



ThruBit
A Schlumberger Company

**ARRAY INDUCTION
GAMMA RAY
MEMORY LOG**

Company	SANDRIDGE ENERGY	Company	SANDRIDGE ENERGY
Well	GARLOW 3406 2-16H	Well	GARLOW 3406 2-16H
Field	EASTHAM	Field	EASTHAM
County	HARPER	County	HARPER
State	KANSAS	State	KANSAS
Location:	API #: 15-077-21904-0100	Other Services	THRUBIT PORTAL BIT
Permanent Datum	SEC 16 TWP 34S RGE 6W	Elevation	K.B. 1318' D.F. 1318' G.L. 1303'
Log Measured From	G.L. 225' FNL & 660' FWL		
Drilling Measured From	K.B. 15' ABOVE PERM DATUM		

Date	27 FEB 2013
Run Number	ONE
Depth Driller	8903'
Depth Logger	8863'
Bottom Logged Interval	8852'
Top Log Interval	2500'
Casing Driller	7" @ 5039'
Casing Logger	5046
Bit Size	6.125"
Type Fluid in Hole	WBM
Density / Viscosity	8.3 / 28
pH / Fluid Loss	8.0 / N.C.
Source of Sample	MUD SENSOR
Rm @ Meas. Temp	2.15 OHM @ 65 DEGF
Rmf @ Meas. Temp	1.98 OHM @ 65 DEGF
Rmc @ Meas. Temp	2.37 OHM @ 65 DEGF
Source of Rmf / Rmc	CALCULATED
Rm @ BHT	1.68 OHM @ 140 DEGF
Time Circulation Stopped	20:10 26 FEB 2013
Time Logger on Bottom	21:01 26 FEB 2013
Maximum Recorded Temperature	140 DEGF
Equipment Number	T005
Location	OKC, OK
Recorded By	C.PARKER
Witnessed By	B.LAROUX

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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: 8797' LOGGED TO: 2500'
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, ft³
ABHV REPRESENTS ANNULAR HOLE VOLUME, CALCULATED FOR 4.5" CSG., ft³
RIGMINDER USED TO ACQUIRE LOG DEPTH
LOG CORRELATED TO MWD GR
RIG: UNIT 310

CREW: C.PARKER I.HERNADEZ R.WILSON

Service Ticket No.	1772	API No.	15-077-21904-0100	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	NEUTRON	DENSITY	INDUCTION
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Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	PS27T	Serial No.	PS14N	Serial No.	PS05D	Serial No.	PS33R
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	8865'	2500'	0 PSI	35 FPM	

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

DIRECTIONAL INFORMATION

Maximum Deviation	92.53	deg. @	8469'	KOP	3702'
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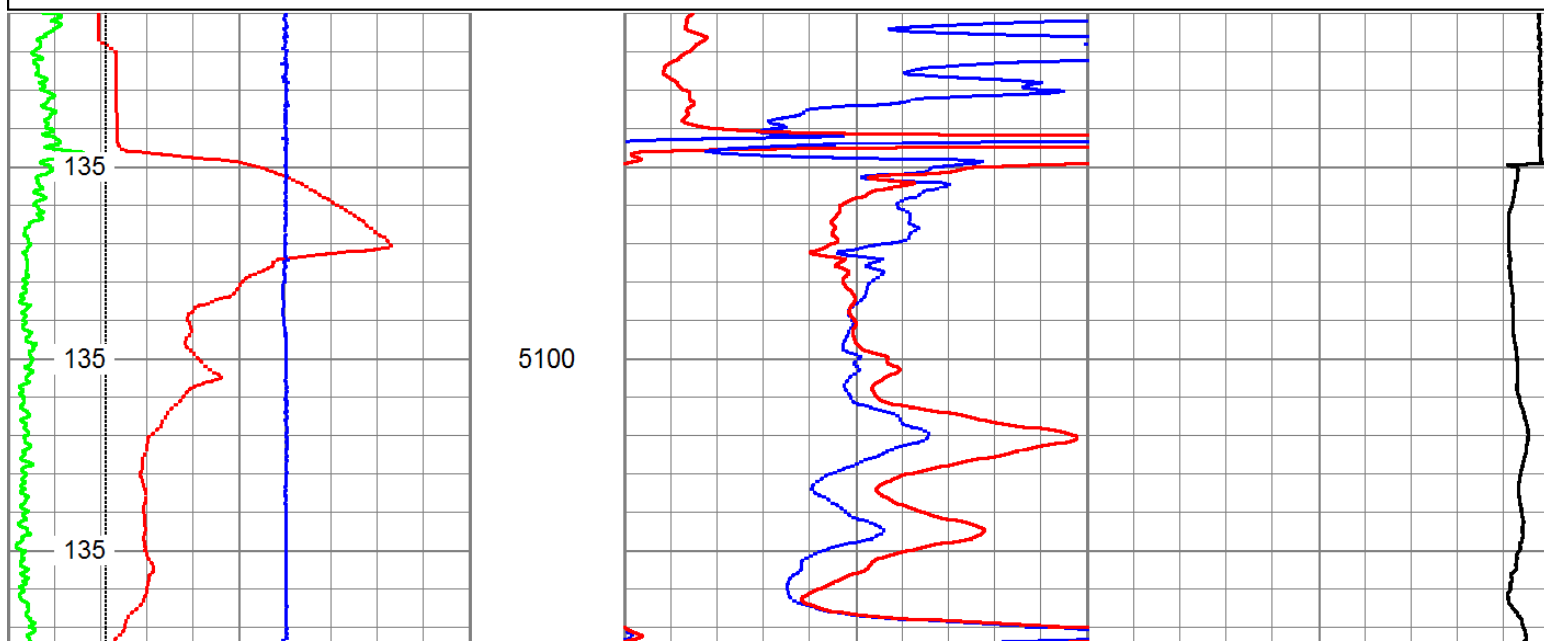


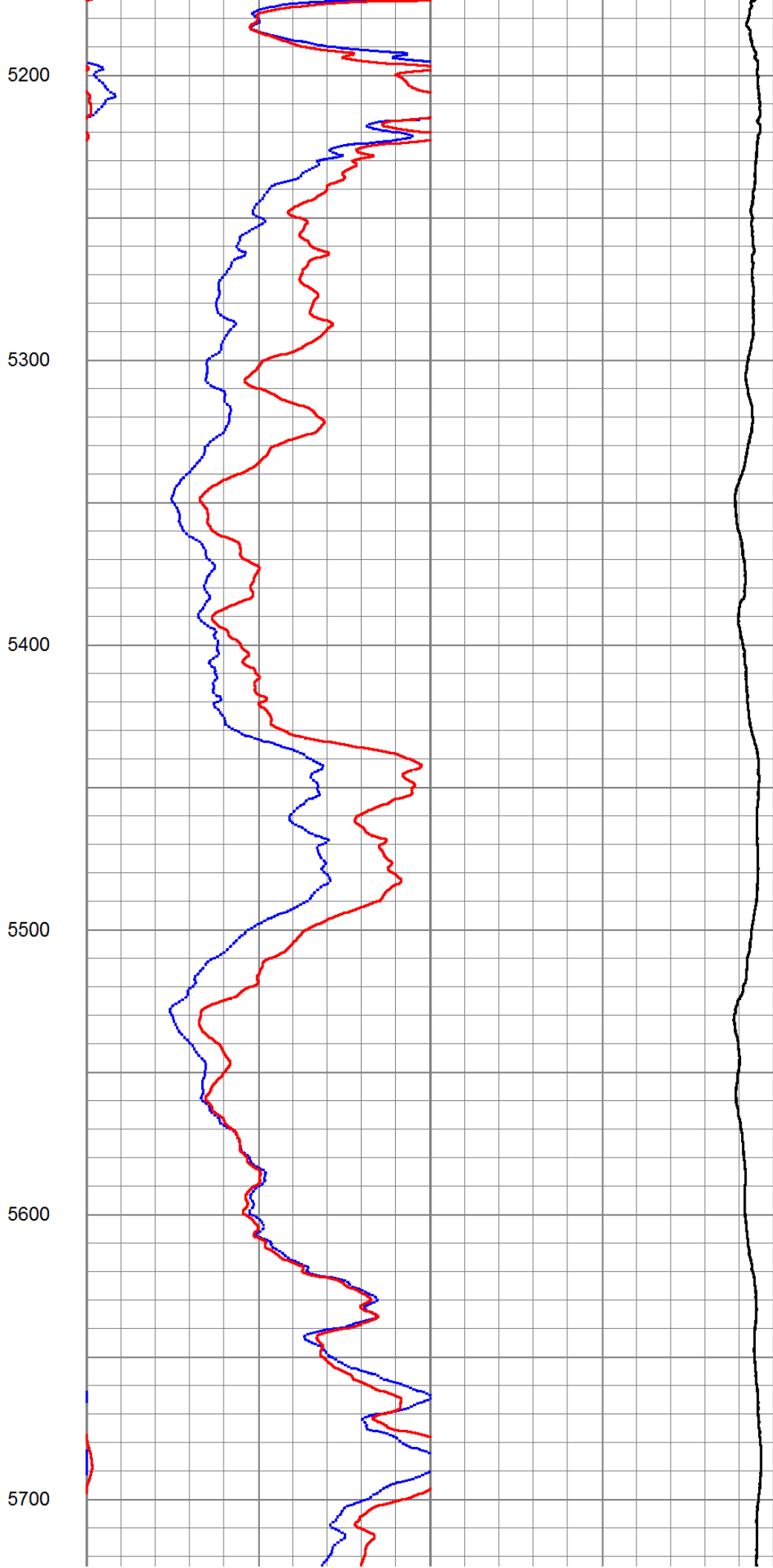
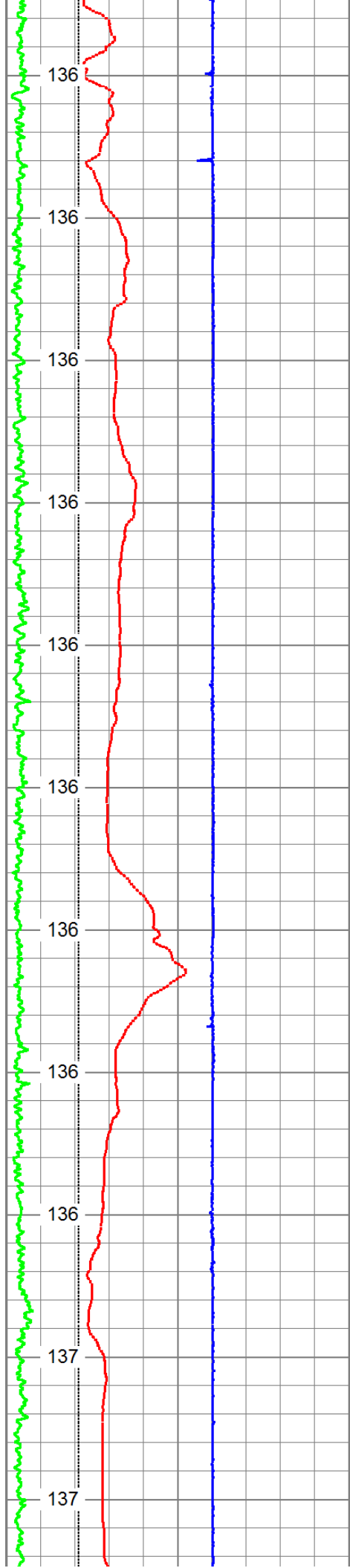
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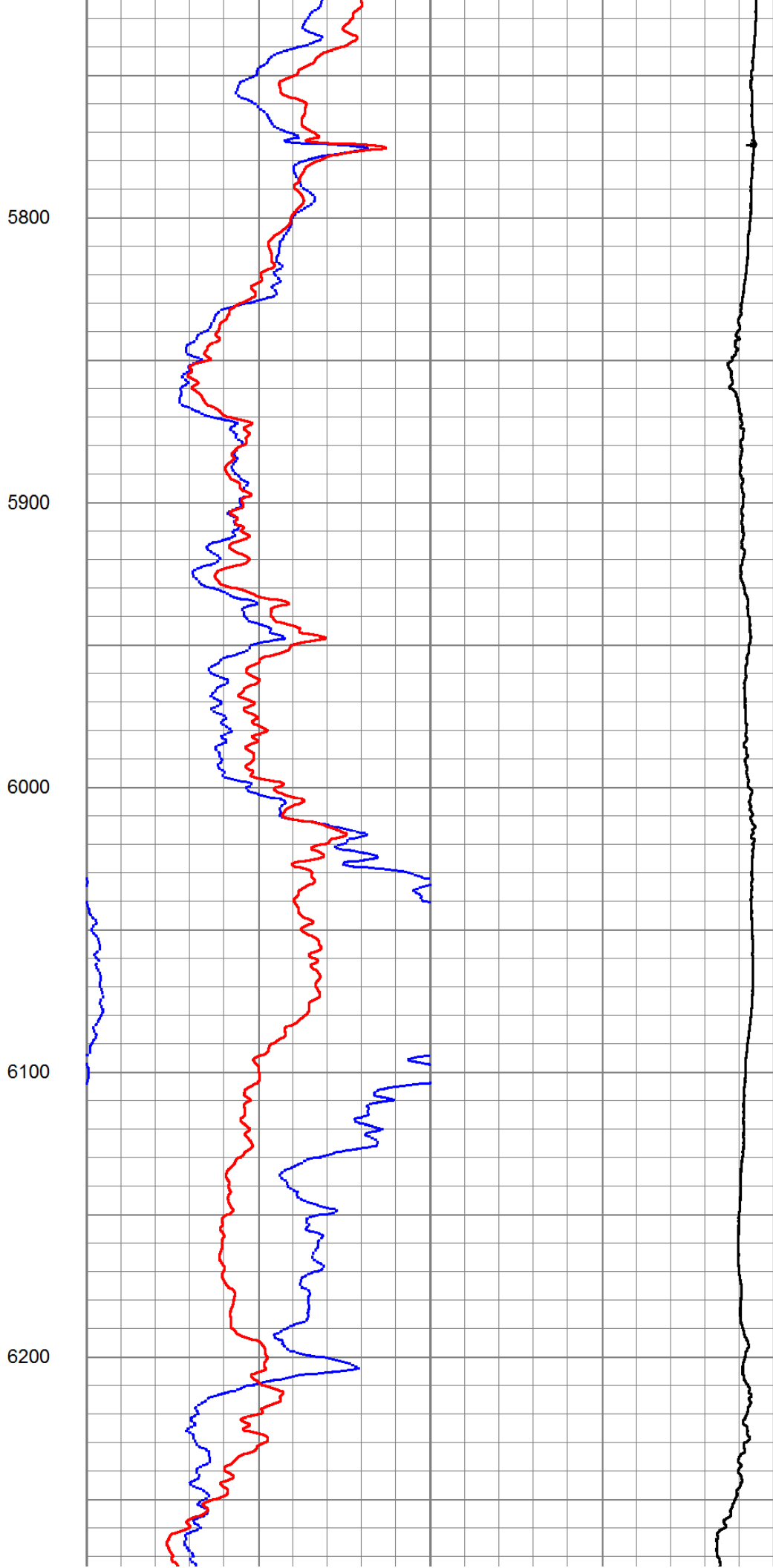
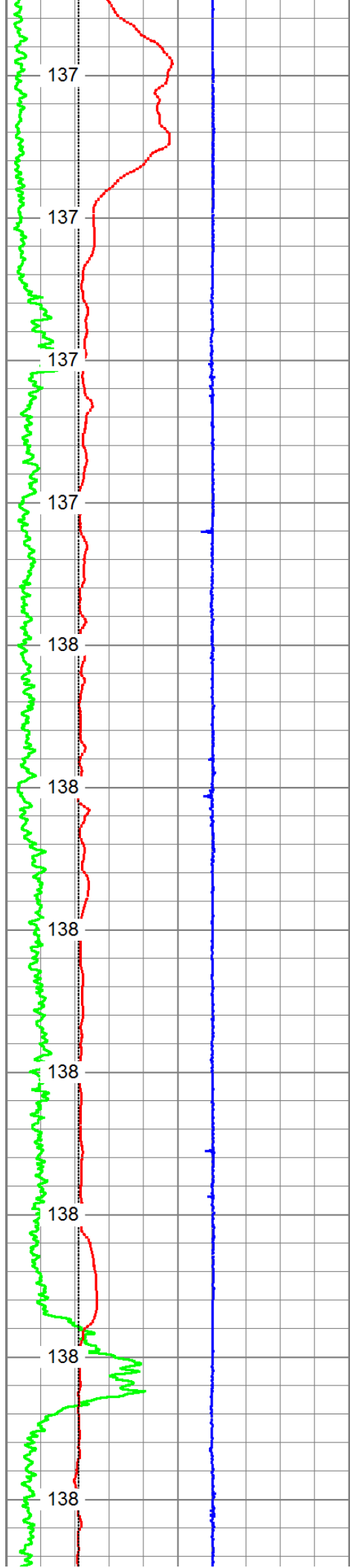
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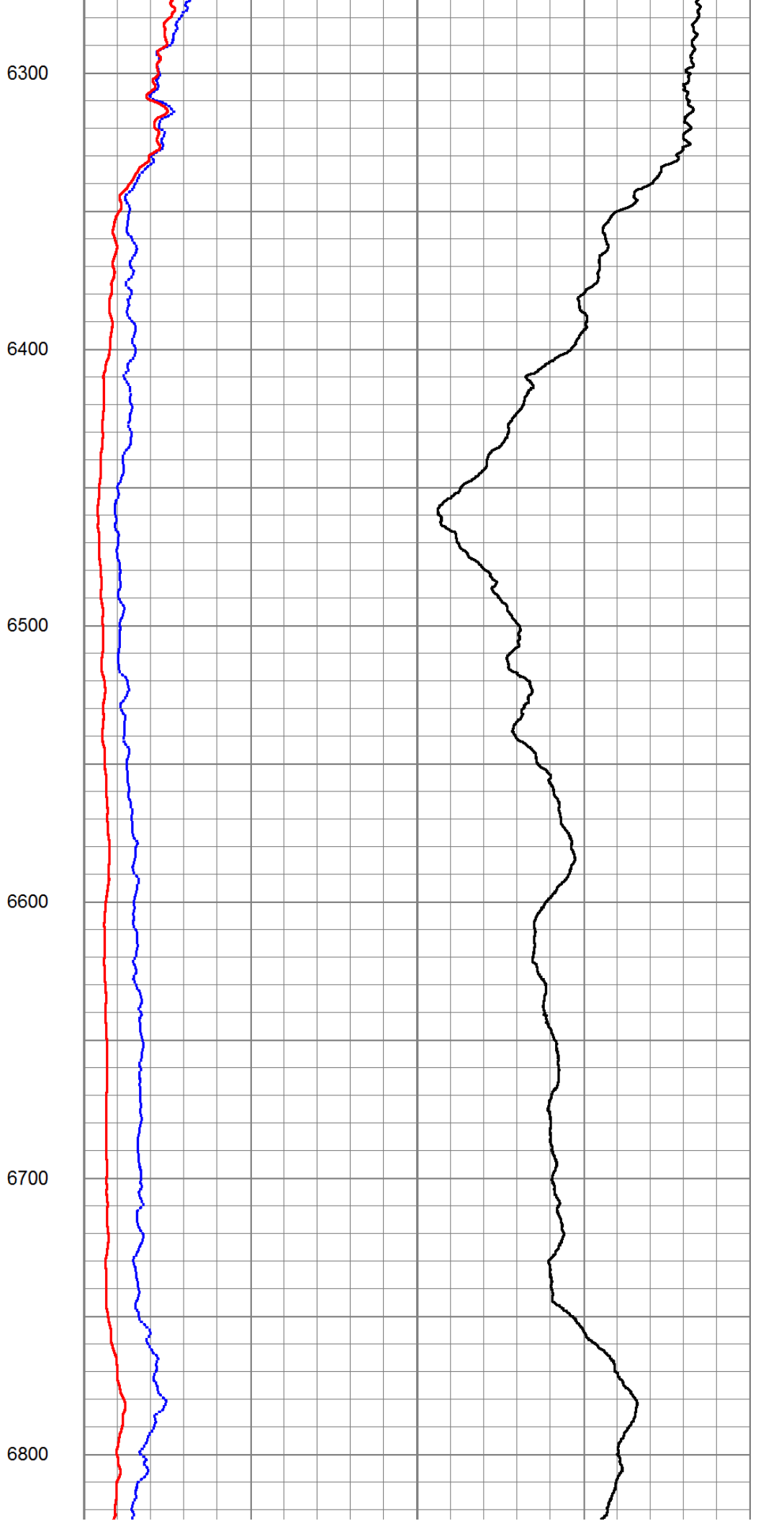
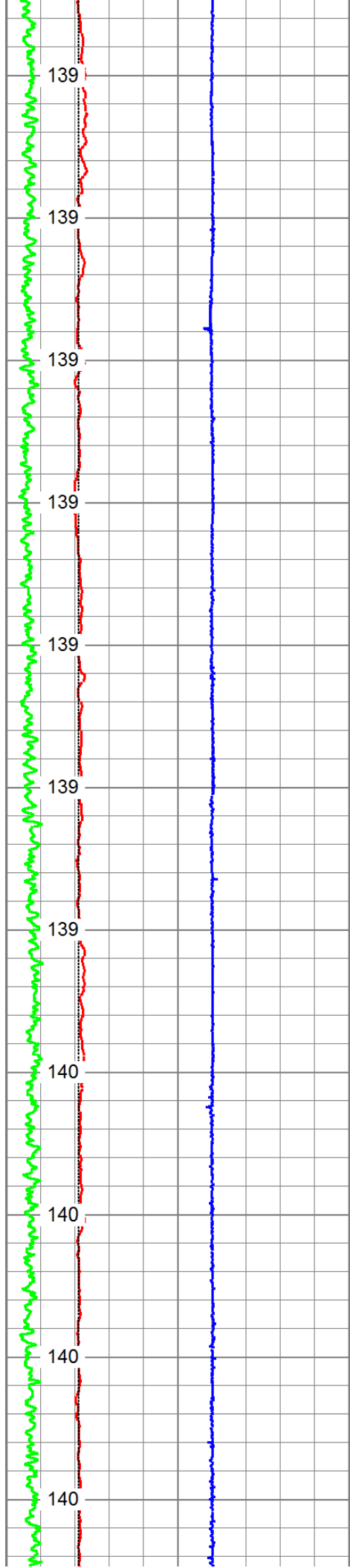
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 Presentation Format: 6_2r_chk
 Dataset Creation: Wed Feb 27 03:44:15 2013
 Charted by: Depth in Feet scaled 1:600

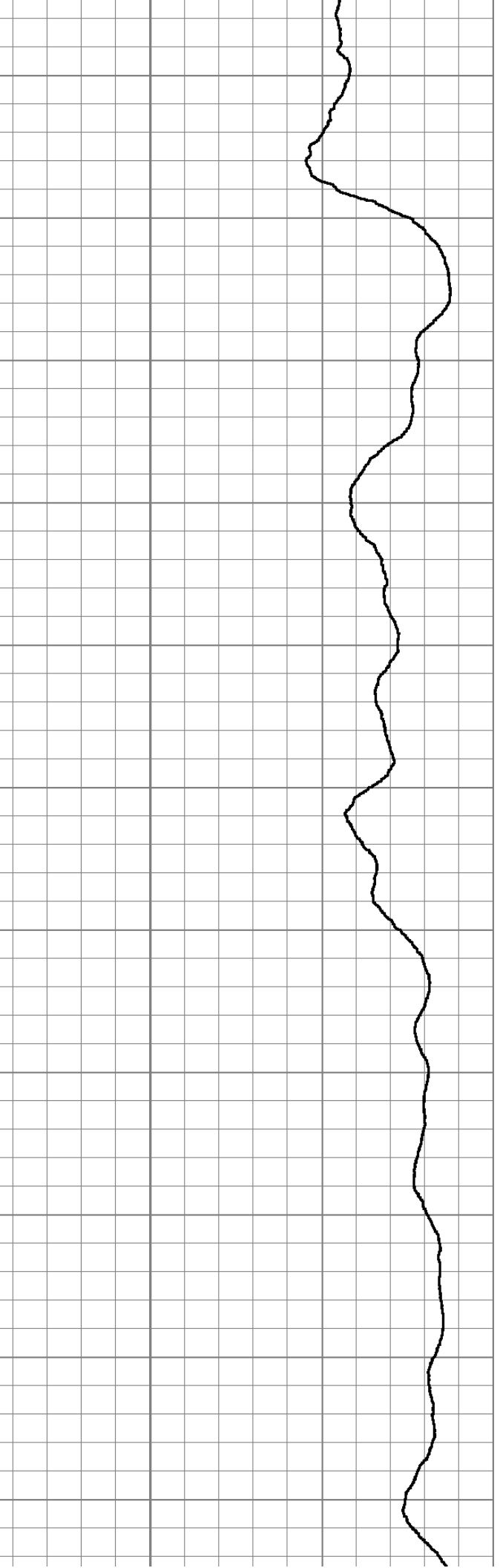
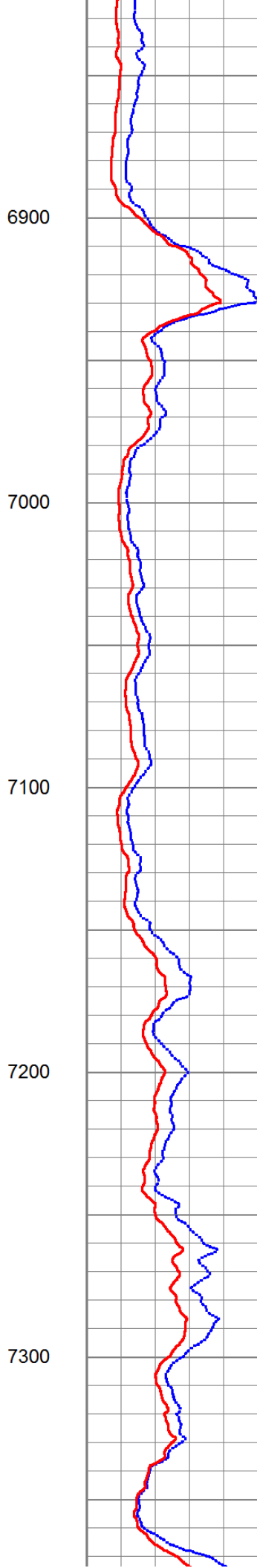
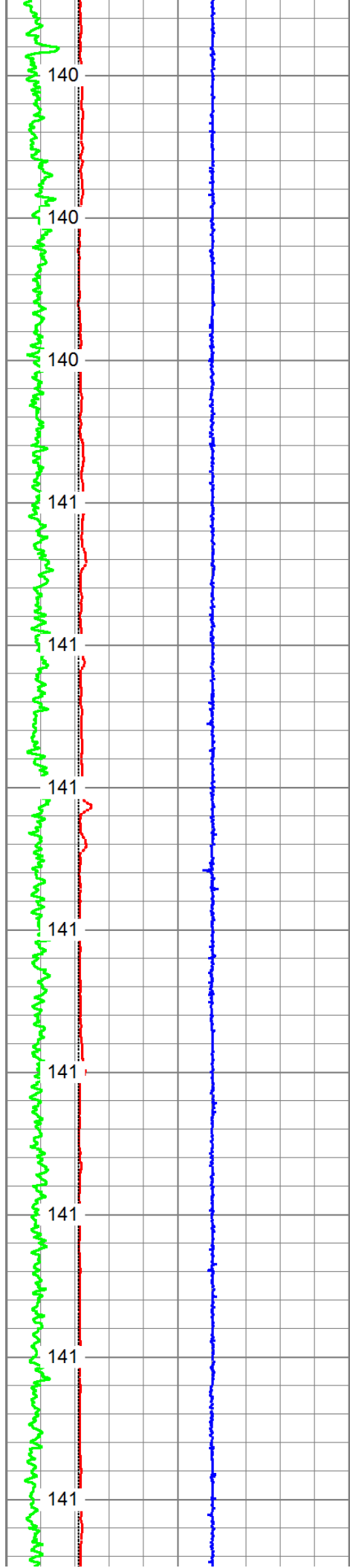
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4	DCAL (in)	14	50	90in 2ft Res (Ohm-m)	500
-5	ACCY	5	1000	DEEP COND (mmho/m) 0	
4	BOREID (in)	14	0	20in 2ft Res (Ohm-m)	50
	GRTEMP (degF)		0	90in 2ft Res (Ohm-m)	50

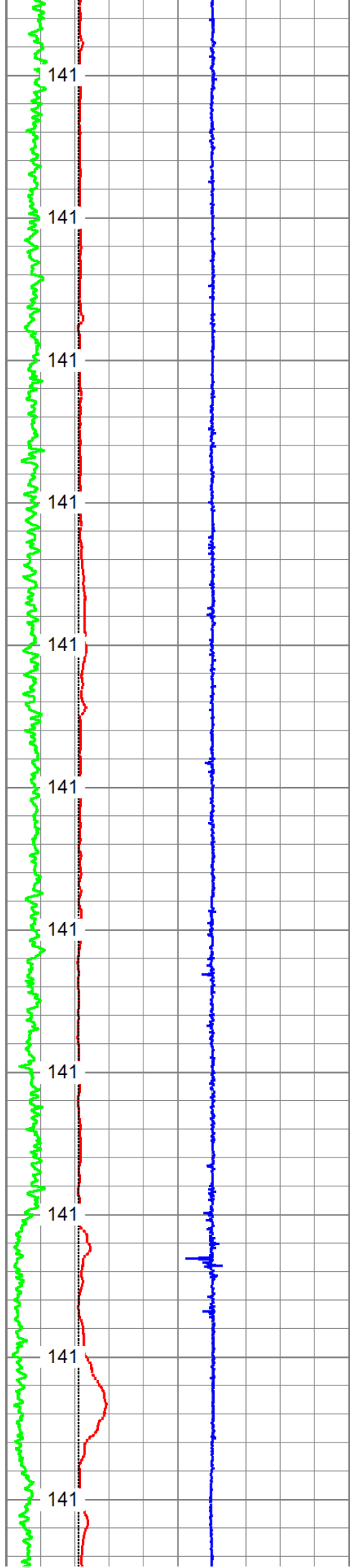












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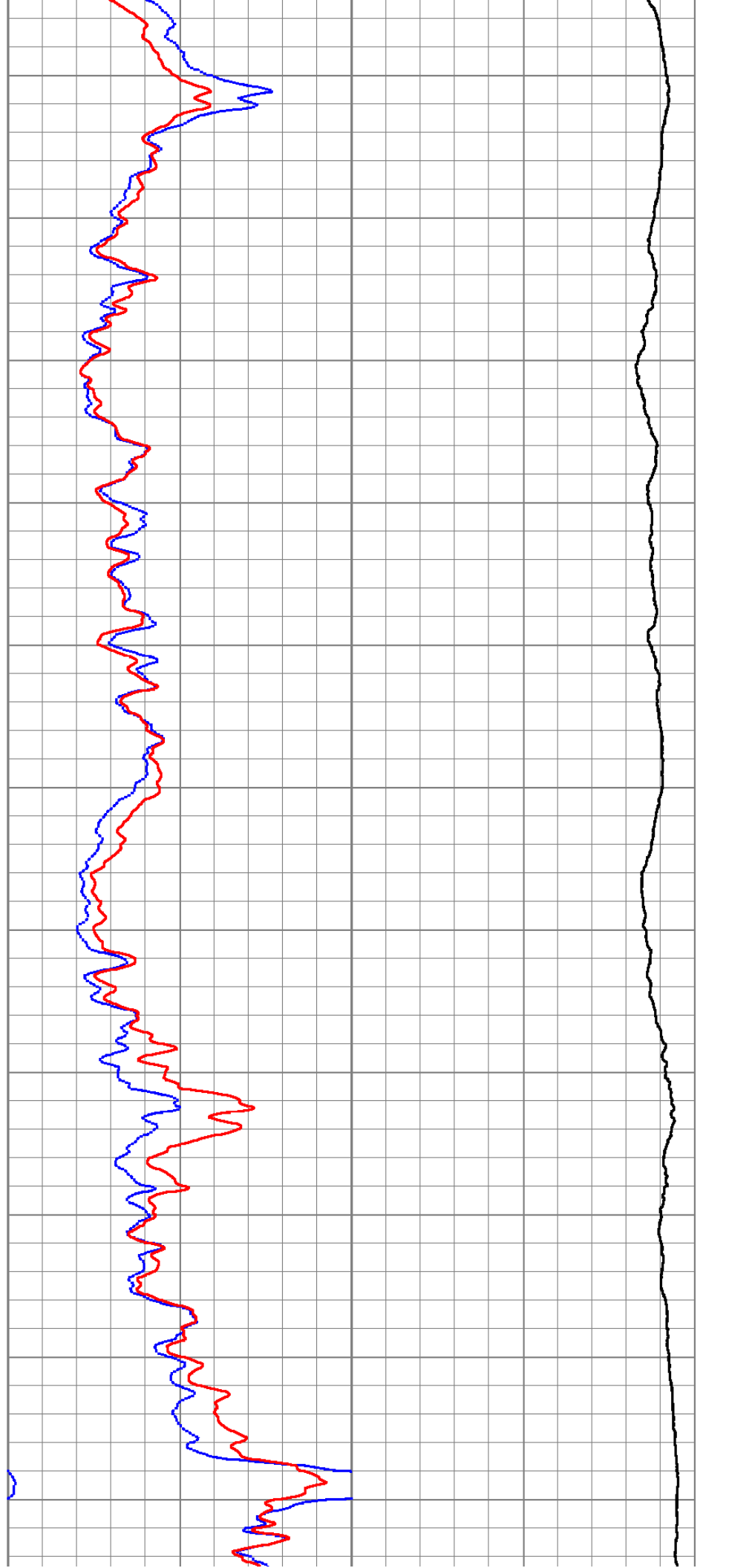
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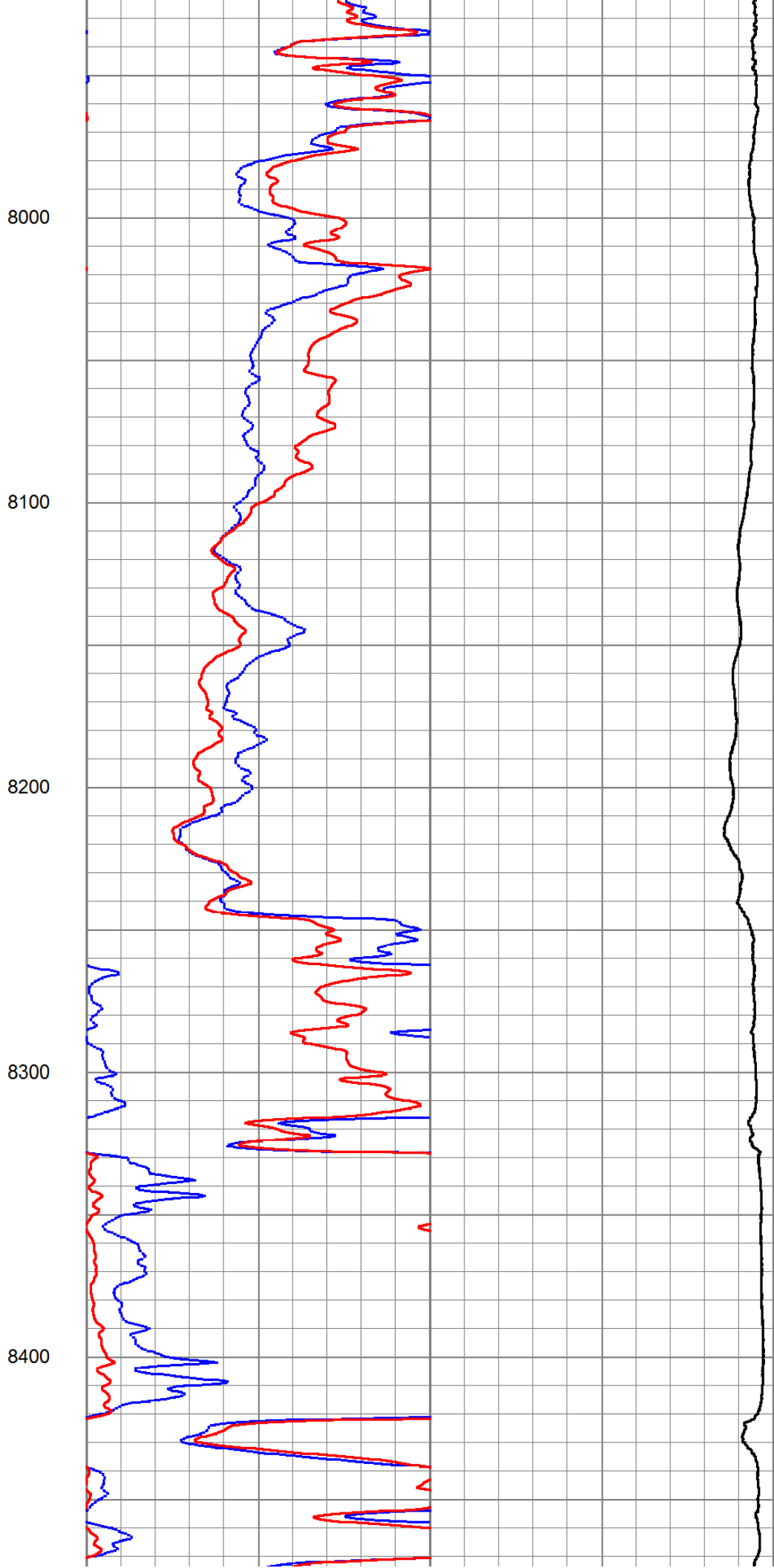
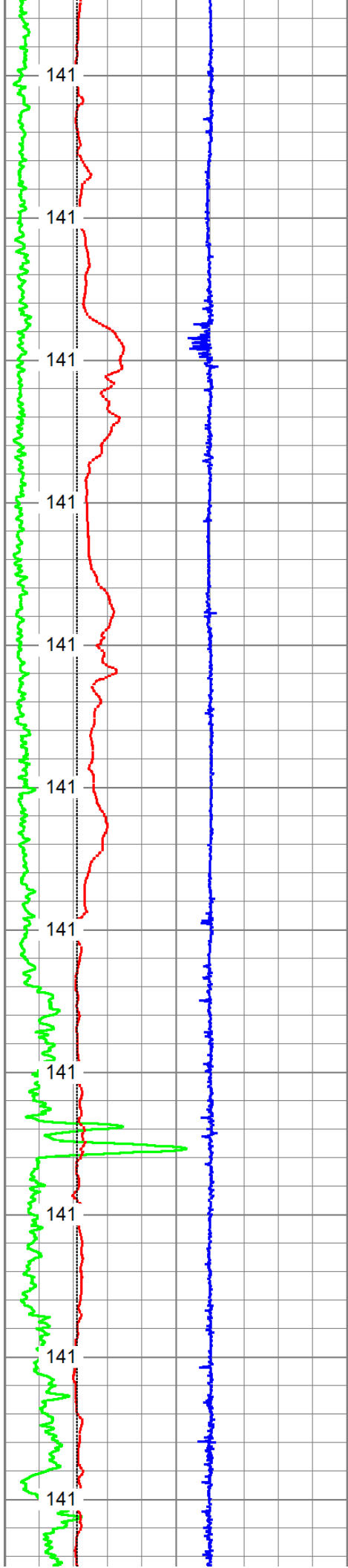
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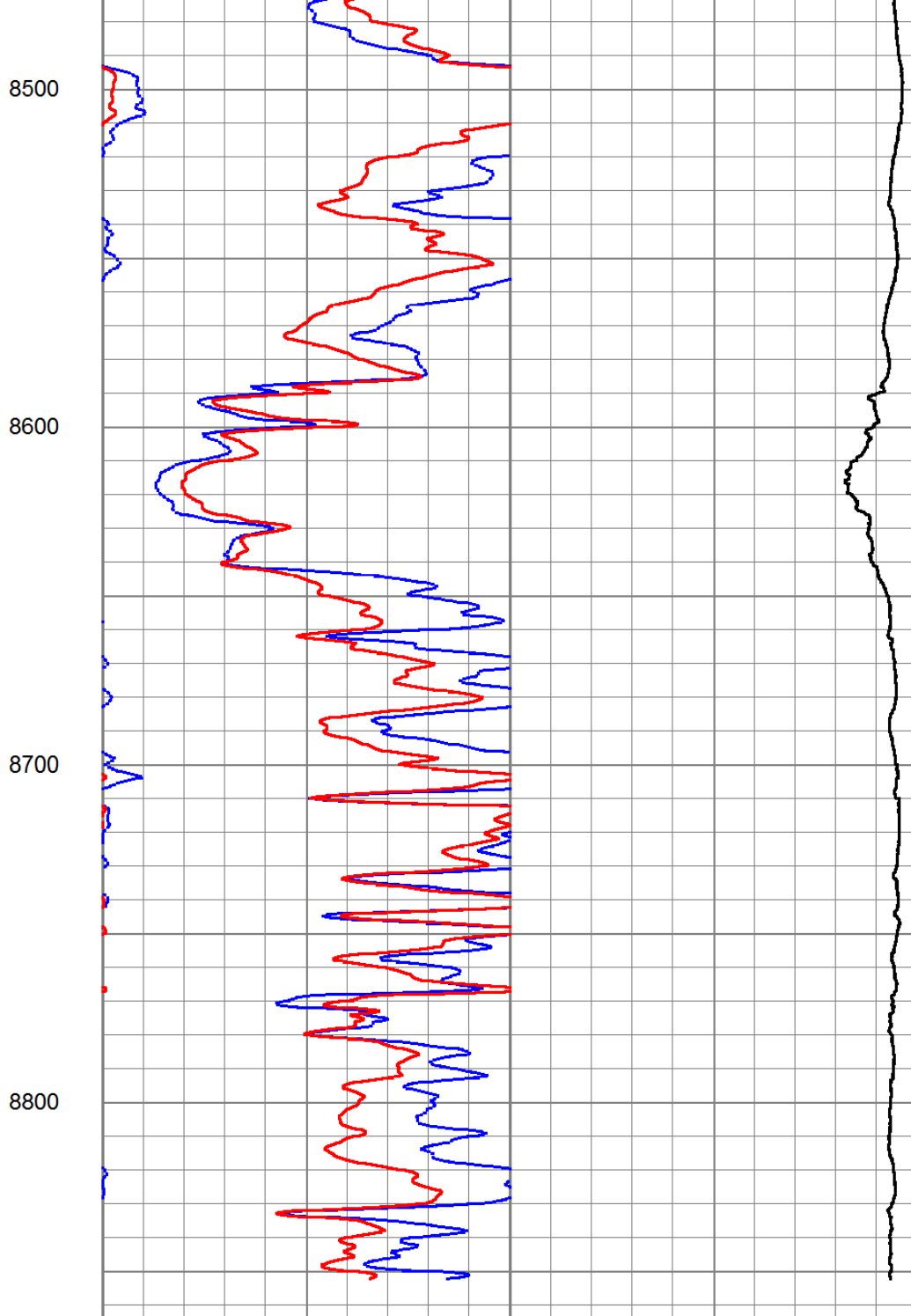
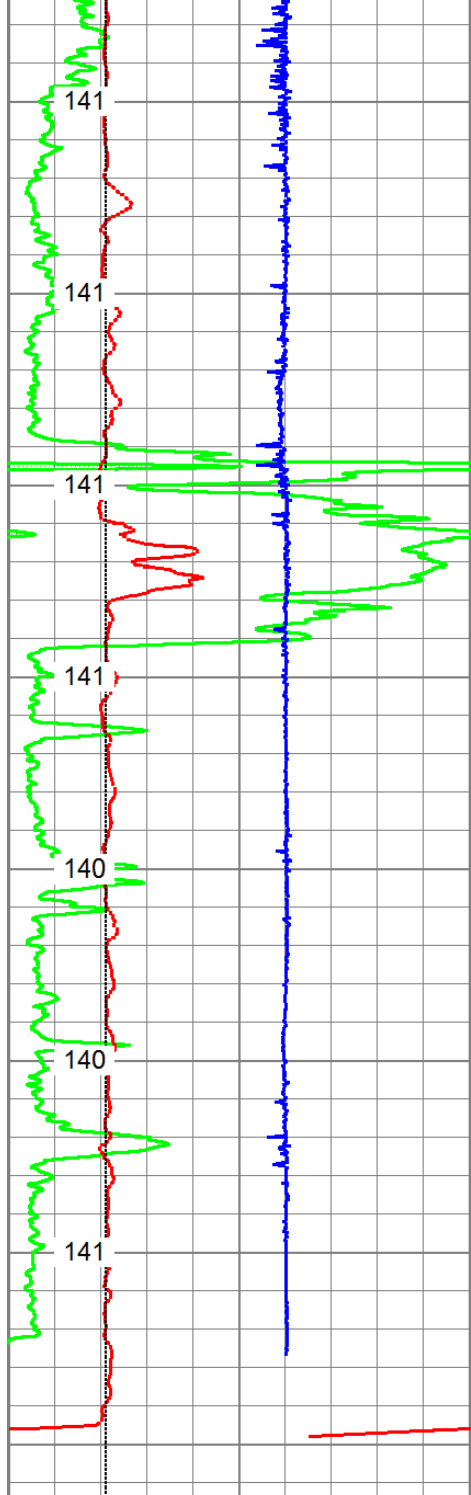
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0	GR (GAPI)	150
4	DCAL (in)	14
-5	ACCY	5
4	BOREID (in)	14
GRTEMP (degF)		

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

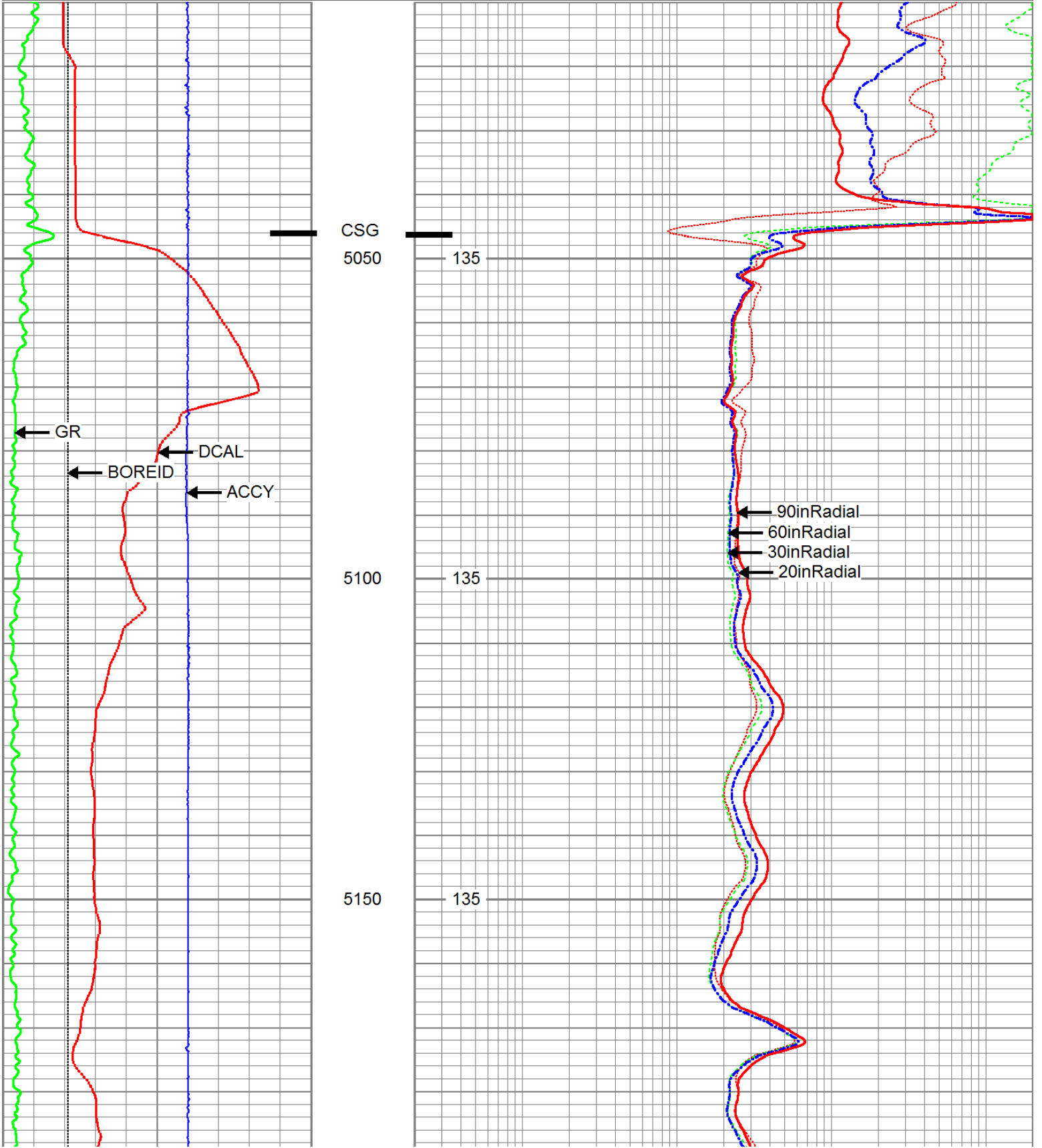


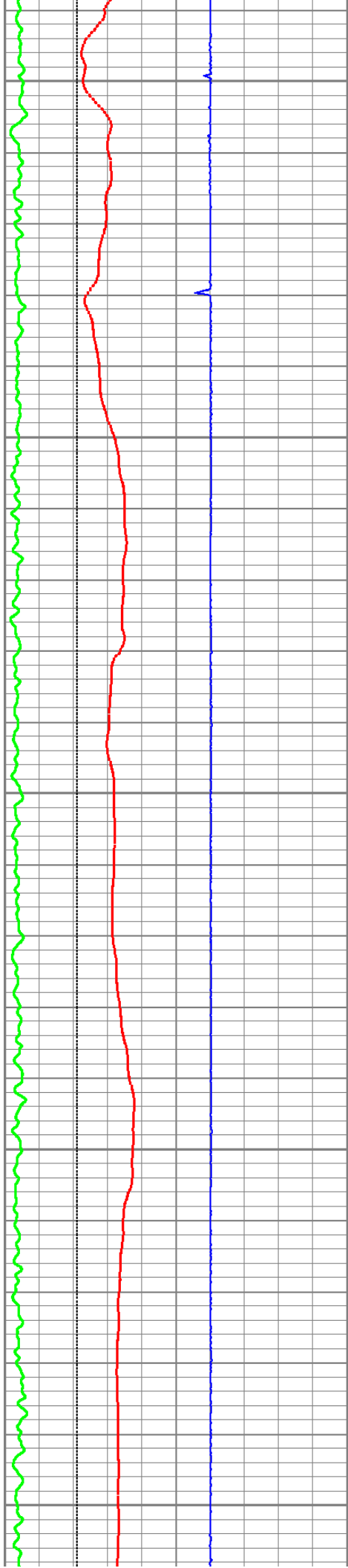
MAIN PASS

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 Presentation Format: 6_5r_chk
 Dataset Creation: Wed Feb 27 03:44:15 2013
 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)		





5200

136

5250

136

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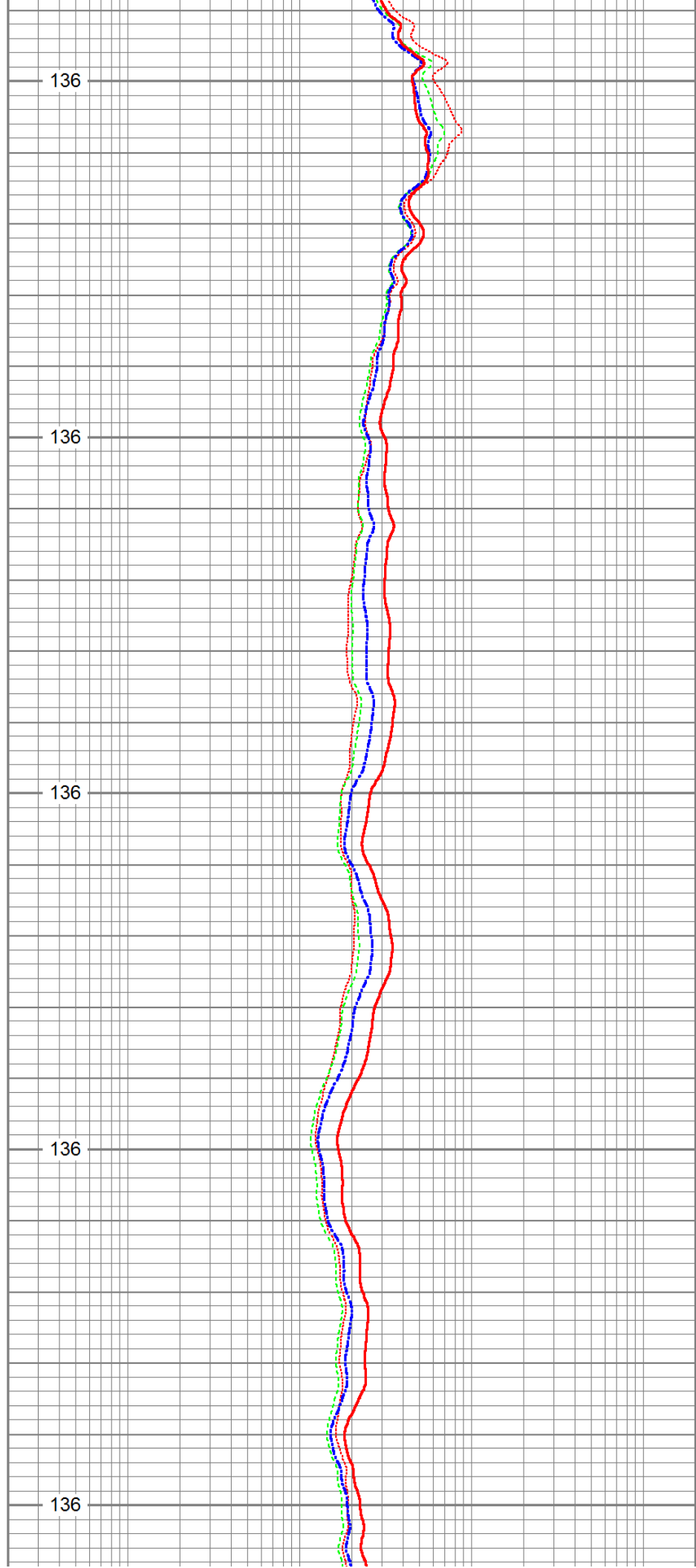
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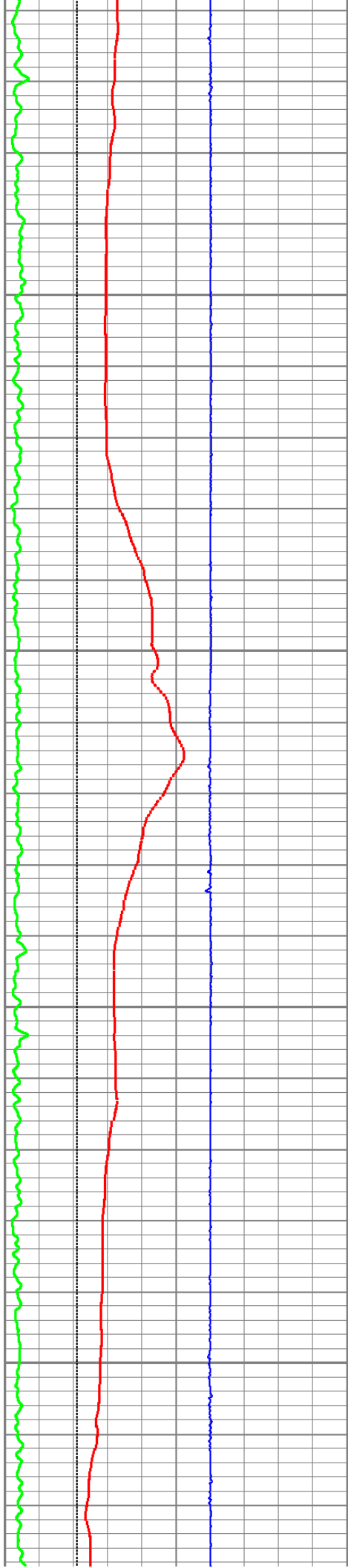
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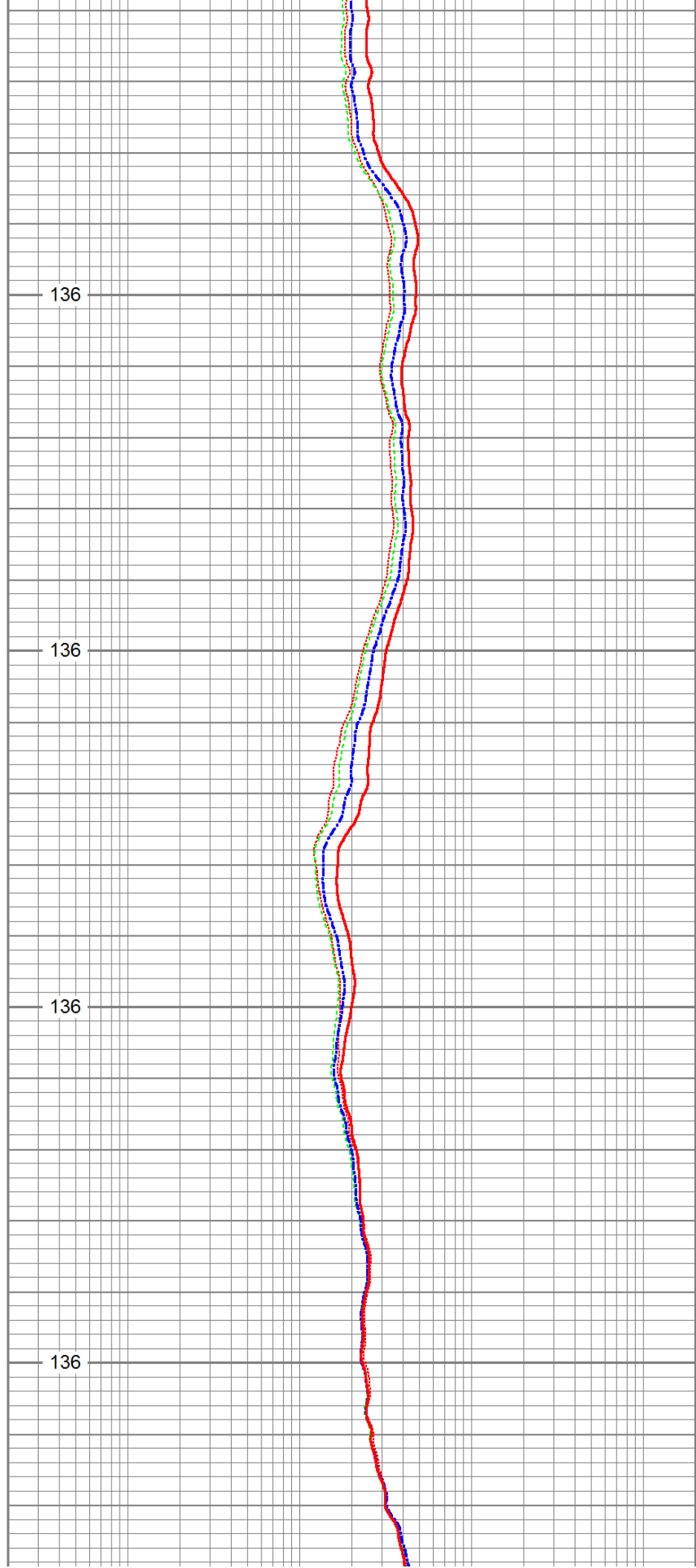
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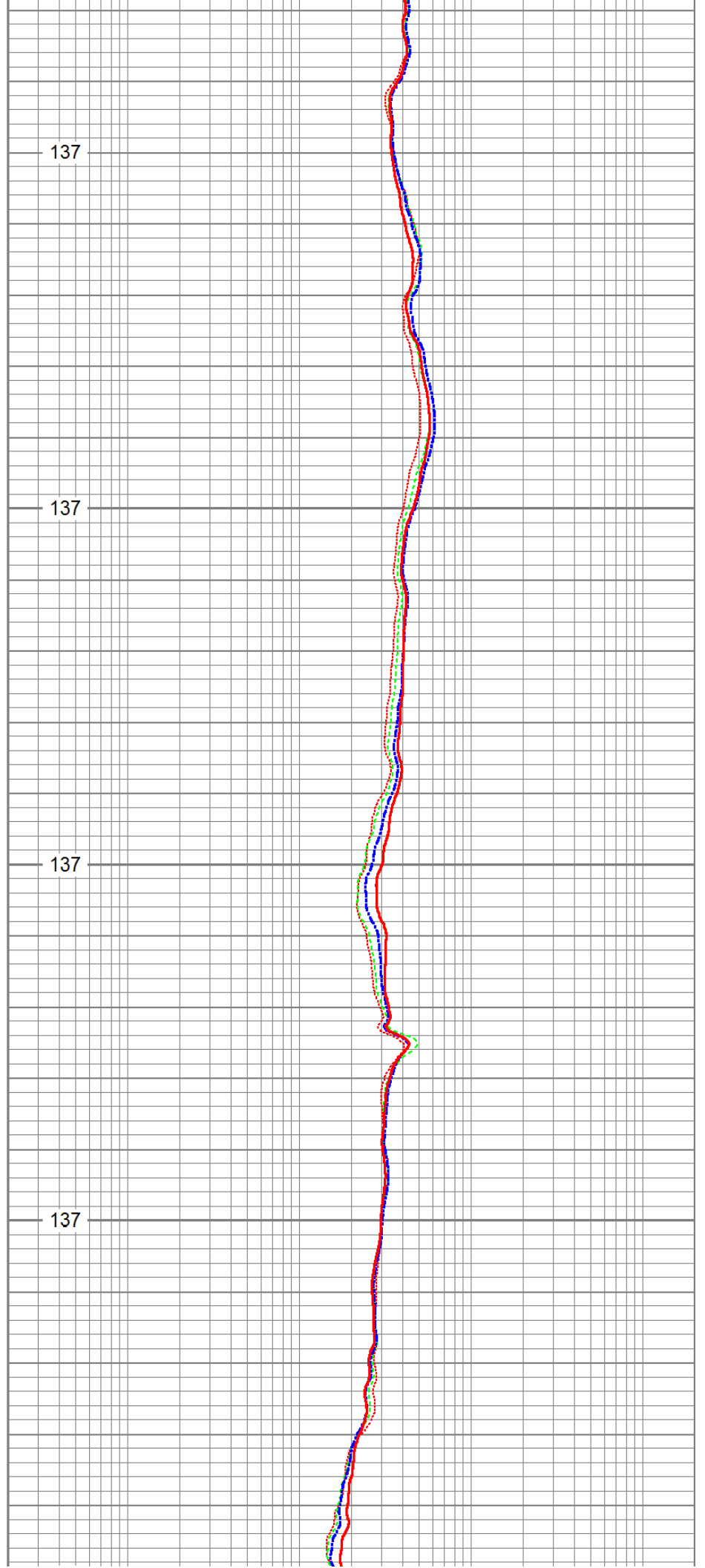
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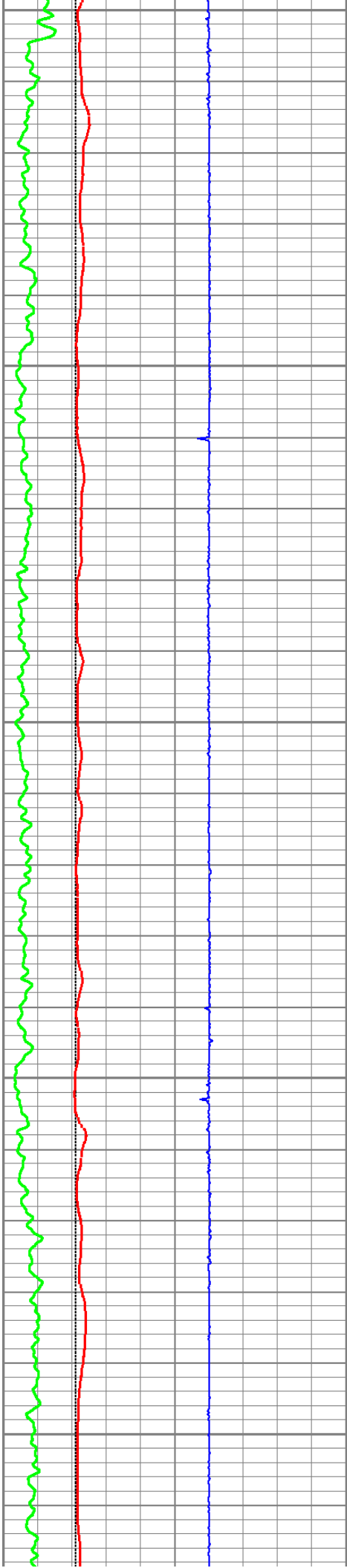
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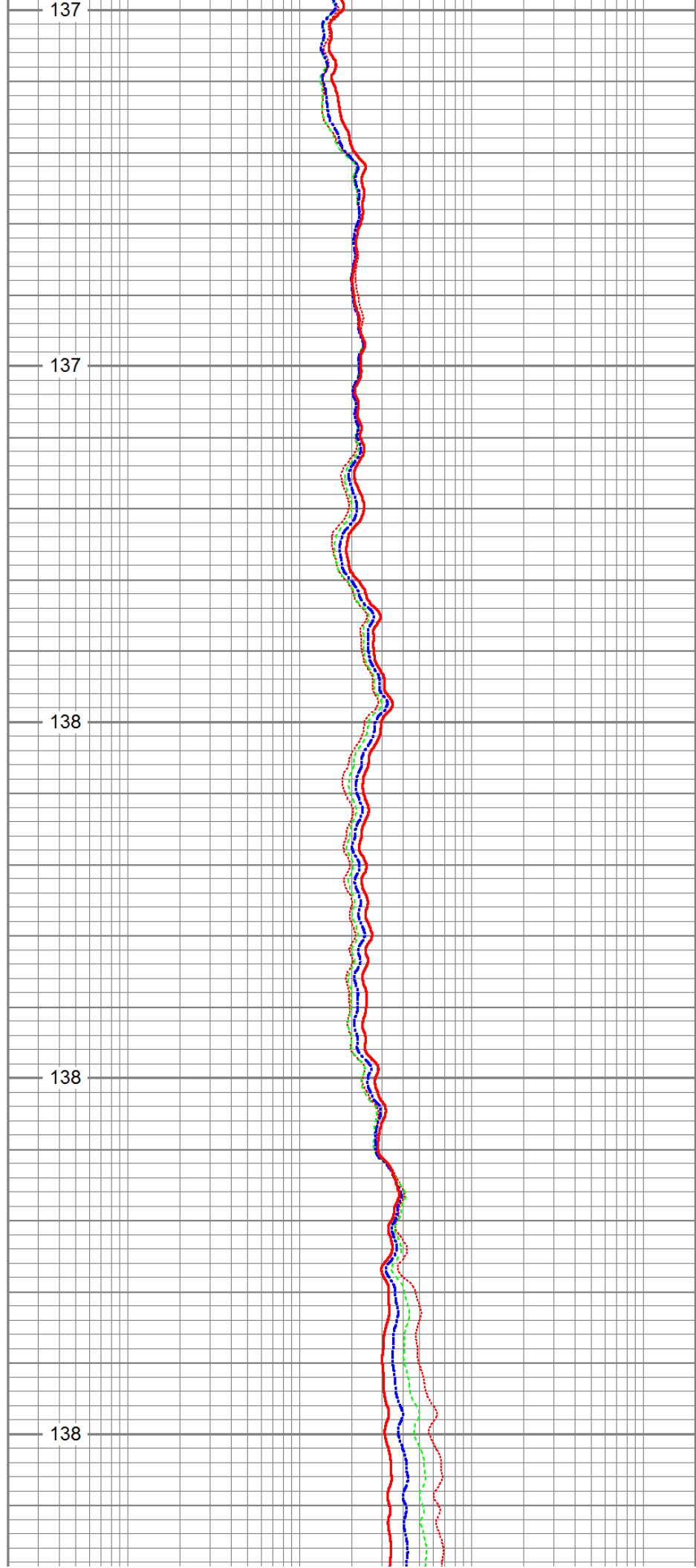
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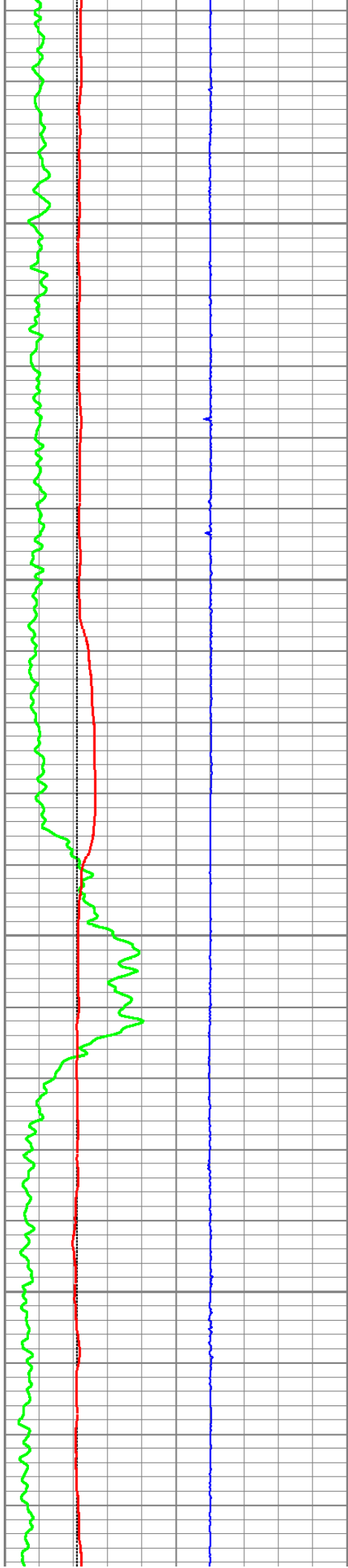
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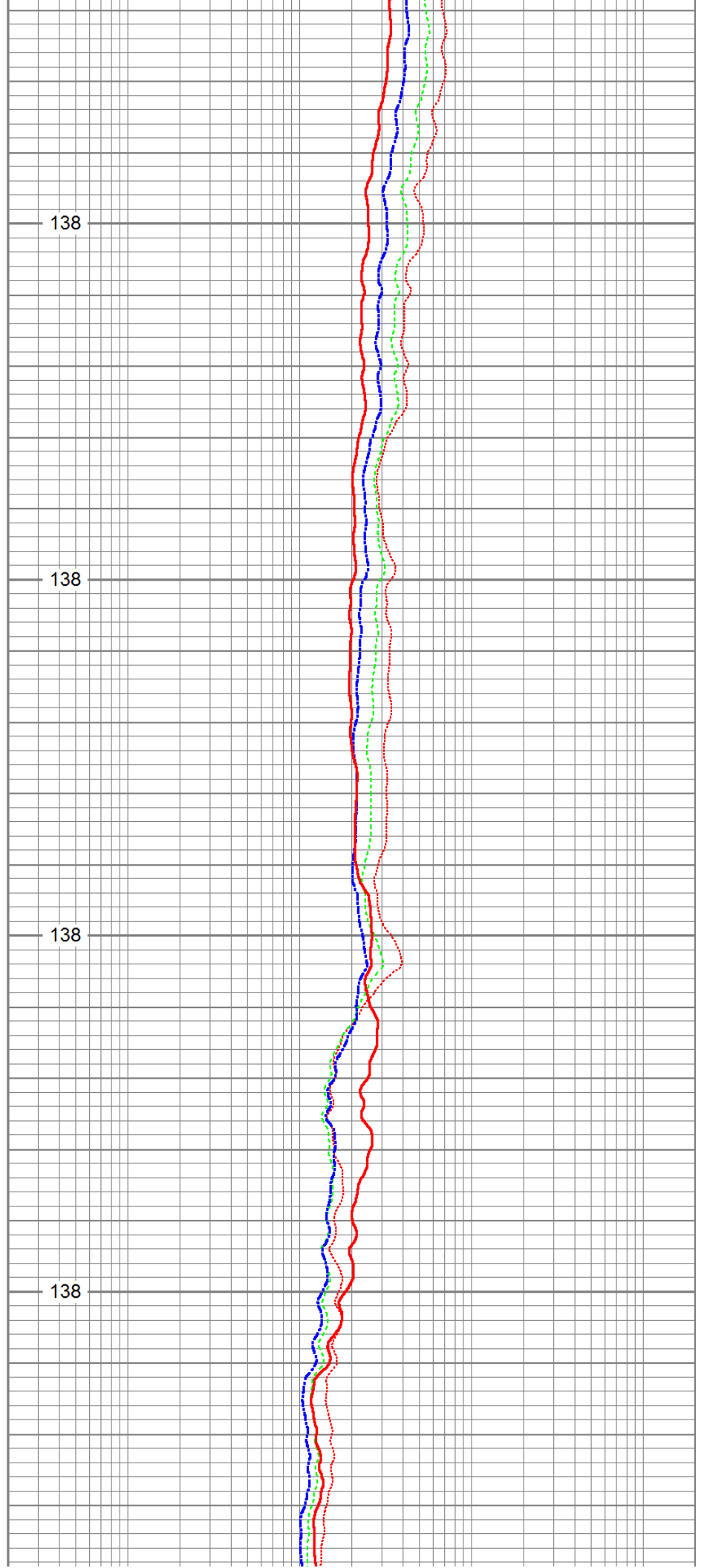
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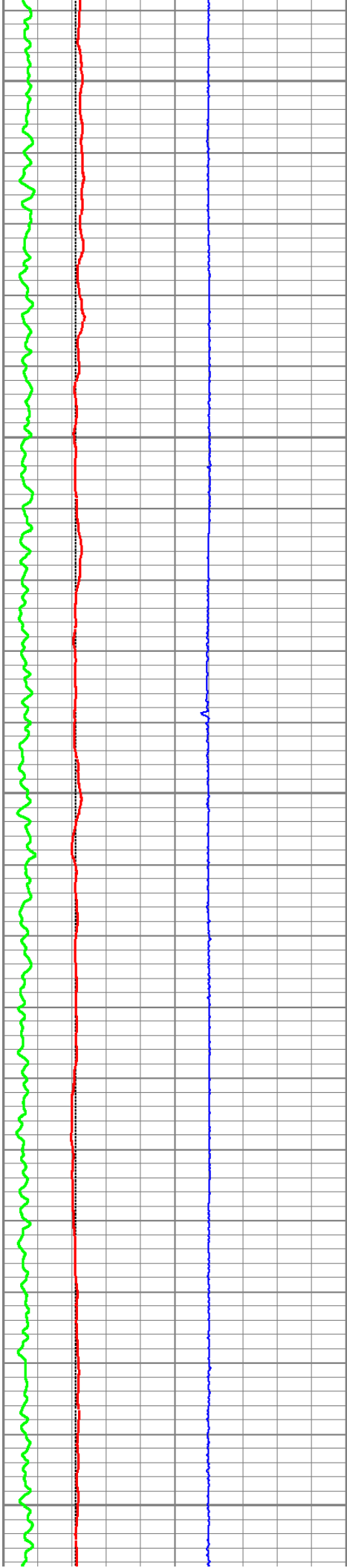
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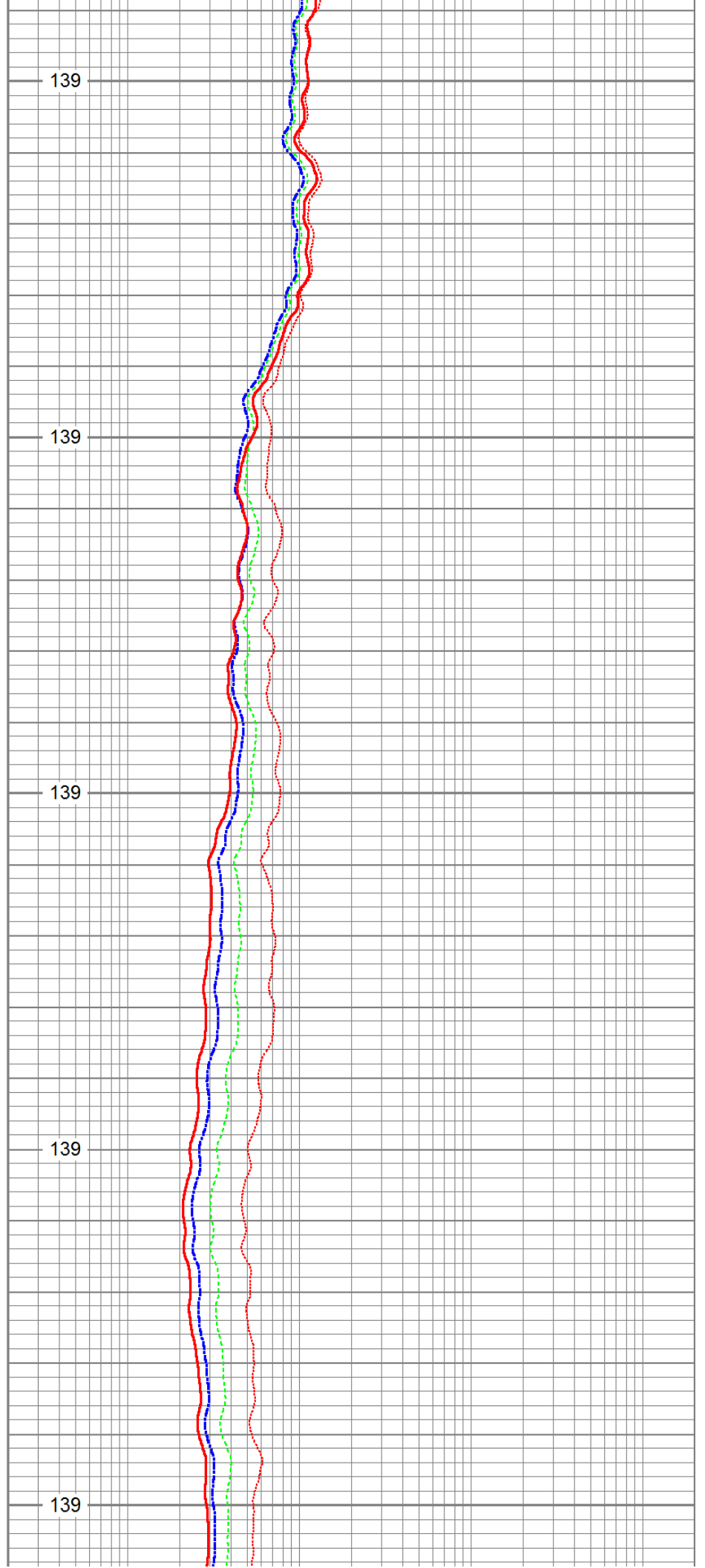
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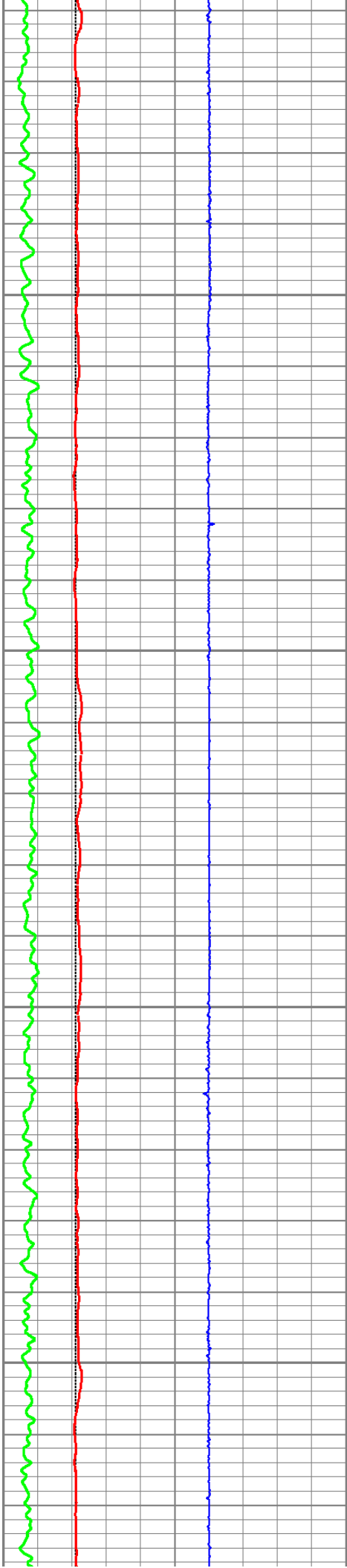
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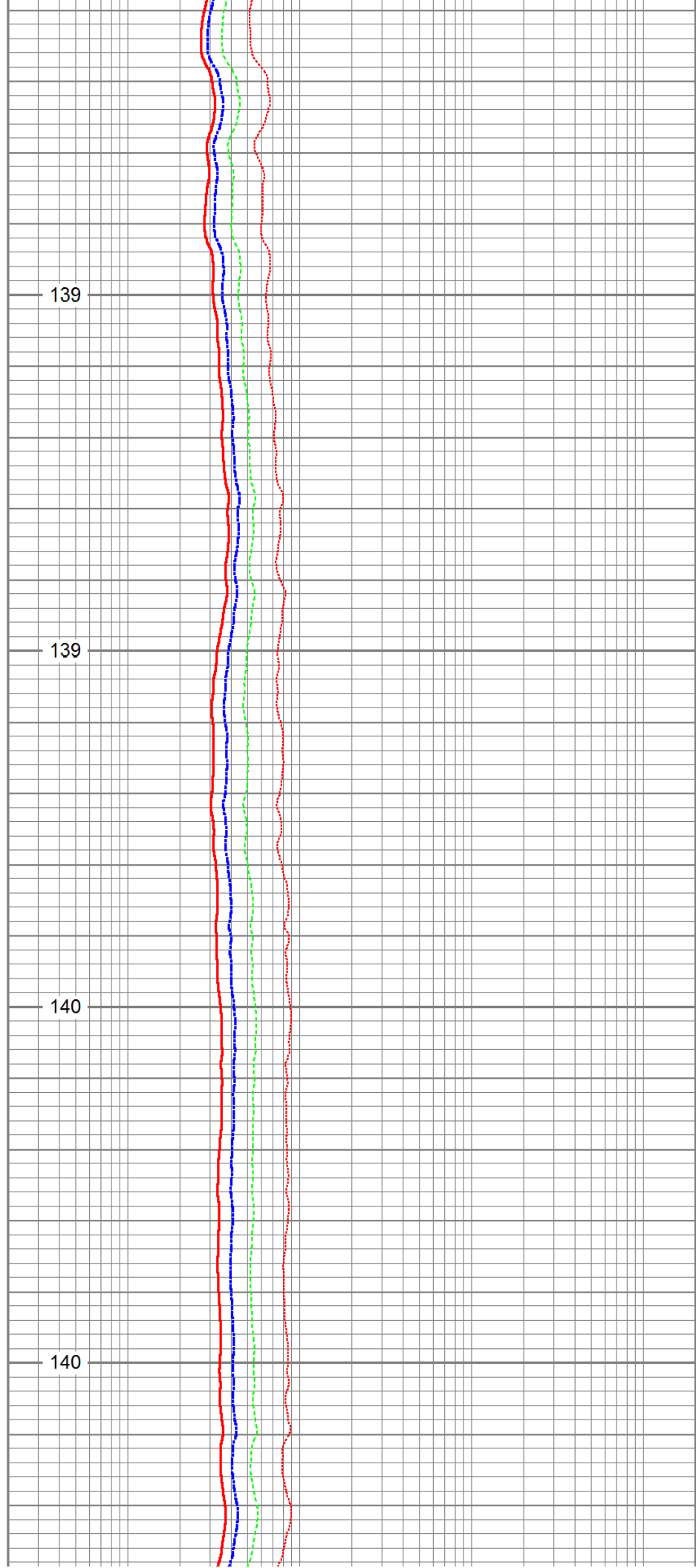
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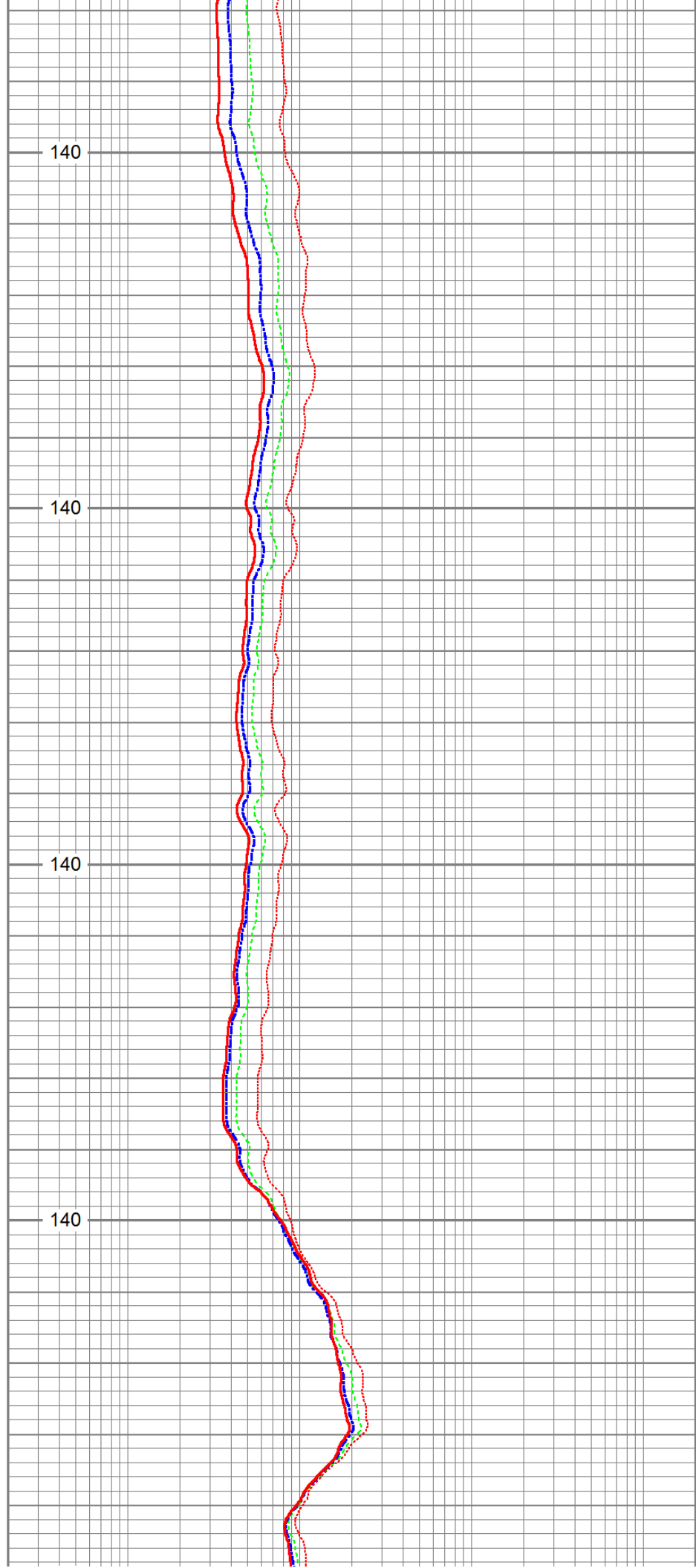
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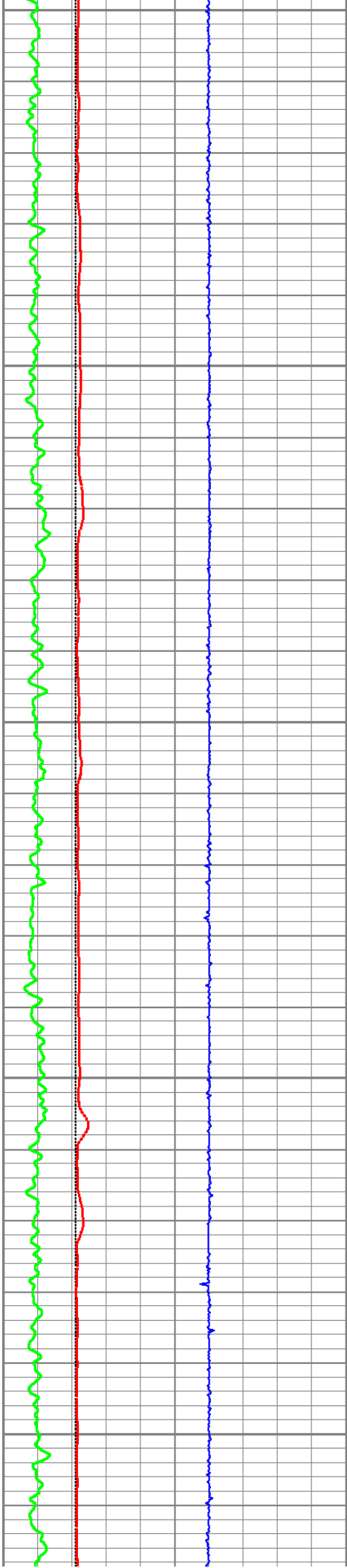
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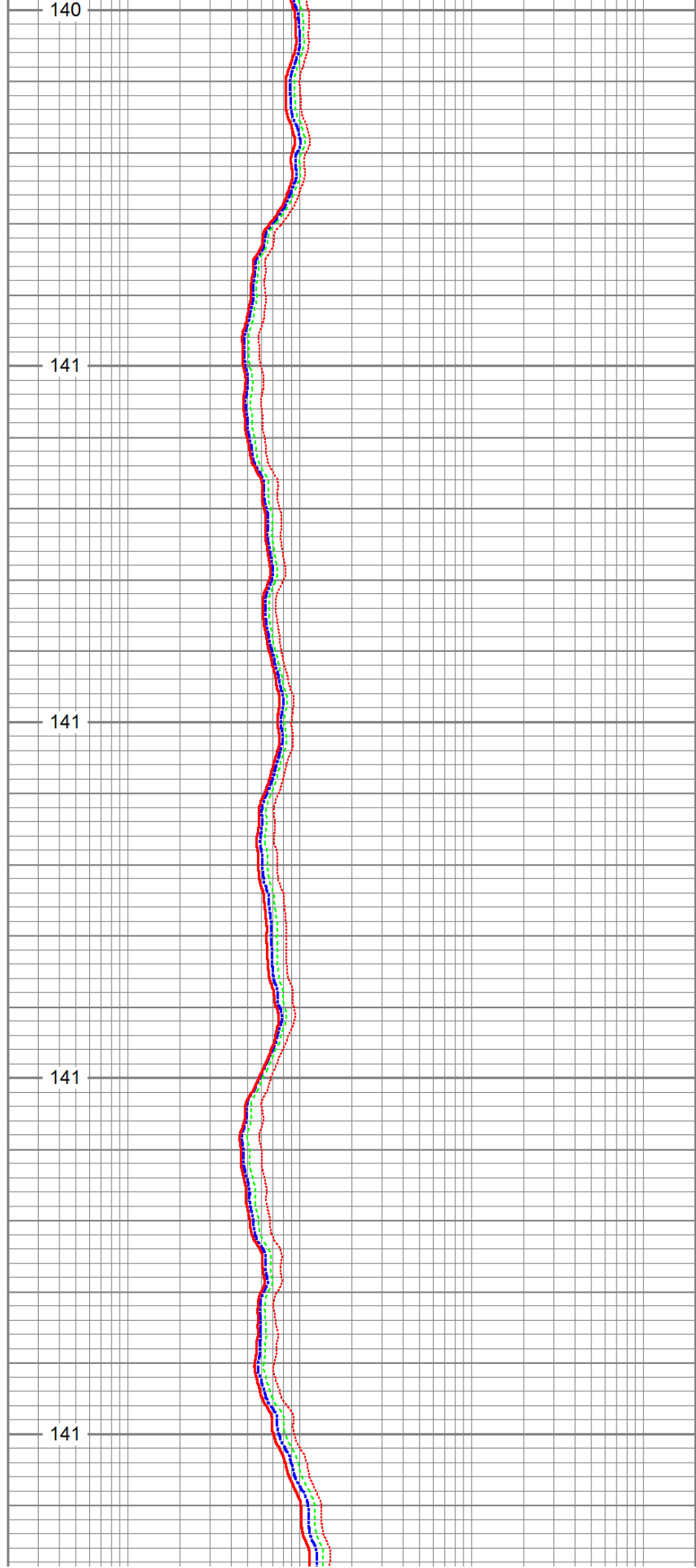
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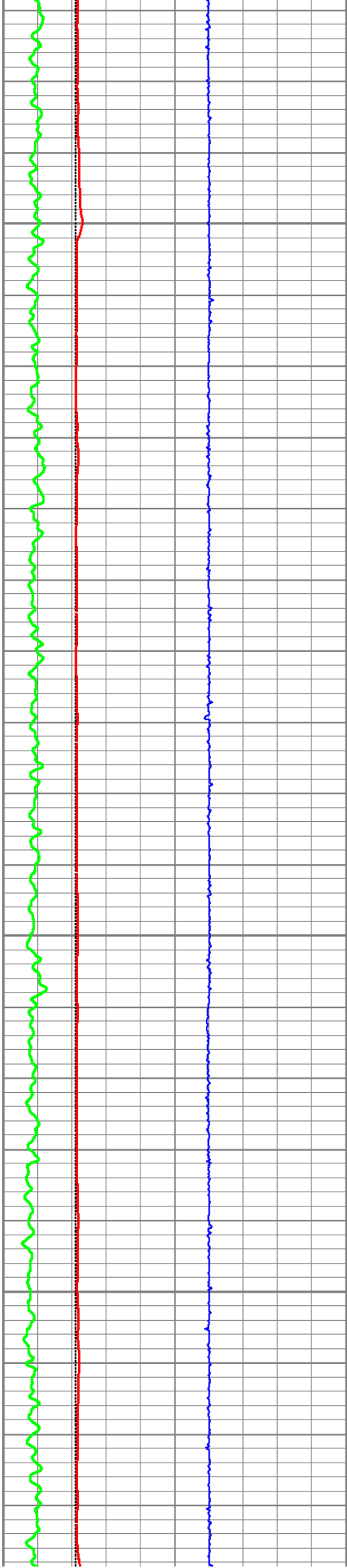
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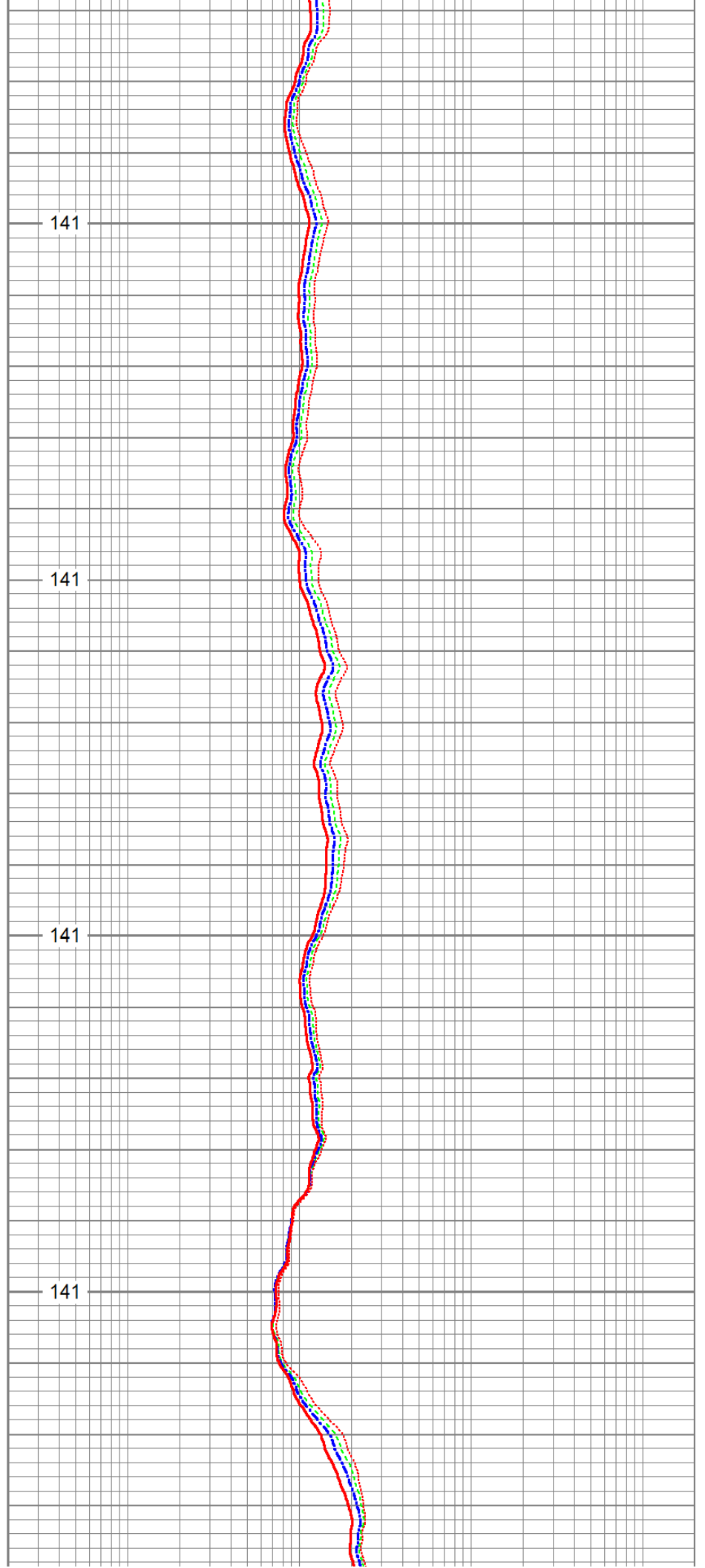
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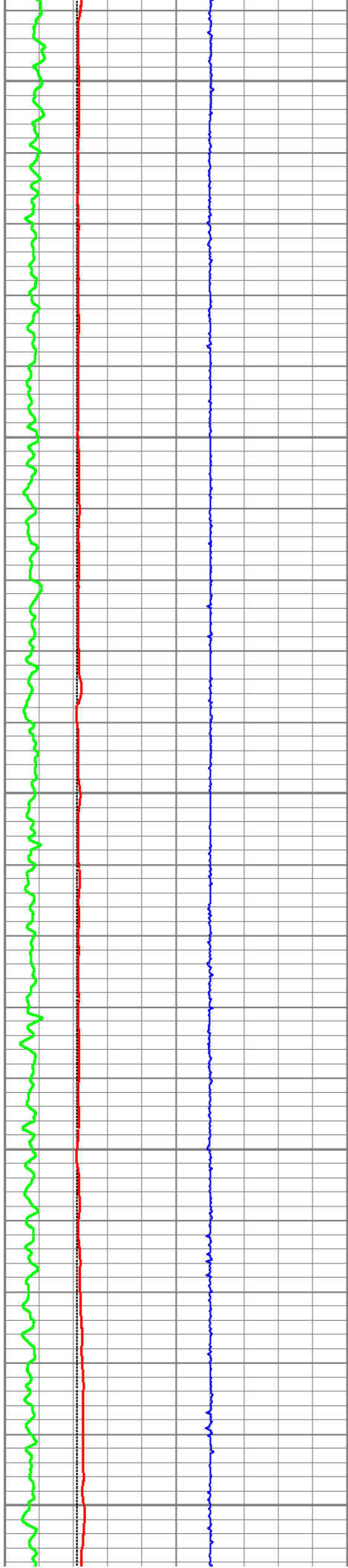
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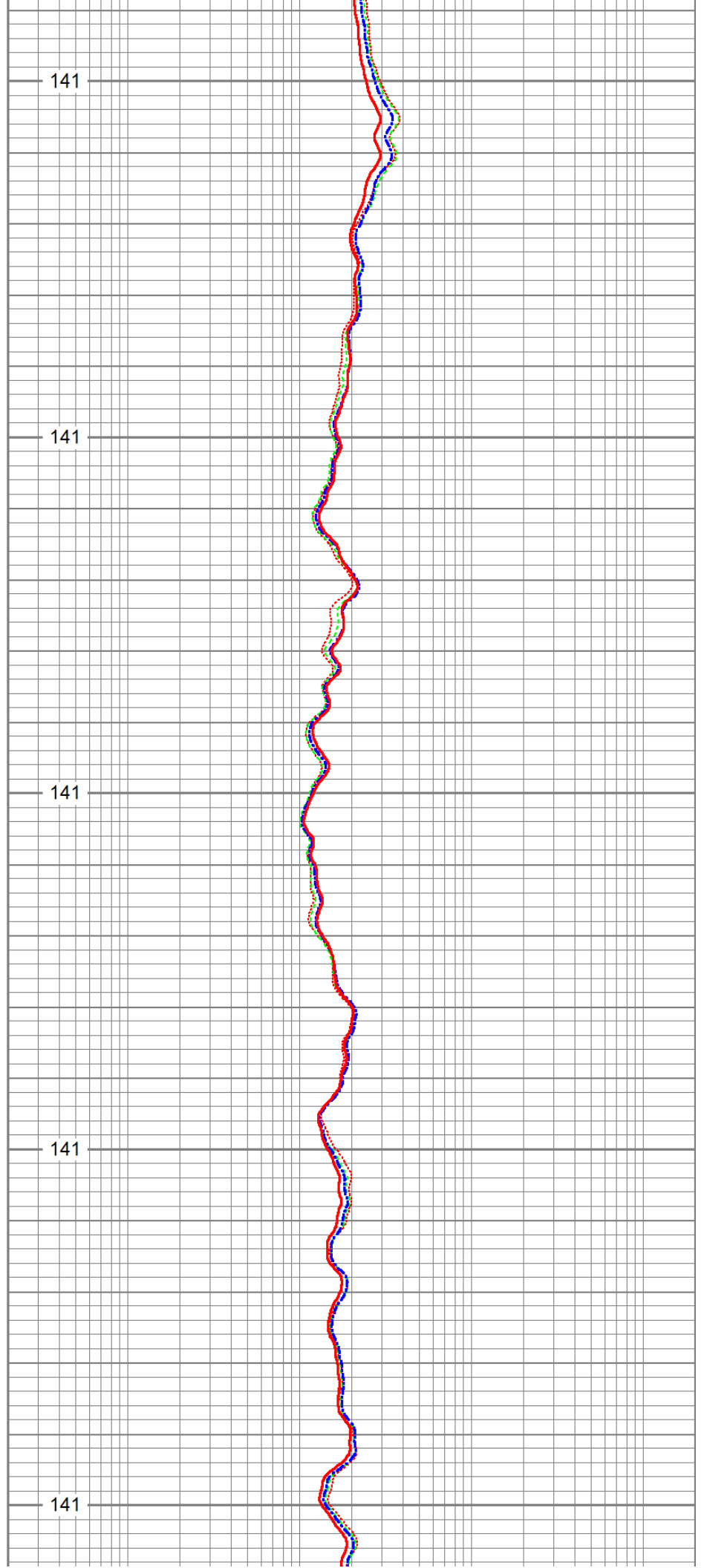
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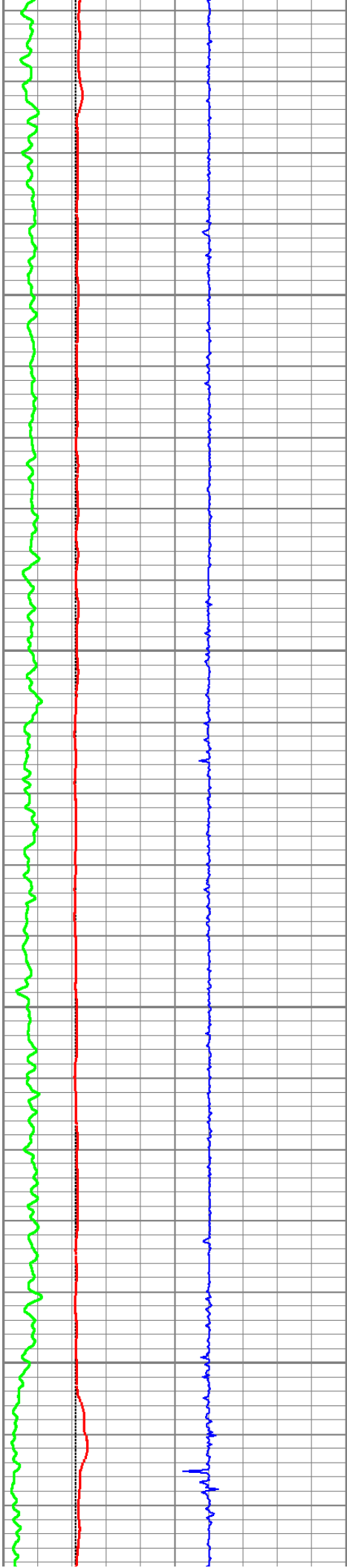
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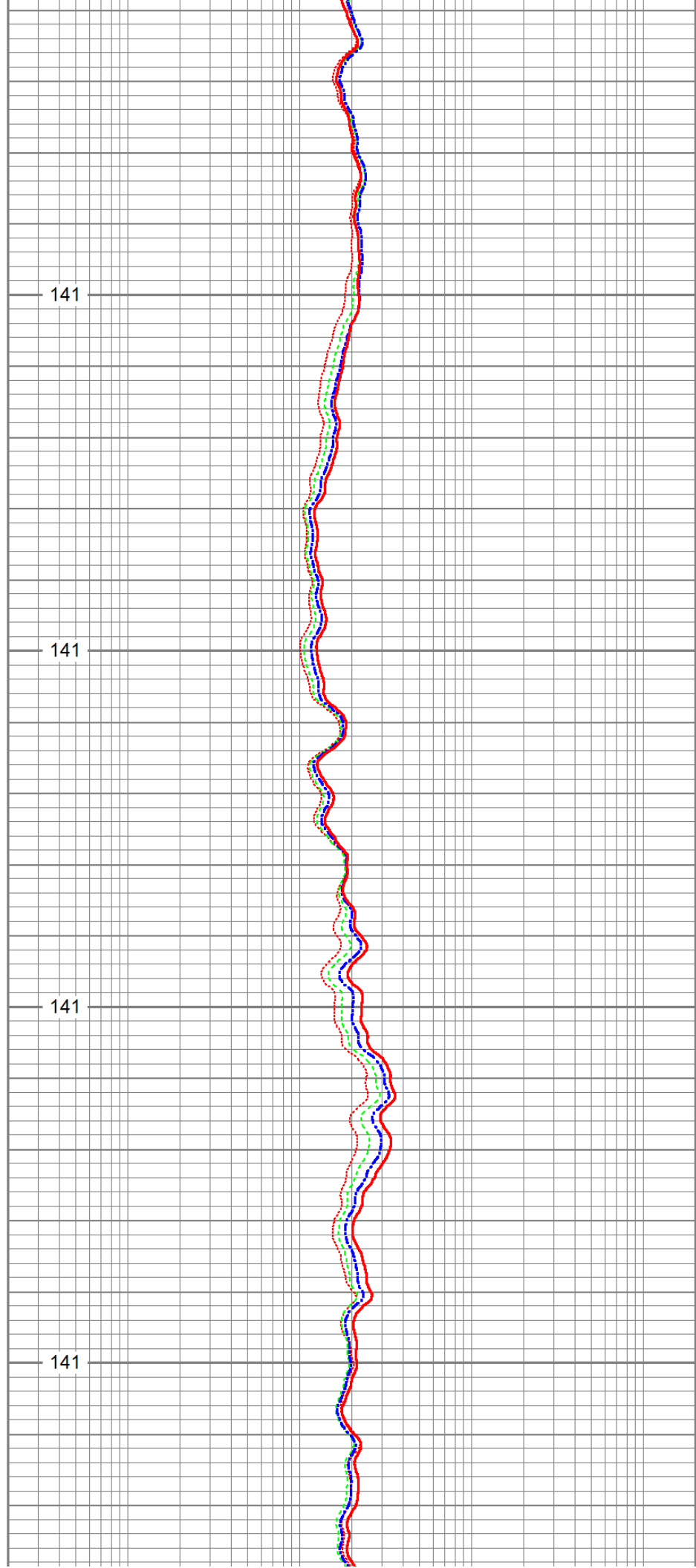
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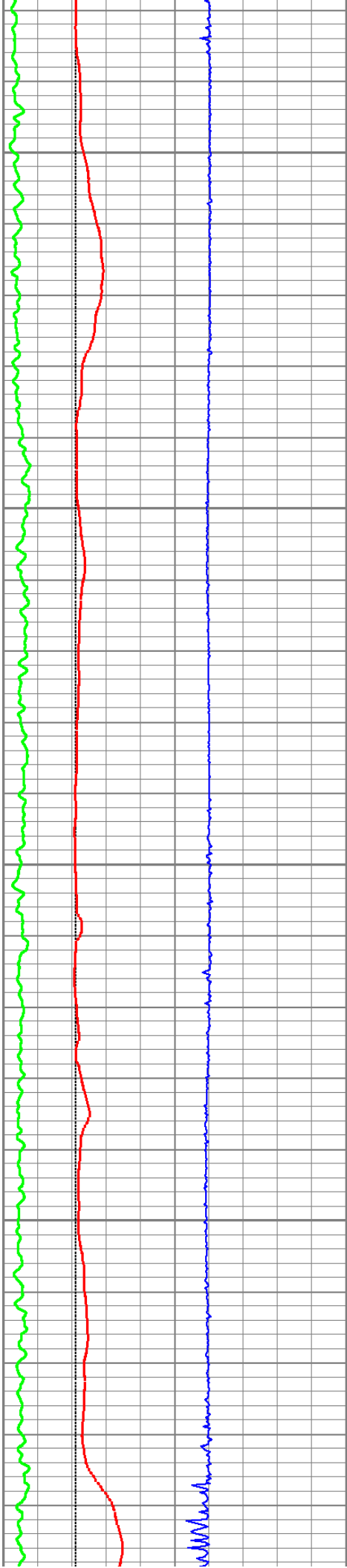
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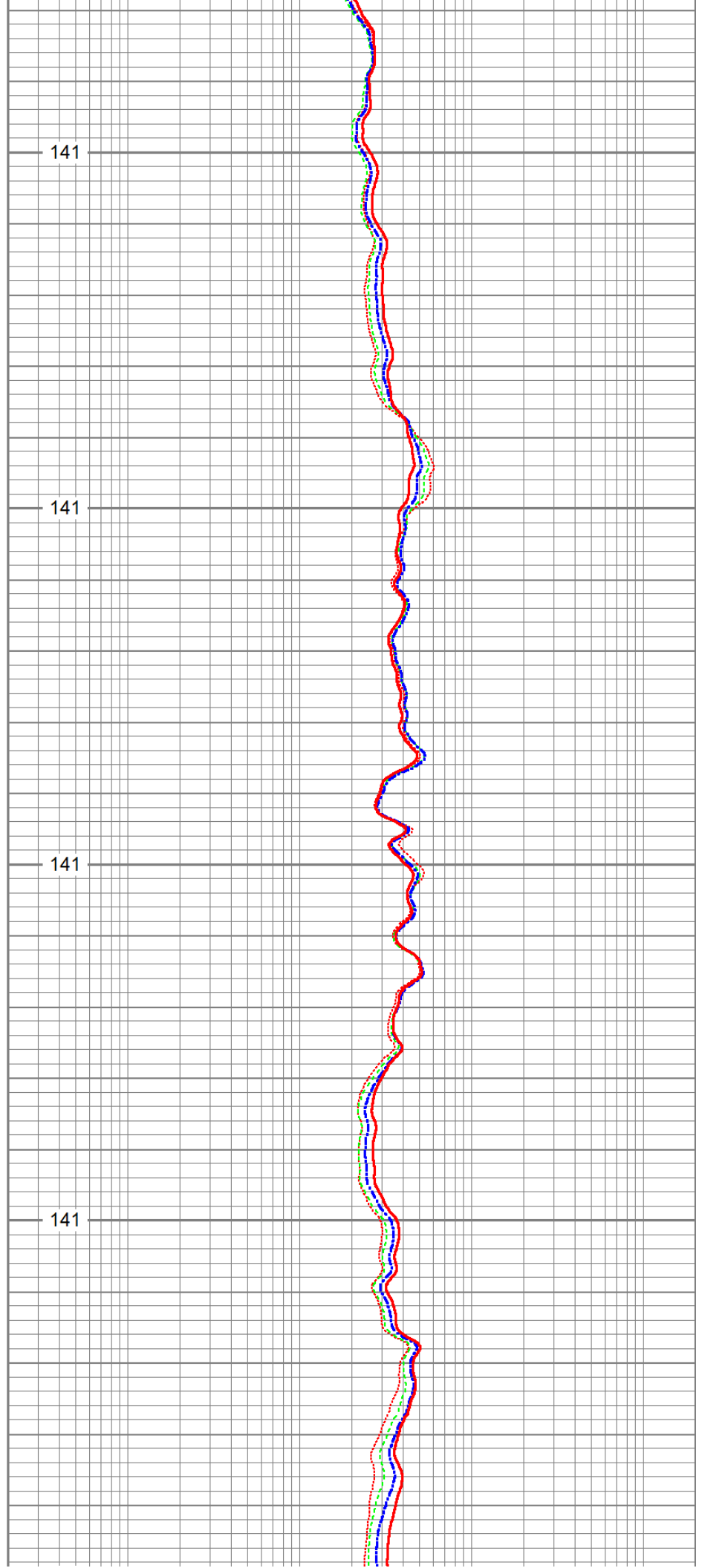
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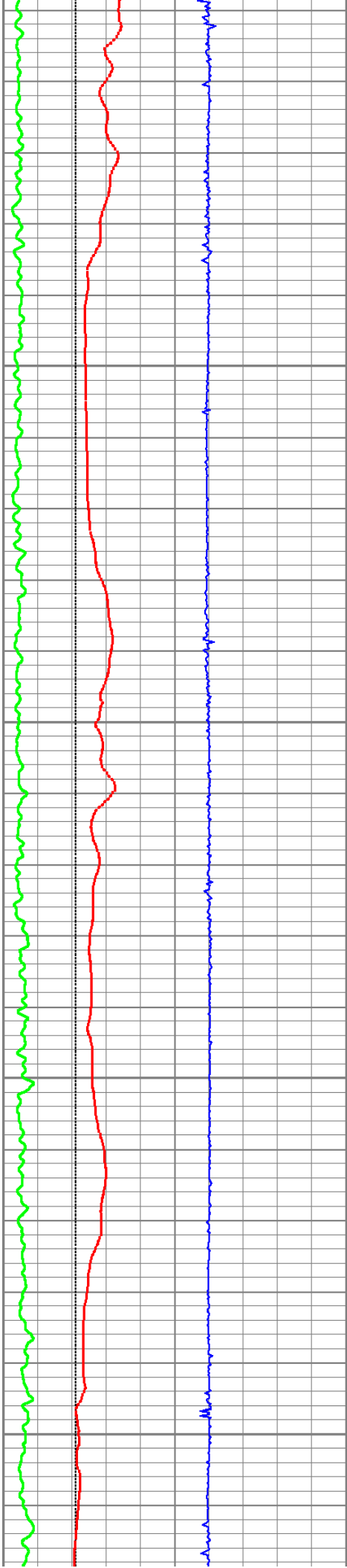
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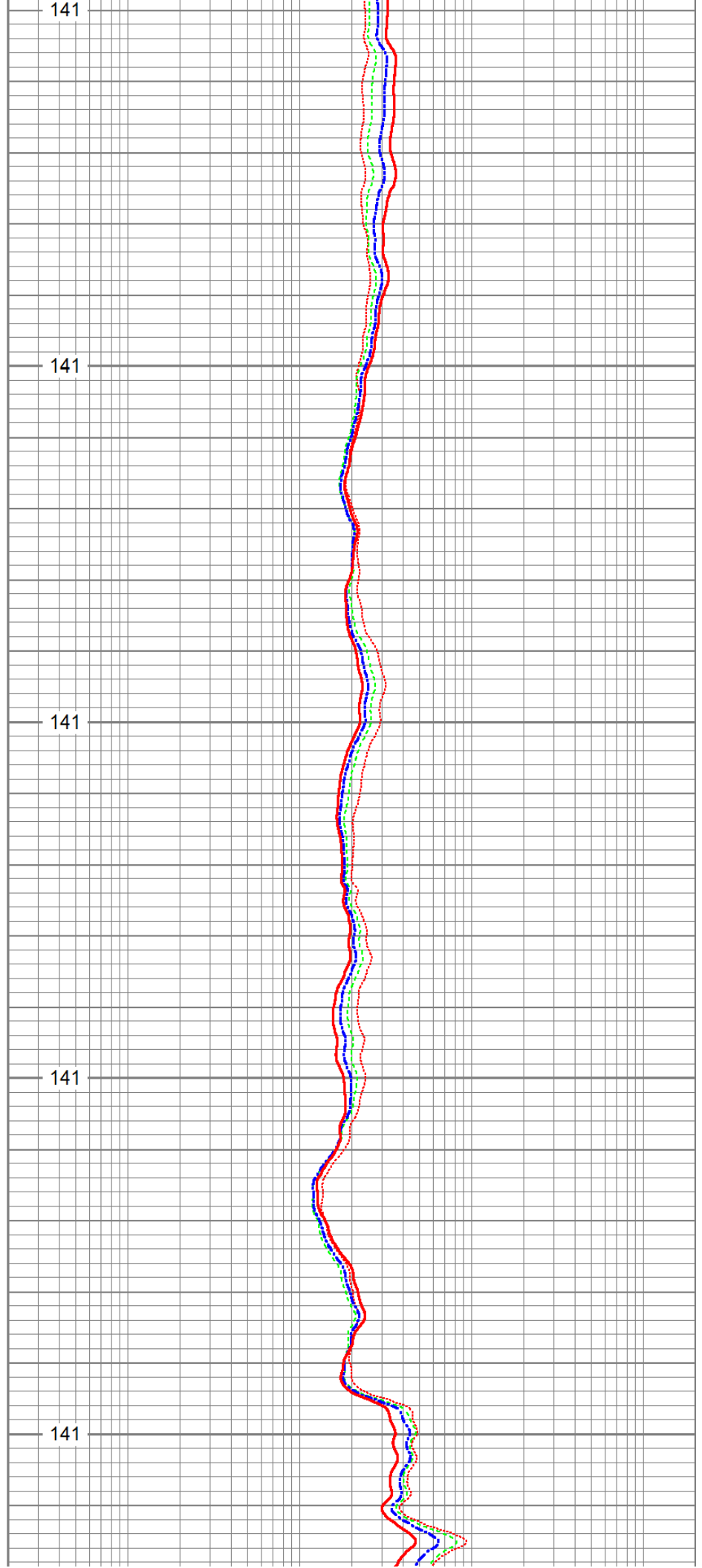
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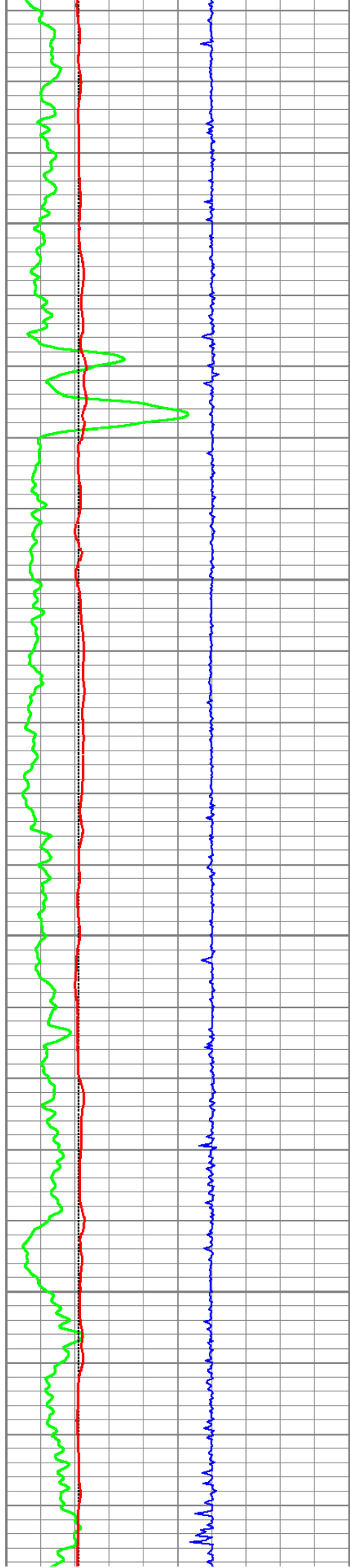
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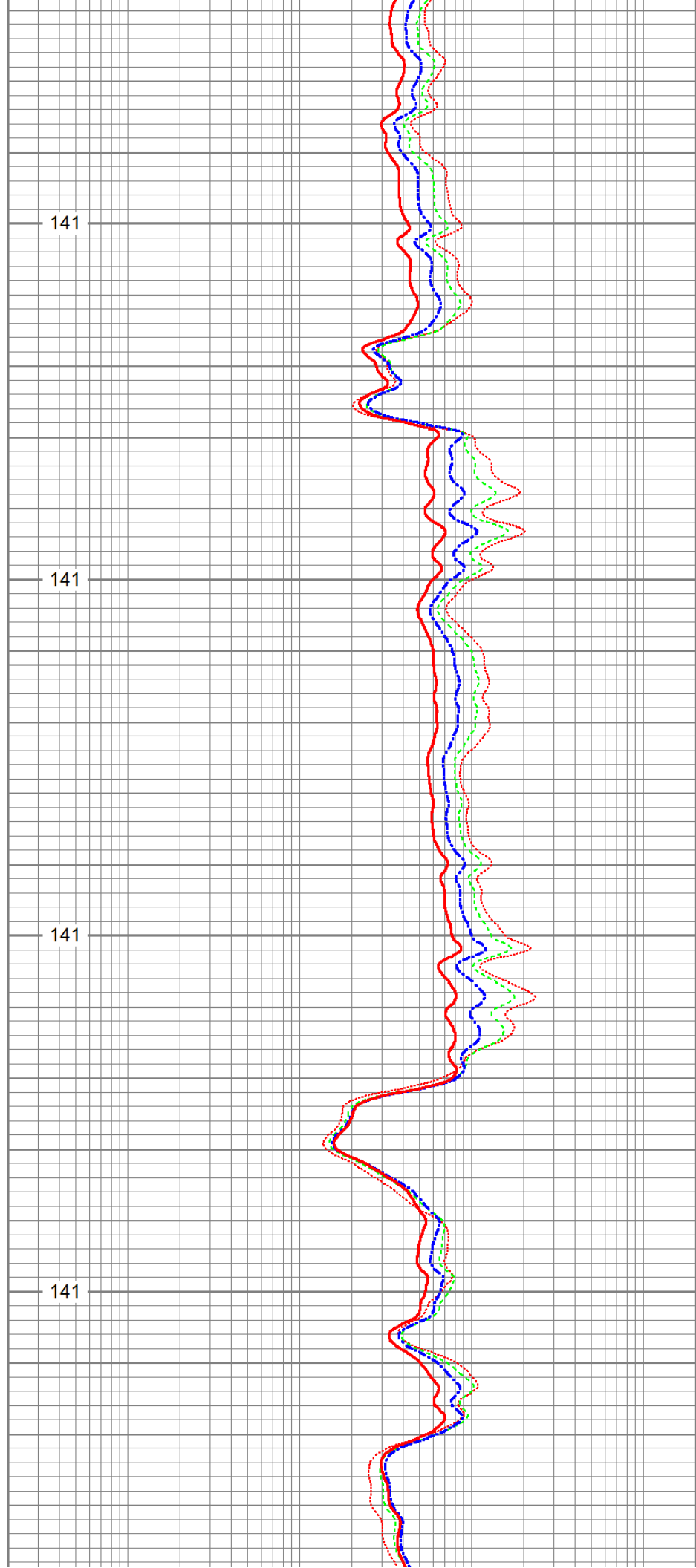
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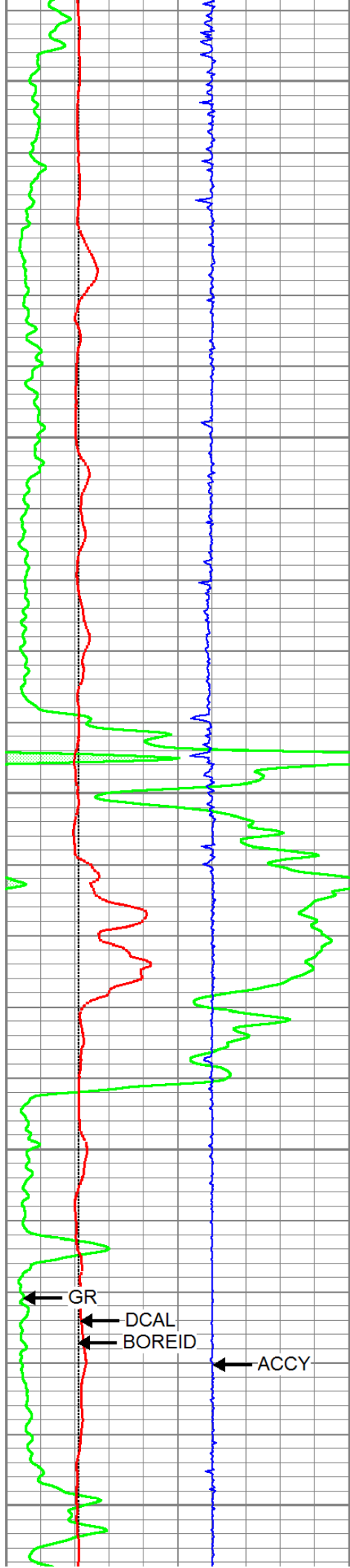
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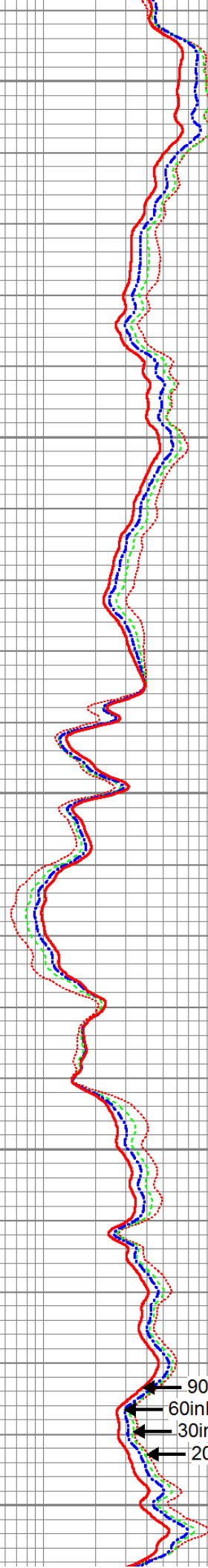
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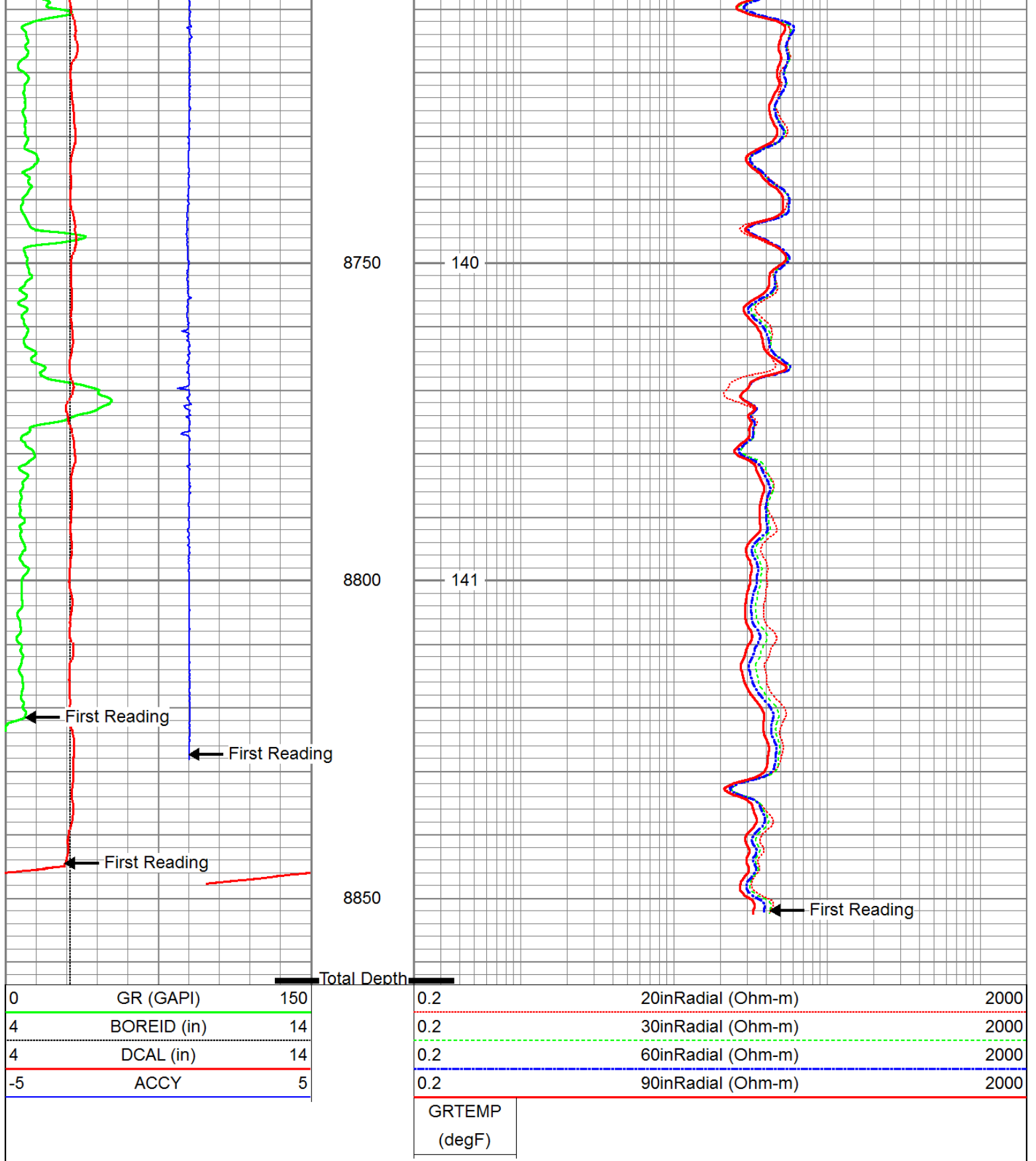


90inRadial

60inRadial

30inRadial

20inRadial



Log Variables

Database: c:\users\kris.wetzel\desktop\garlow 3406 2-16h\sandridge_garlow3406_2_16h_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	CASED?	CASEOD	CASETHCK	CEMWATERSA	CMNTTHCK	DNBHC?

degF 140	No	in 4.5	in 0	kppm 0	in 0	NO
DPOSEL RHOB	FLUIDDEN g/cc 1	FRMSALIN kppm 0	LATNOR Off	M 2	MATRXDEN g/cc 2.71	MUDSALIN kppm 0.8
MudWgt lb/gal 8.3	NPOSEL Limestone	PEBHC? YES	PERFS 0	RESTMPsrc INTERNAL	SO in 0.5	SRFTEMP degF 65
SZCOR On	TDEPTH ft 8903	TMPCOR On	TOOLPOS Ec-centered			

Calibration Report

Database File: c:\users\kris.wetzel\desktop\garlow 3406 2-16h\sandridge_garlow3406_2_16h_mem.db
Dataset Pathname: proc1/pass1.2
Dataset Creation: Wed Feb 27 03:44:15 2013

ThruBit Induction Calibration Report

Tool Model-Serial Number: PS-PS33R
Shop Calibration Performed: Tue Jan 08 10:46:39 2013

BASELINE

	R	Expected	X	Expected
Freq 1				
A1	-463.3680	[-500.00, -400.00]	311.2600	[-500.00, 500.00]
A2	-141.3160	[-180.00, -100.00]	316.8420	[-500.00, 500.00]
A3	-21.9229	[-50.00, -10.00]	43.8285	[-500.00, 500.00]
A4	-15.1666	[-30.00, -10.00]	222.9180	[-500.00, 500.00]
A5	-13.2859	[-30.00, -10.00]	105.1840	[-500.00, 500.00]
Freq 2				
A1	-240.3950	[-280.00, -180.00]	176.7200	[-500.00, 500.00]
A2	-90.2075	[-130.00, -50.00]	180.9770	[-500.00, 500.00]
A3	-16.5750	[-50.00, -10.00]	-20.9807	[-500.00, 500.00]
A4	-18.4833	[-30.00, -10.00]	58.7005	[-500.00, 500.00]
A5	-18.5868	[-30.00, -10.00]	-29.5220	[-500.00, 500.00]
Freq 3				
A1	-150.2440	[-180.00, -80.00]	64.6455	[-500.00, 500.00]
A2	-68.1857	[-130.00, -30.00]	93.5402	[-500.00, 500.00]
A3	-14.0019	[-50.00, -10.00]	-70.7568	[-500.00, 500.00]
A4	-20.3404	[-30.00, -10.00]	-52.2991	[-500.00, 500.00]
A5	-21.4224	[-30.00, -10.00]	-130.4870	[-500.00, 500.00]
Freq 4				
A1	-79.3905	[-120.00, -40.00]	-109.0000	[-500.00, 500.00]
A2	-48.2501	[-110.00, -10.00]	-22.4521	[-500.00, 500.00]
A3	-11.3843	[-50.00, -10.00]	-150.7110	[-500.00, 500.00]
A4	-23.3471	[-30.00, -10.00]	-218.6140	[-500.00, 500.00]
A5	-27.3968	[-30.00, -10.00]	-303.1140	[-500.00, 500.00]

CALIBRATION COEFFICIENTS

	R	Expected	X	Expected
Freq 1				

Freq 1				
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A2	0.9952	[0.95, 1.05]	0.0020	[-0.05, 0.05]
A3	1.0076	[0.95, 1.05]	-0.0053	[-0.05, 0.05]
A4	0.9969	[0.95, 1.05]	0.0043	[-0.05, 0.05]
A5	1.0018	[0.95, 1.05]	0.0014	[-0.05, 0.05]
Freq 2				
A1	0.9890	[0.95, 1.05]	-0.0065	[-0.05, 0.05]
A2	0.9894	[0.95, 1.05]	-0.0064	[-0.05, 0.05]
A3	0.9962	[0.95, 1.05]	-0.0066	[-0.05, 0.05]
A4	0.9930	[0.95, 1.05]	-0.0041	[-0.05, 0.05]
A5	0.9988	[0.95, 1.05]	-0.0087	[-0.05, 0.05]
Freq 3				
A1	0.9974	[0.95, 1.05]	-0.0011	[-0.05, 0.05]
A2	0.9984	[0.95, 1.05]	-0.0009	[-0.05, 0.05]
A3	1.0049	[0.95, 1.05]	-0.0013	[-0.05, 0.05]
A4	1.0010	[0.95, 1.05]	0.0018	[-0.05, 0.05]
A5	1.0073	[0.95, 1.05]	-0.0038	[-0.05, 0.05]
Freq 4				
A1	0.9848	[0.95, 1.05]	-0.0103	[-0.05, 0.05]
A2	0.9852	[0.95, 1.05]	-0.0102	[-0.05, 0.05]
A3	0.9936	[0.95, 1.05]	-0.0127	[-0.05, 0.05]
A4	0.9895	[0.95, 1.05]	-0.0078	[-0.05, 0.05]
A5	1.0000	[0.95, 1.05]	-0.0163	[-0.05, 0.05]
Temperature	17.8769 degC			

ThruBit Density Calibration Report

Tool Model-Serial Number: PS-PS05D
Source Number:
Shop Calibration Performed: Fri Feb 01 11:01:43 2013

REFERENCE

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

READINGS

Outputs	Counts	Units	Expected
SS1 Background	146.60	cps	[130.00, 170.00]
LS1 Background	145.22	cps	[130.00, 170.00]
LS4 Background	30.02	cps	[27.00, 35.00]
SS1 Aluminium	5214.27	cps	[4500.00, 5500.00]
LS1 Aluminium	935.89	cps	[750.00, 950.00]
LS4 Aluminium	1010.88	cps	[843.00, 1068.00]
SS1 Magnesium	8742.35	cps	[7000.00, 9000.00]
LS1 Magnesium	6179.35	cps	[5250.00, 6250.00]
LS1 Al + Fe	798.48	cps	[650.00, 800.00]
LS4 Al + Fe	457.12	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	4.768	[3.510, 6.170]
PEF B Factor	-0.539	[-0.700, -0.410]

Caliper Shop Calibration performed:

Fri Feb 01 11:01:43 2013

RESULTS

Reference	Reading	Units
12.00	1906.84	in
9.00	2059.23	in
6.00	2224.26	in

DENSITY PRE-SURVEY CHECK Performed:

Fri Feb 22 11:04:00 2013

Outputs	Counts	Units	Expected
SS1 Background	147.15	cps	[142.20, 151.00]
LS1 Background	144.78	cps	[140.87, 149.58]
LS4 Background	29.59	cps	[28.22, 31.82]

CALIPER PRE-SURVEY CHECK Performed:

Fri Feb 22 11:04:21 2013

Reference	Readings	Units	Expected
6.00	6.04	in	[5.80, 6.20]

Compensated Neutron Calibration Report

Tool Model-Serial Number: PS-PS14N
Source Number:

Calibration Tank Temperature: 61.1 degF
Shop Calibration Performed: Tue Feb 19 10:08:35 2013

BACKGROUND MEASUREMENT

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

WATER TANK REFERENCE

Outputs	Measured	Units	Expected
SS Counts	800.2	cps	
LS Counts	26.1	cps	
Tank Ratio Ref	30.9580	SS/LS	
Tank Ratio	30.6057	SS/LS	
Tank Ratio Gain	1.0115		[0.85, 1.15]

ALUMINUM SLEEVE REFERENCE

Outputs	Measured	Units	Expected
SS Counts	9004.3	cps	
LS Counts	848.2	cps	
Al Ratio Ref	10.797	SS/LS	
Al Ratio	10.738	SS/LS	

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

PRE-SURVEY BACKGROUND CHECK Performed: Fri Feb 22 11:09:40 2013

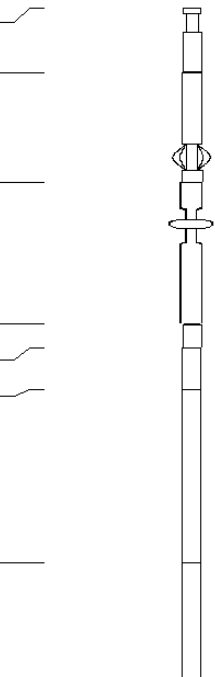
Outputs	Measured	Units	Expected
SS Counts	0.0	cps	<10
LS Counts	0.1	cps	<4

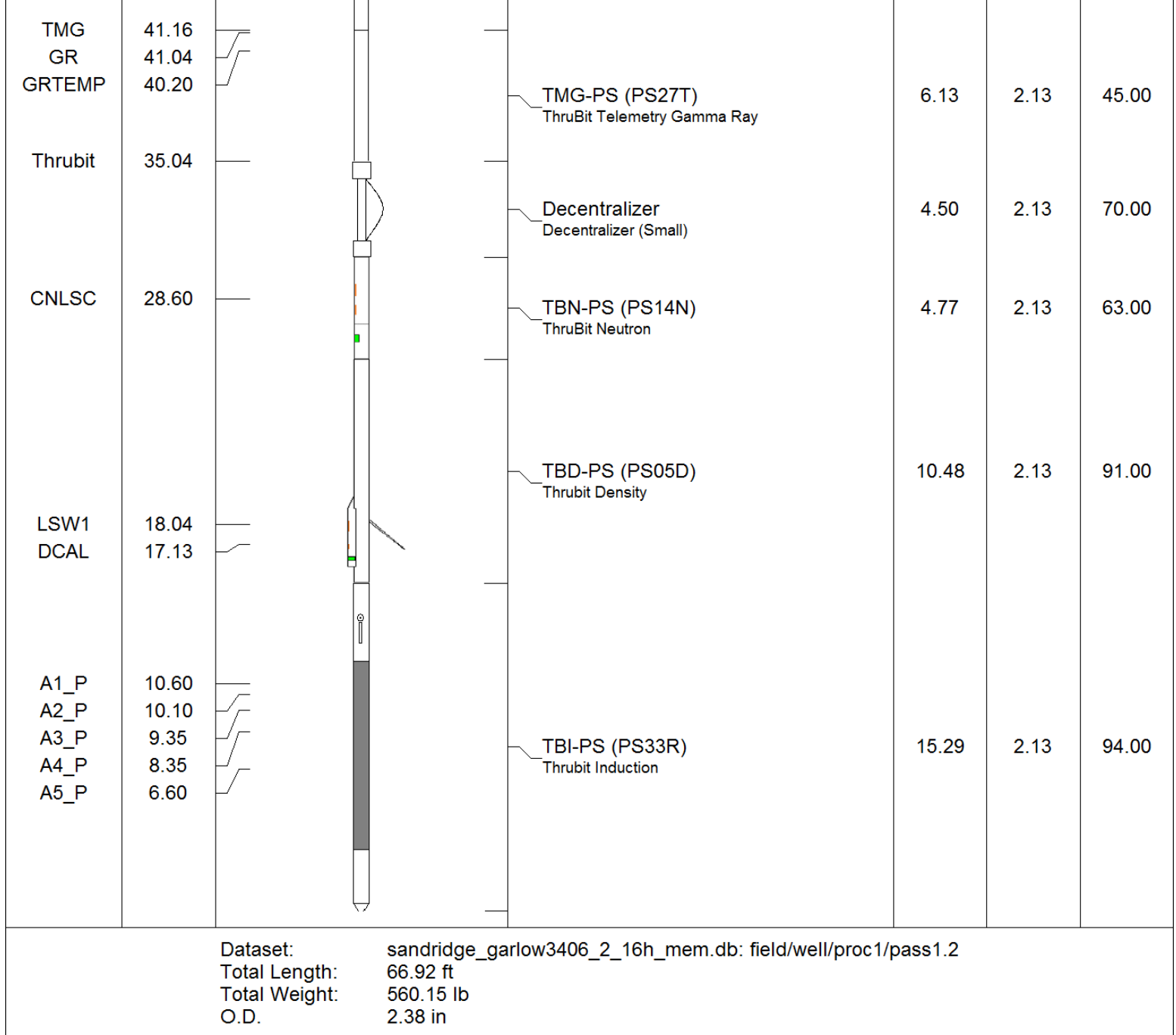
Gamma Ray Calibration Report

Tool Model-Serial Number:	PS-PS27T	
Performed:	Sat Jan 19 09:53:07 2013	
Calibrator Value:	0.0	GAPI
Background Reading:	0.0	cps
Calibrator Reading:	0.0	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	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		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



Company	SANDRIDGE ENERGY
Well	GARLOW 3406 2-16H
Field	EASTHAM
County	HARPER
State	KANSAS

MAIN PASS

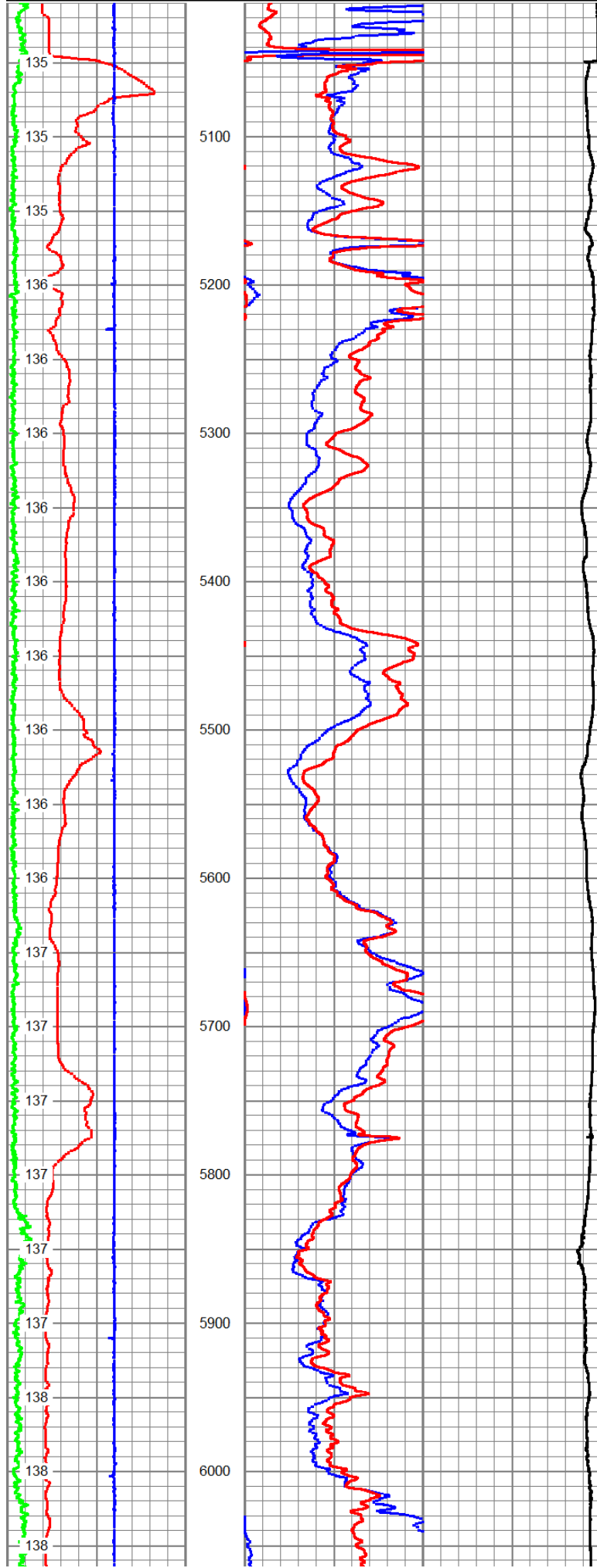
Database File: c:\users\kris.wetzel\desktop\garlow 3406 2-16h\sandridge_garlow3406
 Dataset Pathname: proc1/pass1.2
 Presentation Format: 6_1r_chk
 Dataset Creation: Wed Feb 27 03:44:15 2013
 Charted by: Depth in Feet scaled 1:1200

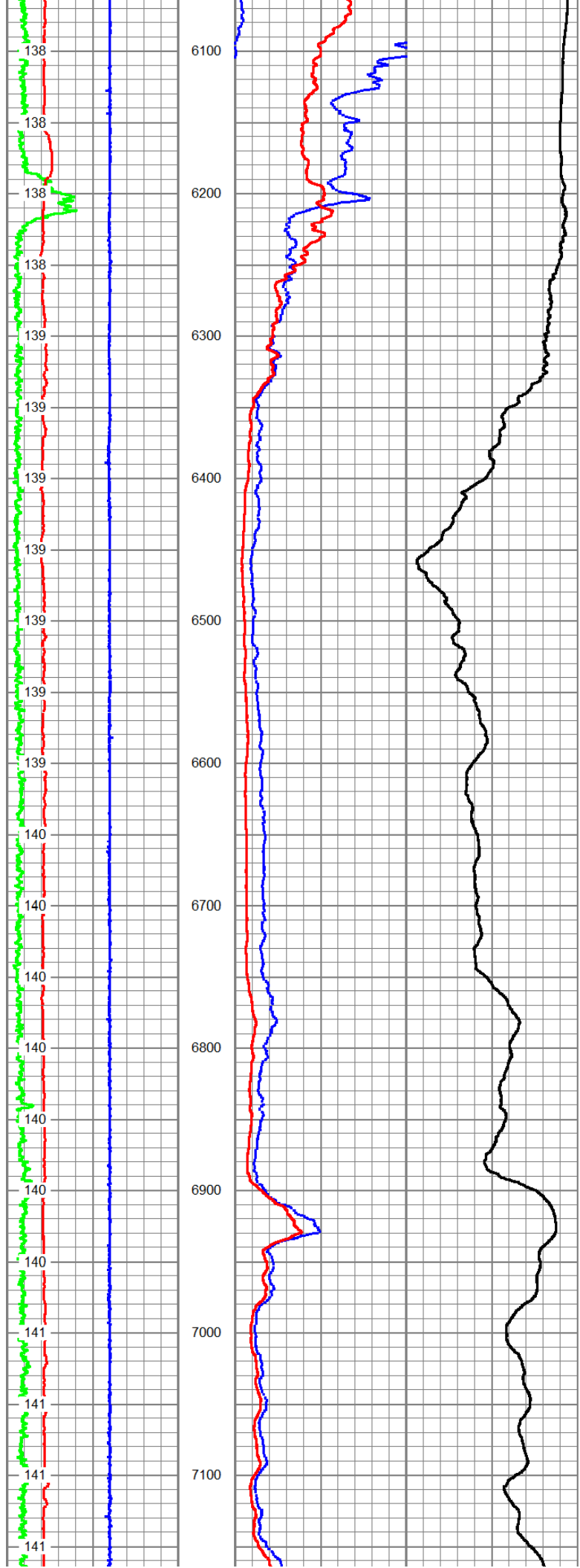
0	GR (GAPI)	150	20in 2ft Res	
4	DCAL (in)	14	50 (Ohm-m)	500
-5	ACCY	5	90in 2ft Res	
GRTEMP			50 (Ohm-m)	500

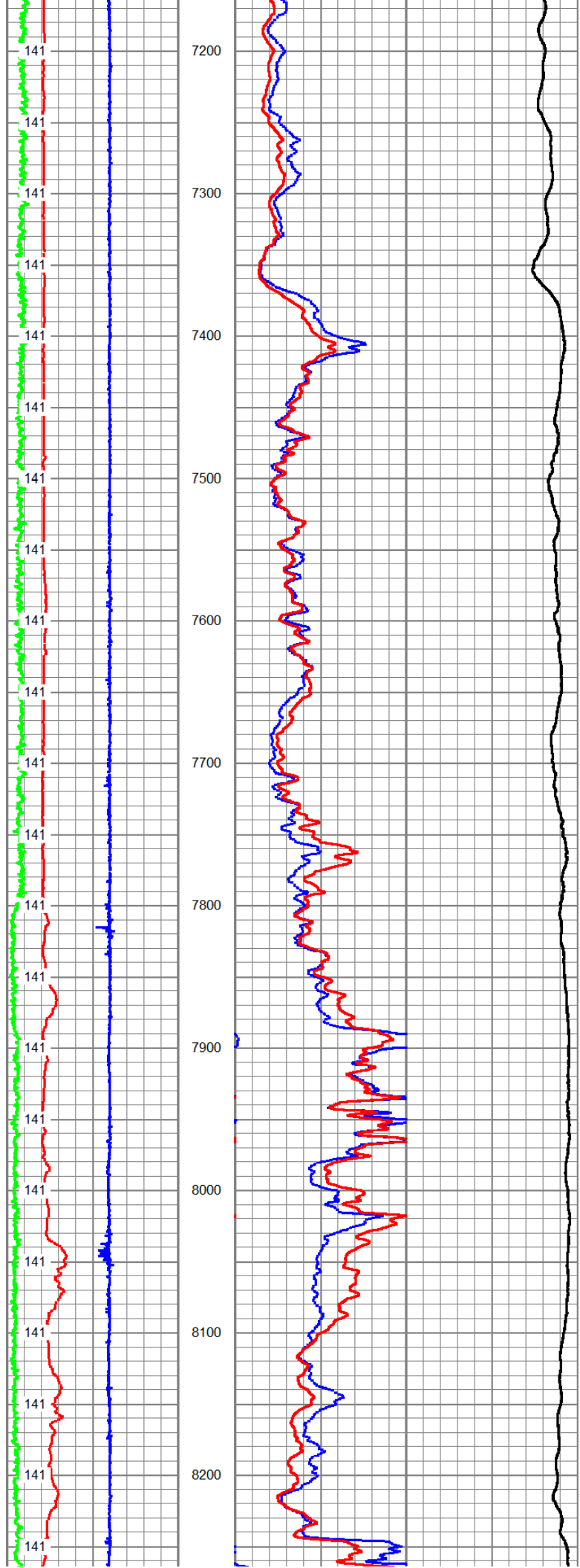
DEEP COND (min/m)

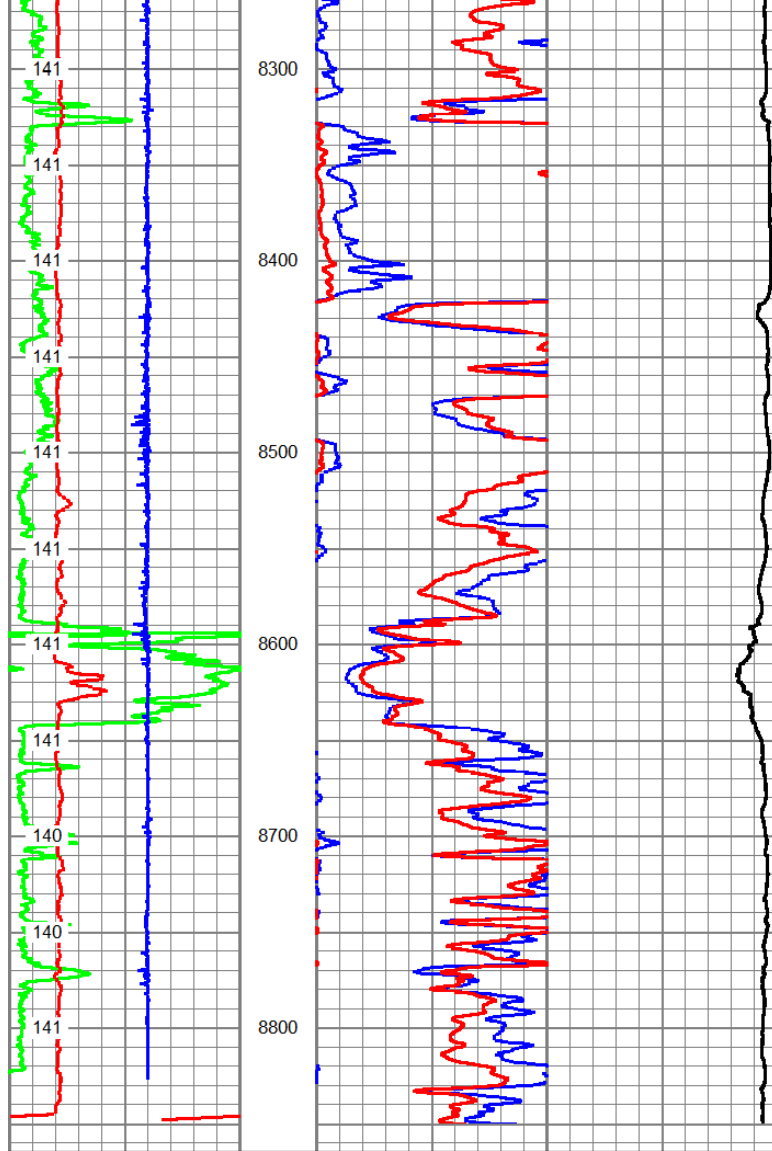
0 20in 2ft Res (Ohm-m) 50

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