

Company: CONOCOPHILLIPS CANADA RESOURCES CORP.

Well: COPRC DODO CANYON E76

Field: DODO CANYON

Province: NORTHWEST TERRITORE

BOREHOLE COMPENSATED \*\*\*MD\*\*\*

SONIC LOG \*\*\*Calgary Processed Data\*\*\*

Province: NORTHWEST TERRITORIES  
Field: DODO CANYON  
Location: UNIT E SECTION 76  
Well: COPRC DODO CANYON E76  
Company: CONOCOPHILLIPS CANADA RESOURCES CO

Location: UNIT E SECTION 76  
300E766510126450  
NORTHING: 7219874.66 EASTING: 594010.01  
Permanent Datum: Ground Level  
Log Measured From: Kelly Bushing  
Drilling Measured From: Kelly Bushing  
Elev.: 268.20  
K.B. 273.40 m  
G.L. 268.20 m  
D.F. 273.10 m  
Elev.: 5.20 m  
above Perm.Datum

API Serial No. EL470  
Longitude: 126° 59' 58" W  
Latitude: 65° 5' 27" N

Logging Date 14-Jan-2014

Run Number 1.1

Depth Driller 1908.00 m

Schlumberger Depth 1819.10 m

Bottom Log Interval 1804.64 m

Top Log Interval 603.00 m

Casing Driller Size @ Depth 244.5 mm @ 603.00 m

Casing Schlumberger 603 m

Bit Size 222 mm

Type Fluid In Hole INVERT

Density 1025 kg/m3  
Viscosity 75 s

Fluid Loss PH

Source of Sample N/A

RM @ Meas Temp N/A

RMF @ Meas Temp N/A

RMC @ Meas Temp N/A

Source RMF N/A

RM @ BHT N/A

Max Recorded Temperatures 71.5 degC

Circulation Stopped 14-Jan-2014 07:20:00

Logger on Bottom 14-Jan-2014 18:25:00

Unit Number 3139

Recorded By JEFFREY TATLOCK

Witnessed By DAVID LAWRENCE

Disclaimer

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## 8.5 Parameter Listing

## 9. 1.1

9.1 Composite Summary

9.2 Log ( SONIC-240 RA )

## 10. 1.1

10.1 Integration Summary

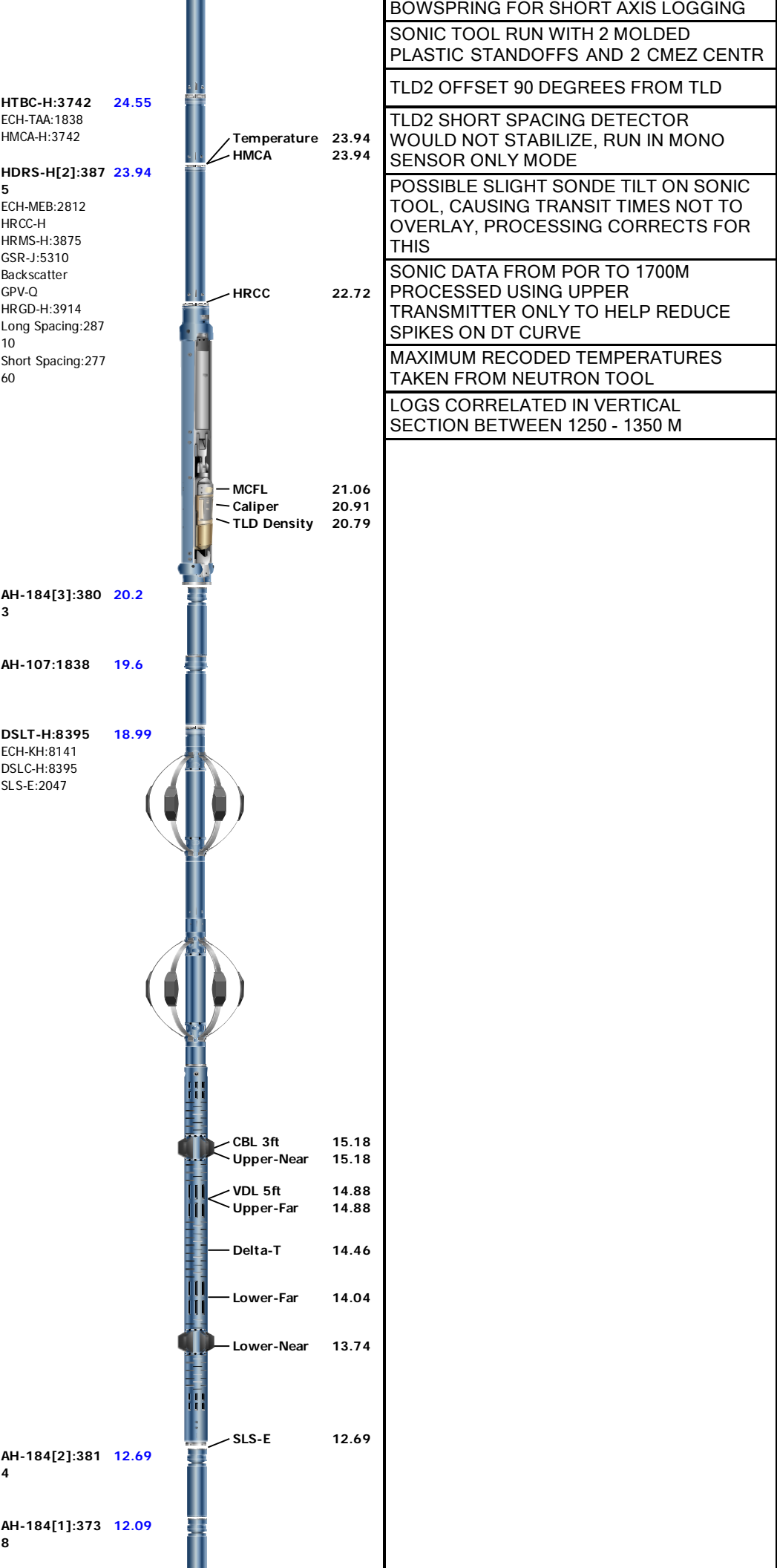
10.2 Software Version

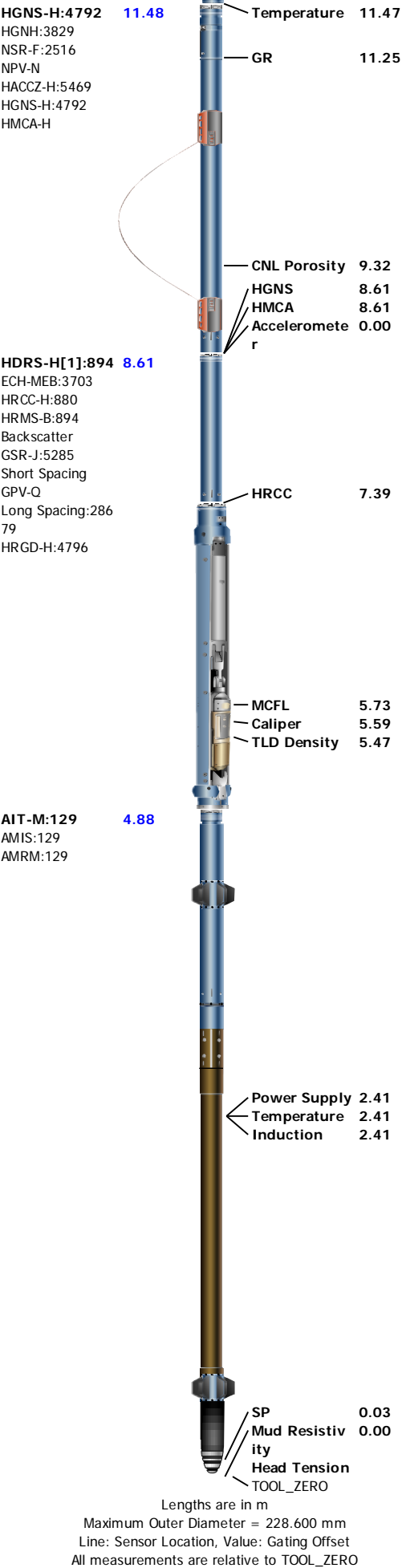
## Borehole Fluids

Parameter( unit )	1.1					
Fluid Type	Oil					
Fluid Name	INVERT					
Max Recorded Temperatures ( degC )	71.5					
Source of Sample	N/A					
Salinity ( ppm )	0					
Density ( kg/m3 )	1025					
Funnel Viscosity ( s )	75					
Fluid Loss ( cm3 )						
PH						
Date/Time Circulation Stopped	14-Jan-2014 07:20:00					
Date Logger on Bottom	14-Jan-2014					
Time Logger on Bottom	18:25:00					
Source RMF	N/A					
RMC	N/A					
RM @ Meas Temp ( ohm.m@degC )	N/A					
RMF @ Meas Temp ( ohm.m@degC )	N/A					
RMC @ Meas Temp ( ohm.m@degC )	N/A					
RM @ BHT ( ohm.m@degC )	N/A					
RMF @ BHT ( ohm.m@degC )	N/A					
RMC @ BHT ( ohm.m@degC )	N/A					
Electricity Stability ( V )						
Oil/Water						
Total Solid ( % )						
High Gravity Solids ( % )						

## Remarks and Equipment Summary

1.1: Toolstring				1.1: Remarks
<div>Equip name LEH-QT:2850 LEH-QT:2850</div> <div>DTC-H:9100 ECH-KC:10172 DTC-H:9100</div> <div>SGT-N:10447 SGH-K:3210 SGC-TB:10447 SGD-TAA</div>	<div>Length 28.03</div> <div>27.14</div> <div>26.22</div>	<div>MP name</div> <div>CTEM HV</div> <div>ToolStatus TelStatus</div> <div>GR</div>	<div>Offset</div> <div>26.86 0.00</div> <div>26.22 26.22</div> <div>25.94</div>	ALL INTERVALS AND PRESENTATIONS AS PER CLIENT REQUEST
				RIG: BEAVER 2
				SLB CREW: JASON LEGASSIE
				LOGGER REQUESTED AT: 10:30 14-JAN-2014
				LOGGER ARRIVED AT: 09:30 14-JAN-2014
				RIG READY AT: 15:45 14-JAN-2014
				INDUCTION TOOL RUN WITH 38.1 MM STANDOFFS IN COMPUTE MUD RESISTIVITY MODE
				NEUTRON TOOL RUN WITH DUAL AXIS





## Depth Summary

1.1

Depth Measuring Device

**Depth Measuring Device**

Type	IDW-JA		
Serial Number	6162		
Calibration Date	10-MAY-2010		
Calibrator Serial Number	4		
Calibration Cable Type	7-39 PLXS		
Wheel Correction 1	-3		
Wheel Correction 2	1		

**Tension Device**

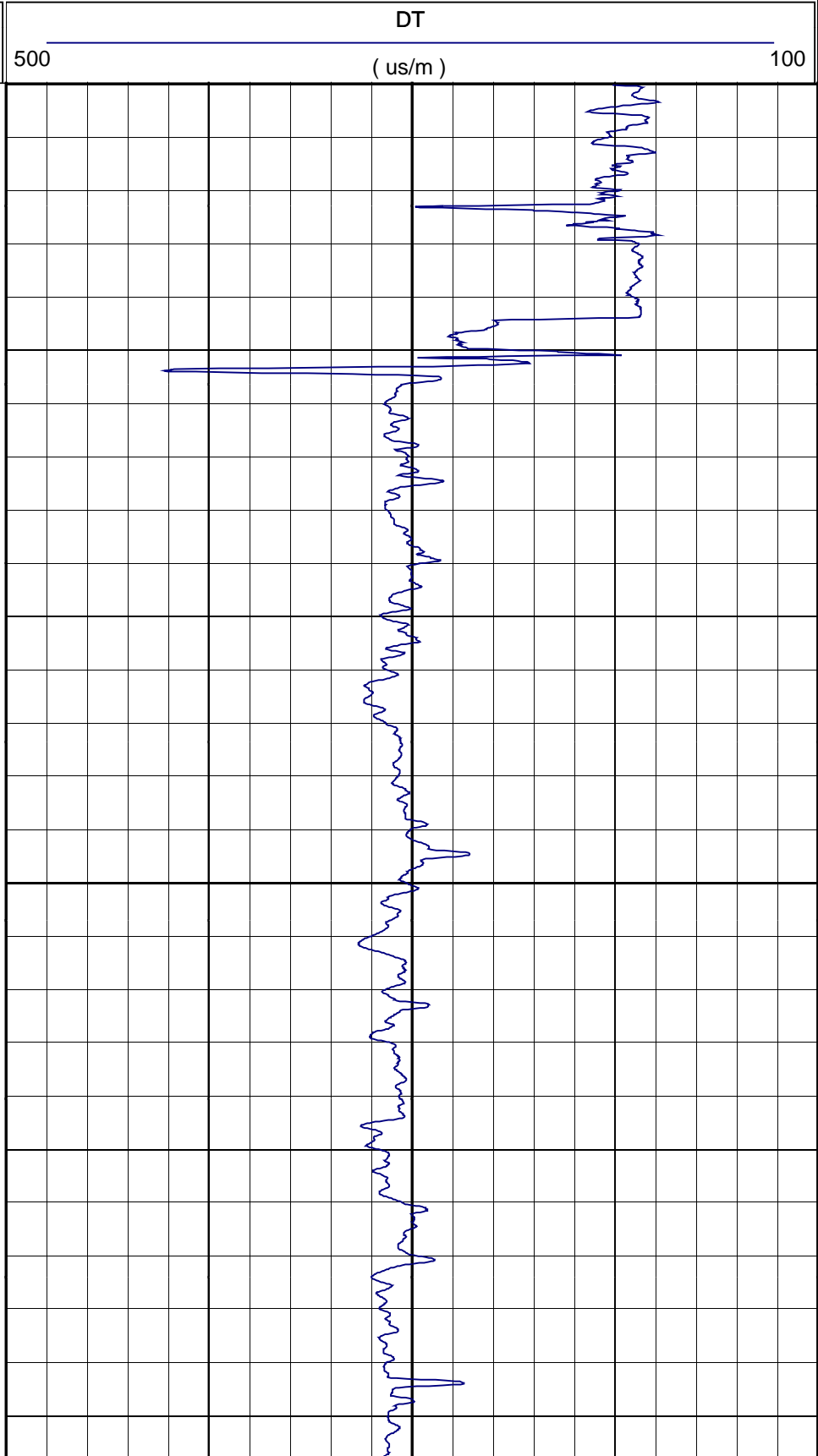
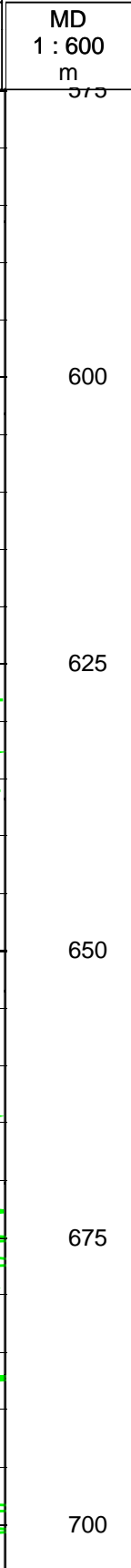
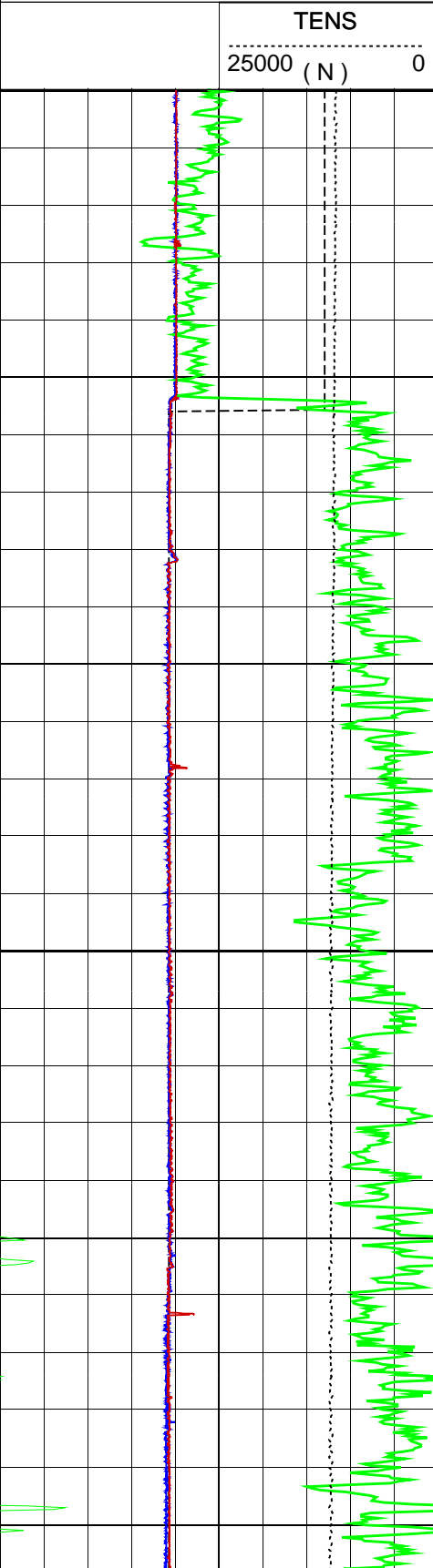
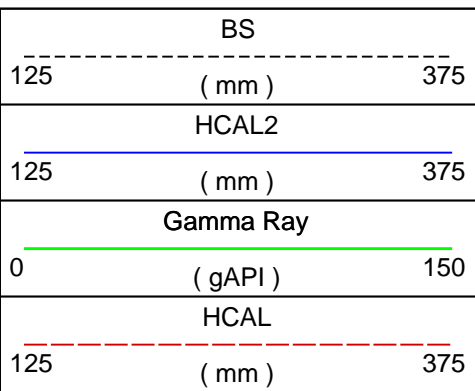
Type	CMTD-B/A		
Serial Number	1293		
Calibration Date	06-SEP-2013		
Calibrator Serial Number	1111		
Number of Calibration Points	10		
Calibration Root Mean Square Error	28		
Calibration Peak Error	54		

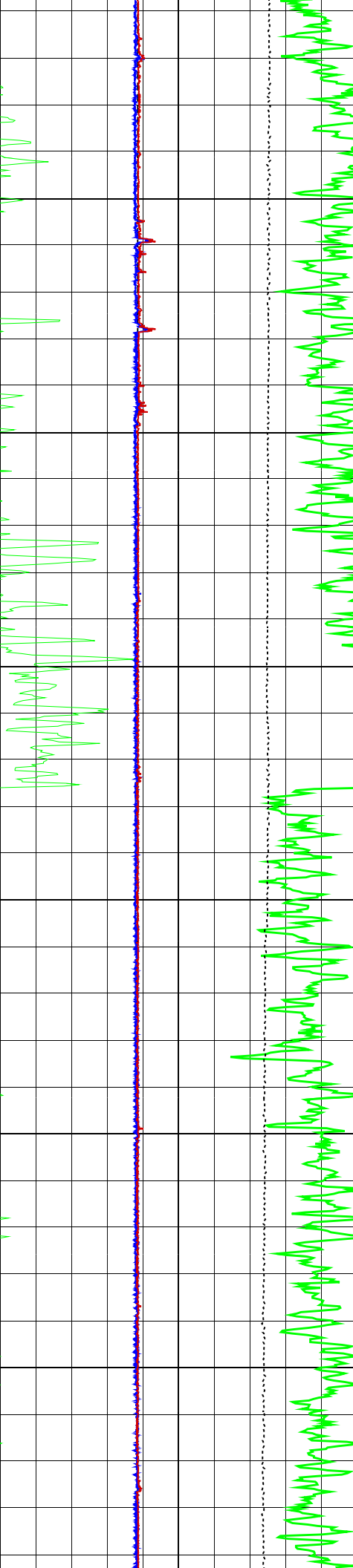
**Logging Cable**

Type	7-39P-LXS		
Serial Number			
Length	3100.00 m		
Conveyance Type	Wireline		
Rig Type			

**1.1:Depth Control Parameters**

1.1:Depth Control Parameters		Depth Control Remarks
Log Sequence	First Log In the Well	ALL SCHLUMBERGER DEPTH CONTROL PROCEDURES FOLLOWED
Rig Up Length At Surface	56.06 m	IDW USED AS PRIMARY DEPTH CONTROL
Rig Up Length At Bottom	56.02 m	Z-CHART USED AS SECONDARY DEPTH CONTROL
Rig Up Length Correction	0.04 m	ALL LOGS CORRELATED TO DOWN LOG IN VERTICAL SECTION BETWEEN 1250 - 1350 M
Stretch Correction	1.27 m	
Tool Zero Check At Surface	0.30 m	





725

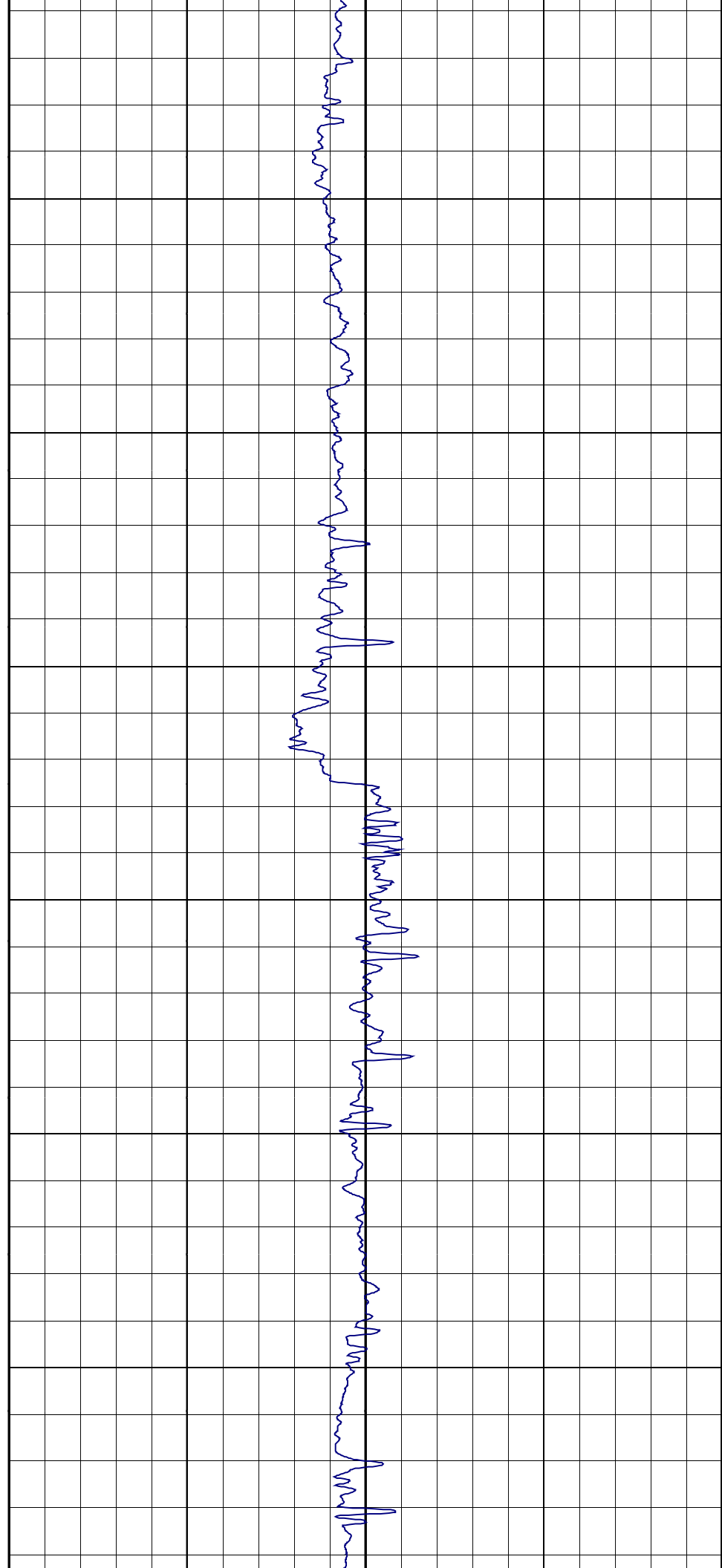
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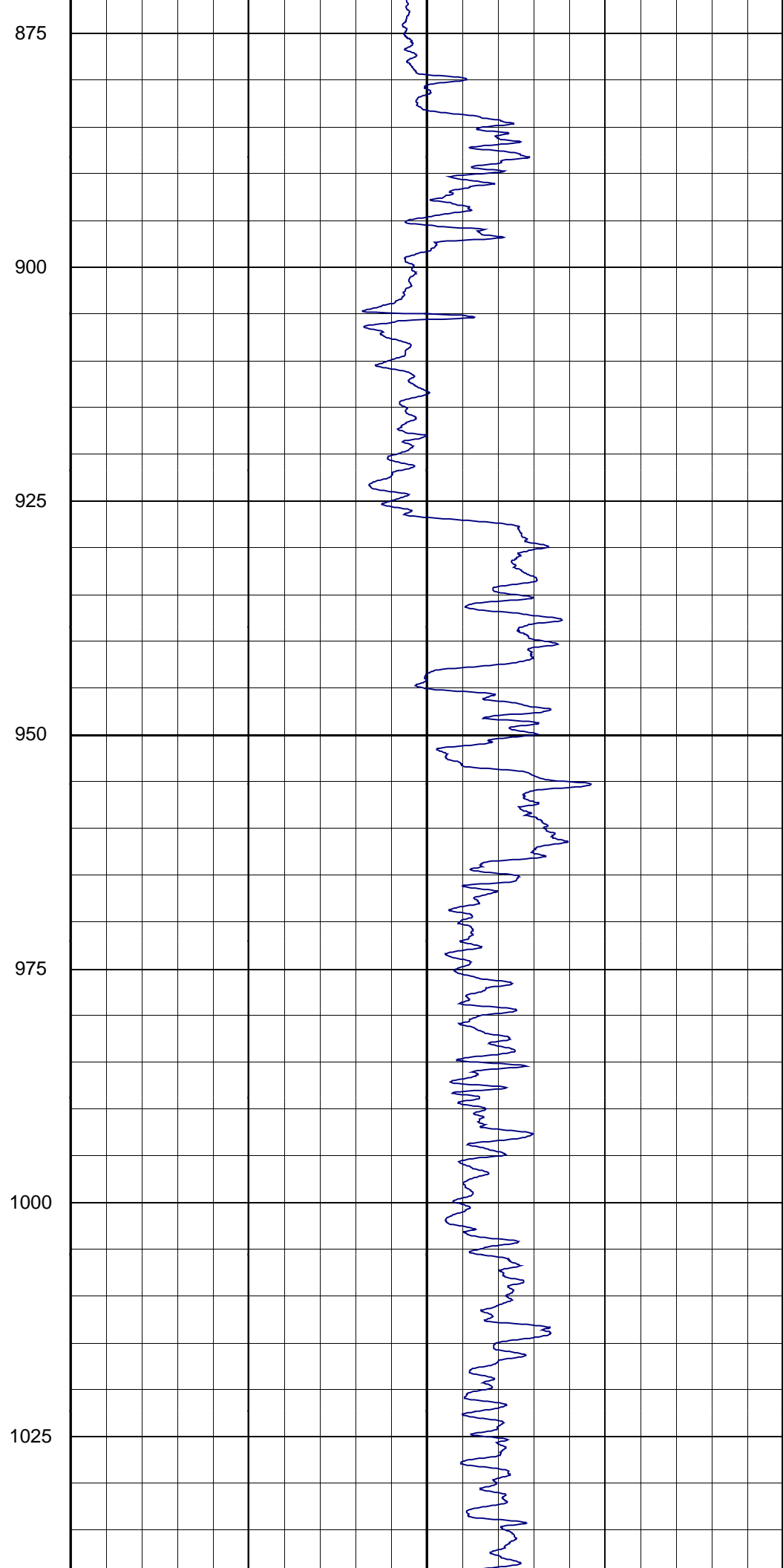
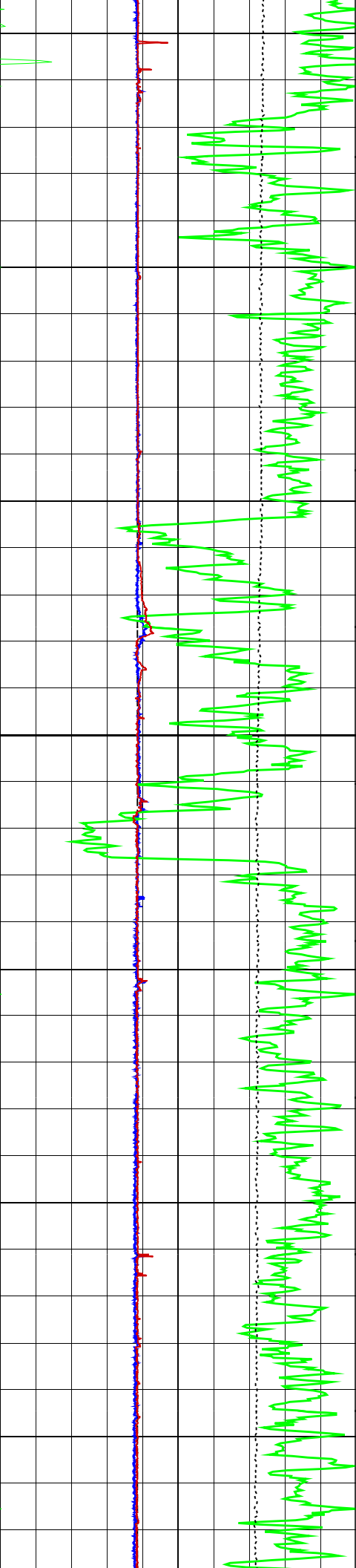
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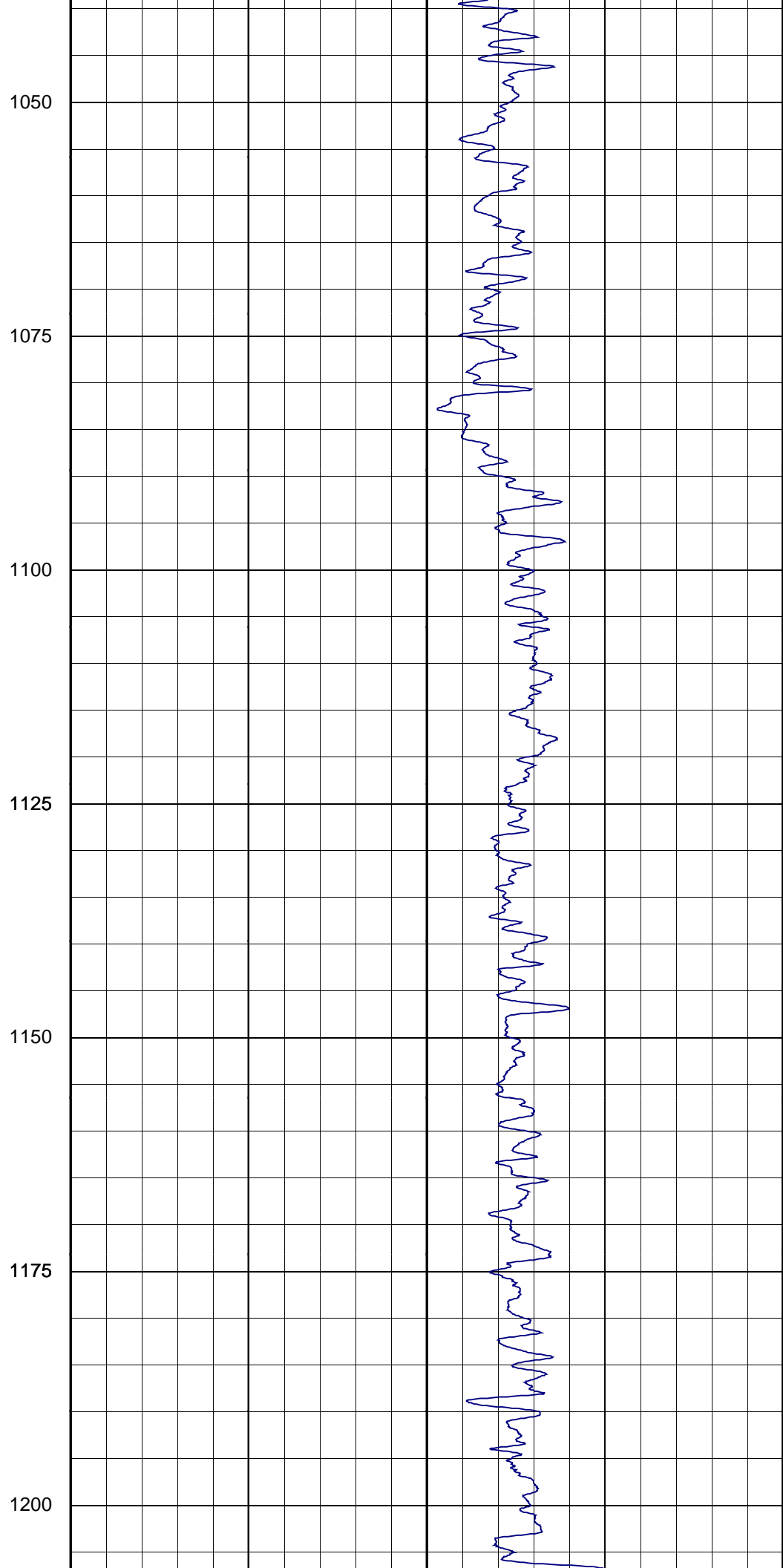
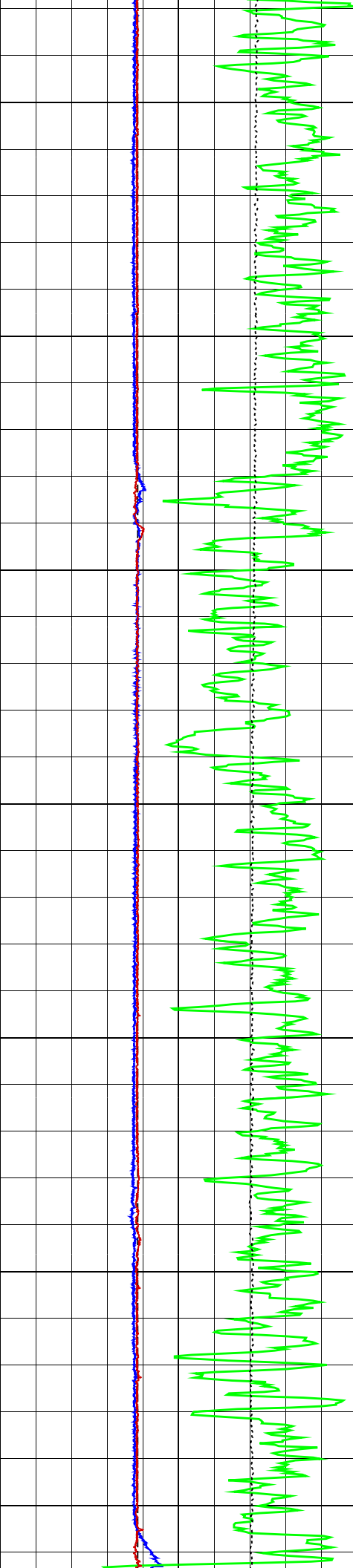
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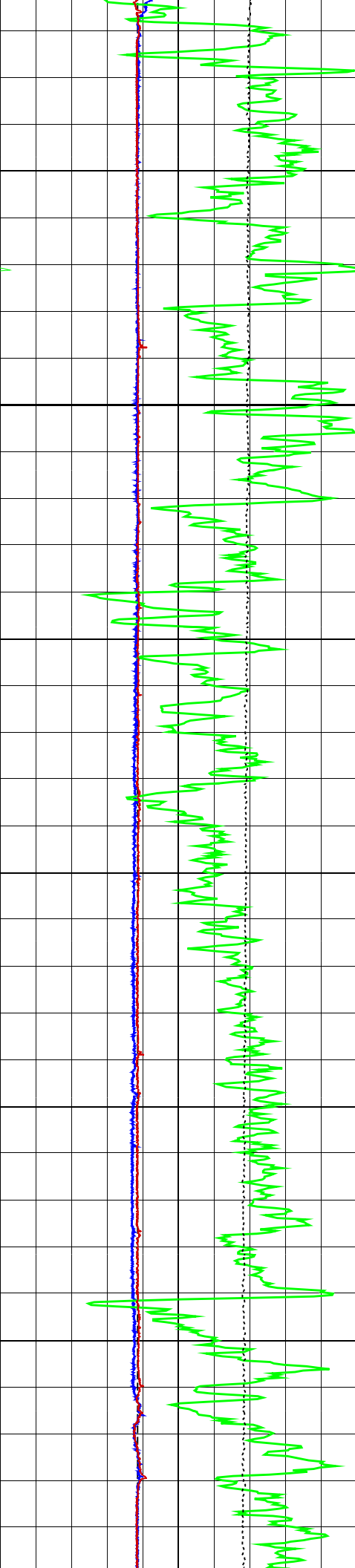
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1225

1250

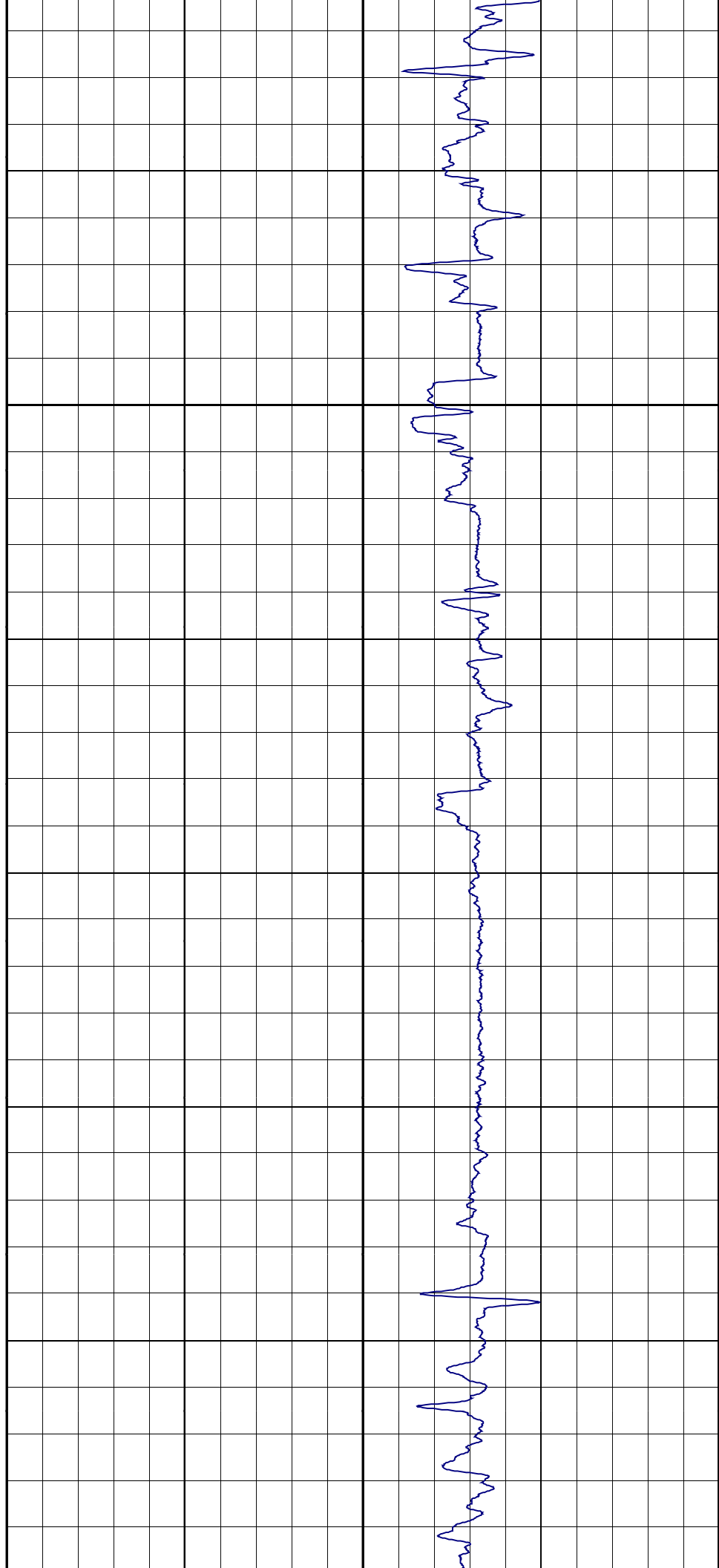
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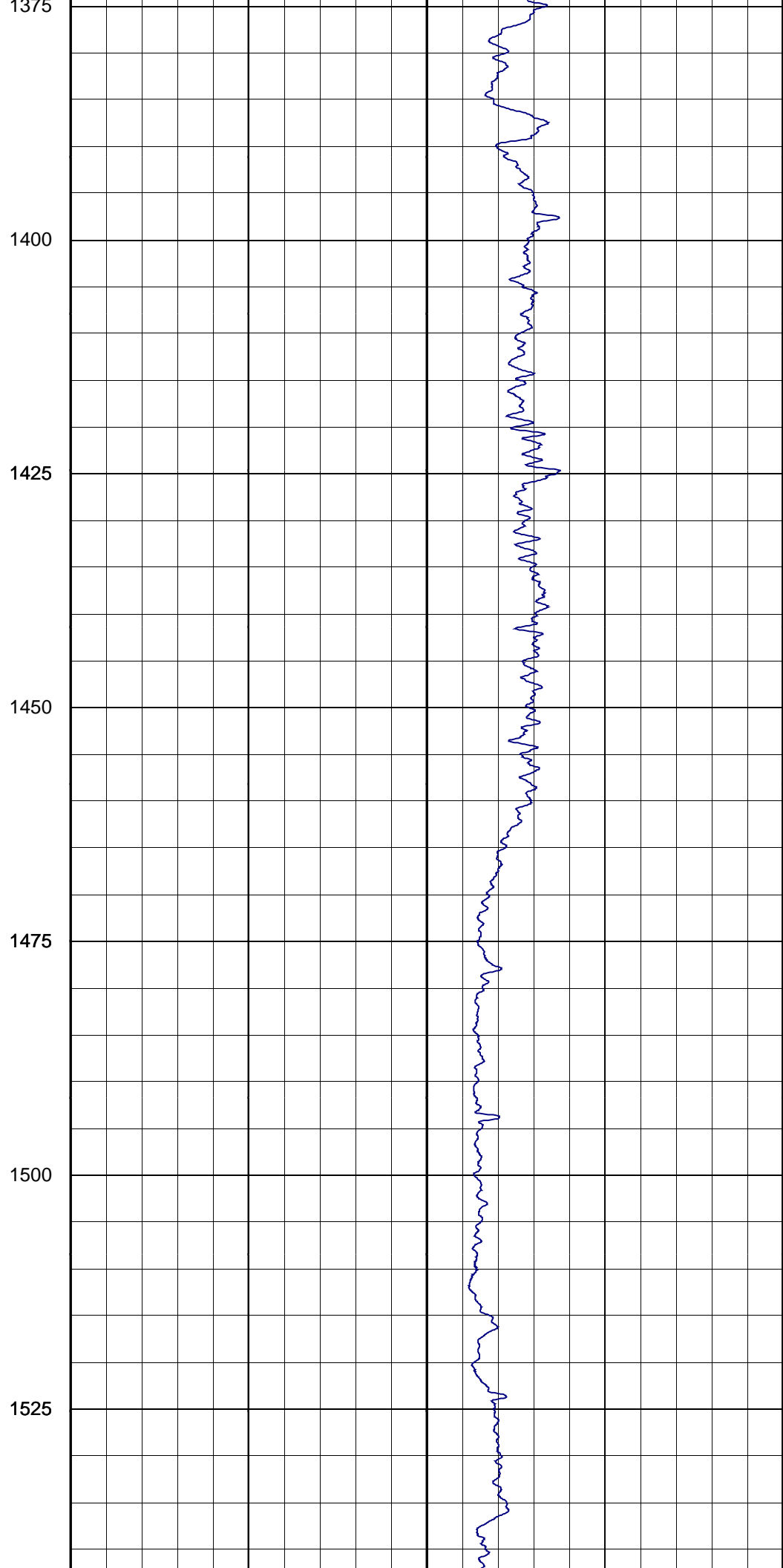
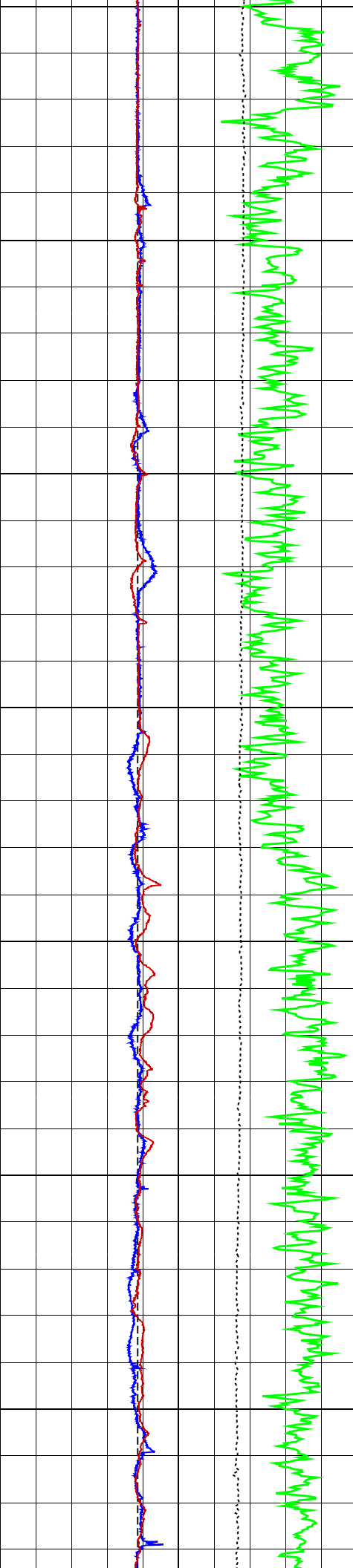
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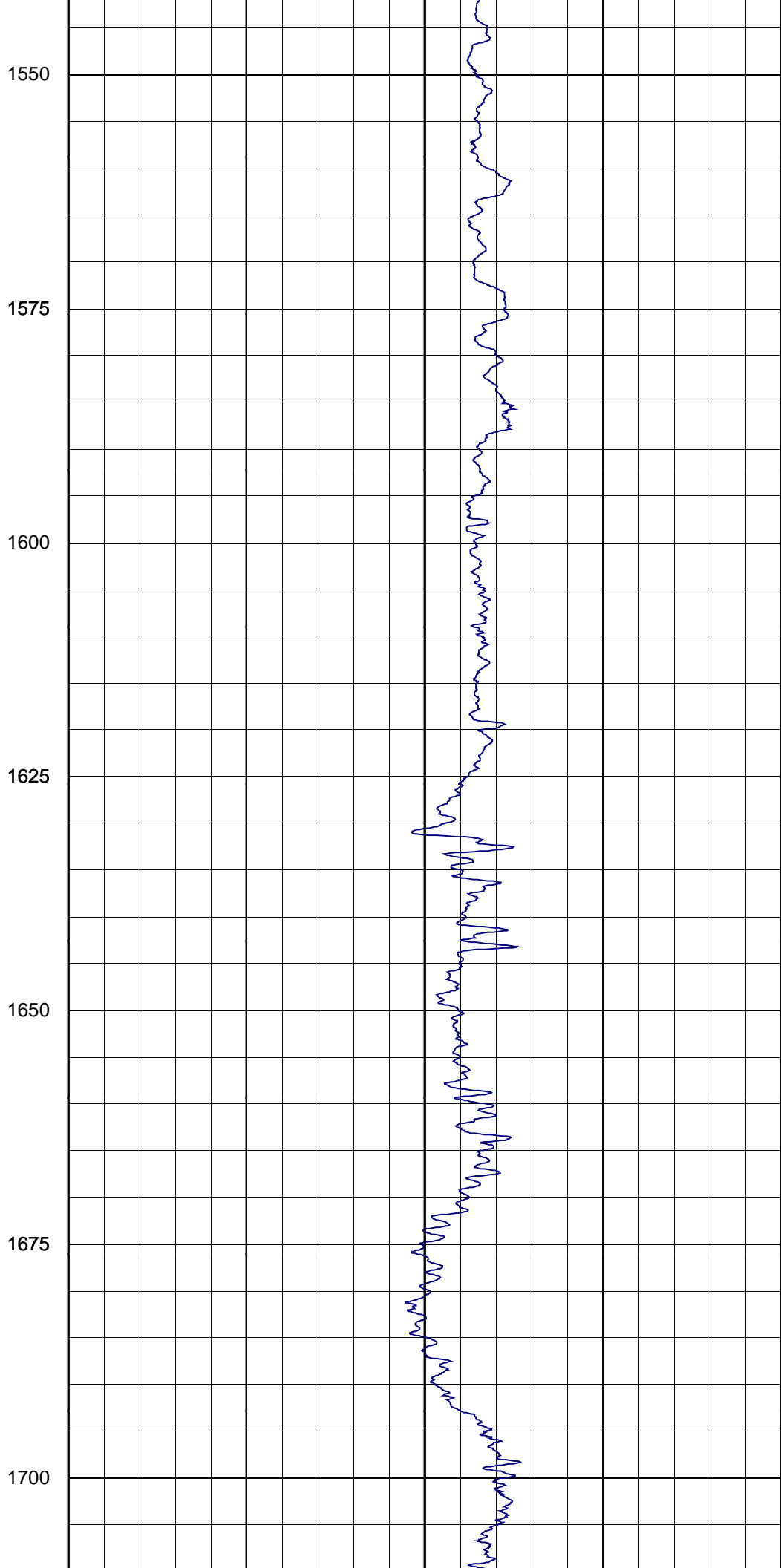
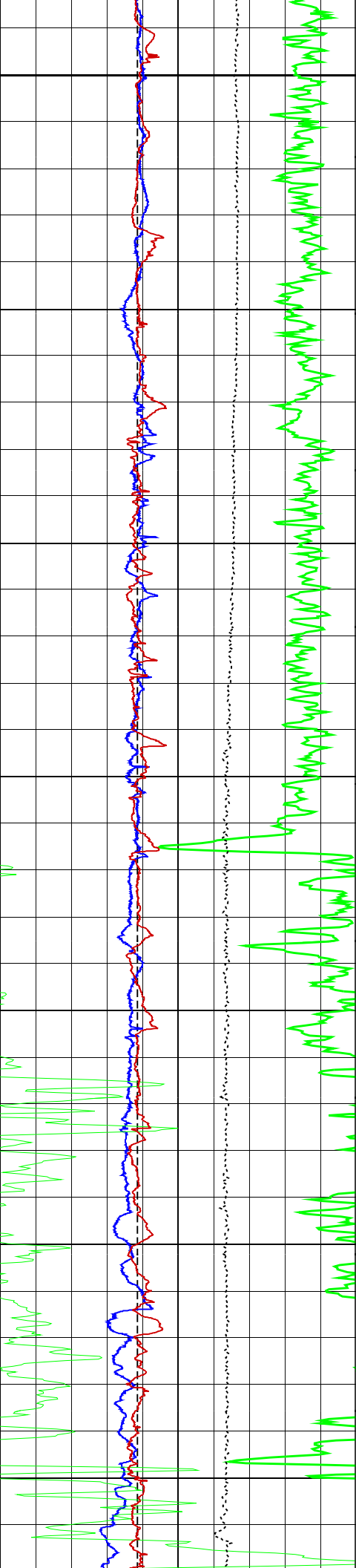
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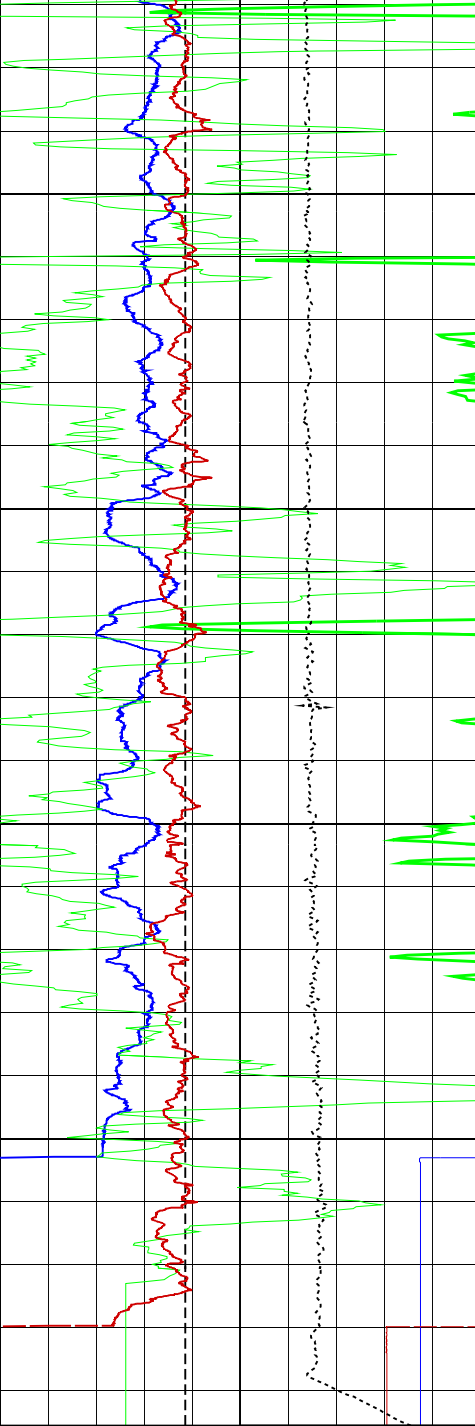
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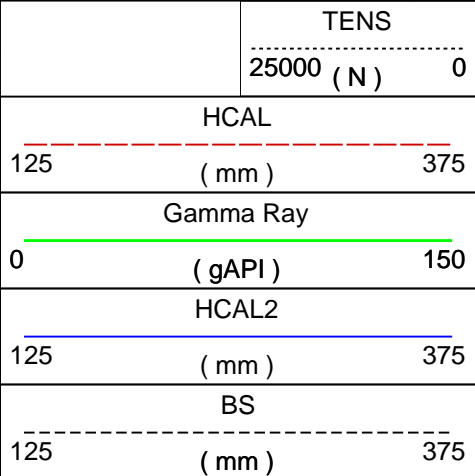
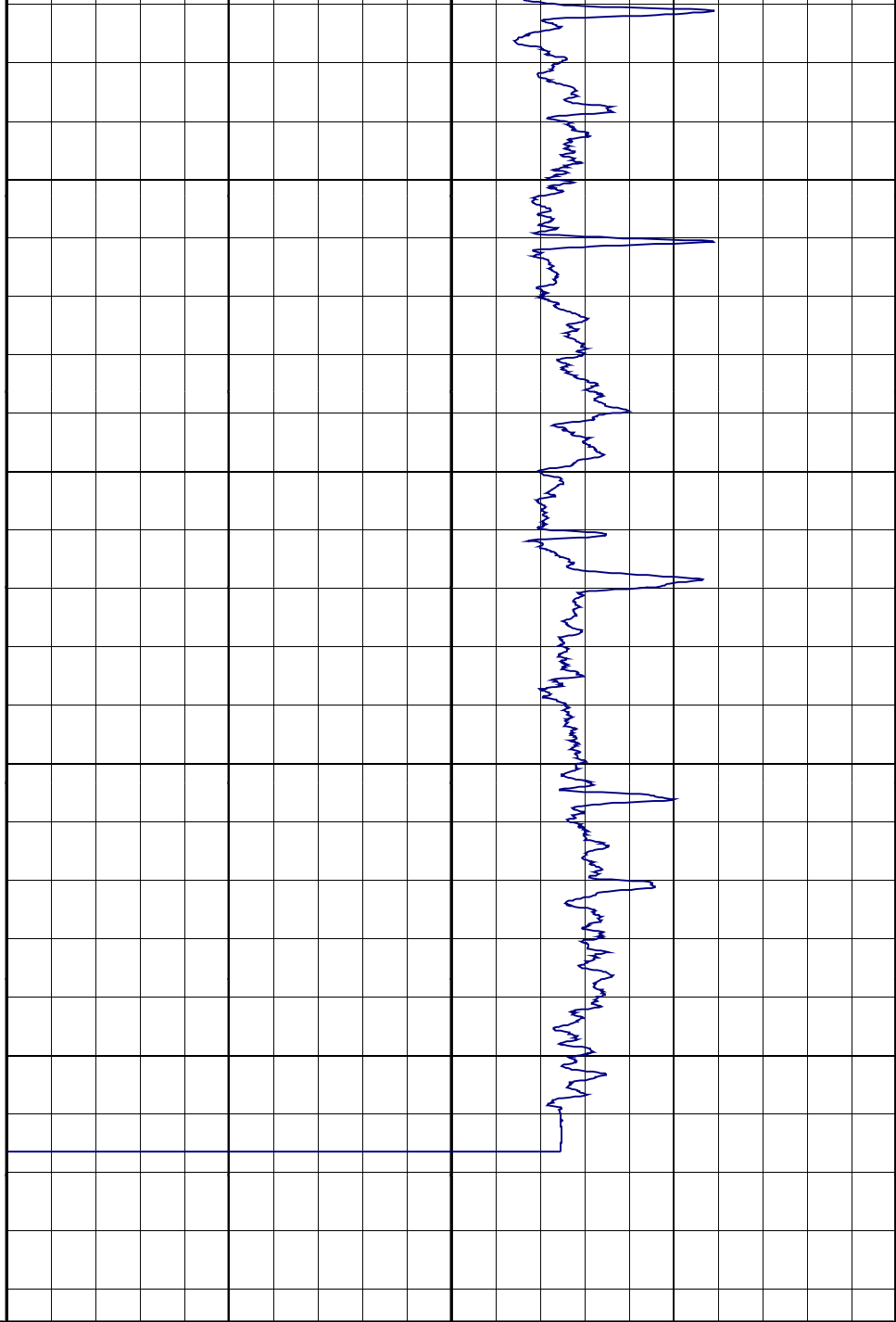


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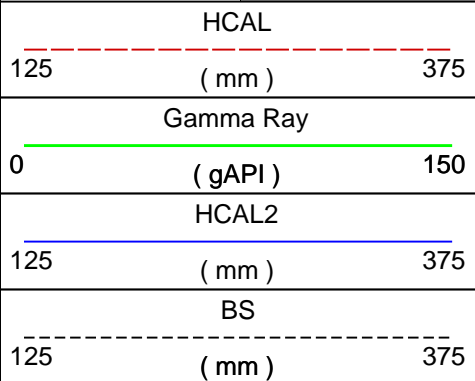
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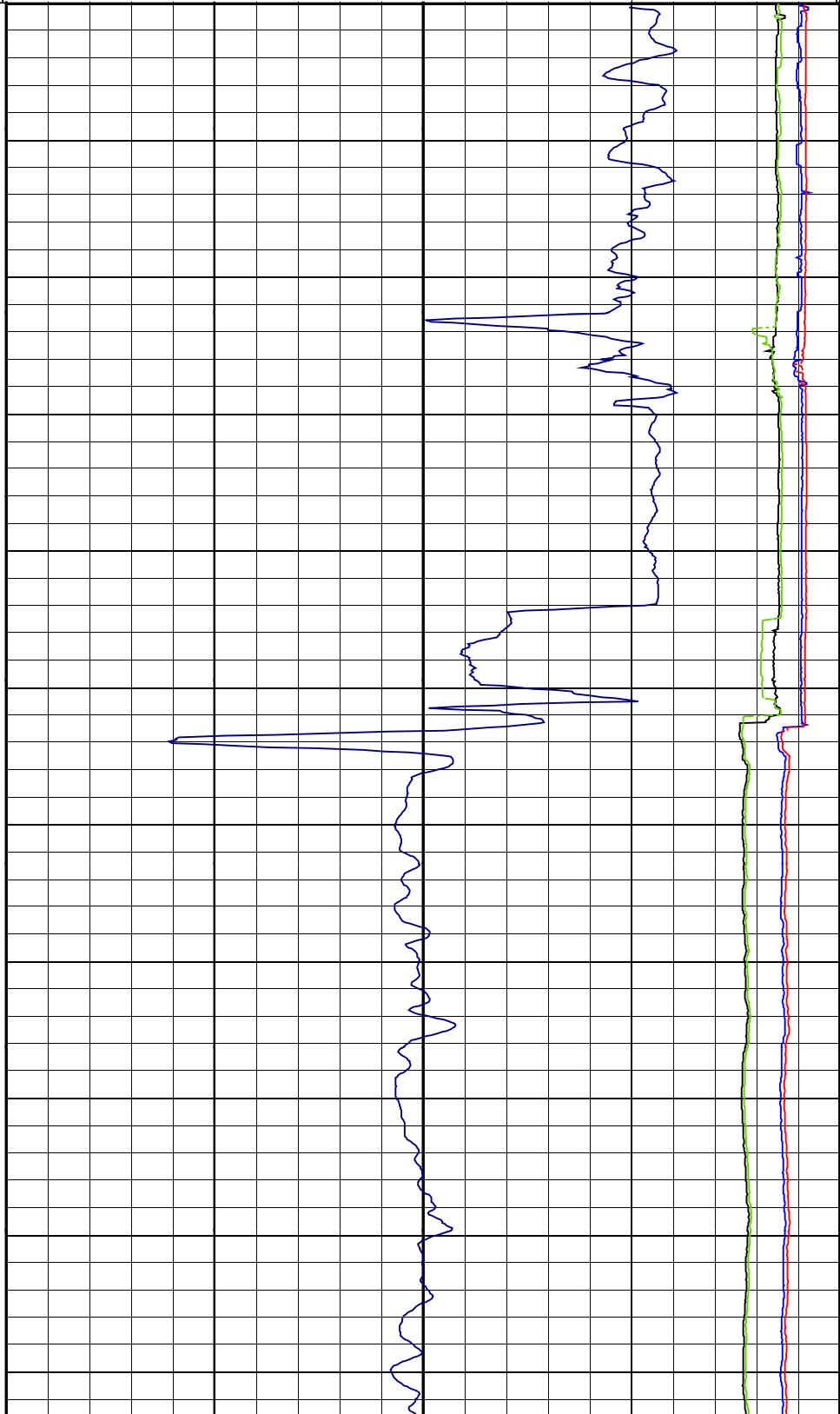
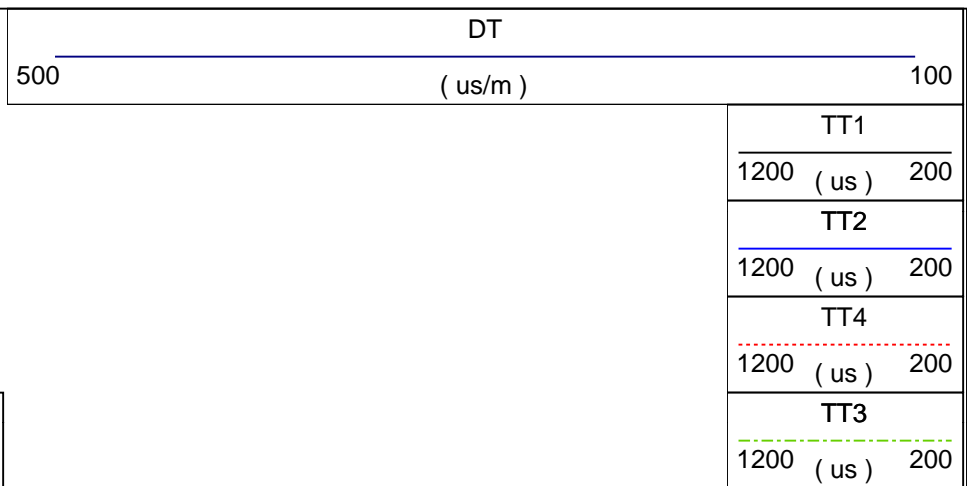
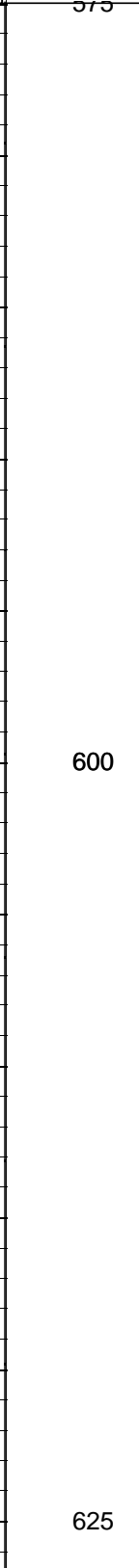
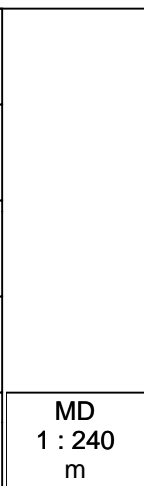
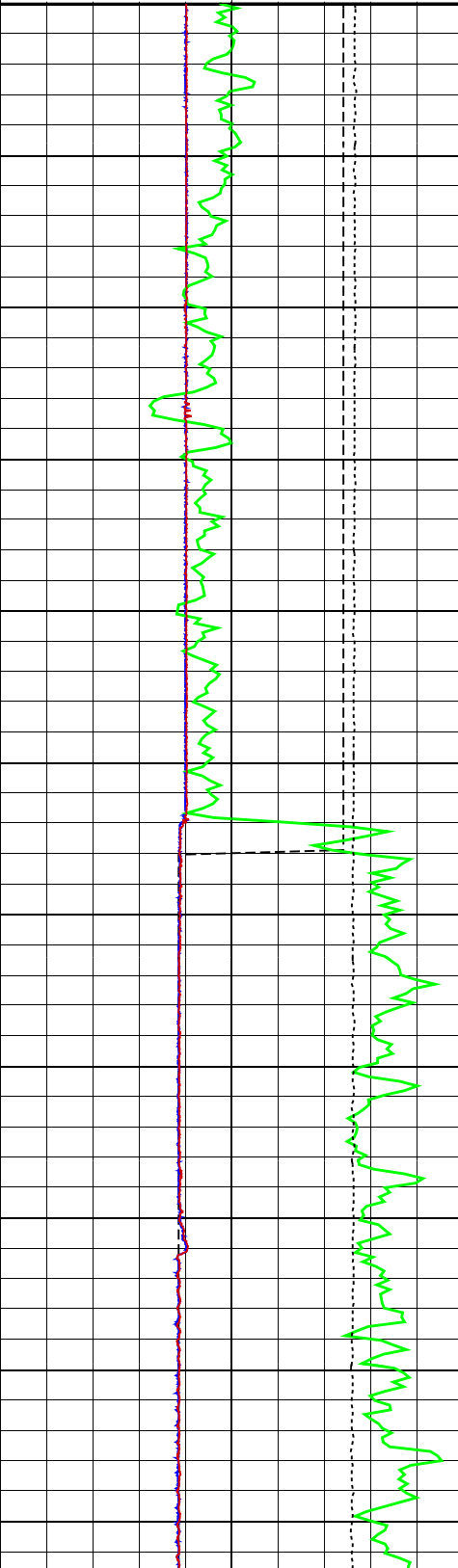
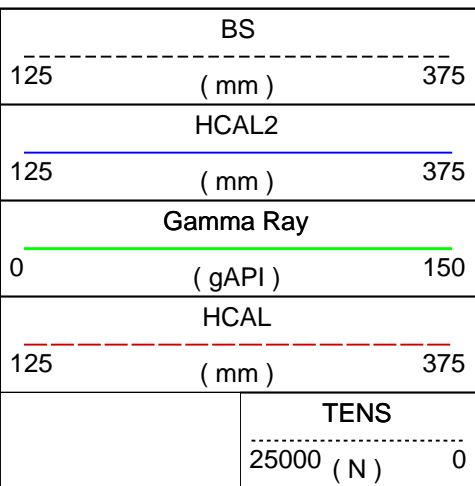
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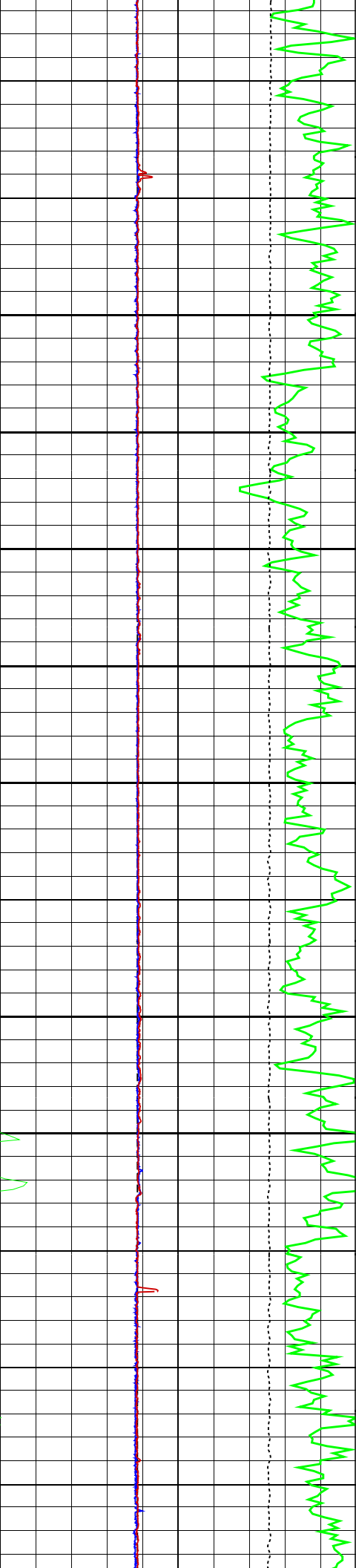


MD  
1 : 600  
m

DT  
( us/m )

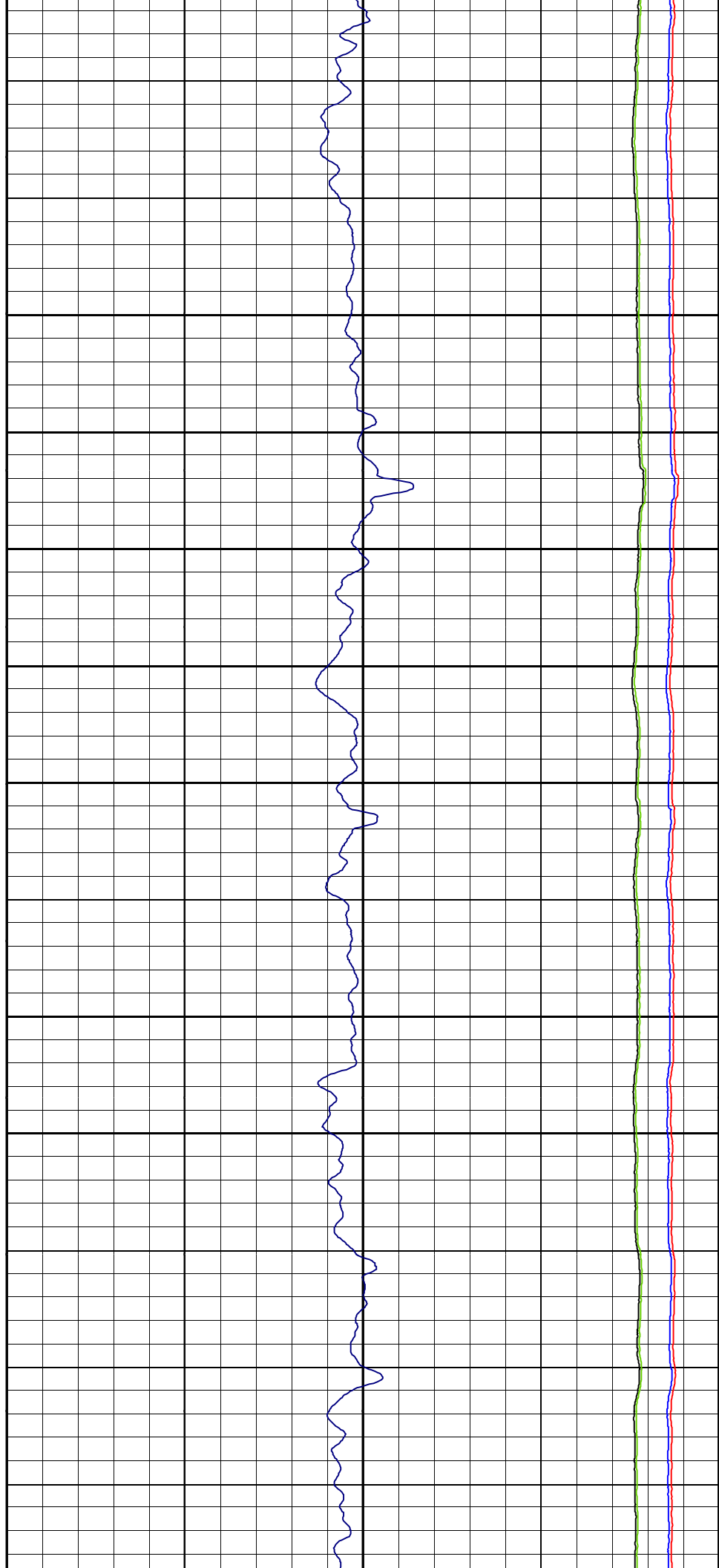


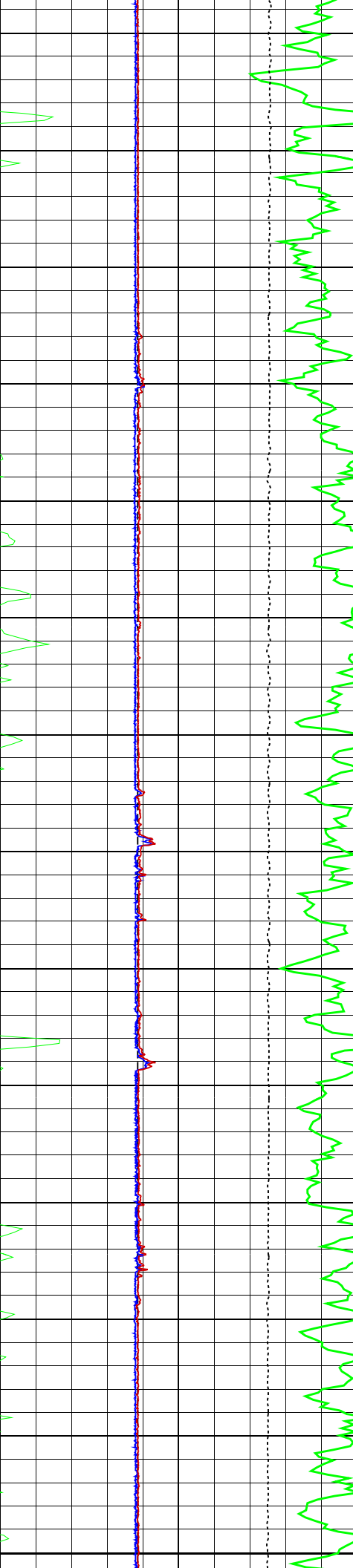




650

675

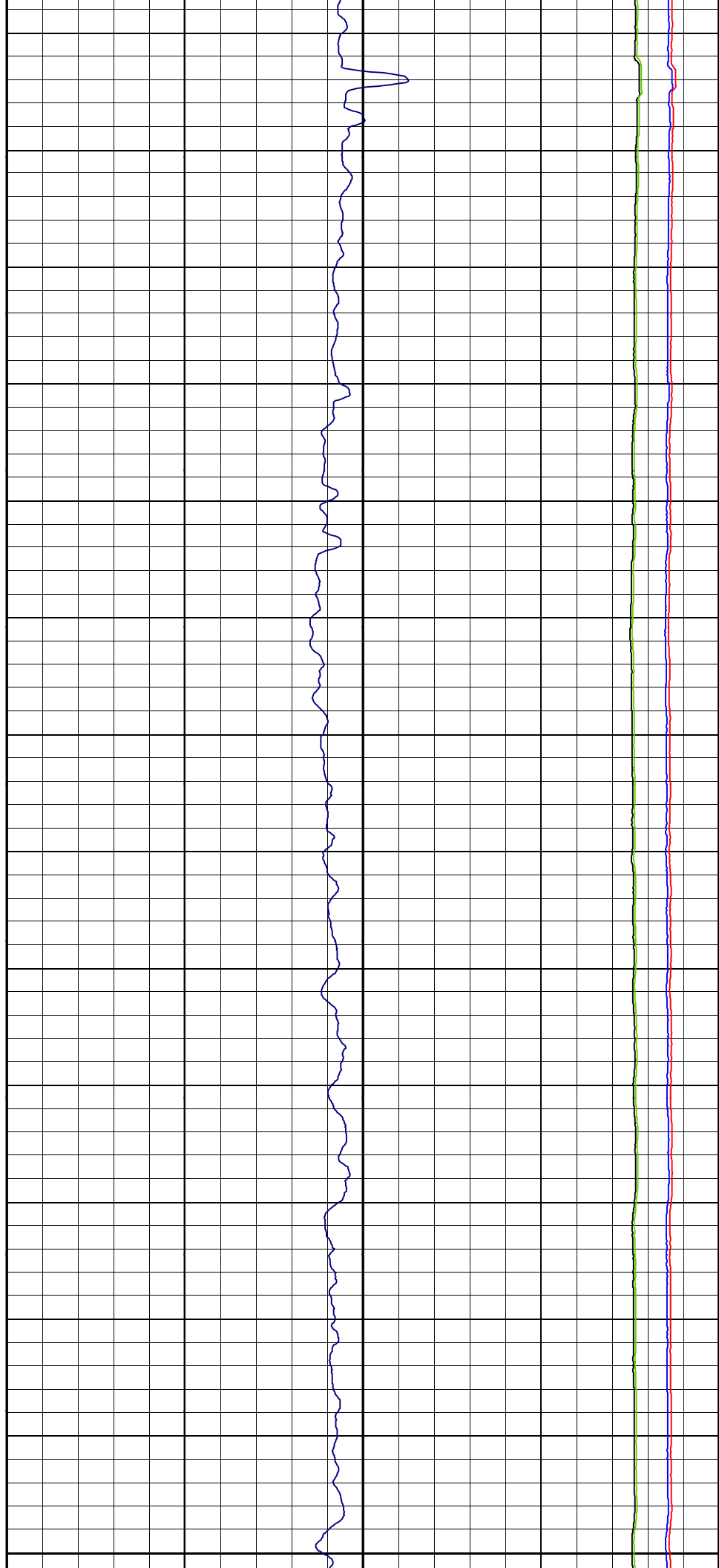




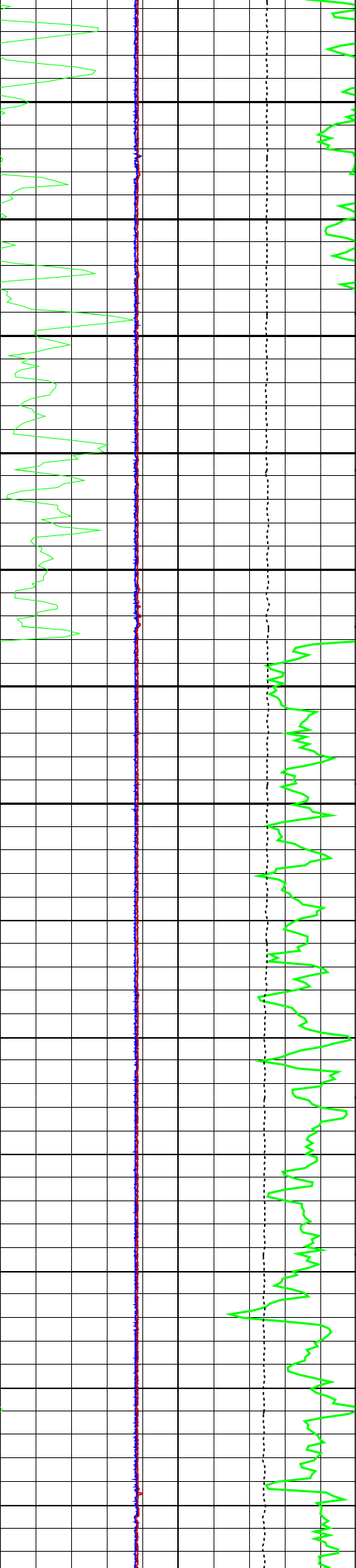
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725

750





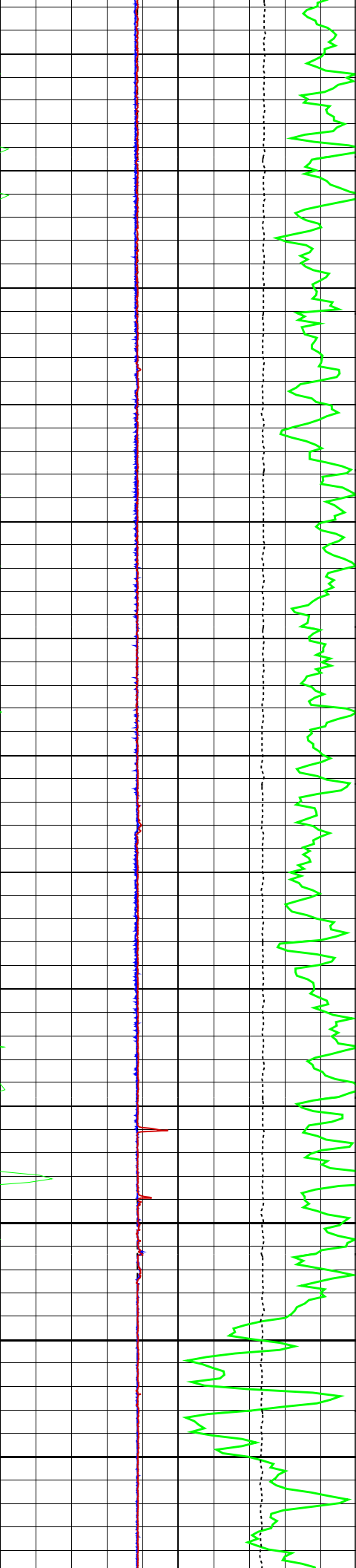


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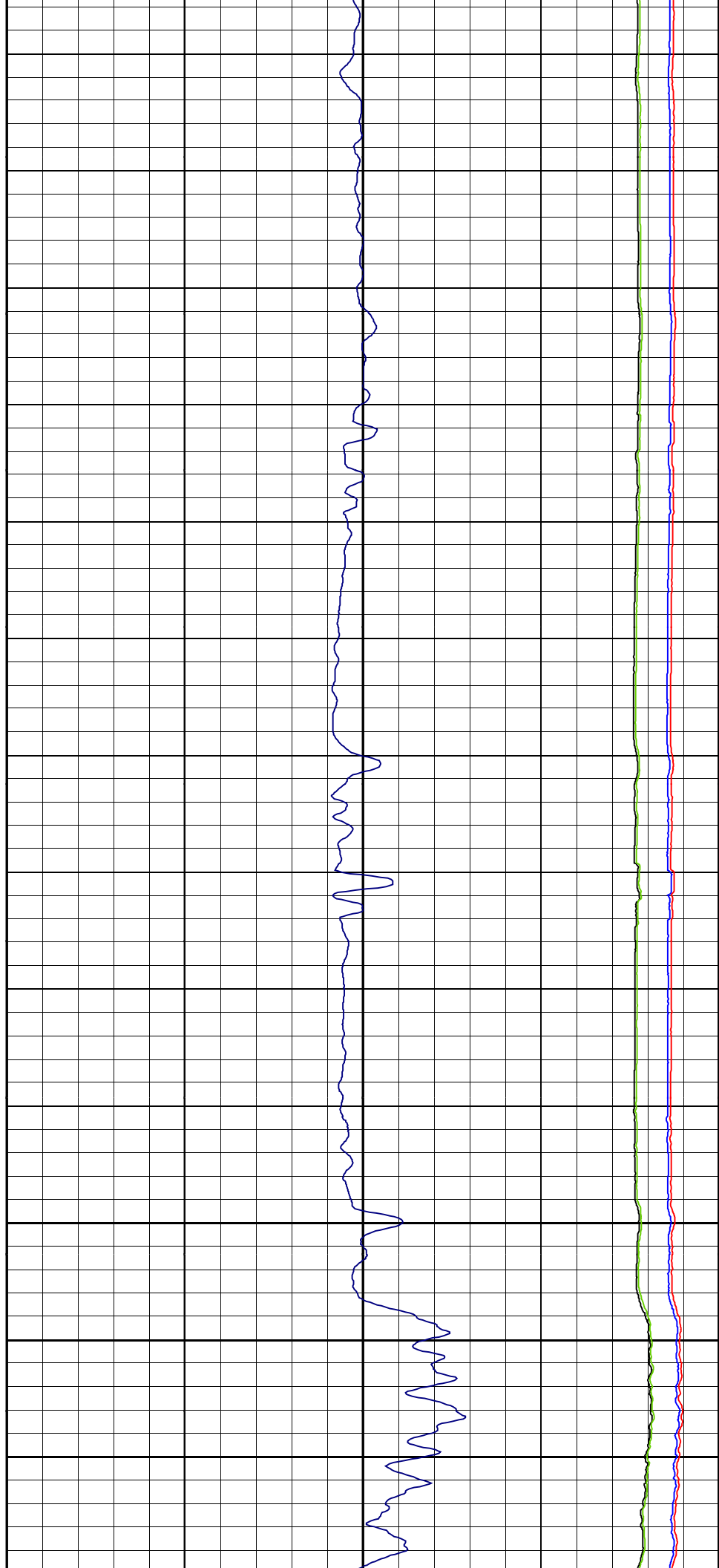
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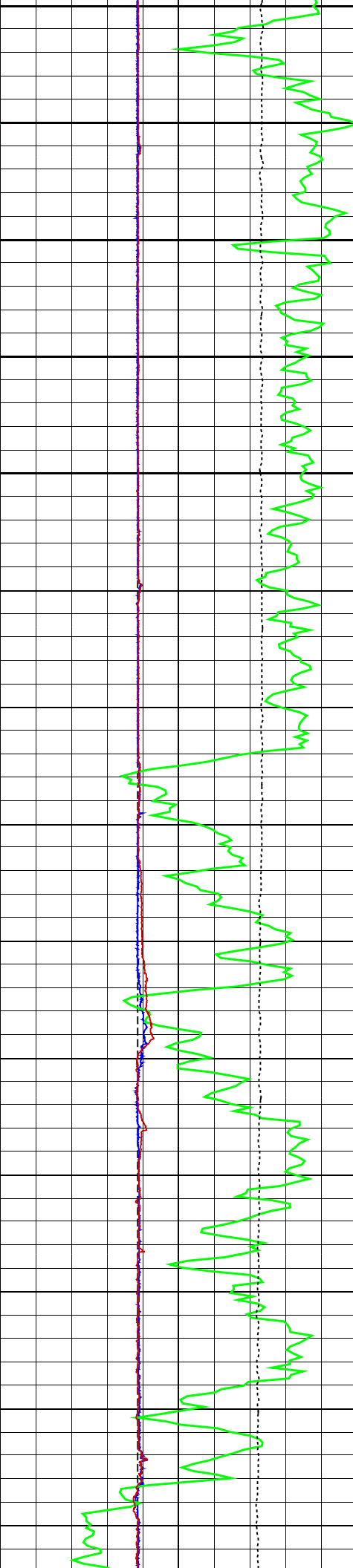




850

875



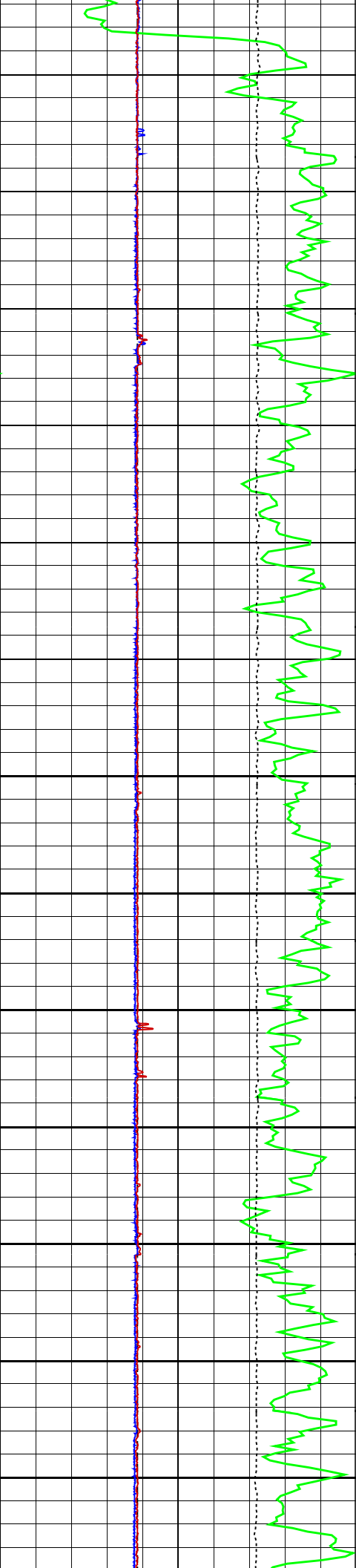


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925

950

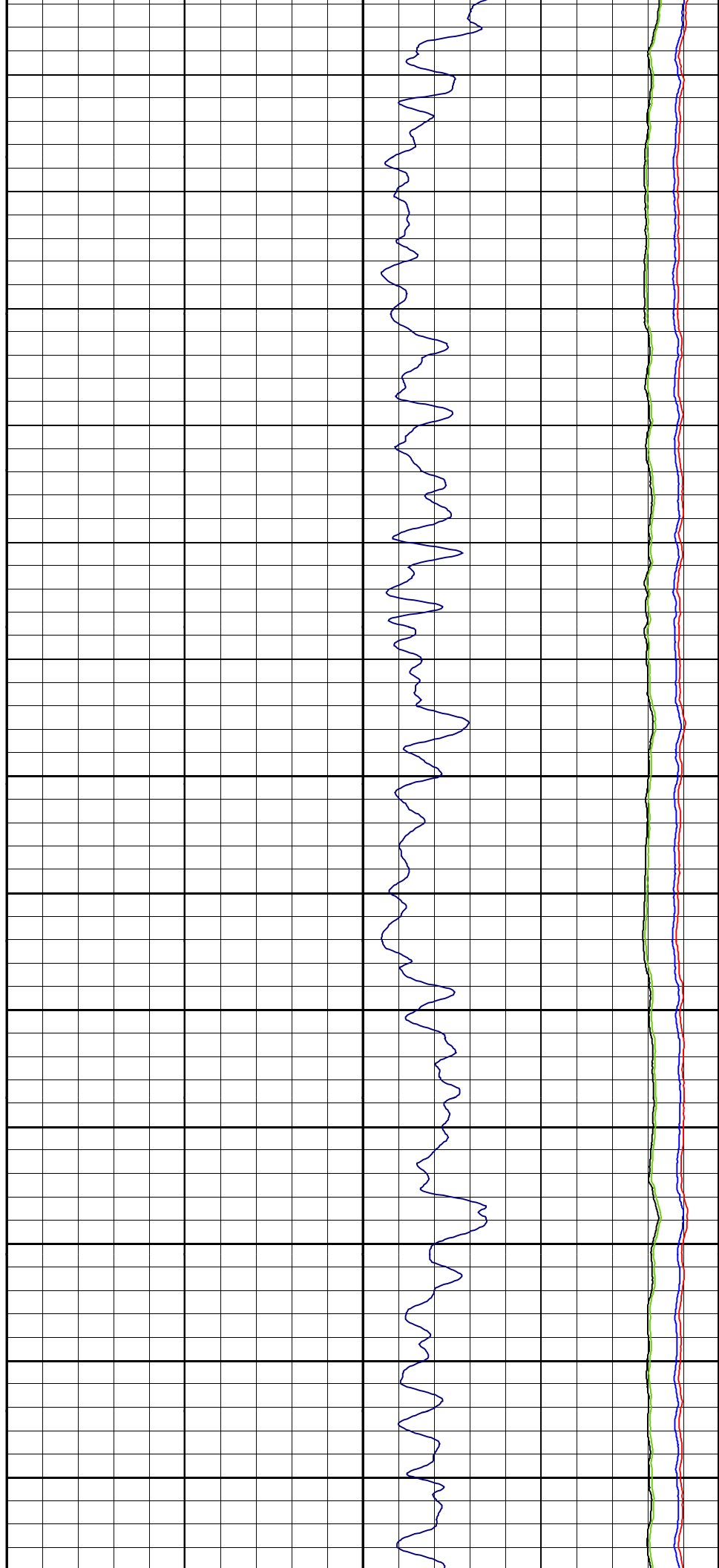


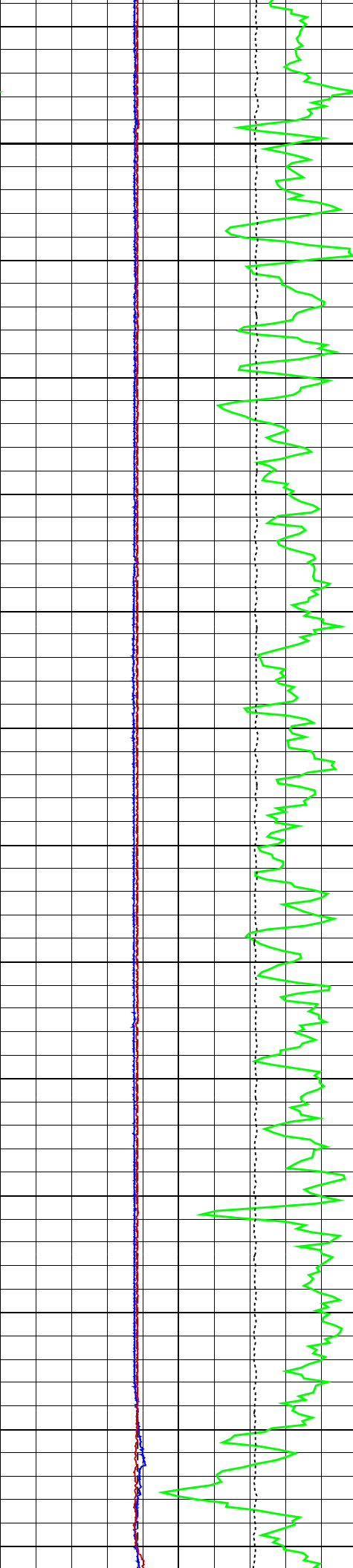


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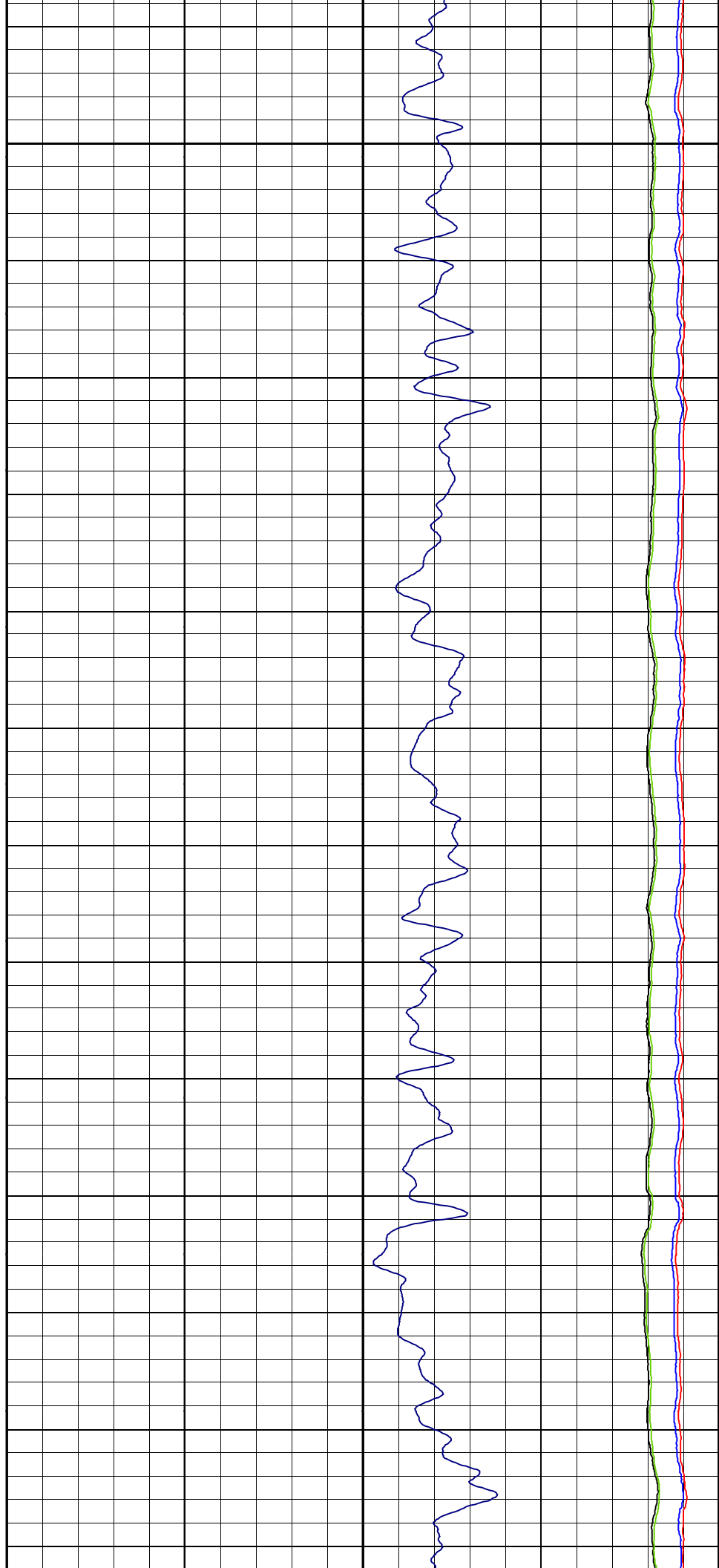
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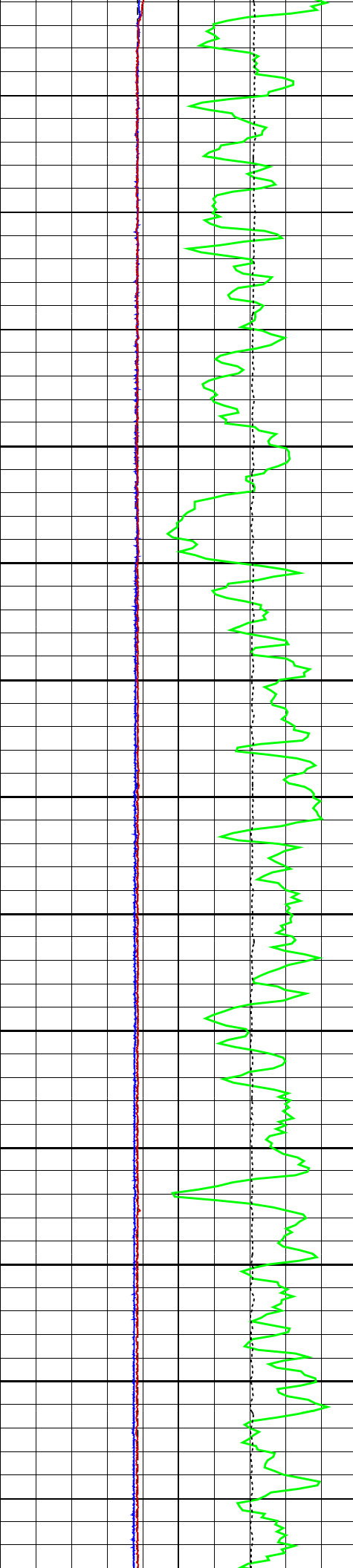




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1075

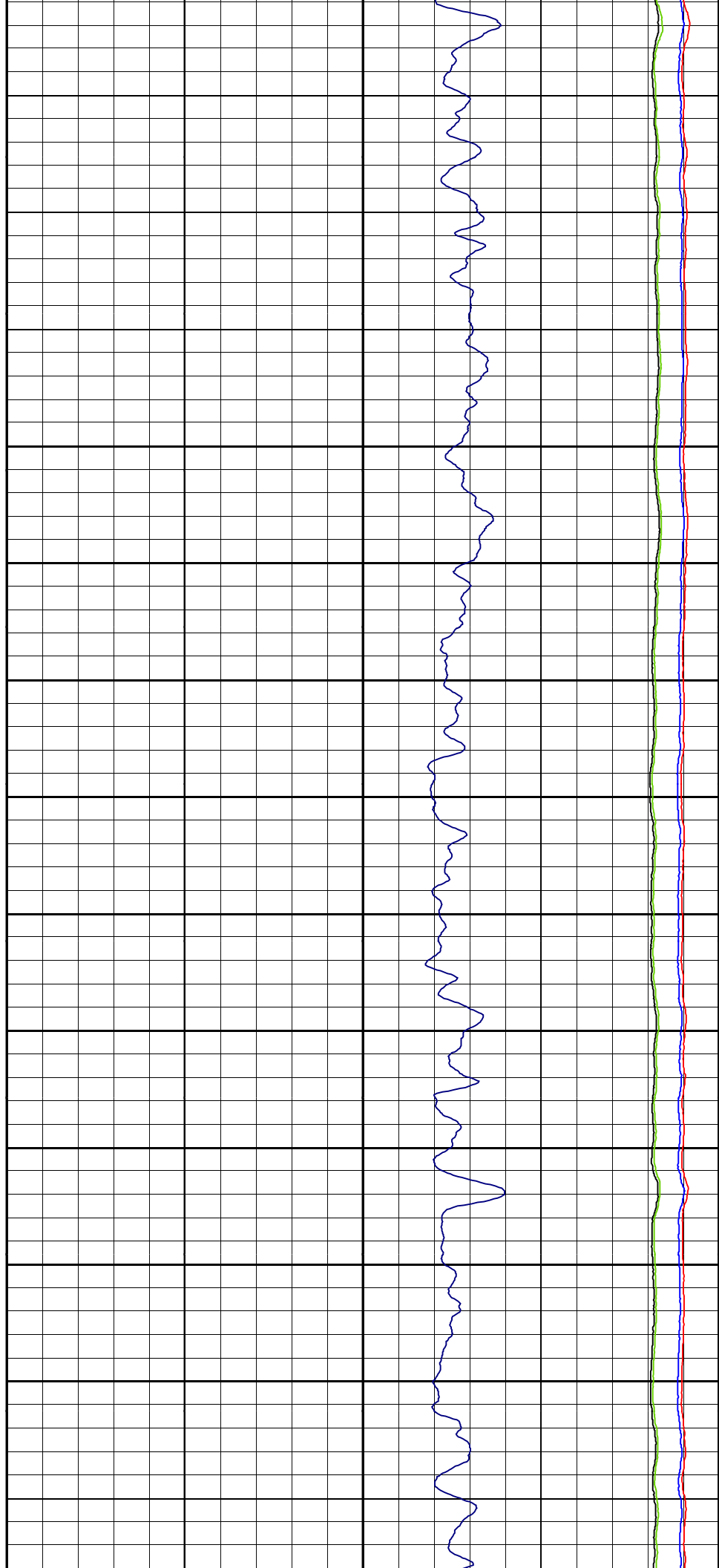


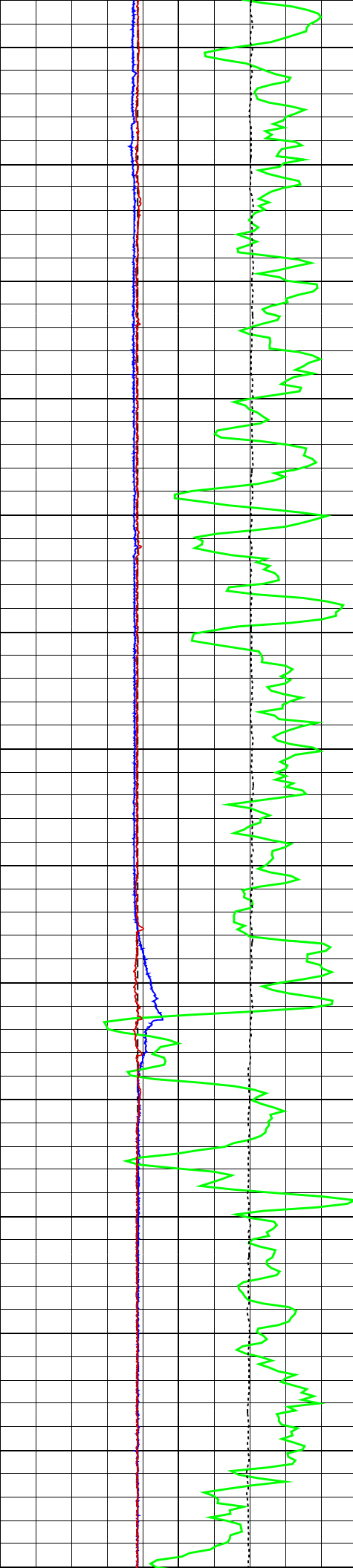


1100

1125

1150



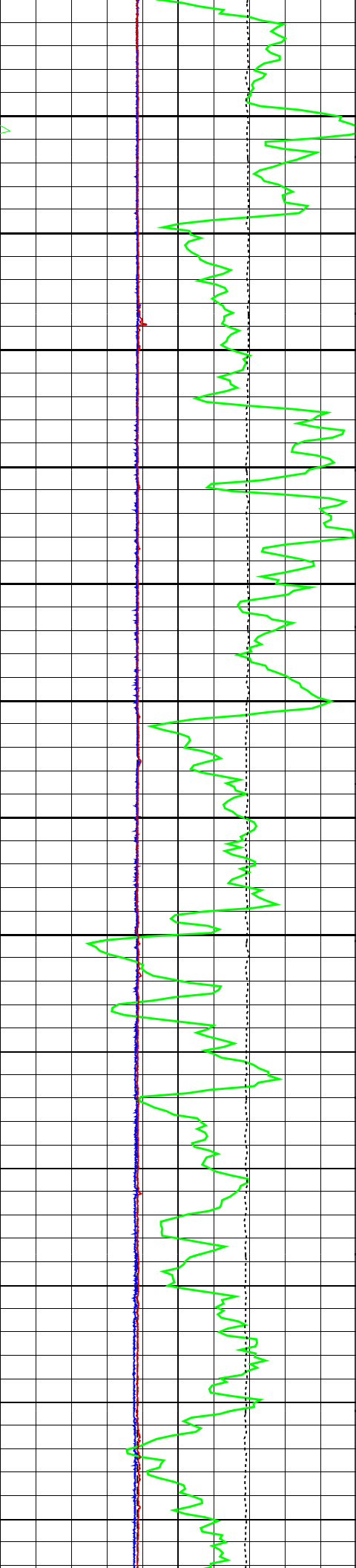


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1200

1225



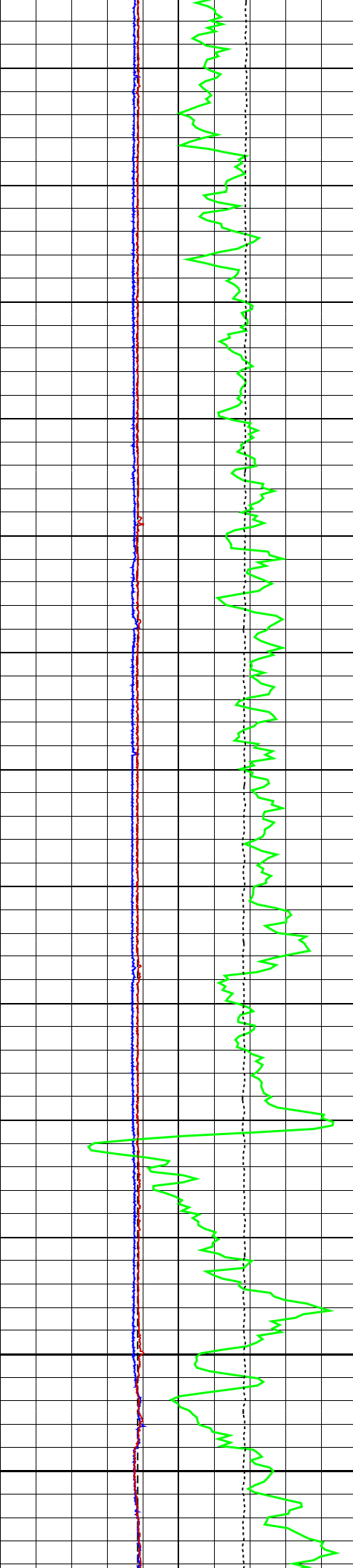


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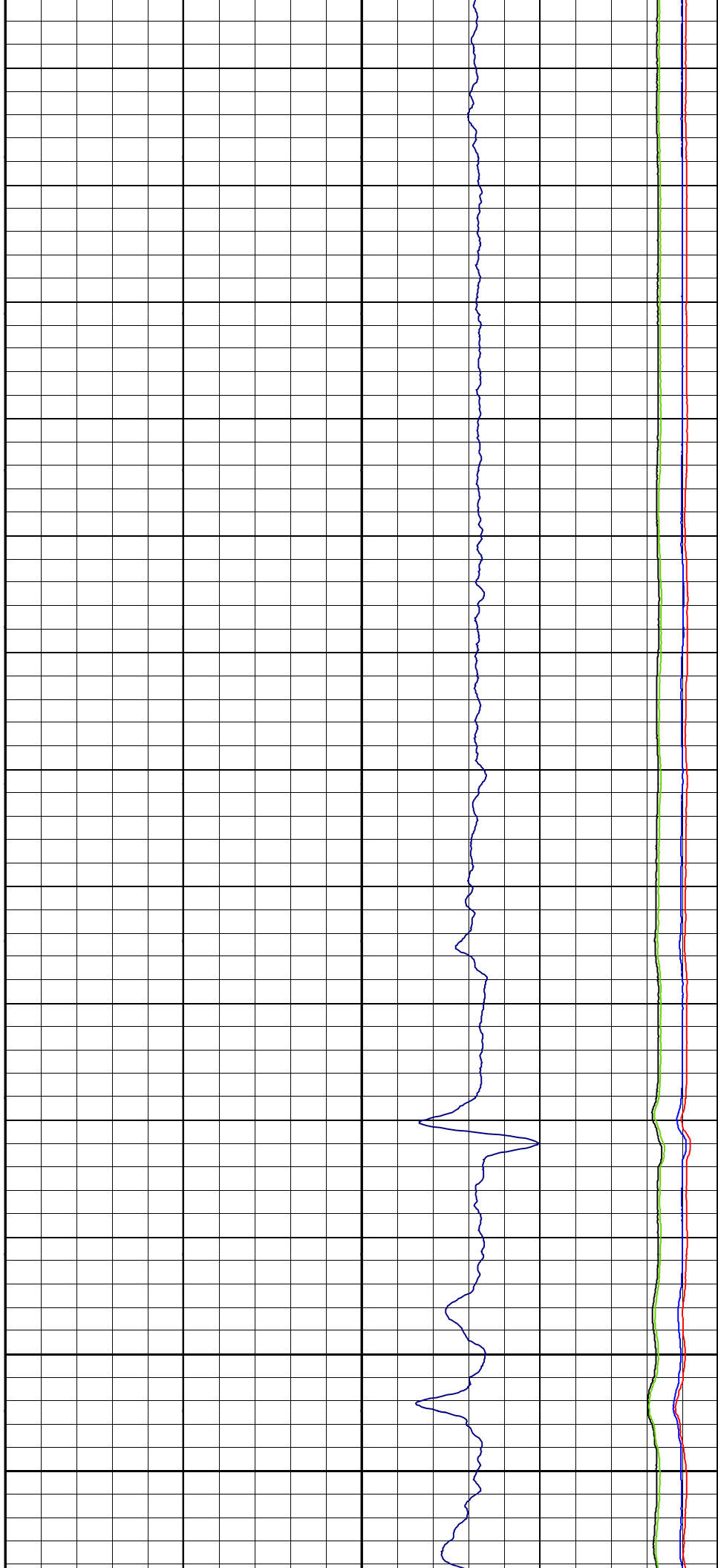


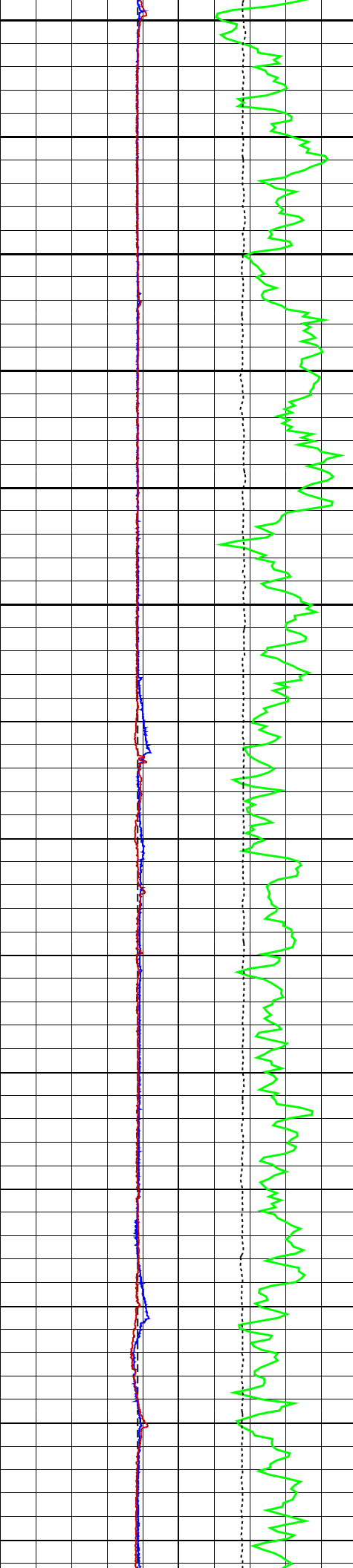


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1325

1350

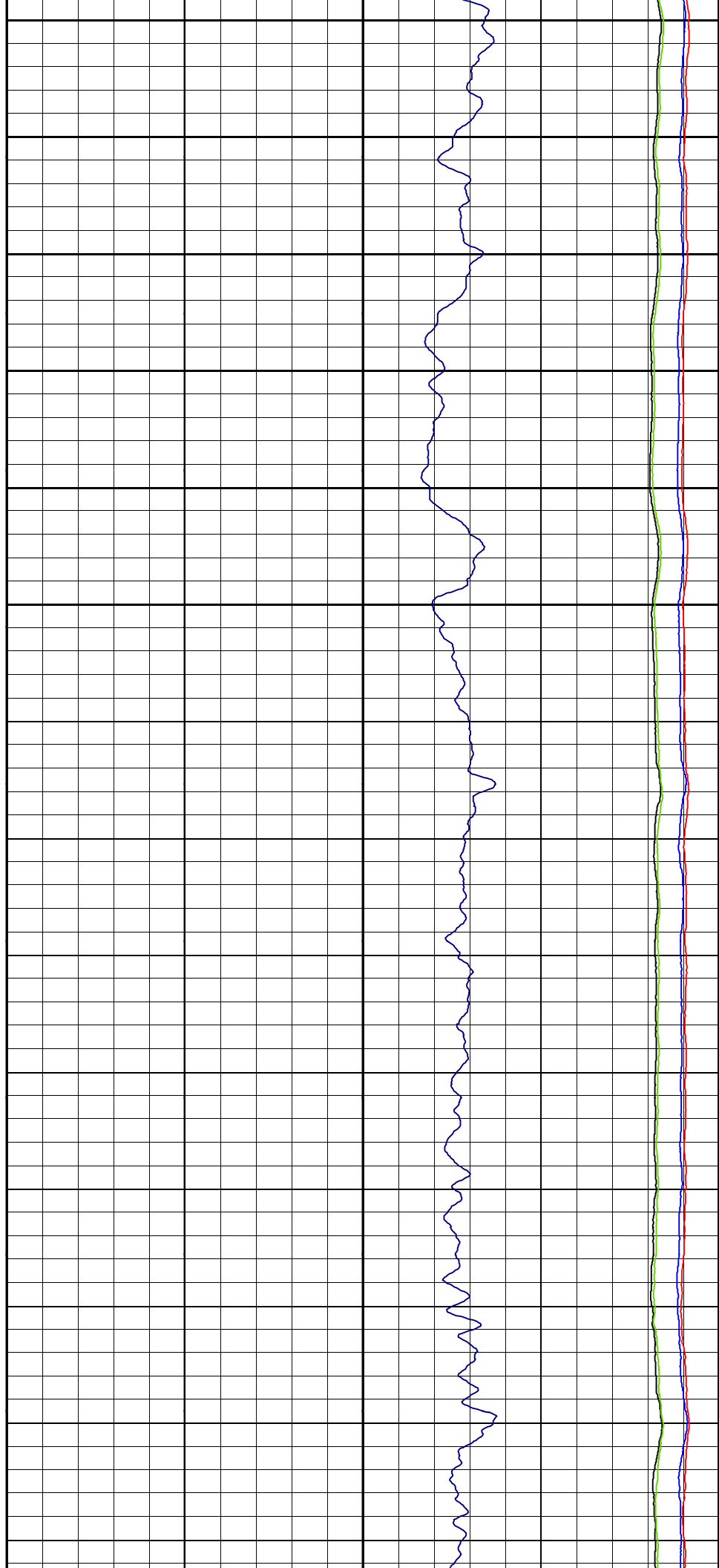


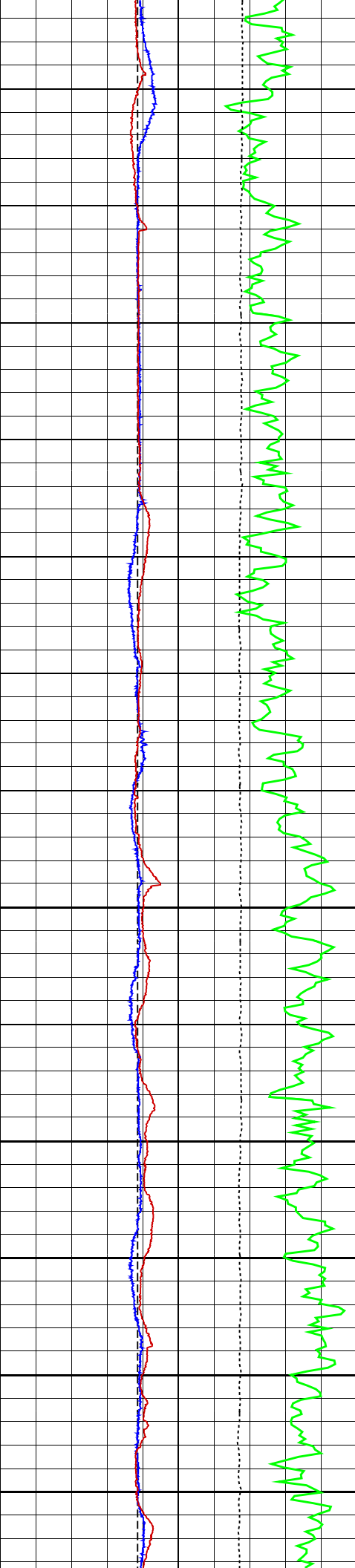


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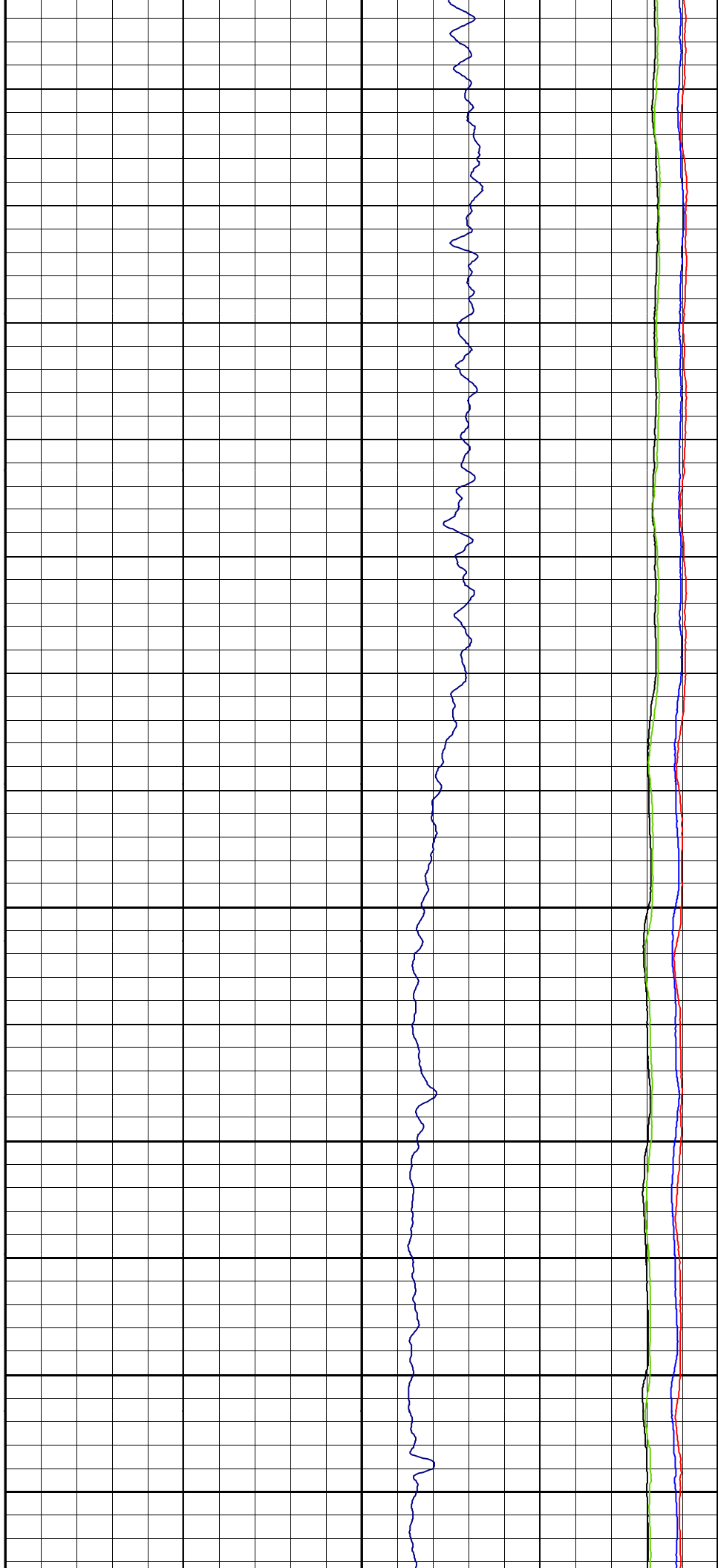
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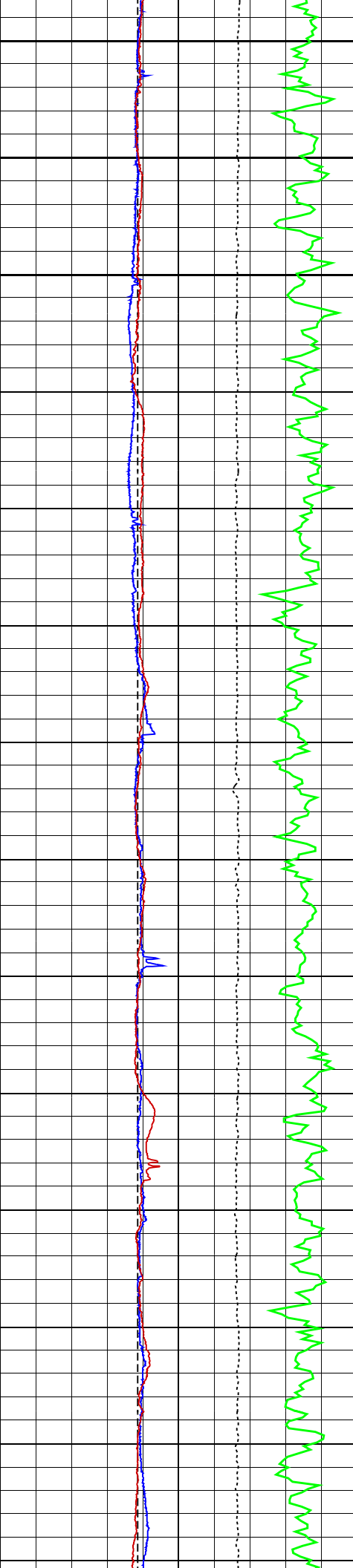




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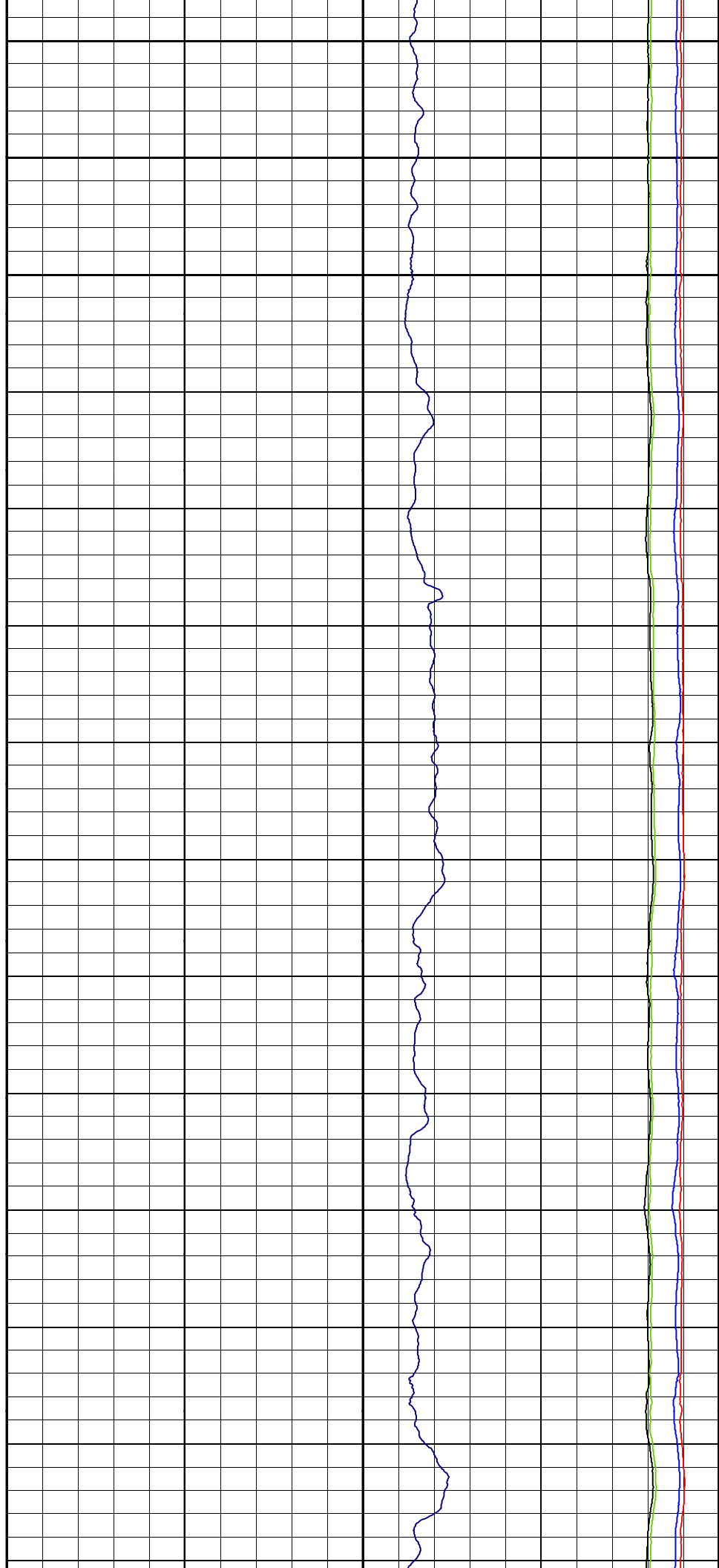


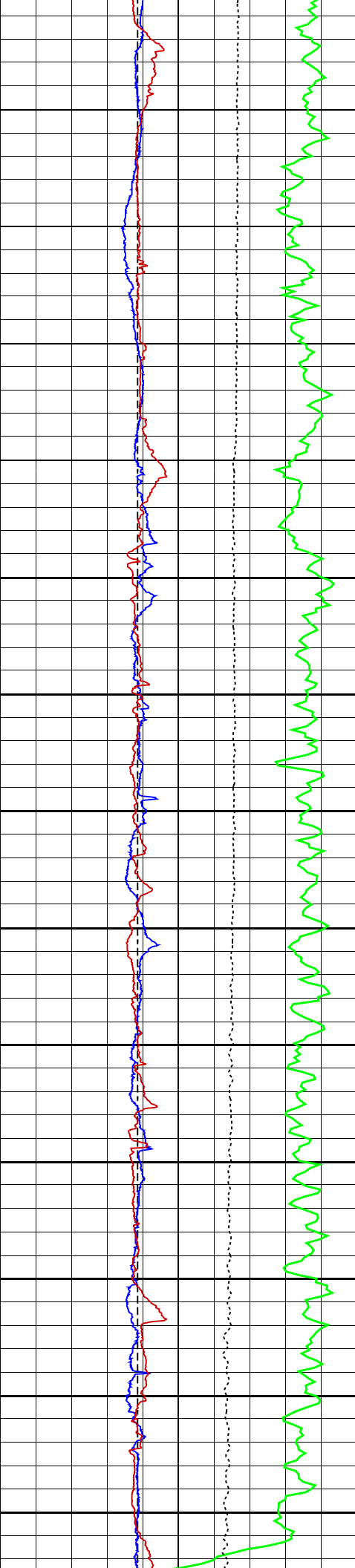


1500

1525

1550



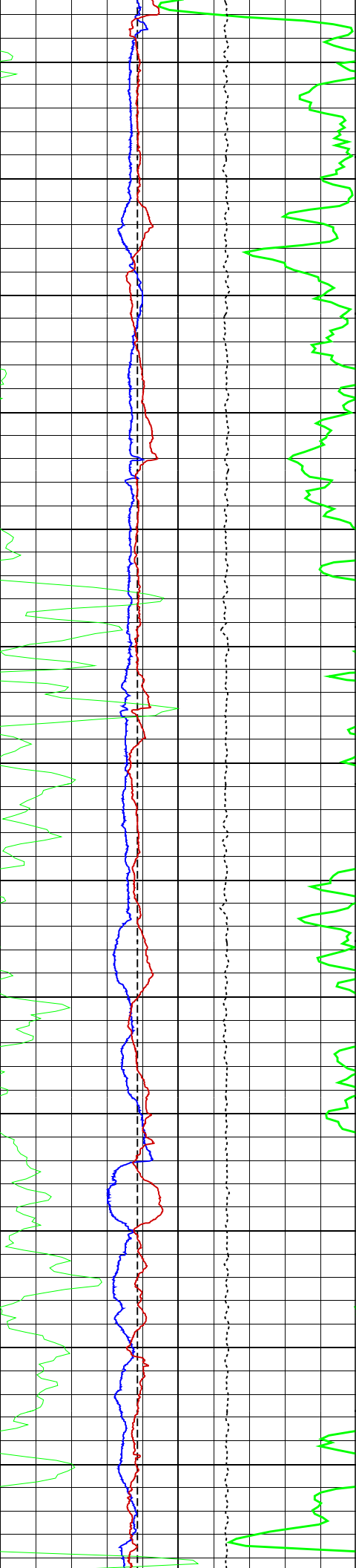


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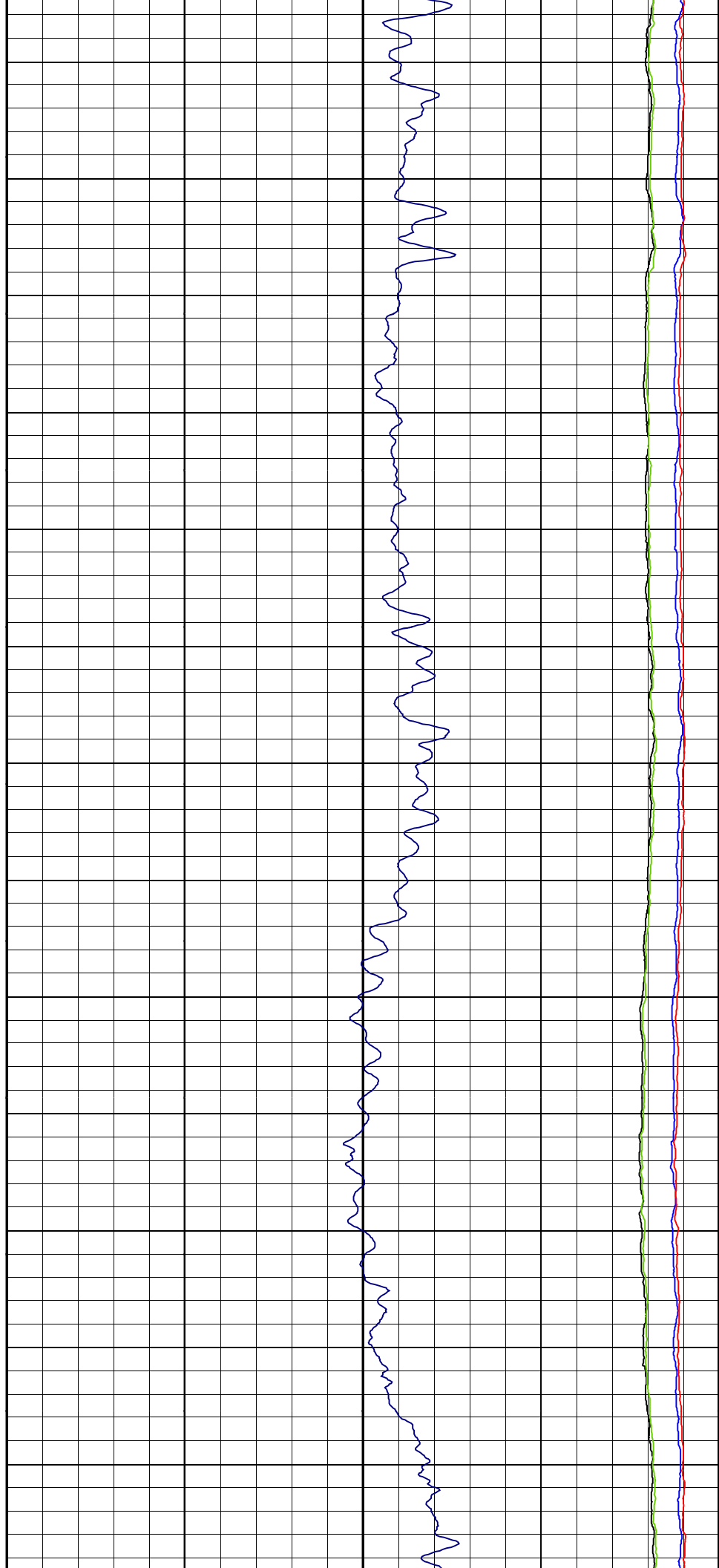
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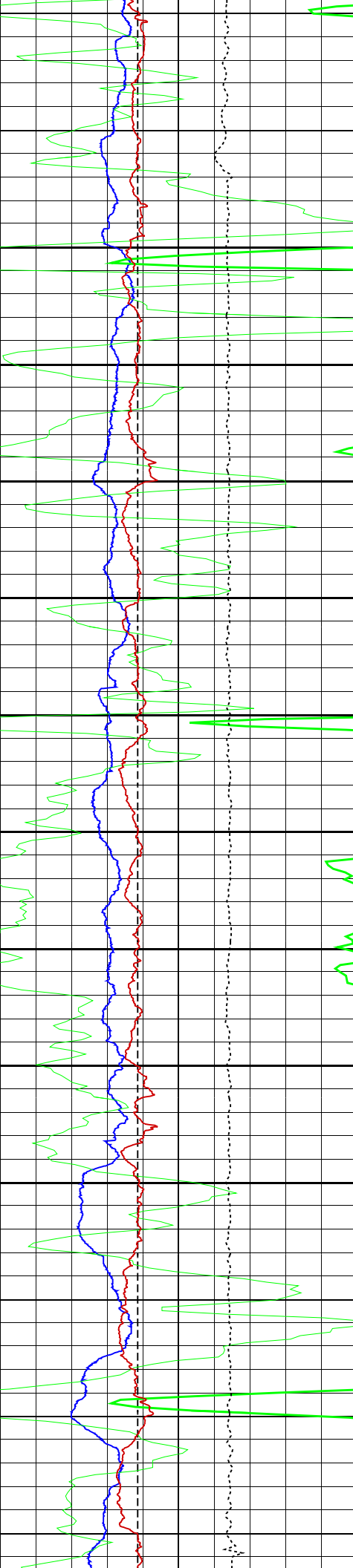




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1675

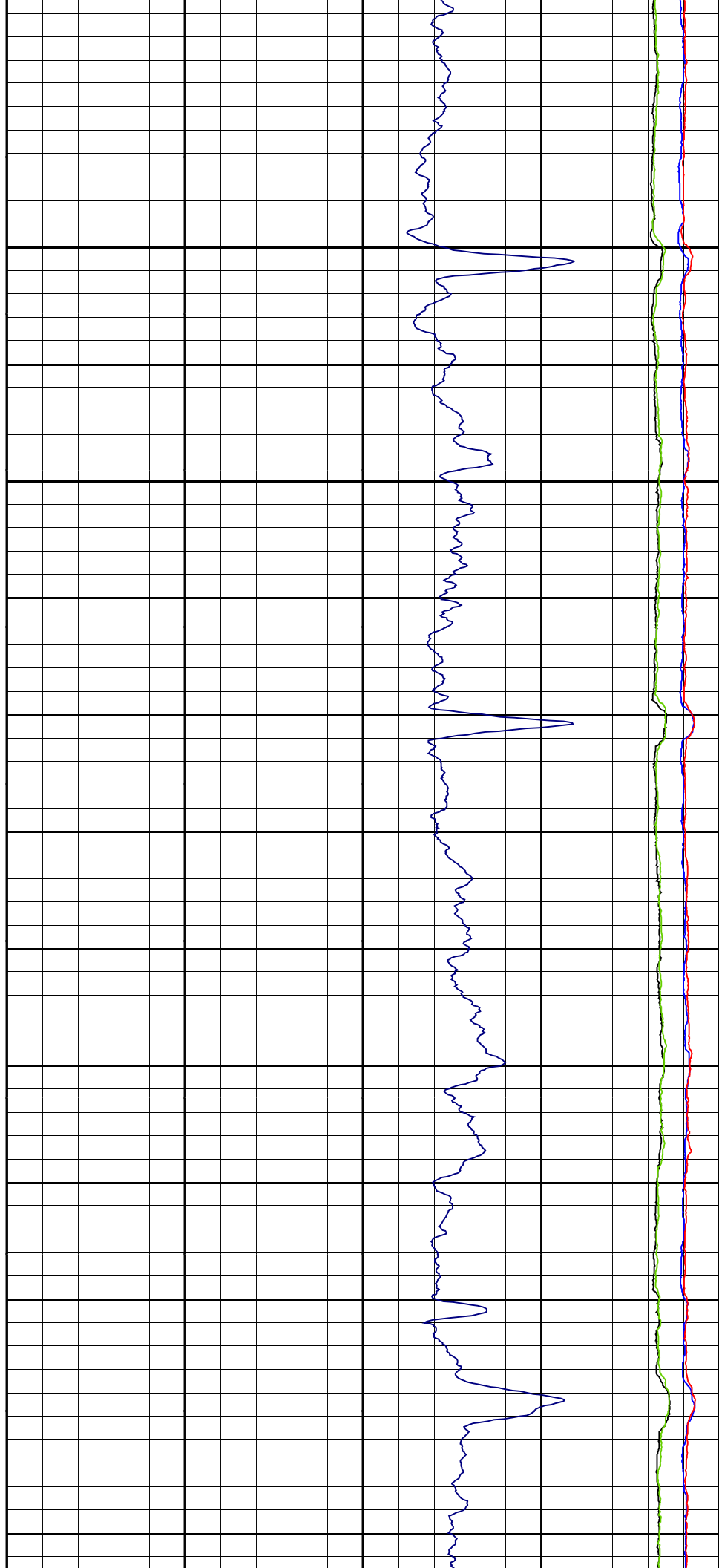


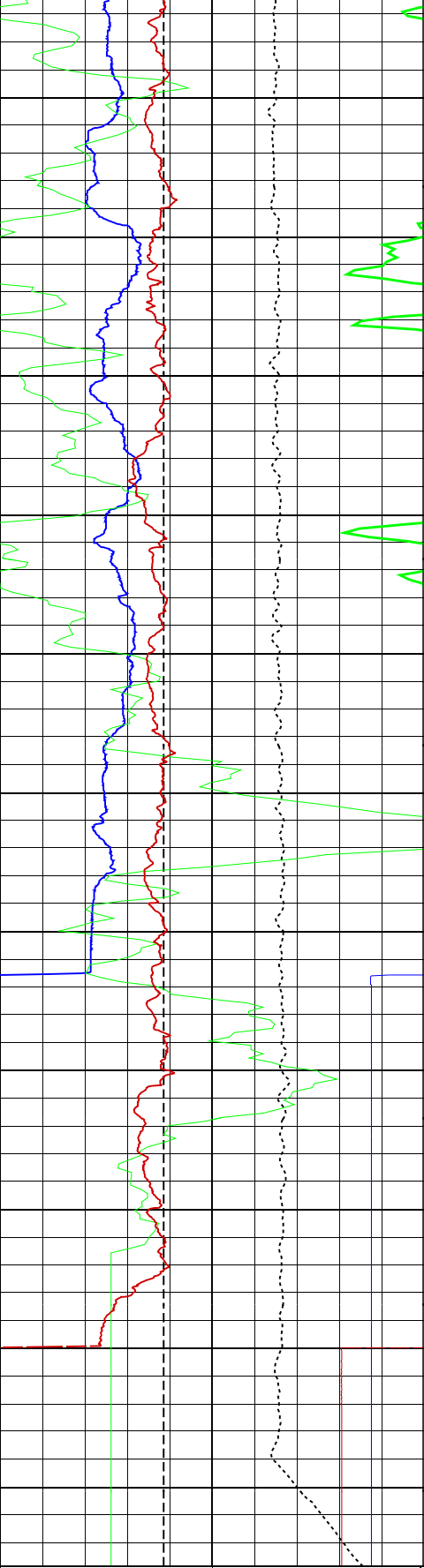


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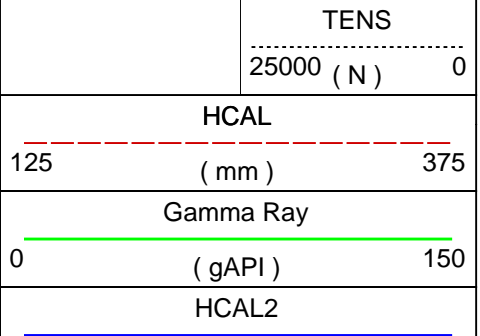
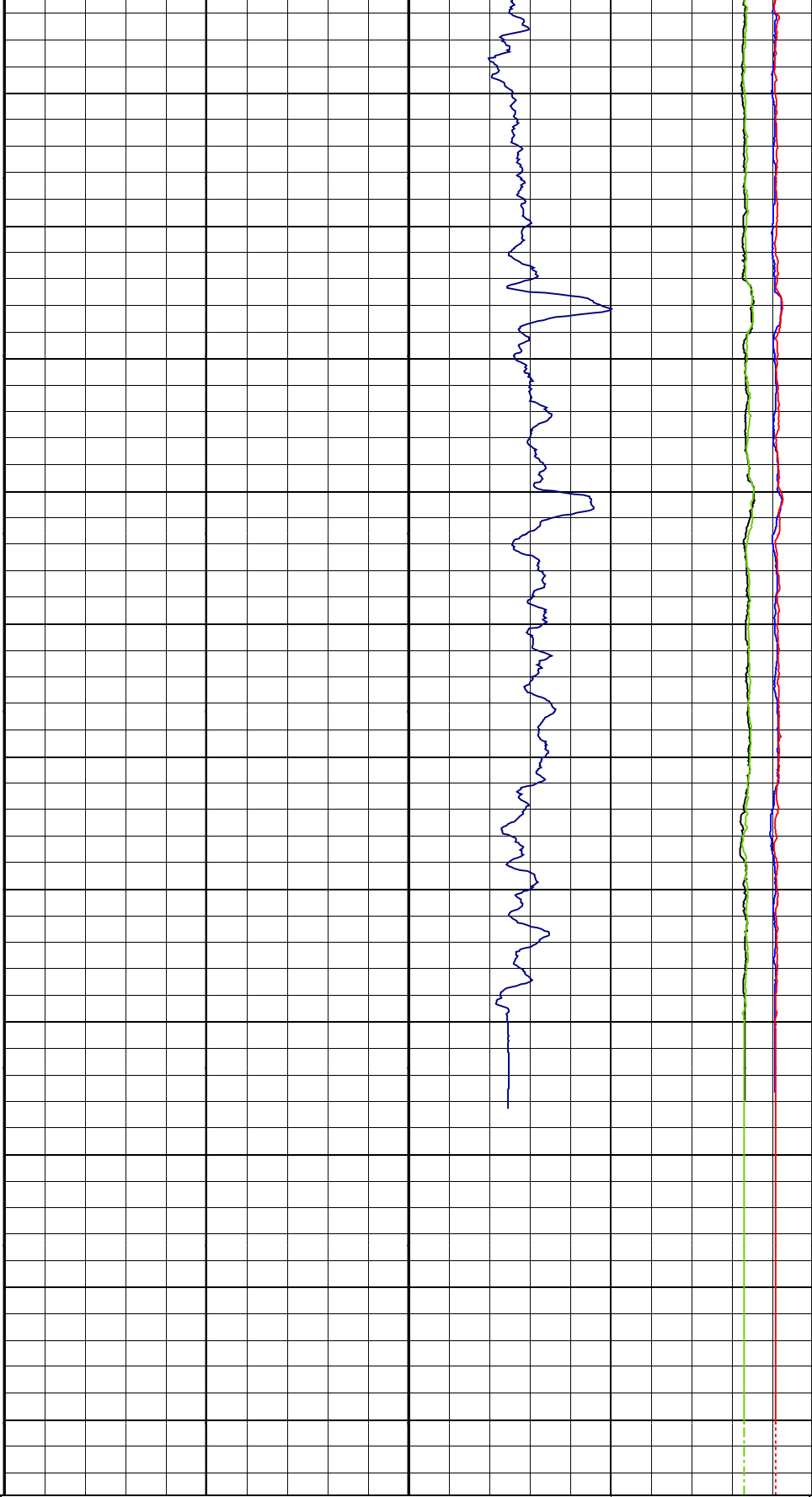
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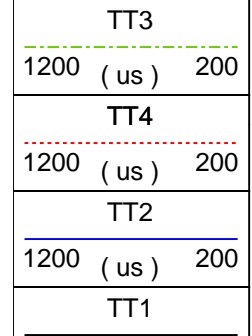


1775

1800



MD  
1 : 240  
m





125	( mm )	375
BS		
125	( mm )	375

		1200 ( us )	200
DT			
500	( us/m )		100

## 1.1

Pass Summary	
--------------	--

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
1.1	Log[4]:Up	Up	1664.09 m	1816.40 m	14-Jan-2014 6:23:51 PM	14-Jan-2014 6:42:06 PM	ON	1.27 m	Yes
1.1	Log[5]:Up	Up	543.85 m	1822.88 m	14-Jan-2014 6:48:20 PM	14-Jan-2014 8:17:20 PM	ON	-1.90 m	Yes

All depths are referenced to toolstring zero

Description: MCFL processing LQC for Platform Express    Format: Log ( SONIC-240 RA )    Index Scale: 1:240    Index Unit: m    Index Type: Measured Depth  
Creation Date: 15-Jan-2014 01:19:20

TIME\_1900 - Time Marked every 60.00 (s)

ITT - Integrated Transit Time every 1.00 (ms)

ITT - Integrated Transit Time every 10.00 (ms)

Main To Repeat

Repeat To Main

Cable Tension (TENS)

25000    N    0

Main To Repeat

Repeat To Main

Caliper (HCAL2) HDRS-H[2]

125    mm    375

Main To Repeat

Repeat To Main

Calibrated Gamma Ray (GR) HGNS-H

0    gAPI    300

Main To Repeat

Repeat To Main

Bit Size (BS)

125    mm    375

Main To Repeat

Repeat To Main

Caliper (HCAL) HDRS-H[1]

125    mm    375

Main To Repeat

Repeat To Main

Transit Time 4 (TT4)  
DSLT-H

550    us    300

Main To Repeat

Repeat To Main

Transit Time 2 (TT2)  
DSLT-H

550    us    300

Main To Repeat

Repeat To Main

Transit Time 1 (TT1)  
DSLT-H

650    us    400

Main To Repeat

Repeat To Main

Transit Time 3 (TT3)  
DSLT-H

650    us    400

Main To Repeat

Repeat To Main

Stuck Tool Indicator,  
Total (STIT)

0    m    20

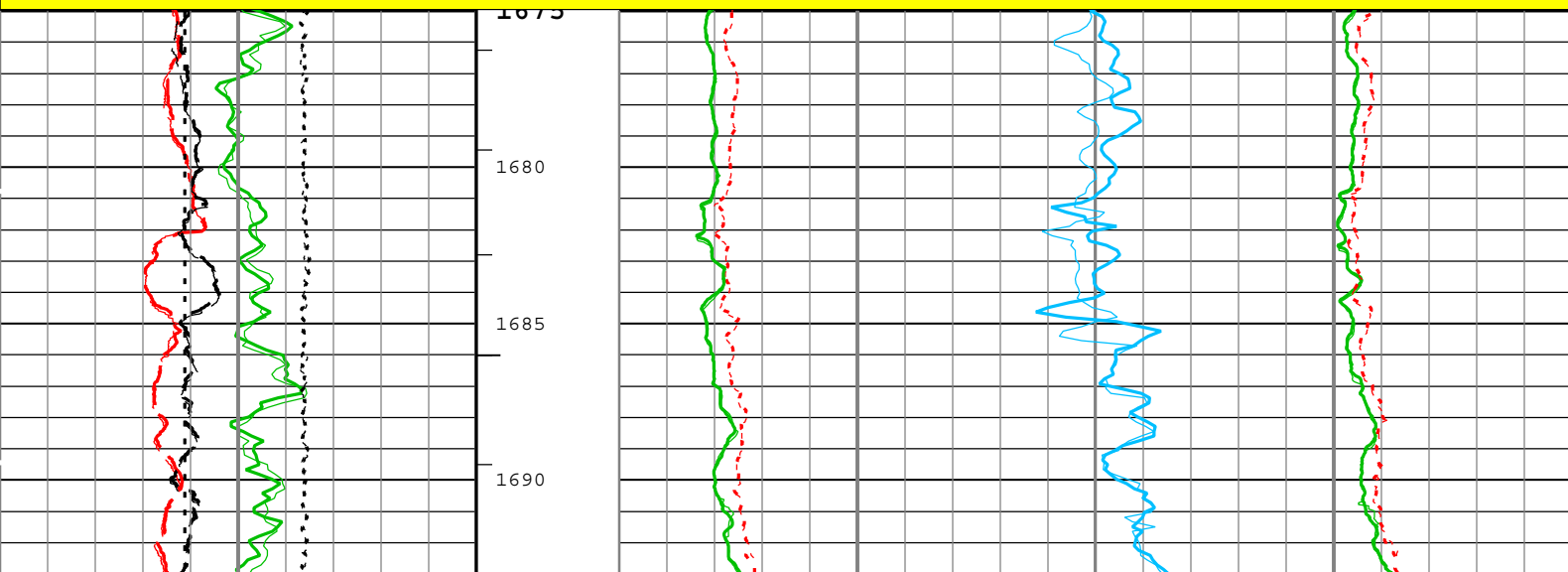
Main To Repeat

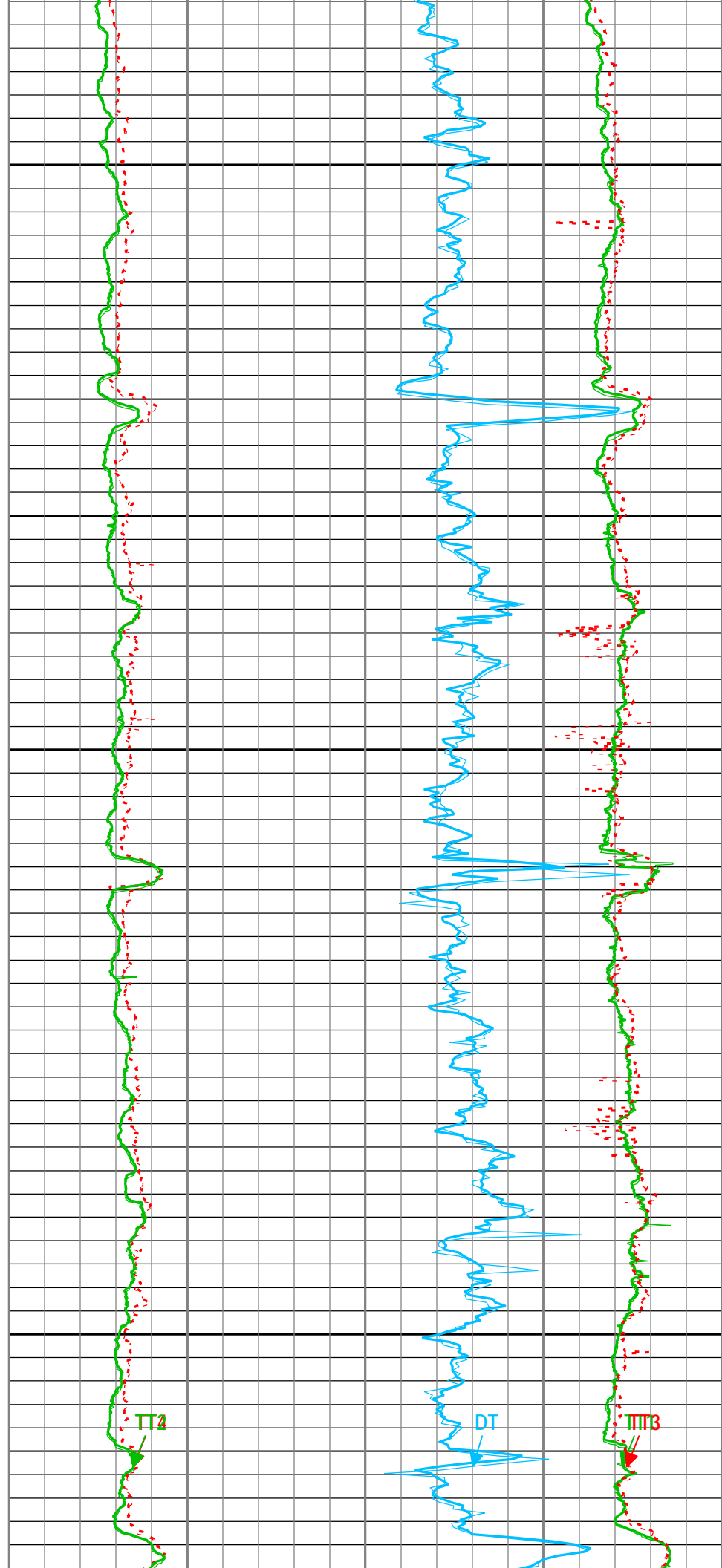
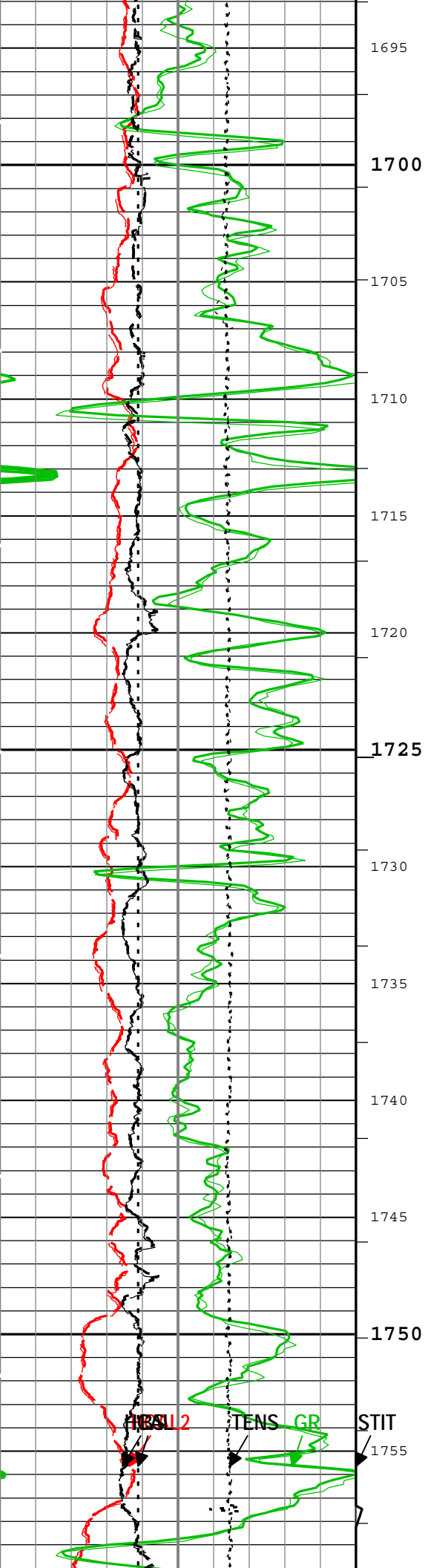
Repeat To Main

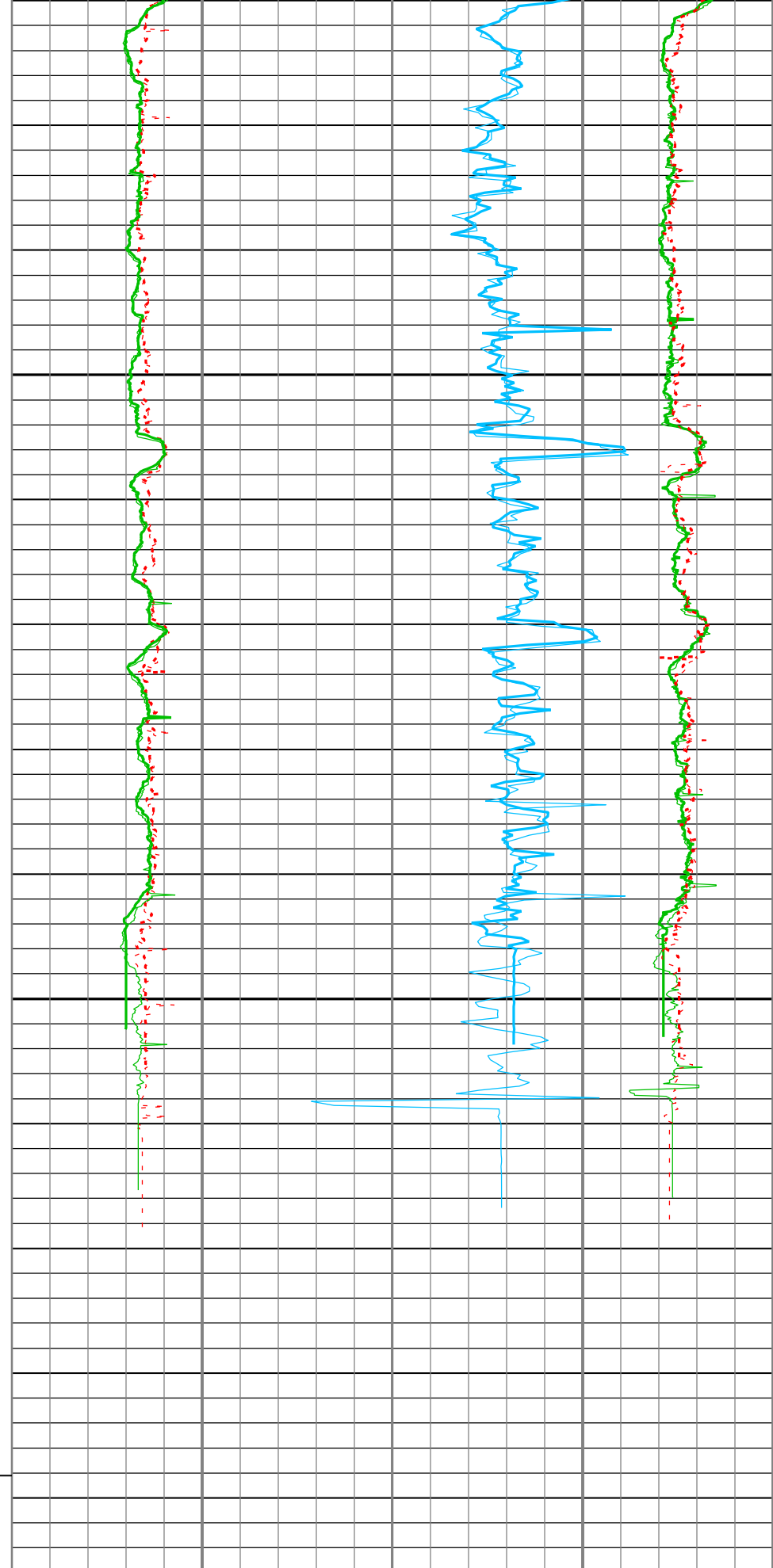
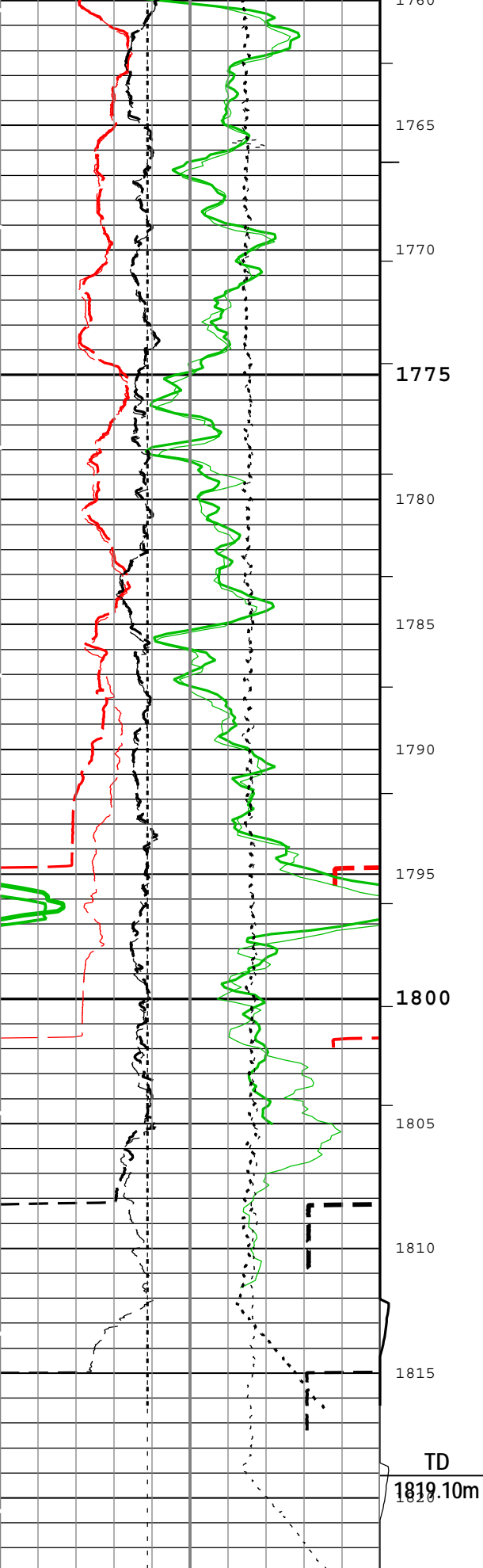
Delta-T (also called Slowness or Interval Transit Time) (DT) DSLT-H

500    us/m    100

\*\*\*REPEAT ANALYSIS: BOREHOLE COMPENSATED SONIC LOG\*\*\*







\*\*\*REPEAT ANALYSIS: BOREHOLE COMPENSATED SONIC LOG\*\*\*

Main To Repeat

Main To Repeat

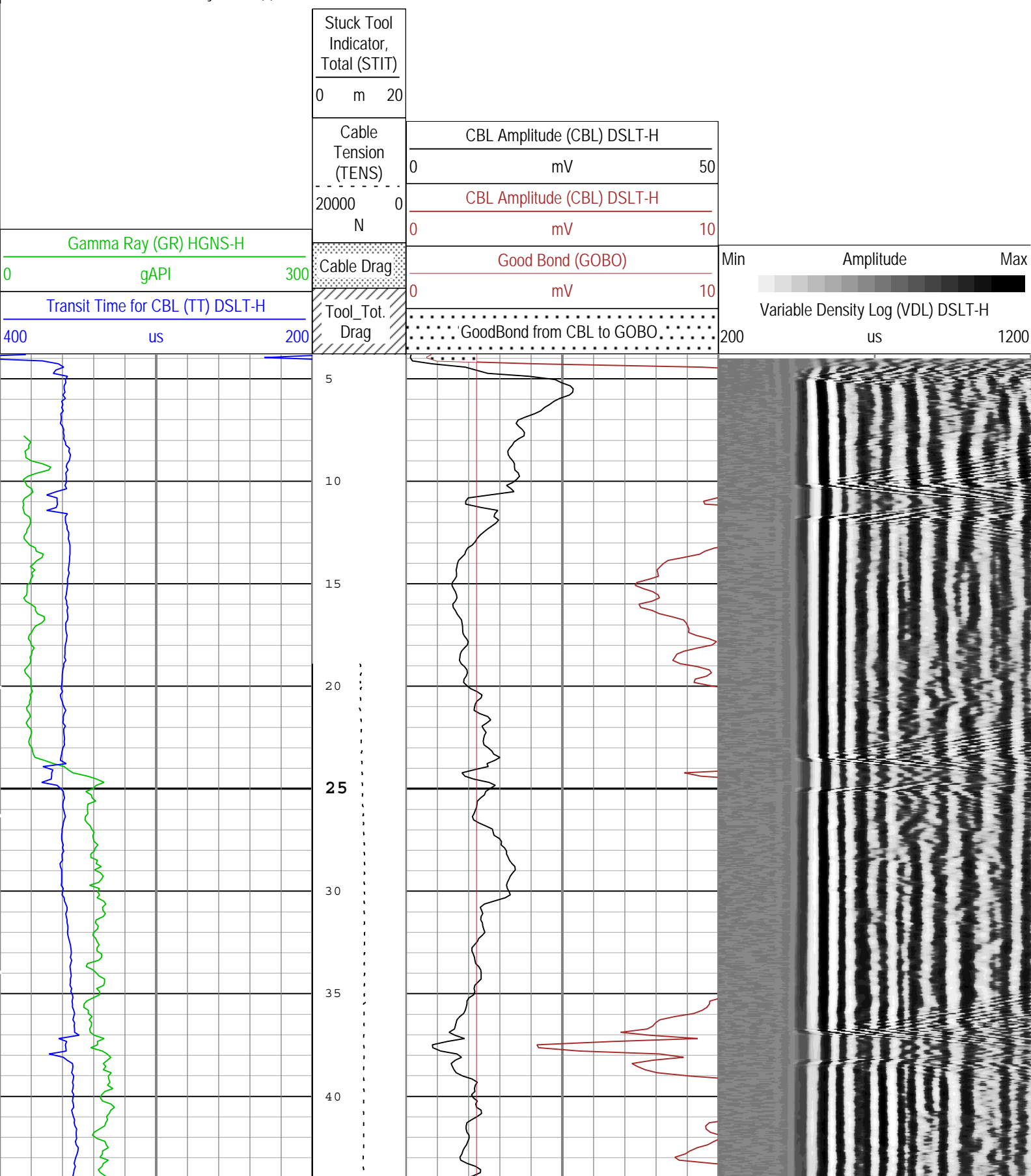
Main To Repeat

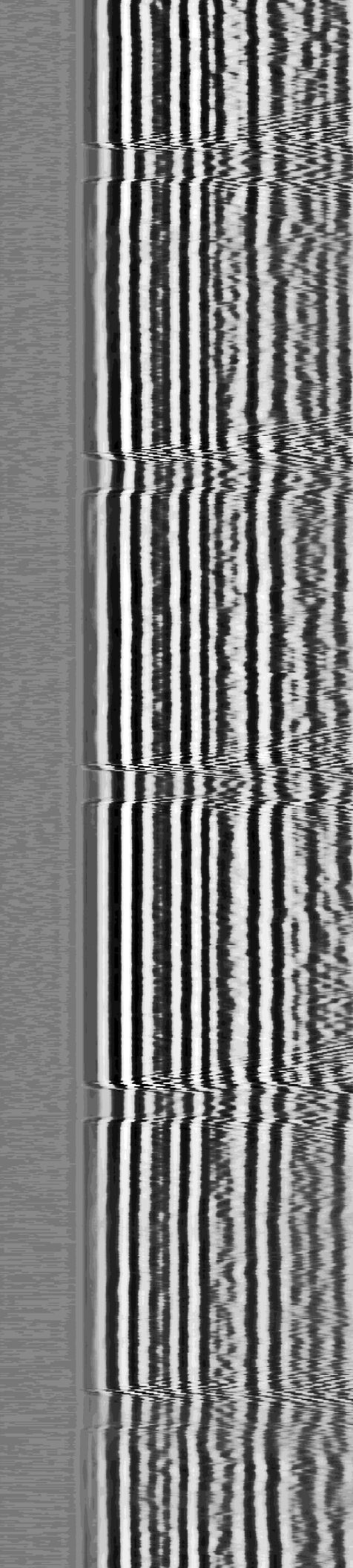
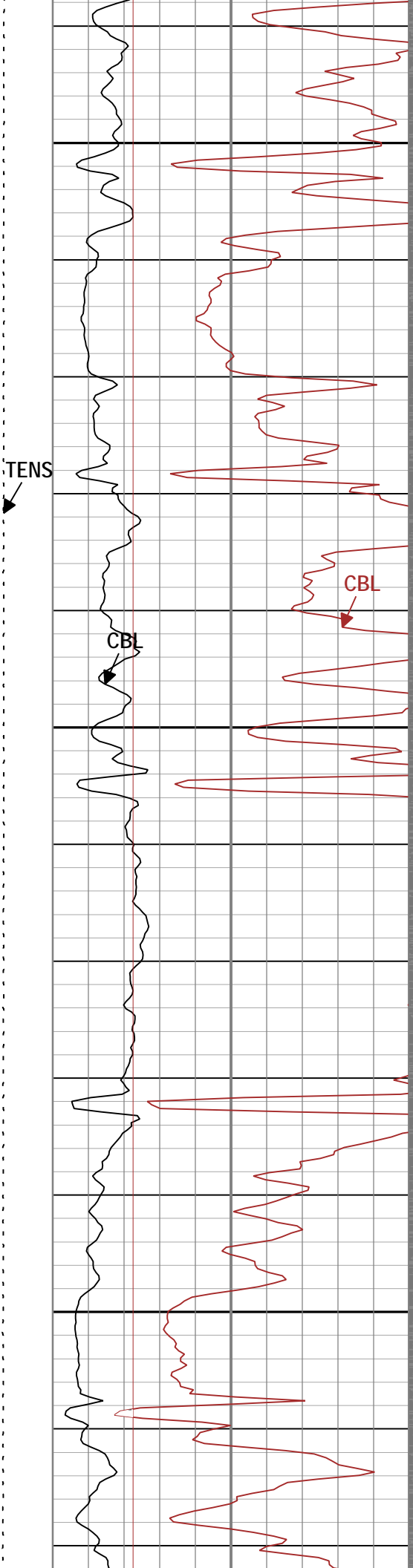
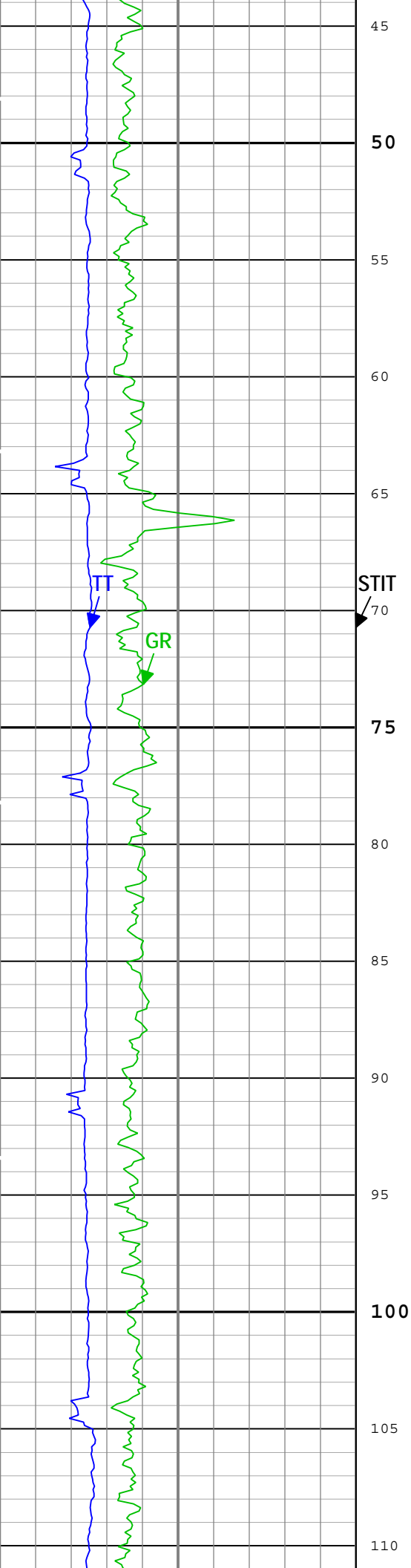
Repeat To Main			Repeat To Main	Repeat To Main			
Caliper (HCAL2) HDRS-H[2]				Delta-T (also called Slowness or Interval Transit Time) (DT) DSLT-H			
125	mm		375	500	us/m		100
Main To Repeat			Stuck Tool Indicator, Total (STIT)	Main To Repeat			Main To Repeat
Repeat To Main				Repeat To Main			Repeat To Main
Calibrated Gamma Ray (GR) HGNS-H			0	m	20	Transit Time 4 (TT4) DSLT-H	
0	gAPI					550 us 300	
Main To Repeat				Main To Repeat			Main To Repeat
Repeat To Main				Repeat To Main			Repeat To Main
Bit Size (BS)				Transit Time 2 (TT2) DSLT-H			Transit Time 3 (TT3) DSLT-H
125	mm			550 us 300			650 us 400
Main To Repeat				Main To Repeat			Main To Repeat
Repeat To Main				Repeat To Main			Repeat To Main
Caliper (HCAL) HDRS-H[1]							
125	mm						
	Main To Repeat						
	Repeat To Main						
	Cable Tension (TENS)						
	25000	N	0				
				ITT - Integrated Transit Time every 10.00 (ms)			
				ITT - Integrated Transit Time every 1.00 (ms)			
				TIME_1900 - Time Marked every 60.00 (s)			

Description: CBL\_VDL   Format: Log ( Sonic CBL with VDL )   Index Scale: 1:240   Index Unit: m   Index Type: Measured Depth   Creation Date: 15-Jan-2014 01:19:22

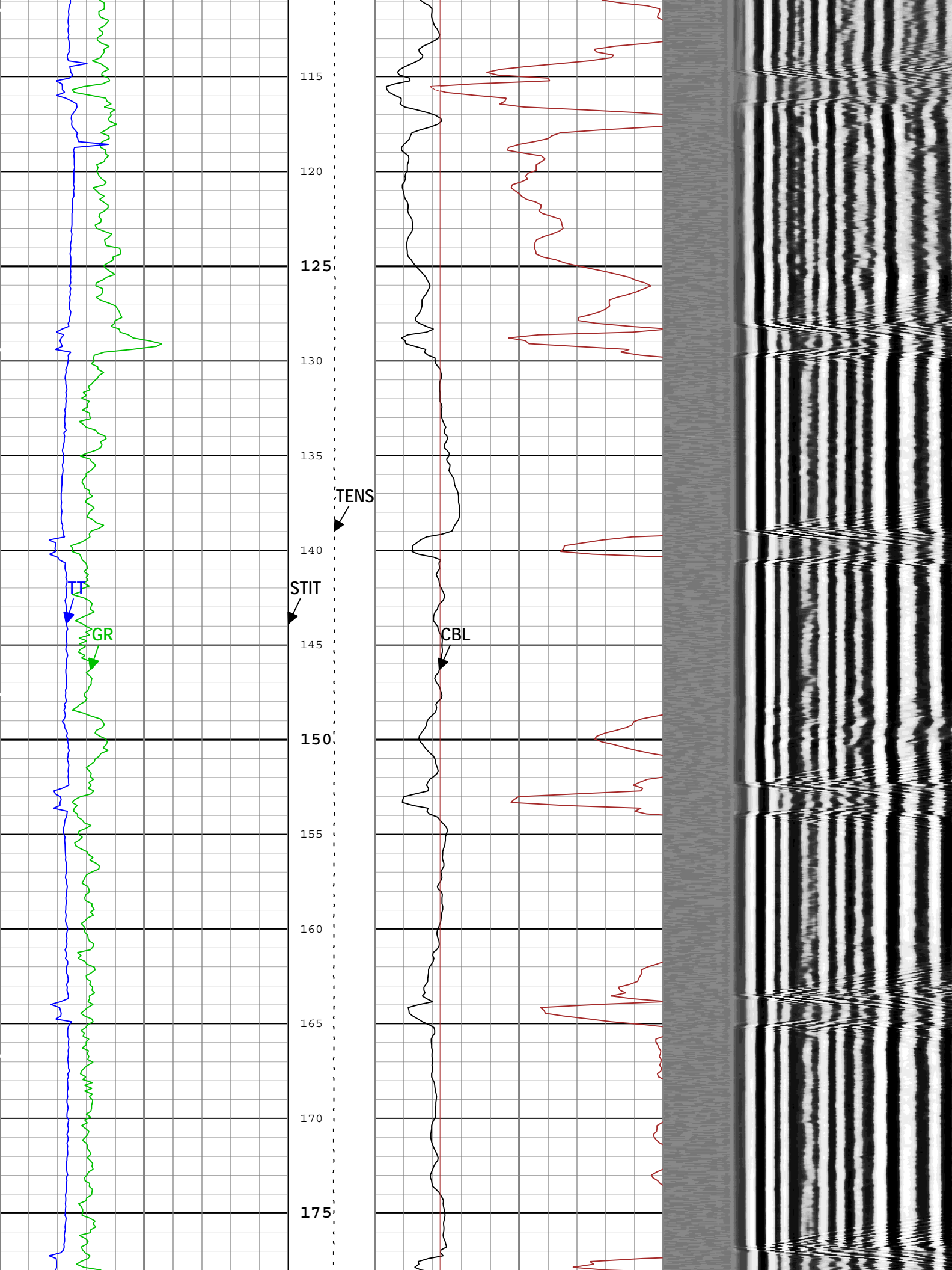
└ BIEP - Bond Index Event Pips DSLT-H

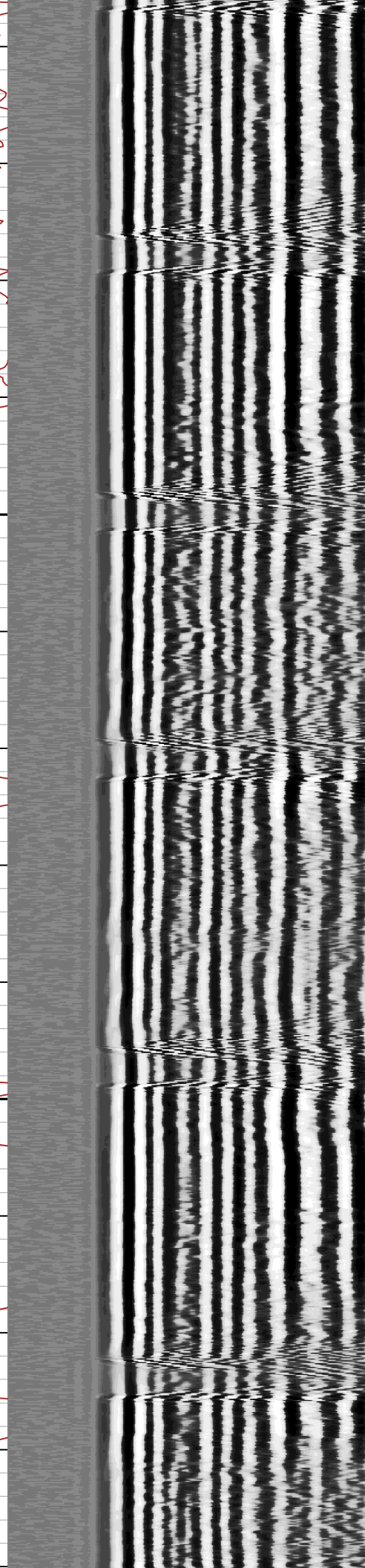
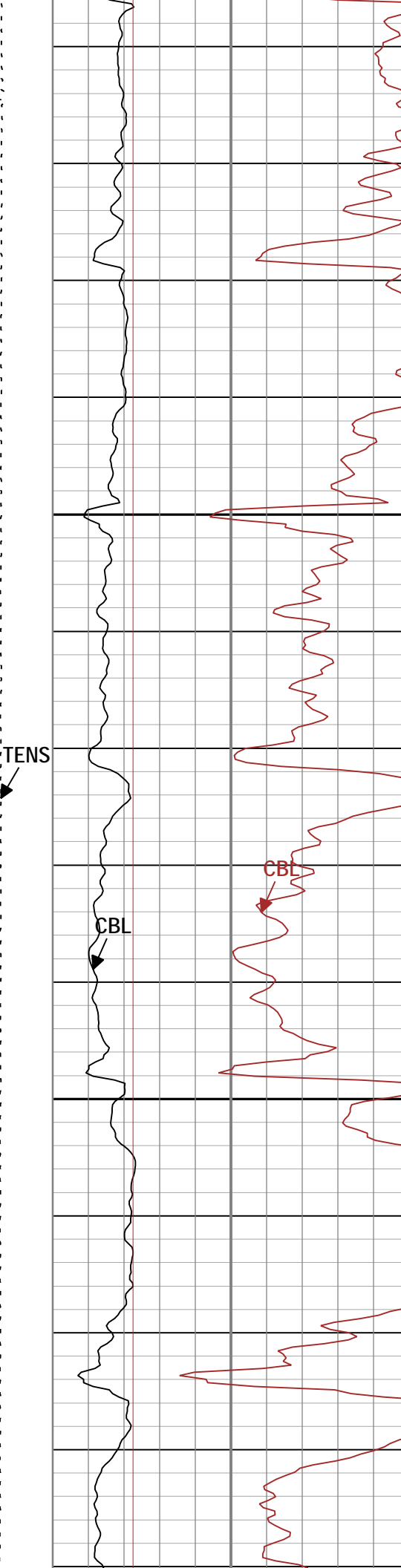
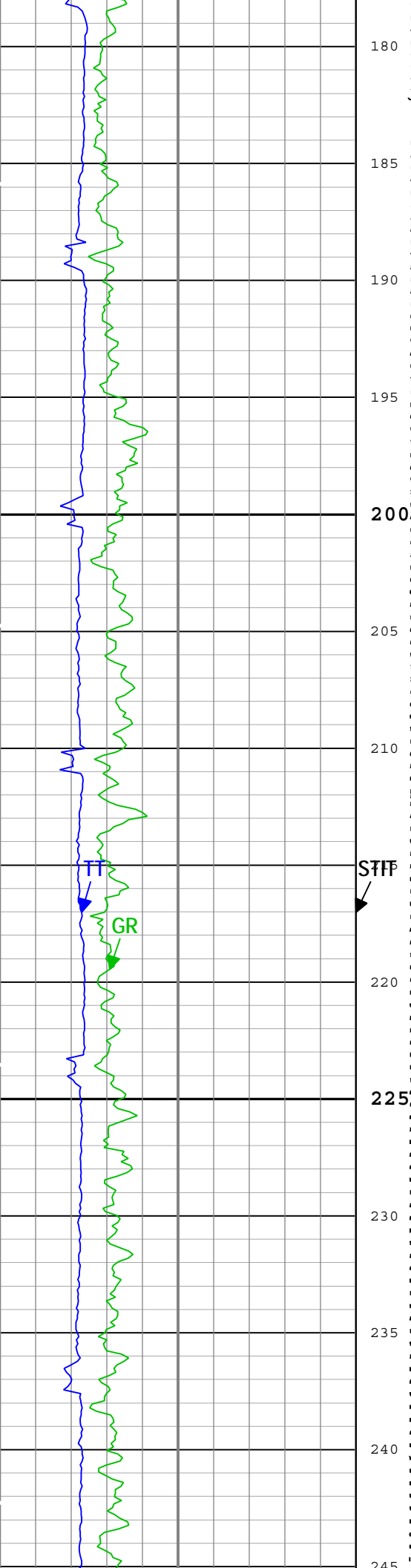
TIME\_1900 - Time Marked every 60.00 (s)

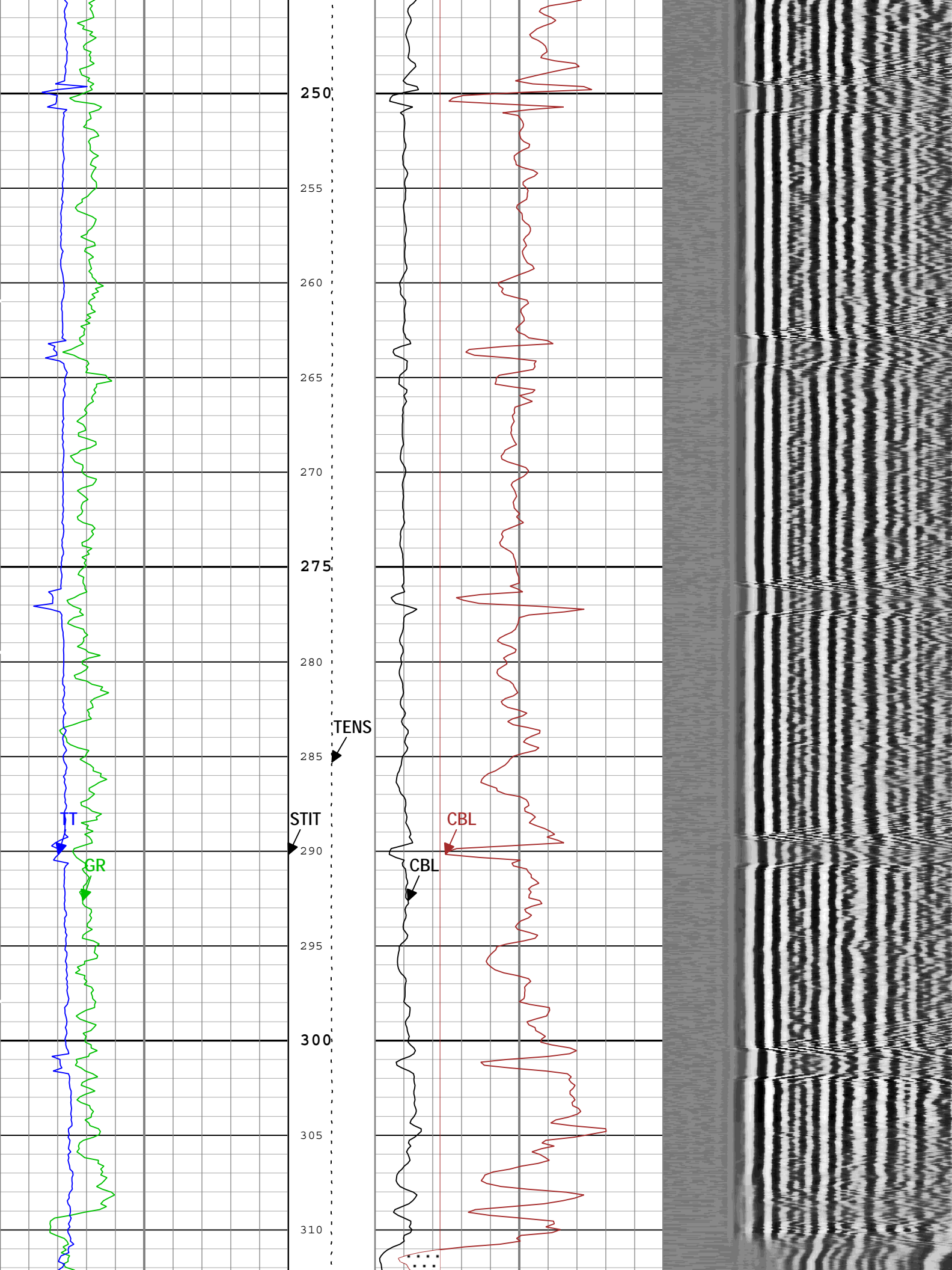




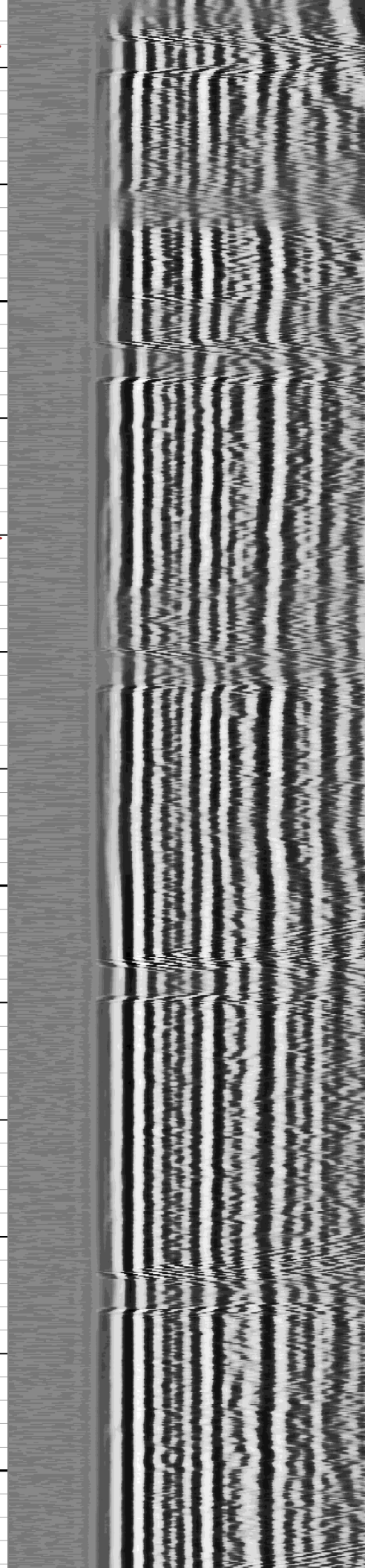
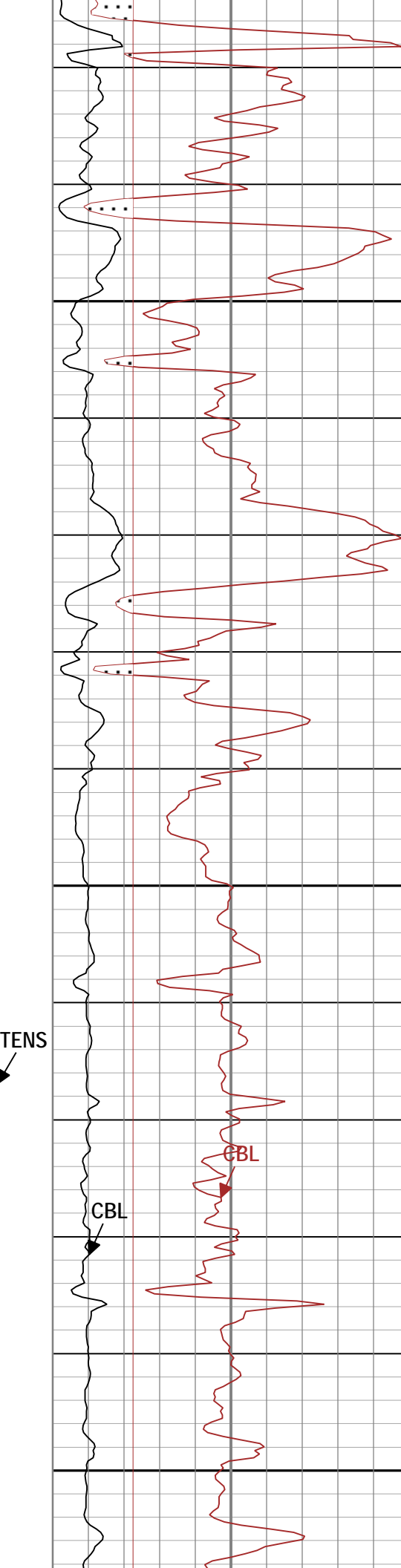
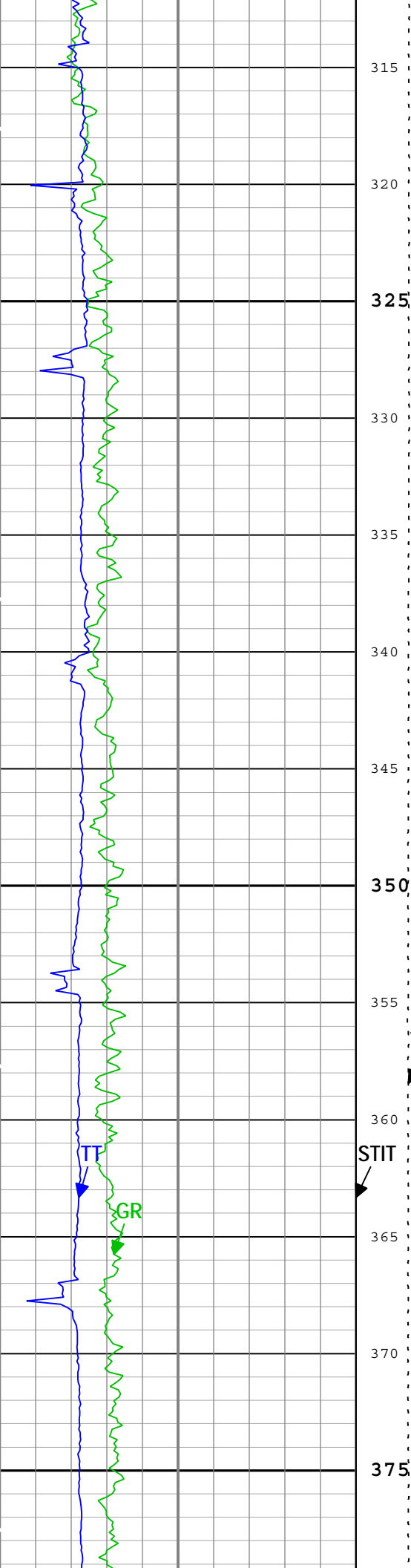


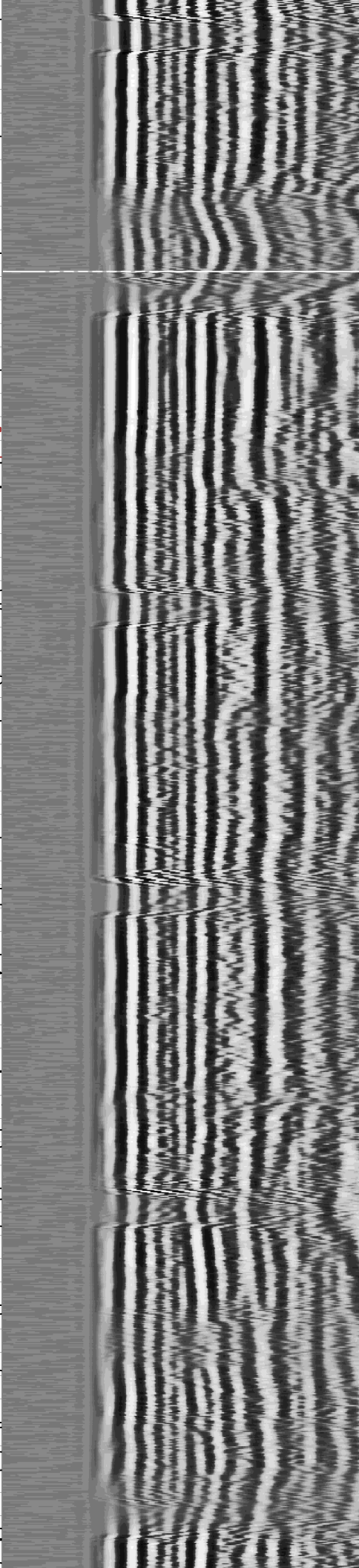
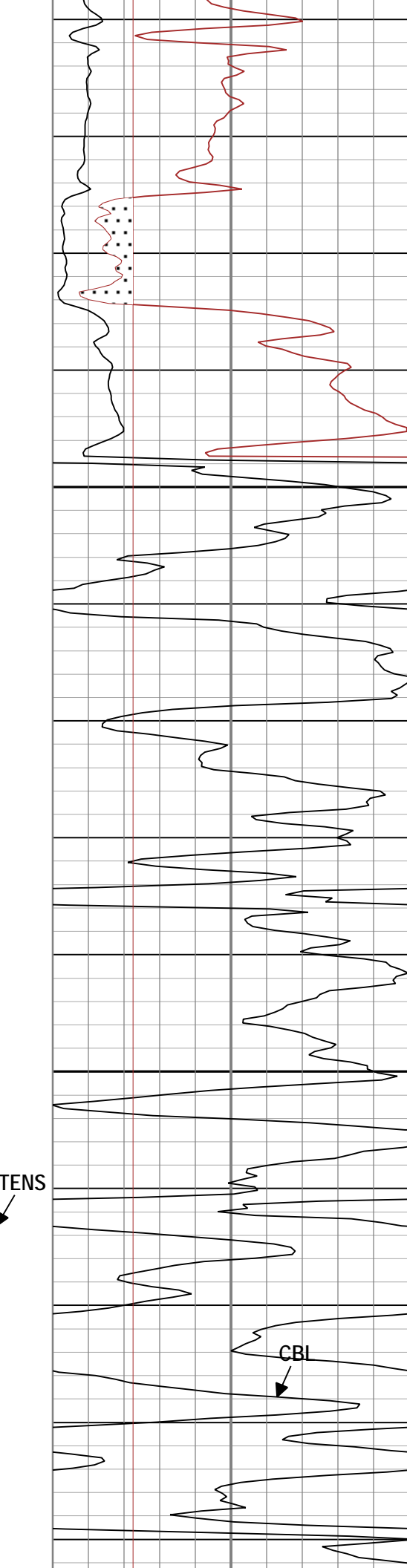
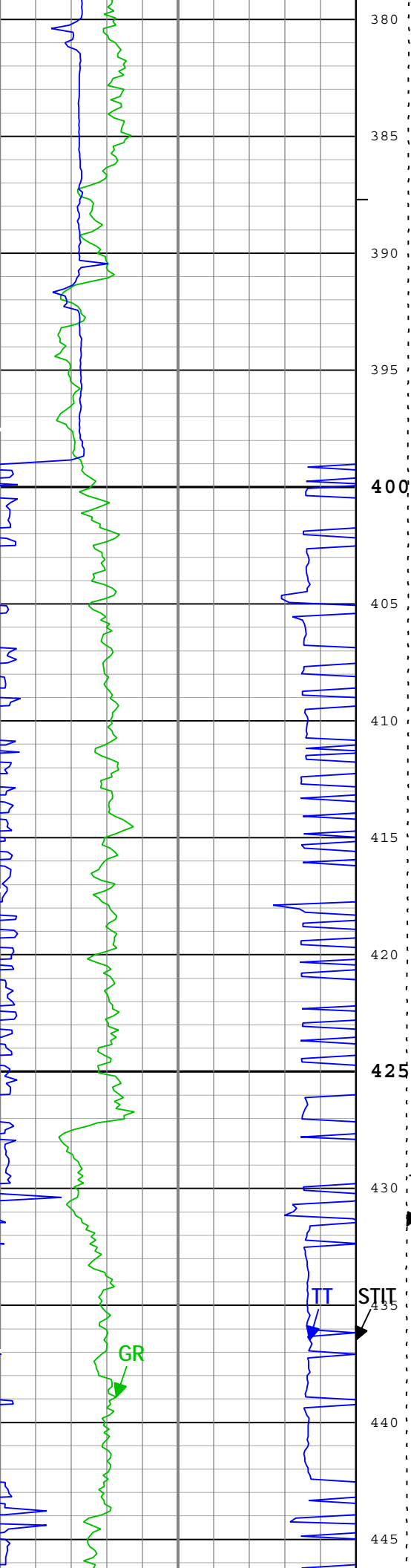


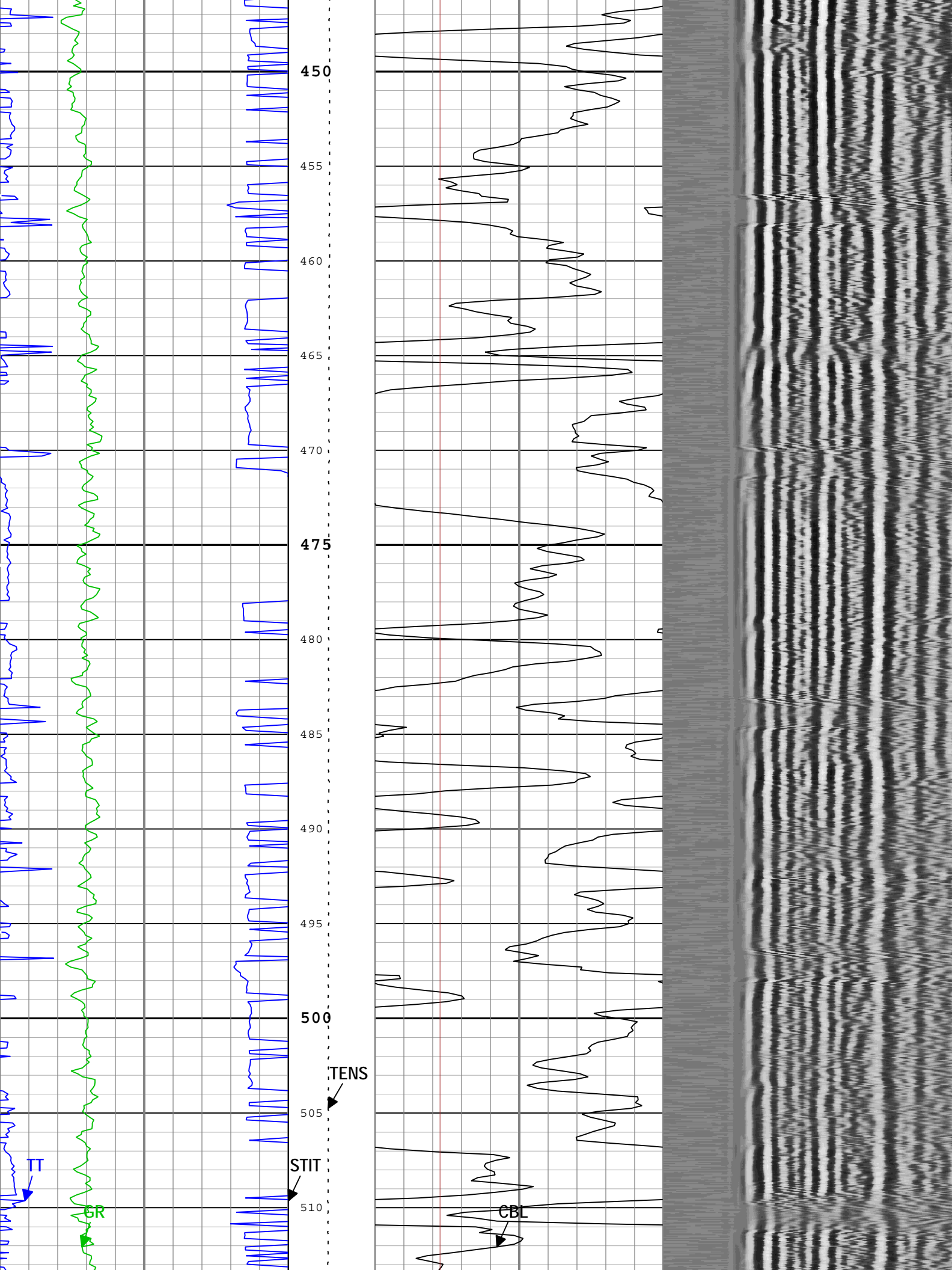




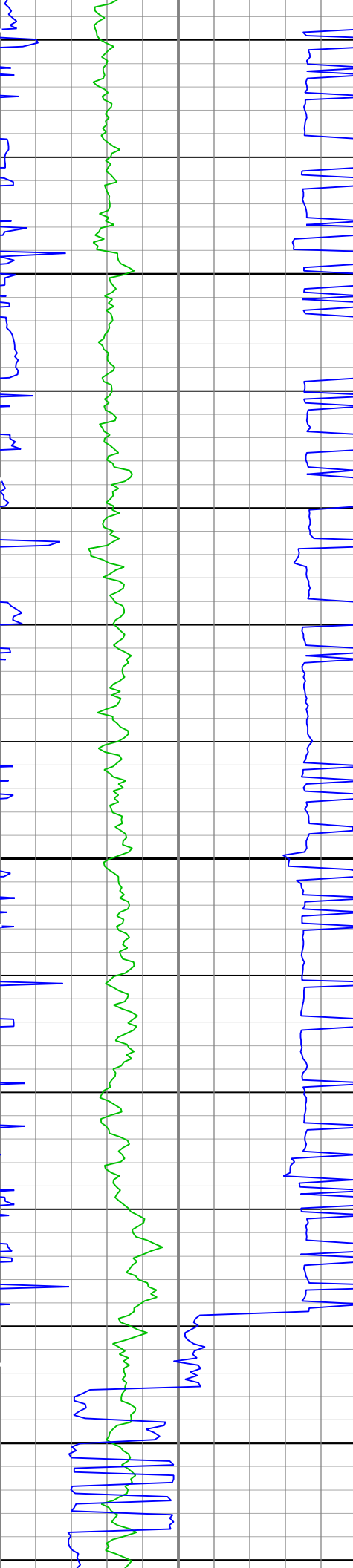






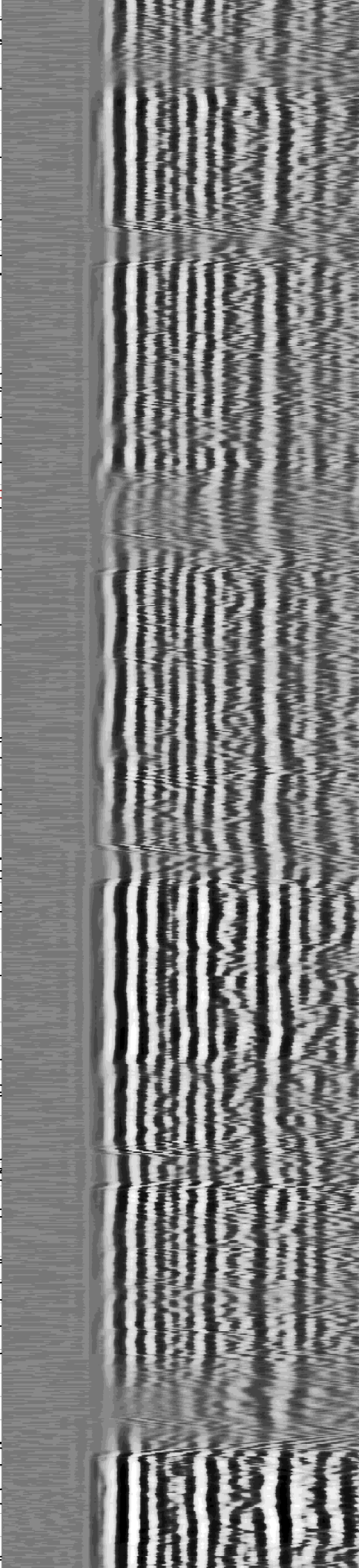
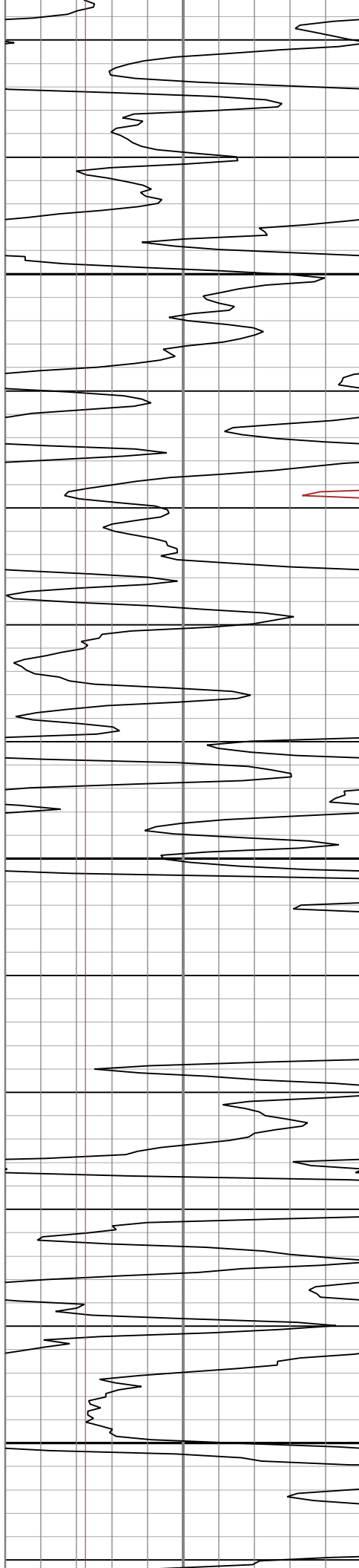


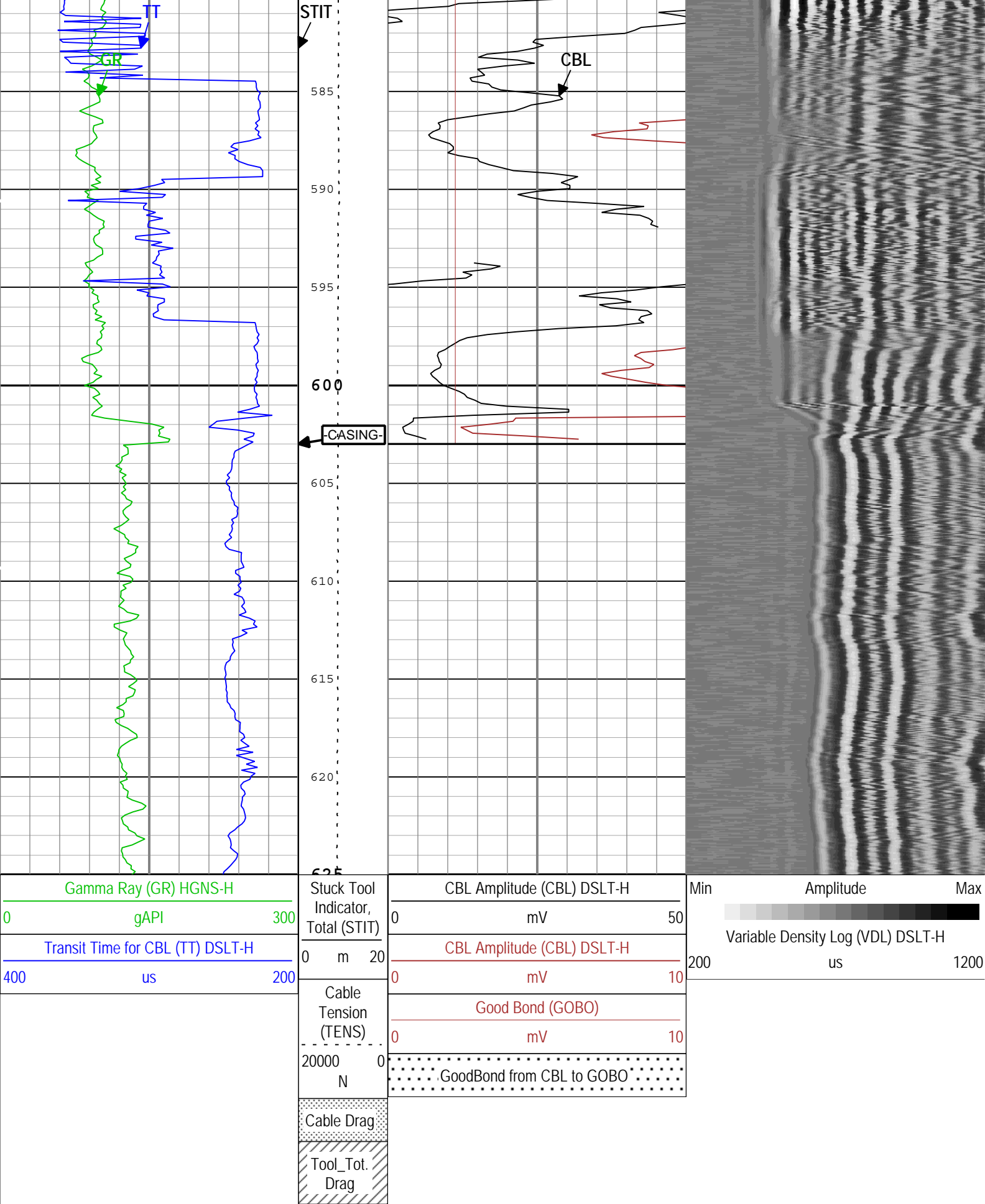




515  
520  
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TENS  
↓







Channel Processing Parameters					
Parameter	Description	Tool	Value	Unit	
AMSG	Auxiliary Minimum Sliding Gate	DSLTH	140	us	
BARI	Barite Mud Presence Flag	Borehole	No		
BHS	Borehole Status (Open or Cased Hole)	Borehole	Depth Zoned		
BS	Bit Size	WLSESSION	Depth Zoned	mm	
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	4.4	mm	
CBLG	CBL Gate Width	DSLTH	Time Zoned	us	
CBLO	Casing Bottom (Logger)	WLSESSION	603	m	
CBRA	CBL LQC Reference Amplitude in Free Pipe	DSLTH	Depth Zoned	mV	
CDEN	Cement Density	HGNS-H	2000	kg/m3	
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time		
DETE	Delta-T Detection	DSLTH	E1		
DFD	Drilling Fluid Density	Borehole	1025	kg/m3	
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS		
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	Depth Zoned		
MAHTR	Manual High Threshold Reference for first arrival detection	DSLTH	120		
MCI	Minimum Cemented Interval for Isolation	DSLTH	Depth Zoned	m	
MNHTR	Minimum High Threshold Reference for first arrival detection	DSLTH	100		
MSA	Minimum Sonic Amplitude	DSLTH	Depth Zoned	mV	
NMSG	Near Minimum Sliding Gate	DSLTH	Time Zoned	us	
SGAD	Sliding Gate Status	DSLTH	Off		
SGDT	Sliding Gate Delta-T	DSLTH	Time Zoned	us/m	
SLEV	Signal Level for AGC	DSLTH	7500	mV	
SOCO	Standoff Correction Option	HGNS-H	Yes		
TD	Total Measured Depth	Borehole	1819.1	m	
Depth Zone Parameters					
Parameter	Value	Start ( m )	Stop ( m )		
BHS	Cased	3.81	603		
BHS	Open	603	625		
BS	311	3.81	603		
BS	222	603	625		
CBRA	51	3.81	603		
CBRA	0	603	625		
GCSE_UP_PASS	BS	3.81	603		
GCSE_UP_PASS	CALI	603	625		
MCI	4.52	3.81	603		
MCI	0	603	625		
MSA	1.03	3.81	603		
MSA	0	603	625		
All depth are actual.					
Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth ( m )	Stop Depth ( m )
CBLG	100	14-Jan-2014 20:19:45	14-Jan-2014 20:22:02	648.67	608.65
CBLG	20	14-Jan-2014 20:22:02	14-Jan-2014 20:22:06	608.65	607.26
CBLG	100	14-Jan-2014 20:22:06	14-Jan-2014 20:56:23	607.26	18.86
NMSG	404	14-Jan-2014 20:19:45	14-Jan-2014 20:21:51	648.67	611.99
NMSG	480	14-Jan-2014 20:21:51	14-Jan-2014 20:22:15	611.99	604.51

NMSG	410	14-Jan-2014 20:22:15	14-Jan-2014 20:22:30	604.51	599.73
NMSG	504	14-Jan-2014 20:22:30	14-Jan-2014 20:23:08	599.73	588.02
NMSG	484	14-Jan-2014 20:23:08	14-Jan-2014 20:23:18	588.02	584.7
NMSG	346	14-Jan-2014 20:23:18	14-Jan-2014 20:23:26	584.7	582.25
NMSG	363	14-Jan-2014 20:23:26	14-Jan-2014 20:32:09	582.25	414.11
NMSG	306	14-Jan-2014 20:32:09	14-Jan-2014 20:56:23	414.11	18.86
SGDT	0	14-Jan-2014 20:19:45	14-Jan-2014 20:21:48	648.67	612.76
SGDT	68	14-Jan-2014 20:21:48	14-Jan-2014 20:21:58	612.76	609.95
SGDT	0	14-Jan-2014 20:21:58	14-Jan-2014 20:22:00	609.95	609.14
SGDT	442	14-Jan-2014 20:22:00	14-Jan-2014 20:22:04	609.14	607.82
SGDT	116	14-Jan-2014 20:22:04	14-Jan-2014 20:22:08	607.82	606.59
SGDT	0	14-Jan-2014 20:22:08	14-Jan-2014 20:32:27	606.59	408.13
SGDT	79	14-Jan-2014 20:32:27	14-Jan-2014 20:32:30	408.13	407.29
SGDT	163	14-Jan-2014 20:32:30	14-Jan-2014 20:56:23	407.29	18.86

All depth are at tool zero.

Tool Control Parameters				
Parameter	Description	Tool	Value	Unit
DSLT_MODE	DSLT Acquisition Mode	DSLT-H	CBL	
DSLT_RATE	DSLT Firing Rate	DSLT-H	15 Hz	
DTFS	DSLT Telemetry Frame Size	DSLT-H	536	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	548.64	m/h
SGAI	Selectable Acquisition Gain	DSLT-H	x1	

Calibration Report	
AIT-M (Array Induction Tool - M) Calibration - Run 1.1	
Primary Equipment :	
File code for AIT-MA Sonde Tool Element	AMIS 129
Auxiliary Equipment :	
AITM Rm/SP Bottom Nose	AMRM 129

AIT Sonde Calibration - Test Loop Gain							
Master (EEPROM):		10:28:12 31-Dec-2013					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Test Loop Gain - 0		Master	1.000	0.950	1.014	1.050	
Test Loop Phase - 0	deg	Master	0	-3.000	1.089	3.000	
Test Loop Gain - 1		Master	1.000	0.950	1.008	1.050	
Test Loop Phase - 1	deg	Master	0	-3.000	0.684	3.000	
Test Loop Gain - 2		Master	1.000	0.950	1.009	1.050	
Test Loop Phase - 2	deg	Master	0	-3.000	-0.018	3.000	
Test Loop Gain - 3		Master	1.000	0.950	1.004	1.050	
Test Loop Phase - 3	deg	Master	0	-3.000	0.042	3.000	
Test Loop Gain - 4		Master	1.000	0.950	0.989	1.050	
Test Loop Phase - 4	deg	Master	0	-3.000	0.028	3.000	
Test Loop Gain - 5		Master	1.000	0.950	0.980	1.050	
Test Loop Phase - 5	deg	Master	0	-3.000	-0.052	3.000	
Test Loop Gain - 6		Master	1.000	0.950	0.987	1.050	
Test Loop Phase - 6	deg	Master	0	-3.000	0.343	3.000	
Test Loop Gain - 7		Master	1.000	0.950	1.007	1.050	
Test Loop Phase - 7	deg	Master	0	-3.000	0.019	3.000	

AIT Sonde Calibration - Sonde Error Correction							
Master (EEPROM):		10:28:12 31-Dec-2013					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Sonde Error Correction Real - 0	mS/m	Master	-----	-231.000	-80.037	119.000	
Sonde Error Correction Quad - 0		Master	-----	-2250.000	-45.287	2250.000	



		After-Before	----	----	----	----		
Thru Cal Phase - 4	deg	Master	----	125.000	173.499	-115.000		
		Before	----	125.000	-177.921	-115.000		
		After	----	----	----	----		
		Before-Master	----	----	-351.420	----		
		After-Before	----	----	----	----		
Thru Cal Mag - 5	V	Master	----	1.176	1.944	2.744		
		Before	----	1.176	1.943	2.744		
		After	----	----	----	----		
		Before-Master	----	----	-0.001	----		
		After-Before	----	----	----	----		
Thru Cal Phase - 5	deg	Master	----	122.000	171.861	-118.000		
		Before	----	122.000	-179.552	-118.000		
		After	----	----	----	----		
		Before-Master	----	----	-351.413	----		
		After-Before	----	----	----	----		
Thru Cal Mag - 6	V	Master	----	1.176	1.941	2.744		
		Before	----	1.176	1.940	2.744		
		After	----	----	----	----		
		Before-Master	----	----	-0.001	----		
		After-Before	----	----	----	----		
Thru Cal Phase - 6	deg	Master	----	121.000	171.902	-119.000		
		Before	----	121.000	-179.513	-119.000		
		After	----	----	----	----		
		Before-Master	----	----	-351.415	----		
		After-Before	----	----	----	----		
Thru Cal Mag - 7	V	Master	----	0.846	1.395	1.974		
		Before	----	0.846	1.395	1.974		
		After	----	----	----	----		
		Before-Master	----	----	0.000	----		
		After-Before	----	----	----	----		
Thru Cal Phase - 7	deg	Master	----	115.000	171.159	-125.000		
		Before	----	115.000	179.812	-125.000		
		After	----	----	----	----		
		Before-Master	----	----	8.653	----		
		After-Before	----	----	----	----		
SPA Zero	mV	Master		-50.000	-0.122	50.000		
		Before		-50.000	-0.133	50.000		
		After	----	----	----	----		
		Before-Master	----	----	-0.011	----		
		After-Before	----	----	----	----		
SPA Plus	mV	Master		941.000	990.432	1040.000		
		Before		941.000	990.105	1040.000		
		After	----	----	----	----		
		Before-Master	----	----	-0.327	----		
		After-Before	----	----	----	----		
Temperature Zero	V	Master		-0.050	0.000	0.050		
		Before		-0.050	0.000	0.050		
		After	----	----	----	----		
		Before-Master	----	----	0.000	----		
		After-Before	----	----	----	----		
Temperature Plus	V	Master		0.870	0.917	0.960		
		Before		0.870	0.917	0.960		
		After	----	----	----	----		
		Before-Master	----	----	0.000	----		
		After-Before	----	----	----	----		

HDRS-H[1] (HILT Density and Rxo Sonde, 150 degC) Calibration - Run 1.1		
Primary Equipment :		
HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	880
HILT Resistivity Gamma-Ray Density Device, 150 degC	HRGD-H	4796
Auxiliary Equipment :		
HRDD Backscatter Detector	Backscatter	
HRDD Long Spacing Detector	Long Spacing	28679
HRDD Short Spacing Detector	Short Spacing	

Cesium 137 Gamma-Ray Logging Source

GSR-J

5285

HILT High-Resolution Control Cartridge, 150 degC

HRCC-H

880

HRMS, 125 degC, 10 kpsi

HRMS-B

894

## Calibration Parameter :

Small Ring Size (Caliper Calibration Small Ring)

203.2

Large Ring Size (Caliper Calibration Large Ring)

304.8

## HDRS Caliper Calibration - Caliper Accumulations

Before (Measured): 06:27:32 14-Jan-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Small Ring	mm	Before	203.2	152.4	199.0	254.0	
Large Ring	mm	Before	304.8	228.6	292.0	381.0	

## HDRS Density Calibration - Inversion Results

Master (EEPROM): 12:27:24 24-Dec-2013

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Rho Aluminum	kg/m3	Master	2596	2586	2600	2606	
Rho Magnesium	kg/m3	Master	1686	1676	1690	1696	
Pe Aluminum		Master	2.570	2.470	2.579	2.670	
Pe Magnesium		Master	2.650	2.550	2.603	2.750	

## HDRS Density Calibration - Deviation Summary

Master (EEPROM): 12:27:24 24-Dec-2013

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS Average Deviation	%	Master	0	-0.6000	0.2068	0.6000	
BS Max Deviation	%	Master	0	-1.6000	0.6397	1.6000	
SS Average Deviation	%	Master	0	-1.0000	0.3839	1.0000	
SS Max Deviation	%	Master	0	-2.5000	1.5922	2.5000	
LS Average Deviation	%	Master	0	-1.5000	0.8683	1.5000	
LS Max Deviation	%	Master	0	-3.5000	2.7525	3.5000	

## HDRS Density Calibration - Background Summary

Master (EEPROM): 12:27:24 24-Dec-2013

Before (Measured):

06:28:18 14-Jan-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS Window Ratio		Master	1.0000		0.7364		
		Before	0.7364	0.6996	0.7419	0.7732	
		Before-Master	-----	-----	0.0055	-----	
BS Window Sum	1/s	Master	1		26467		
		Before	26467	25143	26655	27790	
		Before-Master	-----	-----	188	-----	
SS Window Ratio		Master	1.0000		0.4815		
		Before	0.4815	0.4574	0.4769	0.5056	
		Before-Master	-----	-----	-0.0046	-----	
SS Window Sum	1/s	Master	1		11894		
		Before	11894	11300	11857	12489	
		Before-Master	-----	-----	-37	-----	
LS Window Ratio		Master	1.0000		0.2994		
		Before	0.2994	0.2844	0.2975	0.3144	
		Before-Master	-----	-----	-0.0019	-----	
LS Window Sum	1/s	Master	1		1353		
		Before	1353	1285	1341	1421	
		Before-Master	-----	-----	-12	-----	

## HDRS Density Calibration - Photo-multiplier High Voltages

Master (EEPROM): 12:27:24 24-Dec-2013

Before (Measured):

06:28:18 14-Jan-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS PM High Voltage	V	Master		1000	1339	2400	
		Before		1000	1329	2400	
		Before-Master	-----	-100	-10	100	
SS PM High Voltage	V	Master		1000	1361	2400	
		Before		1000	1398	2400	
		Before-Master	-----	-100	37	100	
LS PM High Voltage	V	Master		1000	1321	2400	
		Before		1000	1343	2400	
		Before-Master	-----	-100	22	100	

# HDRS Density Calibration - Crystal Quality Resolutions

Master (EEPROM):		12:27:24 24-Dec-2013		Before (Measured):		06:28:18 14-Jan-2014	
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS Crystal Resolution	%	Master		5.00	10.60	25.00	
		Before		5.00	10.44	25.00	
		Before-Master	----	-1.00	-0.16	1.00	
SS Crystal Resolution	%	Master		5.00	9.82	20.00	
		Before		5.00	10.29	20.00	
		Before-Master	-----	-1.00	0.47	1.00	
LS Crystal Resolution	%	Master		5.00	8.22	20.00	
		Before		5.00	8.07	20.00	
		Before-Master	-----	-1.00	-0.15	1.00	

## HDRS MCFL Calibration - MCFL Accumulations

Before (Measured):		06:24:53 14-Jan-2014					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Main Resistivity	ohm.m	Before	3875	3565	3839	4185	
Deep Resistivity	ohm.m	Before	3830	3524	3808	4136	
Shallow Resistivity	ohm.m	Before	3830	3524	3810	4136	

## HGNS-H (HILT Gamma-Ray and Neutron Sonde, 150 degC) Calibration - Run 1.1

Primary Equipment :			
HILT Gamma-Ray and Neutron Sonde, 150 degC	HGNS-H	4792	
Auxiliary Equipment :			
HGNS Accelerometer, 150 degC	HACCZ-H	5469	
AmBe Neutron Logging Source	NSR-F	2516	
Calibration Parameter :			
Water Temperature			
Housing Size			
JIG-BKG (Jig minus background reference)	165		

## HGNS Accelerometer Calibration - Accelerometer Accumulations

Before (Measured):		17:31:34 14-Jan-2014					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
AZ Vertical Measurement	m/s2	Before	9.81	9.61	9.81	10.01	

## HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM):		00:00:00 15-Sep-2006					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Accelerometer Manufacturer		Master			QAT_160		
Accelerometer Reference Temperature	degC	Master		-1.0	25.0	50.0	
Accelerometer Coefficients - 0		Master	----	----	7241.000	----	
Accelerometer Coefficients - 1		Master	----	----	5.473	----	
Accelerometer Coefficients - 2		Master	----	----	-0.012	----	
Accelerometer Coefficients - 3		Master	----	----	0.000	----	
Accelerometer Coefficients - 4		Master	----	----	2.735	----	
Accelerometer Coefficients - 5		Master	----	----	0.000	----	
Accelerometer Coefficients - 6		Master	----	----	0.000	----	
Accelerometer Coefficients - 7		Master	----	----	0.000	----	
Accelerometer Coefficients - 8		Master	----	----	300.400	----	
Accelerometer Coefficients - 9		Master	----	----	0.984	----	

## HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM):		09:05:16 31-Dec-2013		Before (Measured):		06:25:14 14-Jan-2014		After:	
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit			
Near Zero Measurement	1/s	Master	0	5.0	27.0	40.0			
		Before	0	5.0	27.3	40.0			
		After	----	----	----	----			
		Before-Master	----	-4.1	0.3	4.1			
		After-Before	----	----	----	----			
Far Zero Measurement	1/s	Master	0	5.0	26.1	40.0			
		Before	0	5.0	28.5	40.0			

		After Before-Master After-Before	----- ----- -----	-3.9 ----- -----	2.4 ----- -----	3.9 ----- -----	<div><div></div><div></div><div></div></div>
Near Plus Measurement	1/s	Master Before After Before-Master After-Before	6031.0 ----- ----- ----- -----	4700.0 ----- ----- ----- -----	5851.0 ----- ----- ----- -----	6900.0 ----- ----- ----- -----	<div><div></div><div></div><div></div></div>
Far Plus Measurement	1/s	Master Before After Before-Master After-Before	2793.0 ----- ----- ----- -----	1900.0 ----- ----- ----- -----	2454.0 ----- ----- ----- -----	2900.0 ----- ----- ----- -----	<div><div></div><div></div><div></div></div>
Near Corrected Plus Measurement	1/s	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	4700.0 ----- ----- ----- -----	5865.0 ----- ----- ----- -----	6900.0 ----- ----- ----- -----	<div><div></div><div></div><div></div></div>
Far Corrected Plus Measurement	1/s	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	1900.0 ----- ----- ----- -----	2454.0 ----- ----- ----- -----	2900.0 ----- ----- ----- -----	<div><div></div><div></div><div></div></div>

## HGNS Gamma-Ray Calibration - Gamma-Ray Accumulations

Before (Measured):		06:27:38 14-Jan-2014		After:			
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div></div>
RGR Zero Measurement	gAPI	Before After After-Before	30.0 ----- -----	0 ----- -----	33.9 ----- -----	120.0 ----- -----	<div><div></div><div></div><div></div></div>
RGR Plus Measurement	gAPI	Before After After-Before	185.4 ----- -----	157.1 ----- -----	159.9 NOT DONE	206.3 ----- -----	<div><div></div><div></div><div></div></div>
GR Calibration Gain		Before After After-Before	0.89 ----- -----	0.80 ----- -----	1.03 ----- -----	1.05 ----- -----	<div><div></div><div></div><div></div></div>

## DSLT-H (Digitizing Sonic Logging Tool - H) Calibration - Run 1.1

Primary Equipment :							
Sonic Logging Sonde E supports 3'-5'BHC DT and CBL/VDL			SLS-E	2047			

## CBL Normalization - CBL Accumulations

Master:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div></div>
Upper Far Amplitude - 0		Master	-----	-----	-----	-----	<div><div></div><div></div><div></div></div>
Upper Near Raw Amplitude - 0	mV	Master	-----	-----	-----	-----	<div><div></div><div></div><div></div></div>
Lower Far Amplitude - 0		Master	-----	-----	-----	-----	<div><div></div><div></div><div></div></div>
Lower Near Raw Amplitude - 0	mV	Master	-----	-----	-----	-----	<div><div></div><div></div><div></div></div>

## CBL Normalization - CBL/VDL Coefficients

Master:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div></div>
CBL Correction Factor for UT		Master	3.500	2.700	NOT DONE	4.300	<div><div></div><div></div><div></div></div>
CBL Correction Factor for LT		Master	2.500	1.700	NOT DONE	4.300	<div><div></div><div></div><div></div></div>
VDL Ratio between UT and LT for CBLB Mode		Master	1.000		NOT DONE		<div><div></div><div></div><div></div></div>

## CBL Free Pipe Adjustment - Free Pipe Measurement

Before:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div></div>
CBL Amplitude - 0	mV	Before	-----	-----	-----	-----	<div><div></div><div></div><div></div></div>
CBL Reference Amplitude (CBRA) - 0	mV	Before	-----	-----	-----	-----	<div><div></div><div></div><div></div></div>
Measurement Depth - 0	m	Before	-----	-----	-----	-----	<div><div></div><div></div><div></div></div>

## CBL Free Pipe Adjustment - CBL Amplitude Coefficient

Before:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div></div>
CBL Adjustment Factor		Before	1.000	0.200	NOT DONE	5.000	<div><div></div><div></div><div></div></div>
Position of Depth of Calibration	ft	Before	-----	-----	NOT DONE	-----	<div><div></div><div></div><div></div></div>

# HDRS-H[2] (HILT Density and Rxo Sonde, 150 degC) Calibration - Run 1.1

## Primary Equipment :

HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	
HILT Resistivity Gamma-Ray Density Device, 150 degC	HRGD-H	3914

## Auxiliary Equipment :

HRDD Backscatter Detector	Backscatter	
HRDD Long Spacing Detector	Long Spacing	28710
HRDD Short Spacing Detector	Short Spacing	27760
Cesium 137 Gamma-Ray Logging Source	GSR-J	5310
HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	
HILT High-Resolution Mechanical Sonde, 150 degC	HRMS-H	3875

## Calibration Parameter :

Small Ring Size (Caliper Calibration Small Ring)	203.2
Large Ring Size (Caliper Calibration Large Ring)	304.8

# HDRS Caliper Calibration - Caliper Accumulations

Before (Measured): 06:29:21 14-Jan-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Small Ring	mm	Before	203.2	152.4	204.6	254.0	
Large Ring	mm	Before	304.8	228.6	313.3	381.0	

# HDRS Density Calibration - Inversion Results

Master (EEPROM): 10:28:40 24-Dec-2013

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Rho Aluminum	kg/m3	Master	2596	2586	2598	2606	
Rho Magnesium	kg/m3	Master	1686	1676	1690	1696	
Pe Aluminum		Master	2.570	2.470	2.568	2.670	
Pe Magnesium		Master	2.650	2.550	2.615	2.750	

# HDRS Density Calibration - Deviation Summary

Master (EEPROM): 10:28:40 24-Dec-2013

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS Average Deviation	%	Master	0	-0.6000	0.2310	0.6000	
BS Max Deviation	%	Master	0	-1.6000	0.8128	1.6000	
SS Average Deviation	%	Master	0	-1.0000	0.6214	1.0000	
SS Max Deviation	%	Master	0	-2.5000	1.9703	2.5000	
LS Average Deviation	%	Master	0	-1.5000	0.3753	1.5000	
LS Max Deviation	%	Master	0	-3.5000	1.3653	3.5000	

# HDRS Density Calibration - Background Summary

Master (EEPROM): 10:28:40 24-Dec-2013 Before (Measured): 14:51:08 09-Jan-2014 Expired by 4 days

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS Window Ratio		Master	1.0000		0.7406		
		Before	0.7406	0.7036	0.7452	0.7776	
		Before-Master	-----	-----	0.0046	-----	
BS Window Sum	1/s	Master	1		23979		
		Before	23979	22780	24136	25178	
		Before-Master	-----	-----	157	-----	
SS Window Ratio		Master	1.0000		0.4809		
		Before	0.4809	0.4569	0.4768	0.5050	
		Before-Master	-----	-----	-0.0041	-----	
SS Window Sum	1/s	Master	1		10589		
		Before	10589	10060	10583	11119	
		Before-Master	-----	-----	-6	-----	
LS Window Ratio		Master	1.0000		0.3042		
		Before	0.3042	0.2890	0.2988	0.3194	
		Before-Master	-----	-----	-0.0054	-----	
LS Window Sum	1/s	Master	1		1192		
		Before	1192	1132	1180	1251	
		Before-Master	-----	-----	-12	-----	

# HDRS Density Calibration - Photo-multiplier High Voltages



## HDRS Density Calibration - Note Multiple High Voltages

Master (EEPROM):		10:28:40 24-Dec-2013		Before (Measured):		14:51:08 09-Jan-2014 Expired by 4 days	
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS PM High Voltage	V	Master		1000	1448	2400	
		Before		1000	1447	2400	
		Before-Master	----	-100	-1	100	
SS PM High Voltage	V	Master		1000	1477	2400	
		Before		1000	1506	2400	
		Before-Master	----	-100	29	100	
LS PM High Voltage	V	Master		1000	1289	2400	
		Before		1000	1286	2400	
		Before-Master	----	-100	-3	100	

## HDRS Density Calibration - Crystal Quality Resolutions

Master (EEPROM):		10:28:40 24-Dec-2013		Before (Measured):		14:51:08 09-Jan-2014 Expired by 4 days	
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS Crystal Resolution	%	Master		5.00	10.46	25.00	
		Before		5.00	10.41	25.00	
		Before-Master	----	-1.00	-0.05	1.00	
SS Crystal Resolution	%	Master		5.00	10.04	20.00	
		Before		5.00	10.64	20.00	
		Before-Master	----	-1.00	0.60	1.00	
LS Crystal Resolution	%	Master		5.00	8.04	20.00	
		Before		5.00	8.03	20.00	
		Before-Master	----	-1.00	-0.01	1.00	

## HDRS MCFL Calibration - MCFL Accumulations

Before (Measured):		06:25:34 14-Jan-2014					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Main Resistivity	ohm.m	Before	3875	3565	3906	4185	
Deep Resistivity	ohm.m	Before	3830	3524	3827	4136	
Shallow Resistivity	ohm.m	Before	3830	3524	3837	4136	

## SGT-N (Scintillation Gamma-Ray Tool) Calibration - Run 1.1

Primary Equipment :			
Scintillation Gamma Cartridge	SGC-TB	10447	
Calibration Parameter :			
Plus Reference (Jig minus background reference)	165		

## SGT-N Gamma-Ray Calibration - Gamma Ray Coefficients

Before (Measured):		06:28:02 14-Jan-2014		After:			
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Gamma Ray Gain		Before			1.169		
		After	----	----	----	----	
		After-Before	----	----	----	----	

## SGT-N Gamma-Ray Calibration - Gamma Ray Accumulations

Before (Measured):		06:28:02 14-Jan-2014		After:			
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RGR Zero Measurement	gAPI	Before		0	44.958	120.000	
		After	----	----	----	----	
		After-Before	----	----	----	----	
RGR Plus Measurement	gAPI	Before	141.161	128.328	141.161	153.994	
		After			NOT DONE		
		After-Before	----	----	----	----	

## SGT-N Gamma-Ray Plateau Check - Gamma Ray Plateau Check

Before (Measured):		14:58:24 09-Jan-2014		After:			
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RGR Plus Plateau Measurement	gAPI	Before			173.529		
		After	----	----	----	----	
		After-Before	----	----	----	----	
RGR Minus Plateau Measurement	gAPI	Before			170.096		
		After	----	----	----	----	
		After-Before	----	----	----	----	

LEH-QT (Logging Equipment Head - QT, 3-3/8 inch 31 pin HPHT with Tension Sensor) Calibration - Run 1.1

Primary Equipment :				Logging Equipment Head - QT, 3-3/8 inch 31 pin HPHT with Tension Sensor	LEH-QT	2850
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HTEN Master Calibration - HTEN Master Calibration

Master:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
HTEN Shop Gain		Master	1.000	0.800	NOT DONE	4.500	
HTEN Shop Offset	lbf	Master	0	-4448.222	NOT DONE	4448.222	

HTEN Before Calibration - HTEN Before Calibration

Before:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RHTE Zero Measurement - 0	lbf	Before	----	----	----	----	
RHTE Plus Measurement - 0	lbf	Before	----	----	----	----	
HTEN Gain - 0		Before	----	----	----	----	
HTEN Offset - 0	lbf	Before	----	----	----	----	

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