



ThruBit
A Schlumberger Company

**ARRAY INDUCTION
GAMMA RAY
MEMORY LOG**

Company SANDRIDGE ENERGY, INC.
Well COOPER 3305 1-27H
Field HARPER KS PROSPECT / MISS LIME
County HARPER
State KS

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Well COOPER 3305 1-27H
Field HARPER KS PROSPECT / MISS LIME
County HARPER State KS

Location: API #: 15077218780000
SURF LOC: 250' FNL & 660' FEL
SEC 27 TWP 33S RGE 5W
Permanent Datum G.L. Elevation 1283'
Log Measured From D.F. 16' ABOVE PERM DATUM
Drilling Measured From D.F. G.L. 1283'

Oilfield Services
PORTAL
BIT
Elevation

Date	21 SEPTEMBER 2012
Run Number	ONE
Depth Driller	8518'
Depth Logger	8482'
Bottom Logged Interval	8472'
Top Log Interval	2490'
Casing Driller	7.0" @ 4890'
Casing Logger	7.0" @ 4880'
Bit Size	6.125"
Type Fluid in Hole	WBM
Density / Viscosity	8.40 / 27
PH / Fluid Loss	8.0 / 60
Source of Sample	SUCTION PIT
Rm @ Meas. Temp	1.10 OHMS@71 DEGF
Rmf @ Meas. Temp	0.83 OHMS@71 DEGF
Rmc @ Meas. Temp	1.40 OHMS@71 DEGF
Source of Rmf / Rmc	CALCULATED
Rm @ BHT	0.54 OHMS 151 DEGF
Time Circulation Stopped	19:15 20SEPT2012
Time Logger on Bottom	20:40 20SEPT2012
Maximum Recorded Temperature	151 DEGF
Equipment Number	T011
Location	OKC, OK
Recorded By	D. THOMAS
Witnessed By	BRENT SECREST

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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 - HORIZONTAL MEMORY PUMP DOWN - BIT DEPTH: 8423', LOG TO: 2490'
ALL SCALES AND PRESENTATIONS PER CLIENT REQUEST
LIMESTONE MATRIX, 2.71 G/CC, USED TO CALCULATE POROSITIES
TOOL STRING RAN WITH SWIVEL, S. DECENTRALIZER, NO STANDOFFS
TBHV = TOTAL BOREHOLE VOLUME, FT3
ABHV = ANNULAR BOREHOLE VOLUME, FT3, CALCULATED FOR 4.50" CSG
RIG MINDER LITE AND PASON USED TO CREATE LOG DEPTH
LOG DEPTH CORRELATED TO MWD GAMMA AT CUSTOMERS REQUEST

RIG: UNIT # 310
CREW: D. THOMAS, R. WILSON, Z. HOWARD

Service Ticket No. 1438 API No. 15077218780000 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
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Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	PS9T	Serial No.	ENP3N	Serial No.	PS28D	Serial No.	ENP6R
Model No.	PS	Model No.	ENP	Model No.	PS	Model No.	ENP
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	8482'	2490'		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	30 %	-10 %	30 %	-10 %	0.2 OHM-M	2000 OHM-M

DIRECTIONAL INFORMATION

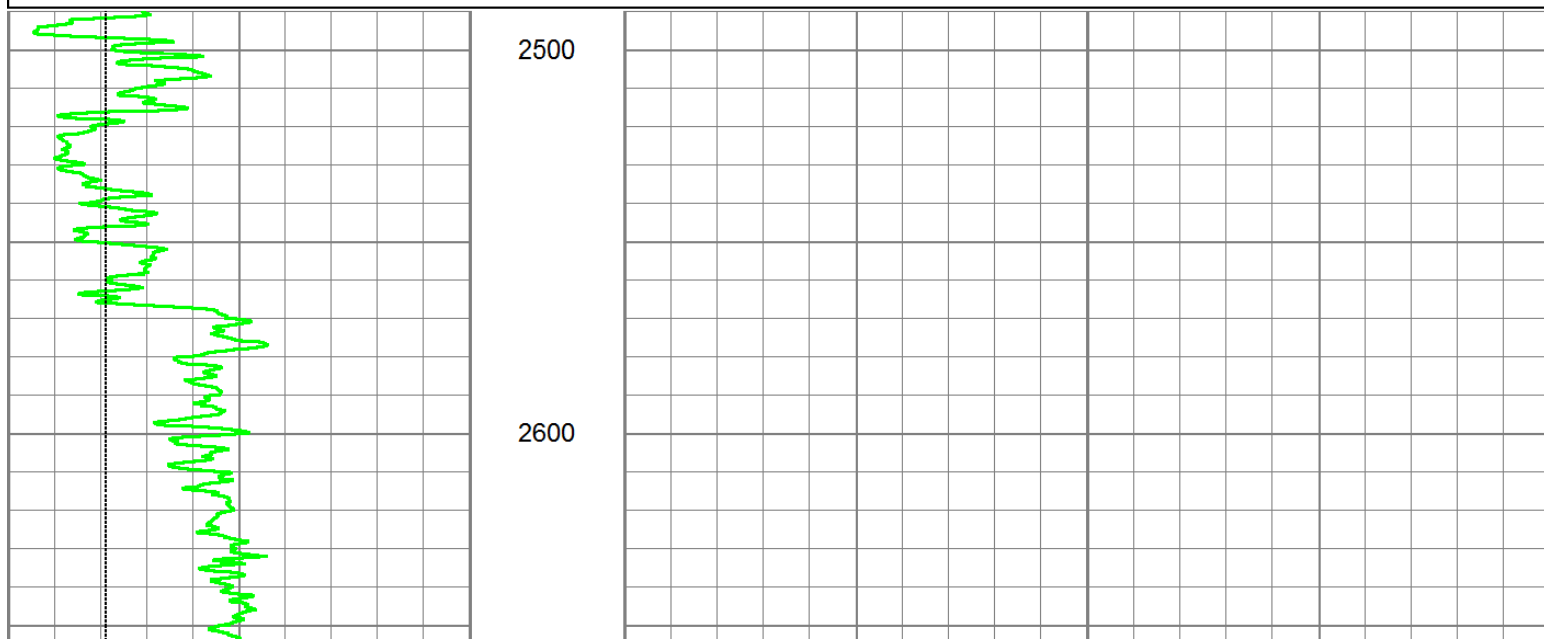
Maximum Deviation	92.0	deg. @	7689'	KOP	3536'
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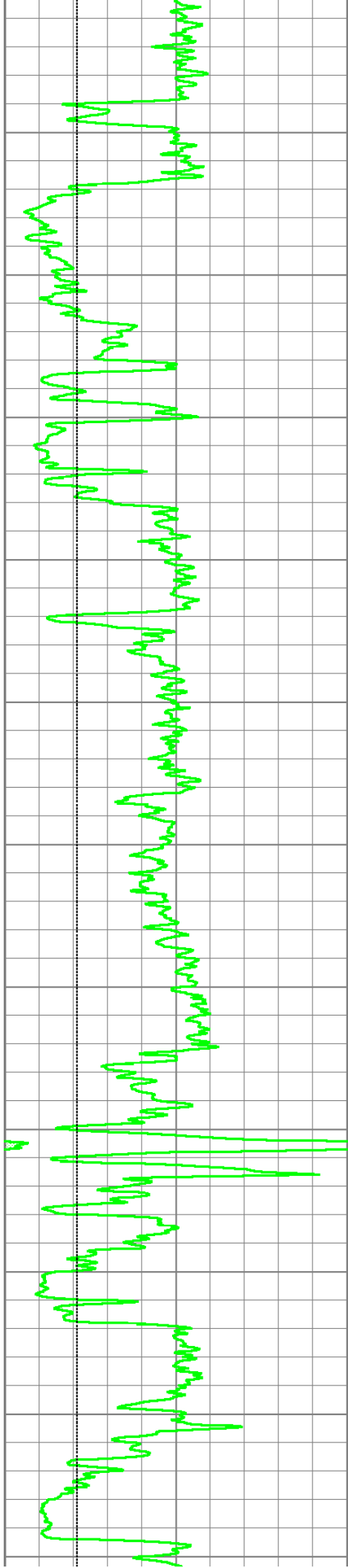


MAIN PASS

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 Dataset Pathname: proc1/pass1.5
 Presentation Format: 6_2r_chk
 Dataset Creation: Fri Sep 21 05:00:15 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			0	90in 2ft Res (Ohm-m)	50
(degF)					





2700

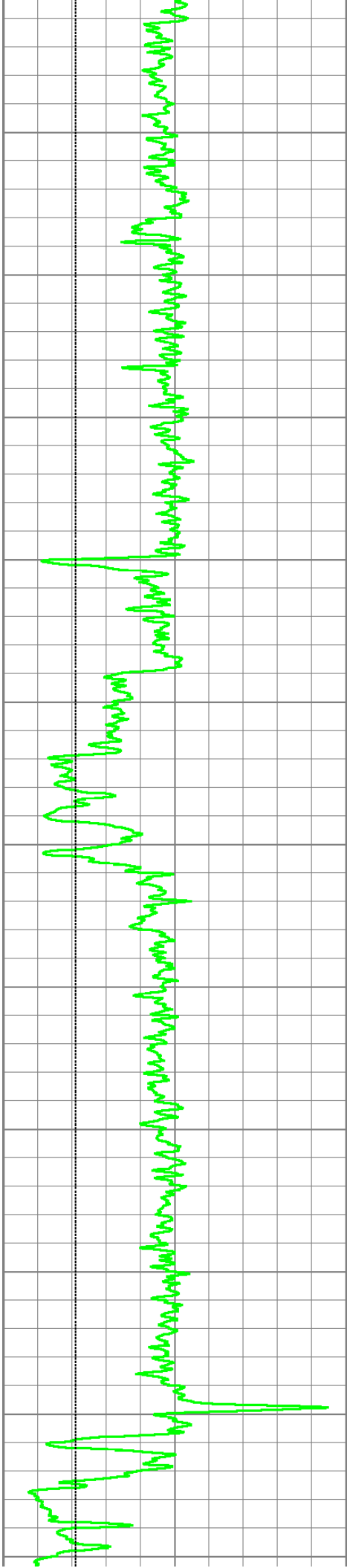
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2900

3000

3100

3200



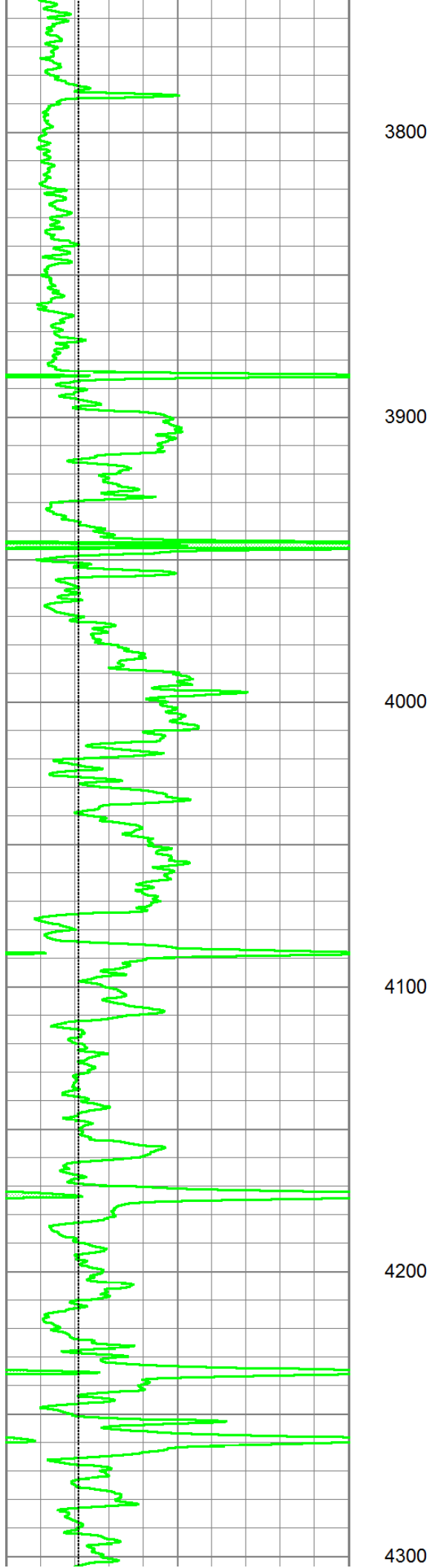
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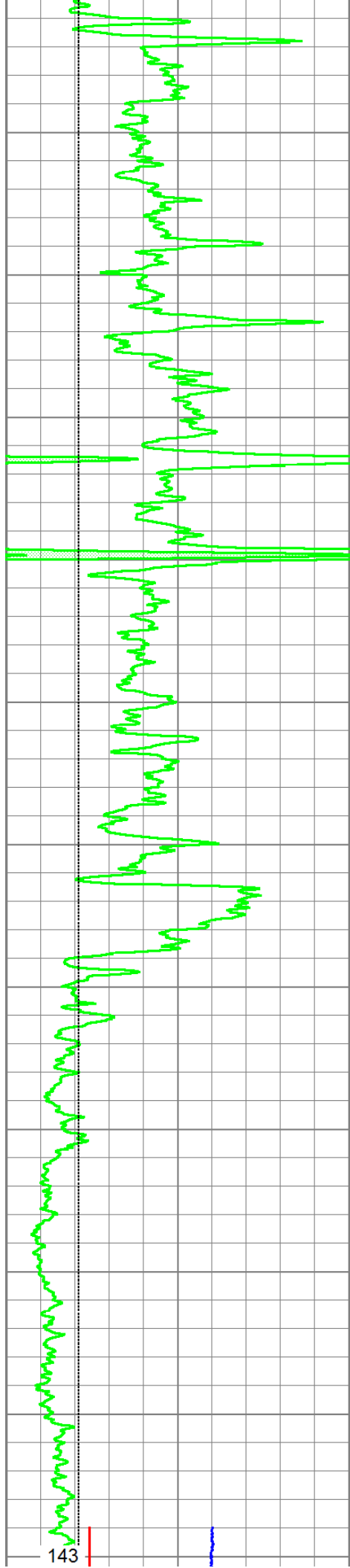
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3500

3600

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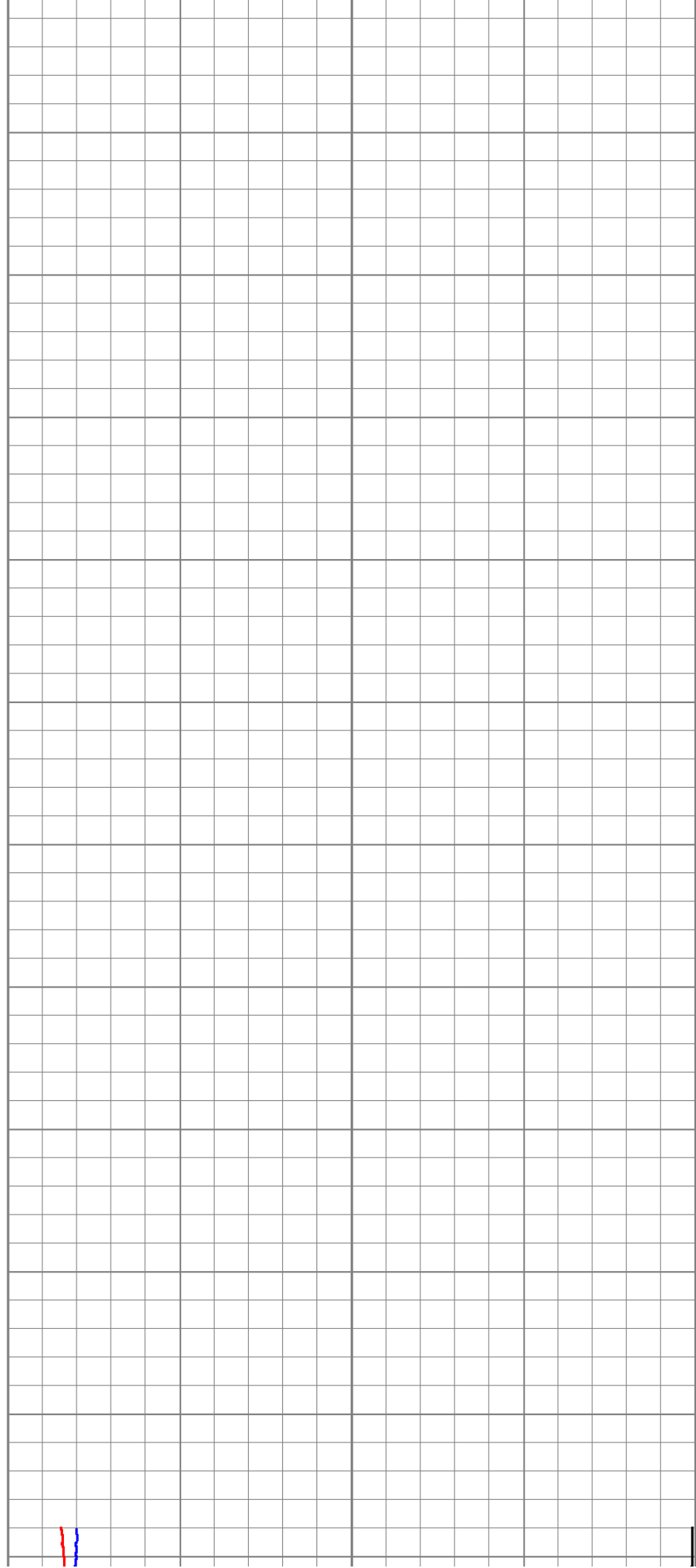
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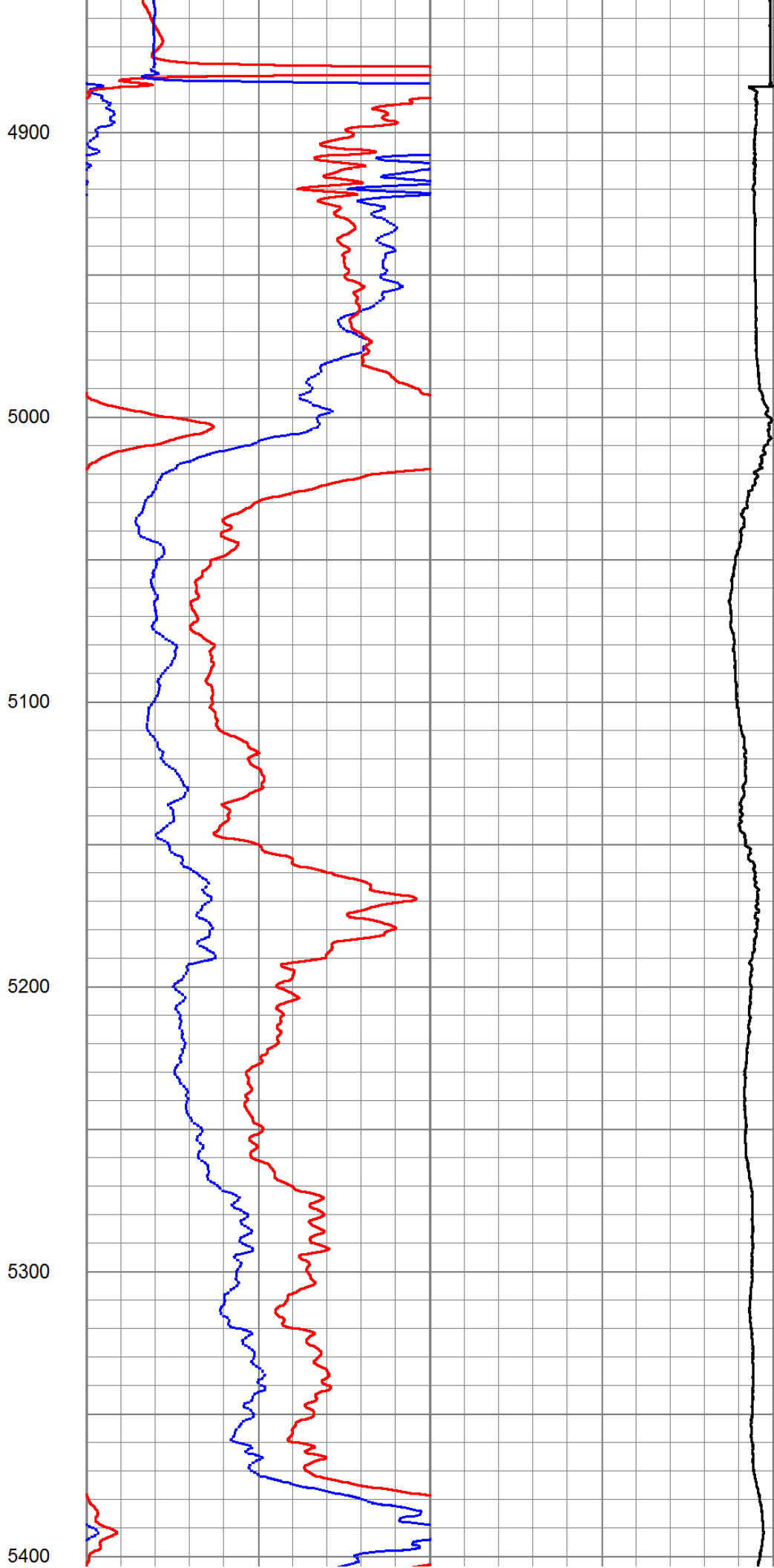
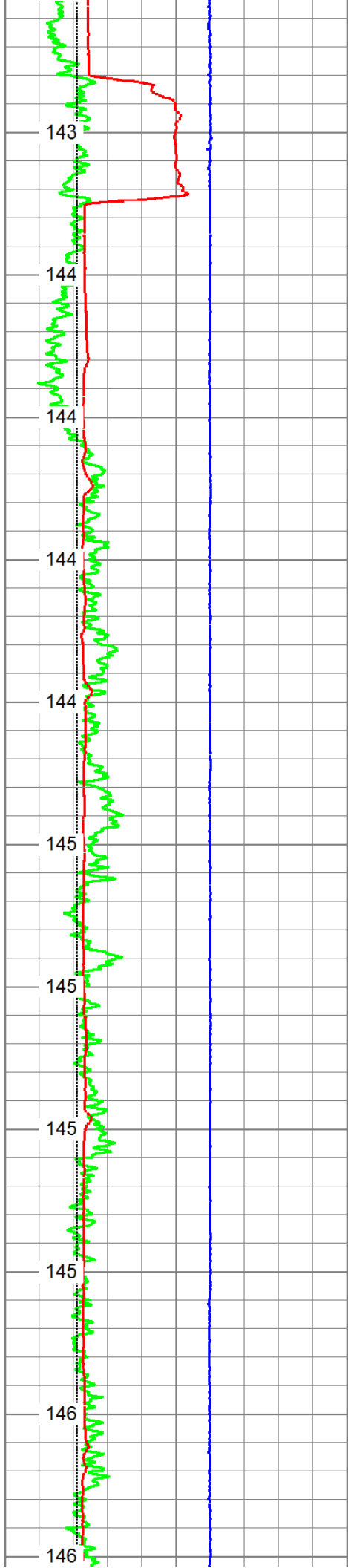
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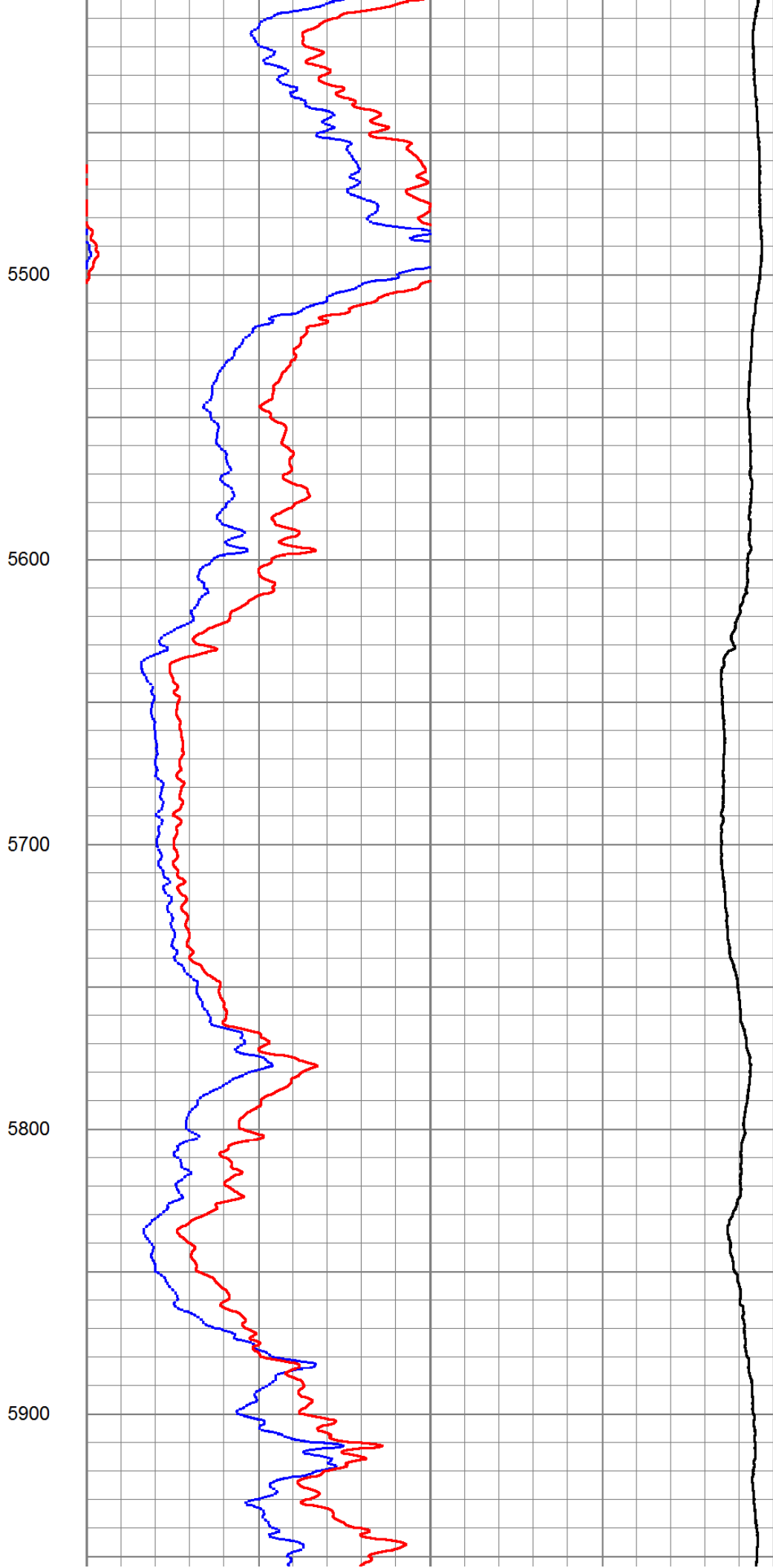
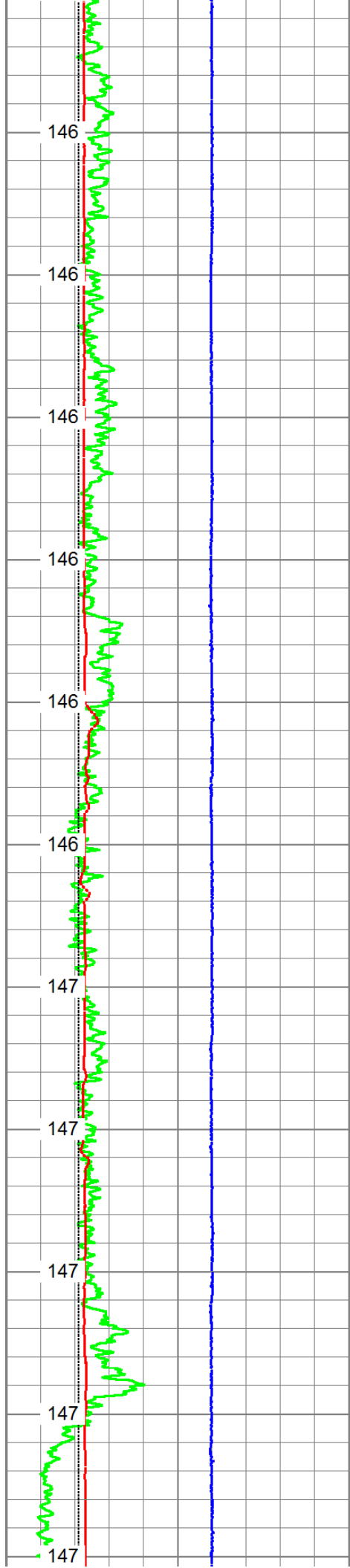
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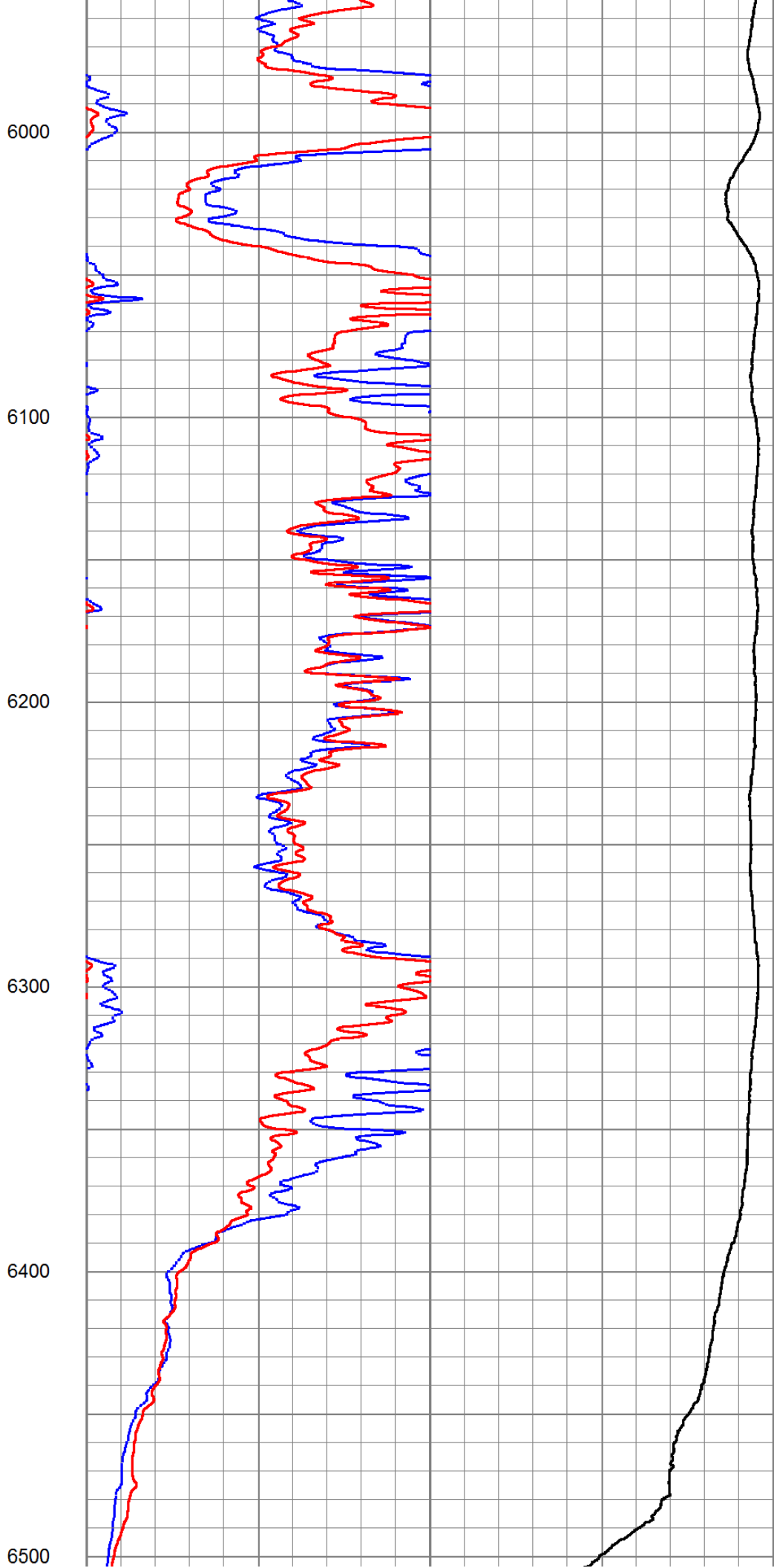
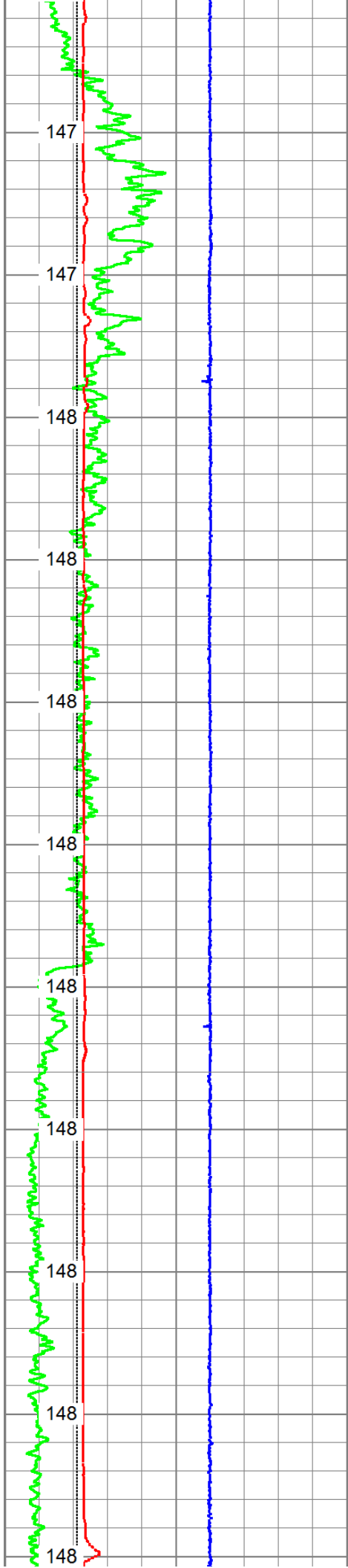
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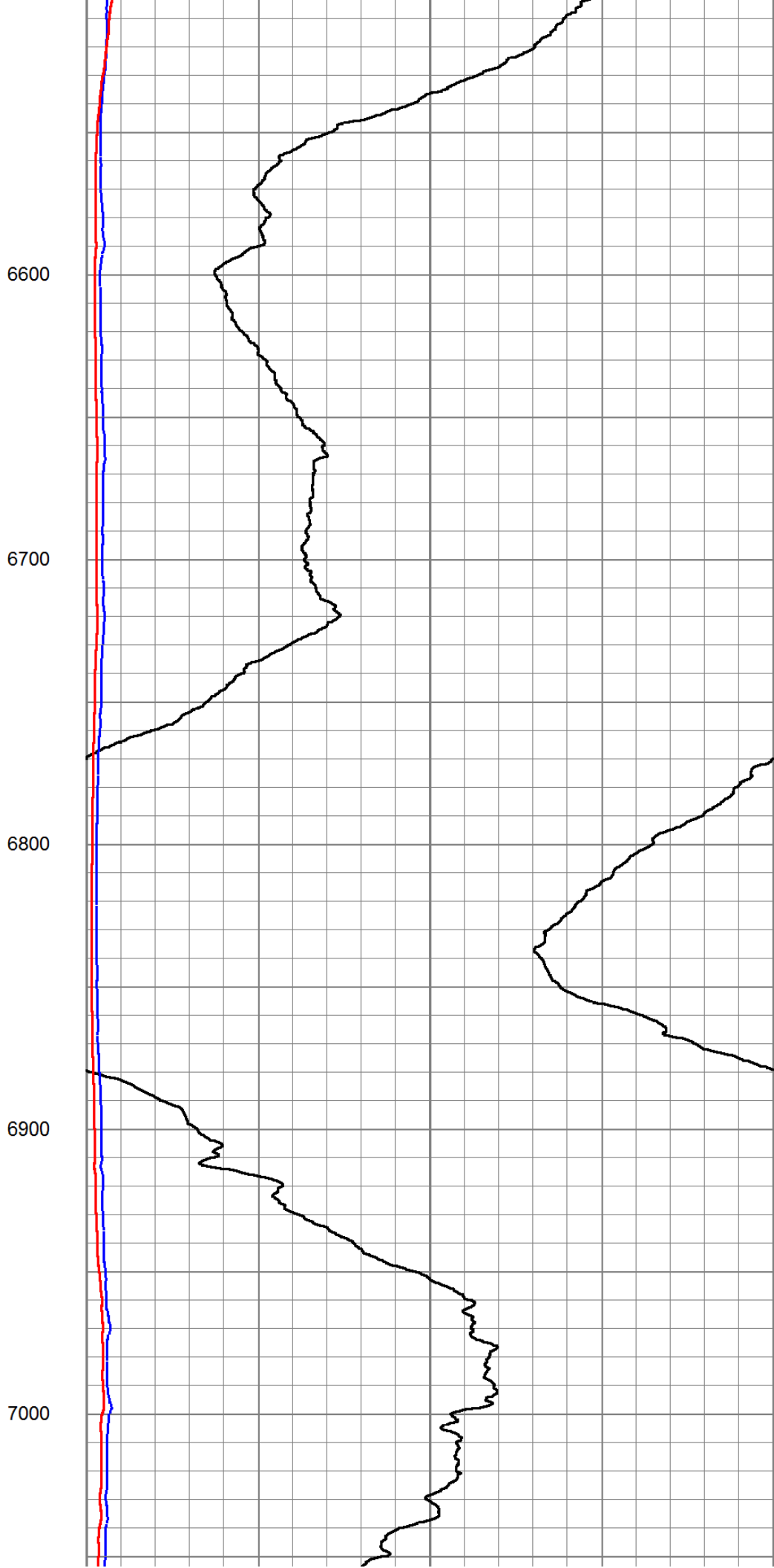
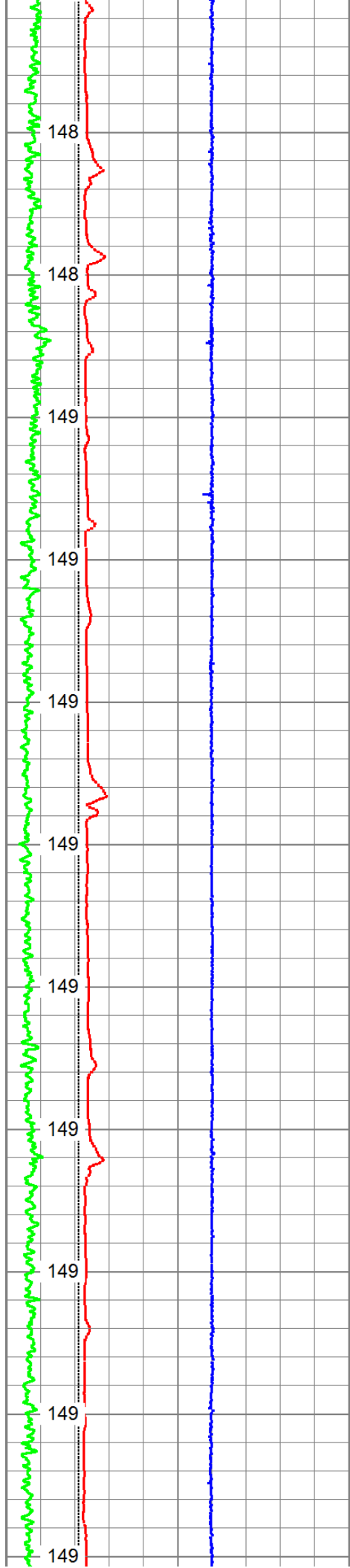
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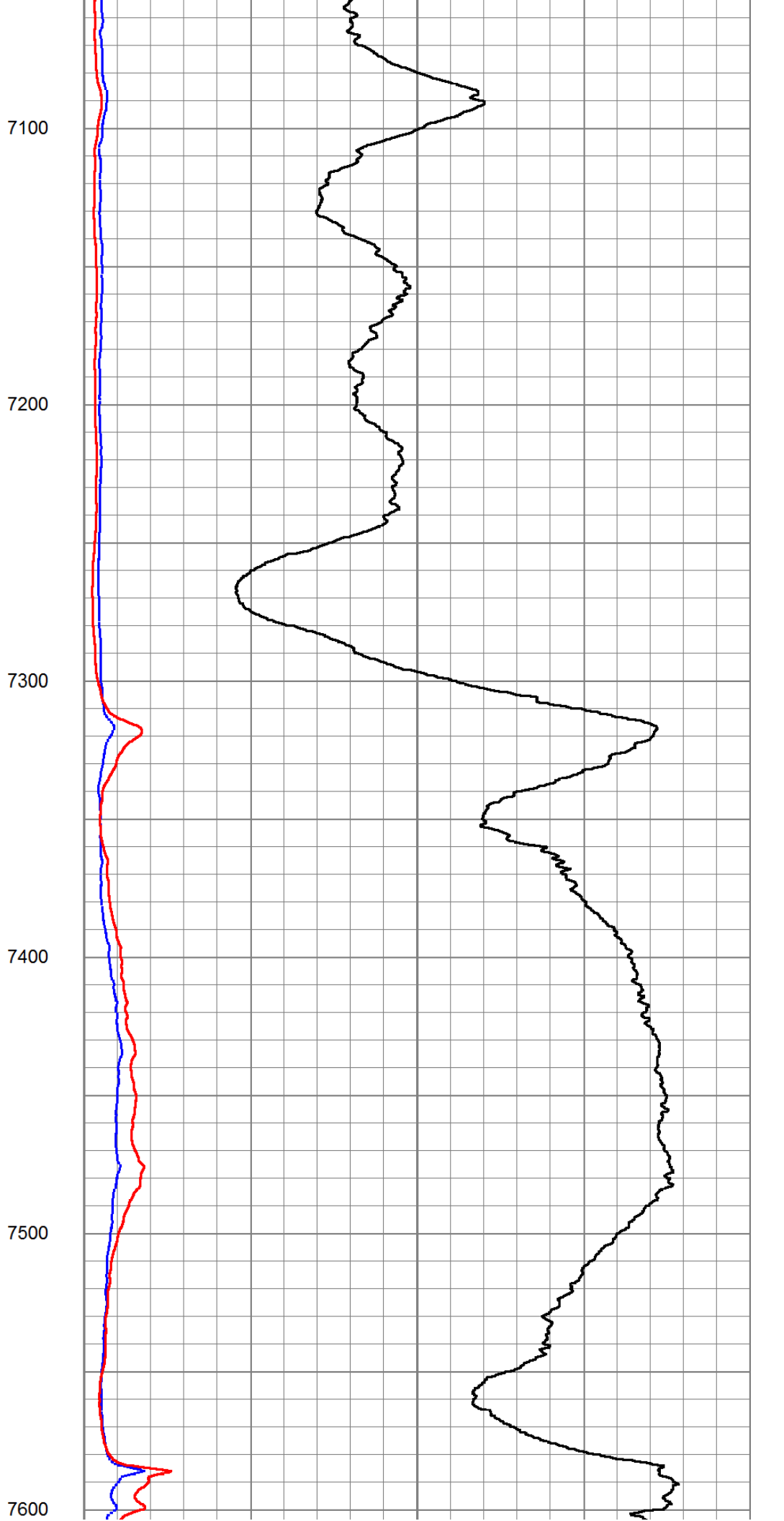
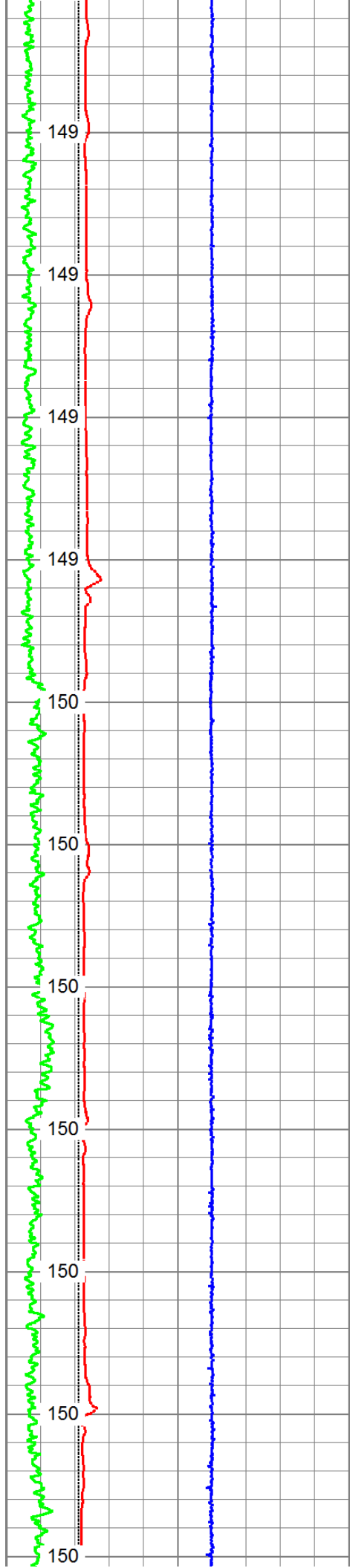


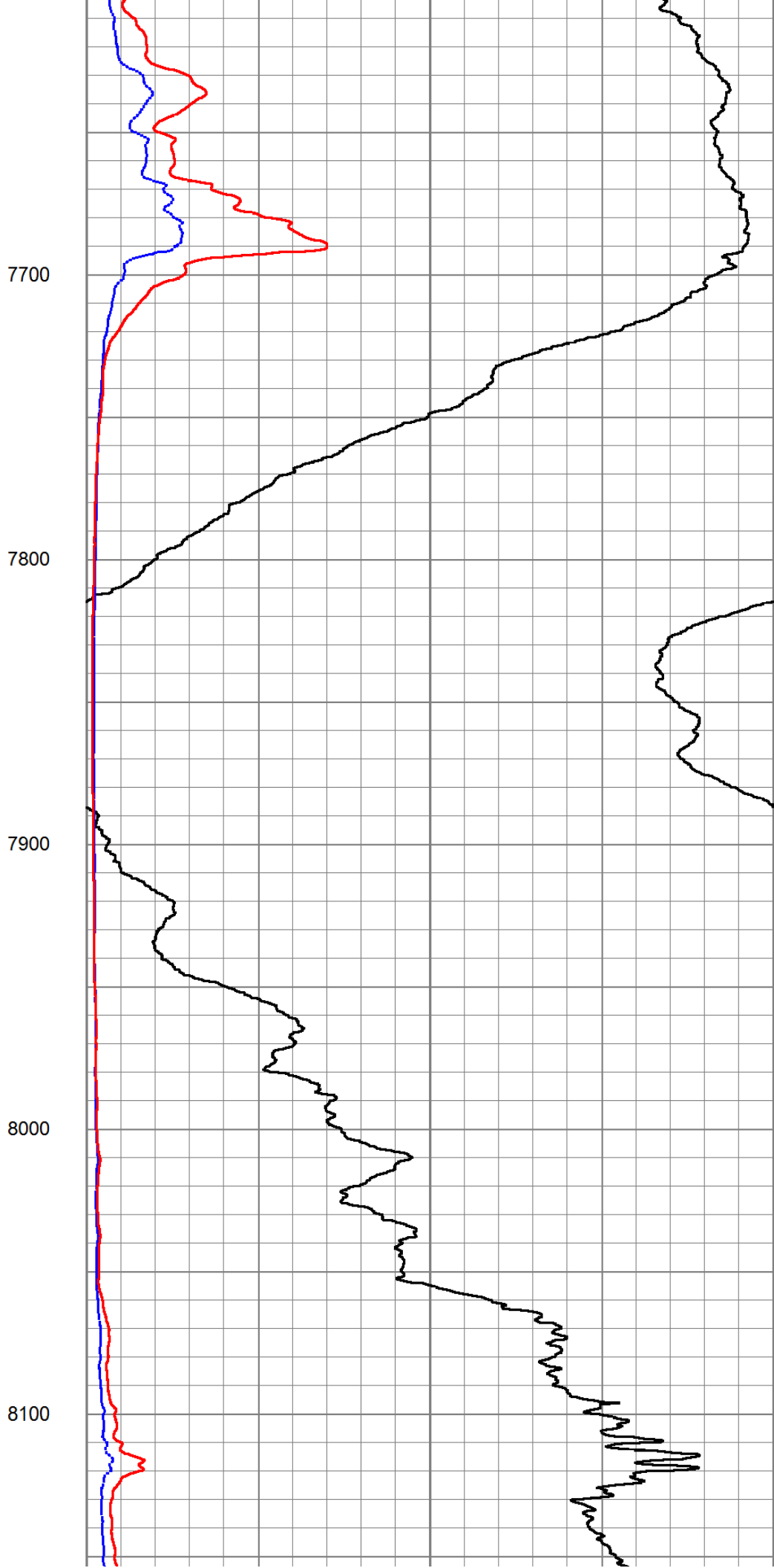
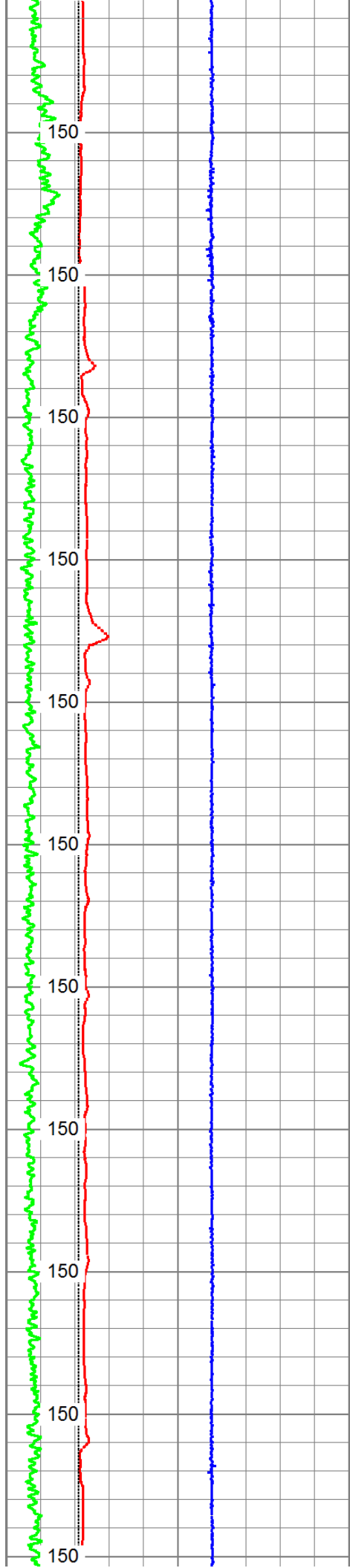


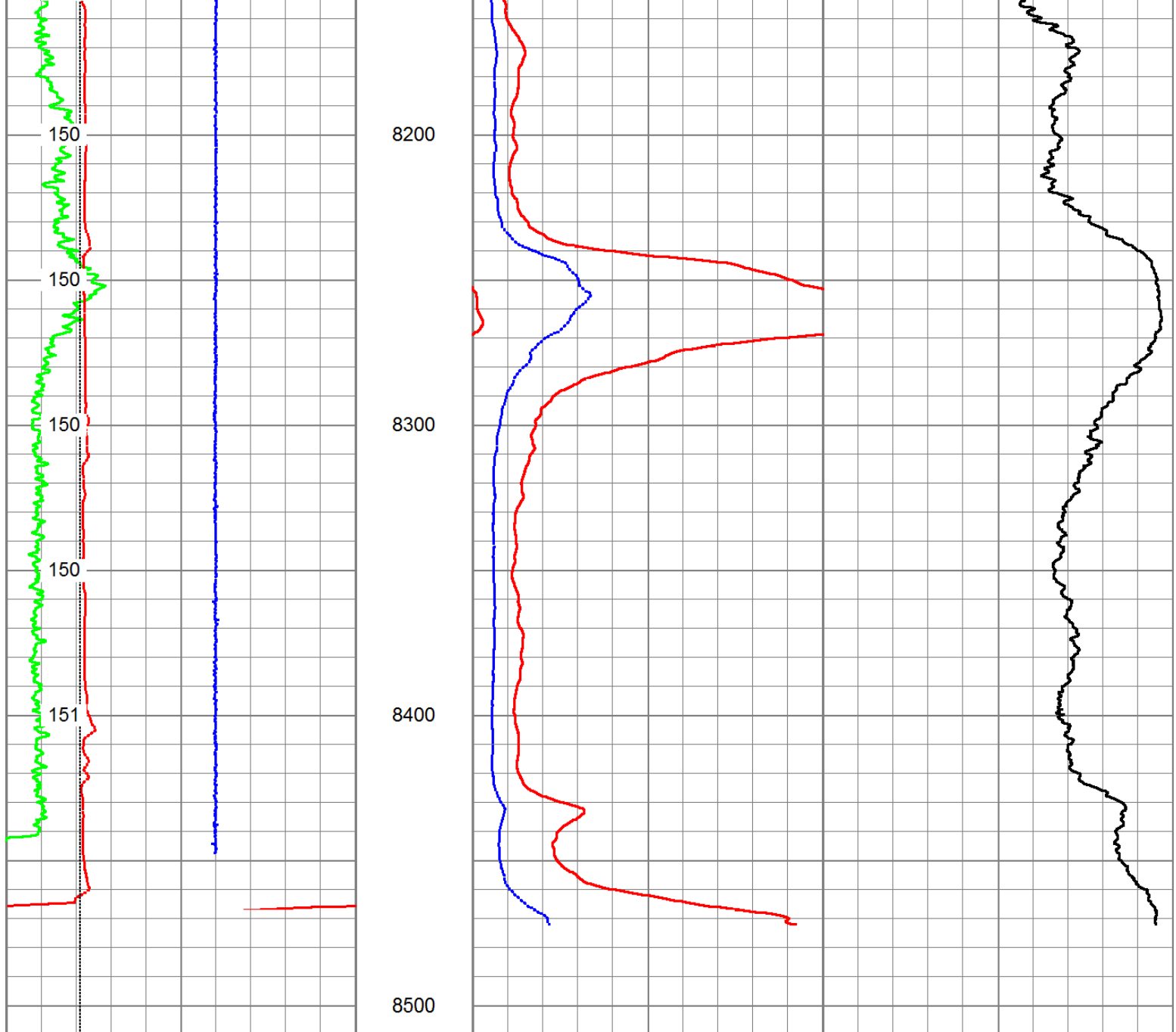












0	GR (GAPI)	150
4	DCAL (in)	14
-5	ACCY	5
4	BOREID (in)	14

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



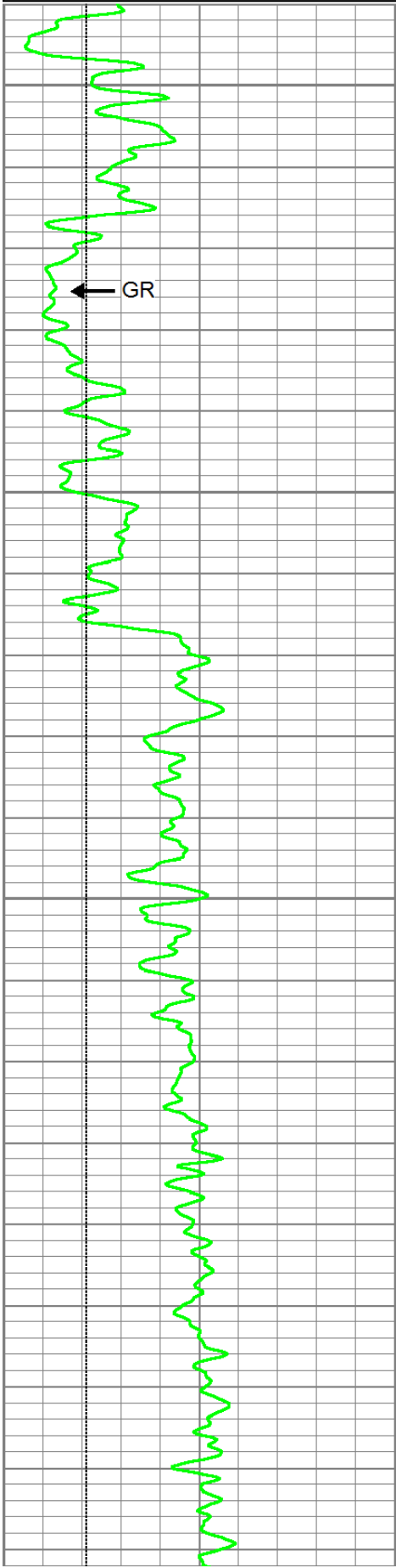
MAIN PASS

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 Dataset Pathname: proc1/pass1.5
 Presentation Format: 6_5r_chk
 Dataset Creation: Fri Sep 21 05:00:15 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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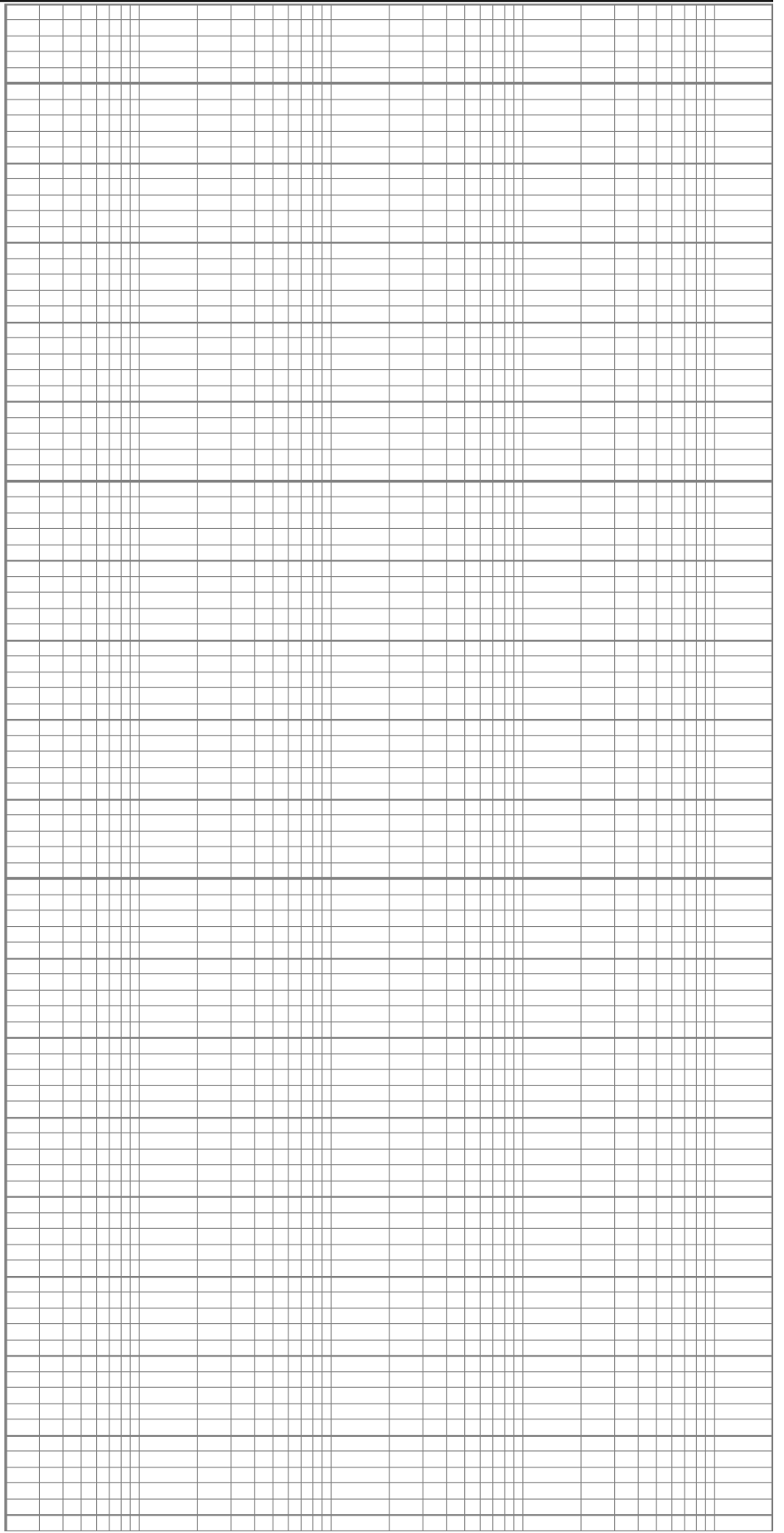


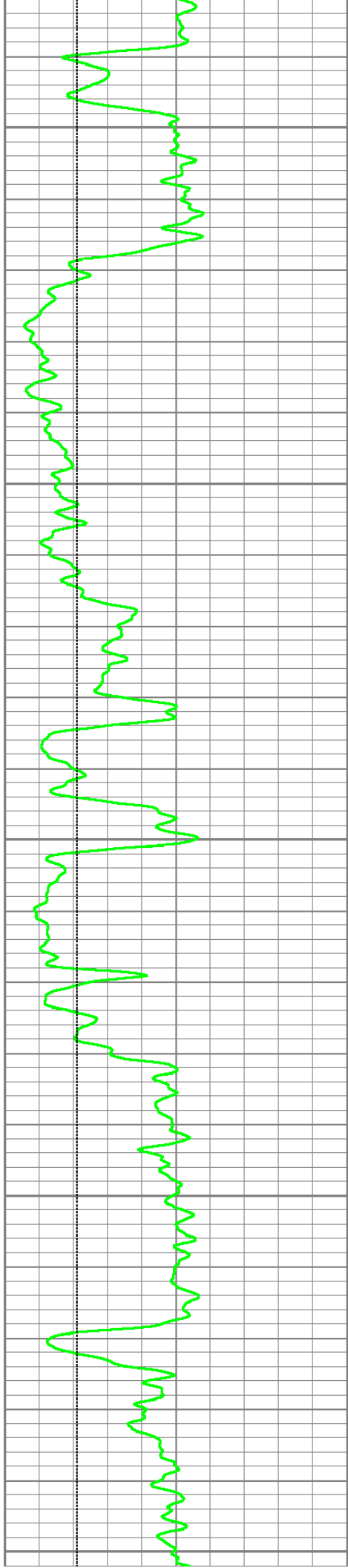
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2550

2600

2650





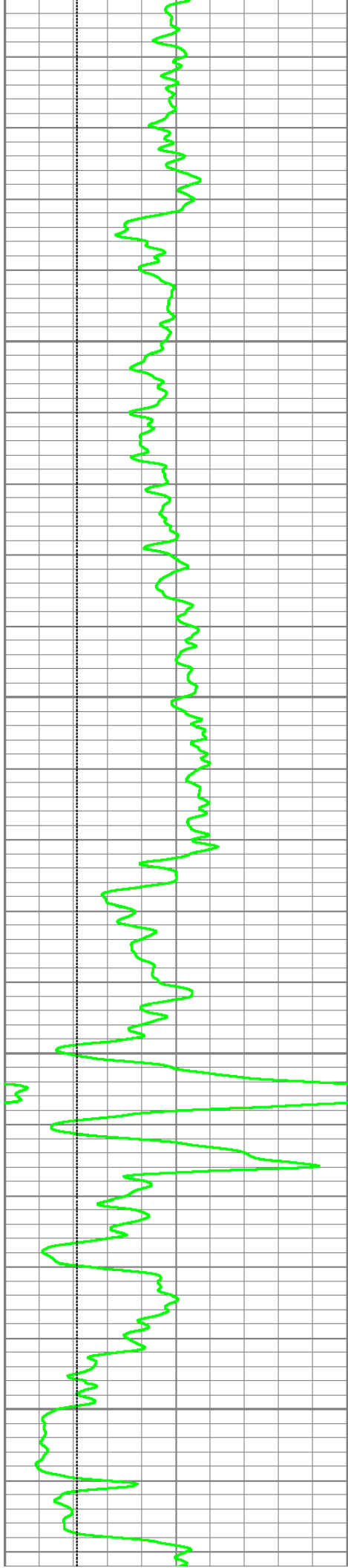
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2850

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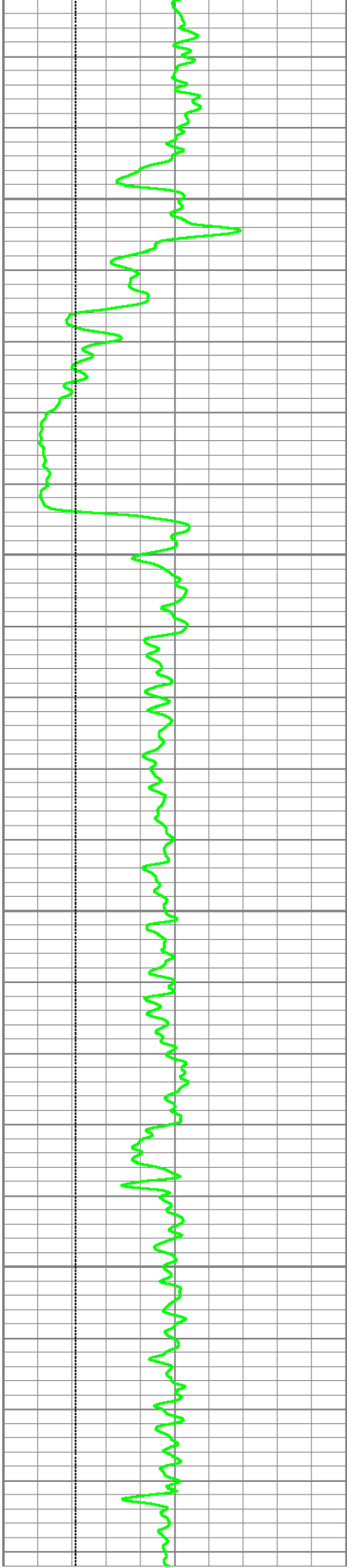


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3000

3050

3100



3150

3200

3250

3300

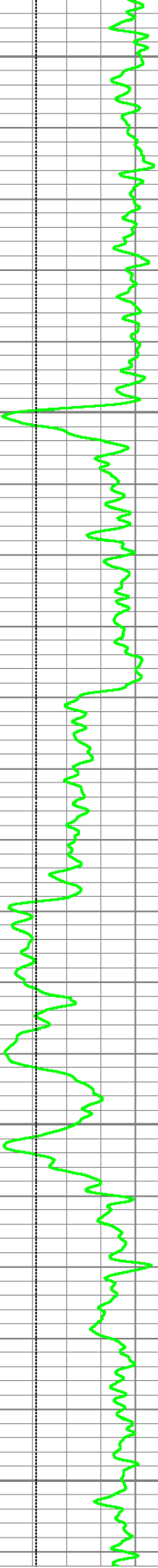
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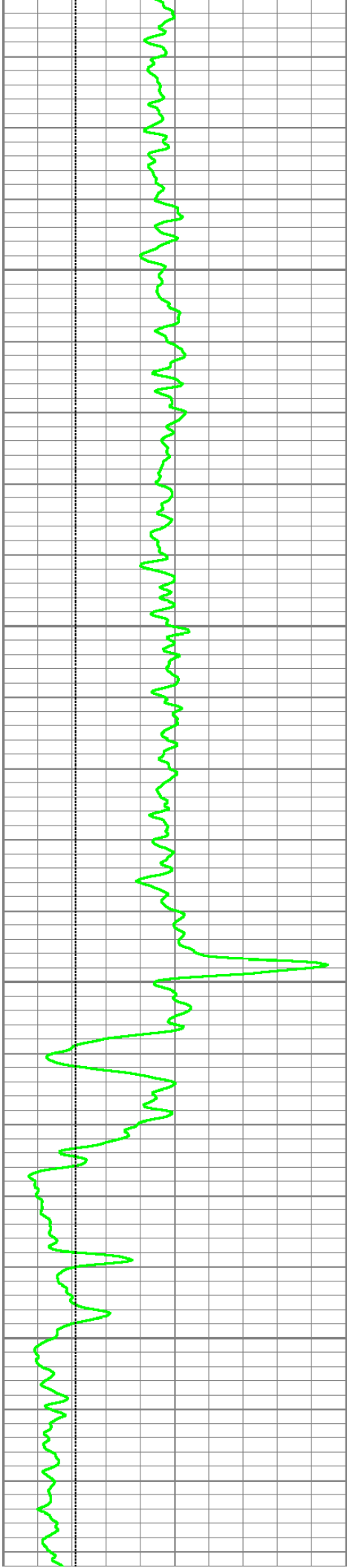
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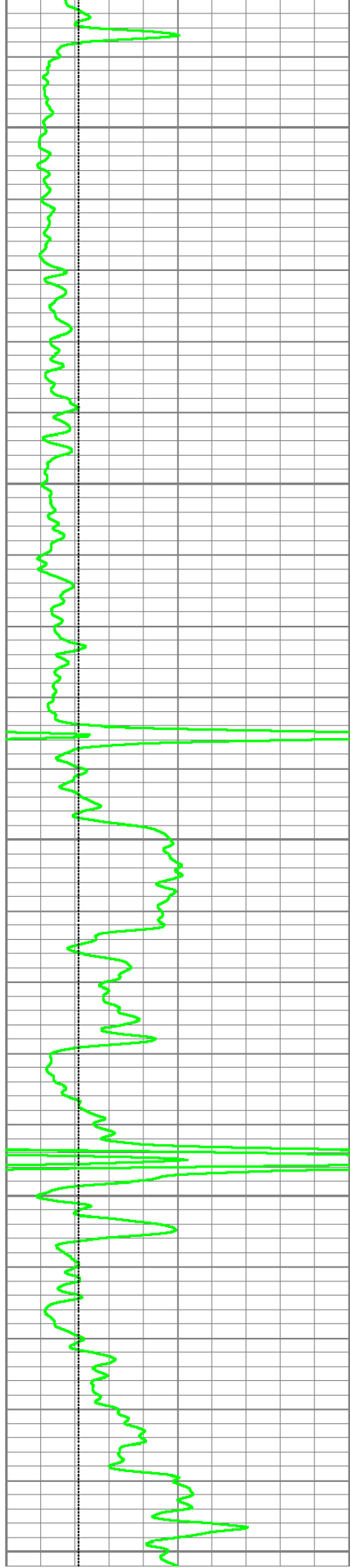


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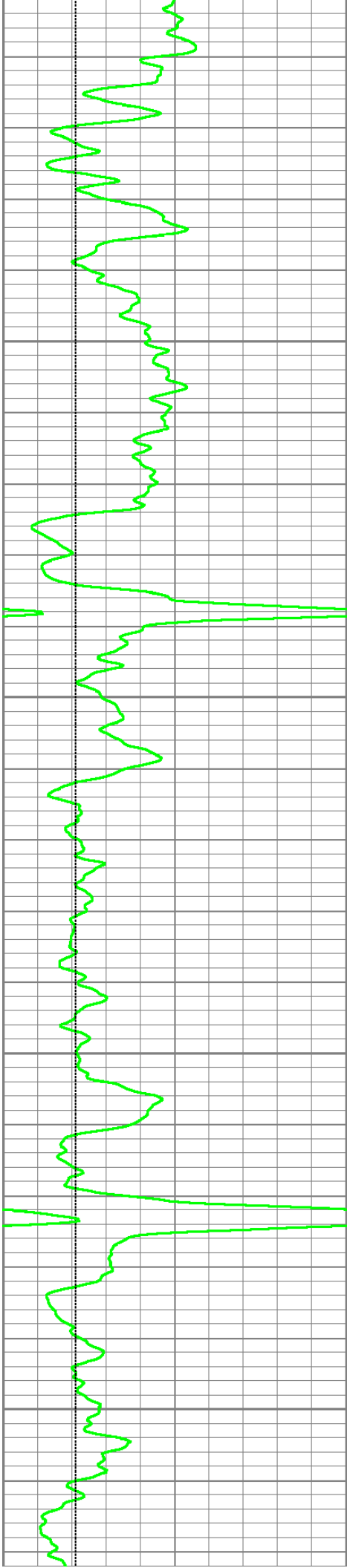
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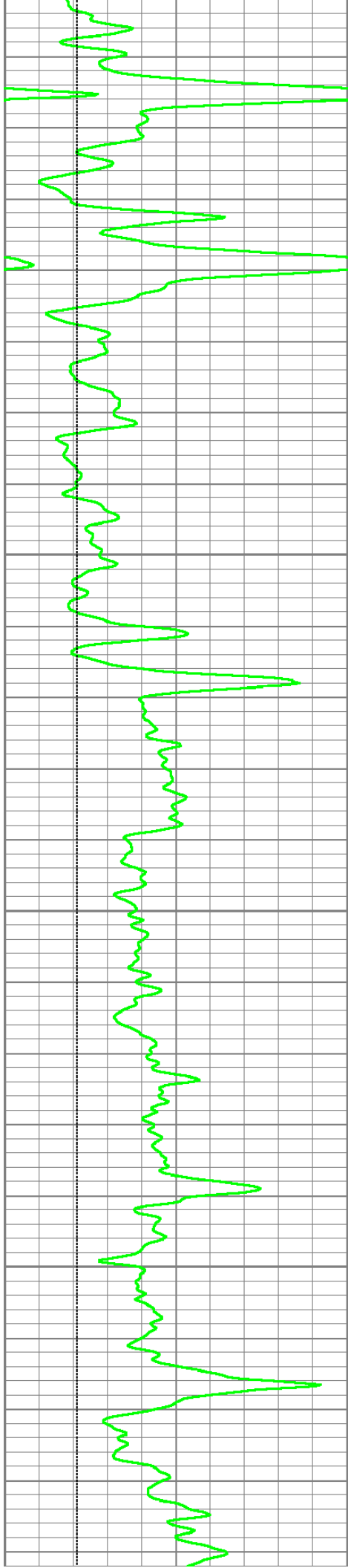


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4150

4200

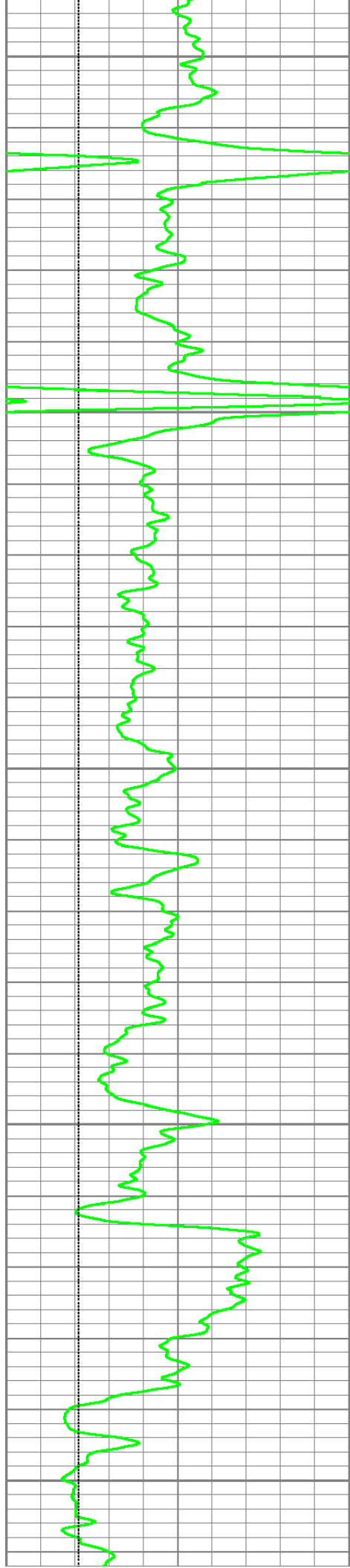


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4400



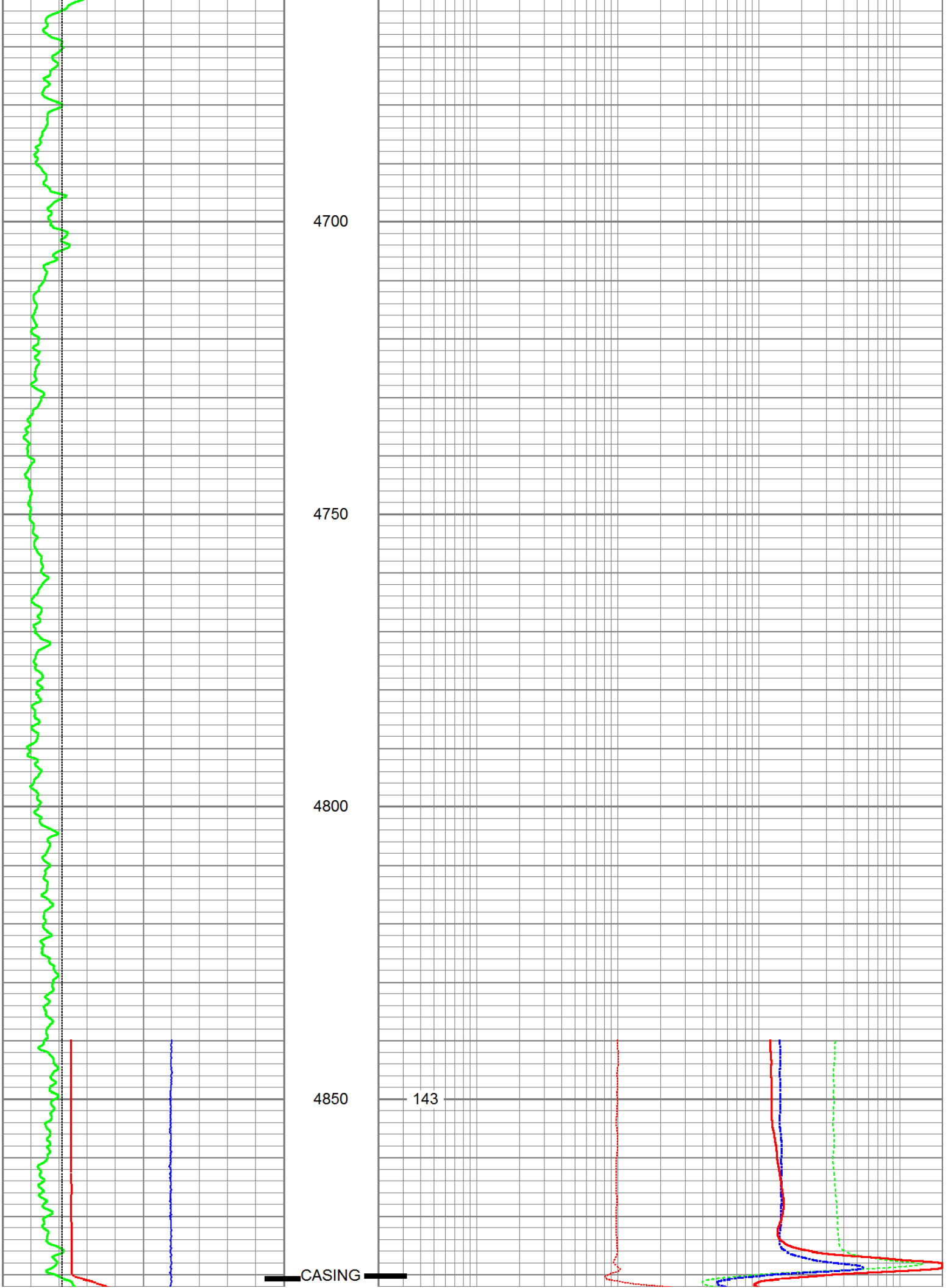
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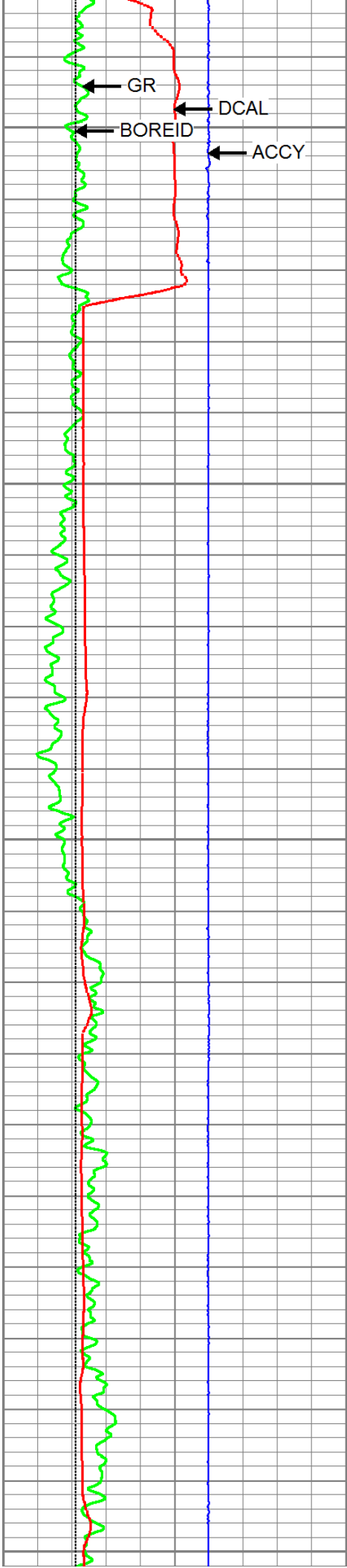
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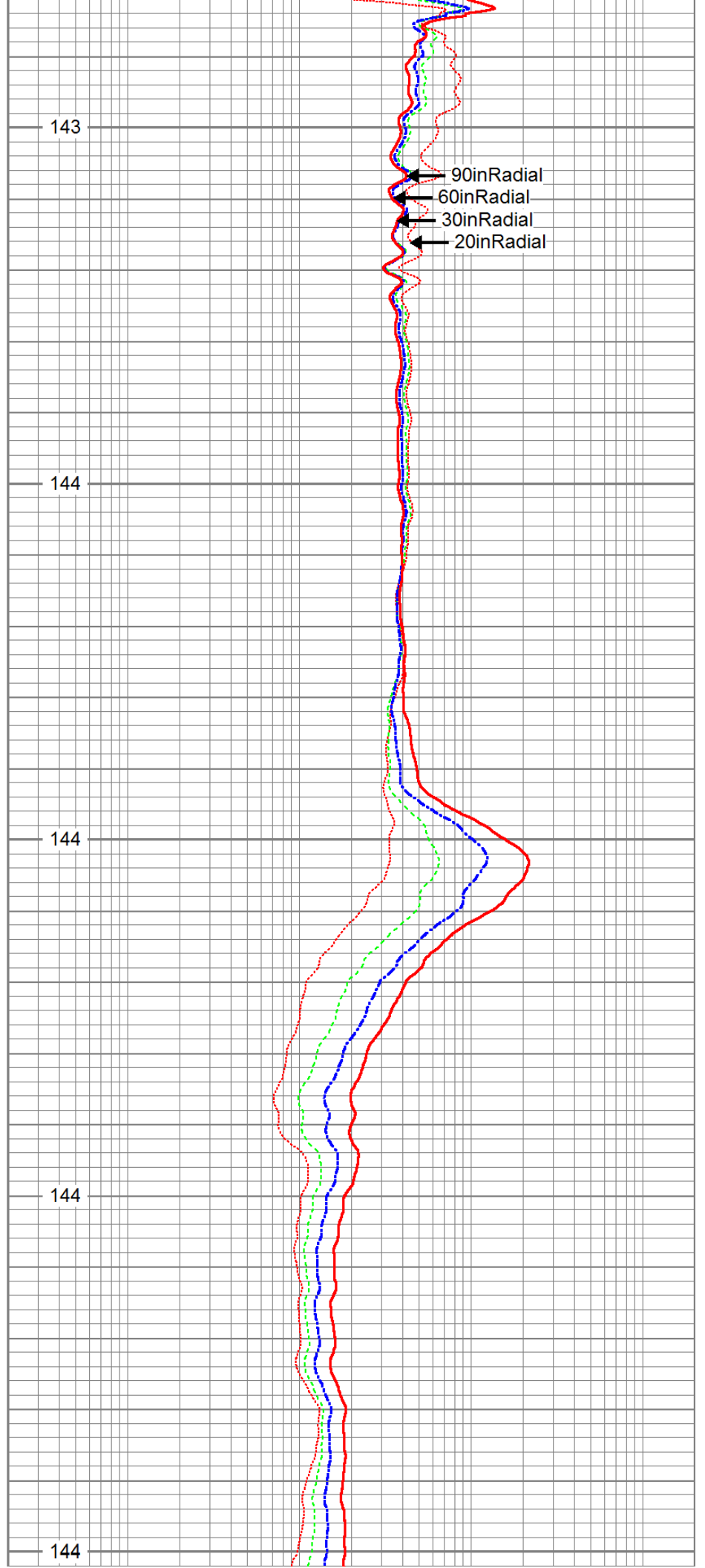
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143

CASING

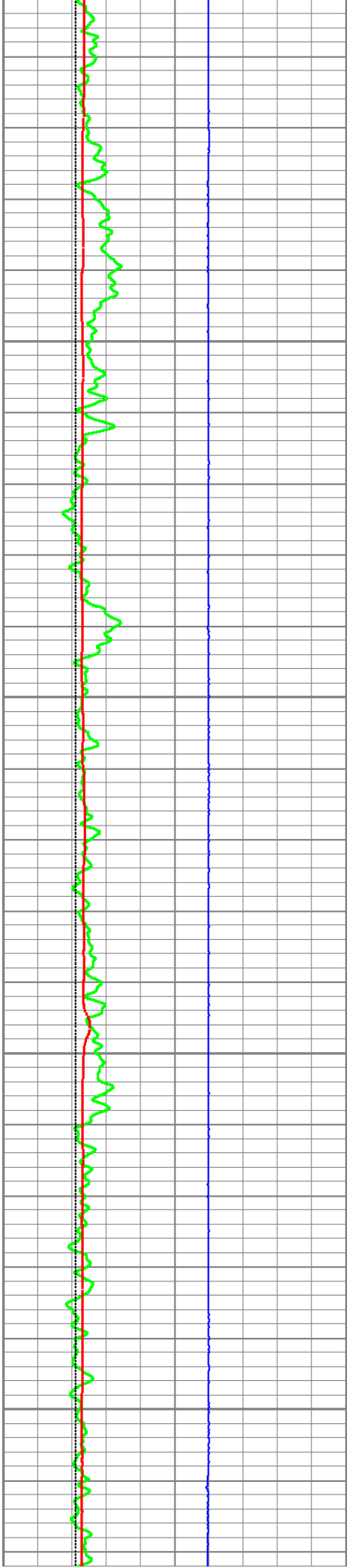


4900
4950
5000
5050
5100



143
144
144
144
144

90inRadial
60inRadial
30inRadial
20inRadial



5150

145

5200

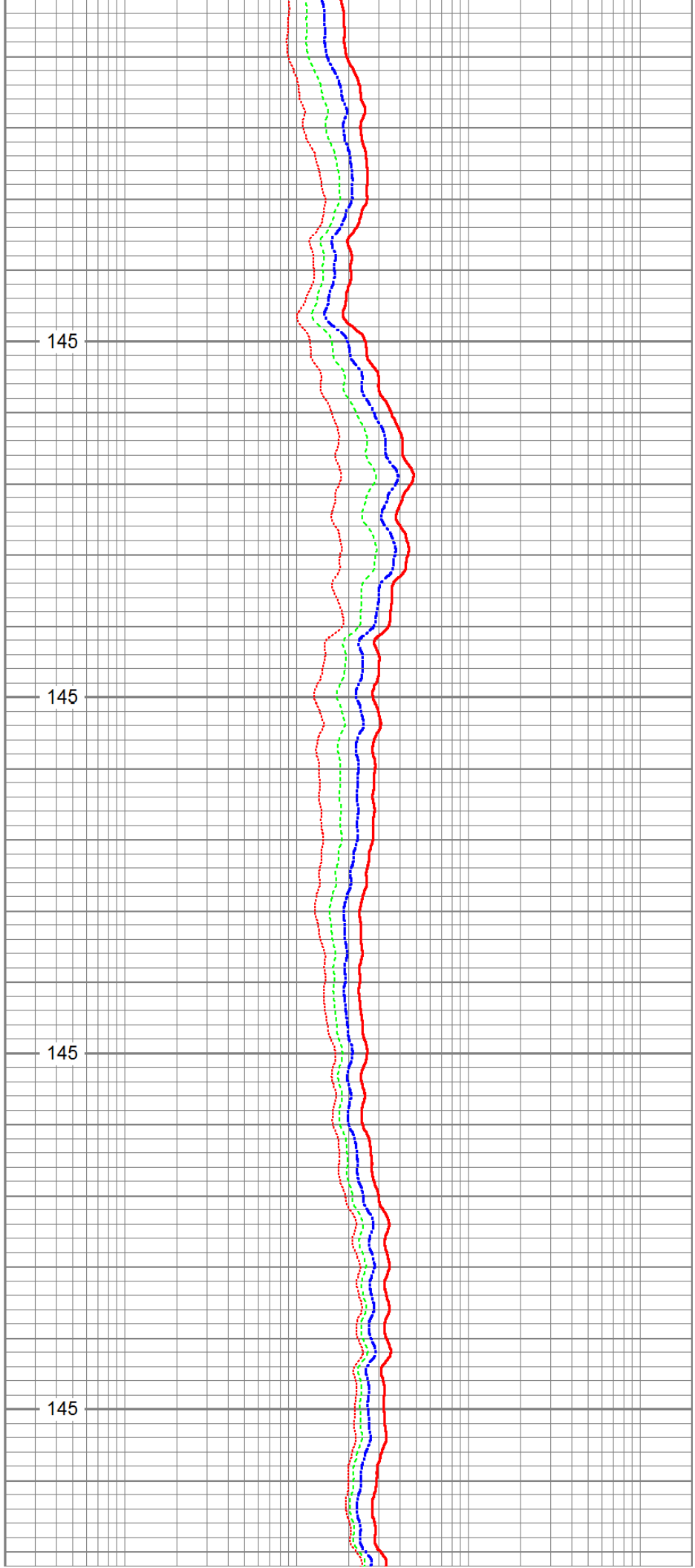
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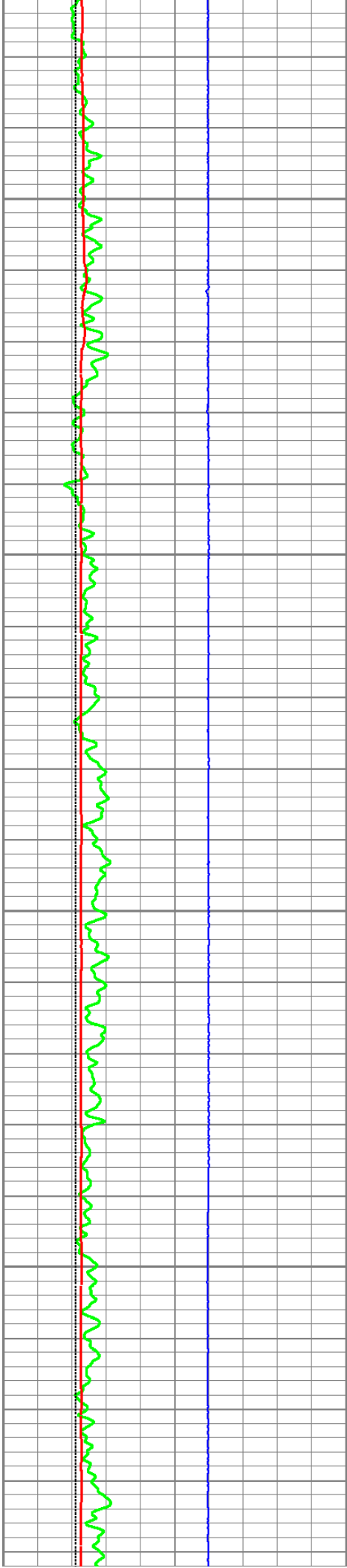
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5300

145





5350

146

5400

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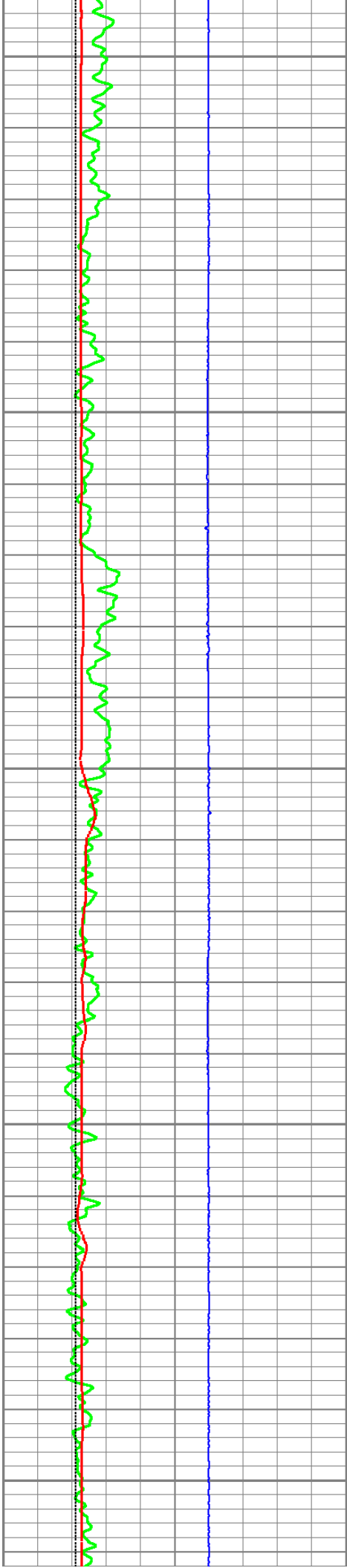
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146

5500

146





5550

146

5600

146

5650

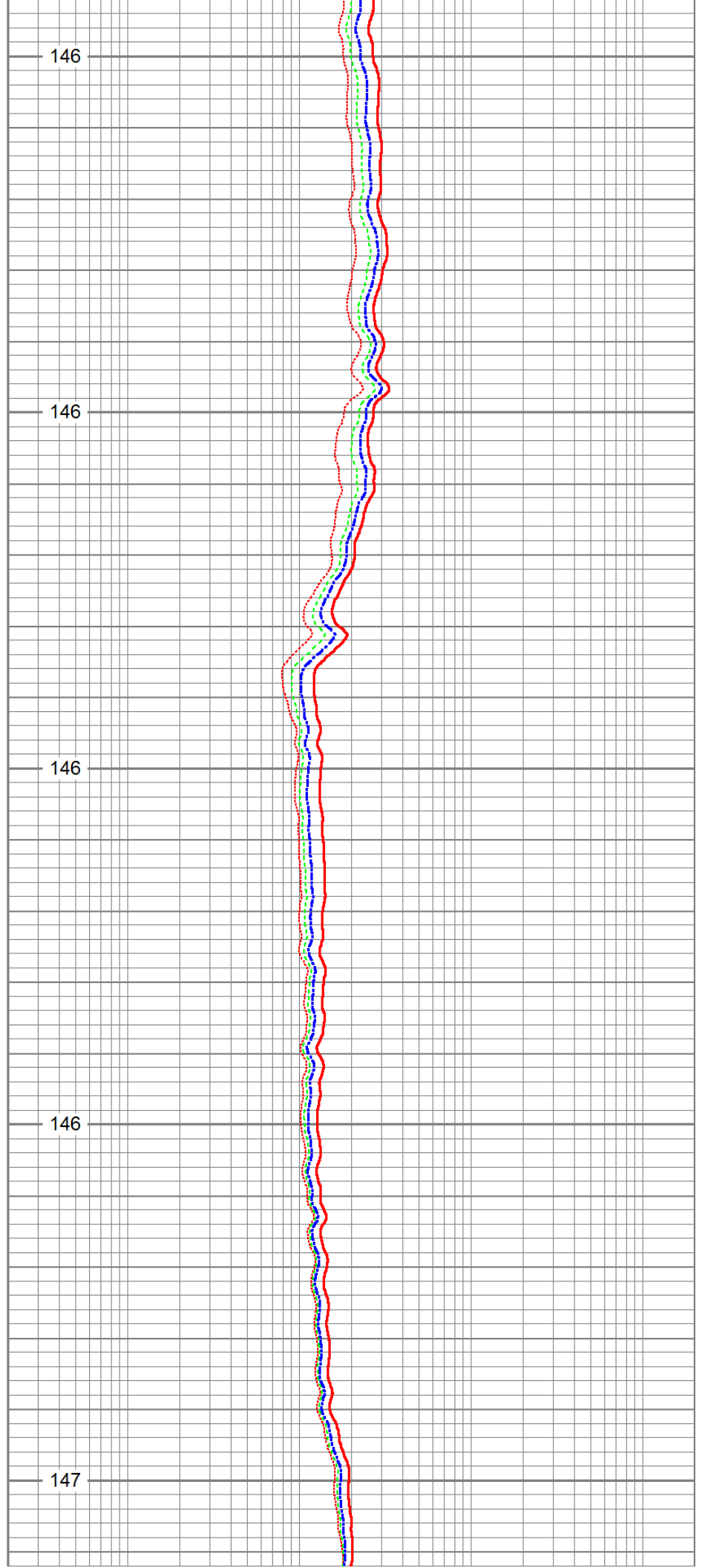
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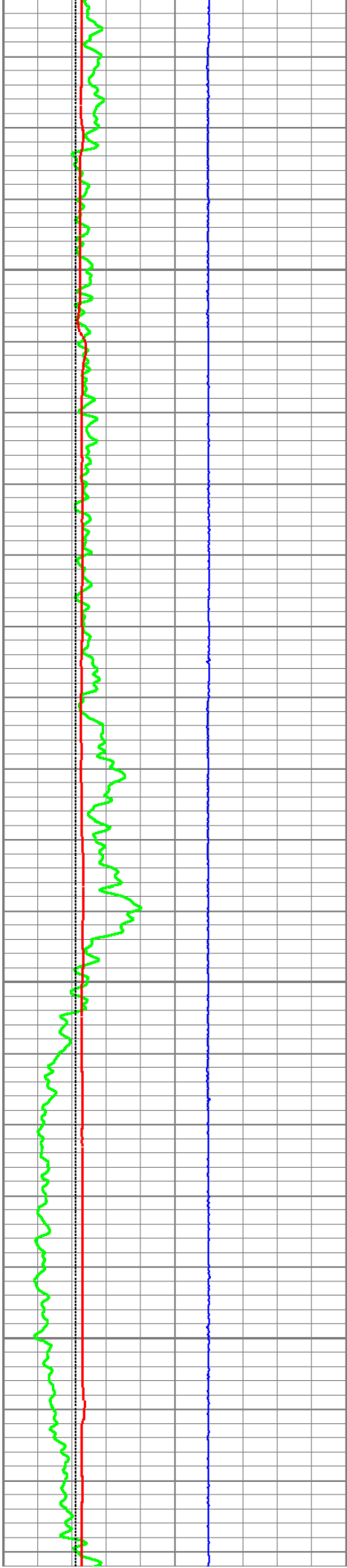
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146

5750

147





5800

147

5850

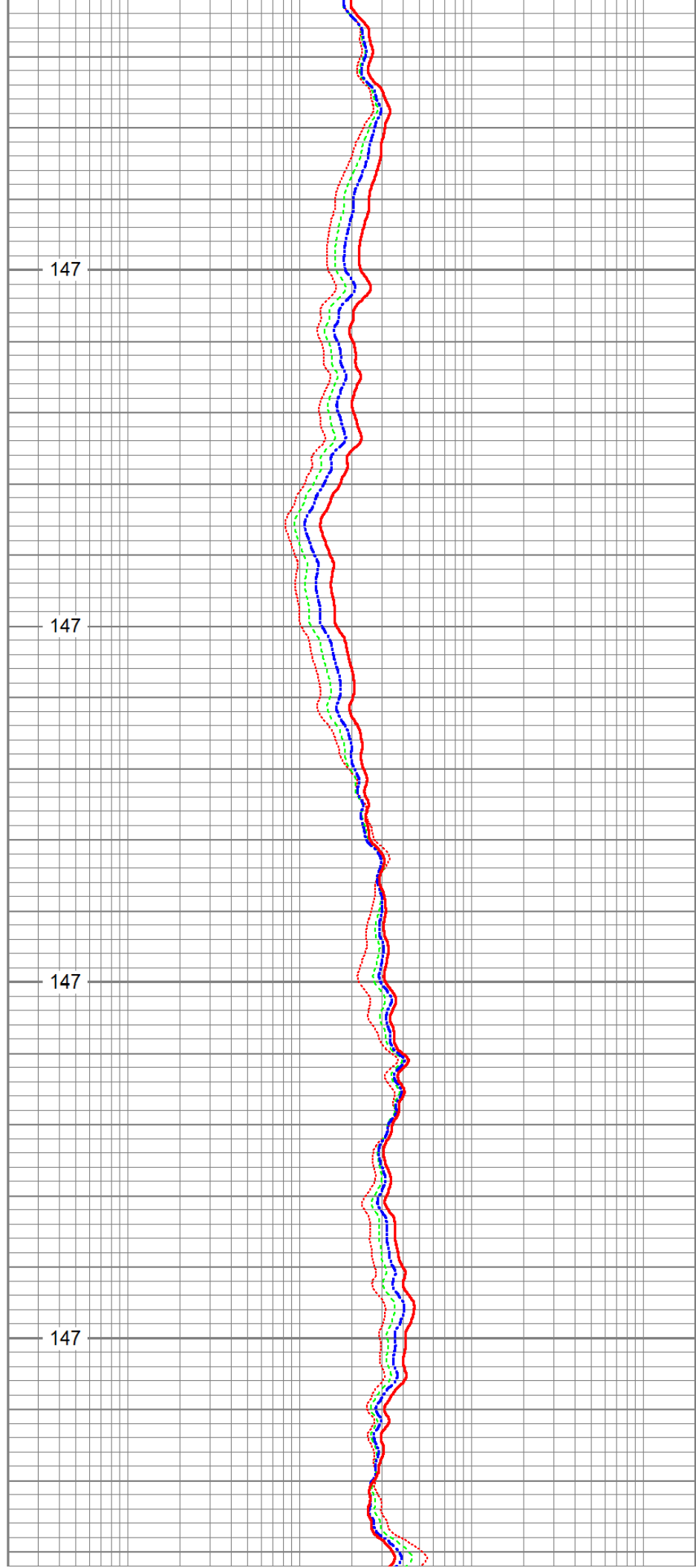
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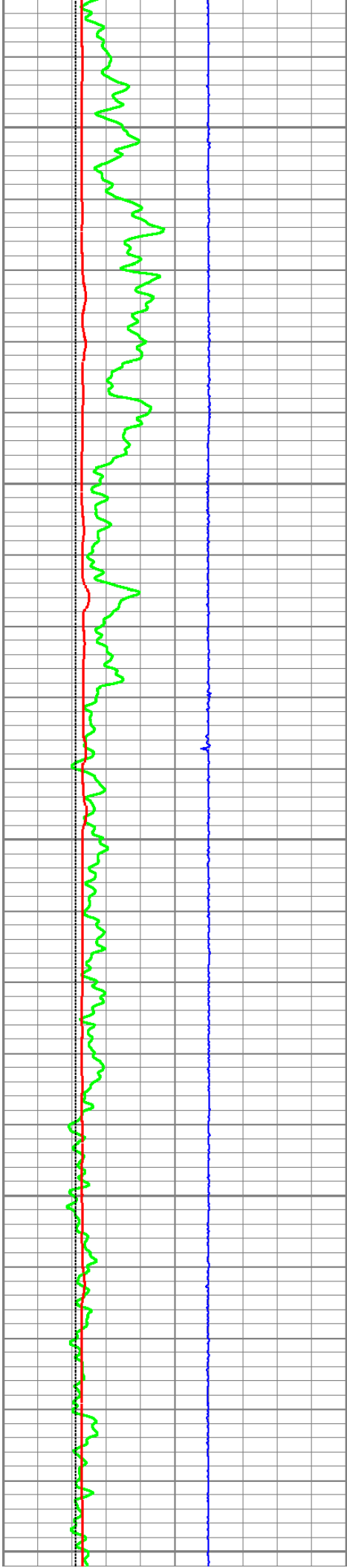
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147

5950

147





6000

147

6050

147

6100

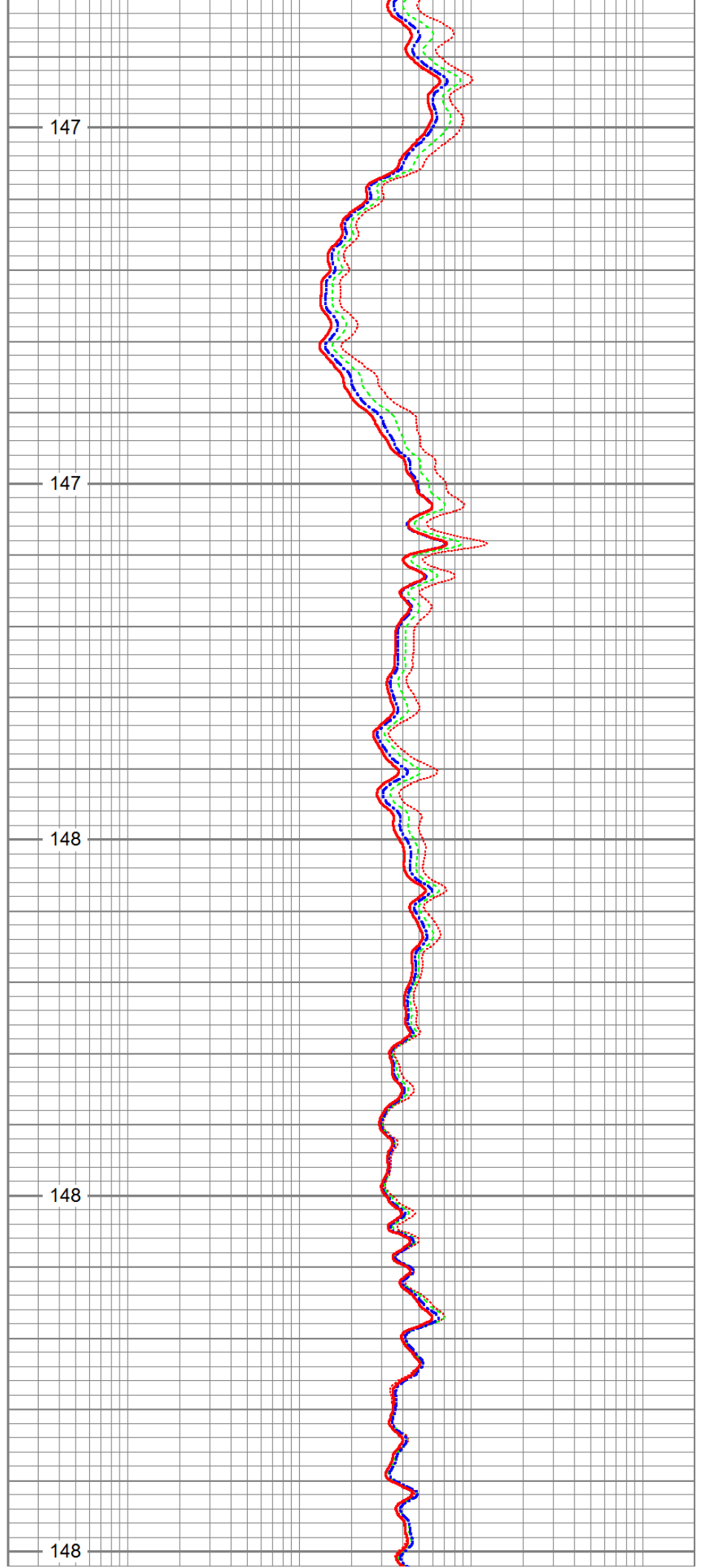
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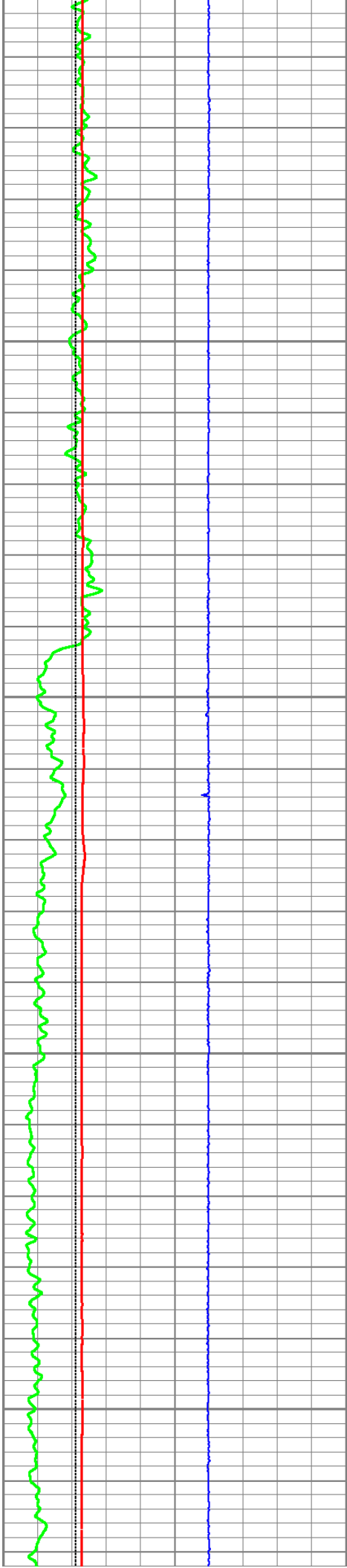
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148

6200

148





6250

6300

6350

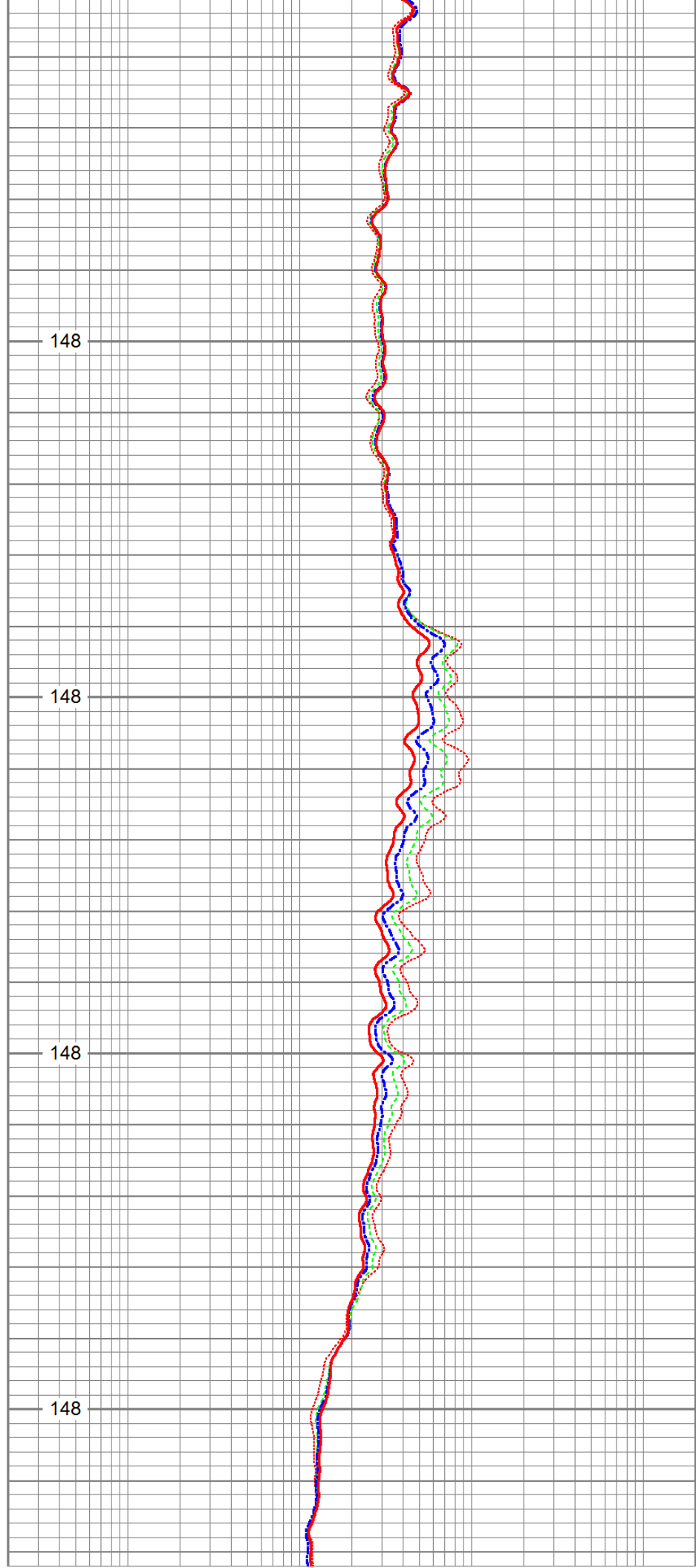
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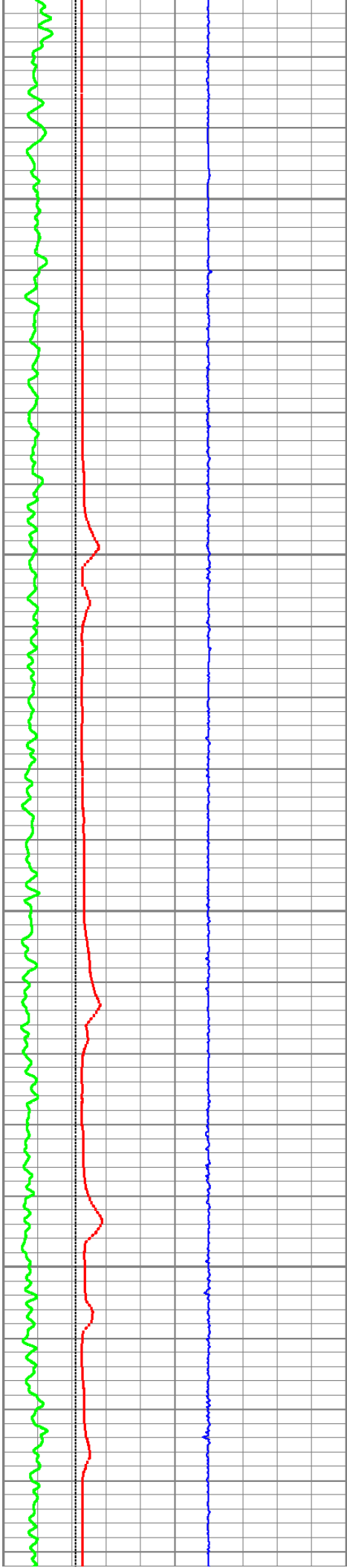
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148

148

148





6450

148

6500

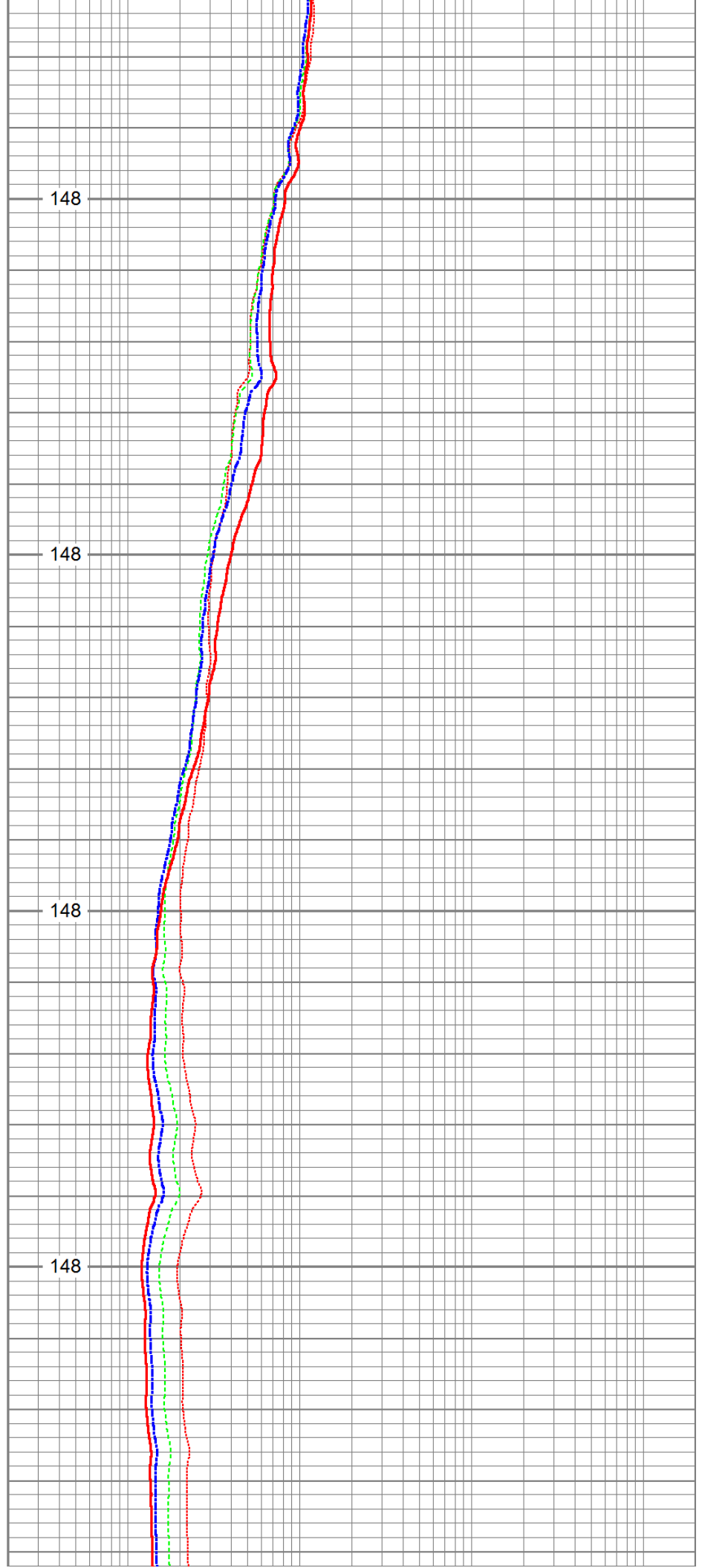
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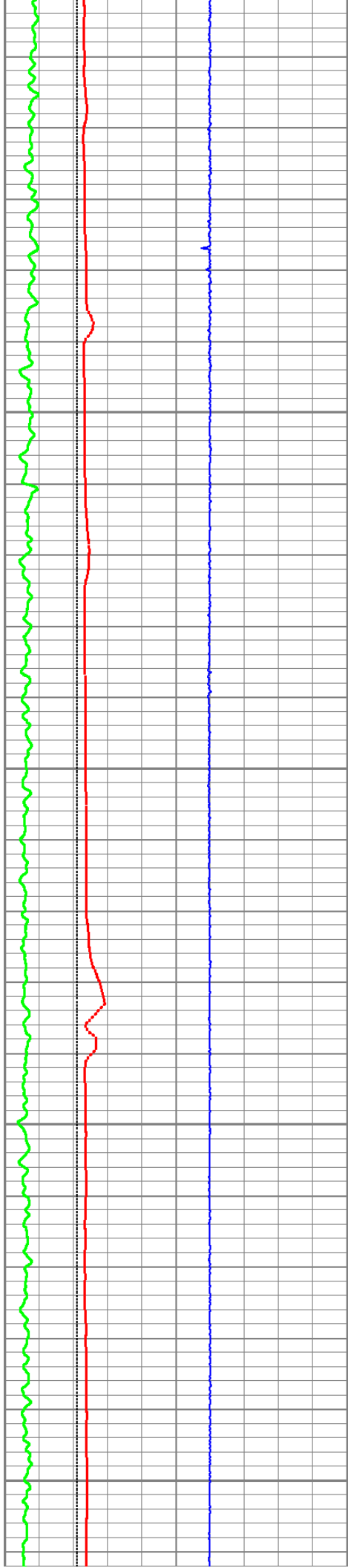
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148

6600

148





6650

6700

6750

6800

6850

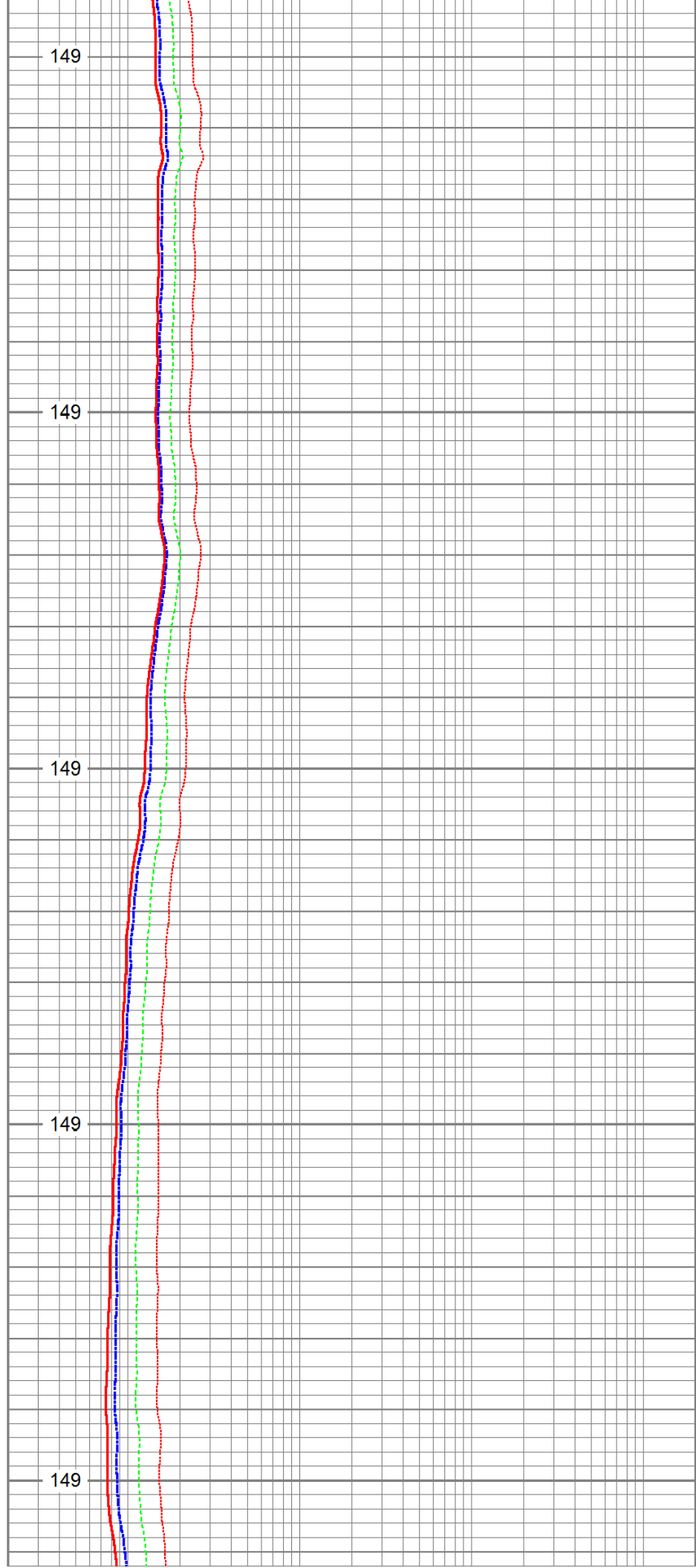
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149

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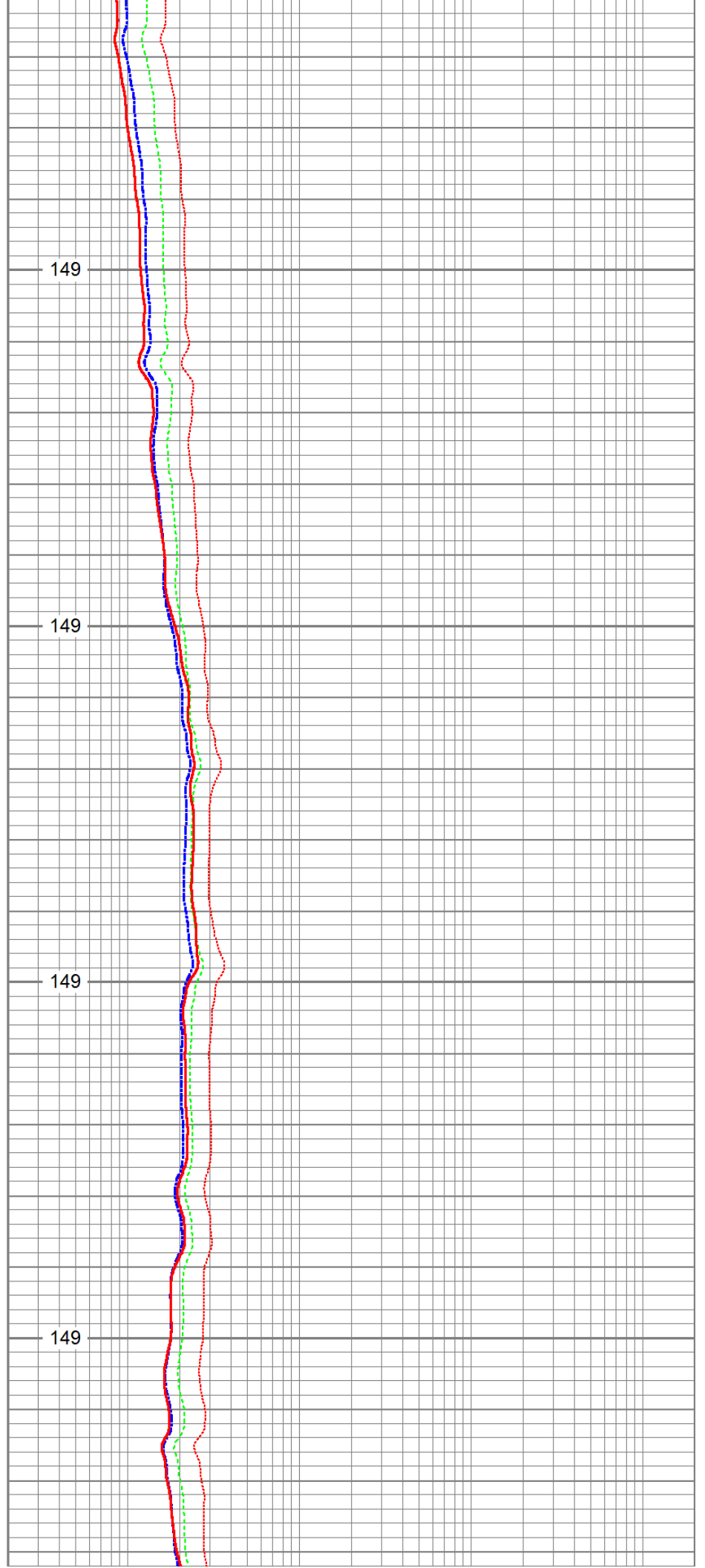


6900

6950

7000

7050

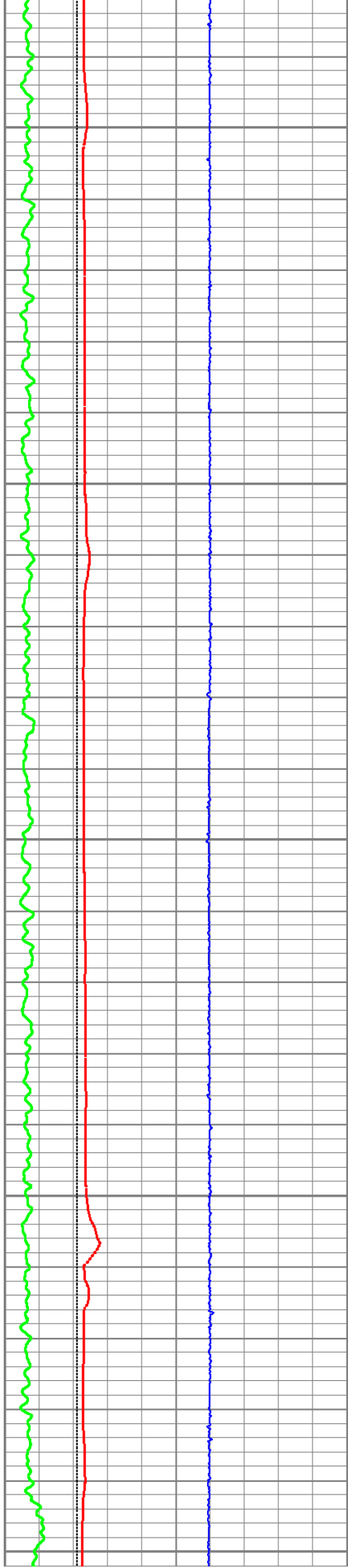


149

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149

149



7100

149

7150

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7200

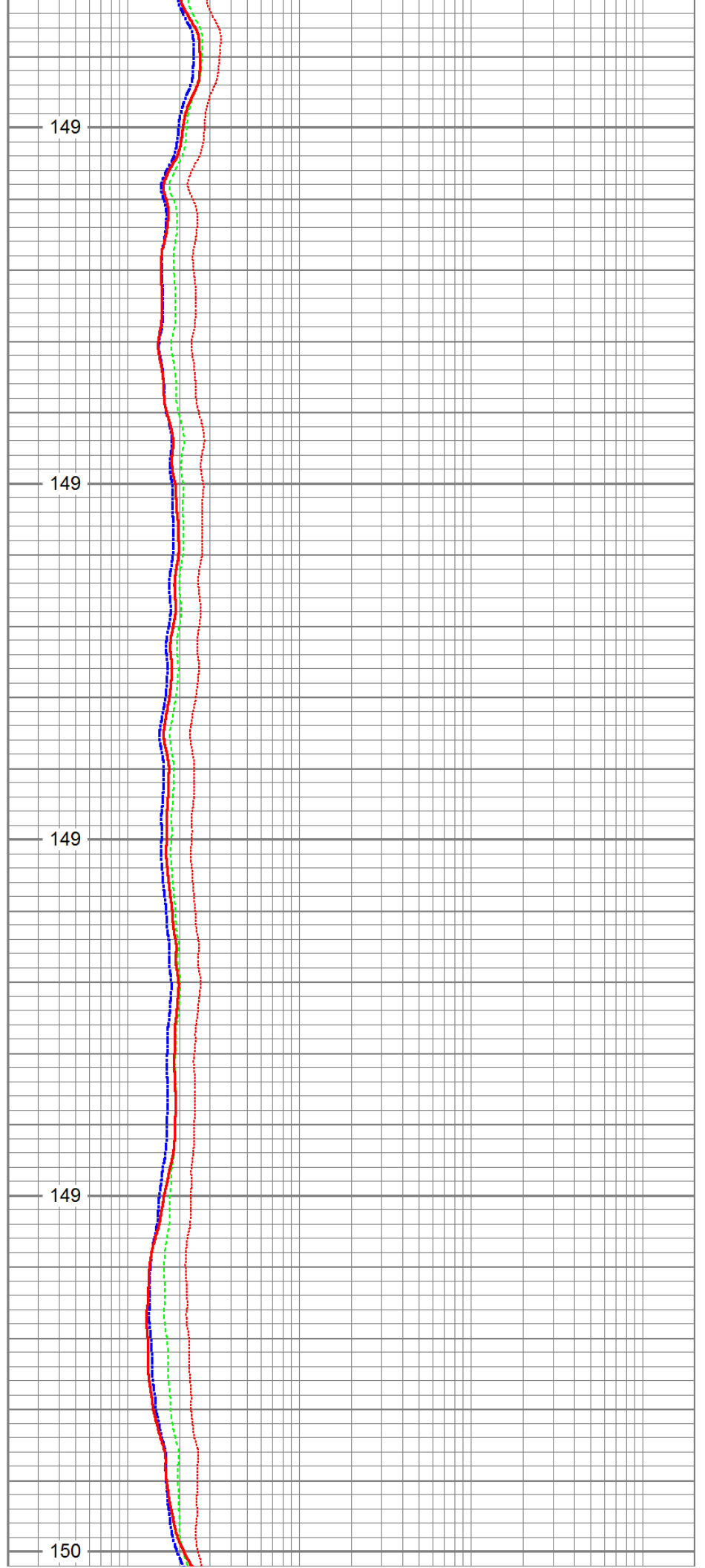
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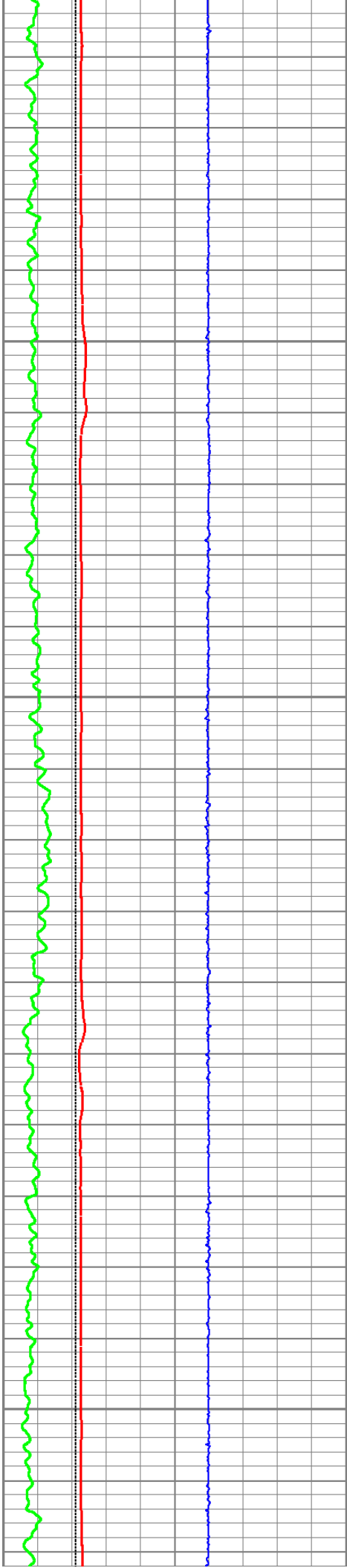
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149

7300

150





7350

150

7400

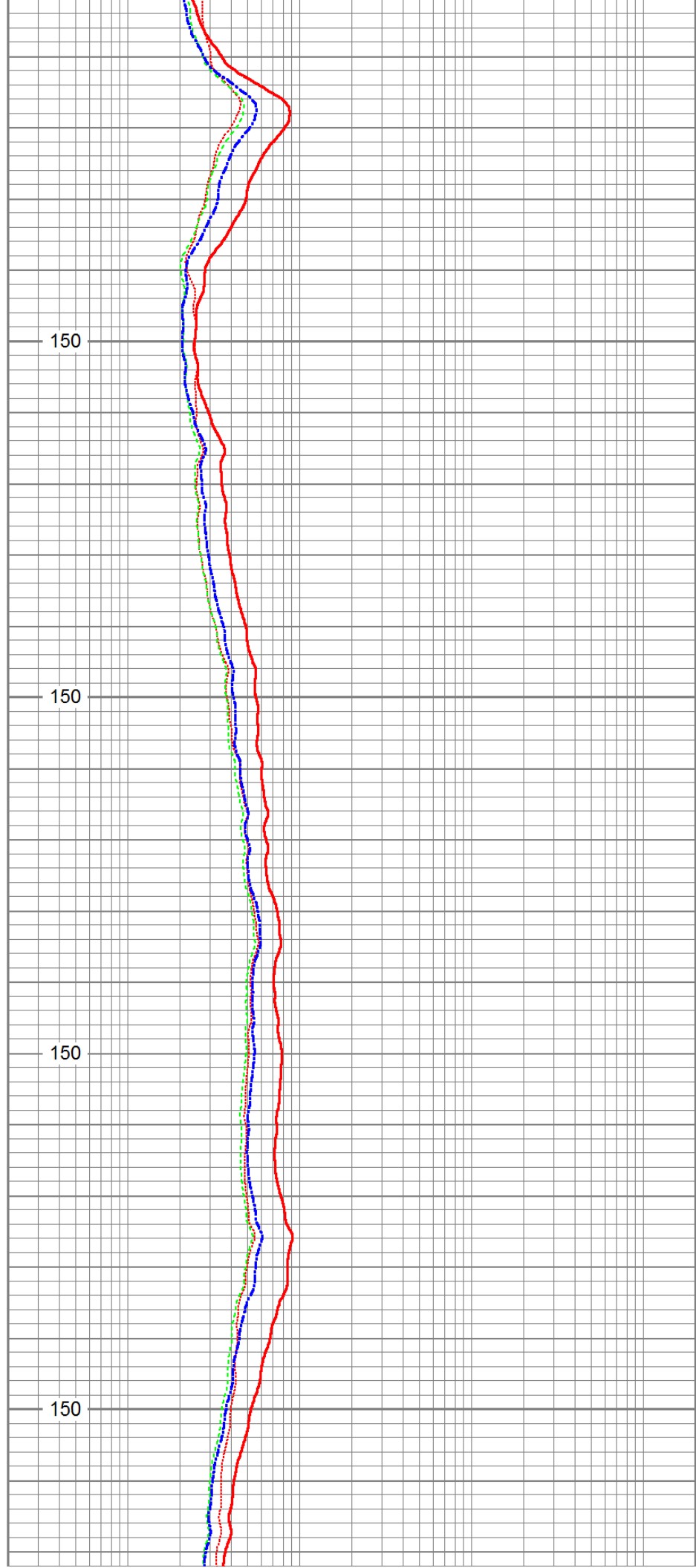
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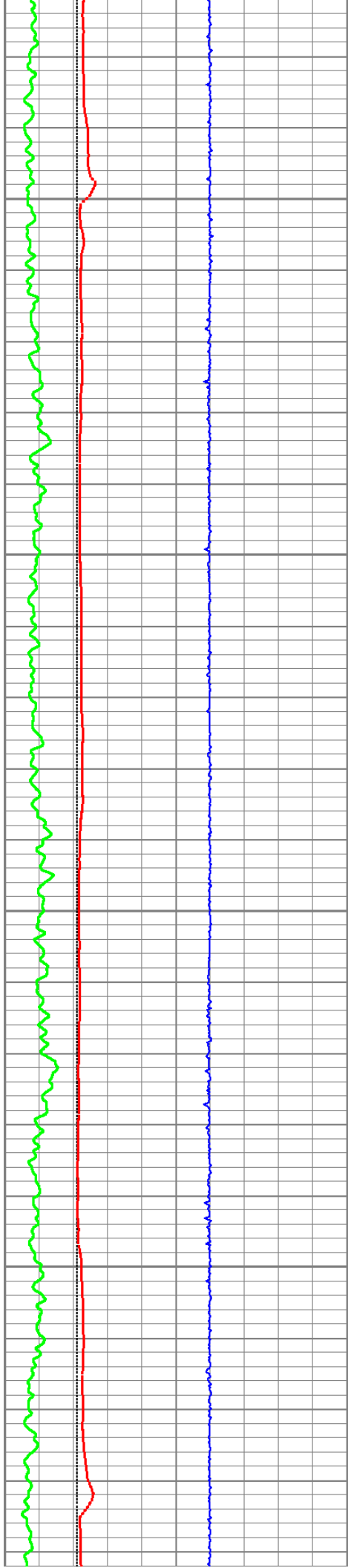
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150

7500

150





7550

7600

7650

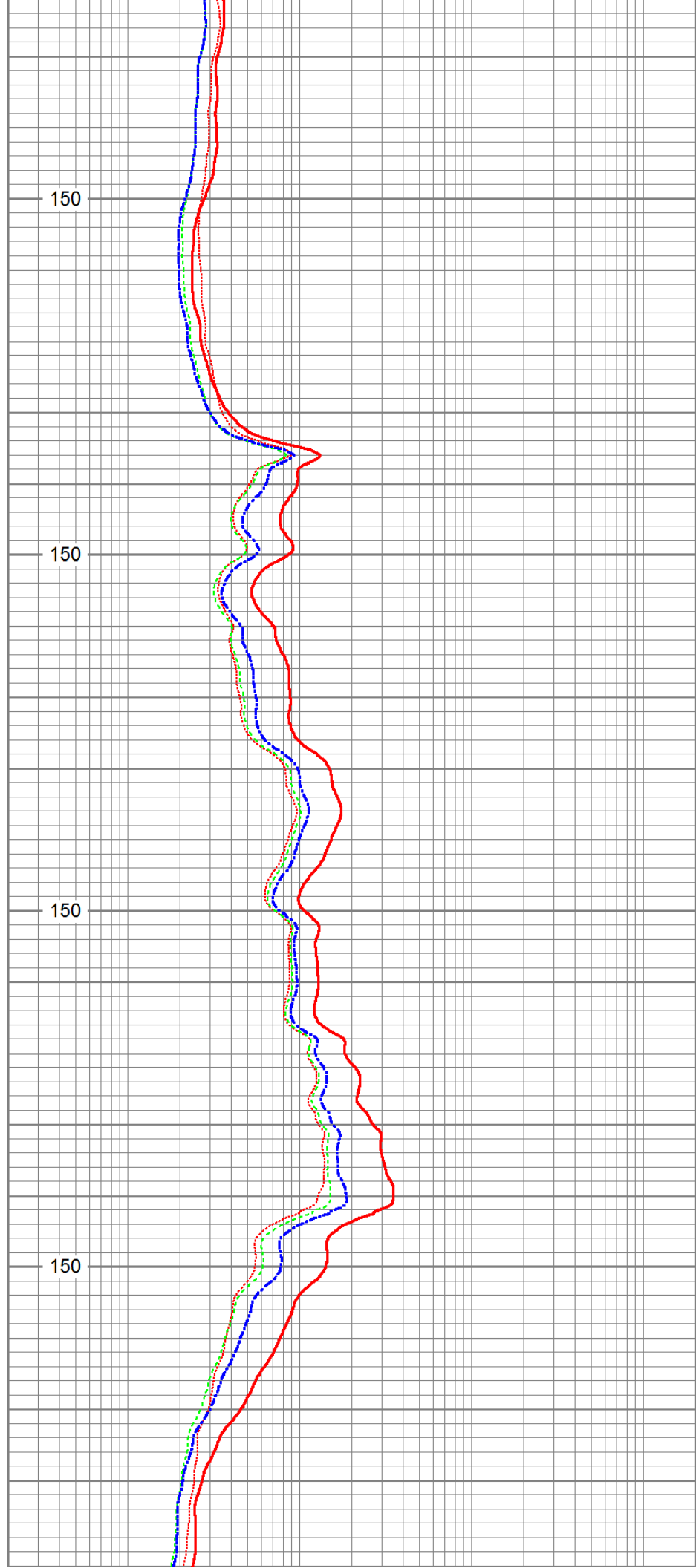
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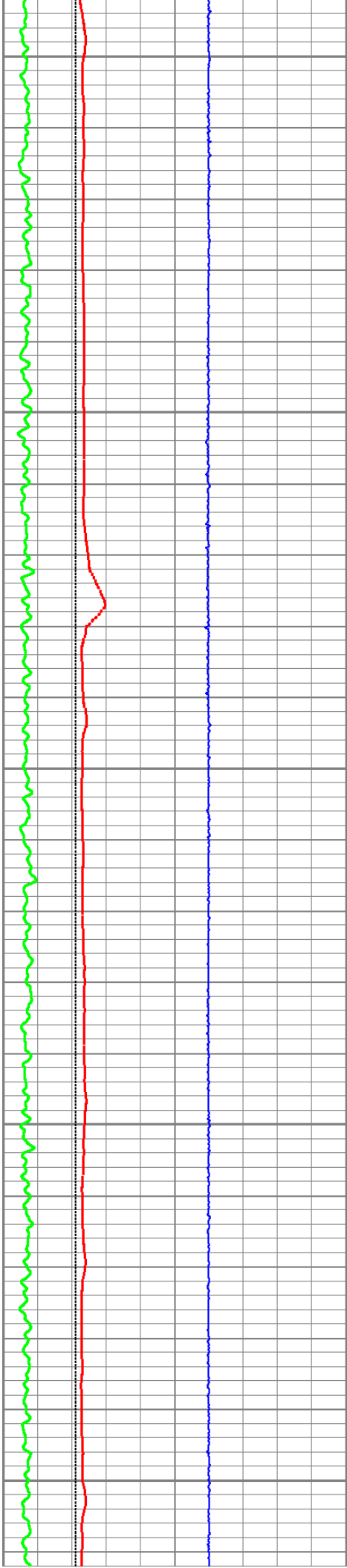
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150

150

150





7750

7800

7850

7900

7950

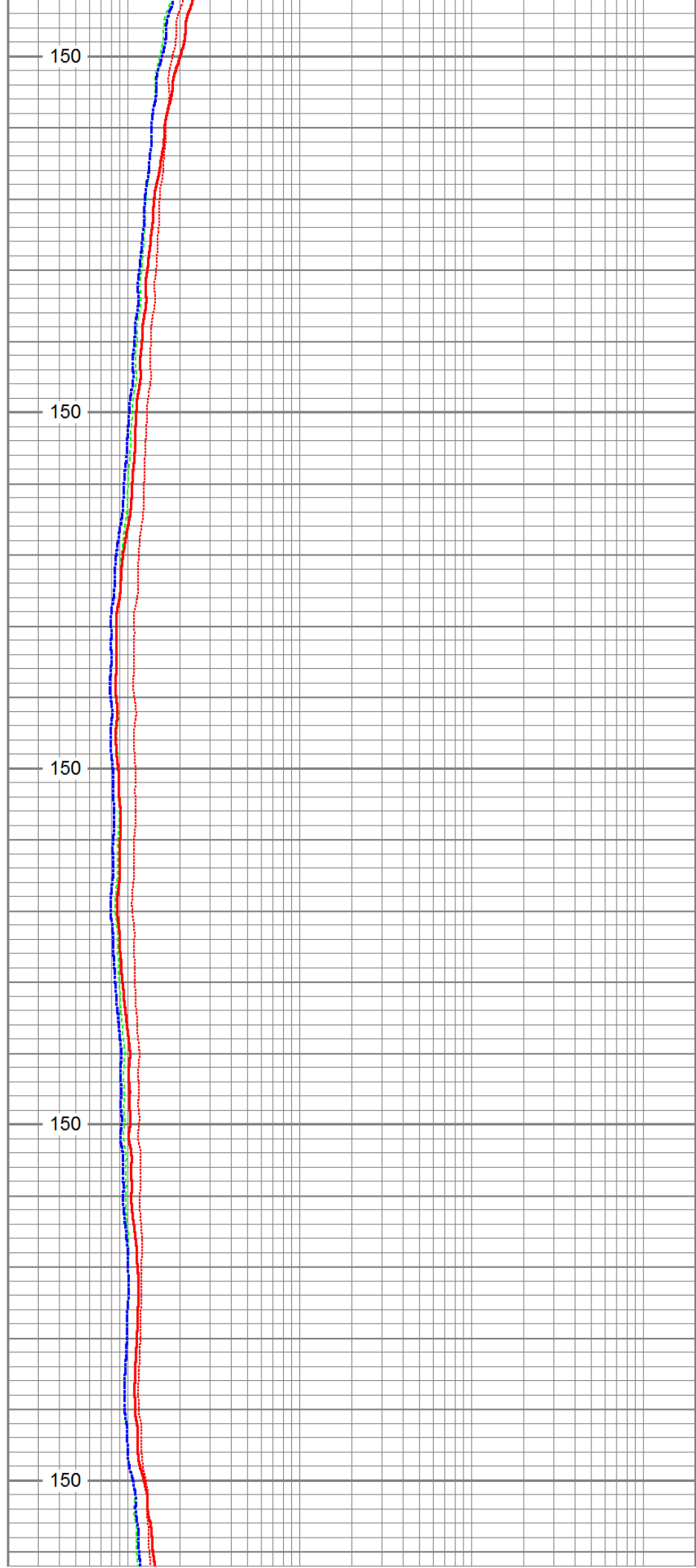
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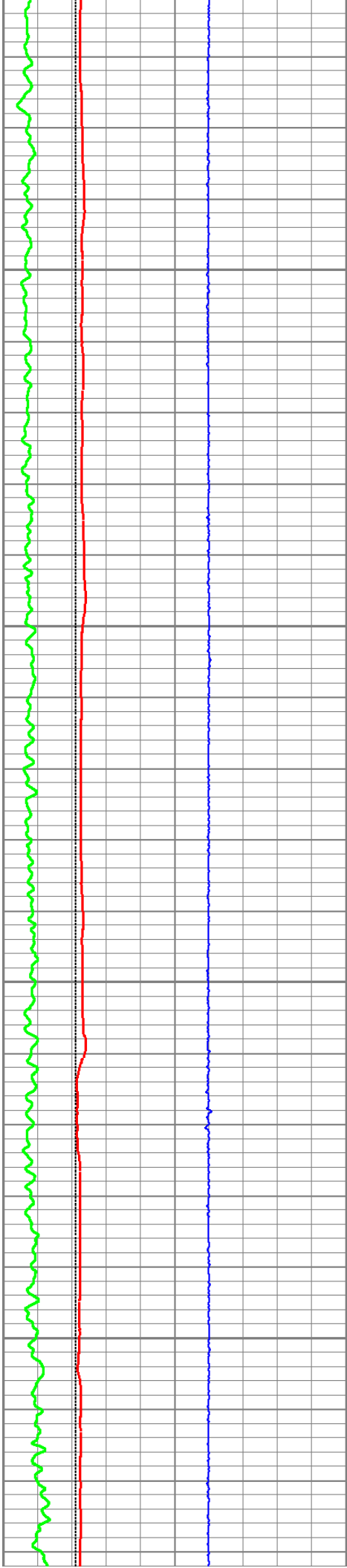
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150

150

150



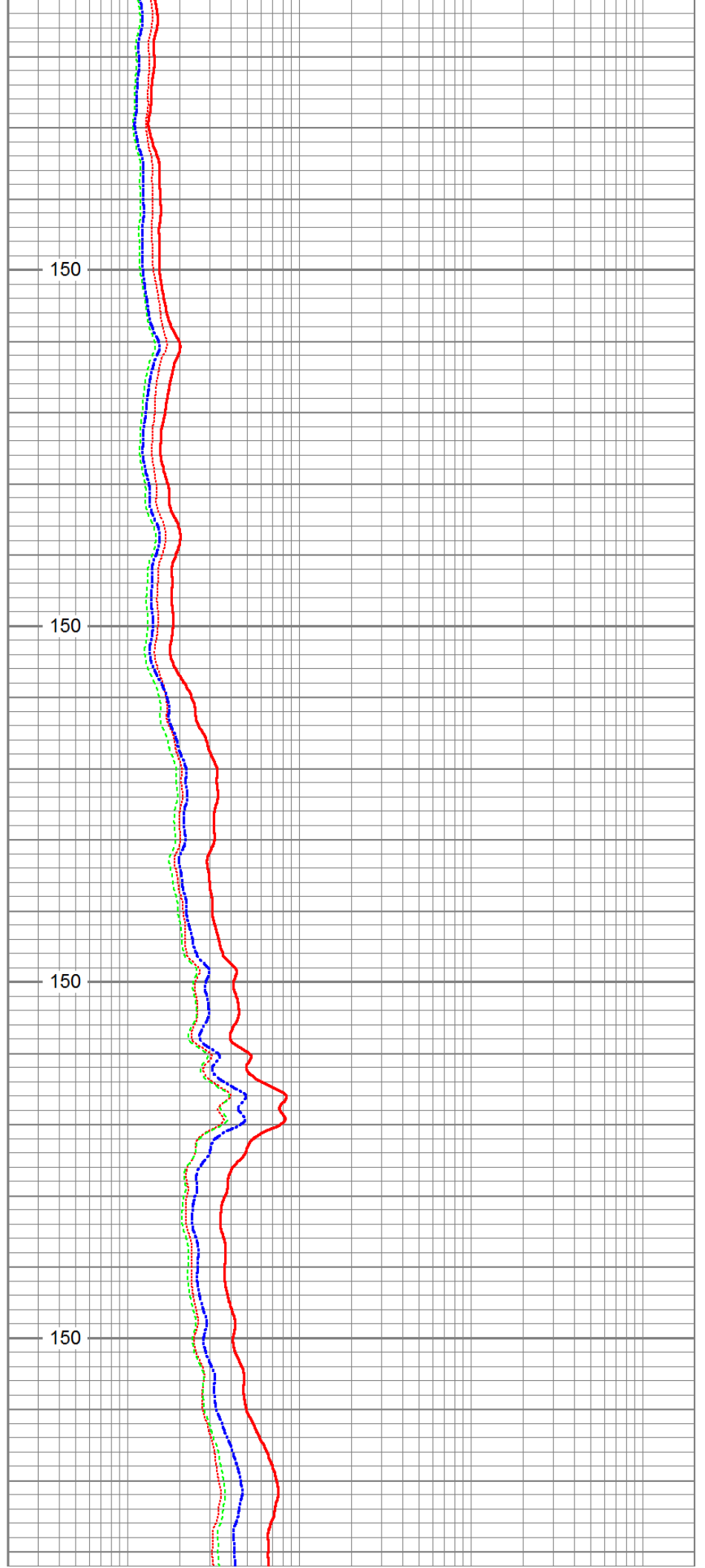


8000

8050

8100

8150

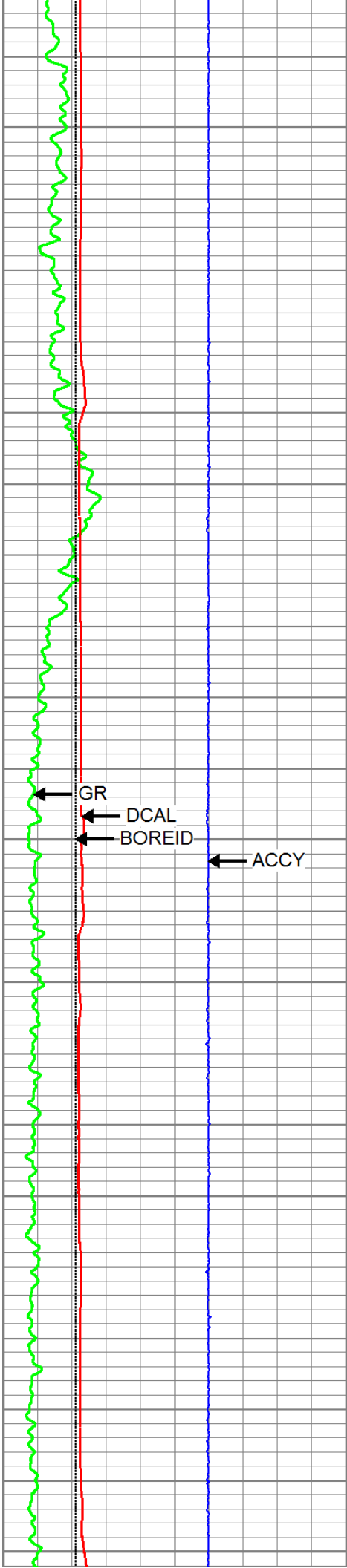


150

150

150

150



8200

8250

8300

8350

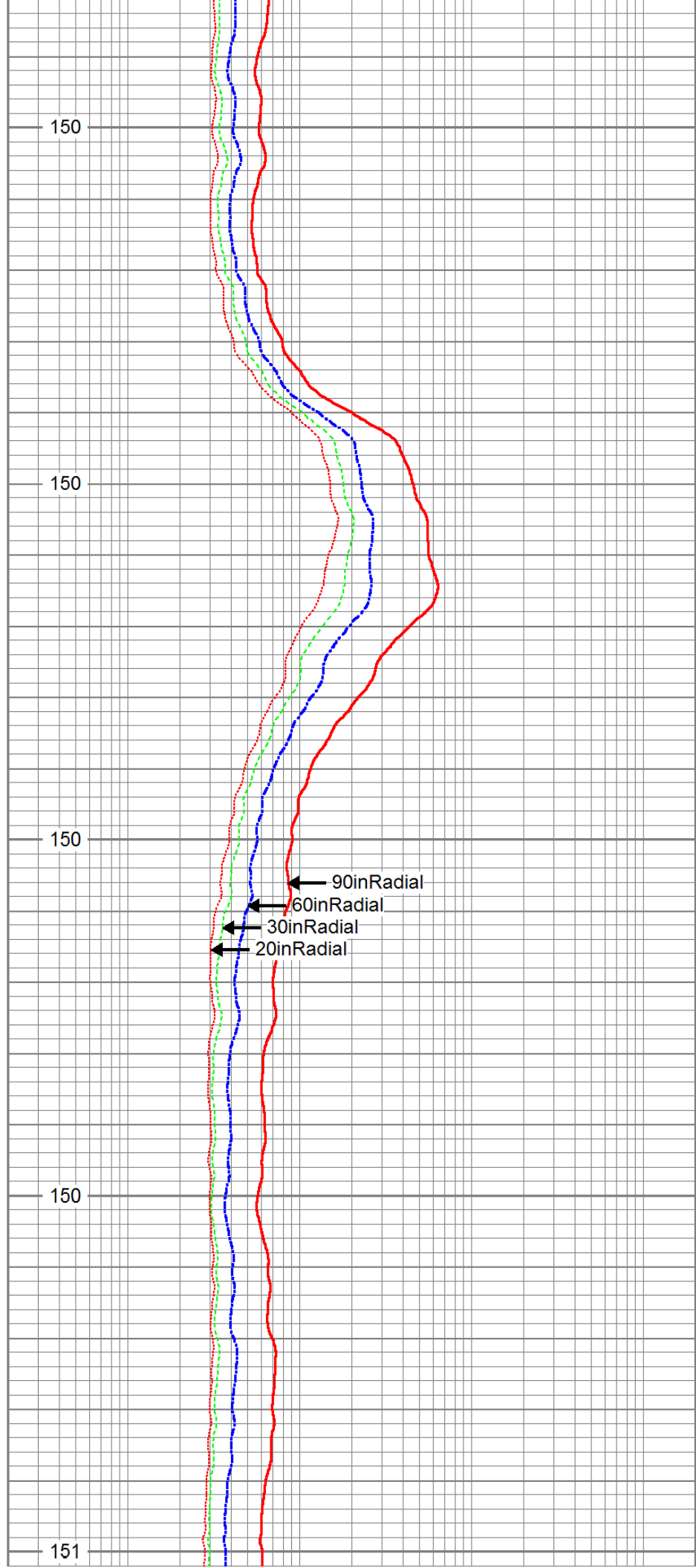
8400

GR

DCAL

BOREID

ACCY



150

150

150

150

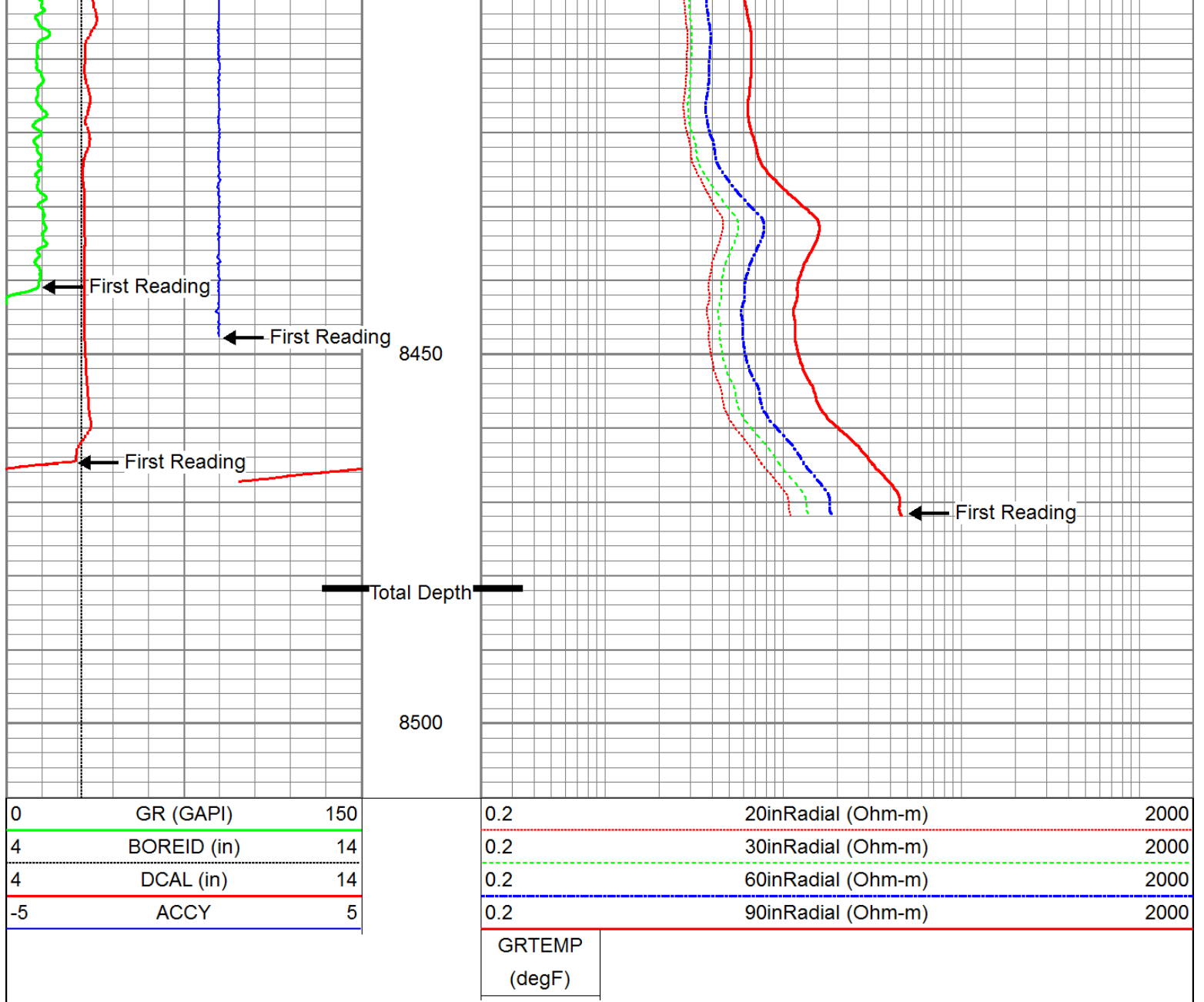
151

90inRadial

60inRadial

30inRadial

20inRadial



Log Variables

Database: C:\Warrior\Data\cooper_mem.db
 Dataset: field/well/proc1/pass1.5

Top - Bottom

BHCOR	BHFL_TYPE	BHFLRES	BHFLRESSRC	BHIDSRC	BOREID	BOTTEMP
On	WBM	Ohm-m	MUDCELL	CURVE	in	degF
		1			6.125	151
CASED?	CASEOD	CASETHCK	CEMWATERSA	CMNTTHCK	DNBHC?	DPORSEL
No	in	in	kppm	in	NO	RHOB
	4.5	0	0	0		
FLUIDDEN	FRMSALIN	LATNOR	MATRXDEN	MUDSALIN	MudWgt	NPORSEL
g/cc	kppm		g/cc	kppm	lb/gal	Limestone
1	0	Off	2.71	1	8.4	
PEBHC?	PERFS	RESTMPSRC	SO	SRFTEMP	SZCOR	TDEPTH
YES	0	INTERNAL	in	degF	On	ft
			0.5	65		8518
TMPCOR	TOOLPOS					

Calibration Report

Database File: cooper_mem.db
 Dataset Pathname: proc1/pass1.5
 Dataset Creation: Fri Sep 21 05:00:15 2012

ThruBit Induction Calibration Report

Tool Model-Serial Number: ENP-ENP6R
 Shop Calibration Performed: Wed Jul 25 10:21:11 2012

BASELINE

	R	Expected	X	Expected
Freq 1				
A1	-469.0170	[-500.00, -400.00]	168.4420	[-500.00, 500.00]
A2	-139.6900	[-180.00, -100.00]	264.6260	[-500.00, 500.00]
A3	-29.4956	[-50.00, -10.00]	109.7290	[-500.00, 500.00]
A4	-15.6177	[-30.00, -10.00]	268.7780	[-500.00, 500.00]
A5	-13.1078	[-30.00, -10.00]	135.2190	[-500.00, 500.00]
Freq 2				
A1	-246.0200	[-280.00, -180.00]	82.3116	[-500.00, 500.00]
A2	-89.6079	[-130.00, -50.00]	142.8020	[-500.00, 500.00]
A3	-22.0117	[-50.00, -10.00]	21.3310	[-500.00, 500.00]
A4	-18.7072	[-30.00, -10.00]	94.9304	[-500.00, 500.00]
A5	-17.6060	[-30.00, -10.00]	0.3442	[-500.00, 500.00]
Freq 3				
A1	-159.7820	[-180.00, -80.00]	-12.4301	[-500.00, 500.00]
A2	-68.4018	[-130.00, -30.00]	61.8104	[-500.00, 500.00]
A3	-18.1166	[-50.00, -10.00]	-41.0520	[-500.00, 500.00]
A4	-20.1535	[-30.00, -10.00]	-18.3517	[-500.00, 500.00]
A5	-20.0484	[-30.00, -10.00]	-96.4786	[-500.00, 500.00]
Freq 4				
A1	-90.0349	[-120.00, -40.00]	-164.8070	[-500.00, 500.00]
A2	-49.6082	[-110.00, -10.00]	-48.3390	[-500.00, 500.00]
A3	-14.0456	[-50.00, -10.00]	-134.2970	[-500.00, 500.00]
A4	-21.8694	[-30.00, -10.00]	-182.7930	[-500.00, 500.00]
A5	-23.3720	[-30.00, -10.00]	-255.1110	[-500.00, 500.00]

CALIBRATION COEFFICIENTS

	R	Expected	X	Expected
Freq 1				
A1	0.9898	[0.95, 1.05]	0.0050	[-0.05, 0.05]
A2	0.9893	[0.95, 1.05]	0.0025	[-0.05, 0.05]
A3	0.9901	[0.95, 1.05]	-0.0047	[-0.05, 0.05]
A4	0.9894	[0.95, 1.05]	0.0038	[-0.05, 0.05]
A5	0.9921	[0.95, 1.05]	0.0017	[-0.05, 0.05]
Freq 2				
A1	0.9845	[0.95, 1.05]	-0.0037	[-0.05, 0.05]
A2	0.9838	[0.95, 1.05]	-0.0052	[-0.05, 0.05]
A3	0.9788	[0.95, 1.05]	-0.0052	[-0.05, 0.05]
A4	0.9853	[0.95, 1.05]	-0.0048	[-0.05, 0.05]
A5	0.9890	[0.95, 1.05]	-0.0077	[-0.05, 0.05]
Freq 3				
A1	0.9876	[0.95, 1.05]	-0.0038	[-0.05, 0.05]

A2	0.9872	[0.95, 1.05]	-0.0046	[-0.05, 0.05]
A3	0.9821	[0.95, 1.05]	-0.0050	[-0.05, 0.05]
A4	0.9884	[0.95, 1.05]	-0.0050	[-0.05, 0.05]
A5	0.9942	[0.95, 1.05]	-0.0070	[-0.05, 0.05]
Freq 4				
A1	0.9872	[0.95, 1.05]	-0.0042	[-0.05, 0.05]
A2	0.9868	[0.95, 1.05]	-0.0046	[-0.05, 0.05]
A3	0.9838	[0.95, 1.05]	-0.0073	[-0.05, 0.05]
A4	0.9901	[0.95, 1.05]	-0.0067	[-0.05, 0.05]
A5	1.0041	[0.95, 1.05]	-0.0097	[-0.05, 0.05]
Temperature	35.1620 degC			

ThruBit Density Calibration Report

Tool Model-Serial Number: PS-PS28D
Source Number:
Shop Calibration Performed: Thu Sep 13 14:37:07 2012

REFERENCE

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

READINGS

Outputs	Counts	Units	Expected
SS1 Background	128.87	cps	[130.00, 170.00]
LS1 Background	142.54	cps	[130.00, 170.00]
LS4 Background	31.21	cps	[27.00, 35.00]
SS1 Aluminium	5148.10	cps	[4500.00, 5500.00]
LS1 Aluminium	918.74	cps	[750.00, 950.00]
LS4 Aluminium	1020.03	cps	[843.00, 1068.00]
SS1 Magnesium	8650.86	cps	[7000.00, 9000.00]
LS1 Magnesium	6109.02	cps	[5250.00, 6250.00]
LS1 Al + Fe	788.82	cps	[650.00, 800.00]
LS4 Al + Fe	455.74	cps	[382.00, 471.00]

RESULTS

SS Slope	1.62	[1.52, 1.77]
LS Slope	0.42	[0.38, 0.45]
PEF K Factor	4.996	[3.510, 6.170]
PEF B Factor	-0.509	[-0.700, -0.410]

Caliper Shop Calibration performed: Thu Sep 13 14:37:07 2012

RESULTS

Reference	Reading	Units
12.00	1937.05	in
9.00	2101.17	in
6.00	2259.77	in

DENSITY PRE-SURVEY CHECK Performed: Wed Sep 19 18:22:30 2012

Outputs	Counts	Units	Expected
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SS1 Background	128.51	cps	[125.01, 132.74]
LS1 Background	141.52	cps	[138.27, 146.82]
LS4 Background	31.48	cps	[29.34, 33.09]

CALIPER PRE-SURVEY CHECK Performed:		Wed Sep 19 18:14:26 2012	
Reference	Readings	Units	Expected
6.00	6.12	in	[5.80, 6.20]

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Compensated Neutron Calibration Report			
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Tool Model-Serial Number:		ENP-ENP3N	
Source Number:			
Calibration Tank Temperature:		84.1 degF	
Shop Calibration Performed:		Thu Sep 13 15:37:13 2012	

BACKGROUND MEASUREMENT			
Outputs	Measured	Units	Expected
SS Counts	0.0	cps	<10
LS Counts	0.0	cps	<4

WATER TANK REFERENCE			
Outputs	Measured	Units	Expected
SS Counts	3839.0	cps	
LS Counts	120.6	cps	
Tank Ratio Ref	30.9580	SS/LS	
Tank Ratio	31.8282	SS/LS	
Tank Ratio Gain	0.9727		[0.85, 1.15]

ALUMINUM SLEEVE REFERENCE			
Outputs	Measured	Units	Expected
SS Counts	43767.7	cps	
LS Counts	3734.8	cps	
Al Ratio Ref	10.797	SS/LS	
Al Ratio	11.399	SS/LS	
Al Ratio Gain	0.95		[0.90, 1.10]
Sleeve Porosity	14.46	pu	

PRE-SURVEY BACKGROUND CHECK Performed:		Wed Sep 19 18:29:18 2012	
Outputs	Measured	Units	Expected
SS Counts	0.1	cps	<10
LS Counts	0.1	cps	<4

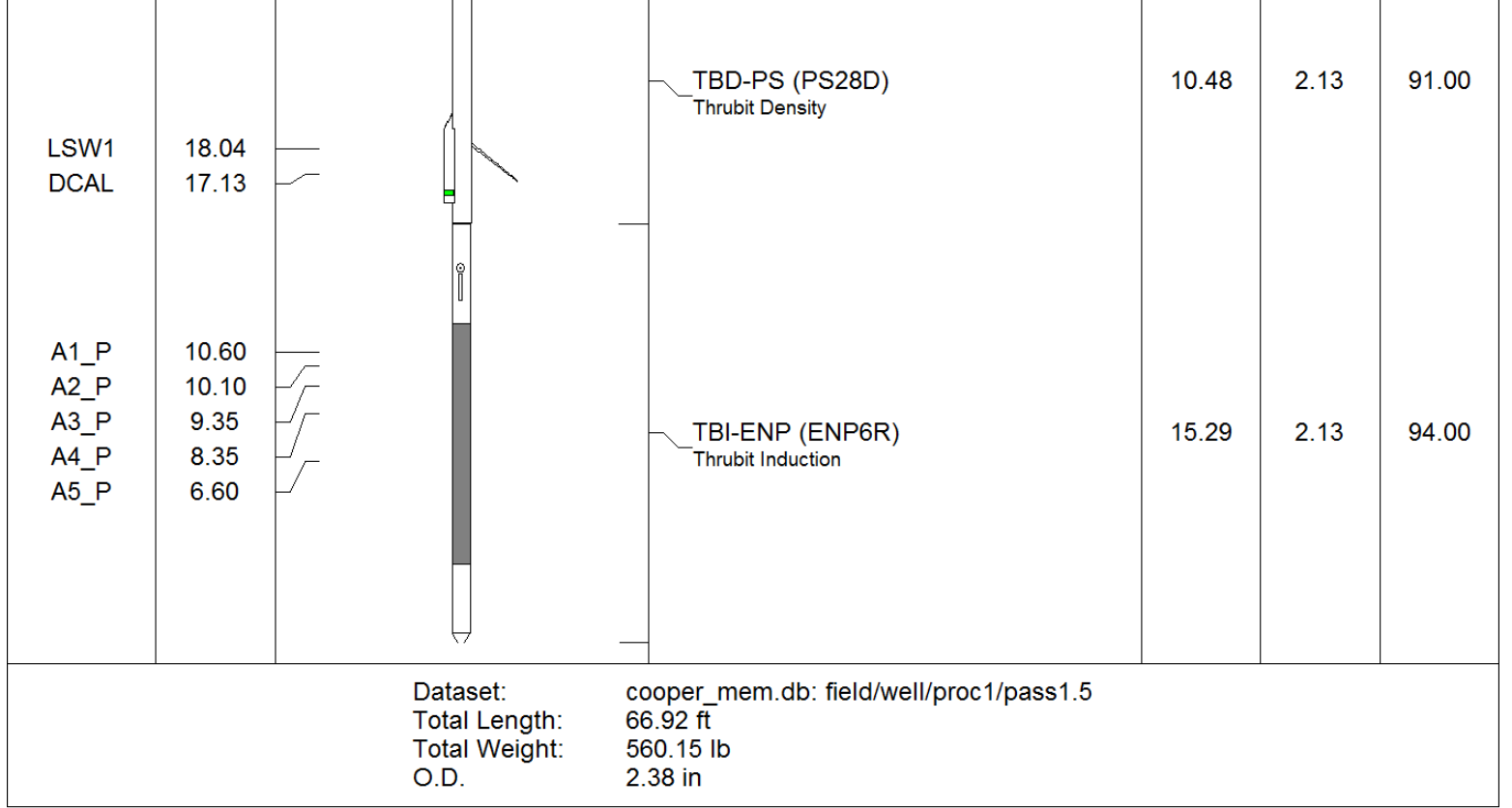
Gamma Ray Calibration Report

Tool Model-Serial Number:	PS-PS09T	
Performed:	Tue Mar 13 14:08:43 2012	
Calibrator Value:	162.7	GAPI
Background Reading:	36.1	cps
Calibrator Reading:	281.0	cps
Sensitivity:	0.3754	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	66.92		Cablehead-S	2.31	2.13	5.00	
ThruBit	64.61		Solid Weakpoint				
			PSBDOT	3.87	2.25	35.00	
ThruBit	60.75		HangOff_Tool	5.00	2.38	60.00	
ThruBit	55.75		Universal Joint	1.46	2.06	15.00	
ThruBit	54.29		10-1	0.88	2.13	3.95	
TBBAT	53.41		TBBAT-A (PS30B) ThruBit Battery	6.13	2.13	38.20	
TBBAT2	47.29		TBBAT2-A (PS29B) ThruBit Battery	6.13	2.13	40.00	
TMG	41.16		TMG-PS (PS09T) ThruBit Telemetry Gamma Ray				
GR	41.04						
GRTEMP	40.20						
ThruBit	35.04		Decentralizer Decentralizer (Small)	4.50	2.13	70.00	
CNLSC	28.60		TBN-ENP (ENP3N) ThruBit Neutron	4.77	2.13	63.00	



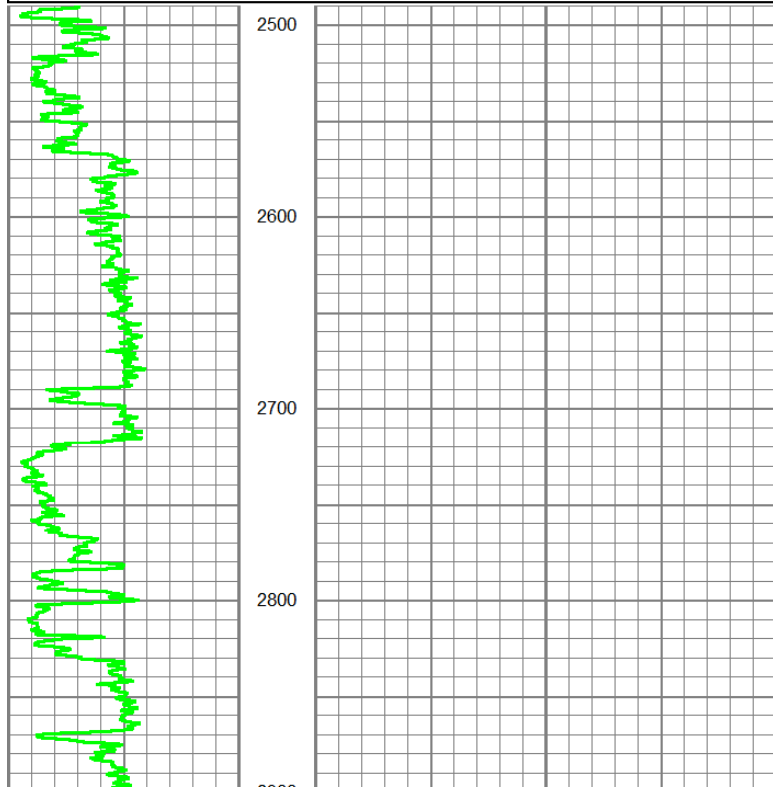
MAIN PASS

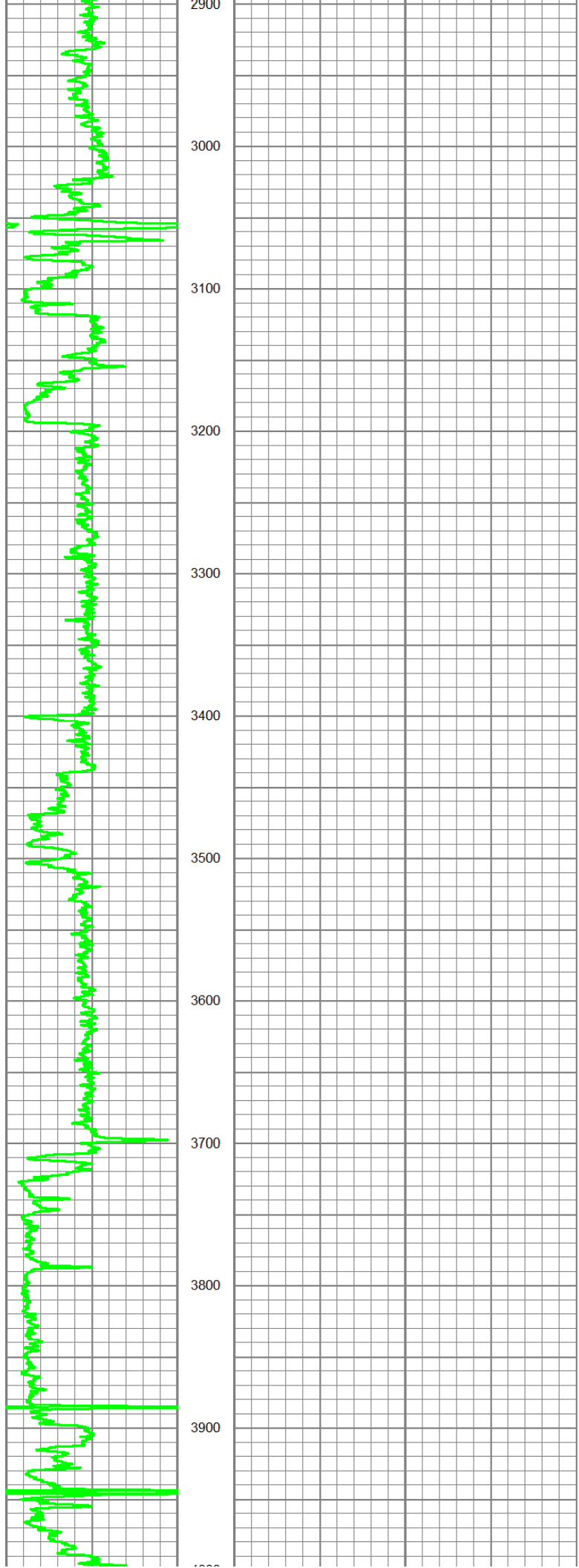
Database File: cooper_mem.db
 Dataset Pathname: proc1/pass1.5
 Presentation Format: 6_1r_chk
 Dataset Creation: Fri Sep 21 05:00:15 2012
 Charted by: Depth in Feet scaled 1:1200

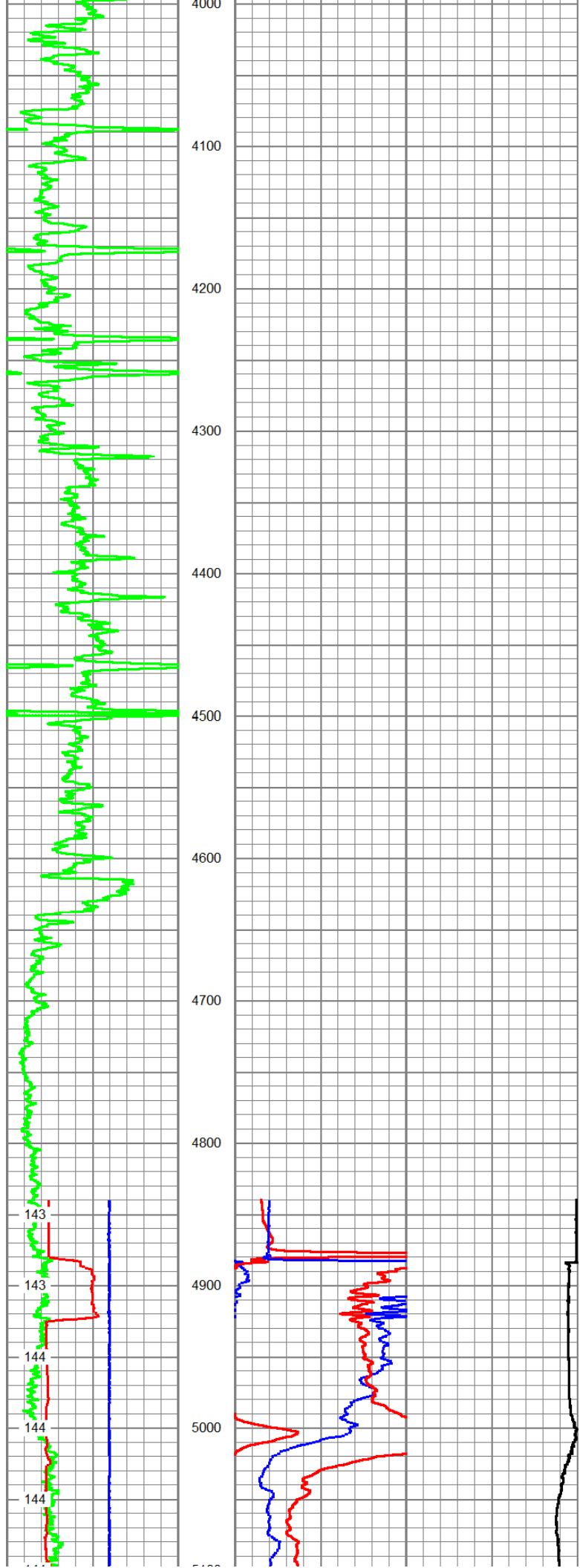
0	GR (GAPI)	150	
4	DCAL (in)	14	
-5	ACCY	5	
GRTEMP			
(degF)			

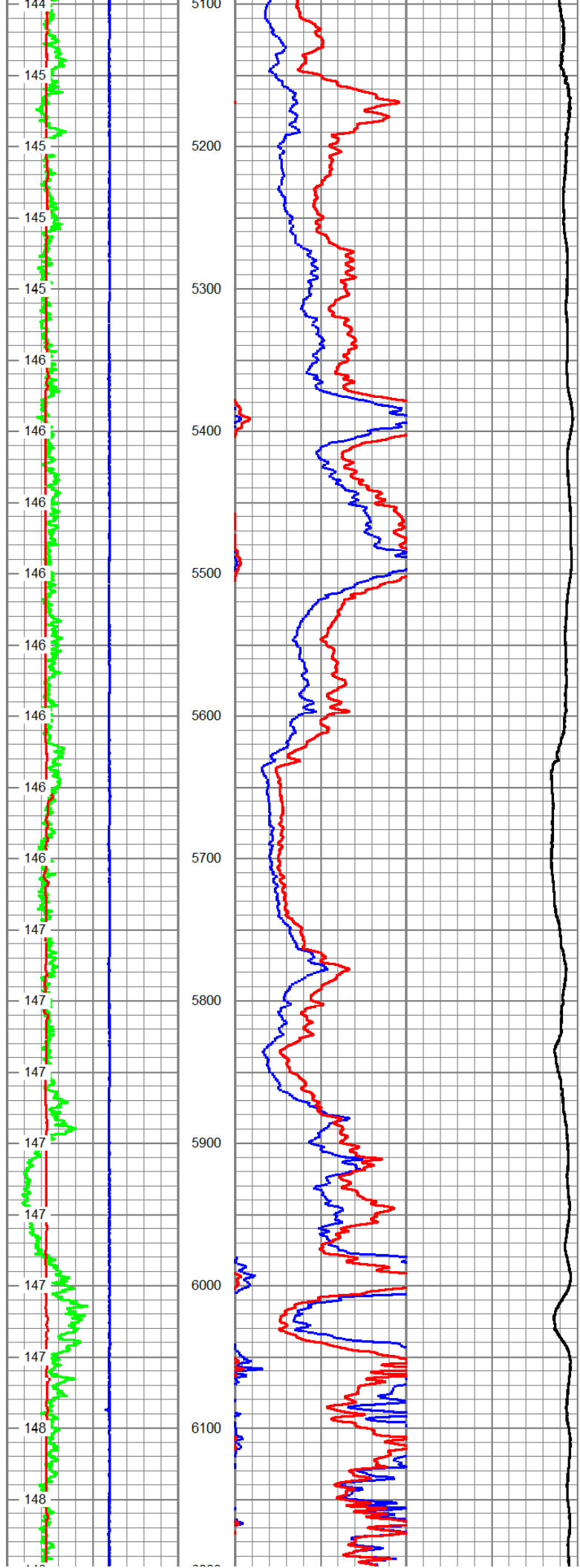
20in 2ft Res	50	(Ohm-m)	500
90in 2ft Res	50	(Ohm-m)	500
DEEP COND (mmho/m)	1000		0

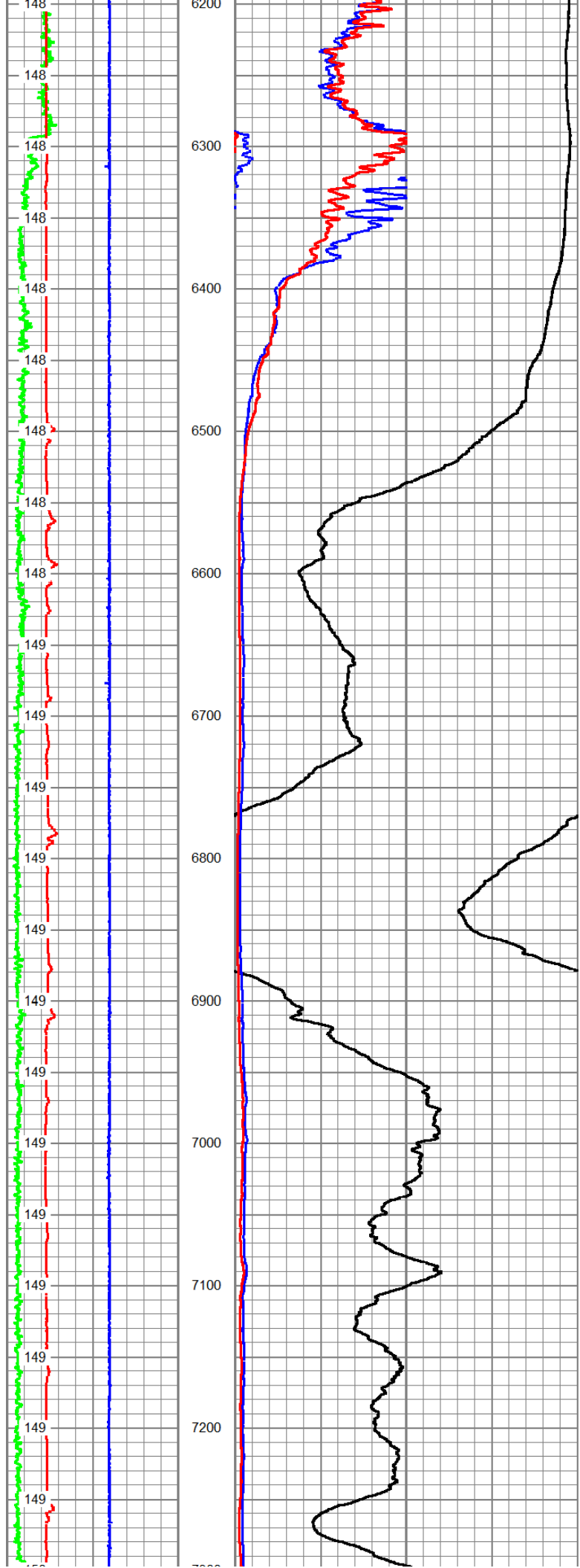
0	20in 2ft Res (Ohm-m)	50	
0	90in 2ft Res (Ohm-m)	50	

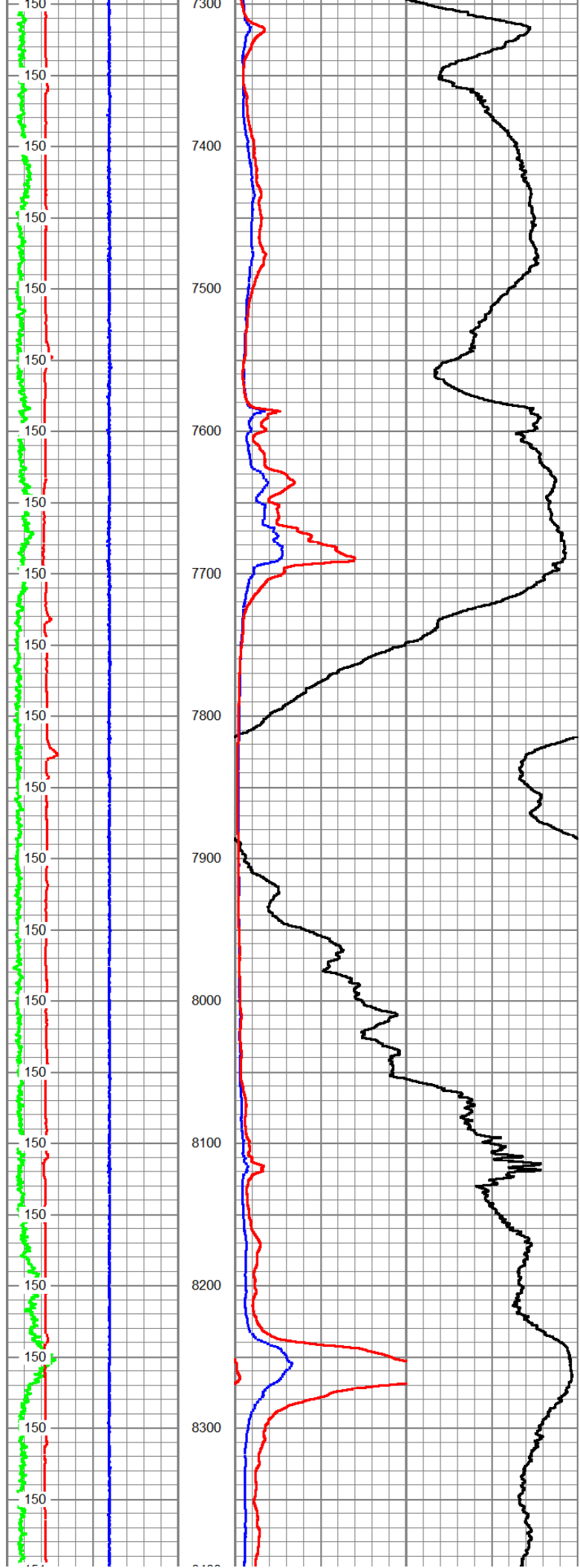


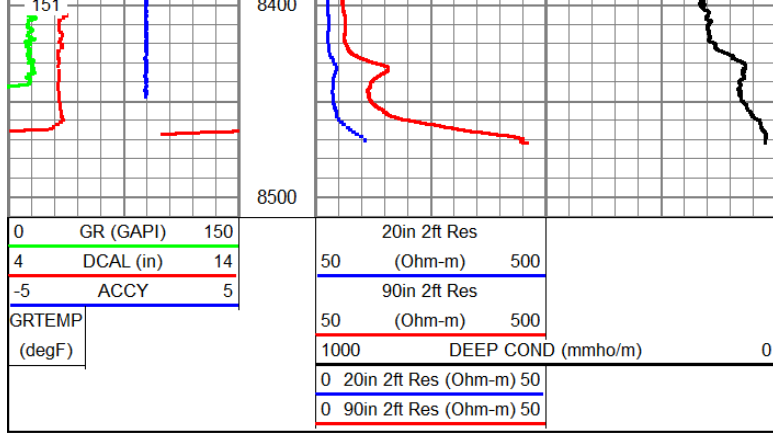












ThruBit
A Schlumberger Company

Company	SANDRIDGE ENERGY, INC.
Well	COOPER 3305 1-27H
Field	HARPER KS PROSPECT/ MISS LIME
County	HARPER
State	KS