



Multifinger Imaging Caliper
Gamma Ray
Casing Collar Log

Company Kerr-McGee Oil & Gas Onshore, L.P.

Well Yellowhammer 13N-17HZ

Field Wattenberg

County Weld State Colorado

Location: API #: 05-123-45495

SEC 8 TWP 1N RGE 68W

Permanent Datum Ground Level Elevation 5063'

Log Measured From Kelly Bushing

Drilling Measured From Kelly Bushing

Other Services
Gauge Ring
RBL

Elevation
K.B. 5080'
D.F. ---
G.L. 5063'

Date 20-FEB-2018

Run Number Three

Depth Driller 13371 FT

Depth Logger 5919 FT

Bottom Logged Interval 5750 FT

Top Log Interval Surface

Open Hole Size ---

Type Fluid Water

Density / Viscosity 8.34 lb/gal

Max. Recorded Temp. 186°F

E. Estimated Cement Top ---

Time Well Ready R.O.A.

Time Logger on Bottom 09:00

Equipment Number HD-324

Location Fort Lupton, CO

Recorded By C. Bryan

Witnessed By John McCarthy

Run Number

Bit From To

Size To Size Weight From To

Size (in) Wgt (lbs/ft) Grade Top Bottom

Surface Casing 9 5/8 36 J-55 Surface 1875 FT

Intermediate #1 7 26 HCP-110 Surface 5893 FT

Intermediate #2 5 8 4 1/2 --- 5675 FT 5701 FT

Liner 4 1/2 11.6 HCP-110 5701 FT 13365 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 Casing Tally reported Liner Top at 5675 FT
Adjusted -26 FT to correlate with Liner Top
Desired logging depth was originally from as deep as possible to Surface
Log ran from 5919 FT to Surface due to tools stacking out repeatedly at 5916 FT
Log ran with 2800 PSI Surface Induced Pressure
Verifications Passes performed on 19-FEB-18 to verify anomaly was not repeatable
Logging tools were clean and free of debris upon completion of operations

Thank you for choosing Reliance Oilfield Services, LLC!!

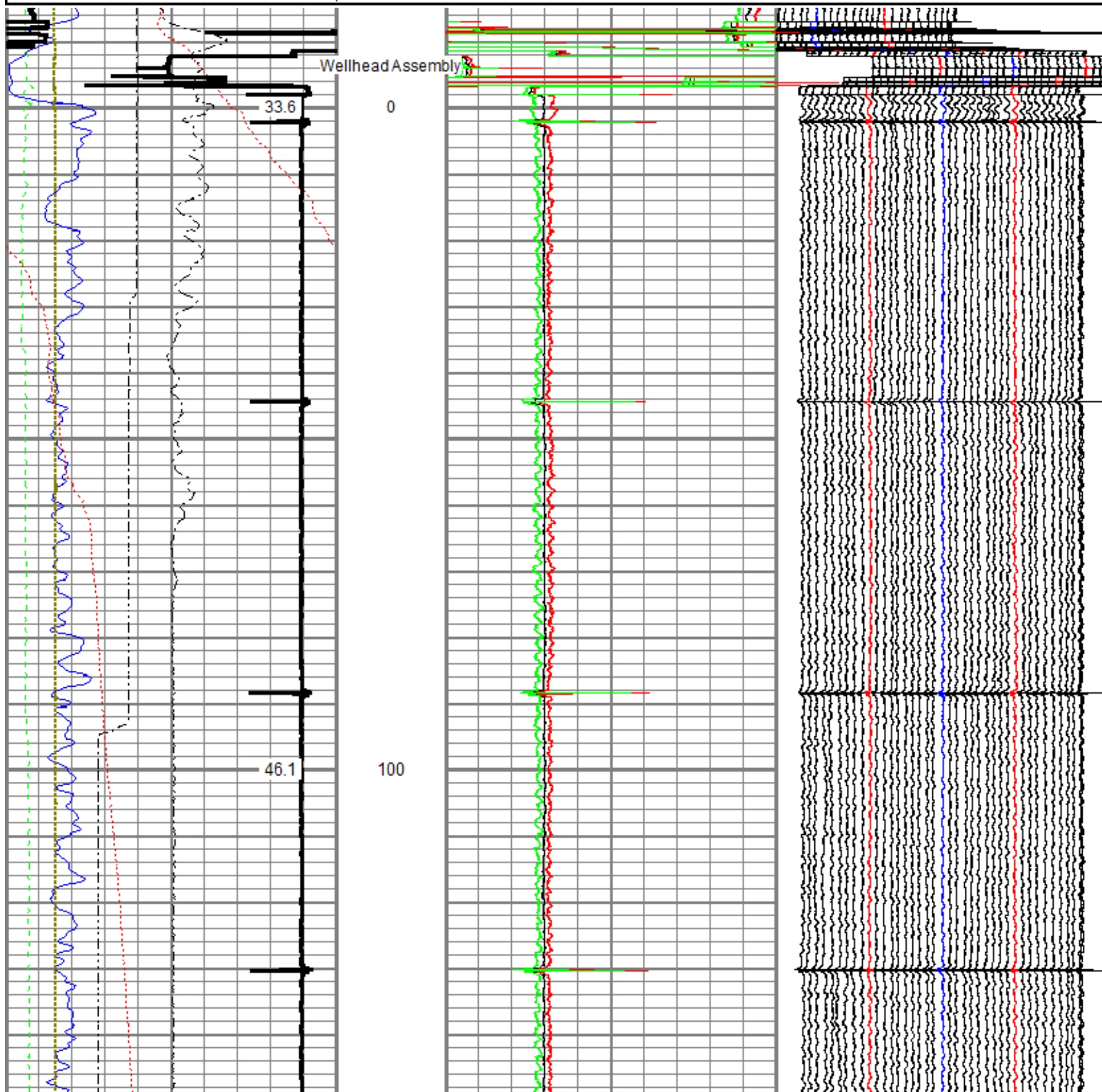
Main Pass

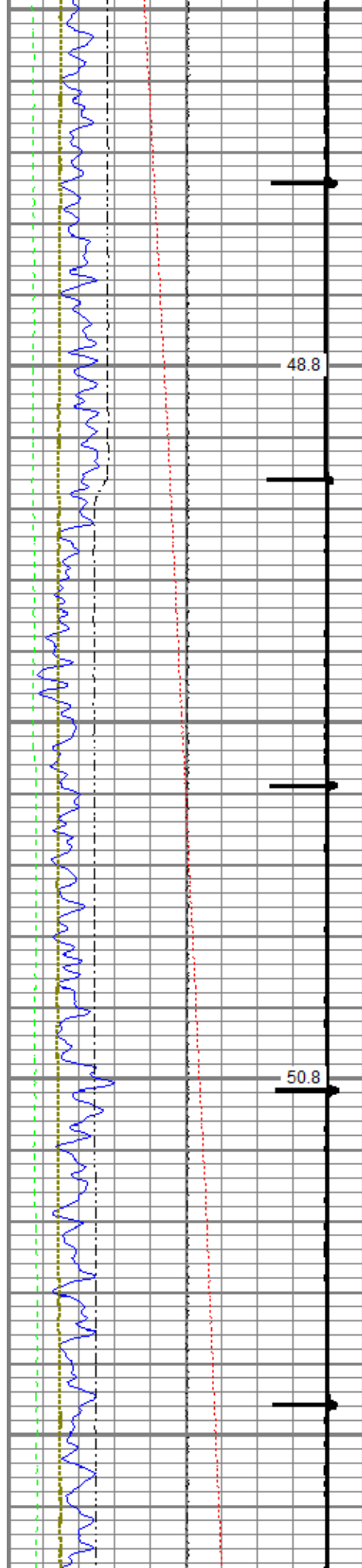


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Dataset Pathname	main.7
Presentation Format	ros_70mit40sx
Dataset Creation	Tue Feb 20 13:13:17 2018
Charted by	Depth in Feet scaled 1:240

0	Gamma Ray (GAPI)	120
-100	Line Speed (ft/min)	100
-10	Deviation (deg)	90
0	Line Tension (lb)	2000
-2	Differential Temperature (degF)	2
0	Temperature (degF)	20
Casing Collar Locator		

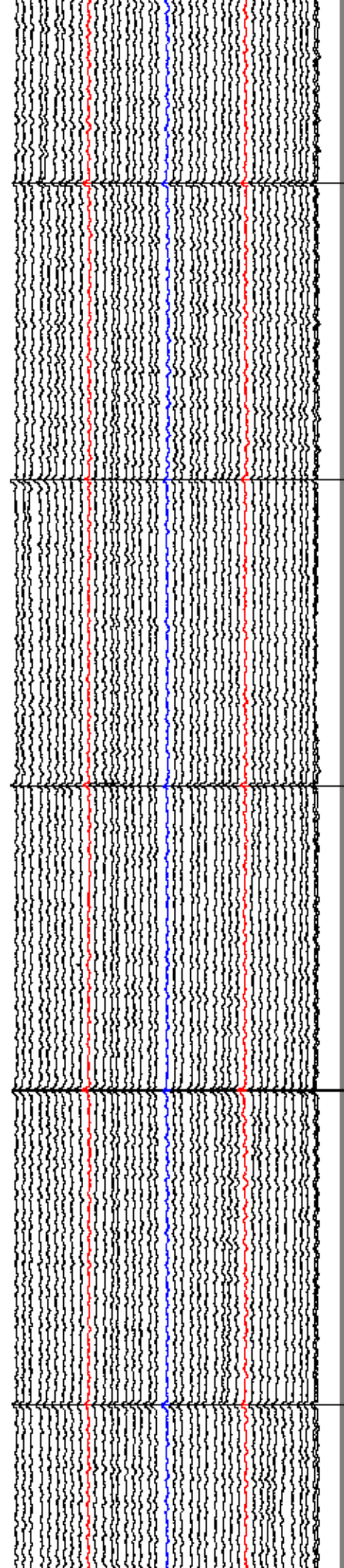
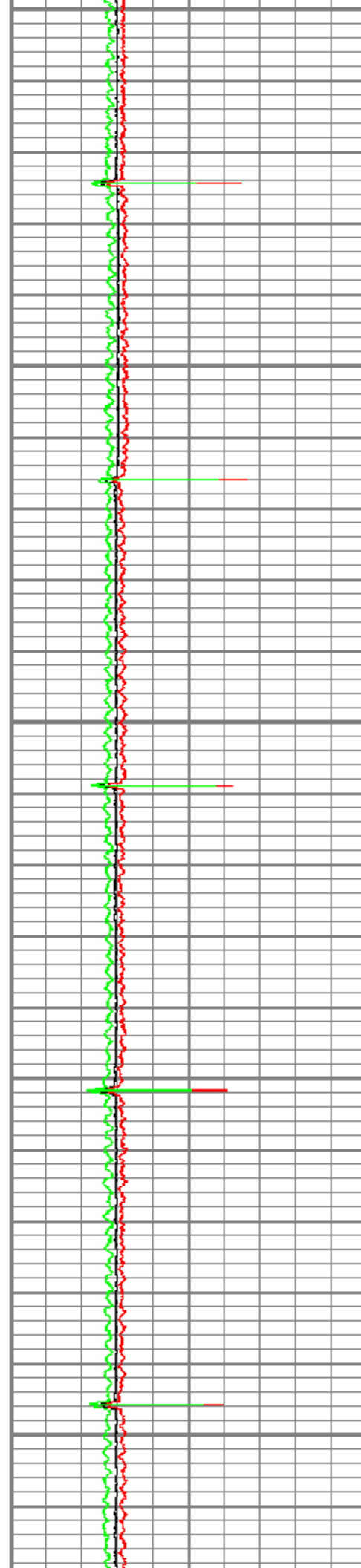
6	Average Diameter (in)	7	Caliper #10
6	Maximum Diameter (in)	7	Caliper #20
6	Minimum Diameter (in)	7	Caliper #30

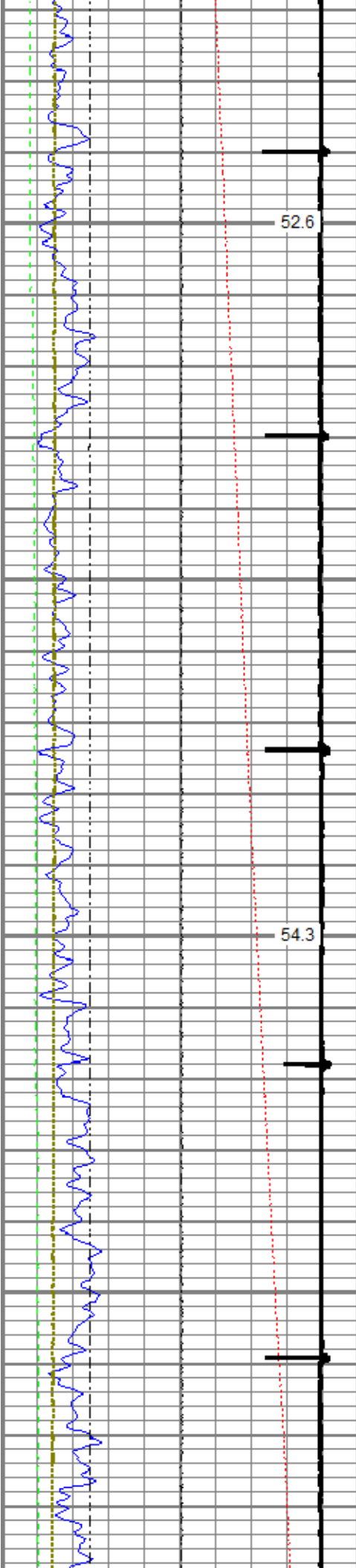




200

300



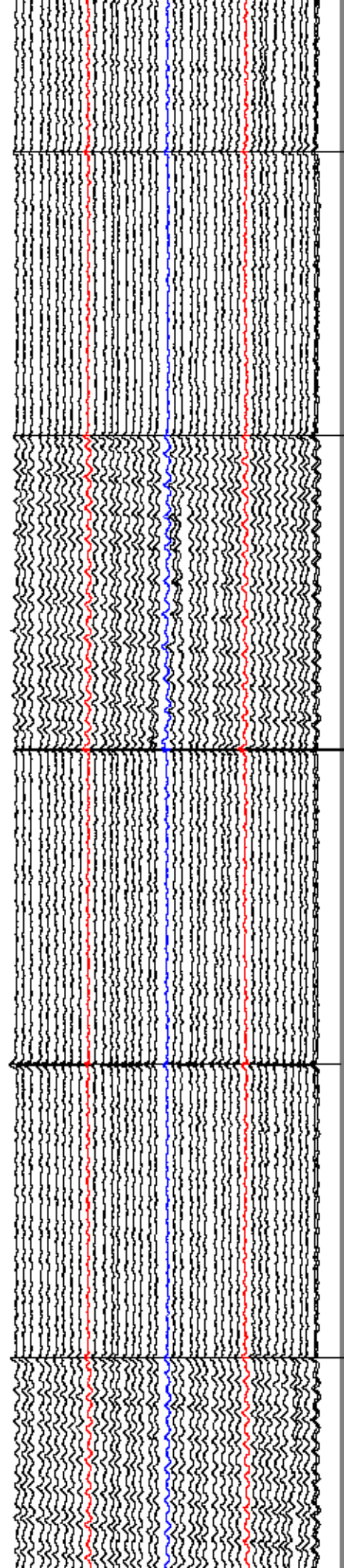
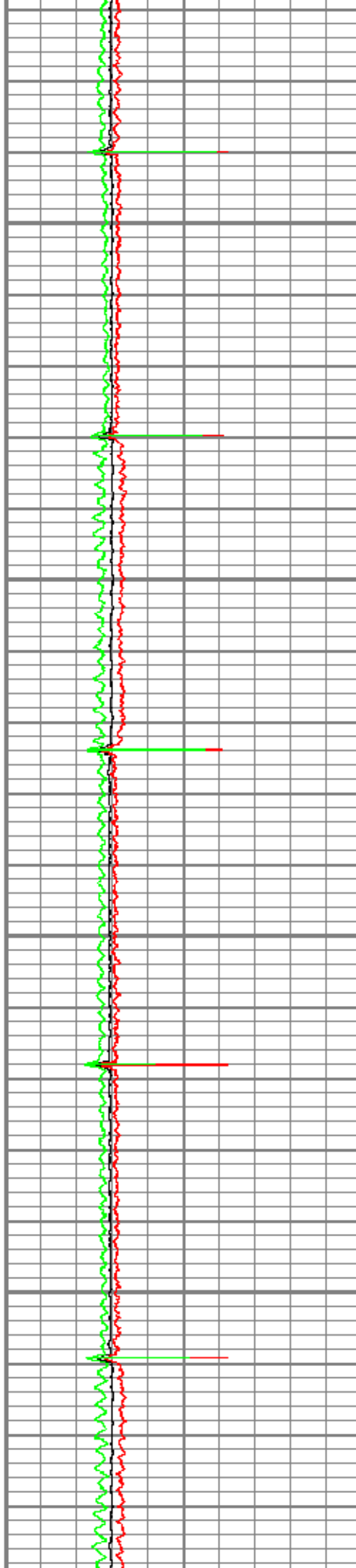


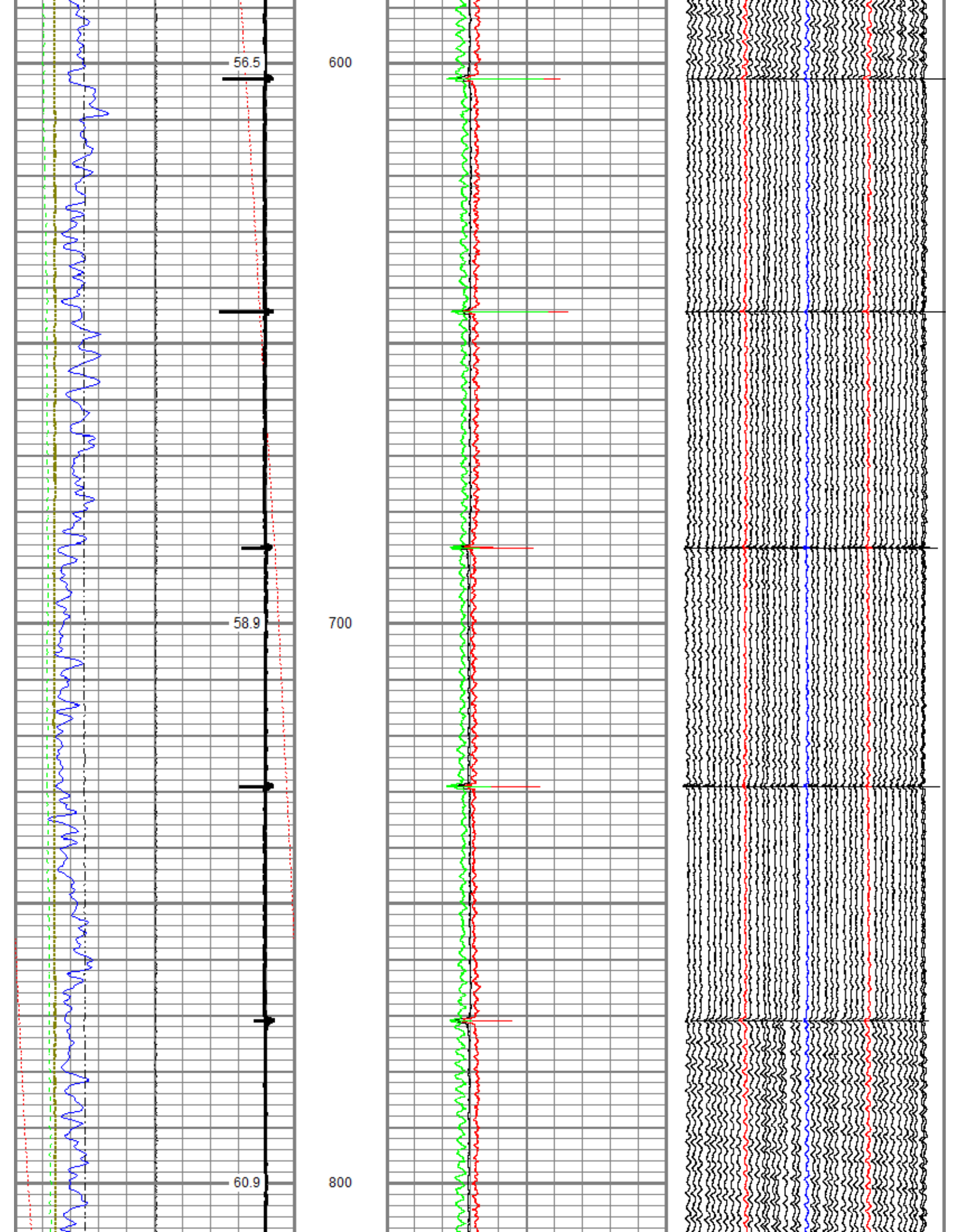
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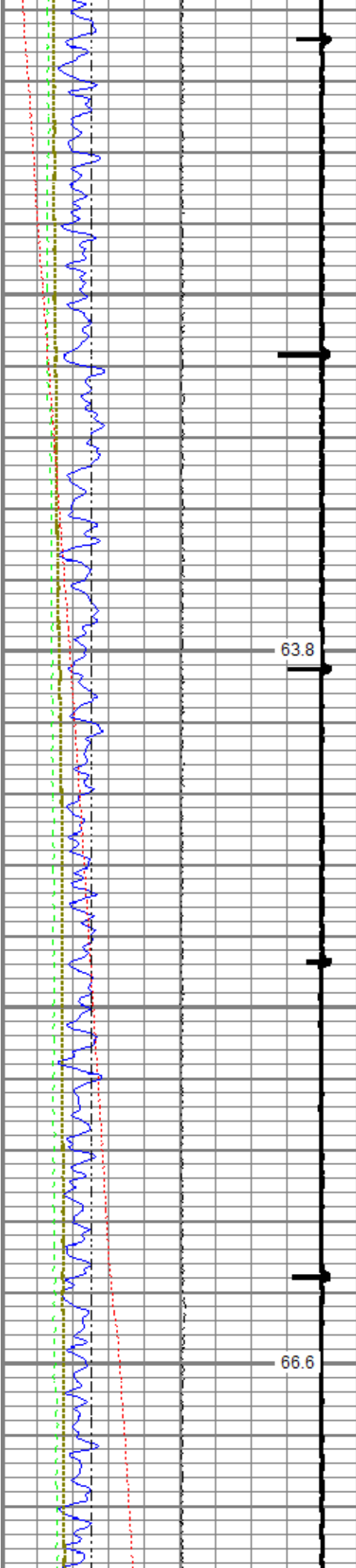
400

54.3

500

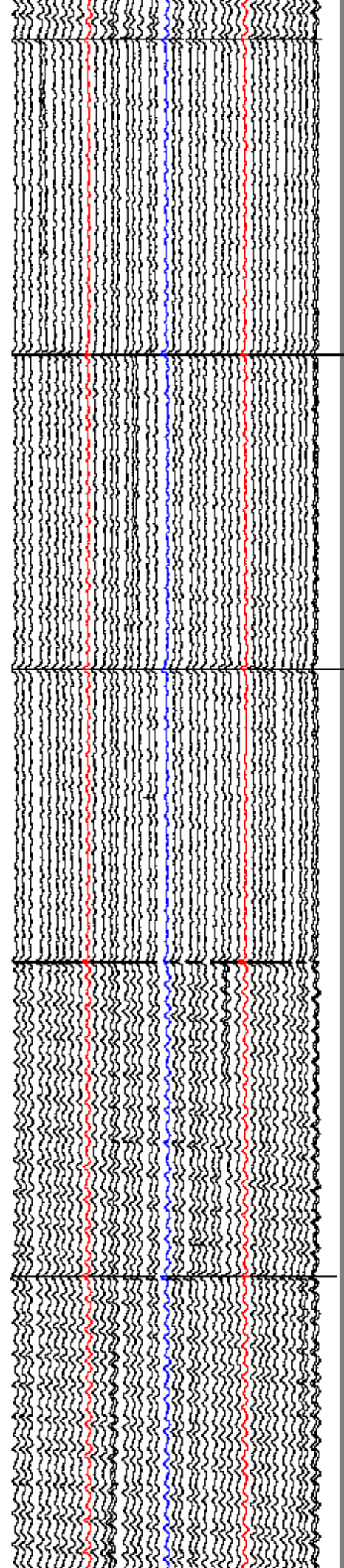
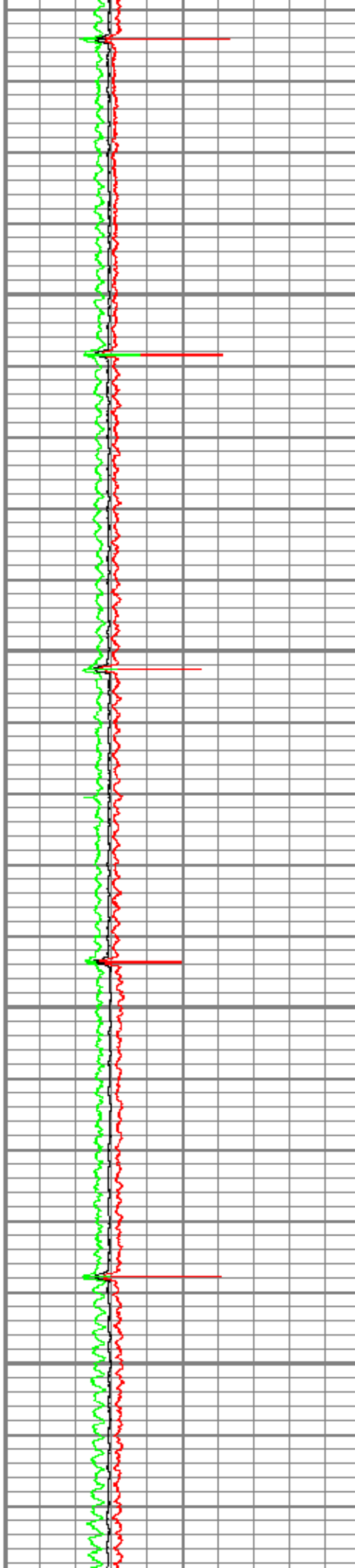


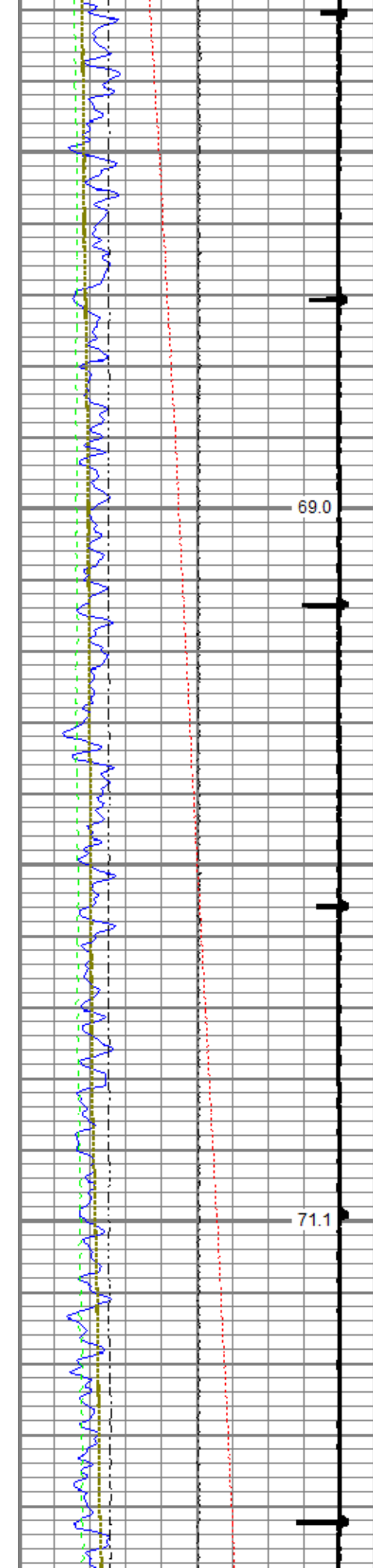




900

1000



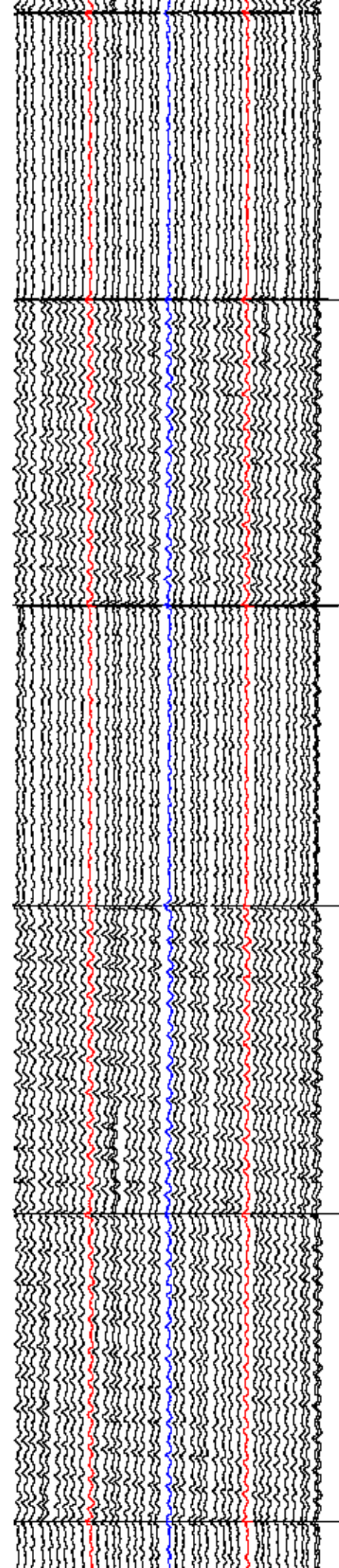
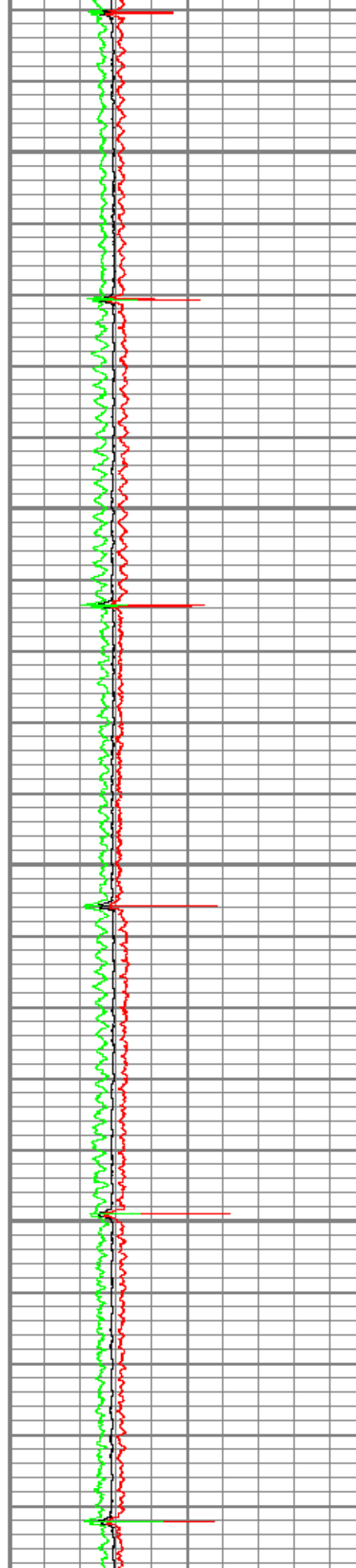


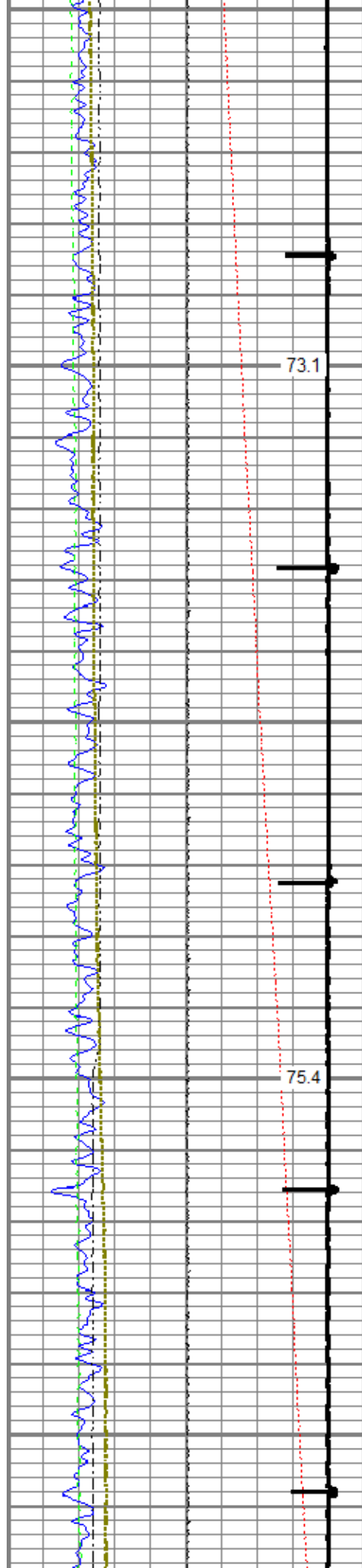
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1100

71.1

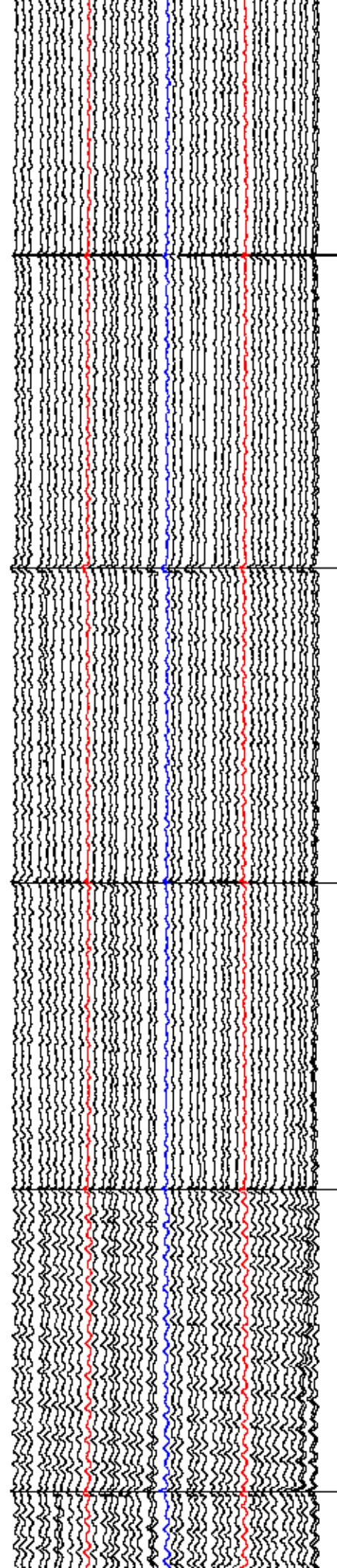
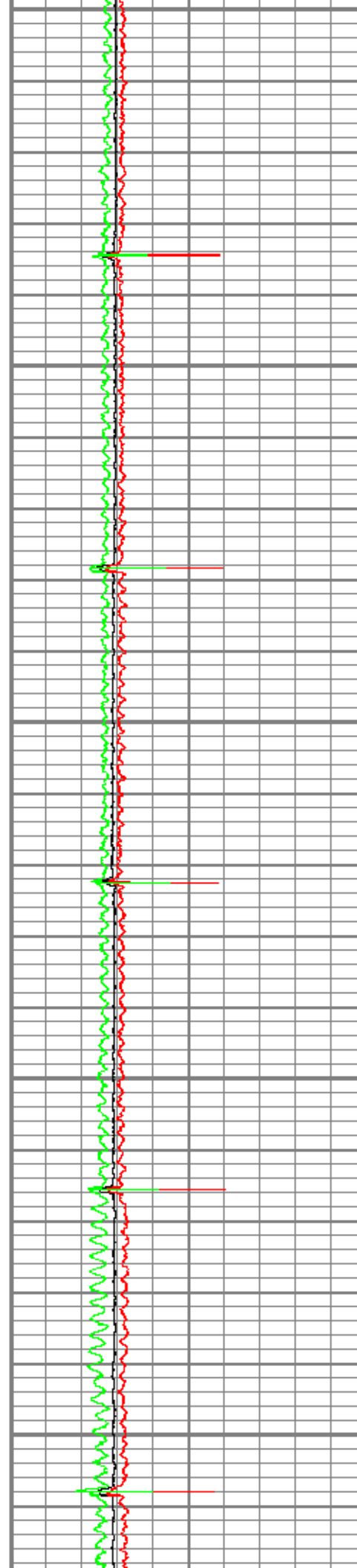
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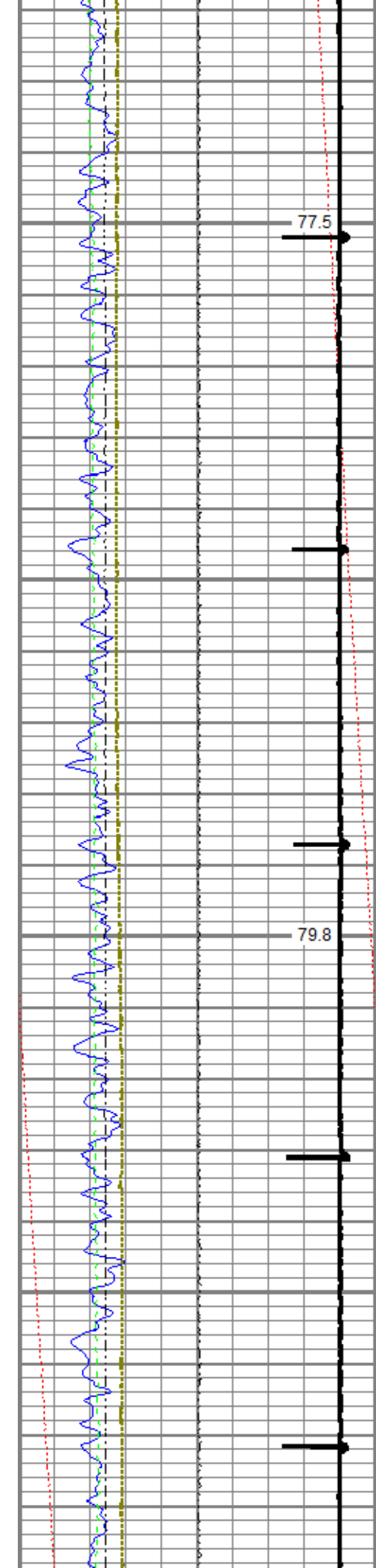




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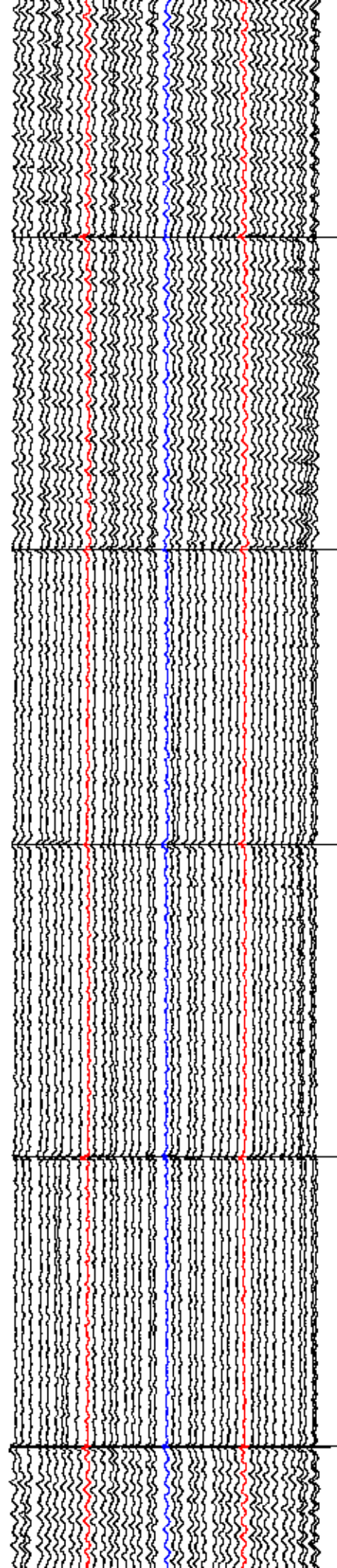
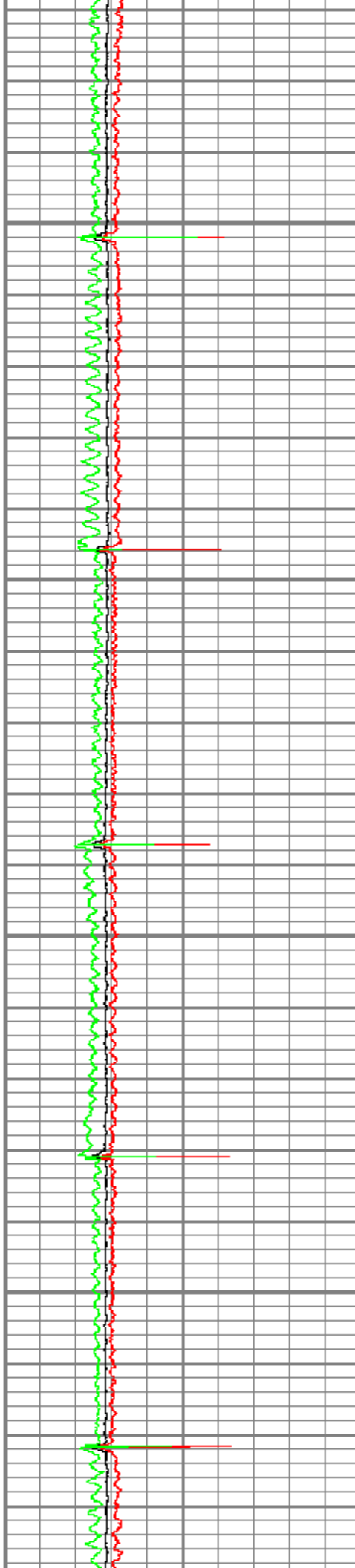
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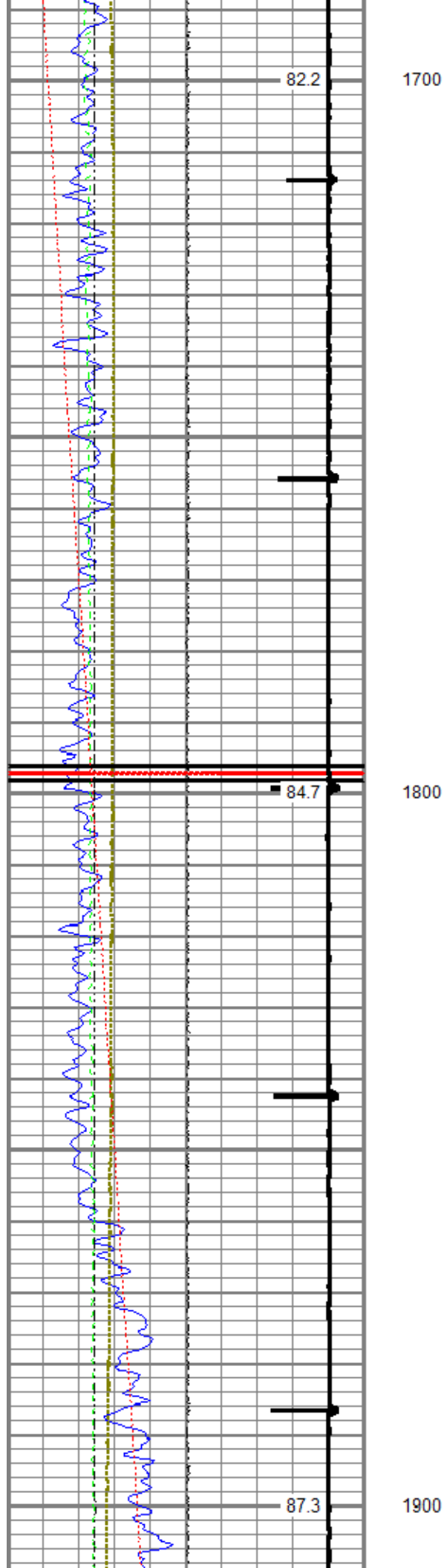




1500

1600

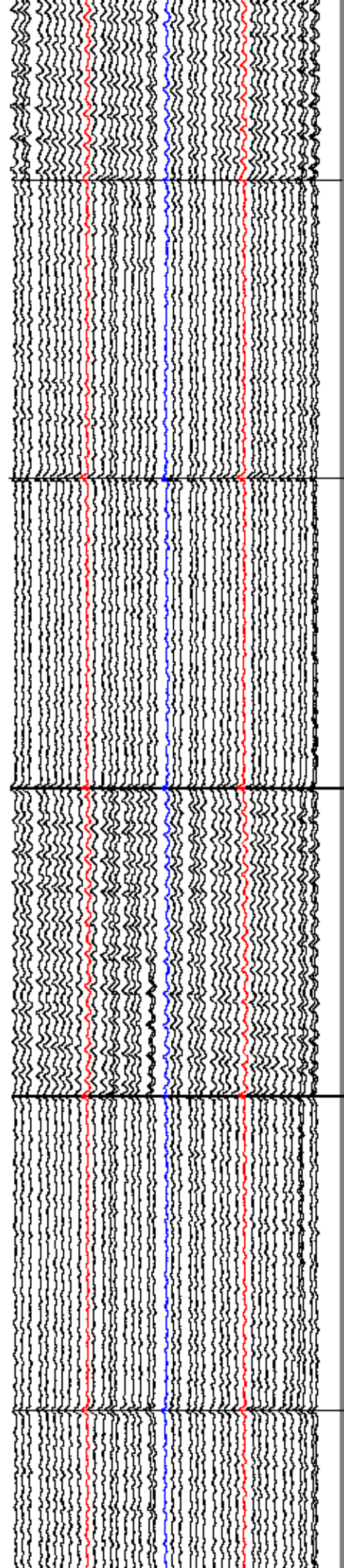
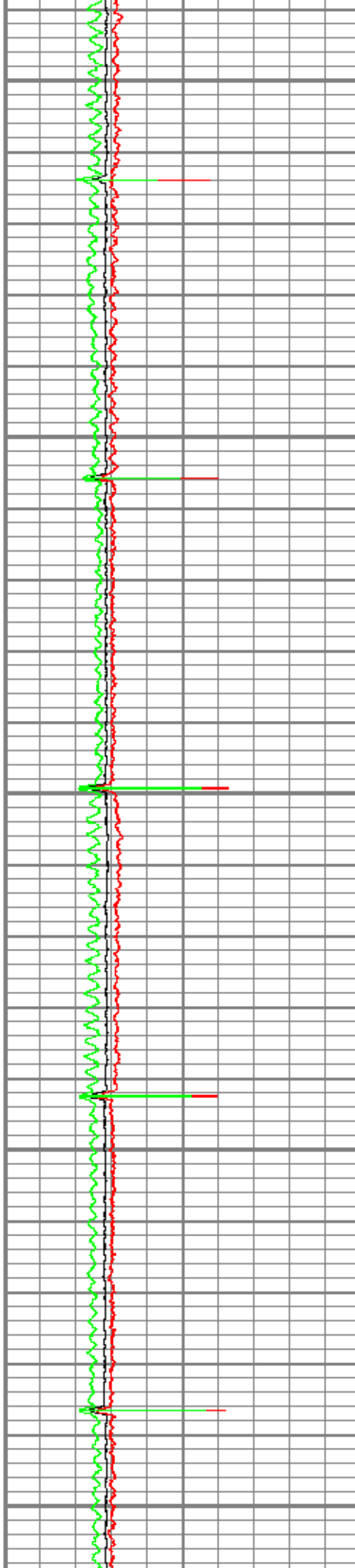


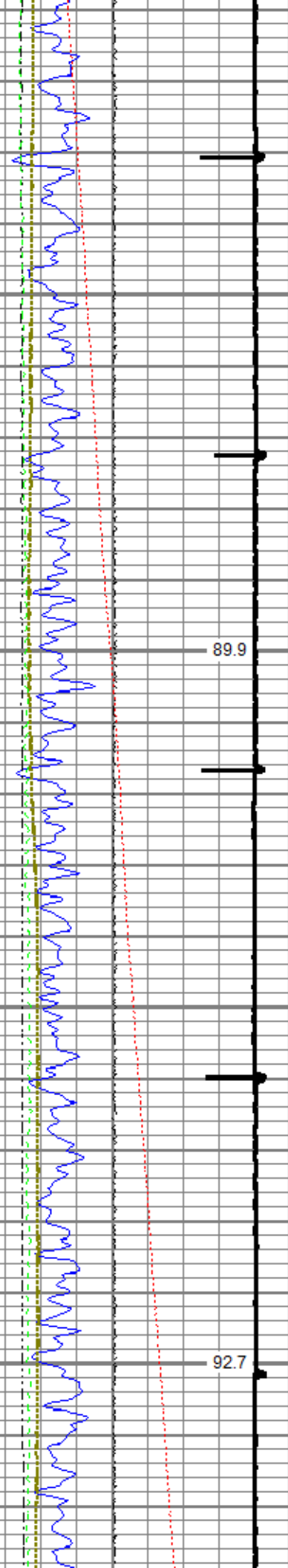


1700

1800

1900



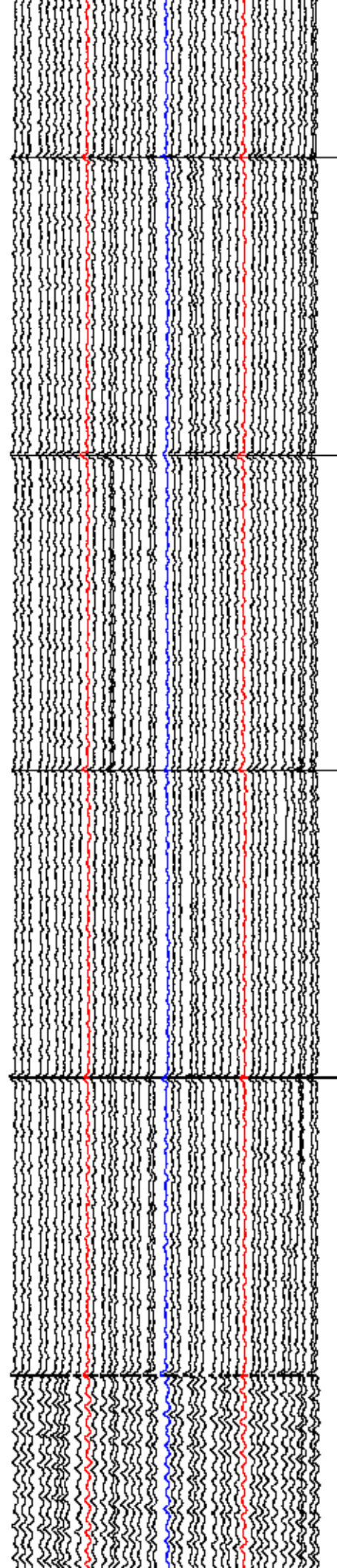
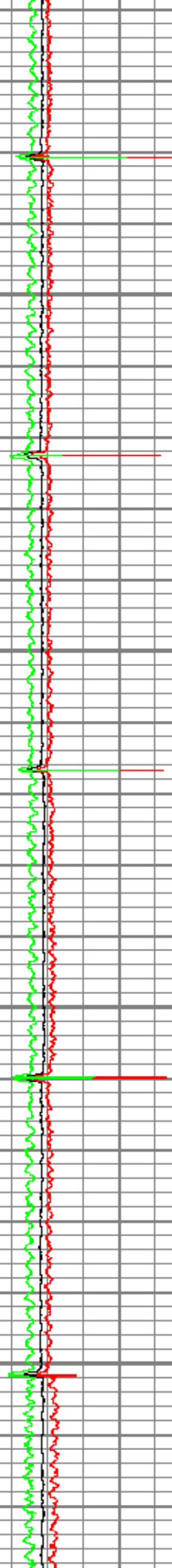


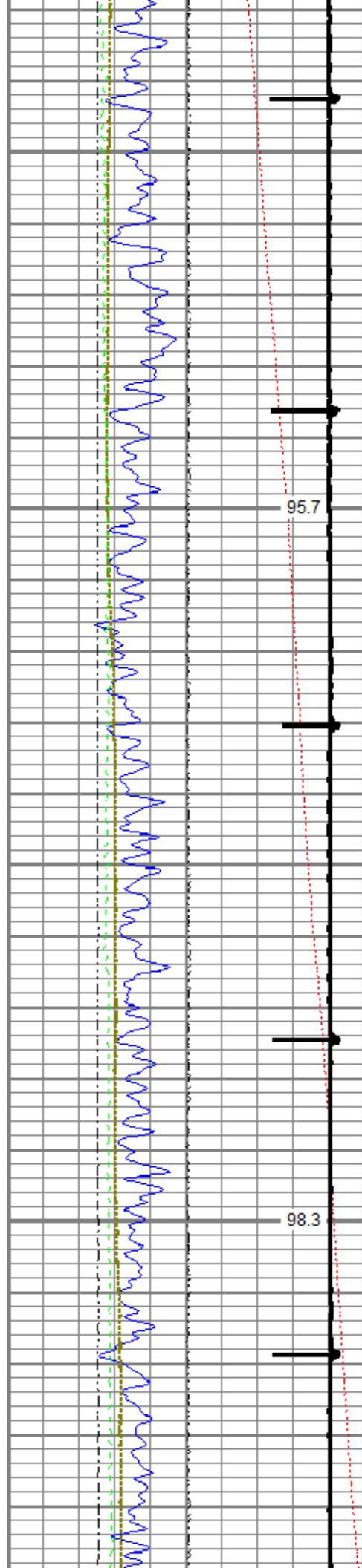
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2000

92.7

2100



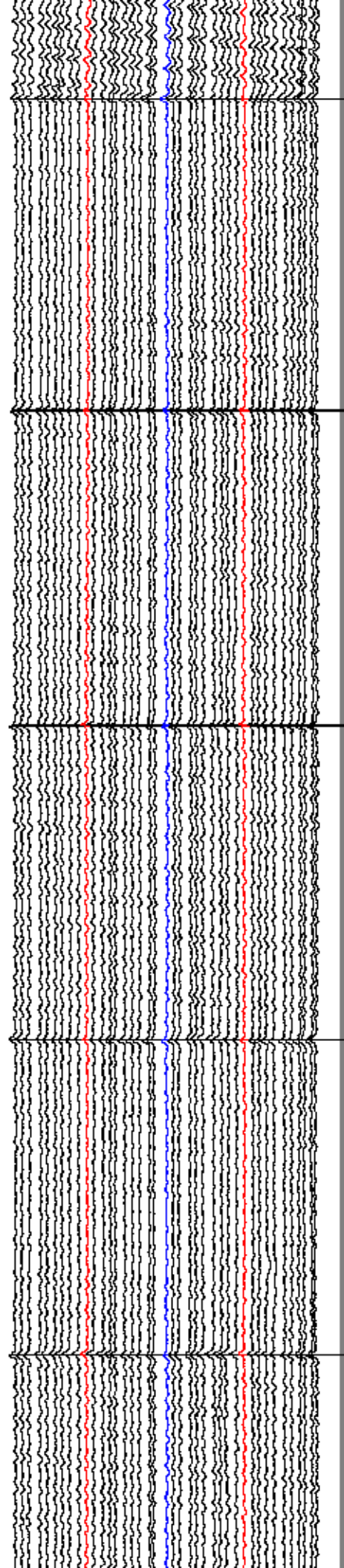
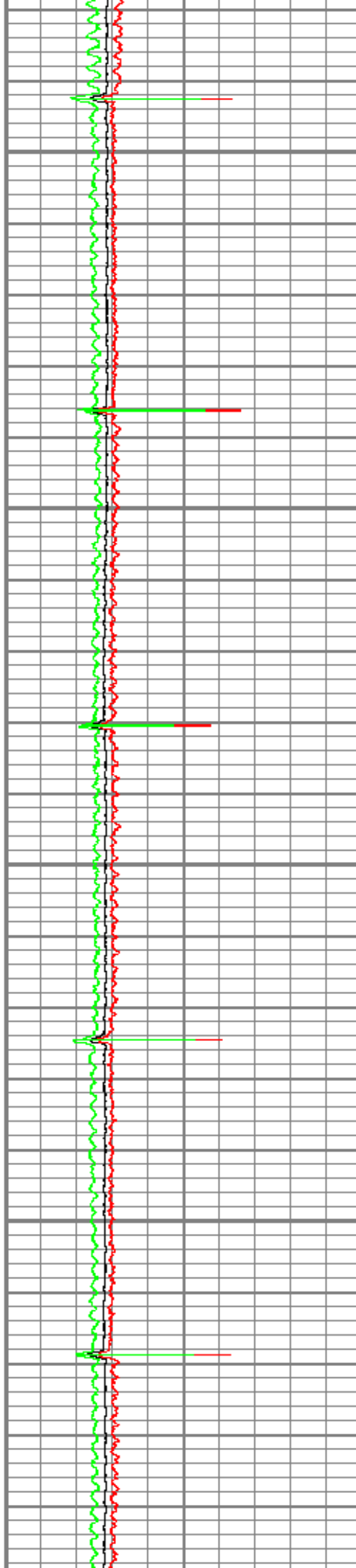


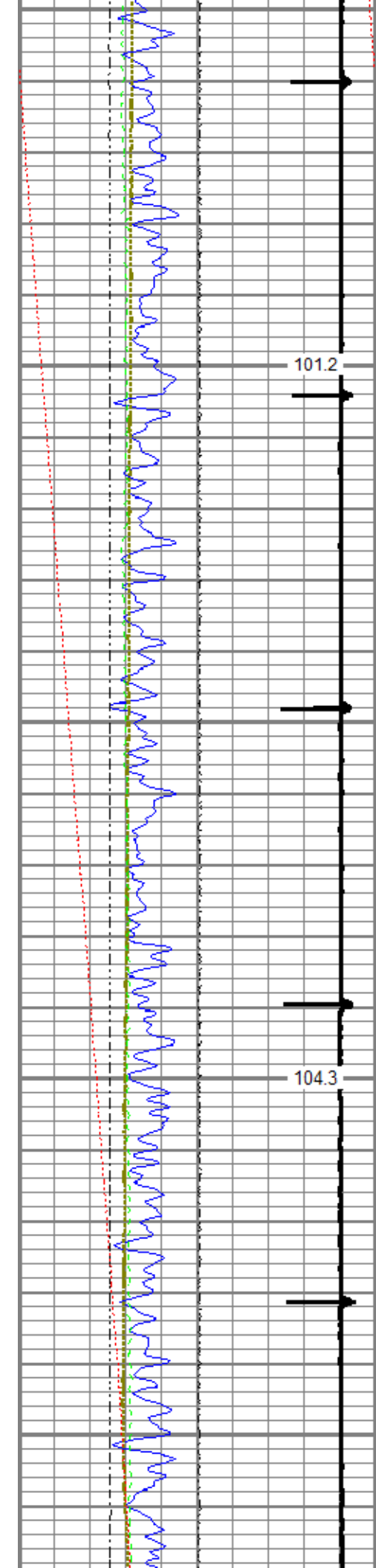
95.7

2200

98.3

2300



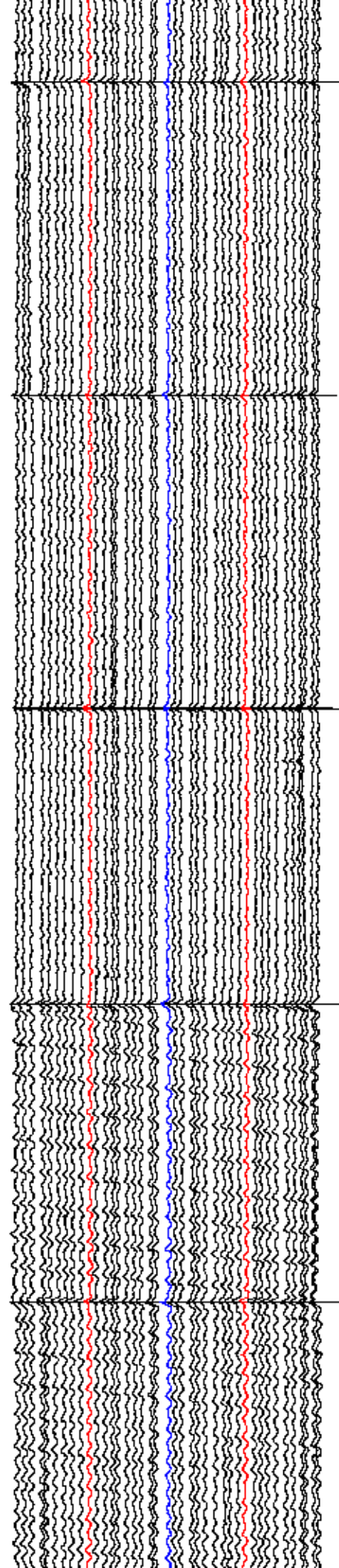
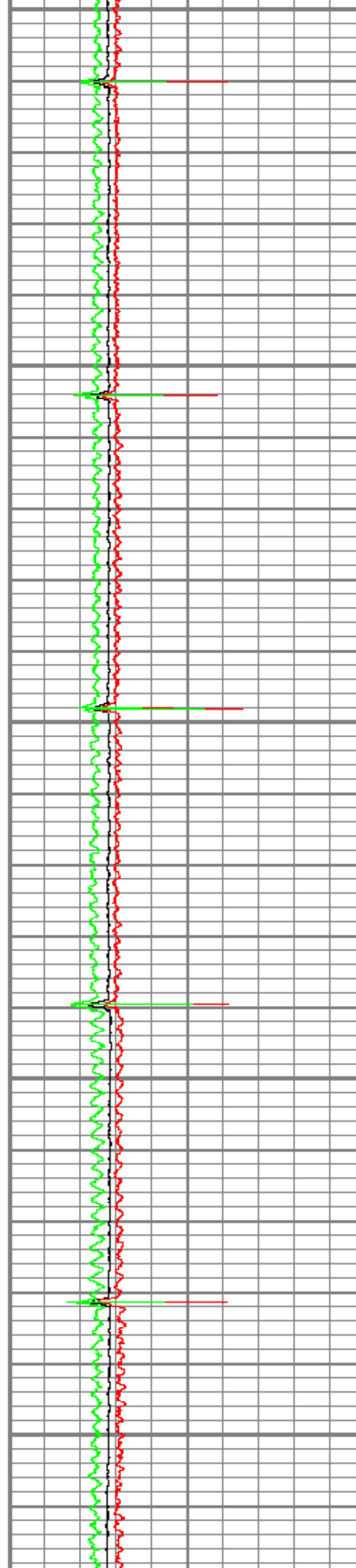


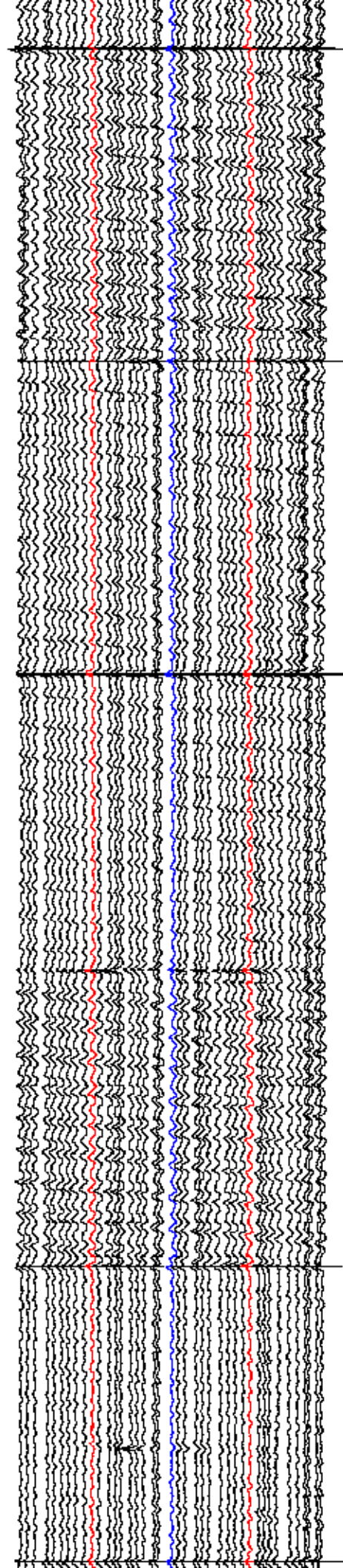
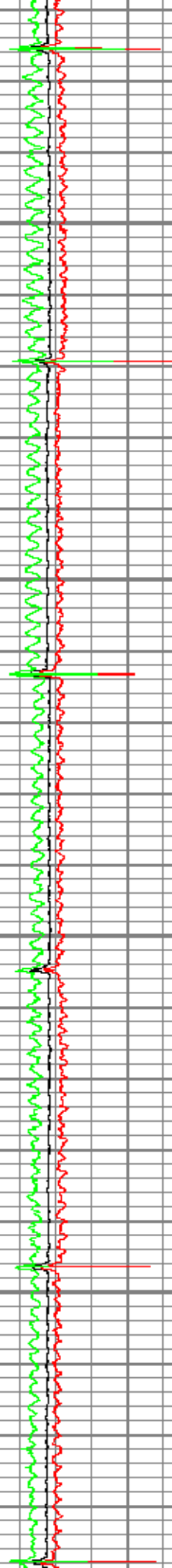
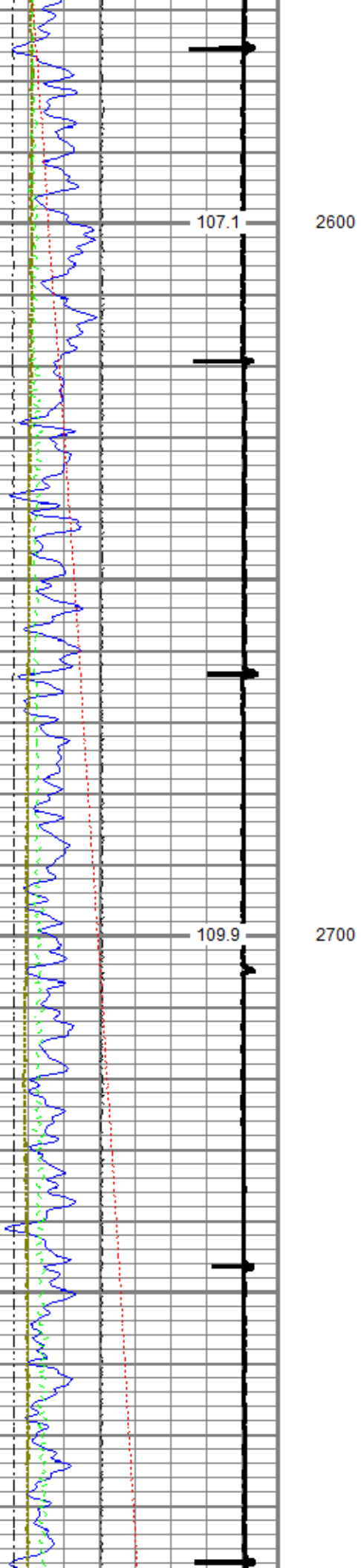
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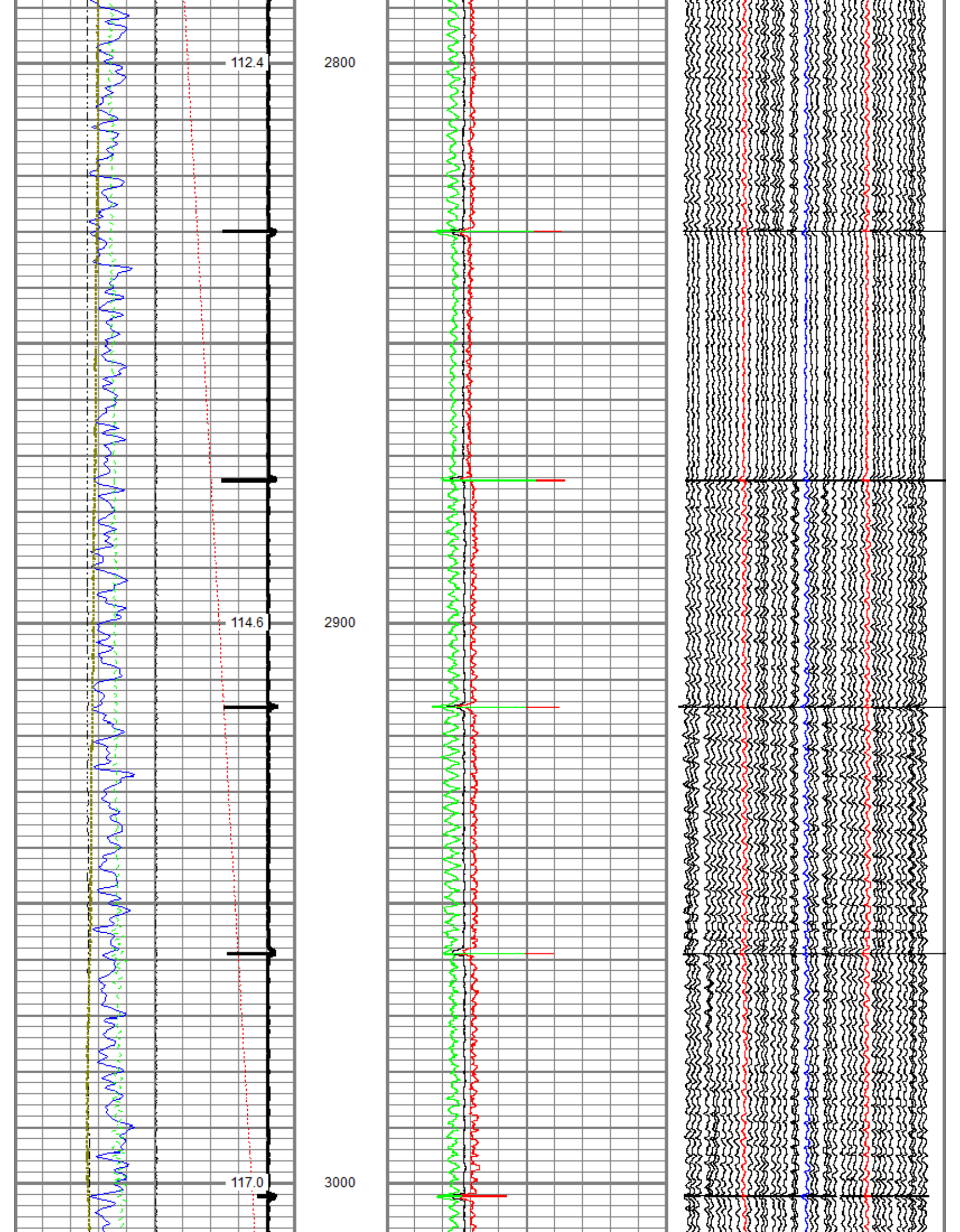
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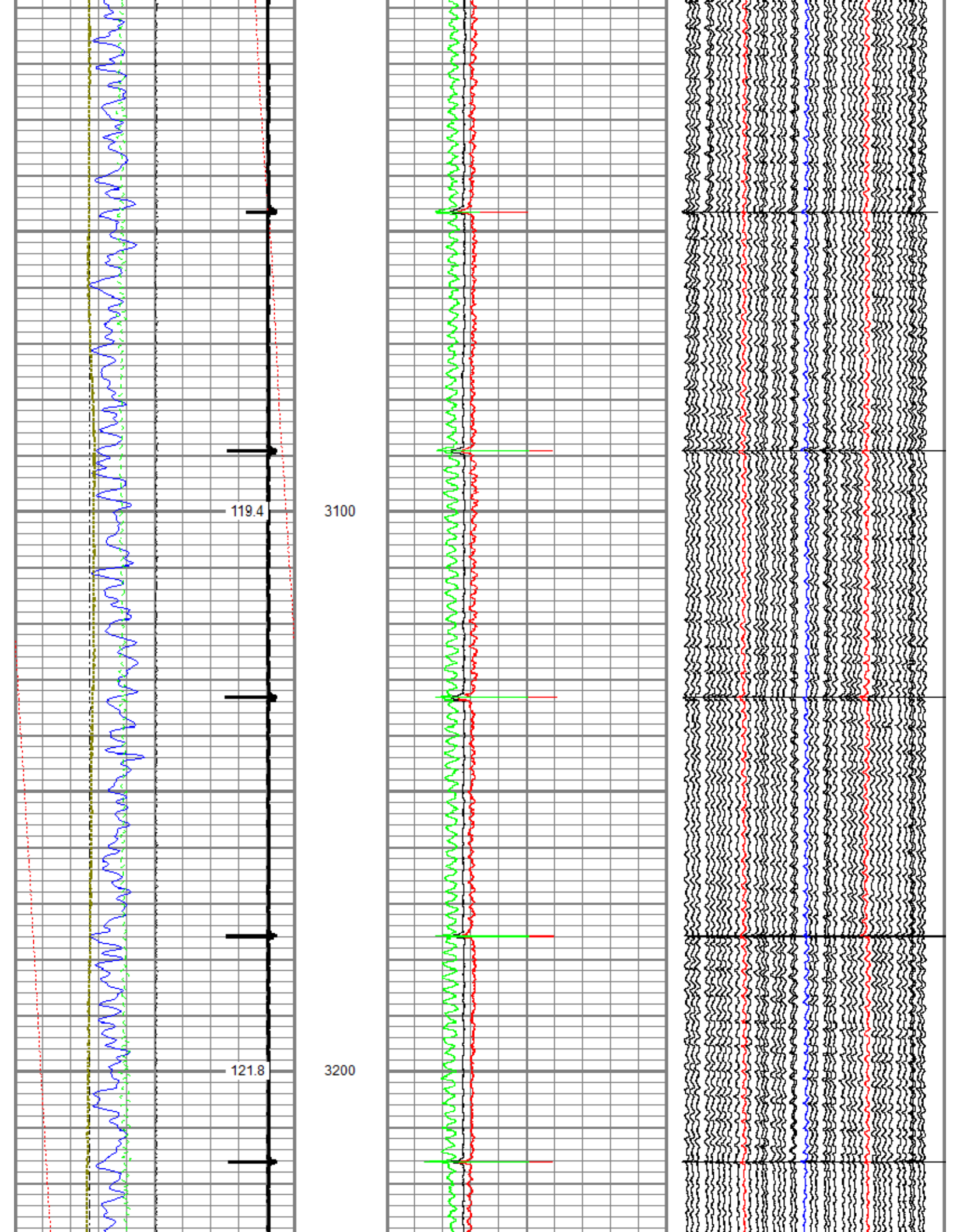
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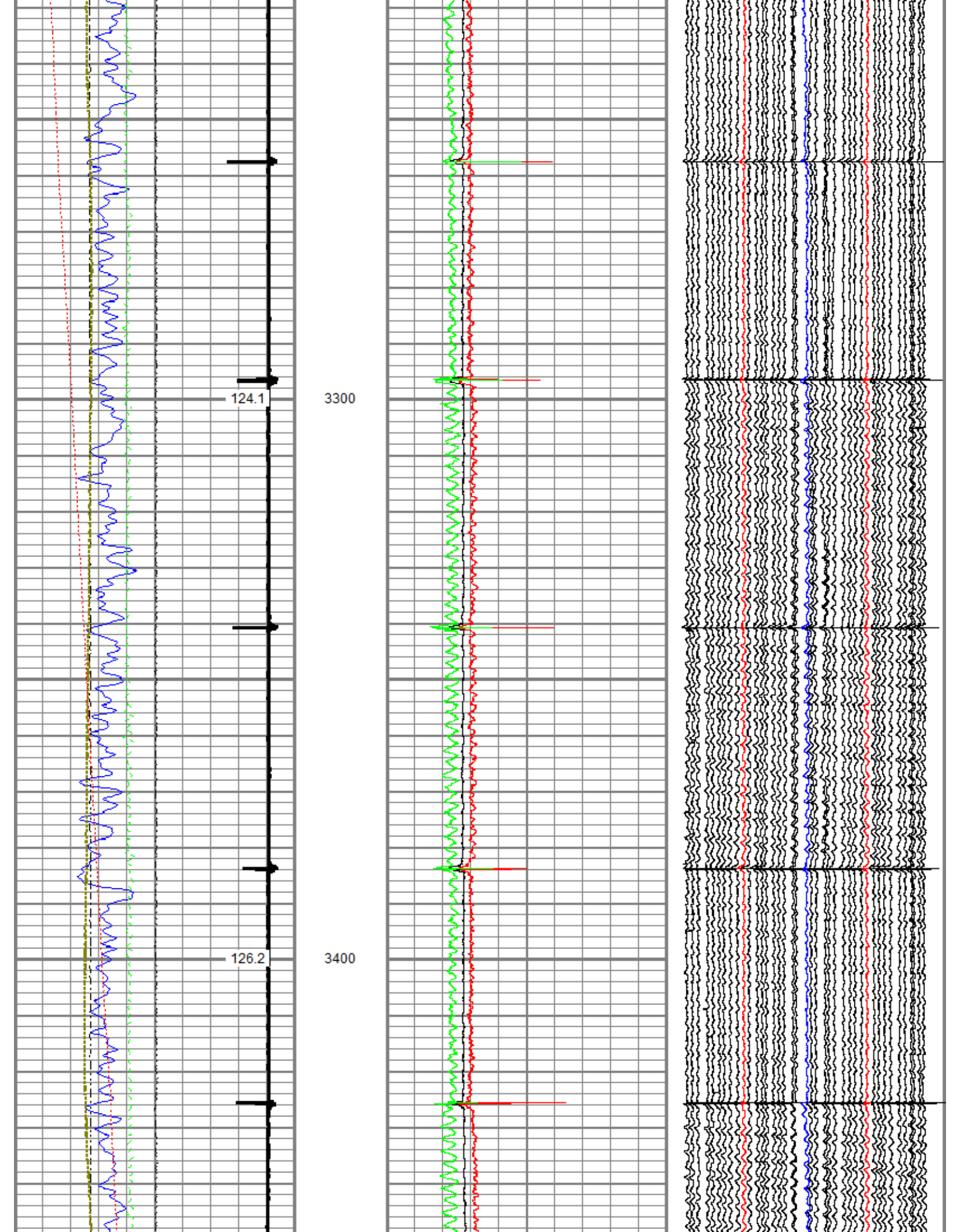
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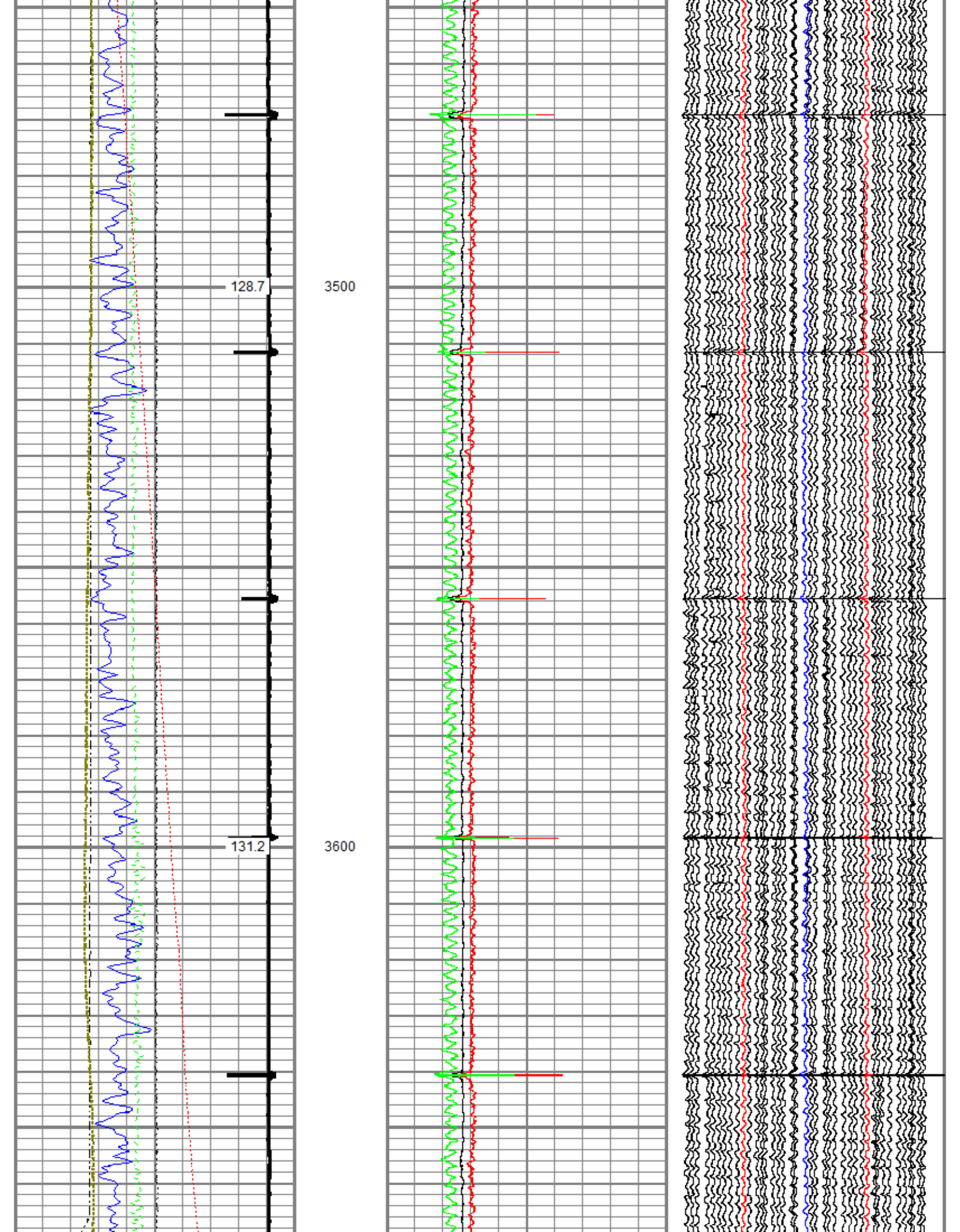


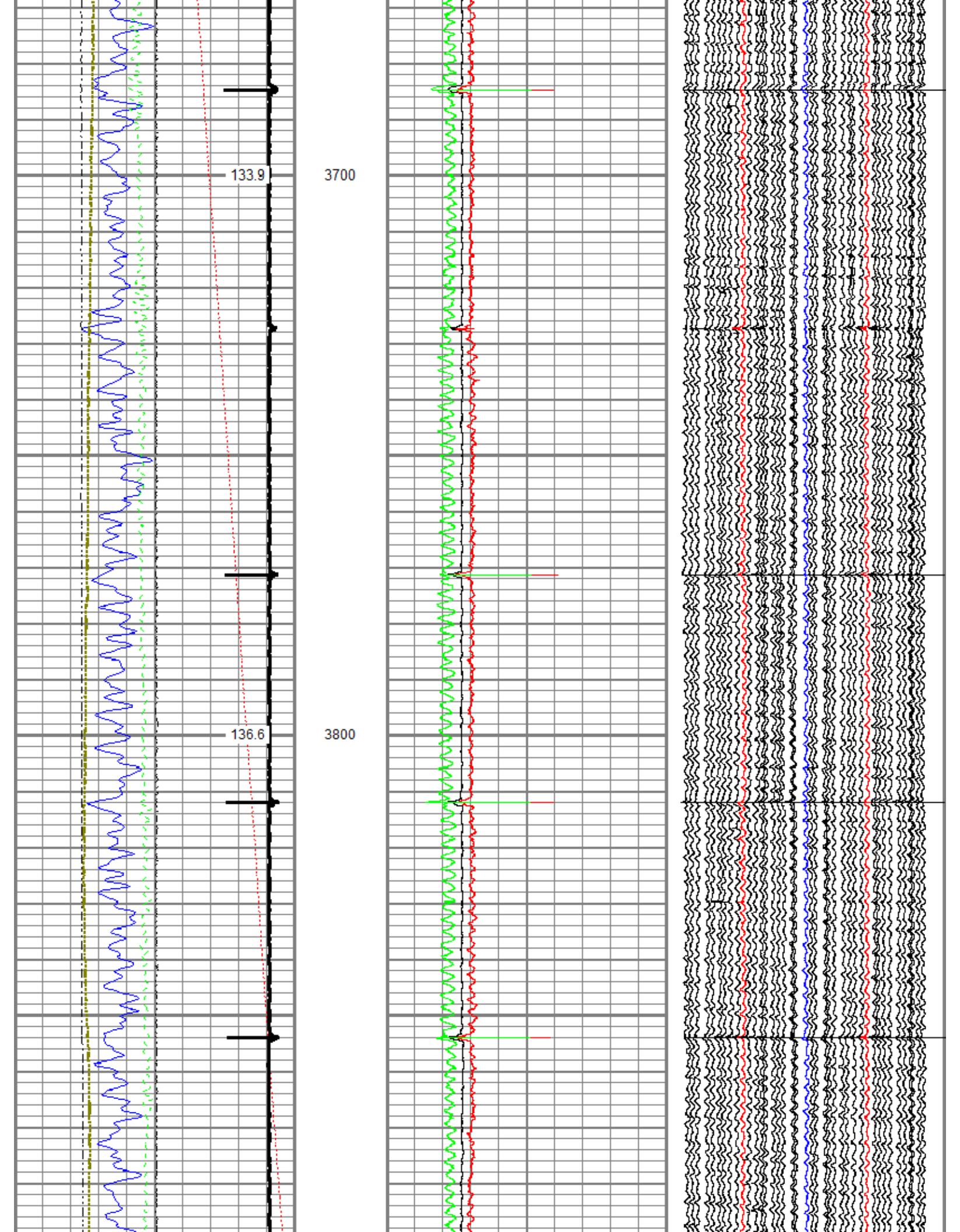


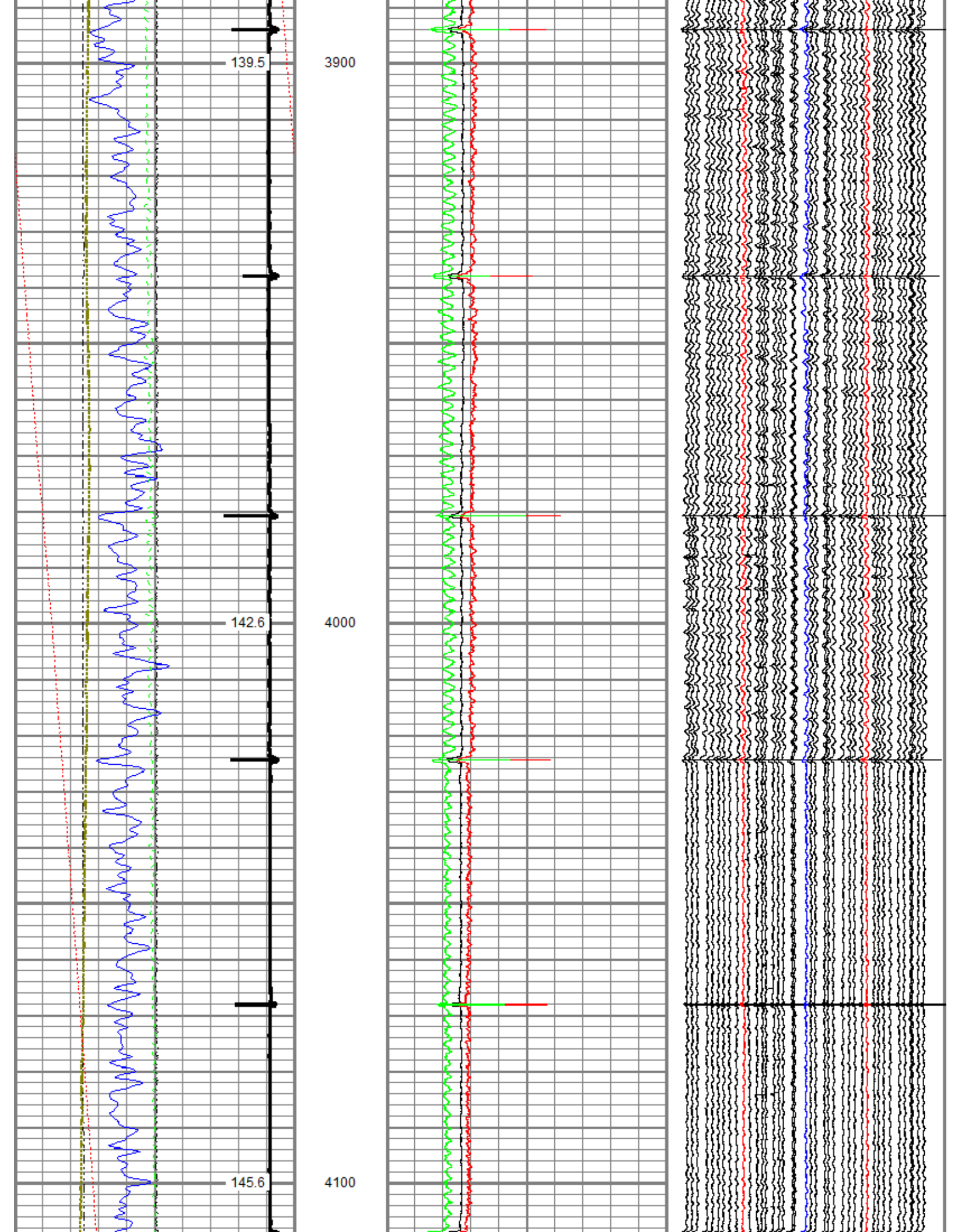


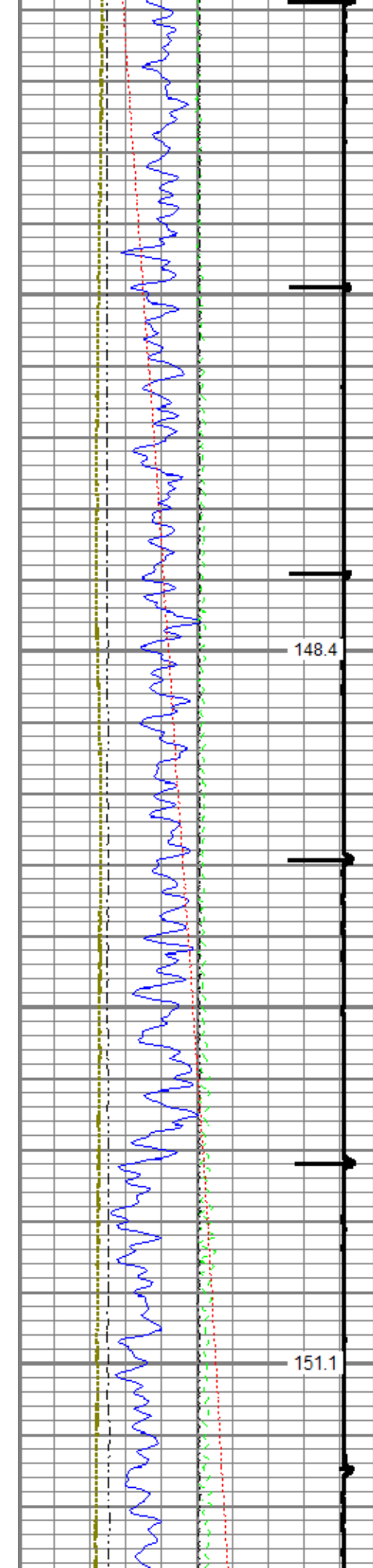






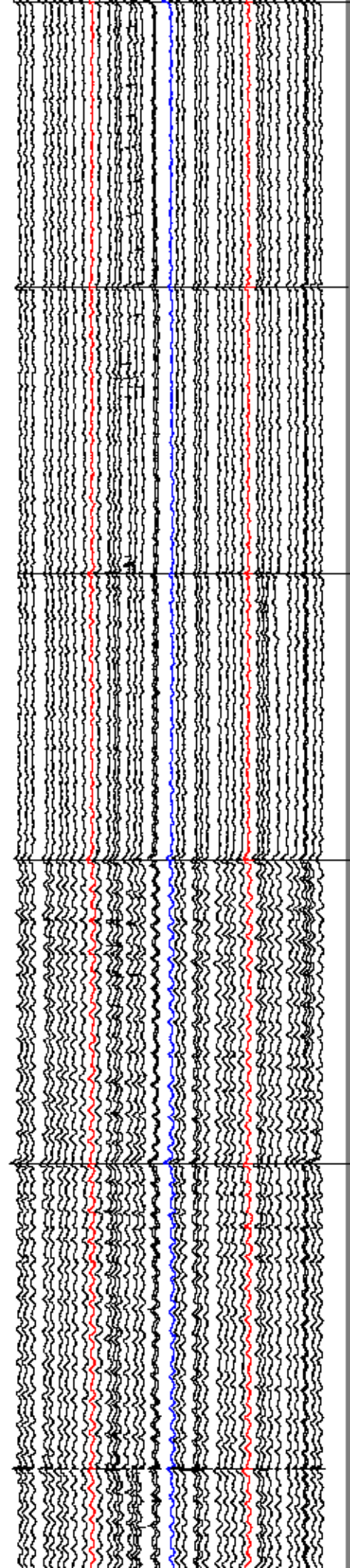
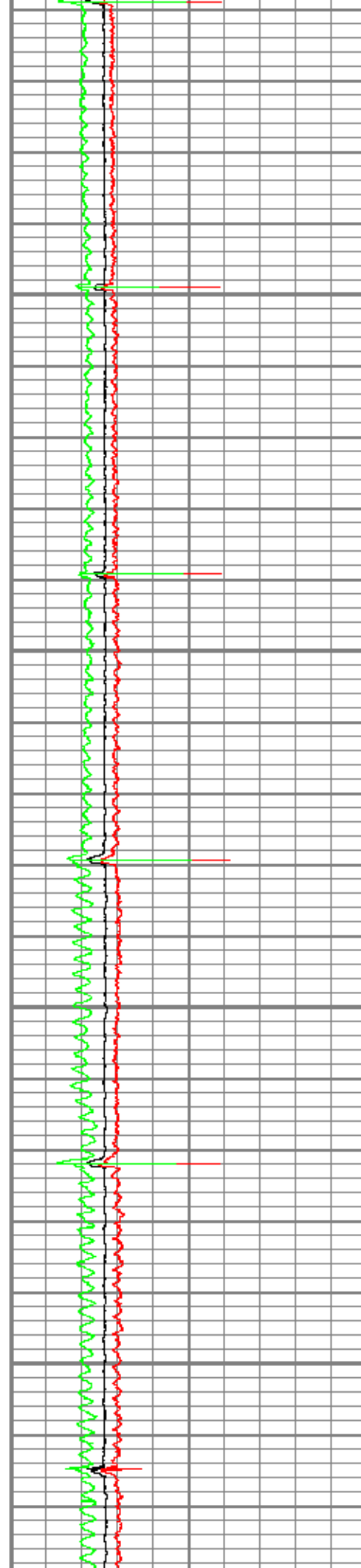


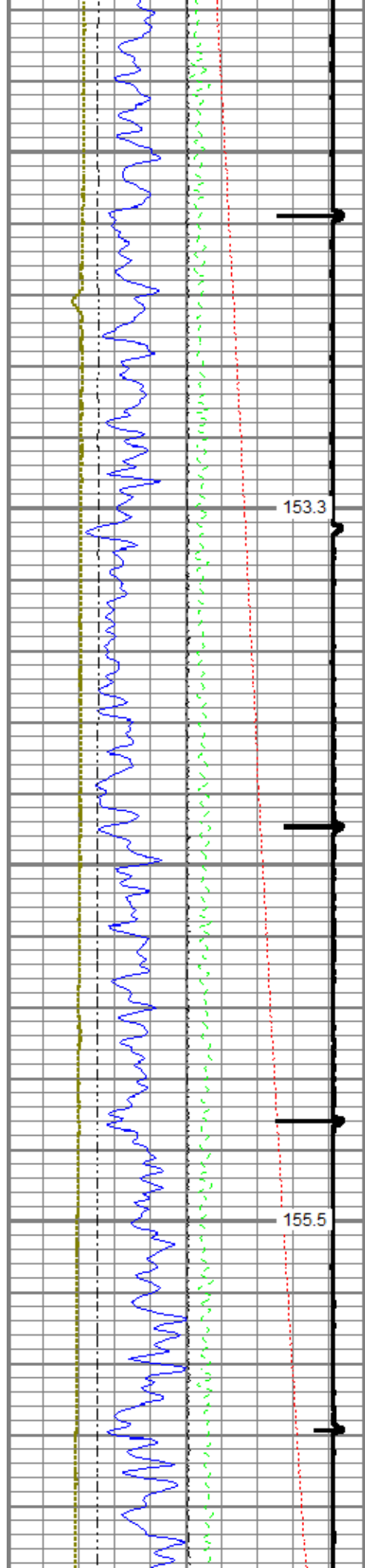




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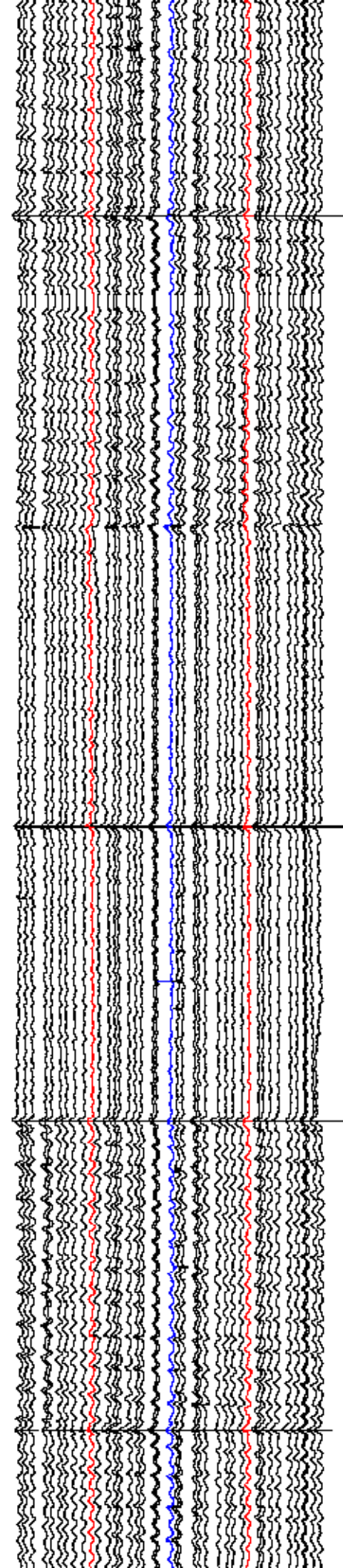
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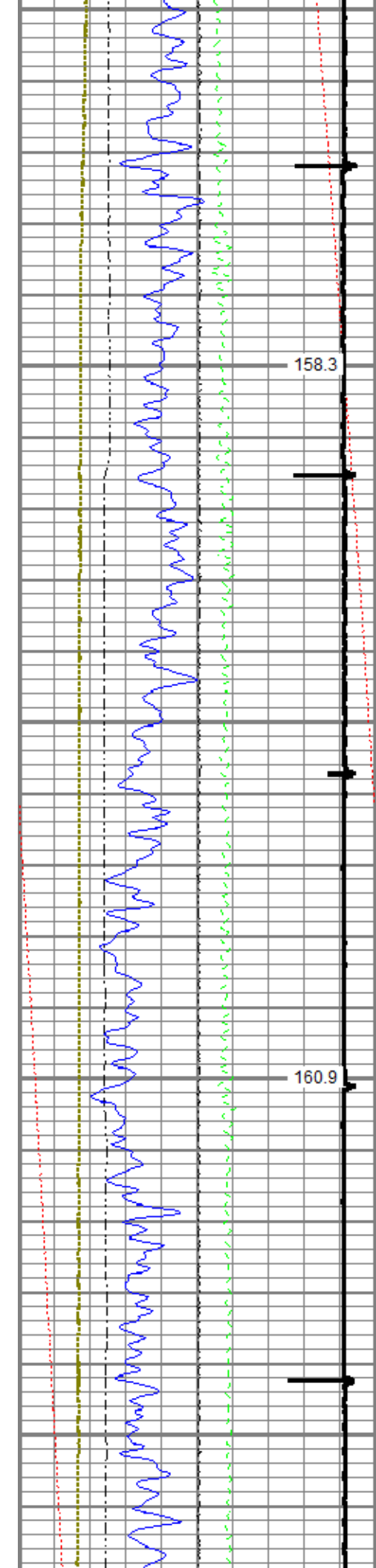




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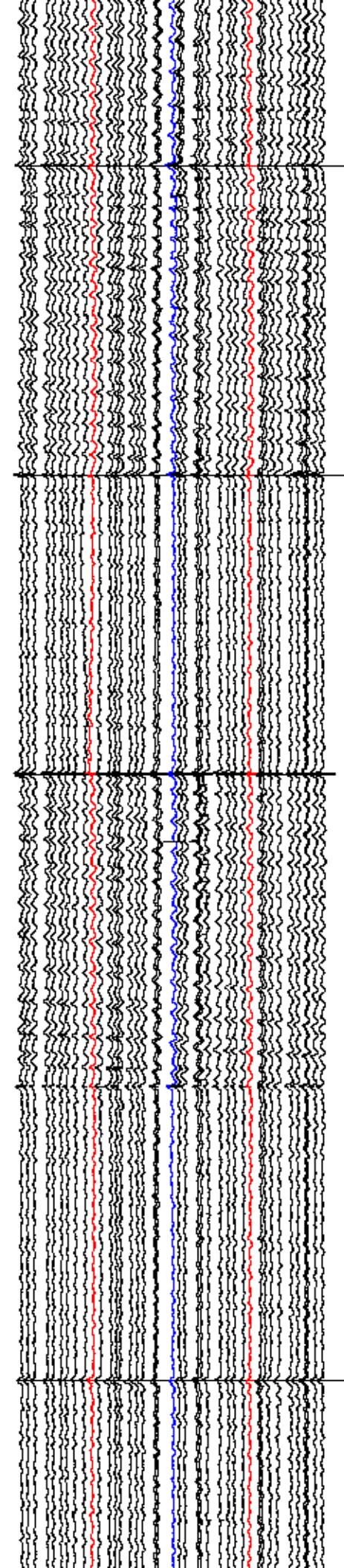
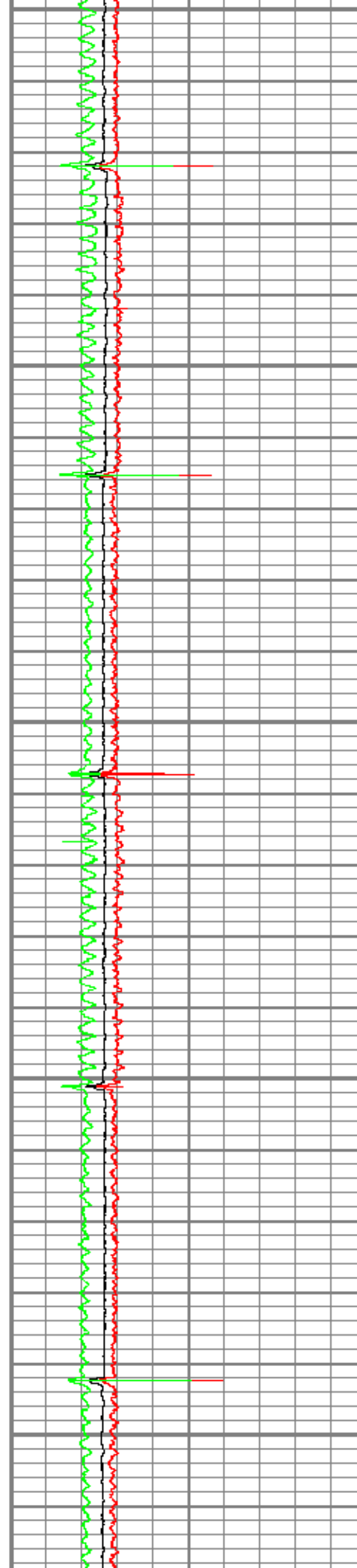
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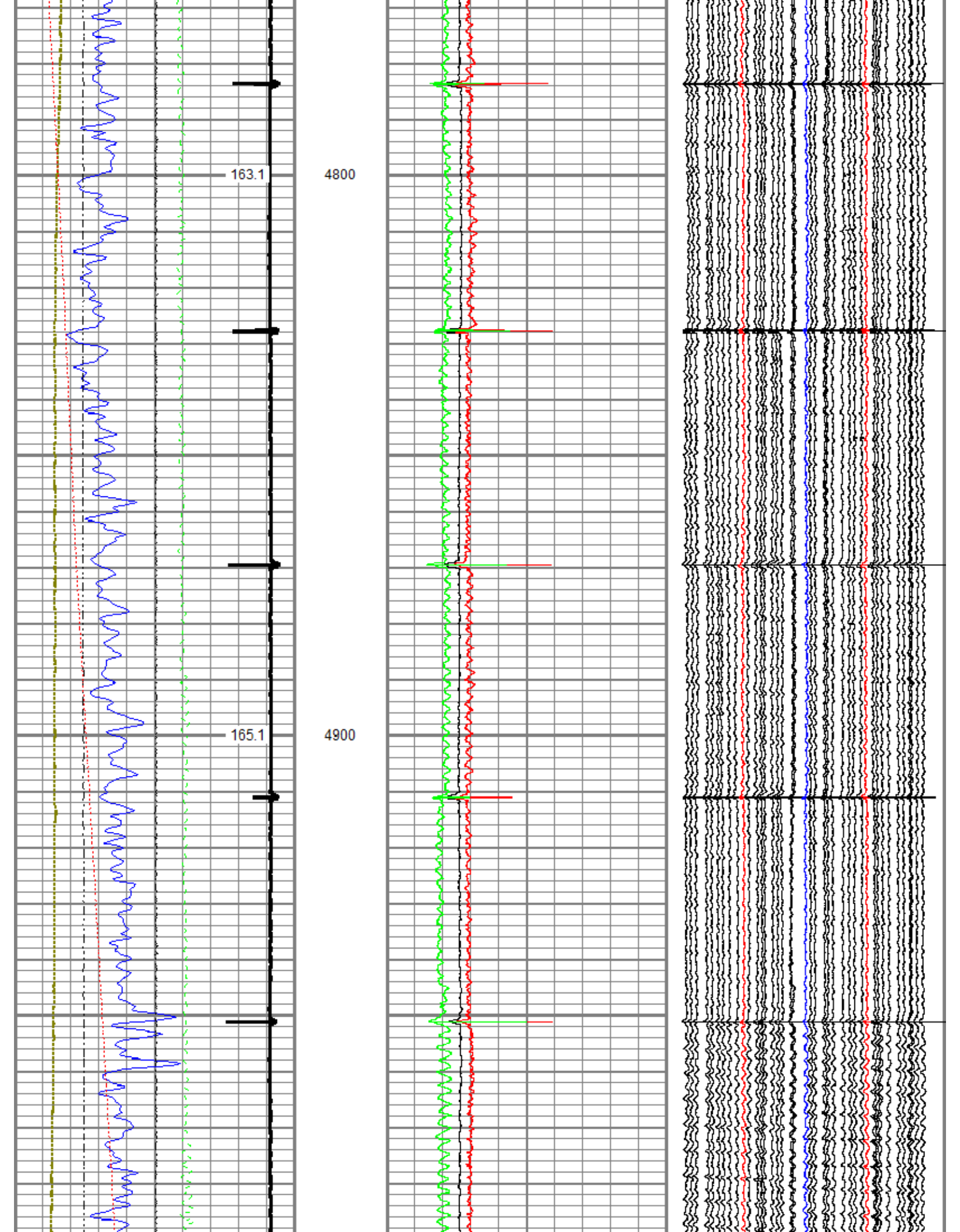


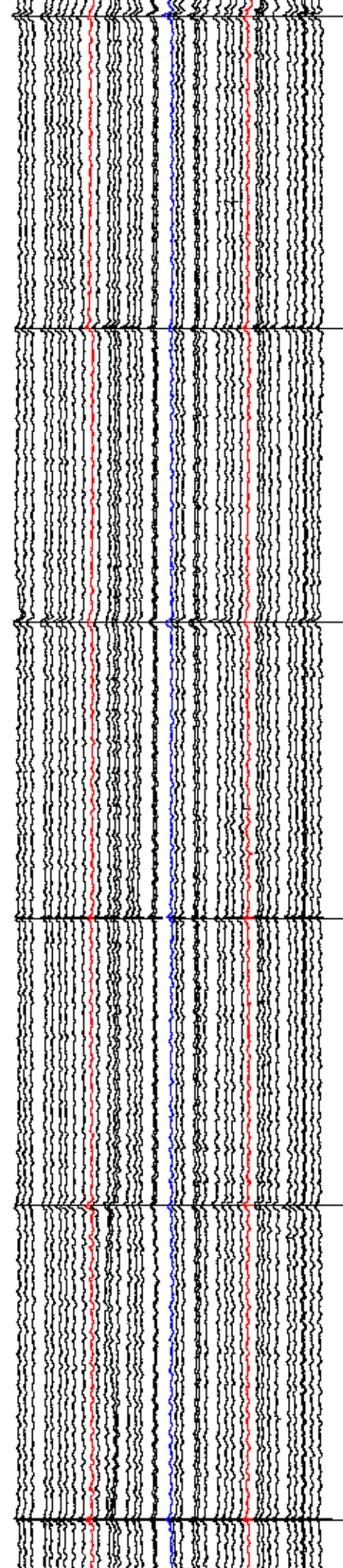
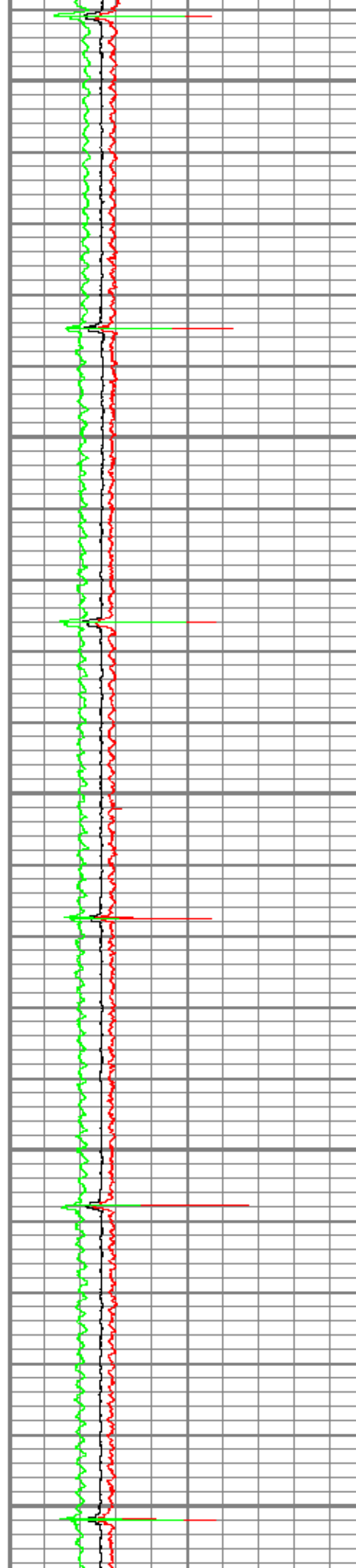
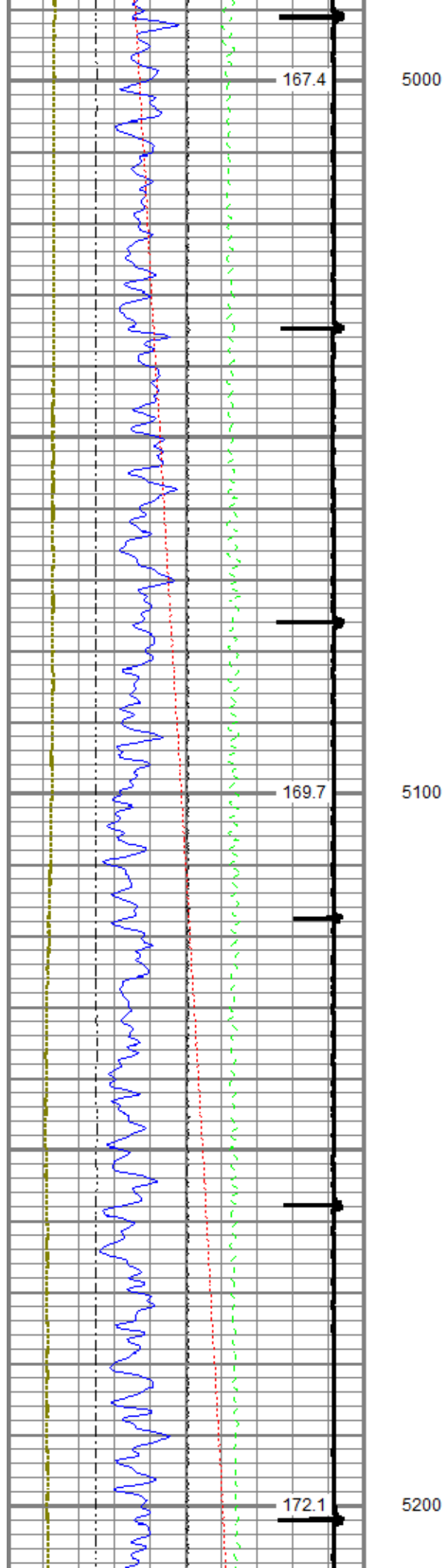


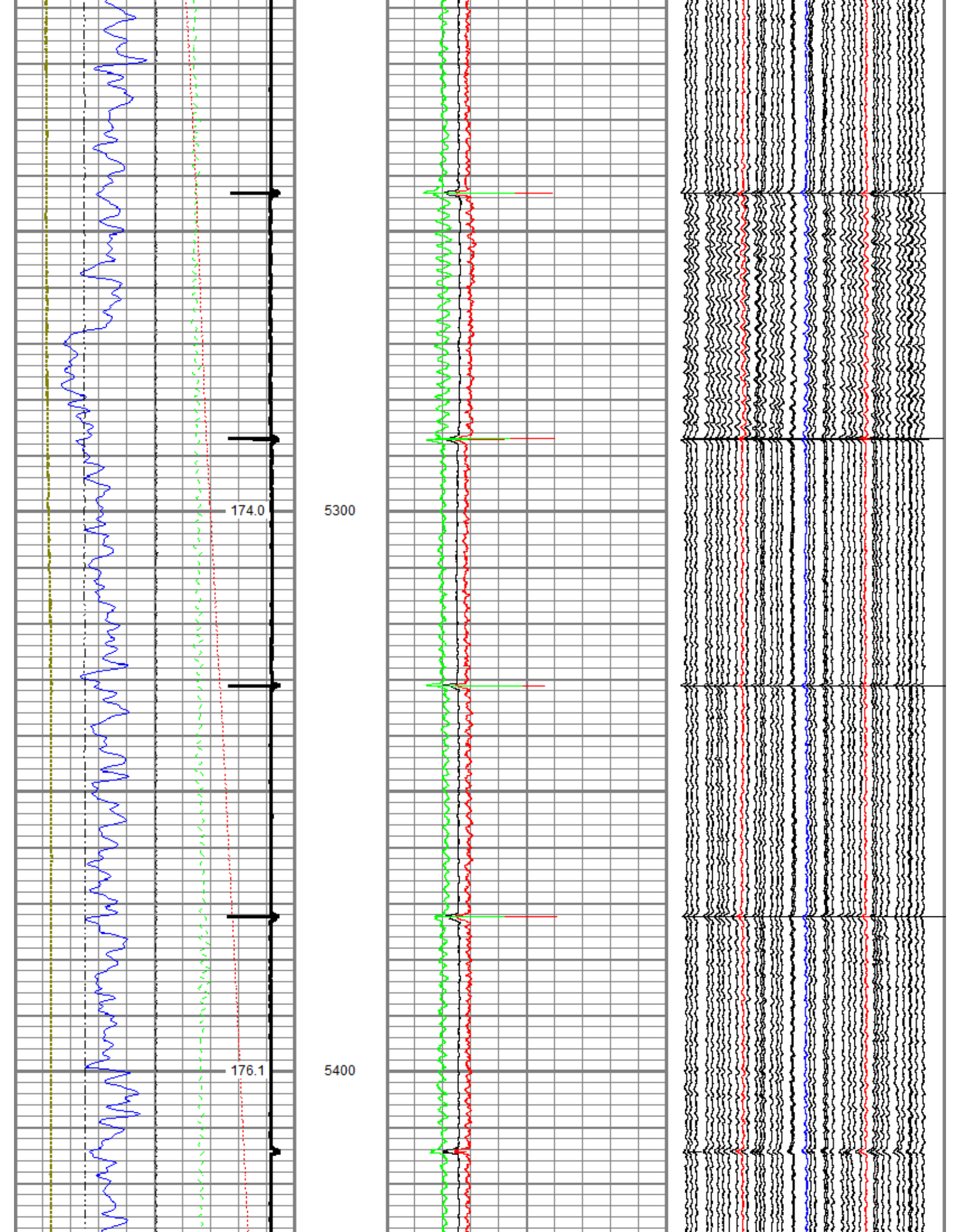
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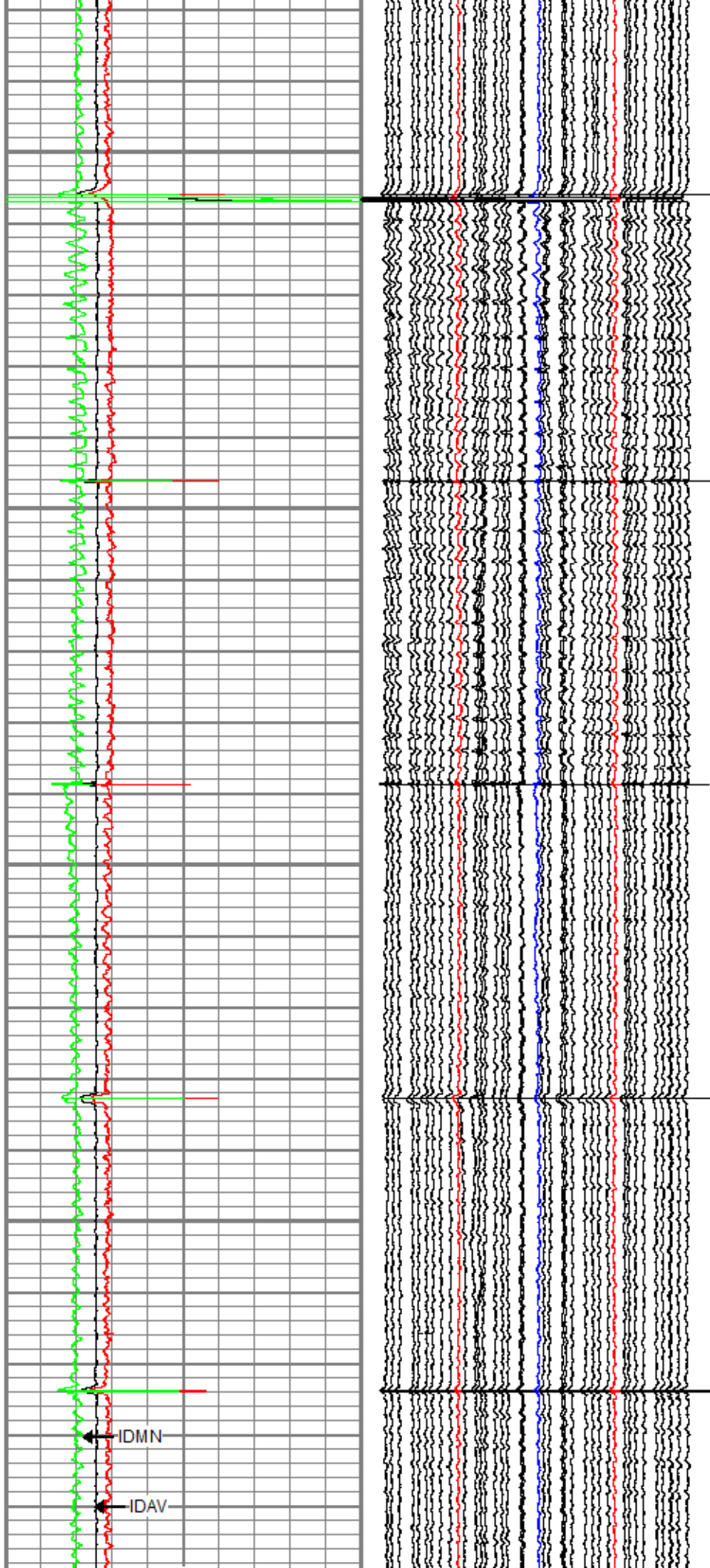
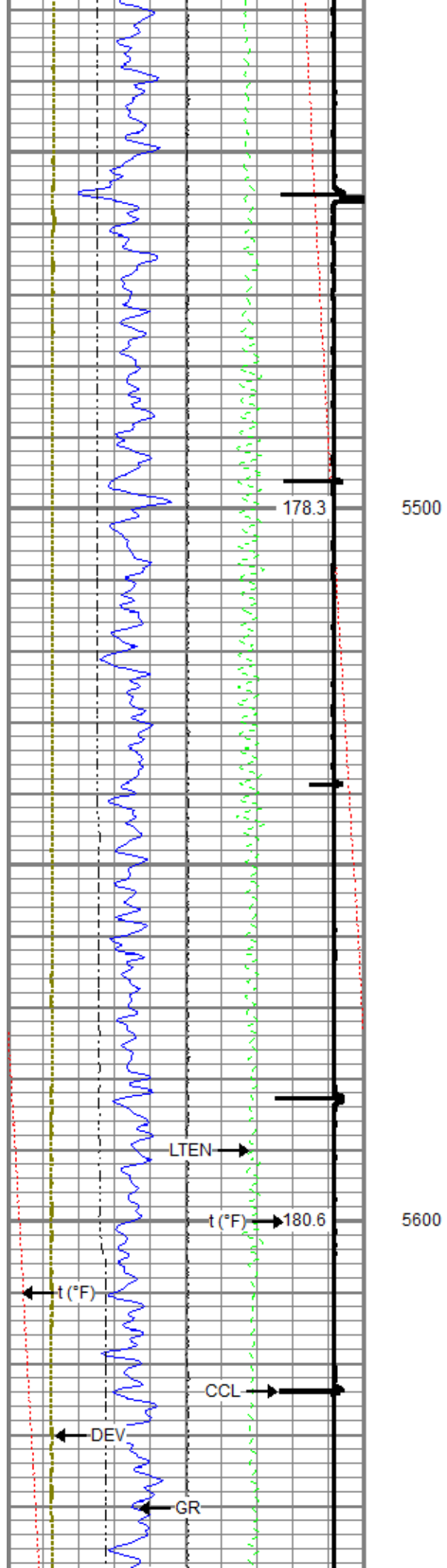
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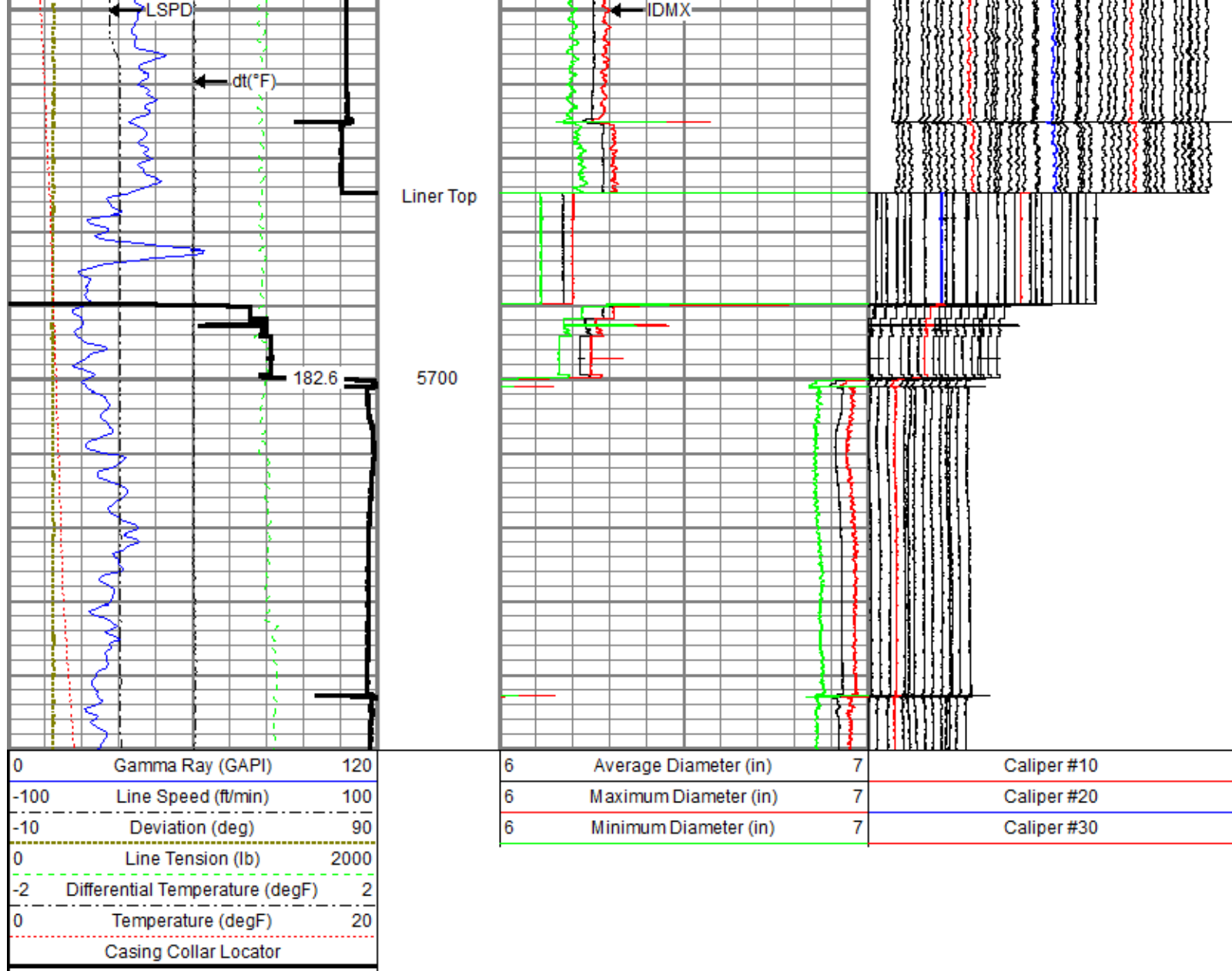








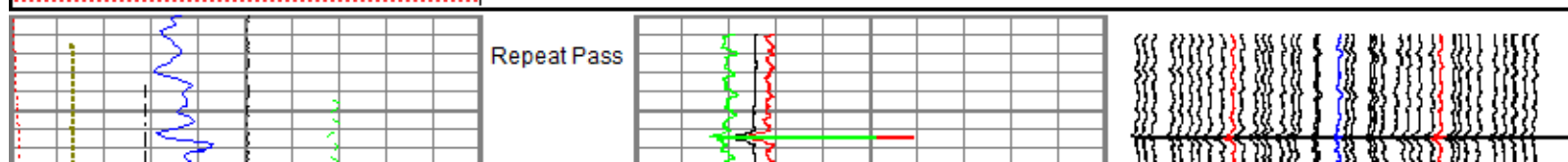
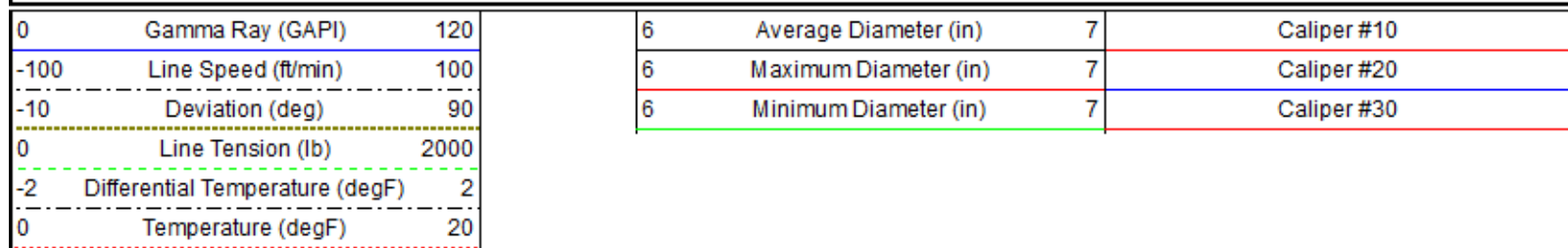


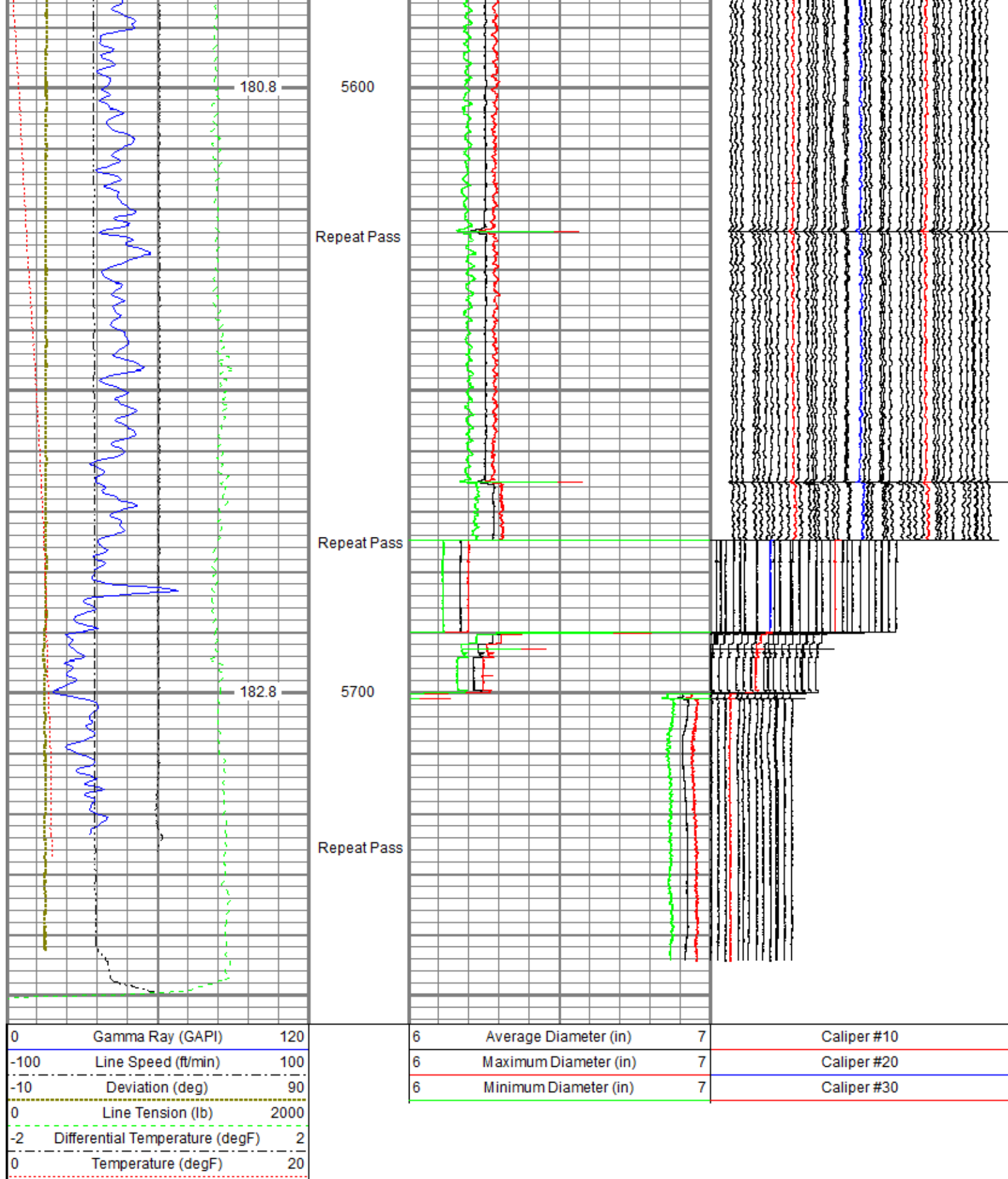


Repeat Pass

Recorded With 2800 PSI Surface Induced Pressure

Database File 0512345495_anadarko_yellowhammer 13n-17hz_mit_rbl_02-20-18\processed_0512345495_anadarko_yellowhammer 13n-1
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 Presentation Format ros_70mit40sx
 Dataset Creation Tue Feb 20 08:41:05 2018
 Charted by Depth in Feet scaled 1:240



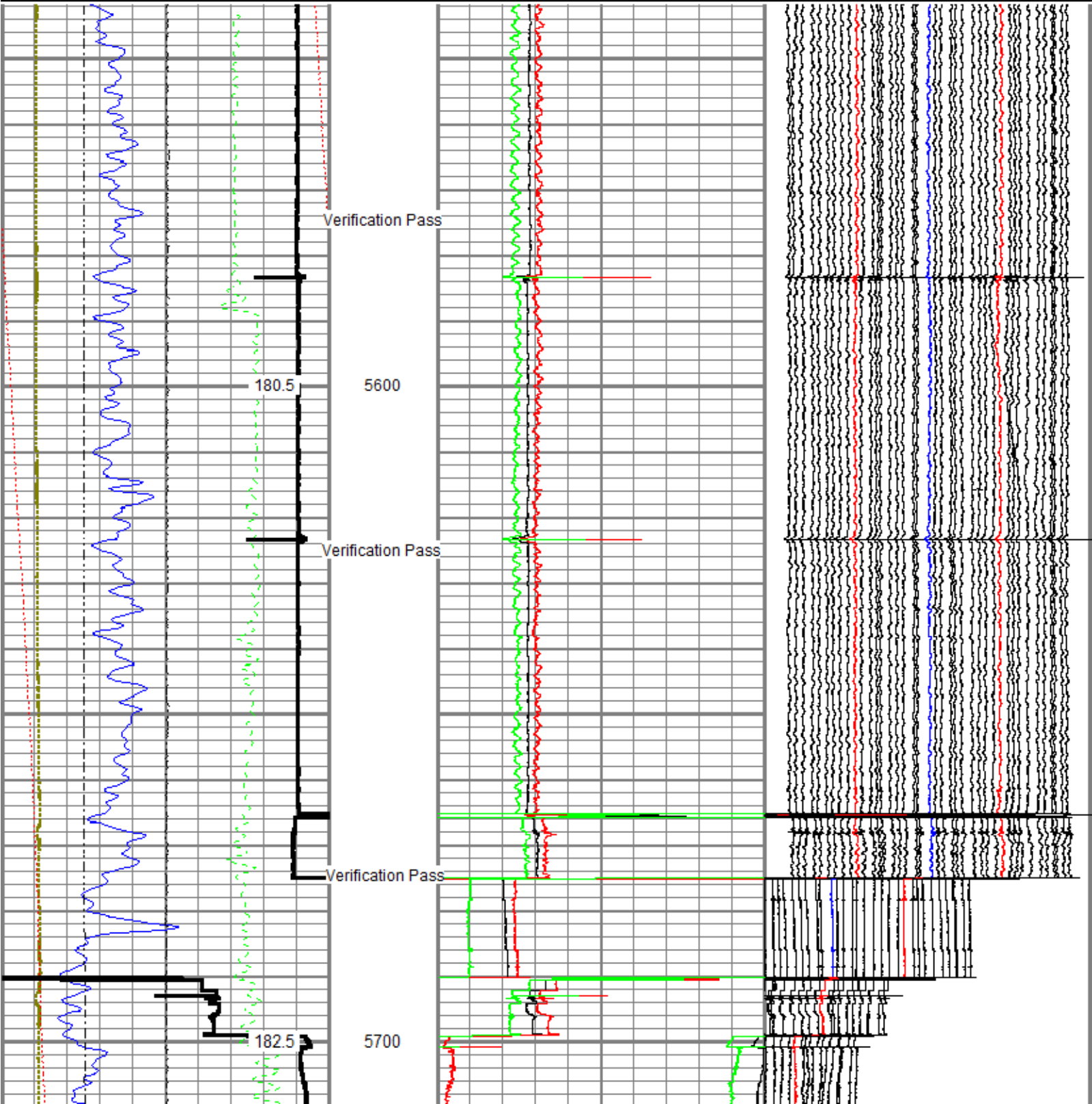


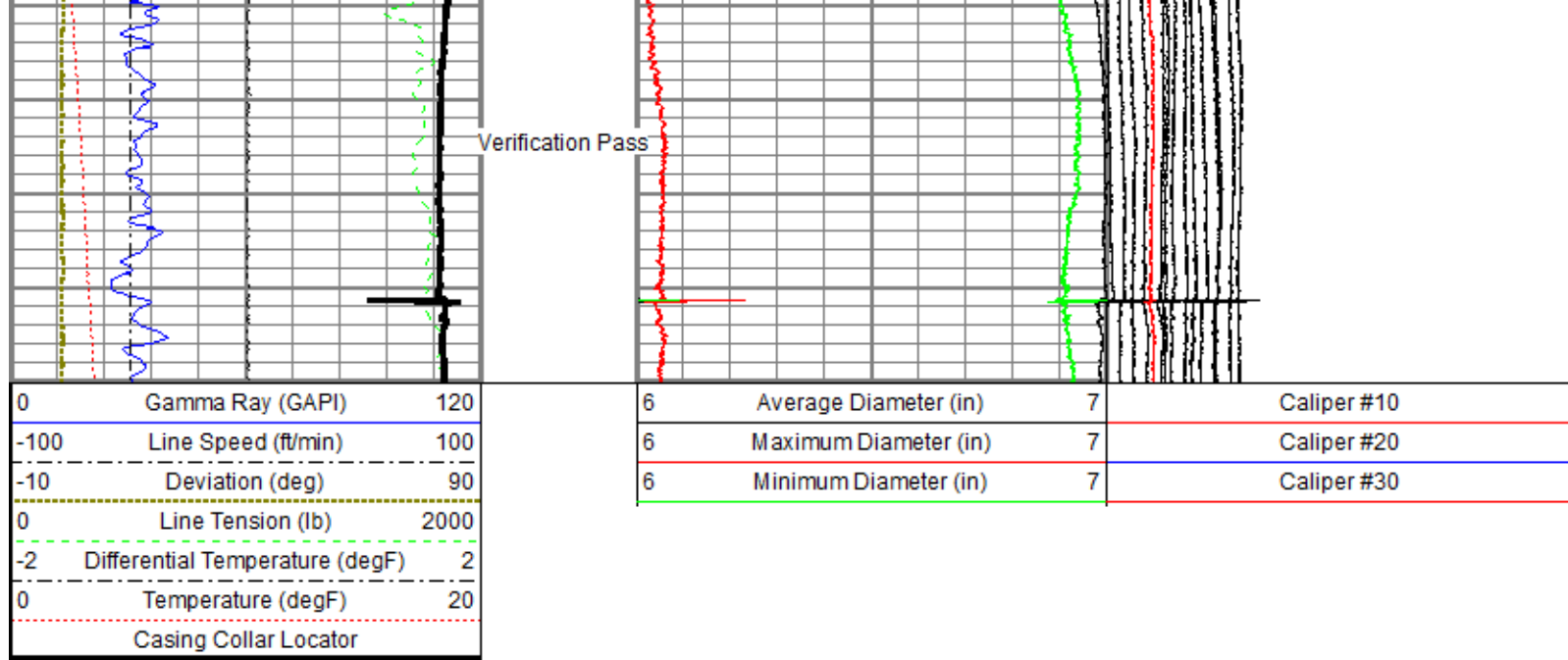
Verification Pass 1



Recorded With 2800 PSI Surface Induced Pressure

0	Gamma Ray (GAPI)	120	6	Average Diameter (in)	7	Caliper #10
-100	Line Speed (ft/min)	100	6	Maximum Diameter (in)	7	Caliper #20
-10	Deviation (deg)	90	6	Minimum Diameter (in)	7	Caliper #30
0	Line Tension (lb)	2000				
-2	Differential Temperature (degF)	2				
0	Temperature (degF)	20				
	Casing Collar Locator					

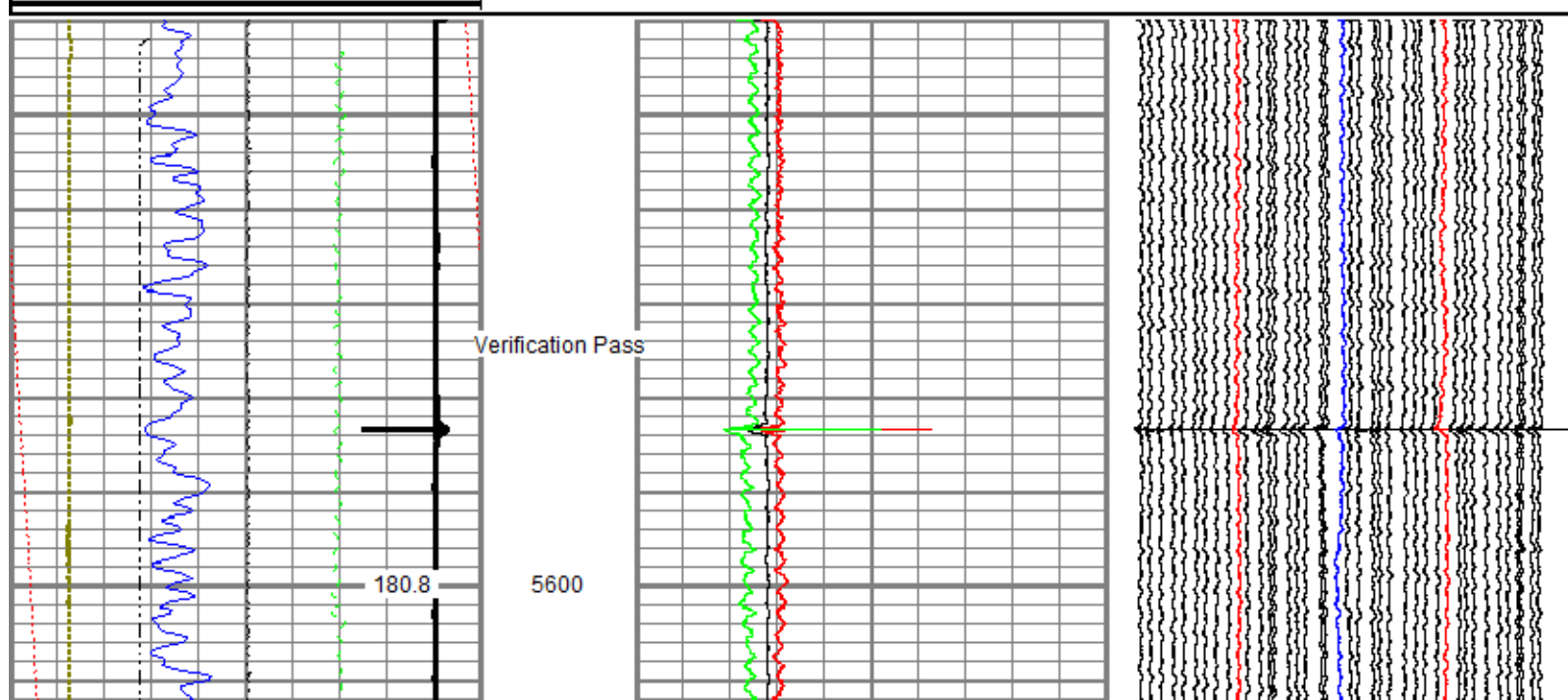
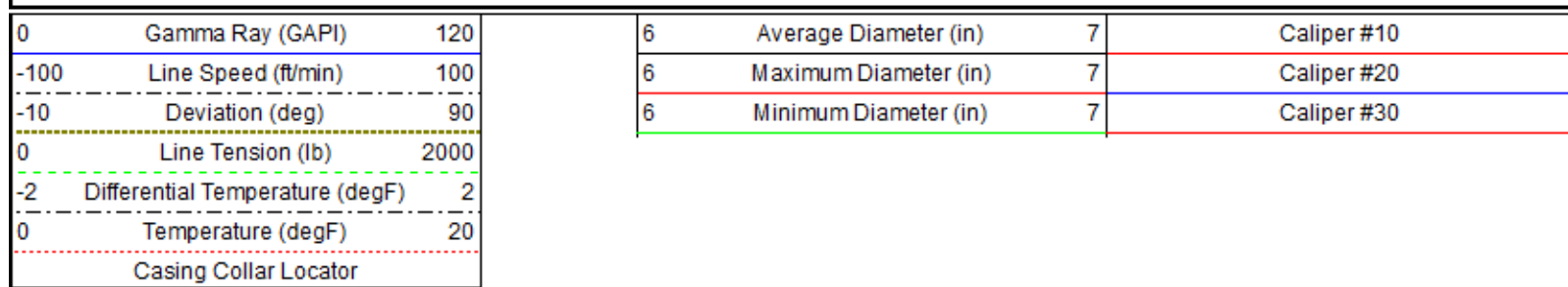


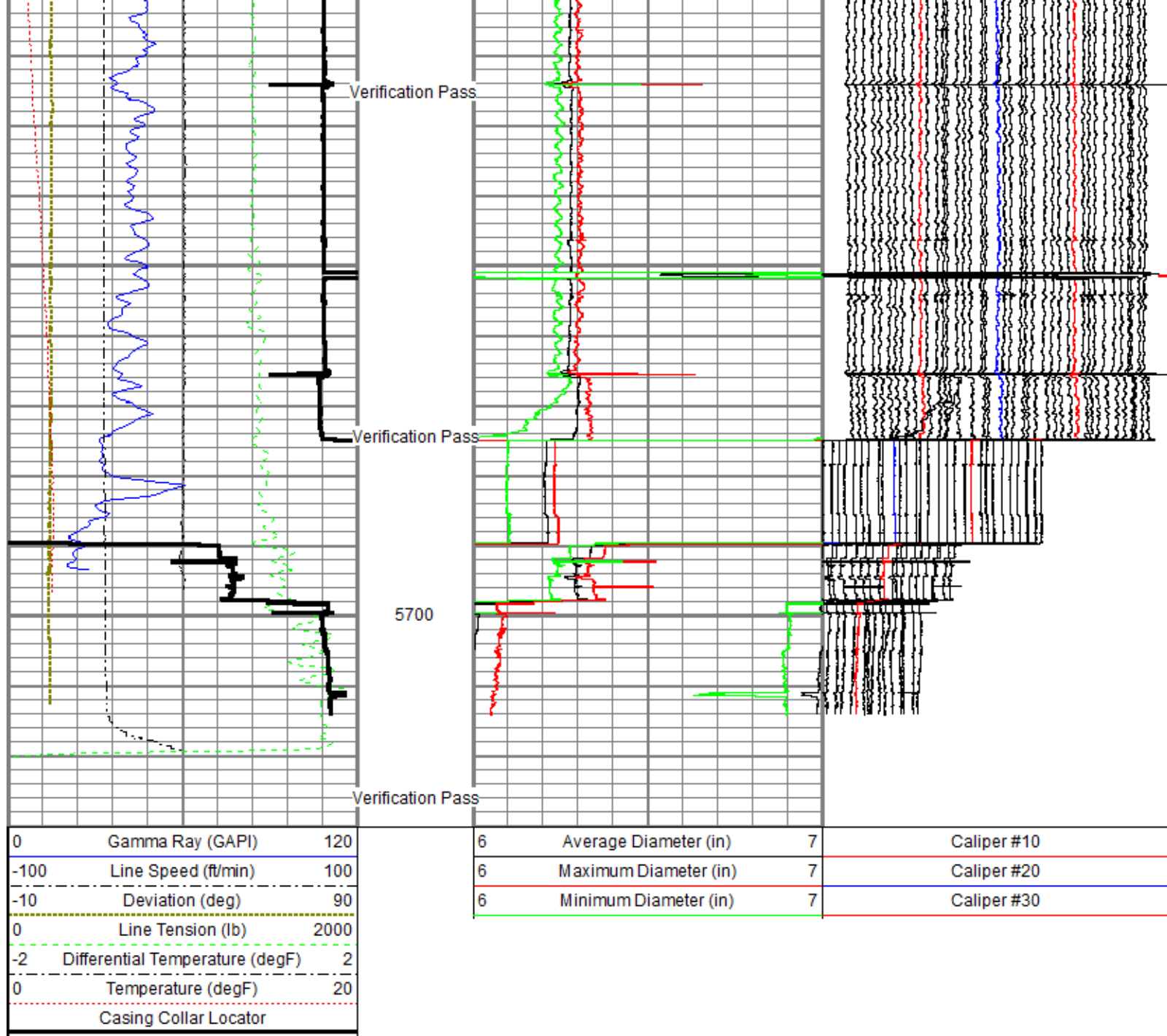


Verification Pass 2

Recorded With 2800 PSI Surface Induced Pressure

Database File 0512345495_anadarko_yellowhammer 13n-17hz_mit_rbl_02-20-18\processed_0512345495_anadarko_yellowhammer 13n-1
 Dataset Pathname verify2
 Presentation Format ros_70mit40sx
 Dataset Creation Tue Feb 20 14:18:31 2018
 Charted by Depth in Feet scaled 1:240



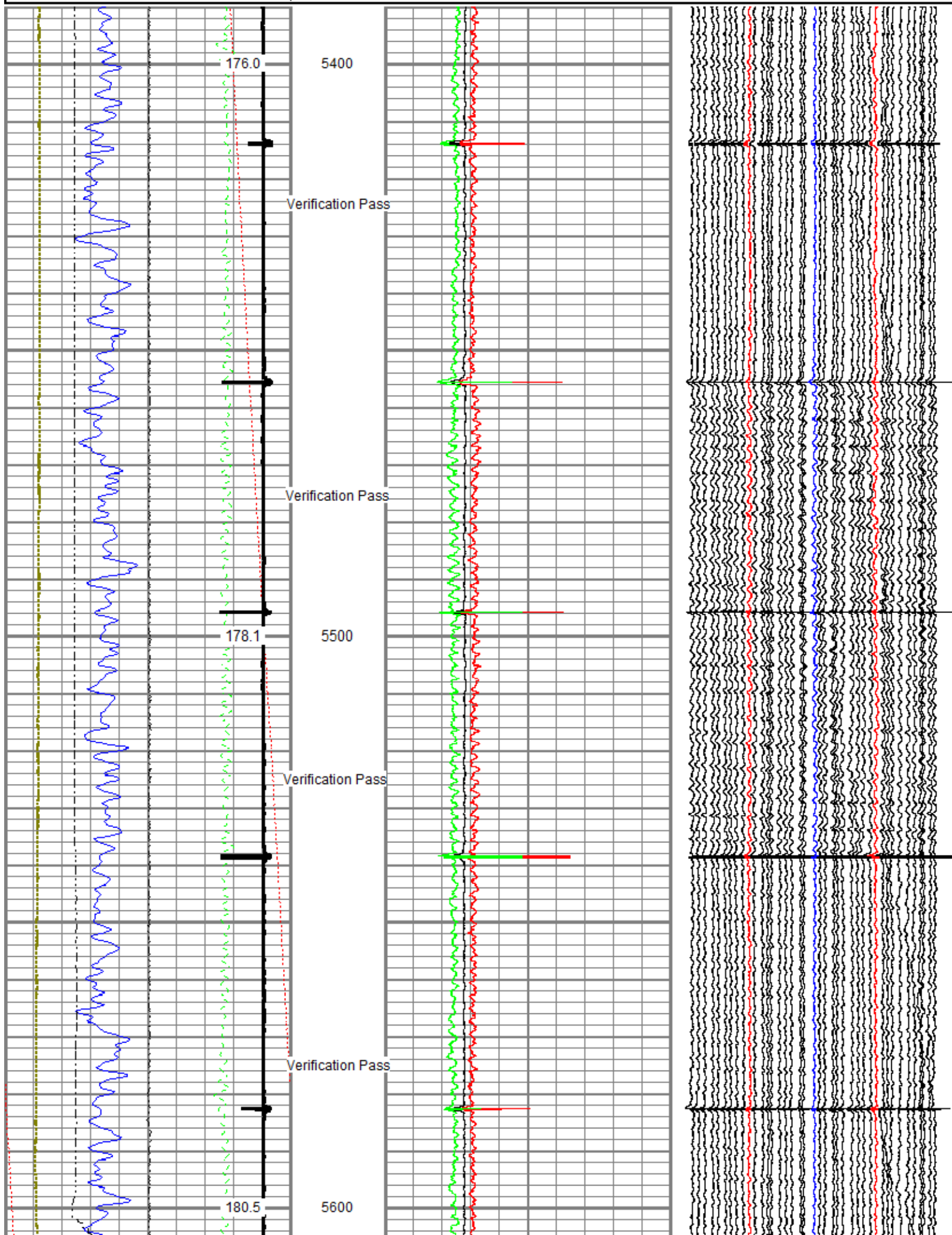


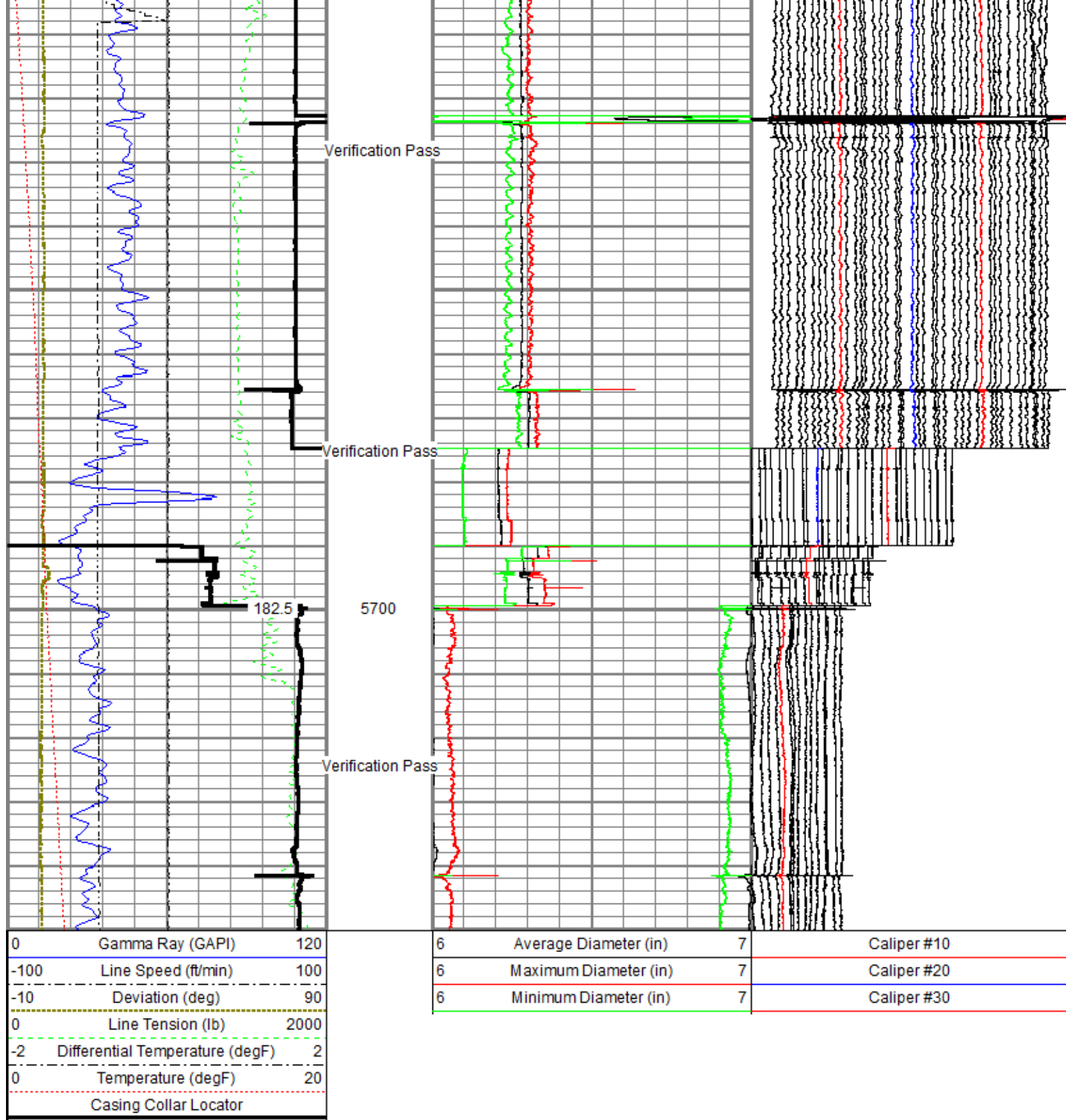
Verification Pass 3


Recorded With 2800 PSI Surface Induced Pressure

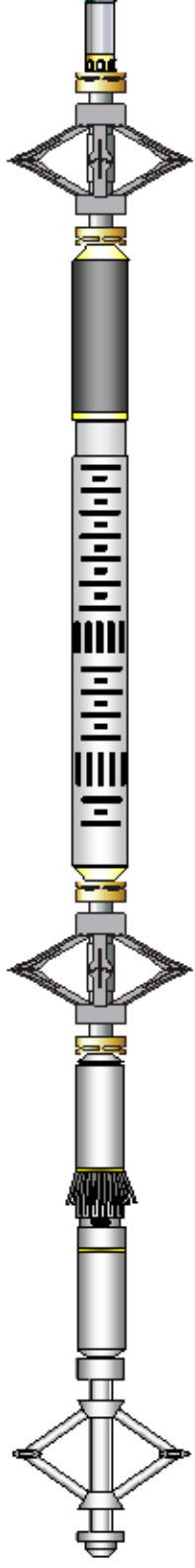
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 Dataset Pathname verify3
 Presentation Format ros_70mit40sx
 Dataset Creation Tue Feb 20 14:18:39 2018
 Charted by Depth in Feet scaled 1:240

0	Gamma Ray (GAPI)	120	6	Average Diameter (in)	7	Caliper #10
-100	Line Speed (ft/min)	100	6	Maximum Diameter (in)	7	Caliper #20
-10	Deviation (deg)	90	6	Minimum Diameter (in)	7	Caliper #30
0	Line Tension (lb)	2000				
-2	Differential Temperature (degF)	2				
0	Temperature (degF)	20				





Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
GR	23.58		Titan CHD-14375 GO	1.03	1.44	3.60
			Titan 1-7/16" Assembled Electric Cable Head w/ 1" Fishing Neck			
			UW AGS-001 (211461)	0.21	1.69	1.00
			Sondex Adapter - GO Box to Sondex Pin			
			UW XTU-002 (10010522)	1.58	1.69	6.50
			Crossover Ultrawire Toolbus to Ultralink			
			UW PGR-020 (211727)	1.92	1.69	9.50
			Production Gamma Ray			

TEMP	22.18		UW PRT-016 (10025100) Platinum Resistance Thermometer	1.04	1.69	5.20
			UW CENT-DSS RAC 5 Arm 2-3/4" Roller Centralizer	2.55	2.75	32.00
CBLROT	15.15		UW RBT-004 (10013454) Sondex Ultrawire 3-1/8" Radial Bond Tool	9.48	3.13	140.00
WVFS8	15.15					
WVFS7	15.15					
WVFS6	15.15					
WVFS5	15.15					
WVFS4	15.15					
WVFS3	15.15					
WVFS2	15.15					
WVFS1	15.15					
WVF3FT	15.15					
WVF5FT	14.15					
CBLTEMP	10.02		UW CENT-DSS RAC 5 Arm 2-3/4" Roller Centralizer	2.55	2.75	32.00
MIT	5.27		UW MIT-40 042 E (10012912) 40 Multifinger Imaging Tool Ext.	4.54	2.75	65.00
			UW CENT-PRC 057 4 Arm 2-3/4" Production Roller Centralizer	2.71	2.75	32.00
TSTAMP	0.00		UW BUL-006 (031422) Sondex Ultrawire Bullnose Terminator Sub	0.22	1.69	1.20
Dataset: PROCESSED_0512345495_Anadarko_Yellowhammer 13N-17HZ_MIT_RBL_02-20-18.db: field/well/run1/main.7						
Total length: 27.83 ft						
Total weight: 328.00 lb						
O.D.: 3.13 in						

Calibration Report	
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Dataset Pathname	calreports
Dataset Creation	Tue Feb 20 11:33:17 2018
Multifinger Imaging Tool Calibration Report	
Serial Number:	10012912
Number of Fingers:	40
Tool Model:	40 042 E

Inclinometer Calibration Report

Performed: Mon Jul 15 09:39:36 2013
Calibration Angle: 45

Vertical:	1968	Inc X	1974
Finger 1 up:	1740	Inc Y	1744
Finger 31 up:	2215		1741
Finger 21 up:	2205		2224
Finger 11 up:	1731		2217
Sensitivity ratio:	0.992868		
X-axis angle:	134.307		
Deviation const.:	335.589		

Finger Calibration Report

Performed: Tue Feb 20 07:32:45 2018

Ring size:	4		5		6		7
(in)		Sens		Sens		Sens	
Finger 01:	1067	367.0	1434	388.0	1822	408.0	2230
Finger 02:	1209	376.0	1585	387.0	1972	402.0	2374
Finger 03:	1093	379.0	1472	406.0	1878	429.0	2307
Finger 04:	1124	371.0	1495	394.0	1889	419.0	2308
Finger 05:	1131	373.0	1504	397.0	1901	412.0	2313
Finger 06:	1129	377.0	1506	400.0	1906	416.0	2322
Finger 07:	1123	376.0	1499	403.0	1902	418.0	2320
Finger 08:	1154	371.0	1525	396.0	1921	418.0	2339
Finger 09:	1140	369.0	1509	397.0	1906	413.0	2319
Finger 10:	1149	367.0	1516	396.0	1912	414.0	2326
Finger 11:	1149	367.0	1516	388.0	1904	410.0	2314
Finger 12:	1149	359.0	1508	394.0	1902	409.0	2311
Finger 13:	1165	357.0	1522	384.0	1906	403.0	2309
Finger 14:	1150	367.0	1517	398.0	1915	414.0	2329
Finger 15:	1104	366.0	1470	407.0	1877	427.0	2304
Finger 16:	1110	363.0	1473	404.0	1877	428.0	2305
Finger 17:	1024	335.0	1359	391.0	1750	431.0	2181
Finger 18:	1149	352.0	1501	391.0	1892	408.0	2300
Finger 19:	1125	350.0	1475	394.0	1869	414.0	2283
Finger 20:	1103	349.0	1452	401.0	1853	427.0	2280
Finger 21:	1107	351.0	1458	397.0	1855	410.0	2265
Finger 22:	1082	350.0	1432	403.0	1835	429.0	2264
Finger 23:	1026	346.0	1372	408.0	1780	441.0	2221
Finger 24:	1111	344.0	1455	386.0	1841	399.0	2240
Finger 25:	1047	347.0	1394	407.0	1801	436.0	2237
Finger 26:	1166	334.0	1500	375.0	1875	392.0	2267
Finger 27:	1093	347.0	1440	396.0	1836	418.0	2254
Finger 28:	1124	346.0	1470	382.0	1852	405.0	2257
Finger 29:	1051	352.0	1403	403.0	1806	427.0	2233
Finger 30:	1082	351.0	1433	394.0	1827	419.0	2246
Finger 31:	1116	351.0	1467	386.0	1853	408.0	2261
Finger 32:	1174	380.0	1554	422.0	1976	435.0	2411
Finger 33:	1170	357.0	1527	377.0	1904	387.0	2291
Finger 34:	1107	363.0	1470	401.0	1871	420.0	2291
Finger 35:	983	335.0	1318	379.0	1697	406.0	2103
Finger 36:	1081	362.0	1443	400.0	1843	422.0	2265
Finger 37:	1125	367.0	1492	392.0	1884	410.0	2294
Finger 38:	1156	362.0	1518	385.0	1903	396.0	2299
Finger 39:	1168	363.0	1531	384.0	1915	397.0	2312
Finger 40:	1113	374.0	1487	398.0	1885	413.0	2298

Post Survey Calibration Check

Performed: Tue Feb 20 11:15:50 2018

Ring size:	4	Nom.	5	Nom.	6	Nom.	7	Nom.
(in)		wear		wear		wear		wear
Finger 01:	3.984	-0.008	4.984	-0.008	5.988	-0.006	6.984	-0.008
Finger 02:	3.979	-0.011	4.976	-0.012	6.140	0.070	6.985	-0.007
Finger 03:	3.978	-0.011	4.978	-0.011	5.982	-0.009	6.973	-0.013
Finger 04:	3.988	-0.006	4.985	-0.008	5.997	-0.001	6.999	-0.000
Finger 05:	3.982	-0.009	4.984	-0.008	5.994	-0.003	7.014	0.007
Finger 06:	3.990	-0.005	4.981	-0.009	5.986	-0.007	6.988	-0.006
Finger 07:	3.979	-0.011	4.979	-0.010	5.981	-0.009	6.980	-0.010
Finger 08:	3.984	-0.008	4.980	-0.010	5.983	-0.008	6.985	-0.007


Finger 08:	3.984	-0.008	4.988	-0.010	5.985	-0.005	6.985	-0.007
Finger 09:	3.982	-0.009	4.986	-0.007	5.990	-0.005	6.989	-0.006
Finger 10:	3.986	-0.007	4.985	-0.008	5.990	-0.005	6.985	-0.007
Finger 11:	3.984	-0.008	4.983	-0.009	5.993	-0.003	6.986	-0.007
Finger 12:	3.996	-0.002	4.997	-0.002	5.994	-0.003	6.996	-0.002
Finger 13:	3.980	-0.010	4.981	-0.009	5.987	-0.006	6.984	-0.008
Finger 14:	4.011	0.006	4.987	-0.006	5.993	-0.003	6.985	-0.007
Finger 15:	3.975	-0.012	4.985	-0.007	5.987	-0.007	6.995	-0.002
Finger 16:	4.012	0.006	4.979	-0.011	5.984	-0.008	6.995	-0.003
Finger 17:	3.970	-0.015	4.977	-0.011	5.982	-0.009	6.980	-0.010
Finger 18:	3.999	-0.001	4.982	-0.009	5.984	-0.008	6.990	-0.005
Finger 19:	3.968	-0.016	4.968	-0.016	5.970	-0.015	6.977	-0.012
Finger 20:	3.984	-0.008	4.982	-0.009	5.987	-0.007	6.987	-0.007
Finger 21:	3.974	-0.013	4.973	-0.013	5.978	-0.011	6.987	-0.007
Finger 22:	3.973	-0.014	4.975	-0.013	5.980	-0.010	6.985	-0.008
Finger 23:	4.001	0.001	5.000	0.000	5.998	-0.001	6.990	-0.005
Finger 24:	3.974	-0.013	4.979	-0.011	5.987	-0.006	6.990	-0.005
Finger 25:	3.976	-0.012	4.985	-0.008	5.985	-0.007	6.983	-0.009
Finger 26:	3.976	-0.012	4.982	-0.009	5.994	-0.003	6.997	-0.002
Finger 27:	3.983	-0.008	4.988	-0.006	5.995	-0.003	6.989	-0.005
Finger 28:	3.992	-0.004	4.981	-0.009	5.993	-0.004	6.988	-0.006
Finger 29:	3.993	-0.004	4.984	-0.008	5.988	-0.006	6.985	-0.007
Finger 30:	3.992	-0.004	4.985	-0.007	5.991	-0.004	6.989	-0.006
Finger 31:	3.992	-0.004	4.979	-0.011	5.985	-0.008	6.995	-0.003
Finger 32:	3.988	-0.006	4.983	-0.008	5.988	-0.006	6.989	-0.005
Finger 33:	3.988	-0.006	4.980	-0.010	5.978	-0.011	6.989	-0.006
Finger 34:	3.990	-0.005	4.985	-0.008	5.985	-0.008	6.986	-0.007
Finger 35:	3.989	-0.005	4.981	-0.009	5.983	-0.008	6.989	-0.006
Finger 36:	3.986	-0.007	4.987	-0.007	5.991	-0.004	6.994	-0.003
Finger 37:	3.990	-0.005	4.987	-0.007	5.986	-0.007	6.988	-0.006
Finger 38:	3.978	-0.011	4.977	-0.011	5.979	-0.010	6.975	-0.012
Finger 39:	3.980	-0.010	4.974	-0.013	5.977	-0.011	6.978	-0.011
Finger 40:	3.982	-0.009	4.986	-0.007	5.991	-0.005	6.995	-0.003
Average:	3.985	-0.007	4.982	-0.009	5.991	-0.005	6.988	-0.006

Segmented Cement Bond Log Calibration Report						
Serial Number:		10013454				
Tool Model:		004				
Calibration Casing Diameter:		7.000	in			
Calibration Depth:		7.942	ft			
Master Calibration, performed Tue Feb 20 11:32:17 2018:						
	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3FT	0.000	0.739	0.800	62.165	82.998	0.800
5FT	0.000	0.834	0.800	62.165	73.588	0.800
S1	0.000	0.780	0.000	100.000	128.225	0.000
S2	0.000	0.798	0.000	100.000	125.280	0.000
S3	0.000	0.788	0.000	100.000	126.883	0.000
S4	0.000	0.801	0.000	100.000	124.816	0.000
S5	0.000	0.788	0.000	100.000	126.906	0.000
S6	0.000	0.758	0.000	100.000	131.886	0.000
S7	0.000	0.723	0.000	100.000	138.343	0.000
S8	0.000	0.730	0.000	100.000	137.028	0.000

Temperature Calibration Report					
		Serial Number:		10025100	
		Tool Model:		016	
		Performed:		Sun Nov 12 14:30:03 2017	
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:	020			
Performed:	Sun Nov 12 06:37:04 2017			
Calibrator Value:	637.0	GAPI		
Background Reading:	78.8	cps		
Calibrator Reading:	1069.9	cps		
Sensitivity:	0.6427	GAPI/cps		

	Company	Kerr-McGee Oil & Gas Onshore, L.P.
	Well	Yellowhammer 13N-17HZ
	Field	Wattenberg
	County	Weld
	State	Colorado