

Company: Anadarko Petroleum Corporation

Well: Verde 13-2HZ

Field: Wattenberg

County: Weld State: Colorado

Cement Bond Log

Variable Density Log

County: Weld
Field: Wattenberg
Location: NWNW Sec. 13, T1N, R66W
Well: Verde 13-2HZ
Company: Anadarko Petroleum Corporation

Location:		Elev.:		K.B.		5122.00 ft	
NWNW Sec. 13, T1N, R66W		909 FNL, 796 FWL		G.L.		5096.00 ft	
Lat/Long: 40.056023, -104.732072				D.F.		5121.00 ft	
Permanent Datum:	Ground Level	Elev.:		5096.00 f			
Log Measured From:	Kelly Bushing	26.00 ft		above Perm.Datum			
Drilling Measured From:	Kelly Bushing						
API Serial No.	Section:	Township:		Range:			
05-123-46018	13	1N		66W			

Logging Date 05-Apr-2018

Run Number One

Depth Driller 16717.00 ft

Schlumberger Depth 6640.00 ft

Bottom Log Interval 6640.00 ft

Top Log Interval 20.00 ft

Casing Fluid Type Water

Salinity

Density 8.4 lbm/gal

Fluid Level 8.00 ft

BIT/CASING/TUBING STRING

Bit Size 7.88 in

From 1884.00 ft

To 16717.00 ft

Casing/Tubing Size 5.5 in

Weight 17 lbm/ft

Grade P110

From 0.00 ft

To 16706.00 ft

Max Recorded Temperatures

Logger on Bottom 05-Apr-2018 13:32:00

Unit Number 9108 Fort Morgan

Recorded By Brandon Makinson

Witnessed By Kyle Carver

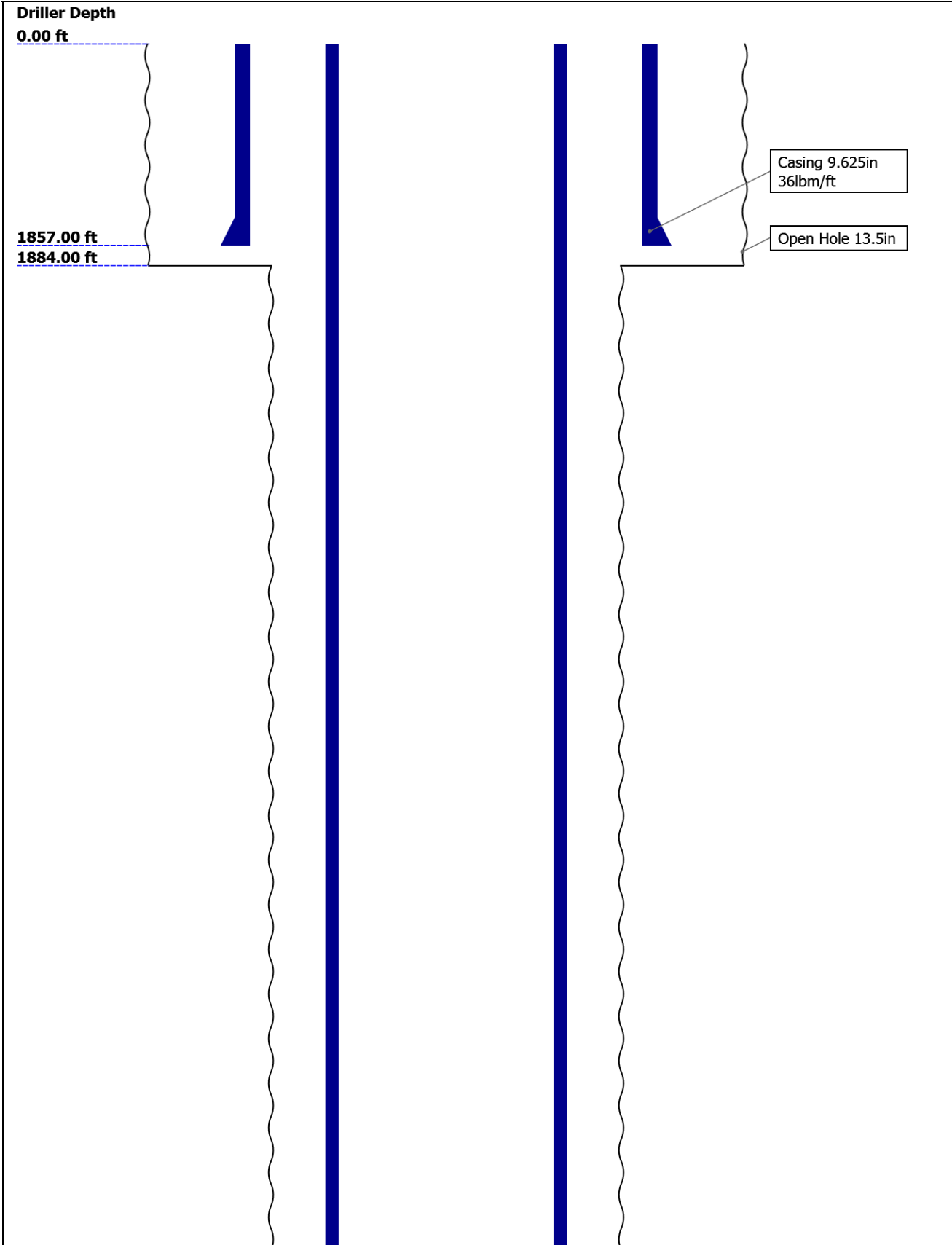
Disclaimer

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Well Sketch



16706.00 ft

16717.00 ft

Casing 5.5in
17lbm/ft

Open Hole 7.875in

Borehole Size/Casing/Tubing Record

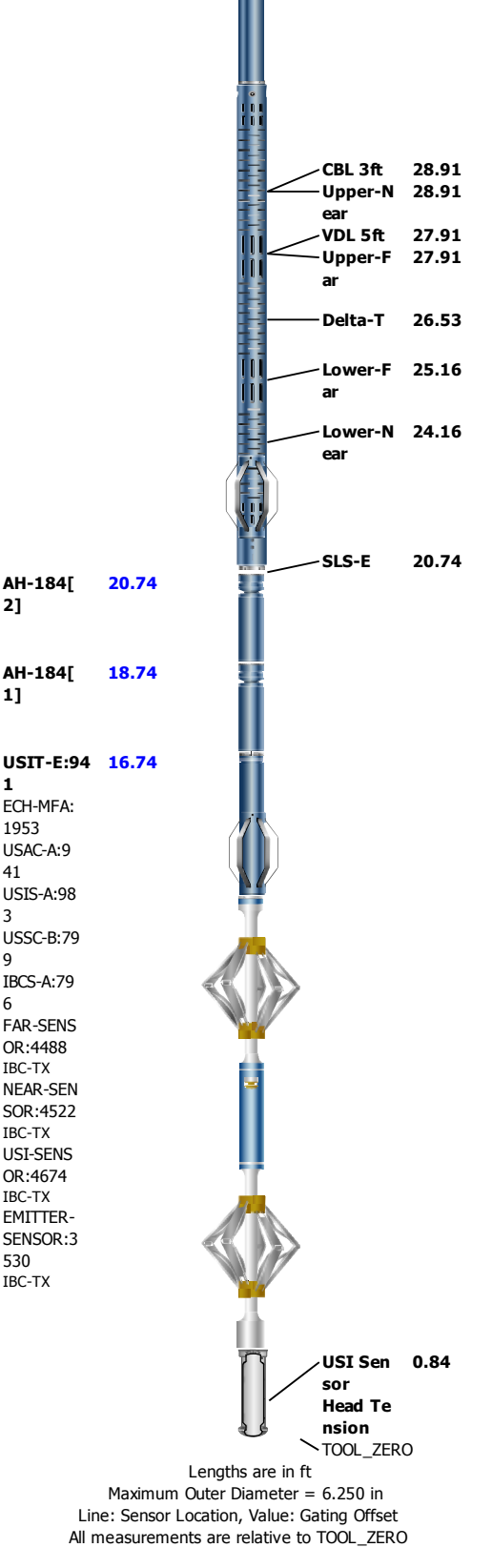
Bit						
Bit Size (in)	13.5	7.875				
Top Driller (ft)	0	1884				
Top Logger (ft)	0	1884				
Bottom Driller (ft)	1884	16717				
Bottom Logger (ft)	1884	16717				
Casing						
Size (in)	9.625	5.5				
Weight (lbm/ft)	36	17				
Inner Diameter (in)	8.921	4.892				
Grade	J55	P110				
Top Driller (ft)	0	0				
Top Logger (ft)	0	0				
Bottom Driller (ft)	1857	16706				
Bottom Logger (ft)	1857	16706				

Operational Run Summary

Parameter (unit)	One					
Date Log Started	05-Apr-2018					
Time Log Started	13:13:27					
Date Log Finished	06-Apr-2018					
Time Log Finished	16:19:49					
Top Log Interval (ft)	20.00					
Bottom Log Interval (ft)	6640.00					
Total Depth (ft)						
Max Hole Deviation (deg)	0.00					
Azimuth of Max Deviation (deg)	0.00					
Bit Size (in)	7.875					
Logging Unit Number	9108					
Logging Unit Location	Fort Morgan					
Recorded By	Brandon Makinson					

Witnessed By	Kyle Carver					
Service Order Number	E1K7-00002					
Borehole Fluids						
Parameter(unit)	One					
Fluid Type	Water					
Max Recorded Temperatures (degF)	NaN					
Salinity (ppm)	0					
Density (lbm/gal)	8.4					
Date Logger on Bottom	05-Apr-2018					
Time Logger on Bottom	13:32:00					
Total Solid (%)						
High Gravity Solids (%)						

Remarks and Equipment Summary						
One: Toolstring			One: Remarks			
<div> <div> <div>Equip name</div> <div>Length</div> </div> <div> <div>MP name</div> <div>Offset</div> </div> </div> <div> <div>LEH-QT:2</div> <div>64.22</div> <div>109</div> <div>LEH-QT:2109</div> </div> <div> <div>SAH-F</div> <div>60.73</div> </div> <div> <div>EQF-48</div> <div>55.88</div> </div> <div> <div>EDTC-B:8</div> <div>47.88</div> <div>478</div> <div>EDTH-B:8470</div> <div>EDTG-A:77437</div> <div>EDTC-B:8478</div> </div> <div> <div>DSLT-H:8</div> <div>41.38</div> <div>416</div> <div>ECH-KH:67</div> <div>DSLCH:8416</div> <div>SLS-E:8020</div> </div> <div> <div>CTEM</div> <div>44.38</div> </div> <div> <div>ACCZ</div> <div>0.00</div> </div> <div> <div>HV</div> <div>0.00</div> </div> <div> <div>Gamma Ray</div> <div>42.51</div> </div> <div> <div>TelStatu s</div> <div>41.38</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	7-39AI-XXS		
Serial Number			
Length	24000.00 ft		
Conveyance Type	Wireline		
Rig Type	Crane		

One:Depth Control Parameters		Depth Control Remarks
Log Sequence	First Log In the Well	
Rig Up Length At Surface		
Rig Up Length At Bottom		
Rig Up Length Correction		
Stretch Correction		
Tool Zero Check At Surface		

2800 PSI

CBL 2800 PSI

Software Version

Acquisition System	Version
Maxwell 2018 SP1	8.1.99839.3100

Composite Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[4]:Up	Up	2771.59 ft	6648.42 ft	06-Apr-2018 10:19:56 AM	06-Apr-2018 11:04:27 AM	ON	7.68 ft	Yes
One	Log[7]:Up	Up	48.56 ft	2817.28 ft	06-Apr-2018 11:13:43 AM	06-Apr-2018 11:45:55 AM	ON	12.00 ft	Yes

All depths are referenced to toolstring zero

Log

Company: Anadarko Petroleum Corporation Well: Verde 13-2HZ
2800 PSI: S012

Description: CBL_Dual_Gate Format: Log (CBL) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 02-Sep-2013 13:45:37

Channel	Source	Sampling
TT	DSLT-H[1]:SLS-E[1]:SLS-E[1]	6in
BIEP	DSLT-H[1]:SLS-E[1]:SLS-E[1]	6in
CBL	DSLT-H[1]:SLS-E[1]:SLS-E[1]	6in
GR	EDTC-B[1]:EDTC-B[1]:EDTC-B[1]	6in
TENS	WLWorkflow	1in
TIME_1900	WLWorkflow	0.1in
TTSL	DSLT-H[1]:SLS-E[1]:SLS-E[1]	6in

TIME_1900 - Time Marked every 60.00 (s)

- └ BIEP - Bond Index Event Pips DSLT-H[1]

Comm. Rev. (EGCB, ERTC) ERTC R[11]

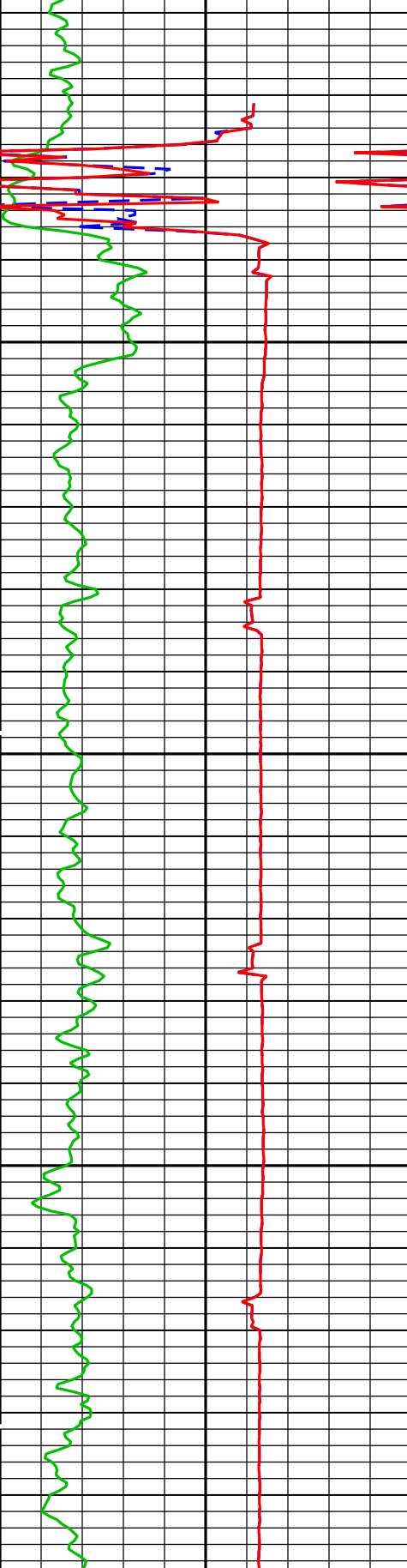
0 gAPI 200

Transit Time (Sliding Gate) (TTSL) DSLT-H[1]

400 us 200

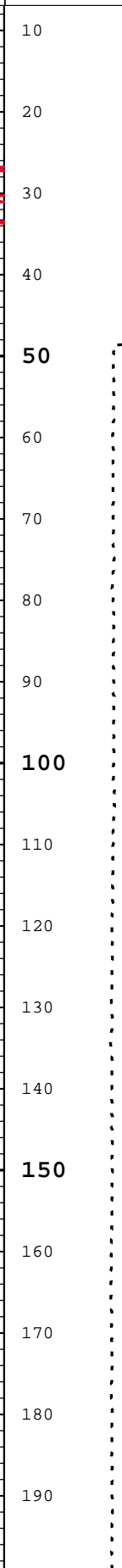
Transit Time for CBL (TT) DSLT-H[1]

400 us 200



Cable
Tension
(TENS)

4000 lbf 0

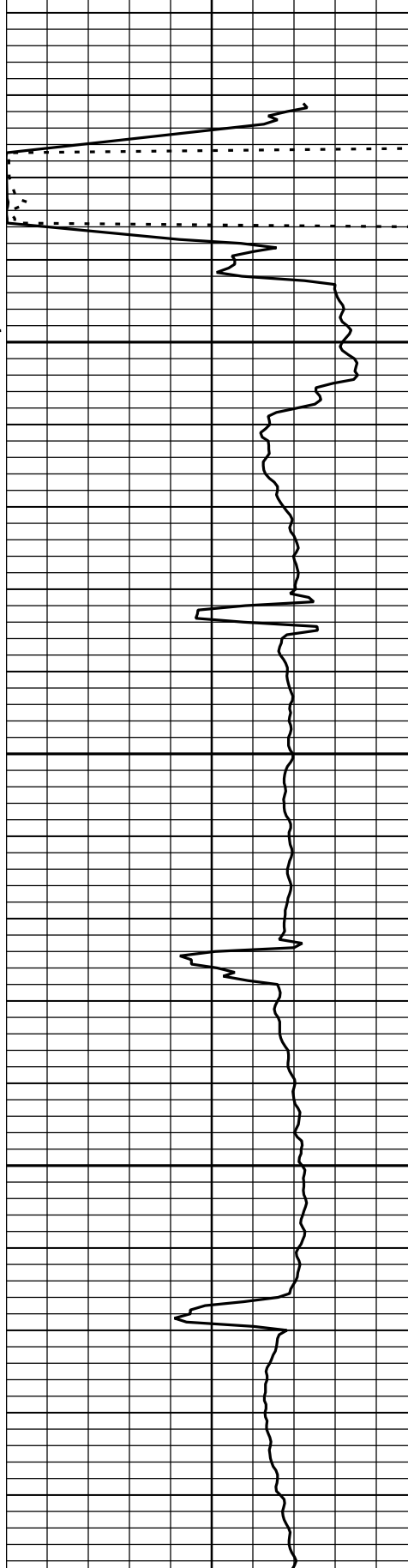


CBL Amplitude (CBL) DSLT-H[1]

0 mV 10

CBL Amplitude (CBL) DSLT-H[1]

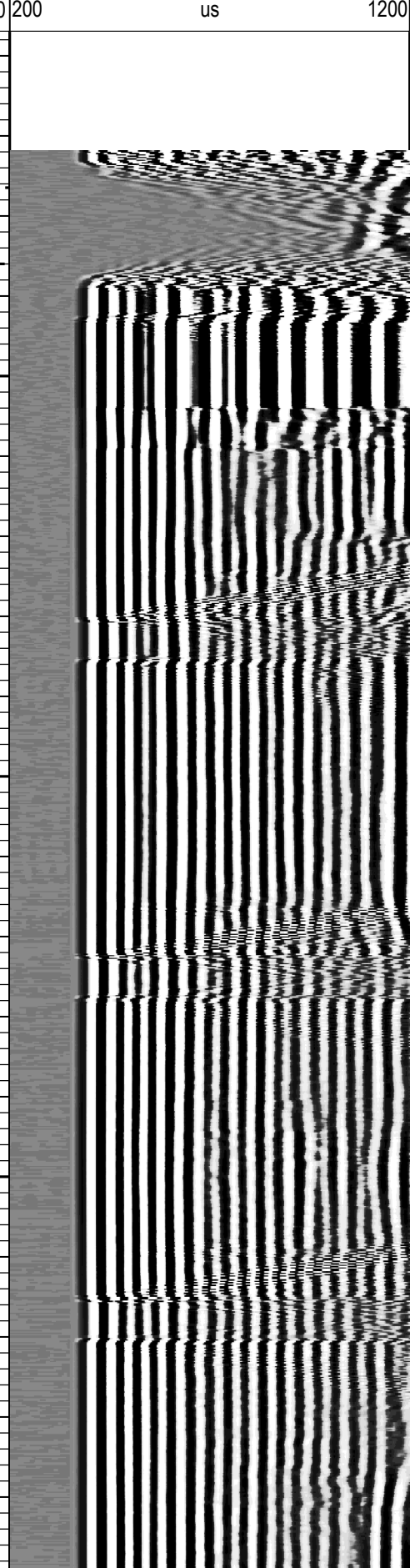
0 mV 100

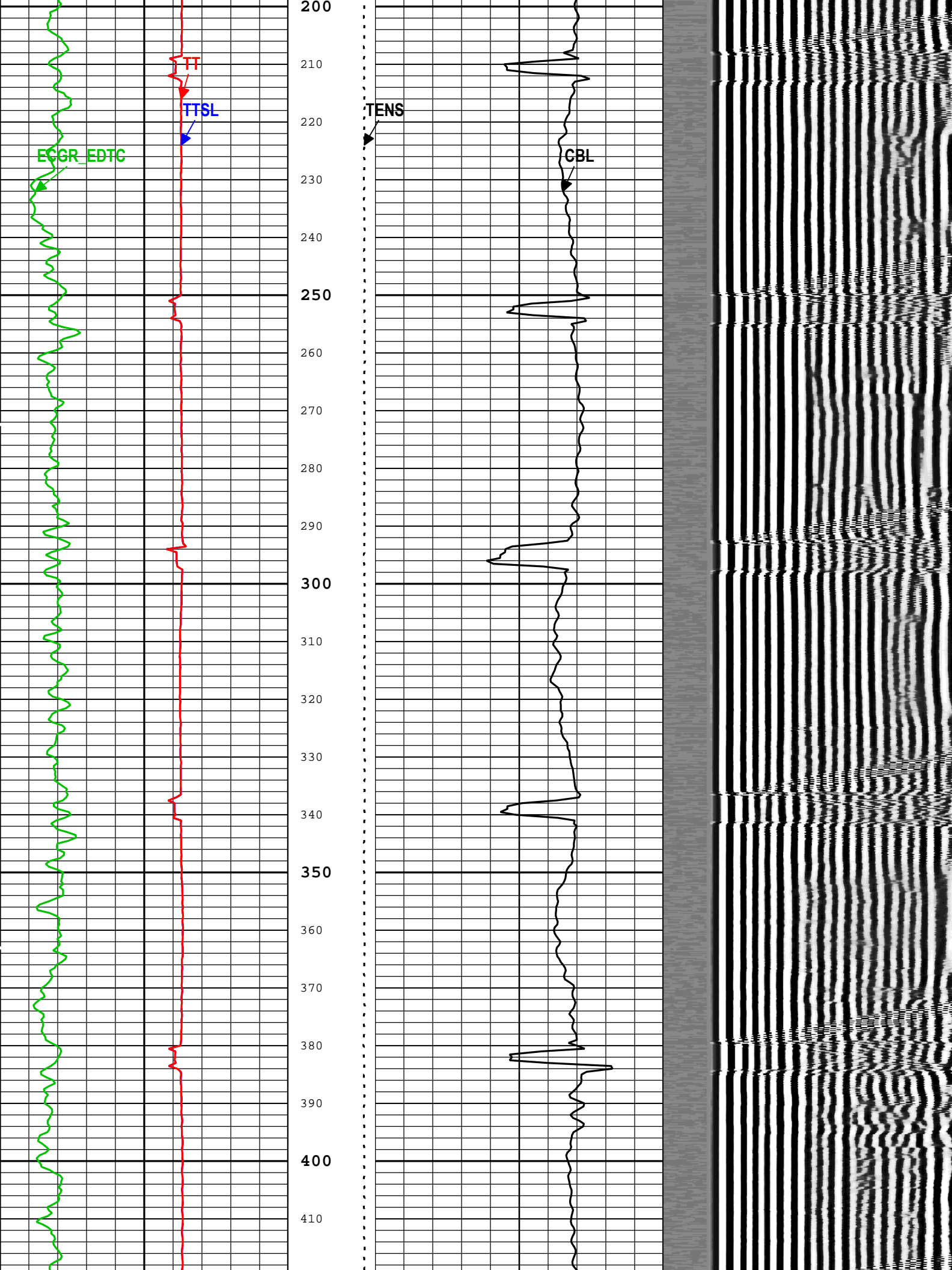


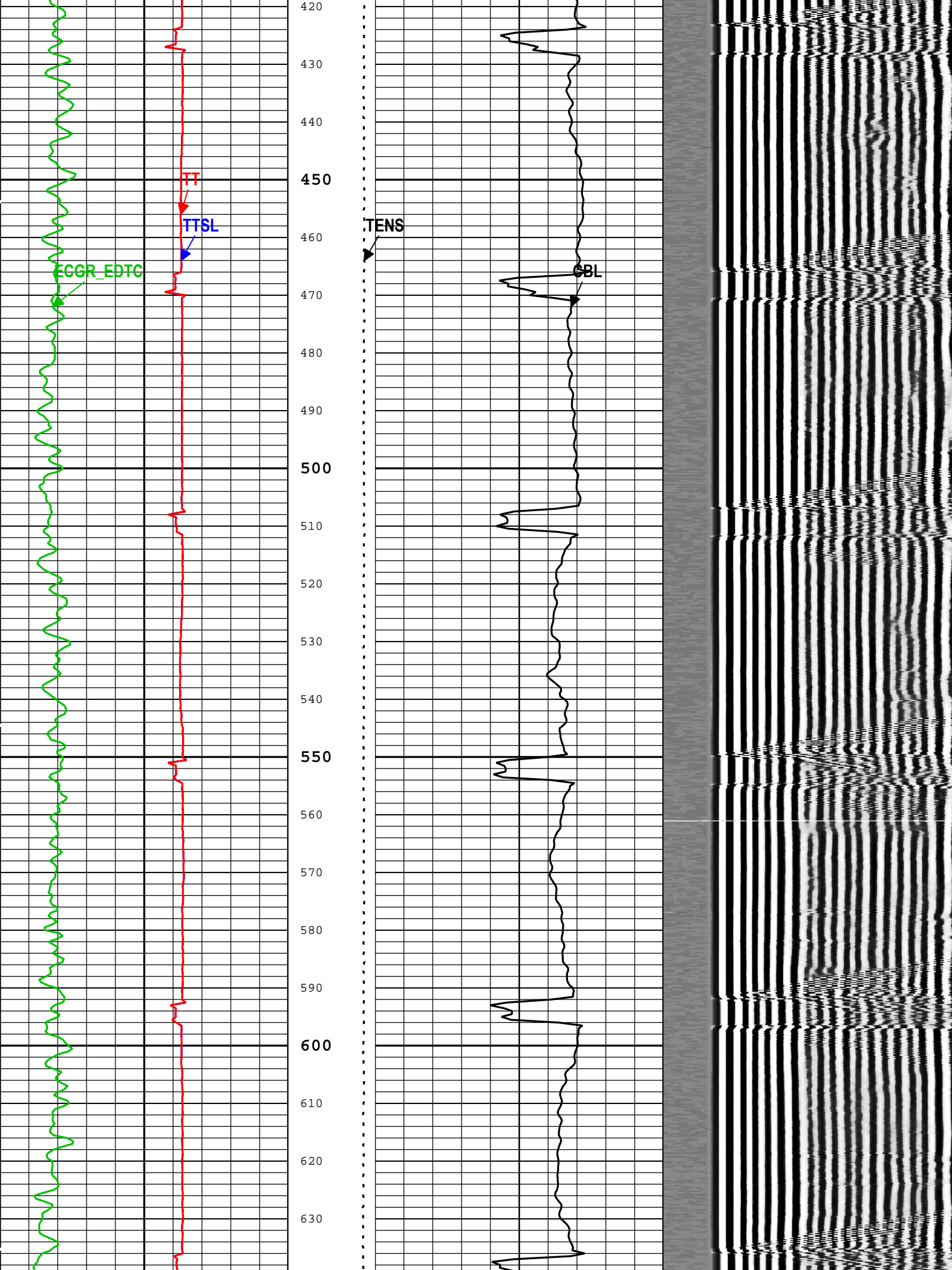
Min Amplitude Max

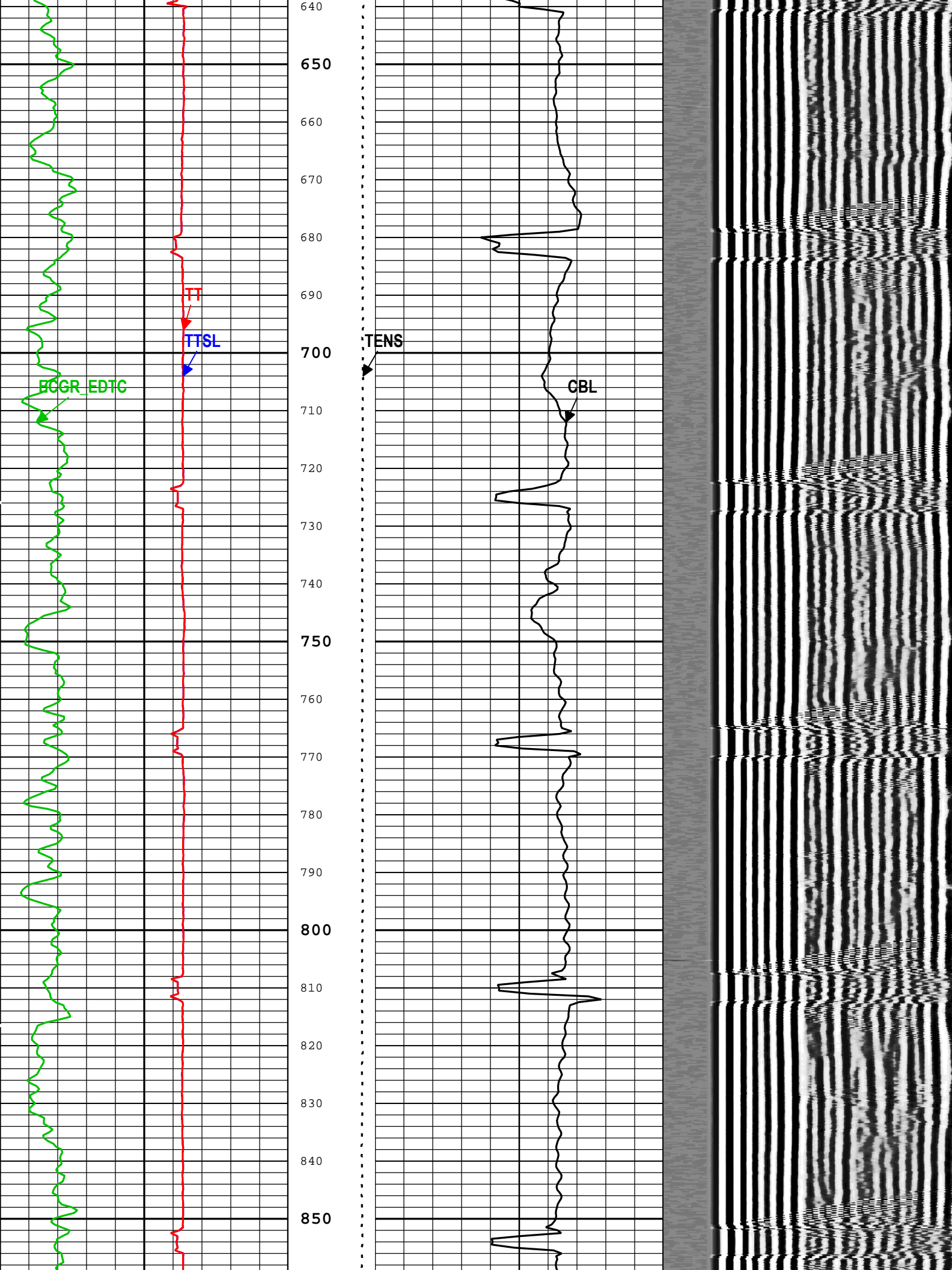
Variable Density Log (VDL) DSLT-H[1]

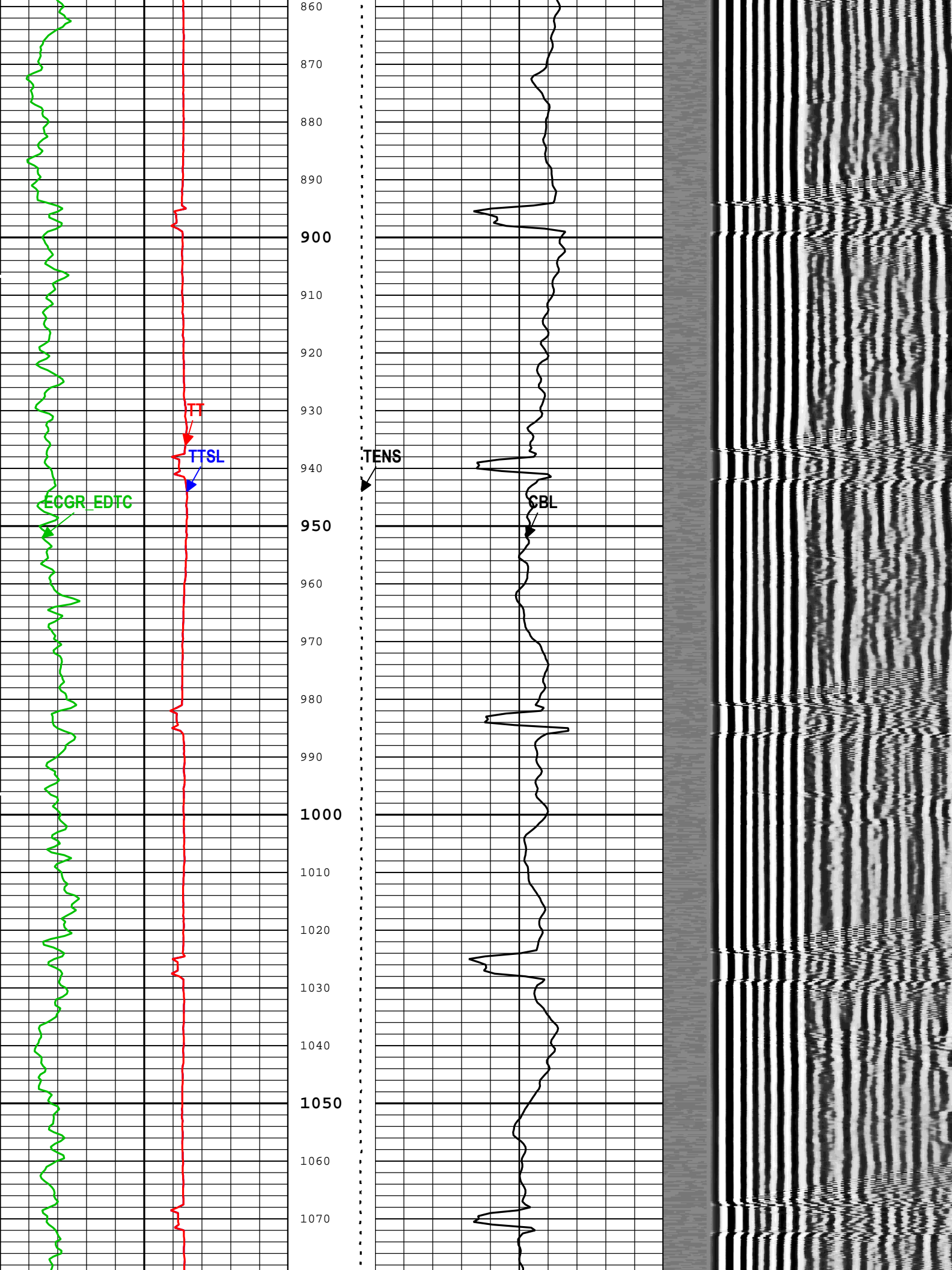
200 us 1200

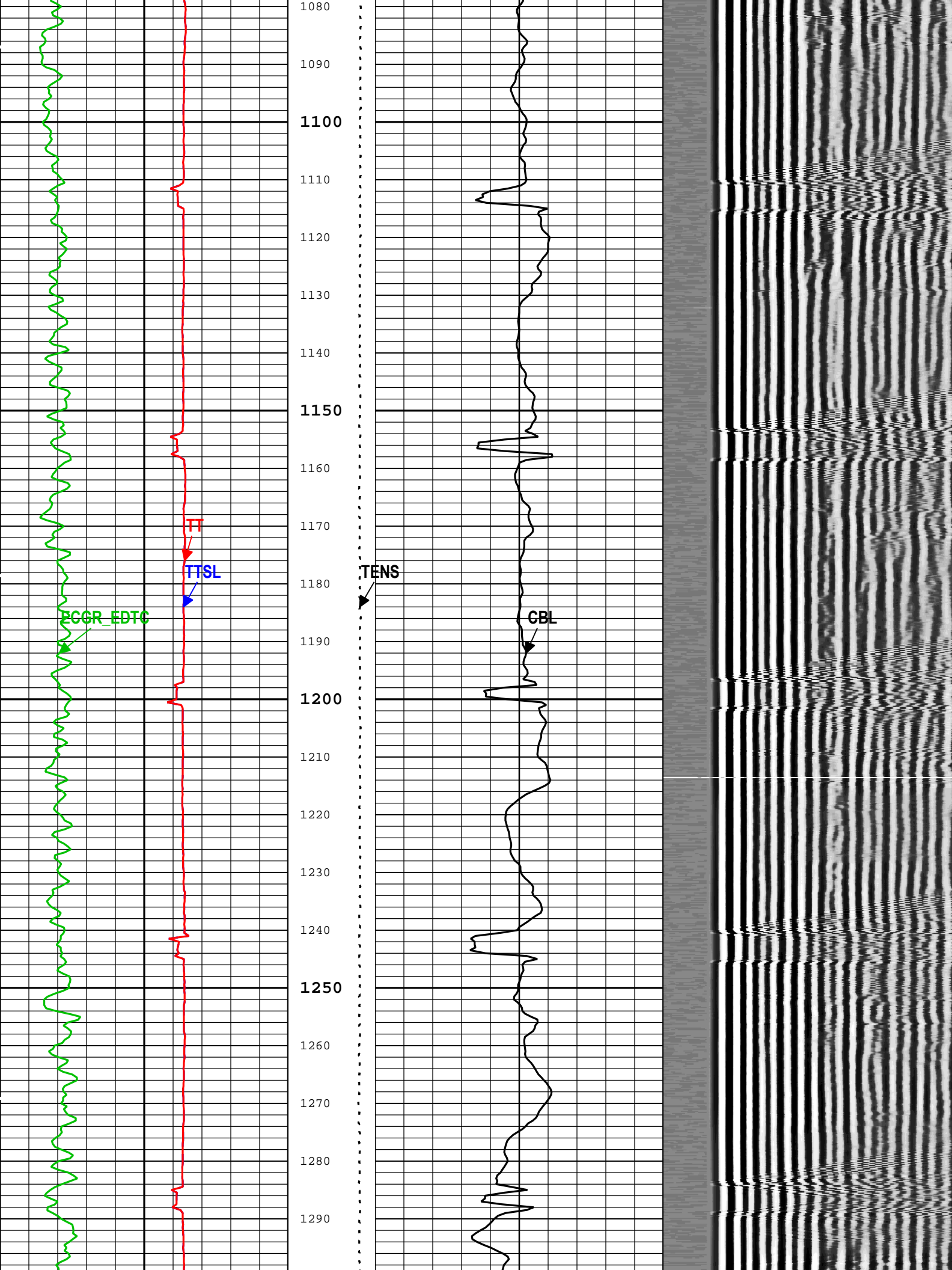


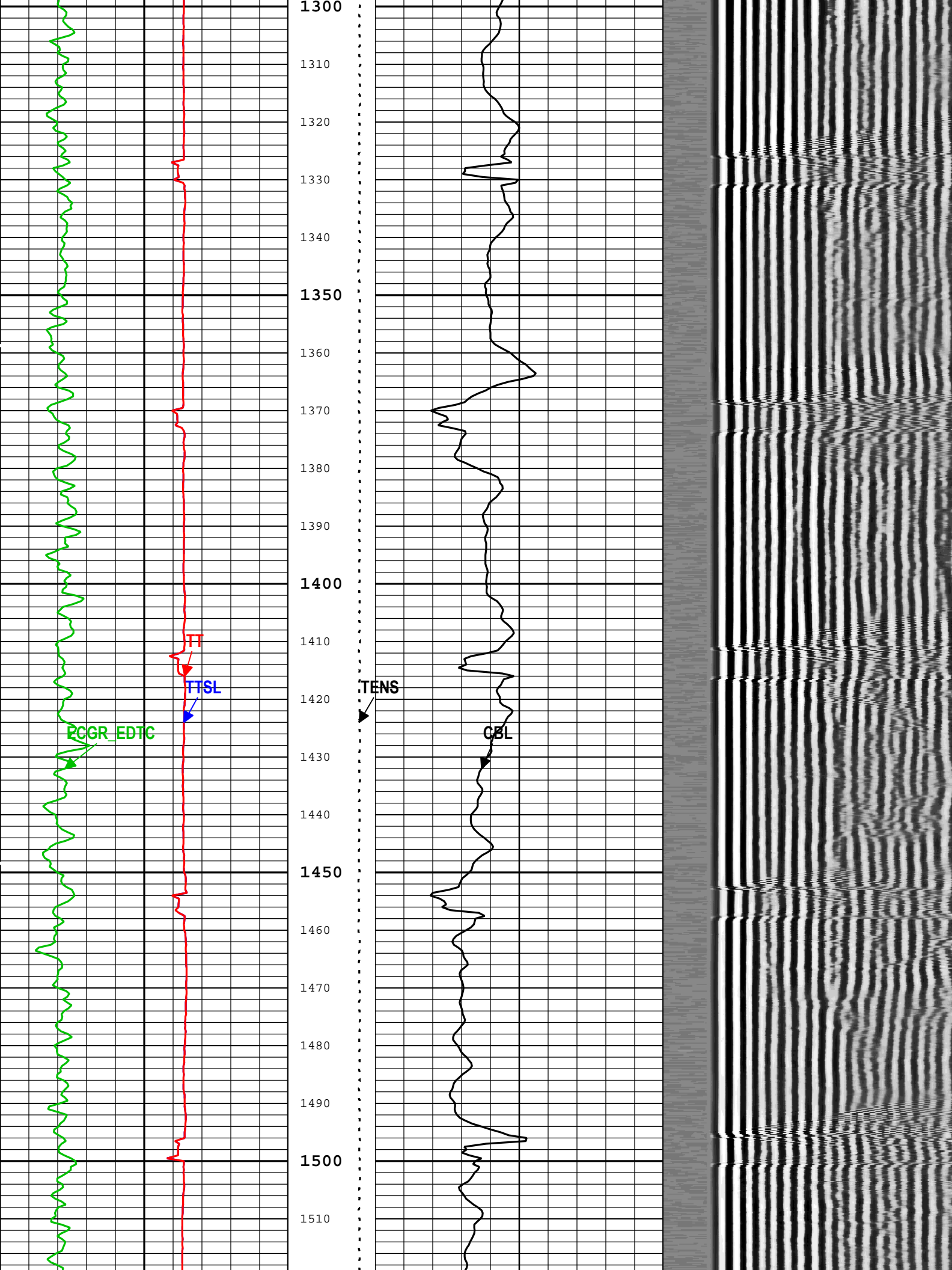


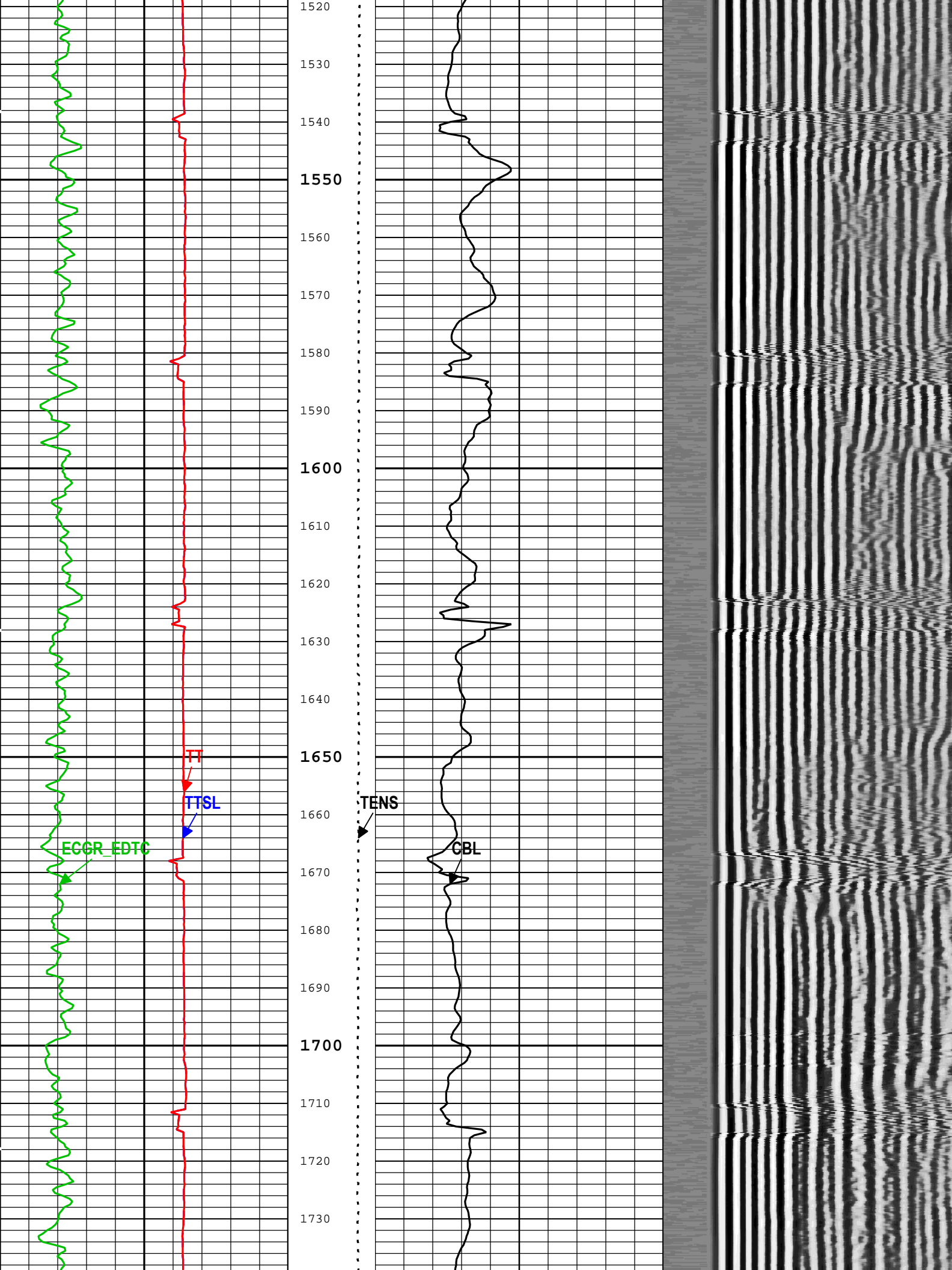


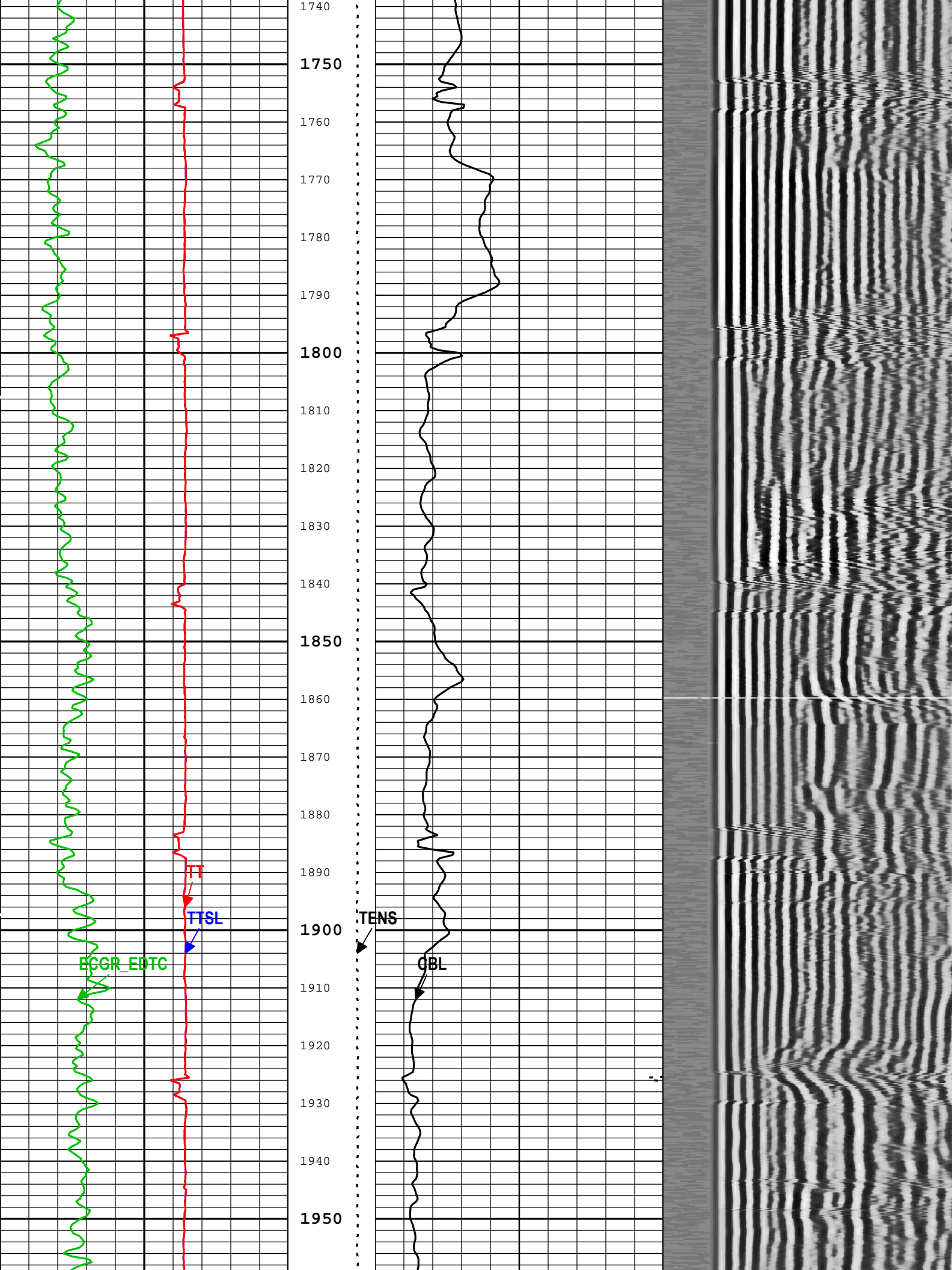


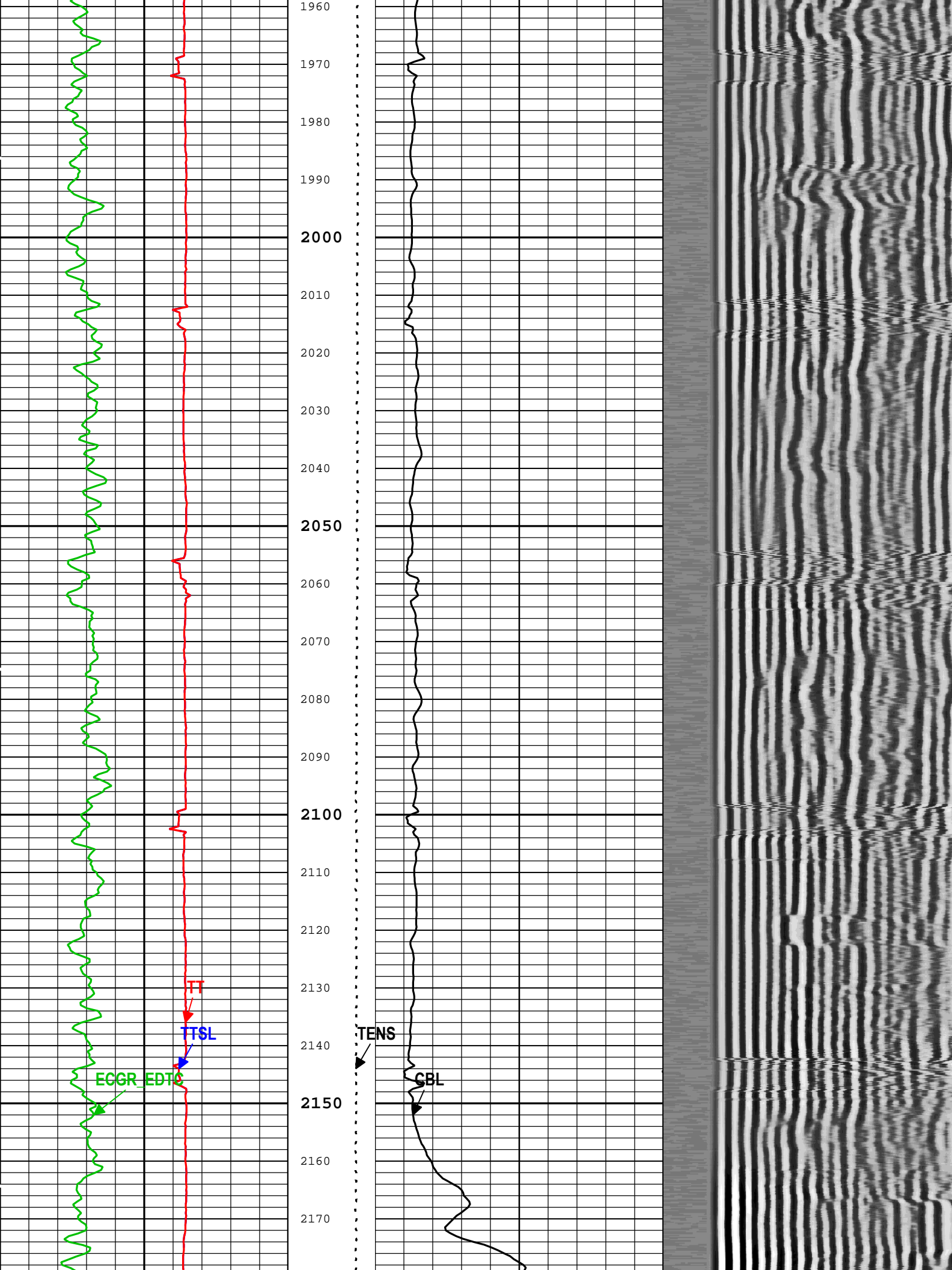


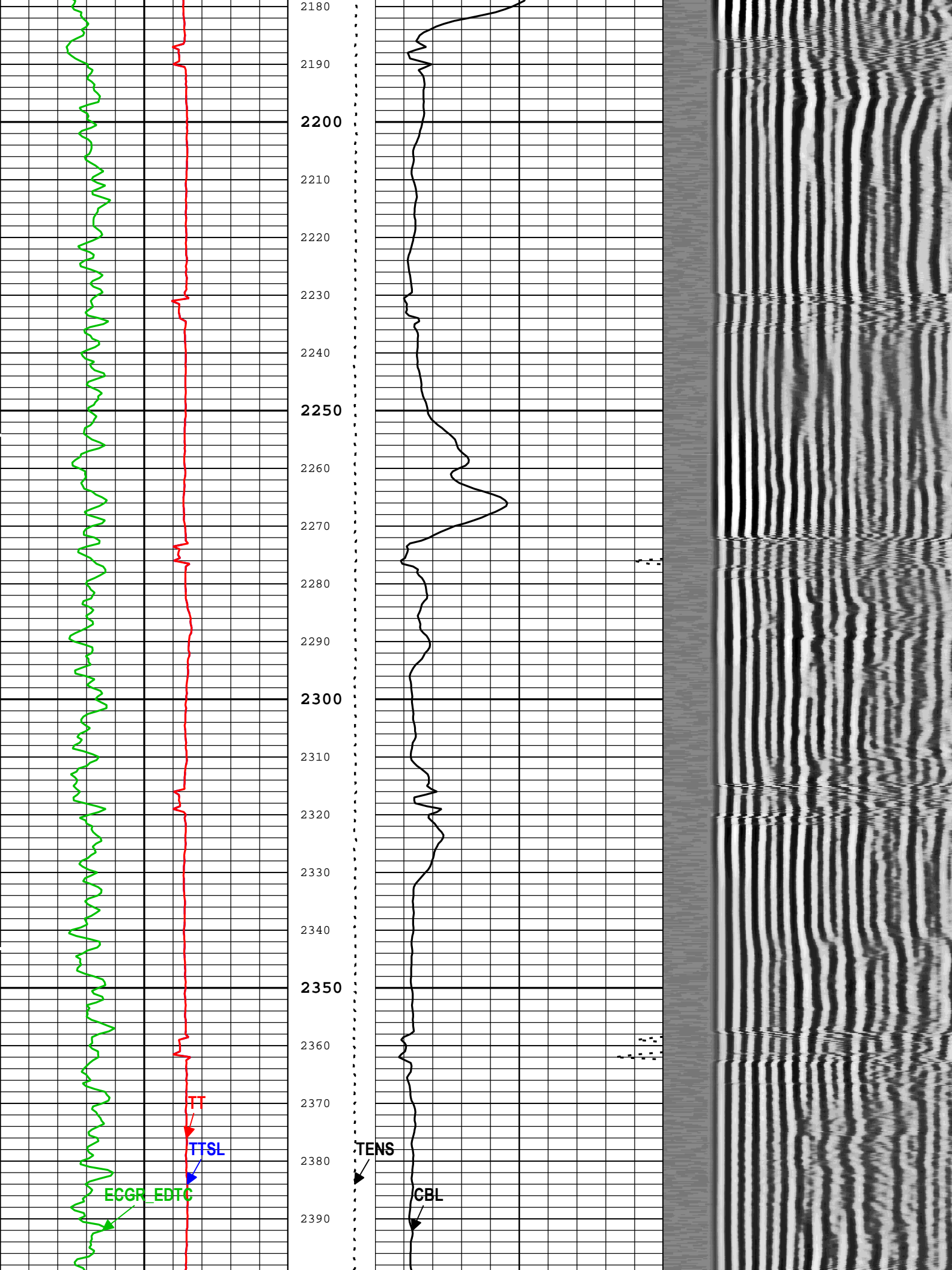


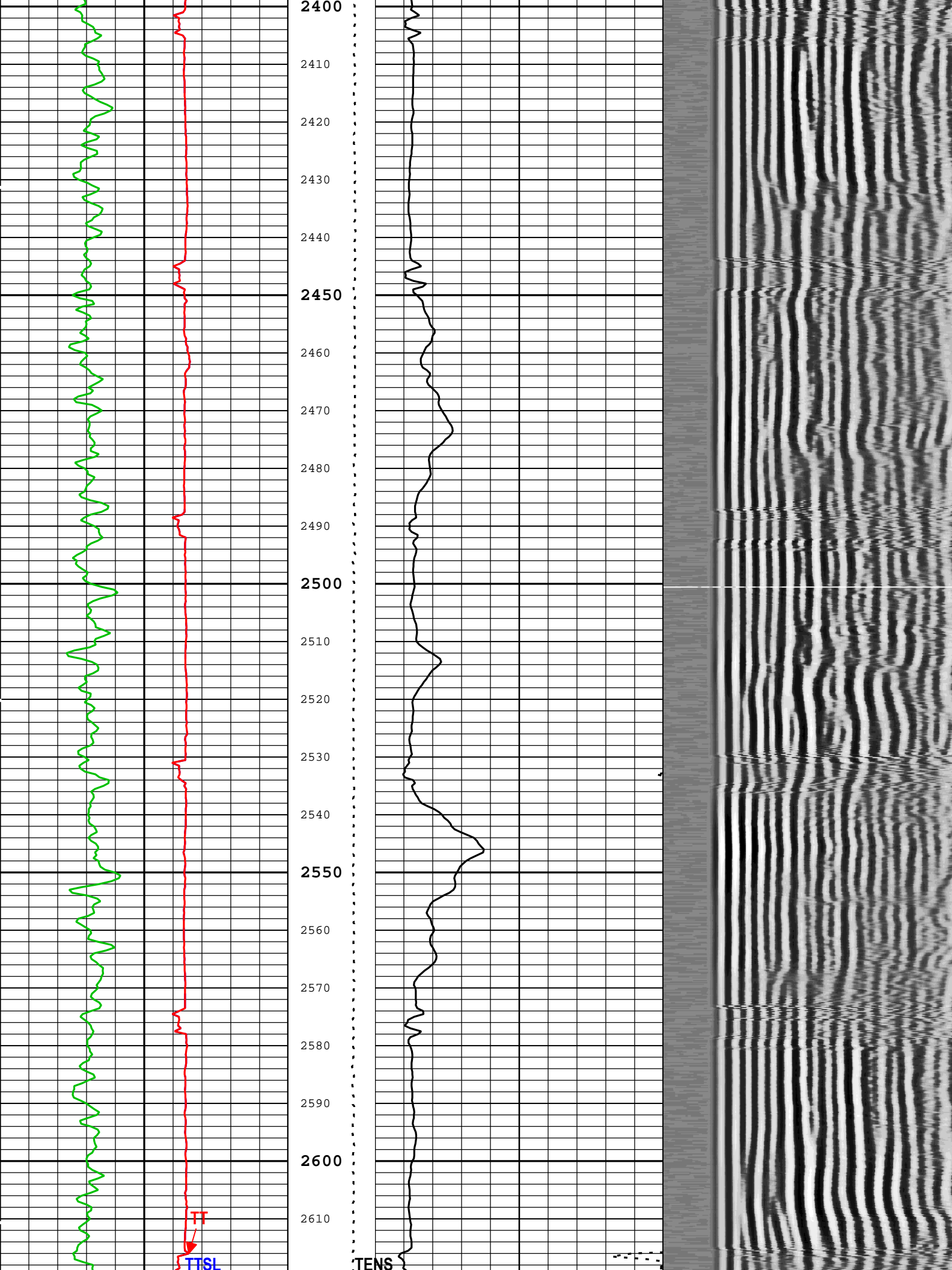


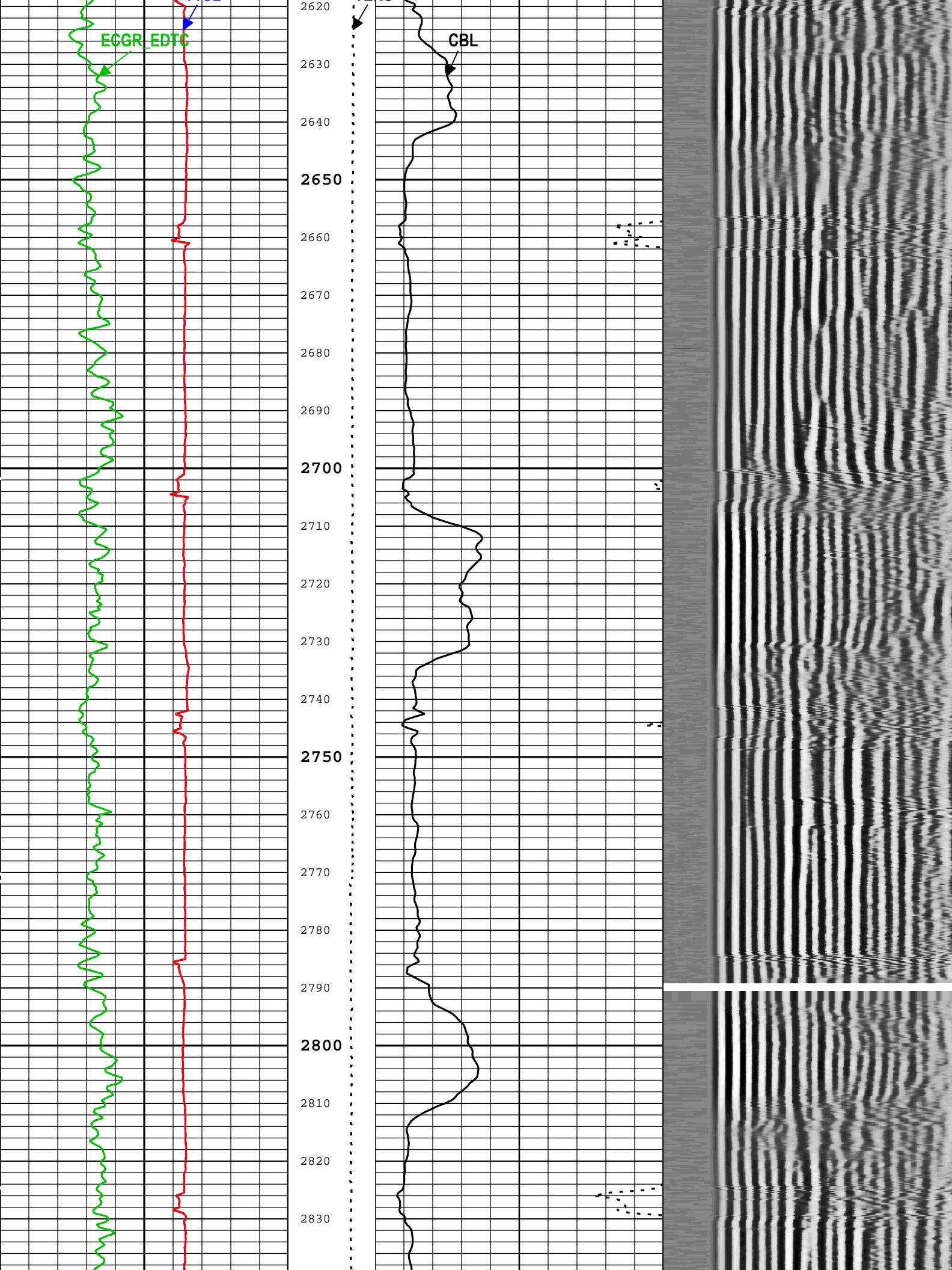


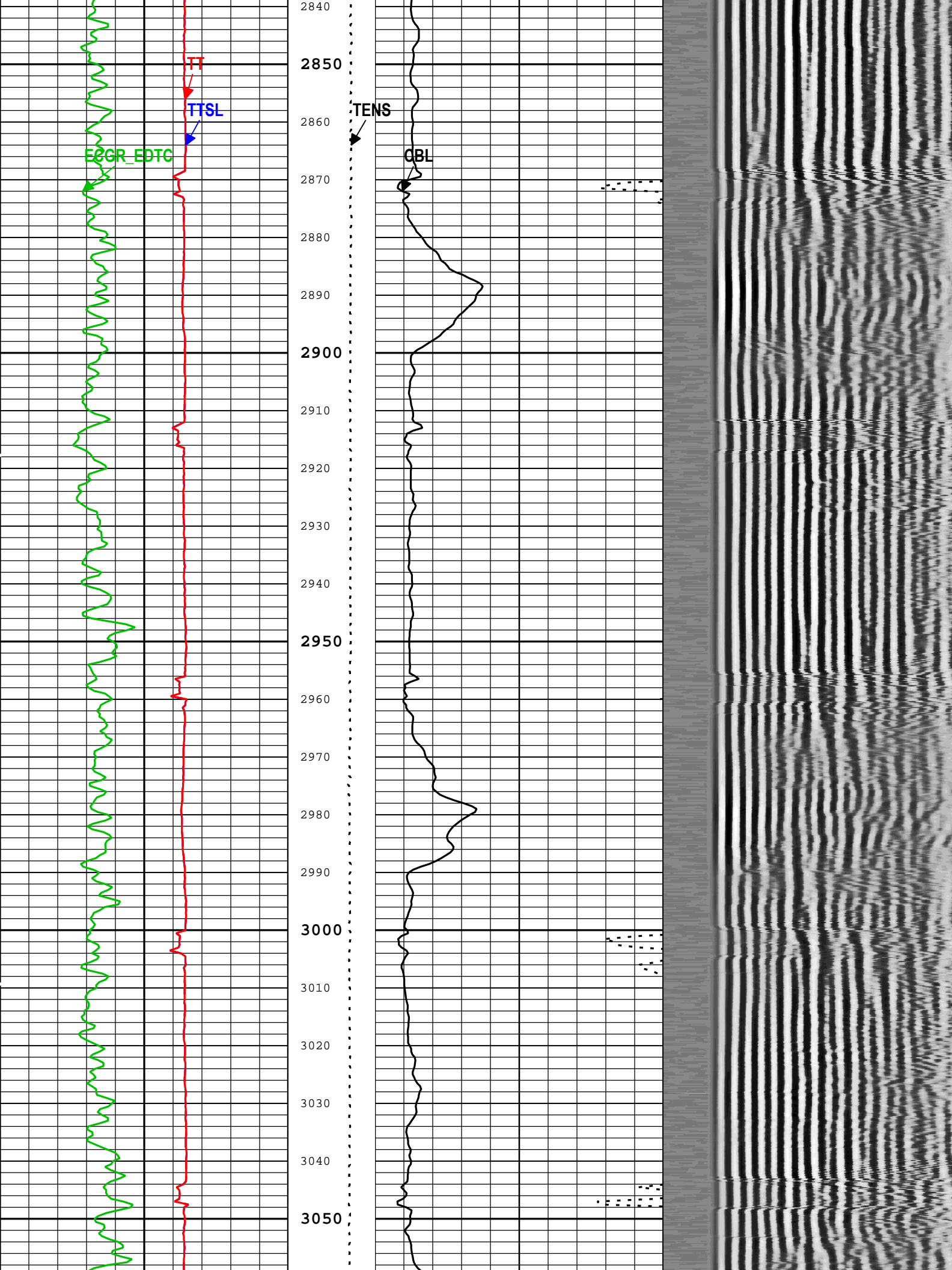


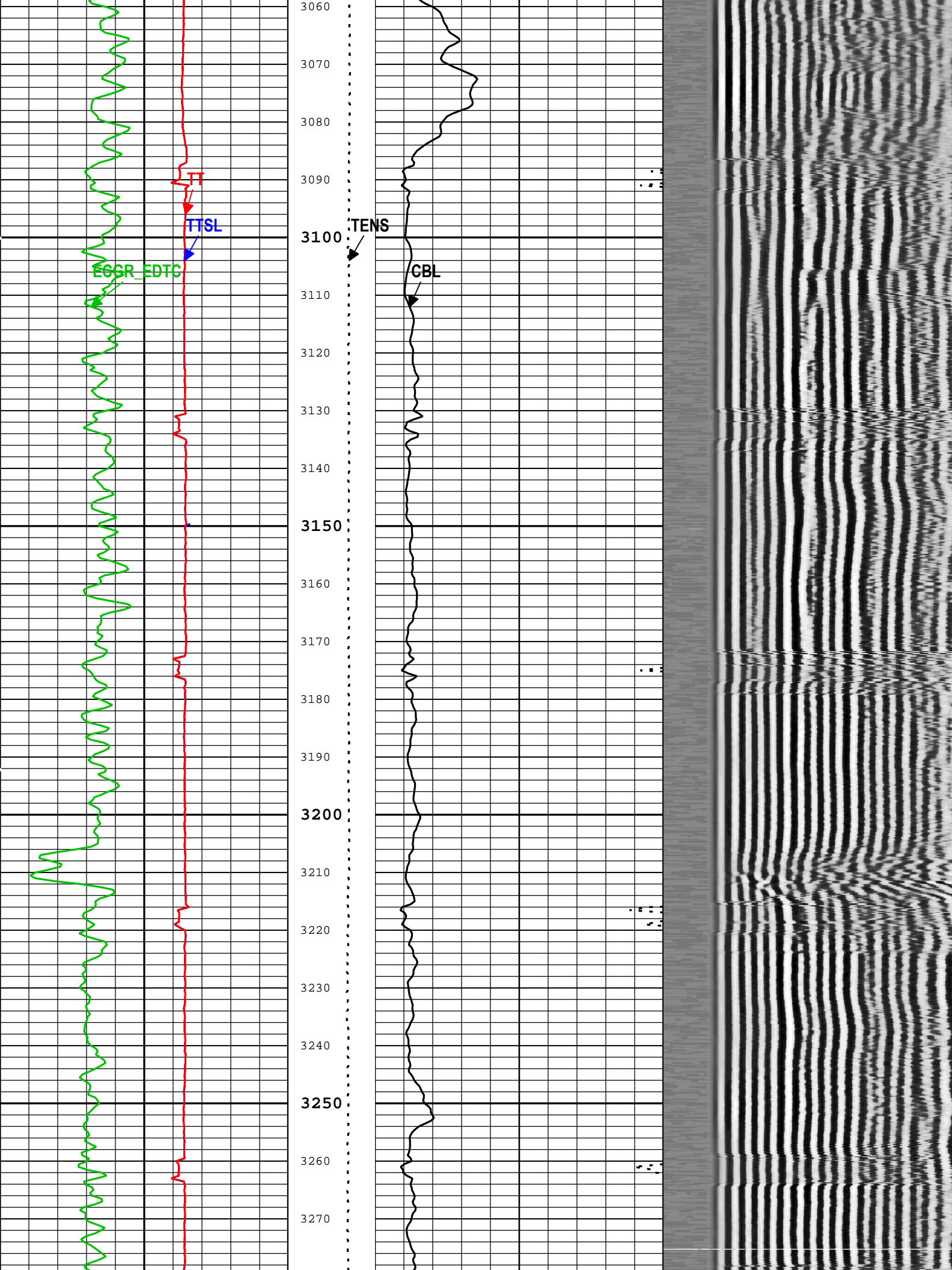


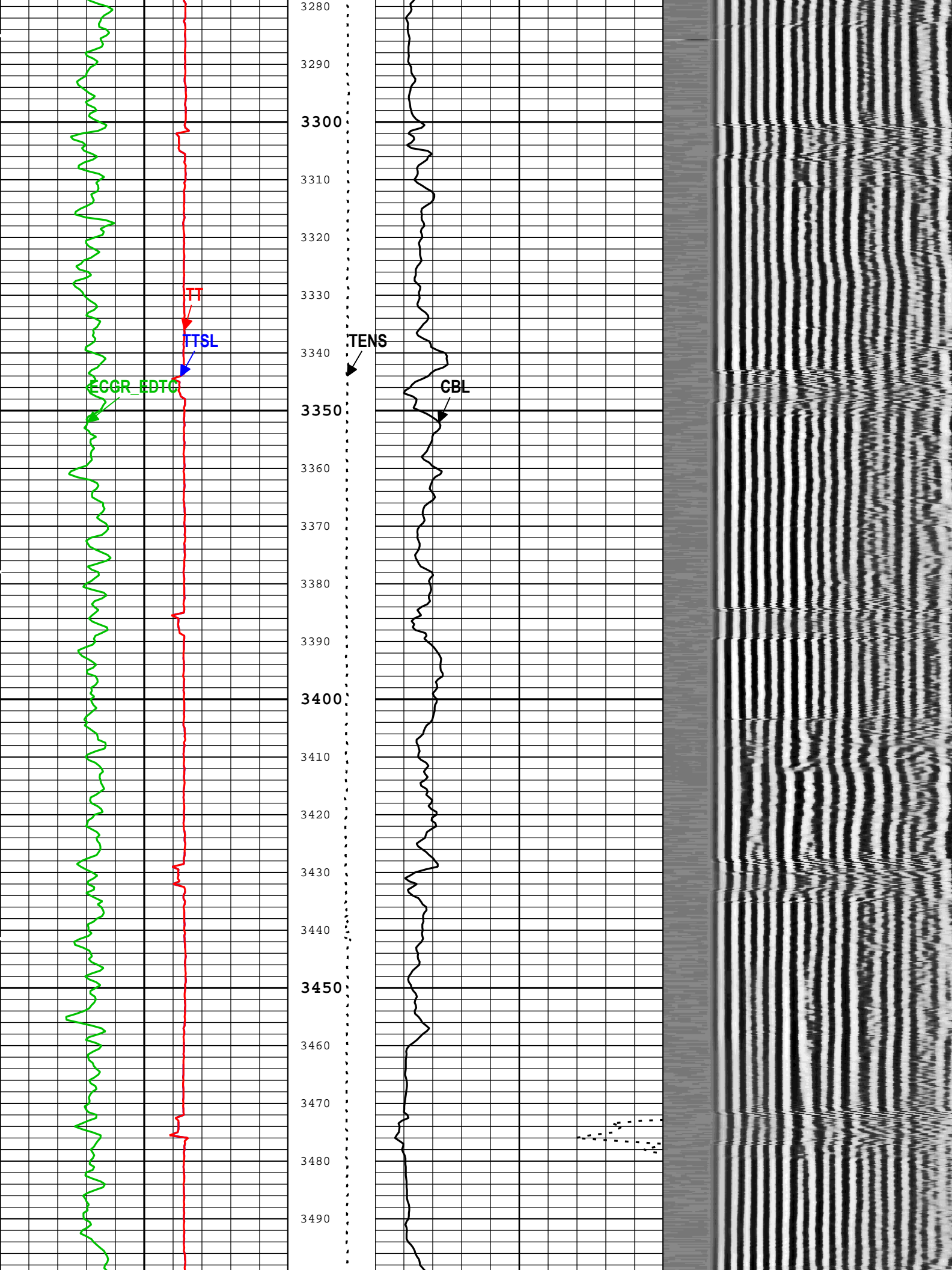


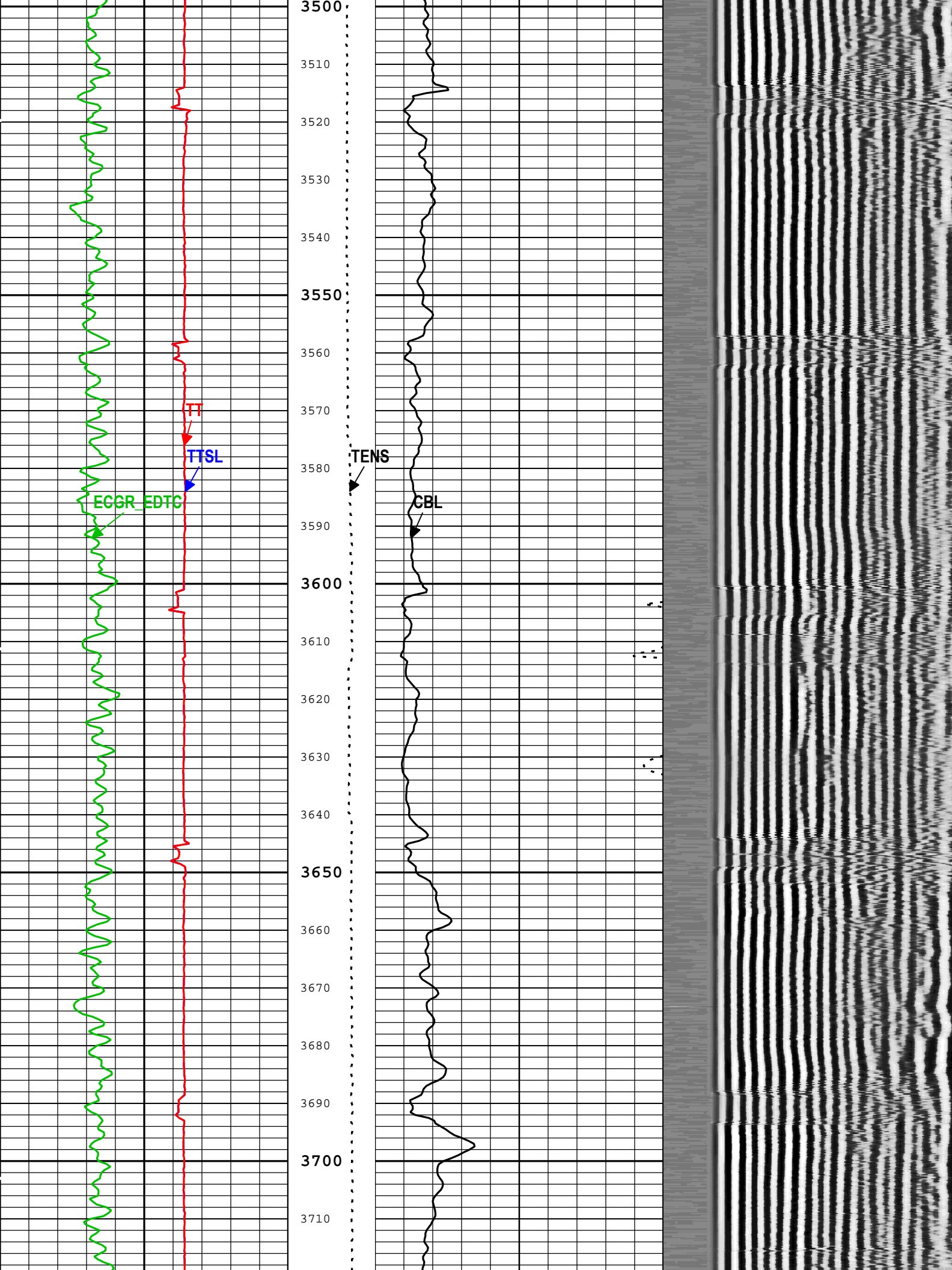


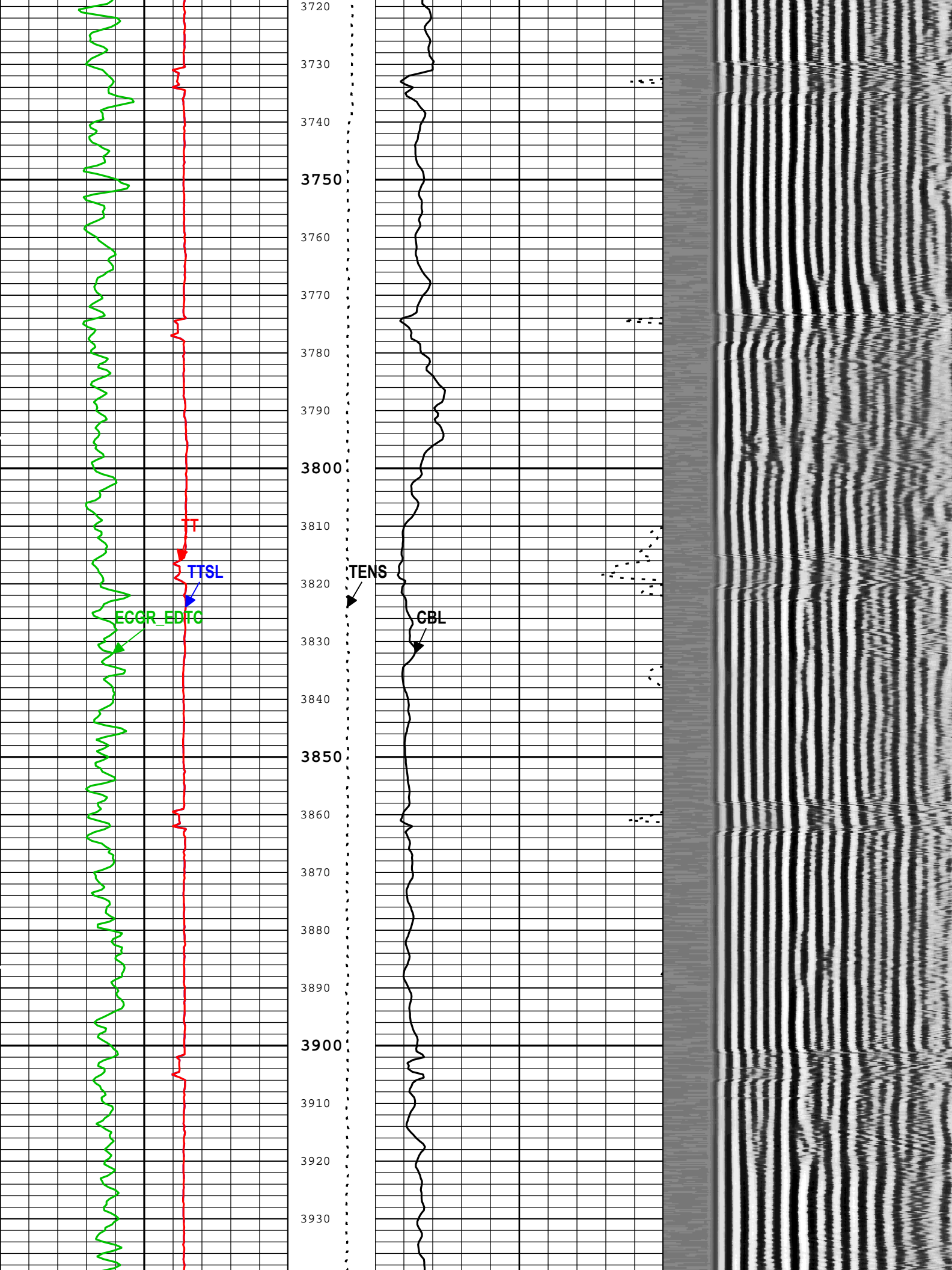


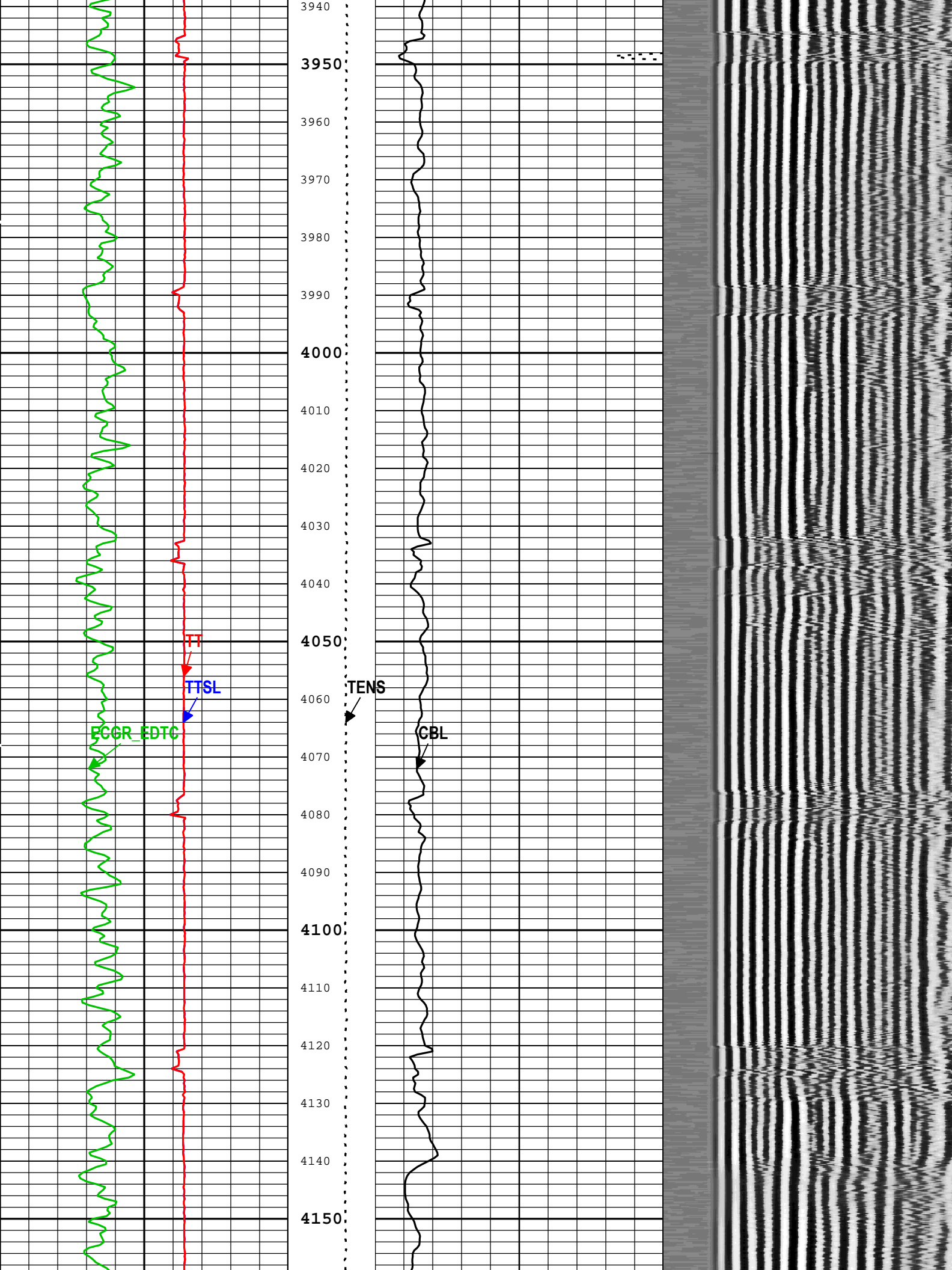


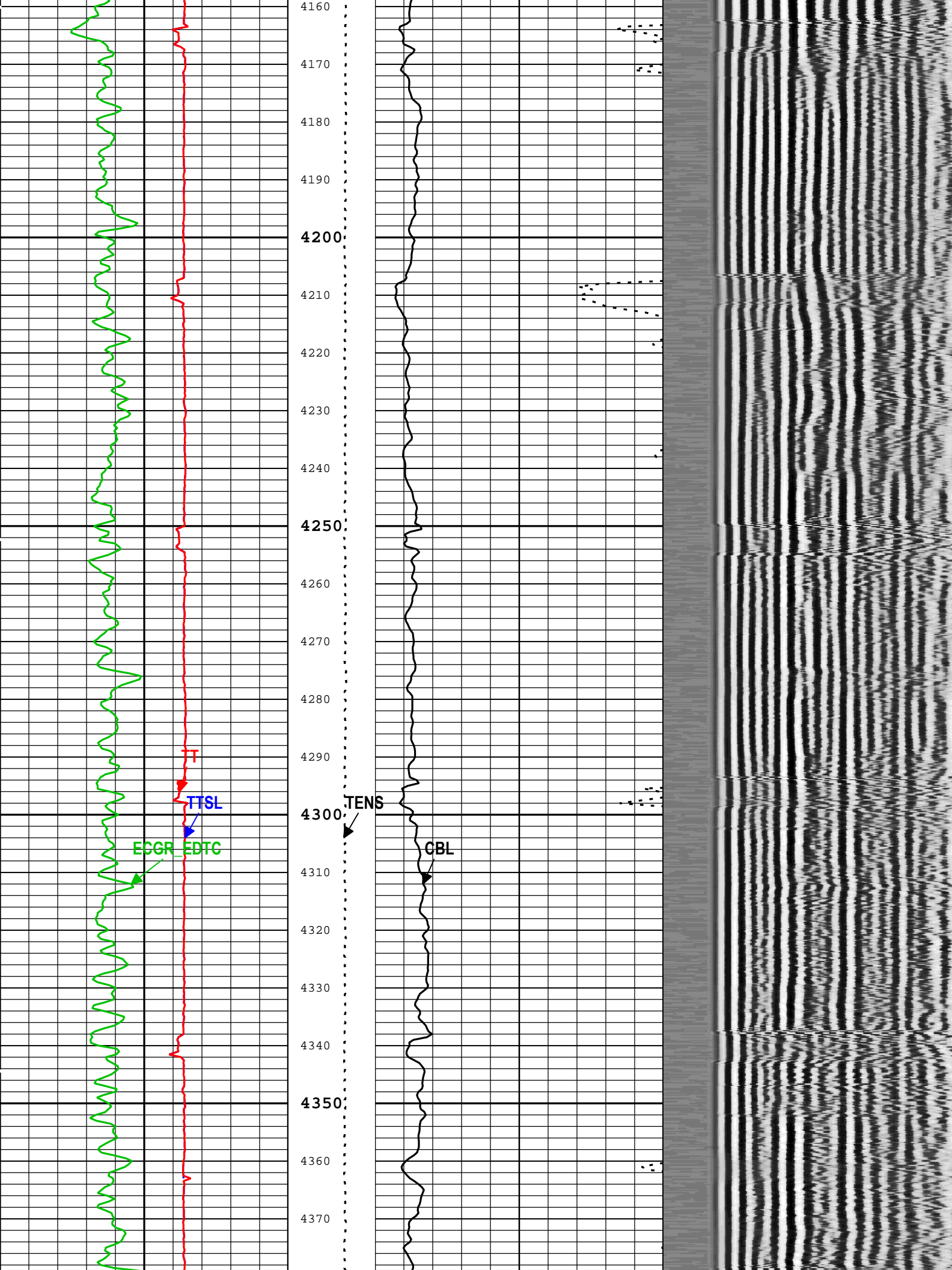


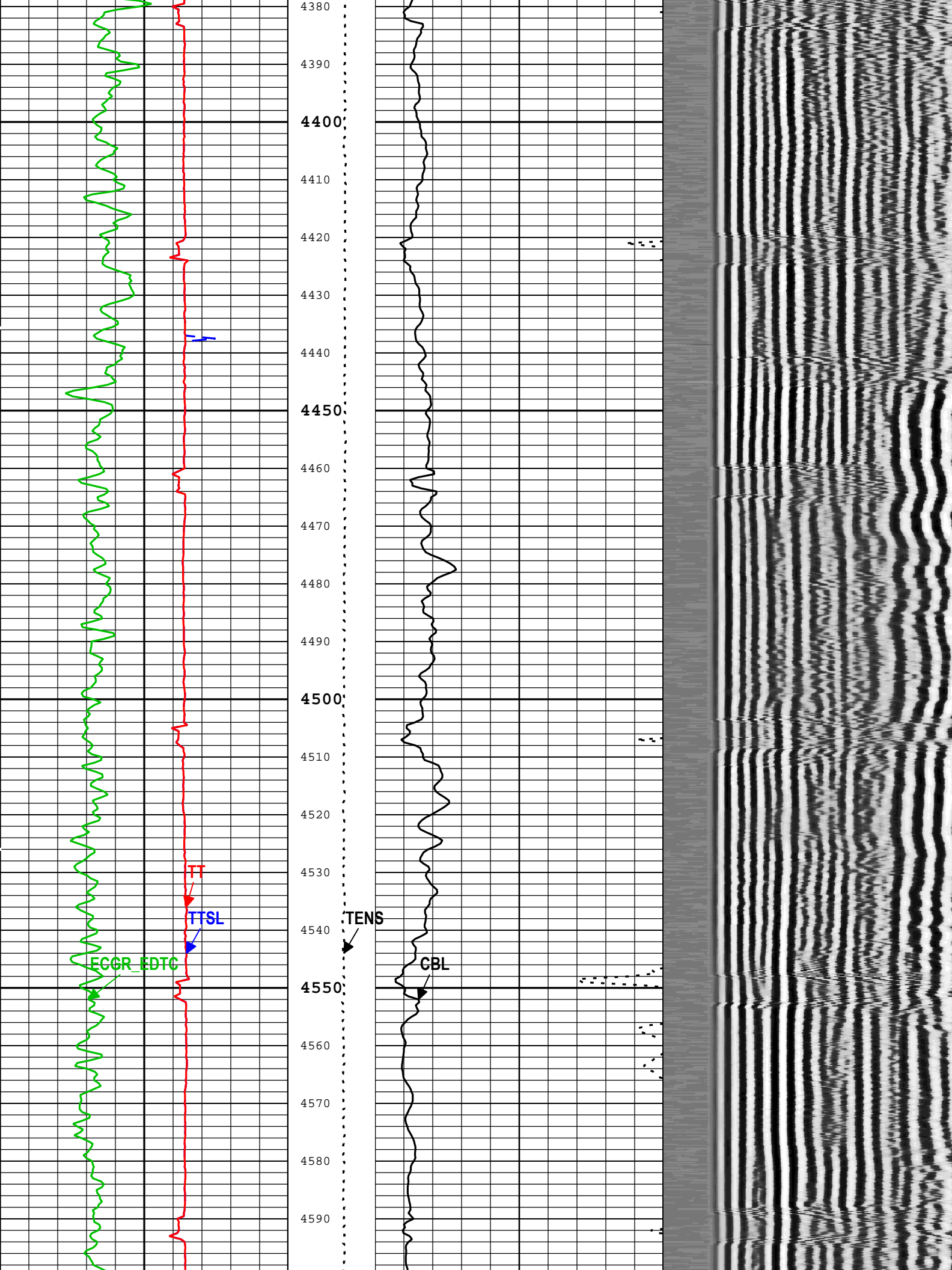


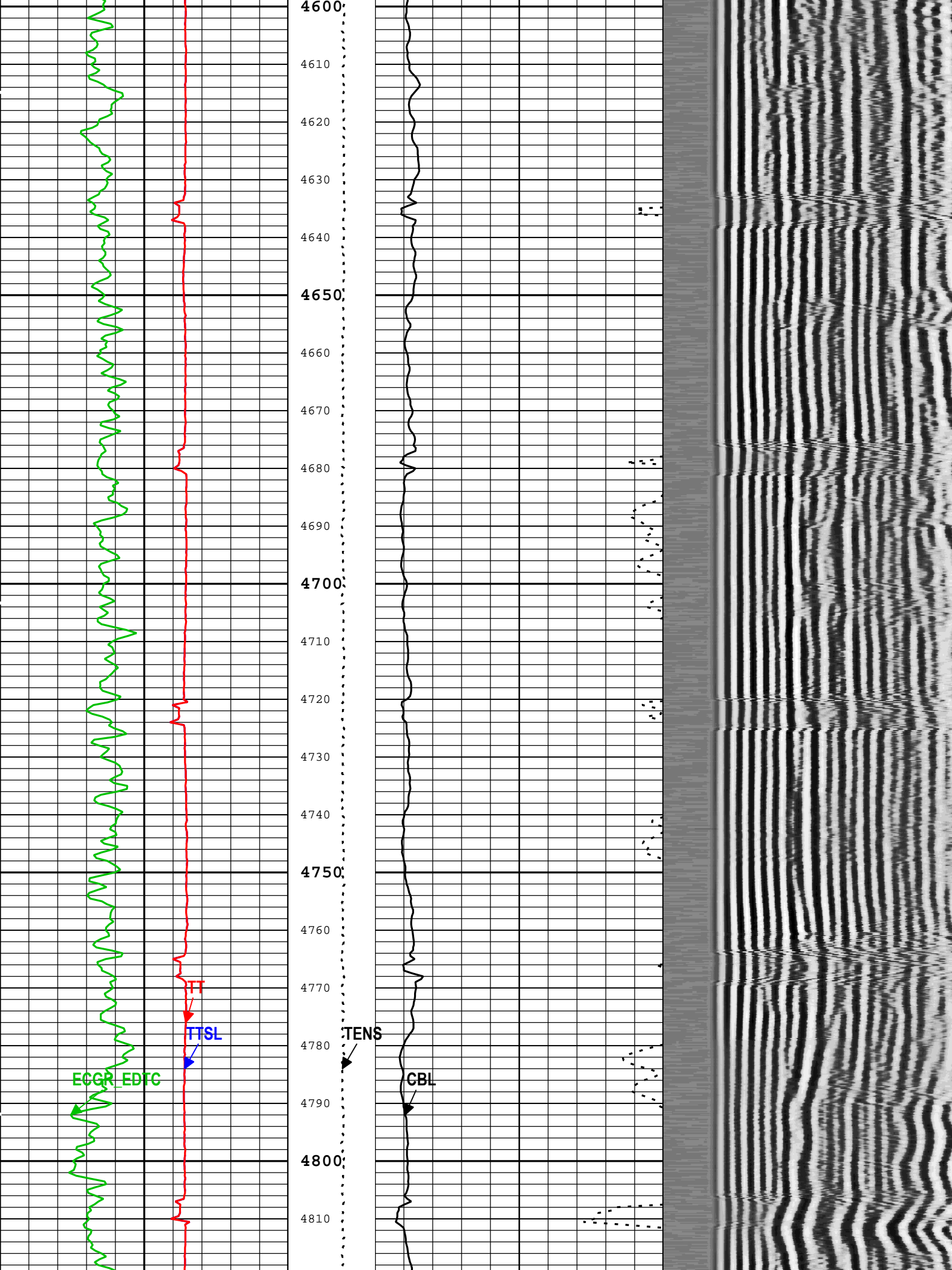


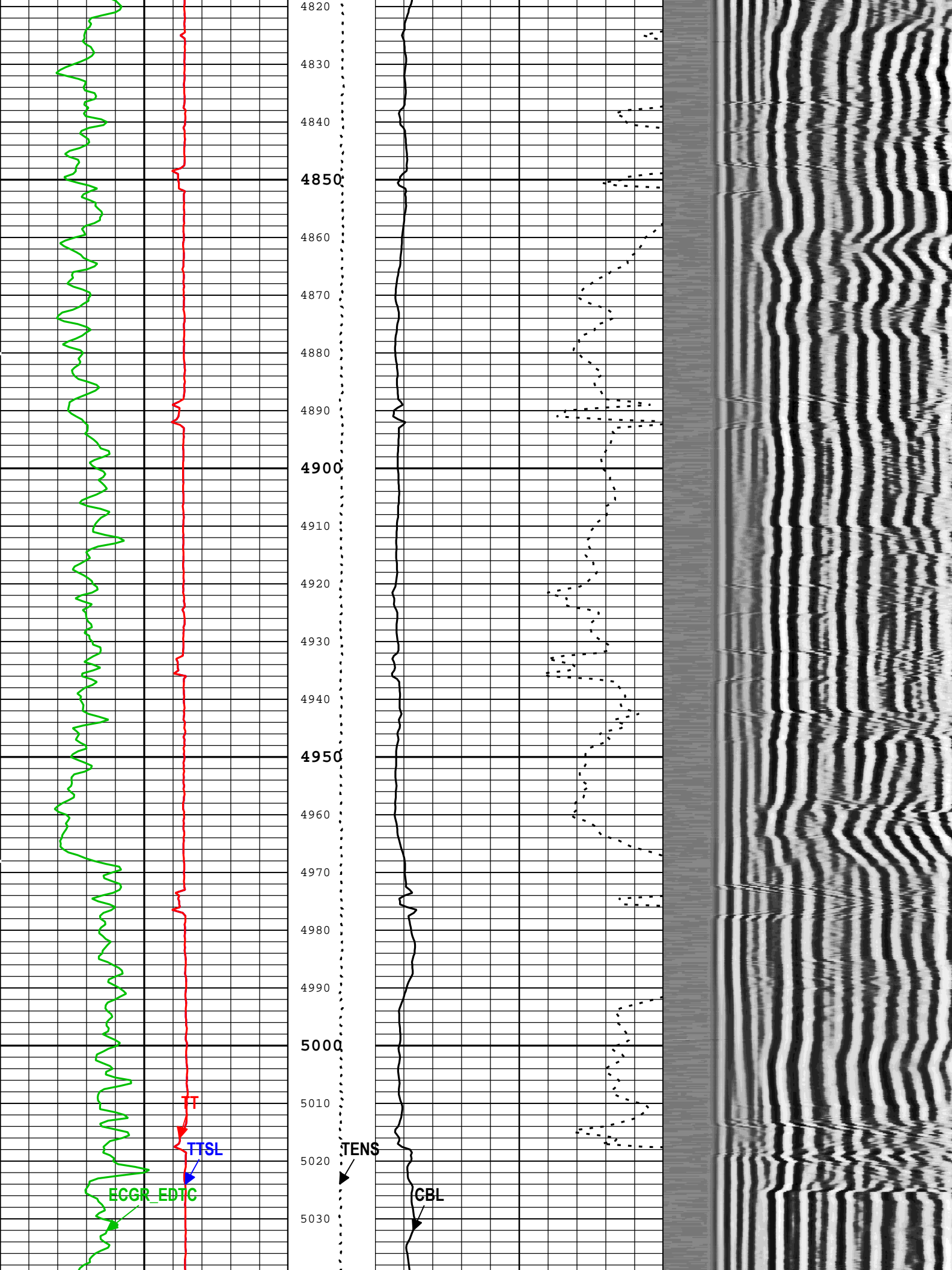


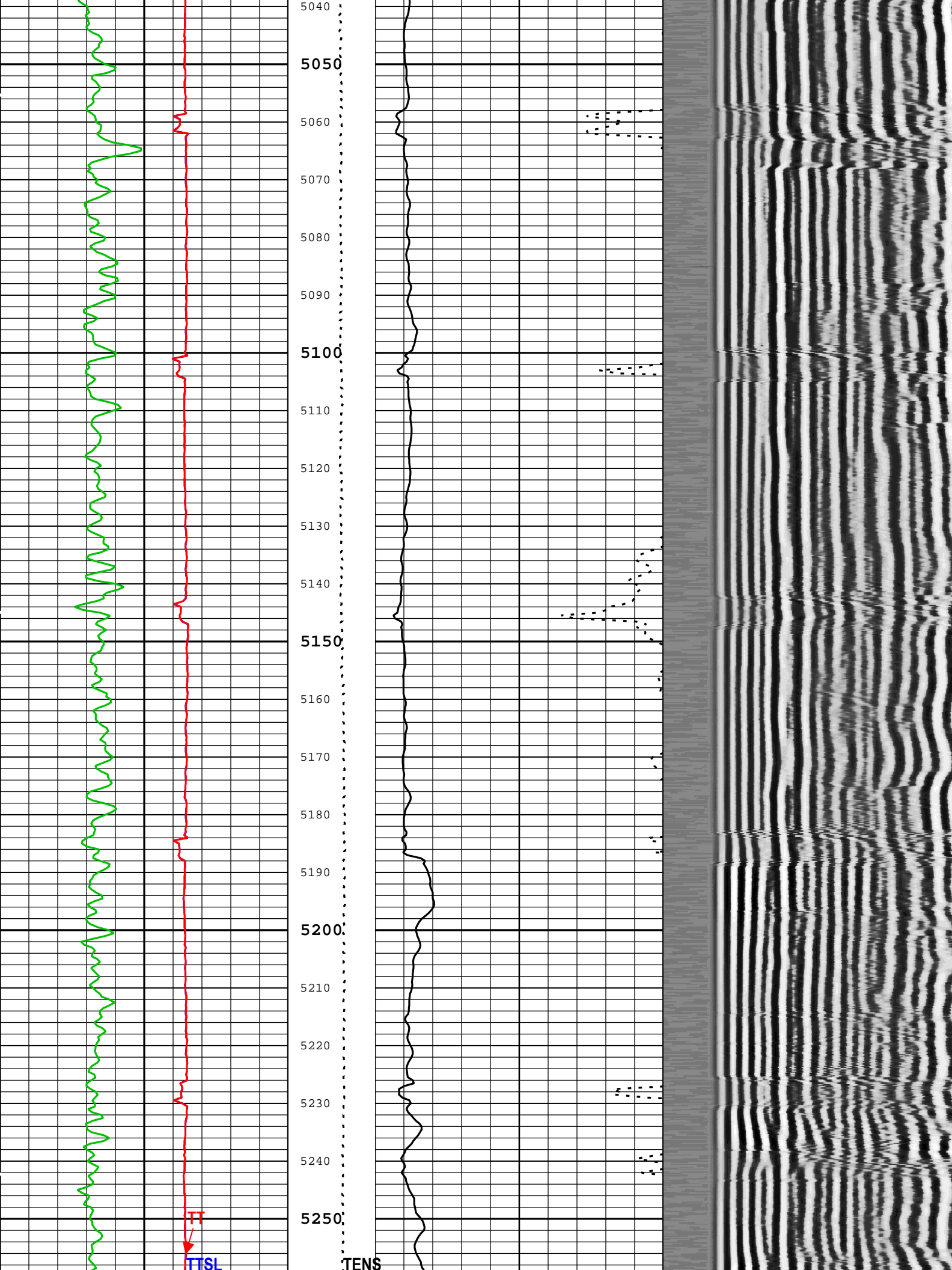


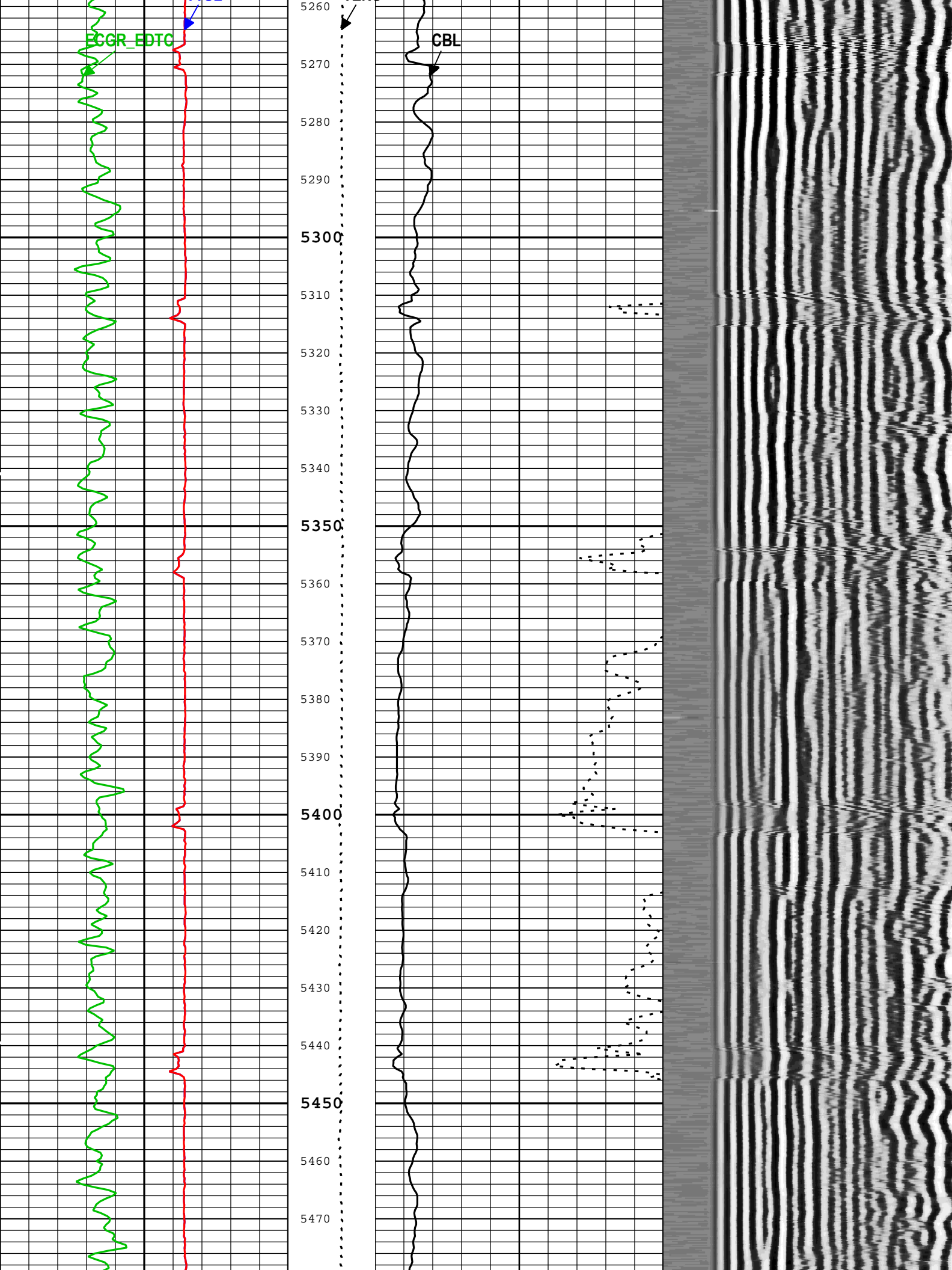


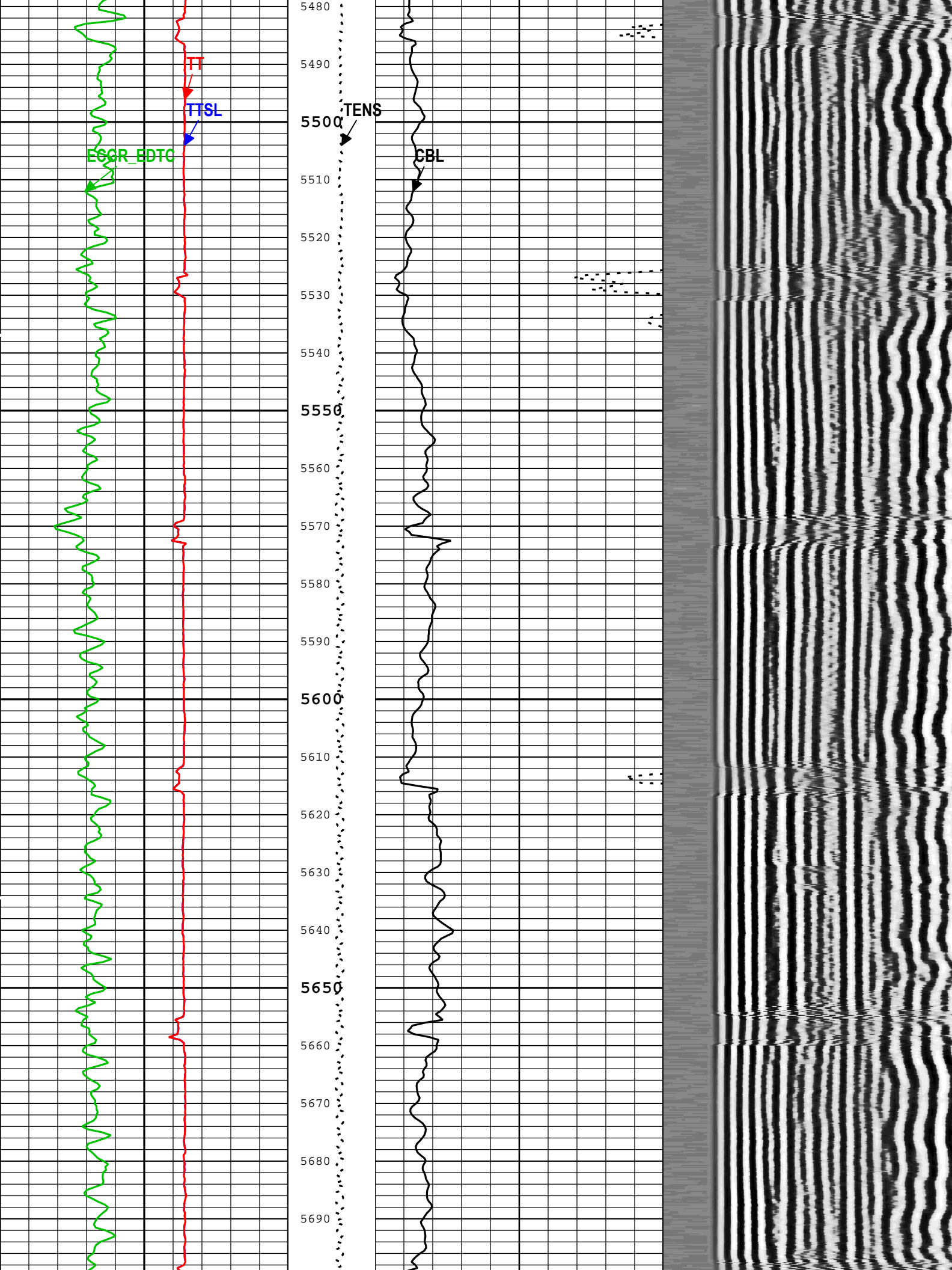


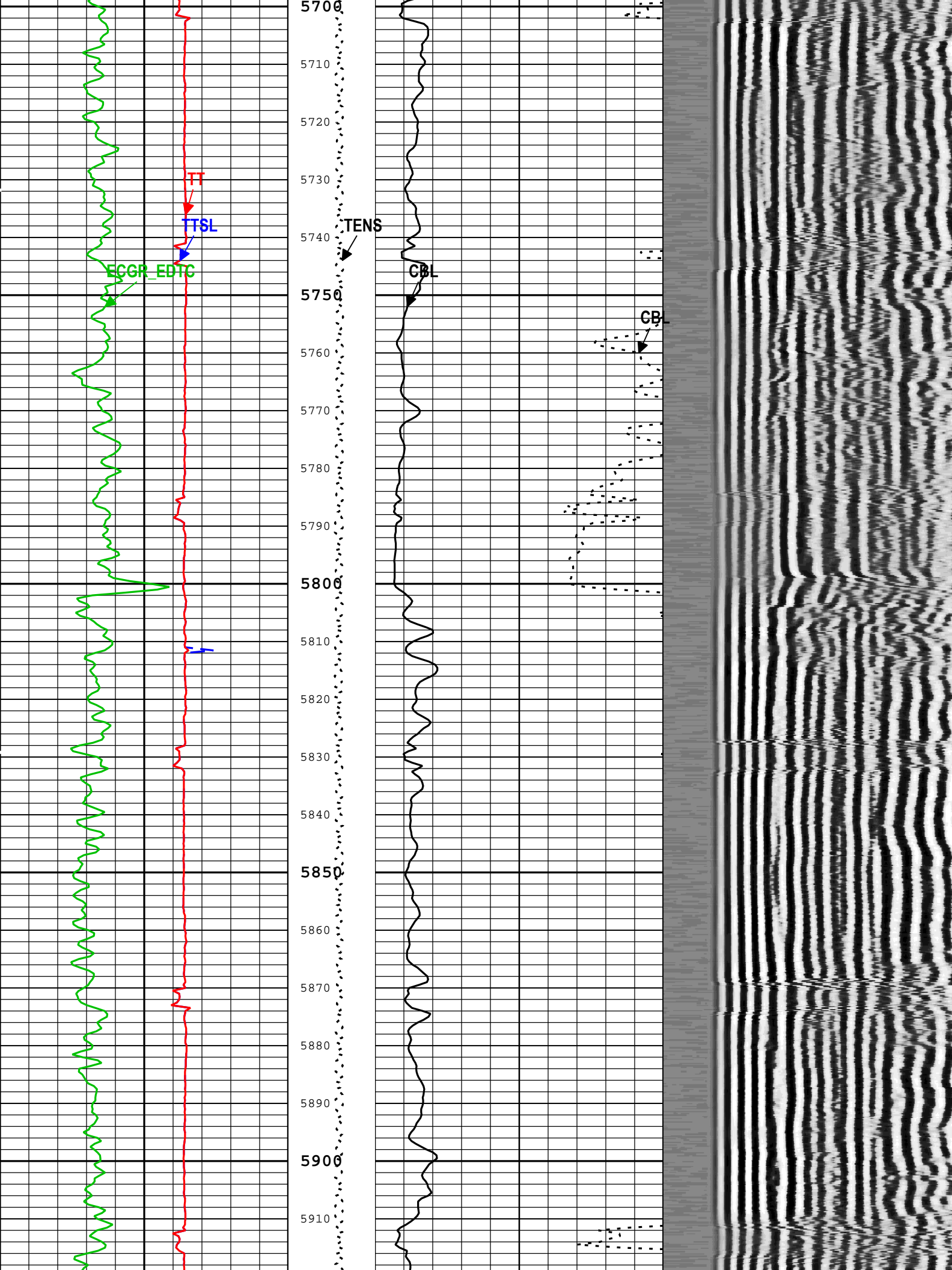


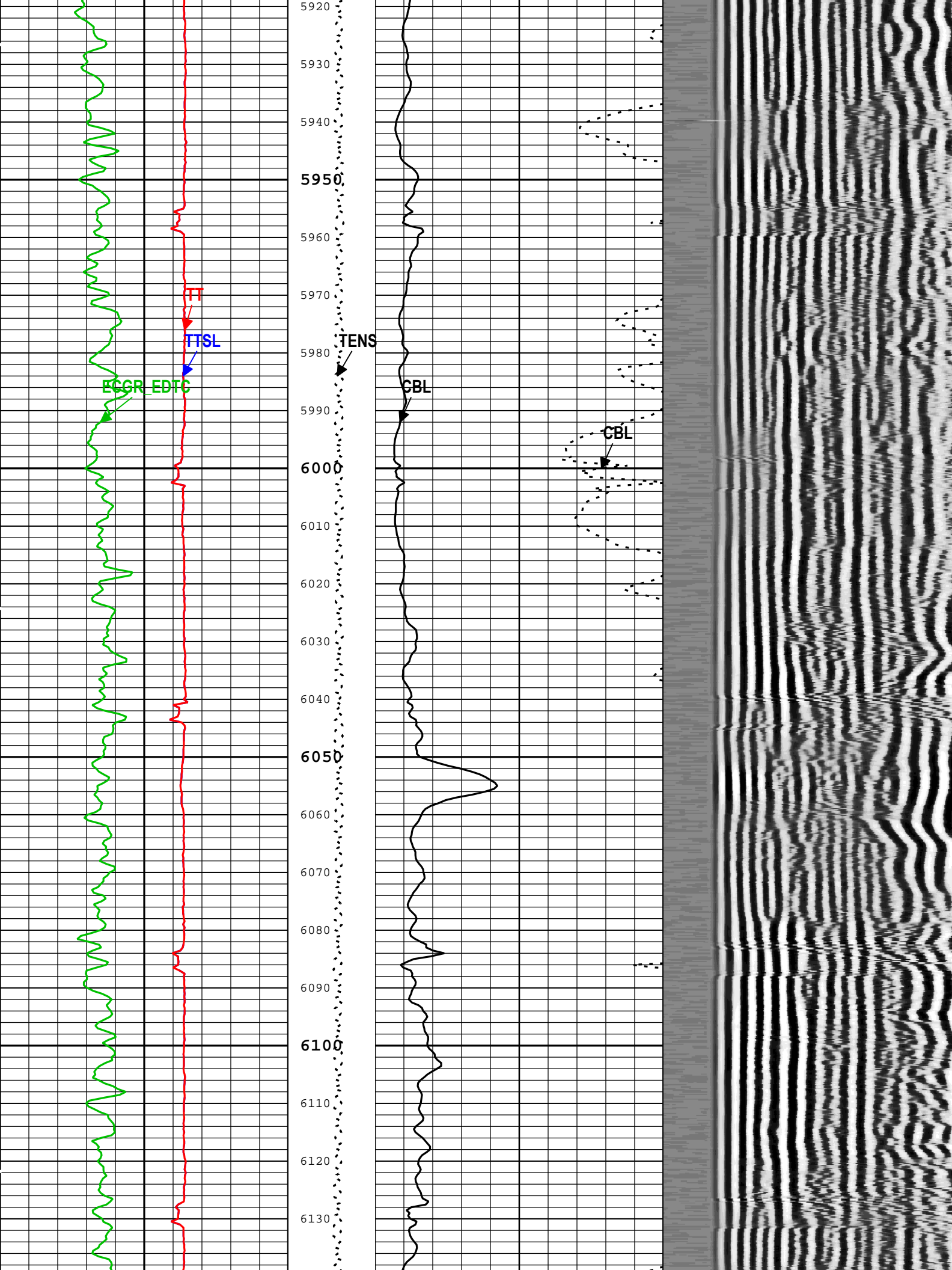


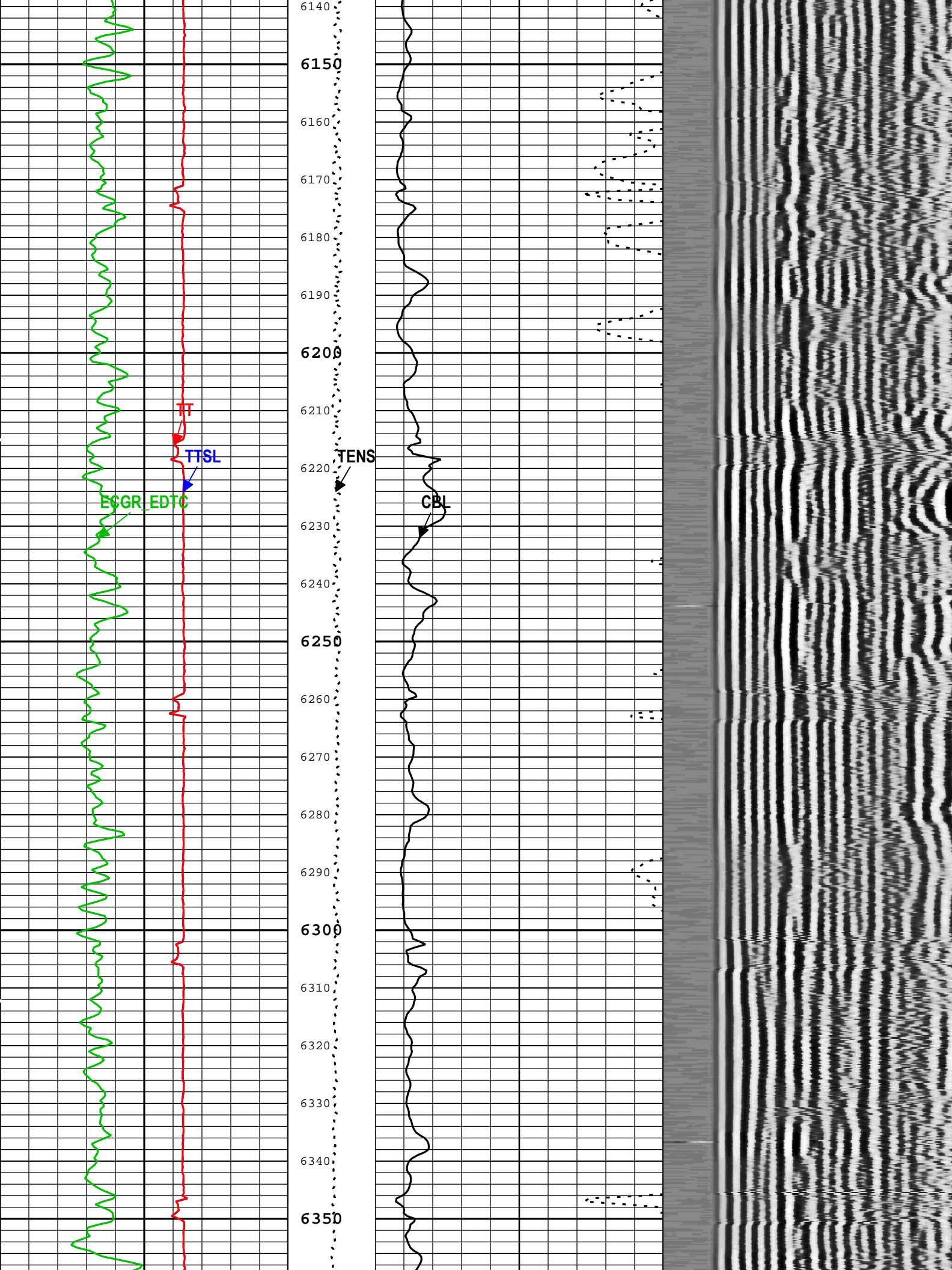


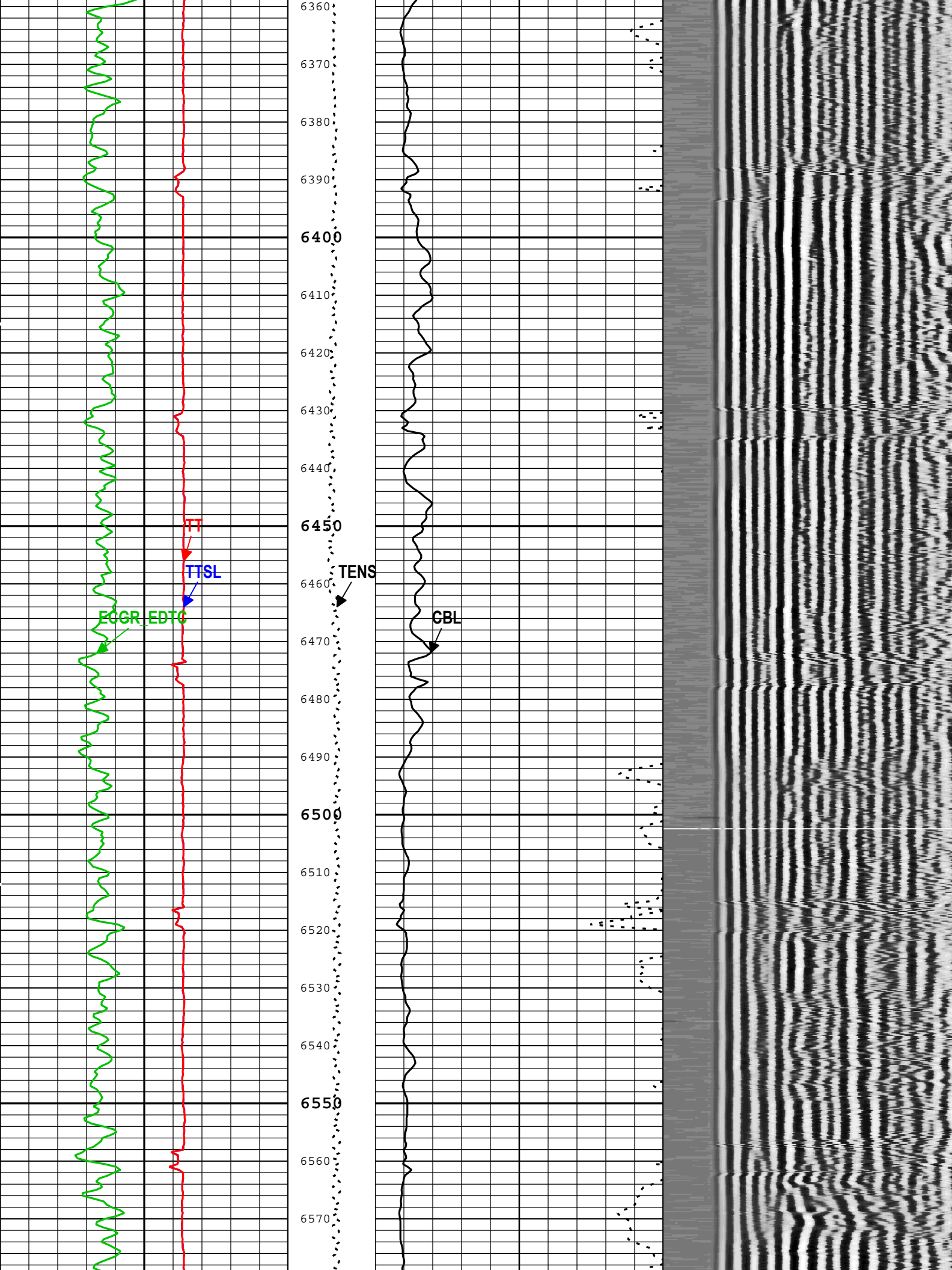


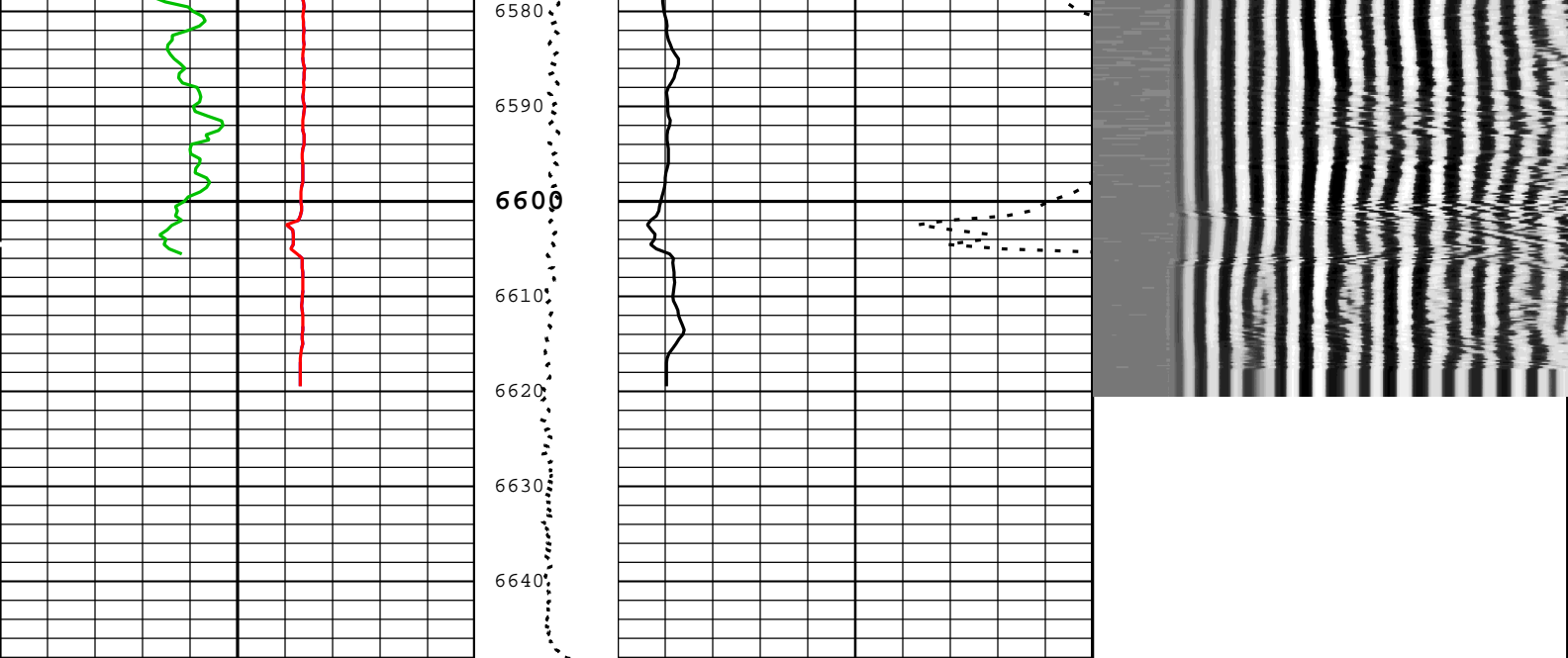












Gamma Ray (ECGR_EDTC) EDTC-B[1]	Cable Tension (TENS)	CBL Amplitude (CBL) DSLT-H[1]	Min	Amplitude	Max
0 gAPI 200	4000 lbf 0	0 mV 10			
Transit Time (Sliding Gate) (TTSL) DSLT-H[1]		CBL Amplitude (CBL) DSLT-H[1]		Variable Density Log (VDL) DSLT-H[1]	
400 us 200		0 mV 100	200	us	1200
Transit Time for CBL (TT) DSLT-H[1]					
400 us 200					

— BIEP - Bond Index Event Pips DSLT-H[1]

TIME_1900 - Time Marked every 60.00 (s)

Description: CBL_Dual_Gate Format: Log (CBL) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 02-Sep-2013 13:45:37

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	Depth Zoned	in
CBLG	CBL Gate Width	DSLTH	60	us
CBLO	Casing Bottom (Logger)	WLSESSION	16706	ft
CBRA	CBL LQC Reference Amplitude in Free Pipe	DSLTH	71	mV
CDEN	Cement Density	EDTC-B	2	g/cm3
CDEN	Cement Density	USIT-E	1.44	g/cm3
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Regular Cement	
DETE	Delta-T Detection	DSLTH	E1	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
FCF	CBL Fluid Compensation Factor	DSLTH	1.01	
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	1.89	mV
IBC_FRP_OFFSET	IBC Flexural Offset from Free Pipe	USIT-E	12.48	dB/m
IBC_FVEL_SEL	IBC Fluid Velocity Selection	USIT-E	Automatic	
IBC_OFFSET_SEL	IBC Flexural Offset Selector	USIT-E	UFAO	
IBC_ZMUD_SEL	IBC Mud Impedance Selection	USIT-E	Theoretical	
IMAR	Image Rotation	USIT-E	RB	

MAHTR	Manual High Threshold Reference for first arrival detection	DSLTH	120	
MATT_CURR	Maximum Attenuation in Arbitrary Cement	DSLTH	13.94	dB/ft
MCI	Minimum Cemented Interval for Isolation	DSLTH	Depth Zoned	ft
MNHTR	Minimum High Threshold Reference for first arrival detection	DSLTH	100	
MSA	Minimum Sonic Amplitude	DSLTH	0.76	mV
MSA_CURR	Minimum Sonic Amplitude in Arbitrary Cement	DSLTH	0.76	mV
NMSG	Near Minimum Sliding Gate	DSLTH	240	us
SGAD	Sliding Gate Status	DSLTH	Off	
SGDT	Sliding Gate Delta-T	DSLTH	57	us/ft
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.95	Mrayl
U-USIT_UFAO	SIT Flexural Attenuation Offset	USIT-E	-33.5	dB/m
U-USIT_UIAP	IBC Answer Product Enabled	USIT-E	SolidLiquidGasMap	

OneDepth Zoned Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	13.5	7	1884
BS	7.875	1884	6648.42
MCI	14.81	7	1857
MCI	4.75	1857	6648.42
All depth are actual.			

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	4408.8	ft/h
U-USIT_UFWB	Far Receiver Window Begin Time	USIT-E	138	us
U-USIT_UFWE	Far Receiver Window End Time	USIT-E	178	us
U-USIT_UNWB	Near Receiver Window Begin Time	USIT-E	107	us
U-USIT_UNWE	Near Receiver Window End Time	USIT-E	147	us
UPAT	USIT Emission Pattern	USIT-E	Pattern 500 KHz	
UWKM	USIT Working Mode	USIT-E	10 deg at 6.0 in	
U-USIT_UTAN	Transducer Angles	USIT-E	33_DEG	
VRES	Vertical Resolution	USIT-E	6.0 in	

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	8020

CBL Normalization - CBL Accumulations

Master (Measured):		10:11:51 21-Jun-2017					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Upper Far Amplitude		Master	4200.0	3200.0	3708.0		
Upper Near Raw Amplitude	mV	Master	33.000	27.000	30.616	43.000	
Lower Far Amplitude		Master	4200.0	3200.0	3531.4		
Lower Near Raw Amplitude	mV	Master	46.000	27.000	38.102	68.000	

CBL Normalization - CBL/VDL Coefficients

Master (Measured):		10:11:51 21-Jun-2017					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
CBL Correction Factor for UT		Master	3.500	2.700	3.789	4.300	

CBL Correction Factor for LT		Master	2.500	1.700	3.044	4.300	<div><div></div><div></div><div></div></div>
VDL Ratio between UT and LT for CBLB Mode		Master	1.000		0.952		<div><div></div><div></div></div>

Company:	Anadarko Petroleum Corporation	Schlumberger
Well:	Verde 13-2HZ	
Field:	Wattenberg	
County:	Weld	
State:	Colorado	
Cement Bond Log		
Variable Density Log		