



ThruBit
A Schlumberger Company

**ARRAY INDUCTION
GAMMA RAY
MEMORY LOG**

Company	SANDRIDGE ENERGY, INC.	Company	SANDRIDGE ENERGY, INC.
Well	STARKS 3408 2-35H	Well	STARKS 3408 2-35H
Field	HARPER, KS / MISS LIME	Field	HARPER, KS / MISS LIME
County	HARPER	County	HARPER
State	KANSAS	State	KANSAS
Location:	API #: 15077219030000	Location:	SEC 35 TWP 34S RGE 8W
Permanent Datum	G.L.	Permanent Datum	G.L.
Log Measured From	D.F.	Log Measured From	D.F.
Drilling Measured From	D.F.	Drilling Measured From	D.F.
Elevation	1277'	Elevation	1277'
Other Services	PORTAL BIT	Other Services	PORTAL BIT
Date	10 FEBRUARY 2013	Date	10 FEBRUARY 2013
Run Number	ONE	Run Number	ONE
Depth Driller	8535'	Depth Driller	8535'
Depth Logger	8518'	Depth Logger	8518'
Bottom Logged Interval	8508'	Bottom Logged Interval	8508'
Top Log Interval	2500'	Top Log Interval	2500'
Casing Driller	7" @ 5210'	Casing Driller	7" @ 5210'
Casing Logger	7" @ 5212'	Casing Logger	7" @ 5212'
Bit Size	6.125"	Bit Size	6.125"
Type Fluid in Hole	WATER	Type Fluid in Hole	WATER
Density / Viscosity	8.4 / 27	Density / Viscosity	8.4 / 27
pH / Fluid Loss	9.0 / NA	pH / Fluid Loss	9.0 / NA
Source of Sample	SUCTION PIT	Source of Sample	SUCTION PIT
Rim @ Meas. Temp	1.3 OHMS @ 62 DEGF	Rim @ Meas. Temp	1.3 OHMS @ 62 DEGF
Rmt @ Meas. Temp	.98 OHMS @ 62 DEGF	Rmt @ Meas. Temp	.98 OHMS @ 62 DEGF
Rmc @ Meas. Temp	1.6 OHMS @ 62 DEGF	Rmc @ Meas. Temp	1.6 OHMS @ 62 DEGF
Source of Rmt / Rmc	CALCULATED	Source of Rmt / Rmc	CALCULATED
Rim @ BHT	0.6 OHMS @ 137 DEGF	Rim @ BHT	0.6 OHMS @ 137 DEGF
Time Circulation Stopped	10:30 10FEB2013	Time Circulation Stopped	10:30 10FEB2013
Time Logger on Bottom	11:50 10FEB2013	Time Logger on Bottom	11:50 10FEB2013
Maximum Recorded Temperature	137 DEGF	Maximum Recorded Temperature	137 DEGF
Equipment Number	T004	Equipment Number	T004
Location	OKC, OK	Location	OKC, OK
Recorded By	D. THOMAS	Recorded By	D. THOMAS
Witnessed By	ERIC VERNON	Witnessed By	ERIC VERNON

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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: 8462' LOG TO: 2500'
ALL SCALES AND PRESENTATIONS PER CLIENT REQUEST
LIMESTONE MATRIX, 2.71 G/CC, USED TO CALCULATE POROSITIES
TOOL STRING RAN WITH S. DECENTRALIZER, SWIVEL, 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 RAY AT CUSTOMERS REQUEST

RIG: UNIT 310
CREW: D. THOMAS, J. DOTY, E. PRICE

Service Ticket No.	1739	API No.	15077219030000	PGM Ver	WARRIOR 7.0
The Well Name, Location, Borehole Description, and / or Cementing Data Furnished by Client					
EQUIPMENT DATA					
GAMMA RAY		NEUTRON		INDUCTION	

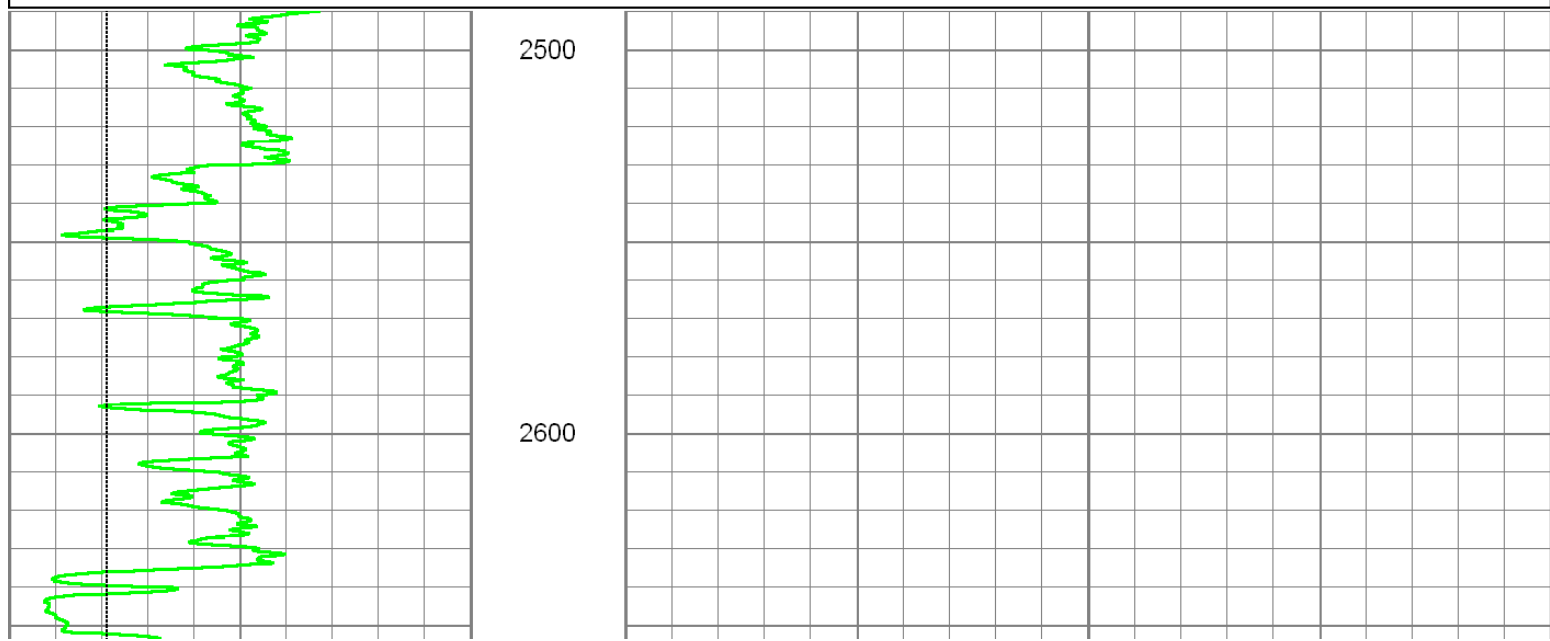
Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	PS30T	Serial No.	PS6N	Serial No.	PS03D	Serial No.	ENP6R
Model No.	PS	Model No.	PS	Model No.	PS	Model No.	ENP
Diameter	2.125"	Diameter	2.125"	Diameter	2.125"	Diameter	2.125"
LOGGING DATA							
General Data							
Pass	Depths		Well Head	Speed	Logging Run Comments		
No.	From	To	Pressure	Ft/Min			
ONE	8518'	2500'		30			
	GAMMA RAY		NEUTRON		DENSITY		INDUCTION
Pass	Scale		Scale		Scale		Scale
No.	L	R	L	R	L	R	L
ONE	0 API	150 API	30 %	-10 %	30 %	-10 %	0.2 OHM-M 2000 OHM-M
DIRECTIONAL INFORMATION							
Maximum Deviation	94.08	deg. @	7623'	KOP	3879'		

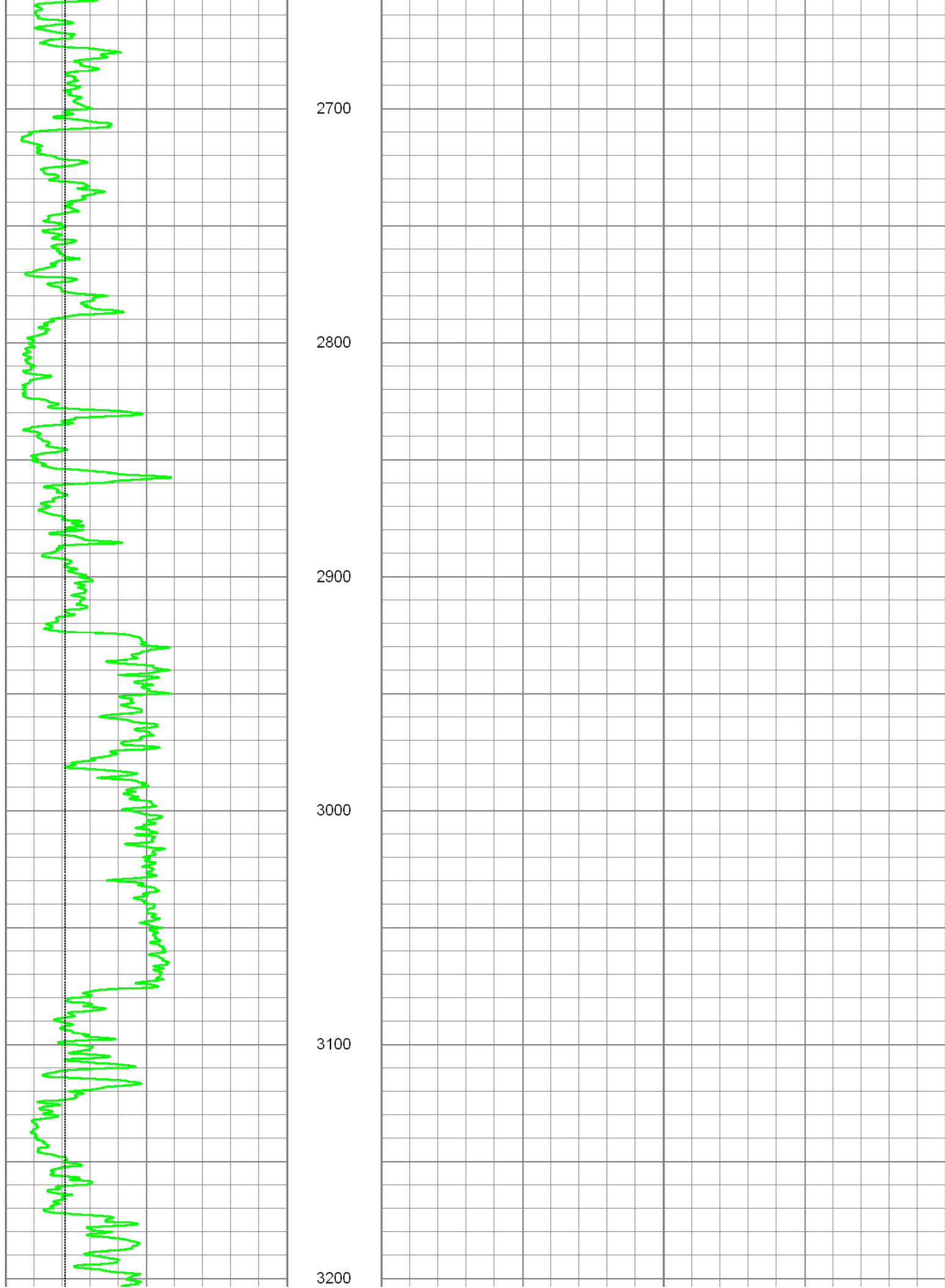


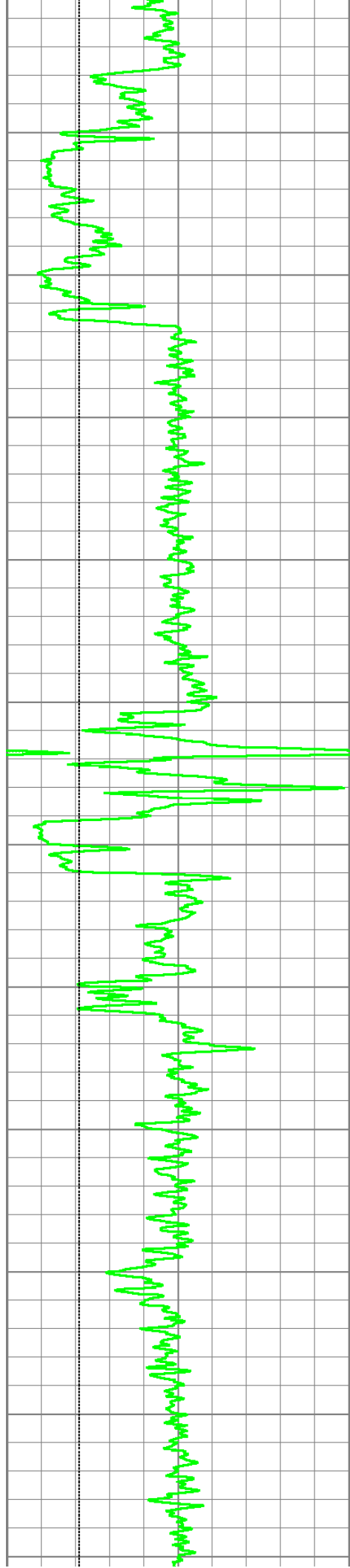
MAIN PASS

Database File: starks_mem.db
 Dataset Pathname: proc2/pass1.4
 Presentation Format: 6_2r_chk
 Dataset Creation: Sun Feb 10 20:33:47 2013
 Charted by: Depth in Feet scaled 1:600

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







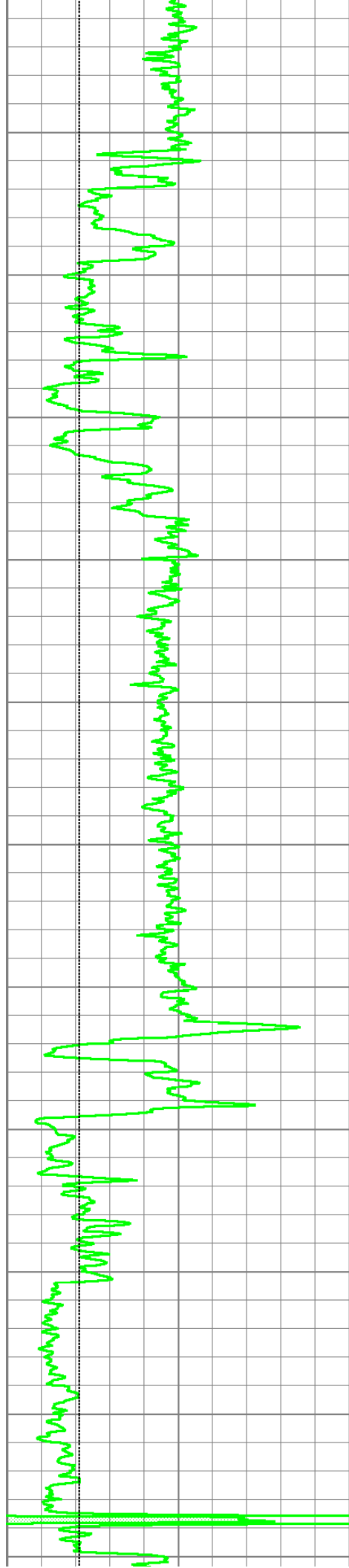
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3700



3800

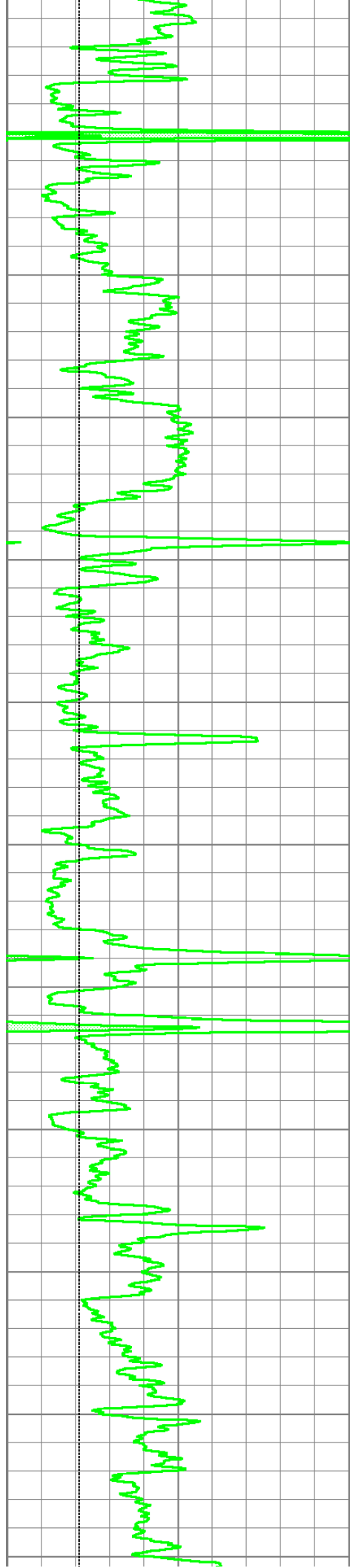
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4100

4200

4300



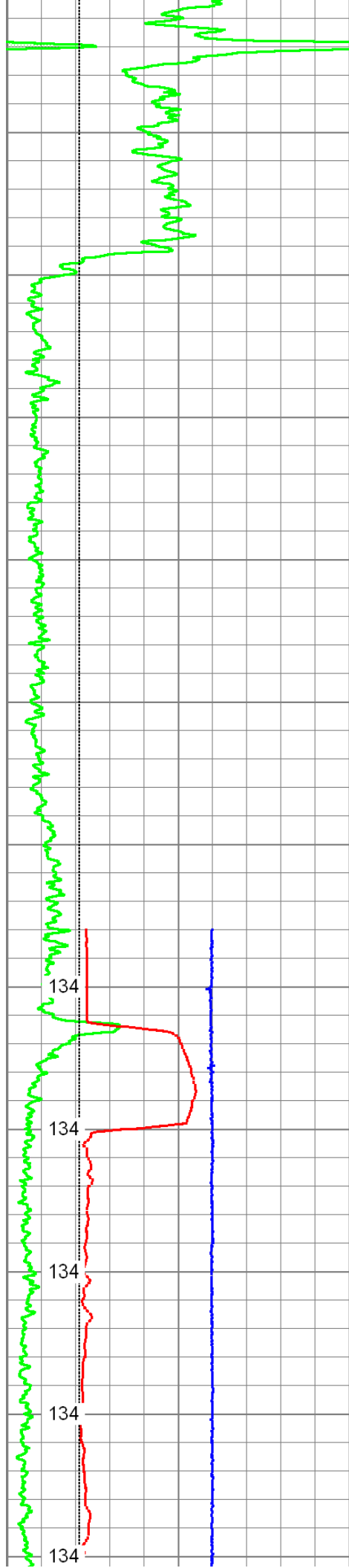
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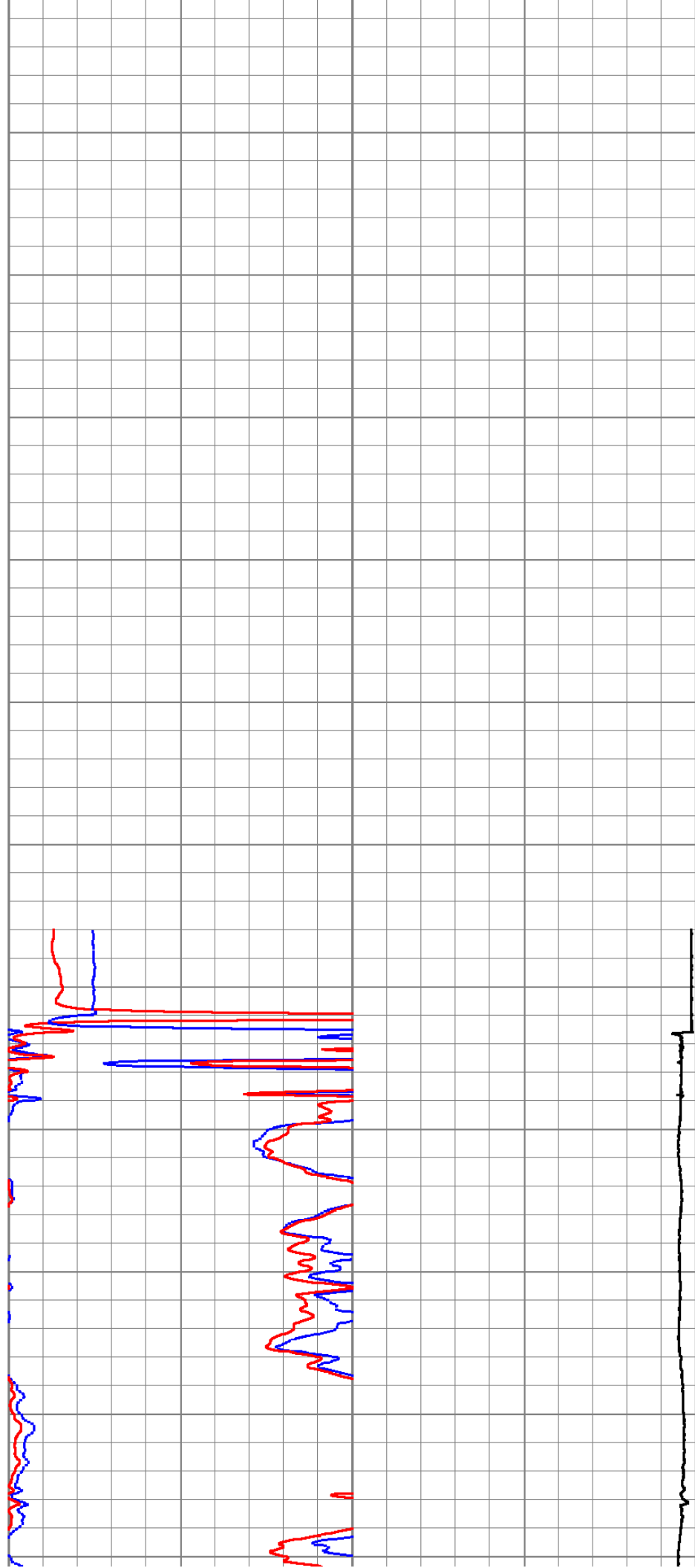
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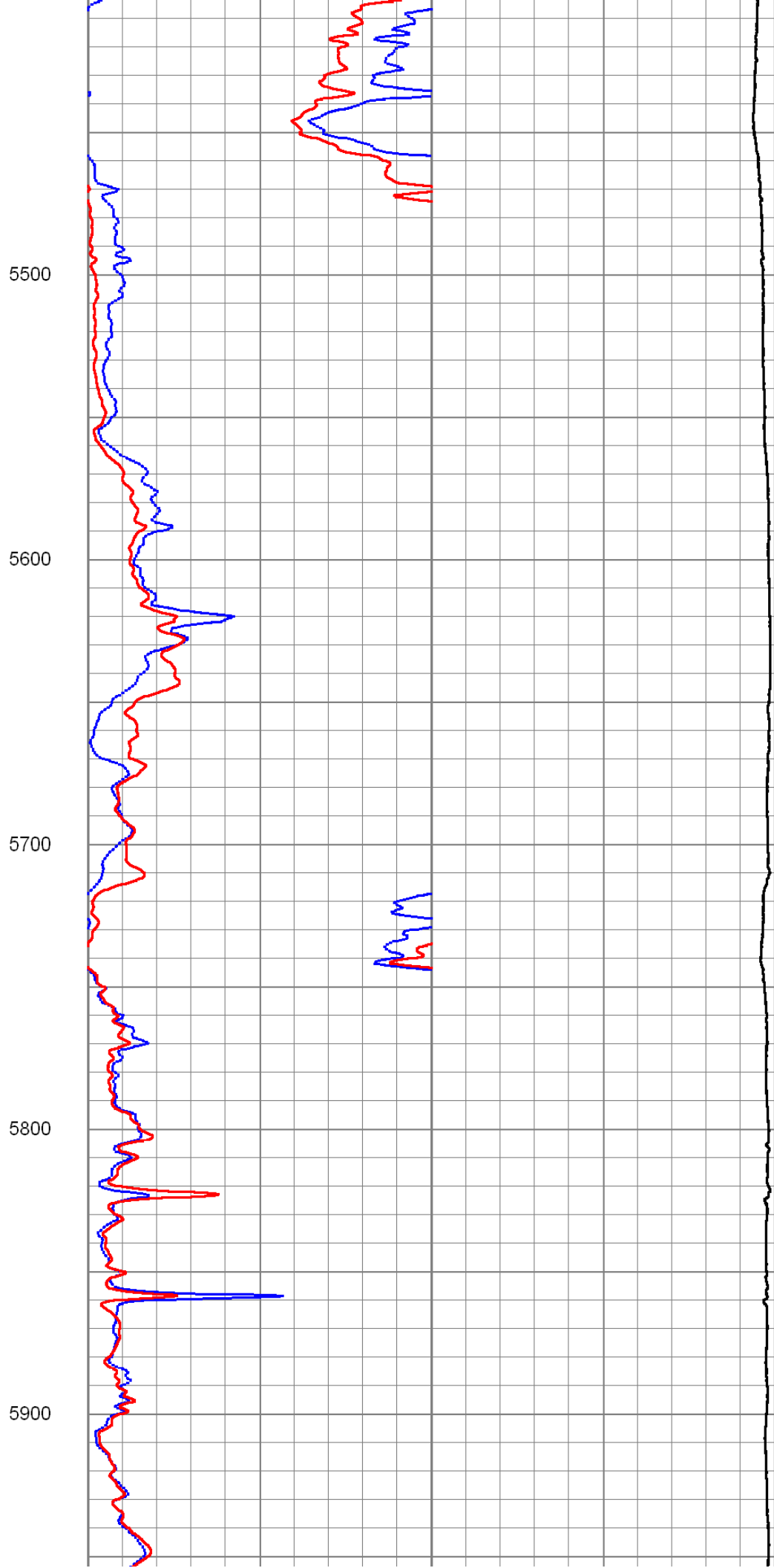
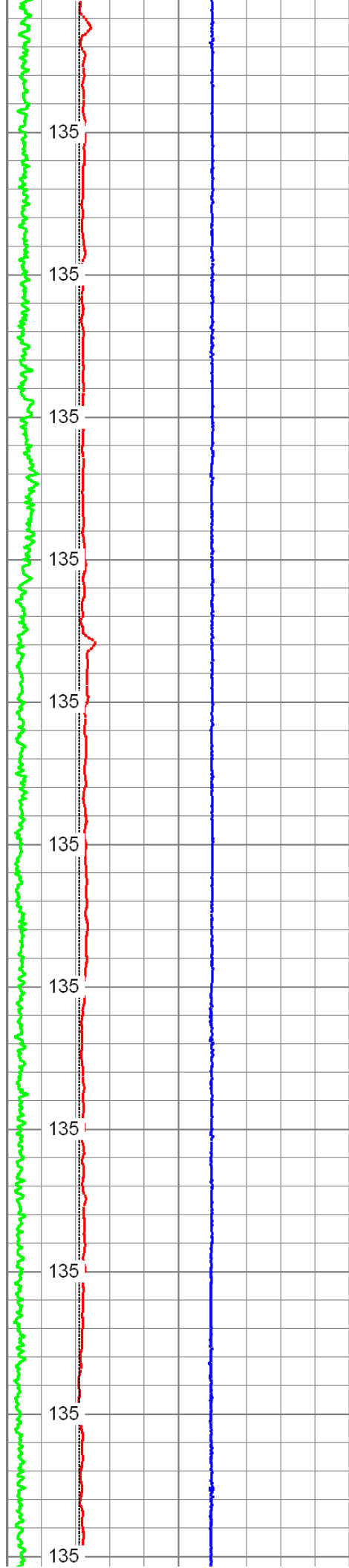
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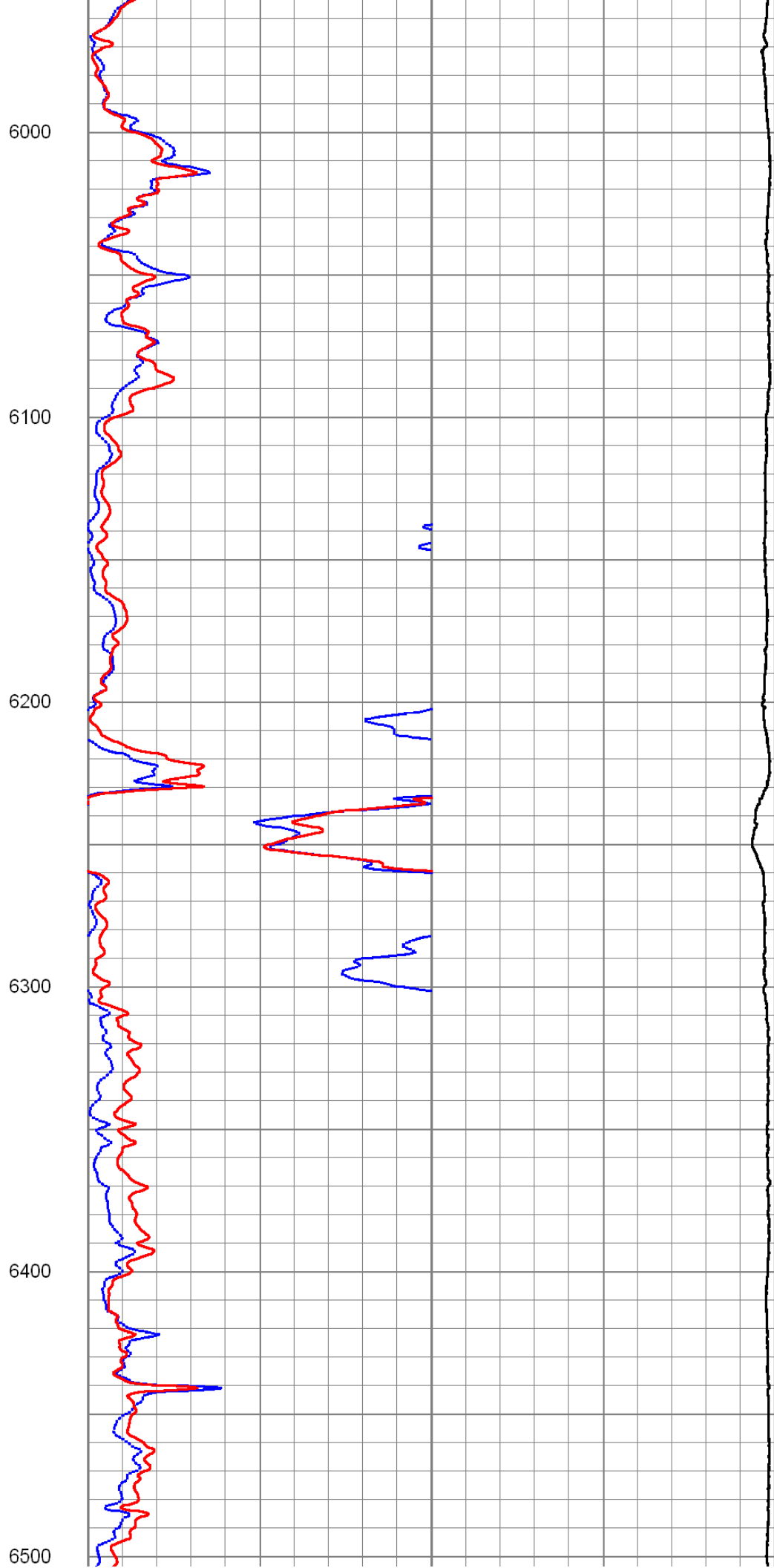
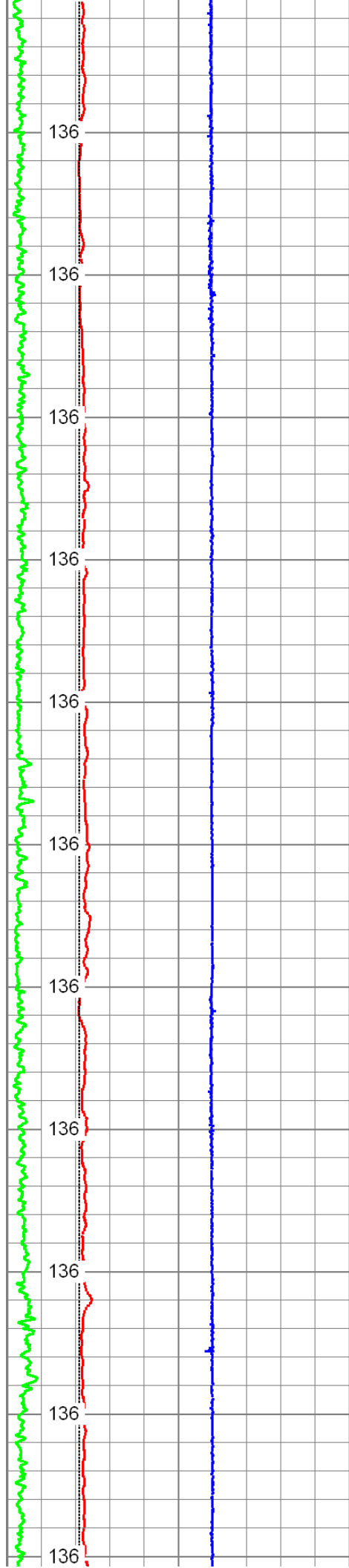
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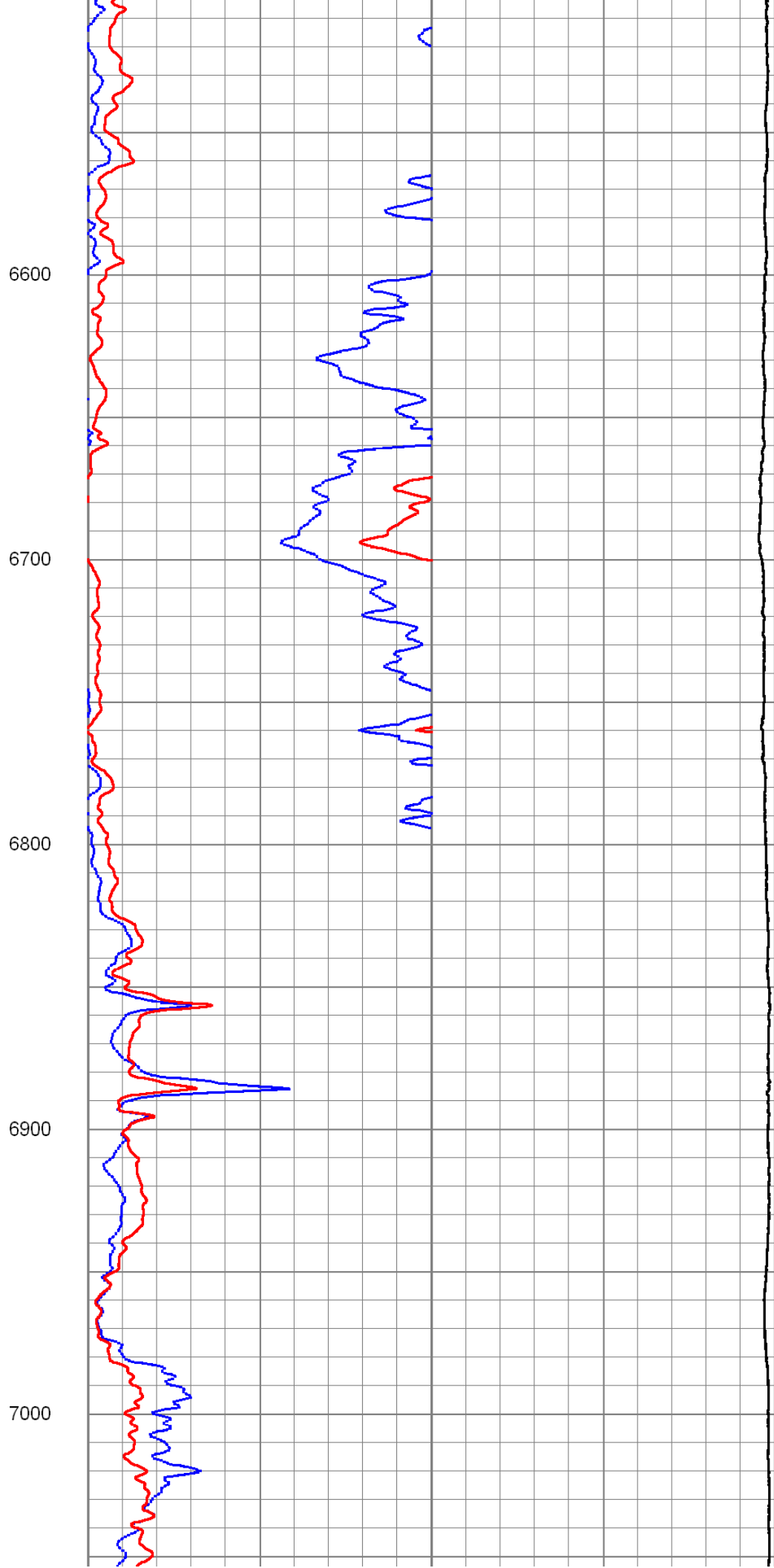
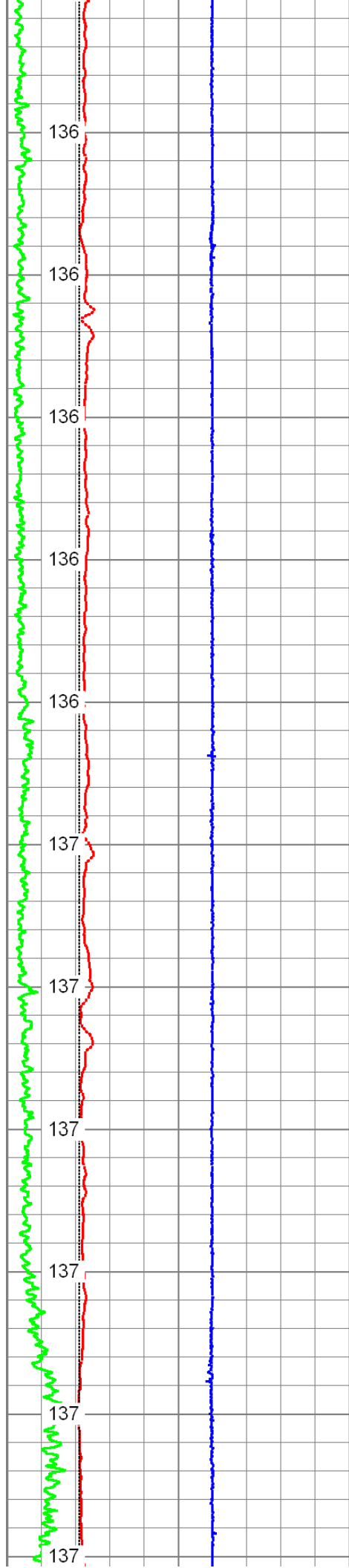
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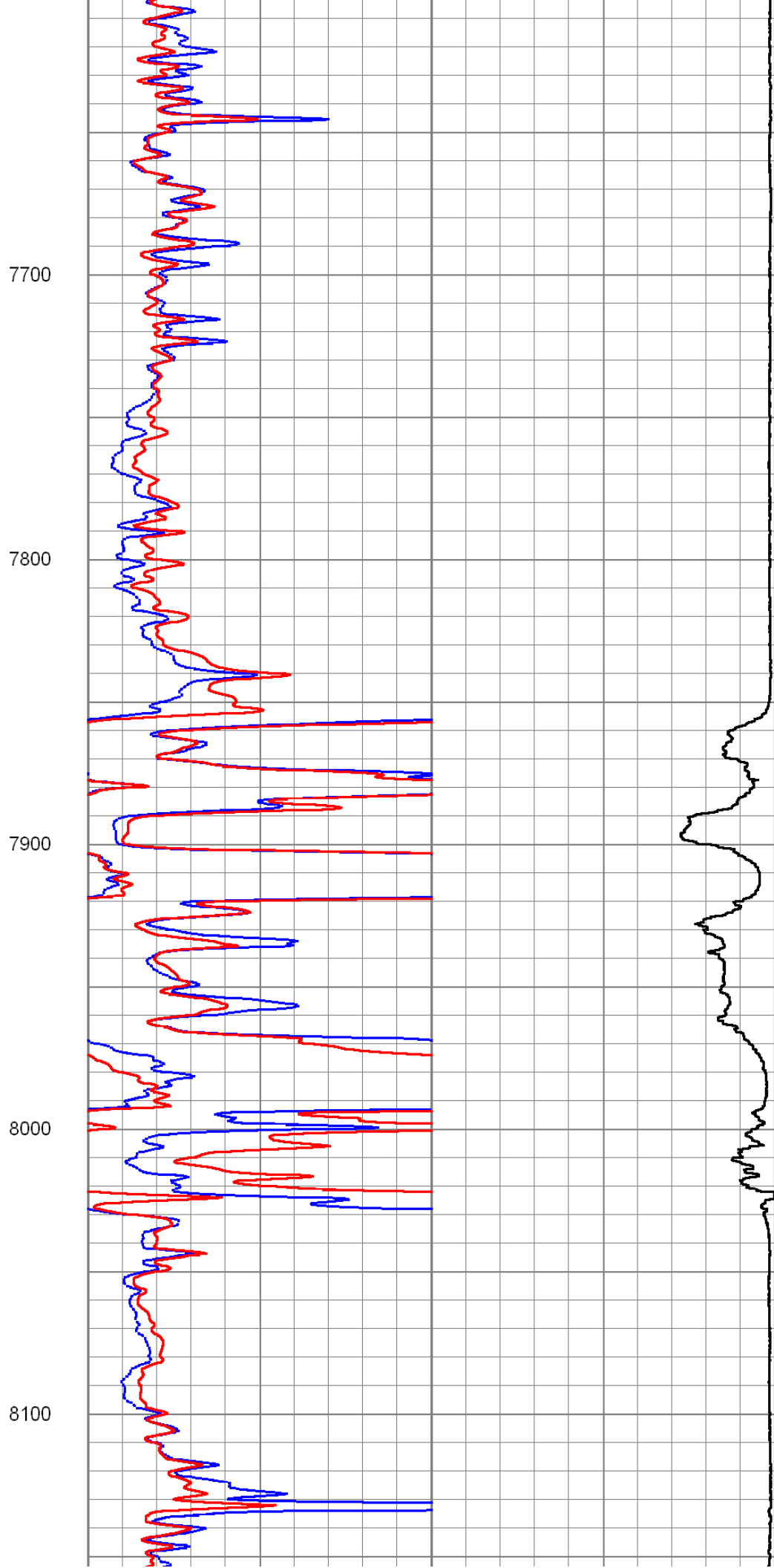
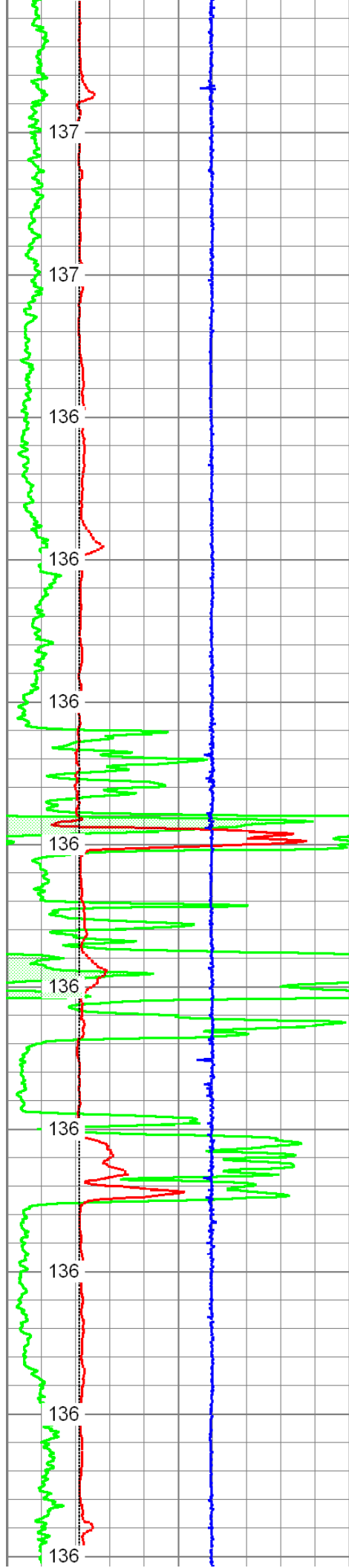
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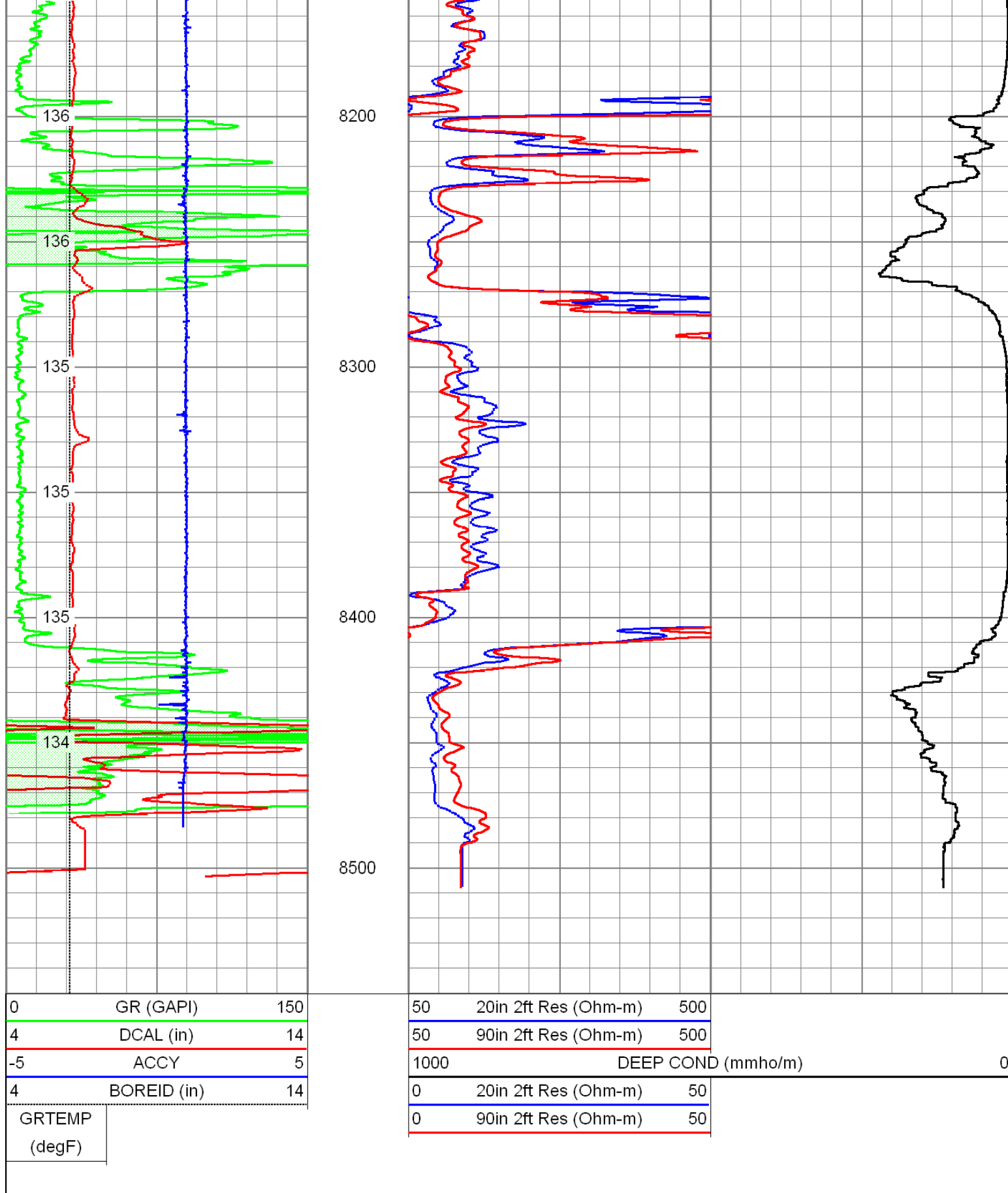








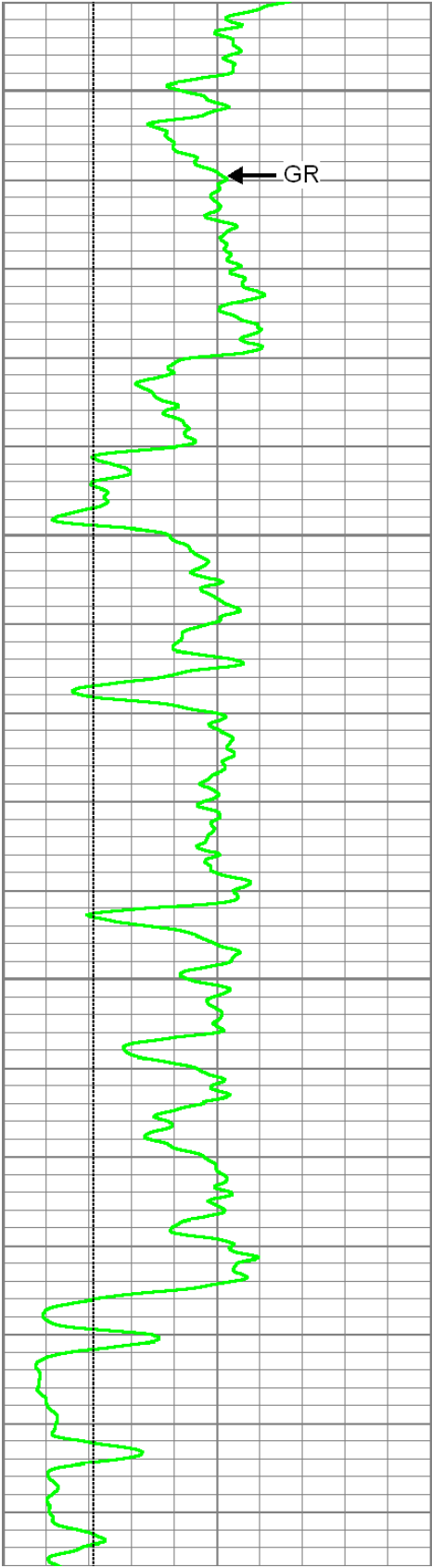




0	GR (GAPI)	150
4	BOREID (in)	14
4	DCAL (in)	14
-5	ACCY	5

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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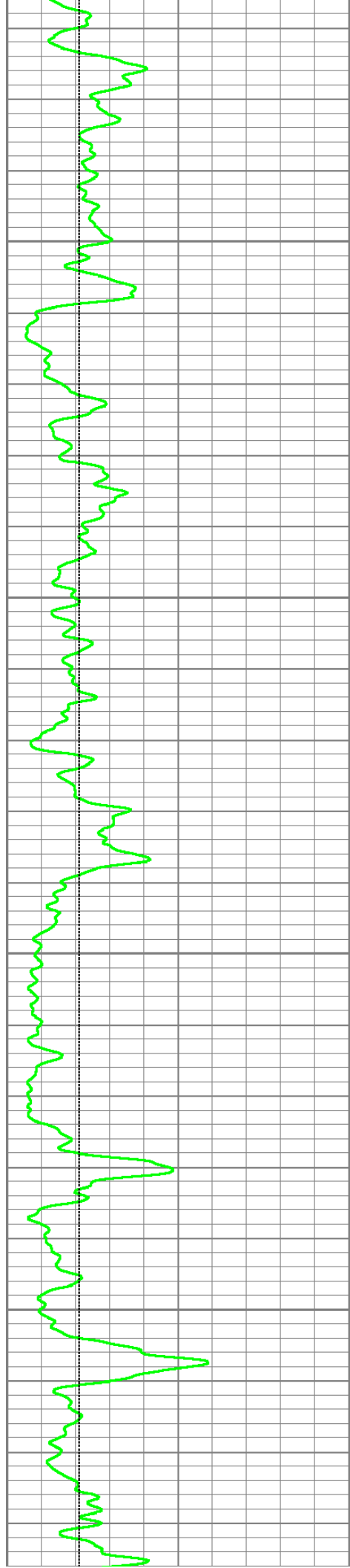


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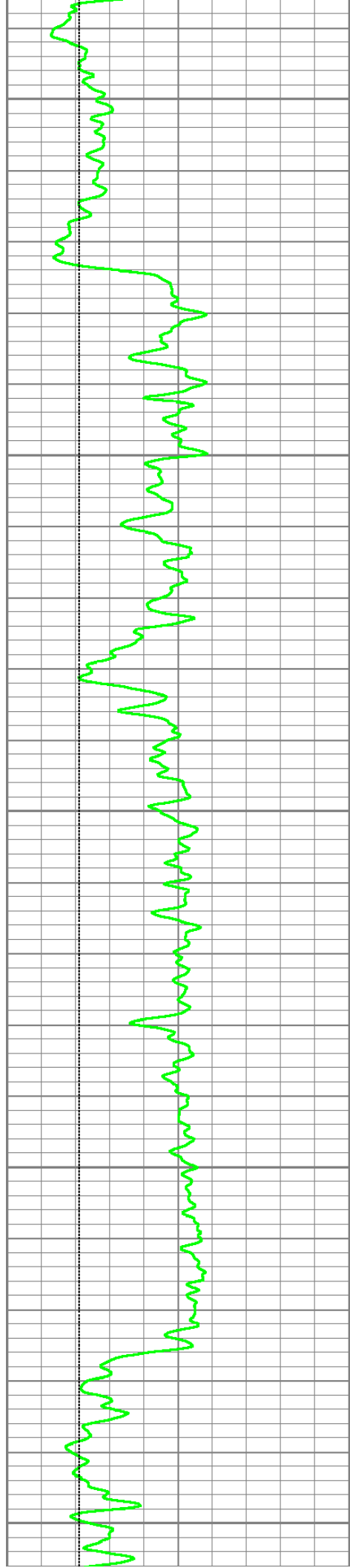


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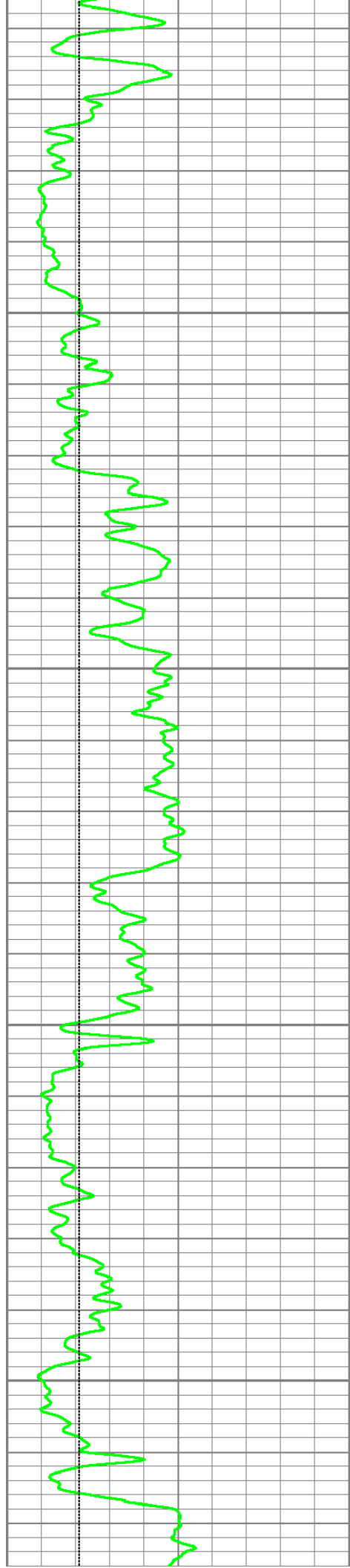
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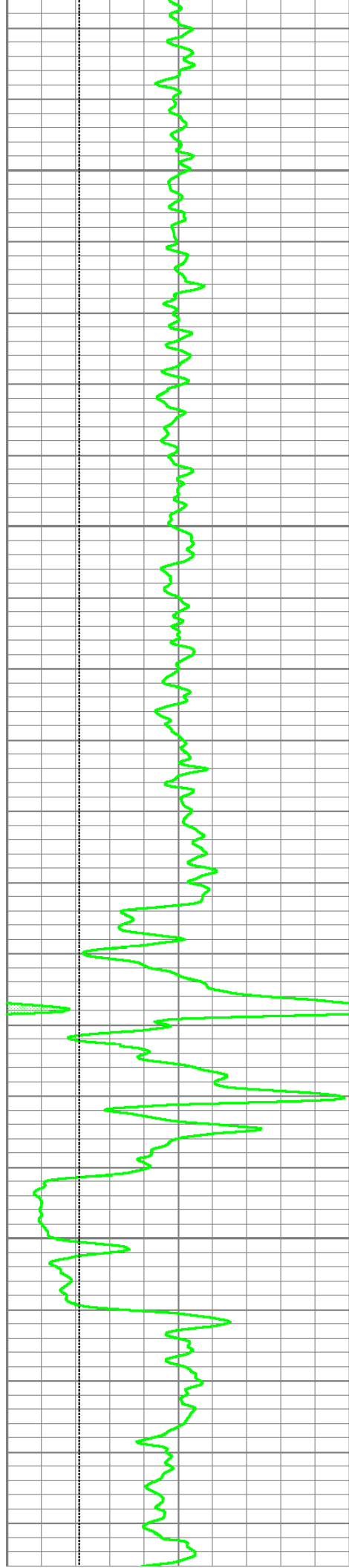


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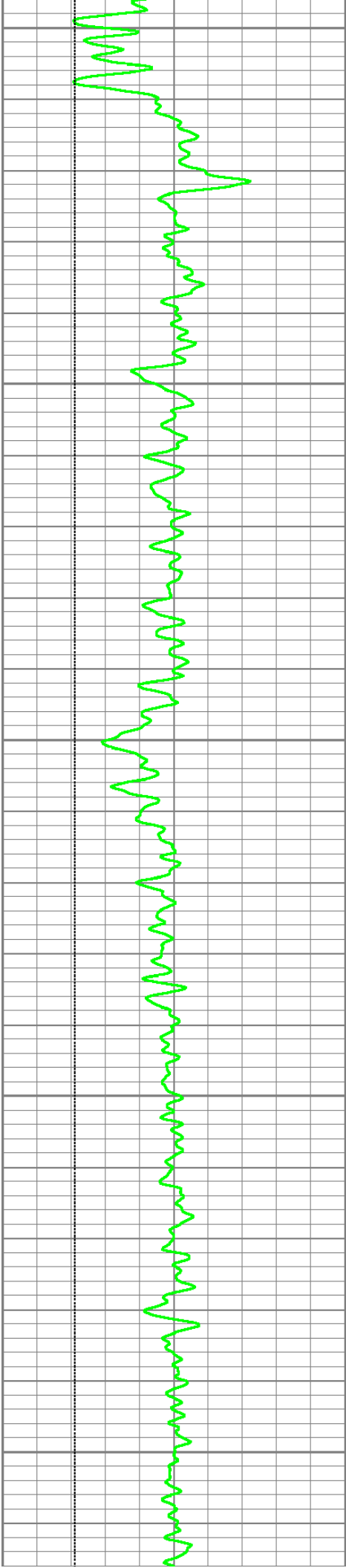


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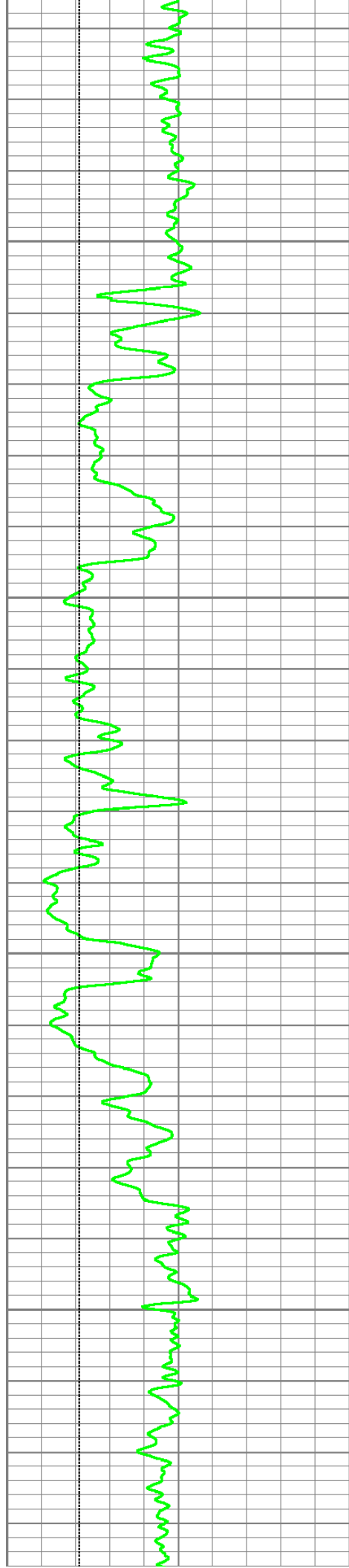
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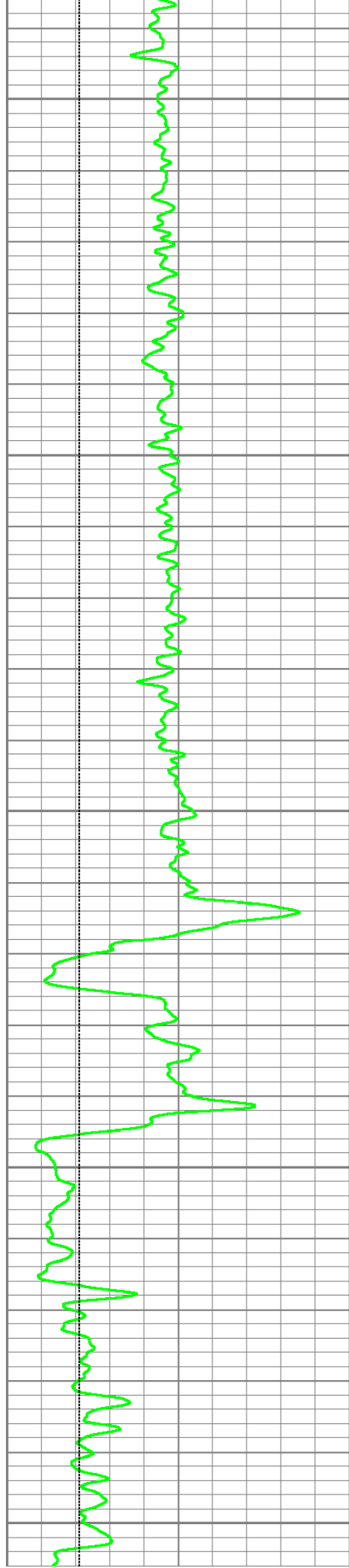


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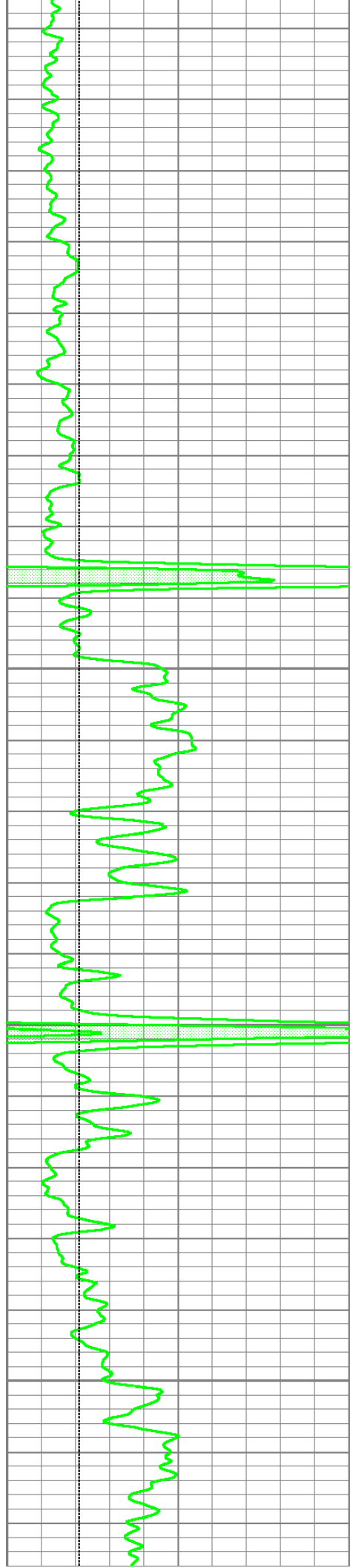
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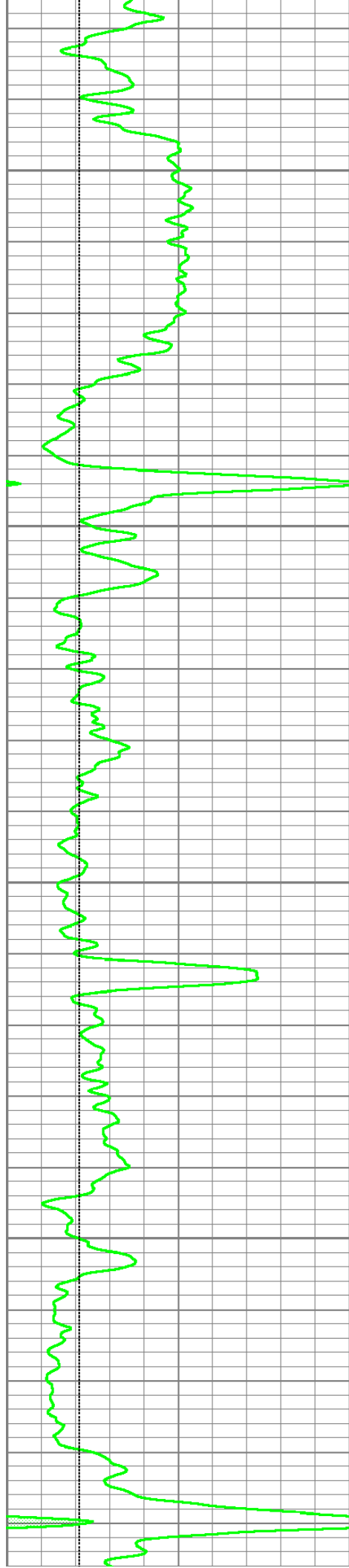


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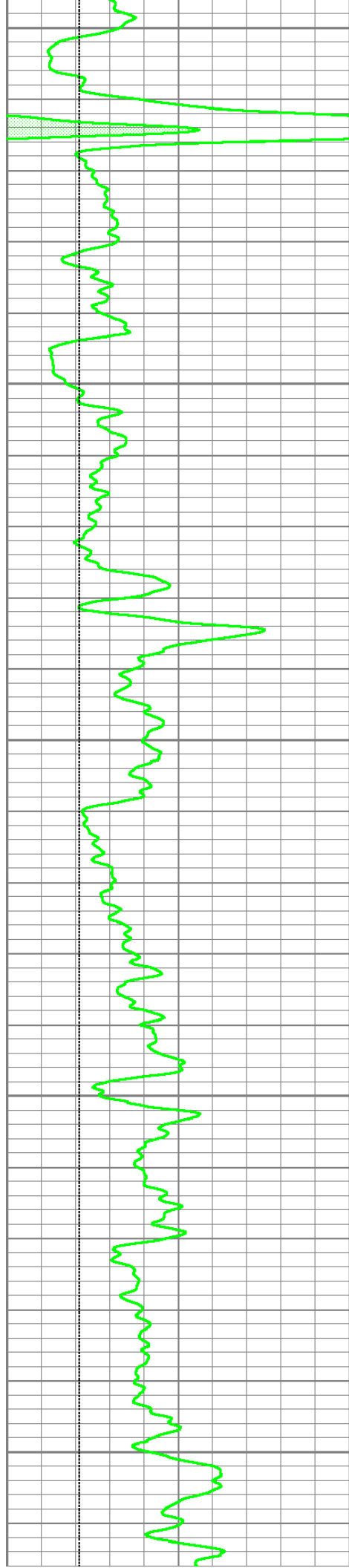


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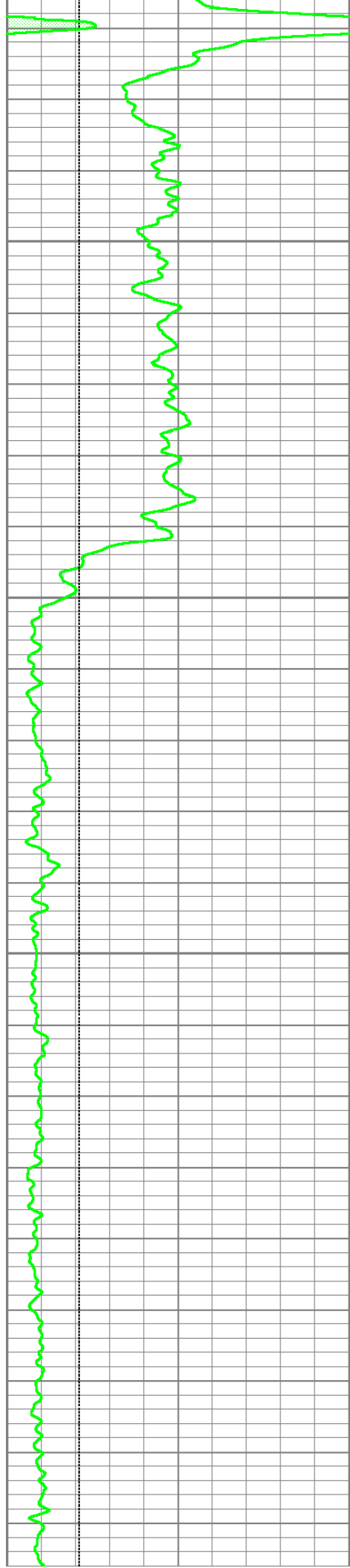
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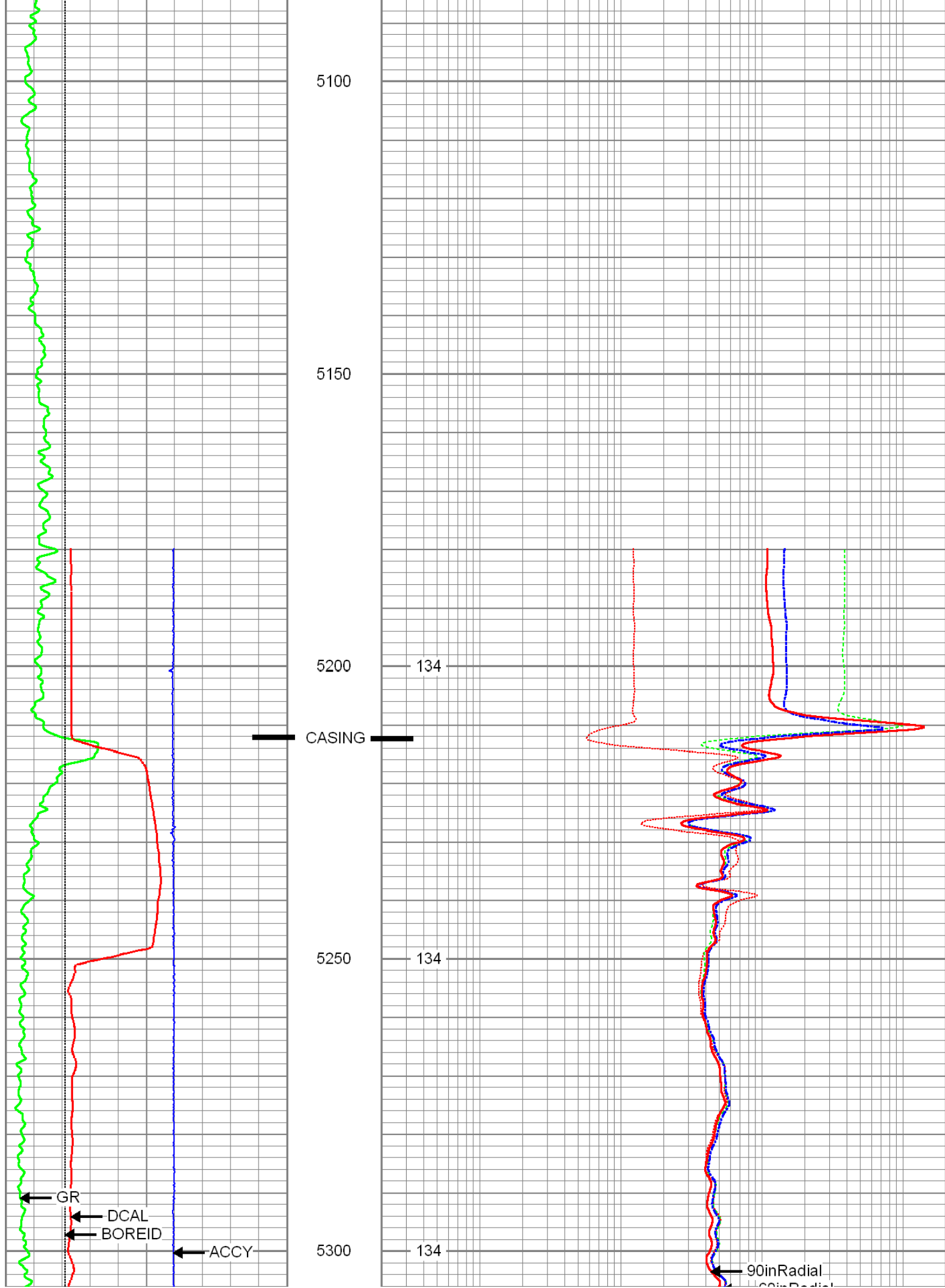


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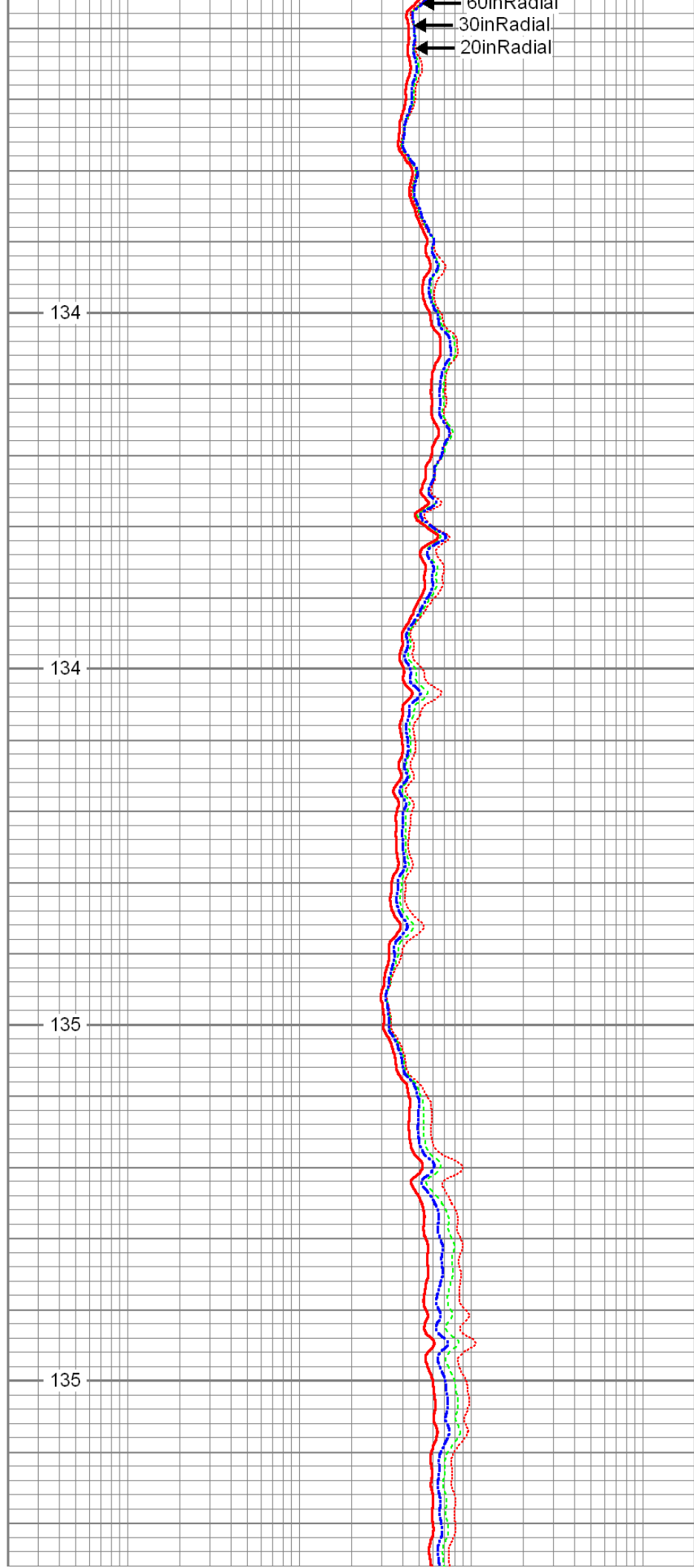
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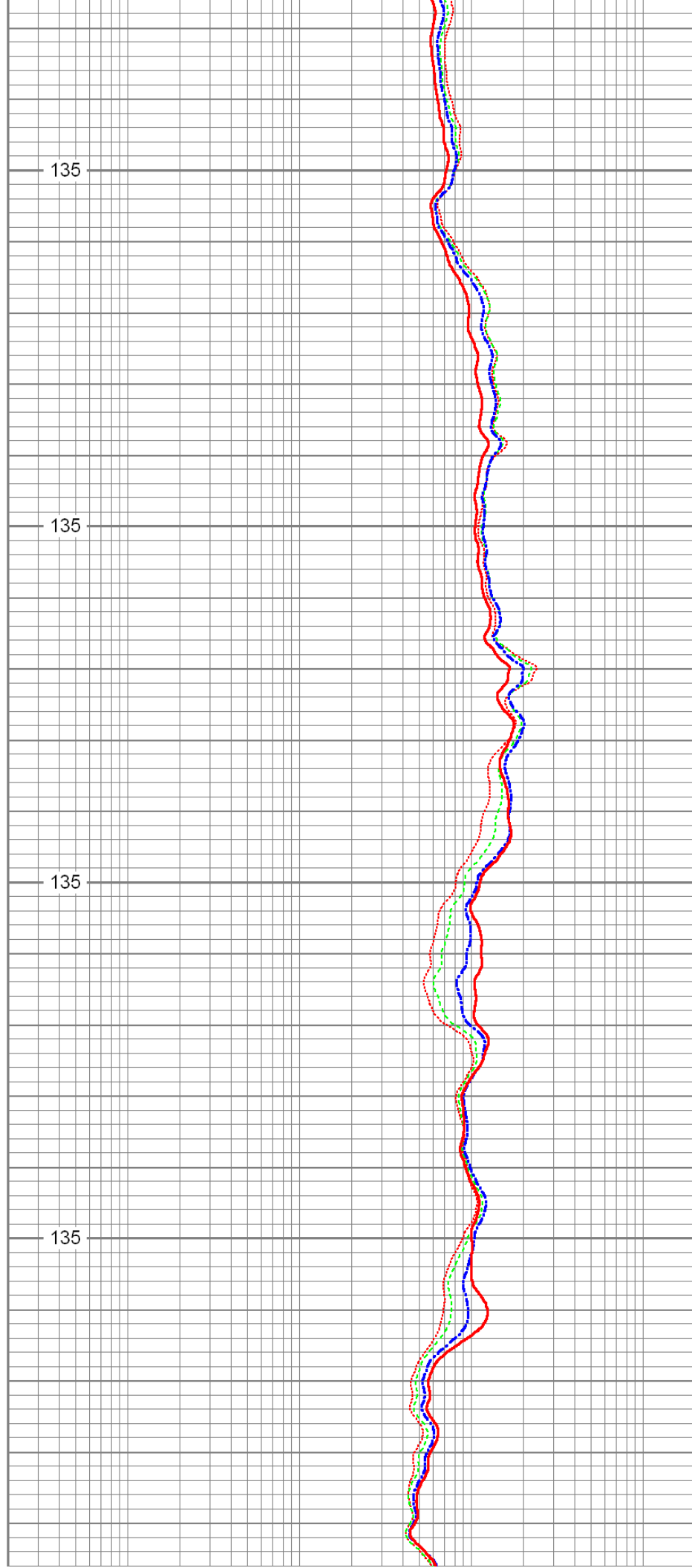
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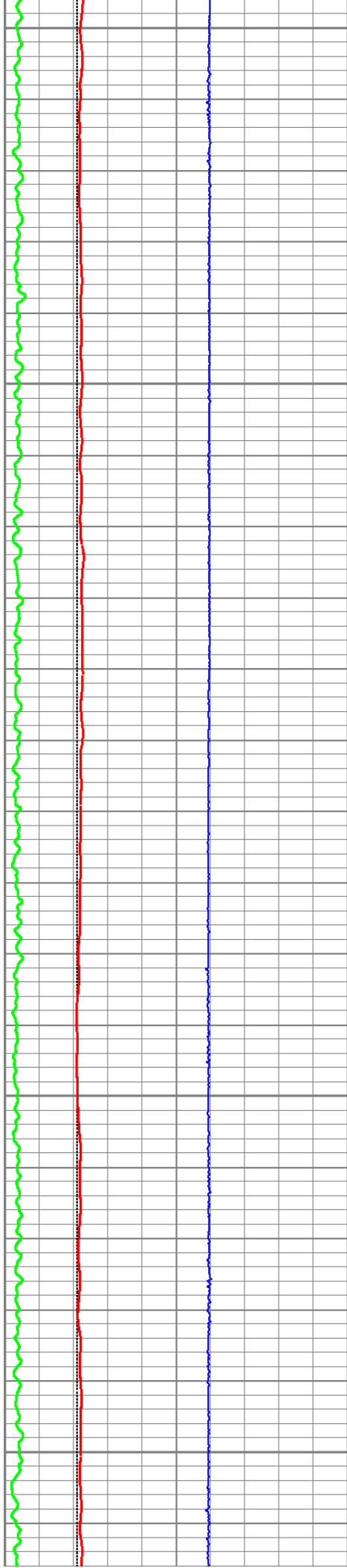
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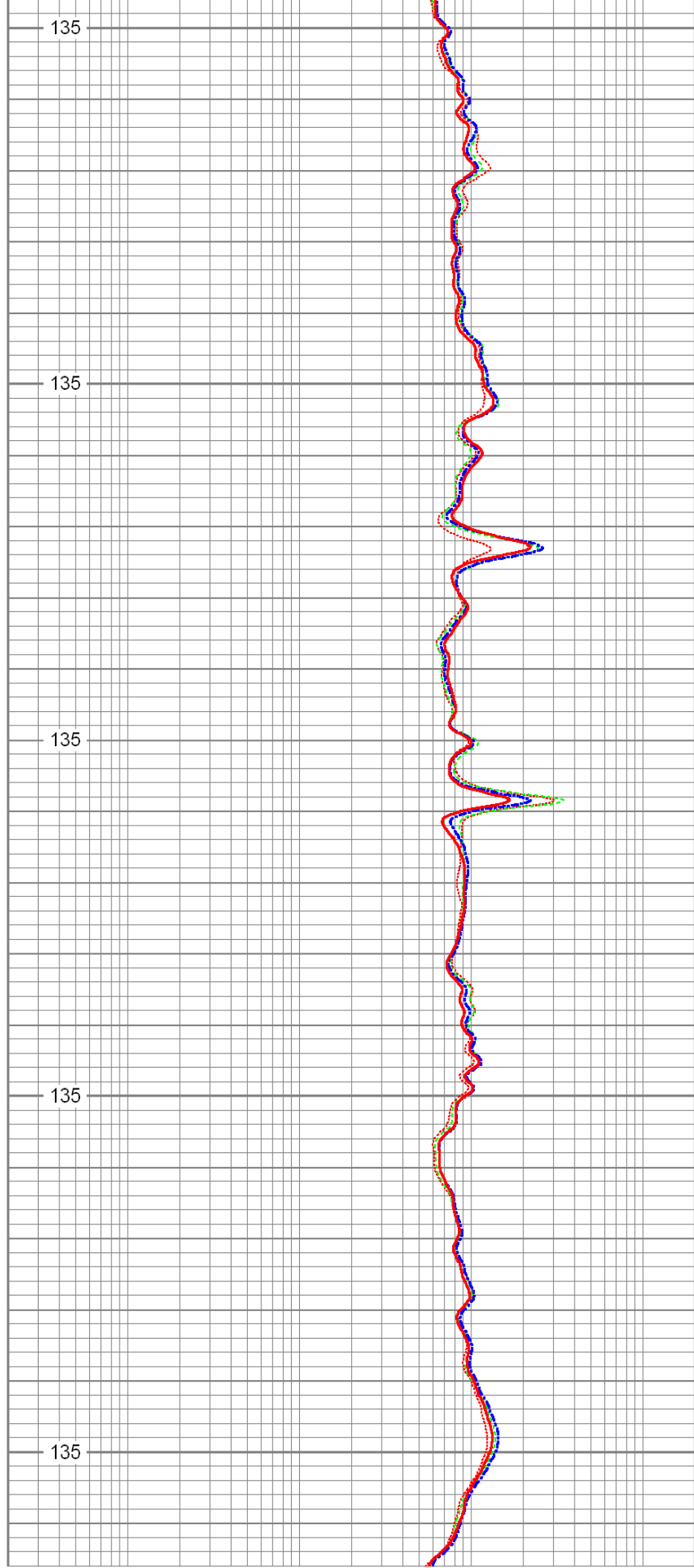
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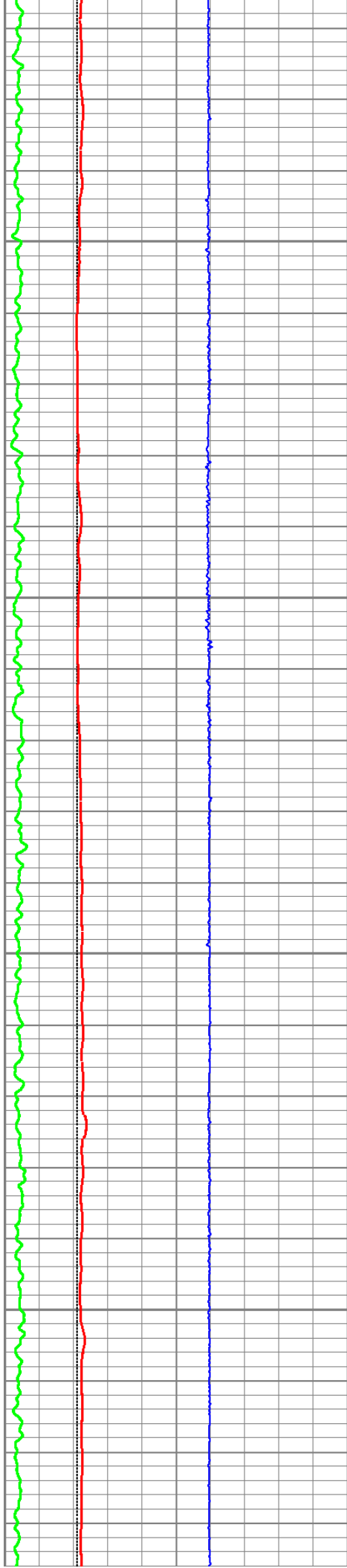
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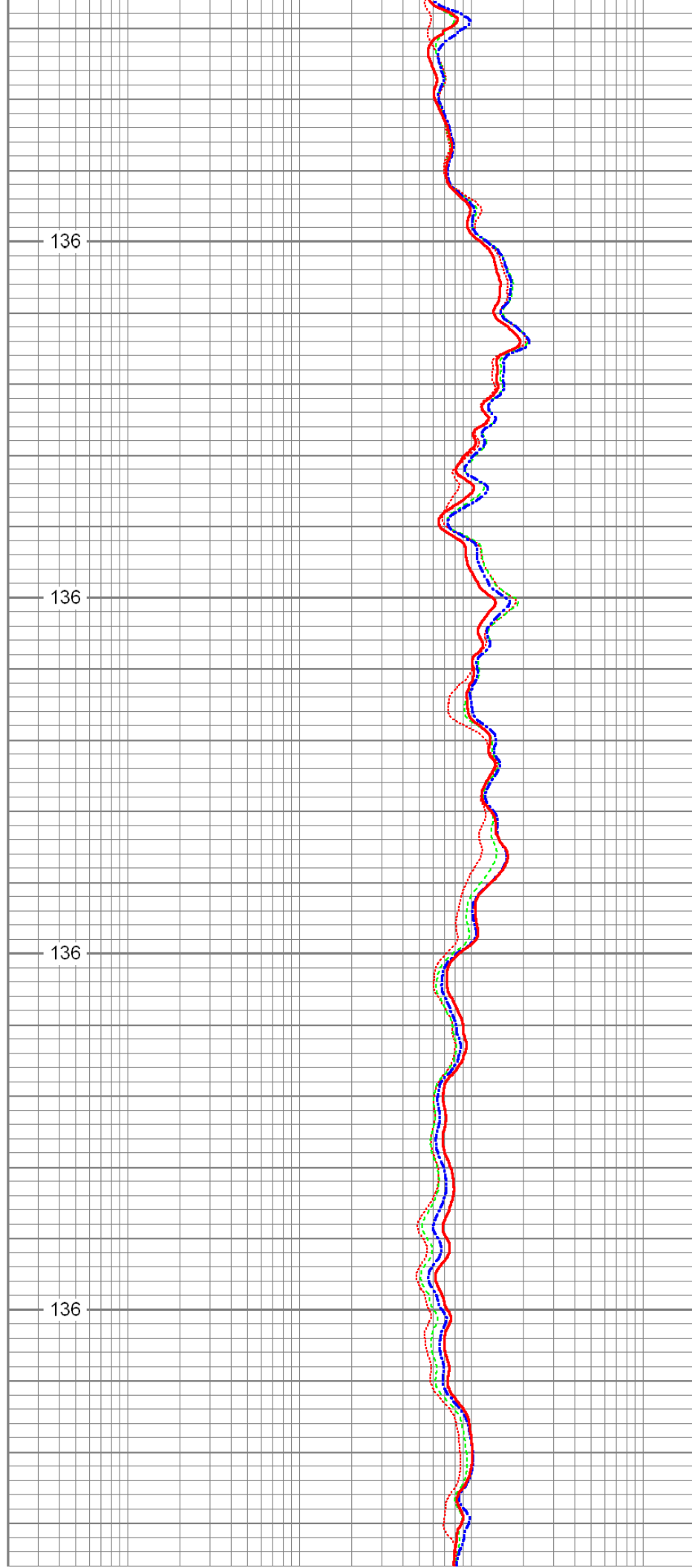
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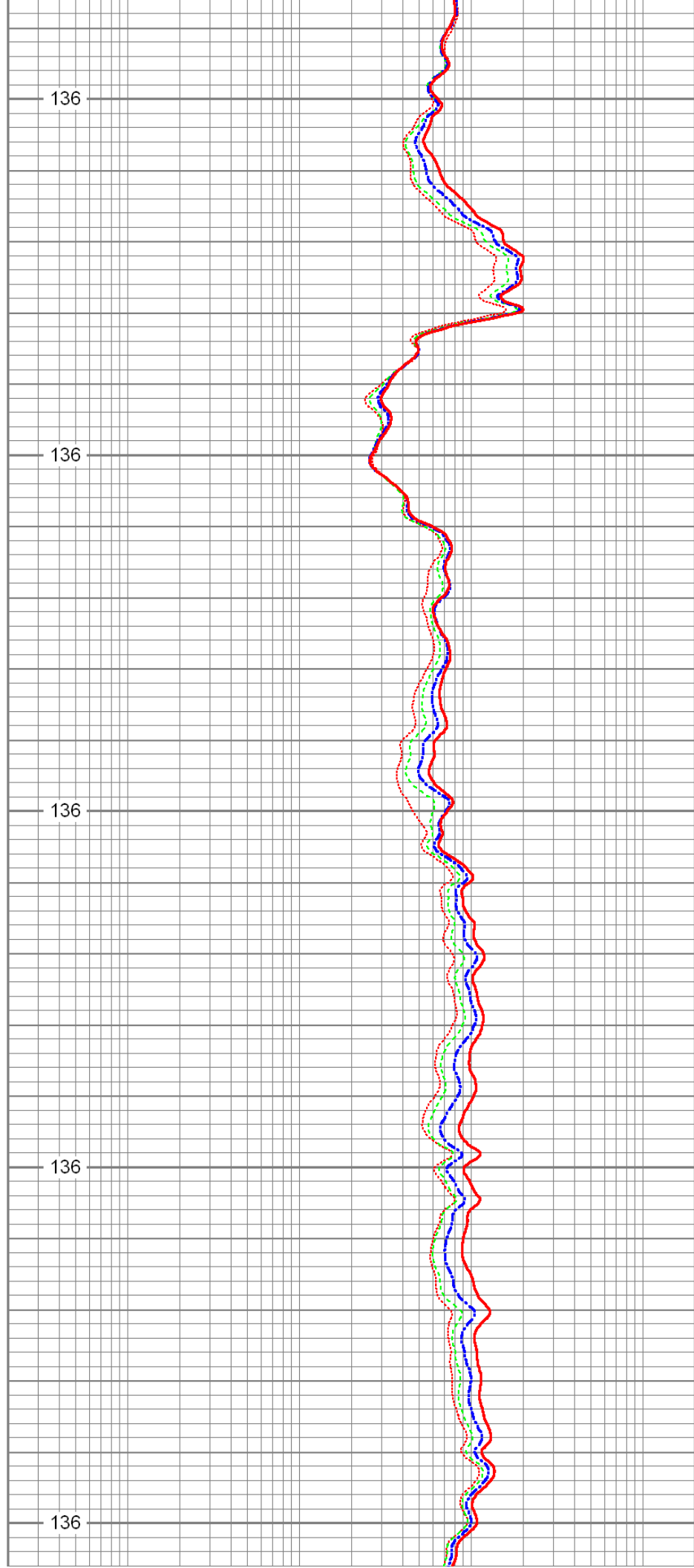
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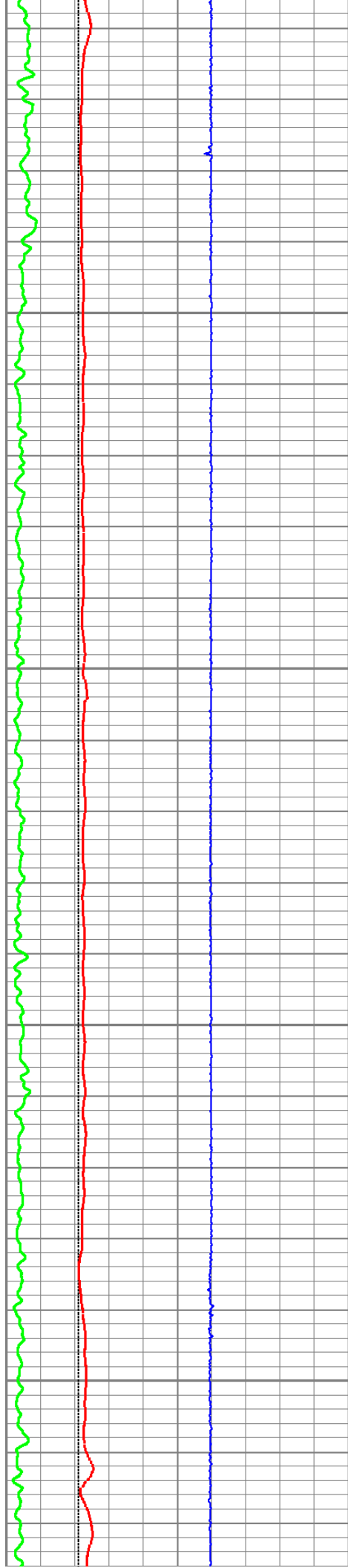
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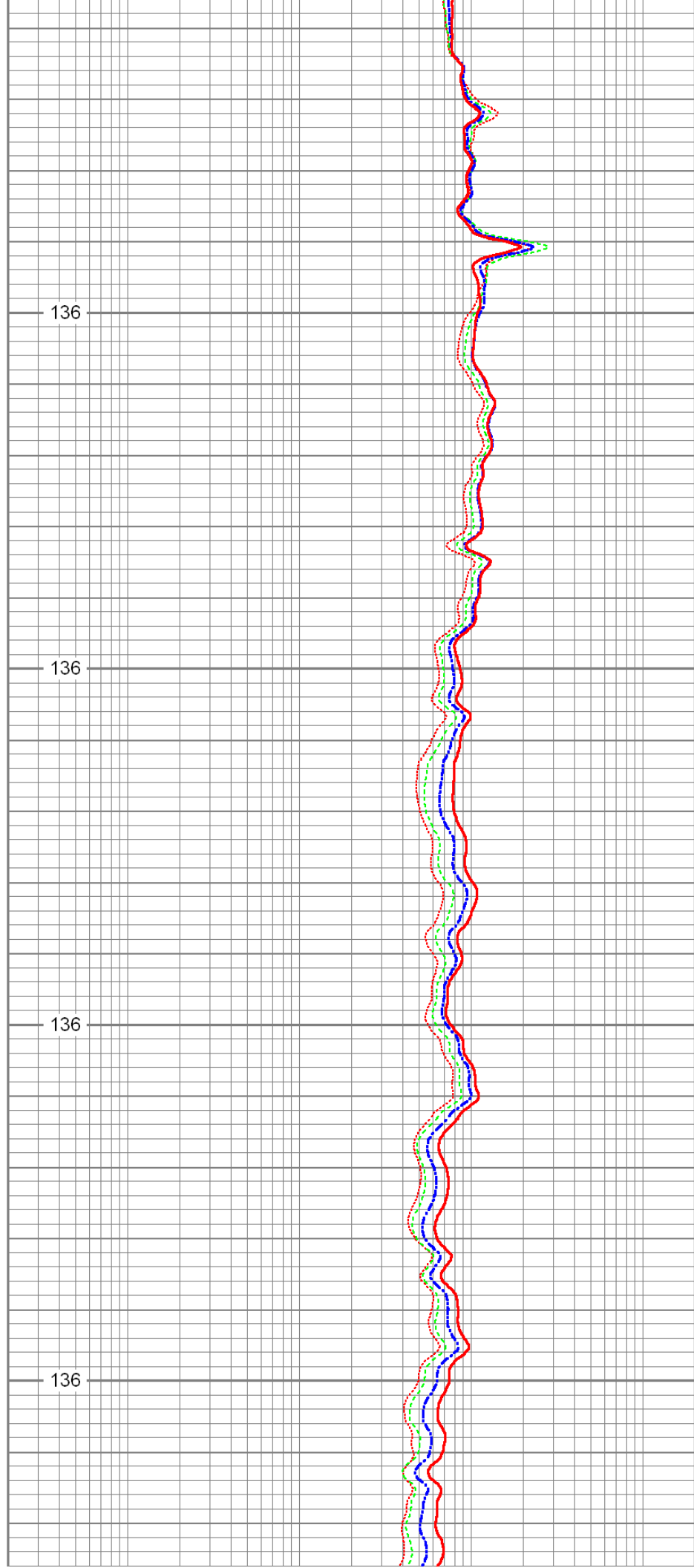
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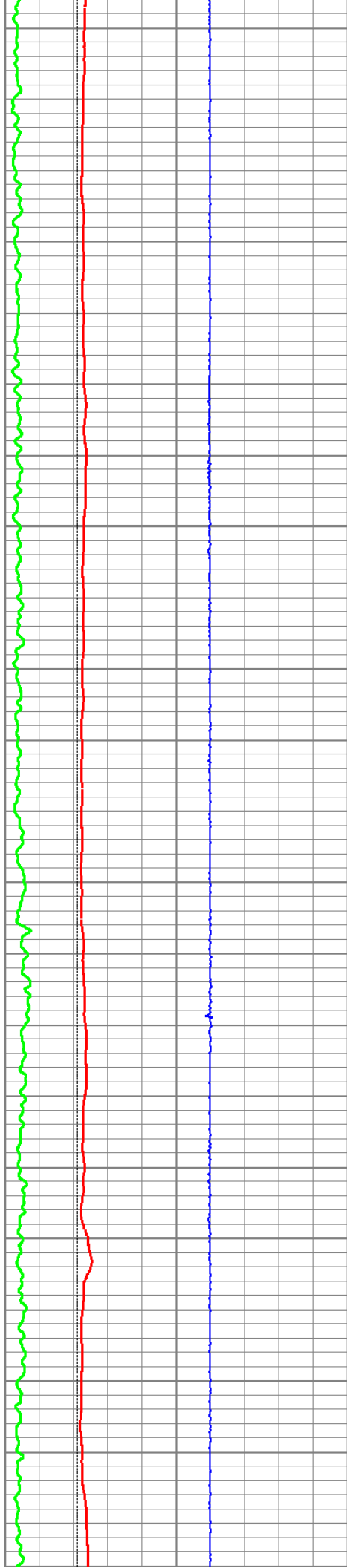
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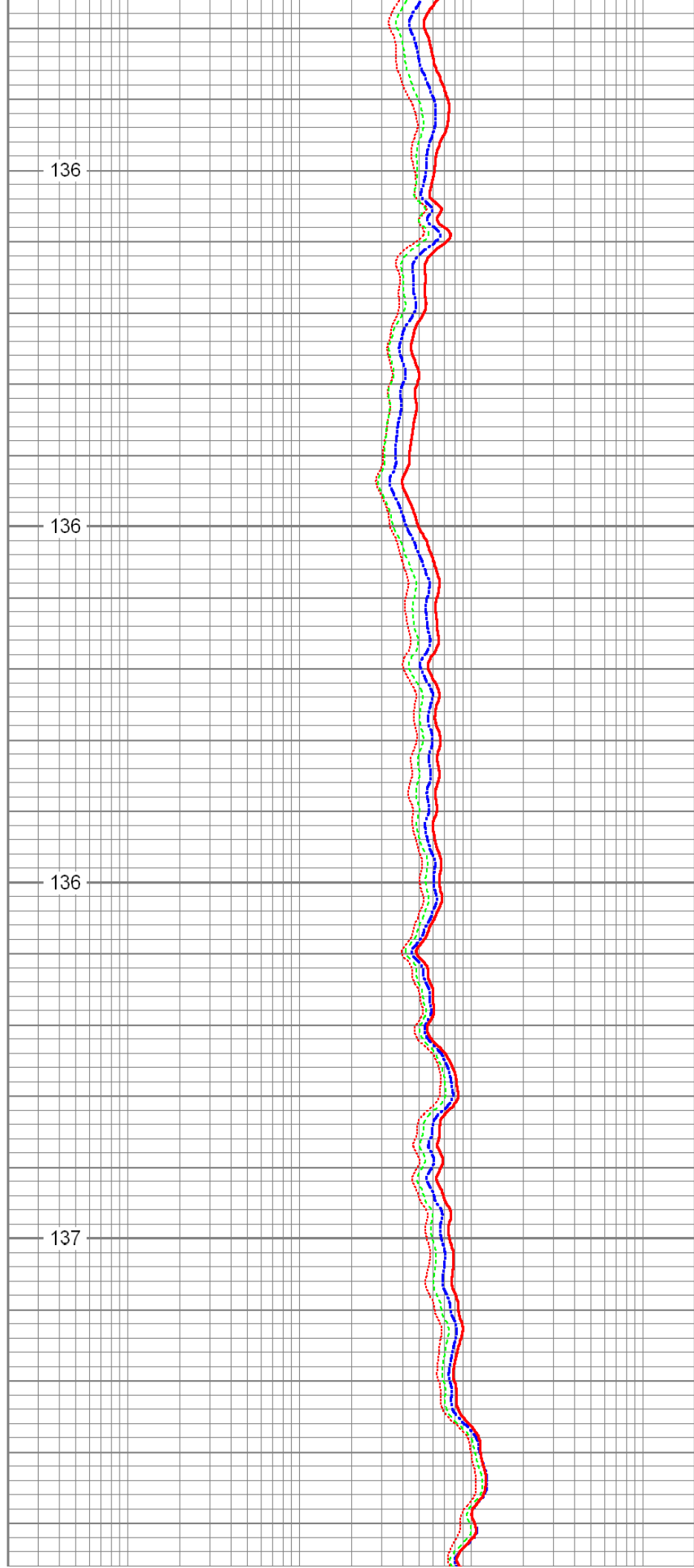
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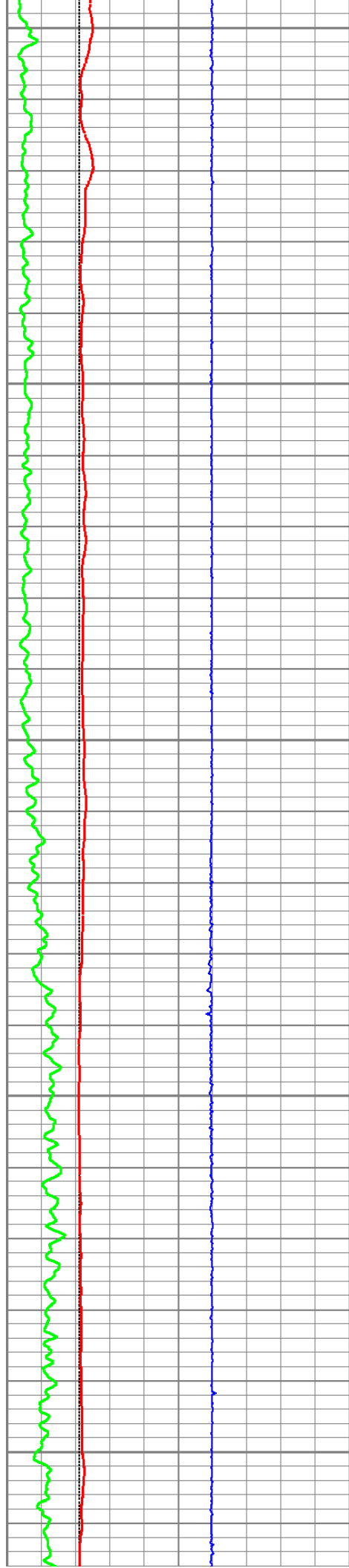
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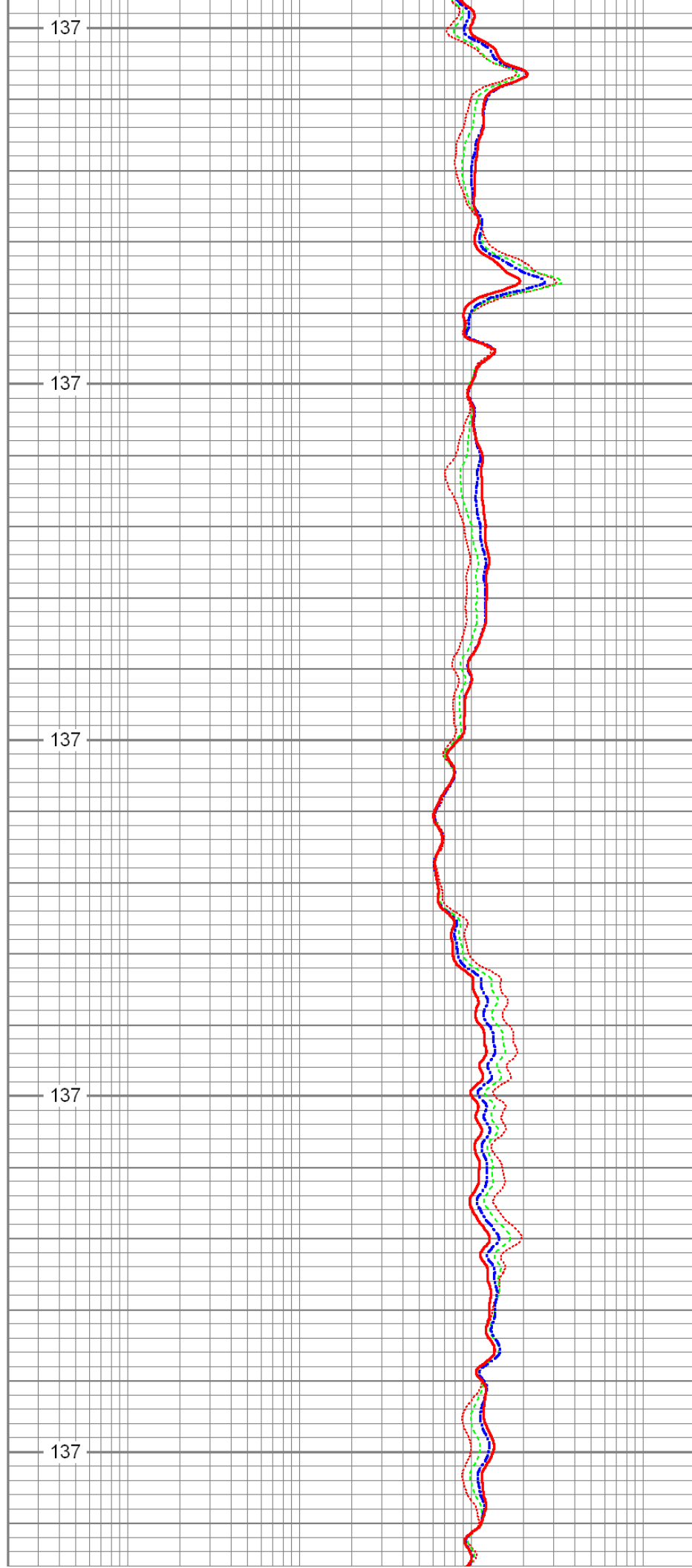
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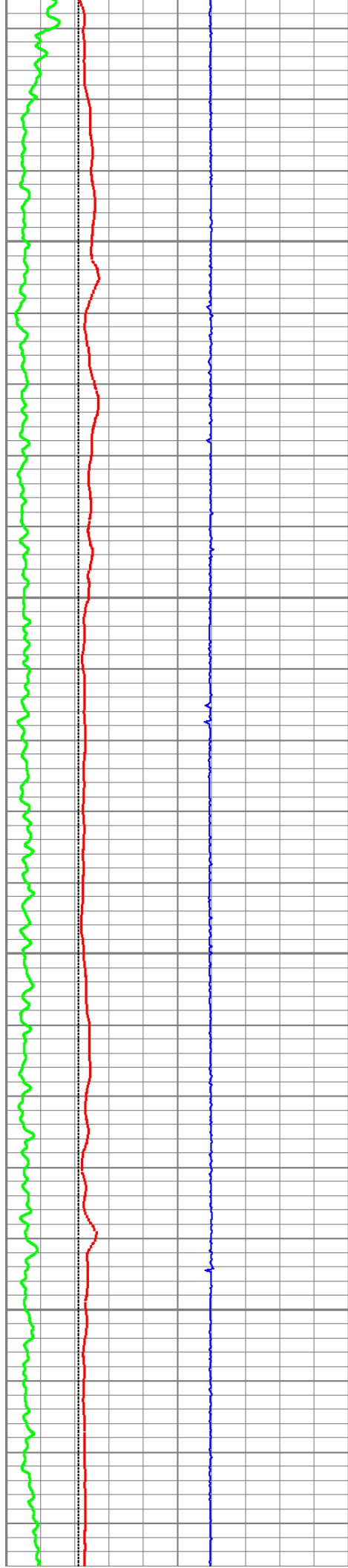
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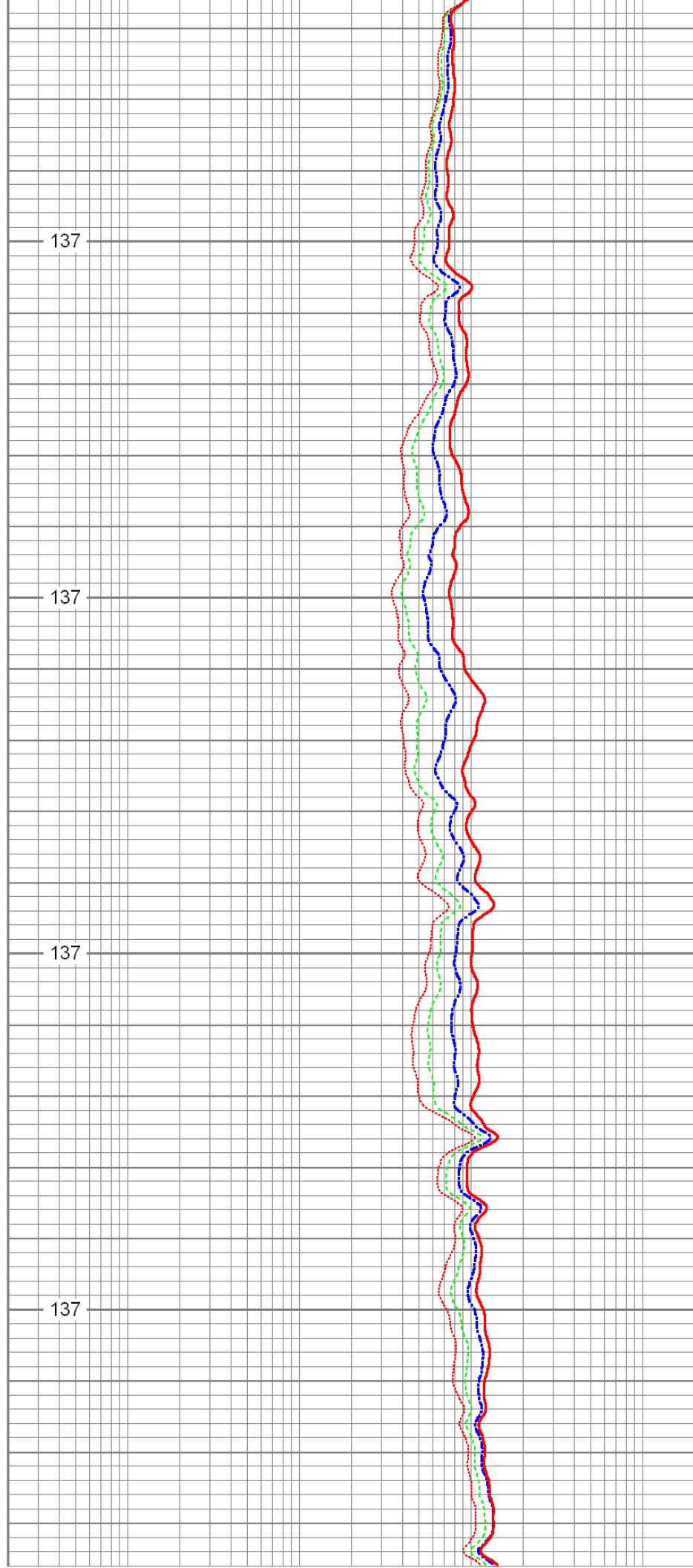
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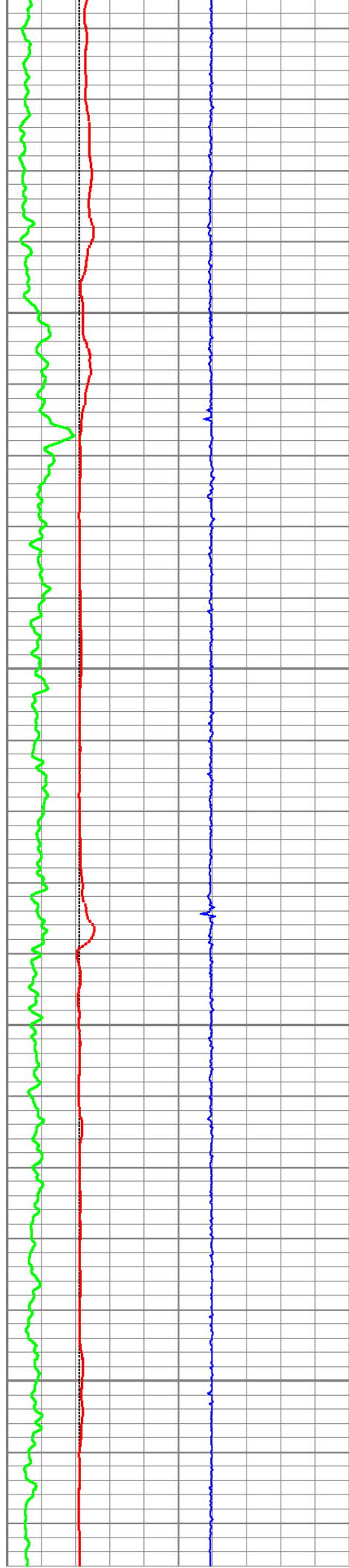
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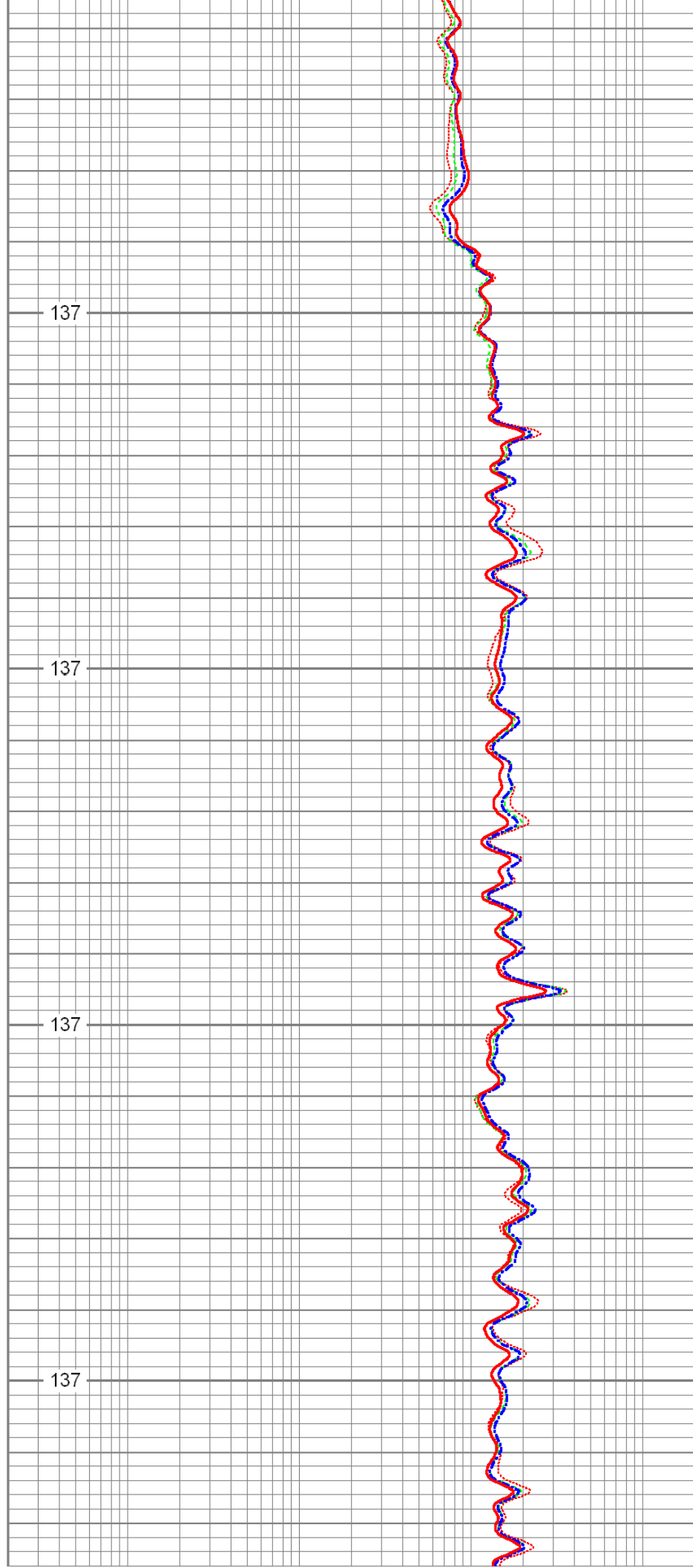
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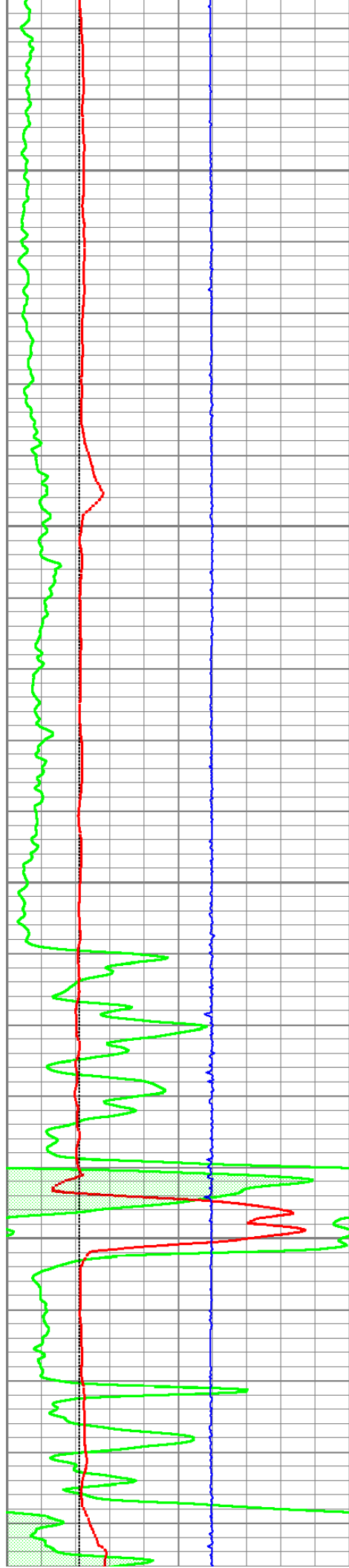
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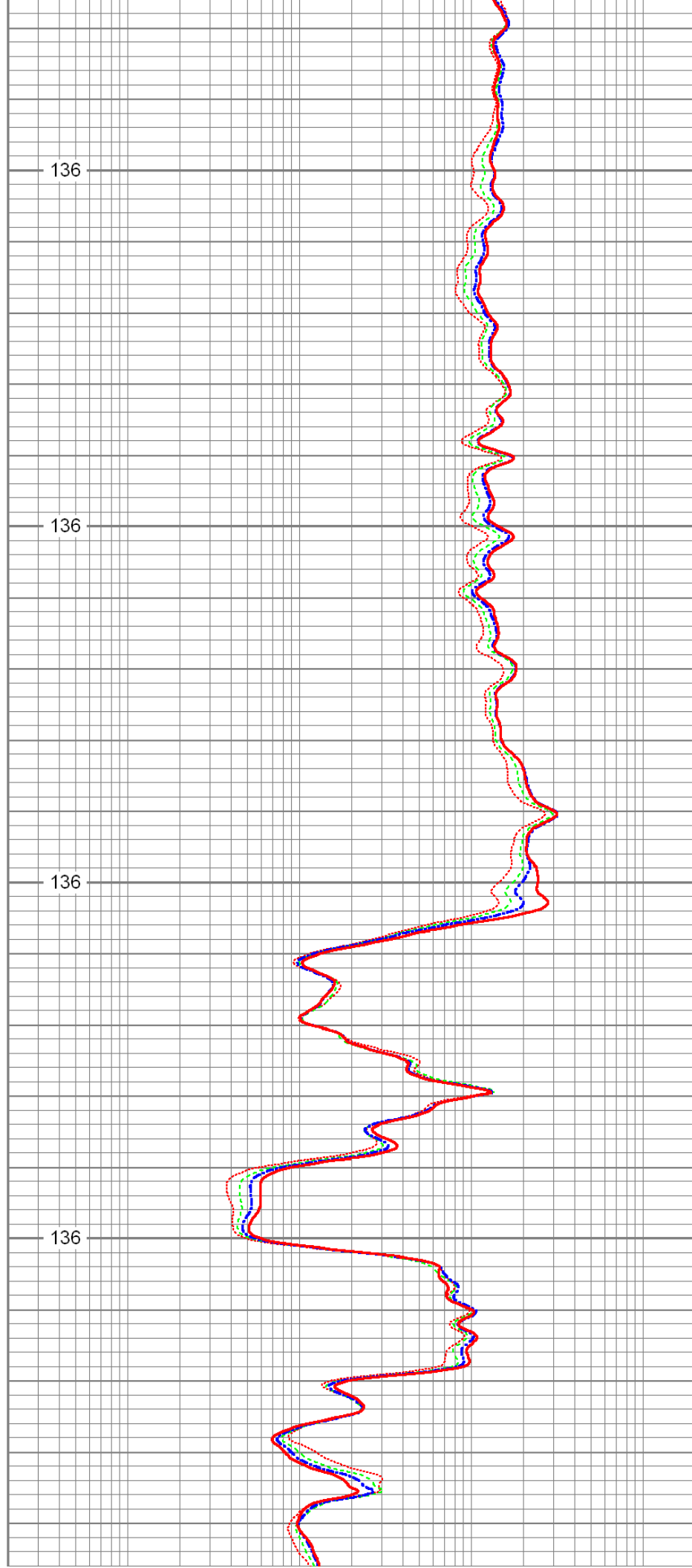
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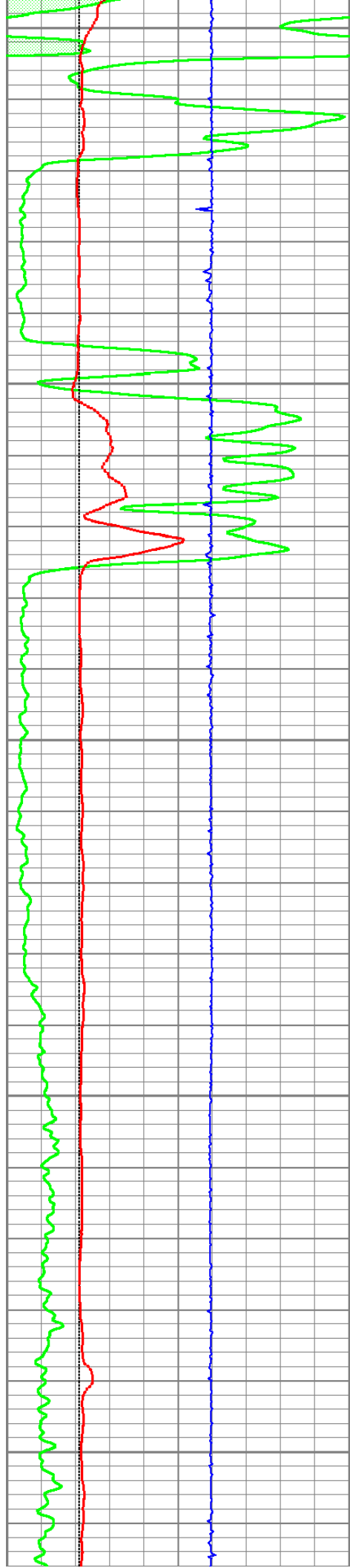
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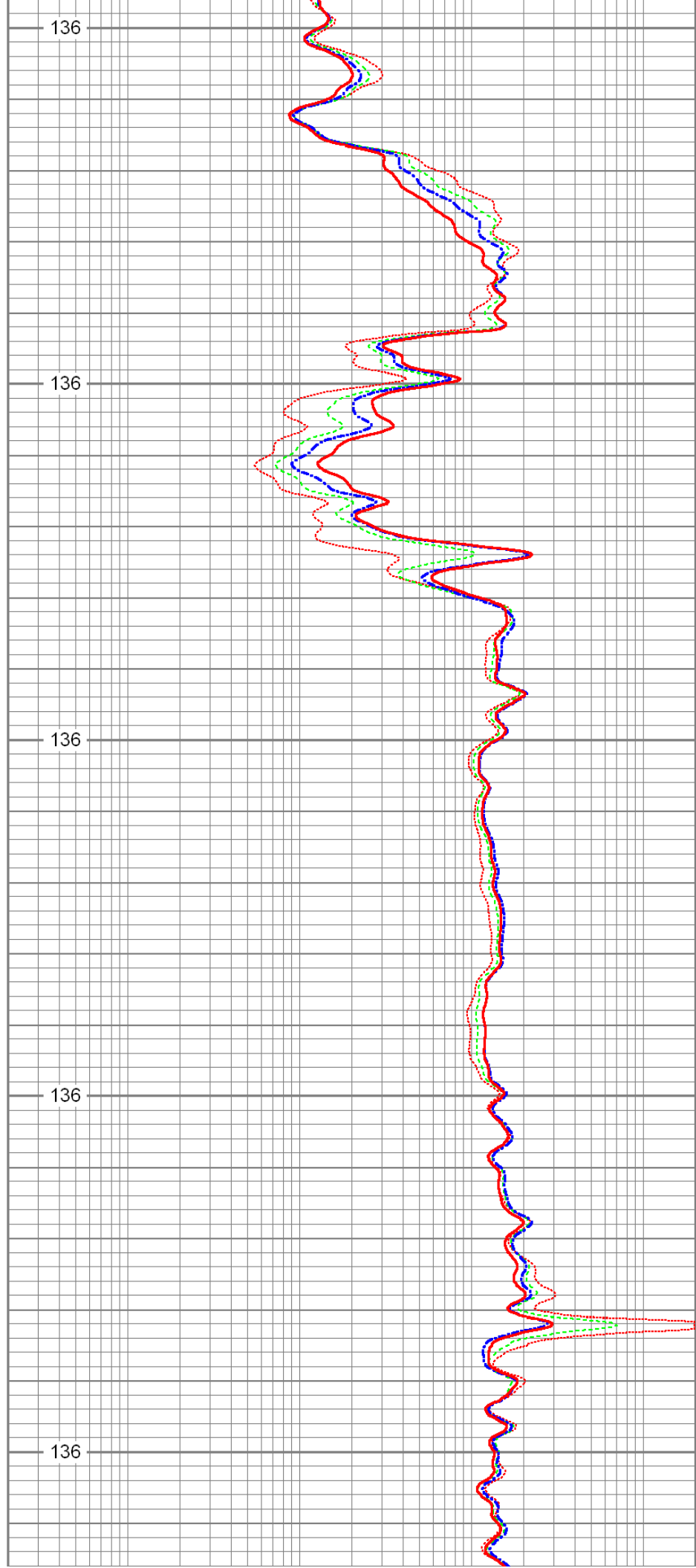
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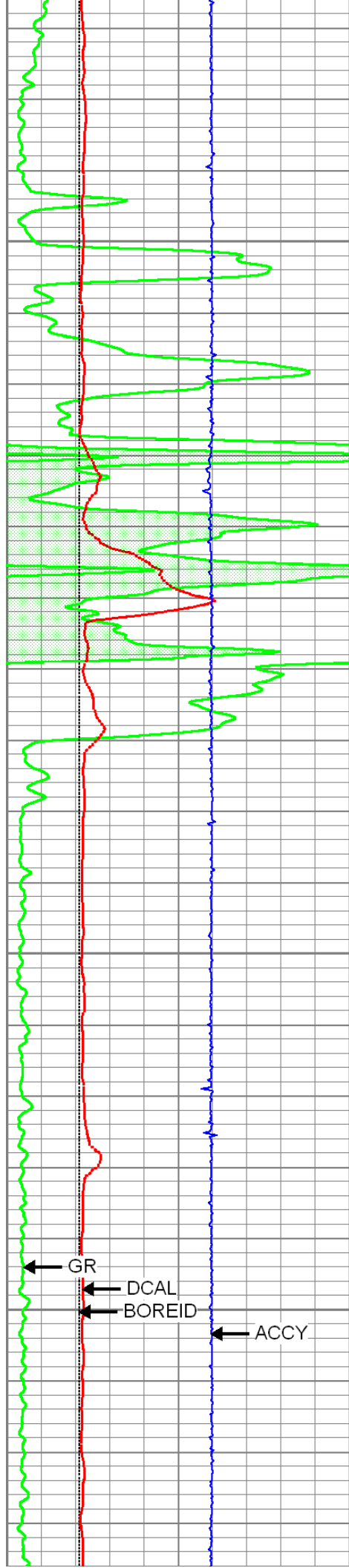
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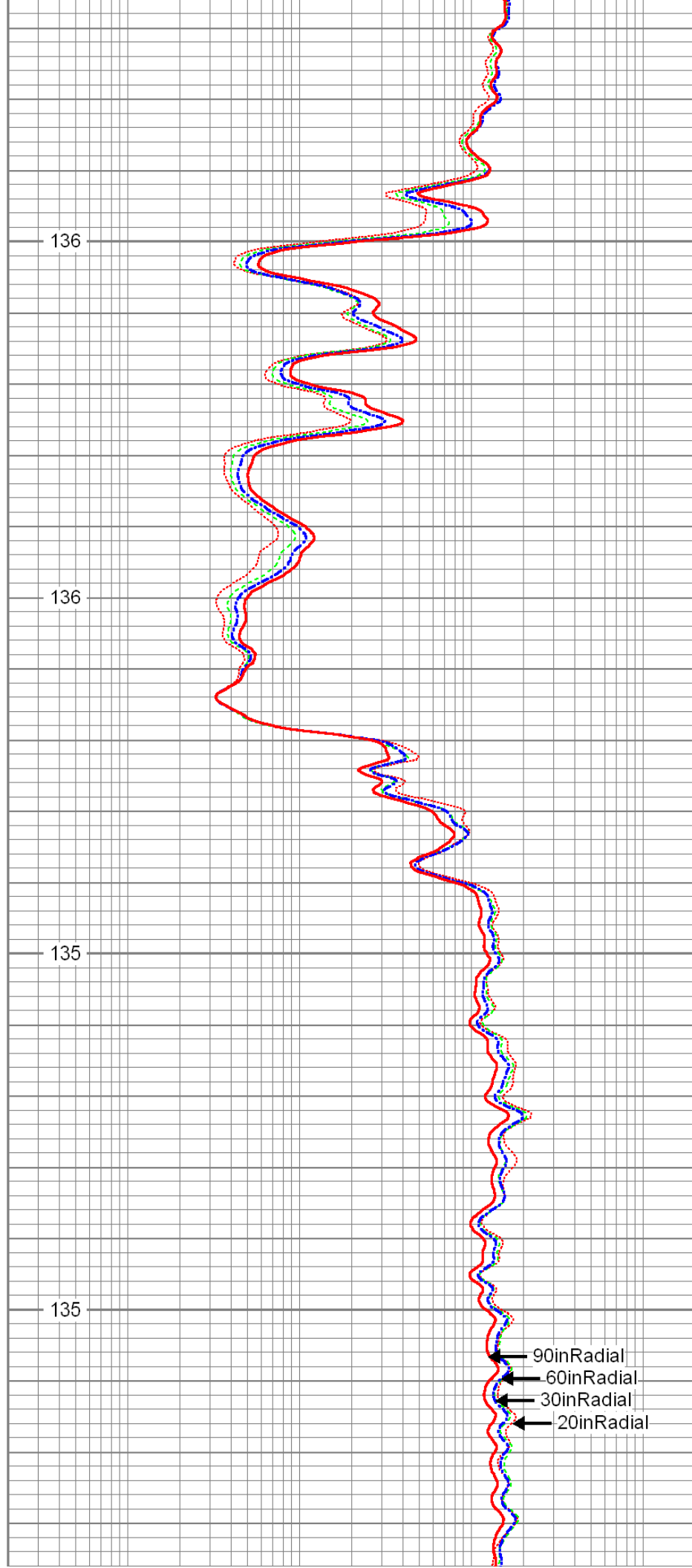
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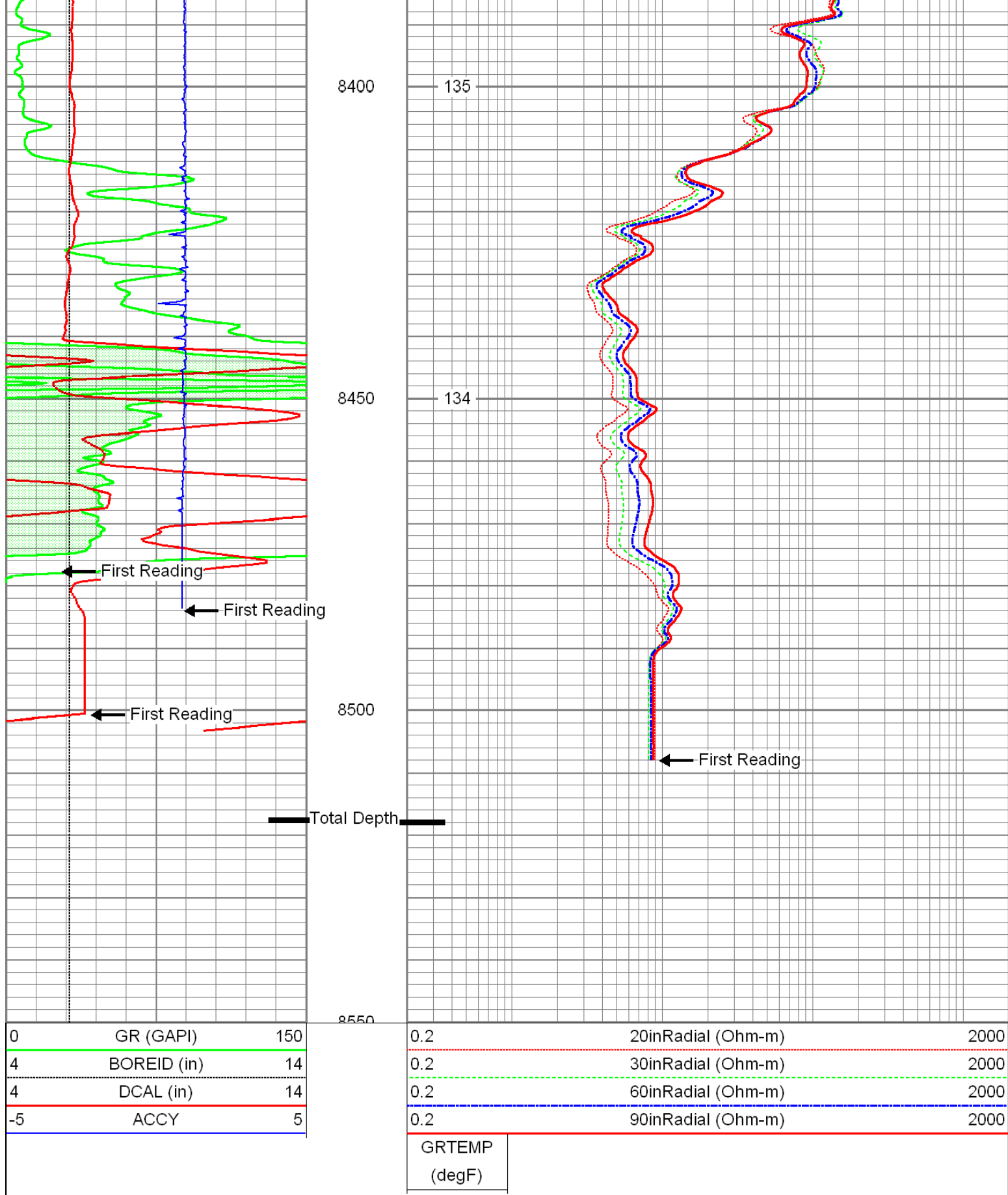
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Log Variables

Database: C:\Warrior\Data\starks_mem.db
Dataset: field/well/proc2/pass1.4

Top - Bottom

A	BHCOR	BHFL_TYPE	BHFLRES Ohm-m	BHFLRESSRC	BHIDSRC	BOREID in
1	Gr	WDM	1	MUDCELL	CURVE	0.125

	On	WBM	I	MUDCELL	CURVE	6.125
BOTTEMP degF 137	CASED? No	CASEOD in 4.5	CASETHCK in 0	CEMWATERSA kppm 0	CMNTTHCK in 0	DNBHC? NO
DPORSEL RHOB	FLUIDDEN g/cc 1	FRMSALIN kppm 0	LATNOR Off	M 2	MATRXDEN g/cc 2.71	MUDSALIN kppm 1.2
MudWgt lb/gal 8.4	NPORSEL Limestone	PEBHC? YES	PERFS 0	RESTMPSRC INTERNAL	SO in 0.5	SRFTEMP degF 65
SZCOR On	TDEPTH ft 8535	TMPCOR On	TOOLPOS Ec-centered			

Calibration Report				
Database File:	starks_mem.db			
Dataset Pathname:	proc2/pass1.4			
Dataset Creation:	Sun Feb 10 20:33:47 2013			
ThruBit Induction Calibration Report				
Tool Model-Serial Number:		ENP-ENP6R		
Shop Calibration Performed:		Fri Jan 11 13:29:57 2013		
BASELINE				
	R	Expected	X	Expected
Freq 1				
A1	-470.1520	[-500.00, -400.00]	277.7640	[-500.00, 500.00]
A2	-136.2750	[-180.00, -100.00]	272.7460	[-500.00, 500.00]
A3	-28.8302	[-50.00, -10.00]	116.1660	[-500.00, 500.00]
A4	-14.9210	[-30.00, -10.00]	269.3470	[-500.00, 500.00]
A5	-12.3449	[-30.00, -10.00]	139.1730	[-500.00, 500.00]
Freq 2				
A1	-247.3840	[-280.00, -180.00]	157.7290	[-500.00, 500.00]
A2	-86.2367	[-130.00, -50.00]	151.0320	[-500.00, 500.00]
A3	-21.1861	[-50.00, -10.00]	28.7889	[-500.00, 500.00]
A4	-18.0336	[-30.00, -10.00]	98.5082	[-500.00, 500.00]
A5	-17.2337	[-30.00, -10.00]	6.0911	[-500.00, 500.00]
Freq 3				
A1	-158.6900	[-180.00, -80.00]	51.9287	[-500.00, 500.00]
A2	-65.3752	[-130.00, -30.00]	71.1079	[-500.00, 500.00]
A3	-16.9573	[-50.00, -10.00]	-32.2877	[-500.00, 500.00]
A4	-19.6522	[-30.00, -10.00]	-12.4078	[-500.00, 500.00]
A5	-19.5998	[-30.00, -10.00]	-88.9966	[-500.00, 500.00]
Freq 4				
A1	-88.0041	[-120.00, -40.00]	-113.4070	[-500.00, 500.00]
A2	-46.8848	[-110.00, -10.00]	-36.3872	[-500.00, 500.00]
A3	-13.3532	[-50.00, -10.00]	-121.8090	[-500.00, 500.00]
A4	-22.4069	[-30.00, -10.00]	-172.7230	[-500.00, 500.00]
A5	-24.3034	[-30.00, -10.00]	-244.0490	[-500.00, 500.00]

CALIBRATION COEFFICIENTS				
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	R	Expected	X	Expected
Freq 1				
A1	0.9813	[0.95, 1.05]	0.0025	[-0.05, 0.05]
A2	0.9888	[0.95, 1.05]	0.0028	[-0.05, 0.05]
A3	0.9894	[0.95, 1.05]	-0.0037	[-0.05, 0.05]
A4	0.9837	[0.95, 1.05]	0.0053	[-0.05, 0.05]
A5	0.9923	[0.95, 1.05]	0.0014	[-0.05, 0.05]
Freq 2				
A1	0.9763	[0.95, 1.05]	-0.0061	[-0.05, 0.05]
A2	0.9833	[0.95, 1.05]	-0.0054	[-0.05, 0.05]
A3	0.9777	[0.95, 1.05]	-0.0058	[-0.05, 0.05]
A4	0.9803	[0.95, 1.05]	-0.0028	[-0.05, 0.05]
A5	0.9899	[0.95, 1.05]	-0.0075	[-0.05, 0.05]
Freq 3				
A1	0.9829	[0.95, 1.05]	-0.0031	[-0.05, 0.05]
A2	0.9906	[0.95, 1.05]	-0.0025	[-0.05, 0.05]
A3	0.9844	[0.95, 1.05]	-0.0040	[-0.05, 0.05]
A4	0.9871	[0.95, 1.05]	-0.0000	[-0.05, 0.05]
A5	0.9986	[0.95, 1.05]	-0.0047	[-0.05, 0.05]
Freq 4				
A1	0.9889	[0.95, 1.05]	0.0060	[-0.05, 0.05]
A2	0.9965	[0.95, 1.05]	0.0067	[-0.05, 0.05]
A3	0.9886	[0.95, 1.05]	0.0033	[-0.05, 0.05]
A4	0.9954	[0.95, 1.05]	0.0092	[-0.05, 0.05]
A5	1.0158	[0.95, 1.05]	0.0017	[-0.05, 0.05]
Temperature	34.1472 degC			

ThruBit Density Calibration Report	
Tool Model-Serial Number:	PS-PS03D
Source Number:	
Shop Calibration Performed:	Wed Feb 06 10:00:07 2013

REFERENCE			
	Density	Units	
Aluminium	2.607	g/cc	
Magnesium	1.752	g/cc	
READINGS			
Outputs	Counts	Units	Expected
SS1 Background	142.57	cps	[130.00, 170.00]
LS1 Background	154.98	cps	[130.00, 170.00]
LS4 Background	32.54	cps	[27.00, 35.00]
SS1 Aluminium	4664.78	cps	[4500.00, 5500.00]
LS1 Aluminium	847.37	cps	[750.00, 950.00]
LS4 Aluminium	914.25	cps	[843.00, 1068.00]
SS1 Magnesium	7697.75	cps	[7000.00, 9000.00]
LS1 Magnesium	5378.37	cps	[5250.00, 6250.00]
LS1 Al + Fe	728.12	cps	[650.00, 800.00]
LS4 Al + Fe	420.59	cps	[382.00, 471.00]
RESULTS			
SS Slope	1.67		[1.52, 1.77]
LS Slope	0.42		[0.38, 0.45]

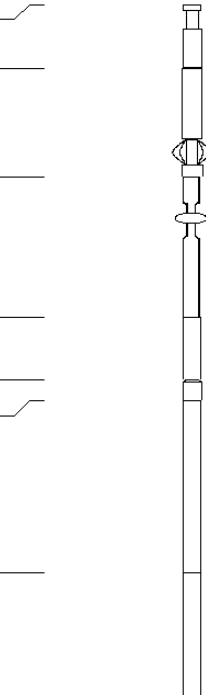
PEF K Factor	4.783	[3.510, 6.170]	
PEF B Factor	-0.564	[-0.700, -0.410]	
RESULTS			
Caliper Shop Calibration performed:		Wed Feb 06 10:00:07 2013	
Reference	Reading	Units	
12.00	1965.82	in	
9.00	2133.31	in	
6.00	2294.06	in	
DENSITY PRE-SURVEY CHECK Performed:		Thu Feb 07 09:54:34 2013	
Outputs	Counts	Units	Expected
SS1 Background	143.28	cps	[138.30, 146.85]
LS1 Background	152.53	cps	[150.33, 159.63]
LS4 Background	33.12	cps	[30.59, 34.49]
CALIPER PRE-SURVEY CHECK Performed:		Thu Feb 07 09:54:58 2013	
Reference	Readings	Units	Expected
9.00	8.95	in	[8.80, 9.20]
Compensated Neutron Calibration Report			
Tool Model-Serial Number:		PS-PS06N	
Source Number:			
Calibration Tank Temperature:		61.3 degF	
Shop Calibration Performed:		Wed Feb 06 13:27:37 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	775.2	cps	
LS Counts	27.0	cps	
Tank Ratio Ref	30.9580	SS/LS	
Tank Ratio	28.7125	SS/LS	
Tank Ratio Gain	1.0782		[0.85, 1.15]
ALUMINUM SLEEVE REFERENCE			
Outputs	Measured	Units	Expected
SS Counts	8554.5	cps	
LS Counts	836.3	cps	

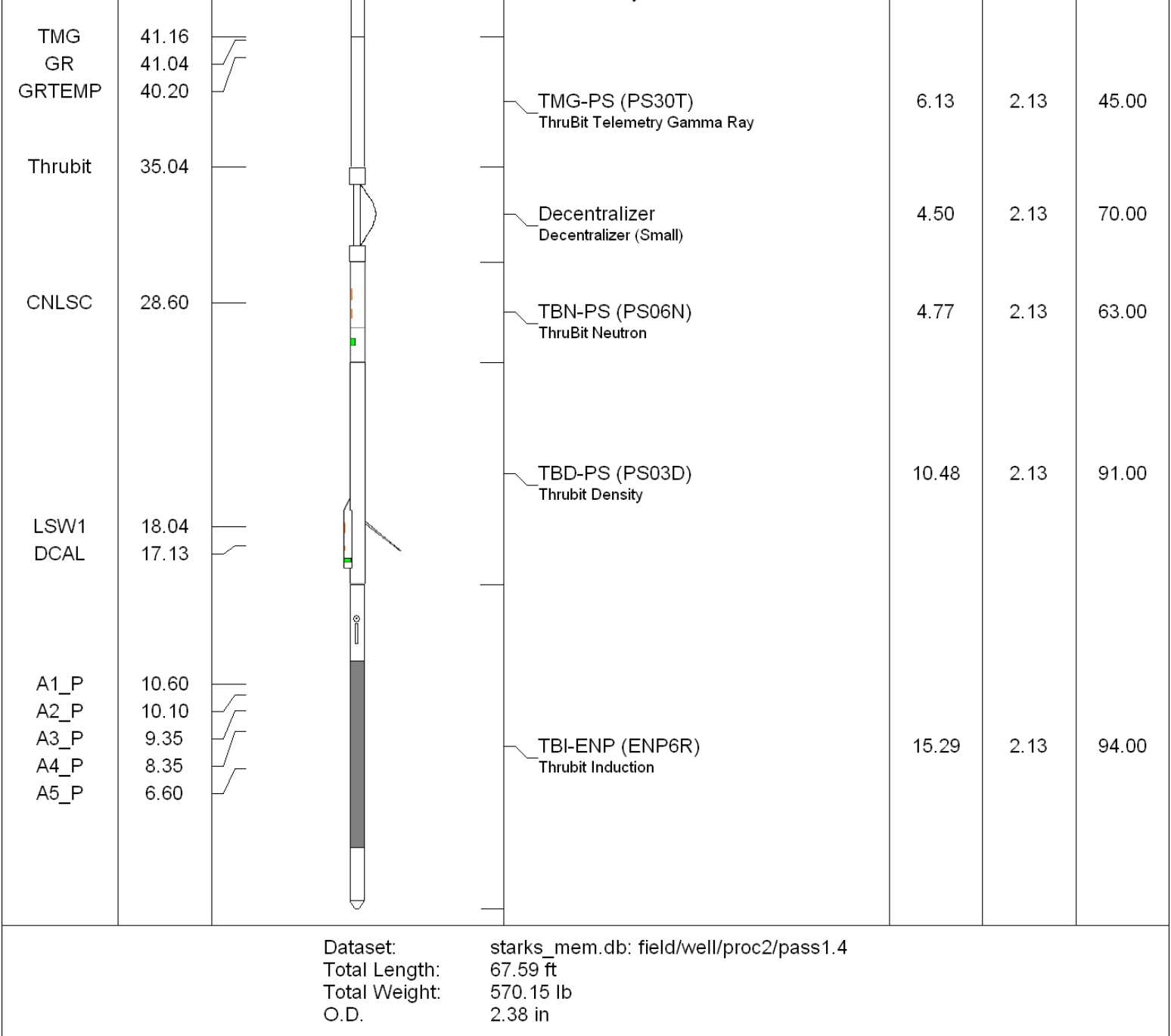
AI Ratio Ref	10.797	SS/LS	
AI Ratio	11.029	SS/LS	
AI Ratio Gain	0.98		[0.90, 1.10]
Sleeve Porosity	14.46	pu	

PRE-SURVEY BACKGROUND CHECK Performed: Thu Feb 07 09:59:40 2013			
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-PS30T		
Performed:	Wed Feb 06 13:36:07 2013		
Calibrator Value:	170.8	GAPI	
Background Reading:	74.2	cps	
Calibrator Reading:	452.4	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 Solid Weakpoint	2.31	2.13	5.00
Thrubit	65.28		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 (PS07B) Thrubit Battery	6.13	2.13	38.20
TBBAT2	47.29		TBBAT2-A (PS40B) Thrubit Battery	6.13	2.13	40.00



Company

Well

Field

County

State

SANDRIDGE ENERGY, INC

STARKS 3408 2-35H

HARPER, KS / MISS LIME

HARPER

KS

MAIN PASS

Database File:starks_mem.db
Dataset Pathname:proc2/pass1.4
Presentation Format:6_1r_chk
Dataset Creation:Sun Feb 10 20:33:47 2013
Charted by:Depth in Feet scaled 1:1200

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

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

