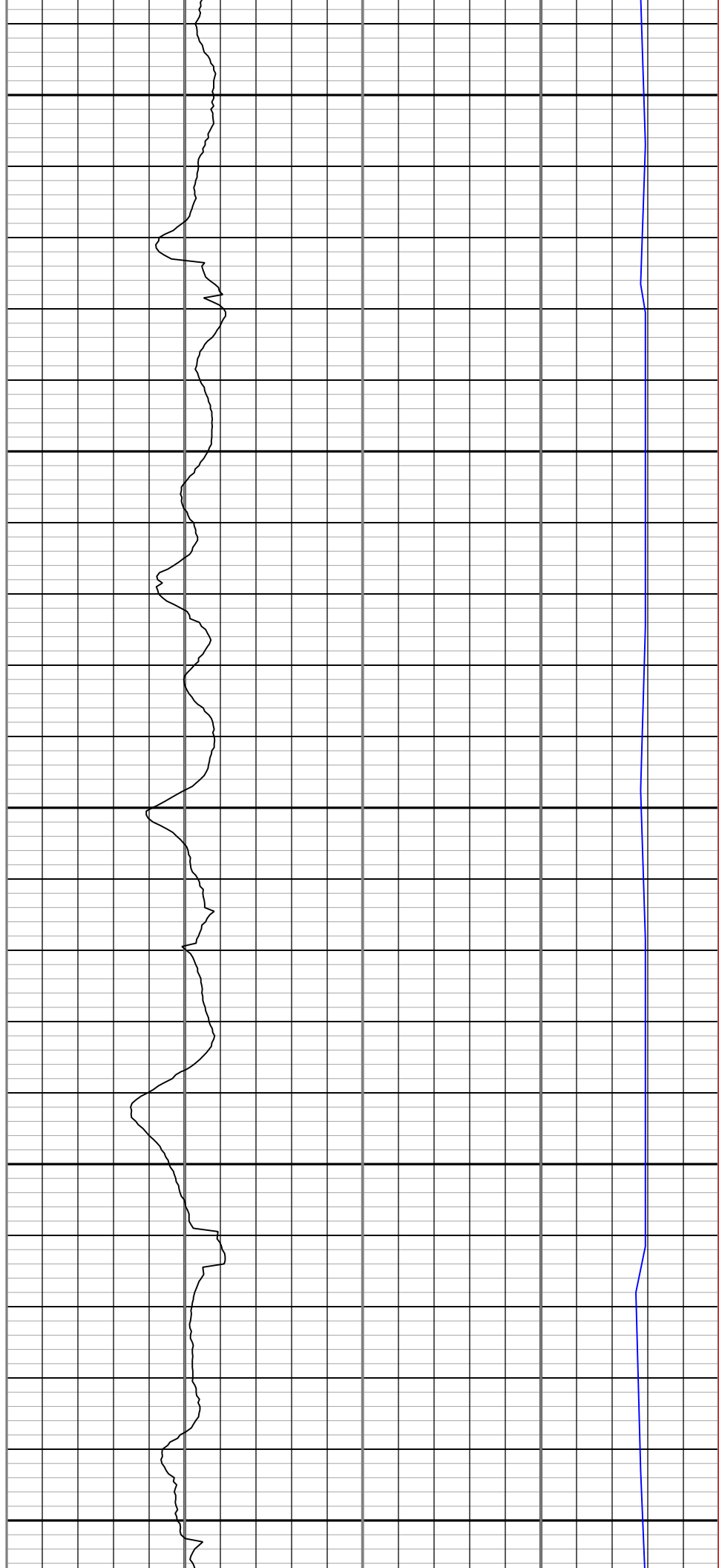
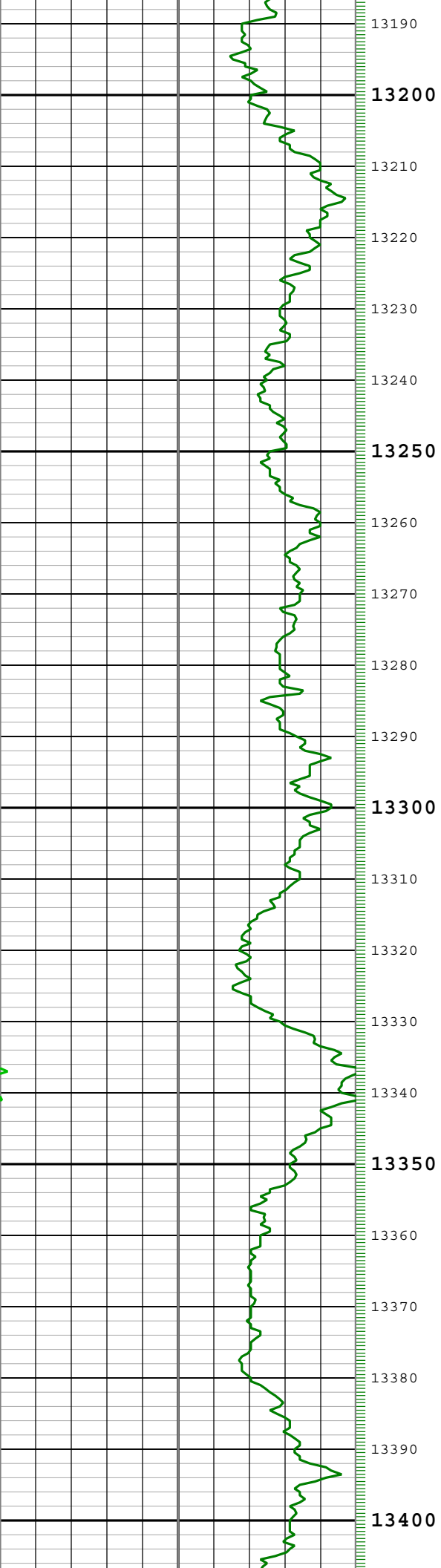


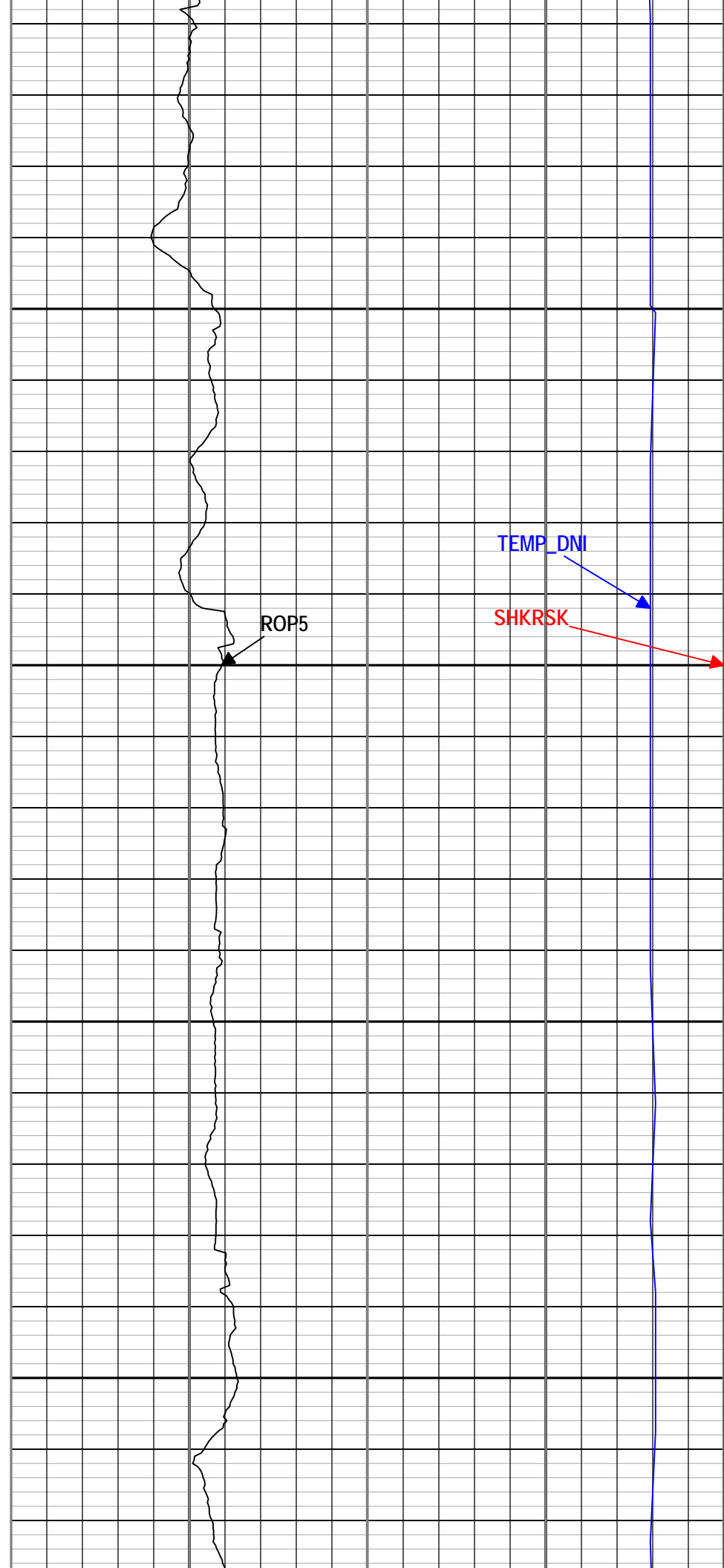
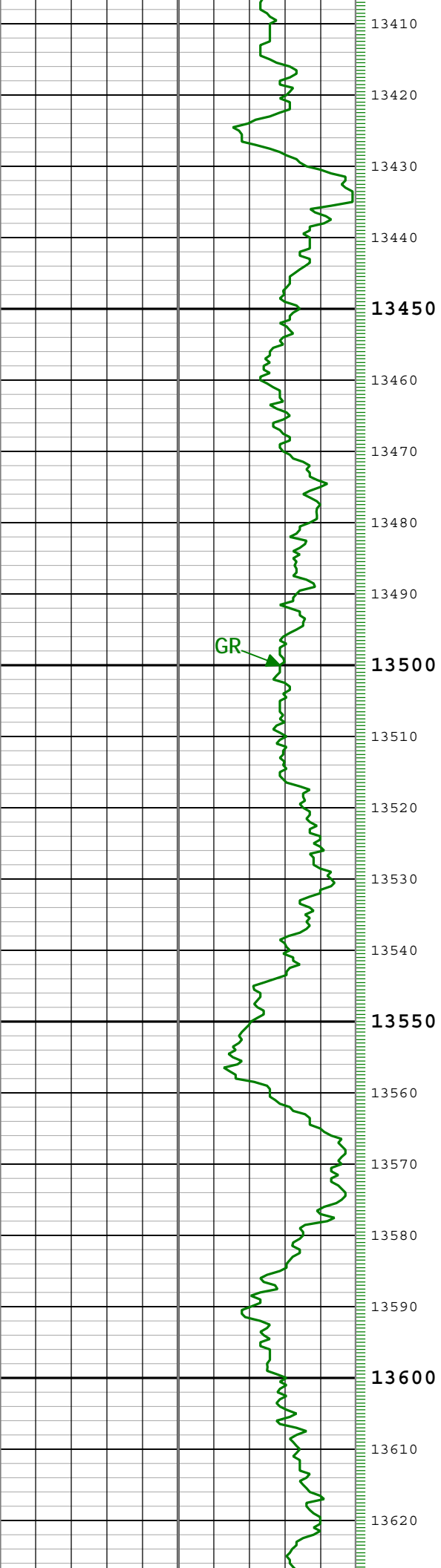


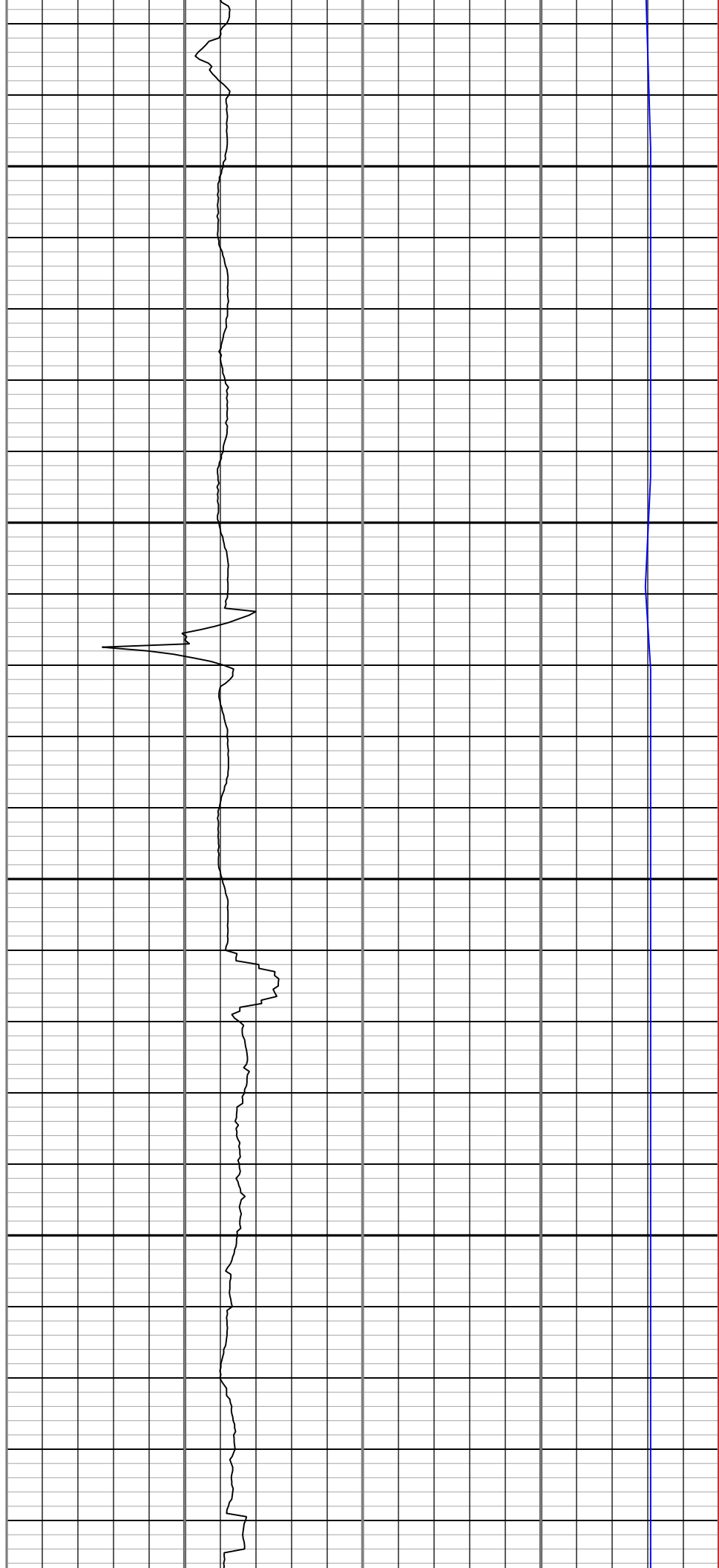
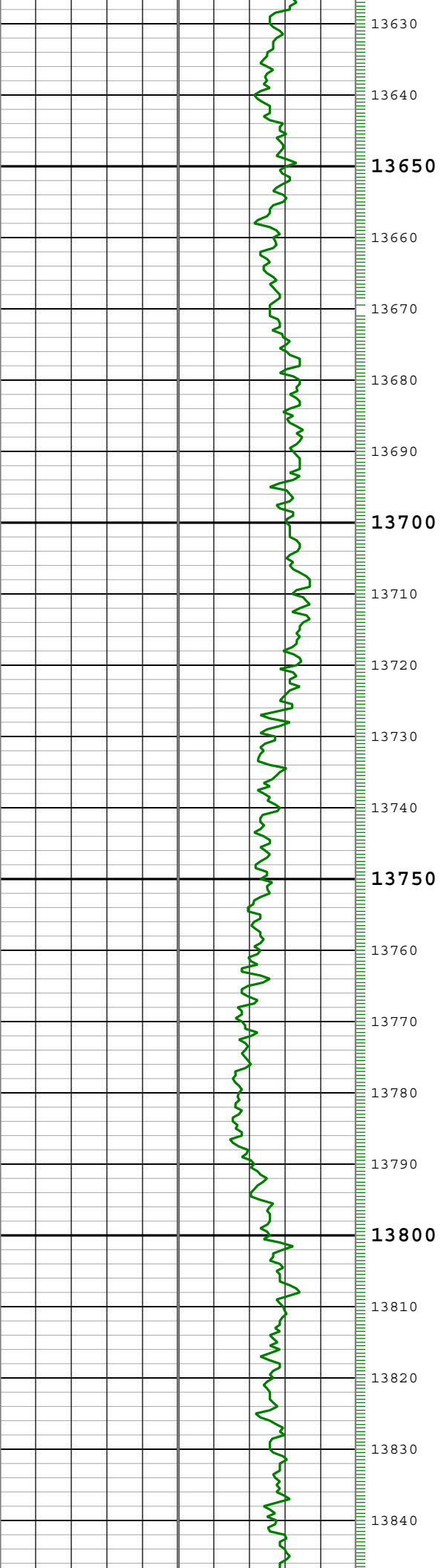


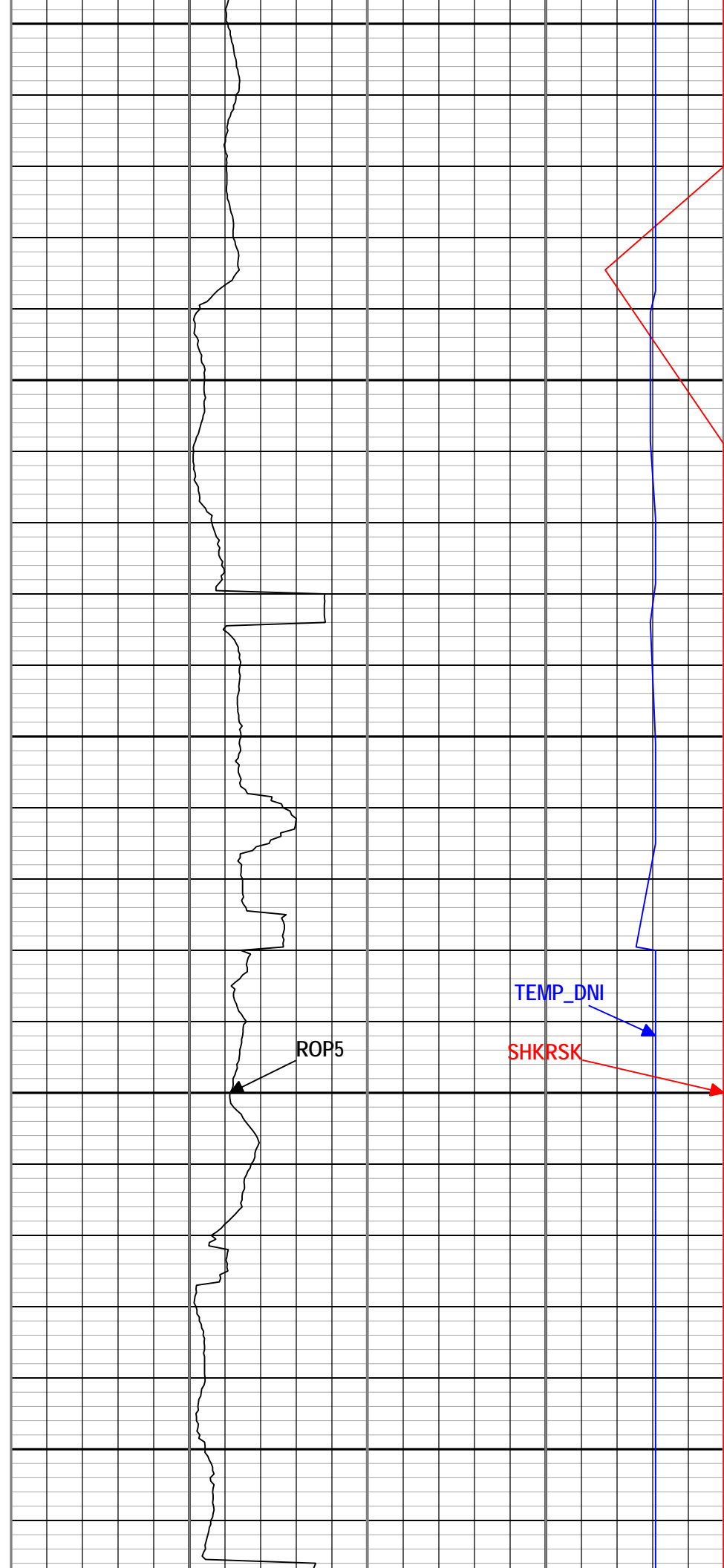
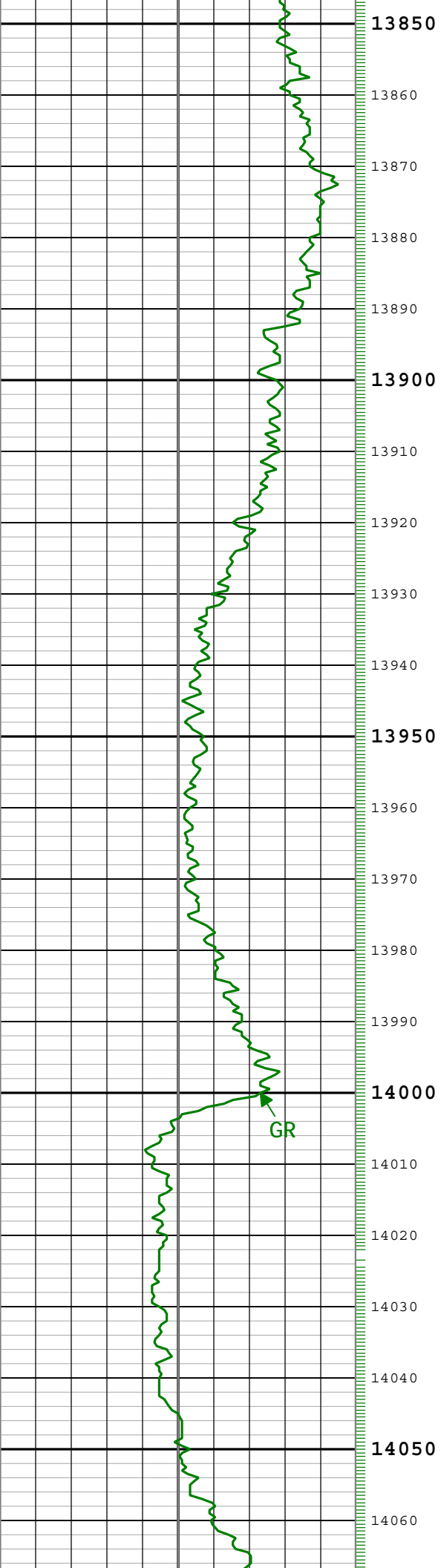


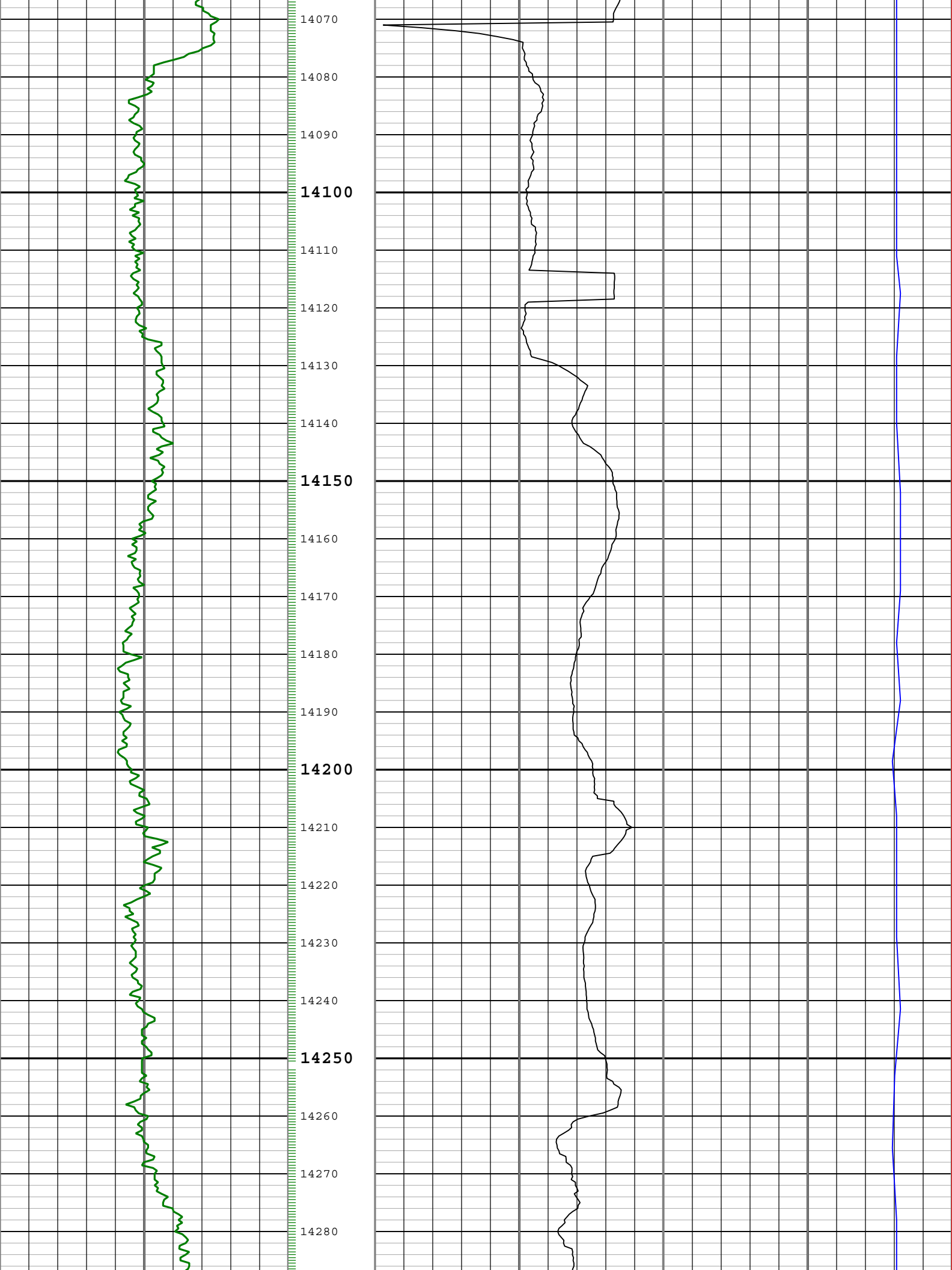


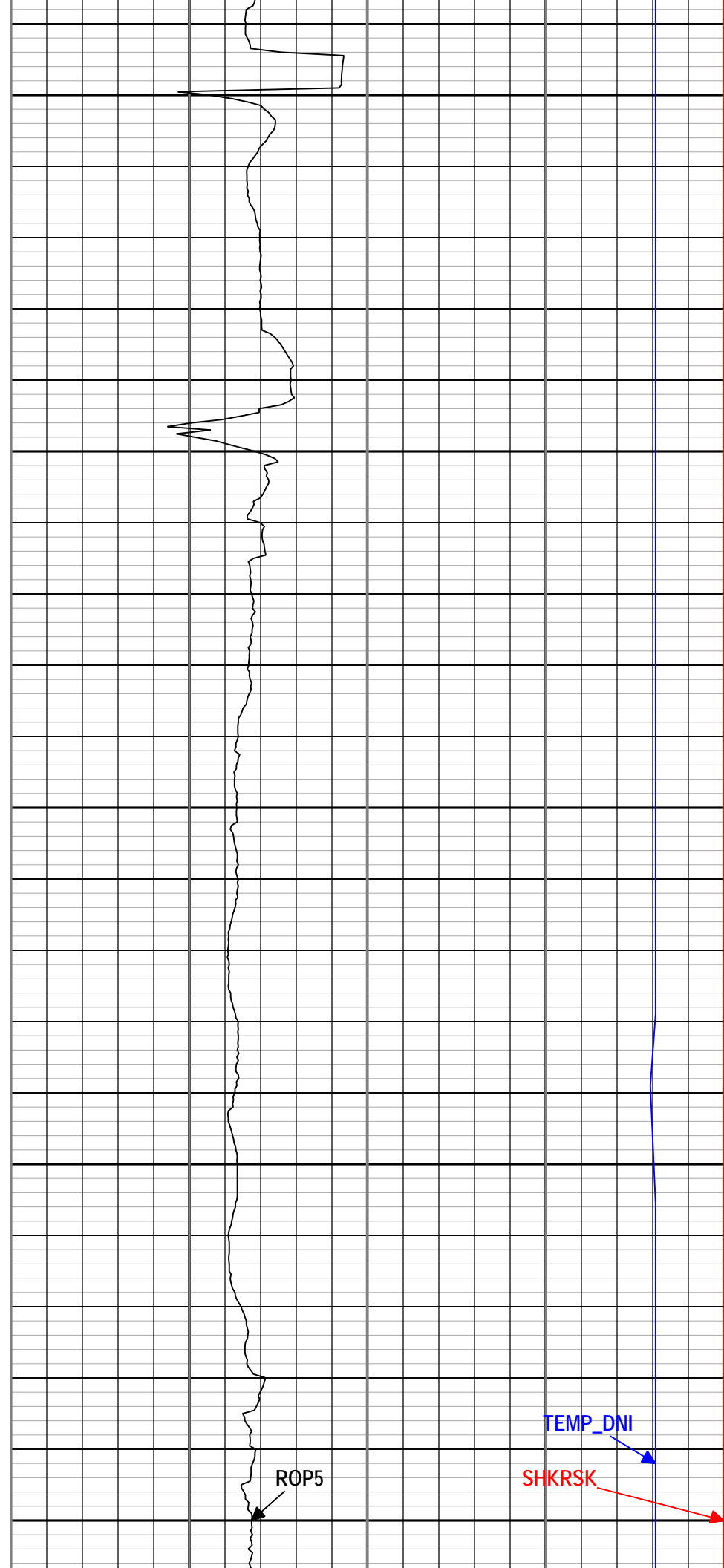
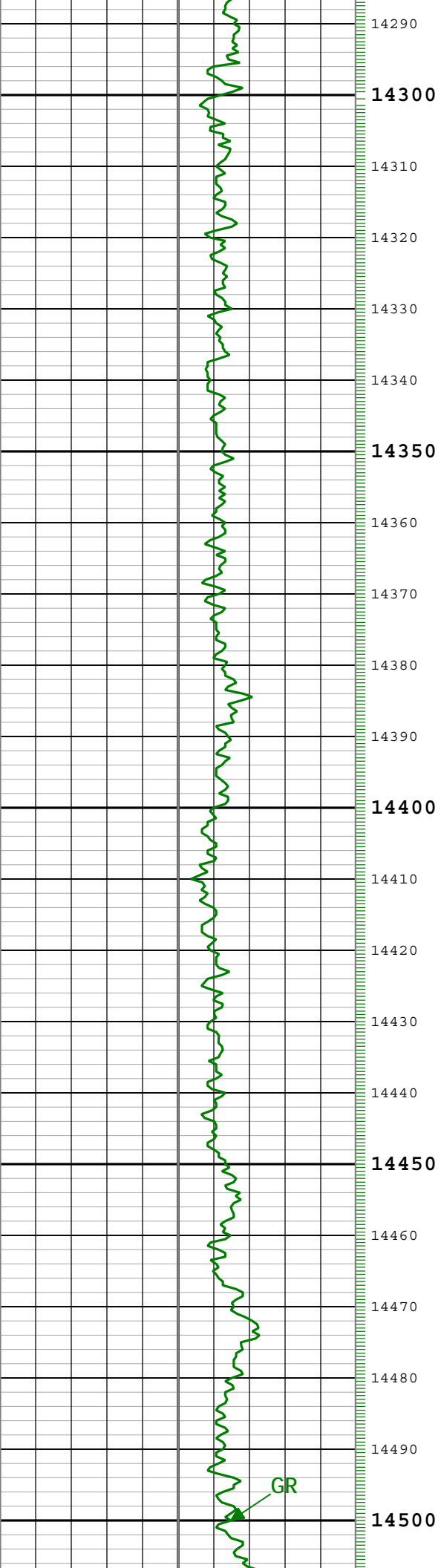


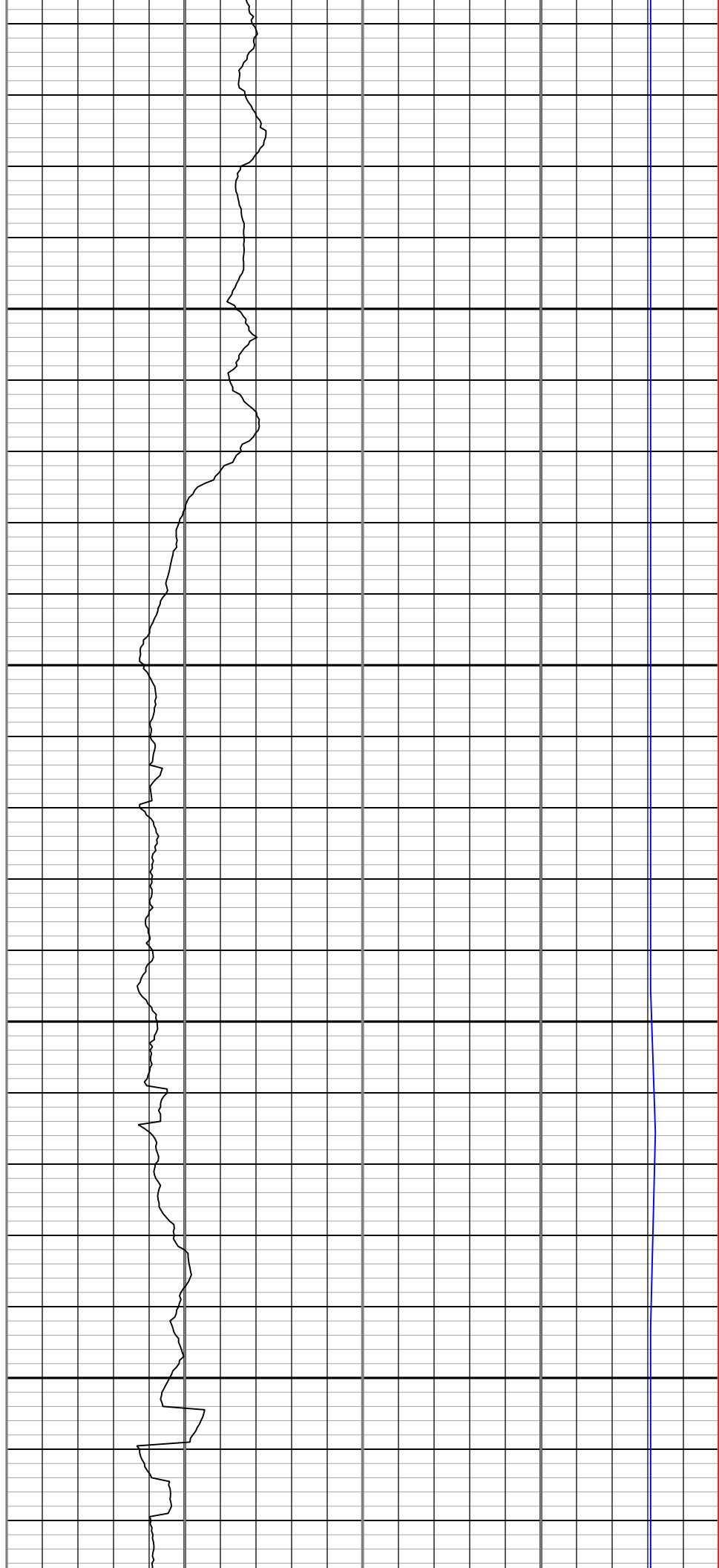
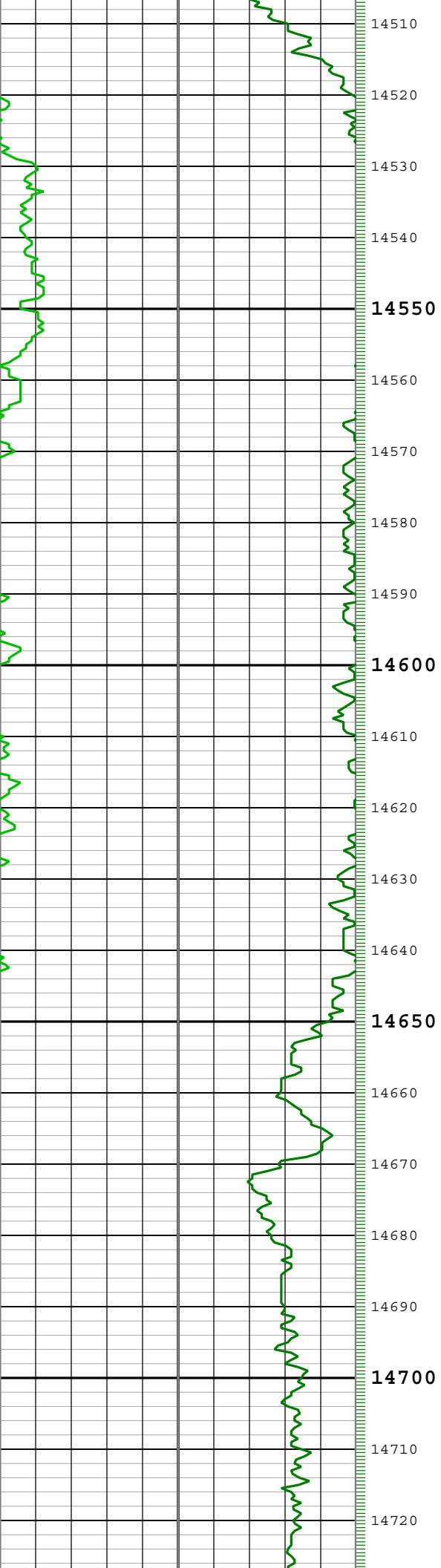


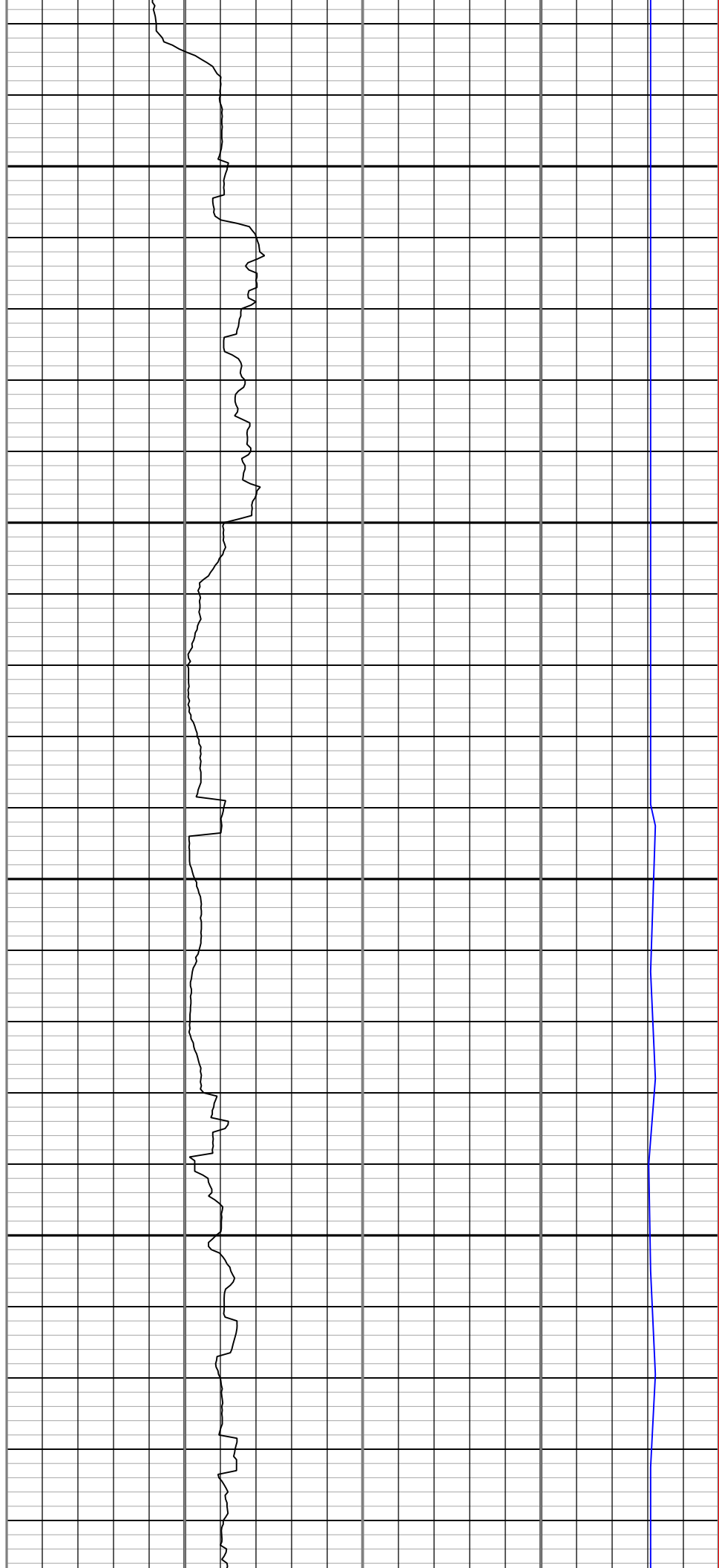
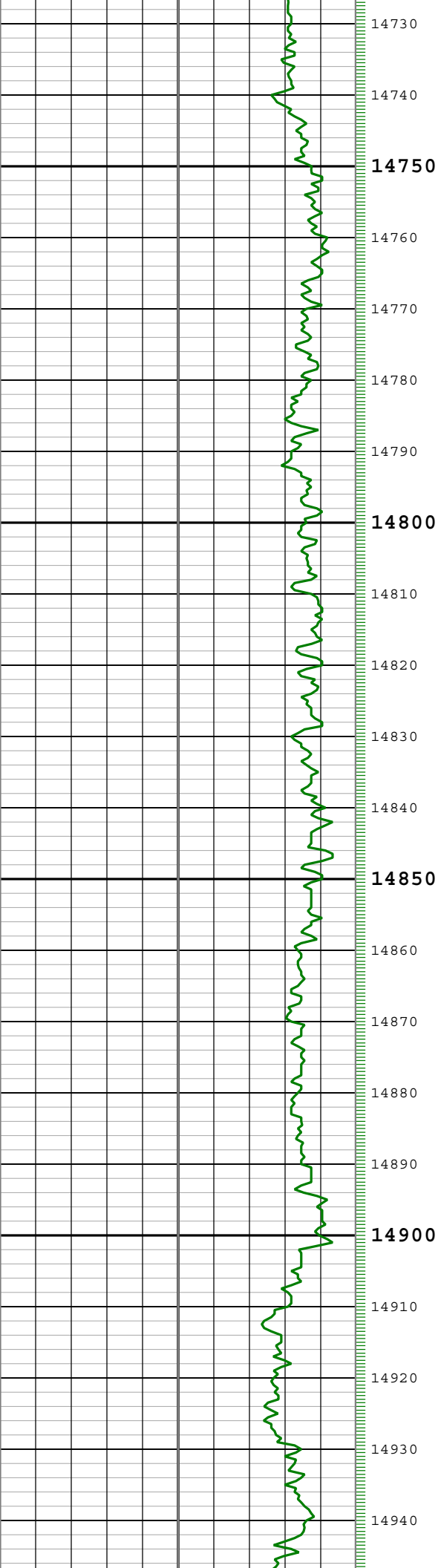


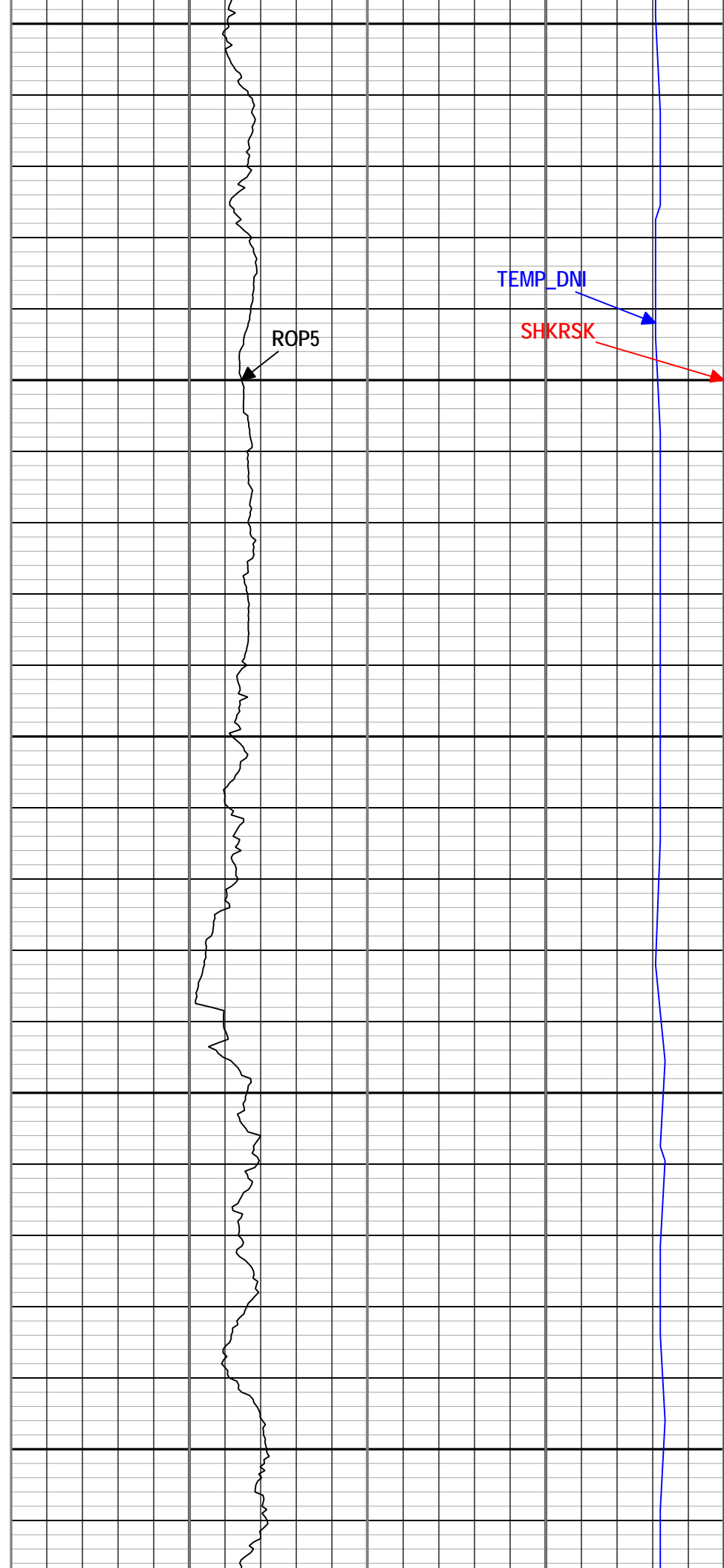
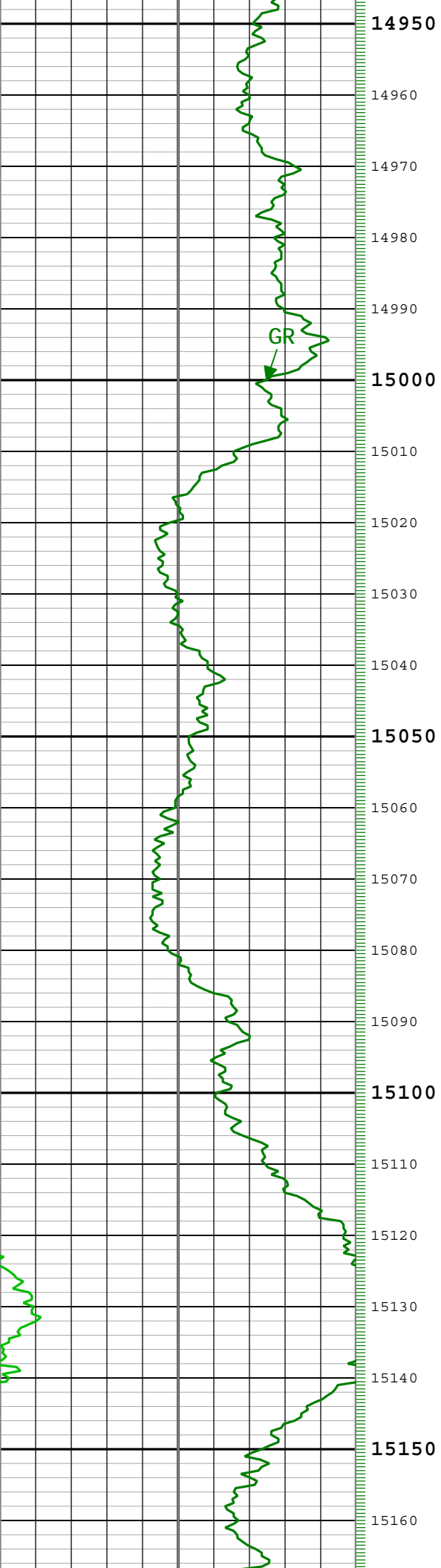


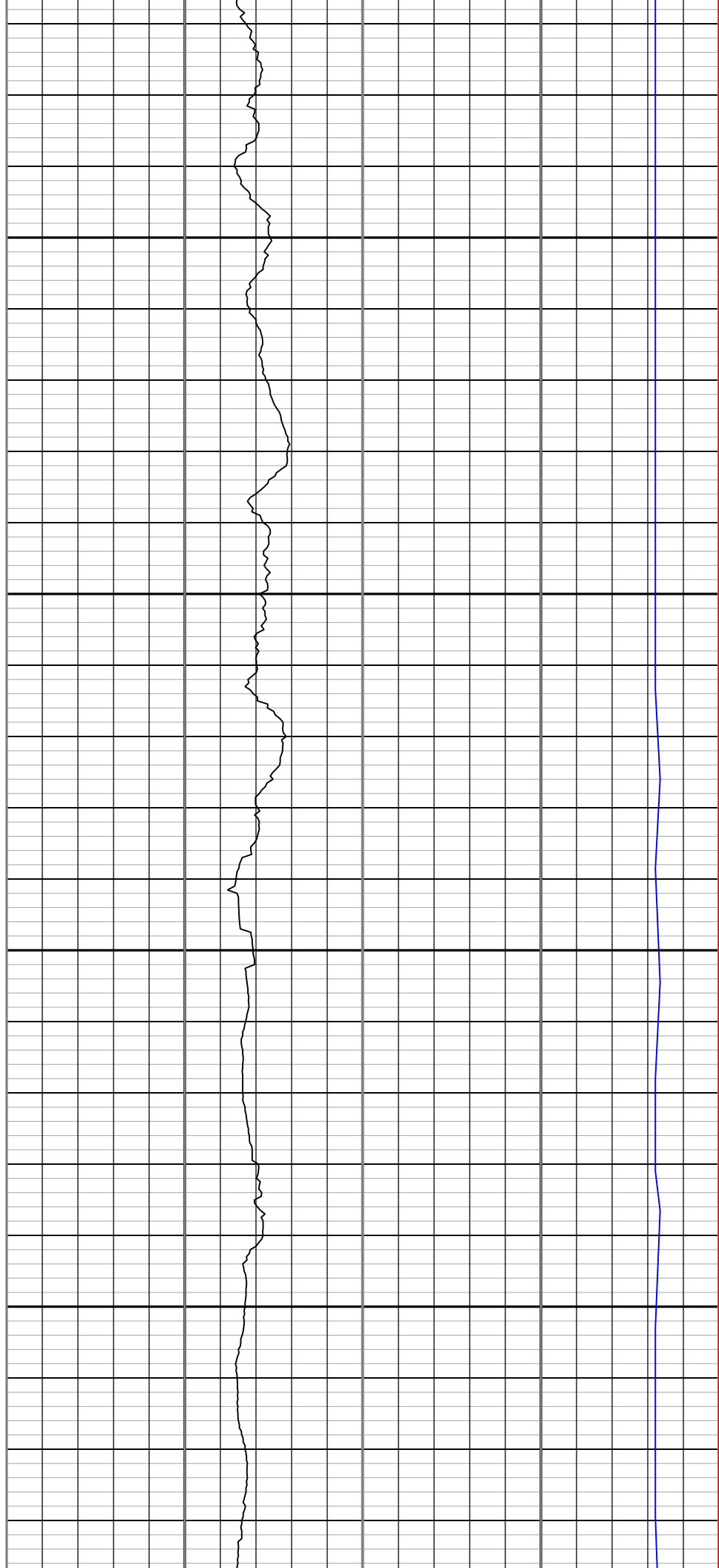
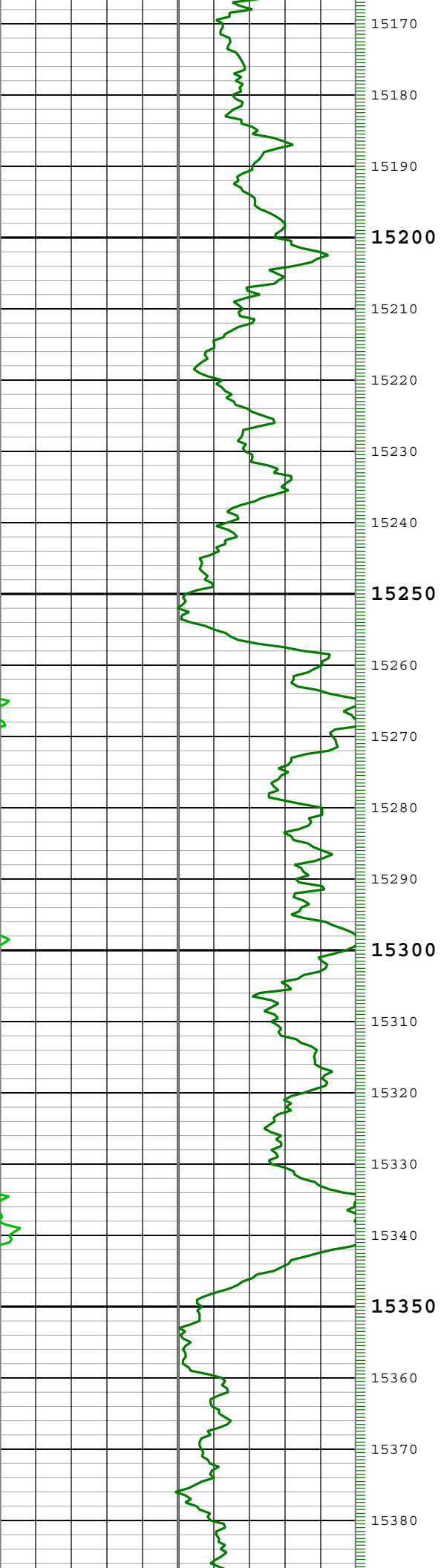


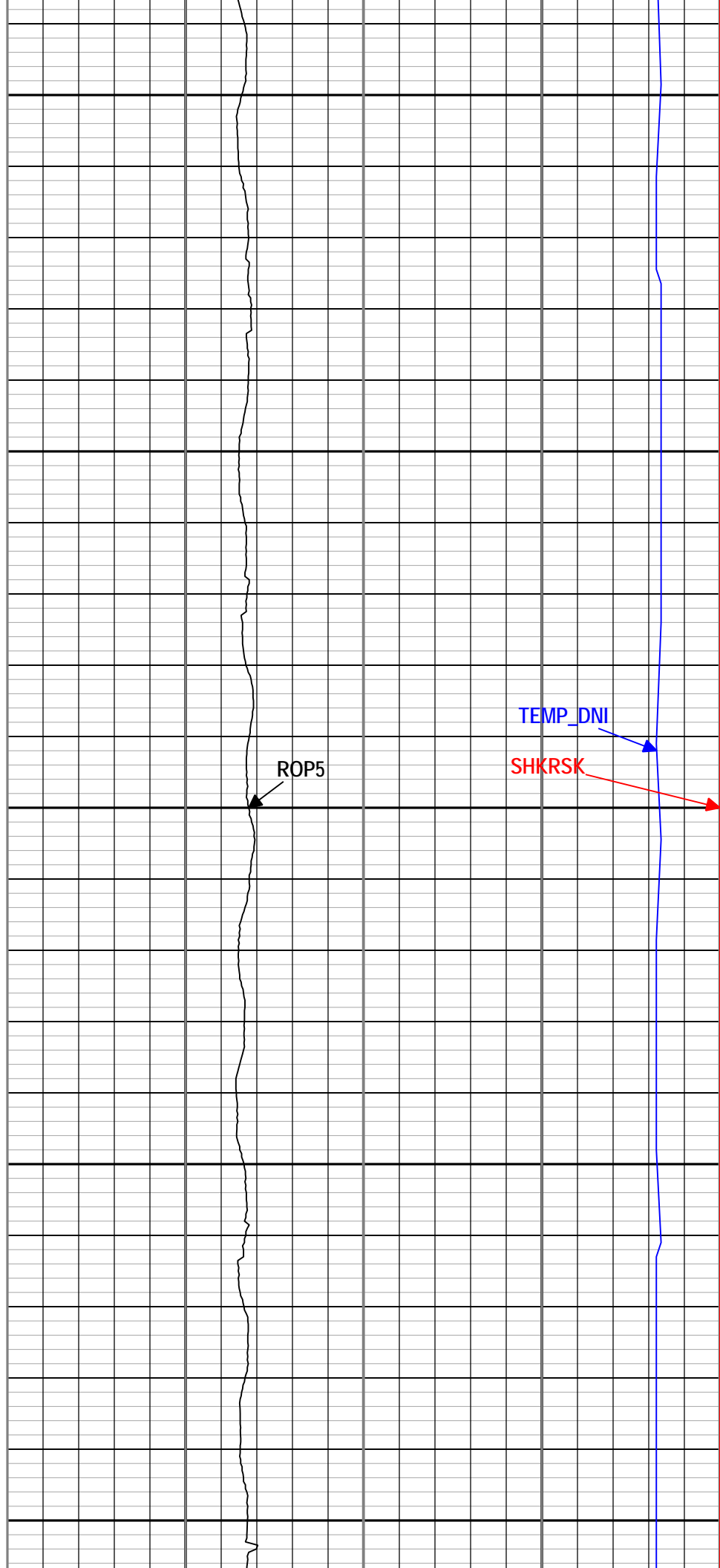
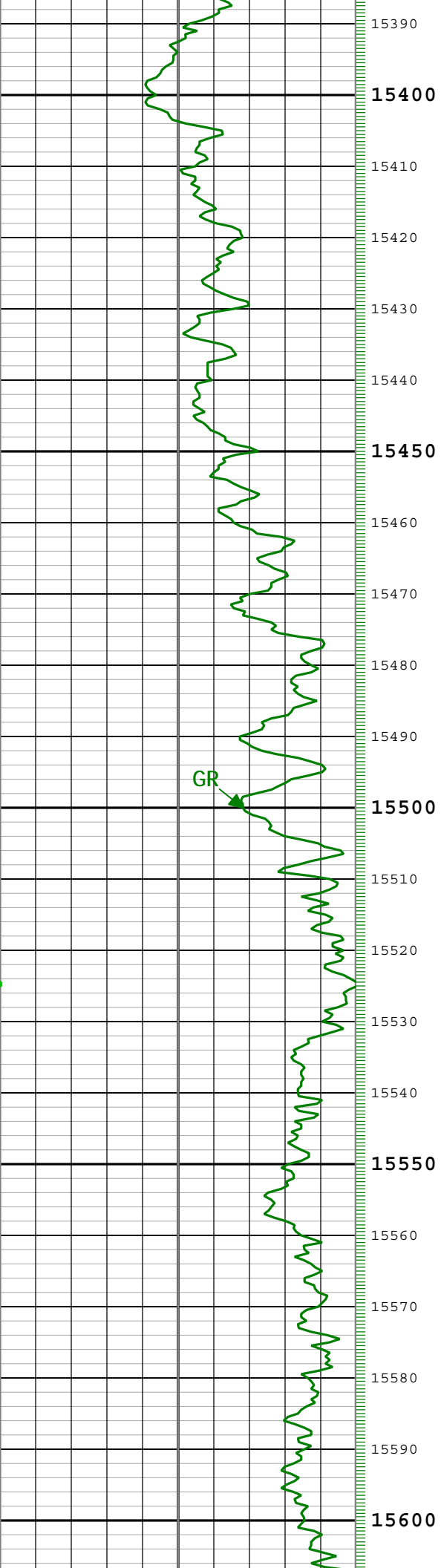


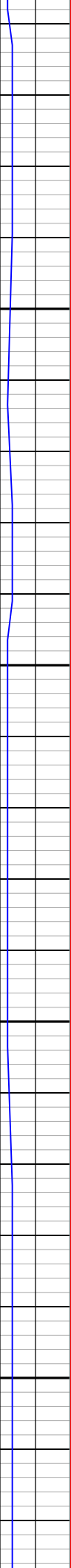
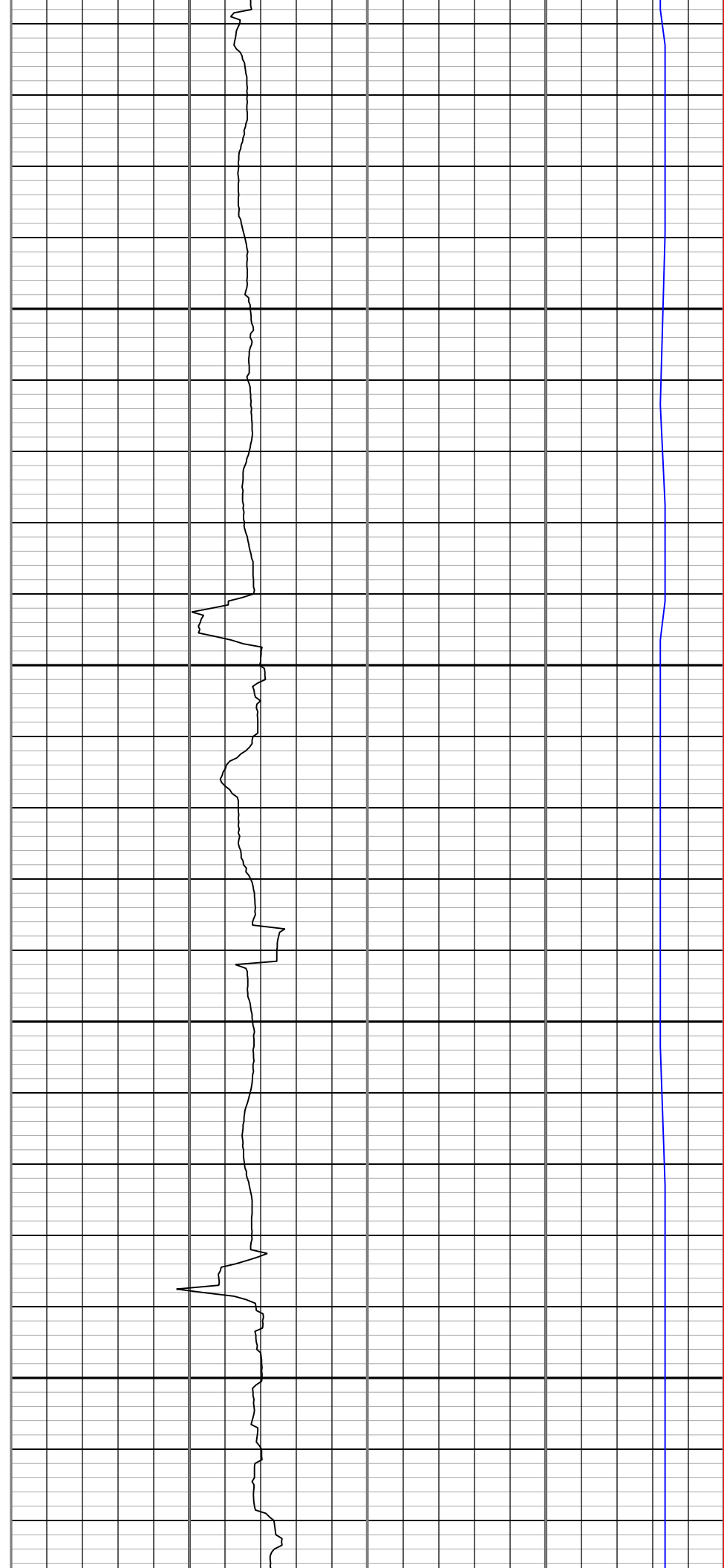
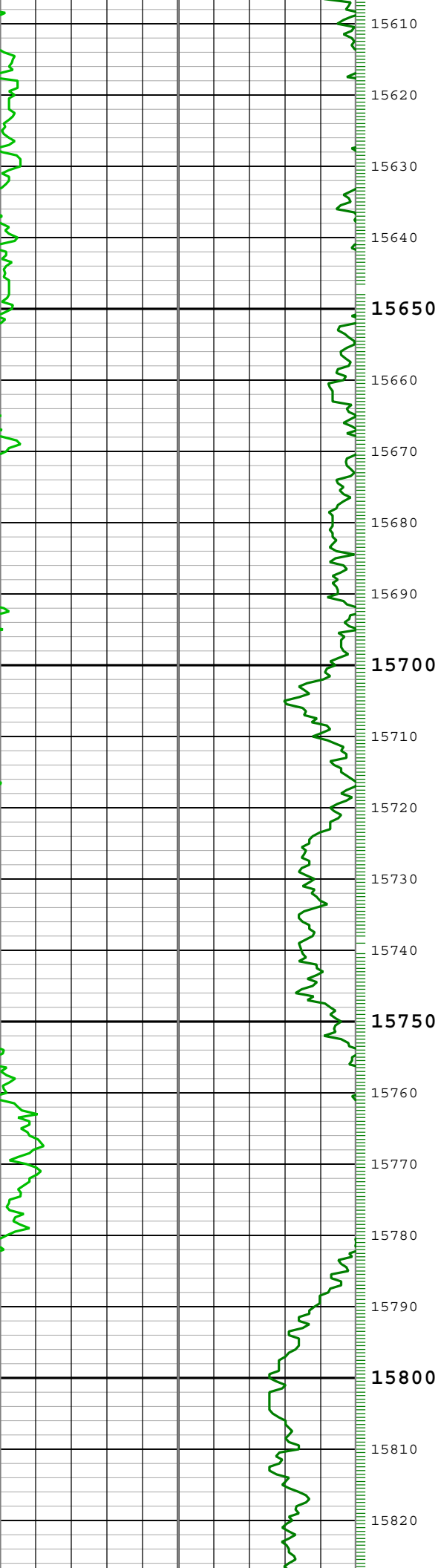


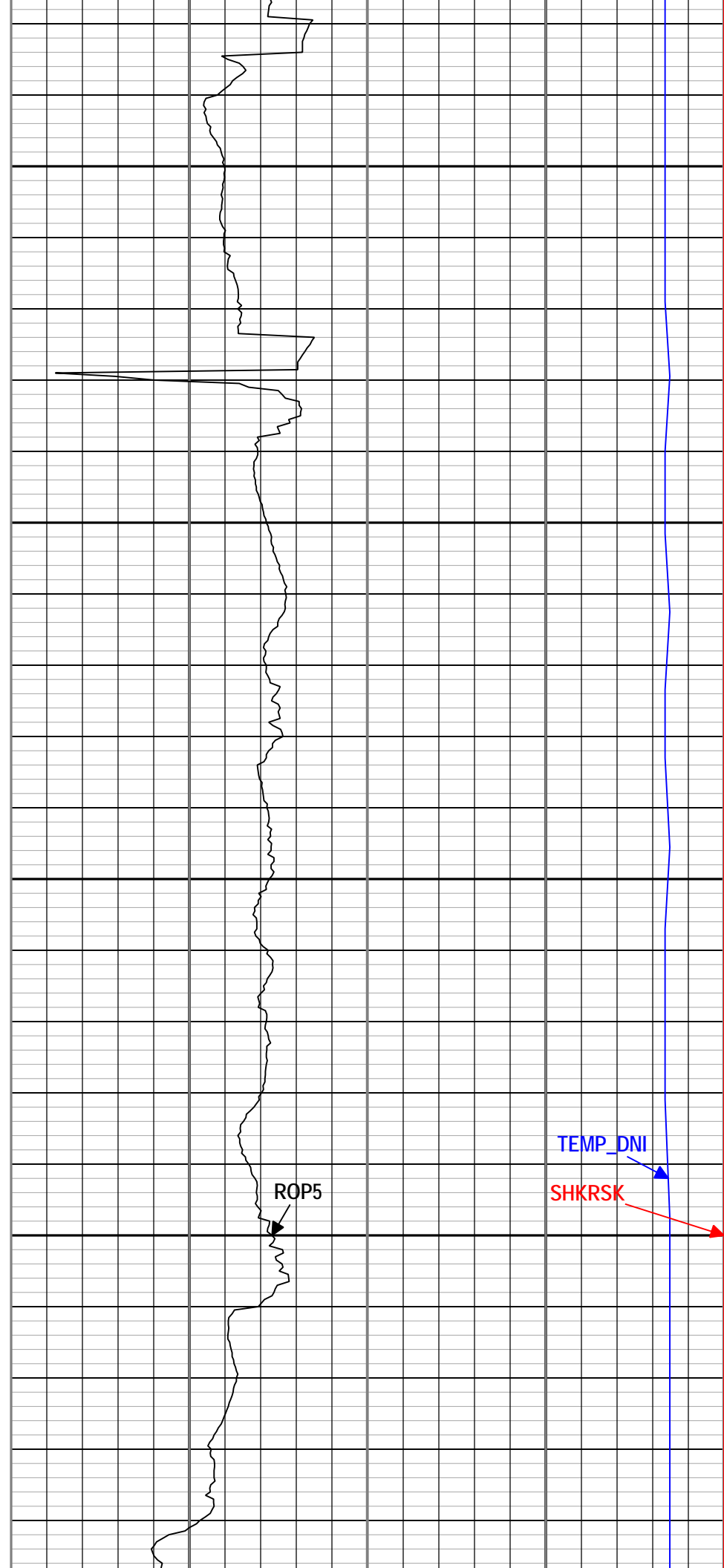
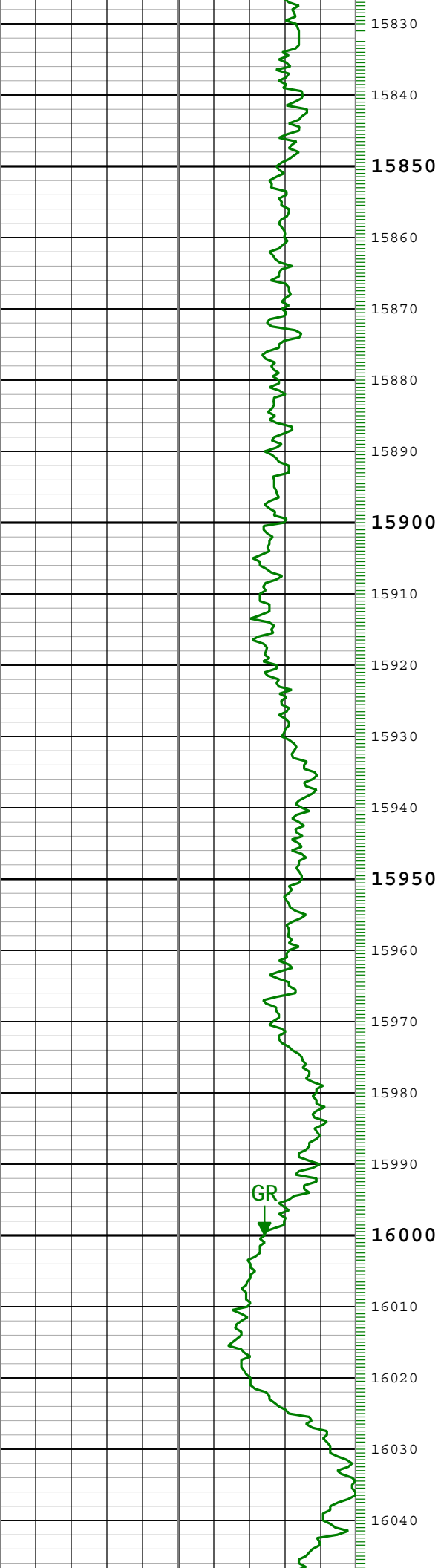


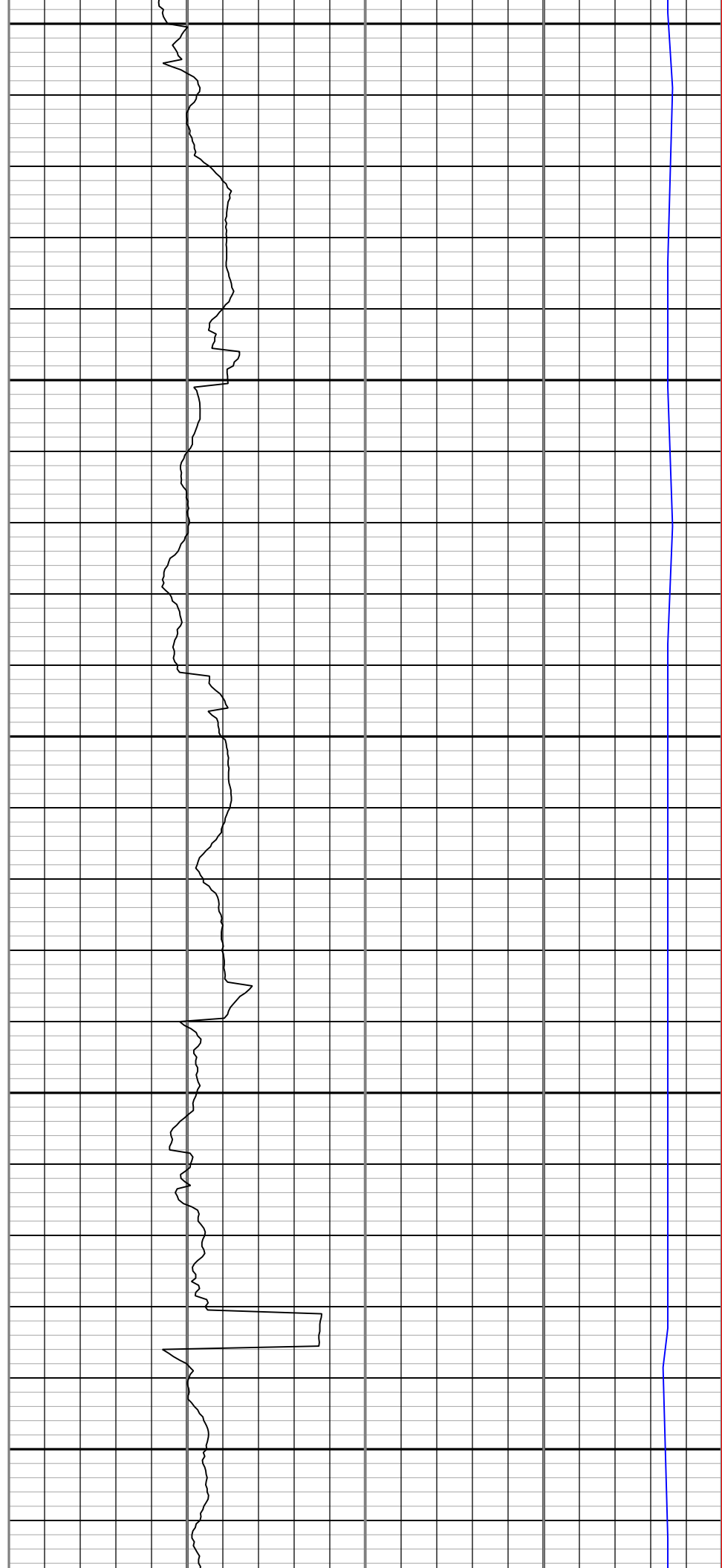
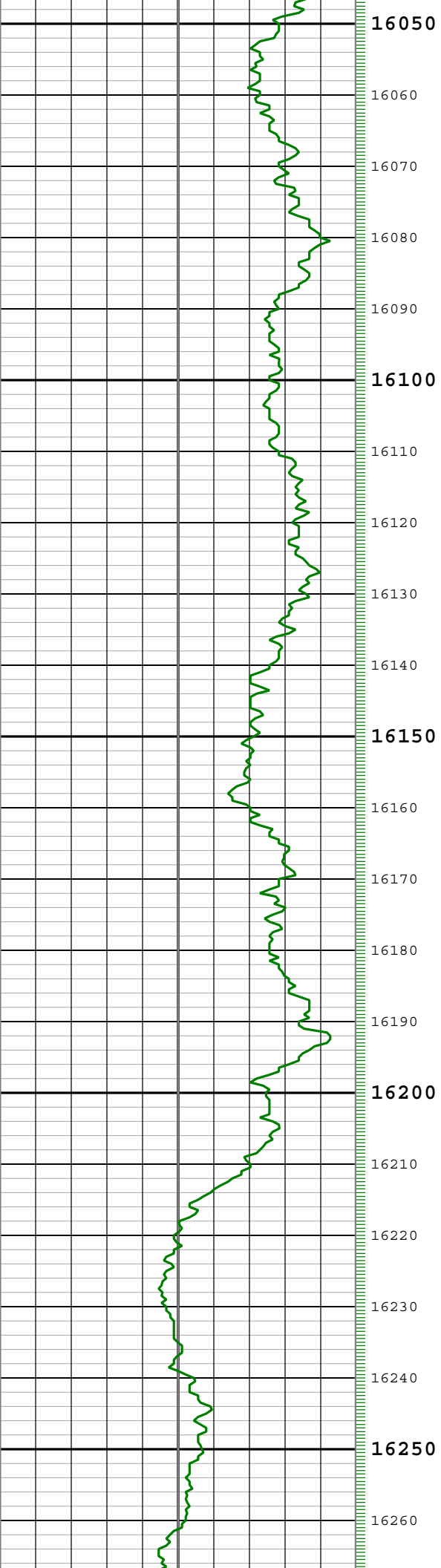


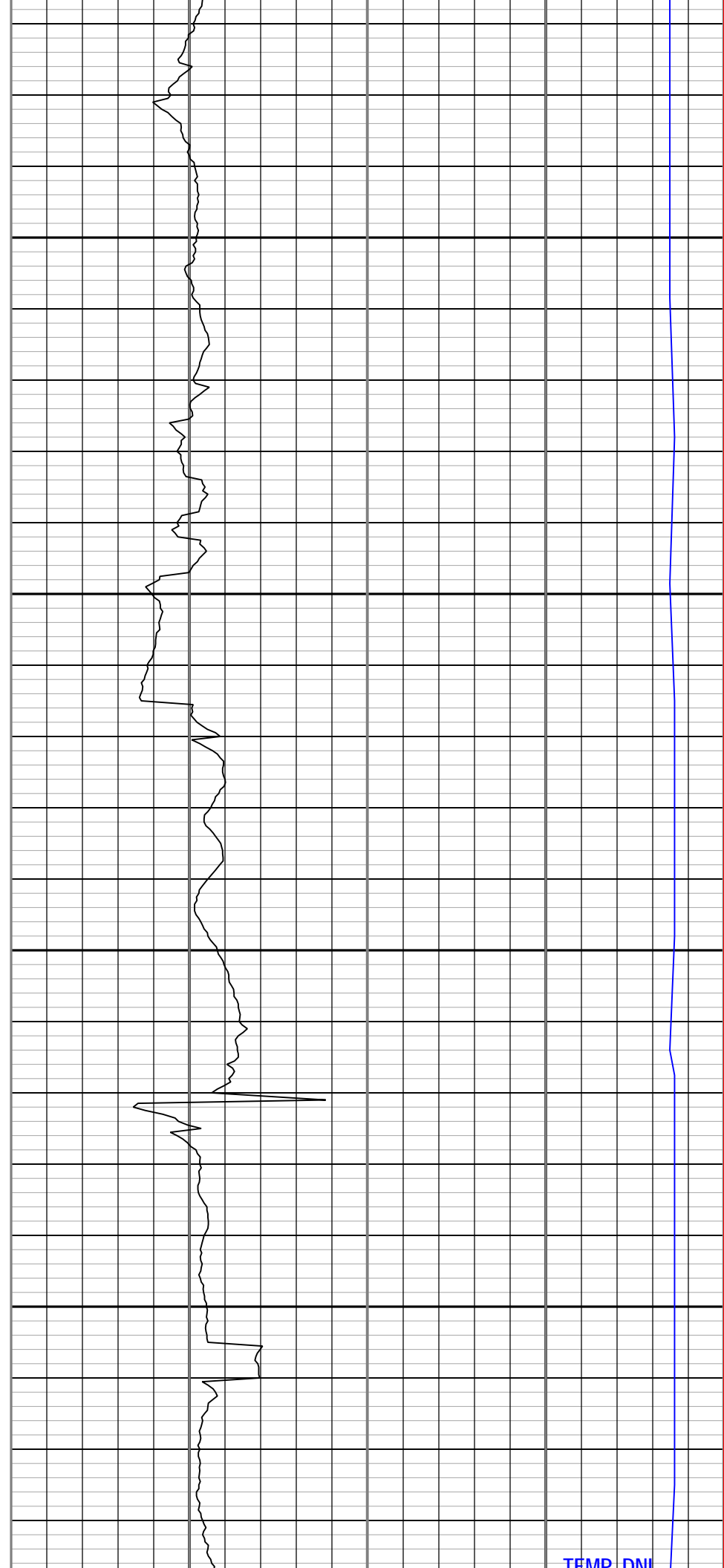
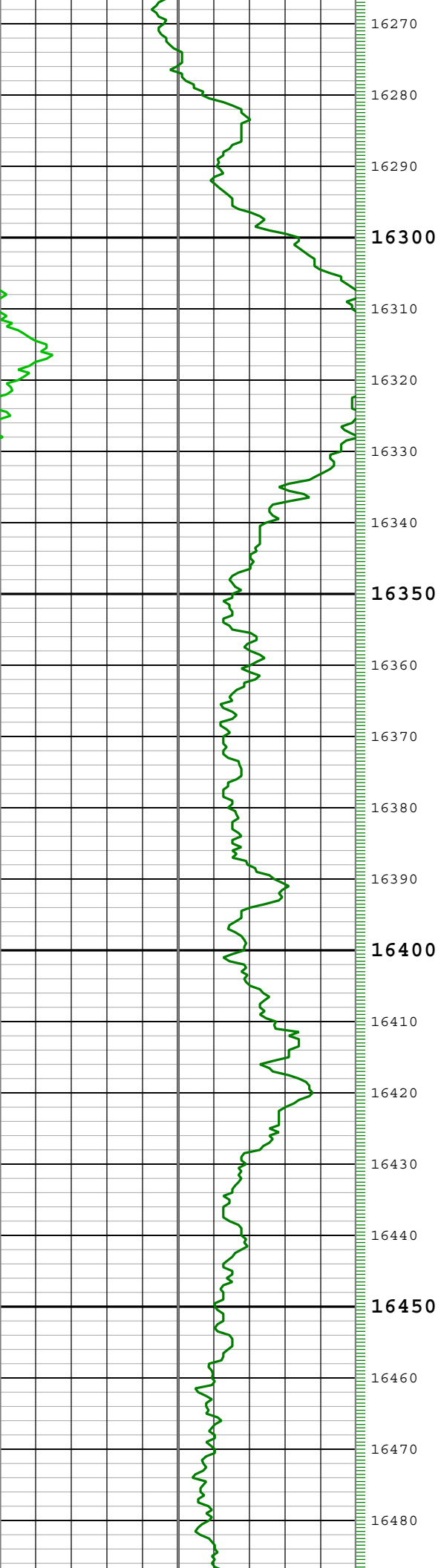


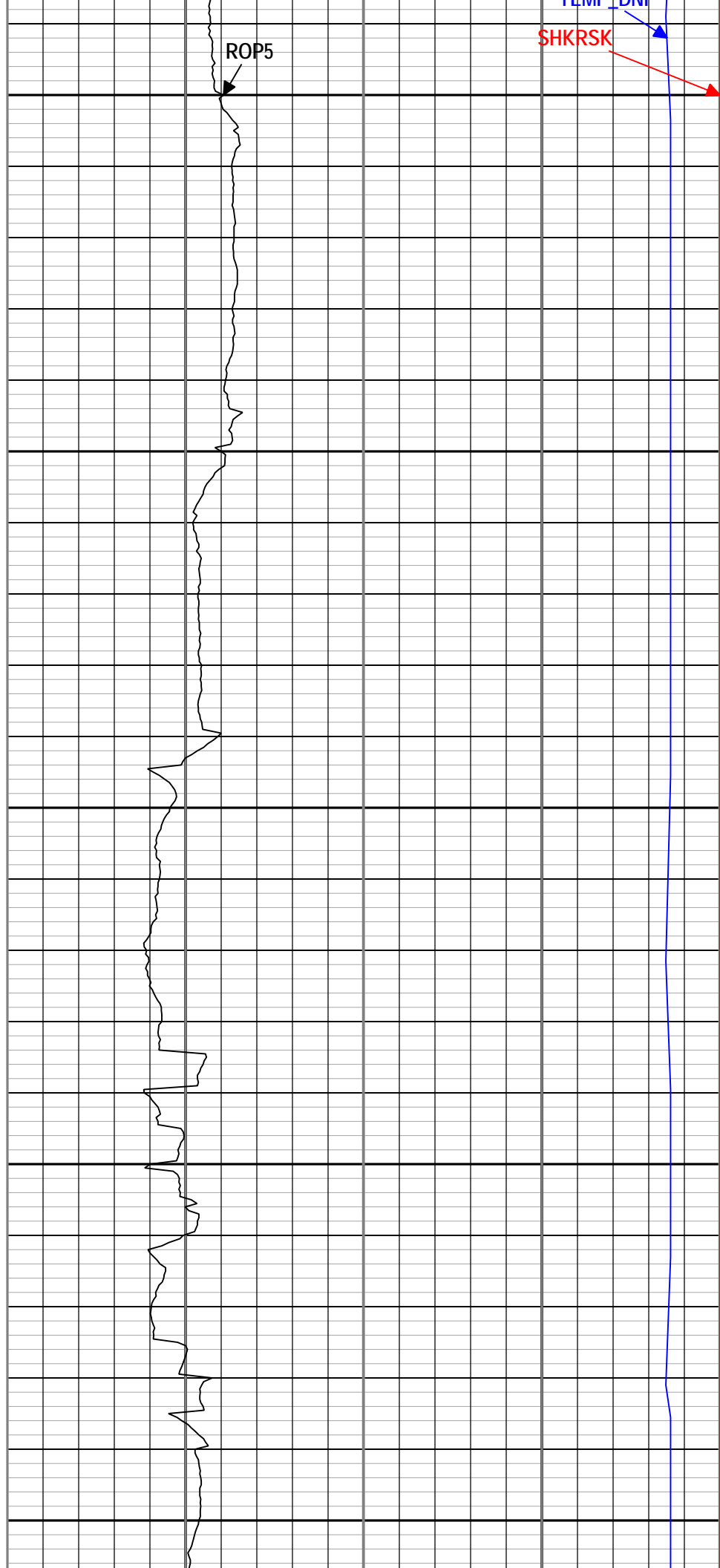
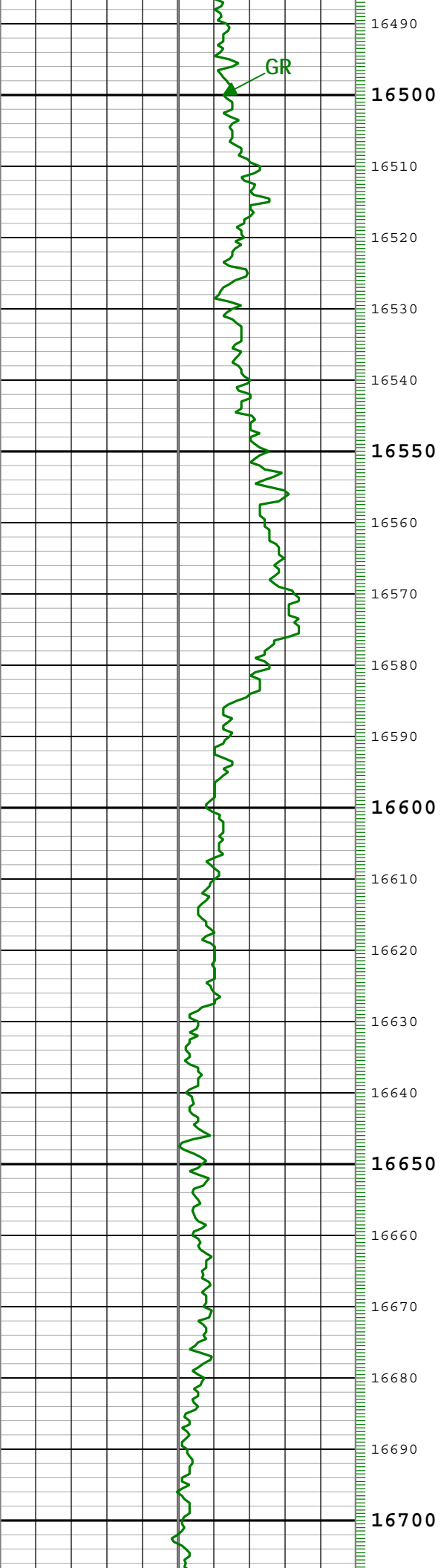


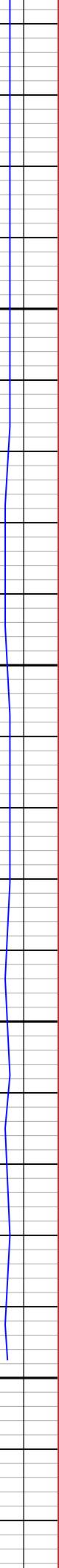
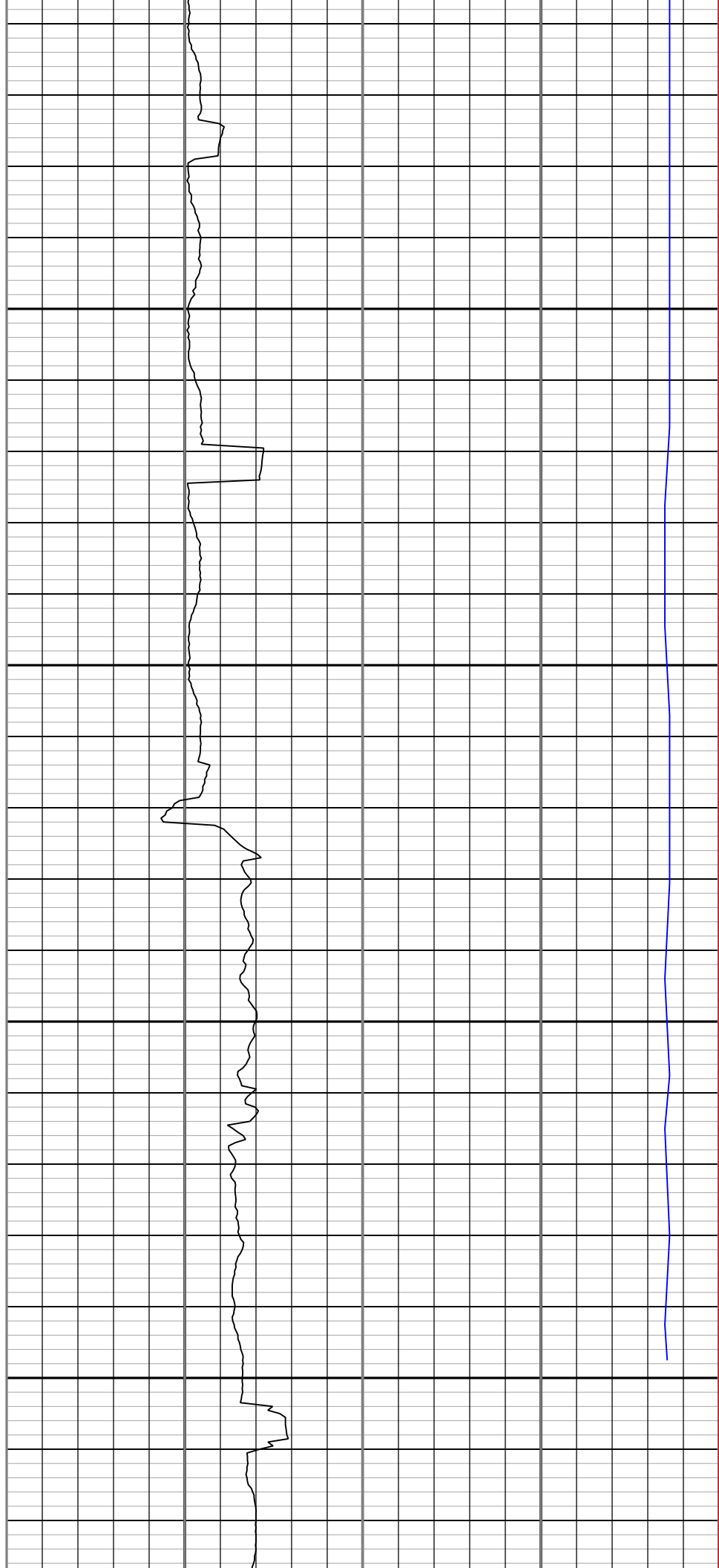
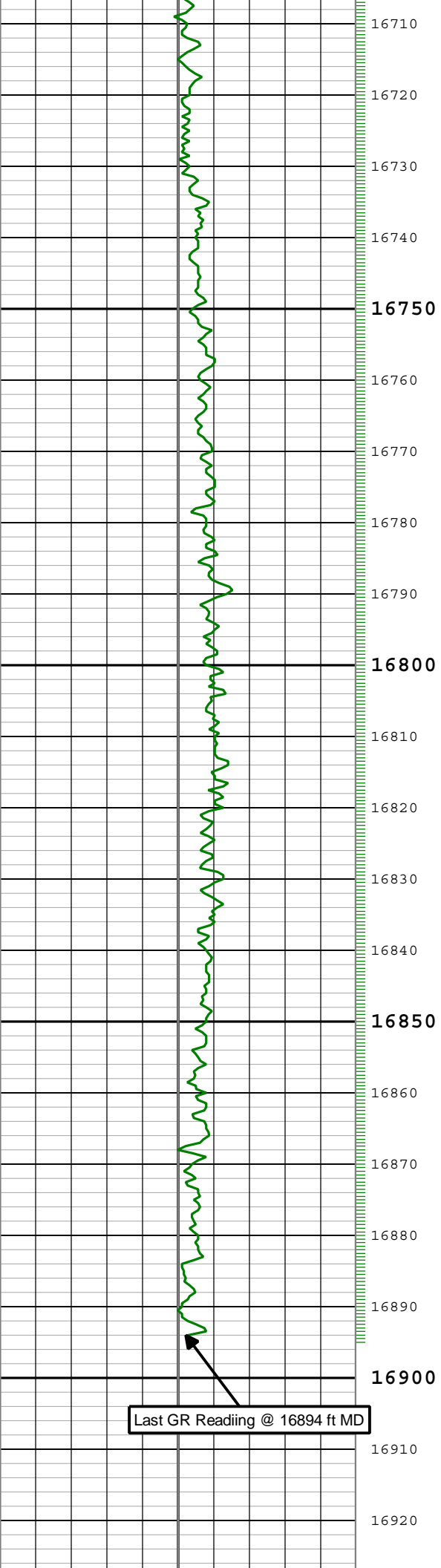


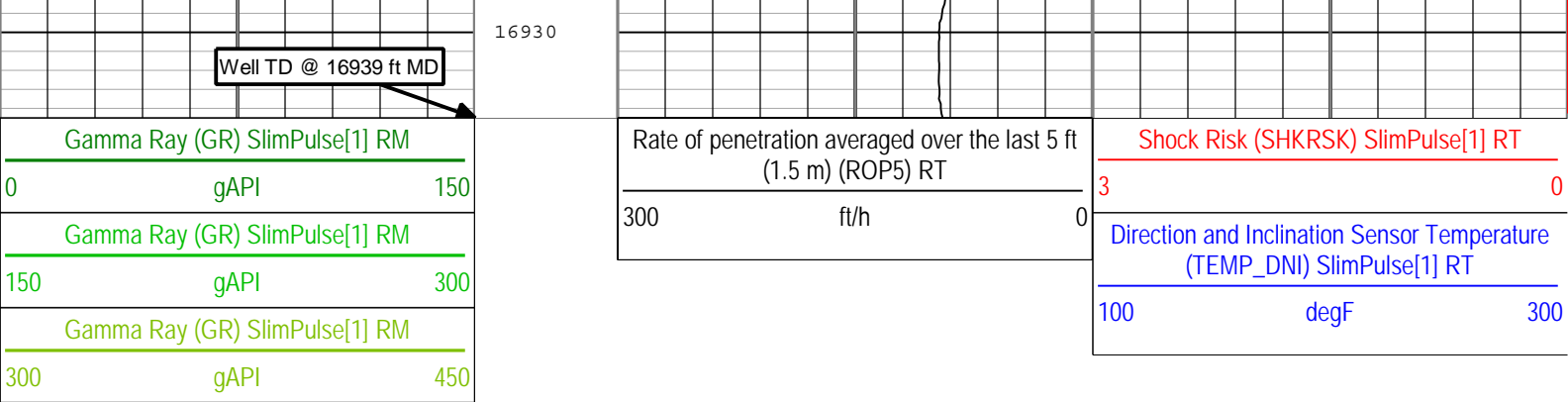












└ GR - Gamma Ray SlimPulse[1] RM

Description: Format: Log (EOW_MD) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 12-Aug-2014 13:51:49

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	8.75	7366.31	7409
BS	6.125	7409	16939

All depth are actual.

Run001Time Zoned Parameters

Pass Drilling

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
DFD	9.5	30-Jul-2014 23:33:30	02-Aug-2014 03:00:00	7423.25	12062.67
DFD	9.55	02-Aug-2014 03:00:00	03-Aug-2014 03:00:00	12062.67	14159.67
DFD	9.85	03-Aug-2014 03:00:00	04-Aug-2014 02:00:00	14159.67	15736.92
DFD	9.4	04-Aug-2014 02:00:00	06-Aug-2014 00:07:34	15736.92	16939.33

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

6045

GRGain - Gamma Ray: Blanket

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

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Gamma Ray Calibration Gain		Master	1.0000	0.9000	1.0378	1.1000	

Company: Noble Energy

Well: Heartland G25-72-1HN

Field: Wattenberg
County: Weld
State: Colorado
Country: U.S.A



SlimPulse - Gamma Ray

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

Rocorded Mode, Composite Log