



ThruBit

A Schlumberger Company

ARRAY INDUCTION GAMMA RAY MEMORY LOG

Company SANDRIDGE ENERGY
 Well WEST 3508 1-5H
 Field BOUSE
 County HARPER
 State KANSAS

Company SANDRIDGE ENERGY
 Well WEST 3508 1-5H
 Field BOUSE
 County HARPER State KANSAS

Location: API #: 15-077-21997-0100
 SHL: 240' FSL & 1720' FEL
 SEC 32 TWP 35S RGE 8W
 Permanent Datum G.L. Elevation 1236'
 Log Measured From KB 18' ABOVE PERM DATUM
 Drilling Measured From KB
 Other Services
 THURBIT PORTAL BIT
 Elevation
 KB: 1254'
 D.F. 1254'
 G.L. 1236'

Date	1 FEB 2014
Run Number	ONE
Depth Driller	9861'
Depth Logger	9820'
Bottom Logged Interval	9809'
Top Log Interval	3000'
Casing Driller	7.0" @ 5782'
Casing Logger	5780'
Bit Size	6.125"
Type Fluid in Hole	WBM
Density / Viscosity	8.5 / 35
pH / Fluid Loss	9.4 / 60
Source of Sample	MUD SENSOR
Rm @ Meas. Temp	4.50 OHM@65DEGF
Rmf @ Meas. Temp	3.85 OHM@65DEGF
Rmc @ Meas. Temp	4.93 OHM@65DEGF
Source of Rmf / Rmc	CALCULATED
Rm @ BHT	3.62 OHM@125DEGF
Time Circulation Stopped	14:32 1 FEB 2014
Time Logger on Bottom	15:16 1 FEB 2014
Maximum Recorded Temperature	125 DEGF
Equipment Number	T005
Location	OKC, OK
Recorded By	C.PARKER
Witnessed By	L.STRONG

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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: 9762' LOGGED TO: 3000'
 ALL SCALES AND PRESENTATIONS PER CLIENT REQUEST
 LIMESTONE MATRIX, 2.71 g/cc. USED FOR POROSITY MEASUREMENTS
 TOOLSTING RAN WITH SWIVEL, KNUCKLE AND SMALL DE-CENTRALIZER
 TBHV REPRESENTS TOTAL BOREHOLE VOLUME, ft3
 ABHV REPRESENTS ANNULAR HOLE VOLUME, CALCULATED FOR 4.5" CSG., ft3
 HSPM USED TO ACQUIRE LOG DEPTH
 LOG CORRELATED TO MWD GR
 RIG: LARIAT 40
 CREW: C.PARKER R.CRESSWELL I.HERNANDEZ

Service Ticket No. 2536 API No. 15-077-21997-0100 PGM Ver WARRIOR 8.0

The Well Name, Location, Borehole Description, and / or Cementing Data Furnished by Client

EQUIPMENT DATA

GAMMA RAY		NEUTRON		DENSITY		INDUCTION	
Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	PS27T	Serial No.	PS6N	Serial No.	PS1D	Serial No.	PS16R
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	9861'	3000'	0 PSI	35 FPM			
DIRECTIONAL INFORMATION							
Maximum Deviation	93.3	deg. @	5831'	KOP	3845'		

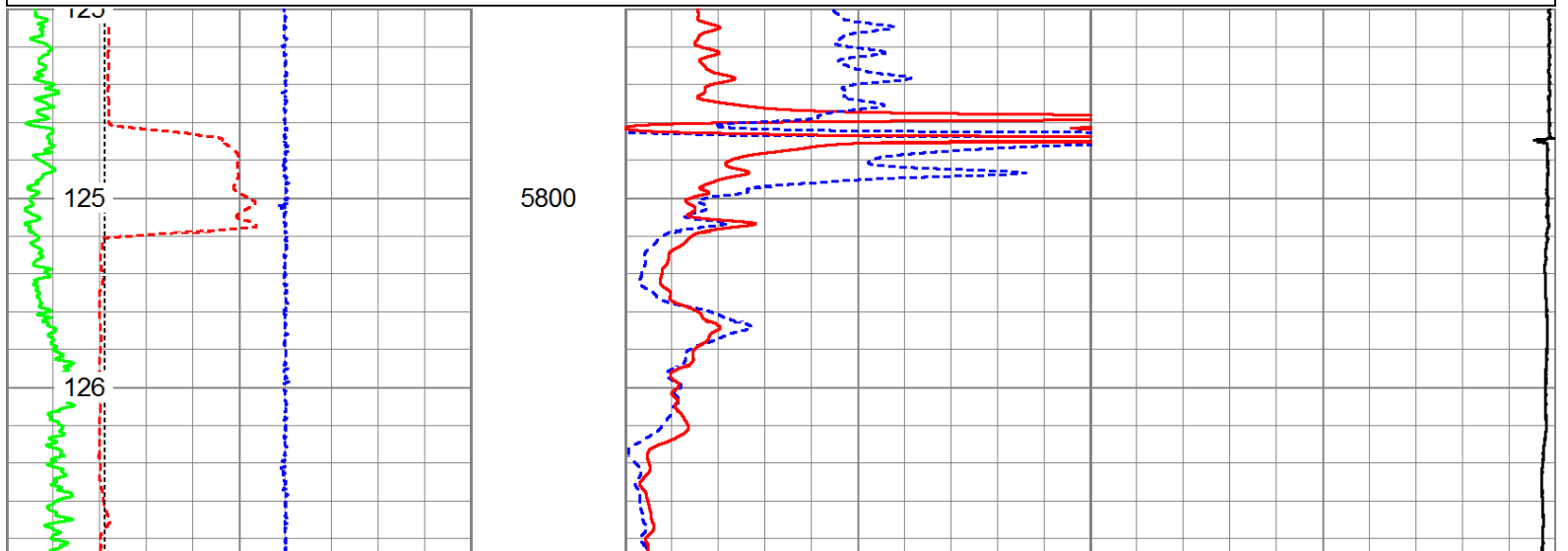


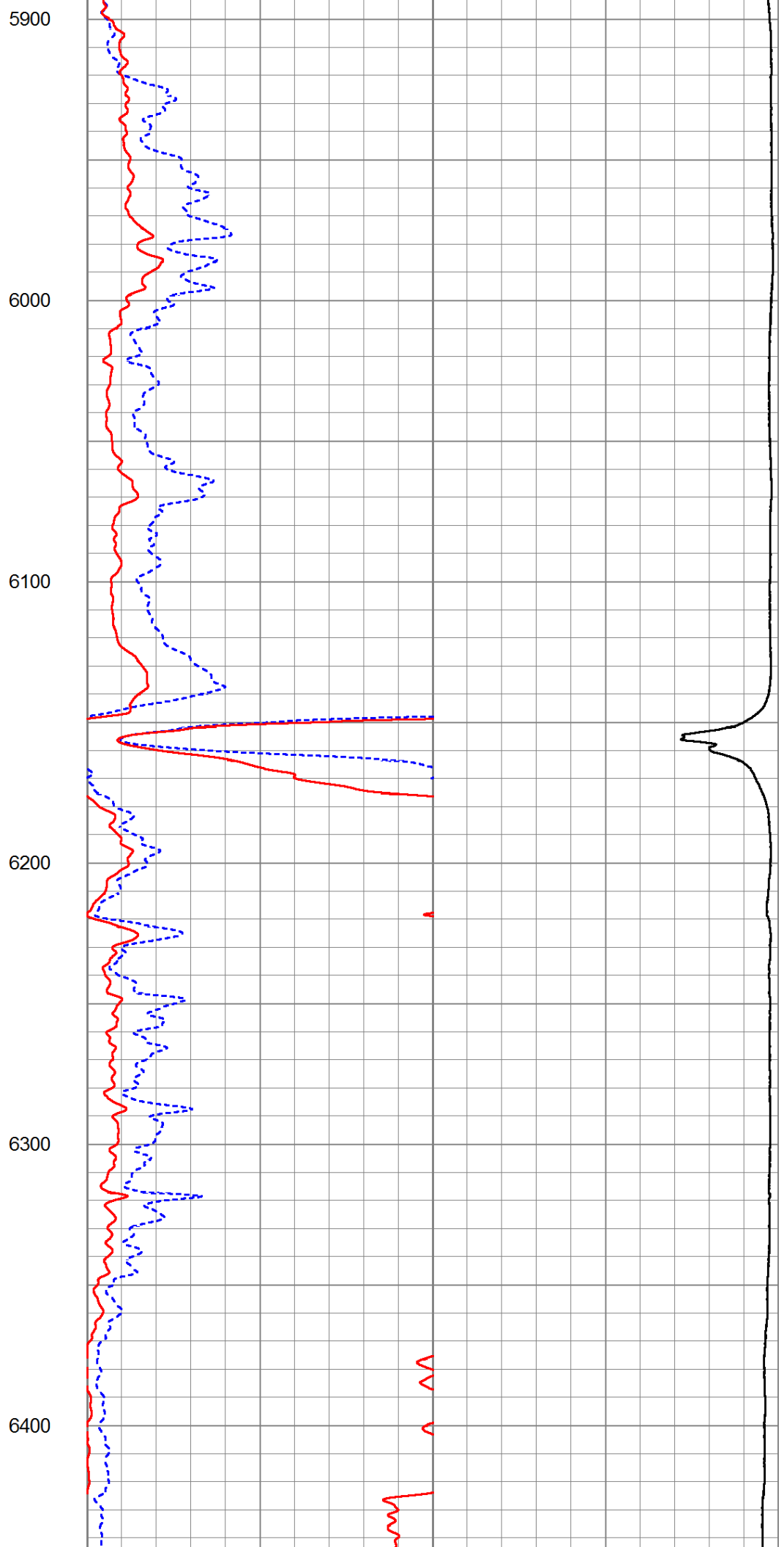
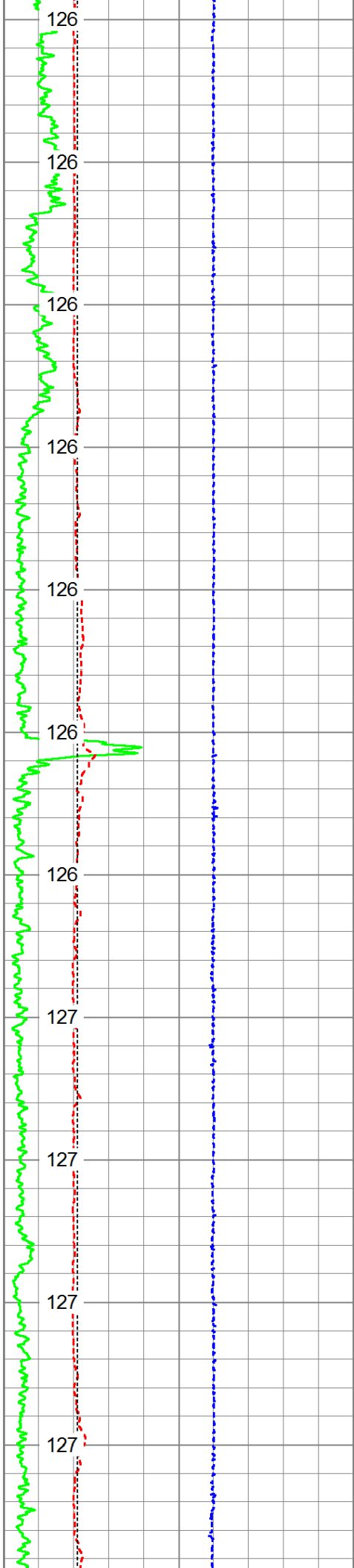
MAIN PASS

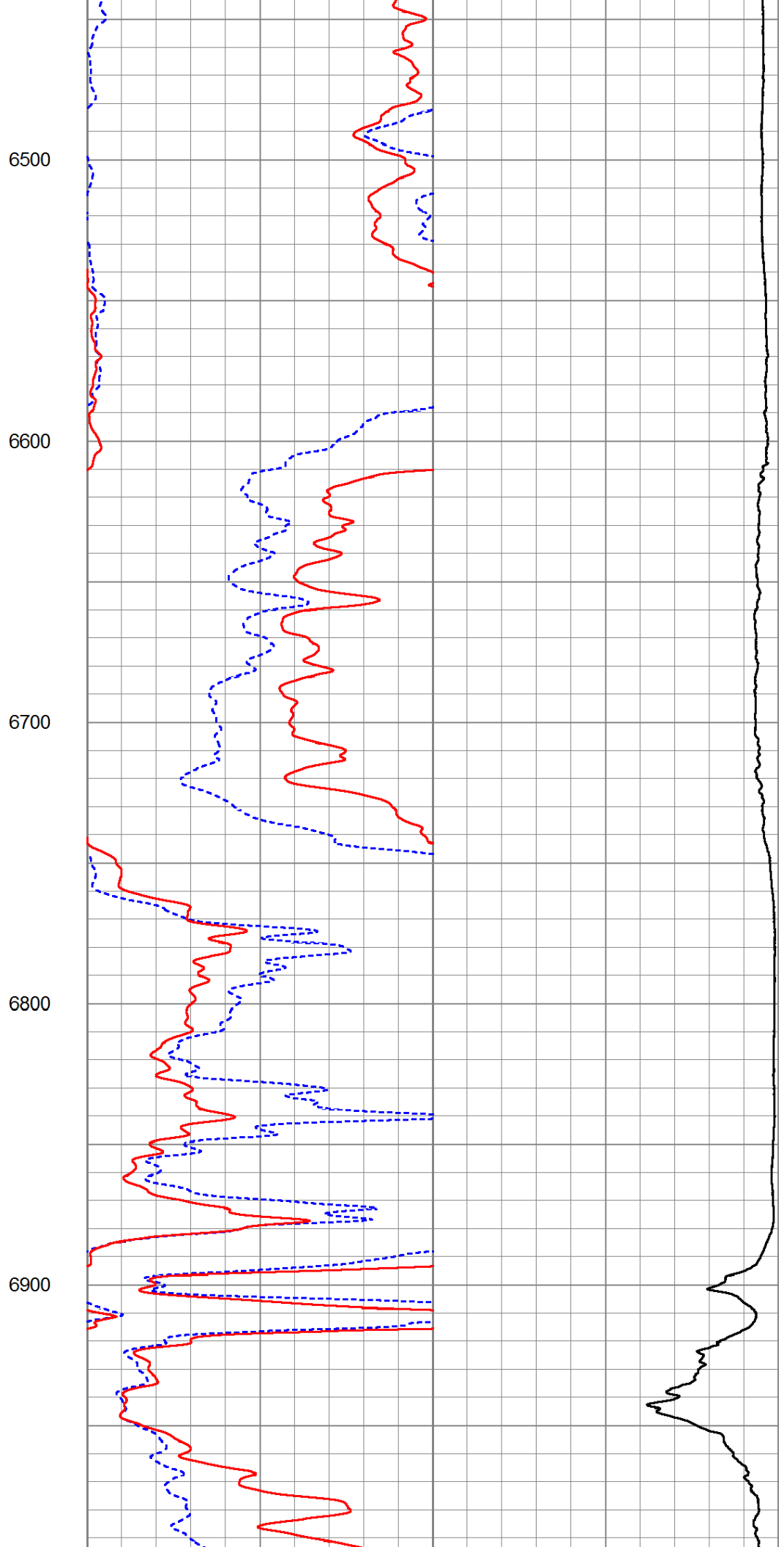
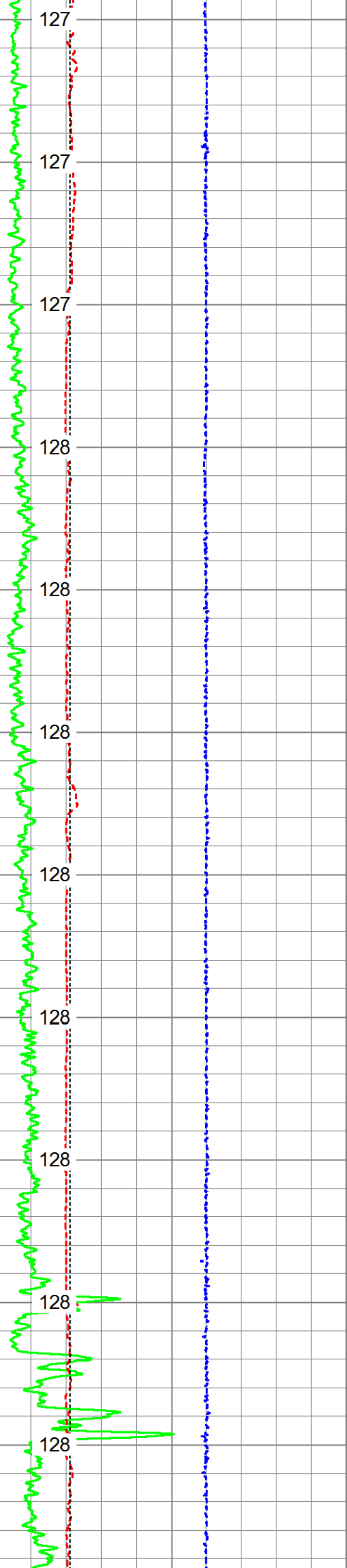
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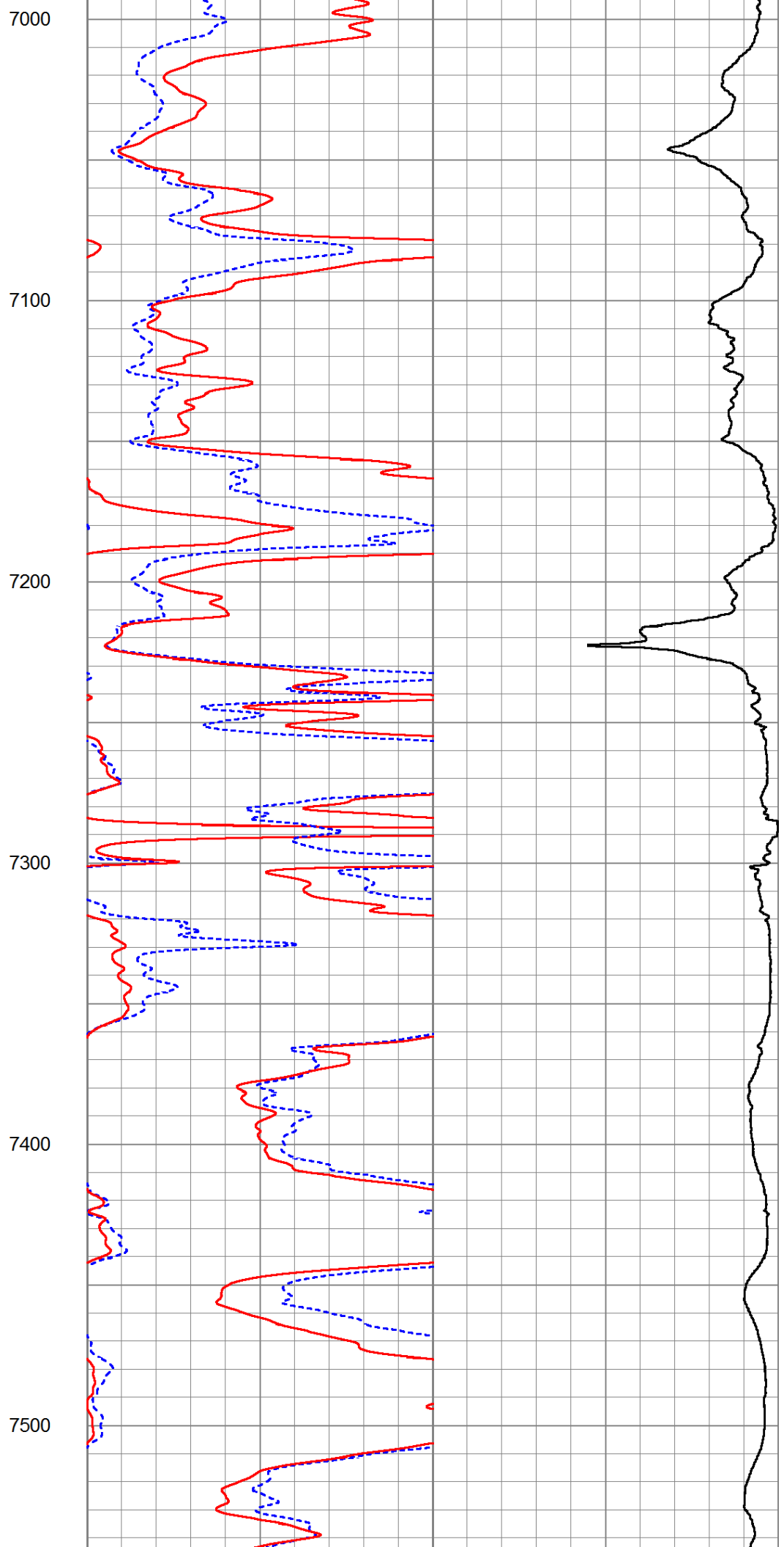
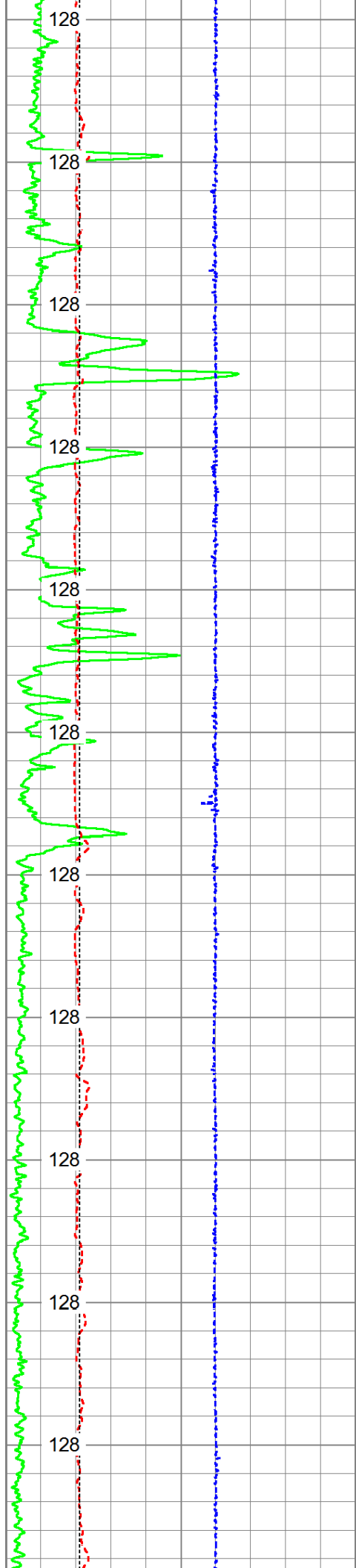
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 Presentation Format 6_2r_chk
 Dataset Creation Sat Feb 01 22:22:06 2014
 Charted by Depth in Feet scaled 1:600

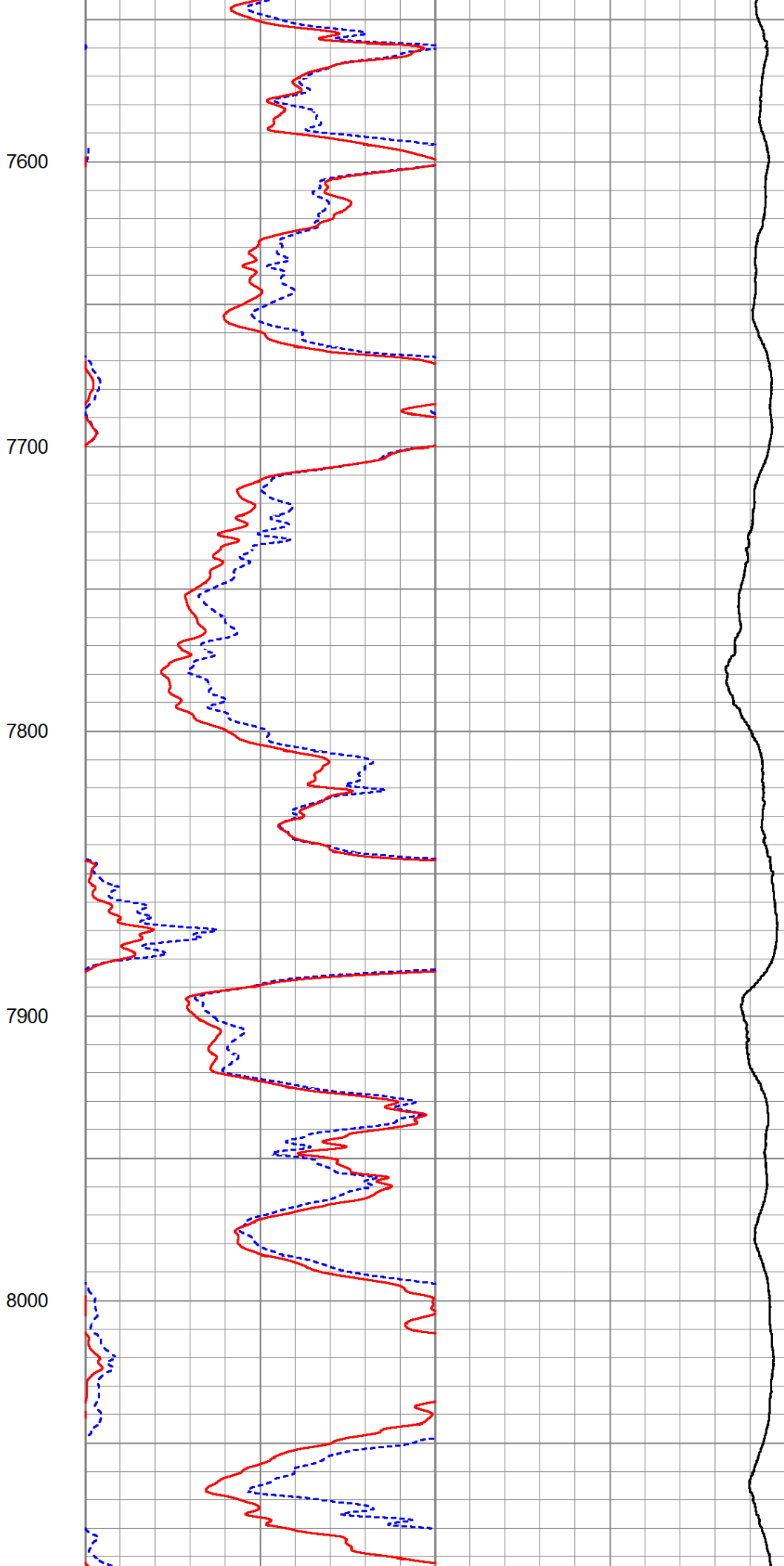
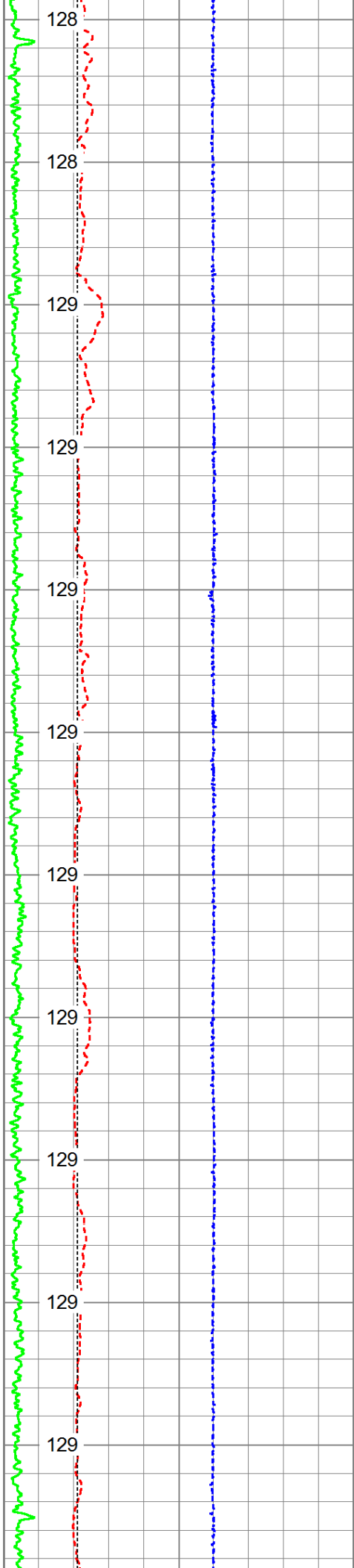
0	GR (GAPI)	150	50	20in 2ft Res (Ohm-m)	500
4	DCAL (in)	14	50	90in 2ft Res (Ohm-m)	500
-5	ACCY	5	1000 DEEP COND (mmho/m) 0		
4	BOREID (in)	14	0	20in 2ft Res (Ohm-m)	50
	GRTEMP (degF)		0	90in 2ft Res (Ohm-m)	50

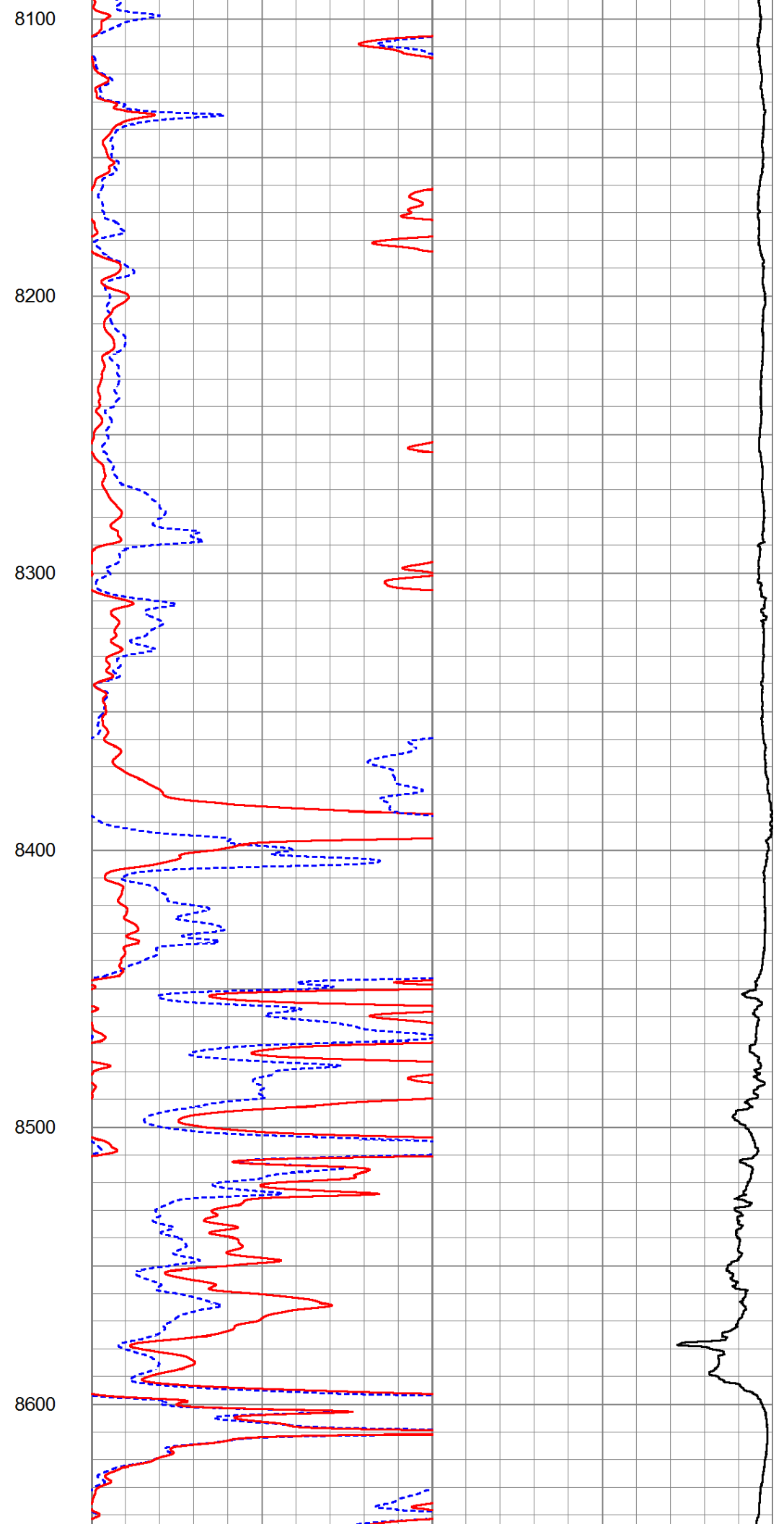
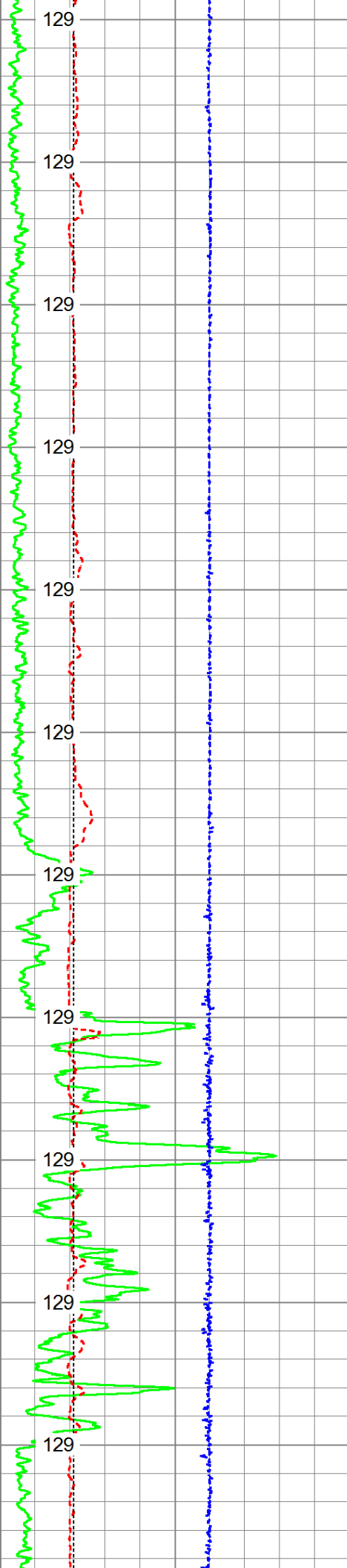


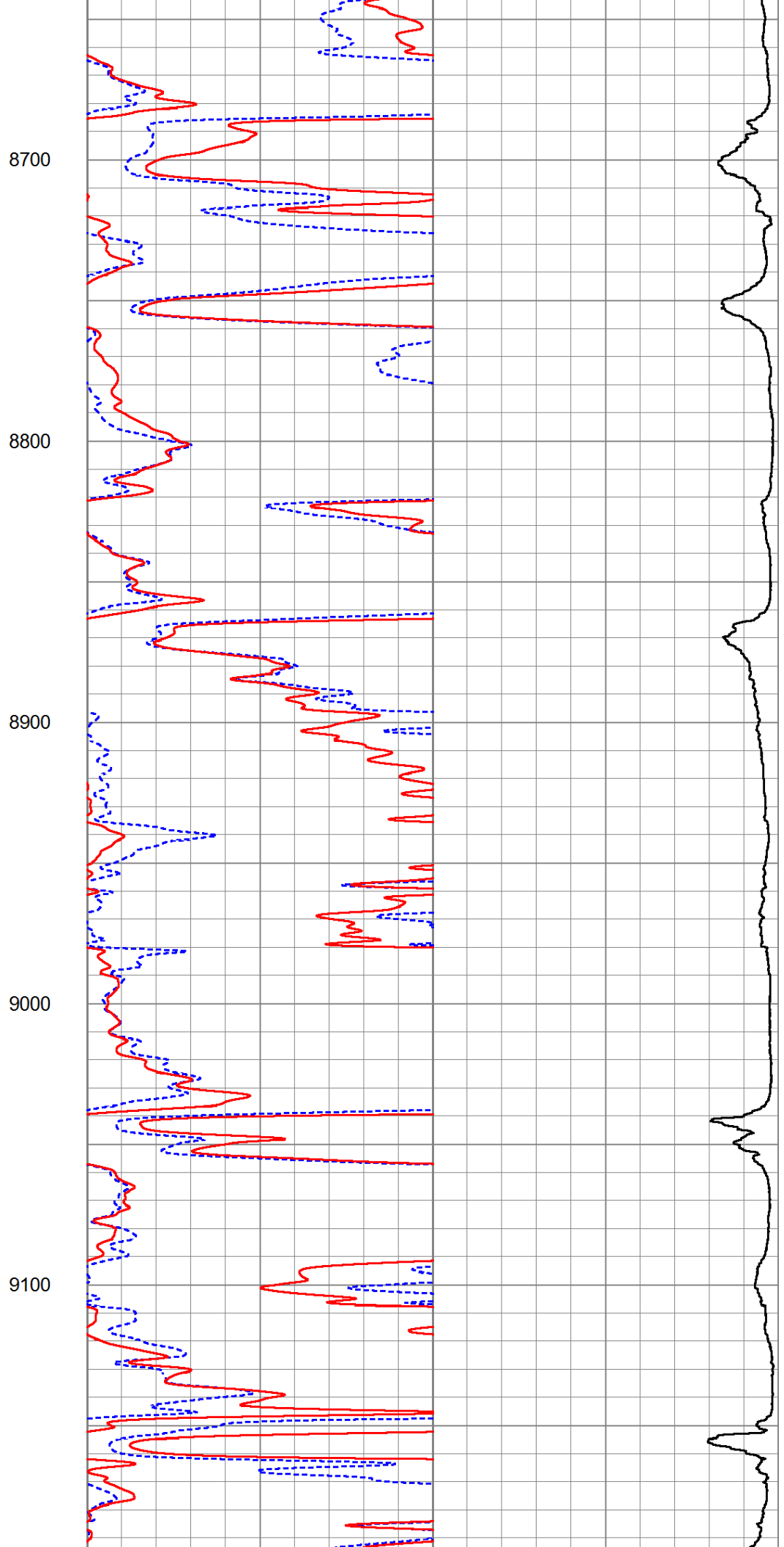
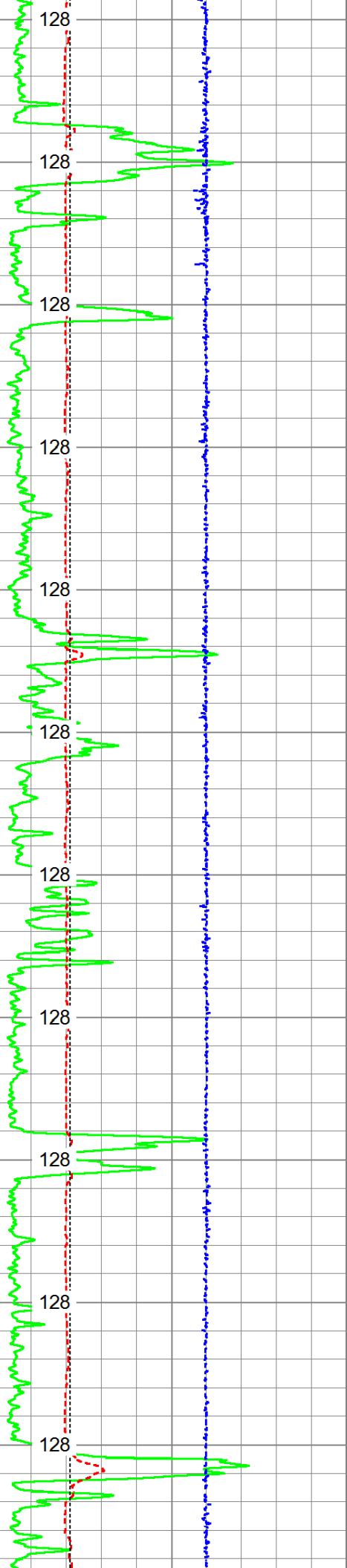


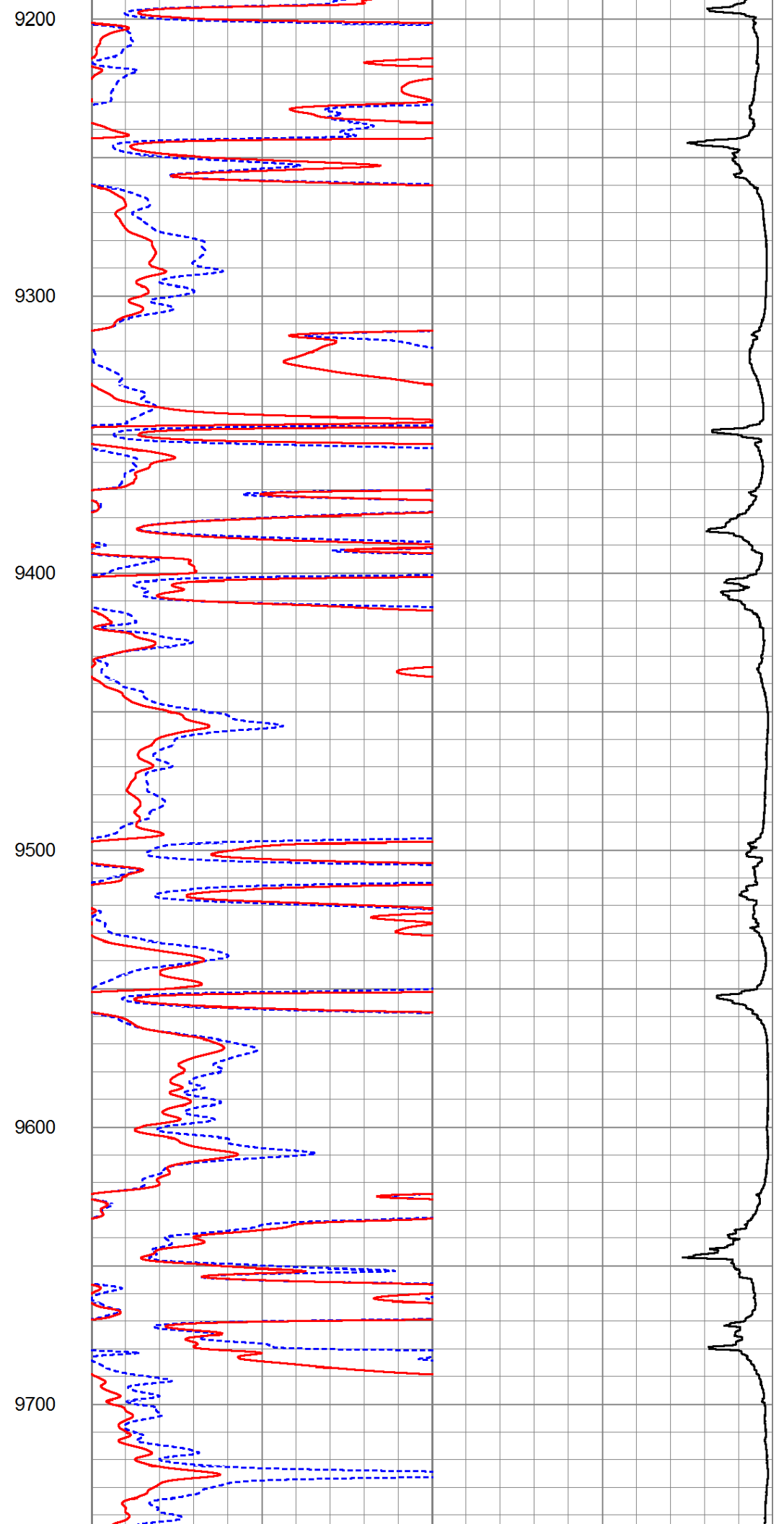
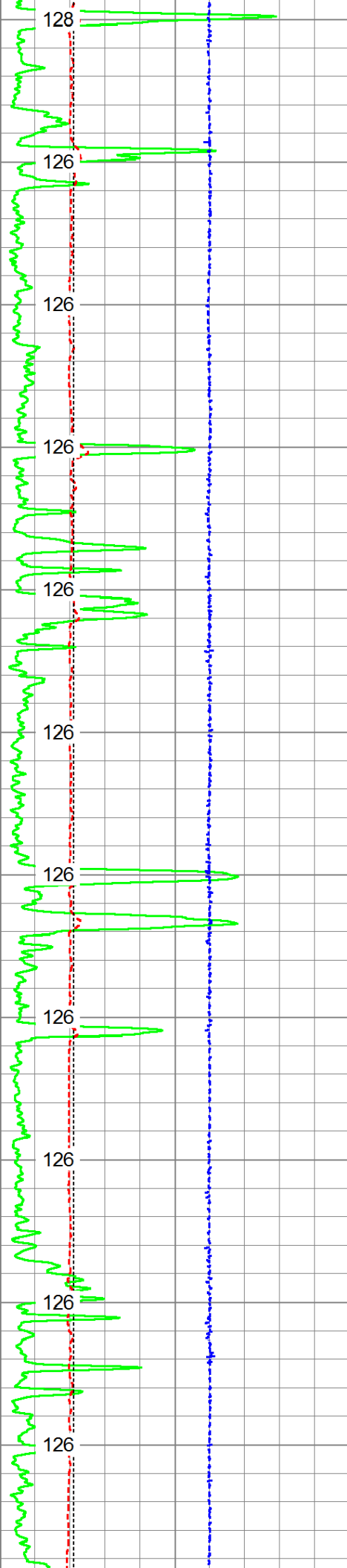


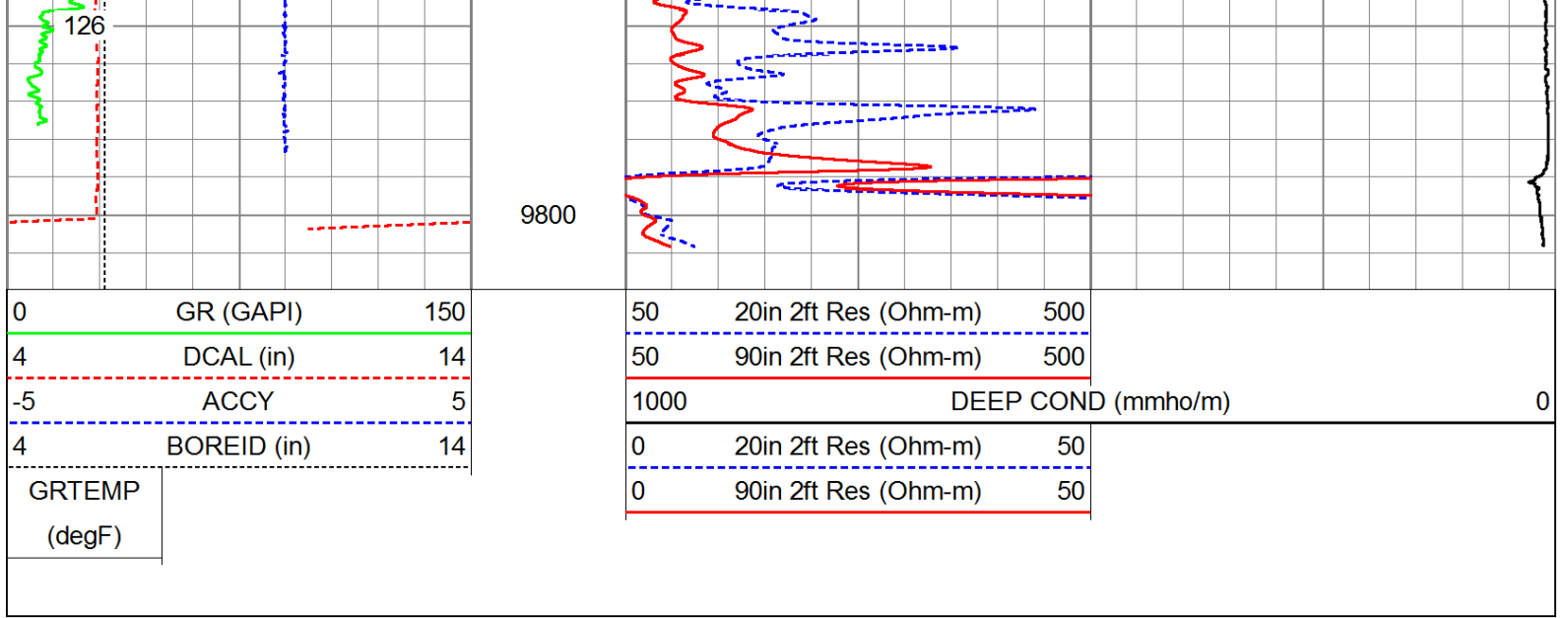






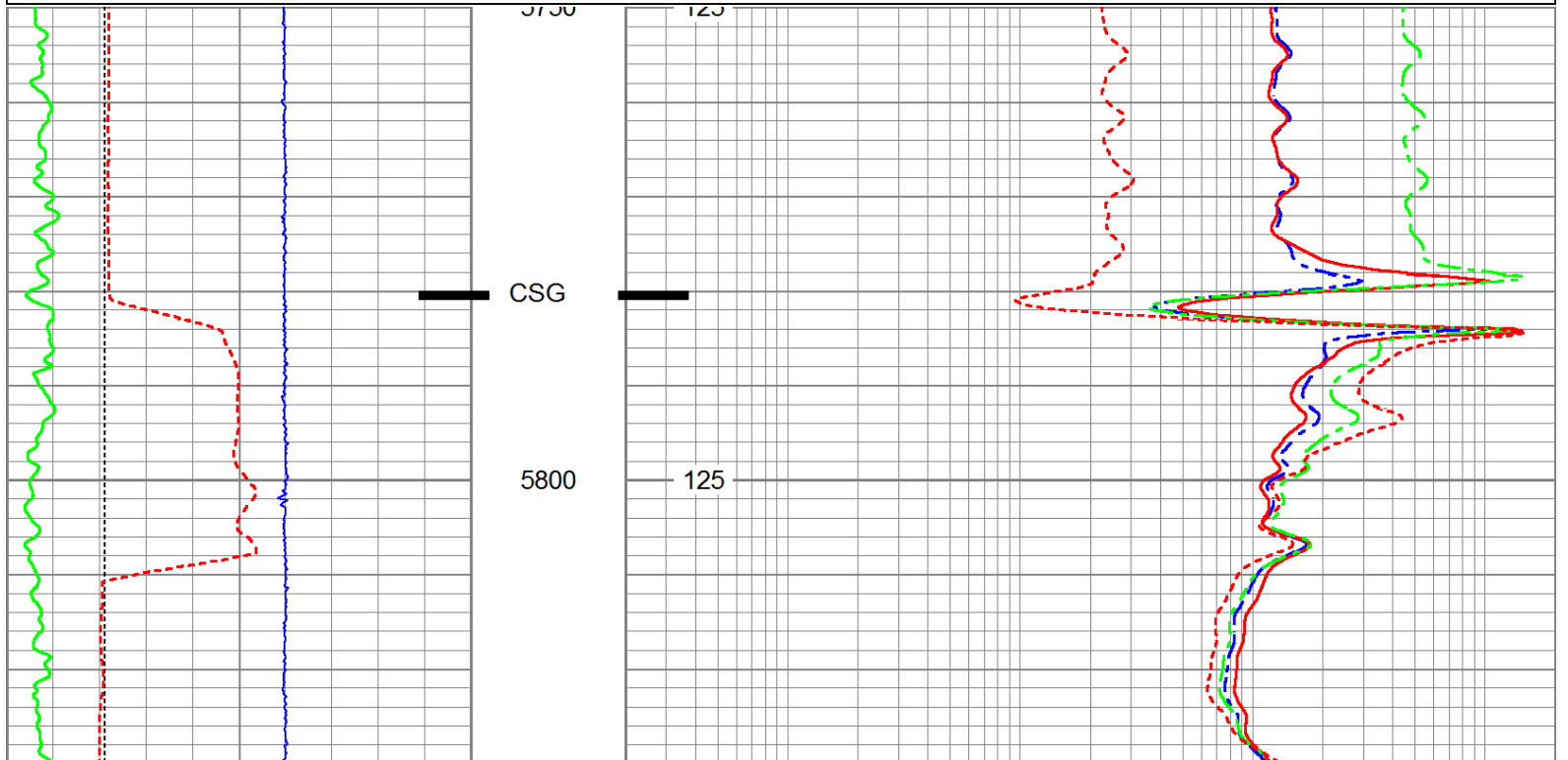
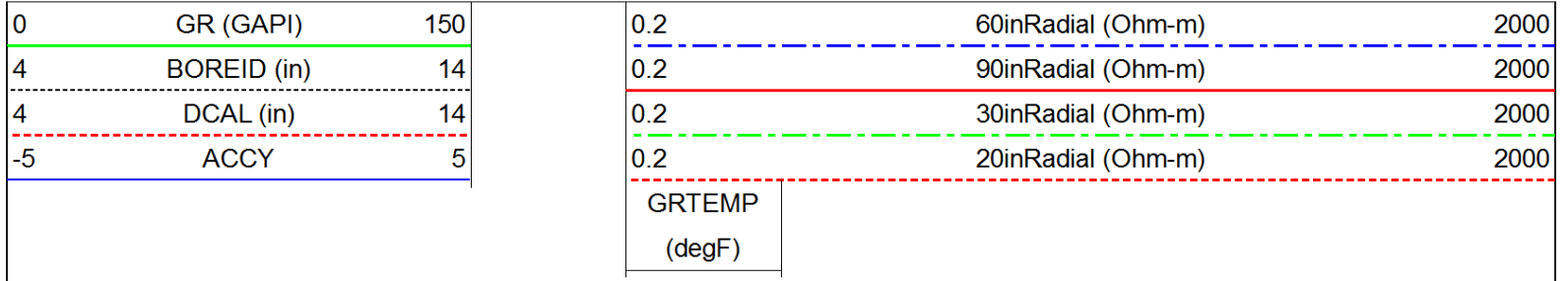


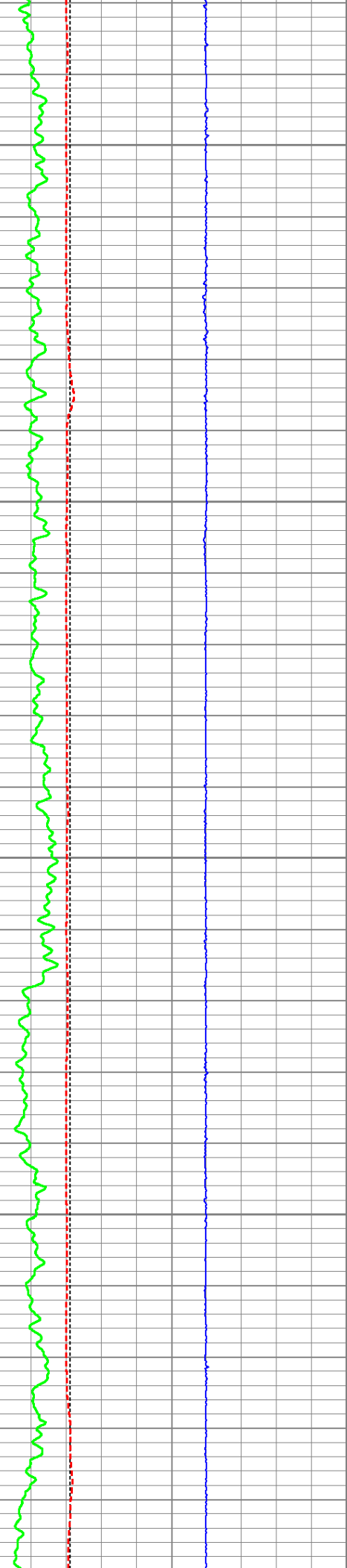




MAIN PASS

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 Dataset Pathname proc1/pass1.2
 Presentation Format 6_5r_chk
 Dataset Creation Sat Feb 01 22:22:06 2014
 Charted by Depth in Feet scaled 1:240





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5900

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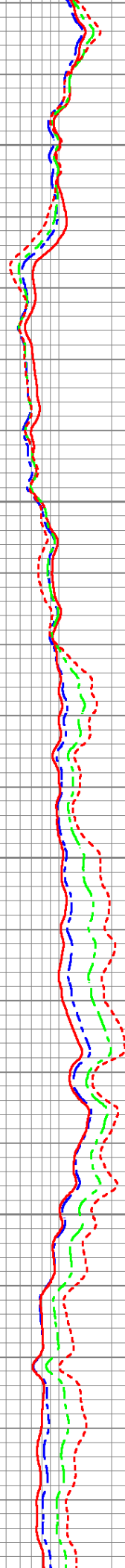
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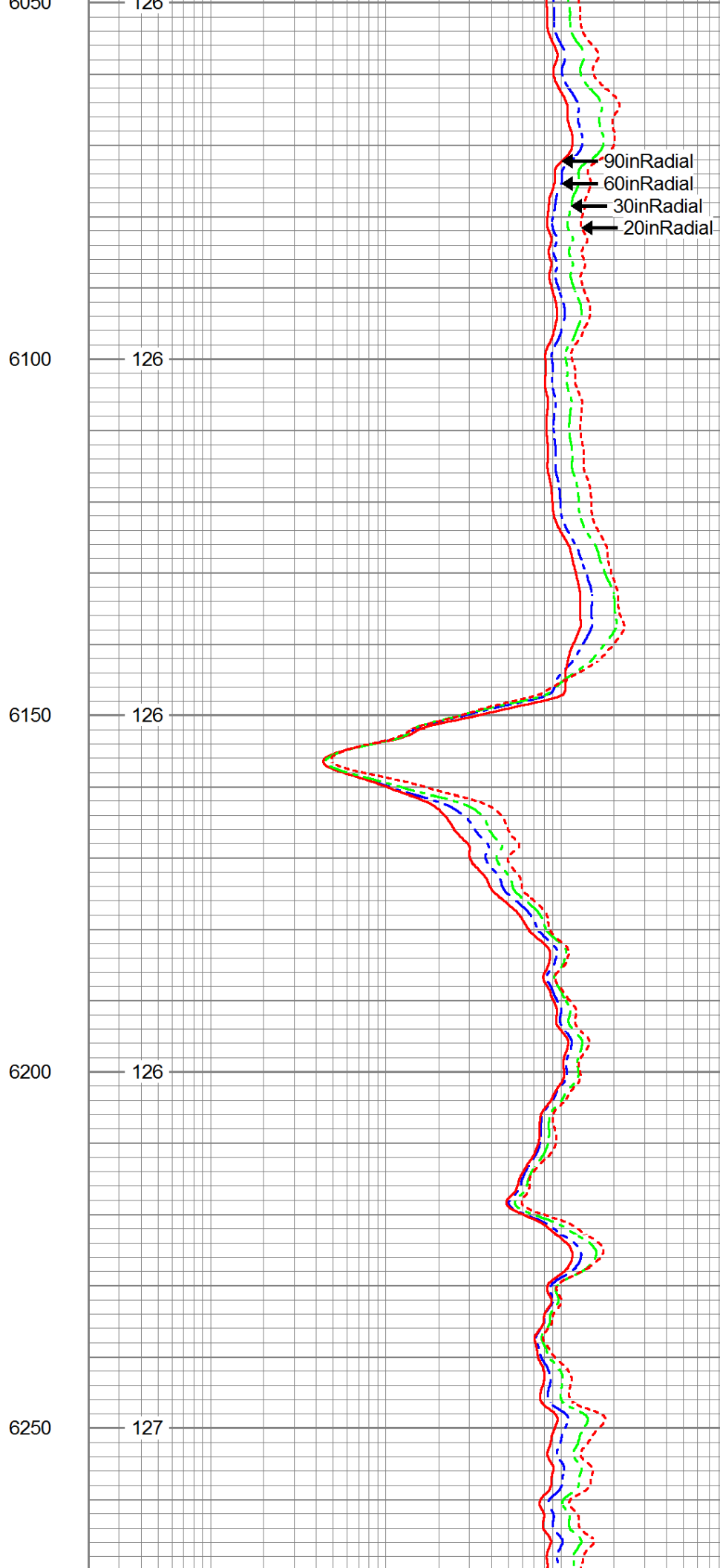
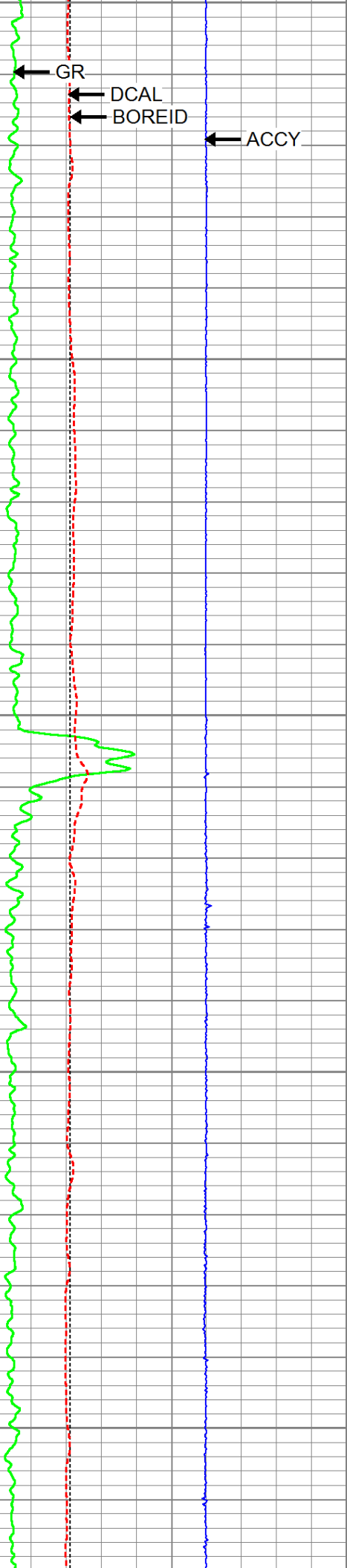
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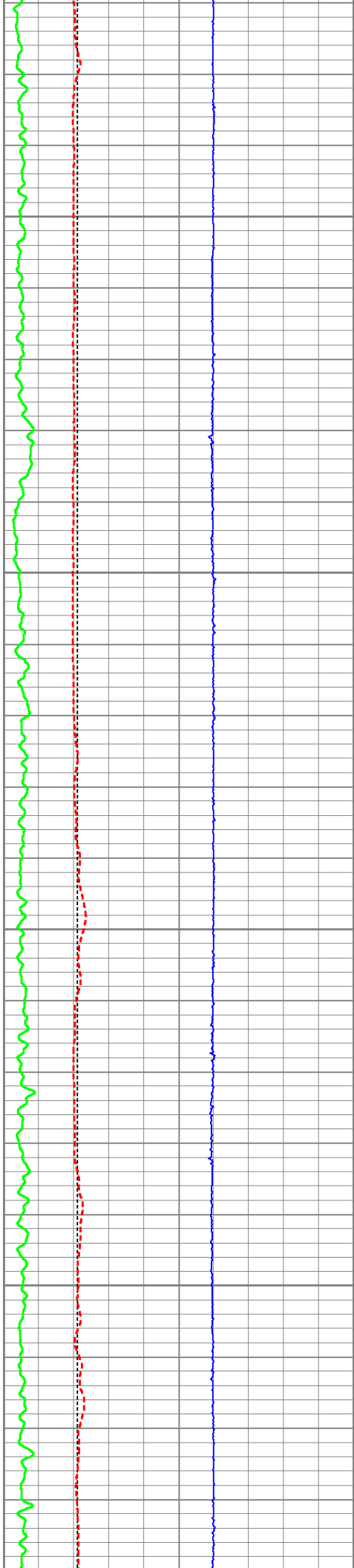
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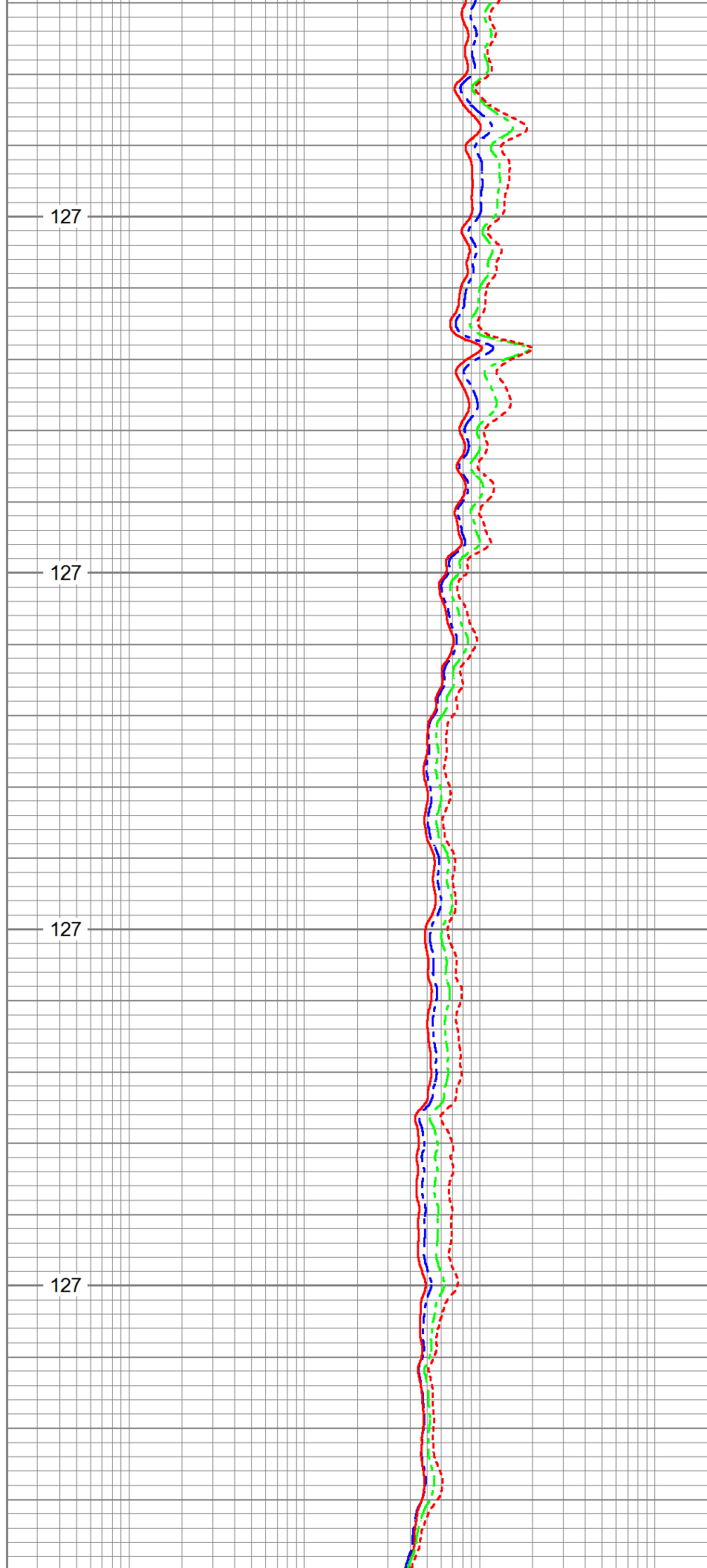
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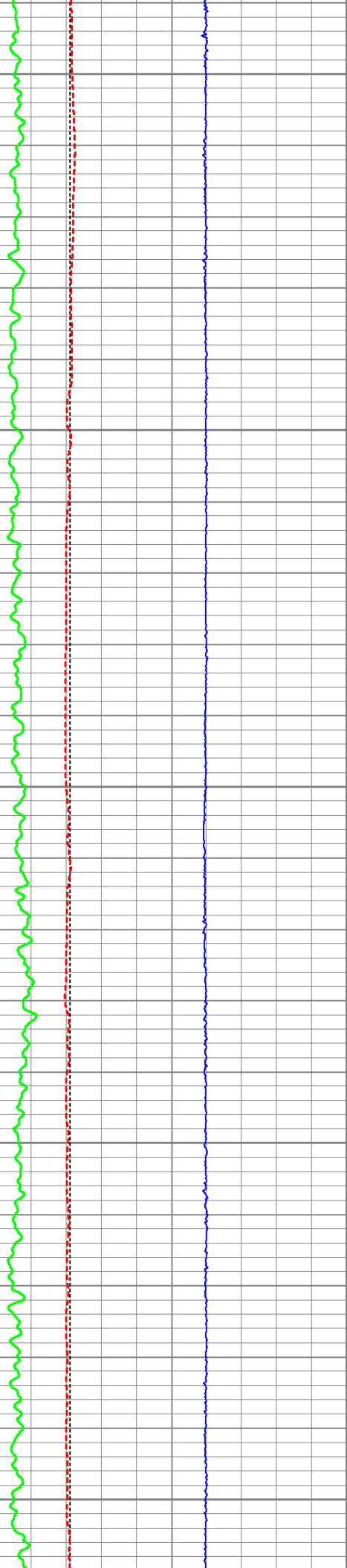
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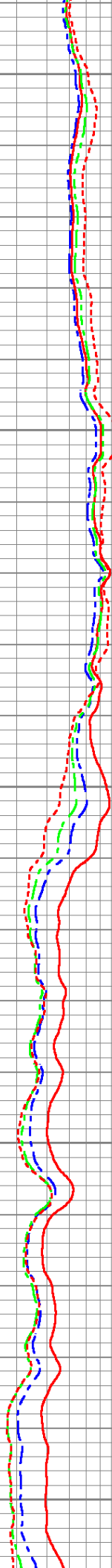
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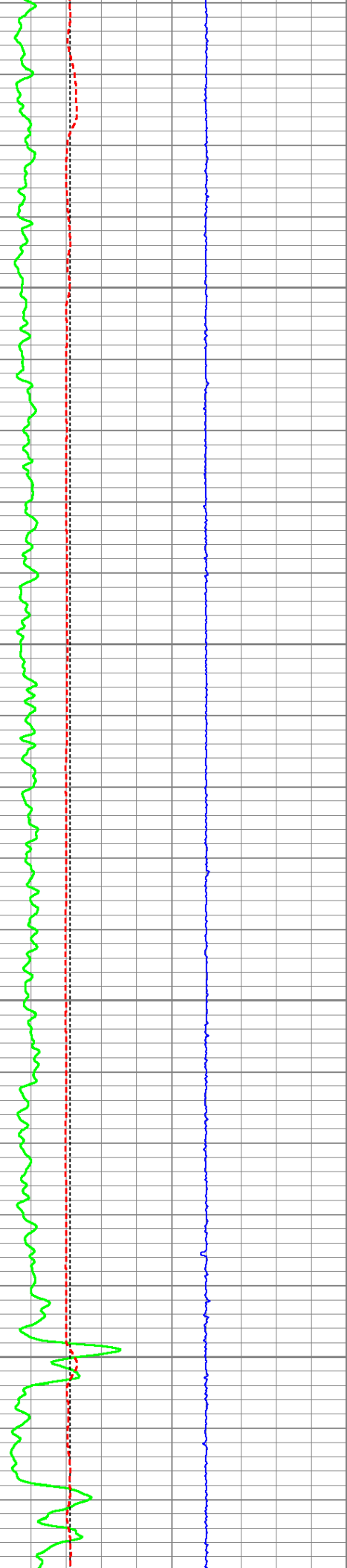
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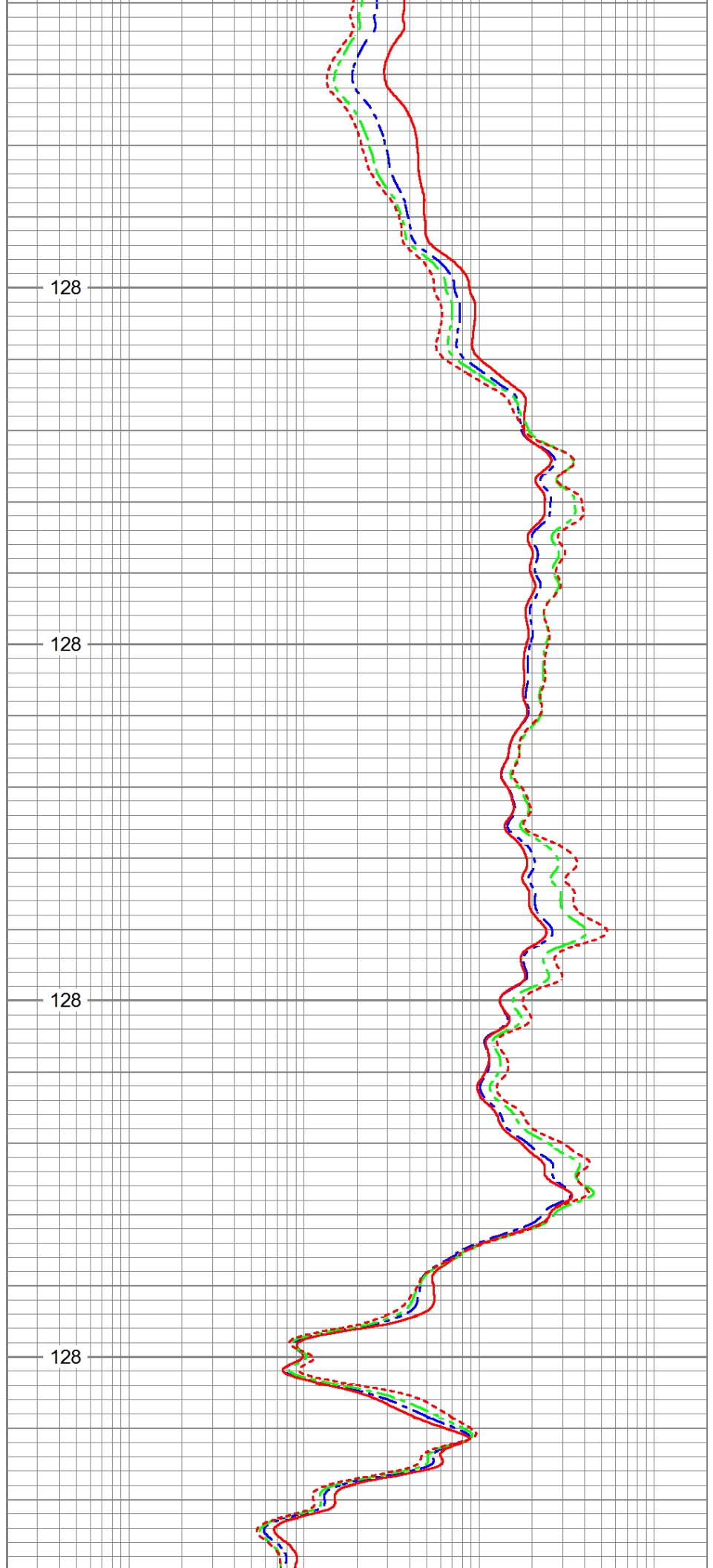
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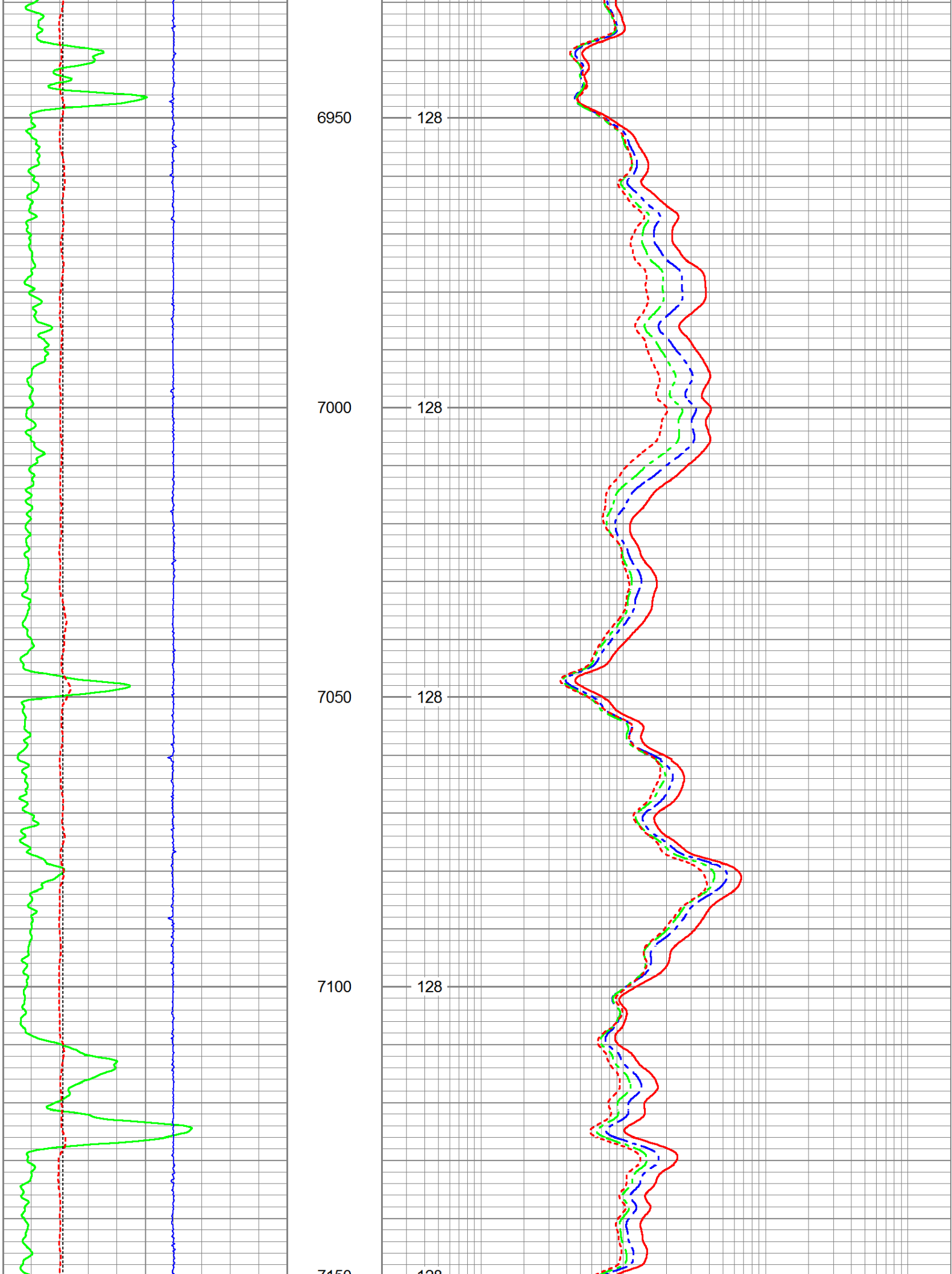
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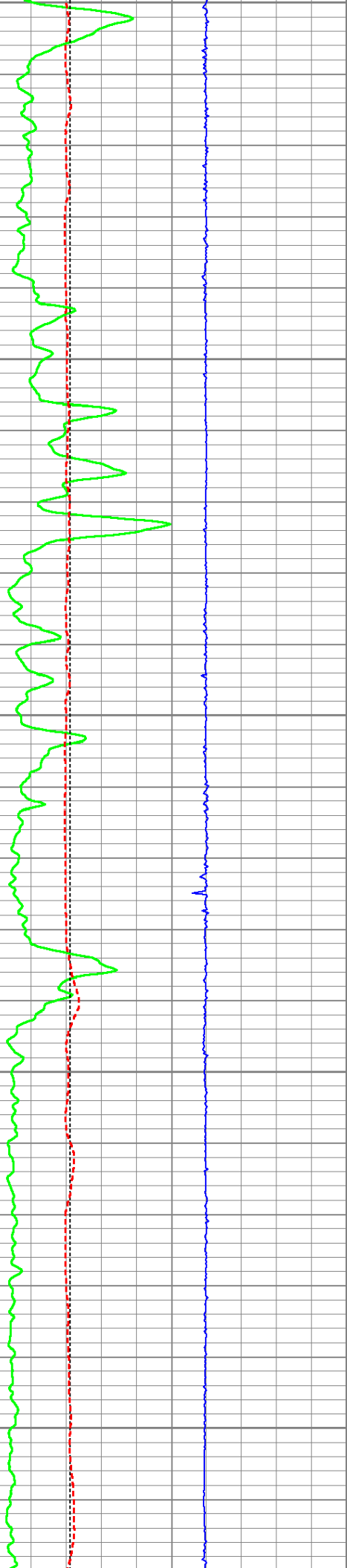
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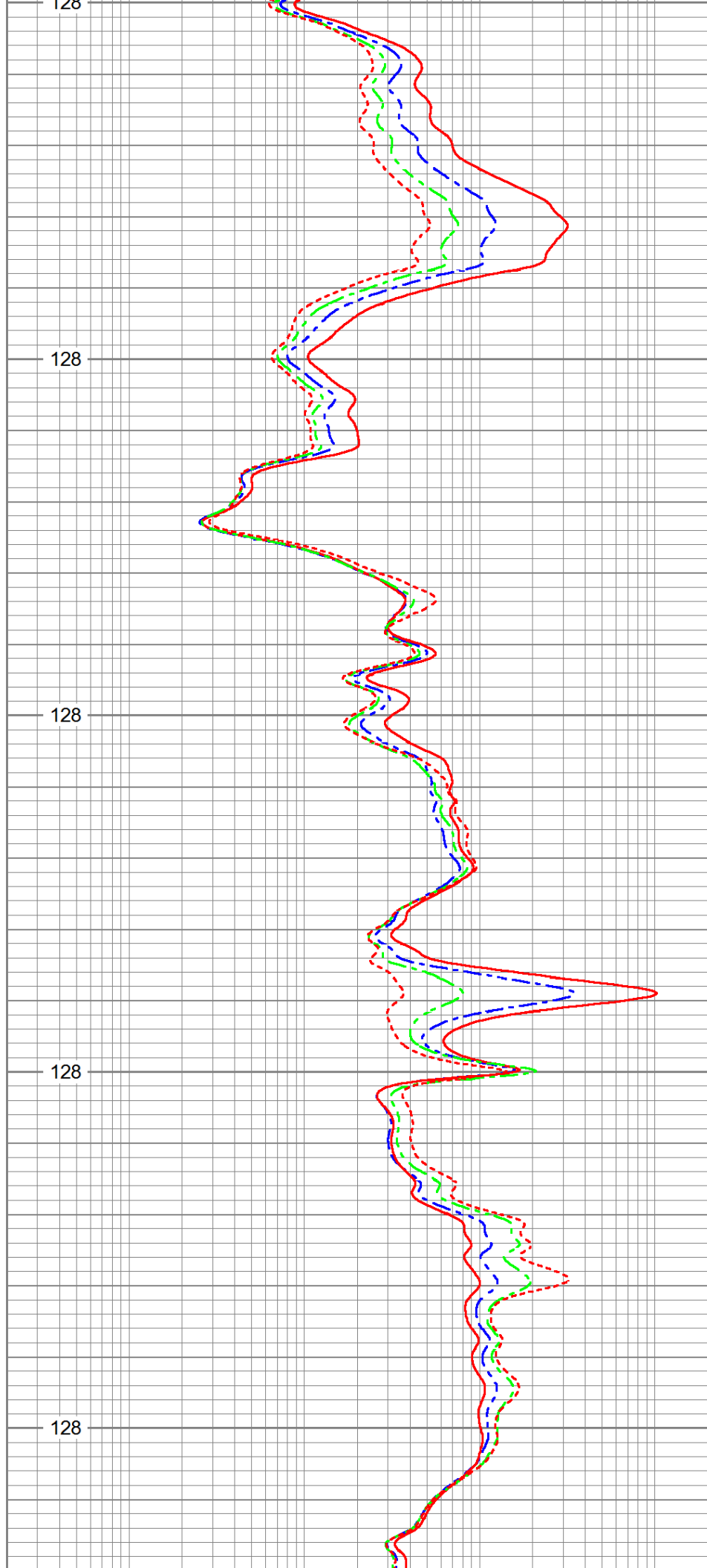
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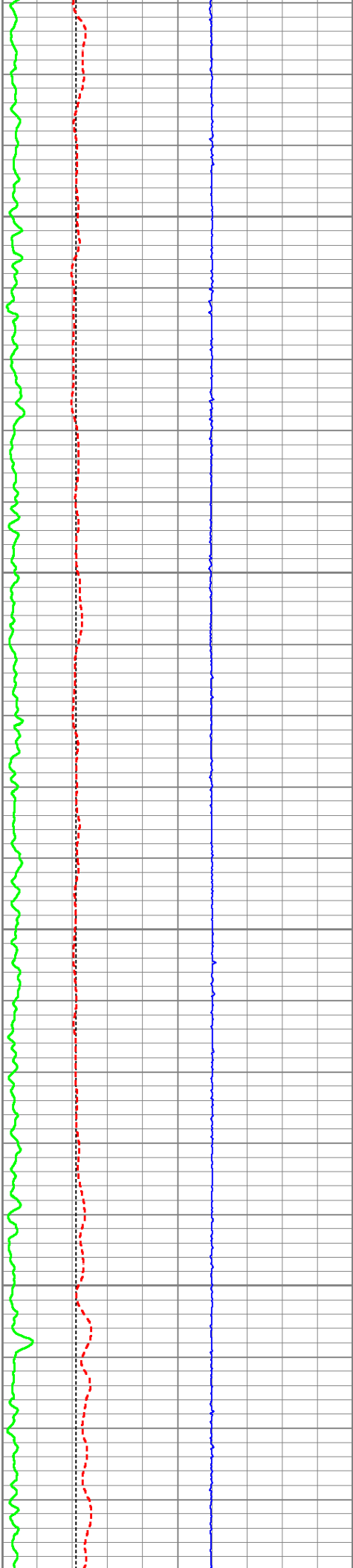
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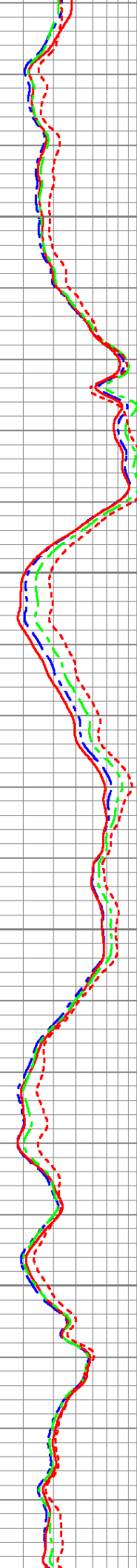
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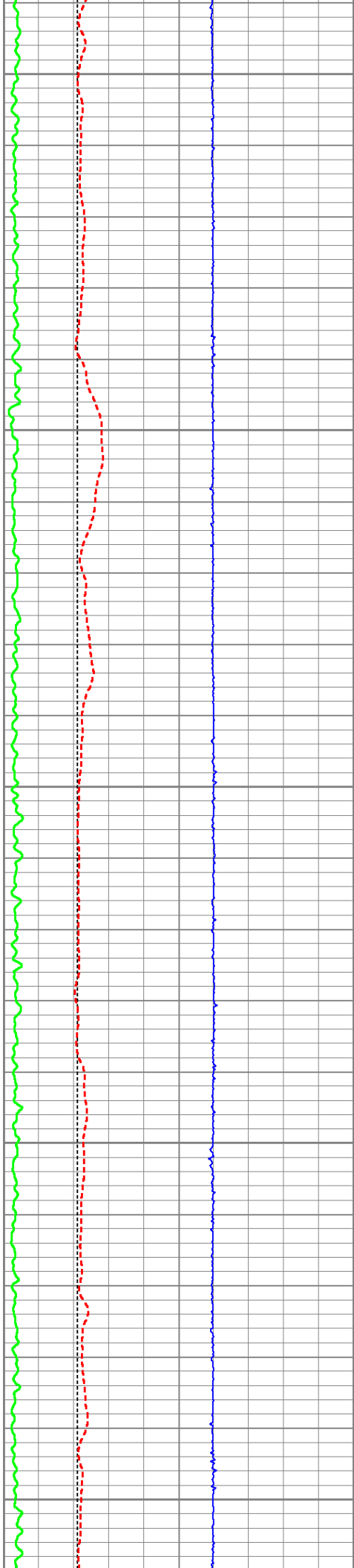
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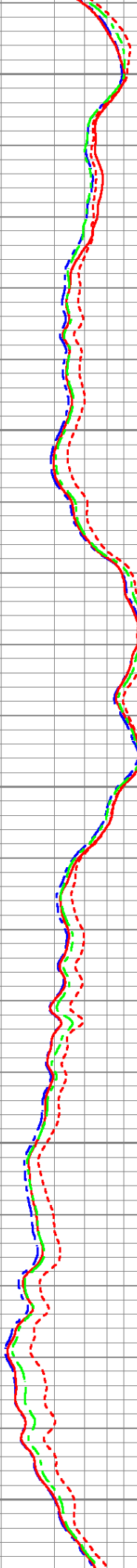
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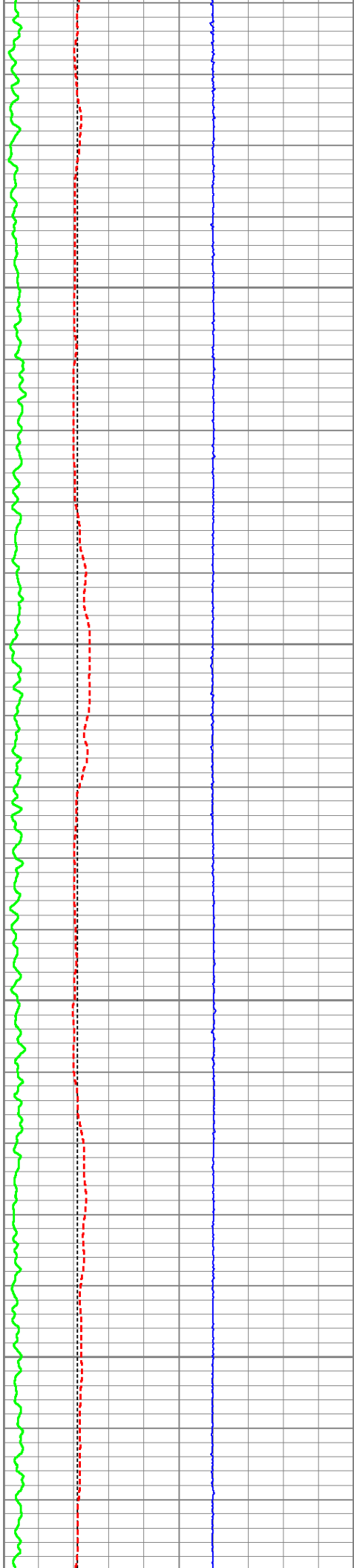
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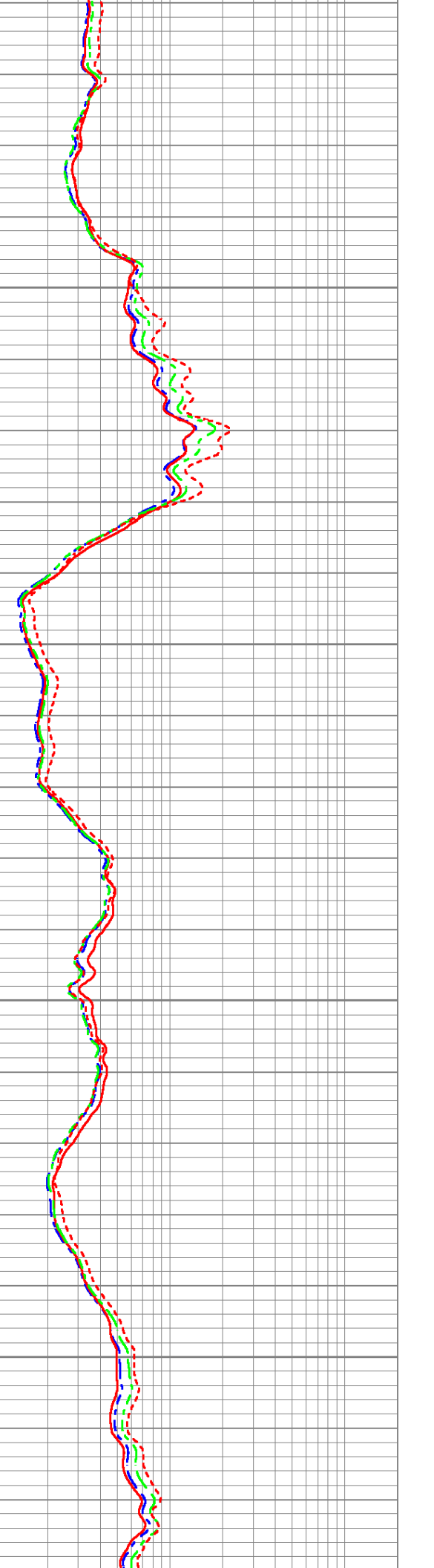
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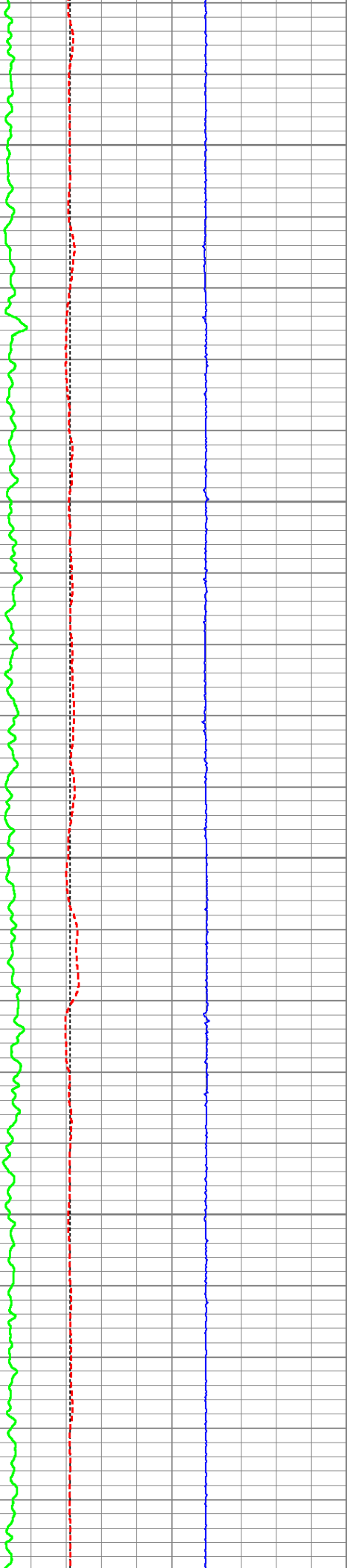
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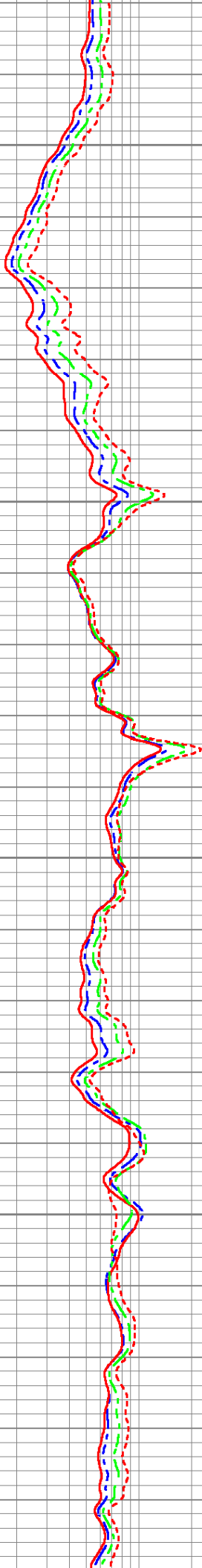
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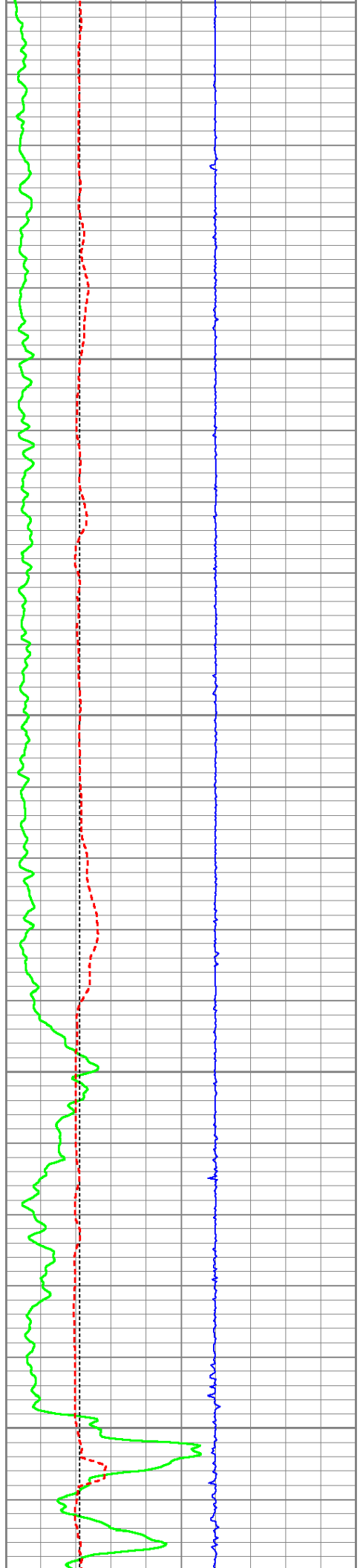
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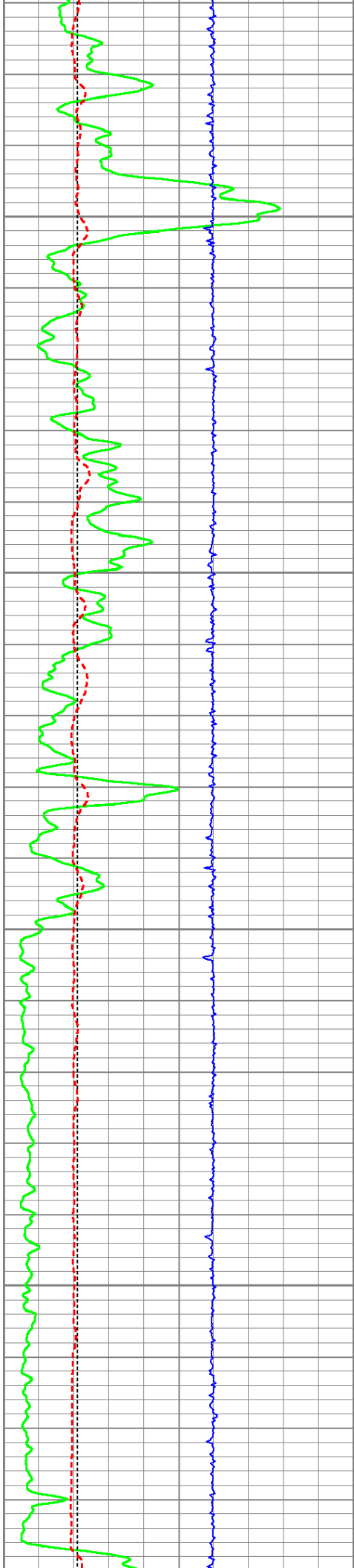
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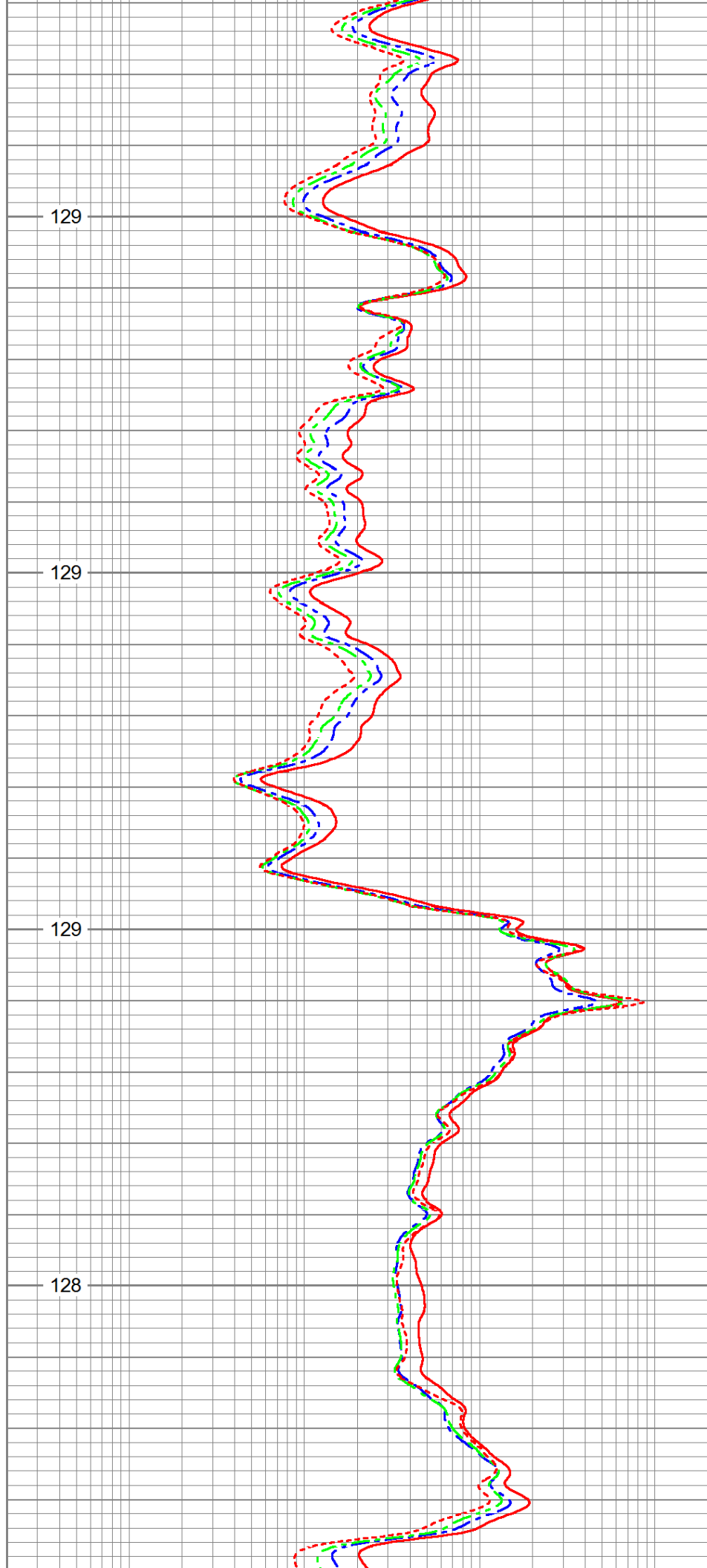
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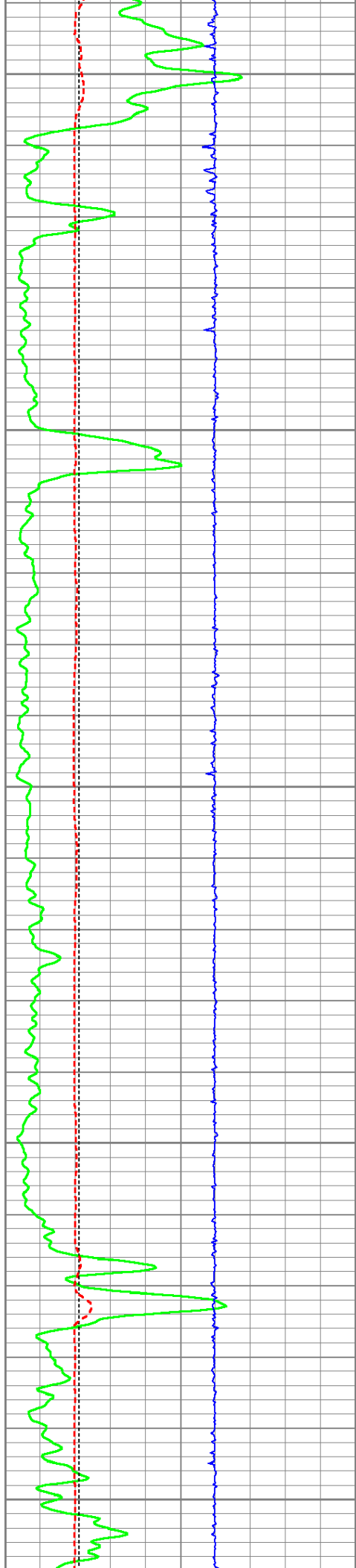
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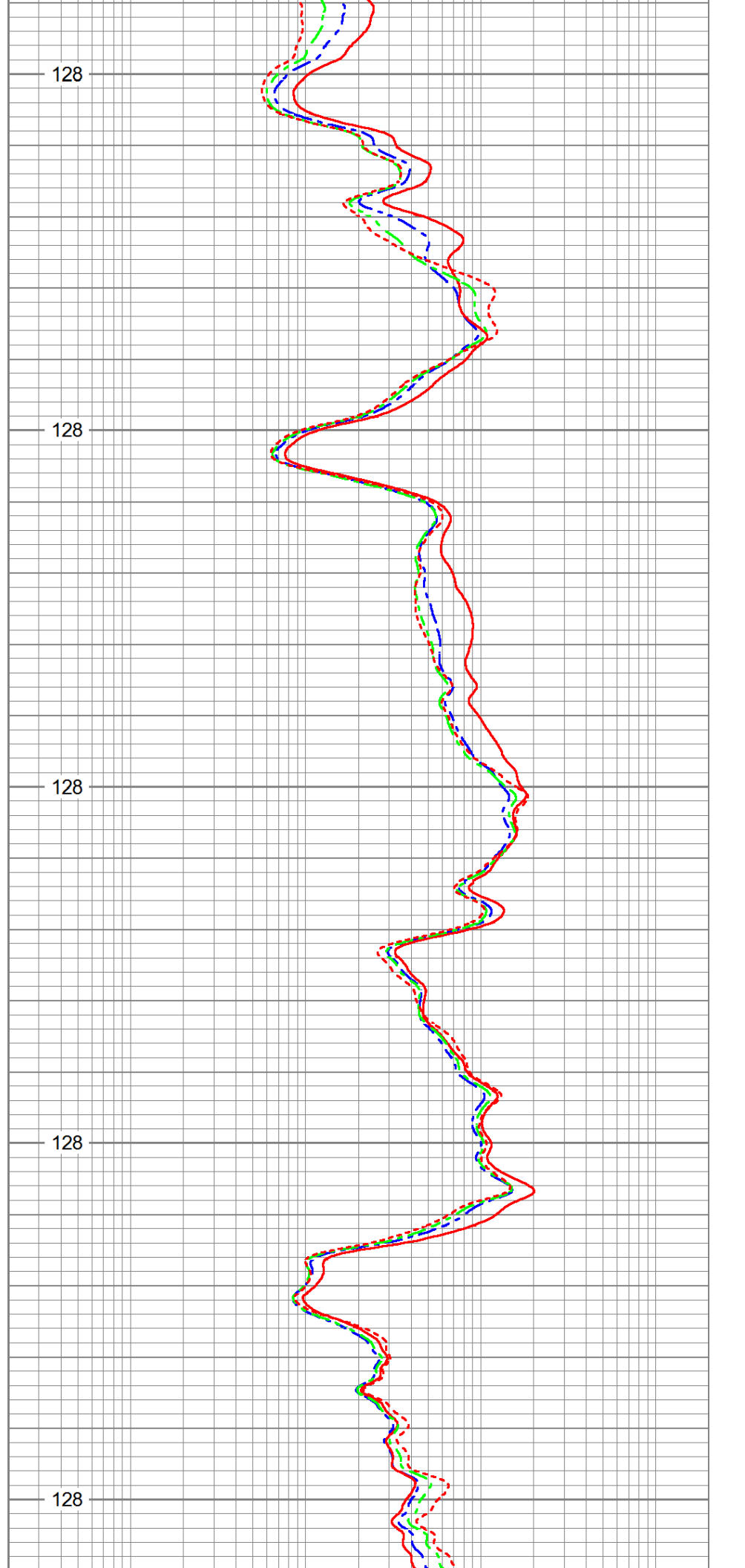
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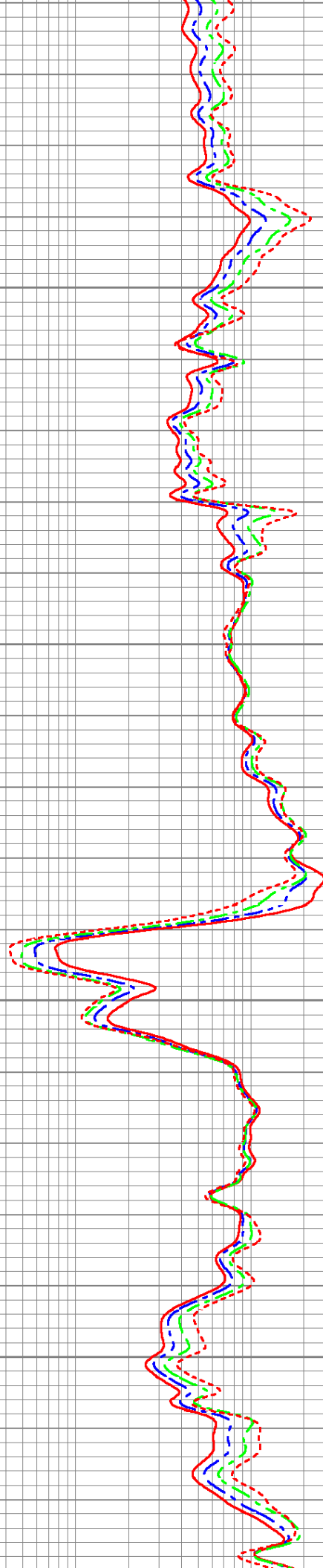
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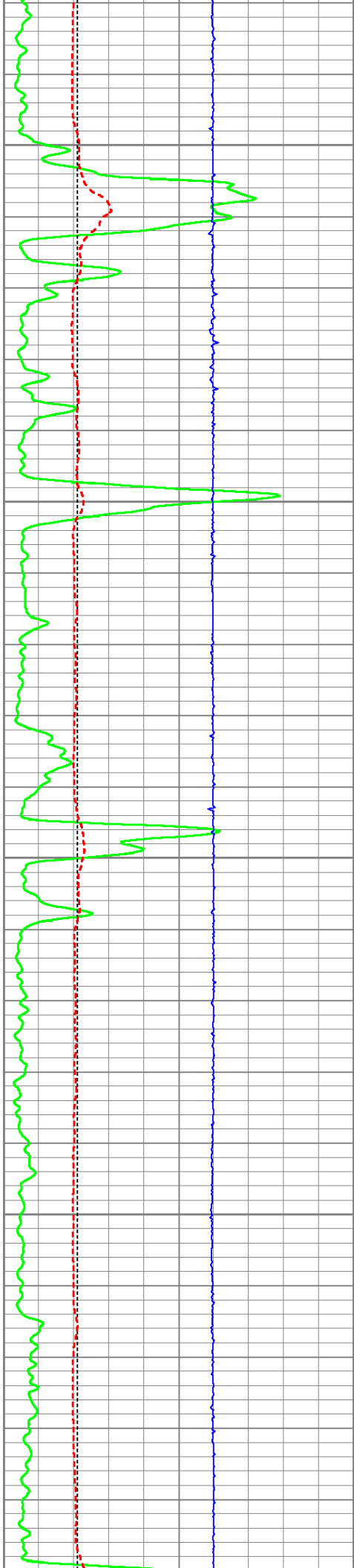
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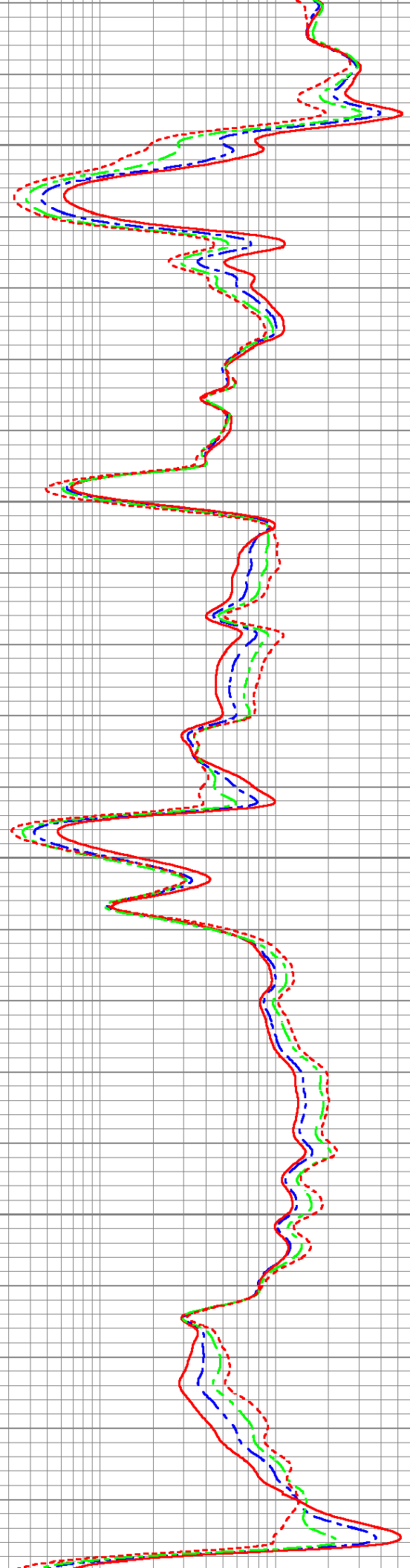
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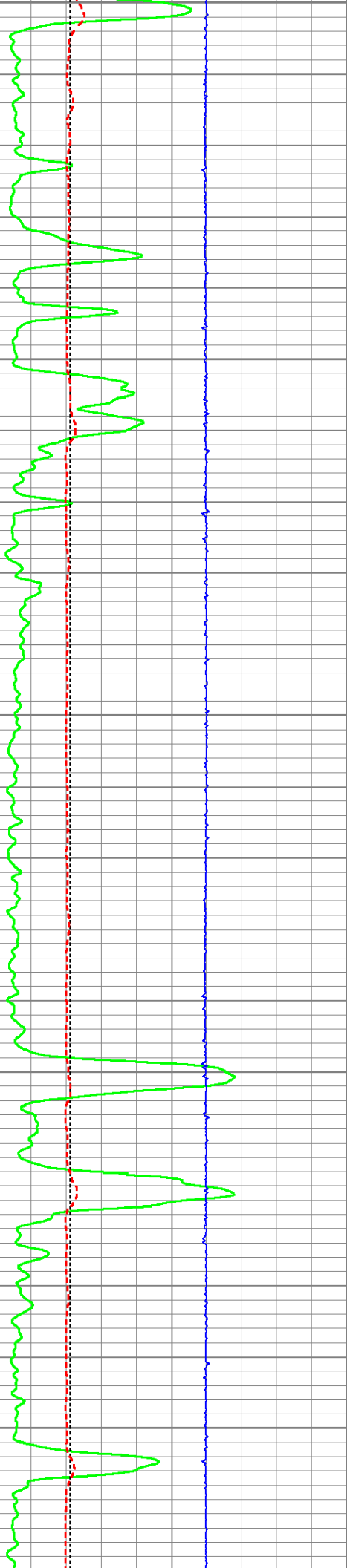
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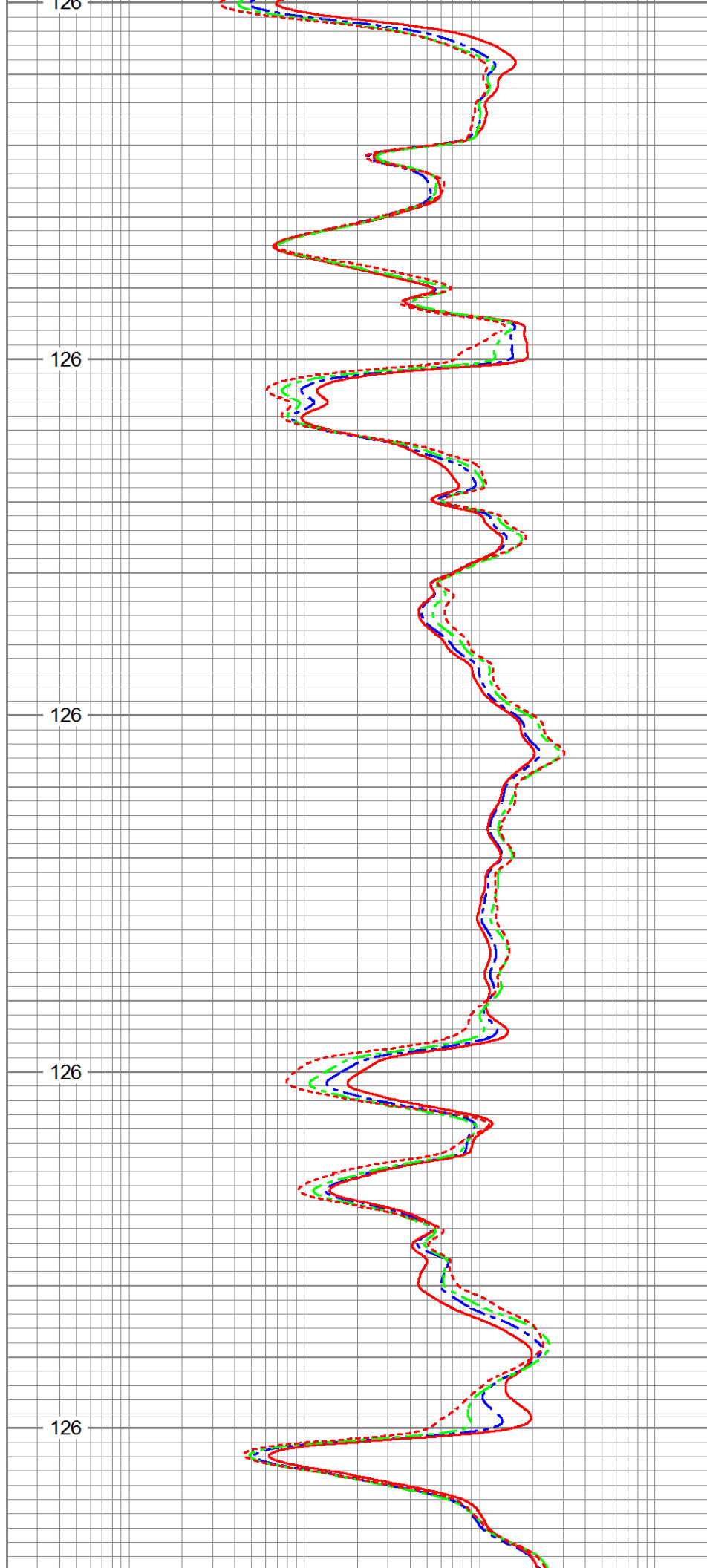
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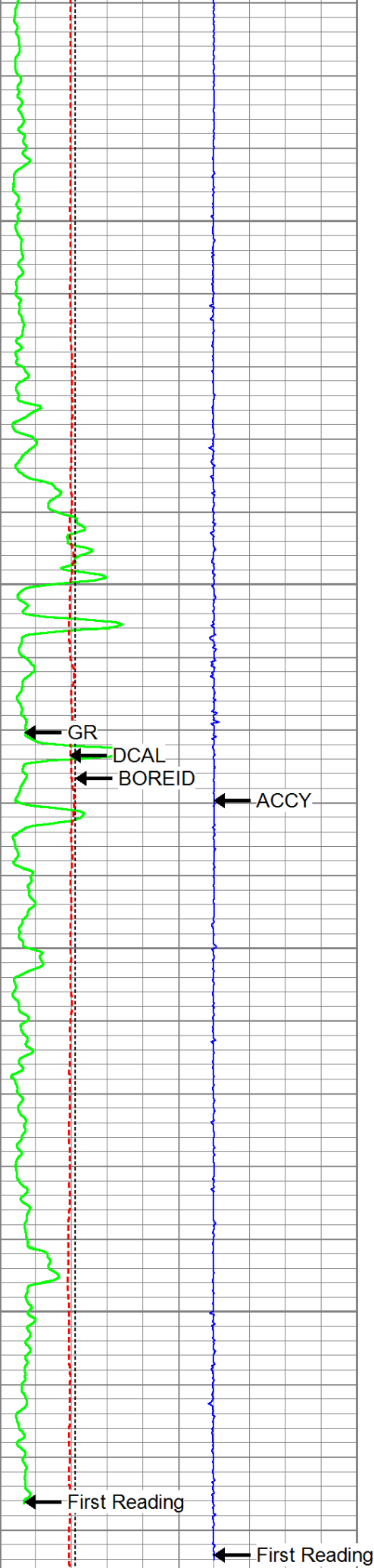
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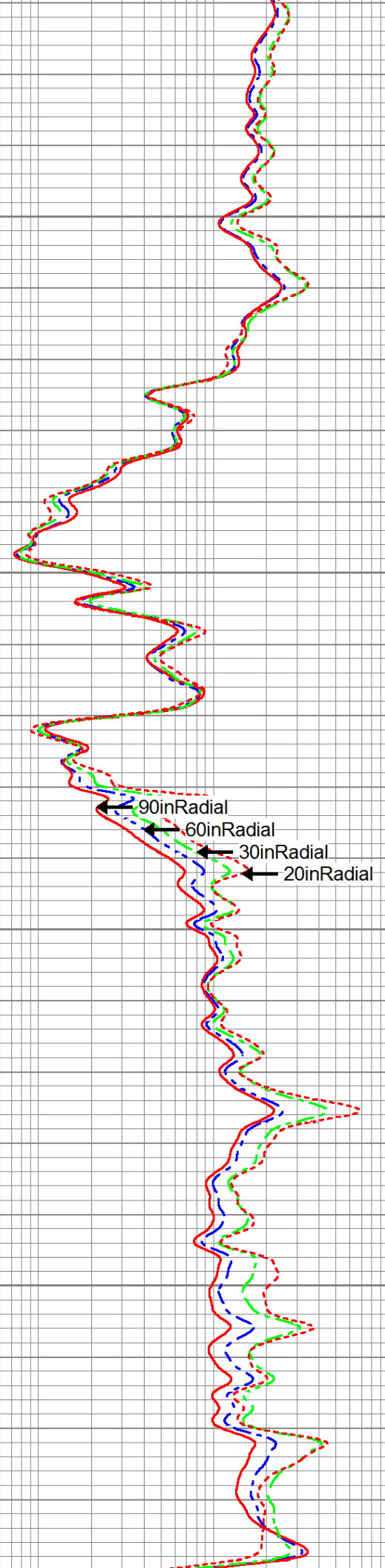
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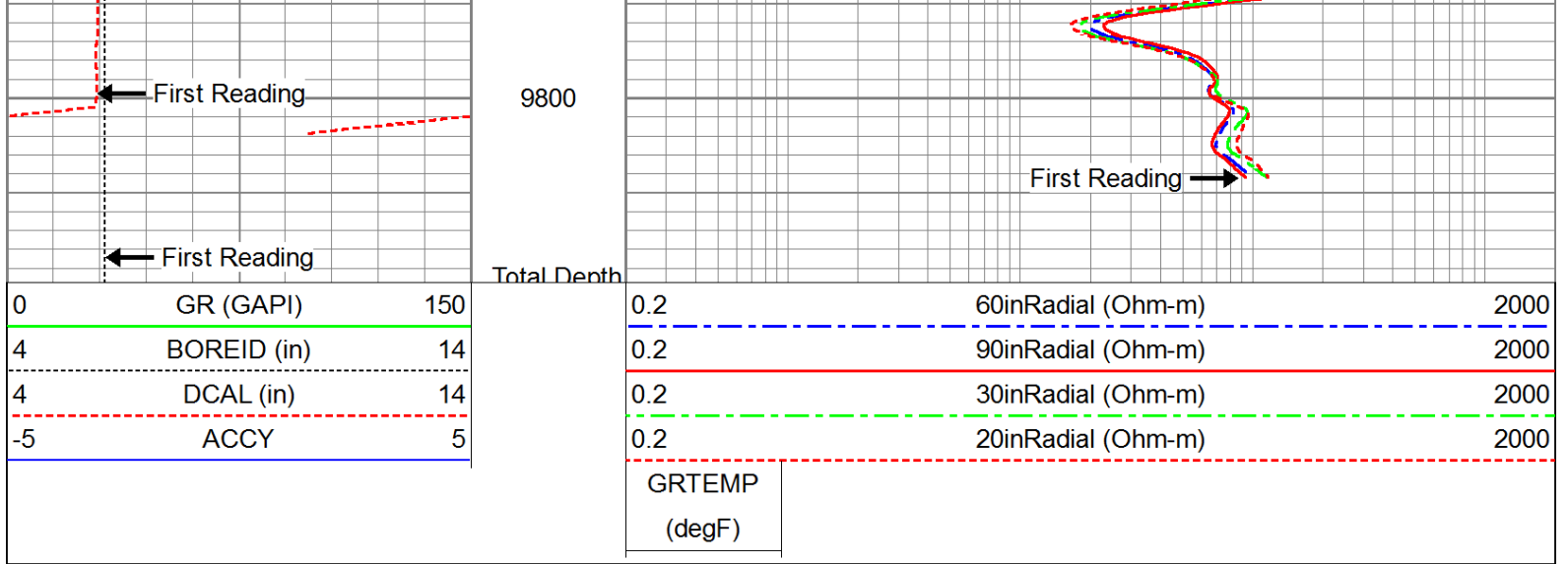
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9600 126
9650 126
9700 126
9750 126



90inRadial
60inRadial
30inRadial
20inRadial



Log Variables Databasec:\users\administrator.slb-6mk87p1\desktop\sandrdige west 3508 1-5h\sandrdige_west_mem.db
Dataset field/well/proc1/pass1.2

Top - Bottom

A	BHCOR	BHFL_TYPE	BHFLRES Ohm-m	BHFLRESSRC	BHIDSRC	BOREID in	BOTTEMP degF
1	On	WBM	1	MUDCELL	CURVE	6.125	125
CASED?	CASEOD in	CASETHCK in	CCEMWSALIN kppm	ICMNTTHCK in	DNBHC?	DPORSEL	FLUIDDEN g/cc
No	4.5	0	0	0	NO	RHOB	1
FRMSALIN kppm	LATNOR	M	MATRXDEN g/cc	MUDSALIN kppm	MudWgt lb/gal	NPORSEL	PEBHC?
0	Off	2	2.71	1.2	8.5	Limestone	YES
PERFS	RESTMPSRC	SO in	SRFTEMP degF	SZCOR	TDEPTH ft	TMPCOR	TOOLPOS
0	1	0.5	0	On	9861	On	Ec-centered

Calibration Report

Database File c:\users\administrator.slb-6mk87p1\desktop\sandrdige west 3508 1-5h\sandrdige_west_mem.db
Dataset Pathname proc1/pass1.2
Dataset Creation Sat Feb 01 22:22:06 2014

ThruBit Induction Calibration Report

Tool Model-Serial Number: PS-PS16R
Shop Calibration Performed: Thu Dec 19 10:53:14 2013

BASELINE

	R	Expected	X	Expected
Freq 1				
A1	-474.2930	[-536.000, -387.000]	8.6506	[-500.000, 1100.000]
A2	-153.9010	[-162.000, -120.000]	44.4956	[-75.000, 700.000]
A3	20.7528	[1.2000, 18.0000]	17.1120	[1.275000, 175.0000]

A3	-29.7528	[-38.000, -18.000]	17.1136	[-375.000, 475.000]
A4	-17.2246	[-24.000, -8.000]	411.5530	[25.000, 575.000]
A5	-13.4994	[-21.000, -7.000]	131.8710	[25.000, 275.000]
Freq 2				
A1	-251.4560	[-293.000, -186.000]	-27.5671	[-375.000, 675.000]
A2	-99.9483	[-106.000, -76.000]	0.0165	[-100.000, 425.000]
A3	-21.5114	[-28.000, -13.000]	-41.8548	[-325.000, 250.000]
A4	-19.5416	[-28.000, -10.000]	186.1720	[-75.000, 275.000]
A5	-18.5218	[-27.000, -10.000]	-8.5555	[-125.000, 75.000]
Freq 3				
A1	-158.7100	[-193.000, -108.000]	-94.7517	[-375.000, 425.000]
A2	-75.9105	[-81.000, -57.000]	-43.1739	[-125.000, 250.000]
A3	-17.2526	[-23.000, -11.000]	-90.4127	[-300.000, 125.000]
A4	-21.0501	[-31.000, -11.000]	45.7675	[-200.000, 100.000]
A5	-21.2165	[-32.000, -11.000]	-110.4930	[-250.000, -25.000]
Freq 4				
A1	-87.8124	[-108.000, -54.000]	-226.7930	[-450.000, 75.000]
A2	-54.9891	[-60.000, -41.000]	-116.5990	[-200.000, 50.000]
A3	-13.9617	[-19.000, -8.000]	-171.6790	[-350.000, -25.000]
A4	-24.1456	[-37.000, -11.000]	-148.7500	[-400.000, -75.000]
A5	-27.2389	[-43.000, -12.000]	-281.7390	[-475.000, -125.000]

CALIBRATION COEFFICIENTS

	R	Expected	X	Expected
Freq 1				
A1	0.9967	[0.950, 1.050]	-0.0013	[-0.050, 0.050]
A2	0.9934	[0.950, 1.050]	0.0014	[-0.050, 0.050]
A3	0.9973	[0.950, 1.050]	-0.0071	[-0.050, 0.050]
A4	0.9923	[0.950, 1.050]	0.0034	[-0.050, 0.050]
A5	1.0000	[0.950, 1.050]	-0.0028	[-0.050, 0.050]
Freq 2				
A1	0.9906	[0.950, 1.050]	-0.0102	[-0.050, 0.050]
A2	0.9868	[0.950, 1.050]	-0.0078	[-0.050, 0.050]
A3	0.9850	[0.950, 1.050]	-0.0087	[-0.050, 0.050]
A4	0.9868	[0.950, 1.050]	-0.0054	[-0.050, 0.050]
A5	0.9963	[0.950, 1.050]	-0.0131	[-0.050, 0.050]
Freq 3				
A1	0.9998	[0.950, 1.050]	-0.0029	[-0.050, 0.050]
A2	0.9966	[0.950, 1.050]	-0.0008	[-0.050, 0.050]
A3	0.9943	[0.950, 1.050]	-0.0021	[-0.050, 0.050]
A4	0.9955	[0.950, 1.050]	0.0017	[-0.050, 0.050]
A5	1.0070	[0.950, 1.050]	-0.0067	[-0.050, 0.050]
Freq 4				
A1	0.9942	[0.950, 1.050]	-0.0035	[-0.050, 0.050]
A2	0.9906	[0.950, 1.050]	-0.0020	[-0.050, 0.050]
A3	0.9905	[0.950, 1.050]	-0.0052	[-0.050, 0.050]
A4	0.9903	[0.950, 1.050]	0.0013	[-0.050, 0.050]
A5	1.0095	[0.930, 1.070]	-0.0122	[-0.050, 0.050]
Temperature	16.5623 degC			

ThruBit Density Calibration Report

Tool Model-Serial Number: PS-PS01D
Source Number: A3216
Shop Calibration Performed: Thu Jan 23 10:09:42 2014

REFERENCE

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

READINGS

Outputs	Counts	Units	Expected
SS1 Background	131.93	cps	[100.00, 185.00]
LS1 Background	141.16	cps	[100.00, 187.00]
LS4 Background	30.20	cps	[20.00, 38.00]
SS1 Aluminium	4750.25	cps	[4076.00, 5613.00]
LS1 Aluminium	873.34	cps	[750.00, 982.00]
LS4 Aluminium	1003.70	cps	[796.00, 1169.00]
SS1 Magnesium	7733.74	cps	[6695.00, 9269.00]
LS1 Magnesium	5605.22	cps	[5158.00, 6486.00]
LS1 Al + Fe	774.67	cps	[650.00, 838.00]
LS4 Al + Fe	485.87	cps	[382.00, 638.00]

RESULTS

SS Slope	1.72	[1.52, 1.77]
LS Slope	0.43	[0.38, 0.45]
PEF K Factor	4.901	[3.510, 6.170]
PEF B Factor	-0.640	[-0.700, -0.410]

Caliper Shop Calibration performed:

Thu Jan 23 10:09:42 2014

RESULTS

Reference	Reading	Units
12.00	1831.42	in
9.00	1993.76	in
6.00	2151.94	in

DENSITY PRE-SURVEY CHECK Performed:

Tue Jan 28 13:34:59 2014

Outputs	Counts	Units	Expected
SS1 Background	130.94	cps	[127.98, 135.89]
LS1 Background	139.84	cps	[136.93, 145.40]
LS4 Background	30.21	cps	[28.39, 32.02]

CALIPER PRE-SURVEY CHECK Performed:

Tue Jan 28 13:37:03 2014

Reference	Readings	Units	Expected
6.00	5.97	in	[5.80, 6.20]

DENSITY PRE-SURVEY CHECK Performed:

Tue Jan 28 13:34:59 2014

Outputs	Counts	Units	Expected
SS1 Background	130.94	cps	[127.98, 135.89]
LS1 Background	139.84	cps	[136.93, 145.40]

LS1 Background	135.84	cps	[136.93, 145.40]
LS4 Background	30.21	cps	[28.39, 32.02]
DENSITY POST-SURVEY CHECK Performed:		Wed Dec 31 18:00:00 1969	
Outputs	Counts	Units	Expected
SS1 Background	0.00	cps	[127.98, 135.89]
LS1 Background	0.00	cps	[136.93, 145.40]
LS4 Background	0.00	cps	[28.39, 32.02]

CALIPER PRE-SURVEY CHECK Performed:		Tue Jan 28 13:37:03 2014	
Reference	Readings	Units	Expected
6.00	5.97	in	[5.80, 6.20]

CALIPER POST-SURVEY CHECK Performed:		Wed Dec 31 18:00:00 1969	
Reference	Readings	Units	Expected
0.00	0.00	in	[-0.20, 0.20]

Compensated Neutron Calibration Report

Tool Model-Serial Number:	PS-PS06N
Source Number:	
Calibration Tank Temperature:	59.1 degF
Shop Calibration Performed:	Thu Jan 16 11:44:08 2014

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	2862.8	cps		
LS Counts	96.5	cps		
Tank Ratio Ref	30.9580	SS/LS		
Tank Ratio	29.6517	SS/LS		
Tank Ratio Gain	1.0441		[0.85, 1.15]	

ALUMINUM SLEEVE REFERENCE				
Outputs	Measured	Units	Expected	
SS Counts	34195.1	cps		
LS Counts	3216.1	cps		
Al Ratio Ref	10.797	SS/LS		
Al Ratio	11.101	SS/LS		

AI Ratio Gain	0.97		[0.90, 1.10]
Sleeve Porosity	14.46	pu	

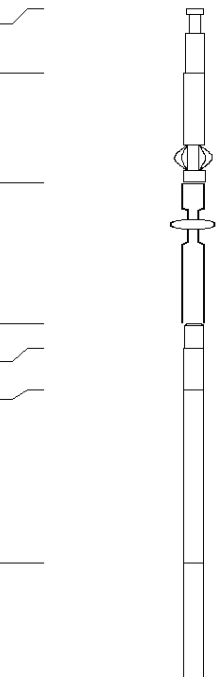
PRE-SURVEY BACKGROUND CHECK Performed:		Tue Jan 28 13:30:05 2014	
Outputs	Measured	Units	Expected
SS Counts	0.1	cps	<10
LS Counts	0.1	cps	<4

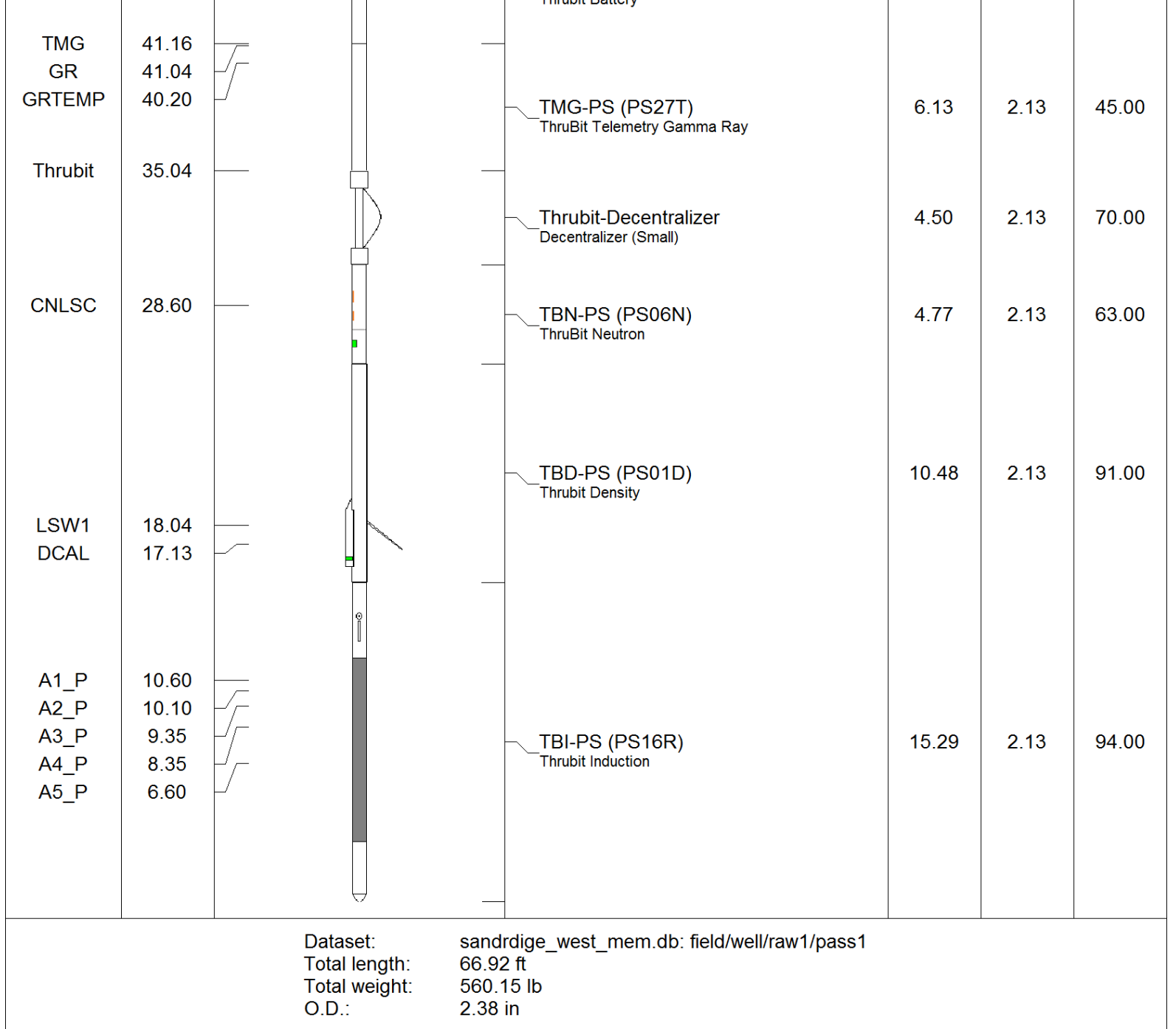
Gamma Ray Calibration Report


Tool Model-Serial Number:	PS-PS27T		
Performed:	Sat Jan 11 02:53:47 2014		
Calibrator Value:	166.7	GAPI	
Background Reading:	59.0	cps	
Calibrator Reading:	449.6	cps	
Sensitivity:	0.3950	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

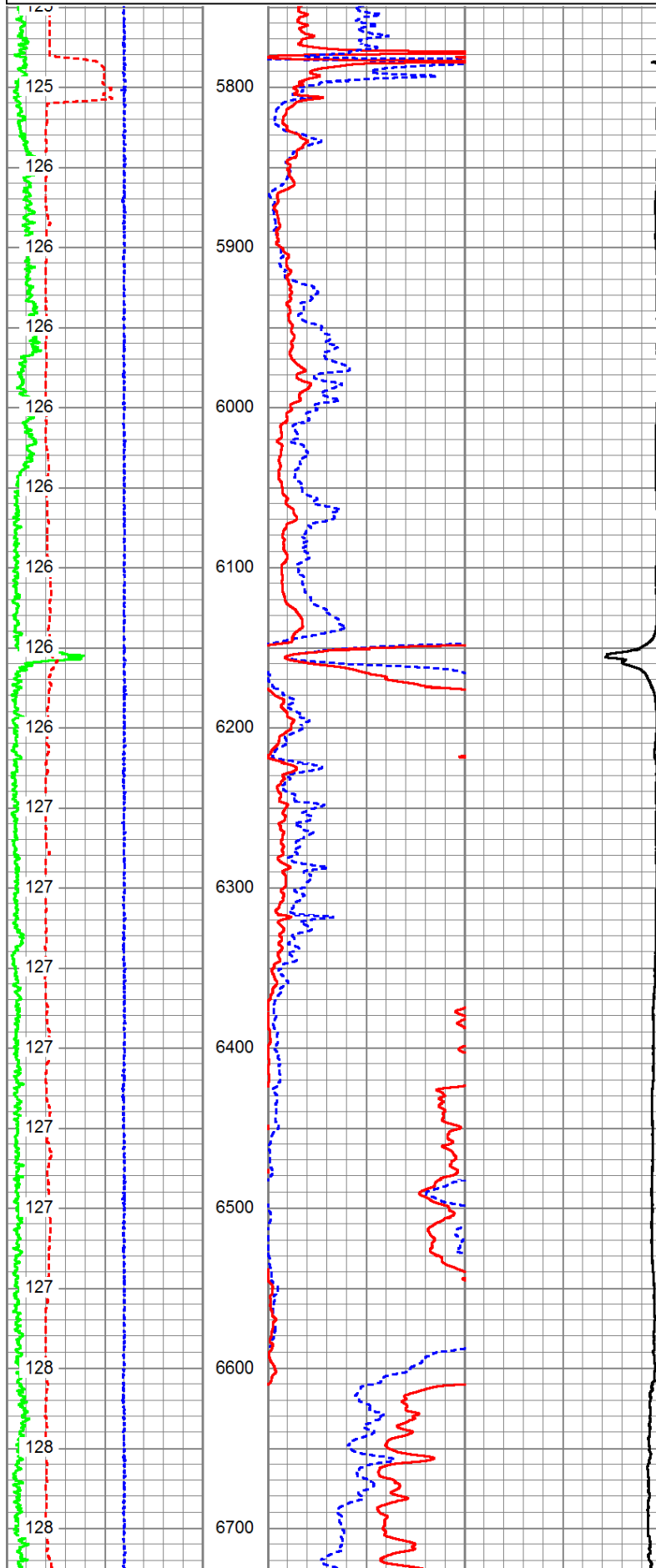
Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
Thrubit	66.92		Thrubit-Cablehead-S	2.31	2.13	5.00
Thrubit	64.61		Solid Weakpoint			
			Thrubit-PSBDOT	3.87	2.25	35.00
Thrubit	60.75		Thrubit-HangOff_Tool	5.00	2.38	60.00
Thrubit	55.75		Thrubit-10-1	0.88	2.13	3.95
Thrubit	54.87		Thrubit-Universal Joint	1.46	2.06	15.00
TBBAT	53.41		TBBAT-A (PS07B)	6.13	2.13	38.20
			Thrubit Battery			
TBBAT2	47.29		TBBAT2-A (PS40B)	6.13	2.13	40.00
			Thrubit Battery			

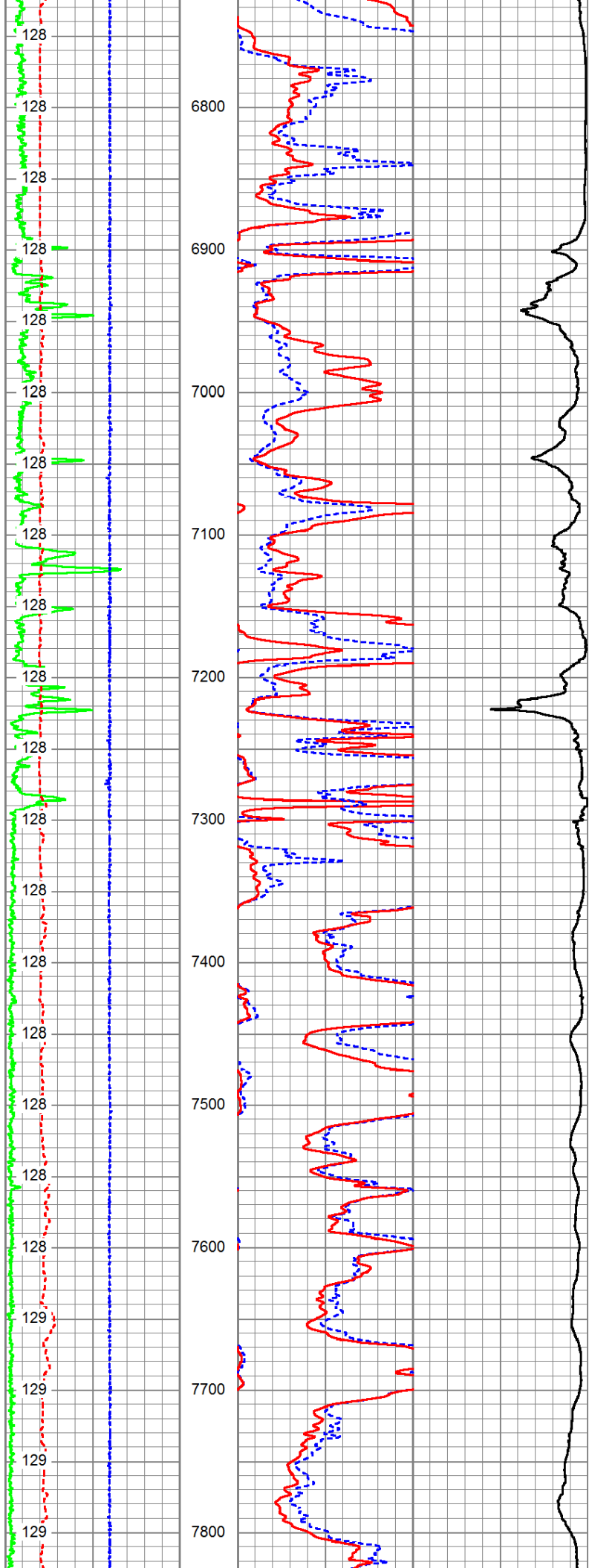


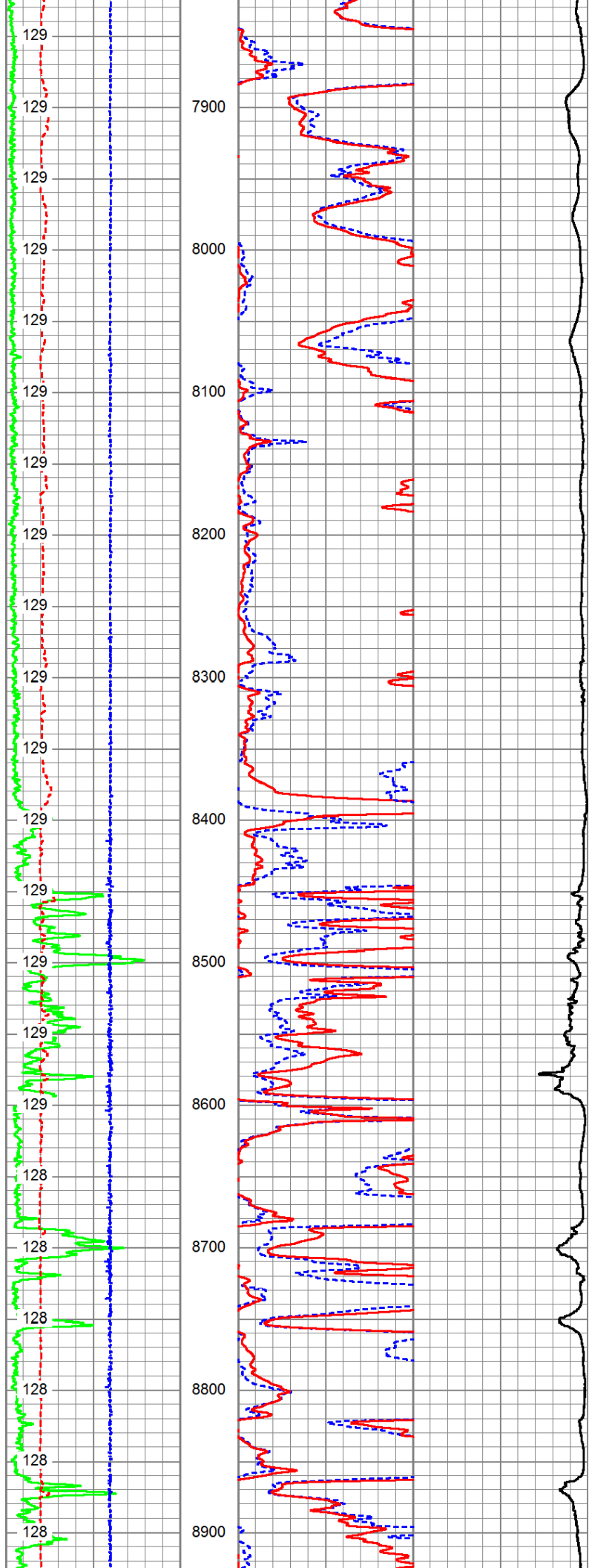
 ThruBit A Schlumberger Company	Company	SANDRIDGE ENERGY
	Well	WEST 3508 1-5H
	Field	BOUSE
	County	HARPER
	State	KANSAS

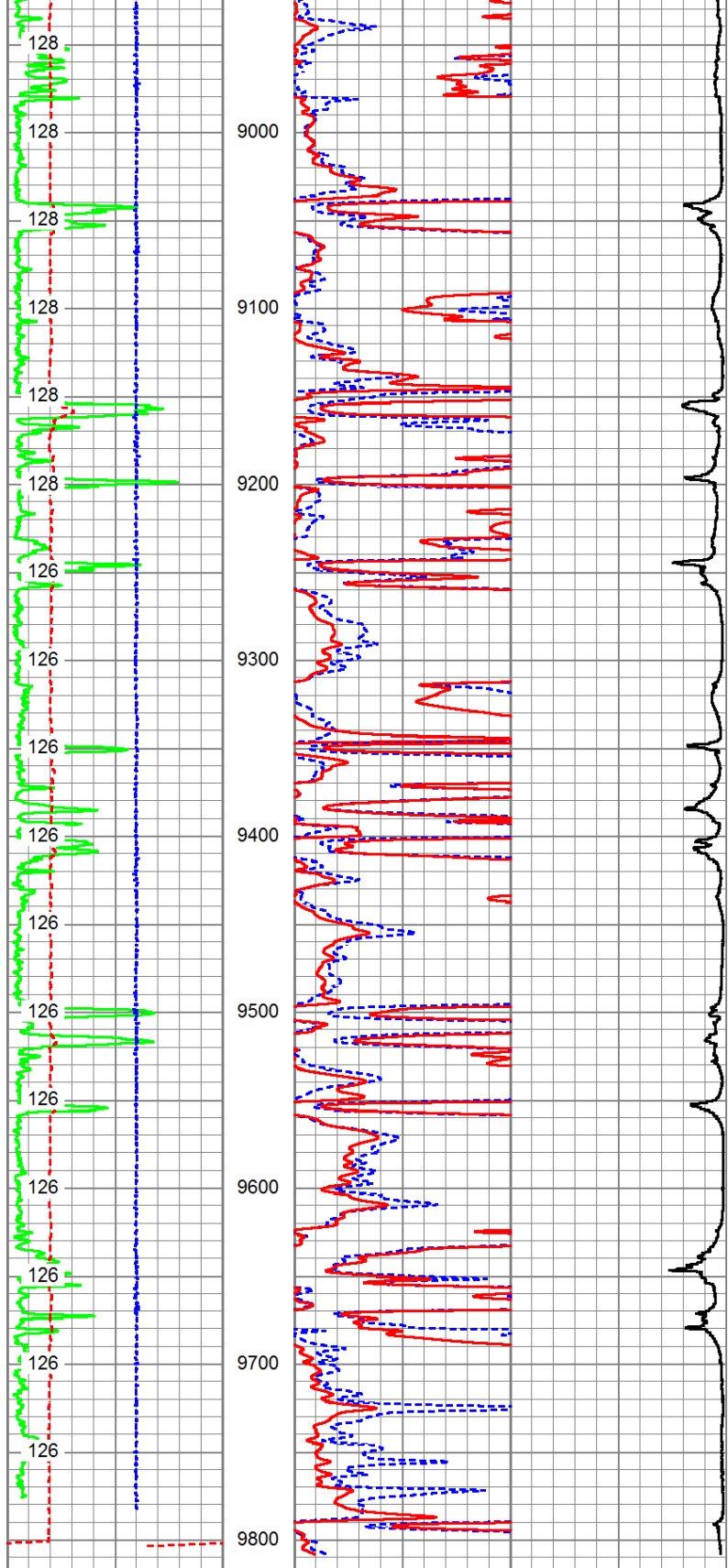
ThruBit		MAIN PASS	
A Schlumberger Company			
Database File	c:\users\administrator.slb-6mk87p1\desktop\sandridge west 3		
Dataset Pathname	proc1/pass1.2		
Presentation Format	6_1r_chk		
Dataset Creation	Sat Feb 01 22:22:06 2014		
Charted by	Depth in Feet scaled 1:1200		
0	GR (GAPI)	150	20in 2ft Res
4	DCAL (in)	14	50 (Ohm-m) 500
-5	ACCY	5	90in 2ft Res

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









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