



**ARRAY INDUCTION  
GAMMA RAY  
MEMORY LOG**

Company SANDRIDGE ENERGY  
Well HOPKINS 1-14H  
Field KANSAS / WALDRON  
County HARPER  
State KANSAS

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Well HOPKINS 1-14H  
Field KANSAS / WALDRON  
County HARPER State KANSAS

Location: API #: 15077217910000  
SURF LOC: 200' FSL & 660' FEEL OF SE/4  
SEC 14 TWP 35S RGE 7W  
Permanent Datum G.L. Elevation 1330'  
Log Measured From D.F. 16' ABOVE PERM DATUM  
Drilling Measured From D.F.  
Other Services  
THRUBIT  
PORTAL BIT  
Elevation  
K.B. 1346'  
D.F. 1346'  
G.L. 1330'

Date	09 APRIL 2012
Run Number	ONE
Depth Driller	12589'
Depth Logger	12565'
Bottom Logged Interval	12554'
Top Log Interval	3300'
Casing Driller	7" @ 5360'
Casing Logger	7" @ 5365'
Bit Size	6.125"
Type Fluid In Hole	WBM
Density / Viscosity	8.50 / 28
pH / Fluid Loss	9.0 / NA
Source of Sample	MUD PIT
Rm @ Meas. Temp	1.1 OHMS@72 DEGF
Rmf @ Meas. Temp	0.8 OHMS@72 DEGF
Rmc @ Meas. Temp	1.4 OHMS@72 DEGF
Source of Rmf / Rmc	CALCULATED
Rm @ BHT	55 OHMS@ 151 DEG
Time Circulation Stopped	20:30 09APRIL2012
Time Logger on Bottom	22:10 09APRIL2012
Maximum Recorded Temperature	151 DEGF
Equipment Number	T004
Location	OKC. OK
Recorded By	D. THOMAS
Witnessed By	BRENT SEGREST
	PHILLIP GARCIA

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All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, 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. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

**Comments**

SERVICE: LEVEL 4 - MEMORY PUMP DOWN - BIT DEPTH: 12503' LOG TO: 3300'  
ALL SCALES AND PRESENTATIONS PER CLIENT REQUEST  
LIMESTONE MATRIX, 2.71 G/CC, USED TO CALCULATE POROSITIES  
TOOL STRING RAN WITH EVANS SWIVEL, S. DECENTRALIZER, NO STANDOFFS  
TBHV = TOTAL BOREHOLE VOLUME, FT3  
ABHV = ANNULAR BOREHOLE VOLUME, FT3, CALCULATED FOR 4.50" CSG  
RIGMINDER LITE AND PASON USED TO CREATE LOG DEPTH  
LOG DEPTH CORRELATED TO MWD GAMMA AT CUSTOMERS REQUEST

RIG: UNIT # 310  
CREW: D. THOMAS/T. DENNIS/J. DOTY

Service Ticket No. 1059      API No. 15077217910000      PGM Ver WARRIOR 7.0

The Well Name, Location, Borehole Description, and / or Cementing Data Furnished by Client

**EQUIPMENT DATA**

GAMMA RAY      NEUTRON      DENSITY      INDUCTION

Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	PS21T	Serial No.	PS27N	Serial No.	PS30D	Serial No.	PS12R
Model No.	PS	Model No.	PS	Model No.	PS	Model No.	PS
Diameter	2.125"	Diameter	2.125"	Diameter	2.125"	Diameter	2.125"

LOGGING DATA

General Data

Pass	Depths		Well Head	Speed	Logging Run Comments		
No.	From	To	Pressure	Ft/Min			
ONE	12565'	3300'		30			

	GAMMA RAY		NEUTRON		DENSITY		INDUCTION	
Pass	Scale		Scale		Scale		Scale	
No.	L	R	L	R	L	R	L	L
ONE	0 API	150 API	-10 %	30 %	-10 %	30 %	0.2 OHMS-M	2000 OHM-M

DIRECTIONAL INFORMATION

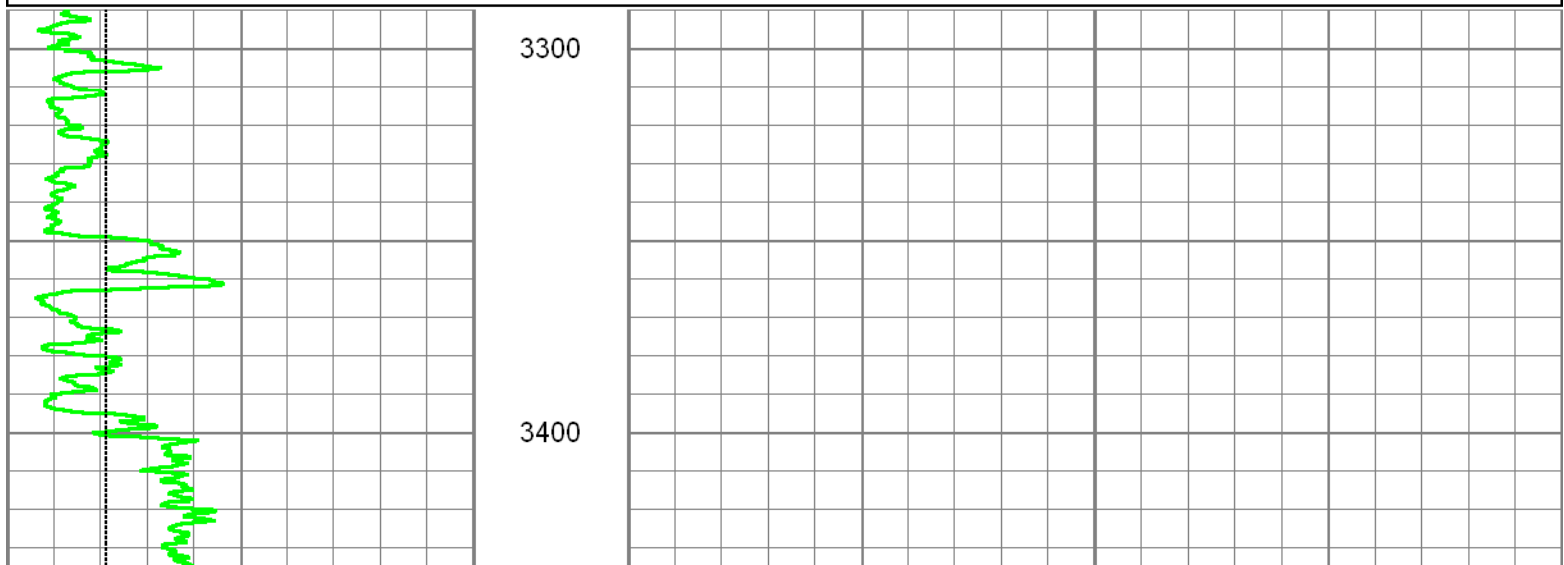
Maximum Deviation	95.4	deg. @	8396'	KOP	3971'	
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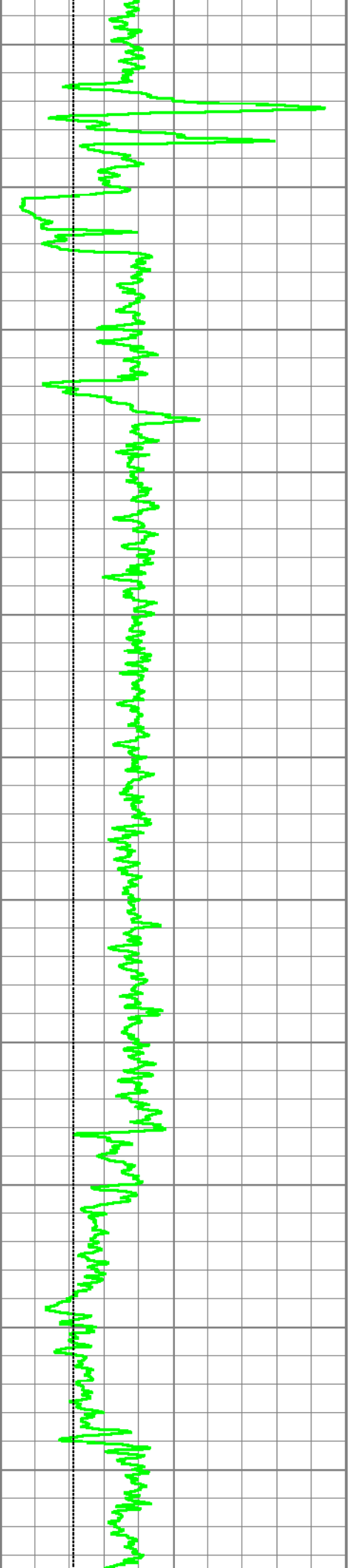


# MAIN PASS

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 Dataset Pathname: proc1/pass1.4  
 Presentation Format: 6\_2r\_chk  
 Dataset Creation: Tue Apr 10 09:51:08 2012  
 Charted by: Depth in Feet scaled 1:600

0	GR (GAPI)	150	50	20in 2ft Res (Ohm-m)	500	
4	DCAL (in)	14	50	90in 2ft Res (Ohm-m)	500	
-5	ACCY	5	1000	DEEP COND (mmho/m)		0
4	BOREID (in)	14	0	20in 2ft Res (Ohm-m)	50	
GRTEMP (degF)			0	90in 2ft Res (Ohm-m)	50	





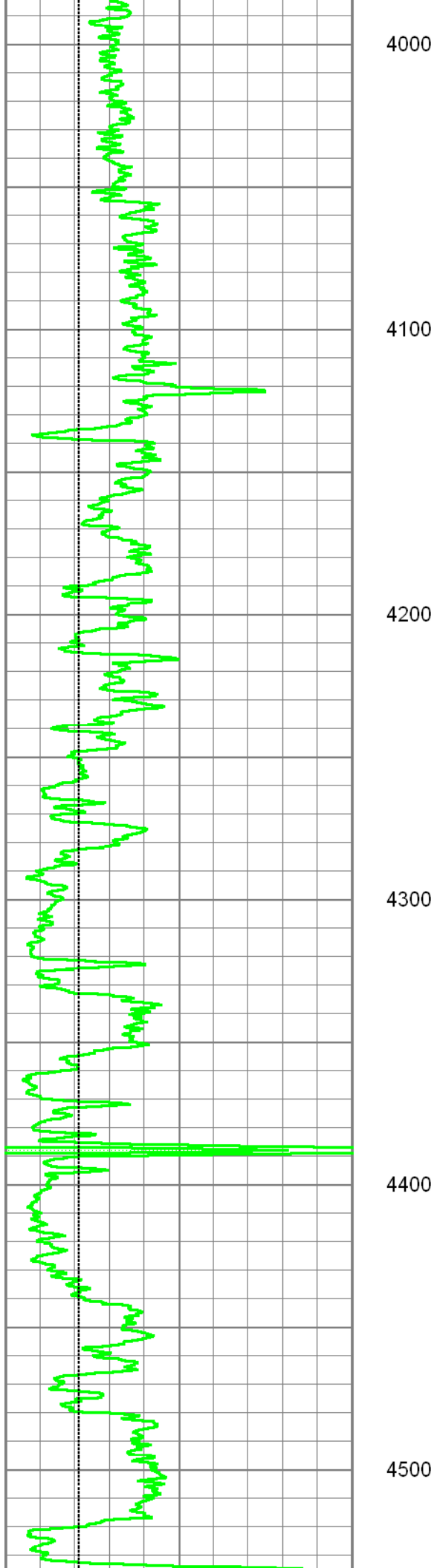
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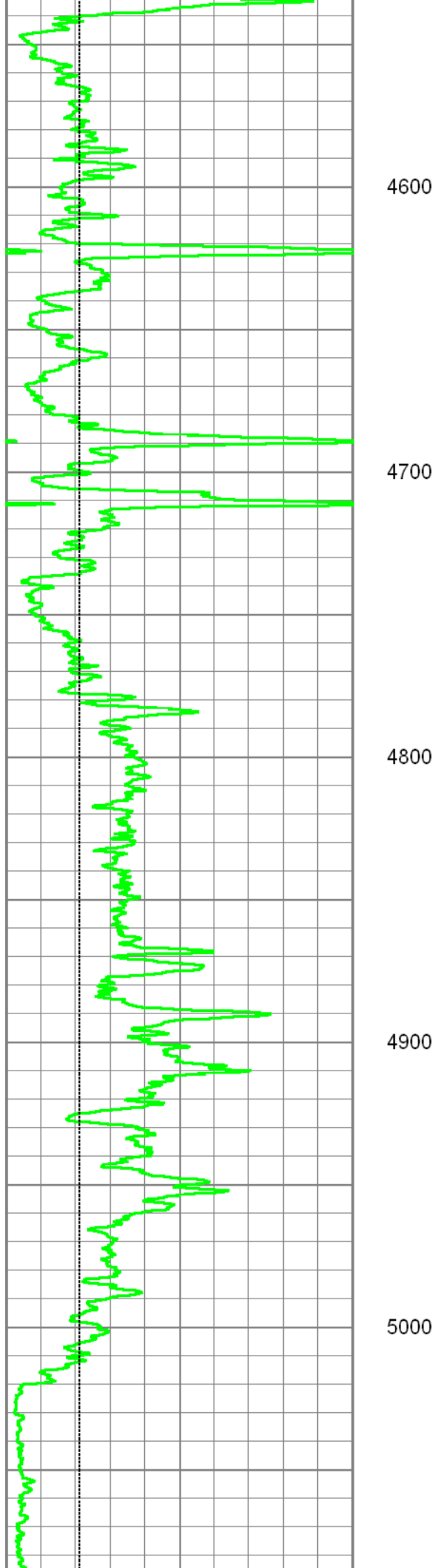
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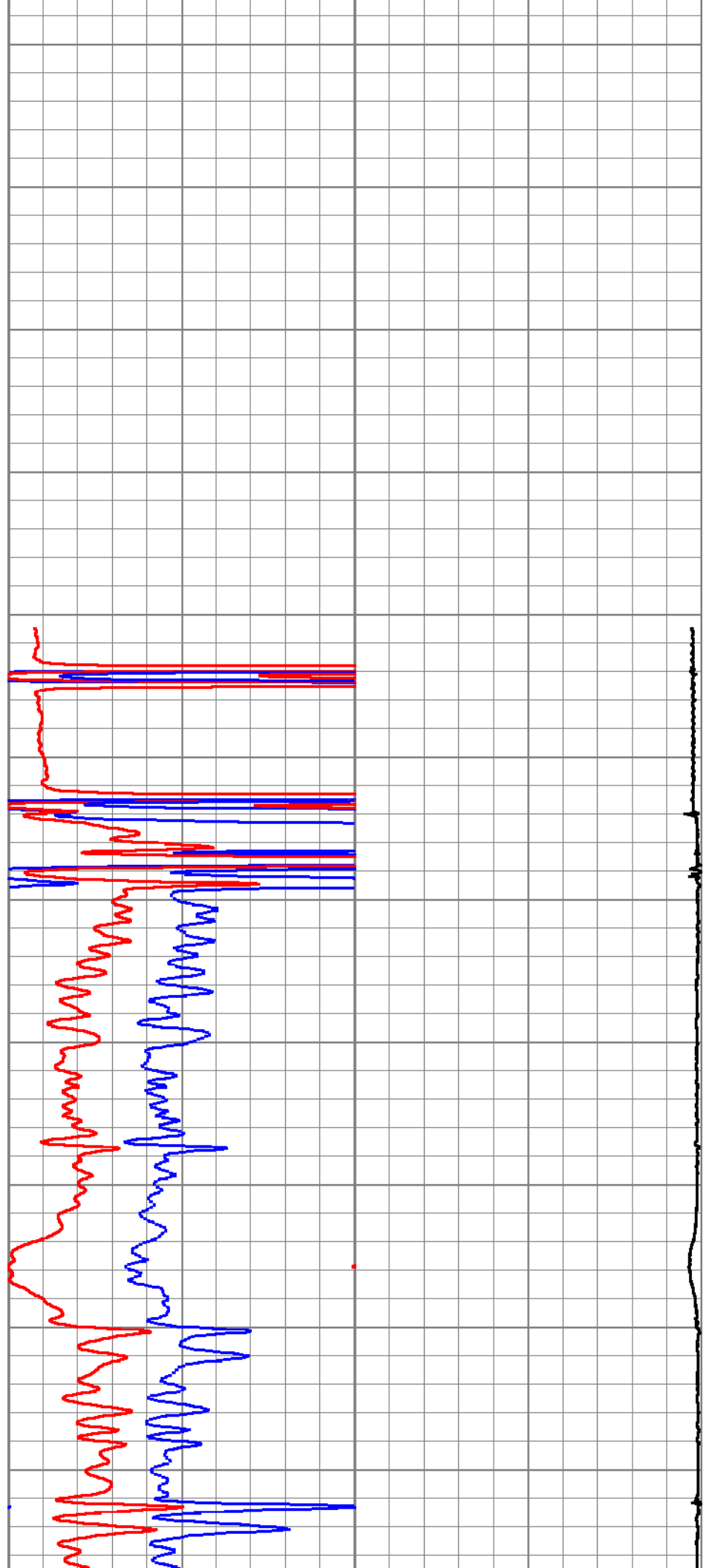
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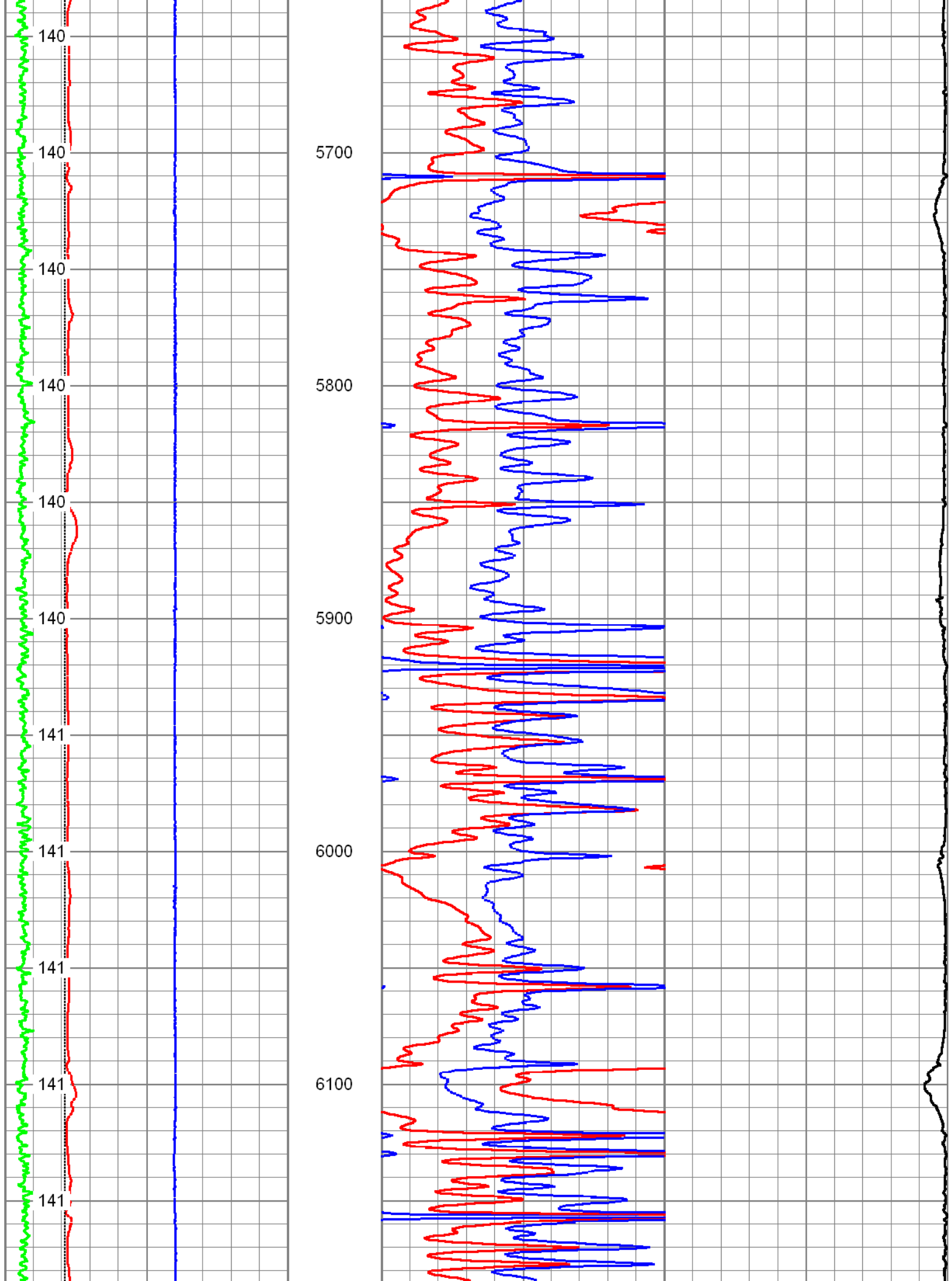
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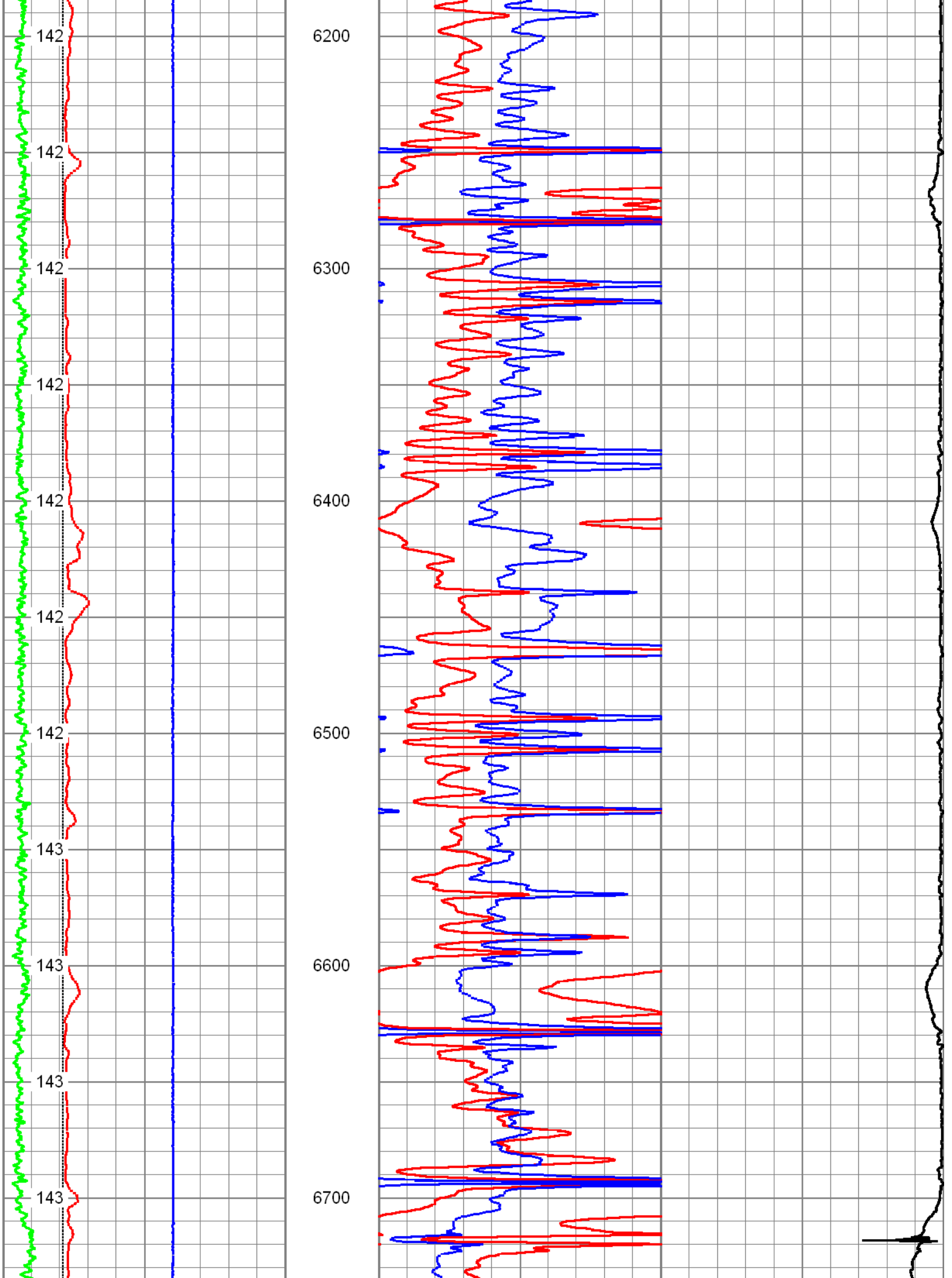
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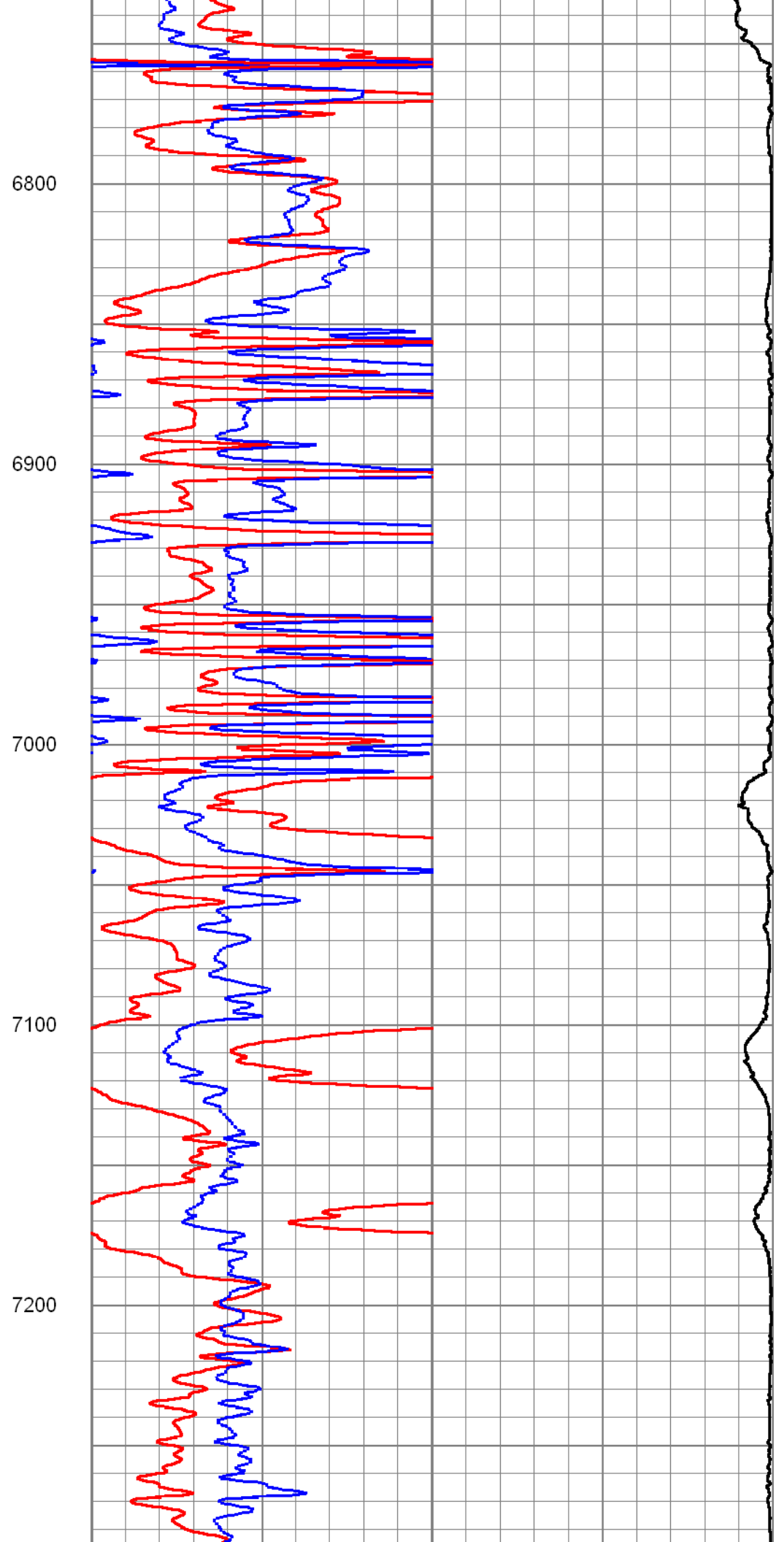
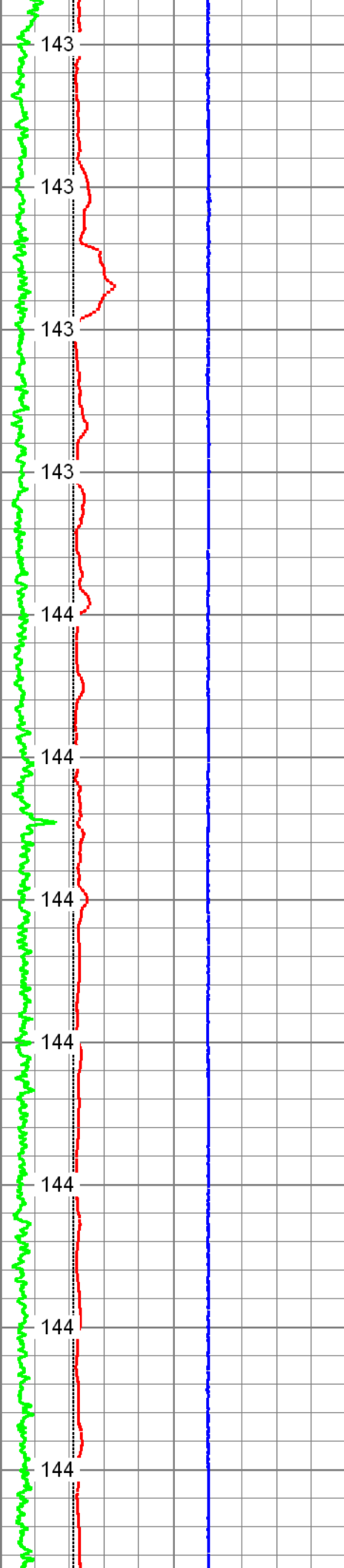
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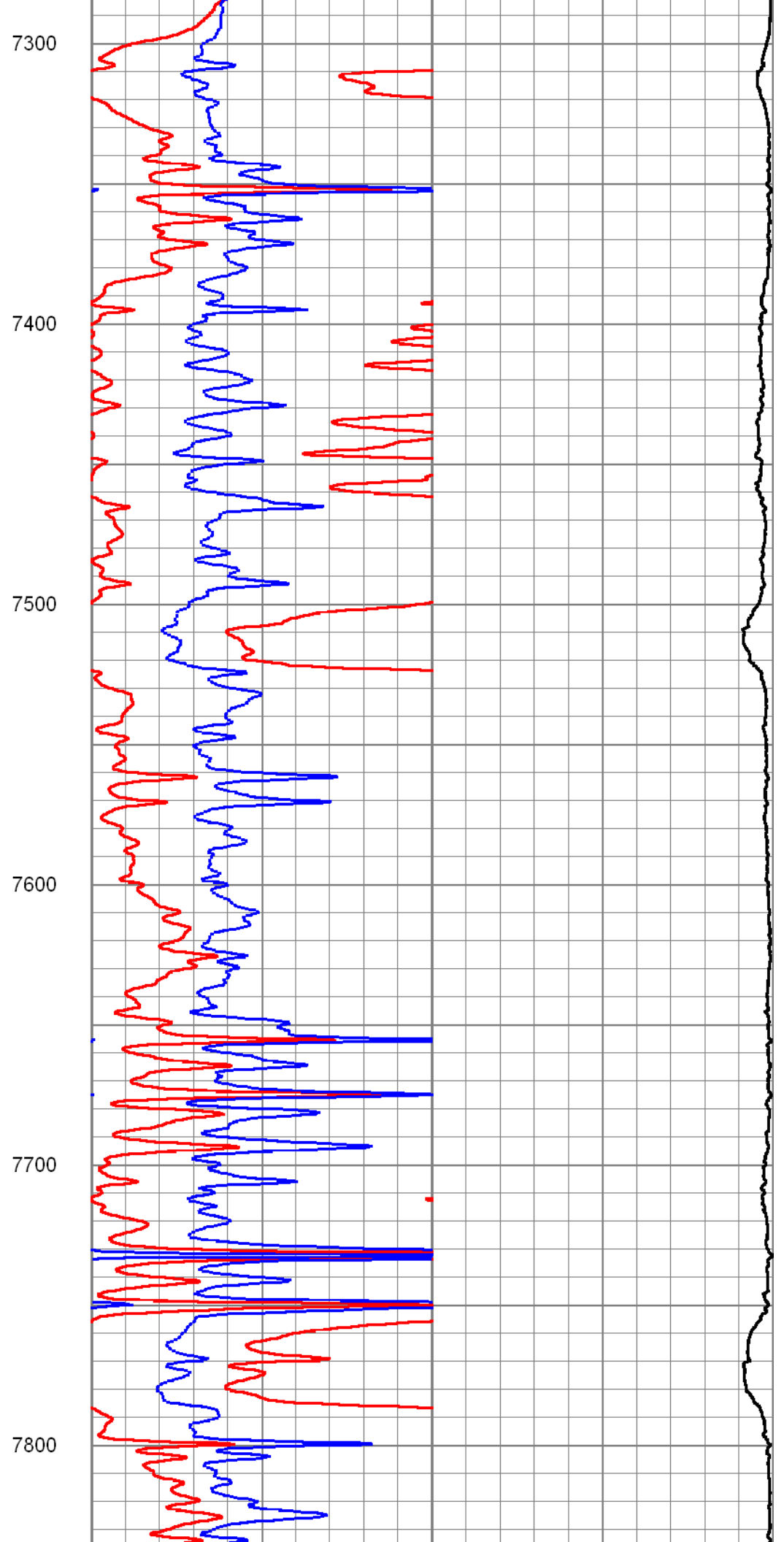
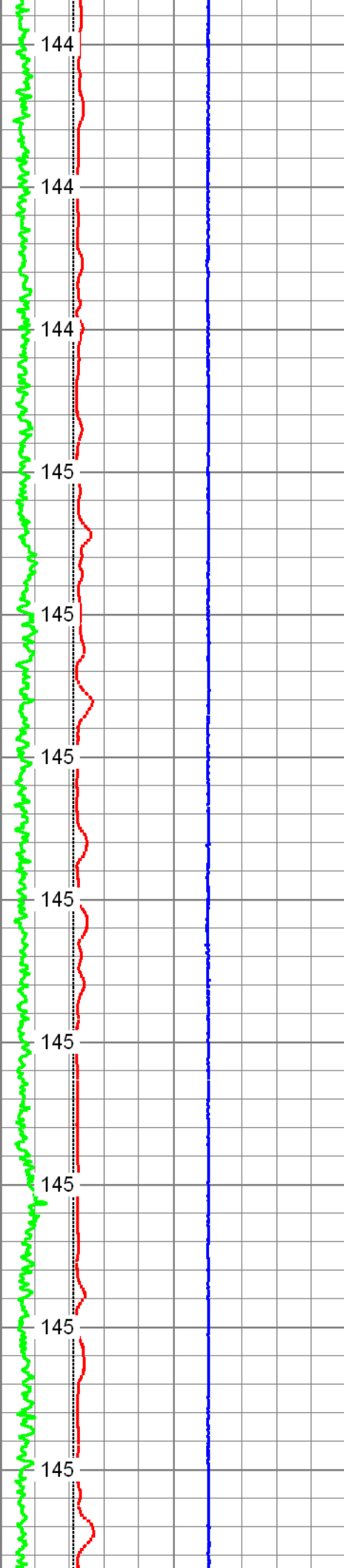


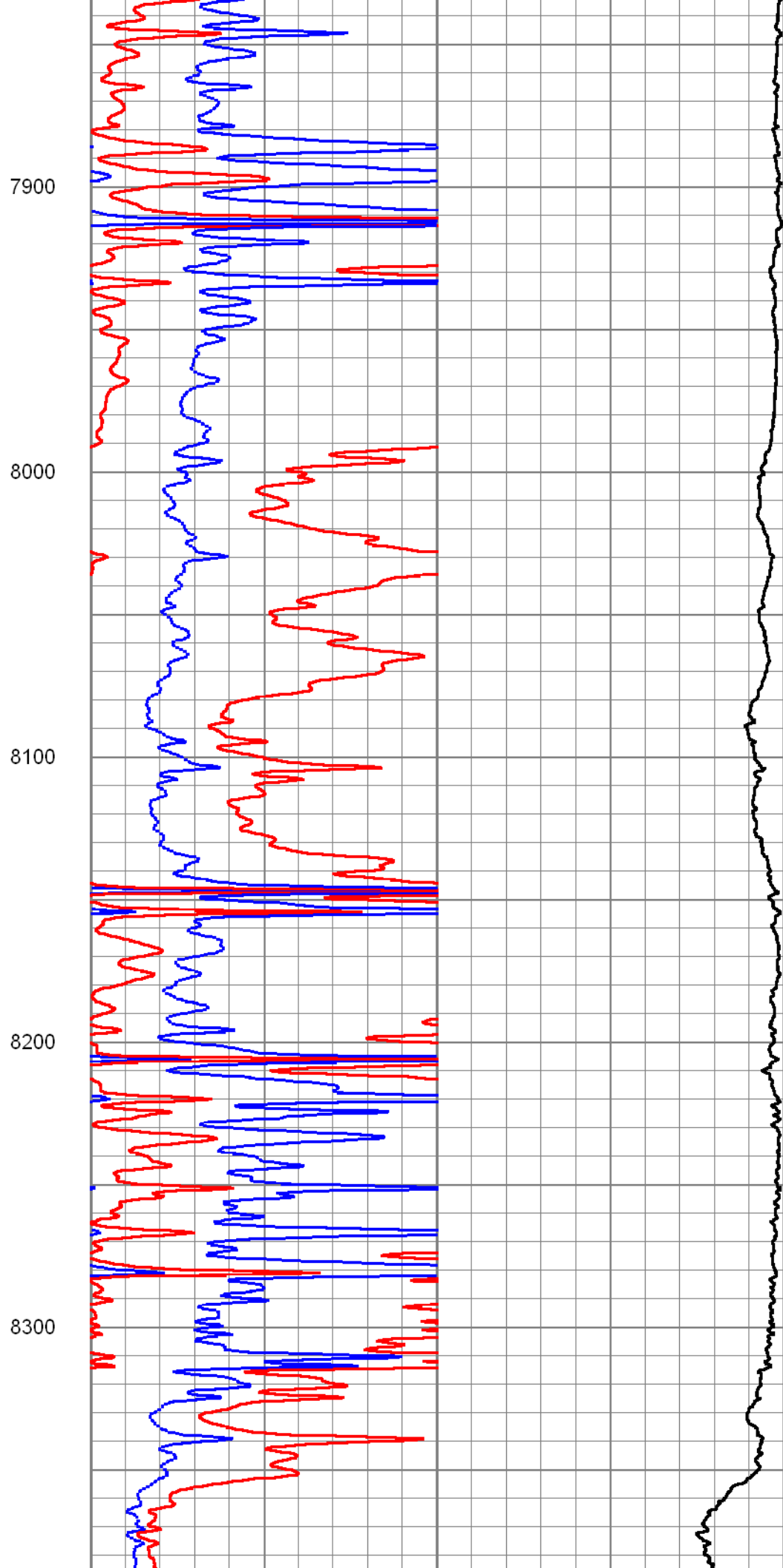
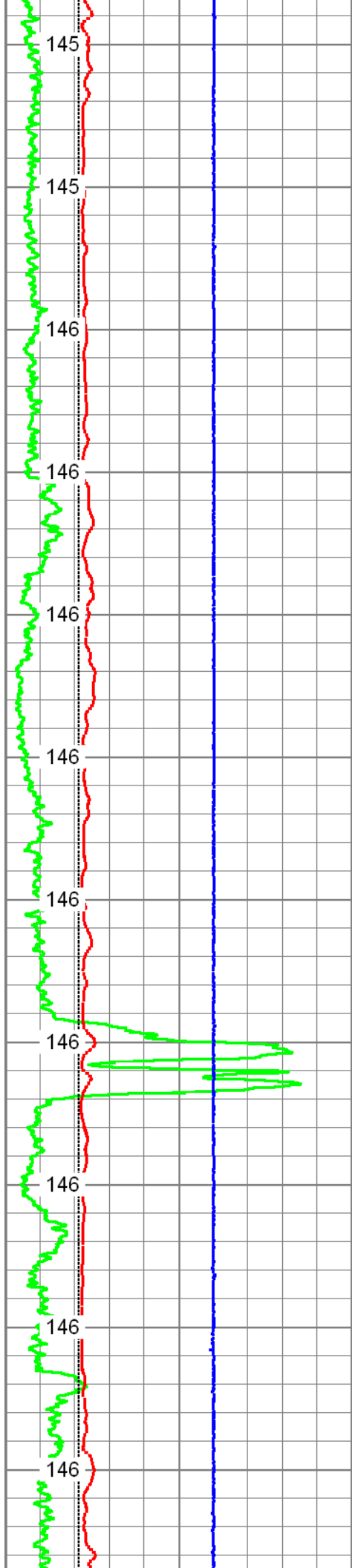


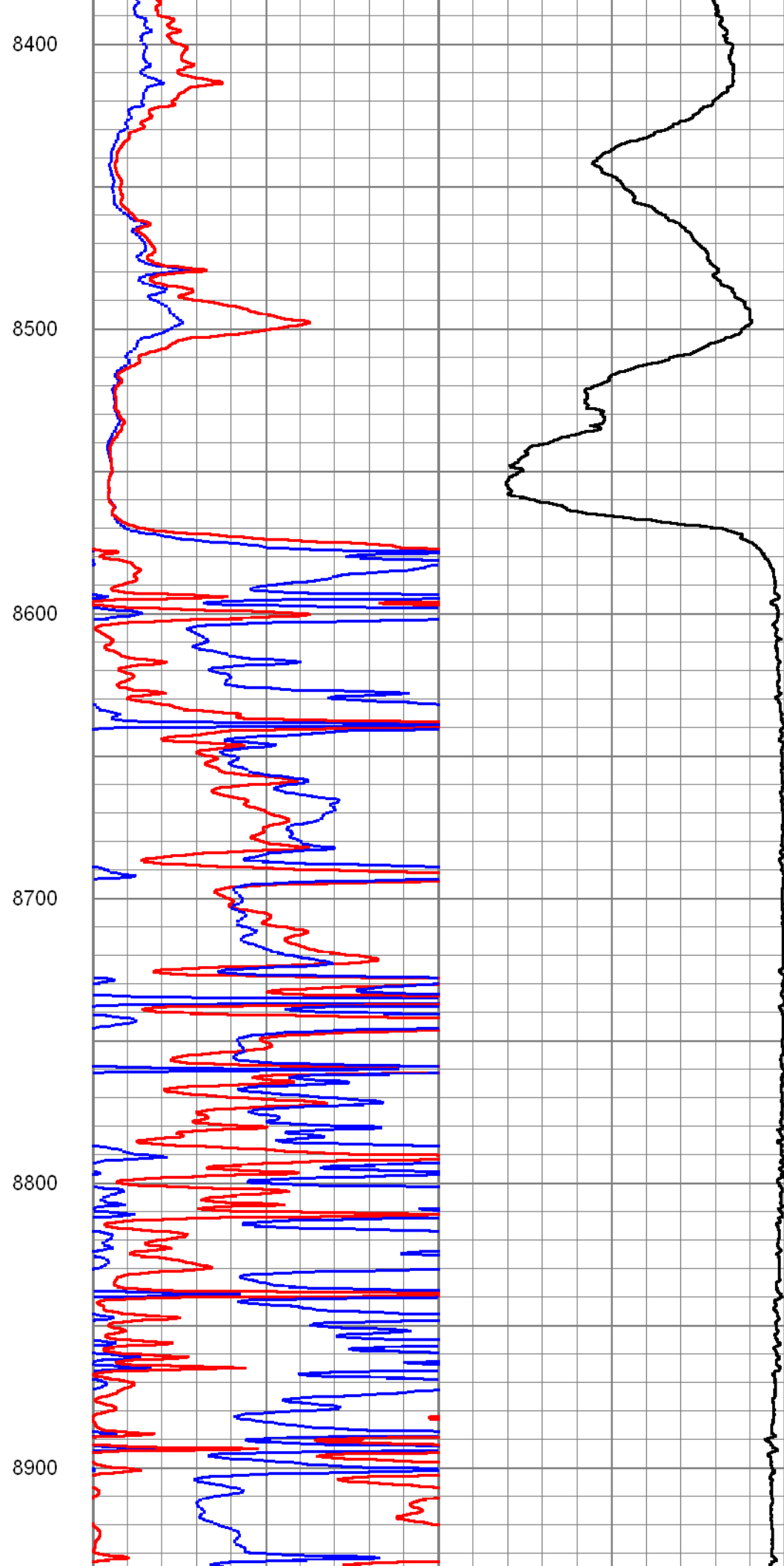
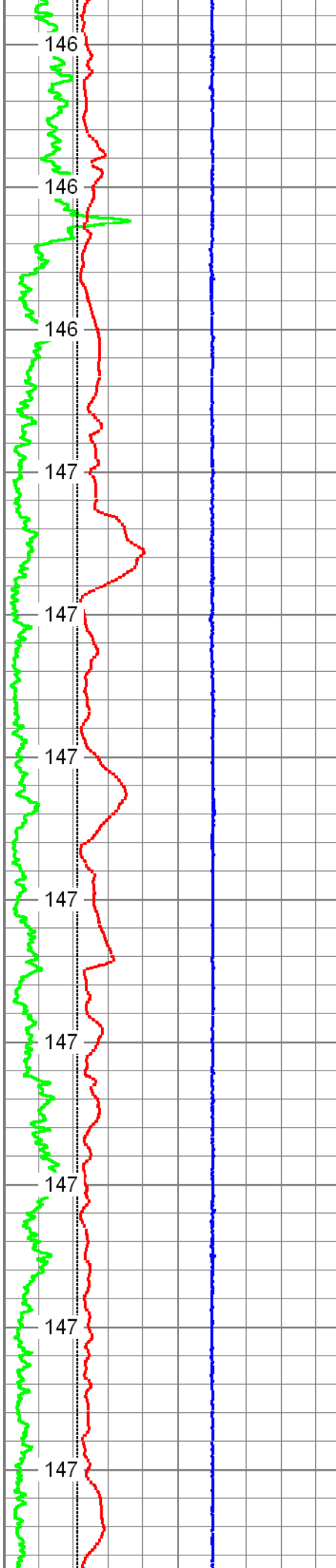


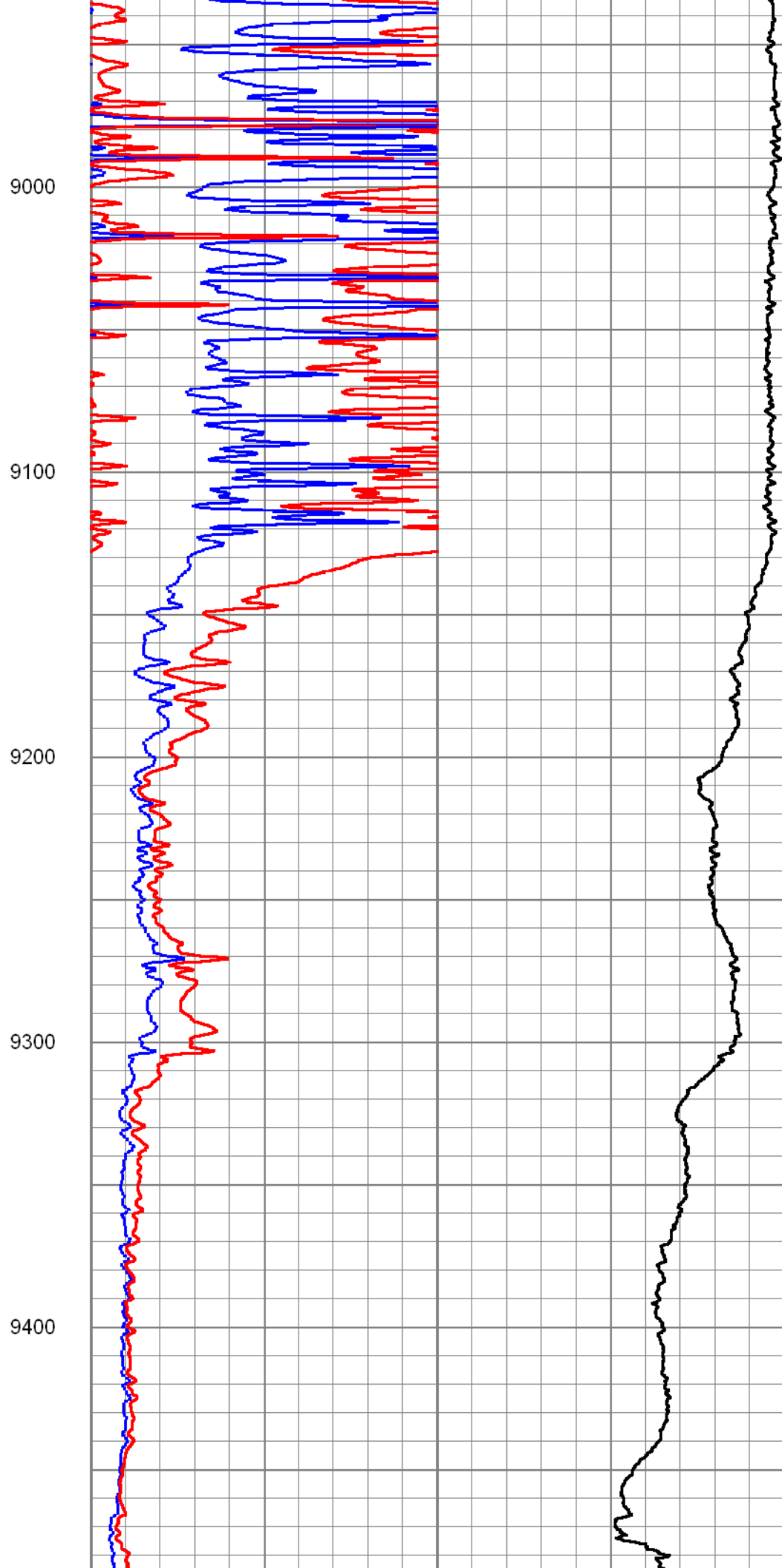
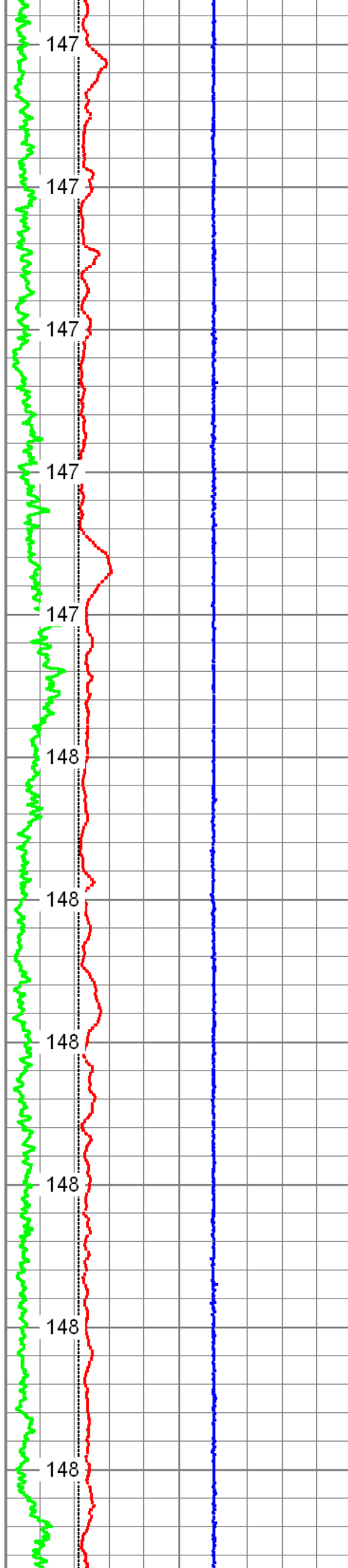


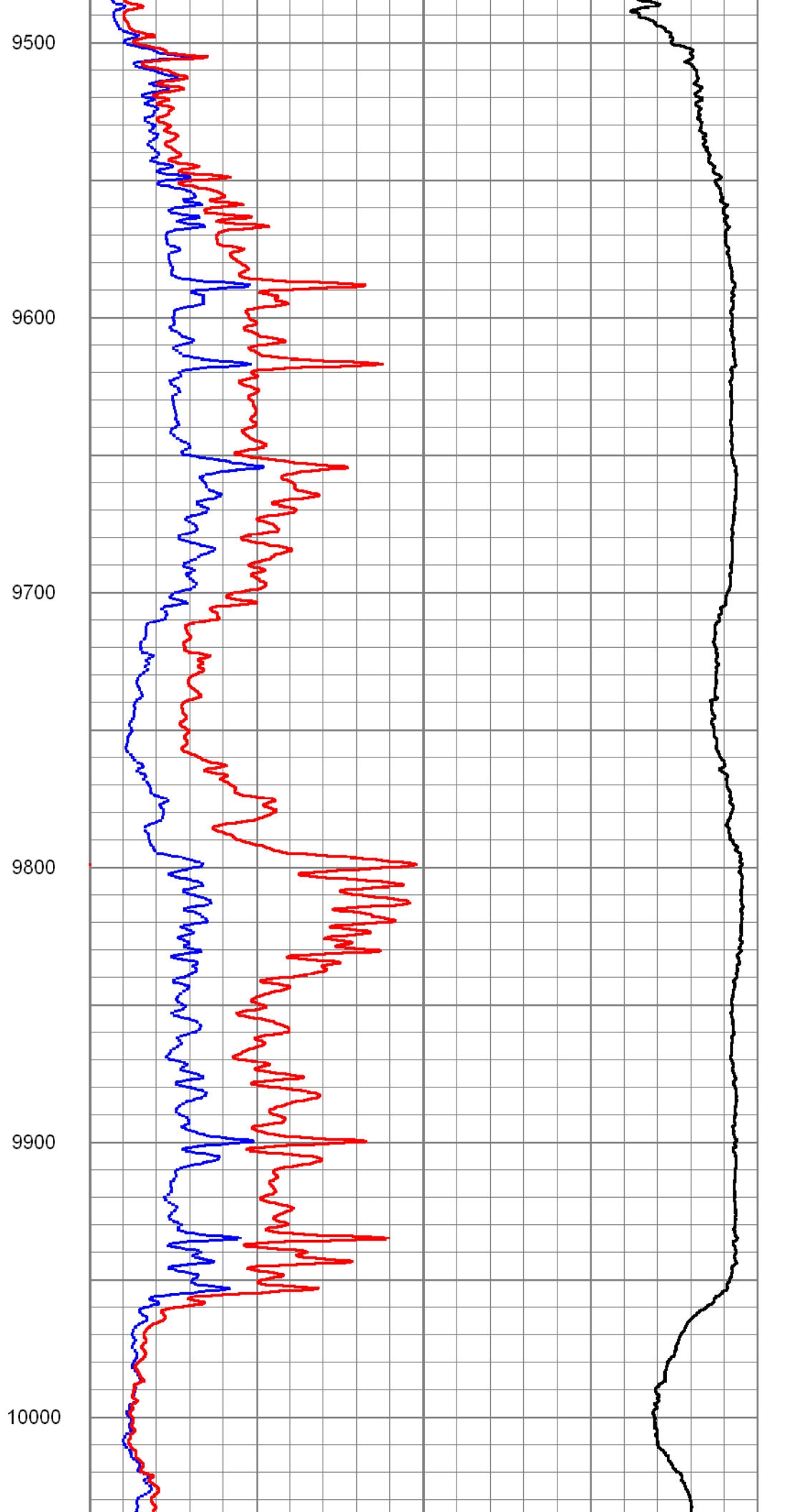
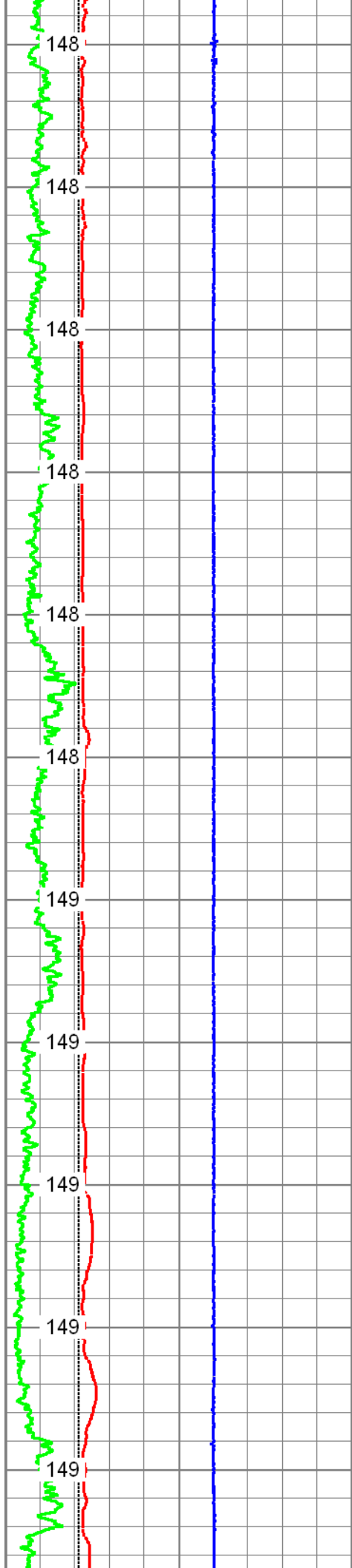


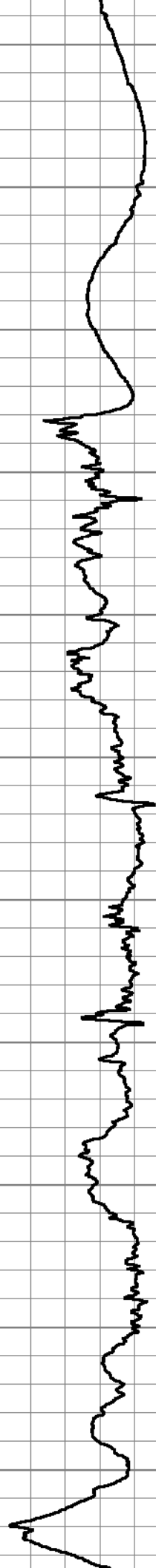
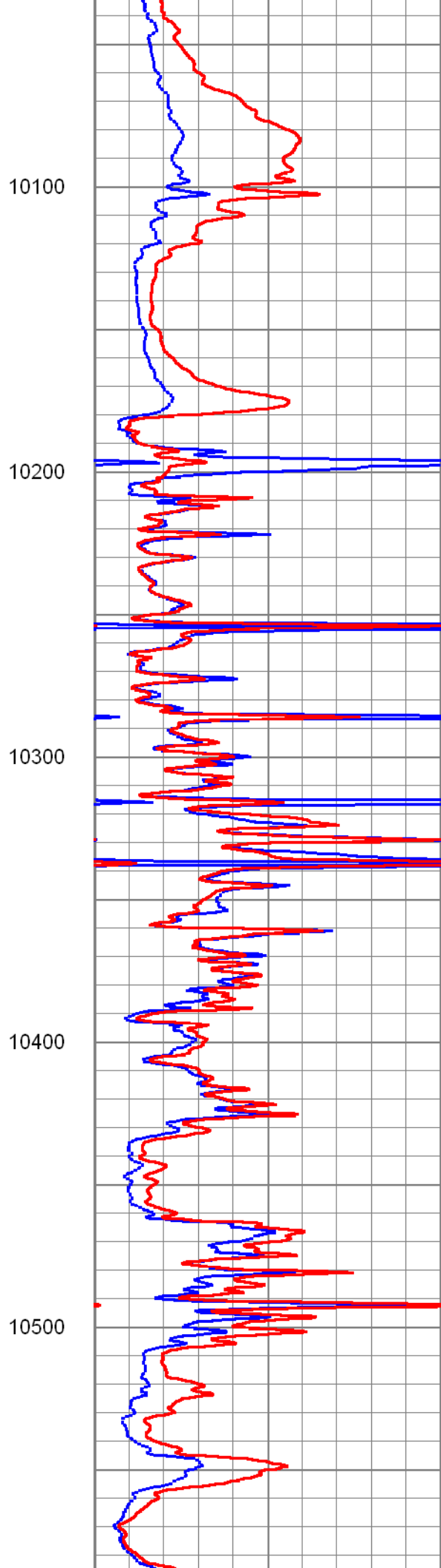
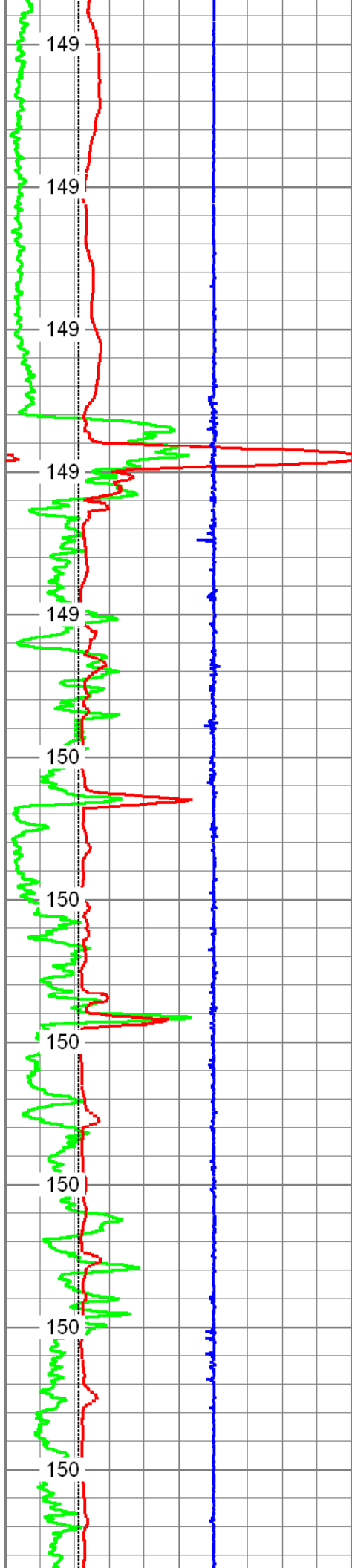


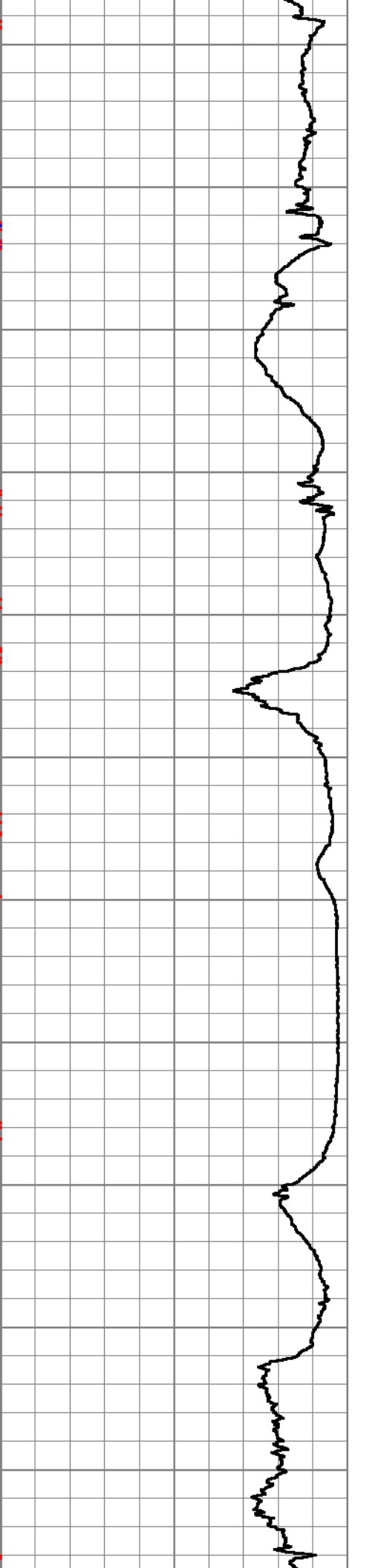
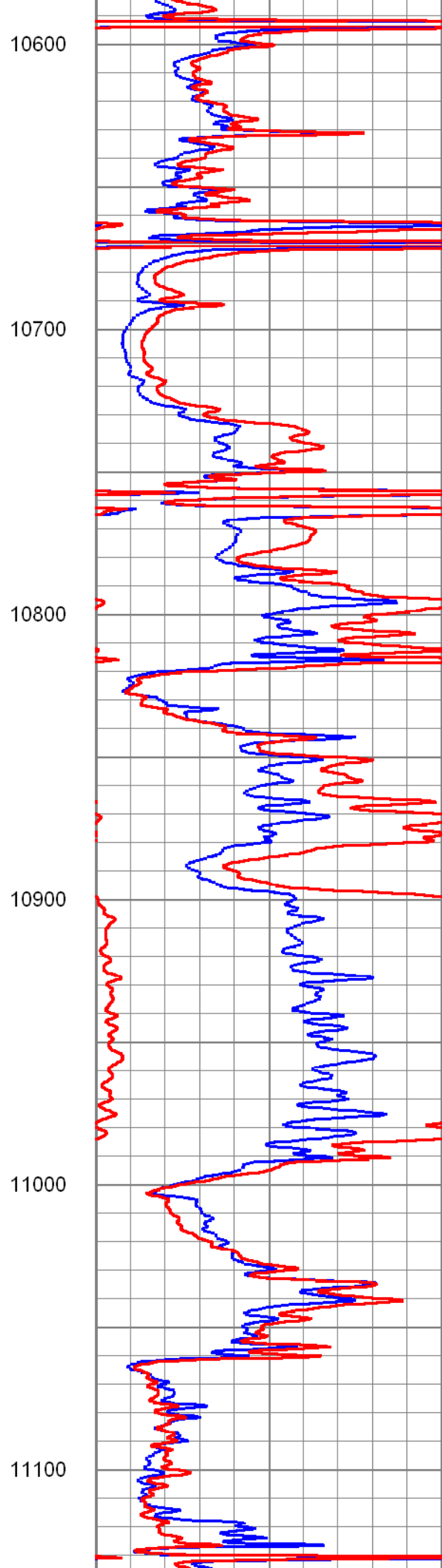
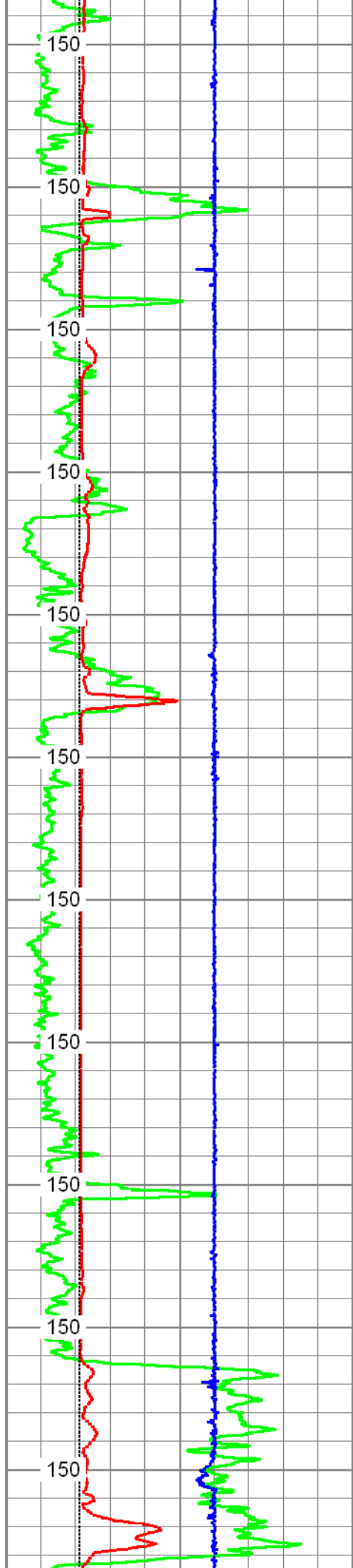




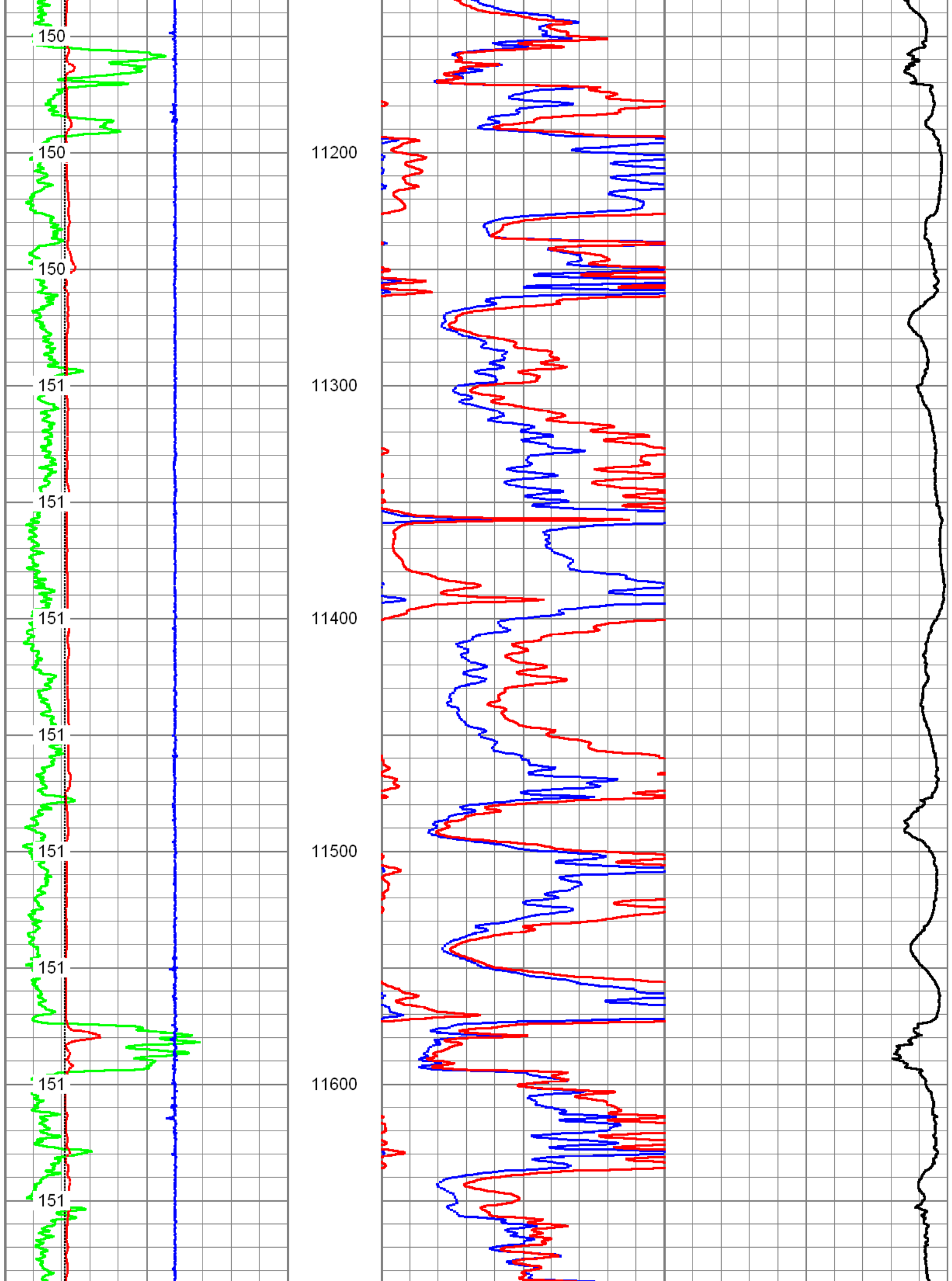


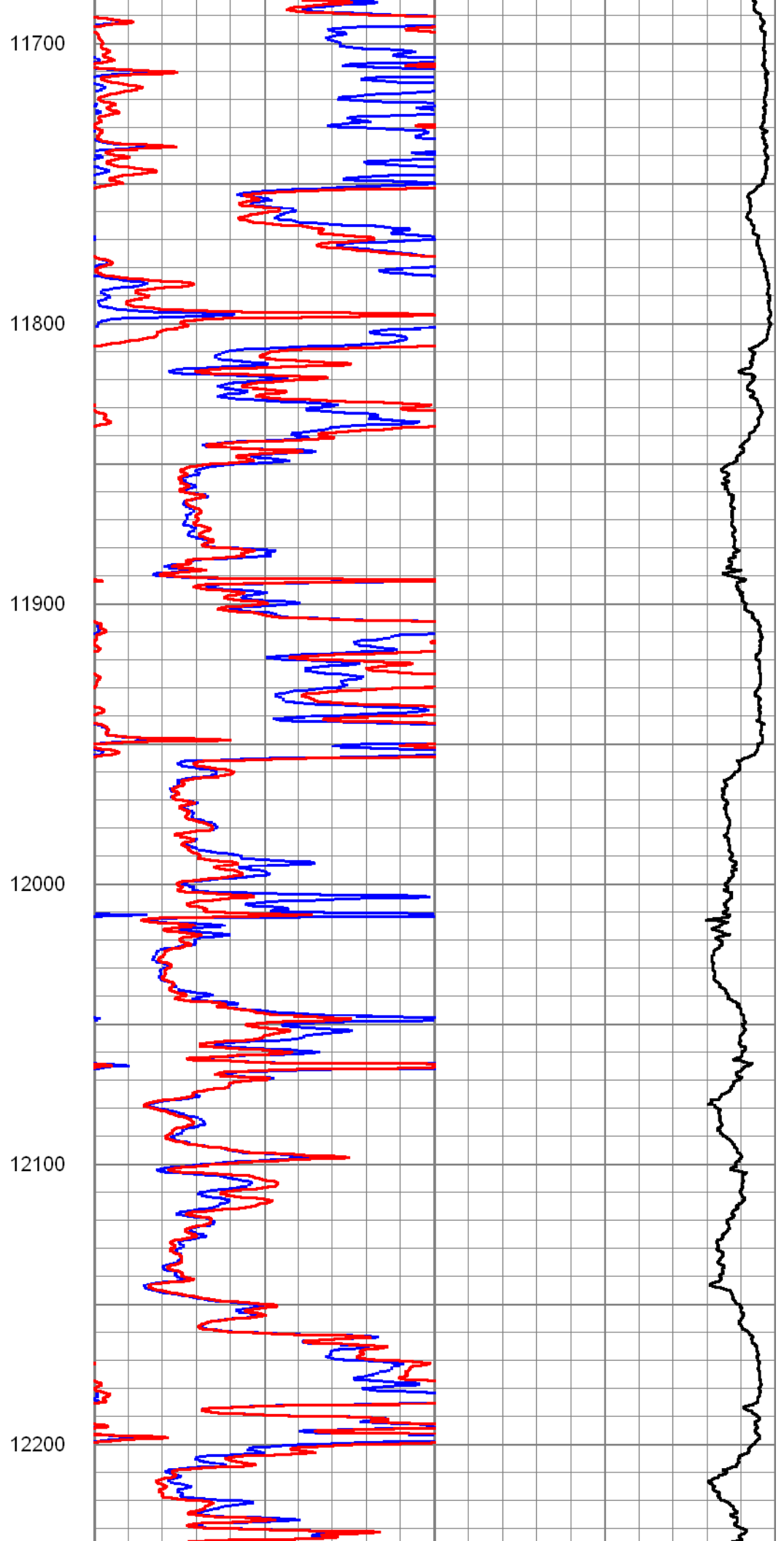
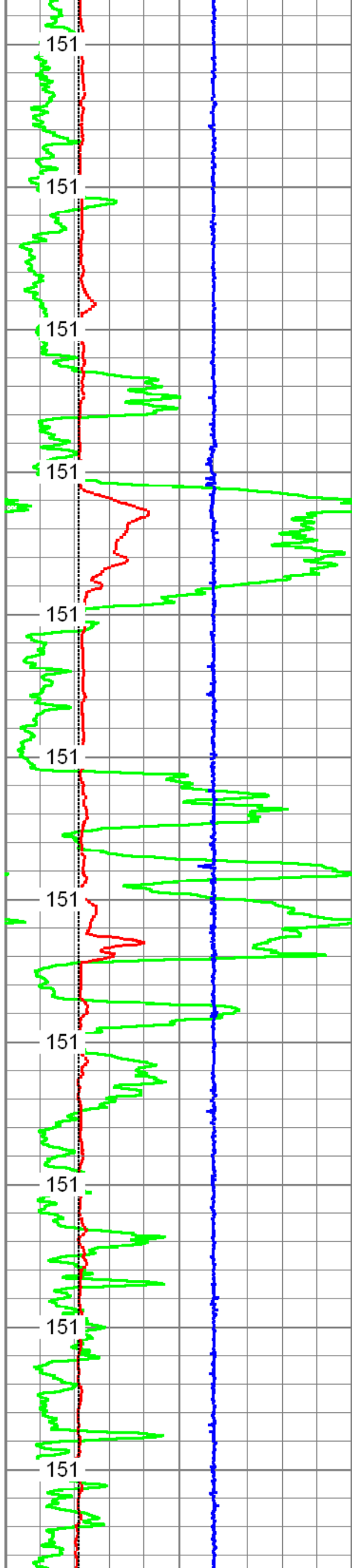


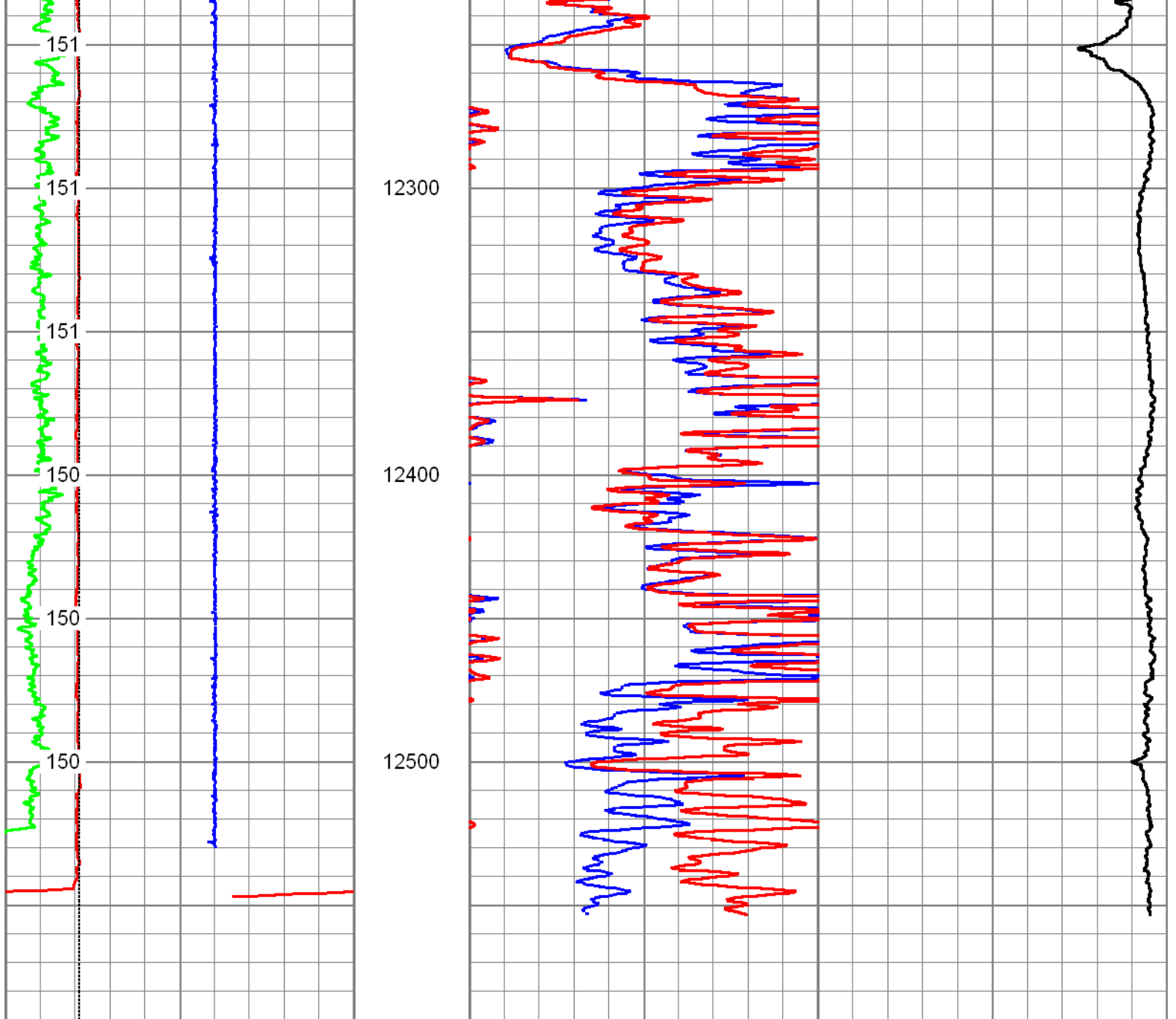












0	GR (GAPI)	150
4	DCAL (in)	14
-5	ACCY	5
4	BOREID (in)	14
GRTEMP (degF)		

50	20in 2ft Res (Ohm-m)	500
50	90in 2ft Res (Ohm-m)	500
1000	DEEP COND (mmho/m)	0
0	20in 2ft Res (Ohm-m)	50
0	90in 2ft Res (Ohm-m)	50



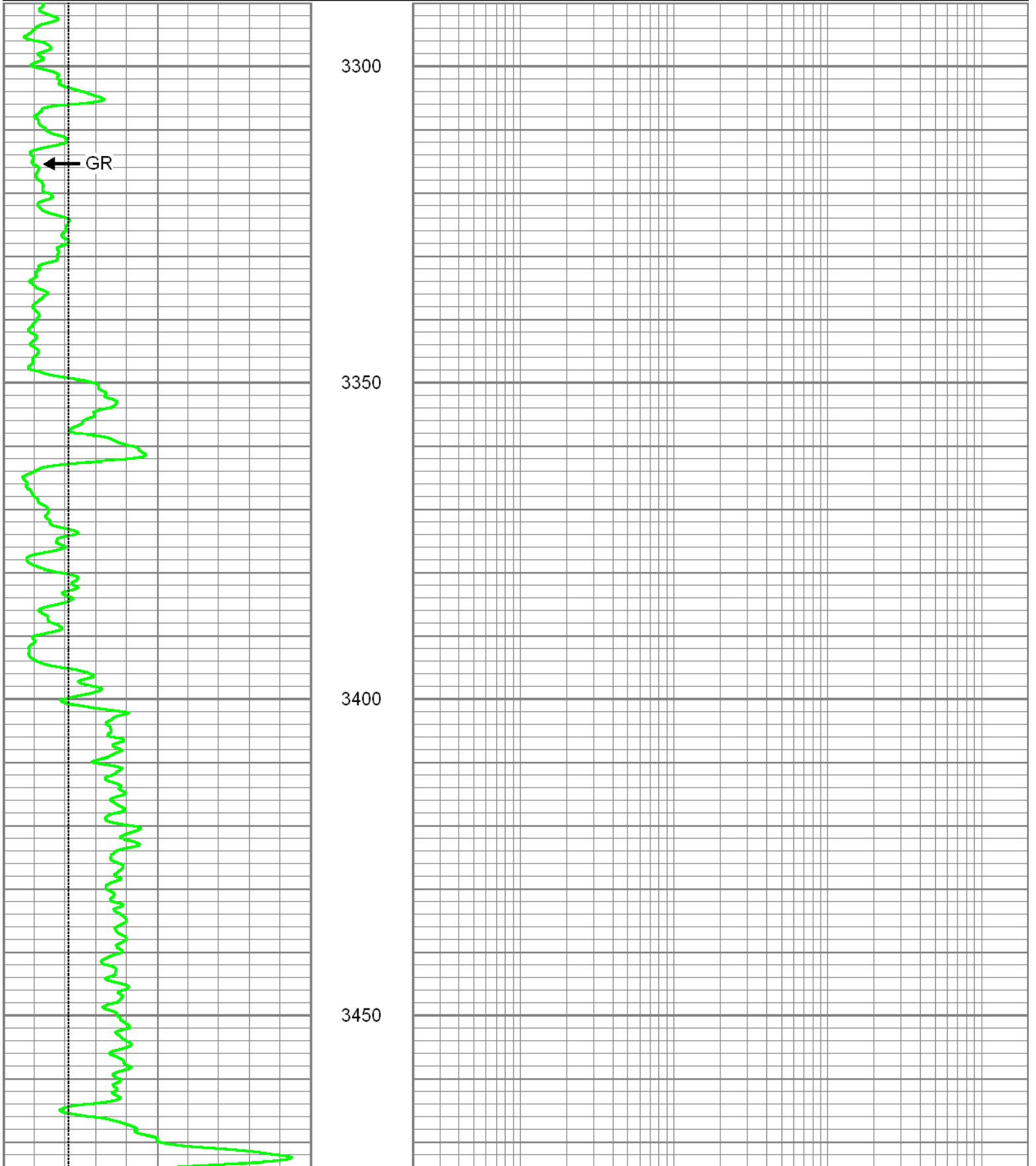
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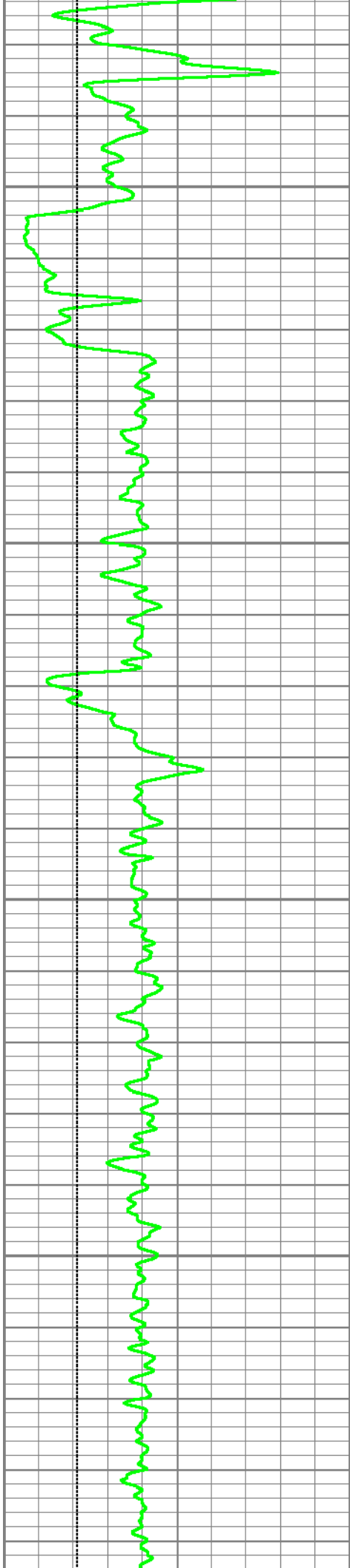
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 Presentation Format: 6\_5r\_chk  
 Dataset Creation: Tue Apr 10 09:51:08 2012  
 Charted by: Depth in Feet scaled 1:240

0	GR (GAPI)	150
4	BOREID (in)	14
4	DCAL (in)	14
-5	ACCY	5

0.2	20inRadial (Ohm-m)	2000
0.2	30inRadial (Ohm-m)	2000
0.2	60inRadial (Ohm-m)	2000
0.2	90inRadial (Ohm-m)	2000

GRTEMP (degF)
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3500

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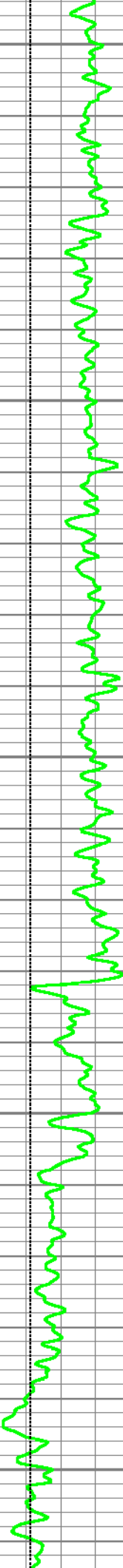
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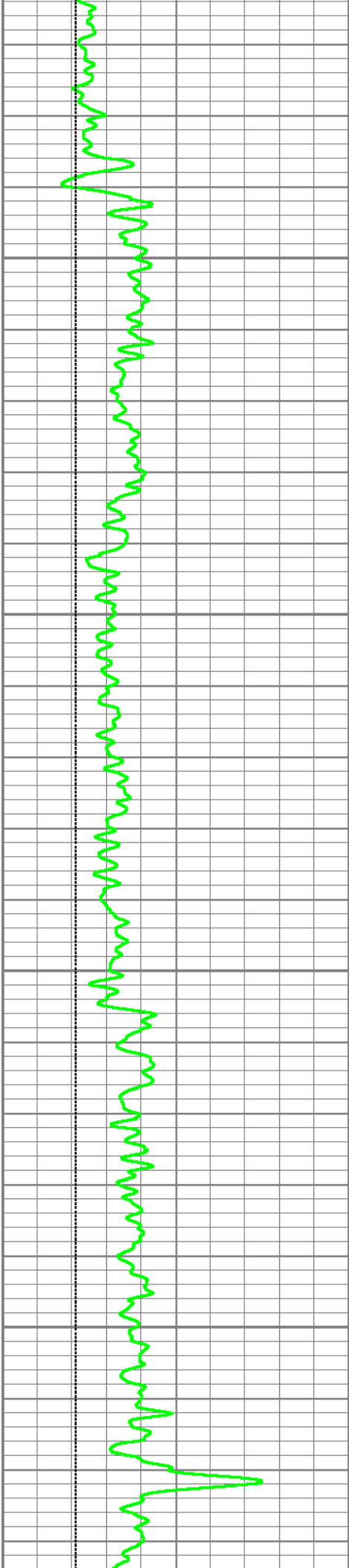
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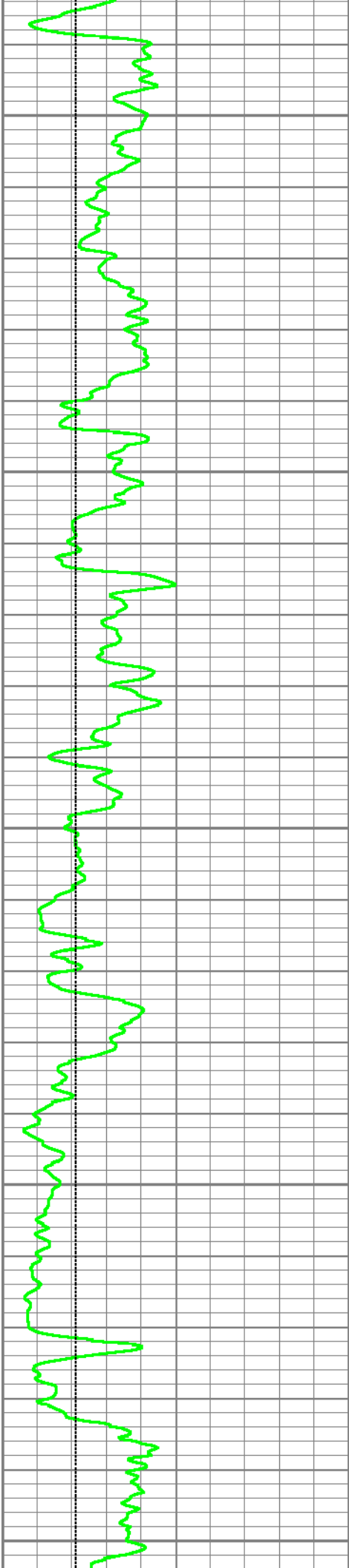


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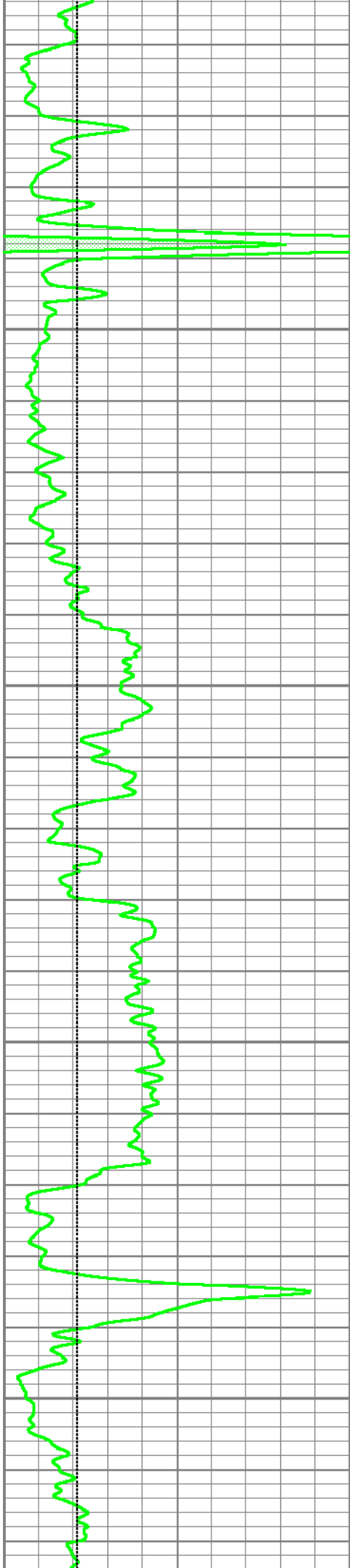
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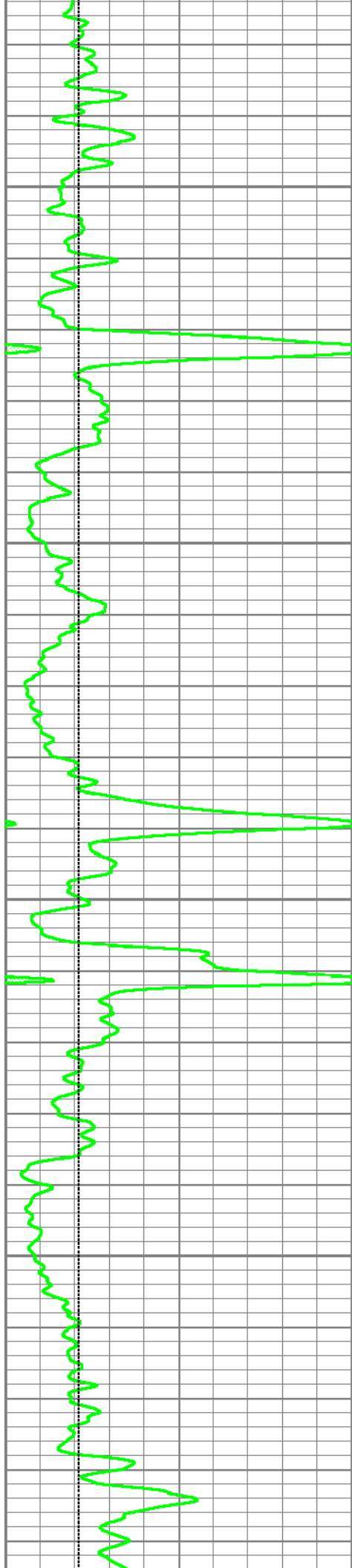


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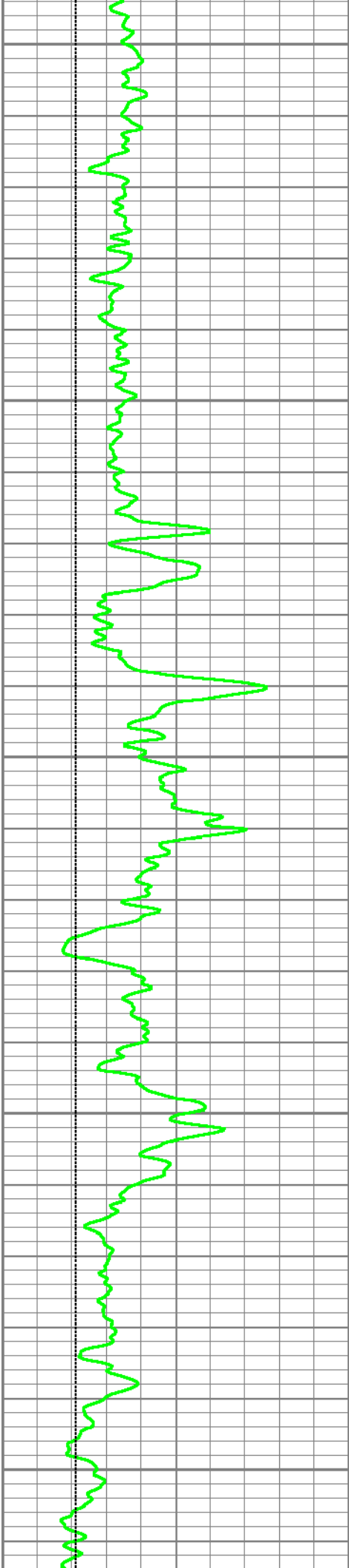


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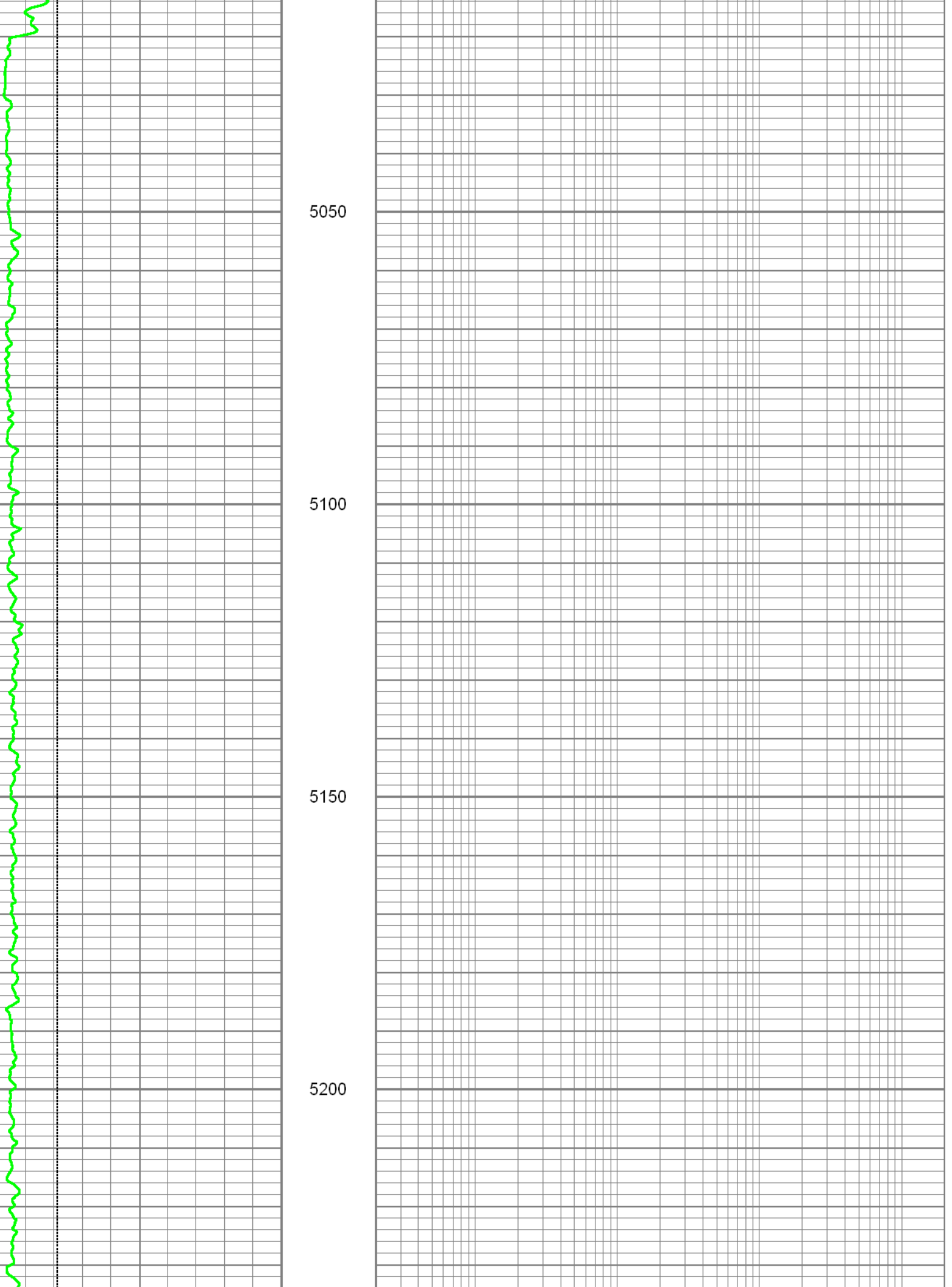
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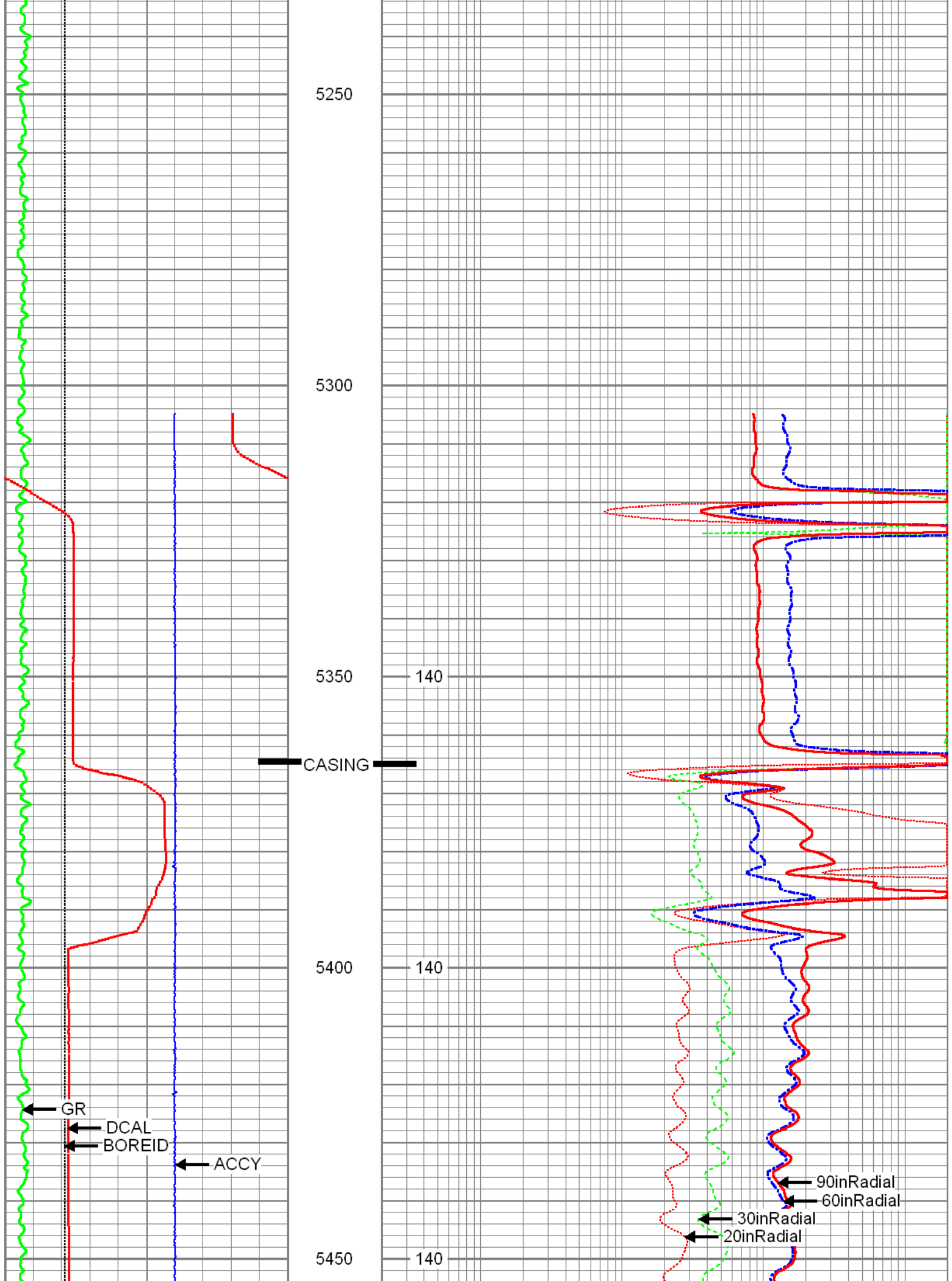
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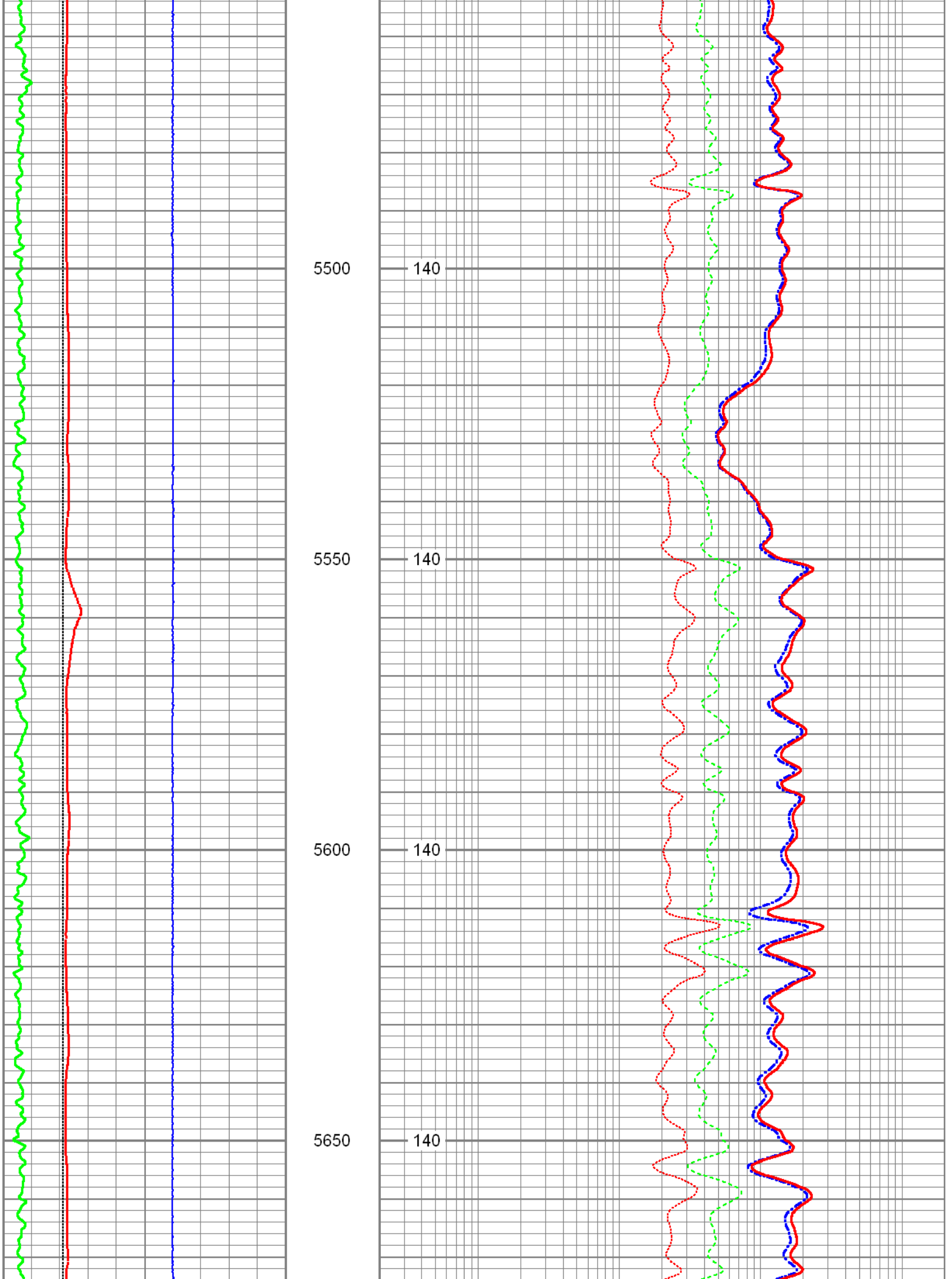
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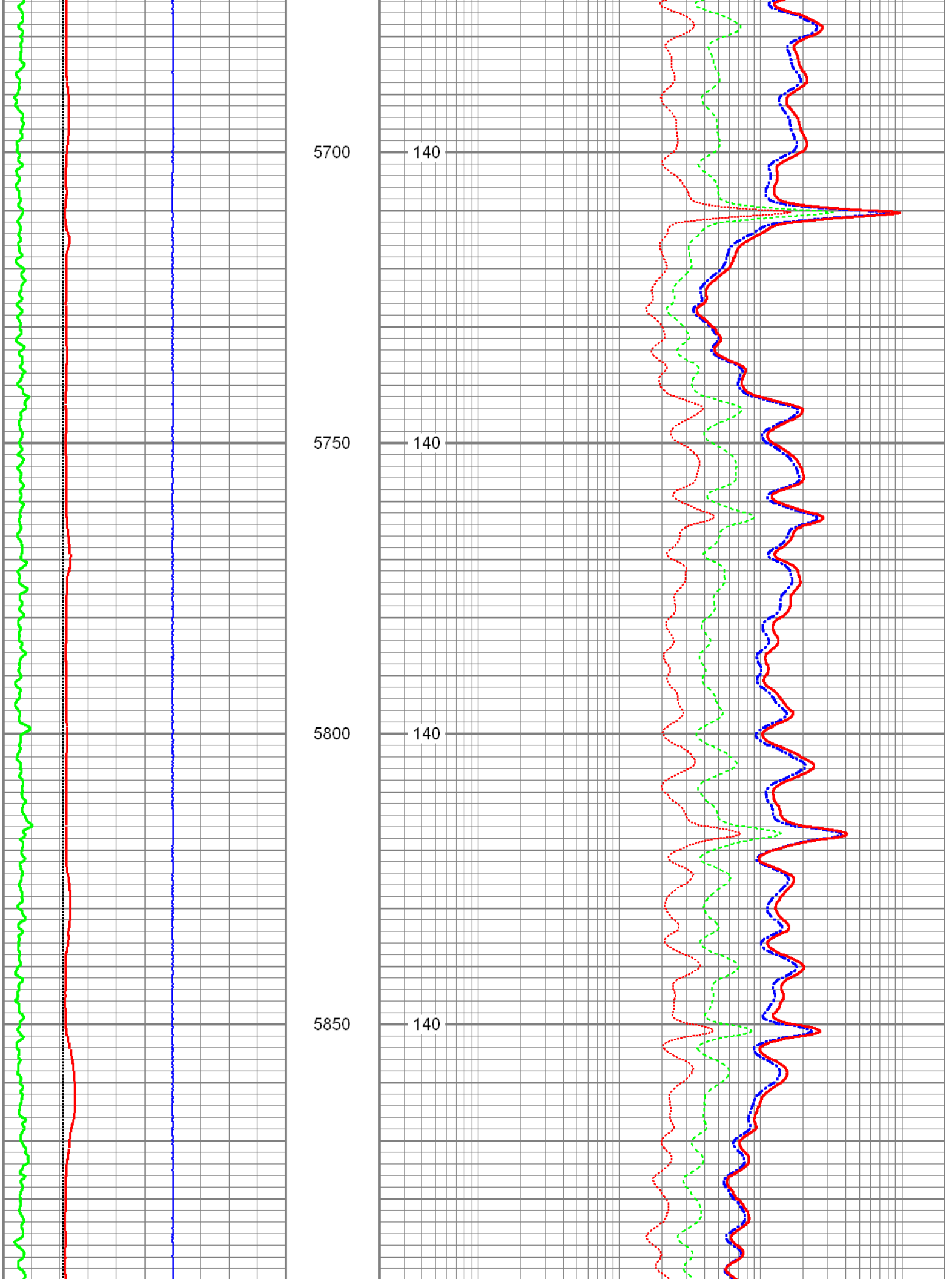
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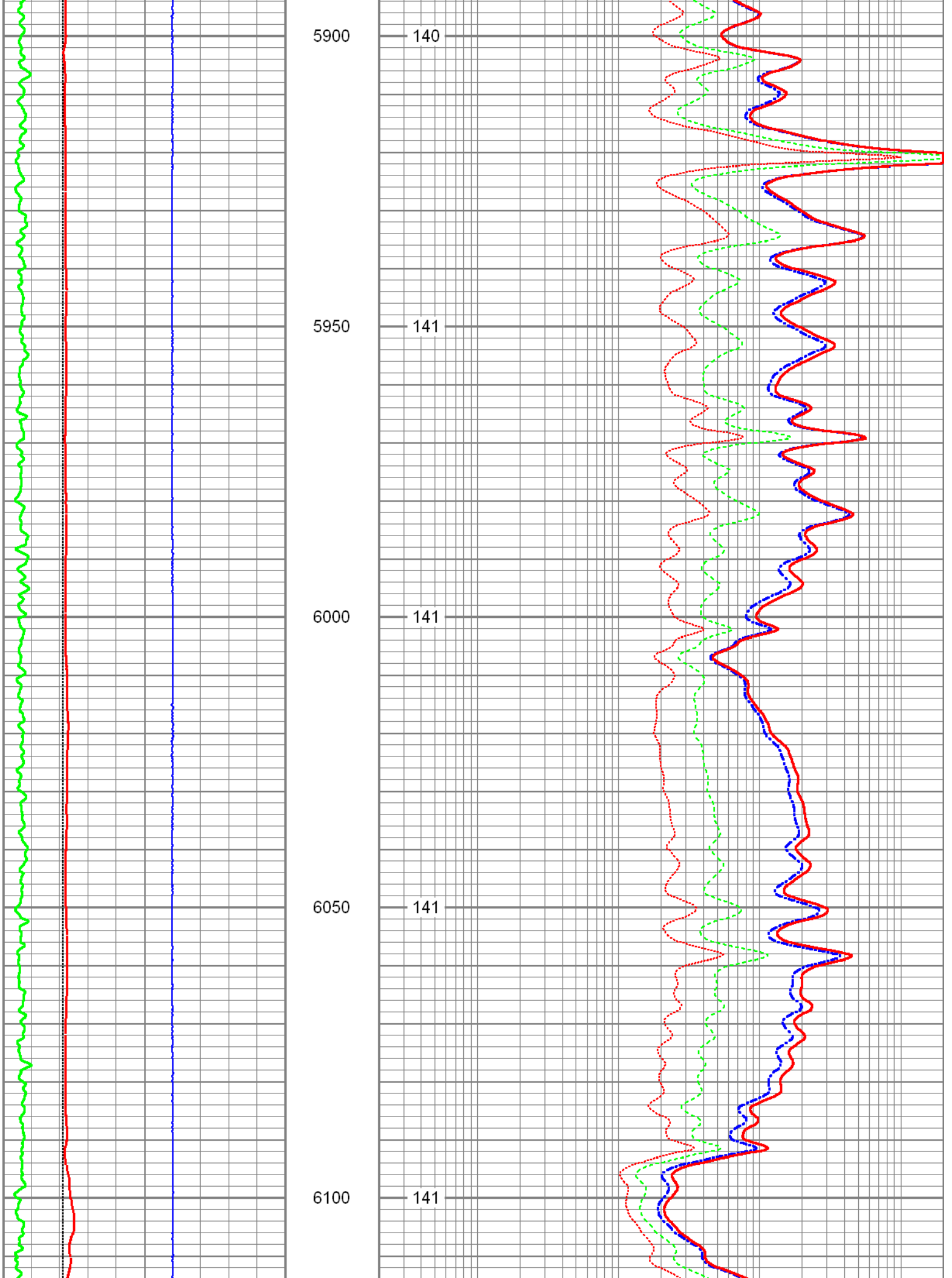
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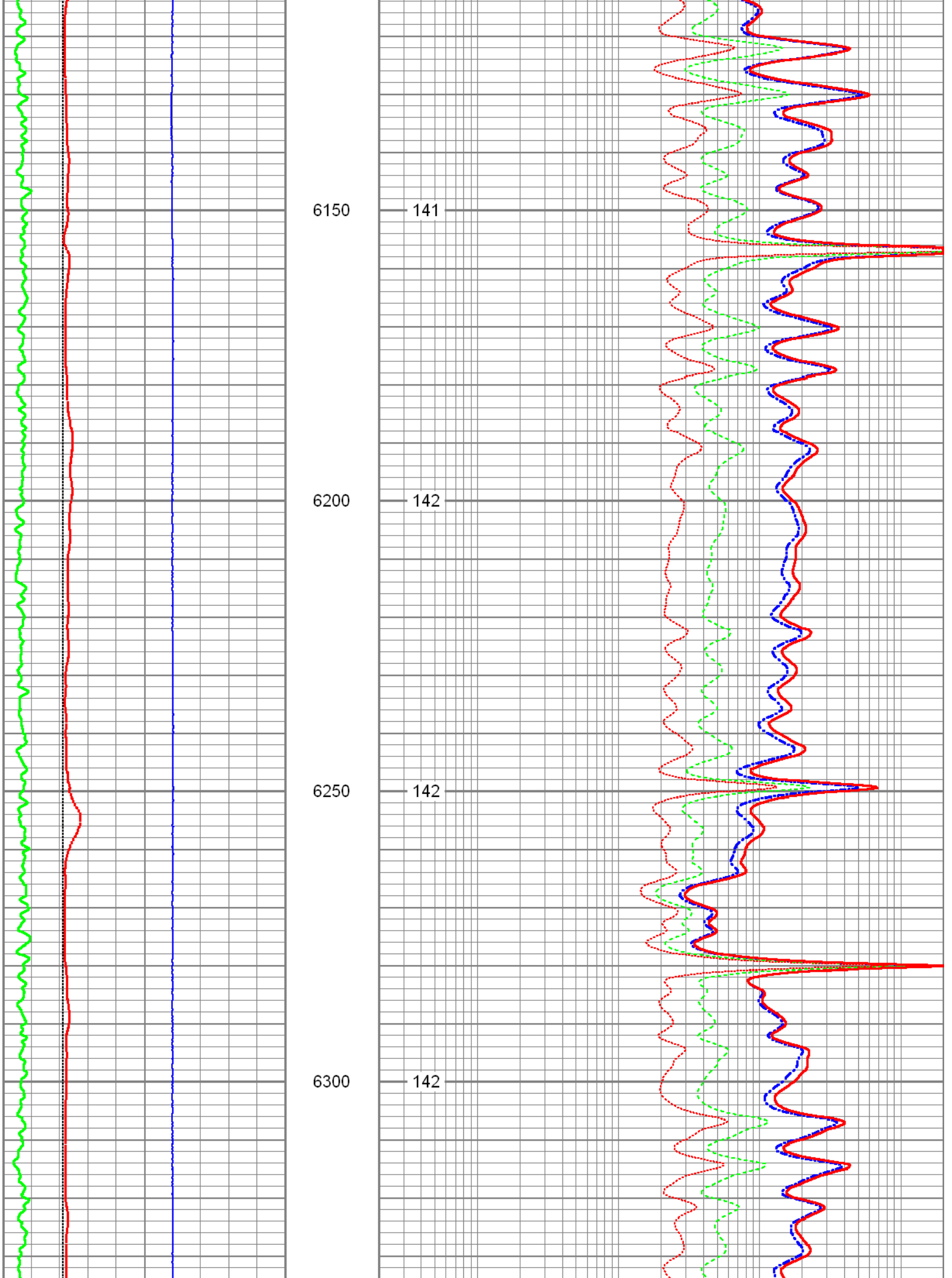


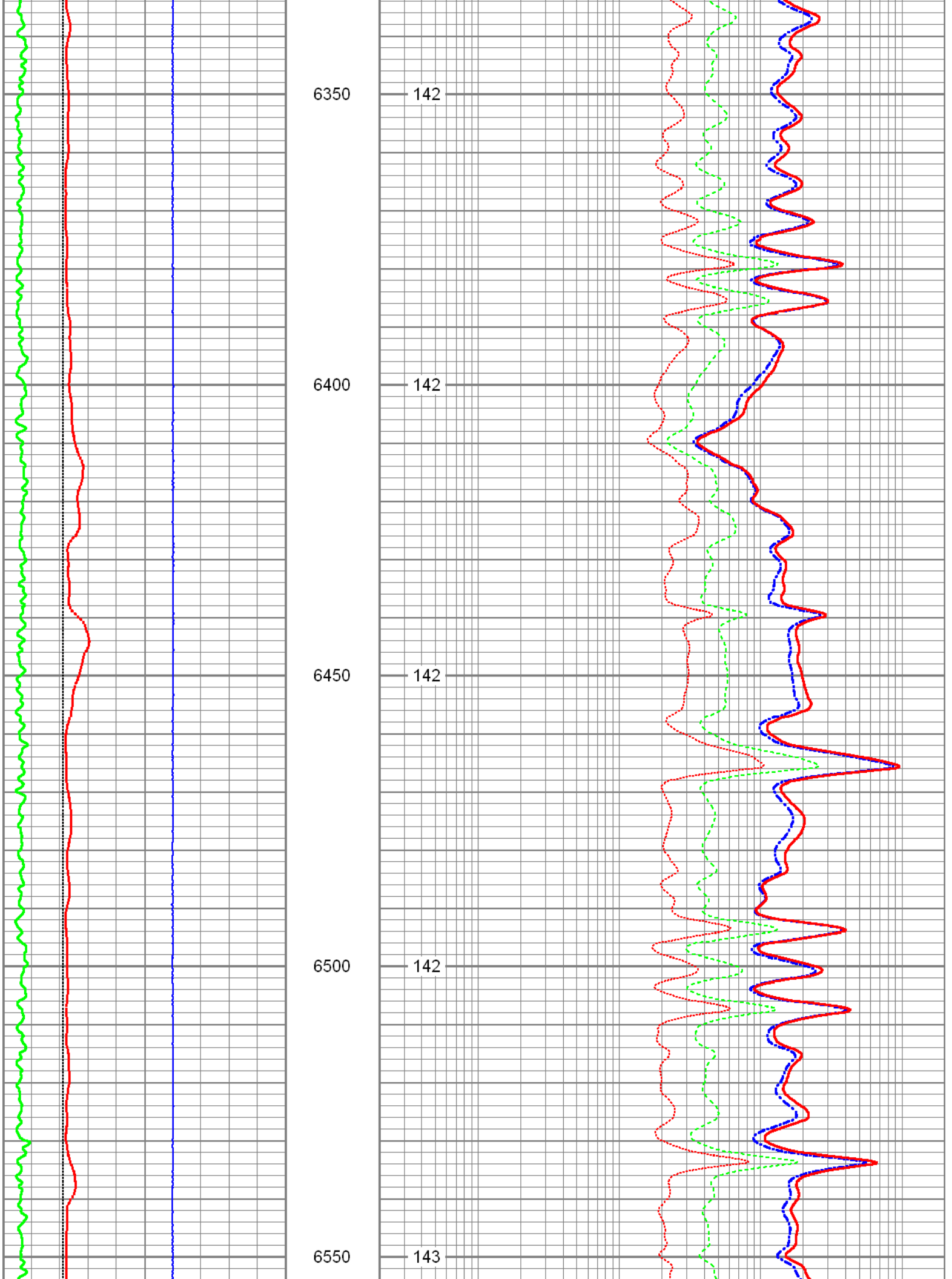


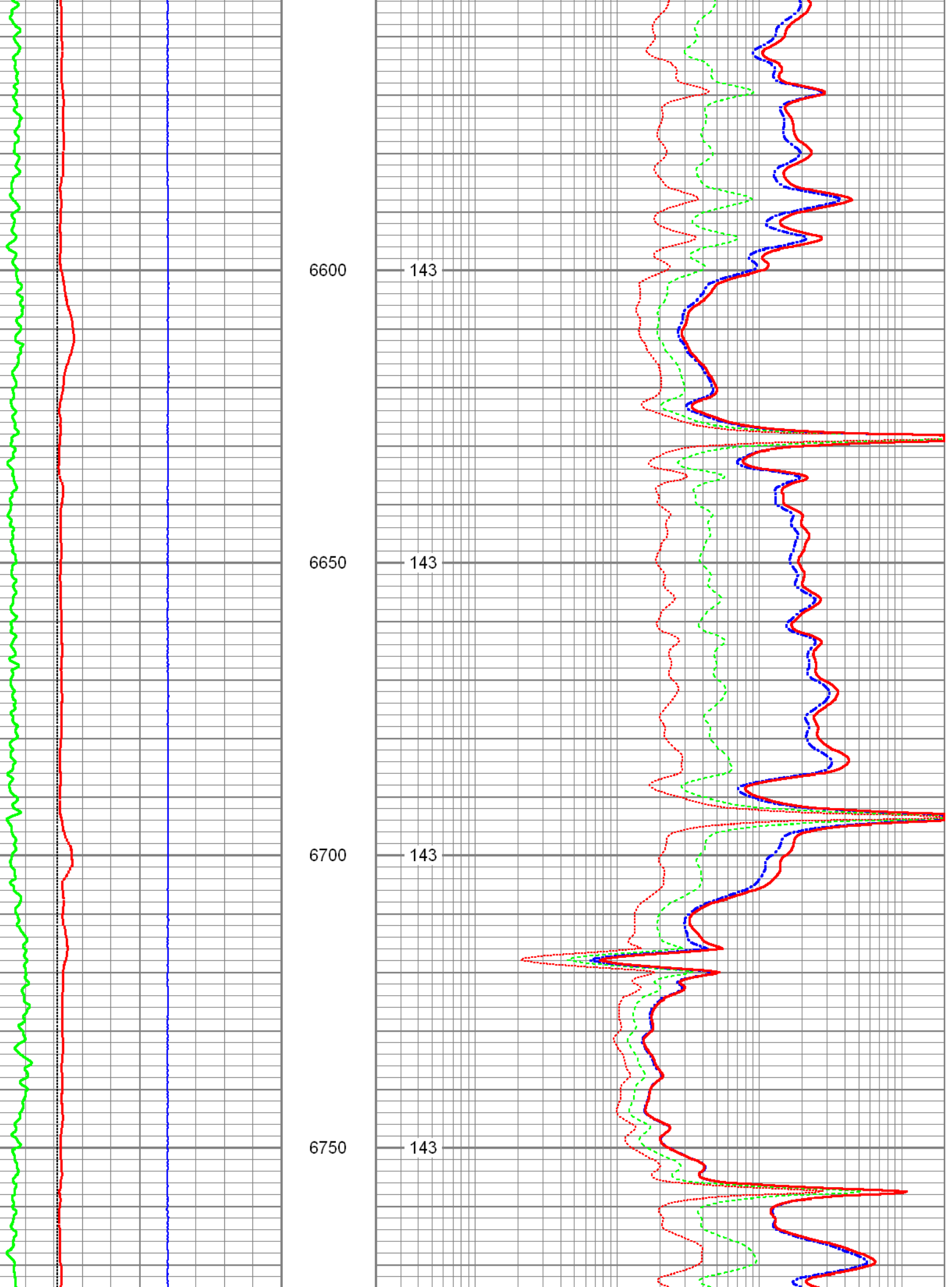


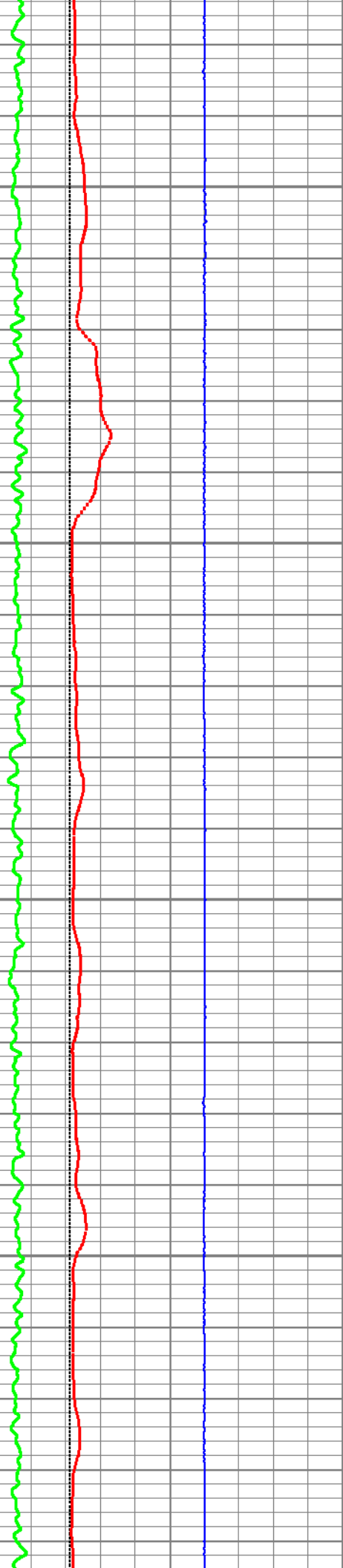












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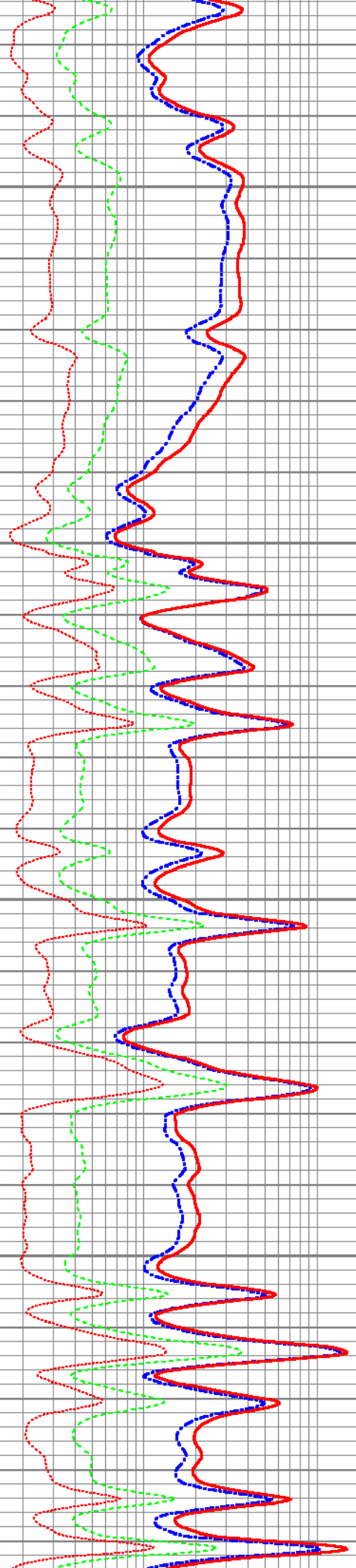
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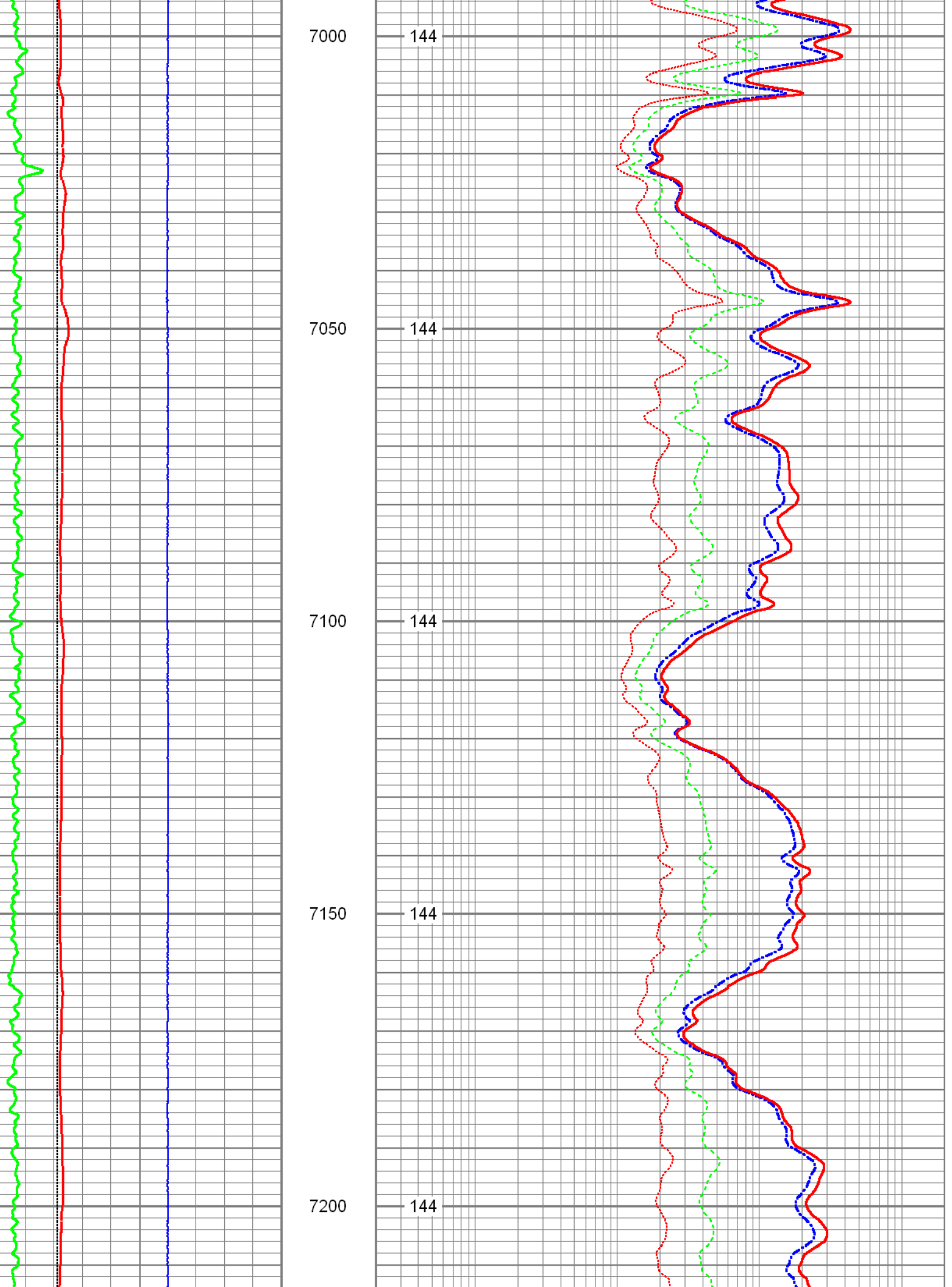
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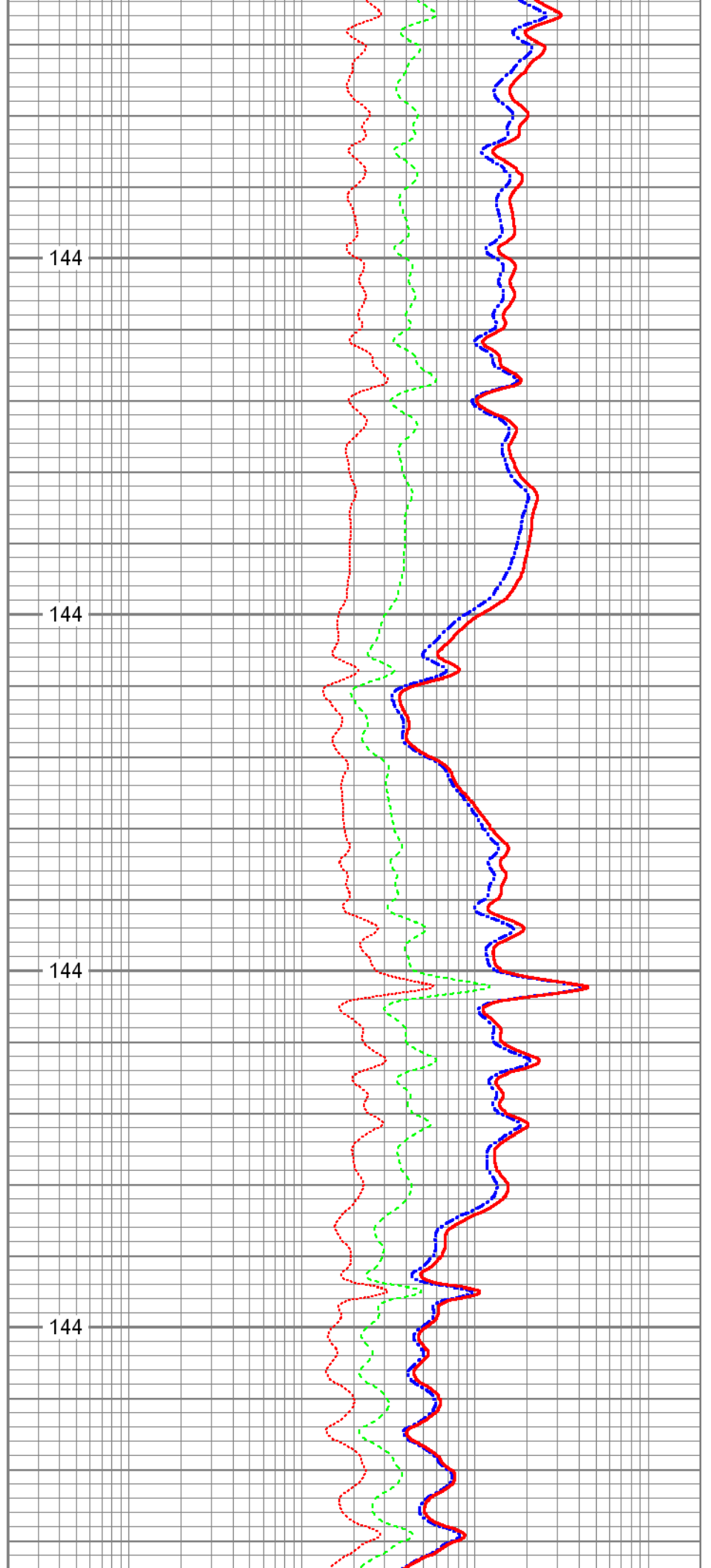
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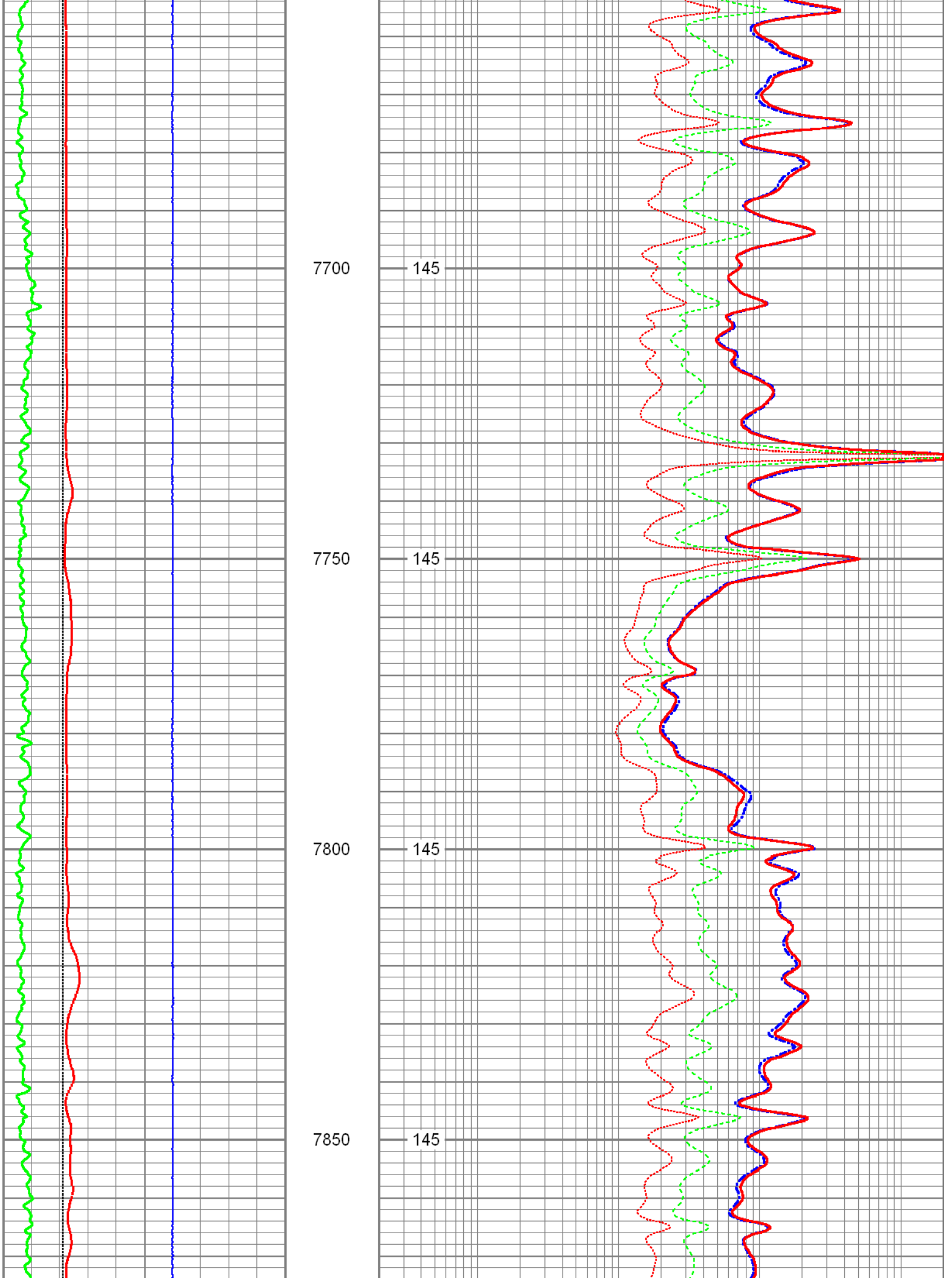
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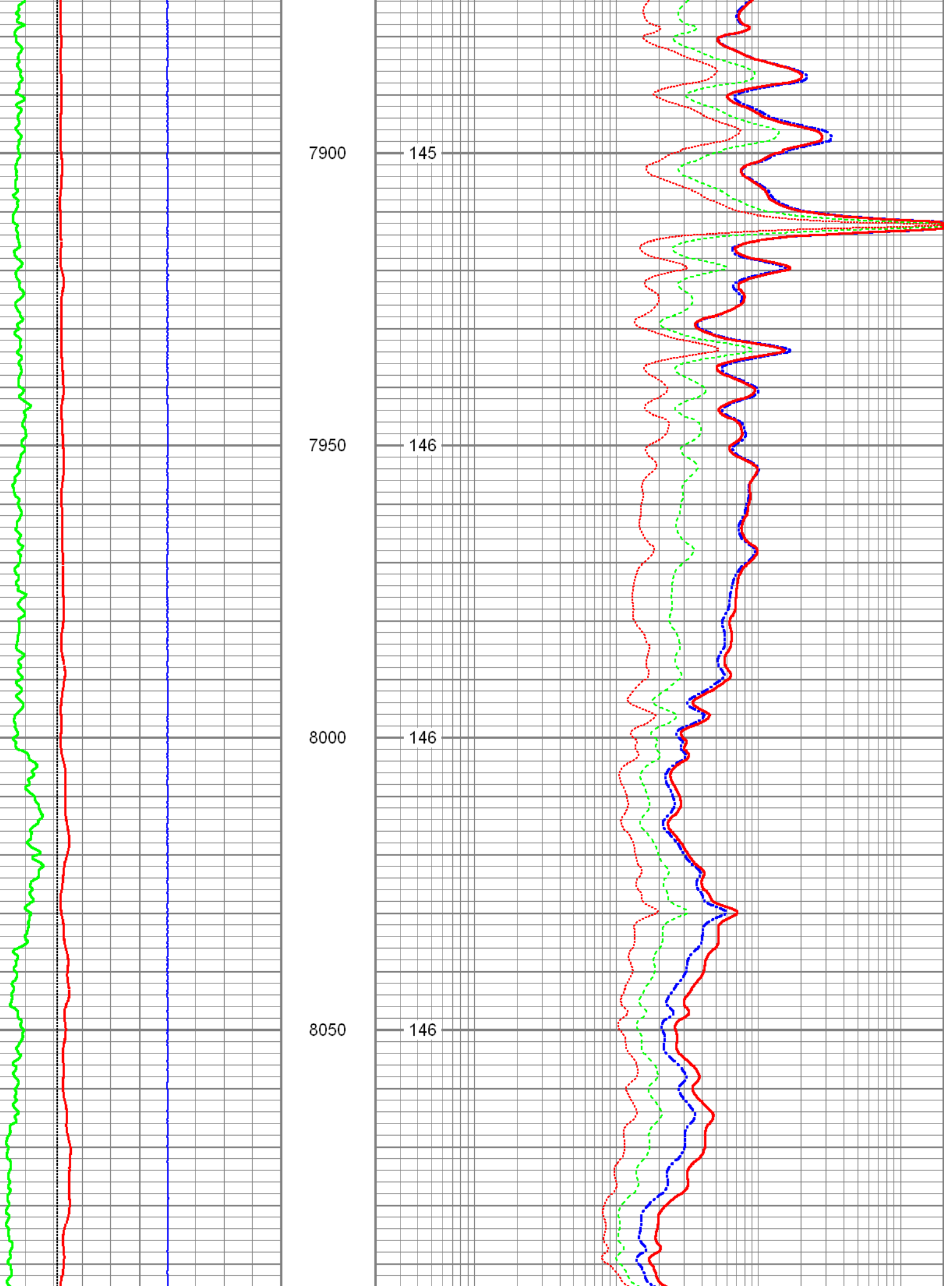
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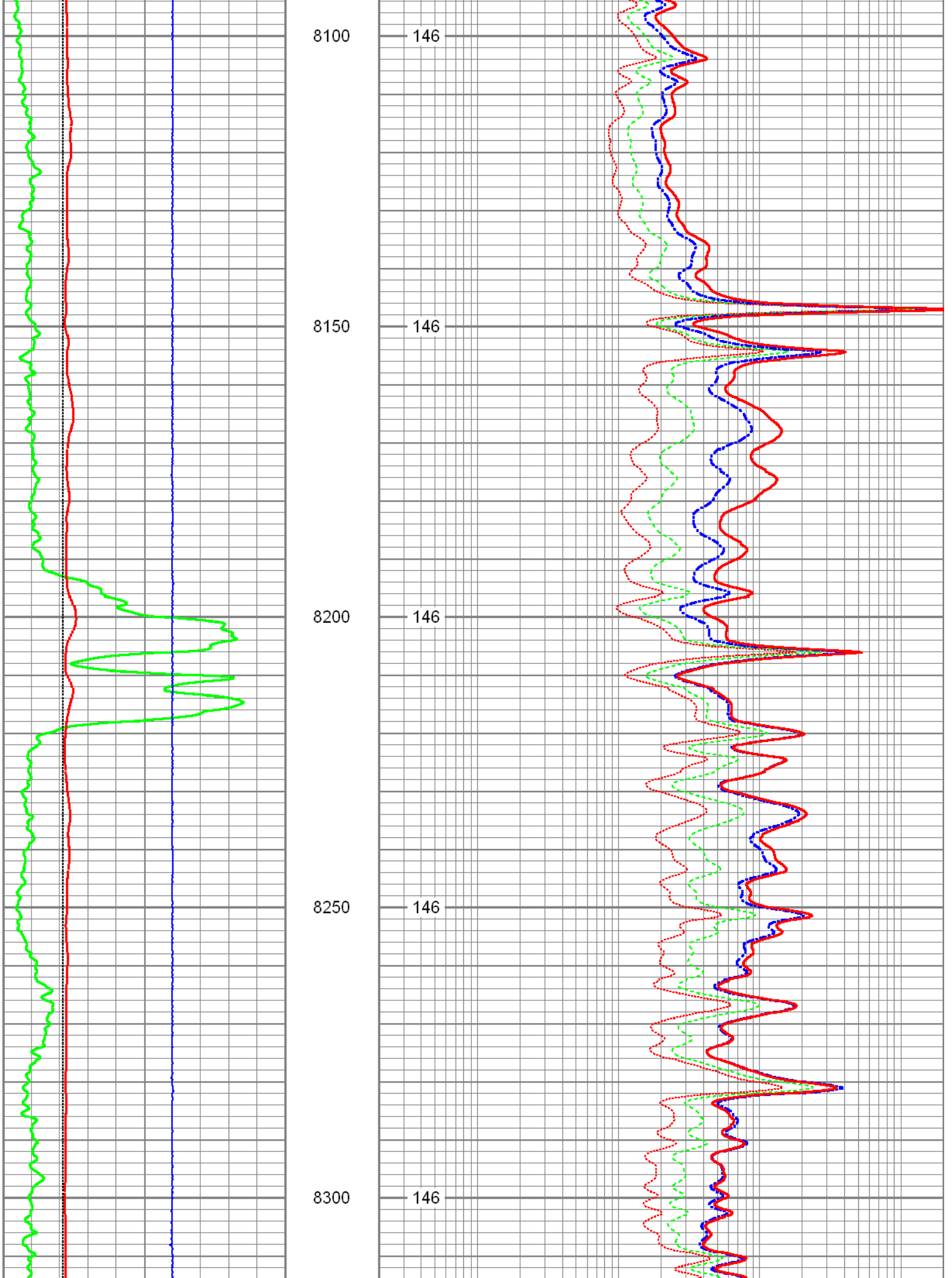


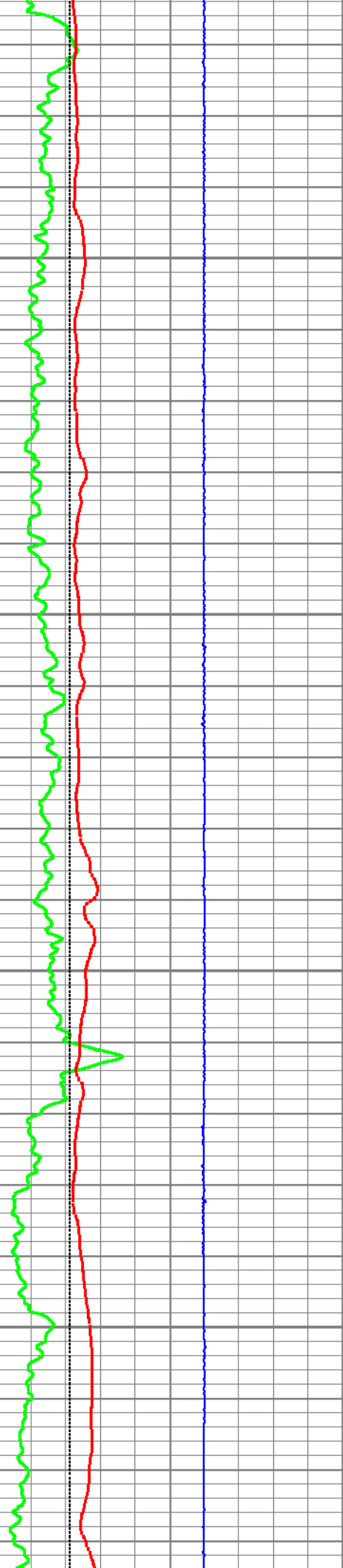












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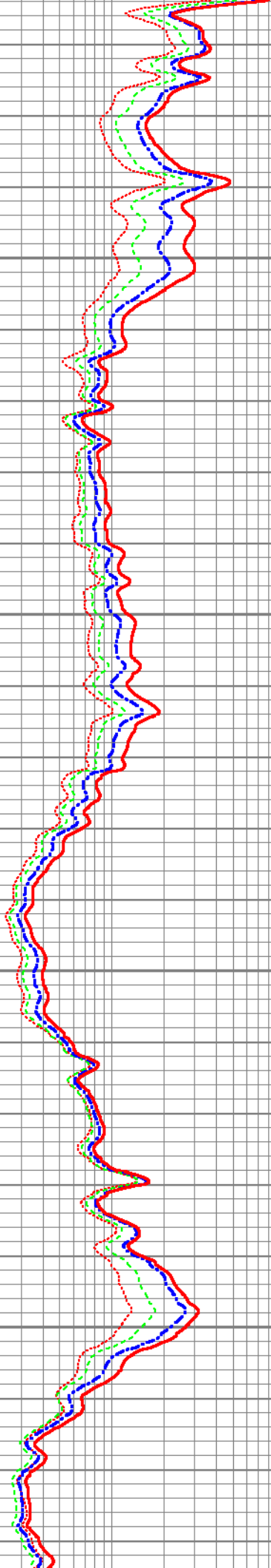
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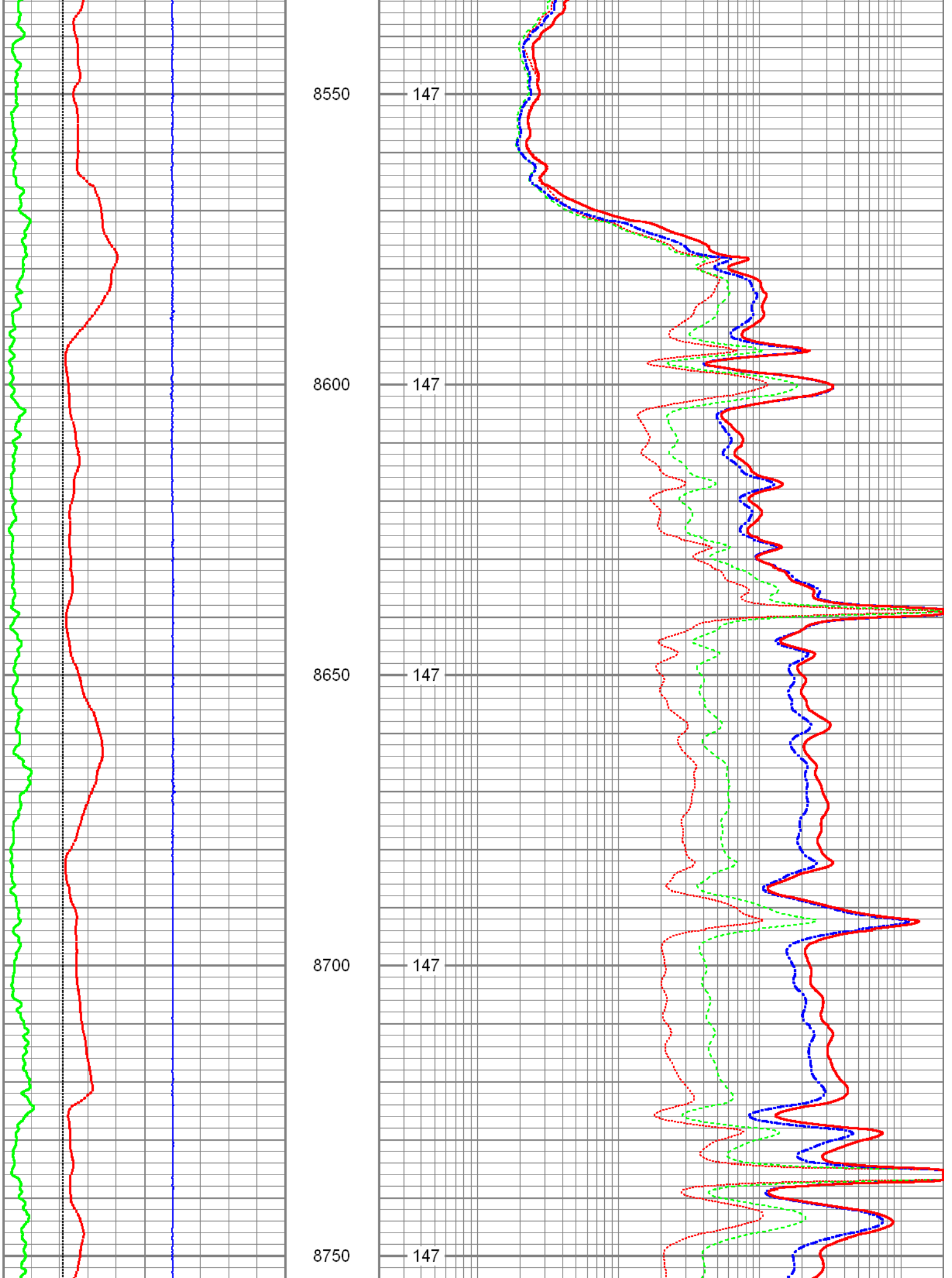
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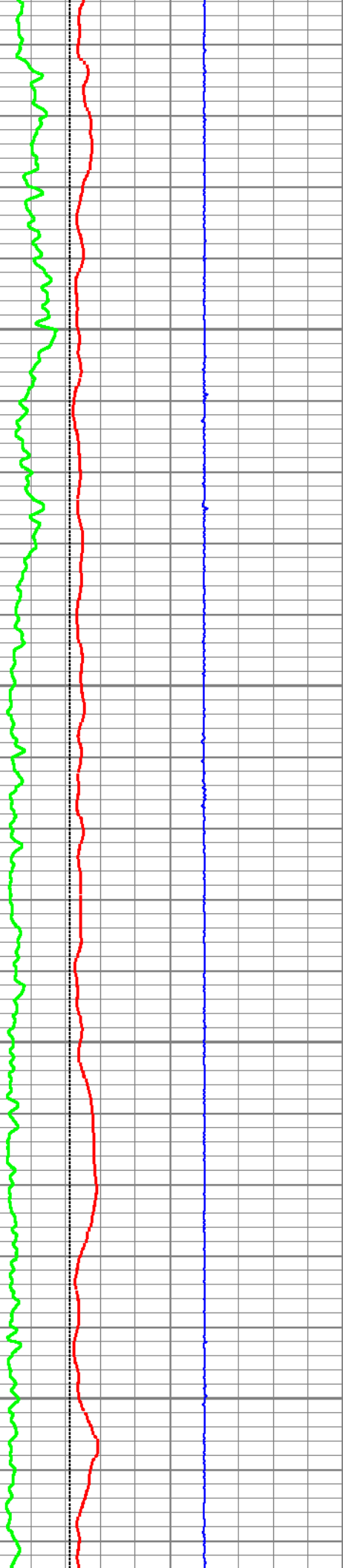
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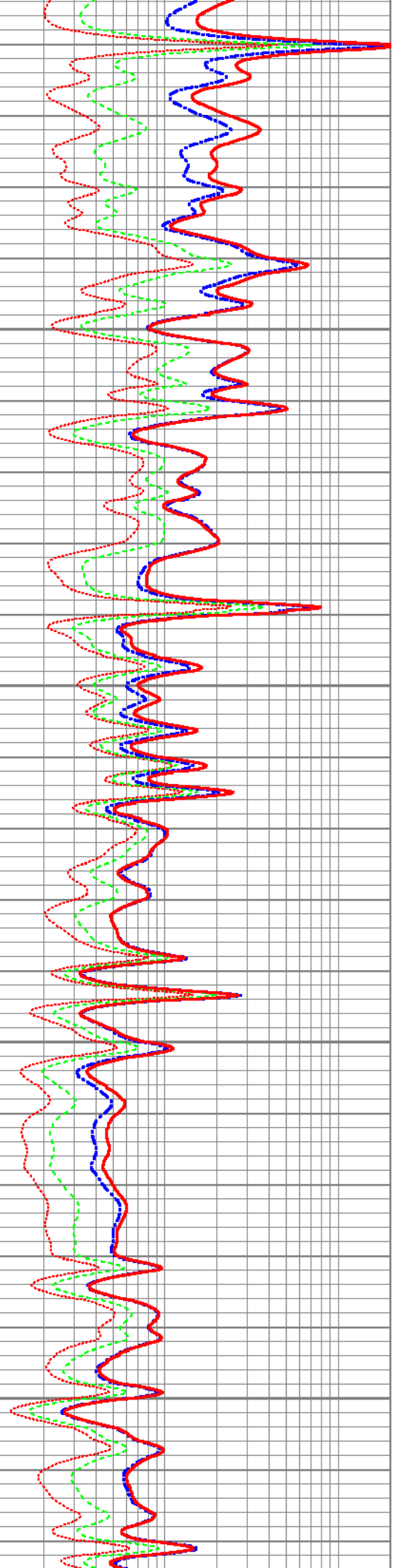
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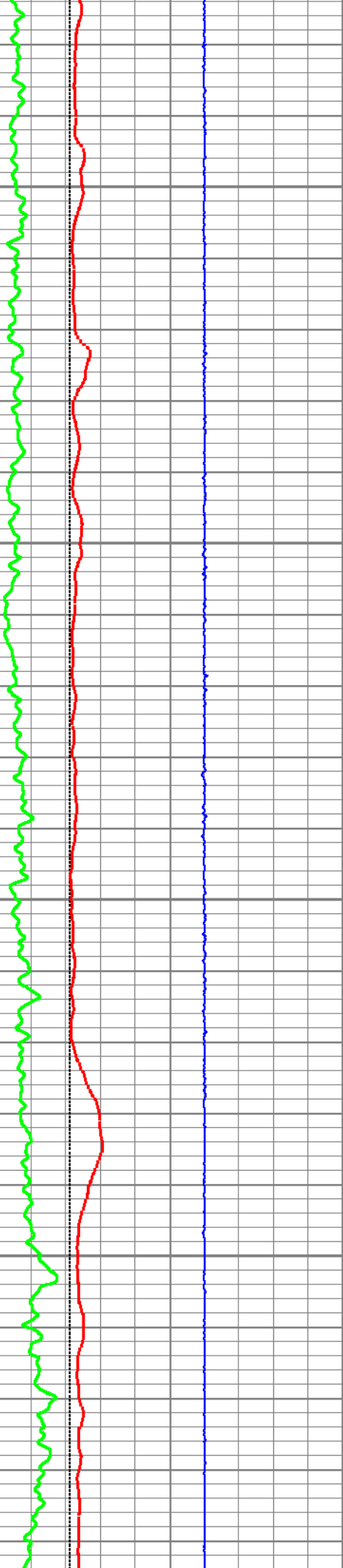
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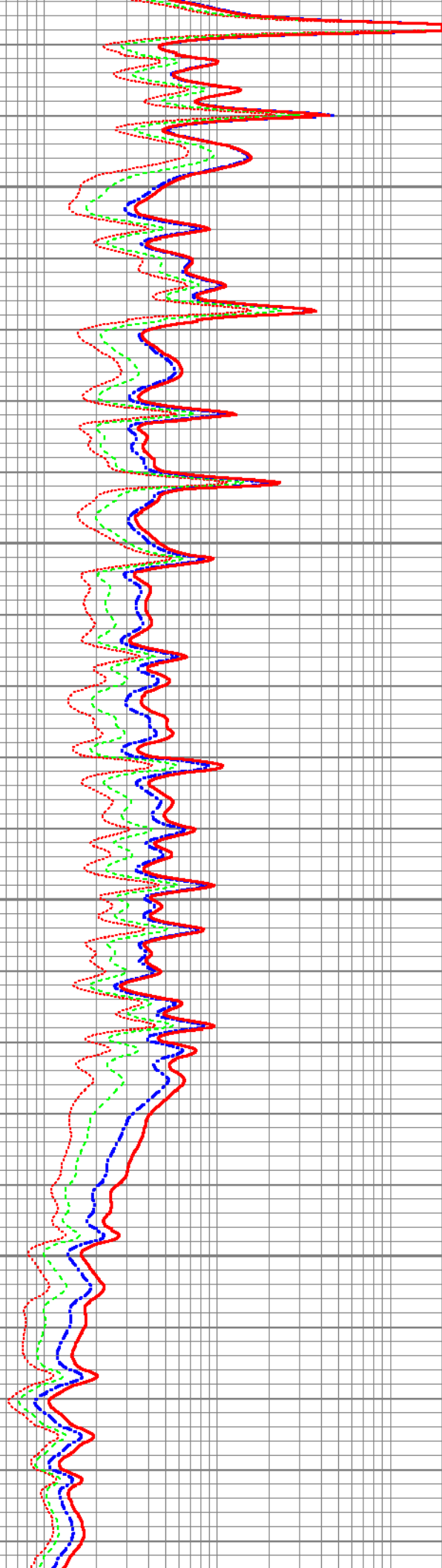
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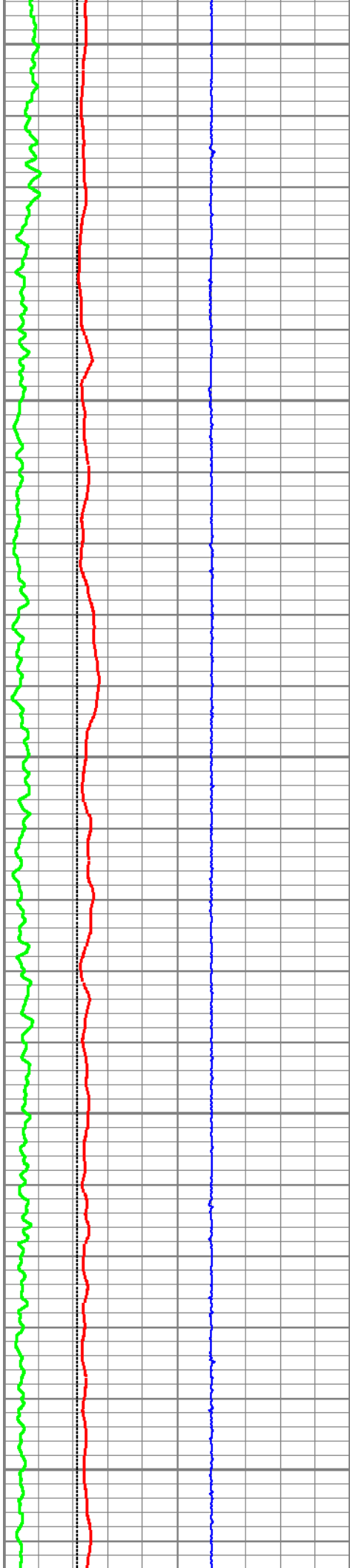
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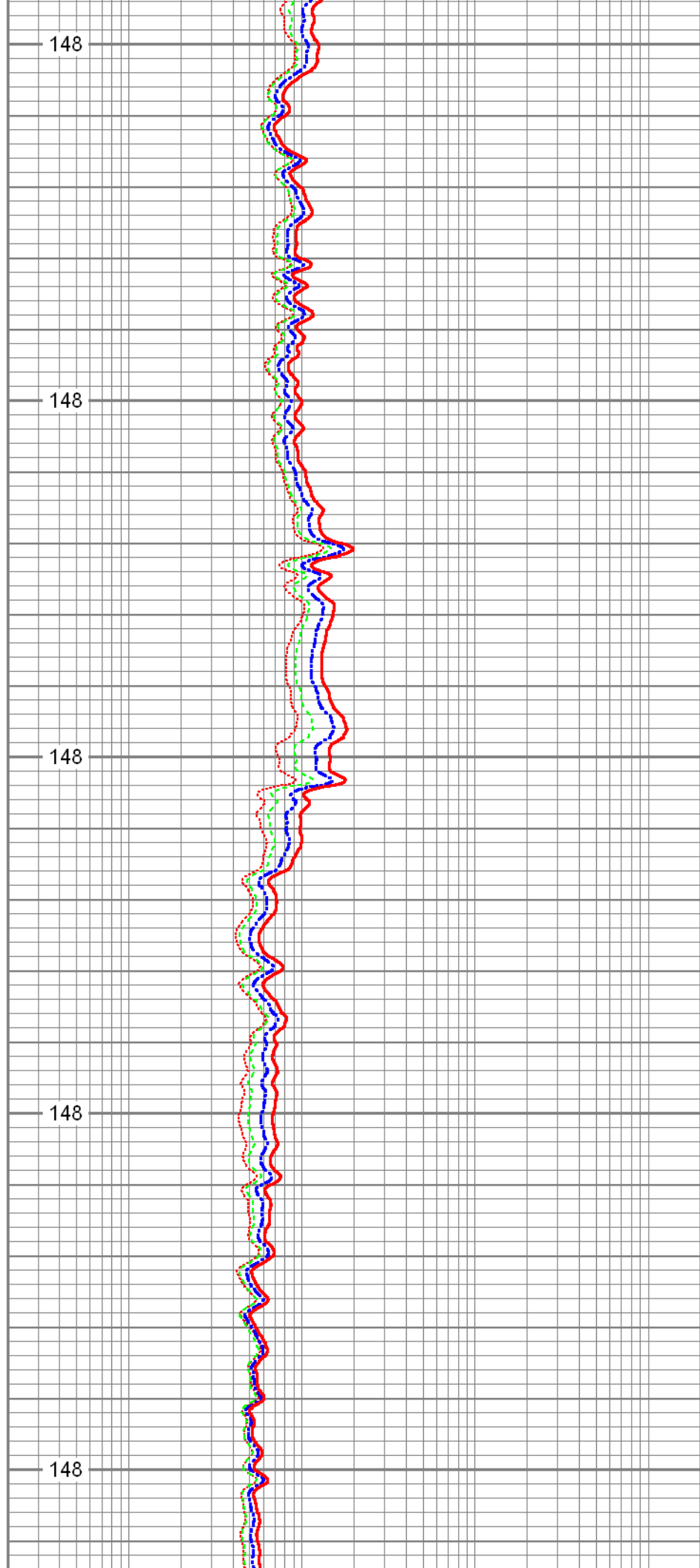
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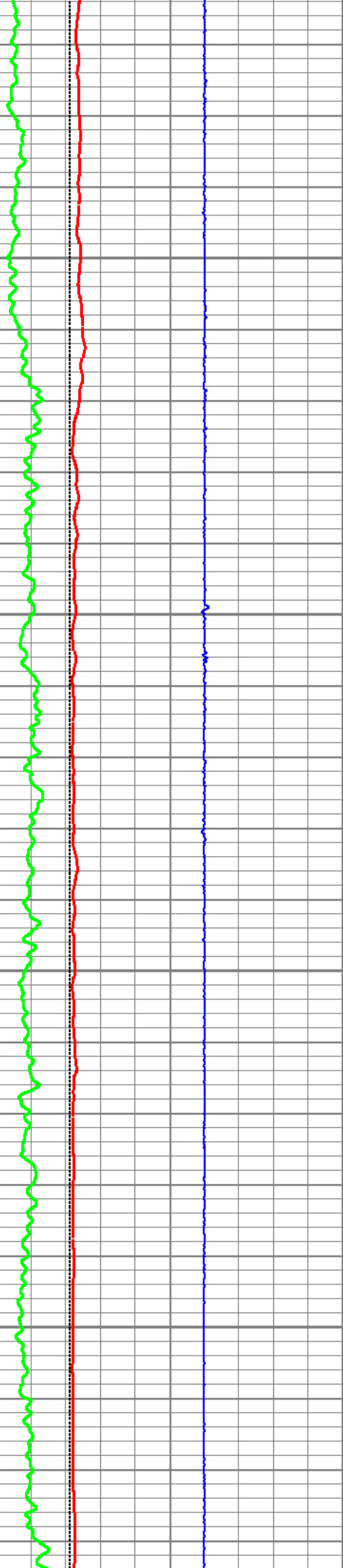
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9400

148





9450

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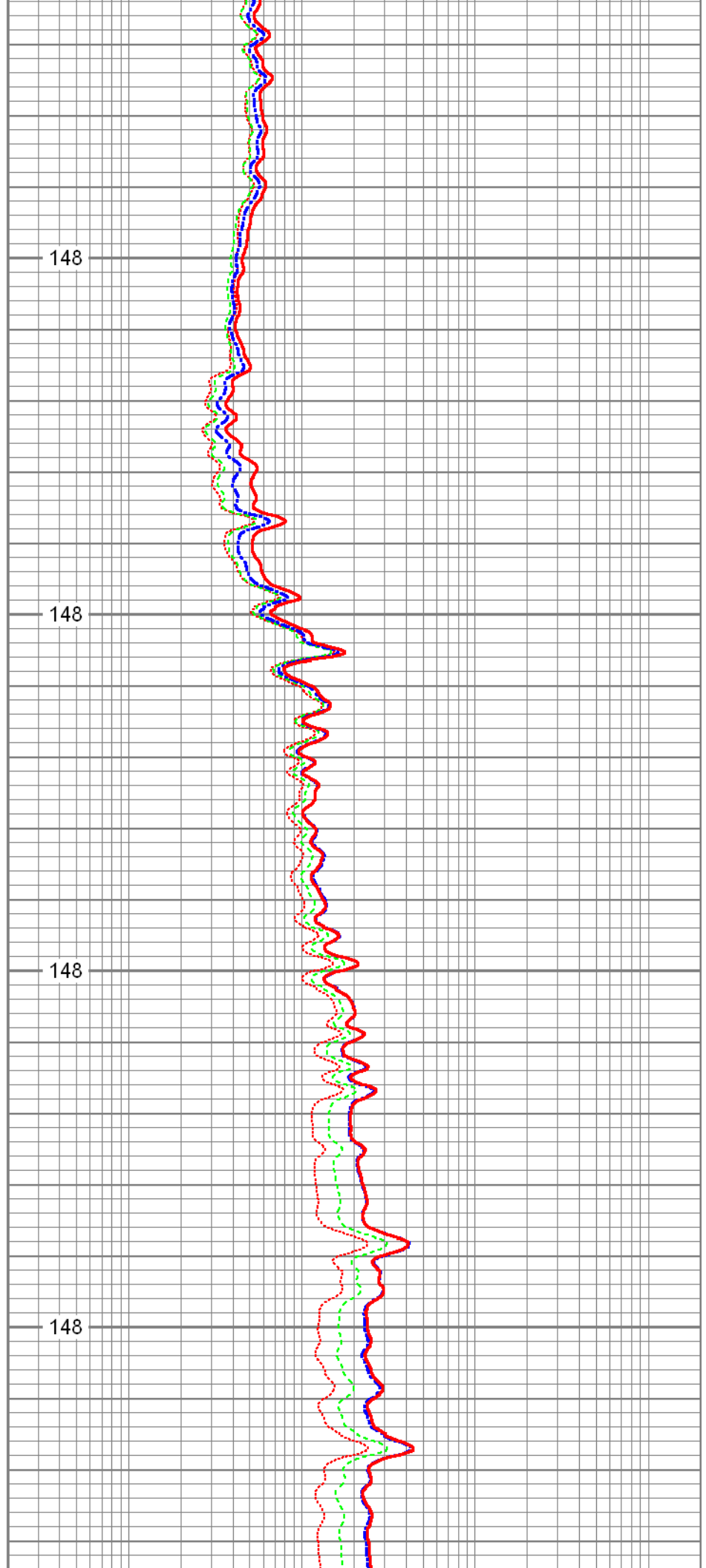
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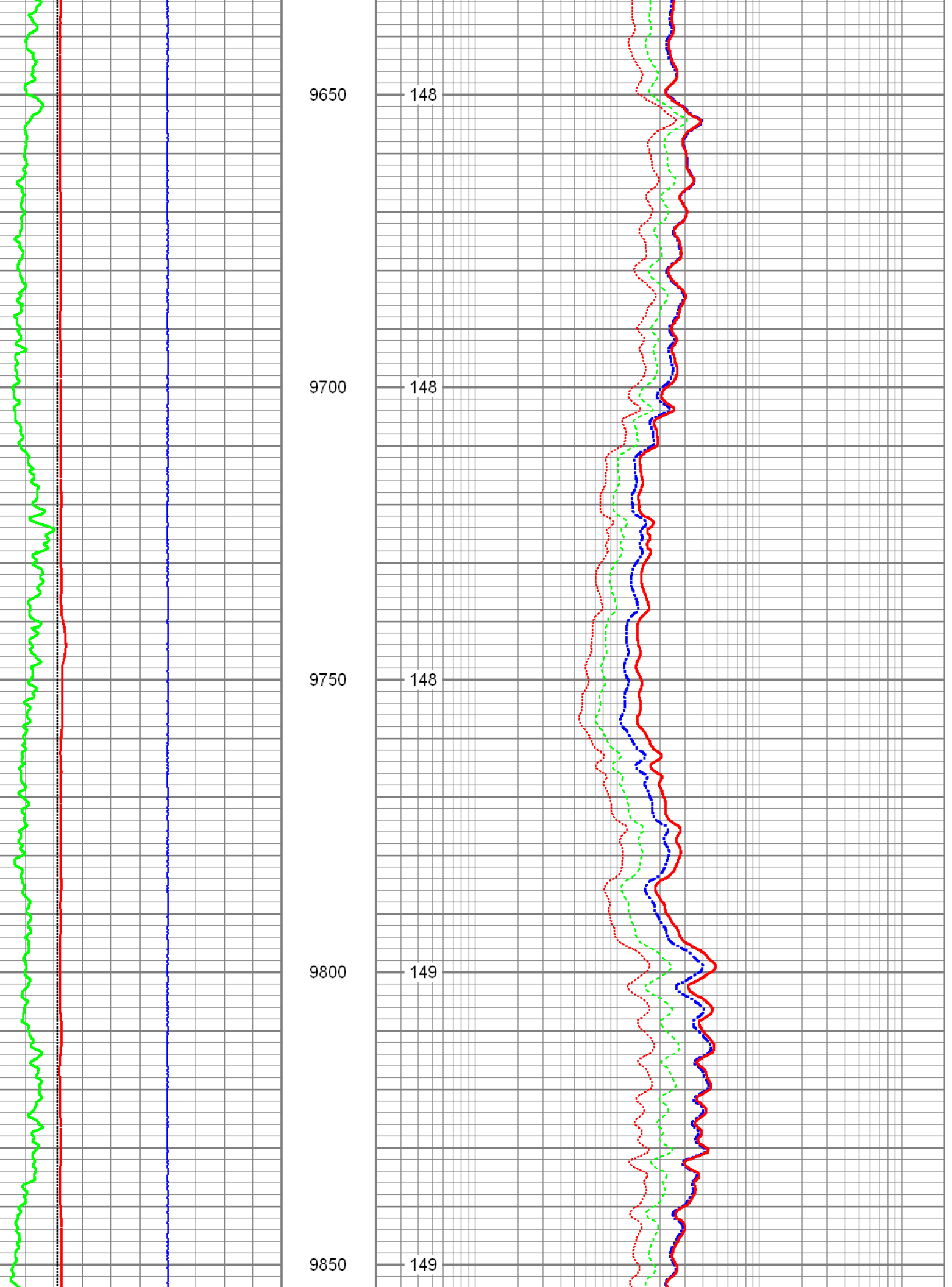
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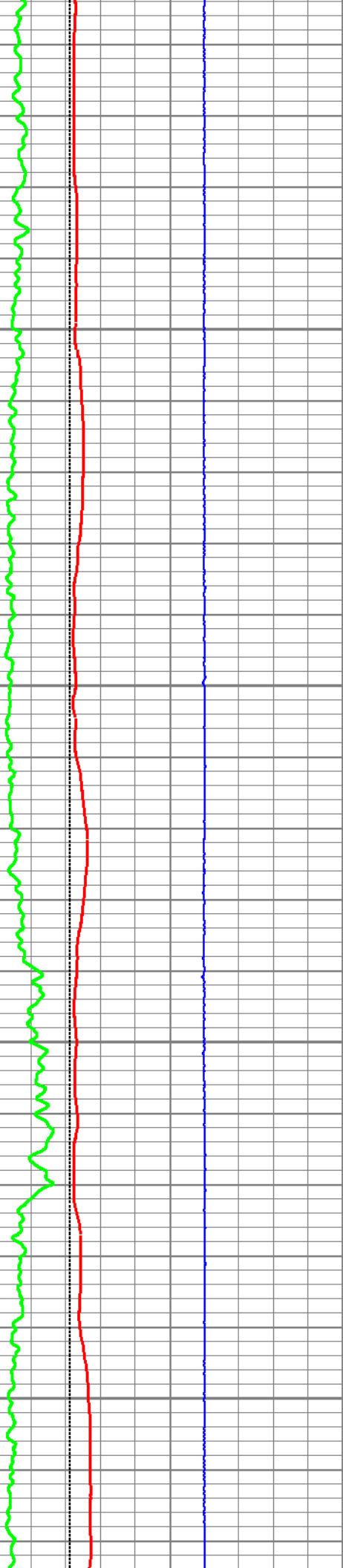
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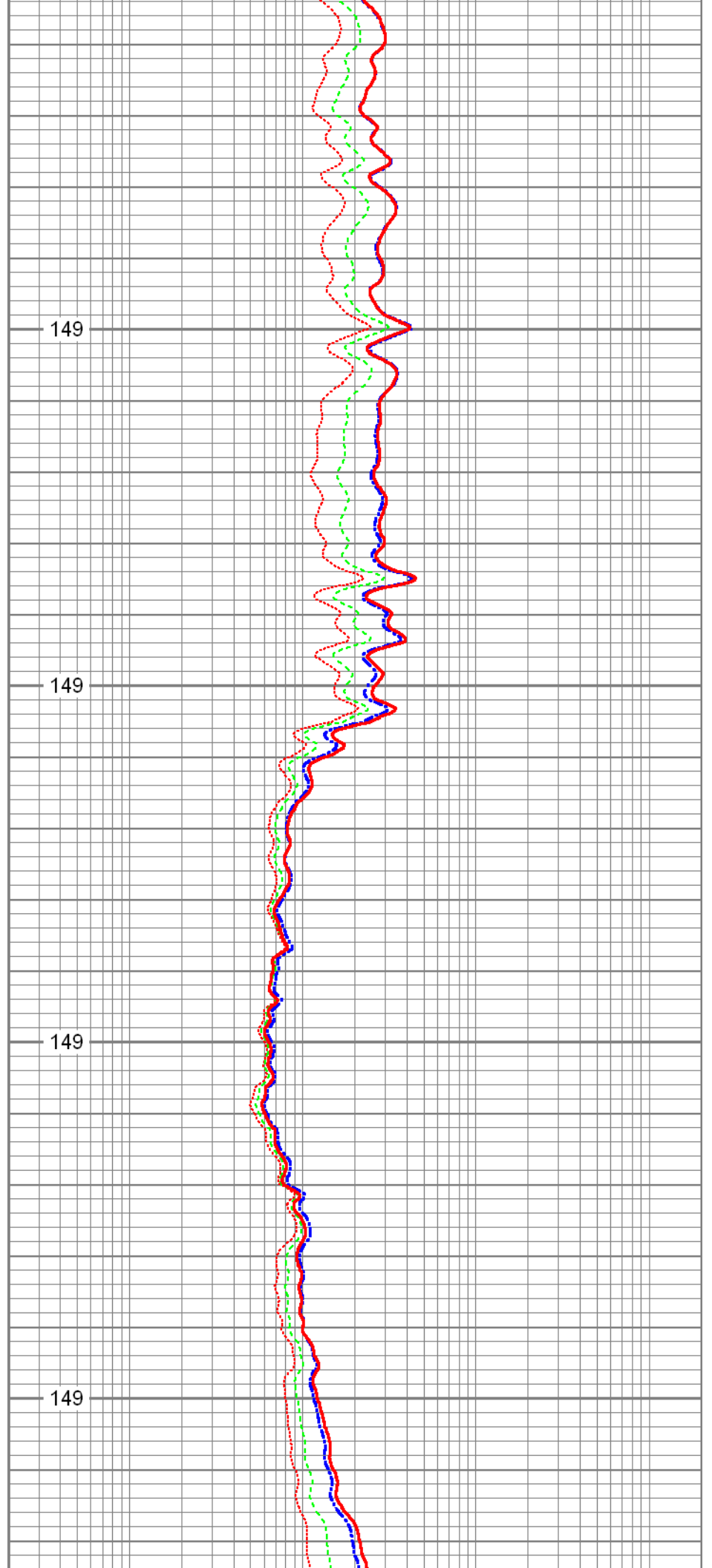
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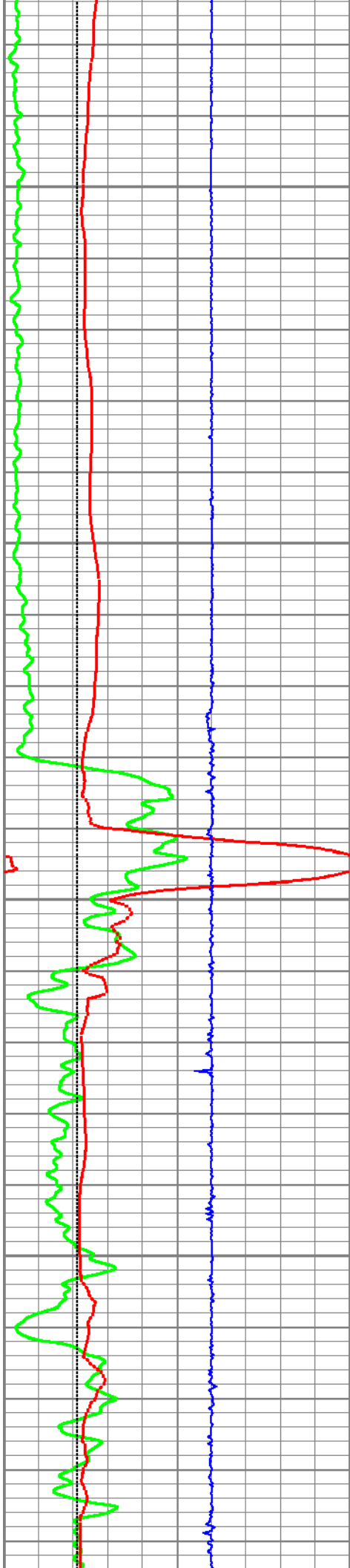
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10100

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10150

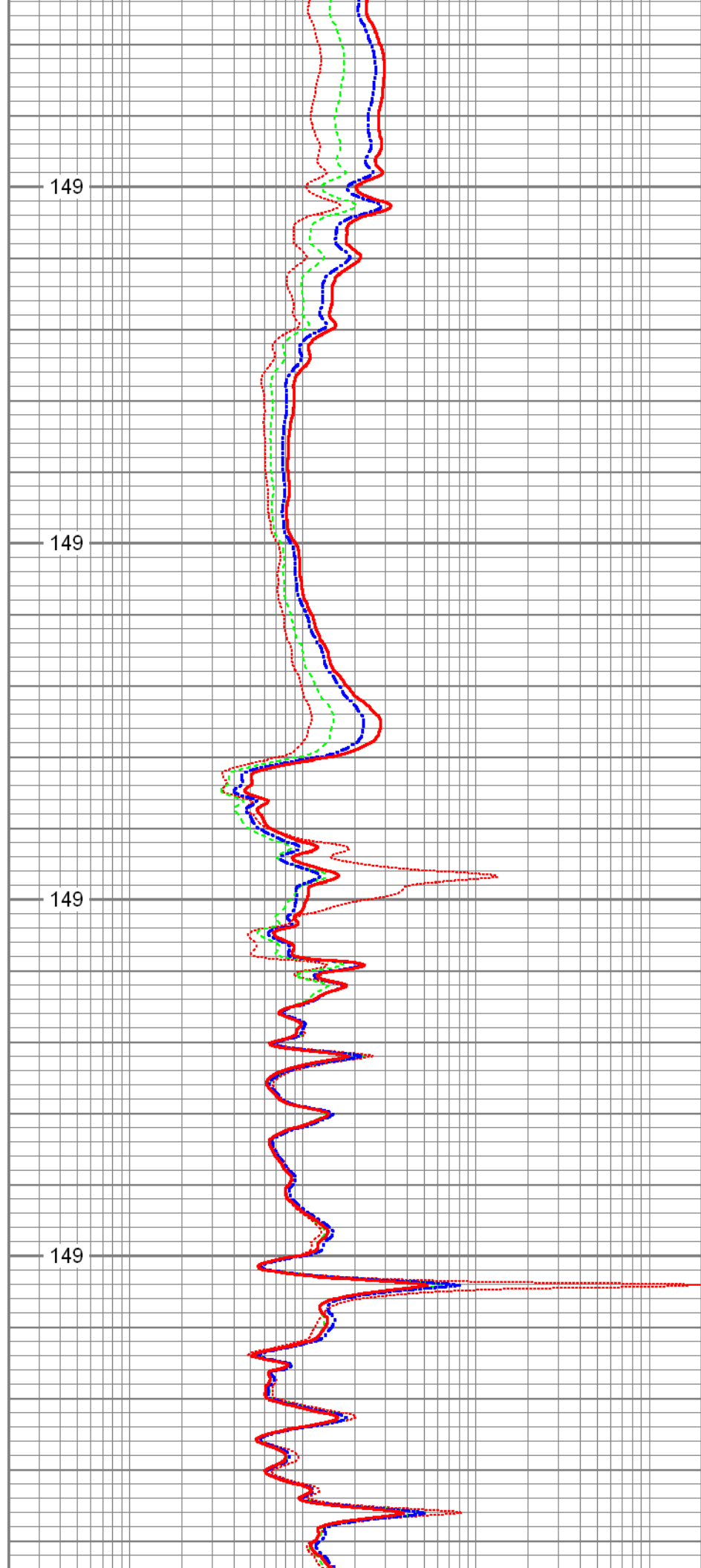
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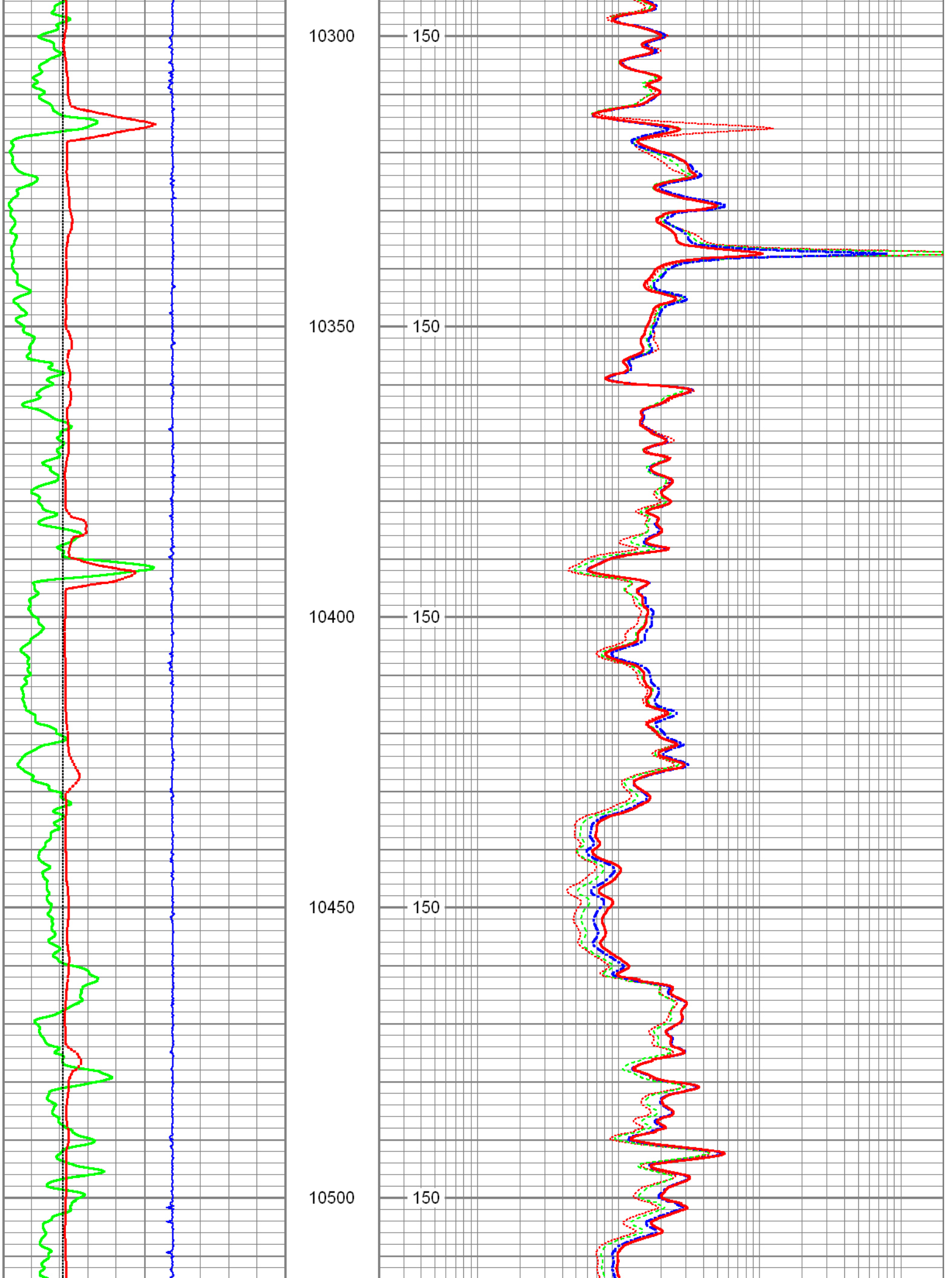
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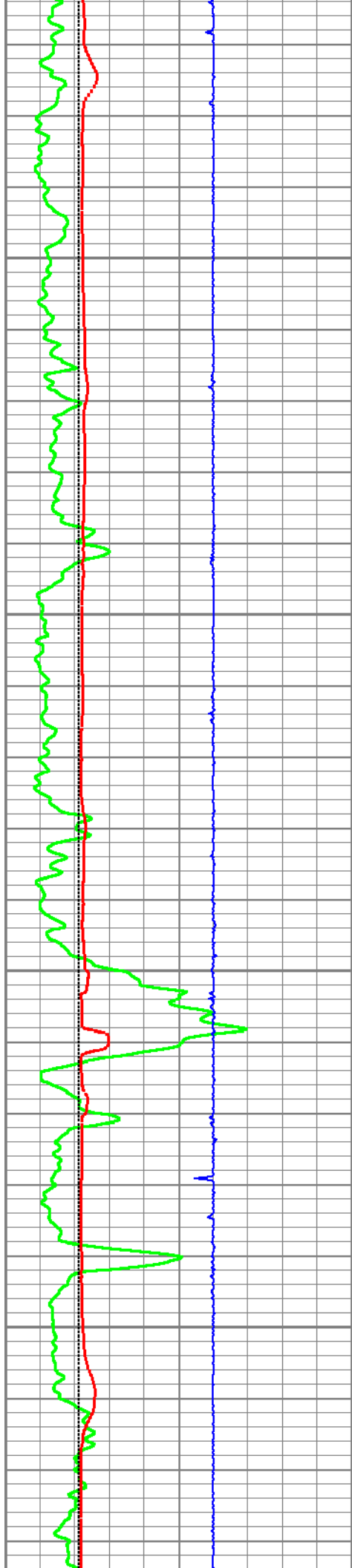
149

10250

149







10550

150

10600

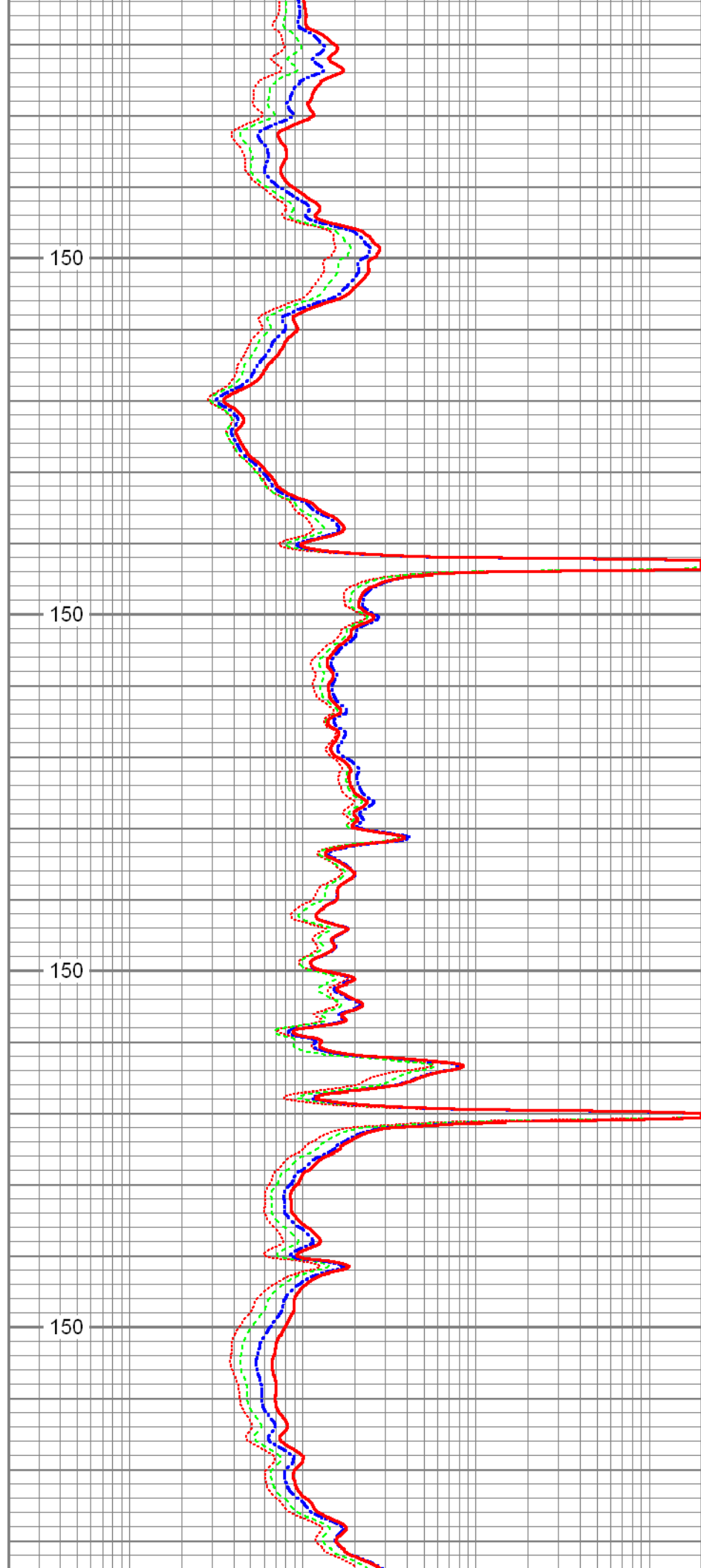
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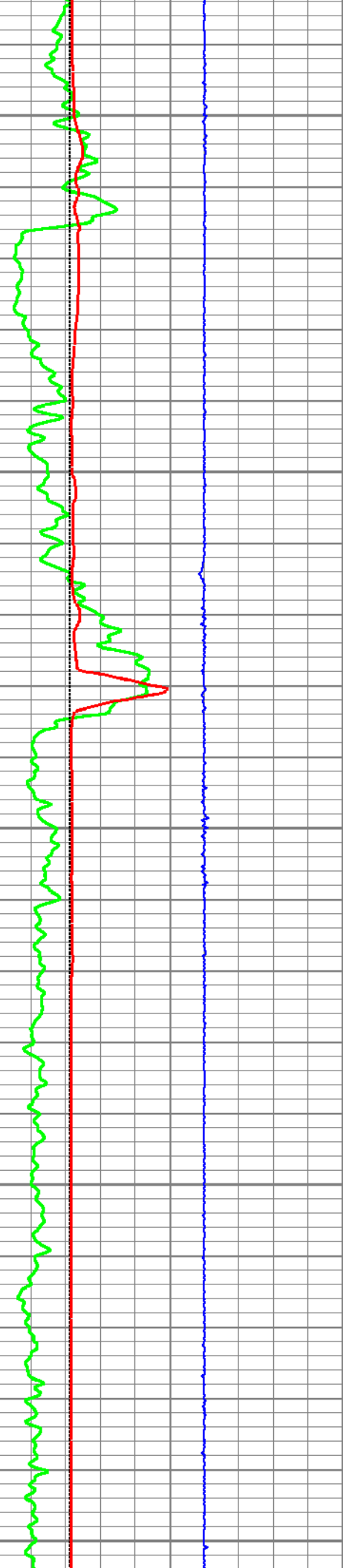
10650

150

10700

150





10750

150

10800

150

10850

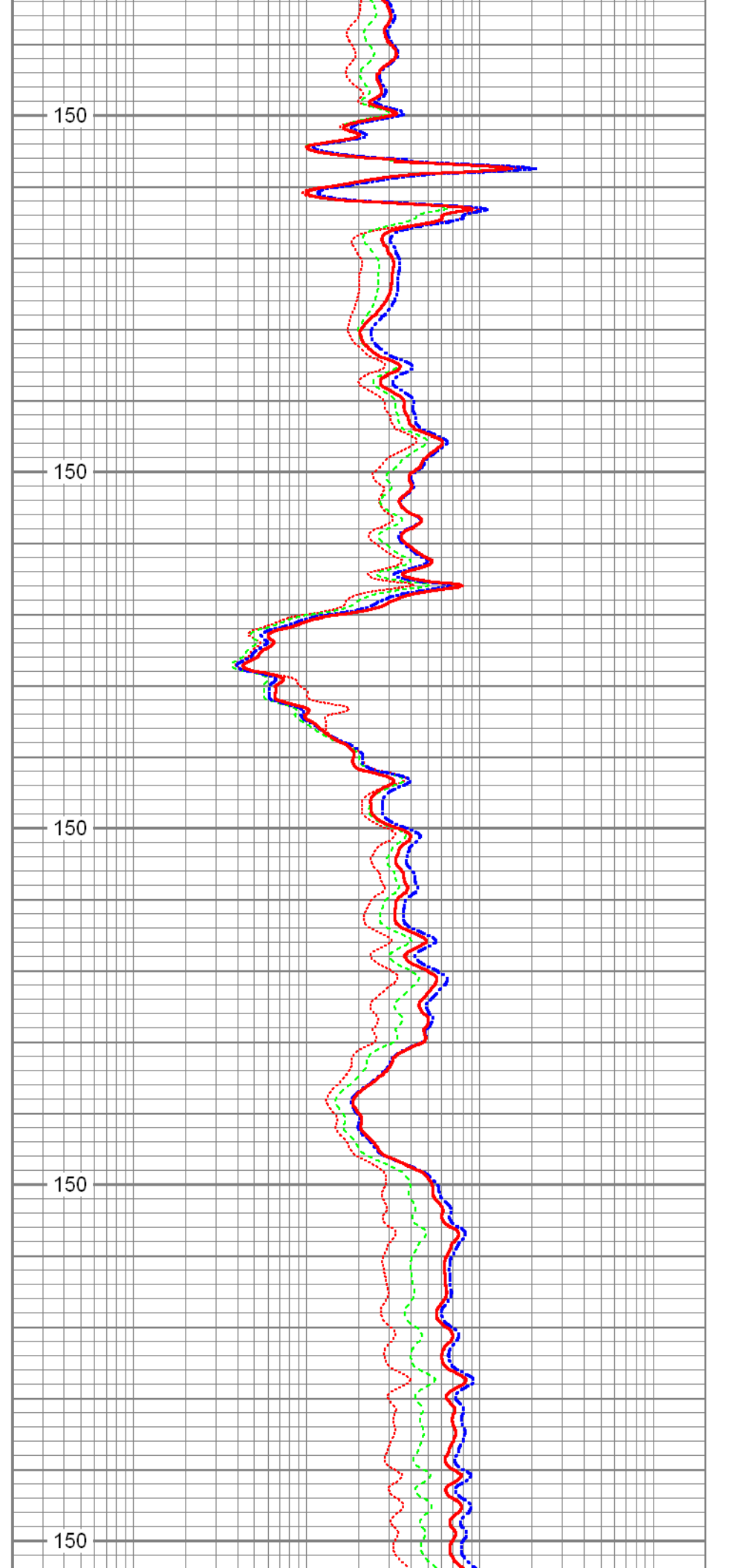
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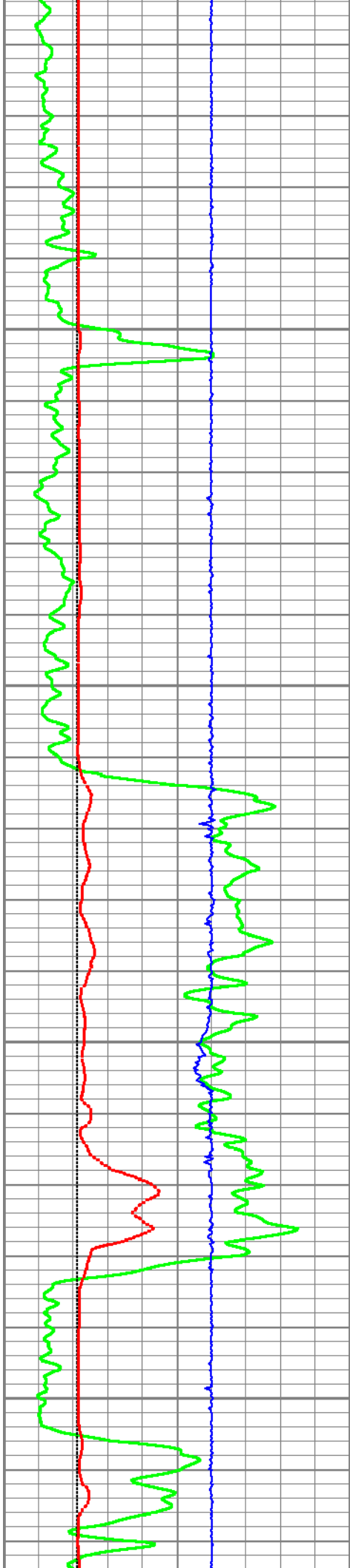
10900

150

10950

150





11000

11050

11100

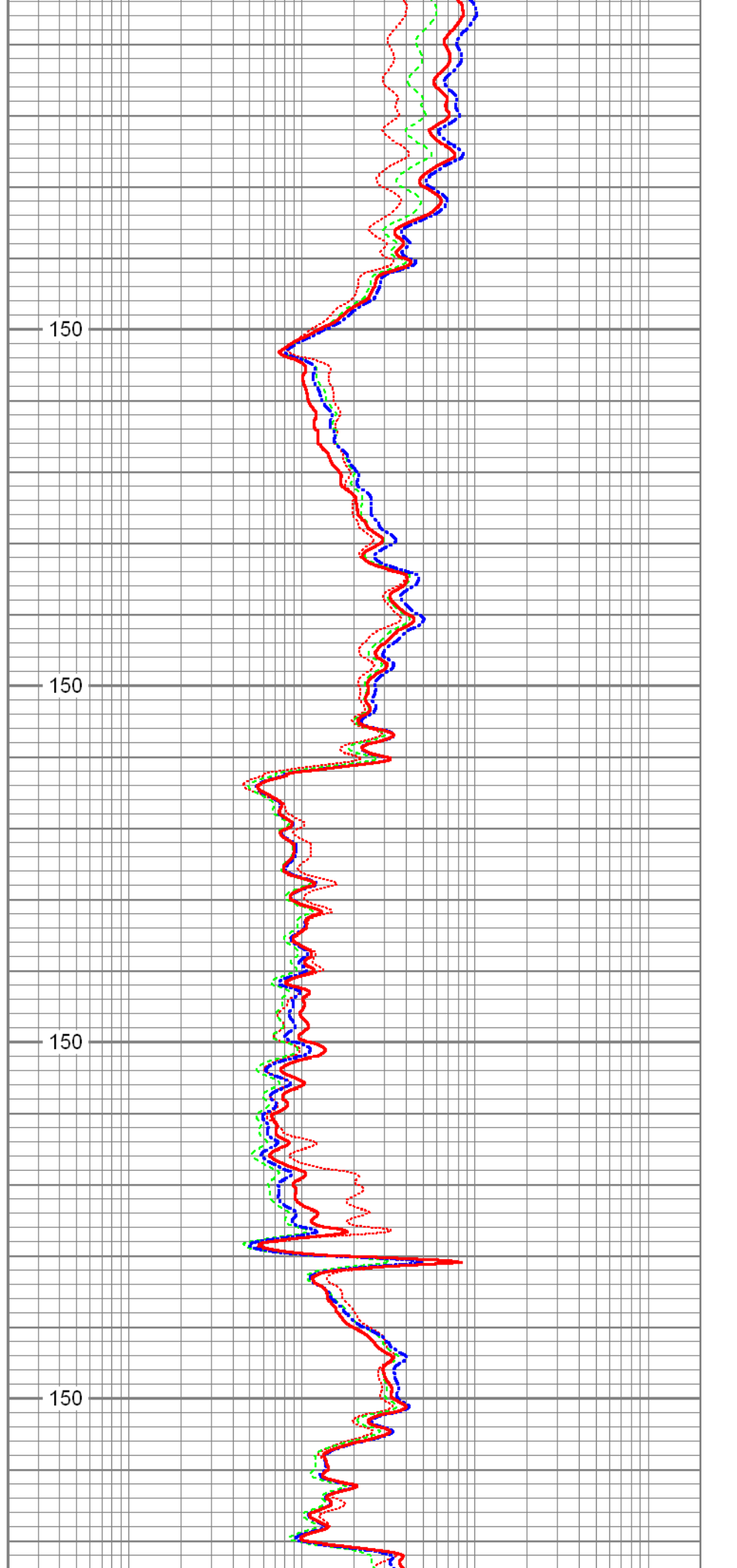
11150

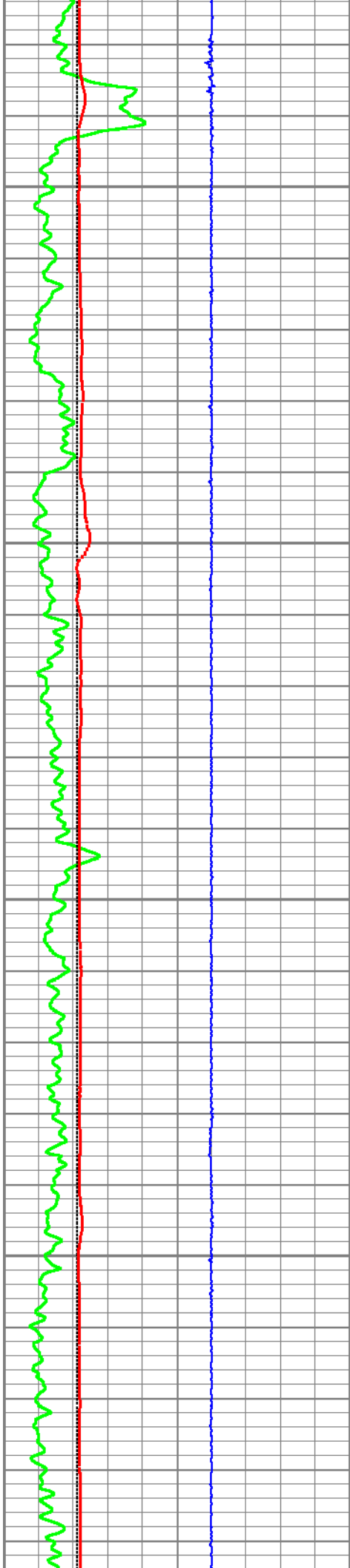
150

150

150

150





11200

150

11250

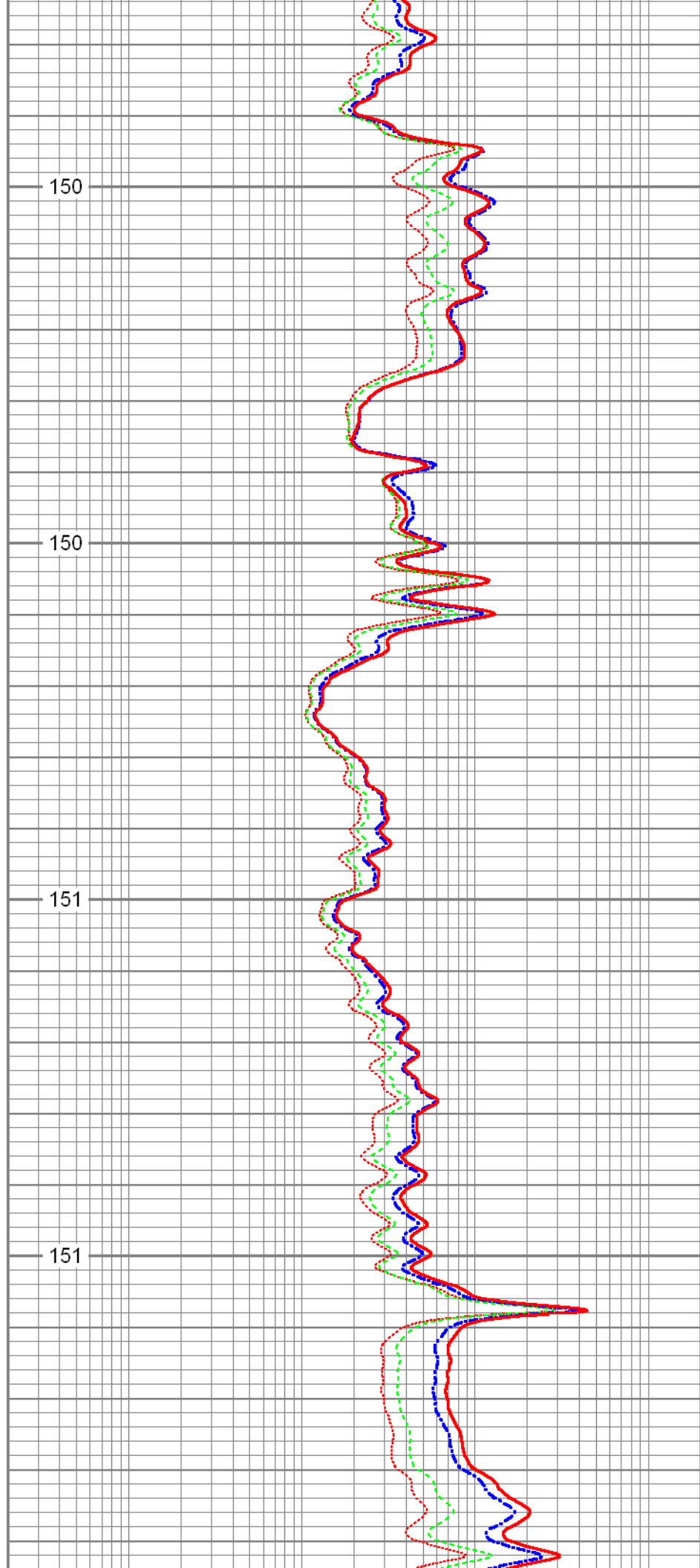
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11300

151

11350

151





11400

151

11450

151

11500

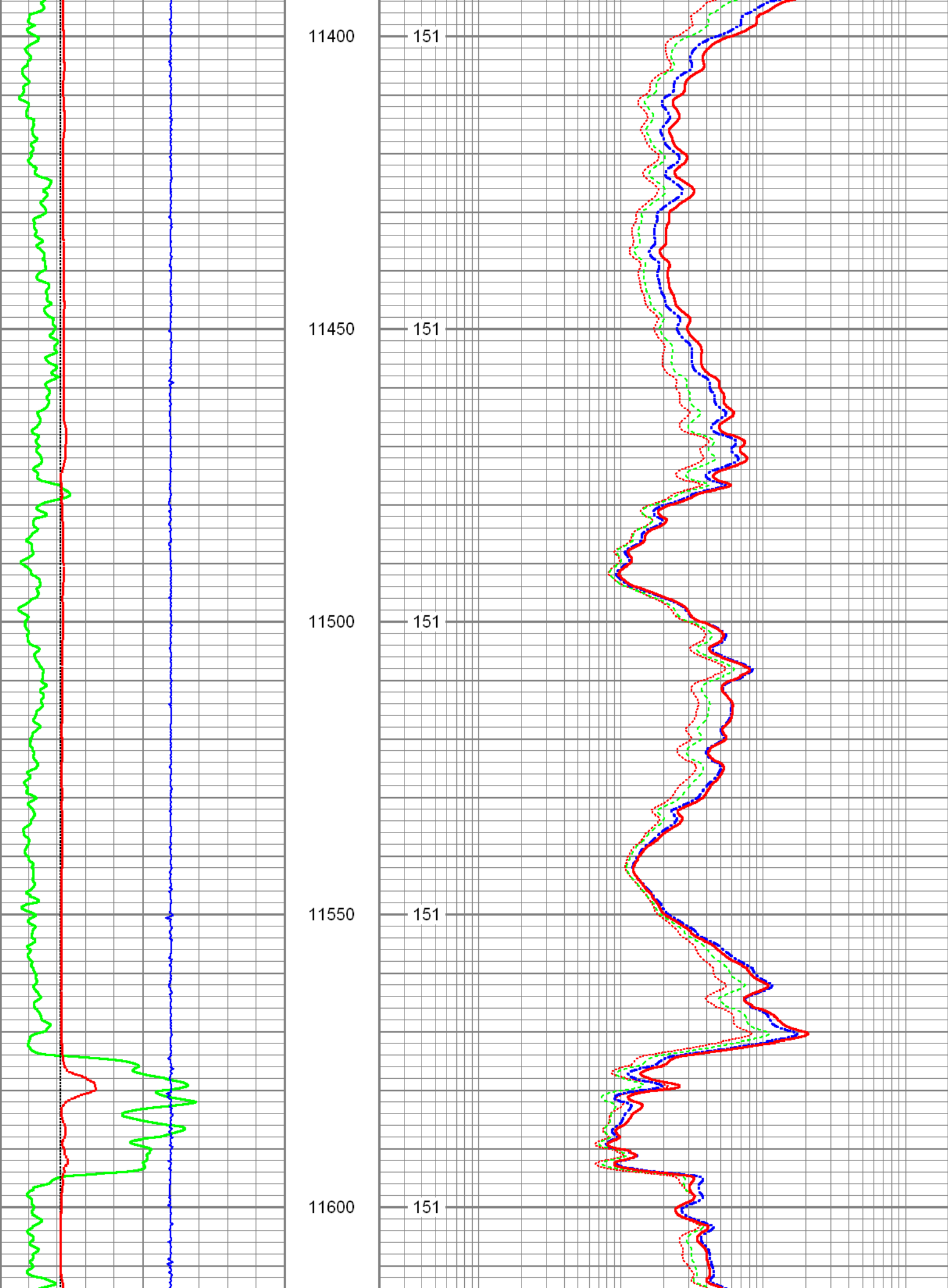
151

11550

151

11600

151





11650

151

11700

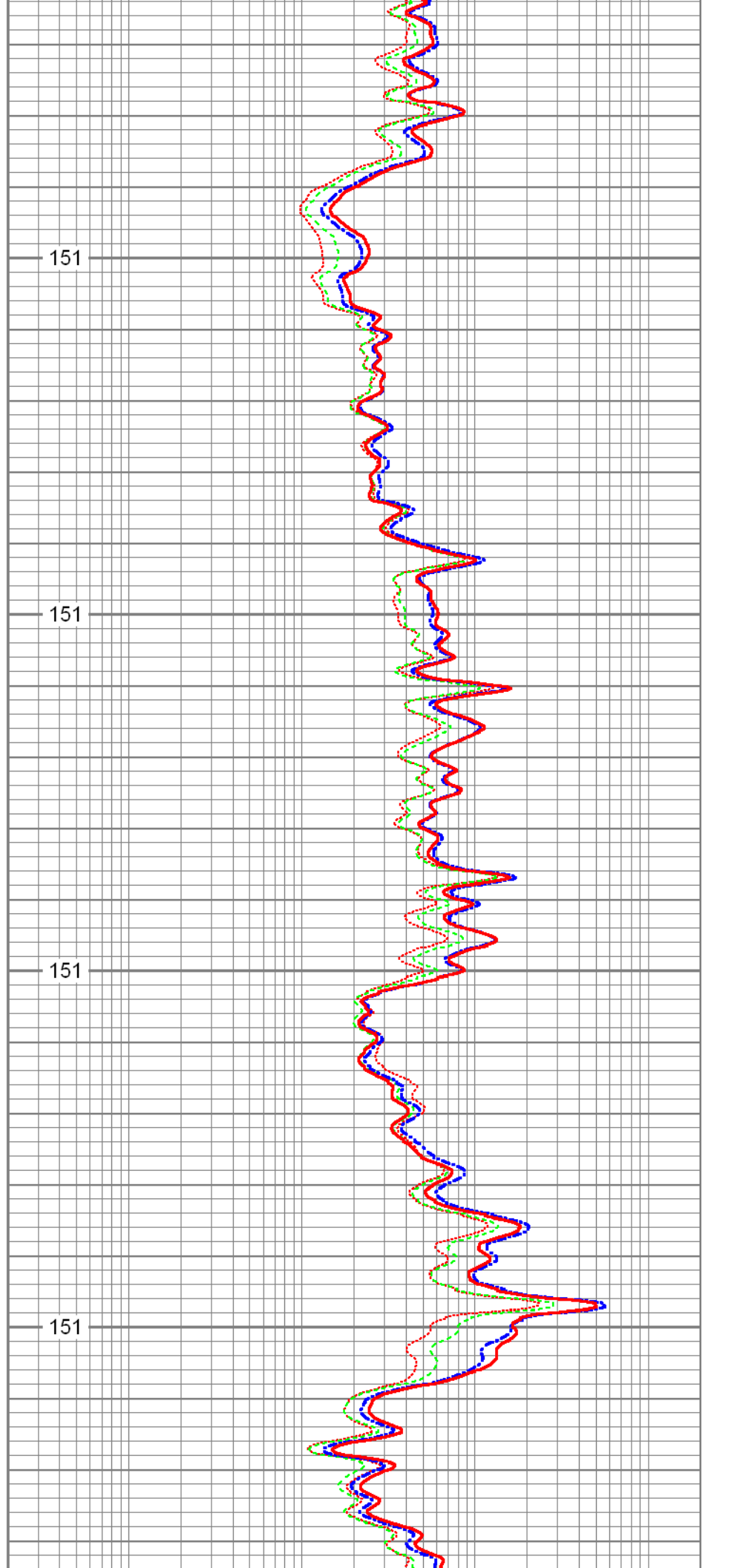
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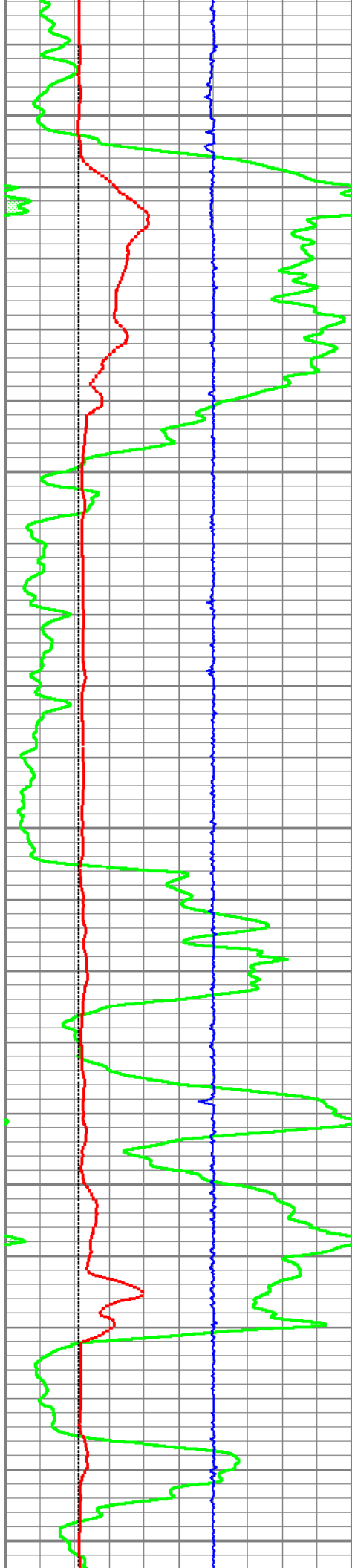
11750

151

11800

151





11850

11900

11950

12000

12050

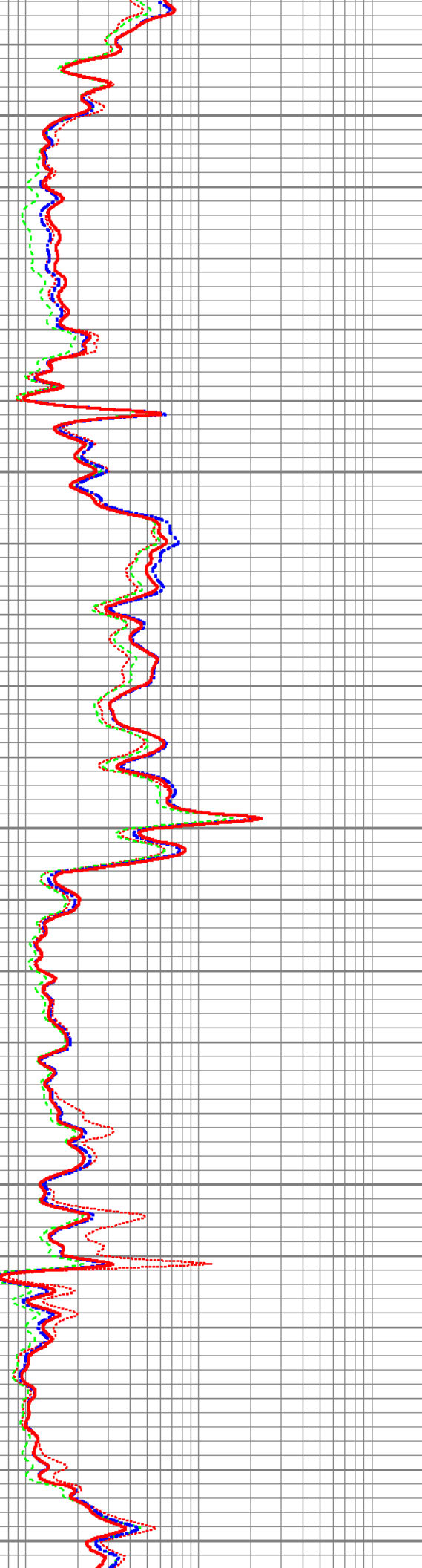
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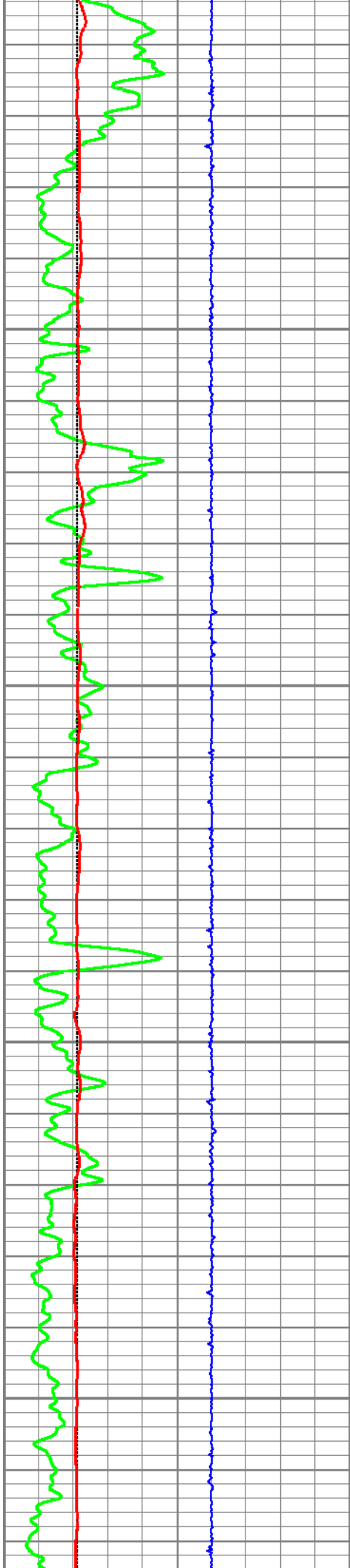
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151

151

151





12100

151

12150

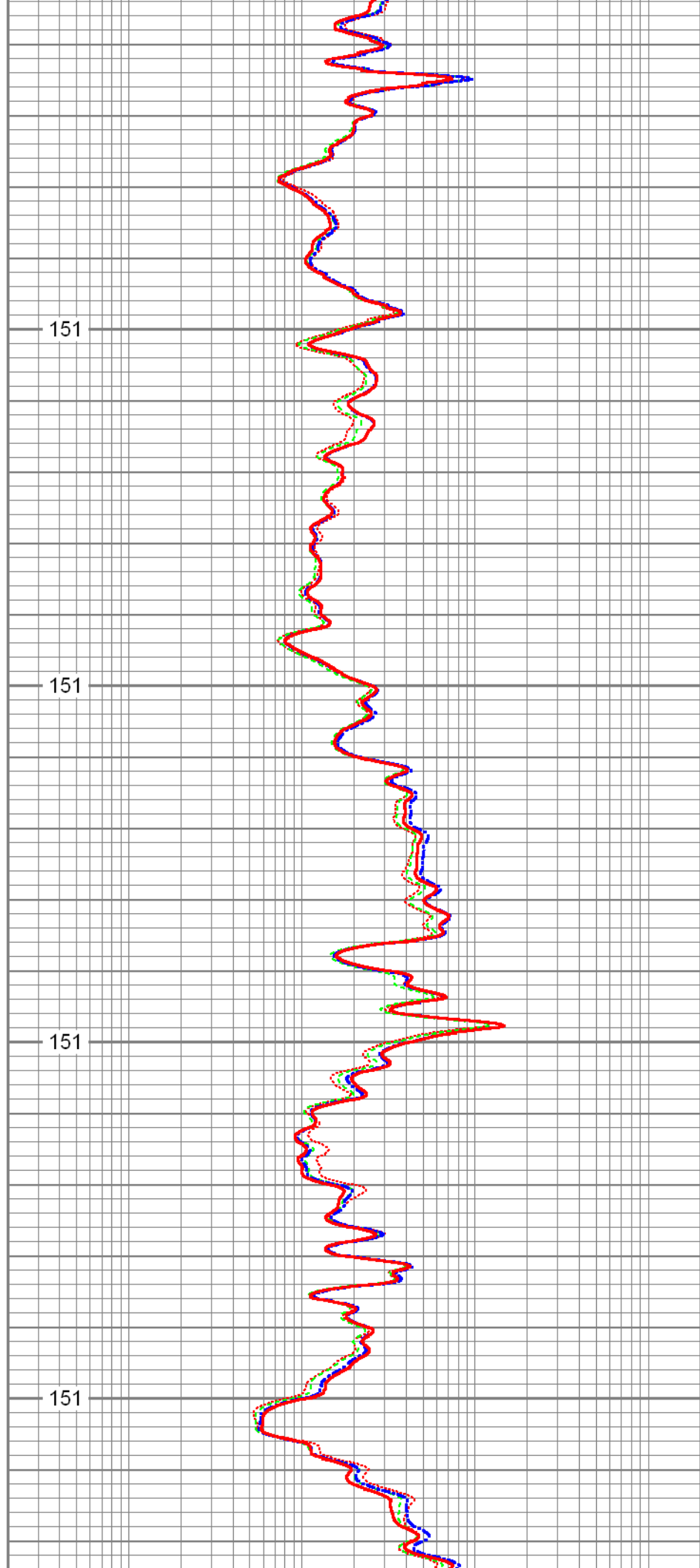
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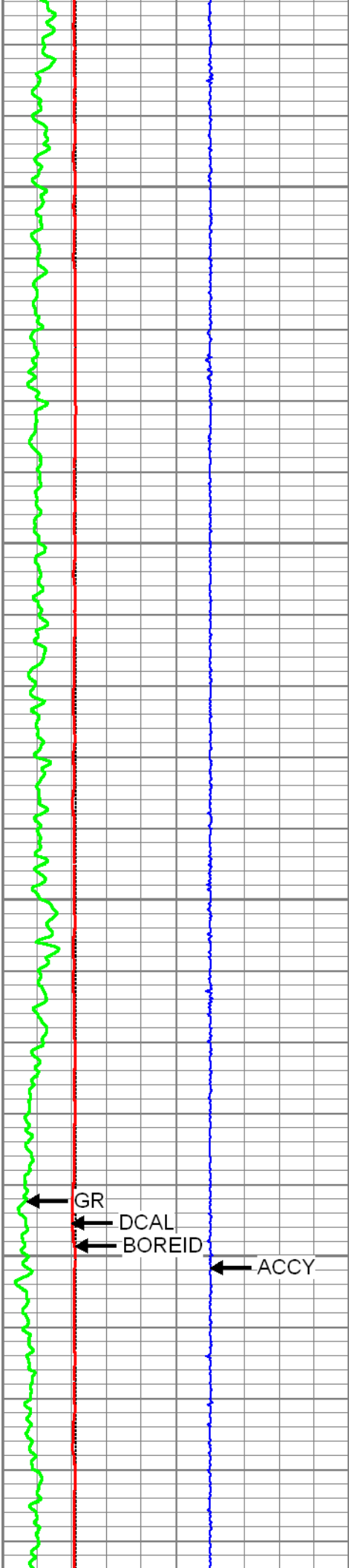
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151

12250

151





12300

151

12350

151

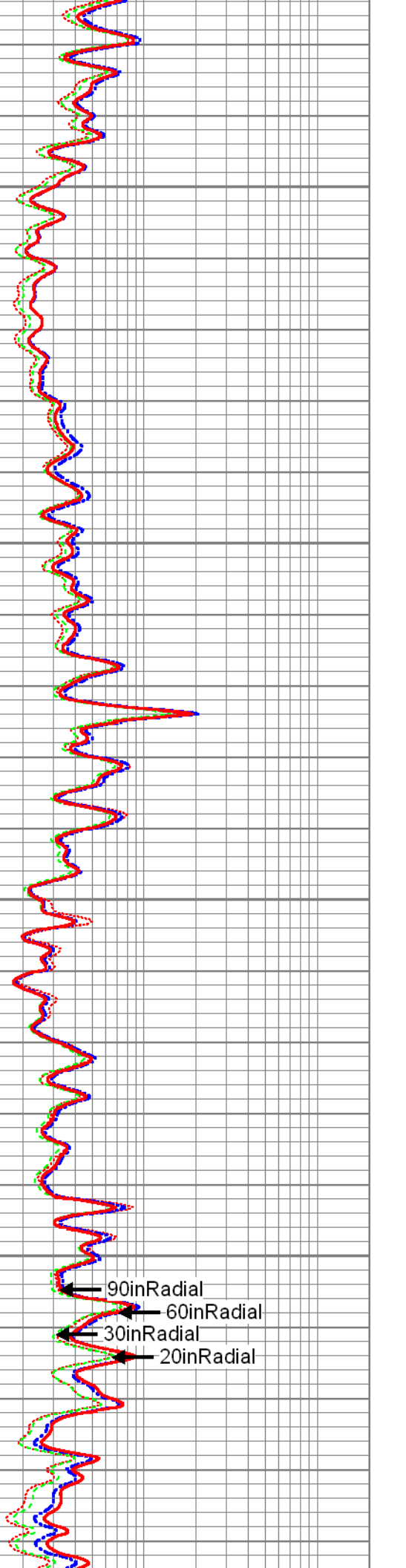
12400

150

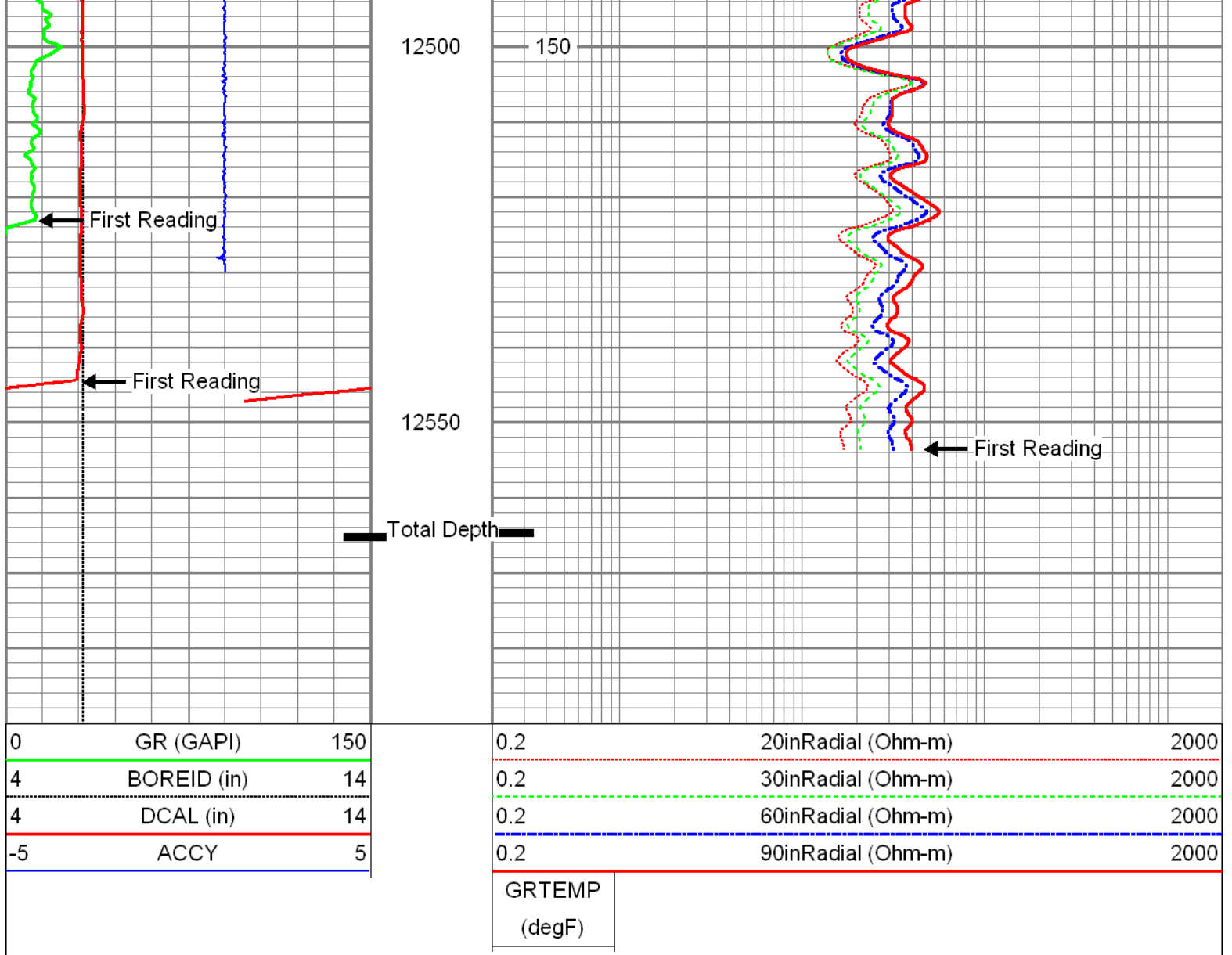
12450

150

GR  
DCAL  
BOREID  
ACCY



90inRadial  
60inRadial  
30inRadial  
20inRadial



## Log Variables

Database: C:\Warrior\Data\hopkins\_mem.db  
 Dataset: field/well/proc1/pass1.4

### Top - Bottom

A	BHCOR	BHFL_TYPE	BHFLRES Ohm-m	BHFLRESSRC	BHIDSRC	BOREID in
1	On	WBM	1	MUDCELL	CURVE	6.125
BOTTEMP degF	CASED?	CASEOD in	CASETHCK in	CEMWATERSA kppm	CMNTTHCK in	DNBHC?
151	No	4.5	0	0	0	NO
DPORSEL	FLUIDDEN g/cc	FRMSALIN kppm	LATNOR	M	MATRXDEN g/cc	MUDSALIN kppm
RHOB	1	0	Off	2	2.71	6.4
MudWgt lb/gal	NPORSEL	PEBHC?	PERFS	RESTMPSRC	SO in	SRFTEMP degF
8.5	Limestone	YES	0	INTERNAL	2.5	65
SZCOR	TDEPTH ft	TMPCOR	TOOLPOS			
On	12589	On	Ec-centered			

Calibration Report

Database File: hopkins\_mem.db  
 Dataset Pathname: proc1/pass1.4  
 Dataset Creation: Tue Apr 10 09:51:08 2012

ThruBit Induction Calibration Report

Tool Model-Serial Number: PS-PS12R  
 Shop Calibration Performed: Sun Mar 18 12:09:00 2012

BASELINE

	R	Expected	X	Expected
Freq 1				
A1	-444.7680	[-500.00, -400.00]	360.4830	[-500.00, 500.00]
A2	-135.8470	[-180.00, -100.00]	342.0540	[-500.00, 500.00]
A3	-28.0414	[-50.00, -10.00]	42.4355	[-500.00, 500.00]
A4	-14.1751	[-30.00, -10.00]	294.5030	[-500.00, 500.00]
A5	-14.4353	[-30.00, -10.00]	137.4160	[-500.00, 500.00]
Freq 2				
A1	-228.6050	[-280.00, -180.00]	202.7520	[-500.00, 500.00]
A2	-87.6561	[-130.00, -50.00]	193.1140	[-500.00, 500.00]
A3	-20.9946	[-50.00, -10.00]	-24.6789	[-500.00, 500.00]
A4	-17.9897	[-30.00, -10.00]	104.9090	[-500.00, 500.00]
A5	-19.2653	[-30.00, -10.00]	-6.0731	[-500.00, 500.00]
Freq 3				
A1	-142.5700	[-180.00, -80.00]	75.3272	[-500.00, 500.00]
A2	-66.4380	[-130.00, -30.00]	98.1865	[-500.00, 500.00]
A3	-16.8818	[-50.00, -10.00]	-76.7036	[-500.00, 500.00]
A4	-19.6149	[-30.00, -10.00]	-18.6520	[-500.00, 500.00]
A5	-21.5785	[-30.00, -10.00]	-110.2220	[-500.00, 500.00]
Freq 4				
A1	-76.0956	[-120.00, -40.00]	-116.4930	[-500.00, 500.00]
A2	-48.5395	[-110.00, -10.00]	-27.2366	[-500.00, 500.00]
A3	-13.2584	[-50.00, -10.00]	-160.1260	[-500.00, 500.00]
A4	-22.7620	[-30.00, -10.00]	-197.5240	[-500.00, 500.00]
A5	-26.7818	[-30.00, -10.00]	-283.3550	[-500.00, 500.00]

CALIBRATION COEFFICIENTS

	R	Expected	X	Expected
Freq 1				
A1	0.9897	[0.95, 1.05]	-0.0006	[-0.05, 0.05]
A2	0.9887	[0.95, 1.05]	0.0016	[-0.05, 0.05]
A3	0.9989	[0.95, 1.05]	-0.0056	[-0.05, 0.05]
A4	0.9874	[0.95, 1.05]	0.0041	[-0.05, 0.05]
A5	0.9954	[0.95, 1.05]	0.0015	[-0.05, 0.05]
Freq 2				
A1	0.9854	[0.95, 1.05]	-0.0082	[-0.05, 0.05]
A2	0.9831	[0.95, 1.05]	-0.0054	[-0.05, 0.05]
A3	0.9872	[0.95, 1.05]	-0.0053	[-0.05, 0.05]
A4	0.9828	[0.95, 1.05]	-0.0033	[-0.05, 0.05]

A5	0.9916	[0.95, 1.05]	-0.0060	[-0.05, 0.05]
Freq 3				
A1	0.9874	[0.95, 1.05]	-0.0027	[-0.05, 0.05]
A2	0.9853	[0.95, 1.05]	-0.0001	[-0.05, 0.05]
A3	0.9890	[0.95, 1.05]	-0.0002	[-0.05, 0.05]
A4	0.9840	[0.95, 1.05]	0.0020	[-0.05, 0.05]
A5	0.9948	[0.95, 1.05]	-0.0004	[-0.05, 0.05]
Freq 4				
A1	0.9894	[0.95, 1.05]	0.0008	[-0.05, 0.05]
A2	0.9867	[0.95, 1.05]	0.0027	[-0.05, 0.05]
A3	0.9922	[0.95, 1.05]	0.0006	[-0.05, 0.05]
A4	0.9862	[0.95, 1.05]	0.0040	[-0.05, 0.05]
A5	1.0046	[0.95, 1.05]	0.0003	[-0.05, 0.05]
Temperature	22.3167 degC			

### ThruBit Density Calibration Report

Tool Model-Serial Number: PS-PS30D  
Source Number:  
Shop Calibration Performed: Thu Apr 05 14:44:07 2012

#### REFERENCE

	Density	Units
Aluminium	2.607	g/cc
Magnesium	1.752	g/cc

#### READINGS

Outputs	Counts	Units	Expected
SS1 Background	141.71	cps	[130.00, 170.00]
LS1 Background	144.95	cps	[130.00, 170.00]
LS4 Background	30.13	cps	[27.00, 35.00]
SS1 Aluminium	4901.07	cps	[4500.00, 5500.00]
LS1 Aluminium	896.18	cps	[750.00, 950.00]
LS4 Aluminium	933.10	cps	[843.00, 1068.00]
SS1 Magnesium	8153.24	cps	[7000.00, 9000.00]
LS1 Magnesium	5807.36	cps	[5250.00, 6250.00]
LS1 Al + Fe	766.62	cps	[650.00, 800.00]
LS4 Al + Fe	420.79	cps	[382.00, 471.00]

#### RESULTS

SS Slope	1.64	[1.52, 1.77]
LS Slope	0.42	[0.38, 0.45]
PEF K Factor	4.635	[3.510, 6.170]
PEF B Factor	-0.504	[-0.700, -0.410]

Caliper Shop Calibration performed: Thu Apr 05 14:44:07 2012

#### RESULTS

Reference	Reading	Units
-----------	---------	-------



12.00	1961.16	in
9.00	2120.27	in
6.00	2286.12	in

DENSITY PRE-SURVEY CHECK Performed: Sat Apr 07 12:37:06 2012

Outputs	Counts	Units	Expected
SS1 Background	141.76	cps	[137.46, 145.96]
LS1 Background	146.19	cps	[140.60, 149.30]
LS4 Background	30.74	cps	[28.32, 31.93]

CALIPER PRE-SURVEY CHECK Performed: Sat Apr 07 12:37:34 2012

Reference	Readings	Units	Expected
9.00	9.00	in	[8.80, 9.20]

### Compensated Neutron Calibration Report

Tool Model-Serial Number:	PS-PS27N
Source Number:	
Calibration Tank Temperature:	62.1 degF
Shop Calibration Performed:	Thu Mar 22 14:02:19 2012

#### BACKGROUND MEASUREMENT

Outputs	Measured	Units	Expected
SS Counts	0.1	cps	<10
LS Counts	0.1	cps	<4

#### WATER TANK REFERENCE

Outputs	Measured	Units	Expected
SS Counts	949.1	cps	
LS Counts	32.1	cps	
Tank Ratio Ref	30.9580	SS/LS	
Tank Ratio	29.5972	SS/LS	
Tank Ratio Gain	1.0460		[0.85, 1.15]

#### ALUMINUM SLEEVE REFERENCE

Outputs	Measured	Units	Expected
SS Counts	10593.8	cps	
LS Counts	1035.0	cps	
Al Ratio Ref	10.797	SS/LS	
Al Ratio	10.706	SS/LS	

AI Ratio Gain	1.01	[0.90, 1.10]
Sleeve Porosity	14.46	pu

PRE-SURVEY BACKGROUND CHECK Performed: Sat Apr 07 12:42:12 2012

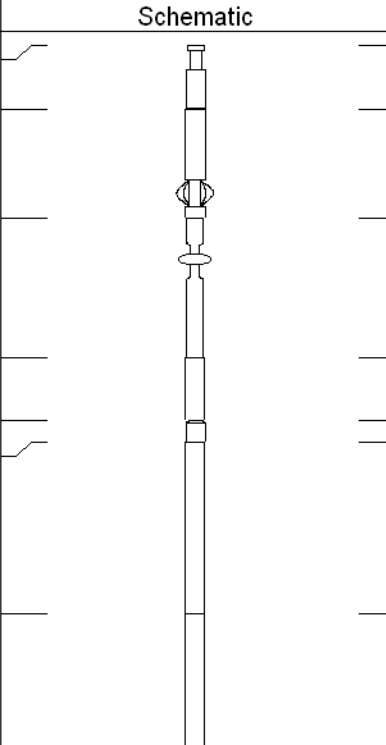
Outputs	Measured	Units	Expected
SS Counts	0.6	cps	<10
LS Counts	1.8	cps	<4

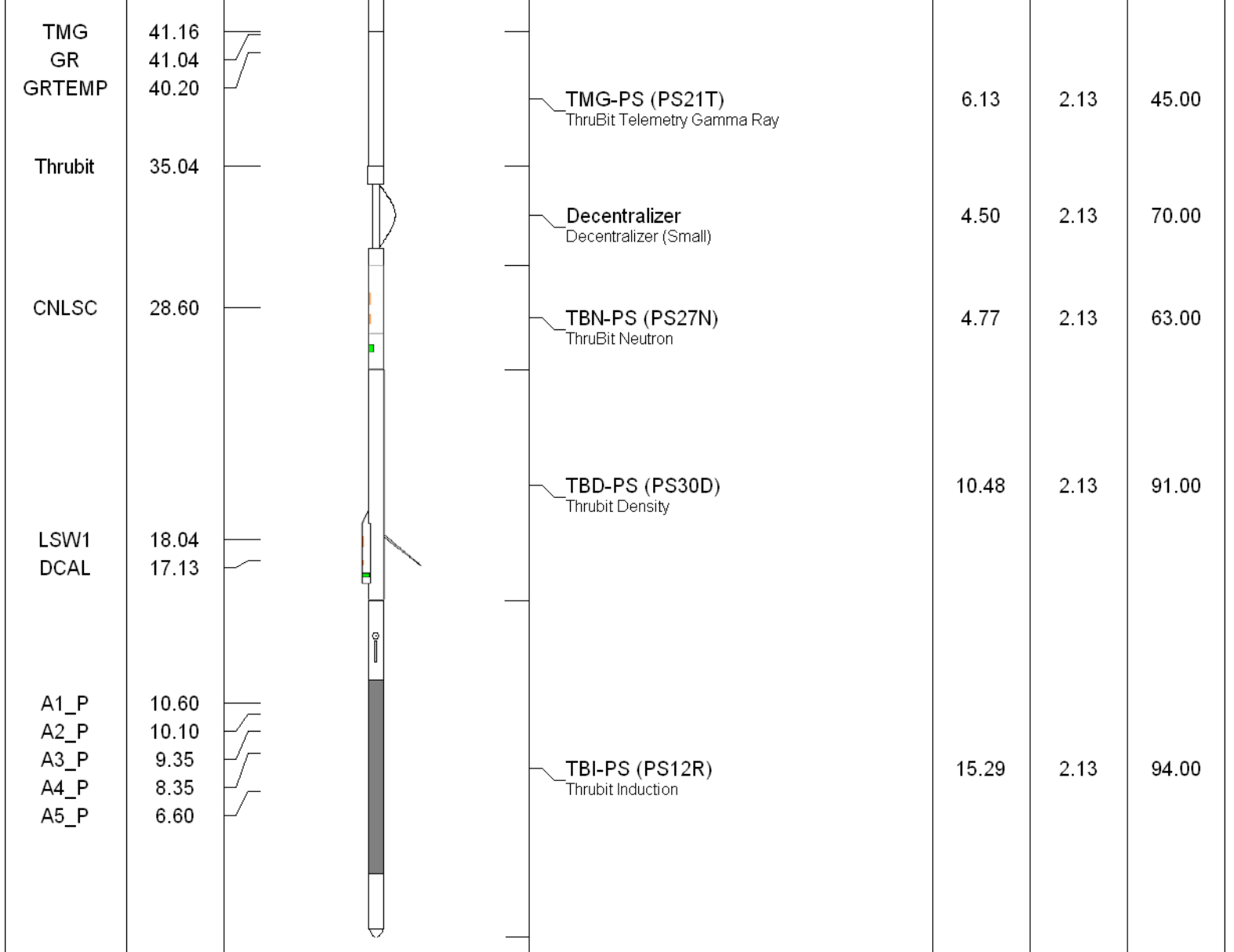
### Gamma Ray Calibration Report

Tool Model-Serial Number:	PS-PS21T		
Performed:	Thu Mar 22 14:19:49 2012		
Calibrator Value:	166.6	GAPI	
Background Reading:	53.2	cps	
Calibrator Reading:	385.7	cps	
Sensitivity:	0.3750	GAPI/cps	

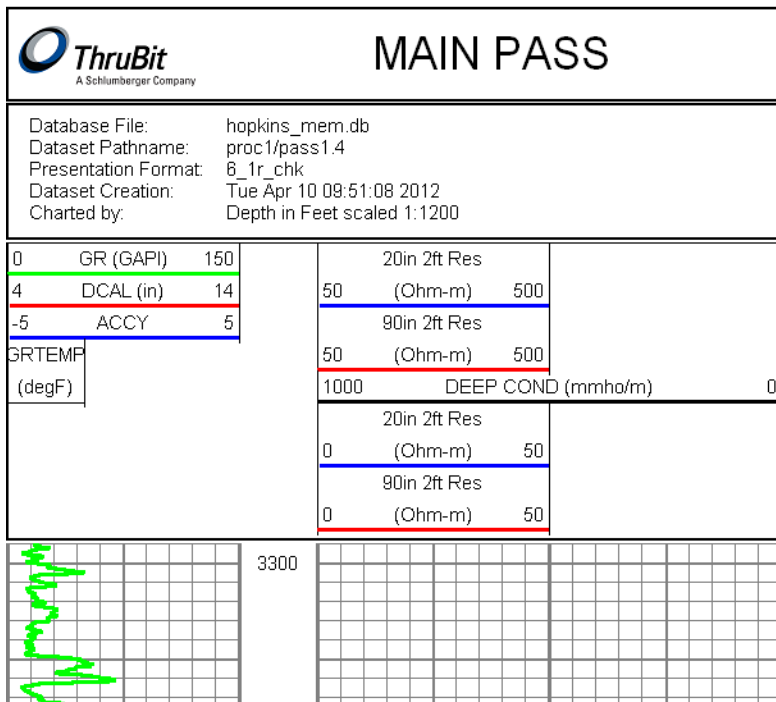
### Inclinometer Calibration Report

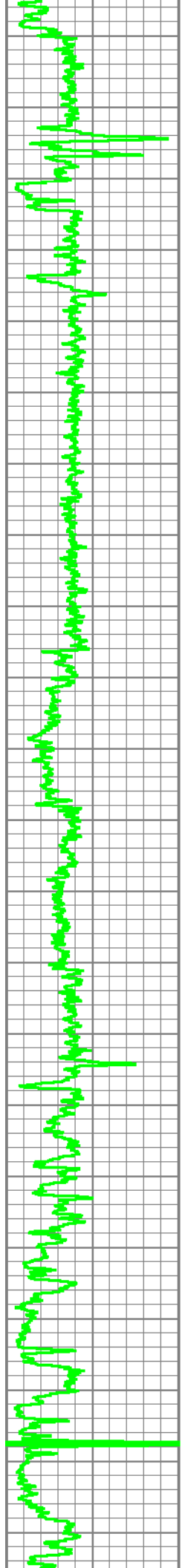
Performed:	Sun Jun 13 14:33:21 1993				
	Low Read.	High Read.	Low Ref.	High Ref.	
X Accelerometer	0.00	1.00	0.00	1.00	gee
Y Accelerometer	0.00	1.00	0.00	1.00	gee
Z Accelerometer	0.00	1.00	0.00	1.00	gee

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
Thrubit	67.59		Cablehead-S	2.31	2.13	5.00
Thrubit	65.28		Solid Weakpoint			
			PSBDOT	3.87	2.25	35.00
Thrubit	61.41		HangOff_Tool	5.00	2.38	60.00
Thrubit	56.41		Swivel	2.25	2.06	25.00
Thrubit	54.16		10-1	0.75	2.13	3.95
TBBAT	53.41		TBBAT-A (PS01B)	6.13	2.13	38.20
			Thrubit Battery			
TBBAT2	47.29		TBBAT2-A (PS13B)	6.13	2.13	40.00
			Thrubit Battery			

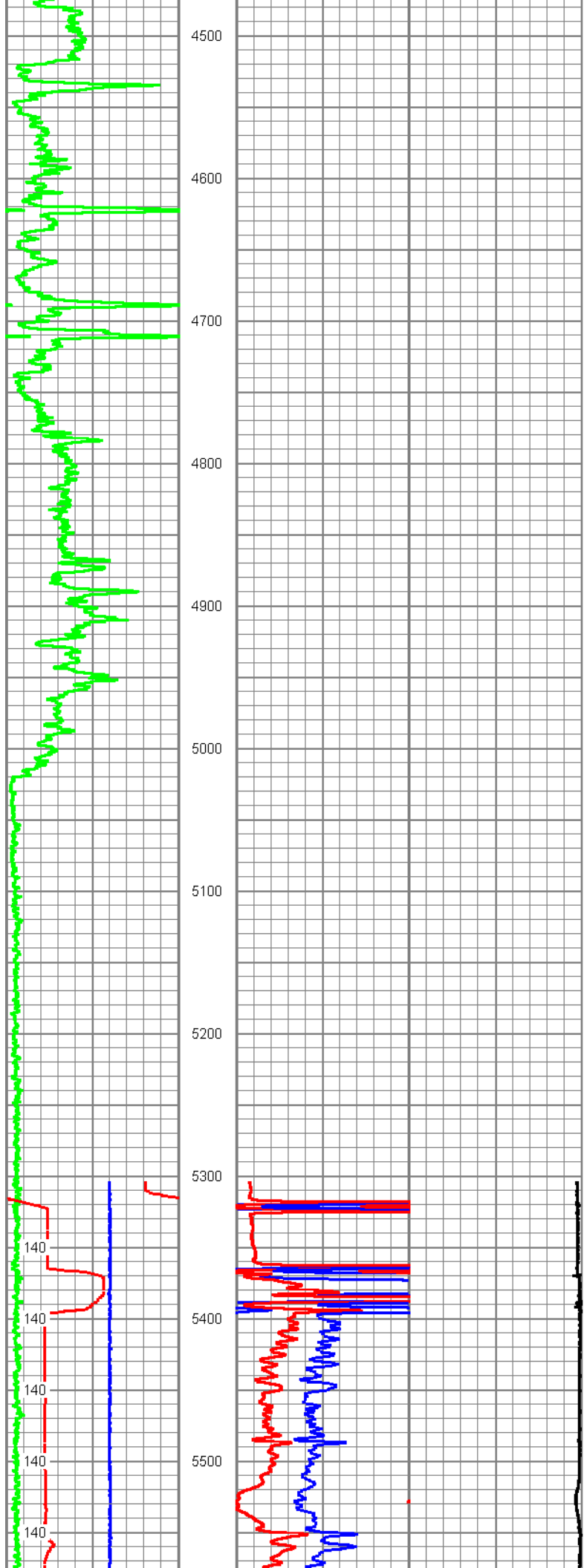


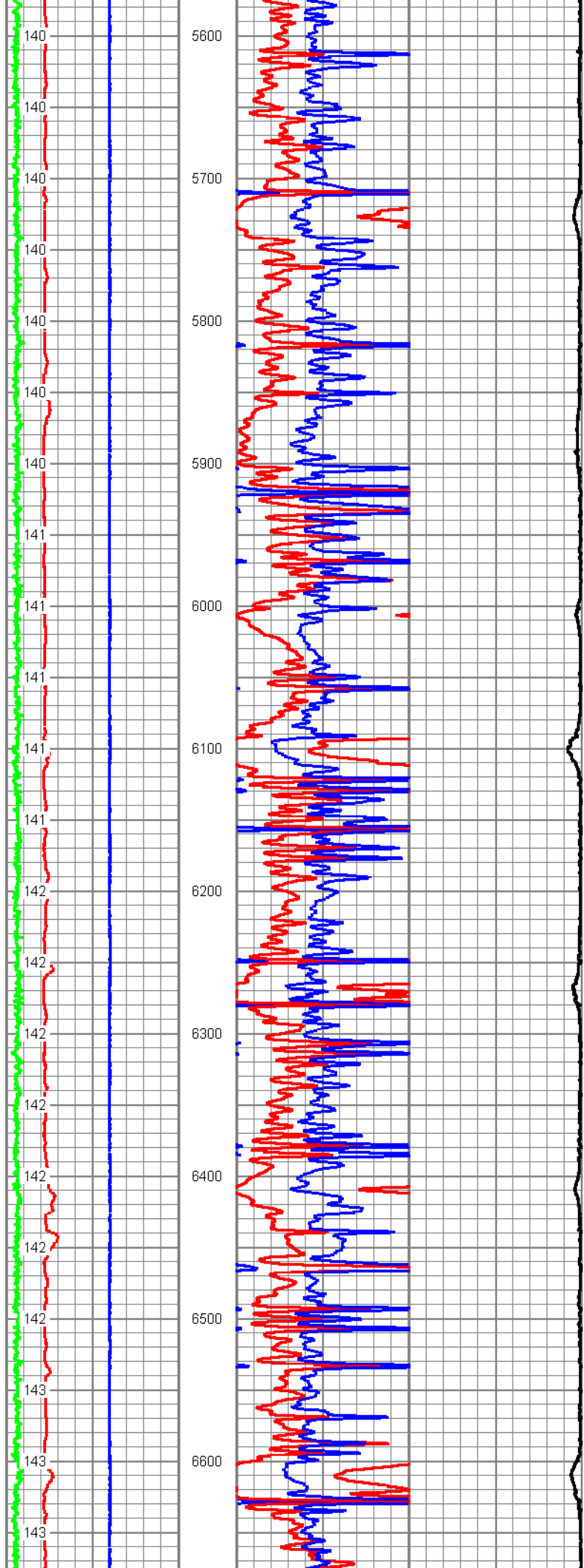
Dataset: hopkins\_mem.db: field/well/proc1/pass1.4  
 Total Length: 67.59 ft  
 Total Weight: 570.15 lb  
 O.D.: 2.38 in

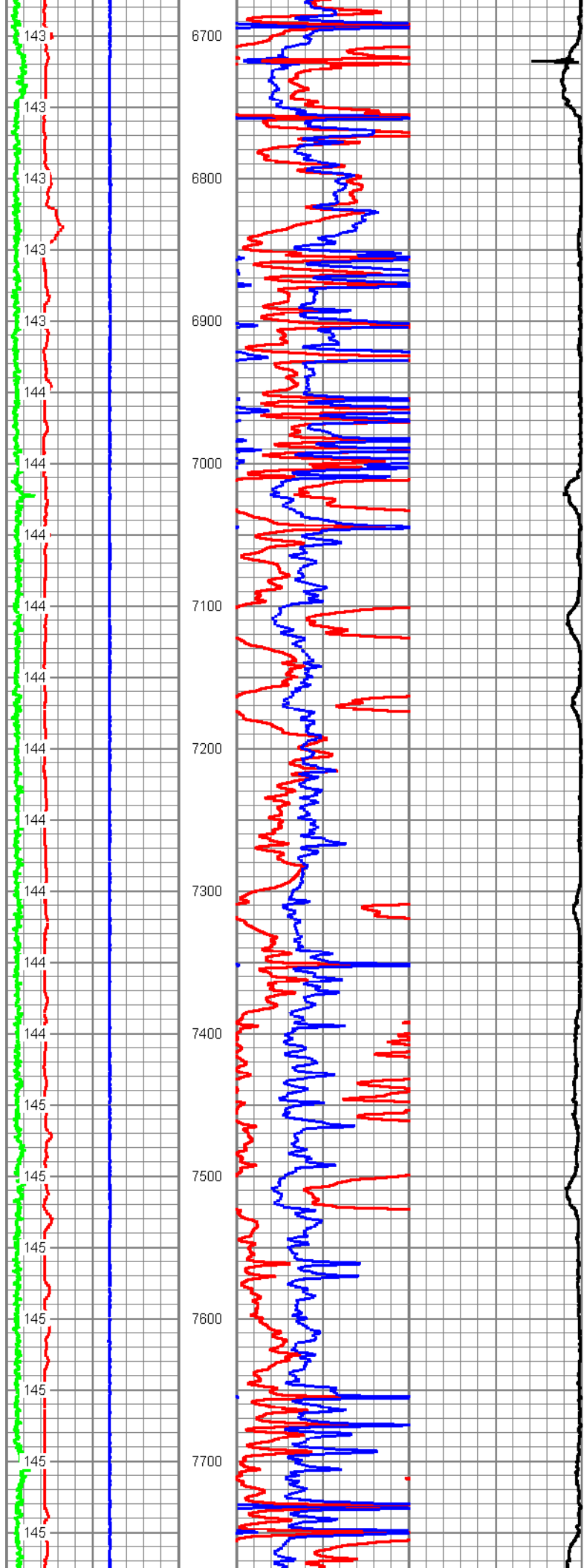


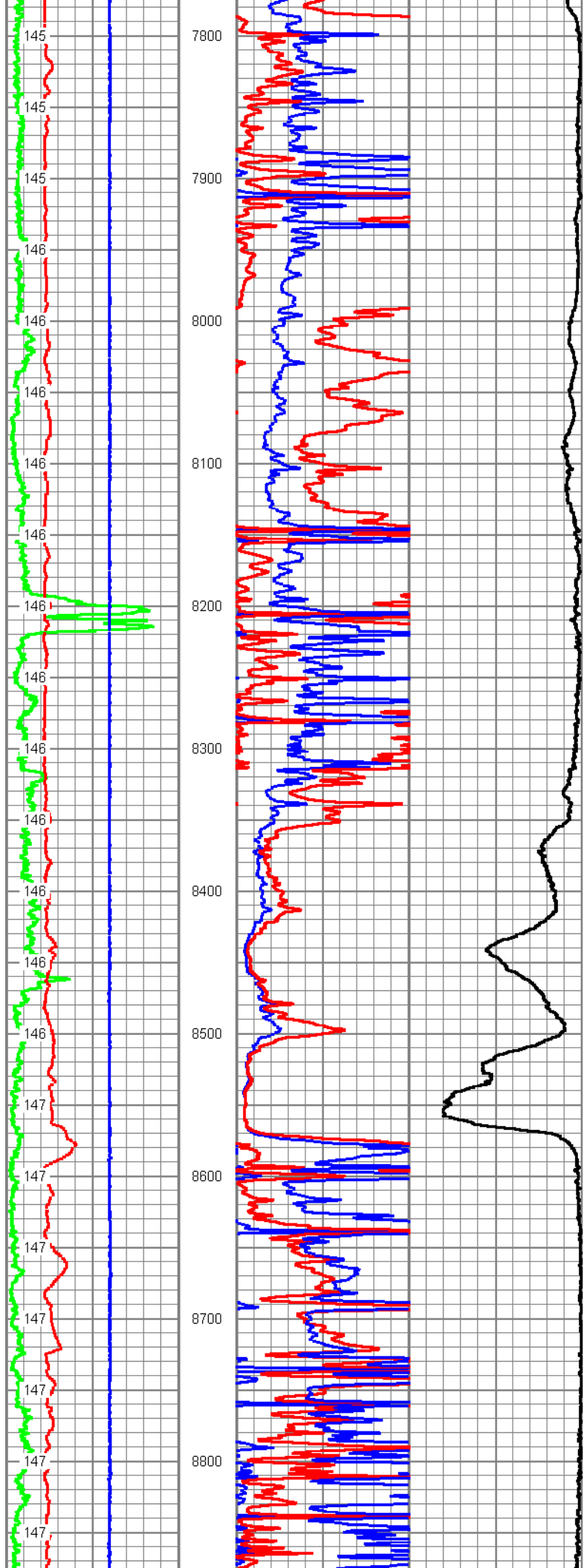


3400  
3500  
3600  
3700  
3800  
3900  
4000  
4100  
4200  
4300  
4400

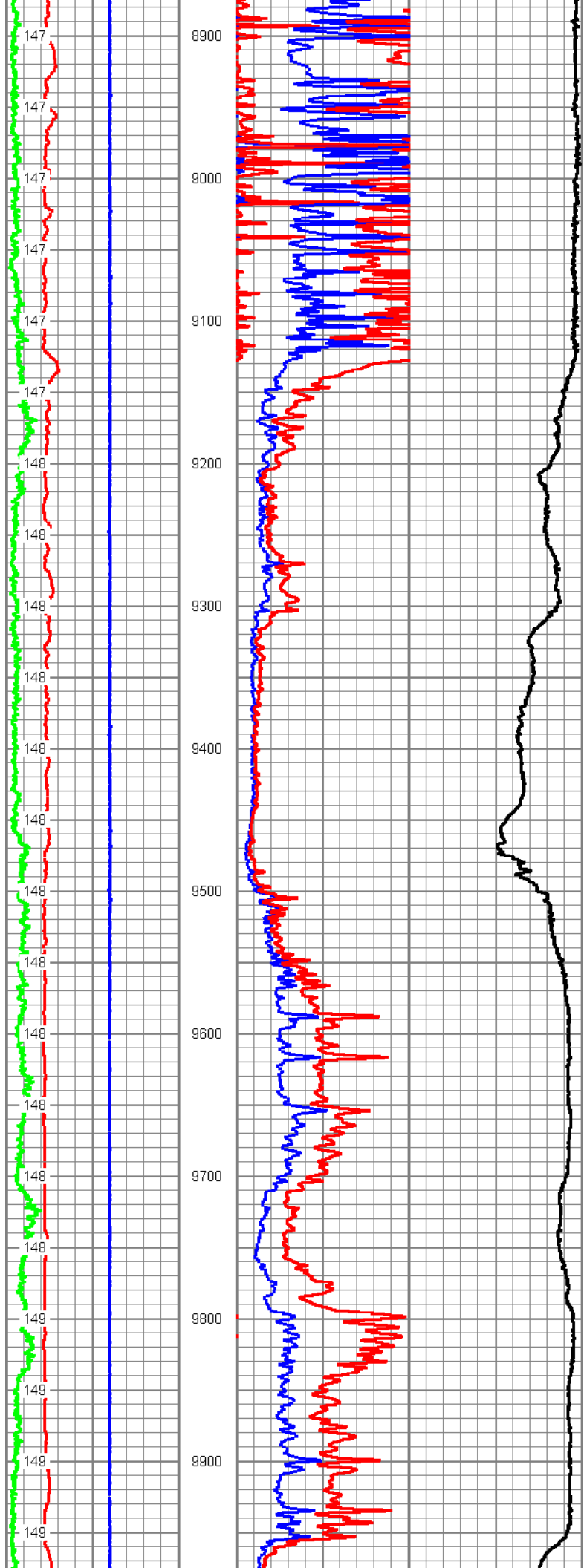


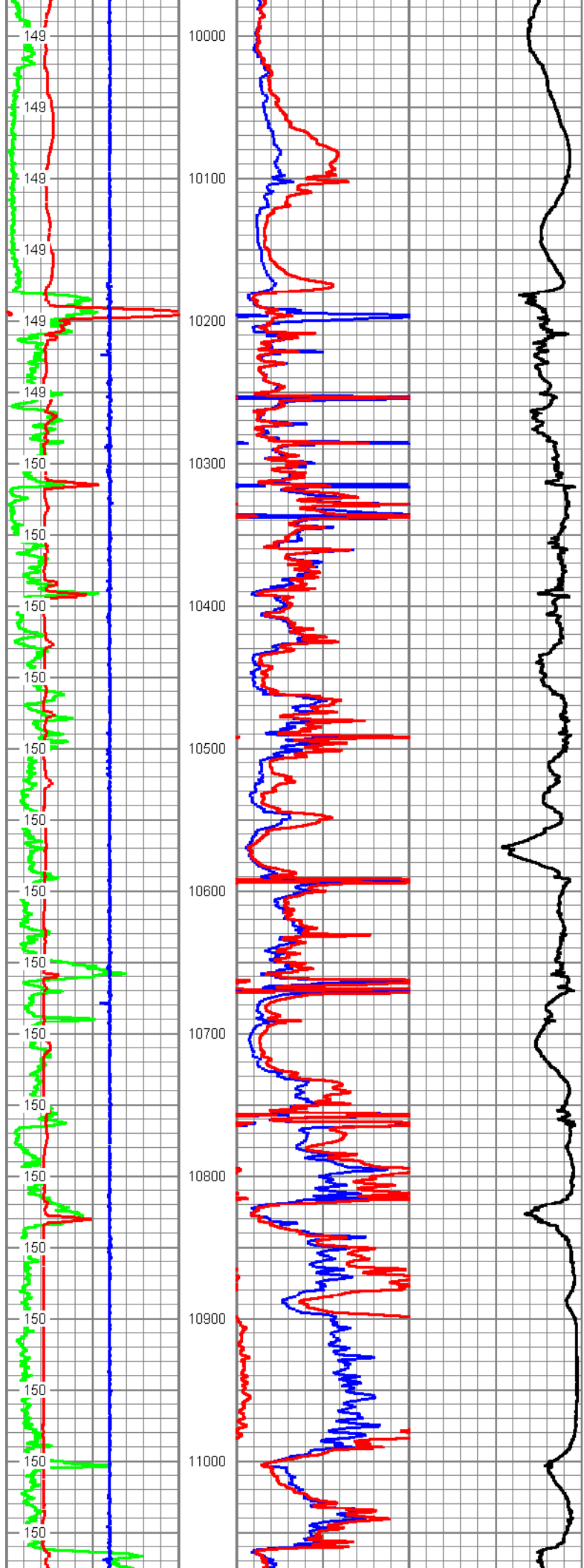


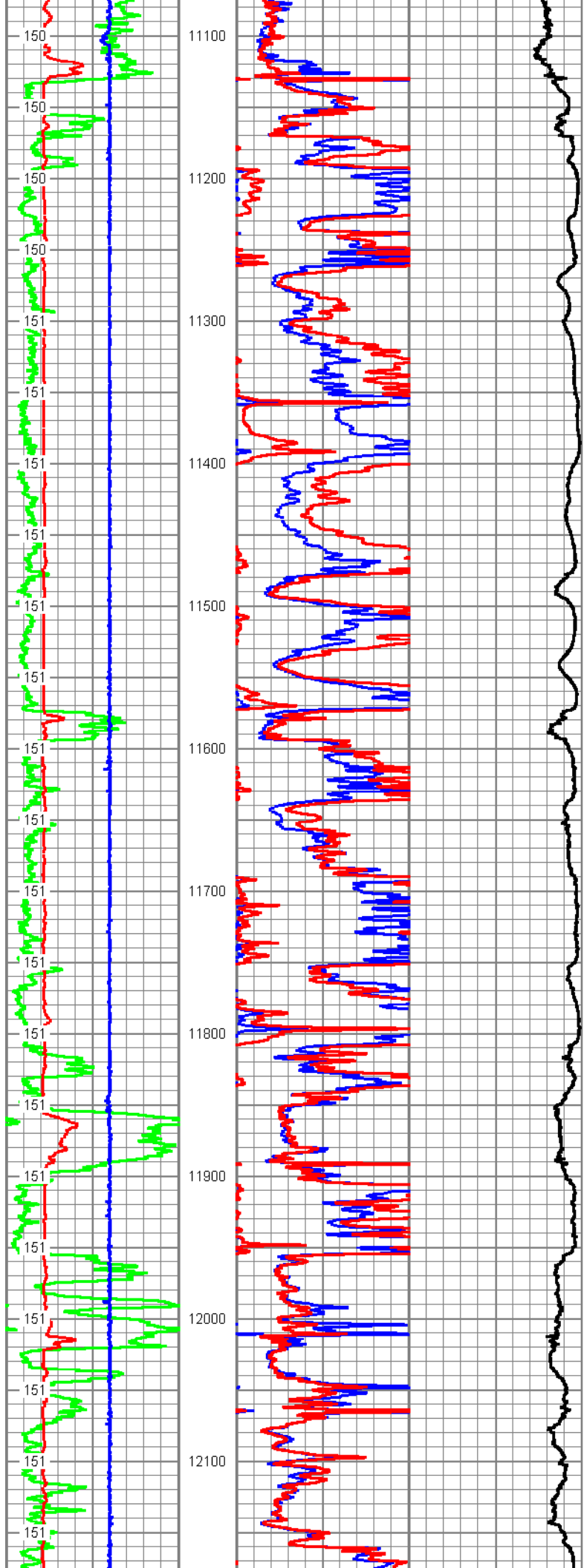


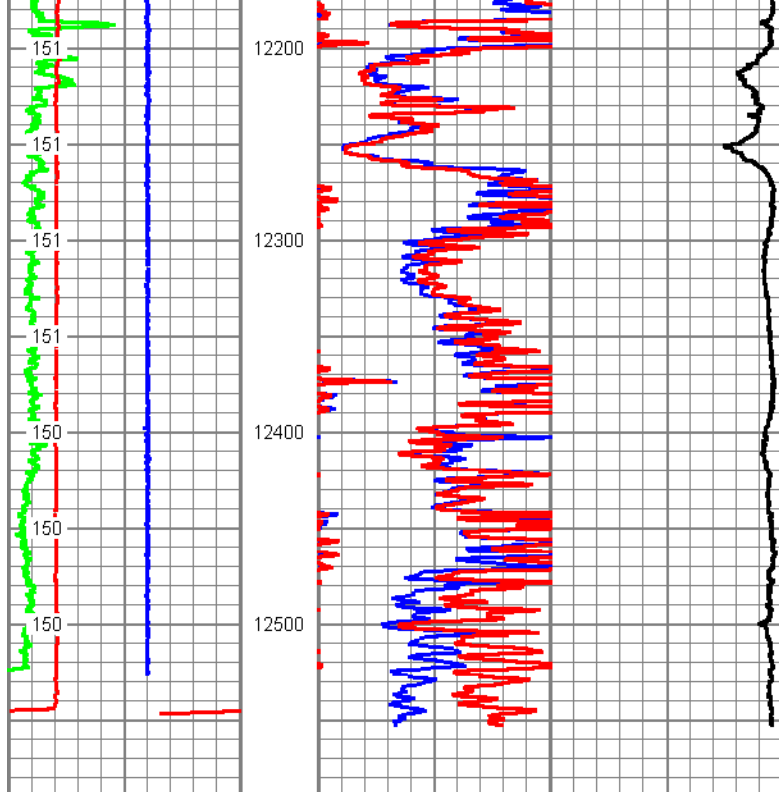












0	GR (GAPI)	150	20in 2ft Res	
4	DCAL (in)	14	50 (Ohm-m)	500
-5	ACCY	5	90in 2ft Res	
GRTEMP			50 (Ohm-m)	500
(degF)			1000	DEEP COND (mmho/m)
				0
			20in 2ft Res	
			0 (Ohm-m)	50
			90in 2ft Res	
			0 (Ohm-m)	50



**ThruBit**  
A Schlumberger Company

Company	SANDRIDGE ENERGY
Well	HOPKINS 1-14H
Field	KANSAS / WALDRON
County	HARPER
State	KANSAS