

Company: Whiting Oil & Gas Corporation

Well: Horsetail 30E-1934

Field: Wildcat

County: Weld State: Colorado

Cement Bond Log
GR-CCL

County:	Weld			
Field:	Wildcat			
Location:	SWNW Sec 30, T10N, R57W			
Well:	Horsetail 30E-1934			
Company:	Whiting Oil & Gas Corporation			
Location:				
SWNW Sec 30, T10N, R57W			Elev.:	K.B. 4738.70 ft
SHL: 2323' FNL x 570' FWL				G.L. 4717.70 ft
Latitude: 40.810703 Longitude: -103.801339				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:
05-123-42878	30		10N	57W
Logging Date	11-Nov-2016			

Run Number	One		
Depth Driller	13962.00 ft		
Schlumberger Depth	13962.00 ft		
Bottom Log Interval	5235.00 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	2050.30 ft		
To	13962.00 ft		
Casing/Tubing Size	5.5 in		
Weight	20 lbm/ft		
Grade	N/A		
From	0.00 ft		
To	13962.00 ft		
Max Recorded Temperatures	193 degF		
Logger on Bottom	11-Nov-2016	10:30:00	
Unit Number	Location:	Time	
2161	Stephen Tang	FtMorgan	
Recorded By			
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.

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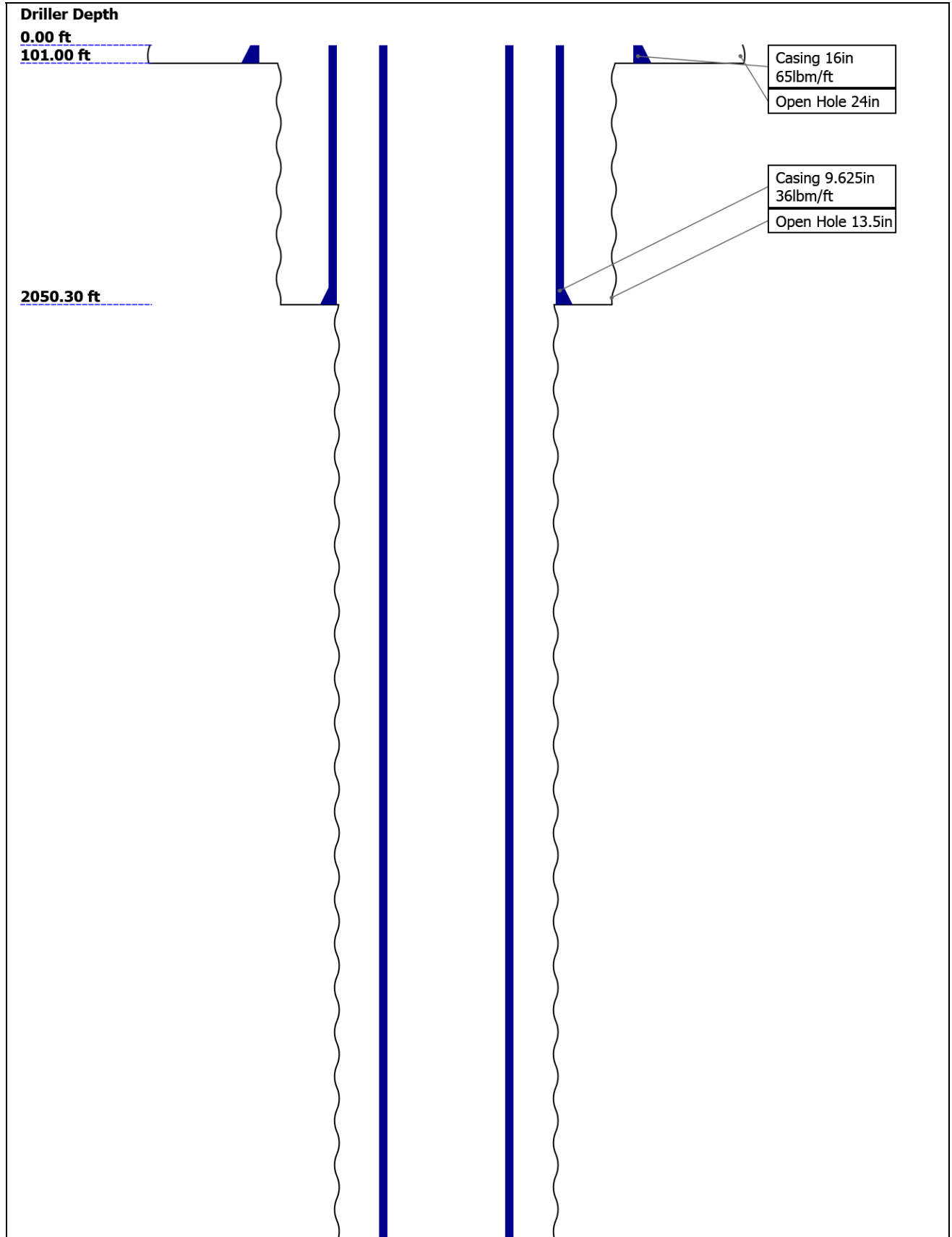
9.4 Log (Sonic CBL with VDL)

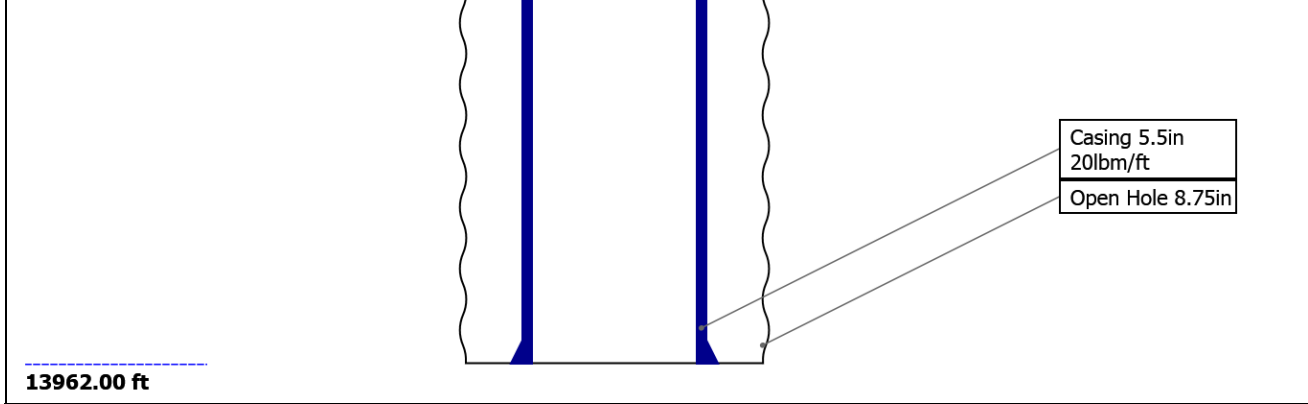
9.5 Parameter Listing

10. Calibration Report

11. Tail

Well Sketch






Borehole Size/Casing/Tubing Record

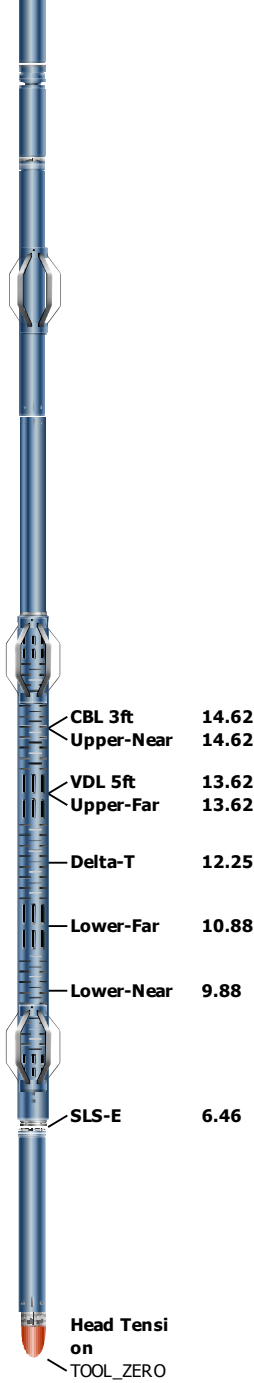
Bit						
Bit Size (in)	24	13.5	8.75			
Top Driller (ft)	0	101	2050.3			
Top Logger (ft)	0	101	2050.3			
Bottom Driller (ft)	101	2050.3	13962			
Bottom Logger (ft)	101	2050.3	13962			
Casing						
Size (in)	16	9.625	5.5			
Weight (lbm/ft)	65	36	20			
Inner Diameter (in)	15.25	8.921	4.778			
Grade	N/A	N/A	N/A			
Top Driller (ft)	0	0	0			
Top Logger (ft)	0	0	0			
Bottom Driller (ft)	101	2050.3	13962			
Bottom Logger (ft)	101	2050.3	13962			

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>CCL</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>CTEM</div><div>HV</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>TelStatus</div><div>ToolStatus</div></div><div><div>36.6</div><div>36.6</div></div></div>					
<div><div><div>AH-184[2]:4</div><div></div></div><div><div>31.1</div></div><div><div>GR</div><div></div></div><div><div>35.68</div></div></div>					

AH-184[1]:3 29.1
906

DSLTT-H:8150 27.1
ECH-KH:8150
DSLCT-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 5176.4 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	58.56 ft	5254.30 ft	11-Nov-2016 4:30:30 PM	11-Nov-2016 6:00:59 PM	ON	3.19 ft	Yes

All depths are referenced to toolstring zero

Log

Company:Whiting Oil & Gas Corporation

Well:Horsetail 30E-1934

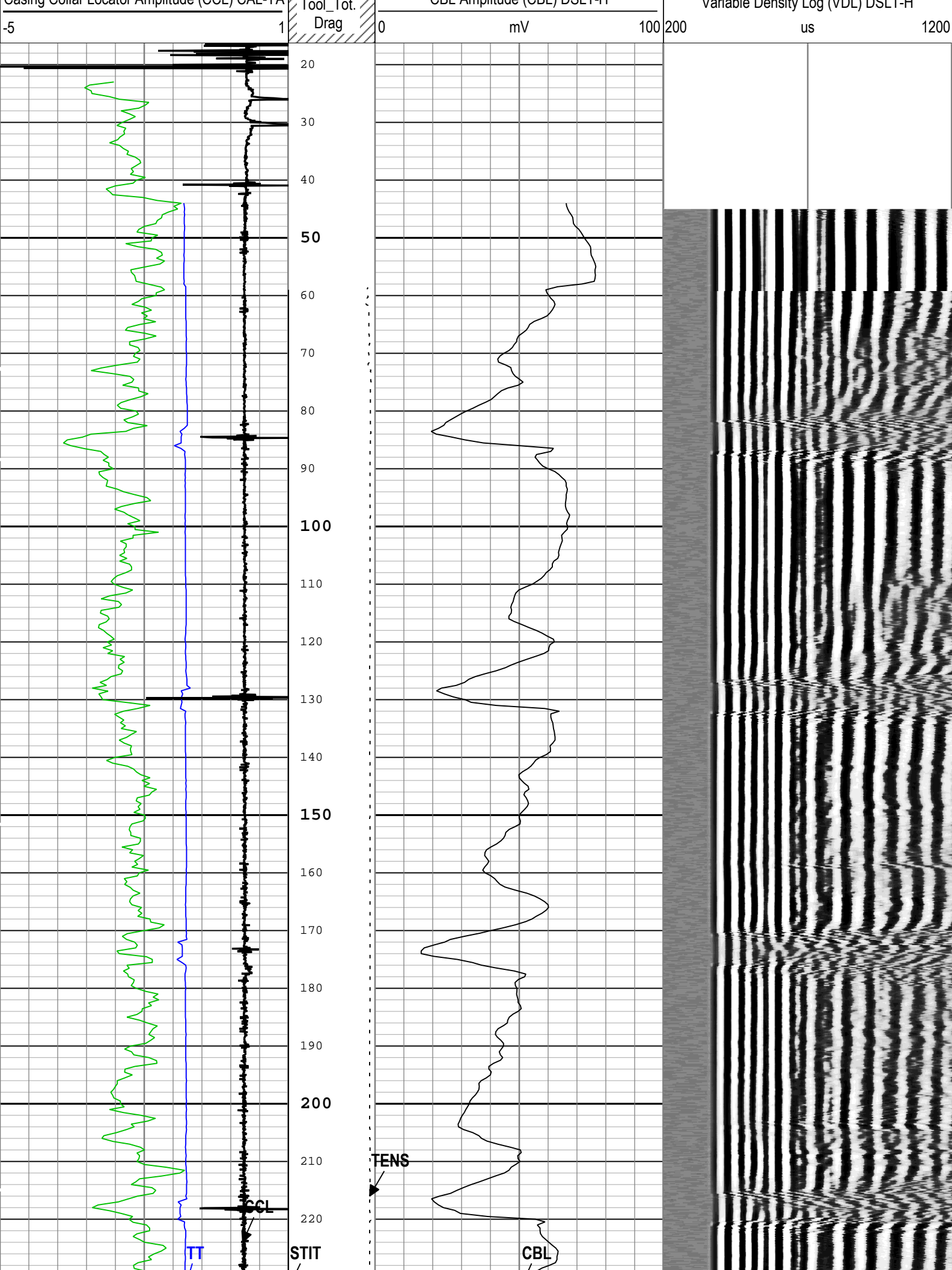
One: Log[4]:Up:S013

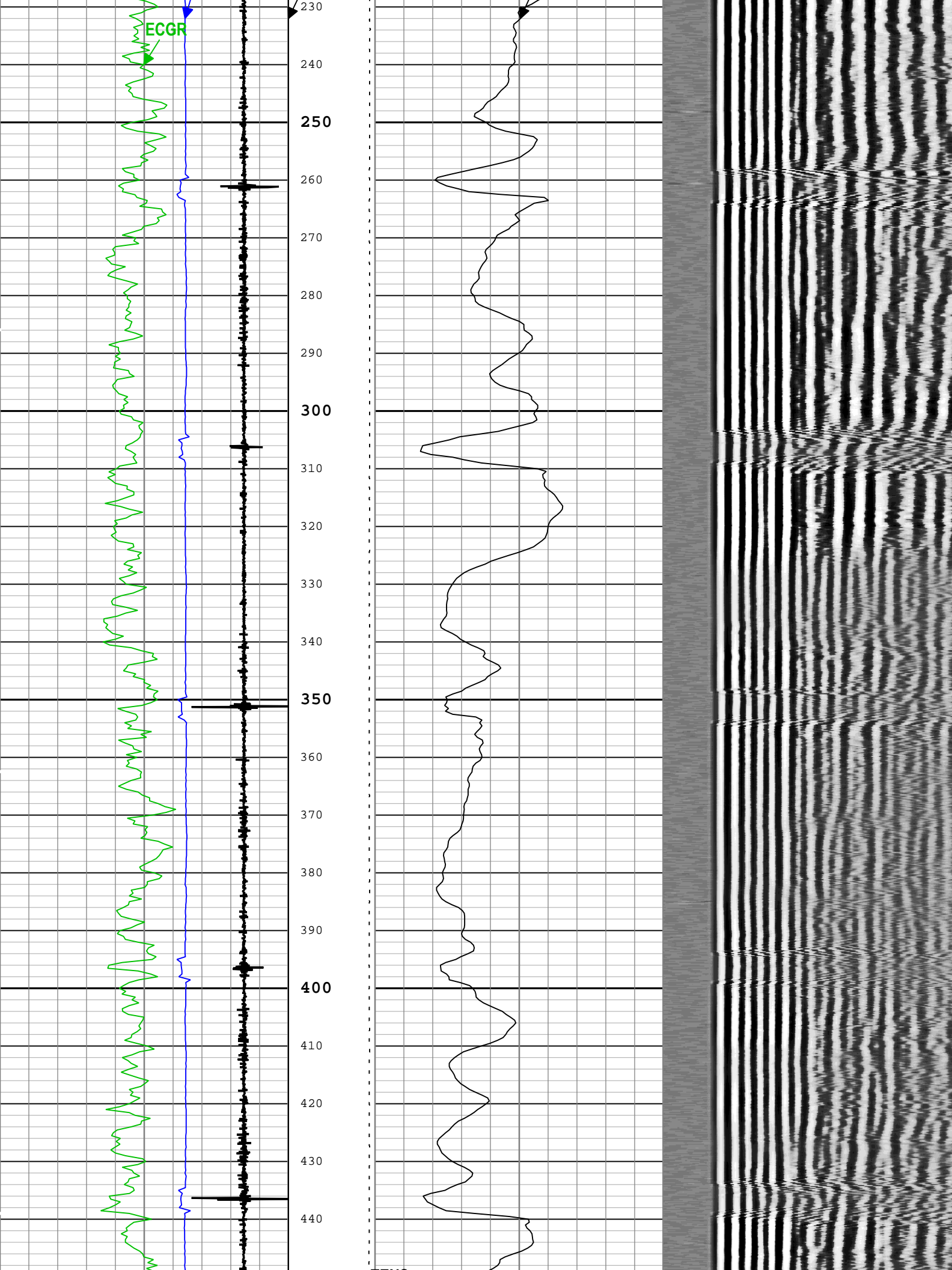
Description: CBL_VDL Format: Log (Sonic CBL with VDL) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 11-Nov-2016 18:16:13

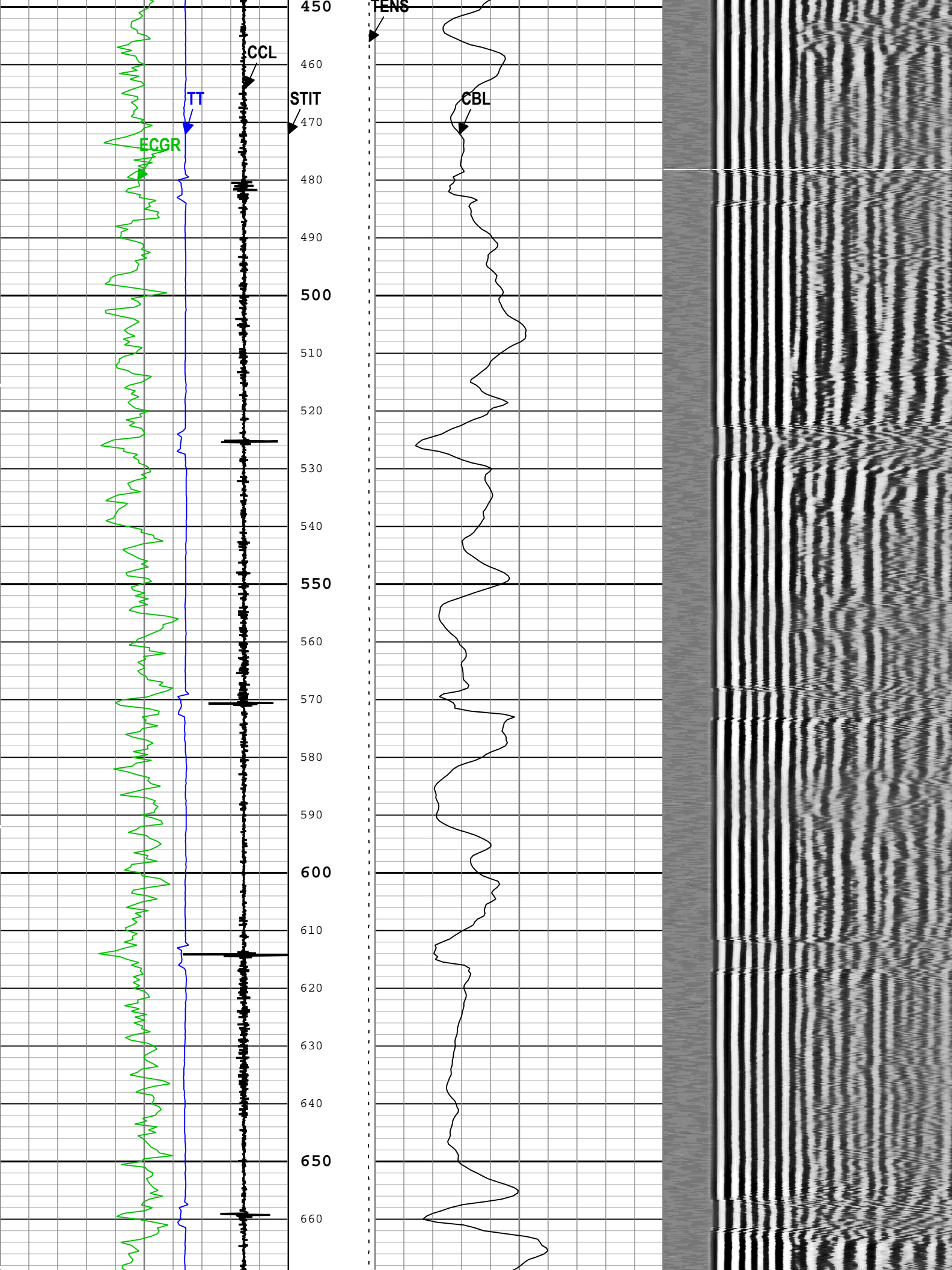
	BIEP - Bond Index Event Pips DSLT-H
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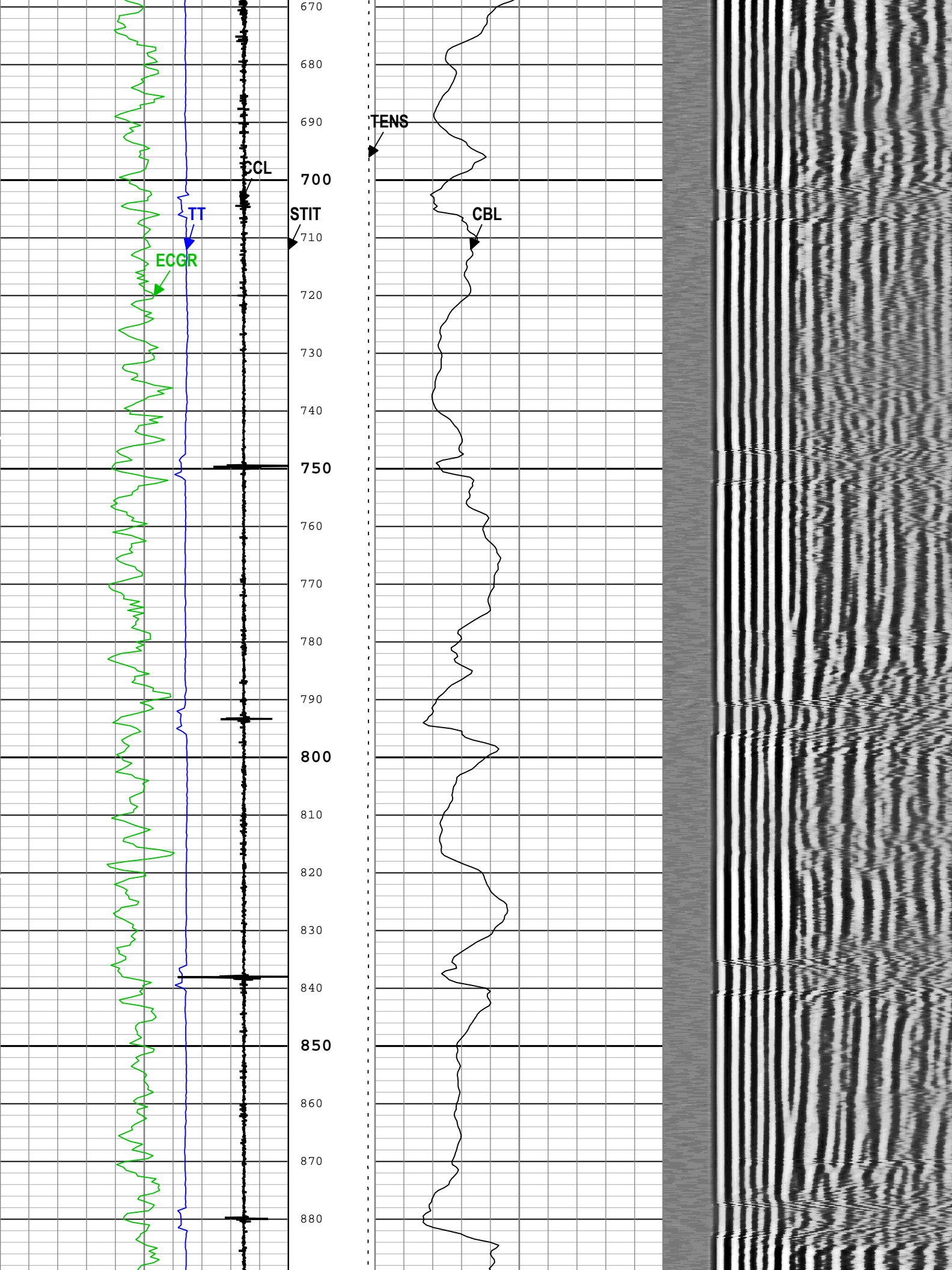
TIME_1900 - Time Marked every 60.00 (s)

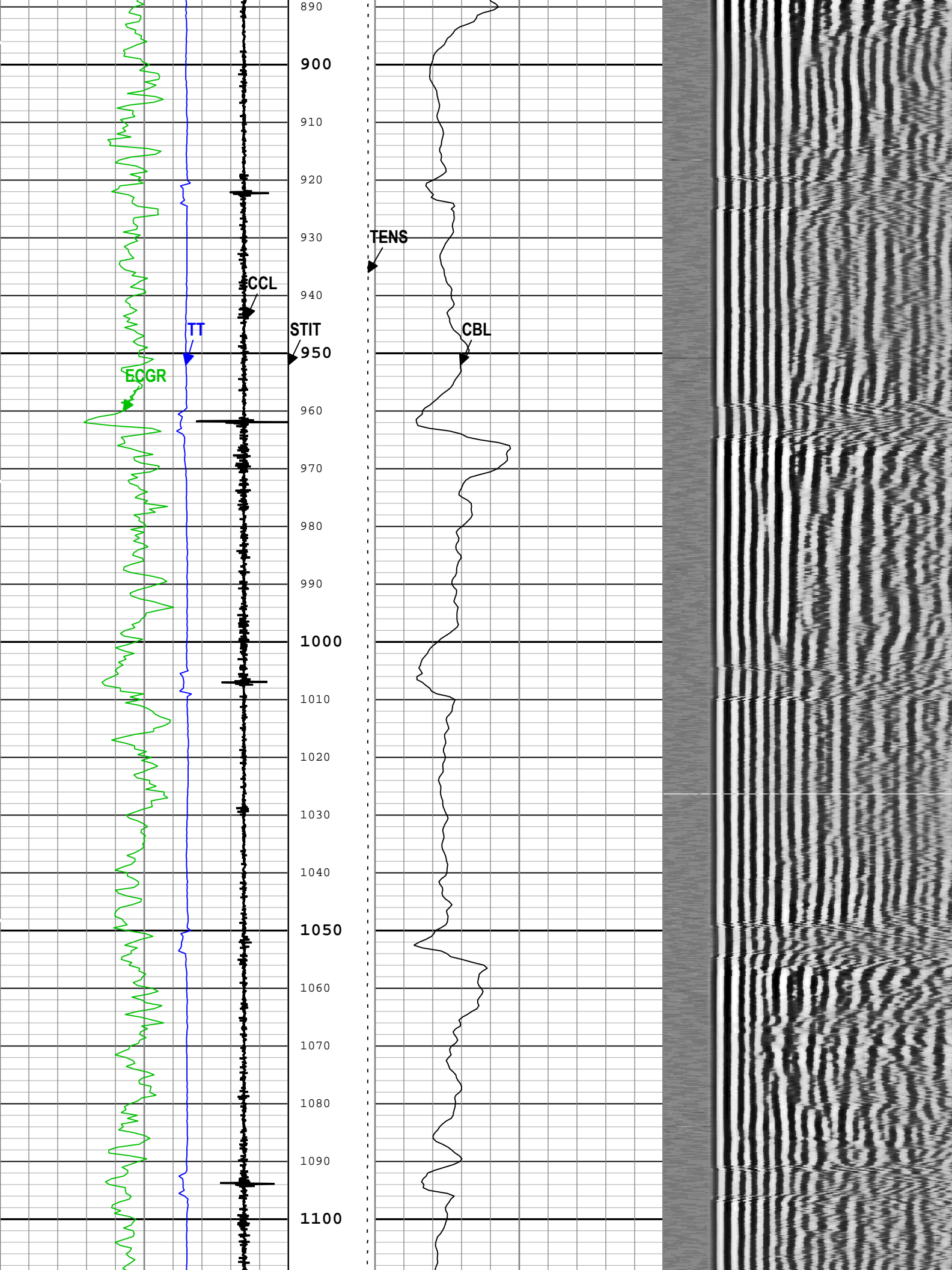
		Stuck Tool Indicator, Total (STIT)		
		0 ft 50		
		Cable Tension (TENS)		
Gamma Ray (ECGR) SGT-N		10000 lbf 0	CBL Amplitude (CBL) DSLT-H	
0	gAPI 150		0	mV 10
Transit Time for CBL (TT) DSLT-H		Cable Drag	CBL Amplitude (CBL) DSLT-H	
400	us 200		CBL Amplitude (CBL) DSLT-H	
Casing Collar Locator Amplitude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

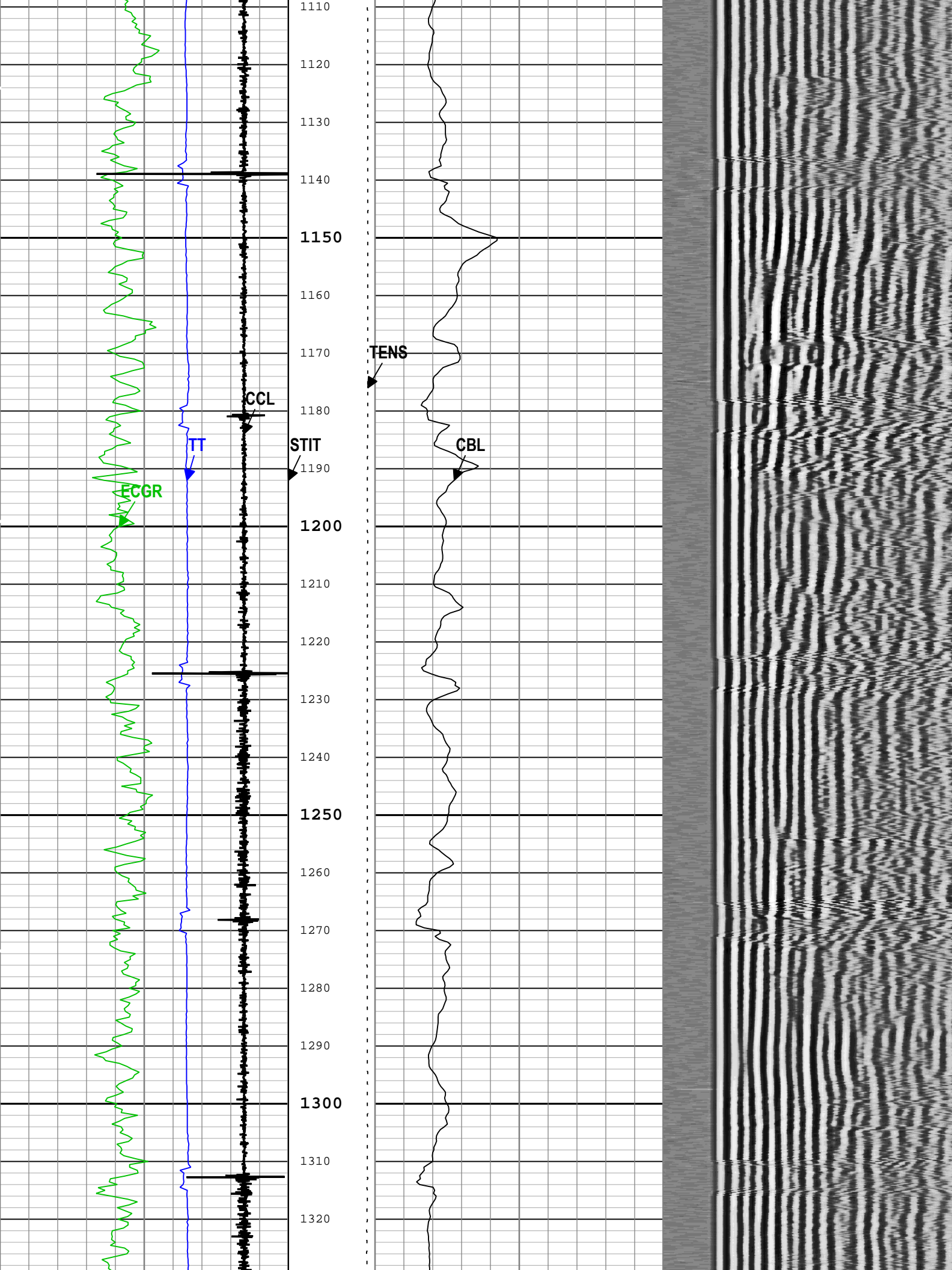


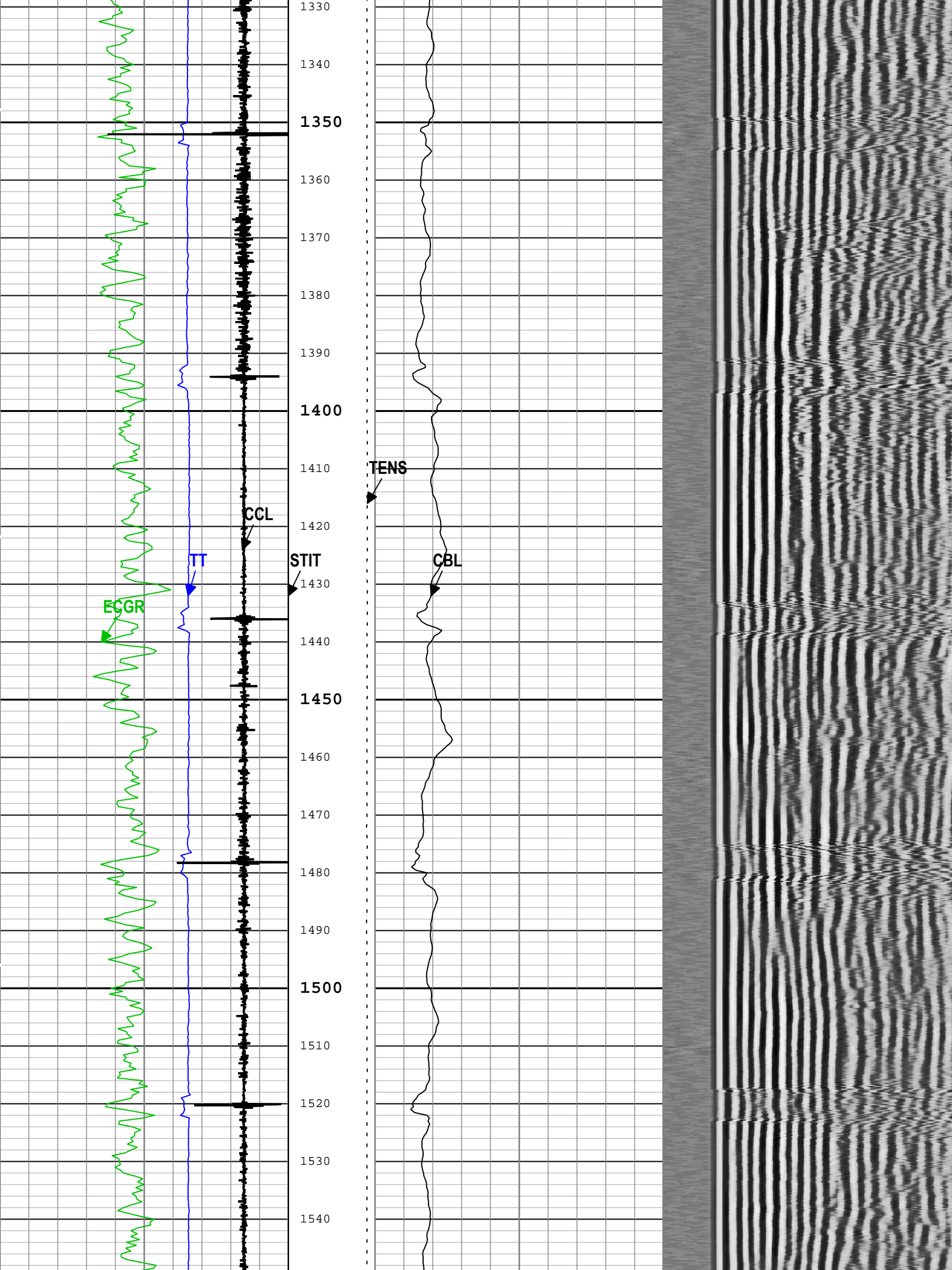


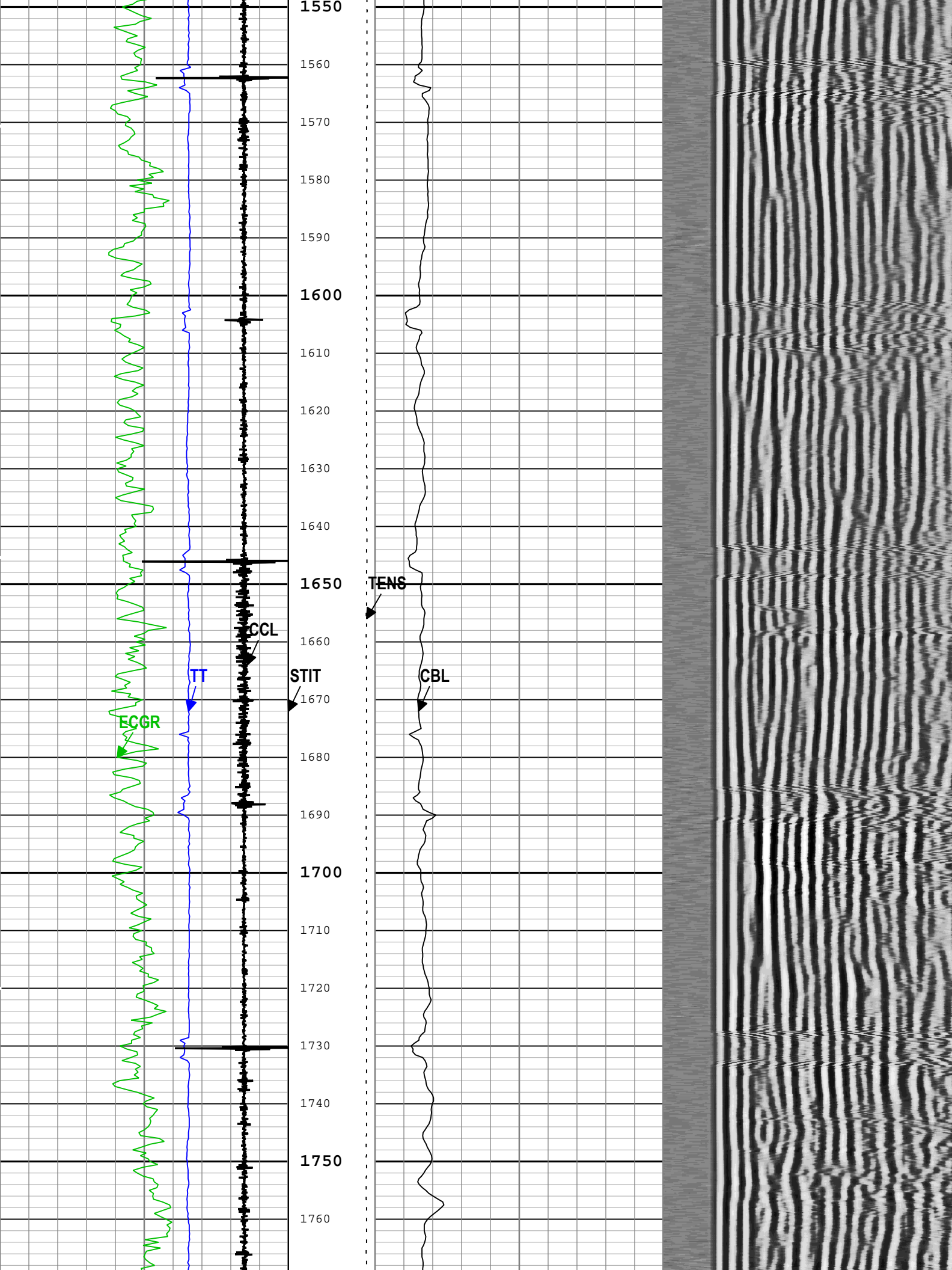


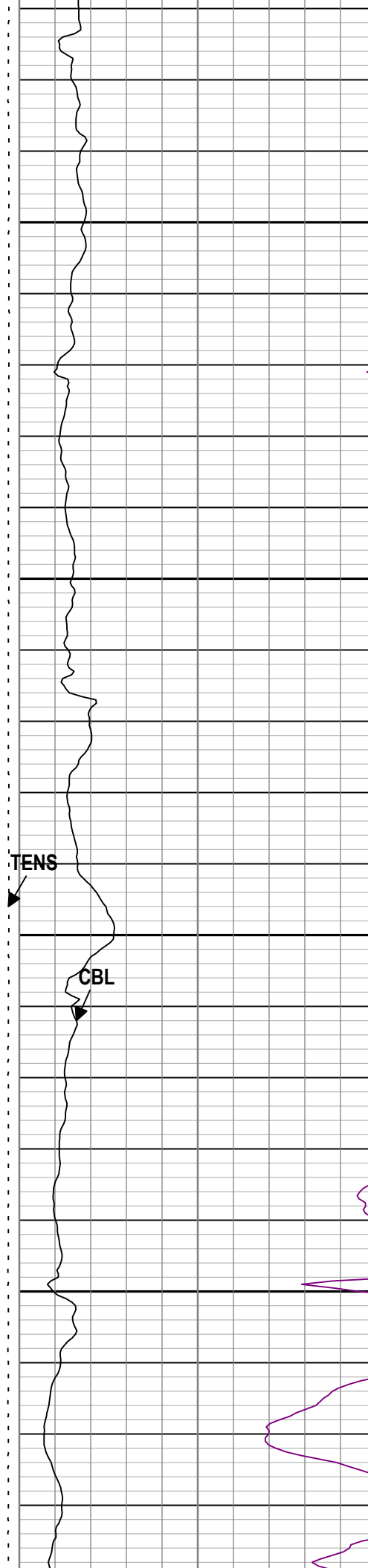
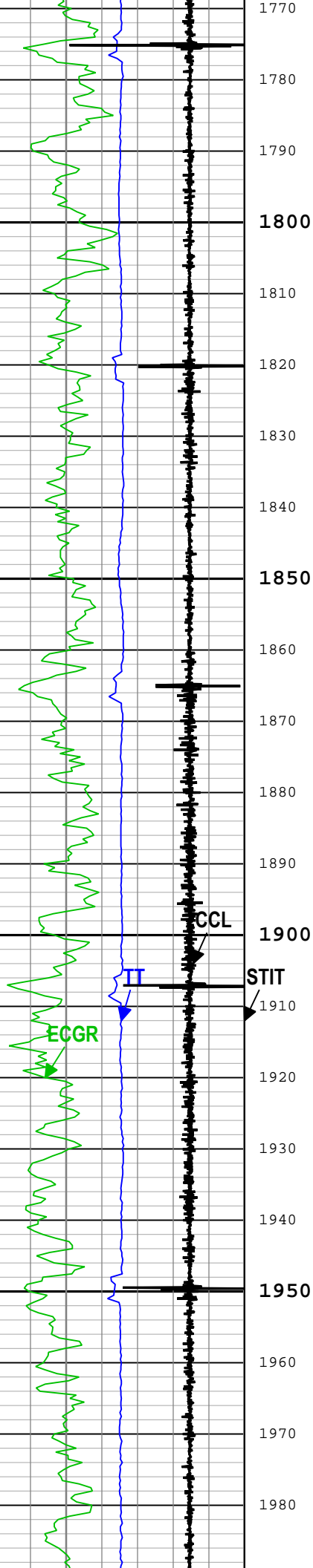


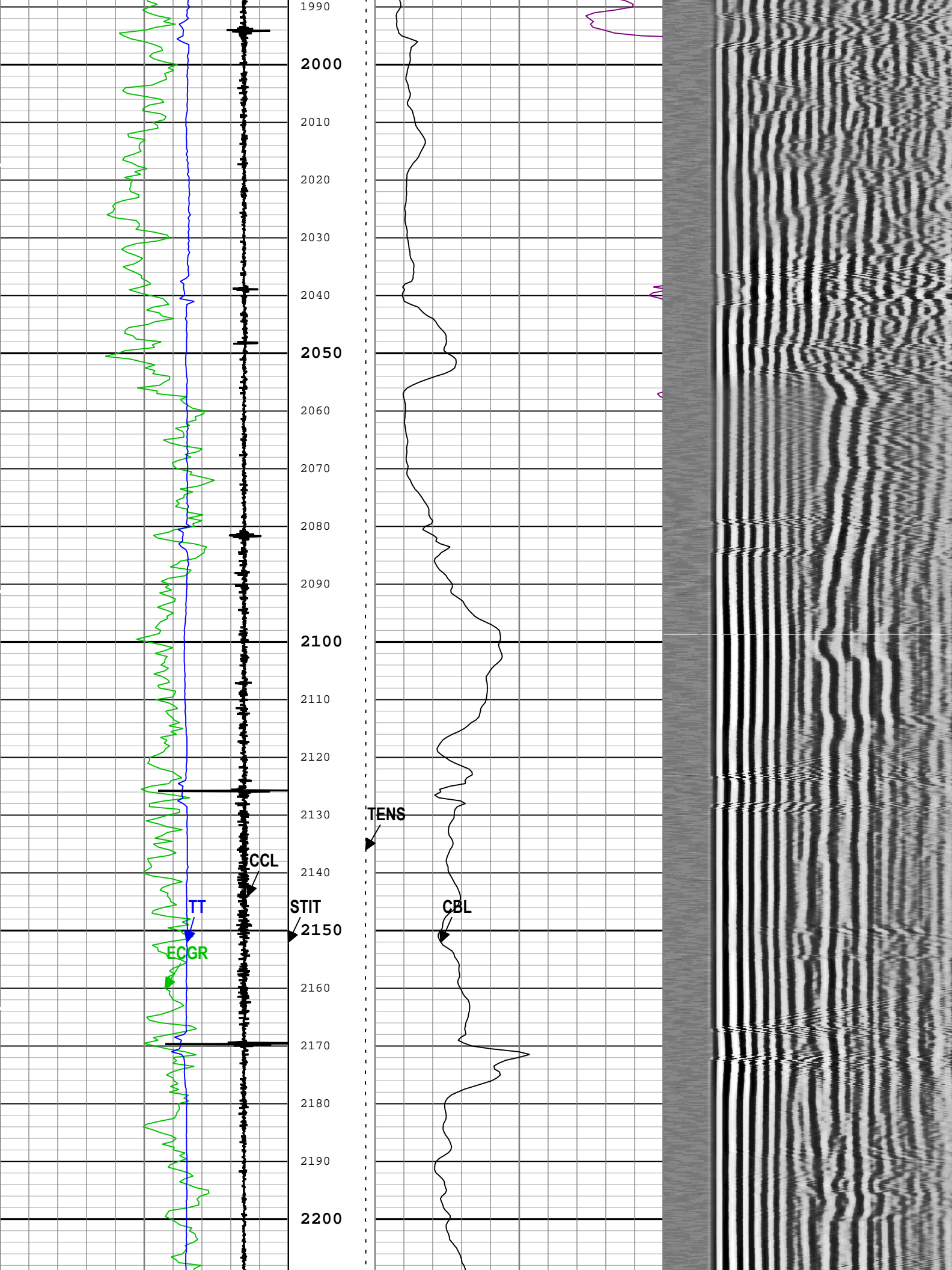


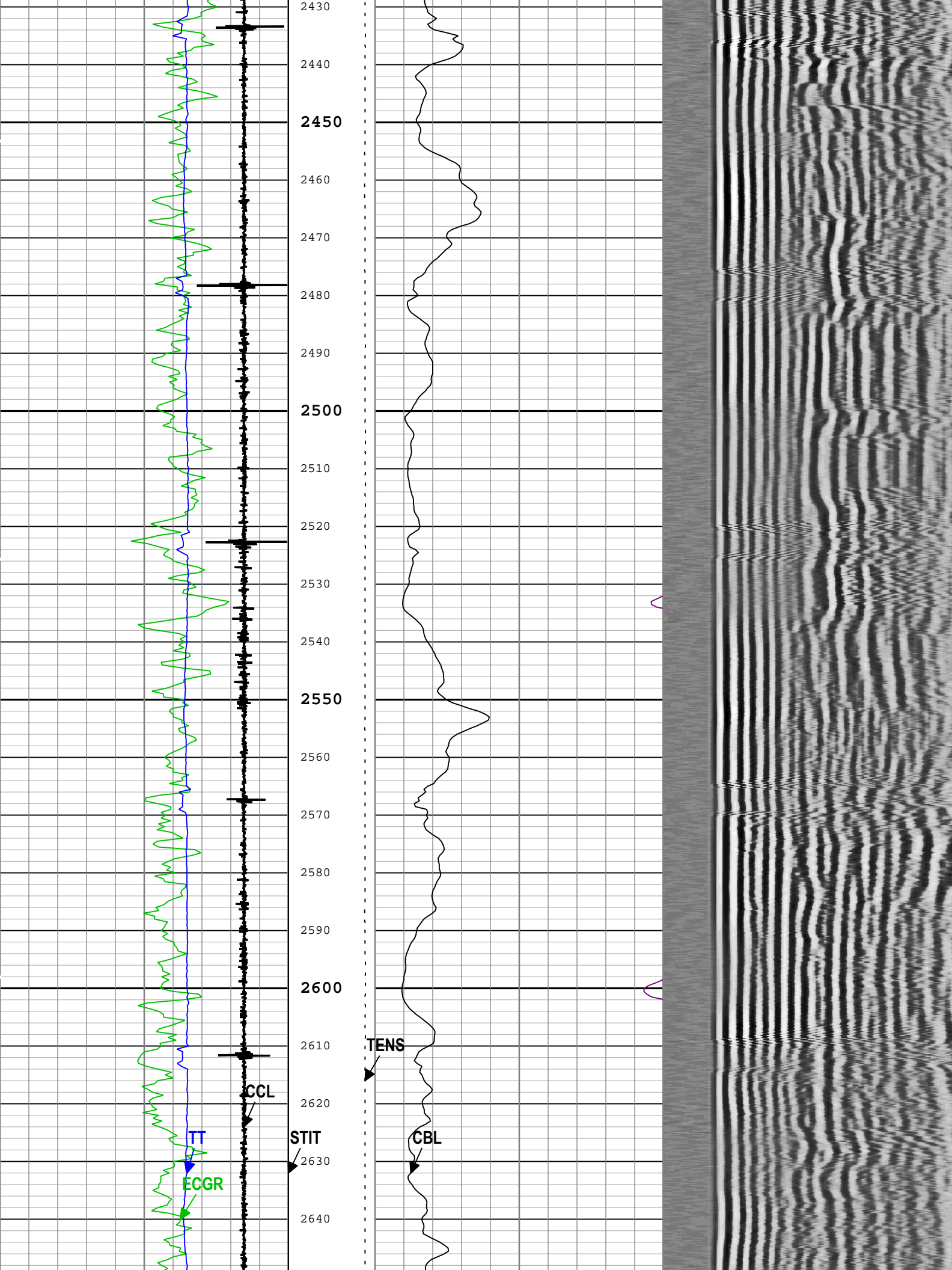


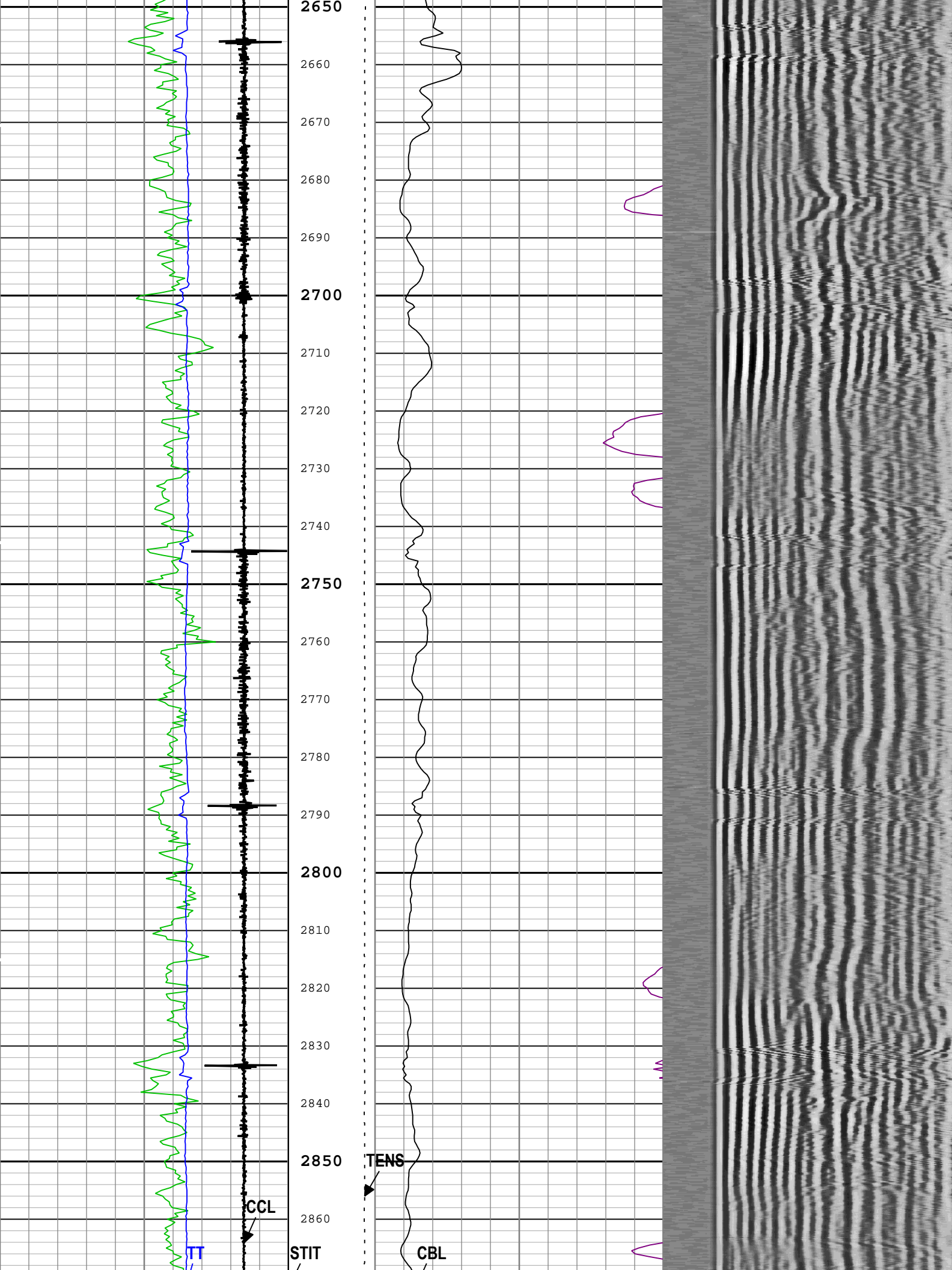


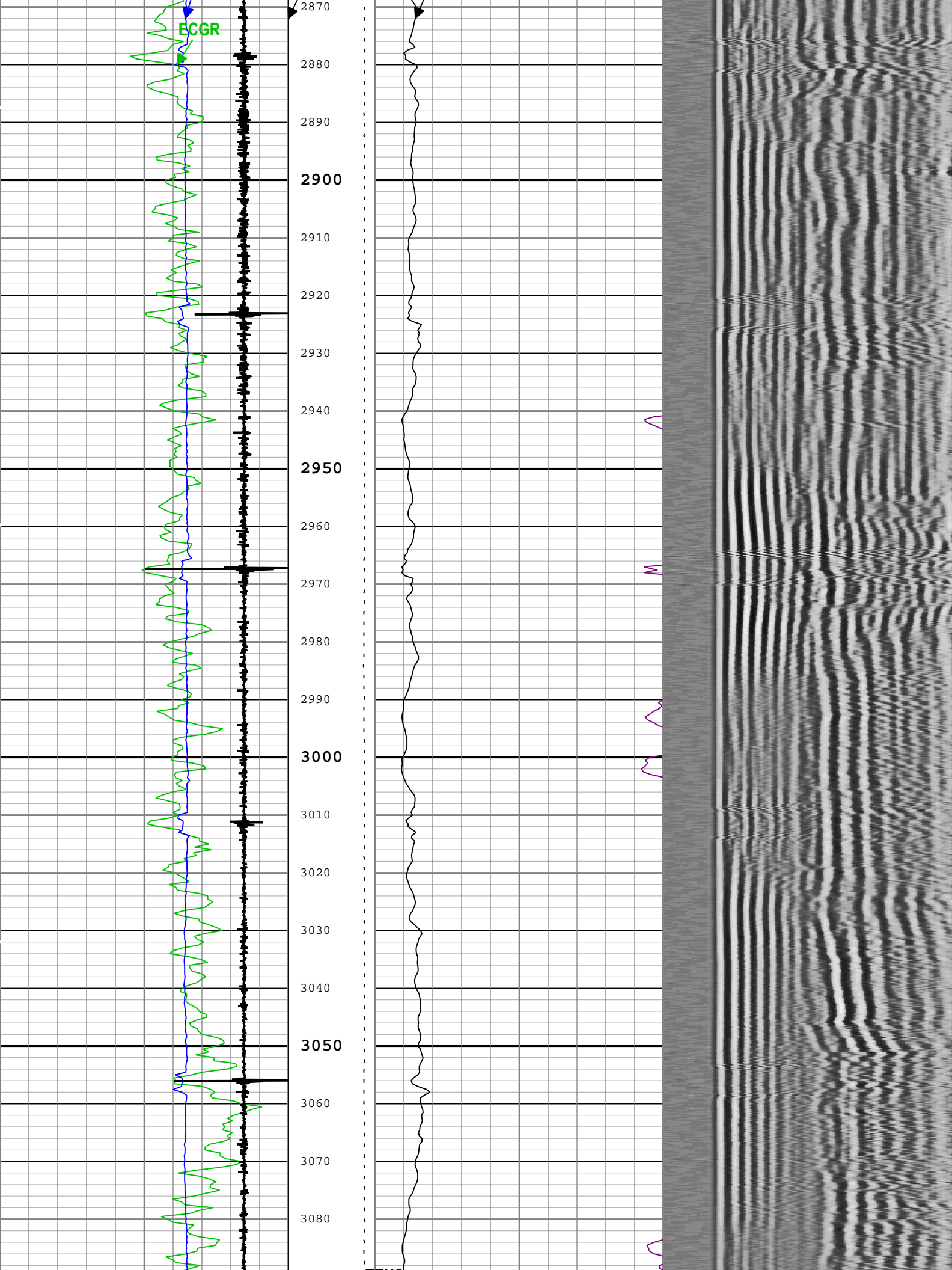


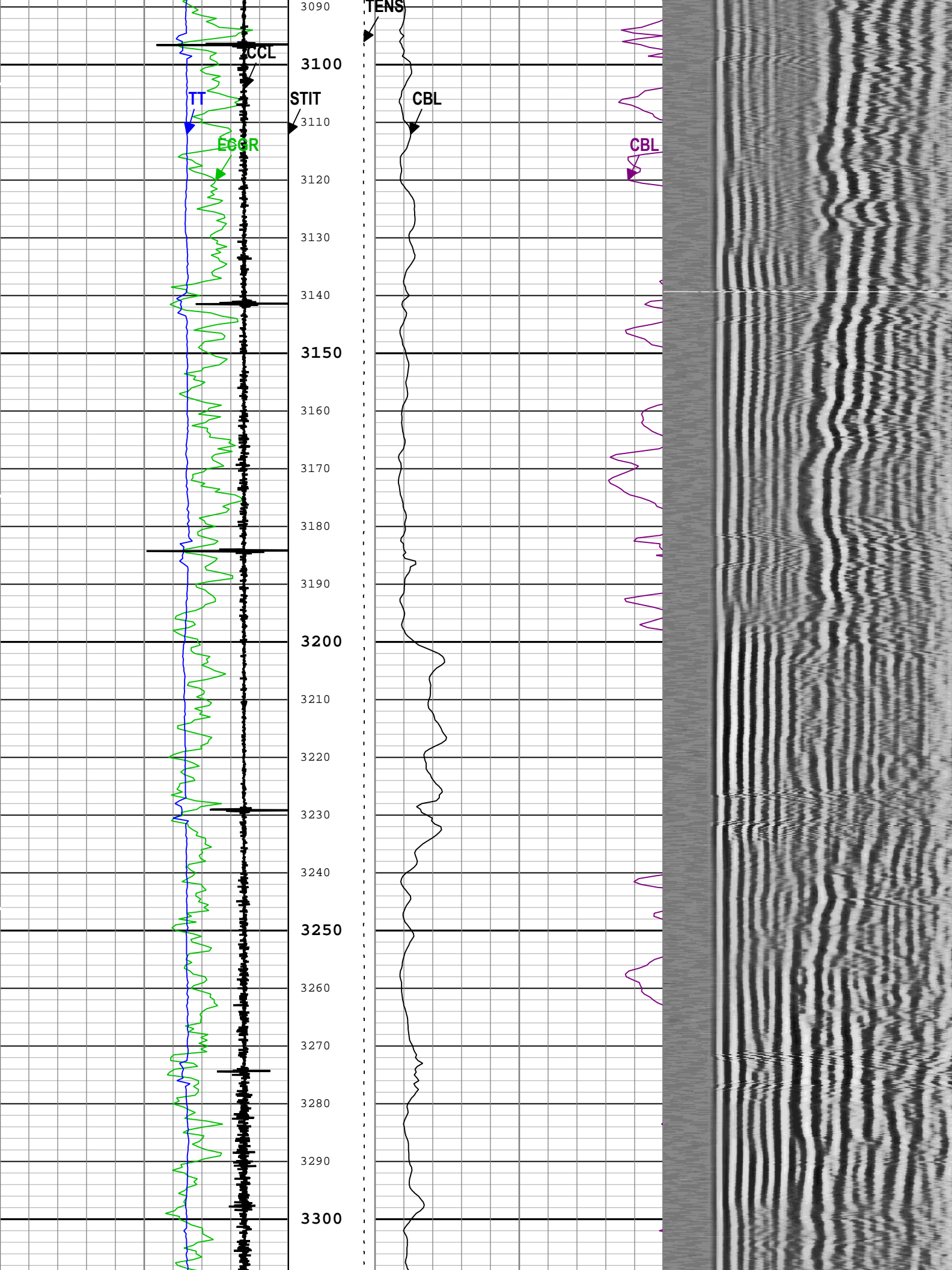


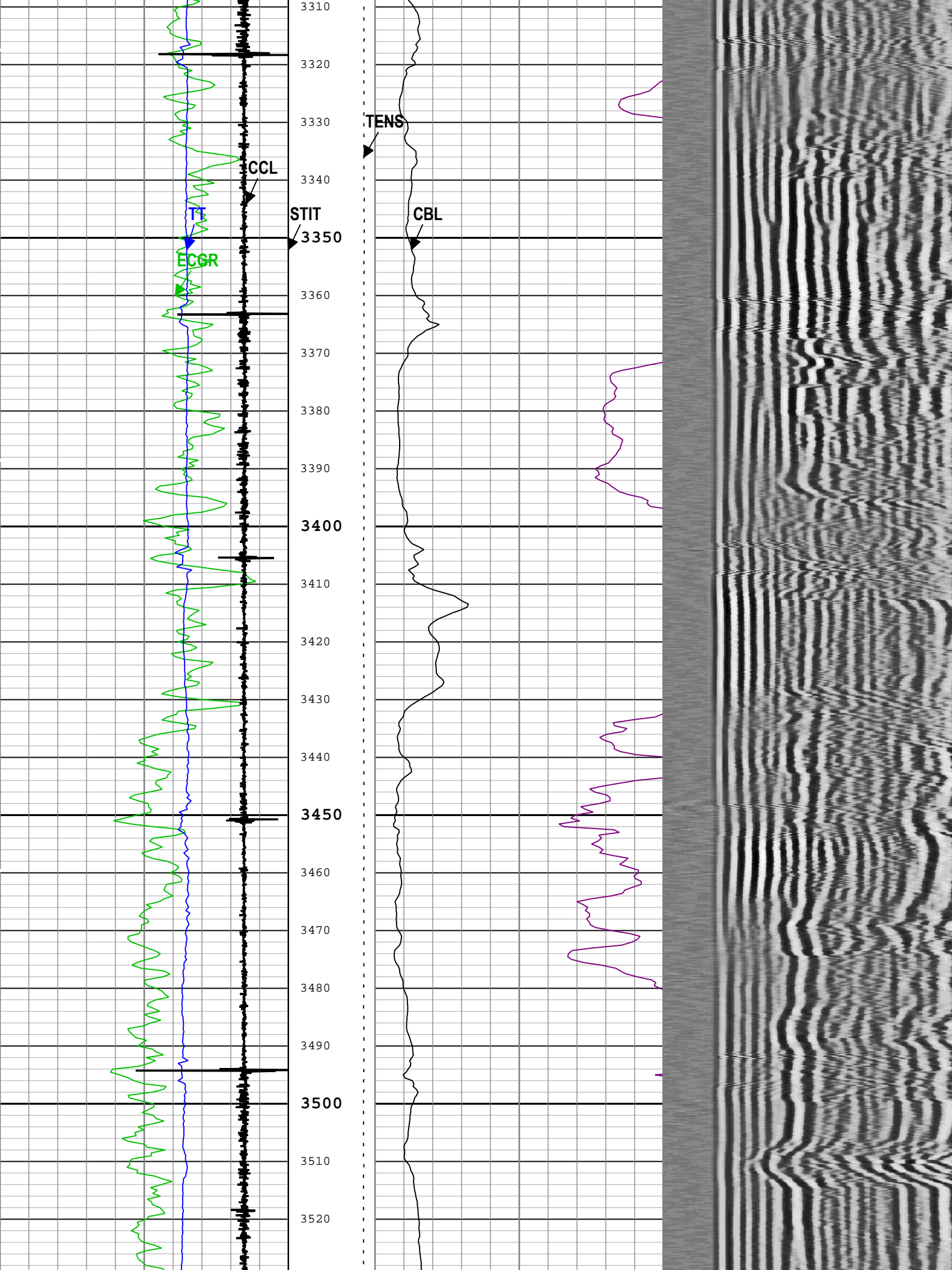


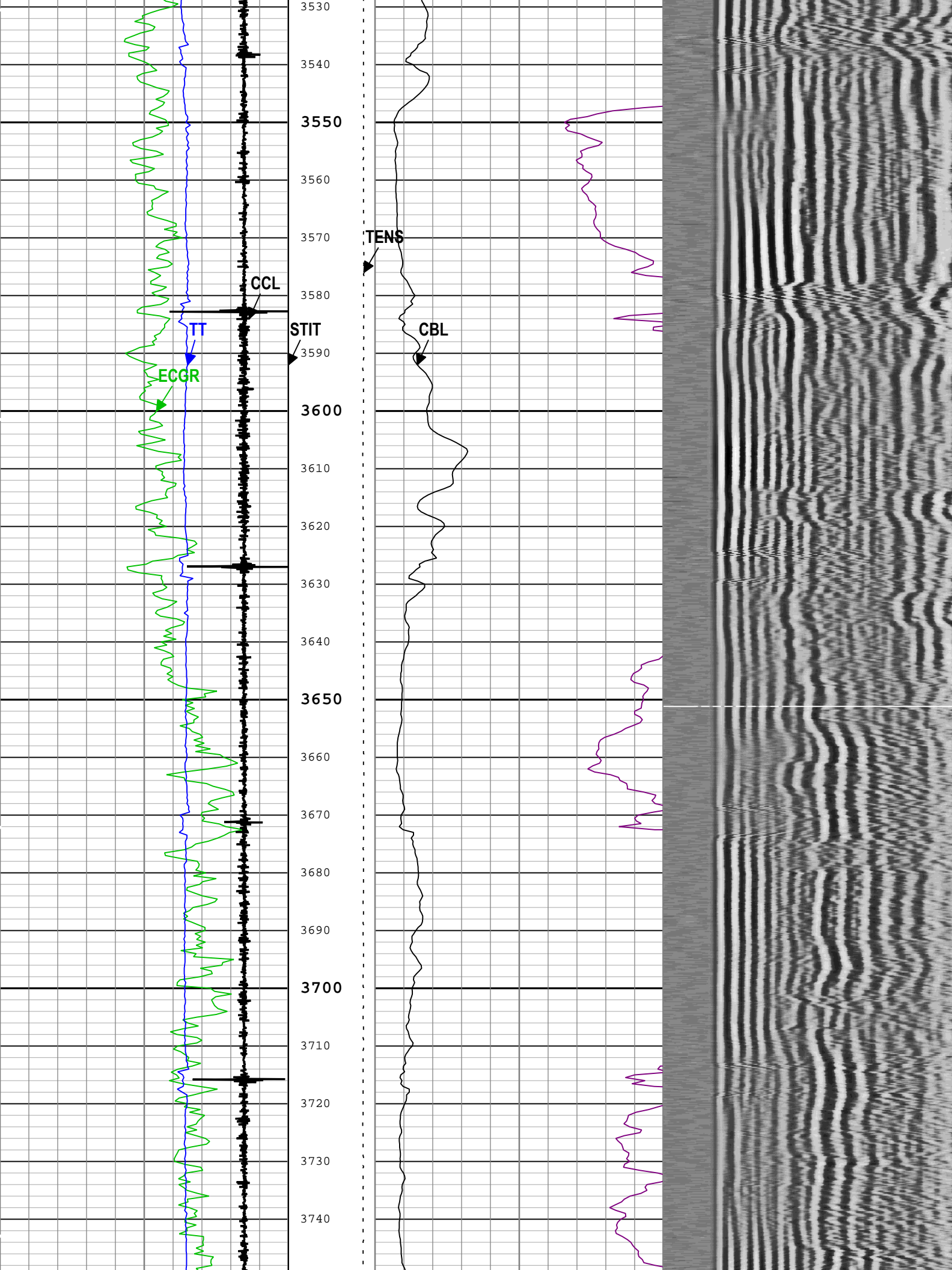


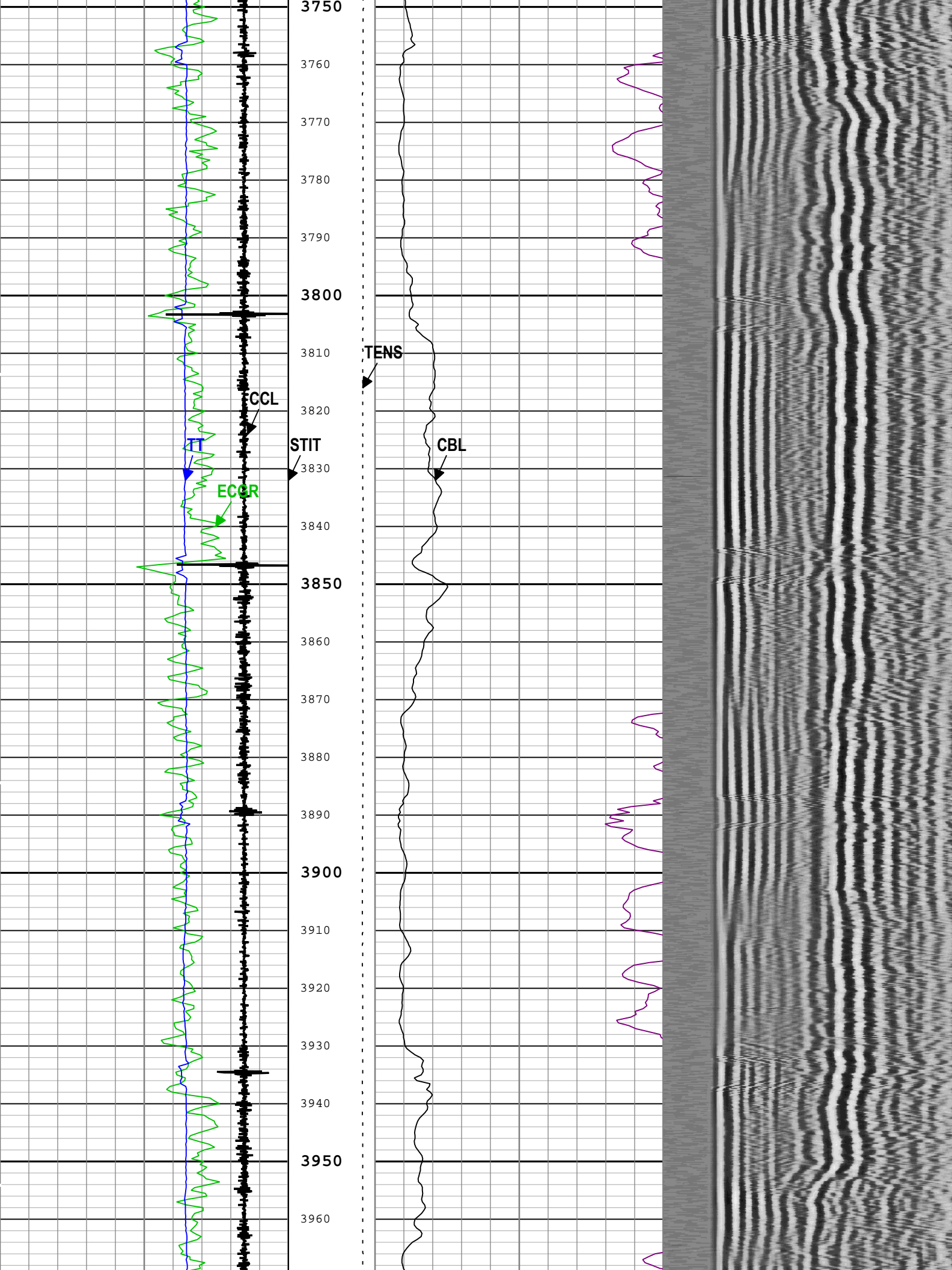


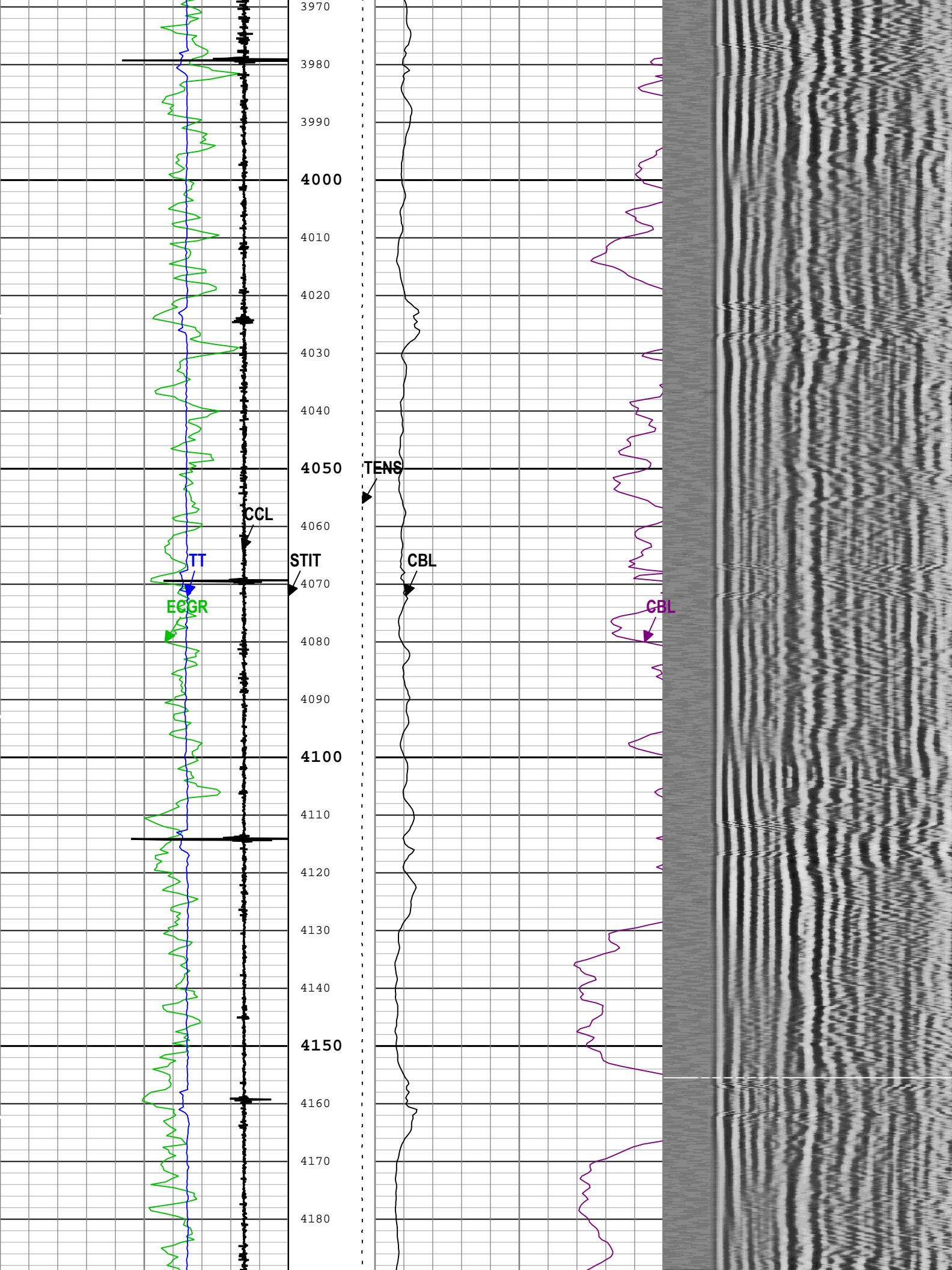


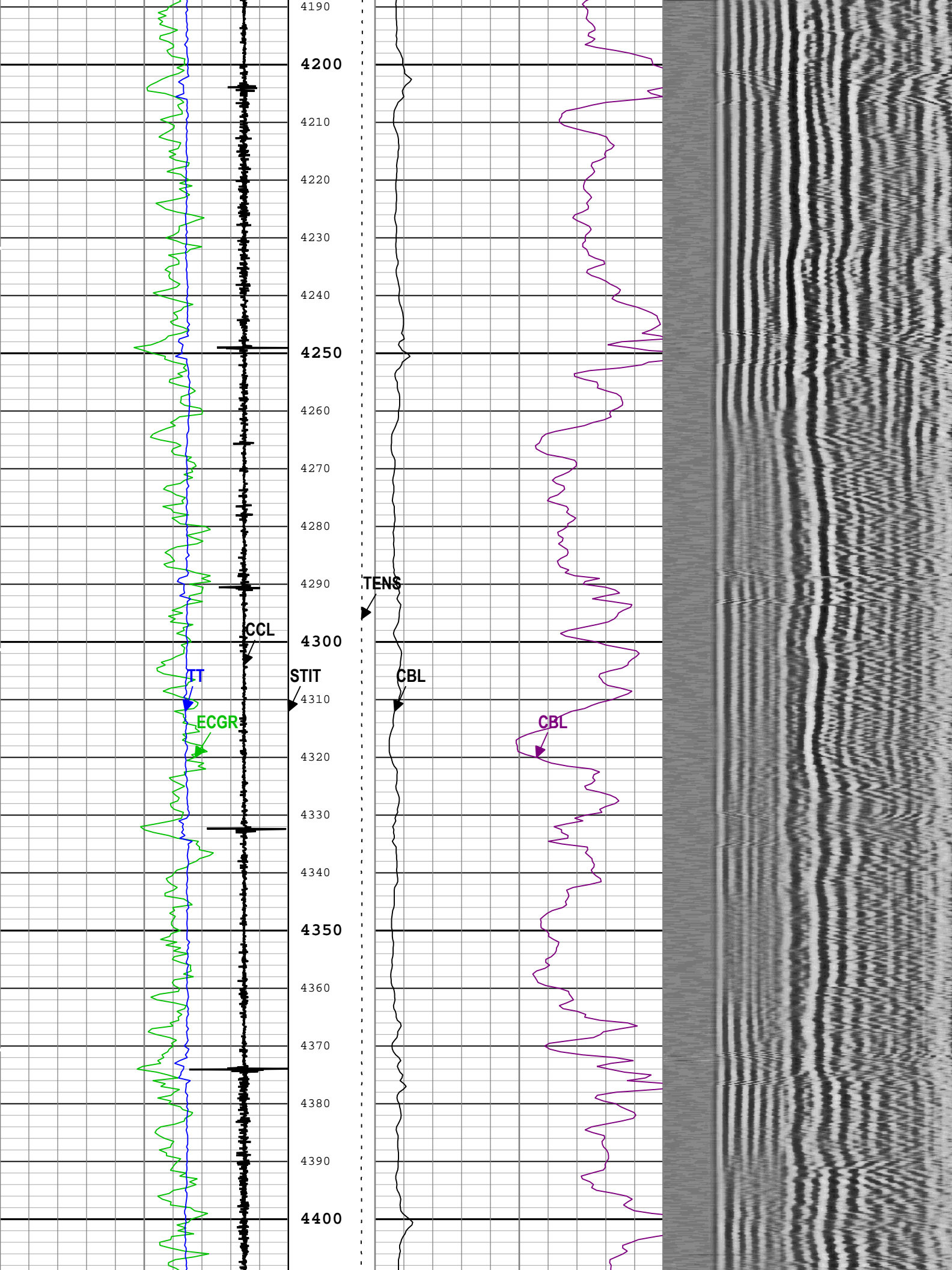


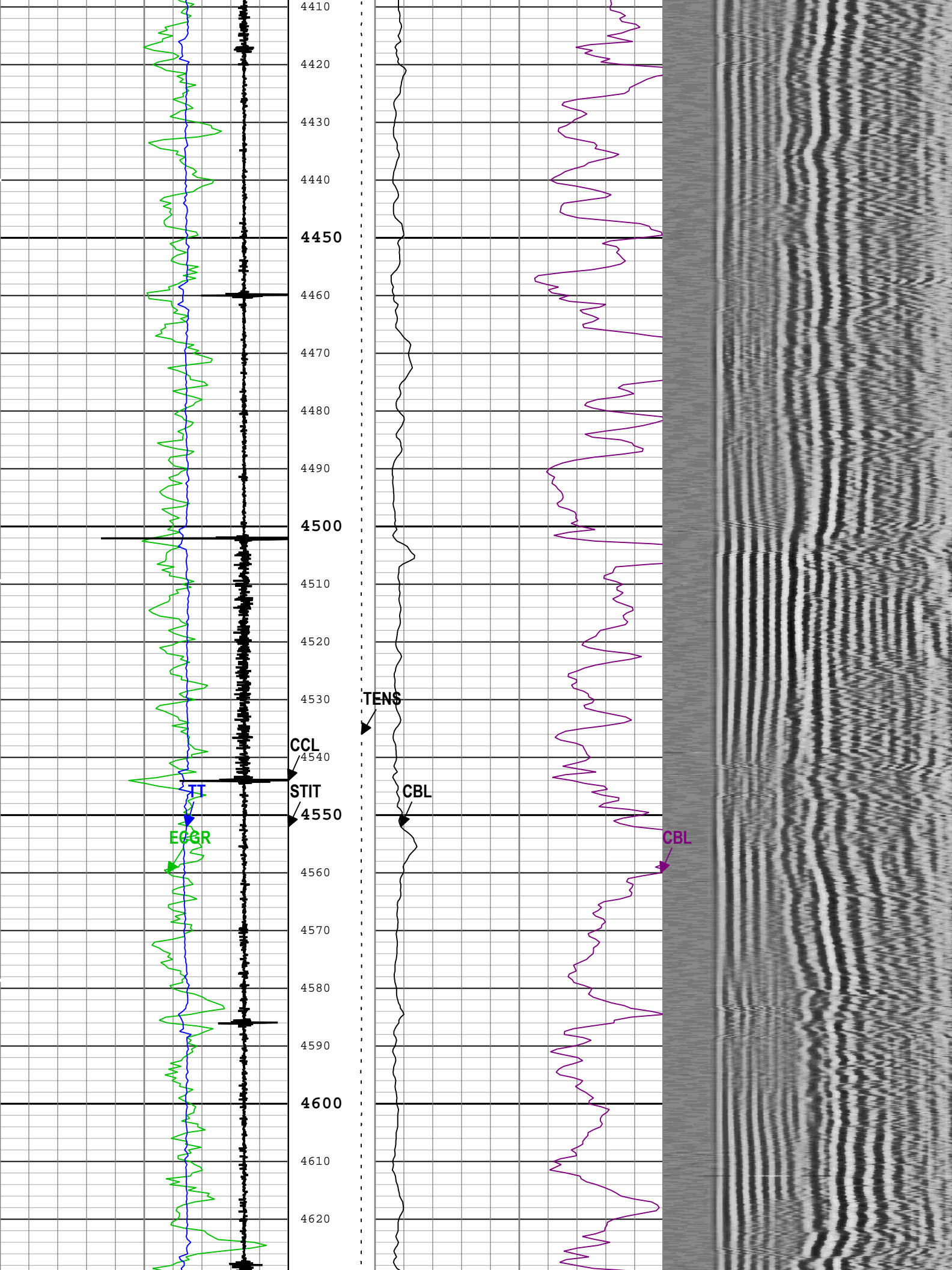


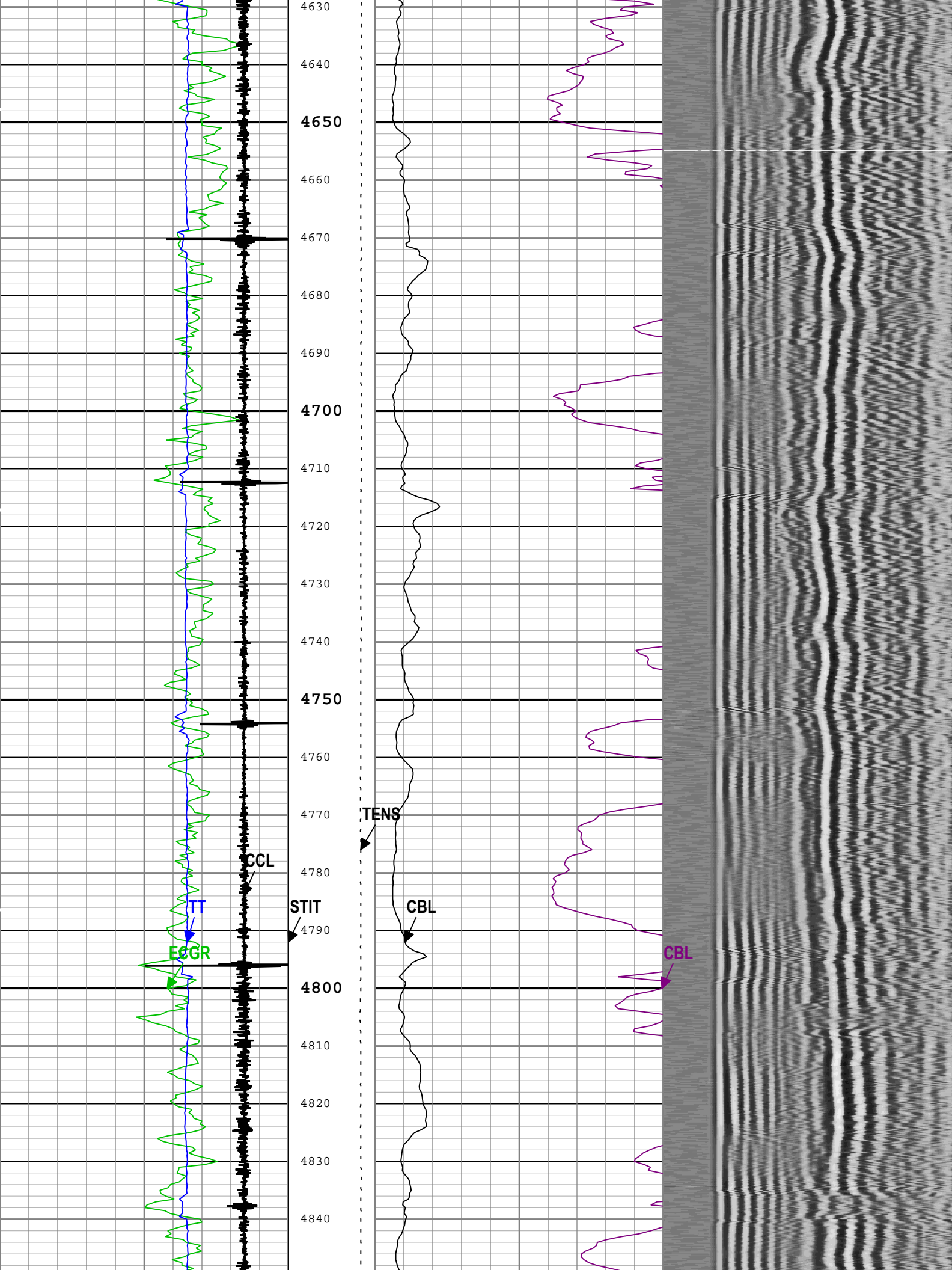


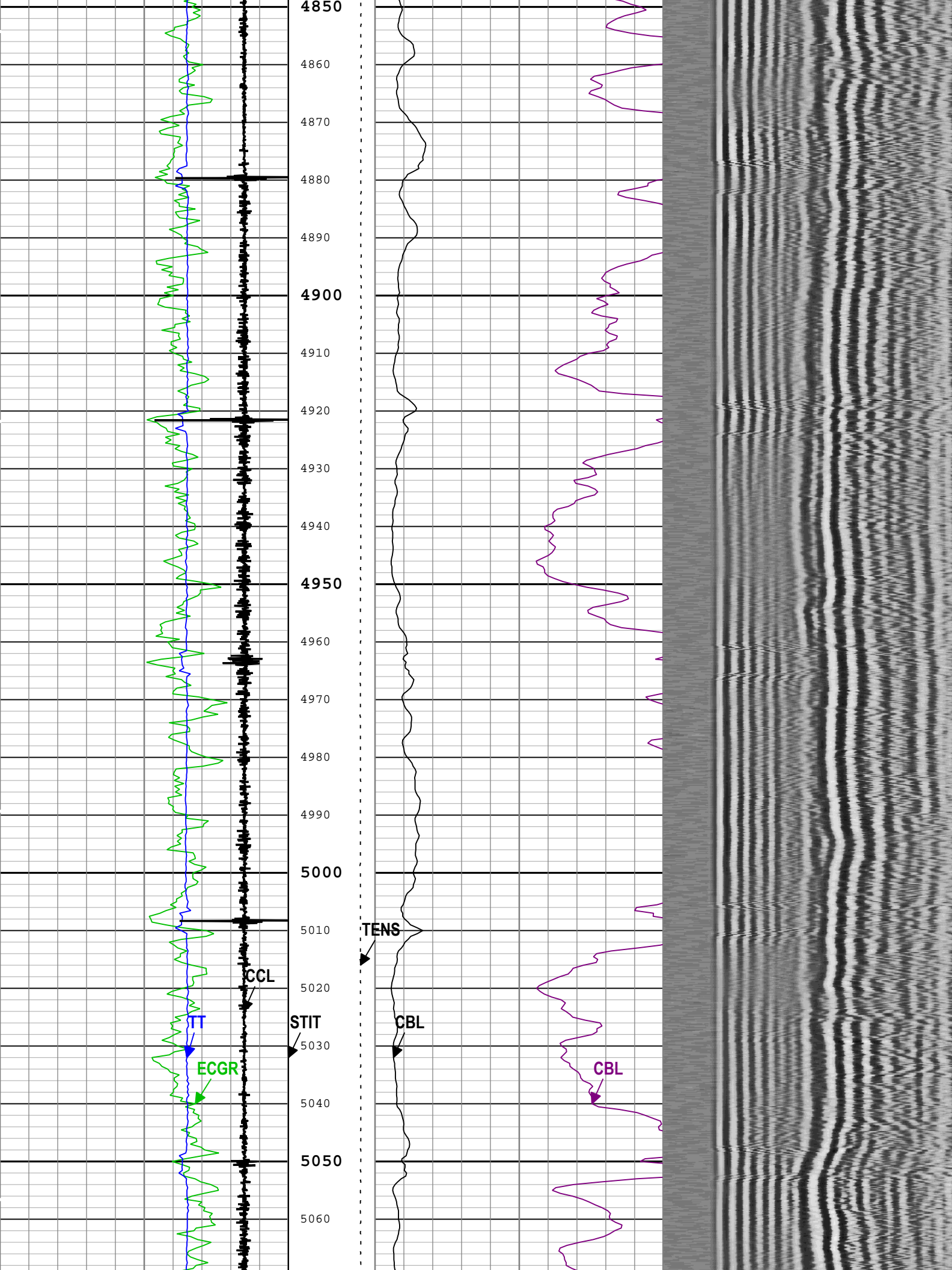


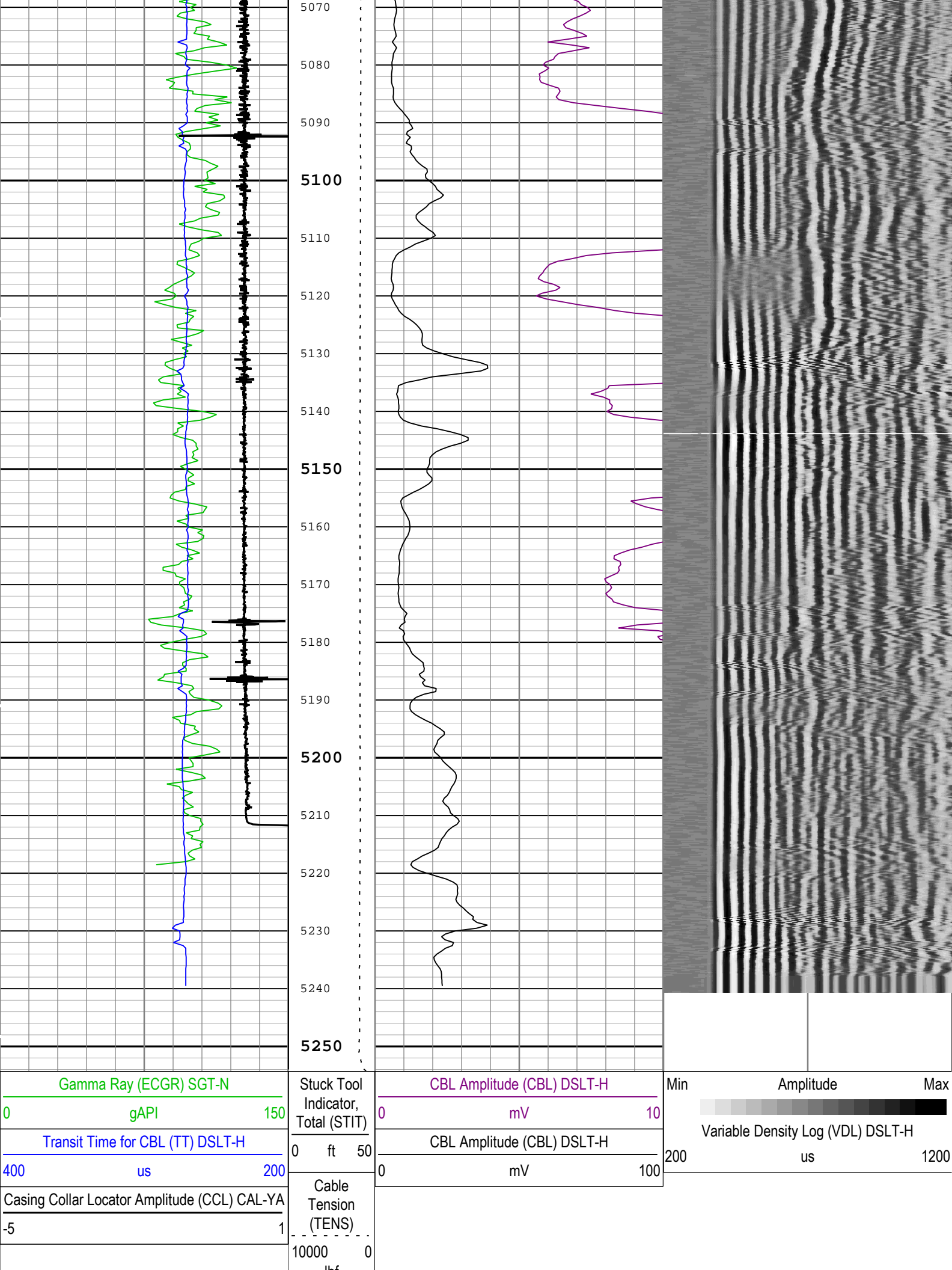












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MODE	DSLTL Acquisition Mode	DSLTL-H	CBL	
RATE	DSLTL Firing Rate	DSLTL-H	15 Hz	
DTFS	DSLTL Telemetry Frame Size	DSLTL-H	536	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h

One

0 PSI Repeat Pass

Software Version

Acquisition System	Version
Maxwell 2016 SP2	6.2.64464.3100

Pass Summary

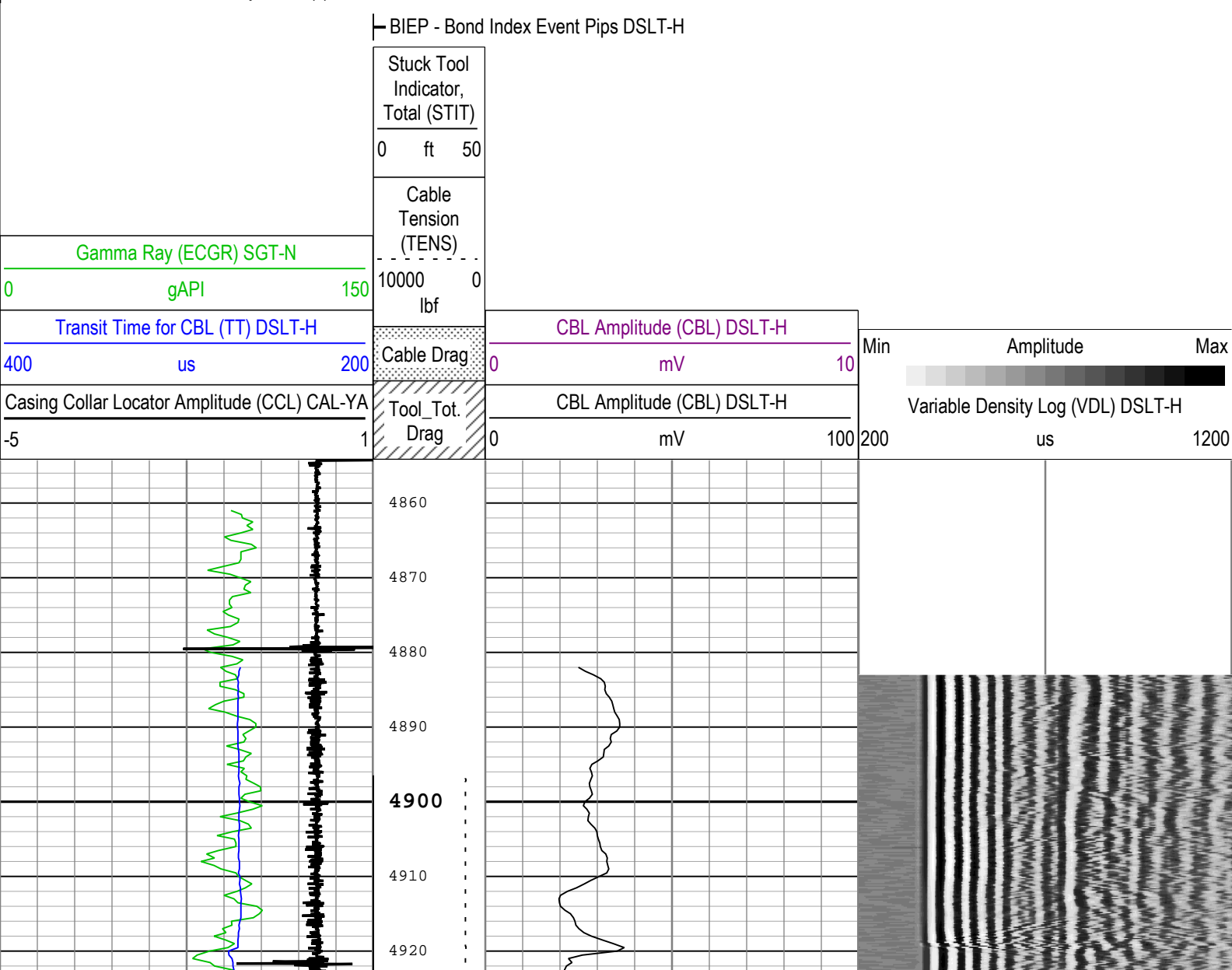
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[3]:Up	Up	4896.49 ft	5254.57 ft	11-Nov-2016 4:21:43 PM	11-Nov-2016 4:28:09 PM	ON	2.40 ft	Yes

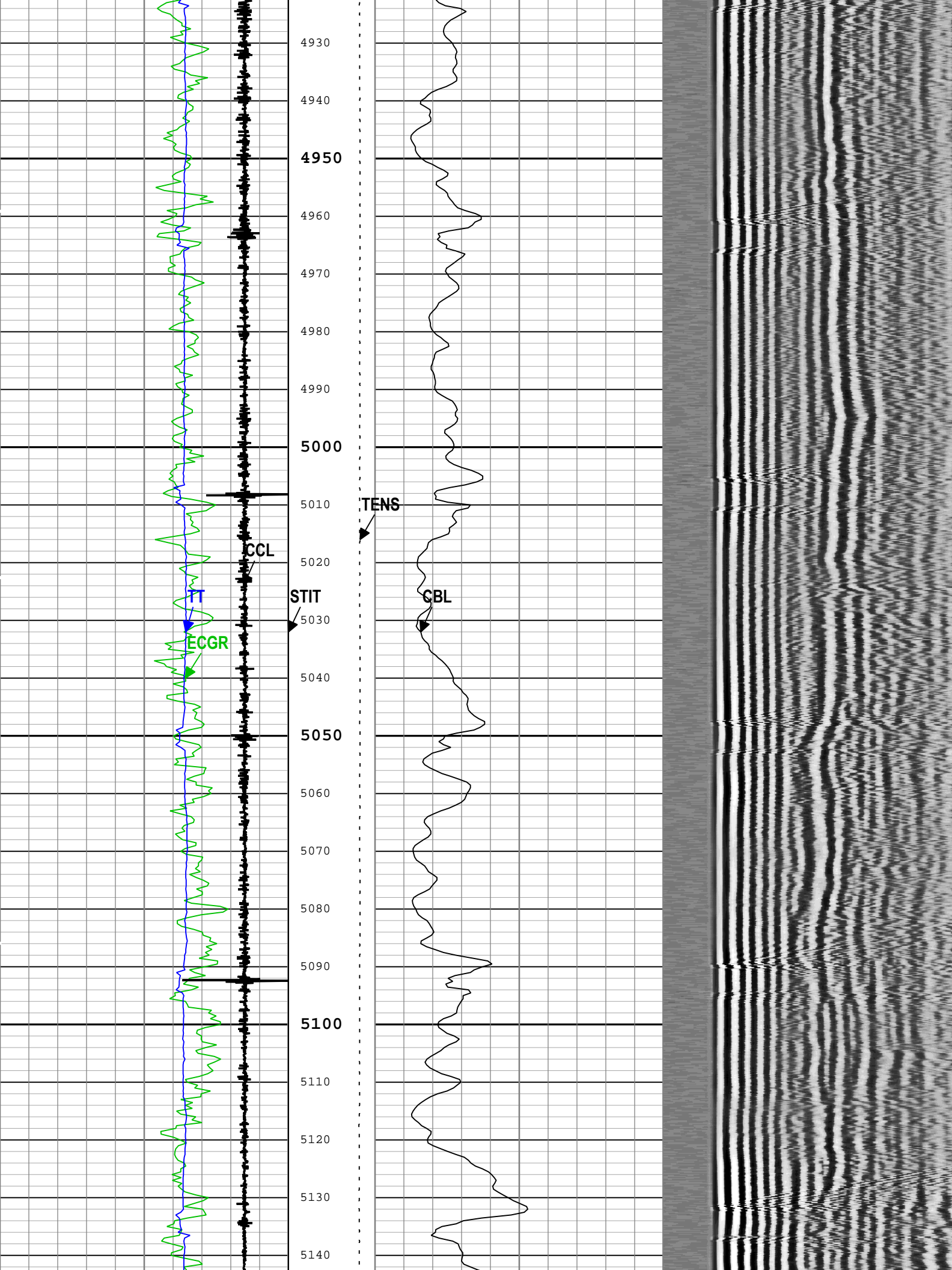
All depths are referenced to toolstring zero

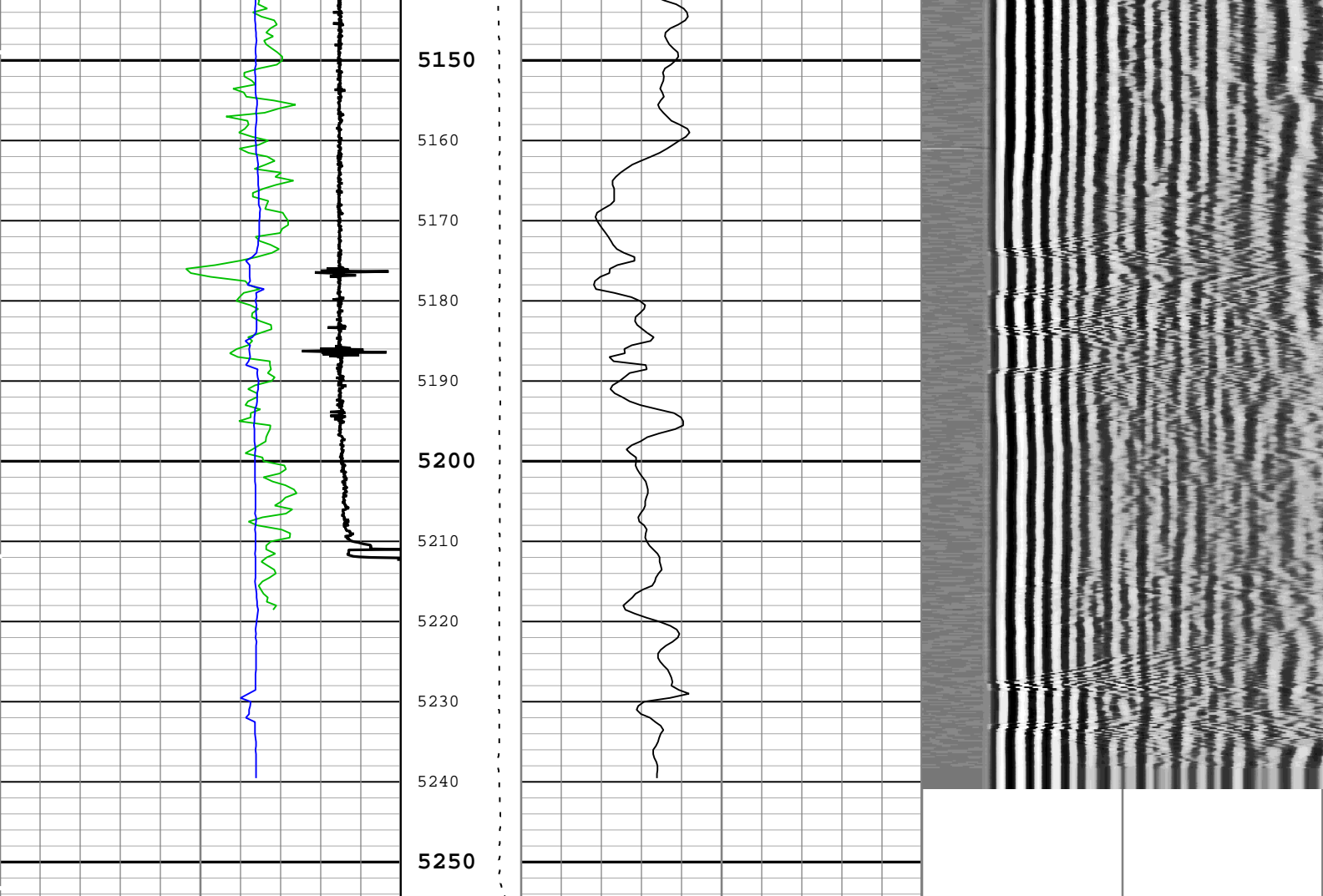
Log	Company:Whiting Oil & Gas Corporation	Well:Horsetail 30E-1934
		One: Log[3]:Up:S013

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: 11-Nov-2016 18:16:18

TIME_1900 - Time Marked every 60.00 (s)







Gamma Ray (ECGR) SGT-N	Stuck Tool Indicator, Total (STIT)	CBL Amplitude (CBL) DSLT-H	Min	Amplitude	Max
0 gAPI 150	0 ft 50	0 mV 10			
Transit Time for CBL (TT) DSLT-H	Cable Tension (TENS)	CBL Amplitude (CBL) DSLT-H		Variable Density Log (VDL) DSLT-H	
400 us 200	10000 lbf 0	0 mV 100	200	us	1200
Casing Collar Locator Amplitude (CCL) CAL-YA	Cable Drag				
-5 1	Tool_Tot. Drag				
	BIEP - Bond Index Event Pips 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: 11-Nov-2016 18:16:18

Channel Processing Parameters				
One: Parameters				
Parameter	Description	Tool	Value	Unit
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	58	us

CBL_O	Casing Bottom (Logger)	WLSESSION	13962	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	252	us
NMXG	Near Maximum Sliding Gate	DSLTH	558	us
SGAD	Sliding Gate Status	DSLTH	Off	
VDLG	VDL Manual Gain	DSLTH	3.82	

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 (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 Normalization - CBL Accumulations

Master:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
Upper Far Amplitude - 0		Master	----	----	----	----		
Upper Near Raw Amplitude - 0	mV	Master	----	----	----	----		
Lower Far Amplitude - 0		Master	----	----	----	----		
Lower Near Raw Amplitude - 0	mV	Master	----	----	----	----		

CBL Normalization - CBL/VDL Coefficients

Master:

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

CBL Free Pipe Adjustment - Free Pipe Measurement

Before (Manual Entry): 18:11:59 11-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):		18:11:59 11-Nov-2016					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div></div>
CBL Adjustment Factor		Before	1.000	0.200	0.742	5.000	<div></div>
Depth of Before Calibration	ft	Before			113.77		<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	

Field:	Wildcat
County:	Weld
State:	Colorado

Cement Bond Log

GR-CCL