Schlumberger

Company: Caerus Operating LLC

Well: NPR 24D-10 596

Field: NPR

County: Garfield State: Colorado

Reservoir Saturation Tool

RST Sigma Mode

Gamma Ray -CCL

Location:	K10-596		Elev.:	K.B.	6733.00 ft
				G.L.	6709.00 ft
				D.F.	6733.00 ft
	Permanent Datum:	Ground Level	Elev.:		6709.00 f
	Log Measured From:	Kelly Bushing	24.00 ft		above Perm.Datum
	Drilling Measured From:	Kelly Bushing			

API Serial No.	Section:	Township:	Range:
05045237700000	10	5S	96W

County: Garfield
Field: NPR
Location: K10-596
Well: NPR 24D-10 596
Company: Caerus Operating LLC

Logging Date		22-Sep-2018		
Run Number		RST Sigma		
Depth Driller		9759.00 ft		
Schlumberger Depth		9710.00 ft		
Bottom Log Interval		9710.00 ft		
Top Log Interval		2000.00 ft		
Casing Fluid Type		2% KCL water		
Salinity				
Density		8.49 lbm/gal		
Fluid Level		8.00 ft		
BIT/CASING/TUBING STRING				
Bit Size		8.75 in		
From		2438.00 ft		
To		9759.00 ft		
Casing/Tubing Size		4.5 in		
Weight		11.6 lbm/ft		
Grade		P110		
From		0.00 ft		
To		9759.00 ft		
Max Recorded Temperatures		276.93 degF		
Logger on Bottom	Time	22-Sep-2018	10:56:00	
Unit Number	Location:	3007	Evanston,Wy	
Recorded By		Beatriz Guaita		
Witnessed By		Trent Ray		

Disclaimer

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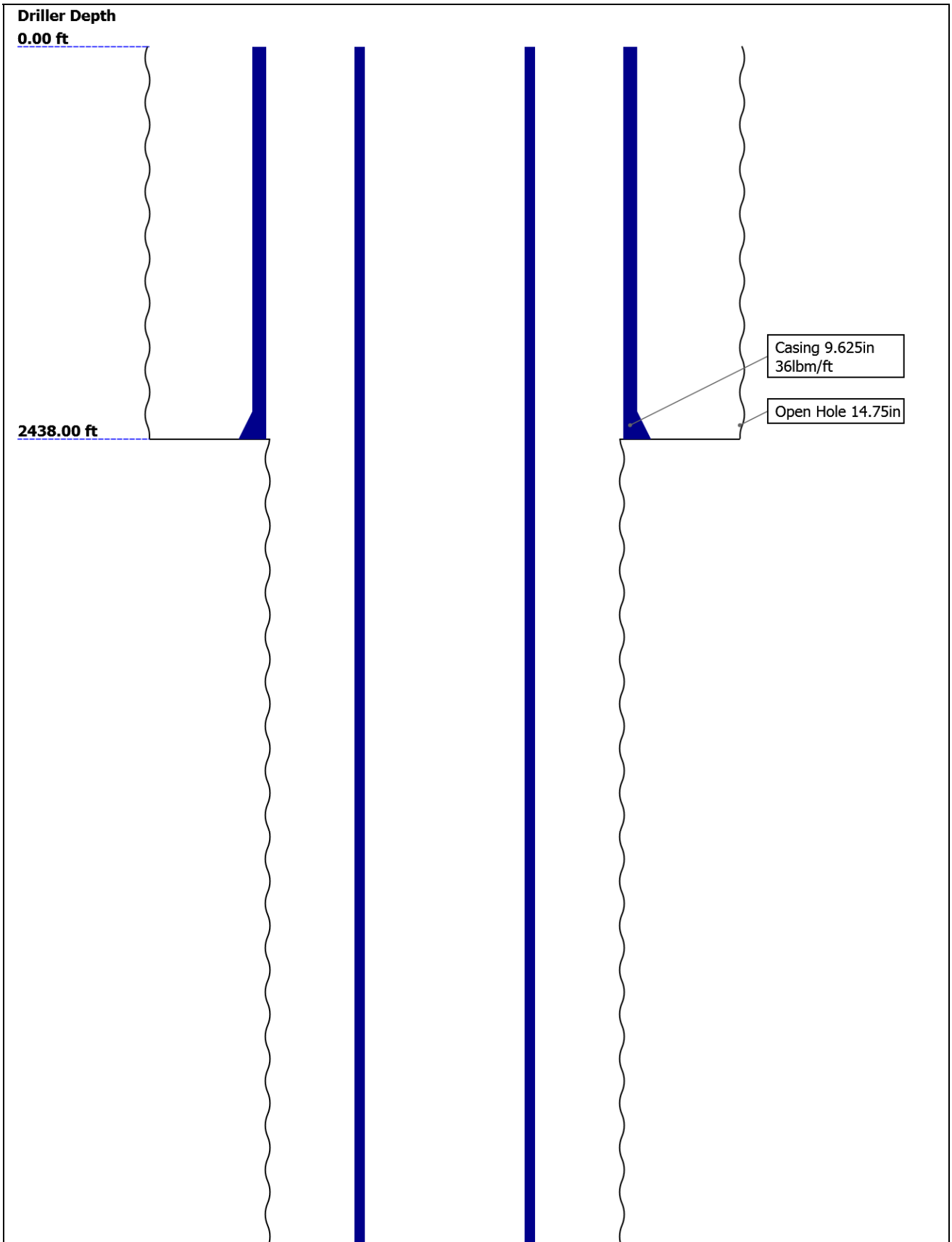
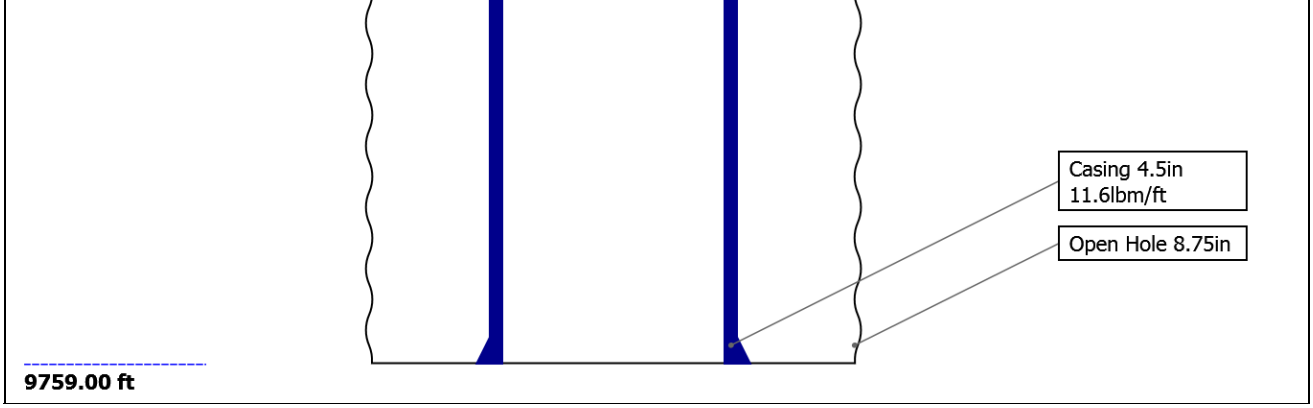
Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	14.75	8.75				
Top Driller (ft)	0	2438				
Top Logger (ft)	0	2438				
Bottom Driller (ft)	2438	9759				
Bottom Logger (ft)	2438	9759				
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)	2438	9759				
Bottom Logger (ft)	2438	9759				

Remarks and Equipment Summary

RST Sigma: Toolstring

Equip name	Length	MP name	Offset
PEH-E	33.4		
AH-38	31.71		
PSTP-B:2826	31.43		
PSC-A		**GR**	27.73
PSTC-A:2826		**PSTC**	27.43
PBMS-B:2826		**PSTC Tool String Bottom**	0.00
		Temperature	24.68
		CQG Pressure	24.33
		CCL	23.92
		PBMS	23.17
RST-C:570	23.17		
RSCH-A			
RSC-E:354			
RSS-A:440			
MNTR-F:1263			
RSXH-A			
RSX-E:570			
		RSC-E	16.81

RST Sigma: Remarks

Toolstring ran as per toolsketch.

Max temperature recorded: 276.93DegF.

SLB Depth: 9710ft.

Thank you for choosing Schlumberger!

Lengths are in ft
Maximum Outer Diameter = 1.720 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

Depth Summary

	RST Sigma		
Depth Measuring Device			
Type	IDW-JA		
Serial Number	5979		
Calibration Date	10-jun-2017		
Calibrator Serial Number	IDWC-C-57		
Calibration Cable Type	IDW-JA		
Wheel Correction 1	-3		
Wheel Correction 2	-3		
Tension Device			
Type	CMTD-B/A		
Serial Number	5036		
Calibration Date	10-Sep-2018		
Calibrator Serial Number	112544A		
Number of Calibration Points	10		
Calibration Root Mean Square Error	21		
Calibration Peak Error	10		
Logging Cable			
Type	1-25ZA		
Serial Number	F112140		
Length	16800.00 ft		
Conveyance Type	Wireline		
Rig Type			

RST Sigma:Depth Control Parameters	Depth Control Remarks

Log Sequence	First Log In the Well
Rig Up Length At Surface	
Rig Up Length At Bottom	
Rig Up Length Correction	
Stretch Correction	
Tool Zero Check At Surface	

All schlumberger depth control policies followed

IDW used as primary depth control

Z-chart used as secondary depth control.

Log Down used as a reference log.

RST Sigma

RST Main Pass

Software Version

Acquisition System	Version
Maxwell 2018 SP1	8.1.99839.3100
Application Patch	Wireline_Hotfix-Mandatory-2018SP1_8.1.102865

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
RST Sigma	Log[4]:Up	Up	1962.52 ft	9750.13 ft	22-Sep-2018 9:03:55 AM	22-Sep-2018 11:59:56 AM	ON	9.94 ft	No

All depths are referenced to toolstring zero

Log

Company:Caerus Operating LLC Well:NPR 24D-10 596

RST Sigma: Log[4]:Up:S009

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: 22-Sep-2018 13:31:35

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)

TIME_1900 - Time Marked every 60.00 (s)

ICV - Integrated Cement Volume every 100.00 (ft3)

Stuck Tool Indicator, Total (STIT)
0 ft 50

Cable Drag From STIA to STIT

Tool_Tot. Drag From D3T to STIT

Minitron Arc Count (MARC) RST-C
0 5

Cable Tension (TENS)
0 lbf 2000

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

Gamma Ray (GR) PSTP-B
0 gAPI 150

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

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

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

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

Inelastic Ratio Filtered (IRAT_FIL) RST-C
0.75 0

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

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

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

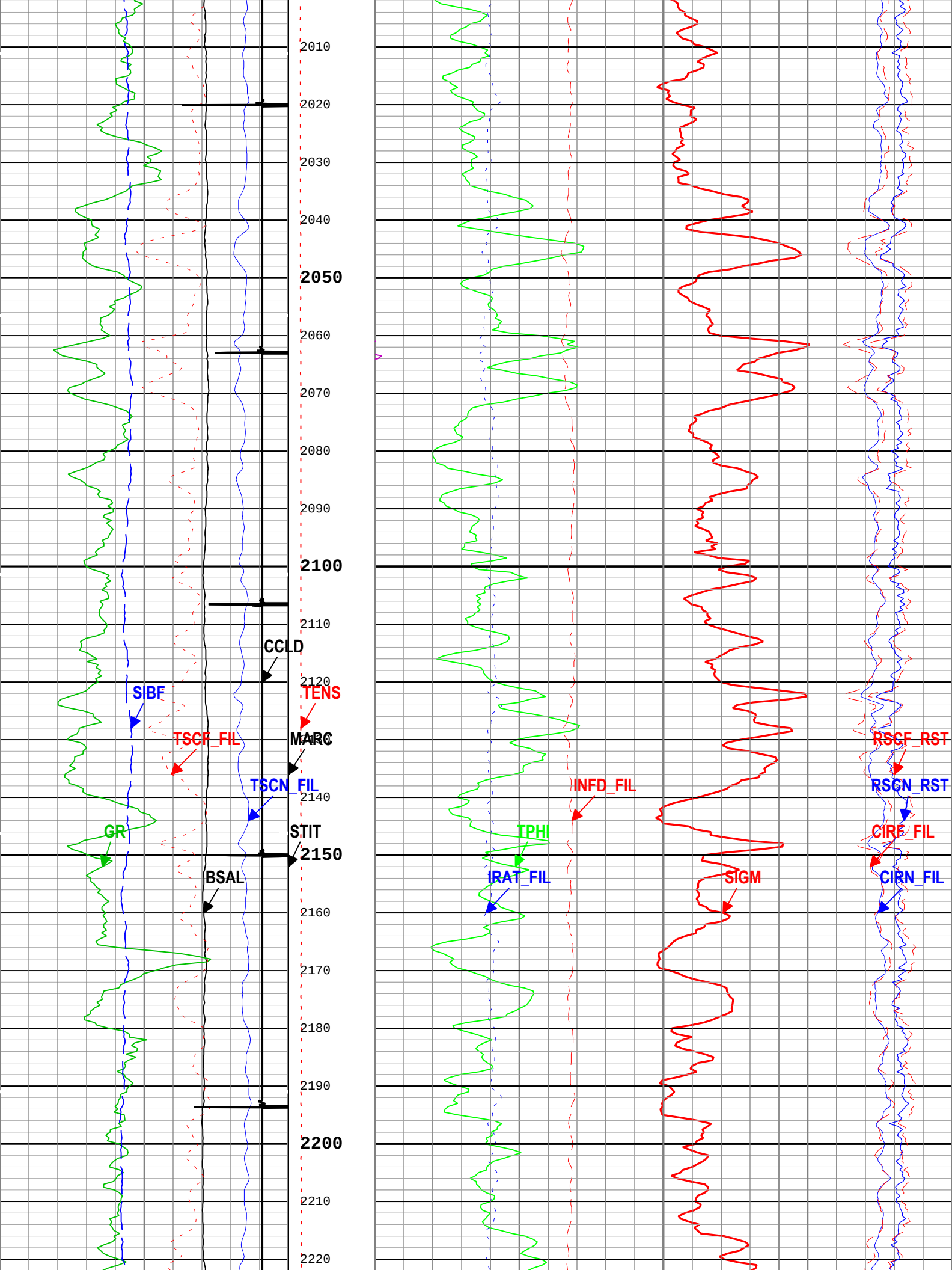
Weighted Inelastic Ratio (WINR_RST) RST-C
0 0.4

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

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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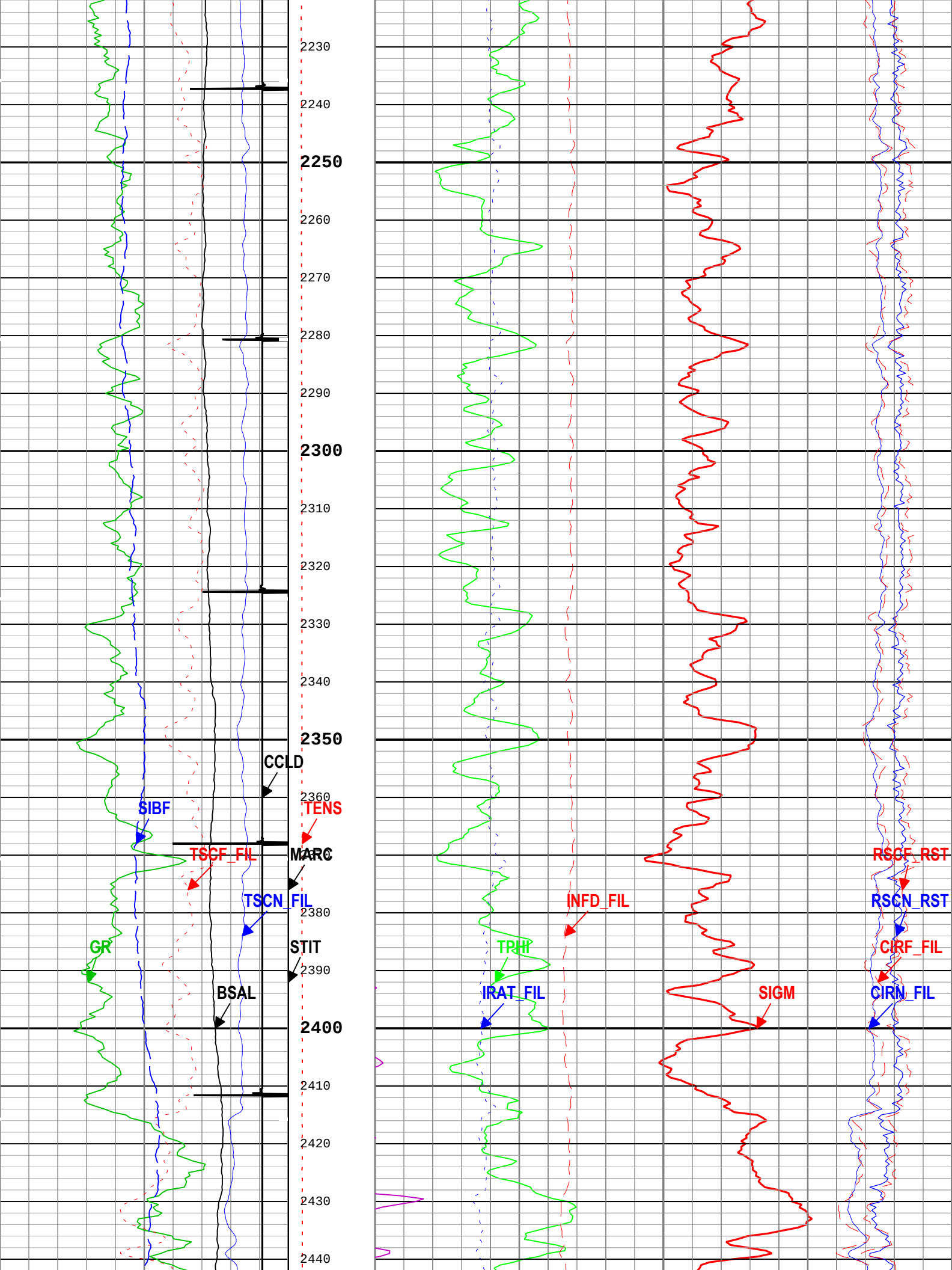
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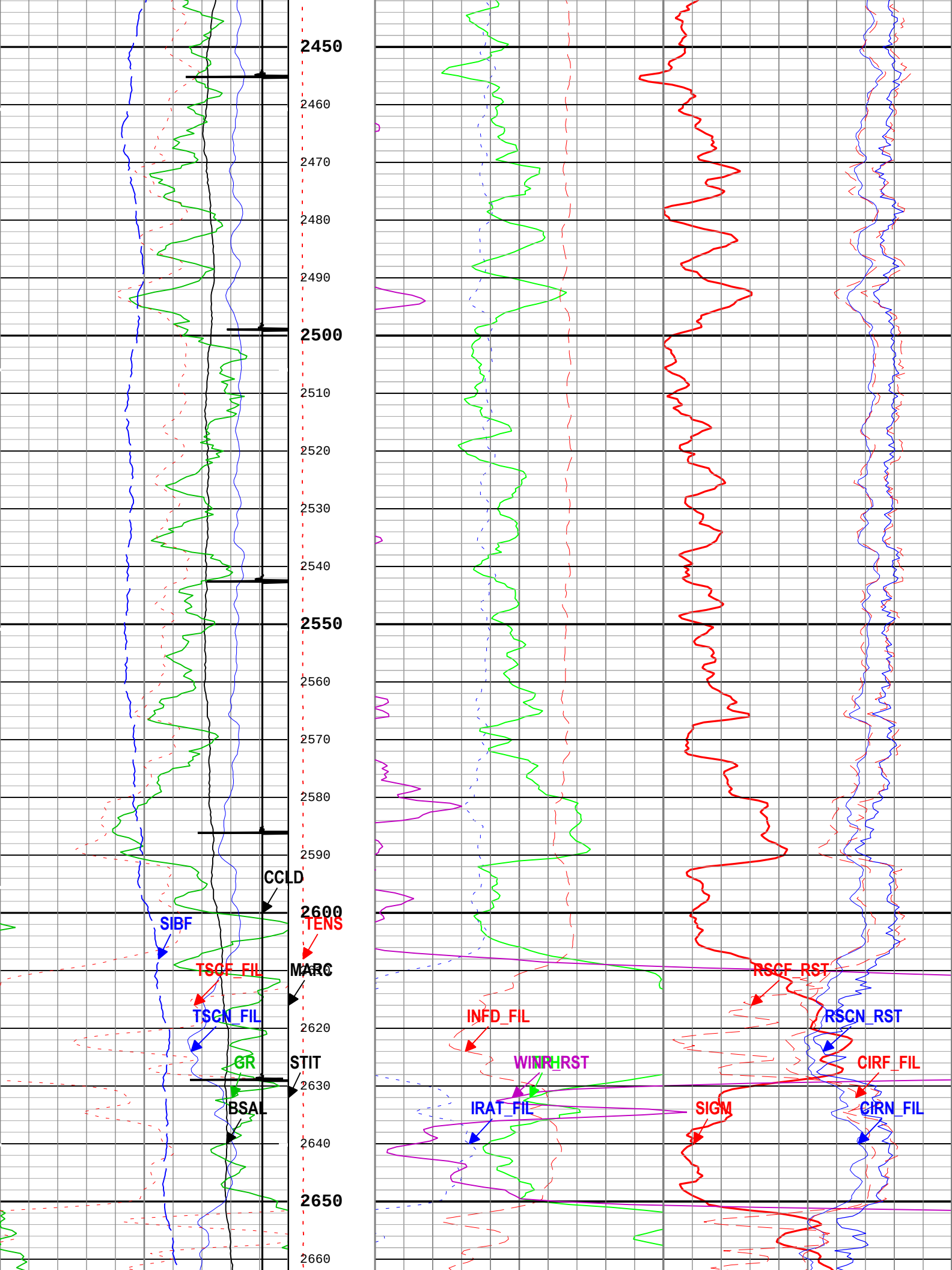
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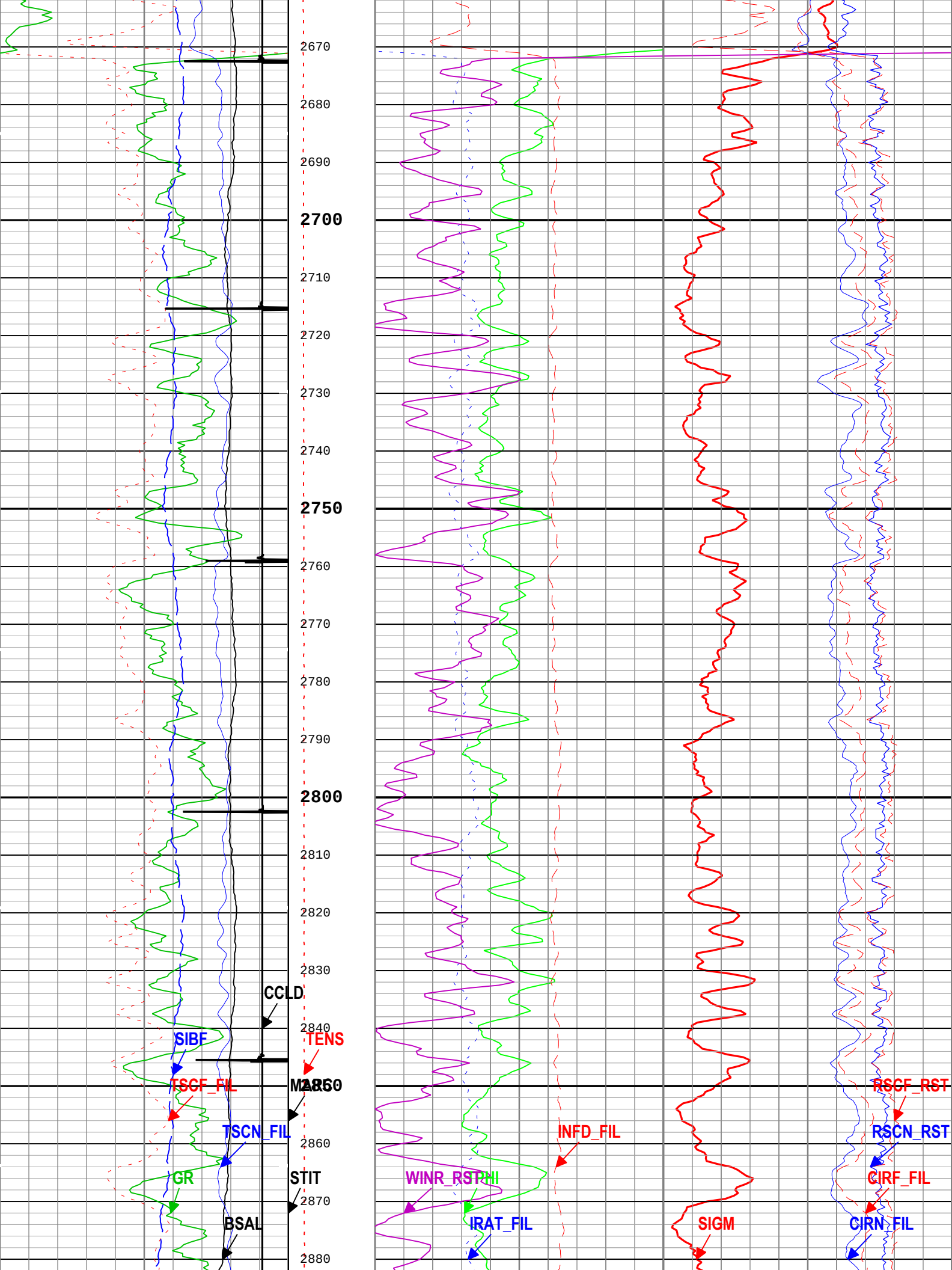
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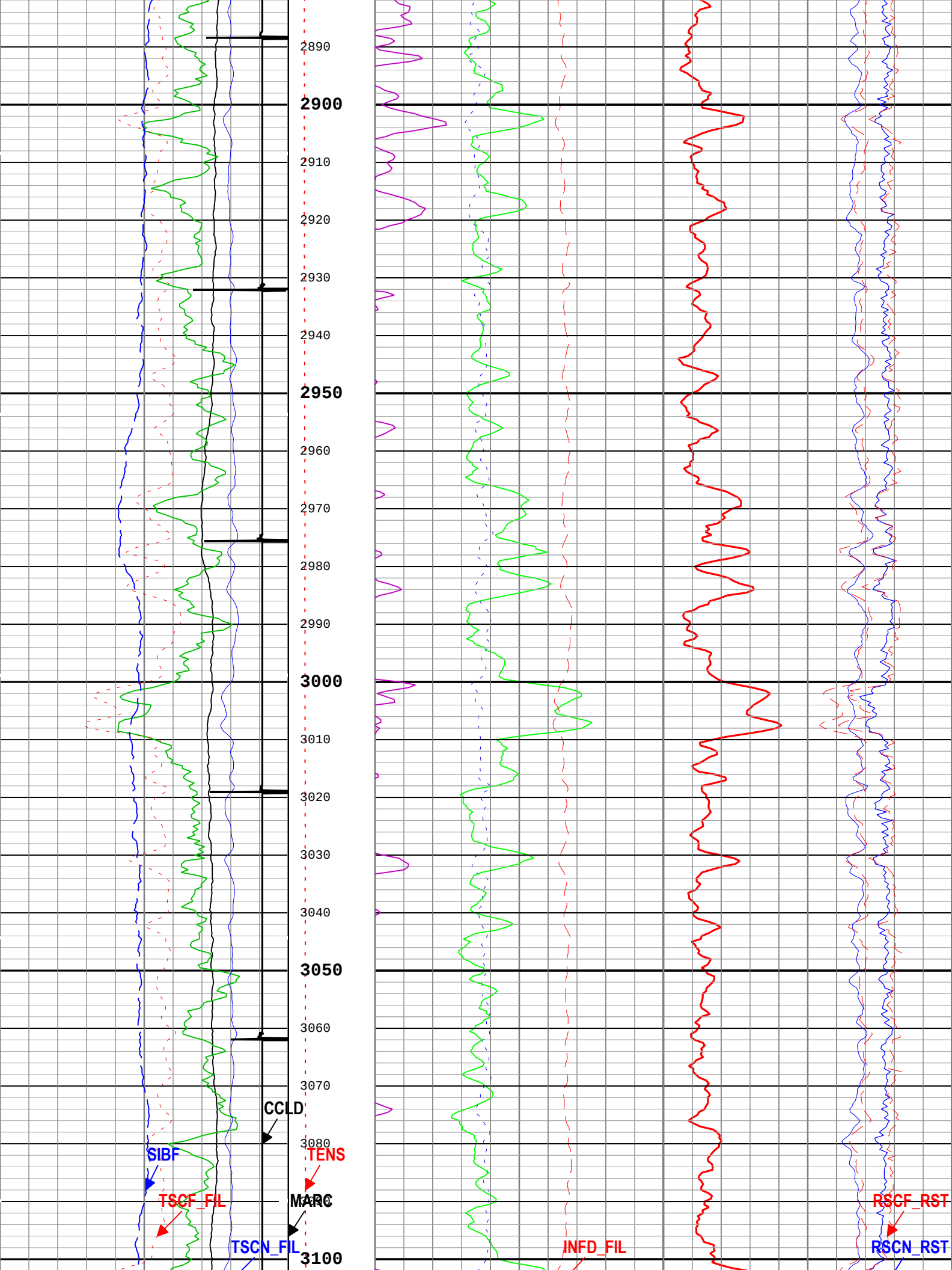
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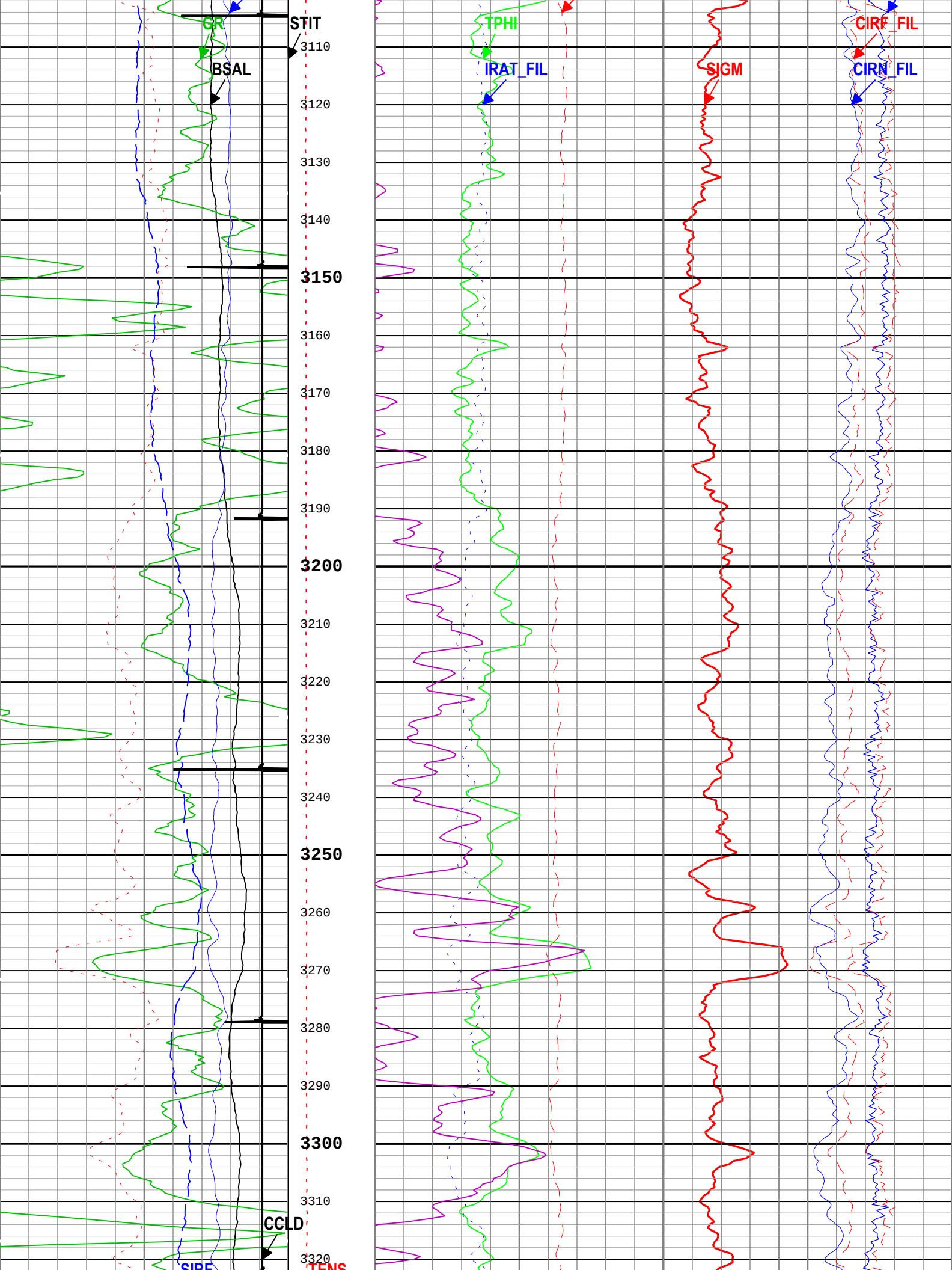
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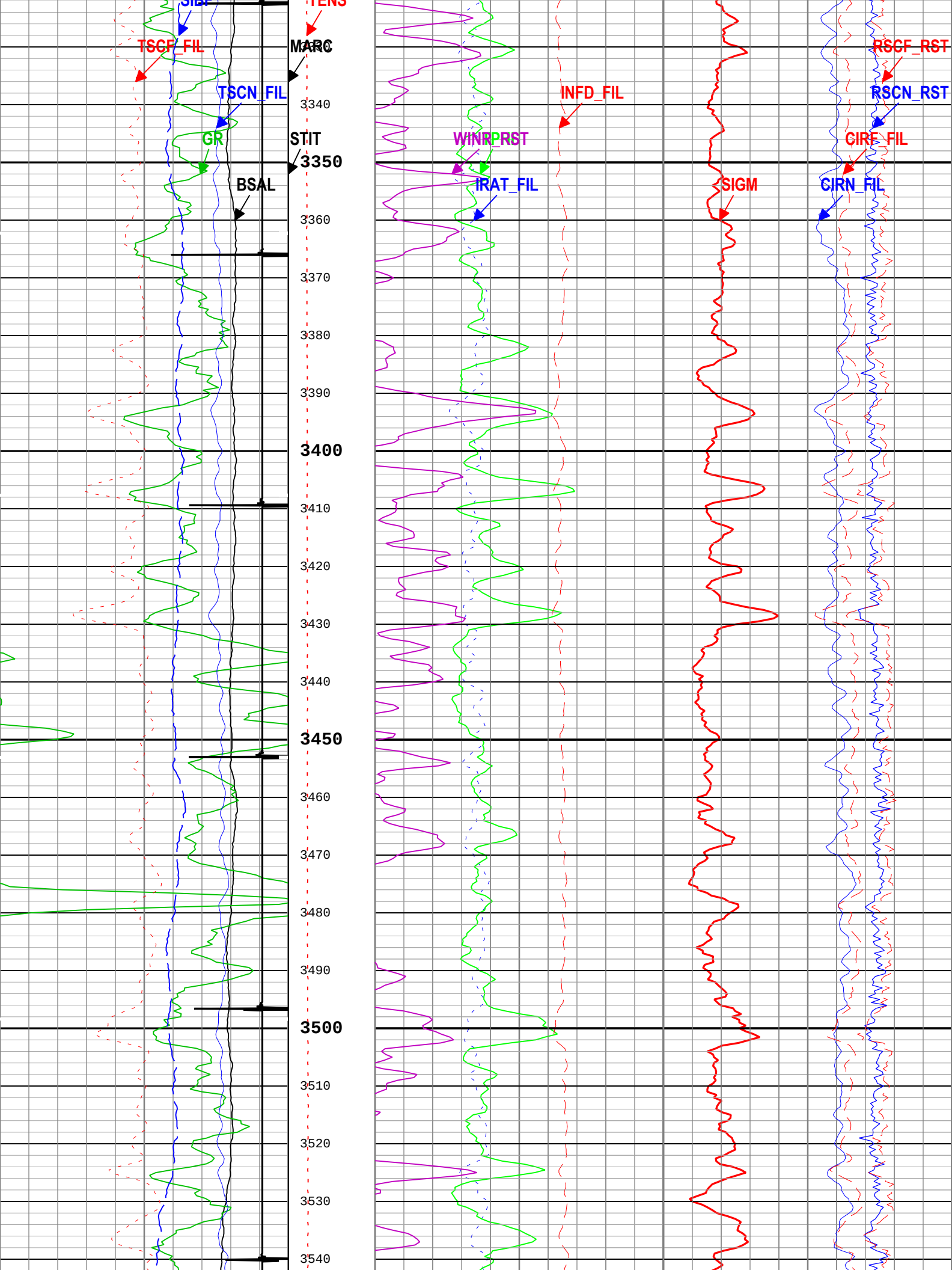
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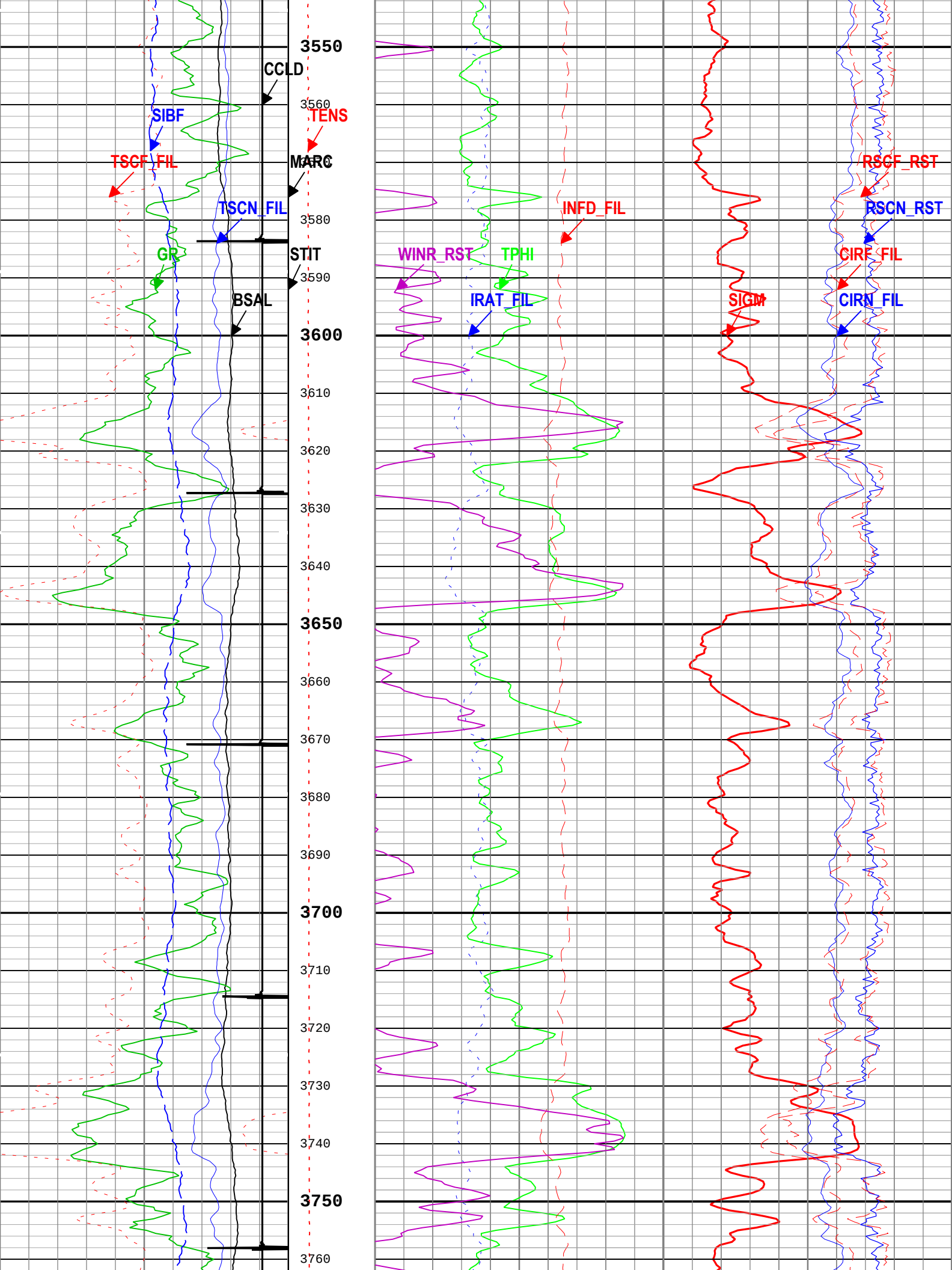
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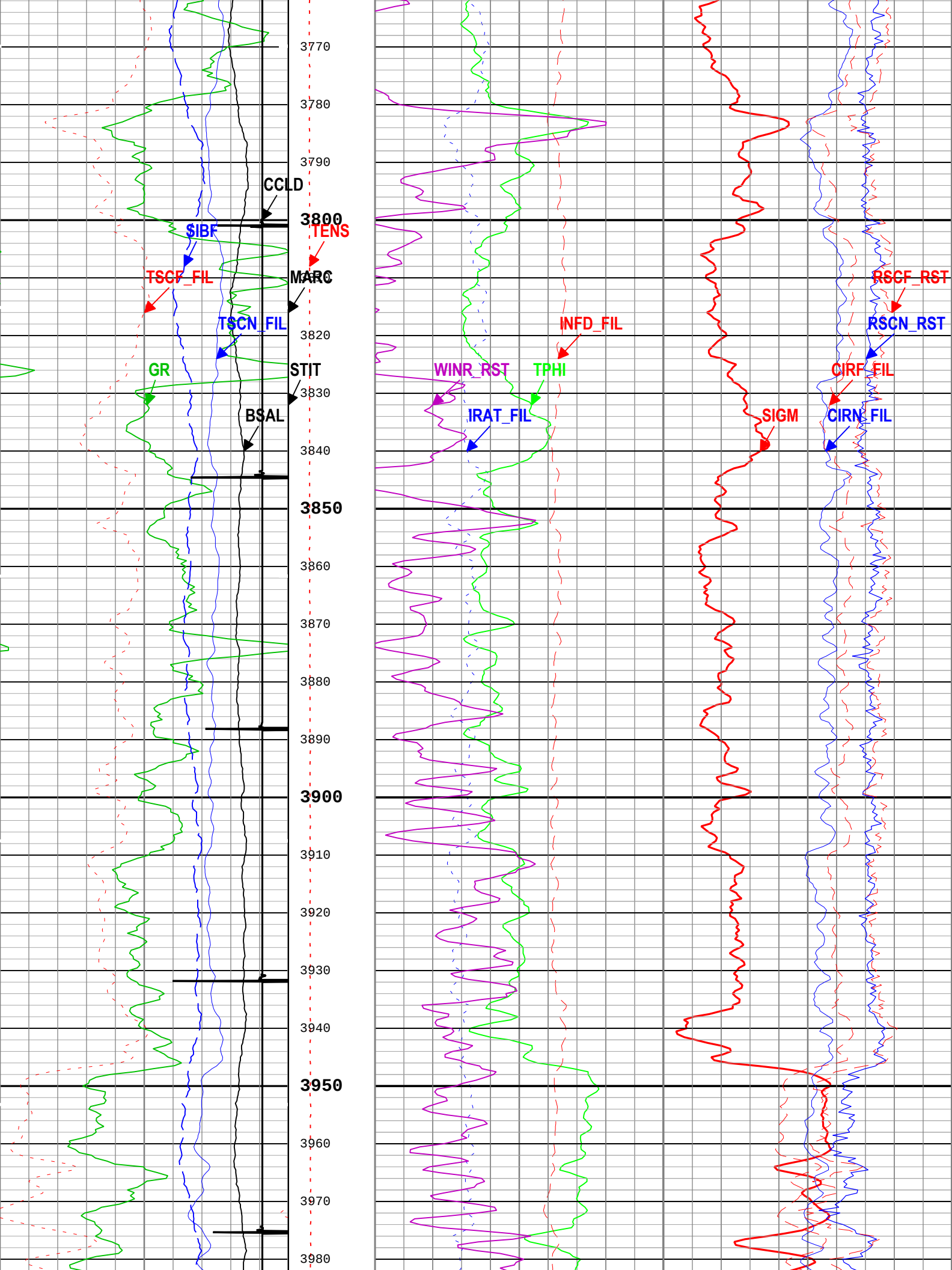
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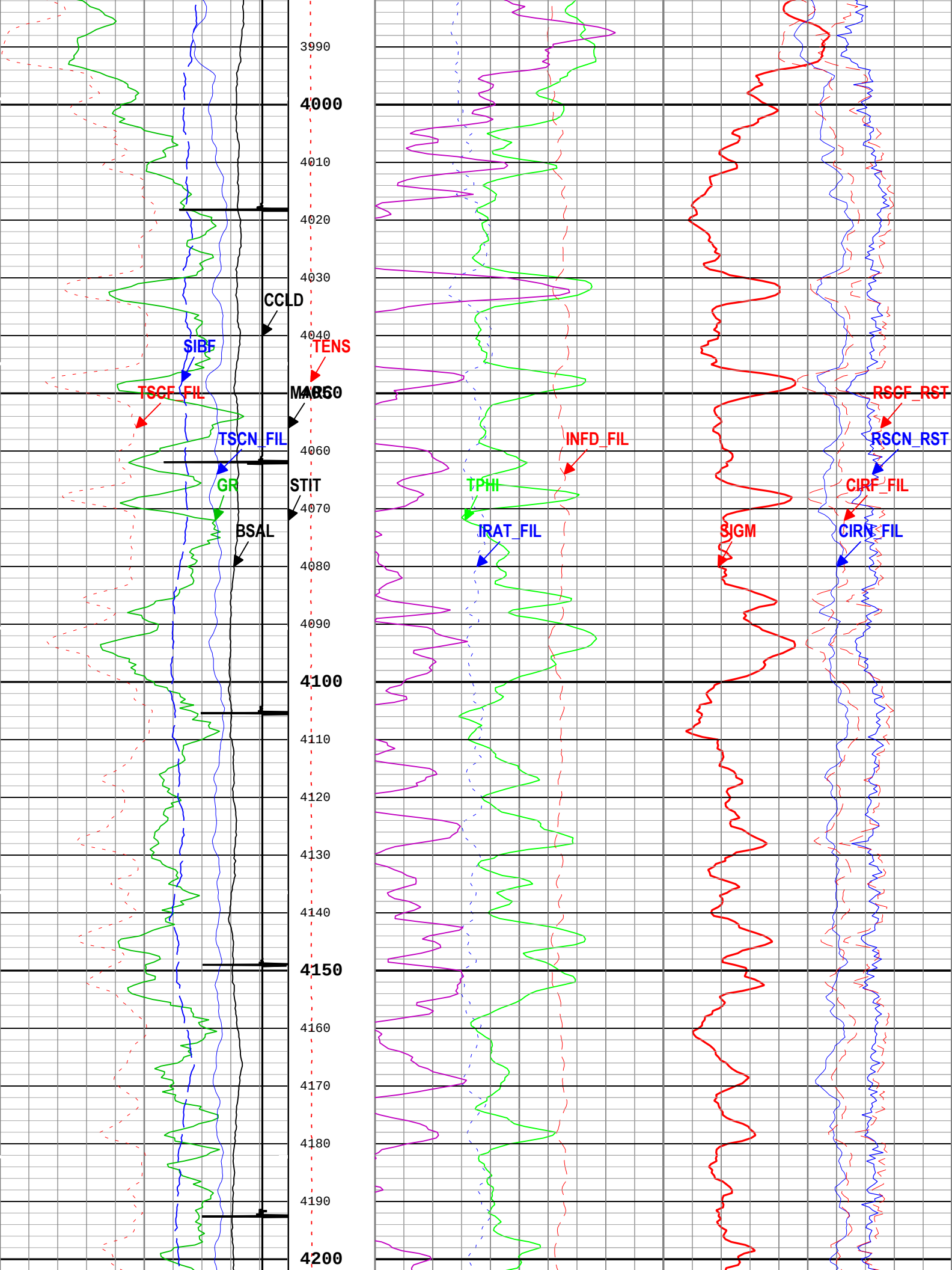
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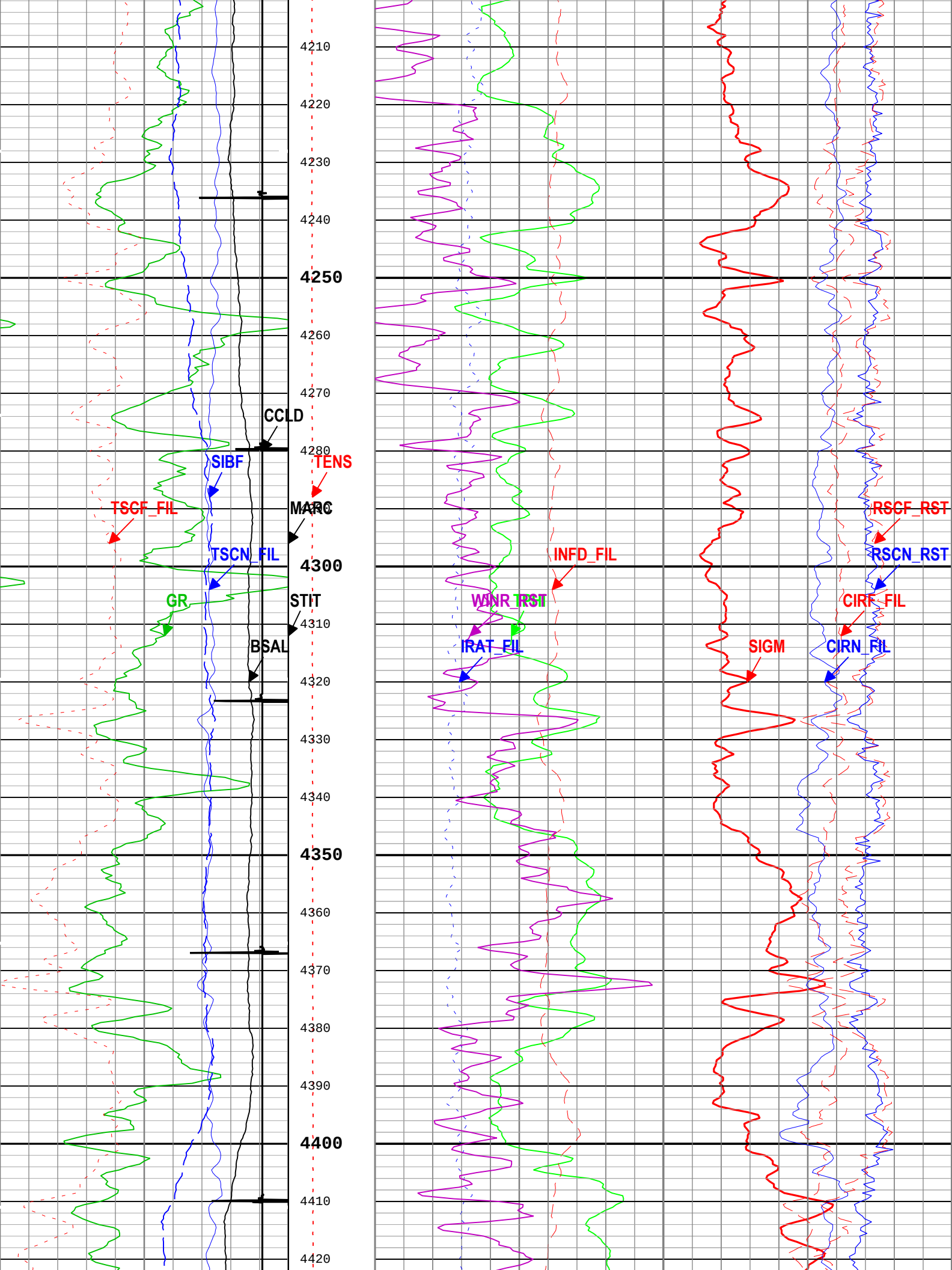
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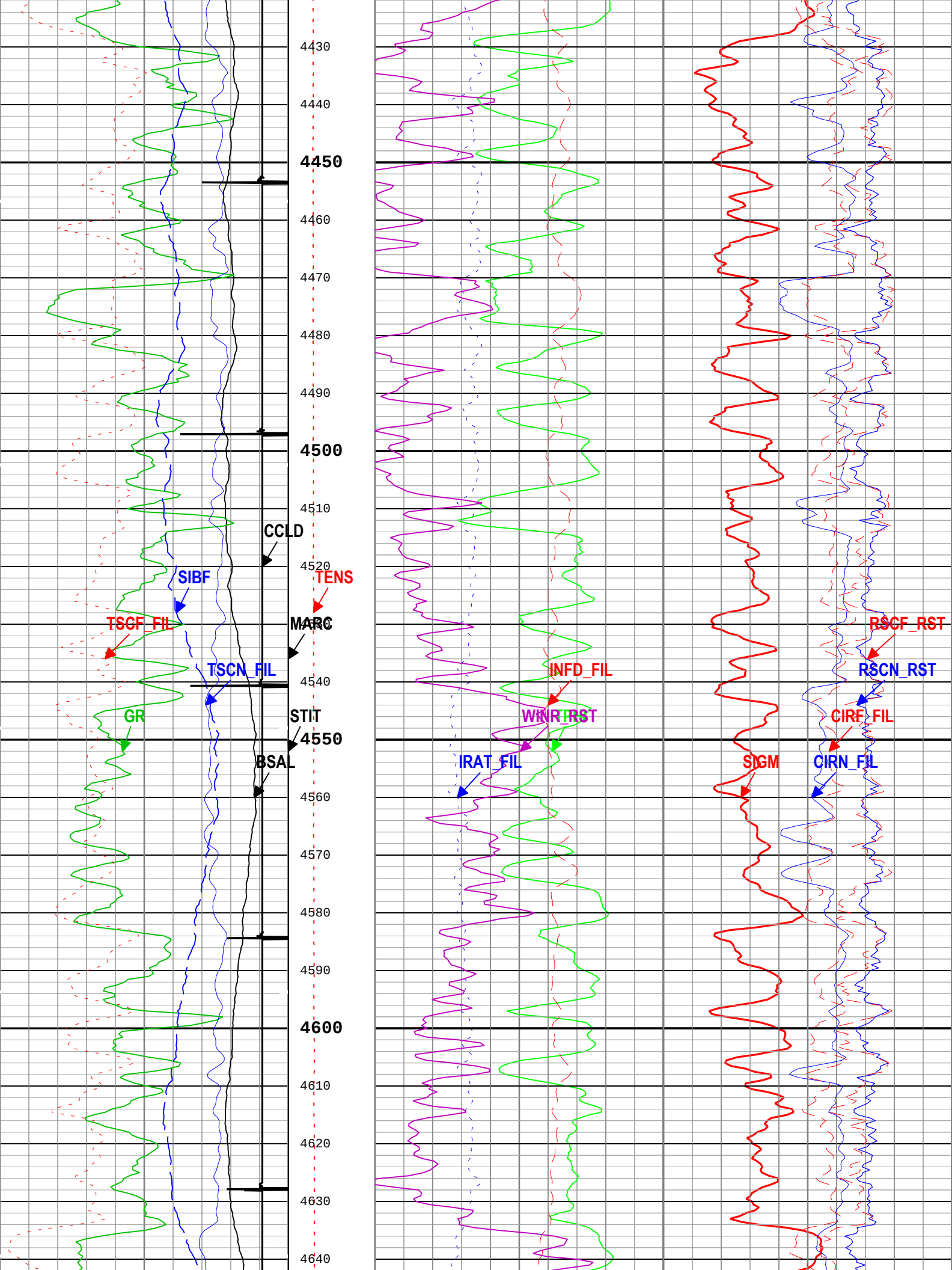
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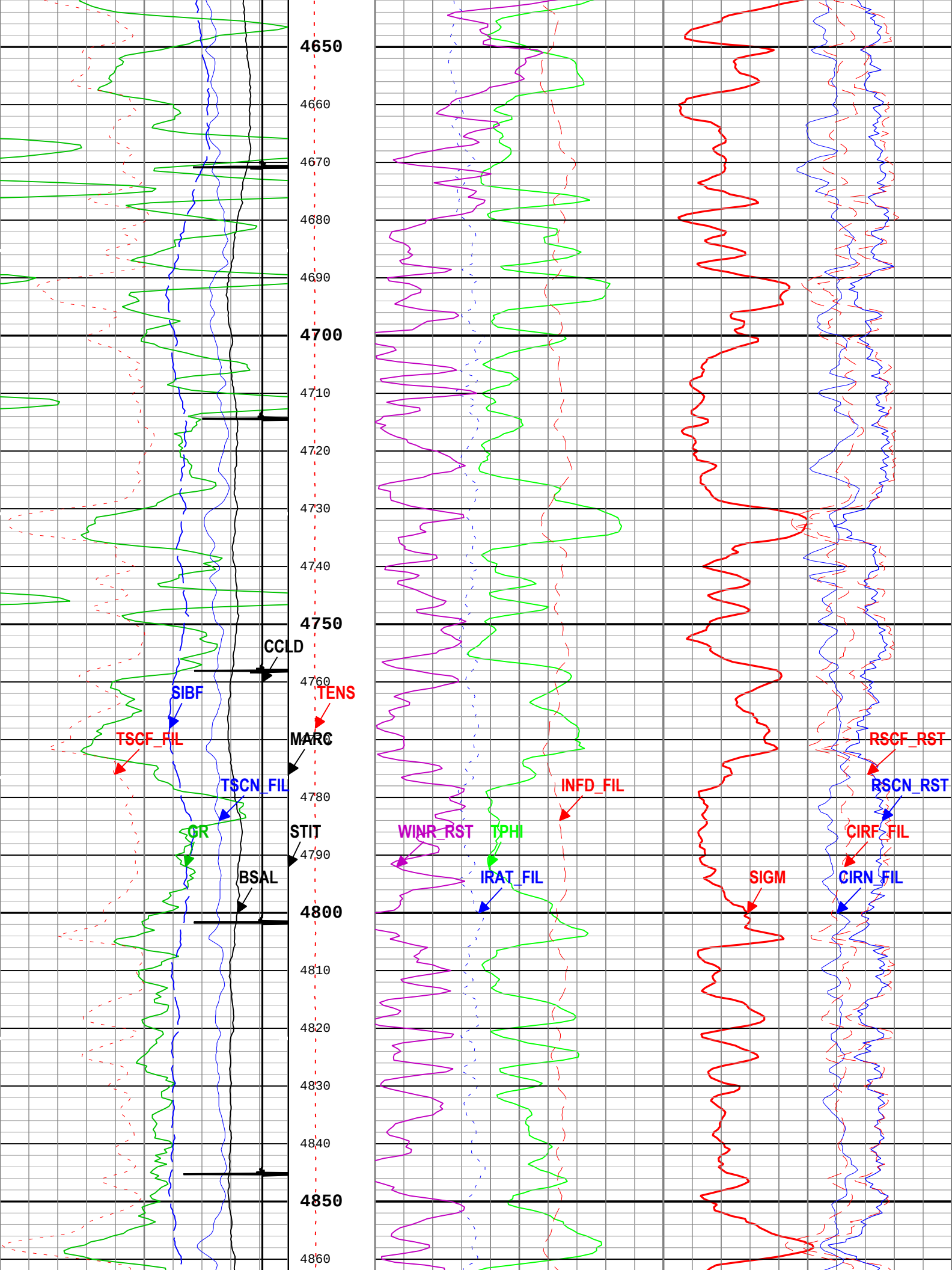
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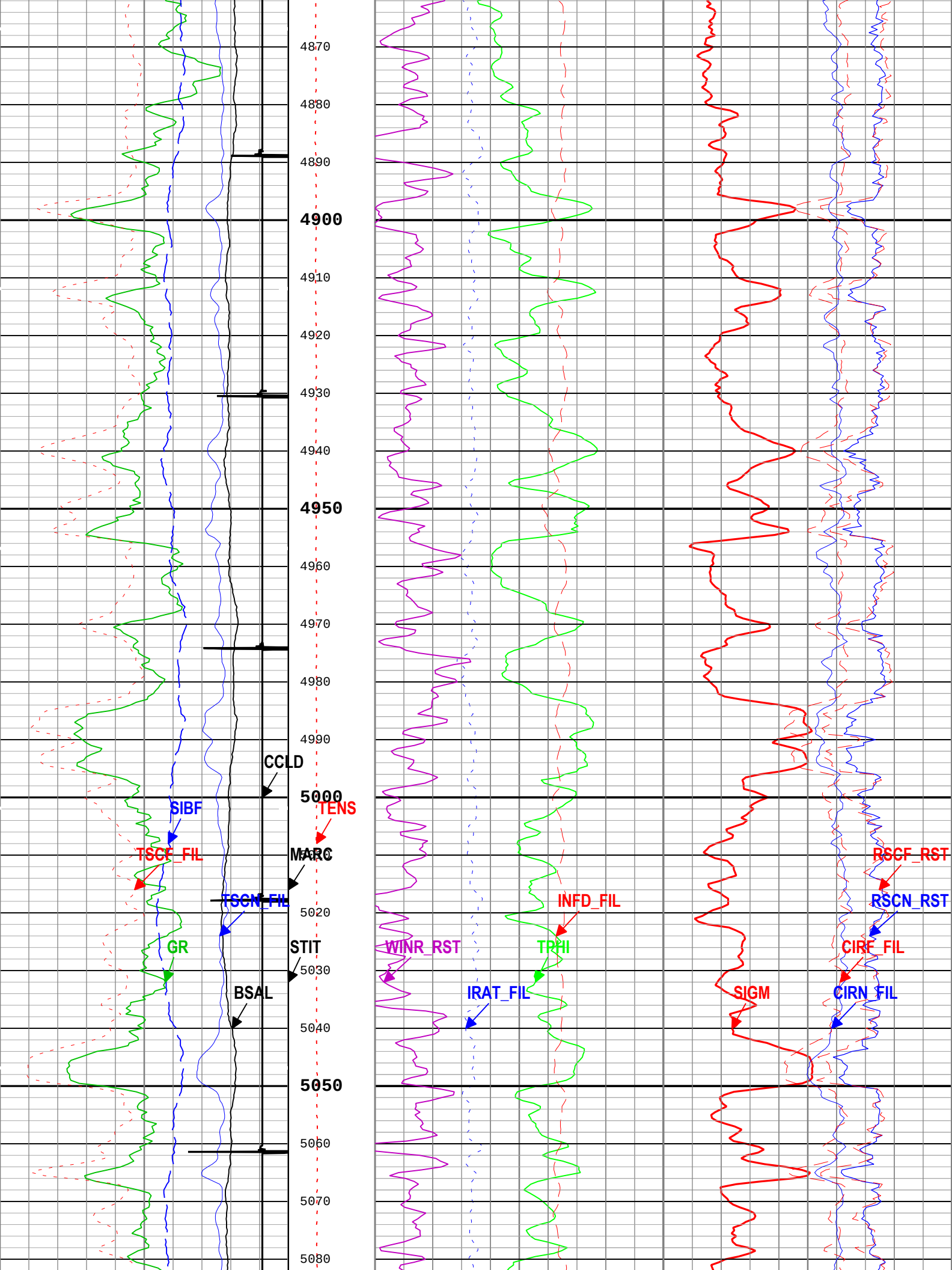
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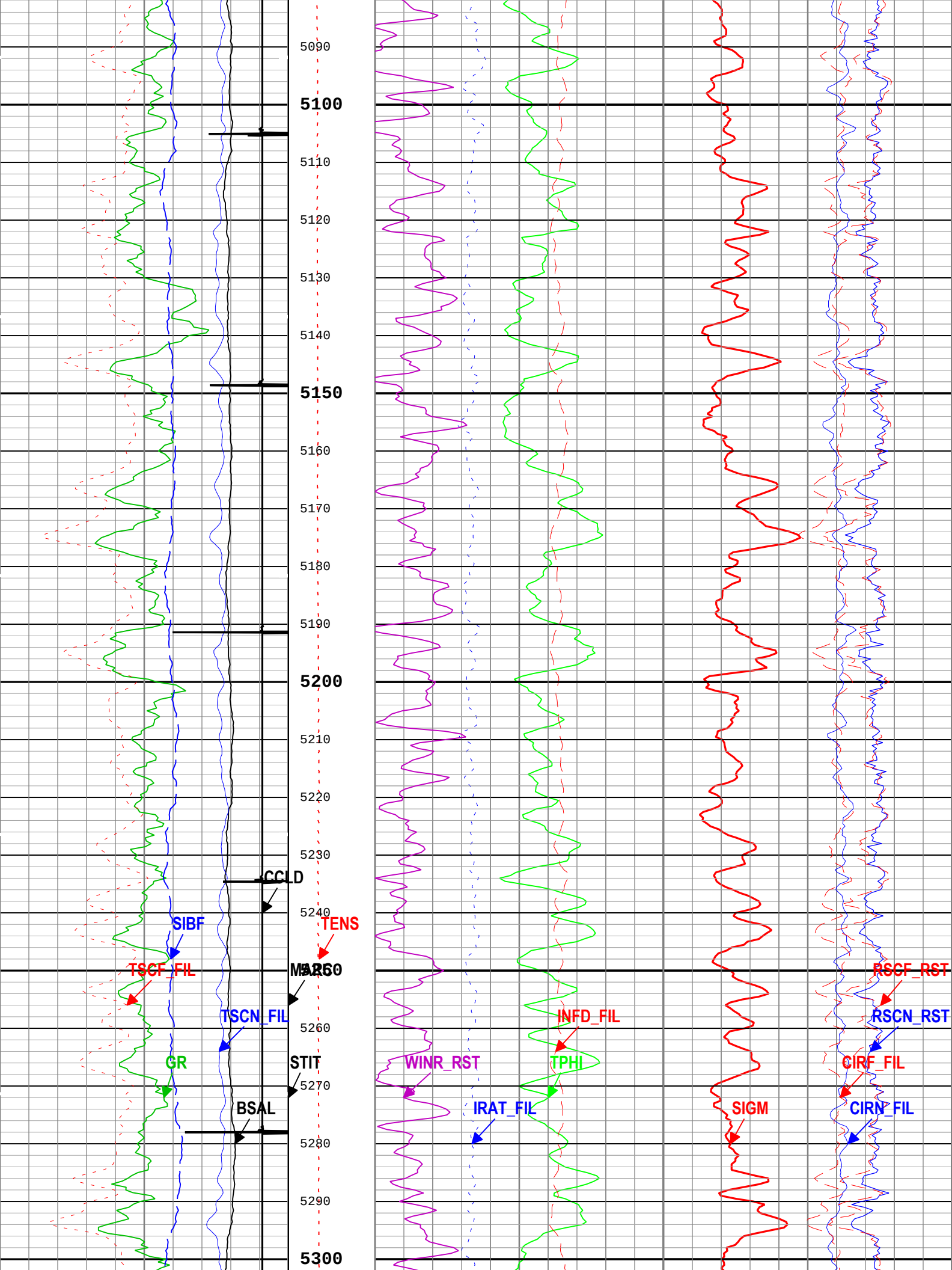
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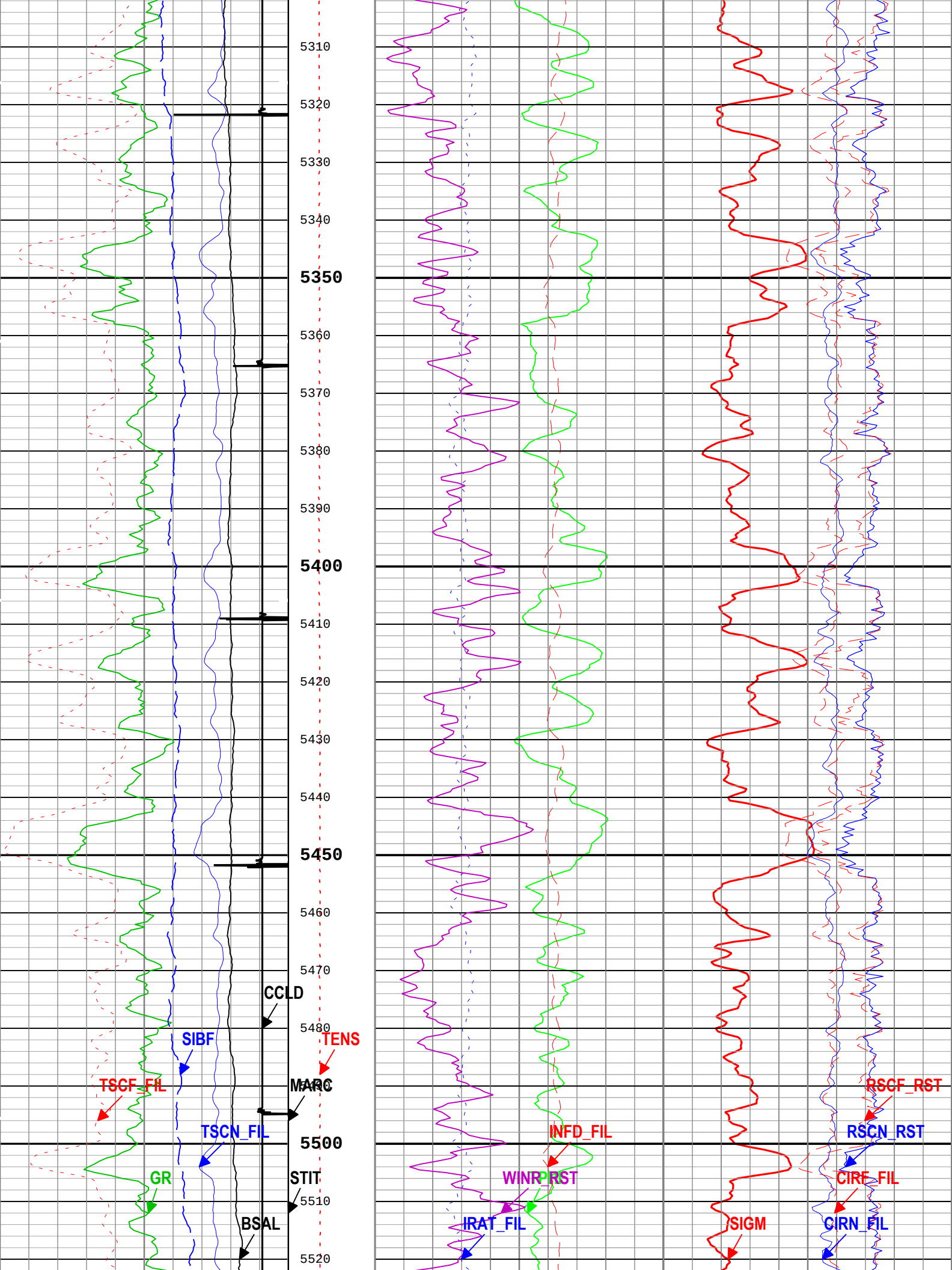
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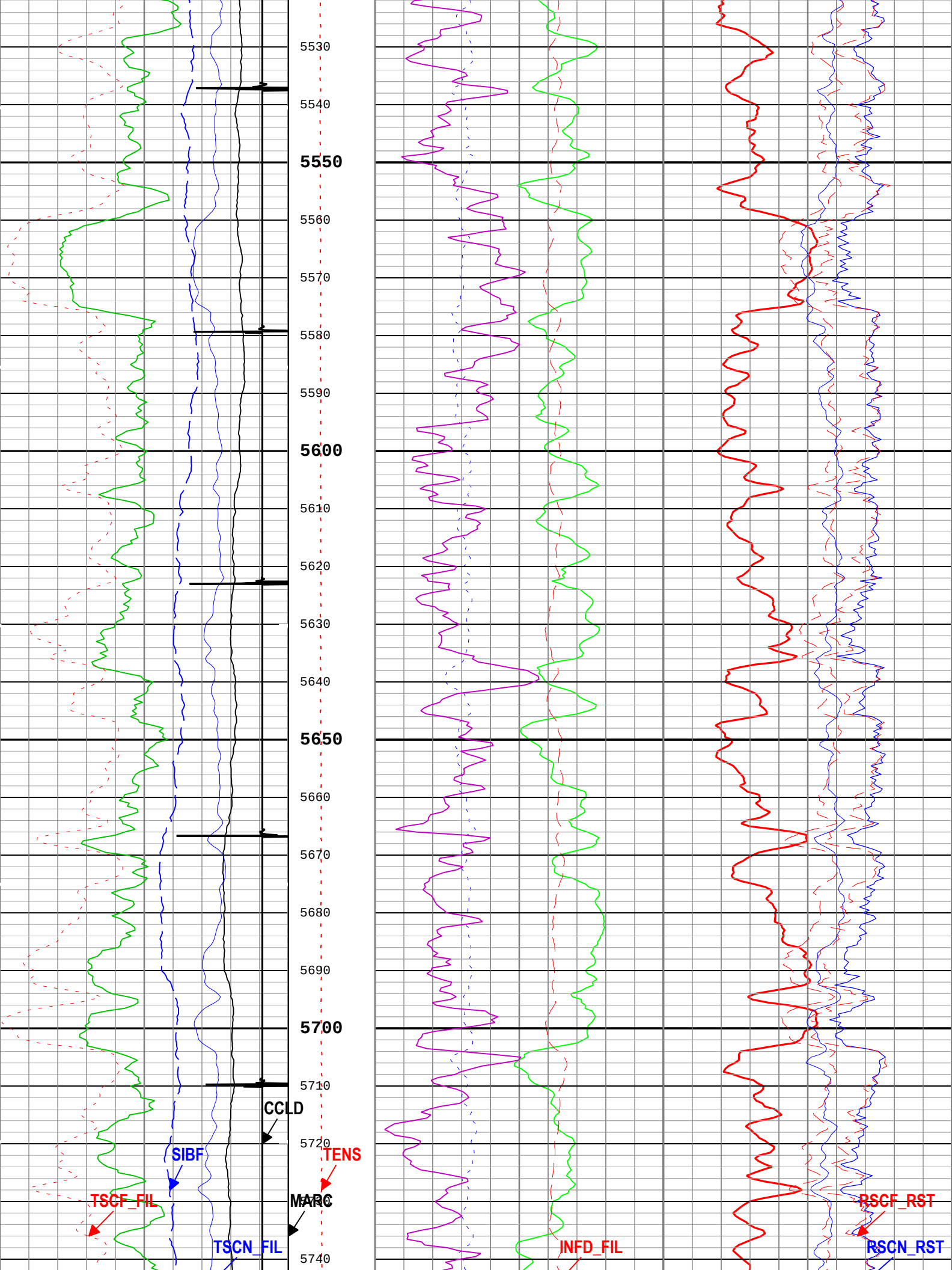
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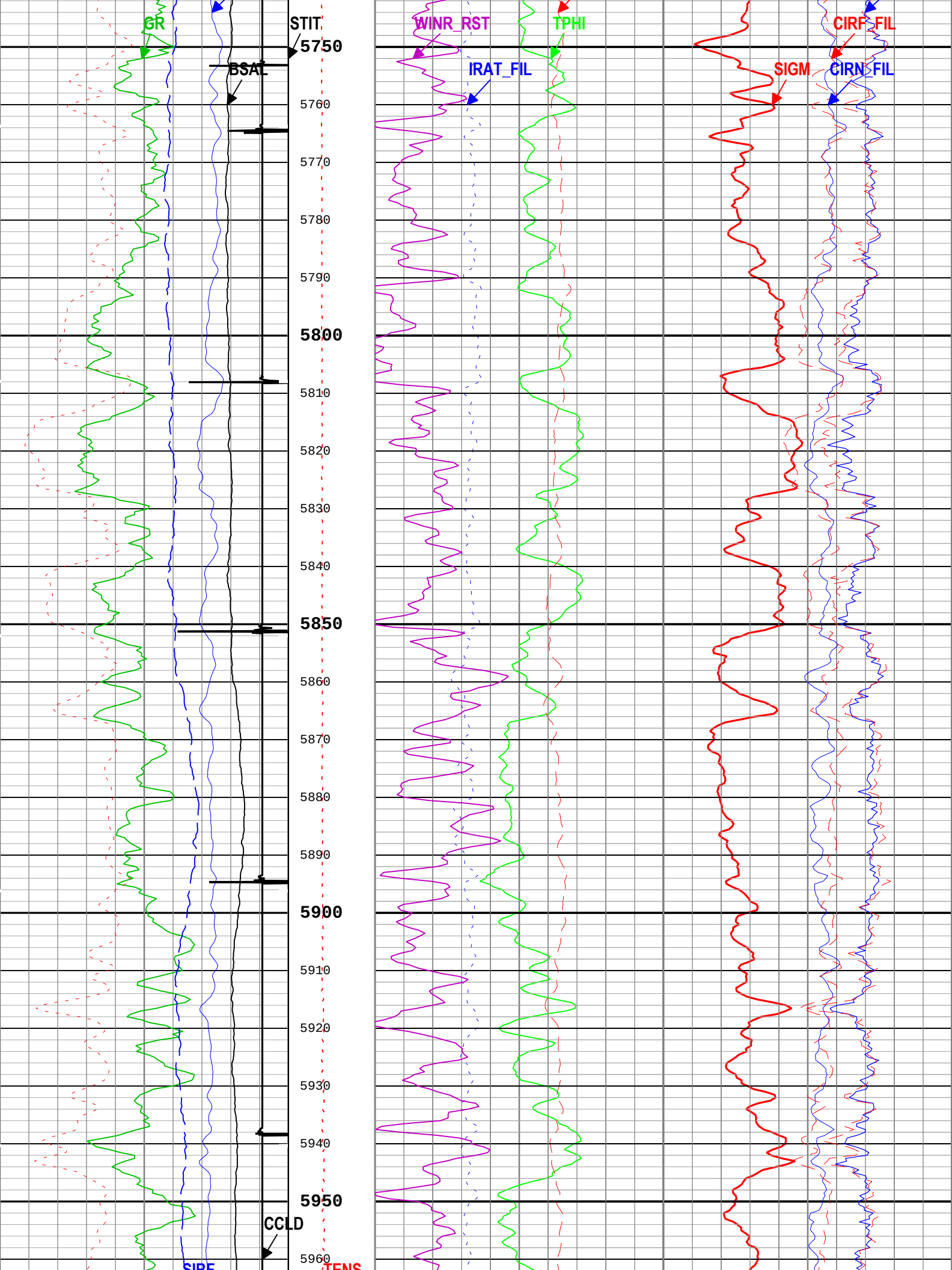
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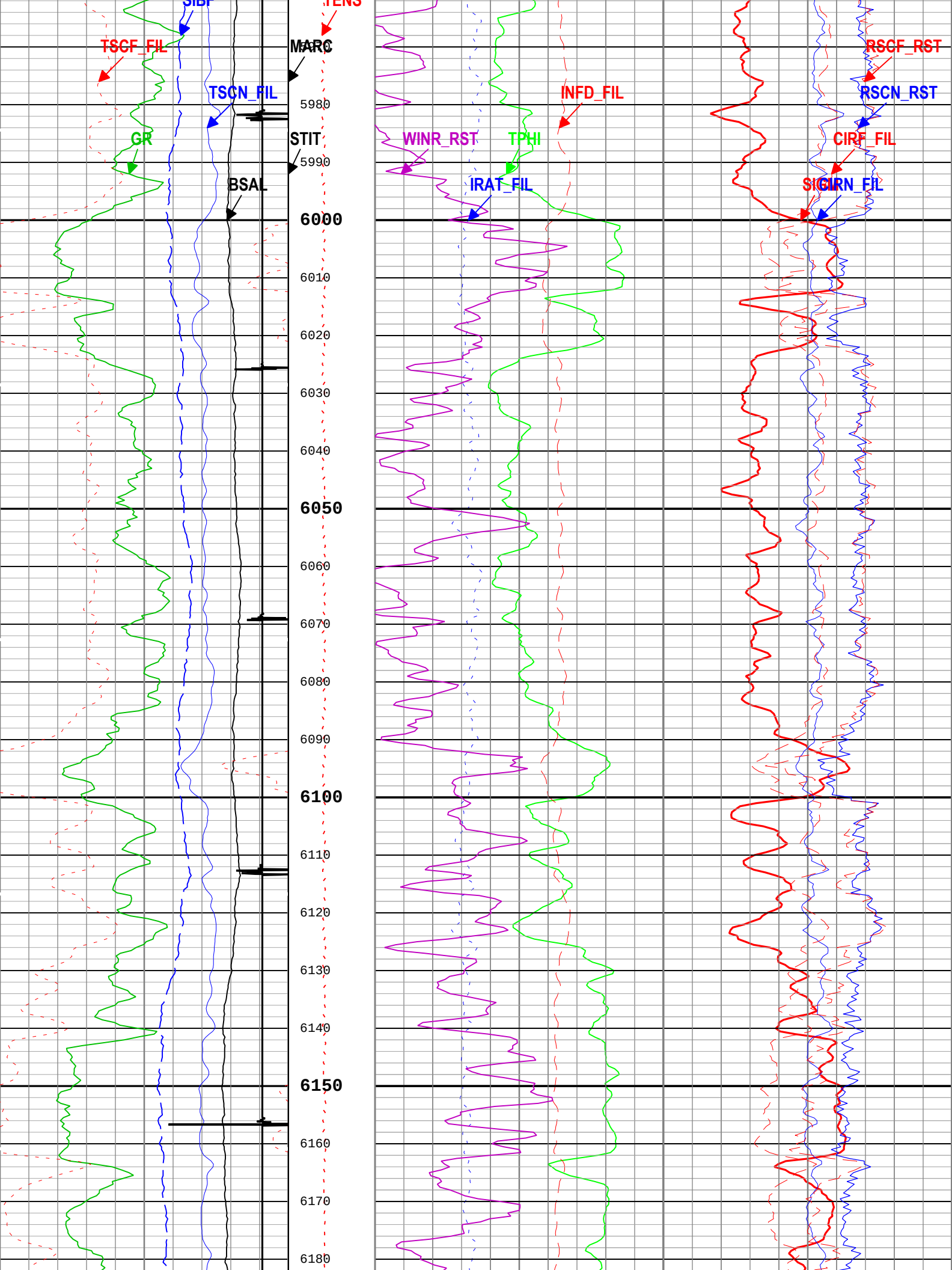
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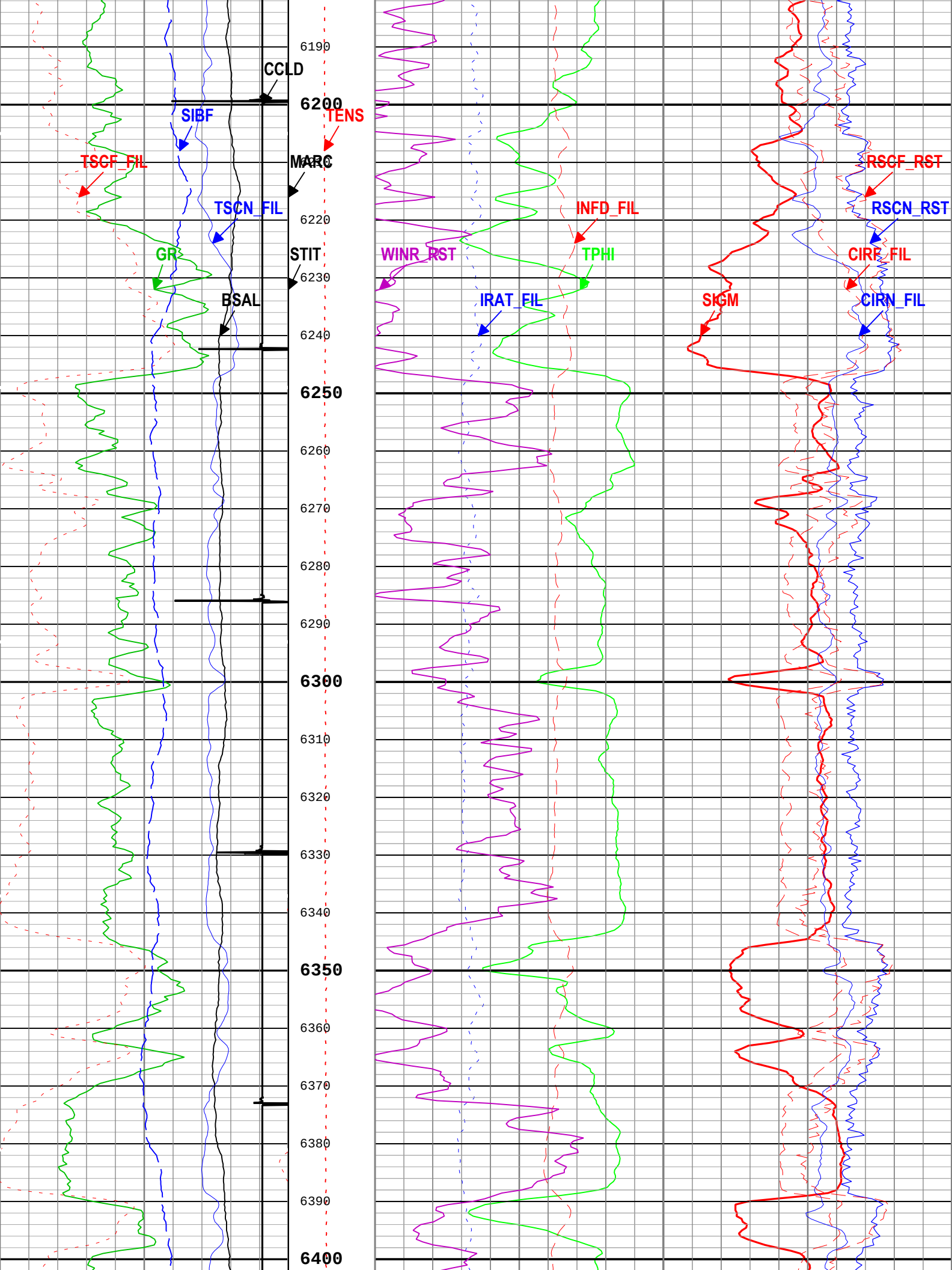
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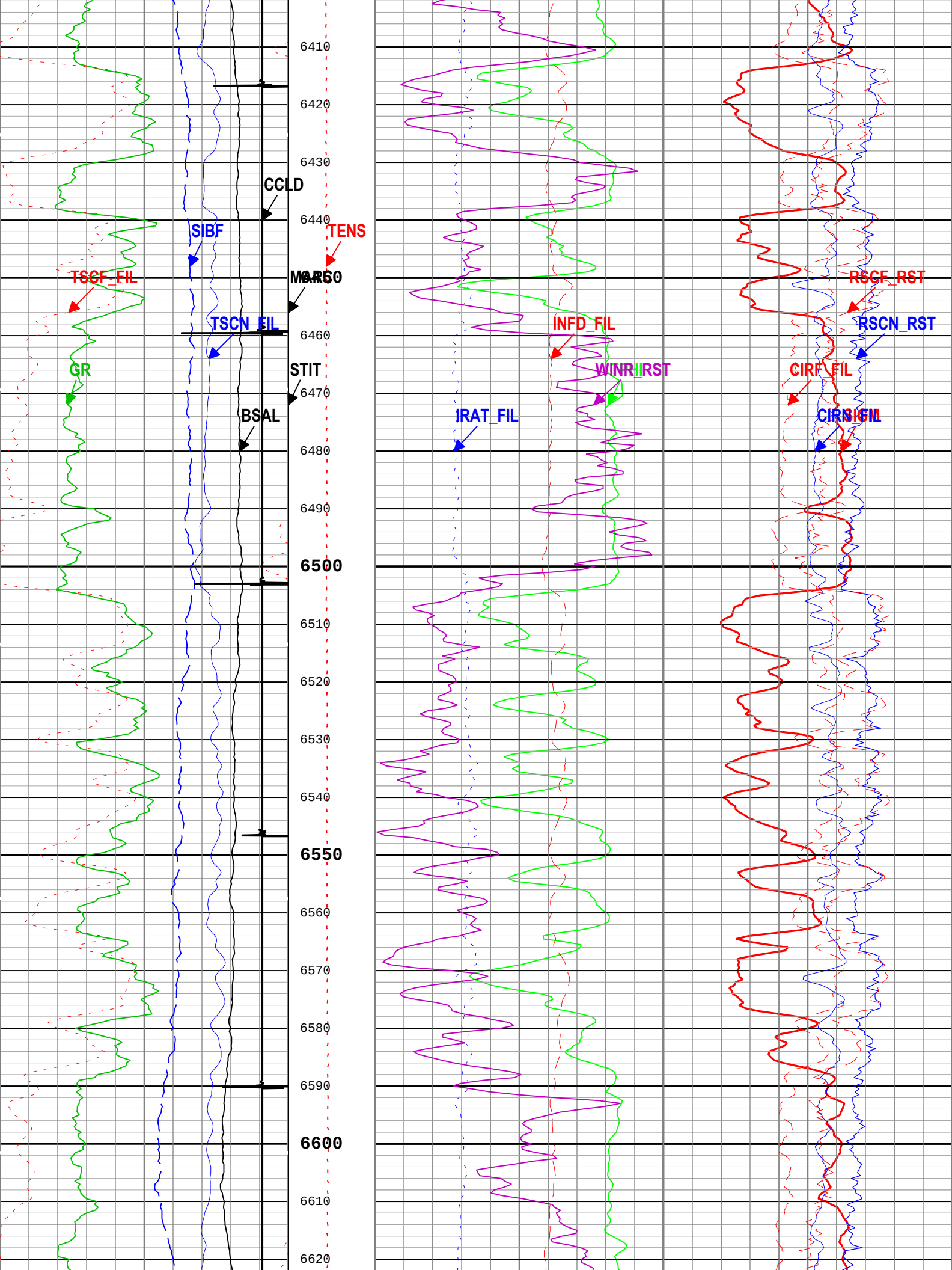
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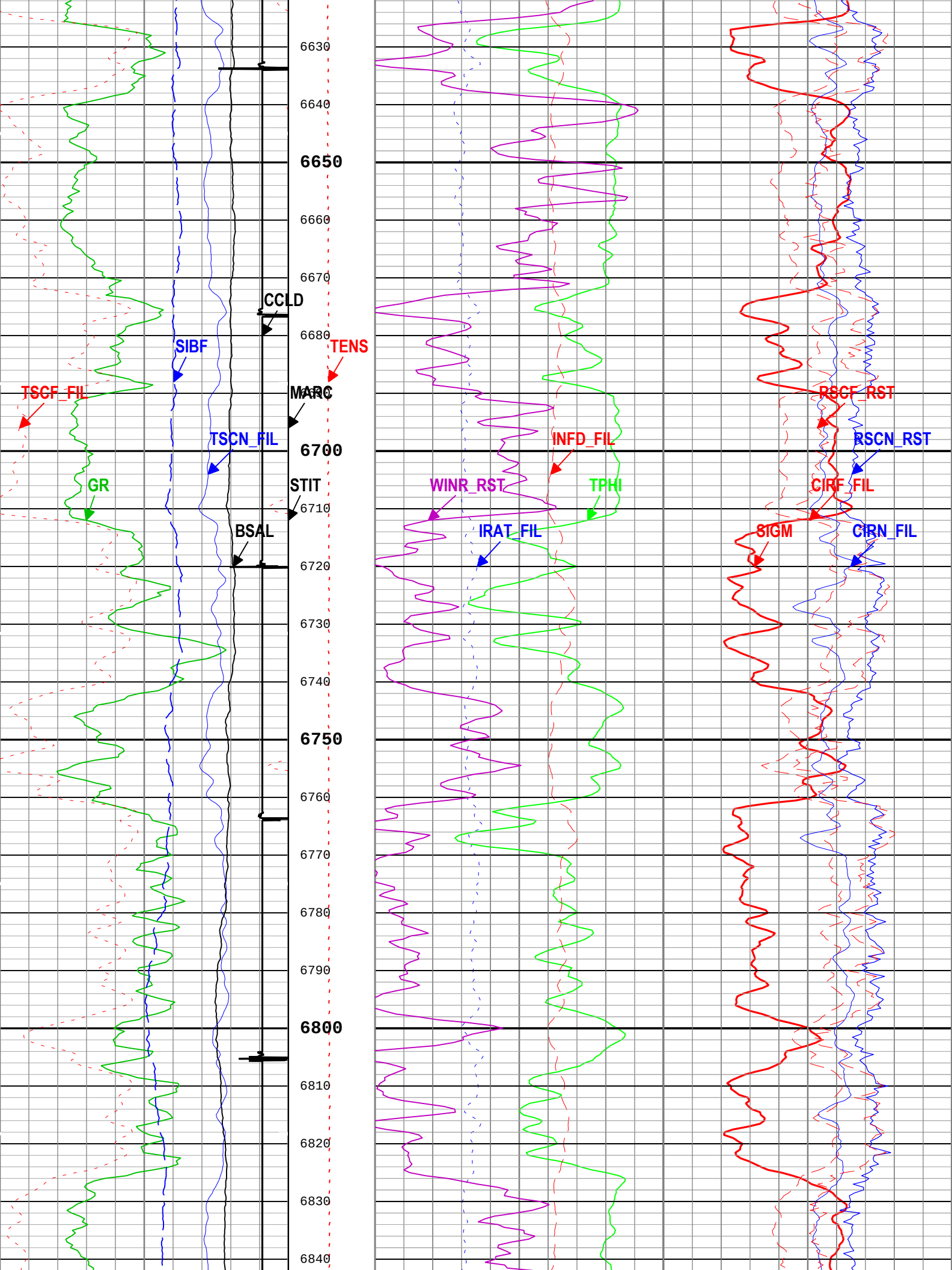
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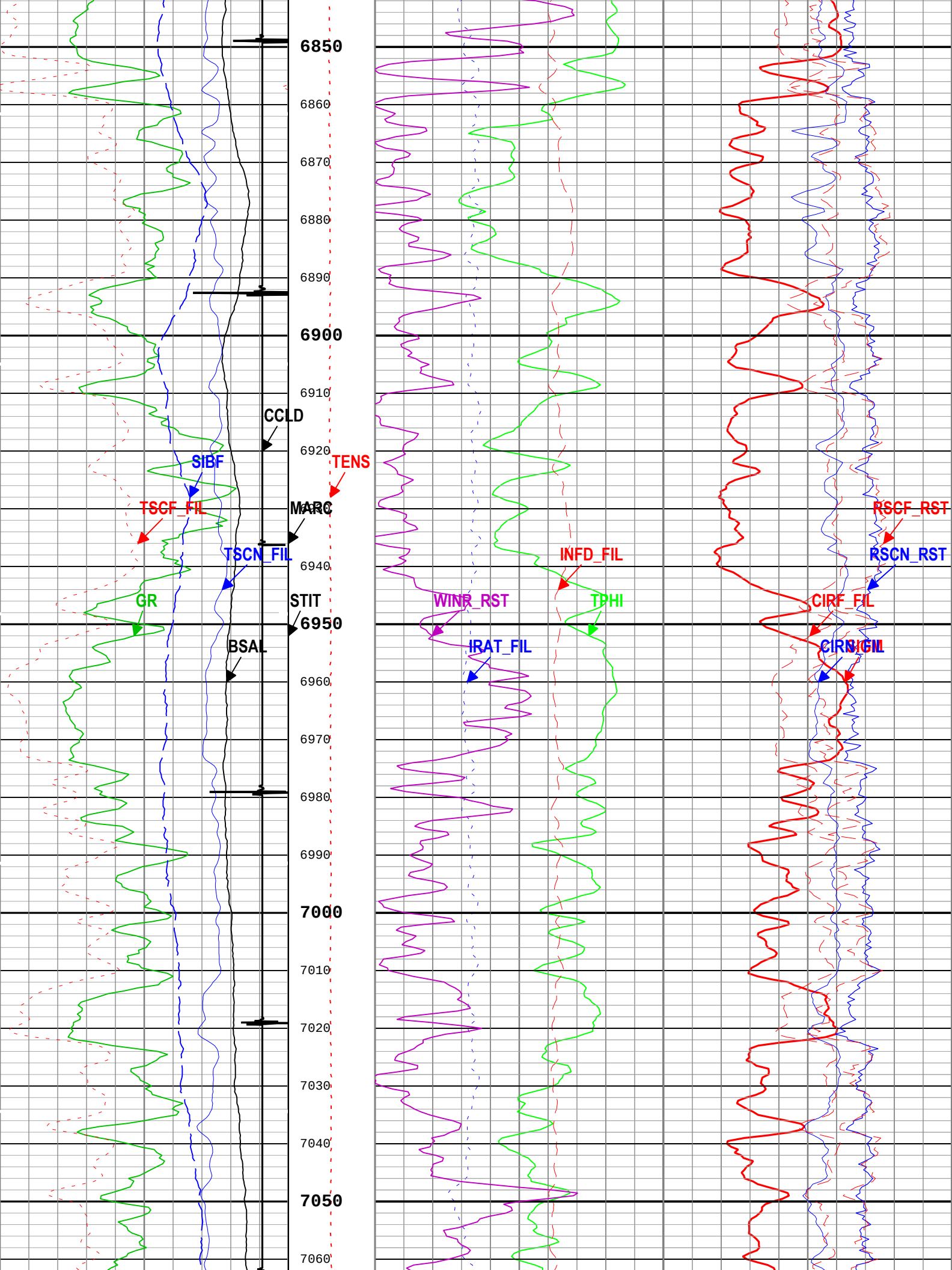
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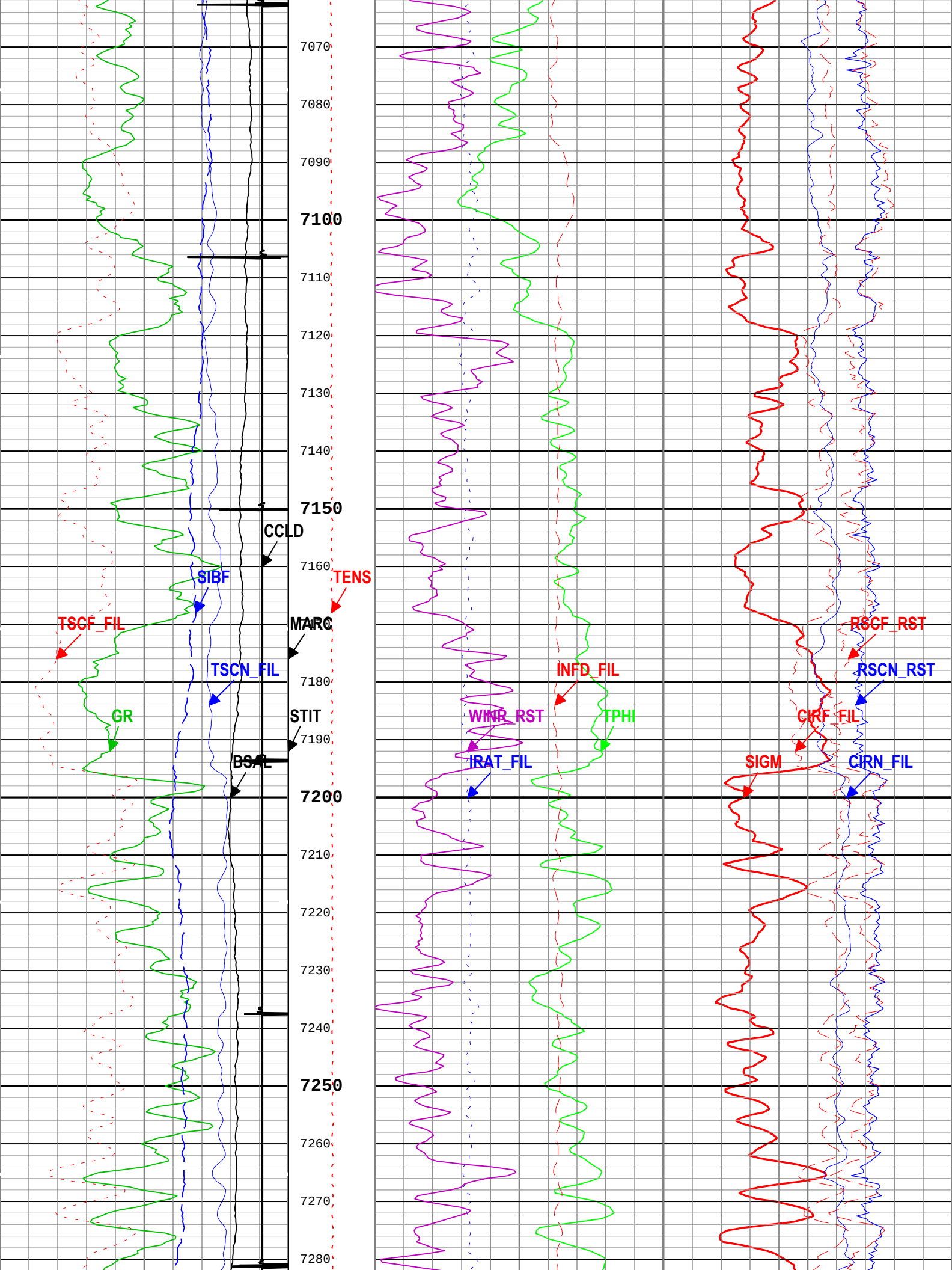
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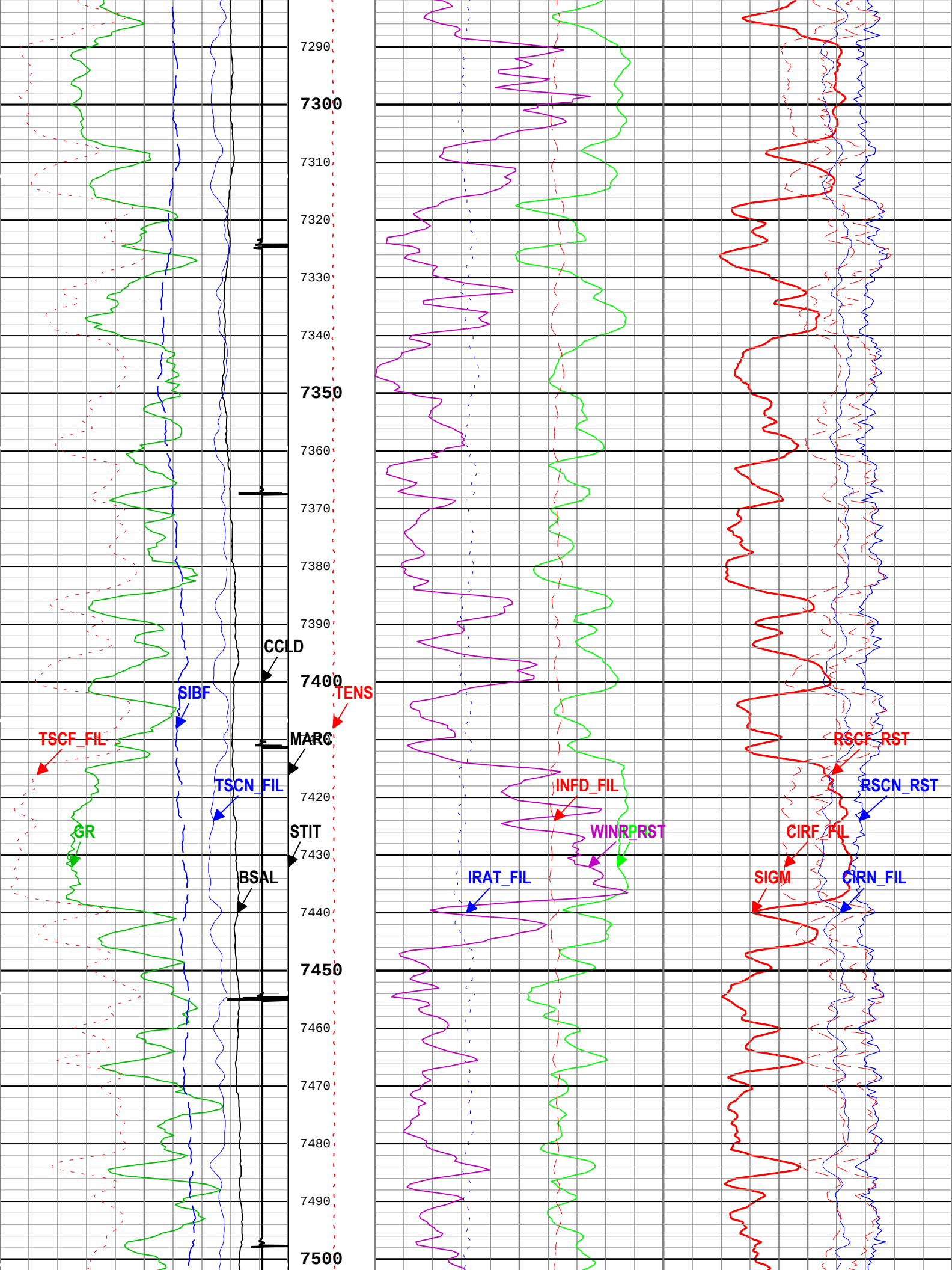
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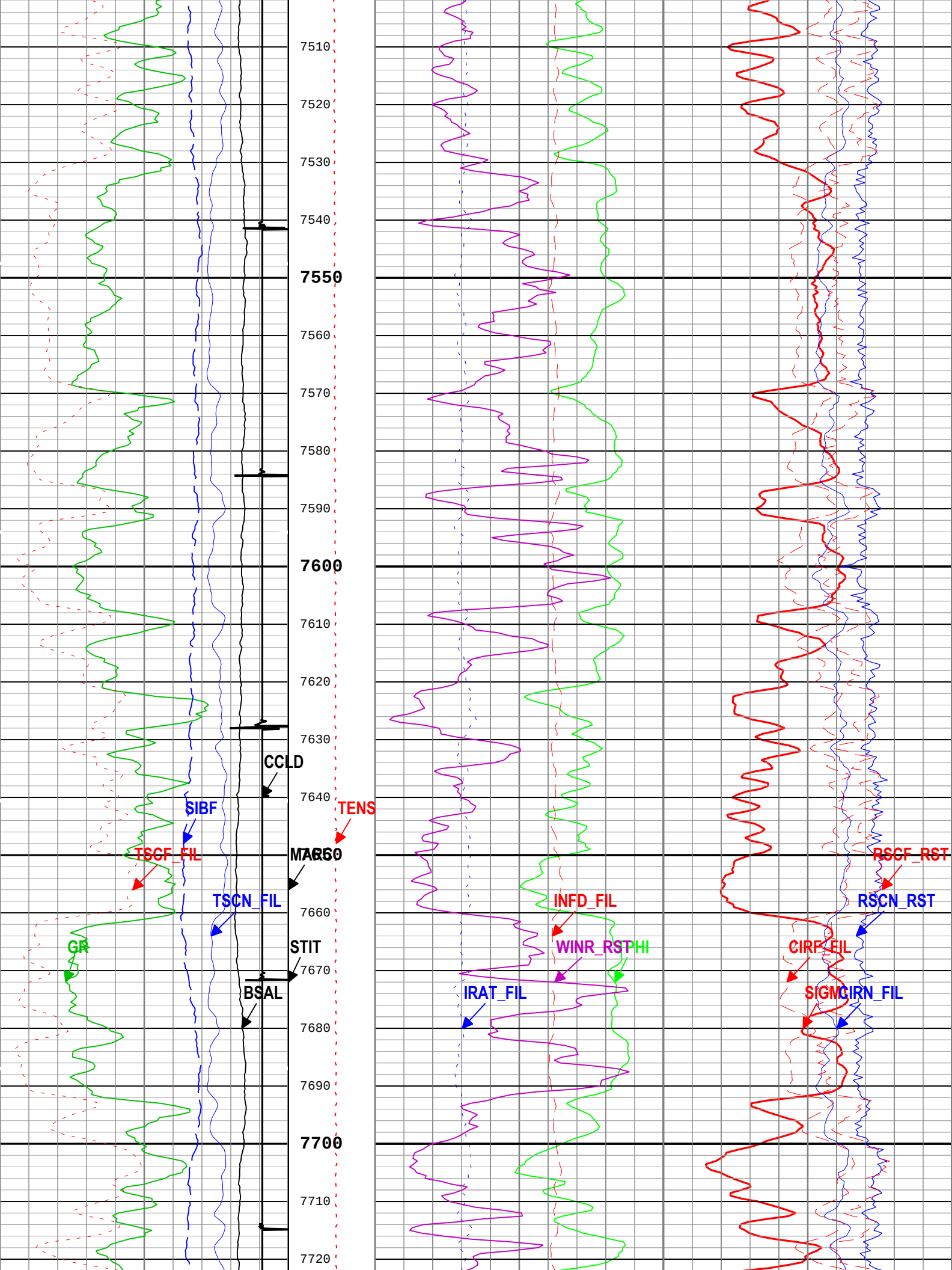
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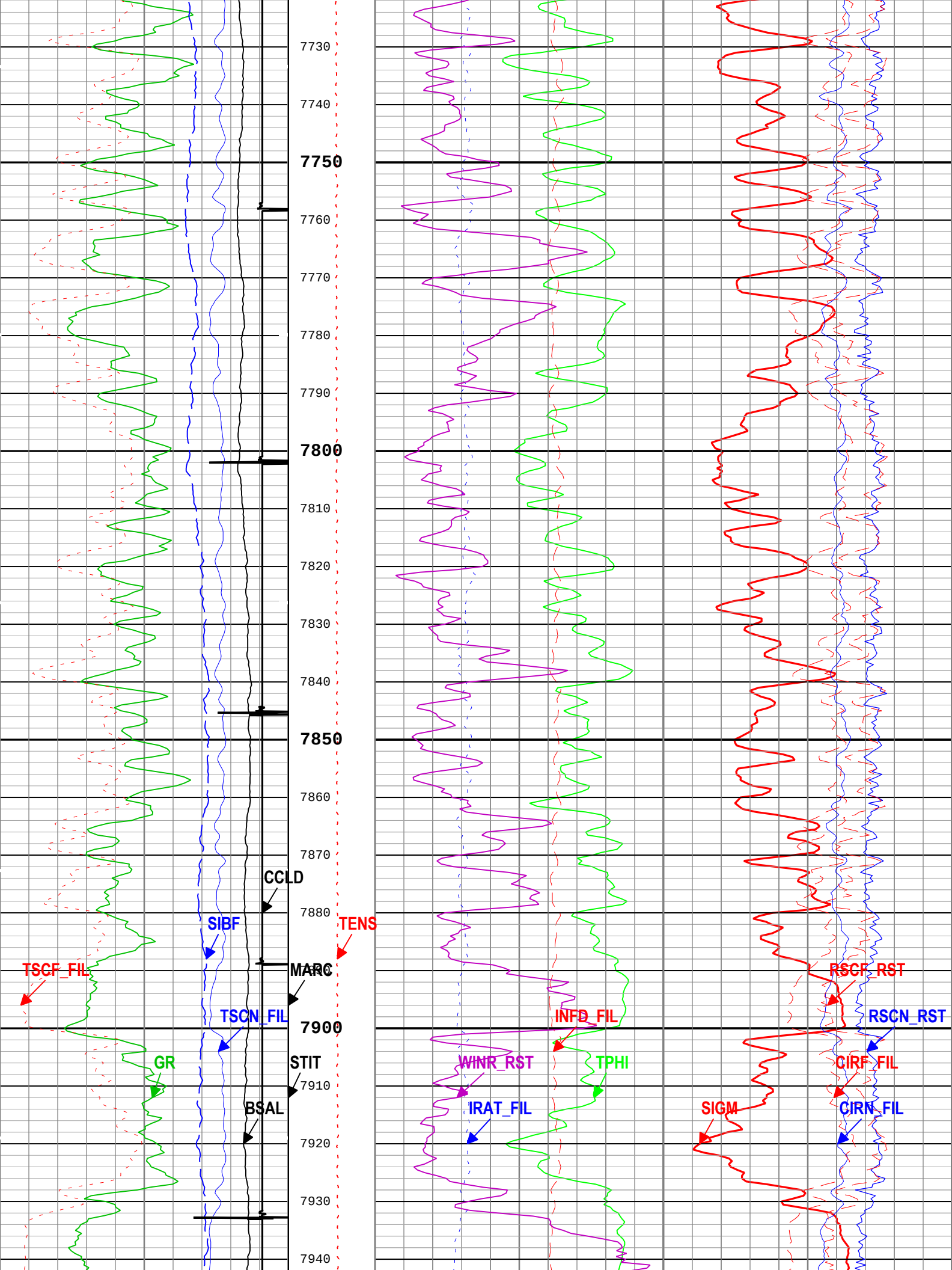
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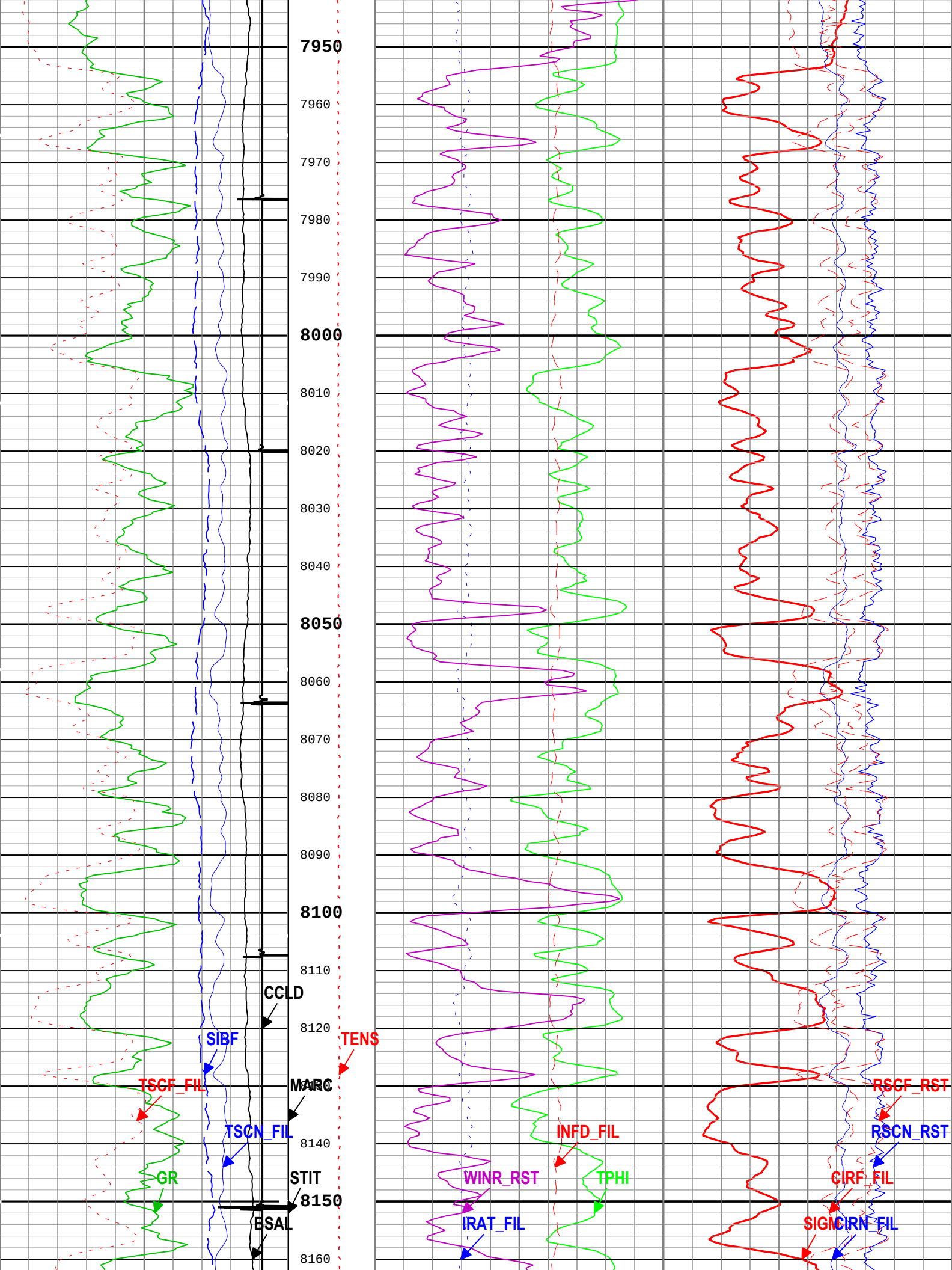
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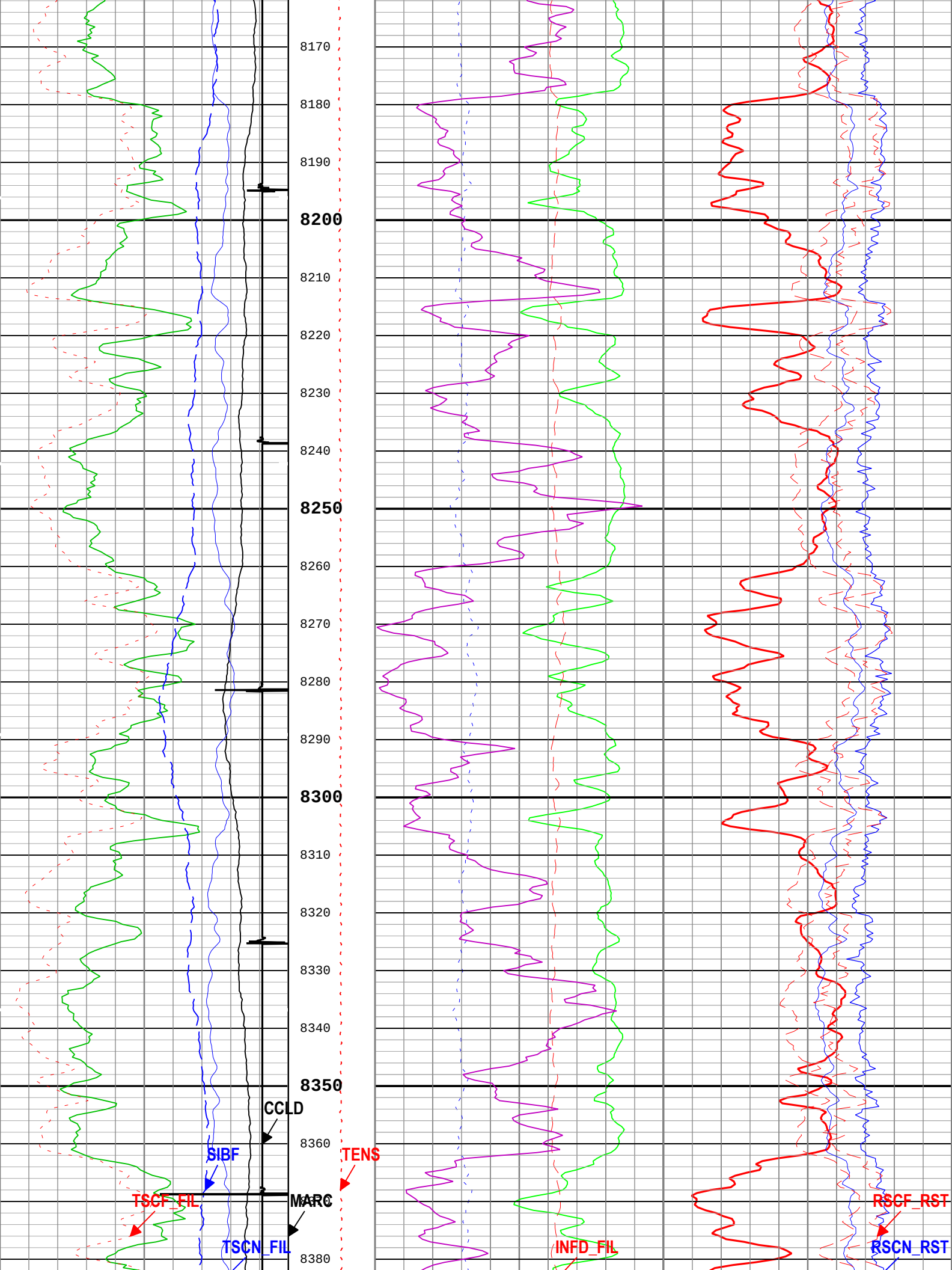
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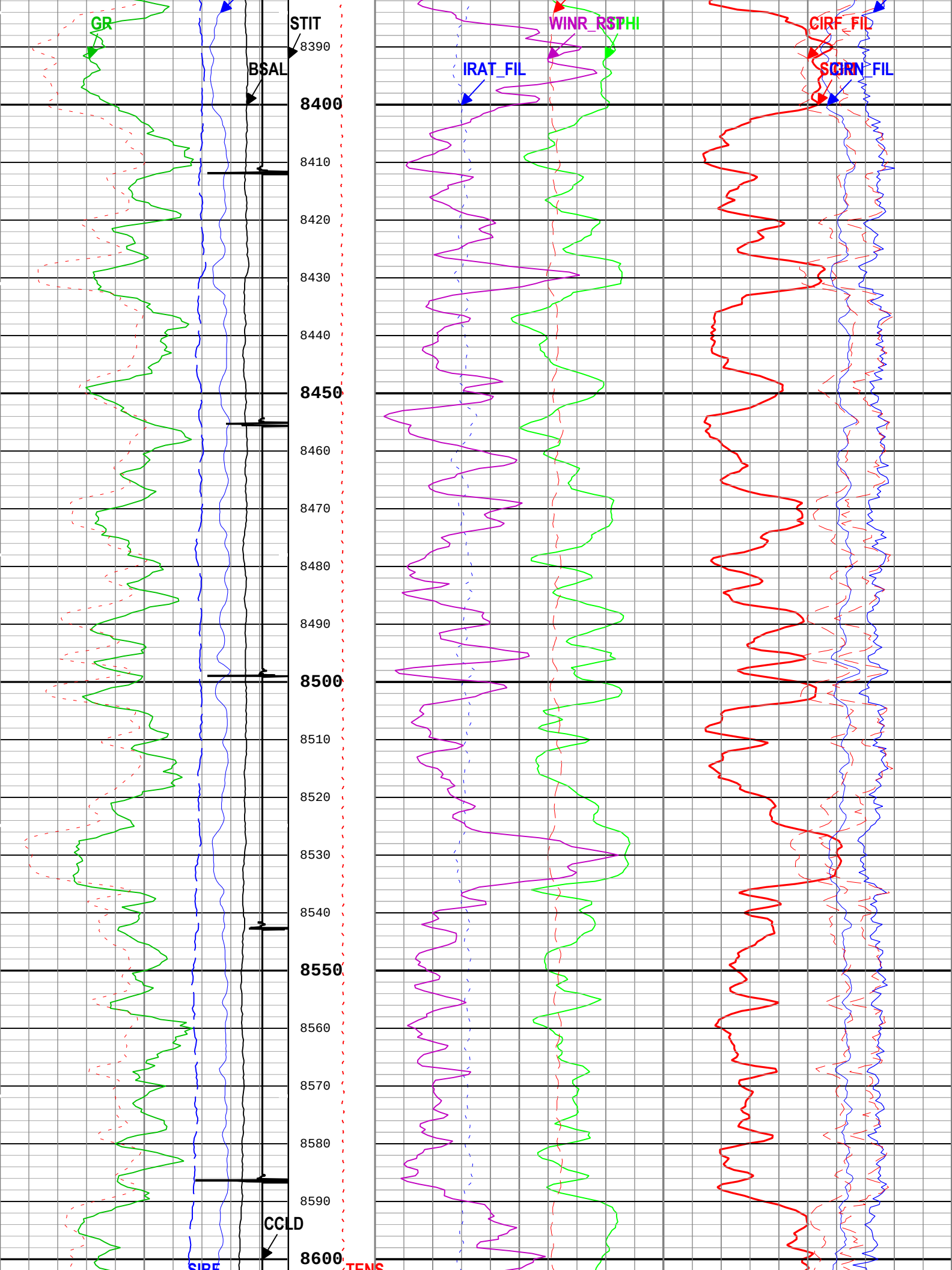
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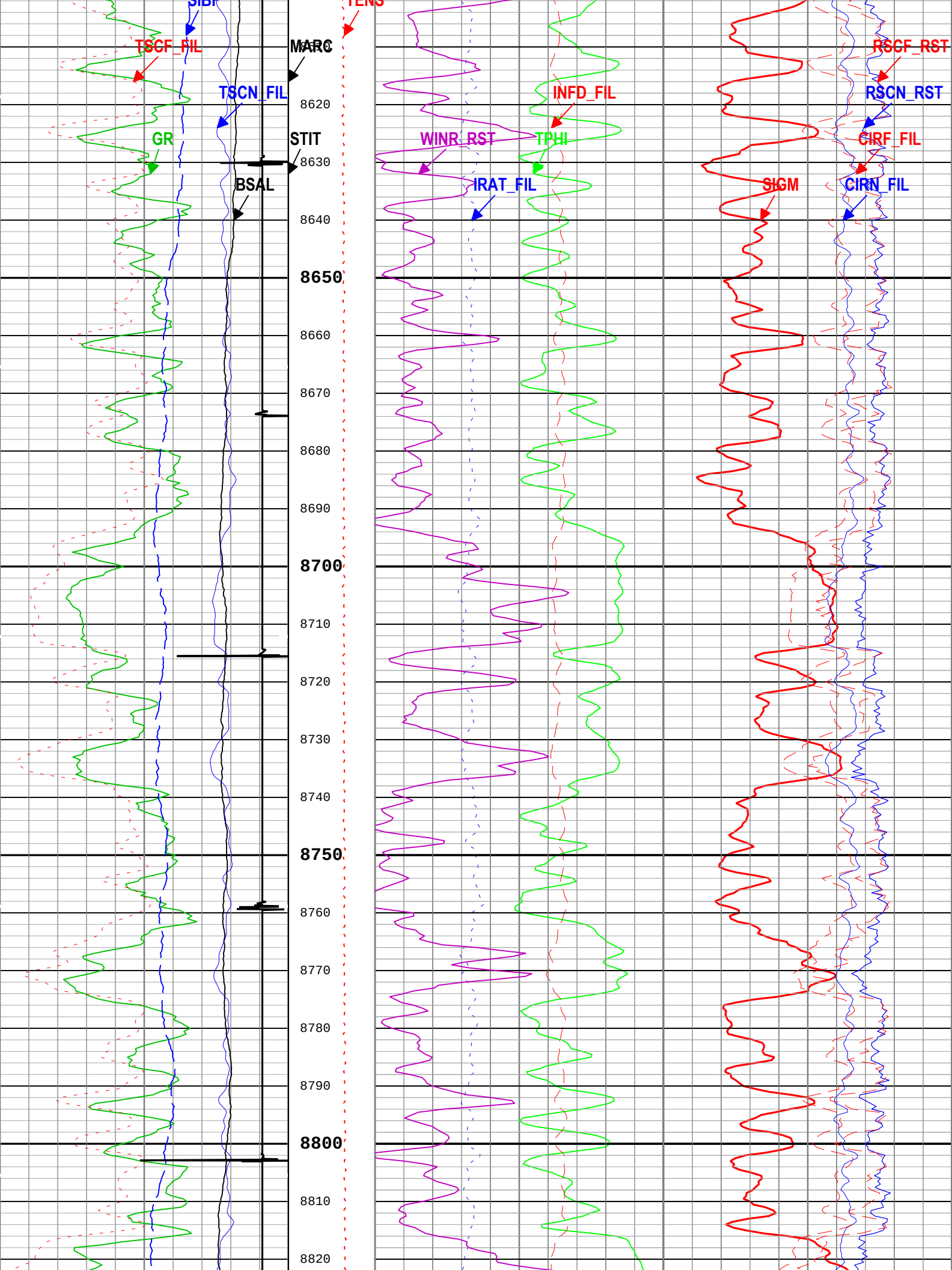
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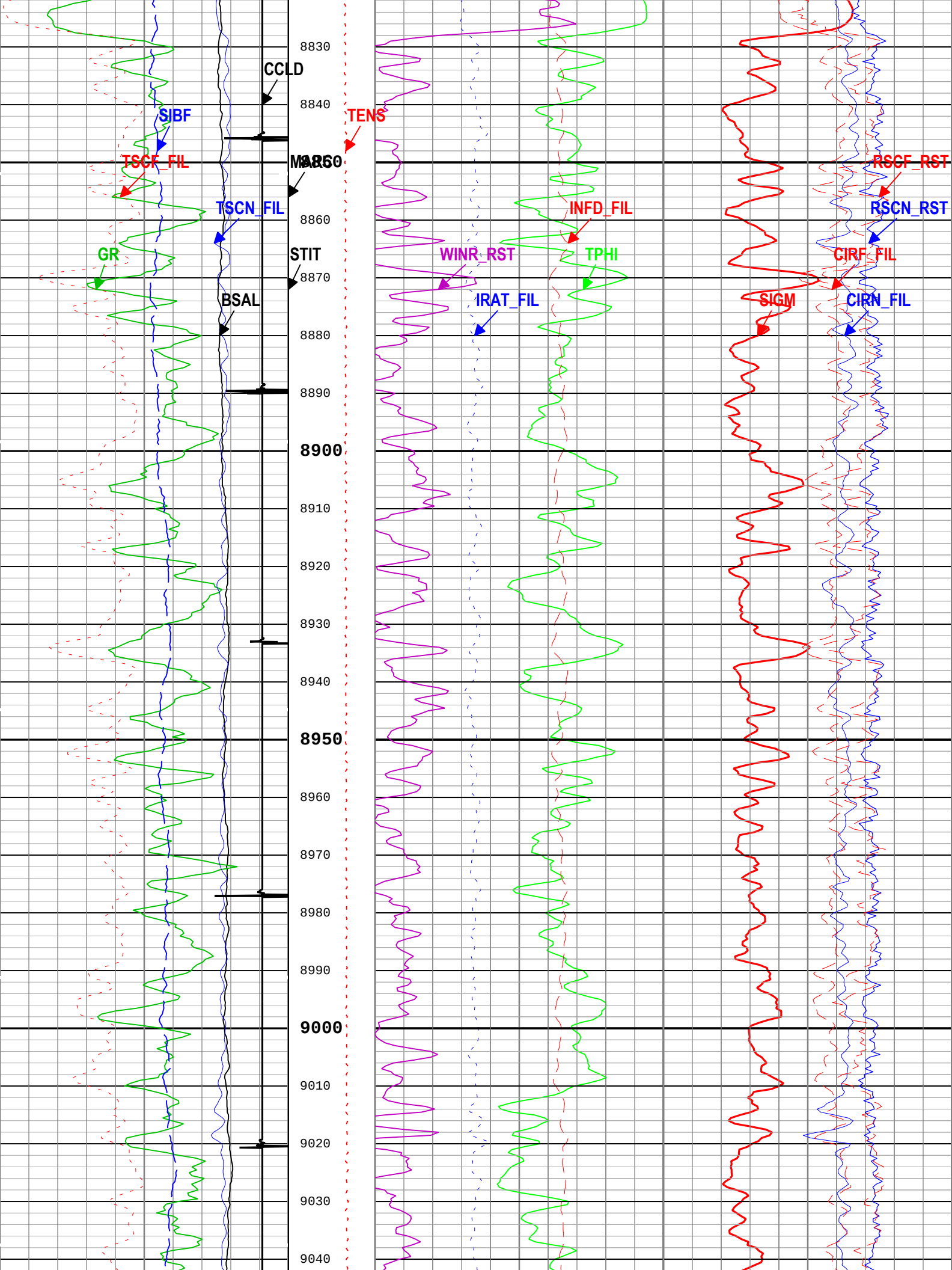
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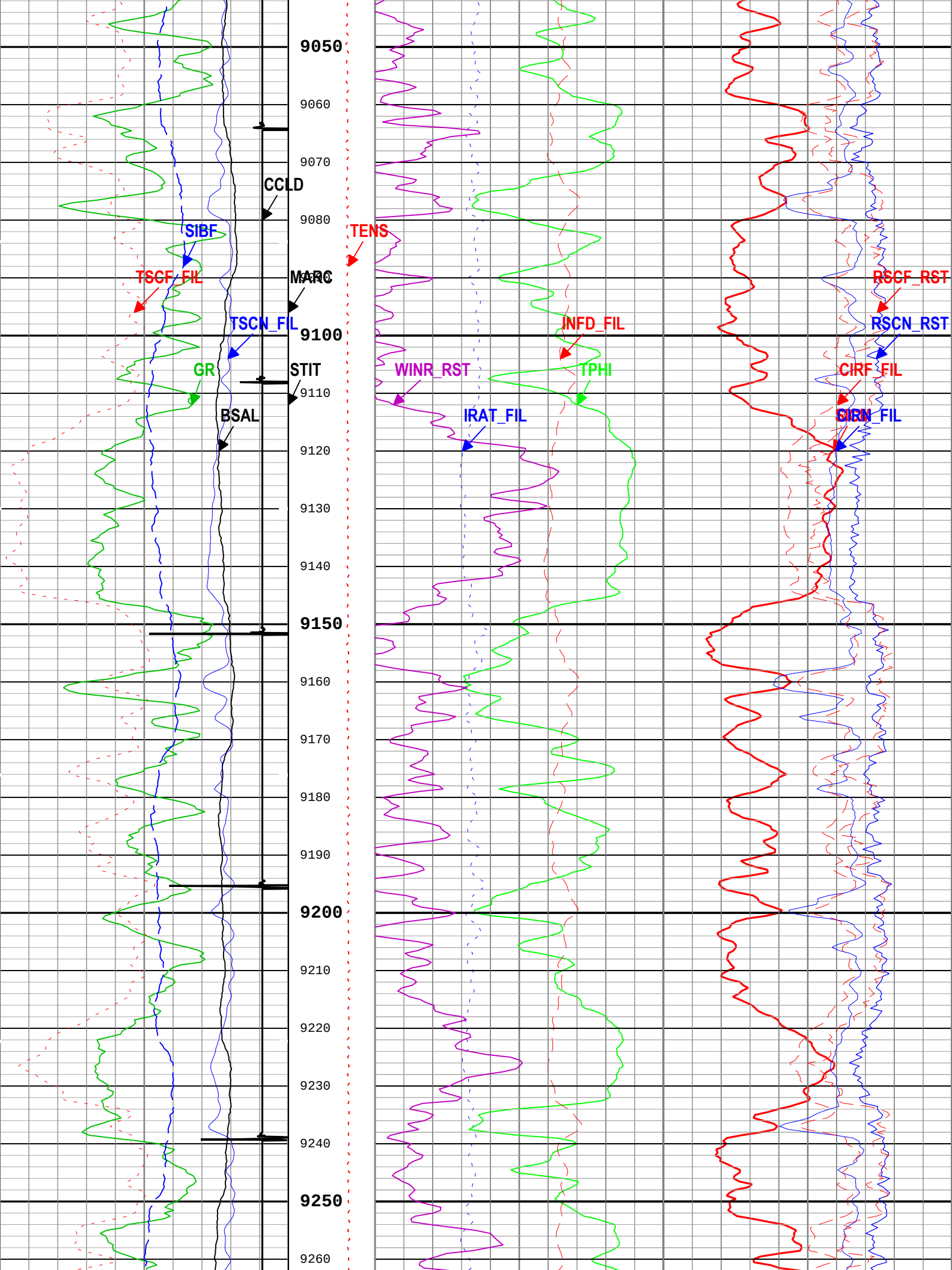
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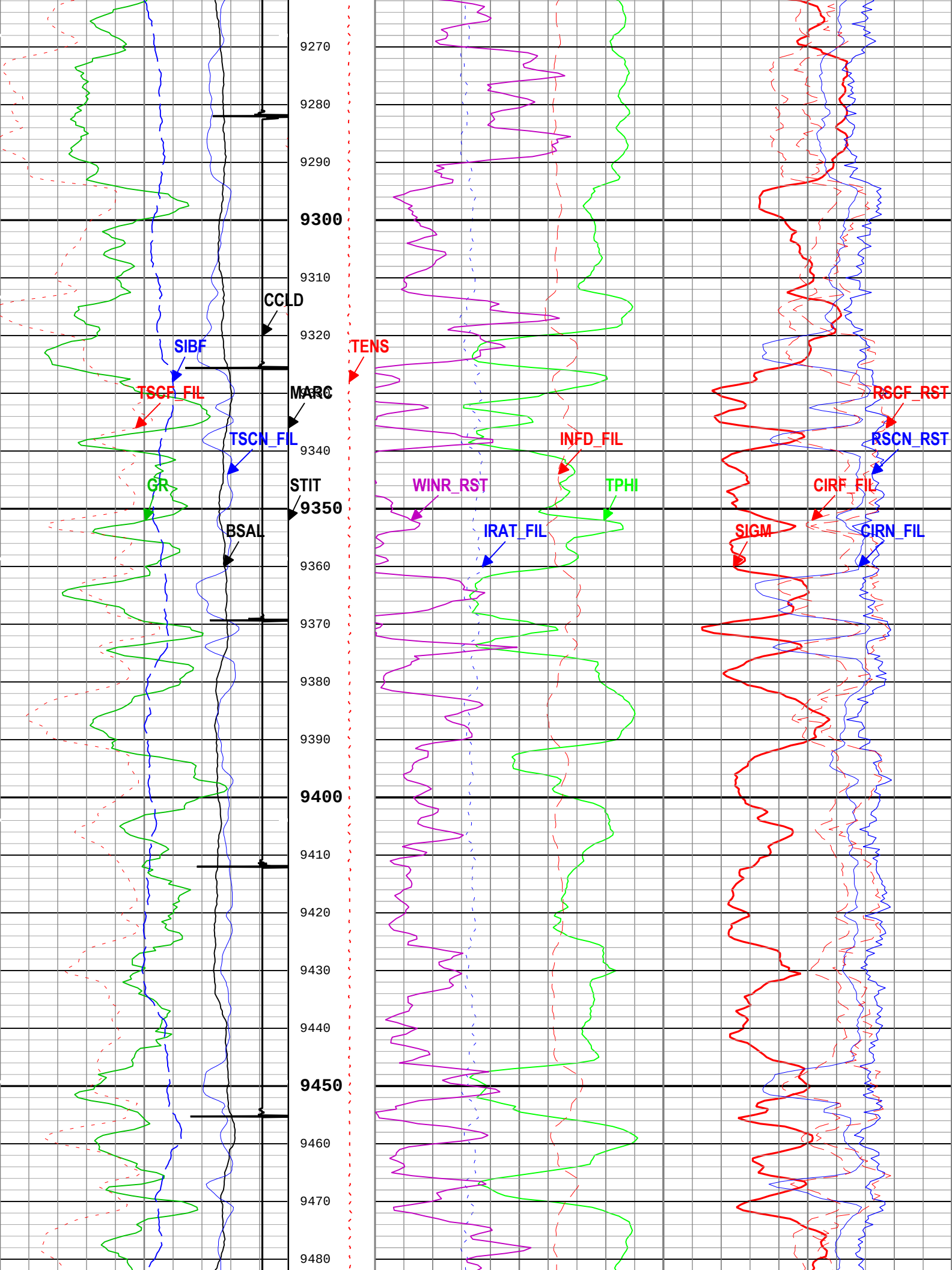
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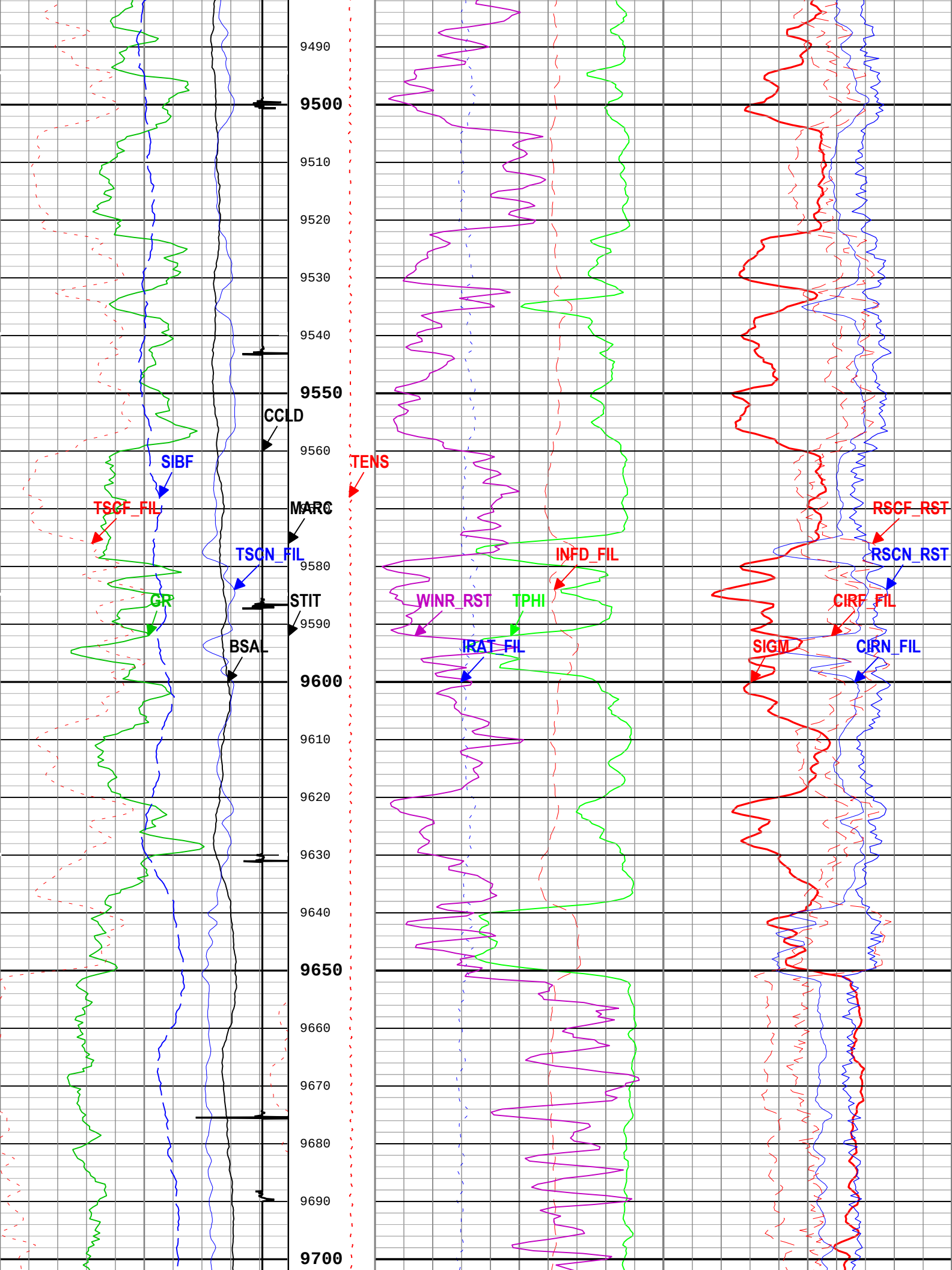
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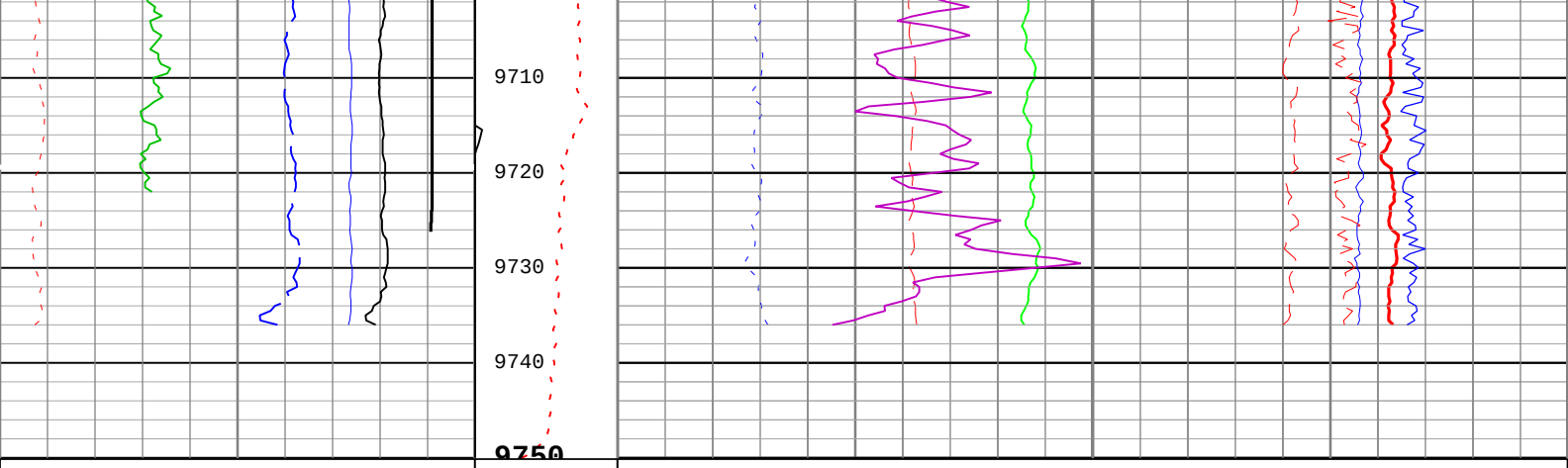


Borehole Salinity (BSAL) RST-C
450 ppk -50

Gamma Ray (GR) PSTP-B
0 gAPI 150

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

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

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

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

Stuck Tool Indicator, Total (STIT)
0 ft 50

Cable Drag From STIA to STIT

Tool_Tot. Drag From D3T to STIT

Minitron Arc Count (MARC) RST-C
0 5

Cable Tension (TENS)
0 lbf 2000

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

Weighted Inelastic Ratio (WINR_RST) RST-C
0 0.4

Inelastic Ratio Filtered (IRAT_FIL) RST-C
0.75 0

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

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

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

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)

TIME_1900 - Time Marked every 60.00 (s)

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)

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: 22-Sep-2018 13:31:35

Channel Processing Parameters

RST Sigma: 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	
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	14.75	2000	2438
BS	8.75	2438	9750.13

All depth are actual.

Tool Control Parameters

RST Sigma: Parameters

Parameter	Description	Tool	Value	Unit
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	150	ft/h
PCCG	PSP Downhole CCL Gain	PSTP-B	12 dB	
RST_DLM	Depth Log Mode	RST-C	Sigma	

RST Sigma

RST Repeat Pass

Software Version

Acquisition System	Version
Maxwell 2018 SP1	8.1.99839.3100
Application Patch	Wireline_Hotfix-Mandatory-2018SP1_8.1.102865

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
RST Sigma	Log[2]:Up	Up	9347.23 ft	9742.52 ft	22-Sep-2018 7:55:16 AM	22-Sep-2018 8:05:29 AM	ON	7.68 ft	No

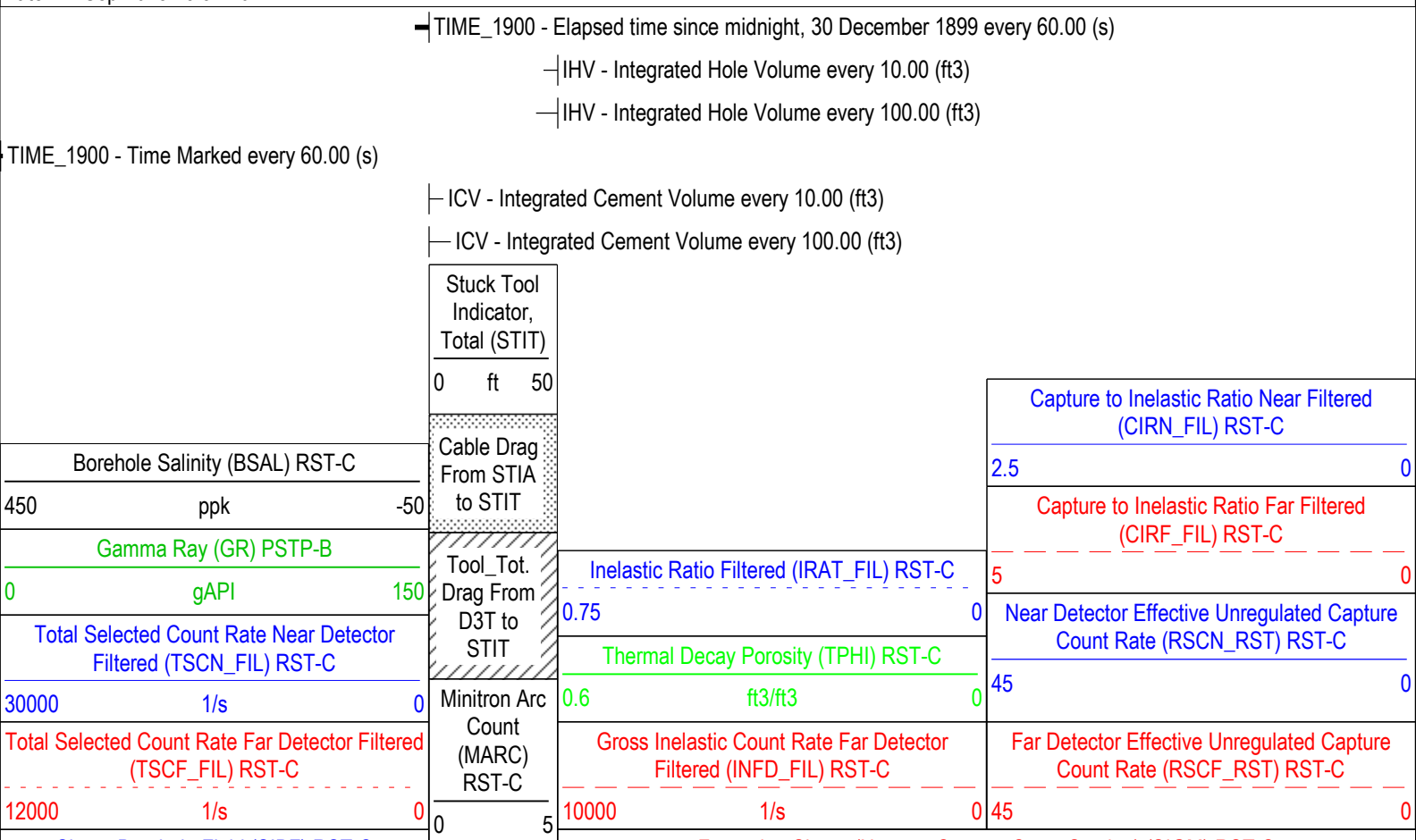
All depths are referenced to toolstring zero

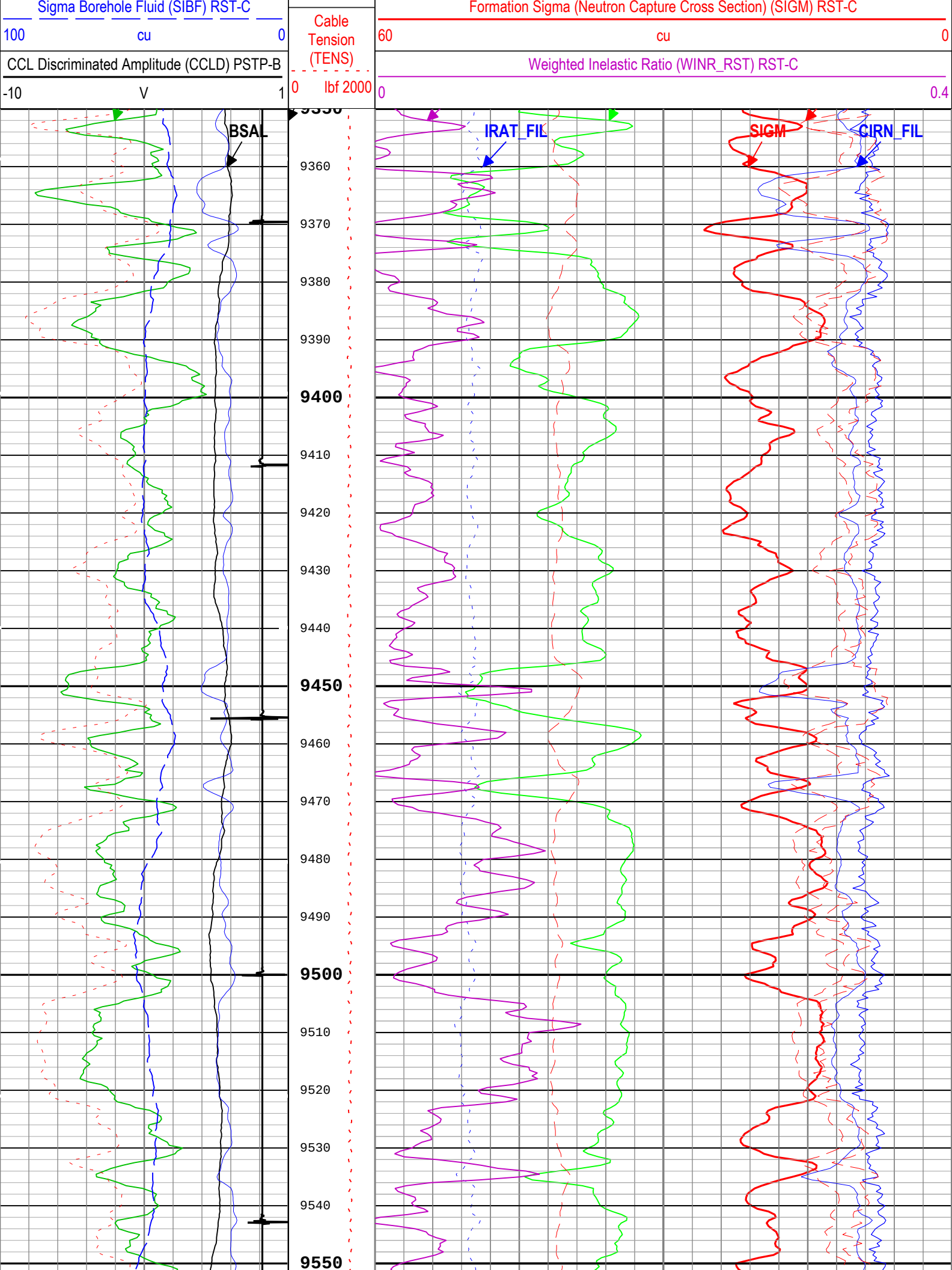
Log

Company:Caerus Operating LLC Well:NPR 24D-10 596

RST Sigma: Log[2]:Up:S009

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: 22-Sep-2018 13:31:40




Sigma Borehole Fluid (SIBF) RST-C
100
cu
0
CCL Discriminated Amplitude (CCLD) PSTP-B
-10
V
1
Cable Tension (TENS)
0
lbf 2000
Formation Sigma (Neutron Capture Cross Section) (SIGM) RST-C
60
cu
0
Weighted Inelastic Ratio (WINR_RST) RST-C
0
0.4
BSAL
IRAT_FIL
SIGM
CIRN_FIL
9360
9370
9380
9390
9400
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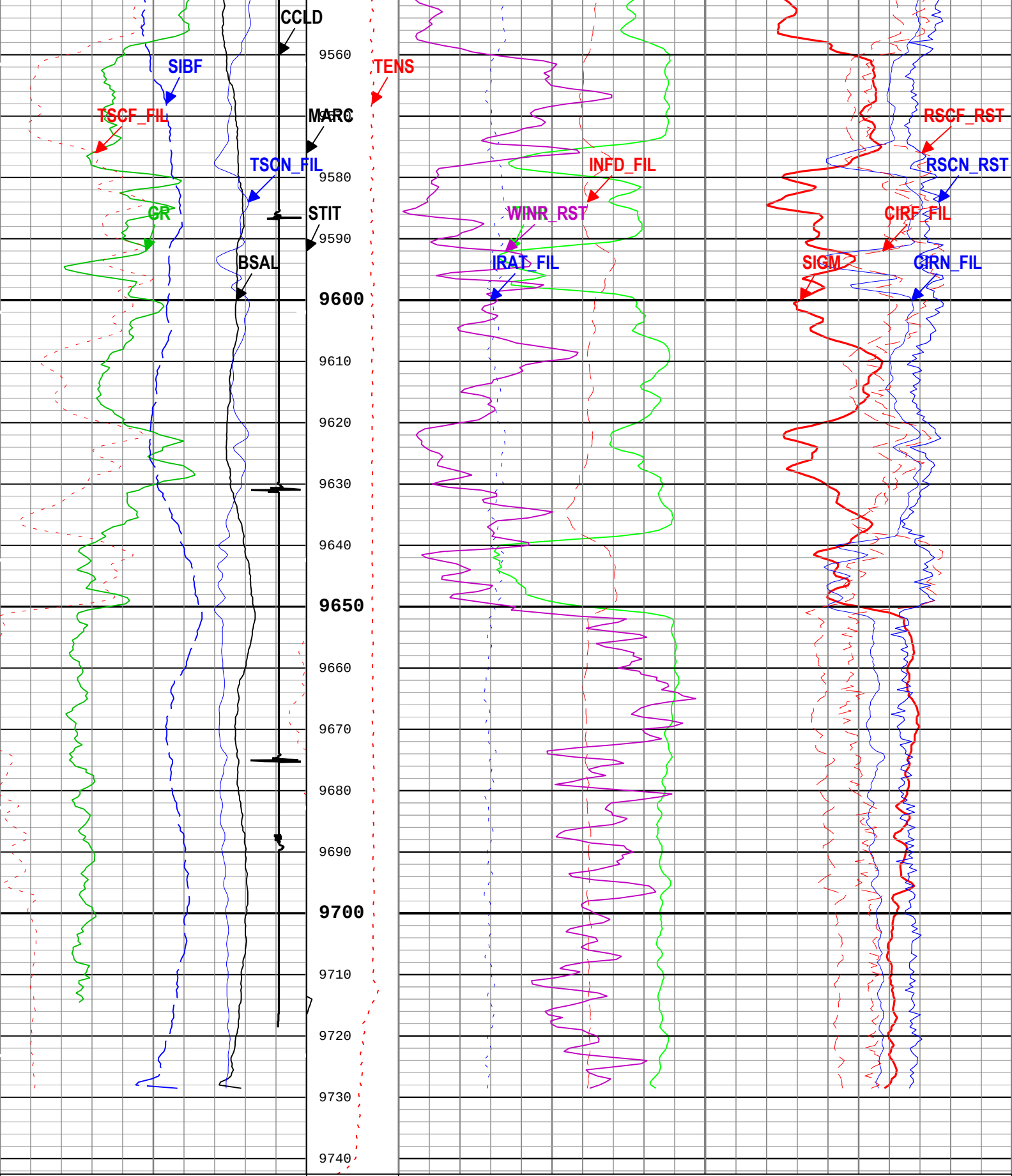
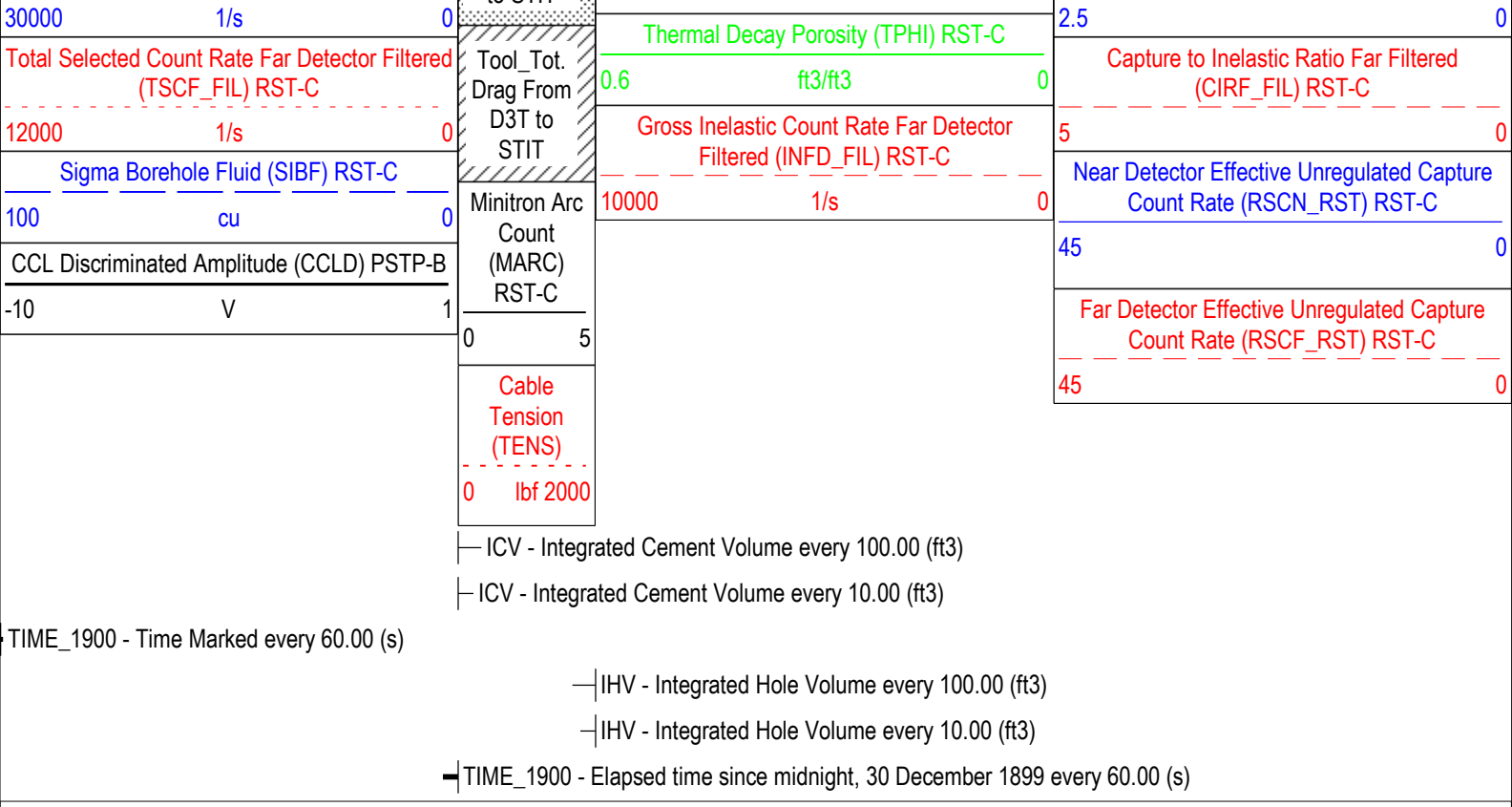


Borehole Salinity (BSAL) RST-C	Stuck Tool Indicator, Total (STIT)	Formation Sigma (Neutron Capture Cross Section) (SIGM) RST-C
450 ppk -50	0 ft 50	60 cu 0
Gamma Ray (GR) PSTP-B		Weighted Inelastic Ratio (WINR_RST) RST-C
0 gAPI 150		0 0.4
Total Selected Count Rate Near Detector Filtered (TSCN_FIL) RST-C	Cable Drag From STIA to STIT	Inelastic Ratio Filtered (IRAT_FIL) RST-C
		0.75 0

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



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: 22-Sep-2018 13:31:40

Channel Processing Parameters

RST Sigma: 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	
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	SANDSTONE	

Tool Control Parameters

RST Sigma: Parameters

Parameter	Description	Tool	Value	Unit
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	150	ft/h
PCCG	PSP Downhole CCL Gain	PSTP-B	12 dB	
RST_DLM	Depth Log Mode	RST-C	Sigma	

Company:	Caerus Operating LLC
Well:	NPR 24D-10 596
Field:	NPR
County:	Garfield
State:	Colorado

Schlumberger

Reservoir Saturation Tool
RST Sigma Mode
Gamma Ray -CCL