

Company: Whiting Oil & Gas Corporation

Well: Razor 250-2444

Field: Wildcat

County: Weld State: Colorado

Cement Bond Log

GR-CCL

County:	Weld		
Field:	Wildcat		
Location:	SWSE Sec 25, T10N, R58W		
Well:	Razor 250-2444		
Company:	Whiting Oil & Gas Corporation		
Location:		Elev.:	K.B. 4739.00 ft
SWSE Sec 25, T10N, R58W			G.L. 4718.00 ft
SHL: 305' FSL x 1950' FEL			D.F. 4738.00 ft
Lat/Long: 40.8013325/-103.810194			
Permanent Datum:	Ground Level	Elev.:	4718.00 f
Log Measured From:	Kelly Bushing	21.00 ft	above Perm.Datum
Drilling Measured From:	Kelly Bushing		
API Serial No.	Section:	Township:	Range:
05-123-42646	25	10N	58W
Logging Date	21-Sep-2016		

Run Number	One		
Depth Driller	15910.00 ft		
Schlumberger Depth	15910.00 ft		
Bottom Log Interval	5100.00 ft		
Top Log Interval	60.00 ft		
Casing Fluid Type	Water		
Salinity			
Density	8.4 lbm/gal		
Fluid Level	8.00 ft		
BIT/CASING/TUBING STRING			
Bit Size	8.50 in		
From	2079.00 ft		
To	15910.00 ft		
Casing/Tubing Size	5.5 in		
Weight	20 lbm/ft		
Grade	N/A		
From	21.00 ft		
To	15910.00 ft		
Max Recorded Temperatures	195 degF		
Logger on Bottom	21-Sep-2016	10:44:00	
Unit Number	Location:	Time	
2161			
Recorded By	B Kesek & B Marmon	FtMorgan	
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

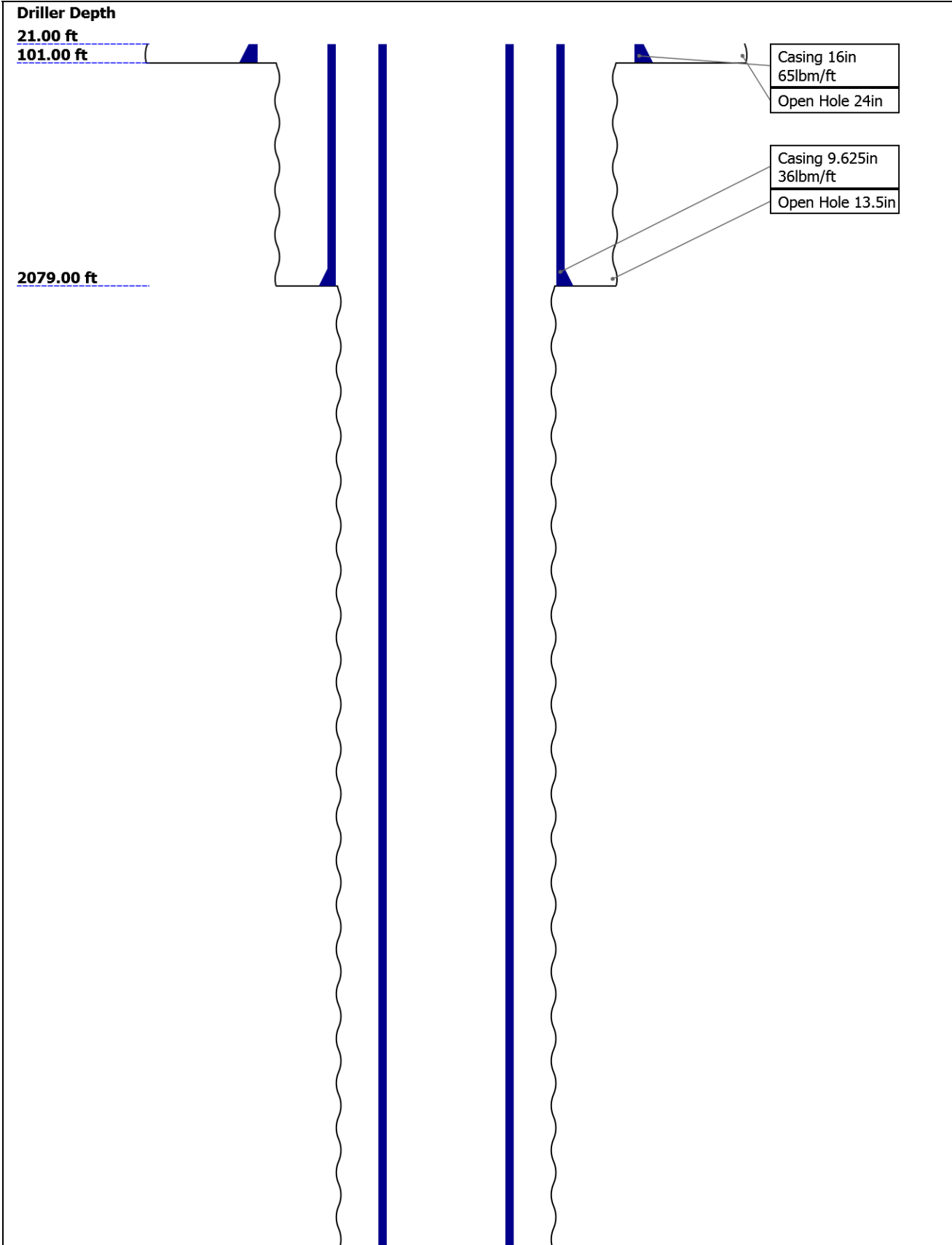
9.4 Log (Sonic CBL with VDL)

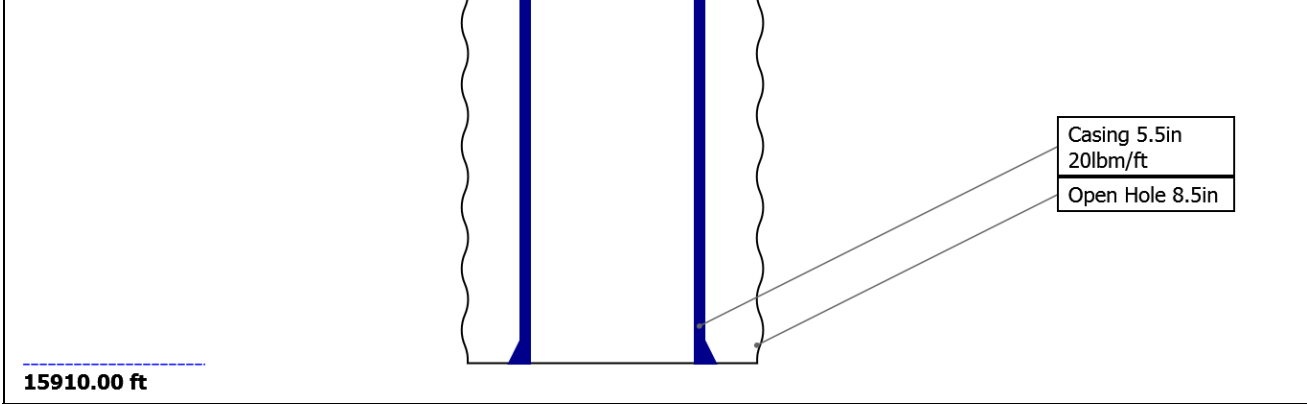
9.5 Parameter Listing

10. Calibration Report

11. Tail

Well Sketch






Borehole Size/Casing/Tubing Record

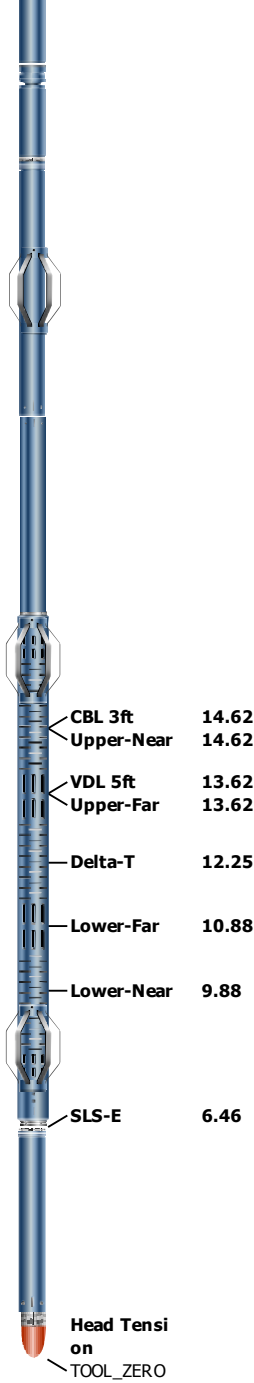
Bit						
Bit Size (in)	24	13.5	8.5			
Top Driller (ft)	21	101	2079			
Top Logger (ft)	21	101	2079			
Bottom Driller (ft)	101	2079	15910			
Bottom Logger (ft)	101	2079	15910			
Casing						
Size (in)	16	9.625	5.5			
Weight (lbm/ft)	65	36	20			
Inner Diameter (in)	15.25	8.921	4.778			
Grade	N/A	N/A	N/A			
Top Driller (ft)	21	21	21			
Top Logger (ft)	21	21	21			
Bottom Driller (ft)	101	2079	15910			
Bottom Logger (ft)	101	2079	15910			

Remarks and Equipment Summary

One: Toolstring				One: Remarks	
Equip name LEH-QT LEH-QT	Length 46.01	MP name	Offset	Tool ran as per toolsketch.	
				Main pass recorded at 1500PSI, repeat pass at 0PSI.	
CAL-YA:666 CAL-YA:666	43.1	CCL	42.31		
DTC-H:8803 ECH-KC:10354 DTC-H:8803	39.6	CTEM HV	38.7 0.00		
SGT-N:10210 SGH-K:2996 SGD-TAA:2166 1 SGC-TB:10210	36.6	TelStatus ToolStatus	36.6 36.6		
AH-184[2]:4 700	31.1	GR	35.68		

AH-184[1]:3 29.1
906

DSLTT-H:8318 27.1
ECH-KH:8373
DSLCT-H:8318
SLS-E:1650



Adaptor_Head 6.46

BNS-STD 0.46

Head Tension
TOOL_ZERO

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

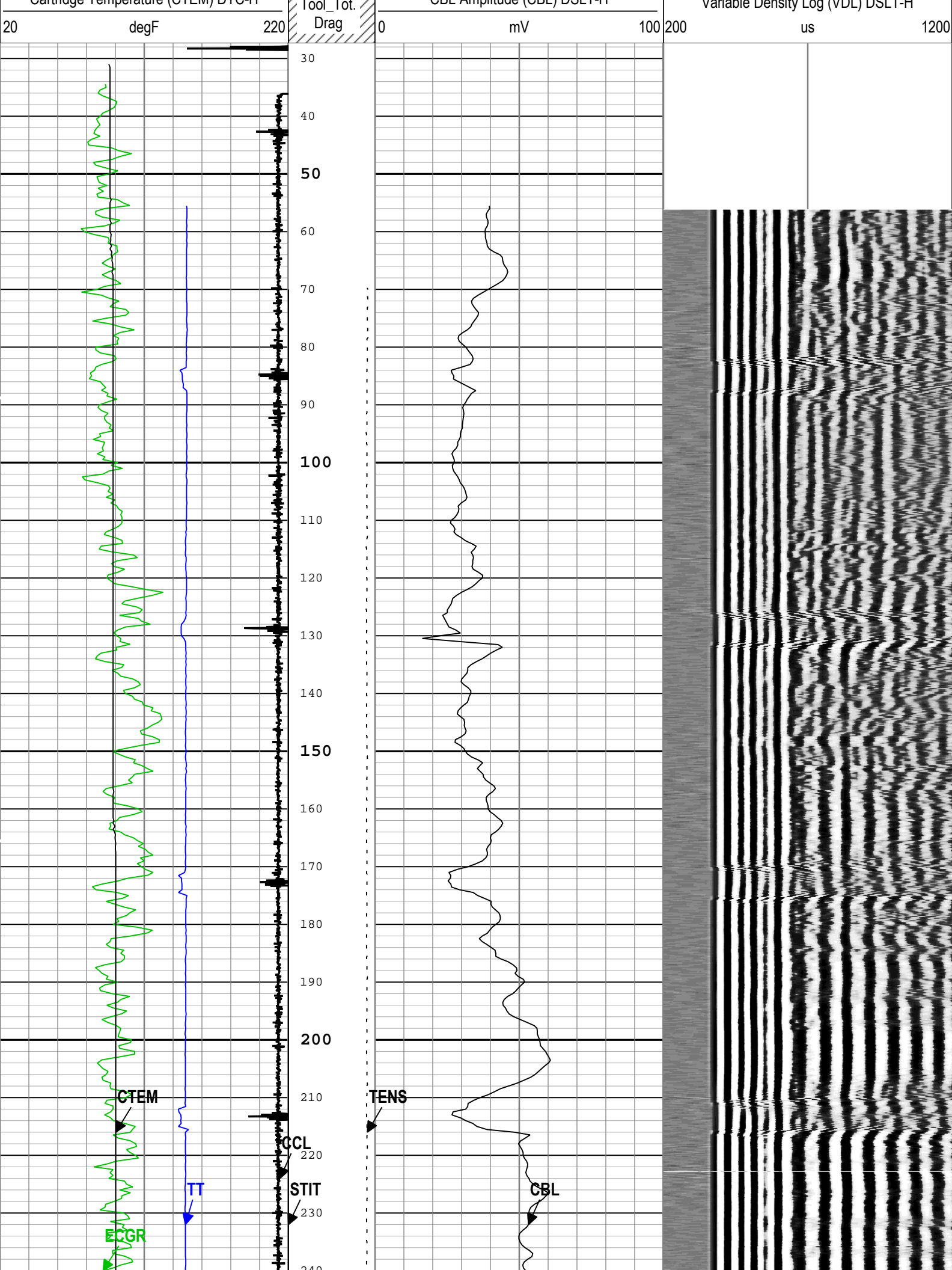
One

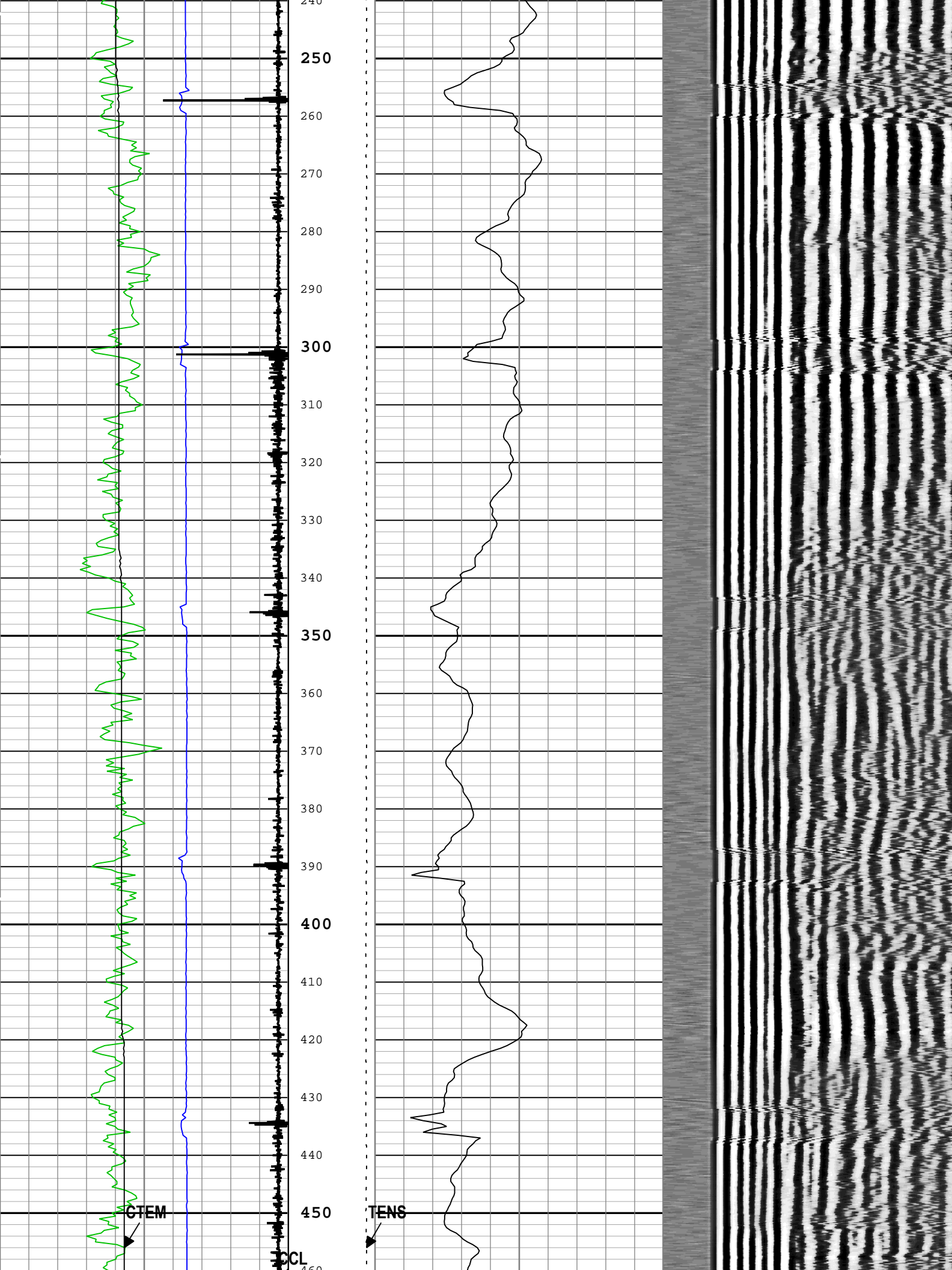
Depth Measuring Device

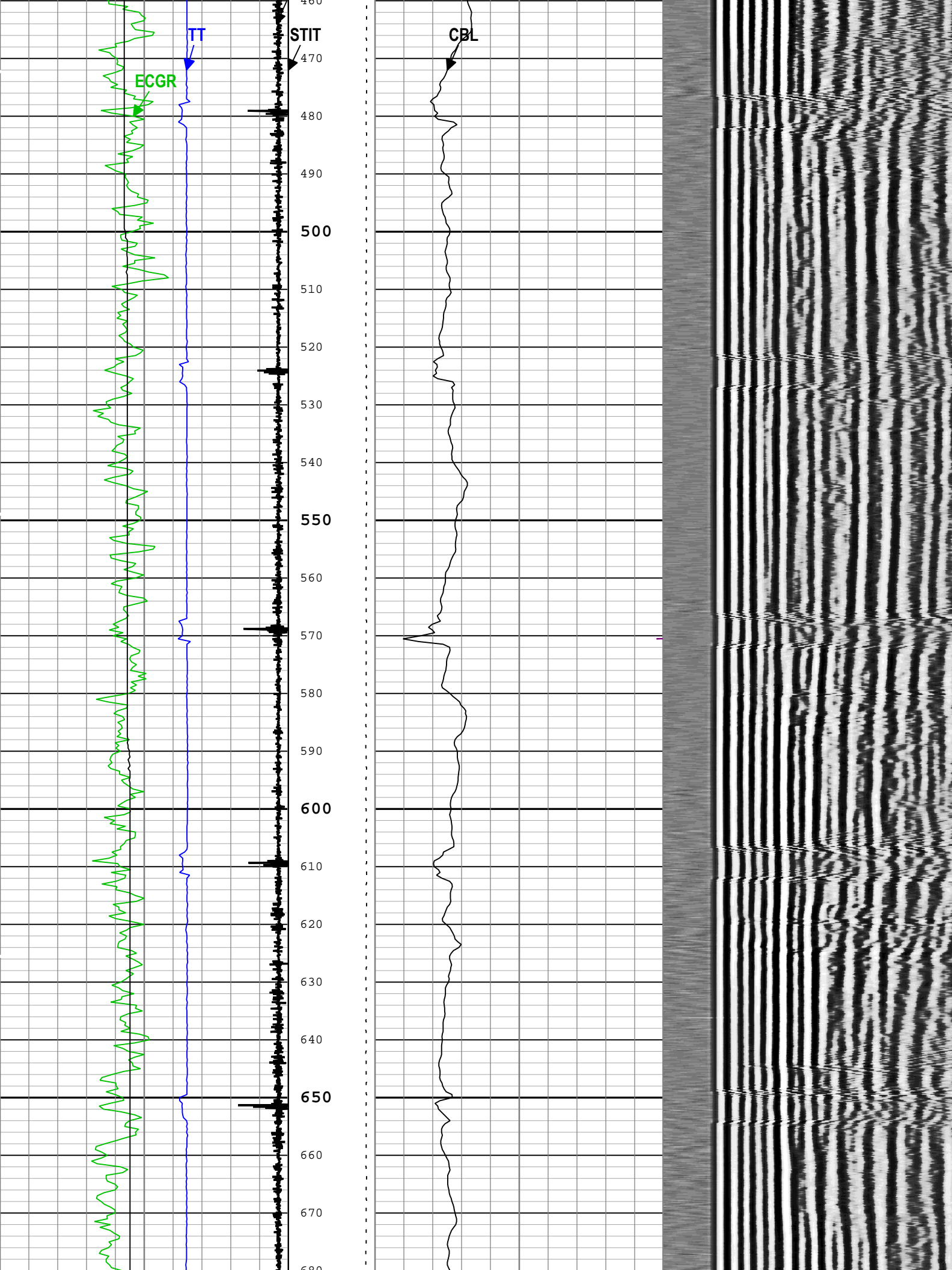
Type	IDW-JA
Serial Number	5896
Calibration Date	29-Apr-2016
Calibrator Serial Number	
Calibration Cable Type	7-39P-LXS
Wheel Correction 1	-1
Wheel Correction 2	-3

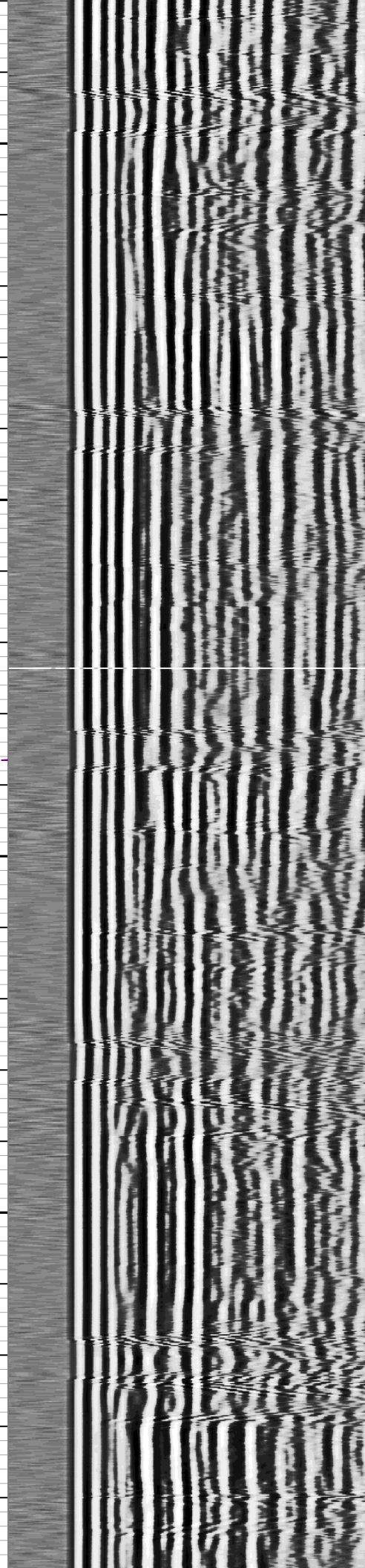
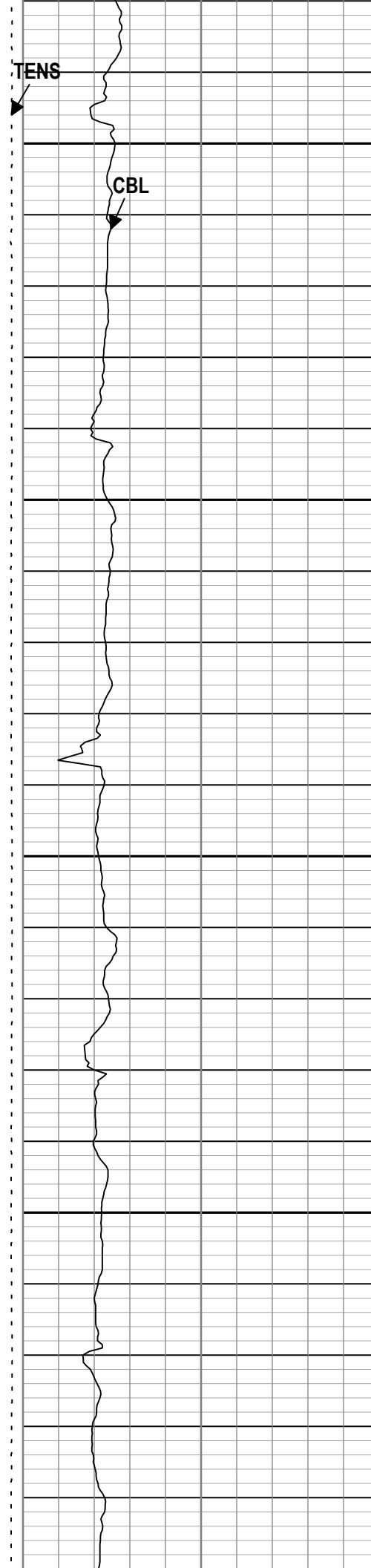
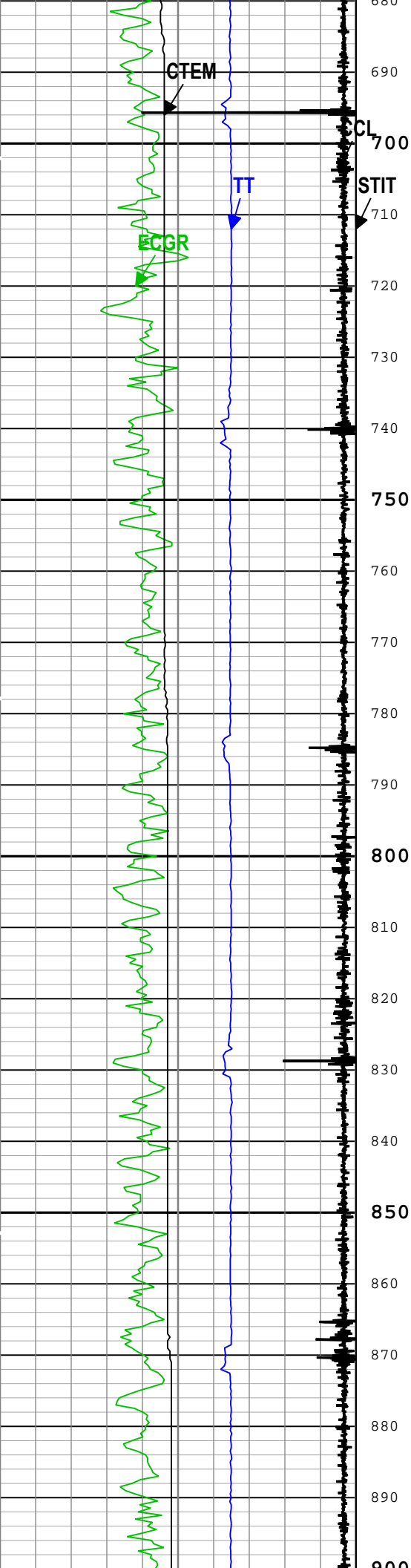
Tension Device

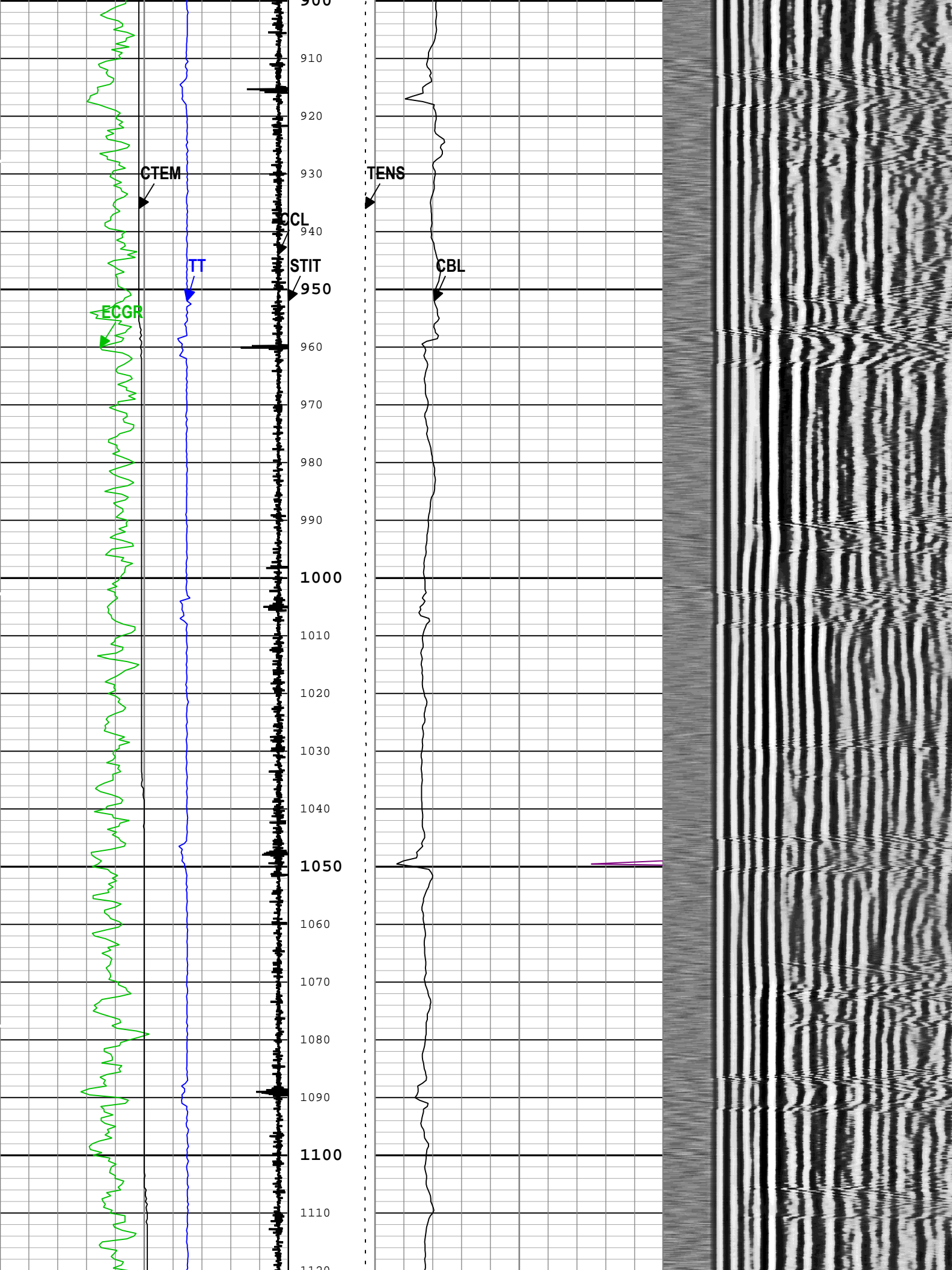
Type	CMTD-B/A
Serial Number	1109

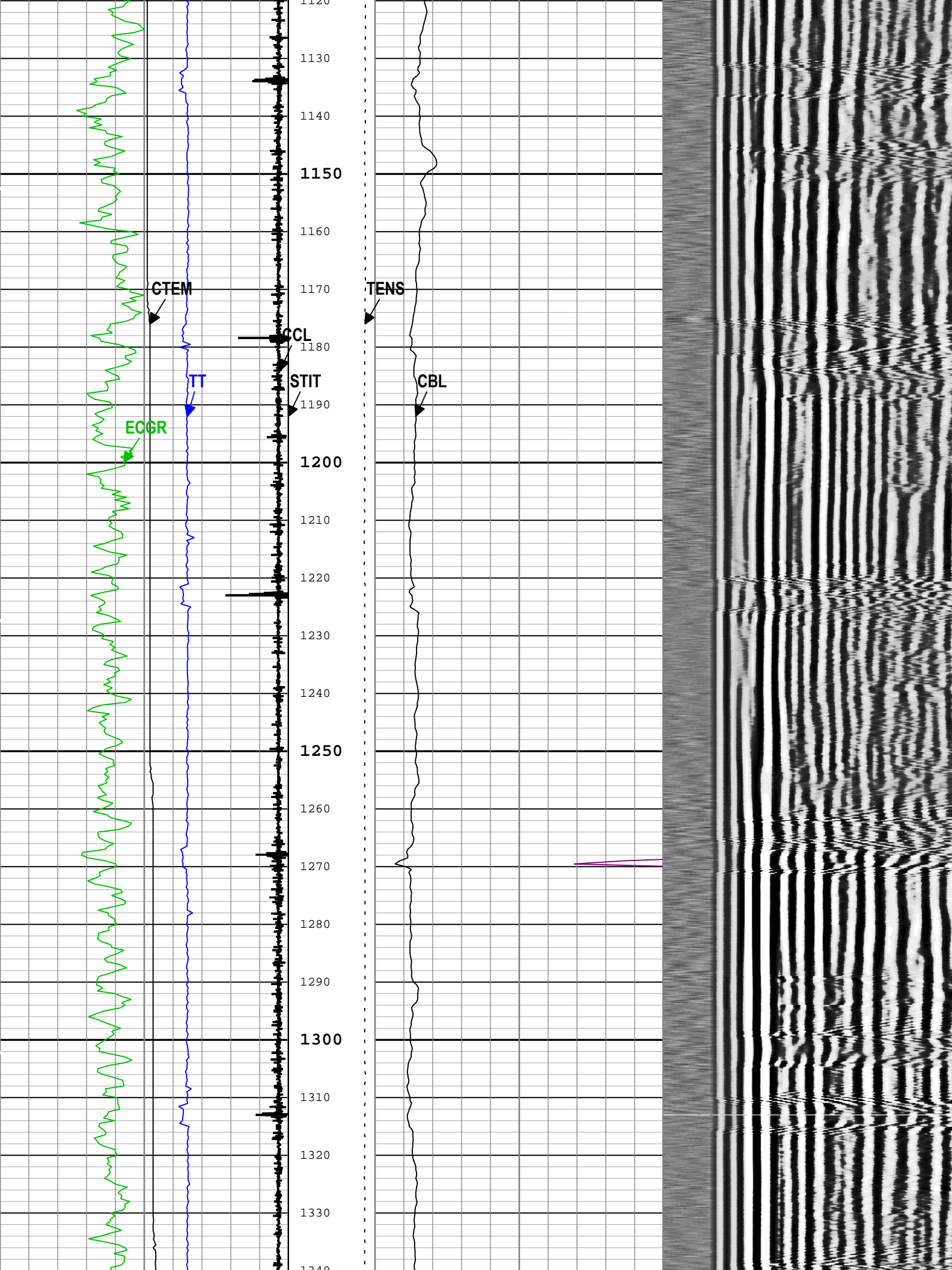


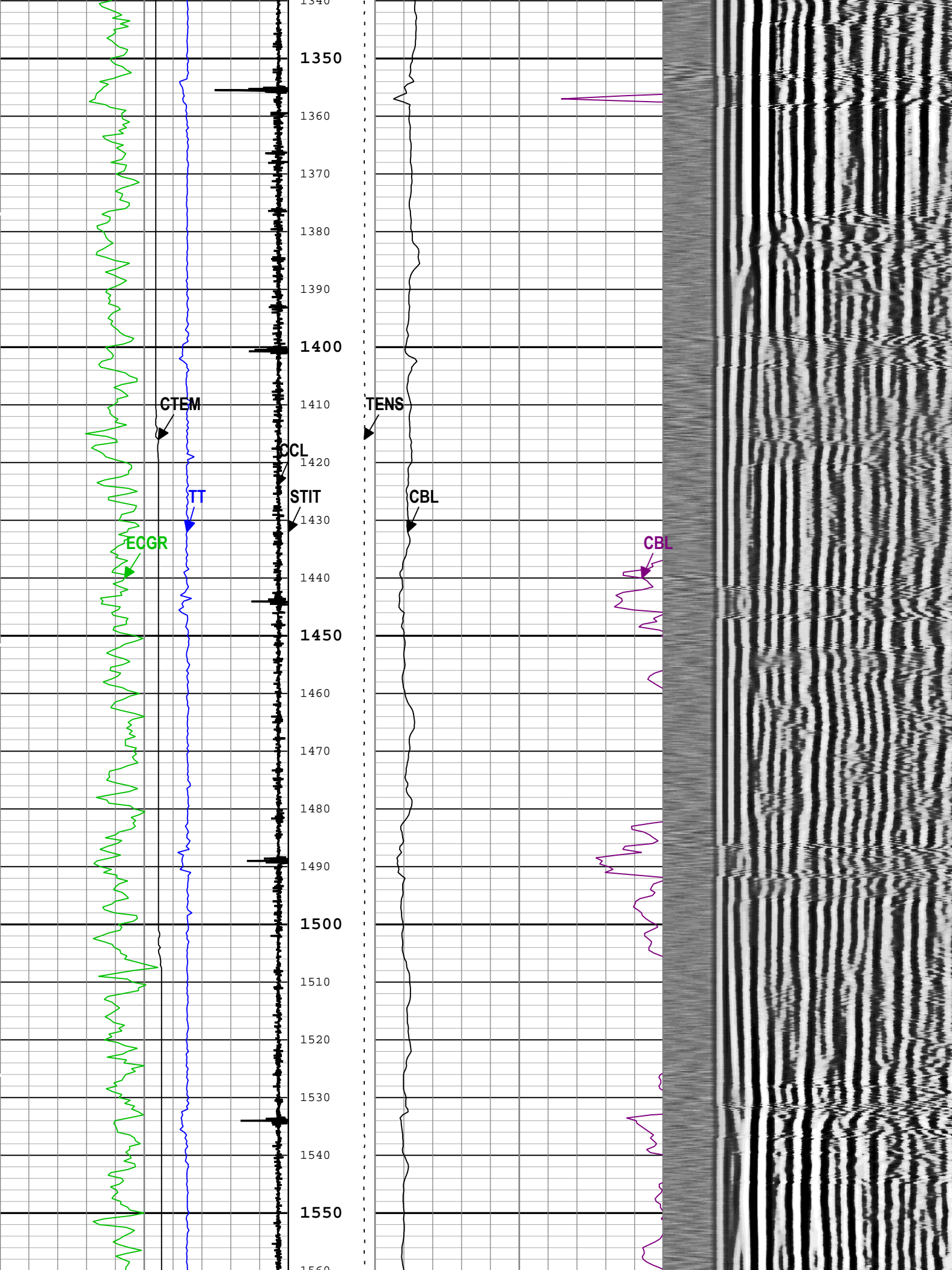


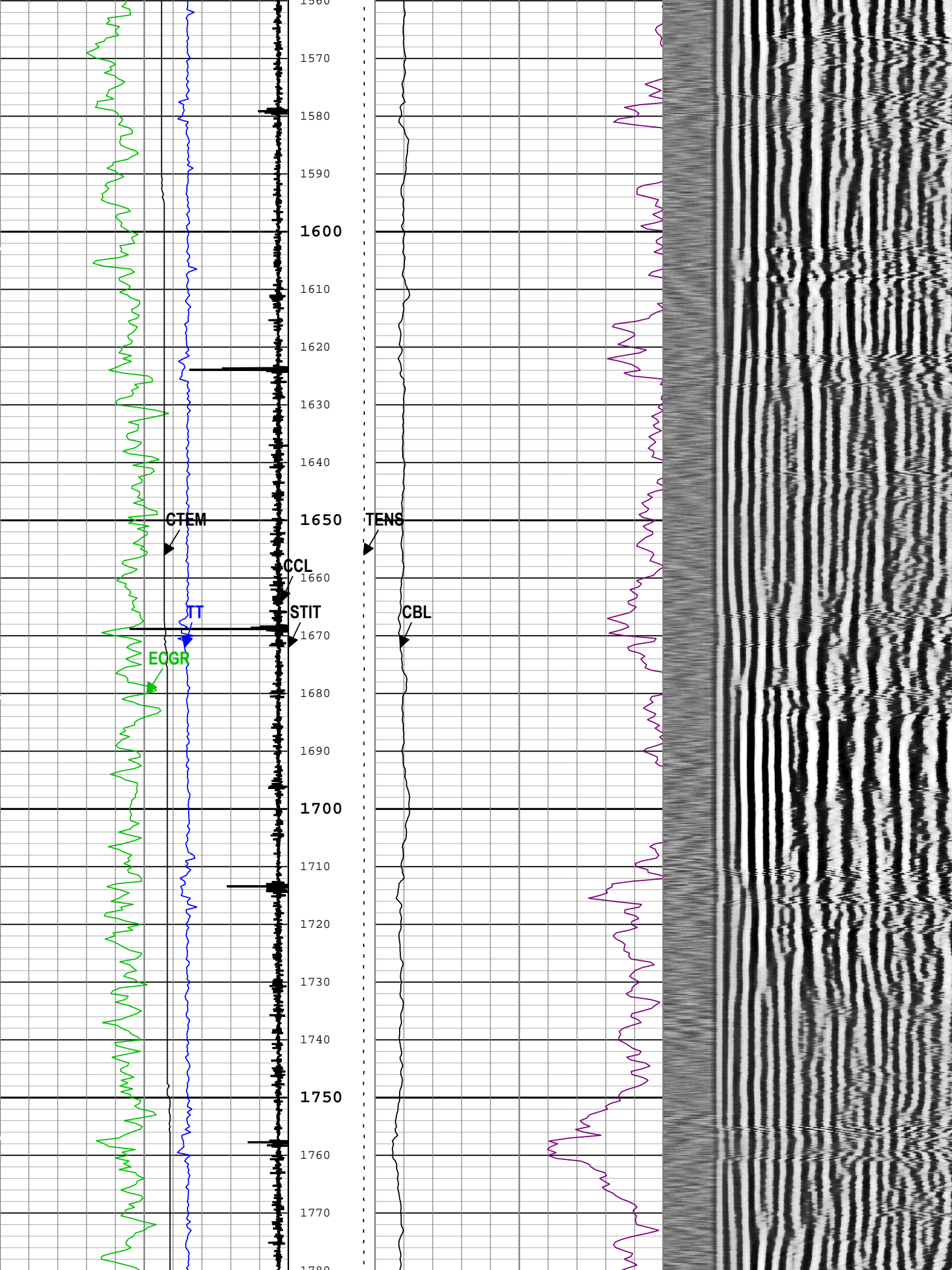


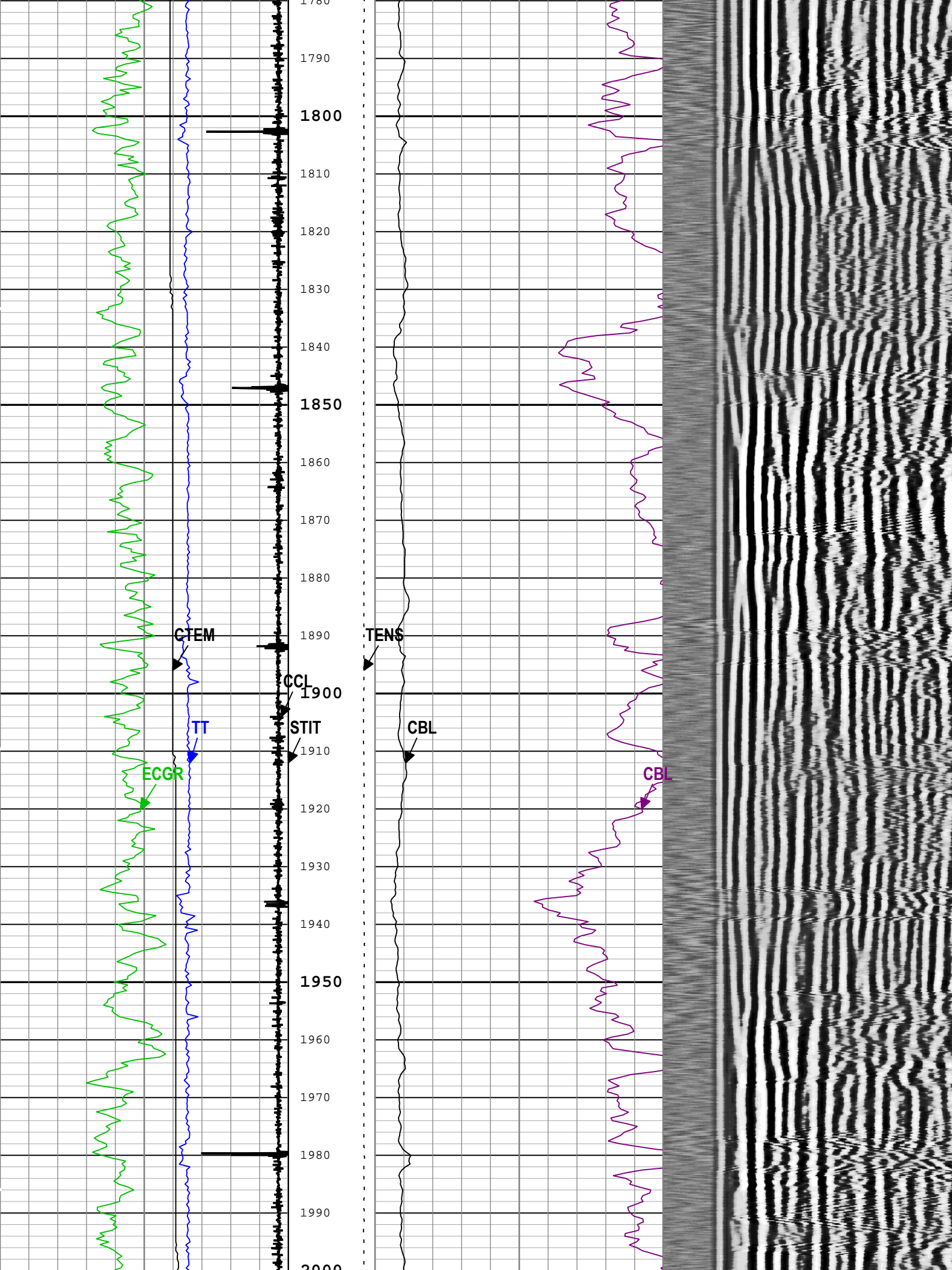


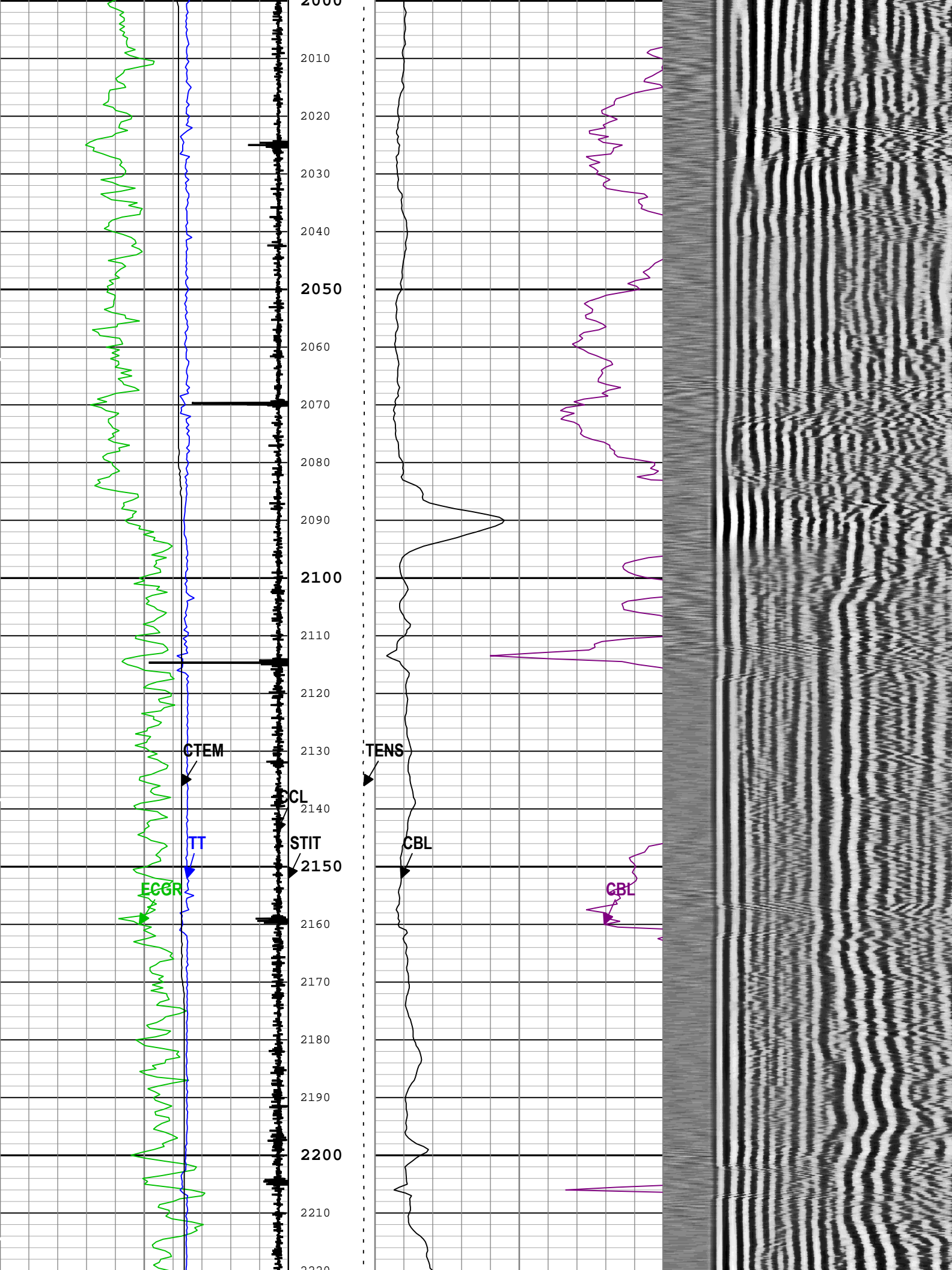


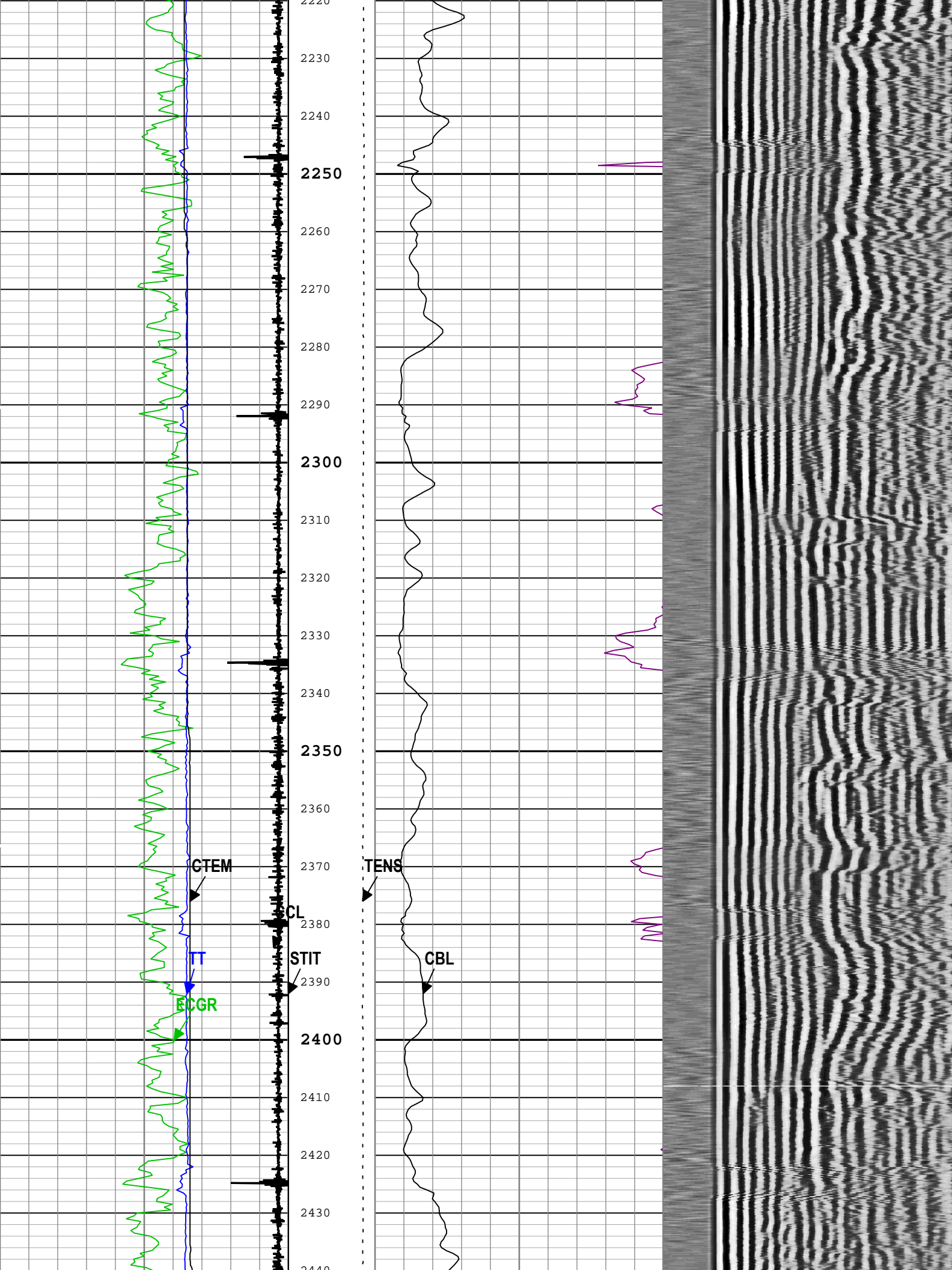


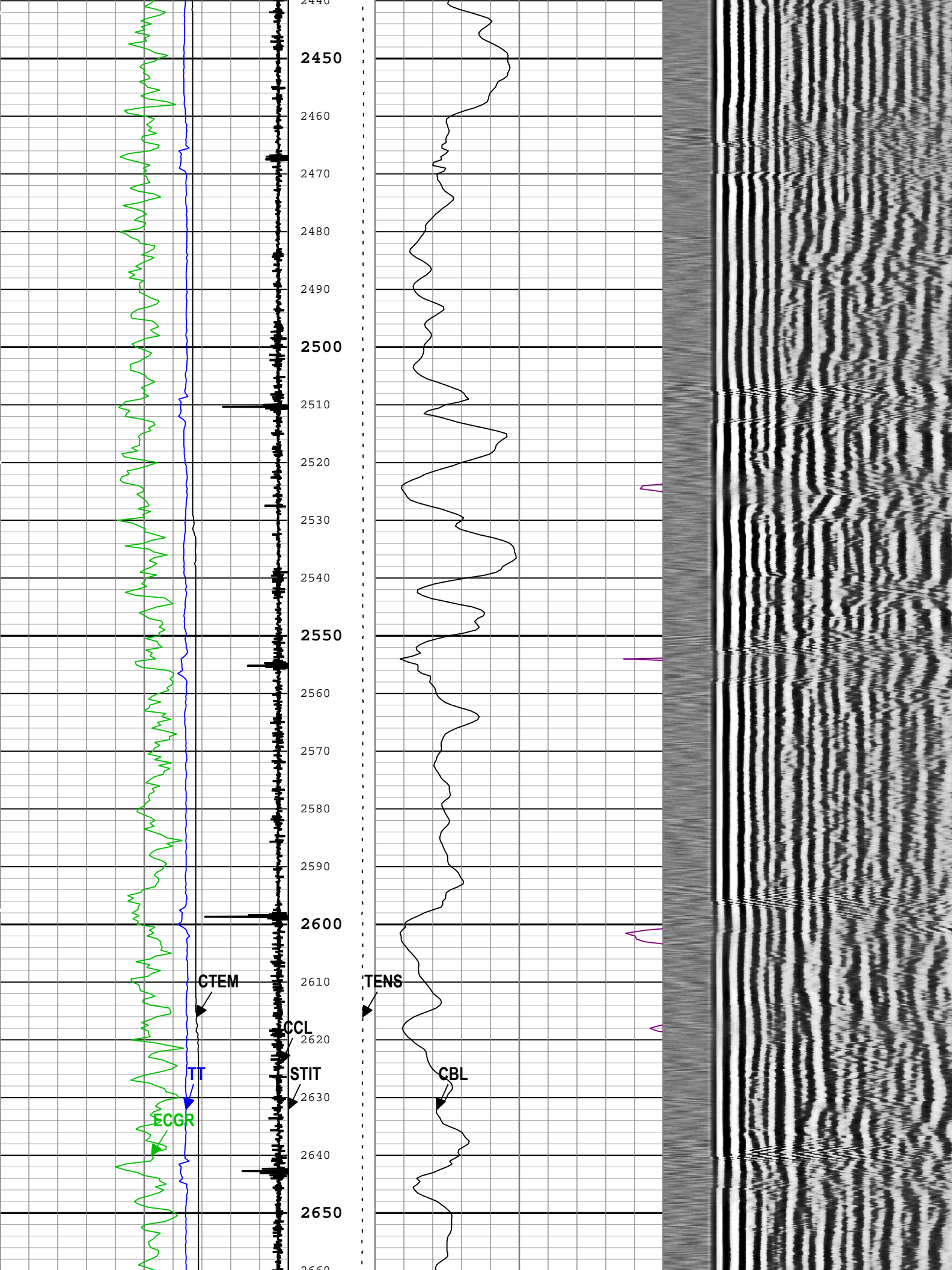


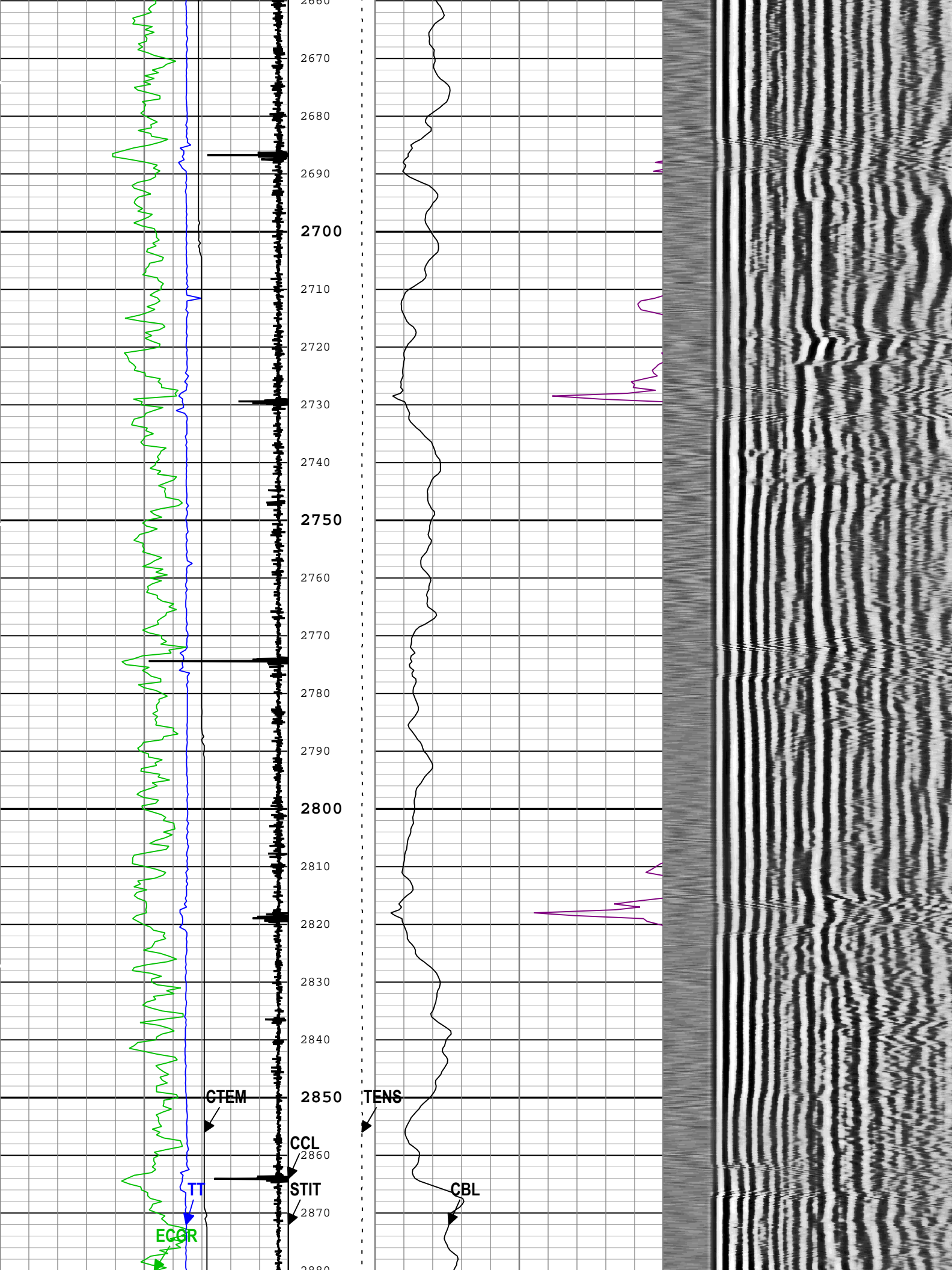


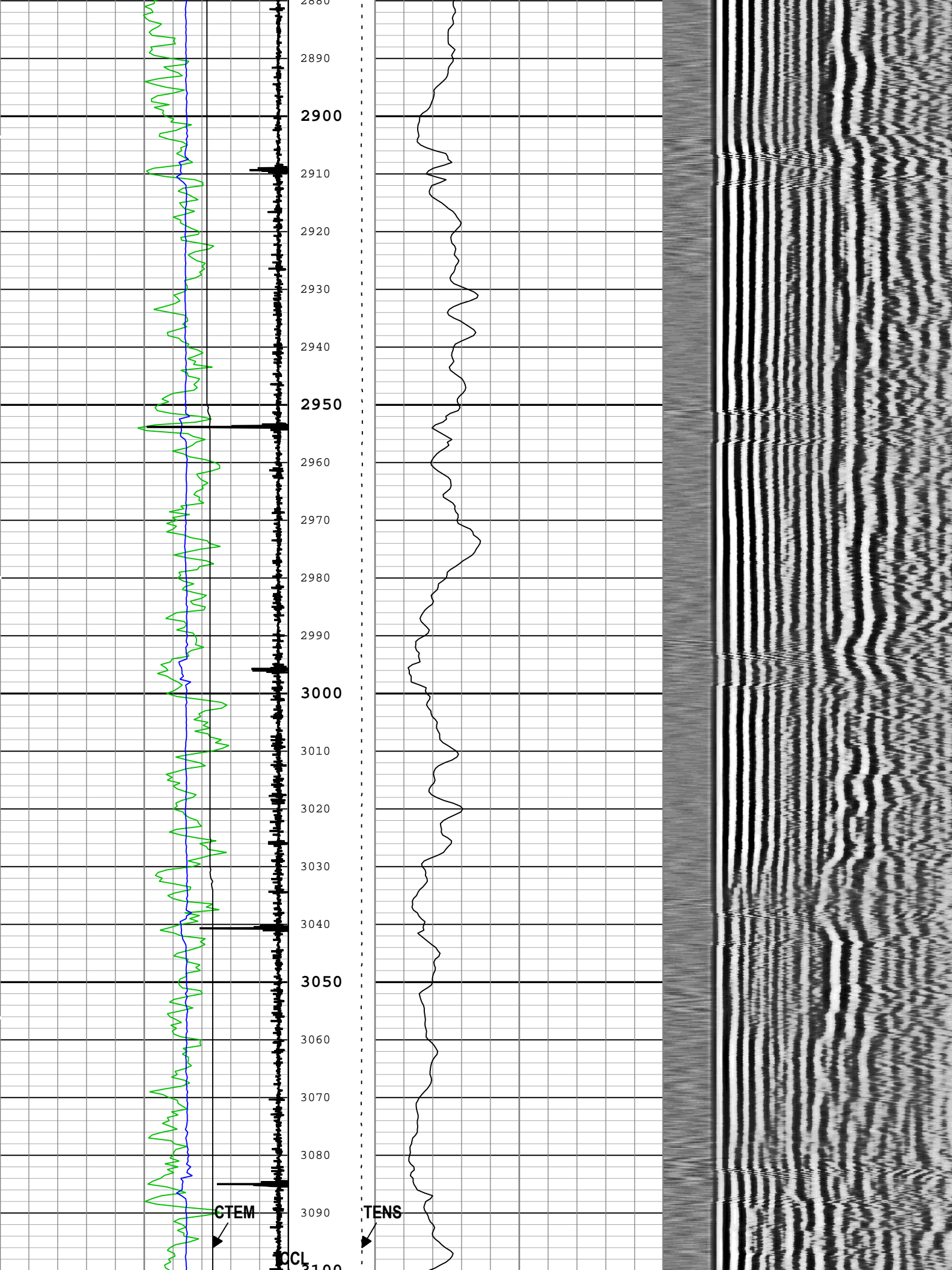


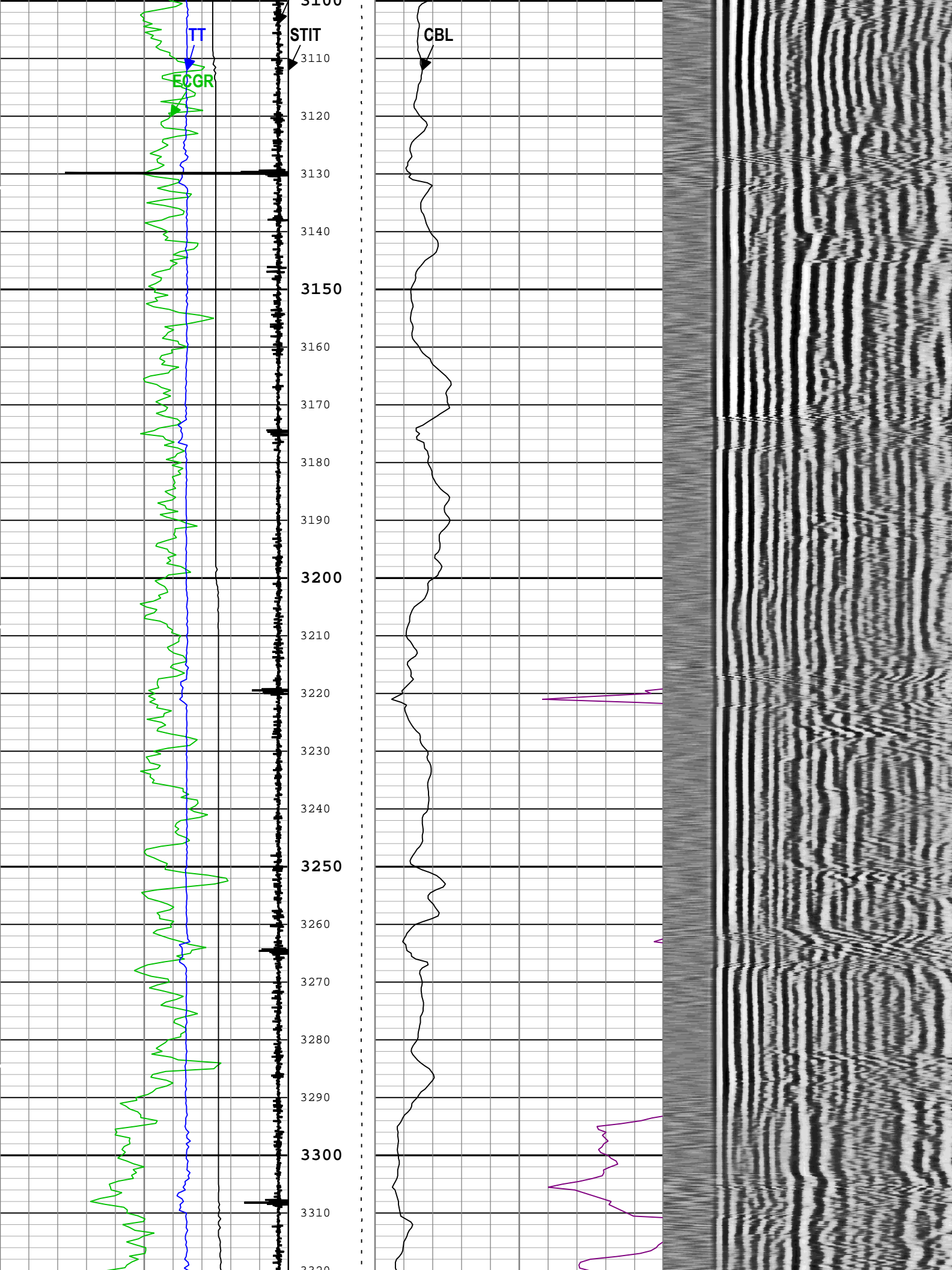


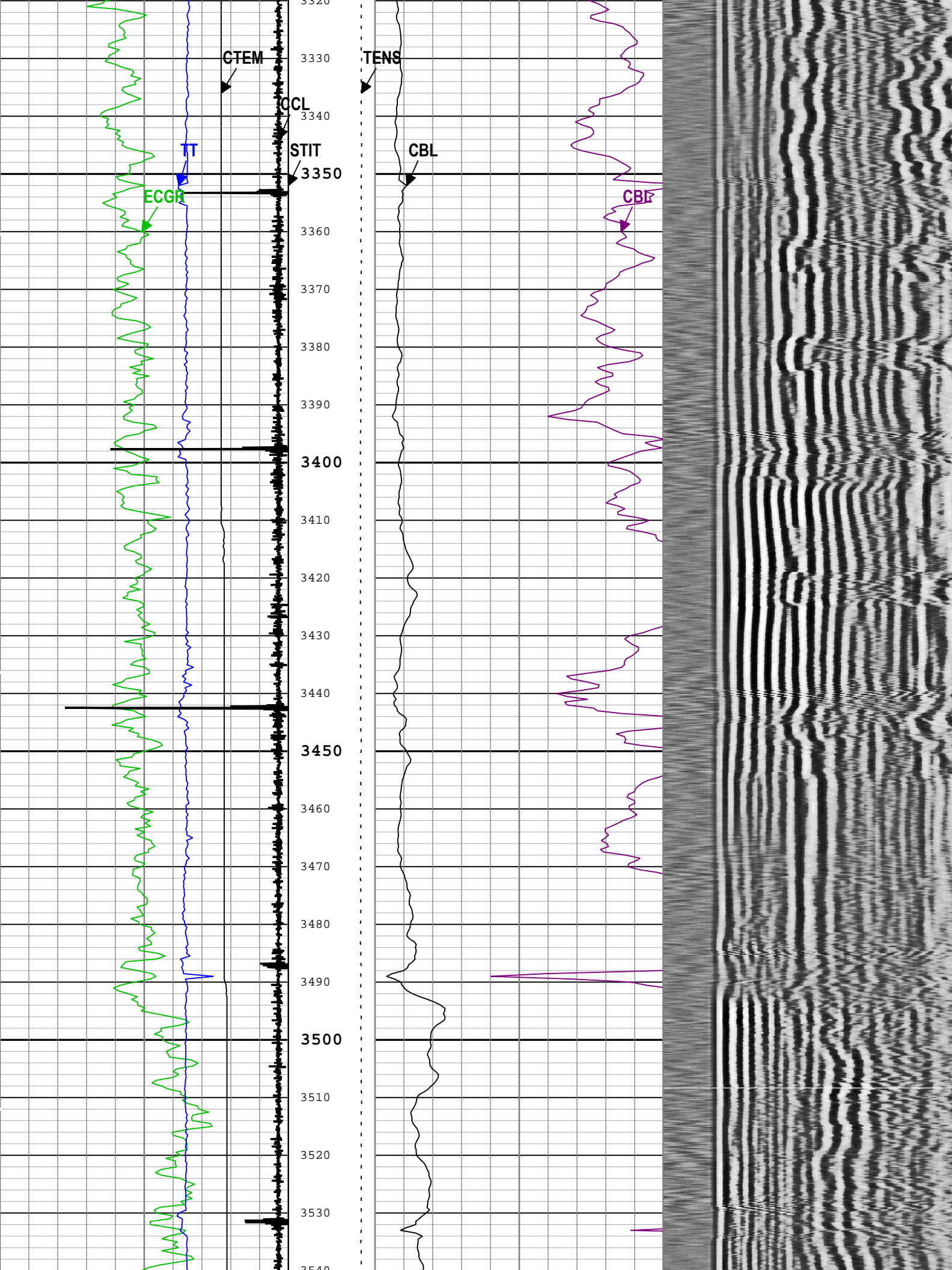


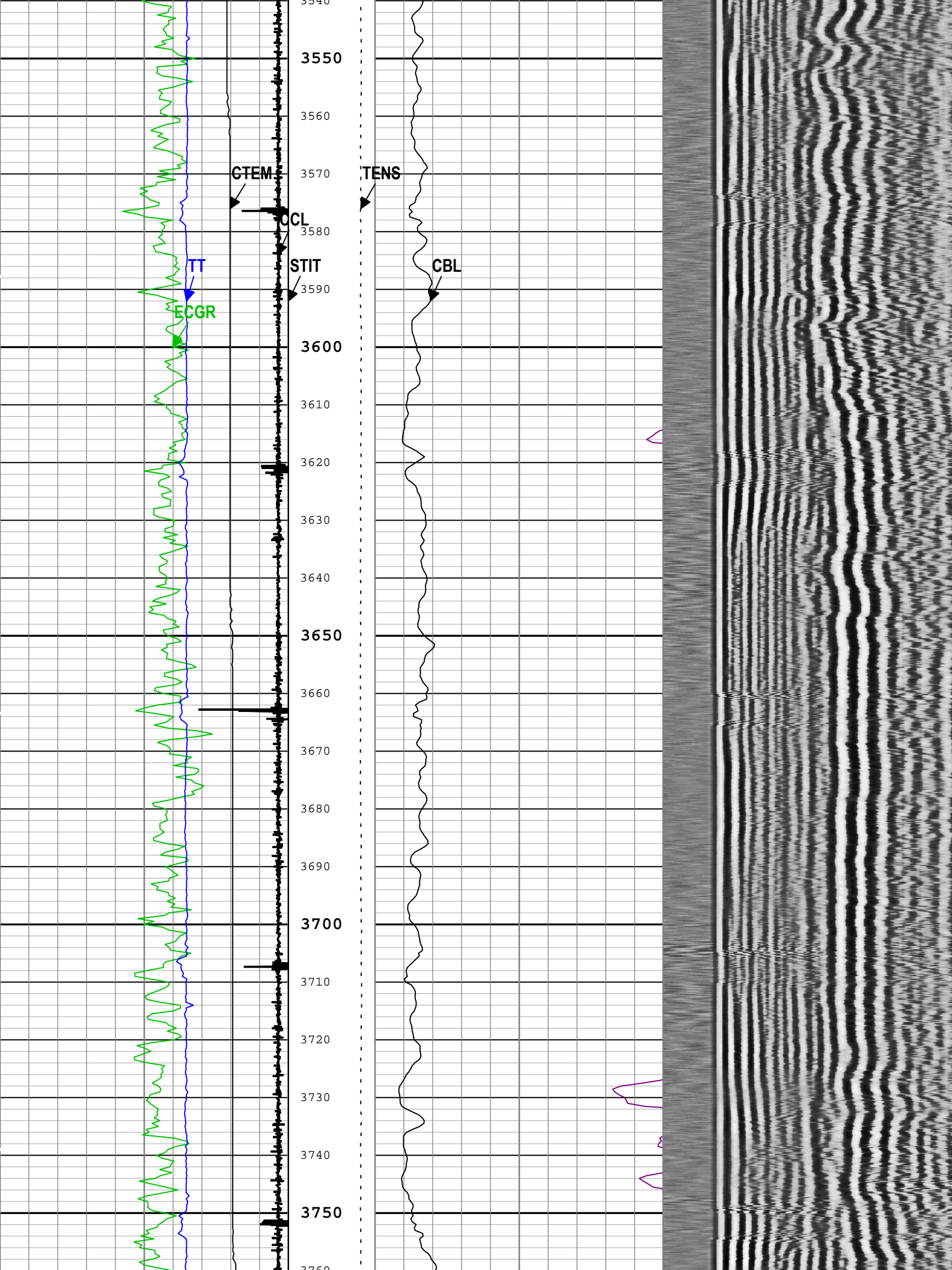


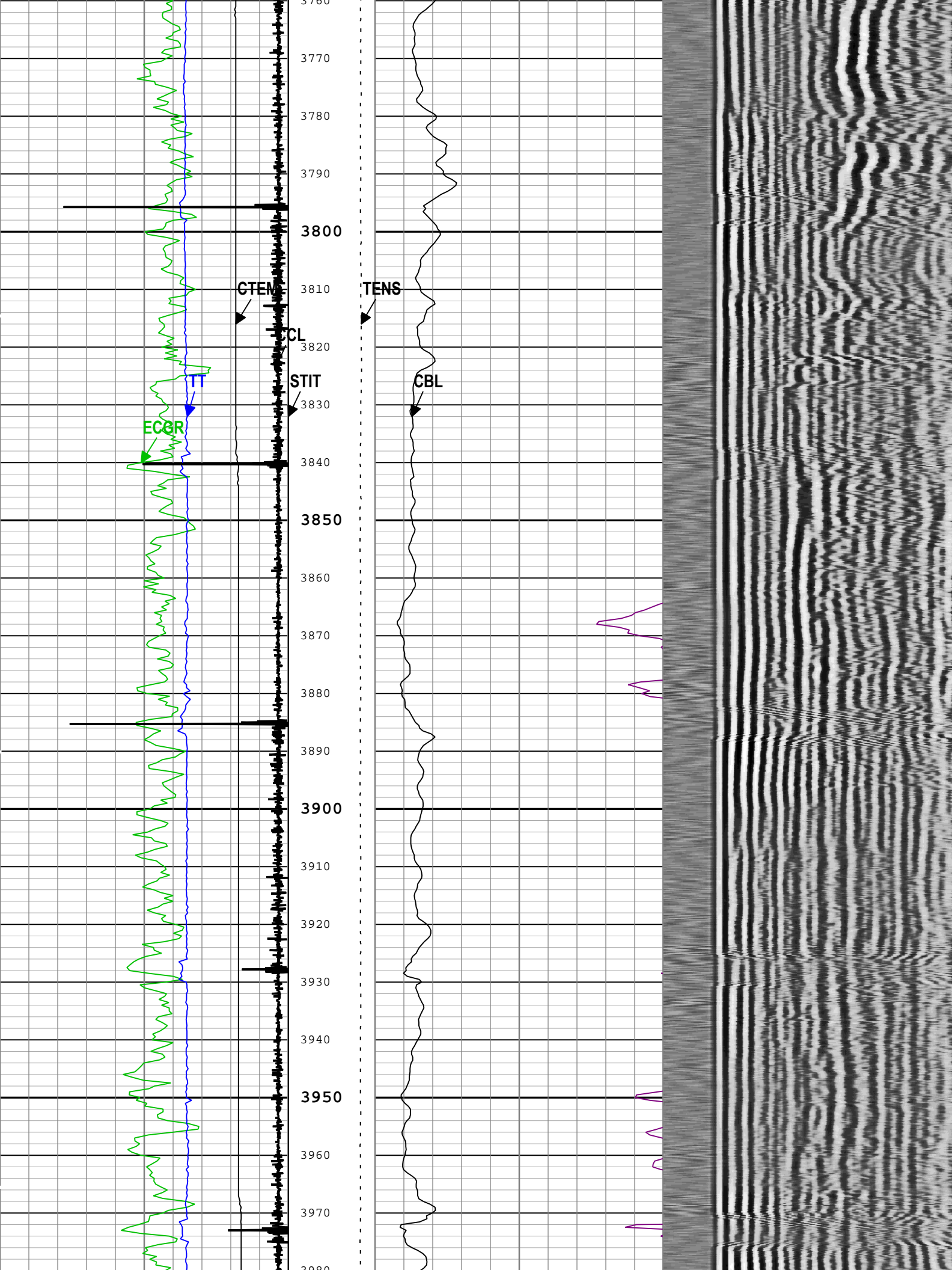


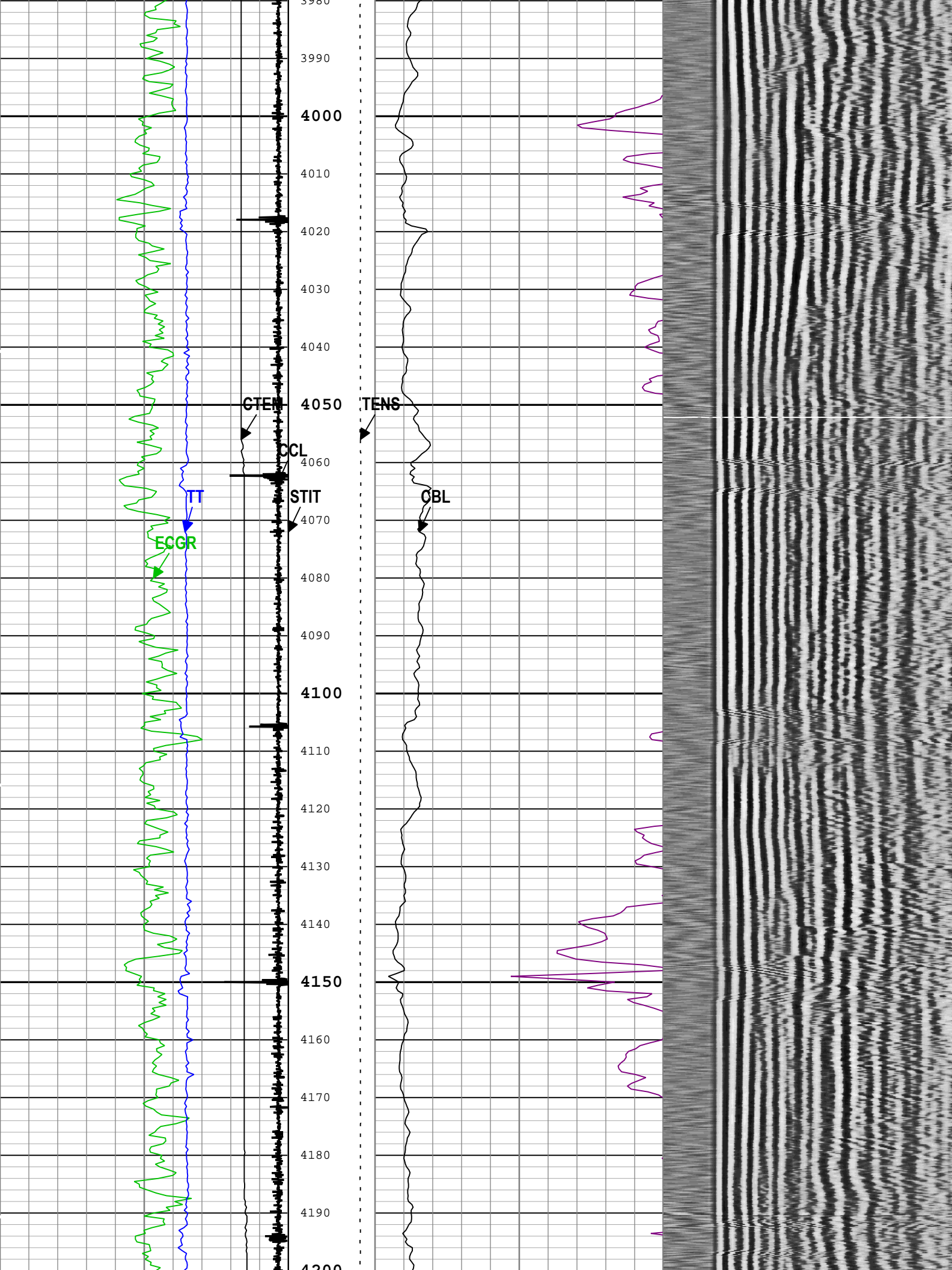


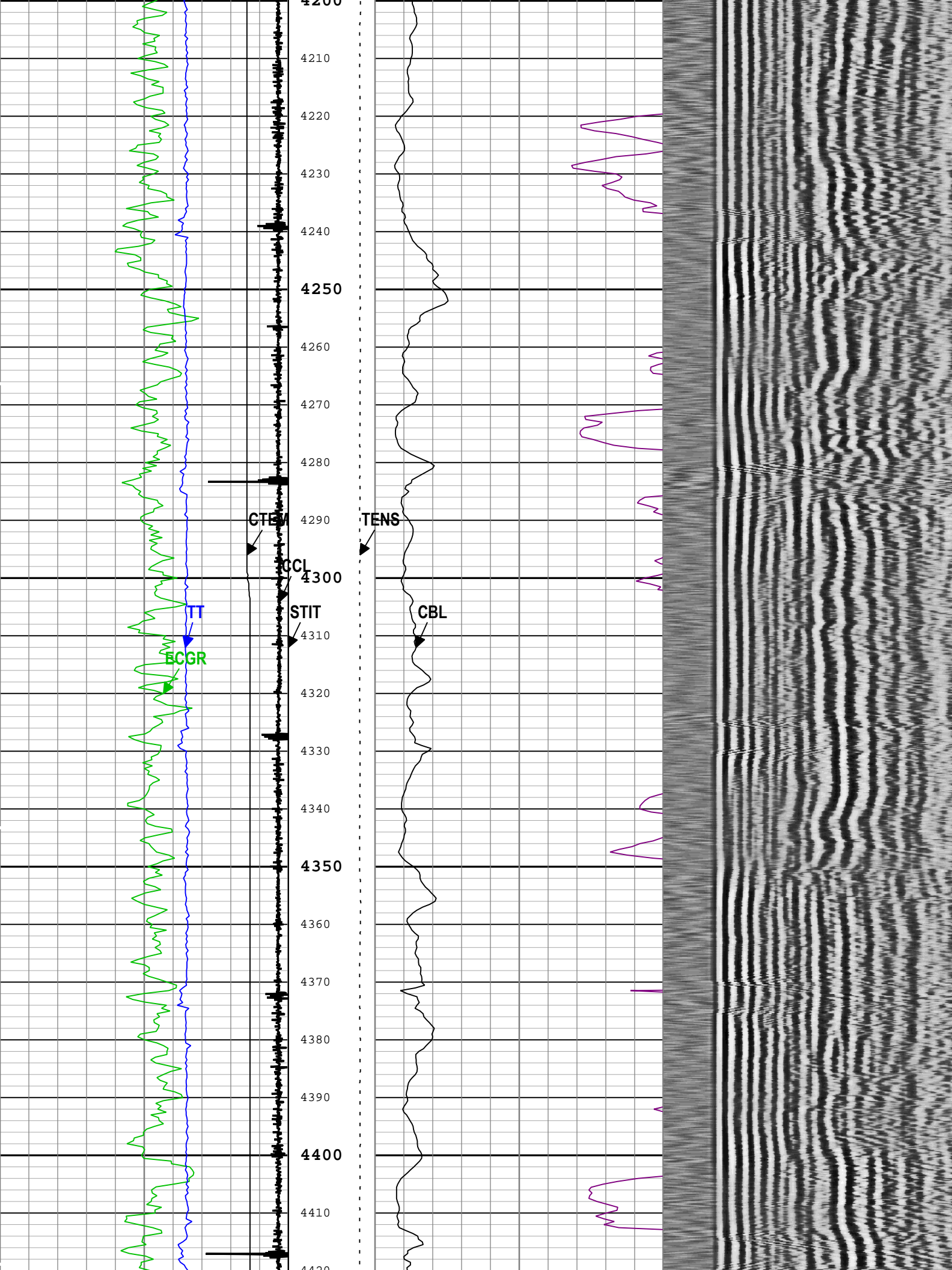


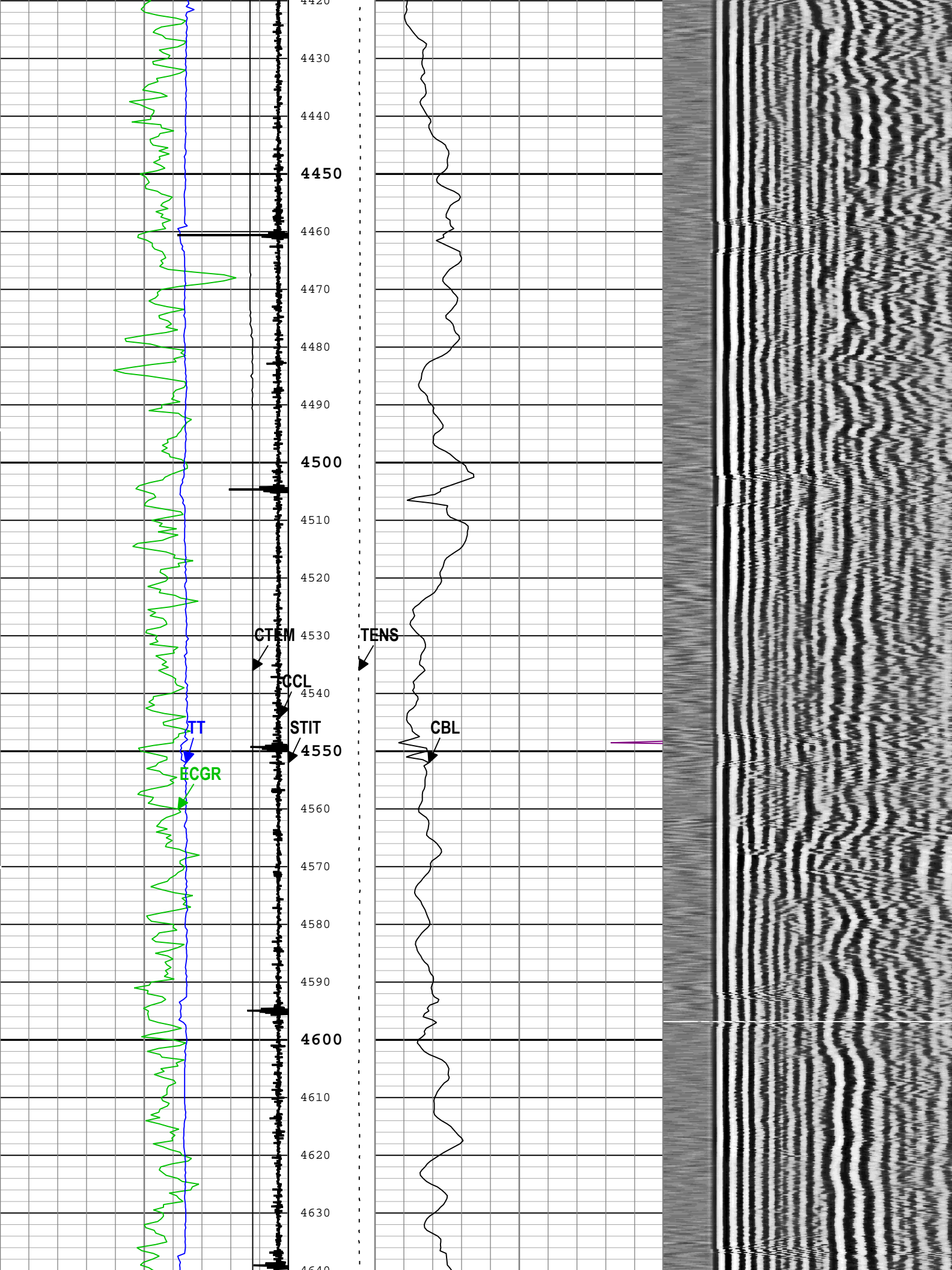


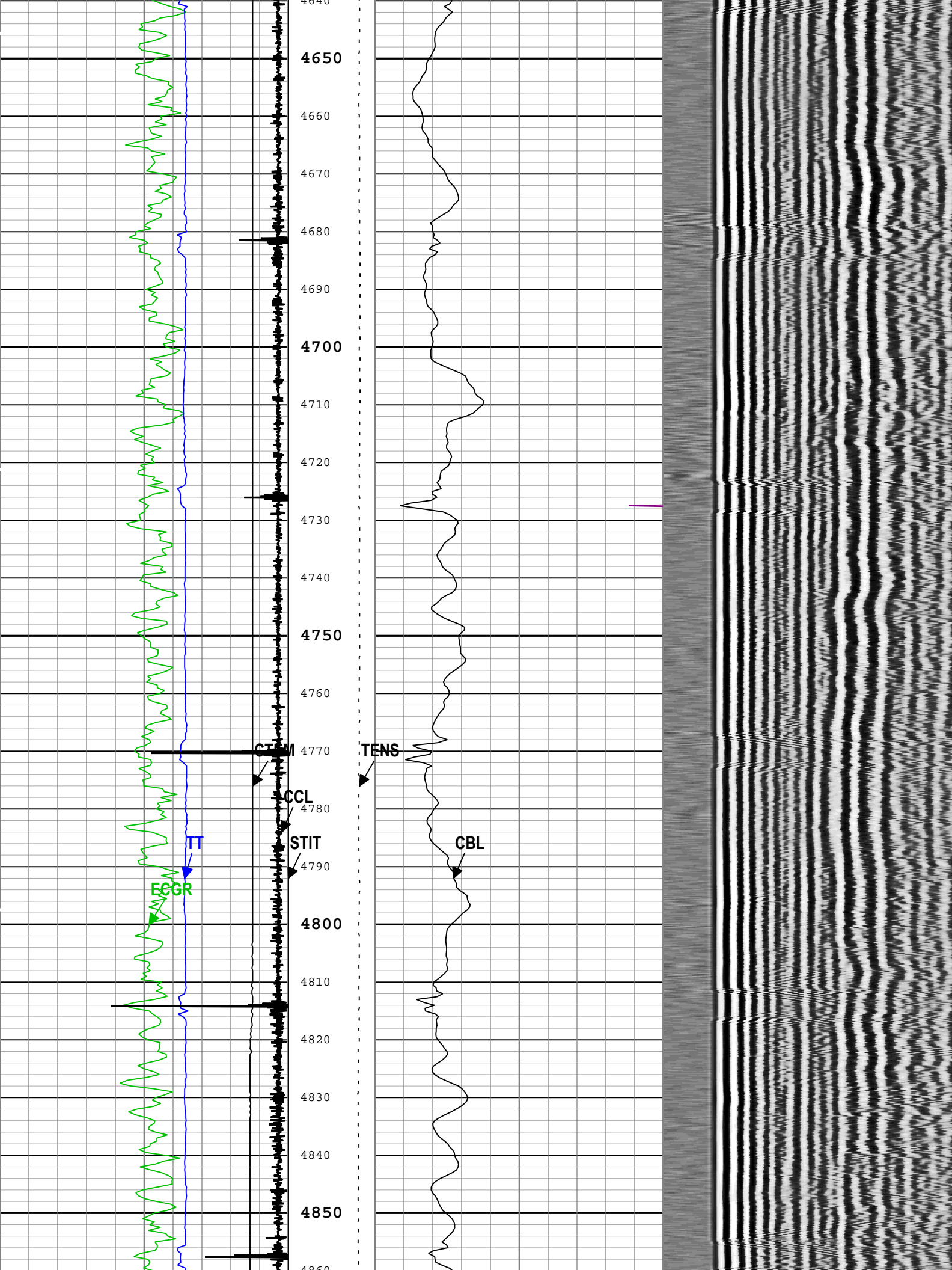


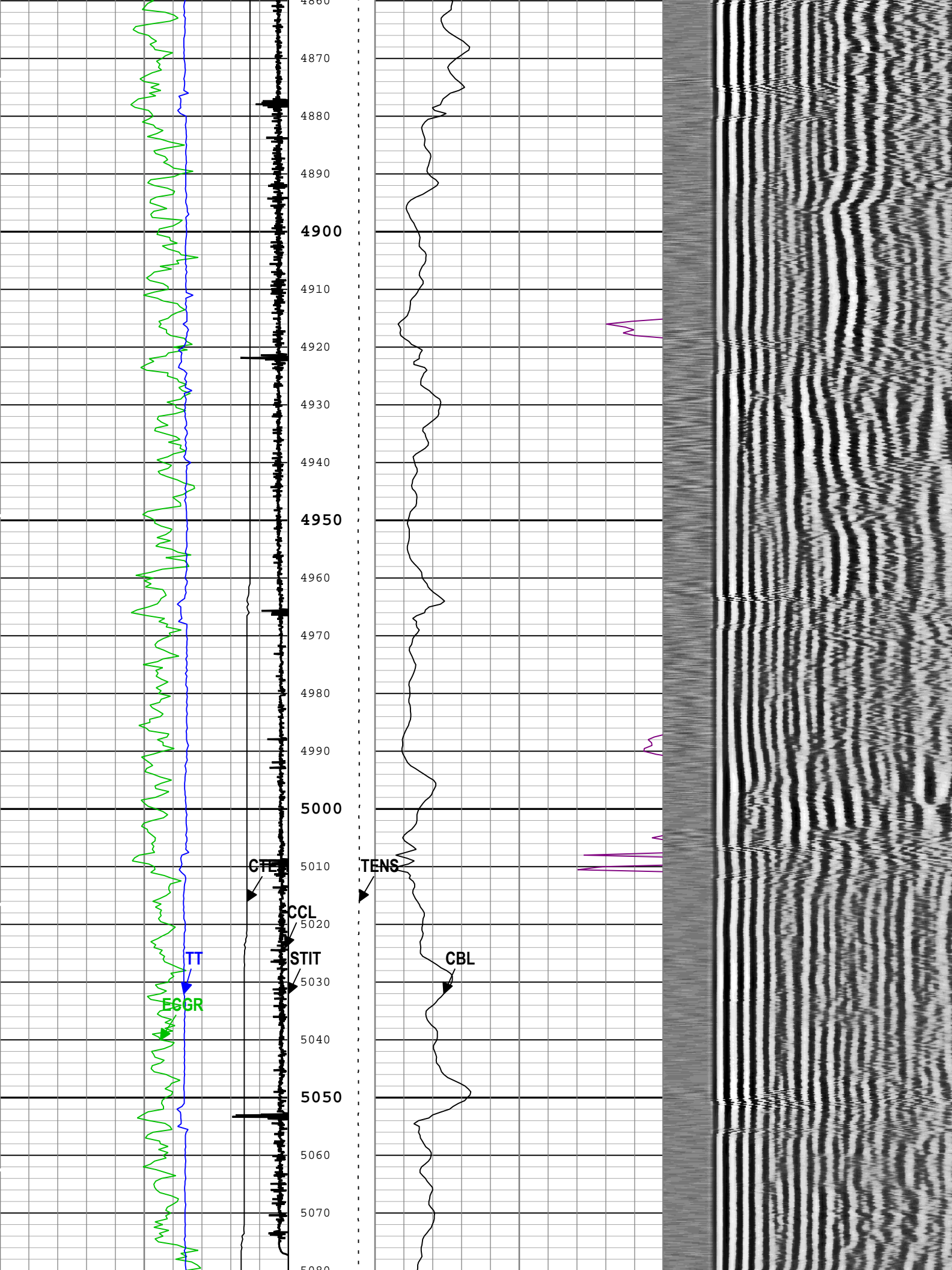


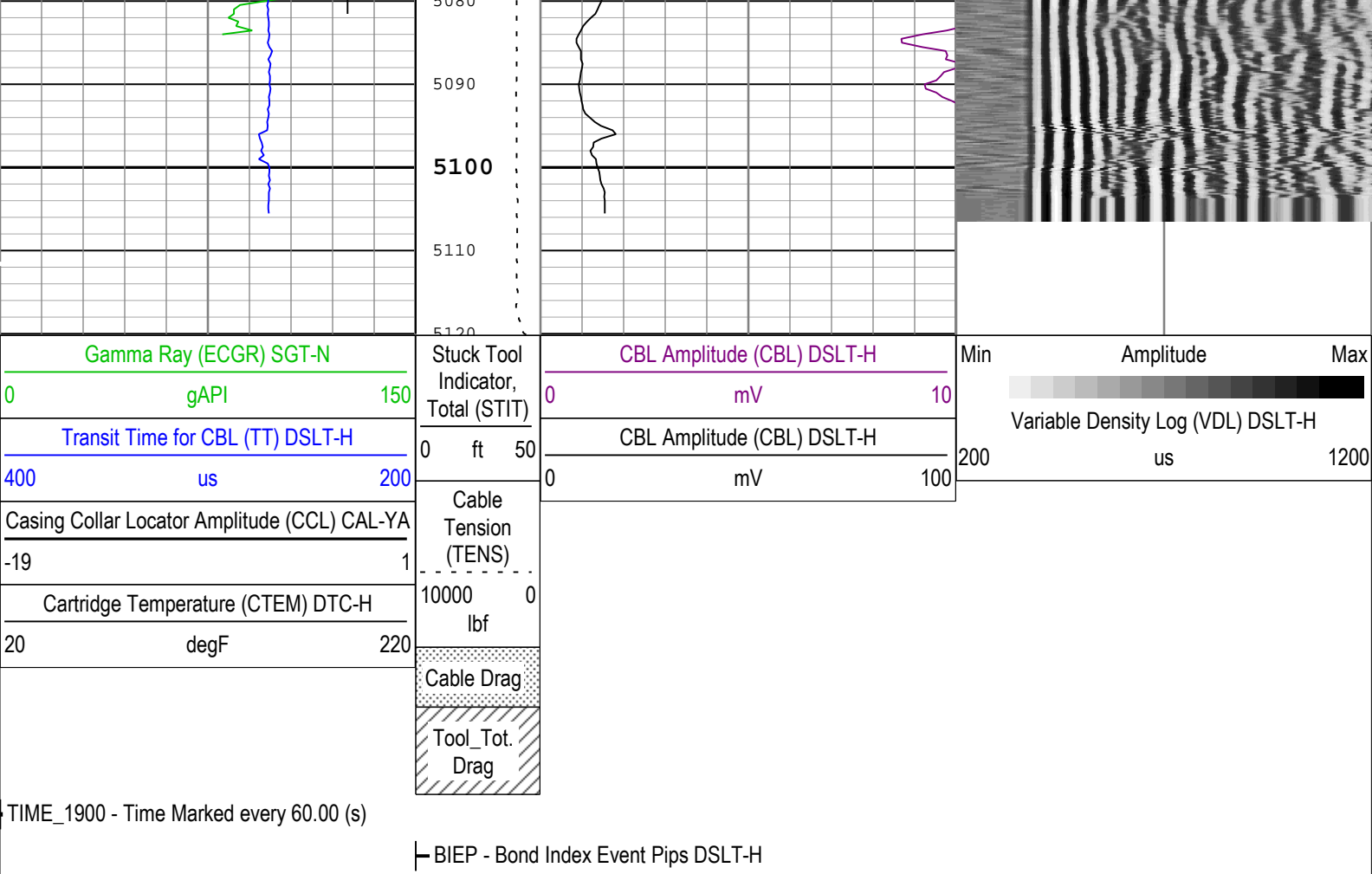












Description: CBL_VDL Format: Log (Sonic CBL with VDL) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 21-Sep-2016 10:56:13

Channel Processing Parameters

One: Parameters

Parameter	Description	Tool	Value	Unit
AMSG	Auxiliary Minimum Sliding Gate	DSLTH	255	us
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	47	us
CBLO	Casing Bottom (Logger)	WLSESSION	15910	ft
CBRA	CBL LQC Reference Amplitude in Free Pipe	DSLTH	72	mV
CCL_MULTIPLIER	Casing Collar Locator Multiplier	CAL-YA	15	
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	Depth Zoned	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	DSLT-H	242	us
NMXG	Near Maximum Sliding Gate	DSLT-H	913	us
SGAD	Sliding Gate Status	DSLT-H	Off	
SGDT	Sliding Gate Delta-T	DSLT-H	68	us/ft

Depth Zone Parameters			
Parameter	Value	Start (ft)	Stop (ft)
BS	24	27.42	101
BS	13.5	101	2079
BS	8.5	2079	5120.17
MCI	26.48	27.42	101
MCI	14.81	101	2079
MCI	4.75	2079	5120.17
All depth are actual.			

Tool Control Parameters	
-------------------------	--

One: Parameters				
Parameter	Description	Tool	Value	Unit
MODE	DSLT Acquisition Mode	DSLT-H	CBL	
RATE	DSLT Firing Rate	DSLT-H	15 Hz	
DTFS	DSLT Telemetry Frame Size	DSLT-H	536	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h
SGAI	Selectable Acquisition Gain	DSLT-H	x1	

One									
0 PSI Repeat Pass									

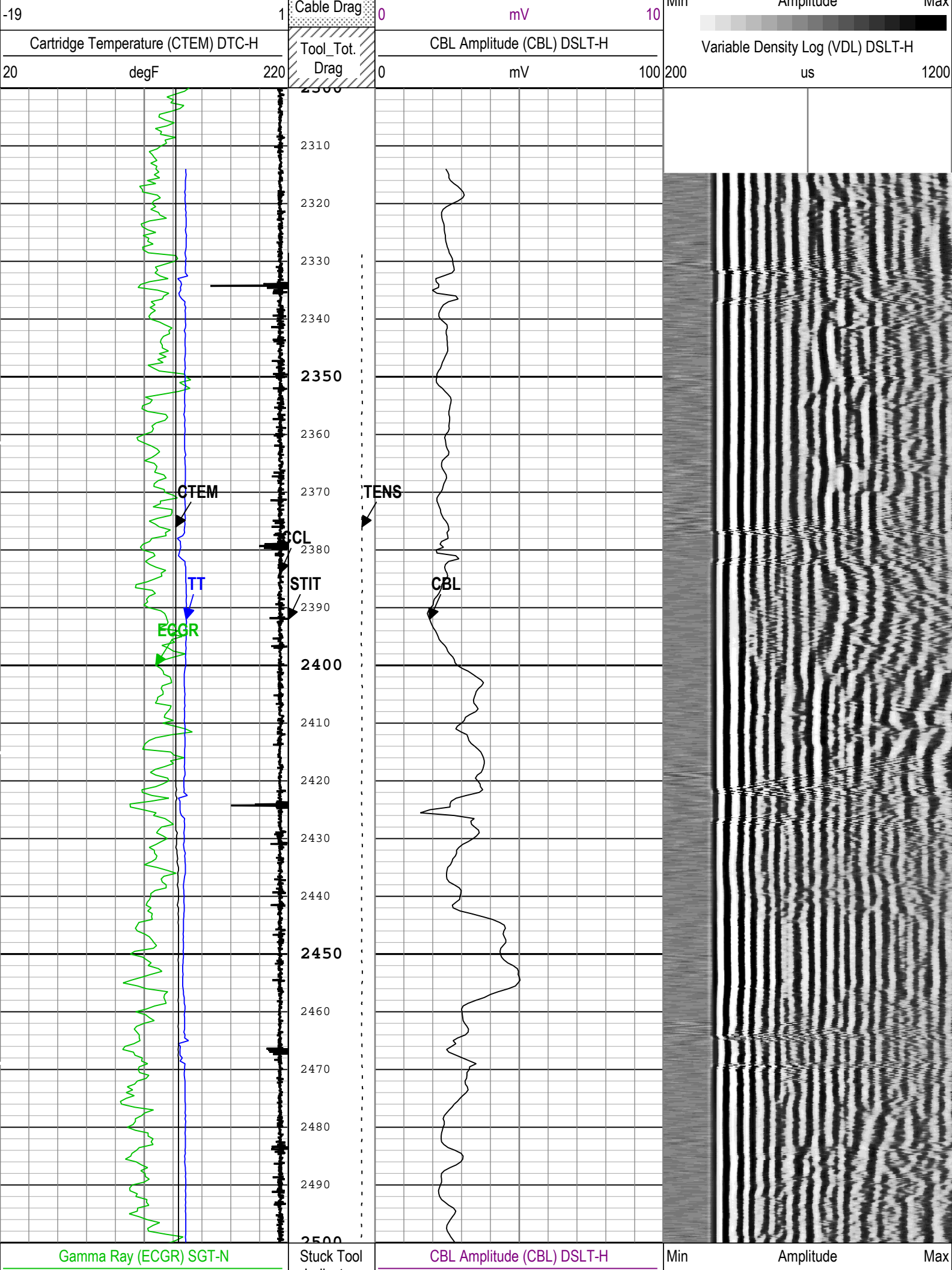
Software Version	
Acquisition System	Version
Maxwell 2016 SP2	6.2.68624.3100

Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[3]:Up	Up	2328.23 ft	3408.78 ft	21-Sep-2016 8:29:55 AM	21-Sep-2016 8:50:37 AM	ON	15.69 ft	No

All depths are referenced to toolstring zero		
Log	Company:Whiting Oil & Gas Corporation	Well:Razor 25O-2444 One: Log[3]:Up:S008

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: 21-Sep-2016 10:56:19

TIME_1900 - Time Marked every 60.00 (s)													
			BIEP - Bond Index Event Pips DSLT-H										
			Stuck Tool Indicator, Total (STIT)										
			0	ft	50								
Gamma Ray (ECGR) SGT-N			Cable Tension (TENS)										
0	gAPI		150										
Transit Time for CBL (TT) DSLT-H													
400	us		200										
Casing Collar Locator Amplitude (CCL) CAL-YA					CBL Amplitude (CBL) DSLT-H								
					Min								
					Amplitude								
					Max								



0	gAPI	150	Indicator, Total (STIT)	0	mV	10	<div><div></div></div> Variable Density Log (VDL) DSLT-H	
Transit Time for CBL (TT) DSLT-H			0 ft 50	CBL Amplitude (CBL) DSLT-H		200	us	1200
400	us	200	Cable Tension (TENS)	0	mV	100		
Casing Collar Locator Amplitude (CCL) CAL-YA								
-19								
Cartridge Temperature (CTEM) DTC-H								
20	degF	220	10000 lbf					
			Cable Drag					
			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: 21-Sep-2016 10:56:19

Channel Processing Parameters

One: Parameters

Parameter	Description	Tool	Value	Unit
AMSG	Auxiliary Minimum Sliding Gate	DSLTH	255	us
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	8.5	in
CBLG	CBL Gate Width	DSLTH	Time Zoned	us
CBLO	Casing Bottom (Logger)	WLSESSION	15910	ft
CBRA	CBL LQC Reference Amplitude in Free Pipe	DSLTH	72	mV
CCL_MULTIPLIER	Casing Collar Locator Multiplier	CAL-YA	15	
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	Time Zoned	
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	Time Zoned	us
NMXG	Near Maximum Sliding Gate	DSLTH	913	us
SGAD	Sliding Gate Status	DSLTH	Off	
SGDT	Sliding Gate Delta-T	DSLTH	Time Zoned	us/ft

Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
CBLG	32	21-Sep-2016 08:29:55	21-Sep-2016 08:36:32	3408.78	3072.03
CBLG	30	21-Sep-2016 08:36:32	21-Sep-2016 08:36:48	3072.03	3058.24
CBLG	21	21-Sep-2016 08:36:48	21-Sep-2016 08:37:06	3058.24	3042.35

CBLG	47	21-Sep-2016 08:37:06	21-Sep-2016 08:50:37	3042.35	2328.23
MNHTR	100	21-Sep-2016 08:29:55	21-Sep-2016 08:33:33	3408.78	3228.58
MNHTR	305	21-Sep-2016 08:33:33	21-Sep-2016 08:33:46	3228.58	3217.29
MNHTR	514	21-Sep-2016 08:33:46	21-Sep-2016 08:38:09	3217.29	2987.28
MNHTR	100	21-Sep-2016 08:38:09	21-Sep-2016 08:50:37	2987.28	2328.23
NMSG	241	21-Sep-2016 08:29:55	21-Sep-2016 08:36:24	3408.78	3078.99
NMSG	247	21-Sep-2016 08:36:24	21-Sep-2016 08:36:52	3078.99	3054.79
NMSG	242	21-Sep-2016 08:36:52	21-Sep-2016 08:50:37	3054.79	2328.23
SGDT	69	21-Sep-2016 08:29:55	21-Sep-2016 08:37:21	3408.78	3029.65
SGDT	68	21-Sep-2016 08:37:21	21-Sep-2016 08:50:37	3029.65	2328.23

Tool Control Parameters

One: Parameters

Parameter	Description	Tool	Value	Unit
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
SGAI	Selectable Acquisition Gain	DSLTL-H	x1	

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

1650

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 (Measured):

10:32:37 21-Sep-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
CBL Amplitude	mV	Before	60.00	15.00	94.12	174.00	
CBL Reference Amplitude (CBRA)	mV	Before			72.00		
Measurement Depth	ft	Before			291.06		

CBL Free Pipe Adjustment - CBL Amplitude Coefficient

Before (Measured):

10:32:37 21-Sep-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
CBL Adjustment Factor		Before	1.000	0.200	0.765	5.000		
Depth of Before Calibration	ft	Before			291.06			

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

Discussion

Calibration Parameter :

Plus Reference (Jig minus background reference)

160

SGT-N Gamma-Ray Calibration - Gamma Ray Coefficients

Before (Measured): 14:30:25 20-Sep-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
Gamma Ray Gain		Before			1.148			

SGT-N Gamma-Ray Calibration - Gamma Ray Accumulations

Before (Measured): 14:30:25 20-Sep-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
RGR Zero Measurement	gAPI	Before		0	60.089	120.000		
RGR Plus Measurement	gAPI	Before	139.354	126.685	139.354	152.022		

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

Before (Measured): 14:33:01 20-Sep-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
RGR Plus Plateau Measurement	gAPI	Before			205.737			
RGR Minus Plateau Measurement	gAPI	Before			191.286			

Company: Whiting Oil & Gas Corporation

Schlumberger

Well: Razor 25O-2444

Field: Wildcat

County: Weld

State: Colorado

Cement Bond Log

