Schlumberger

Company: CAERUS OPERATING LLC

Well: SG 8506E-34 E34 496

Field: GRAND VALLEY

County: GARFIELD Country: UNITED STATES

County: GARFIELD
Field: GRAND VALLEY
Location: 2229' FNL & 1001' FWL
Well: SG 8506E-34 E34 496
Company: CAERUS OPERATING LLC

CEMENT BOND LOG

RST SIGMA LOG

GAMMA RAY - COLLAR LOCATOR LOG

Location:			
2229' FNL & 1001' FWL SECTION 34, TOWNSHIP 4S, RANGE 96W	Elev.:	K.B.	8353.50 ft
		G.L.	8323.50 ft
		D.F.	8352.50 ft
Permanent Datum: Ground Level	Elev.:	8323.50 f	
Log Measured From: Kelly Bushing	30.00 ft	above Perm.Datum	
Drilling Measured From: Kelly Bushing			

API Serial No.	Section:	Township:	Range:
50-452-1926	34	4S	96W

Logging Date	19-Feb-2019		
Run Number	1A		
Depth Driller	12562.90 ft		
Schlumberger Depth	12582.00 ft		
Bottom Log Interval	12490.00 ft		
Top Log Interval	0.00 ft		
Casing Fluid Type	Fresh Water		
Salinity			
Density	8.34 lbm/gal		
Fluid Level	8.00 ft		
BIT/CASING/TUBING STRING			
Bit Size	8.75 in		
From	2981.00 ft		
To	12582.00 ft		
Casing/Tubing Size	4.5 in		
Weight	11.6 lbm/ft		
Grade	P110		
From	0.00 ft		
To	12562.90 ft		
Max Recorded Temperatures	280 degF		
Logger on Bottom Time	19-Feb-2019	03:16:00	
Unit Number Location:	2801	FORT MORGAN	
Recorded By	CODY SPENCE		
Witnessed By	TRENTON RAY		

Disclaimer

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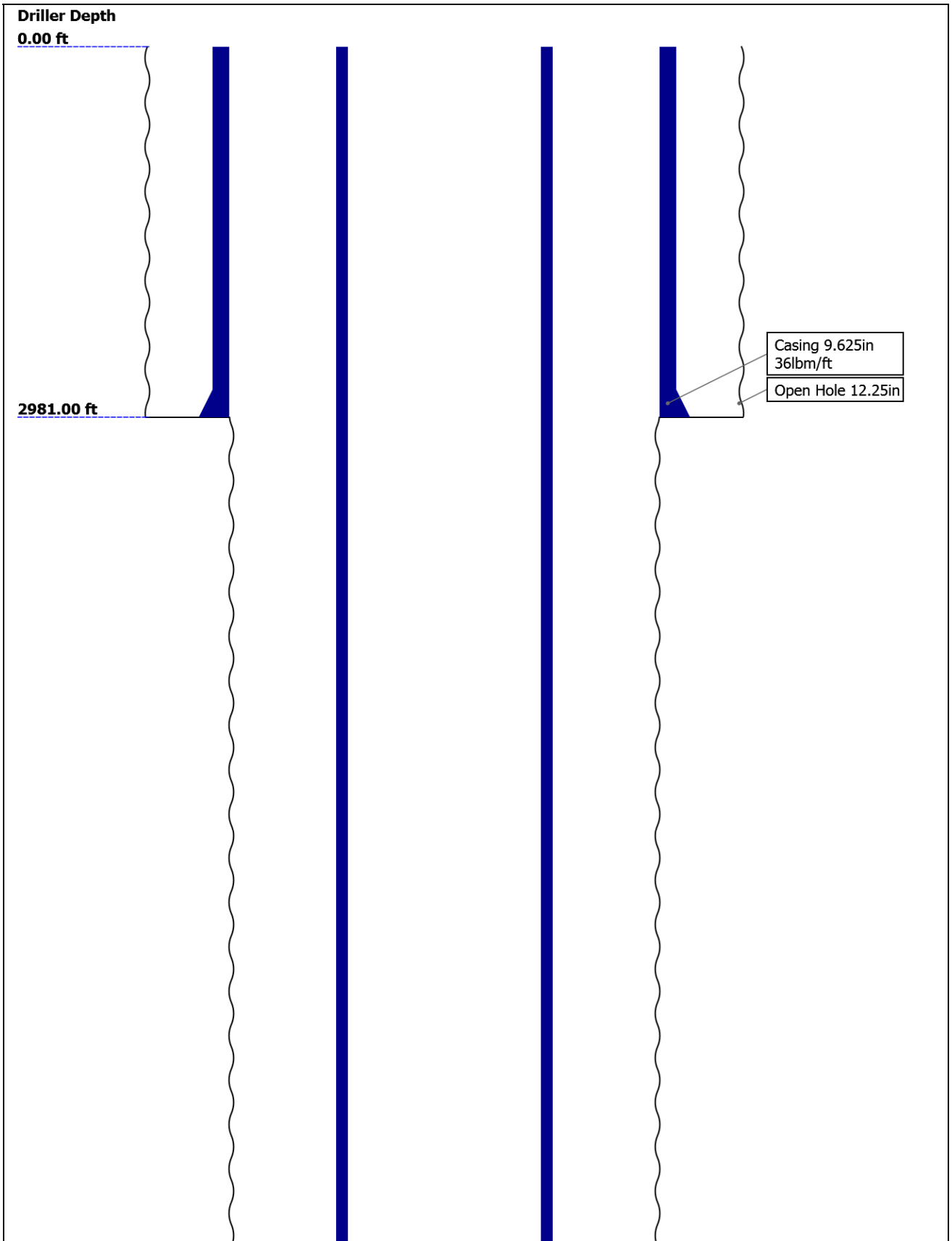
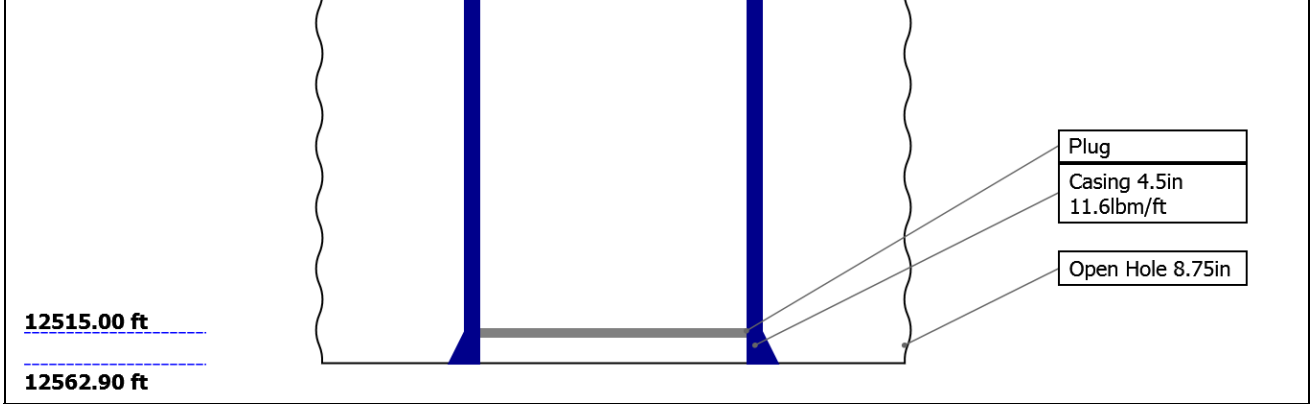
Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	12.25	8.75				
Top Driller (ft)	0	2981				
Top Logger (ft)	0	2981				
Bottom Driller (ft)	2981	12562.9				
Bottom Logger (ft)	2981	12582				
Casing						
Size (in)	9.625	4.5				
Weight (lbm/ft)	36	11.6				
Inner Diameter (in)	8.921	4				
Grade	J55	P110				
Top Driller (ft)	0	0				
Top Logger (ft)	0	0				
Bottom Driller (ft)	2981	12562.9				
Bottom Logger (ft)	2981	12562.9				

Remarks and Equipment Summary

1A: Toolstring

Equip name	Length
PEH-E	65.42
AH-38	63.74
PSTP-E:824	63.46
PSC-A:822	
PSTC-E:822	
PBMS-E:824	
Sapphire 175:37216	
RST-C:404	55.19
RSCH-A	
RSC-E:566	
RSS-A:499	
MNTR-F:1476-50672	
RSXH-A	
RSX-E:404	

MP name	Offset
GR	59.75
PSTC	59.46
PSTC Tool String Bottom	0.00
Temperature	56.67
Board Temperature	56.55
Sapphire Pressure	56.55
CCL	55.94
PBMS	55.19

1A: Remarks

THANK YOU FOR CHOOSING SCHLUMBERGER TECHNOLOGY CORPORATION!

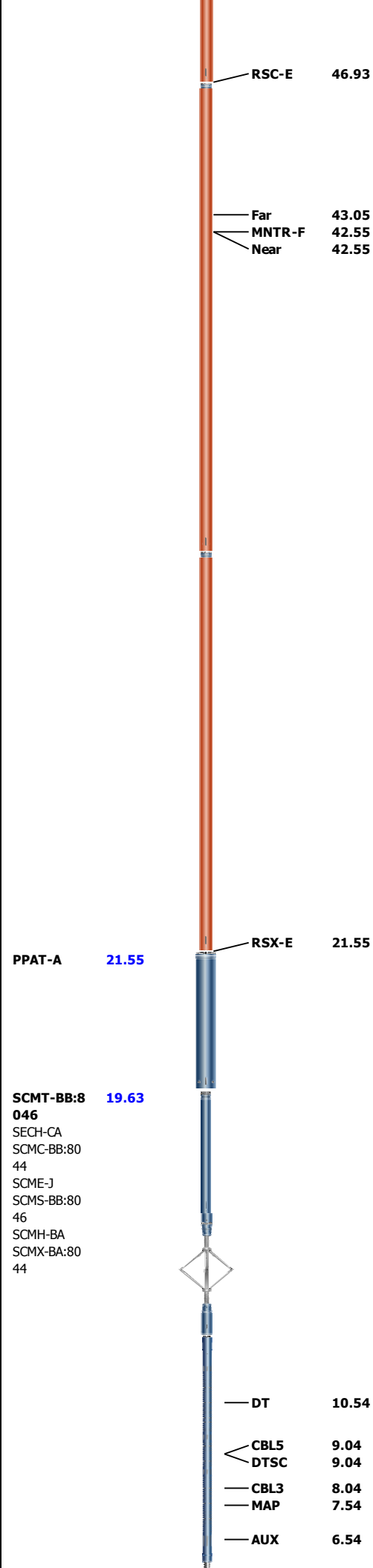
TOOL STRING RAN AS PER TOOL SKETCH

RST MODE: SIGMA

MATRIX: SANDSTONE

MAX RECORDED TEMPERATURE: 285.31 F

SLB DEPTH: 12,492 FT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Near 42.55
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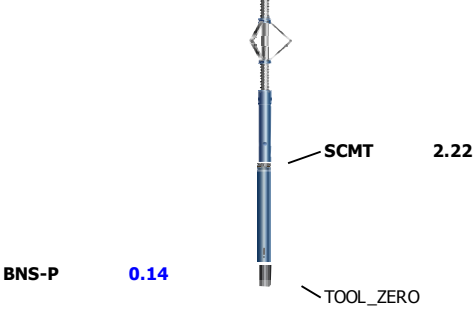


Lengths are in ft
Maximum Outer Diameter = 2.125 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

Depth Summary

	1A		
Depth Measuring Device			
Type	IDW-JA		
Serial Number	6495		
Calibration Date	05-FEB-2019		
Calibrator Serial Number	IDWC-C-57		
Calibration Cable Type	1-25ZA-XXS		
Wheel Correction 1	-6		
Wheel Correction 2	-5		
Tension Device			
Type	CMTD-B/A		
Serial Number	2733		
Calibration Date	10-FEB-2019		
Calibrator Serial Number	78135A		
Number of Calibration Points	10		
Calibration Root Mean Square Error	13		
Calibration Peak Error	26		
Logging Cable			
Type	1-25ZA-XXS		
Serial Number	F112155		
Length	18000.00 ft		
Conveyance Type	Wireline		
Rig Type	LAND - CRANE		

1A:Depth Control Parameters		Depth Control Remarks
Log Sequence	First Log In the Well	ALL SCHLUMBERGER DEPTH CONTROL POLICIES AND PROCEDURES FOLLOWED
Rig Up Length At Surface		IDW USED AS PRIMARY DEPTH CONTROL
Rig Up Length At Bottom		Z-CHART USED AS SECONDARY DEPTH CONTROL
Rig Up Length Correction		LOGS CORRELATED TO DOWN PASS
Stretch Correction		
Tool Zero Check At Surface		

1A

CBL-VDL MAIN PASS [5:100]

Software Version

Software Version

Acquisition System	Version
Maxwell 2019	9.0.106845.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
1A	Main[3]:Up	Up	93.92 ft	12507.98 ft	19-Feb-2019 4:42:42 AM	19-Feb-2019 12:00:47 PM	ON	10.36 ft	Yes

All depths are referenced to toolstring zero

Log

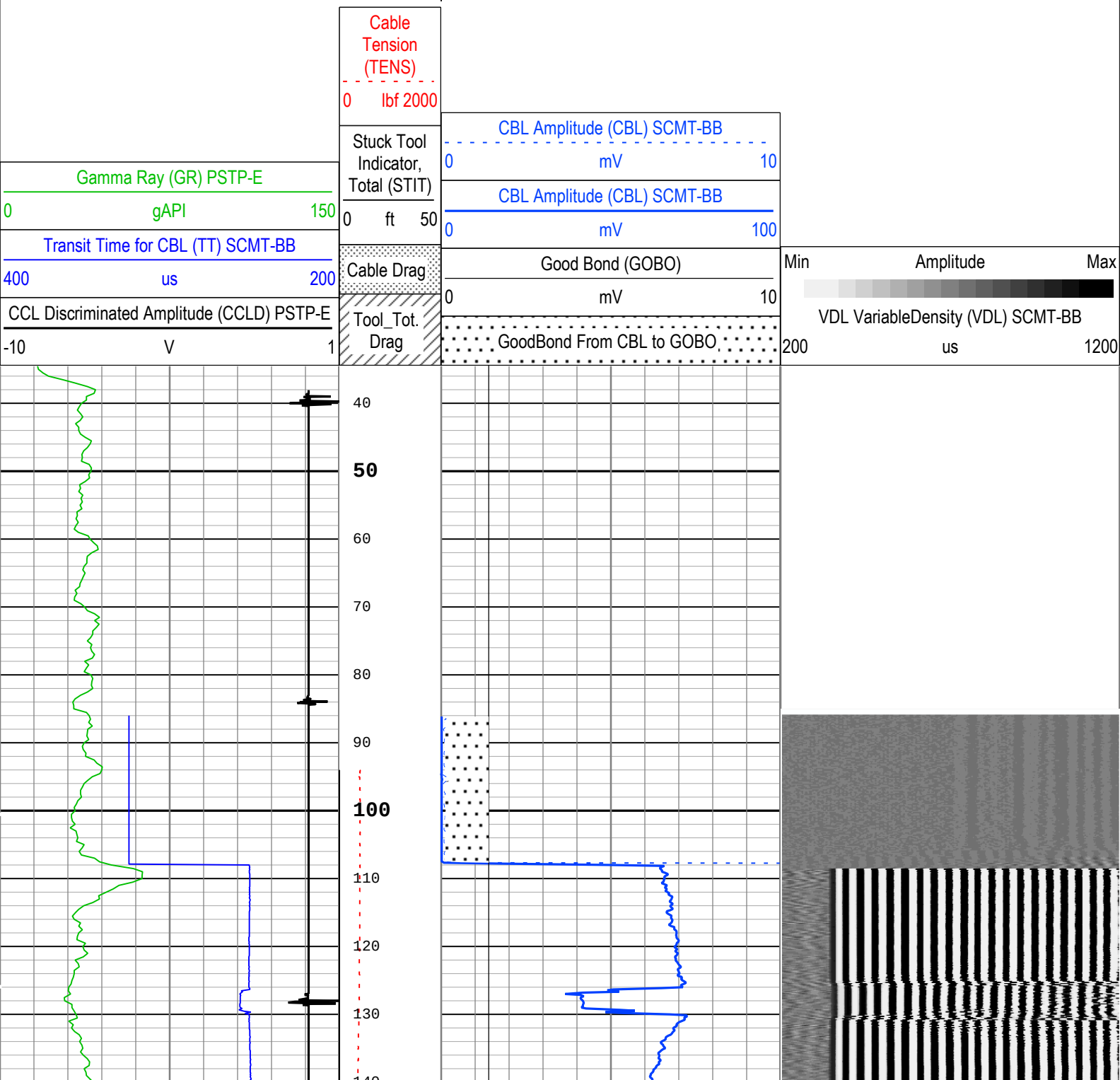
Company:CAERUS OPERATING LLC Well:SG 8506E-34 E34 496

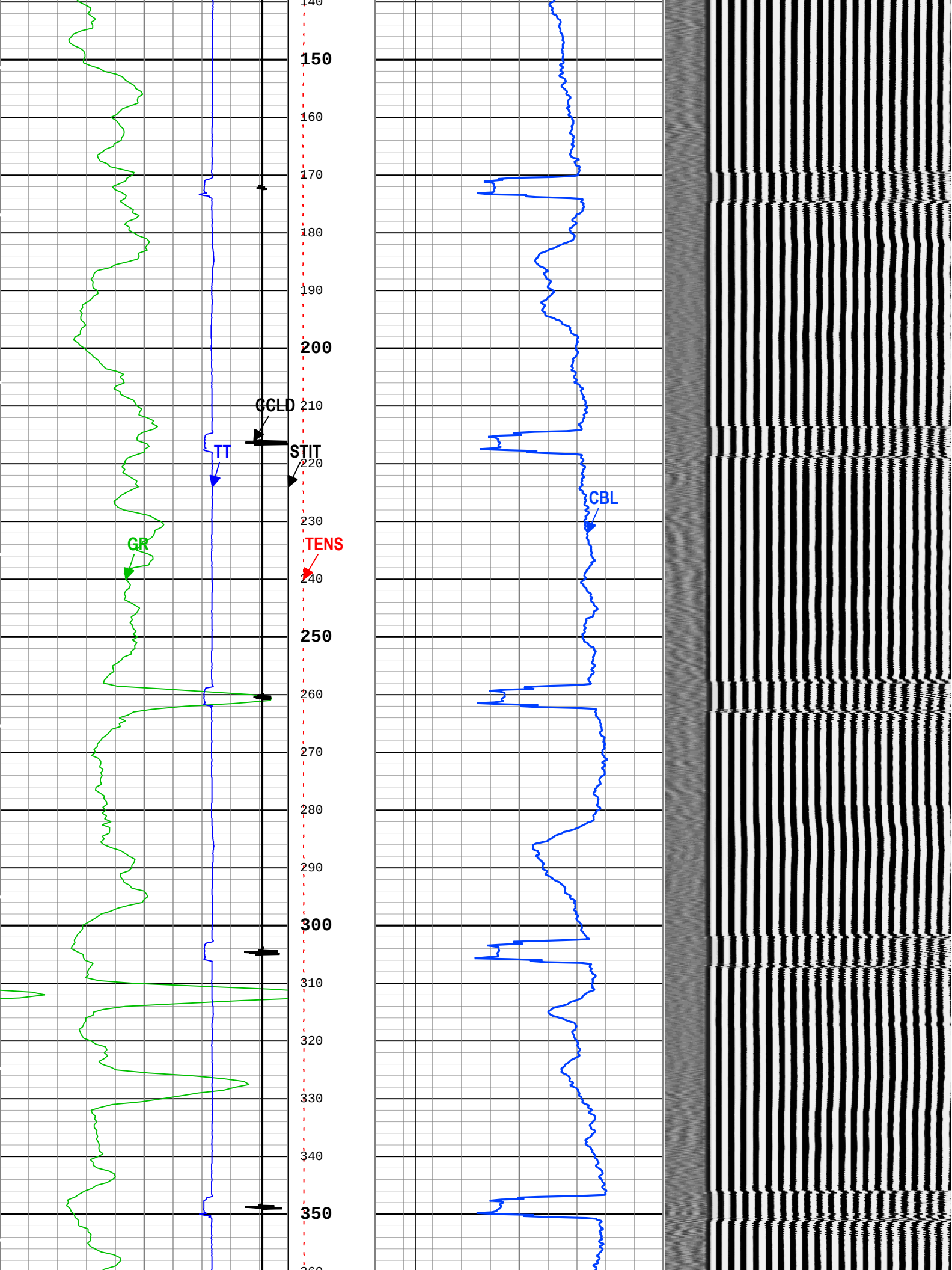
1A: Main[3]:Up:S002

Description: Sonic CBL with VDL Format: Log (Sonic CBL with VDL) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 19-Feb-2019 13:16:09

TIME_1900 - Time Marked every 60.00 (s)

BIEP - Bond Index Event Pips SCMT-BB

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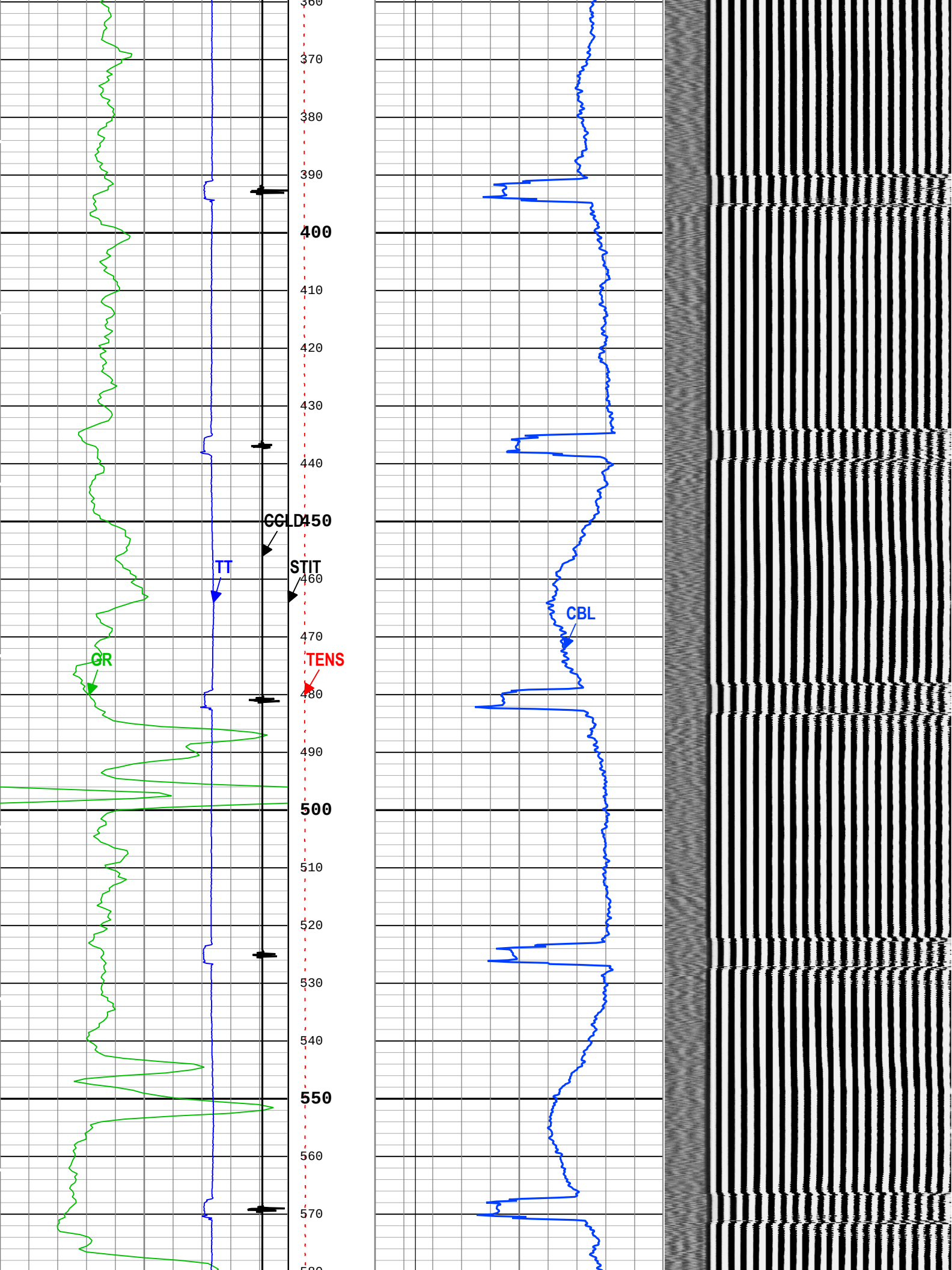
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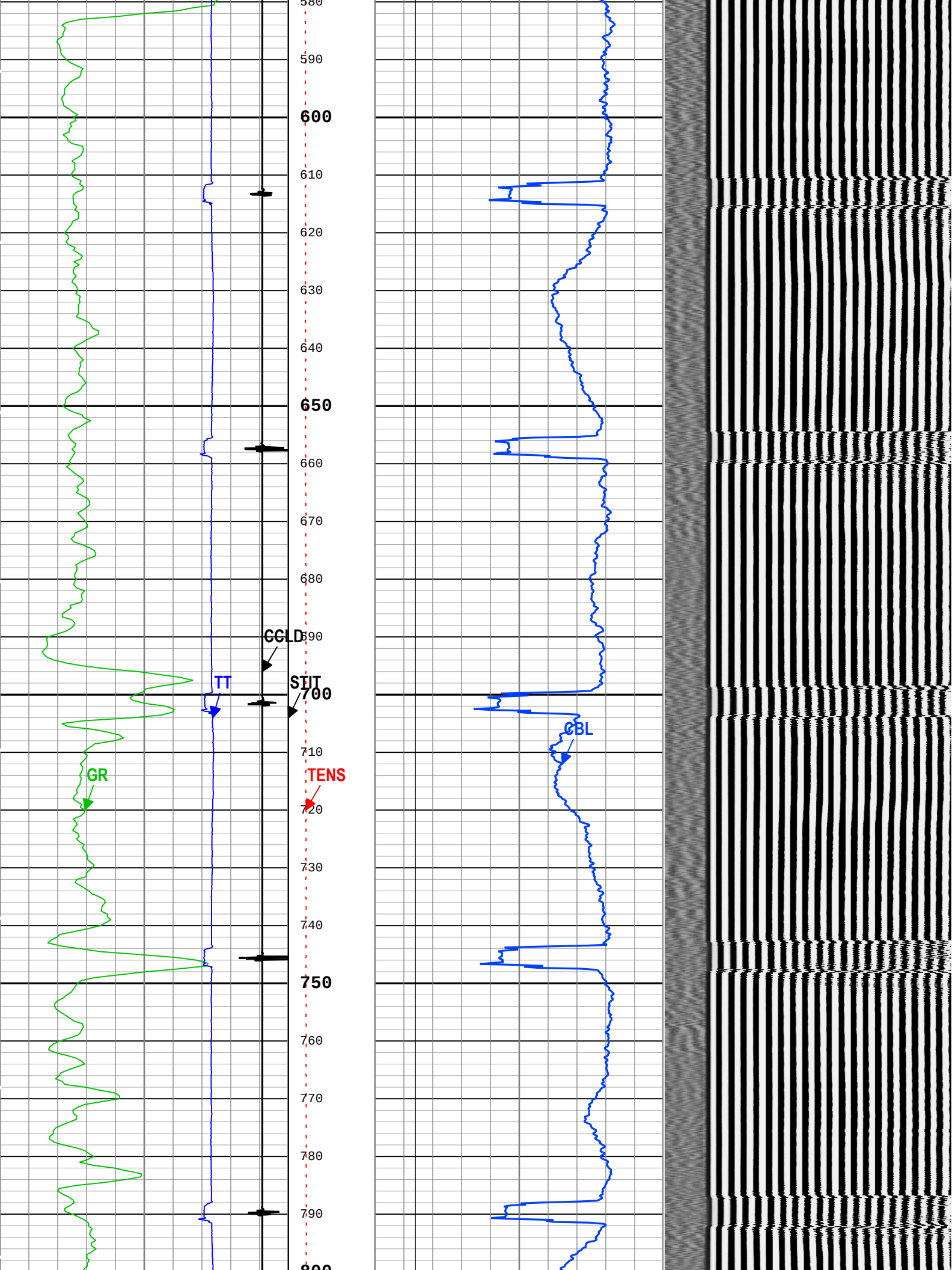
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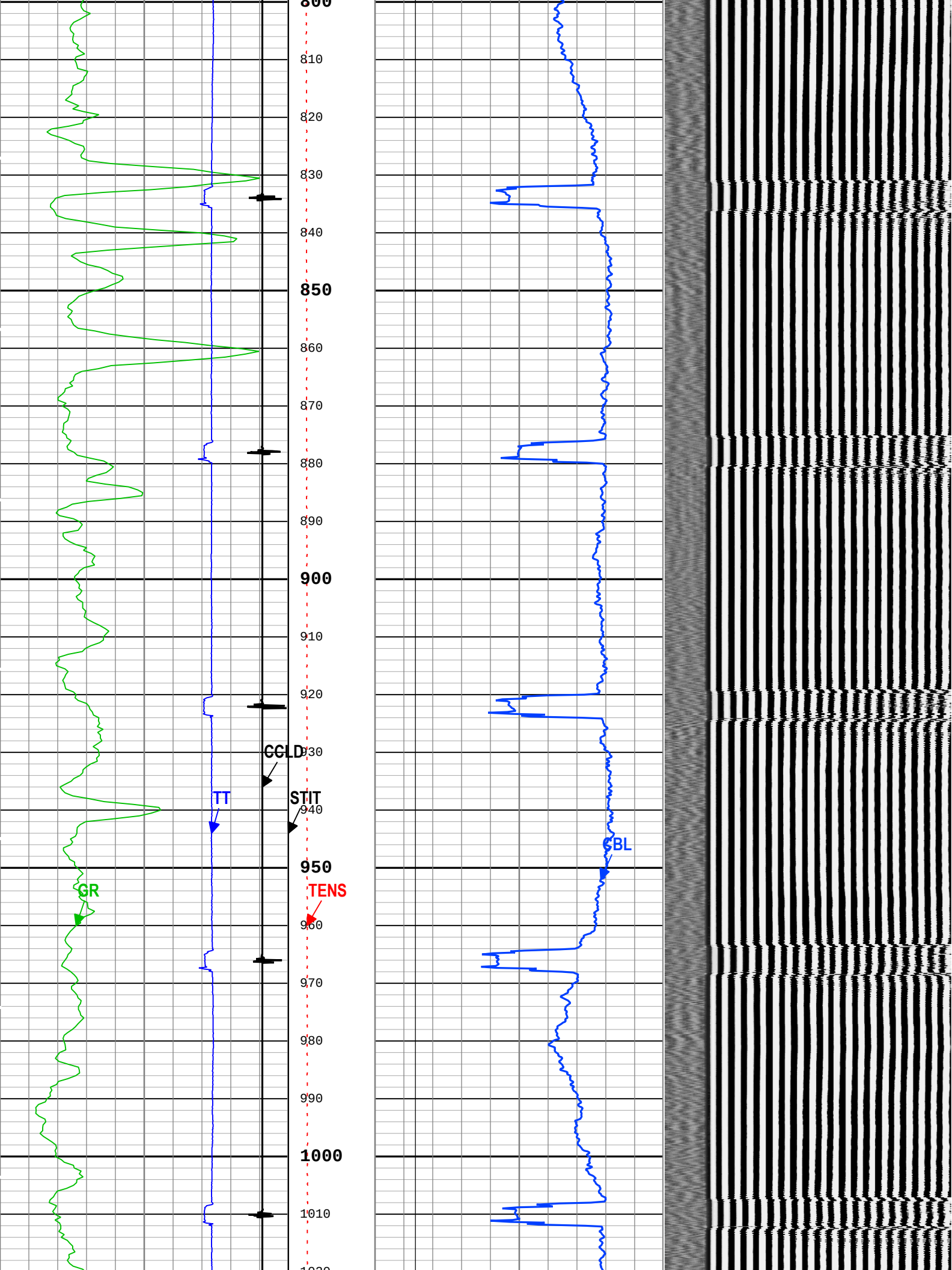
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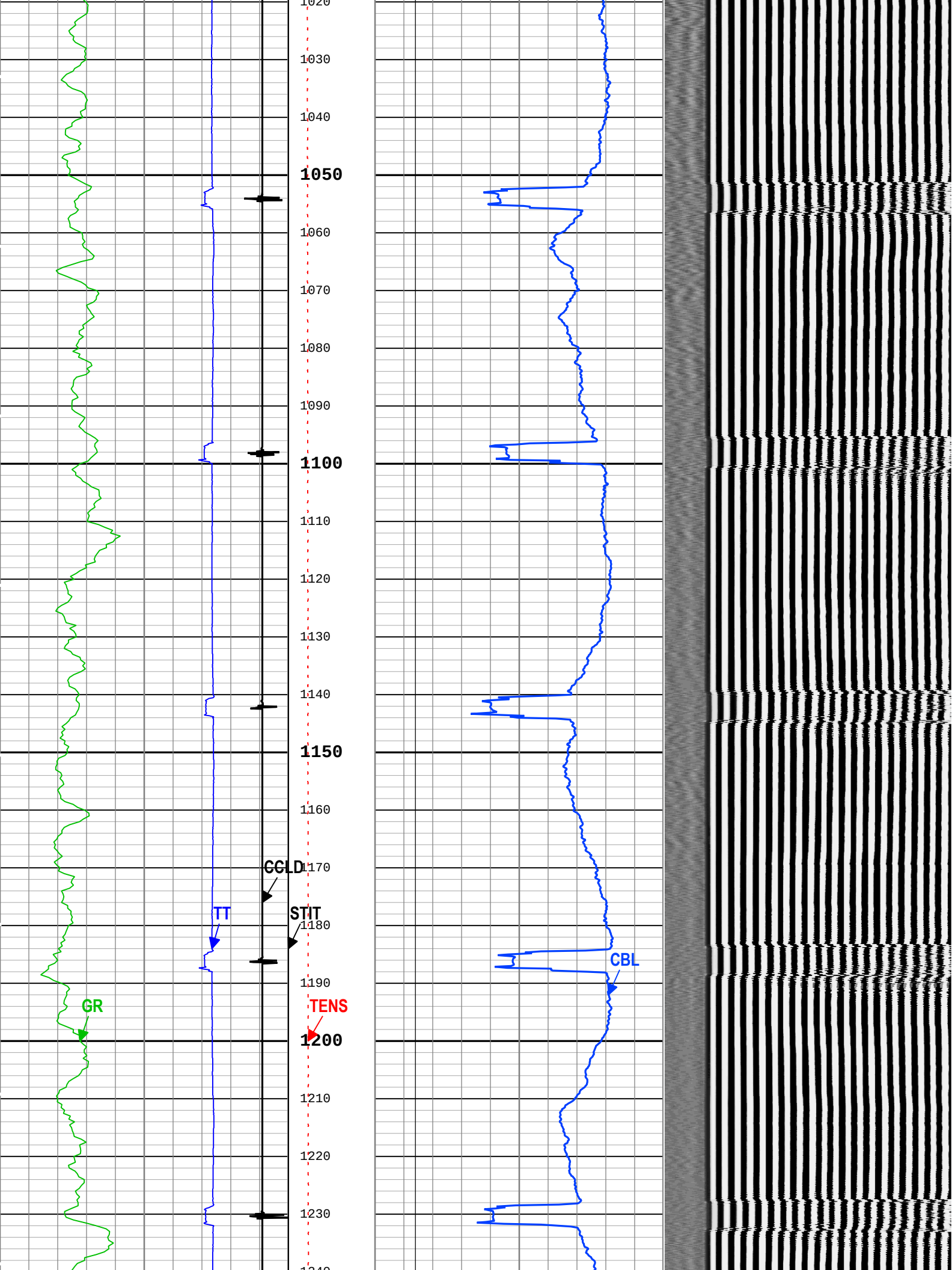
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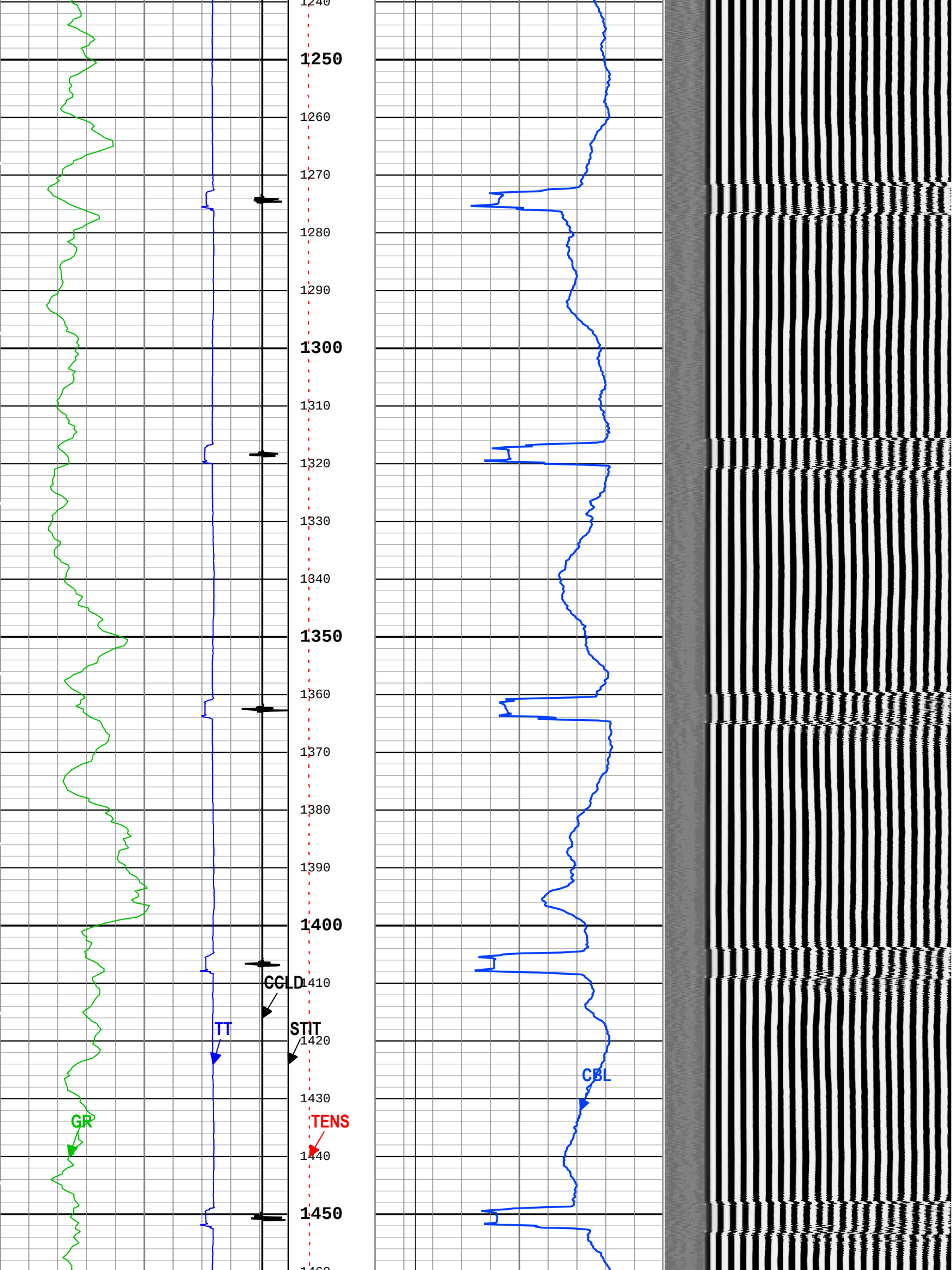
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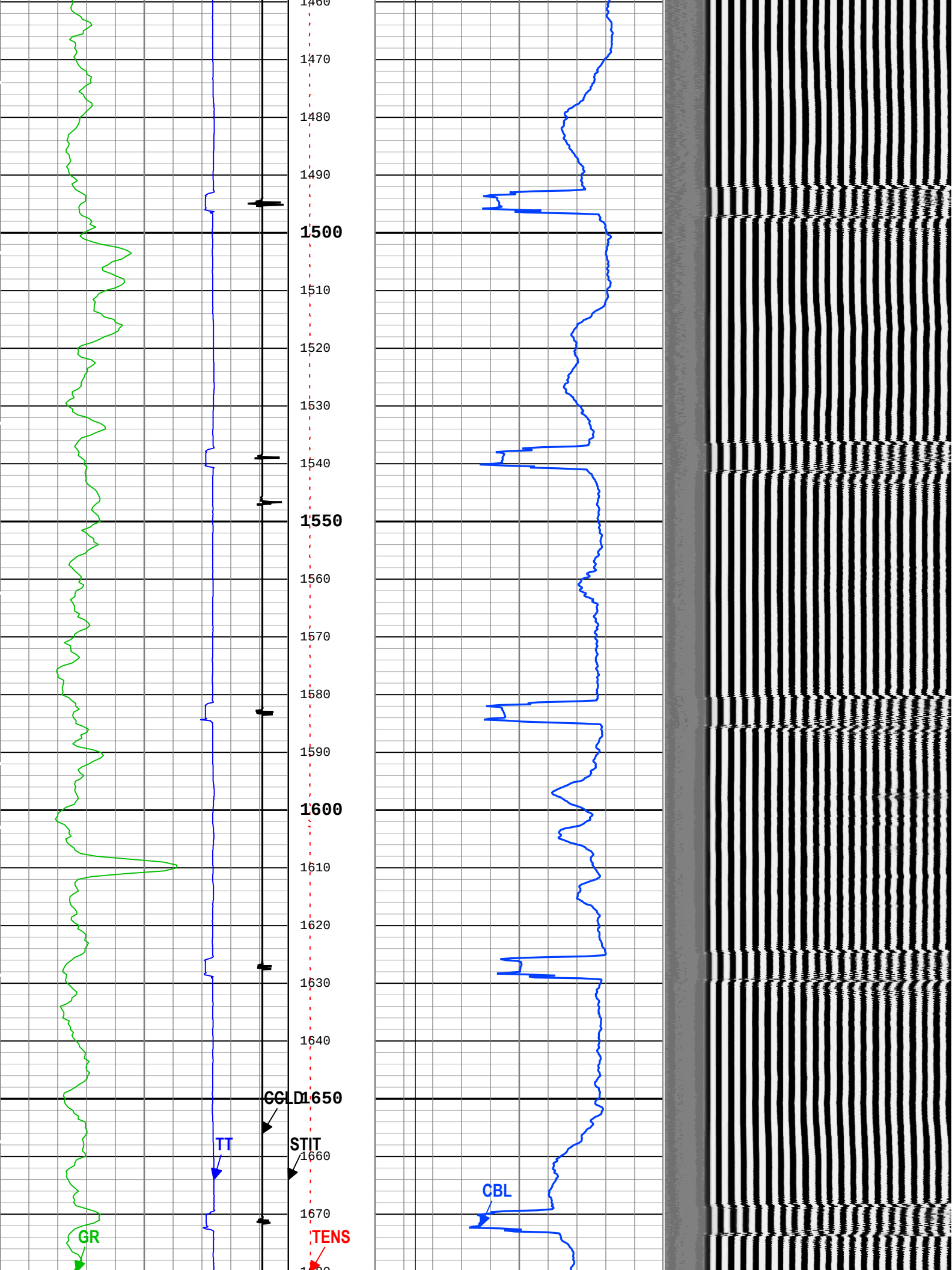
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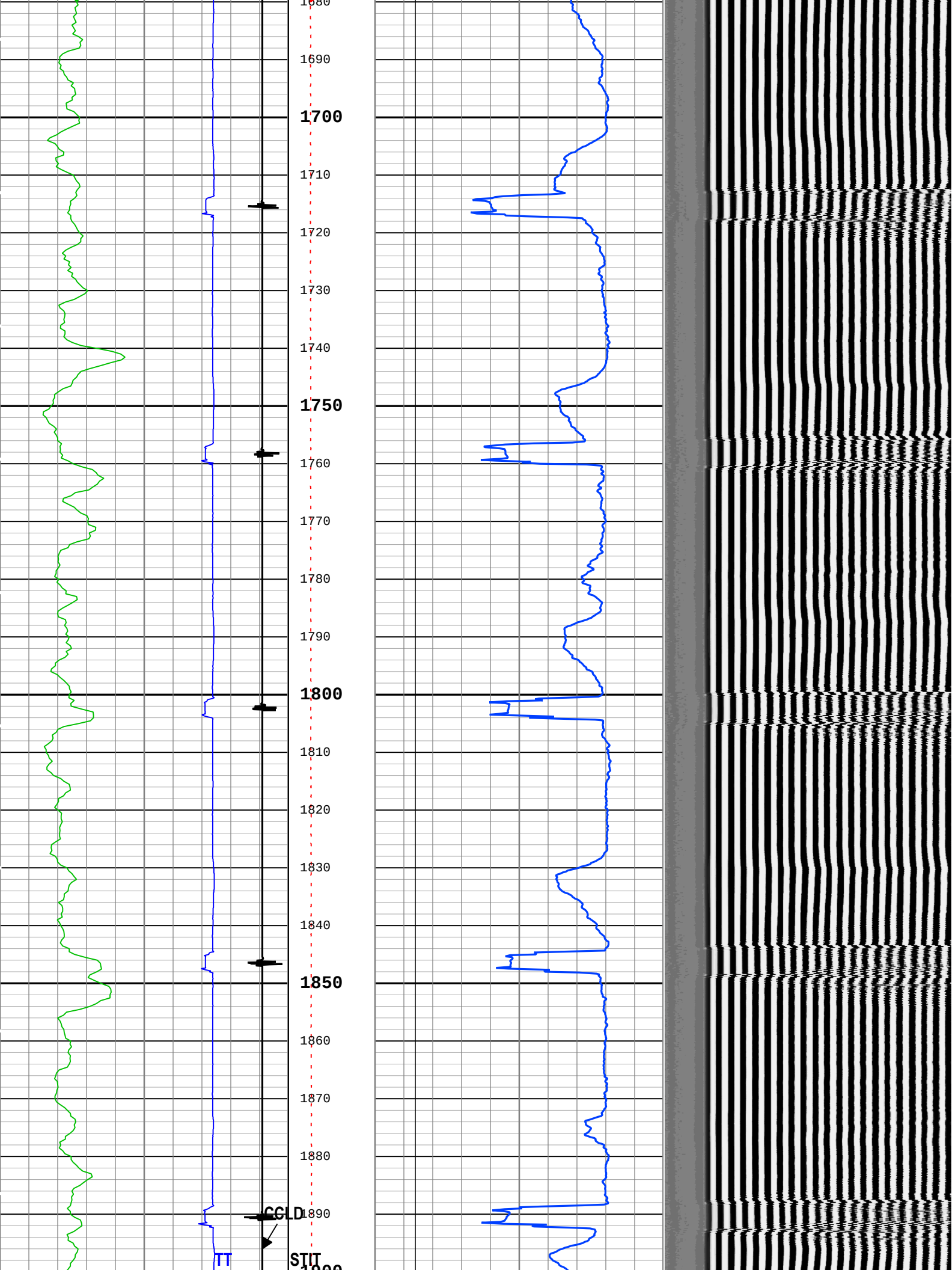
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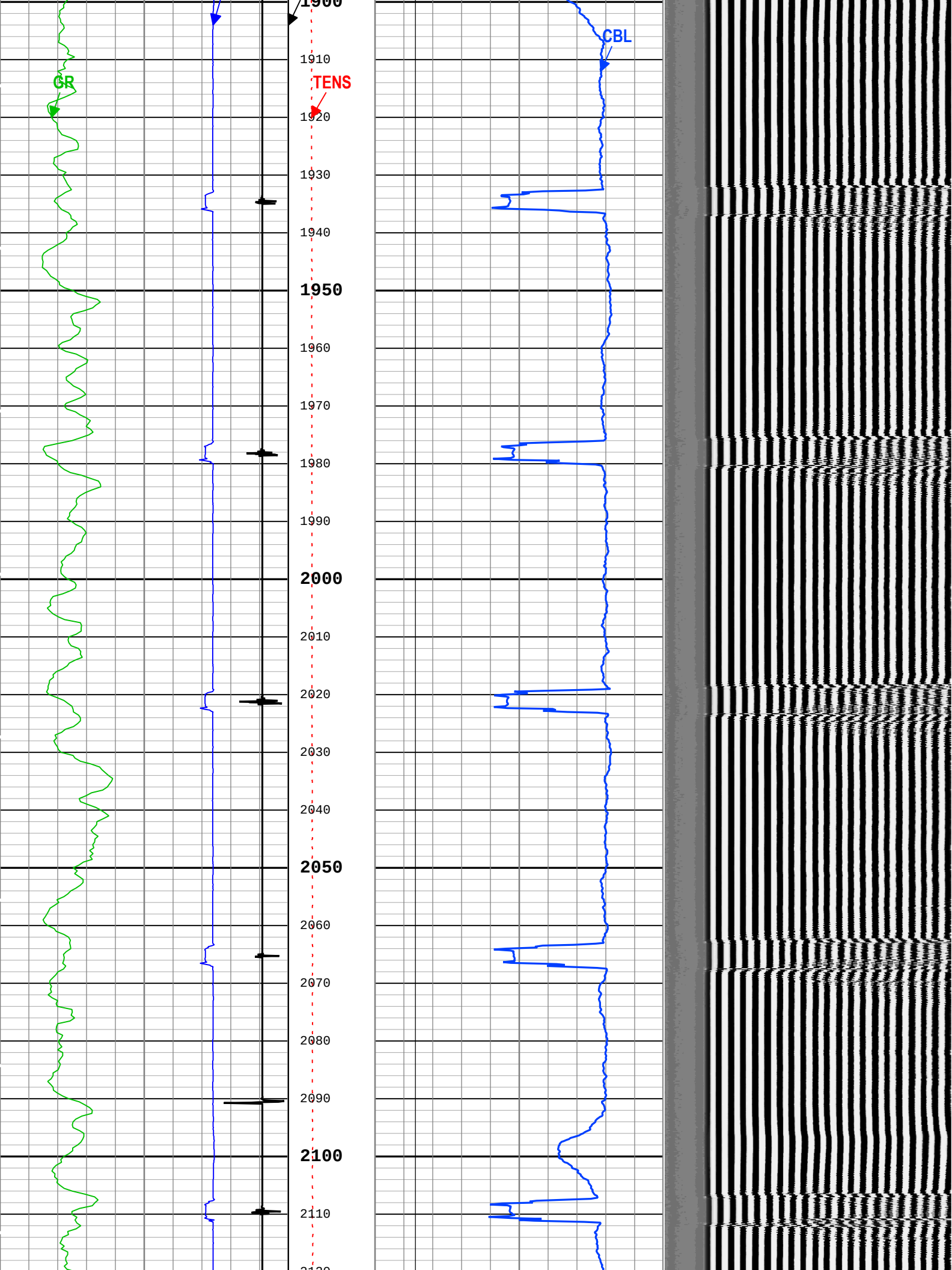
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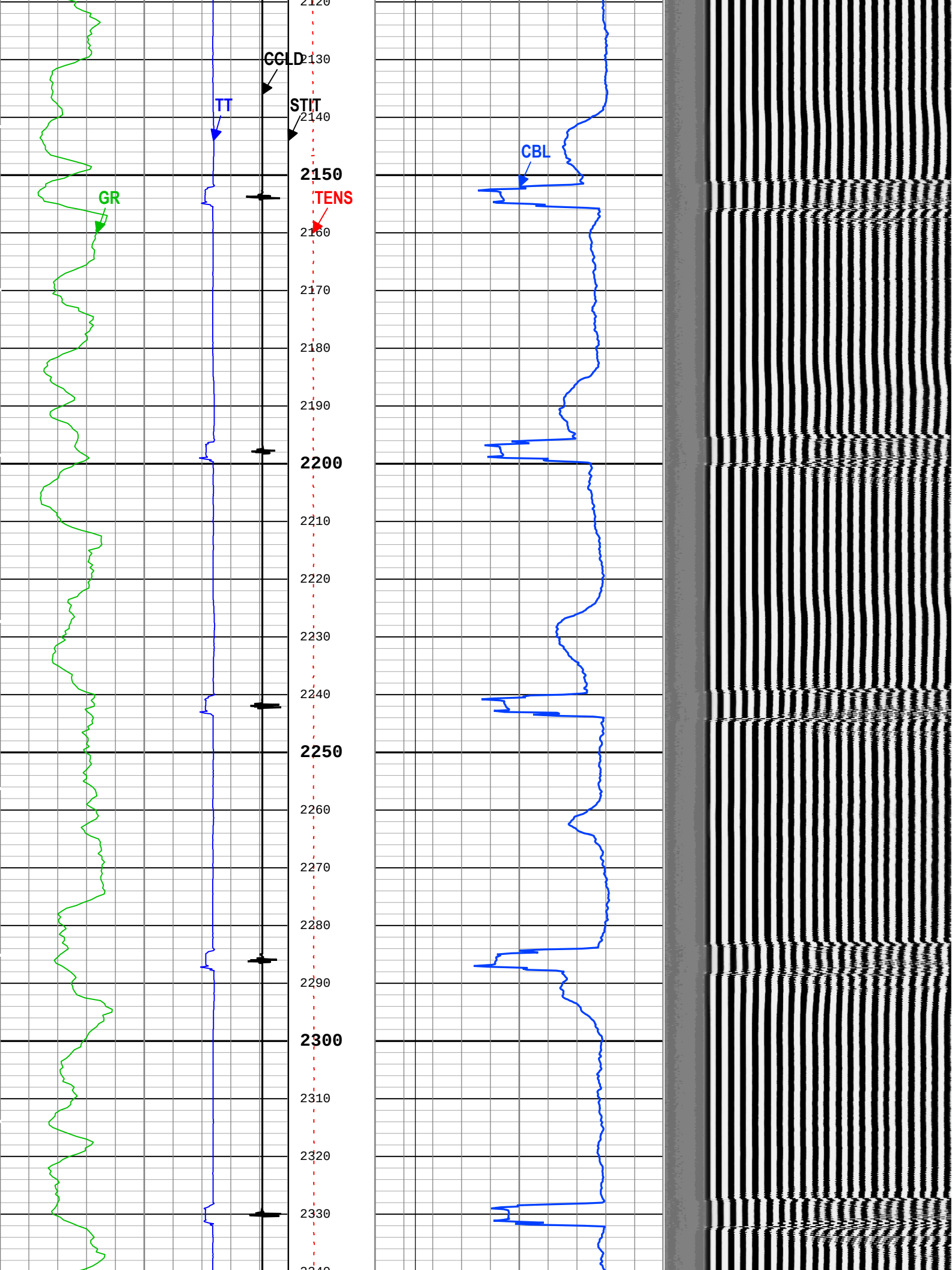
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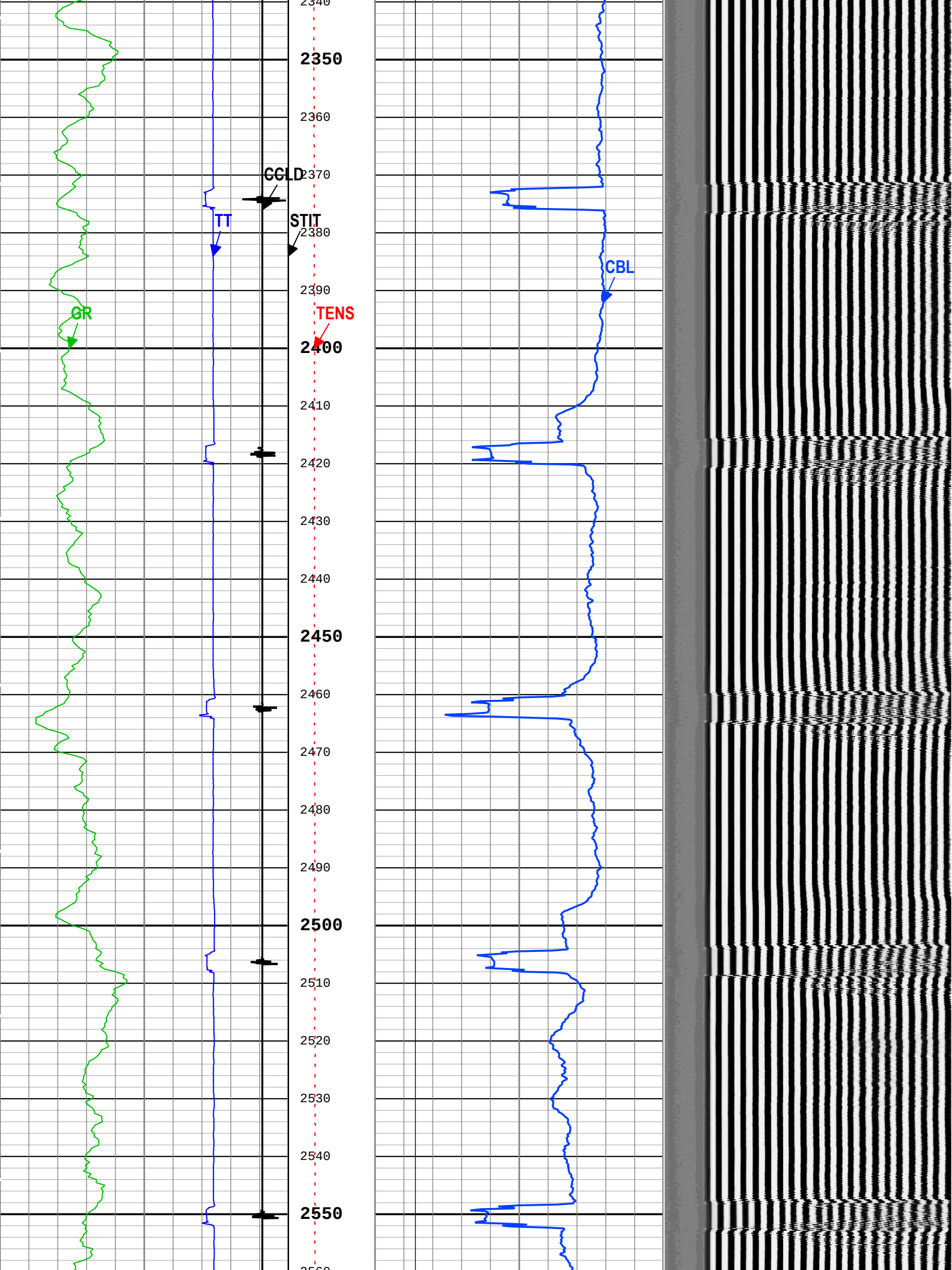
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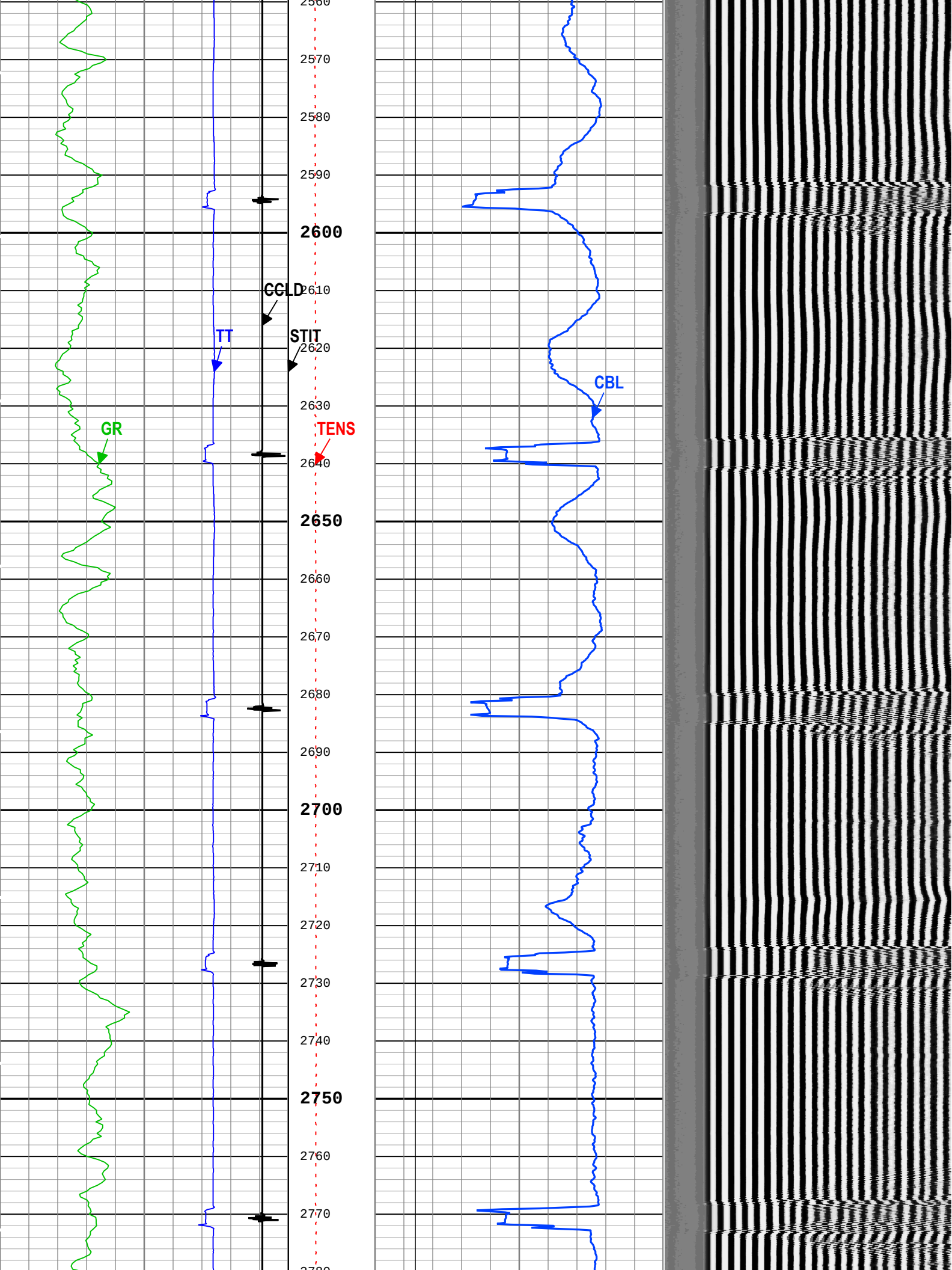
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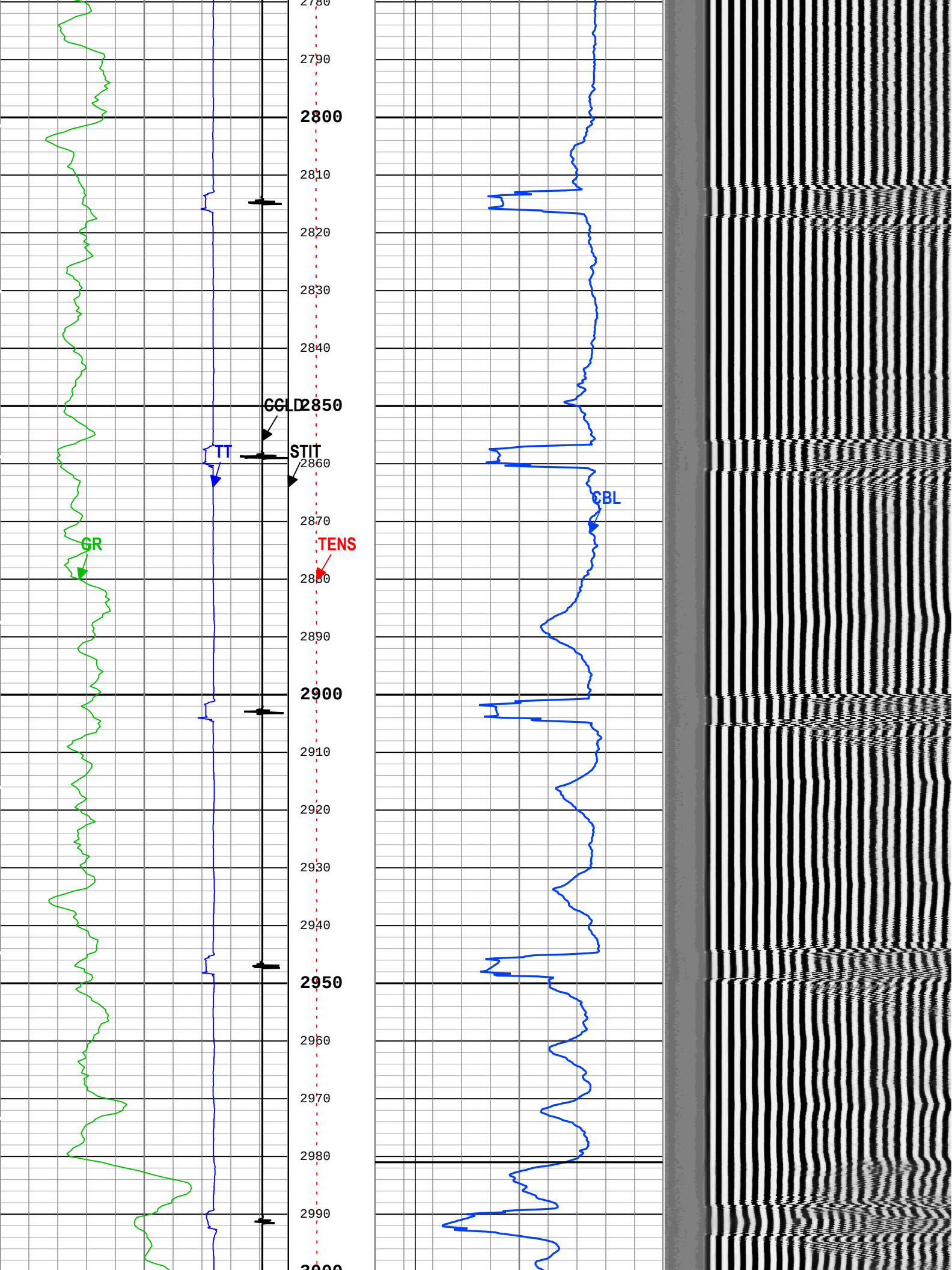
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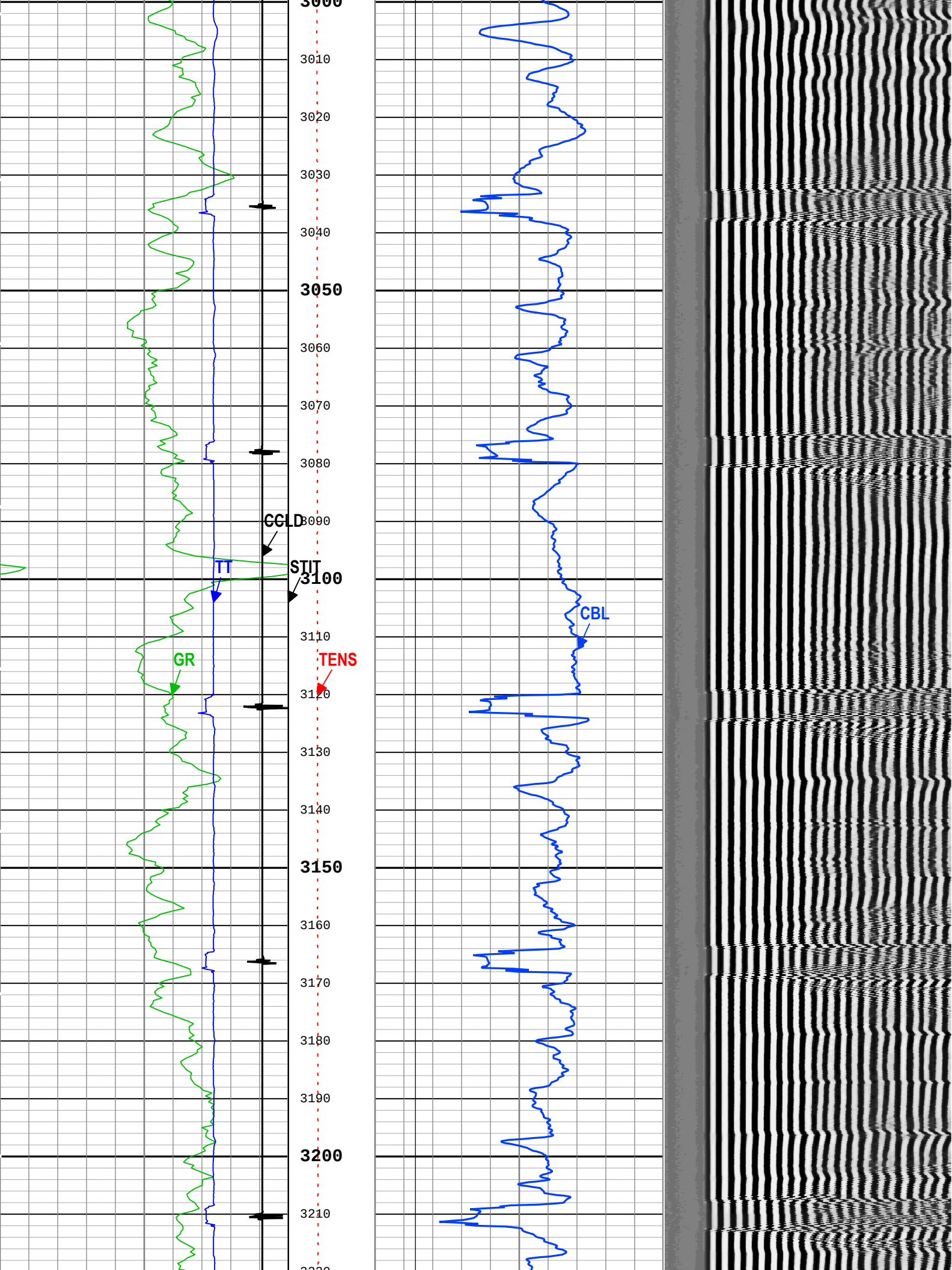
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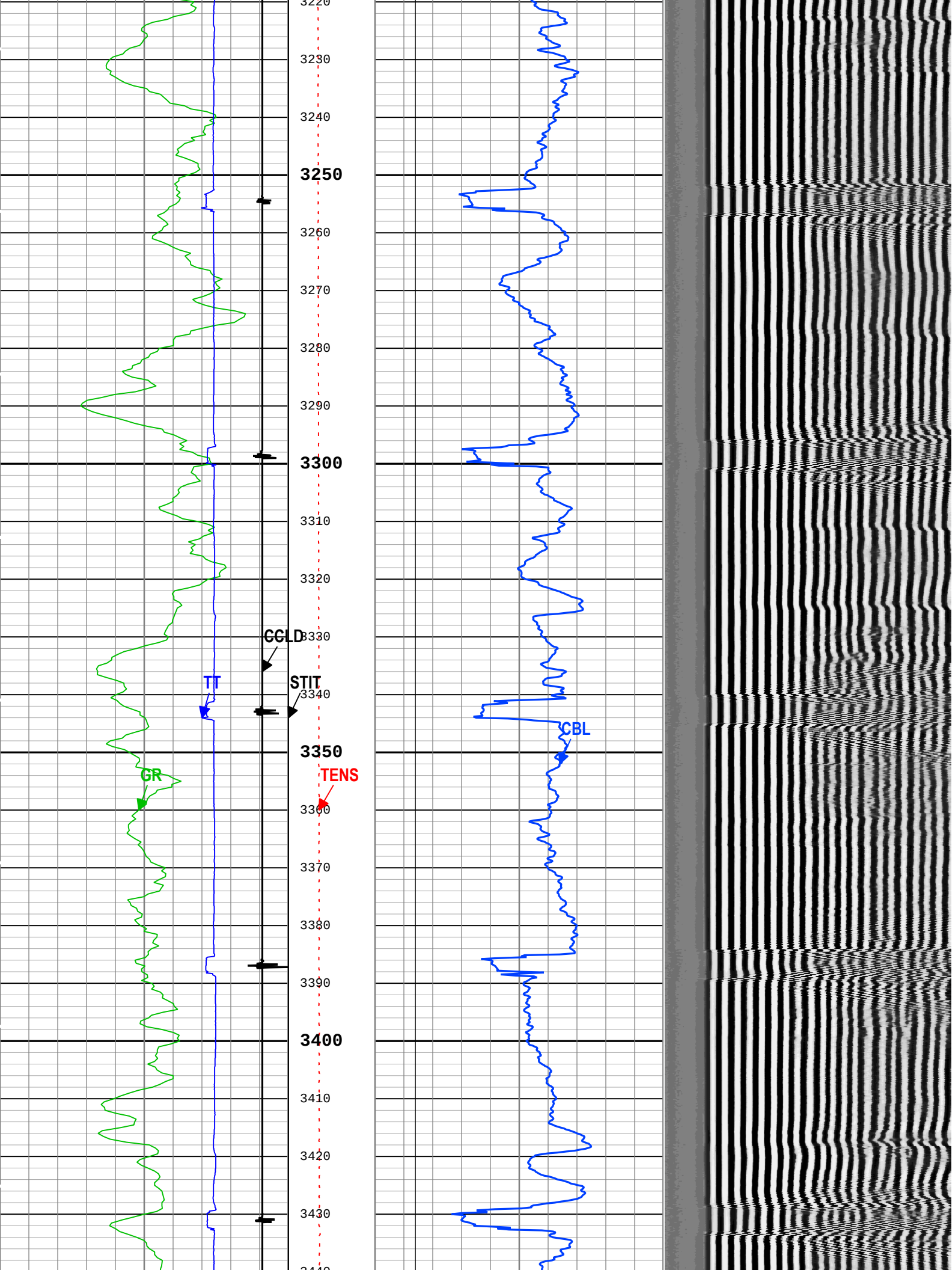
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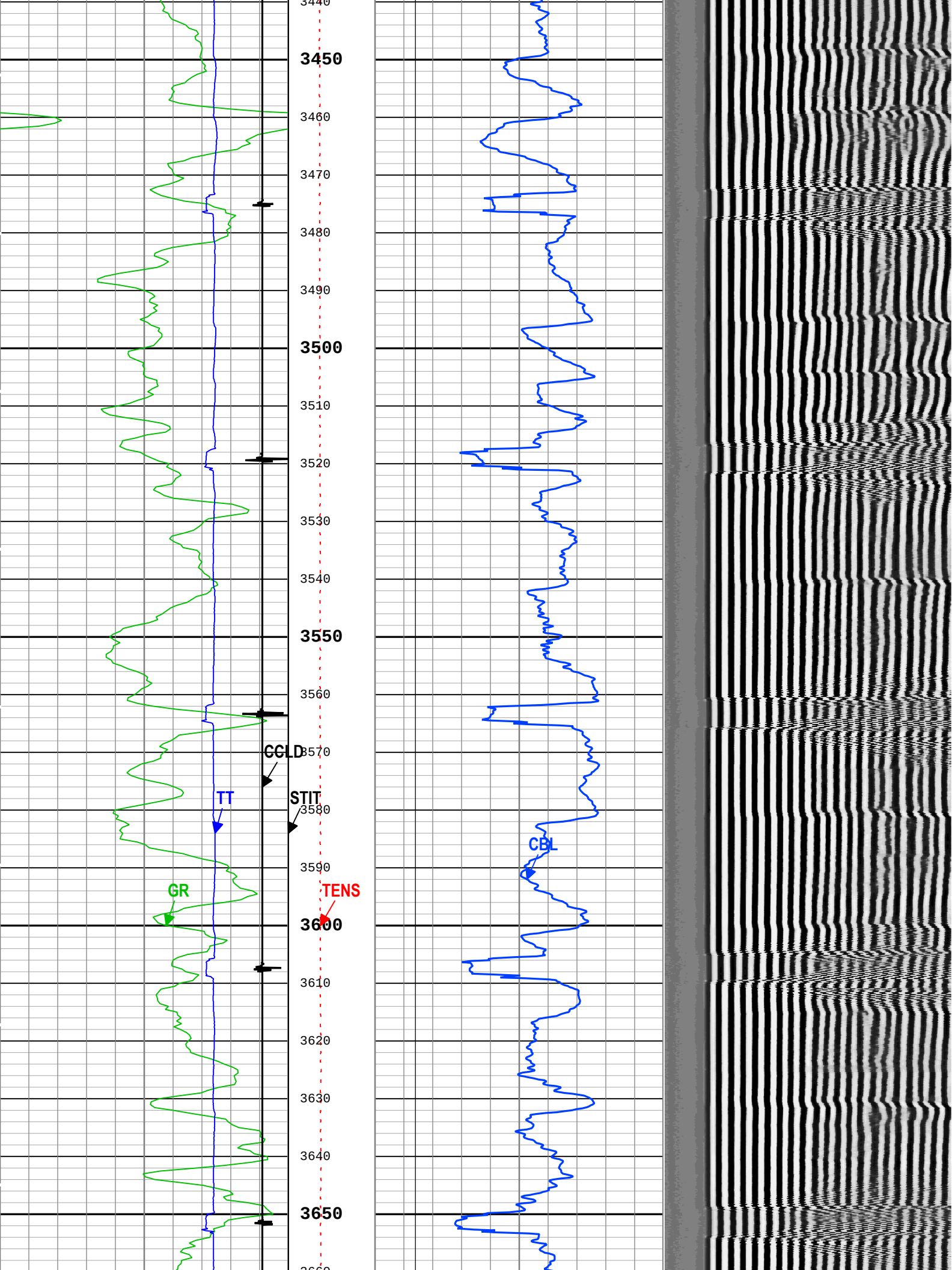
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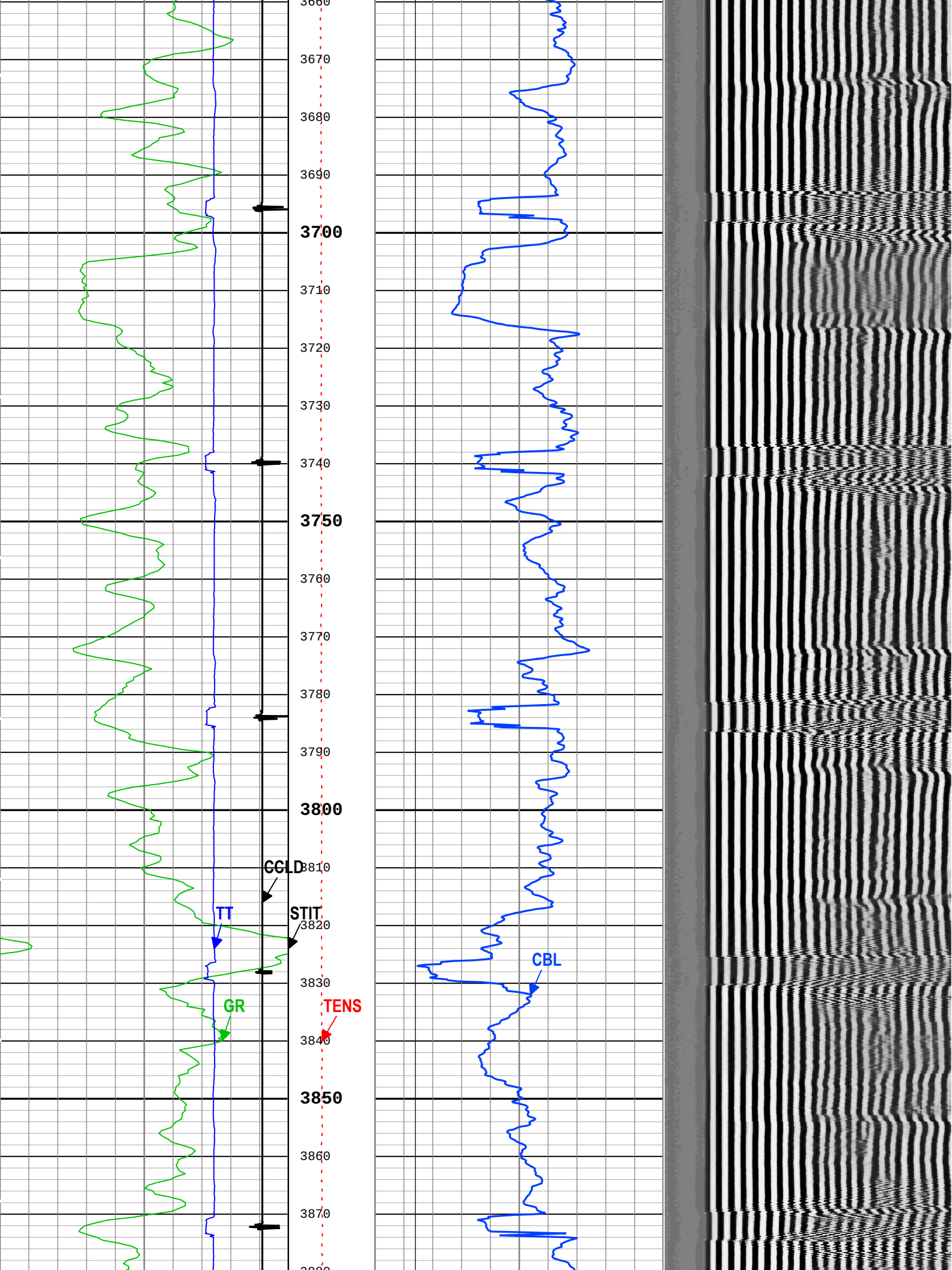
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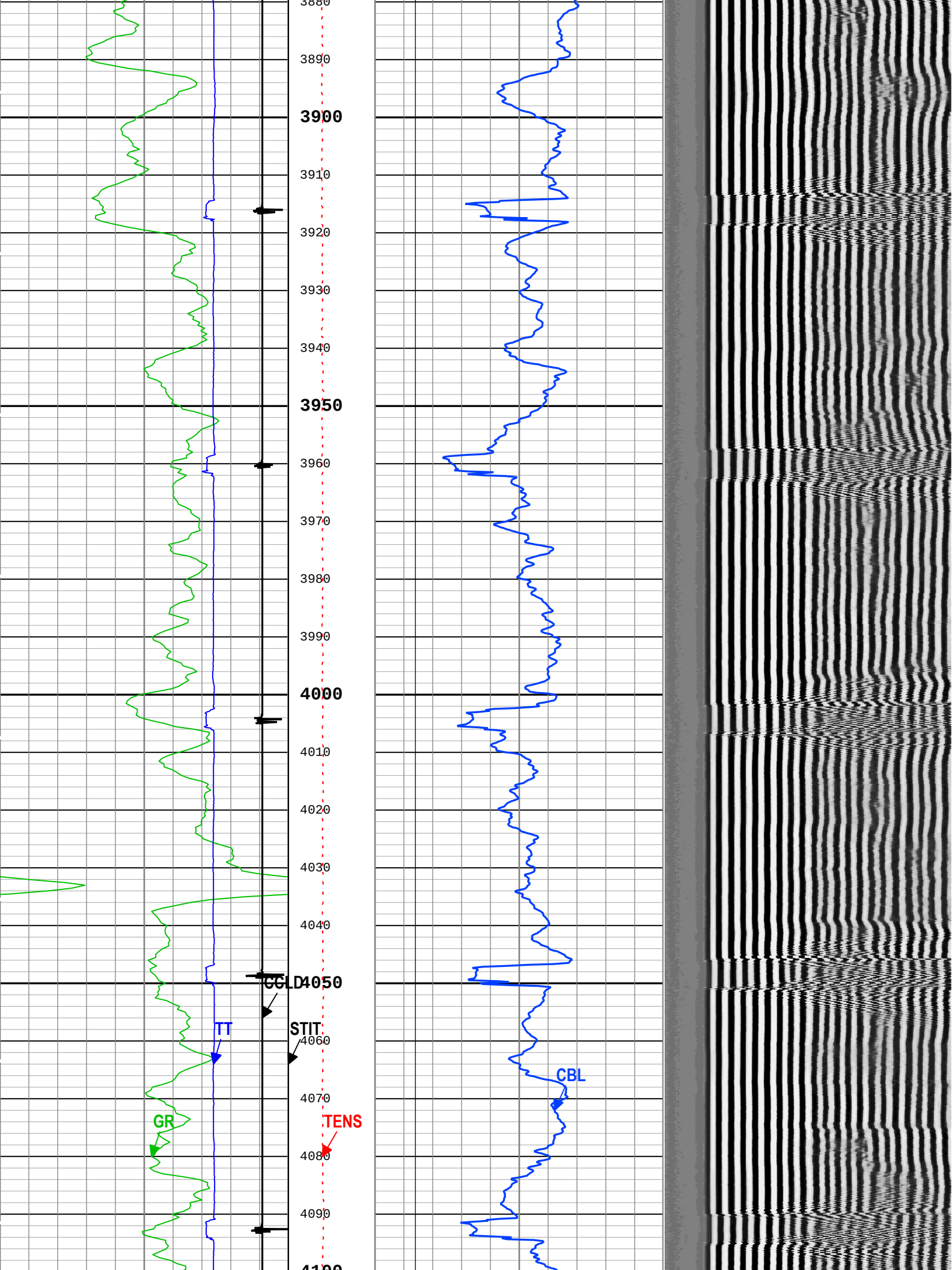
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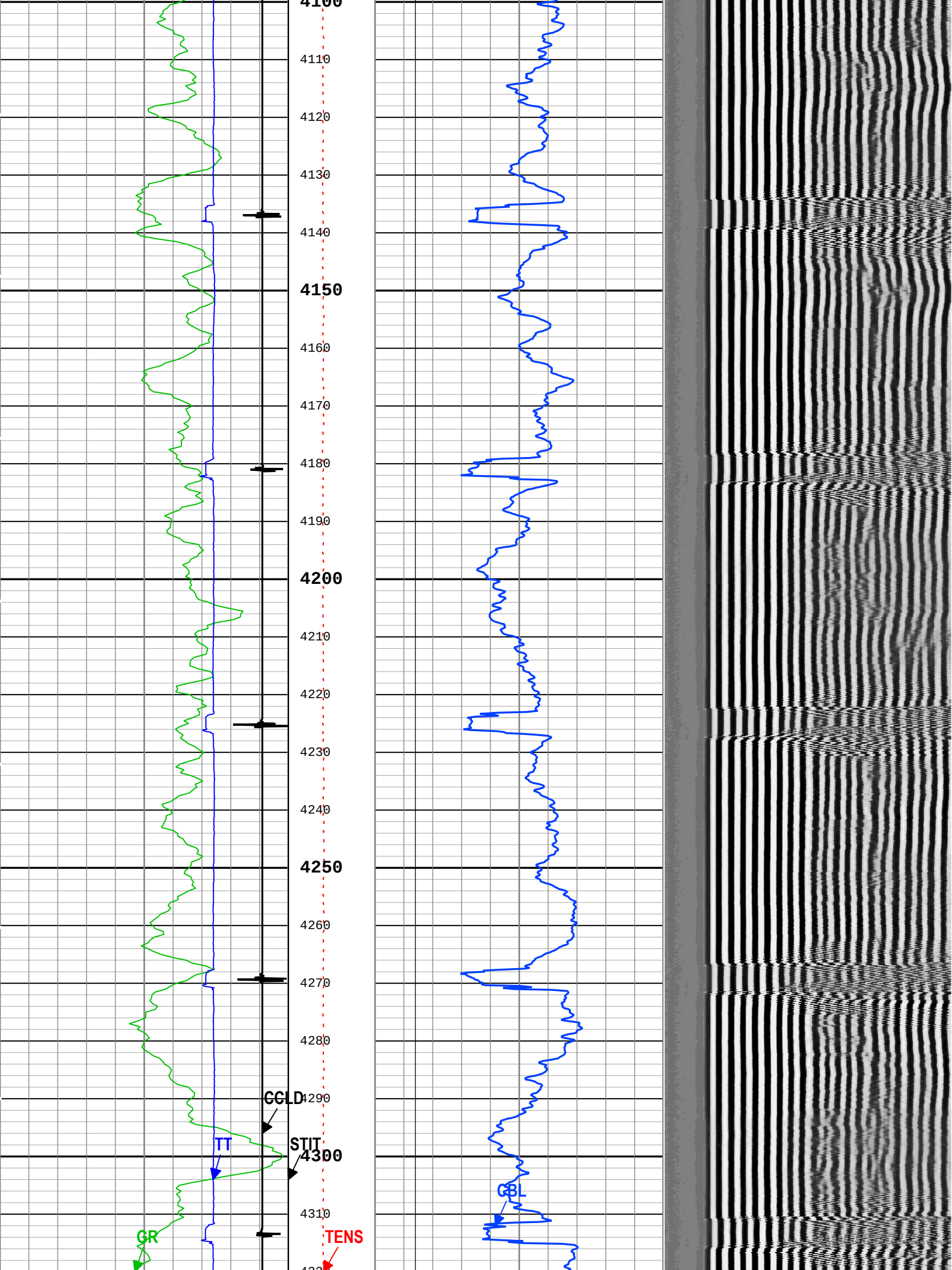
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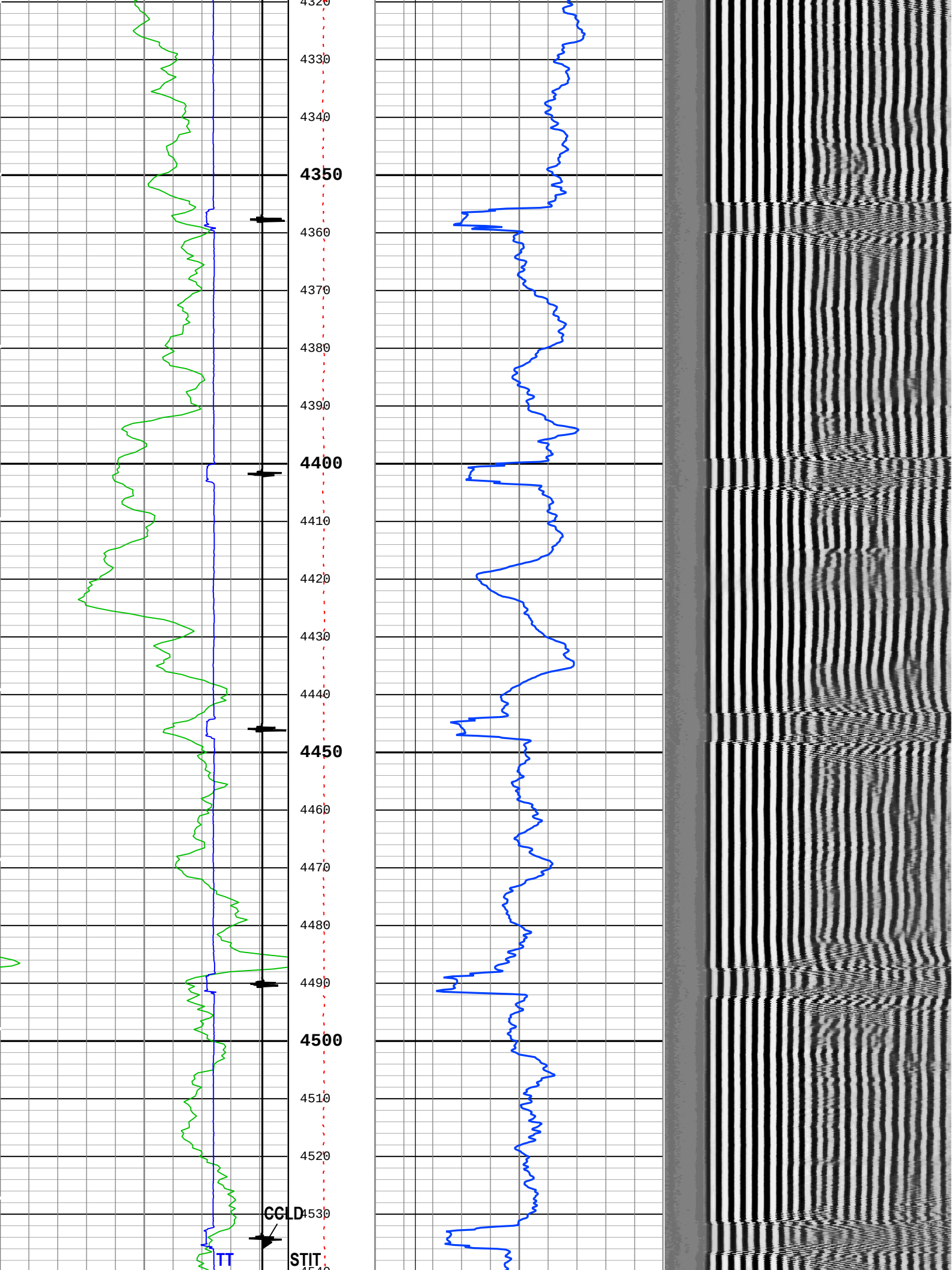
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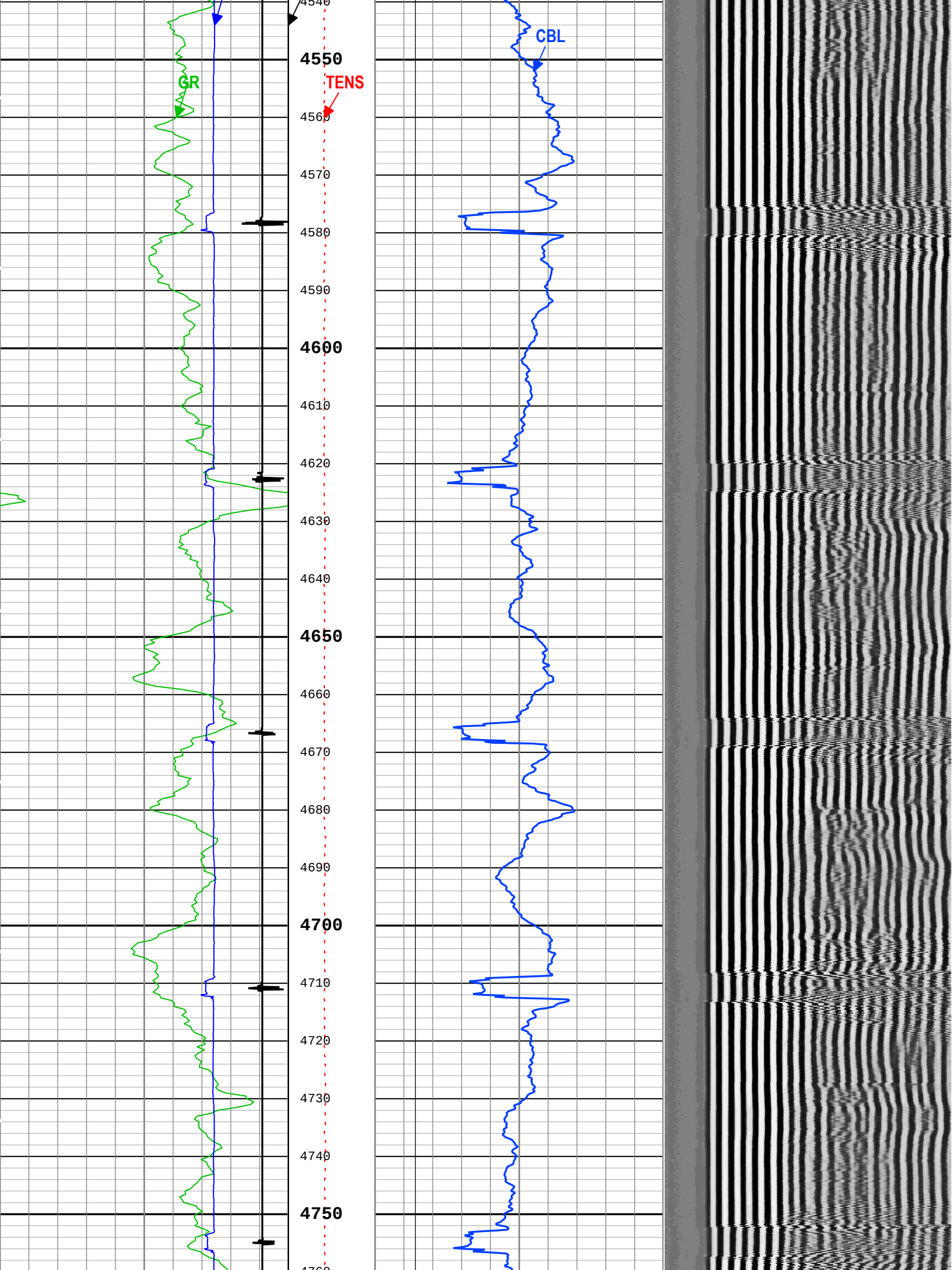
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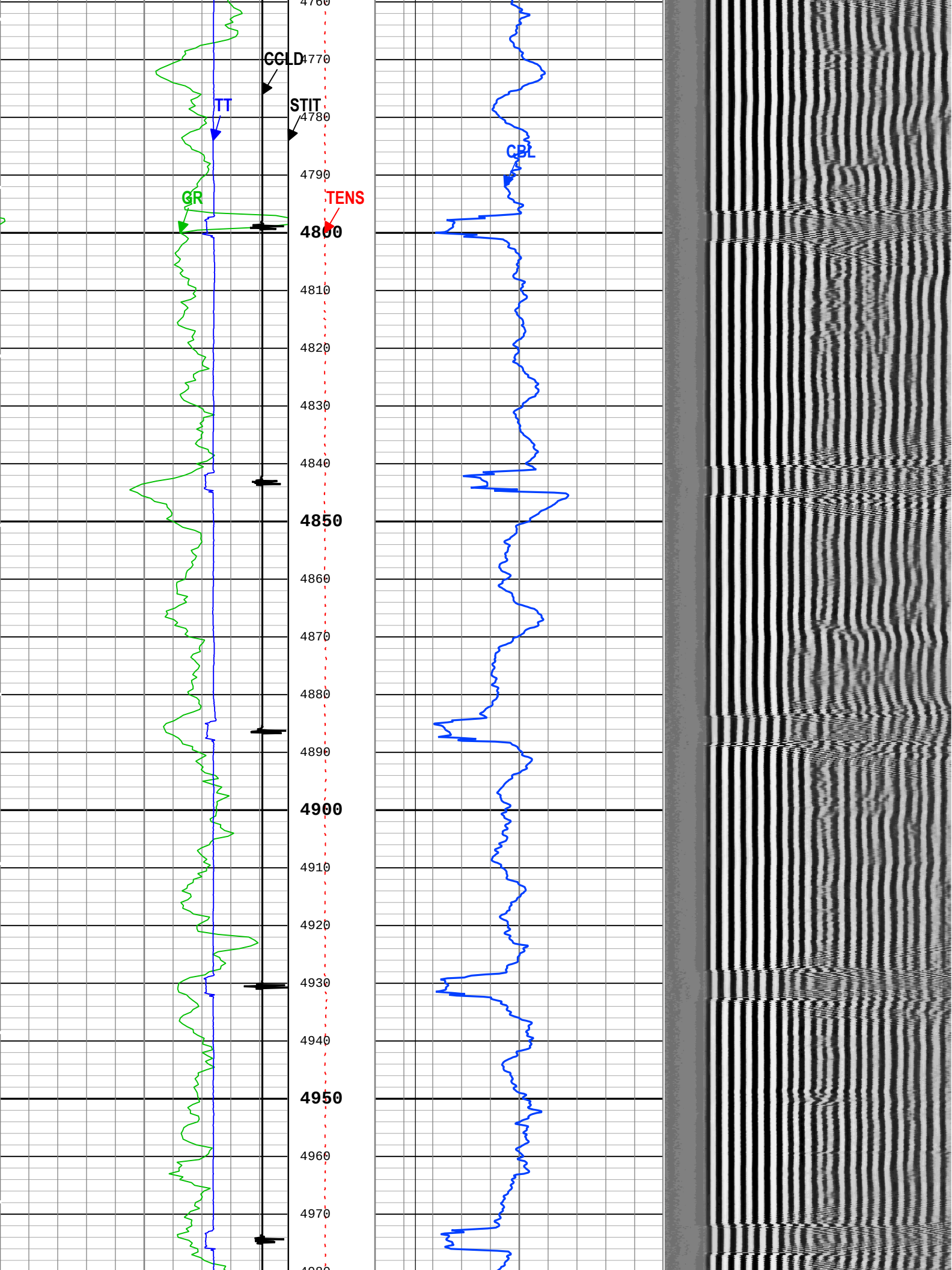
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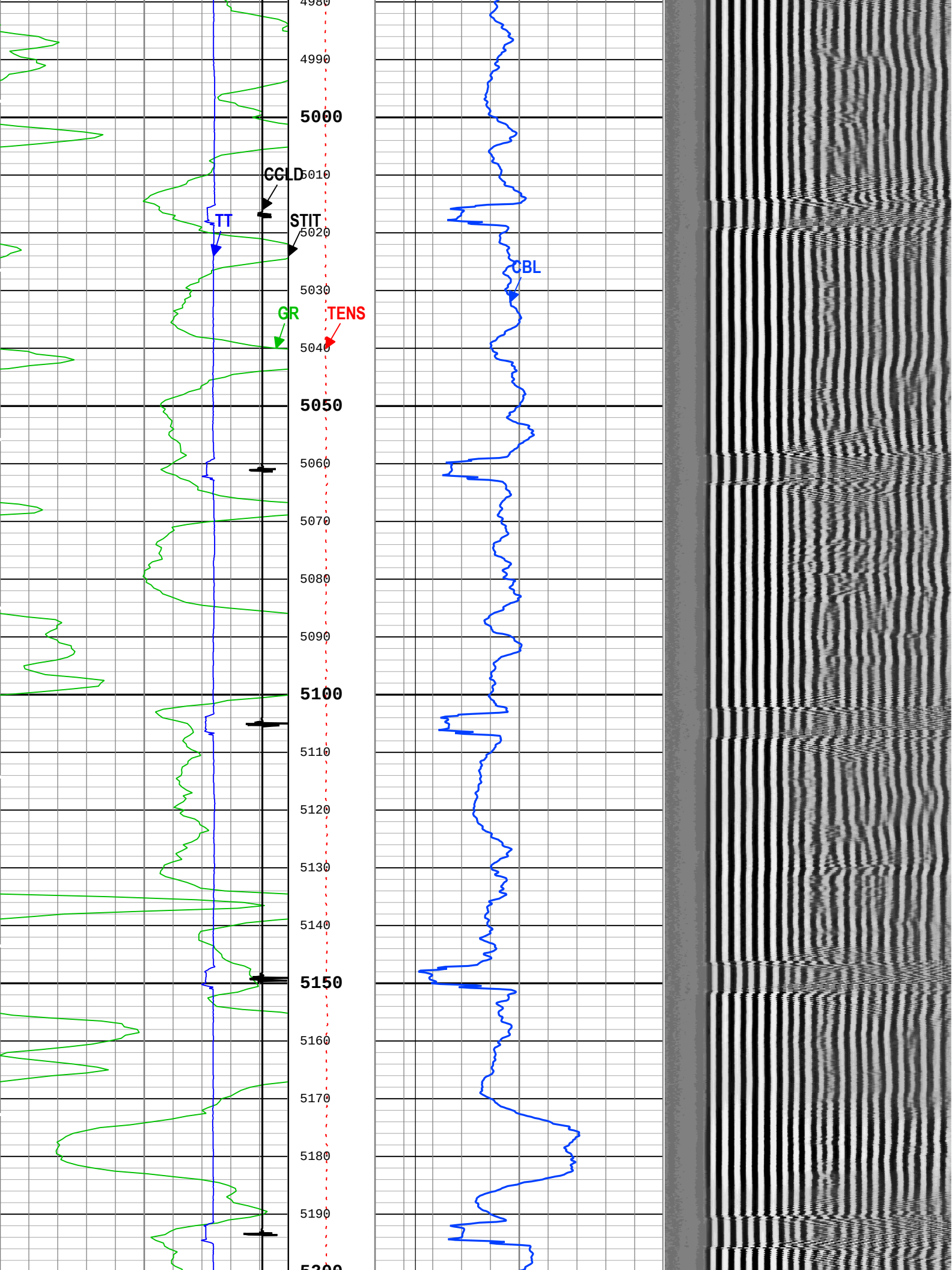
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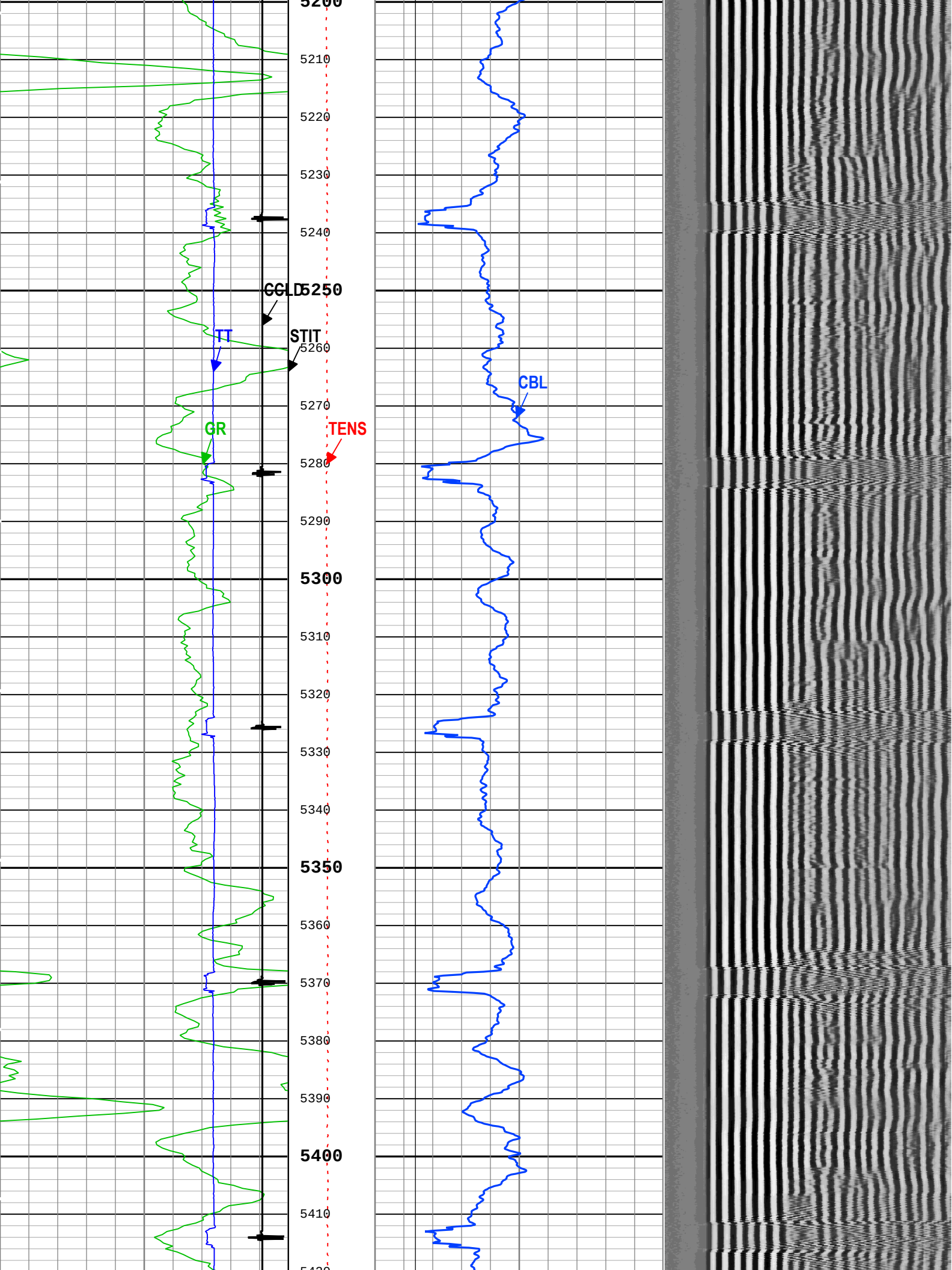
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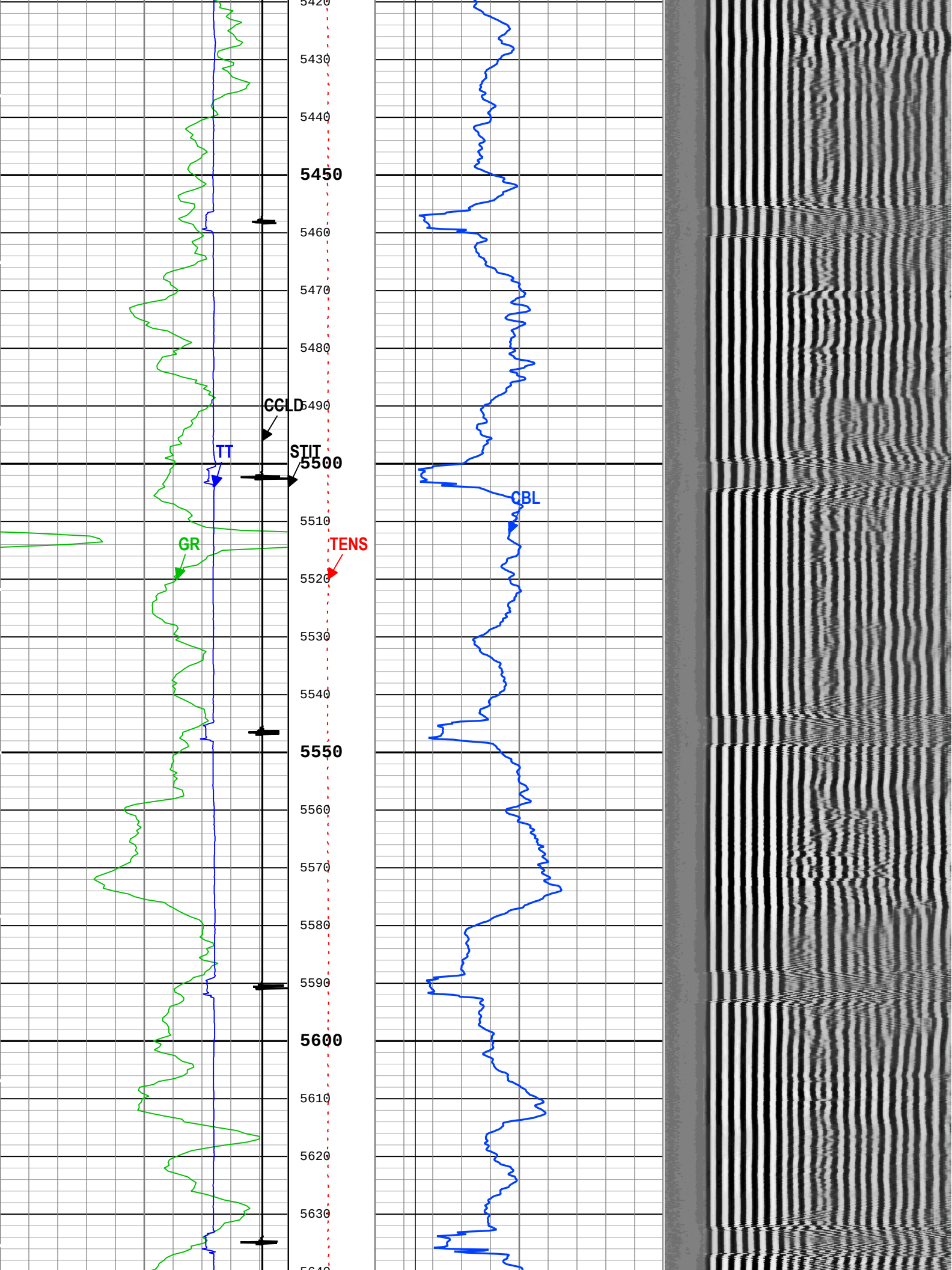
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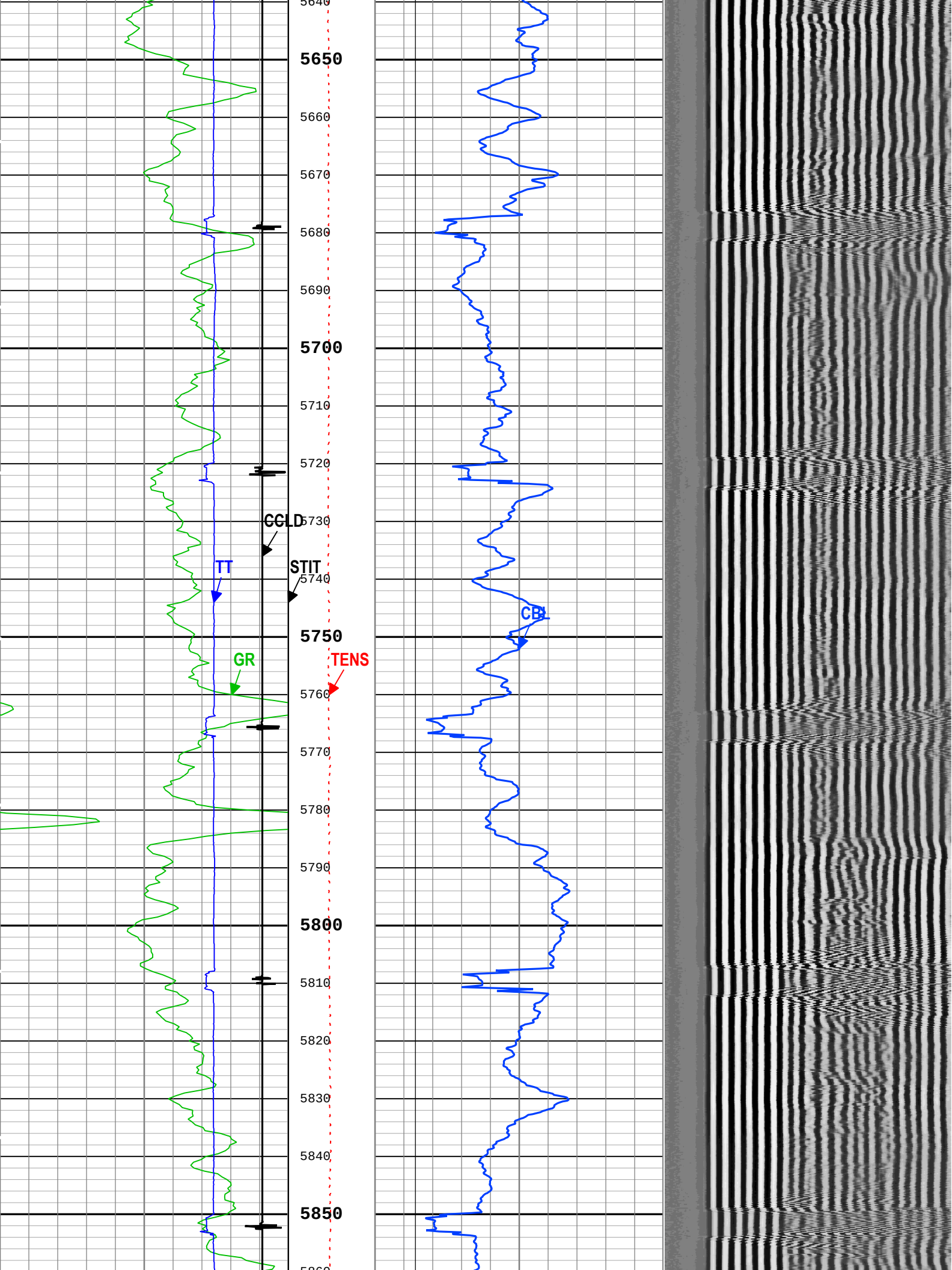
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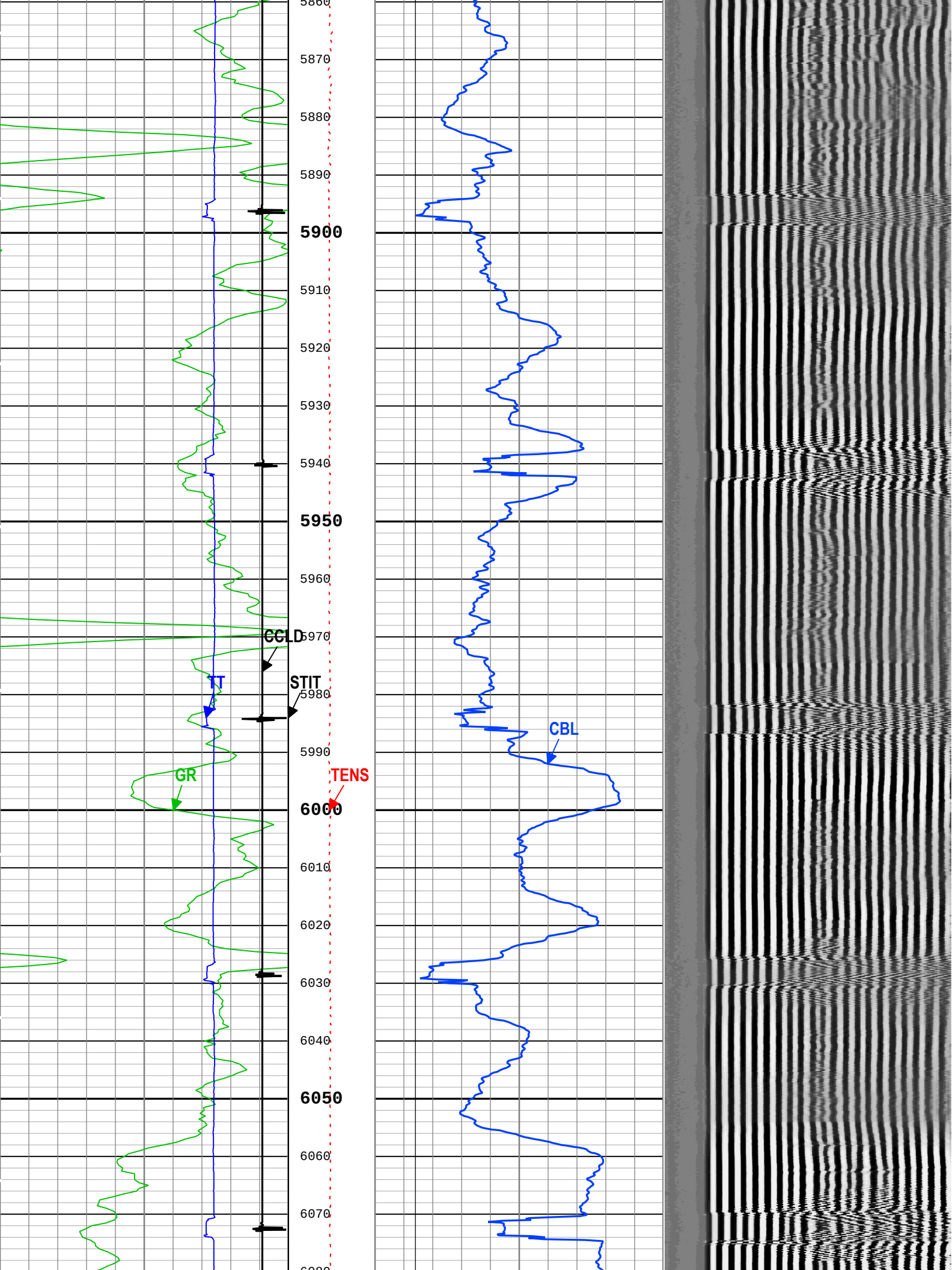
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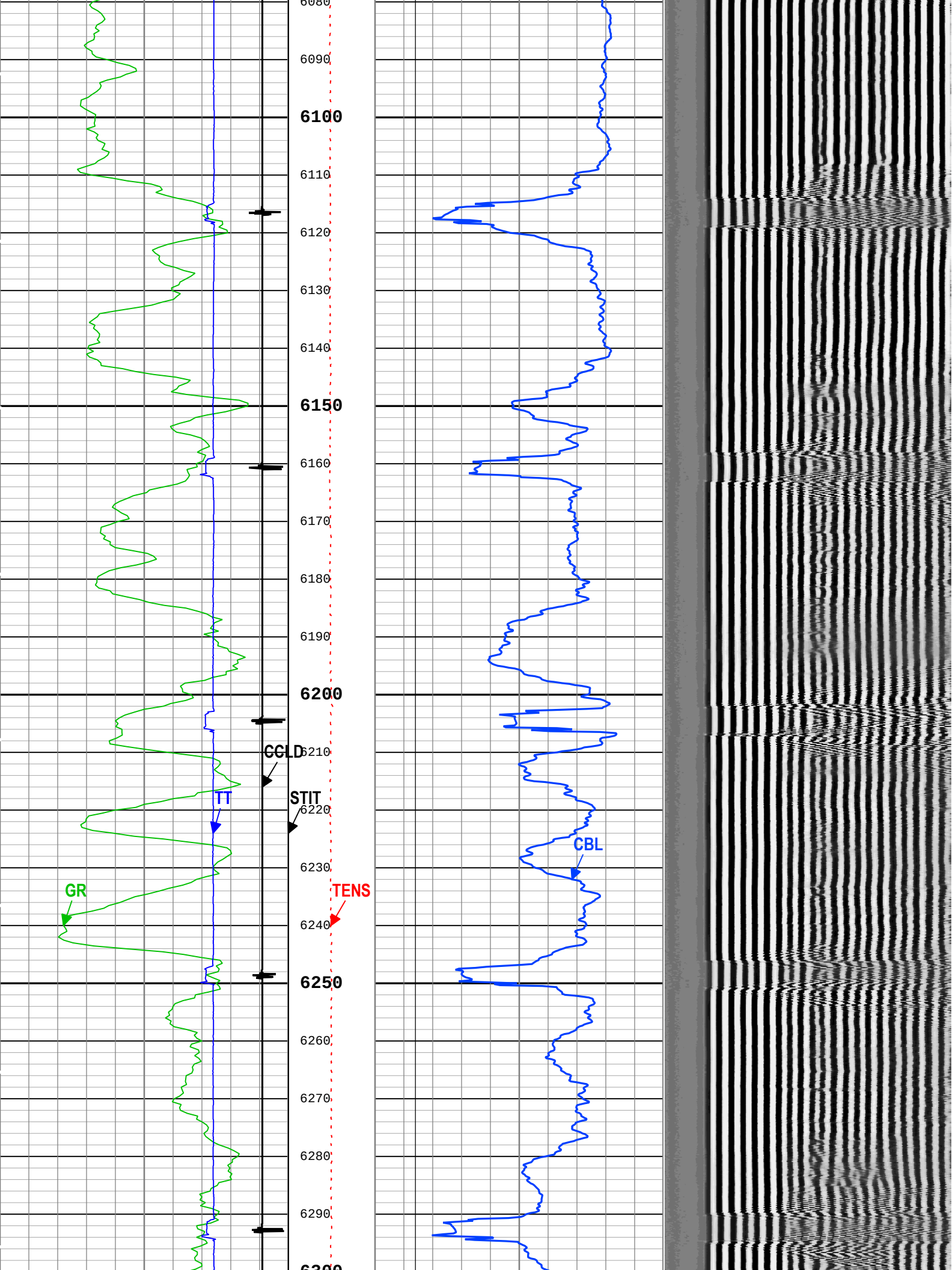
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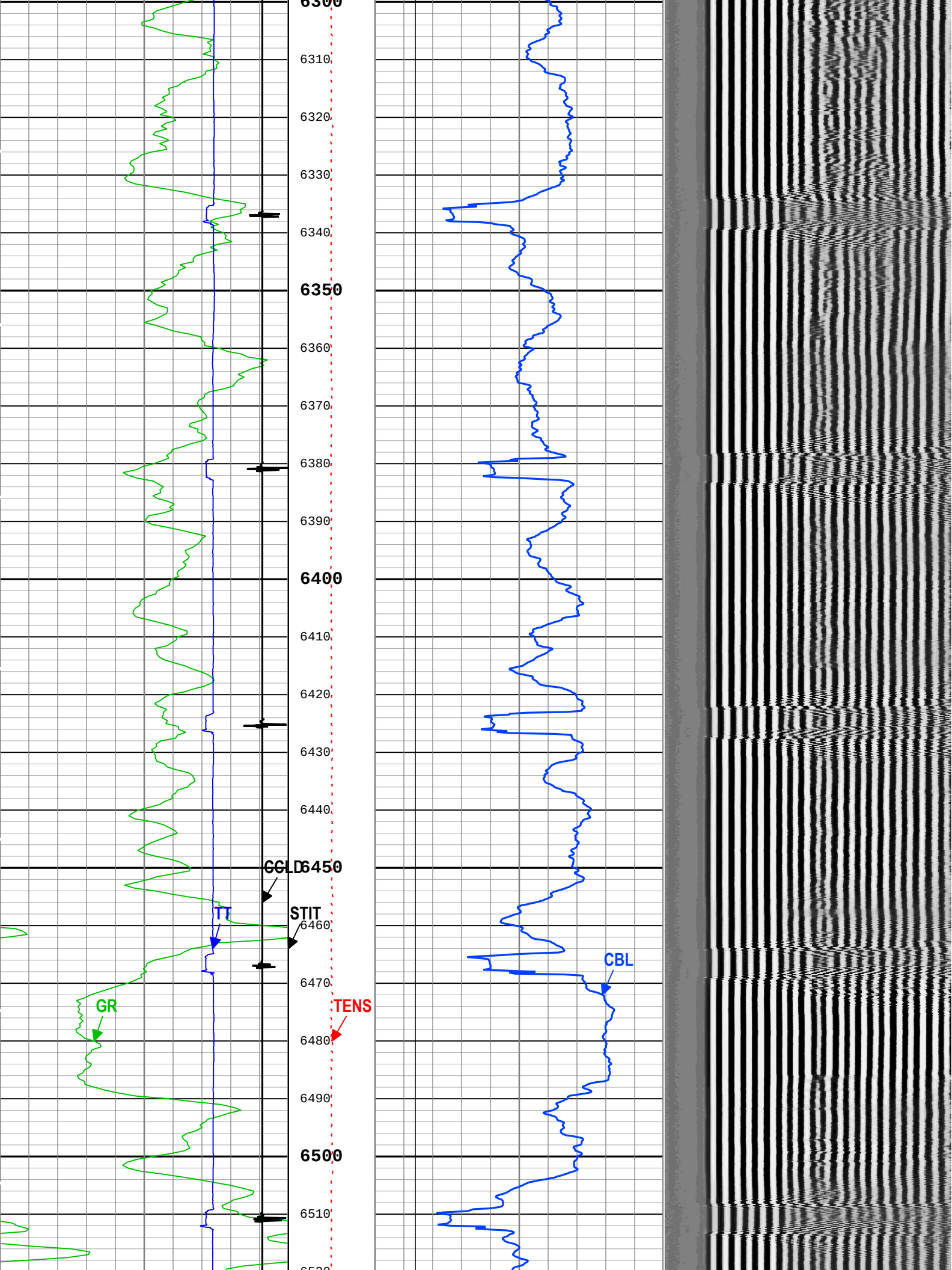
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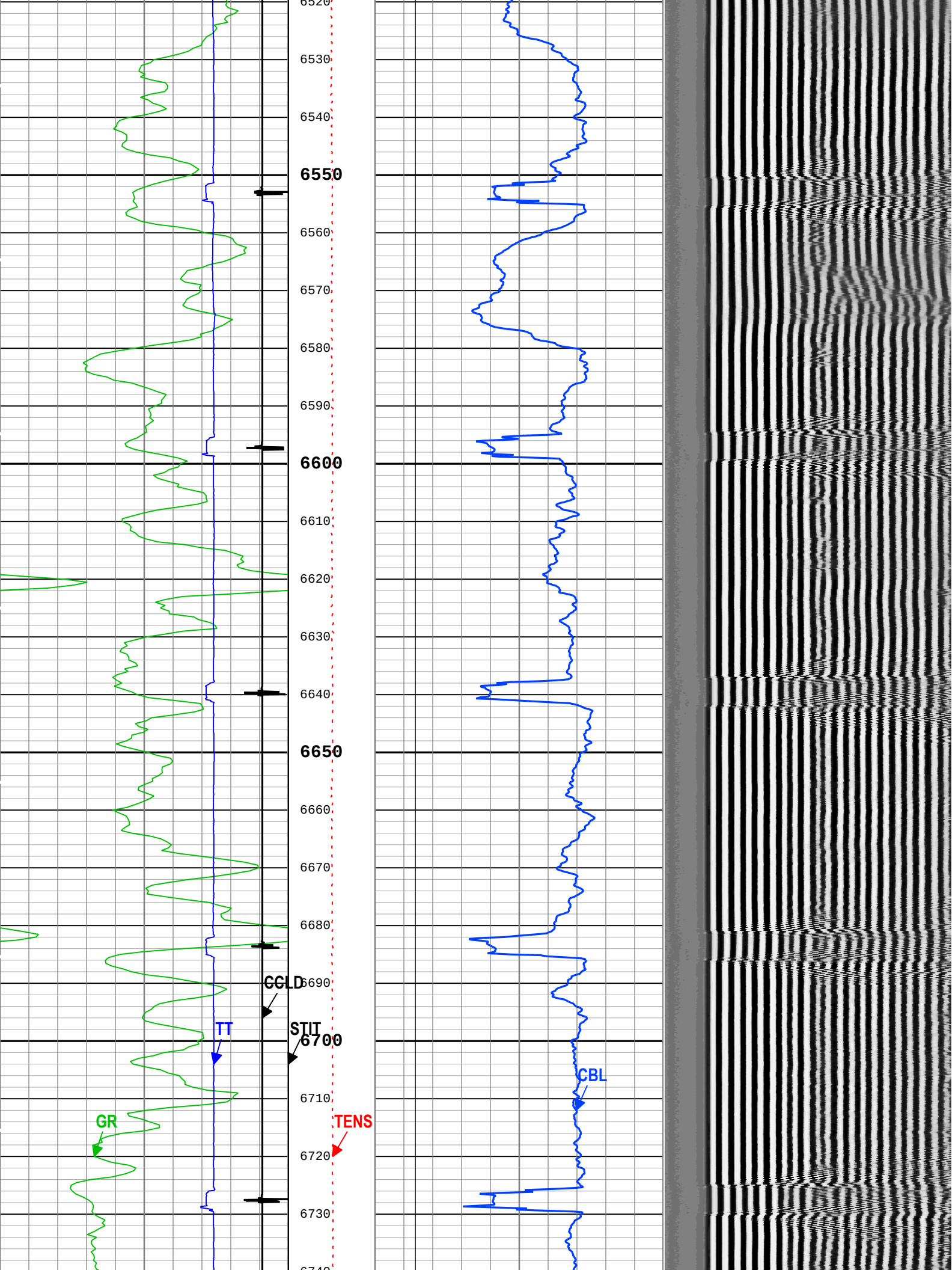
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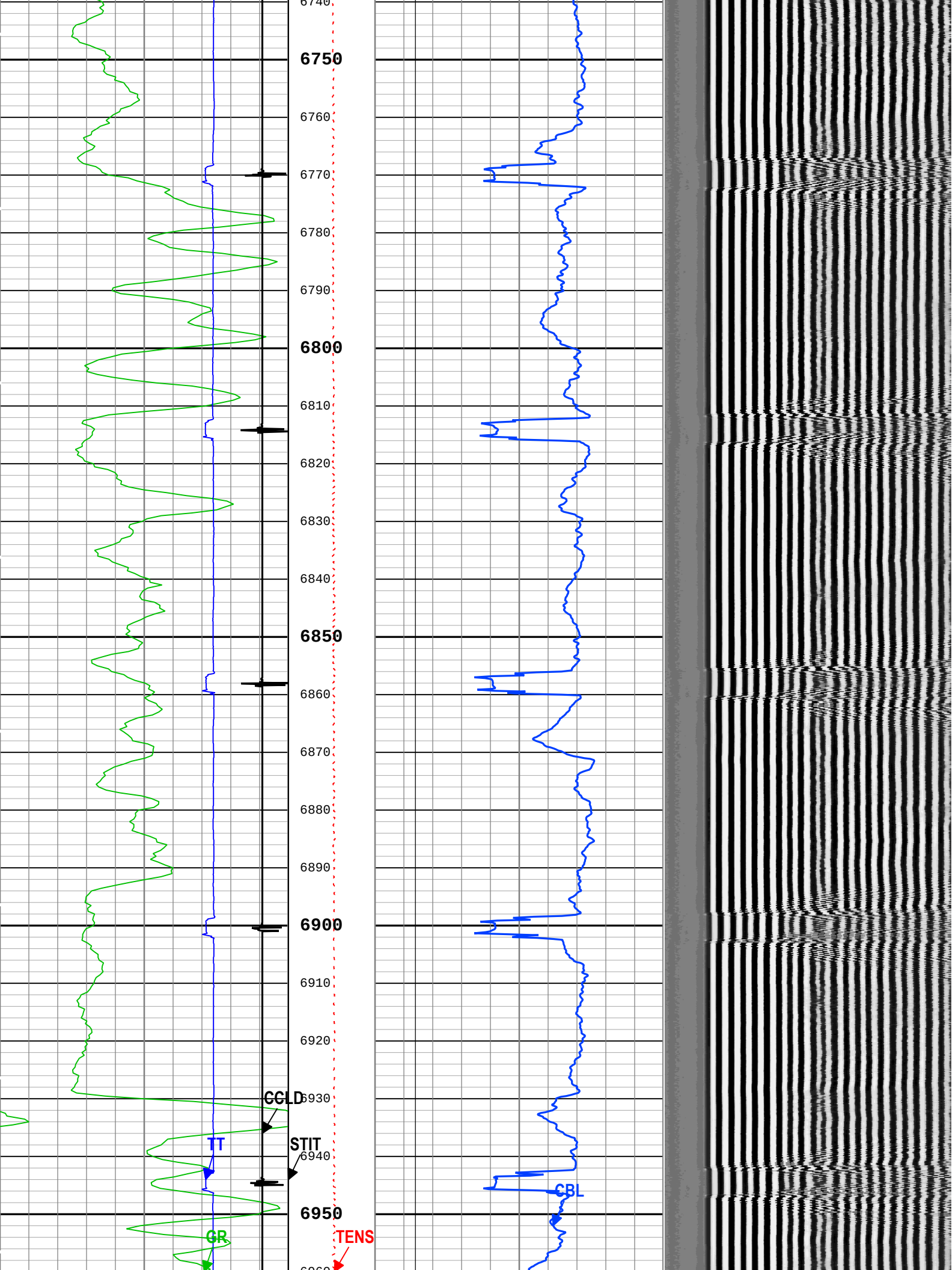
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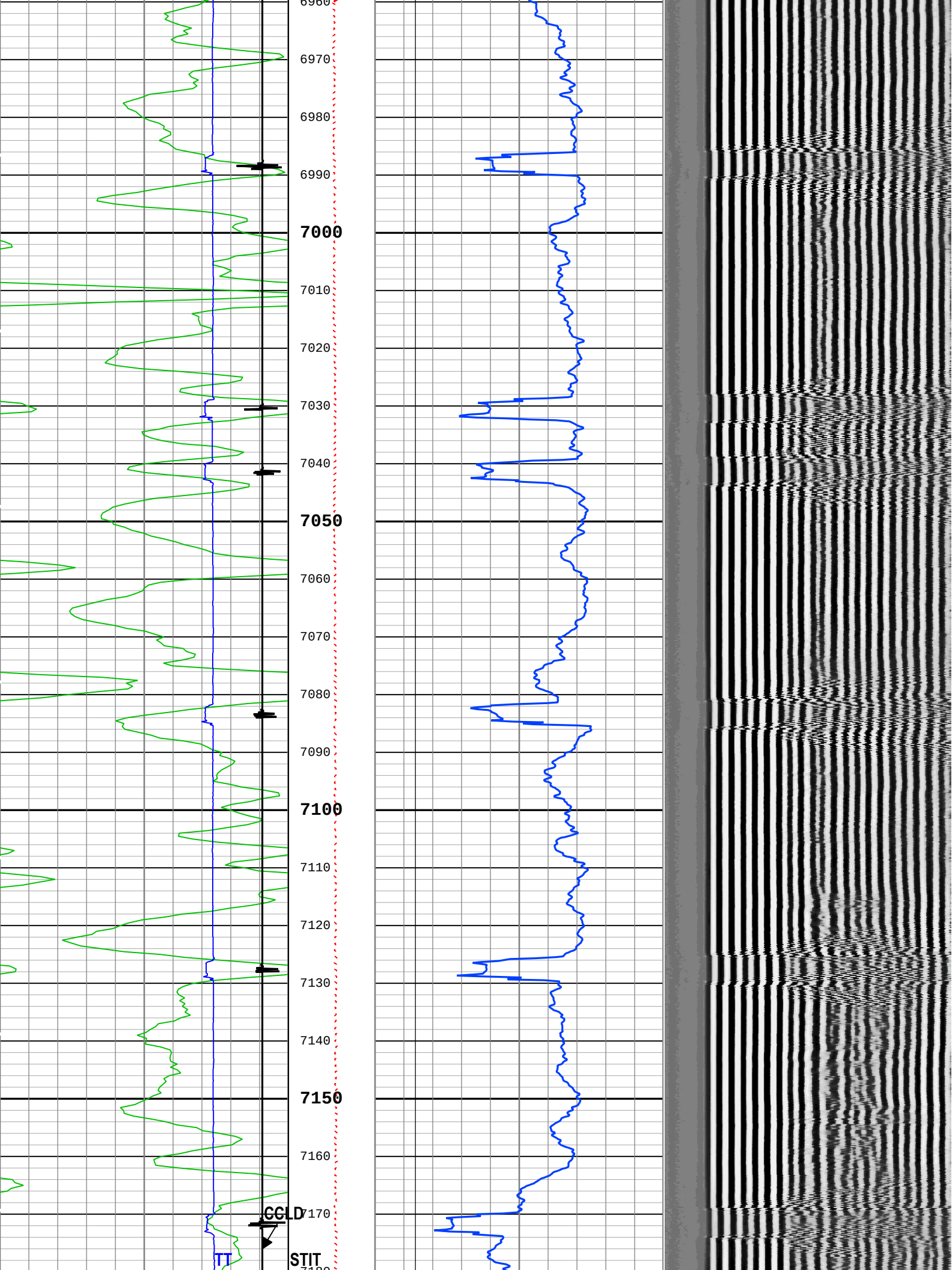
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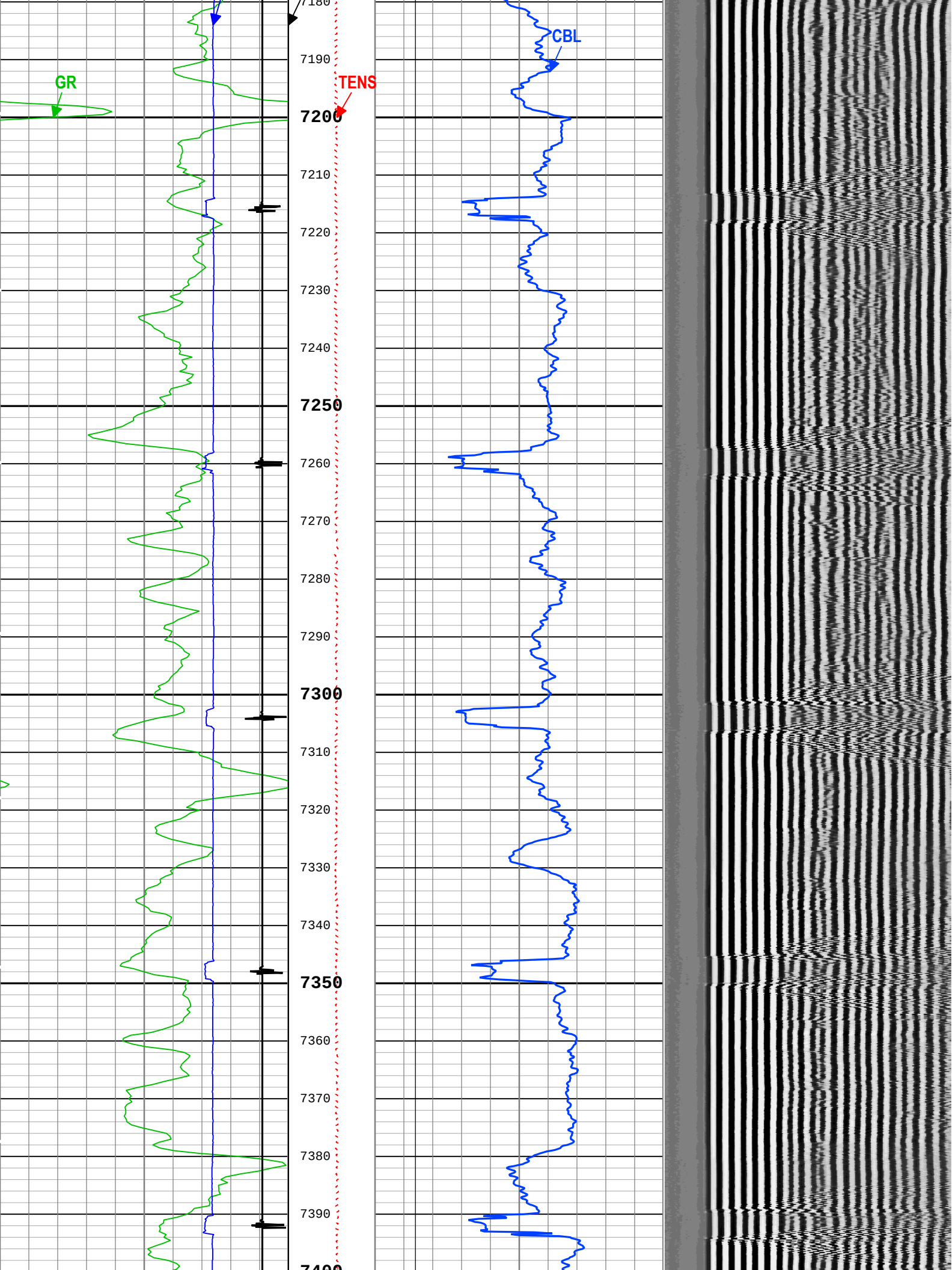
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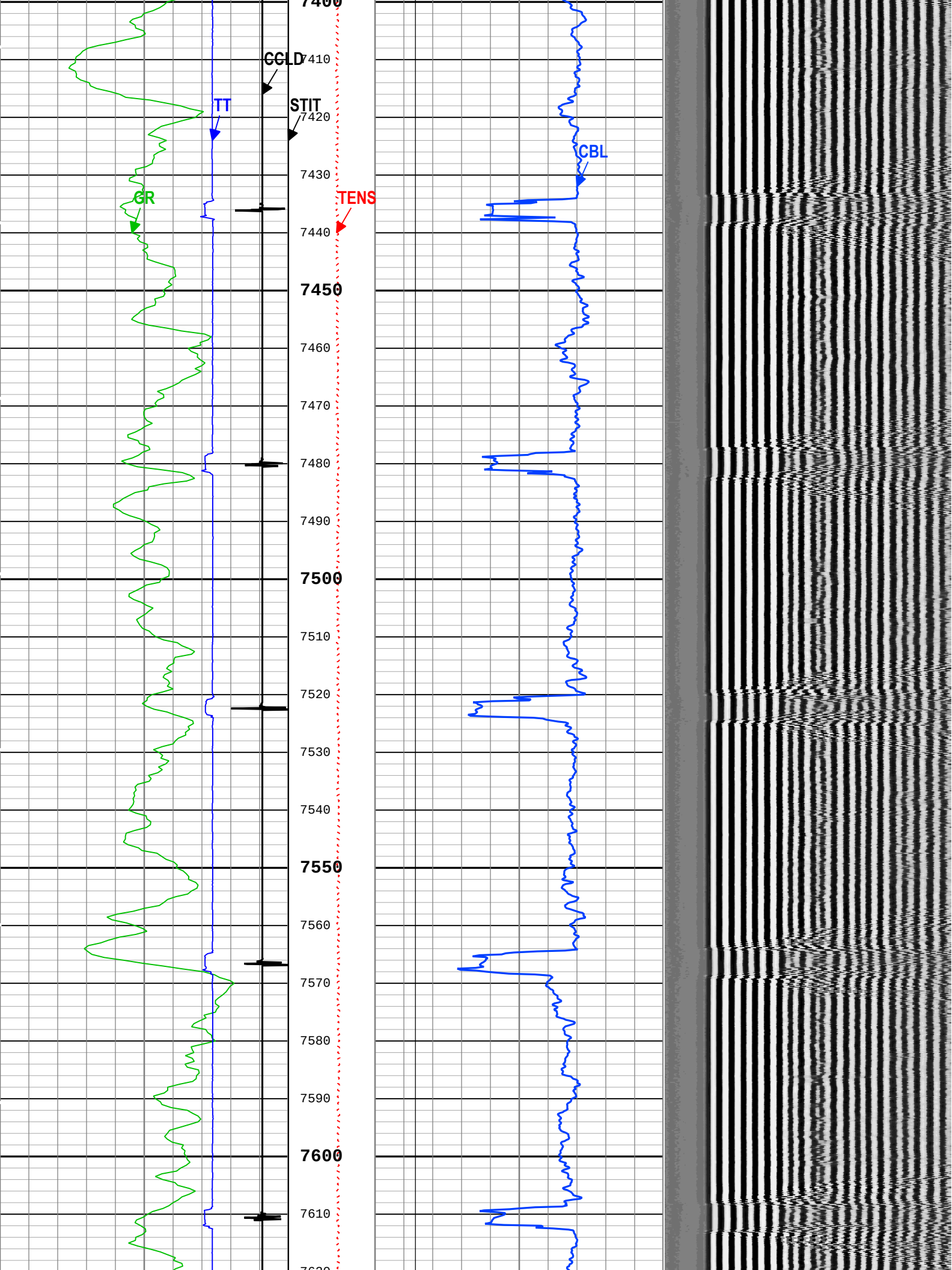
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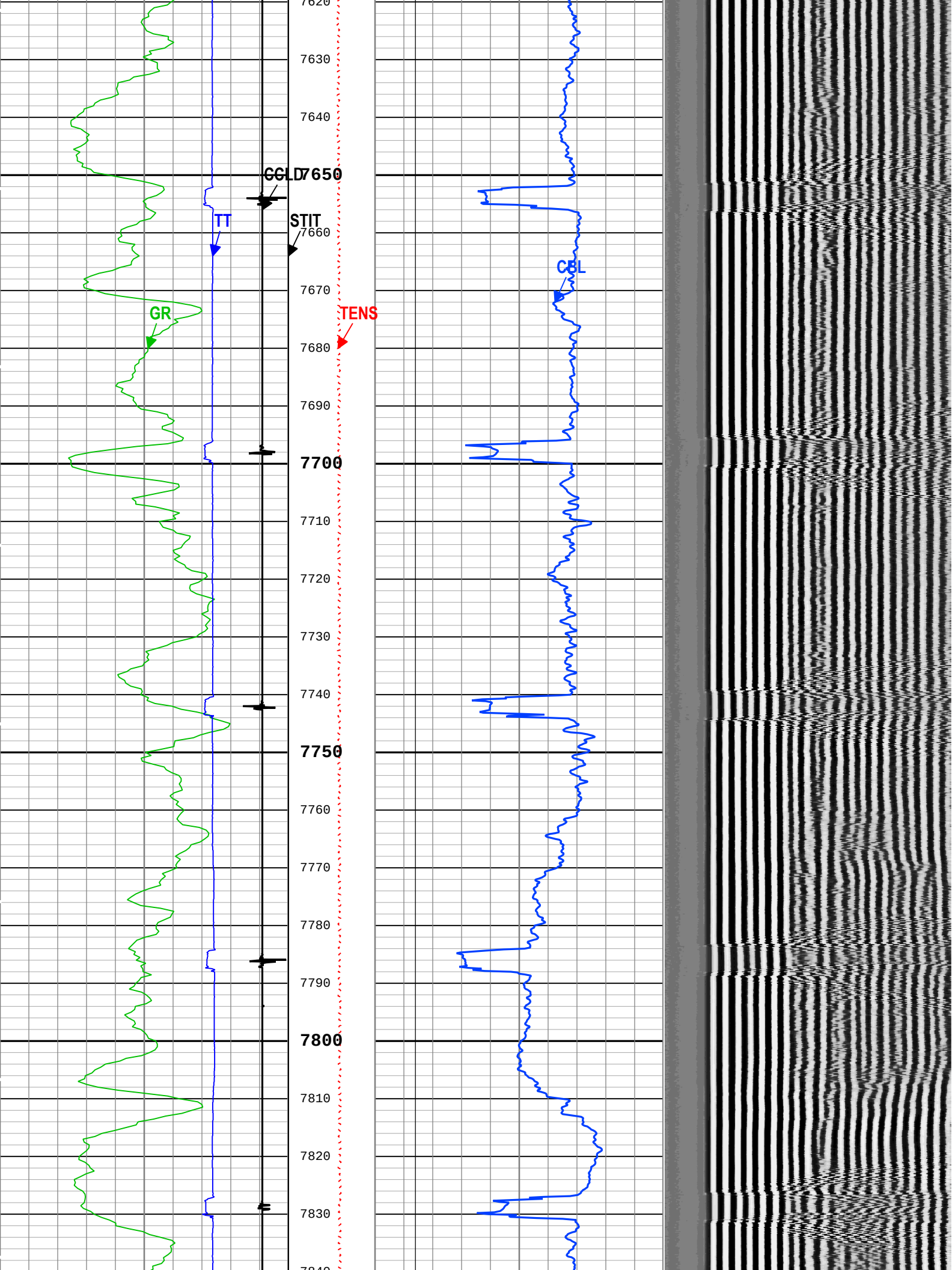
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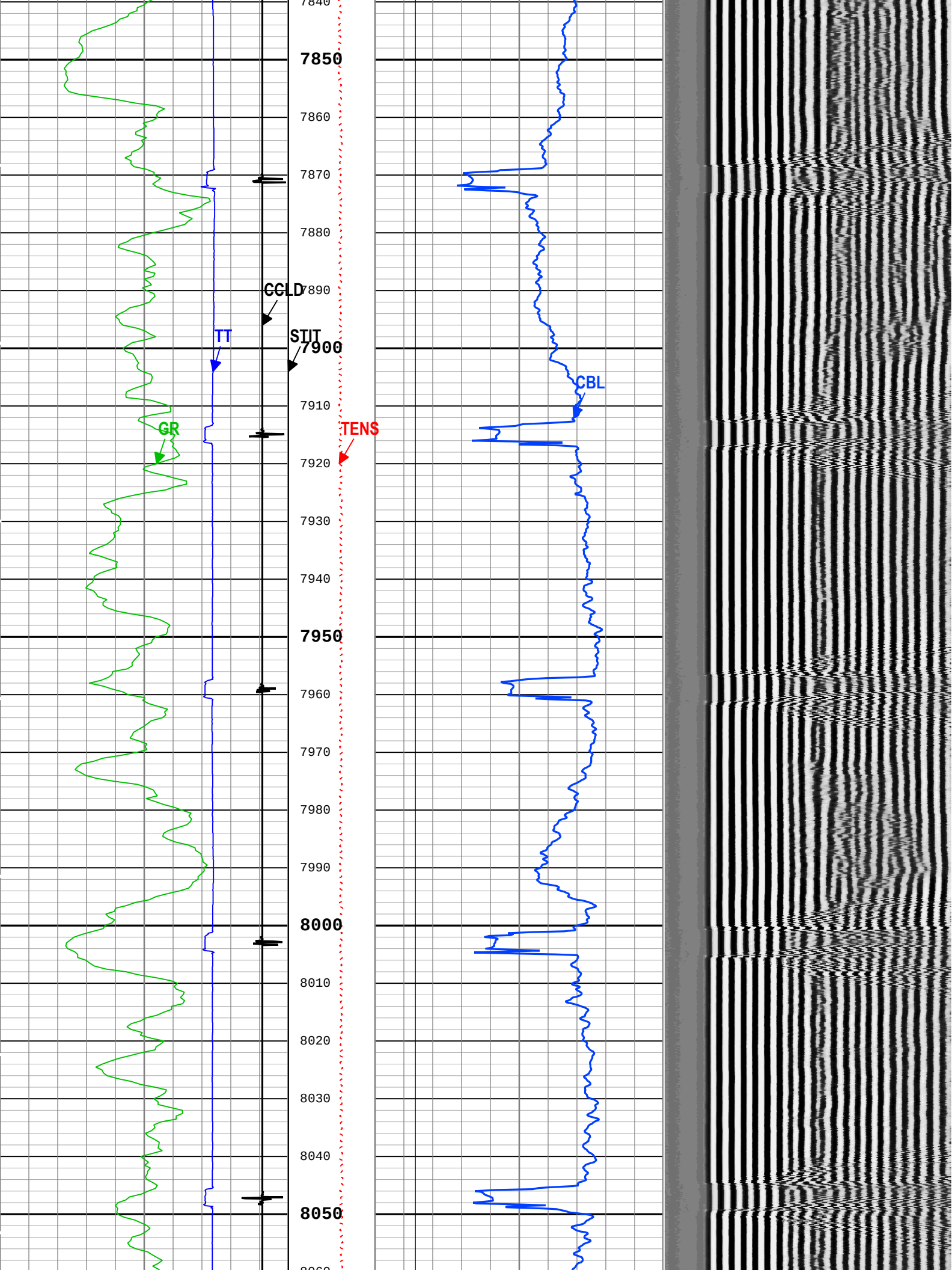
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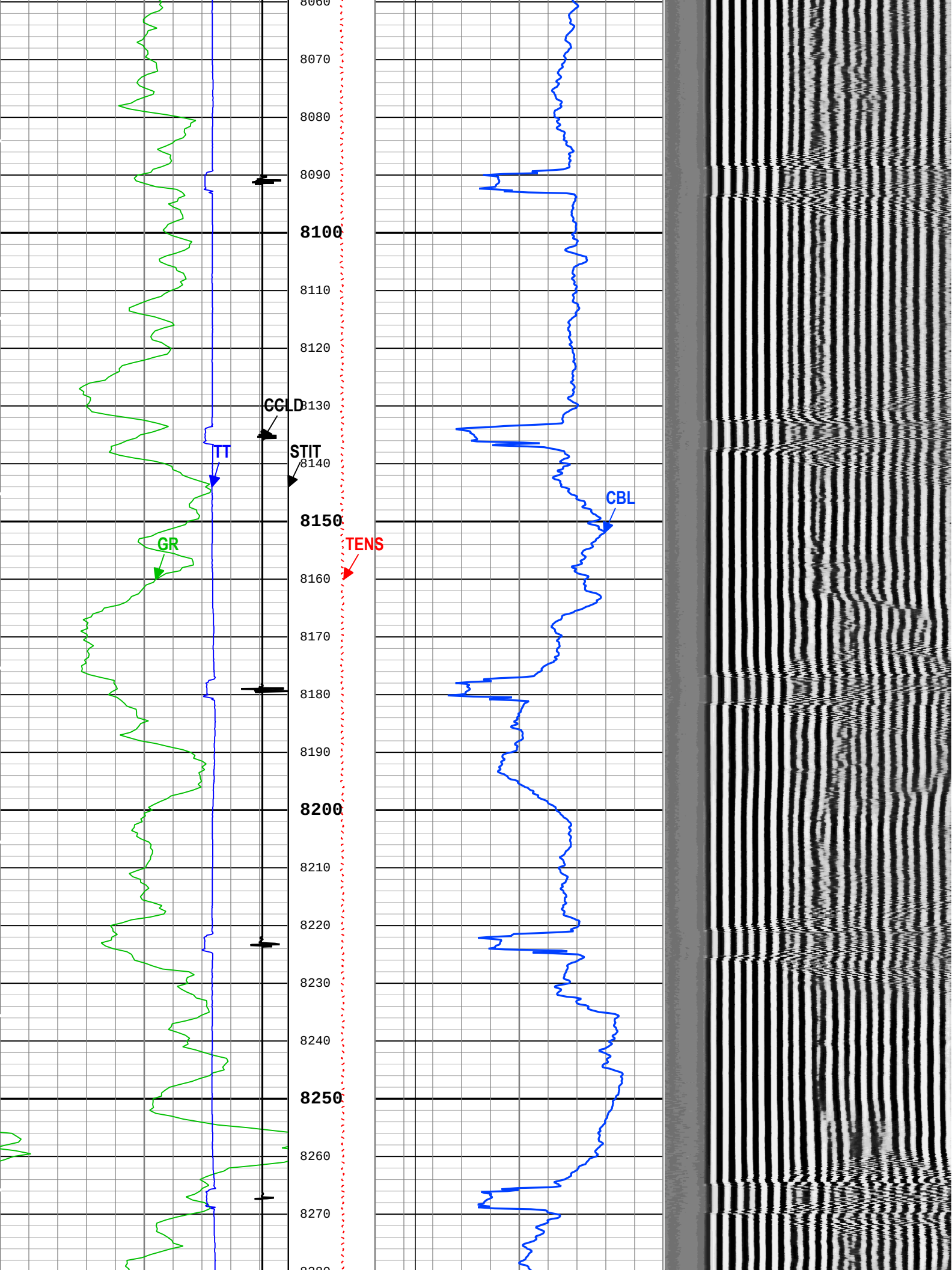
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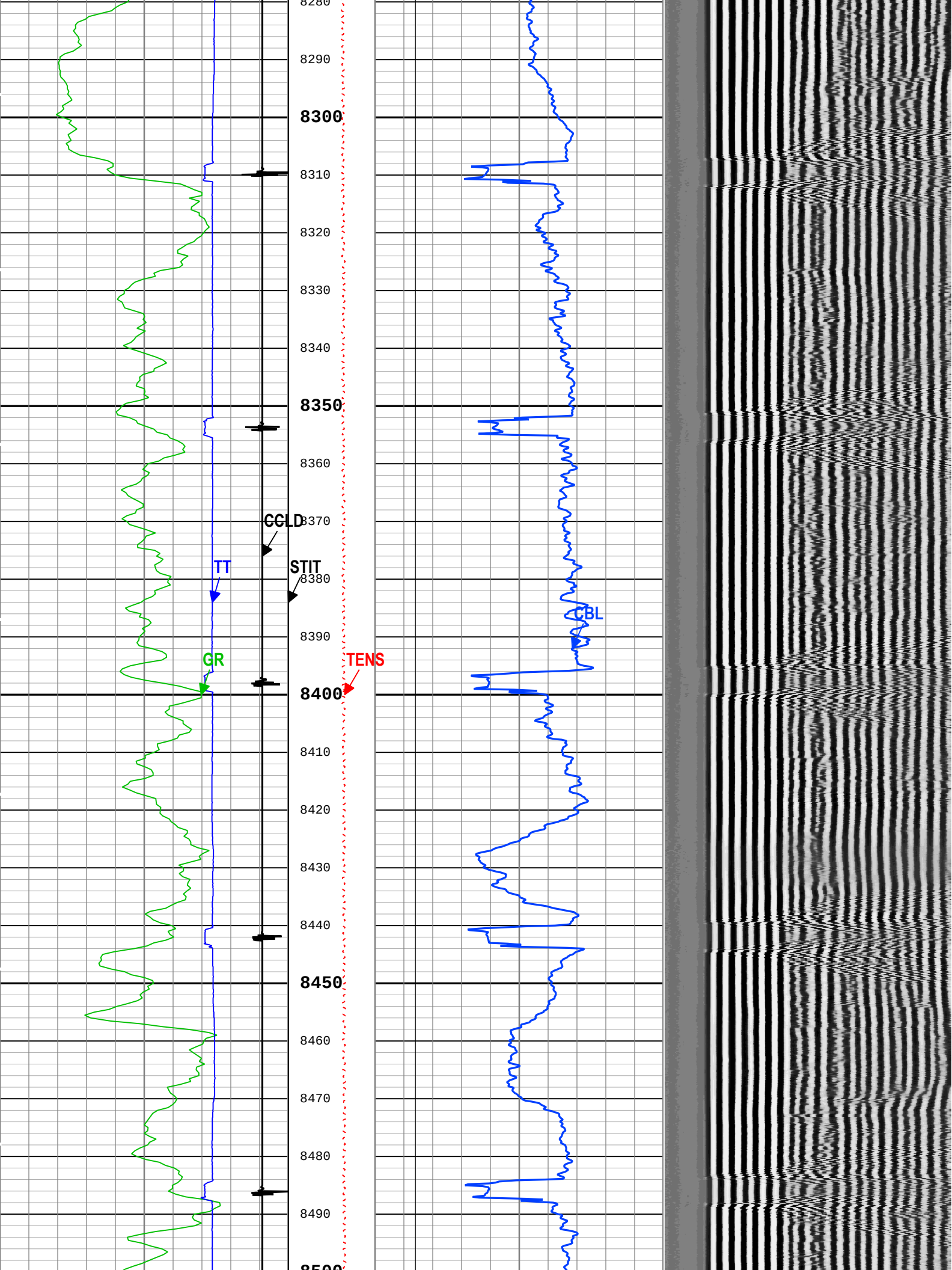
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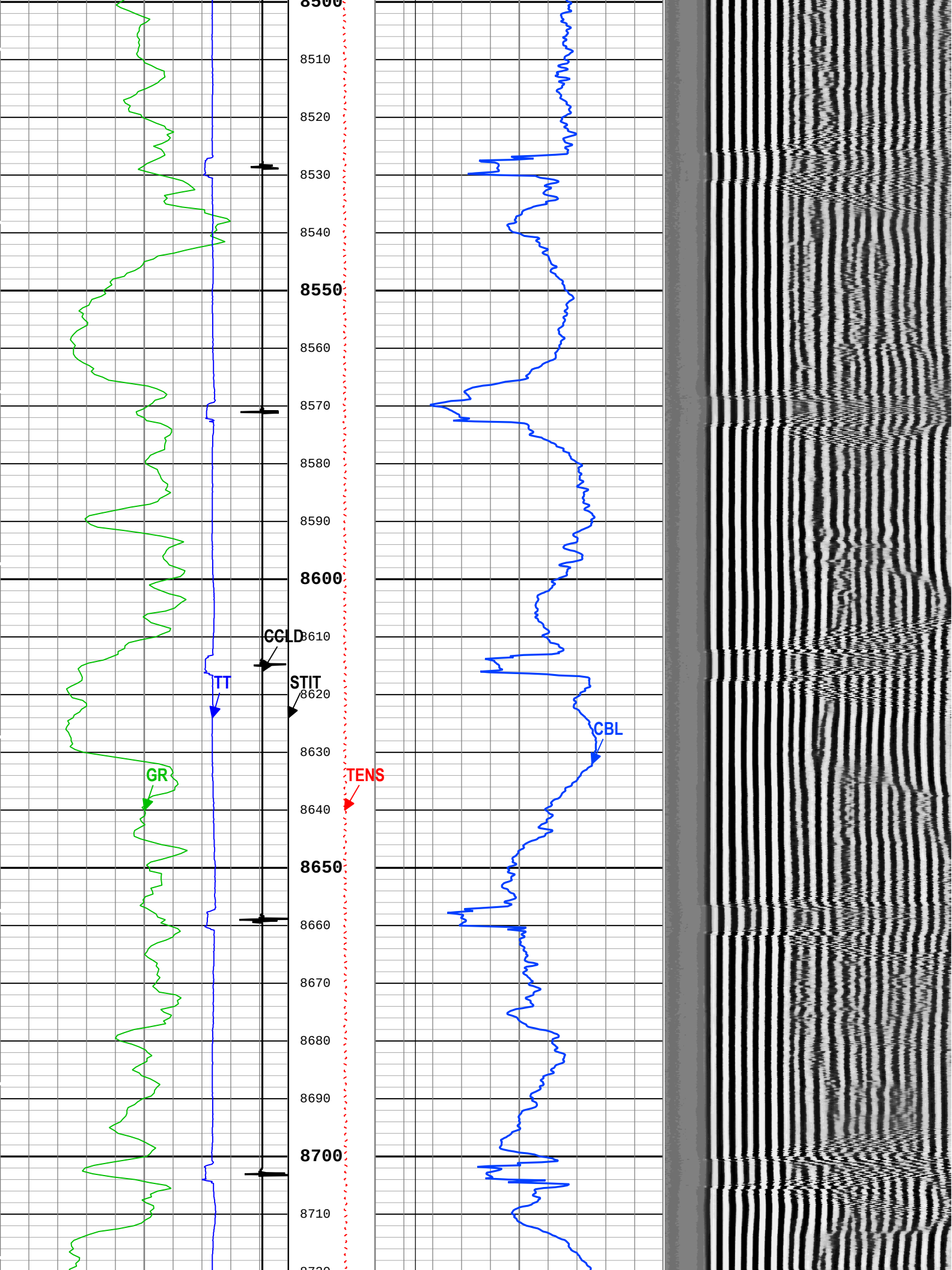
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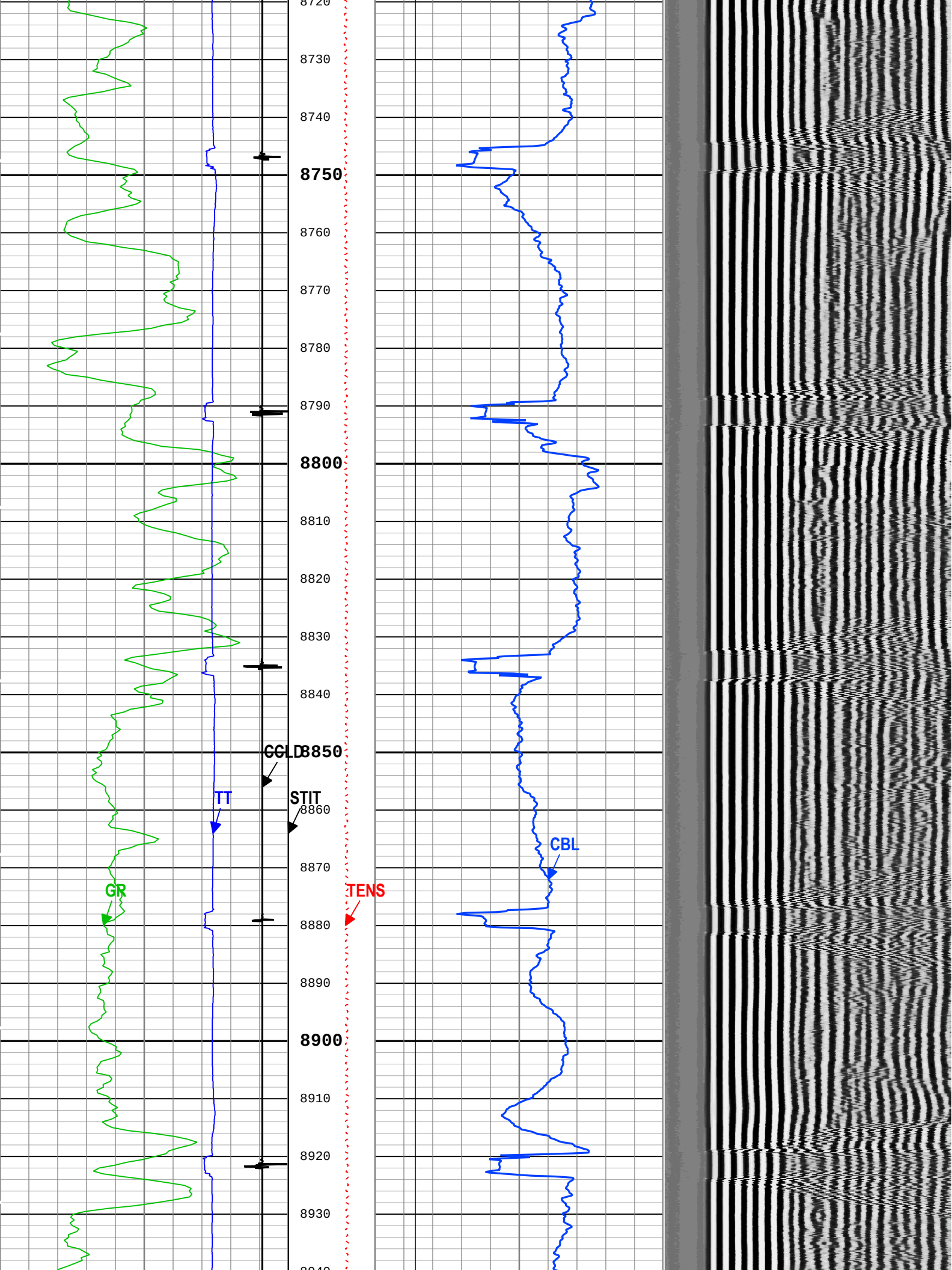
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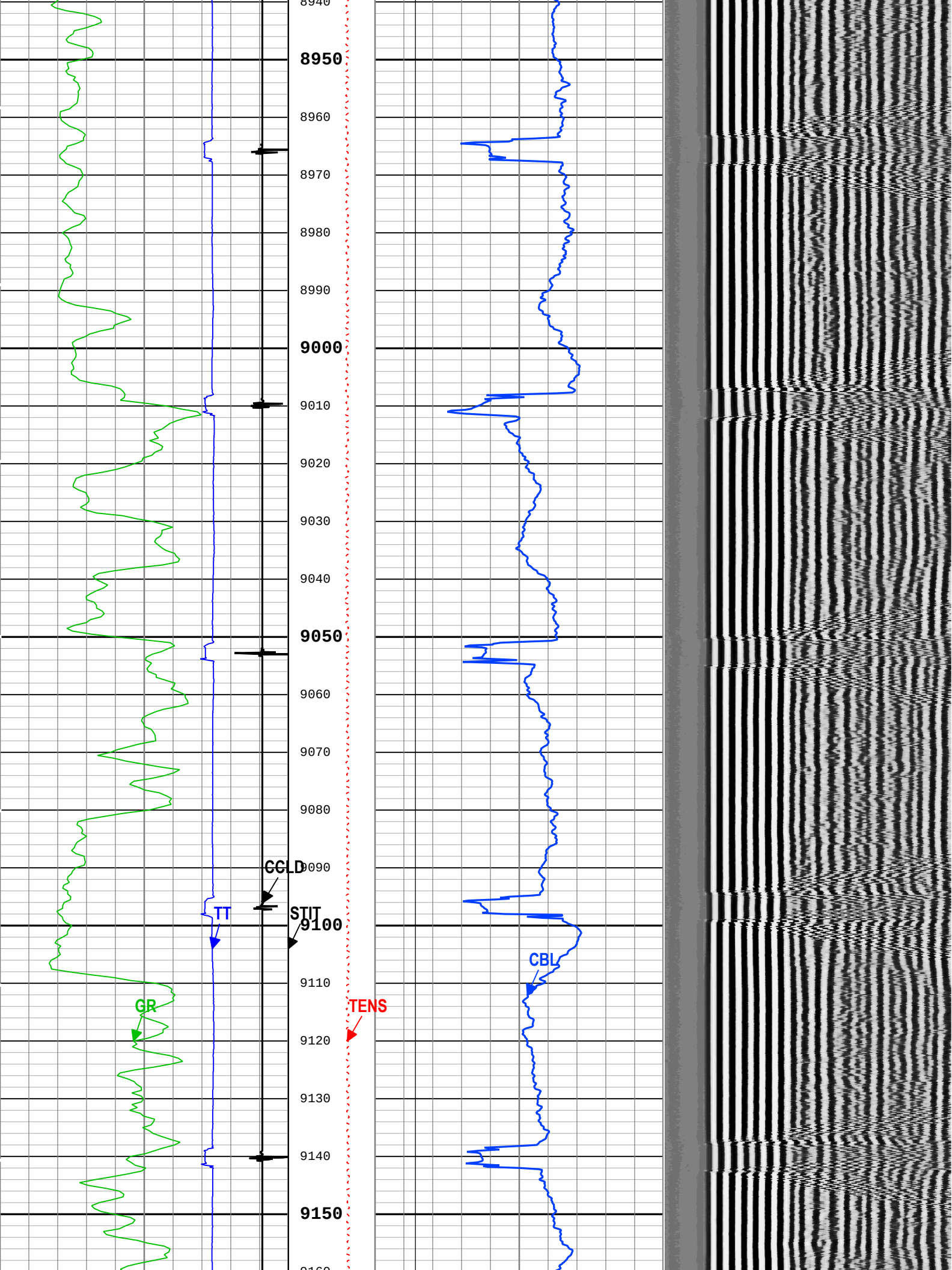
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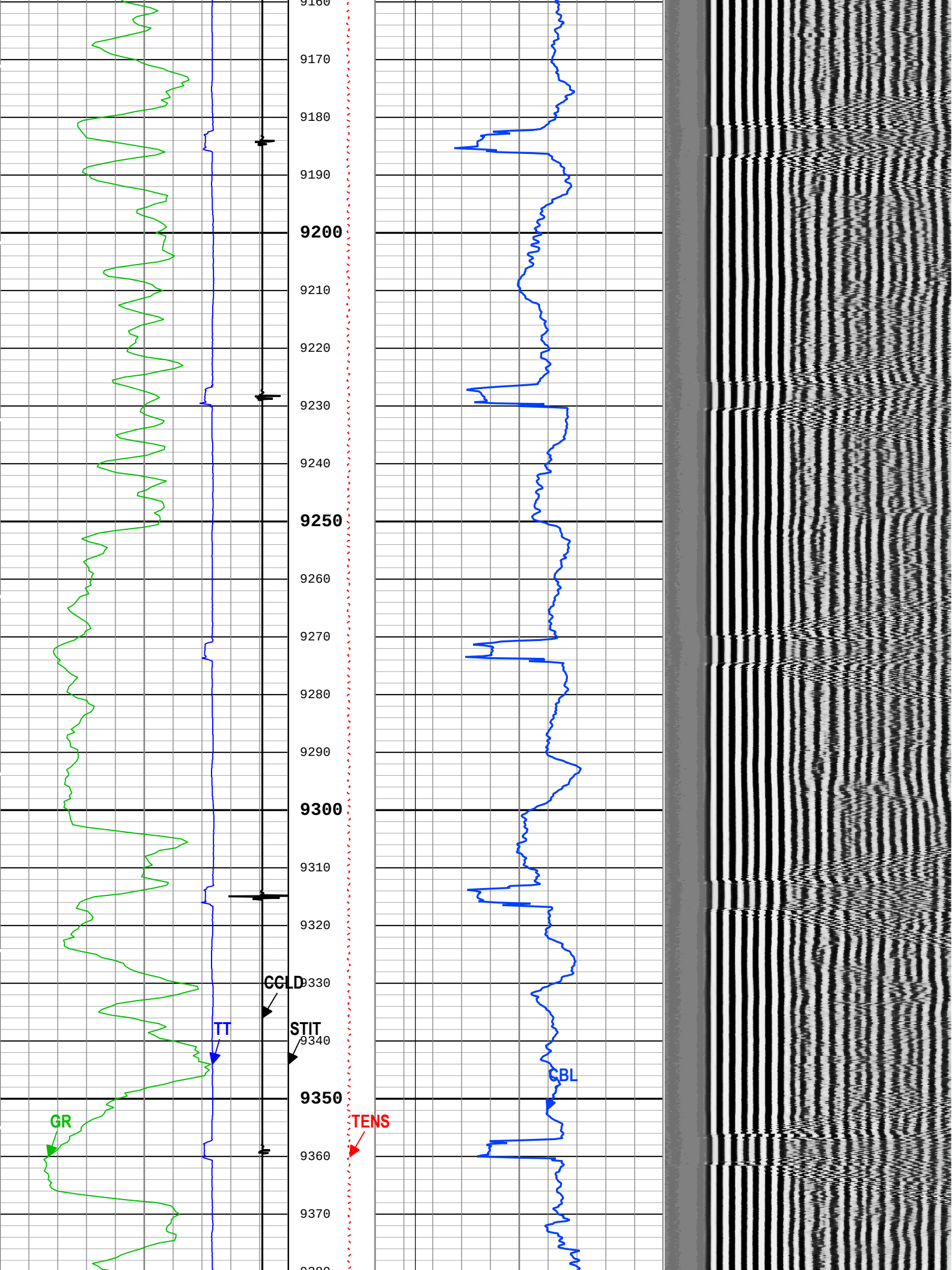
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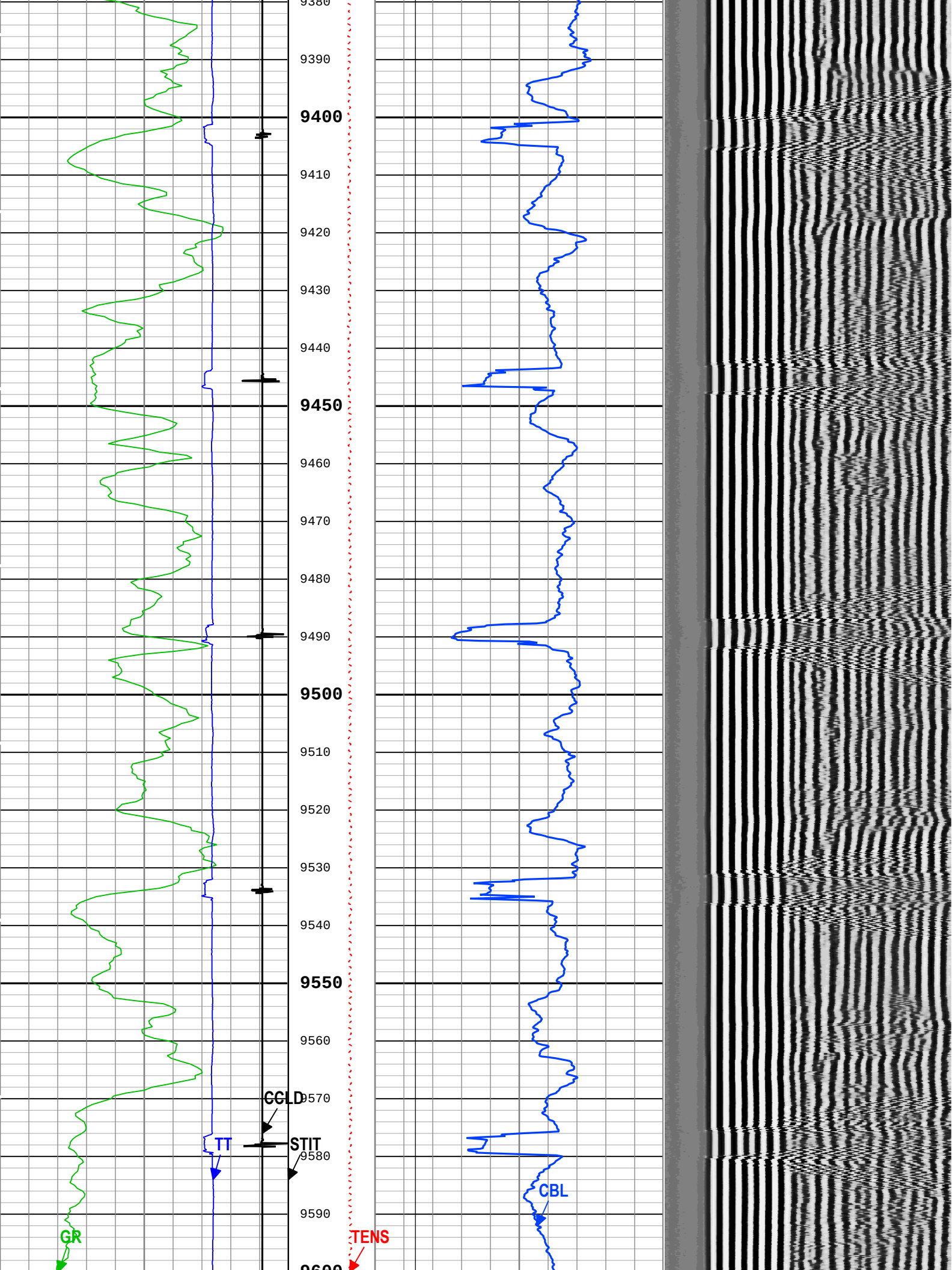
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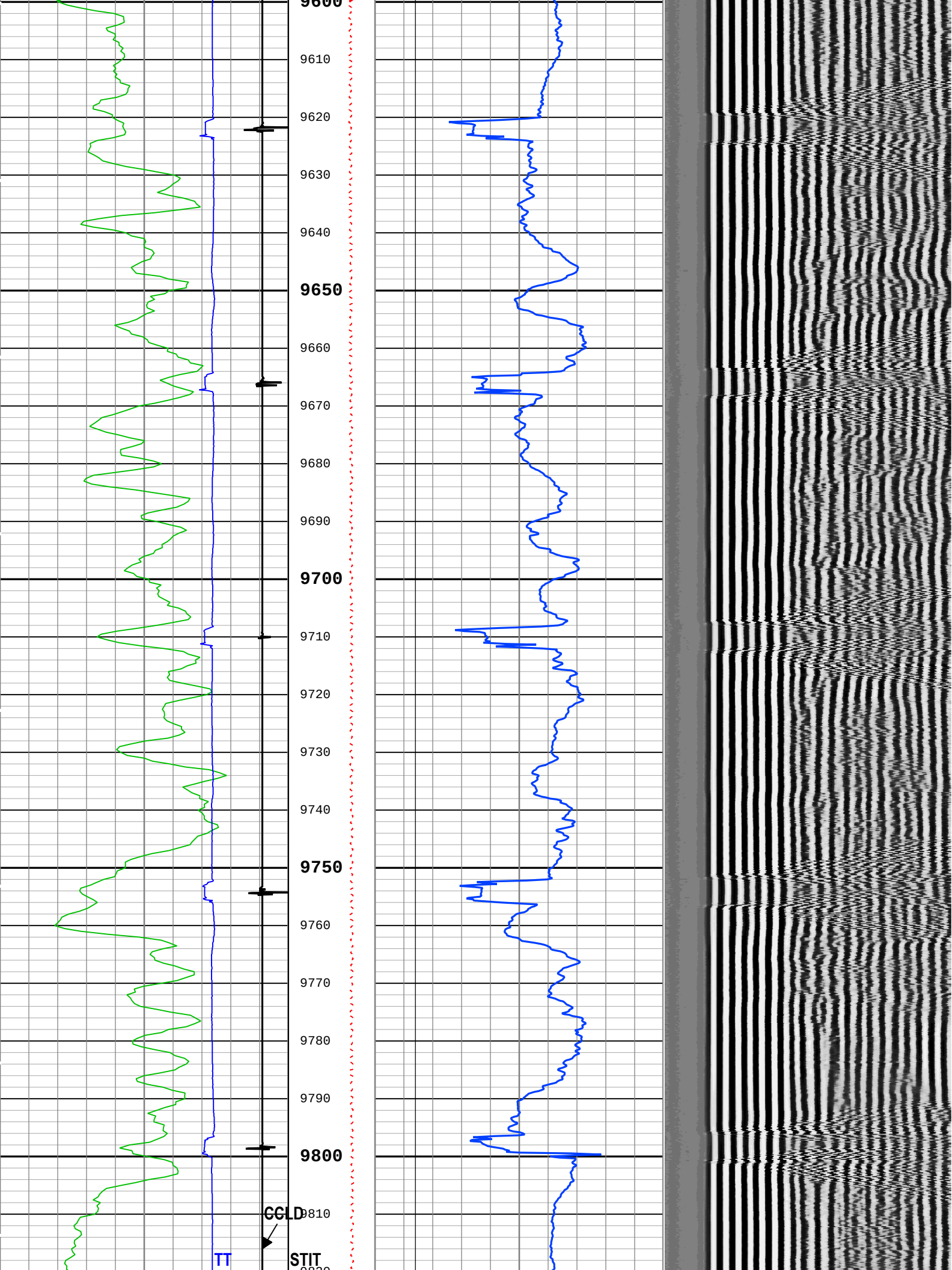
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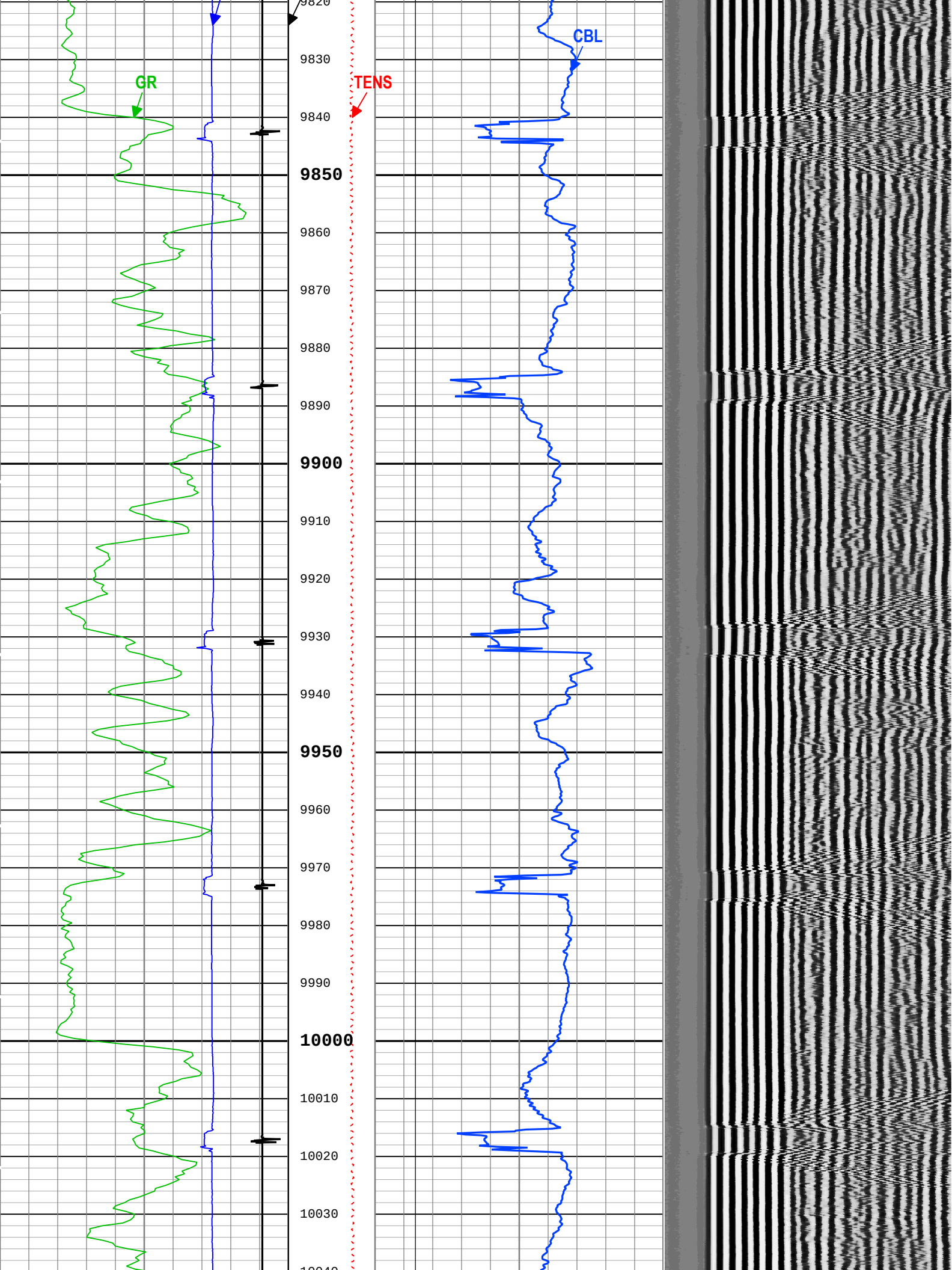
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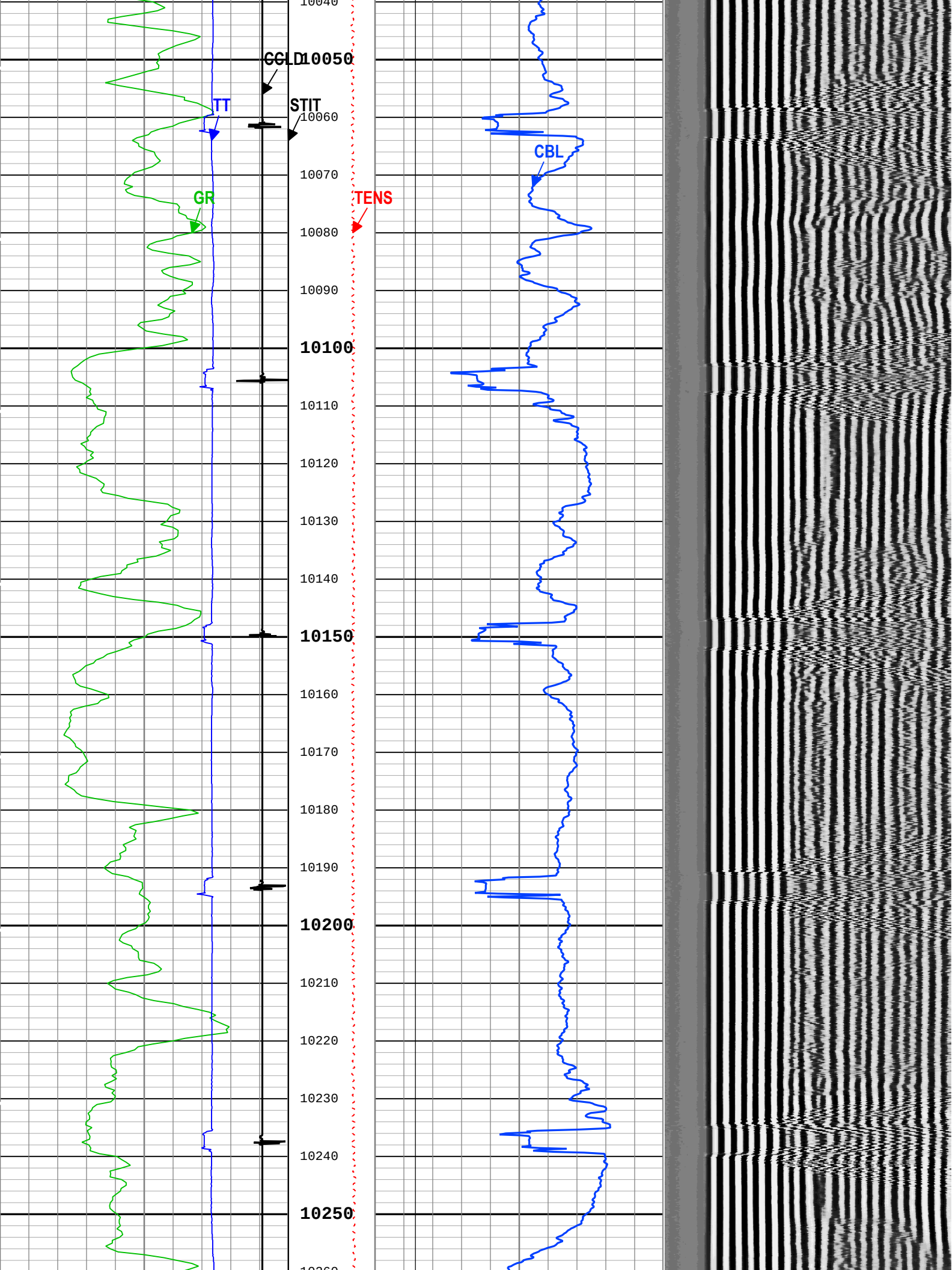
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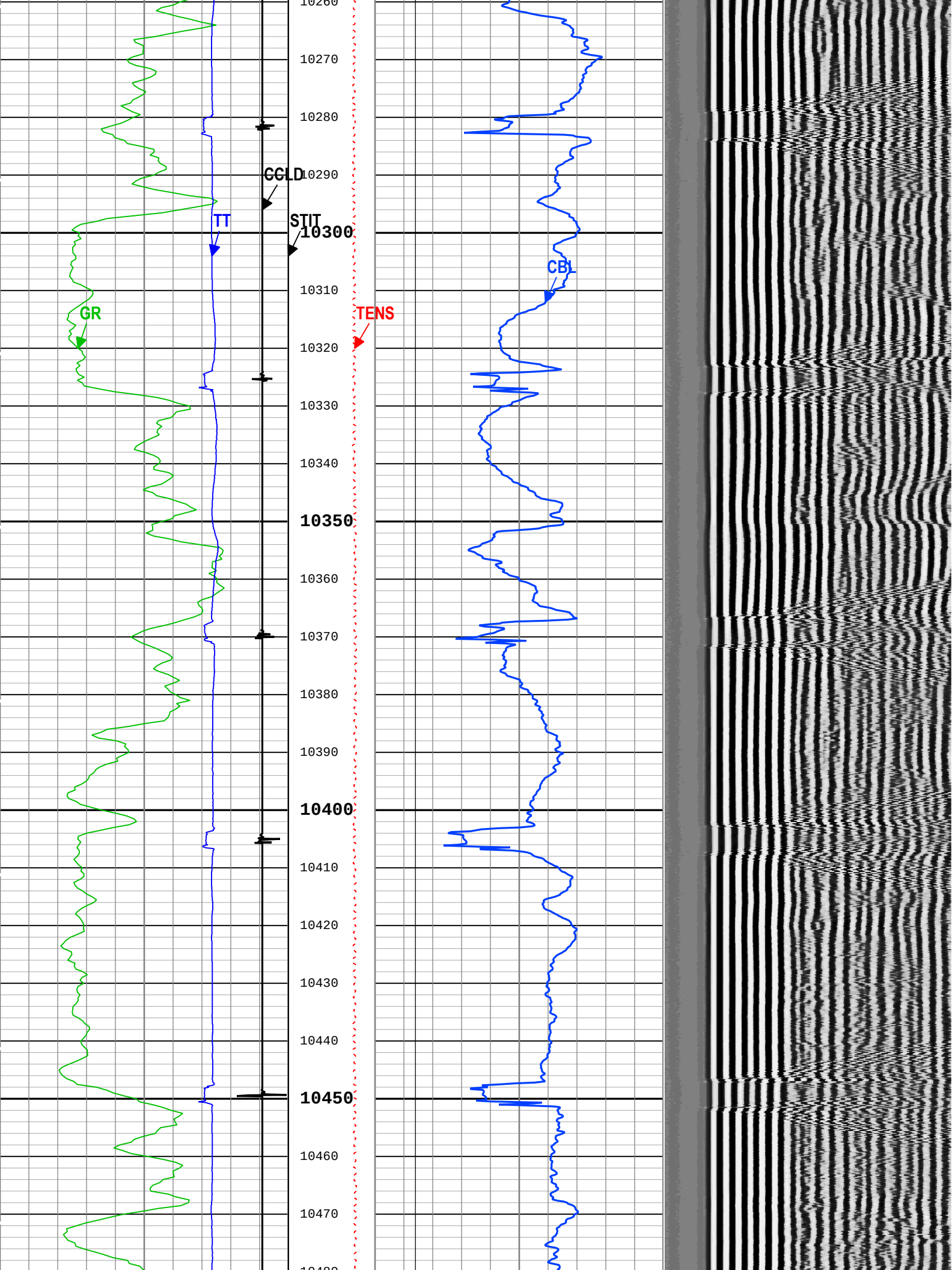
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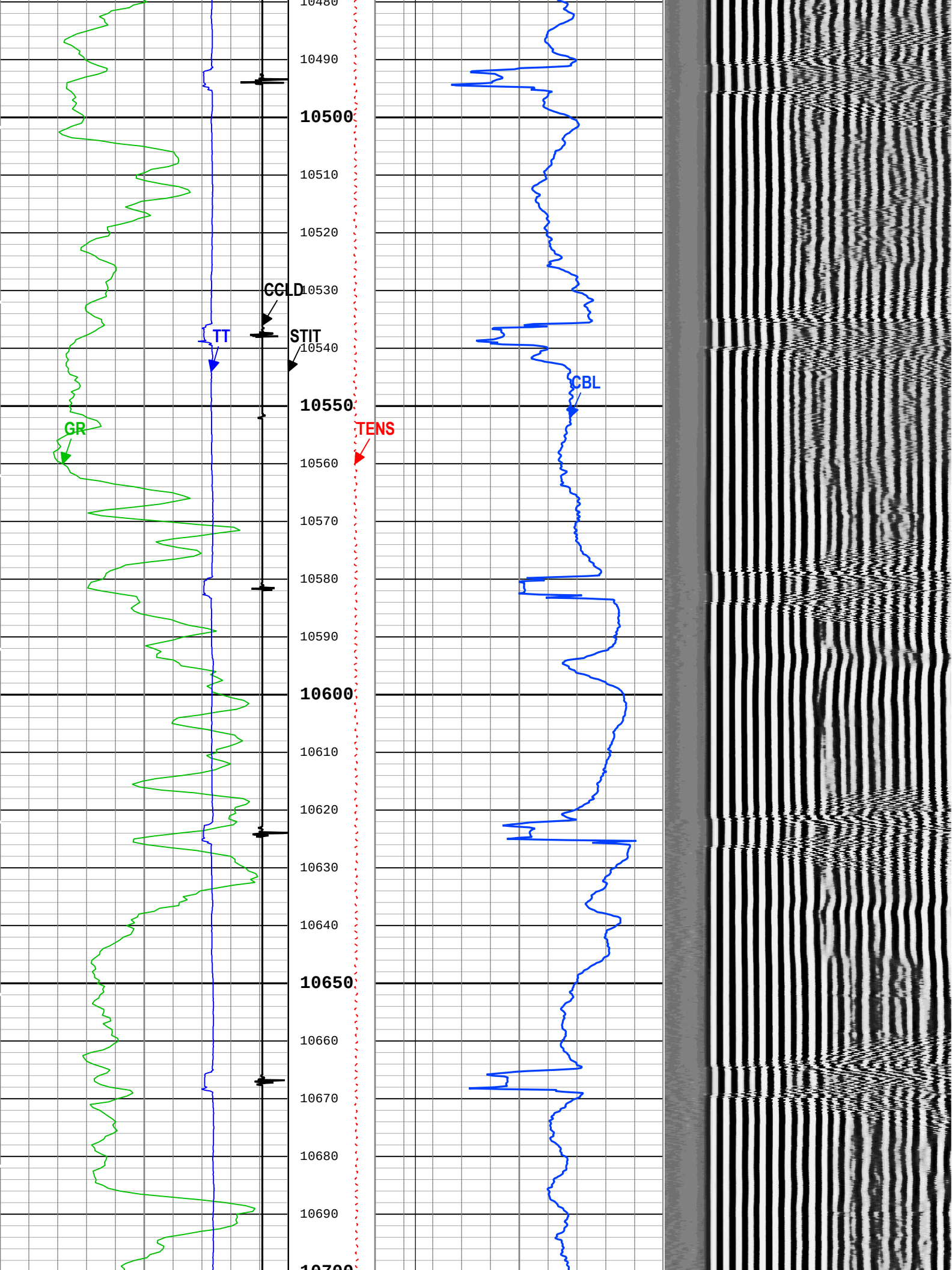
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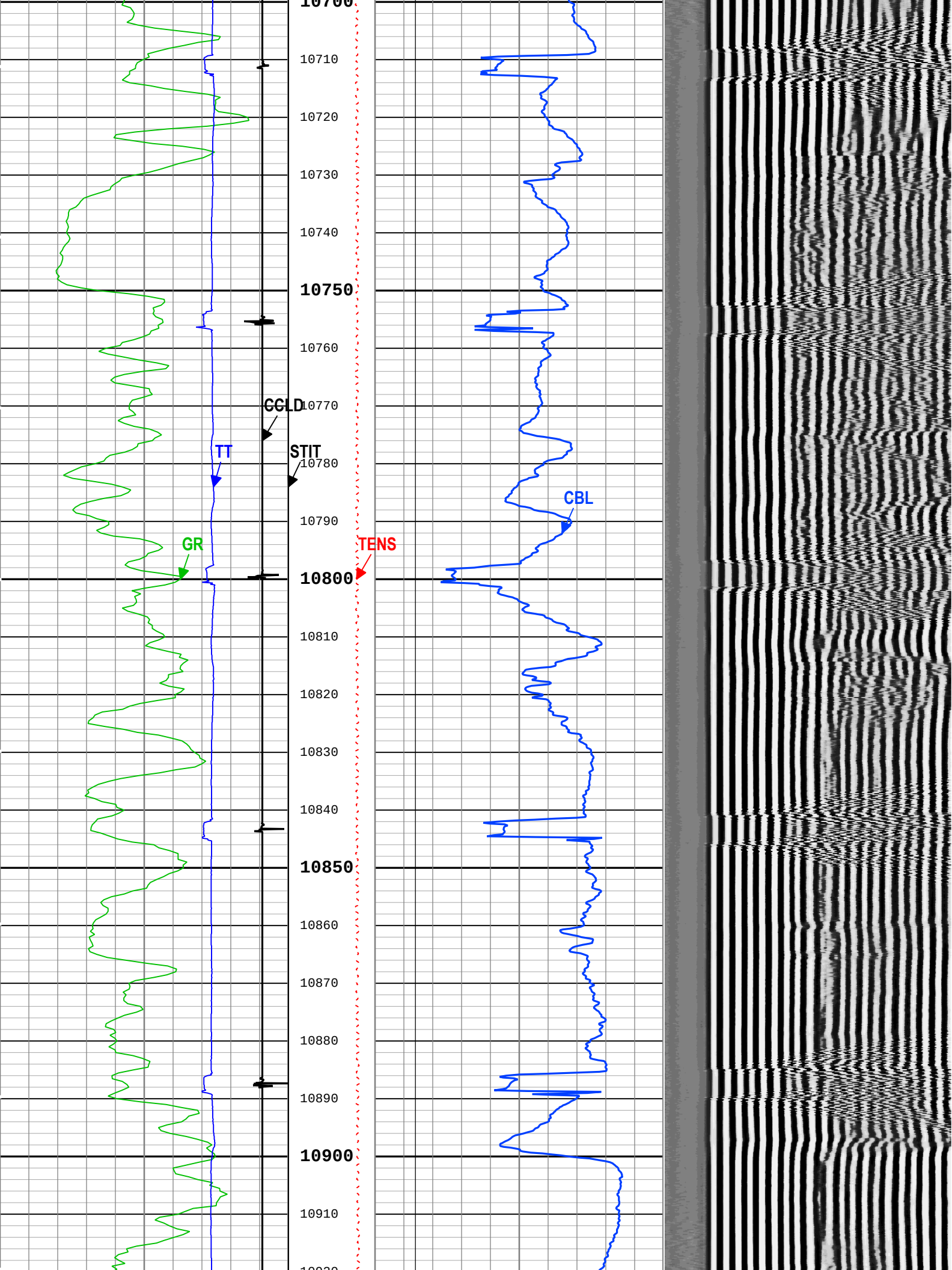
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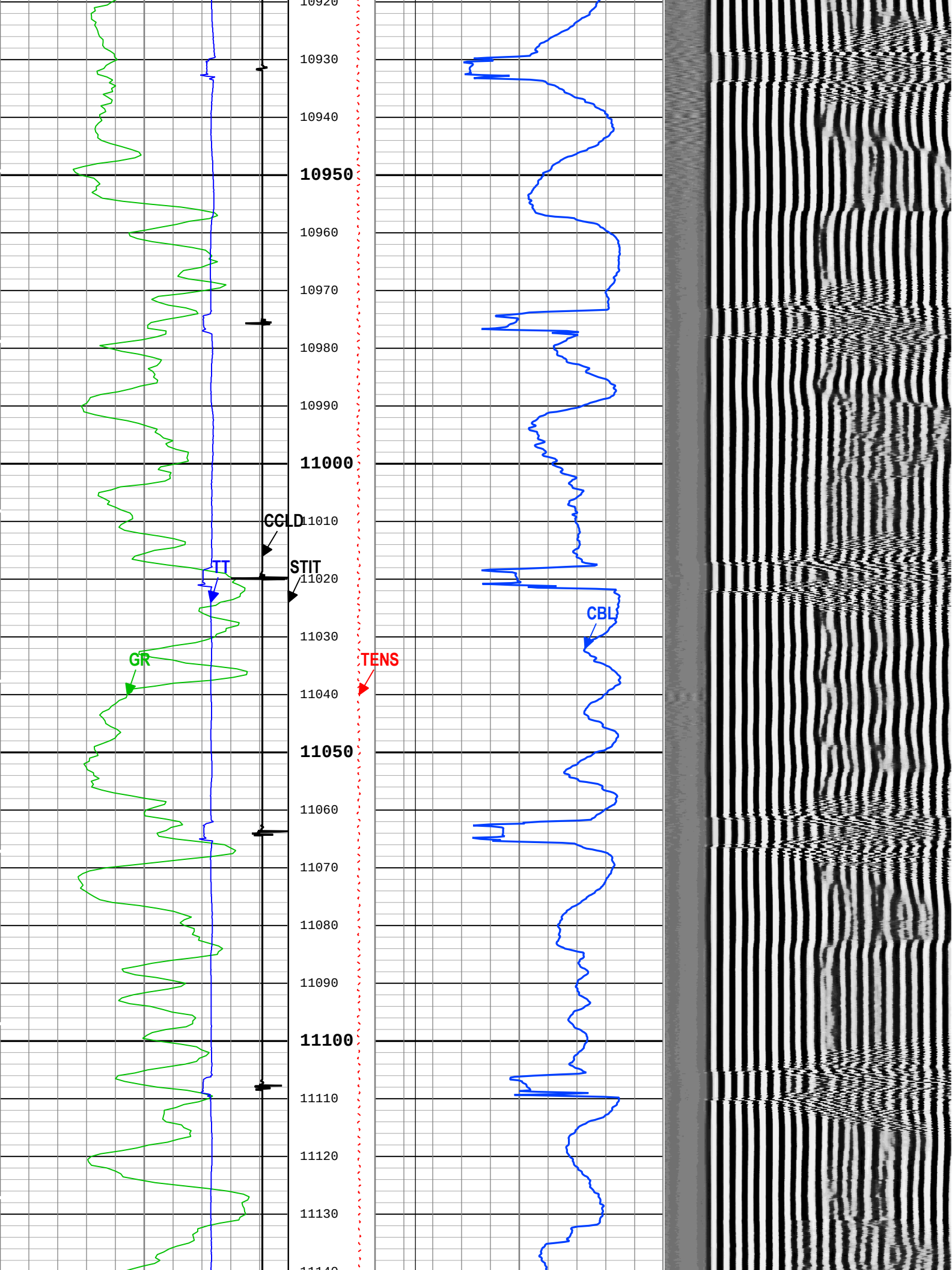
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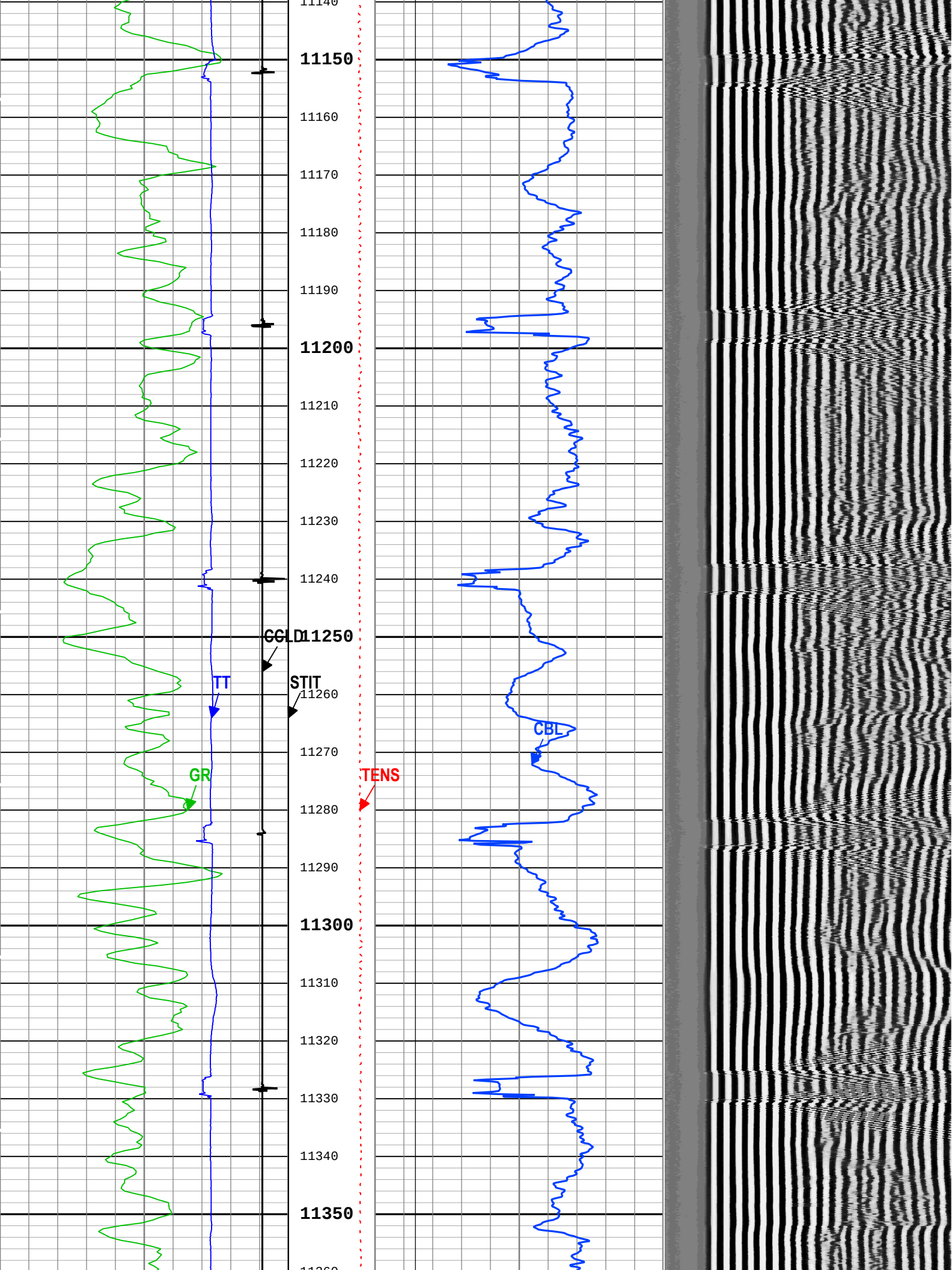
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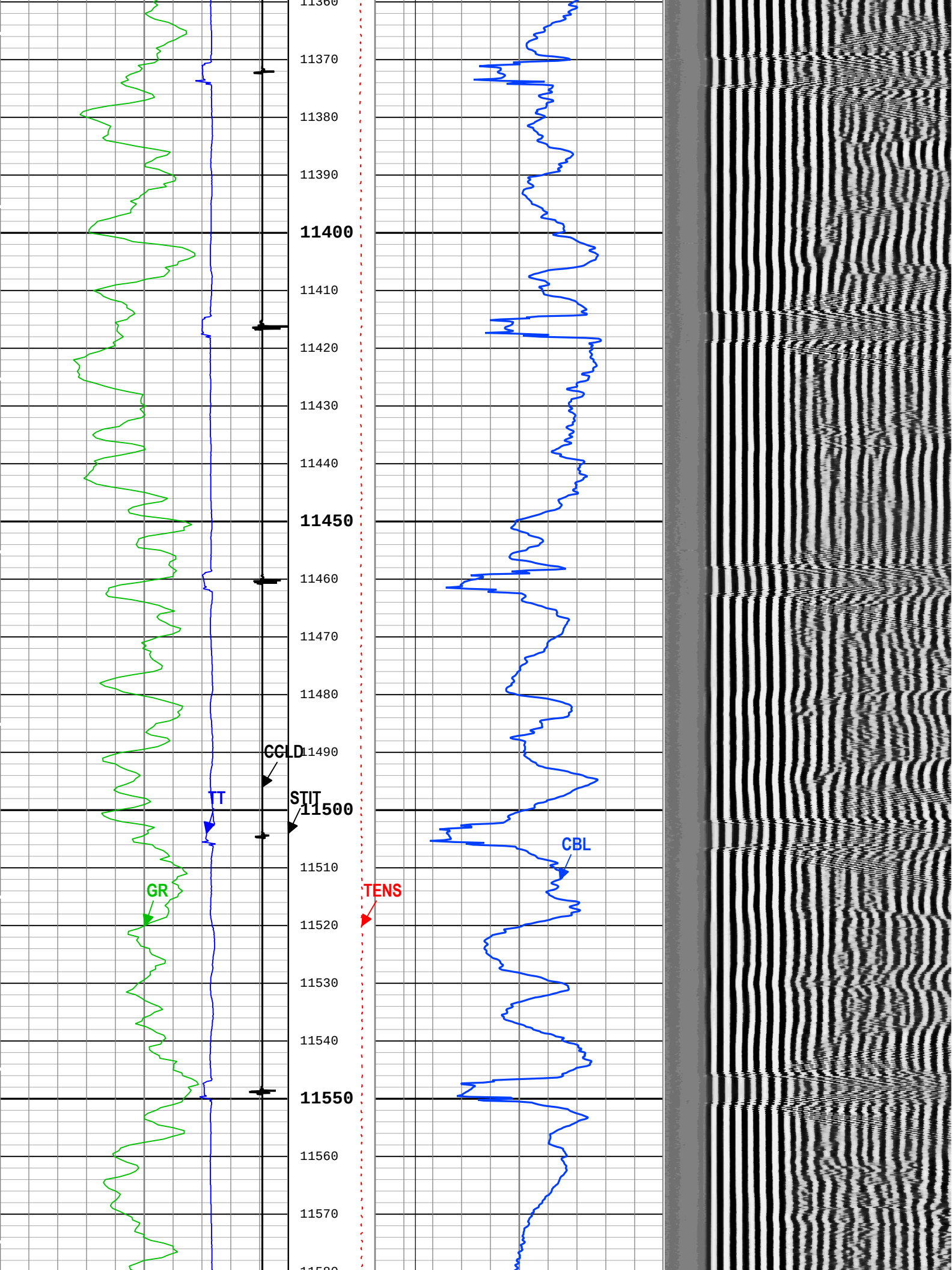
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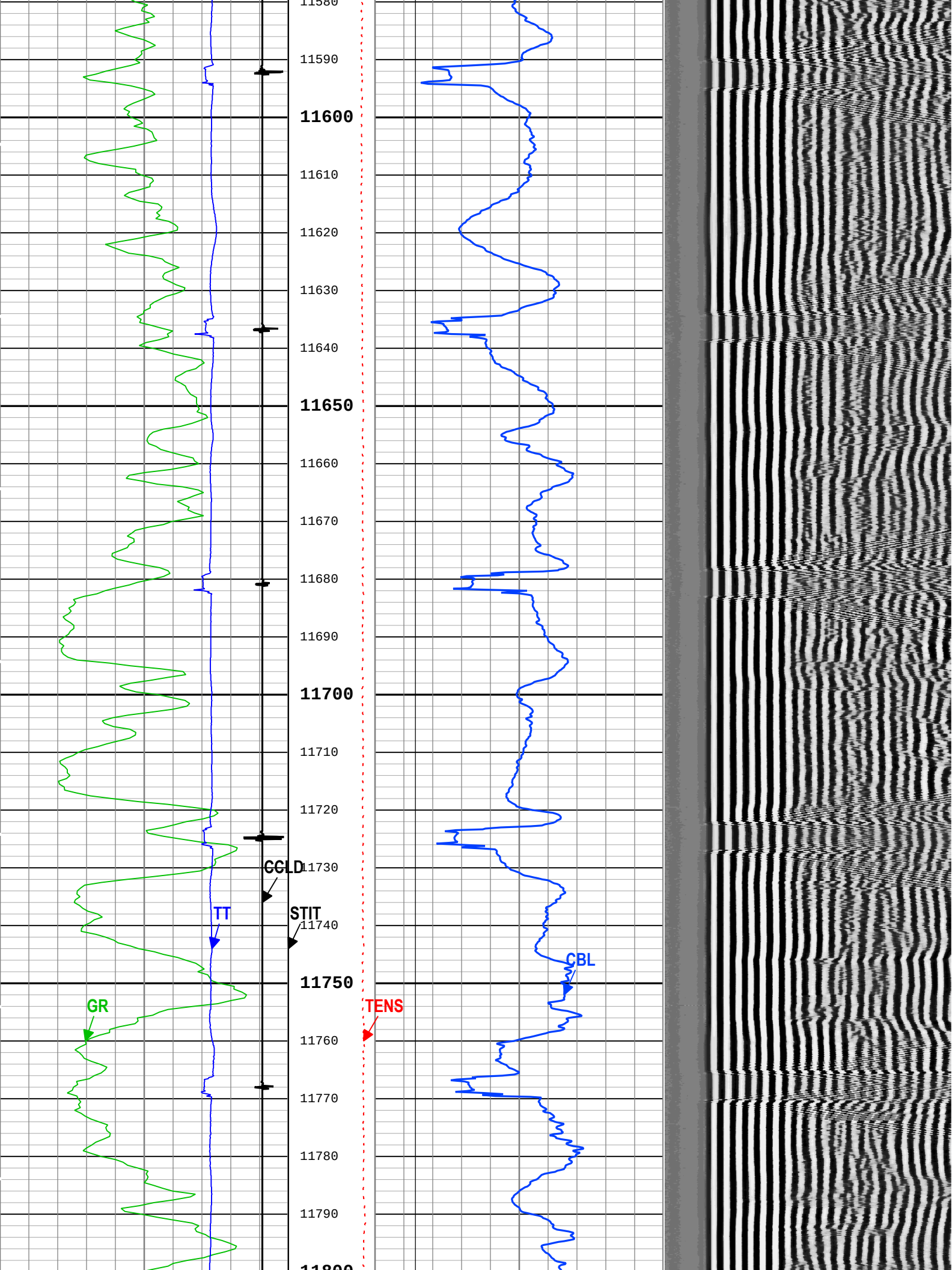
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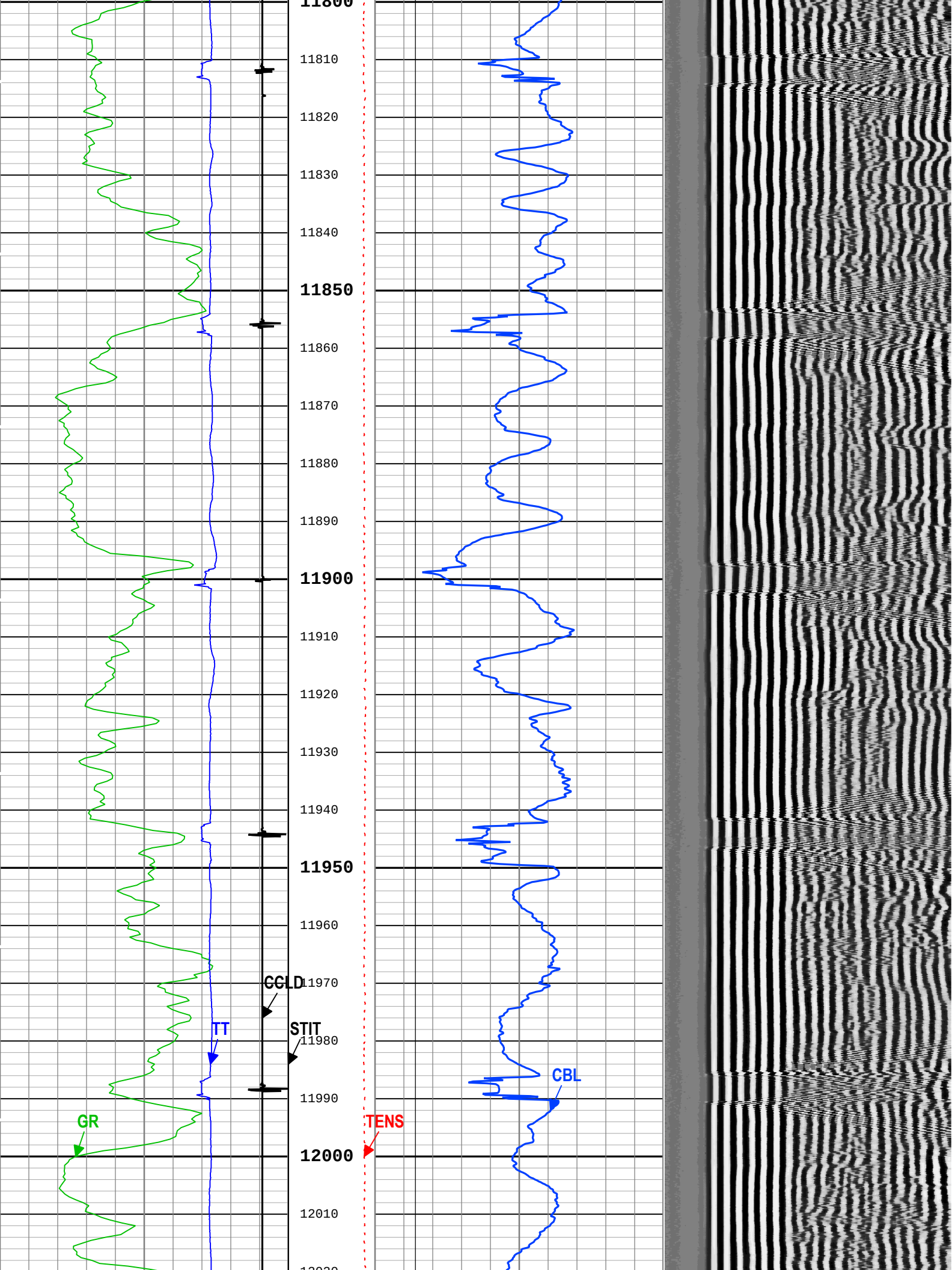
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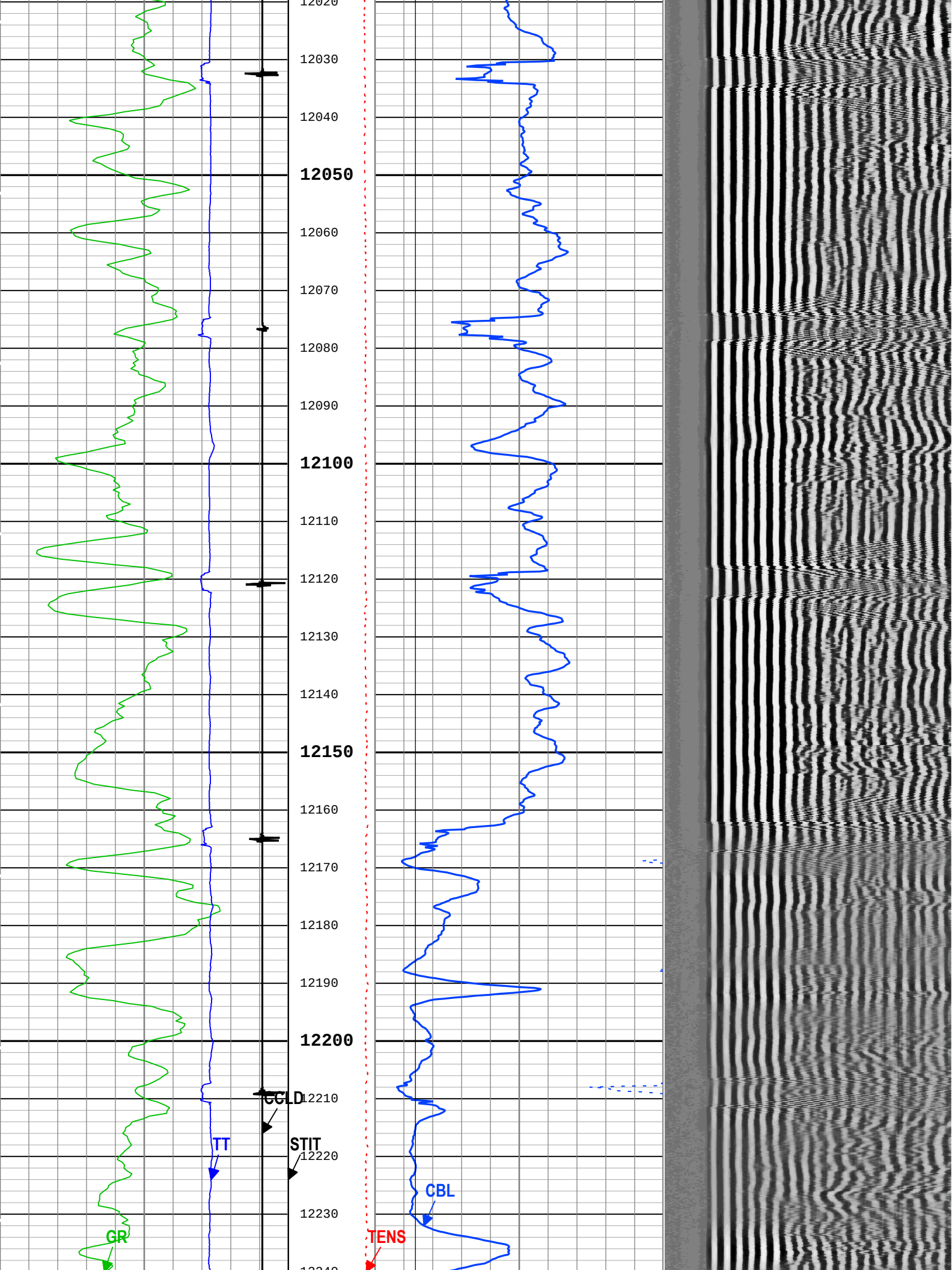
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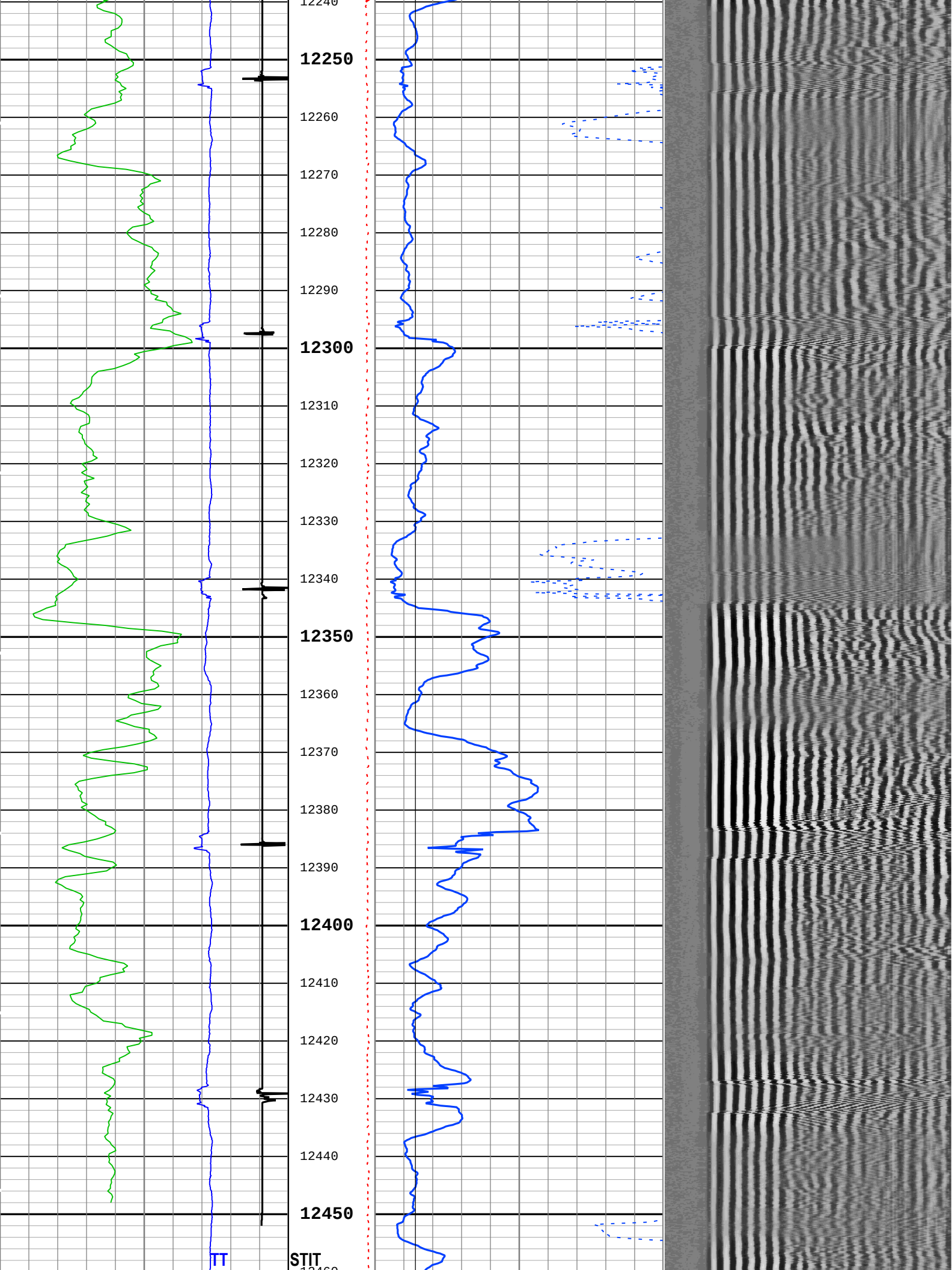
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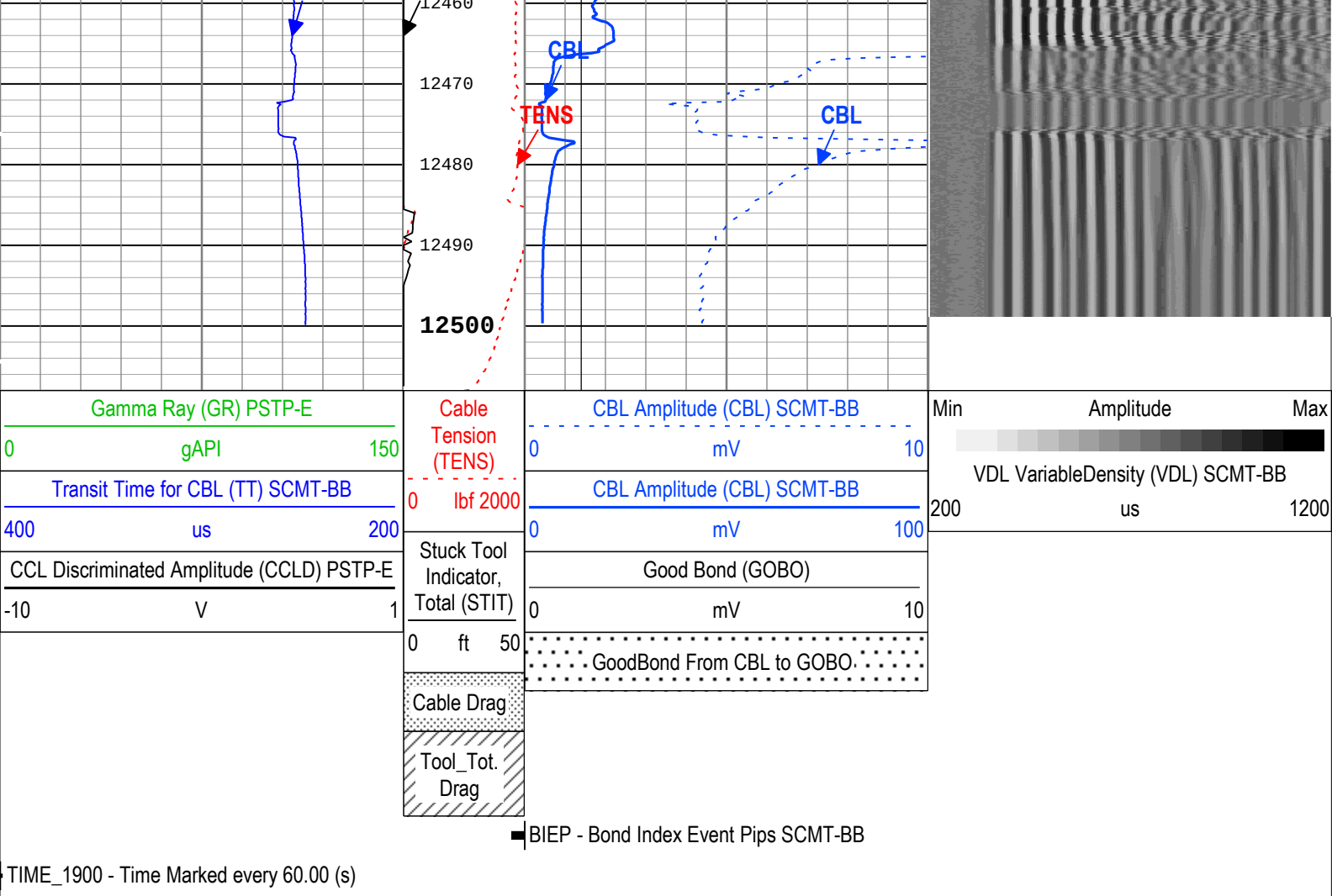


TIME_1900 - Time Marked every 60.00 (s)

Description: Sonic CBL with VDL Format: Log (Sonic CBL with VDL) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 19-Feb-2019 13:16:09

Channel Processing Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
BHT	Bottom Hole Temperature	Borehole	280	degF
CB3G	SCMT CBL 3 ft Peak Detection T0_Delay and Noise Gate	SCMT-BB	224	us
CBLG	CBL Gate Width	SCMT-BB	40	us
CBRA	CBL LQC Reference Amplitude in Free Pipe	SCMT-BB	80	mV
THNO	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.25	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	8.34	lbm/gal
DFT_CATEGORY	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	8323.5	ft
GGRD	Geothermal Gradient	Borehole	1	0.01 degF/ft
GOBO_CURR	Good Bond in Arbitrary Cement	SCMT-BB	1.4	mV
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	GTEM_LINEST(RT)	
MATT_CURR	Maximum Attenuation in Arbitrary Cement	SCMT-BB	16.92	dB/ft
MCI	Minimum Cemented Interval for Isolation	SCMT-BB	Depth Zoned	ft
MSA	Minimum Sonic Amplitude	SCMT-BB	0.51	mV
MSA_CURR	Minimum Sonic Amplitude in Arbitrary Cement	SCMT-BB	0.51	mV
PDAT	Permanent Datum	WLSESSION	GL	

RUN_SNUM	Run Sequence Number	WSDRUN	1	
SHT	Surface Hole Temperature	Borehole	68	degF

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
MCI	14.81	34.5	2981
MCI	1.25	2981	12508

All depth are actual.

Tool Control Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
CMTM	SCMT Operating Mode	SCMT-BB	Log	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	150	ft/h
PCCG	PSP Downhole CCL Gain	PSTP-E	0 dB	

1A

CBL-VDL REPEAT PASS [5:100]

Software Version

Acquisition System	Version
Maxwell 2019	9.0.106845.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
1A	Log[2]:Up	Up	12179.31 ft	12508.35 ft	19-Feb-2019 4:24:59 AM	19-Feb-2019 4:36:22 AM	ON	9.67 ft	Yes

All depths are referenced to toolstring zero

Log

Company:CAERUS OPERATING LLC Well:SG 8506E-34 E34 496

1A: Log[2]:Up:S002

Description: Sonic CBL with VDL Format: Log (Sonic CBL with VDL) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 19-Feb-2019 13:17:02

TIME_1900 - Time Marked every 60.00 (s)

BIEP - Bond Index Event Pips SCMT-BB

Cable Tension (TENS)
0 lbf 2000

Stuck Tool Indicator, Total (STIT)
0 ft 50

Cable Drag

Tool_Tot. Drag

CBL Amplitude (CBL) SCMT-BB
0 mV 10

CBL Amplitude (CBL) SCMT-BB
0 mV 100

Good Bond (GOBO)
0 mV 10

GoodBond From CBL to GOBO

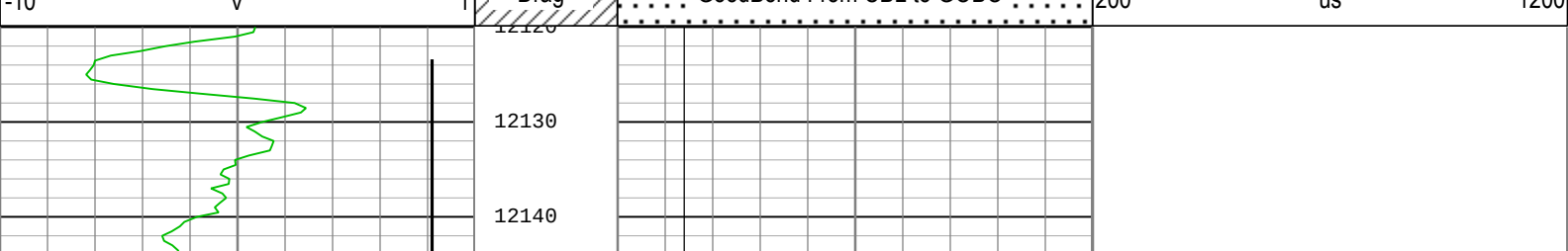
Gamma Ray (GR) PSTP-E
0 gAPI 150

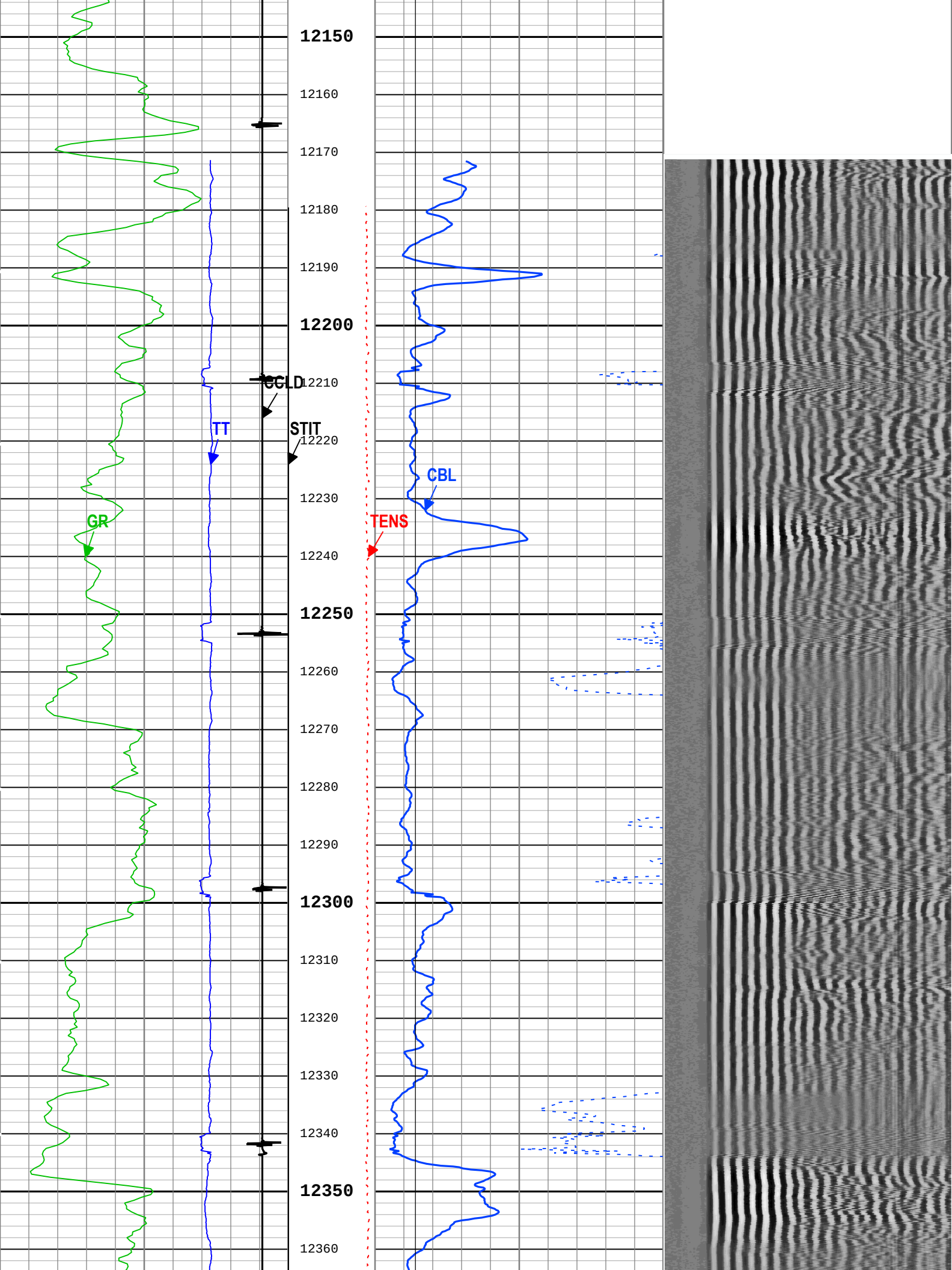
Transit Time for CBL (TT) SCMT-BB
400 us 200

CCL Discriminated Amplitude (CCLD) PSTP-E
-10 V 1

Min Amplitude Max

VDL VariableDensity (VDL) SCMT-BB
200 us 1200

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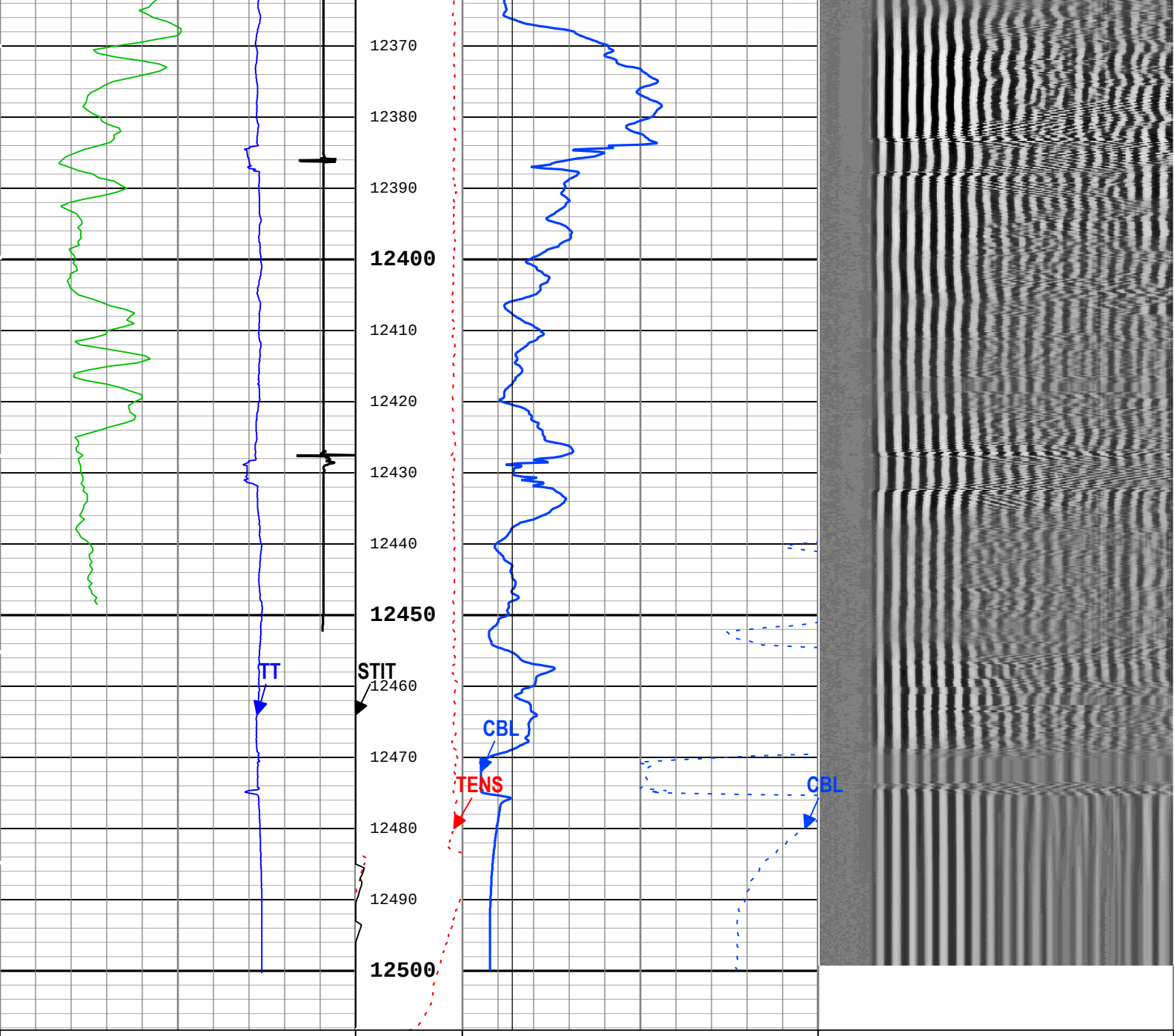


Gamma Ray (GR) PSTP-E	Cable Tension (TENS)	CBL Amplitude (CBL) SCMT-BB	Min Amplitude Max
0 gAPI 150	0 lbf 2000	0 mV 10	VDL VariableDensity (VDL) SCMT-BB
Transit Time for CBL (TT) SCMT-BB		CBL Amplitude (CBL) SCMT-BB	200 us 1200
400 us 200		0 mV 100	
CCL Discriminated Amplitude (CCLD) PSTP-E	Stuck Tool Indicator, Total (STIT)	Good Bond (GOBO)	
-10 V 1	0 ft 50	0 mV 10	
	Cable Drag	GoodBond From CBL to GOBO	
	Tool_Tot. Drag		

BIEP - Bond Index Event Pips SCMT-BB

TIME_1900 - Time Marked every 60.00 (s)

Description: Sonic CBL with VDL Format: Log (Sonic CBL with VDL) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 19-Feb-2019 13:17:02

Channel Processing Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
BHT	Bottom Hole Temperature	Borehole	280	degF
CB3G	SCMT CBL 3 ft Peak Detection T0_Delay and Noise Gate	SCMT-BB	224	us
CBLG	CBL Gate Width	SCMT-BB	40	us
CBRA	CBL LQC Reference Amplitude in Free Pipe	SCMT-BB	80	mV
THNO	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.25	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	8.34	lbm/gal
DFT_CATEGORY	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	8323.5	ft
GGRD	Geothermal Gradient	Borehole	1	0.01 degF/ft
GOBO_CURR	Good Bond in Arbitrary Cement	SCMT-BB	1.4	mV
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	GTEM_LINEST(RT)	
MATT_CURR	Maximum Attenuation in Arbitrary Cement	SCMT-BB	16.92	dB/ft
MCI	Minimum Cemented Interval for Isolation	SCMT-BB	1.25	ft
MSA	Minimum Sonic Amplitude	SCMT-BB	0.51	mV
MSA_CURR	Minimum Sonic Amplitude in Arbitrary Cement	SCMT-BB	0.51	mV
PDAT	Permanent Datum	WLSESSION	GL	
RUN_SNUM	Run Sequence Number	WSDRUN	1	
SHT	Surface Hole Temperature	Borehole	68	degF

Tool Control Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
CMTM	SCMT Operating Mode	SCMT-BB	Log	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	150	ft/h
PCCG	PSP Downhole CCL Gain	PSTP-E	0 dB	

1A

RST SIGMA MAIN PASS [5:100]

Software Version

Acquisition System	Version
Maxwell 2019	9.0.106845.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
1A	Main[3]:Up	Up	93.92 ft	12507.98 ft	19-Feb-2019 4:42:42 AM	19-Feb-2019 12:00:47 PM	ON	10.36 ft	Yes

All depths are referenced to toolstring zero

Log

Company:CAERUS OPERATING LLC Well:SG 8506E-34 E34 496

1A: Main[3]:Up:S002

Description: RST SIGMA Answer Format: Log (RST SIGMA Answer) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 19-Feb-2019 13:17:07

TIME_1900 - Elapsed time since midnight, 30 December 1899 every 60.00 (s)

TIME_1900 - Time Marked every 60.00 (s)

IHV - Integrated Hole Volume every 10.00 (ft3)

IHV - Integrated Hole Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

Capture to Inelastic Ratio Near Filtered (CIRN_FIL) RST-C
2.5 0

Capture to Inelastic Ratio Far Filtered (CIRF_FIL) RST-C
5 0

Borehole Salinity (BSAL) RST-C
450 ppk -50

Stuck Tool Indicator, Total (STIT)
0 ft 50

Inelastic Ratio Filtered (IRAT_FIL) RST-C
0.75 0

Near Detector Effective Unregulated Capture Count Rate (RSCN_RST) RST-C
45 0

Gamma Ray (GR) PSTP-E
0 gAPI 150

Cable Drag From STIA to STIT

Thermal Decay Porosity (TPHI) RST-C
0.6 ft3/ft3 0

Total Selected Count Rate Near Detector Filtered (TSCN_FIL) RST-C
30000 1/s 0

Gross Inelastic Count Rate Far Detector Filtered (INFD_FIL) RST-C
10000 1/s 0

Far Detector Effective Unregulated Capture Count Rate (RSCF_RST) RST-C
45 0

Tool_Tot. Drag From D3T to STIT

Total Selected Count Rate Far Detector Filtered (TSCF_FIL) RST-C
12000 1/s 0

Formation Sigma (Neutron Capture Cross Section) (SIGM) RST-C
60 cu 0

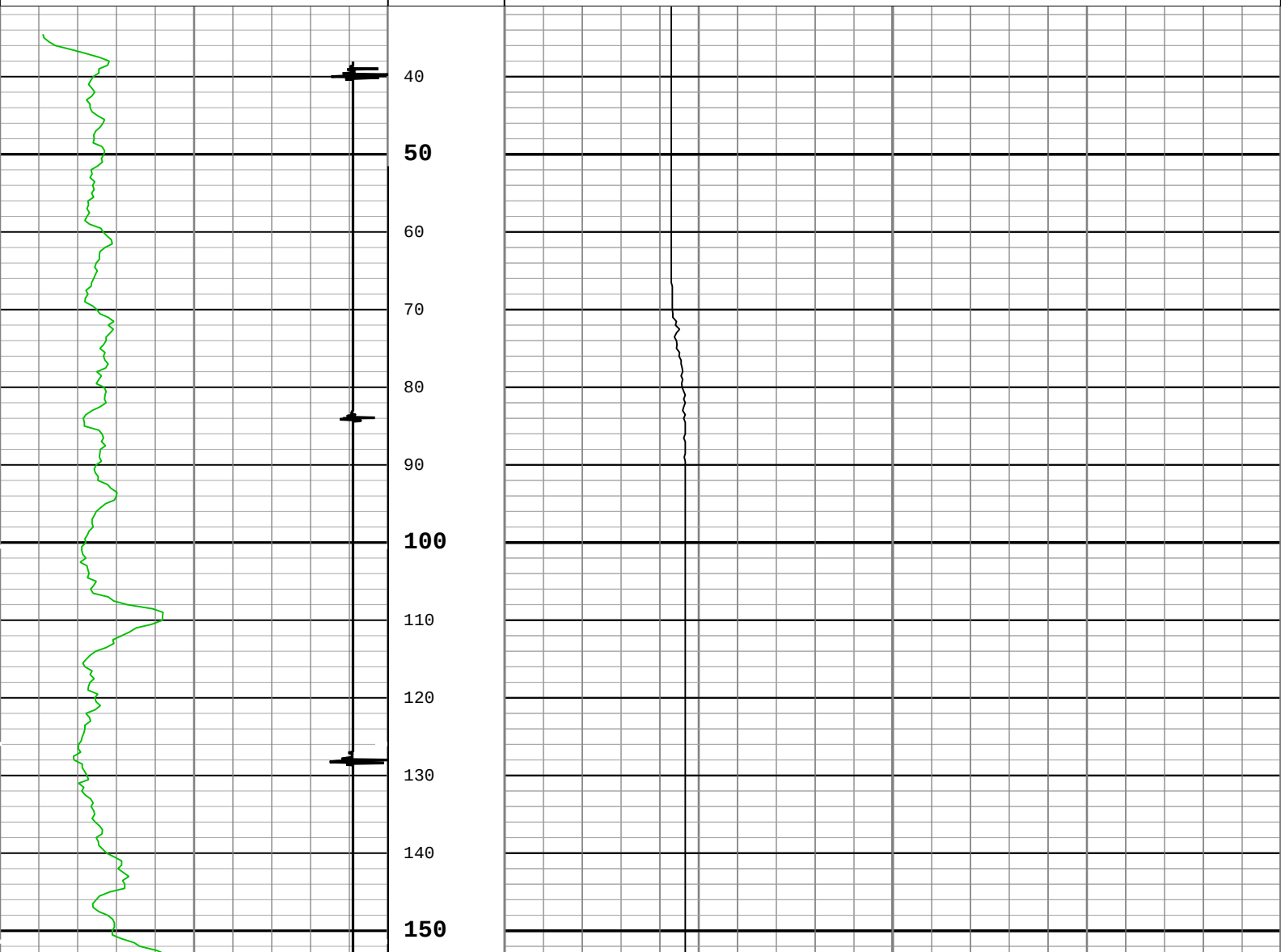
Sigma Borehole Fluid (SIBF) RST-C
100 cu 0

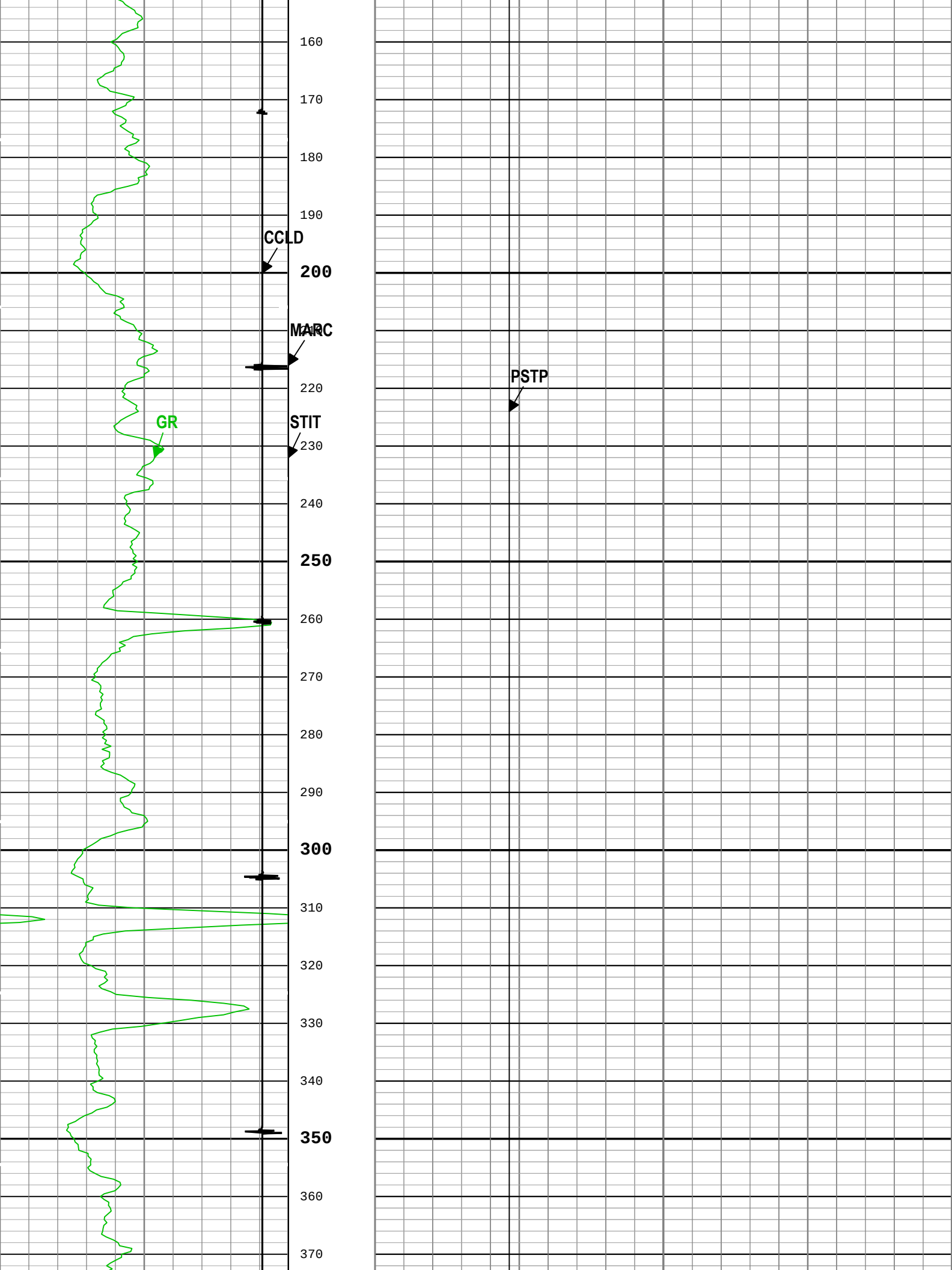
Minitron Arc Count (MARC) RST-C
0 5

Weighted Inelastic Ratio (WINR_RST) RST-C
0 0.4

CCL Discriminated Amplitude (CCLD) PSTP-E
-10 V 1

Cartridge Temperature (PSTP) PSTP-E
20 degF 220

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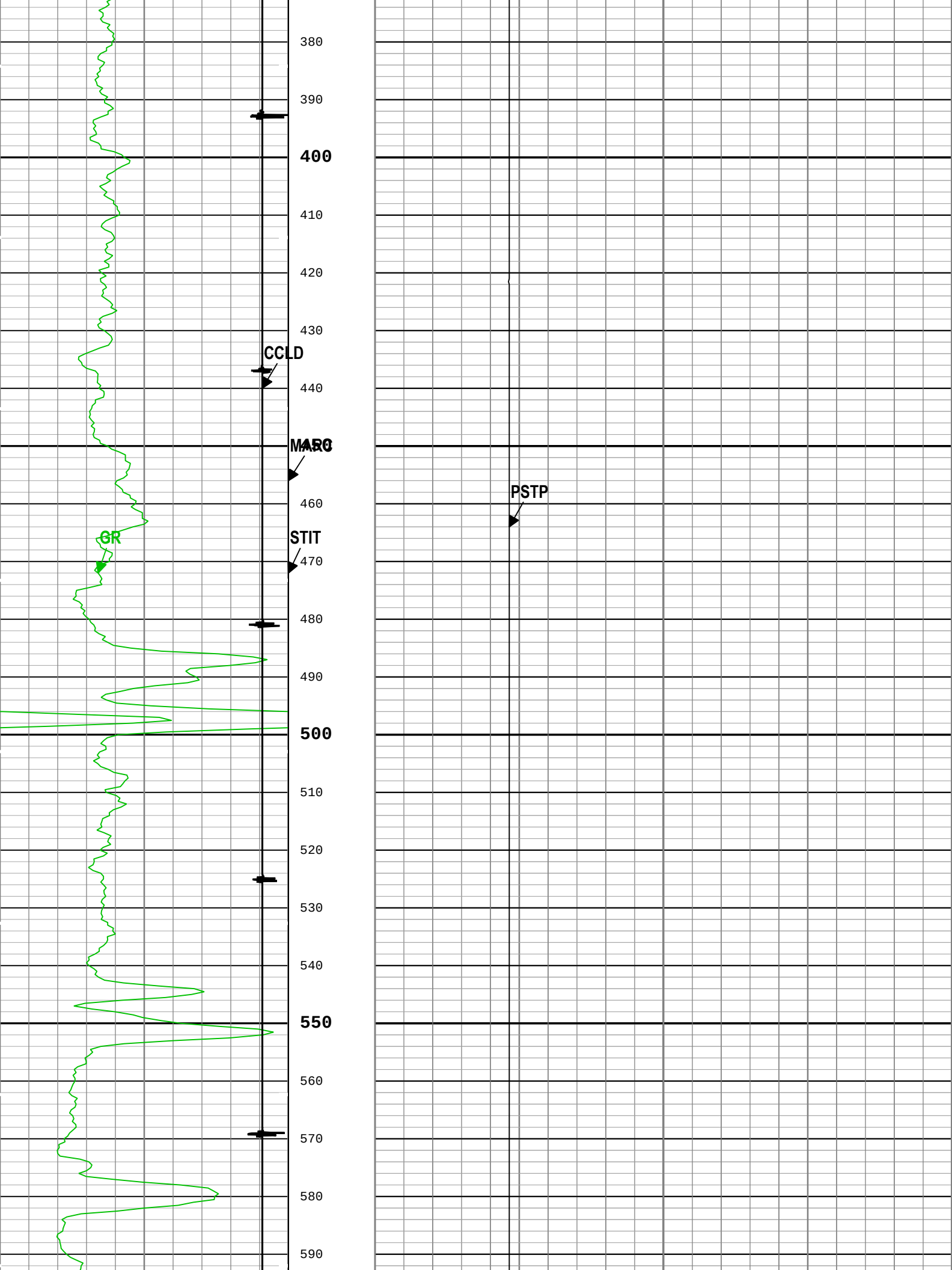
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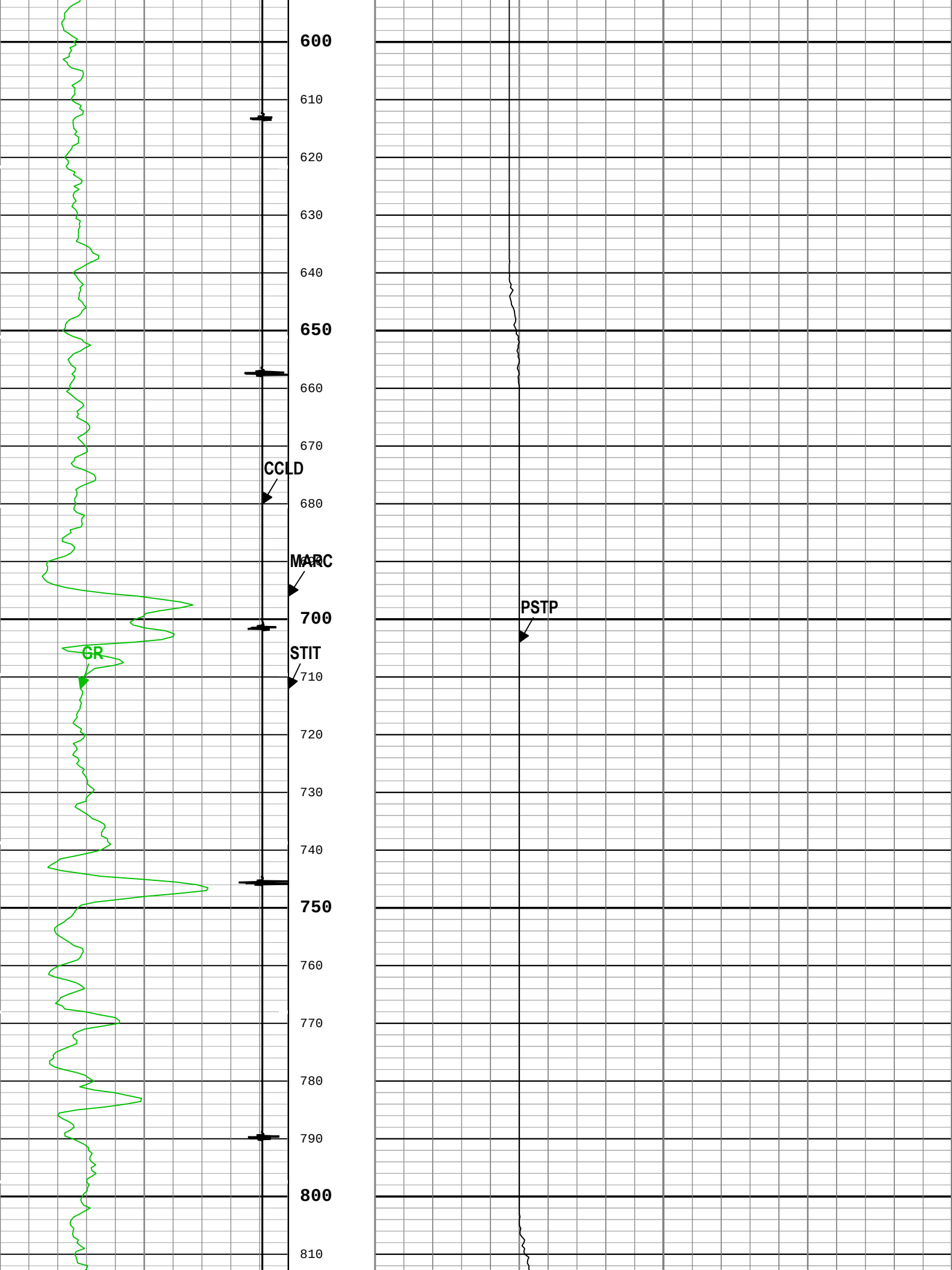
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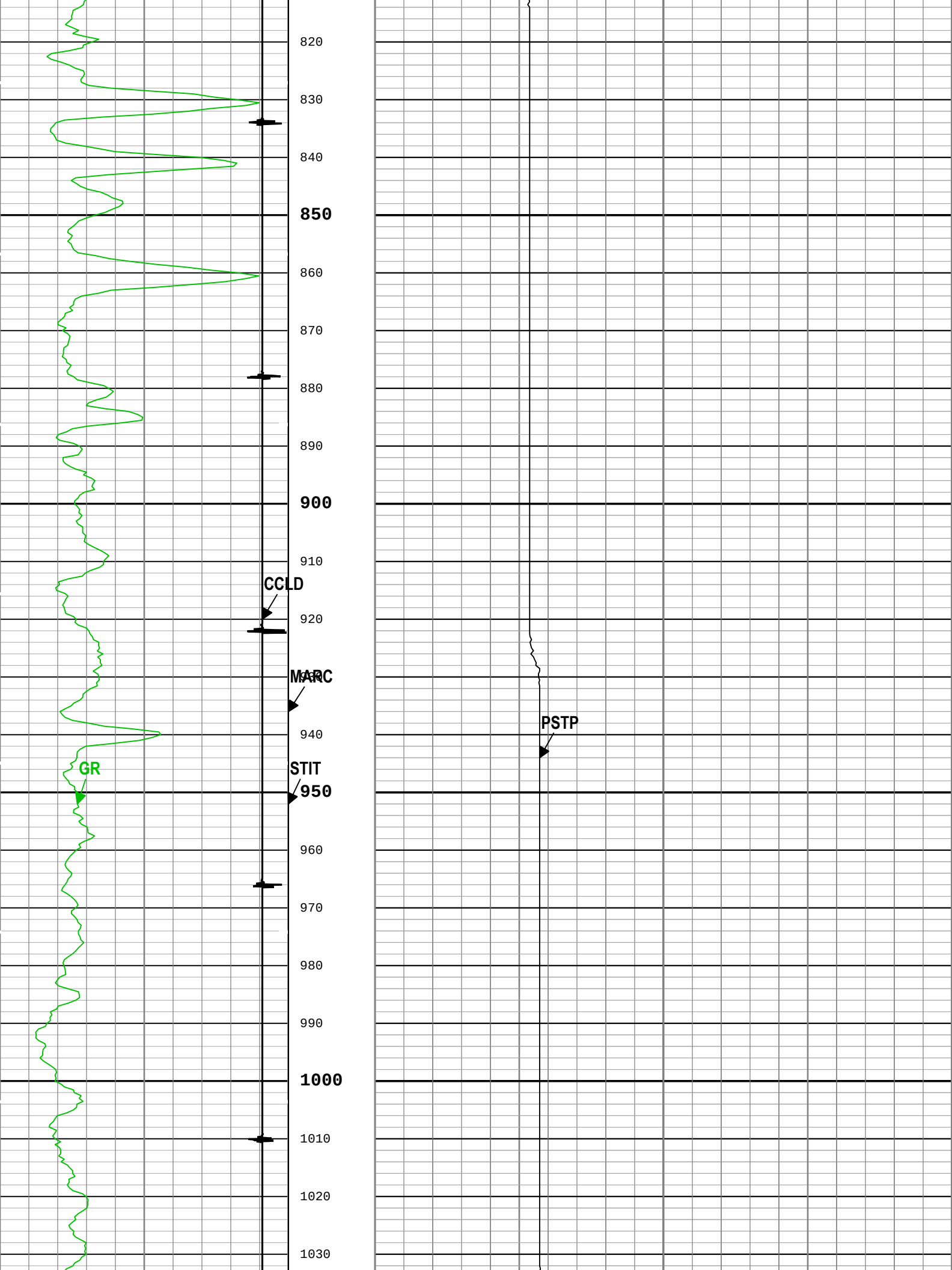
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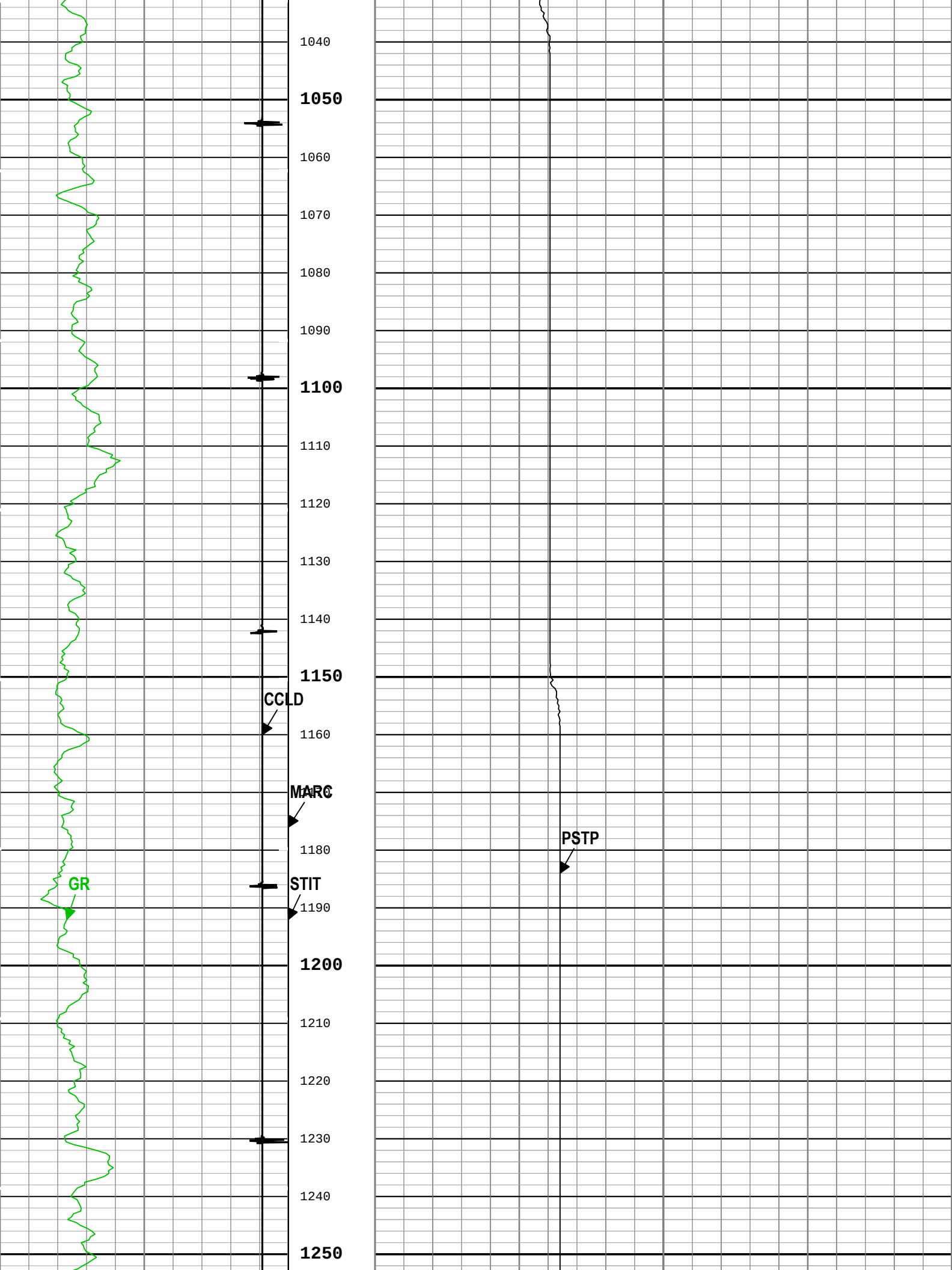
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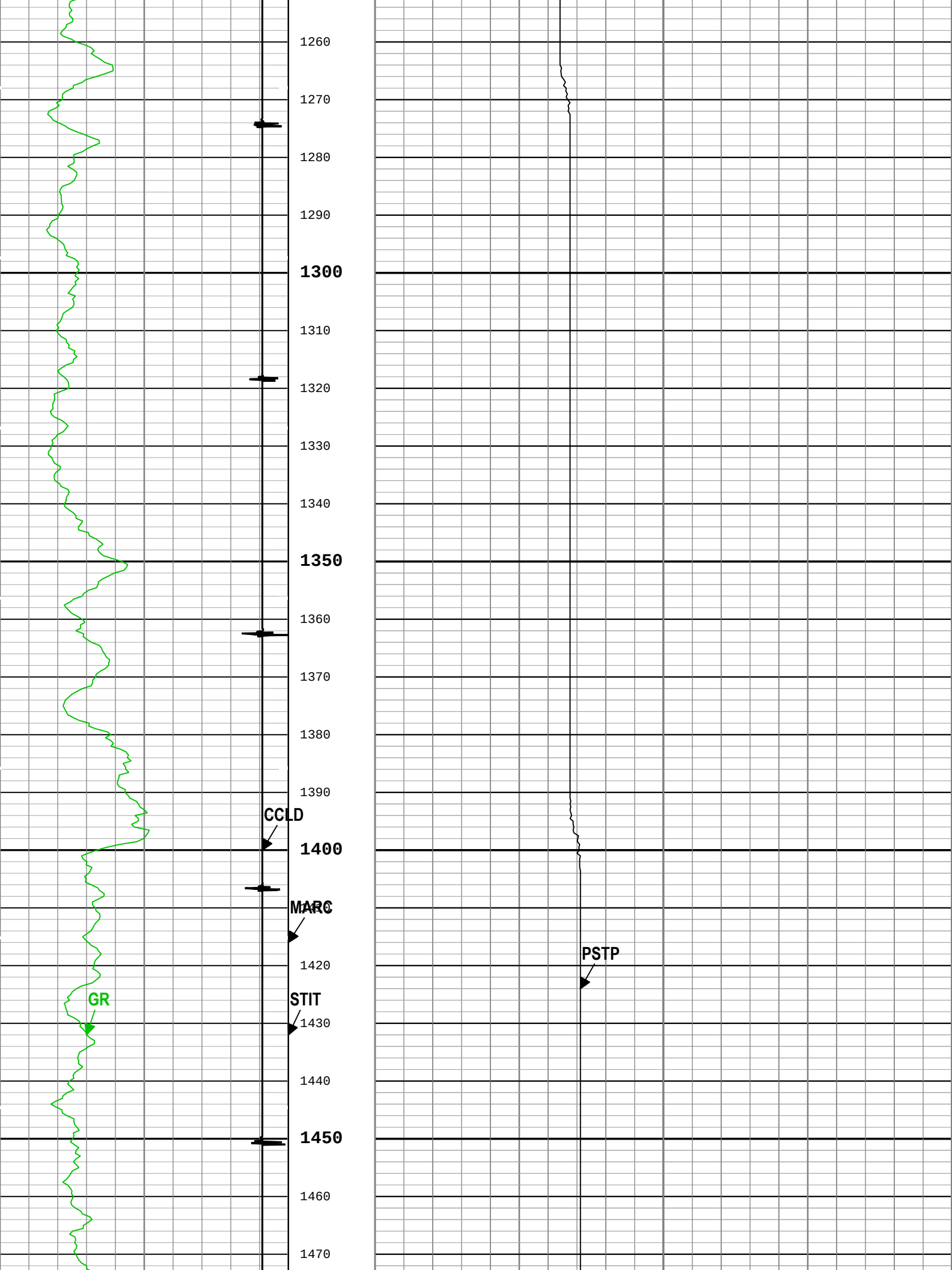
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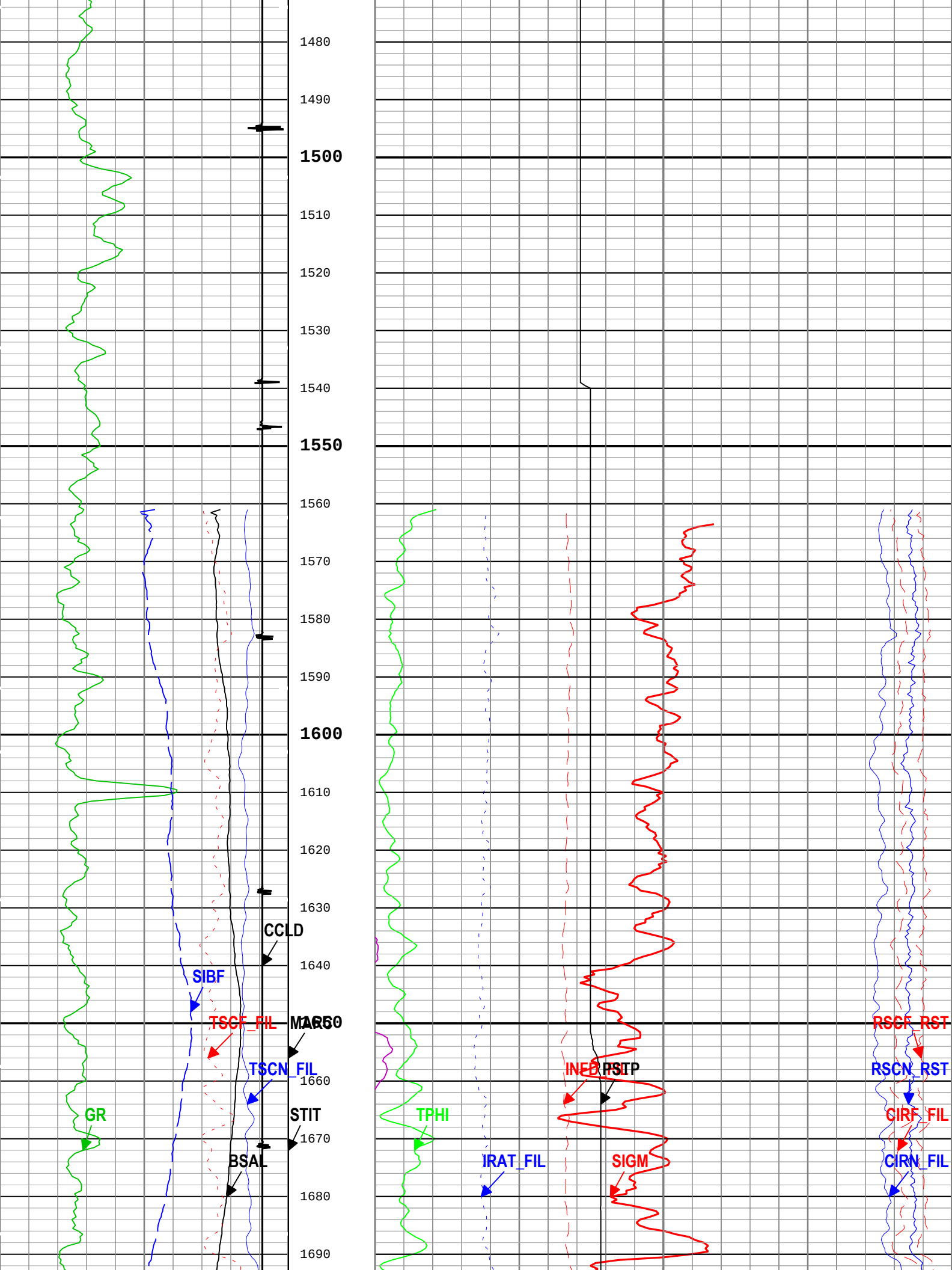
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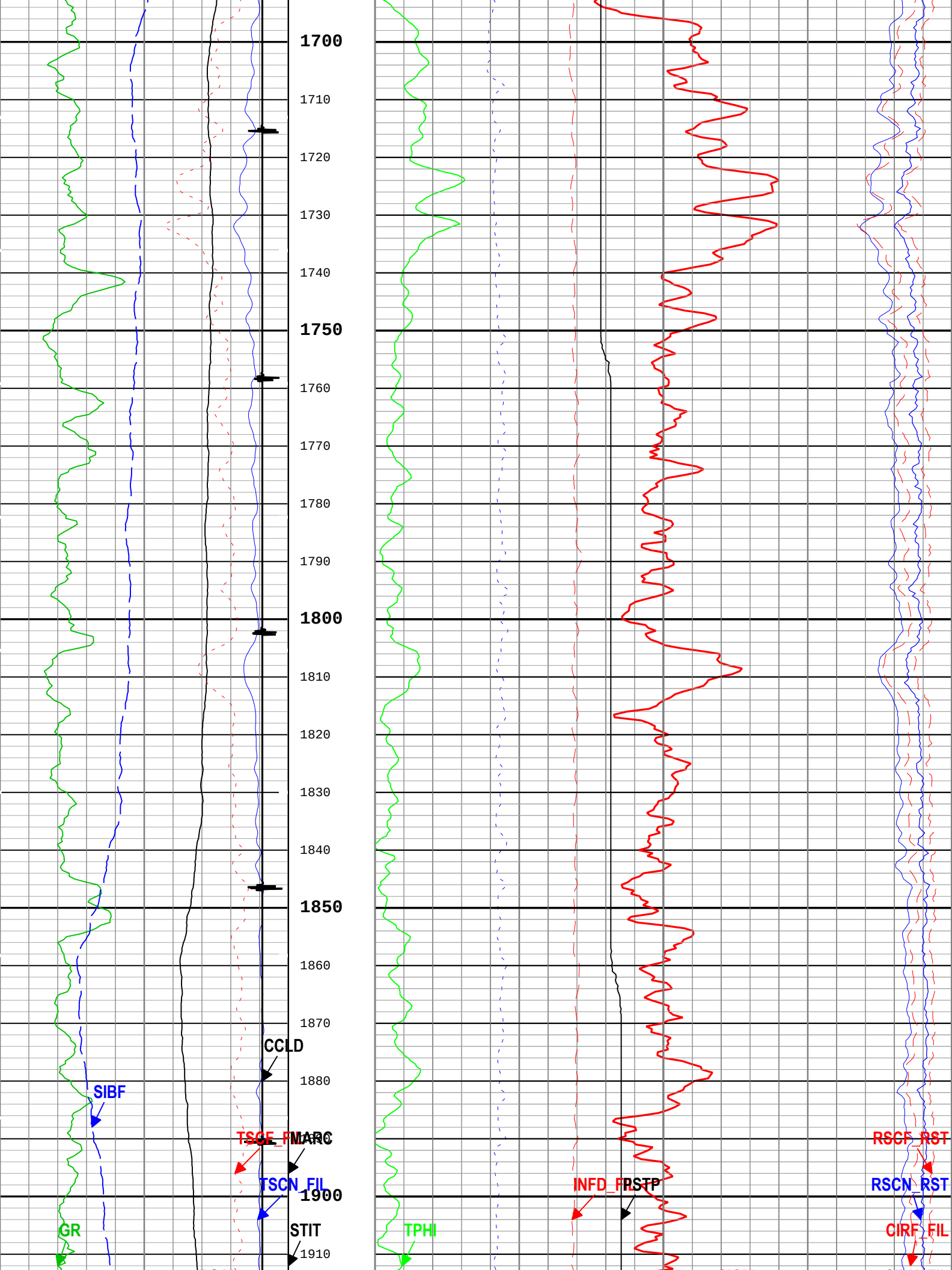
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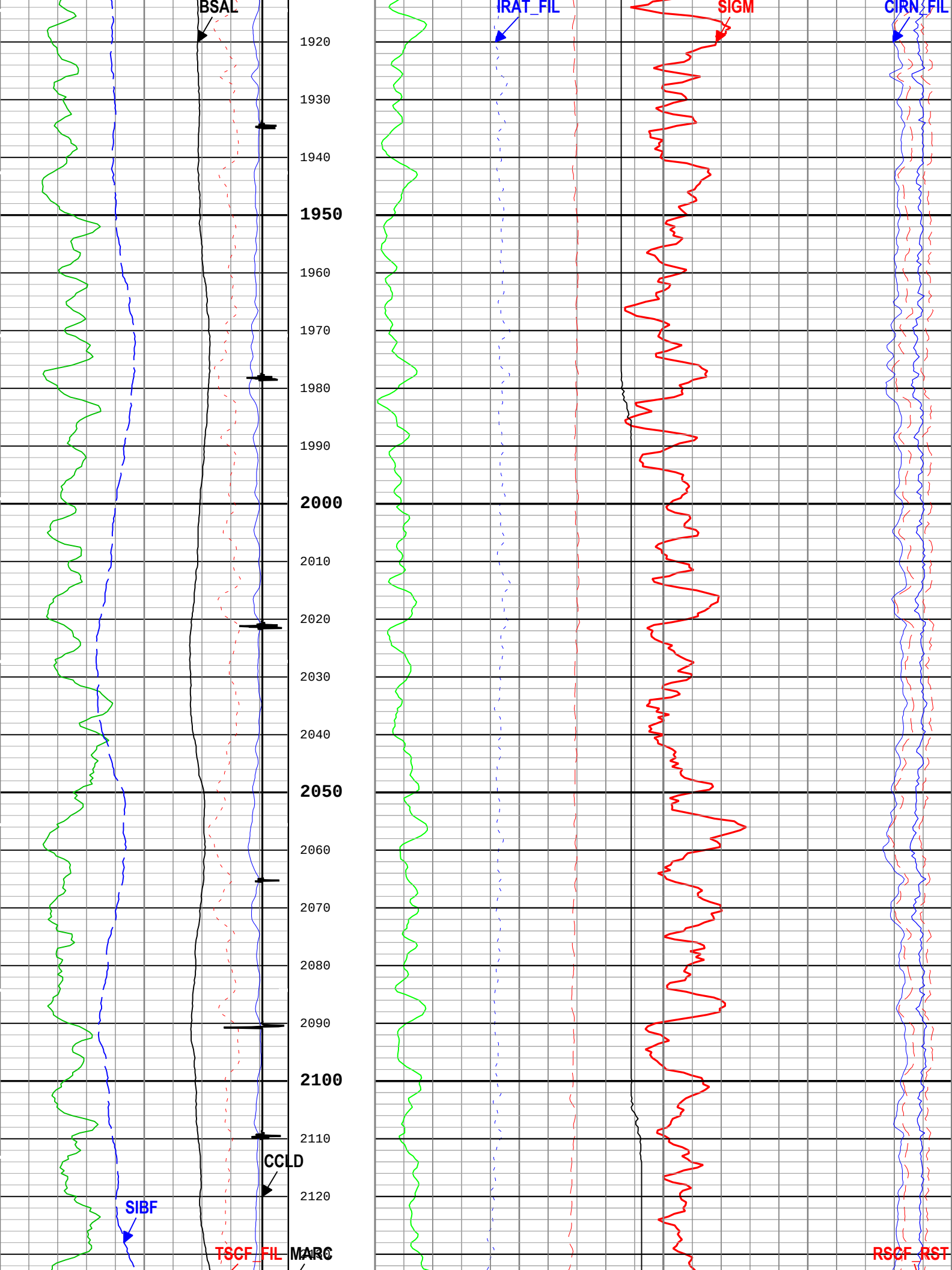
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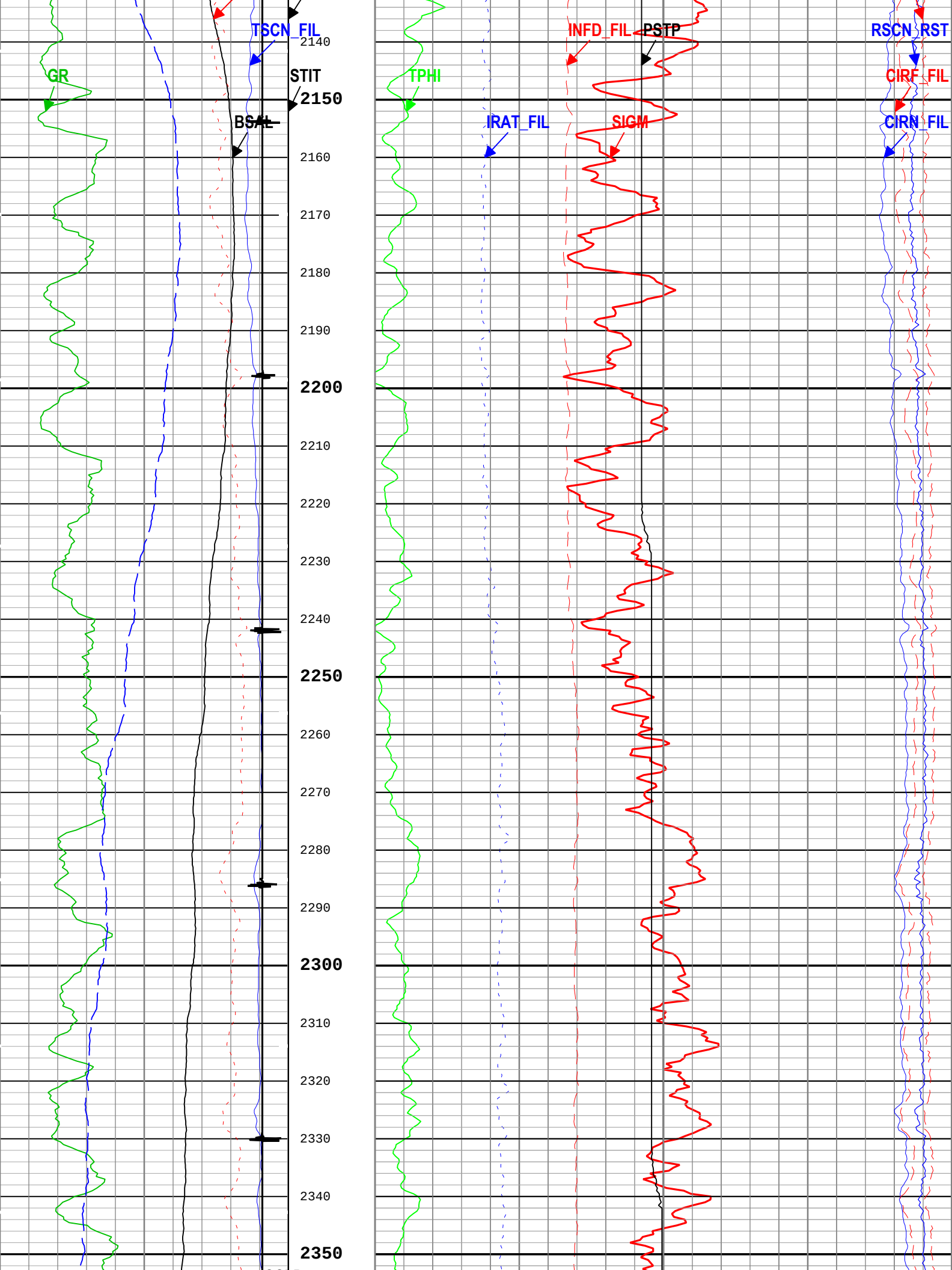
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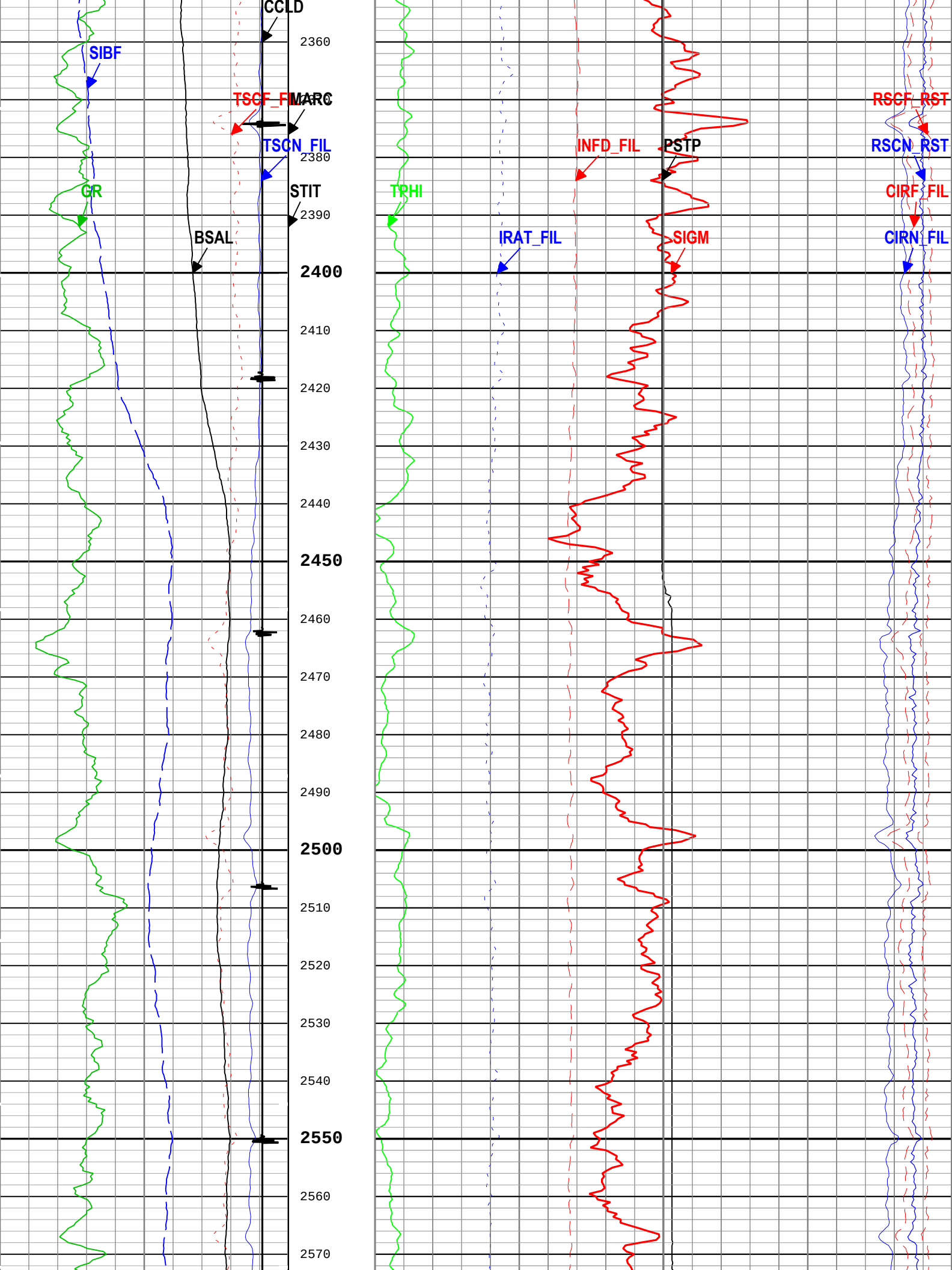
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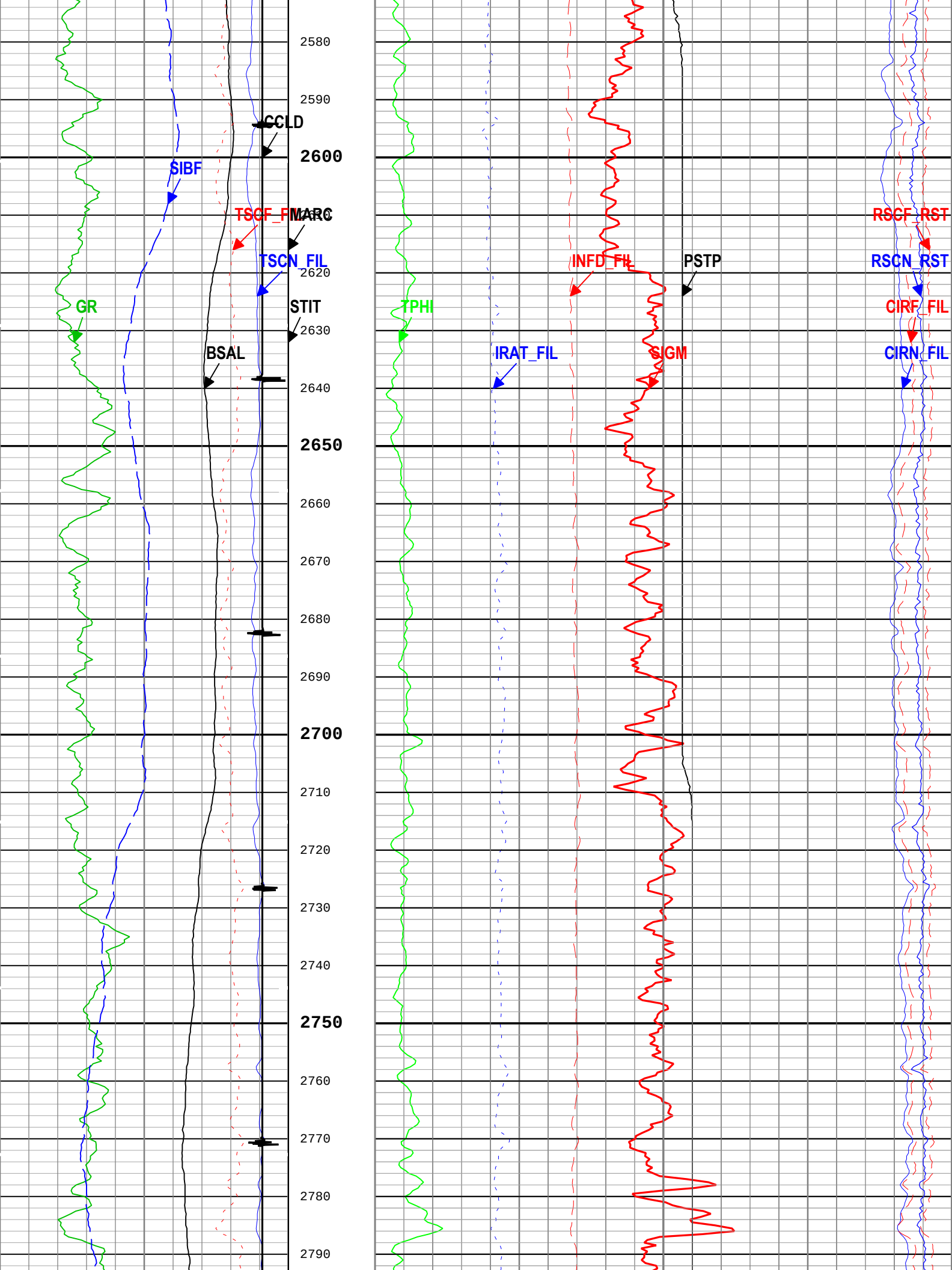
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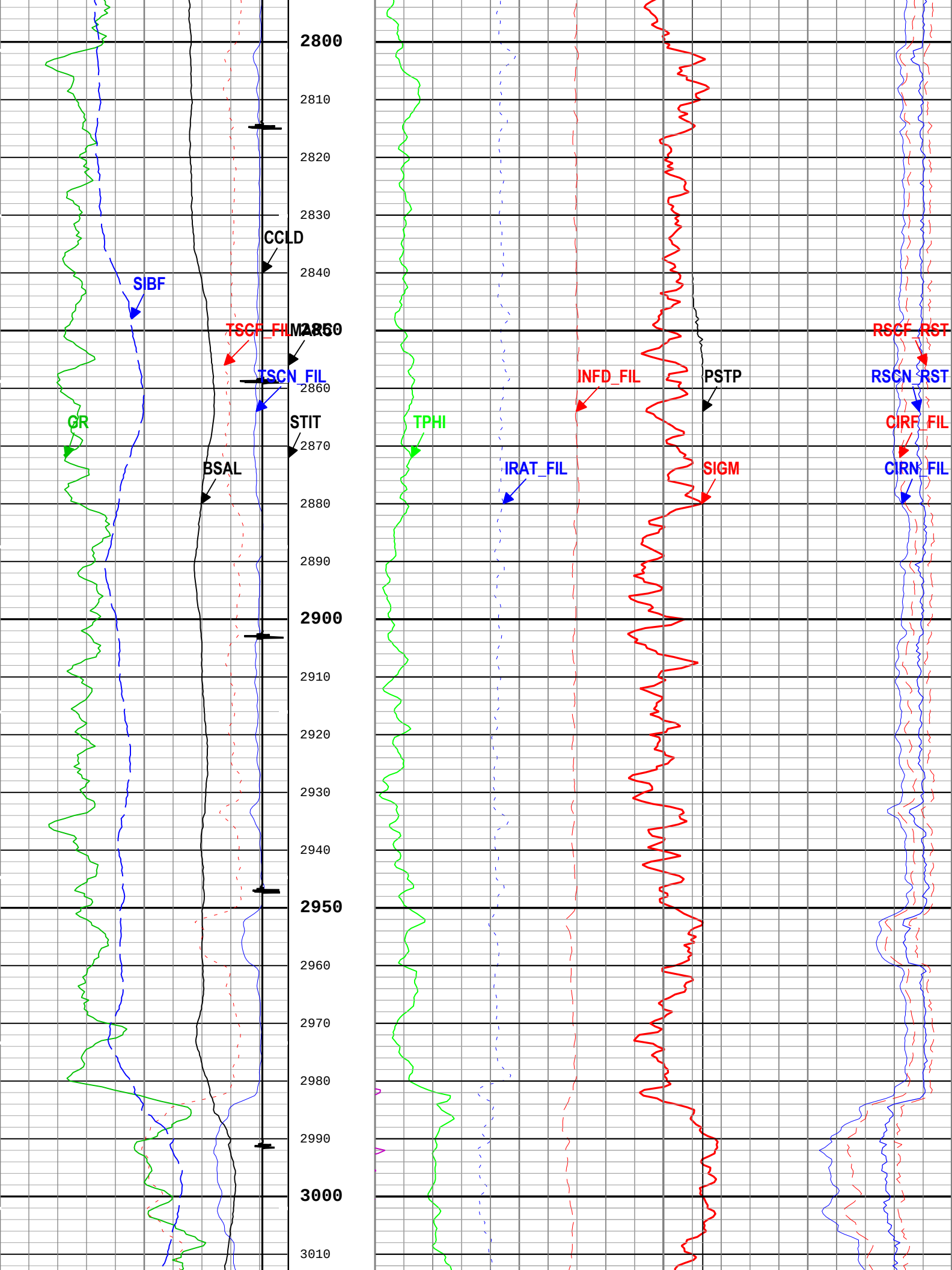
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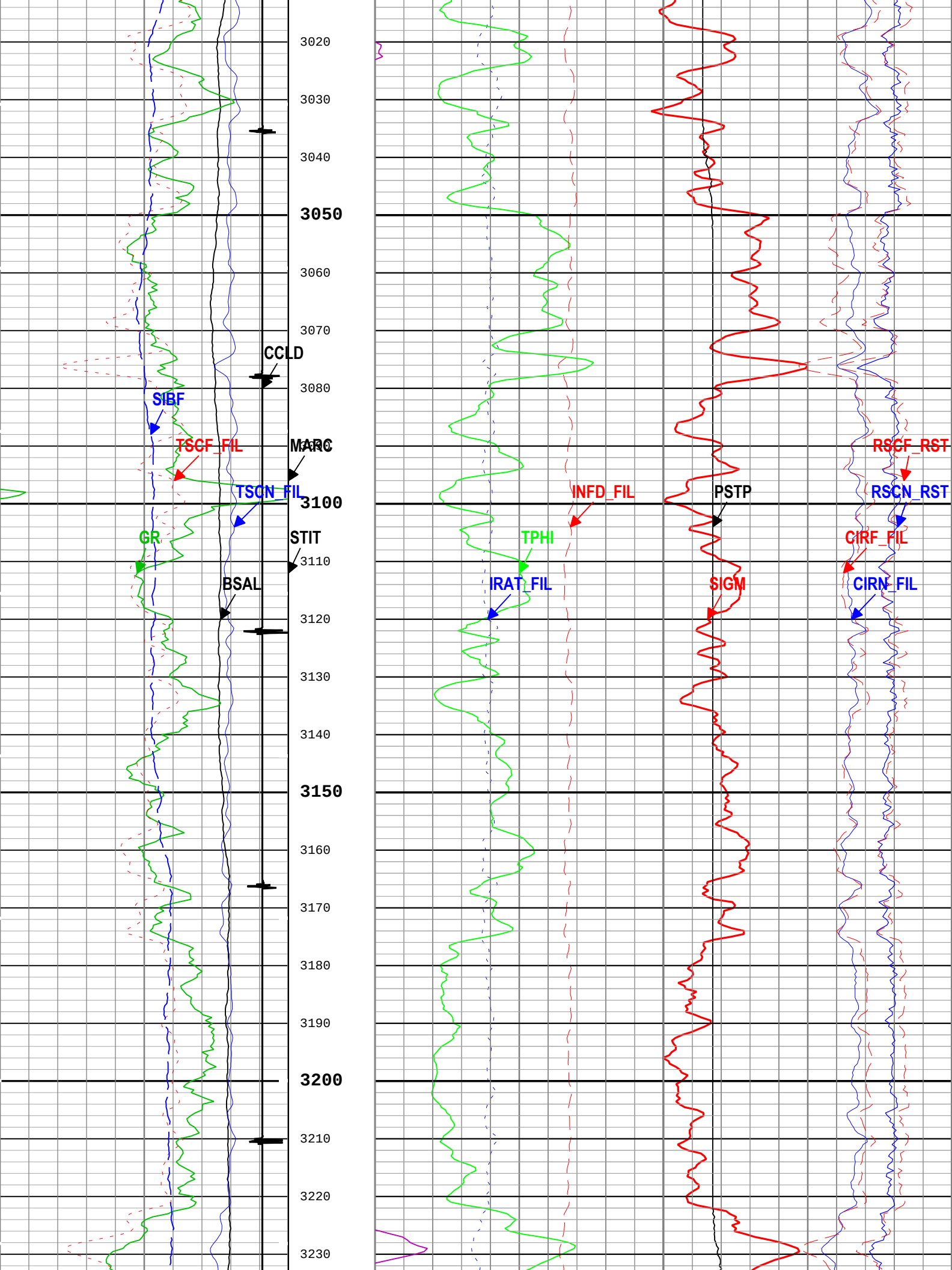
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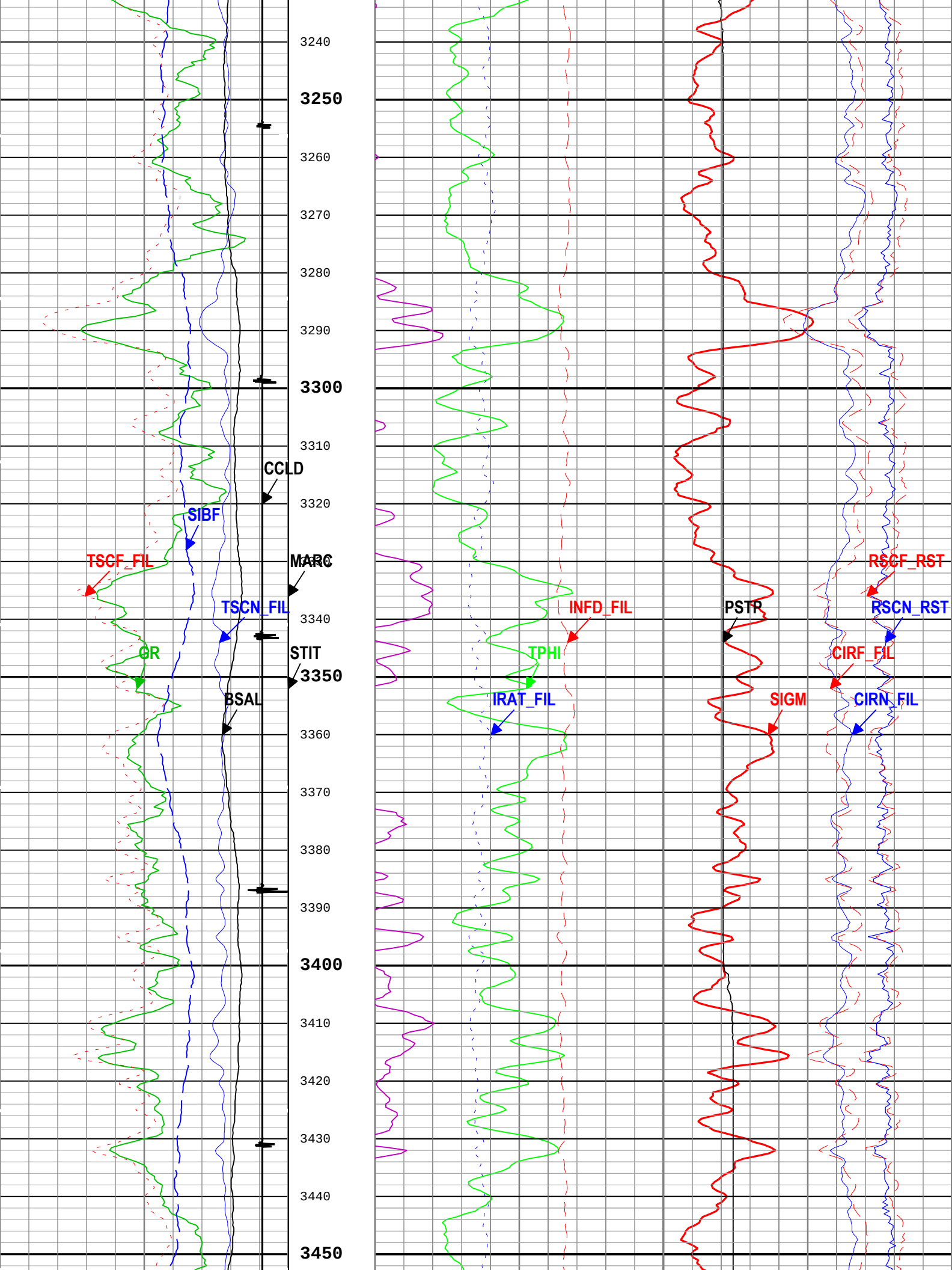
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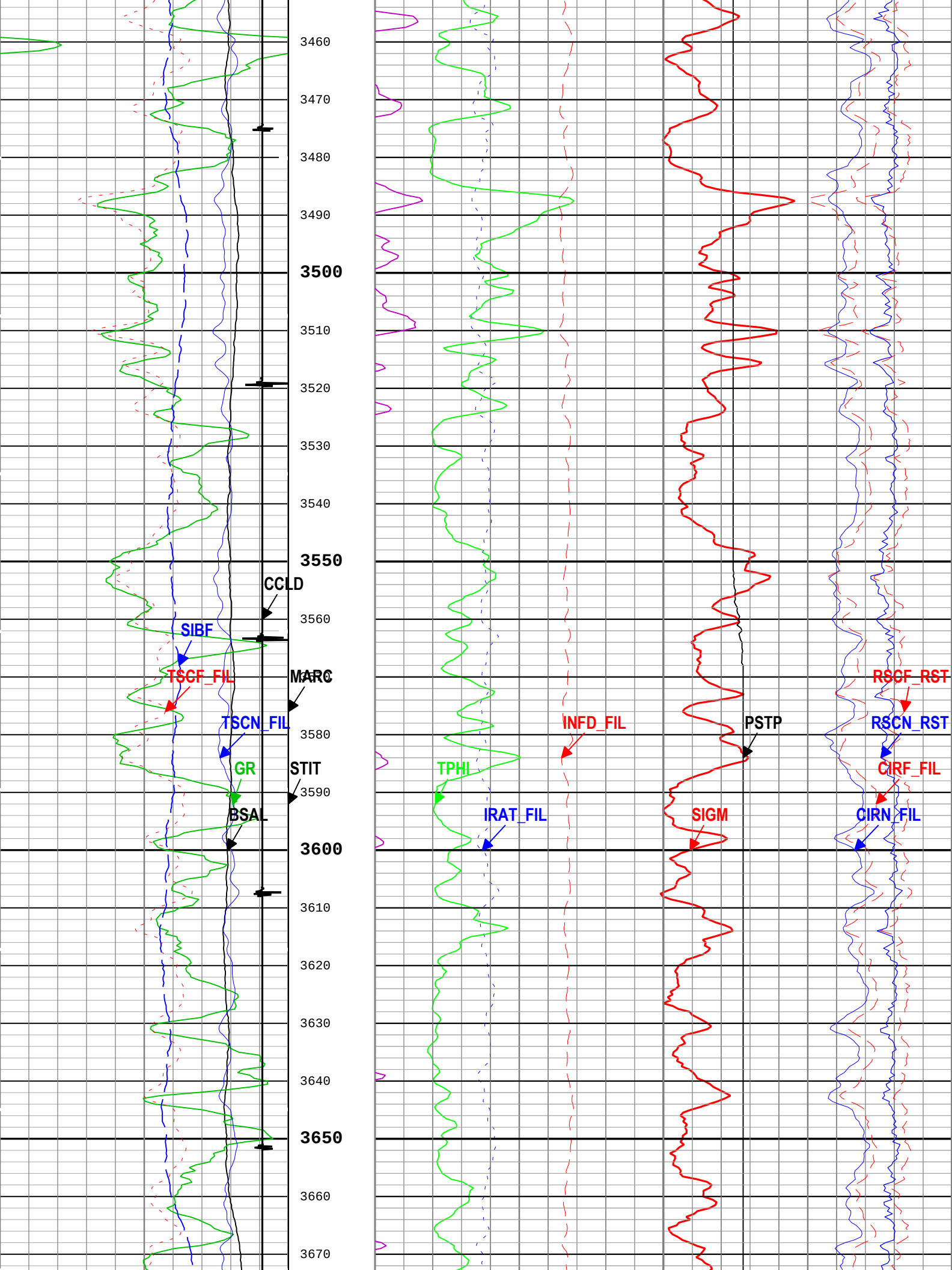
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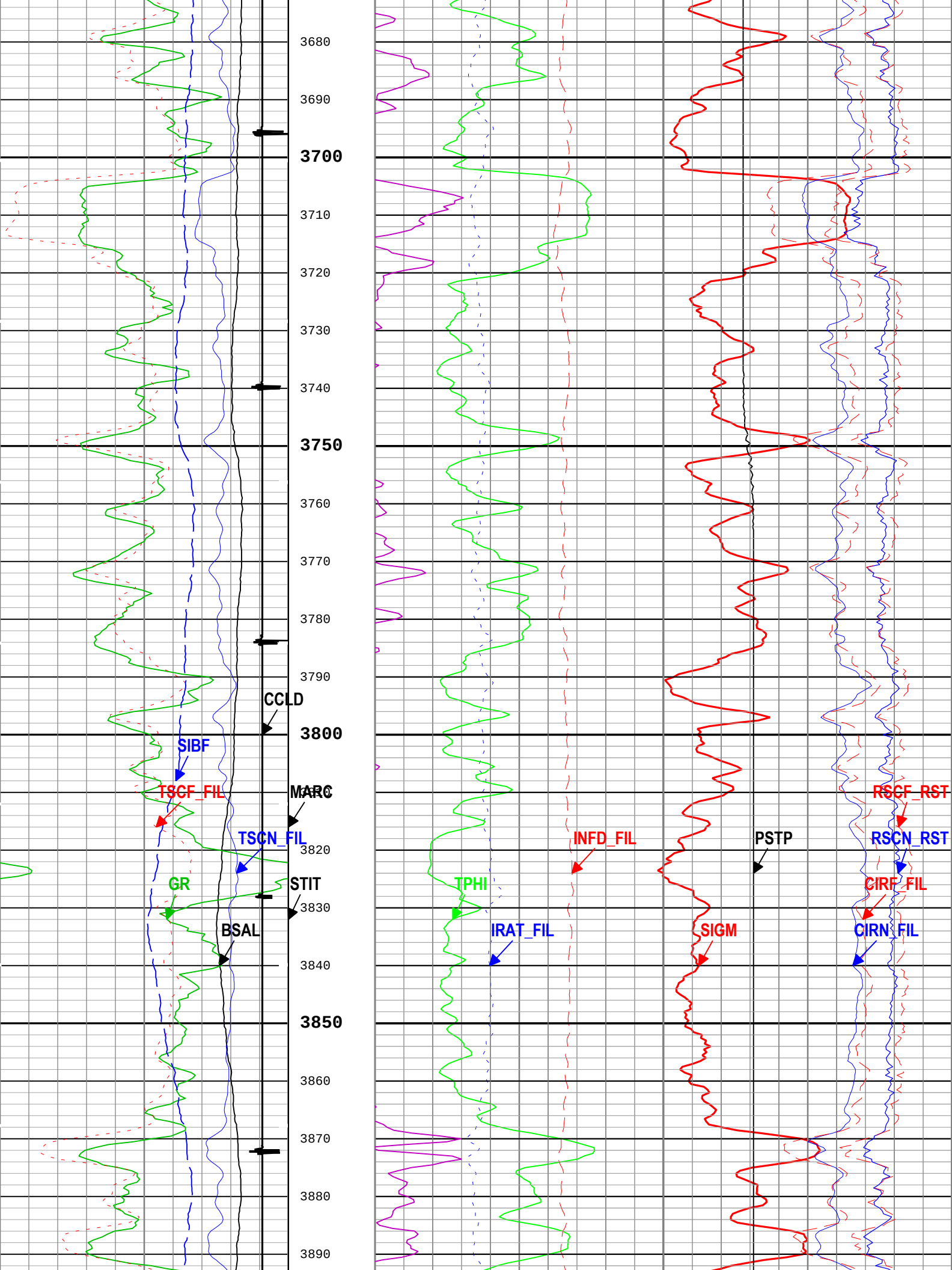
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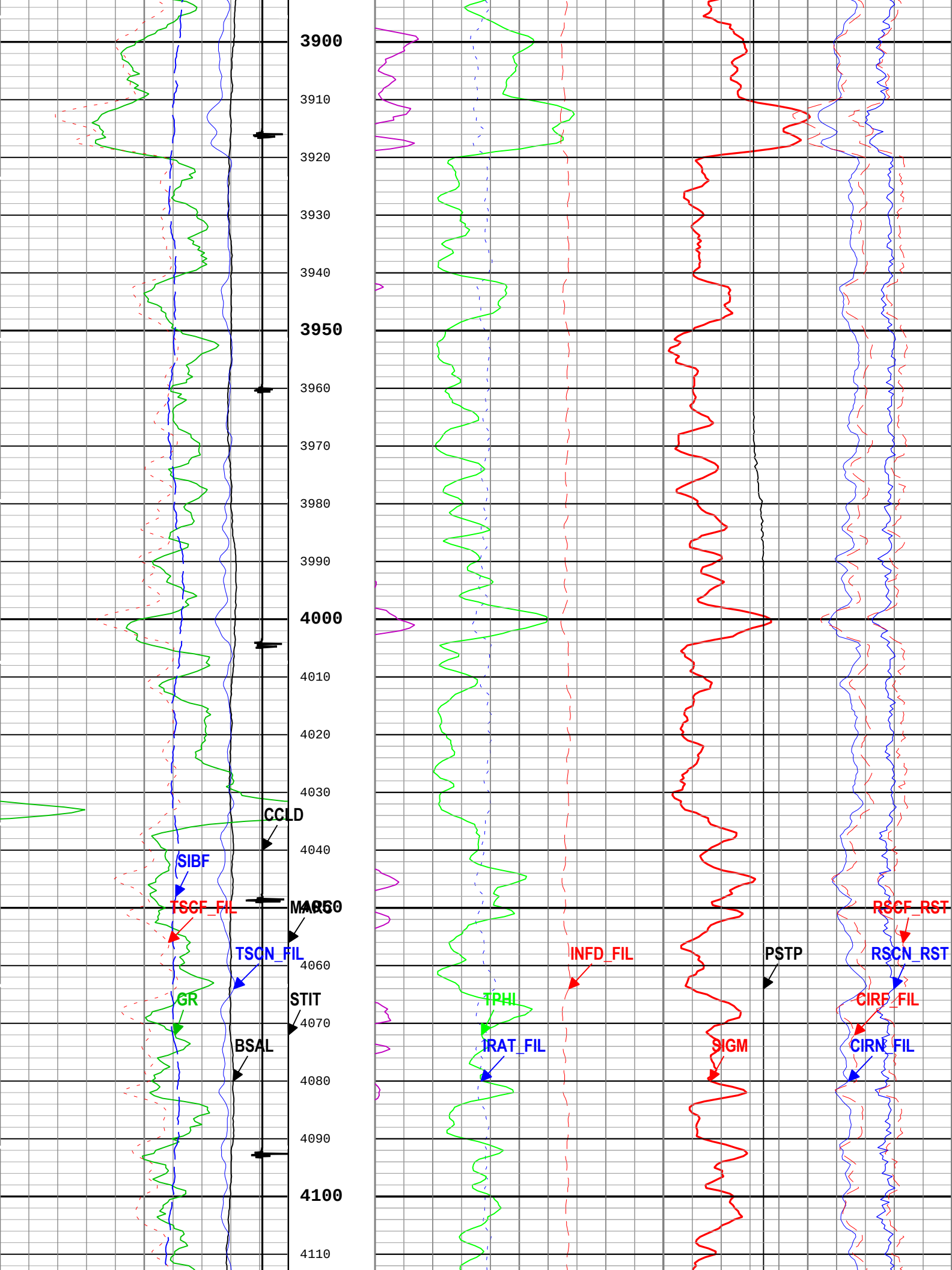
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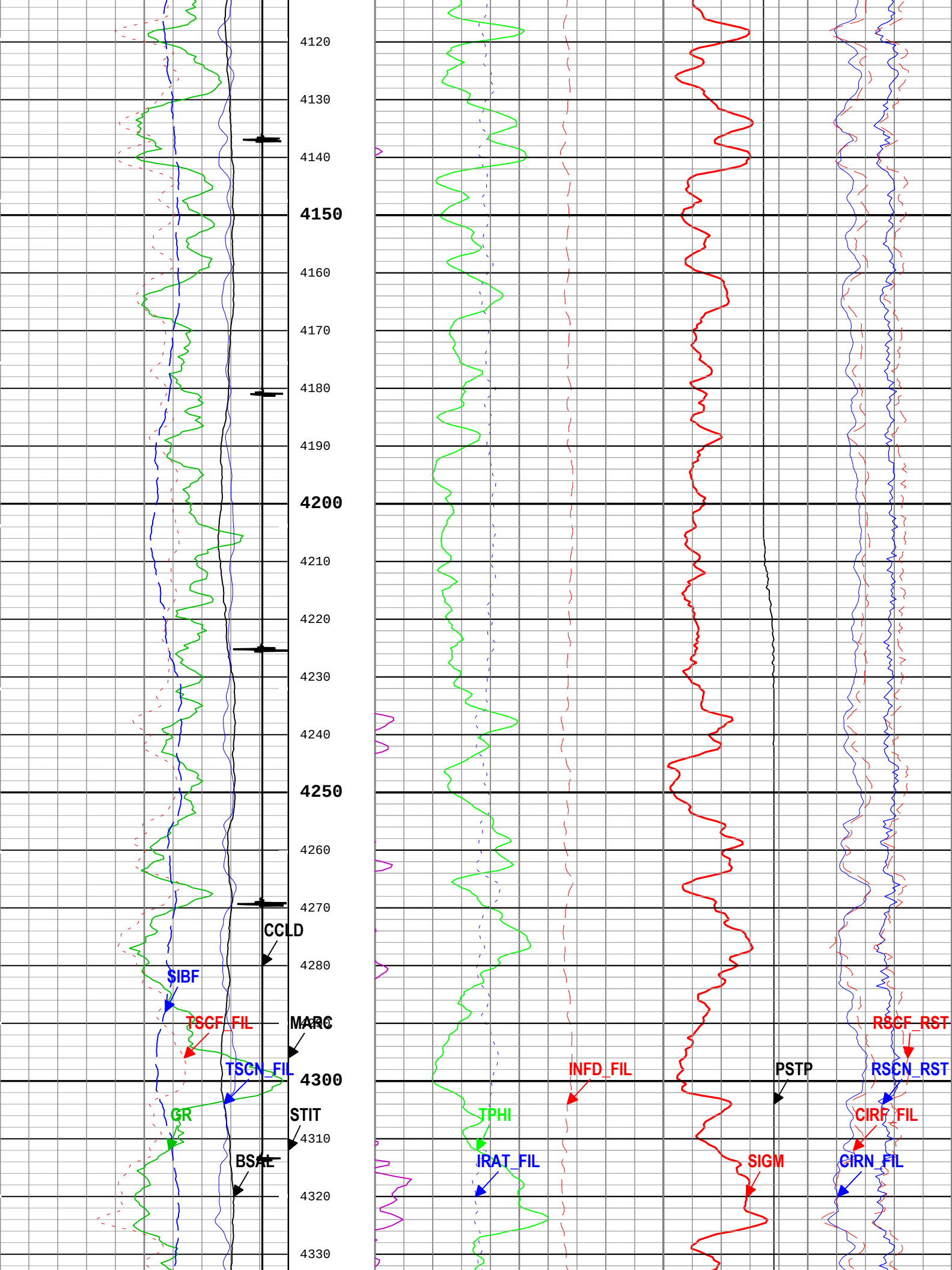
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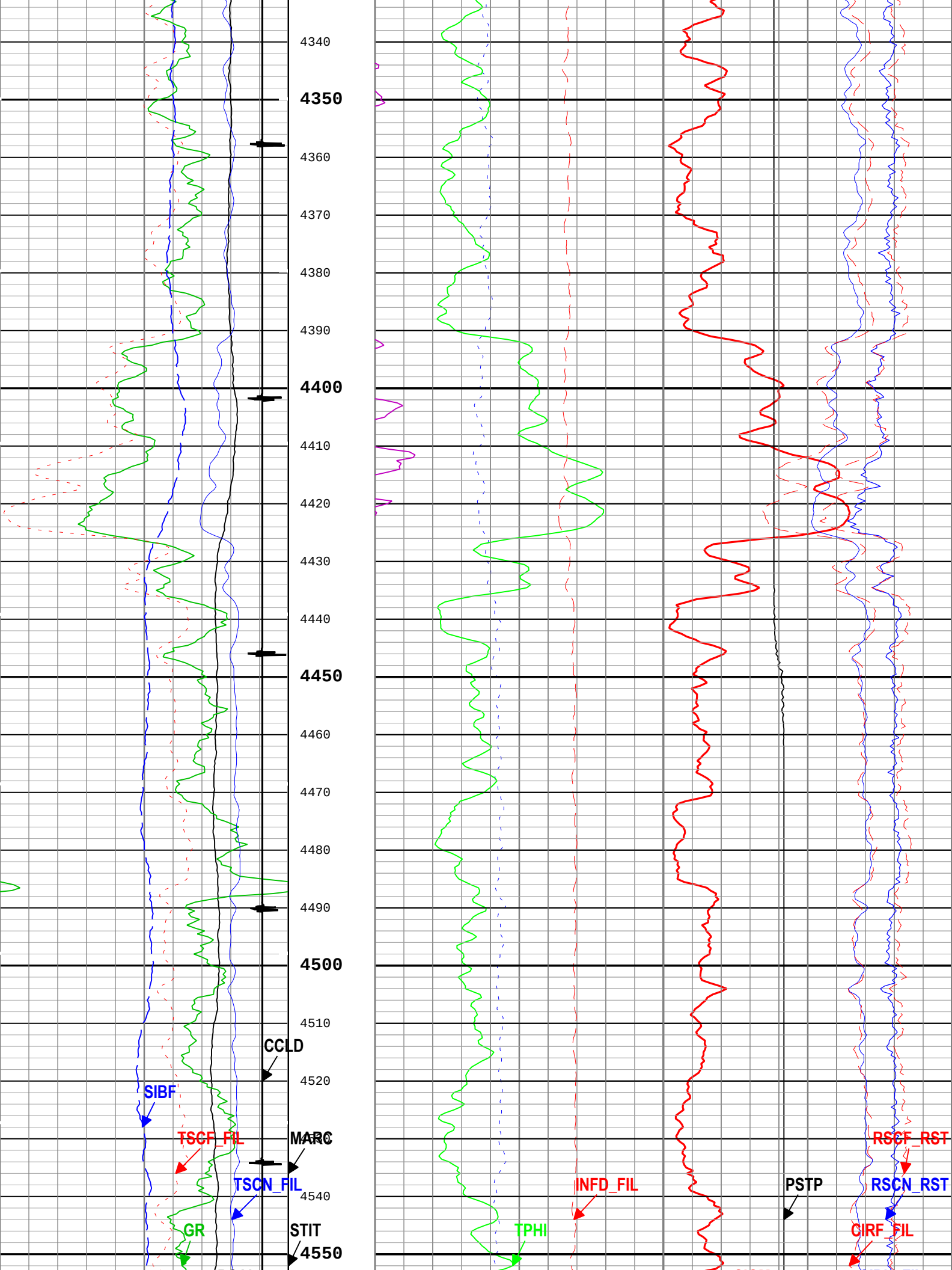
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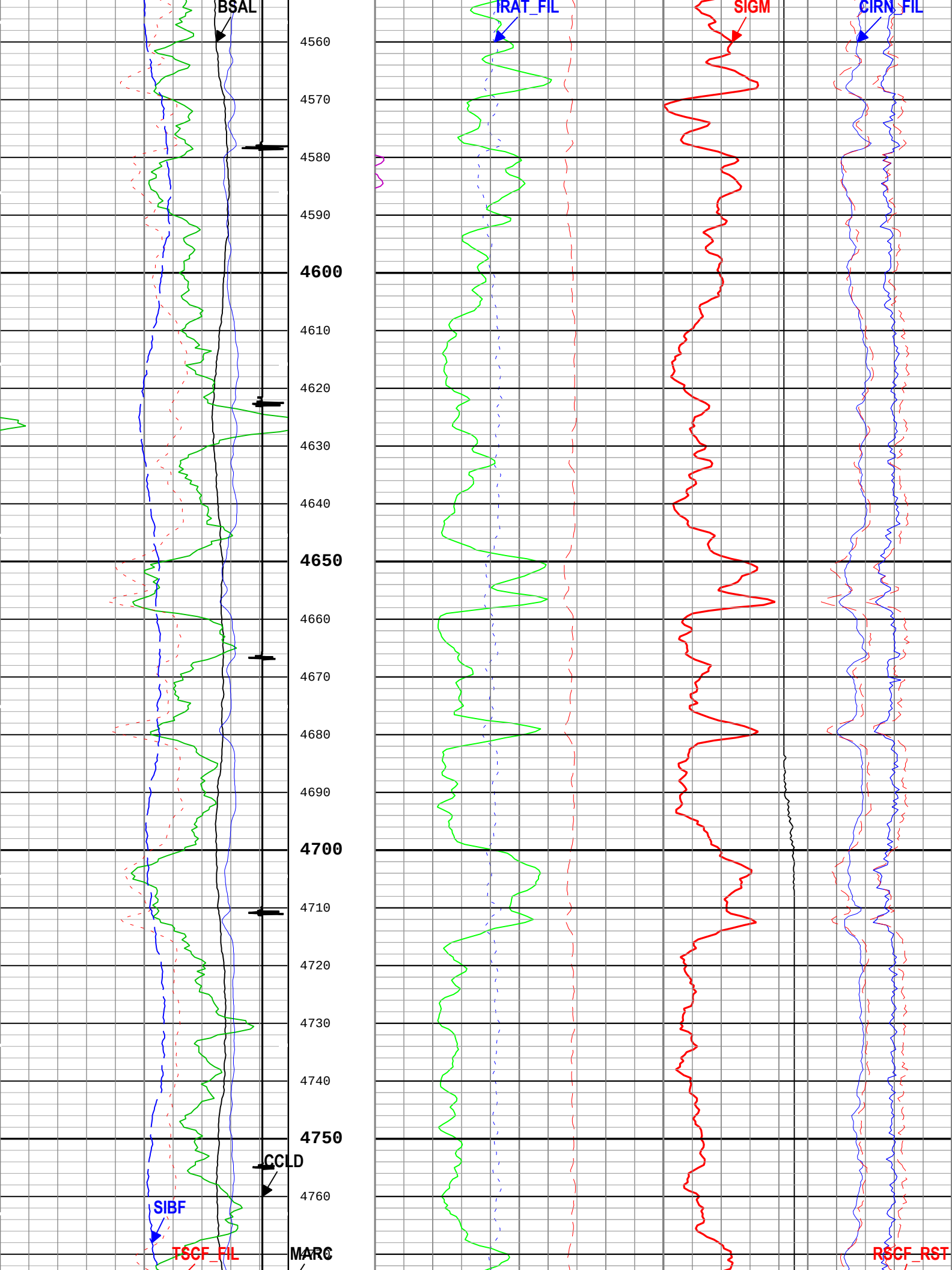
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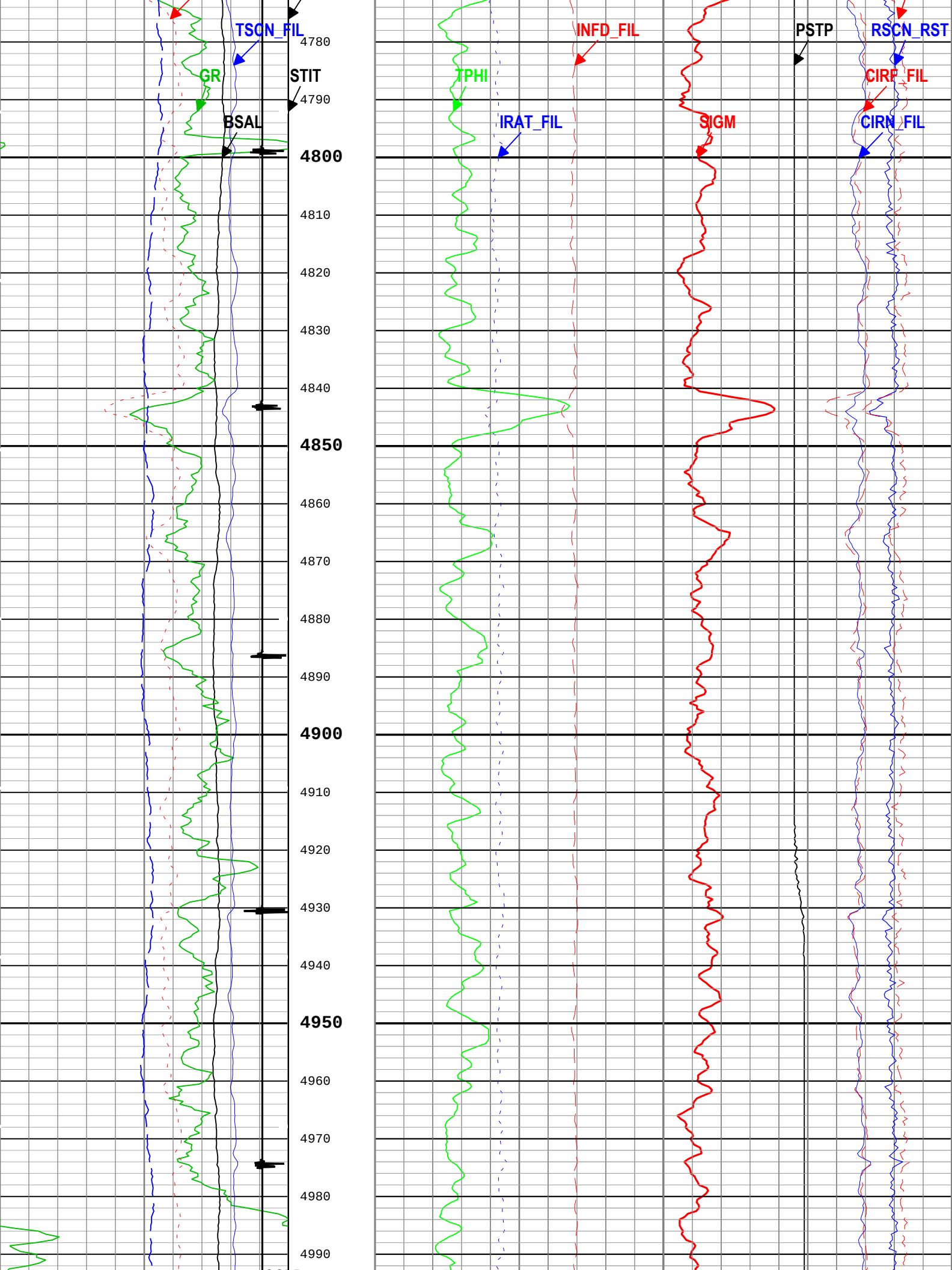
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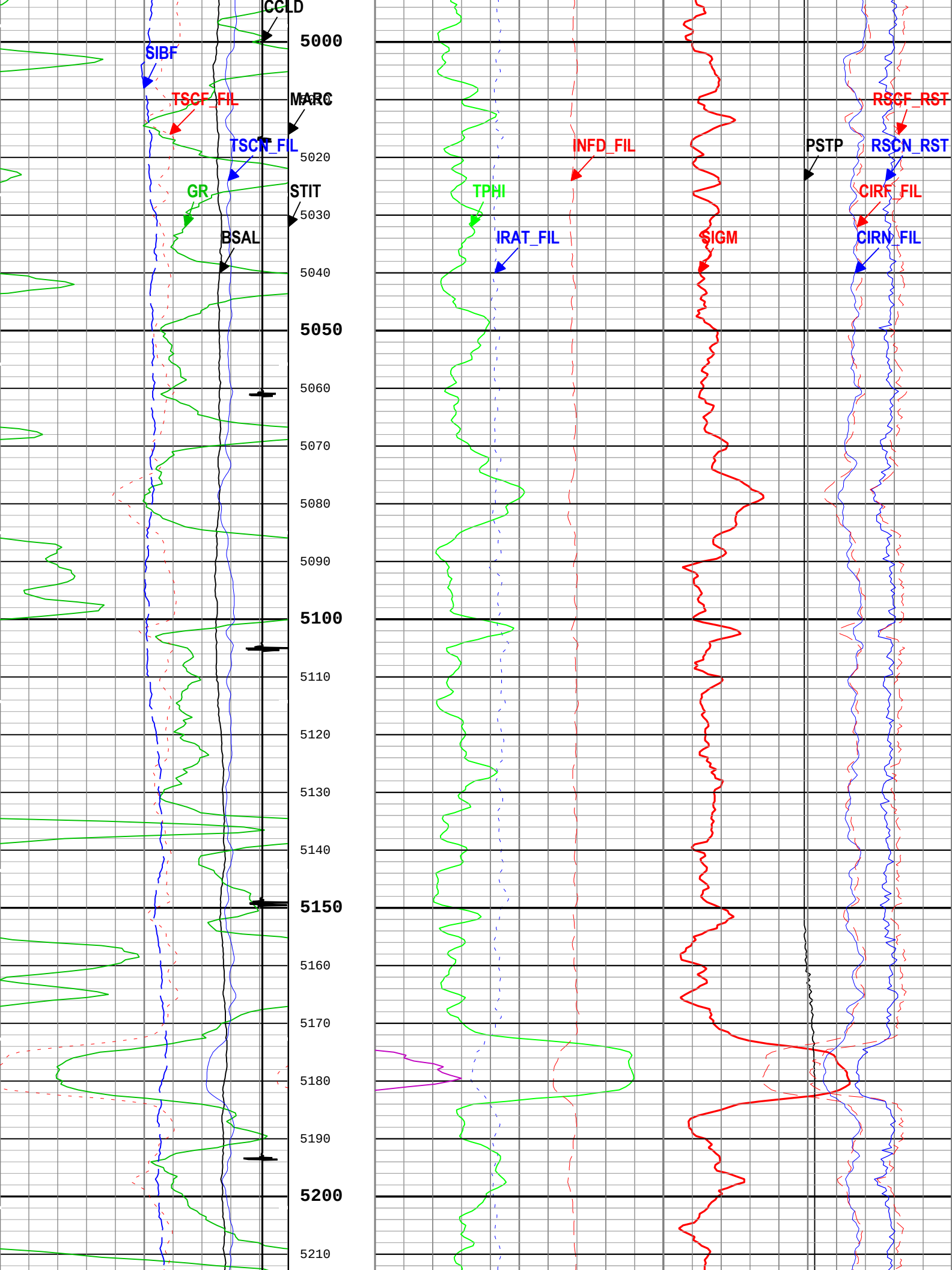
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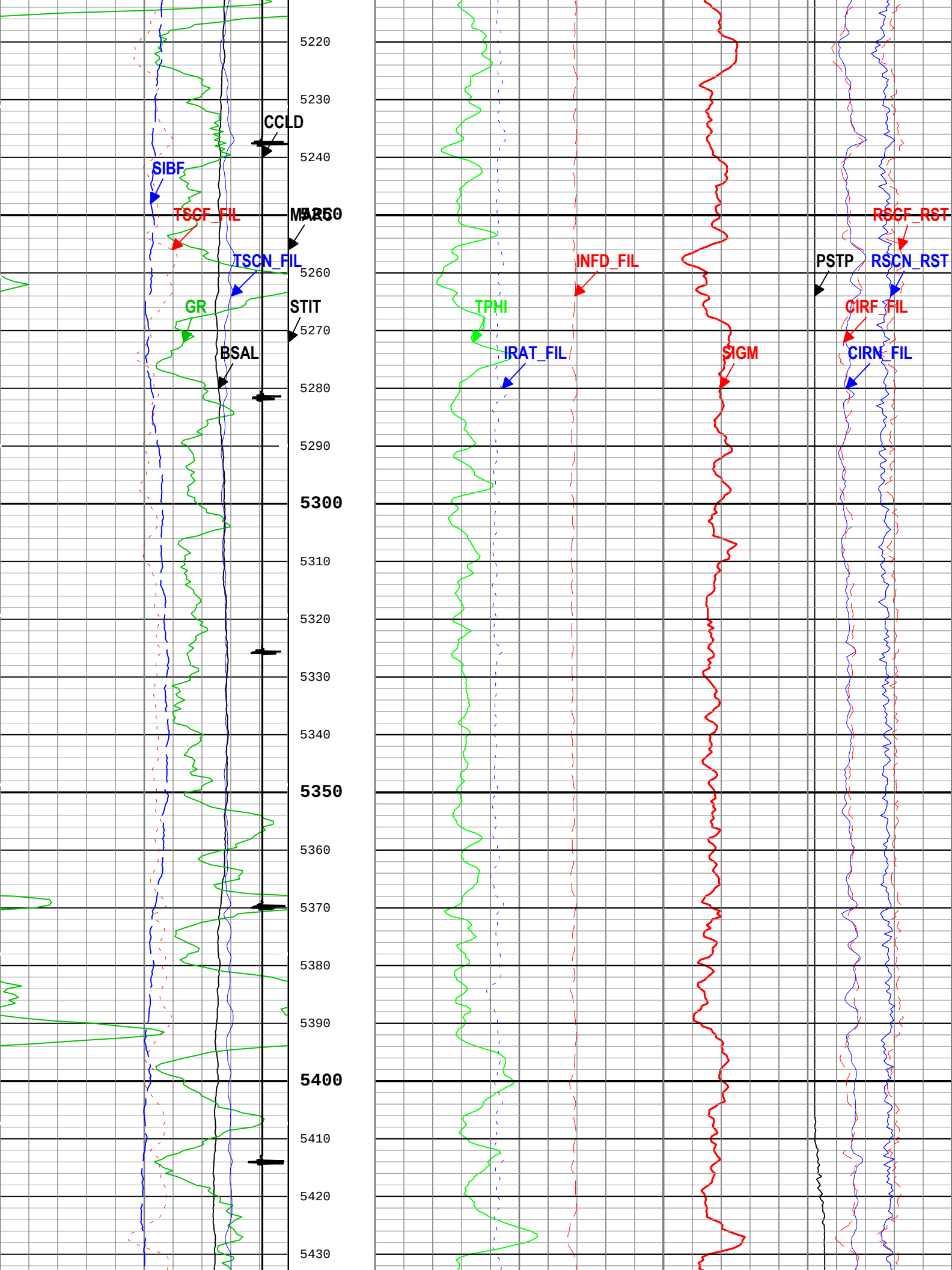
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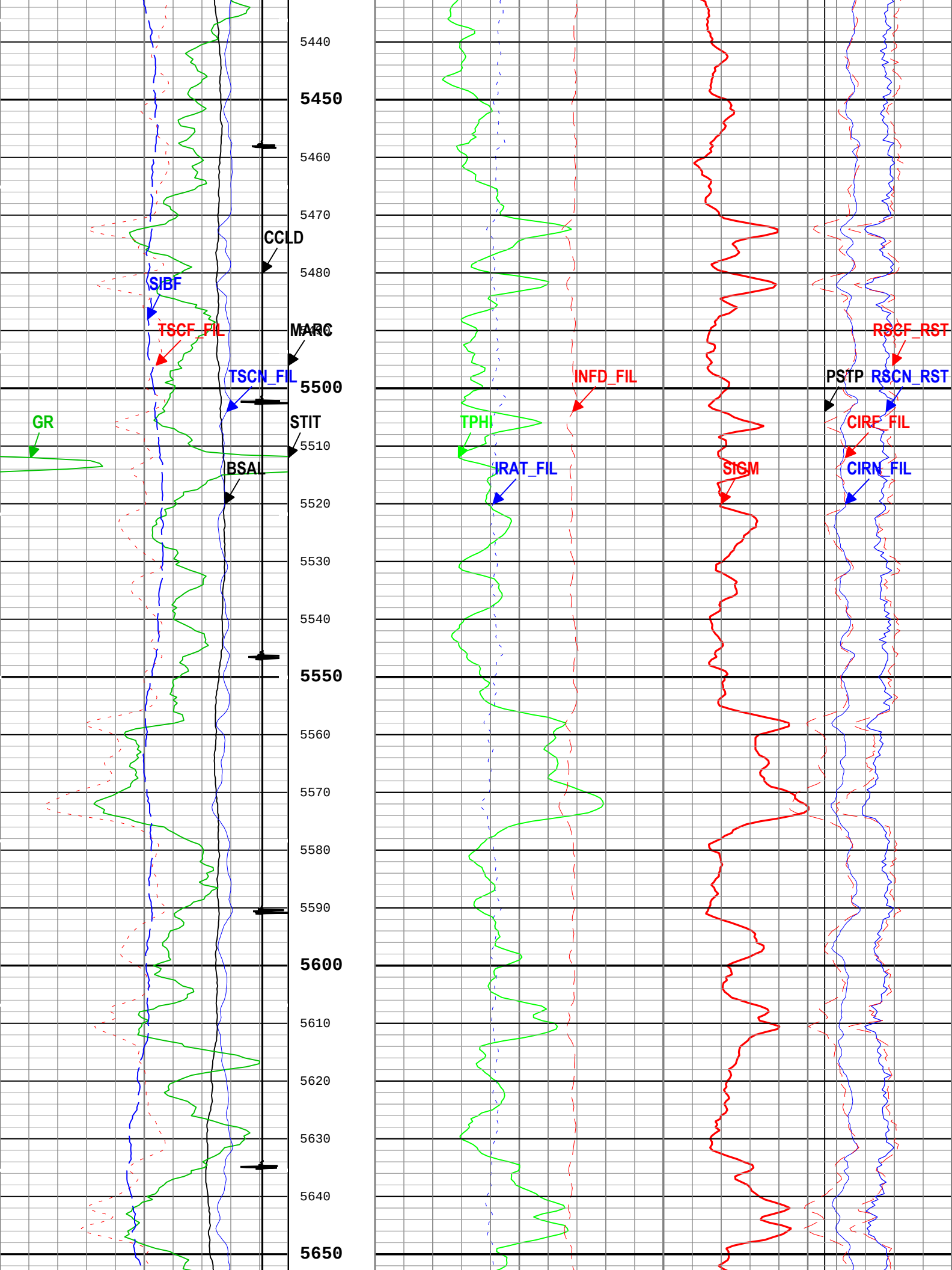
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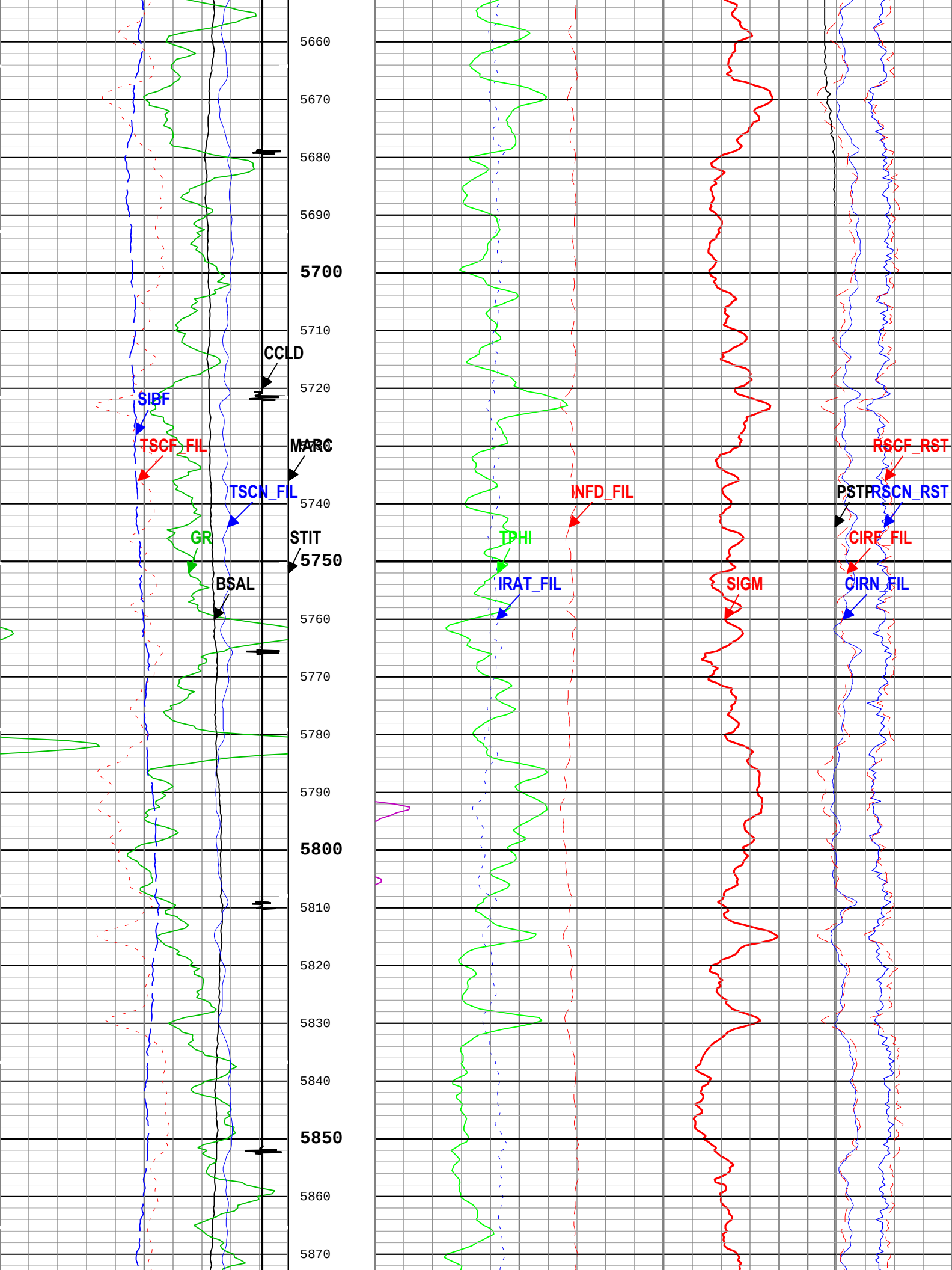
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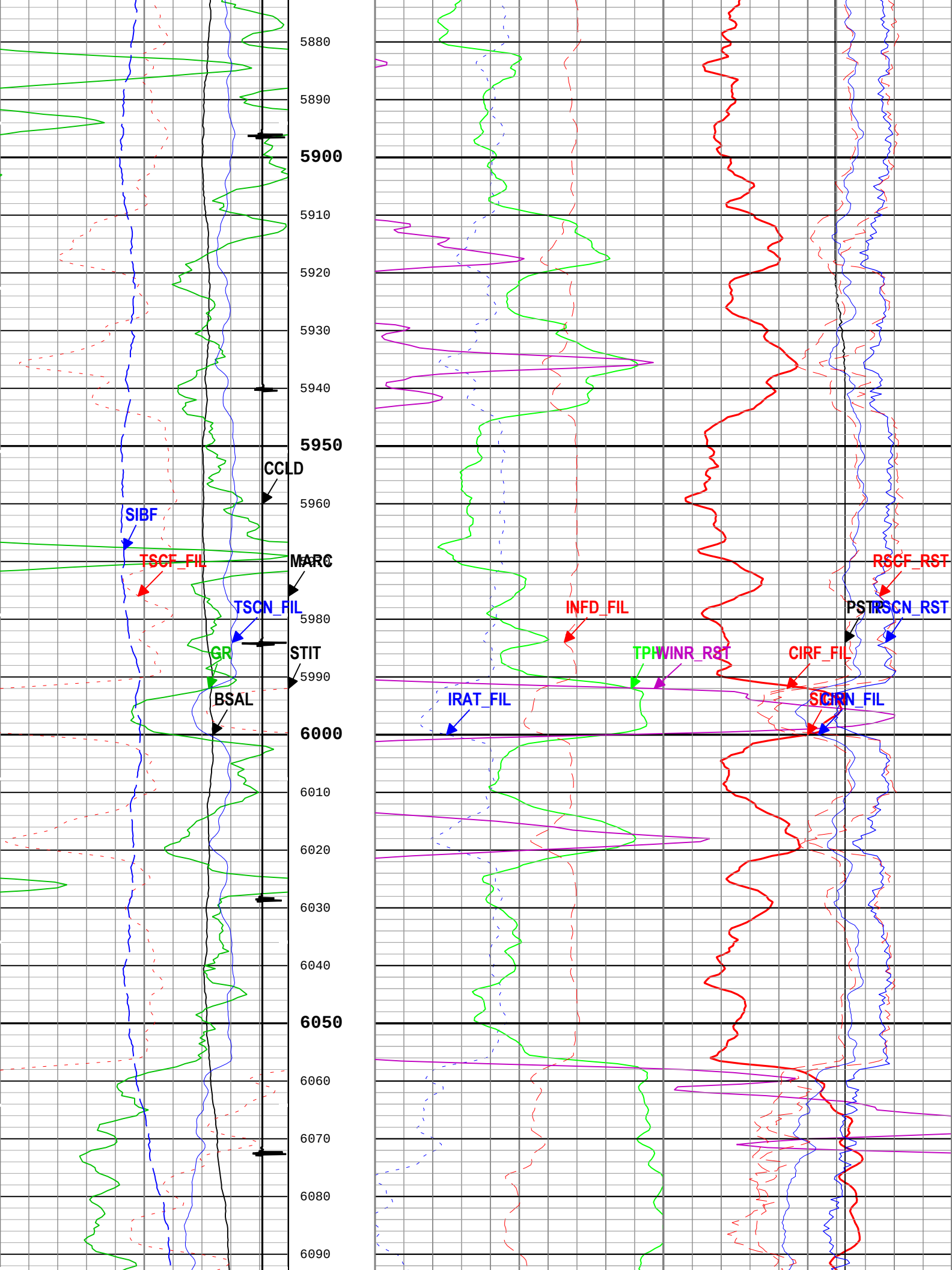
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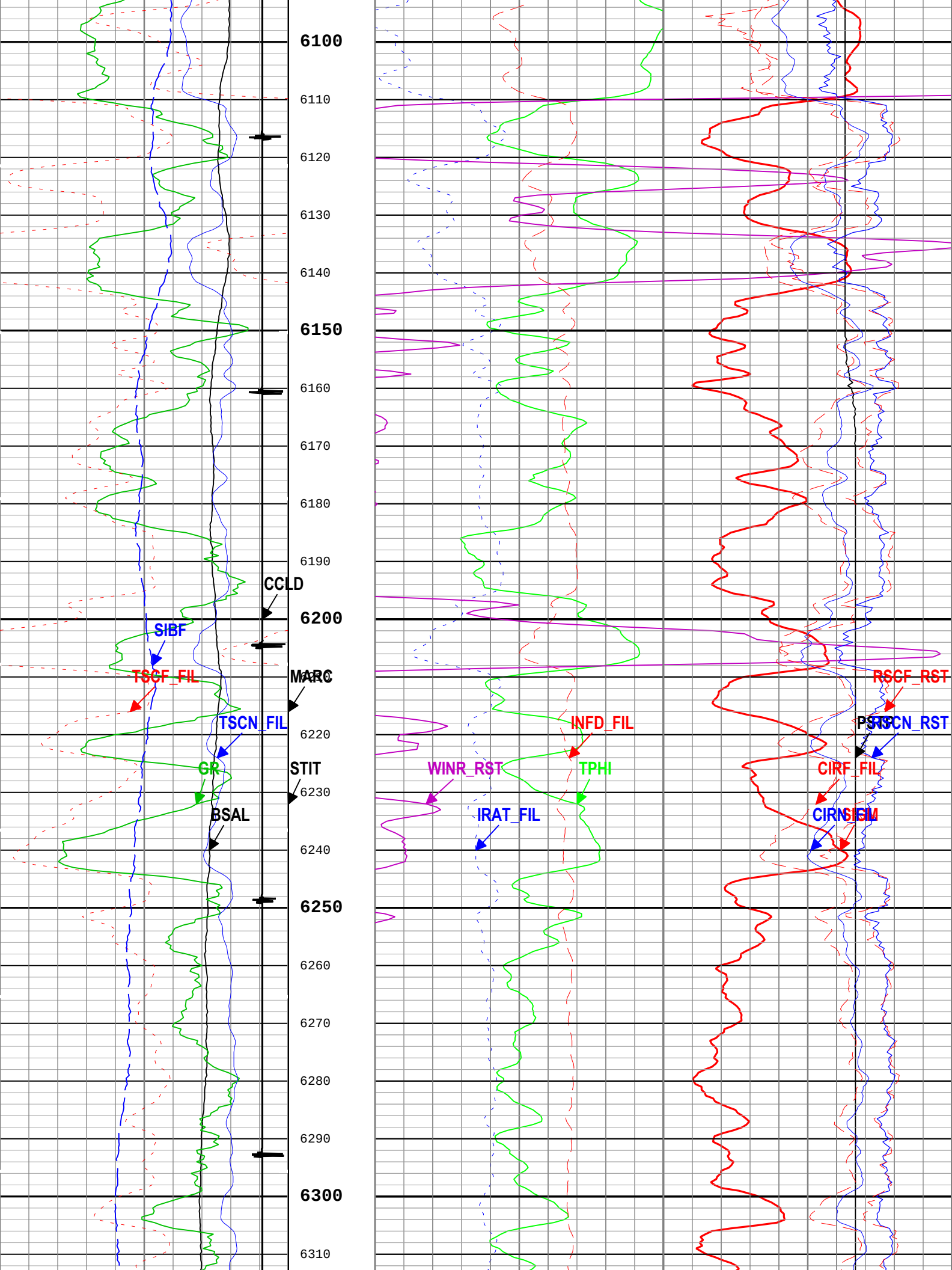
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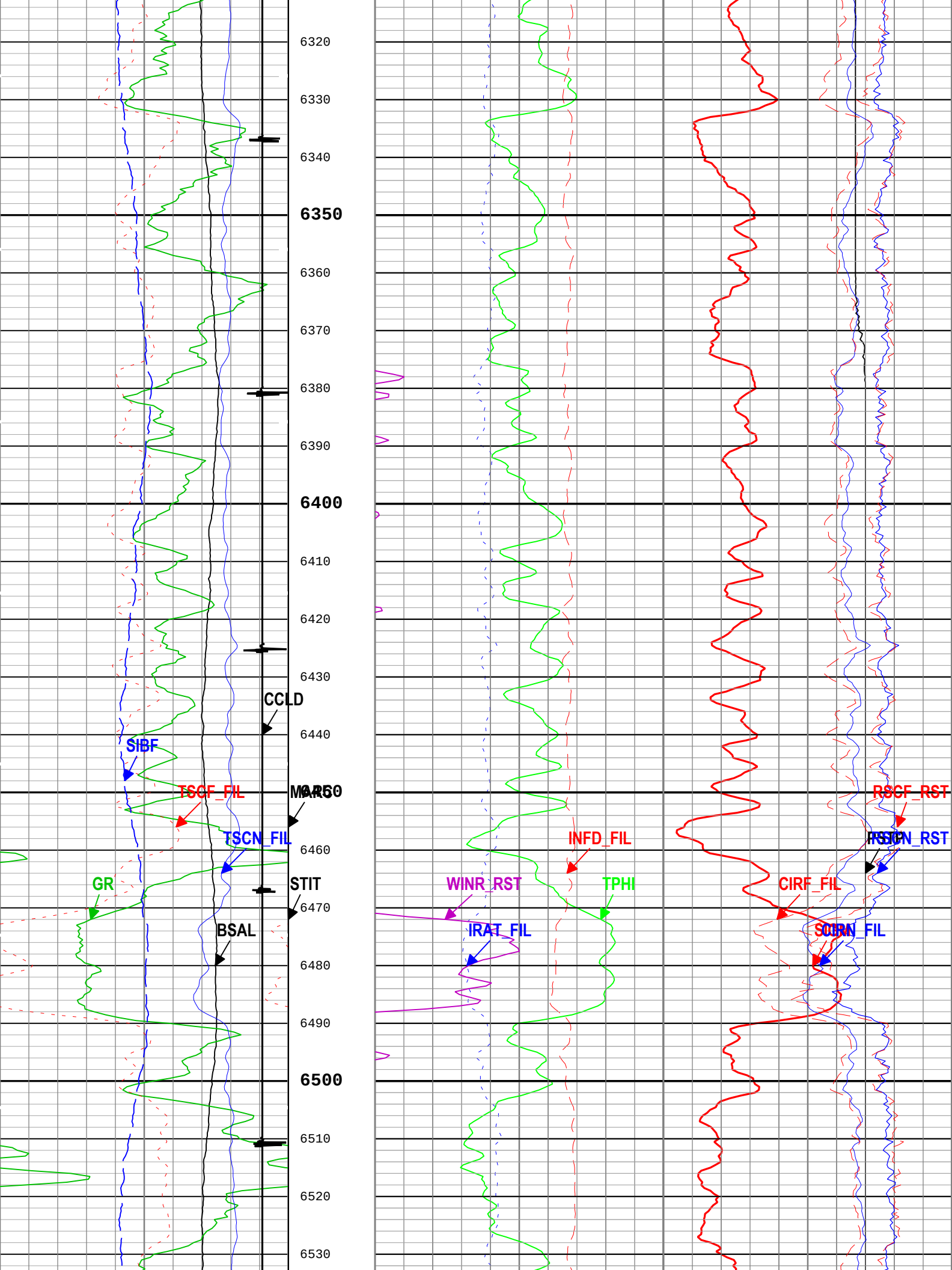
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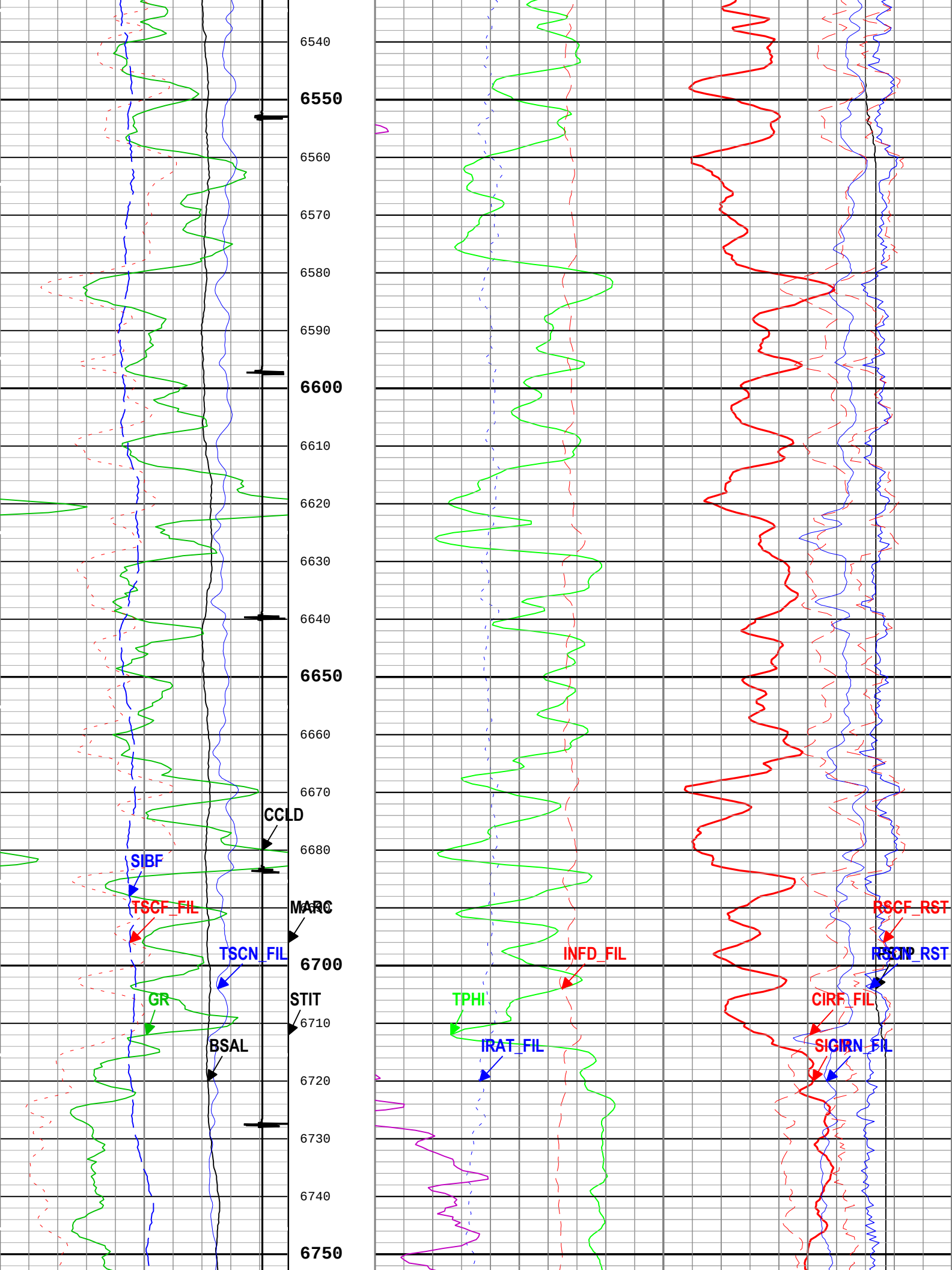
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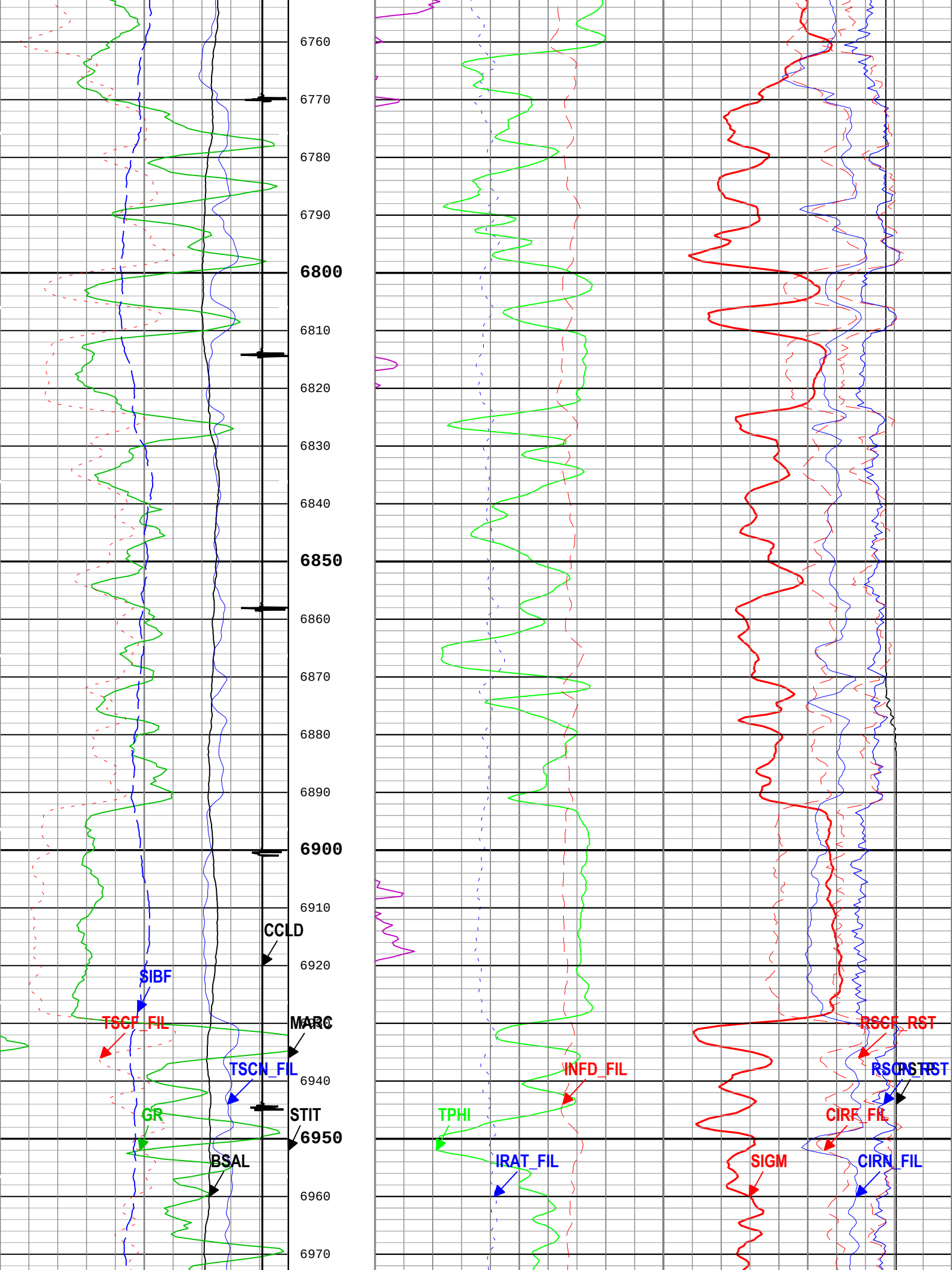
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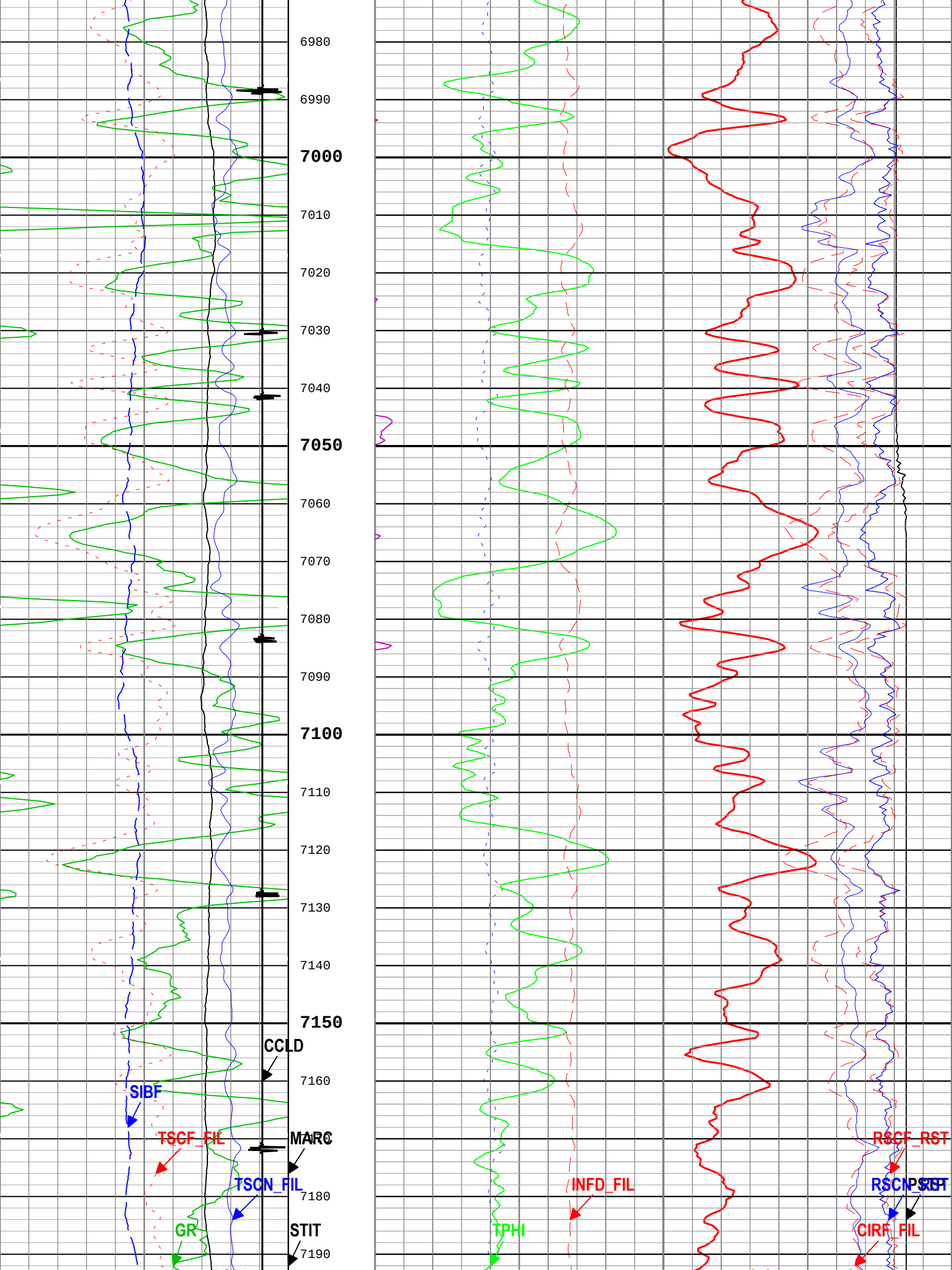
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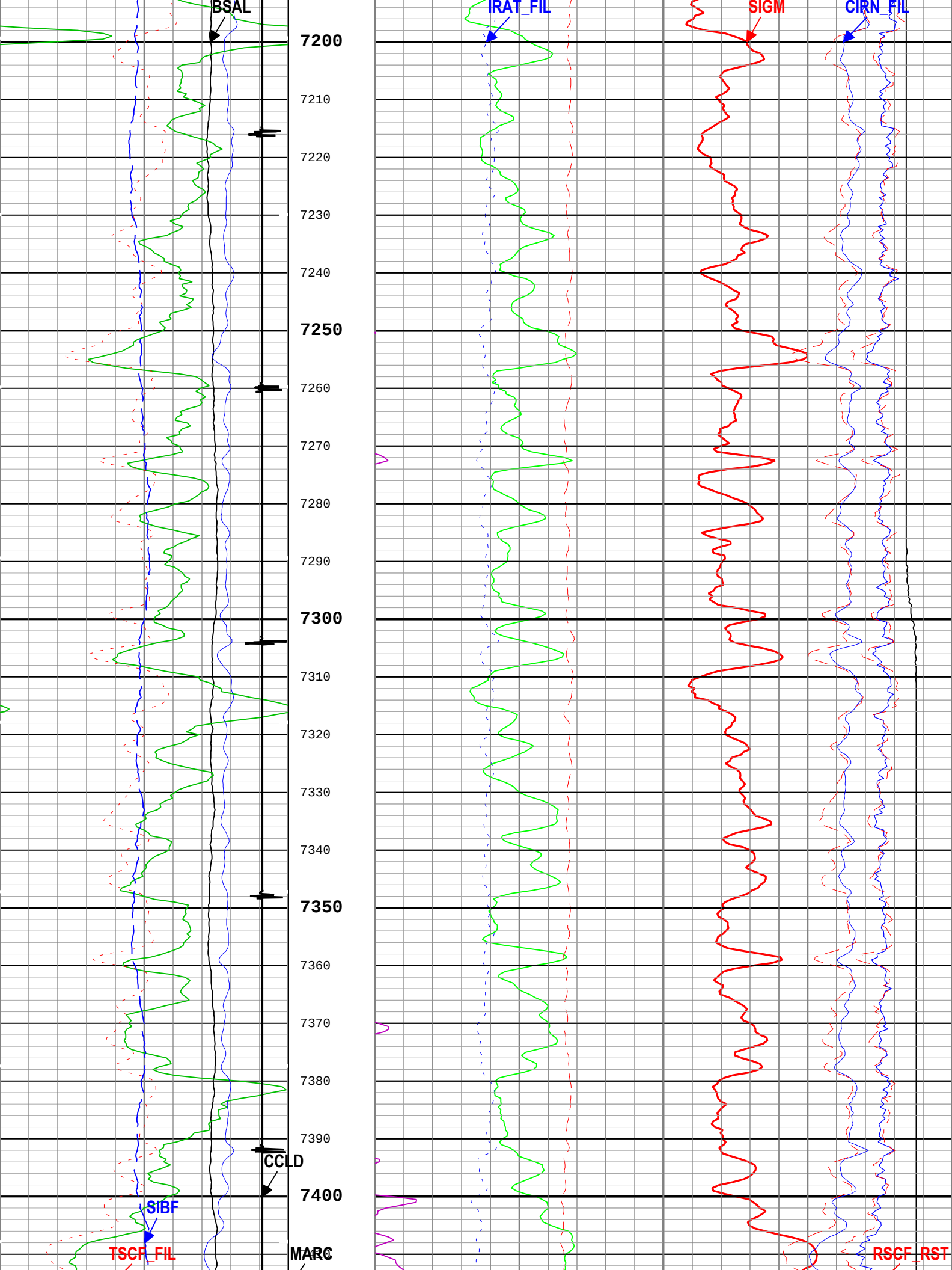
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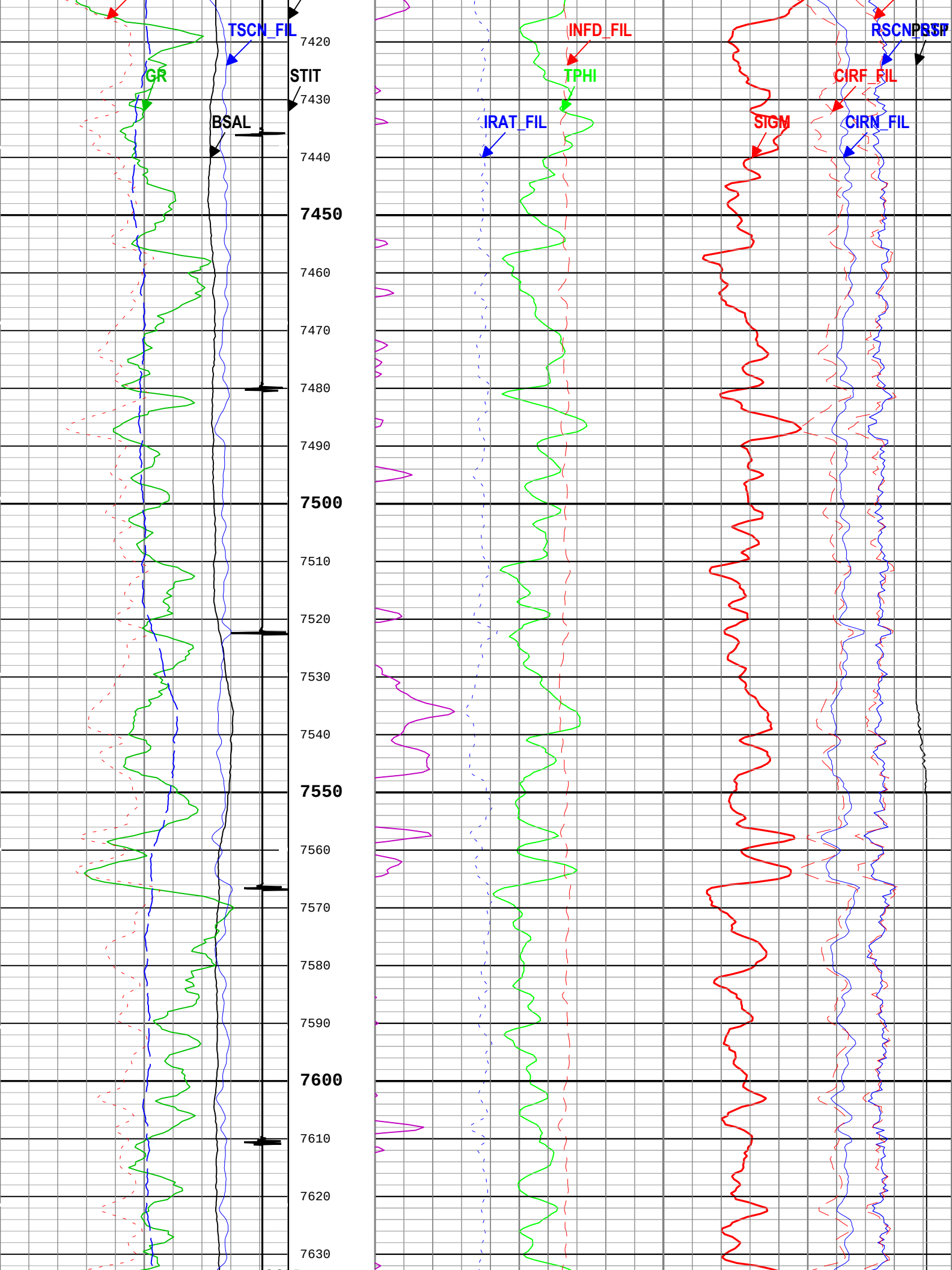
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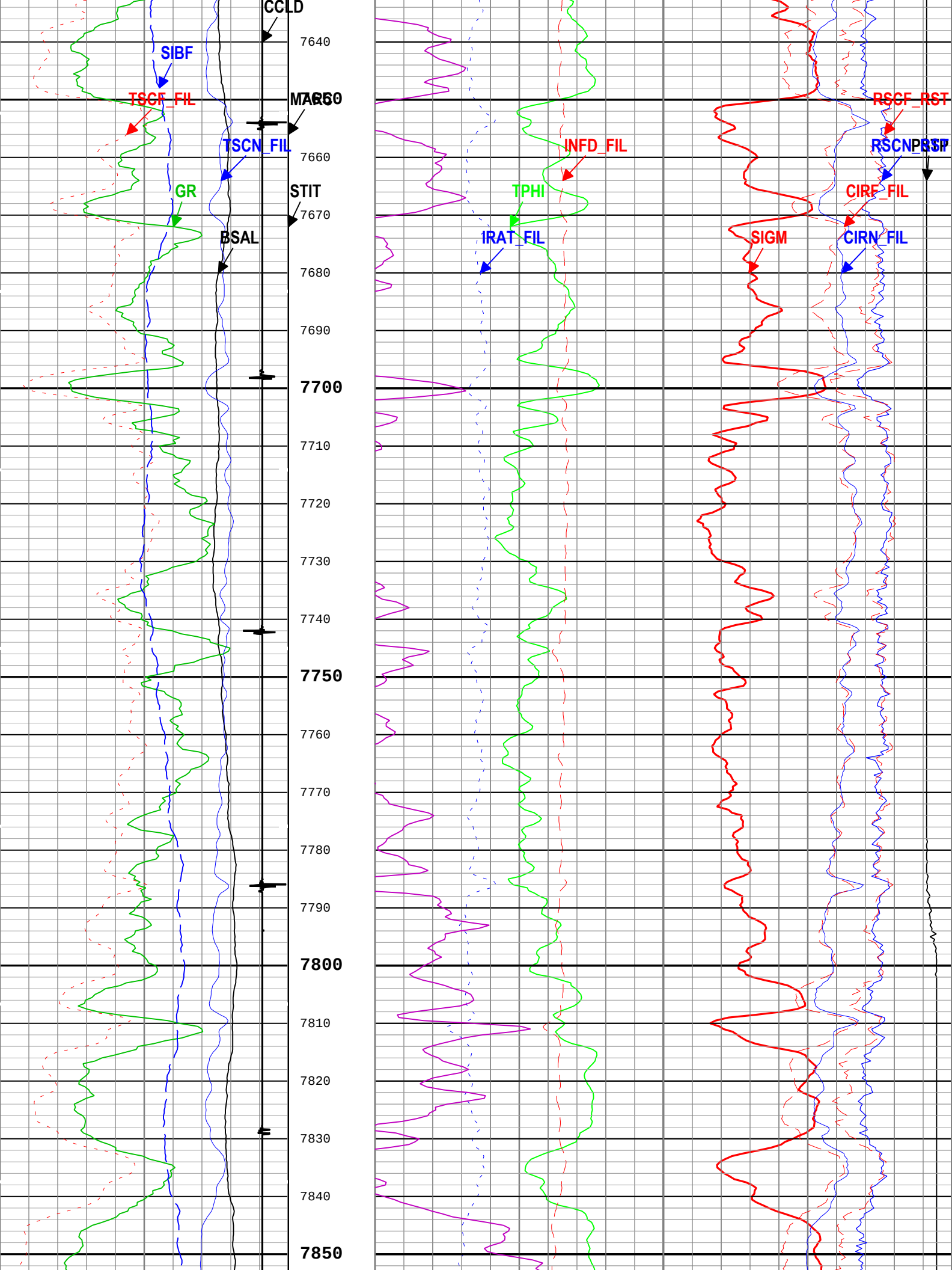
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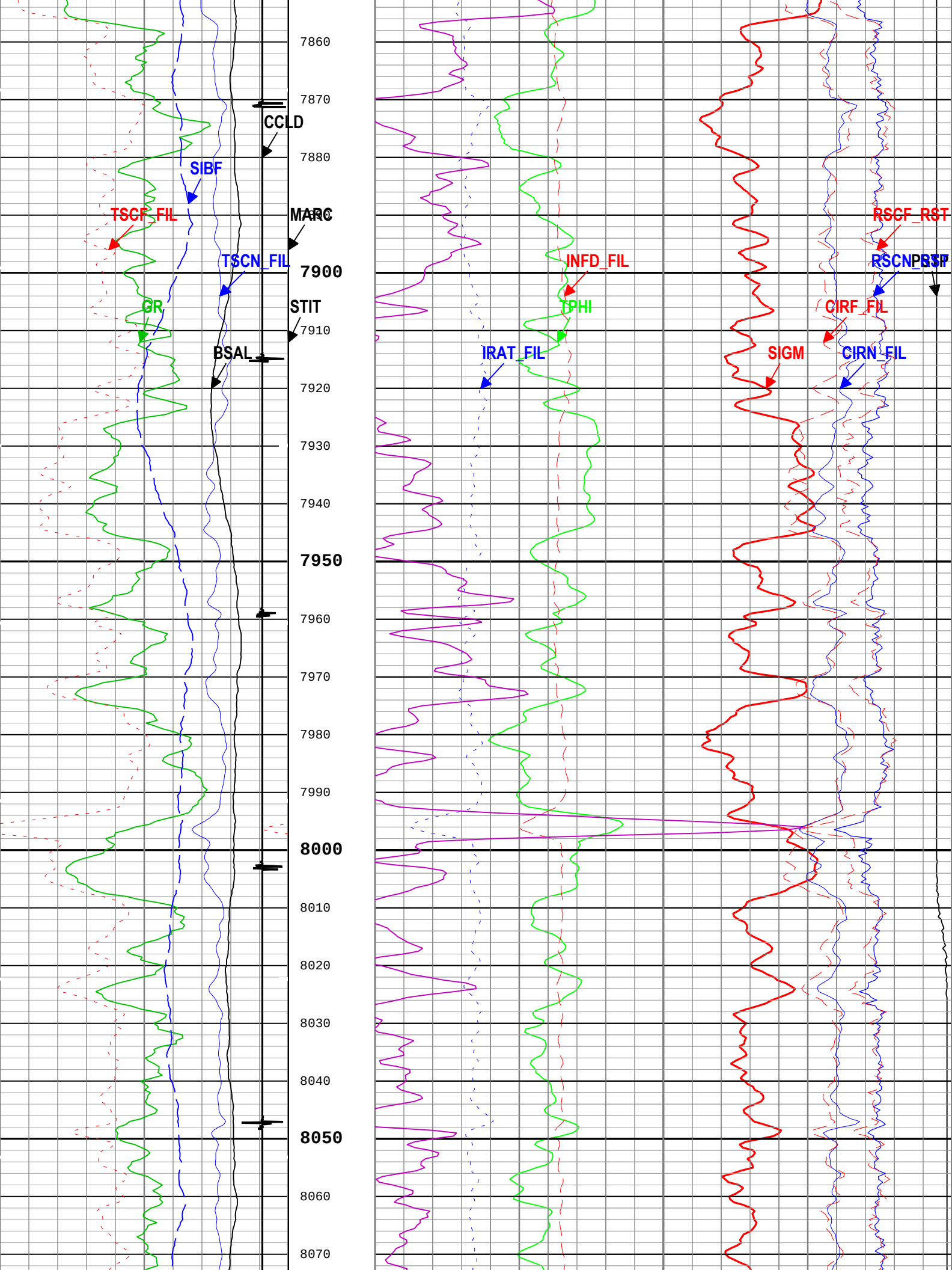
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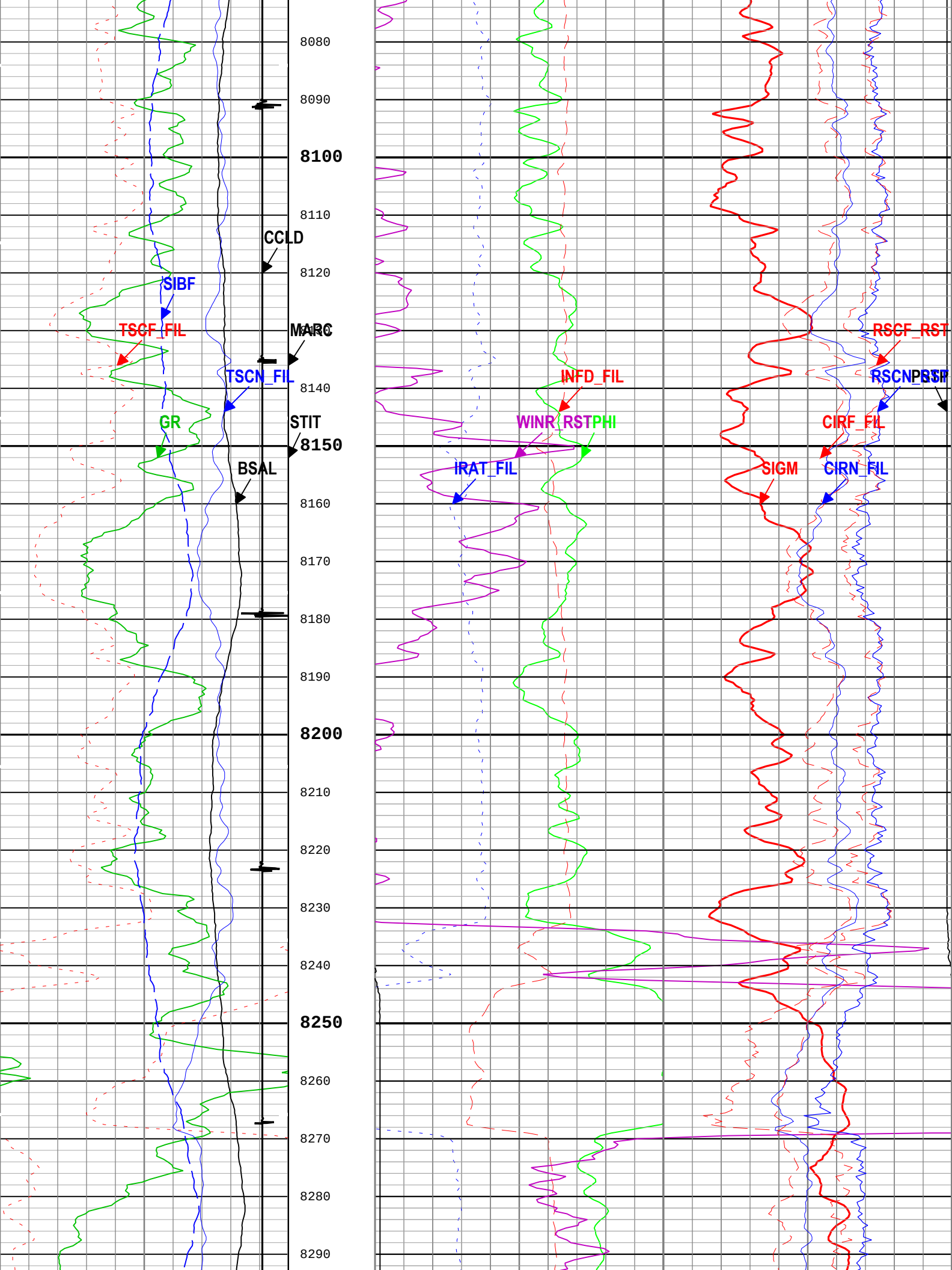
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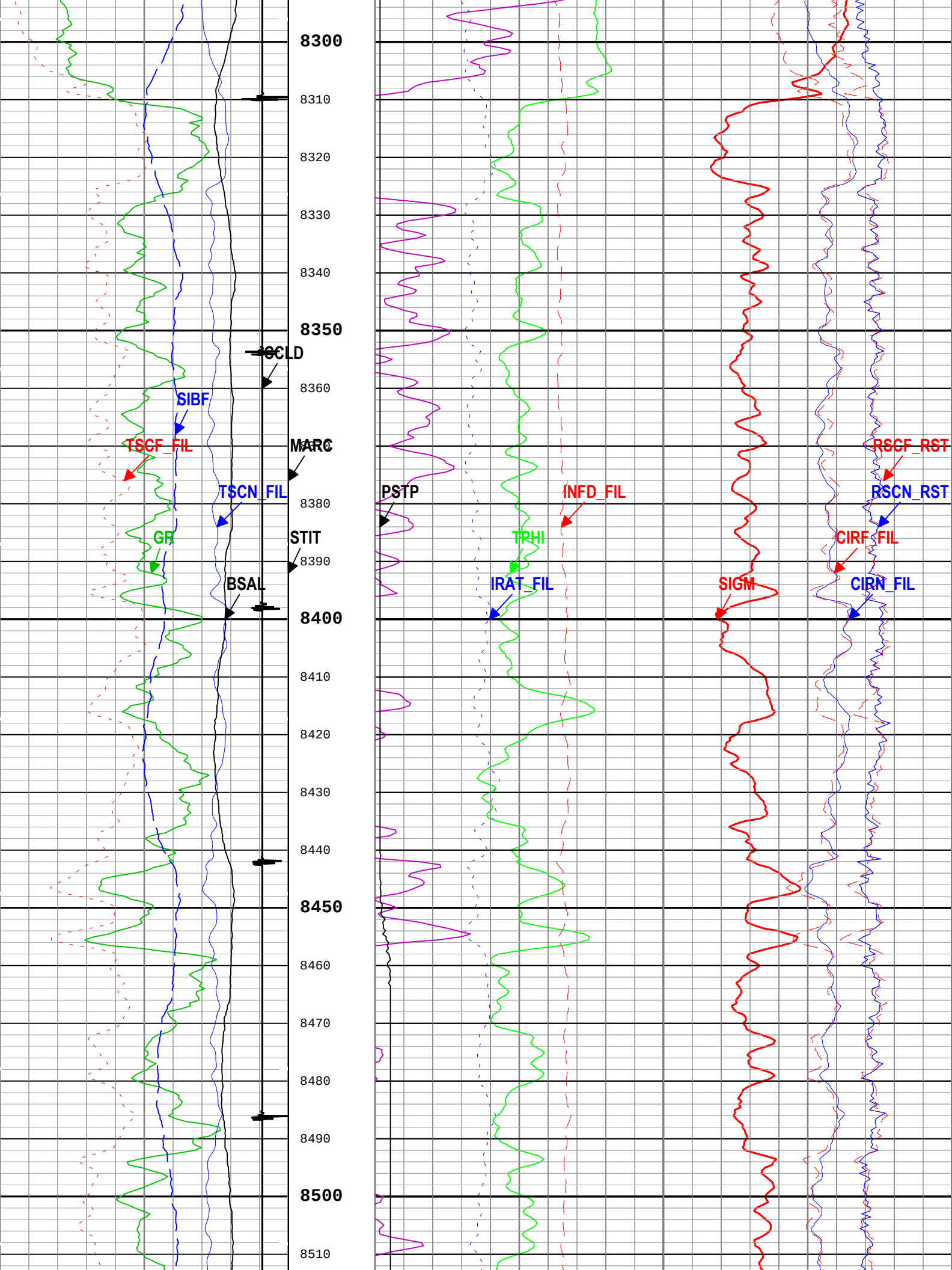
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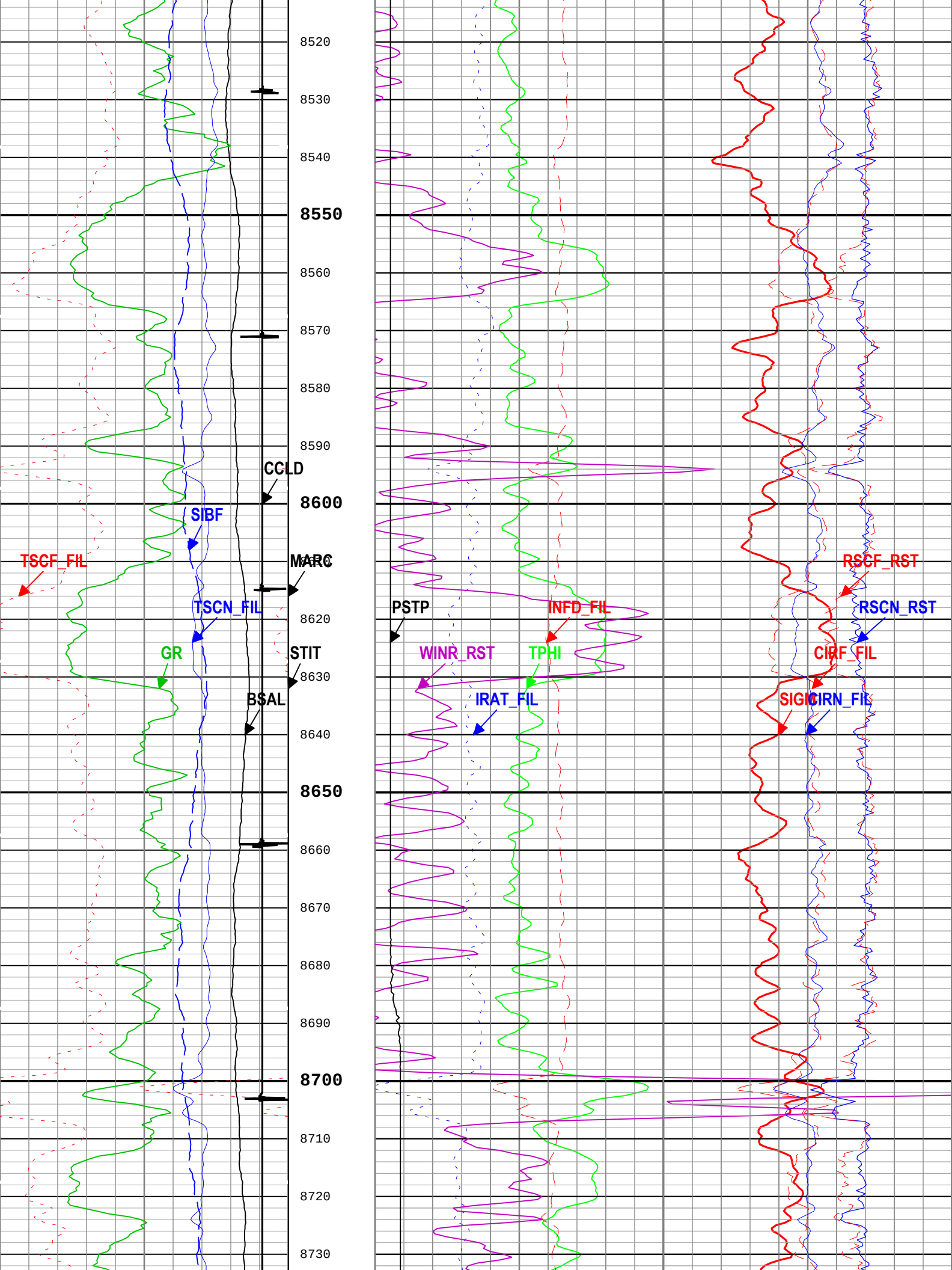
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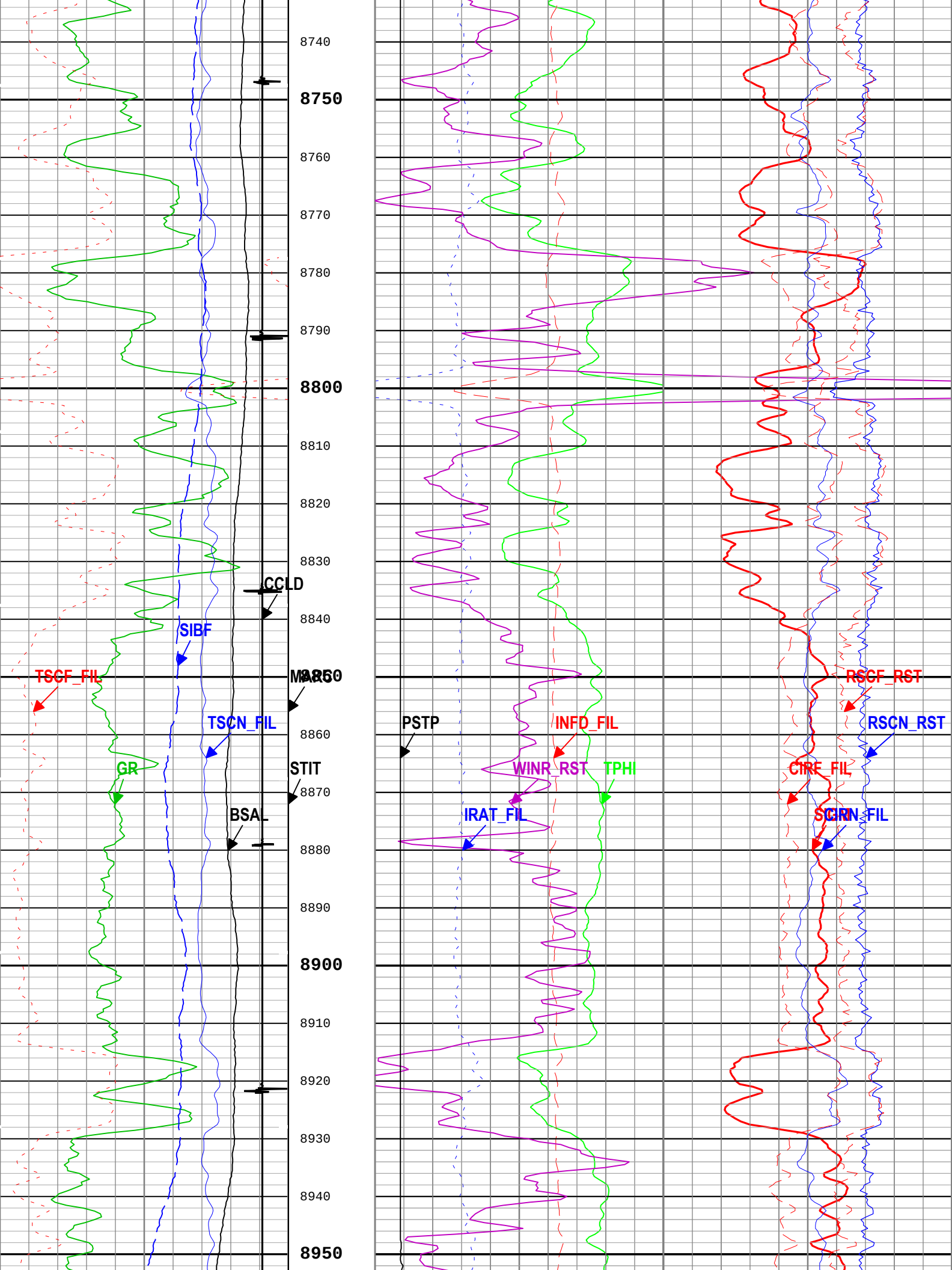
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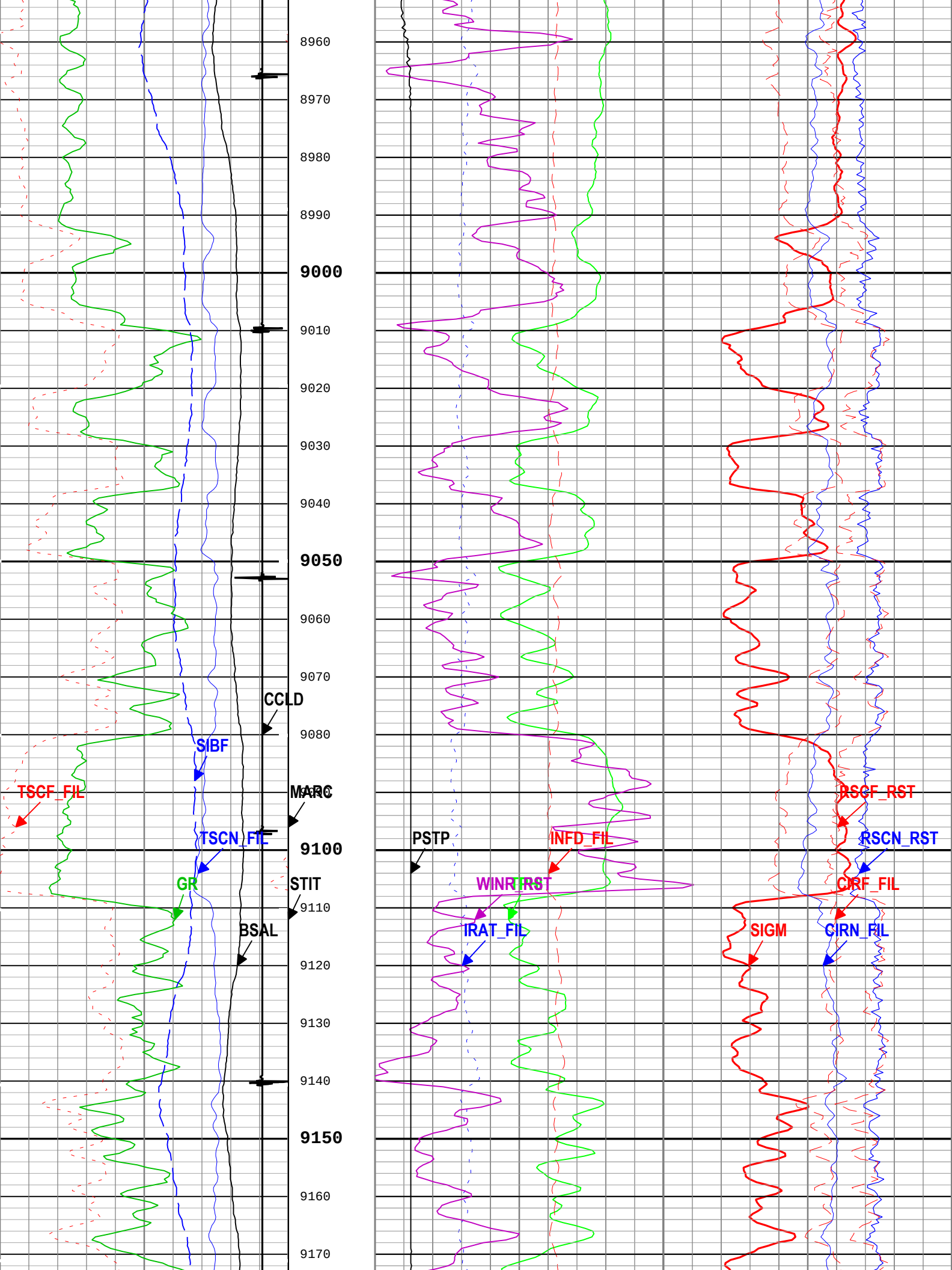
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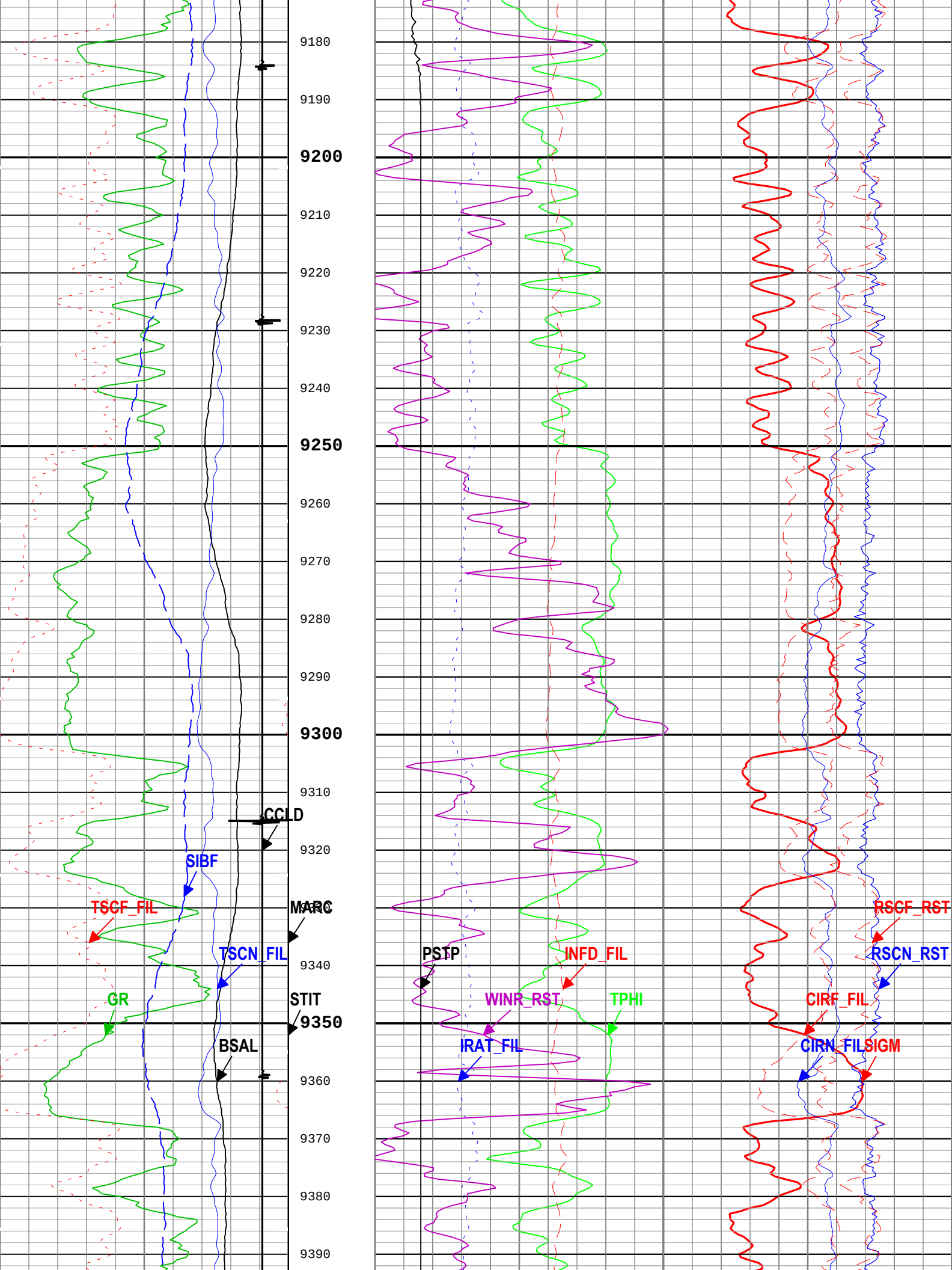
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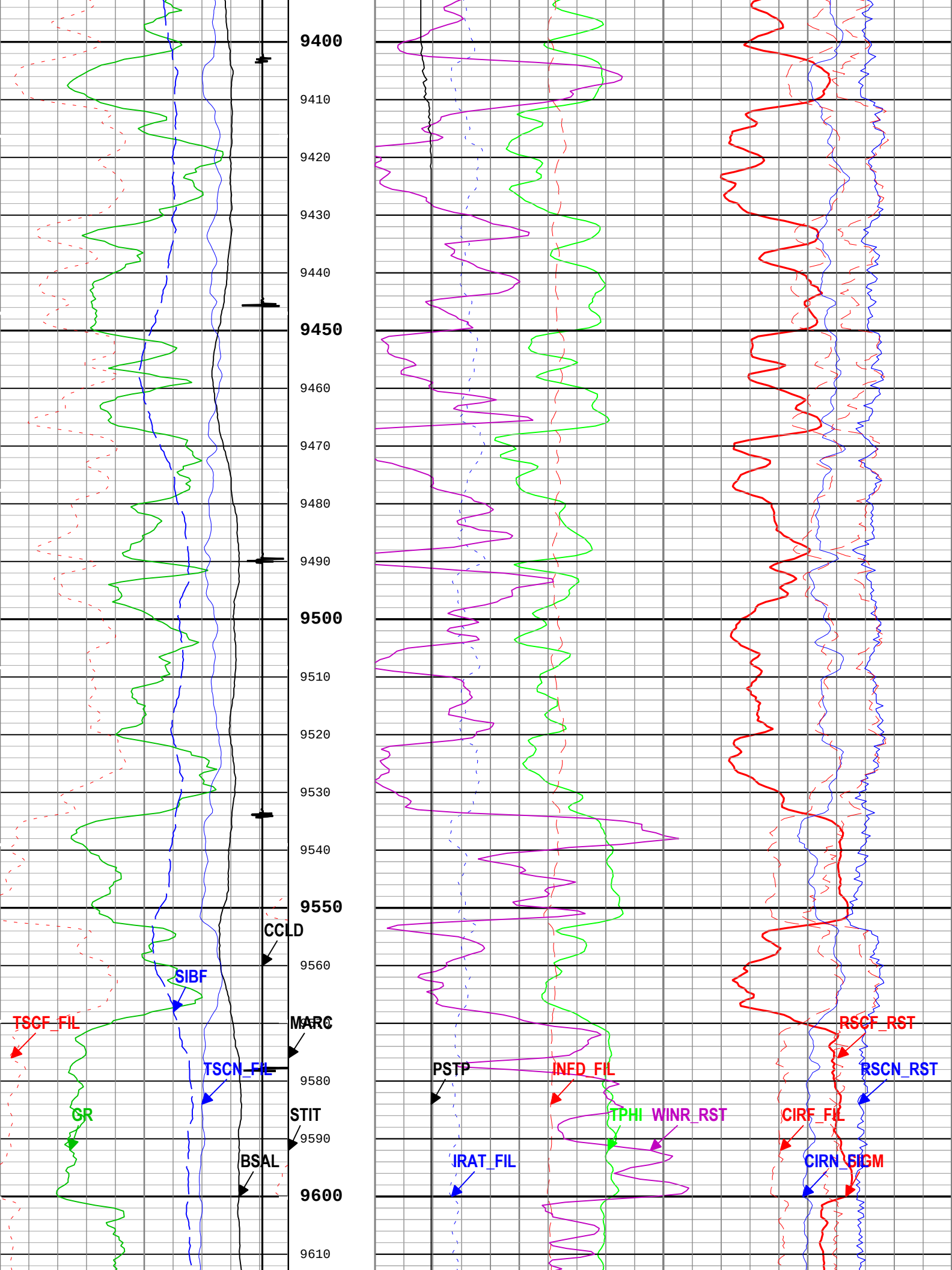
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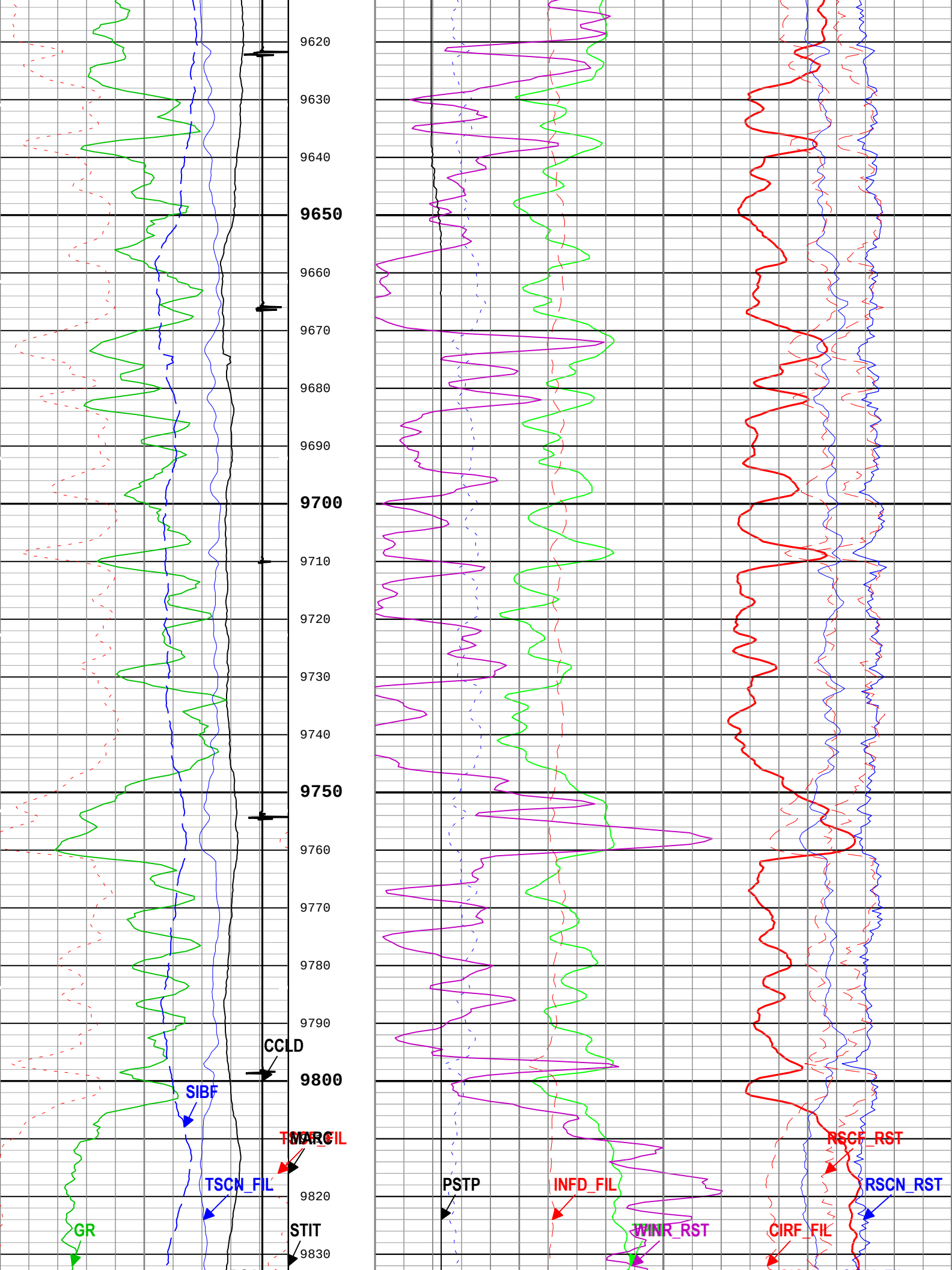
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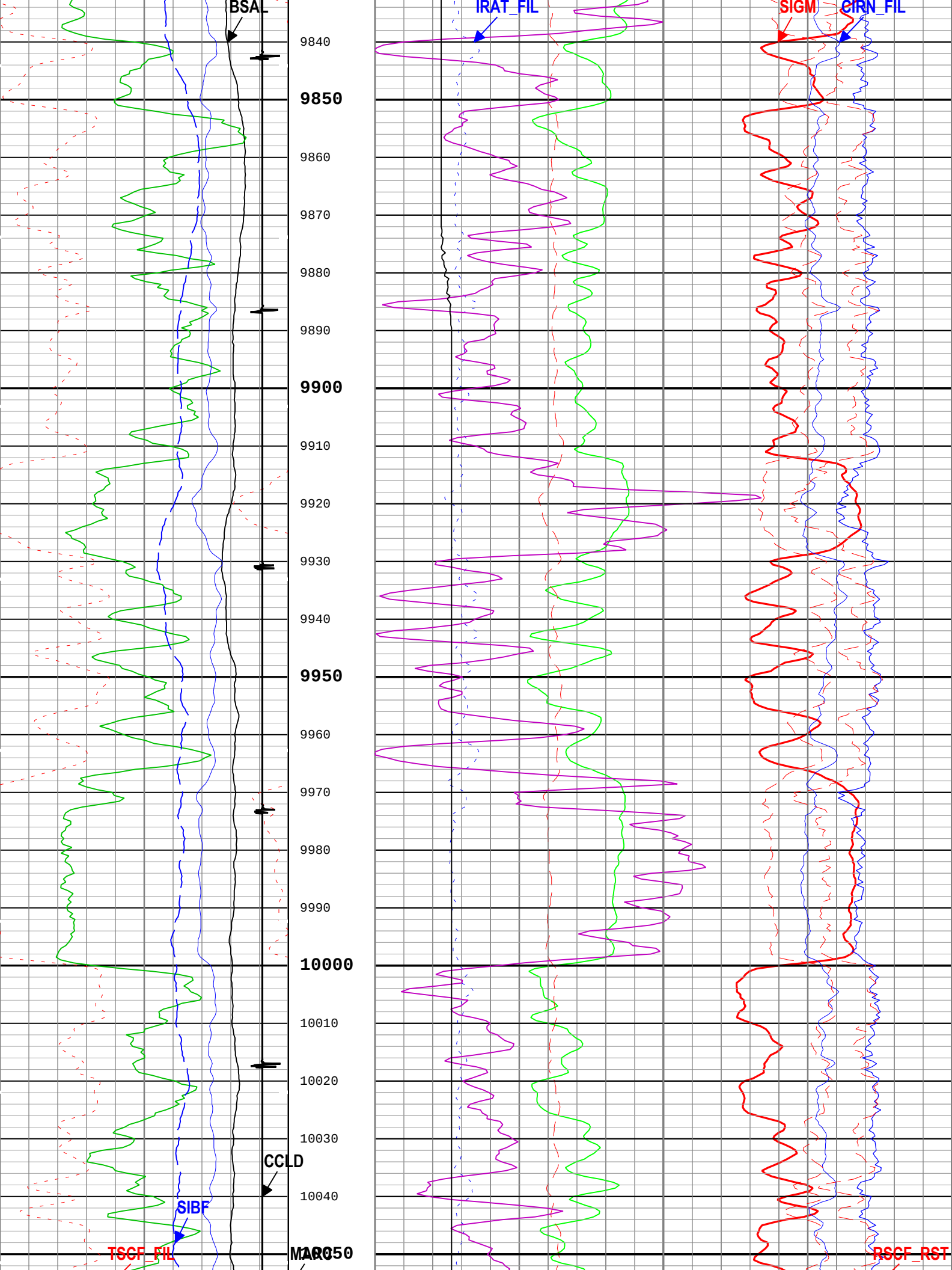
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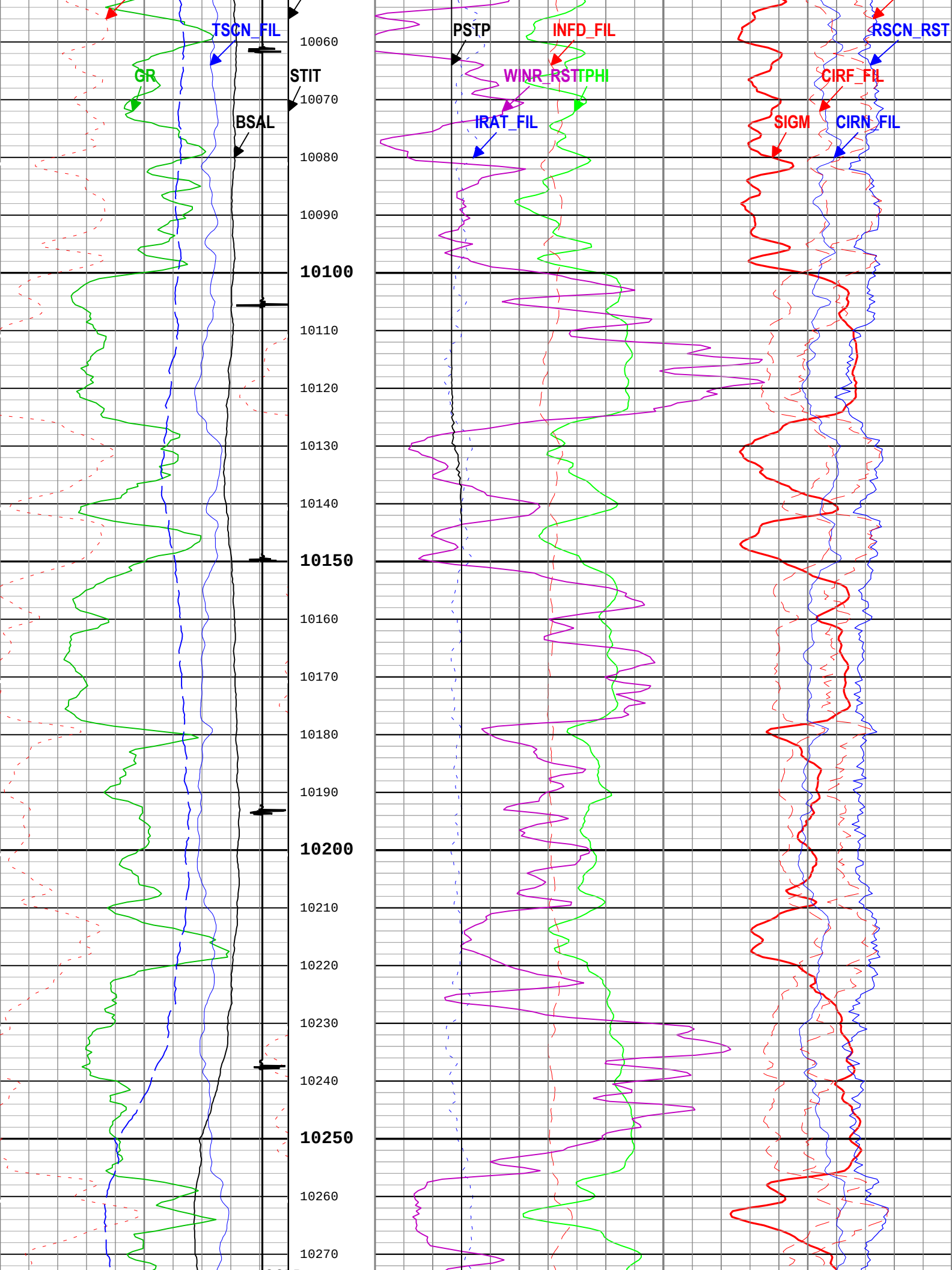
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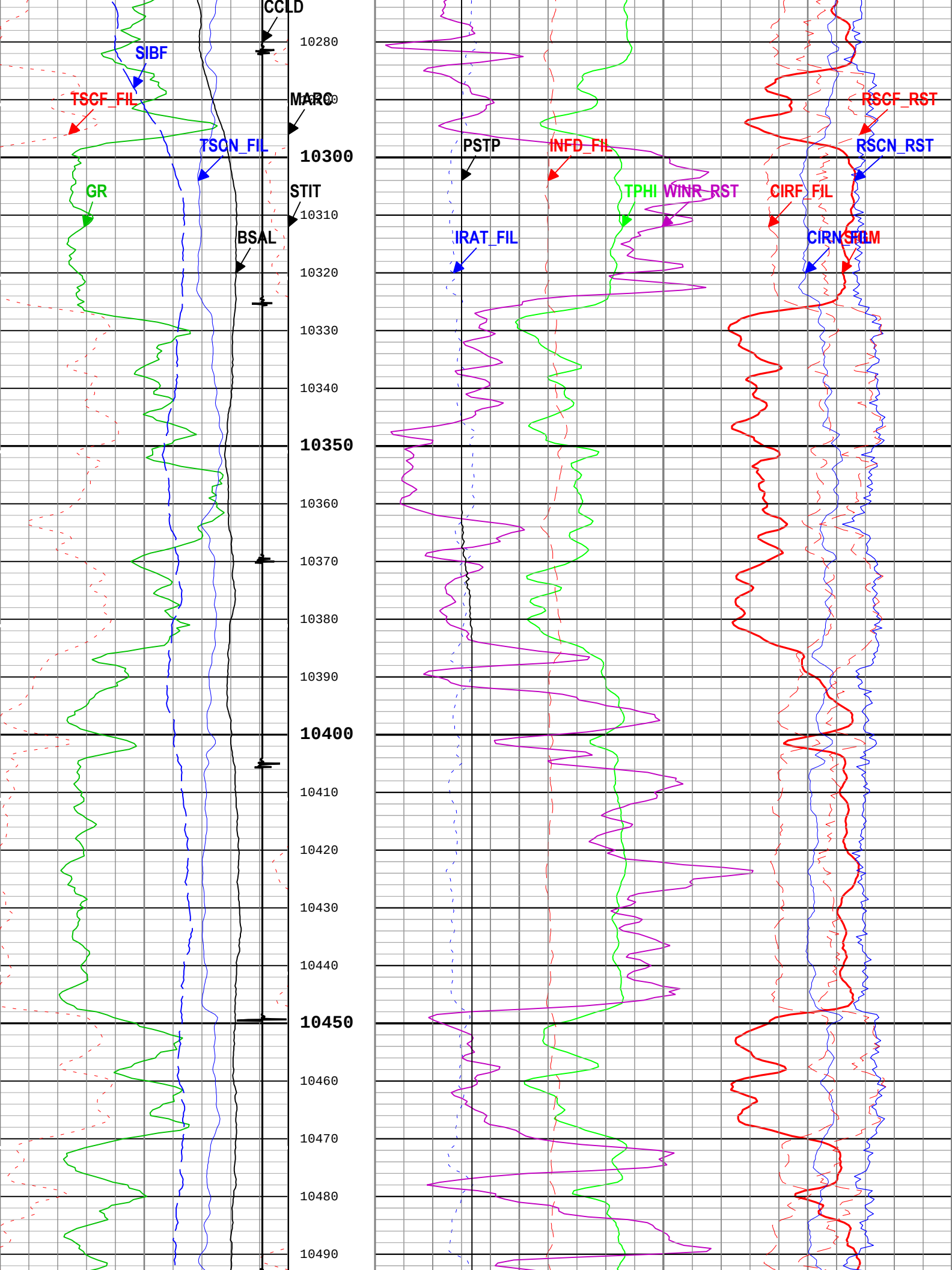
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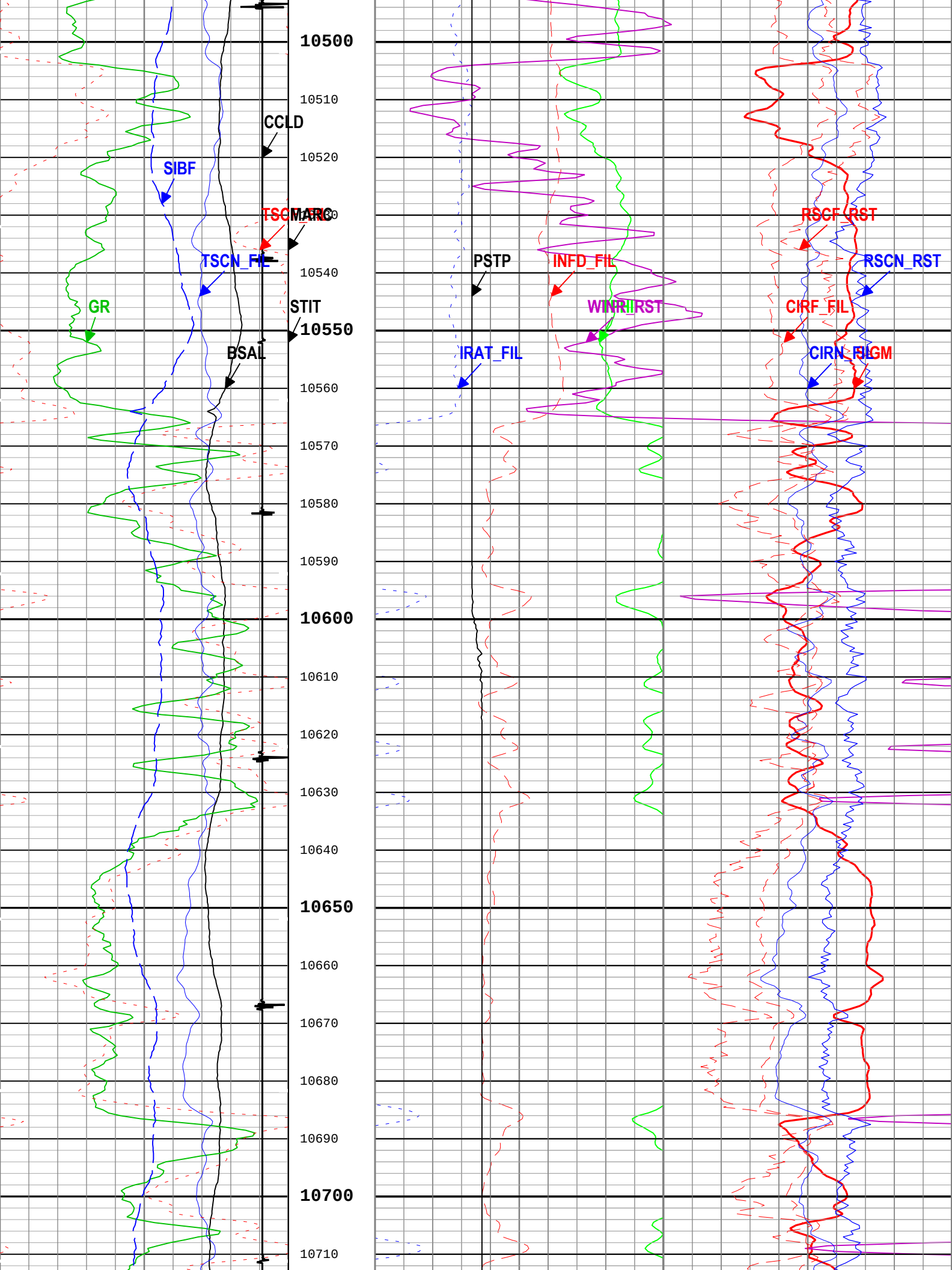
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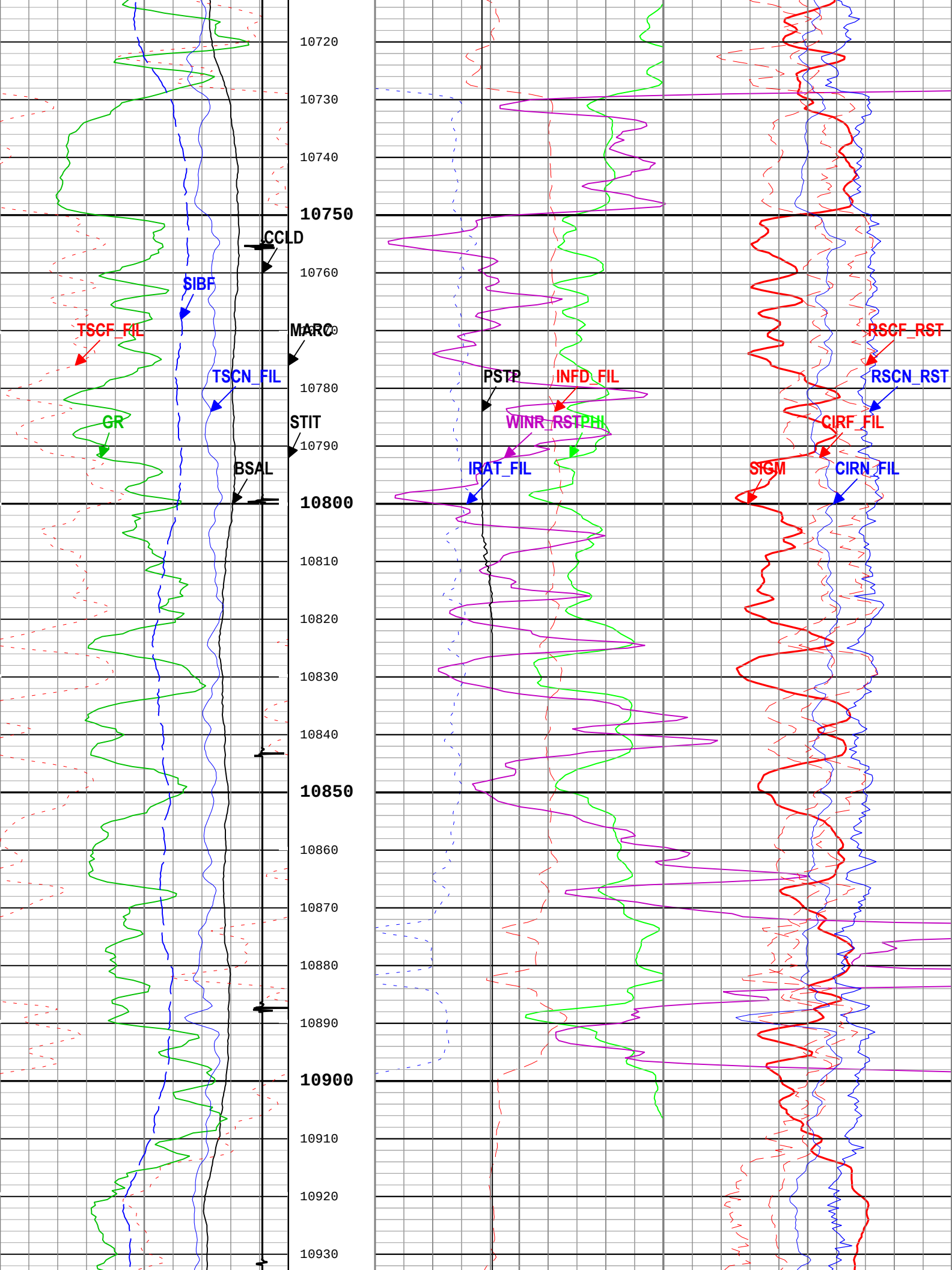
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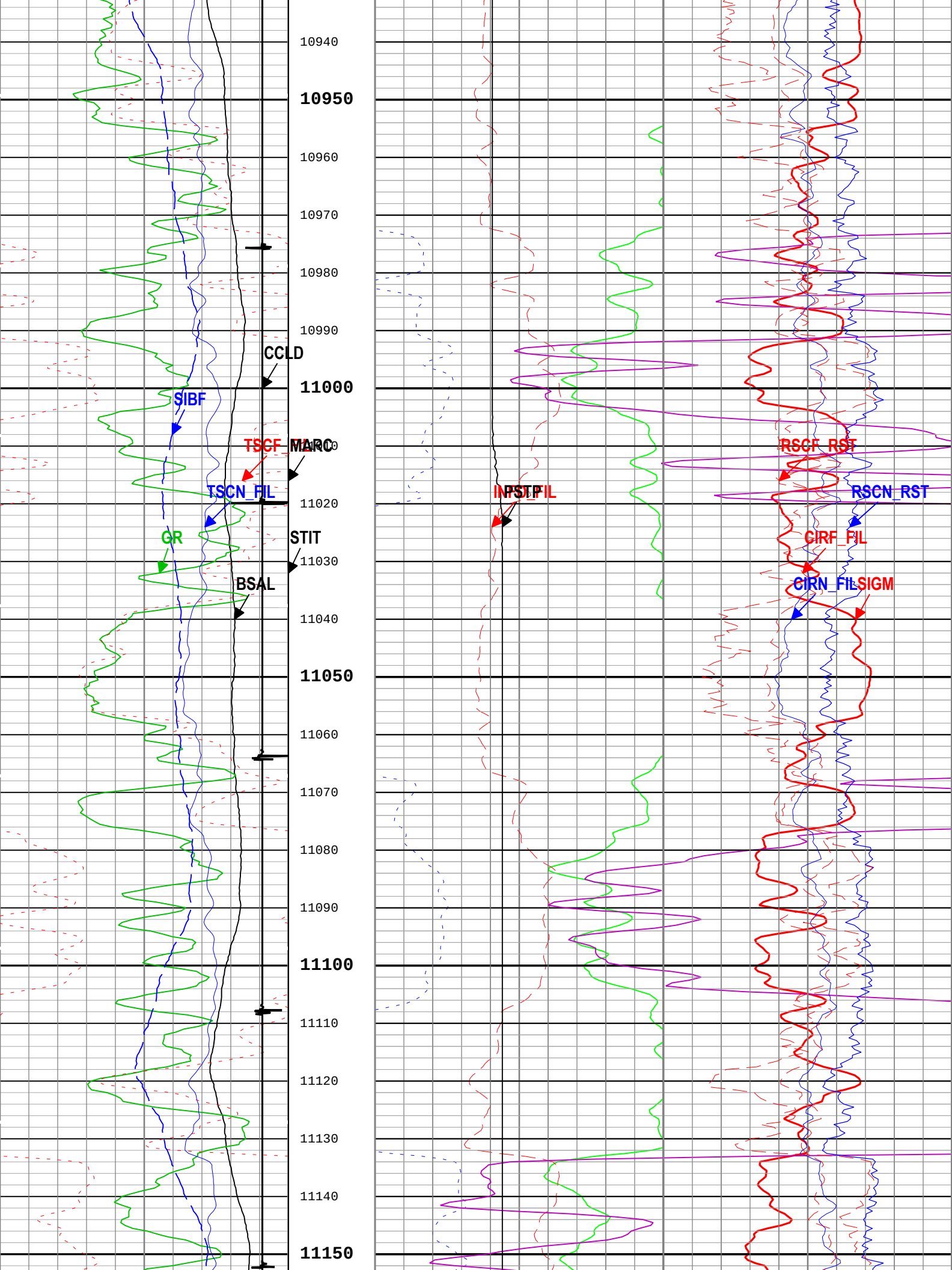
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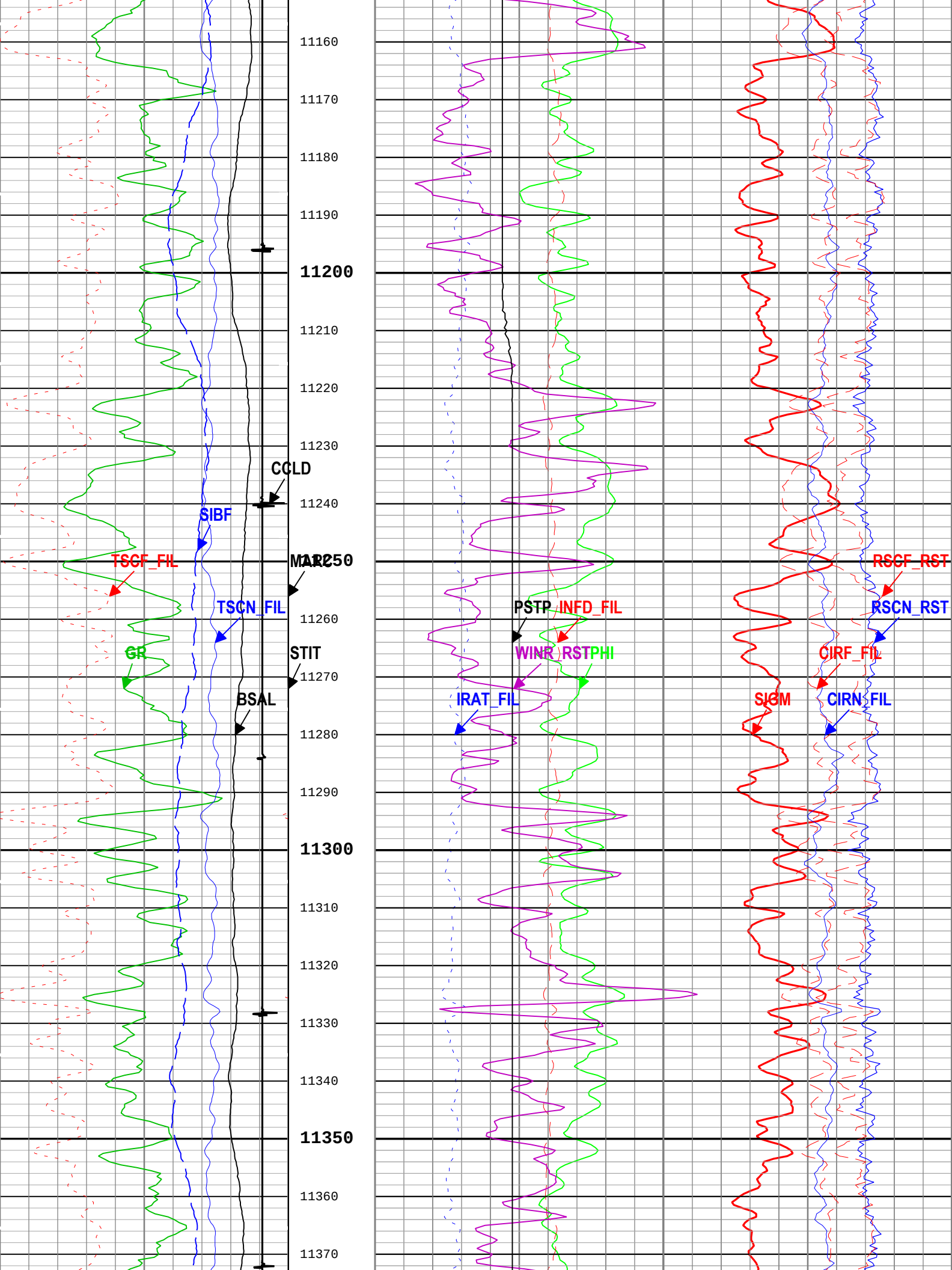
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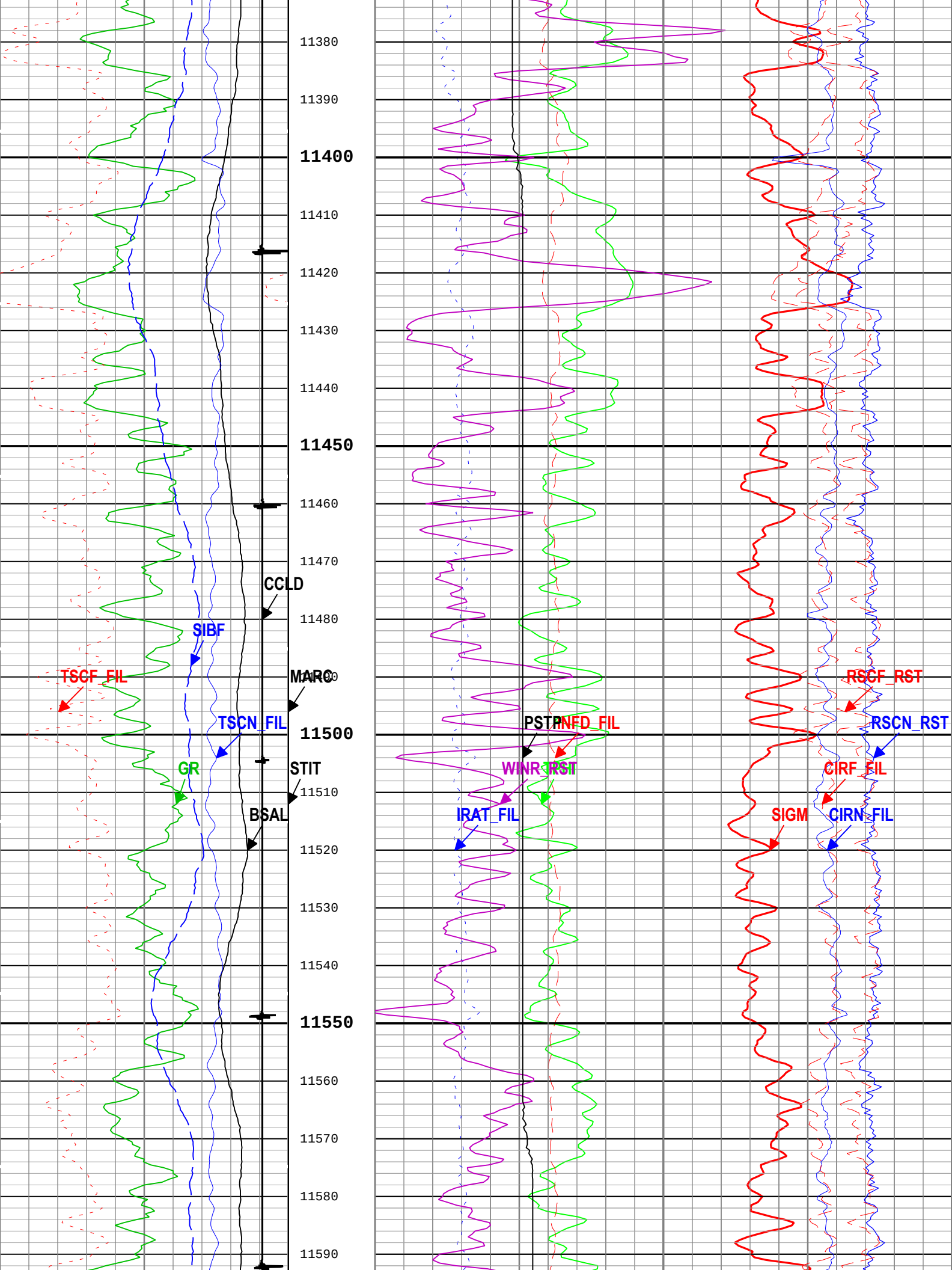
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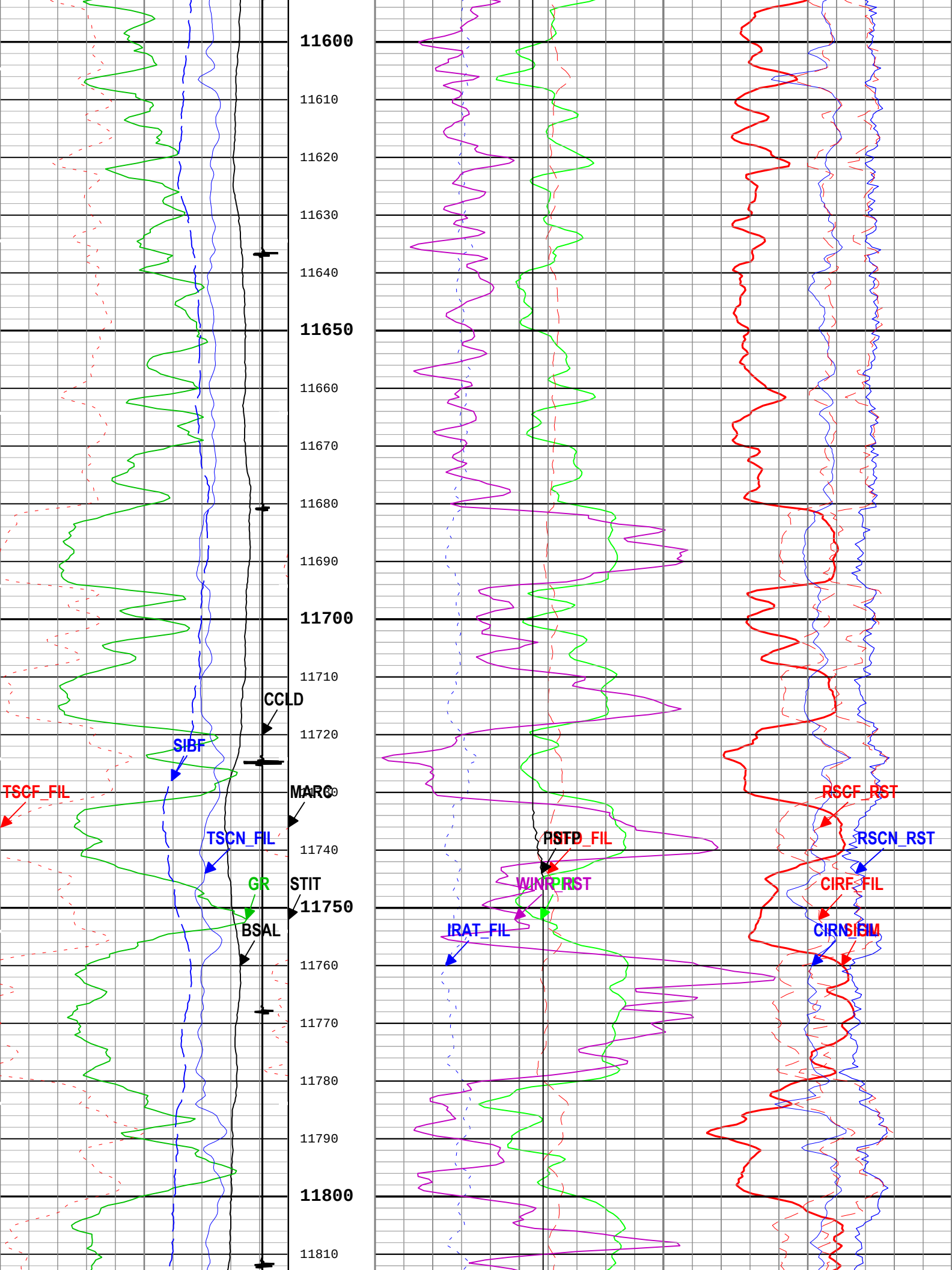
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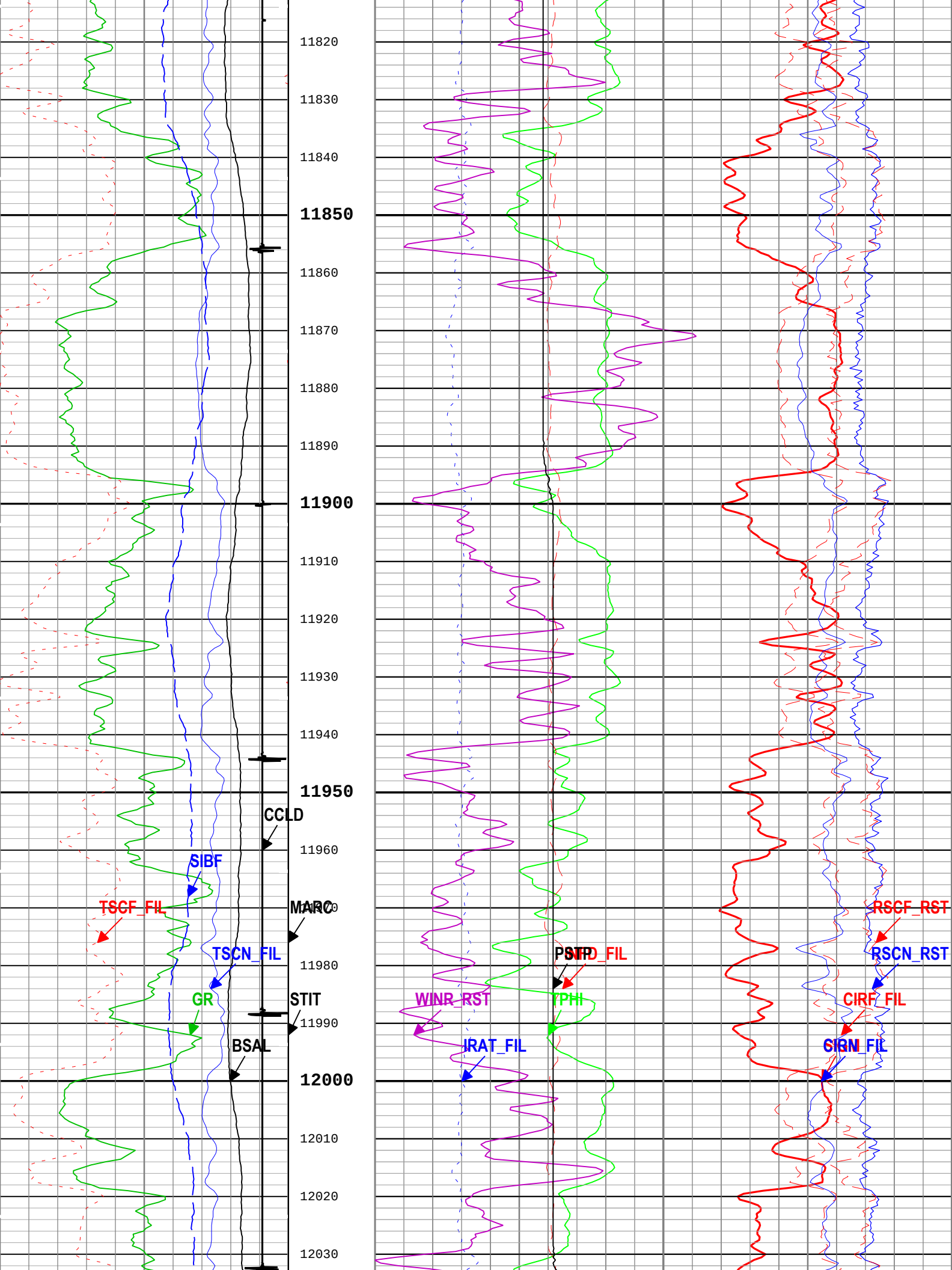
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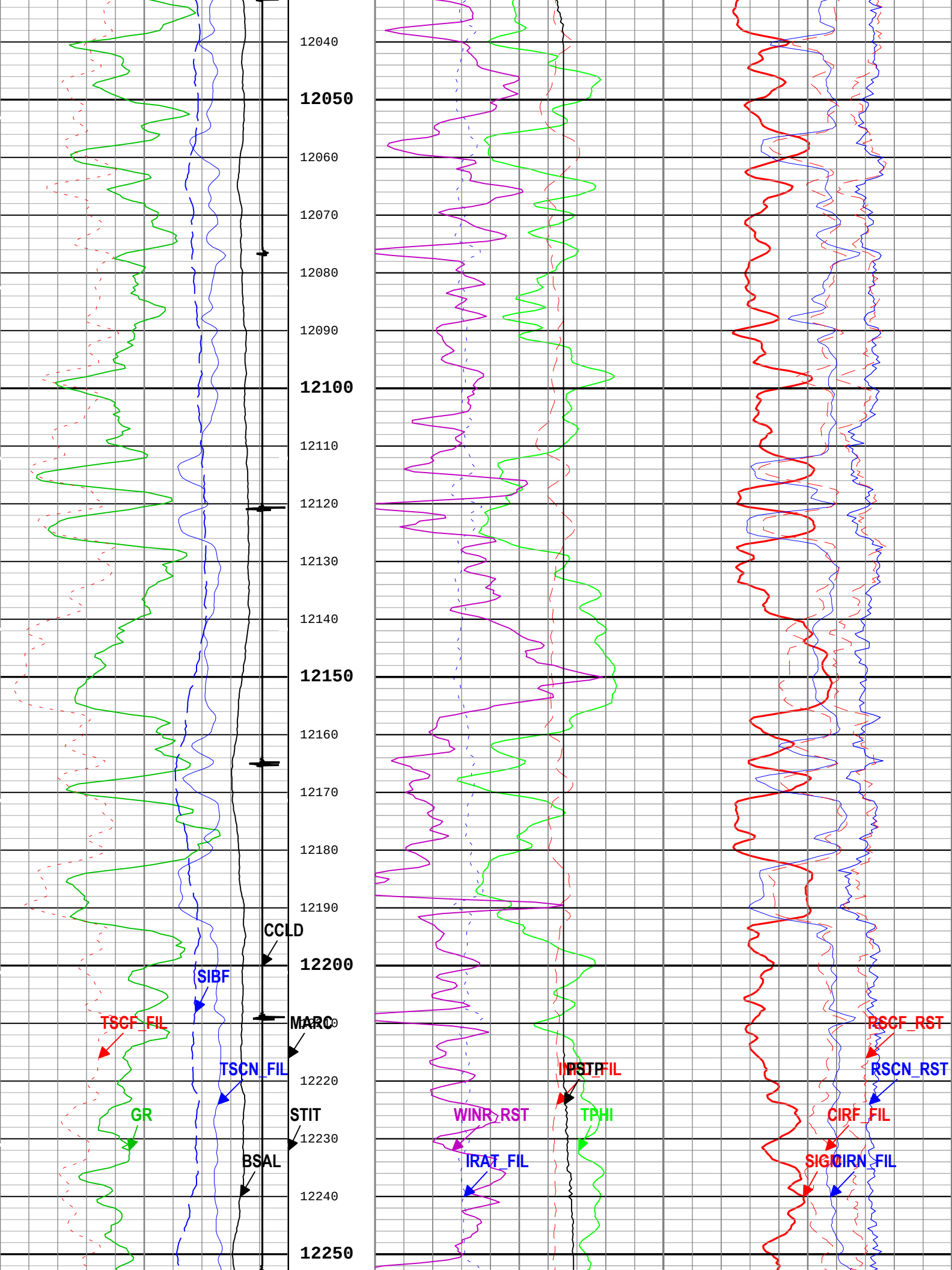
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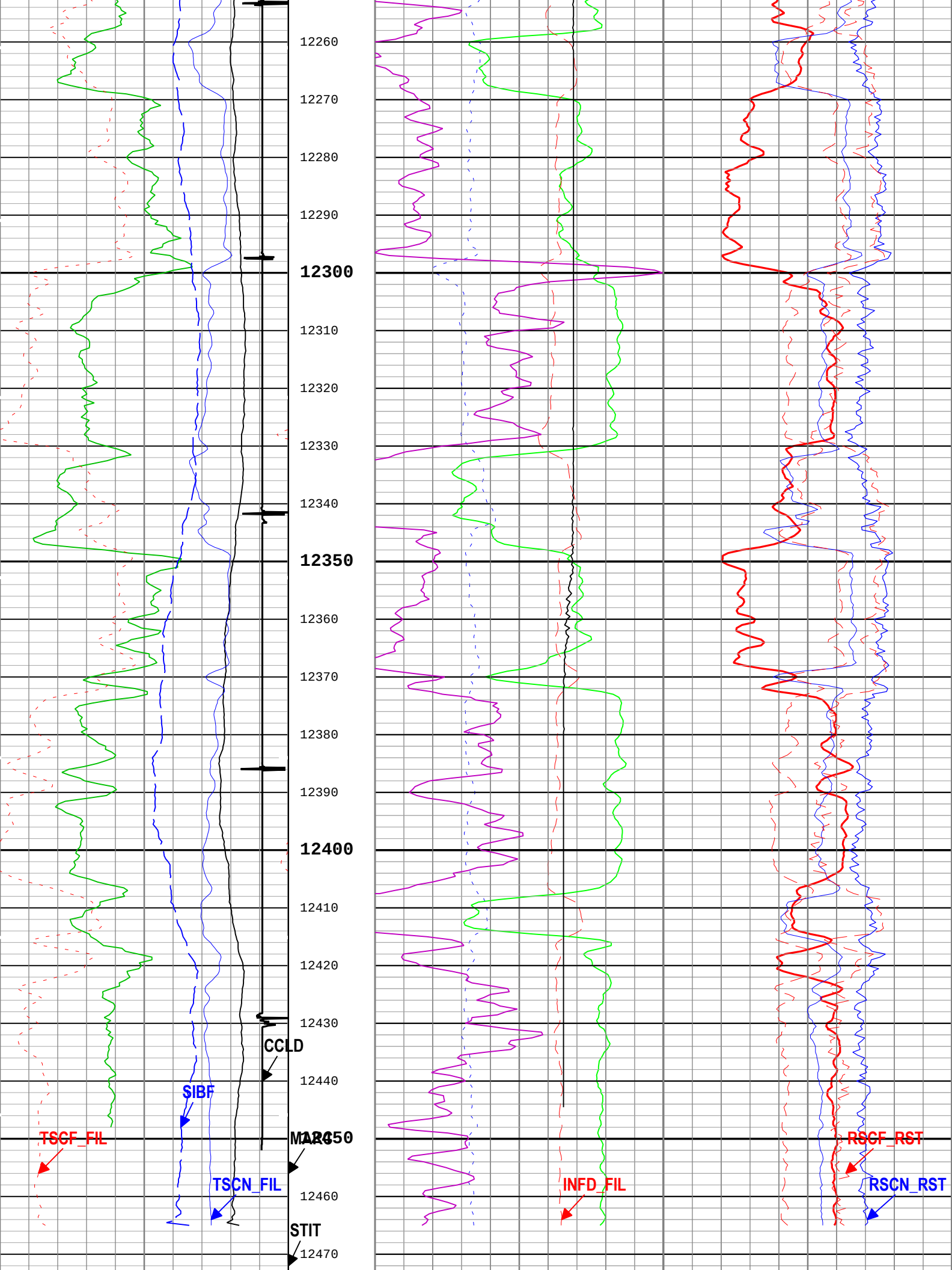
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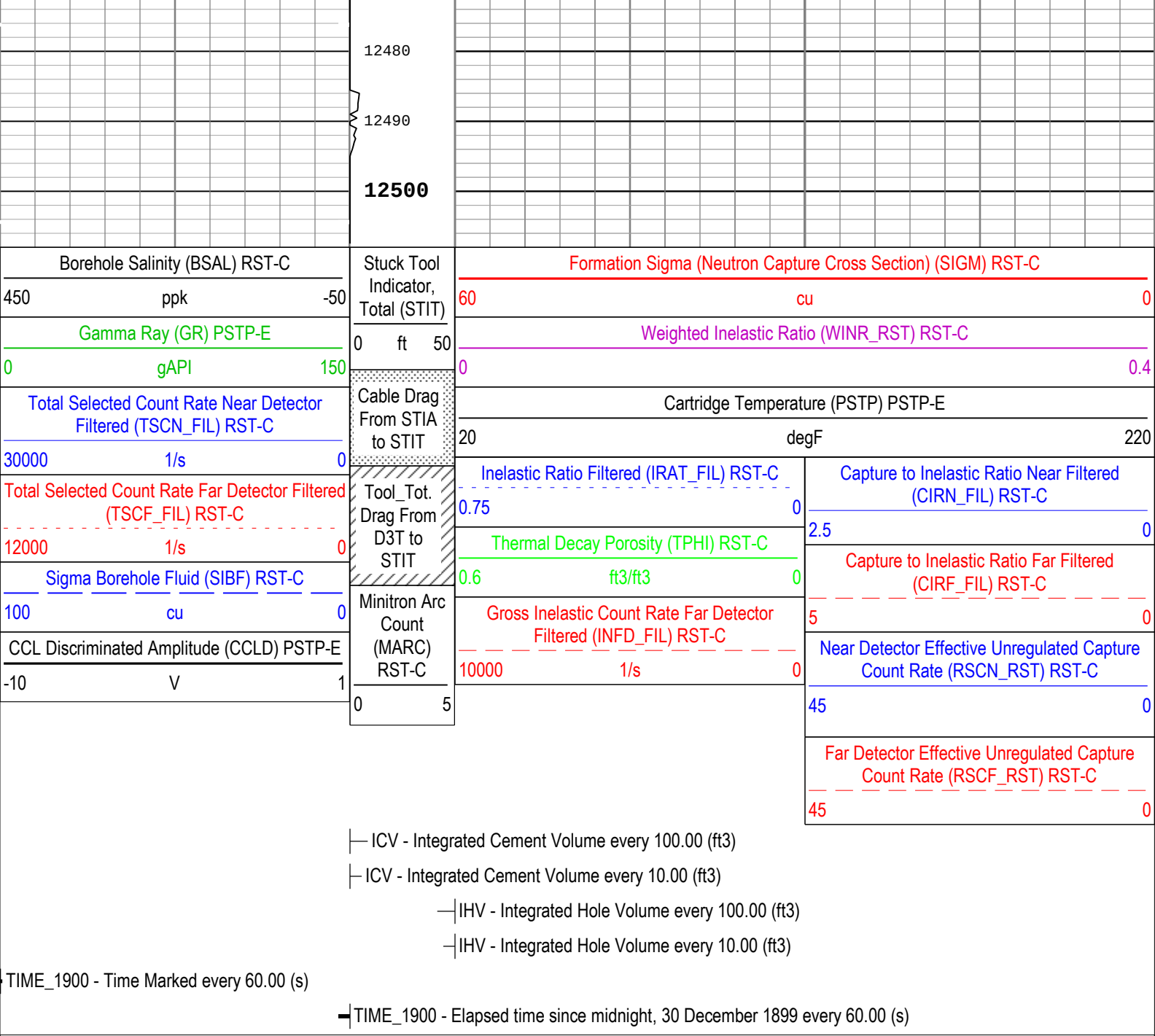


Description: RST SIGMA Answer Format: Log (RST SIGMA Answer) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 19-Feb-2019 13:17:07

Channel Processing Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	Depth Zoned	in
BSAL	Borehole Salinity	Borehole	0	ppm
BSALOPT	Borehole Salinity Option	RST-C	Unknown	
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	SANDSTONE	

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	12.25	31	2981
BS	8.75	2981	12507.98

All depth are actual.

Tool Control Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	150	ft/h
PCCG	PSP Downhole CCL Gain	PSTP-E	0 dB	
RST_DLM	Depth Log Mode	RST-C	Sigma	

1A

RST SIGMA REPEAT PASS [5:100]

Software Version

Acquisition System	Version
Maxwell 2019	9.0.106845.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
1A	Log[2]:Up	Up	12179.31 ft	12508.35 ft	19-Feb-2019 4:24:59 AM	19-Feb-2019 4:36:22 AM	ON	9.67 ft	Yes

All depths are referenced to toolstring zero

Log

Company:CAERUS OPERATING LLC Well:SG 8506E-34 E34 496

1A: Log[2]:Up:S002

Description: RST SIGMA Answer Format: Log (RST SIGMA Answer) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 19-Feb-2019 13:17:23

TIME_1900 - Time Marked every 60.00 (s)

TIME_1900 - Elapsed time since midnight, 30 December 1899 every 60.00 (s)

IHV - Integrated Hole Volume every 10.00 (ft3)

IHV - Integrated Hole Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

Capture to Inelastic Ratio Near Filtered (CIRN_FIL) RST-C
2.5 0

Capture to Inelastic Ratio Far Filtered (CIRF_FIL) RST-C
5 0

Borehole Salinity (BSAL) RST-C
450 ppk -50

Stuck Tool Indicator, Total (STIT)
0 ft 50

Inelastic Ratio Filtered (IRAT_FIL) RST-C
0.75 0

Near Detector Effective Unregulated Capture Count Rate (RSCN_RST) RST-C
45 0

Gamma Ray (GR) PSTP-E
0 gAPI 150

Cable Drag From STIA to STIT

Thermal Decay Porosity (TPHI) RST-C
0.6 ft3/ft3 0

Total Selected Count Rate Near Detector Filtered (TSCN_FIL) RST-C
30000 1/s 0

Gross Inelastic Count Rate Far Detector Filtered (INFD_FIL) RST-C
10000 1/s 0

Far Detector Effective Unregulated Capture Count Rate (RSCF_RST) RST-C
45 0

Total Selected Count Rate Far Detector Filtered (TSCF_FIL) RST-C
12000 1/s 0

Tool_Tot. Drag From D3T to STIT

Formation Sigma (Neutron Capture Cross Section) (SIGM) RST-C
60 cu 0

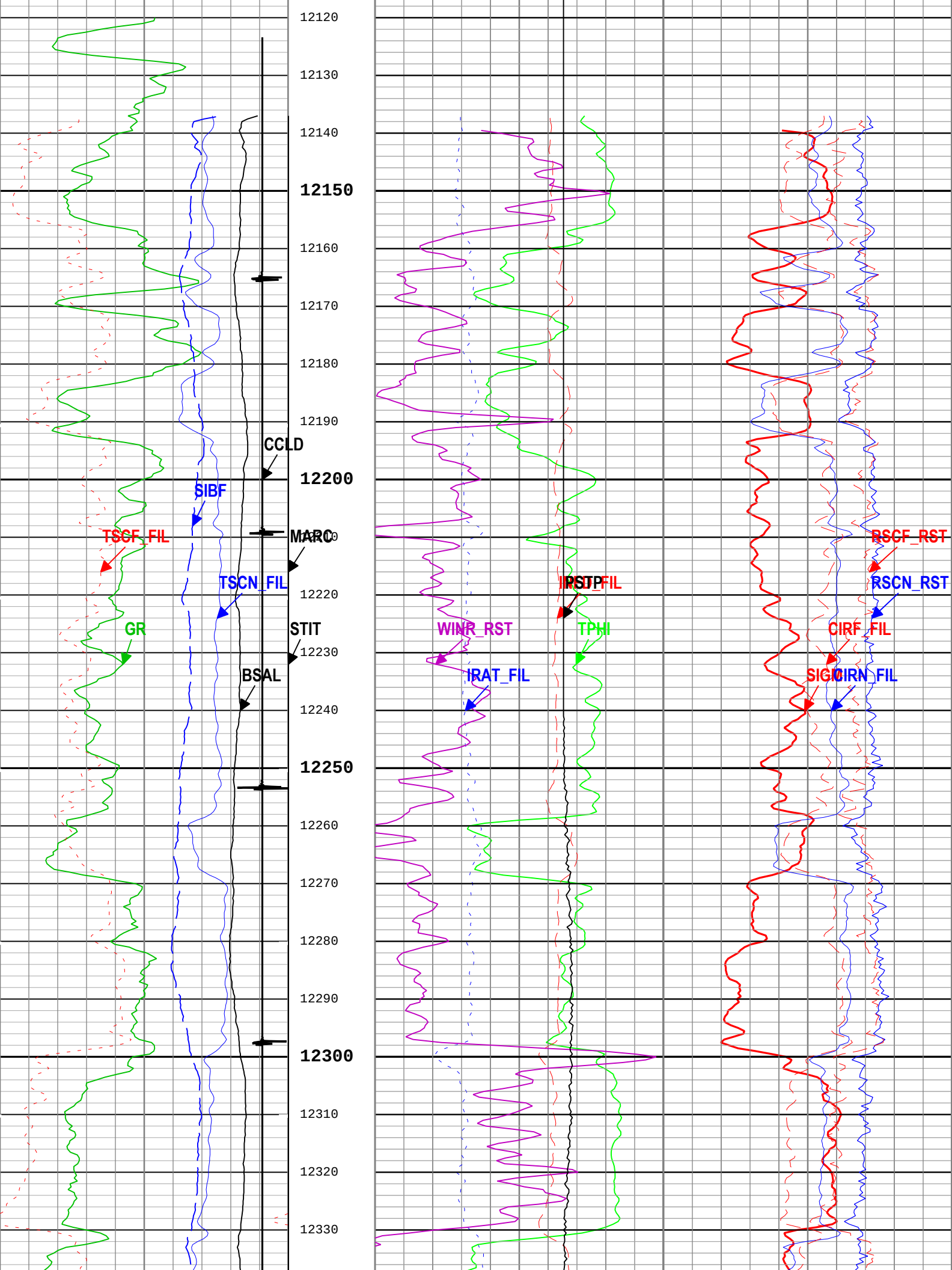
Sigma Borehole Fluid (SIBF) RST-C
100 cu 0

Minitron Arc Count (MARC) RST-C
0 5

Weighted Inelastic Ratio (WINR_RST) RST-C
0 0.4

CCL Discriminated Amplitude (CCLD) PSTP-E
-10 V 1

Cartridge Temperature (PSTP) PSTP-E
20 degF 220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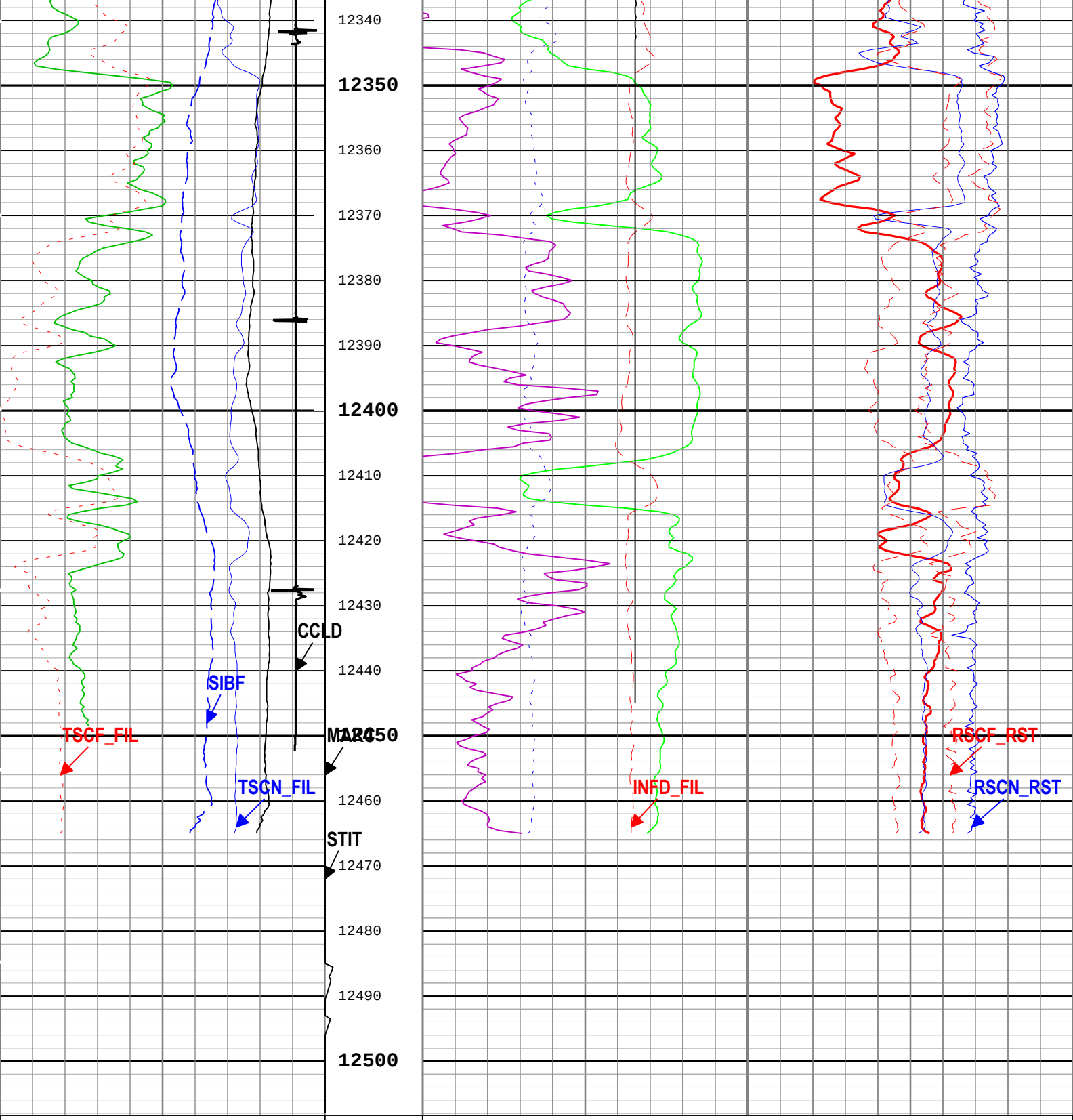

Borehole Salinity (BSAL) RST-C 450 ppk -50	Stuck Tool Indicator, Total (STIT) 0 ft 50	Formation Sigma (Neutron Capture Cross Section) (SIGM) RST-C 60 cu 0
Gamma Ray (GR) PSTP-E 0 gAPI 150		Weighted Inelastic Ratio (WINR_RST) RST-C 0 0.4
Total Selected Count Rate Near Detector Filtered (TSCN_FIL) RST-C 30000 1/s 0	Cable Drag From STIA to STIT	Cartridge Temperature (PSTP) PSTP-E 20 degF 220
Total Selected Count Rate Far Detector Filtered (TSCF_FIL) RST-C 12000 1/s 0	Tool_Tot. Drag From D3T to STIT	Inelastic Ratio Filtered (IRAT_FIL) RST-C 0.75 0
Sigma Borehole Fluid (SIBF) RST-C		Capture to Inelastic Ratio Near Filtered (CIRN_FIL) RST-C 2.5 0
		Thermal Decay Porosity (TPHI) RST-C 0.6 ft3/ft3 0
		Capture to Inelastic Ratio Far Filtered (CIRF_FIL) RST-C

100 cu 0

CCL Discriminated Amplitude (CCLD) PSTP-E

-10 V 1

Minitron Arc Count (MARC) RST-C

0 5

Gross Inelastic Count Rate Far Detector Filtered (INFD_FIL) RST-C

10000 1/s 0

5 0

Near Detector Effective Unregulated Capture Count Rate (RSCN_RST) RST-C

45 0

Far Detector Effective Unregulated Capture Count Rate (RSCF_RST) RST-C

45 0

ICV - Integrated Cement Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

IHV - Integrated Hole Volume every 100.00 (ft3)

IHV - Integrated Hole Volume every 10.00 (ft3)

TIME_1900 - Elapsed time since midnight, 30 December 1899 every 60.00 (s)

TIME_1900 - Time Marked every 60.00 (s)

Description: RST SIGMA Answer Format: Log (RST SIGMA Answer) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 19-Feb-2019 13:17:23

Channel Processing Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	8.75	in
BSAL	Borehole Salinity	Borehole	0	ppm
BSALOPT	Borehole Salinity Option	RST-C	Unknown	
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	SANDSTONE	

Tool Control Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	150	ft/h
PCCG	PSP Downhole CCL Gain	PSTP-E	0 dB	
RST_DLM	Depth Log Mode	RST-C	Sigma	

Company:	CAERUS OPERATING LLC
Well:	SG 8506E-34 E34 496
Field:	GRAND VALLEY
County:	GARFIELD
Country:	UNITED STATES

Schlumberger

CEMENT BOND LOG
RST SIGMA LOG
GAMMA RAY - COLLAR LOCATOR LOG