

Company: Whiting Oil Gas Corp

Well: Razor 21B 0910B

Field: Wildcat

County: Weld State: Colorado

Digital Sonic Tool
Cement Bond Log
GR-VDL-CBL-CCL

County:	Weld
Field:	Wildcat
Location:	NWNE Sec. 21, T10N, R58W
Well:	Razor 21B 0910B
Company:	Whiting Oil Gas Corp
Location:	
NWNE Sec. 21, T10N, R58W	
SHL: 328' FNL & 2128' FSL	
Lat/Long: 40.8302/-103.868744	
Permanent Datum:	Ground Level
Log Measured From:	Kelly Bushing
Drilling Measured From:	Kelly Bushing
API Serial No.	Section: 21
05-123-39532-0000	Township: 10N
	Range: 58W

Logging Date	07-Nov-2014
Run Number	ONE
Depth Driller	13997.00 ft
Schlumberger Depth	13997.00 ft
Bottom Log Interval	5090.00 ft
Top Log Interval	0.00 ft
Casing Fluid Type	2% KCL
Salinity	
Density	8.7 lbm/gal
Fluid Level	0.00 ft
BIT/CASING/TUBING STRING	
Bit Size	6.00 in
From	6210.00 ft
To	13997.00 ft
Casing/Tubing Size	4.5 in
Weight	11.6 lbm/ft
Grade	P110
From	5101.30 ft
To	13992.00 ft
Max Recorded Temperatures	186 degF
Logger on Bottom	07-Nov-2014
Unit Number	3022
Recorded By	Nolan Welsh
Witnessed By	Tom Flynn

Disclaimer

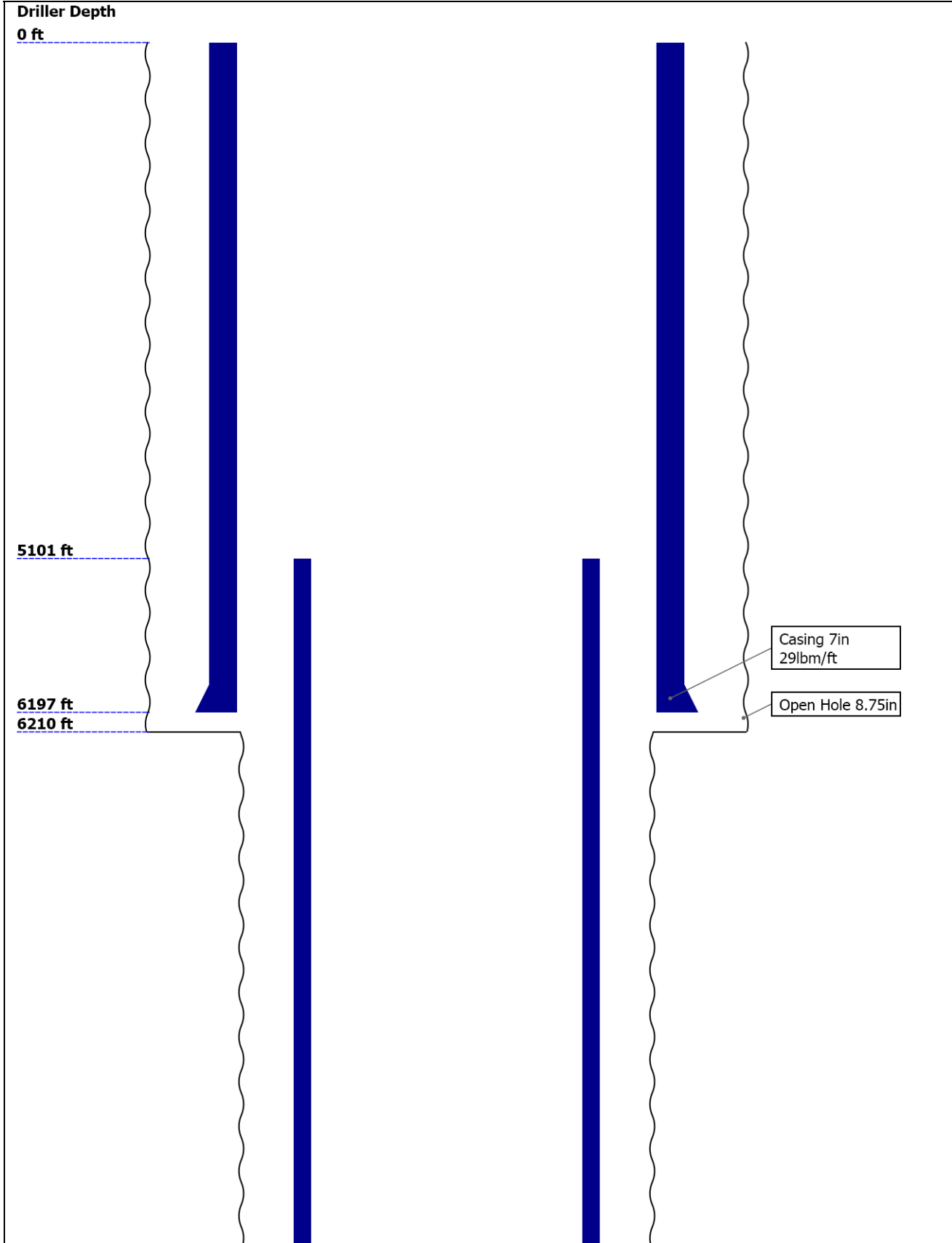
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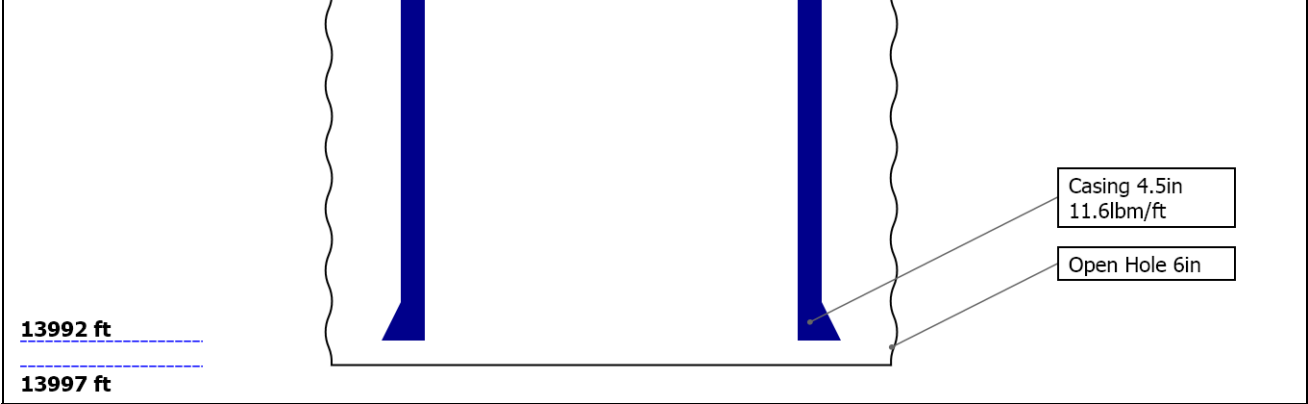
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Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	8.75	6				
Top Driller (ft)	0	6210				
Top Logger (ft)	0	6210				
Bottom Driller (ft)	6210	13997				
Bottom Logger (ft)	6210	13997				
Casing						
Size (in)	7	4.5				
Weight (lbm/ft)	29	11.6				
Inner Diameter (in)	6.184	4				
Grade	P110	P110				
Top Driller (ft)	0	5101				
Top Logger (ft)	0	5101				
Bottom Driller (ft)	6197	13992				
Bottom Logger (ft)	6197	13992				

Operational Run Summary

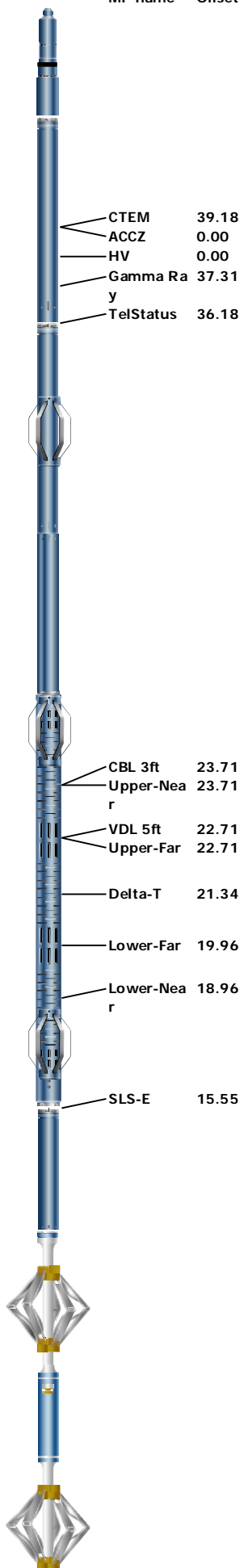
Parameter (unit)	ONE					
Date Log Started	07-Nov-2014					
Time Log Started	08:03:12					
Date Log Finished	07-Nov-2014					
Time Log Finished	10:07:02					
Top Log Interval (ft)	0.00					
Bottom Log Interval (ft)	5090.00					
Total Depth (ft)	5090.00					
Max Hole Deviation (deg)	0.00					
Azimuth of Max Deviation (deg)	0.00					
Bit Size (in)	6.000					
Logging Unit Number	3022					
Logging Unit Location	Fort Morgan, CO					
Recorded By	Nolan Welsh					
Witnessed By	Tom Flynn					
Service Order Number	CYBX-00051					

Remarks and Equipment Summary

ONE: Toolstring

ONE: Remarks

Equip name	Length	MP name	Offset
LEH-QT LEH-QT	45.6		
EDTC-B EDTH-B EDTG-A EDTC-B	42.68		
DSLTH ECH-KH DSLCH SLS-E	36.18		
USIT-E ECH-MFA USAC-A USIS-A USSC-B USRS-B USI-SENSOR	15.54		



Toolstring as per tool sketch.

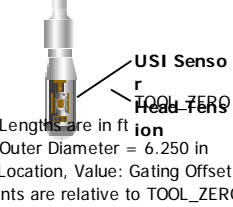
0 psi Repeat Pass

1500 psi Main Pass.

Top of Cement: 152 Feet.

Primary Cement: 14.5 lb/gal Class G.

Crew: Ian Derry, Troy Ocanas, Mike Sullivan

<div></div>											
Depth Summary											
				ONE							
Depth Measuring Device											
Type		IDW-B									
Serial Number											
Calibration Date											
Calibrator Serial Number											
Calibration Cable Type											
Wheel Correction 1		0									
Wheel Correction 2		0									
Tension Device											
Type		CMTD-B/A									
Serial Number											
Calibration Date											
Calibrator Serial Number											
Number of Calibration Points		0									
Logging Cable											
Type		7-46NT-XS									
Serial Number											
Length		24000 ft									
Conveyance Type		Wireline									
Rig Type		Rigless									
ONE:Depth Control Parameters						Depth Control Remarks					
Log Sequence		First Log In the Well				All Schlumberger depth procedures followed. IDW used as primary depth control. Z-Chart used as secondary depth control.					
Rig Up Length At Surface											
Rig Up Length At Bottom											
Rig Up Length Correction											
Stretch Correction											
Tool Zero Check At Surface											
ONE											
5" CBL-VDL Main											
Software Version											
Acquisition System						Version					
MaxWell						4.0.9163.3000					
Application Patch						Patch-SP-10767_13393-4.0.9163.3001					
Computation		Description						Version			
CEVAL		Sonic Cement Evaluation Computation Ensemble provides common Parameters and Channels						4.0.9033.3000			
DepthCorrection		DepthCorrection						4.0.9213.3000			
Tool Elements		Description				Software Version			Firmware Version		
SLS-E		Sonic Logging Sonde E supports 3'-5'BHC DT and CBL/VDL				4.0.9033.3000			4.0		
USI-SENSOR		USIT Transducer Element				4.0.9265.3000			DSP: v01.82		
EDTC-B		Enhanced Digital Telemetry Cartridge - B				4.0.9119.3000					
Pass Summary											
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include		

All depths are referenced to toolstring zero

ONE: Log[5]:Up:S069

TIME_1900 - Time Marked every 60.00 (s)

└ BIEP - Bond Index Event Pips DSLT-H

0	ft	50
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0 qAPI 150

400 us 200

-19 in 1

10000 0
lbf

Tool_Tot.
Drag

0 mV 100

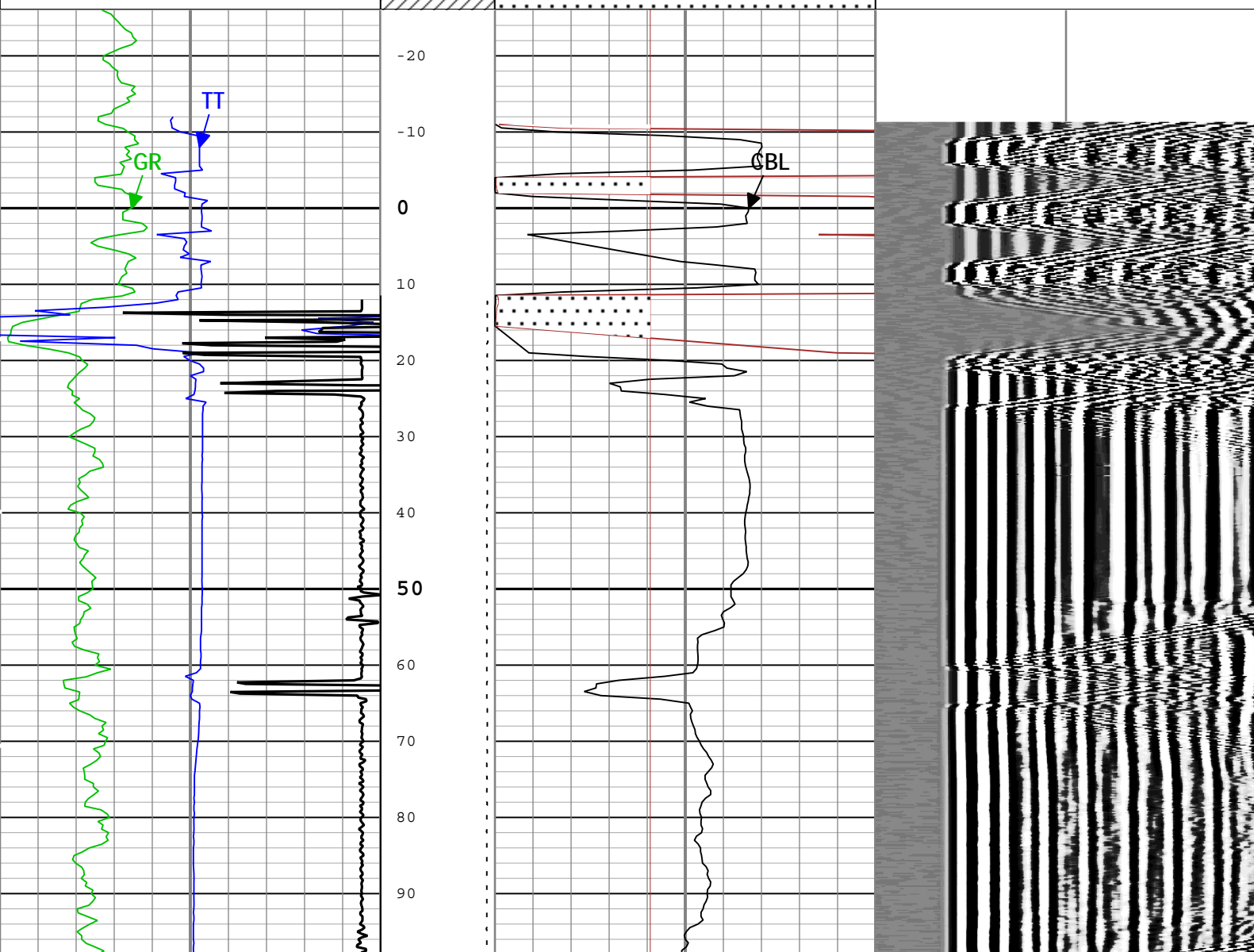
0 mV 10

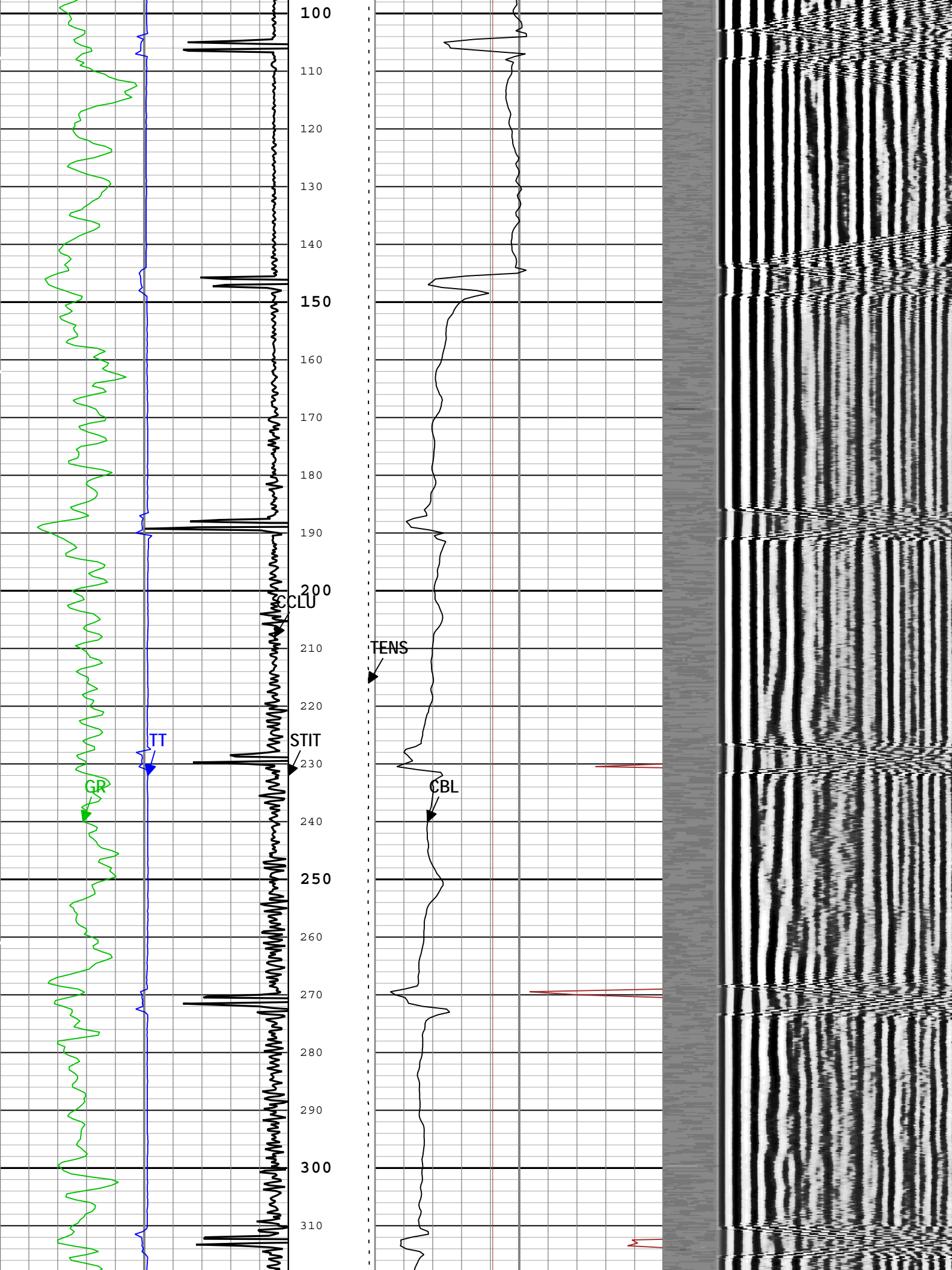
0 mV 10

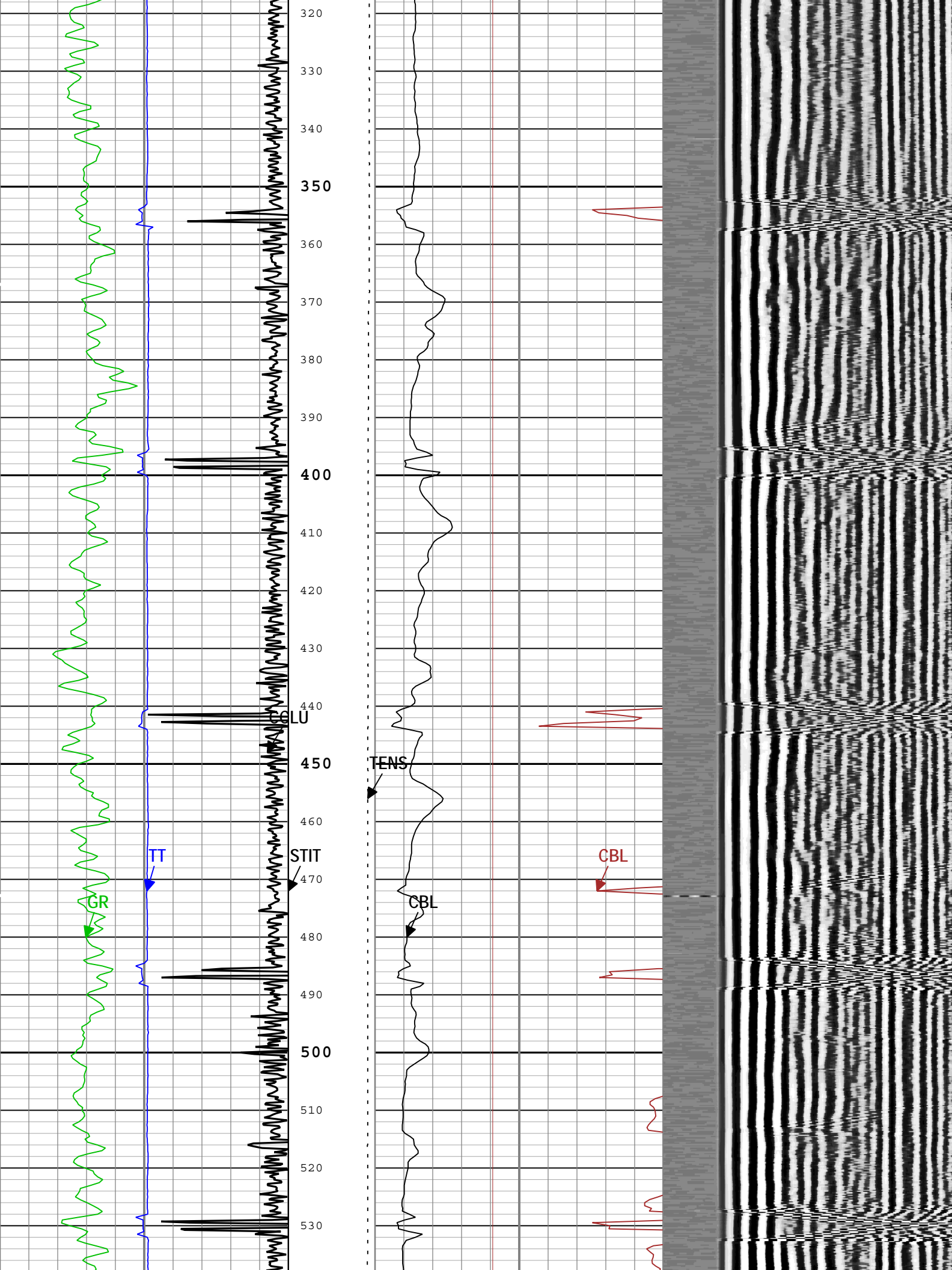
Min	Amplitude	Max
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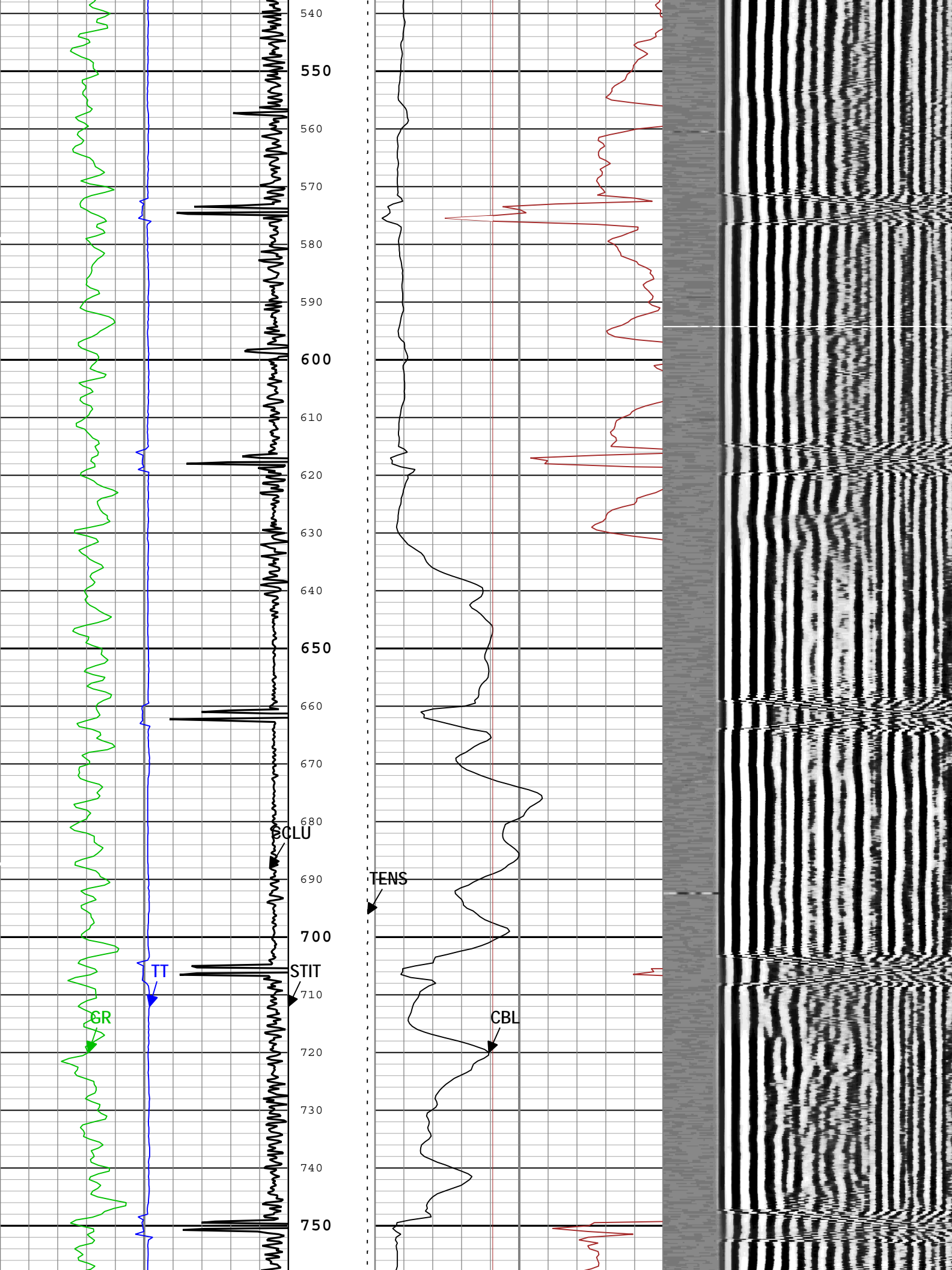
Variable Density Log (VDL) DSLT-H

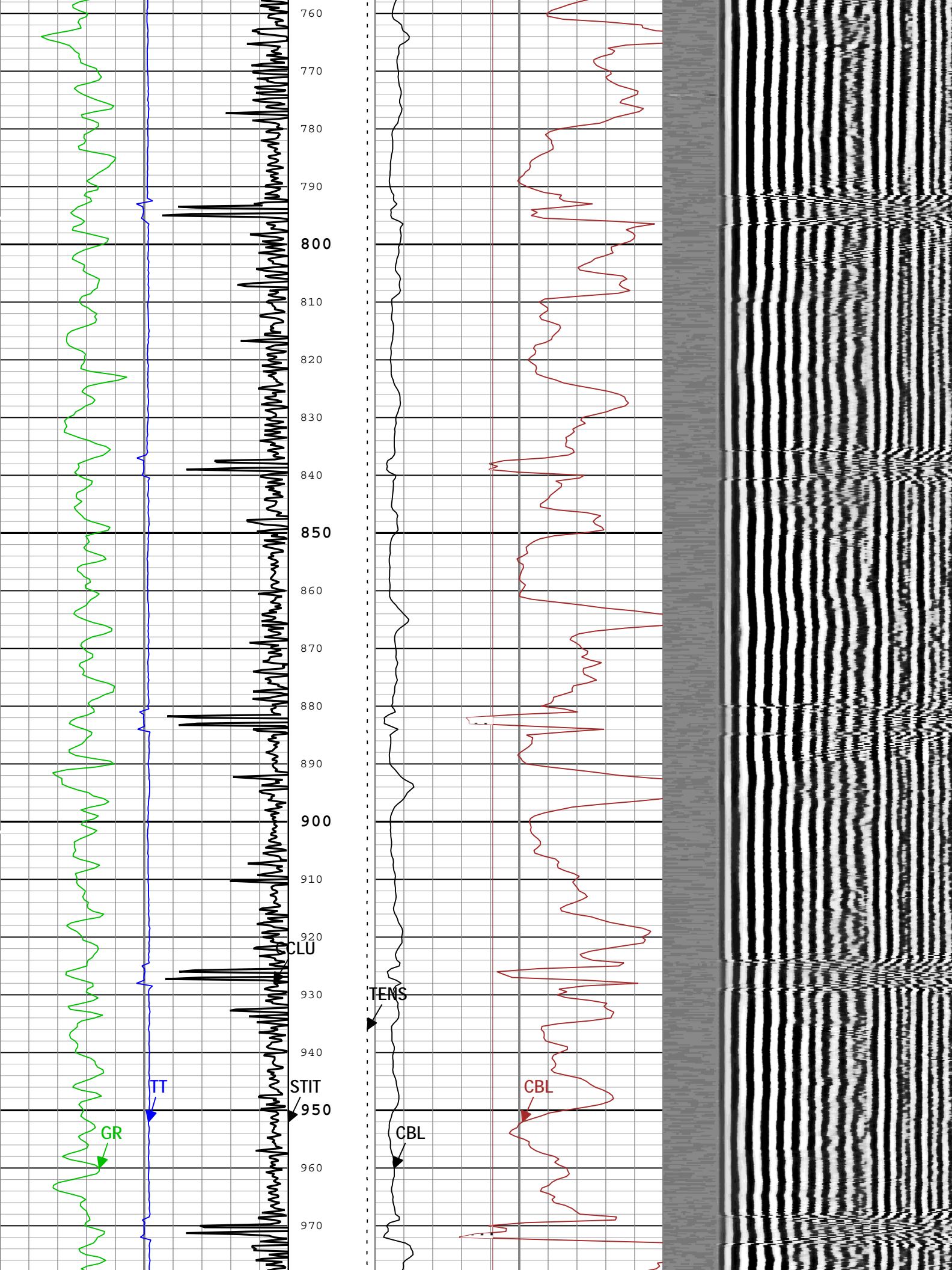
200	us	1200
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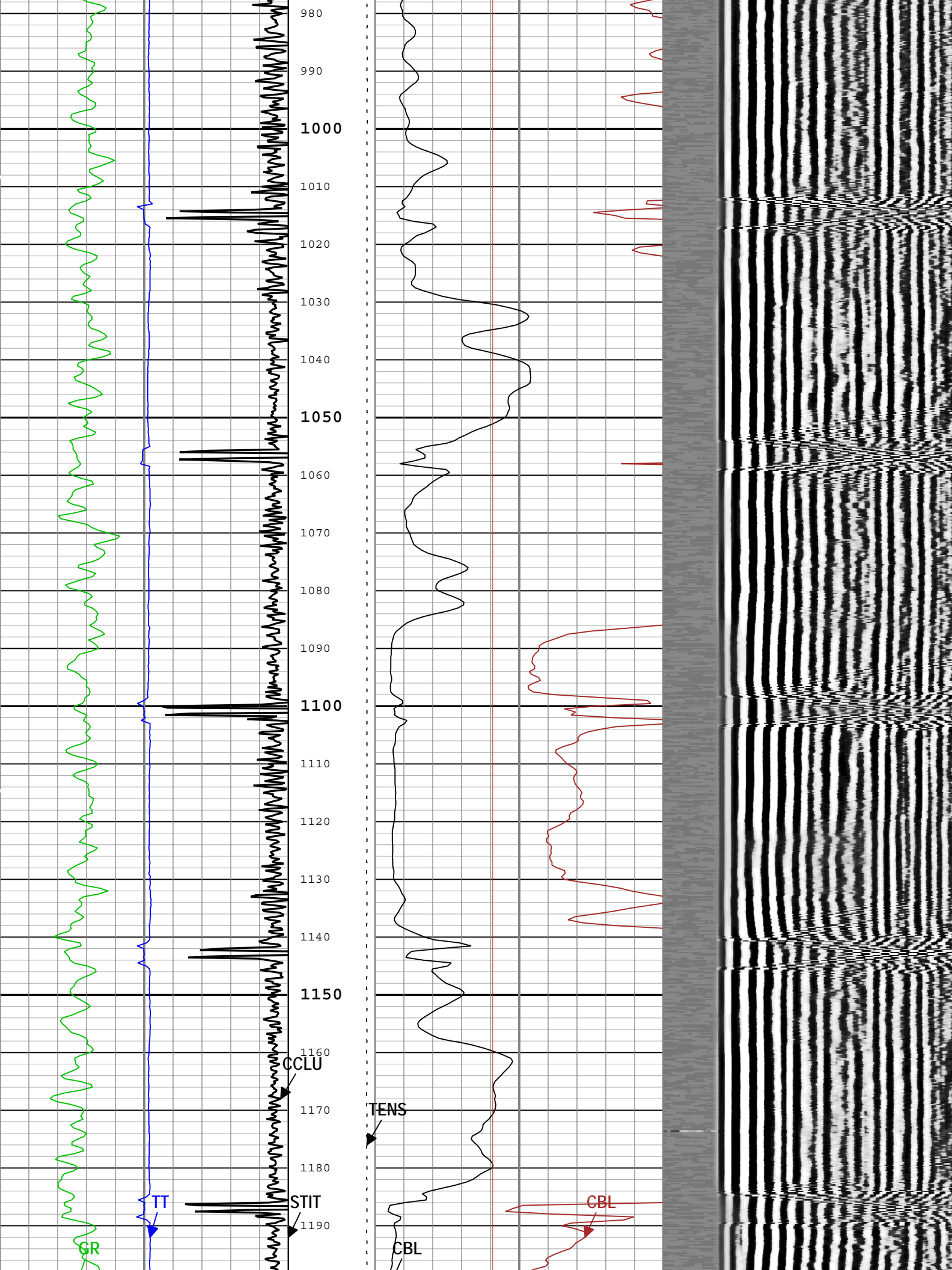


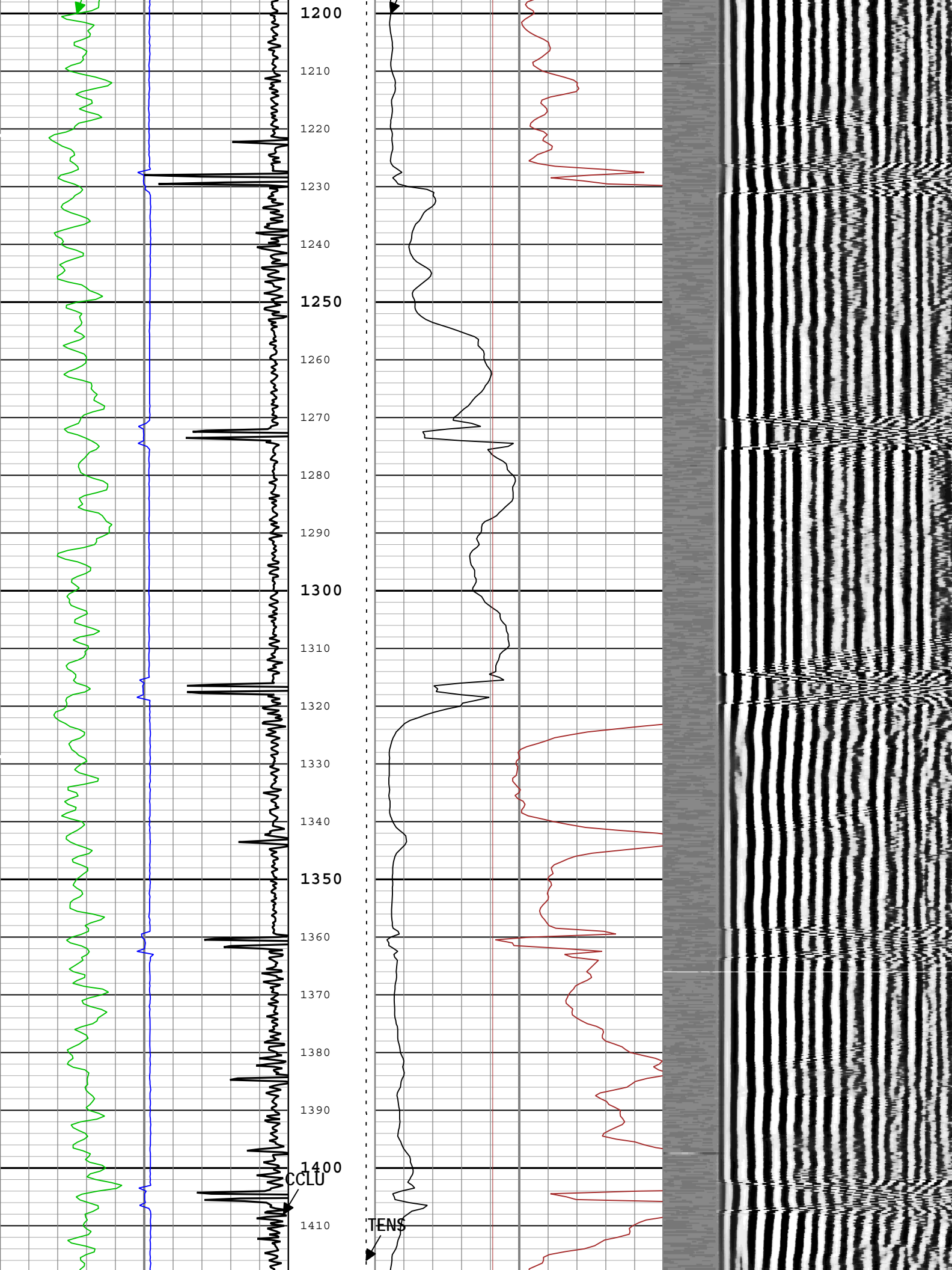


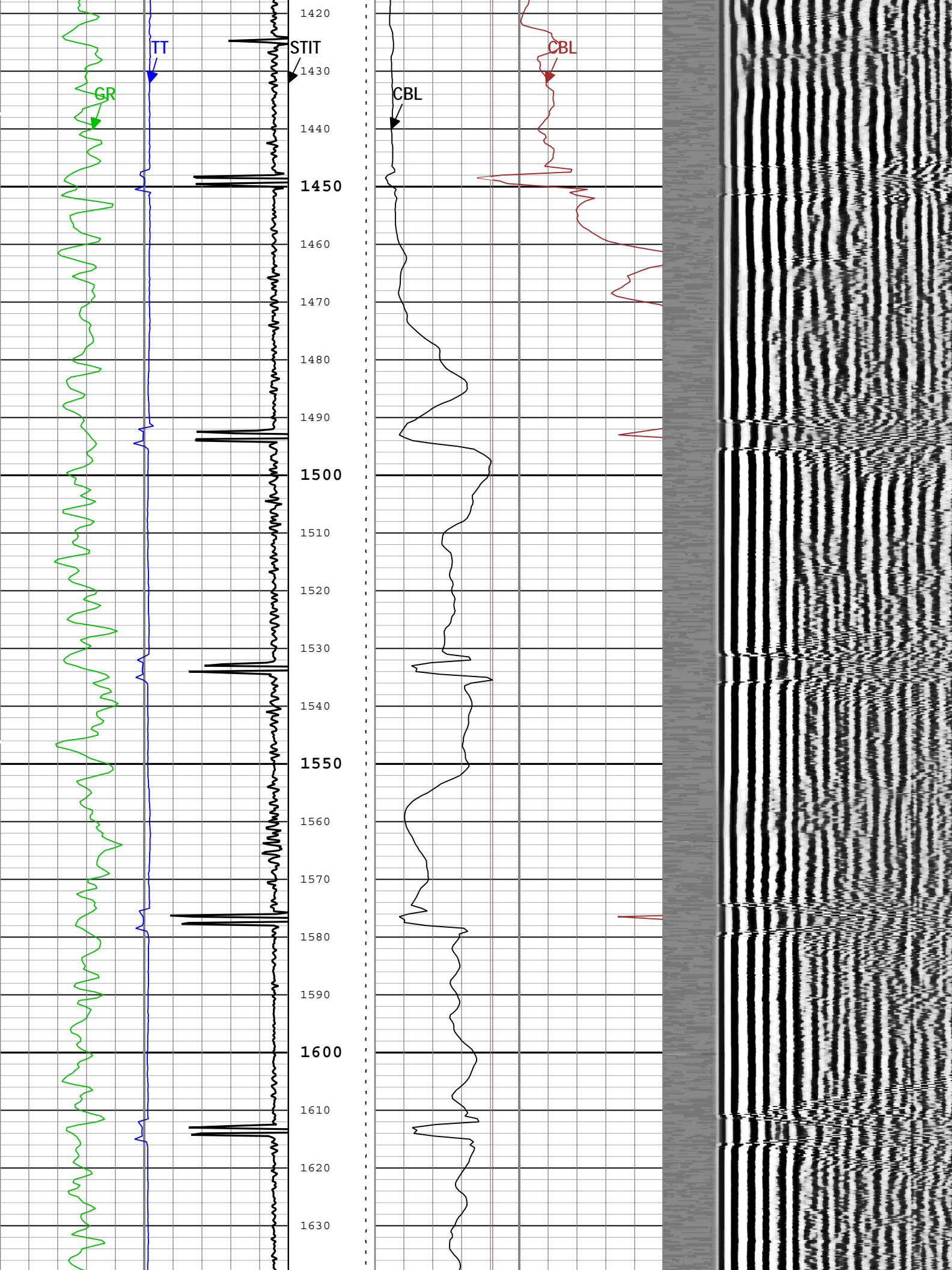


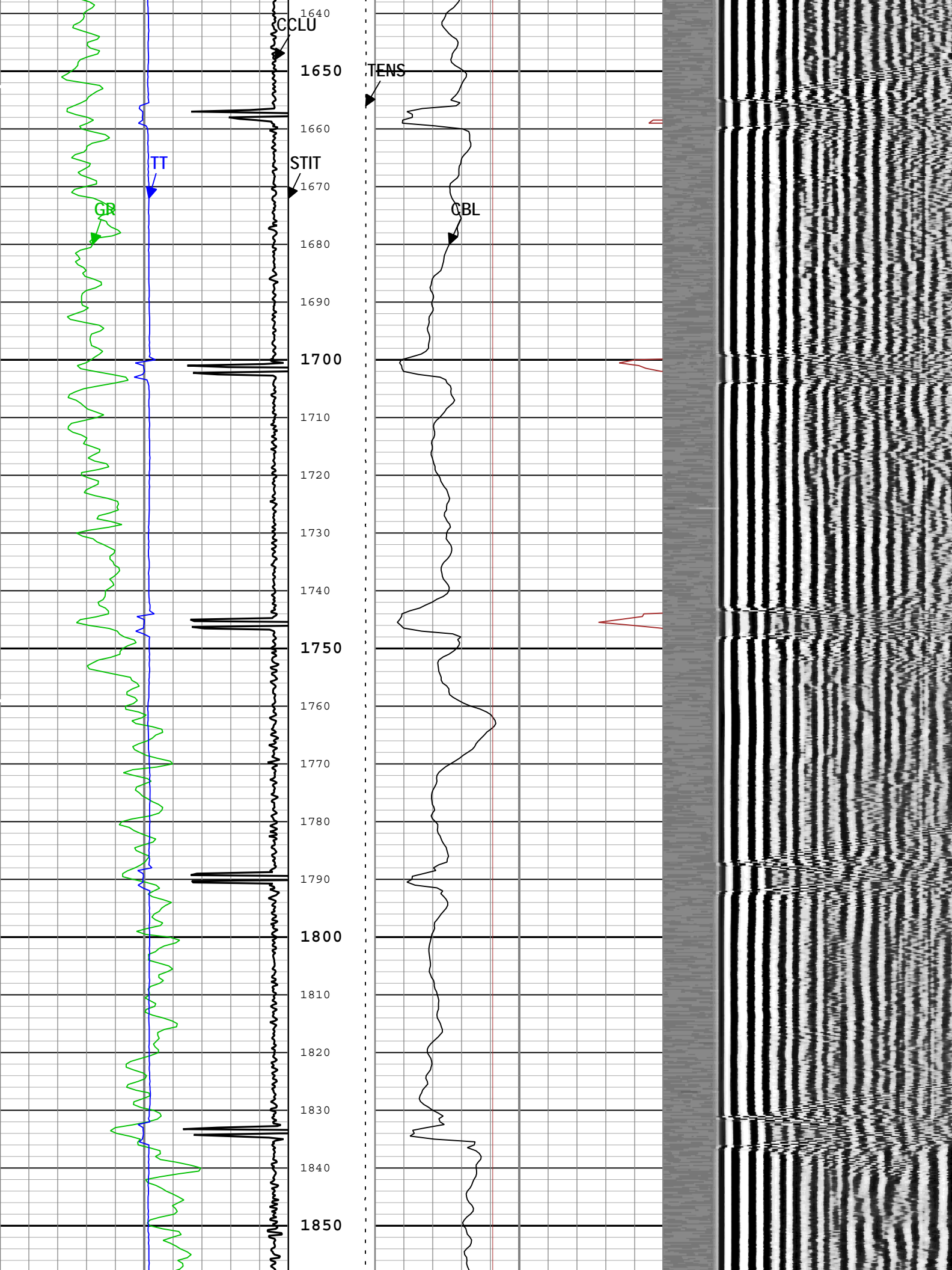


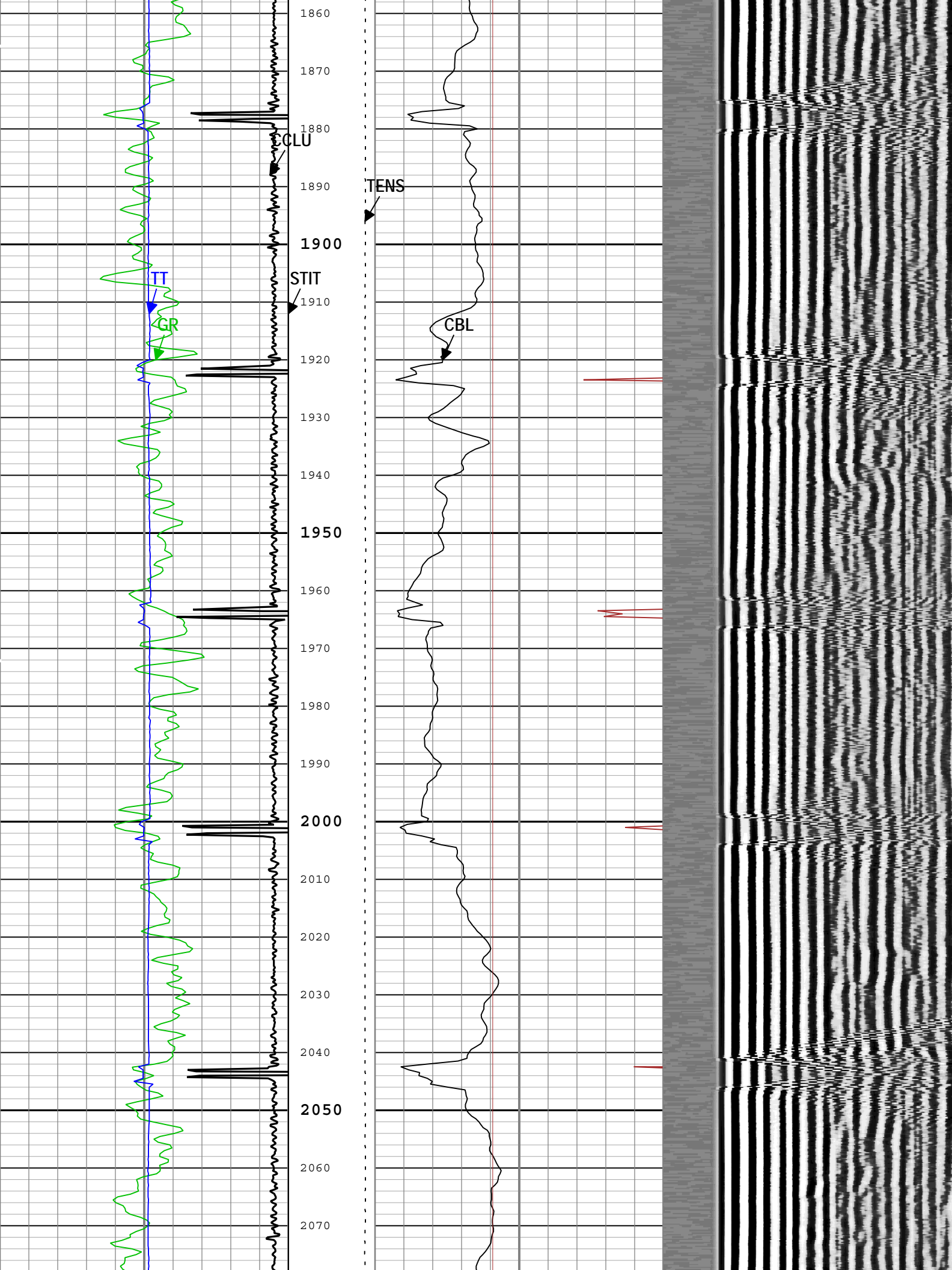


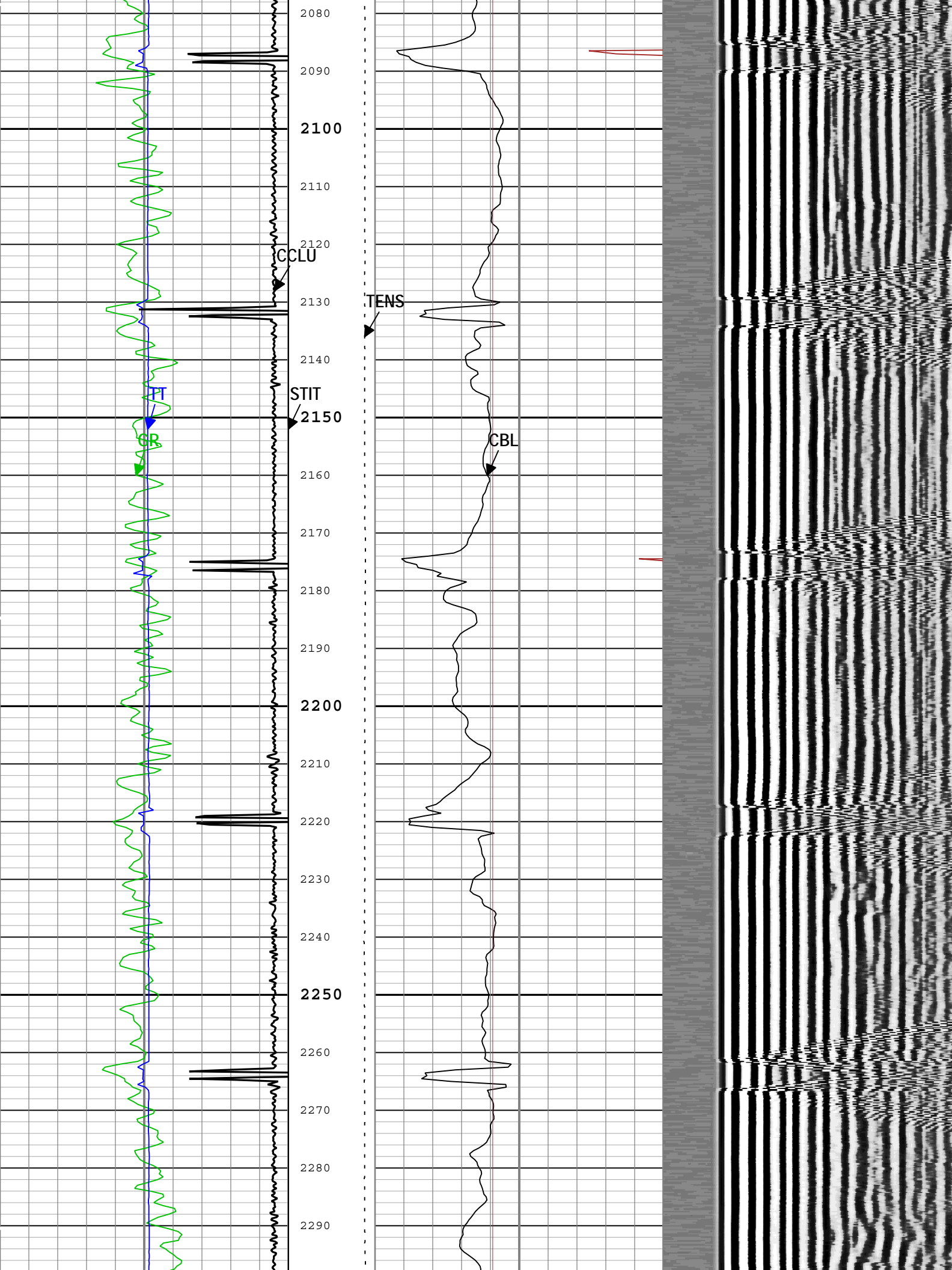


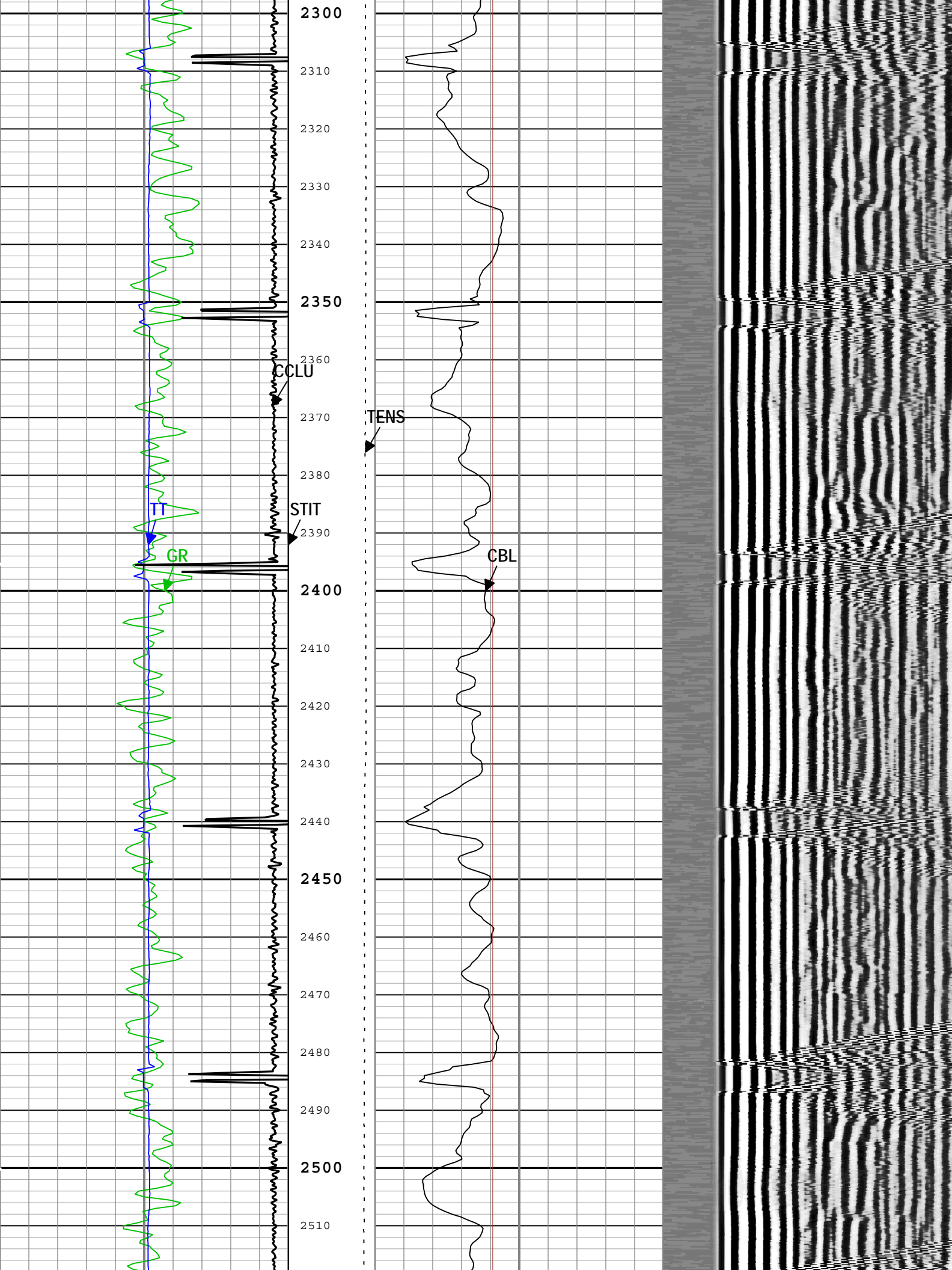


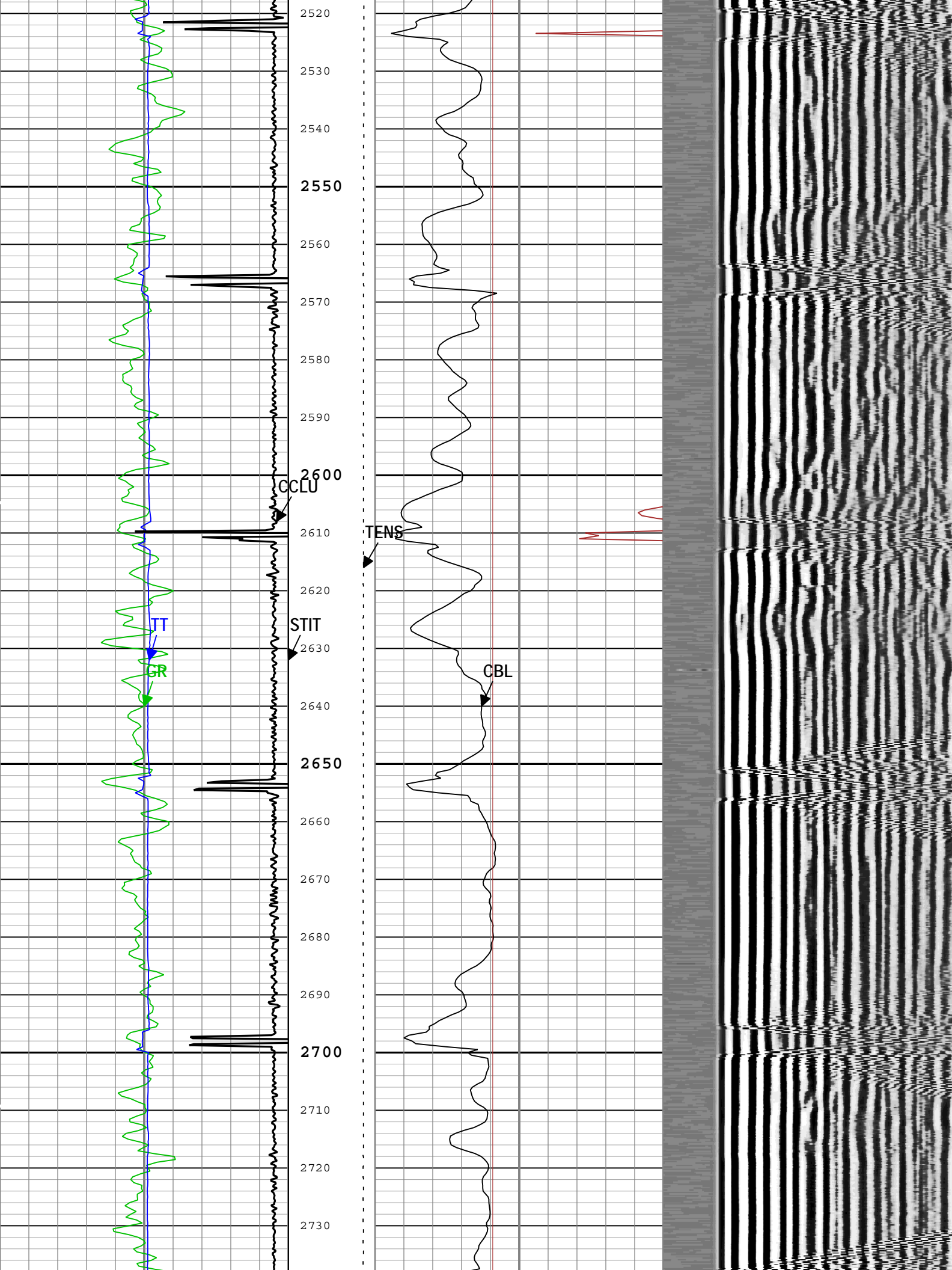


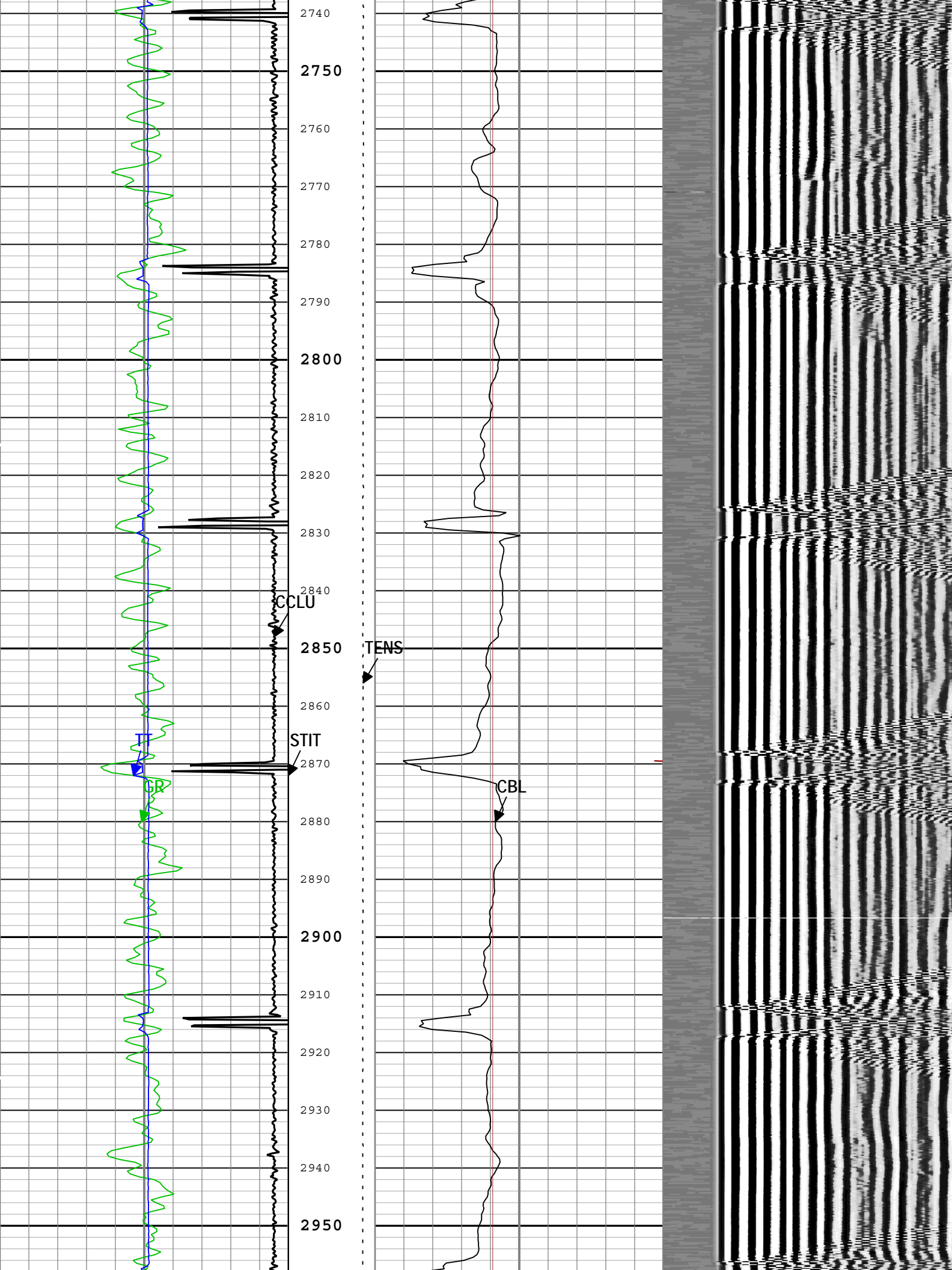


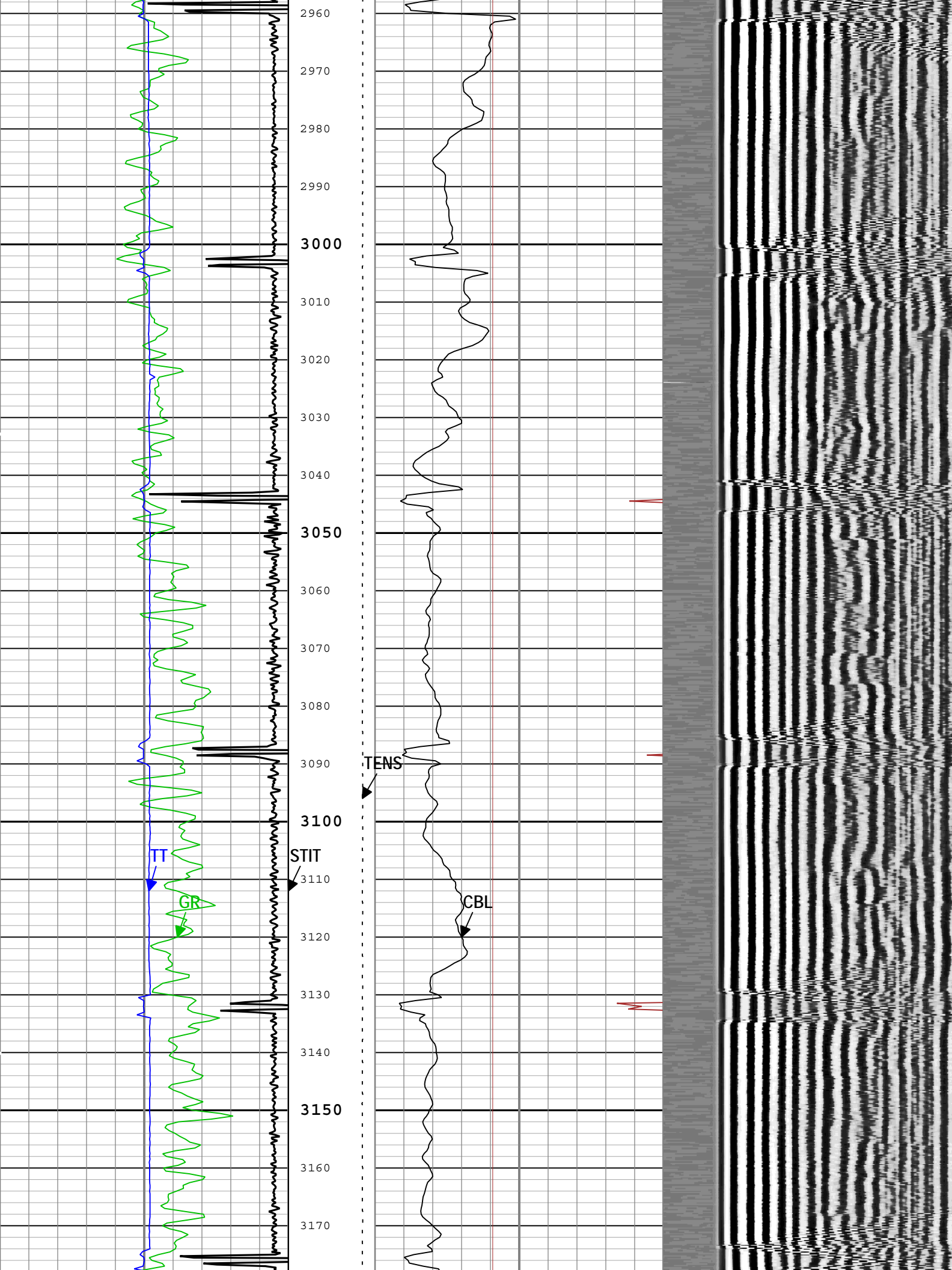


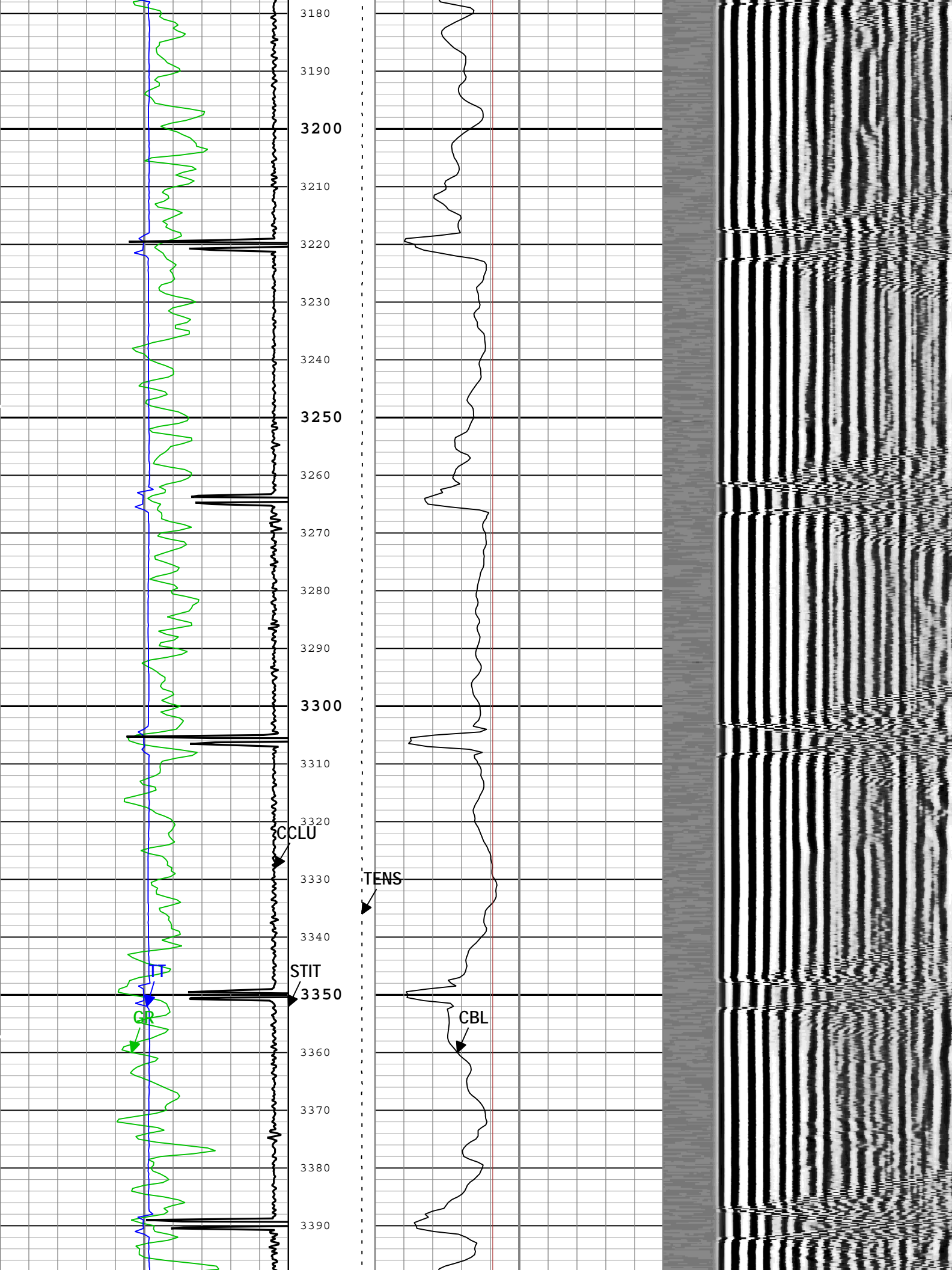


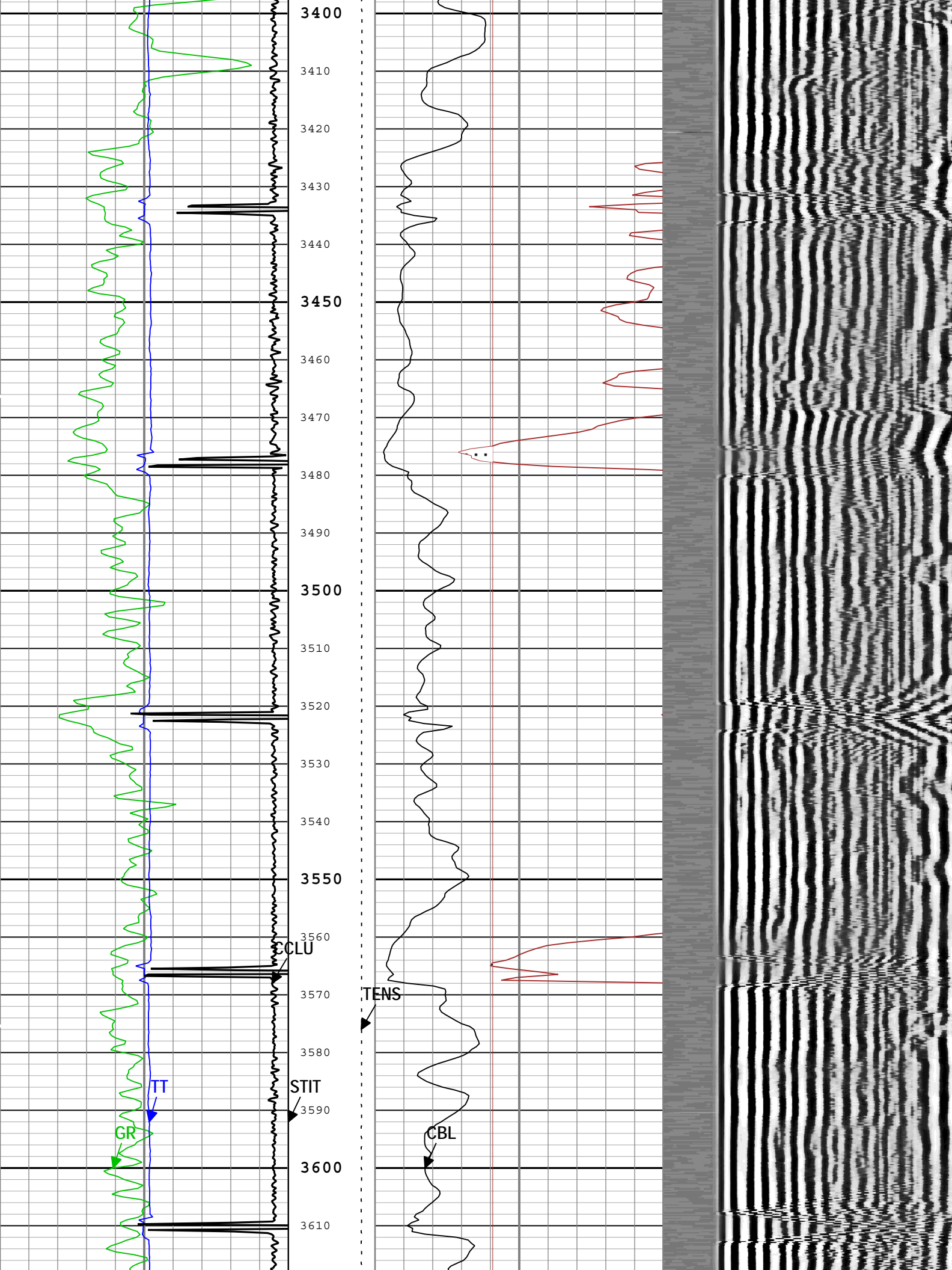


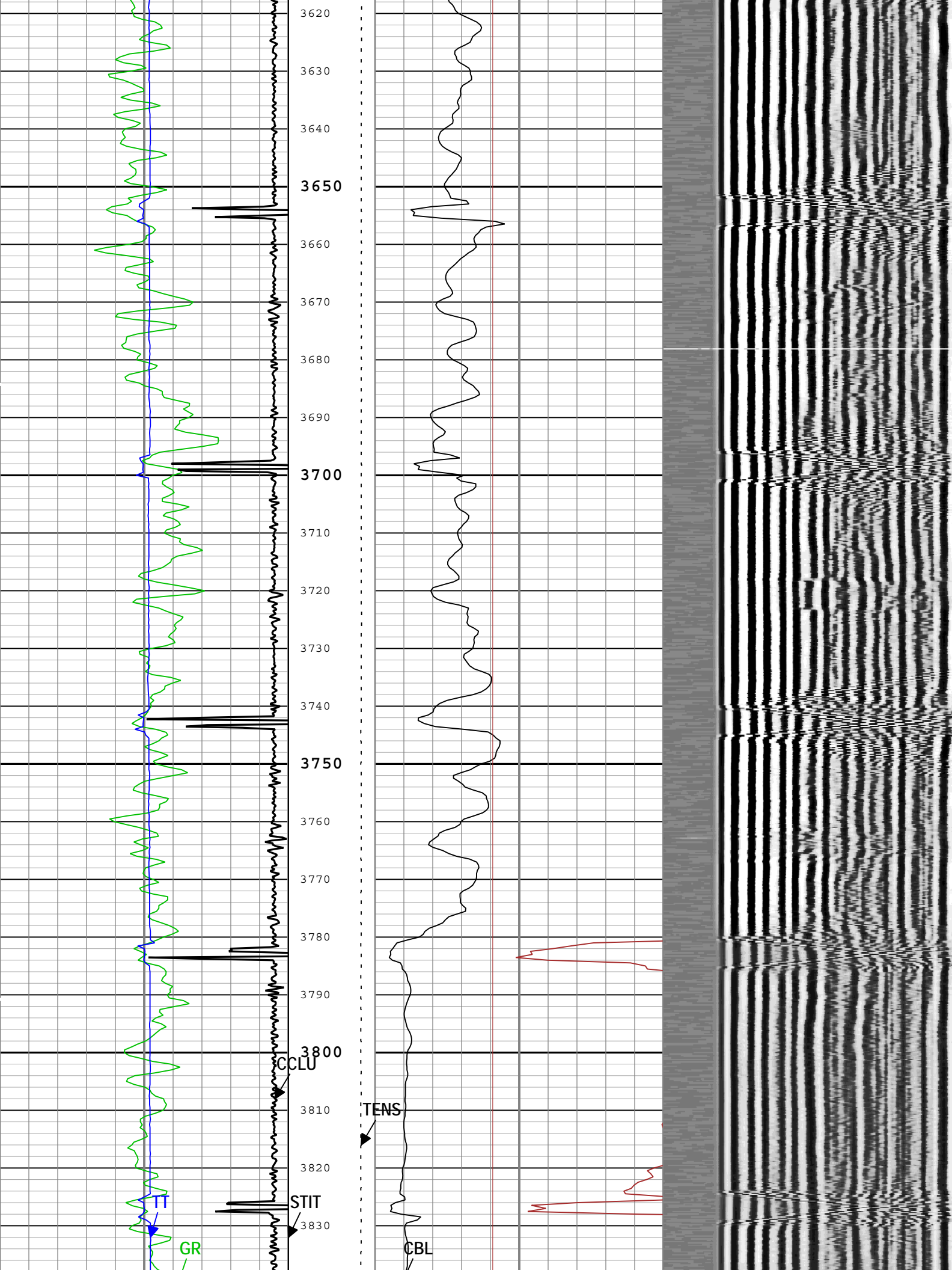


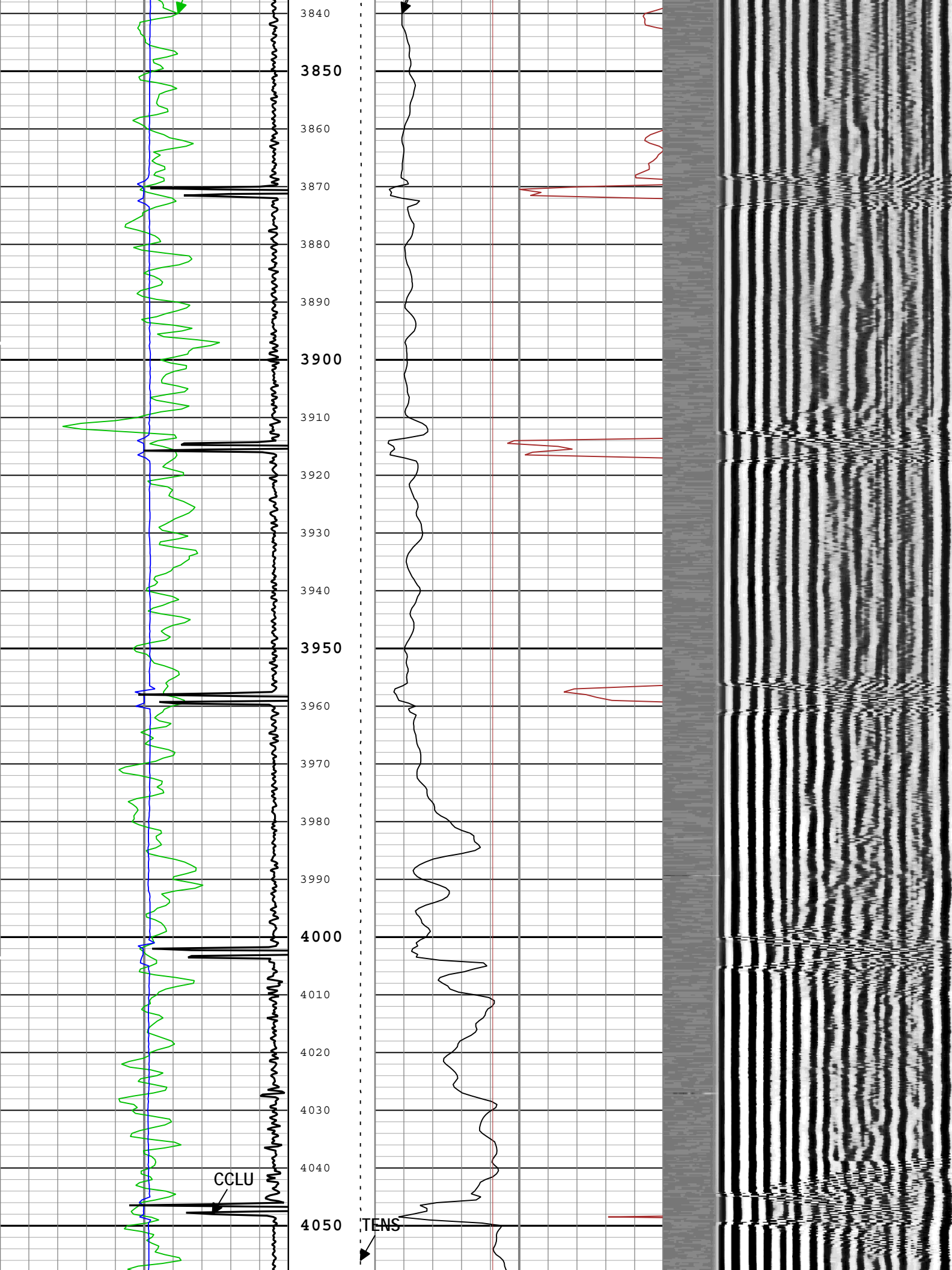


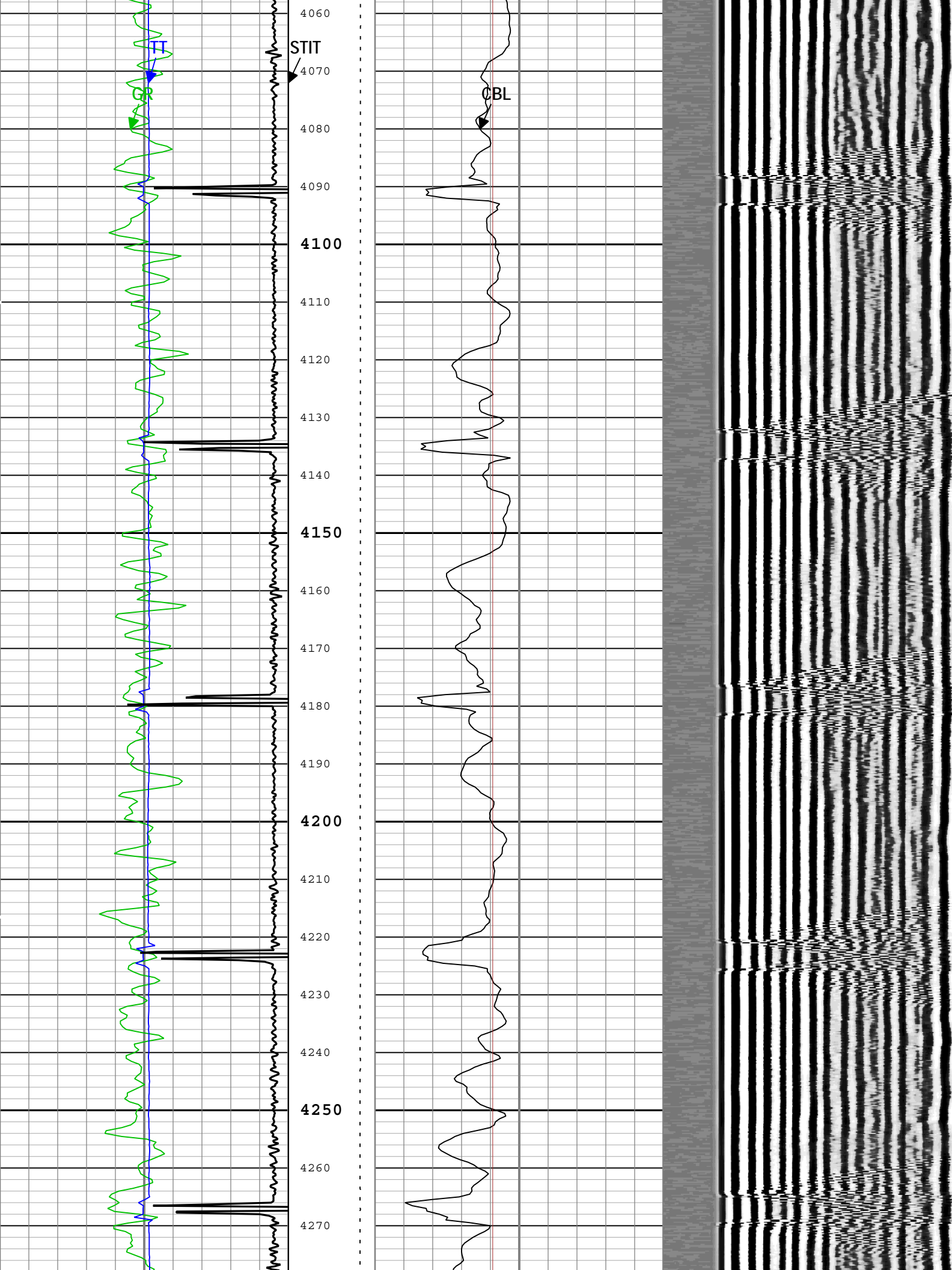


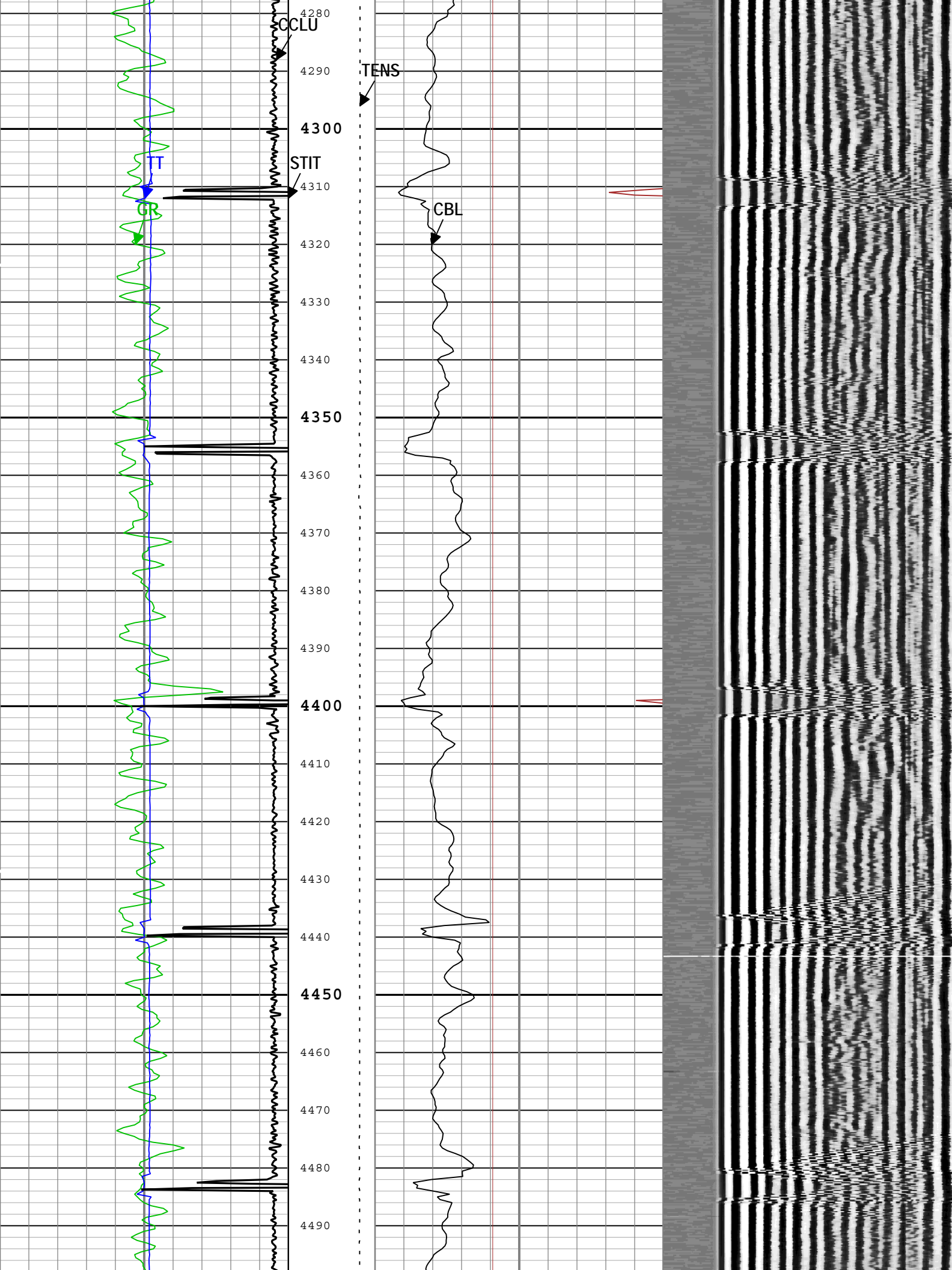


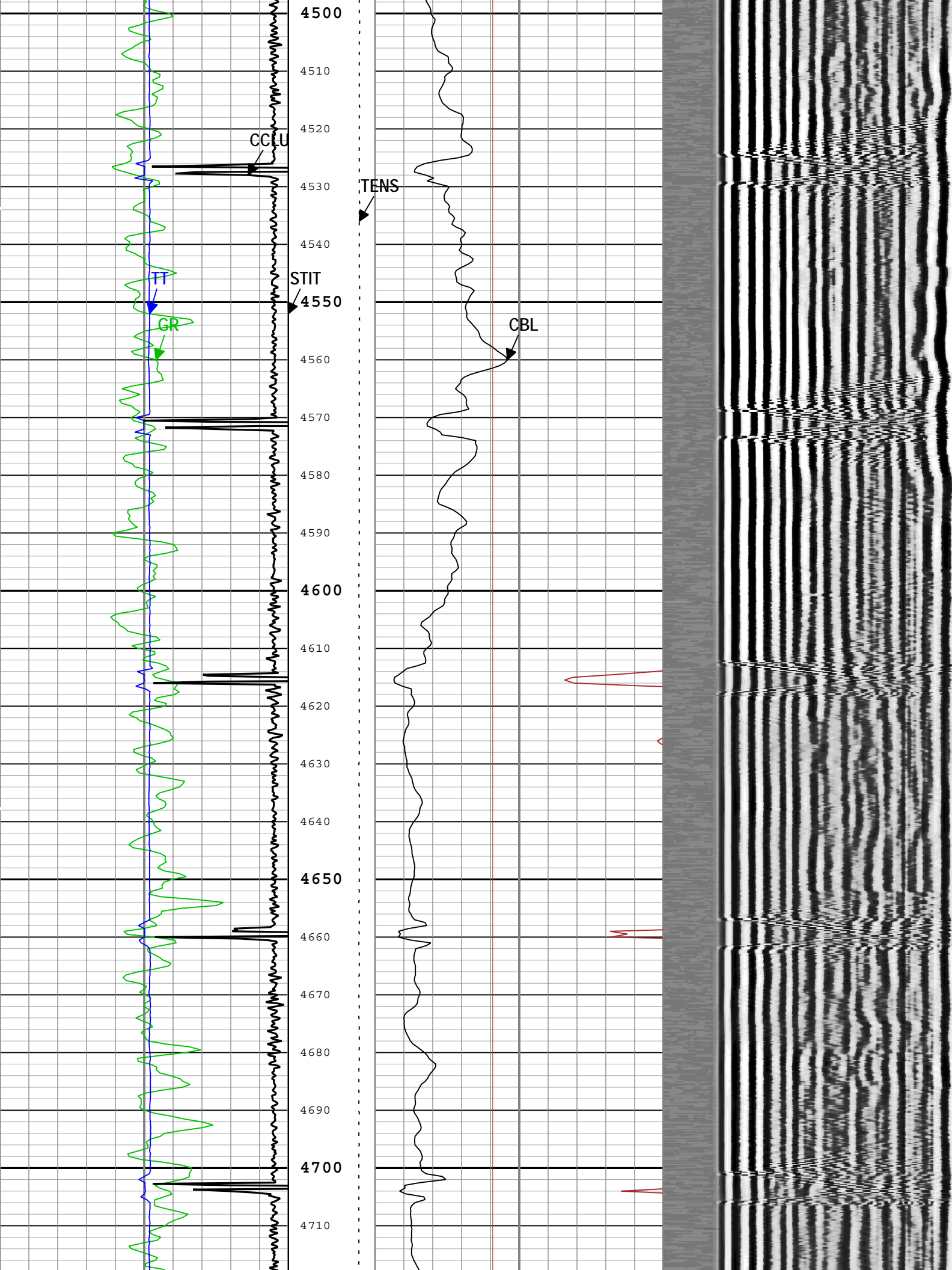


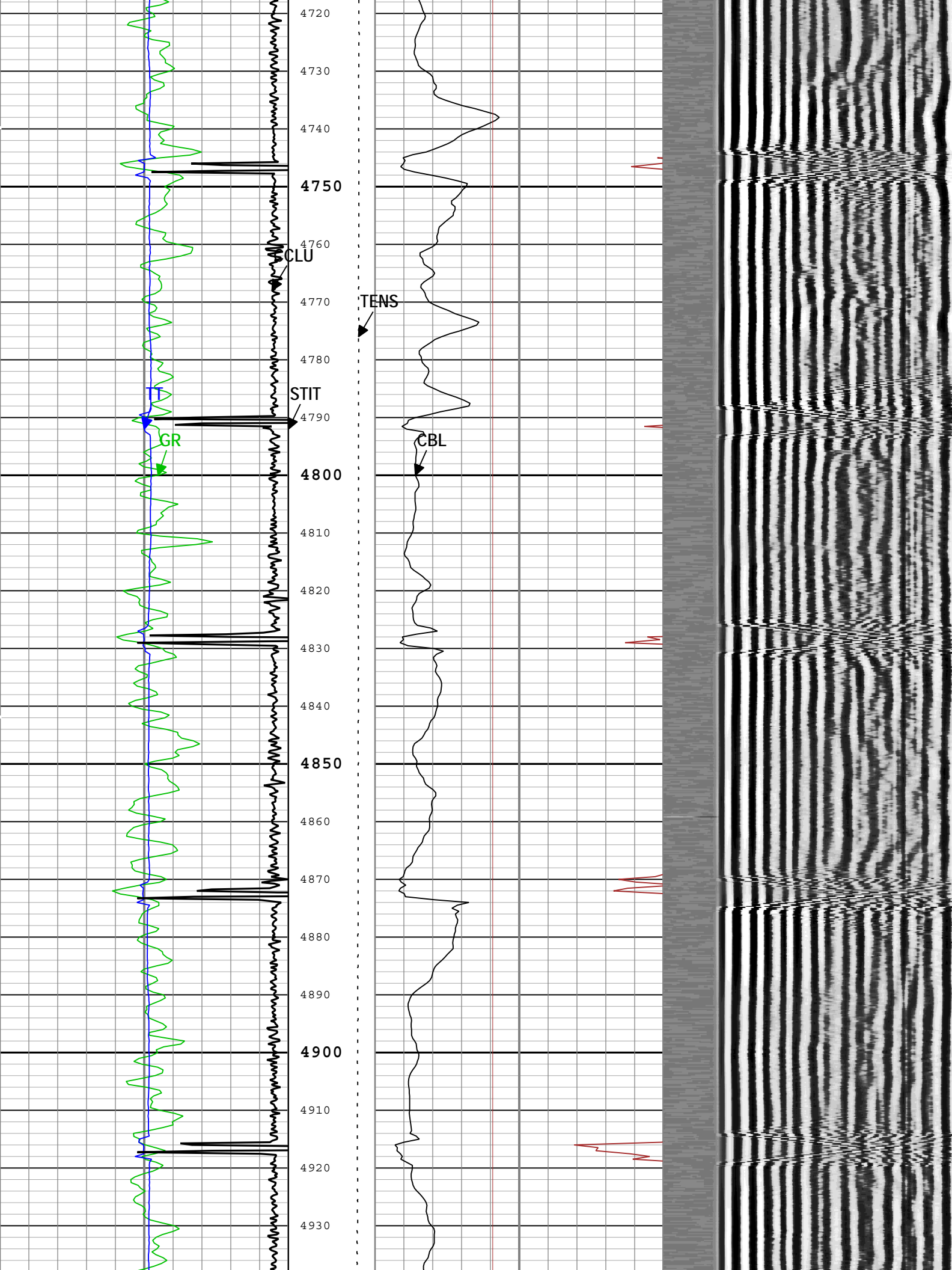








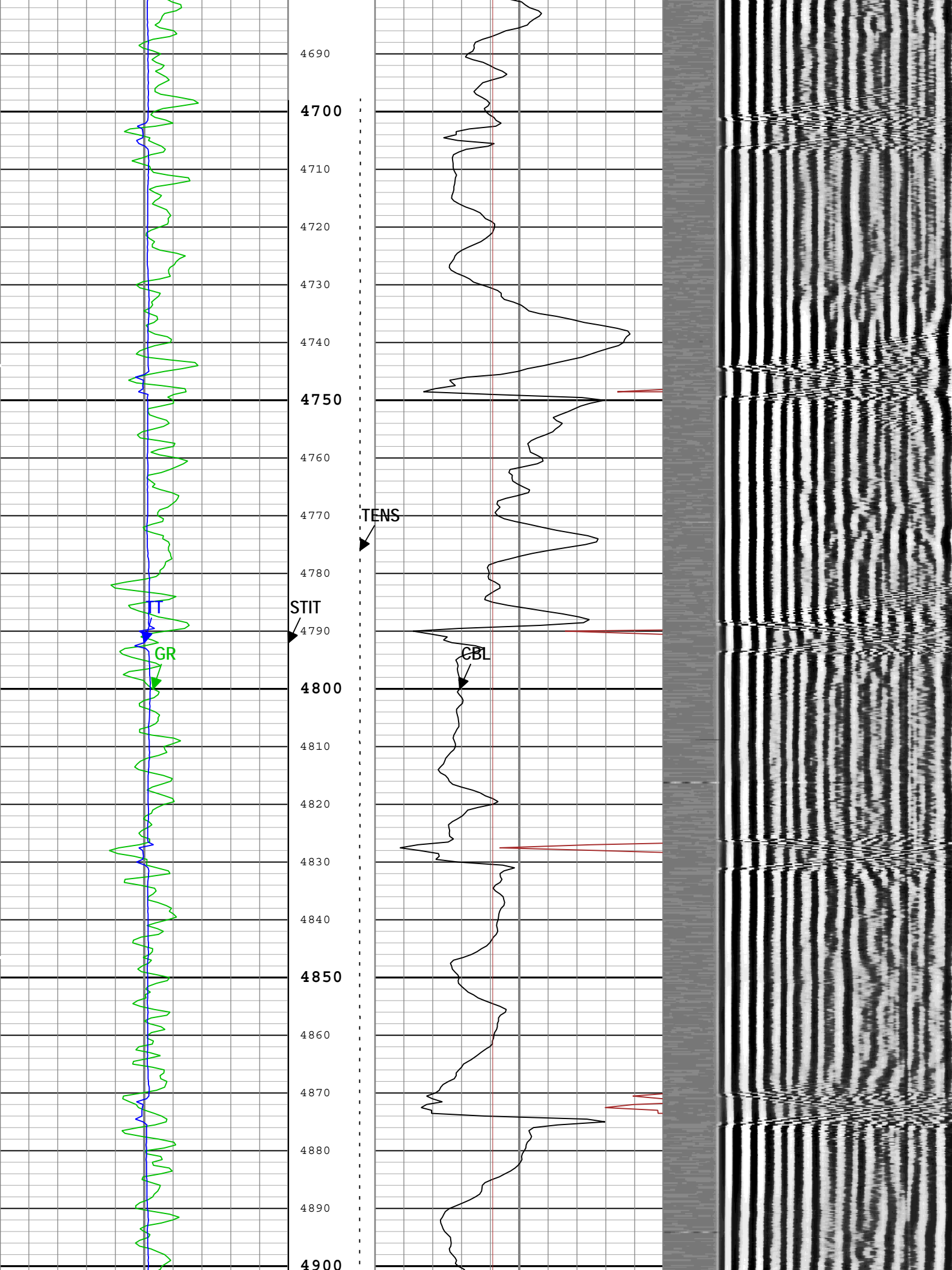


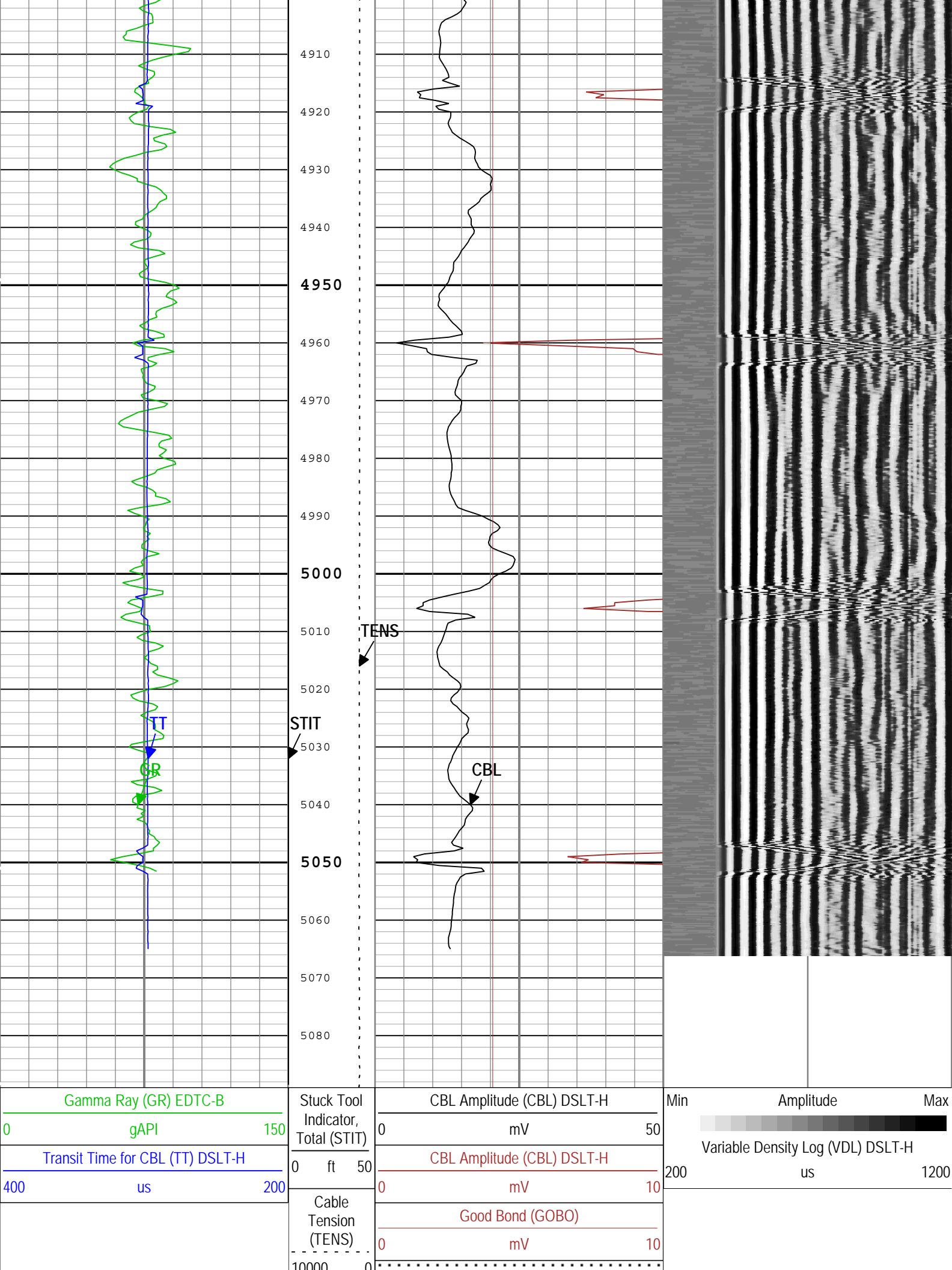




Channel Processing Parameters				
Parameter	Description	Tool	Value	Unit
BARI	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	8.75	in
CBLO	Casing Bottom (Logger)	WLSESSION	13992	ft
CBRA	CBL LQC Reference Amplitude in Free Pipe	DSLTH	63	mV
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMCF	CBL Cement Type Compensation Factor	DSLTH	0.53	
CMTY	Cement Type	USIT-E	Light Cement	
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DETE	Delta-T Detection	DSLTH	E1	
DFD	Drilling Fluid Density	Borehole	8.7	lbm/gal
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	BS	
IMAR	Image Rotation	USIT-E	Off	
MAHTR	Manual High Threshold Reference for first arrival detection	DSLTH	120	
MCI	Minimum Cemented Interval for Isolation	DSLTH	10	ft
MNHTR	Minimum High Threshold Reference for first arrival detection	DSLTH	100	
MSA	Minimum Sonic Amplitude	DSLTH	2.06	mV
NMSG	Near Minimum Sliding Gate	DSLTH	273	us
RCTH	Reference Calibrator Thickness	USIT-E	0.295	in
SGAD	Sliding Gate Status	DSLTH	Off	
SGDT	Sliding Gate Delta-T	DSLTH	57	us/ft
TCUB	T^3 Processing Level	USIT-E	Loop	
TD	Total Measured Depth	Borehole	5090	ft
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	130	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	70	%
UDFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0	Mrayl
UFGDE	Fiberglass Density	USIT-E	16.27	lbm/gal
UFGPS	Fiberglass Processing Selection	USIT-E	No	
UFGVL	Fiberglass Velocity	USIT-E	9678.48	ft/s
USI_FSOD	USIT USI Fluid Slowness Fits Casing Outer Diameter	USIT-E	0_OFF	
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-E	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-E	FreePipe Norm.	
UTHDP	Thickness Detection Policy	USIT-E	Fundamental	
VCAS	Ultrasonic Transversal Velocity in Casing	USIT-E	51.4	us/ft
VDLG	VDL Manual Gain	DSLTH	6.09	
ZCAS	Acoustic Impedance of Casing	USIT-E	46.25	Mrayl
ZCMT	Acoustic Impedance of Cement	DSLTH	5.23	Mrayl

Tool Control Parameters				
Parameter	Description	Tool	Value	Unit
DSLTH_MODE	DSLTH Acquisition Mode	DSLTH	CBL	
DSLTH_RATE	DSLTH Firing Rate	DSLTH	15 Hz	
DTFS	DSLTH Telemetry Frame Size	DSLTH	536	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	5000	ft/h
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMER	Modulation Frequency	USIT-E	333333	Hz







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	5000	ft/h
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USI_UPAT	USIT Emission Pattern	USIT-E	Pattern 300 KHz	
USI_UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 3.0 in LF	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	5091	ft
VRES	Vertical Resolution	USIT-E	3.0 in	
WINB	Window Begin Time	USIT-E	36.82	us
WINE	Window End Time	USIT-E	76.82	us

Calibration Report

DSLT-H (Digitizing Sonic Logging Tool - H) Calibration - Run ONE

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

CBL Free Pipe Adjustment - Free Pipe Measurement

Before (Manual Entry): 16:13:00 10-Nov-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
CBL Amplitude - 0	mV	Before	-----	-----	-----	-----		
CBL Reference Amplitude (CBRA) - 0	mV	Before	-----	-----	-----	-----		
Measurement Depth - 0	ft	Before	-----	-----	-----	-----		

CBL Free Pipe Adjustment - CBL Amplitude Coefficient

Before (Manual Entry): 16:13:00 10-Nov-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
CBL Adjustment Factor		Before	1.000	0.200	1.218	5.000		
Depth of Before Calibration	ft	Before			59.00			

EDTC-B (Enhanced Digital Telemetry Cartridge - Version B) Calibration - Run ONE

Primary Equipment :
EDTC-B EDTC-B

Calibration Parameter :
Plus Reference (Jig minus background reference) 165

EDTC-B Accelerometer Calibration - EDTC-B Accelerometer Calibration

Before (Measured): 14:22:41 06-Nov-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
AZ Vertical Measurement	ft/s2	Before	32.19	31.53	32.13	32.84		

EDTC-B Memory Data - EDTC-B Memory Data

Master (EEPROM): 14:13:23 06-Nov-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
Initial PMT HV	V	Master			1440.000			
Accelerometer Serial Number		Master			1562			
Accelerometer Coefficients - 0		Master	-----	-----	2.955	-----		
Accelerometer Coefficients - 1		Master	-----	-----	0.000	-----		
Accelerometer Coefficients - 2		Master	-----	-----	0.000	-----		
Accelerometer Coefficients - 3		Master	-----	-----	0.000	-----		
Accelerometer Coefficients - 4		Master	-----	-----	0.000	-----		
Accelerometer Coefficients - 5		Master	-----	-----	0.000	-----		
Accelerometer Coefficients - 6		Master	-----	-----	0.000	-----		
Accelerometer Coefficients - 7		Master	-----	-----	-0.006	-----		
Accelerometer Coefficients - 8		Master	-----	-----	0.000	-----		
Accelerometer Coefficients - 9		Master	-----	-----	0.000	-----		

Accelerometer Coefficients - 10		Master	----	----	0.000	----		
Accelerometer Coefficients - 11		Master	----	----	0.000	----		
Gamma-Ray Detector Serial Number		Master			79498			

EDTC-B Gamma-Ray Calibration - Gamma Ray Coefficients

Before (Measured):		14:22:23 06-Nov-2014						
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
Gamma Ray Gain		Before	1.000	0.900	1.089	1.100		

EDTC-B Gamma-Ray Calibration - Gamma Ray Accumulations

Before (Measured):		14:22:23 06-Nov-2014						
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
RGR Zero Measurement	gAPI	Before		0	77.193	120.000		
RGR Plus Measurement	gAPI	Before	165.000	150.000	151.507	180.000		

Company:	Whiting Oil Gas Corp	Schlumberger
Well:	Razor 21B 0910B	
Field:	Wildcat	
County:	Weld	
State:	Colorado	
Digital Sonic Tool Cement Bond Log GR-VDL-CBL-CCL		