



**ThruBit**  
A Schlumberger Company

**ARRAY INDUCTION  
GAMMA RAY  
MEMORY LOG**

Company SANDRIDGE ENERGY  
Well 4J RANCH 3408 3-33H  
Field BOUSE  
County HARPER  
State KANSAS

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Location: API #: 15-077-21931-01-00  
Permanent Datum G.L. Elevation 1251'  
Log Measured From D.F. 18' ABOVE PERM DATUM  
Drilling Measured From D.F.  
SHL: 220' FSL & 1715' FWL  
BHL: 330' FNL & 1980' FWL  
SEC 33 TWP 34S RGE 8W  
Other Services  
THRUBIT  
PORTAL BIT  
Elevation  
K.B. 1269'  
D.F. 1269'  
G.L. 1251'

Date	27 JUNE 2013
Run Number	ONE
Depth Driller	9355'
Depth Logger	9334'
Bottom Logged Interval	9323'
Top Log Interval	3000'
Casing Driller	7" @ 5489'
Casing Logger	7" @ 5484'
Bit Size	6.125"
Type Fluid In Hole	WBM
Density / Viscosity	8.4 / 27
PH / Fluid Loss	10.0 / NA
Source of Sample	FLOW LINE
Rm @ Meas. Temp	8.24 OHM @ 79 DEGF
Rmf @ Meas. Temp	6.18 OHM @ 79 DEGF
Rmc @ Meas. Temp	10.3 OHM @ 79 DEGF
Source of Rmf / Rmc	CALCULATED
Rm @ BHT	5.29 OHM @ 129 DEGF
Time Circulation Stopped	0030 27 JUNE 2013
Time Logger on Bottom	0145 27 JUNE 2013
Maximum Recorded Temperature	129 DEGF
Equipment Number	T011
Location	OKC, OK
Recorded By	R. BROOMFIELD
Witnessed By	MICHAEL KULCHISKY

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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 PUMPDOWN - BIT DEPTH 9276' LOG TO 3000'**  
**ALL SCALES AND PRESENTATION PER CLIENT REQUEST**  
**LIMESTONE POROSITY , 2.71 G/CC, USED FOR POROSITY CALCULATIONS**  
**LOG RAN WITH SWIVEL, DECENTRALIZER AND NO STANDOFFS**  
**TBHV REPRESENTS TOTAL BOREHOLE VOLUME, FT3**  
**ABHV REPRESENTS ANNULAR BOREHOLE VOLUME, FT3, CALCULATED FOR 4.50" CASING**  
**RIGMINDER LITE AND PASON USED TO CREATE DEPTH LOG**  
**LOG DEPTH CORRELATED TO MWD GR PROVIDED BY CUSTOMER**

**RIG: UNIT 310**  
**CREW: R. BROOMFIELD, J. HIRSCHLER, Z. HOWARD**

Service Ticket No. 2003	API No. 15-077-21931-01-00	PGM Ver WARRIOR 7.0
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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.	PS10T	Serial No.	PS35N	Serial No.	PS52D	Serial No.	PS31R
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	9334'	3000'	0	30 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**

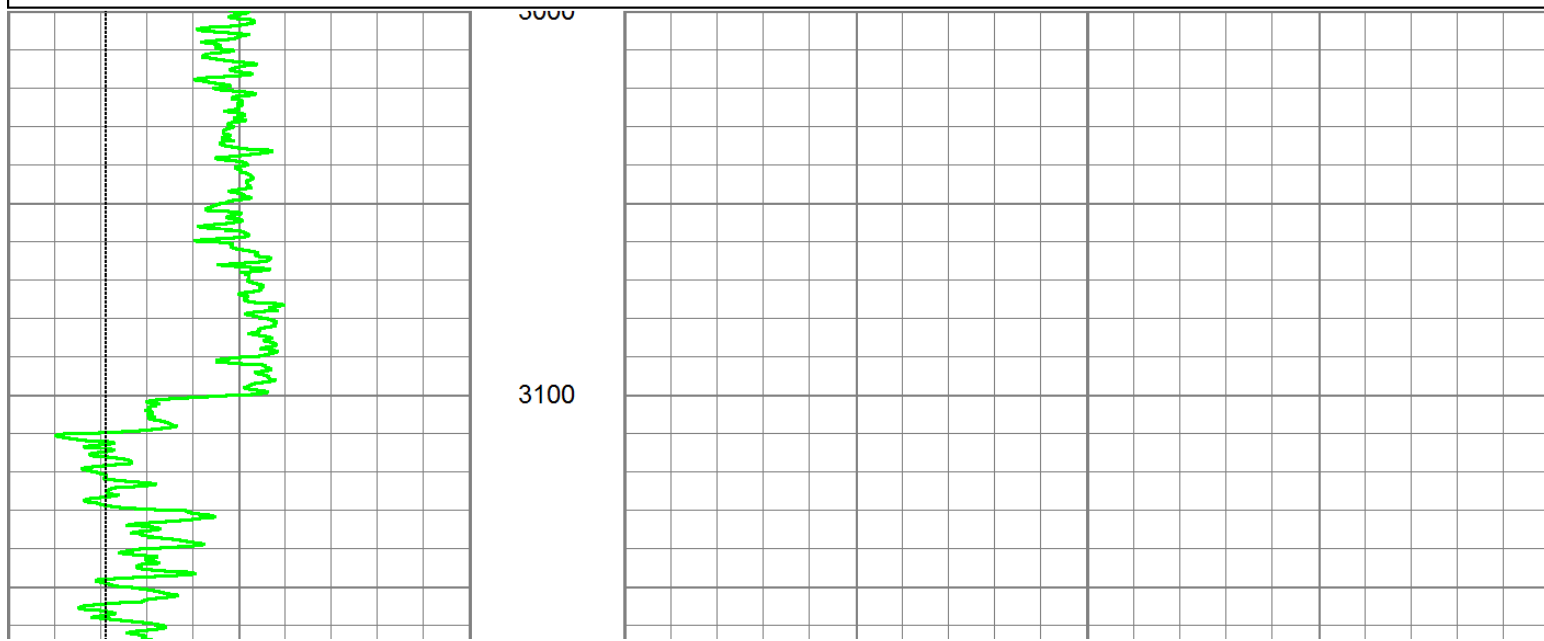
Maximum Deviation	93.63	deg. @	7014'	KOP	3982'
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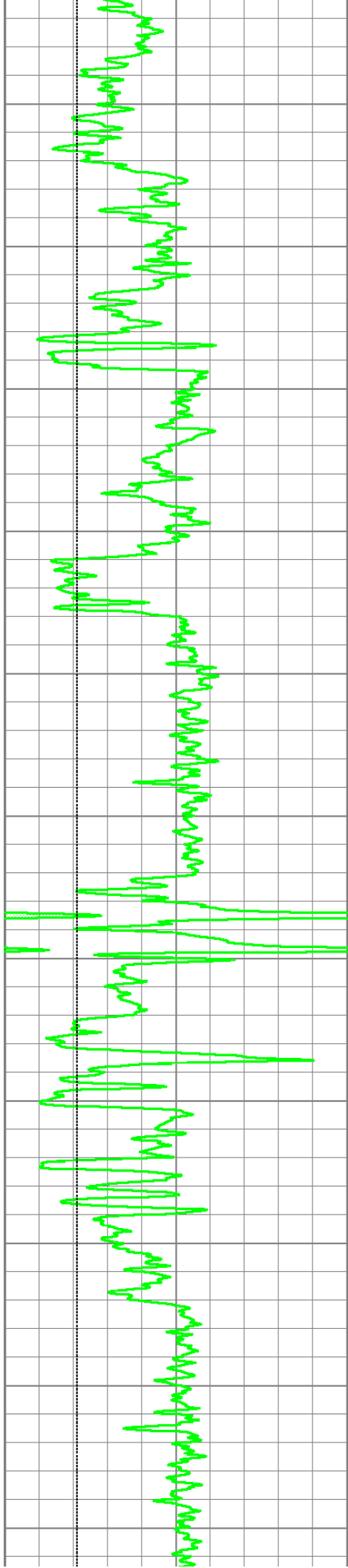


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 Dataset Pathname: proc1/pass1.2  
 Presentation Format: 6\_2r\_chk  
 Dataset Creation: Thu Jun 27 14:17:51 2013  
 Charted by: Depth in Feet scaled 1:600

0	GR (GAPI)	150	50	20in 2ft Res (Ohm-m)	500
4	DCAL (in)	14	50	90in 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





3200

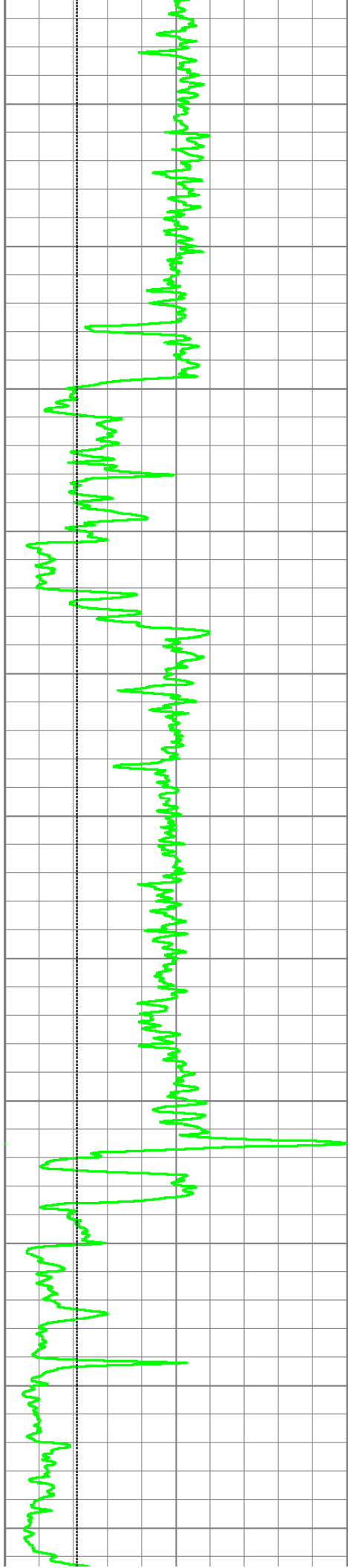
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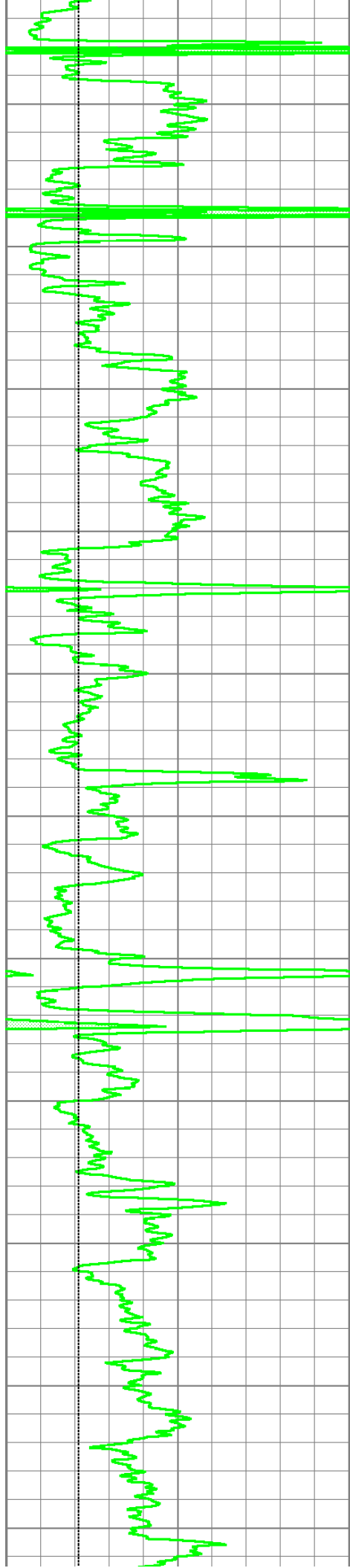
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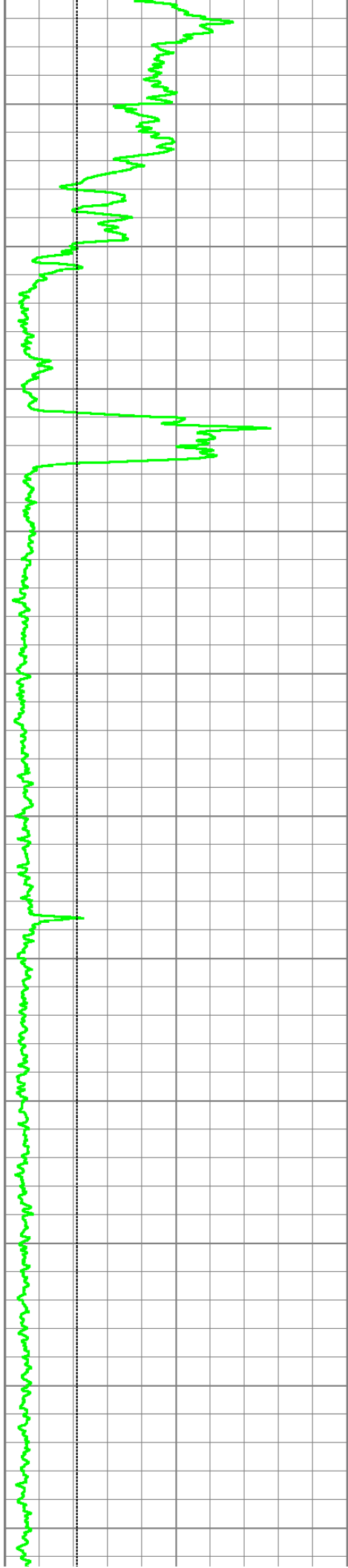
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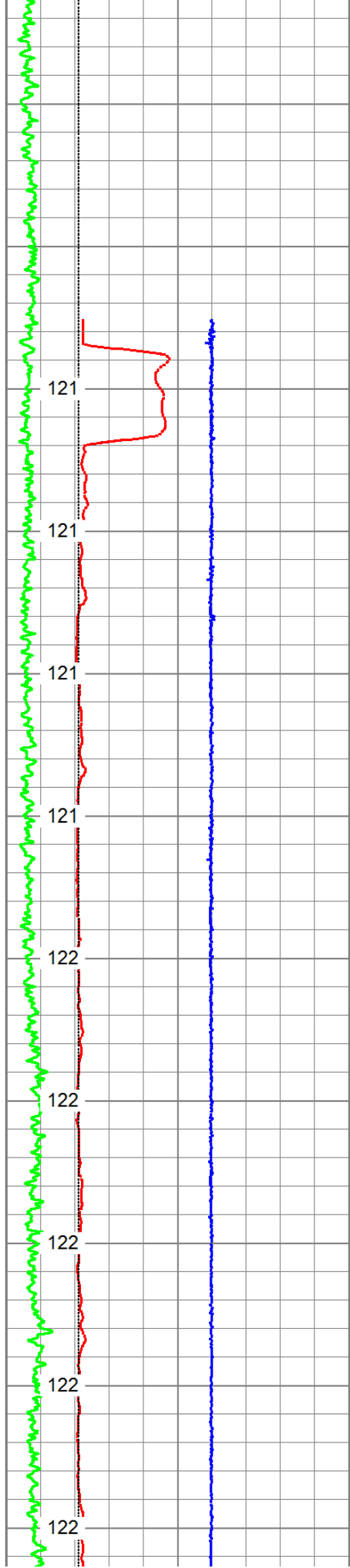
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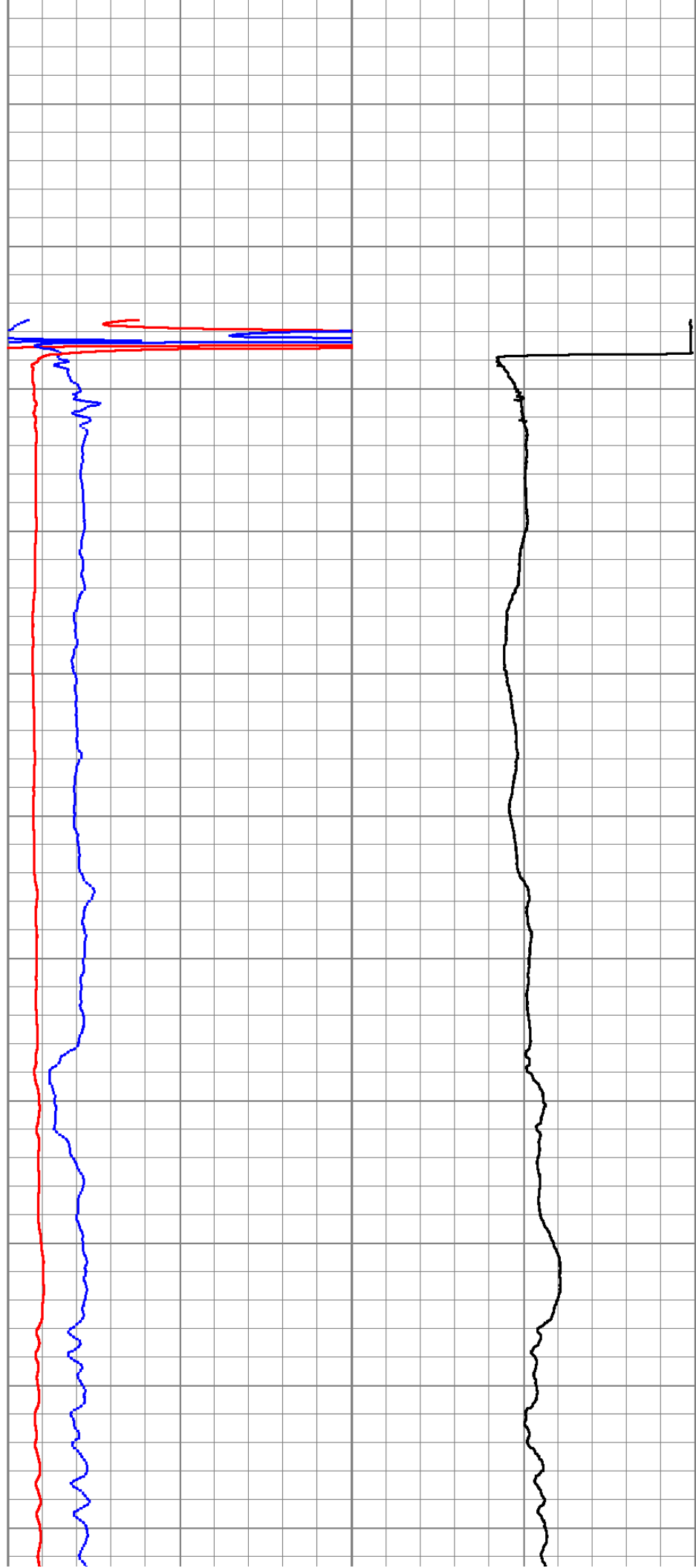
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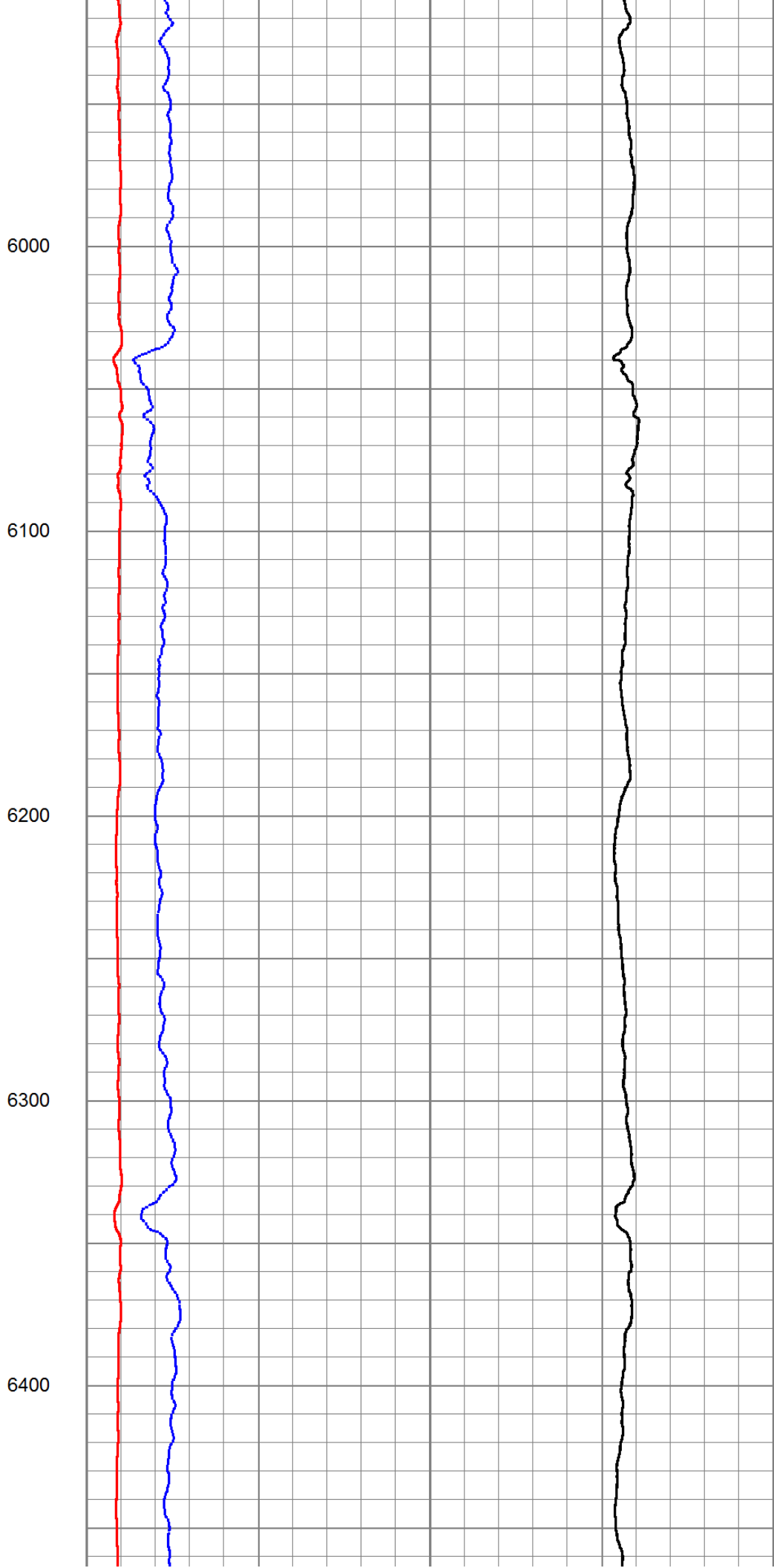
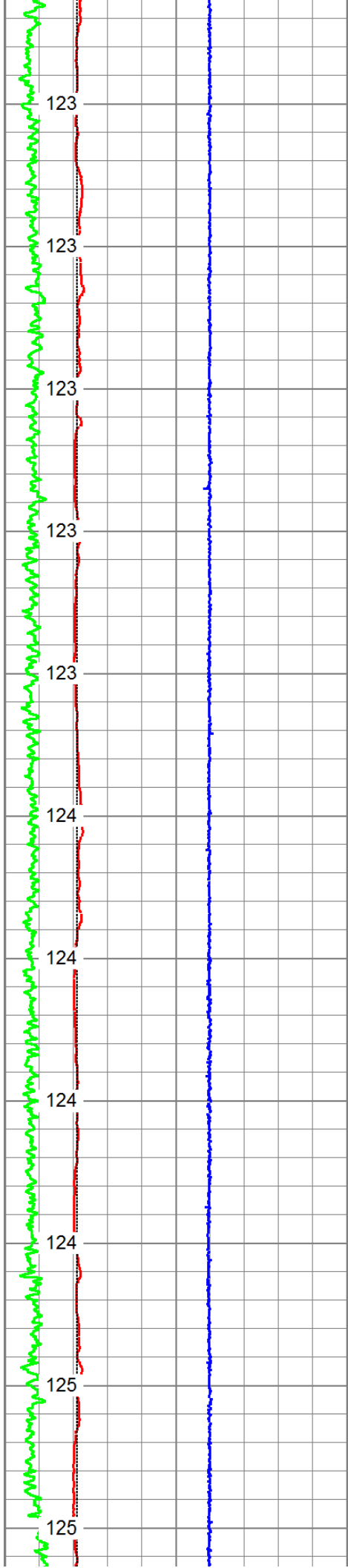
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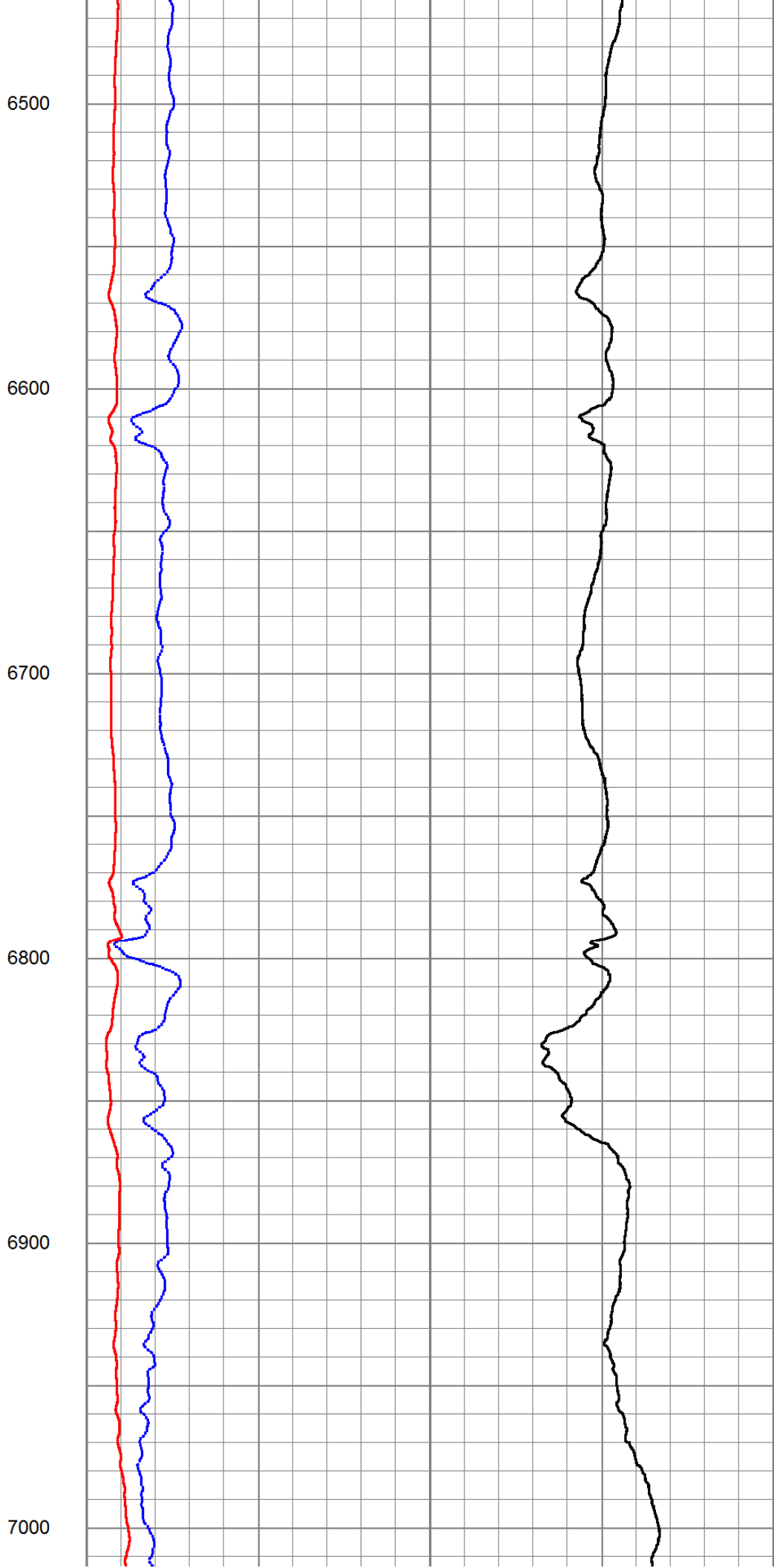
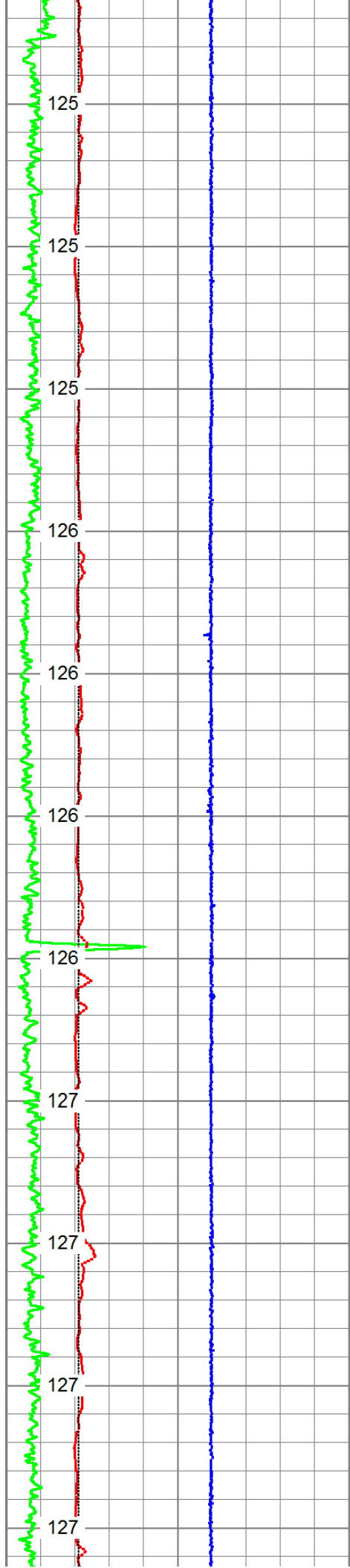
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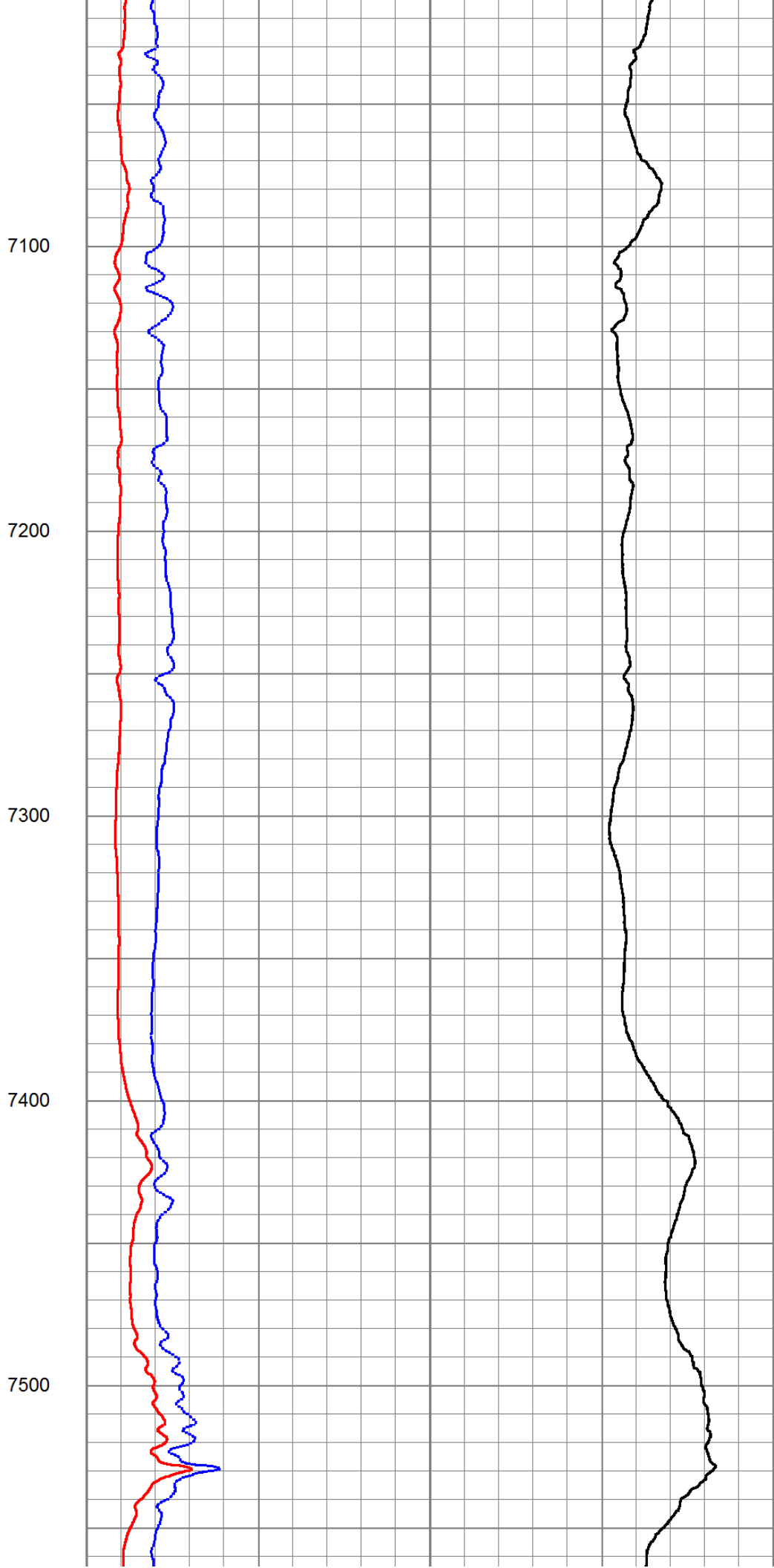
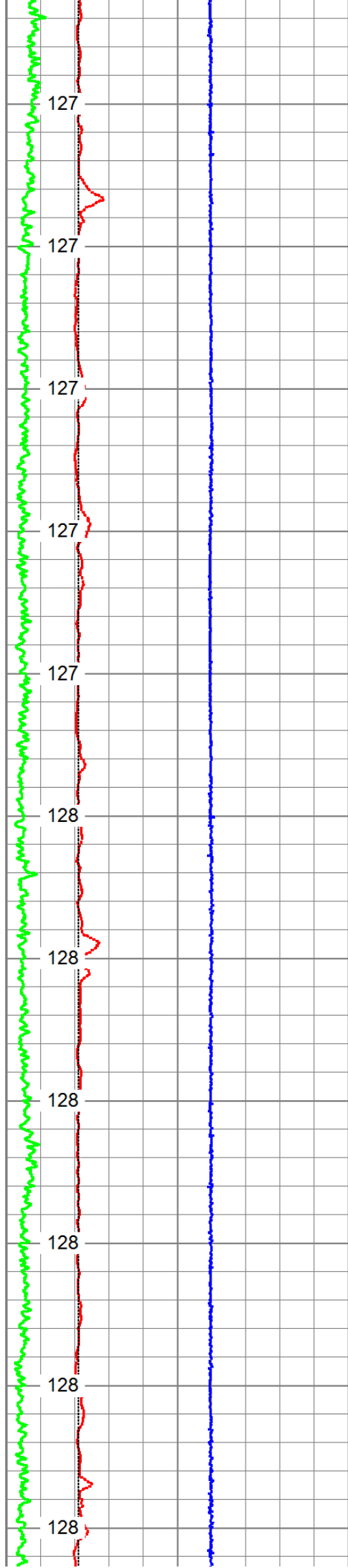
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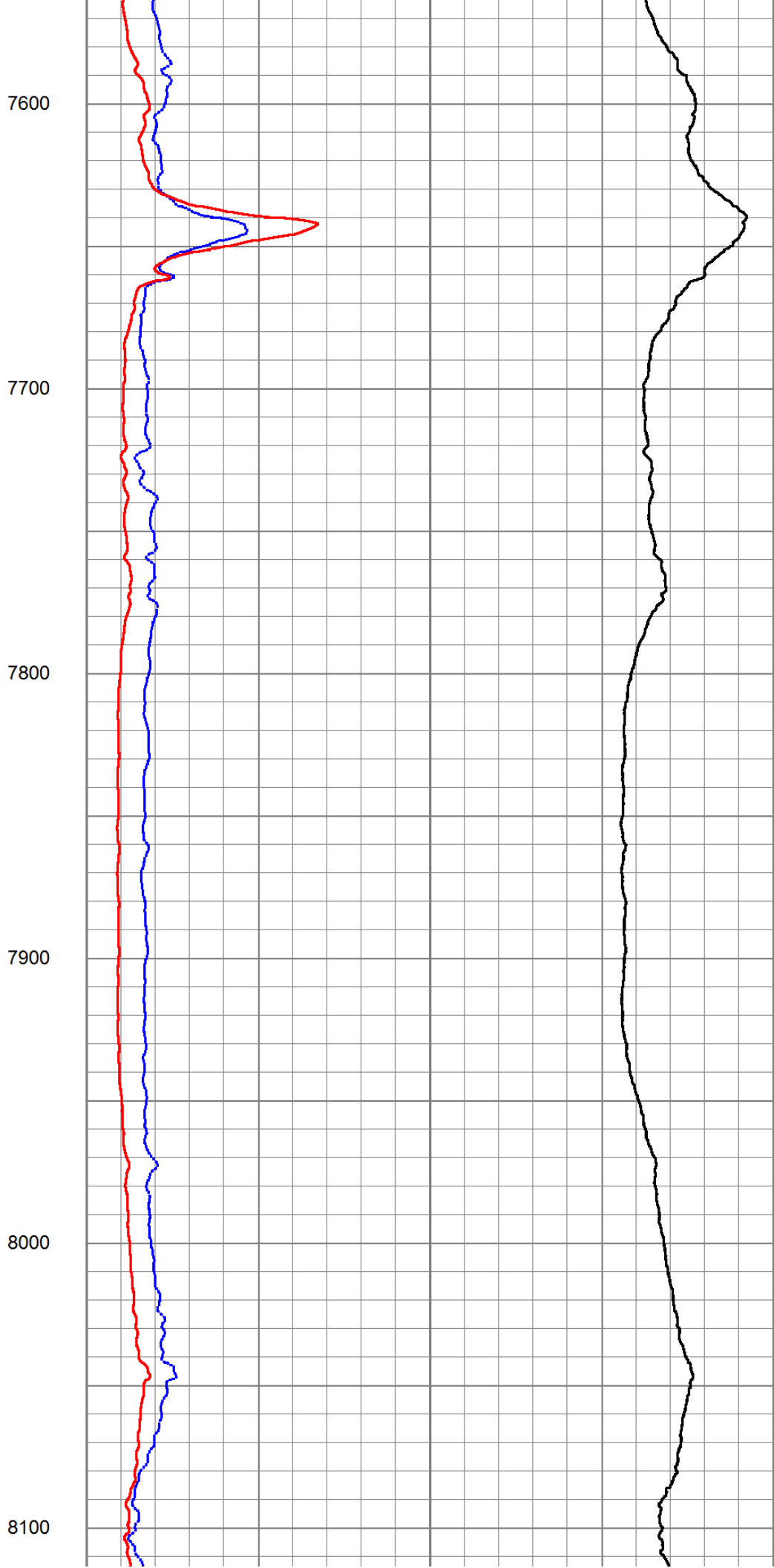
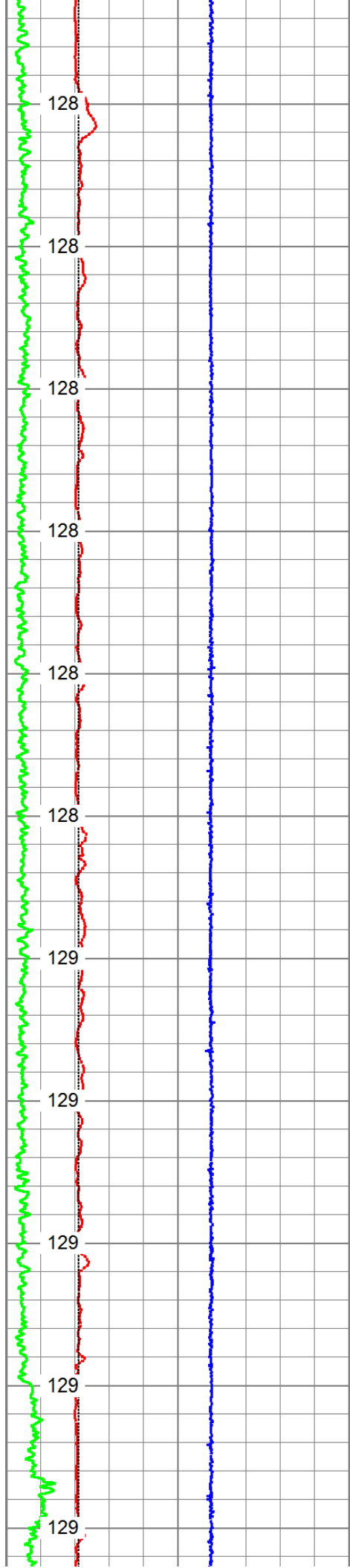


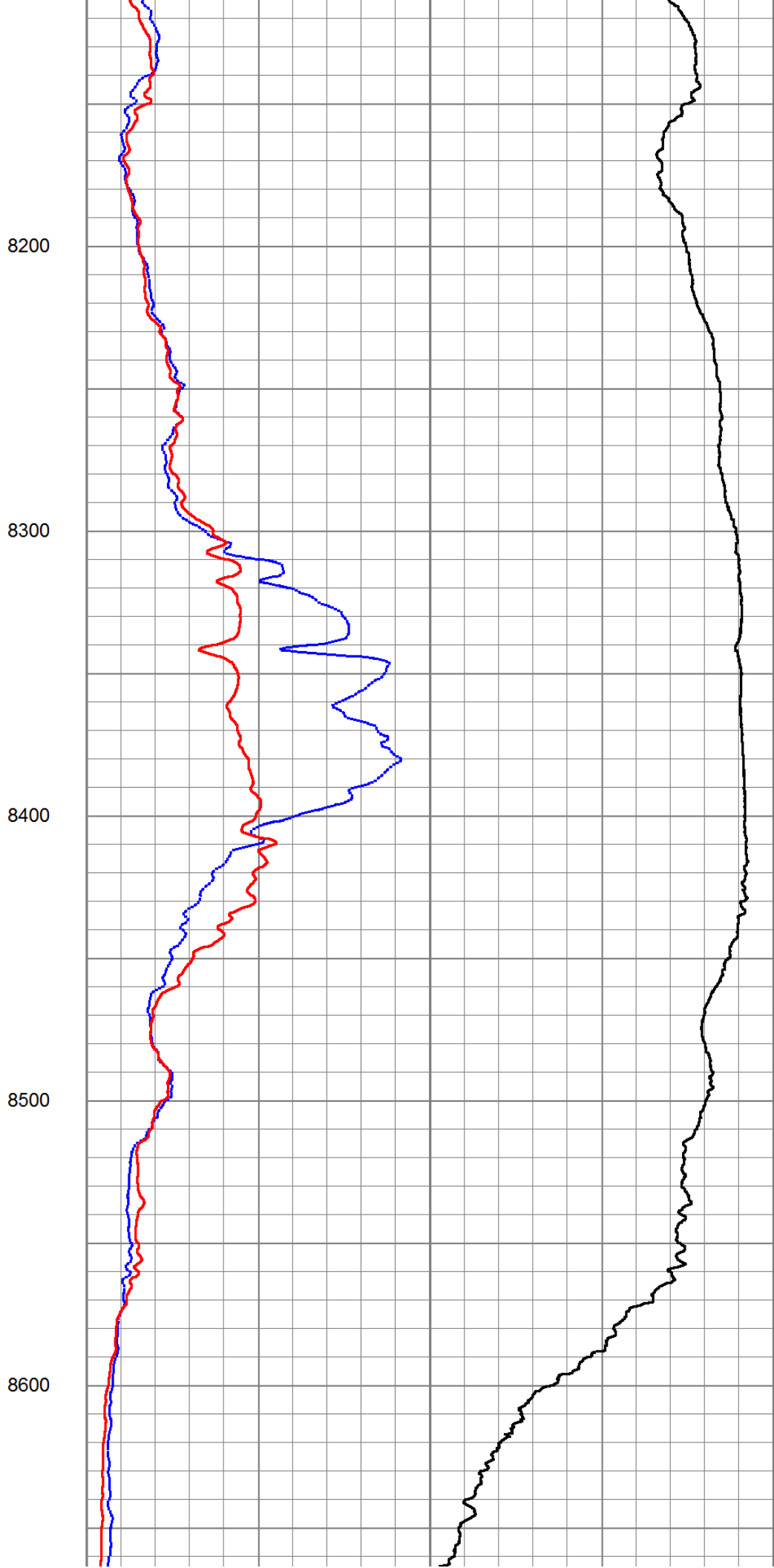
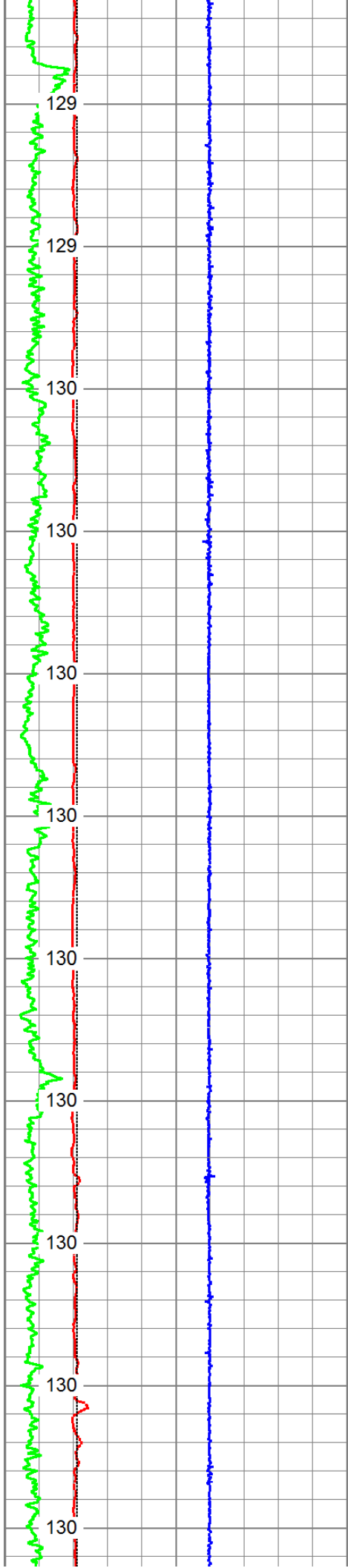


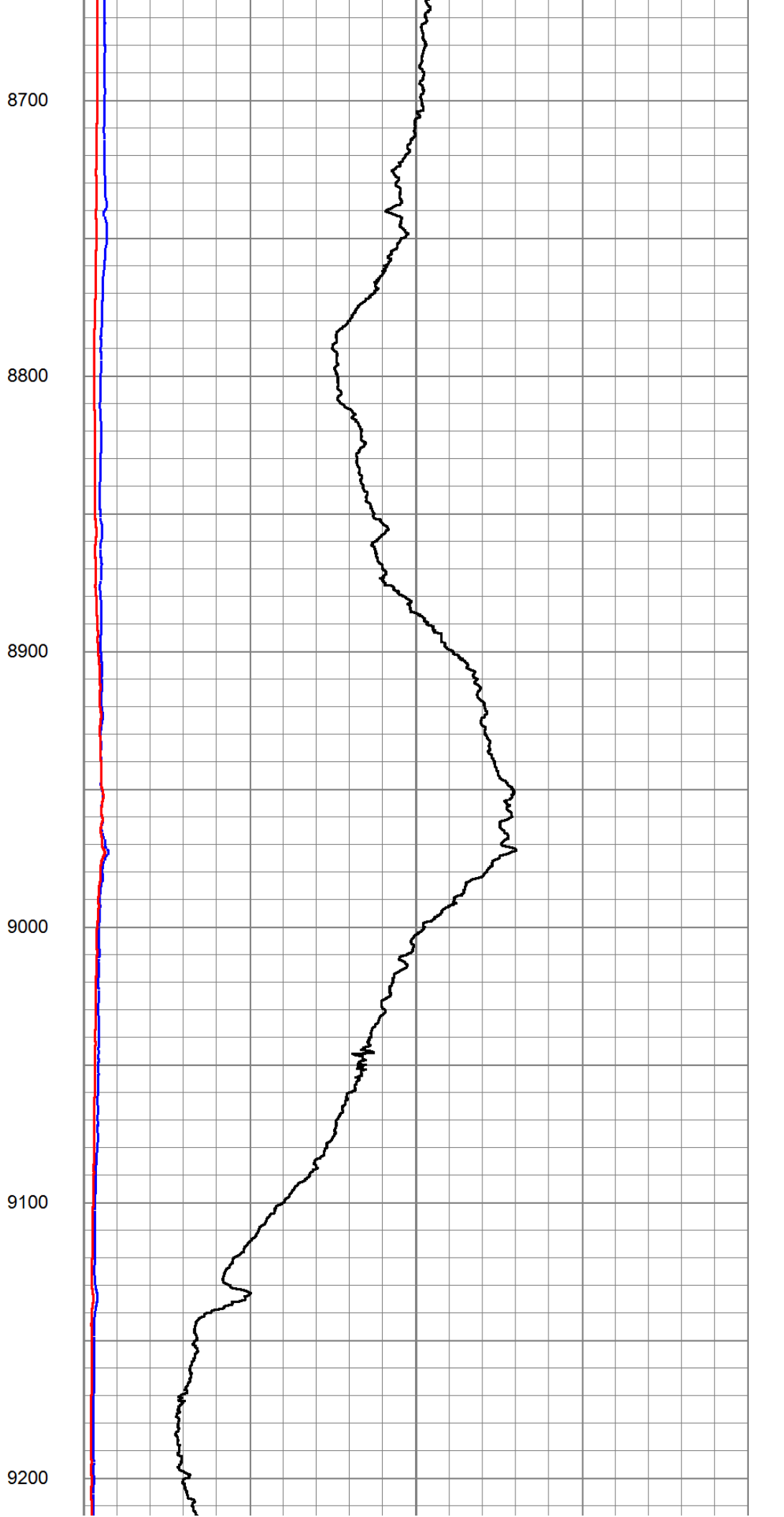
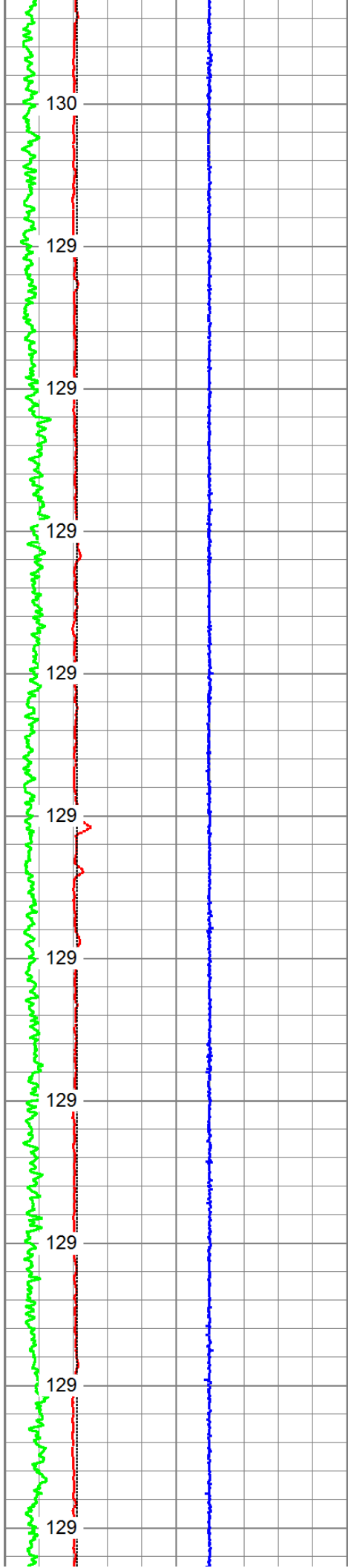






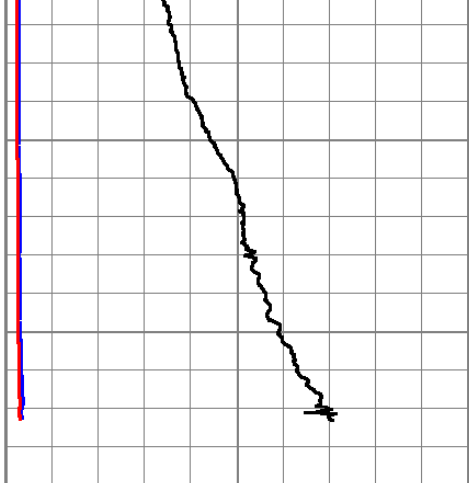








9300



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

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

0

GRTEMP  
(degF)

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



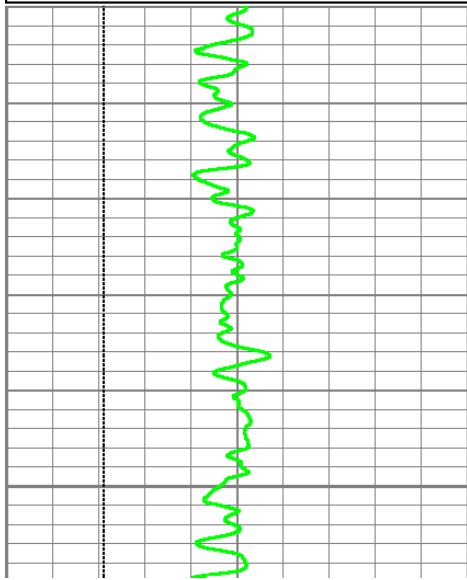
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 Presentation Format: 6\_5r\_chk  
 Dataset Creation: Thu Jun 27 14:17:51 2013  
 Charted by: Depth in Feet scaled 1:240

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4	DCAL (in)	14
-5	ACCY	5

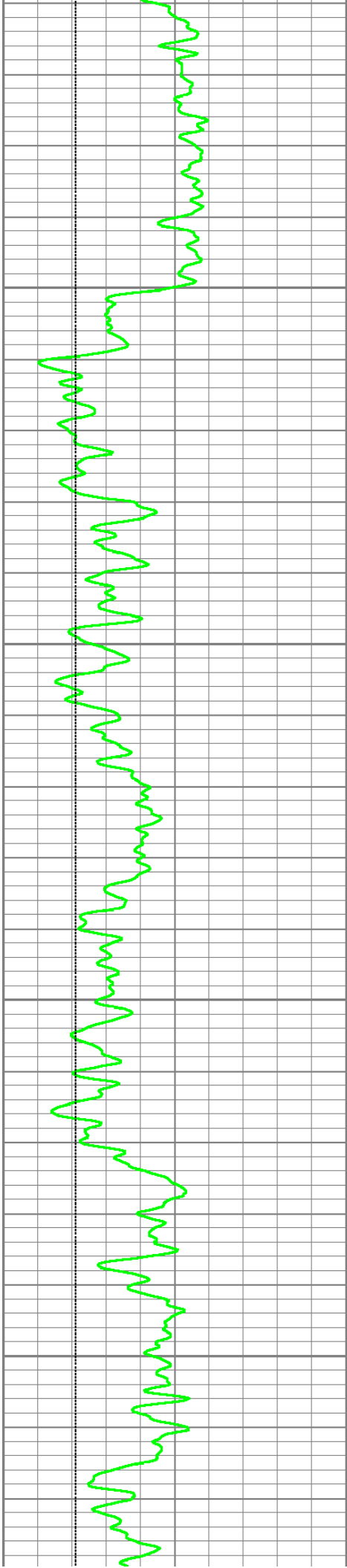
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0.2	30inRadial (Ohm-m)	2000
0.2	60inRadial (Ohm-m)	2000
0.2	90inRadial (Ohm-m)	2000
0.2	10inRadial (Ohm-m)	2000

GRTEMP  
(degF)



3000

3050

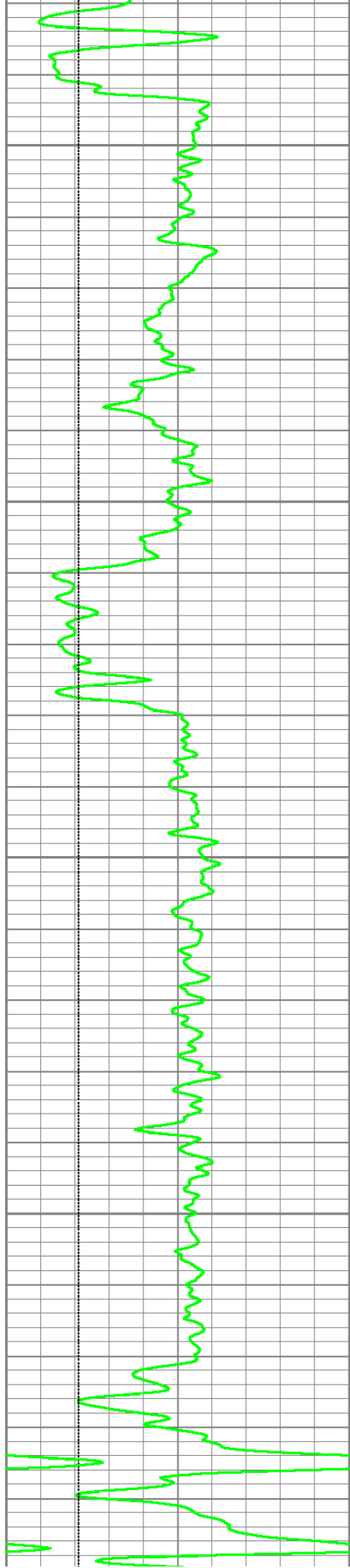


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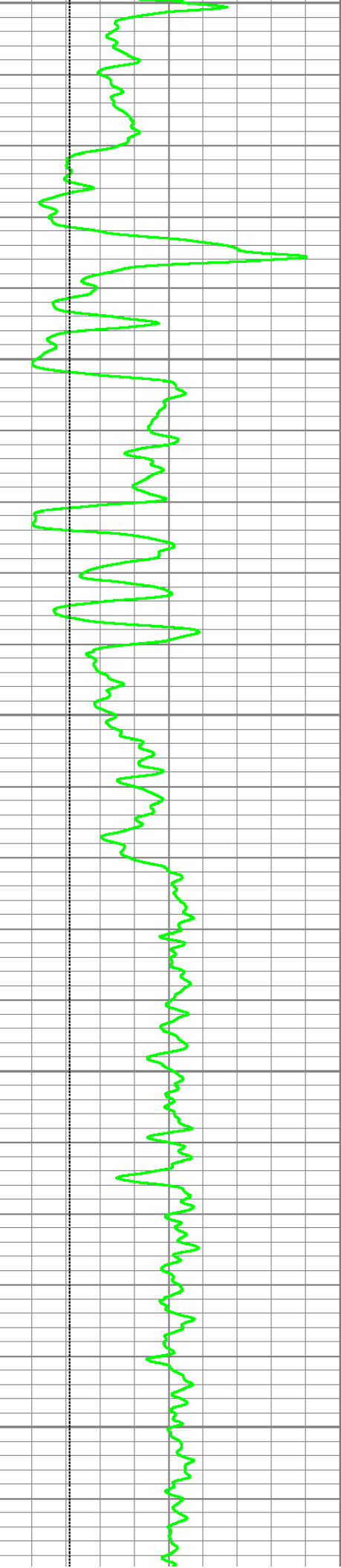
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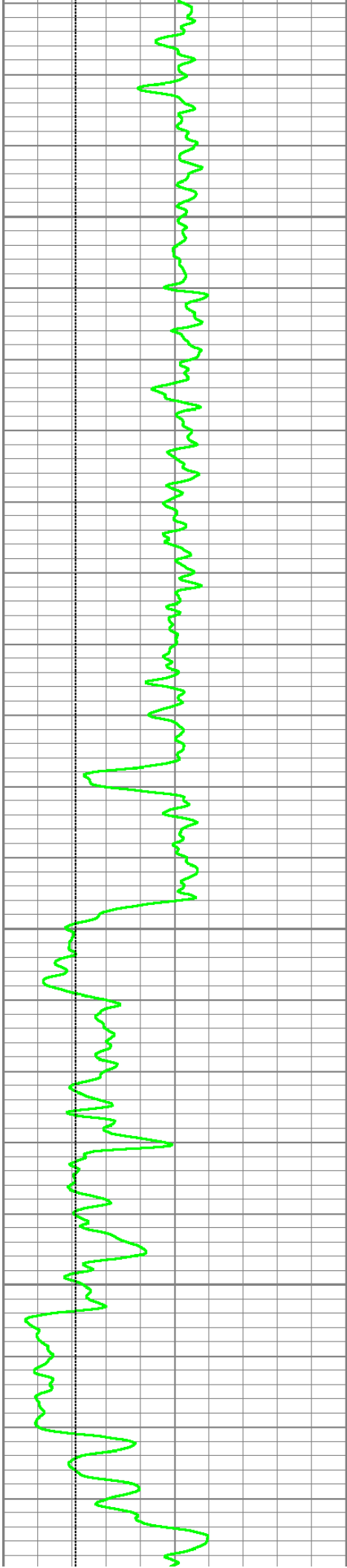
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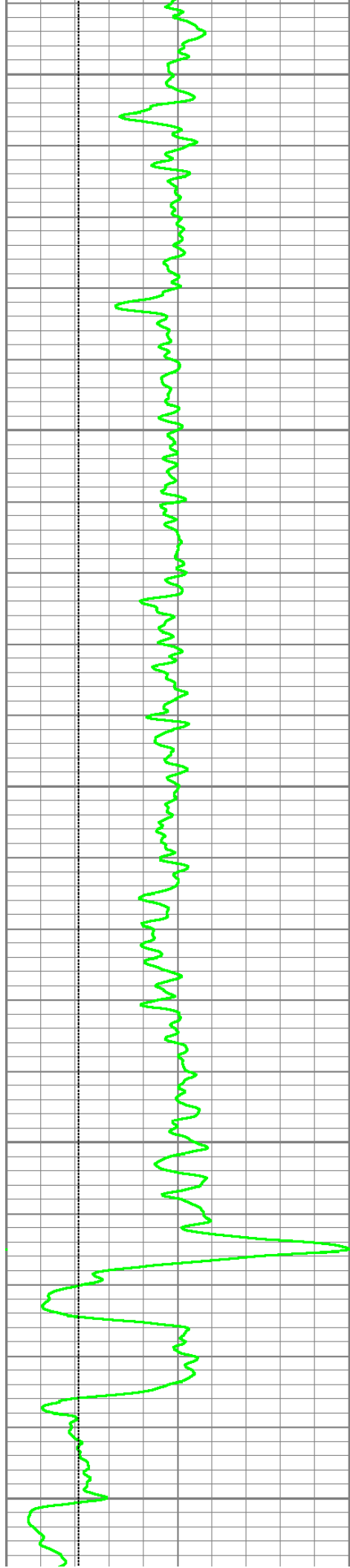


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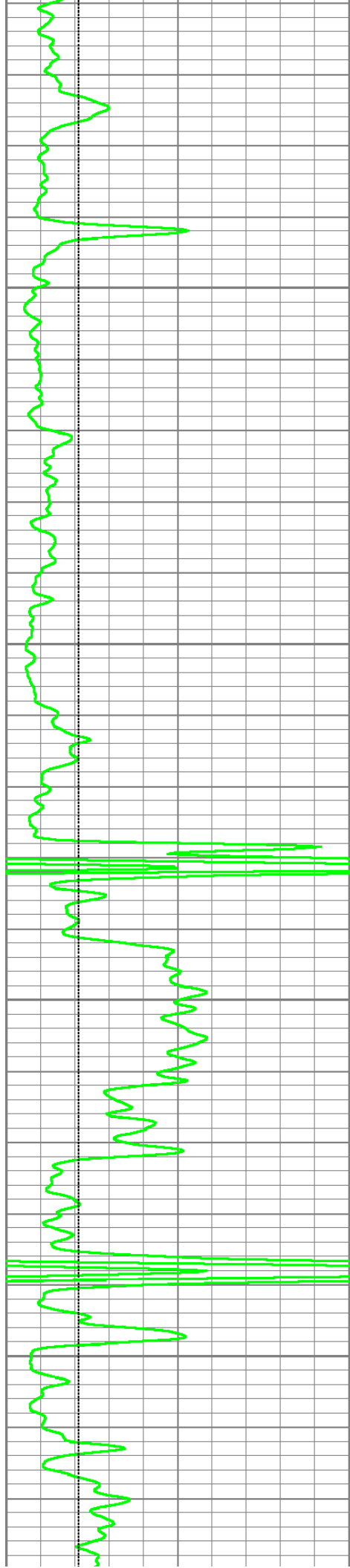
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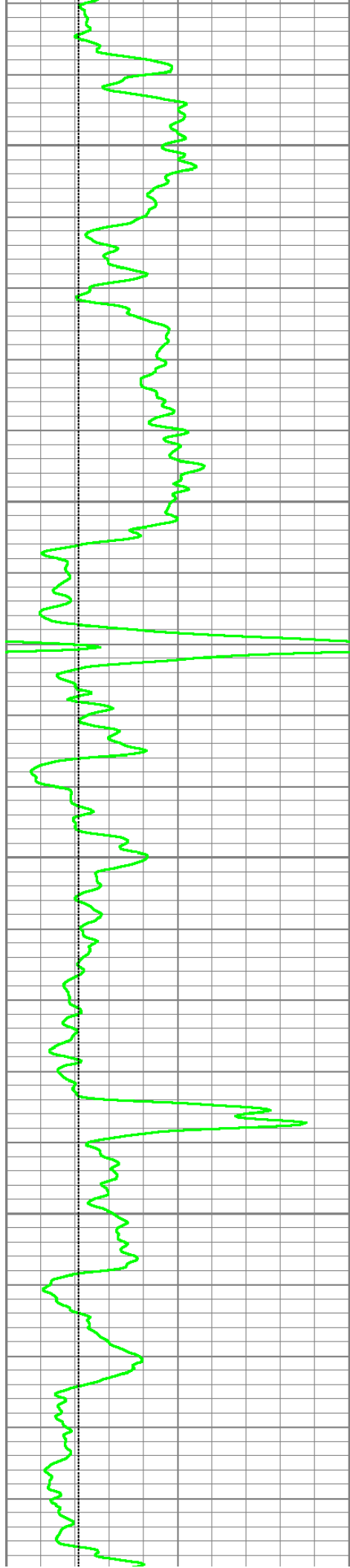


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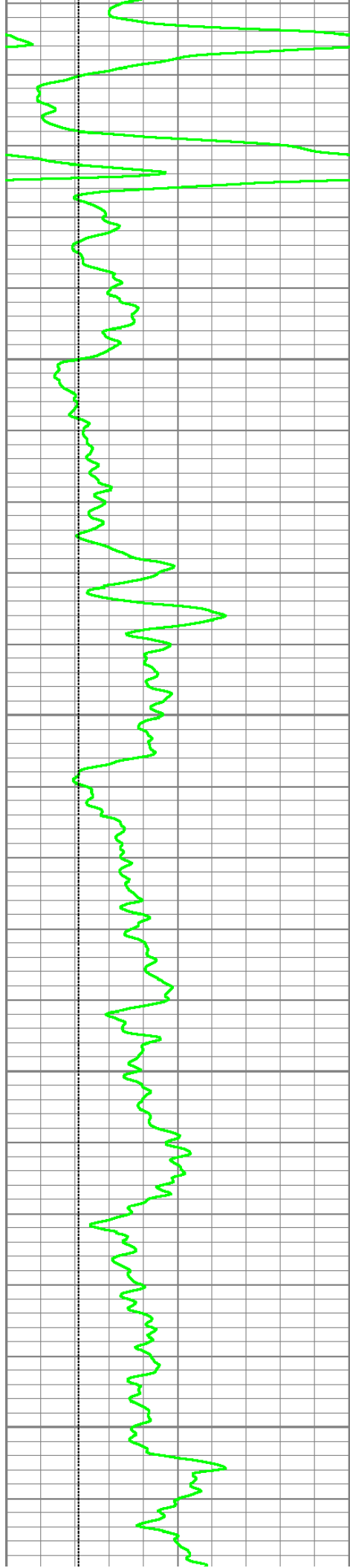
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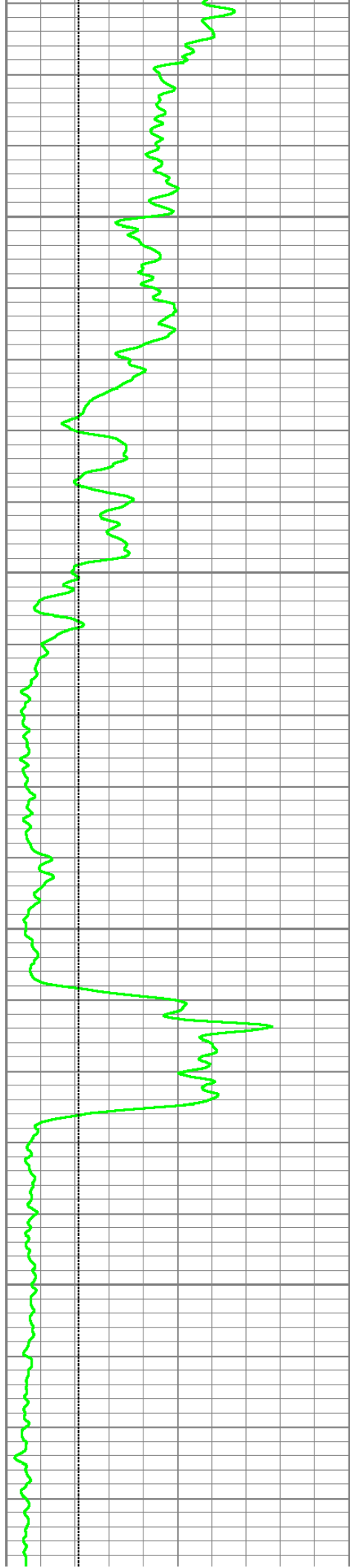
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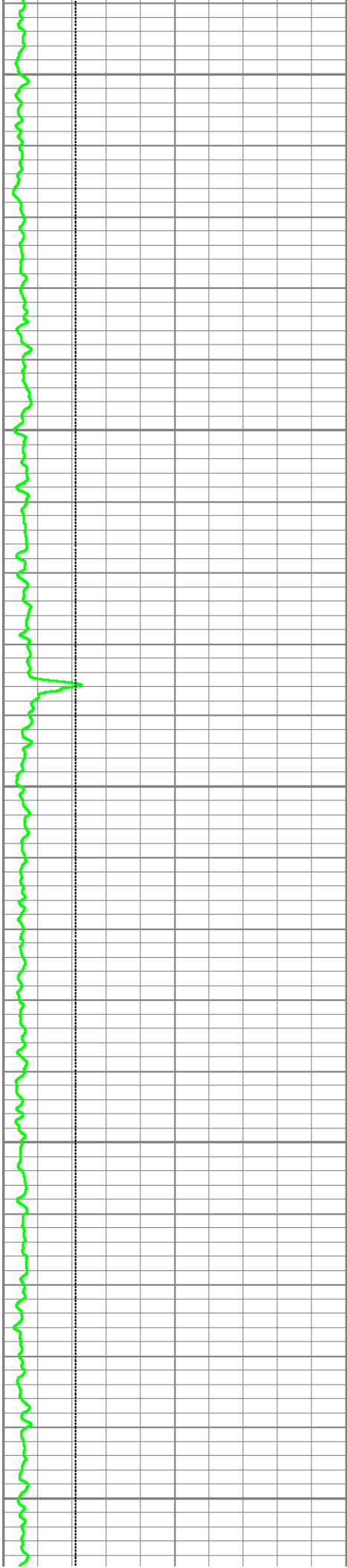


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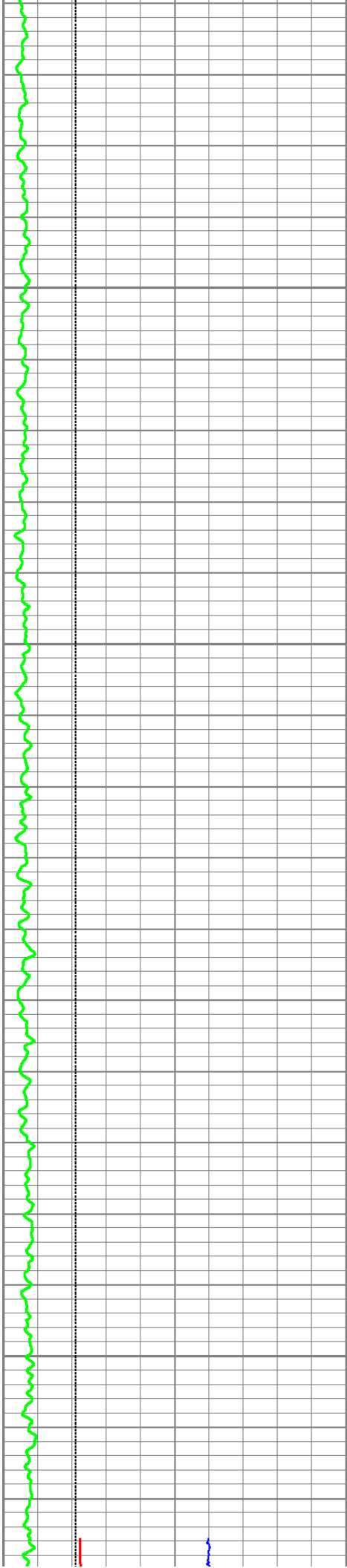
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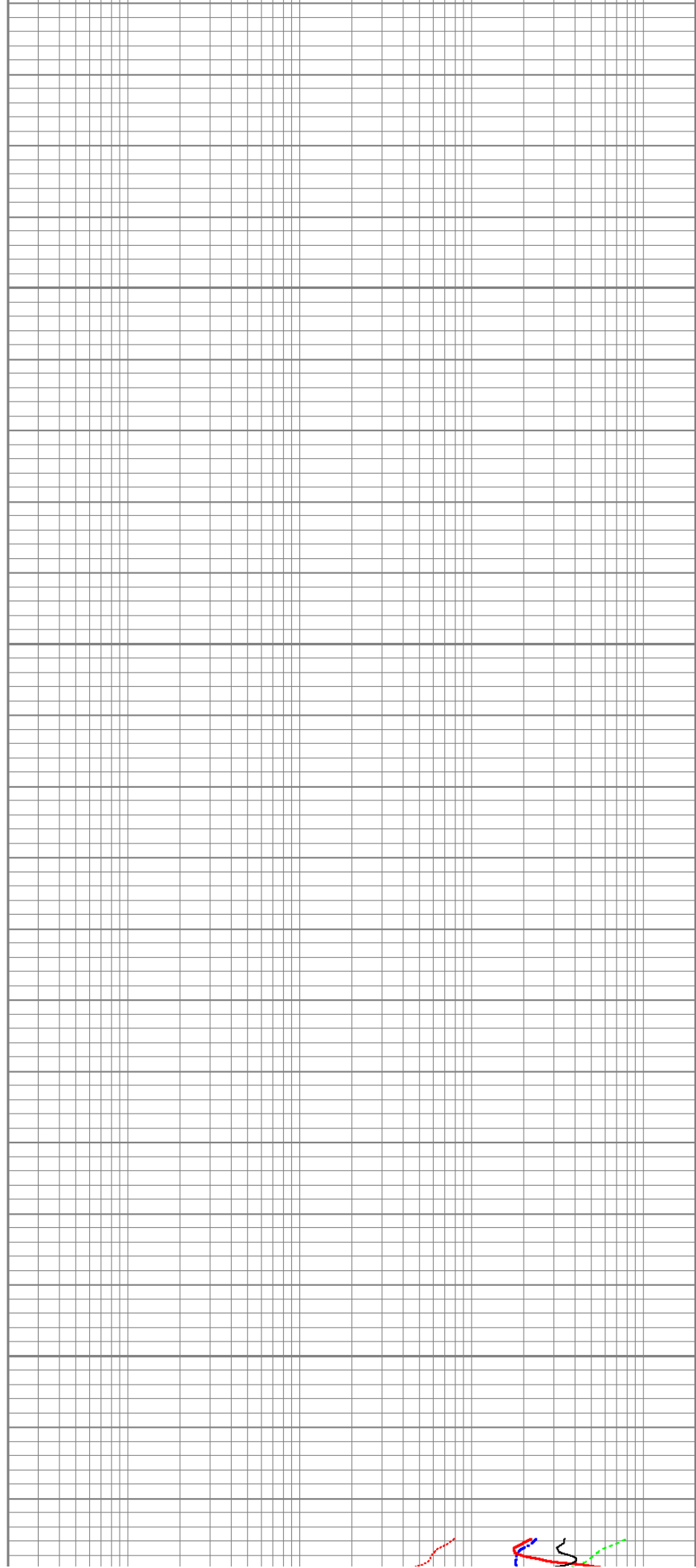


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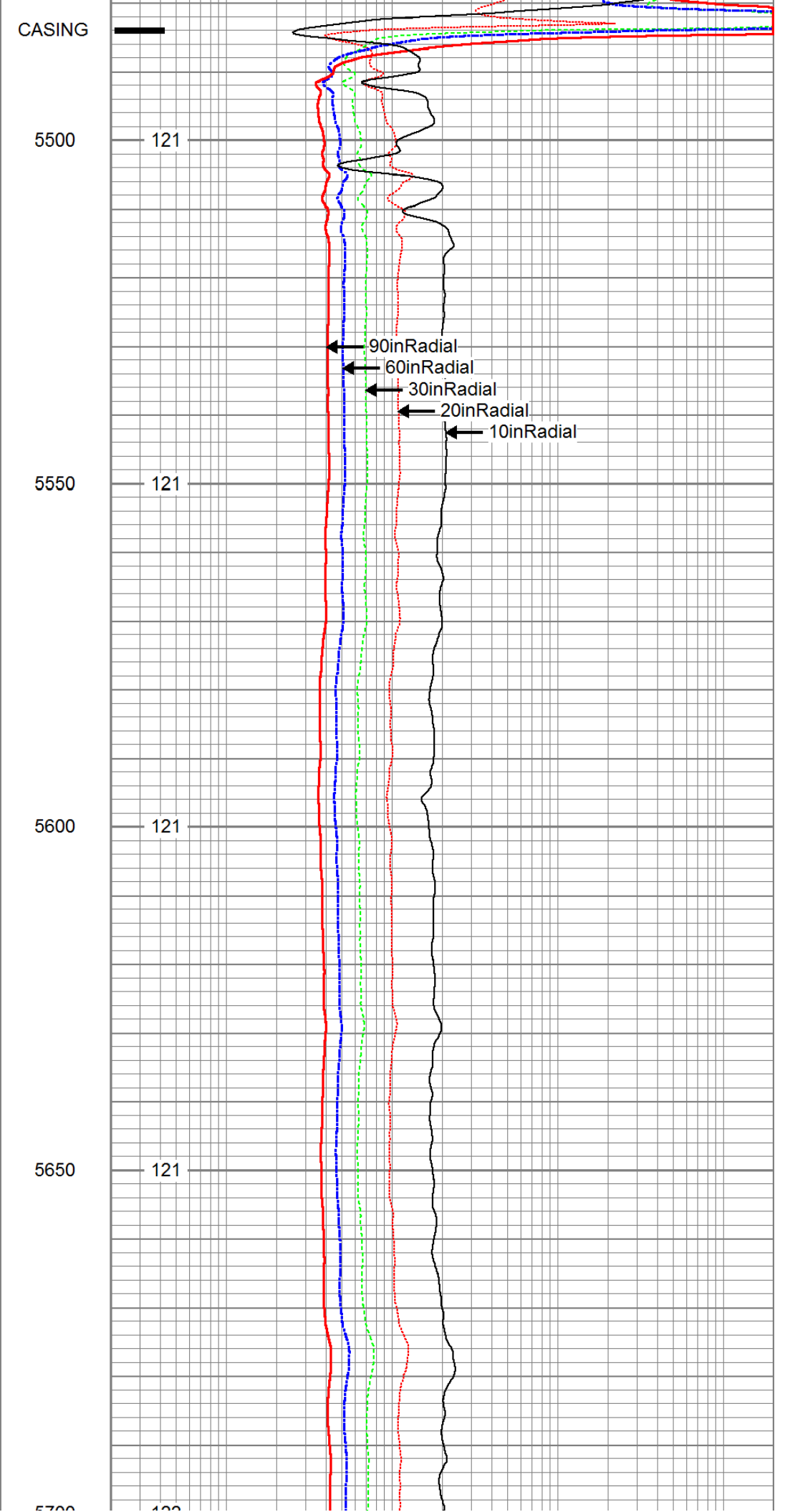
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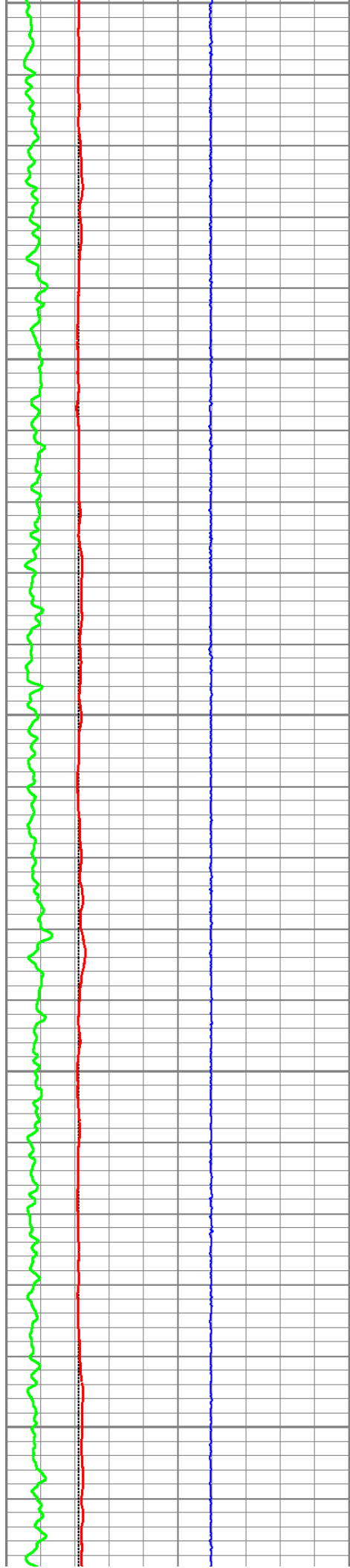
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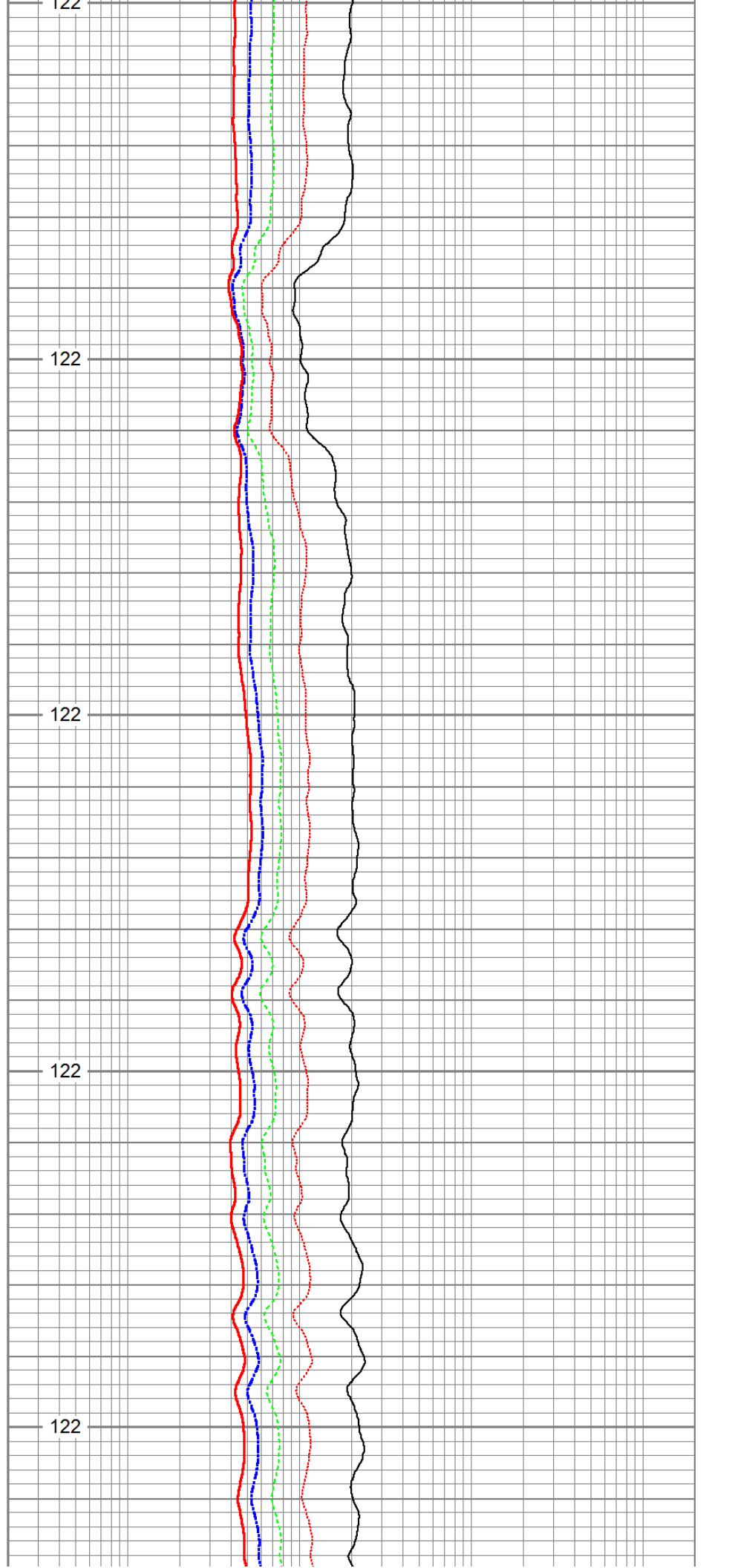
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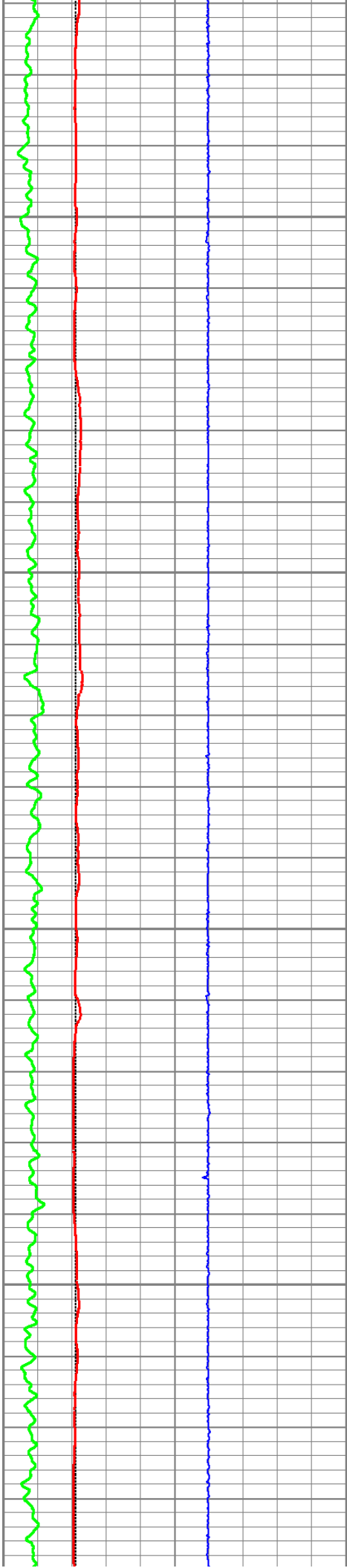
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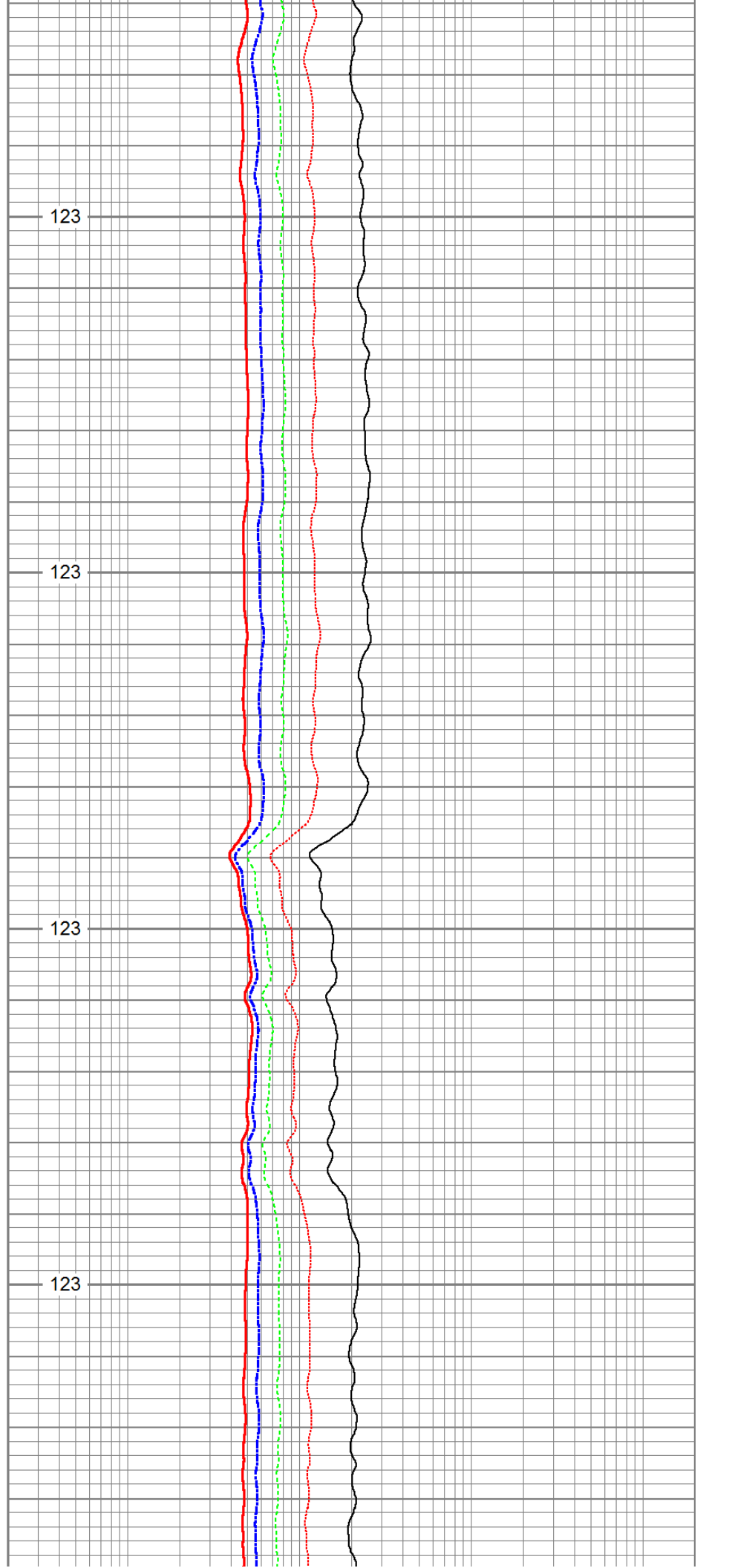
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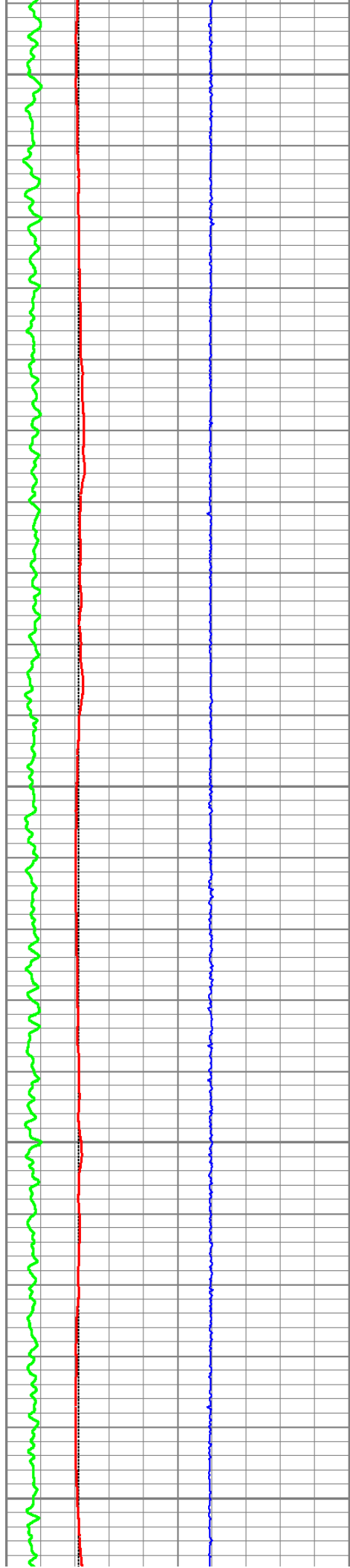
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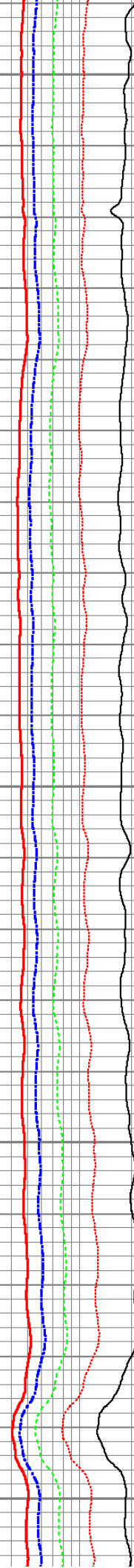
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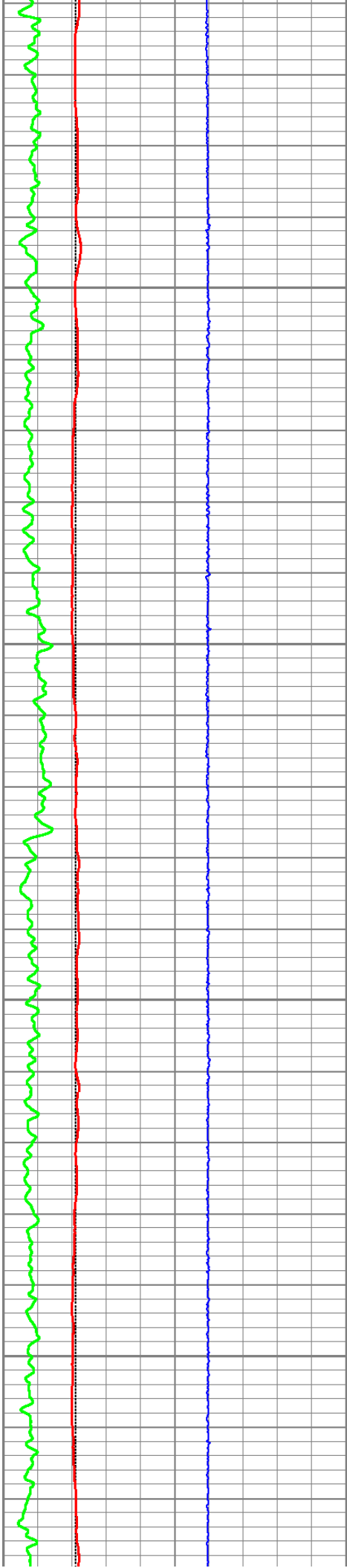
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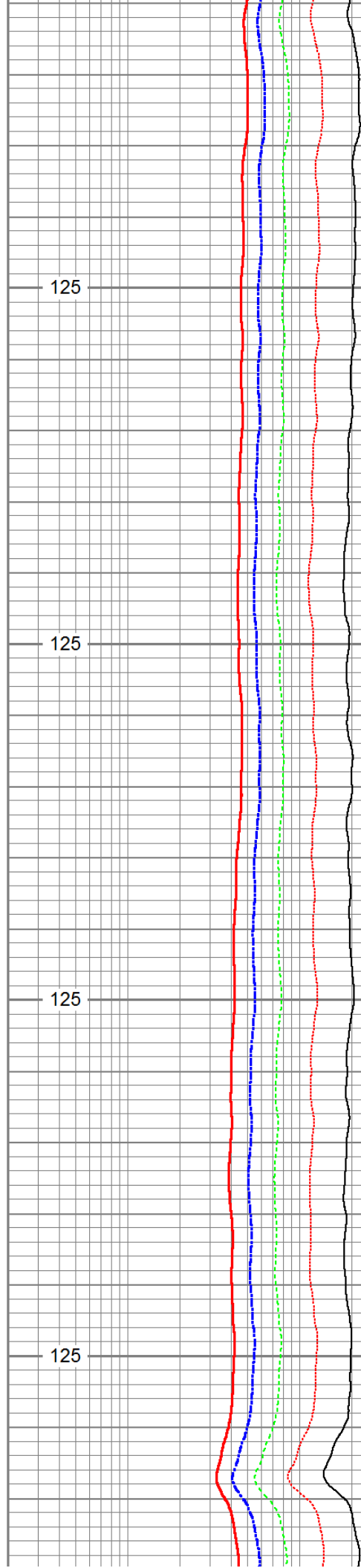
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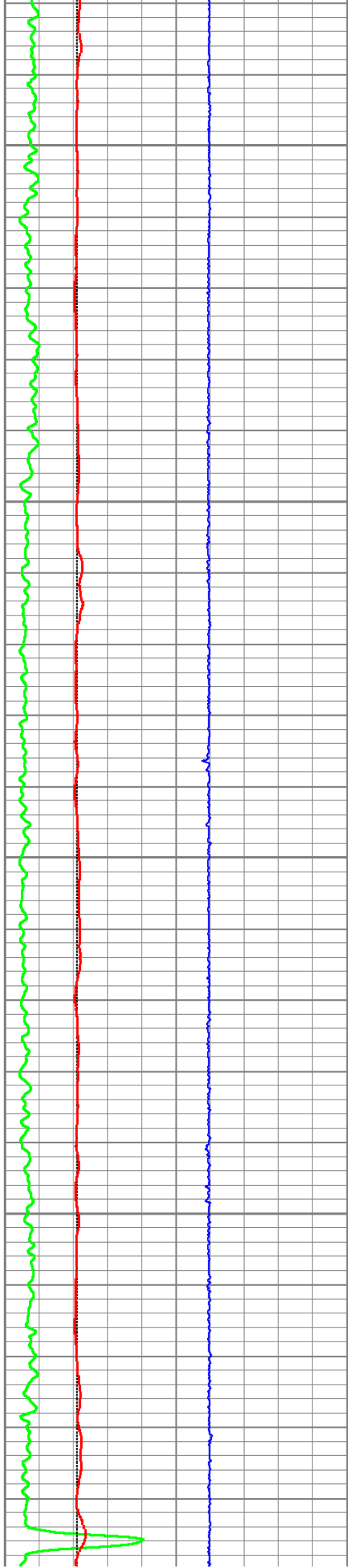
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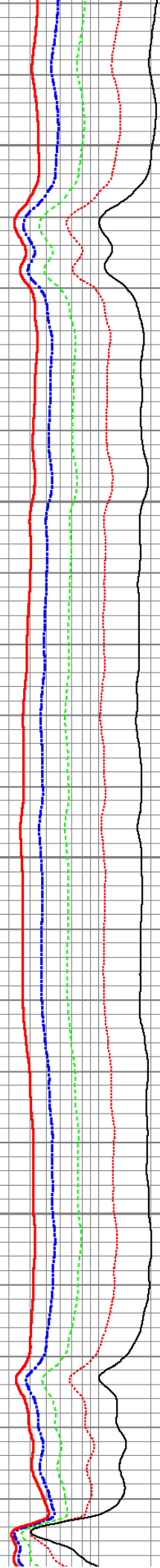
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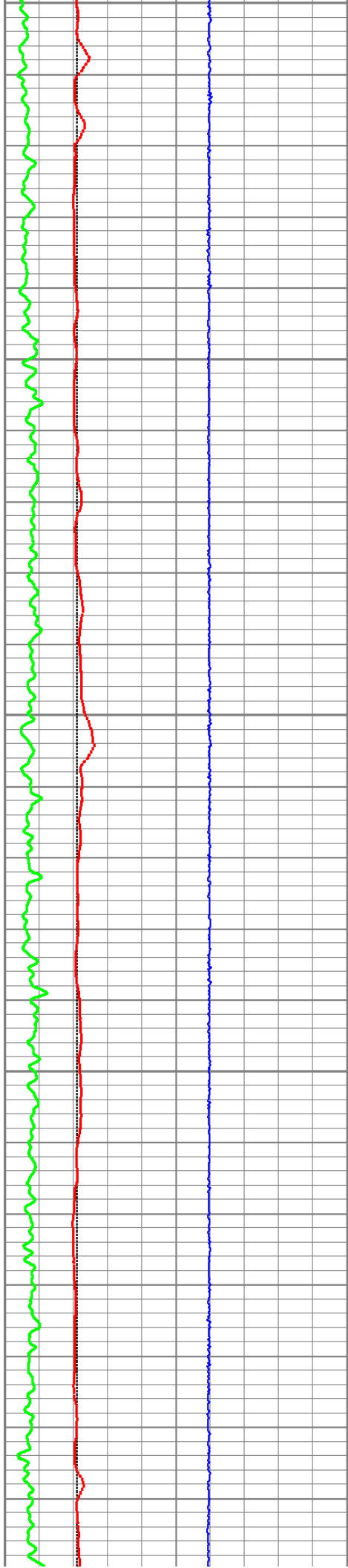
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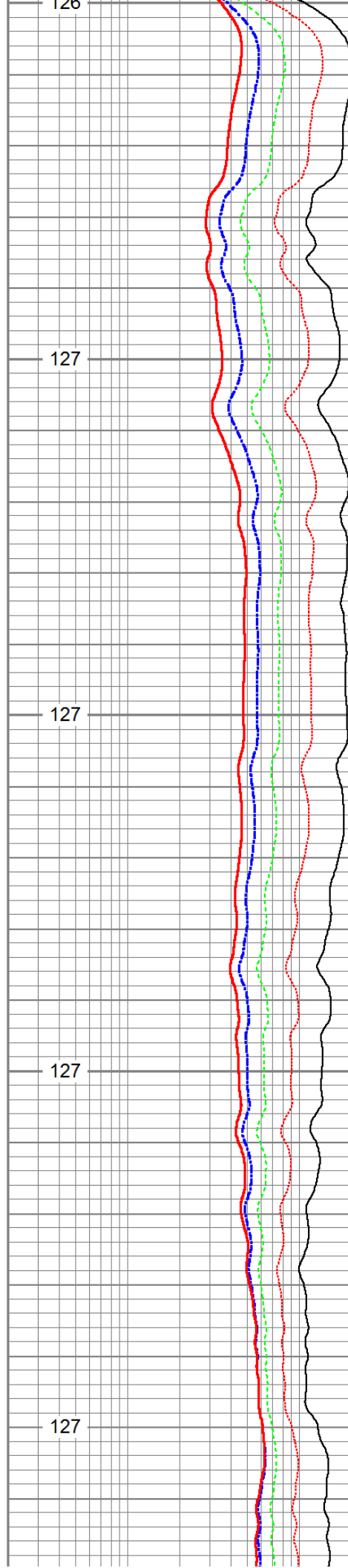
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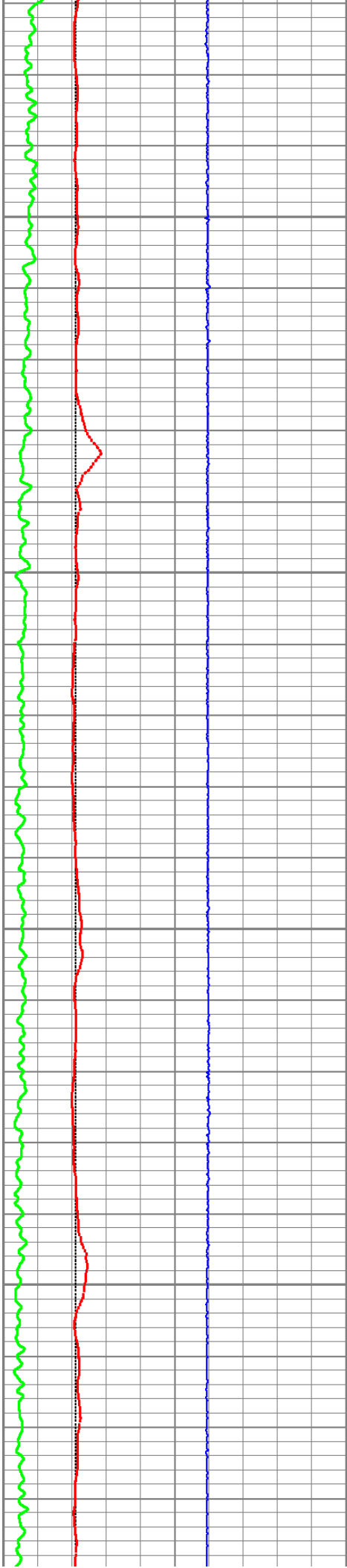
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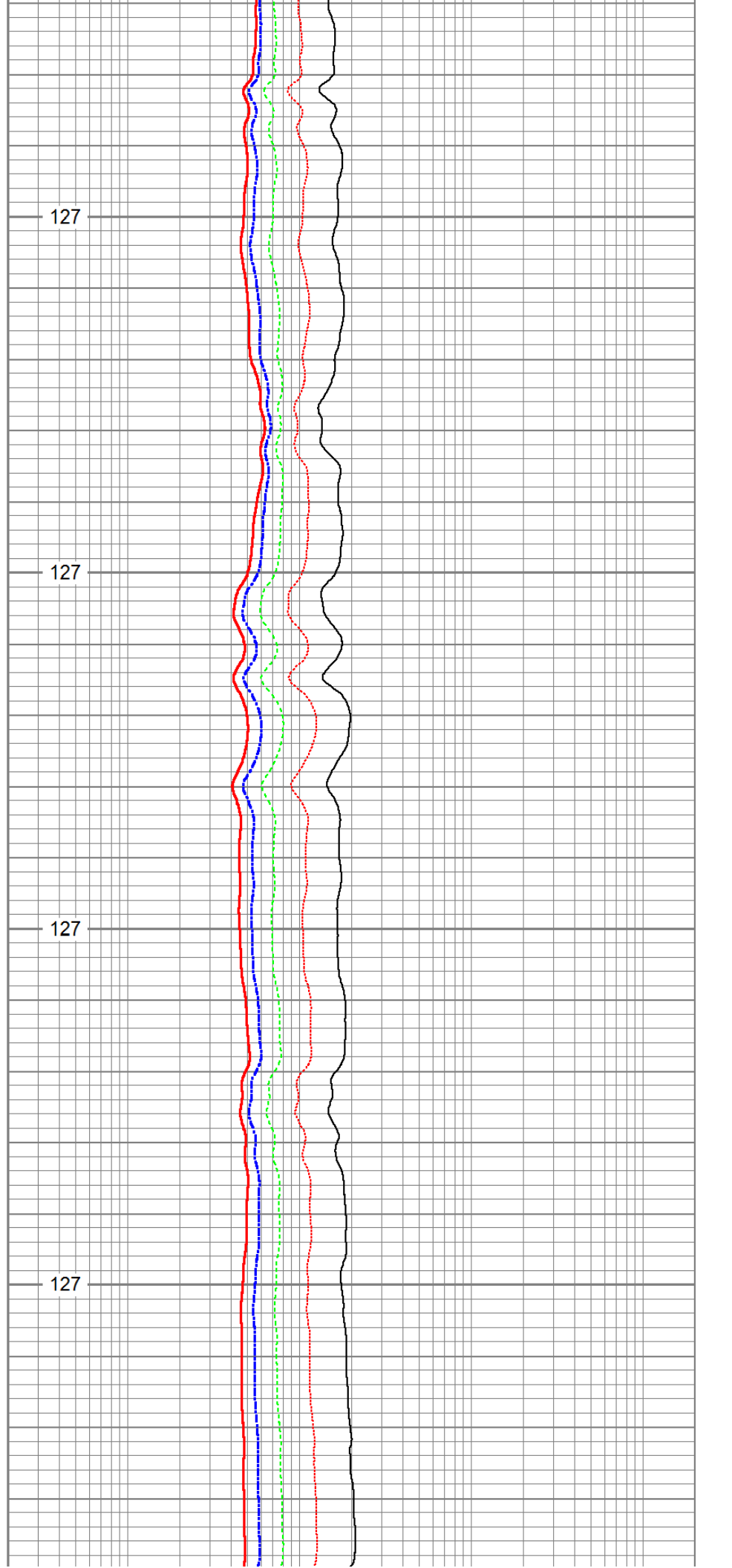
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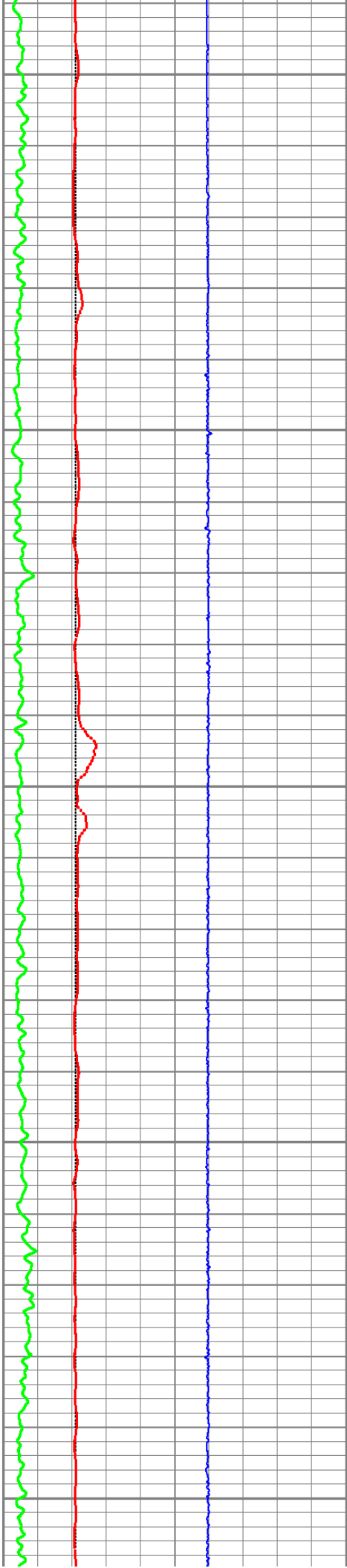
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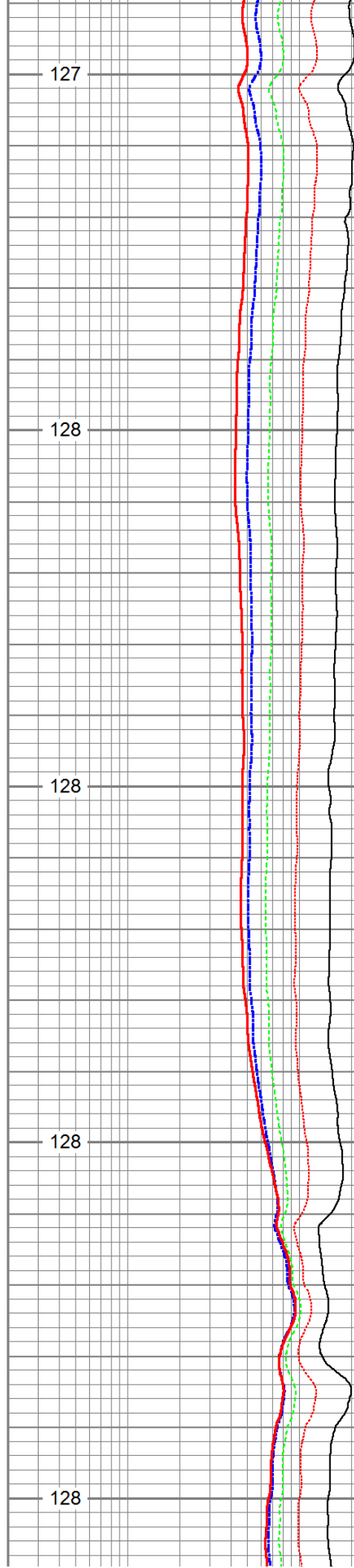
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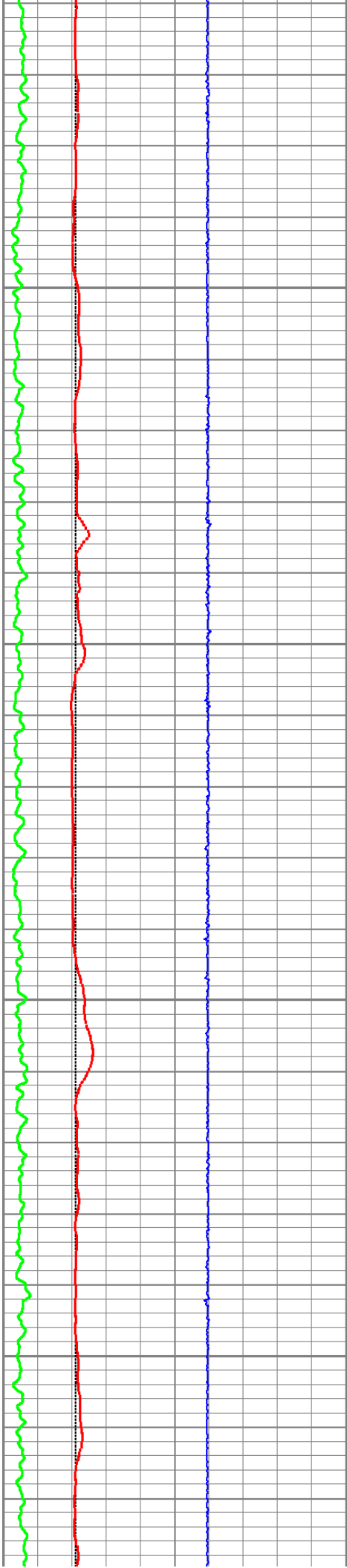
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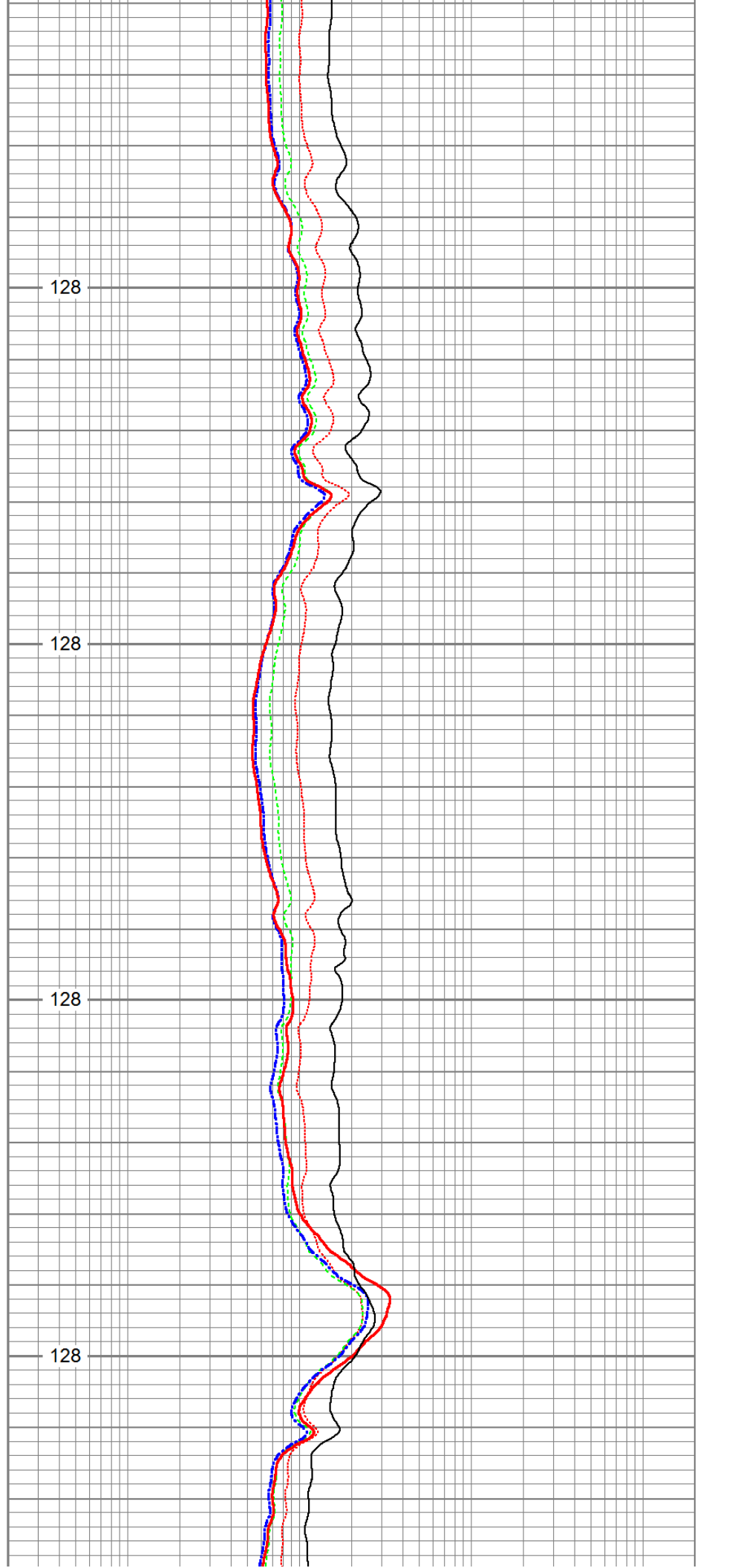
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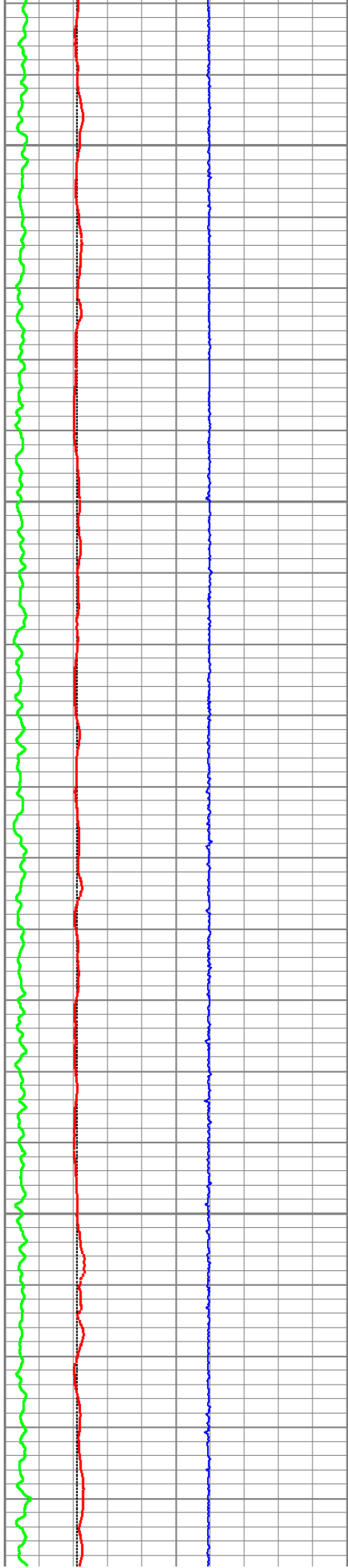
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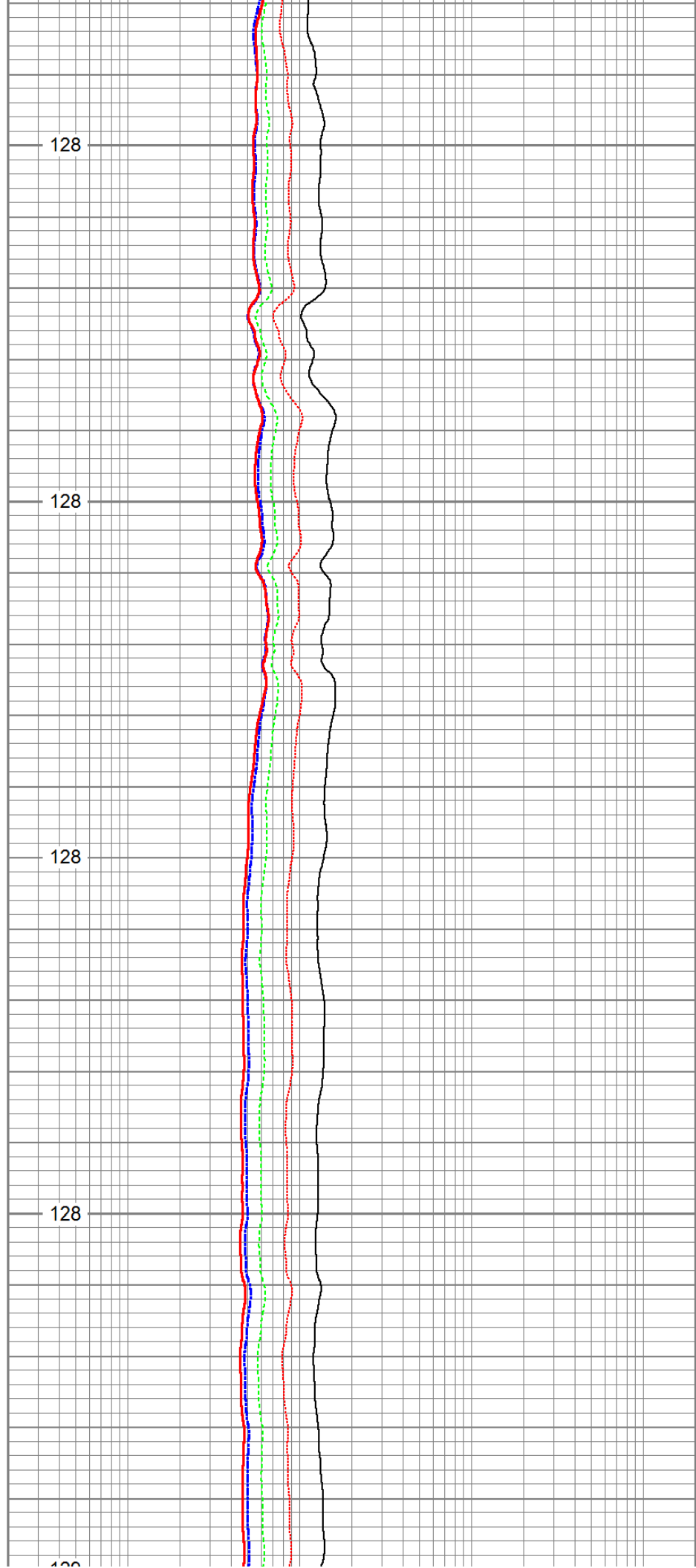
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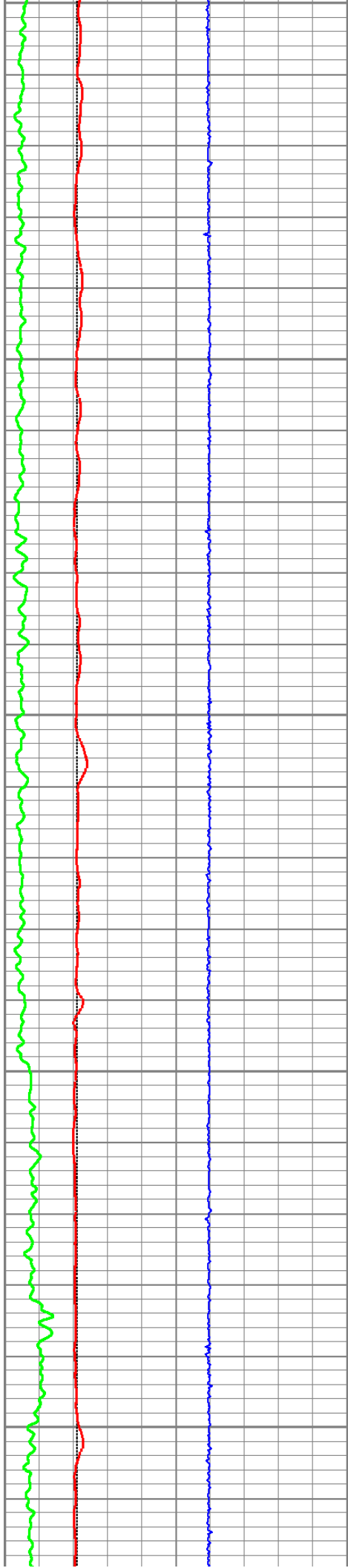
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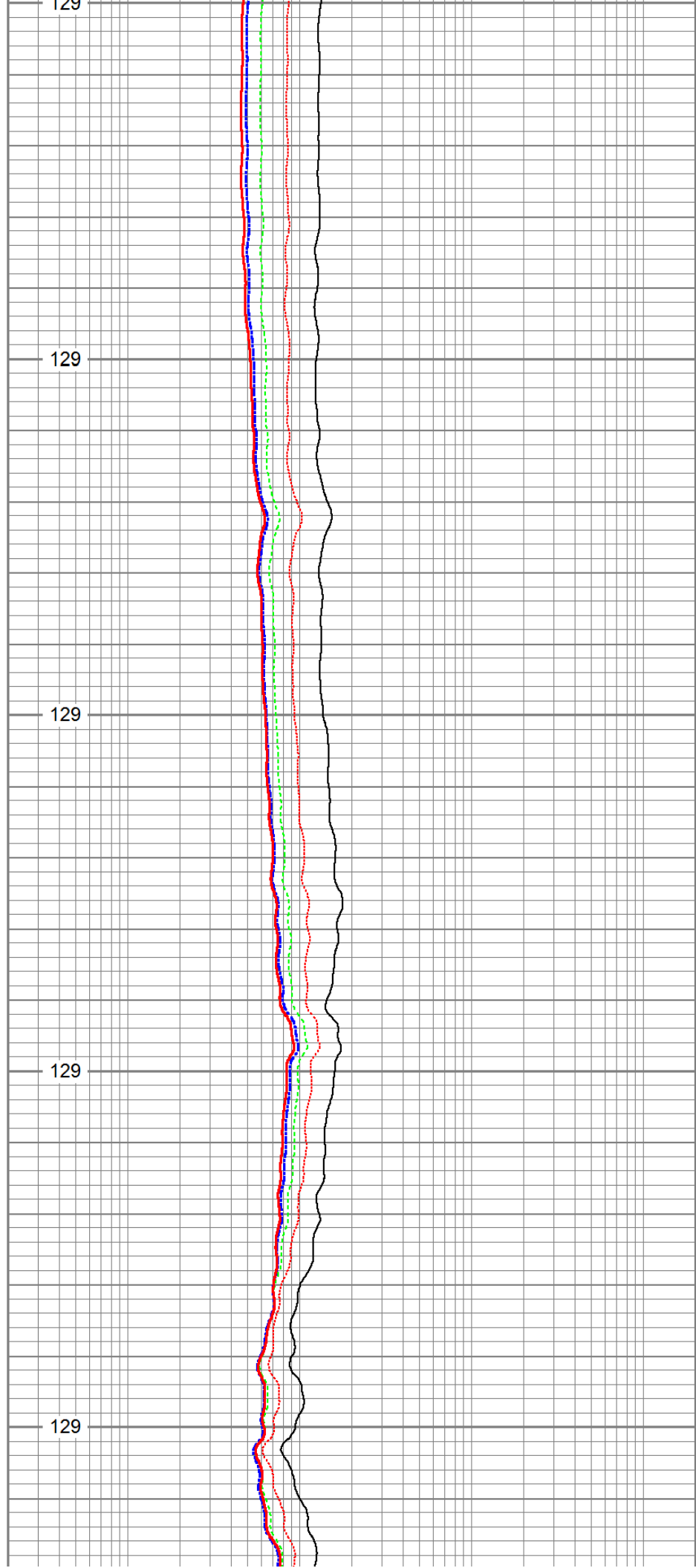
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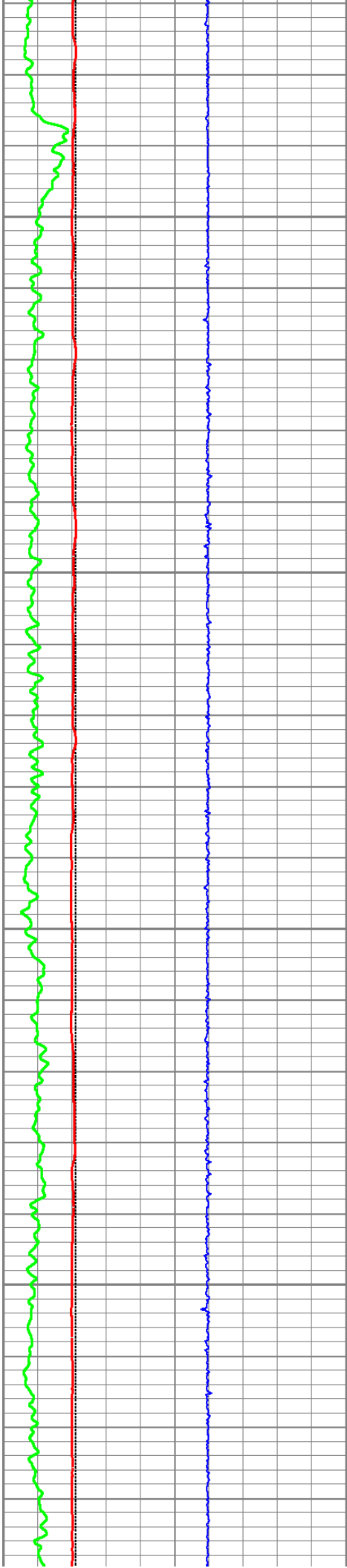
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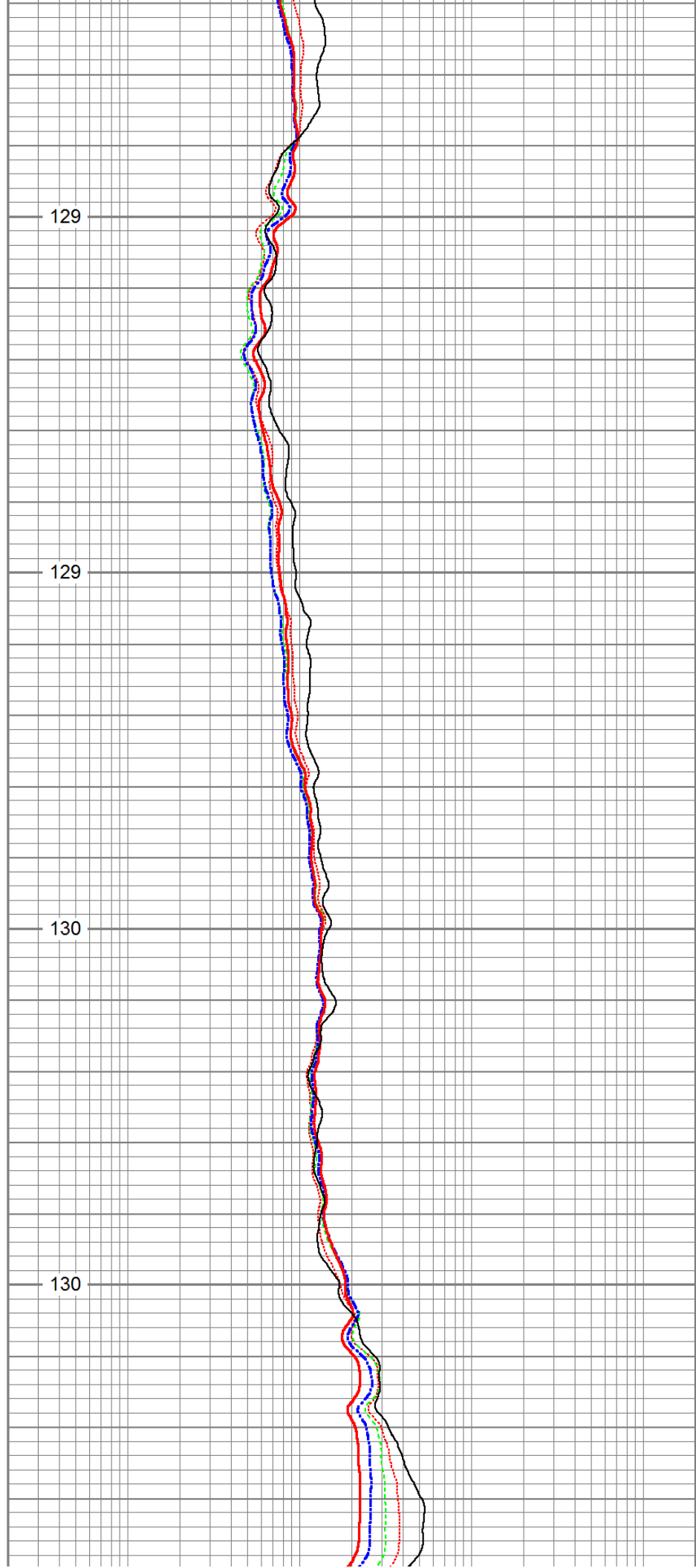
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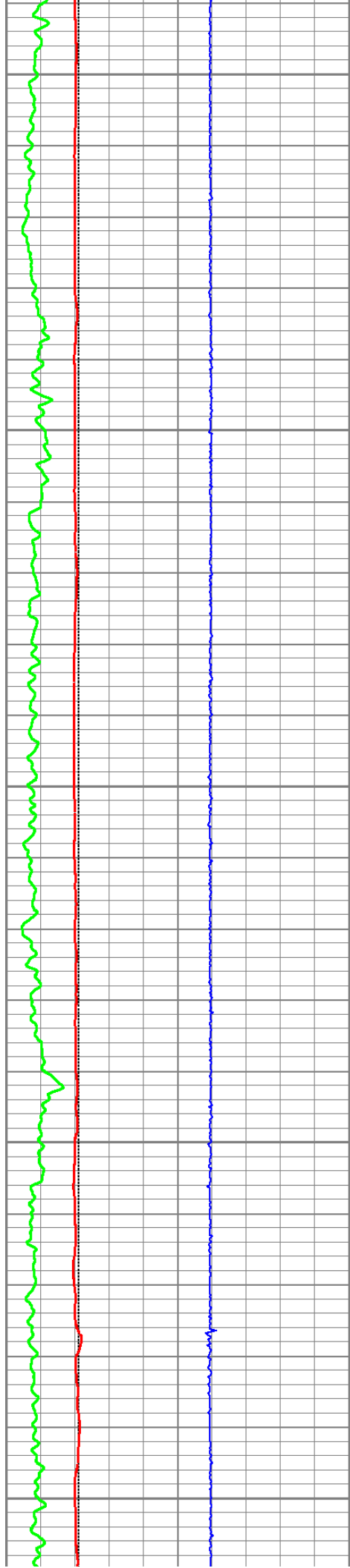
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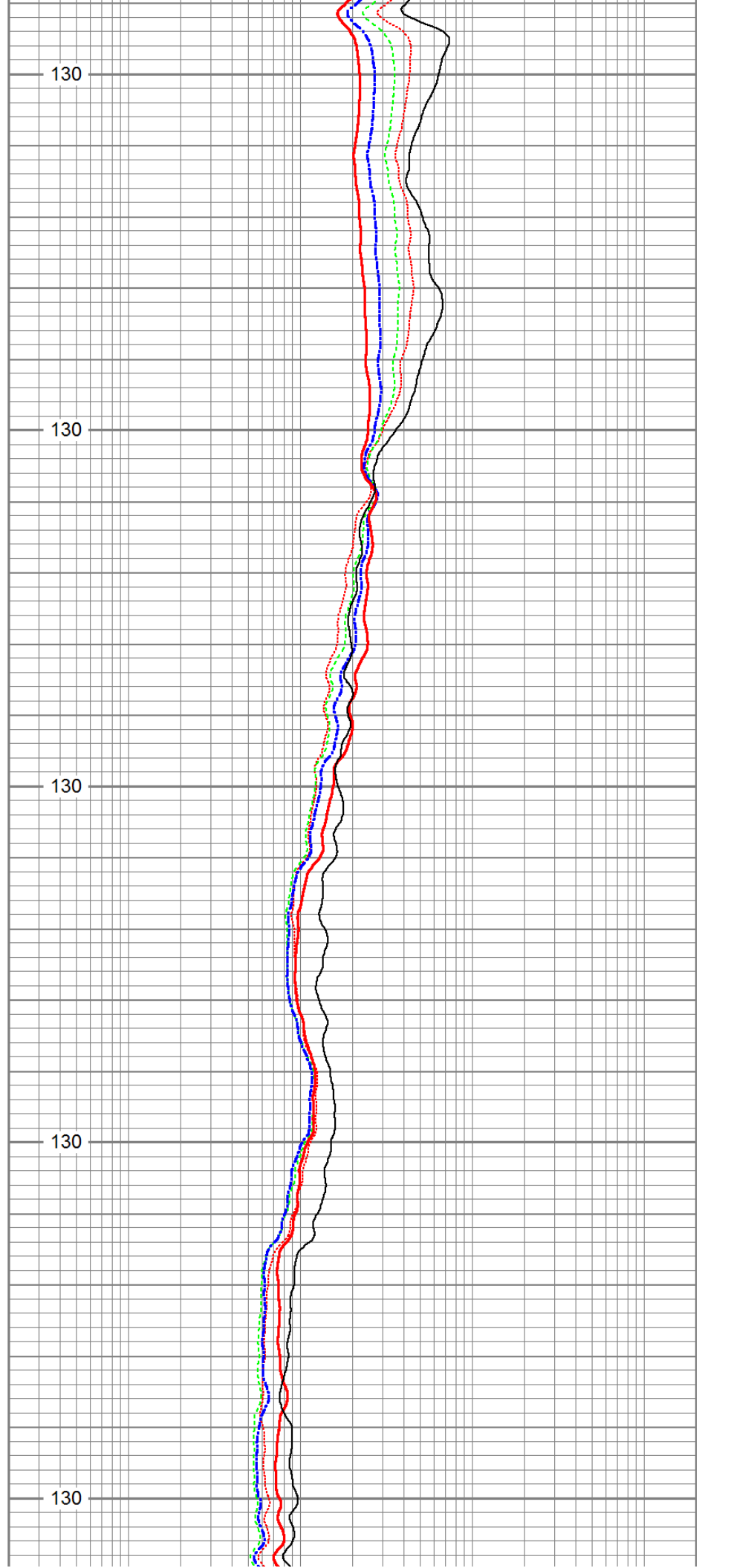
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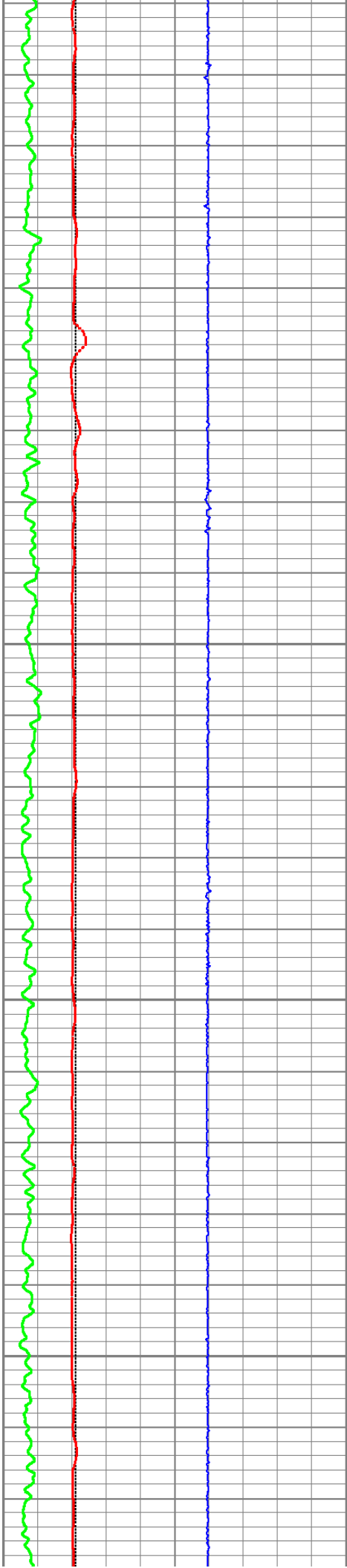
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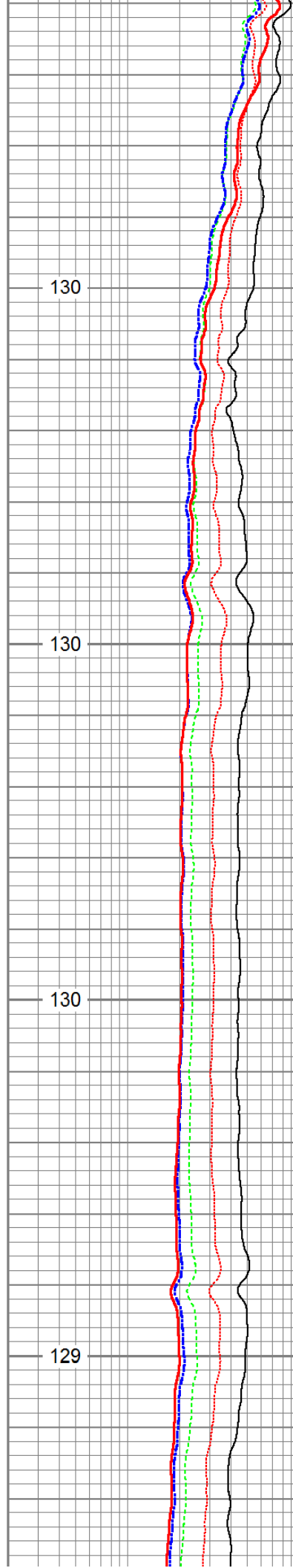
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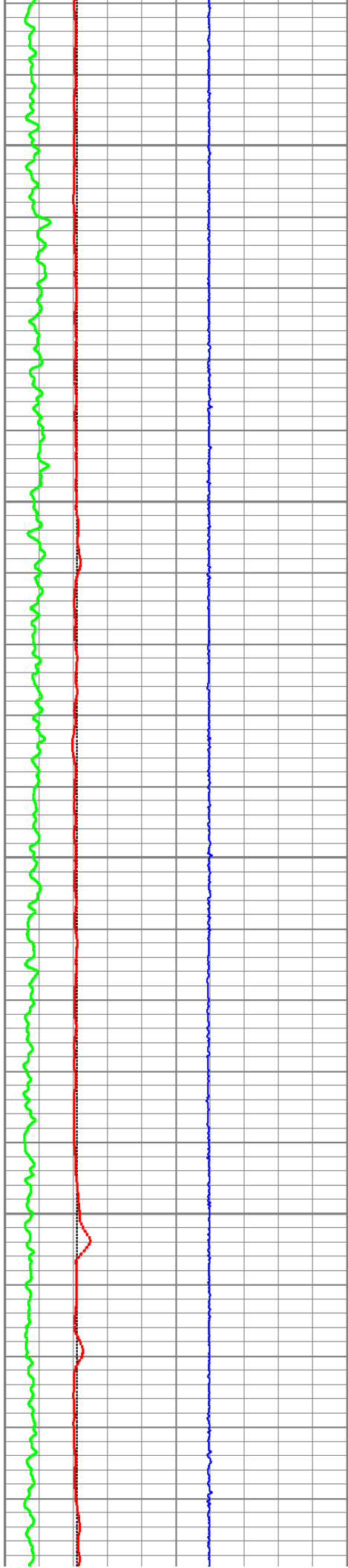
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129

8900

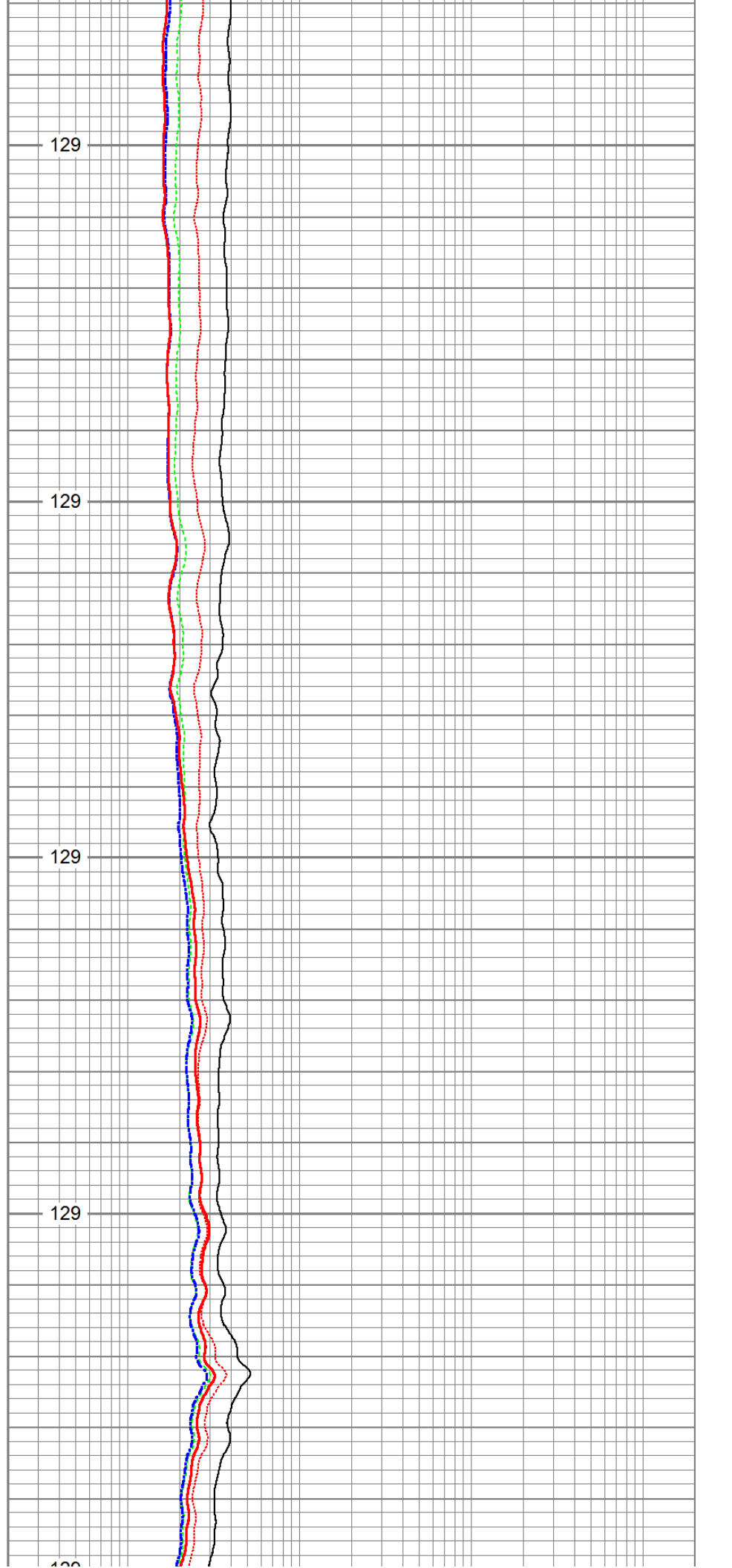
129

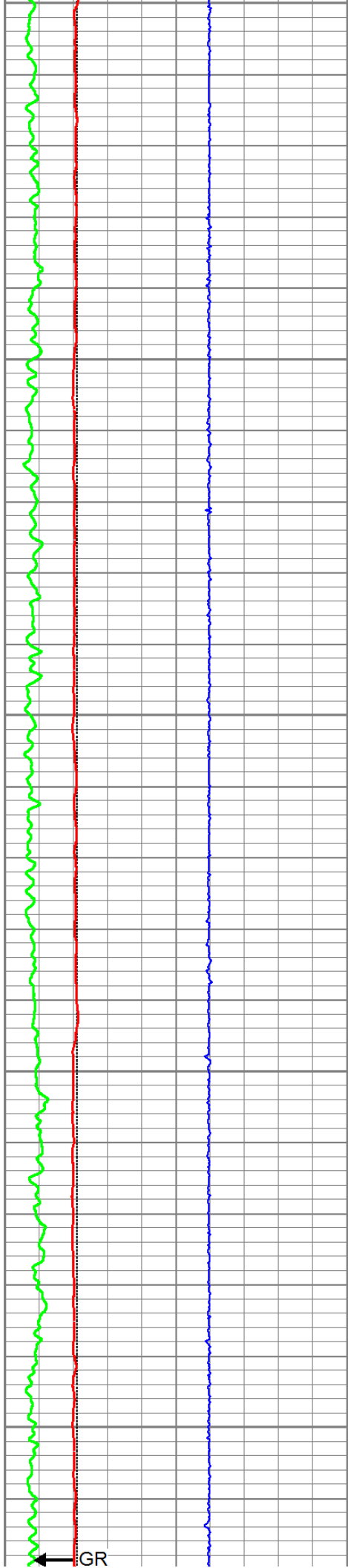
8950

129

9000

130





9000

9050

9100

9150

9200

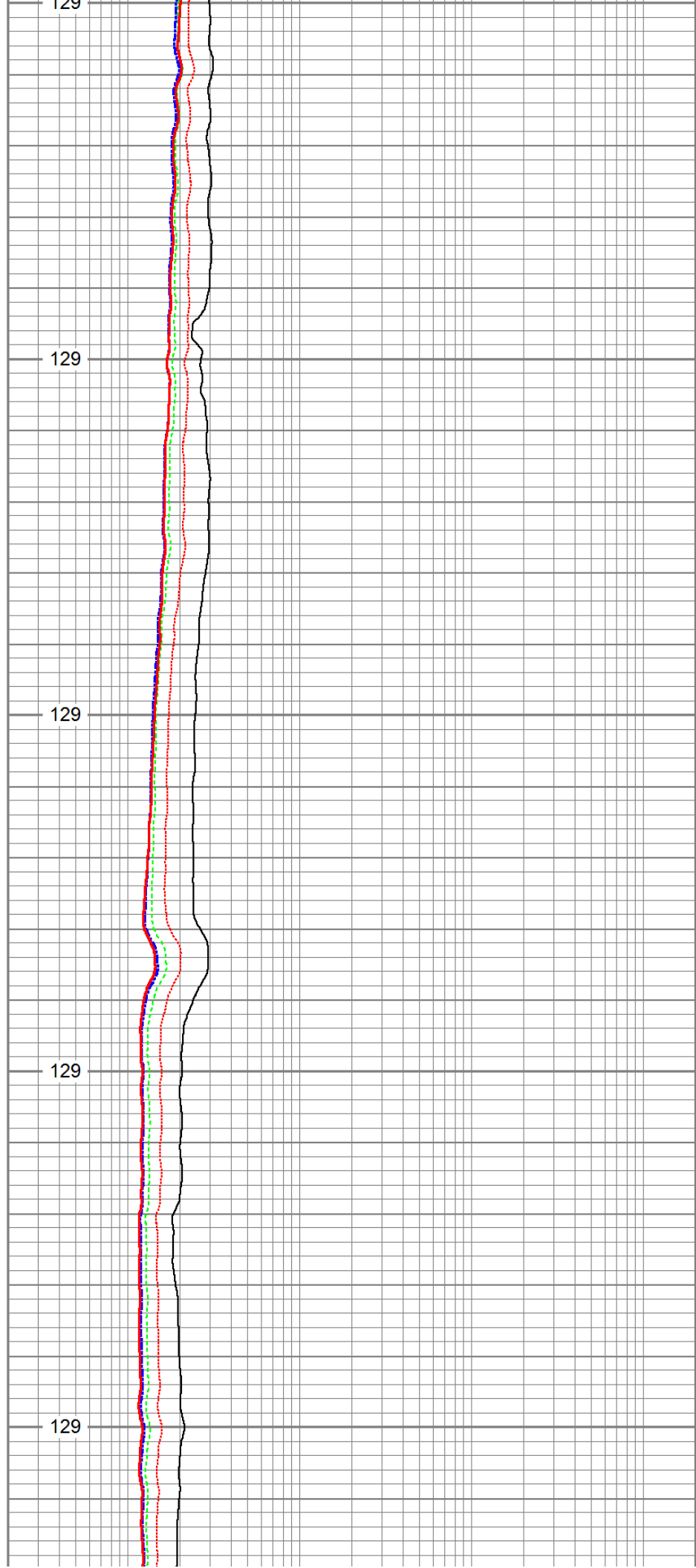
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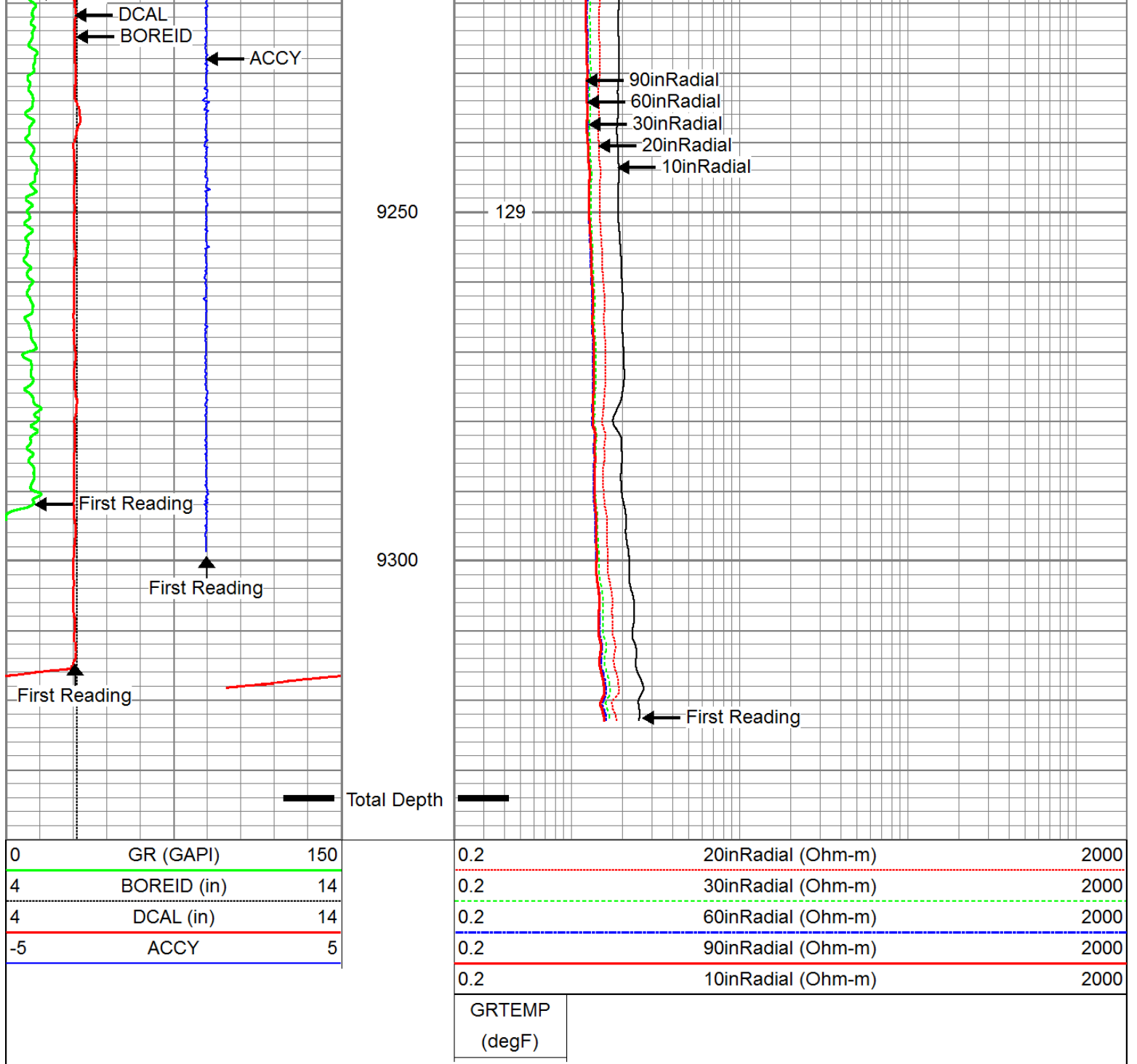
129

129

129

129





## Log Variables

Database: c:\users\t010\desktop\4j\_ranch\_3408\_3-33h\sandridge\_4j\_ranch\_mem2.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?
129	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	4
MudWgt lb/gal	NPORSEL	PEBHC?	PERFS	RESTMP SRC	SO in	SRFTEMP degF

4	Limestone	YES	0	INTERNAL	0.5	65
SZCOR	TDEPTH ft	TMPCOR	TOOLPOS			
On	9352	On	Free			

Calibration Report

Database File: c:\users\t010\desktop\4j ranch 3408 3-33h\sandridge 4j ranch mem2.db  
Dataset Pathname: proc1/pass1.2  
Dataset Creation: Thu Jun 27 14:17:51 2013

ThruBit Induction Calibration Report

Tool Model-Serial Number: PS-PS31R  
Shop Calibration Performed: Wed Jun 19 10:12:58 2013

BASELINE

	R	Expected	X	Expected
Freq 1				
A1	-462.1450	[-500.00, -400.00]	-12.6076	[-500.00, 500.00]
A2	-145.2930	[-180.00, -100.00]	147.4280	[-500.00, 500.00]
A3	-27.9186	[-50.00, -10.00]	-96.7329	[-500.00, 500.00]
A4	-15.6632	[-30.00, -10.00]	273.6140	[-500.00, 500.00]
A5	-14.4051	[-30.00, -10.00]	108.6260	[-500.00, 500.00]
Freq 2				
A1	-244.4100	[-280.00, -180.00]	-39.3764	[-500.00, 500.00]
A2	-93.6198	[-130.00, -50.00]	69.2823	[-500.00, 500.00]
A3	-20.1718	[-50.00, -10.00]	-114.3700	[-500.00, 500.00]
A4	-19.1041	[-30.00, -10.00]	96.8636	[-500.00, 500.00]
A5	-18.5044	[-30.00, -10.00]	-19.7682	[-500.00, 500.00]
Freq 3				
A1	-153.1930	[-180.00, -80.00]	-99.5953	[-500.00, 500.00]
A2	-70.9510	[-130.00, -30.00]	10.9301	[-500.00, 500.00]
A3	-16.1377	[-50.00, -10.00]	-140.2860	[-500.00, 500.00]
A4	-20.2900	[-30.00, -10.00]	-17.1267	[-500.00, 500.00]
A5	-21.5769	[-30.00, -10.00]	-112.3690	[-500.00, 500.00]
Freq 4				
A1	-86.8059	[-120.00, -40.00]	-220.8280	[-500.00, 500.00]
A2	-52.8721	[-110.00, -10.00]	-77.4492	[-500.00, 500.00]
A3	-12.6785	[-50.00, -10.00]	-200.4370	[-500.00, 500.00]
A4	-24.5917	[-30.00, -10.00]	-187.7310	[-500.00, 500.00]
A5	-28.6308	[-30.00, -10.00]	-278.2820	[-500.00, 500.00]

CALIBRATION COEFFICIENTS

	R	Expected	X	Expected
Freq 1				
A1	0.9955	[0.95, 1.05]	-0.0055	[-0.05, 0.05]
A2	0.9870	[0.95, 1.05]	0.0017	[-0.05, 0.05]
A3	1.0035	[0.95, 1.05]	-0.0062	[-0.05, 0.05]
A4	0.9858	[0.95, 1.05]	0.0048	[-0.05, 0.05]
A5	0.9959	[0.95, 1.05]	0.0002	[-0.05, 0.05]
Freq 2				
A1	0.9909	[0.95, 1.05]	-0.0118	[-0.05, 0.05]
A2	0.9822	[0.95, 1.05]	-0.0065	[-0.05, 0.05]
A3	0.9922	[0.95, 1.05]	0.0070	[-0.05, 0.05]
A4	0.9870	[0.95, 1.05]	0.0017	[-0.05, 0.05]
A5	0.9959	[0.95, 1.05]	0.0002	[-0.05, 0.05]

A3	0.9928	[0.95, 1.05]	-0.0072	[-0.05, 0.05]
A4	0.9816	[0.95, 1.05]	-0.0033	[-0.05, 0.05]
A5	0.9930	[0.95, 1.05]	-0.0096	[-0.05, 0.05]
Freq 3				
A1	0.9960	[0.95, 1.05]	-0.0068	[-0.05, 0.05]
A2	0.9876	[0.95, 1.05]	-0.0027	[-0.05, 0.05]
A3	0.9980	[0.95, 1.05]	-0.0033	[-0.05, 0.05]
A4	0.9854	[0.95, 1.05]	0.0004	[-0.05, 0.05]
A5	0.9992	[0.95, 1.05]	-0.0064	[-0.05, 0.05]
Freq 4				
A1	0.9863	[0.95, 1.05]	0.0060	[-0.05, 0.05]
A2	0.9778	[0.95, 1.05]	0.0087	[-0.05, 0.05]
A3	0.9904	[0.95, 1.05]	0.0061	[-0.05, 0.05]
A4	0.9748	[0.95, 1.05]	0.0121	[-0.05, 0.05]
A5	0.9980	[0.95, 1.05]	0.0021	[-0.05, 0.05]
Temperature	36.1191 degC			

### ThruBit Density Calibration Report

Tool Model-Serial Number: PS-PS52D  
 Source Number:  
 Shop Calibration Performed: Thu Jun 20 09:21:33 2013

#### REFERENCE

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

#### READINGS

Outputs	Counts	Units	Expected
SS1 Background	133.60	cps	[130.00, 170.00]
LS1 Background	132.62	cps	[130.00, 170.00]
LS4 Background	28.92	cps	[27.00, 35.00]
SS1 Aluminium	4711.53	cps	[4500.00, 5500.00]
LS1 Aluminium	845.31	cps	[750.00, 950.00]
LS4 Aluminium	987.34	cps	[843.00, 1068.00]
SS1 Magnesium	7824.88	cps	[7000.00, 9000.00]
LS1 Magnesium	5546.57	cps	[5250.00, 6250.00]
LS1 Al + Fe	730.93	cps	[650.00, 800.00]
LS4 Al + Fe	440.28	cps	[382.00, 471.00]

#### RESULTS

SS Slope	1.65	[1.52, 1.77]
LS Slope	0.42	[0.38, 0.45]
PEF K Factor	5.270	[3.510, 6.170]
PEF B Factor	-0.517	[-0.700, -0.410]

Caliper Shop Calibration performed: Thu Jun 20 09:21:33 2013

#### RESULTS

Reference	Reading	Units
12.00	1894.46	in
9.00	2059.77	in
6.00	2208.49	in

0.00

2200.49

in

DENSITY PRE-SURVEY CHECK Performed:

Fri Jun 21 10:29:13 2013

Outputs	Counts	Units	Expected
SS1 Background	133.47	cps	[129.59, 137.61]
LS1 Background	133.19	cps	[128.64, 136.60]
LS4 Background	28.77	cps	[27.18, 30.65]

CALIPER PRE-SURVEY CHECK Performed:

Fri Jun 21 10:22:10 2013

Reference	Readings	Units	Expected
6.00	5.89	in	[5.80, 6.20]

Compensated Neutron Calibration Report

Tool Model-Serial Number: PS-PS35N  
 Source Number:  
 Calibration Tank Temperature: 79.9 degF  
 Shop Calibration Performed: Wed Jun 19 09:46:25 2013

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	2786.0	cps	
LS Counts	91.9	cps	
Tank Ratio Ref	30.9580	SS/LS	
Tank Ratio	30.3172	SS/LS	
Tank Ratio Gain	1.0211		[0.85, 1.15]

ALUMINUM SLEEVE REFERENCE

Outputs	Measured	Units	Expected
SS Counts	32700.6	cps	
LS Counts	2996.8	cps	
Al Ratio Ref	10.797	SS/LS	
Al Ratio	11.142	SS/LS	
Al Ratio Gain	0.97		[0.90, 1.10]
Sleeve Porosity	14.46	pu	

PRE-SURVEY BACKGROUND CHECK Performed:

Fri Jun 21 10:26:44 2013

Outputs	Measured	Units	Expected
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Outputs	Measured	Units	Expected
SS Counts	0.0	cps	<10
LS Counts	0.1	cps	<4

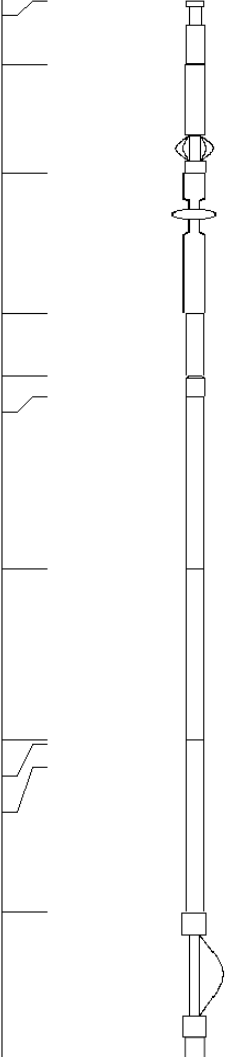
### Gamma Ray Calibration Report

Tool Model-Serial Number: PS-PS10T  
 Performed: Thu Jun 20 12:02:36 2013  
 Calibrator Value: 162.7 GAPI  
 Background Reading: 65.9 cps  
 Calibrator Reading: 472.7 cps  
 Sensitivity: 0.3750 GAPI/cps


### Inclinometer Calibration Report

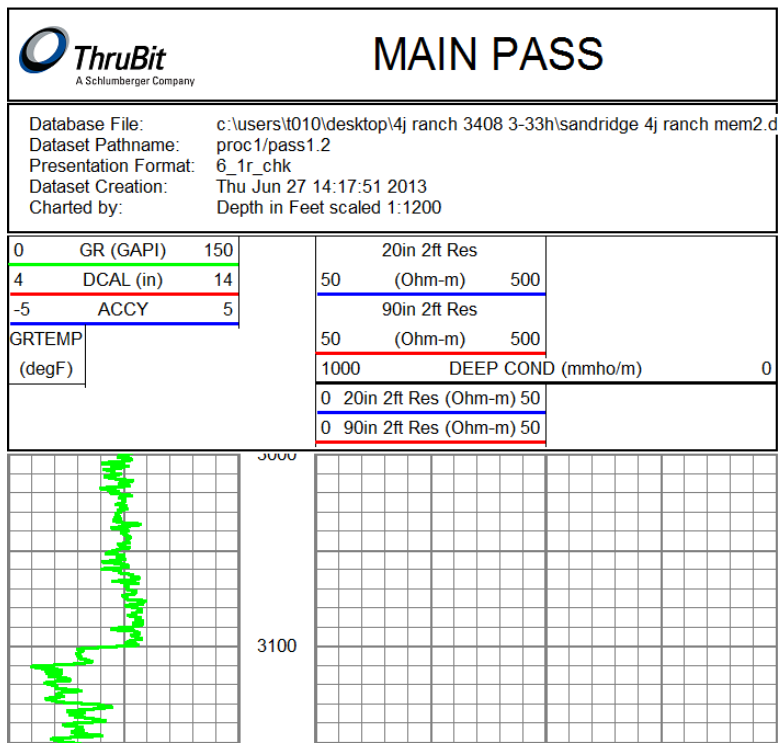
Performed: Sun Jun 13 14:33:21 1993

	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

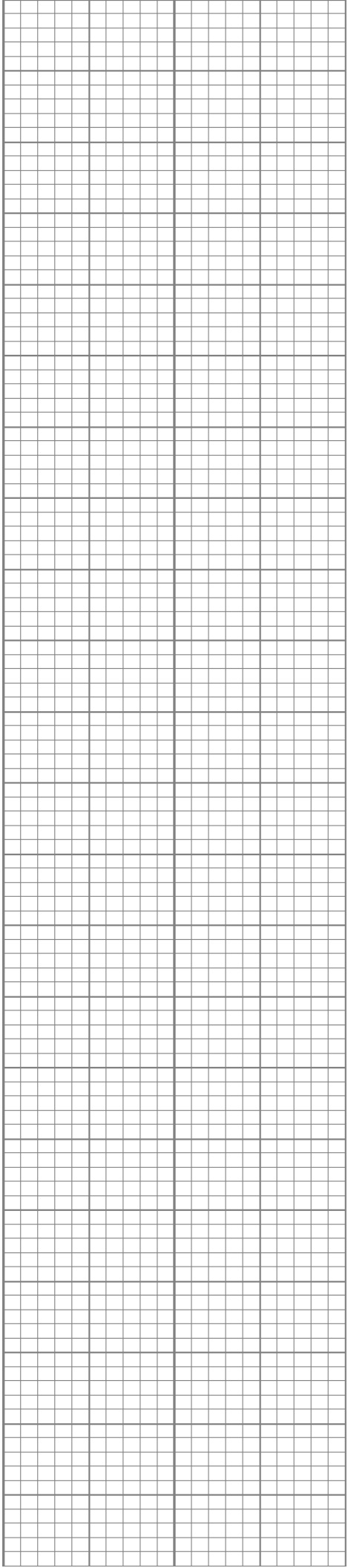
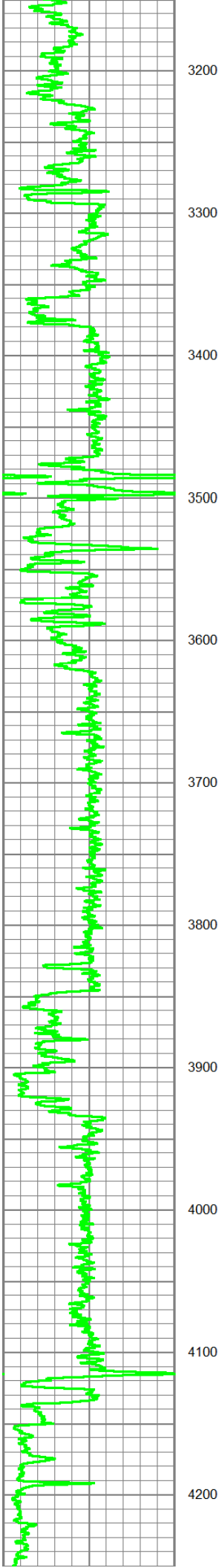
Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
ThruBit	67.59		Cablehead-S	2.31	2.13	5.00
ThruBit	65.28		Solid Weakpoint			
			PSBDOT	3.87	2.25	35.00
ThruBit	61.41		HangOff_Tool	5.00	2.38	60.00
ThruBit	56.41		Swivel	2.25	2.06	25.00
ThruBit	54.16		10-1	0.75	2.13	3.95
TBBAT	53.41		TBBAT-A (PS30B) ThruBit Battery	6.13	2.13	38.20
TBBAT2	47.29		TBBAT2-A (PS29B) ThruBit Battery	6.13	2.13	40.00
TMG GR GRTEMP	41.16 41.04 40.20		TMG-PS (PS10T) ThruBit Telemetry Gamma Ray	6.13	2.13	45.00
ThruBit	35.04		Decentralizer Decentralizer (Small)	4.50	2.13	70.00

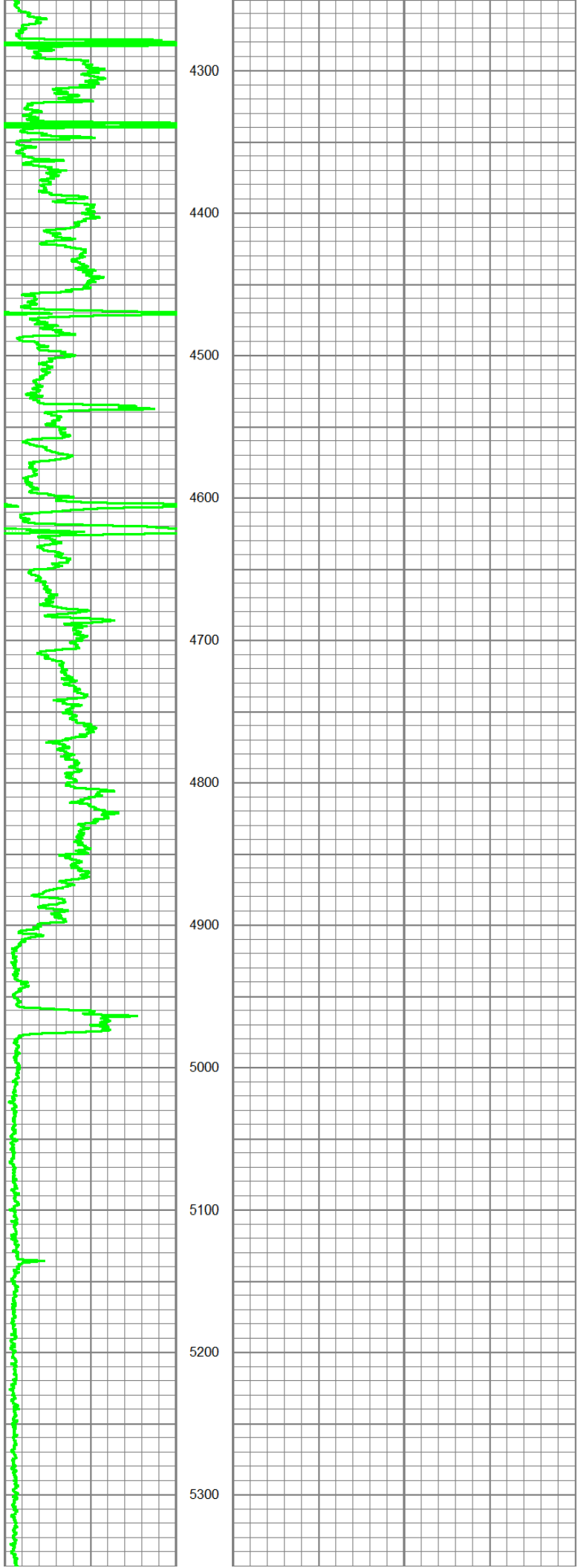
CNLSC	28.60		TBN-PS (PS35N) ThruBit Neutron	4.77	2.13	63.00
			TBD-PS (PS52D) ThruBit Density	10.48	2.13	91.00
LSW1	18.04					
DCAL	17.13					
A1_P	10.60					
A2_P	10.10					
A3_P	9.35					
A4_P	8.35		TBI-PS (PS31R) ThruBit Induction	15.29	2.13	94.00
A5_P	6.60					
		Dataset: sandridge 4j ranch mem2.db: field/well/proc1/pass1.2				
		Total Length: 67.59 ft				
		Total Weight: 570.15 lb				
		O.D. 2.38 in				

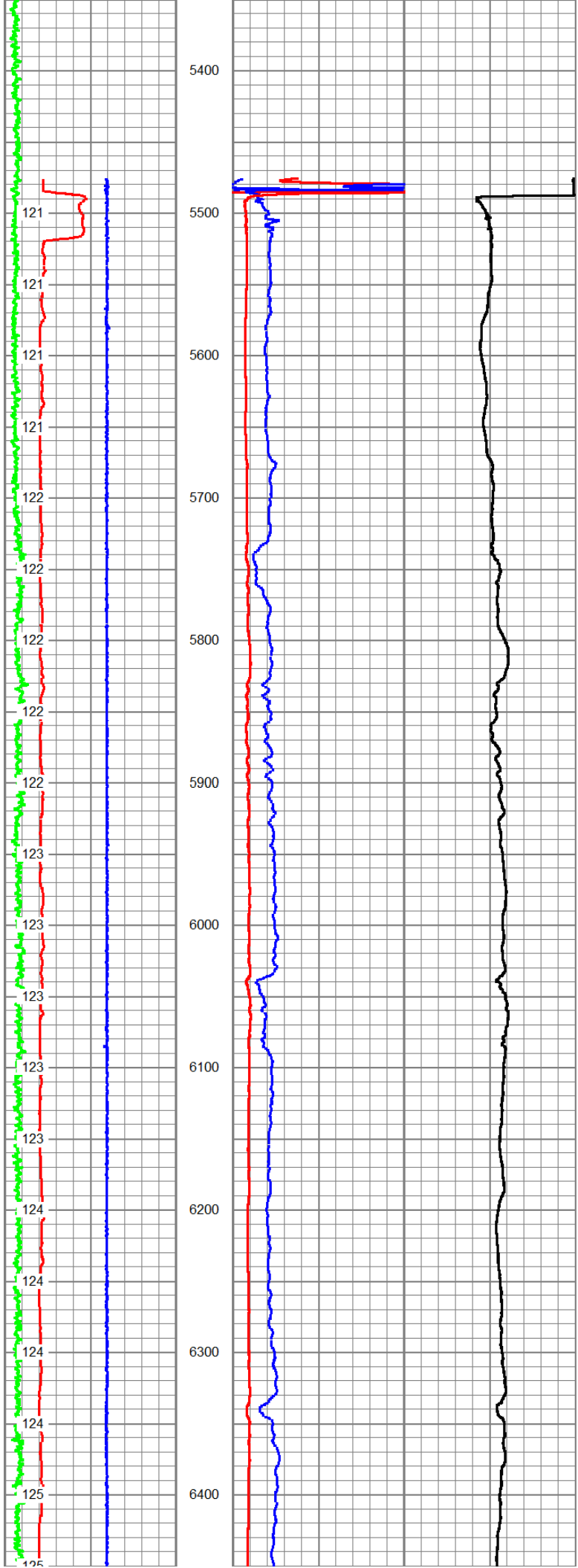
 <b>ThruBit</b> A Schlumberger Company	Company	SANDRIDGE ENERGY
	Well	4J Ranch 3408 3-33H
	Field	BOUSE
	County	HARPER
	State	KANSAS

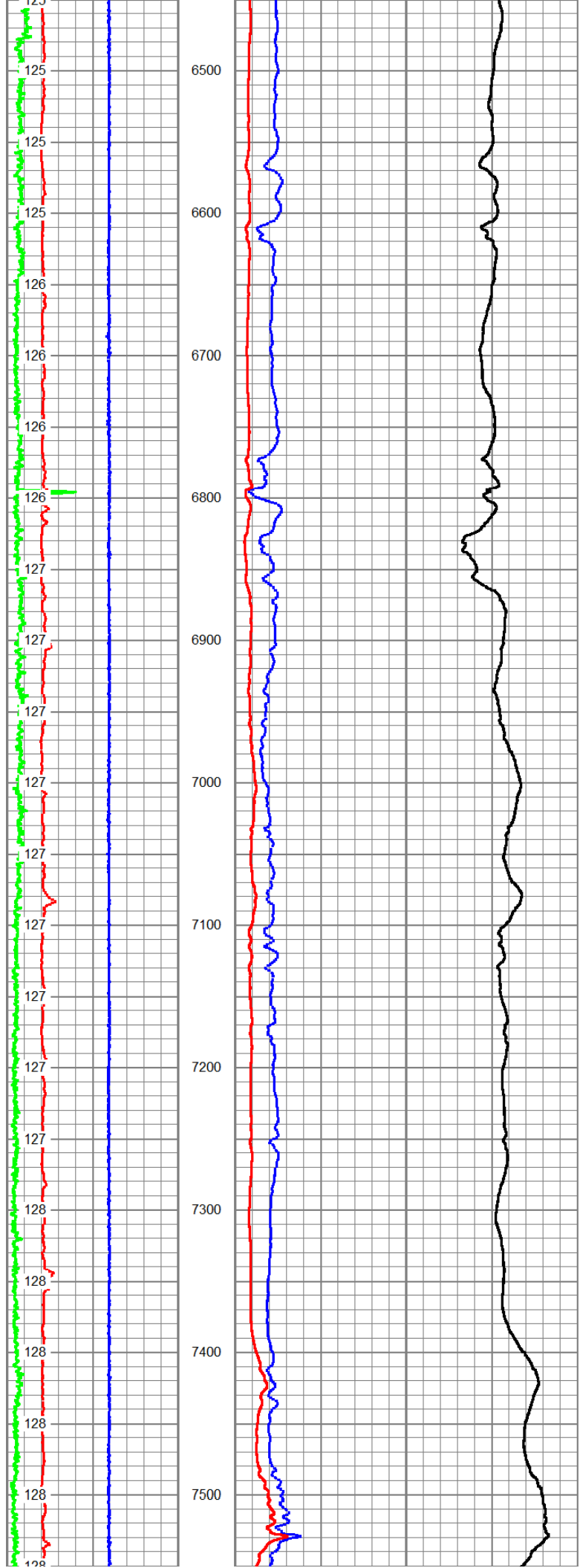


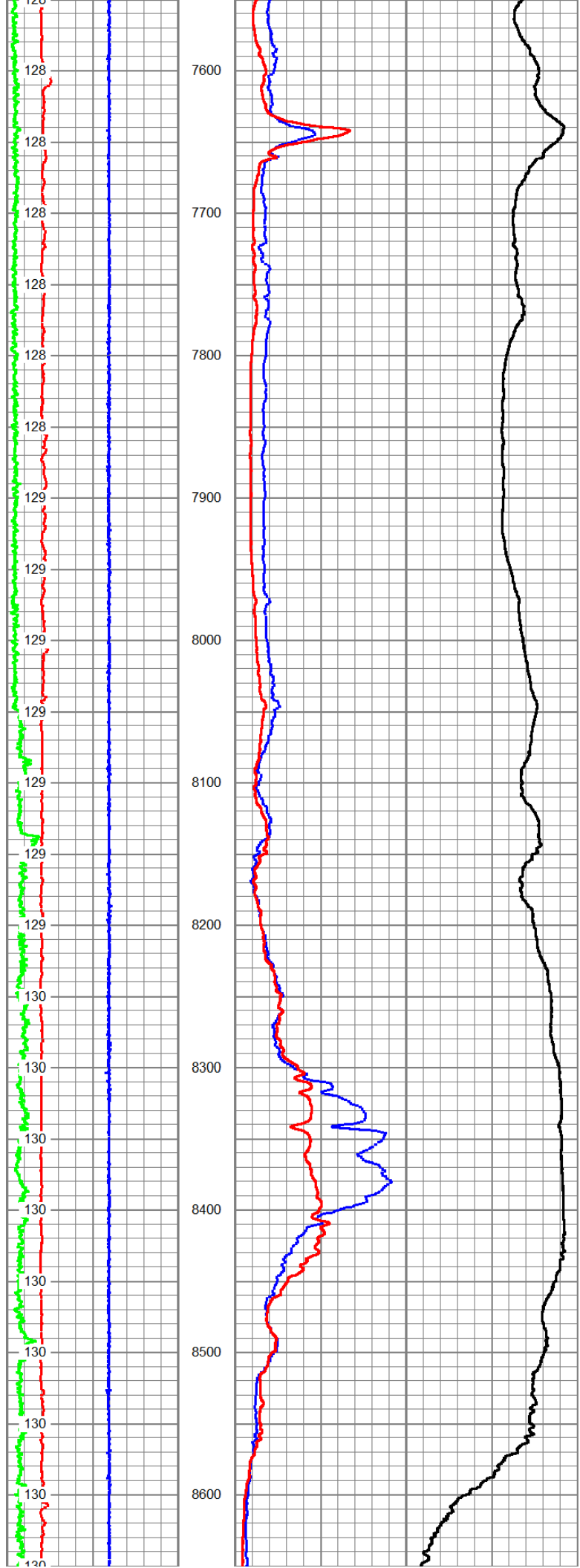


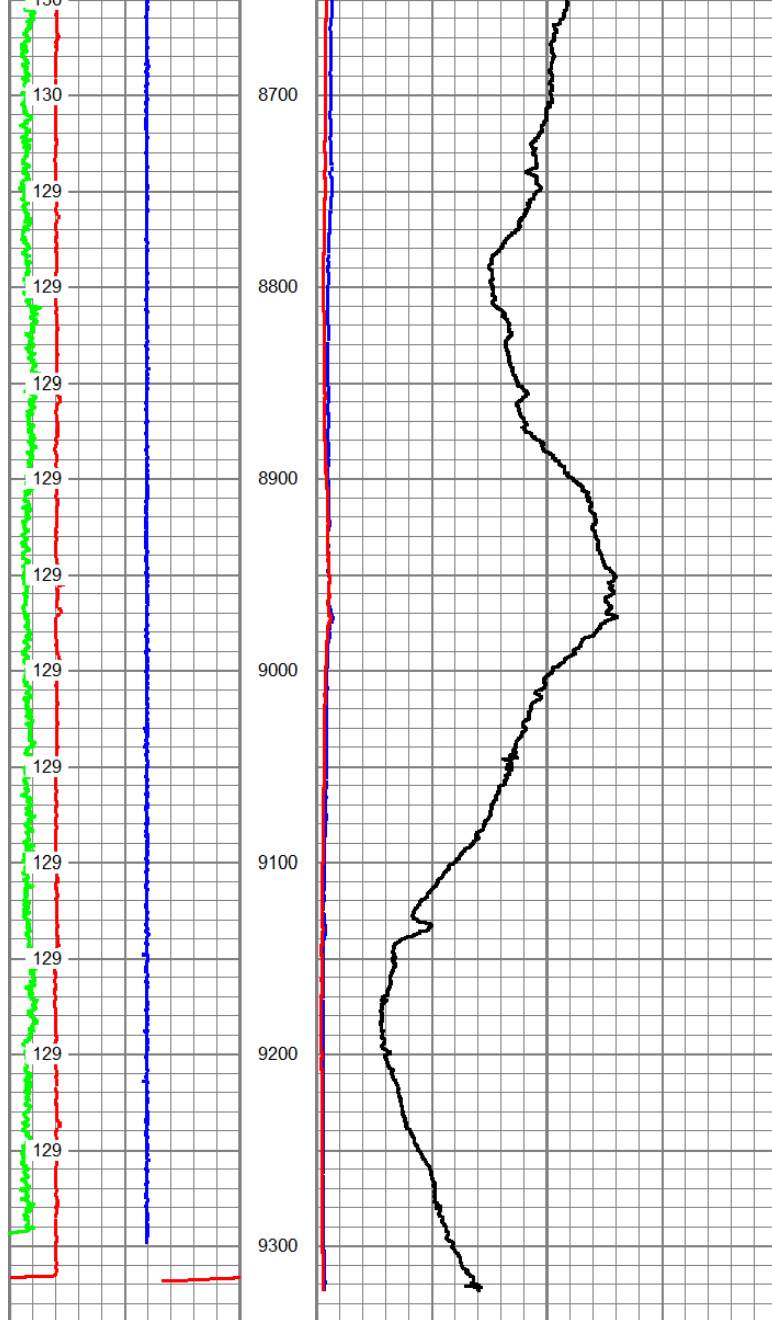












0	GR (GAPI)	150	20in 2ft Res	
4	DCAL (in)	14	50 (Ohm-m)	500
-5	ACCY	5	90in 2ft Res	
	GRTEMP (degF)		50 (Ohm-m)	500
			1000 DEEP COND (mmho/m)	0
			0 20in 2ft Res (Ohm-m)	50
			0 90in 2ft Res (Ohm-m)	50