



GAMMA RAY NEUTRON LOG

PIONEER
Pioneer Energy Services

Comp. PDC ENERGY INC.
Well HAROLD 6X-202
Field WATTENBERG
Co. WELD
State COLORADO

Company **PDC ENERGY INC.**
Well **HAROLD 6X-202**
Field **WATTENBERG**
County **WELD** State **COLORADO**

Location: API # : 05-123-45747
637' FSL & 441' FEL
SE SE
SEC 6 TWP 4N RGE 64W
Permanent Datum GL Elevation 4788'
Log Measured From KB 23' Above Perm. Datum
Drilling Measured From KB
Other Services
SCBL
K.B. 4811'
D.F. N/A
G.L. 4788'

Date of Service	25 FEBRUARY 2019		
Run Number	ONE		
Depth Driller or P8TD	N/A		
Depth Logger	7070'		
Bottom Log Interval	7070'		
Top Log Interval	SURFACE		
Open Hole Size	8.5"		
Type Fluid	WATER		
Fluid Level	FULL		
Fluid Density	N/A		
Max. Recorded Temperature	275 F		
Max. Wellhead Pressure	ZERO		
Wellhead Connection	OPEN		
Estimated Cement Top	N/A		
Unit Number	P-57		
Wireline Size	9/32"		
Location	FORT MORGAN		
Recorded By	SCHOENROGGE		
Witnessed By	MR. MYERS		
	Size	Wt/Ft	Top
Tubing Record			Bottom
Surface Casing	9.625"	36#	SURFACE
Production Casing	5.5"	20#	SURFACE
Liner Record			N/A

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All interpretations are opinions based on inferences from electrical or other measurements and Pioneer Wireline Services, LLC cannot and does not guarantee the accuracy or correctness of any interpretation, and Pioneer Wireline Services, LLC will not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees.

Comments

N/A DENOTES NOT AVAILABLE OR NON-APPLICABLE.
CORRELATED TO CUSTOMER MARKER JOINT

THANK YOU FOR USING PIONEER ENERGY SERVICES!

Your Pioneer Energy Services Crew

Engineer: SCHOENROGGE
Operator: WAYNE
Operator: LEE
Operator:

Tool Data - Services

SEE DIAGRAM
PLUS OVERBODIES

Serial Number

Log Variables

DatabaseC:\ProgramData\Warrior\Data\pdc_harold_05123_20190225_scbl-cn1.db
Dataset field/well/run1/pass7/_vars_

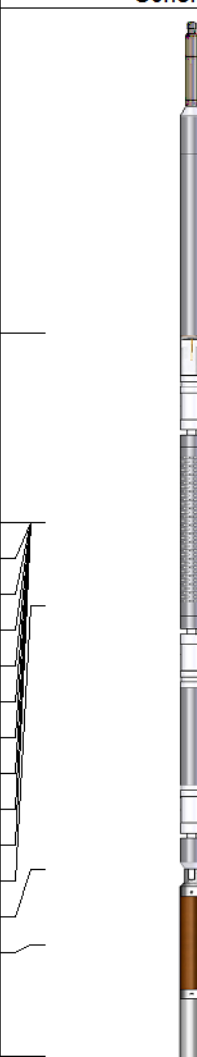
Top - Bottom

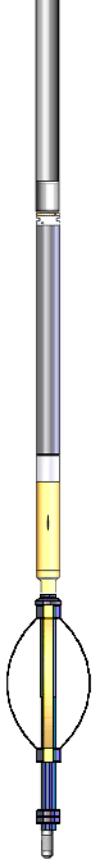
BHTEMP_Src TEMP	BOREID in 8.5	BOTTEMP degF 220	CASED? Yes	CASEOD in 5.5	CASETHCK in 0.361	CASEWGHT lb/ft 20
CMNTTHCK in 1.5	CMTTKCOR Off	CSTKCOR Off	MAXAMPL mV 71.2	MINAMPL mV 2.2	MINATTN db/ft 0.8	NPORSEL Limestone
PERFS 0	PPT usec 261	SRFTEMP degF 50	SZCOR Off	TDEPTH ft 7000		


Variable Description

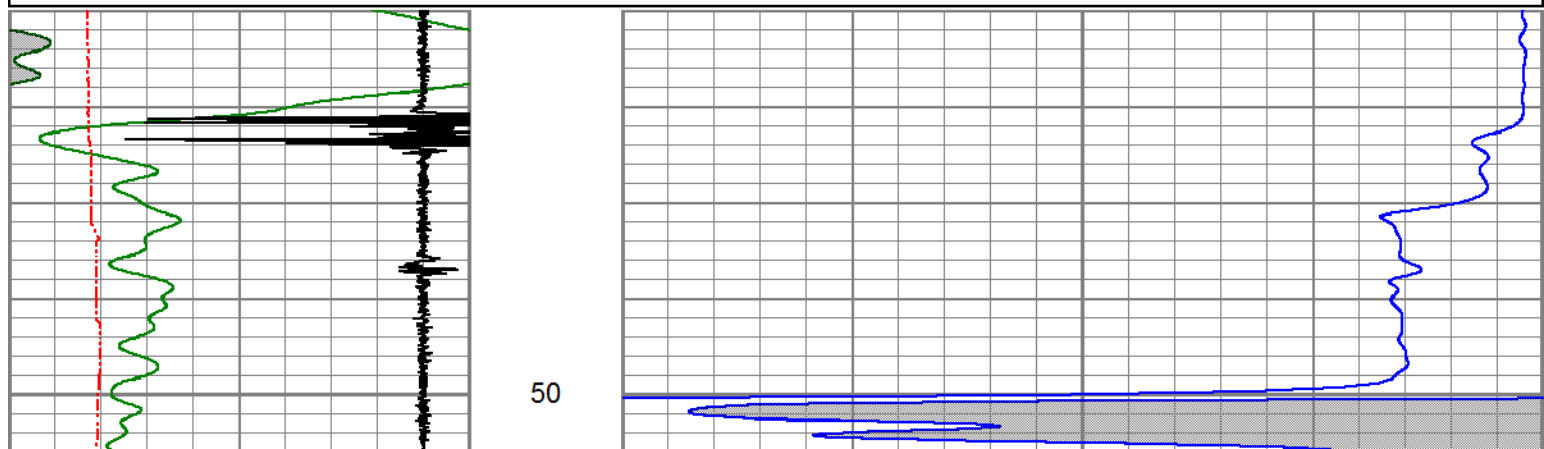
BHTEMP_Src : BHTEMP Input Source Selector
BOREID : Borehole I.D.
BOTTEMP : Bottom Hole Temperature
CASED? : Cased hole ?
CASEOD : Casing O.D.
CASETHCK : Casing Thickness
CASEWGHT : Casing Weight
CMNTTHCK : Cement Thickness
CMTTKCOR : CN CemThk. Cor. ?
CSTKCOR : CN CasThk. Cor. ?

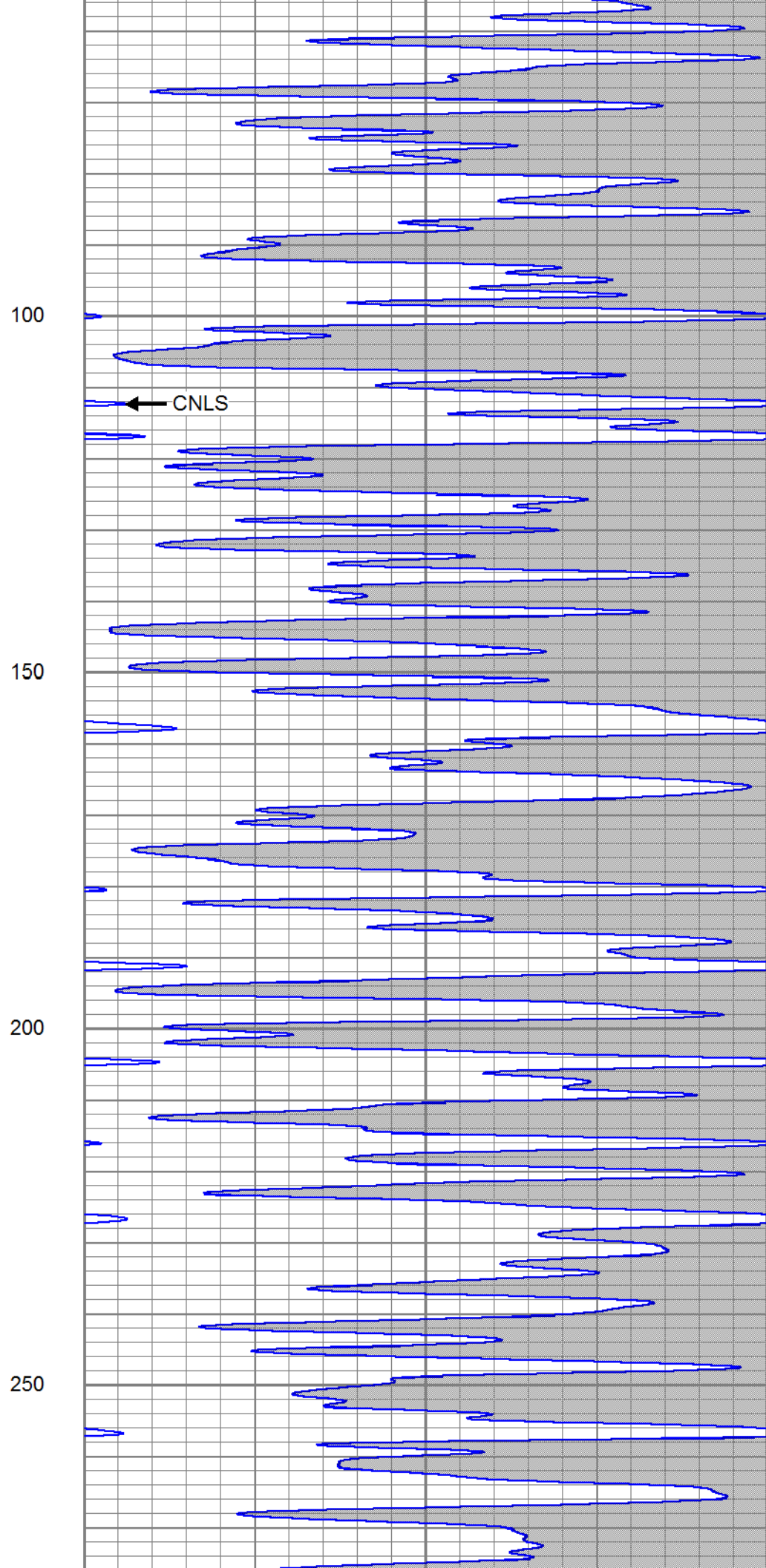
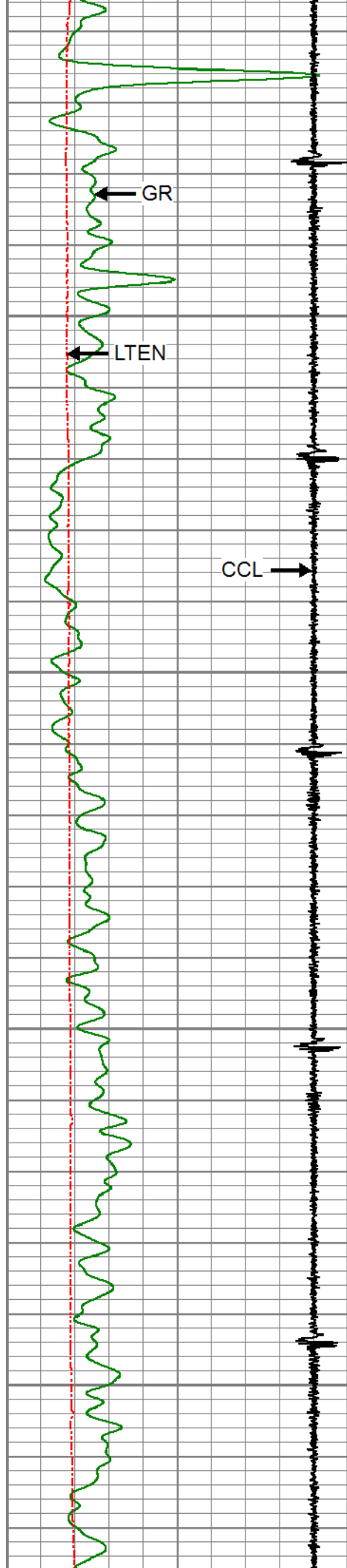
MAXAMPL : Maximum Amplitude
MINAMPL : Minimum Amplitude
MINATTN : Minimum Attenuation
NPORSEL : Neutron Porosity Curve Select
PERFS : Perforation Flag
PPT : Predicted Pipe Time
SRFTEMP : Surface Temperature
SZCOR : CN Size Cor. ?
TDEPTH : Total Depth

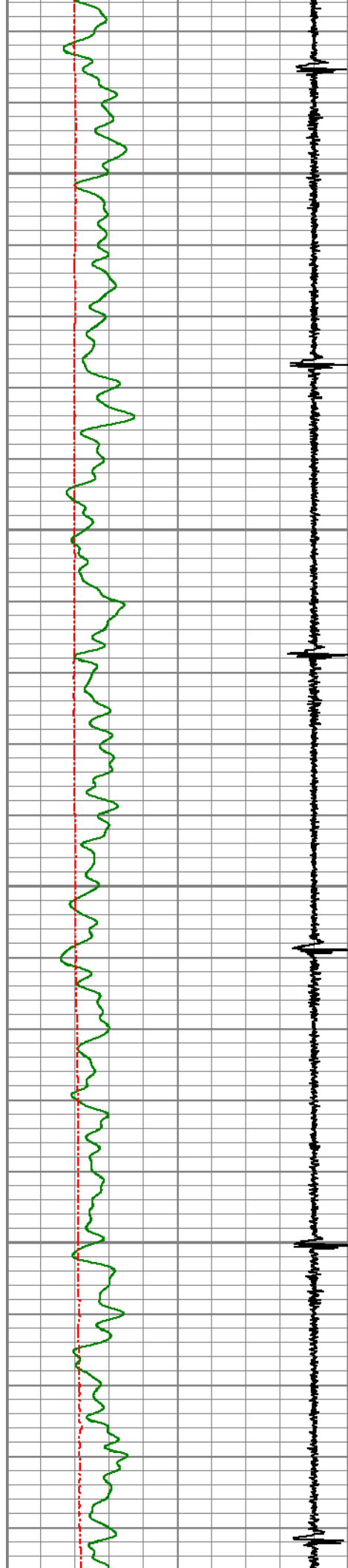
Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
TEMP	19.11		Cable Head-Titan_144 1 7/16" Titan Cable Head	1.03	1.44	2.00
WVFS8	16.82		PROBE-RBT-DIGITAL-RBL-DCT (FW1411-9.21) Probe 2 3/4" Radii Bond with Temp-Corrosion Package	11-9.21	2.75	105.00
WVFS7	16.82					
WVFS6	16.82					
WVFS5	16.82					
WVFS4	16.82					
WVFS3	16.82					
WVFS2	16.82					
WVFS1	16.82					
WVFCAL	16.82					
WVF3FT	16.82					
WVF5FT	15.82					
HEADVOLT	12.63					
CCL	11.71					
GR	10.38					

GR	10.38		PROBE-GR/CCL-DIGITAL-275_6-PIN (1114.83) Probe 2 3/4" Gamma CCL 6-pin Bottom for CNT	2.75	50.00
CNLSC	4.99				
CNSSC	4.58		PROBE-CNT-DIGITAL-PRB_DIG (120508) Probe 2.75 Digital CNT	2.75	69.00
			Centralizer-275 Probe 2 3/4" Probe Adjustable Spring Centralizer	2.88	15.00
			Bullnose-PROBE Probe Go Pin Pressure Cap	0.33	1.00
					
Dataset: pdc_harold_05123_20190225_scbl-cn1.db: field/well/run1/pass7 Total length: 22.87 ft Total weight: 242.00 lb O.D.: 2.75 in					

		MAIN LOG ZERO PSI APPLIED AT SURFACE			
Database File	pdc_harold_05123_20190225_scbl-cn1.db				
Dataset Pathname	pass7				
Presentation Format	pinr_cn1_co				
Dataset Creation	Mon Feb 25 13:31:28 2019				
Charted by	Depth in Feet scaled 1:240				
0	Gamma Ray (GAPI)	150	40	CNPOR (pu)	0
-9	Collars	1	80	CNPOR (pu)	40
150	Gamma Ray (GAPI)	300			
0	LineTension (lb)	2000			





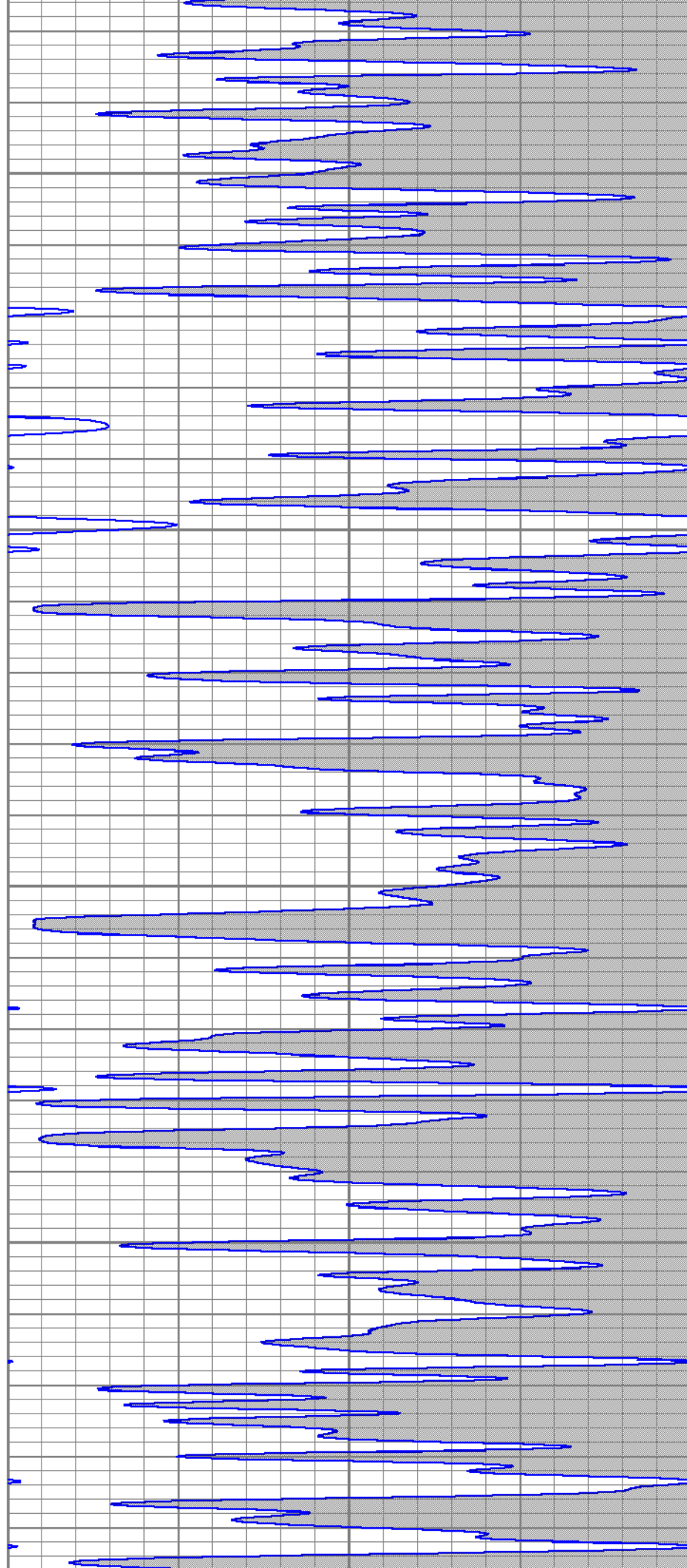


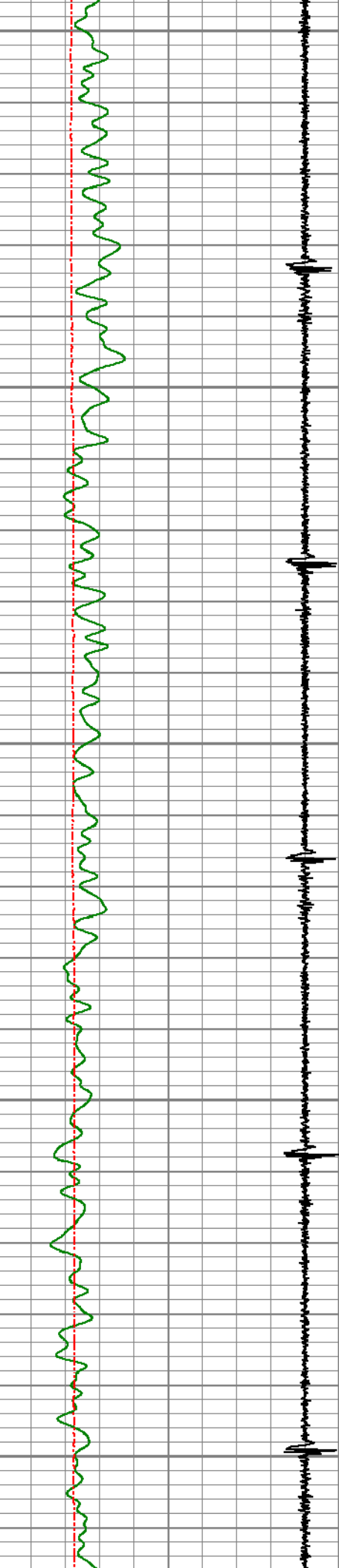
300

350

400

450





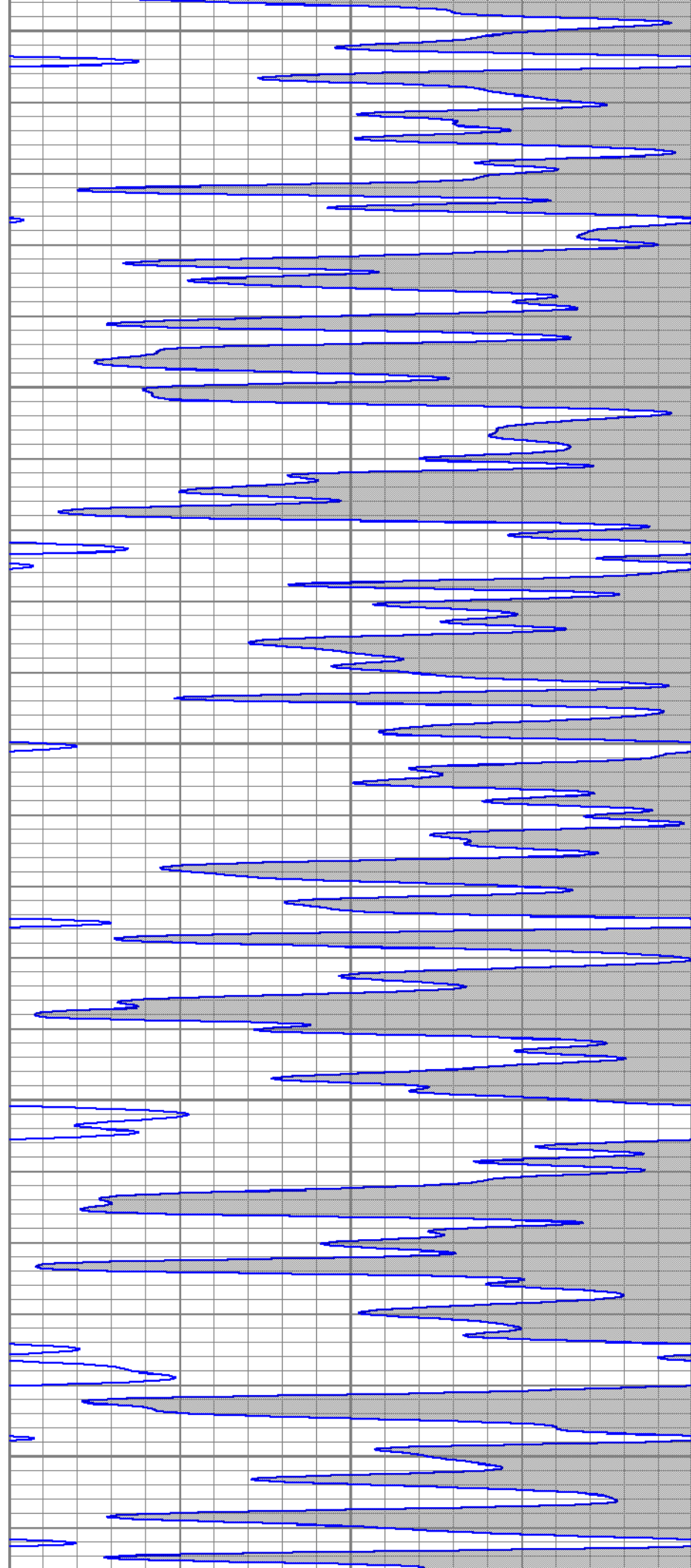
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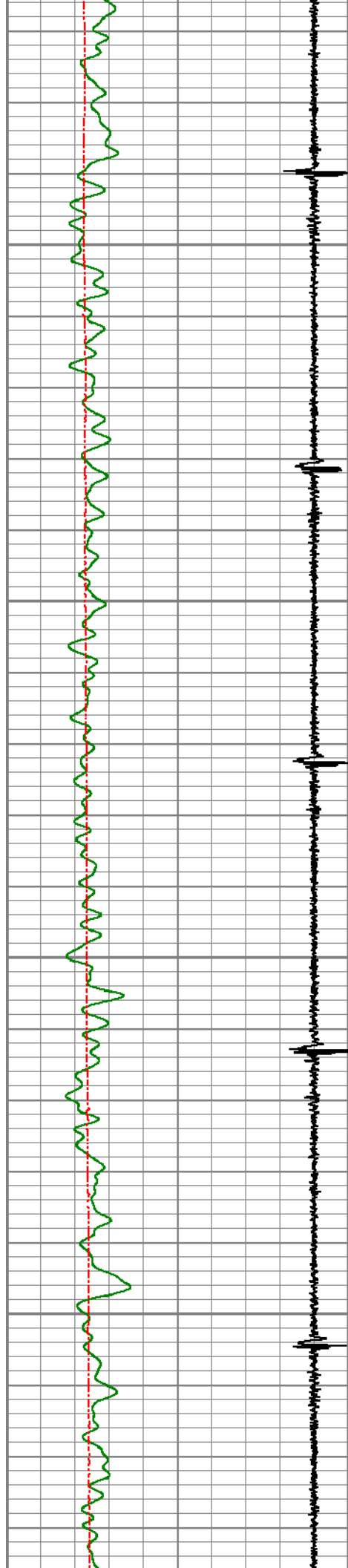
550

600

650

700



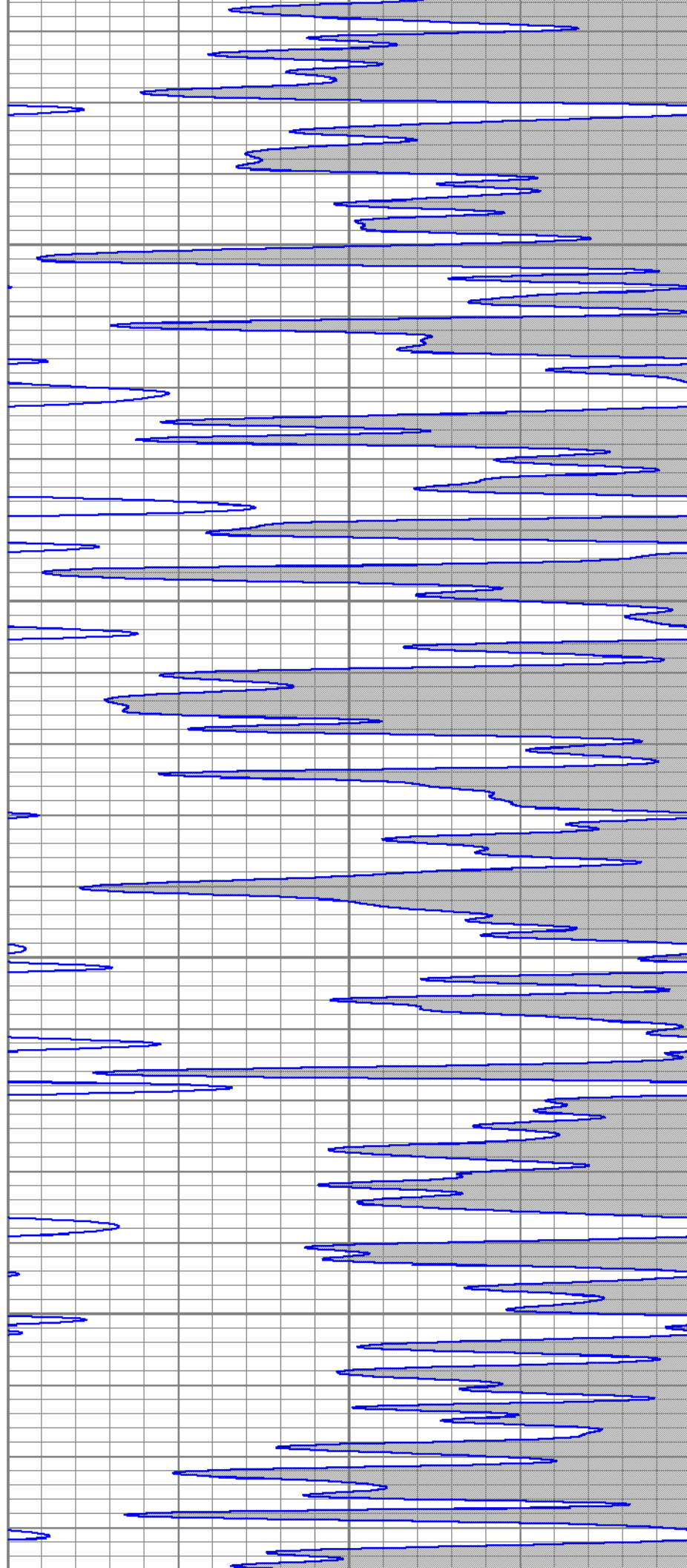


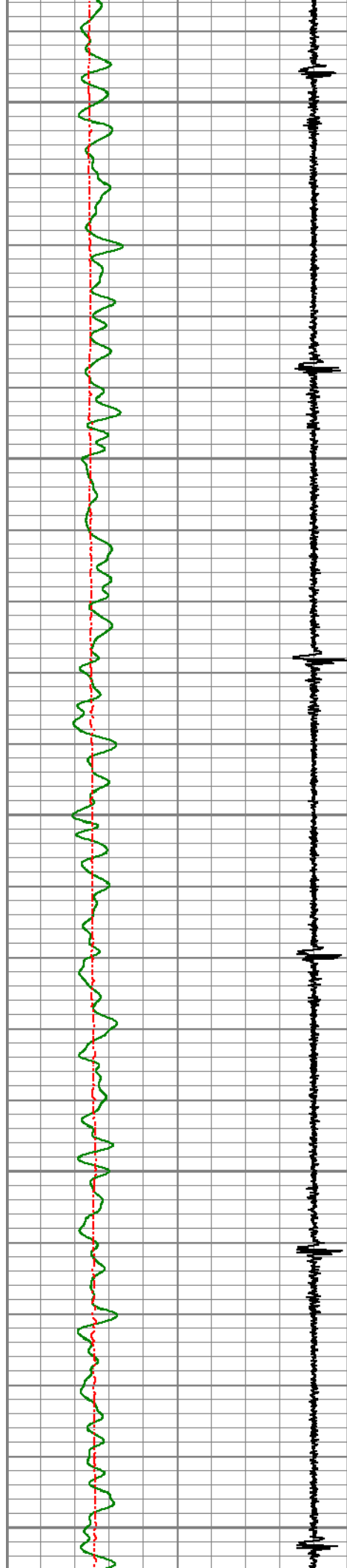
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800

850

900





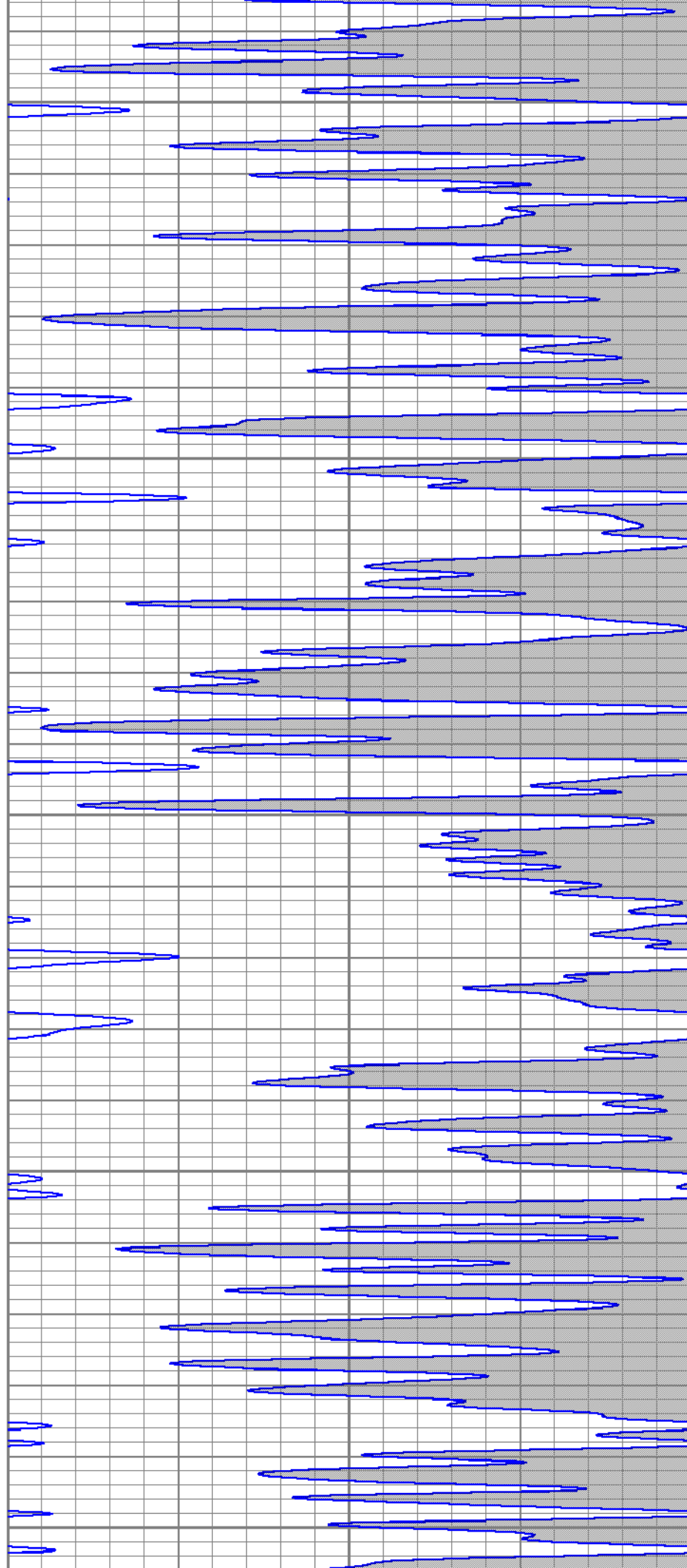
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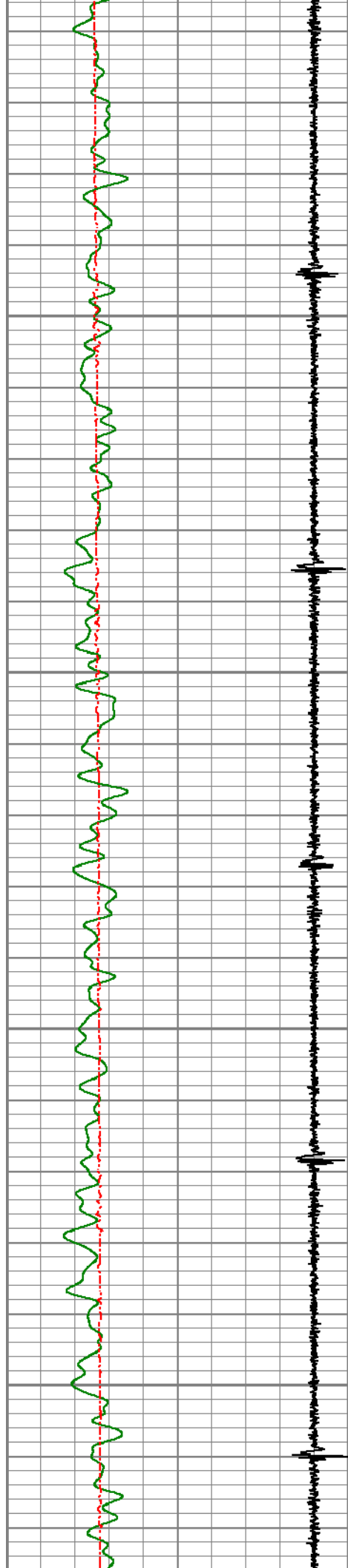
1000

1050

1100

1150



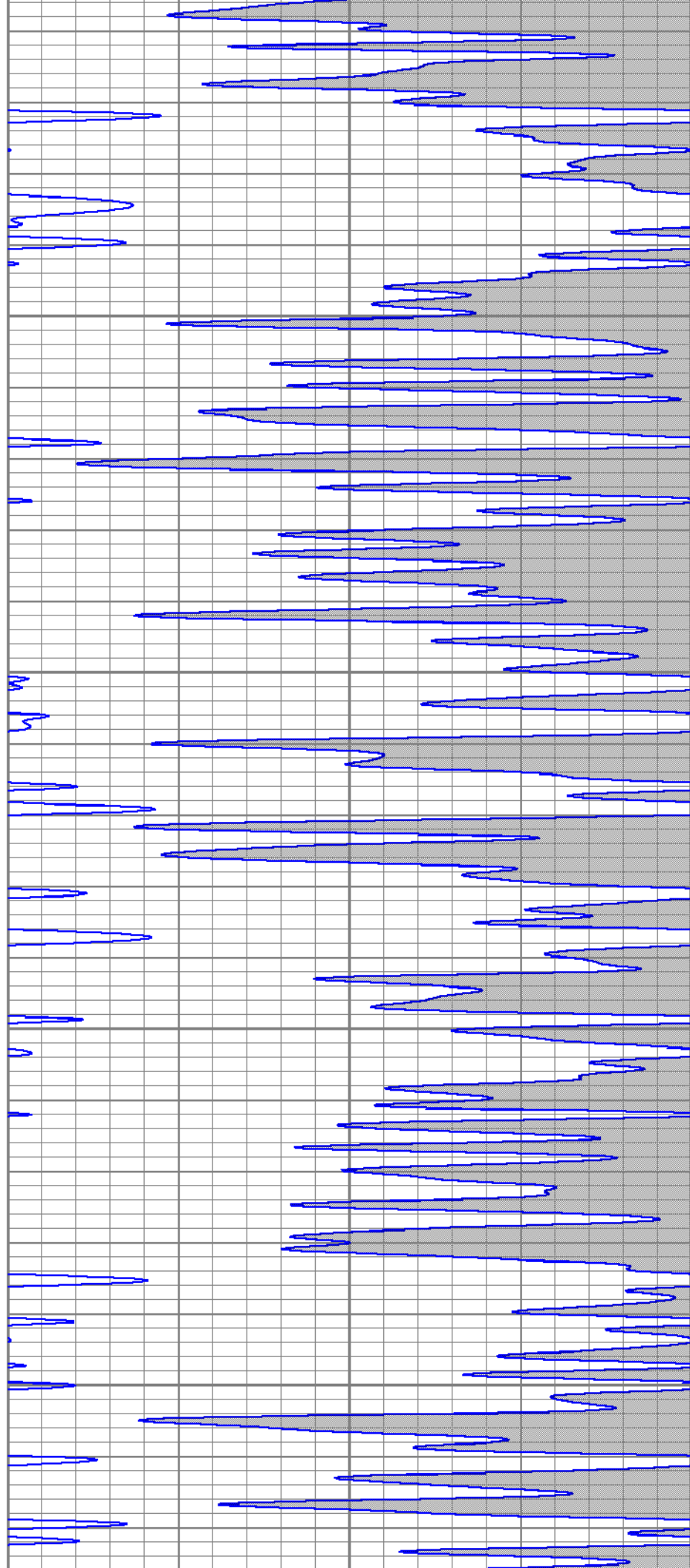


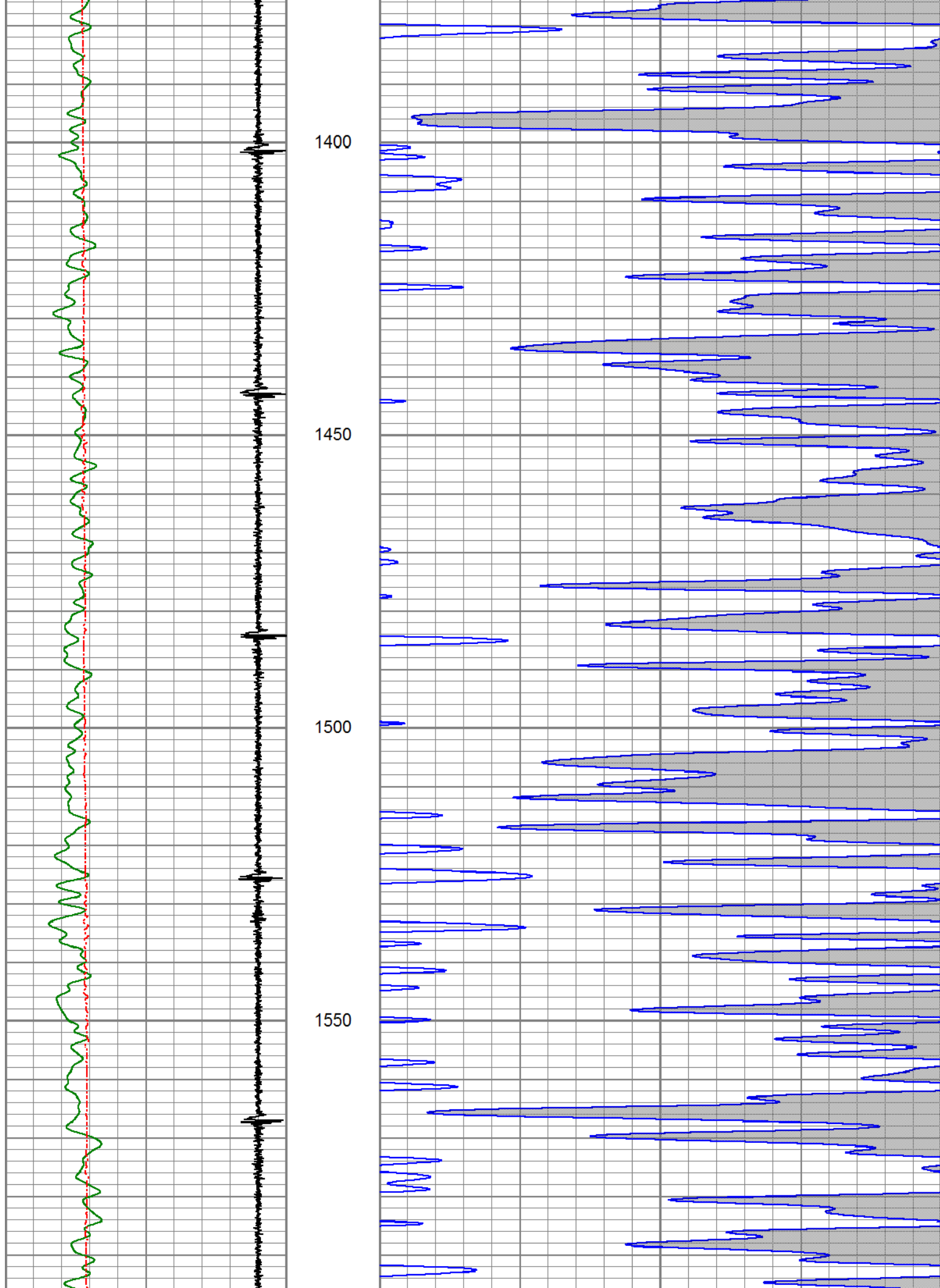
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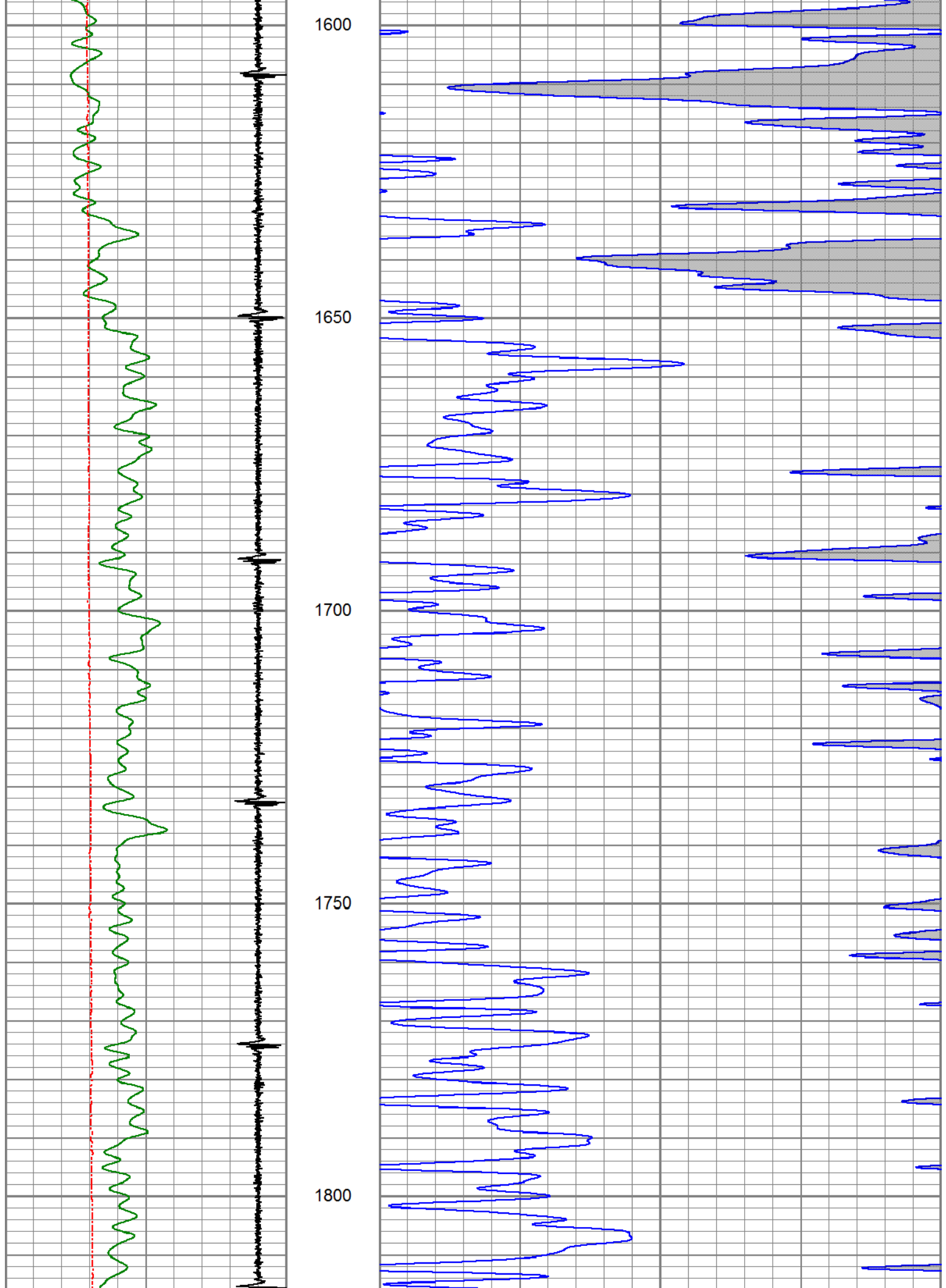
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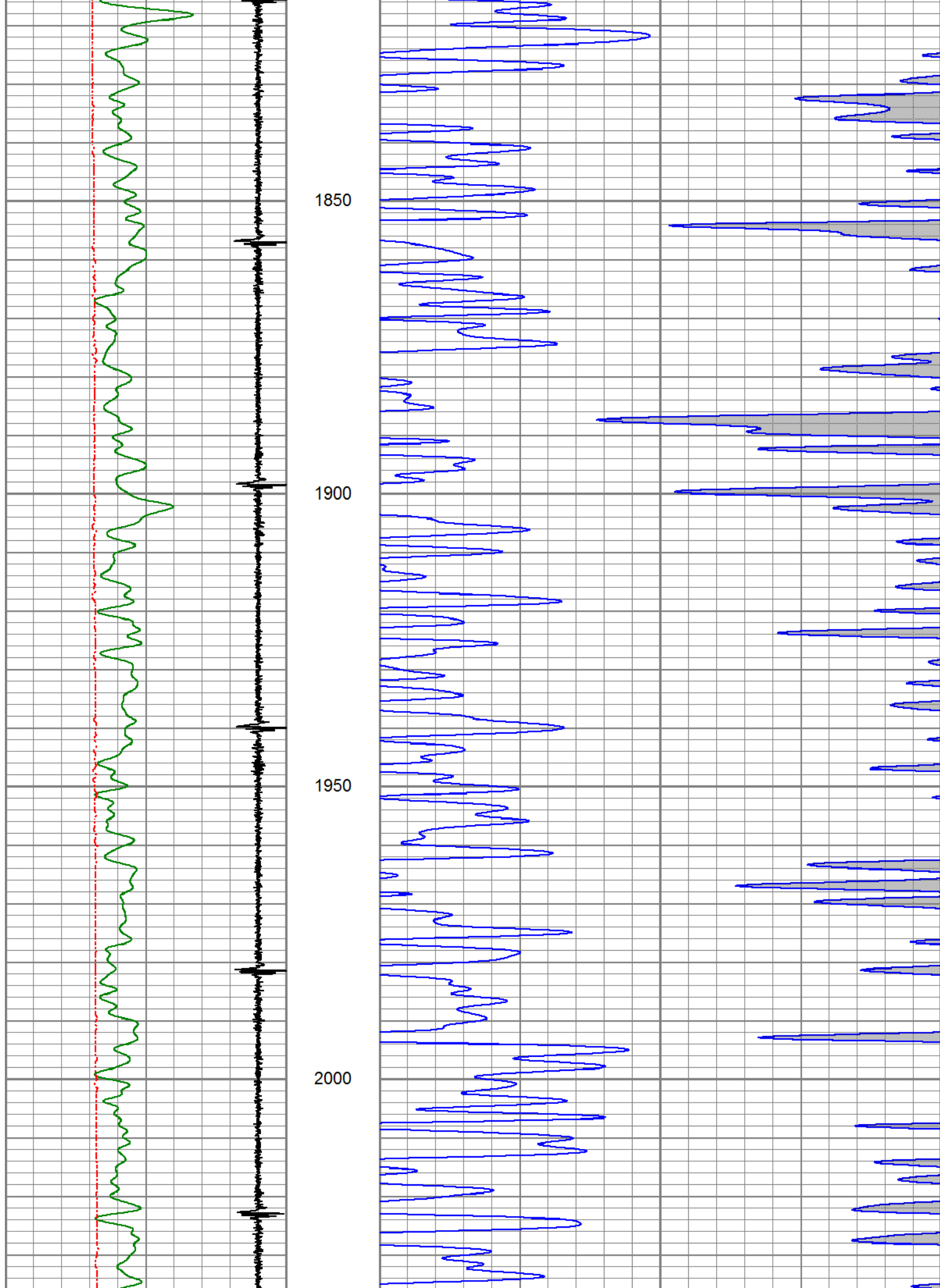
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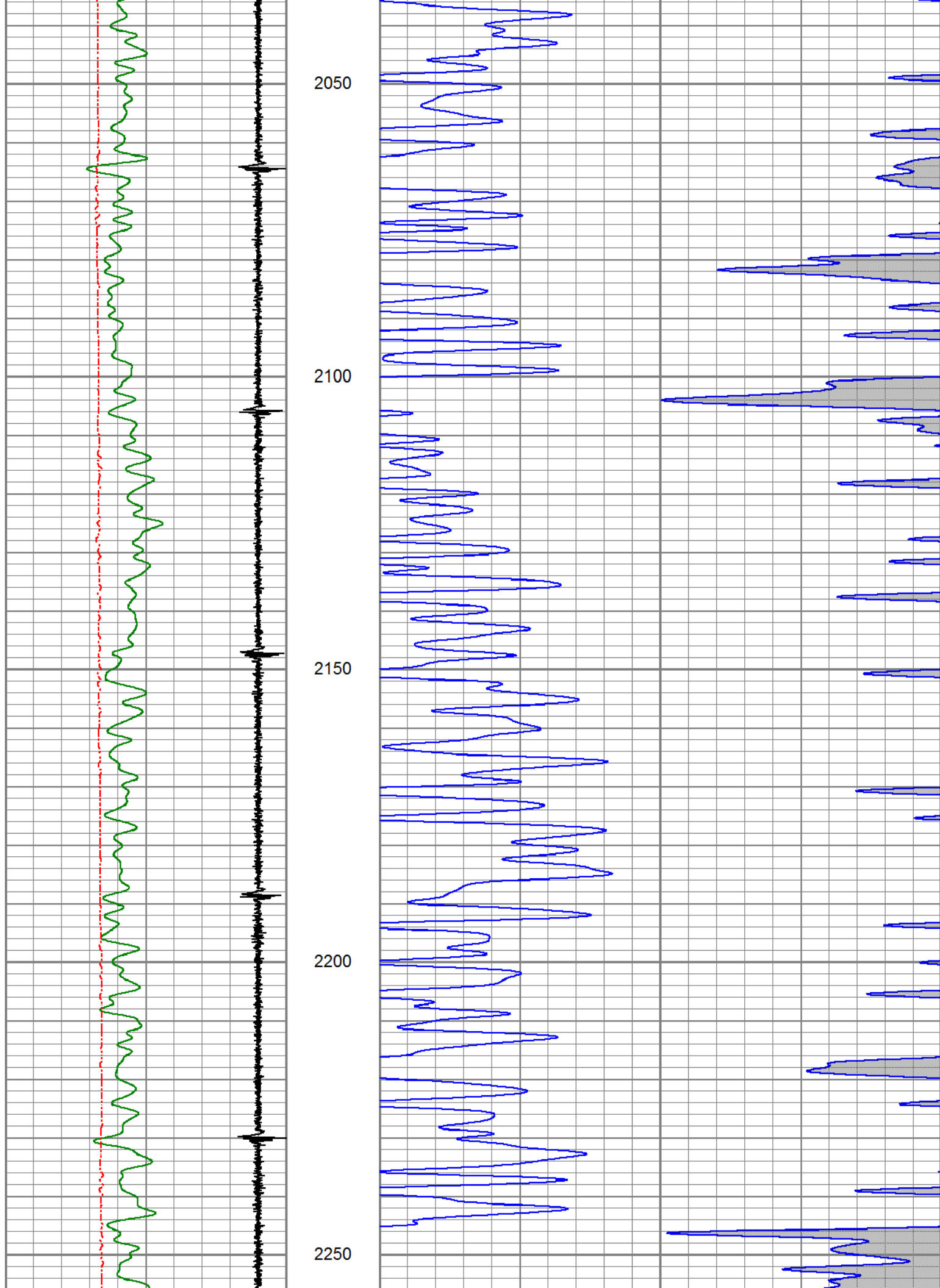
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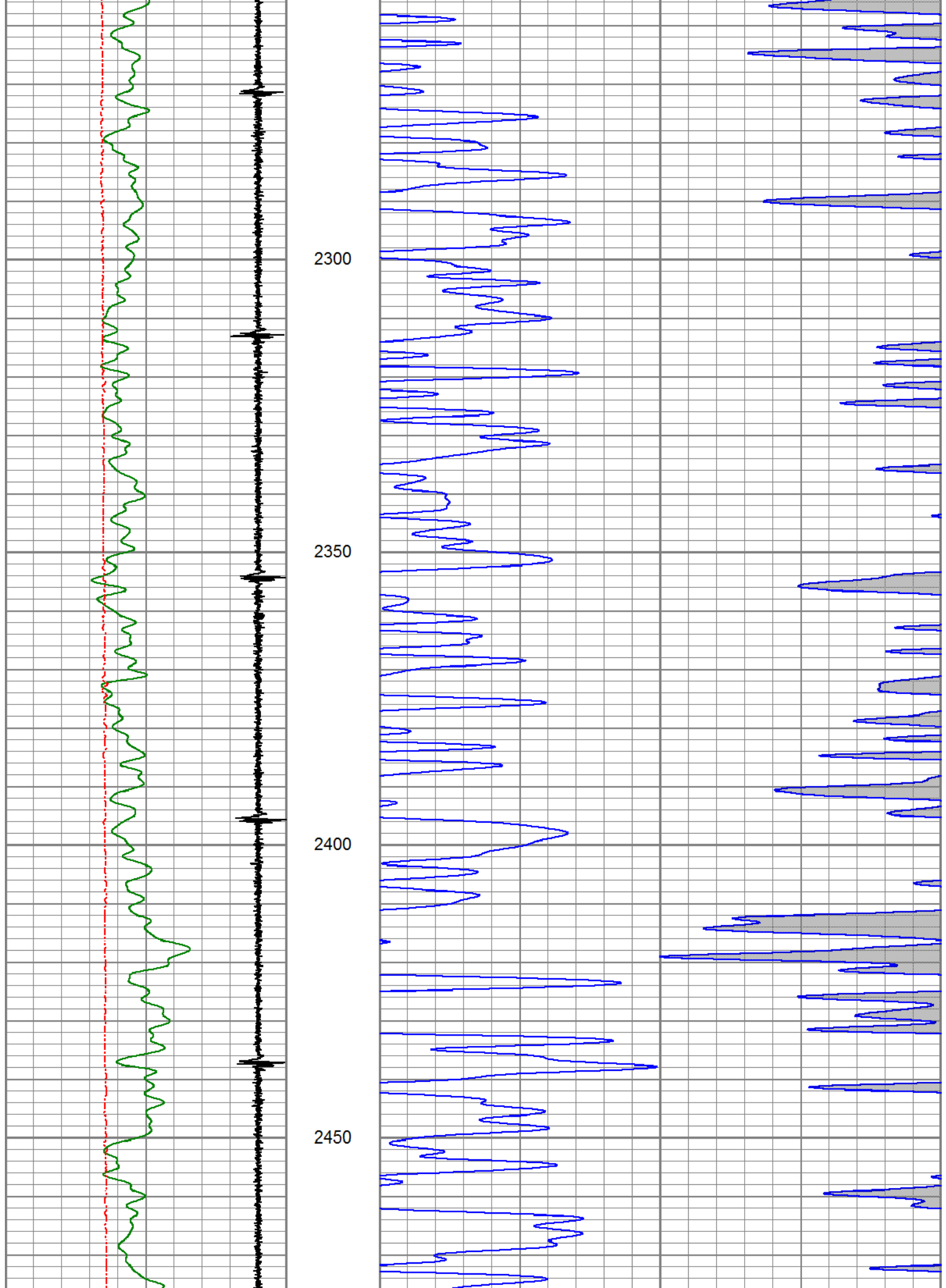


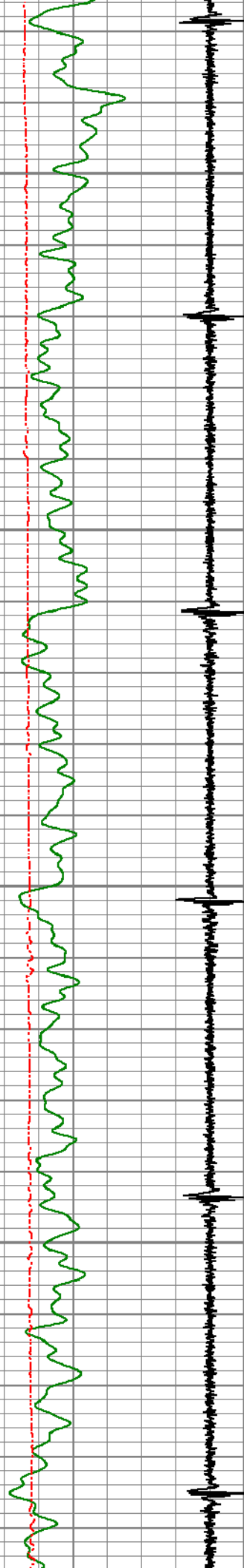










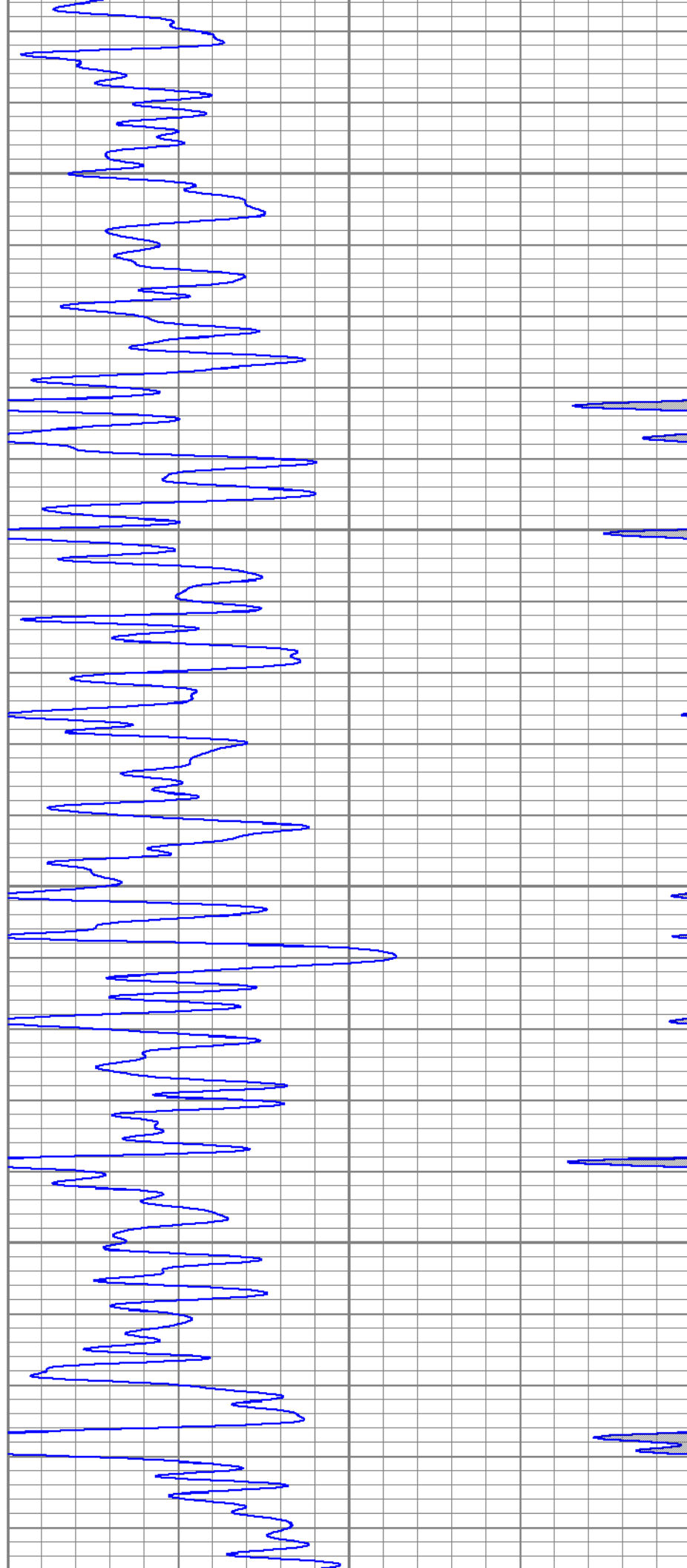


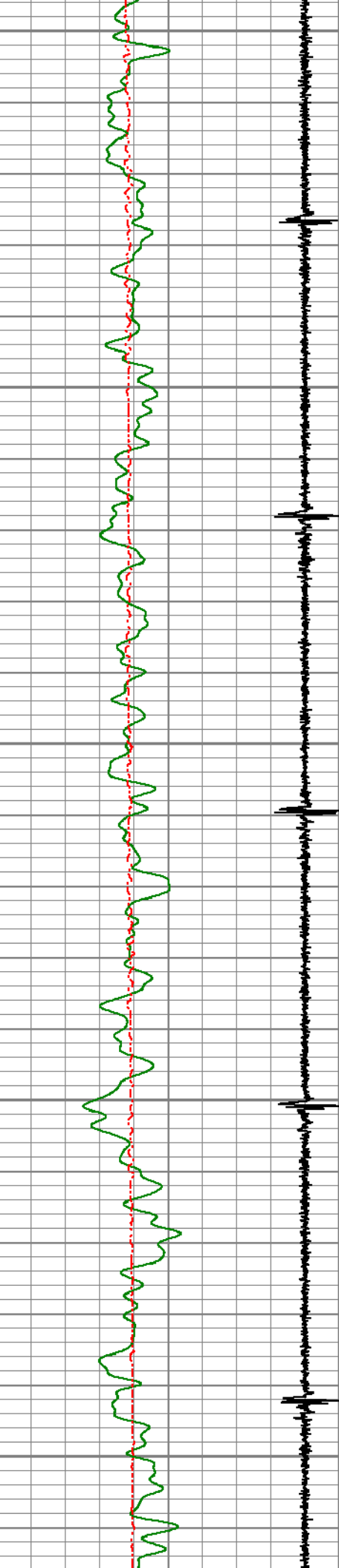
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2550

2600

2650





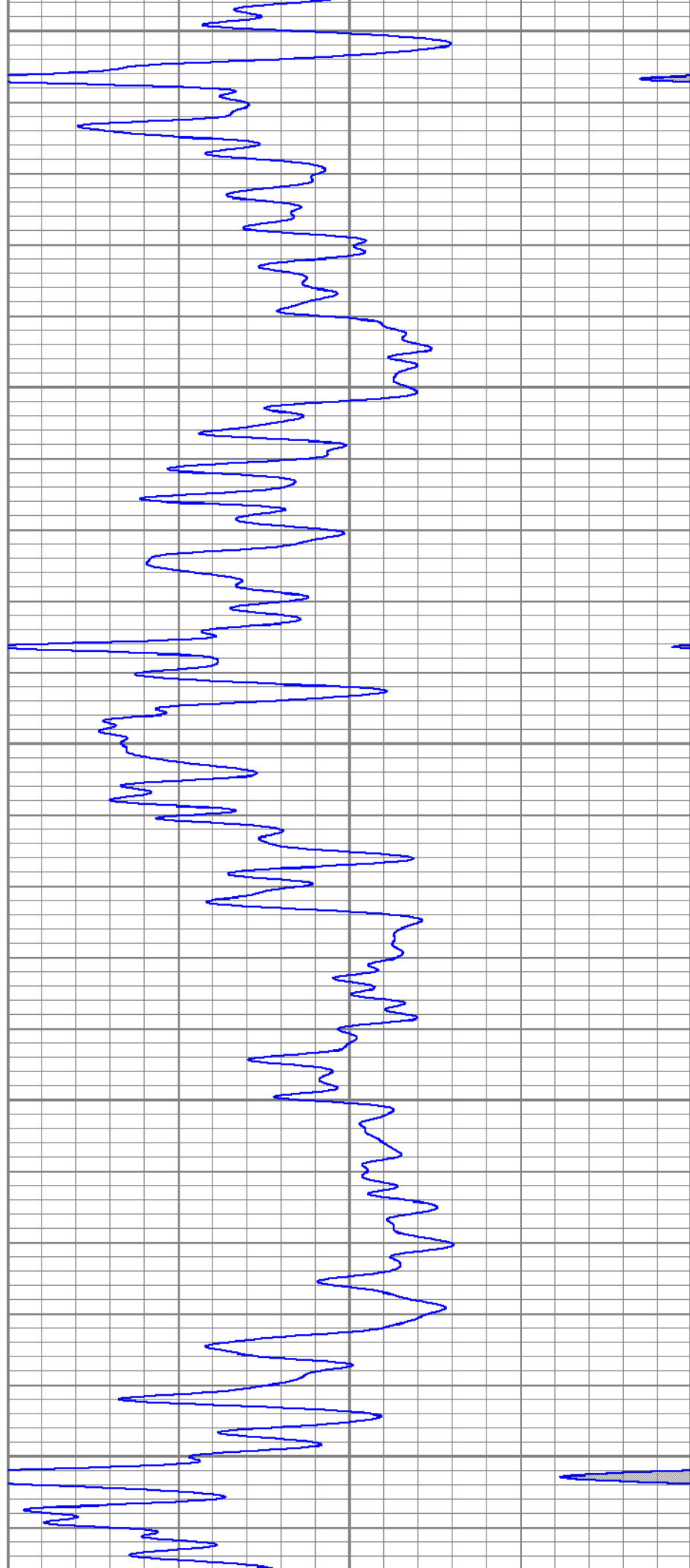
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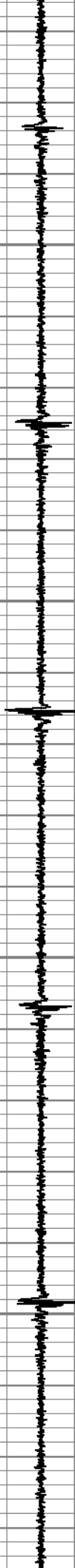
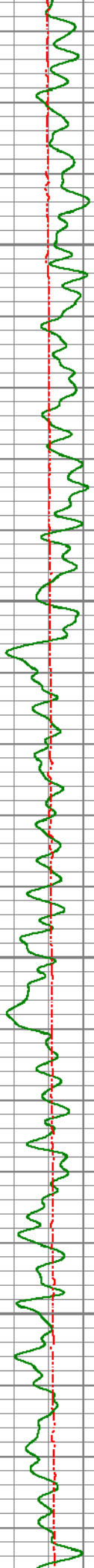
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2850

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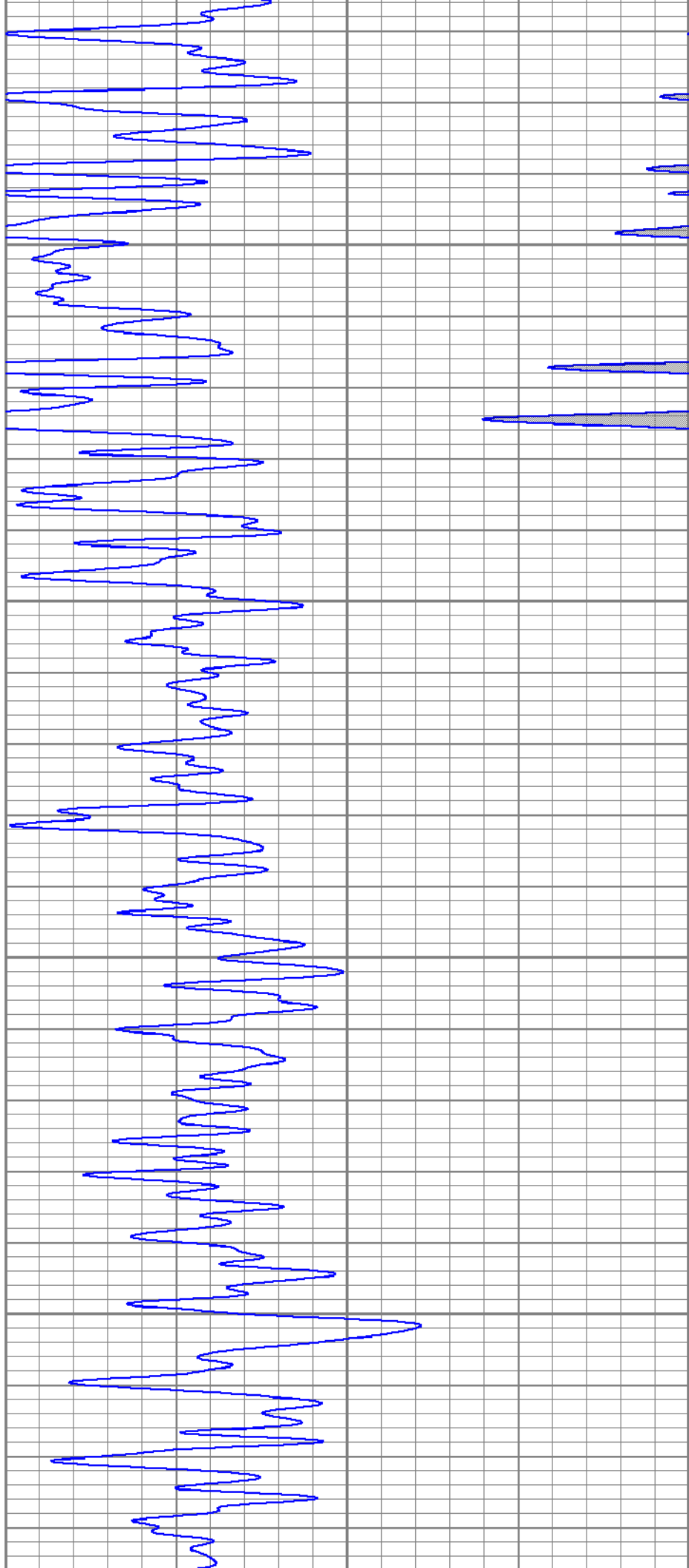


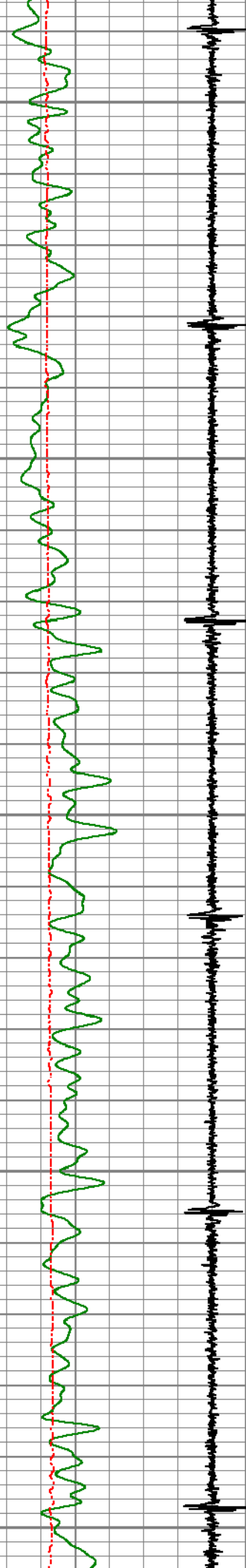
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3000

3050

3100





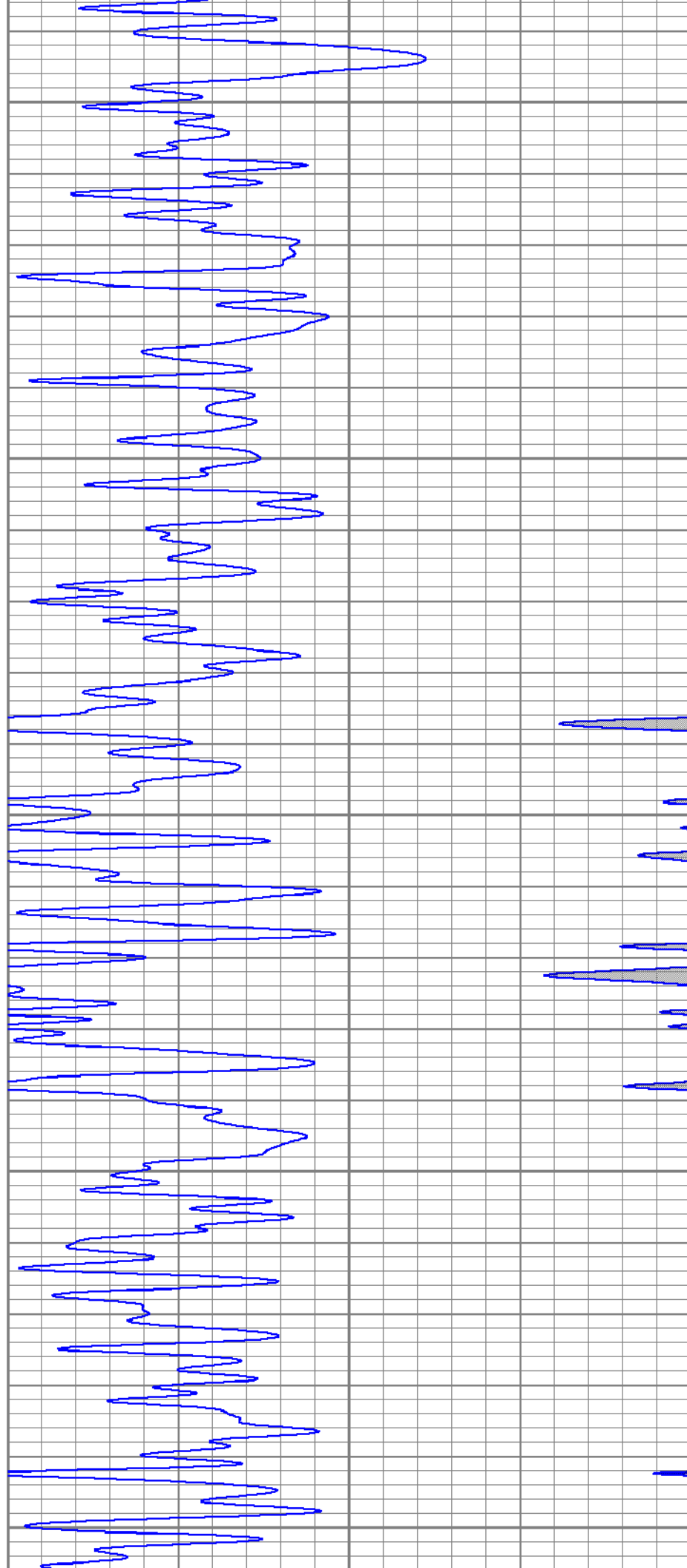
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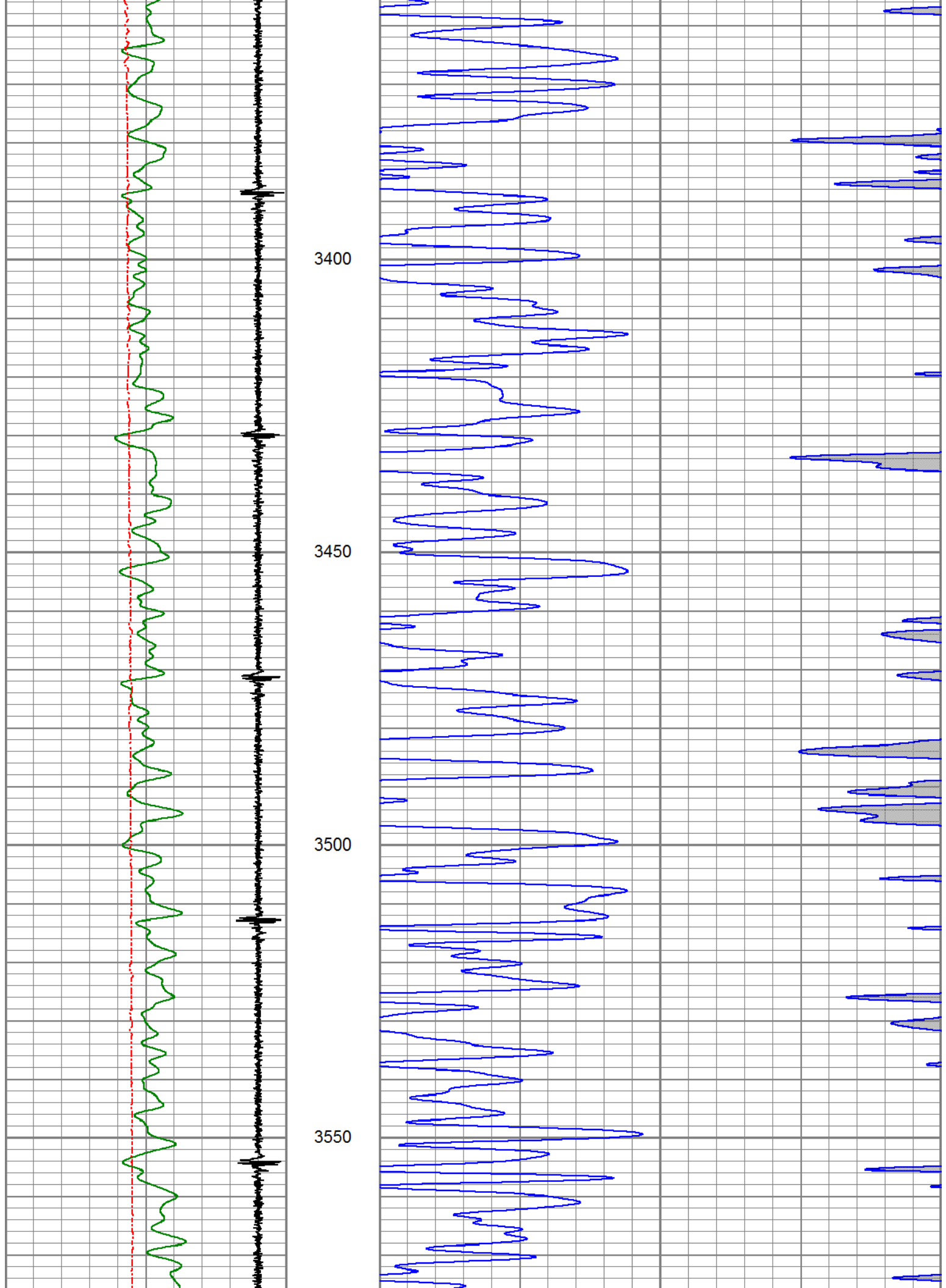
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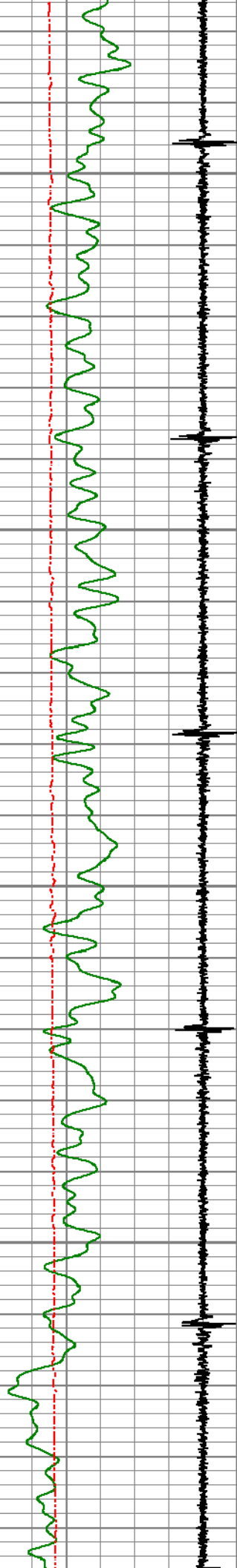
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3300

3350





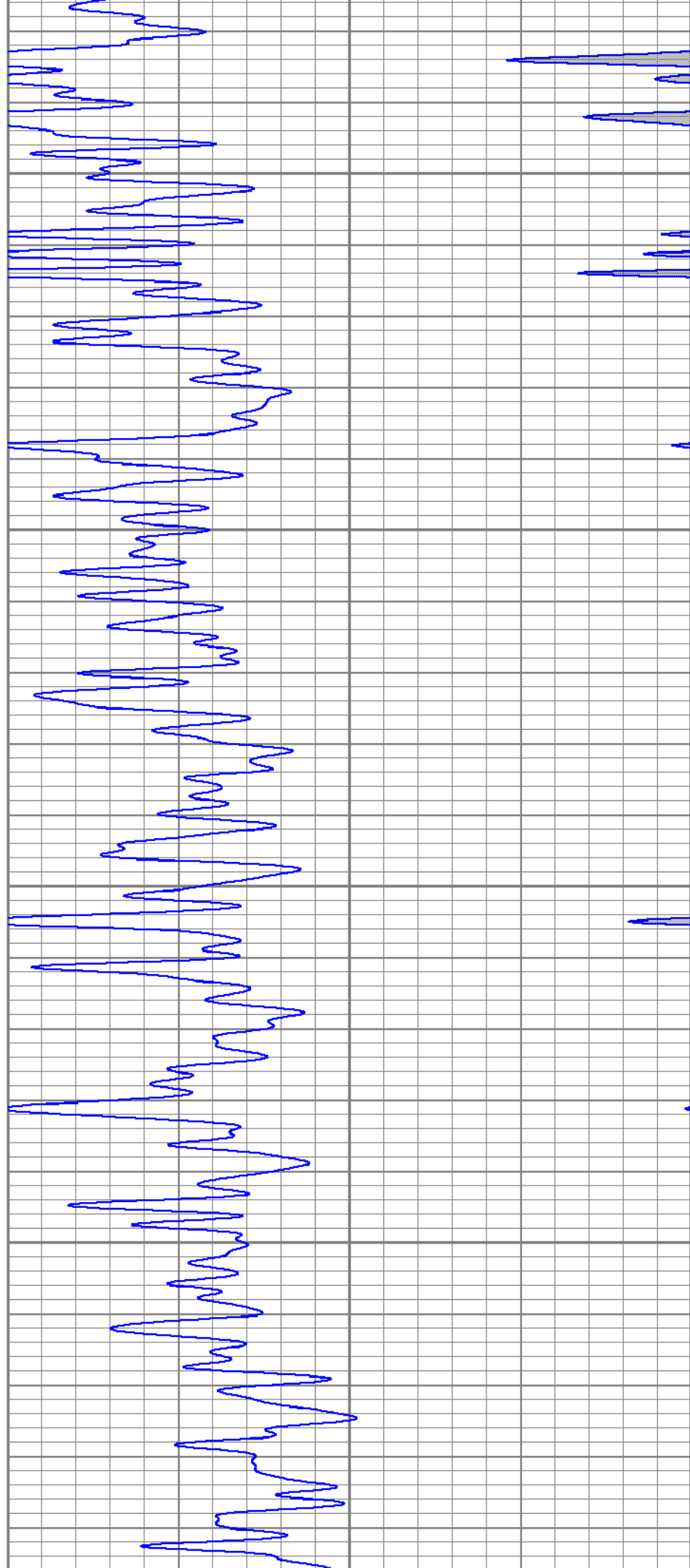


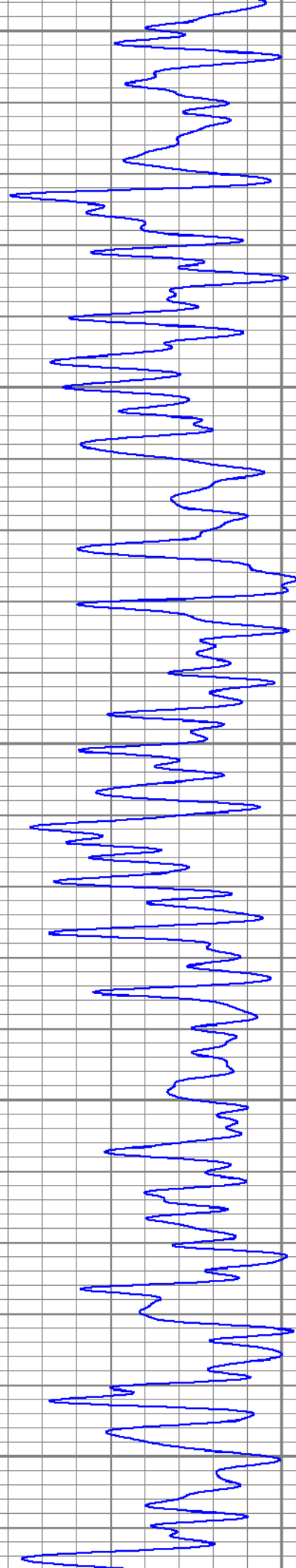
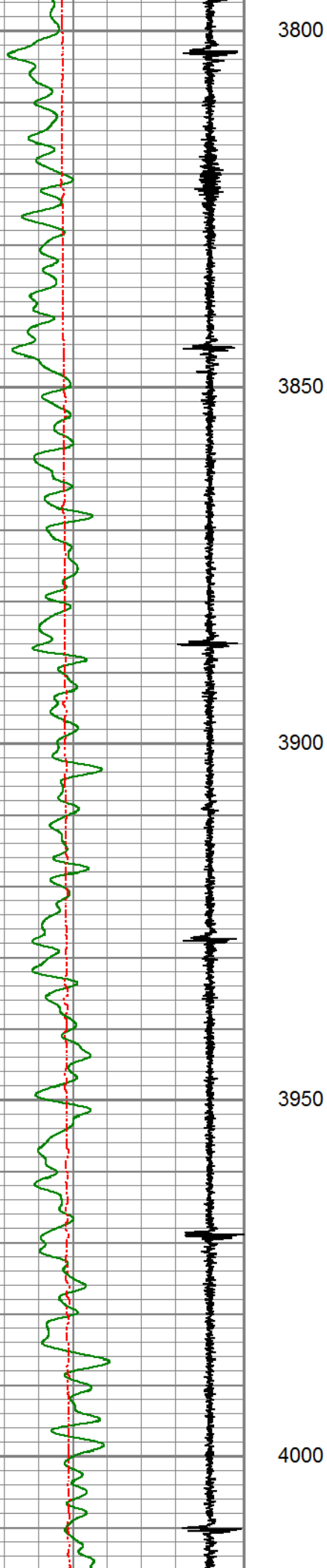
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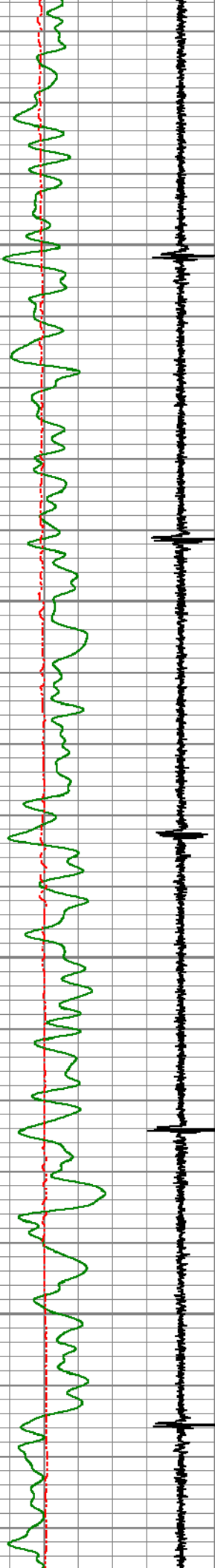
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3750





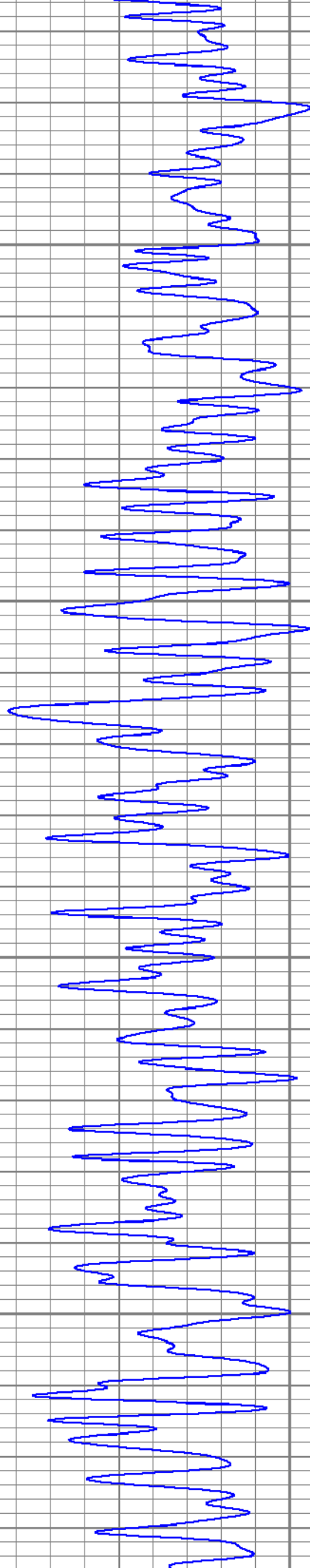


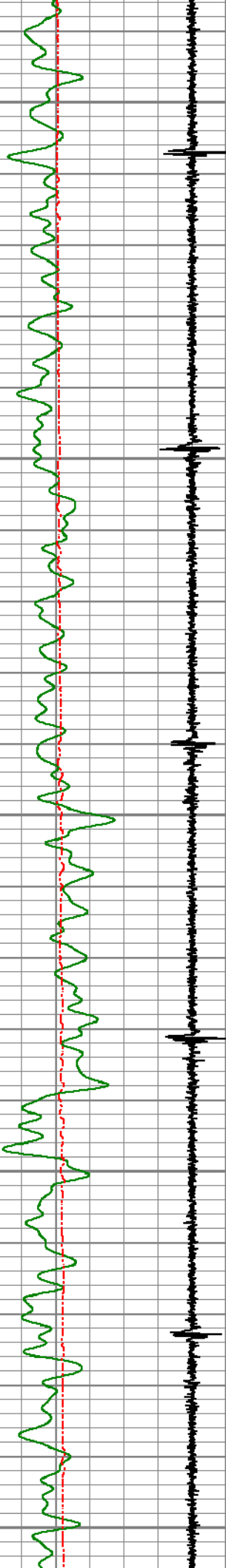
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4150

4200





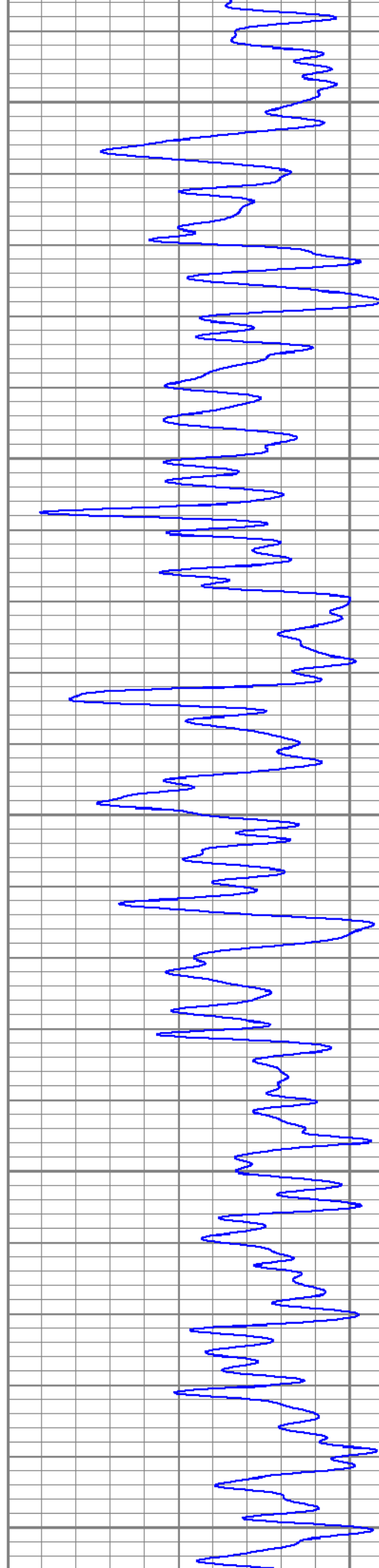
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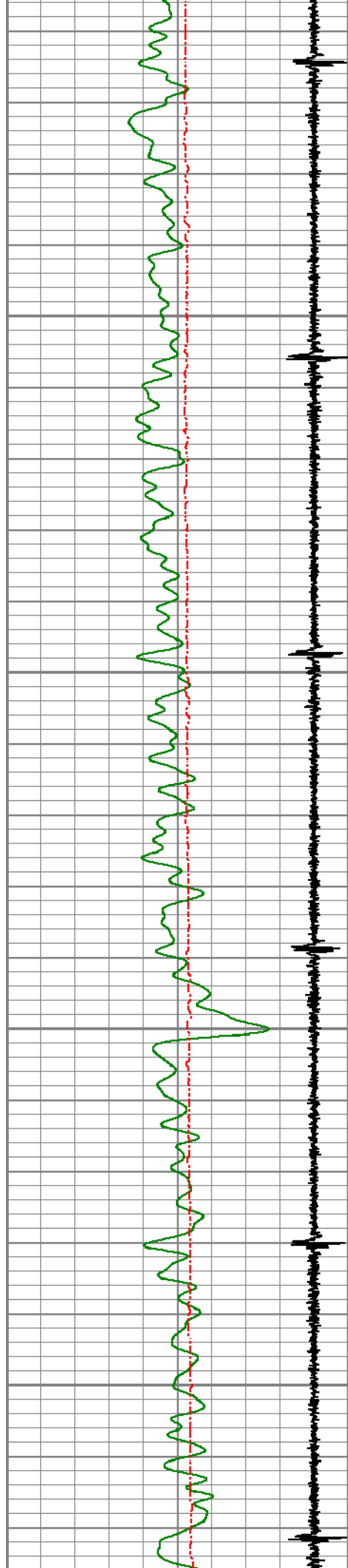
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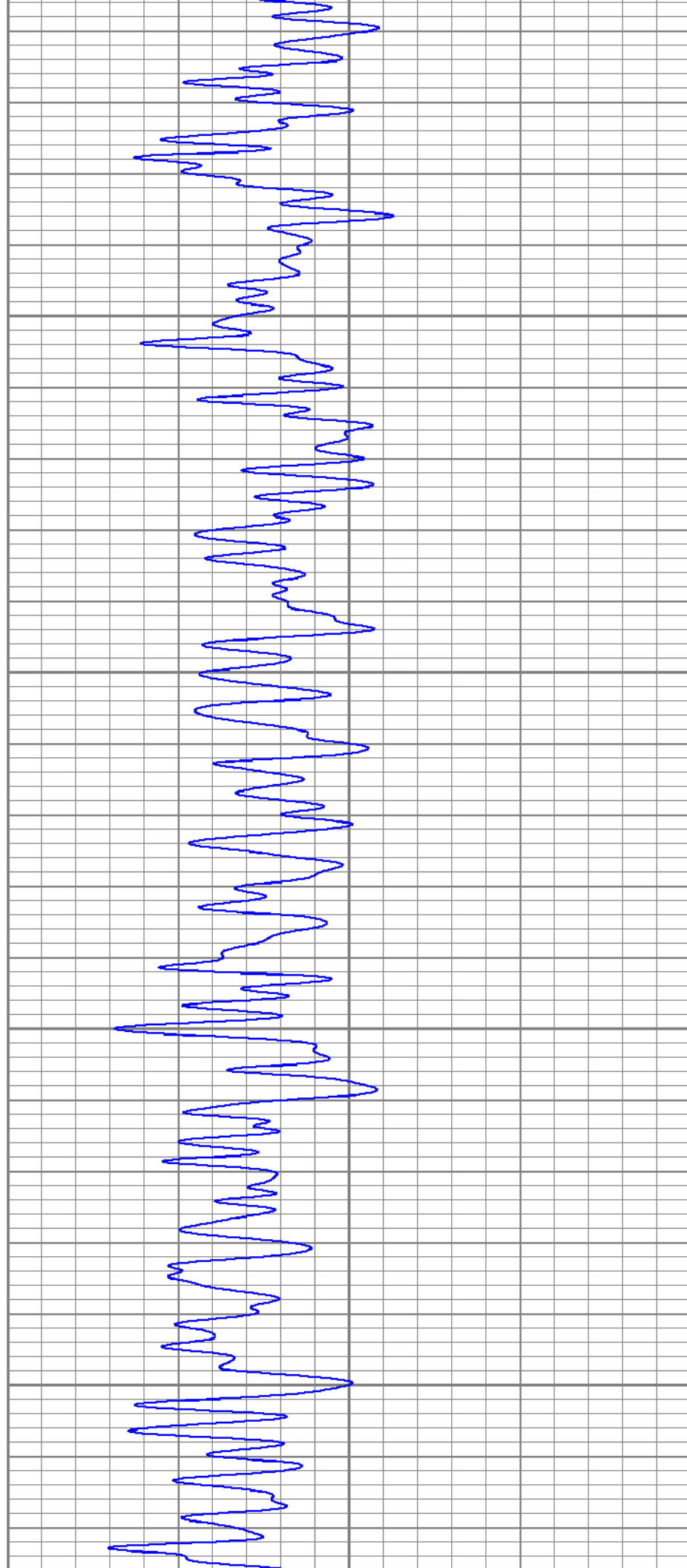


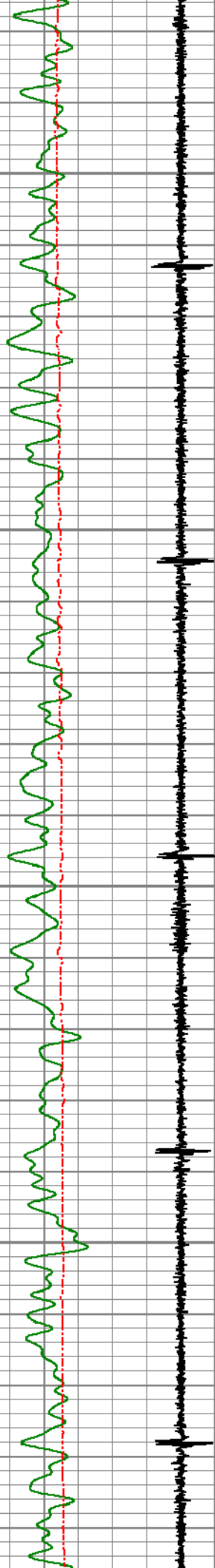
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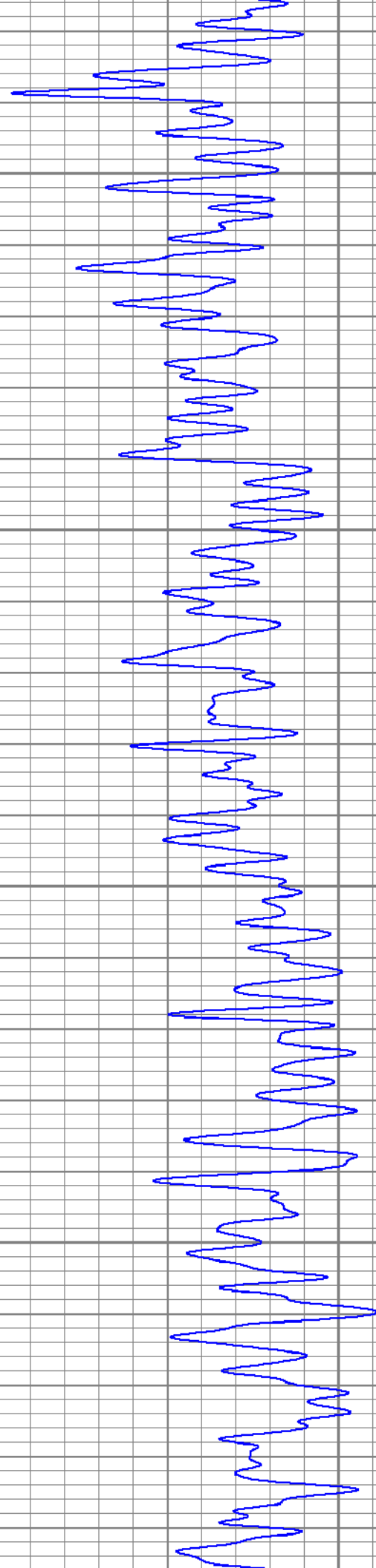


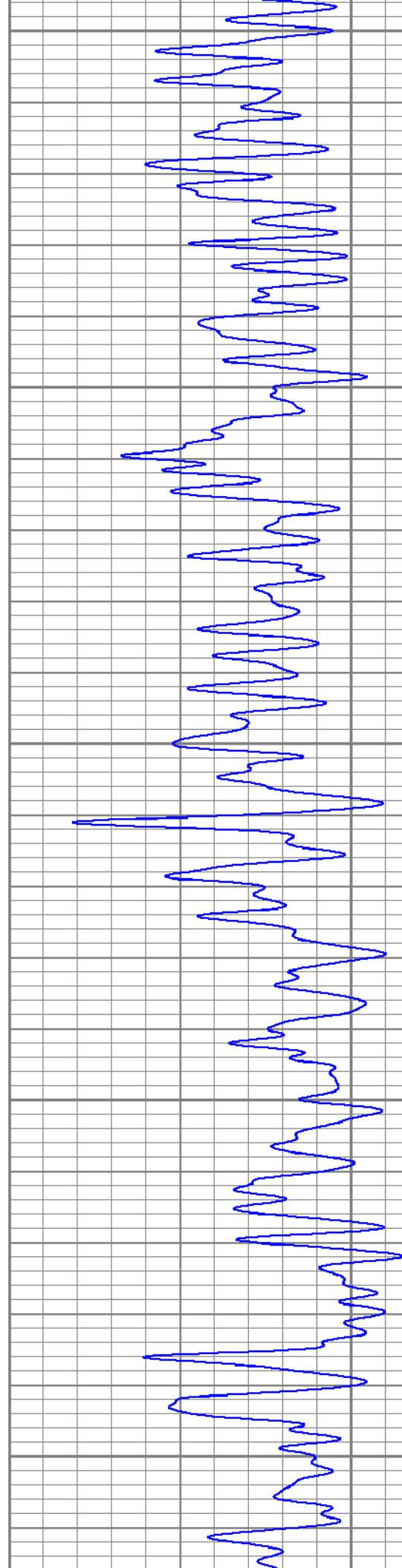
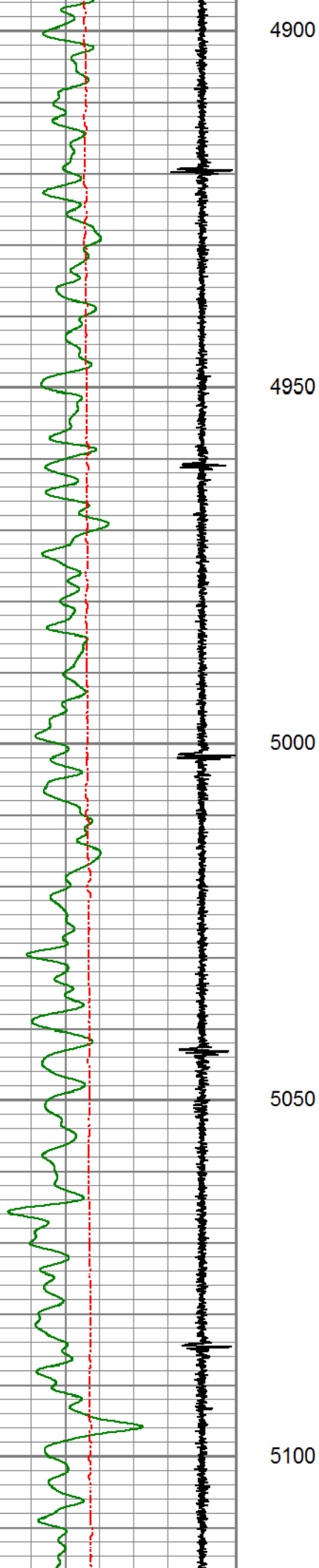
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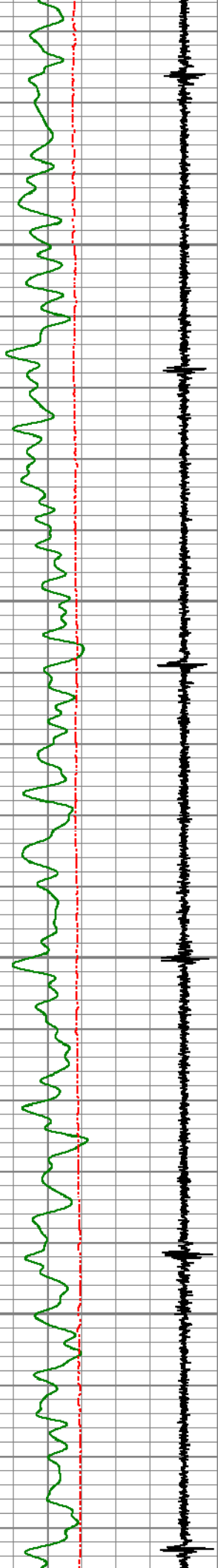
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4850





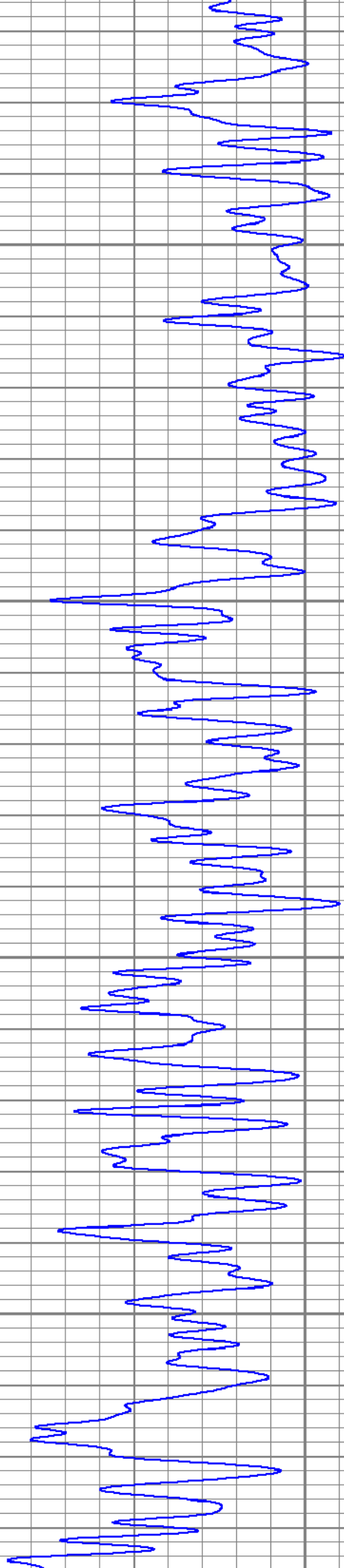


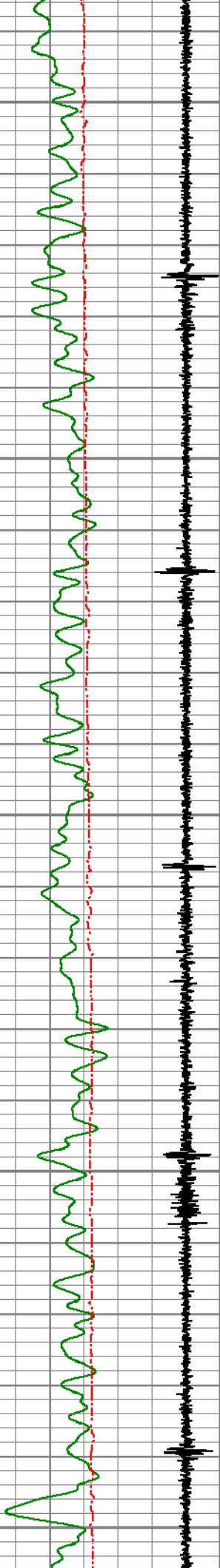
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5300





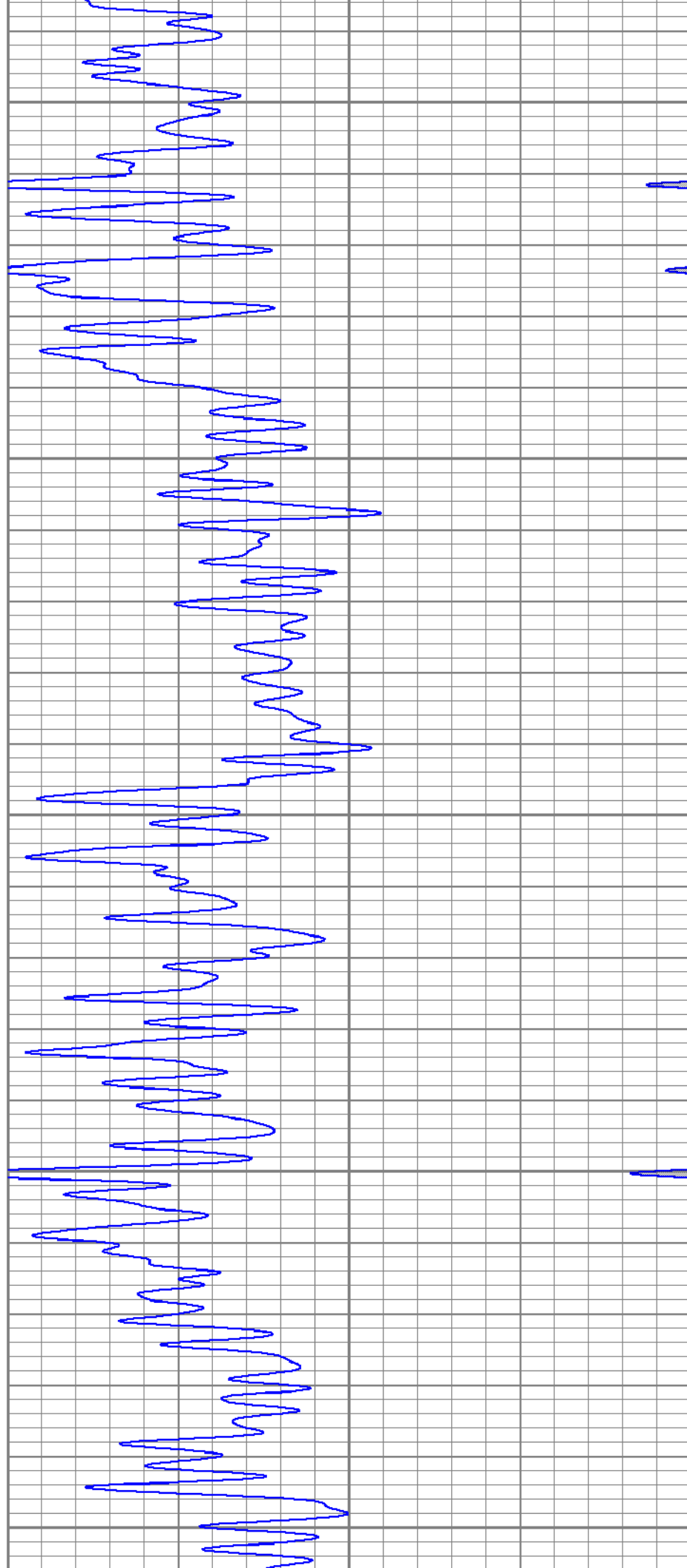
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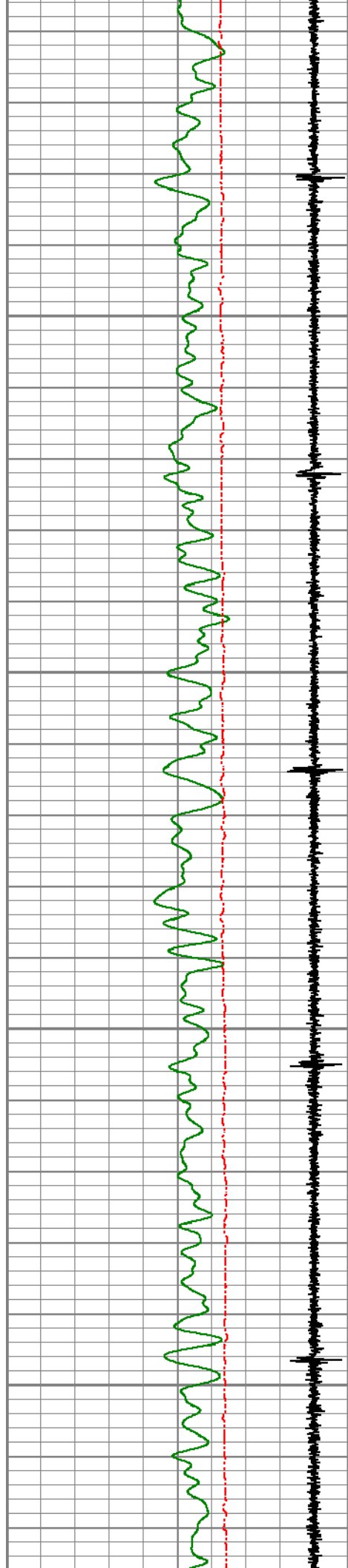
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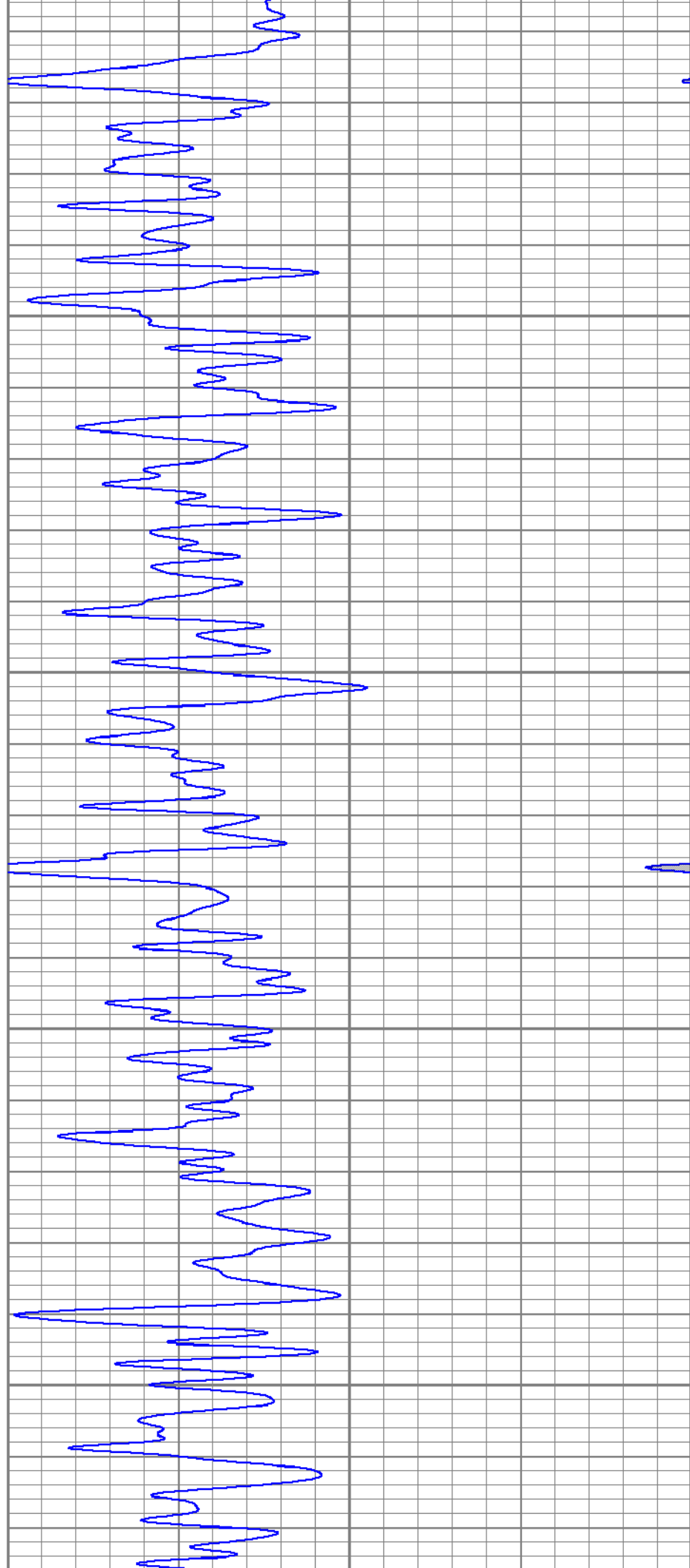


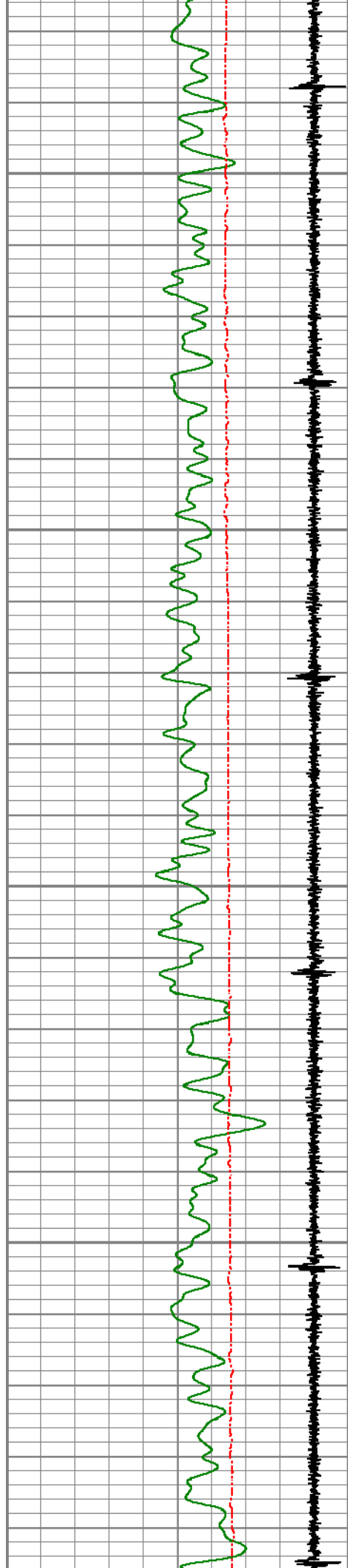
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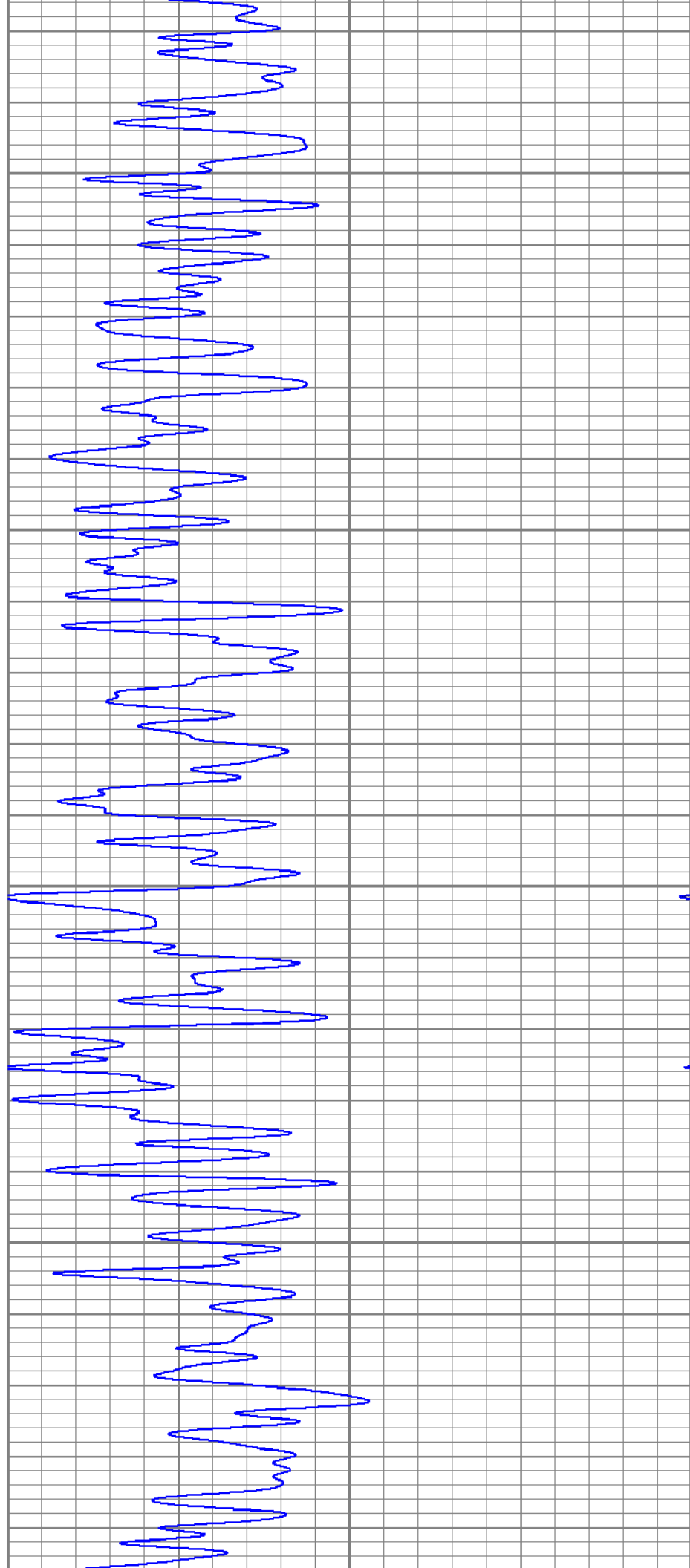


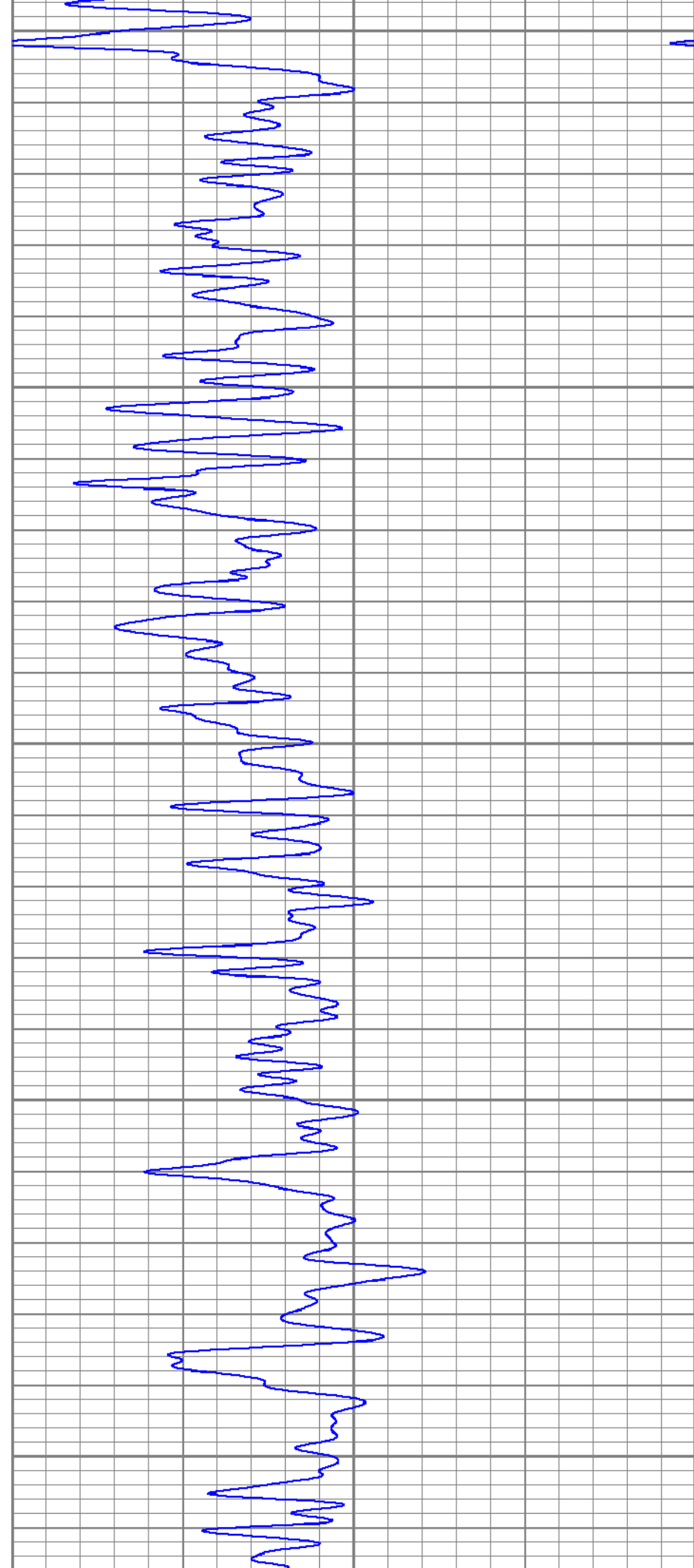
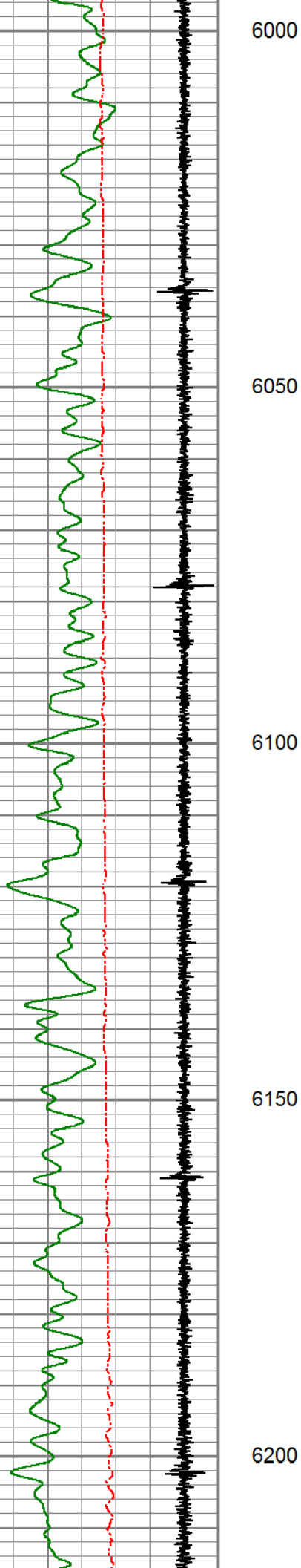
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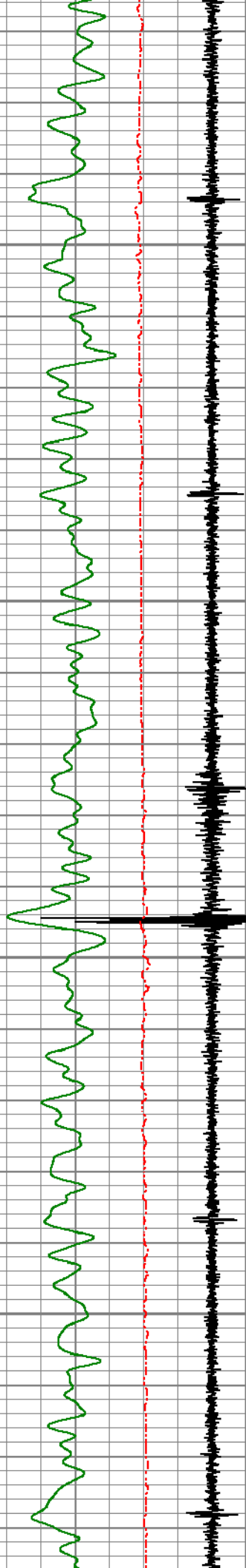
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5900

5950





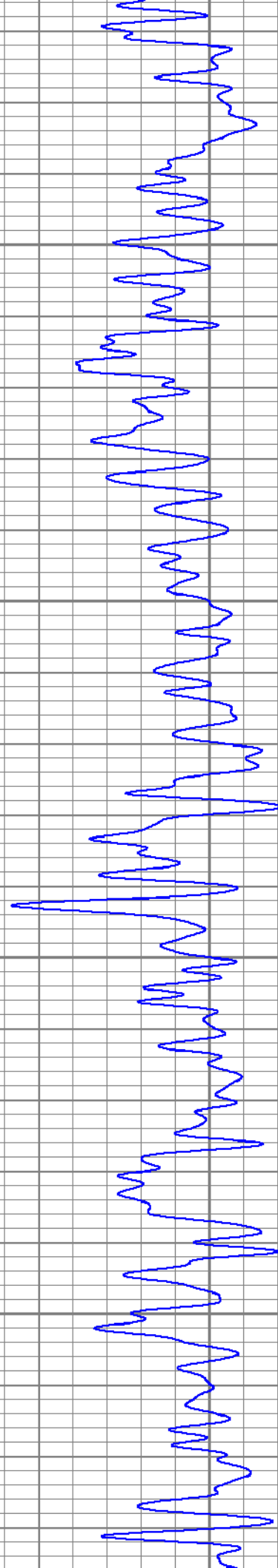


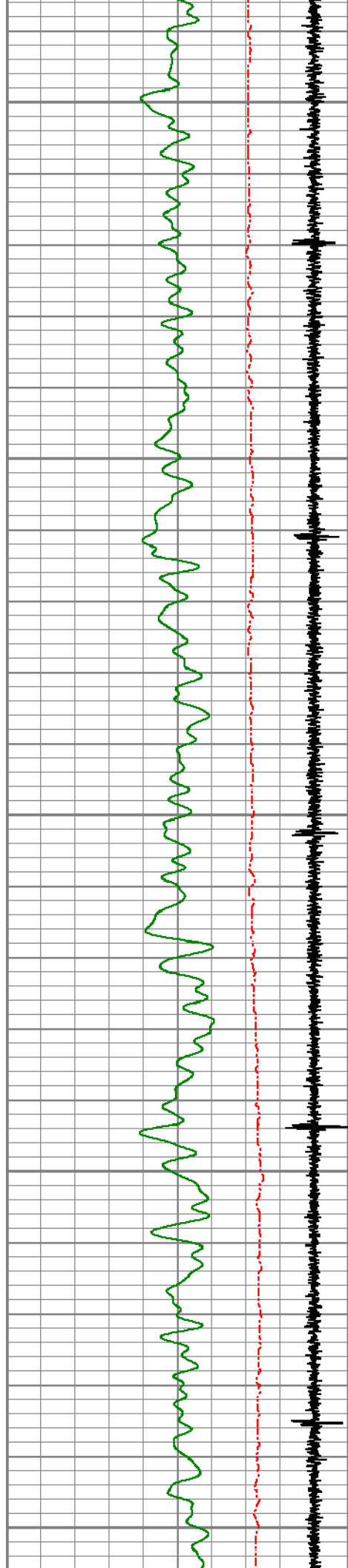
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6400





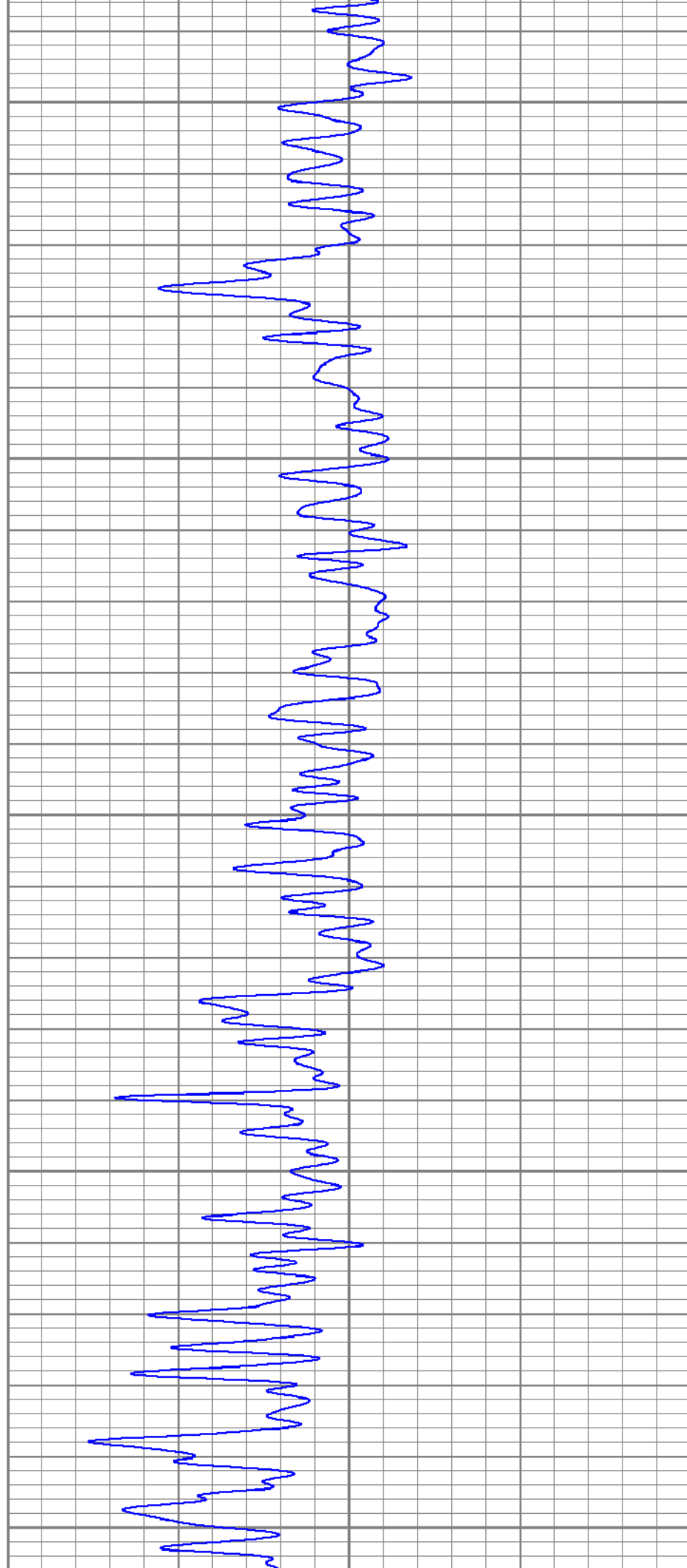
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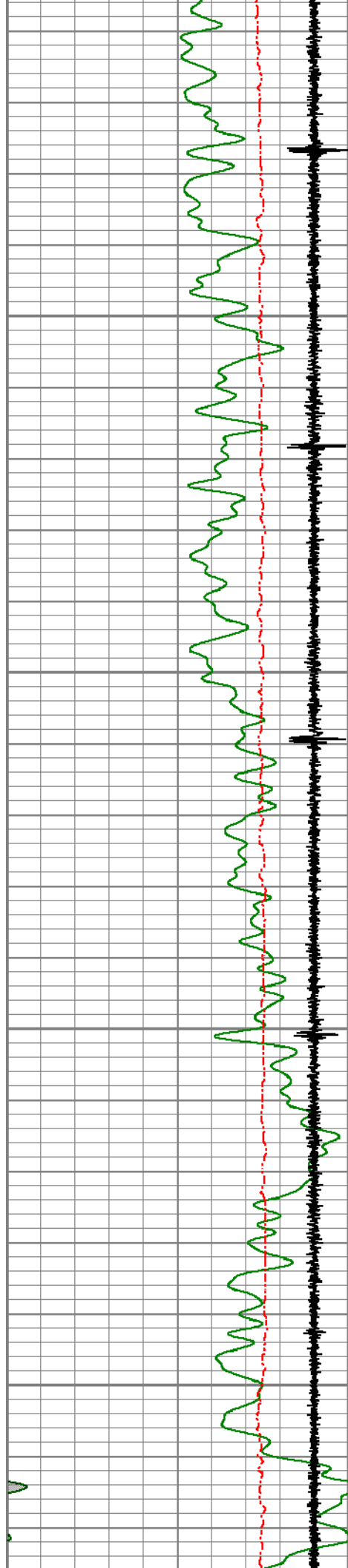
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6550

6600

6650



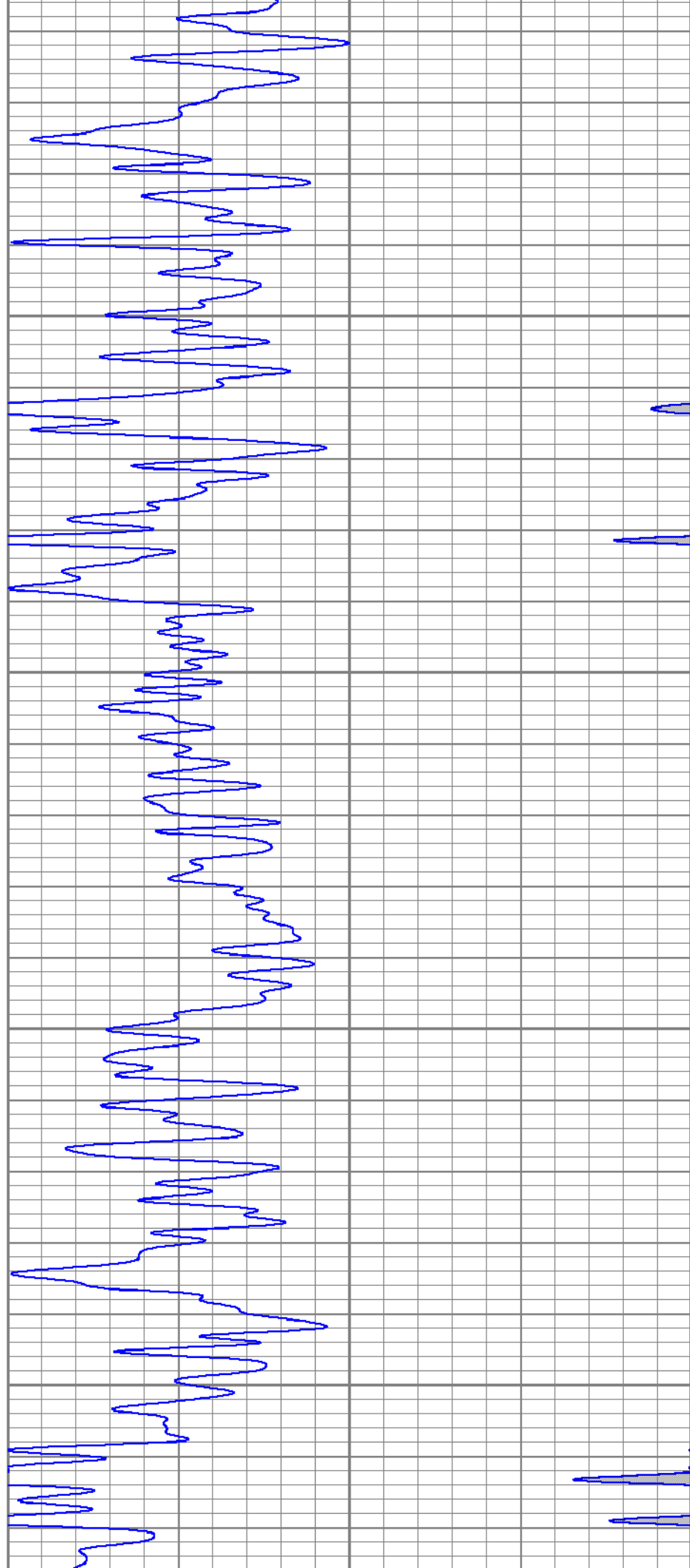


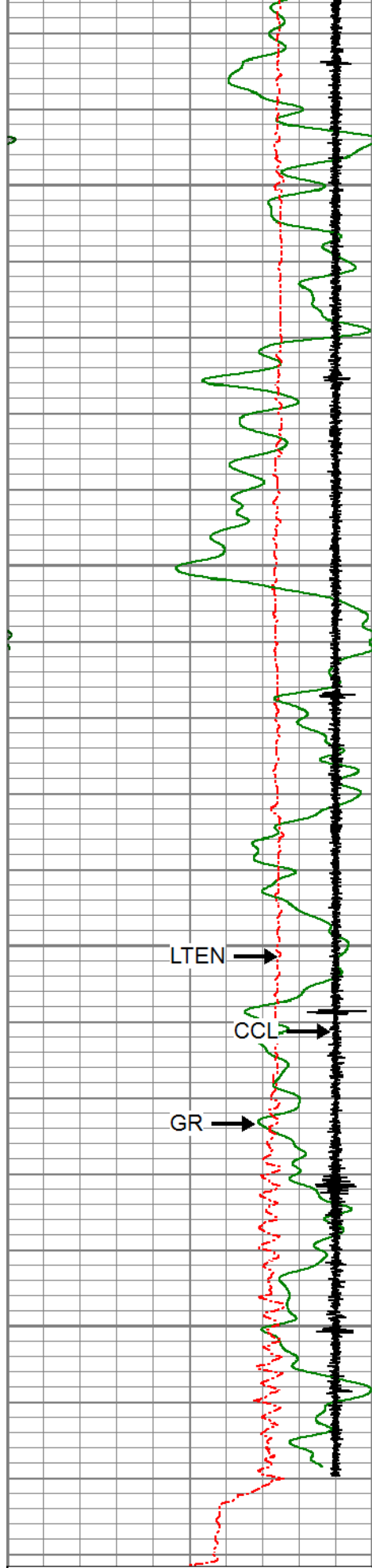
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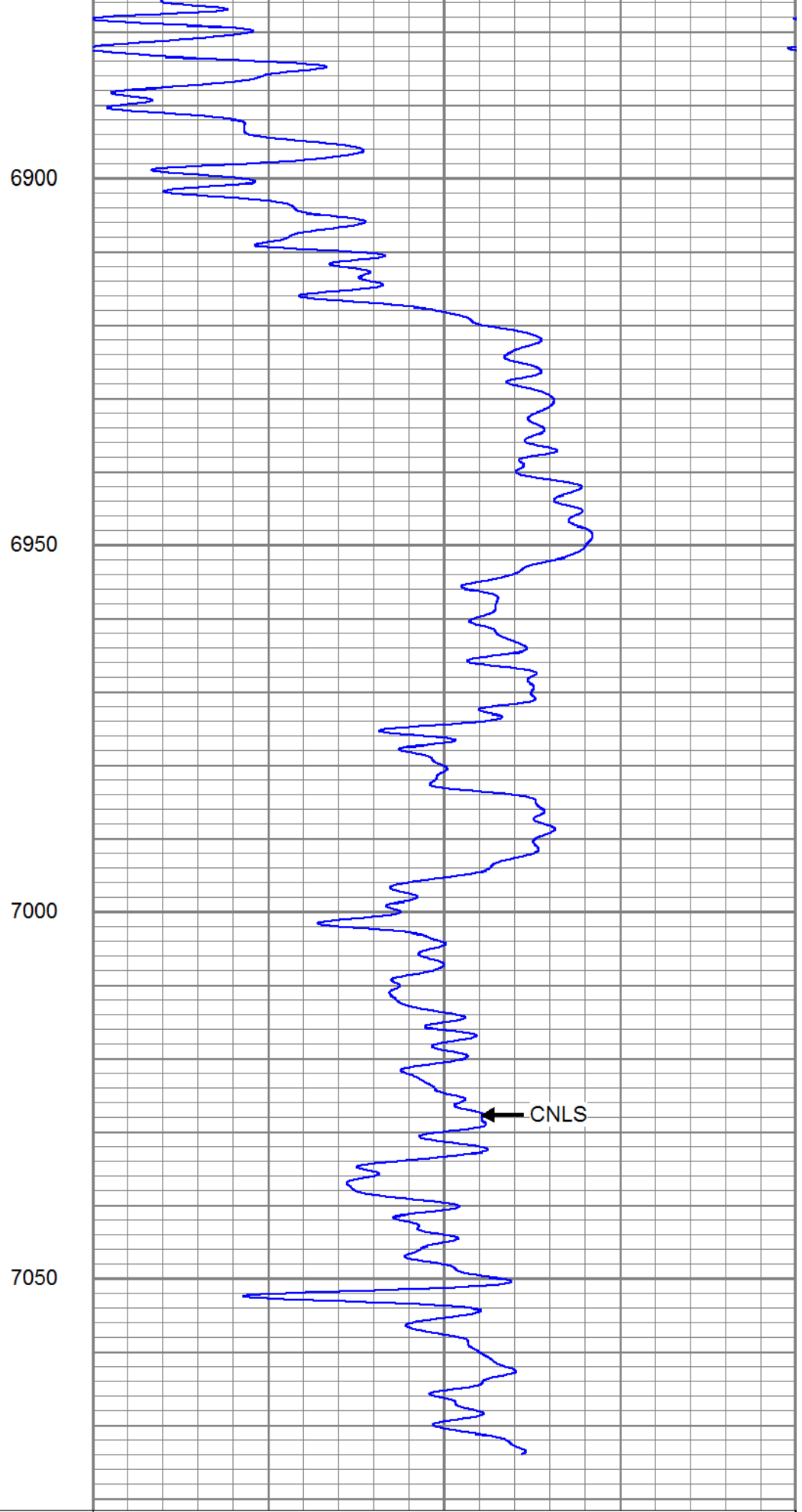
6800

6850





0	Gamma Ray (GAPI)	150
-9	Collars	1
150	Gamma Ray (GAPI)	300



40	CNPOR (pu)	0
80	CNPOR (pu)	40

0	LineTension (lb)	2000
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MAIN LOG

ZERO PSI APPLIED AT SURFACE



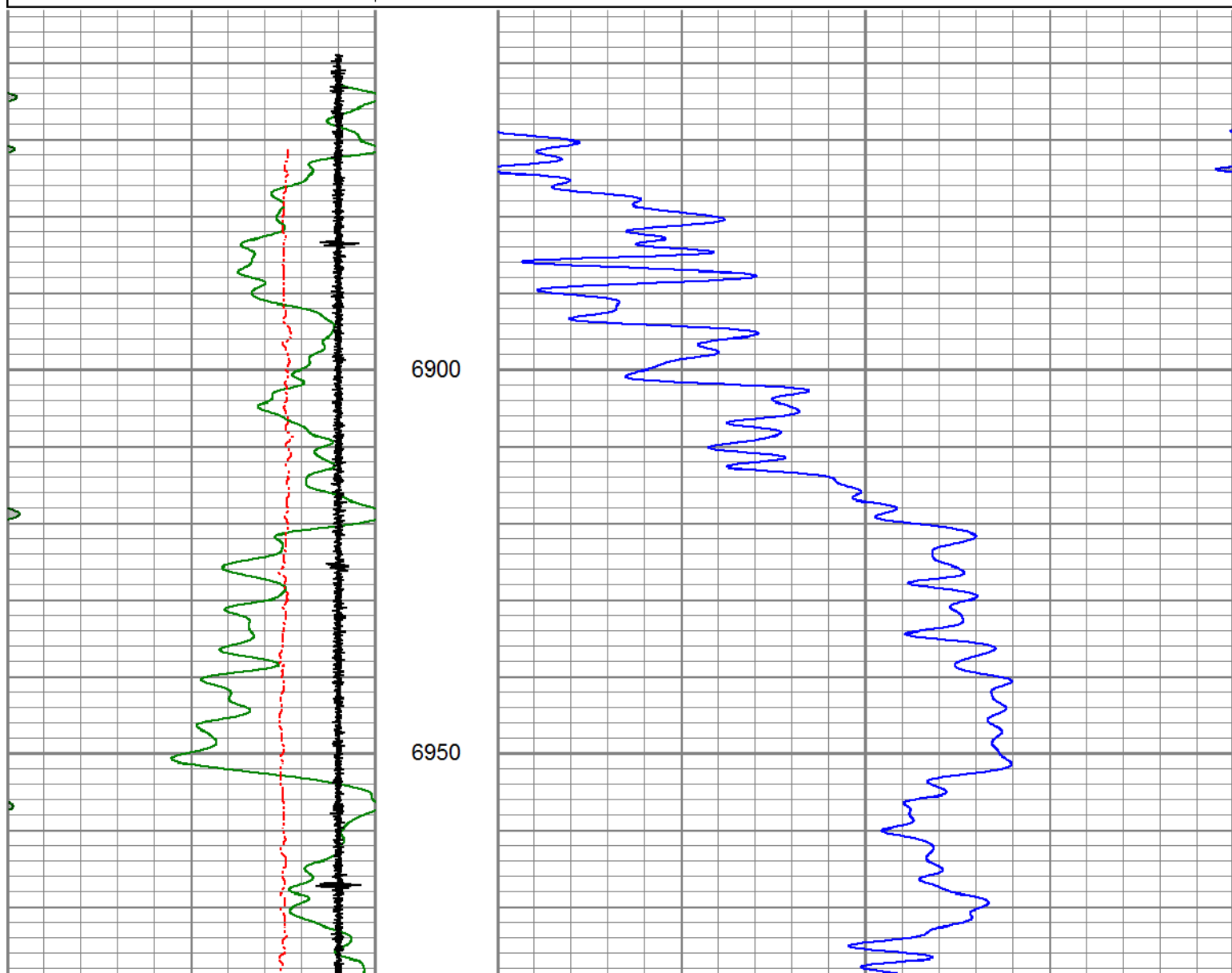
REPEAT SECTION

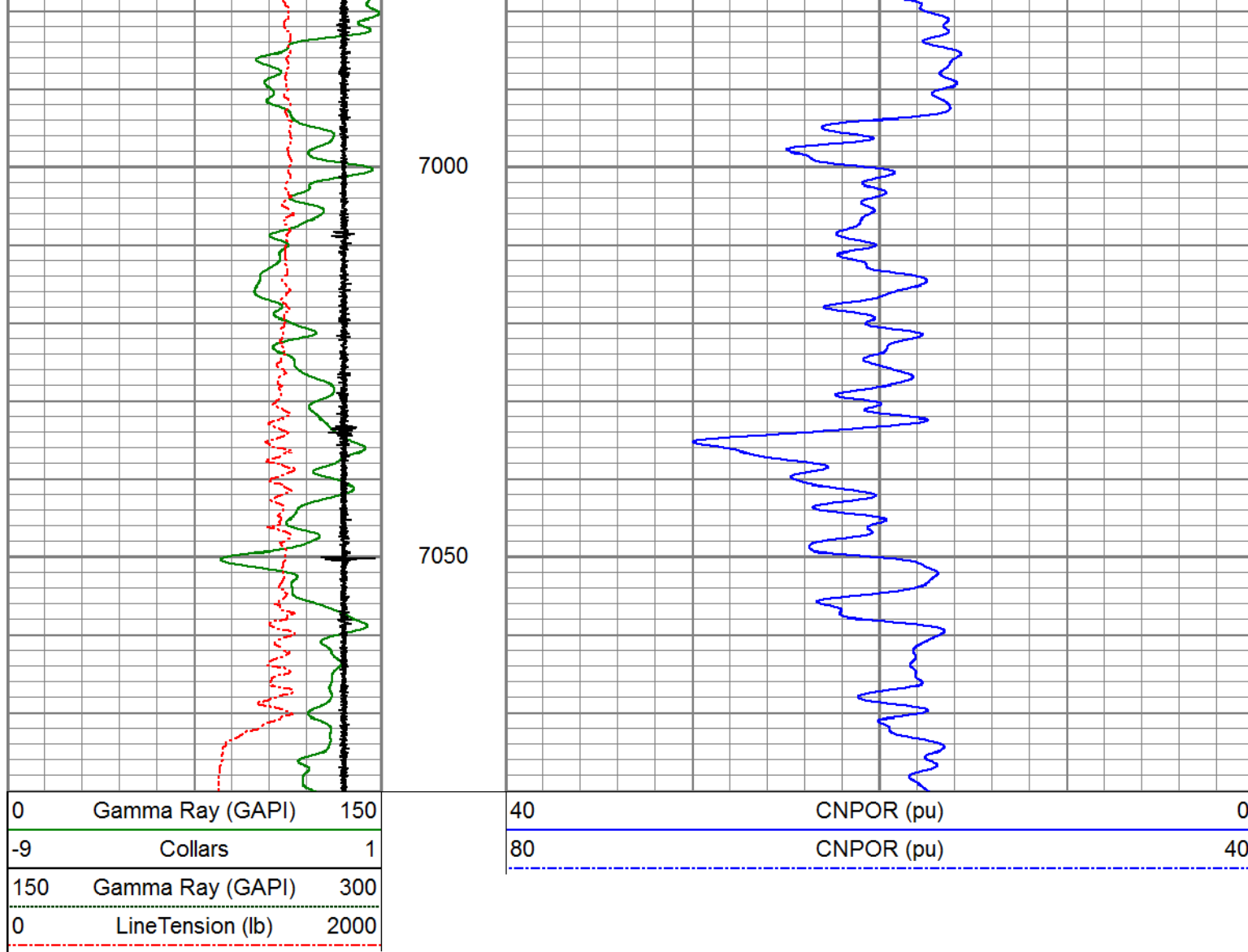
ZERO PSI APPLIED AT SURFACE

Database File pdc_harold_05123_20190225_scbl-cn1.db
Dataset Pathname pass6
Presentation Format pinr_cn1_co
Dataset Creation Mon Feb 25 13:23:55 2019
Charted by Depth in Feet scaled 1:240

0	Gamma Ray (GAPI)	150
-9	Collars	1
150	Gamma Ray (GAPI)	300
0	LineTension (lb)	2000

40	CNPOR (pu)	0
80	CNPOR (pu)	40






Database File		pdcc_harold_05123_20190225_scbi-cn1.db		
Dataset Pathname		pass6		
Dataset Creation		Mon Feb 25 13:23:55 2019		
Calibration Report				
Compensated Neutron Calibration Report				
Type / Serial:		PRB_DIG / 120508		
Source / Verifier:		/		
Temperature:				
SHOP CALIBRATION		Tue Nov 20 10:33:19 2012		
	Cal Tube	Units		
Tank Ratio		SS/LS		
Tank Porosity		pu		
LS Detector		cps		
SS Detector		cps		
Tool Ratio		SS/LS		
Tool Porosity		pu		
Tool Constant =				
Field Verifier	SS Detector	LS Detector	Ratio	Porosity

PRE-SURVEY VERIFICATION

	SS Detector	LS Detector	Ratio	Porosity		
POST-SURVEY VERIFICATION						
	SS Detector	LS Detector	Ratio	Porosity		
Gamma Ray Calibration Report						
Serial Number:	111212					
Tool Model:	275_6-PIN					
Performed:	Mon Feb 25 13:01:04 2019					
Calibrator Value:	1.0	GAPI				
Background Reading:	0.0	cps				
Calibrator Reading:	1.0	cps				
Sensitivity:	0.6800	GAPI/cps				
Segmented Cement Bond Log Calibration Report						
Serial Number:	FW1411-67-T					
Tool Model:	RBL-DCT					
Calibration Casing Diameter:	5.500	in				
Calibration Depth:	2891.410	ft				
Master Calibration, performed Mon Feb 25 13:05:01 2019:						
	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	0.006	1.358	2.200	71.921	51.551	1.905
CAL	0.018	1.493				
5'	0.001	1.269	2.200	71.921	55.006	2.144
SUM						
S1	0.003	1.244	0.000	100.000	80.581	-0.229
S2	0.005	1.285	0.000	100.000	78.115	-0.392
S3	0.005	1.319	0.000	100.000	76.081	-0.370
S4	0.003	1.452	0.000	100.000	68.992	-0.179
S5	0.001	1.561	0.000	100.000	64.095	-0.052
S6	0.001	1.530	0.000	100.000	65.396	-0.060
S7	0.001	1.421	0.000	100.000	70.423	-0.077
S8	0.001	1.320	0.000	100.000	75.781	-0.068
Air Zero Calibration, performed Mon Feb 25 12:18:55 2019:						
	Raw (v)		Calibrated (v)		Results	
	Zero		Zero		Offset	
3'	0.000		0.000		0.000	
5'	0.000		0.000		0.000	
SUM						
S1	0.000		0.000		0.000	
S2	0.000		0.000		0.000	
S3	0.000		0.000		0.000	
S4	0.000		0.000		0.000	
S5	0.000		0.000		0.000	
S6	0.000		0.000		0.000	

S7	0.000	0.000	0.000
S8	0.000	0.000	0.000

Temperature Calibration Report			
Serial Number:	FW1411-67-T		
Tool Model:	RBL-DCT		
Performed:	(Not Performed)		
	Reference	Reading	
Low Reference:	0.00 degF	0.00	degF
High Reference:	1.00 degF	1.00	degF
Gain:	1.00		
Offset:	0.00		
Delta Spacing	1		

 PIONEER Pioneer Energy Services	Company	PDC ENERGY INC.
	Well	HAROLD 6X-202
	Field	WATTENBERG
	County	WELD
	State	COLORADO