

Company: Whiting Oil & Gas Corporation

Well: Horsetail 30E-1935

Field: Wildcat

County: Weld State: Colorado

Cement Bond Log

GR-CCL

County:	Weld				
Field:	Wildcat				
Location:	SWNW Sec 30, T10N, R57W				
Well:	Horsetail 30E-1935				
Company:	Whiting Oil & Gas Corporation				
		Location:			
		SWNW Sec 30, T10N, R57W	Elev.:	K.B.	4738.70 ft
		SHL: 2323' FNL x 630' FWL		G.L.	4717.70 ft
		Latitude: 40.810703 Longitude: -103.801122		D.F.	4737.70 ft
		Permanent Datum:	Ground Level	Elev.:	4717.70 f
		Log Measured From:	Kelly Bushing	21.00 ft	above Perm.Datum
		Drilling Measured From:	Kelly Bushing		
		API Serial No.	Section:	Township:	Range:
		05-123-42869	30	10N	57W
Logging Date	10-Nov-2016				

Run Number	One		
Depth Driller	14020.00 ft		
Schlumberger Depth	14020.00 ft		
Bottom Log Interval	5290.00 ft		
Top Log Interval	0.00 ft		
Casing Fluid Type	Water		
Salinity			
Density	8.4 lbm/gal		
Fluid Level	8.00 ft		
BIT/CASING/TUBING STRING			
Bit Size	8.75 in		
From	2067.30 ft		
To	14020.00 ft		
Casing/Tubing Size	5.5 in		
Weight	20 lbm/ft		
Grade	N/A		
From	0.00 ft		
To	14020.00 ft		
Max Recorded Temperatures	191 degF		
Logger on Bottom	Time	12:51:00	
Unit Number	Location:	FtMorgan	
Recorded By	Stephen Tang		
Witnessed By	Bradd Kothe		

Disclaimer

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

Contents

- 1. Header
- 2. Disclaimer
- 3. Contents
- 4. Well Sketch
- 5. Borehole Size/Casing/Tubing Record
- 6. Remarks and Equipment Summary
- 7. Depth Summary
- 8. One 1500 PSI Main Pass
  - 8.1 Integration Summary
  - 8.2 Software Version
  - 8.3 Composite Summary
  - 8.4 Log ( Sonic CBL with VDL )
  - 8.5 Parameter Listing
- 9. One 0 PSI Repeat Pass
  - 9.1 Integration Summary
  - 9.2 Software Version
  - 9.3 Composite Summary

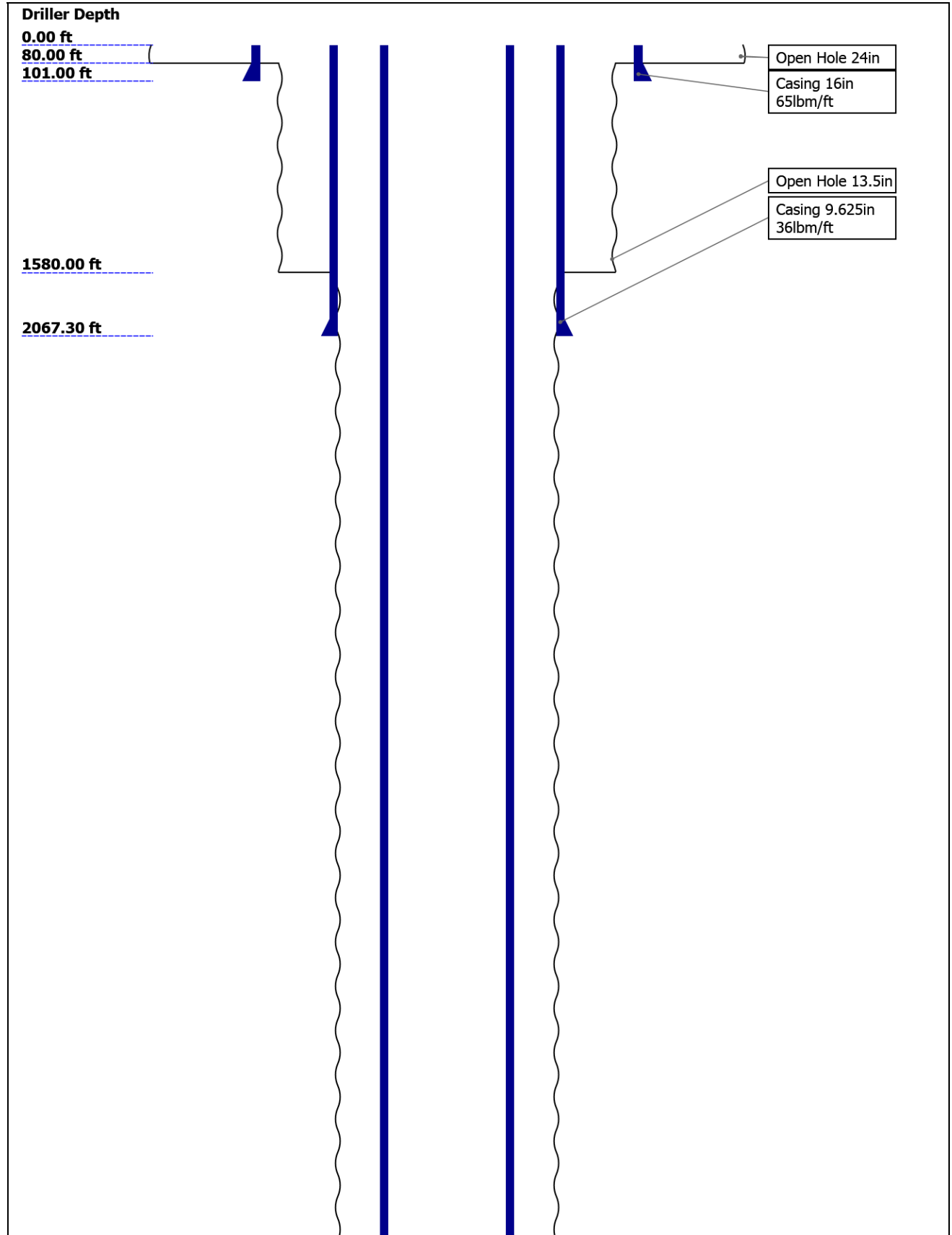
9.4 Log ( Sonic CBL with VDL )

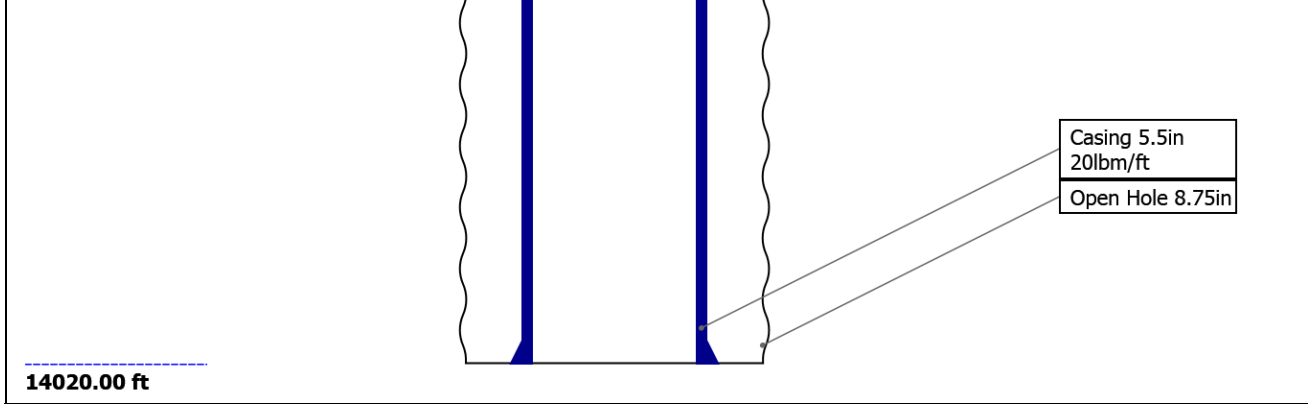
9.5 Parameter Listing

10. Calibration Report

11. Tail

## Well Sketch






Borehole Size/Casing/Tubing Record

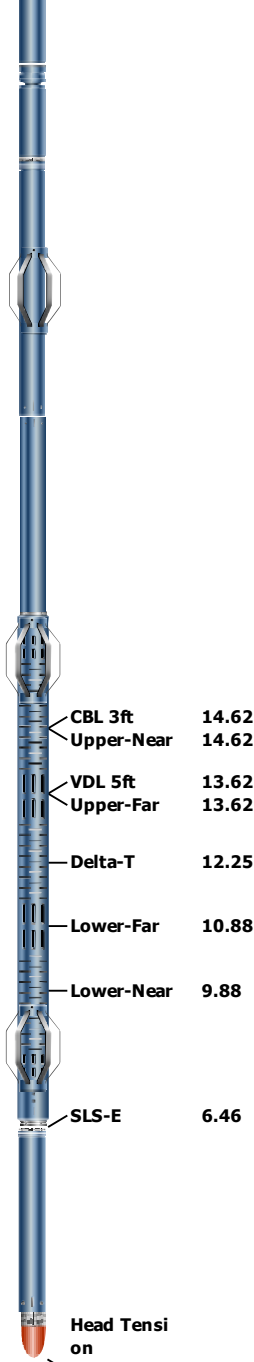
Bit						
Bit Size ( in )	24	13.5	8.75			
Top Driller ( ft )	0	80	1580			
Top Logger ( ft )	0	101	2067.3			
Bottom Driller ( ft )	80	1580	14020			
Bottom Logger ( ft )	101	2067.3	14020			
Casing						
Size ( in )	16	9.625	5.5			
Weight ( lbm/ft )	65	36	20			
Inner Diameter ( in )	15.25	8.921	4.778			
Grade	N/A	N/A	N/A			
Top Driller ( ft )	0	0	0			
Top Logger ( ft )	0	0	0			
Bottom Driller ( ft )	101	2067.3	14020			
Bottom Logger ( ft )	101	2067.3	14020			

Remarks and Equipment Summary

One: Toolstring				One: Remarks	
<div><div><div>Equip name</div><div>LEH-QT</div><div>LEH-QT</div></div><div><div>Length</div><div>46.01</div></div><div><div>MP name</div><div></div></div><div><div>Offset</div><div></div></div></div> <div></div>	Toolstring ran as per toolsketch.				
	Main pass logged with 1500 psi.				
	Repeat pass logged with 0 psi.				
<div><div><div>CAL-YA:666</div><div>CAL-YA:666</div></div><div><div>43.1</div></div><div><div></div></div><div><div>42.31</div></div></div>					
<div><div><div>DTC-H:8803</div><div>ECH-KC:10354</div><div>DTC-H:8803</div></div><div><div>39.6</div></div><div><div></div></div><div><div>38.7</div><div>0.00</div></div></div>					
<div><div><div>SGT-N:10249</div><div>SGH-K:3039</div><div>SGD-TAA:2170</div><div>0</div><div>SGC-TB:10249</div></div><div><div>36.6</div></div><div><div></div></div><div><div>36.6</div><div>36.6</div></div></div>					
<div><div><div>AH-184[2]:4</div><div>700</div></div><div><div>31.1</div></div><div><div></div></div><div><div></div></div></div>					

AH-184[1]:3 29.1  
906

DSLTH-H:8150 27.1  
ECH-KH:8150  
DSLCH-H:8150  
SLS-E:1185



Lengths are in ft  
Maximum Outer Diameter = 6.250 in  
Line: Sensor Location, Value: Gating Offset  
All measurements are relative to TOOL\_ZERO

## Depth Summary

One

### Depth Measuring Device

Type	IDW-JA
Serial Number	5896
Calibration Date	29-Apr-2016
Calibrator Serial Number	
Calibration Cable Type	7-39P-LXS
Wheel Correction 1	-1
Wheel Correction 2	-3

### Tension Device

Type	CMTD-B/A
Serial Number	1109

Calibration Date			
Calibrator Serial Number	441435A		
Number of Calibration Points	10		
Calibration Root Mean Square Error	3		
Calibration Peak Error	4		

## Logging Cable

Type	7-39P-LXS		
Serial Number			
Length	15000.00 ft		
Conveyance Type	Wireline		
Rig Type	Crane		

## One:Depth Control Parameters

### Depth Control Remarks

Log Sequence	First Log In the Well	All Schlumberger depth procedures followed.
Rig Up Length At Surface		IDW used as primary depth device.
Rig Up Length At Bottom		Z-Chart used as secondary depth device.
Rig Up Length Correction		Depth correlated to short joint at 5199 ft
Stretch Correction		
Tool Zero Check At Surface		

# One

## 1500 PSI Main Pass

## Software Version

Acquisition System	Version
Maxwell 2016 SP2	6.2.64464.3100

## Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[4]:Up	Up	59.97 ft	5308.13 ft	10-Nov-2016 6:54:22 PM	10-Nov-2016 8:28:20 PM	ON	2.48 ft	Yes

All depths are referenced to toolstring zero

## Log

Company:Whiting Oil & Gas Corporation

Well:Horsetail 30E-1935

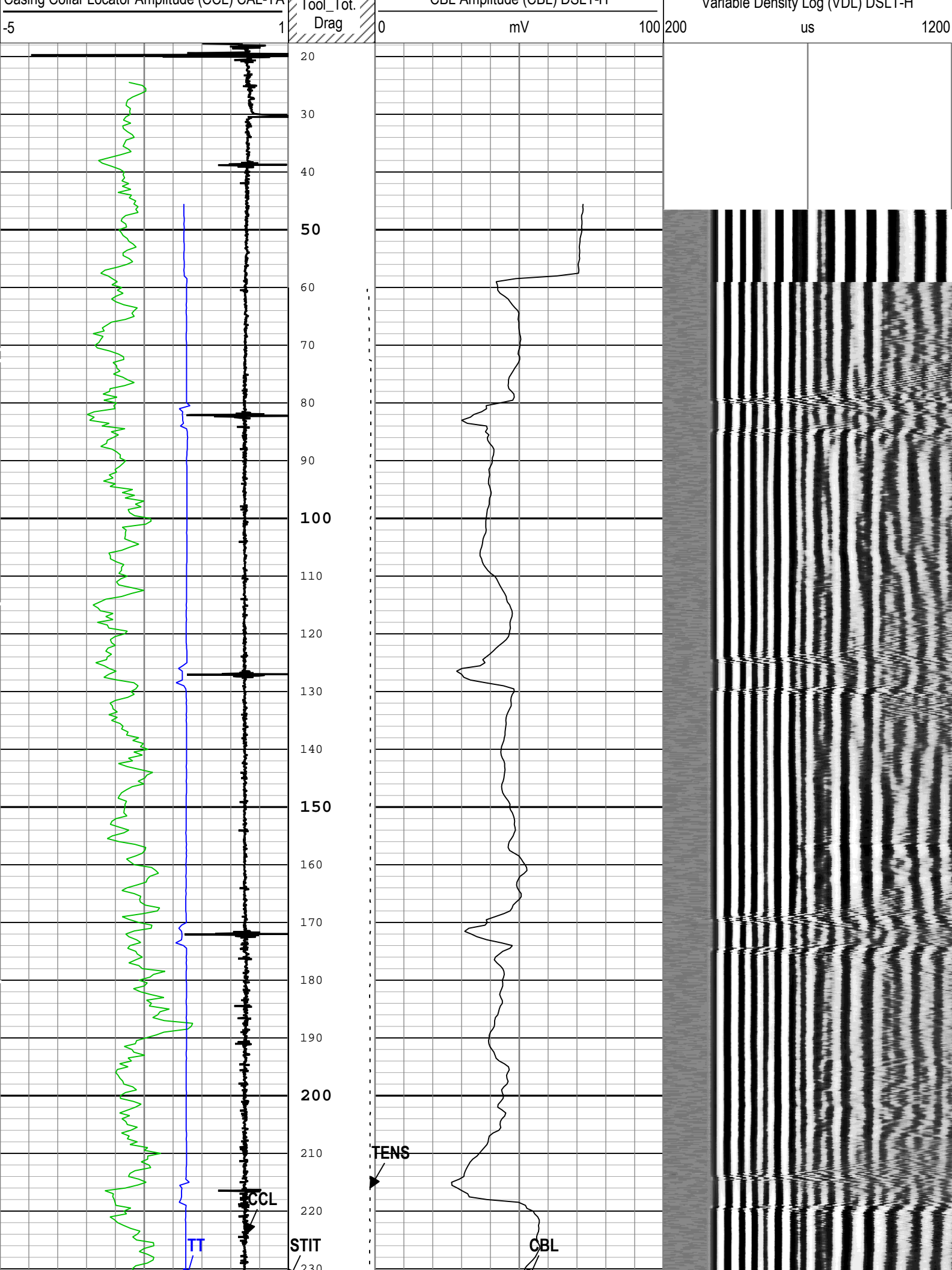
One: Log[4]:Up:S010

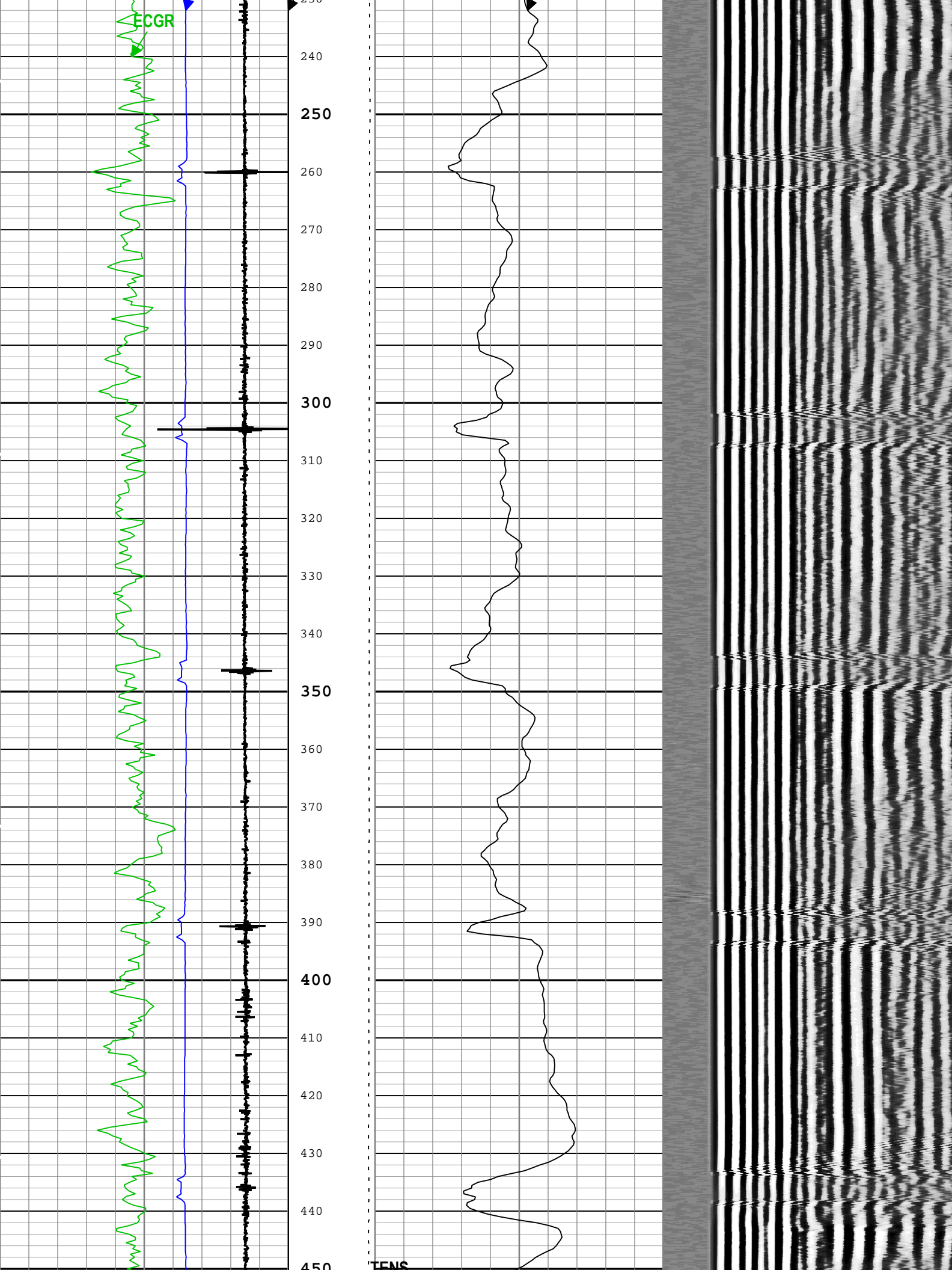
Description: CBL\_VDL    Format: Log ( Sonic CBL with VDL )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 10-Nov-2016 20:37:56

TIME 1900 - Time Marked every 60.00 (s)

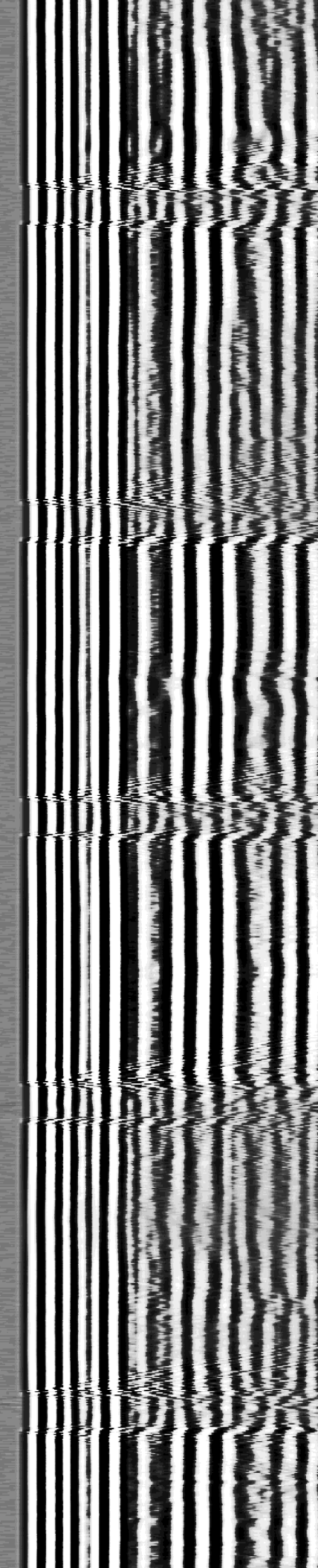
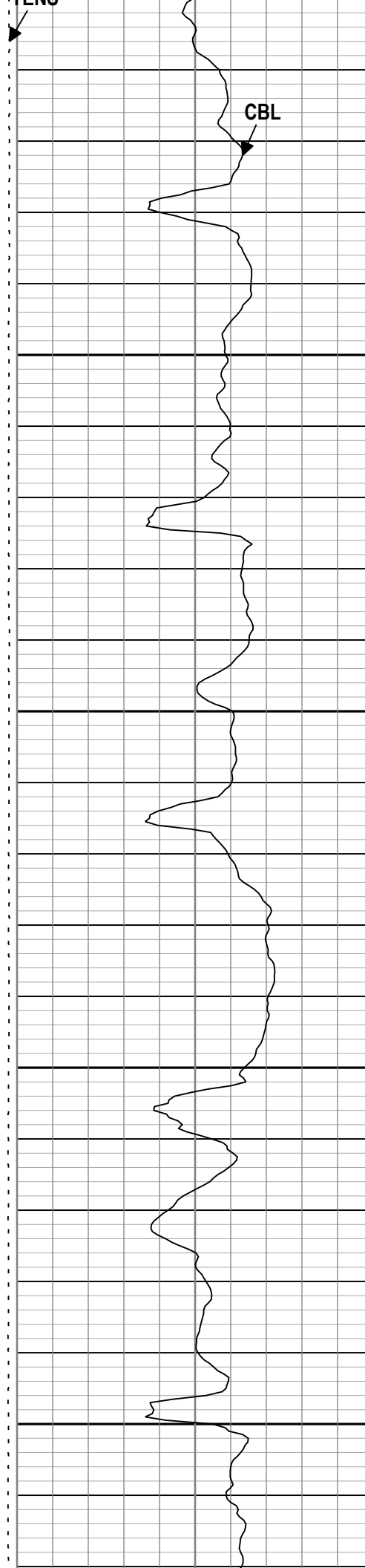
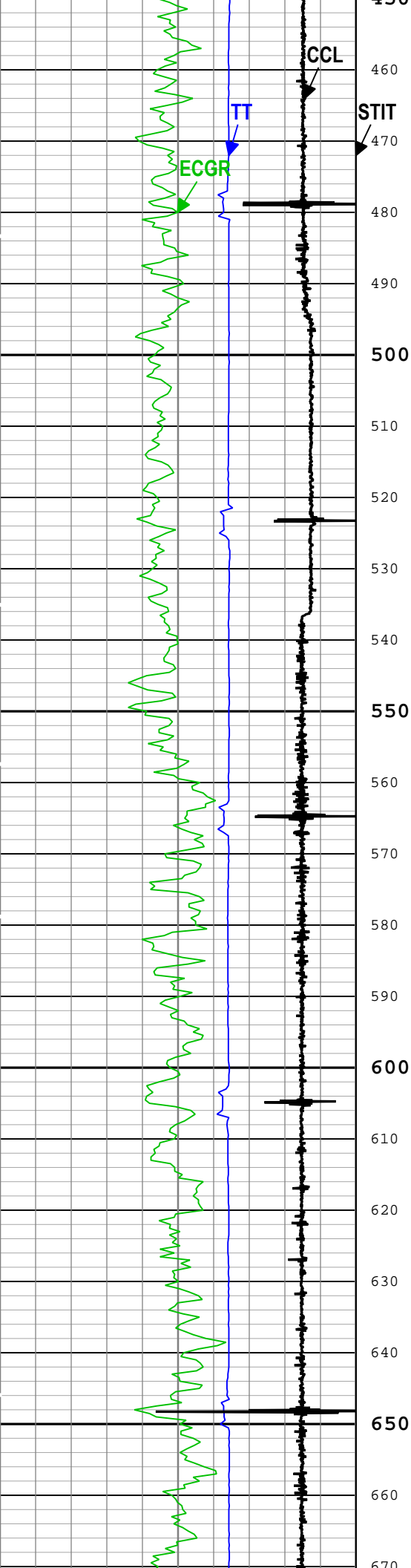
└ BIEP - Bond Index Event Pips DSLT-H

			Stuck Tool Indicator, Total (STIT)			
			0 ft 50			
			Cable Tension (TENS)			
Gamma Ray (ECGR) SGT-N			10000 lbf 0			
0	gAPI	150				
Transit Time for CBL (TT) DSLT-H				CBL Amplitude (CBL) DSLT-H		
400	us	200	Cable Drag	0 mV	10	
Casing Collar Locator Amplitude (CCL) CAL-YA				CBL Amplitude (CBL) DSLT-H		
				Variable Density Log (VDL) DSLT-H		

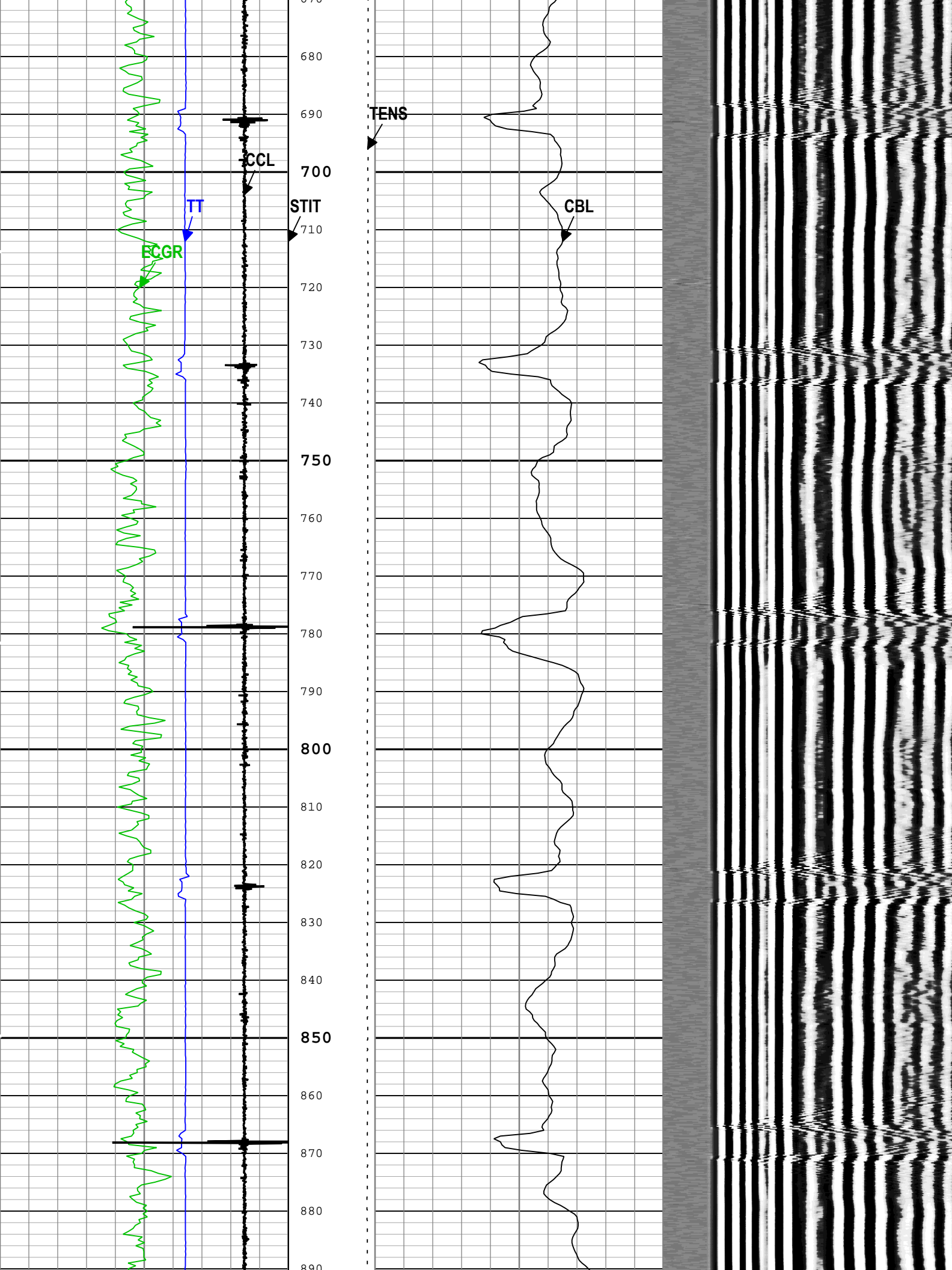


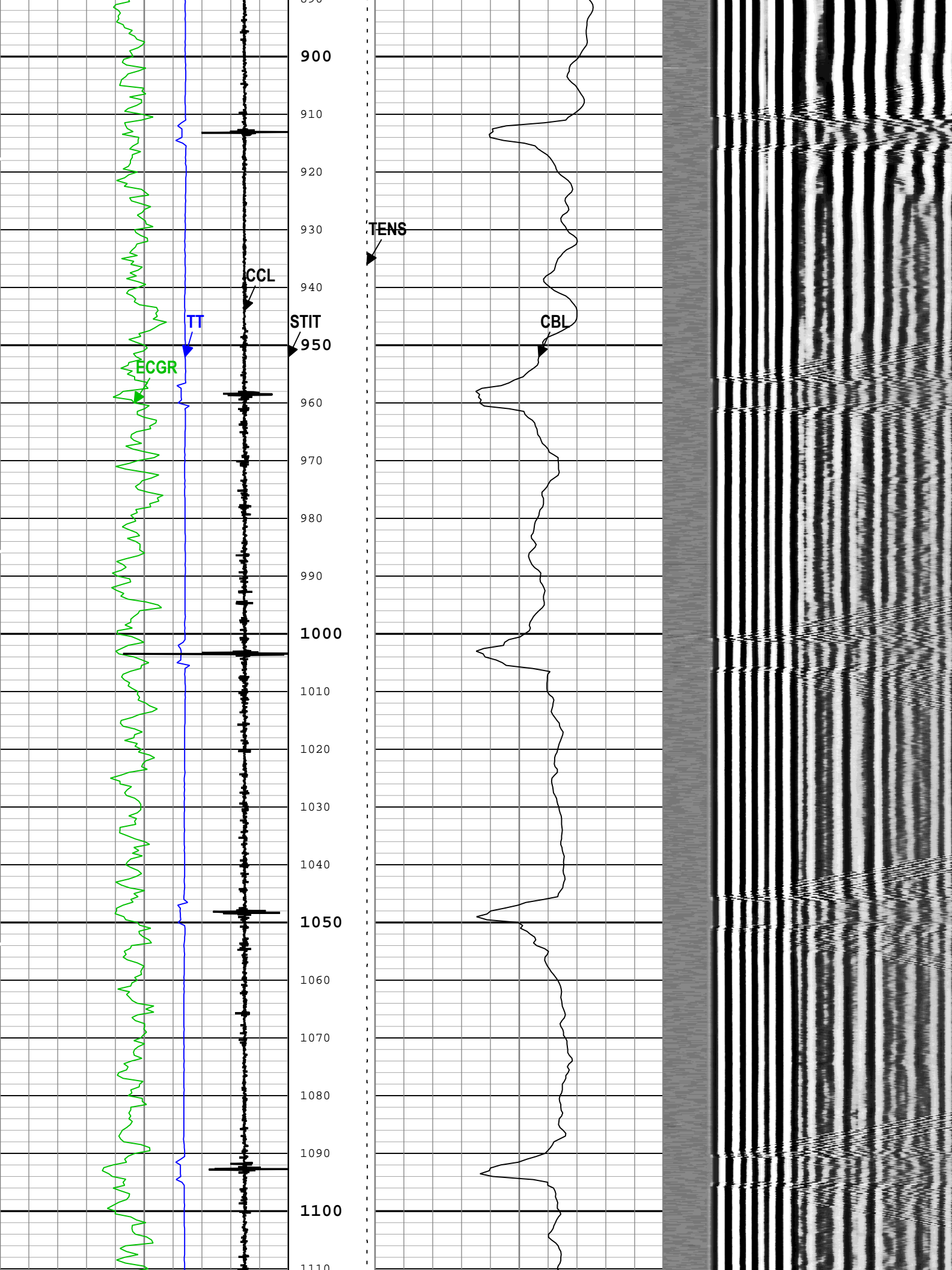


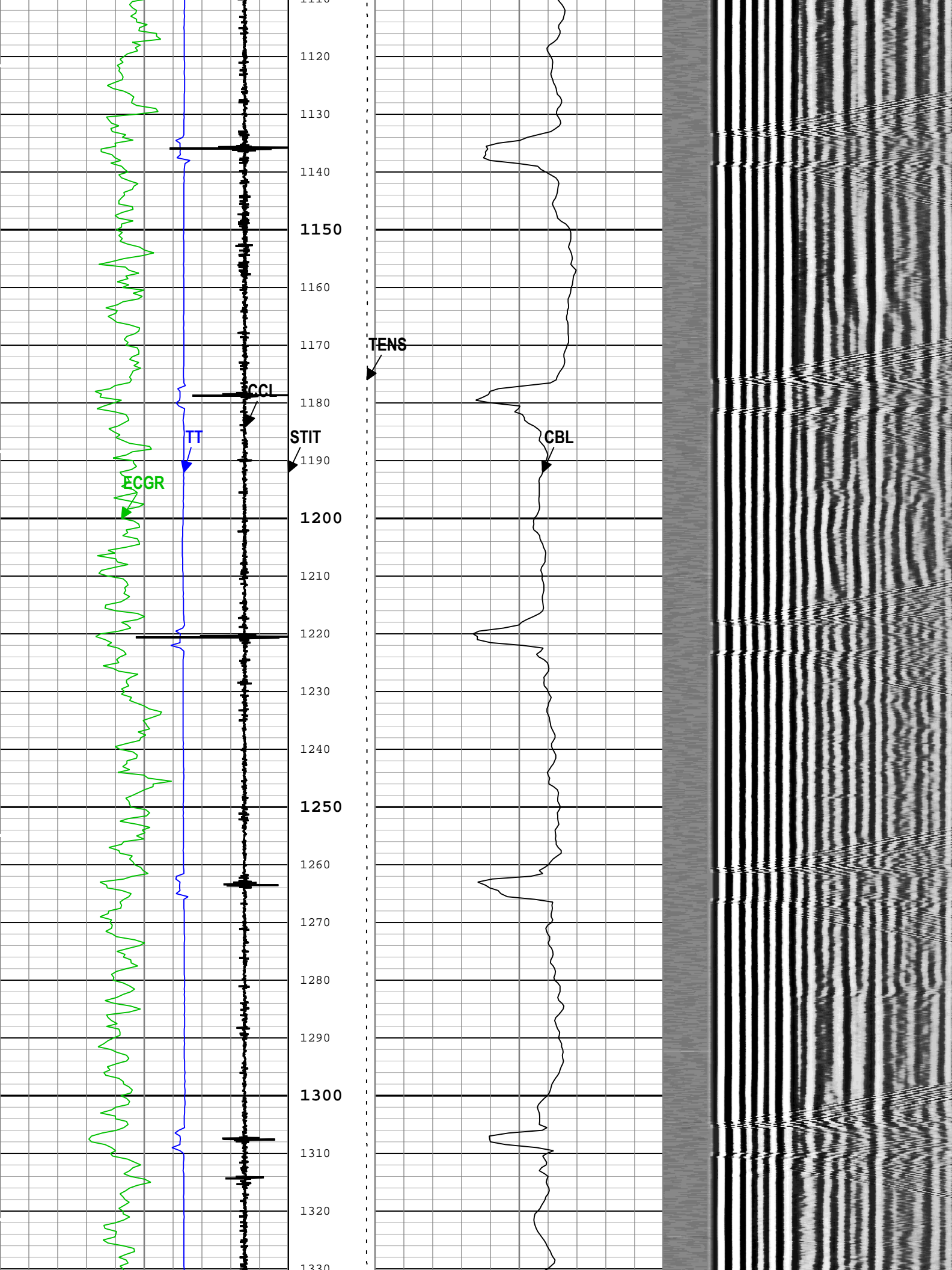




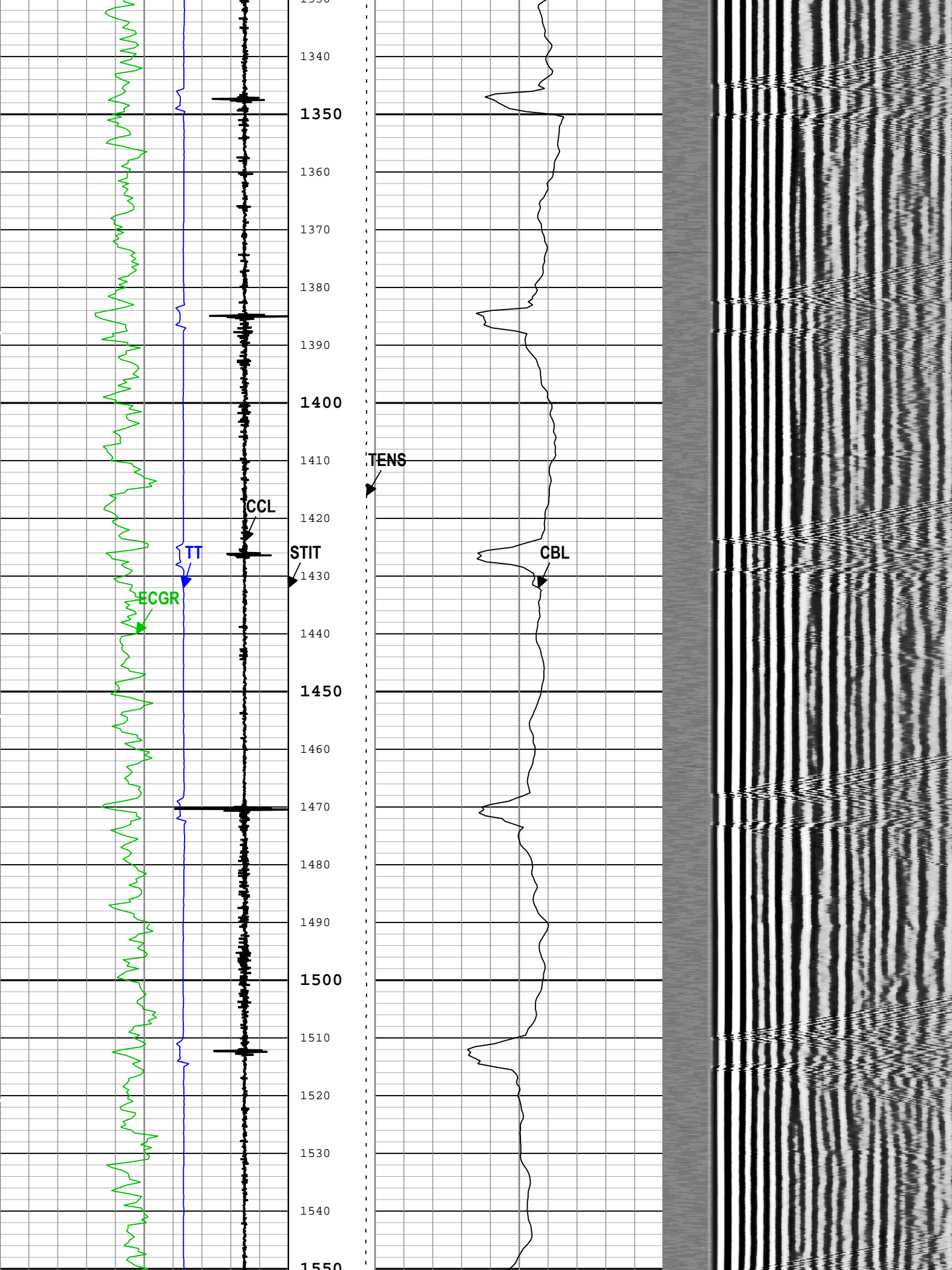


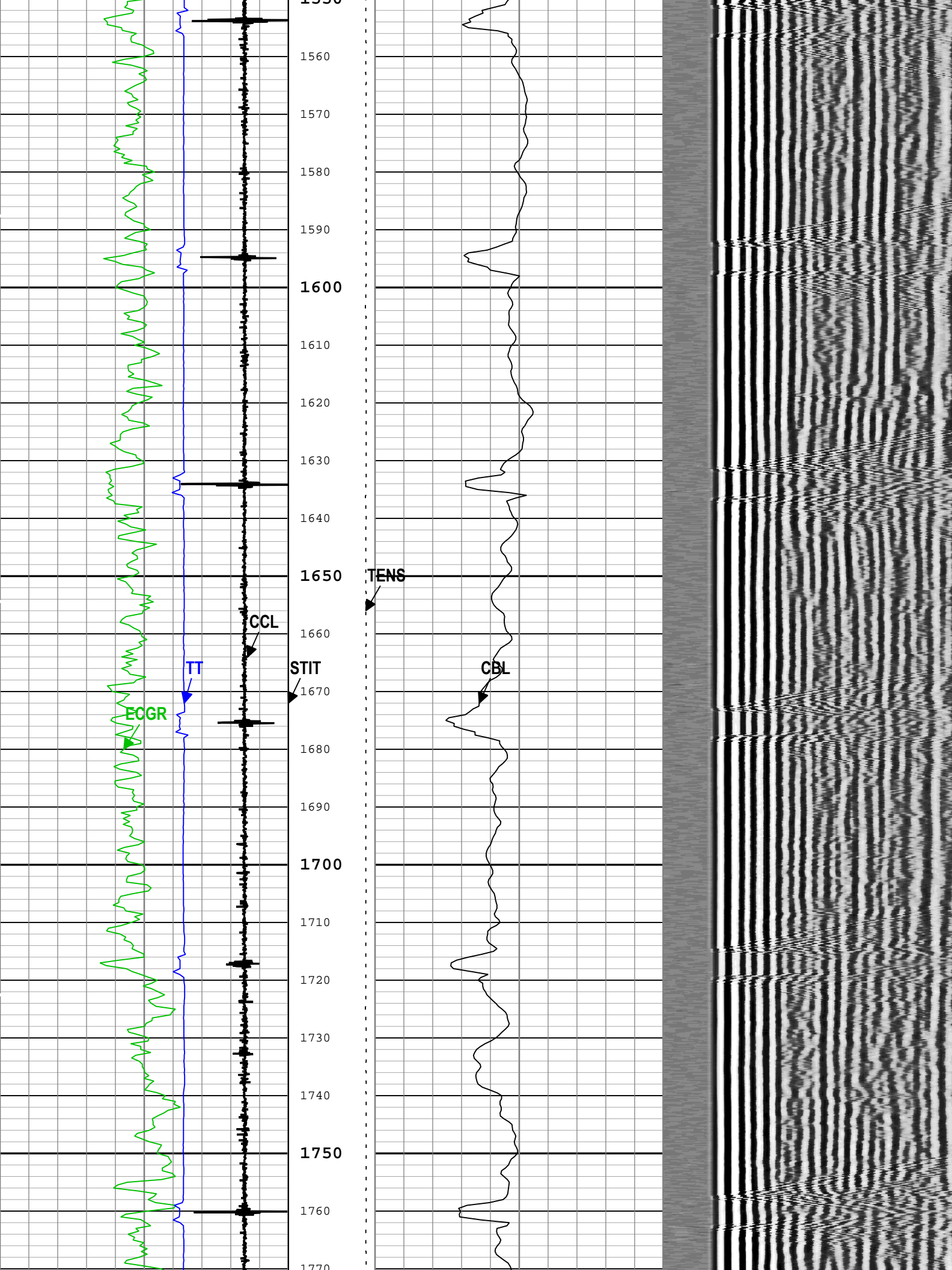


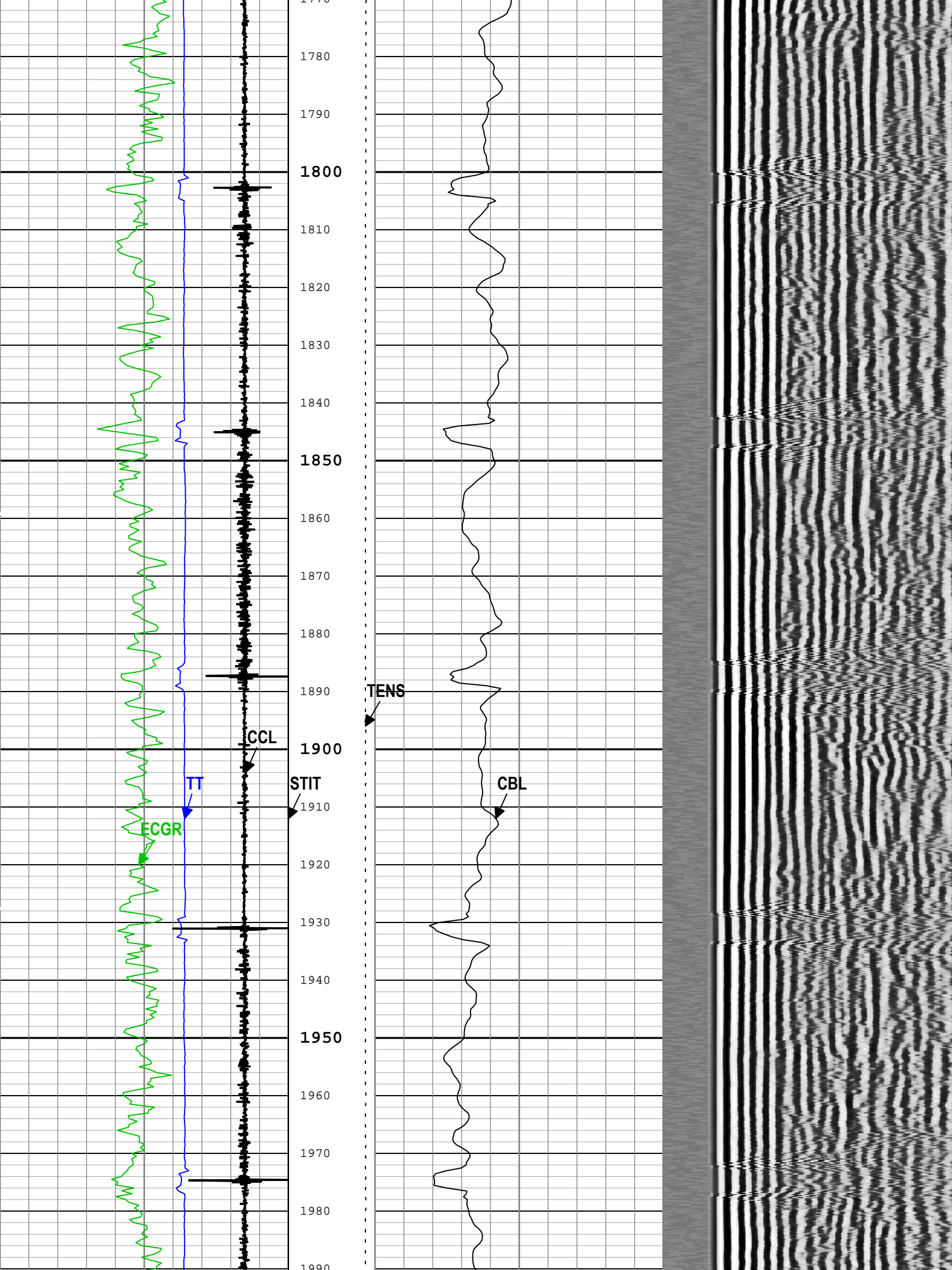




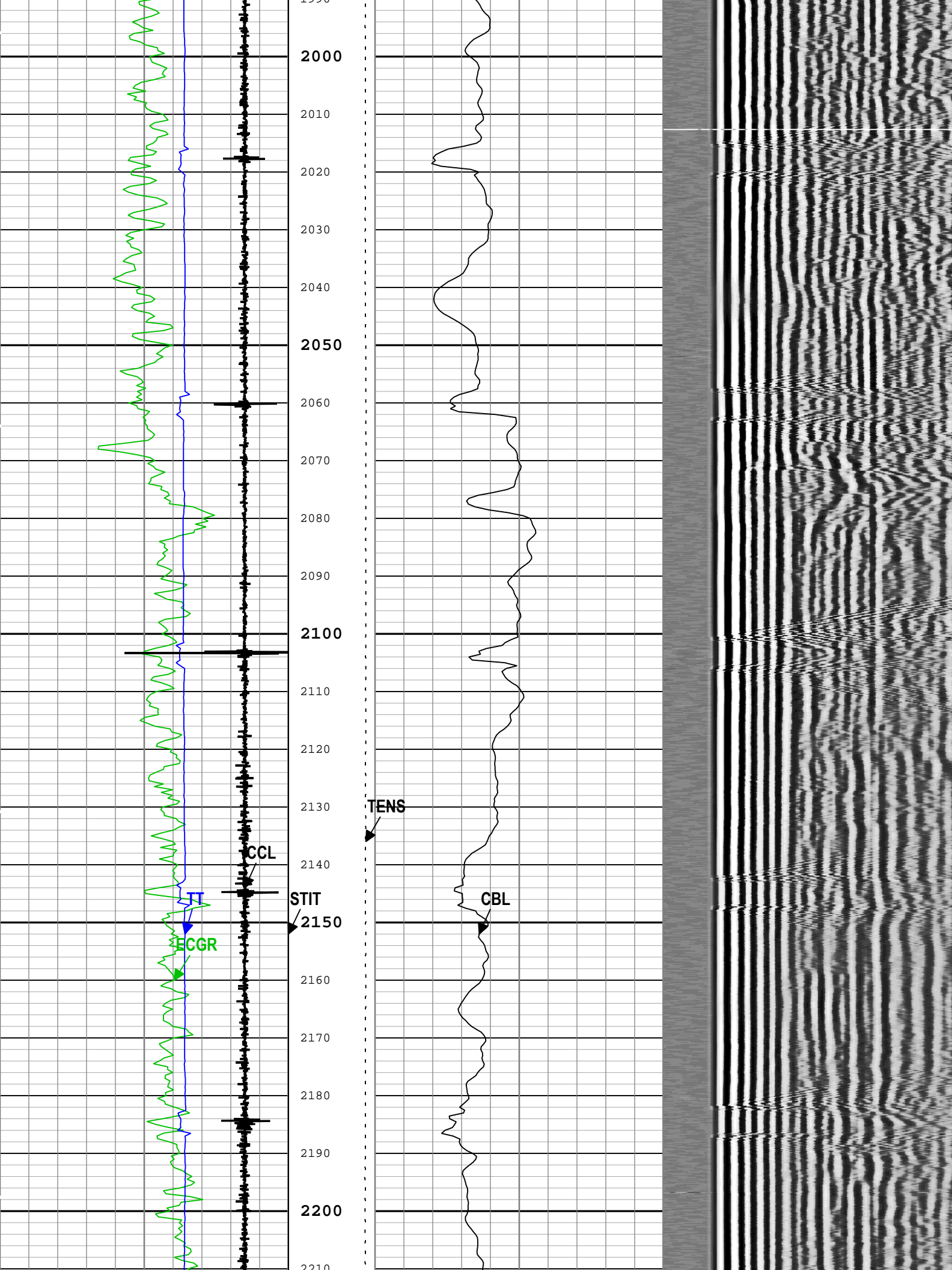


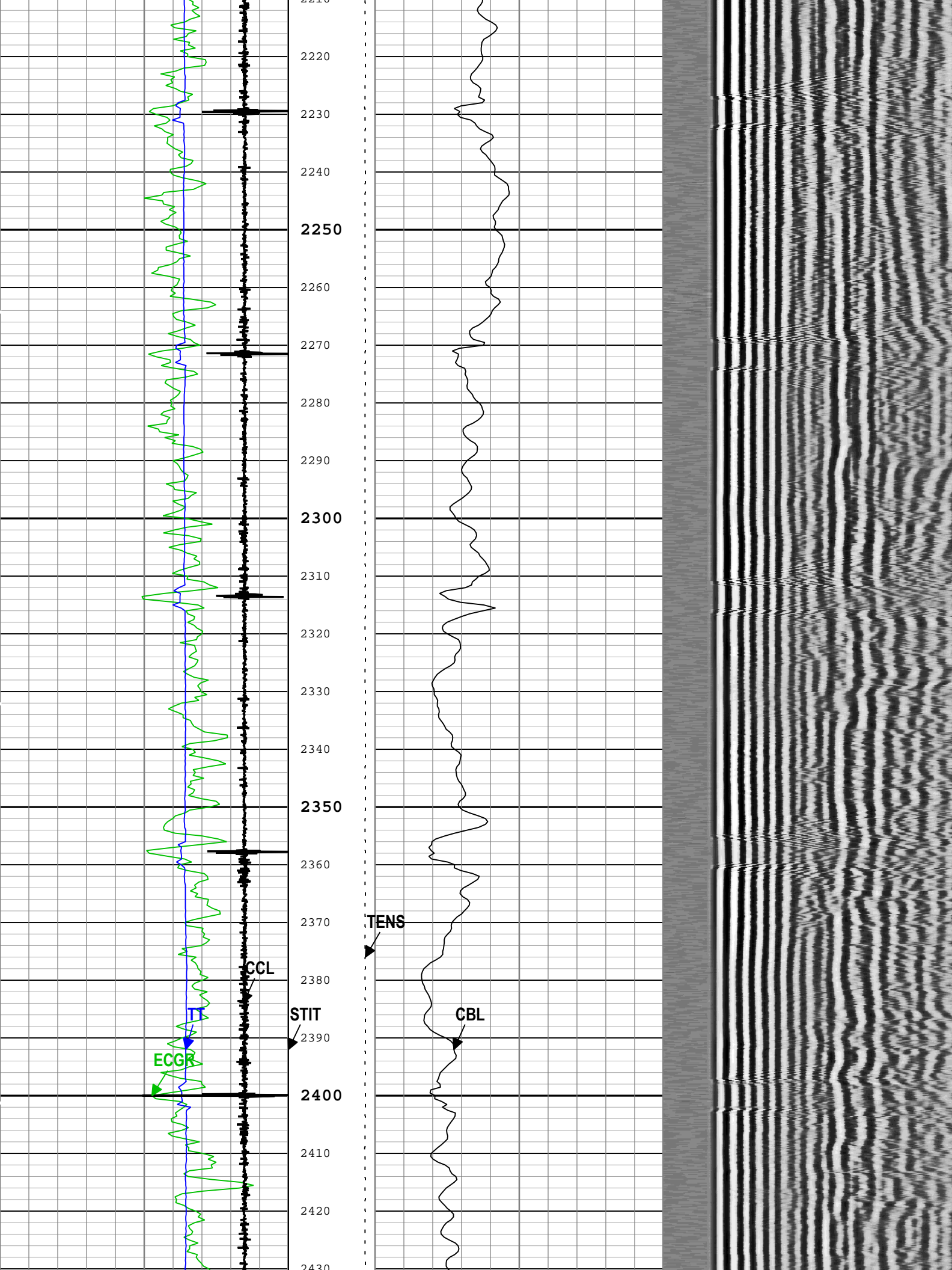


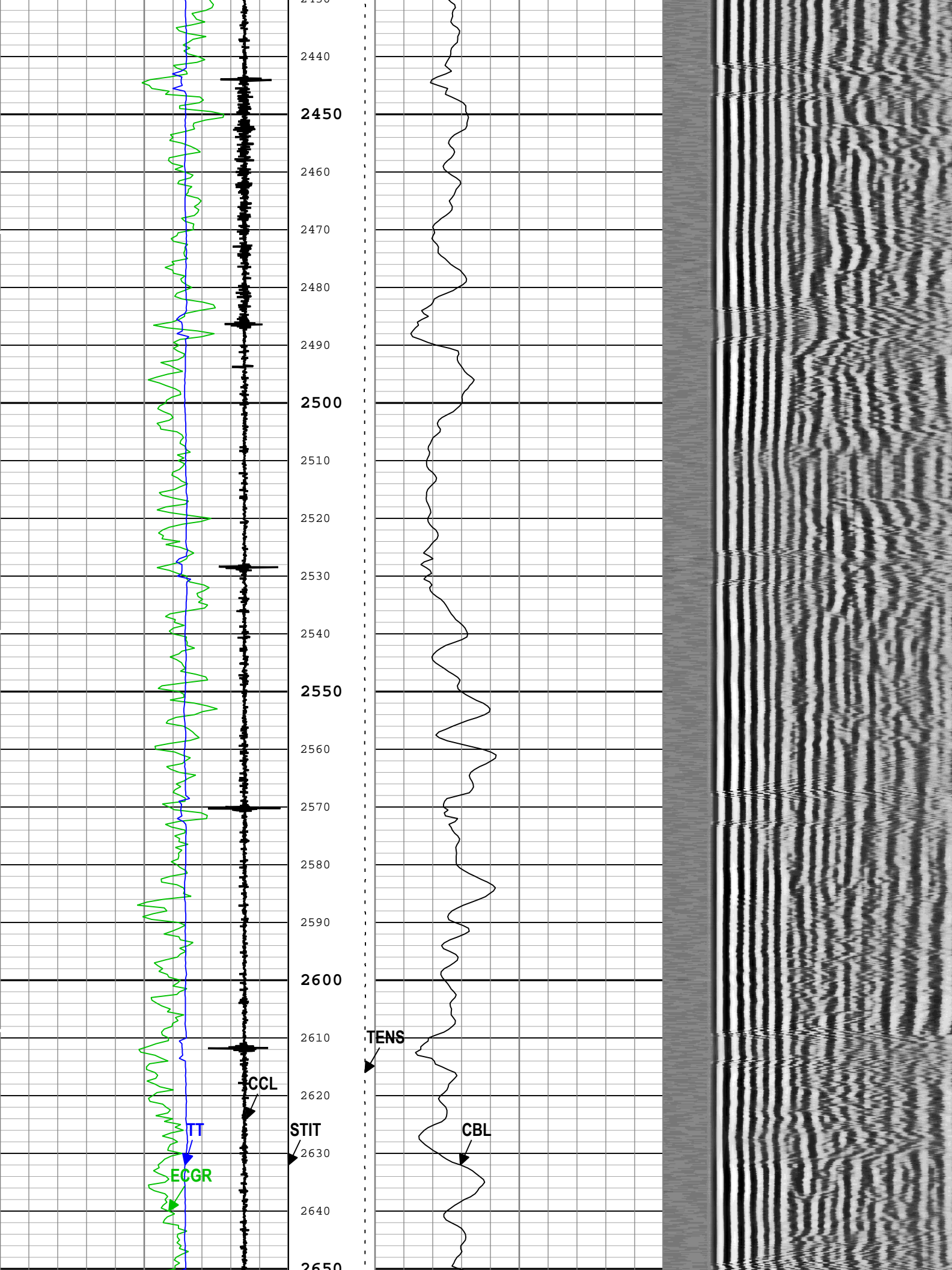




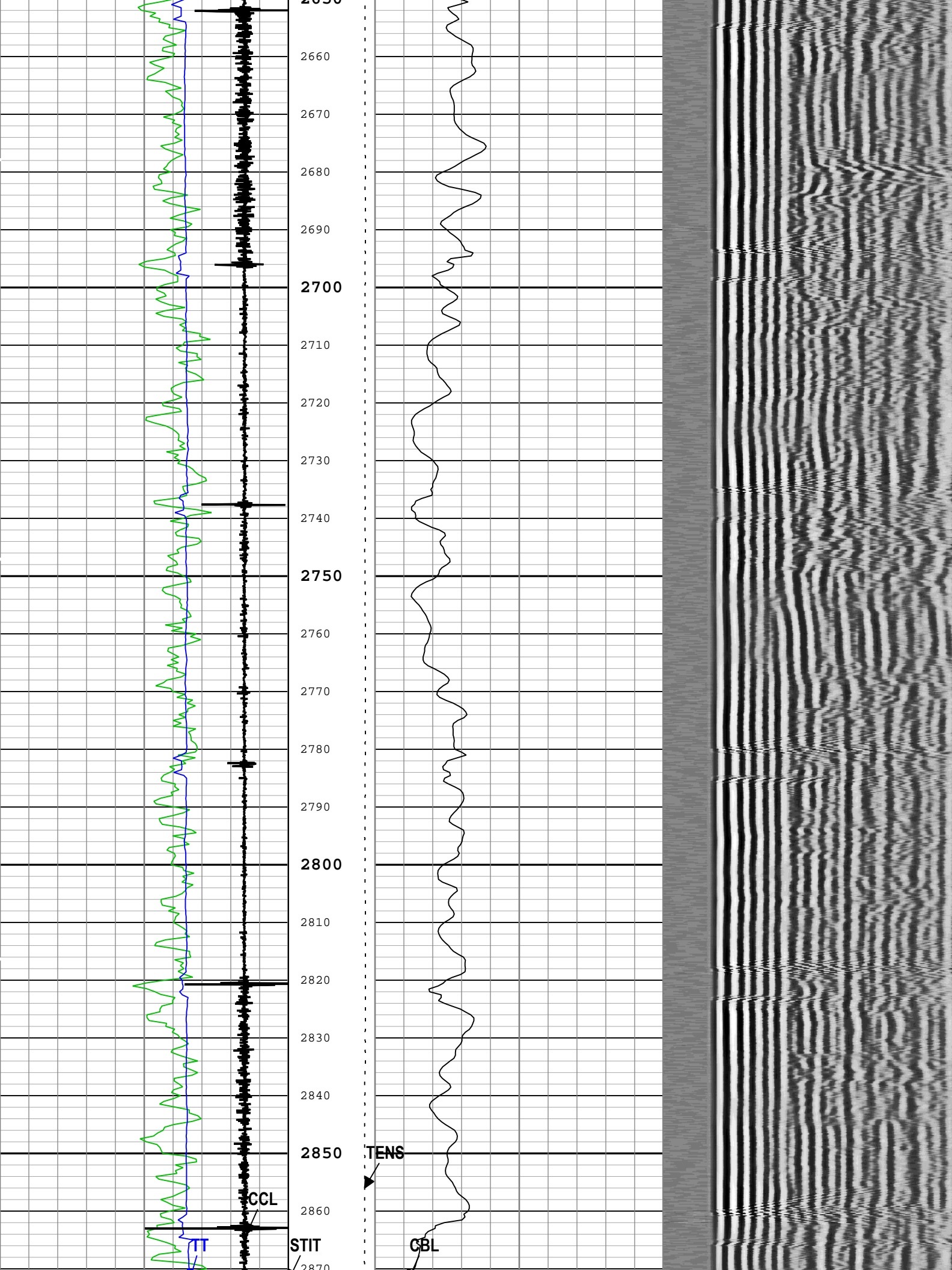


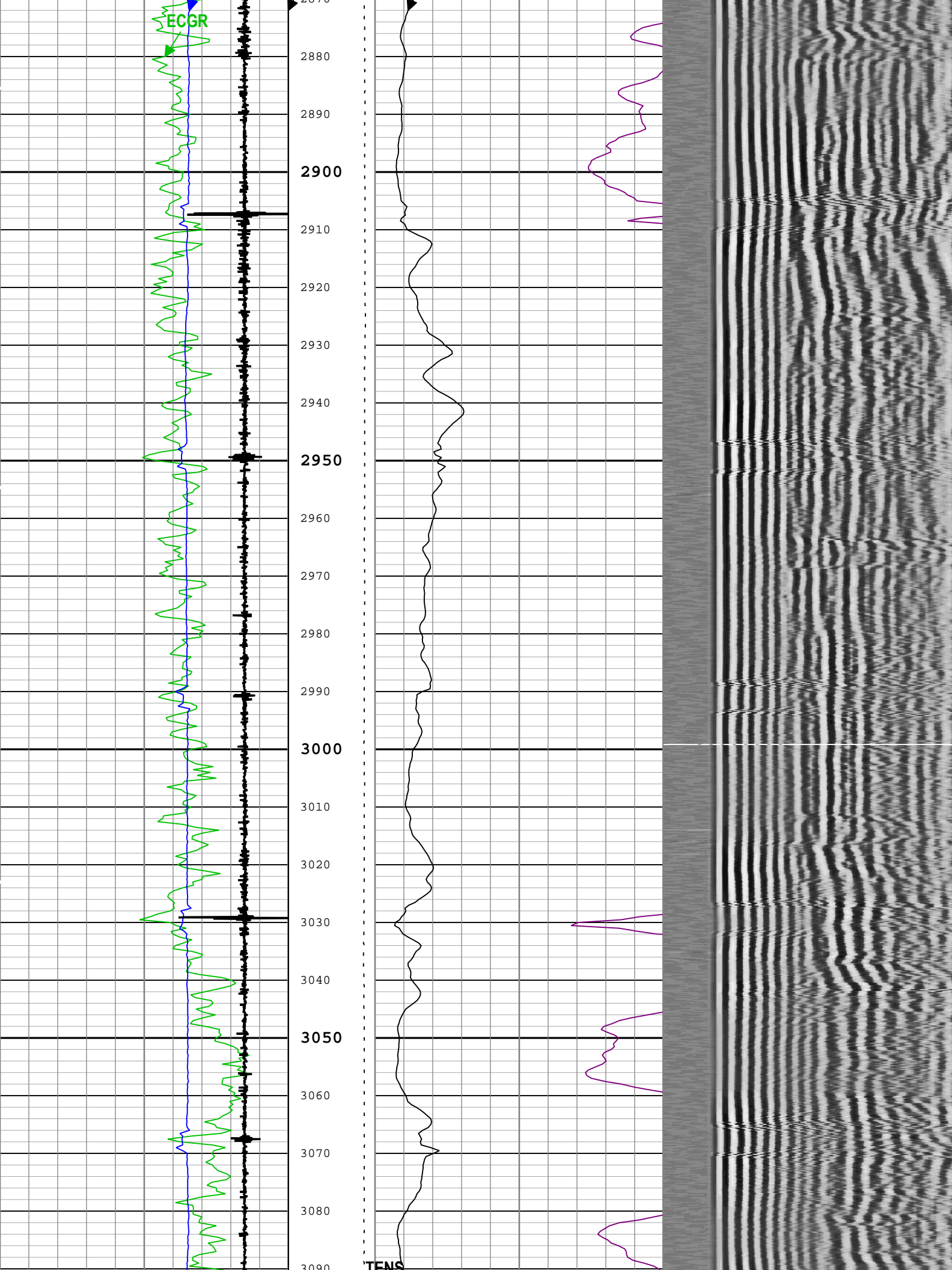


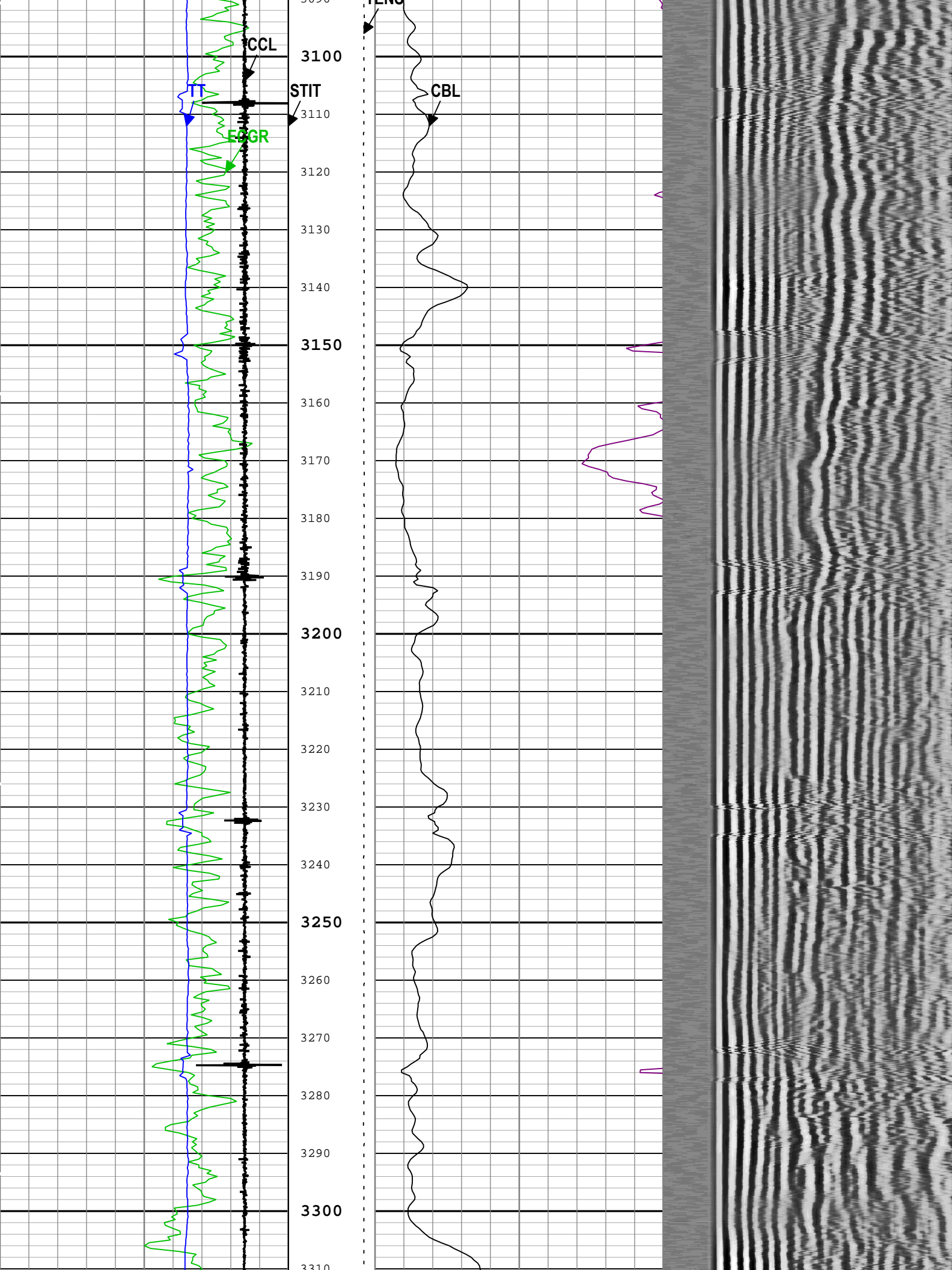




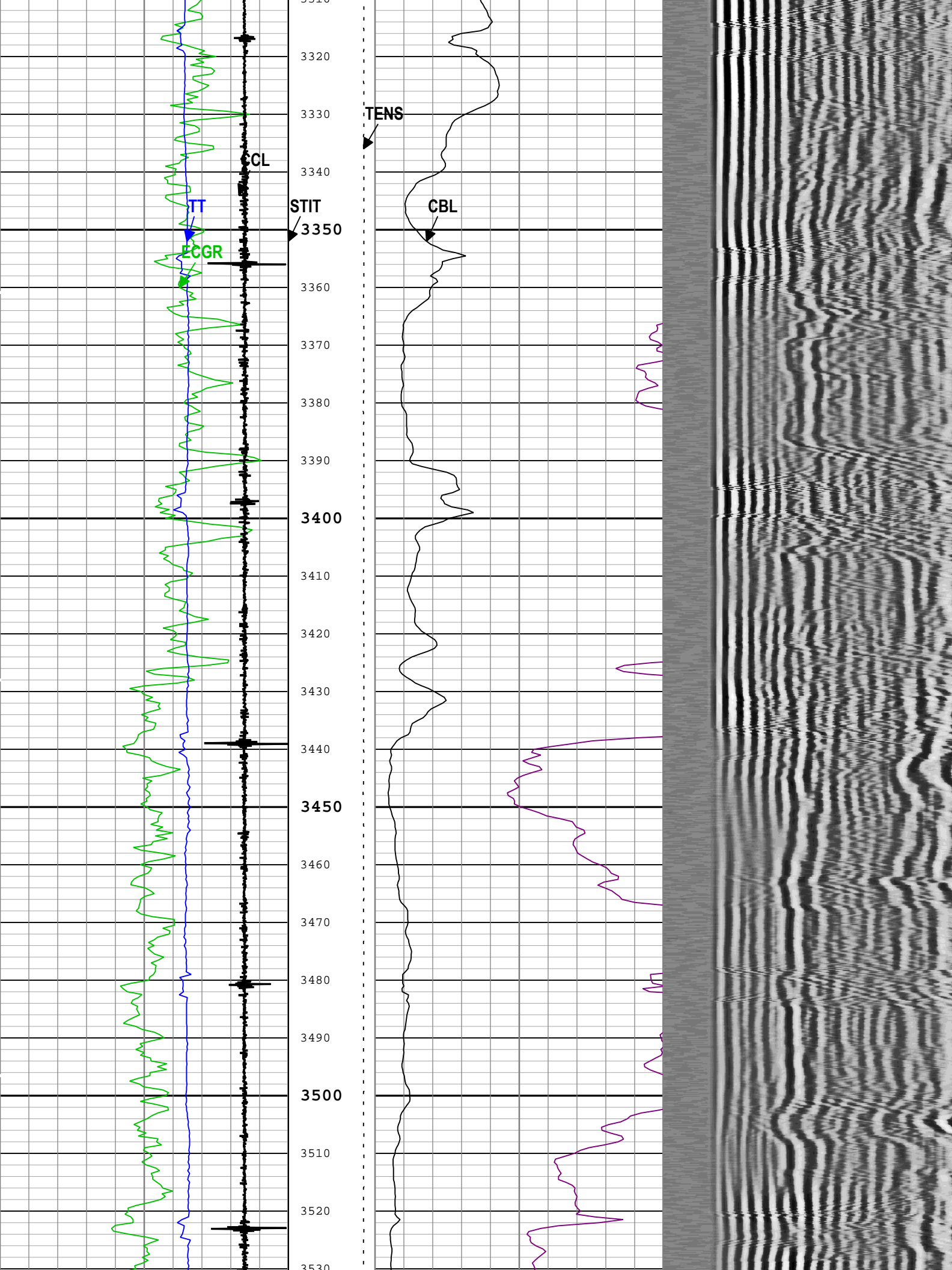


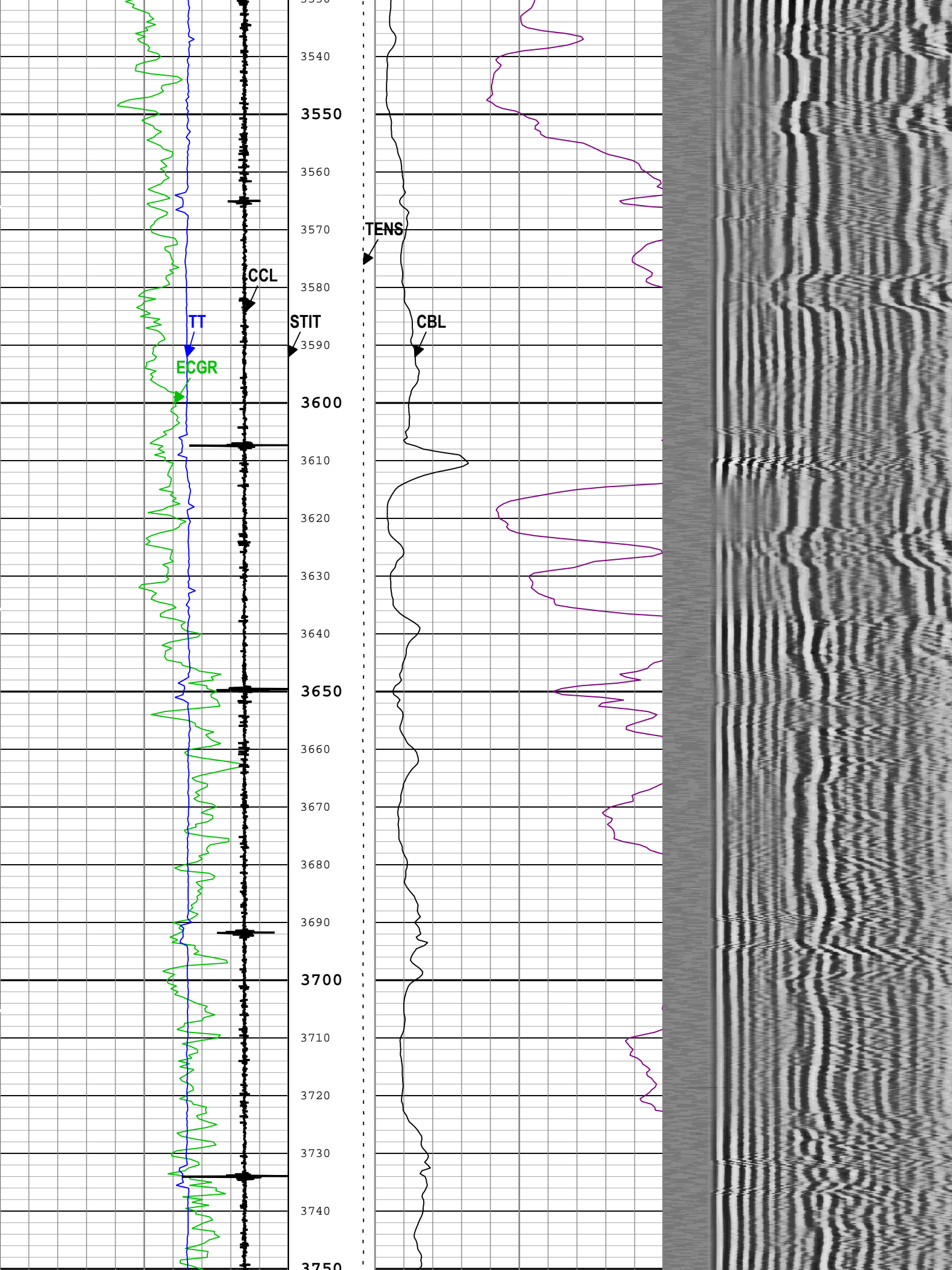


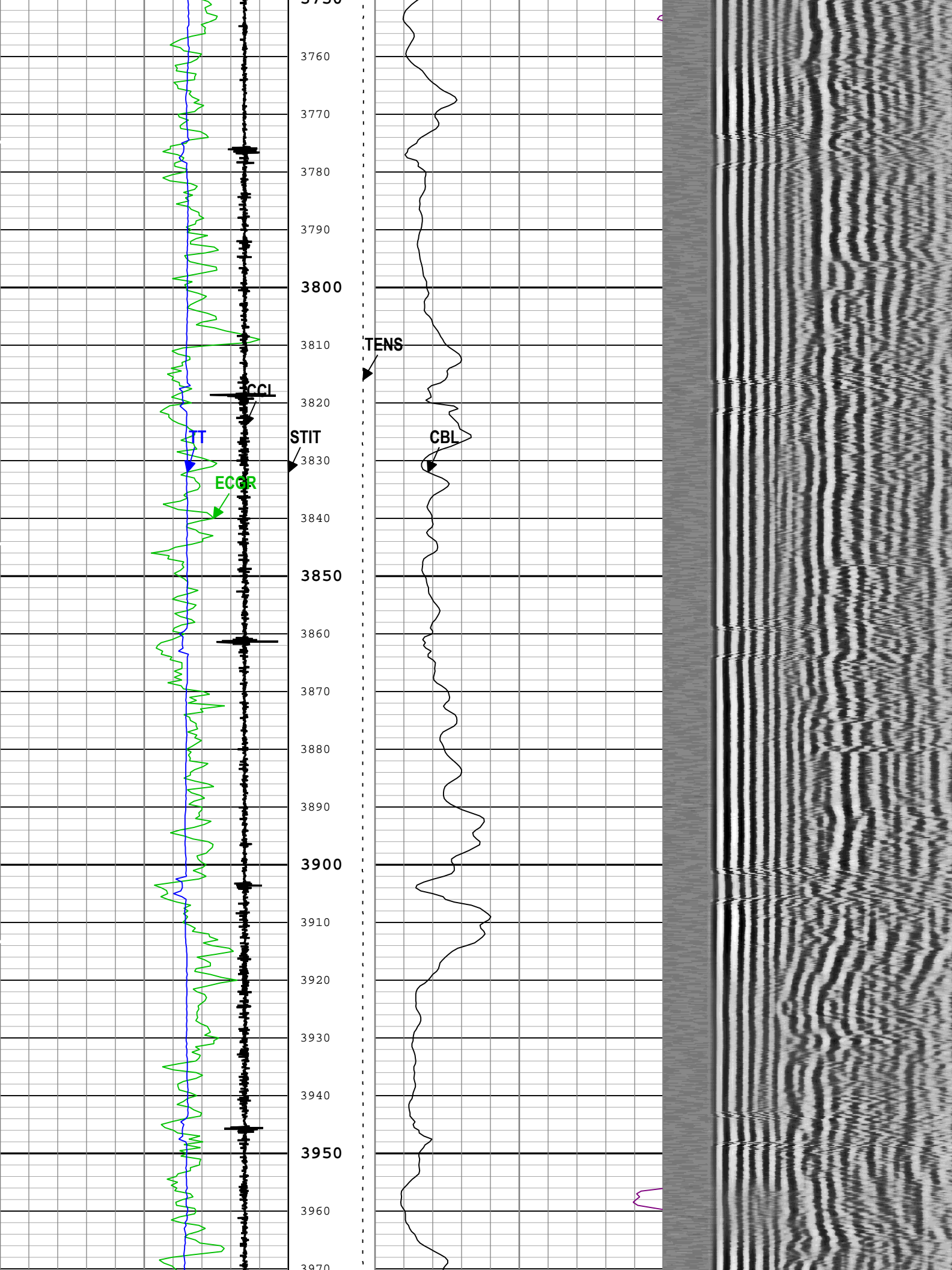




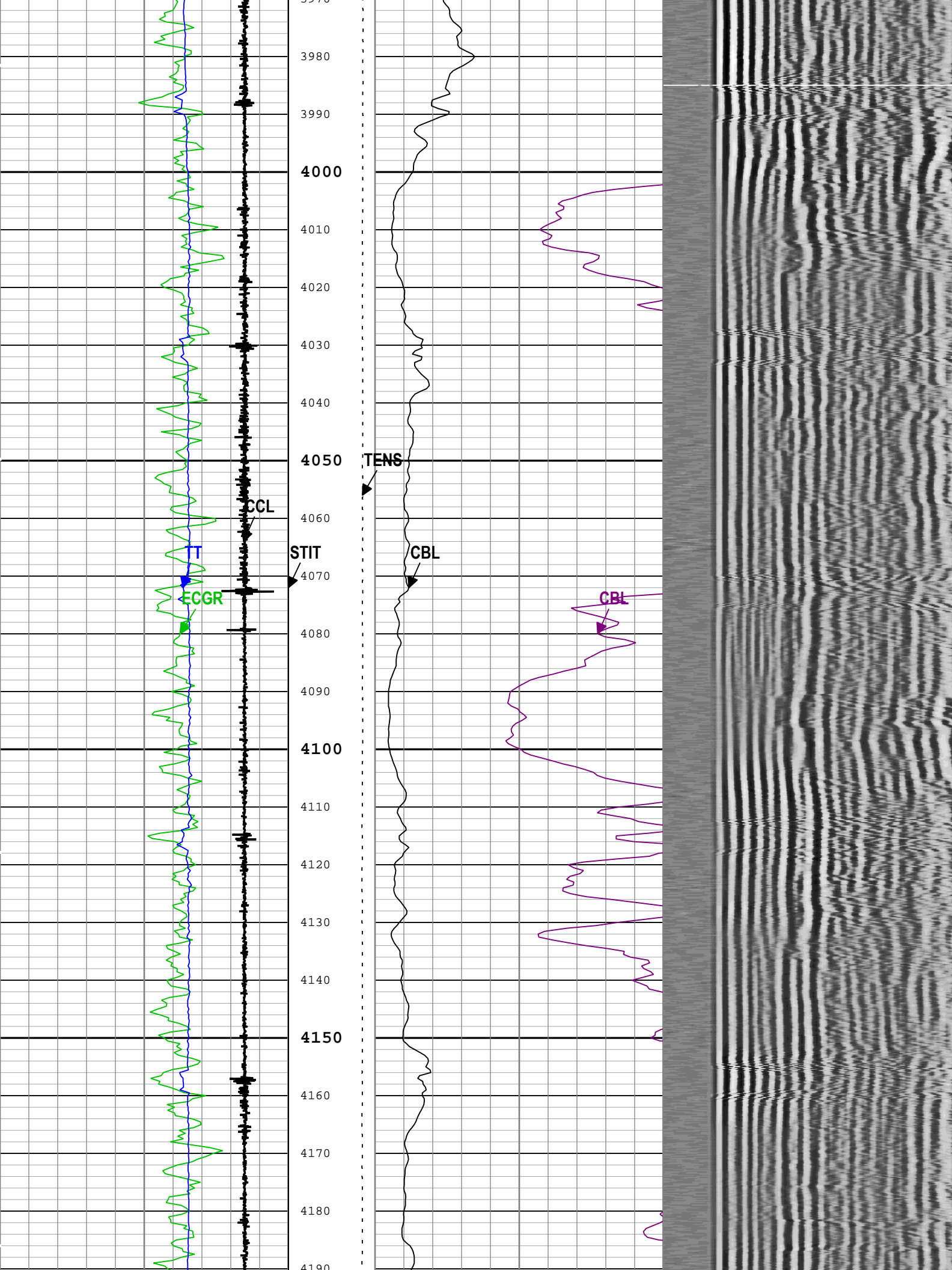


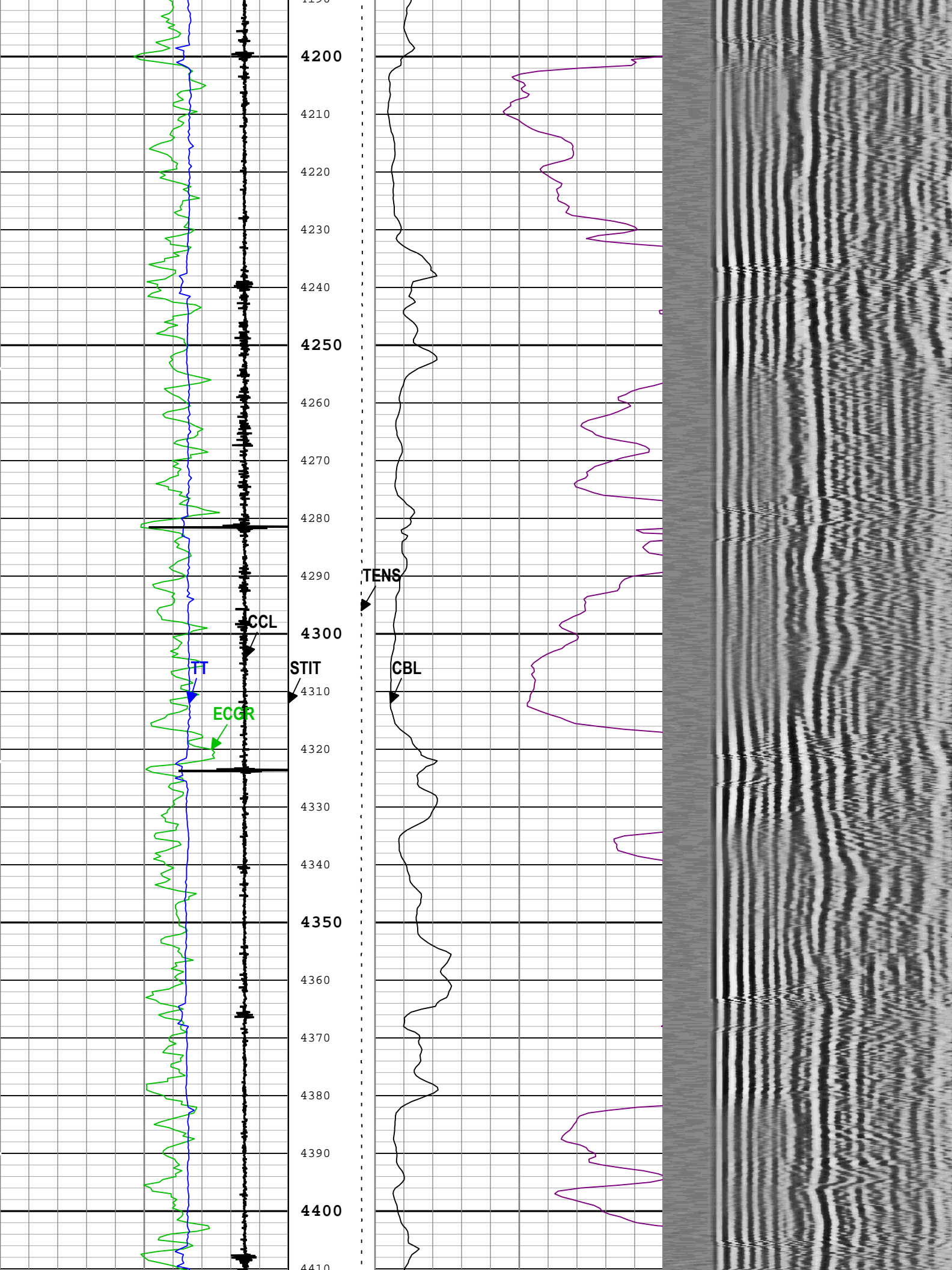


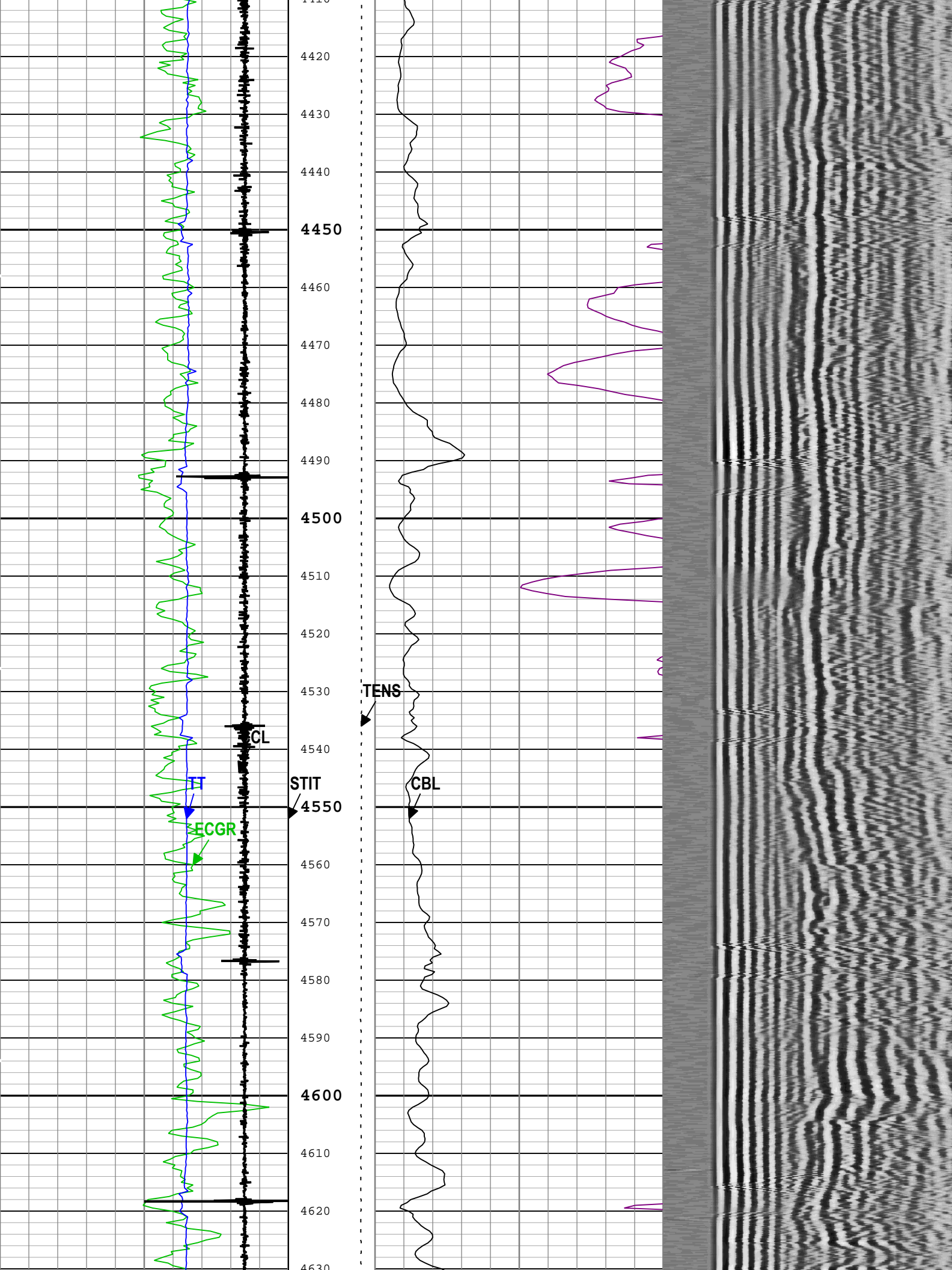




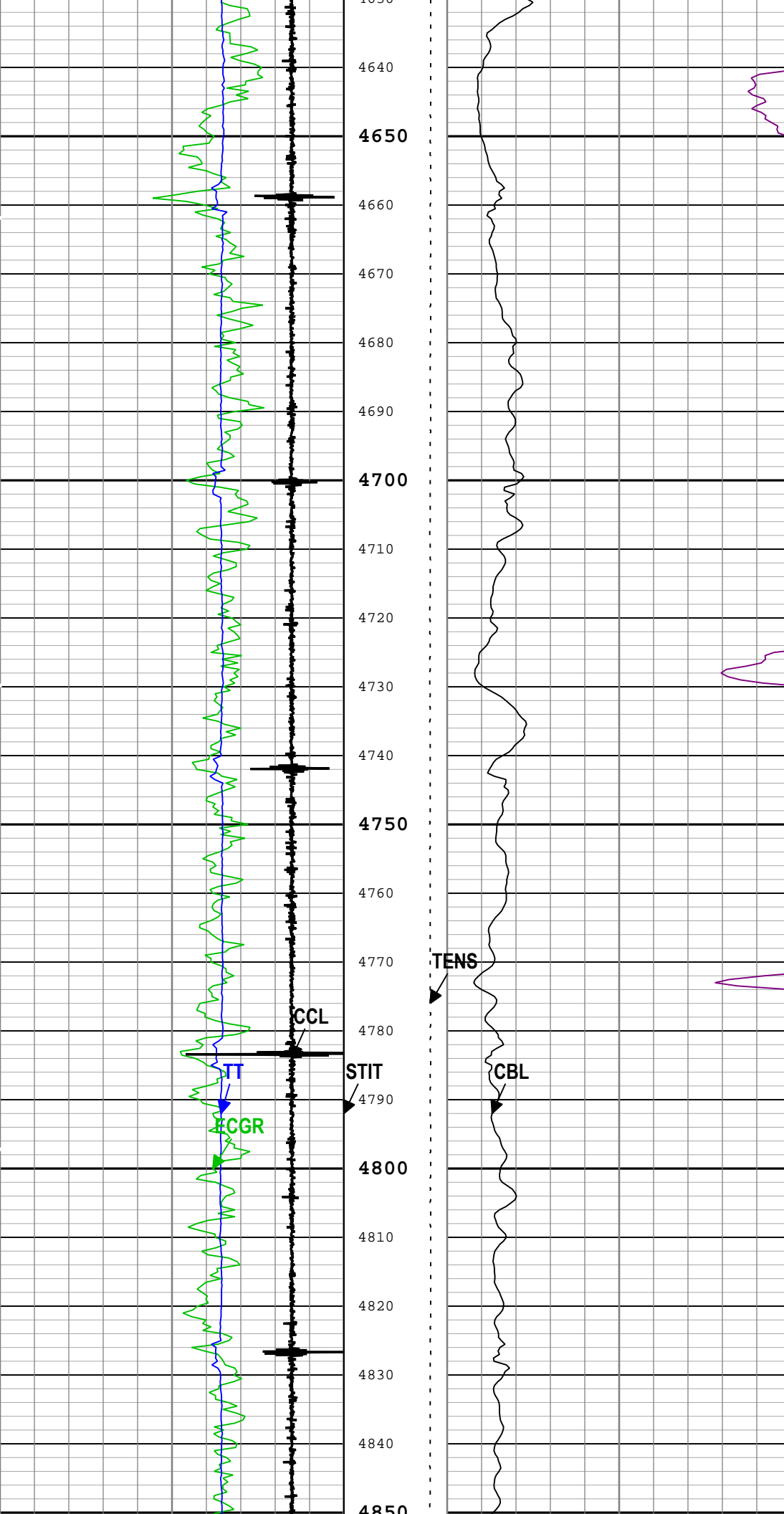


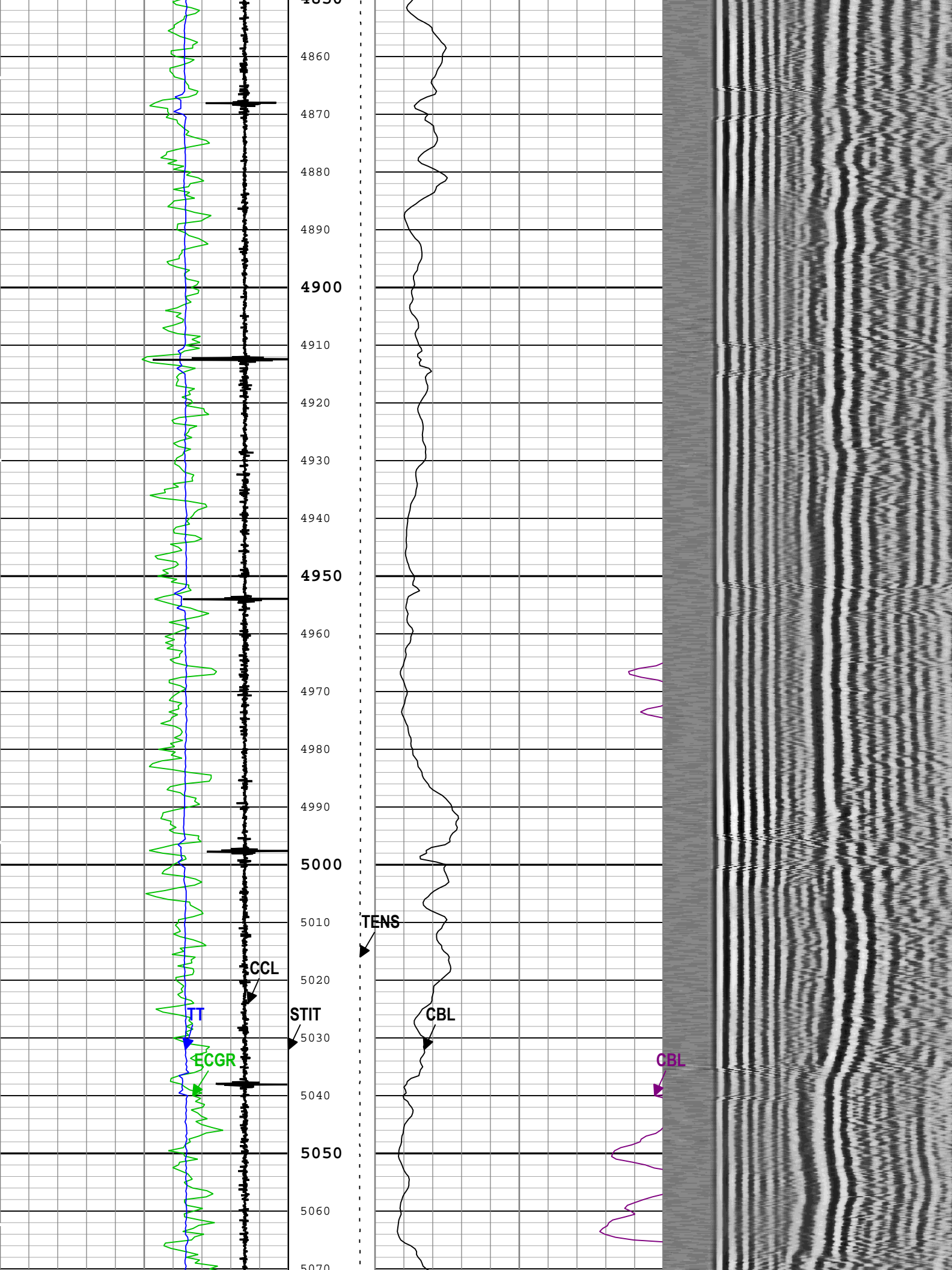


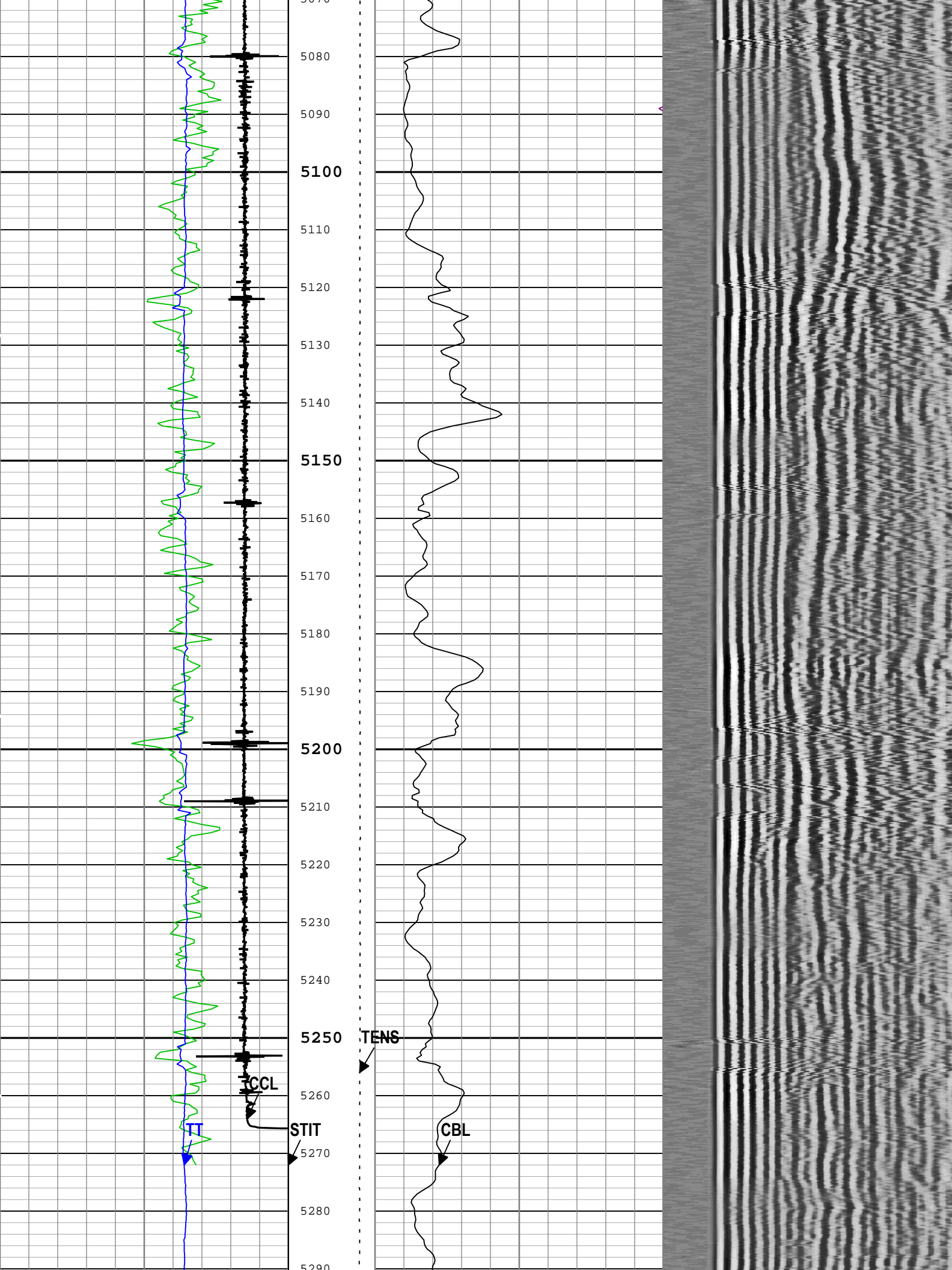












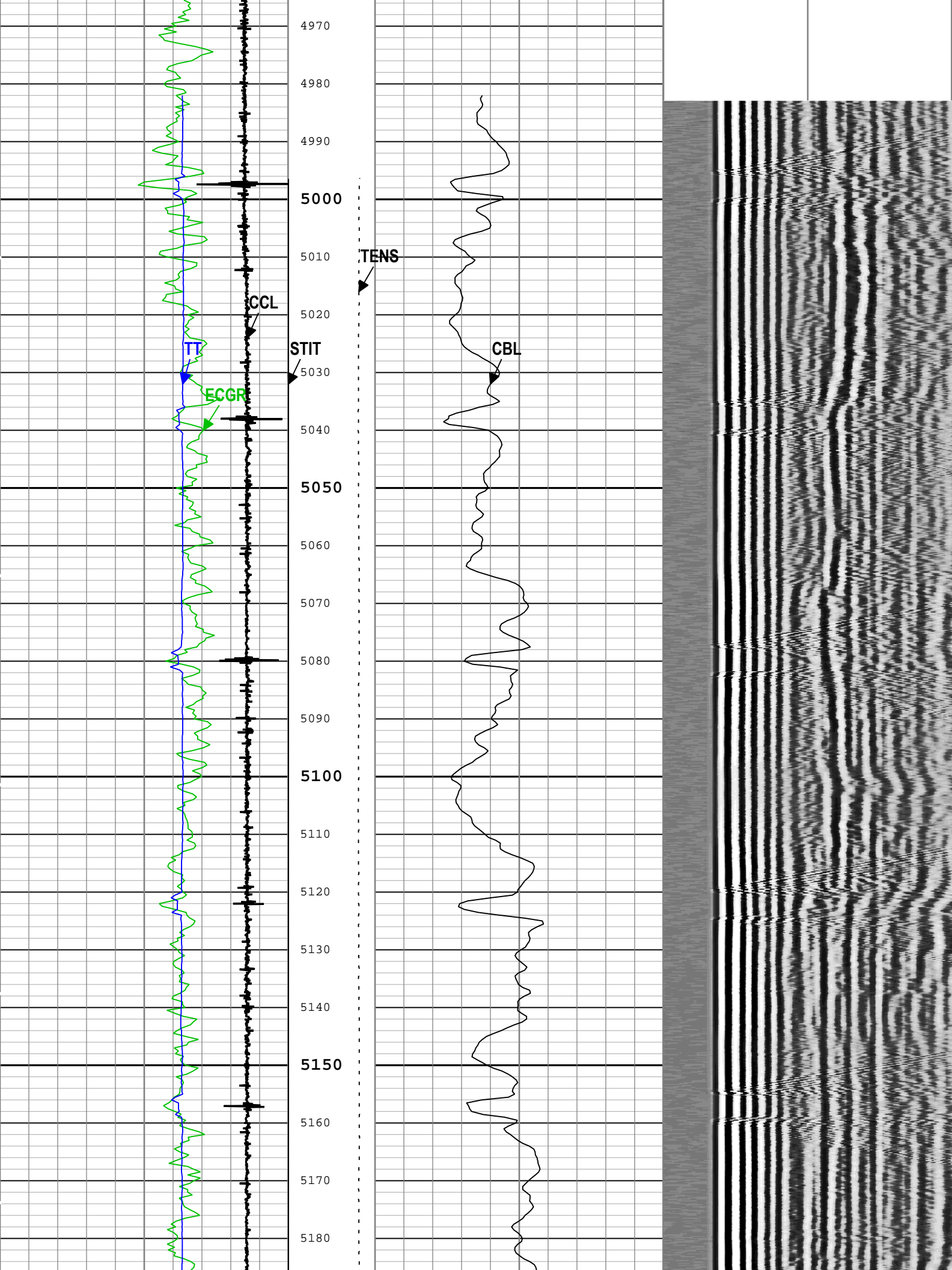


TIME_1900 - Time Marked every 60.00 (s)					
Description: CBL_VDL	Format: Log ( Sonic CBL with VDL )	Index Scale: 5 in per 100 ft	Index Unit: ft	Index Type: Measured Depth	Creation Date: 10-Nov-2016 20:37:56

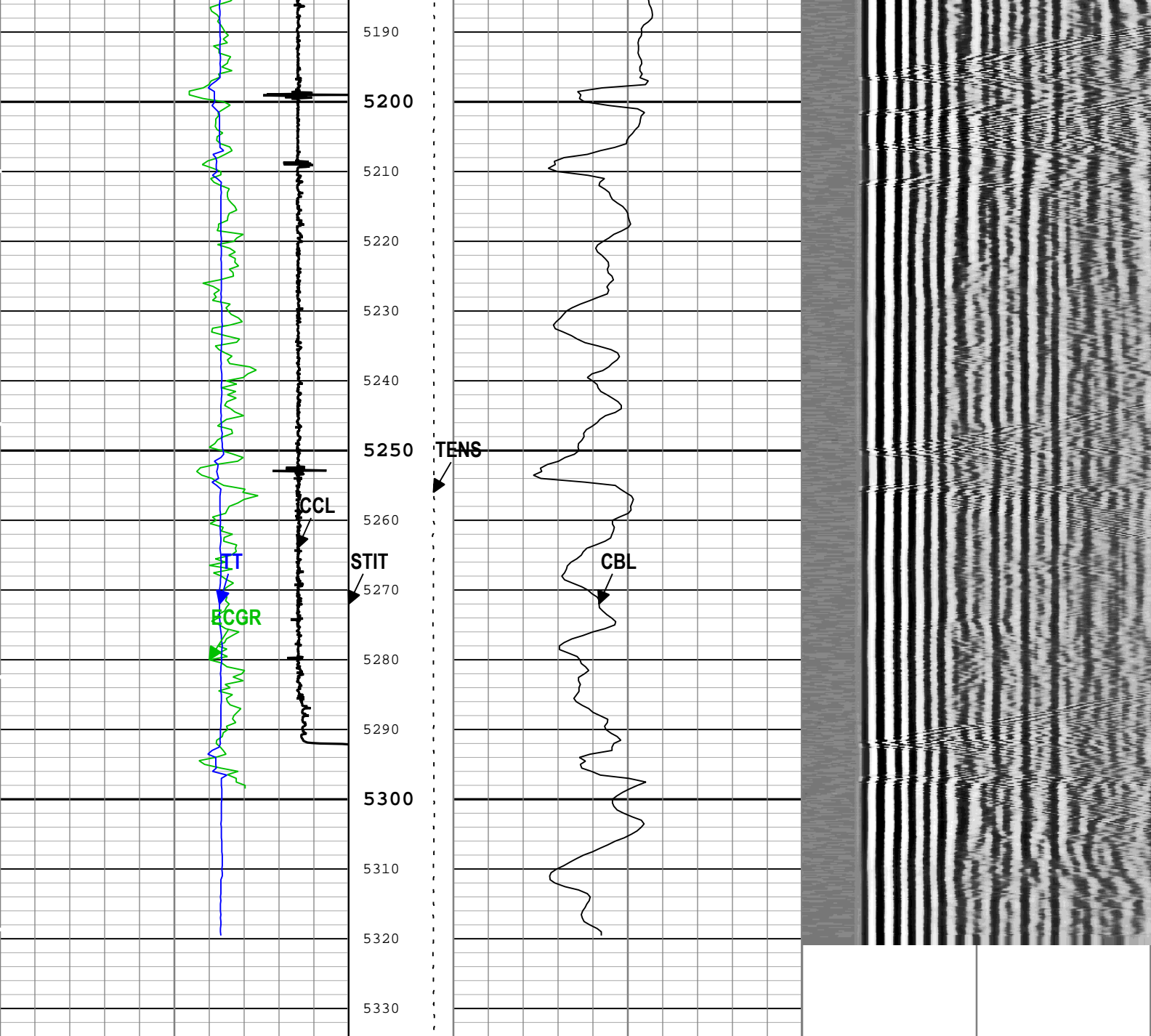
## One: Parameters

### Death Zone Boundary









<b>Gamma Ray (ECGR) SGT-N</b> 0 gAPI 150	Stuck Tool Indicator, Total (STIT) 0 ft 50	<b>CBL Amplitude (CBL) DSLT-H</b> 0 mV 10	Min Amplitude Max Variable Density Log (VDL) DSLT-H 200 us 1200
<b>Transit Time for CBL (TT) DSLT-H</b> 400 us 200		<b>CBL Amplitude (CBL) DSLT-H</b> 0 mV 100	
<b>Casing Collar Locator Amplitude (CCL) CAL-YA</b> -5 1	Cable Tension (TENS) 10000 lbf 0		
	Cable Drag		
	Tool_Tot. Drag		
	BIEP - Bond Index Event Pips DSLT-H		

TIME\_1900 - Time Marked every 60.00 (s)

## Channel Processing Parameters

### One: Parameters

Parameter	Description	Tool	Value	Unit
AMSG	Auxiliary Minimum Sliding Gate	DSLTH	227	us
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	8.75	in
CBLG	CBL Gate Width	DSLTH	90	us
CBLO	Casing Bottom (Logger)	WLSESSION	14020	ft
CBRA	CBL LQC Reference Amplitude in Free Pipe	DSLTH	72	mV
CCL_MULTIPLIER	Casing Collar Locator Multiplier	CAL-YA	3	
CDEN	Cement Density	SGT-N	2	g/cm3
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DETE	Delta-T Detection	DSLTH	E1	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	BS(RT)	
GOBO_CURR	Good Bond in Arbitrary Cement	DSLTH	3.42	mV
MAHTR	Manual High Threshold Reference for first arrival detection	DSLTH	120	
MATT_CURR	Maximum Attenuation in Arbitrary Cement	DSLTH	11.85	dB/ft
MCI	Minimum Cemented Interval for Isolation	DSLTH	4.75	ft
MNHTR	Minimum High Threshold Reference for first arrival detection	DSLTH	100	
MSA	Minimum Sonic Amplitude	DSLTH	1.6	mV
MSA_CURR	Minimum Sonic Amplitude in Arbitrary Cement	DSLTH	1.6	mV
NMSG	Near Minimum Sliding Gate	DSLTH	225	us
NMXG	Near Maximum Sliding Gate	DSLTH	678	us
SGAD	Sliding Gate Status	DSLTH	Off	
VDLG	VDL Manual Gain	DSLTH	3.57	

## Tool Control Parameters

### One: Parameters

Parameter	Description	Tool	Value	Unit
MODE	DSLTH Acquisition Mode	DSLTH	CBL	
RATE	DSLTH Firing Rate	DSLTH	15 Hz	
DTFS	DSLTH Telemetry Frame Size	DSLTH	536	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h

## Calibration Report

### DSLTH-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

1185

### CBL Free Pipe Adjustment - Free Pipe Measurement

Before (Manual Entry): 20:34:05 10-Nov-2016

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): 20:34:05 10-Nov-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
-------------	------	-------	---------	-----------	--------	------------	--	--

CBL Adjustment Factor		Before	1.000	0.200	0.714	5.000	<div><div></div><div></div><div></div><div></div><div></div></div>
Depth of Before Calibration	ft	Before			585.00		<div><div></div><div></div><div></div><div></div><div></div></div>

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

Primary Equipment :			
Scintillation Gamma Cartridge	SGC-TB	10249	
Calibration Parameter :			
Plus Reference (Jig minus background reference)	165		

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

Before (Measured):		10:57:13 08-Nov-2016					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div><div></div><div></div></div>
Gamma Ray Gain		Before			1.135		<div><div></div><div></div><div></div><div></div><div></div></div>

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

Before (Measured):		10:57:13 08-Nov-2016					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div><div></div><div></div></div>
RGR Zero Measurement	gAPI	Before		0	67.925	120.000	<div><div></div><div></div><div></div><div></div><div></div></div>
RGR Plus Measurement	gAPI	Before	145.340	132.128	145.340	158.553	<div><div></div><div></div><div></div><div></div><div></div></div>

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

Before (Measured):		10:59:50 08-Nov-2016					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div><div></div><div></div></div>
RGR Plus Plateau Measurement	gAPI	Before			215.418		<div><div></div><div></div><div></div><div></div><div></div></div>
RGR Minus Plateau Measurement	gAPI	Before			209.727		<div><div></div><div></div><div></div><div></div><div></div></div>

Company: Whiting Oil & Gas Corporation

**Schlumberger**

Well: Horsetail 30E-1935



Field:	Wildcat
County:	Weld
State:	Colorado

# Cement Bond Log

## GR-CCL