

Company: Noble Energy Inc

Well: Colt A13-648

Field: Wattenberg

County: Weld

Country: United States

County: Weld

Field: Wattenberg

Location: NSW Sec. 17, T6N, R63W

Well: Colt A13-648

Company: Noble Energy Inc

Slim Cement Mapping Tool

Cement Evaluation

Gamma Ray - CCL Log

Location:

NWSW Sec. 17, T6N, R63W

SHL: 2496' FSL & 424' FWL

Lat/Long: 40.486110/-104.468810

Elev.:

K.B. 4694.00 ft

G.L. 4664.00 ft

D.F. 4693.00 ft

Permanent Datum:

Ground Level

Elev.: 4664.00 f

Log Measured From:

Kelly Bushing

30.00 ft

above Perm.Datum

Drilling Measured From:

Kelly Bushing

Logging Date	18-Apr-2015		
Run Number	Run 2		
Depth Driller	7019.00 ft		
Schlumberger Depth	7019.00 ft		
Bottom Log Interval	6850.00 ft		
Top Log Interval	30.00 ft		
Casing Fluid Type	Water		
Salinity			
Density	8.7 lbm/gal		
Fluid Level	8.00 ft		
BIT/CASING/TUBING STRING			
Bit Size	8.75 in		
From	934.00 ft		
To	7019.00 ft		
Casing/Tubing Size	7 in		
Weight	26 lbm/ft		
Grade	P110		
From	30.00 ft		
To	7019.00 ft		
Max Recorded Temperatures			
Logger on Bottom	Time	20-Apr-2015	13:08:00
Unit Number	Location:	3022	Fort Morgan, CO
Recorded By		Keri Ondrus	
Witnessed By			

Disclaimer

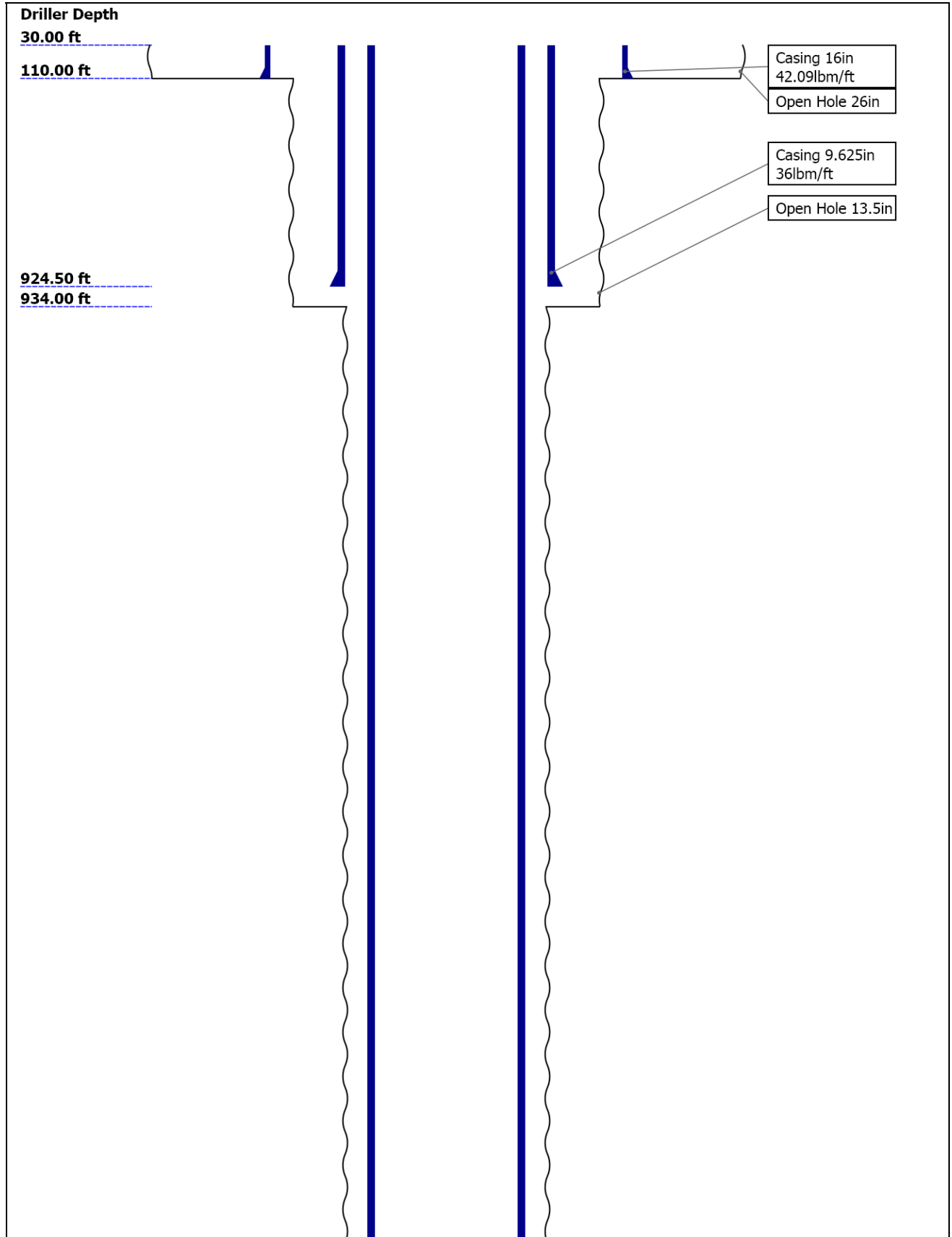
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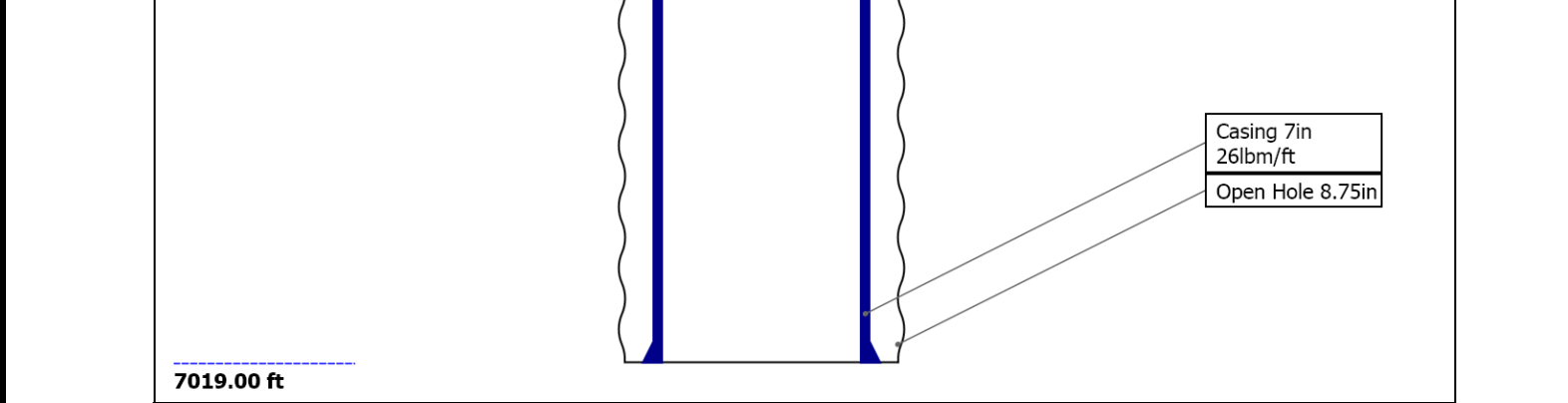
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## Well Sketch





## Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	26	13.5	8.75			
Top Driller ( ft )	30	110	934			
Top Logger ( ft )	30	110	934			
Bottom Driller ( ft )	110	934	7019			
Bottom Logger ( ft )	110	934	7019			
Casing						
Size ( in )	16	9.625	7			
Weight ( lbm/ft )	42.09	36	26			
Inner Diameter ( in )	15.511	8.921	6.276			
Grade	N/A	J55	P110			
Top Driller ( ft )	30	30	30			
Top Logger ( ft )	30	30	30			
Bottom Driller ( ft )	110	924.5	7019			
Bottom Logger ( ft )	110	924.5	7019			

## Operational Run Summary

Parameter ( unit )	Run 2					
Date Log Started	18-Apr-2015					
Time Log Started	11:12:35					
Date Log Finished	18-Apr-2015					
Time Log Finished	17:10:05					
Top Log Interval ( ft )	30.00					
Bottom Log Interval ( ft )	6850.00					
Total Depth ( ft )	6850.00					
Max Hole Deviation ( deg )	0.00					
Azimuth of Max Deviation ( deg )	0.00					
Bit Size ( in )	8.750					
Logging Unit Number	3022					
Logging Unit Location	Fort Morgan, CO					
Recorded By	Keri Ondrus					

## Borehole Fluids

Parameter( unit )	Run 2					
Fluid Type	Water					
Max Recorded Temperatures ( degF )	NaN					
Salinity ( ppm )	0					
Density ( lbm/gal )	8.7					
Date Logger on Bottom	20-Apr-2015					
Time Logger on Bottom	13:08:00					
Total Solid ( % )						
High Gravity Solids ( % )						

## Remarks and Equipment Summary

[illegible]



All measurements are relative to TOOL\_ZERO

## Run 2

Type	IDW-B
Serial Number	7234
Calibration Date	13-Feb-2015
Calibrator Serial Number	
Calibration Cable Type	7-39PLXS
Wheel Correction 1	-4
Wheel Correction 2	-2

Type	CMTD-B/A
Serial Number	1109
Calibration Date	19-Mar-2015
Calibrator Serial Number	78135A
Number of Calibration Points	10
Calibration Root Mean Square Error	11
Calibration Peak Error	19

Type	7-39P-LXS
Serial Number	U711136
Length	17200.00 ft
Conveyance Type	Wireline
Rig Type	Crane

Log Sequence	Subsequent Log In the Well	All Schlumberger depth control procedures followed.
Reference Log Name		IDW used as primary depth control device.
Reference Log Run Number		Z-chart used as secondary depth control device.
Reference Log Date		

## Software Version

Maxwell	5.2.40401.3100
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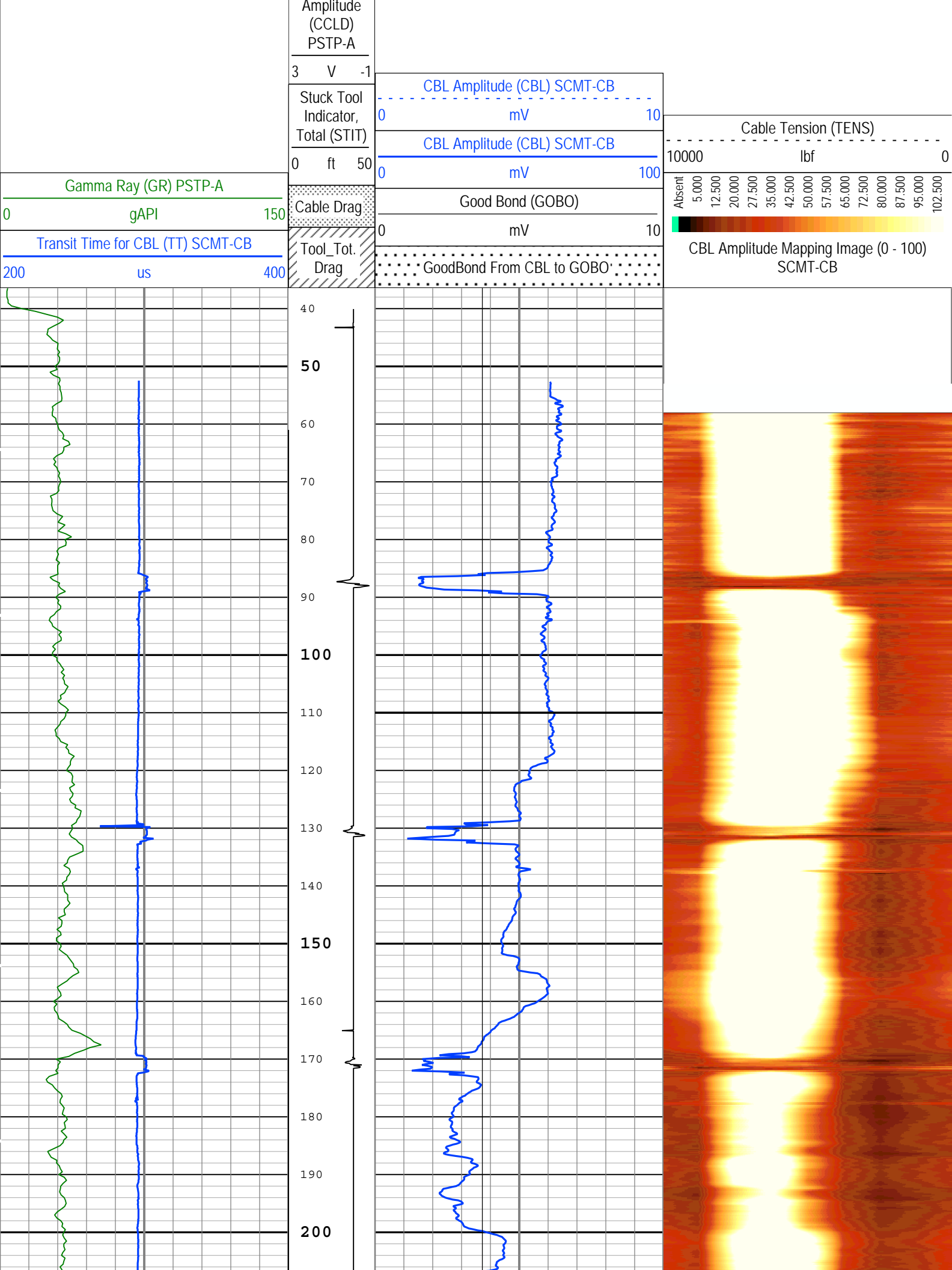
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 2	Main[5]:Up	Up	60.98 ft	6850.88 ft	18-Apr-2015 12:58:22 PM	18-Apr-2015 4:50:28 PM	ON	5.13 ft	Yes

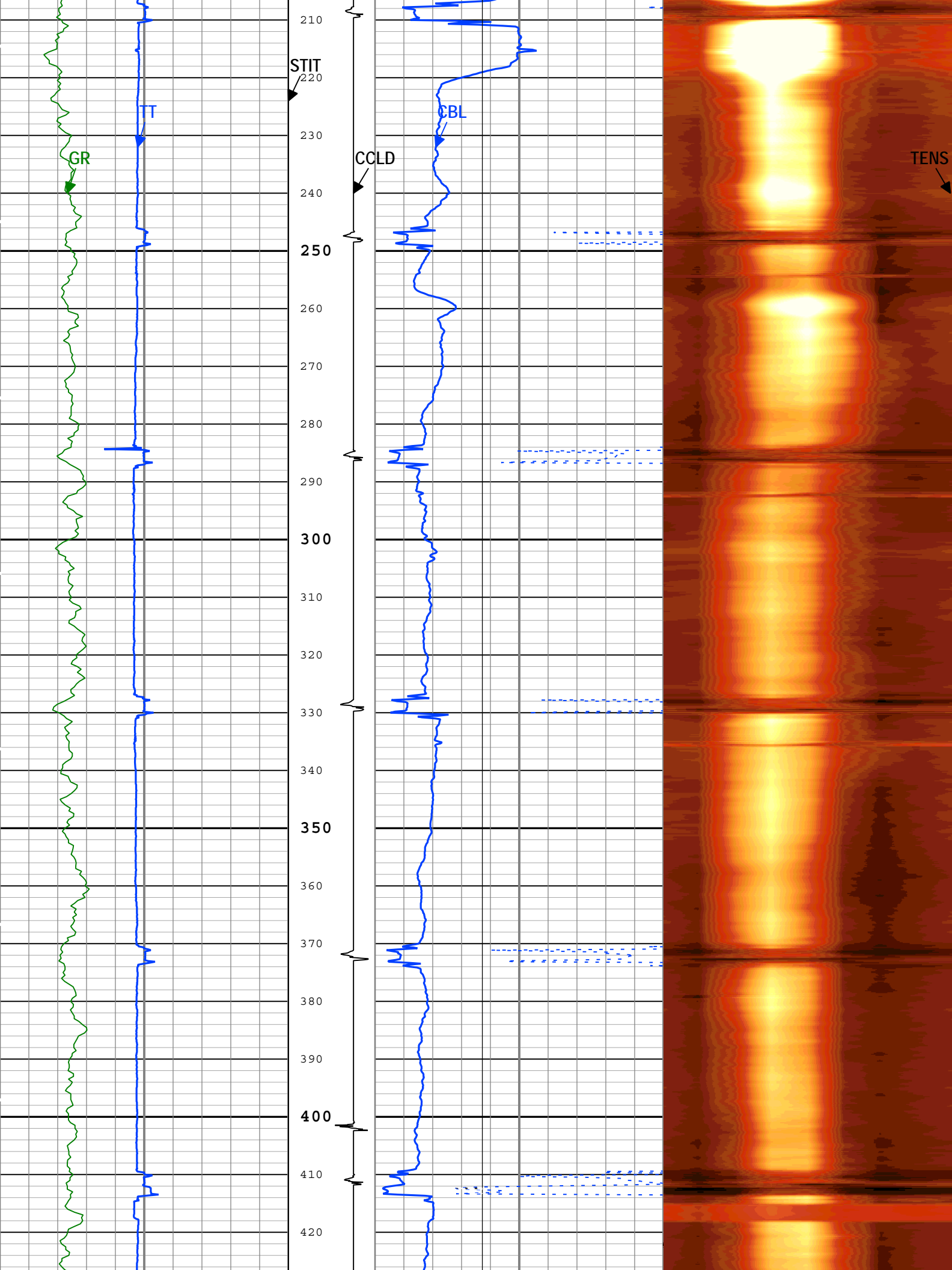
All depths are referenced to toolstring zero

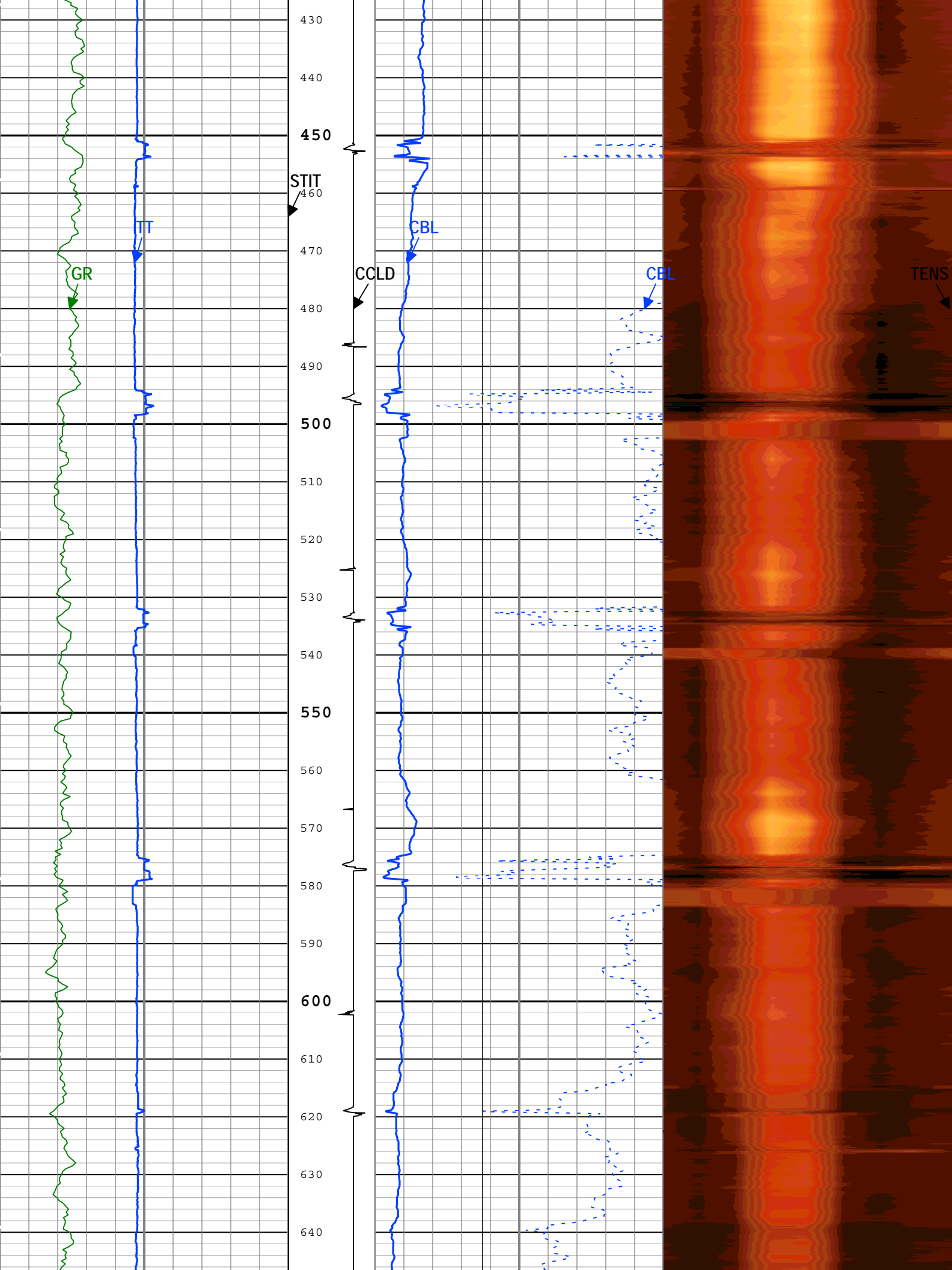
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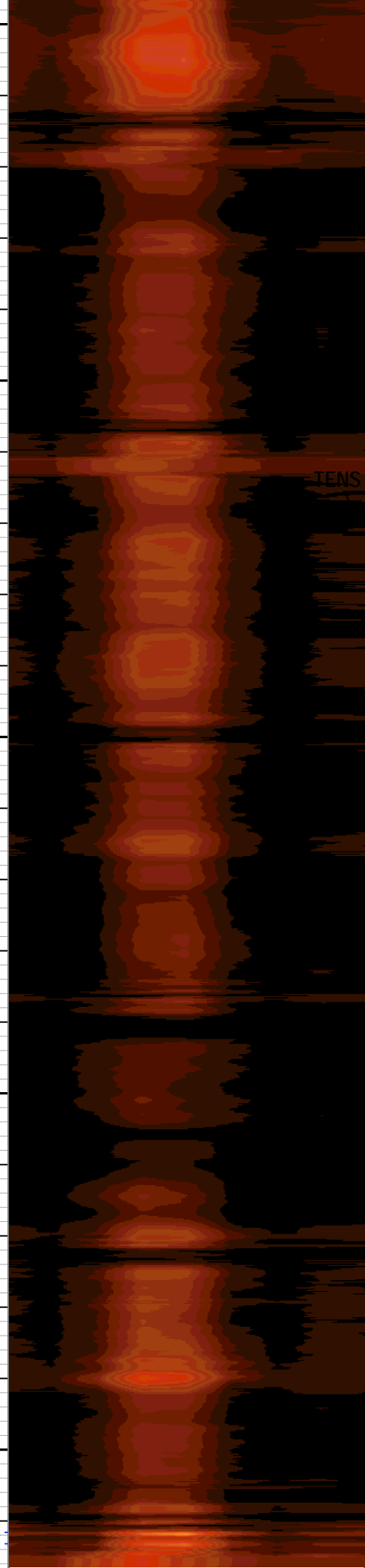
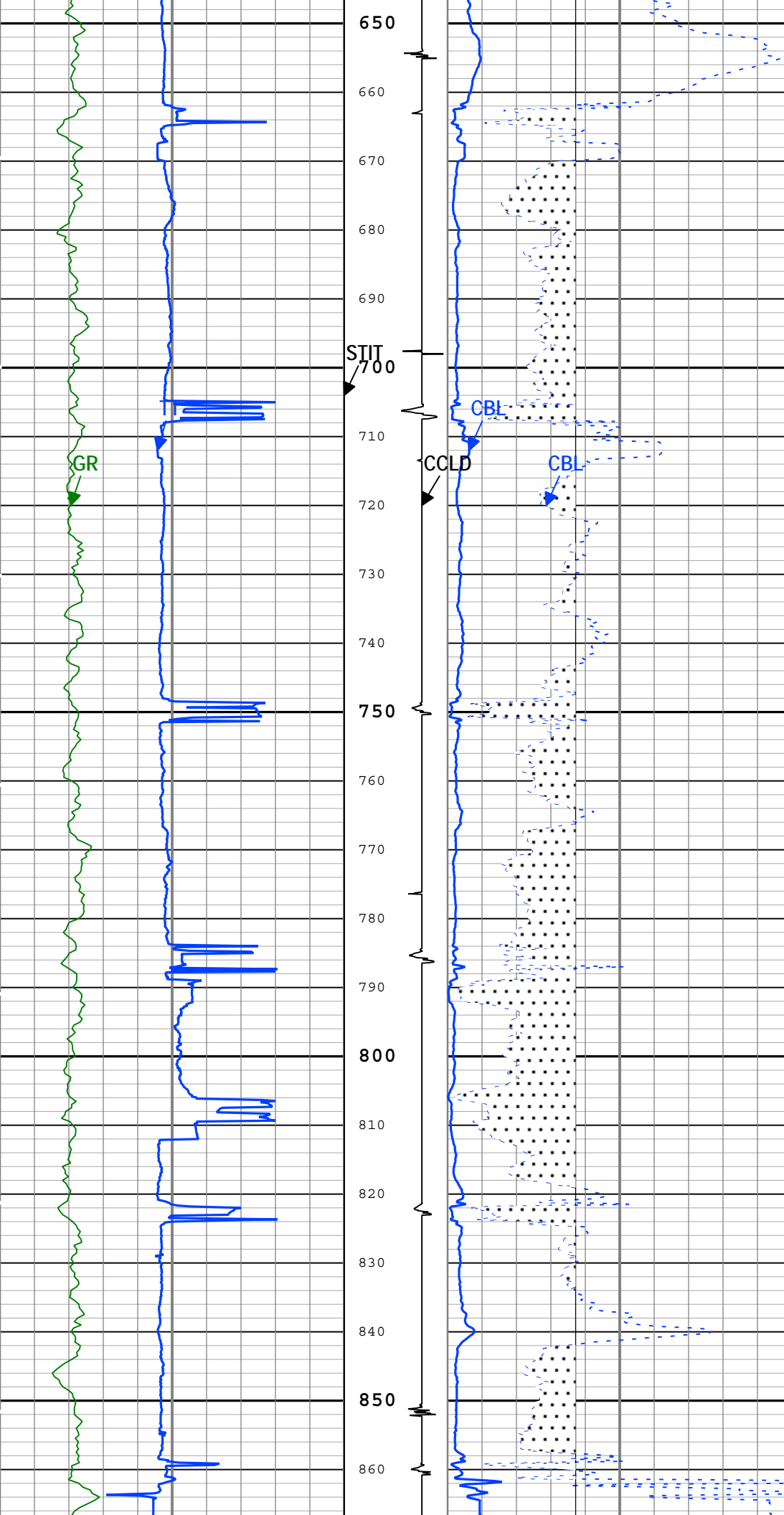
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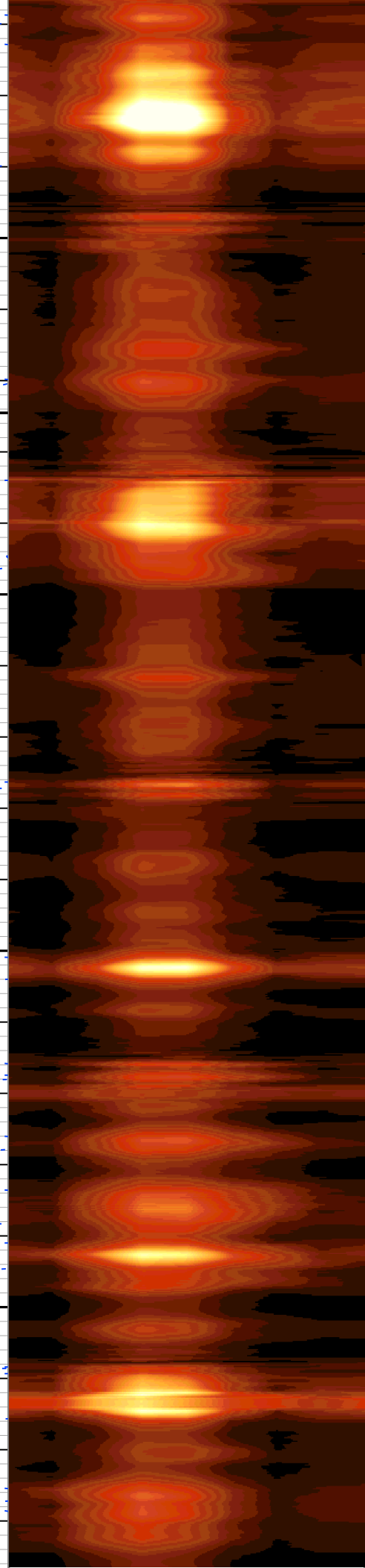
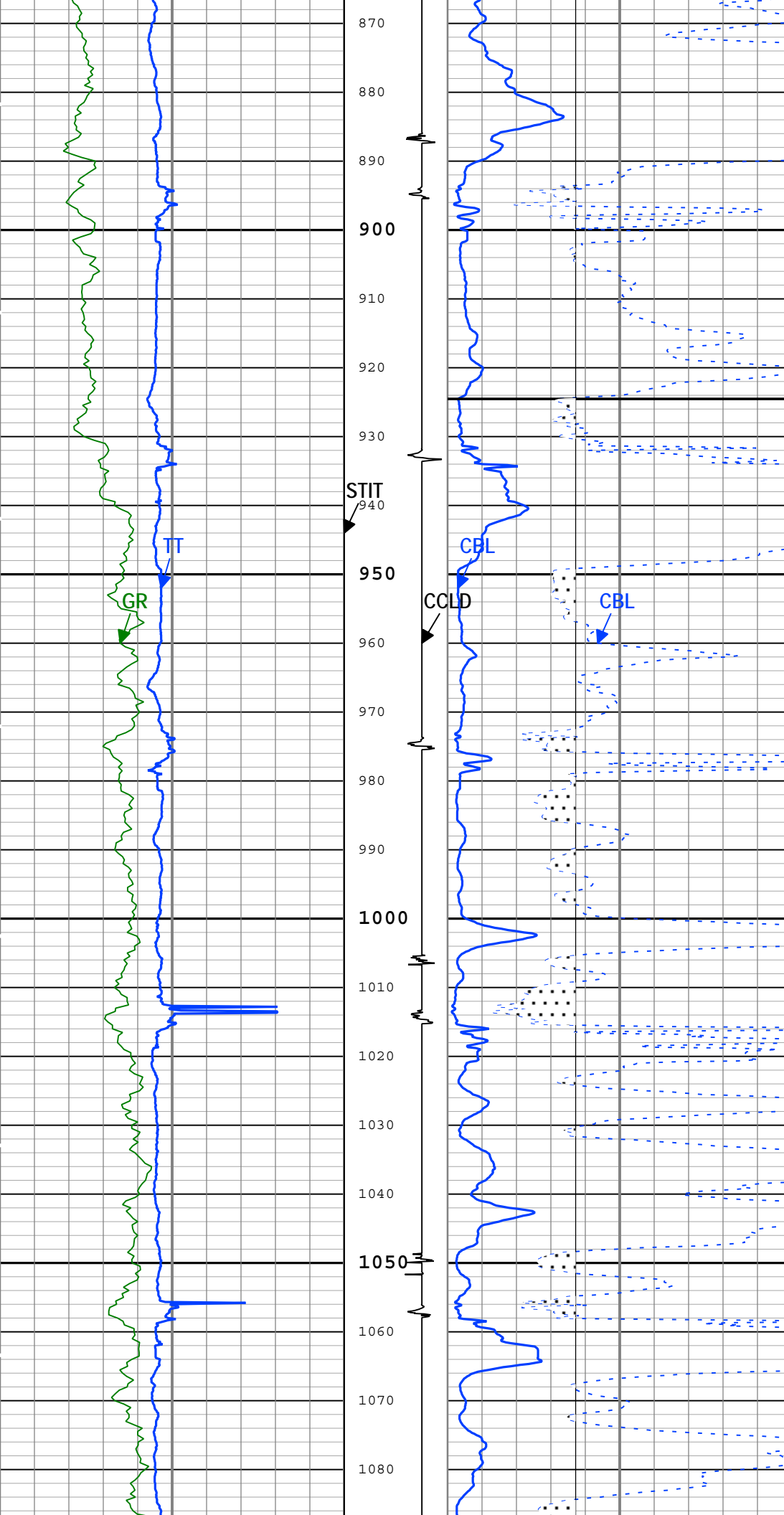
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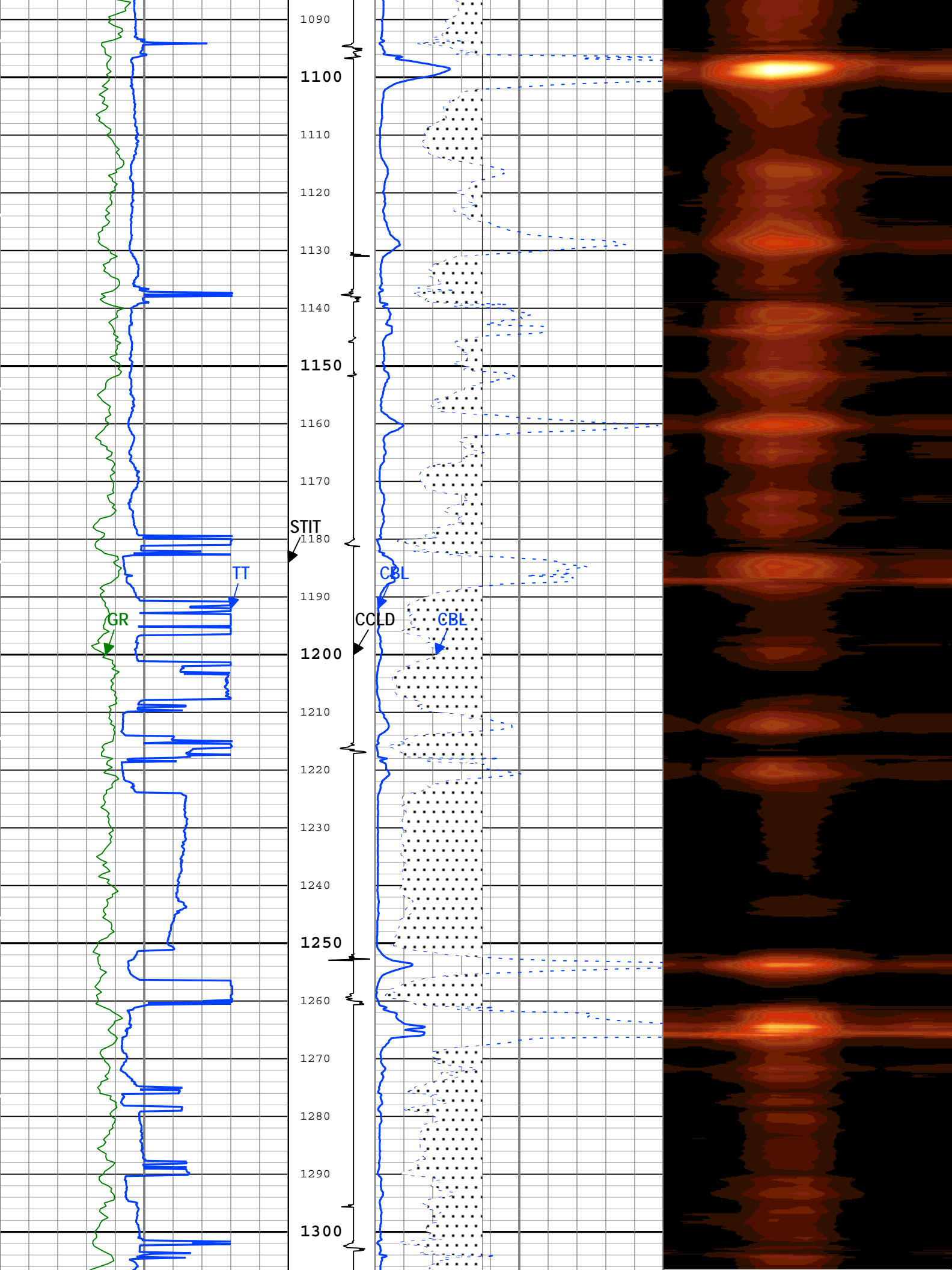


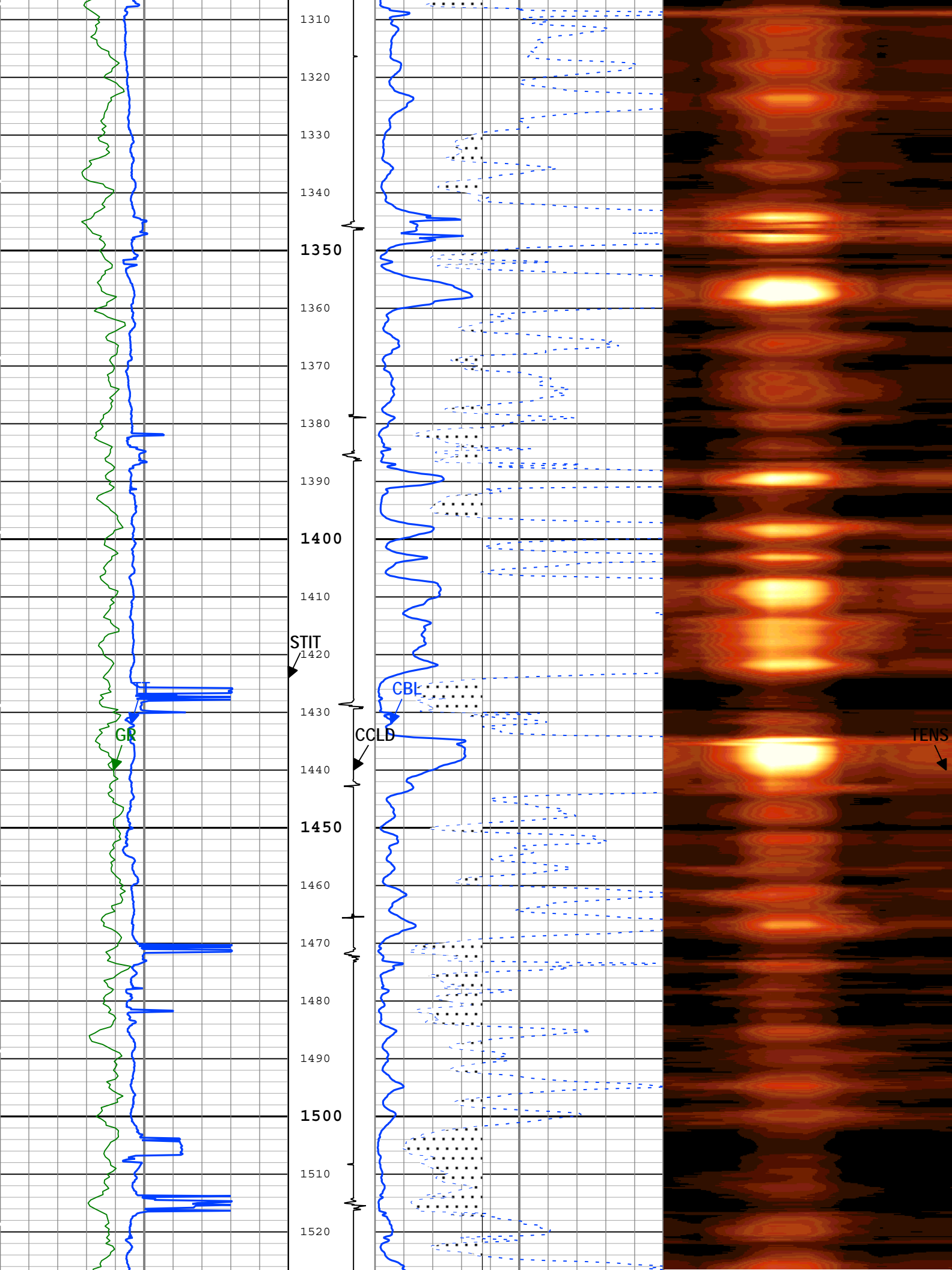




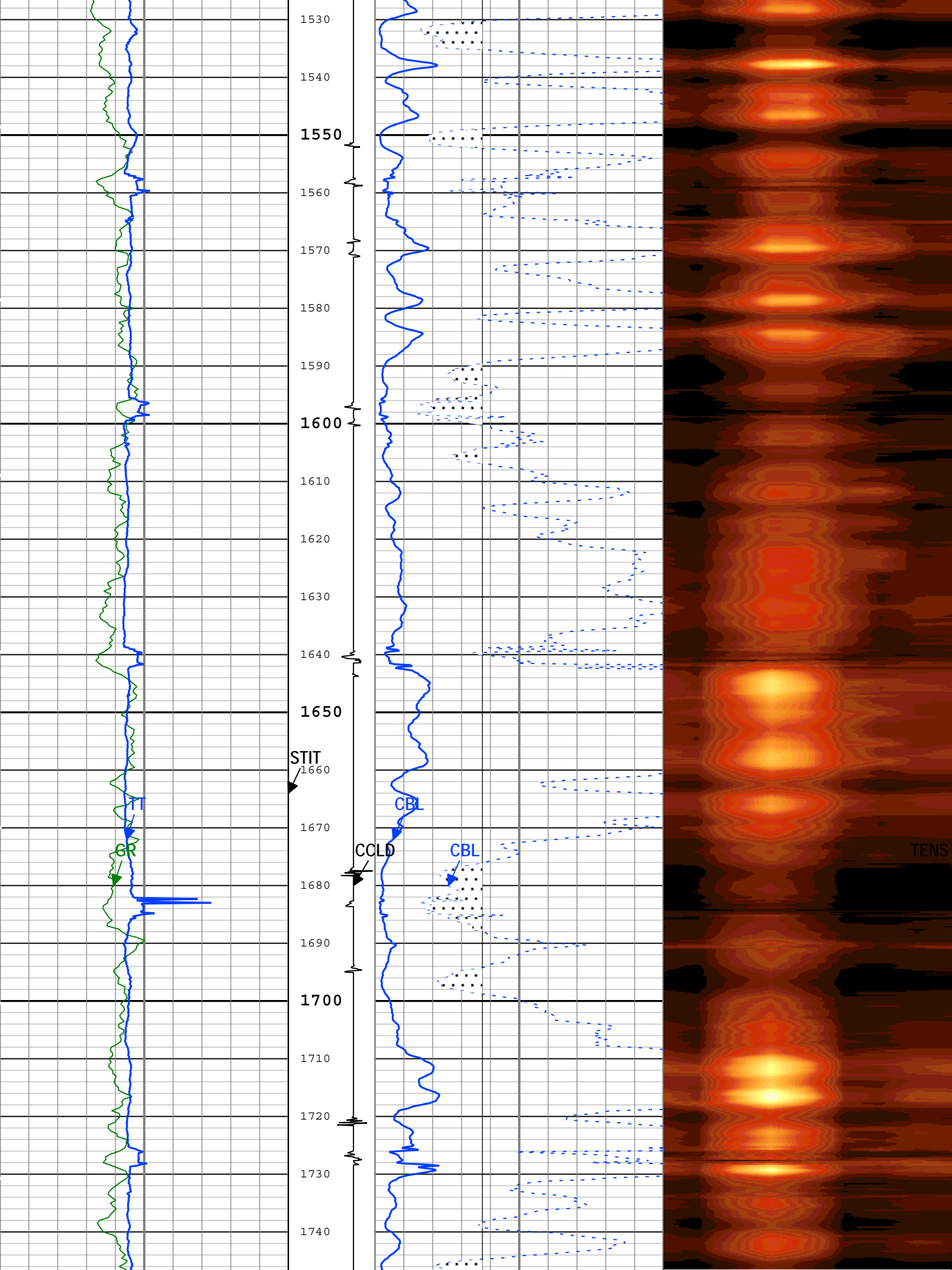


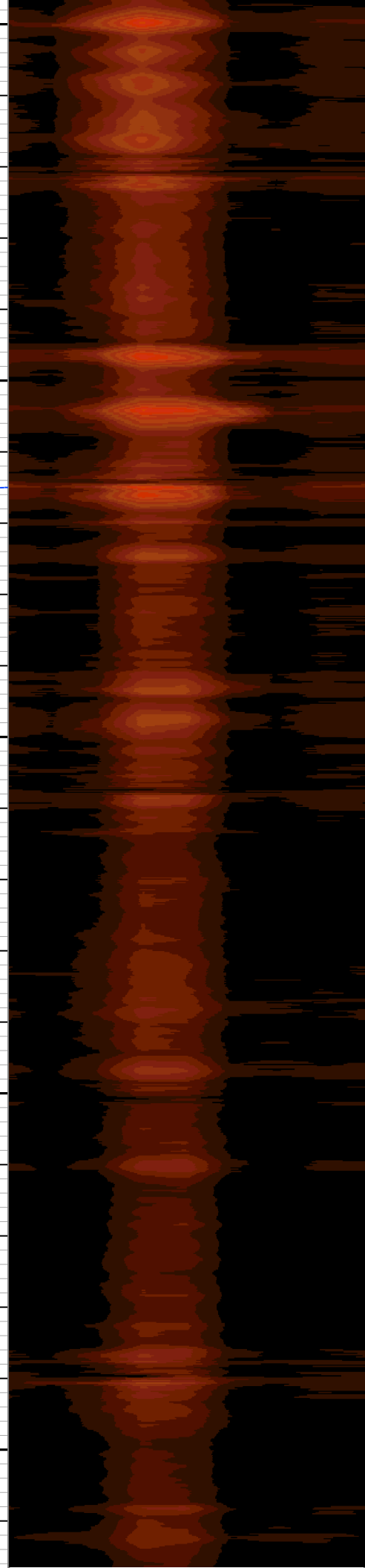
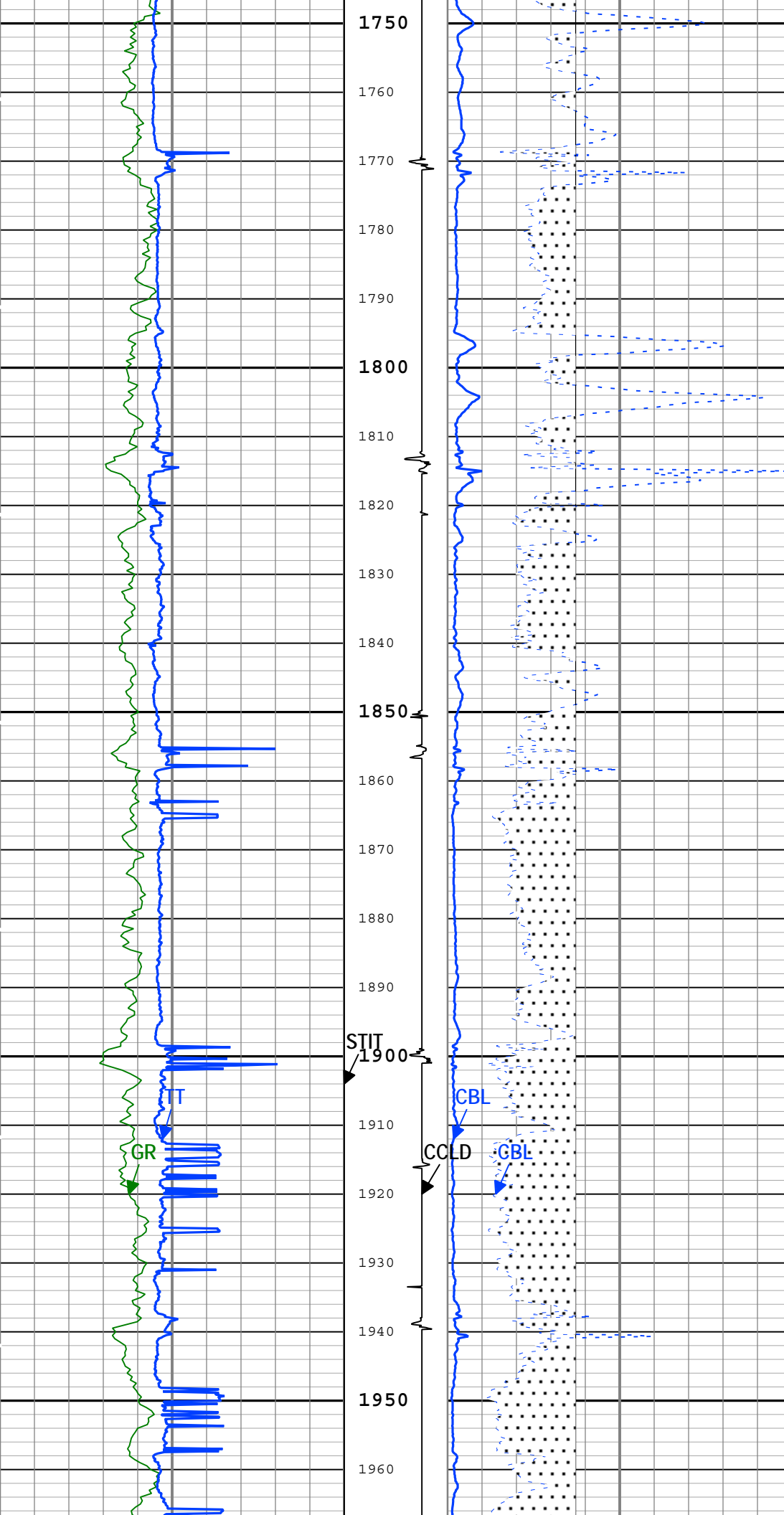


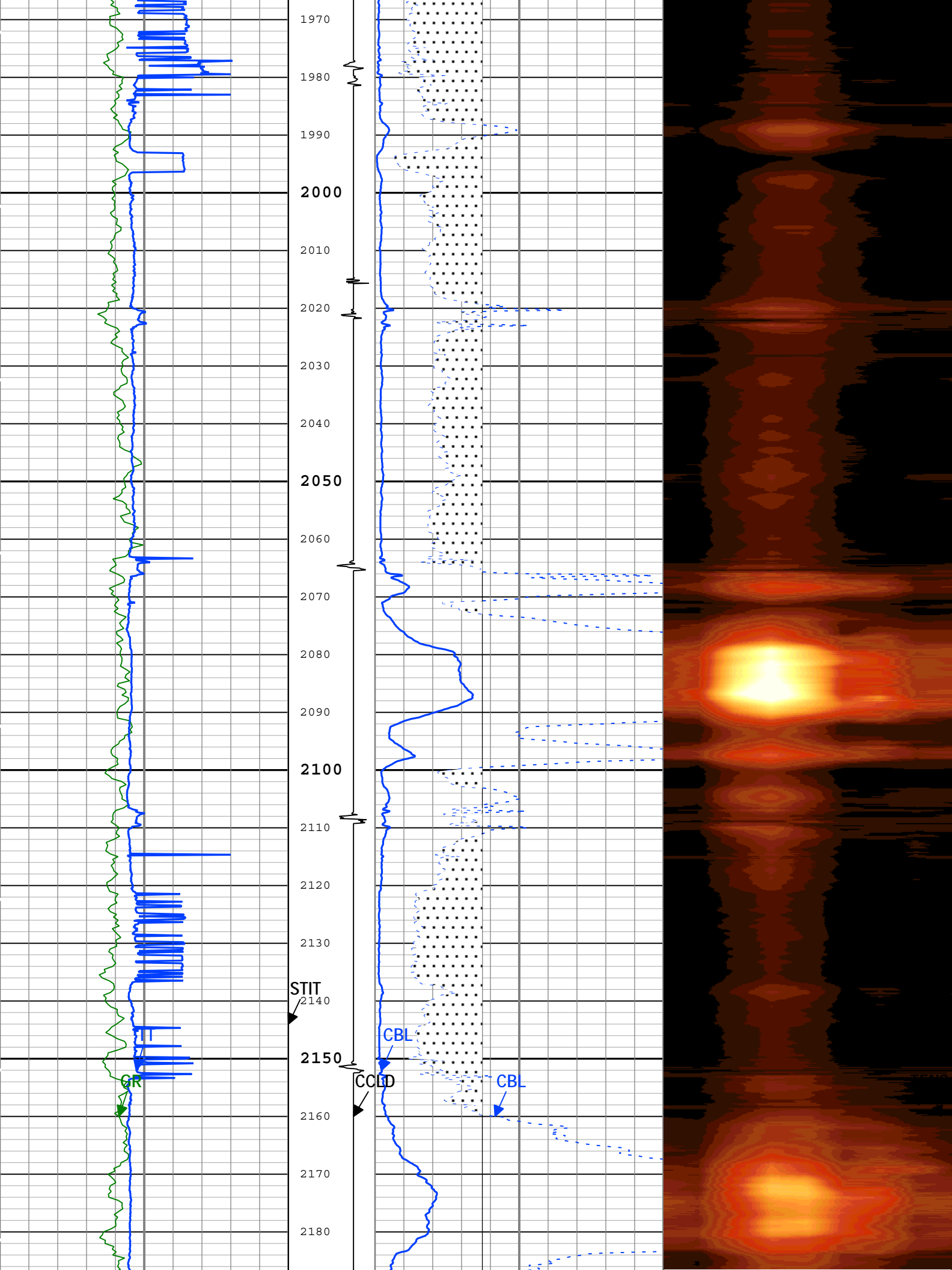


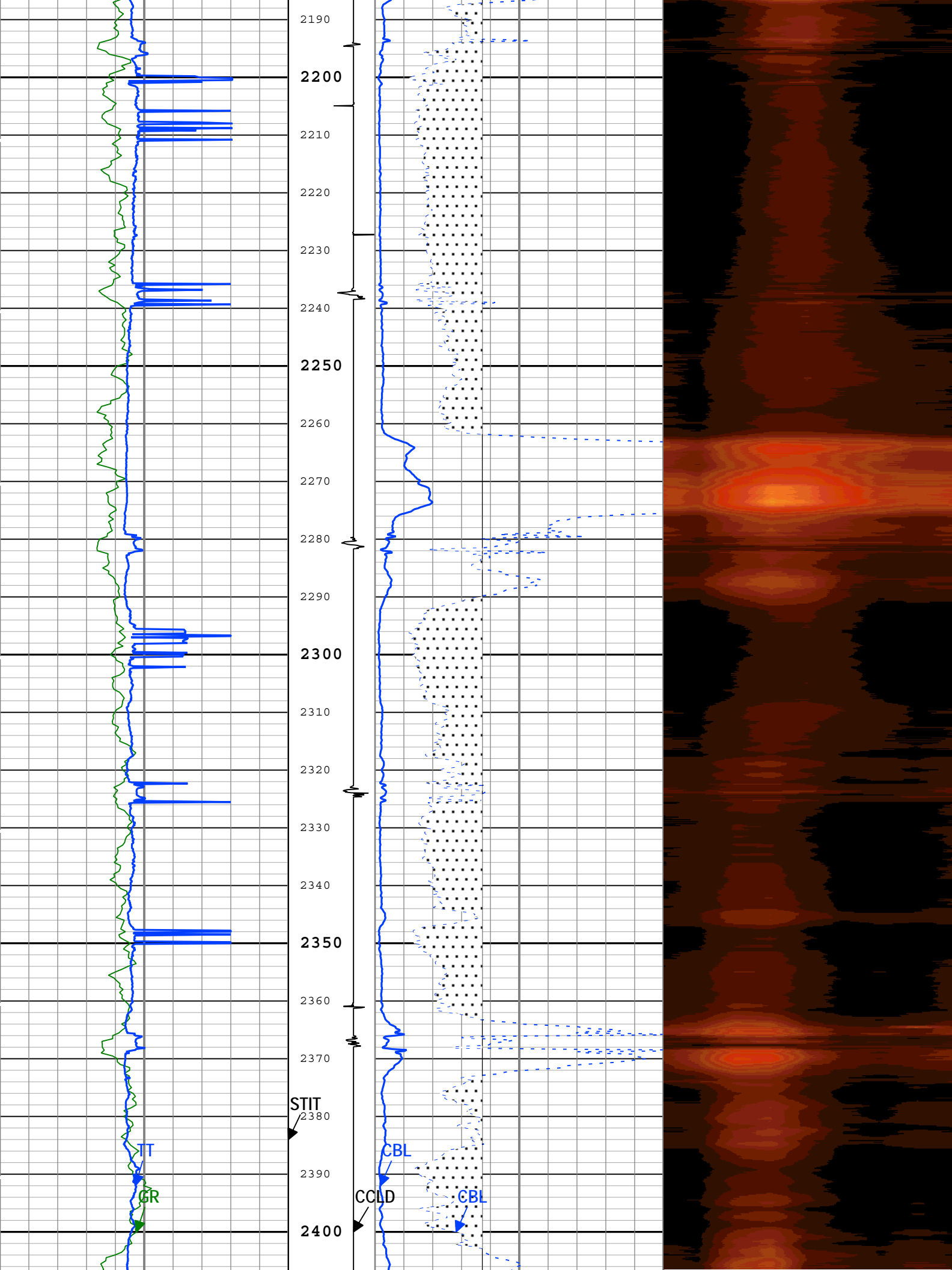


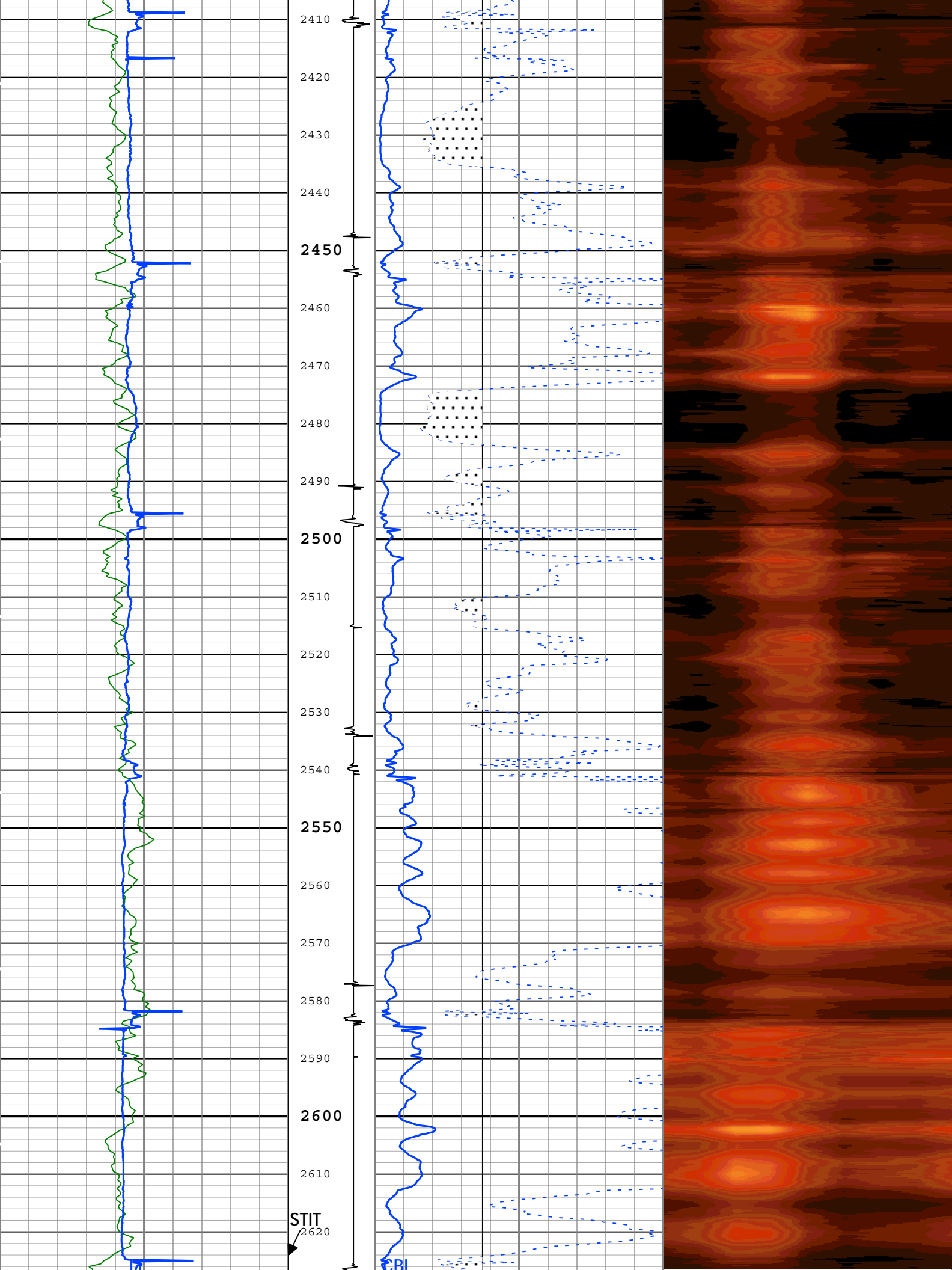


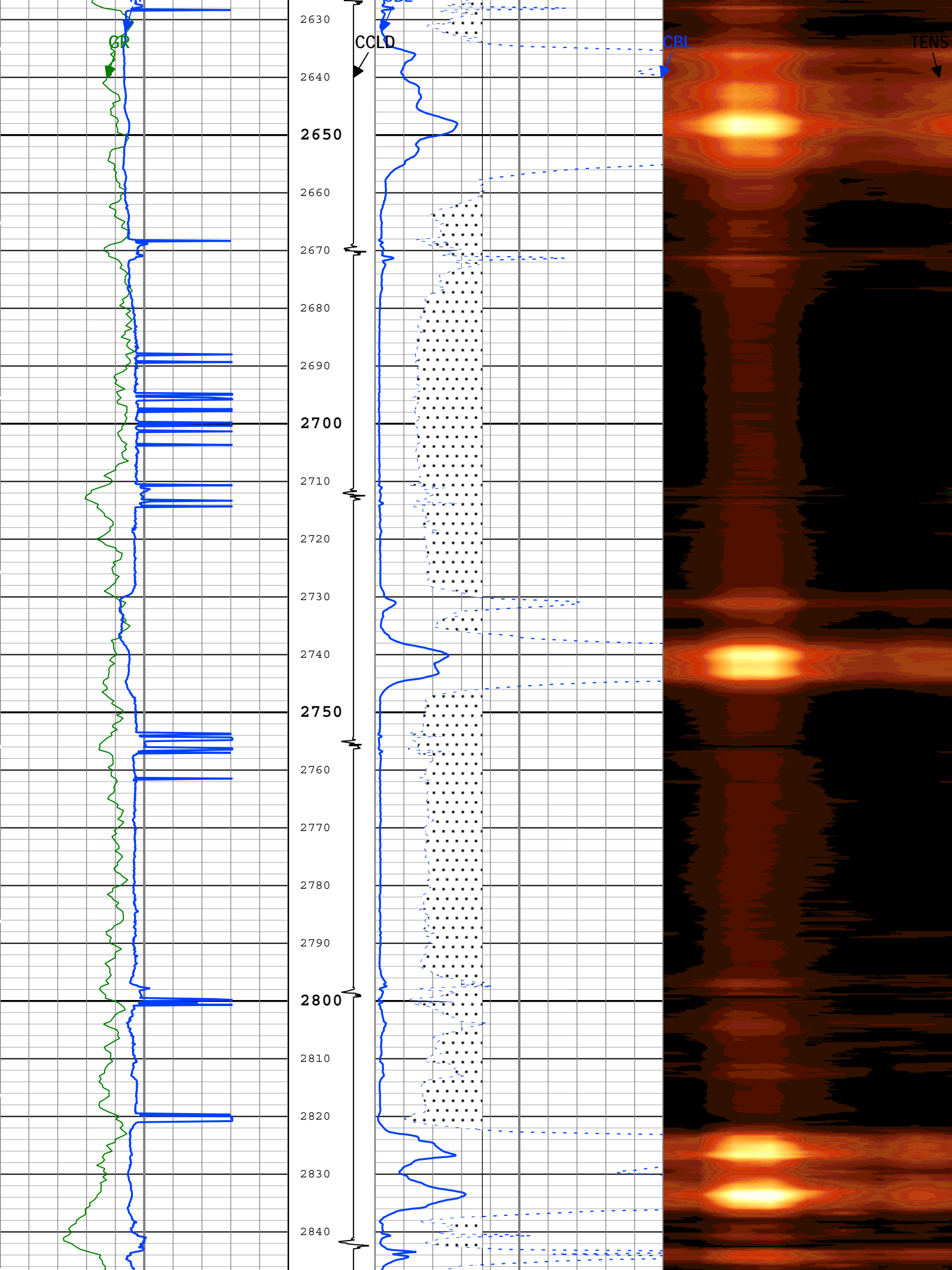


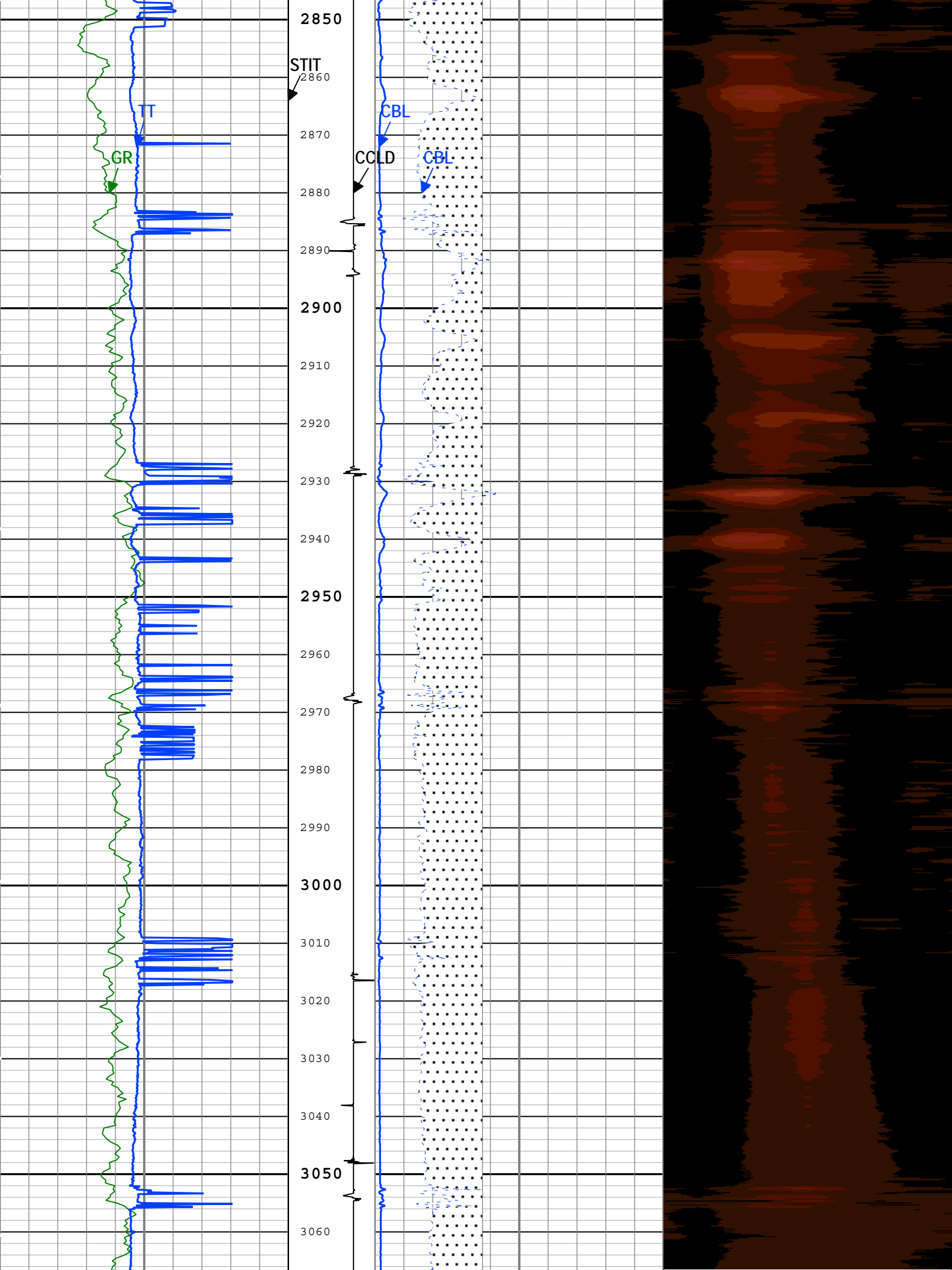


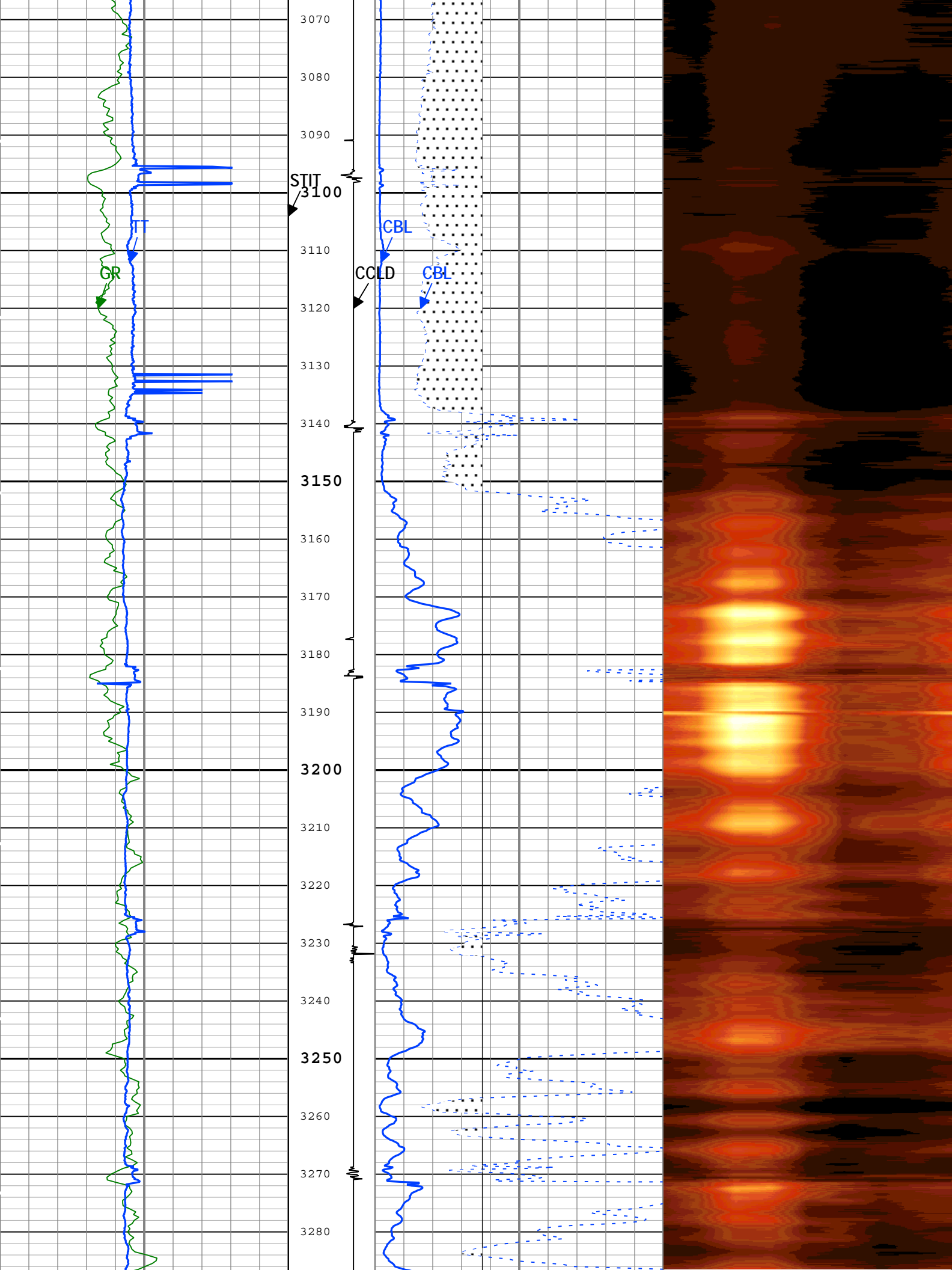




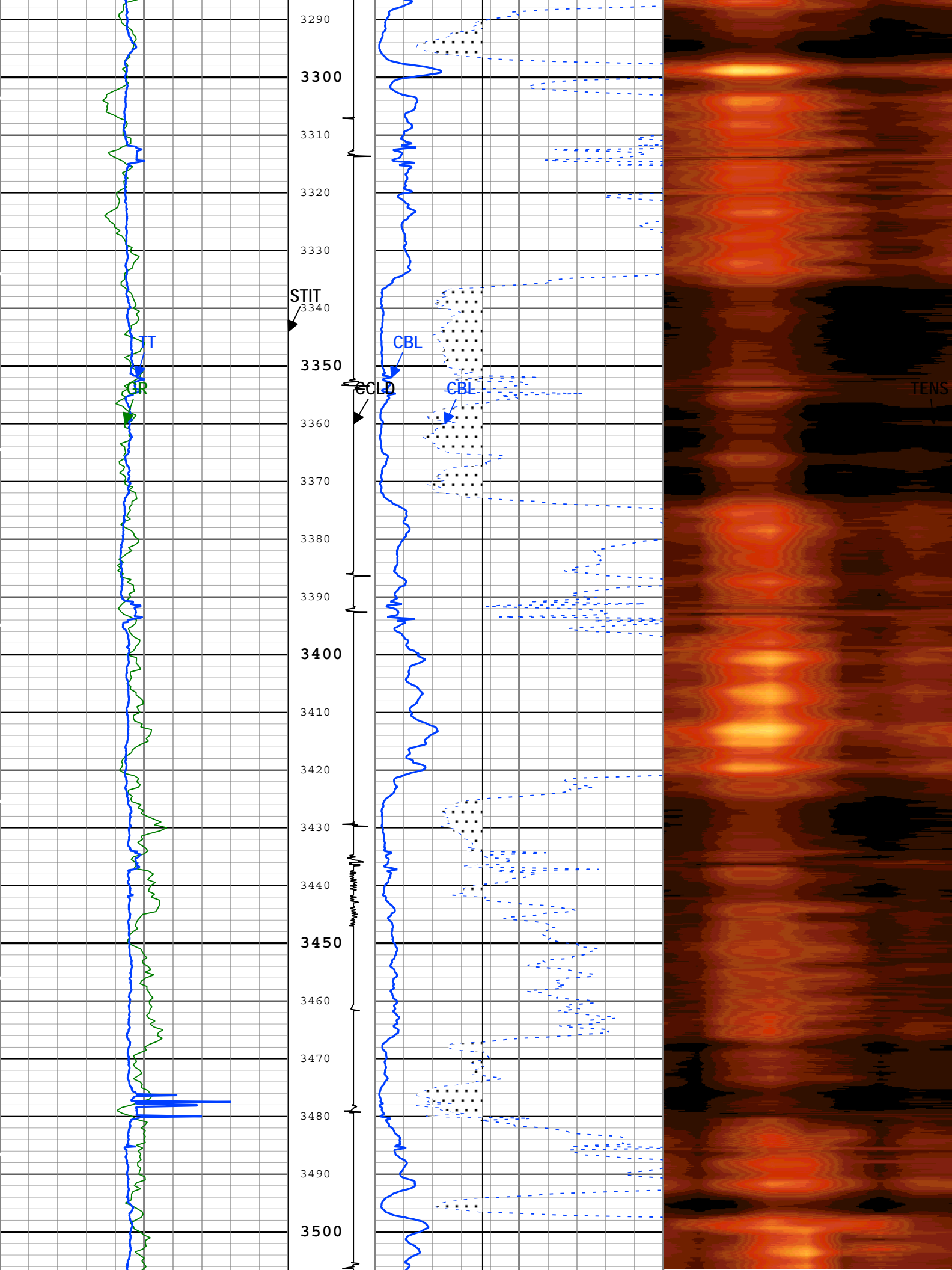


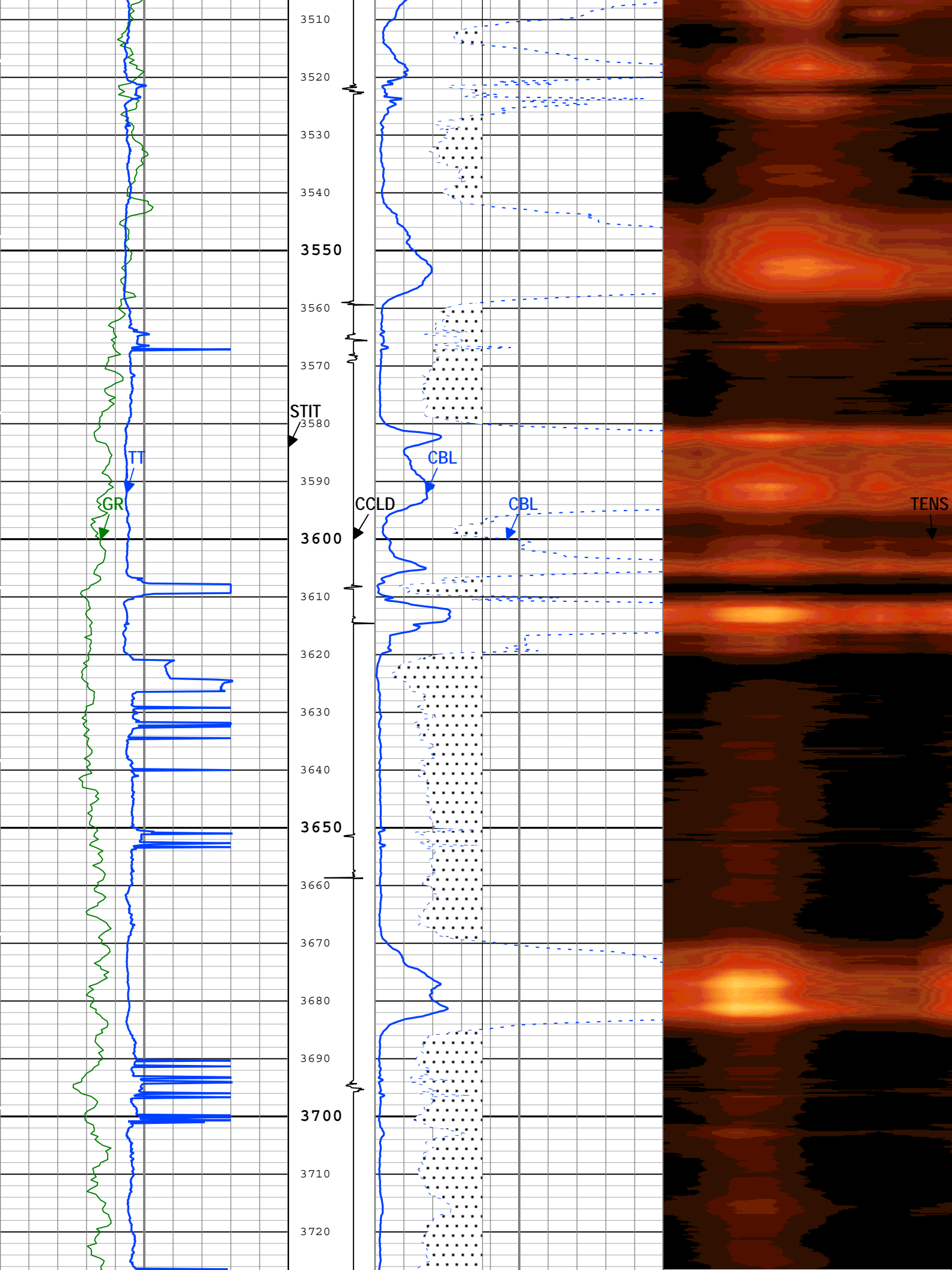


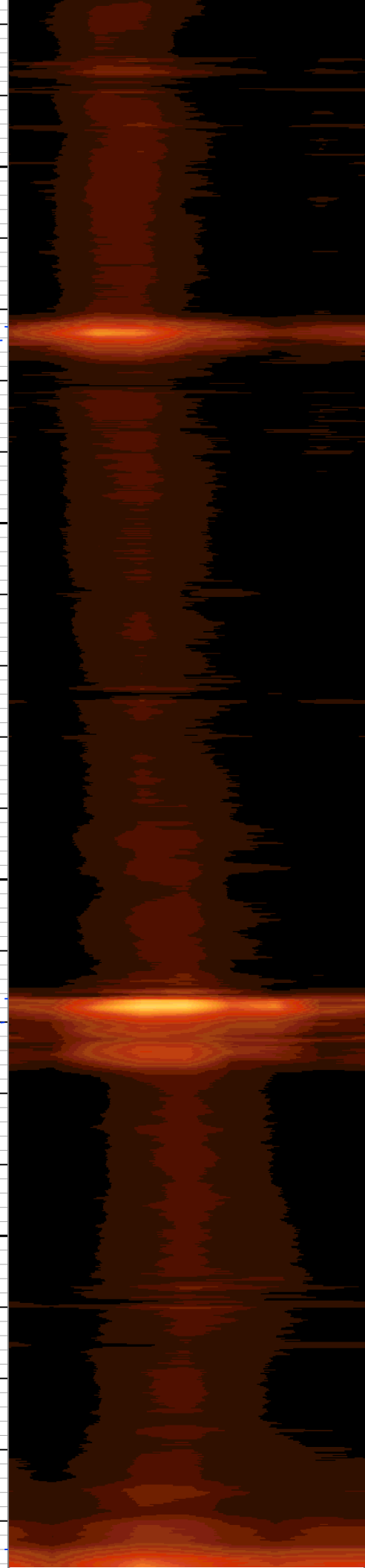
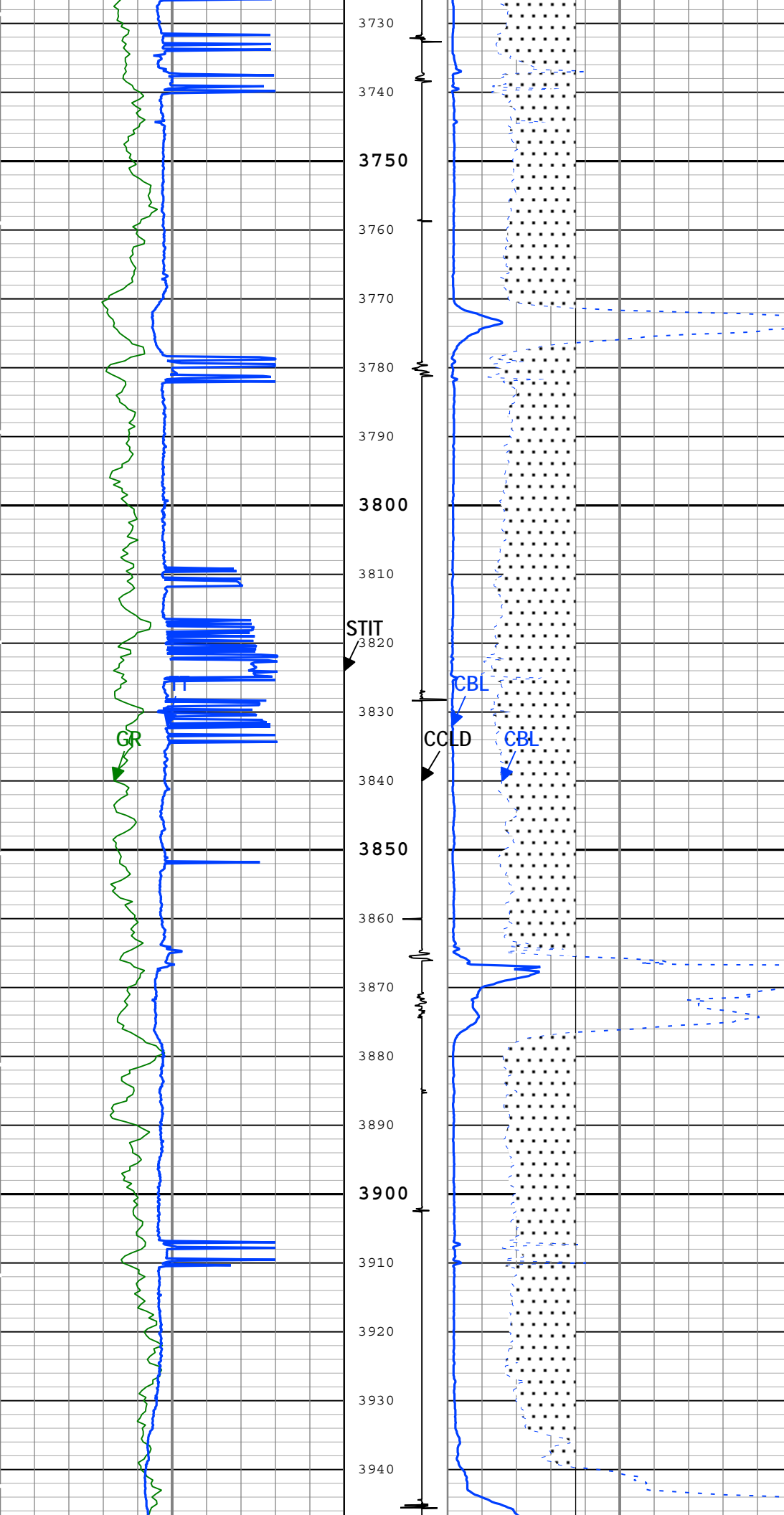


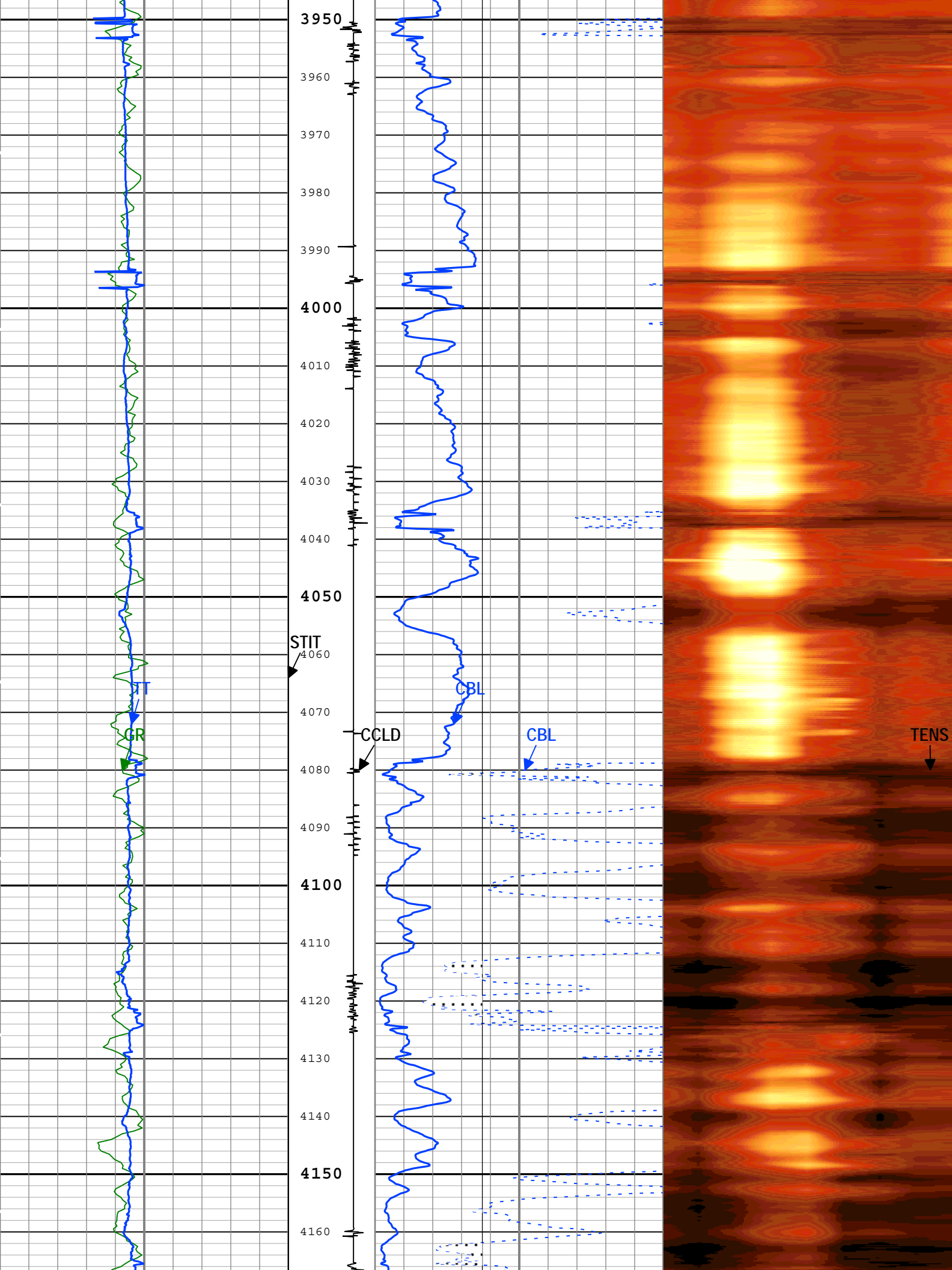


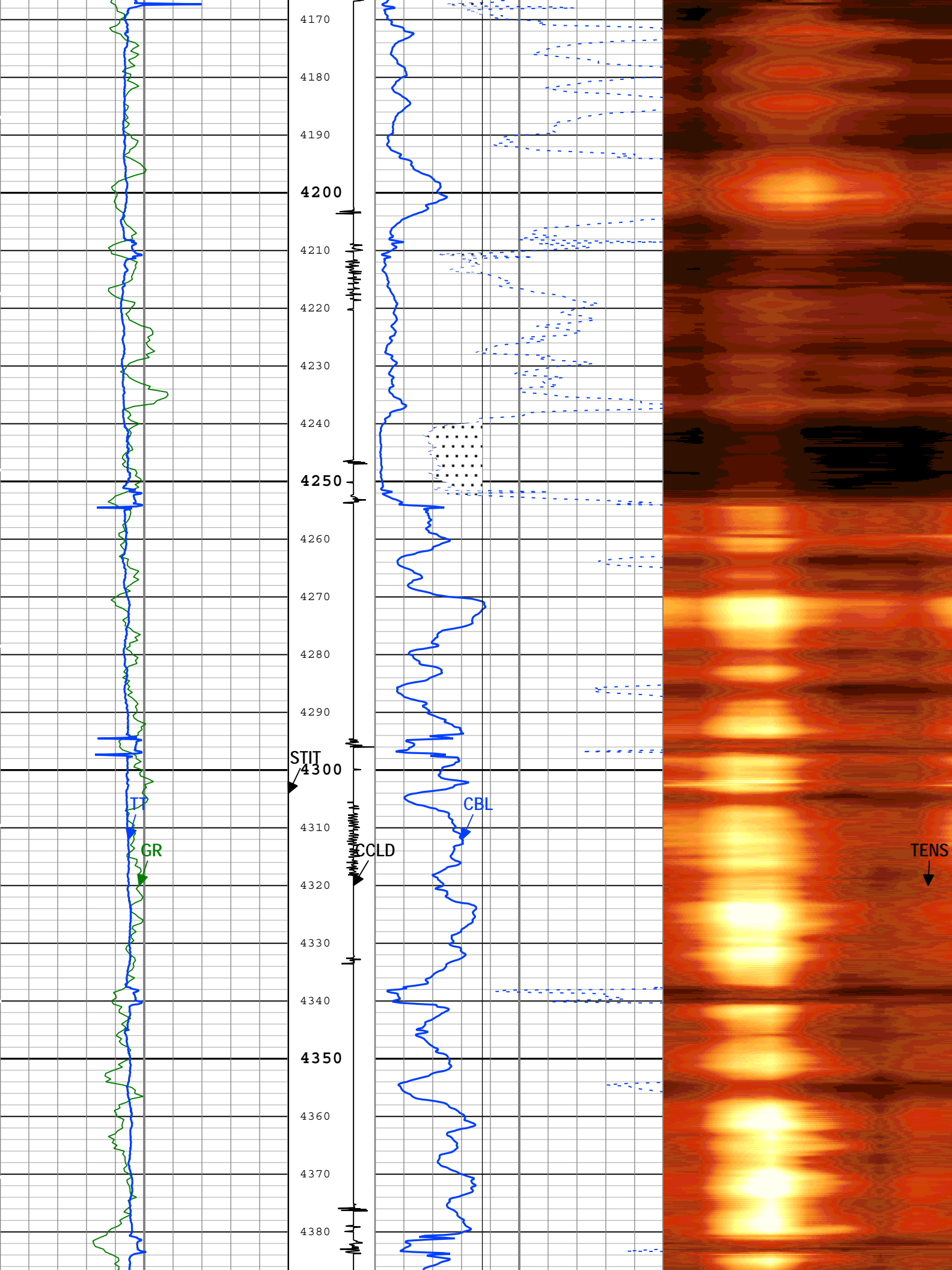


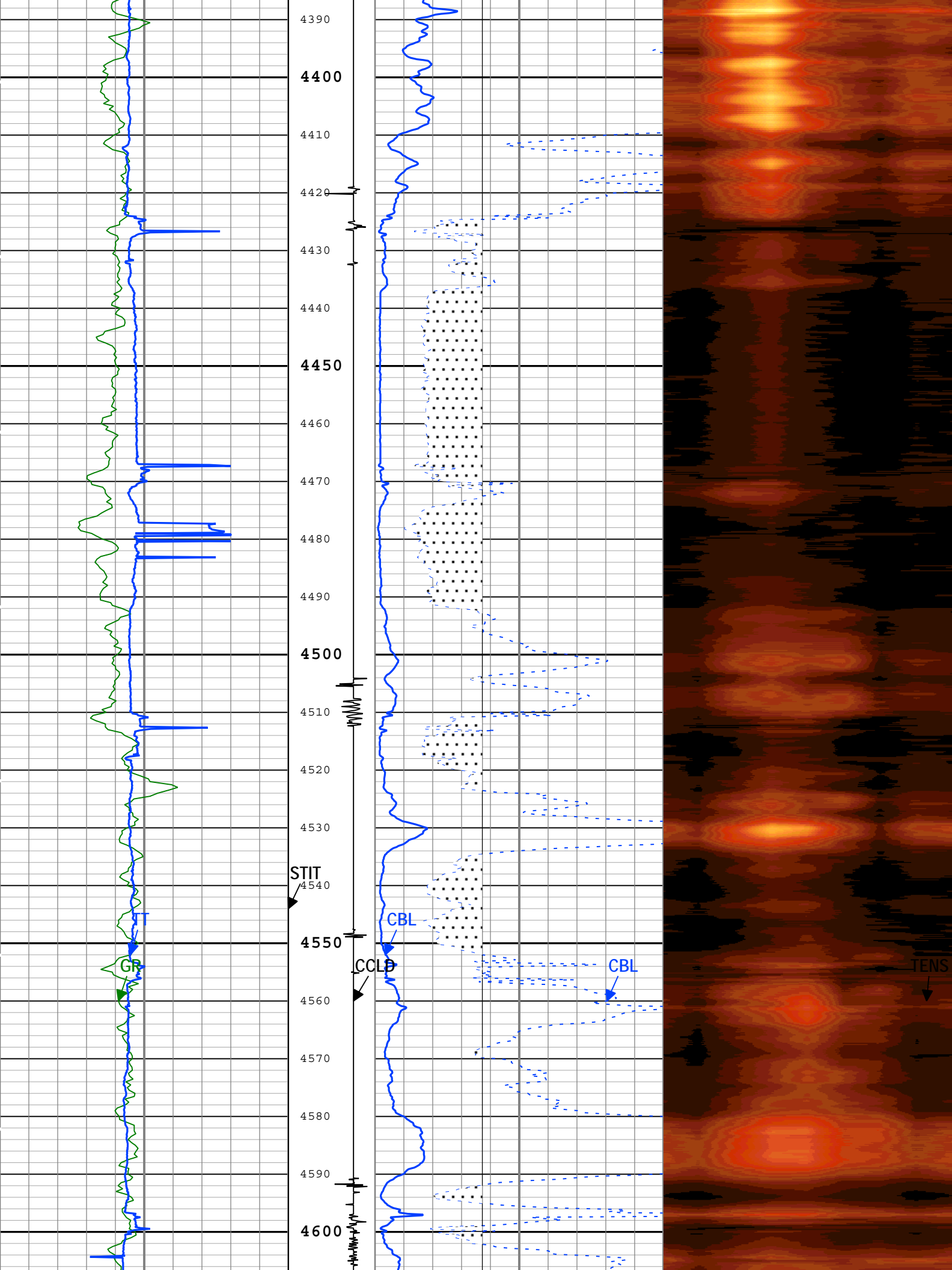


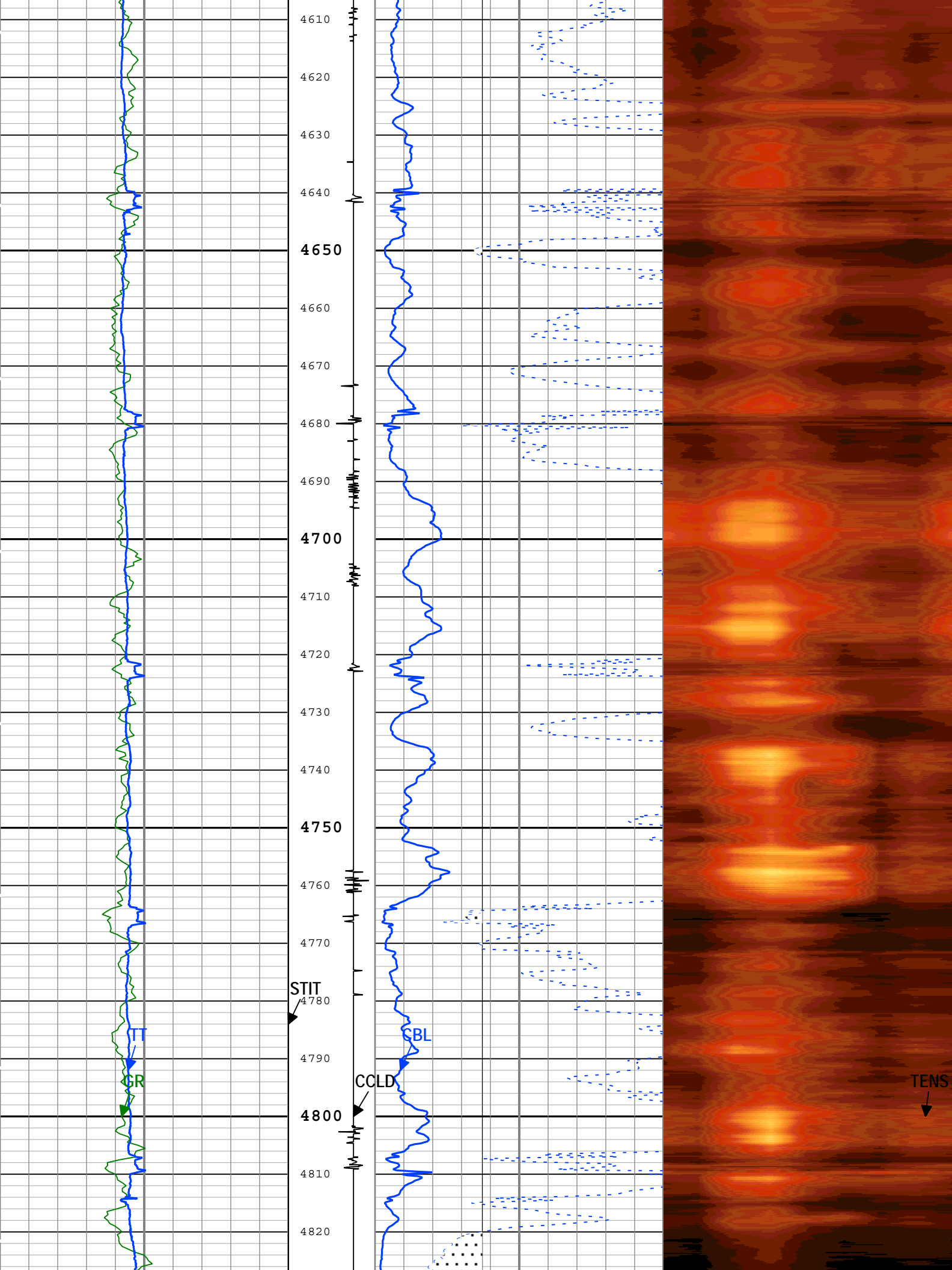




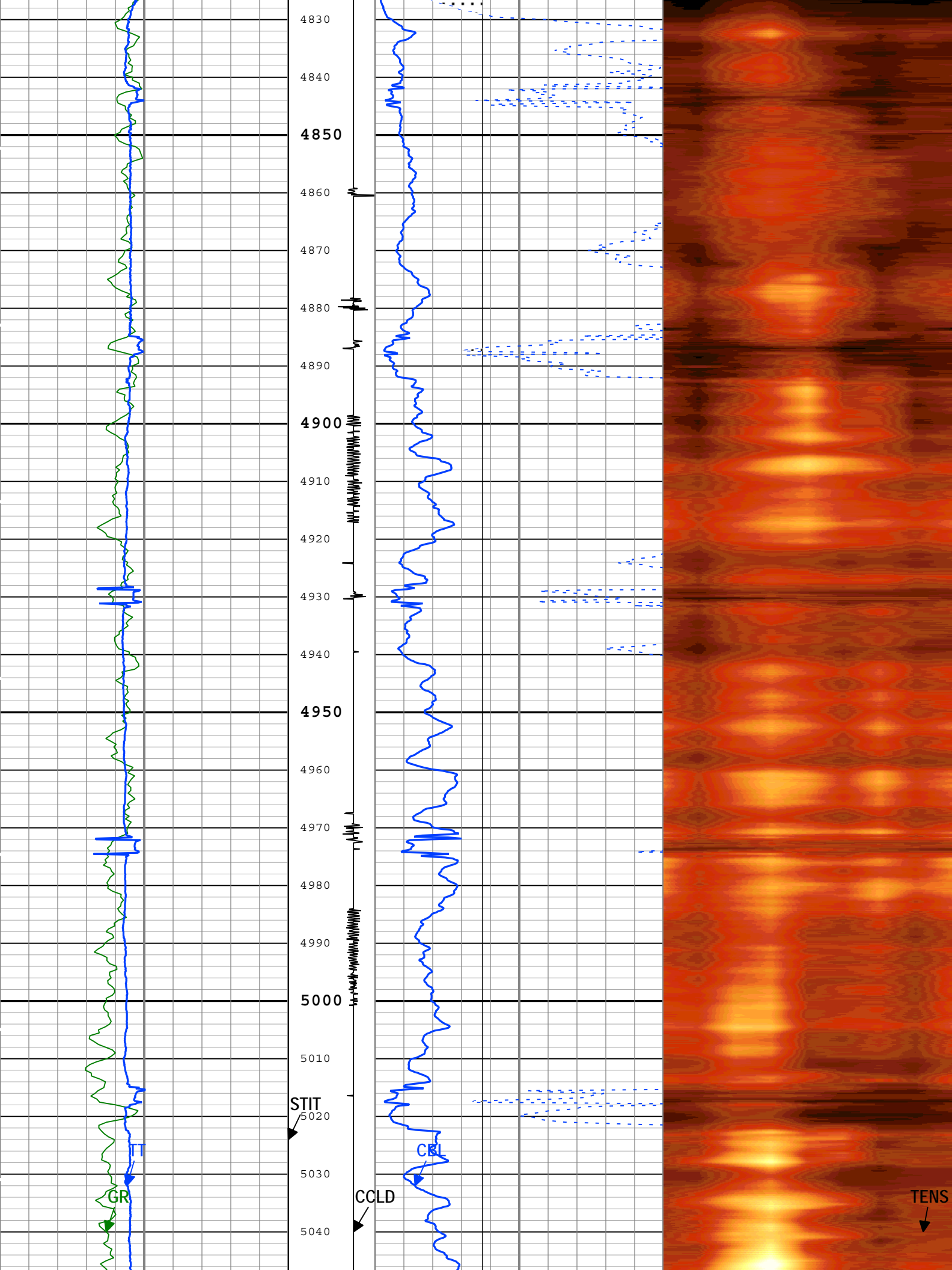




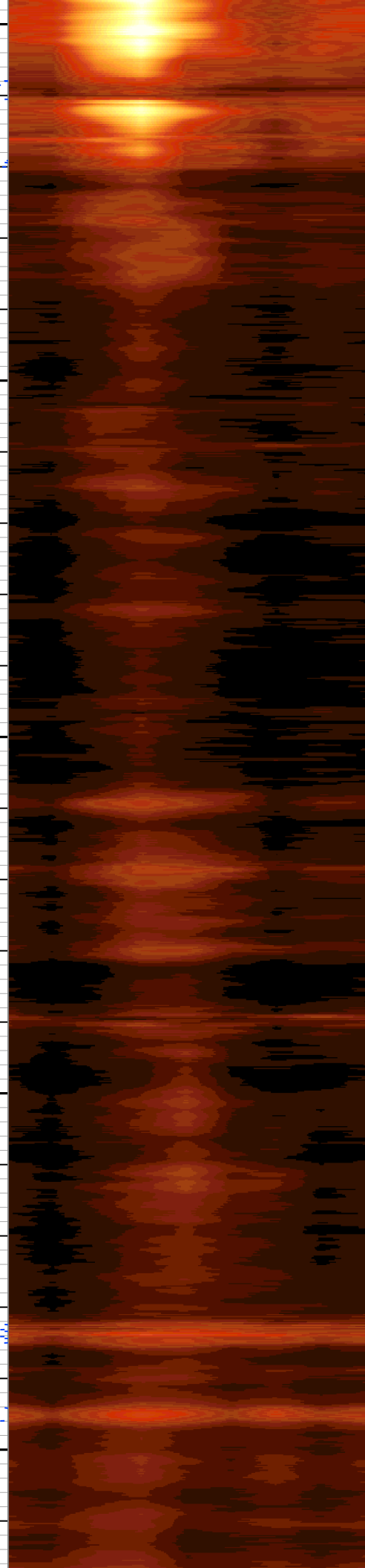
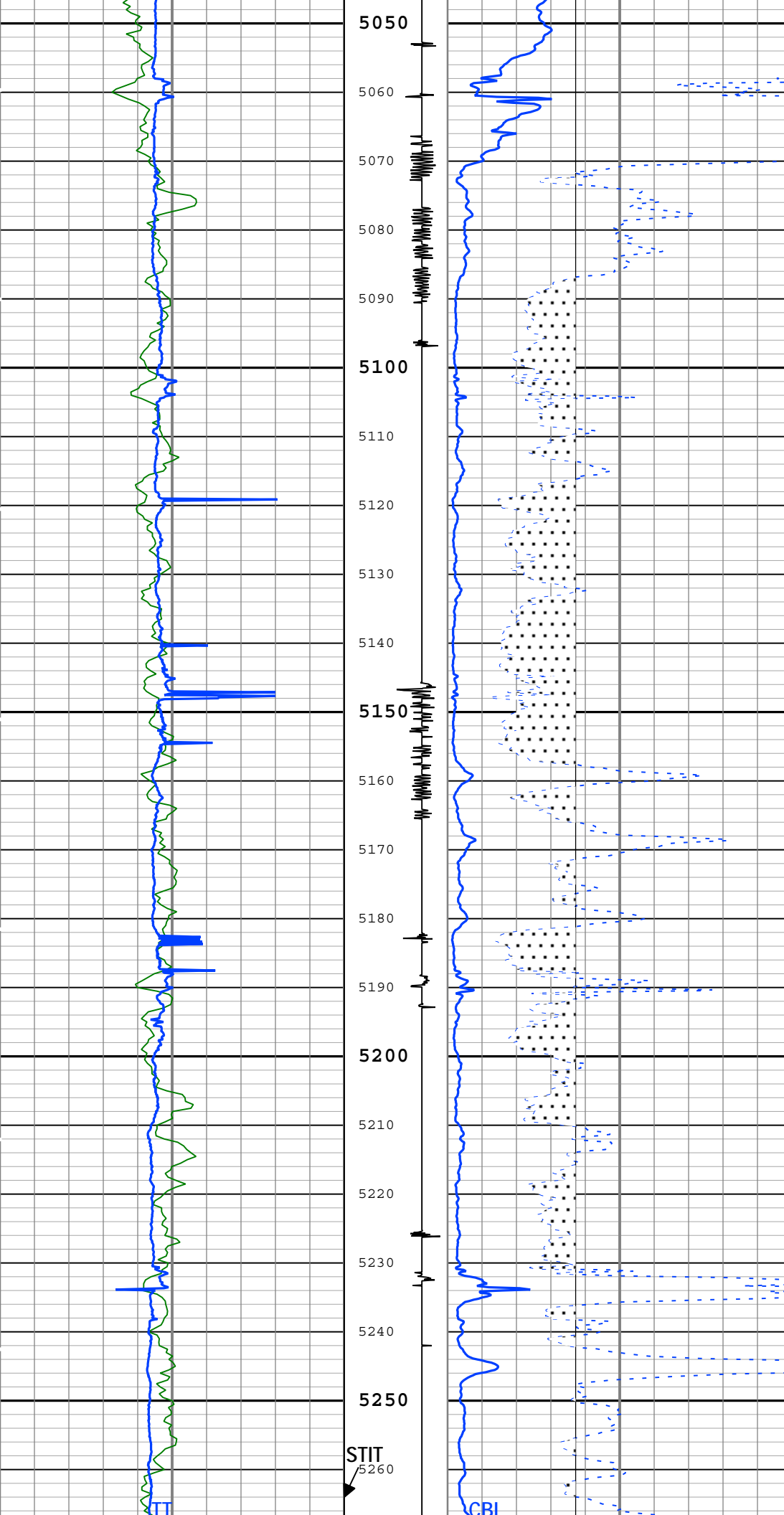


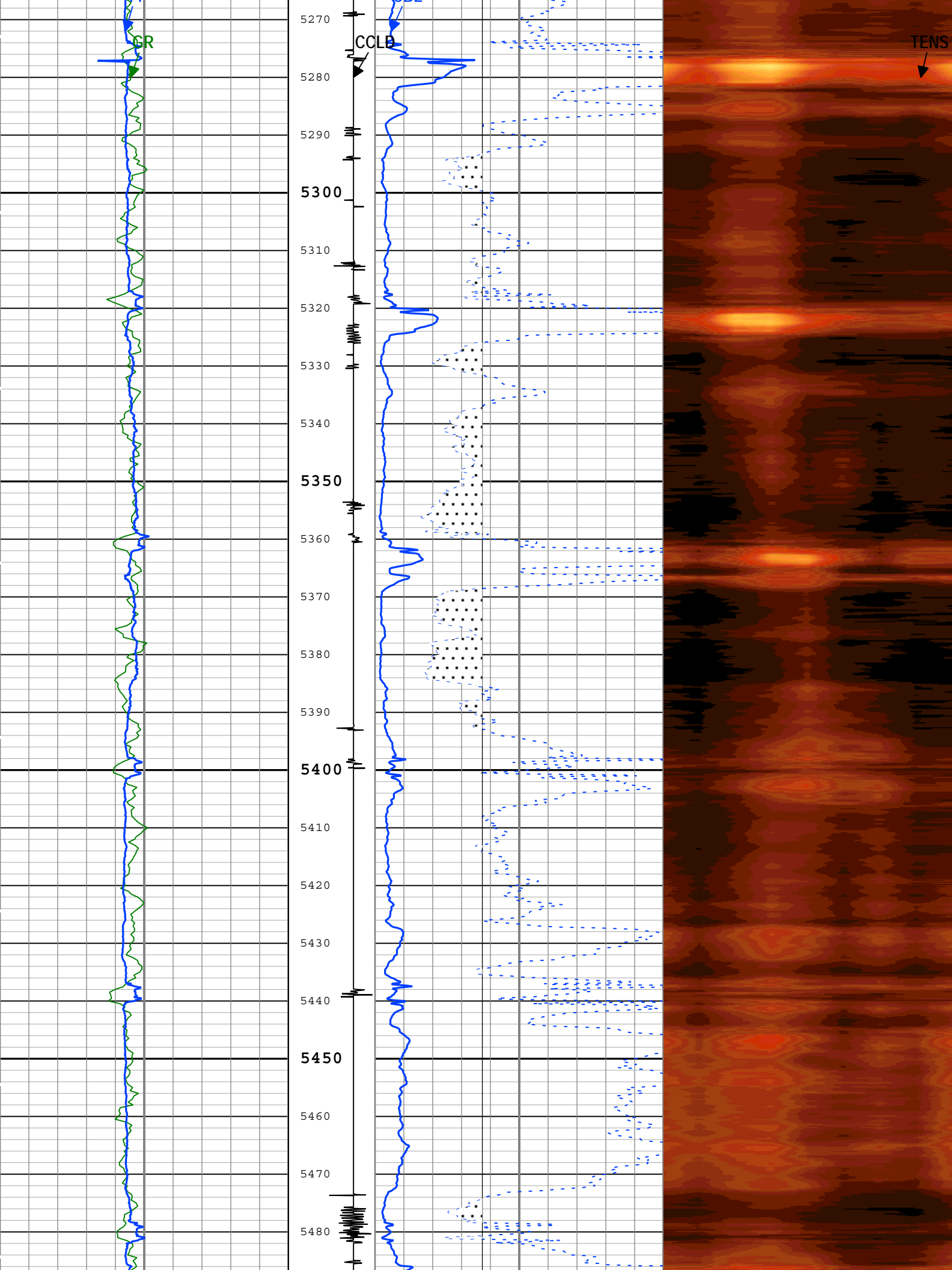


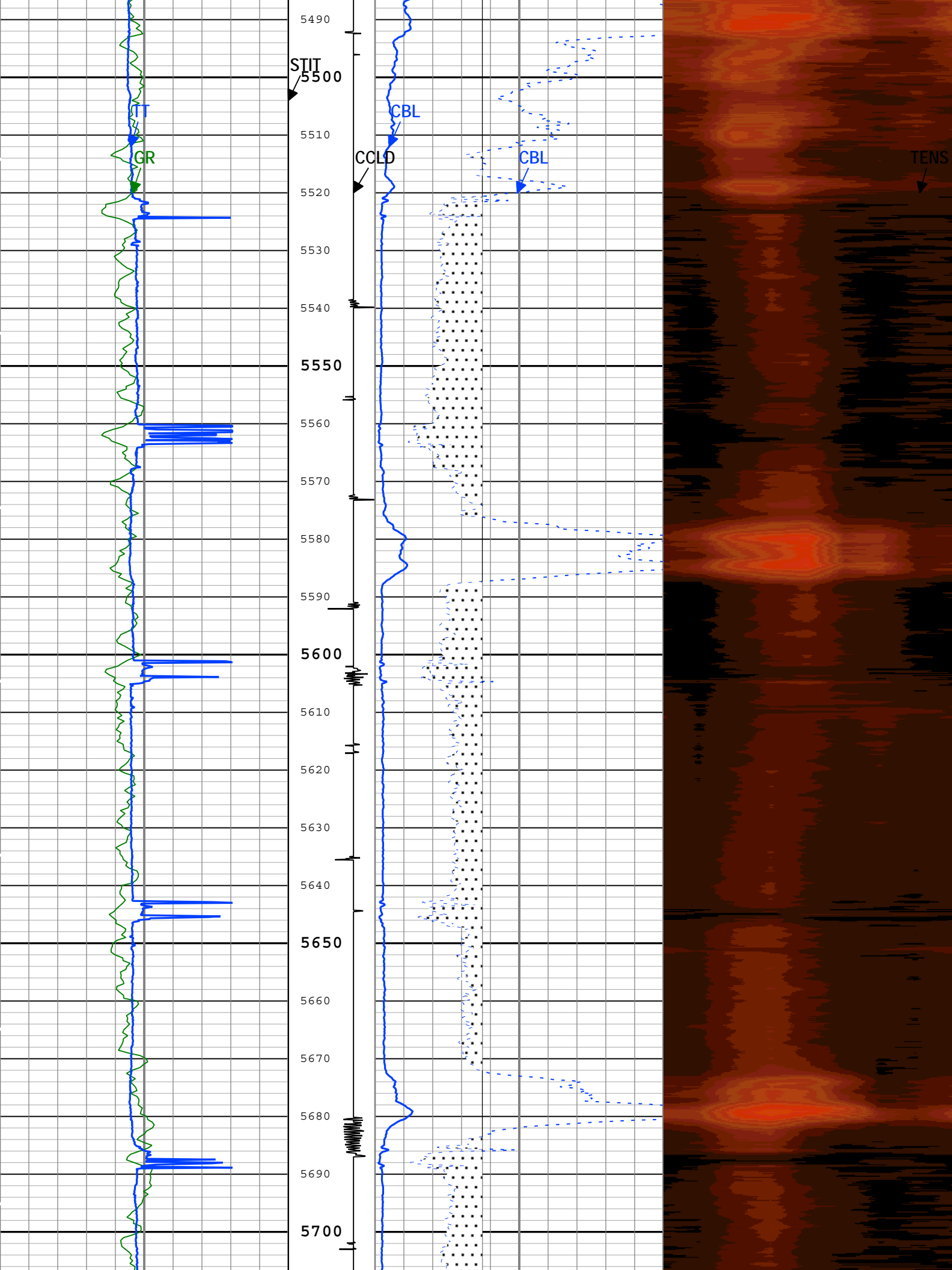


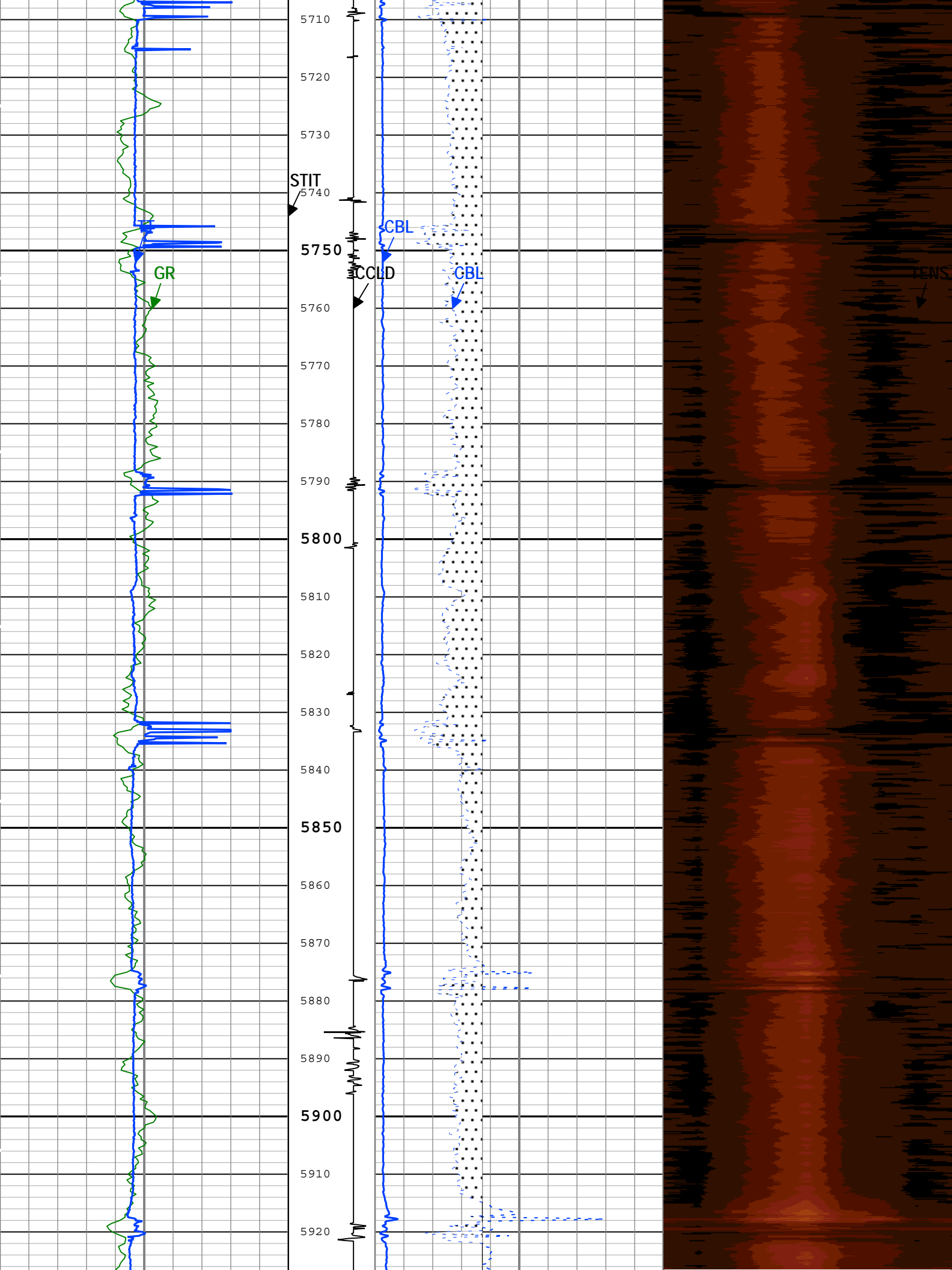


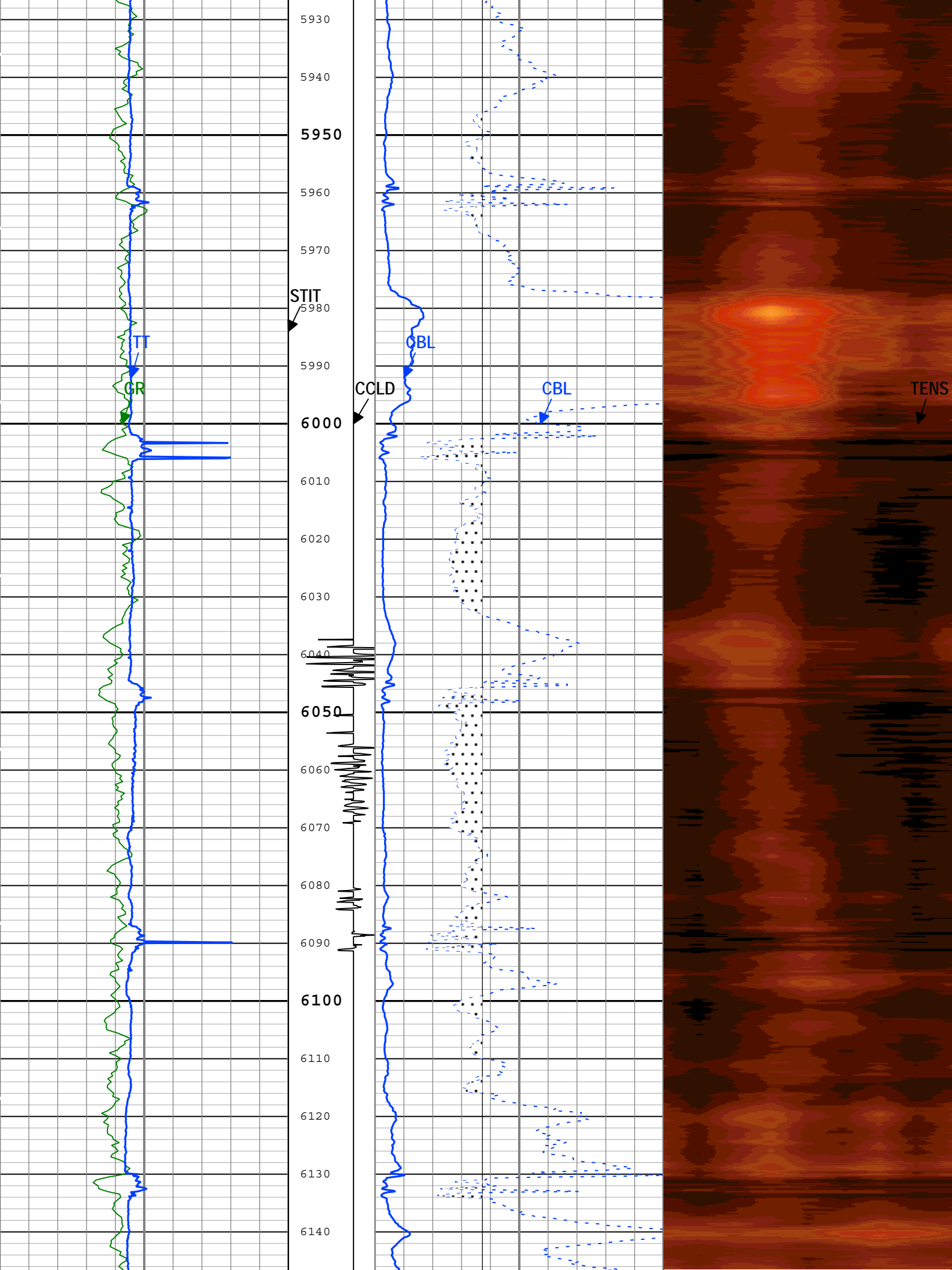


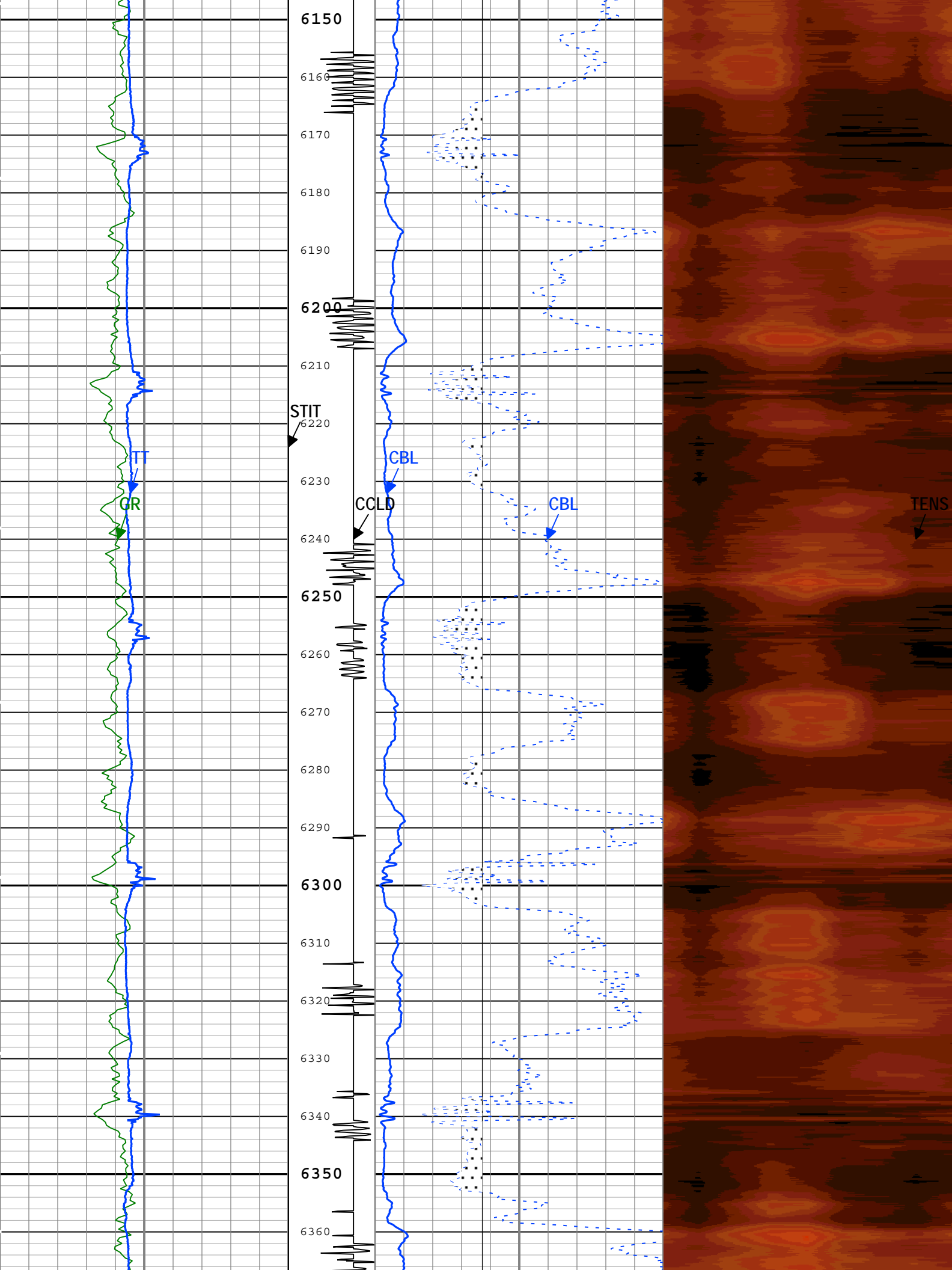


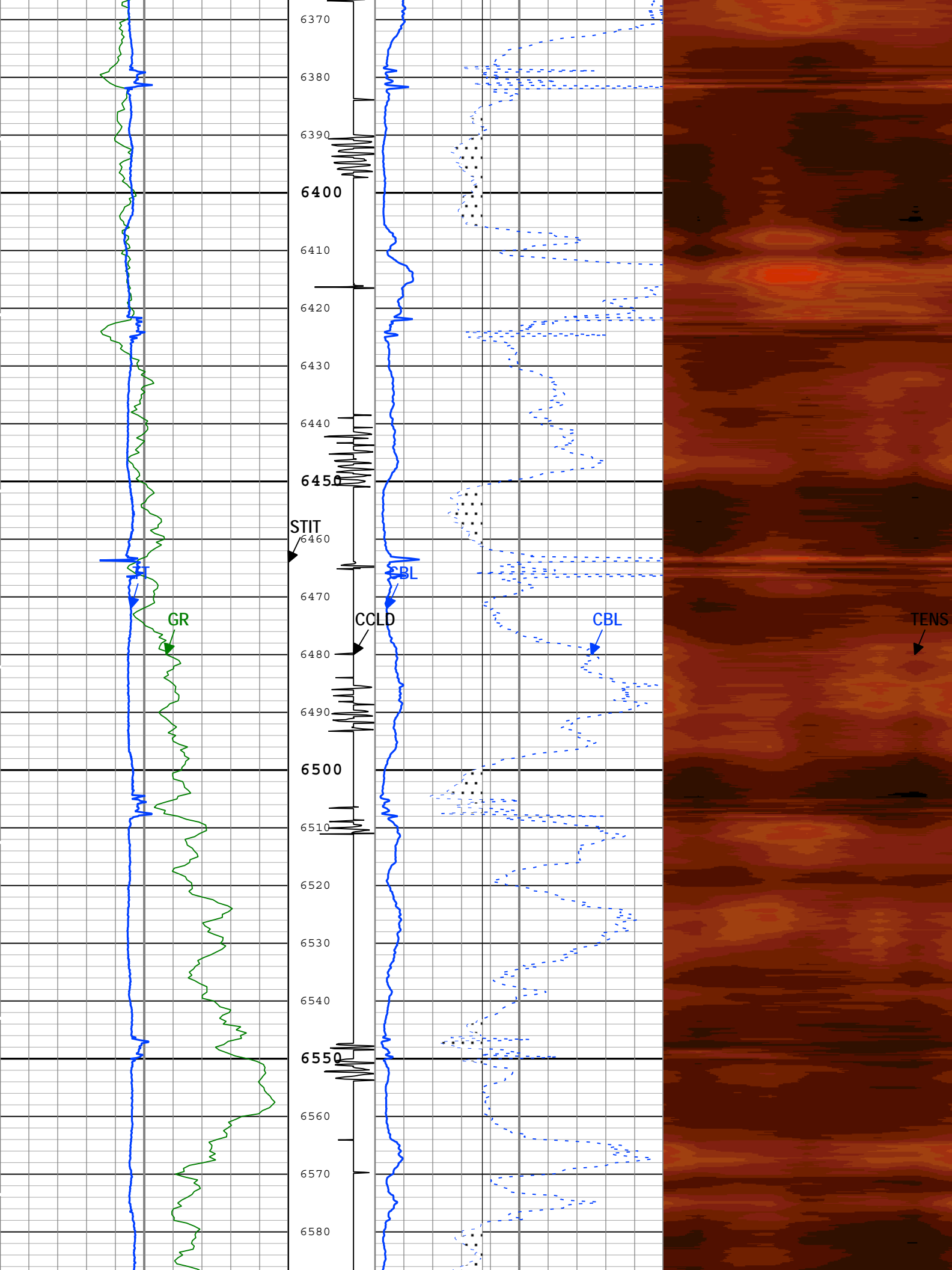


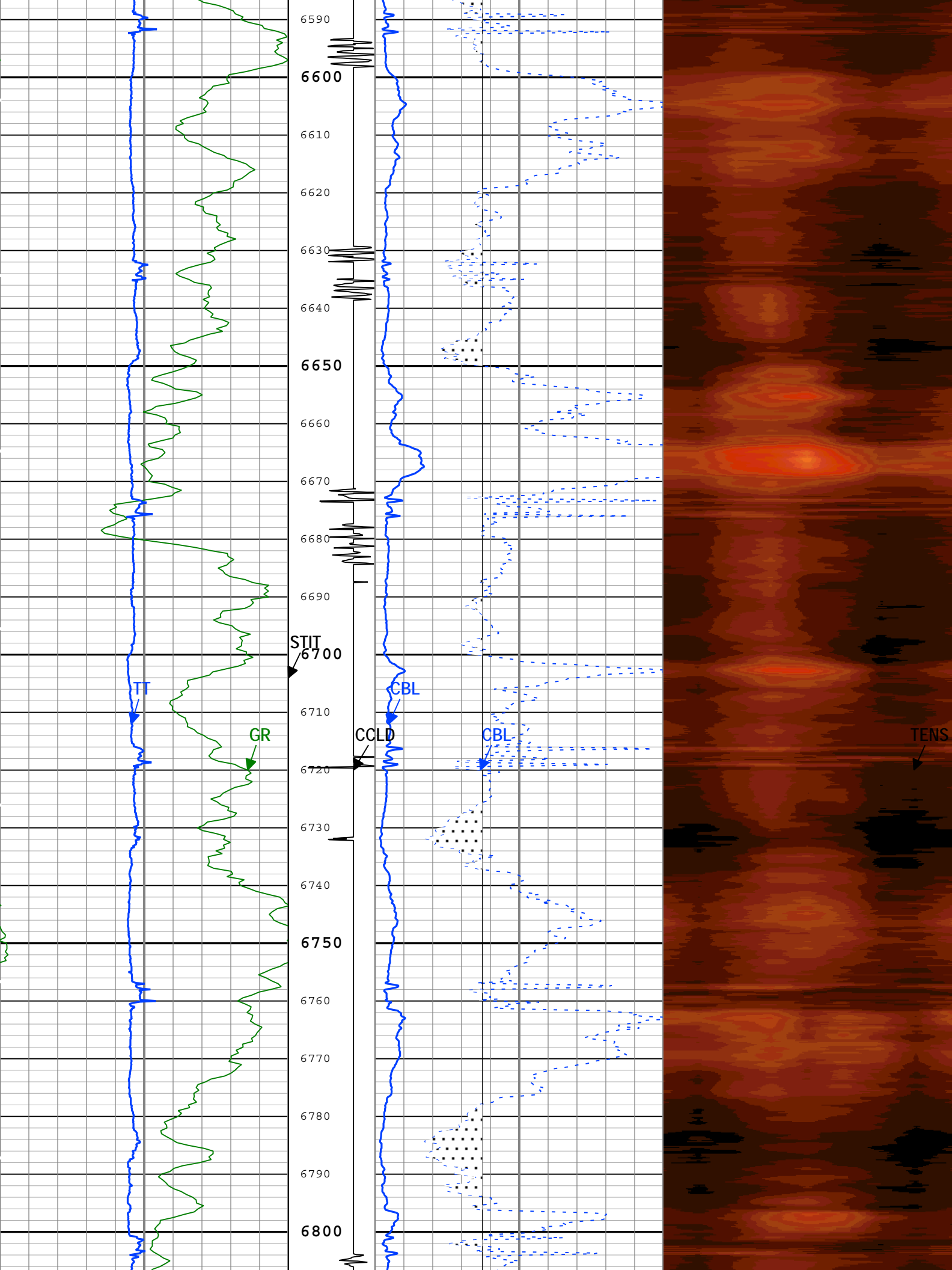




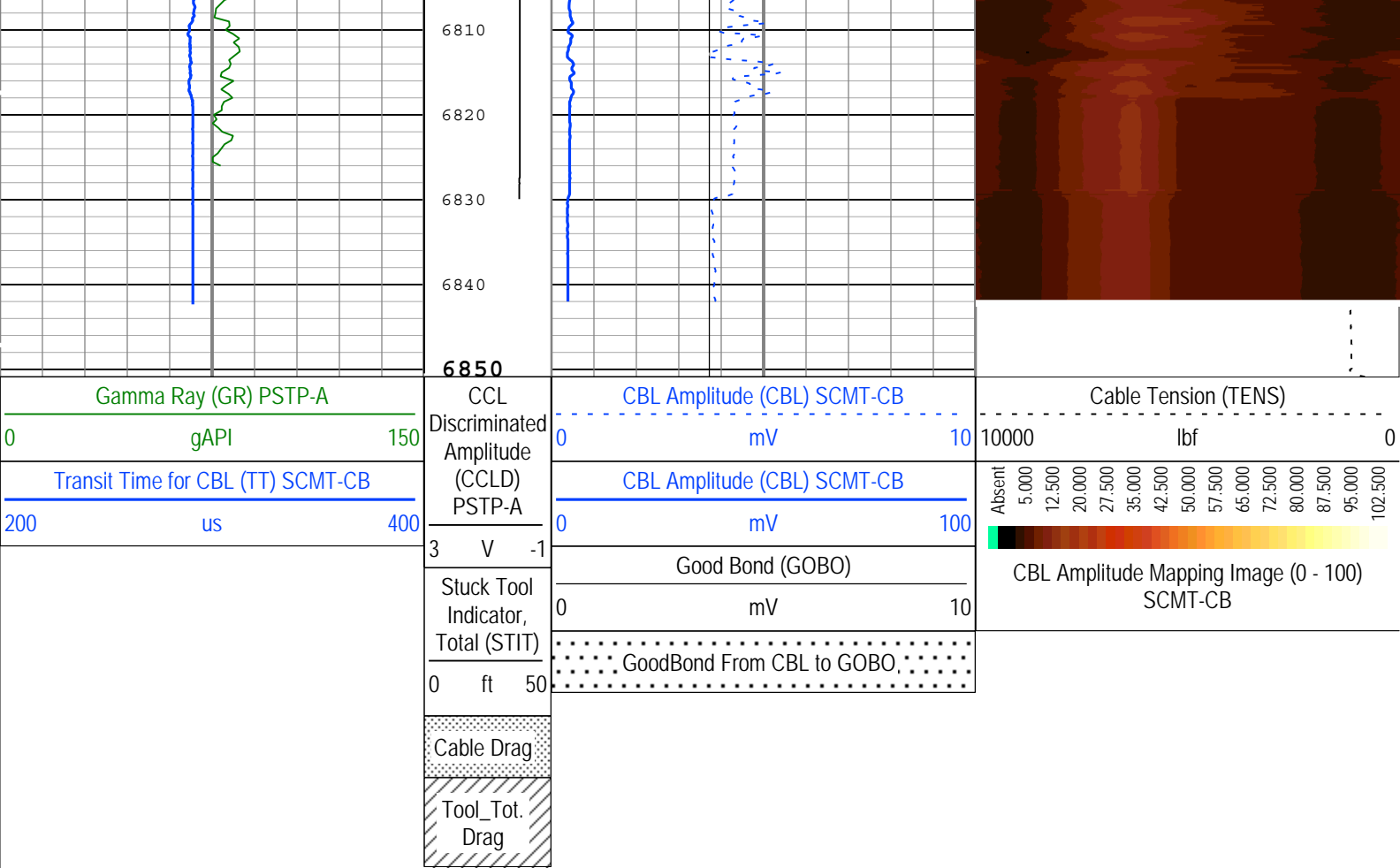








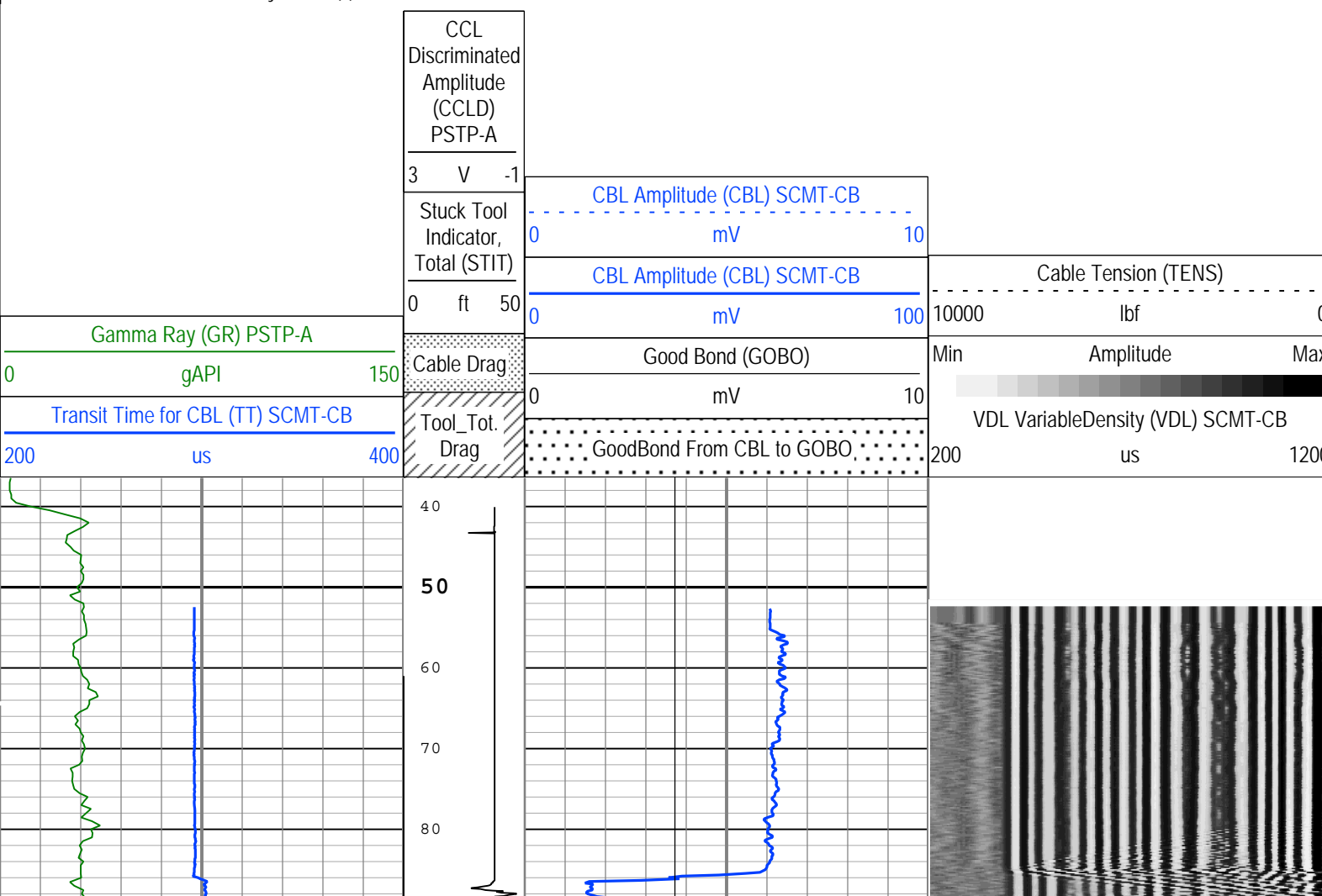


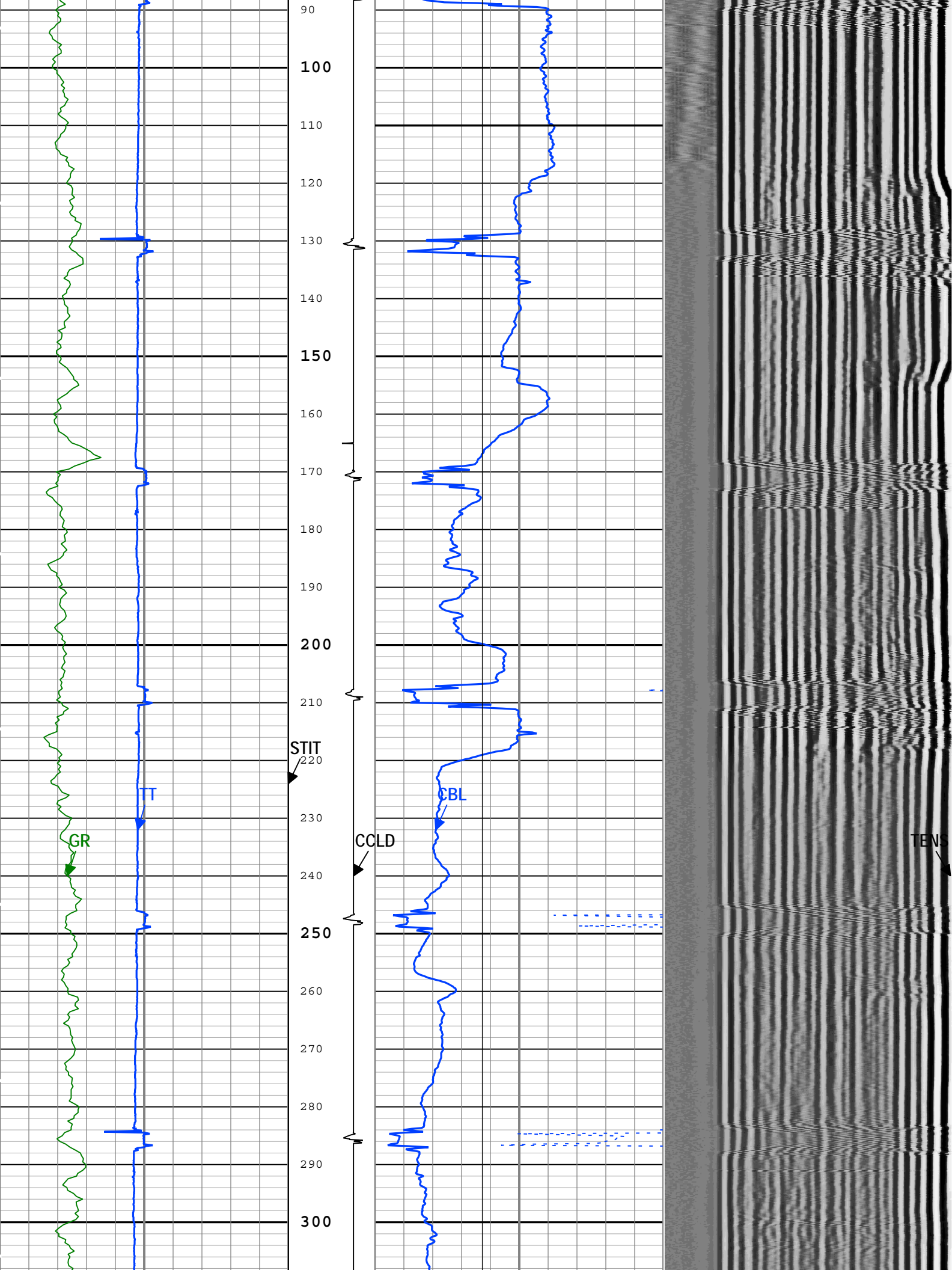


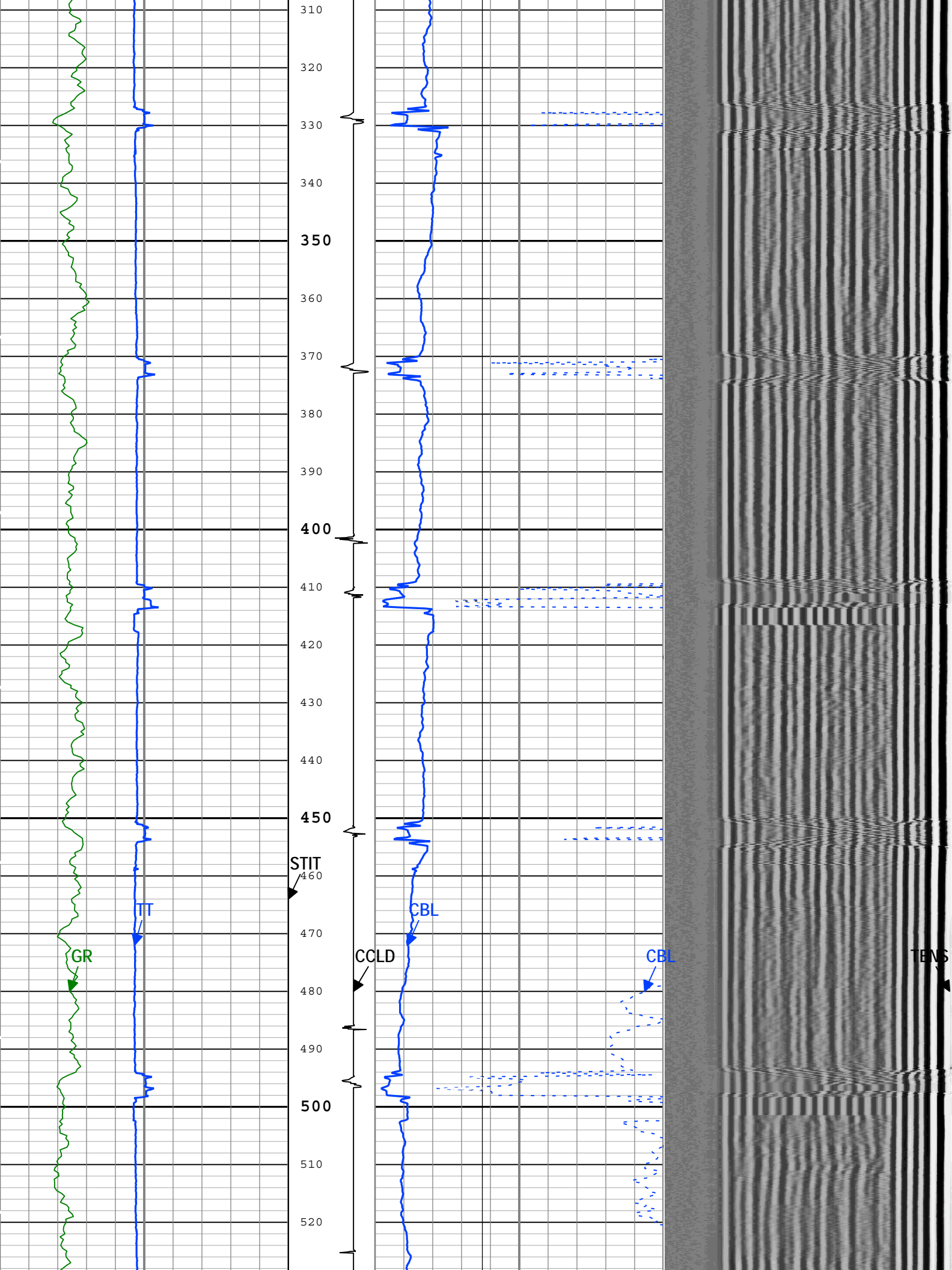
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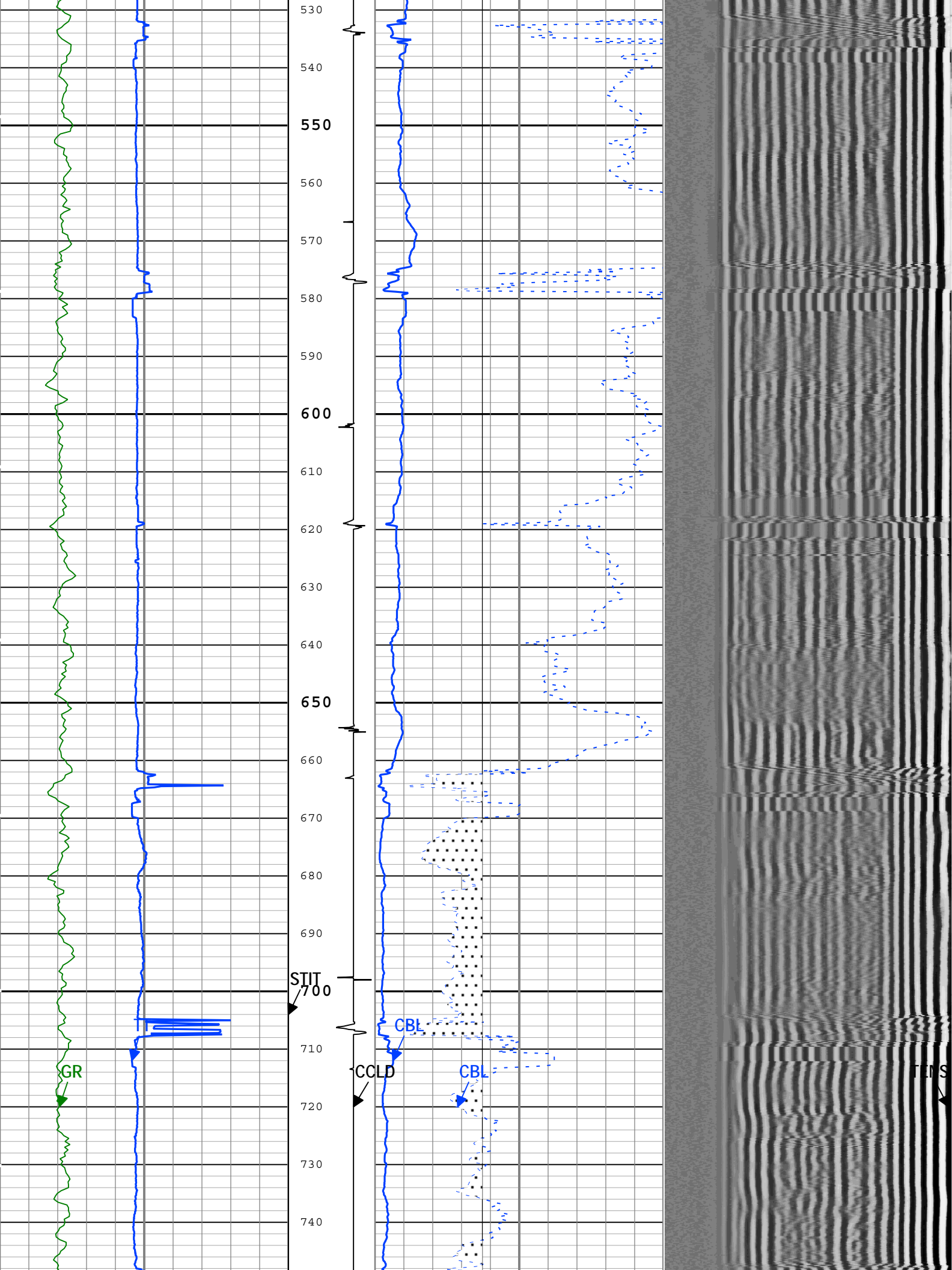
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Depth    Creation Date: 20-Apr-2015 21:59:32

Channel Processing Parameters				
Run 2: Parameters				
Parameter	Description	Tool	Value	Unit
BHT	Bottom Hole Temperature	Borehole	216.02	degF
CB3G	SCMT CBL 3 ft Peak Detection T0_Delay and Noise Gate	SCMT-CB	260.38	us
CBLG	CBL Gate Width	SCMT-CB	45	us
CBRA	CBL LQC Reference Amplitude in Free Pipe	SCMT-CB	62	mV
CMCF	CBL Cement Type Compensation Factor	SCMT-CB	0.6	
THNO	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.362	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	8.7	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
EDF	Elevation of Derrick Floor Above Permanent Datum	WLSESSION	29	ft
EPD	Elevation of Permanent Datum (PDAT) above Mean Sea Level	WLSESSION	4664	ft
GGRD	Geothermal Gradient	Borehole	1	0.01 degF/ft
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	GTEM_LINEST	
MAPG	SCMT MAP Peak Detection T0_Delay and Noise Gate	SCMT-CB	195	us
MCCF	MAP Cement Type Compensation Factor	SCMT-CB	0.73	
MMSA	MAP Minimum Sonic Amplitude	SCMT-CB	10.86	mV
MSA	Minimum Sonic Amplitude	SCMT-CB	1.84	mV
PDAT	Permanent Datum	WLSESSION	GL	
RUN_SNUM	Run Sequence Number	WSDRUN	2	

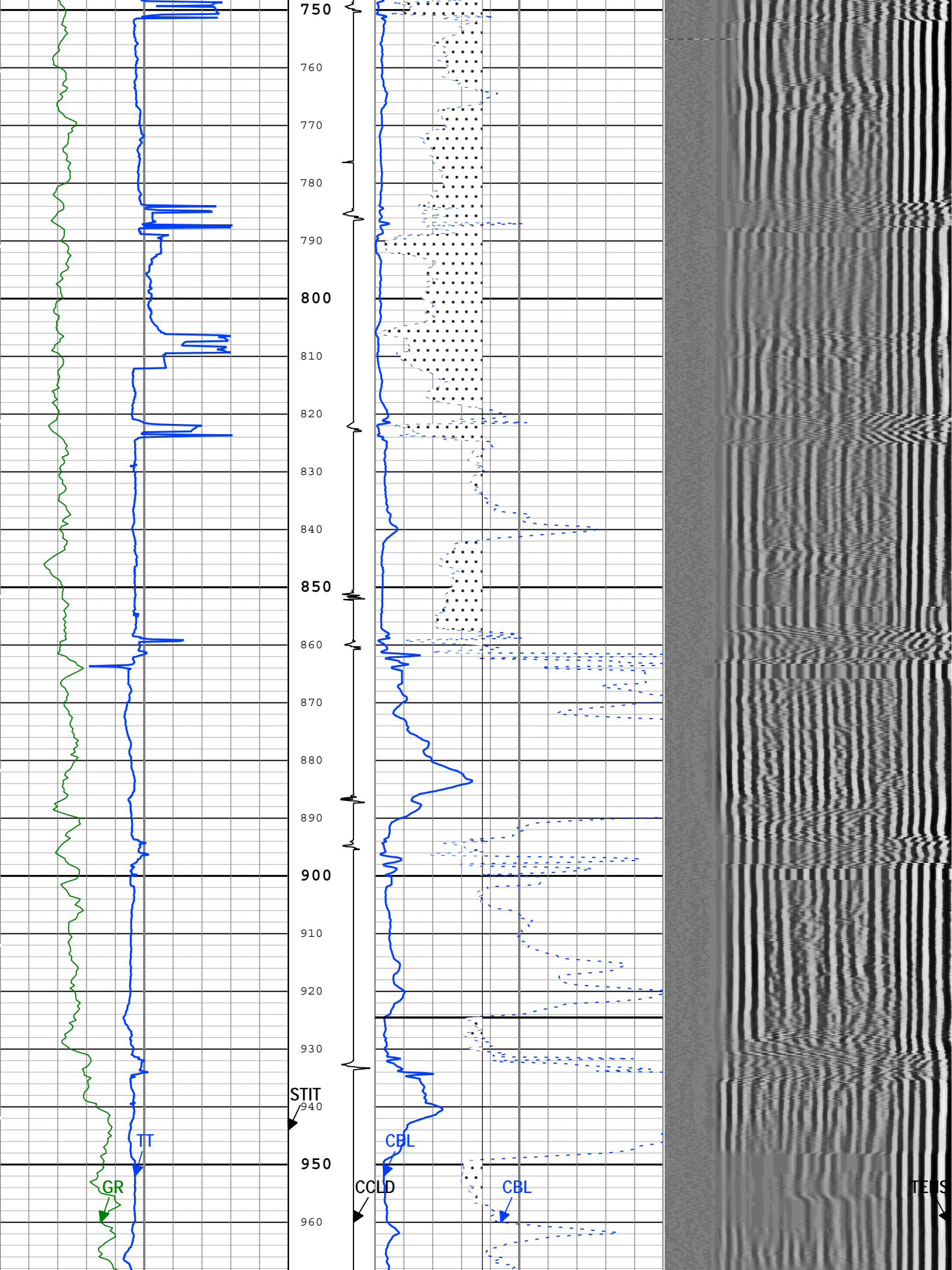


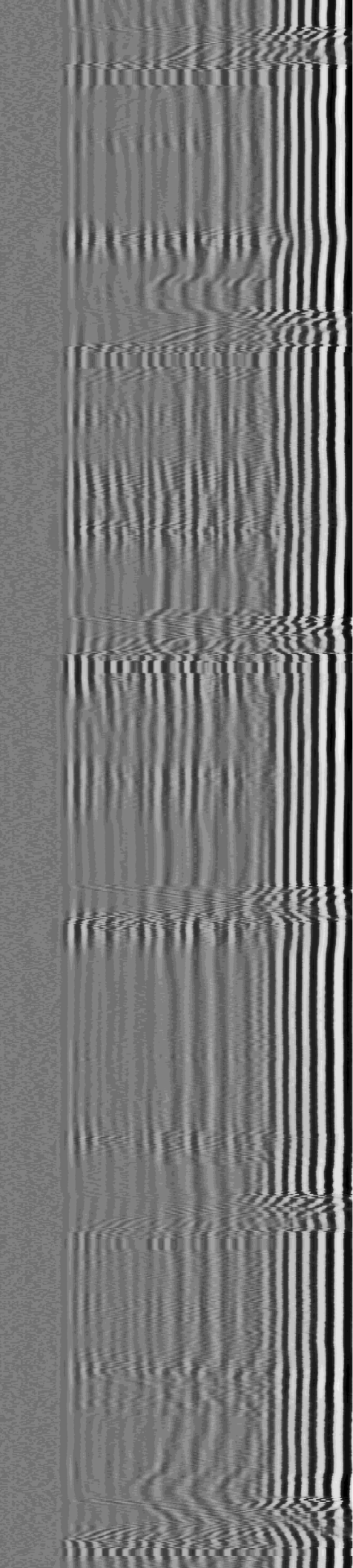
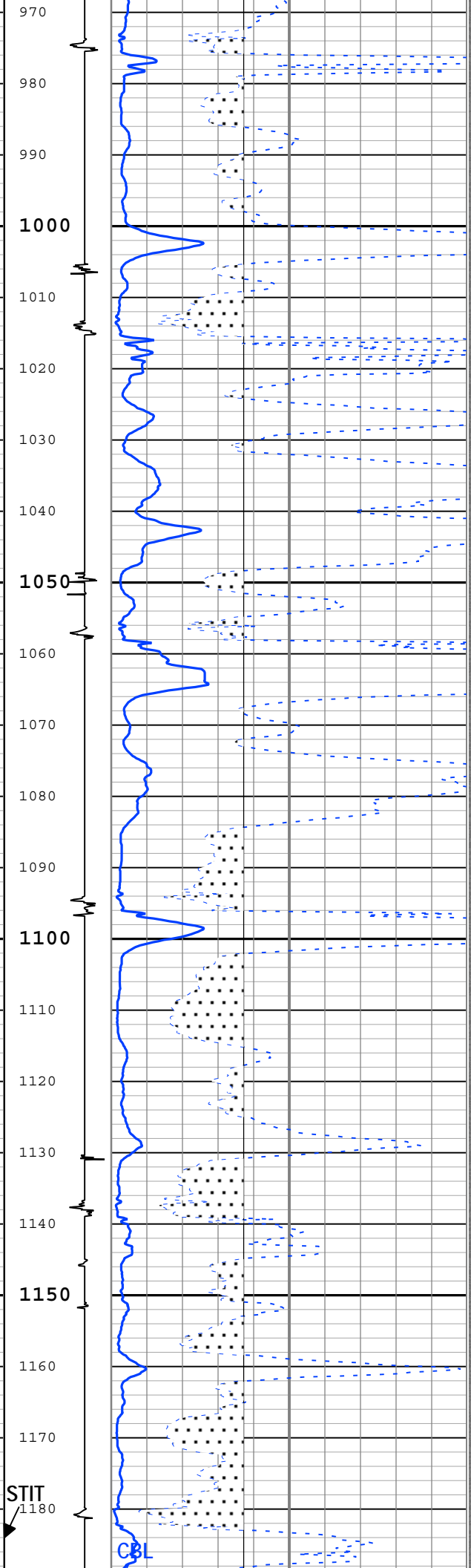
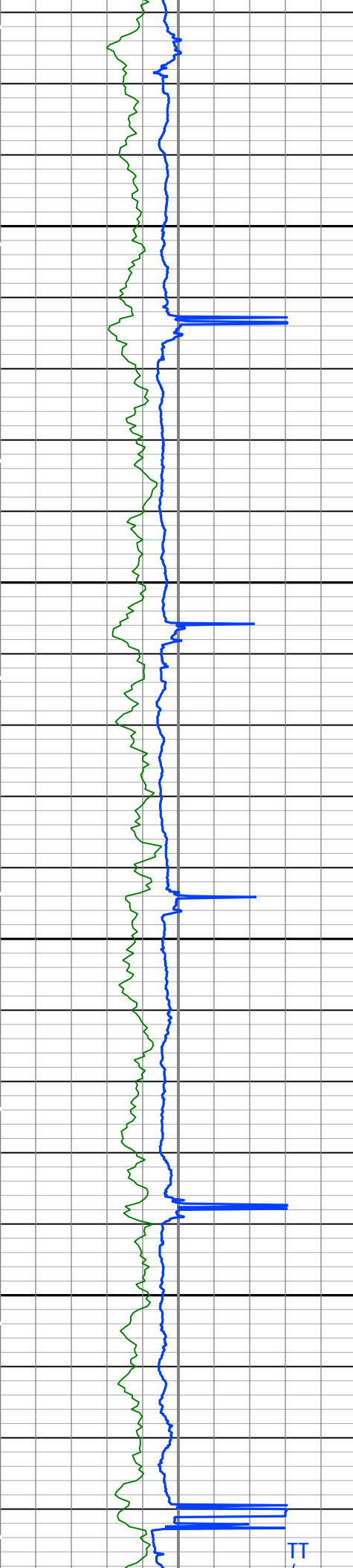


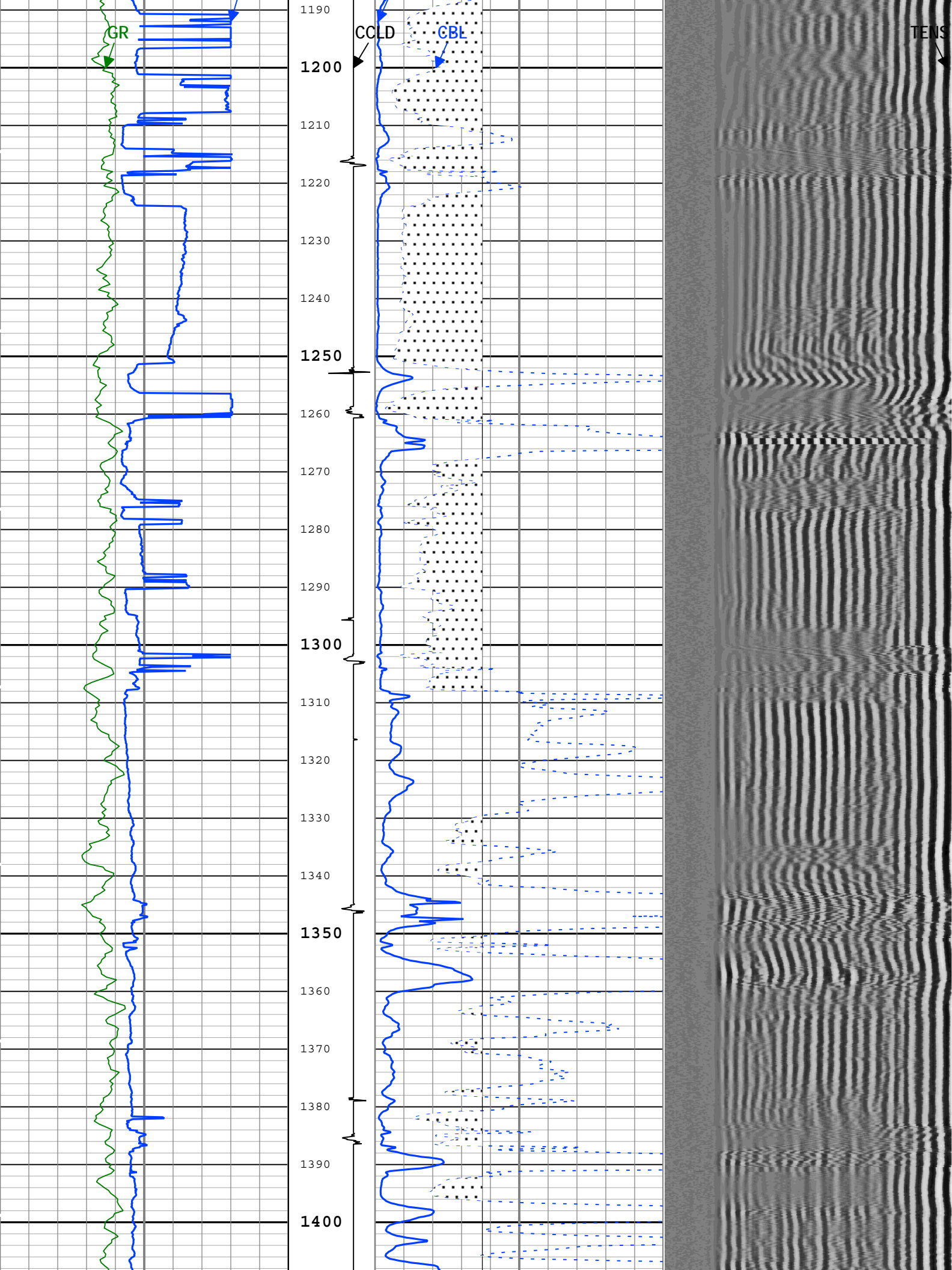




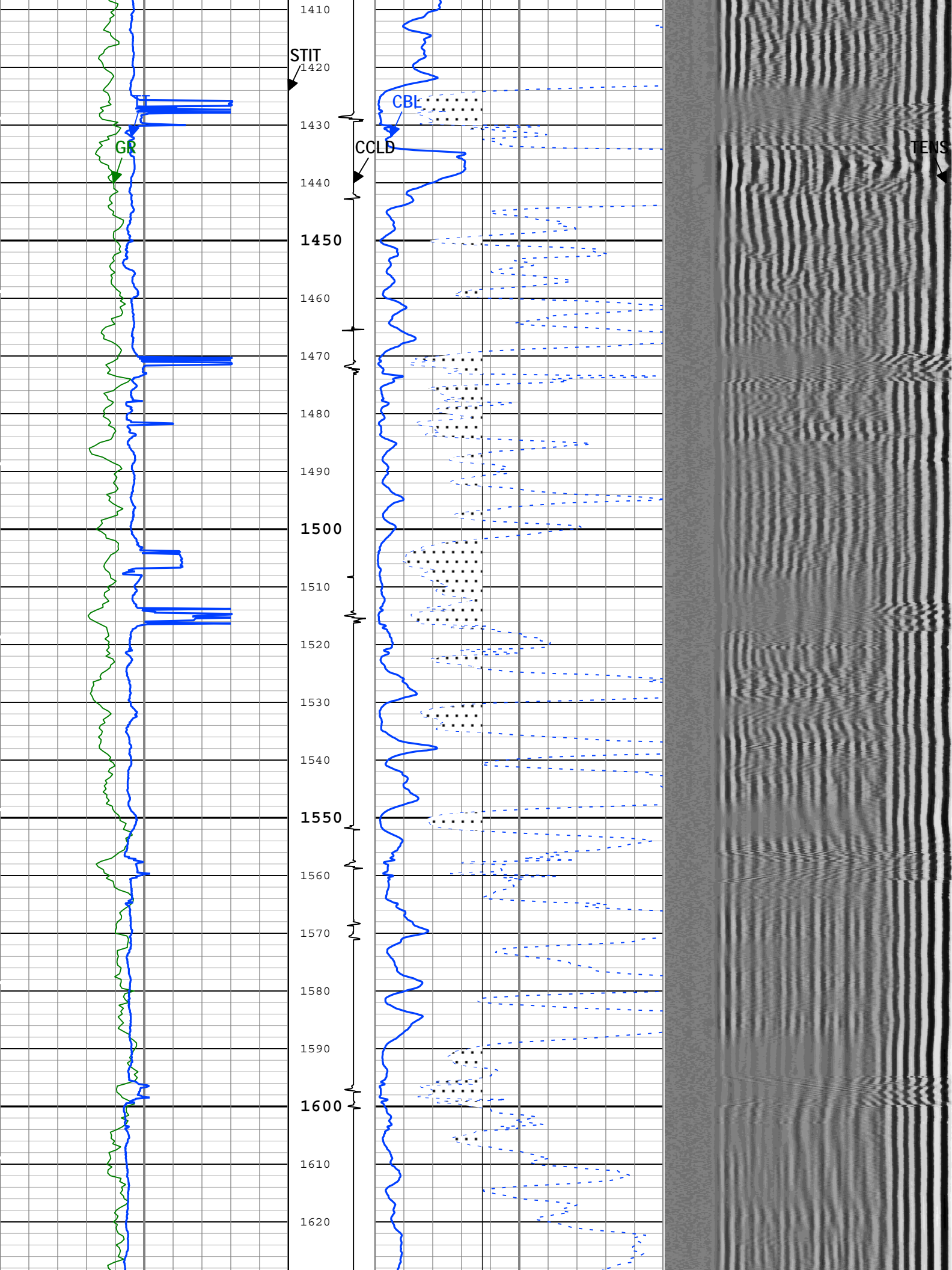


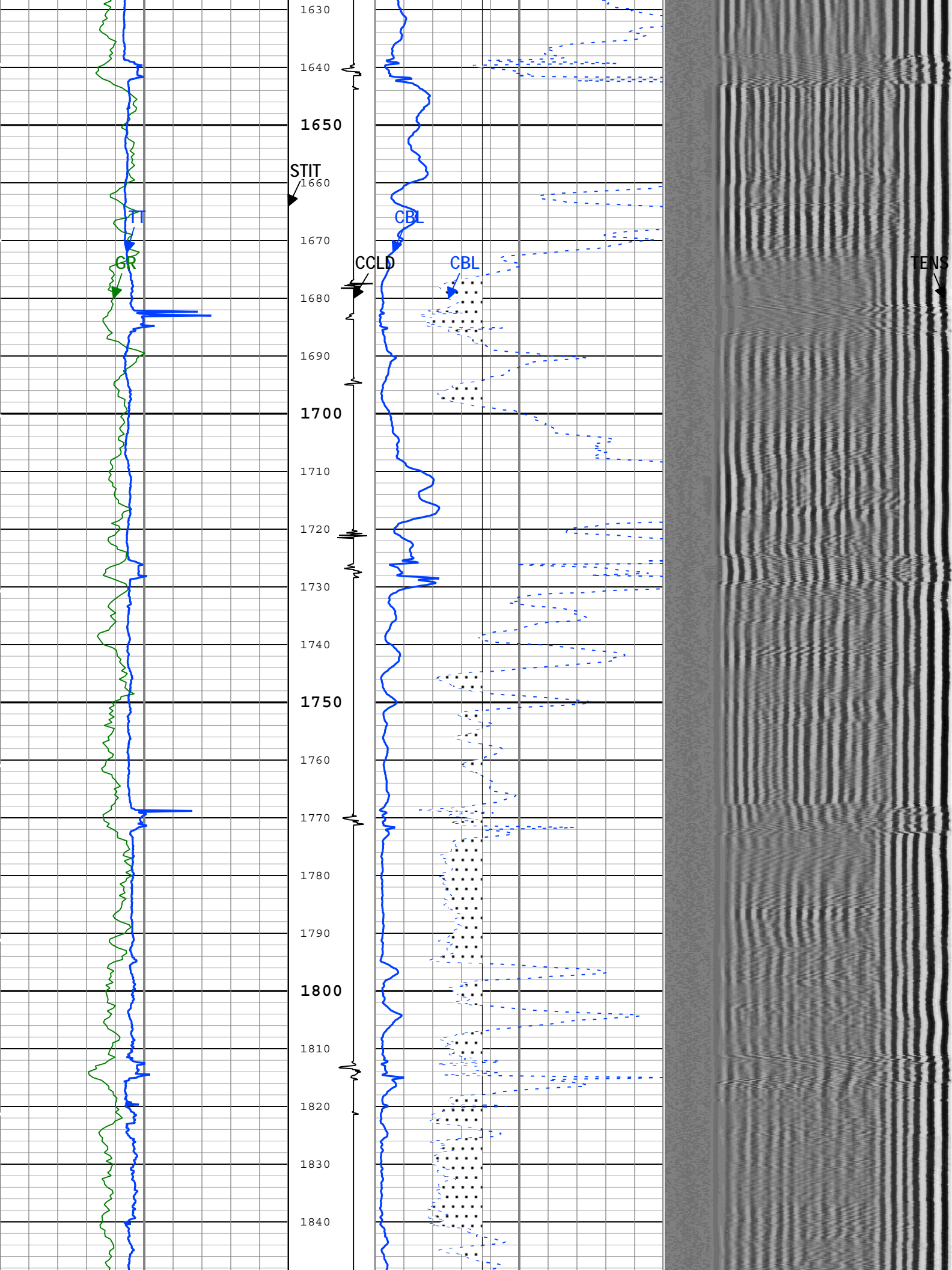


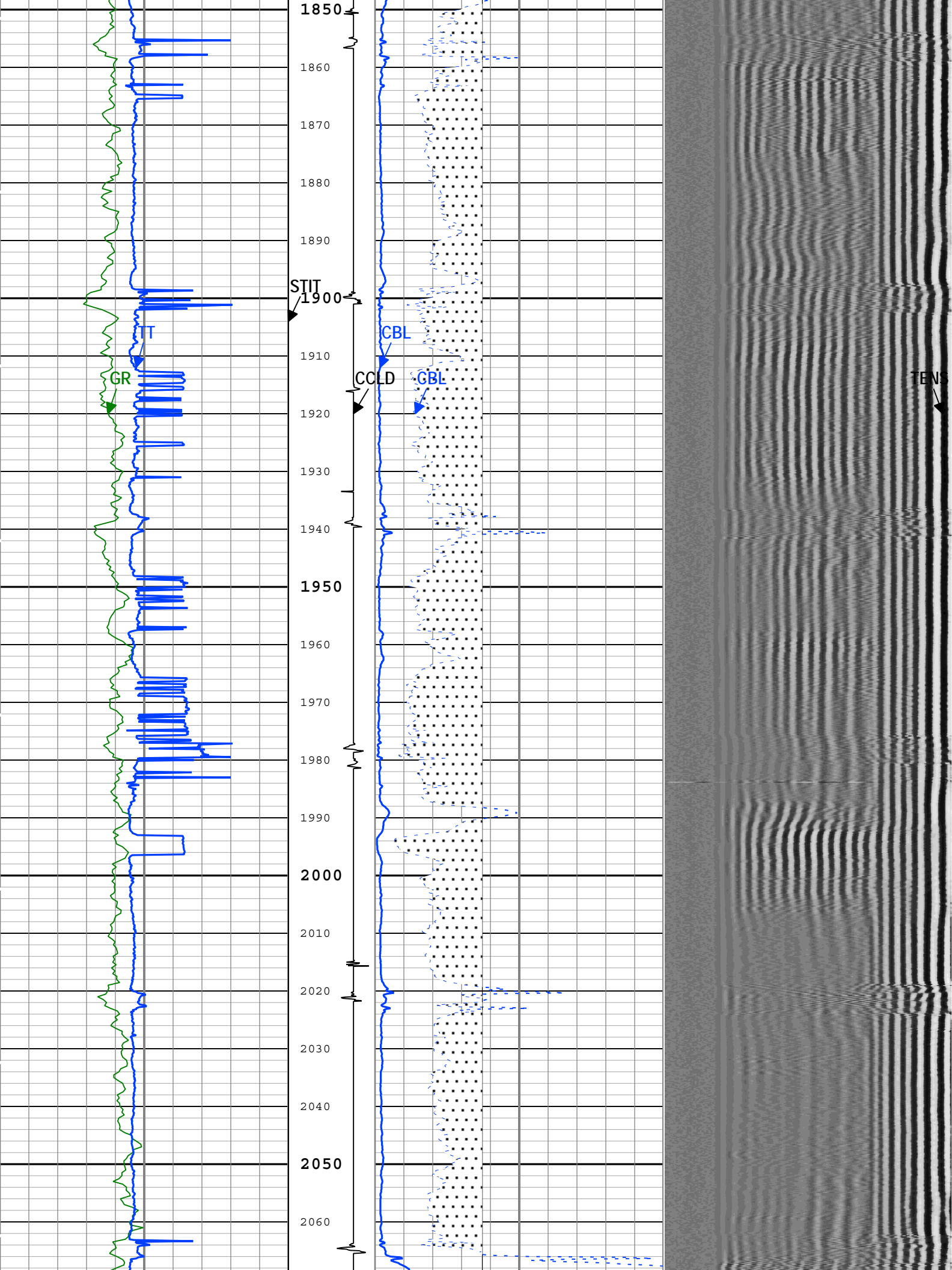




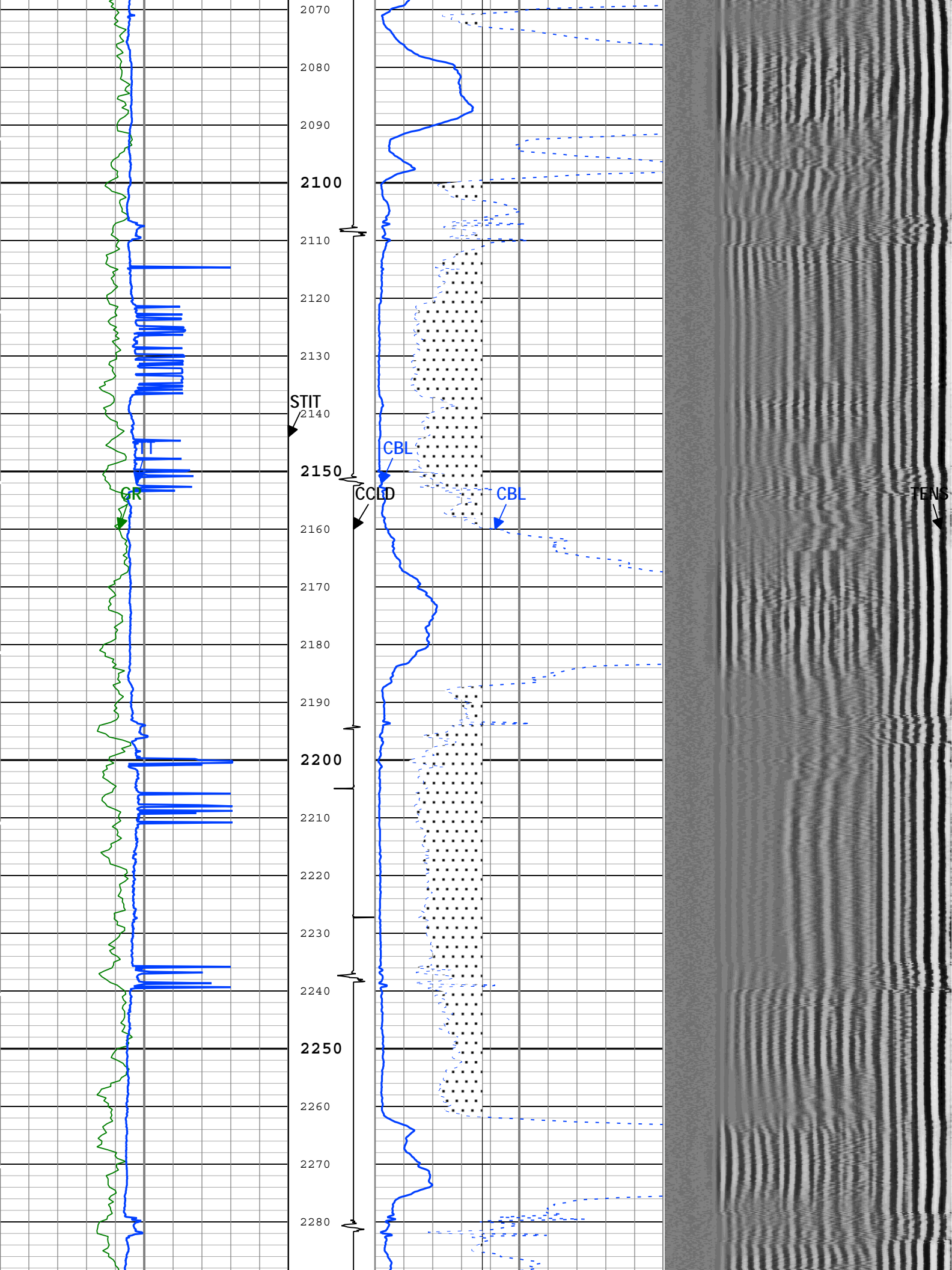


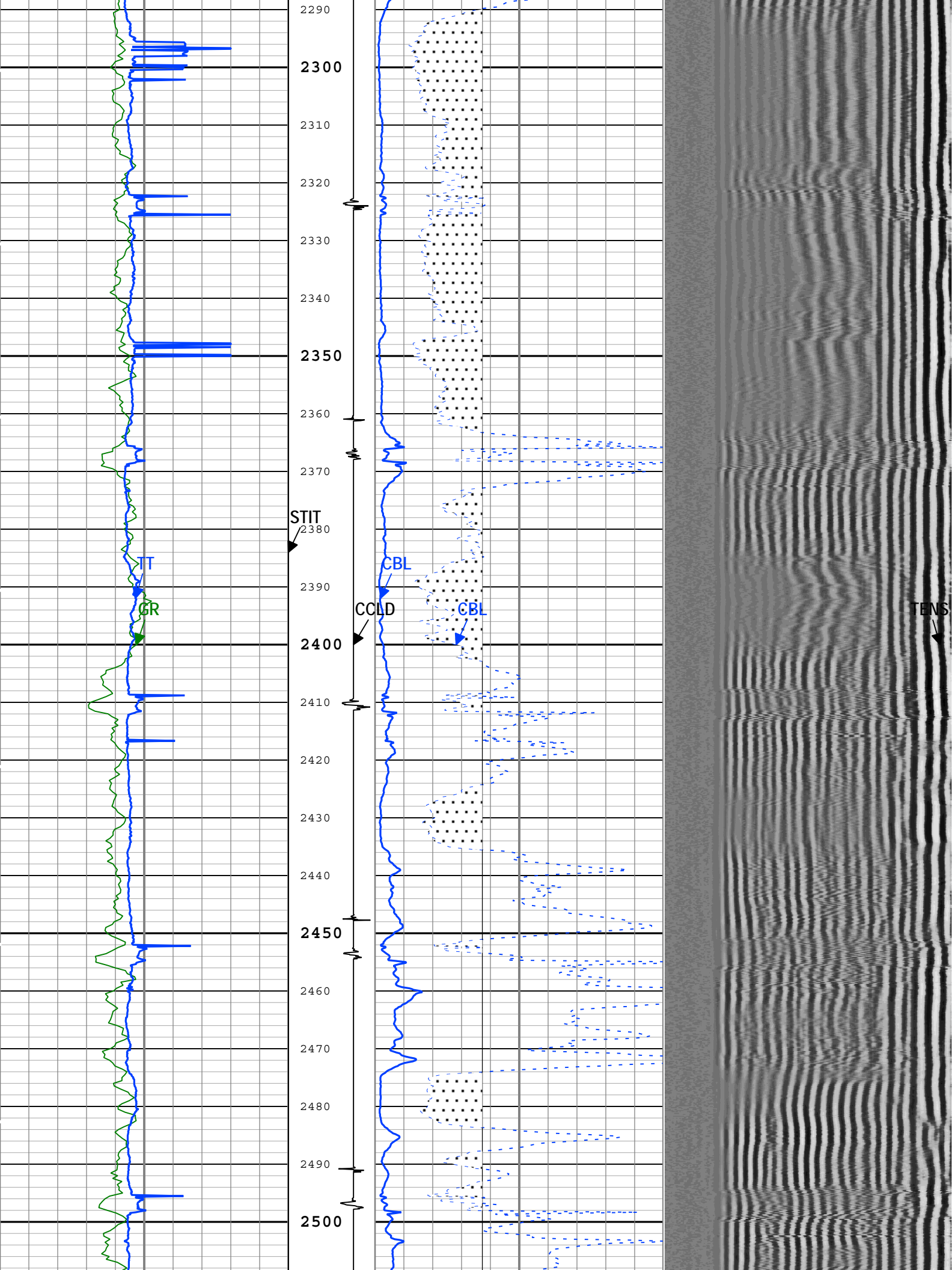


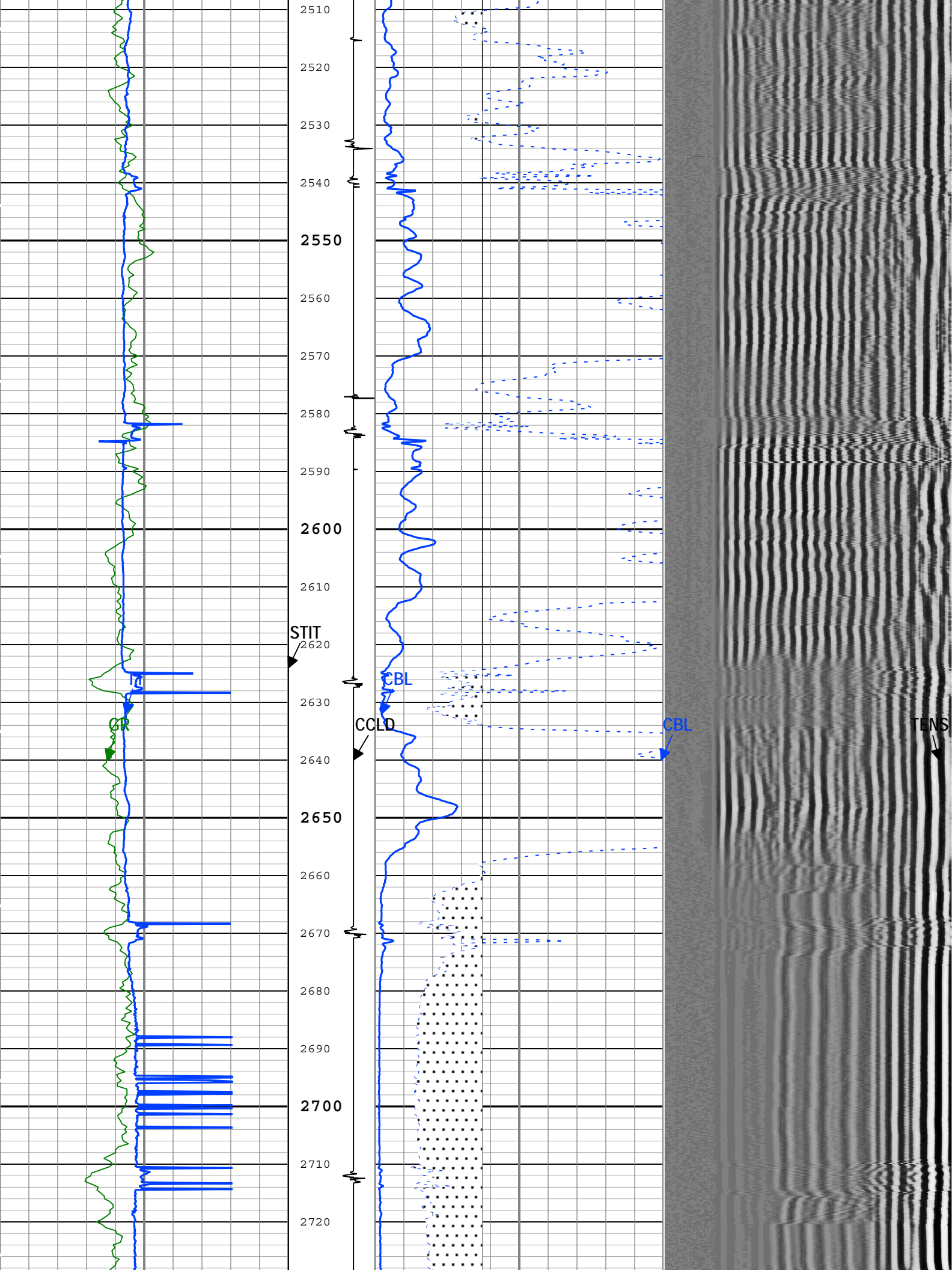




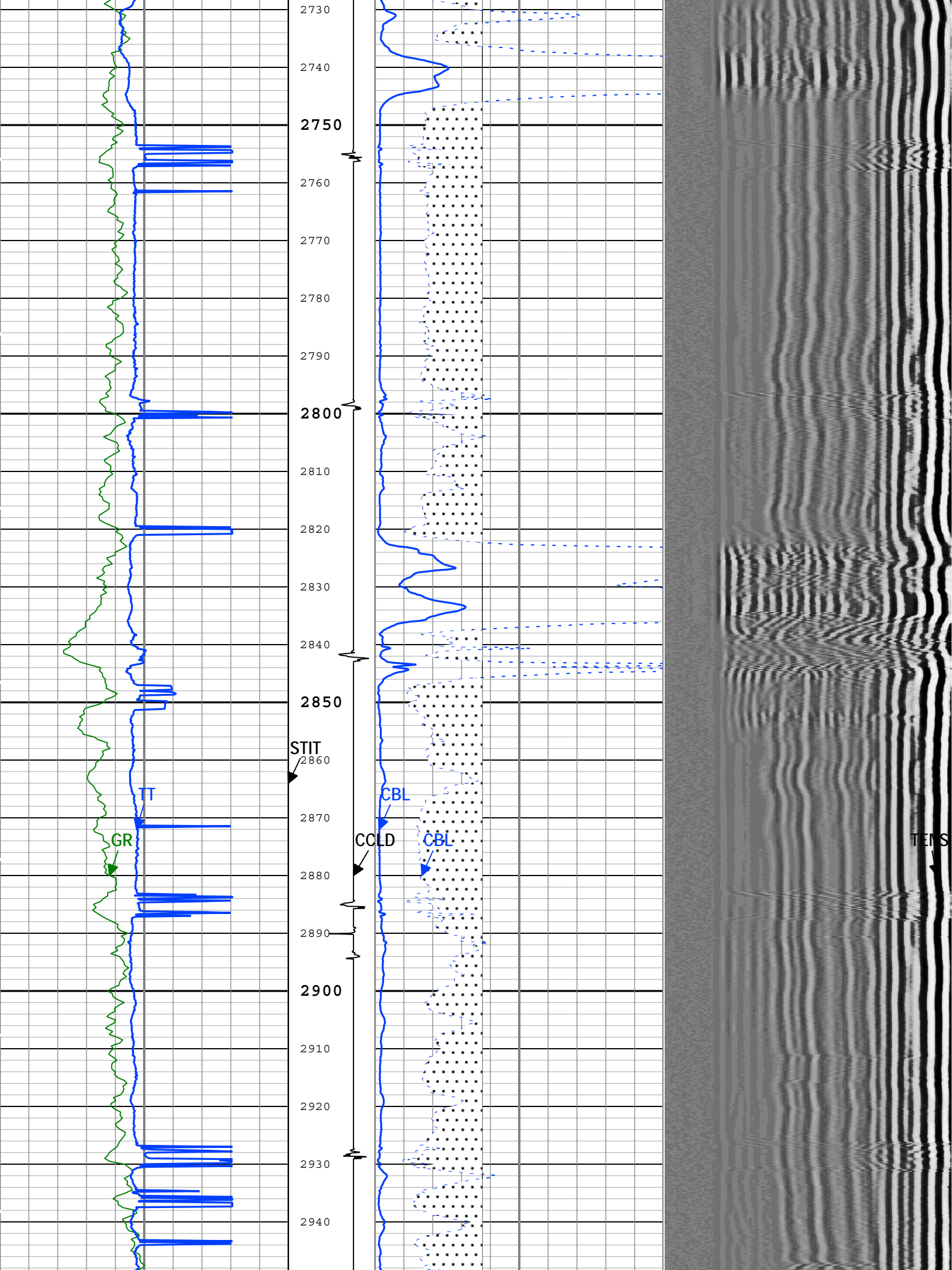


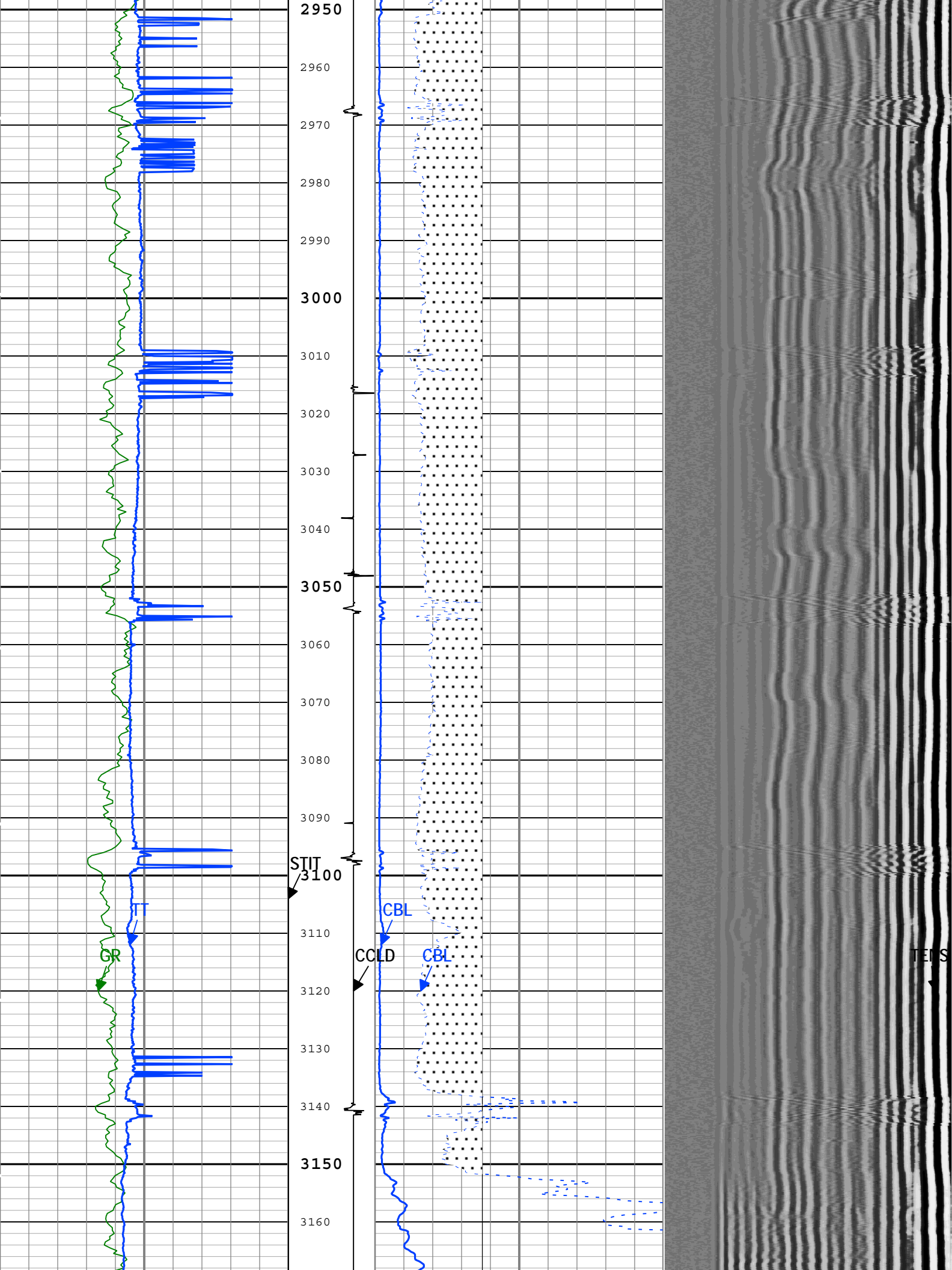




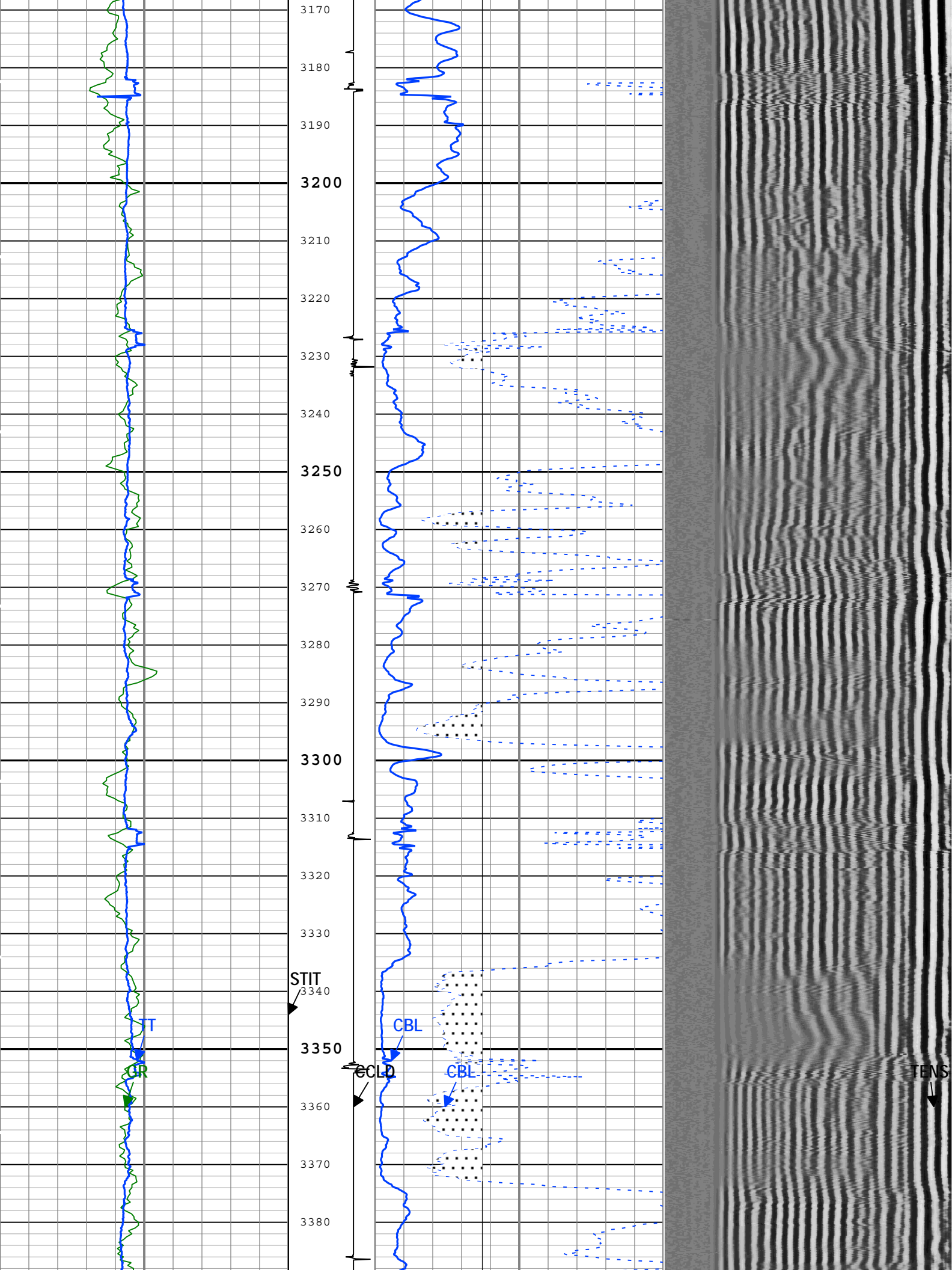


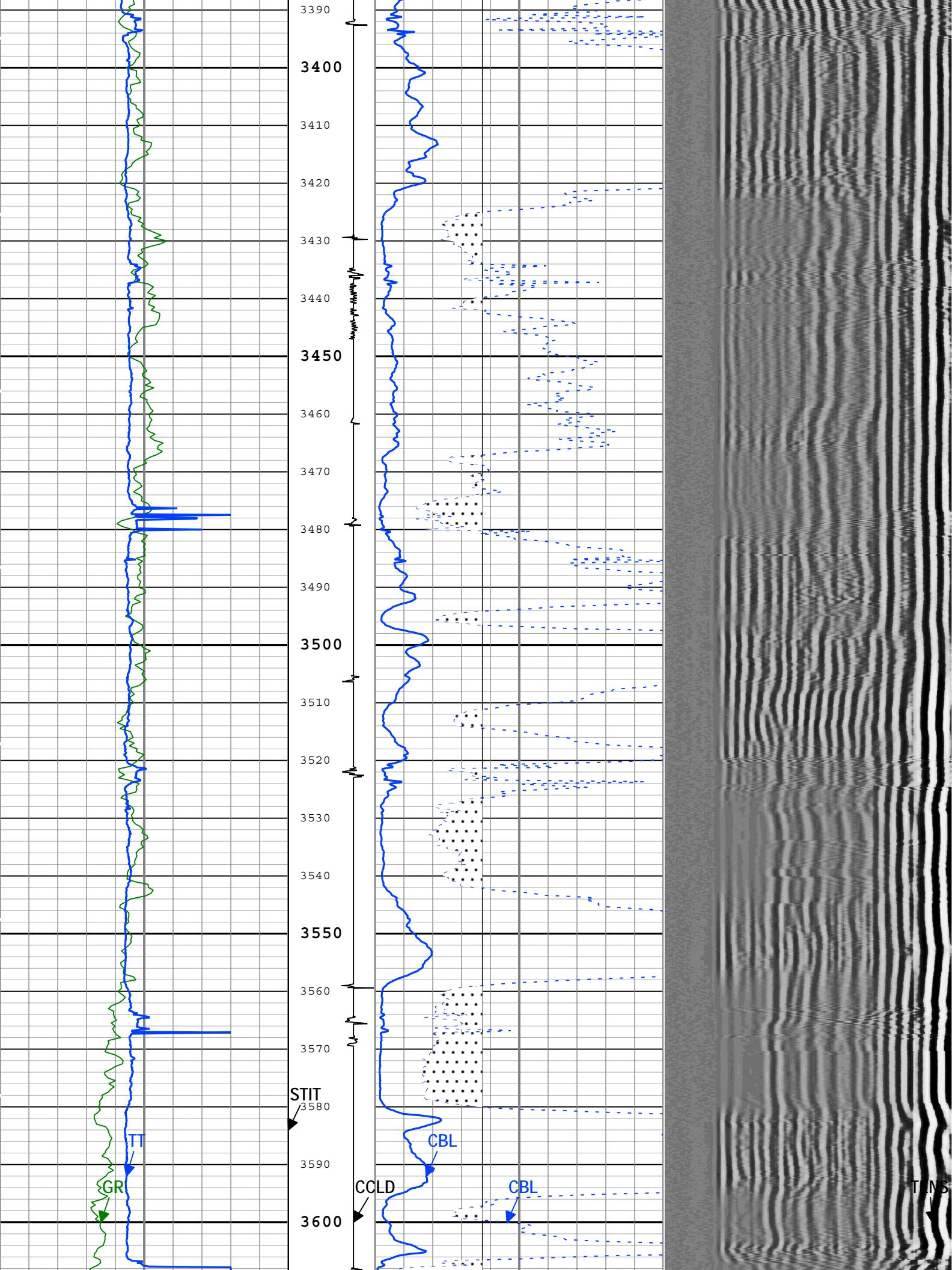


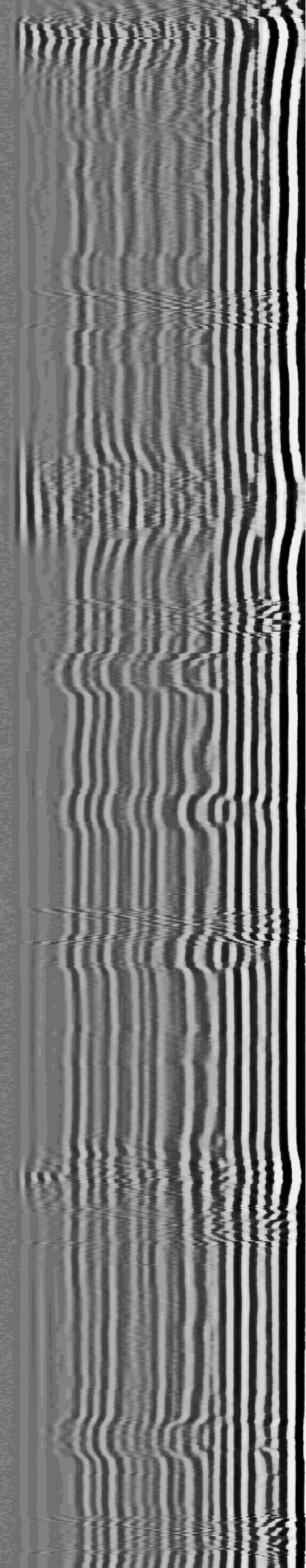
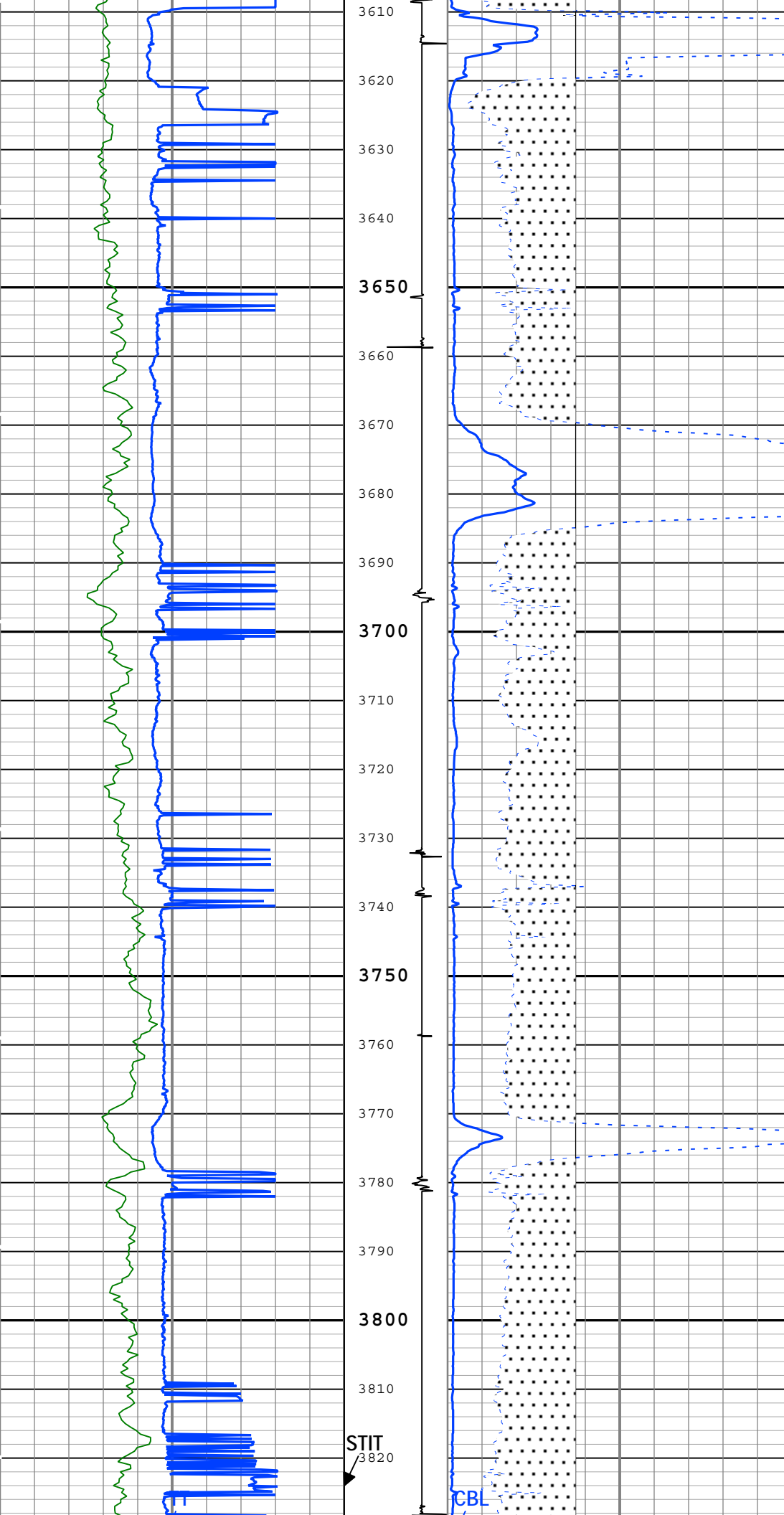




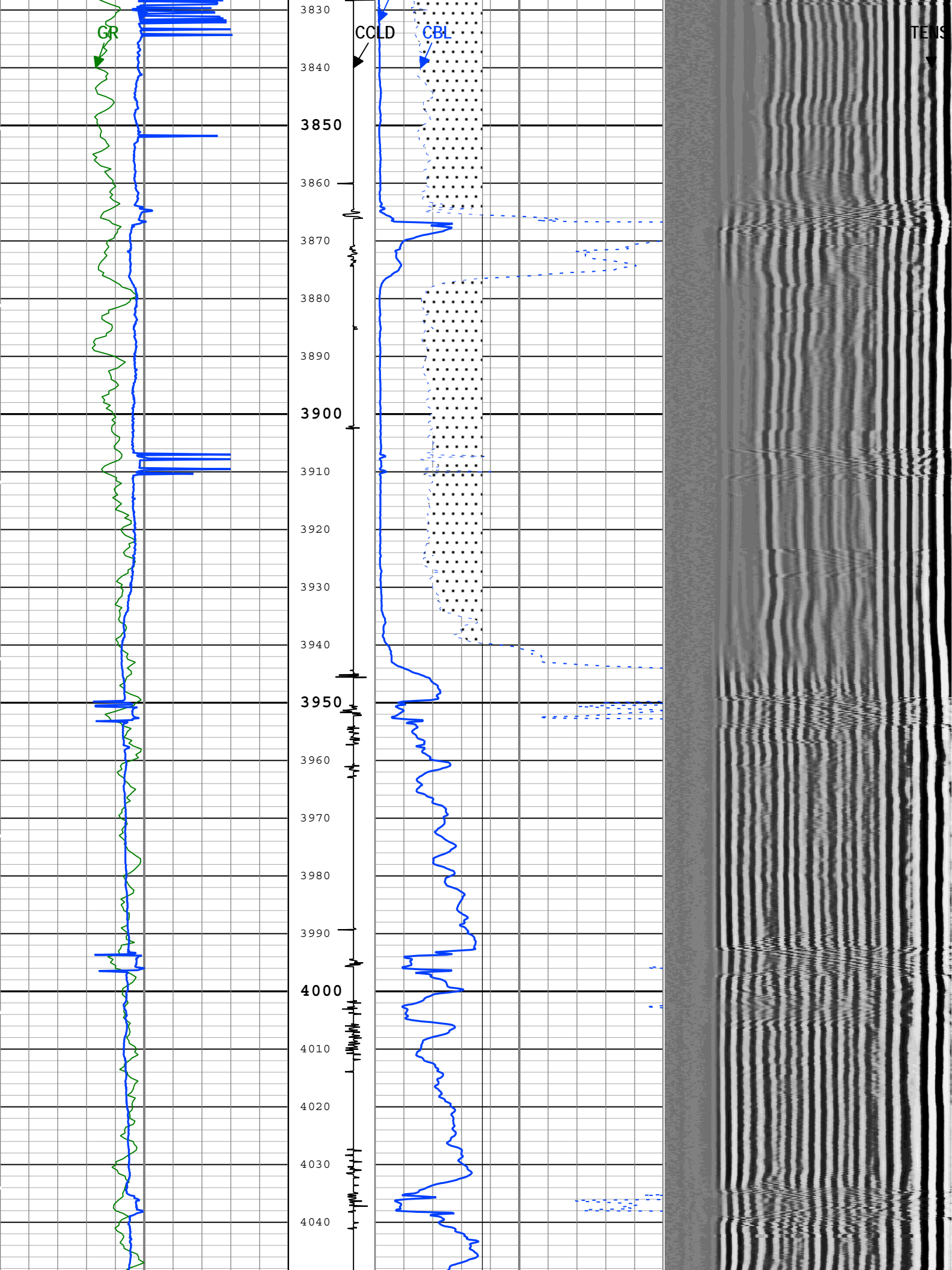


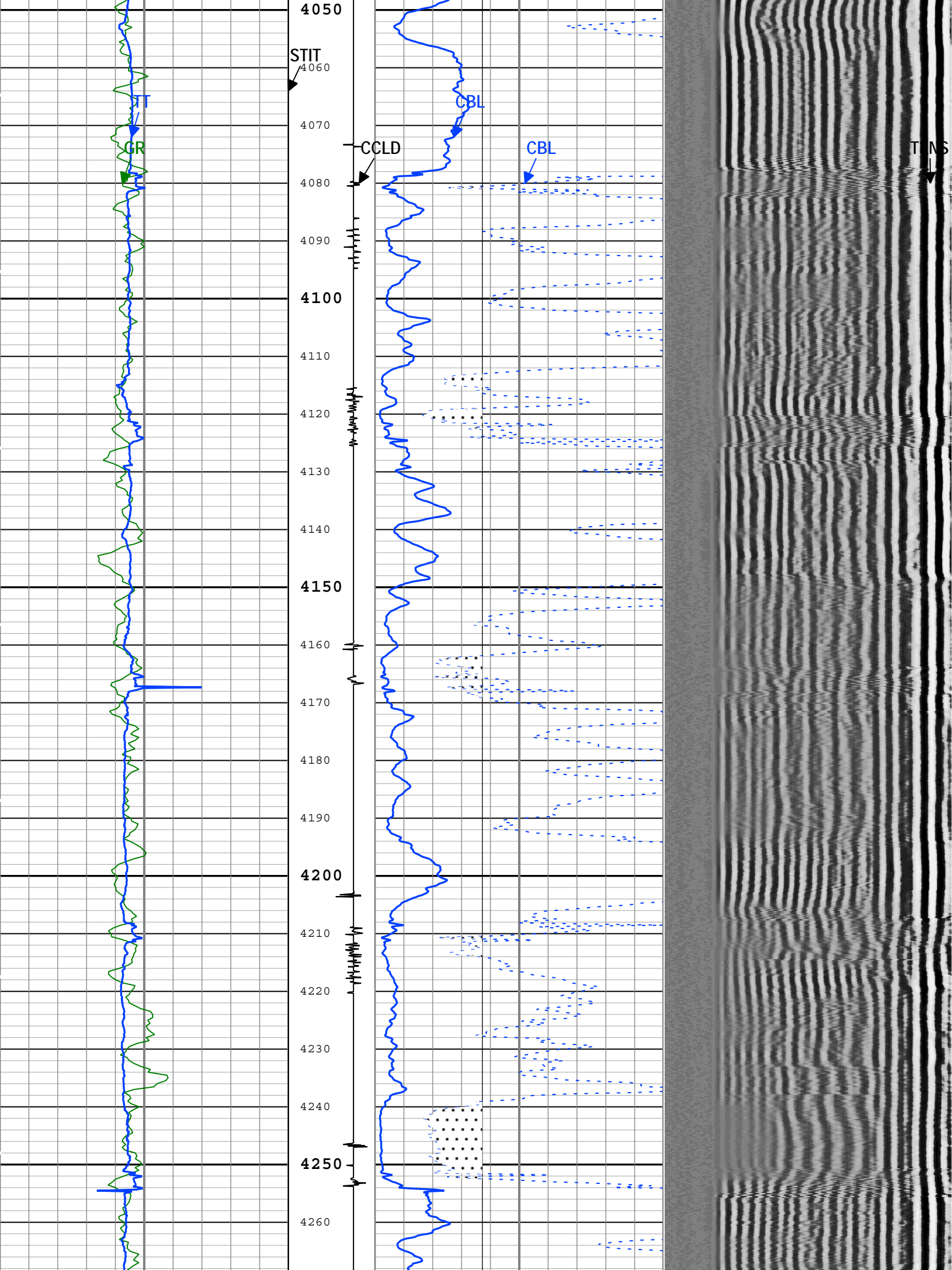


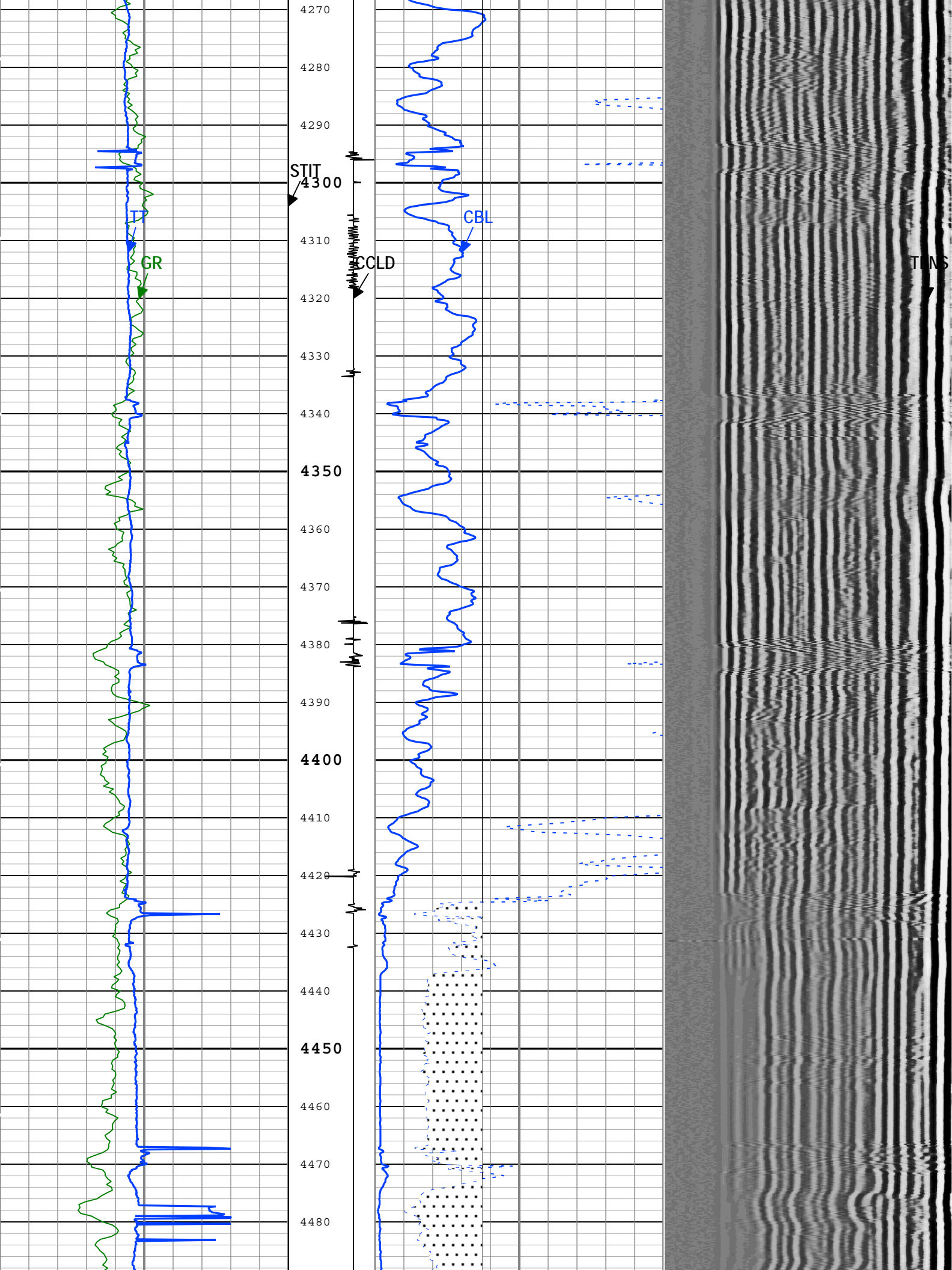




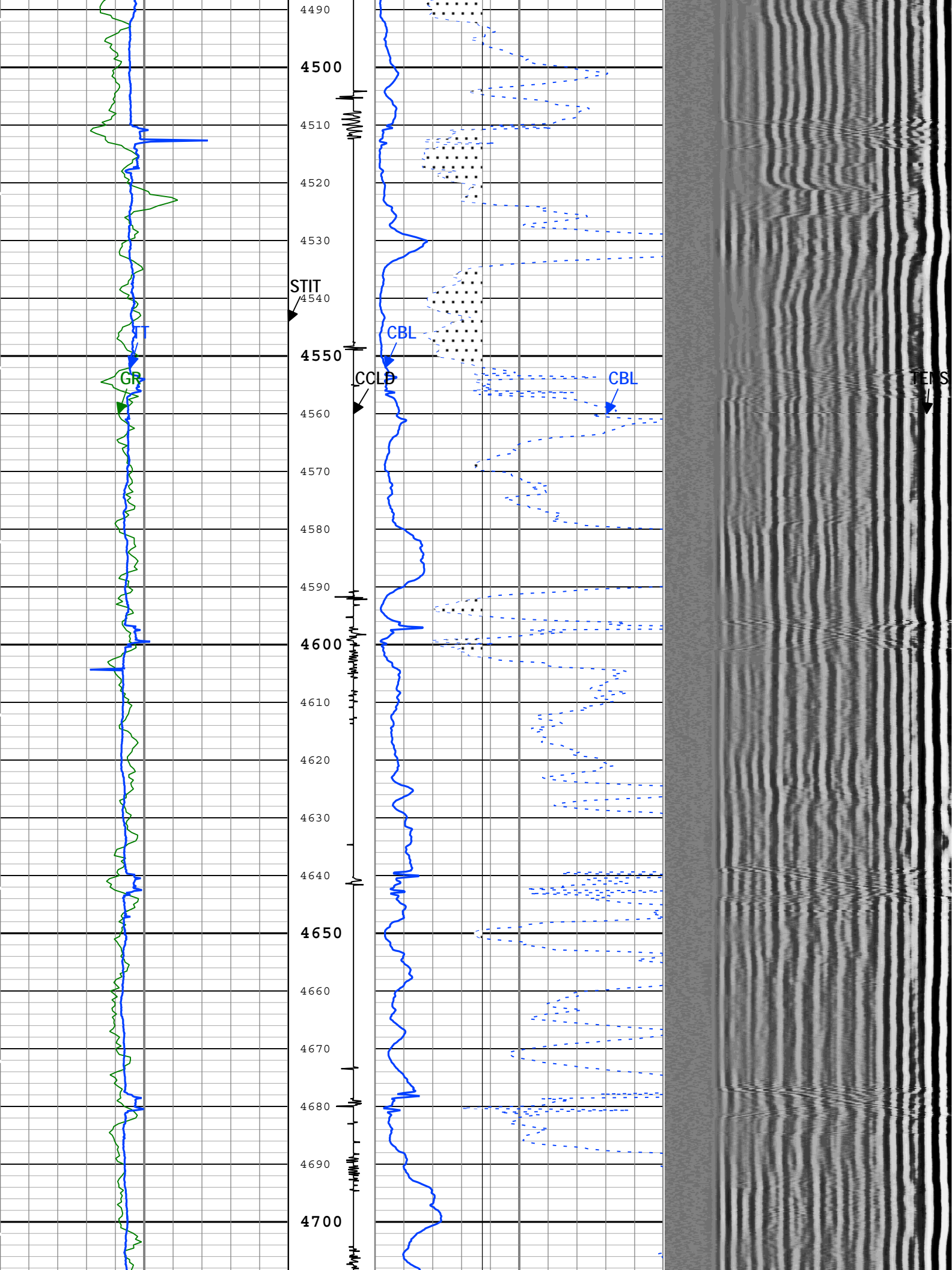


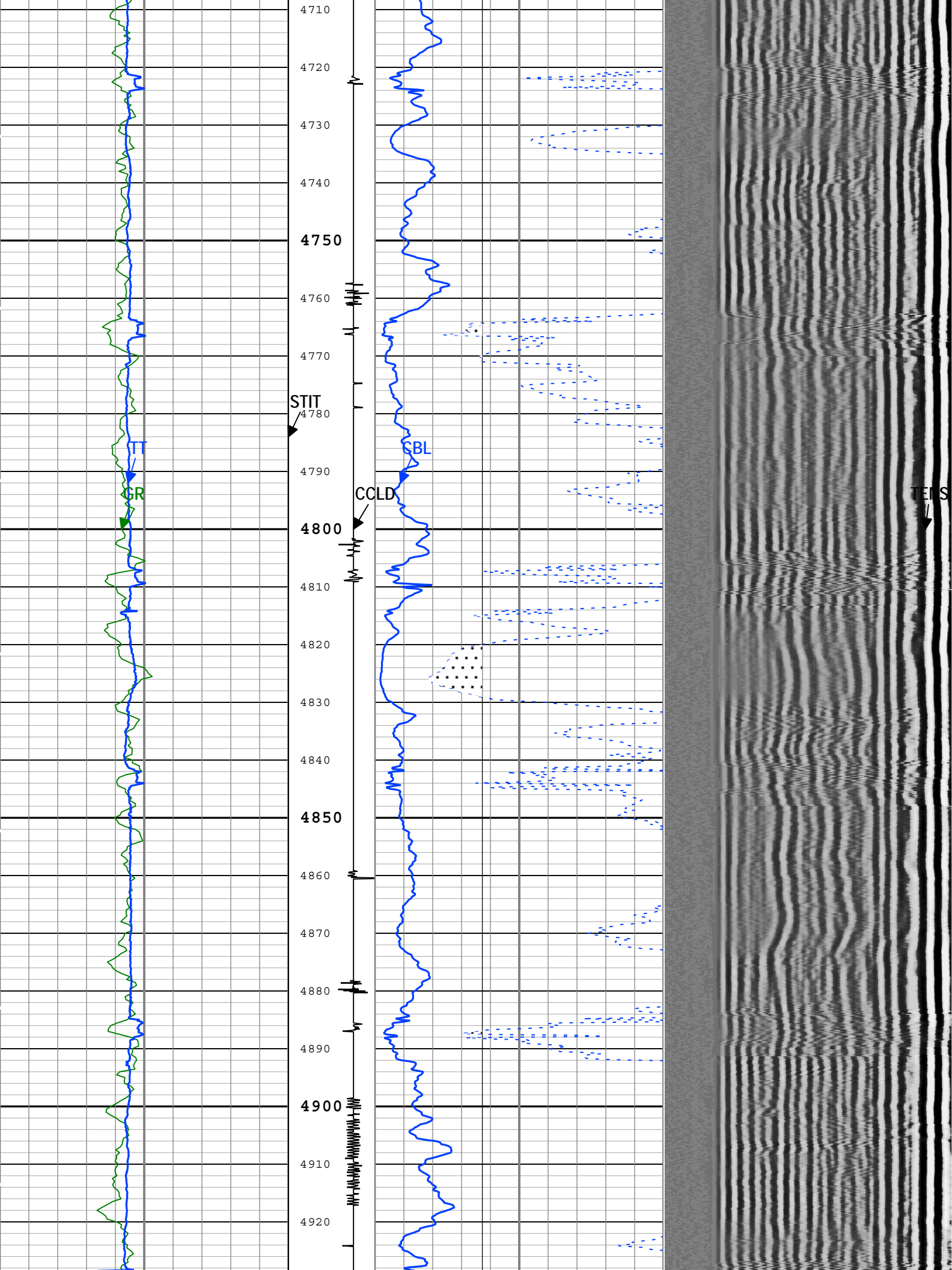




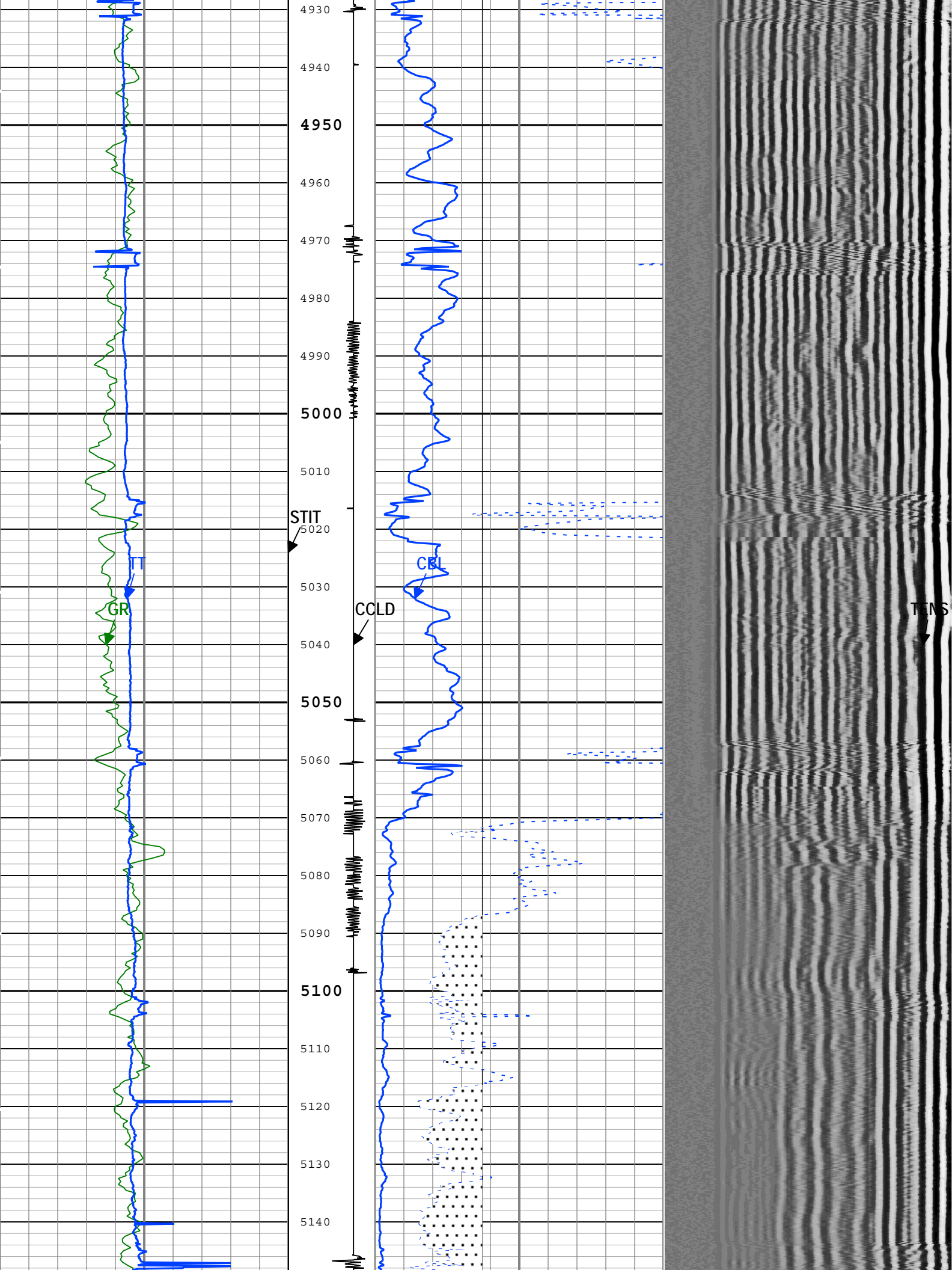


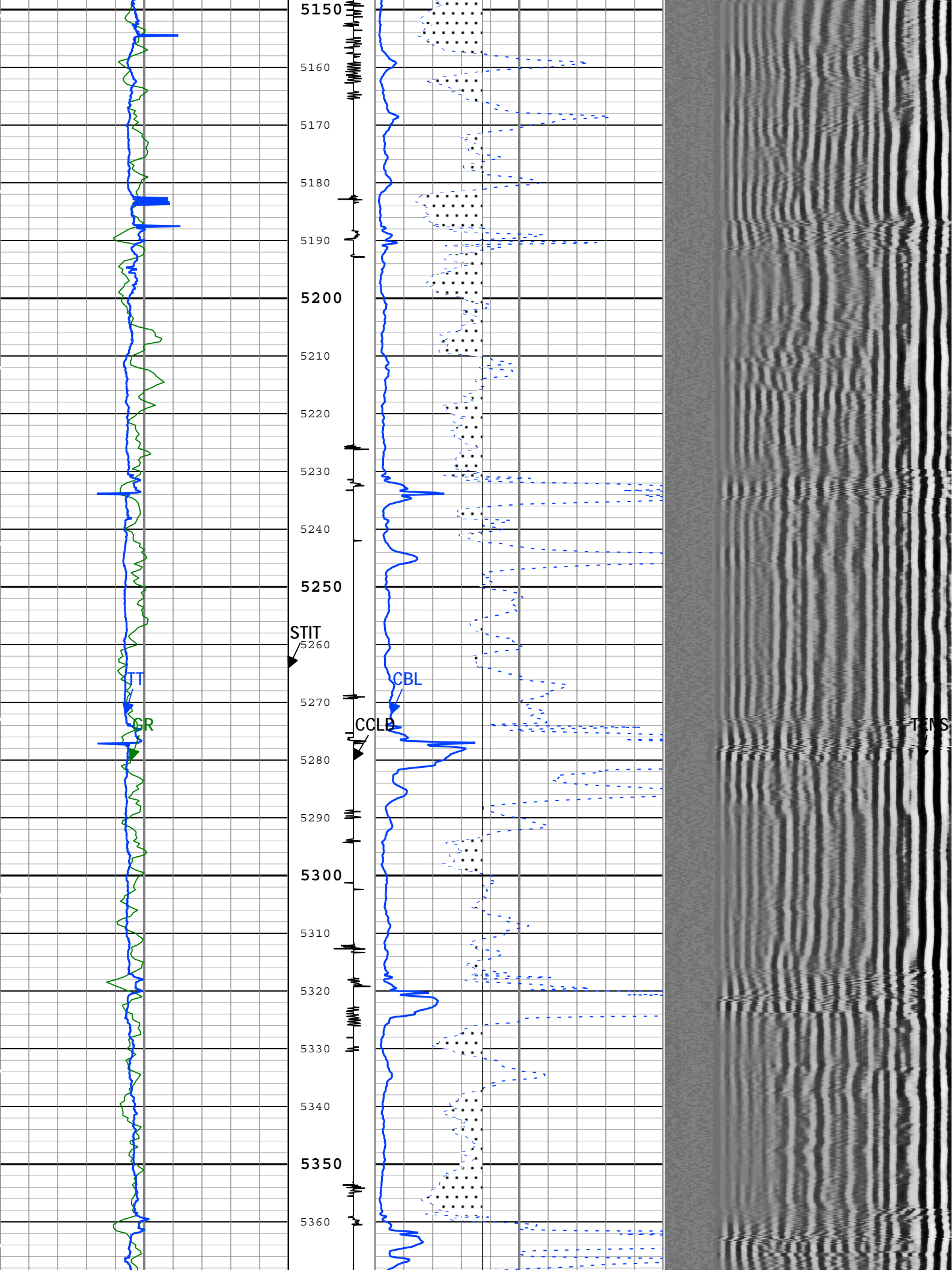


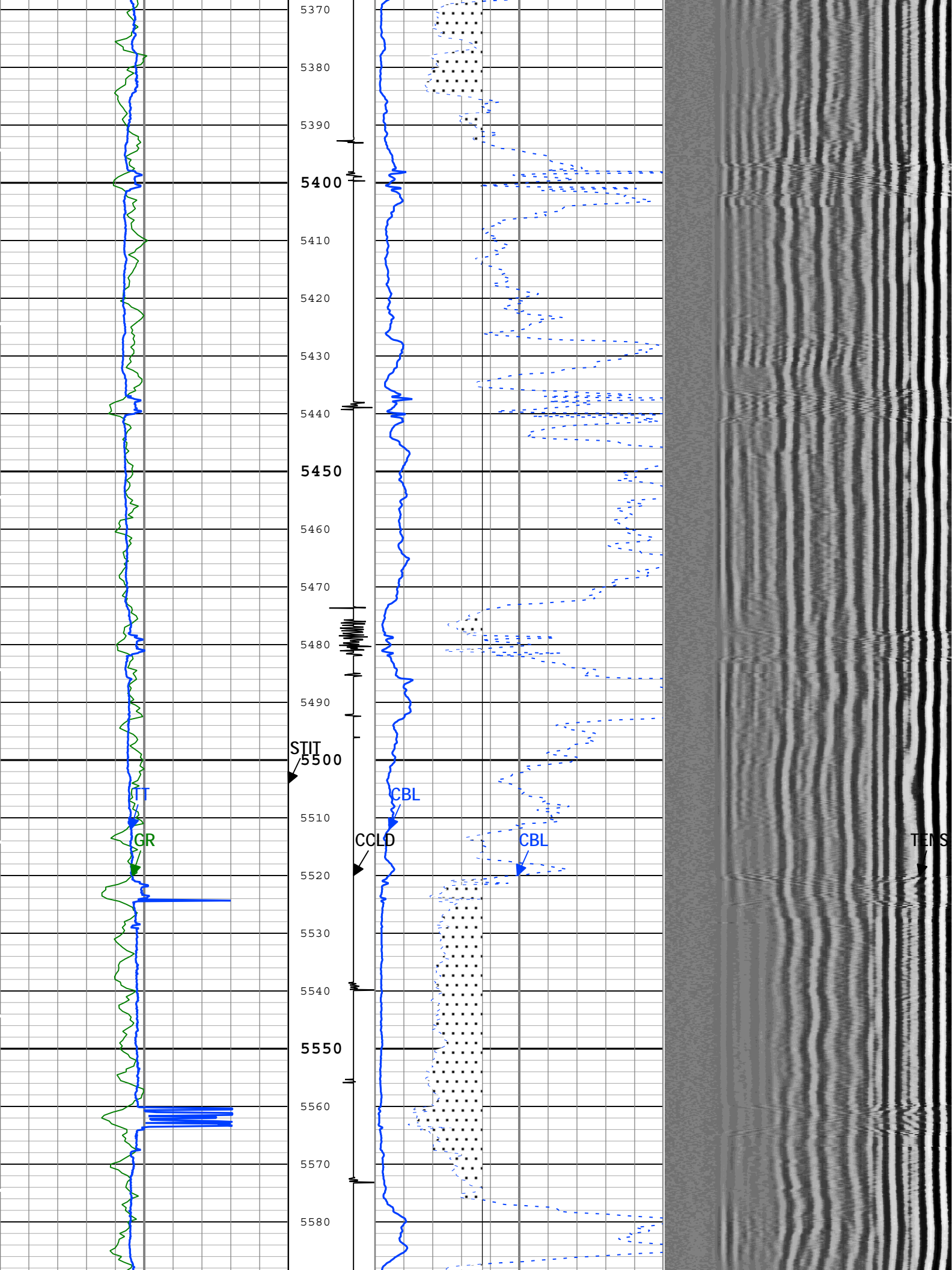




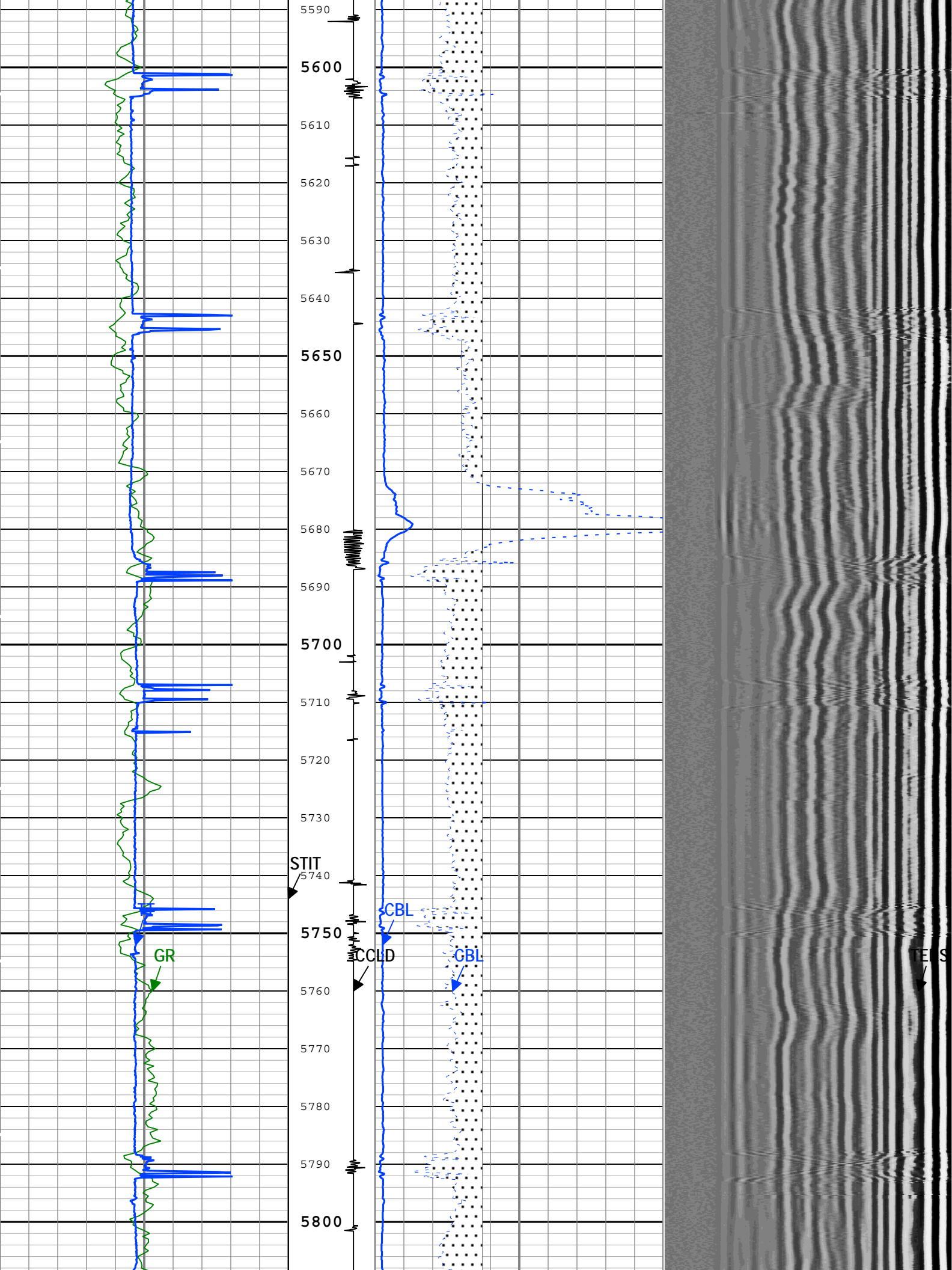


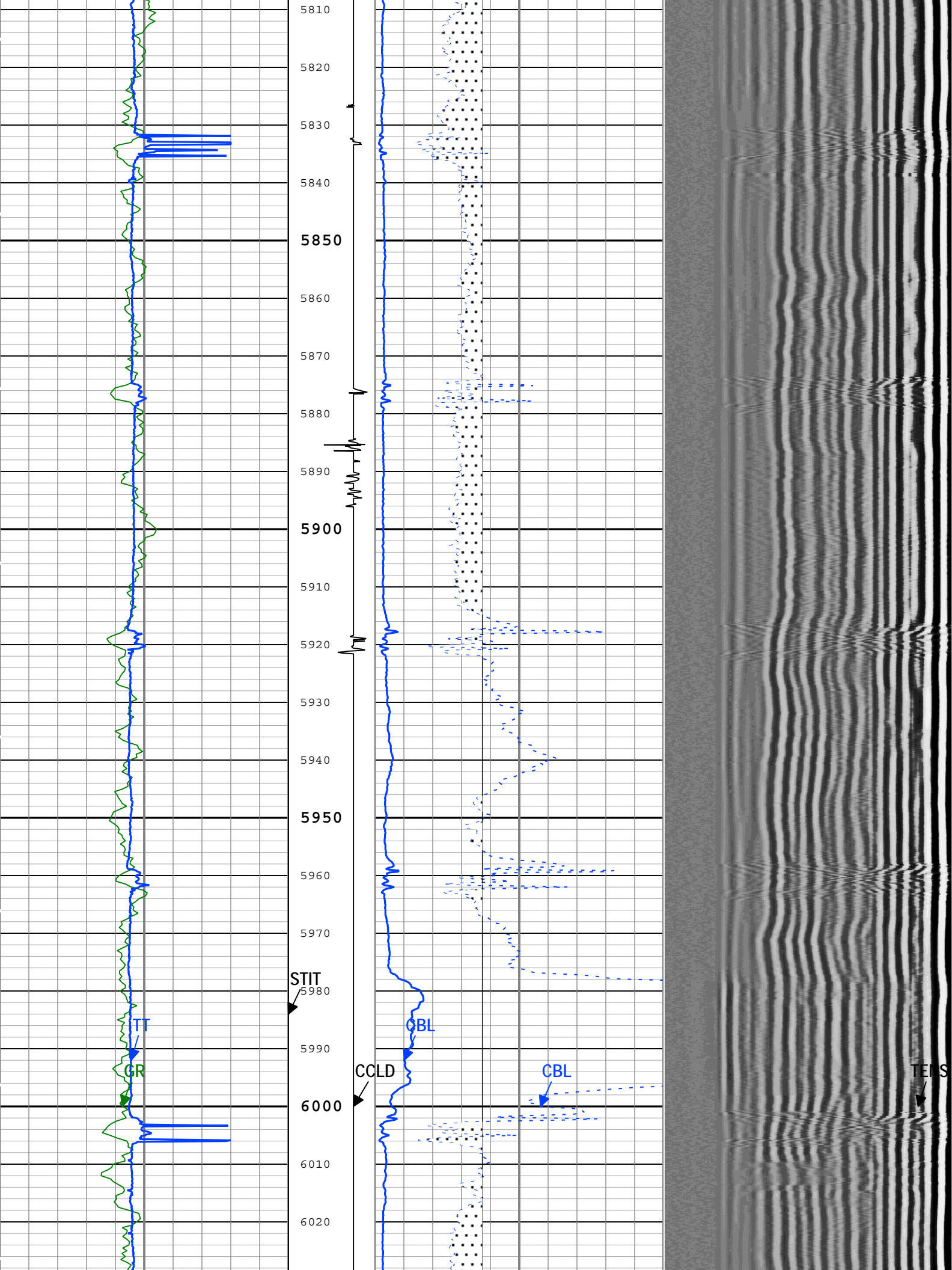


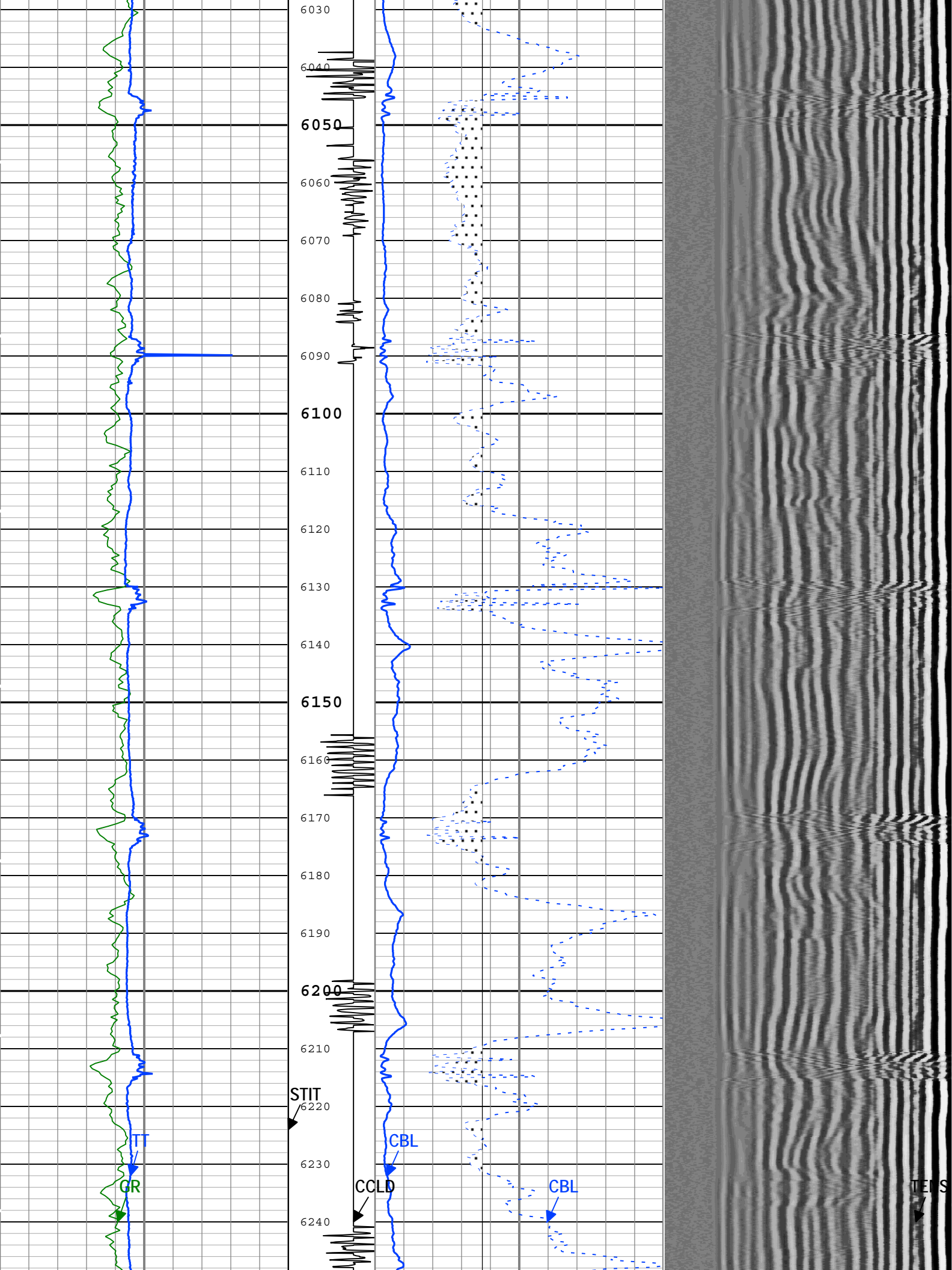




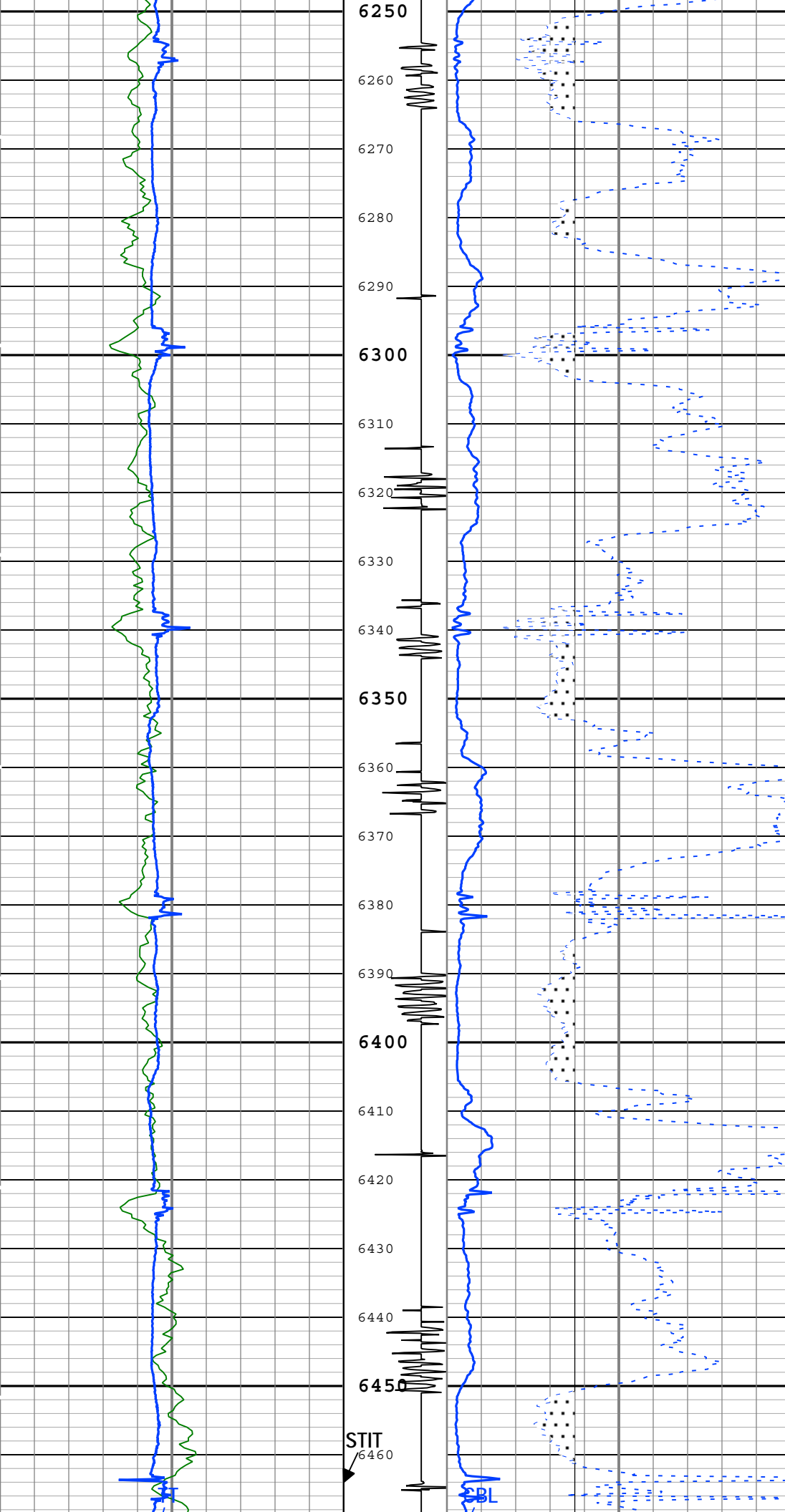


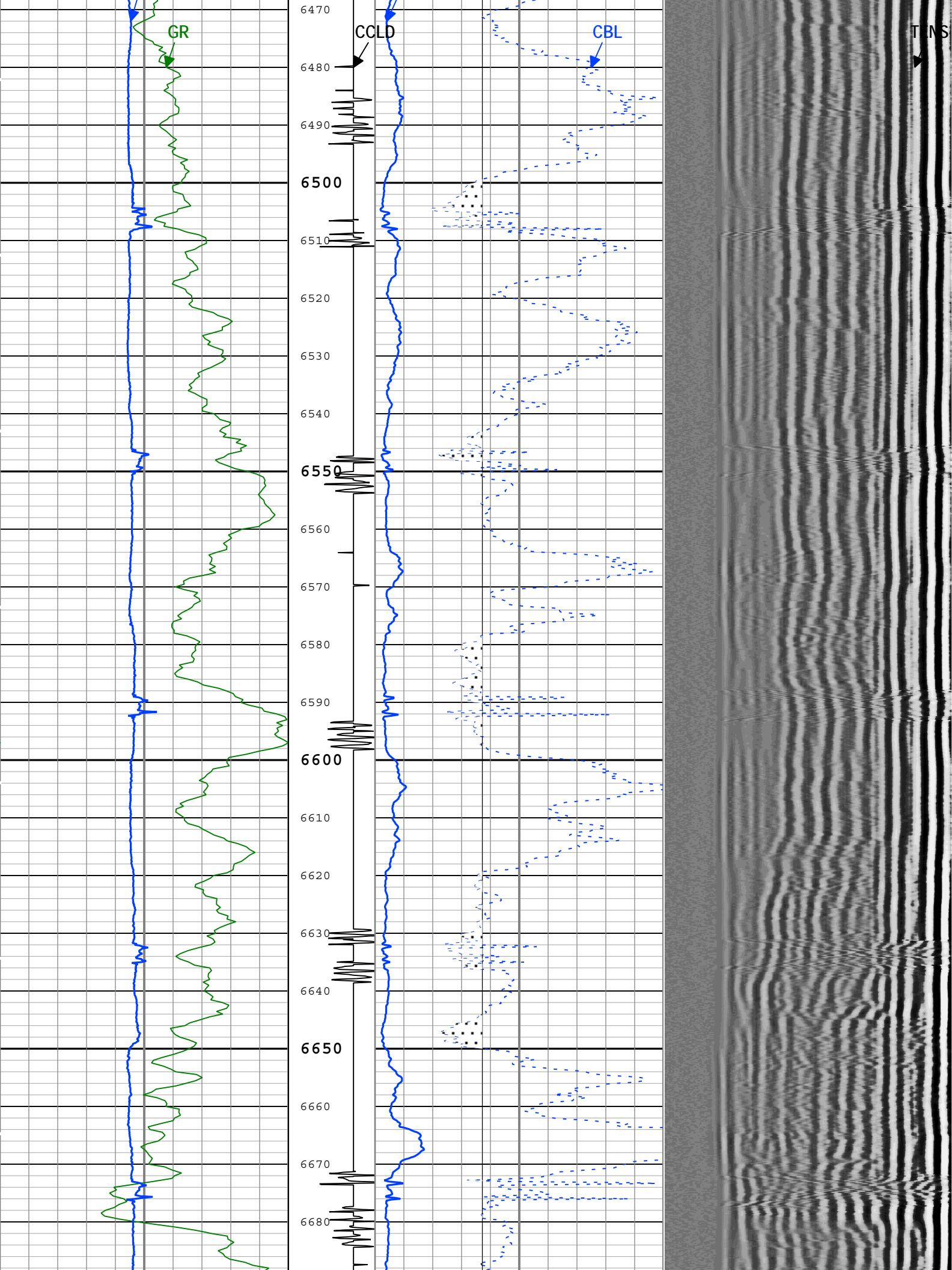




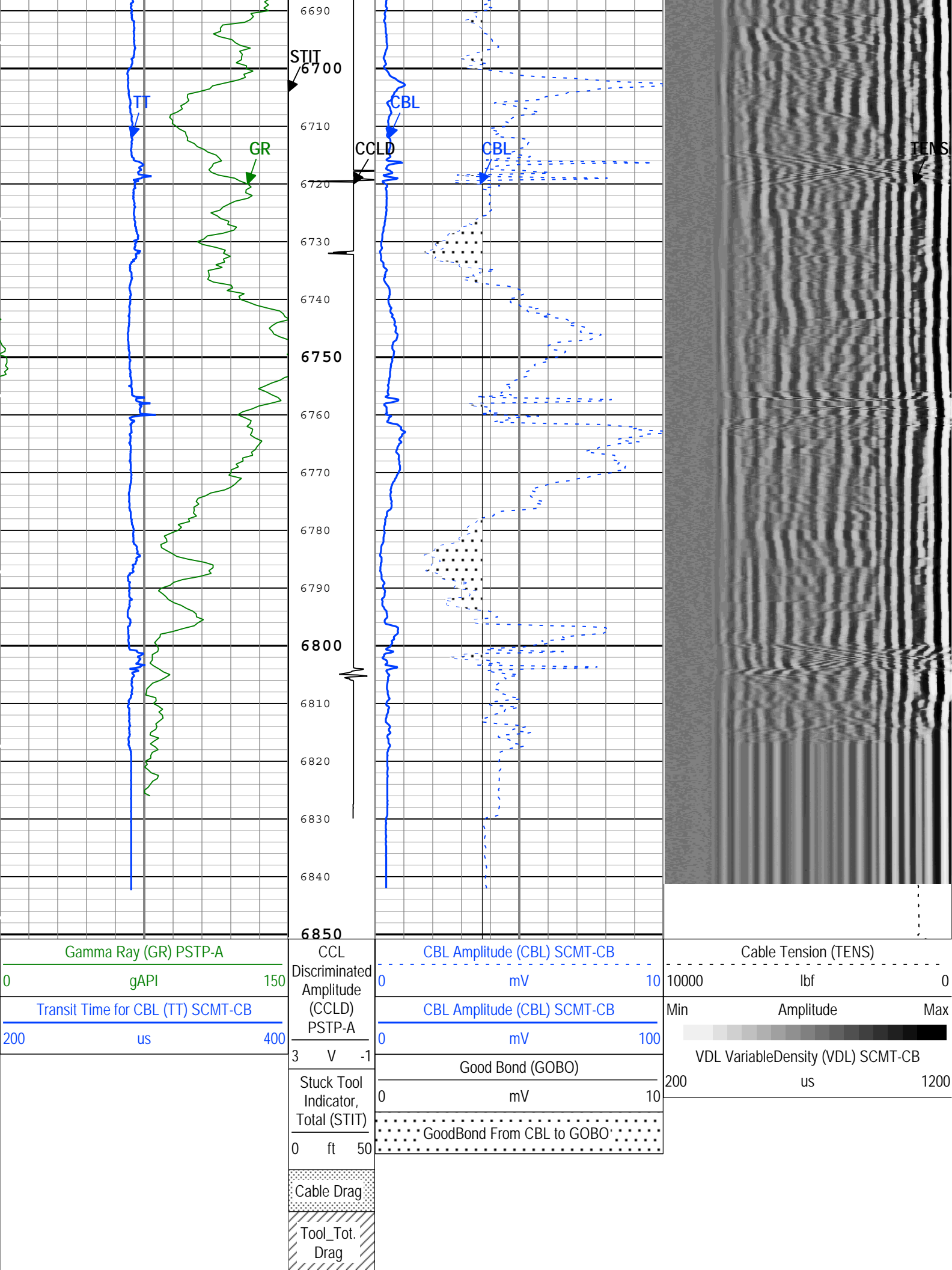












TIME\_1900 - Time Marked every 60.00 (s)

Description: SCMT Amplitudes and VDL    Format: Log ( SCMT\_Amp\_VDL )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth  
Creation Date: 20-Apr-2015 21:59:37

## Channel Processing Parameters

### Run 2: Parameters

Parameter	Description	Tool	Value	Unit
BHT	Bottom Hole Temperature	Borehole	216.02	degF
CB3G	SCMT CBL 3 ft Peak Detection T0_Delay and Noise Gate	SCMT-CB	260.38	us
CBLG	CBL Gate Width	SCMT-CB	45	us
CBRA	CBL LQC Reference Amplitude in Free Pipe	SCMT-CB	62	mV
CMCF	CBL Cement Type Compensation Factor	SCMT-CB	0.6	
THNO	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.362	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	8.7	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
EDF	Elevation of Derrick Floor Above Permanent Datum	WLSESSION	29	ft
EPD	Elevation of Permanent Datum (PDAT) above Mean Sea Level	WLSESSION	4664	ft
GGRD	Geothermal Gradient	Borehole	1	0.01 degF/ft
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	GTEM_LINEST	
MSA	Minimum Sonic Amplitude	SCMT-CB	1.84	mV
PDAT	Permanent Datum	WLSESSION	GL	
RUN_SNUM	Run Sequence Number	WSDRUN	2	
SHT	Surface Hole Temperature	Borehole	68	degF
TD	Total Measured Depth	Borehole	6850	ft

## Tool Control Parameters

### Run 2: Parameters

Parameter	Description	Tool	Value	Unit
CMTM	SCMT Operating Mode	SCMT-CB	Log	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	1800	ft/h

## Calibration Report

### SCMT-CB (Slim Cement Mapping Tool, 1-11/16 OD) Calibration - Run 2

Primary Equipment :		
Slim Cement Mapping Sonde	SCMS-CB	8284

### CBL and MAP Amplitude Adjustment - Measurements

Before (Manual Entry):		17:15:04 18-Apr-2015					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
CBL Amplitude - 0	mV	Before	-----	-----	-----	-----	
Average MAP Amplitude (Fluid Compensated) - 0	mV	Before	-----	-----	-----	-----	
Measurement Depth - 0	ft	Before	-----	-----	-----	-----	

### CBL and MAP Amplitude Adjustment - Coefficients

Before (Manual Entry):		17:15:04 18-Apr-2015					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
CBL Adjustment Factor		Before			0.837		
CBL LQC Reference Amplitude in Free Pipe	mV	Before			62.00		
MAP Adjustment Factor		Before			1.772		
Depth of Before Calibration	ft	Before			55.86		

PSTP-A (PSP Telemetry Platform A - Sapphire) Calibration - Run 2

Primary Equipment :	PBMS-A	PBMS-A	2702
Calibration Parameter :	JIG-BKGD (Jig minus background reference)	165	

PBMS Gamma Ray Check - PBMSA Gamma Ray Accumulations

Before (Measured):	15:40:33 17-Apr-2015							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
GR Zero Average	gAPI	Before	30	0	68.79333	120		
GR Zero Standard Deviation	gAPI	Before			27.54417			
GR Zero Max Deviation	gAPI	Before			124.2792			
GR Plus Average	gAPI	Before			244.4637			
GR Plus Standard Deviation	gAPI	Before			55.79148			
GR Plus Max Deviation	gAPI	Before			167.4243			
Jig-Background	gAPI	Before	165	150	175.6704	180		

PBMS Well Temp Master Calibration

Master (EEPROM):		00:00:00 08-Oct-2004				
PBMS_RTD_THERM (Master)		RTD Coefficients				
	Tt**0	Tt**1	Tt**2	Tt**3	Tt**4	Tt**5
Tt**0	-1799.09	1662.227	-617.1353	108.8717	-7.149958	0

PBMS Gamma Ray Master Calibration

Master (EEPROM):		00:00:00 09-Aug-2004	
PBMS_GR_MODEL (Master)		GR Coefficients	
	Rt**0		Rt**1
Rt**0	2000		2640

PBMS A Reference Clock Master Calibration

Master (EEPROM):		00:00:00 08-Oct-2004				
PBMS_REF_CLOCK (Master)		PBMS A Clock Coefficients				
	Temp**0	Temp**1	Temp**2	Temp**3	Temp**4	Temp**5
Temp**0	109.1373	-8.123132	0.00245278	-0.0001326561	4.957816E-06	0

PBMS A Sapphire Master Calibration

Master (EEPROM):00:00:00 08-Oct-2004

PBMS_P_GAUGE_PRES    Sapphire Pressure Model Coefficients (Master)						
	Tt**0	Tt**1	Tt**2	Tt**3	Tt**4	Tt**5
Tp**0	-2775.166	3999.948	-2267.865	424.0844	-28.94072	0
Tp**1	5116.926	-4147.714	2010.187	-367.7473	25.01963	0
Tp**2	-10.72299	11.4629	-3.7961	0	0	0
Tp**3	-1.833663	0.5695261	0	0	0	0
Tp**4	0	0	0	0	0	0
Tp**5	0	0	0	0	0	0
PBMS_P_GAUGE_TEMP    Sapphire Temperature Model Coefficients (Master)						
	Tp**0	Tp**1	Tp**2	Tp**3	Tp**4	Tp**5

Tt**0	-363.5885	-12.65834	4.797672	-1.494675	0.1462443	0
Tt**1	130.998	6.423772	-1.132448	0.4128172	-0.04101843	0
Tt**2	-5.720248	-1.297287	-0.0471031	0	0	0
Tt**3	0.7255451	0.1332451	0	0	0	0
Tt**4	0	0	0	0	0	0
Tt**5	0	0	0	0	0	0

Company:

Noble Energy Inc

Well:

Colt A13-648

Field:

Wattenberg

County:

Weld

Country:

United States

Slim Cement Mapping Tool

Cement Evaluation

Gamma Ray - CCL Log

Schlumberger