



**ThruBit**  
A Schlumberger Company

**ARRAY INDUCTION  
GAMMA RAY  
MEMORY LOG**

Company SANDRIDGE ENERGY  
Well RICHARD 3206 3-30H 3L  
Field EASTHAM  
County HARPER  
State KANSAS

Company SANDRIDGE ENERGY  
Well RICHARD 3206 3-30H 3L  
Field EASTHAM  
County HARPER State KANSAS

Location: API #: 15-077-21964-0300  
SEC 25 TWP 32S RGE 7W  
250' FWL & 790' FEEL  
Permanent Datum G.L. Elevation 1411'  
Log Measured From D.F. 20.5' ABOVE PERM DATUM  
Drilling Measured From D.F.  
Other Services  
THRUBIT  
PORTAL BIT  
Elevation  
K.B. 1431.5'  
D.F. 1431.5'  
G.L. 1411'

Date	24 OCT 2013
Run Number	ONE
Depth Driller	9055'
Depth Logger	9016'
Bottom Logged Interval	9005'
Top Log Interval	5136'
Casing Driller	7.0" @ 5147'
Casing Logger	5136'
Bit Size	6.125"
Type Fluid in Hole	WBM
Density / Viscosity	8.4 / 28
pH / Fluid Loss	10.5 / 99
Source of Sample	MUD SENSOR
Rm @ Meas. Temp	0.23 OHM@65DEGF
Rmf @ Meas. Temp	0.19 OHM@65DEGF
Rmc @ Meas. Temp	0.26 OHM@65DEGF
Source of Rmf / Rmc	CALCULATED
Rm @ BHT	0.13 OHM@120DEGF
Time Circulation Stopped	21:00 23 OCT 2013
Time Logger on Bottom	21:48 23 OCT 2013
Maximum Recorded Temperature	120 DEGF
Equipment Number	T005
Location	OKC, OK
Recorded By	C.PARKER
Witnessed By	C.DAVIS

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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: HORIZONTAL PUMP DOWN MEMORY BIT DEPTH: 8927' LOGGED TO: 5136'  
 ALL SCALES AND PRESENTATIONS PER CLIENT REQUEST  
 LIMESTONE MATRIX, 2.71 g/cc. USED FOR POROSITY MEASUREMENTS  
 TOOLSTING RAN WITH SWIVEL AND SMALL DE-CENTRALIZER  
 TBHV REPRESENTS TOTAL BOREHOLE VOLUME, ft<sup>3</sup>  
 ABHV REPRESENTS ANNULAR HOLE VOLUME, CALCULATED FOR 4.5" CSG., ft<sup>3</sup>  
 RIGMINDER USED TO ACQUIRE LOG DEPTH  
 LOG CORRELATED TO MWD GR  
 RIG: HORIZION 15  
 CREW: C.PARKER R.WILSON I.HERNDEZ

Service Ticket No. 2276      API No. 15-077-21964-0300      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.	PS2T	Serial No.	ENP2N	Serial No.	PS44D	Serial No.	PS3R
Model No.	PS	Model No.	ENP	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	9016'	5136'	0 PSI	35 FPM	

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

DIRECTIONAL INFORMATION

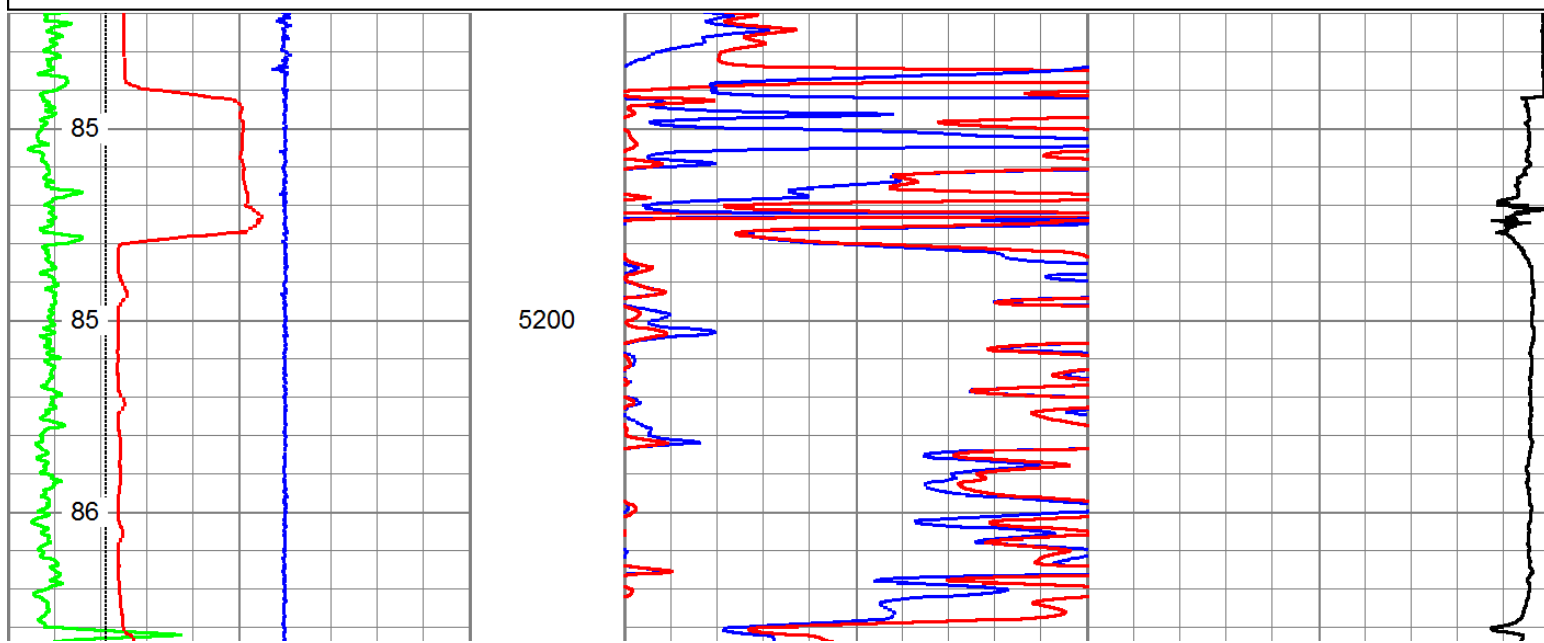
Maximum Deviation	93.86°	deg. @	9002'	KOP	3745'
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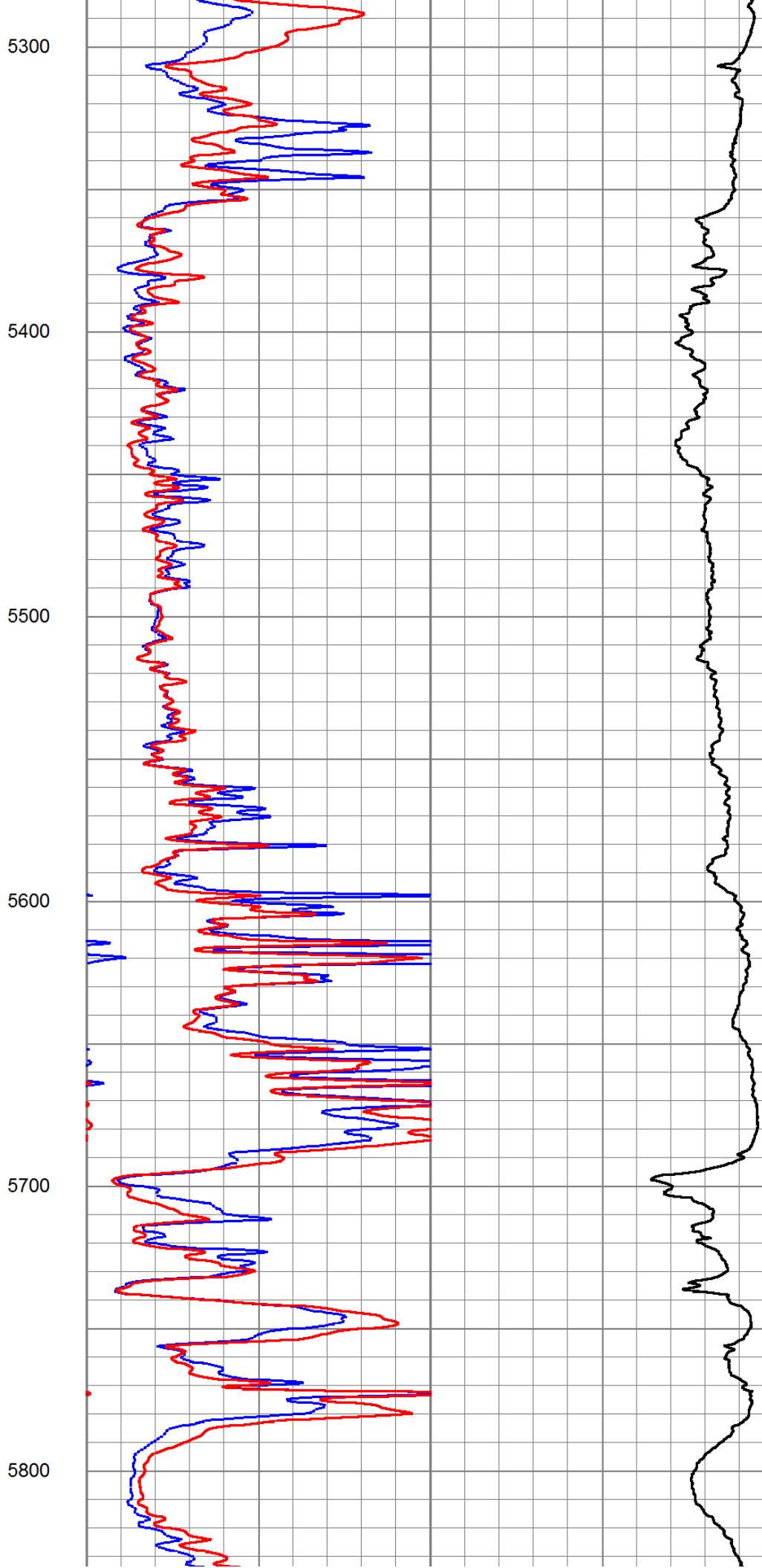
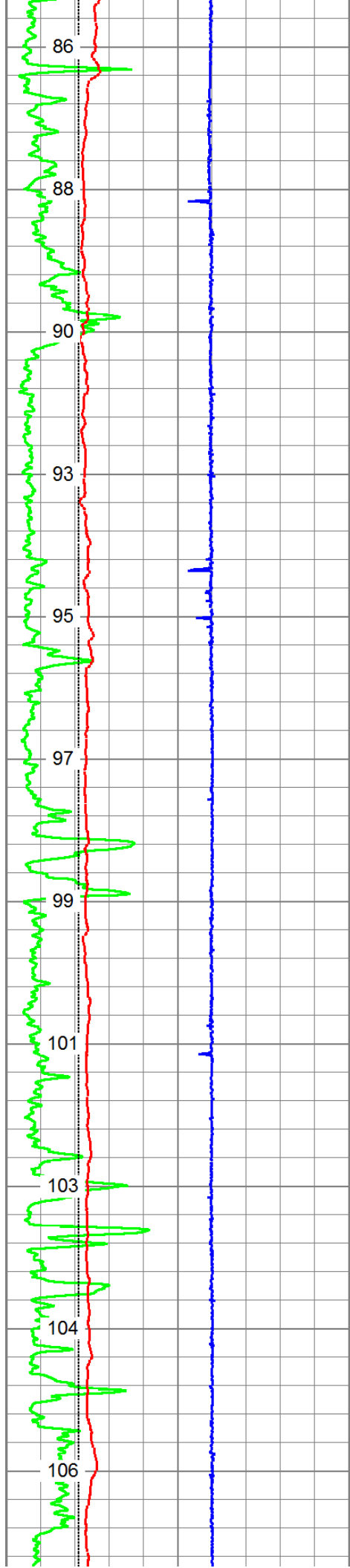


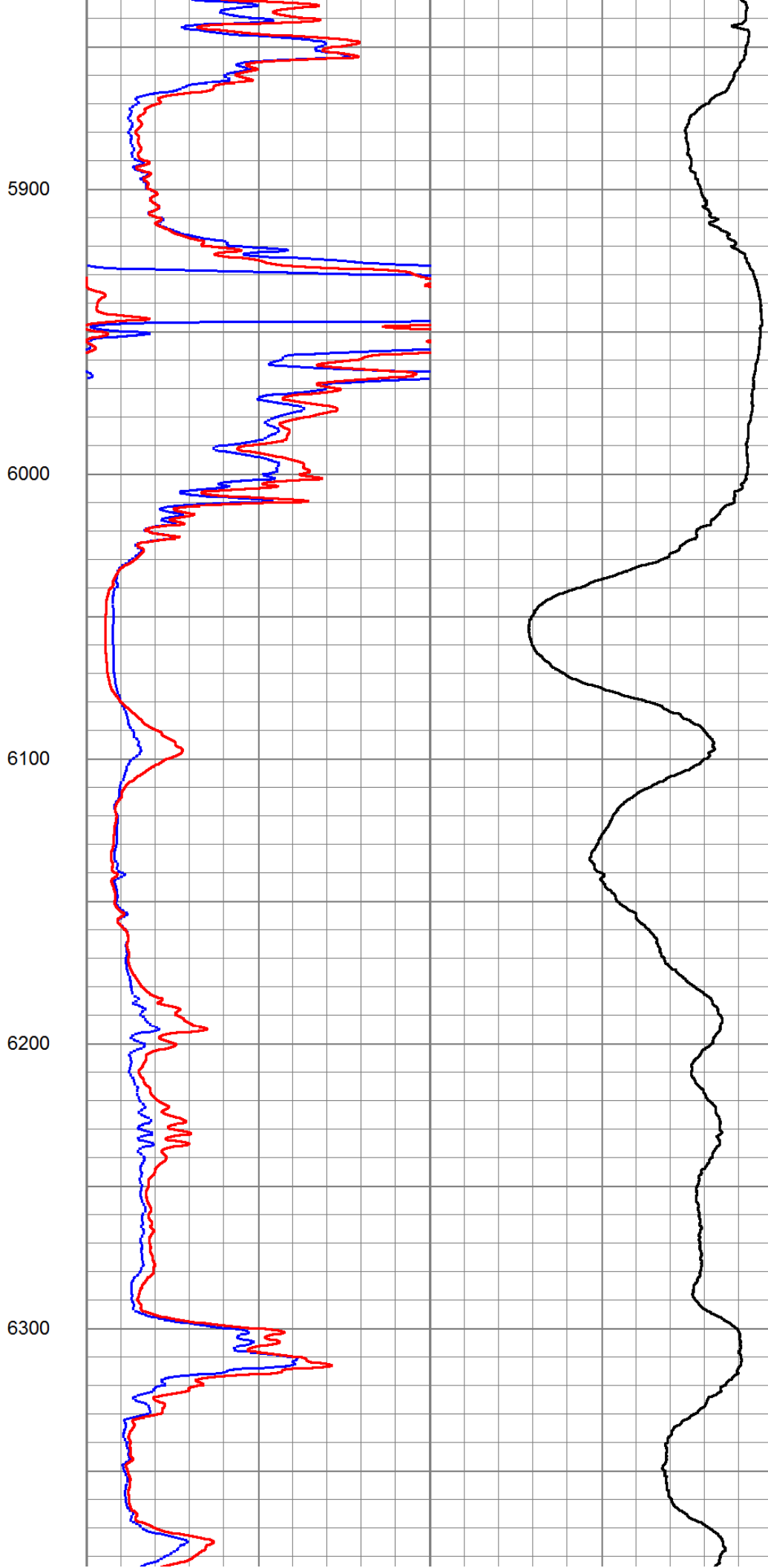
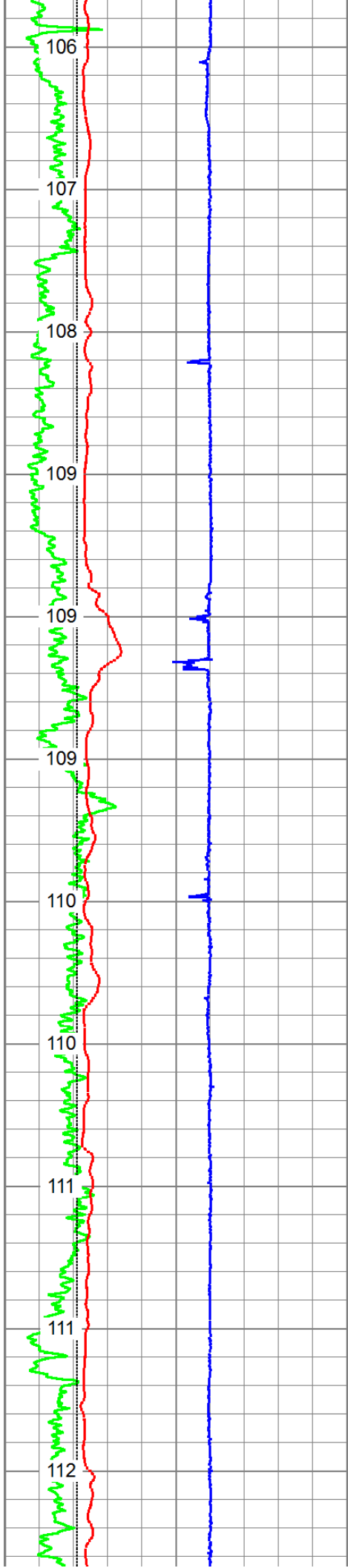
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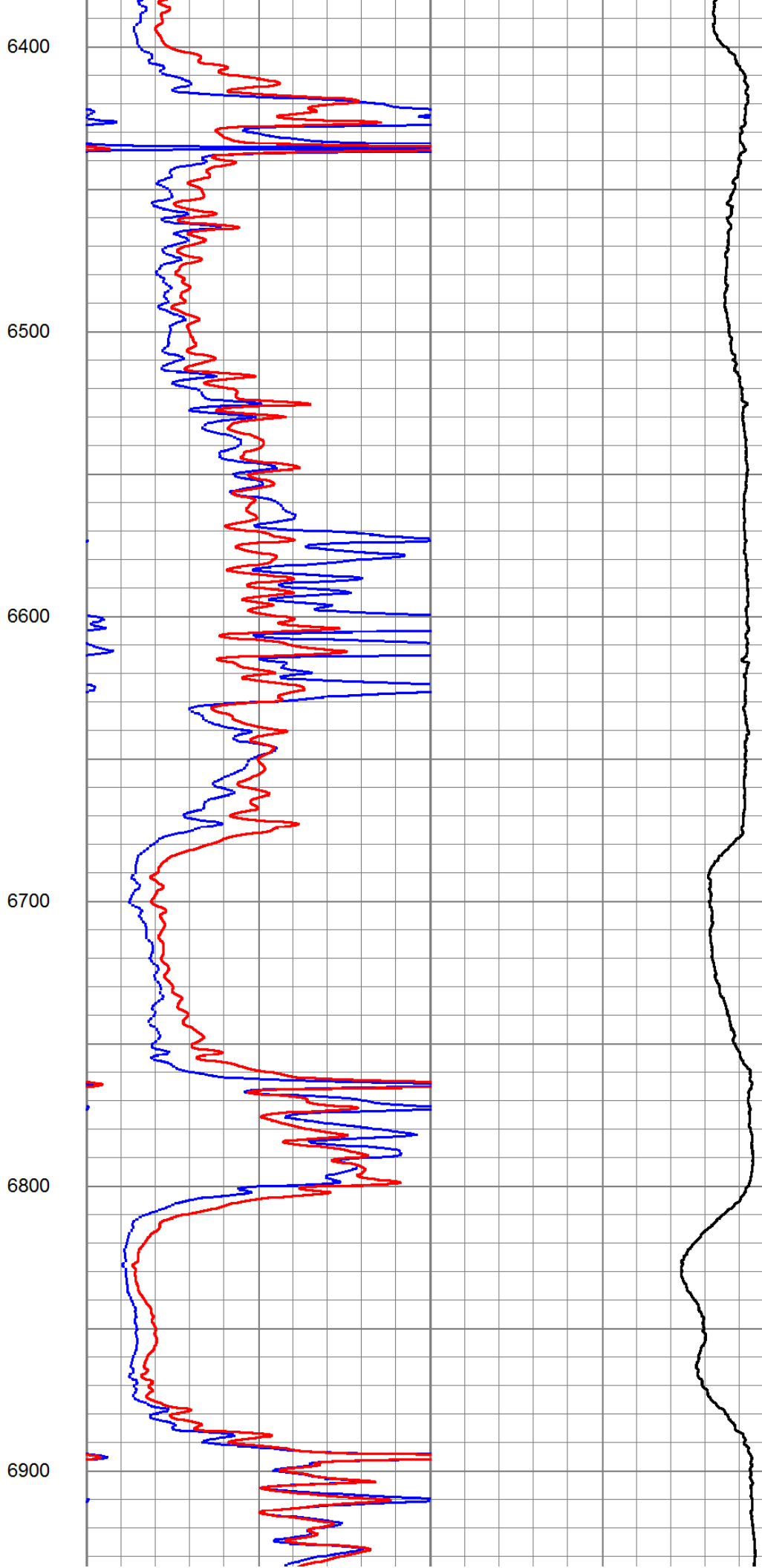
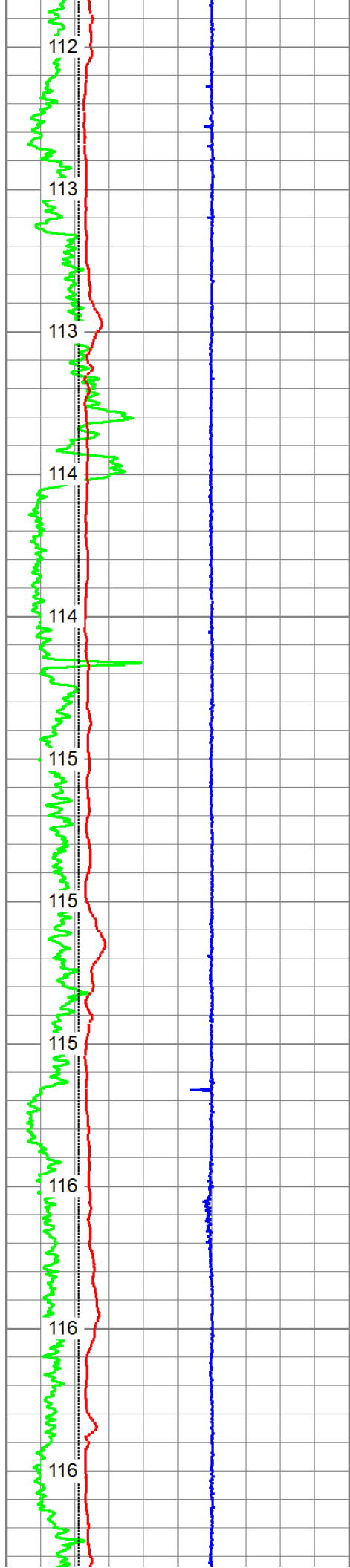
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 Dataset Pathname: proc1/pass1.2  
 Presentation Format: 6\_2r\_chk  
 Dataset Creation: Thu Oct 24 02:53:50 2013  
 Charted by: Depth in Feet scaled 1:600

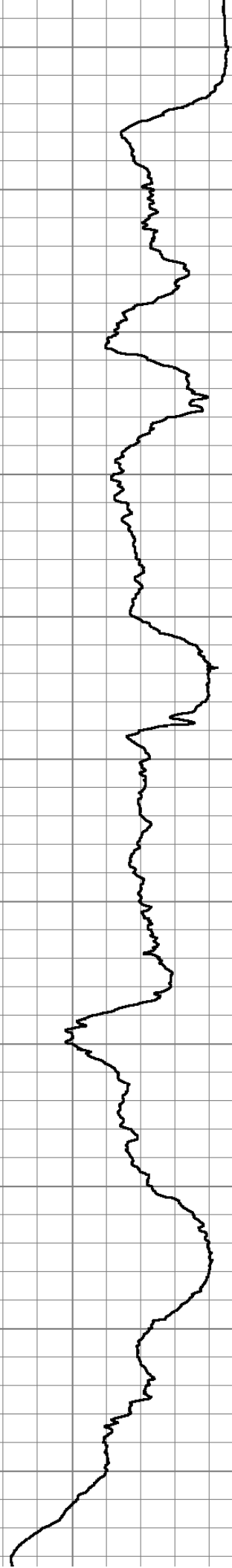
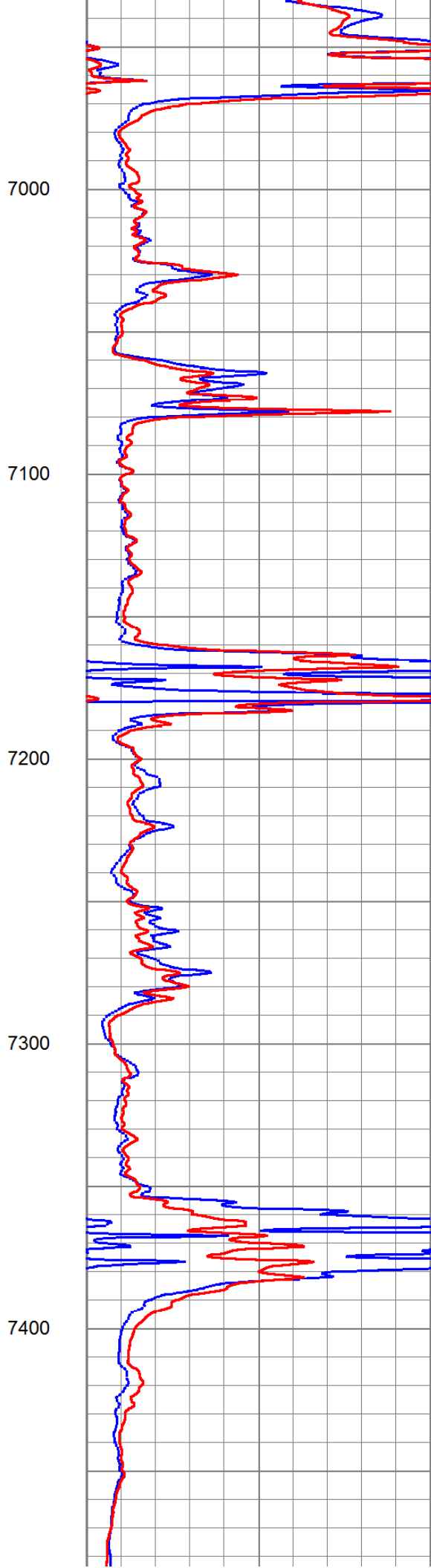
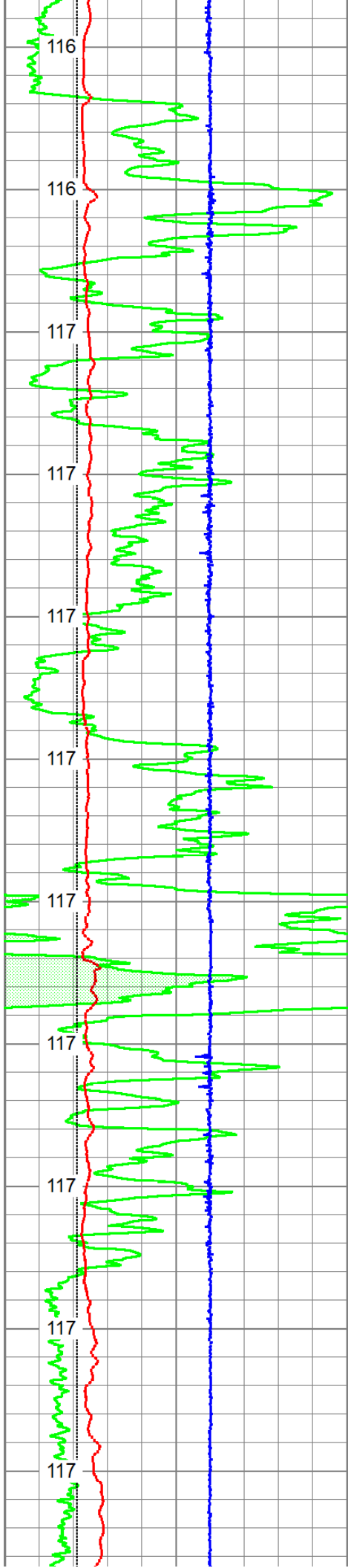
0	GR (GAPI)	150	50	20in 2ft Res (Ohm-m)	500
4	DCAL (in)	14	50	90in 4ft Res (Ohm-m)	500
-5	ACCY	5	1000	DEEP COND (mmho/m) 0	
4	BOREID (in)	14	0	20in 4ft Res (Ohm-m)	50
	GRTEMP (degF)		0	90in 4ft Res (Ohm-m)	50

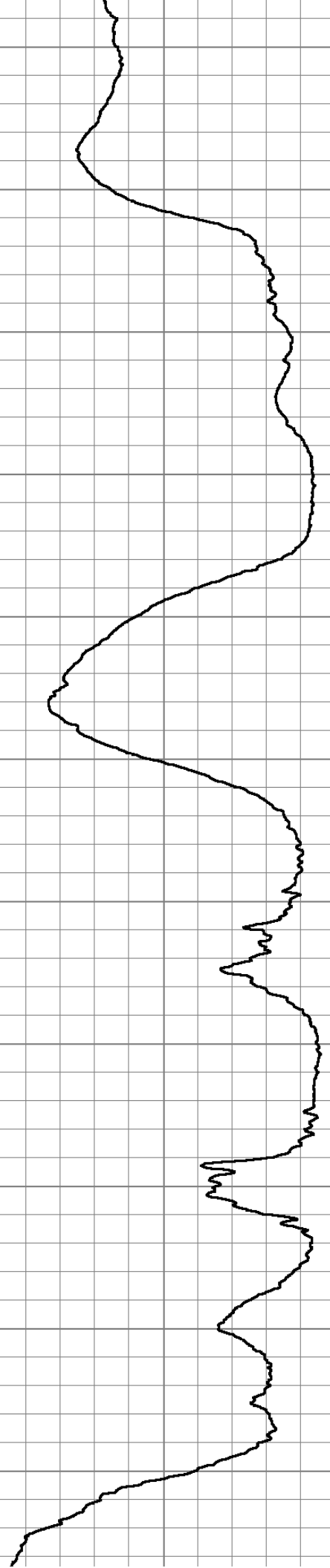
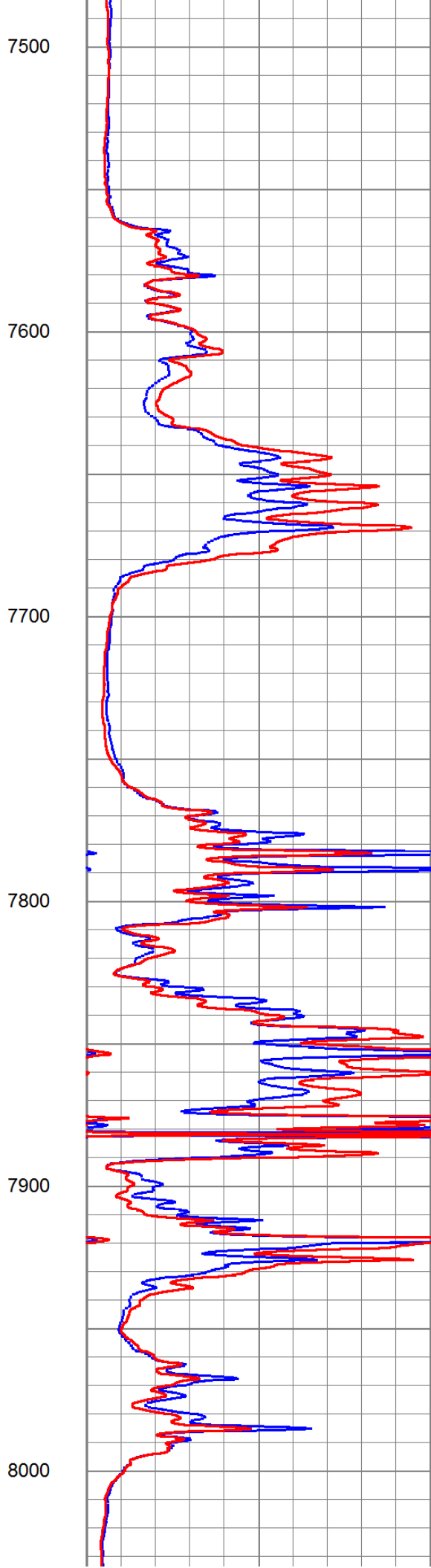
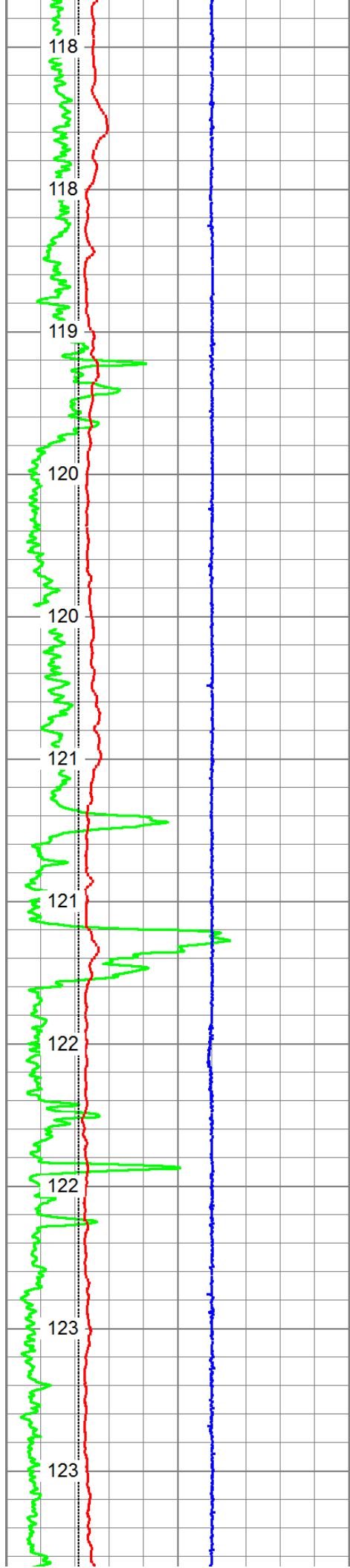


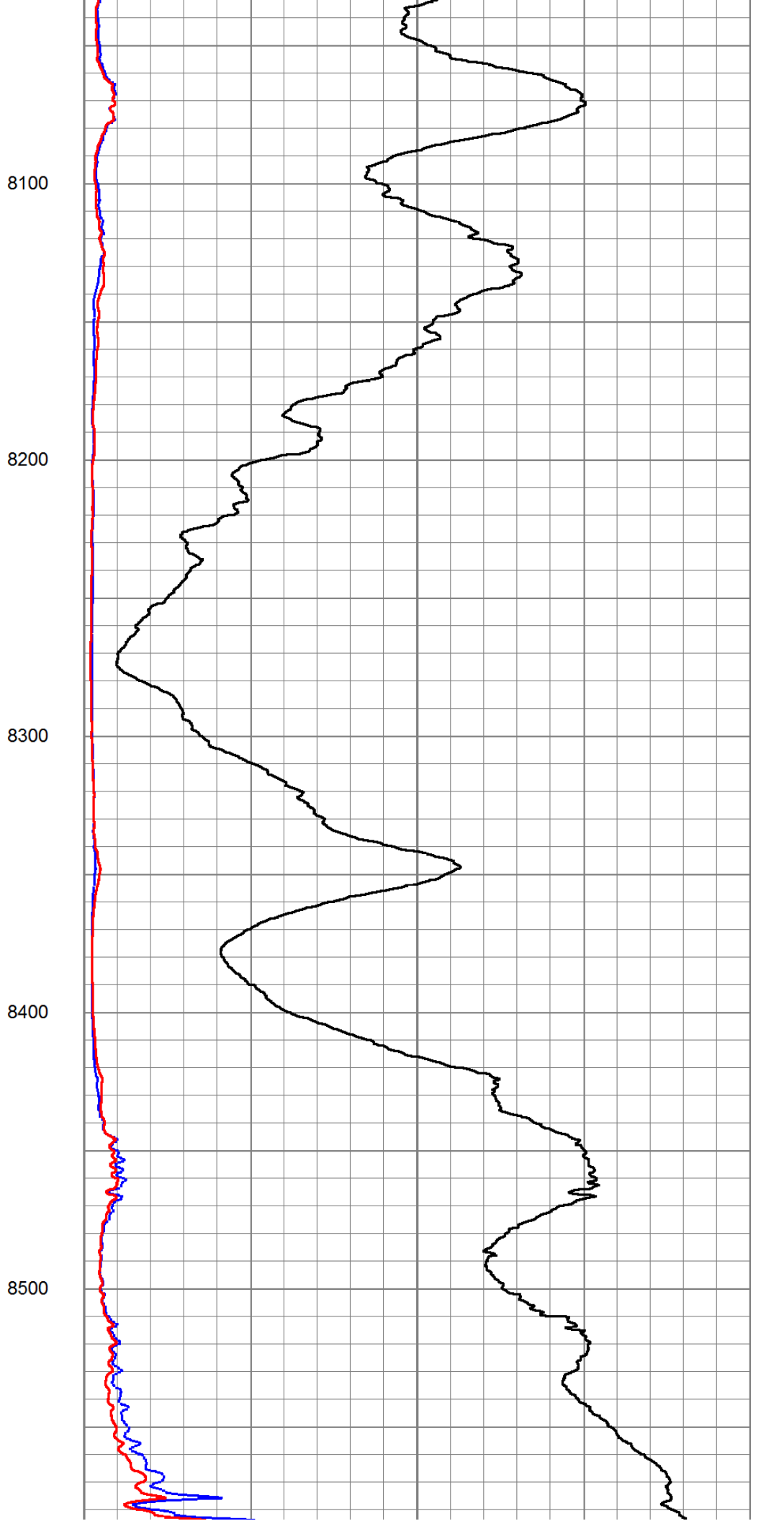
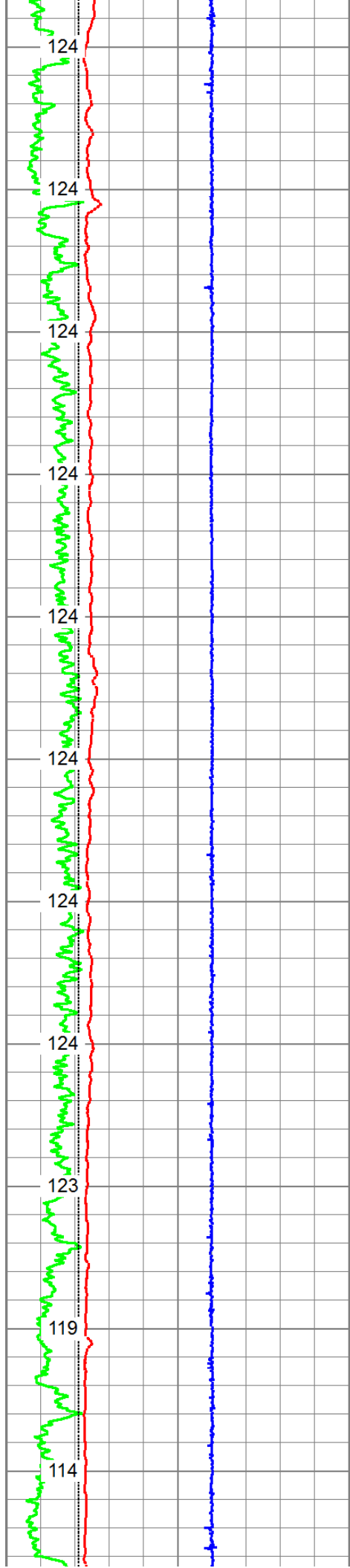




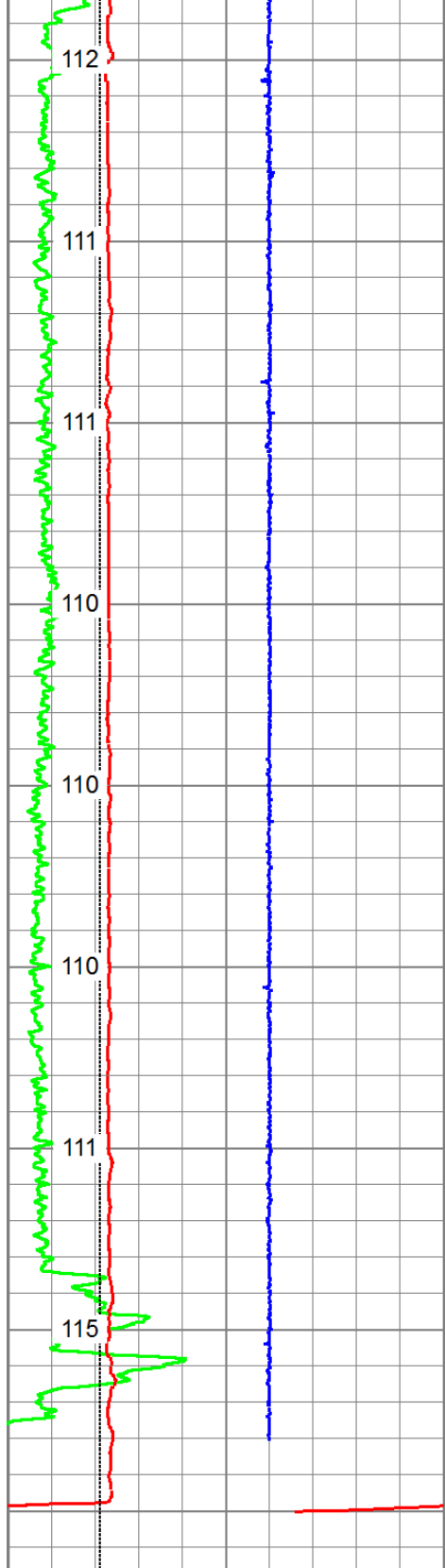






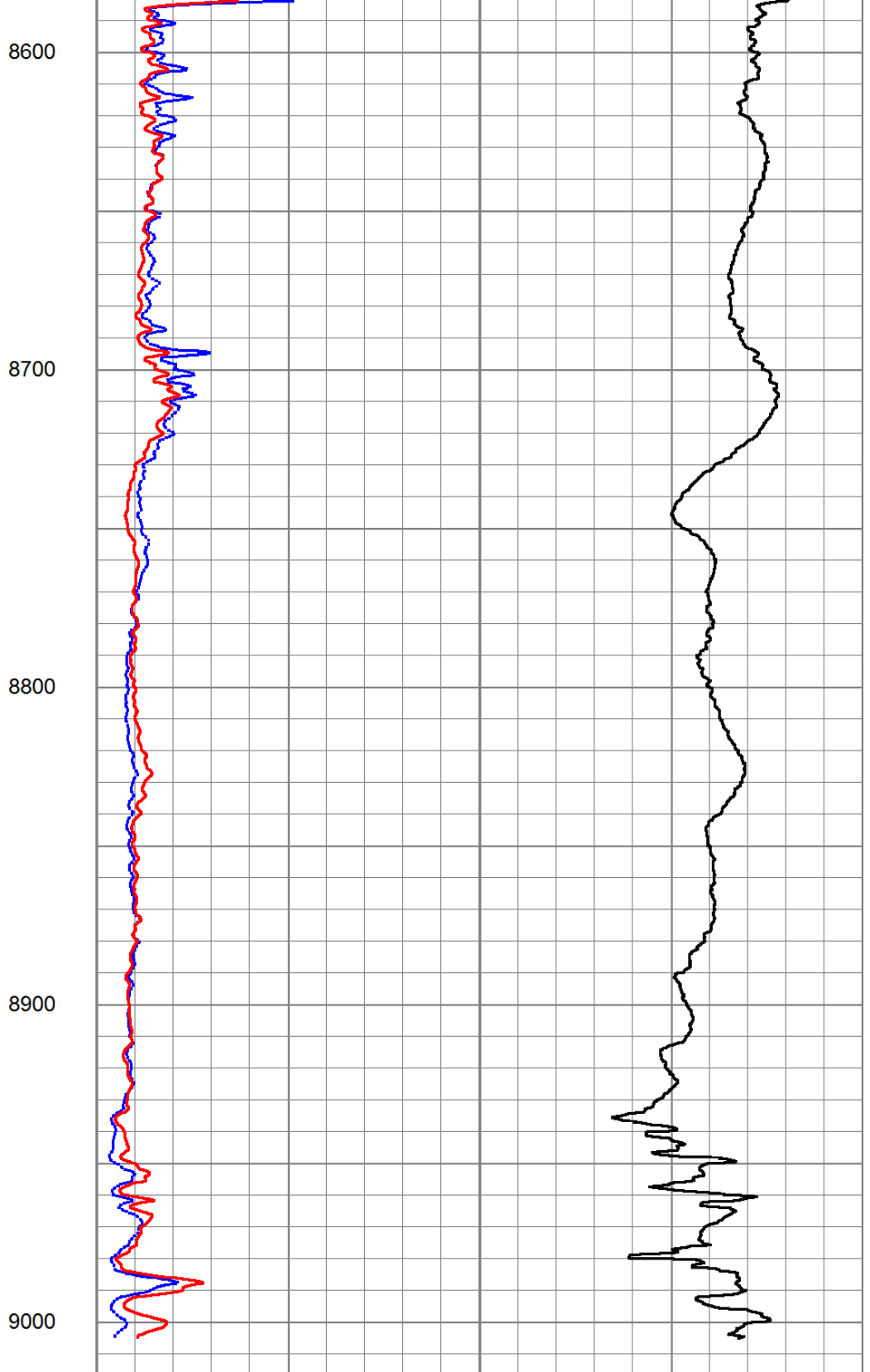






0	GR (GAPI)	150
4	DCAL (in)	14
-5	ACCY	5
4	BOREID (in)	14

GRTEMP  
(degF)



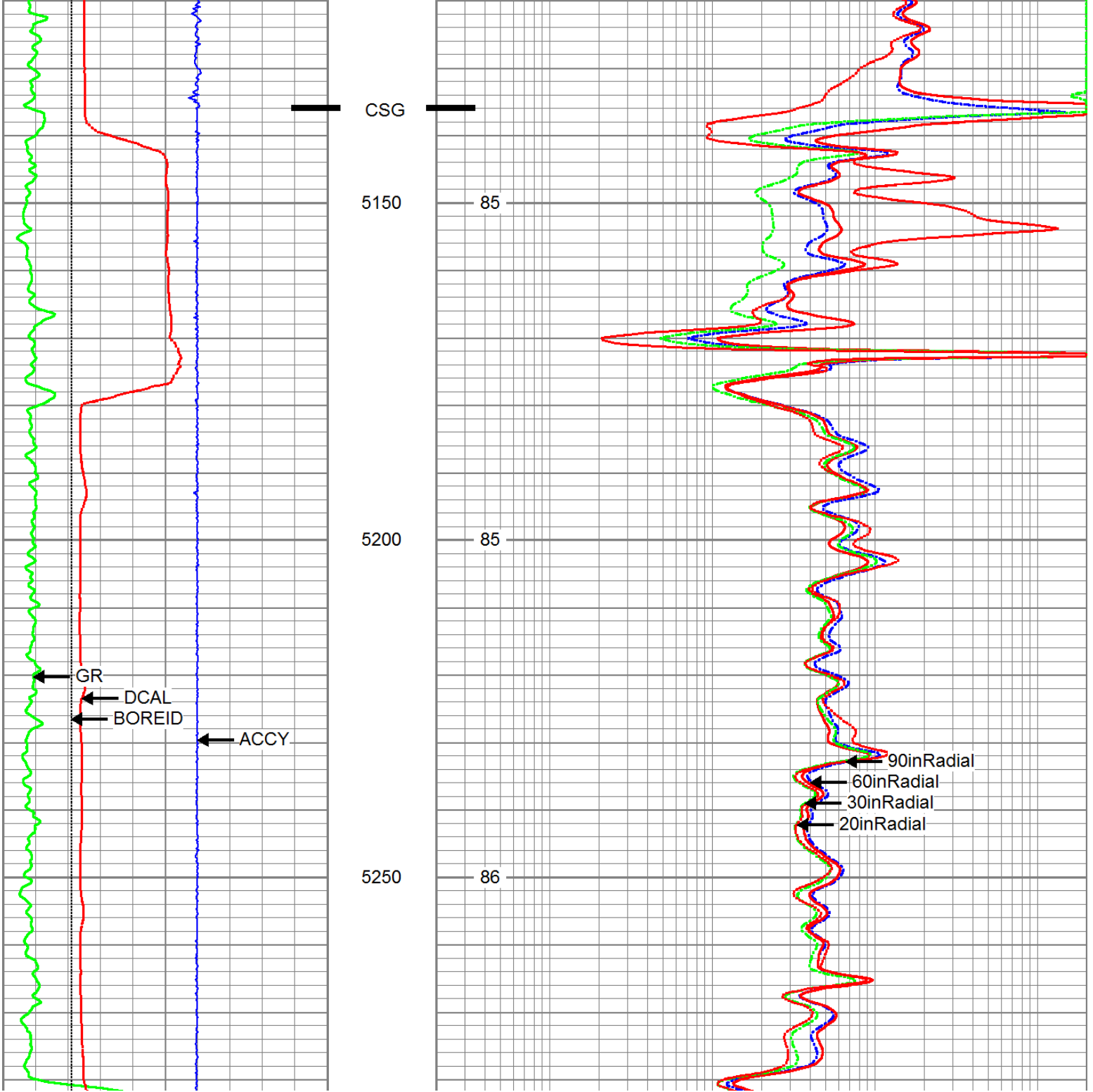
50	20in 2ft Res (Ohm-m)	500
50	90in 4ft Res (Ohm-m)	500
1000	DEEP COND (mmho/m)	0
0	20in 4ft Res (Ohm-m)	50
0	90in 4ft Res (Ohm-m)	50

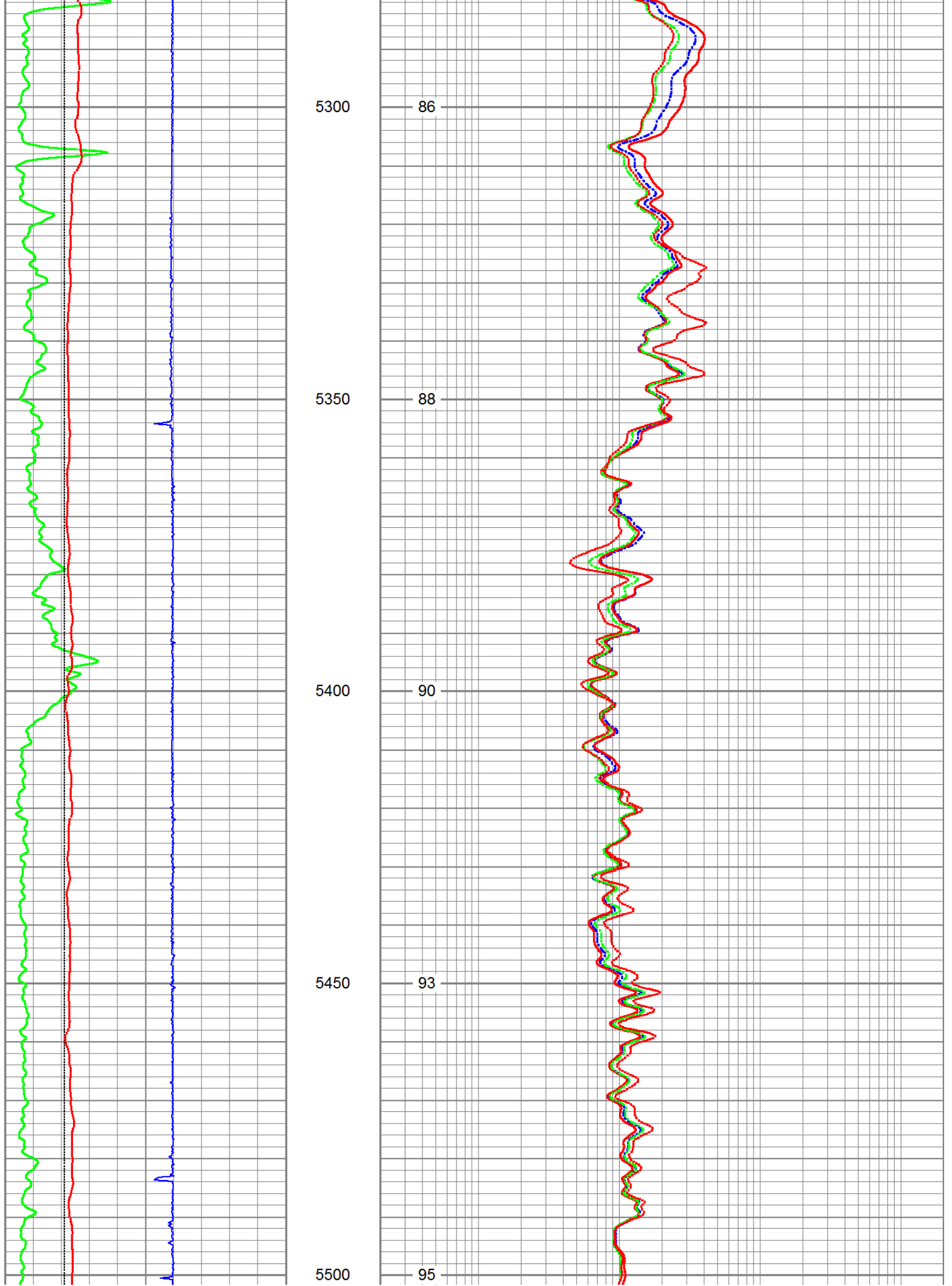


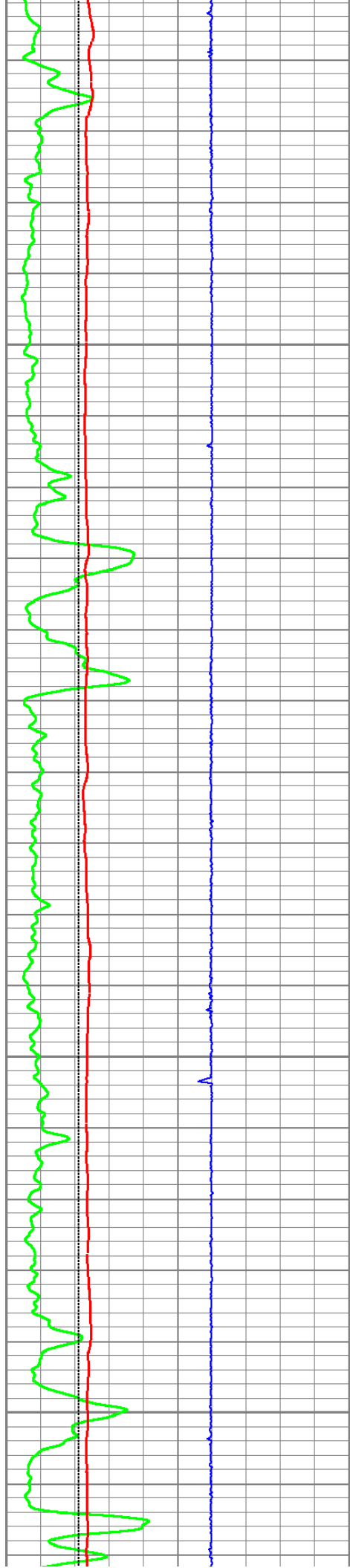
MAIN PASS

Database File: c:\users\kris.wetzel\desktop\richard 3206 l3\sandridge\_richardl3\_mem.db  
 Dataset Pathname: proc1/pass1.2  
 Presentation Format: 6\_5r\_chk  
 Dataset Creation: Thu Oct 24 02:53:50 2013  
 Charted by: Depth in Feet scaled 1:240

0	GR (GAPI)	150	0.2	60inRadial (Ohm-m)	2000
4	BOREID (in)	14	0.2	90inRadial (Ohm-m)	2000
4	DCAL (in)	14	0.2	30inRadial (Ohm-m)	2000
-5	ACCY	5	0.2	20inRadial (Ohm-m)	2000
			GRTEMP		
			(degF)		







5550

97

5600

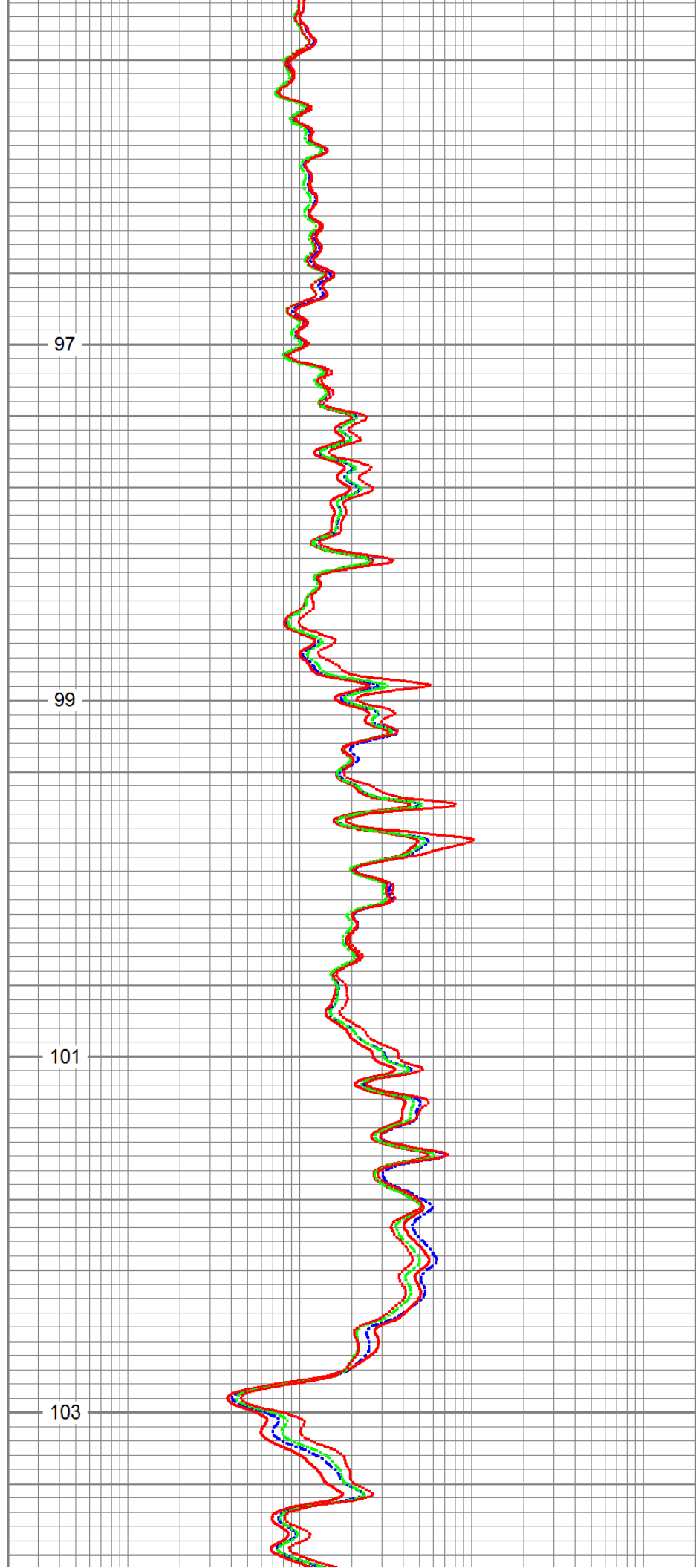
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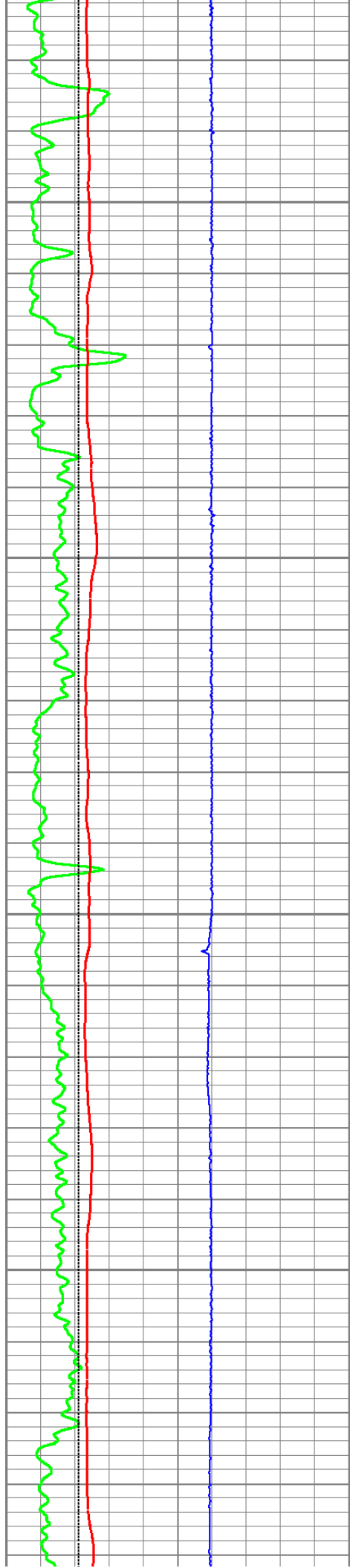
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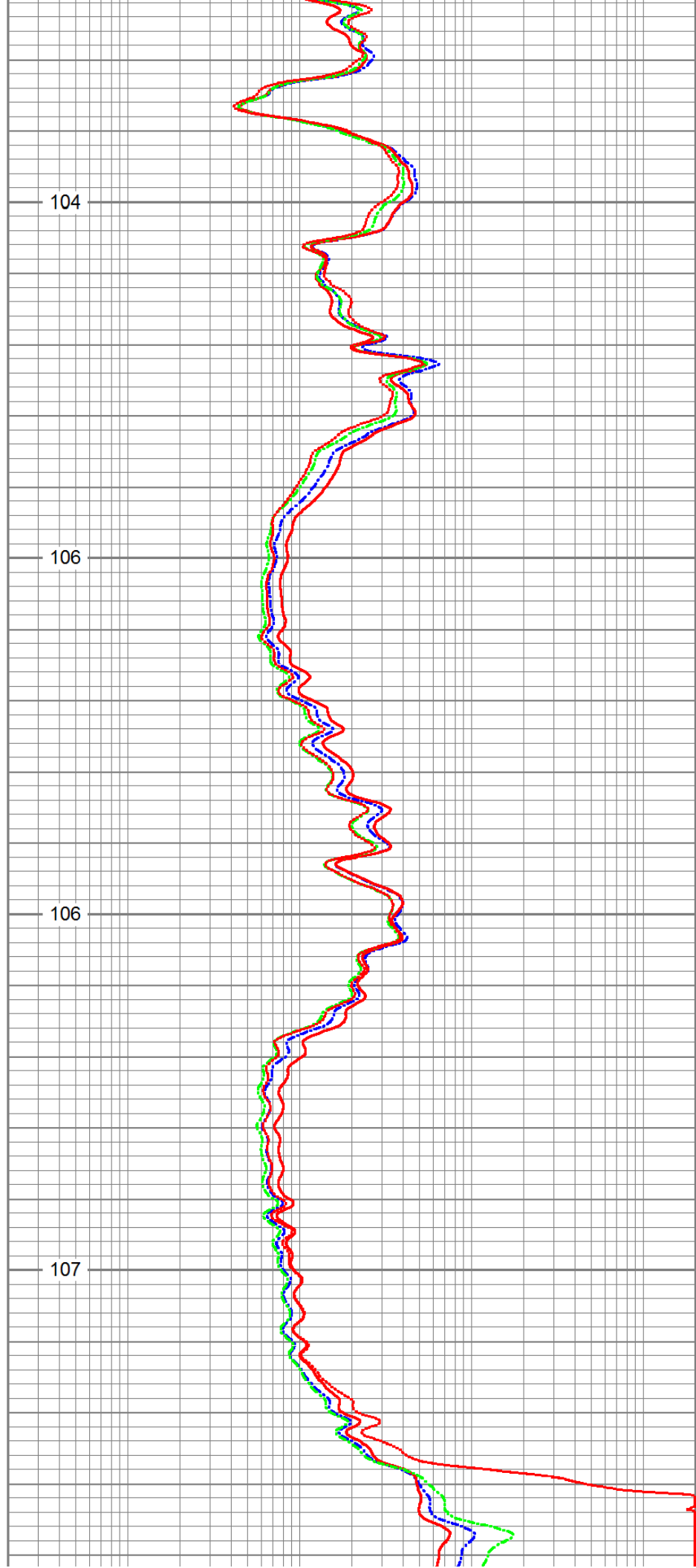
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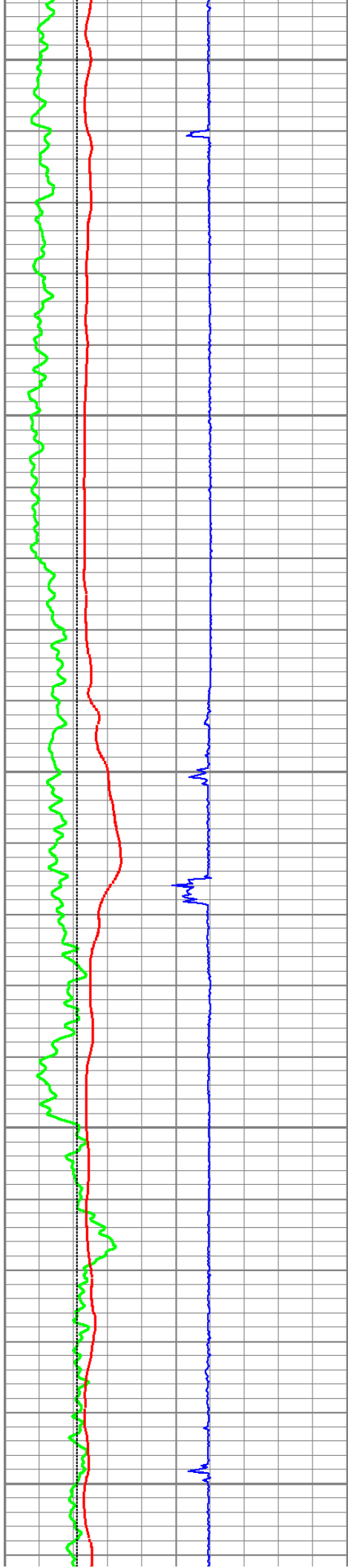
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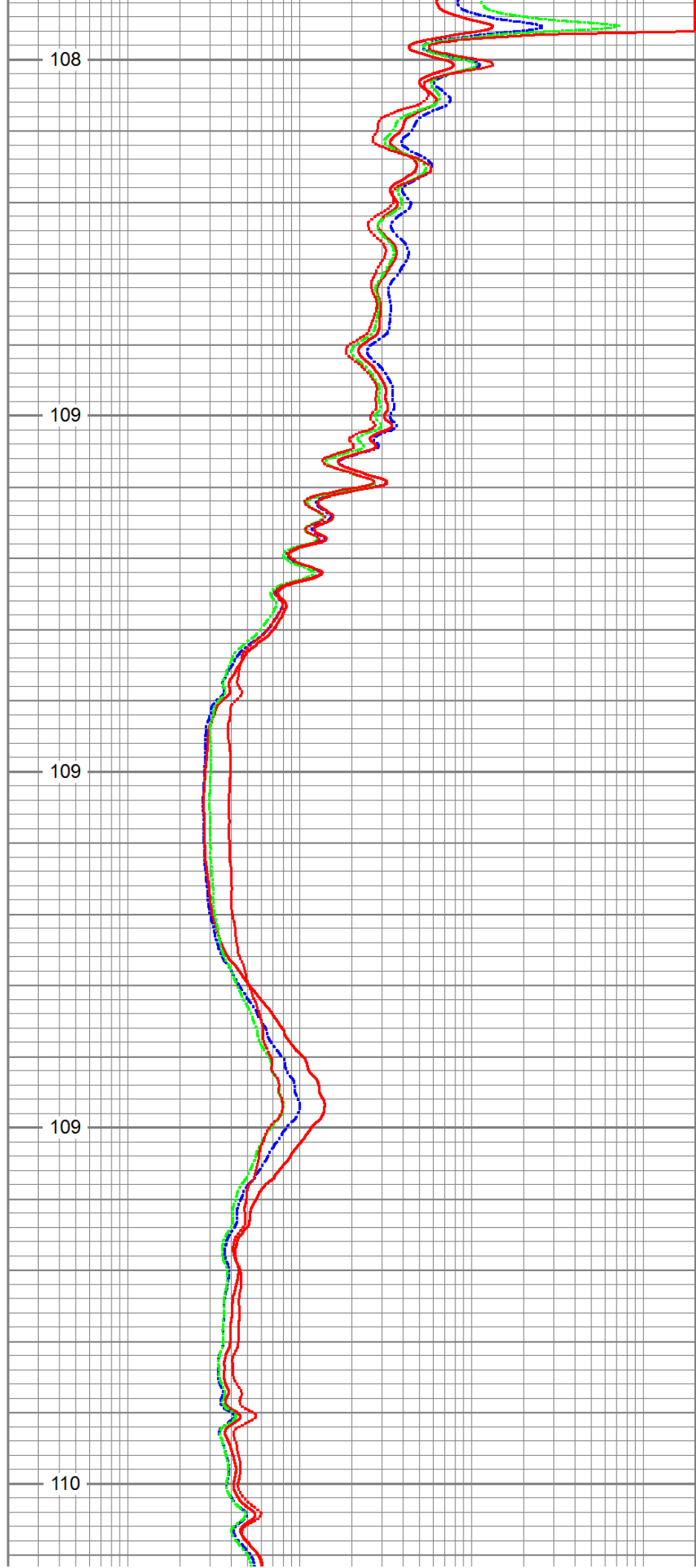
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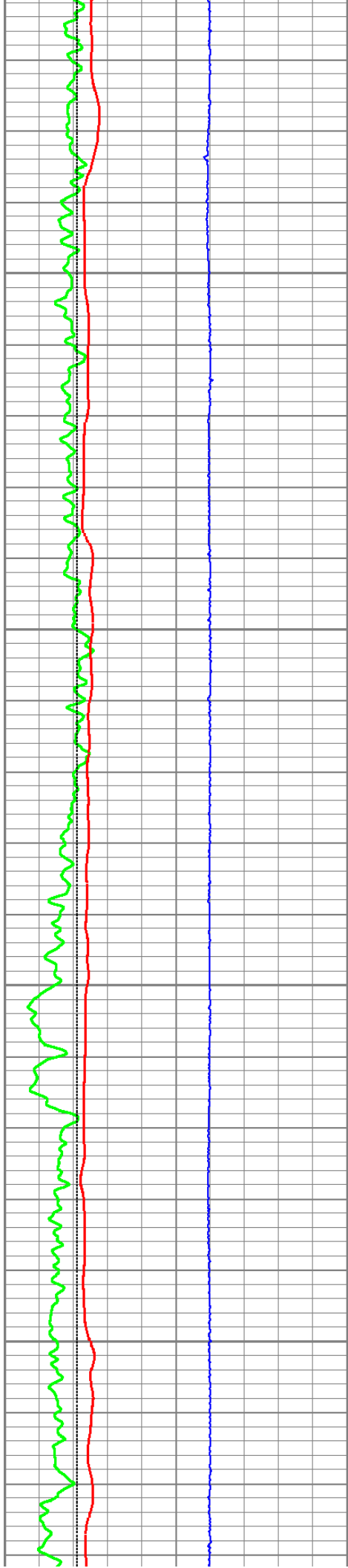
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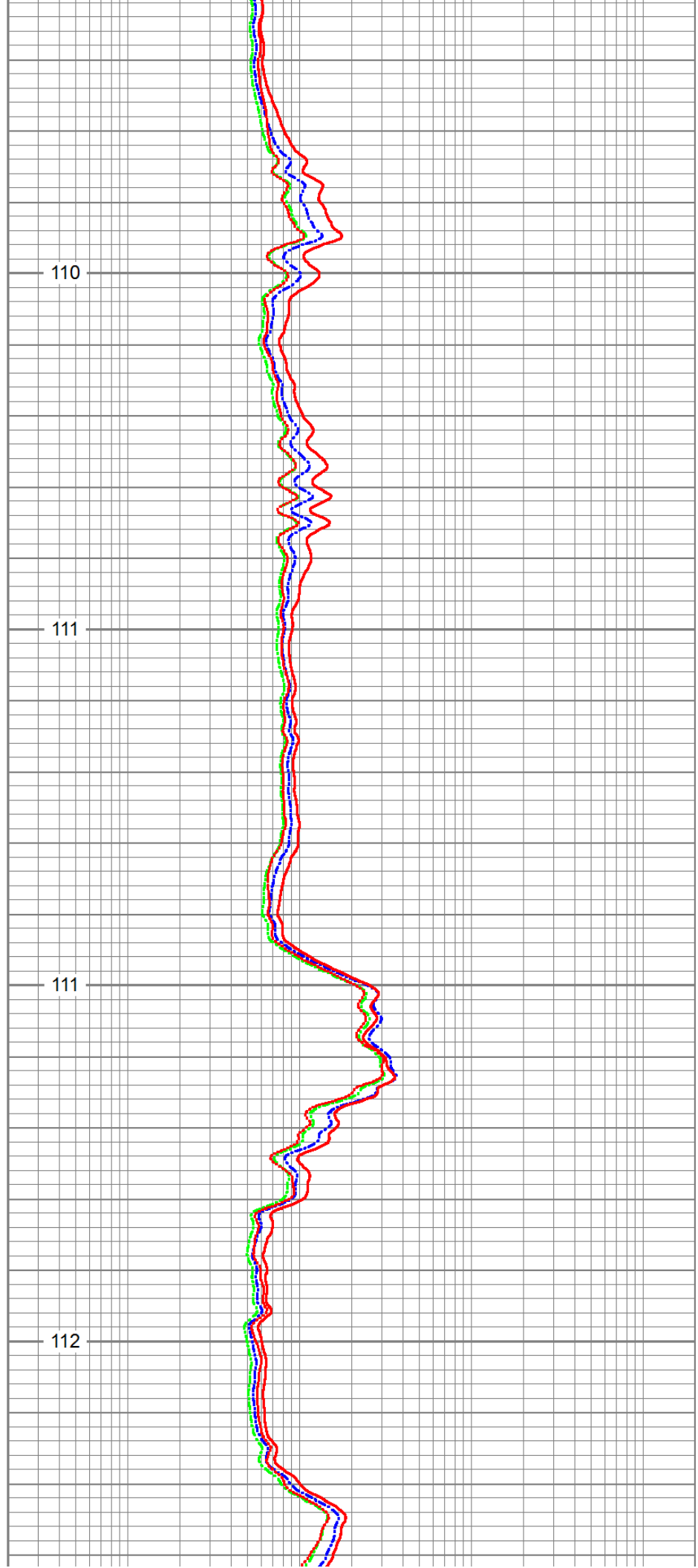
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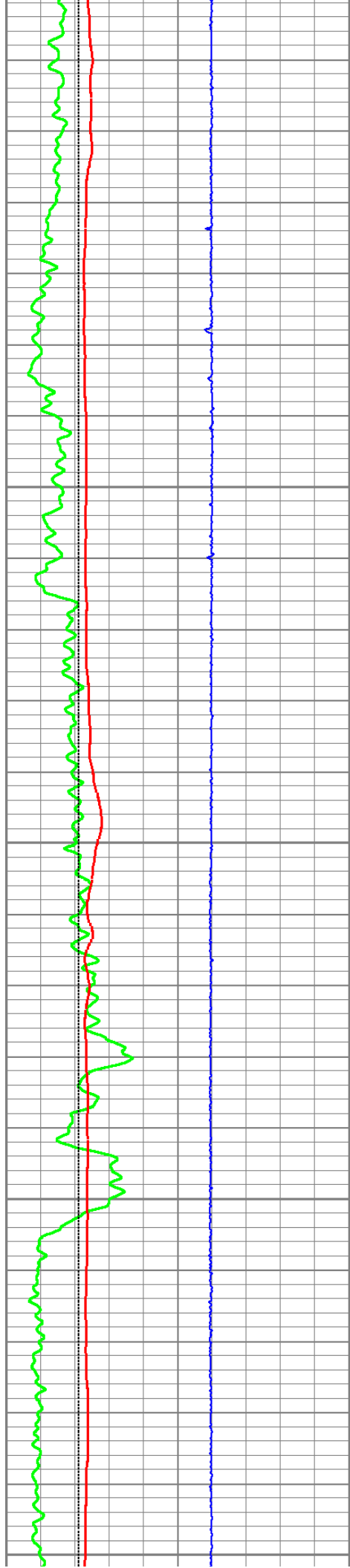
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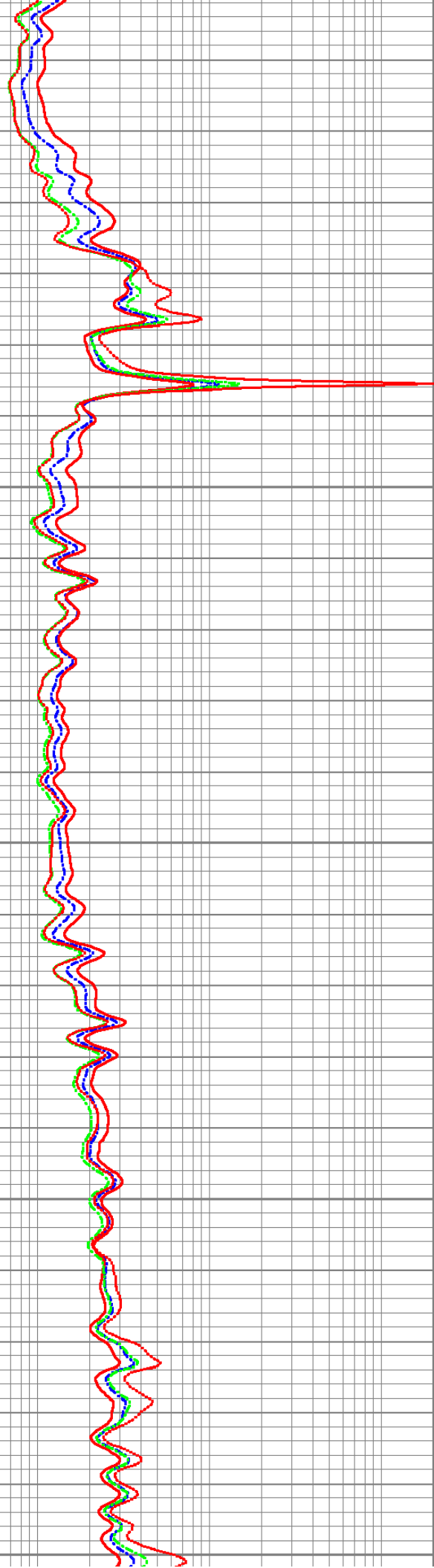
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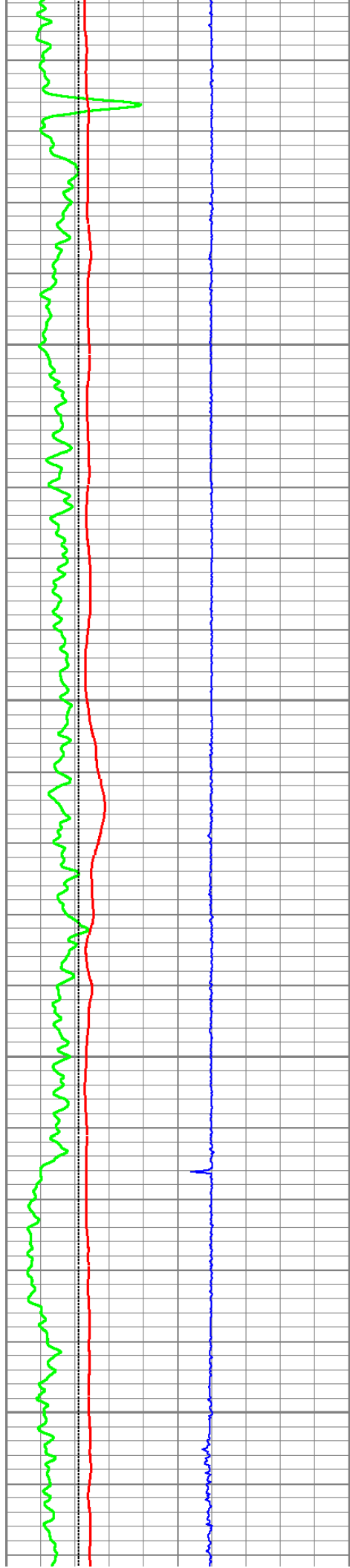
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6600

114







6650

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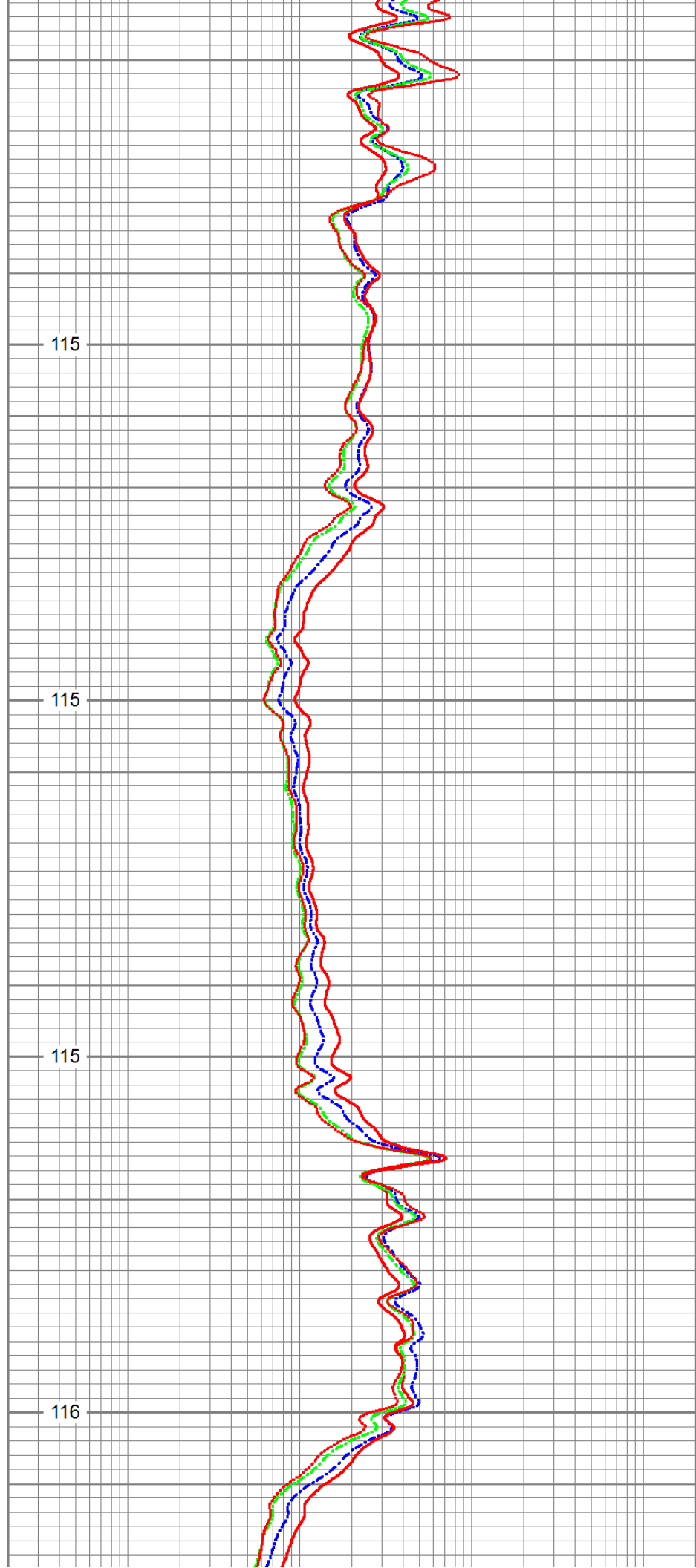
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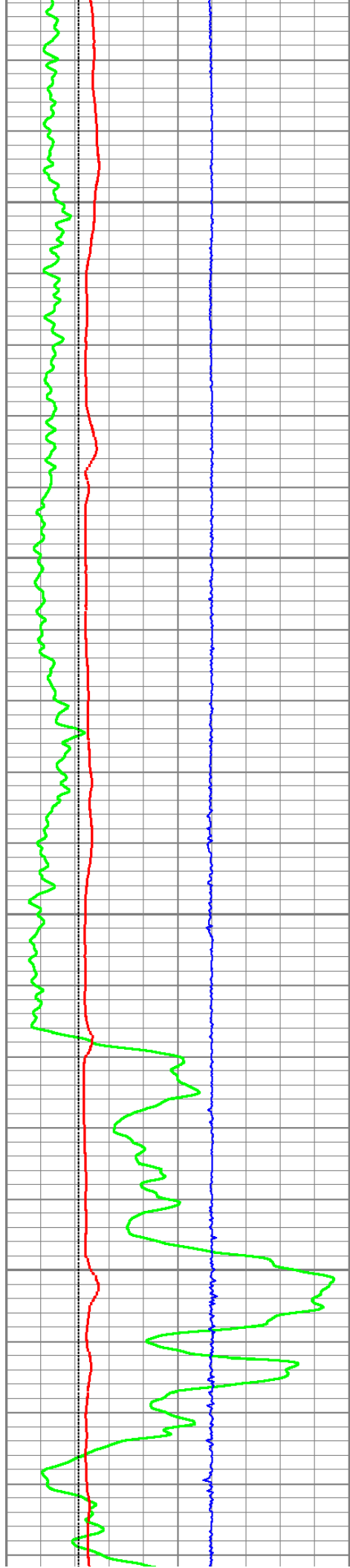
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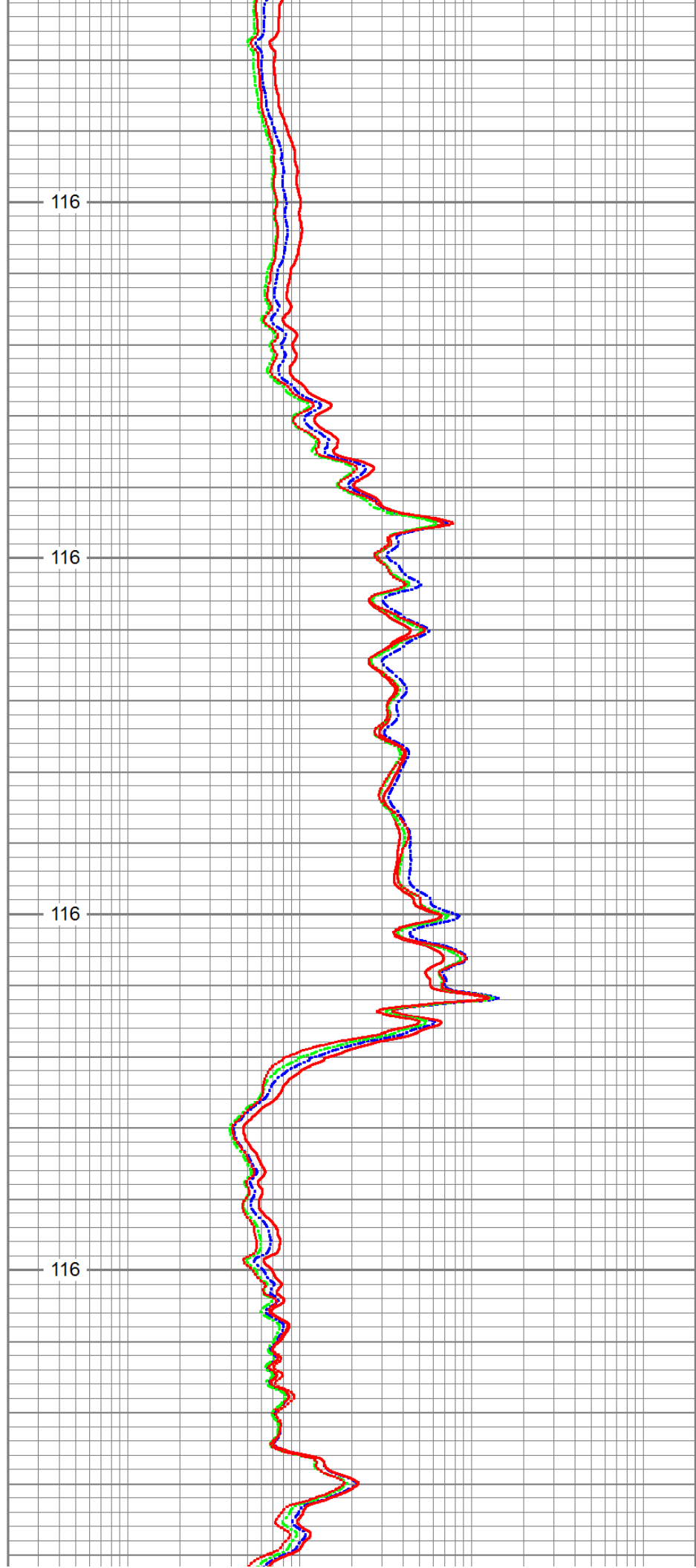
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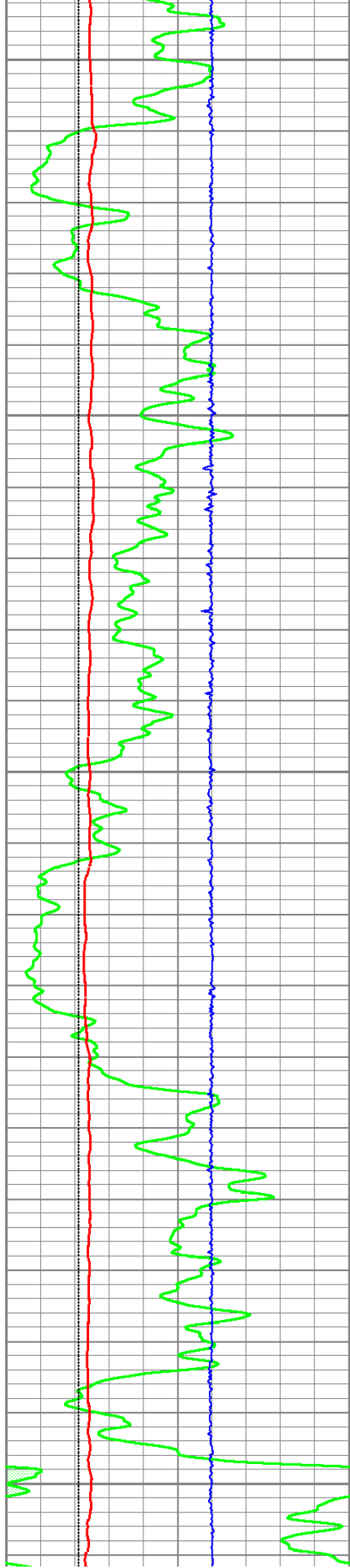
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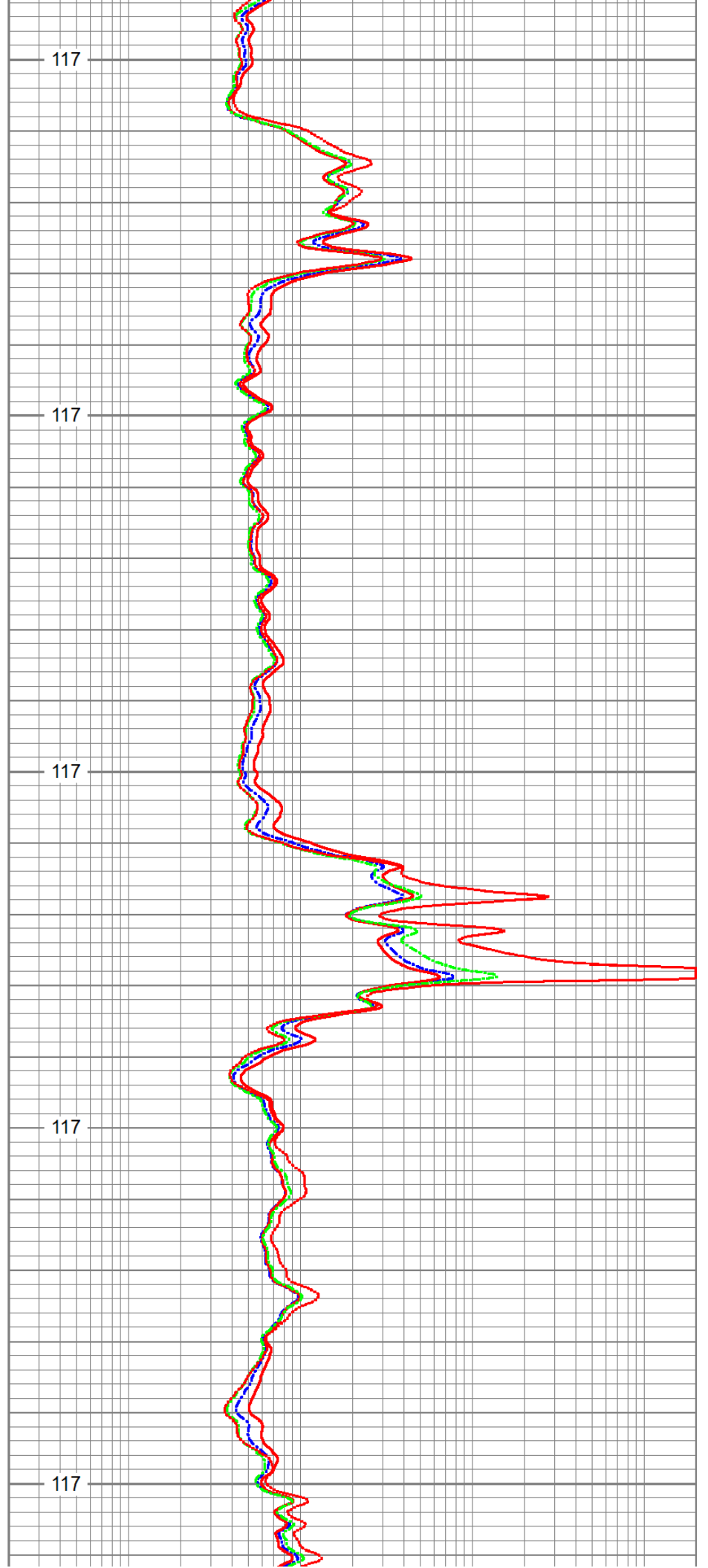
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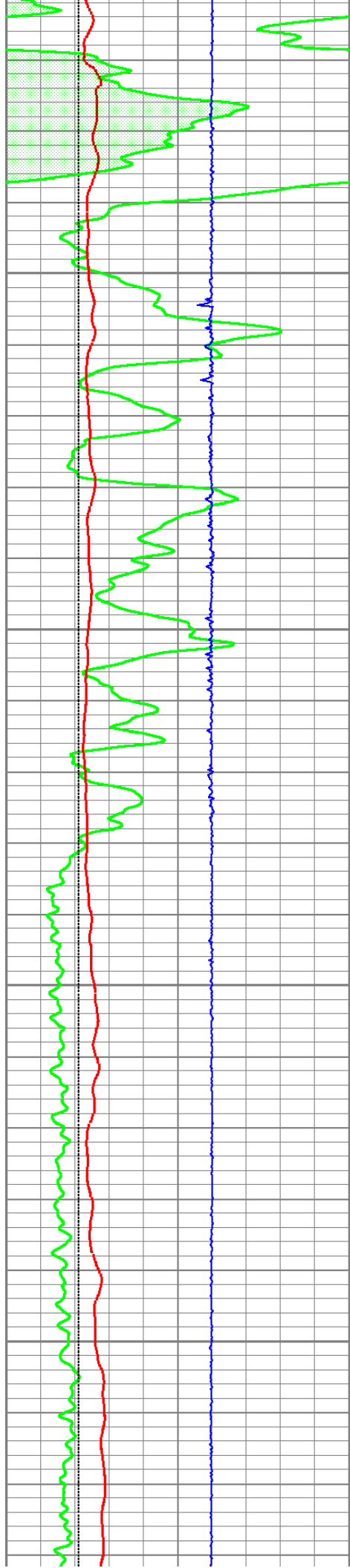
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7250

117





7300

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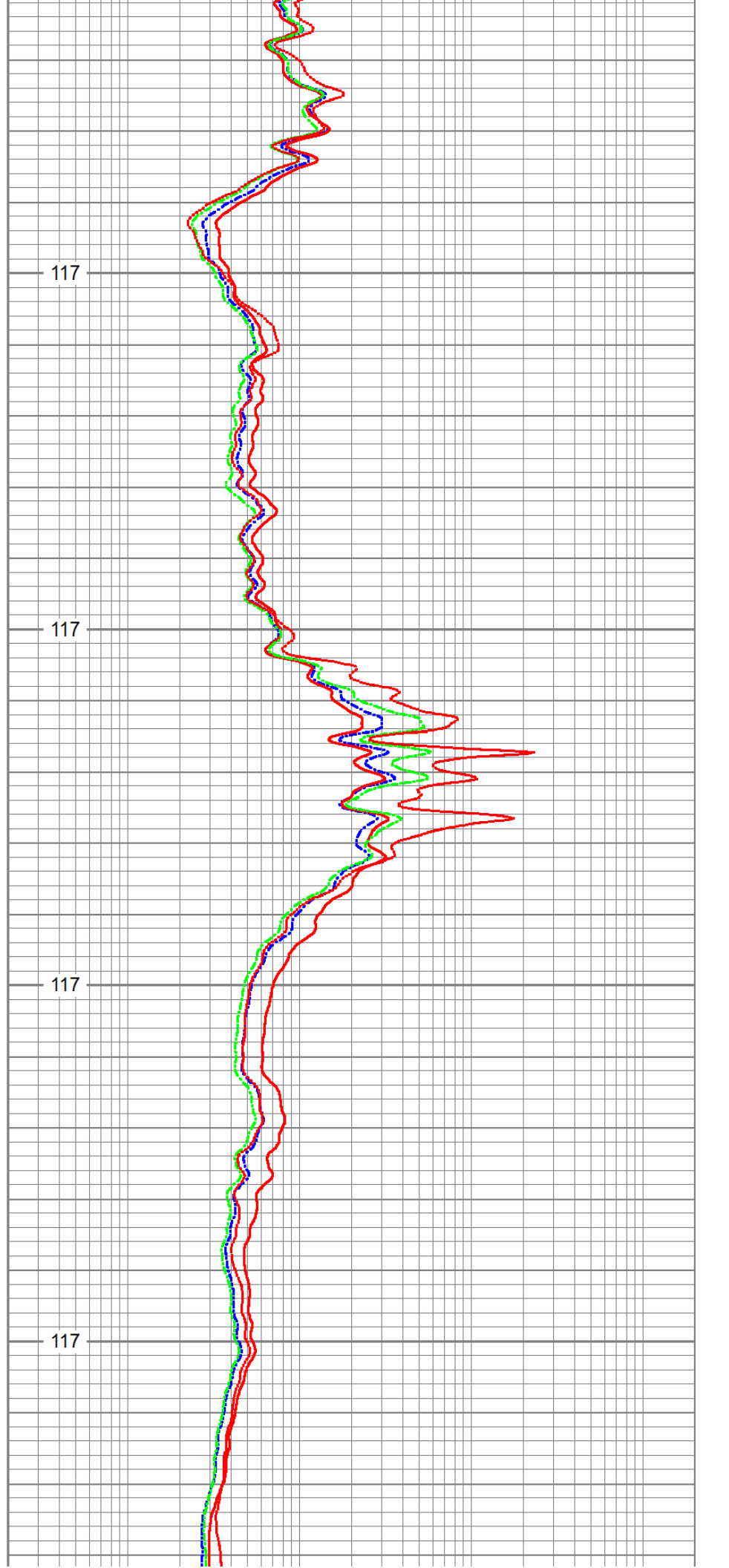
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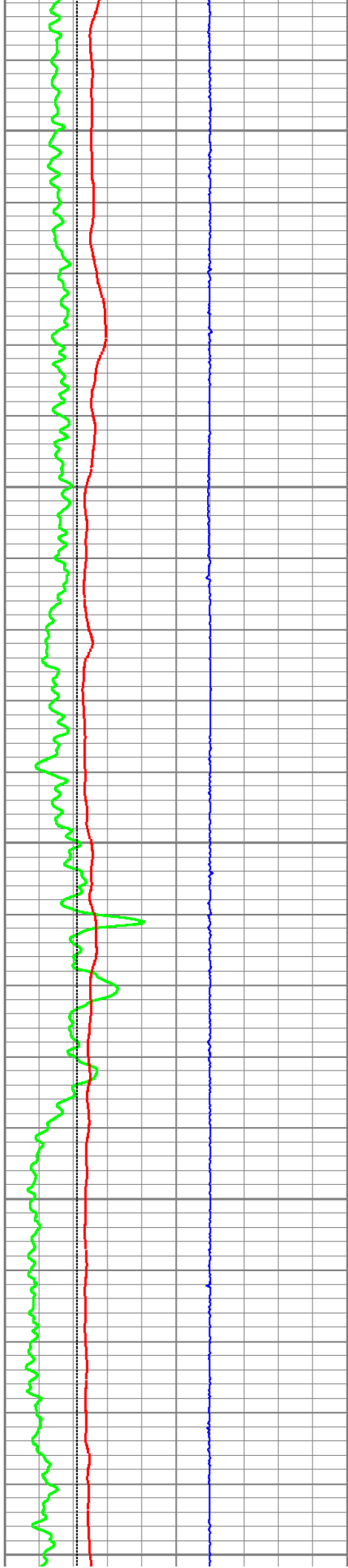
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7700

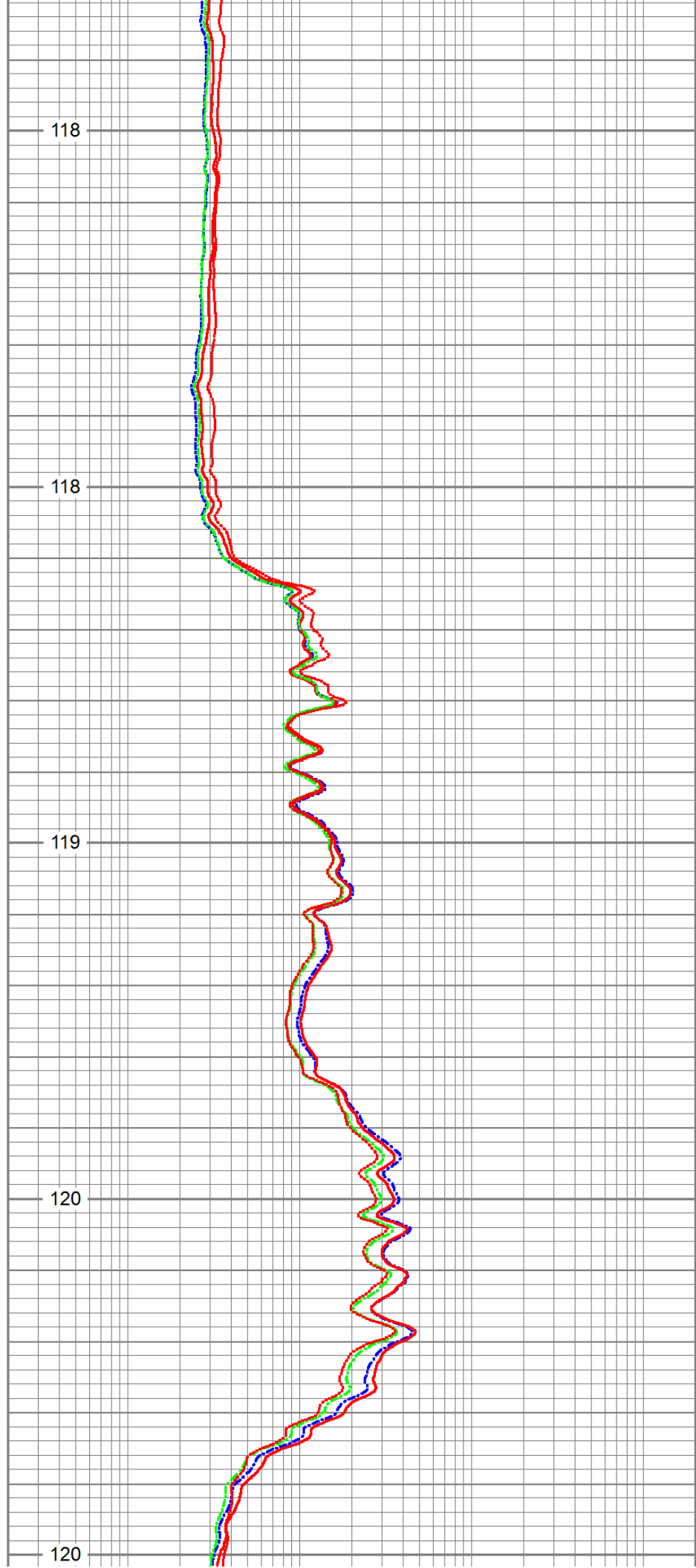
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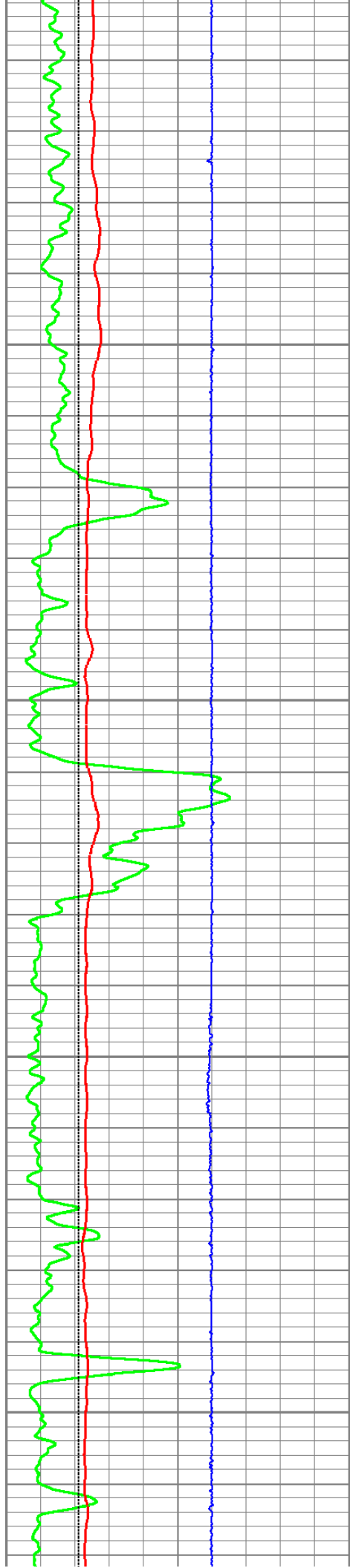
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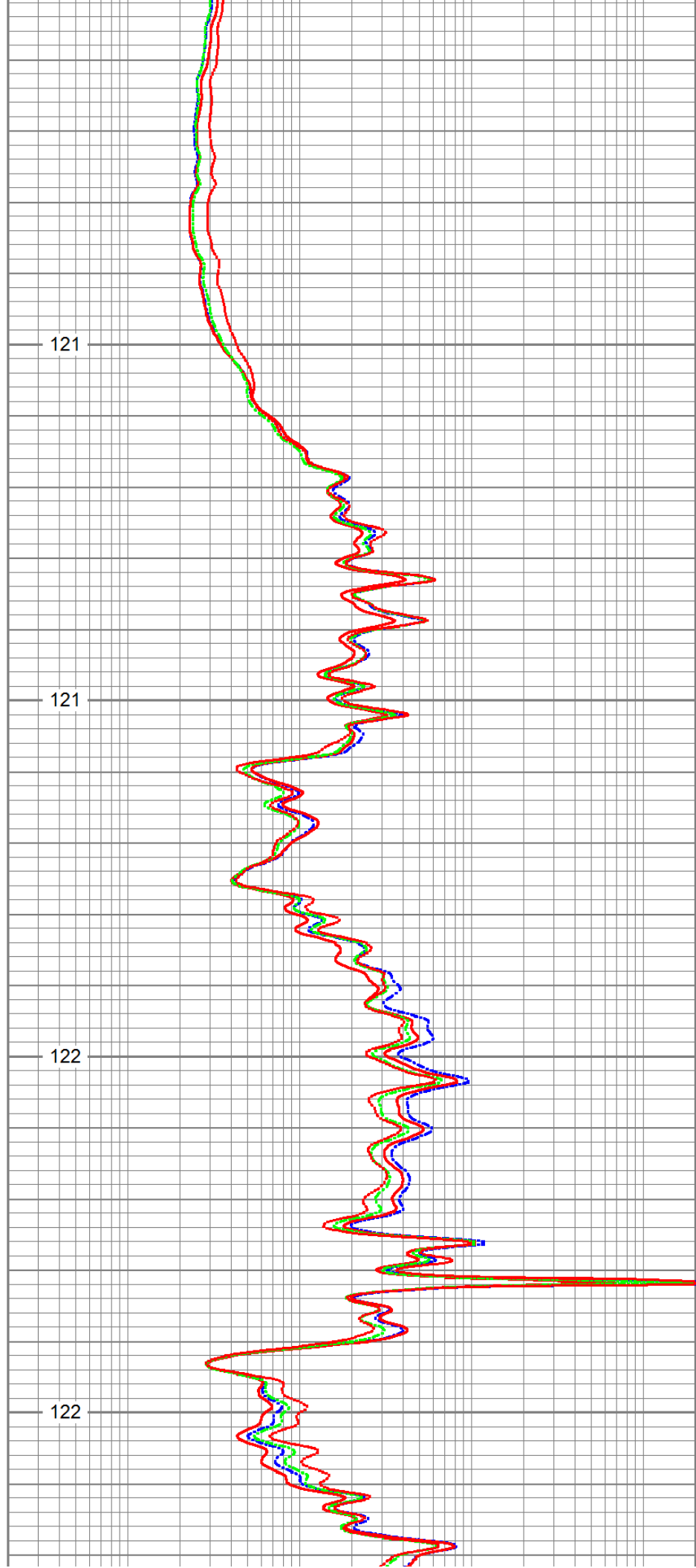
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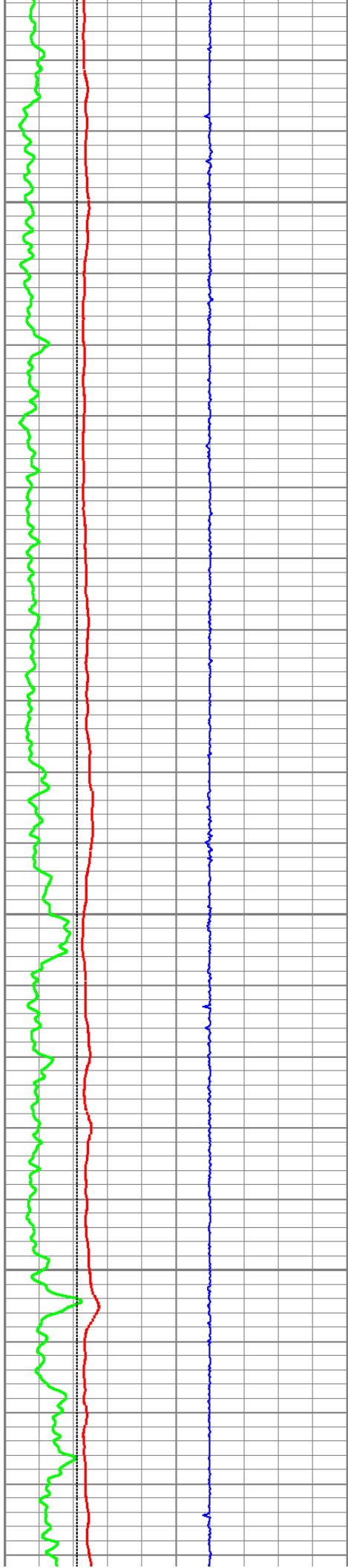
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122





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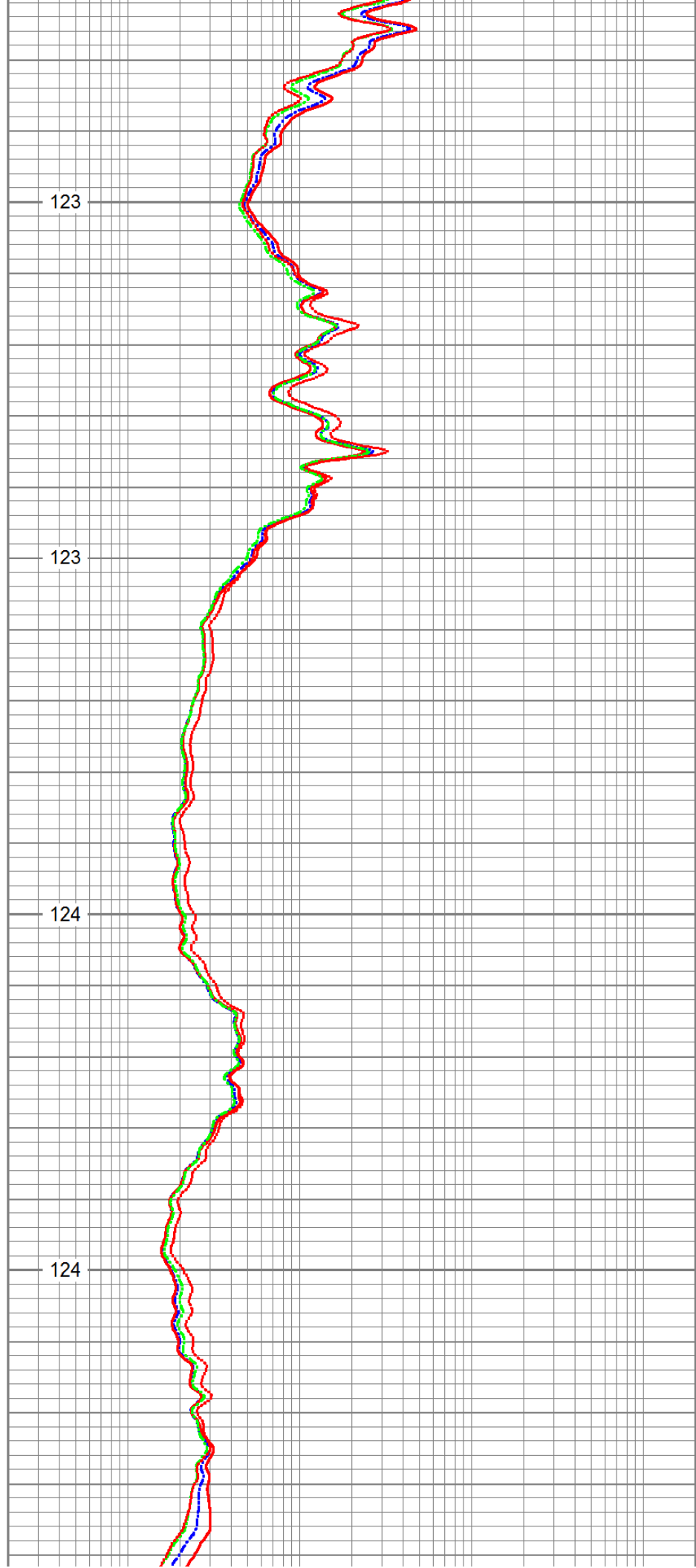
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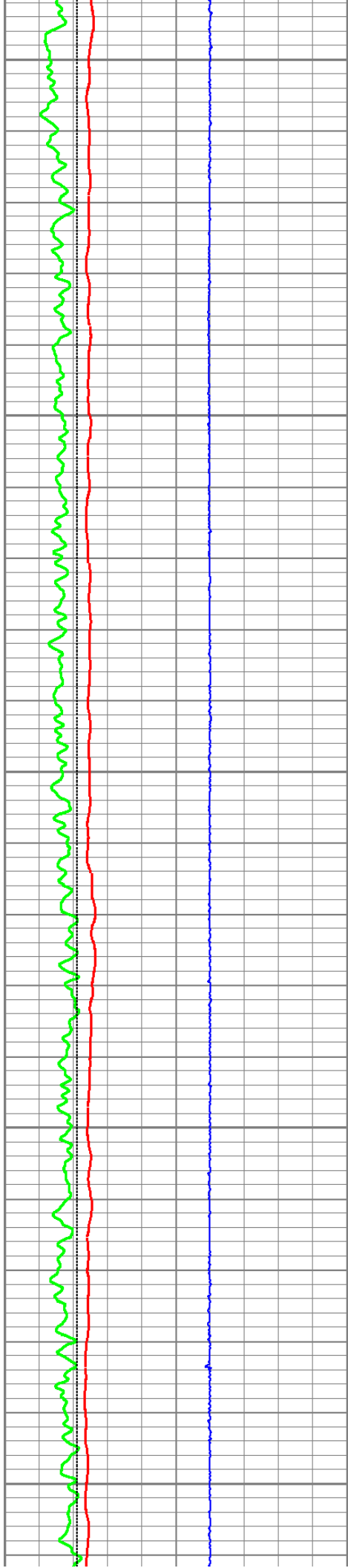
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8100

124





8150

8200

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8300

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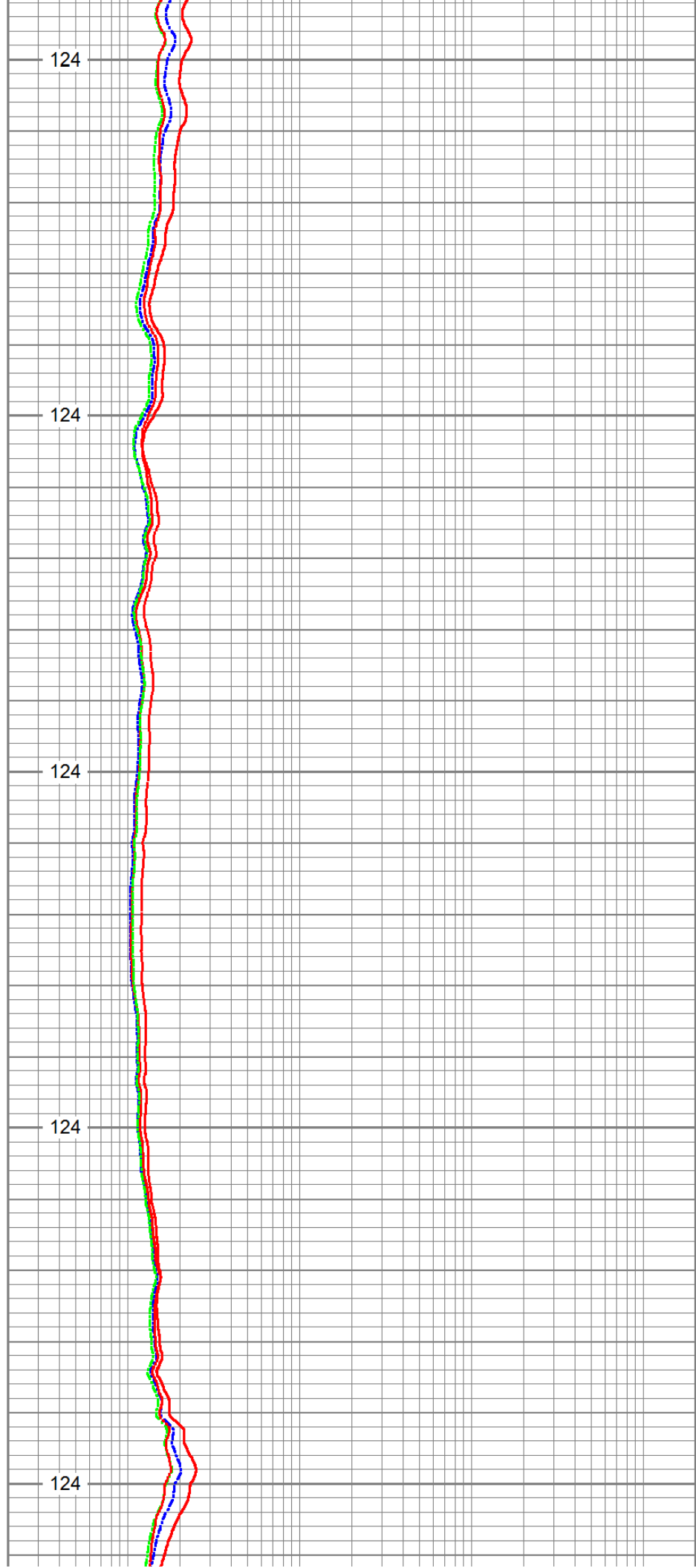
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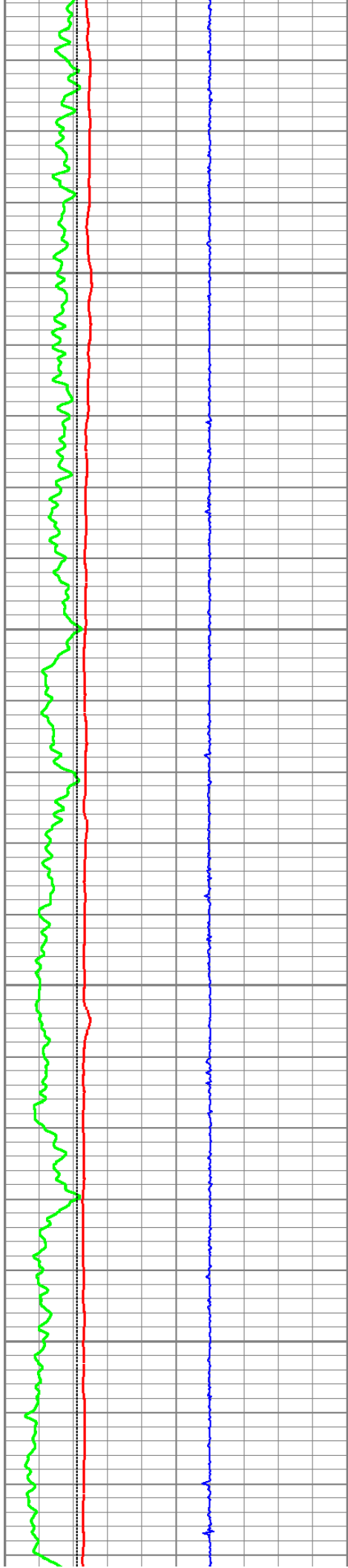
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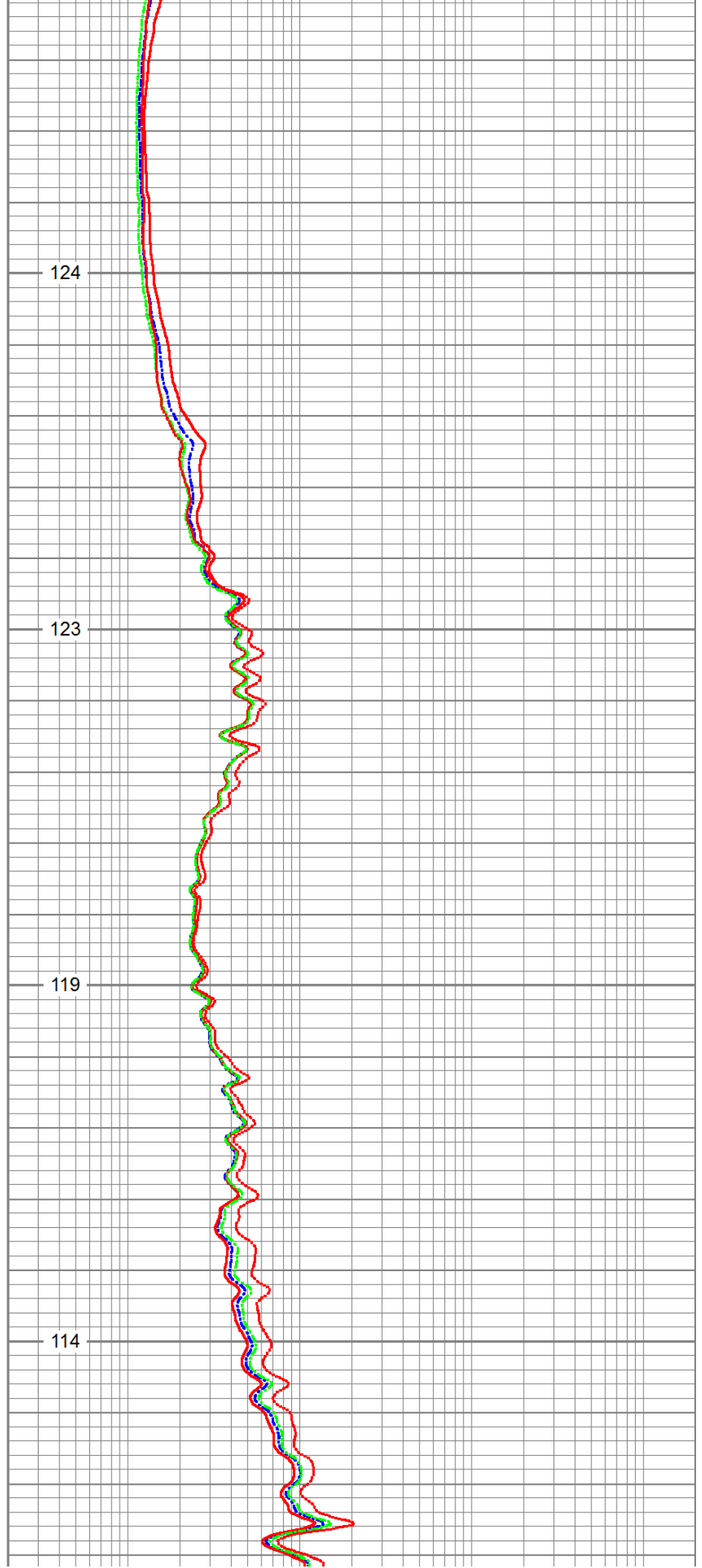
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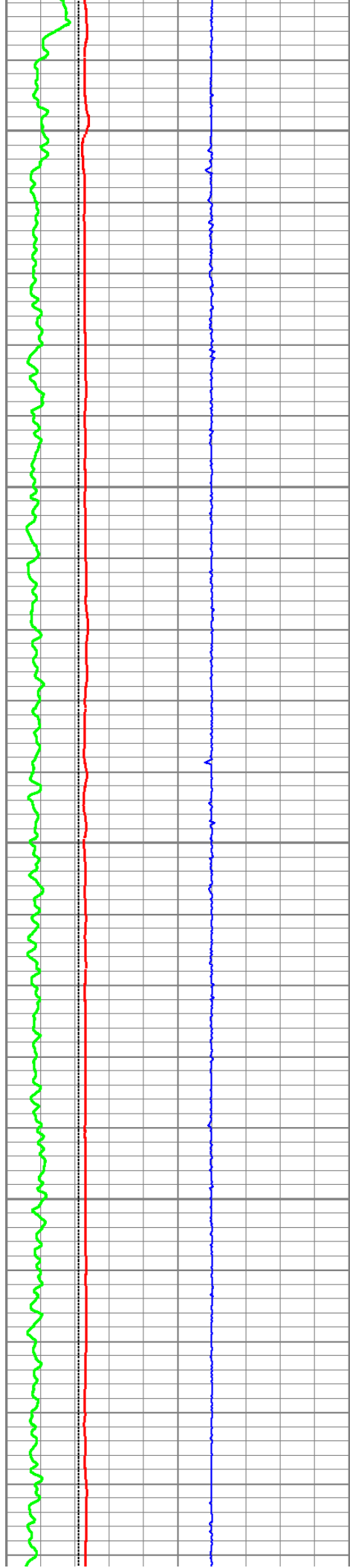
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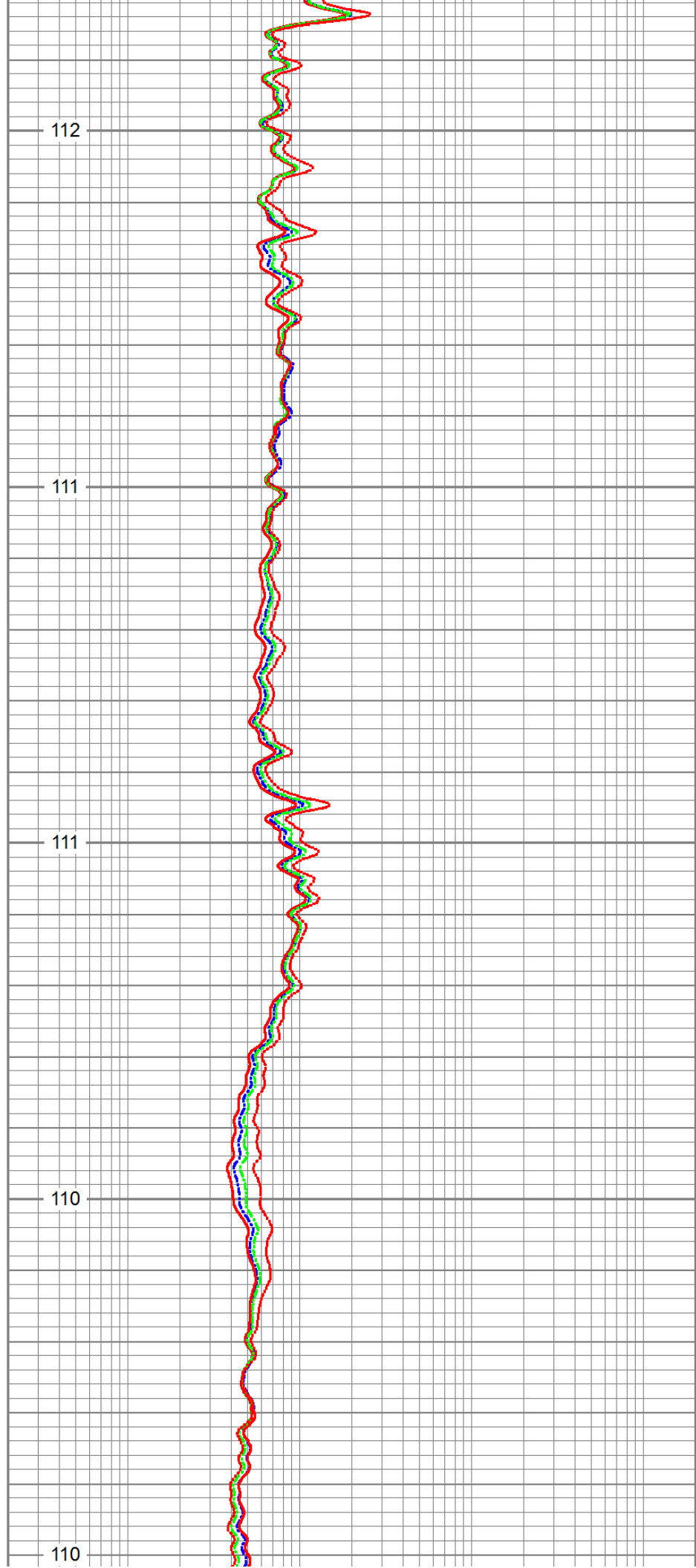
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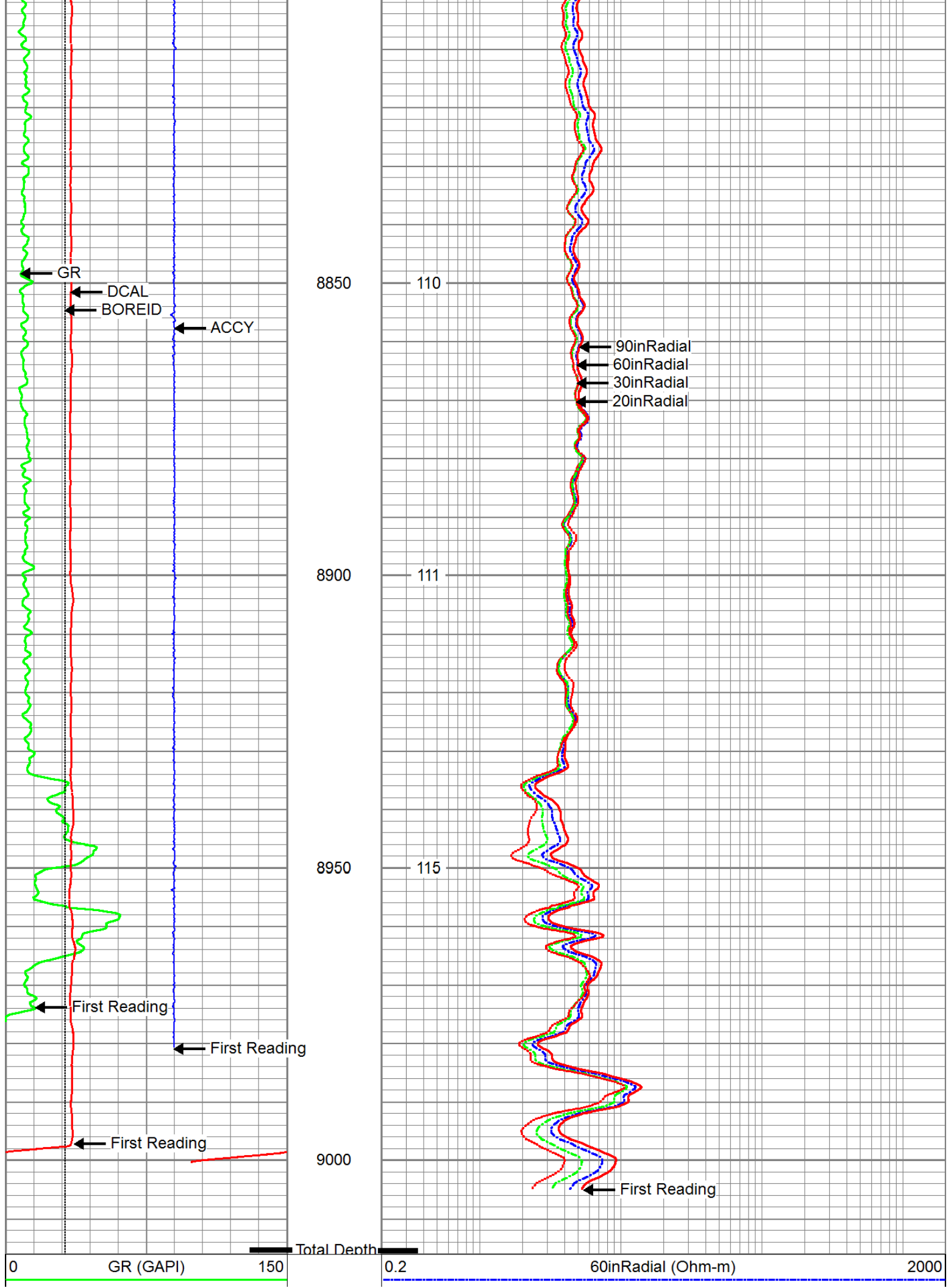
8750

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8800

110





4	BOREID (in)	14
4	DCAL (in)	14
-5	ACCY	5

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

GRTEMP (degF)	
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# Log Variables

Database: c:\users\kris.wetzel\desktop\richard 3206 l3\sandridge\_richardl3\_mem.db  
 Dataset: field/well/proc1/pass1.2

## 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?
120	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	2.5
MudWgt lb/gal	NPORSEL	PEBHC?	PERFS	RESTMPSRC	SO in	SRFTEMP degF
8.4	Limestone	YES	0	INTERNAL	0.5	65
SZCOR	TDEPTH ft	TMPCOR	TOOLPOS			
On	9055	On	Ec-centered			

## Calibration Report

Database File: c:\users\kris.wetzel\desktop\richard 3206 l3\sandridge\_richardl3\_mem.db  
 Dataset Pathname: proc1/pass1.2  
 Dataset Creation: Thu Oct 24 02:53:50 2013

## ThruBit Induction Calibration Report

Tool Model-Serial Number: PS-PS03R  
 Shop Calibration Performed: Mon Aug 05 09:40:03 2013

## BASELINE

	R	Expected	X	Expected
Freq 1				
A1	-468.0840	[-500.00, -400.00]	72.8838	[-500.00, 500.00]
A2	-145.2750	[-180.00, -100.00]	10.7250	[-500.00, 500.00]
A3	-29.6967	[-50.00, -10.00]	-117.5550	[-500.00, 500.00]
A4	-18.5257	[-30.00, -10.00]	207.5980	[-500.00, 500.00]
A5	-15.3741	[-30.00, -10.00]	134.9460	[-500.00, 500.00]
Freq 2				
A1	-241.6600	[-280.00, -180.00]	17.0635	[-500.00, 500.00]
A2	-93.7452	[-130.00, -50.00]	-21.3022	[-500.00, 500.00]
A3	-21.5530	[-50.00, -10.00]	-130.8850	[-500.00, 500.00]
A4	-21.6062	[-30.00, -10.00]	47.1430	[-500.00, 500.00]
A5	-20.7412	[-30.00, -10.00]	-10.3315	[-500.00, 500.00]
Freq 3				
A1	-150.4620	[-180.00, -80.00]	-59.4470	[-500.00, 500.00]
A2	70.8152	[-120.00, -20.00]	57.0476	[-500.00, 500.00]

A2	-70.8155	[-130.00, -30.00]	-97.0478	[-500.00, 500.00]
A3	-17.3957	[-50.00, -10.00]	-156.7580	[-500.00, 500.00]
A4	-23.3347	[-30.00, -10.00]	-61.6453	[-500.00, 500.00]
A5	-23.8551	[-30.00, -10.00]	-115.8030	[-500.00, 500.00]
Freq 4				
A1	-80.0508	[-120.00, -40.00]	-199.5280	[-500.00, 500.00]
A2	-50.7274	[-110.00, -10.00]	-121.1000	[-500.00, 500.00]
A3	-13.8356	[-50.00, -10.00]	-214.7800	[-500.00, 500.00]
A4	-26.9167	[-30.00, -10.00]	-226.6750	[-500.00, 500.00]
A5	-30.7104	[-30.00, -10.00]	-292.2140	[-500.00, 500.00]

### CALIBRATION COEFFICIENTS

	R	Expected	X	Expected
Freq 1				
A1	0.9970	[0.95, 1.05]	0.0029	[-0.05, 0.05]
A2	0.9980	[0.95, 1.05]	0.0029	[-0.05, 0.05]
A3	1.0025	[0.95, 1.05]	-0.0044	[-0.05, 0.05]
A4	0.9951	[0.95, 1.05]	0.0050	[-0.05, 0.05]
A5	0.9991	[0.95, 1.05]	0.0028	[-0.05, 0.05]
Freq 2				
A1	0.9908	[0.95, 1.05]	-0.0059	[-0.05, 0.05]
A2	0.9914	[0.95, 1.05]	-0.0055	[-0.05, 0.05]
A3	0.9900	[0.95, 1.05]	-0.0057	[-0.05, 0.05]
A4	0.9899	[0.95, 1.05]	-0.0040	[-0.05, 0.05]
A5	0.9946	[0.95, 1.05]	-0.0062	[-0.05, 0.05]
Freq 3				
A1	1.0044	[0.95, 1.05]	-0.0046	[-0.05, 0.05]
A2	1.0053	[0.95, 1.05]	-0.0039	[-0.05, 0.05]
A3	1.0038	[0.95, 1.05]	-0.0043	[-0.05, 0.05]
A4	1.0033	[0.95, 1.05]	-0.0027	[-0.05, 0.05]
A5	1.0090	[0.95, 1.05]	-0.0043	[-0.05, 0.05]
Freq 4				
A1	0.9927	[0.95, 1.05]	-0.0052	[-0.05, 0.05]
A2	0.9939	[0.95, 1.05]	-0.0047	[-0.05, 0.05]
A3	0.9940	[0.95, 1.05]	-0.0079	[-0.05, 0.05]
A4	0.9930	[0.95, 1.05]	-0.0039	[-0.05, 0.05]
A5	1.0024	[0.95, 1.05]	-0.0074	[-0.05, 0.05]
Temperature	34.4131 degC			

### ThruBit Density Calibration Report

Tool Model-Serial Number: PS-PS44D  
Source Number:  
Shop Calibration Performed: Mon Oct 14 10:29:11 2013

### REFERENCE

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

### READINGS

Outputs	Counts	Units	Expected
SS1 Background	127.25	cps	[130.00, 170.00]
LS1 Background	142.61	cps	[130.00, 170.00]

LS1 Background	142.01	cps	[130.00, 170.00]
LS4 Background	29.14	cps	[27.00, 35.00]
SS1 Aluminium	5605.85	cps	[4500.00, 5500.00]
LS1 Aluminium	938.46	cps	[750.00, 950.00]
LS4 Aluminium	1046.36	cps	[843.00, 1068.00]
SS1 Magnesium	9060.90	cps	[7000.00, 9000.00]
LS1 Magnesium	6042.34	cps	[5250.00, 6250.00]
LS1 Al + Fe	828.49	cps	[650.00, 800.00]
LS4 Al + Fe	492.86	cps	[382.00, 471.00]

RESULTS

SS Slope	1.75	[1.52, 1.77]
LS Slope	0.43	[0.38, 0.45]
PEF K Factor	4.874	[3.510, 6.170]
PEF B Factor	-0.572	[-0.700, -0.410]

RESULTS

Caliper Shop Calibration performed: Mon Oct 14 10:29:11 2013

Reference	Reading	Units
12.00	1914.19	in
9.00	2054.06	in
6.00	2215.24	in

DENSITY PRE-SURVEY CHECK Performed: Tue Oct 22 14:20:44 2013

Outputs	Counts	Units	Expected
SS1 Background	124.81	cps	[123.43, 131.06]
LS1 Background	142.17	cps	[138.33, 146.89]
LS4 Background	29.31	cps	[27.39, 30.89]

CALIPER PRE-SURVEY CHECK Performed: Tue Oct 22 14:18:16 2013

Reference	Readings	Units	Expected
6.00	6.00	in	[5.80, 6.20]

Compensated Neutron Calibration Report

Tool Model-Serial Number: ENP-ENP2N  
 Source Number:  
 Calibration Tank Temperature: 70.3 degF  
 Shop Calibration Performed: Mon Oct 14 13:08:56 2013

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	3357.7	cps	

LS Counts	108.5	cps	
Tank Ratio Ref	30.9580	SS/LS	
Tank Ratio	30.9475	SS/LS	
Tank Ratio Gain	1.0003		[0.85, 1.15]

ALUMINUM SLEEVE REFERENCE

Outputs	Measured	Units	Expected
SS Counts	39149.4	cps	
LS Counts	3578.9	cps	
AI Ratio Ref	10.797	SS/LS	
AI Ratio	10.943	SS/LS	
AI Ratio Gain	0.99		[0.90, 1.10]
Sleeve Porosity	14.46	pu	

PRE-SURVEY BACKGROUND CHECK Performed: Tue Oct 22 14:25:31 2013



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-PS02T	
Performed:	Mon Jul 15 14:19:43 2013	
Calibrator Value:	165.0	GAPI
Background Reading:	61.6	cps
Calibrator Reading:	455.7	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)
Thru-bit	66.92		Cablehead-S Solid Weakpoint	2.31	2.13	5.00
Thru-bit	64.61		PS02T	2.97	2.25	25.00

ThruBit	60.75			PSDDT	5.87	2.23	35.00
				HangOff_Tool	5.00	2.38	60.00
ThruBit	55.75			10-1	0.88	2.13	3.95
ThruBit	54.87			Universal Joint	1.46	2.06	15.00
TBBAT	53.41			TBBAT-A (PS13B) ThruBit Battery	6.13	2.13	38.20
TBBAT2	47.29			TBBAT2-A (PS33B) ThruBit Battery	6.13	2.13	40.00
TMG	41.16			TMG-PS (PS02T) ThruBit Telemetry Gamma Ray	6.13	2.13	45.00
GR	41.04						
GRTEMP	40.20						
ThruBit	35.04			Decentralizer Decentralizer (Small)	4.50	2.13	70.00
CNLSC	28.60			TBN-ENP (ENP2N) ThruBit Neutron	4.77	2.13	63.00
LSW1	18.04			TBD-PS (PS44D) ThruBit Density	10.48	2.13	91.00
DCAL	17.13						
A1_P	10.60			TBI-PS (PS03R) ThruBit Induction	15.29	2.13	94.00
A2_P	10.10						
A3_P	9.35						
A4_P	8.35						
A5_P	6.60						

Dataset: sandridge\_richardI3\_mem.db: field/well/proc1/pass1.2  
 Total Length: 66.92 ft  
 Total Weight: 560.15 lb  
 O.D.: 2.38 in

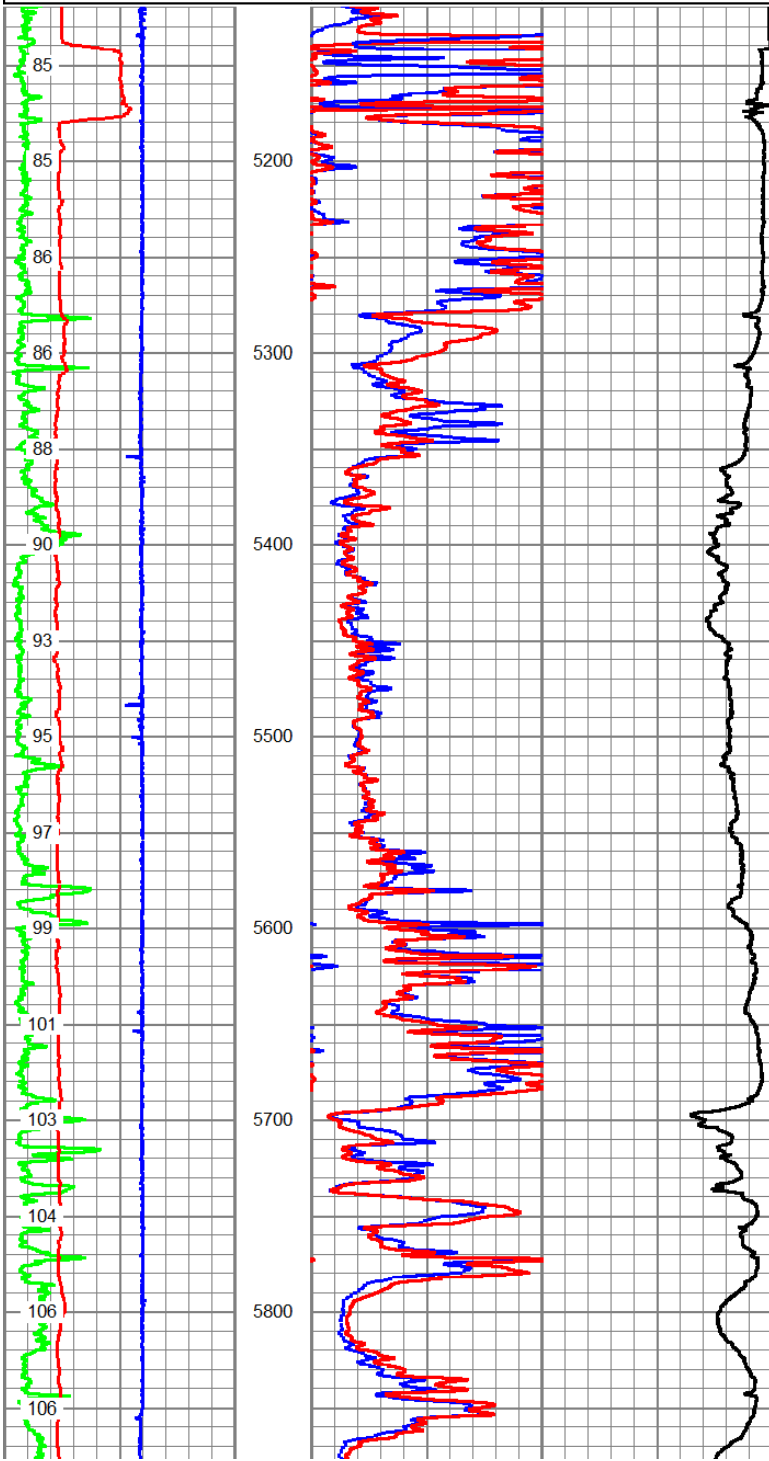
Company SANDRIDGE ENERGY  
 Well RICHARD 3206 3-30H 3L

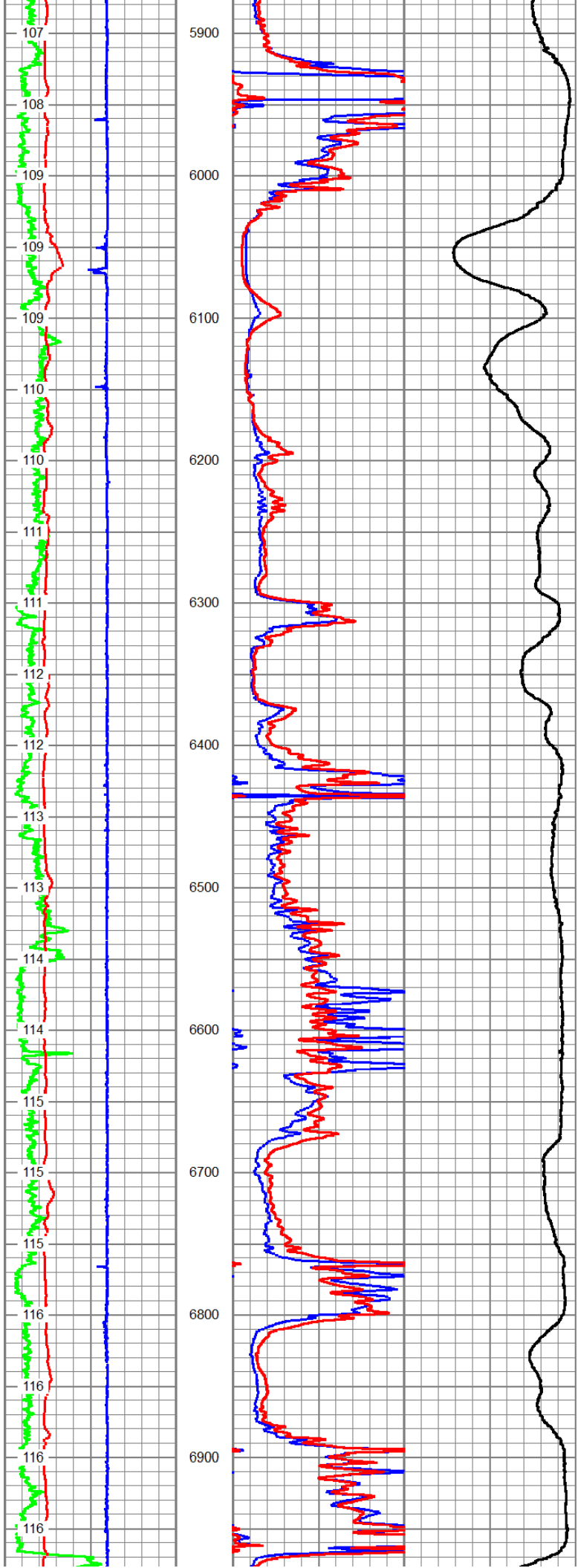


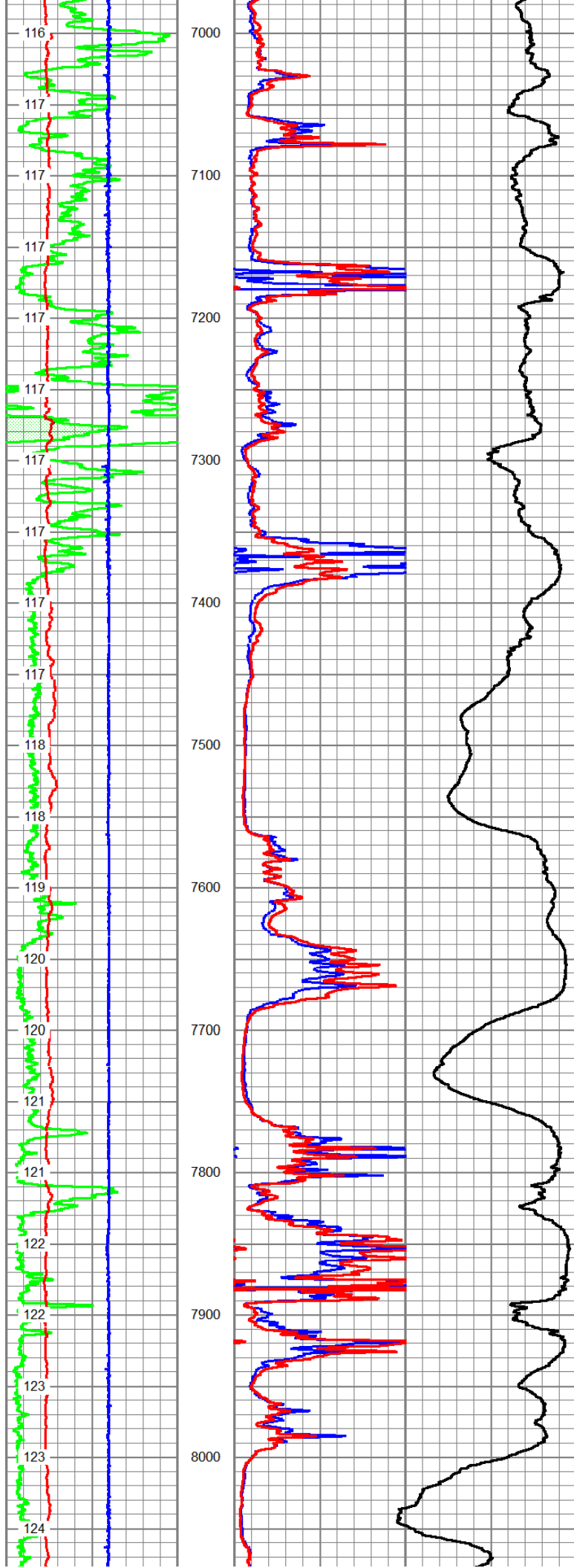
## MAIN PASS

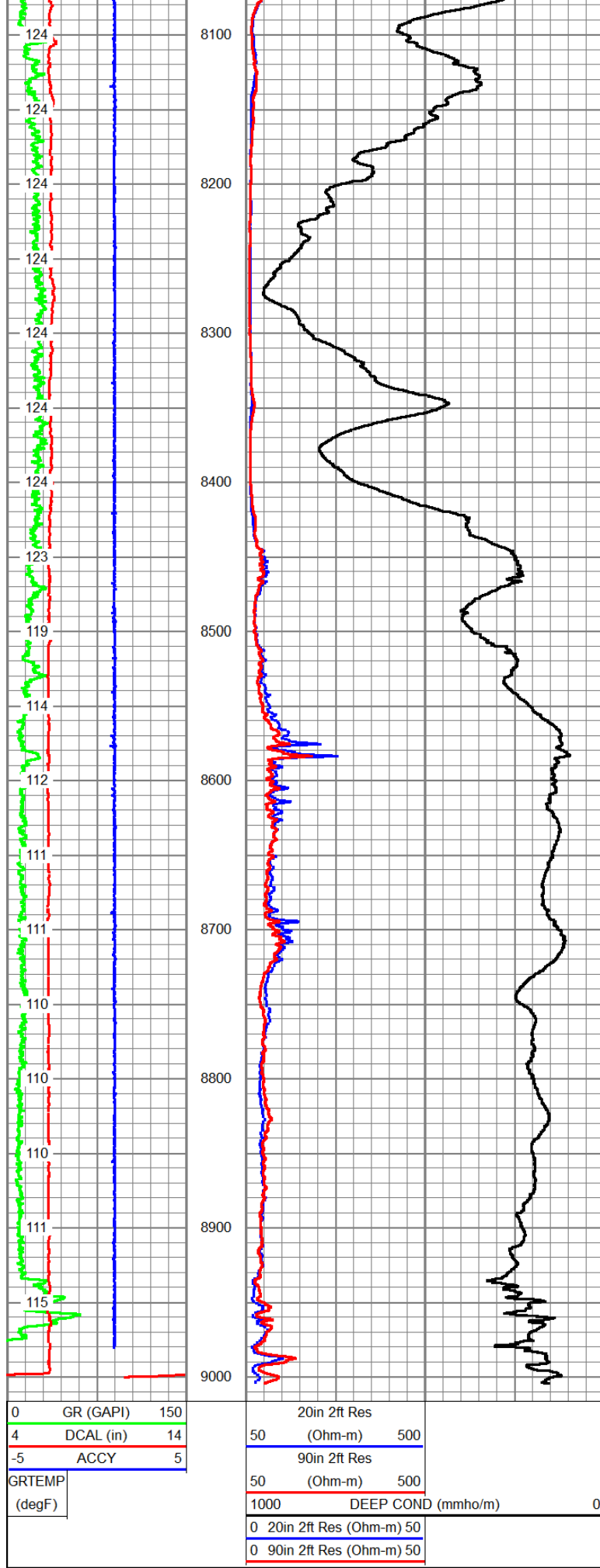
Database File: c:\users\kris.wetzel\desktop\richard 3206 I3\sandridge\_richardI3\_mem.  
 Dataset Pathname: proc1\pass1.2  
 Presentation Format: 6\_1r\_chk  
 Dataset Creation: Thu Oct 24 02:53:50 2013  
 Charted by: Depth in Feet scaled 1:1200

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









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