

Compensated Neutron Gamma Ray Casing Collar Log

Company	Noble Energy Inc.	Location:	API # : 05-123-40731	Other Services
Well	Moser H34-769	Well	Moser H34-769	MIT
Field	Wattenberg	Field	Wattenberg	RBL
County	Weld	County	Weld	
State	Colorado	State	Colorado	
Permanent Datum	SEC 22 TWP 3N RGE 65W	Ground Level	Elevation 4812'	Elevation
Log Measured From	Kelly Bushing	24 FT		K.B. 4836'
Drilling Measured From	Kelly Bushing			D.F. 4835'
				G.L. 4812'

Date	22-Dec-2015
Run Number	One
Depth Driller	16650 FT
Depth Logger	4365 FT
Bottom Logged Interval	4364 FT
Top Log Interval	Surface
Open Hole Size	8.750"
Type Fluid	Water
Density / Viscosity	8.34 lbm/gal
Max. Recorded Temp.	168°F
Estimated Cement Top	66 FT
Time Well Ready	ROA
Time Logger on Bottom	11:20
Equipment Number	HD-0343
Location	Fort Lupton, CO
Recorded By	Sam Hopper
Witnessed By	Bill Mansfield

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To
Casing Record	Size (in)	Wgt (lbs/ft)	Grade	Top	Bottom		
Surface Casing	9 5/8	36	J-55	24 FT	805 FT		
Intermediate #1	7	26	P-110 IC	24 FT	7377 FT		
Intermediate #2							
Liner	4 1/2	11.6	P-110 IC	4374.1 FT	13723 FT		

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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.

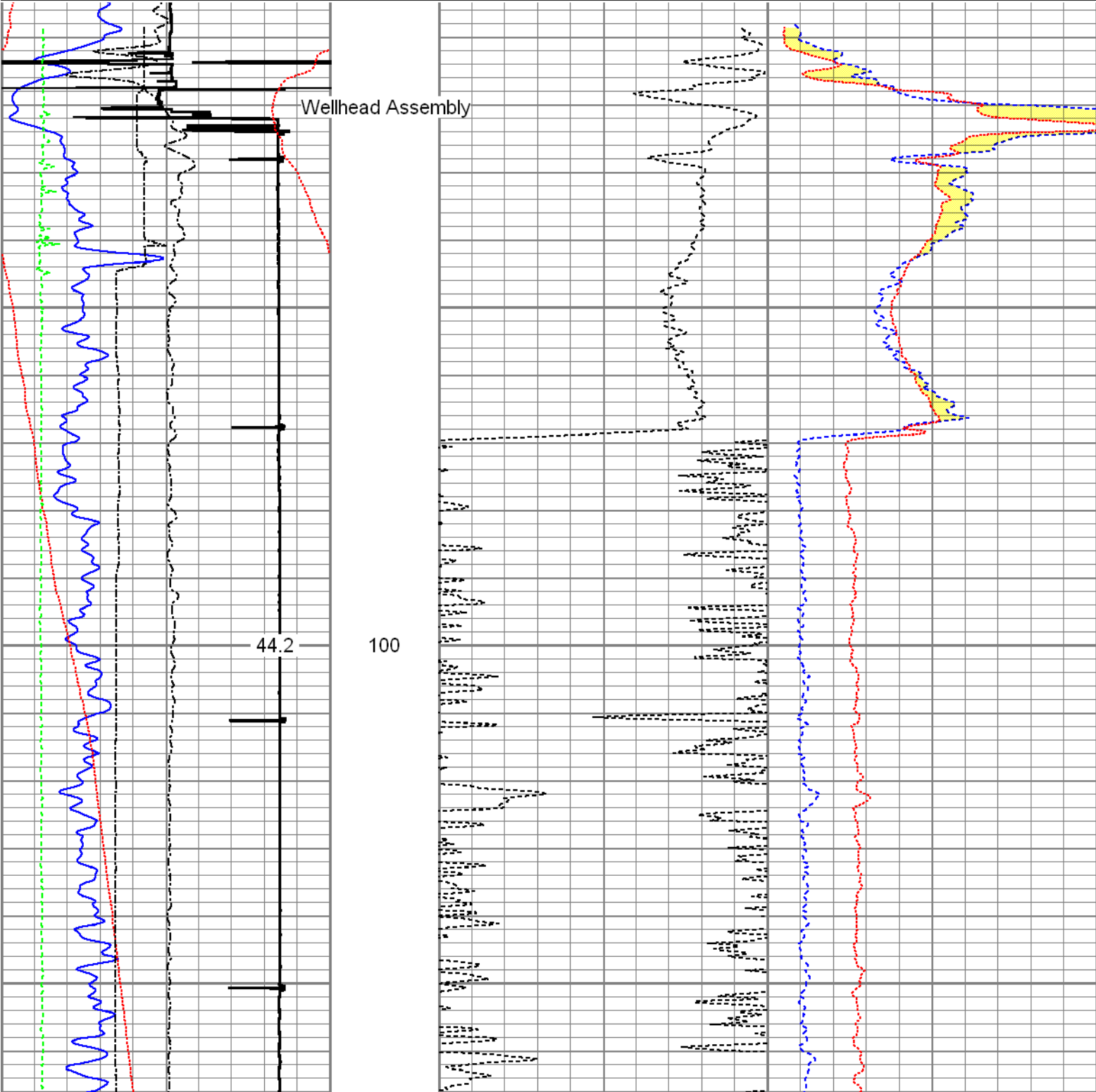
Comments

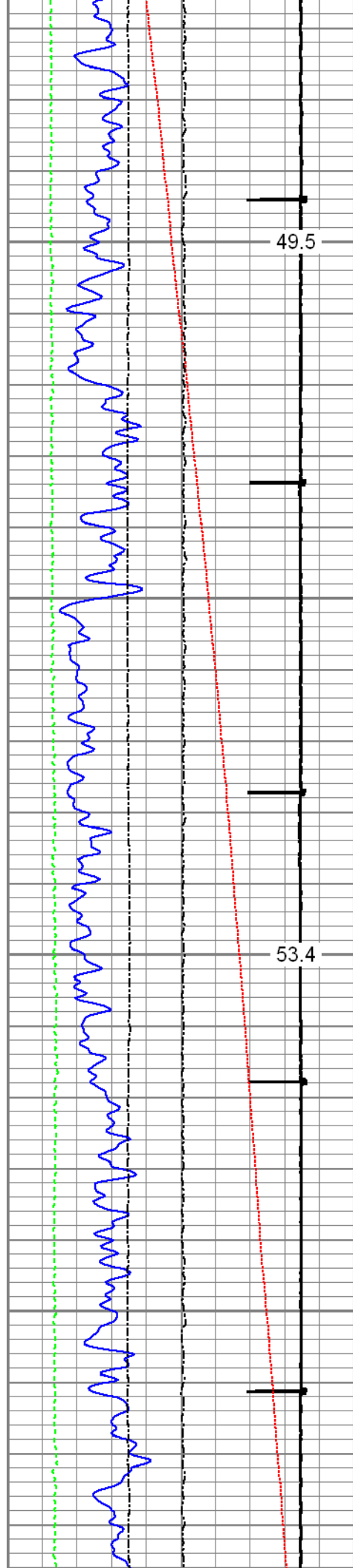
Log ran as per customer request
 Depth referenced to Kelly Bushing at 24 FT
 Log ran from 10 FT above Liner Top to surface
 Recorded with 2500 PSI surface induced pressure
 Logging tools were clean and free of any debris upon completion of operations
 Thank you for choosing FMC Technologies Surface Integrated Services.

Database File: 12-22-15_noble_moser h34-769_mit_rbl_cnl.db
Dataset Pathname: pass6.1
Presentation Format: cnl_mit
Dataset Creation: Tue Dec 22 16:19:43 2015 by Calc 7.0 B1
Charted by: Depth in Feet scaled 1:240

0	Gamma Ray (GAPI)	120
Casing Collar Locator		
0	Temperature (degF)	20
-100	Line Speed (ft/min)	100
0	Line Tension (lb)	2000
-2	Differential Temperature (degF)	2

60	Neutron Porosity (pu)	0	0	Far Neutron (cps)	1000
0					Near Neutron (cps) 10000



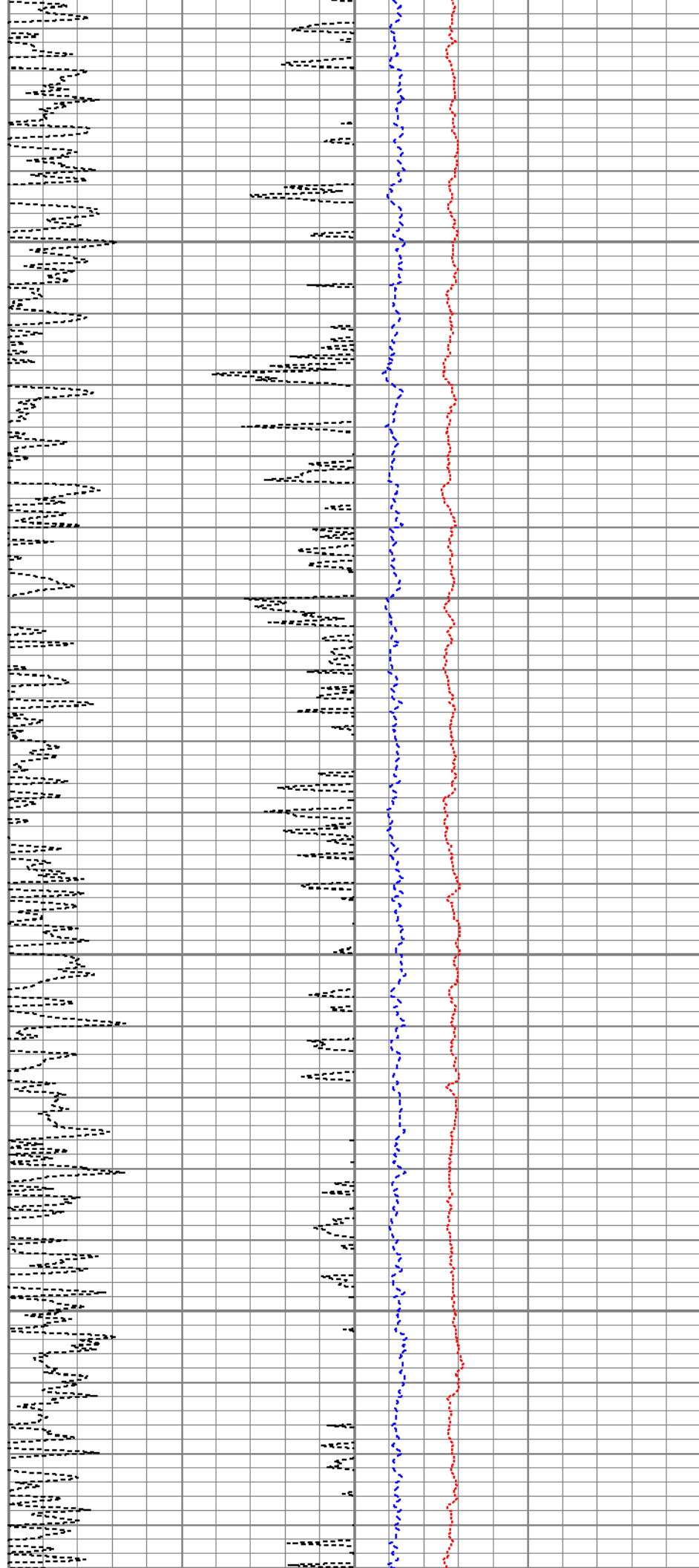


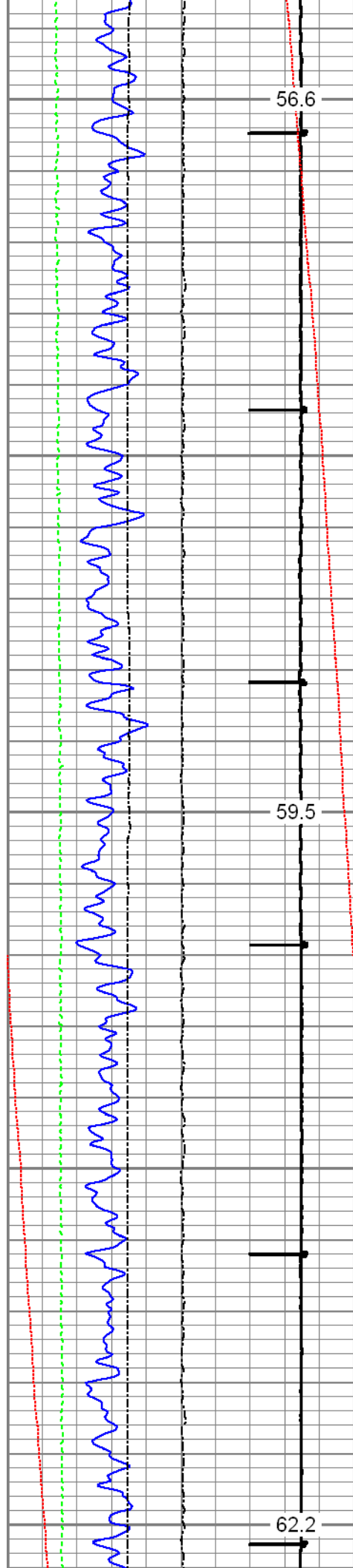
49.5

200

53.4

300

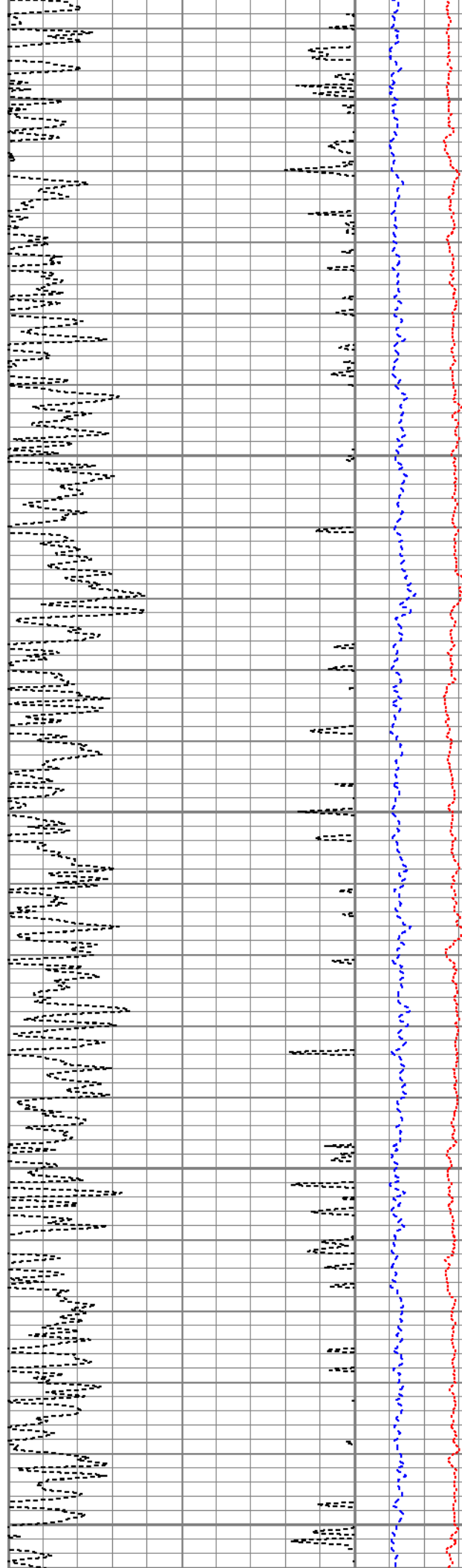


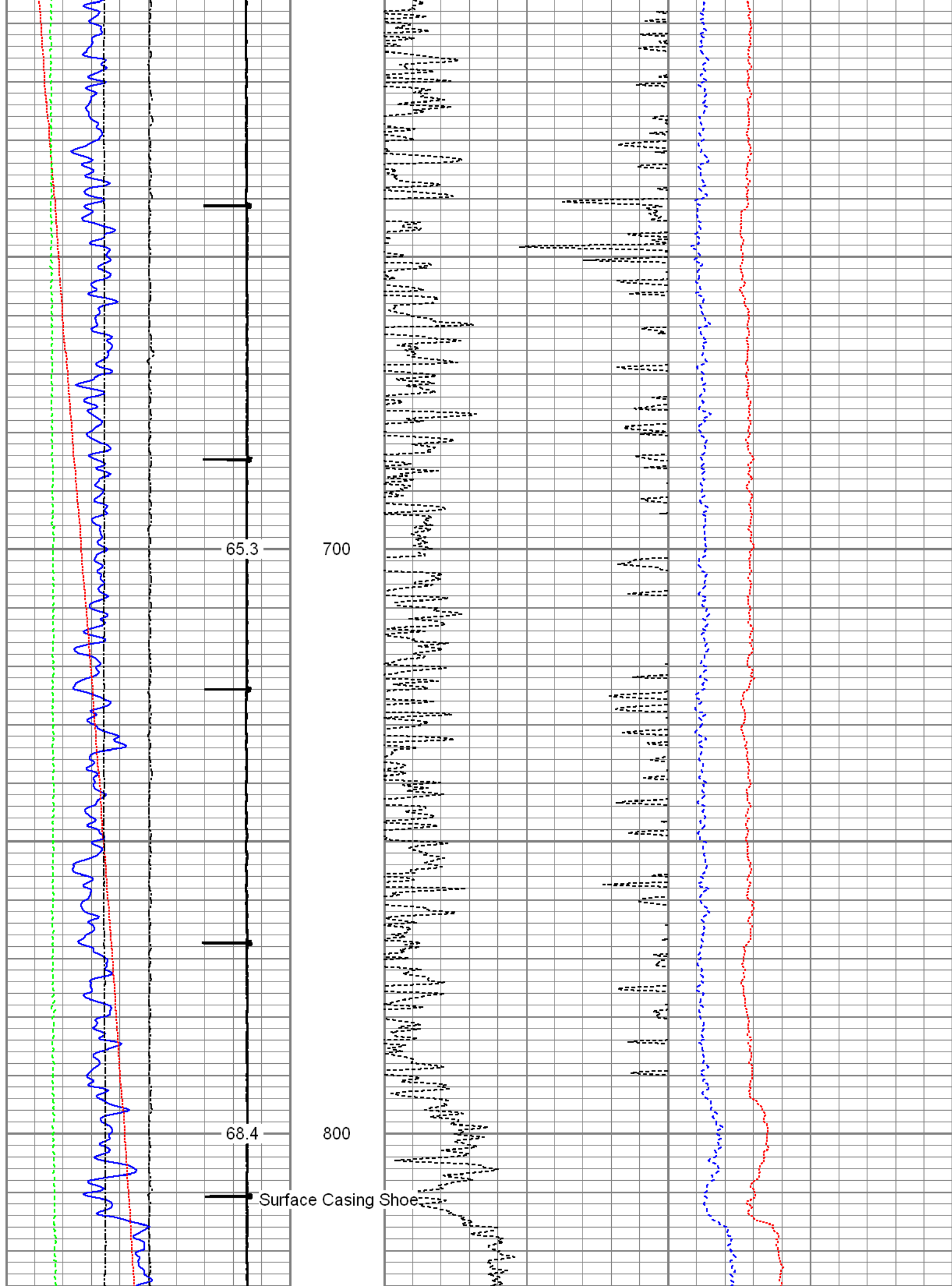


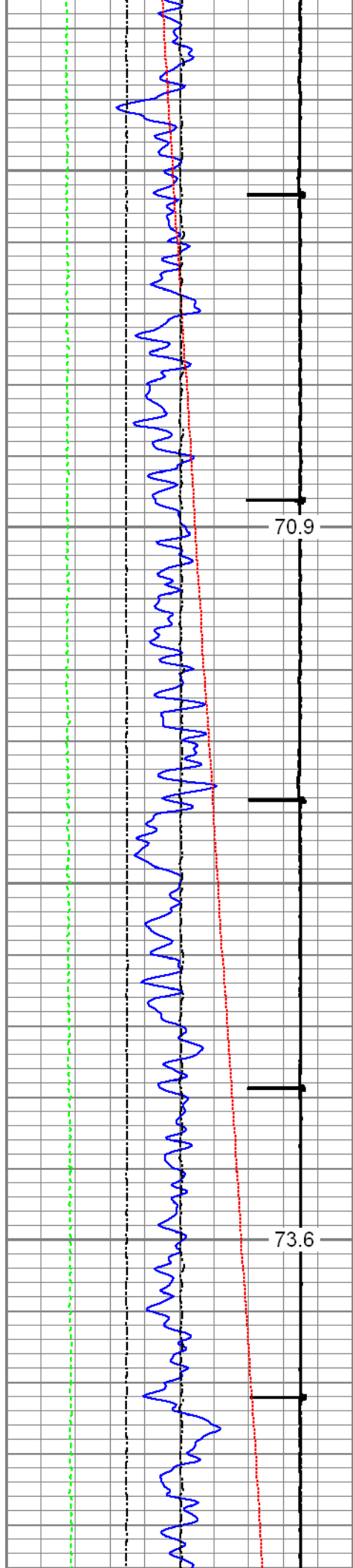
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500

600

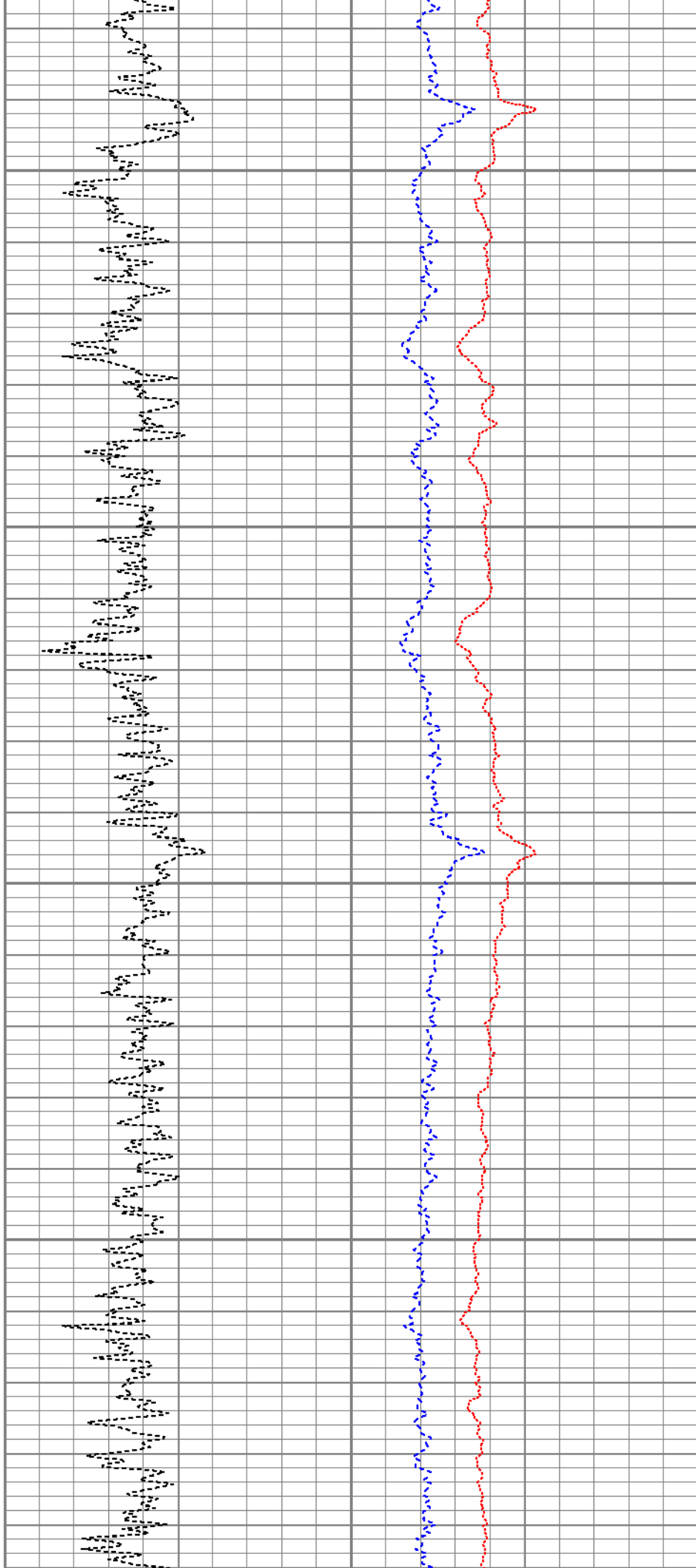


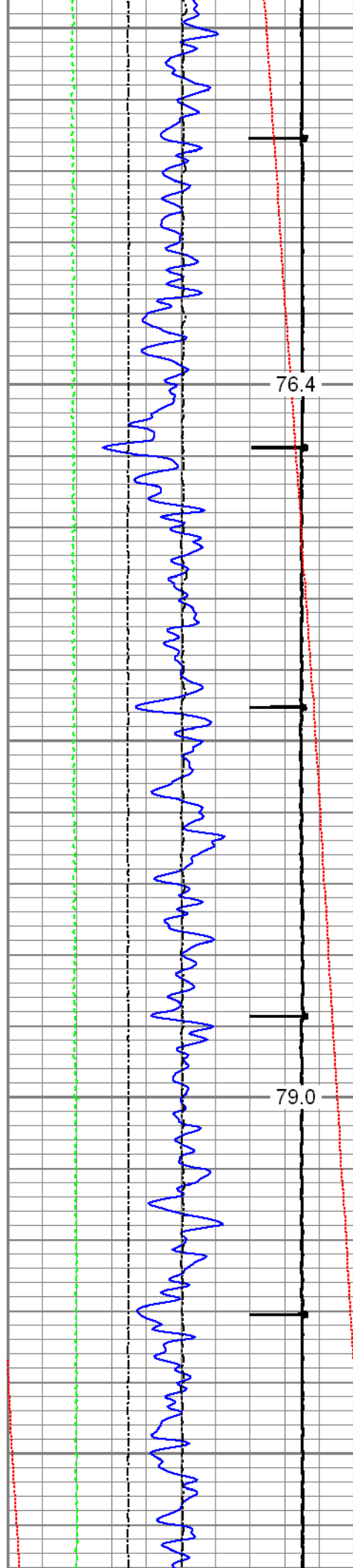




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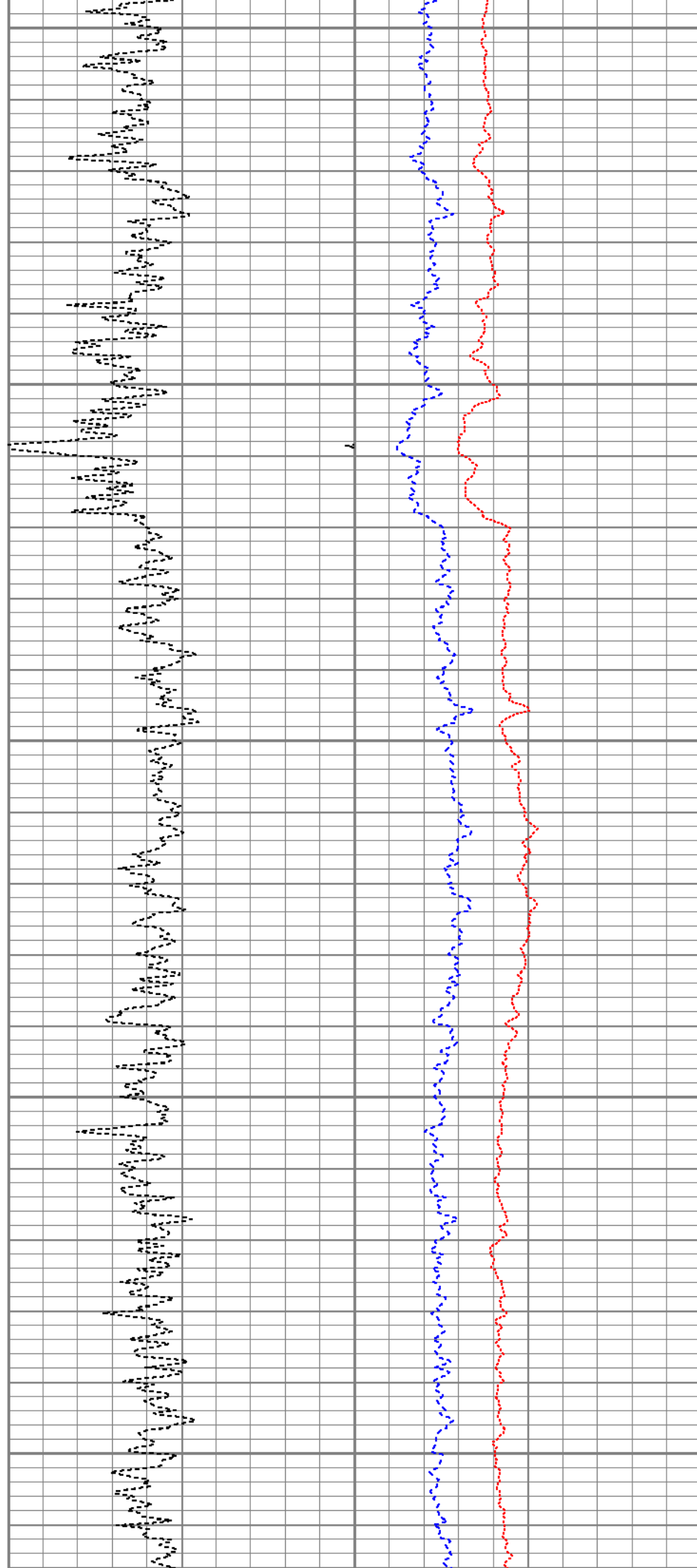
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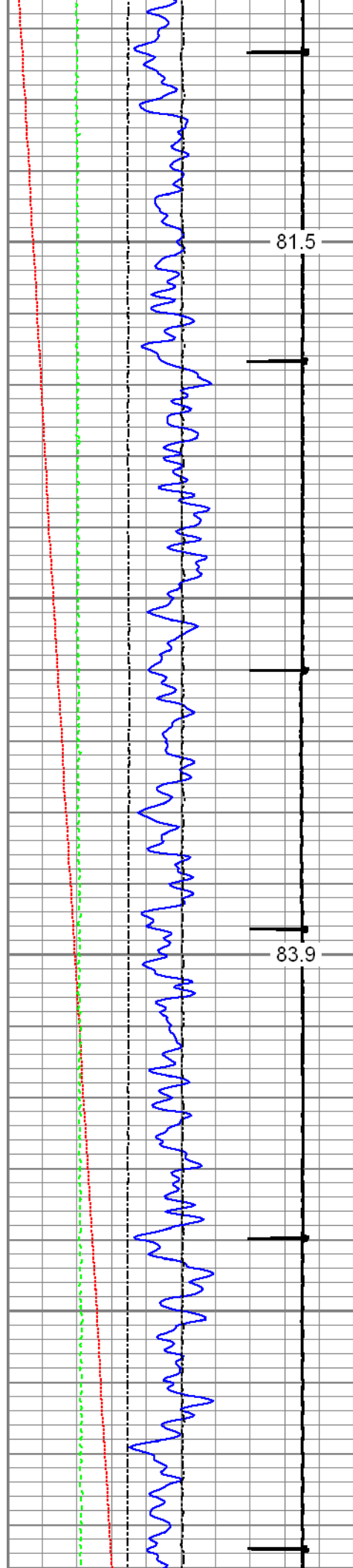




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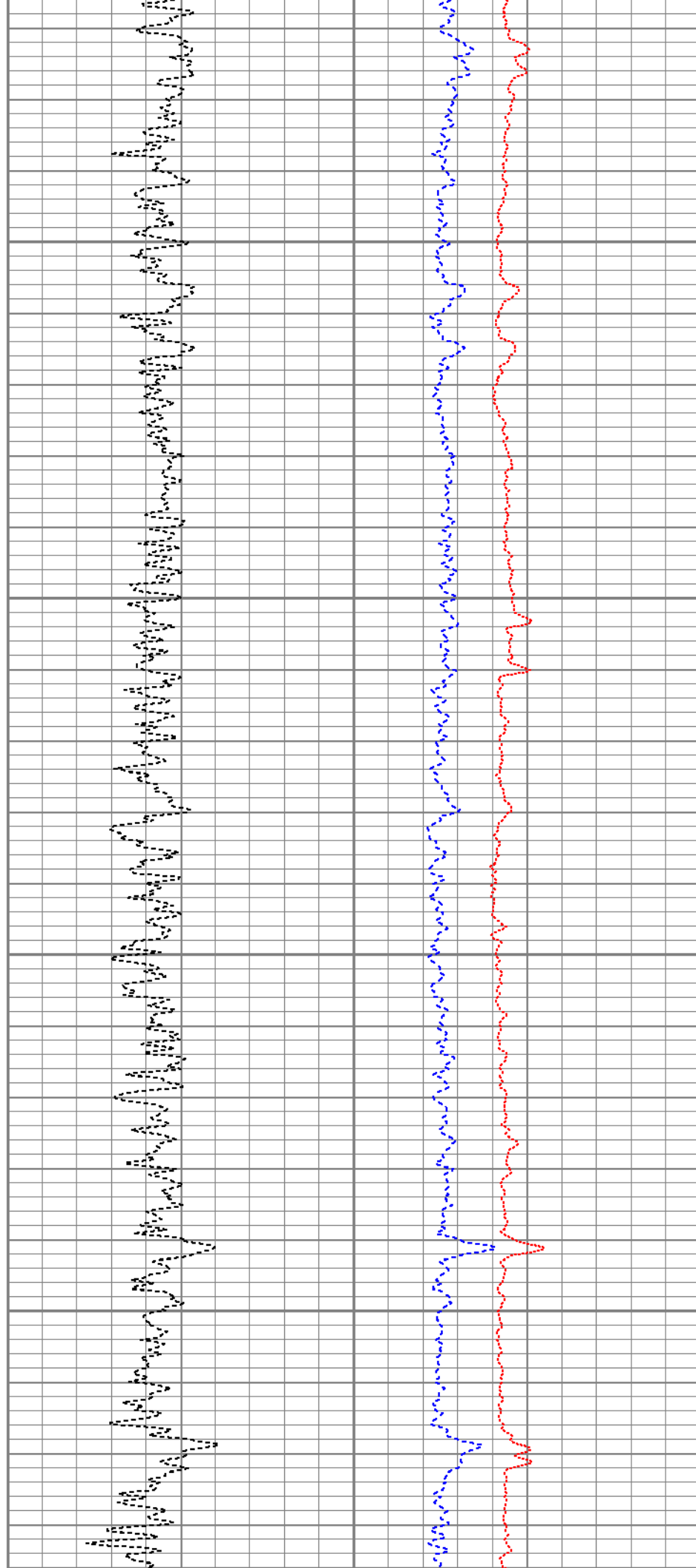
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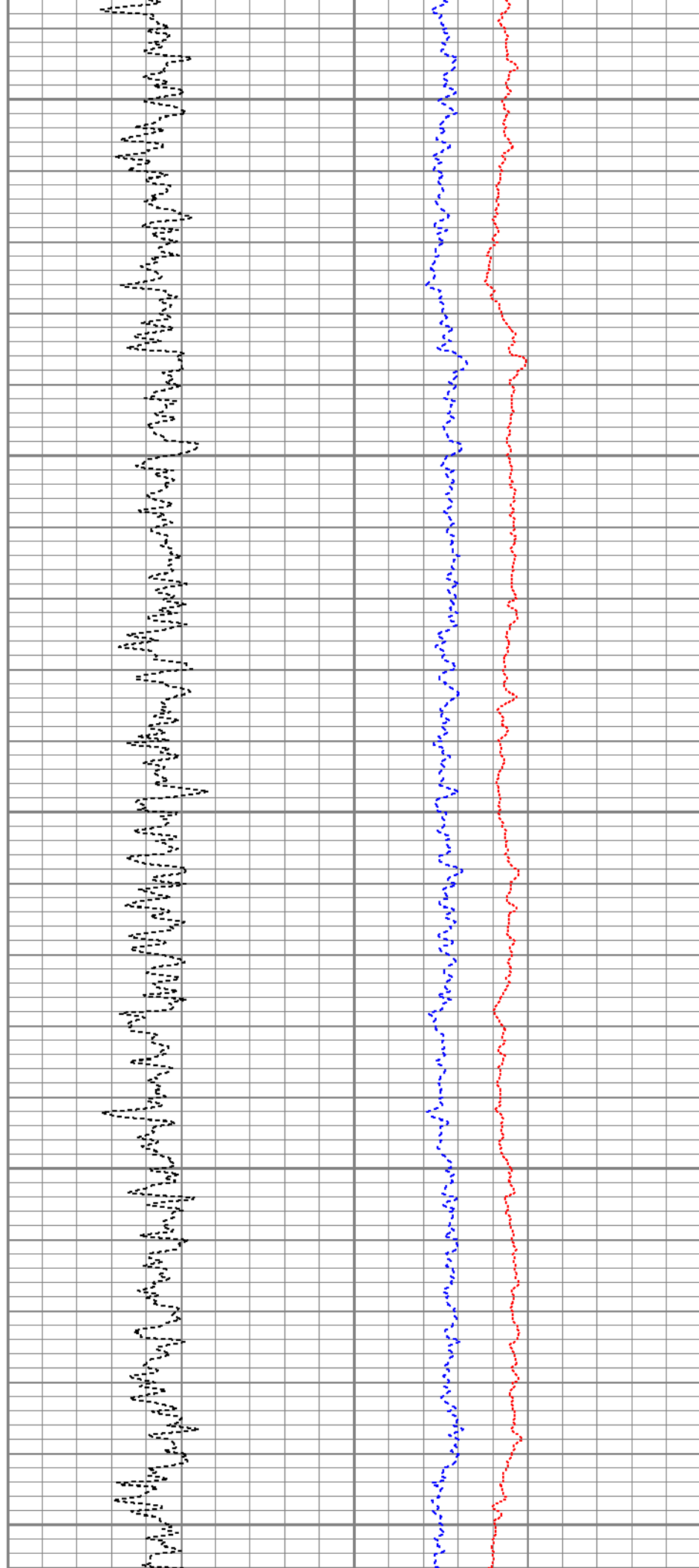
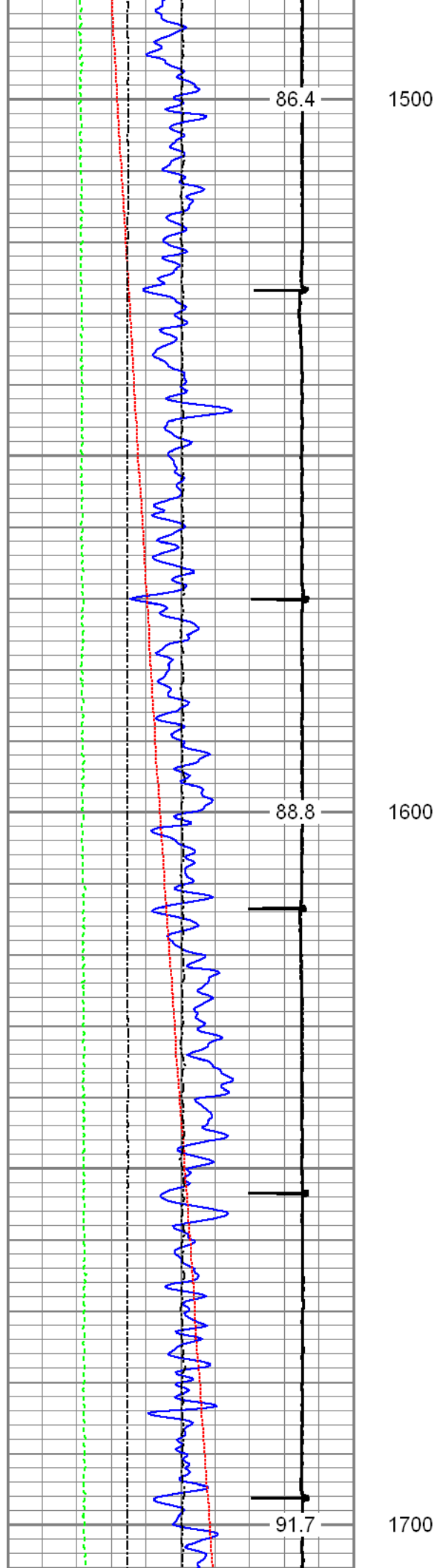


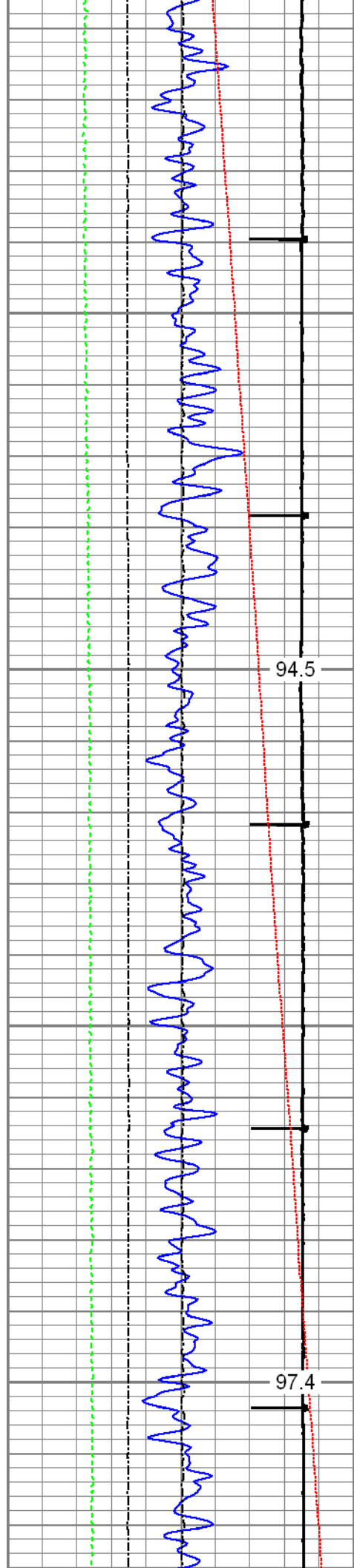


1300

1400

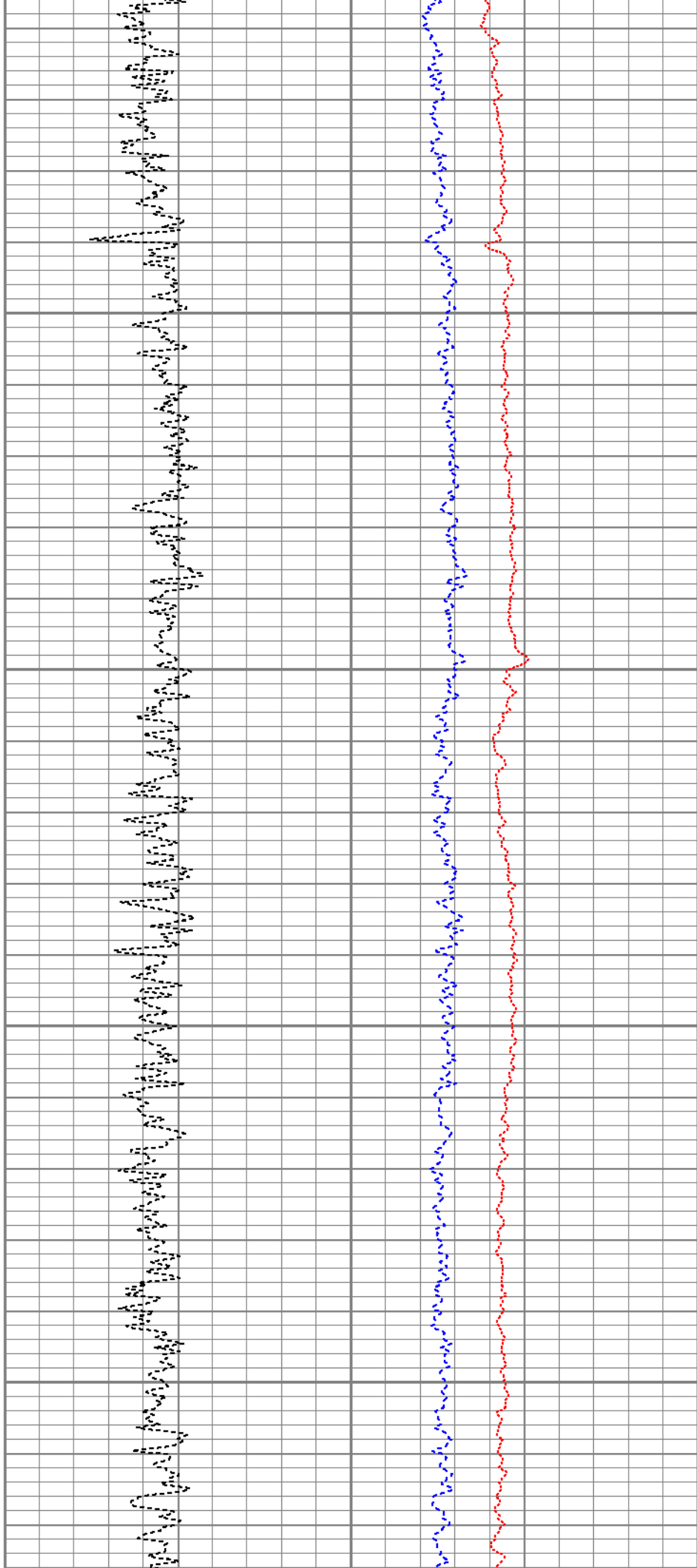


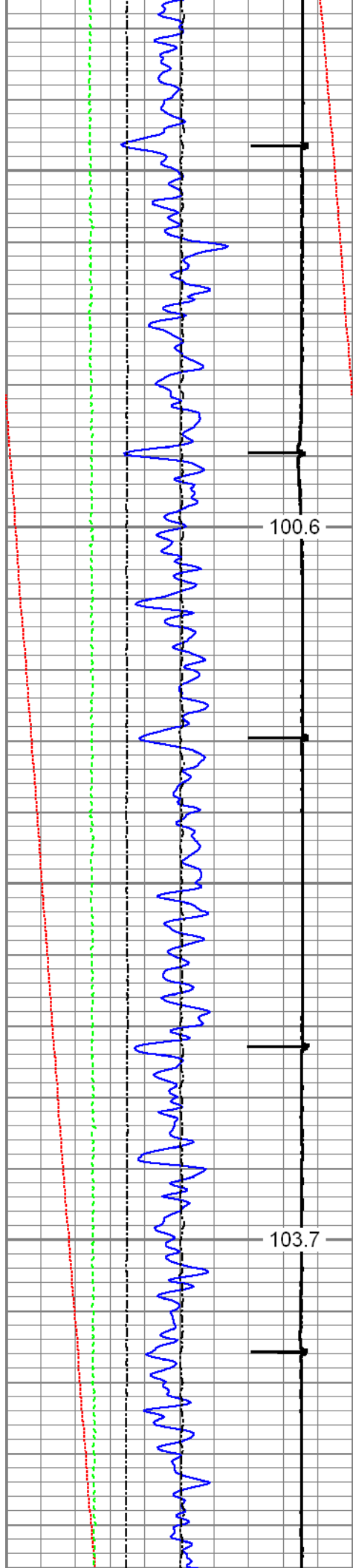




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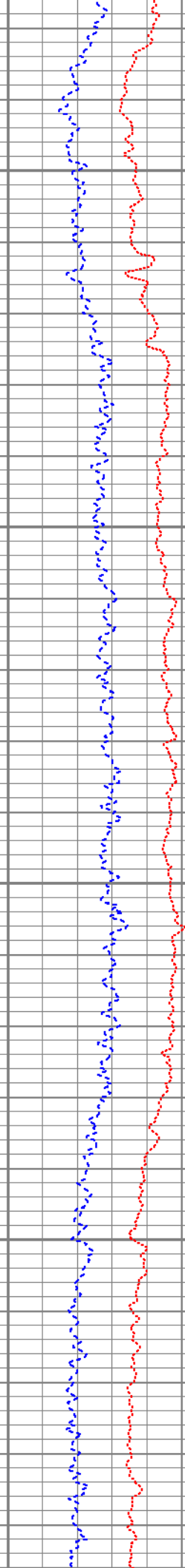
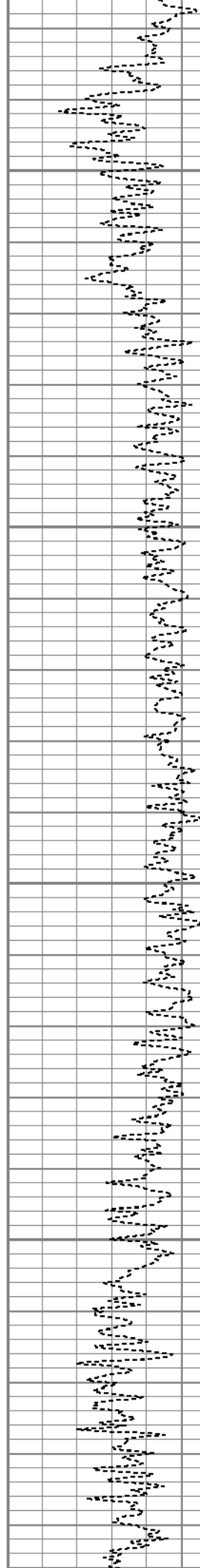
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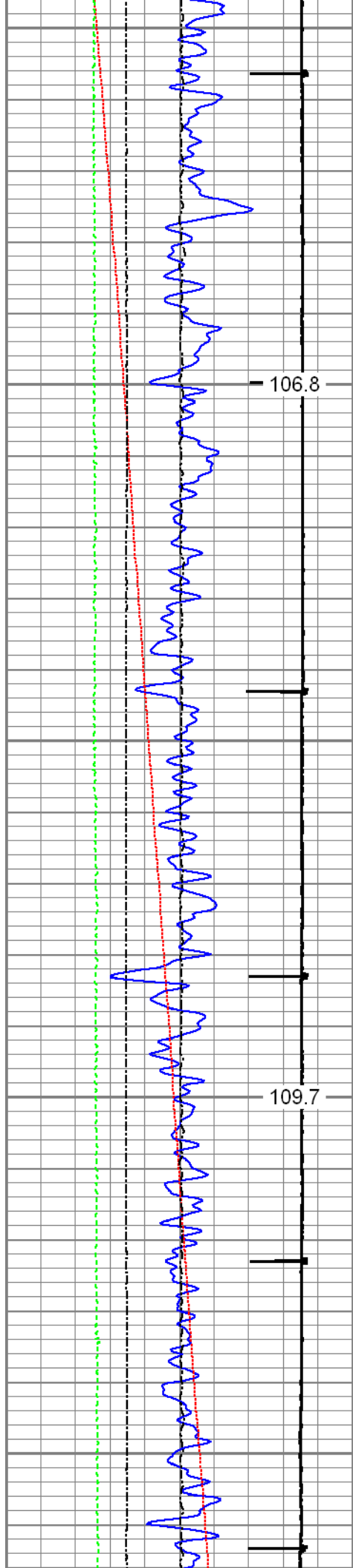




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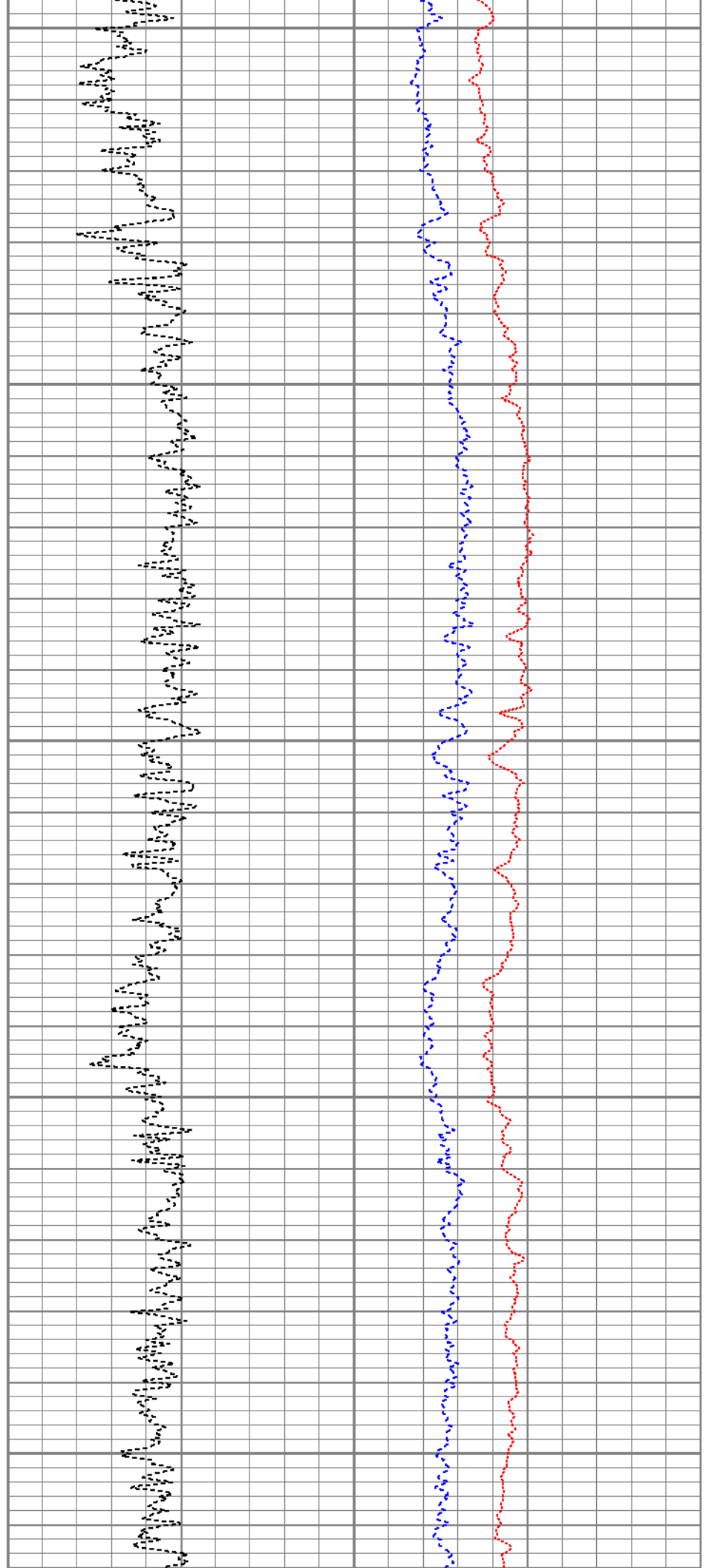
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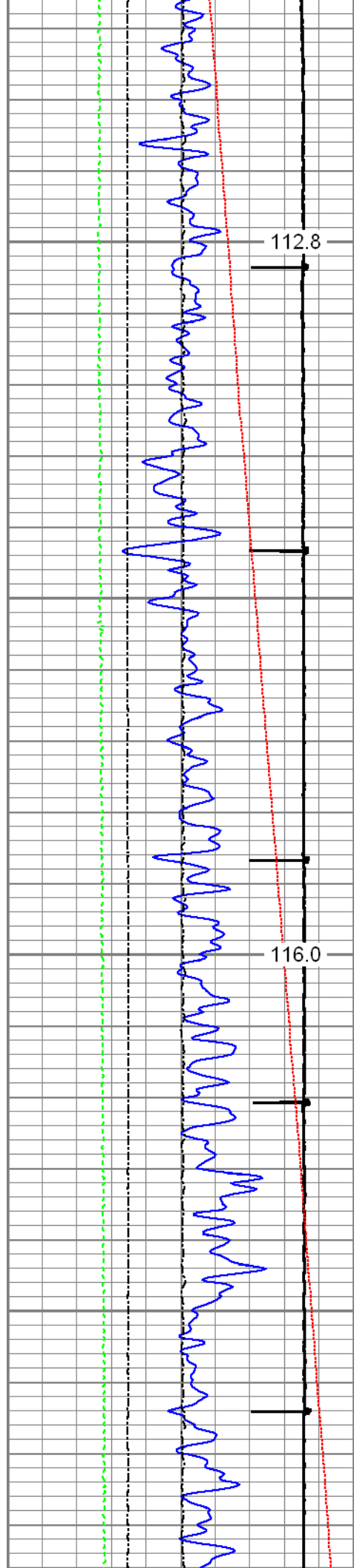




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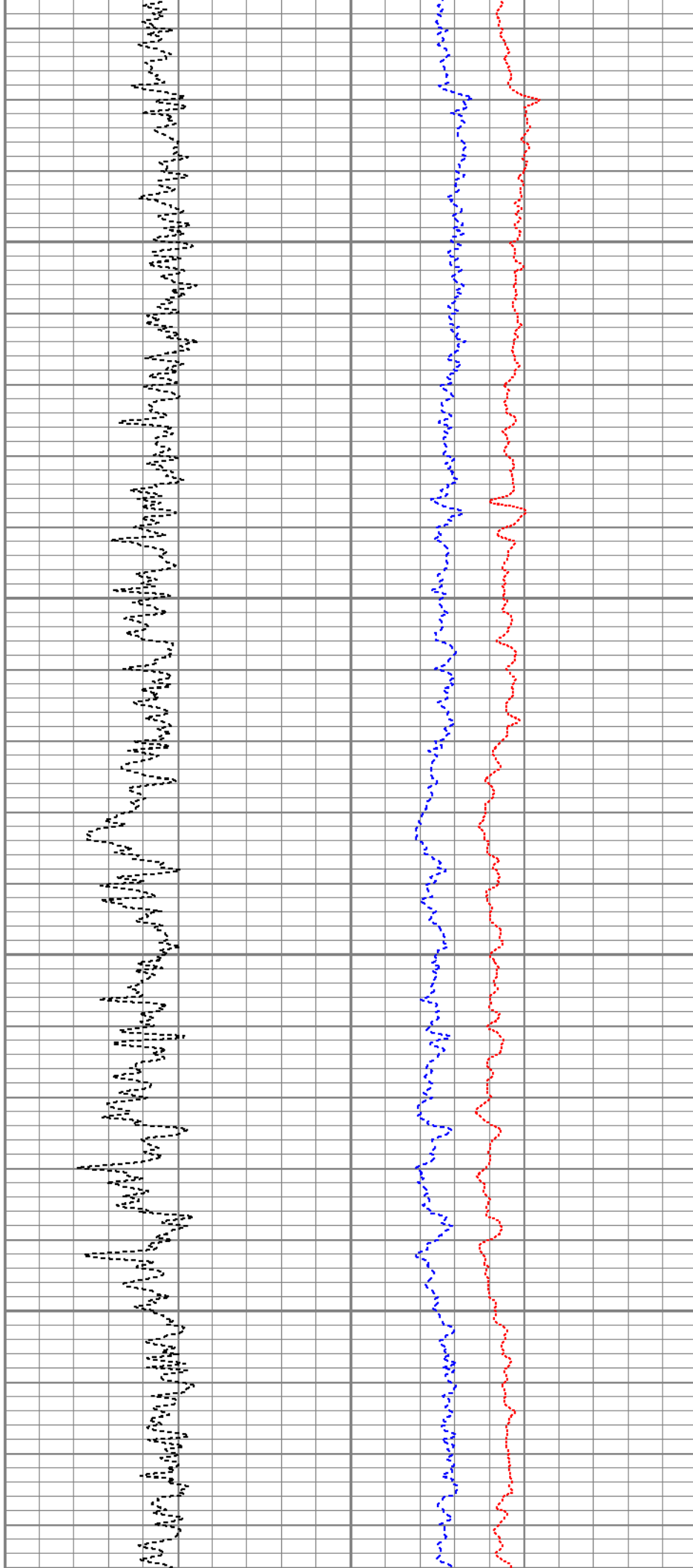
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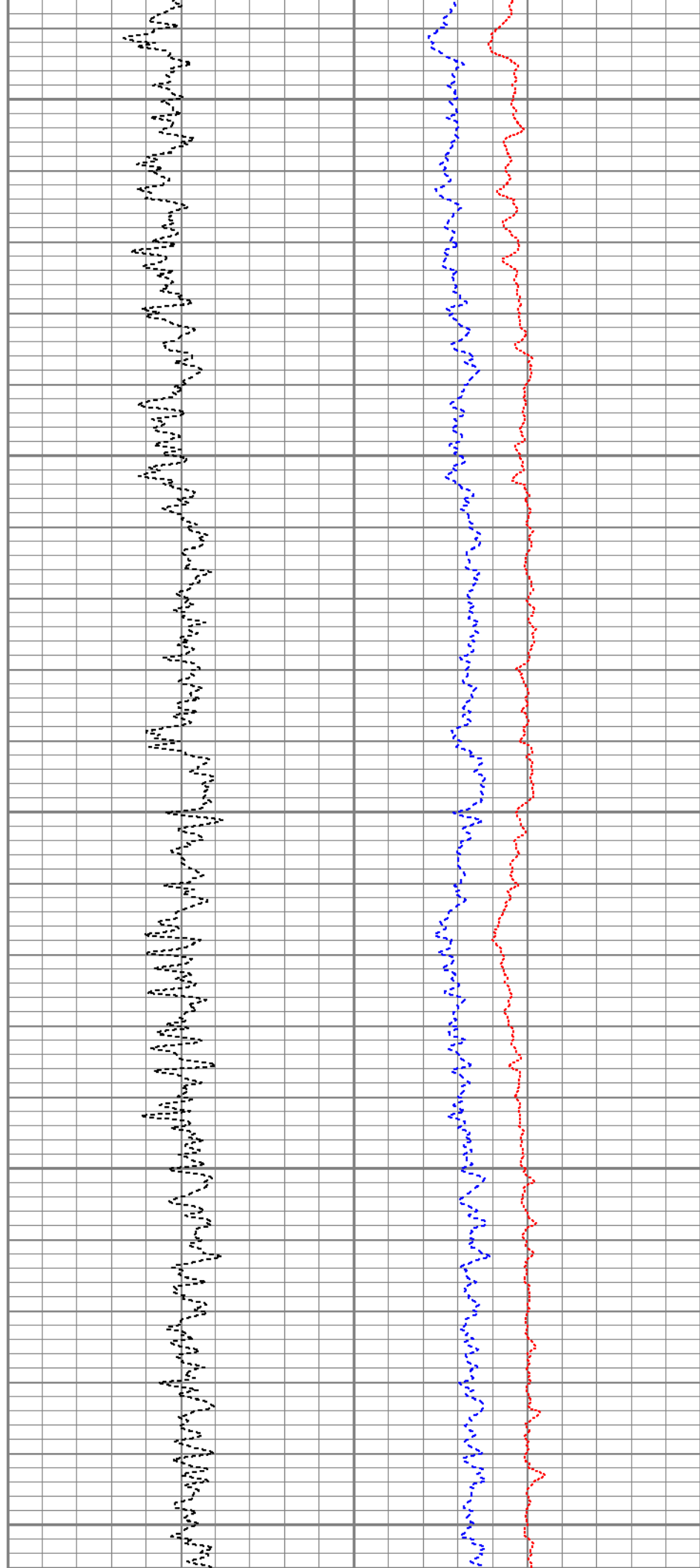
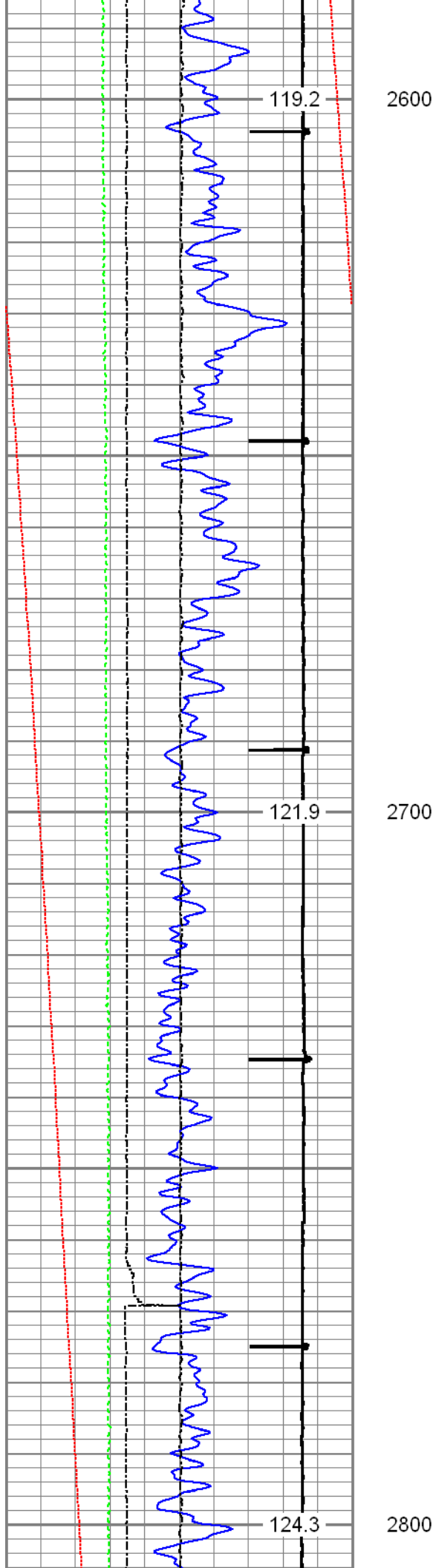


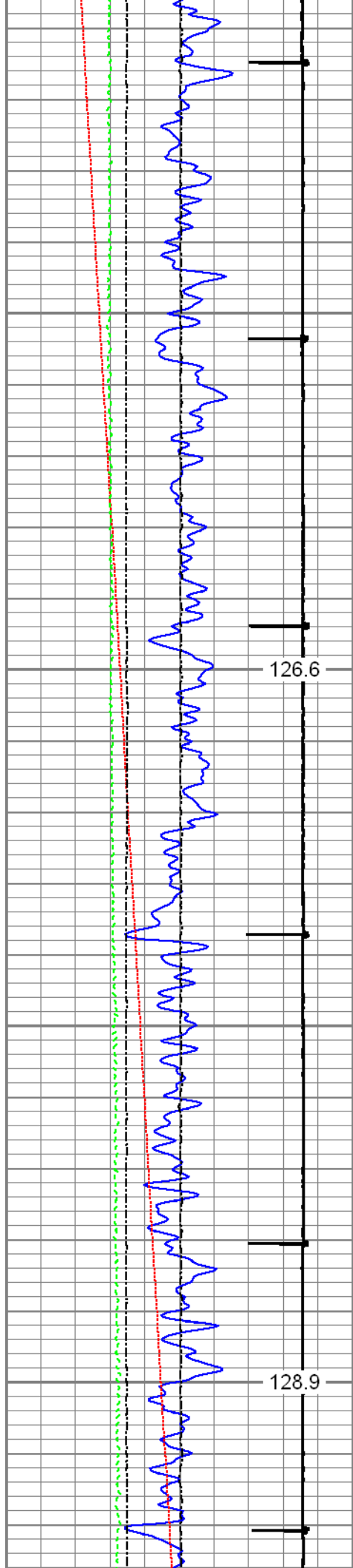


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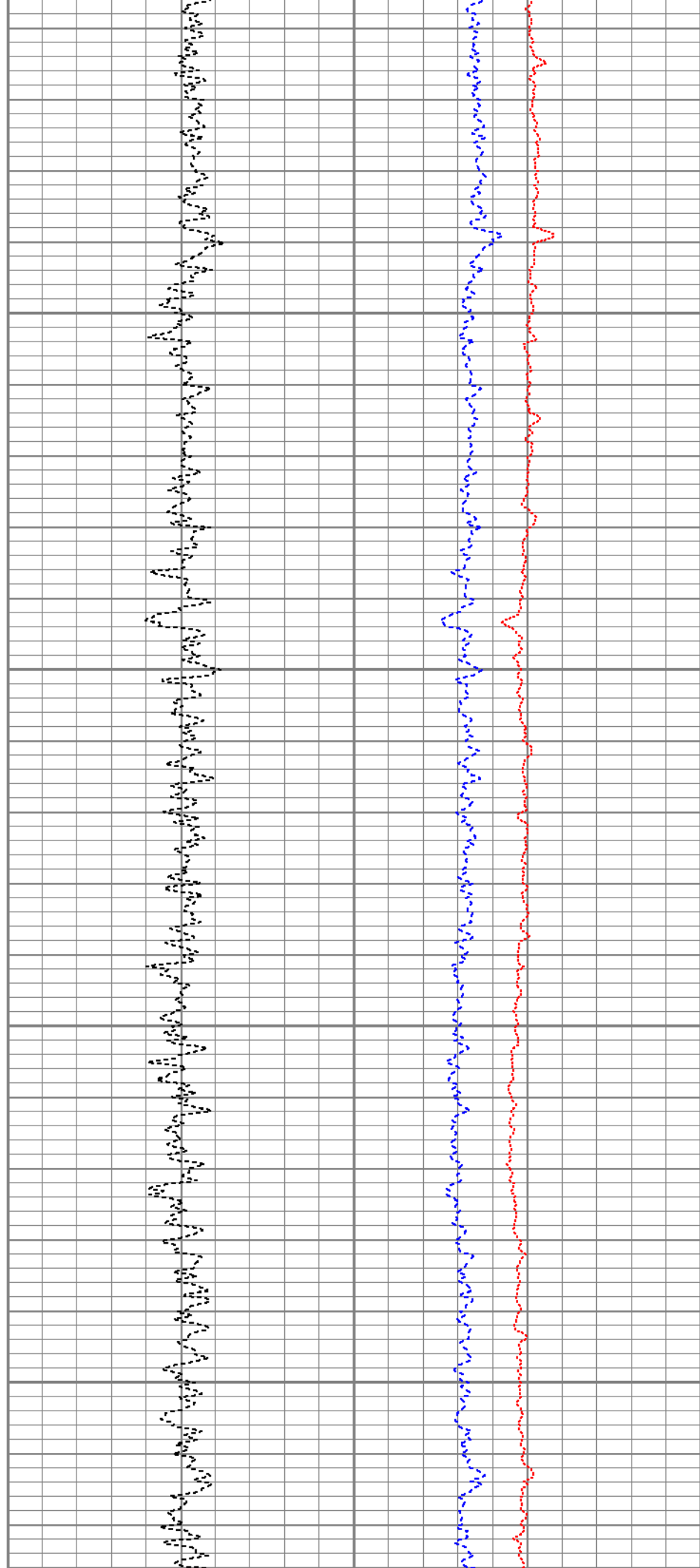


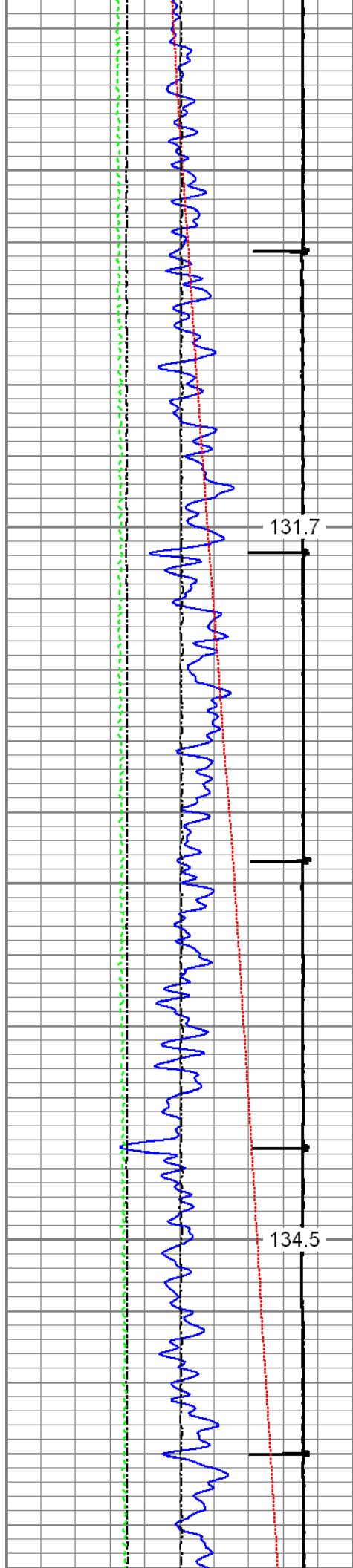




2900

3000



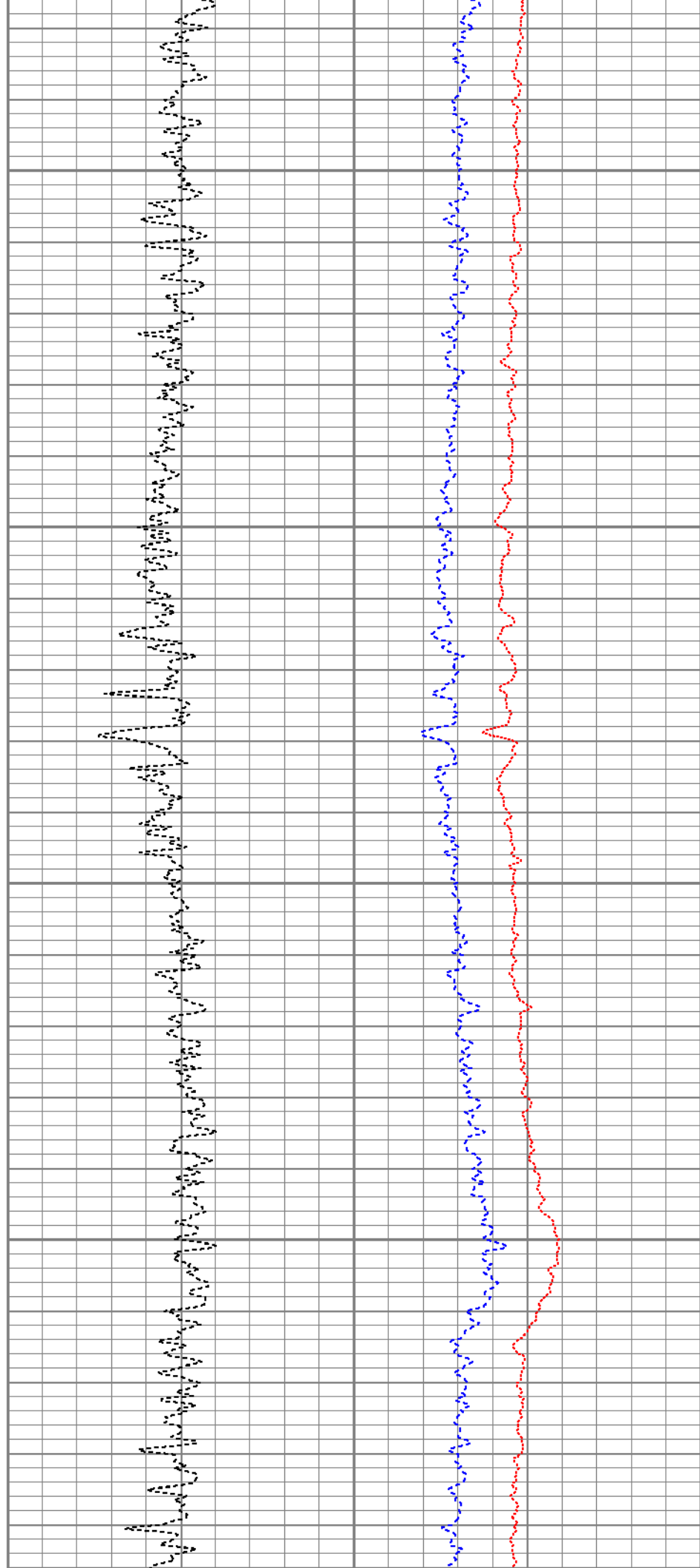


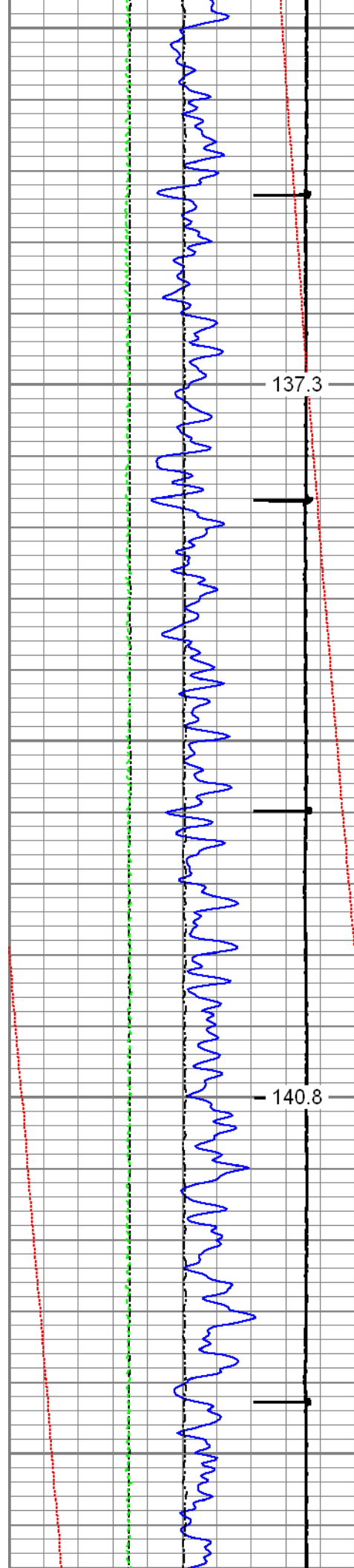
3100

131.7

3200

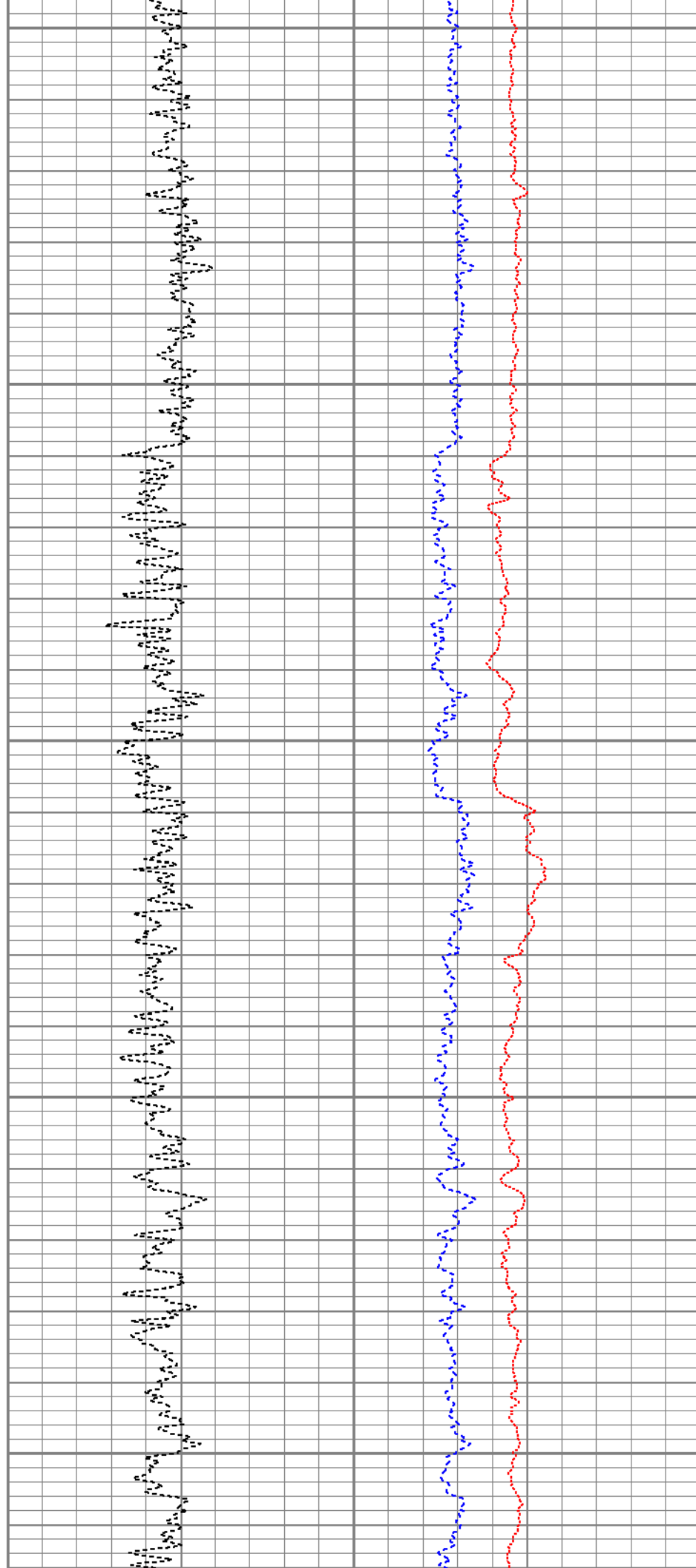
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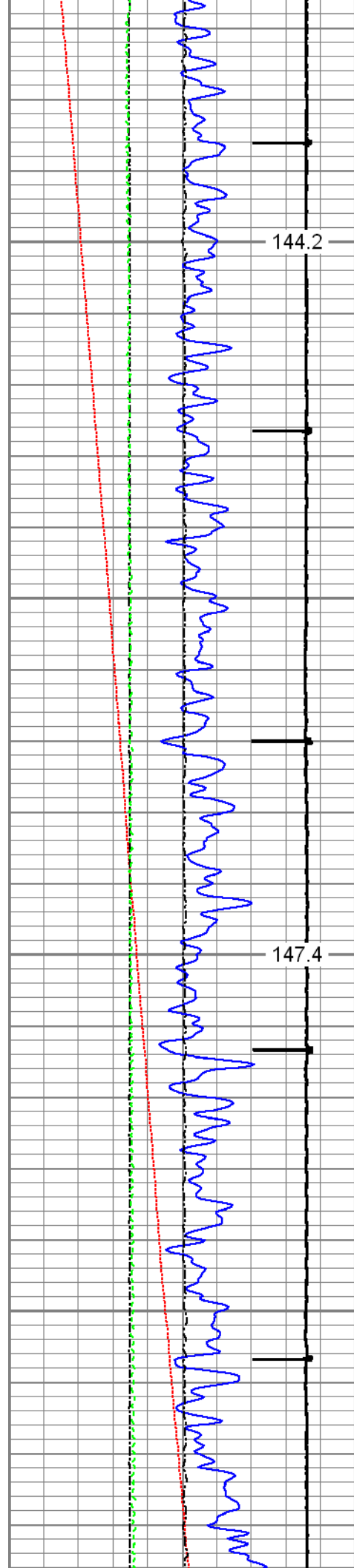




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3400



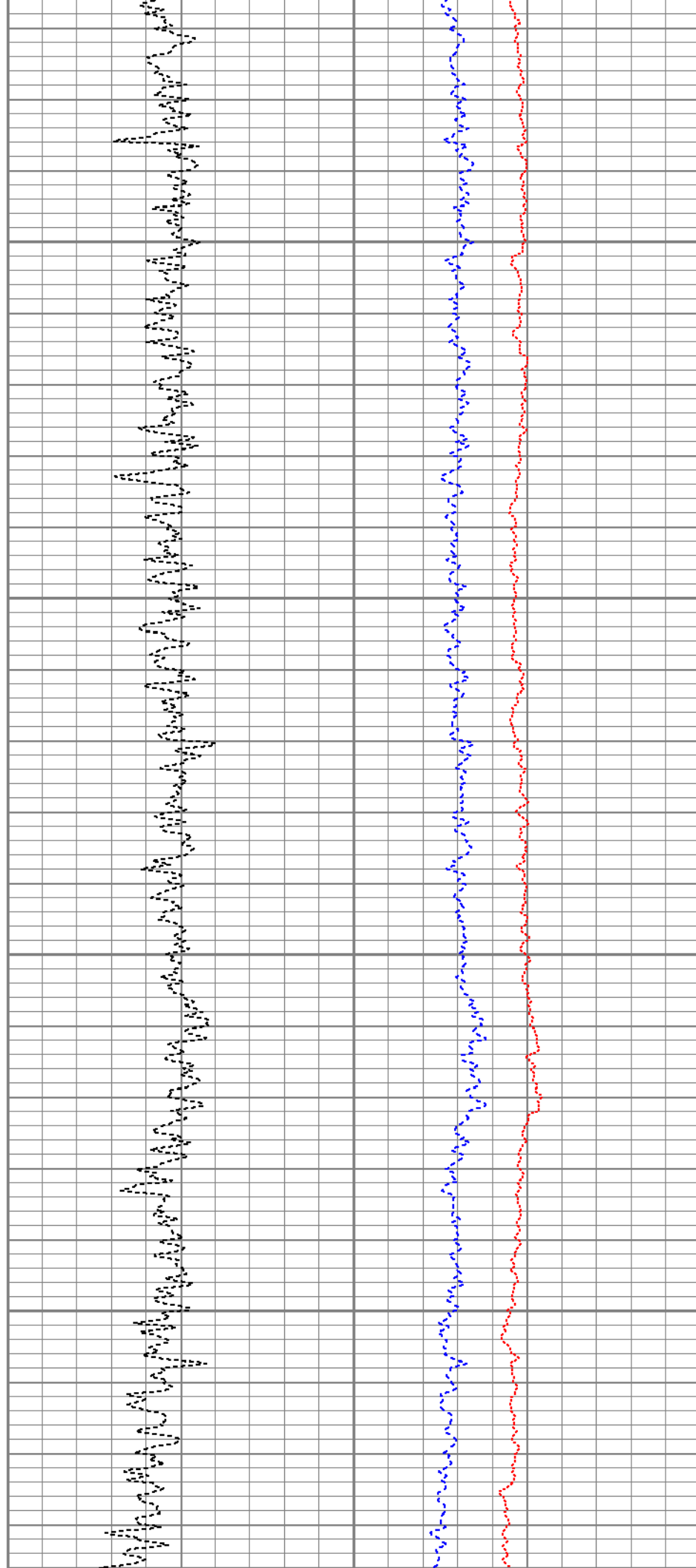


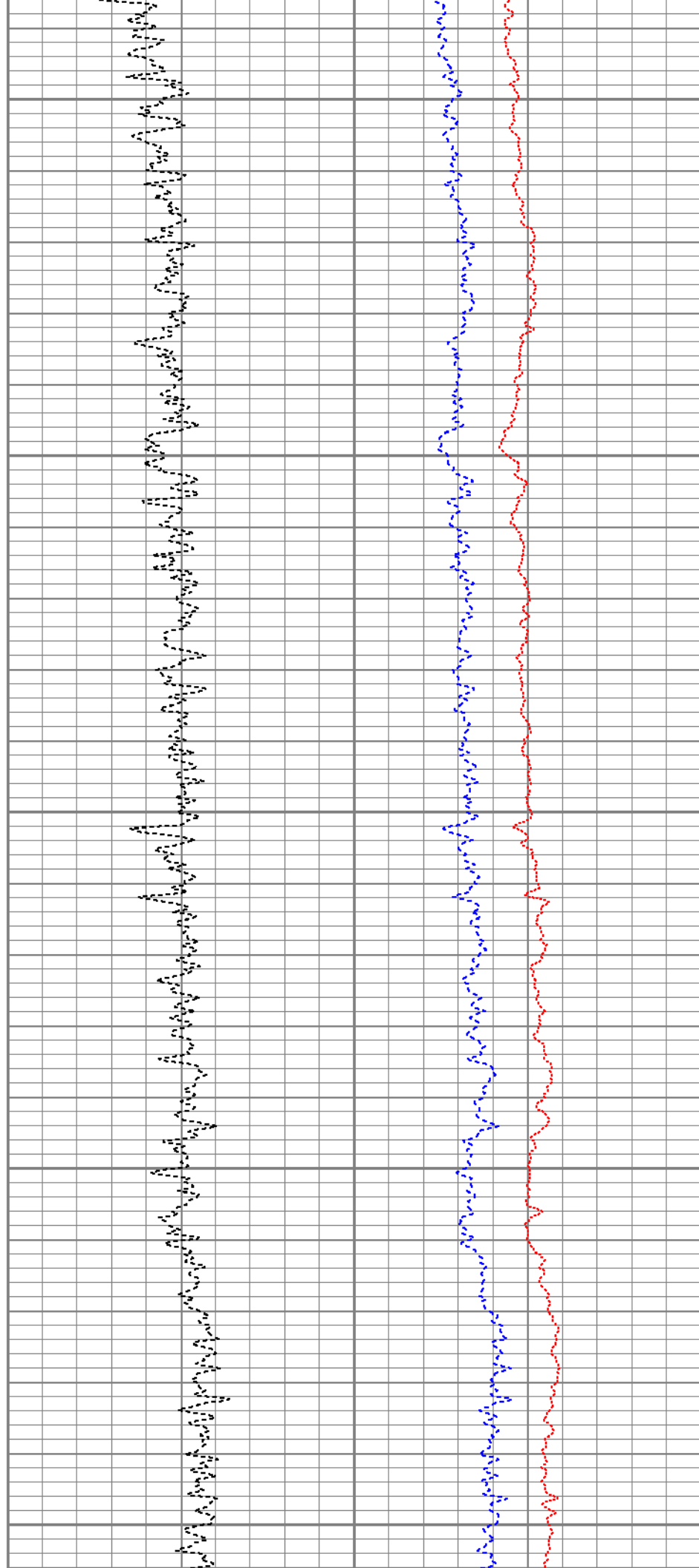
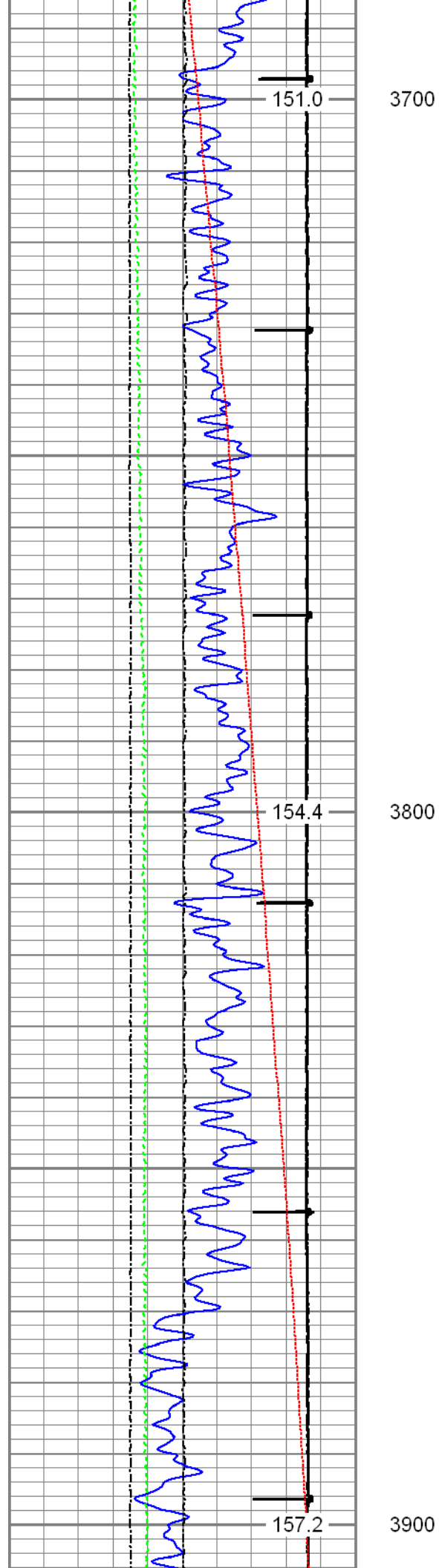
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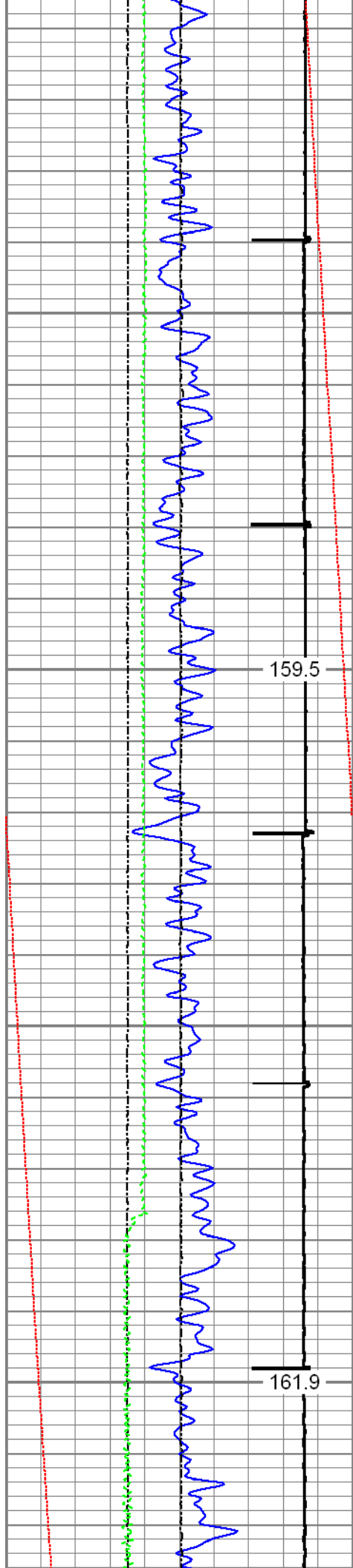
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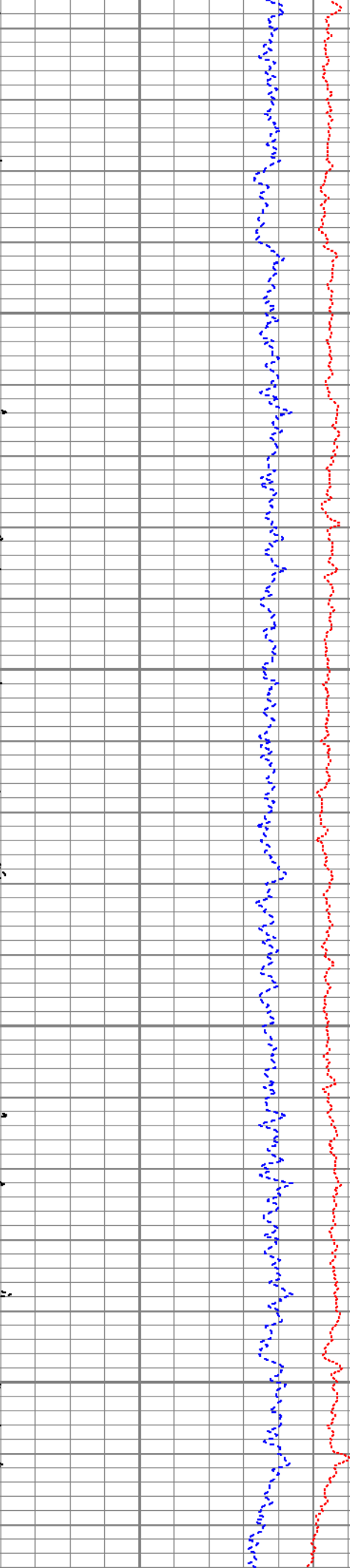
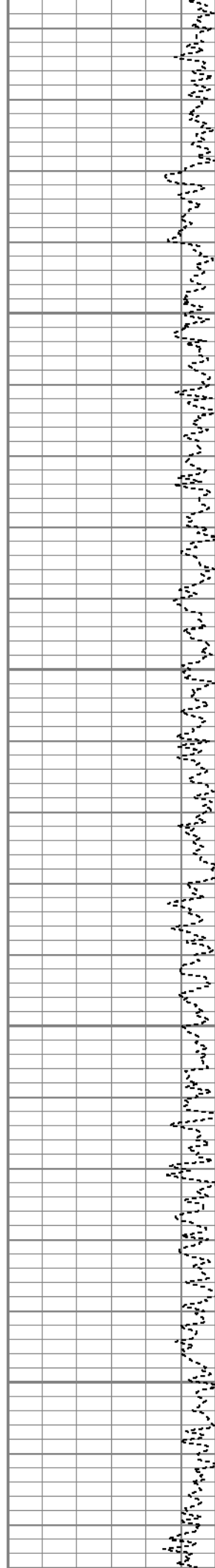


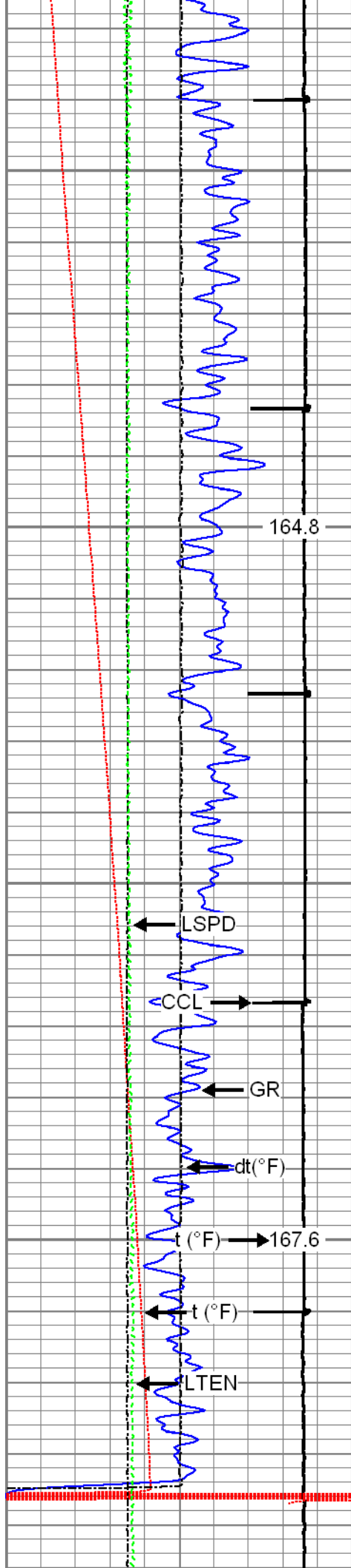




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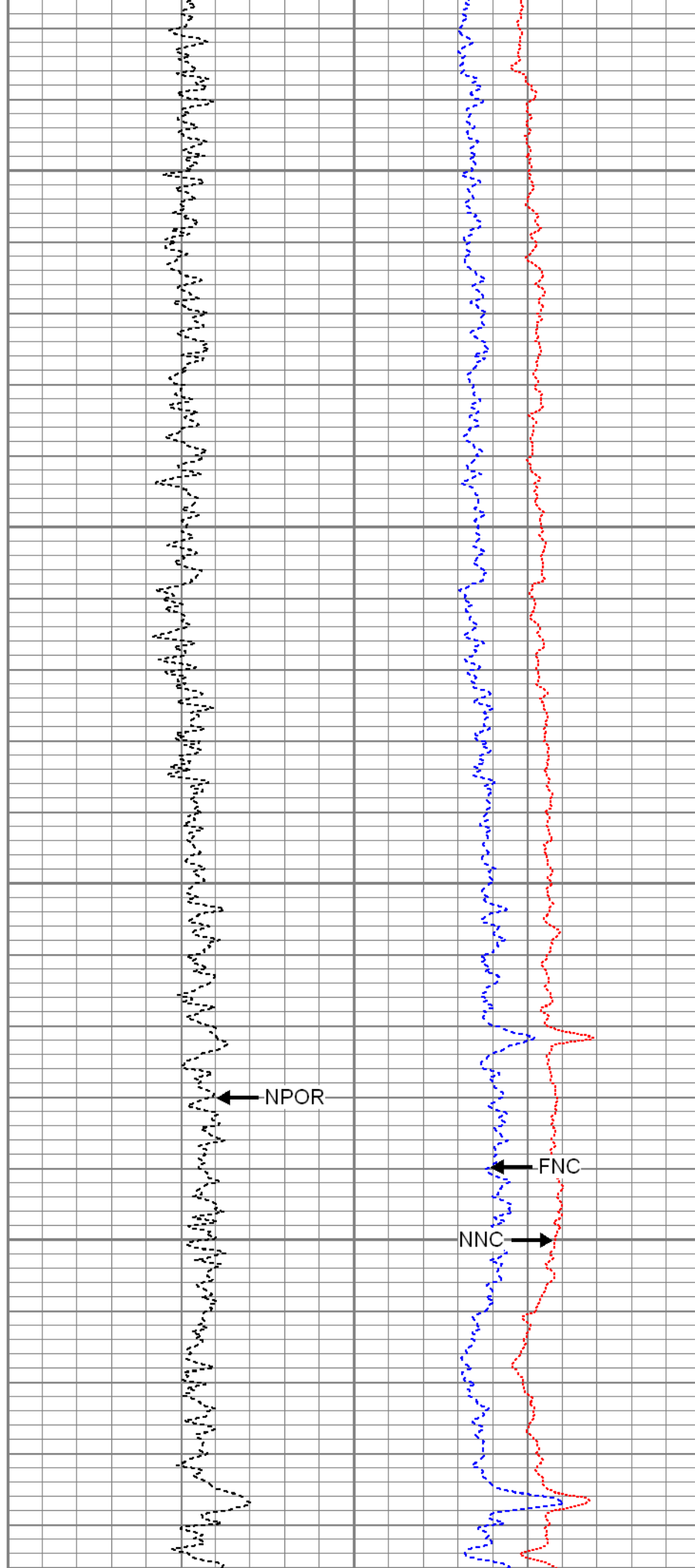
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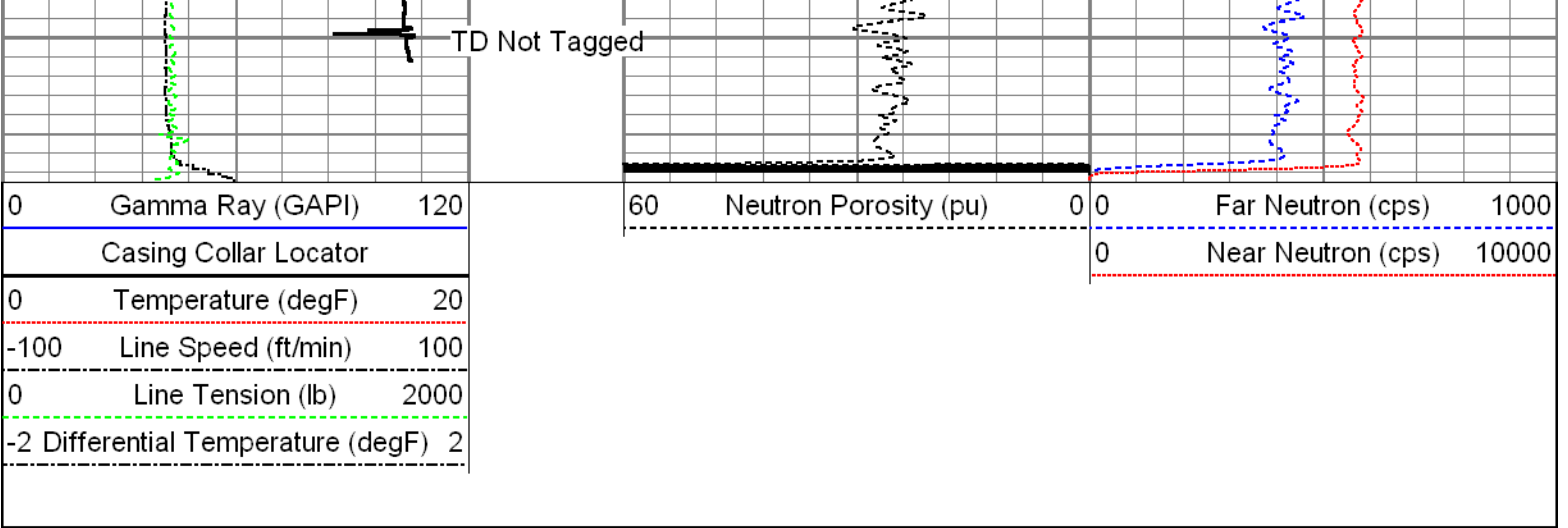




4200

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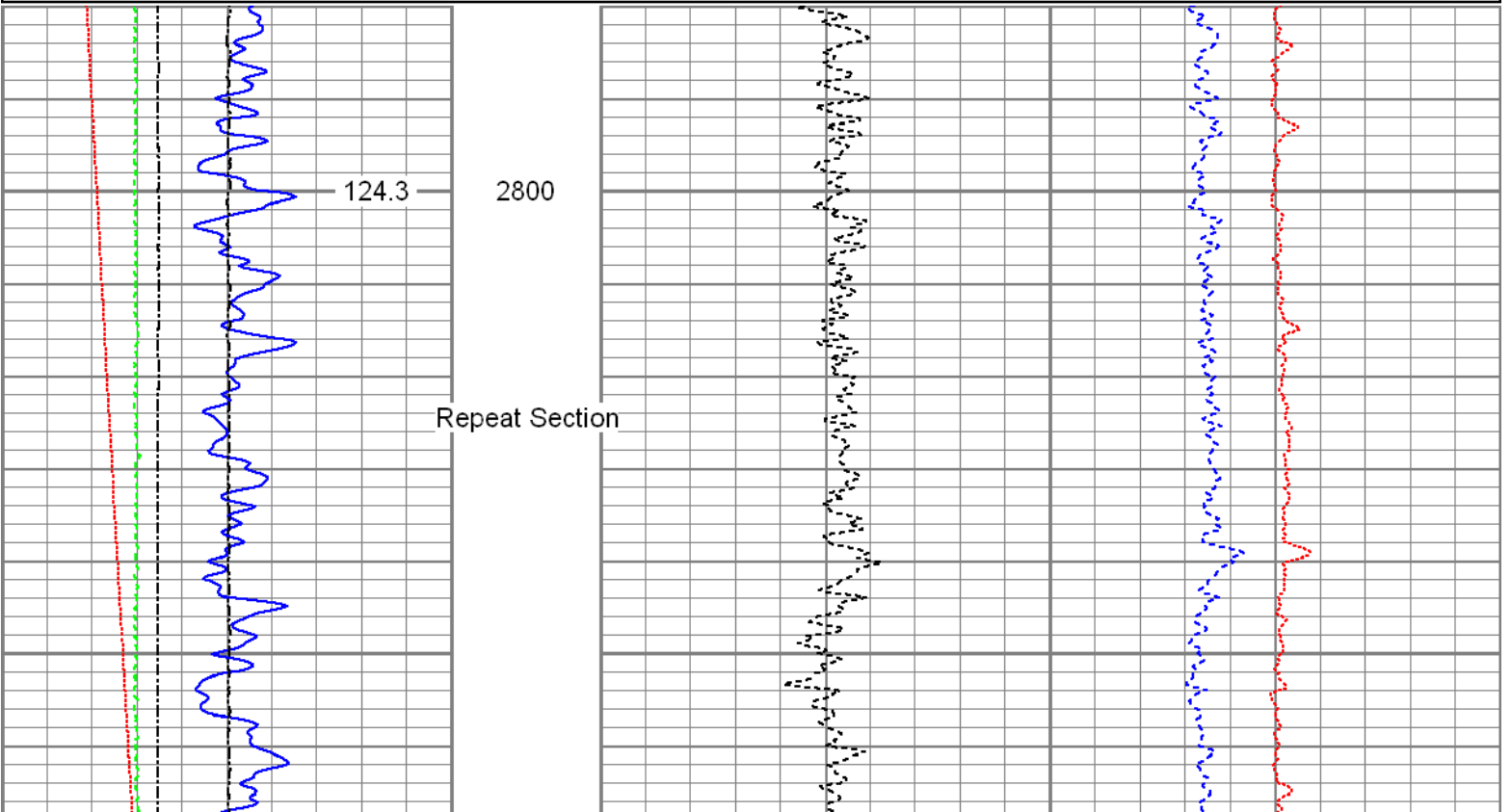
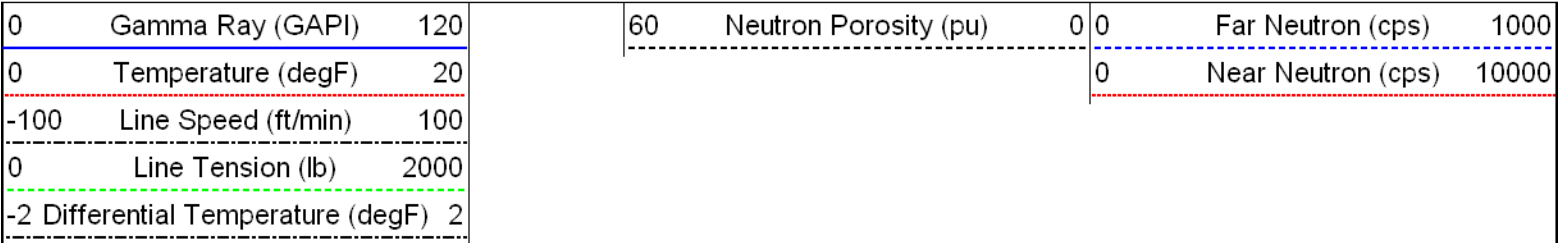


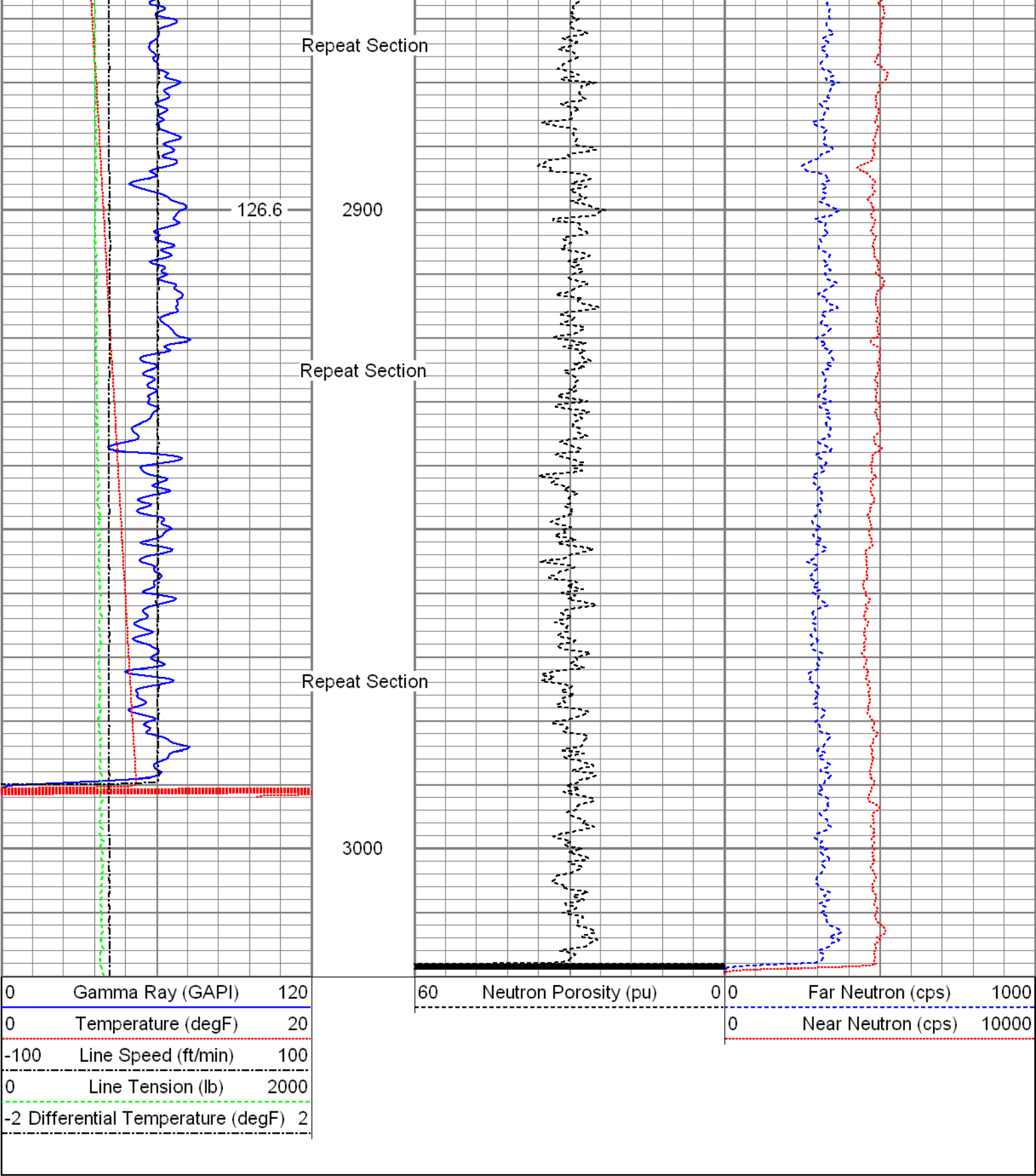



Repeat Section

Recorded With 2500 PSI Surface Induced Pressure

Database File: 12-22-15_noble_moser h34-769_mit_rbl_cnl.db
 Dataset Pathname: pass4.1
 Presentation Format: cnl_mit
 Dataset Creation: Tue Dec 22 16:28:04 2015 by Calc 7.0 B1
 Charted by: Depth in Feet scaled 1:240





Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	30.24		T_CH14375_1_GO Titan 1-7/16" Assembled Electric Cable Head with 1" Fishing Neck	1.03	1.44	4.00
			UW_AGS-UW_AGS_001 (215017) Sondex Adapter - GO Box to Sondex Pin	0.21	1.69	1.00
			UW_XTU-UW_XTU_002 (10010522) Crossover Ultrawire Toolbus to Ultralink	1.58	1.69	6.50

TEMP	28.84		UW_PGR-UW_PGR_020 (211727) Production Gamma Ray	1.93	1.69	9.50
			UW_PRT-UW_PRT_016 (10025100) Platinum Resistance Thermometer	1.04	1.69	5.20
			UW_PRC #4 -DSSRAC (081) 2-3/4" DSS 5 Arm Roller Centralizer	2.55	2.75	32.00
WVF3FT	21.81		UW_RBT-UW_RBT_004 (10013454) Sondex Ultrawire 3-1/8" Radial Bond Tool	9.47	3.13	140.00
WVFS1	21.81					
WVFS2	21.81					
WVFS3	21.81					
WVFS4	21.81					
WVFS5	21.81					
WVFS6	21.81					
WVFS7	21.81					
WVFS8	21.81					
CBLTEMP	21.81		UW_PRC-DSSRAC (082) 2-3/4" DSS 5 Arm Roller Centralizer	2.55	2.75	32.00
CBLROT	21.81					
WVF5FT	20.81					
MIT	11.80		UW_MIT-UW_MIT40_027 (218950) 40 Multifinger Imaging Tool	4.54	2.75	61.10
			UW_PRC-UW_PRC_057 (1102) Sondex 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00
			CNL-007 (1005) Compensated Neutron Logging Tool	6.61	1.69	30.00
CNLSC	1.53					
CNSSC	1.12					
TSTAMP	0.00					
Dataset: 12-22-15_Noble_Moser H34-769_MIT_RBL_CNL.db: field/well/run1/pass6.1 Total Length: 34.48 ft Total Weight: 353.30 lb O.D. 3.13 in						

Calibration Report	
Database File:	12-22-15_Noble_Moser H34-769_MIT_RBL_CNL.db
Dataset Pathname:	calreport
Dataset Creation:	Tue Dec 22 14:17:33 2015 by Log 7.0 B1
Compensated Neutron Calibration Report	

Serial Number: 1005 Tool Model: 007			
Master Calibration		Tue Jun 03 09:29:29 2014	
Detector		Readings	
Short Space		240.87	cps
Long Space		303.55	cps
Ratio		Measured 0.8150	Reference Sleeve: 1.0000
CNRAT Gain K		1.0271	
Before Survey			
Detector		Readings	
Short Space			cps
Long Space			cps
Ratio		Measured	Reference
After Survey			
Detector		Readings	
Short Space			cps
Long Space			cps
Ratio		Measured	Reference
Multi-finger Imaging Tool Calibration Report			
Serial Number:		218950	
Number of Fingers:		40	
Tool Model:		UW_MIT40_027	
Inclinometer Calibration Report			
Performed:		Fri, Oct, 10 10:41:51 2008	
Calibration Angle:		45	
		Inc X	Inc Y
Vertical:		1996	1975
Finger 1 up:		2238	2226
Finger 31 up:		1760	2216
Finger 21 up:		1769	1745
Finger 11 up:		2250	1738
Sensitivity ratio:		1.00023	
X-axis angle:		314.283	
Deviation const.:		339.139	
Finger Calibration Report			
Performed:		Tue Dec 22 08:35:31 2015	
Ring size:	4	5	6
(in)			
	Sens	Sens	Sens
Finger 01:	1470 268.0	1738 292.0	2030 300.0 2330
Finger 02:	1526 245.0	1771 262.0	2033 264.0 2297
Finger 03:	1446 273.0	1719 295.0	2014 299.0 2313
Finger 04:	1478 272.0	1750 293.0	2043 288.0 2331
Finger 05:	1505 265.0	1770 284.0	2054 273.0 2327
Finger 06:	1429 278.0	1707 302.0	2009 298.0 2307
Finger 07:	1442 276.0	1718 296.0	2014 297.0 2311

Finger 08:	1425	280.0	1705	294.0	1999	287.0	2286
Finger 09:	1435	284.0	1719	299.0	2018	290.0	2308
Finger 10:	1439	275.0	1714	285.0	1999	278.0	2277
Finger 11:	1433	286.0	1719	297.0	2016	291.0	2307
Finger 12:	1371	294.0	1665	306.0	1971	292.0	2263
Finger 13:	1470	268.0	1738	277.0	2015	262.0	2277
Finger 14:	1417	270.0	1687	287.0	1974	285.0	2259
Finger 15:	1409	288.0	1697	295.0	1992	298.0	2290
Finger 16:	1422	279.0	1701	291.0	1992	291.0	2283
Finger 17:	1412	290.0	1702	299.0	2001	302.0	2303
Finger 18:	1371	278.0	1649	287.0	1936	294.0	2230
Finger 19:	1411	286.0	1697	289.0	1986	297.0	2283
Finger 20:	1411	279.0	1690	287.0	1977	302.0	2279
Finger 21:	1392	293.0	1685	301.0	1986	316.0	2302
Finger 22:	1426	269.0	1695	280.0	1975	294.0	2269
Finger 23:	1399	270.0	1669	283.0	1952	301.0	2253
Finger 24:	1444	273.0	1717	279.0	1996	295.0	2291
Finger 25:	1383	271.0	1654	280.0	1934	301.0	2235
Finger 26:	1403	279.0	1682	289.0	1971	313.0	2284
Finger 27:	1457	269.0	1726	278.0	2004	300.0	2304
Finger 28:	1448	281.0	1729	288.0	2017	315.0	2332
Finger 29:	1503	263.0	1766	269.0	2035	291.0	2326
Finger 30:	1405	276.0	1681	288.0	1969	318.0	2287
Finger 31:	1431	280.0	1711	292.0	2003	317.0	2320
Finger 32:	1478	260.0	1738	271.0	2009	291.0	2300
Finger 33:	1443	281.0	1724	299.0	2023	318.0	2341
Finger 34:	1451	275.0	1726	293.0	2019	316.0	2335
Finger 35:	1500	253.0	1753	266.0	2019	285.0	2304
Finger 36:	1520	260.0	1780	280.0	2060	297.0	2357
Finger 37:	1483	272.0	1755	291.0	2046	307.0	2353
Finger 38:	1563	247.0	1810	261.0	2071	275.0	2346
Finger 39:	1477	265.0	1742	285.0	2027	290.0	2317
Finger 40:	1438	278.0	1716	303.0	2019	314.0	2333

Post Survey Calibration Check								
Performed:					Tue Dec 22 14:17:10 2015			
Ring size: (in)	4	Nom. wear	5	Nom. wear	6	Nom. wear	7	Nom. wear
Finger 01:	4.016	0.008	5.002	0.001	6.006	0.003	7.010	0.005
Finger 02:	4.022	0.011	5.019	0.010	6.024	0.012	7.029	0.015
Finger 03:	4.012	0.006	5.002	0.001	6.004	0.002	7.007	0.004
Finger 04:	4.013	0.006	5.007	0.004	6.006	0.003	7.007	0.004
Finger 05:	4.014	0.007	5.013	0.007	6.007	0.004	7.019	0.009
Finger 06:	4.006	0.003	5.007	0.004	6.004	0.002	7.003	0.002
Finger 07:	4.003	0.002	5.000	-0.000	6.005	0.003	7.003	0.002
Finger 08:	4.043	0.022	5.016	0.008	6.015	0.007	7.011	0.005
Finger 09:	4.026	0.013	5.004	0.002	6.004	0.002	7.011	0.006
Finger 10:	3.996	-0.002	4.976	-0.012	5.991	-0.005	7.002	0.001
Finger 11:	4.019	0.009	5.007	0.003	6.007	0.004	7.003	0.001
Finger 12:	4.034	0.017	5.006	0.003	5.994	-0.003	7.018	0.009
Finger 13:	4.015	0.008	4.987	-0.007	5.976	-0.012	7.002	0.001
Finger 14:	4.009	0.005	5.008	0.004	6.007	0.004	7.009	0.005
Finger 15:	4.012	0.006	5.001	0.001	6.007	0.003	7.001	0.000
Finger 16:	4.010	0.005	5.002	0.001	6.005	0.003	7.005	0.003
Finger 17:	4.030	0.015	5.016	0.008	6.017	0.008	7.022	0.011
Finger 18:	4.043	0.022	5.029	0.014	6.029	0.015	7.034	0.017
Finger 19:	4.020	0.010	4.999	-0.001	6.007	0.004	7.012	0.006
Finger 20:	4.018	0.009	5.007	0.004	6.009	0.004	7.014	0.007
Finger 21:	4.017	0.009	4.998	-0.001	5.997	-0.002	7.002	0.001
Finger 22:	4.019	0.010	5.011	0.005	6.004	0.002	7.007	0.003
Finger 23:	3.992	-0.004	5.002	0.001	6.000	-0.000	7.006	0.003
Finger 24:	4.013	0.007	5.007	0.003	6.004	0.002	7.003	0.002
Finger 25:	4.013	0.006	5.008	0.004	6.004	0.002	7.010	0.005
Finger 26:	4.016	0.008	5.002	0.001	6.004	0.002	7.007	0.003
Finger 27:	4.015	0.008	5.003	0.002	6.008	0.004	7.010	0.005

Finger 28:	4.018	0.009	5.005	0.002	6.009	0.005	7.010	0.005
Finger 29:	4.020	0.010	4.998	-0.001	5.996	-0.002	7.003	0.001
Finger 30:	4.019	0.009	5.006	0.003	6.014	0.007	7.019	0.009
Finger 31:	4.020	0.010	5.003	0.002	6.004	0.002	7.012	0.006
Finger 32:	4.019	0.009	5.003	0.001	5.999	-0.001	7.010	0.005
Finger 33:	4.019	0.010	4.997	-0.002	5.997	-0.001	7.009	0.004
Finger 34:	4.021	0.010	5.006	0.003	6.004	0.002	7.013	0.006
Finger 35:	4.028	0.014	5.013	0.006	6.004	0.002	7.009	0.004
Finger 36:	4.013	0.006	5.001	0.000	6.005	0.002	7.009	0.004
Finger 37:	4.016	0.008	5.007	0.004	6.009	0.005	7.005	0.003
Finger 38:	4.020	0.010	4.998	-0.001	5.998	-0.001	7.006	0.003
Finger 39:	4.018	0.009	5.008	0.004	6.000	-0.000	7.005	0.002
Finger 40:	4.022	0.011	5.006	0.003	6.008	0.004	7.013	0.006
Average:	4.017	0.009	5.005	0.002	6.005	0.002	7.010	0.005

Segmented Cement Bond Log Calibration Report								
Serial Number:			10013454					
Tool Model:			UW_RBT_004					
Calibration Casing Diameter:			7.000	in				
Calibration Depth:			358.833	ft				

Master Calibration, performed Tue Dec 22 10:42:56 2015:						
Raw (v)		Calibrated (mv)		Results		
	Zero	Cal	Zero	Cal	Gain	Offset
3FT	-0.003	0.498	0.800	62.165	122.614	1.128
5FT	-0.004	0.575	0.800	62.165	106.049	1.188
S1	-0.003	0.482	0.000	100.000	206.099	0.561
S2	-0.004	0.500	0.000	100.000	198.691	0.735
S3	-0.004	0.513	0.000	100.000	193.679	0.716
S4	-0.004	0.522	0.000	100.000	190.000	0.796
S5	-0.003	0.510	0.000	100.000	194.802	0.568
S6	-0.005	0.497	0.000	100.000	199.159	0.963
S7	-0.004	0.481	0.000	100.000	206.535	0.756
S8	-0.004	0.475	0.000	100.000	209.001	0.765

Temperature Calibration Report					
Serial Number:			10025100		
Tool Model:			UW_PRT_016		
Performed:			Wed Feb 11 13:47:59 2015		
Point #	Reading		Reference		
1	13249.00	cps	68.00	degF	
2	18454.00	cps	104.00	degF	
3	29735.00	cps	176.00	degF	
4	41457.00	cps	248.00	degF	
5	52851.00	cps	320.00	degF	
6	59128.00	cps	356.00	degF	
7		cps		degF	
8		cps		degF	
9		cps		degF	
10		cps		degF	

Gamma Ray Calibration Report					
Serial Number:		211727			
Tool Model:		UW_PGR_020			
Performed:		Sun Jun 13 13:33:21 1993			

Permitted:

Calculated 10.00.21 1000

Calibrator Value:	1.0	GAPI
Background Reading:	0.0	cps
Calibrator Reading:	1.0	cps
Sensitivity:	1.0000	GAPI/cps



Company	Noble Energy Inc.
Well	Moser H34-769
Field	Wattenberg
County	Weld
State	Colorado