Schlumberger

Company: Caerus Piceance LLC

Well: Puckett 43A-2

Field: Wildcat

County: Garfield State: Colorado

Reservoir Saturation Tool

Sigma

County: Garfield
Field: Wildcat
Location: Sec.2, T7S, R97W
Well: Puckett 43A-2
Company: Caerus Piceance LLC

Location: Sec.2, T7S, R97W
Lat: 39.475722/Long: -108.179636

Elev.:		
	K.B.	8507.00 ft
	G.L.	8477.00 ft
	D.F.	8506.00 ft

Permanent Datum:	Ground Level	Elev.:	8477.00 f
Log Measured From:	Kelly Bushing	30.00 ft	above Perm.Datum
Drilling Measured From:	Kelly Bushing		

API Serial No.	Section:	Township:	Range:
0504522635	2	7S	97W

Logging Date	20-May-2015		
Run Number	Run 1		
Depth Driller	8940.00 ft		
Schlumberger Depth	8940.00 ft		
Bottom Log Interval	8799.00 ft		
Top Log Interval	2500.00 ft		
Casing Fluid Type	3% KCl		
Salinity			
Density	9.1 lbm/gal		
Fluid Level	0.00 ft		
BIT/CASING/TUBING STRING			
Bit Size	8.75 in		
From	2550.00 ft		
To	8940.00 ft		
Casing/Tubing Size	4.5 in		
Weight	11.6 lbm/ft		
Grade	P110		
From	0.00 ft		
To	8940.00 ft		
Max Recorded Temperatures	226 degF		
Logger on Bottom Time	20-May-2015	21:10:00	
Unit Number Location:	3022	Ft. Morgan, CO	
Recorded By	Aleksei Bekhterev/Modhar Khan		
Witnessed By	Natalie Naeve		

Disclaimer

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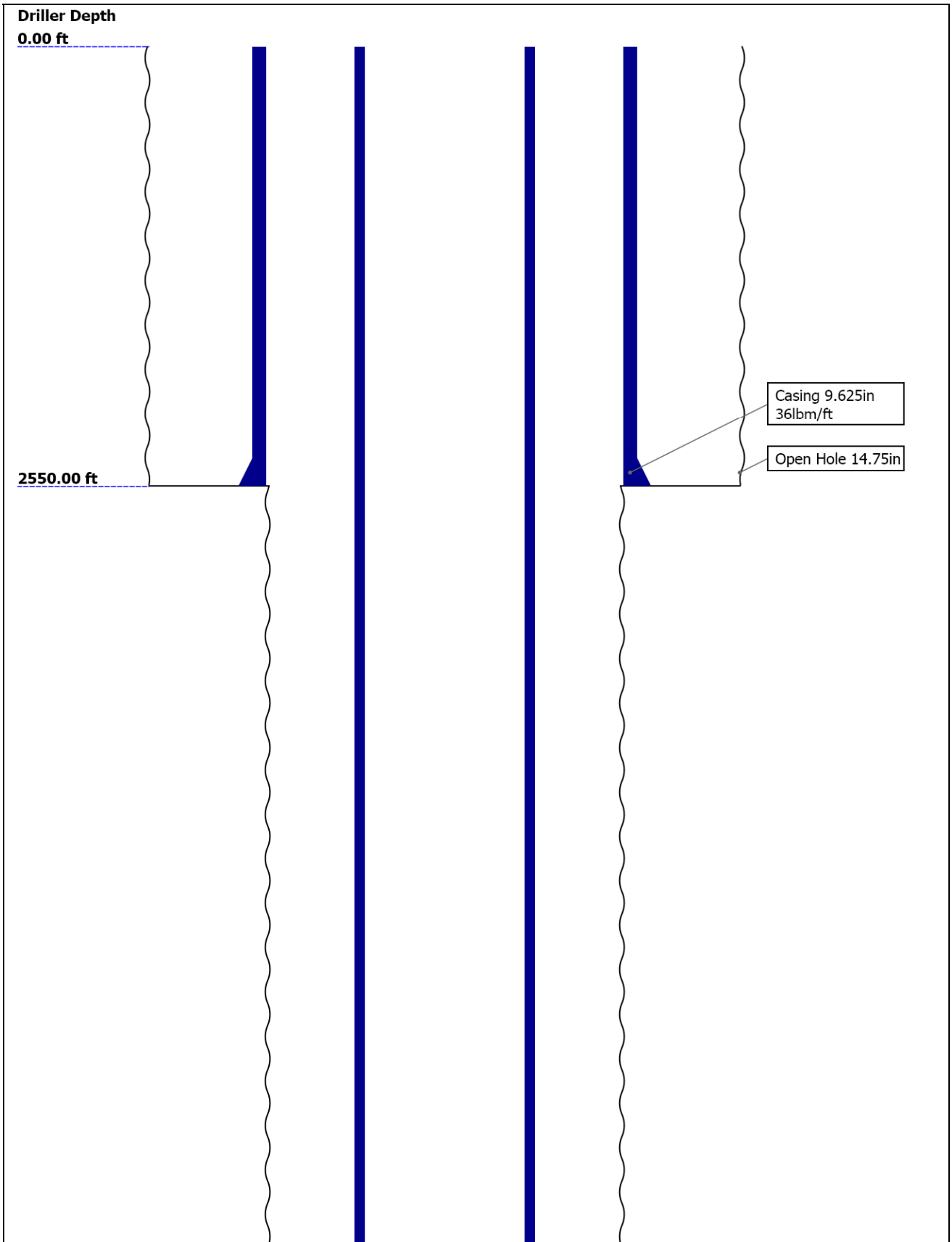
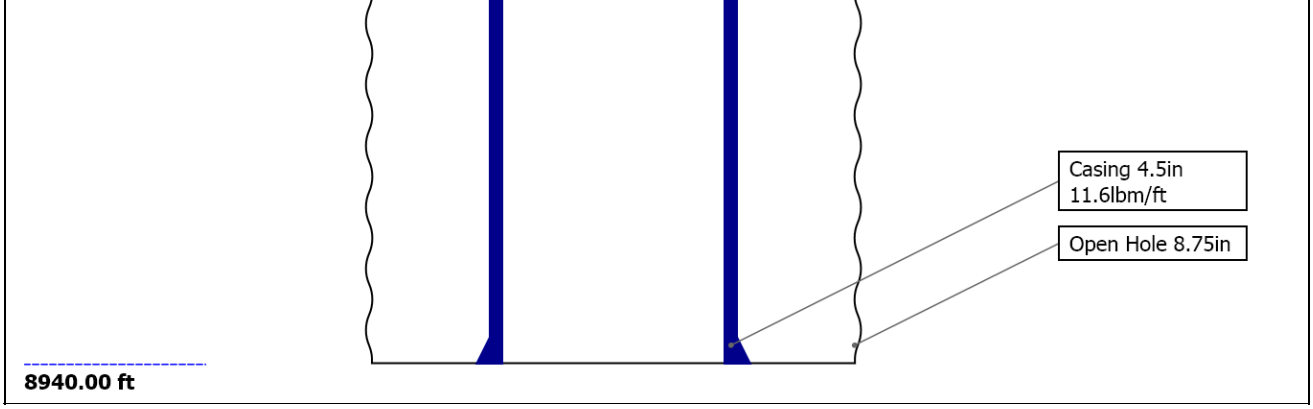
Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	14.75	8.75				
Top Driller (ft)	0	2550				
Top Logger (ft)	0	2550				
Bottom Driller (ft)	2550	8940				
Bottom Logger (ft)	2550	8940				
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)	2550	8940				
Bottom Logger (ft)	2550	8940				

Operational Run Summary

Parameter (unit)	Run 1					
Date Log Started	20-May-2015					
Time Log Started	19:56:35					
Date Log Finished	21-May-2015					
Time Log Finished	00:54:11					
Top Log Interval (ft)	2500.00					
Bottom Log Interval (ft)	8799.00					
Total Depth (ft)	8940.00					
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	Ft. Morgan, CO					
Recorded By	Aleksei Bekhterev/Modh					

	ar Khan					
Witnessed By	Natalie Naeve					
Service Order Number	CY37-00109					

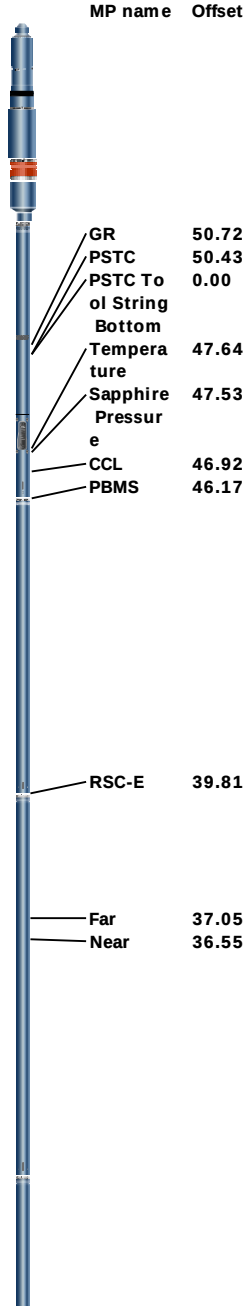
Borehole Fluids

Parameter(unit)	Run 1					
Fluid Type	Water					
Fluid Name	3% KCl					
Max Recorded Temperatures (degF)	226					
Salinity (ppm)	0					
Density (lbm/gal)	9.1					
Date Logger on Bottom	20-May-2015					
Time Logger on Bottom	21:10:00					
Total Solid (%)						
High Gravity Solids (%)						

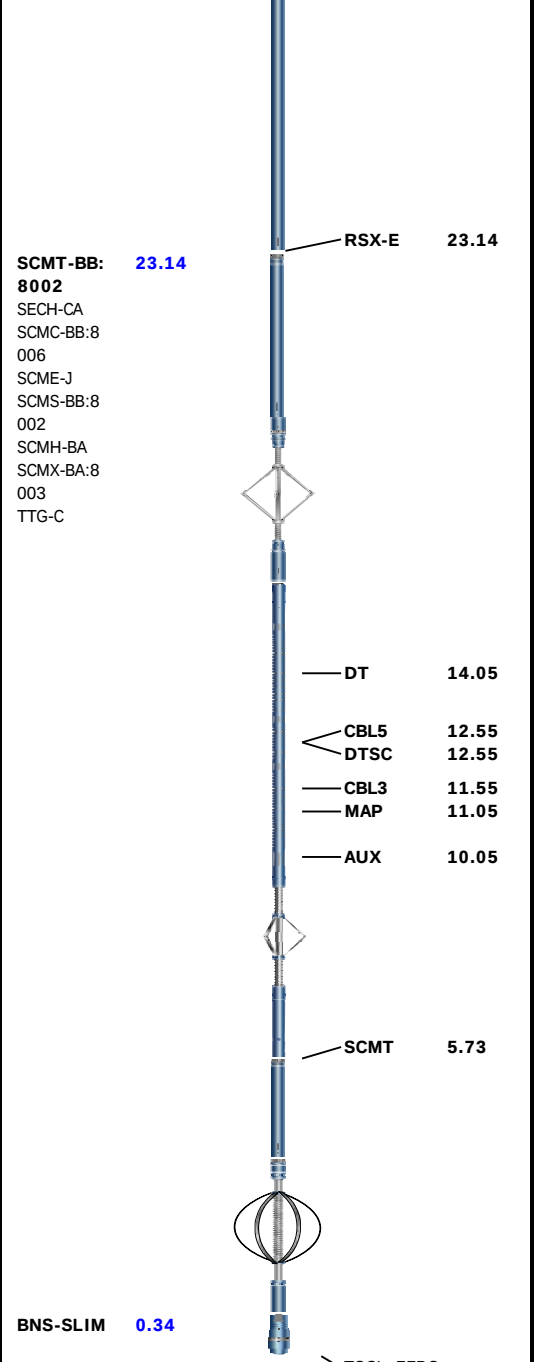
Remarks and Equipment Summary

Run 1: Toolstring

Equip name	Length
LEH-QT	**58.5**
LEH-QT	
AH-63	**55.58**
AH-79	**55.26**
PSTP-A:3869	**54.43**
PSC-A	
PSTC-A:3747	
PBMS-A:3869	
Sapphire 10 kPSI	
RST-C:282	**46.17**
RSCH-A	
RSC-E:279	
RSS-A:21075	
MNTR-F:109	
RSXH-A	
RSX-E:282	



Run 1: Remarks
Toolstring ran as per tool sketch
This is first run in hole
Main and repeat passes are correlated to down log
RST ran in Sigma mode
Matrix: Sandstone, 2.68 g/cc
Repeat pass is done from 5000' to 4000' as per client request
Repeat pass is done with no pressure
Main Pass is done under 2500 psi
Float Collar tagged at 8799 ft
Log stopped at 2500 ft as per client request
Crew: Tim Ludgate, Troy Ocanas
Thank you for choosing Schlumberger Wireline!



Lengths are in ft
Maximum Outer Diameter = 3.375 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

Depth Summary

	Run 1		
Depth Measuring Device			
Type	IDW-JA		
Serial Number	7234		
Calibration Date	13-Feb-2015		
Calibrator Serial Number			
Calibration Cable Type	7-39P-LXS		
Wheel Correction 1	-4		
Wheel Correction 2	-2		
Tension Device			
Type	CMTD-B/A		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Number of Calibration Points	0		

Number of Calibration Points	0		

Logging Cable

Type	7-39P-LXS		
Serial Number			
Length	17000.00 ft		
Conveyance Type	Wireline		
Rig Type	Crane		

Run 1:Depth Control Parameters		Depth Control Remarks
Log Sequence	First Log In the Well	All Schlumberger depth policies followed
Rig Up Length At Surface		IDW used as primary depth device
Rig Up Length At Bottom		Z-chart used as secondary depth reference
Rig Up Length Correction		
Stretch Correction		
Tool Zero Check At Surface		

Run 1

Software Version

Acquisition System	Version
Maxwell	5.2.40990.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1	Main[4]:Up	Up	2408.03 ft	8821.13 ft	20-May-2015 9:14:47 PM	21-May-2015 12:51:44 AM	ON	0.00 ft	No

All depths are referenced to toolstring zero

Log

Company:Caerus Piceance LLC Well:Puckett 43A-2

Run 1: Main[4]:Up:S004

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: 21-May-2015 01:17:58

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)

Stuck Tool Indicator, Total (STIT)
0 ft 50

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

Inelastic Ratio Filtered (IRAT_FIL) RST-C
0.75 0

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

Cable Drag From STIA to STIT

Gamma Ray (GR) PSTP-A
0 gAPI 150

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

Tool_Tot. Drag From D3T to STIT

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

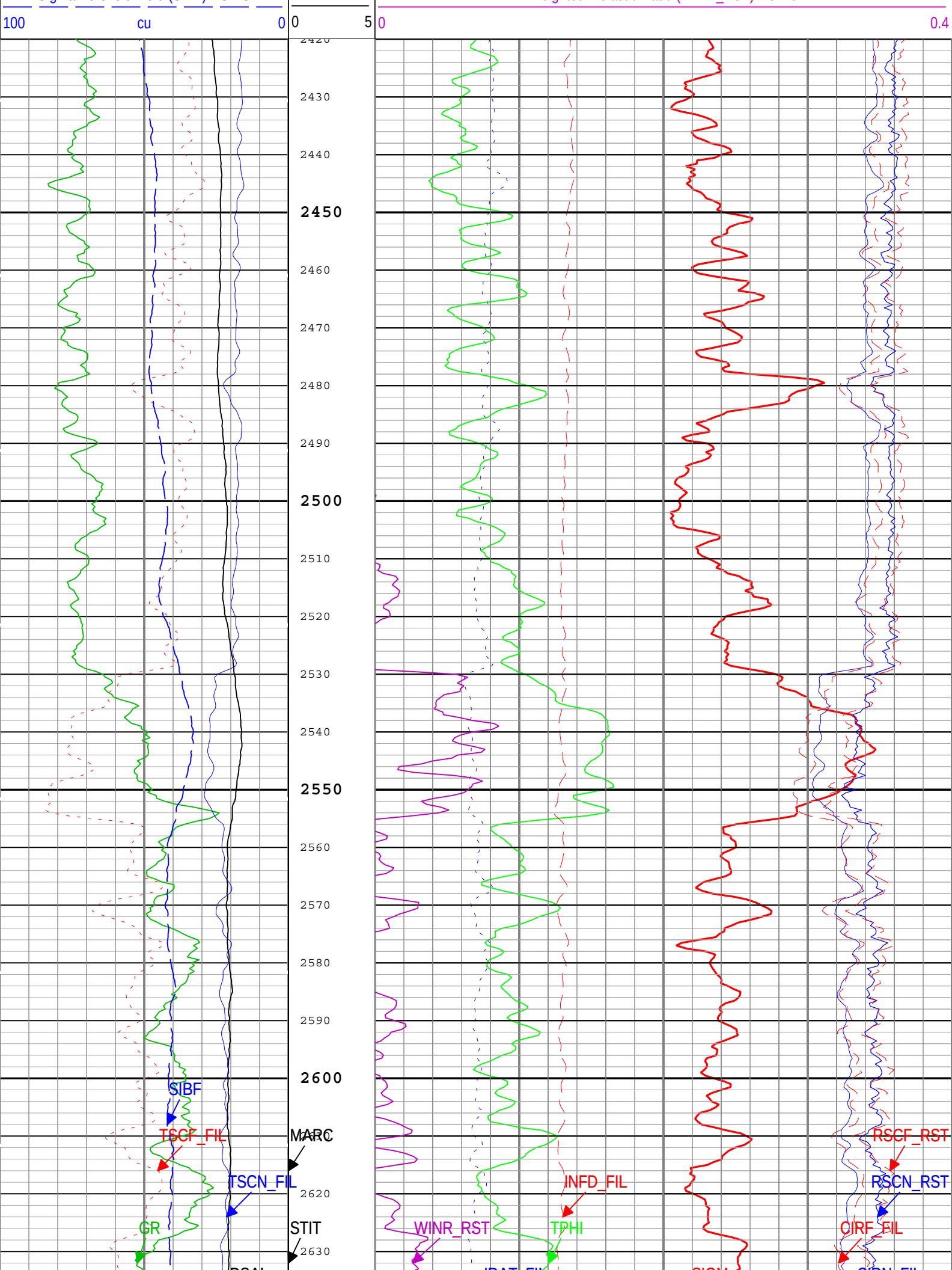
Total Selected Count Rate Far Detector Filtered (TSCF_FIL) RST-C
12000 1/s 0

Minitron Arc Count (MARC) RST-C

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

Sigma Borehole Fluid (SIBF) RST-C

Weighted Inelastic Ratio (WINR_RST) RST-C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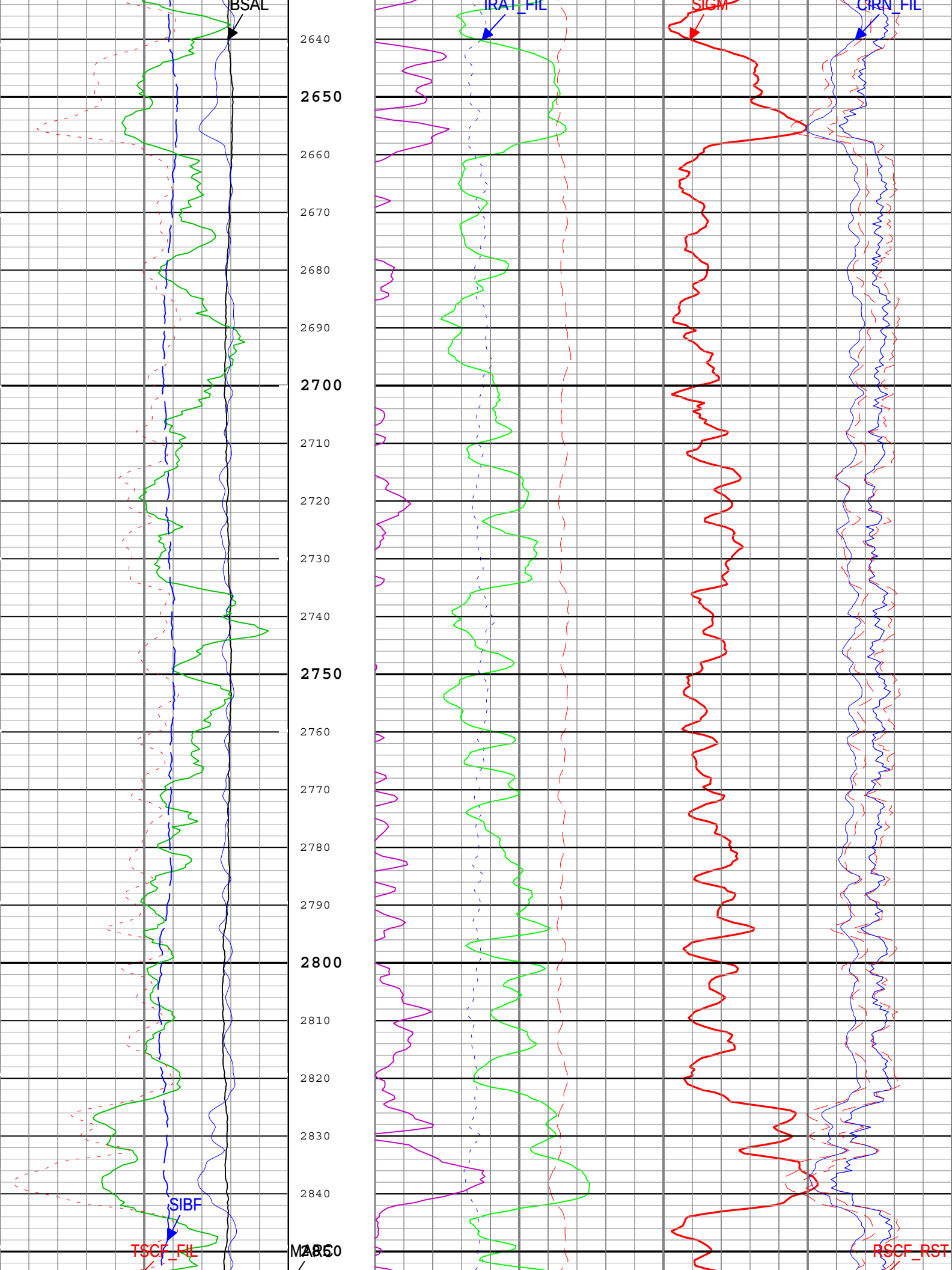
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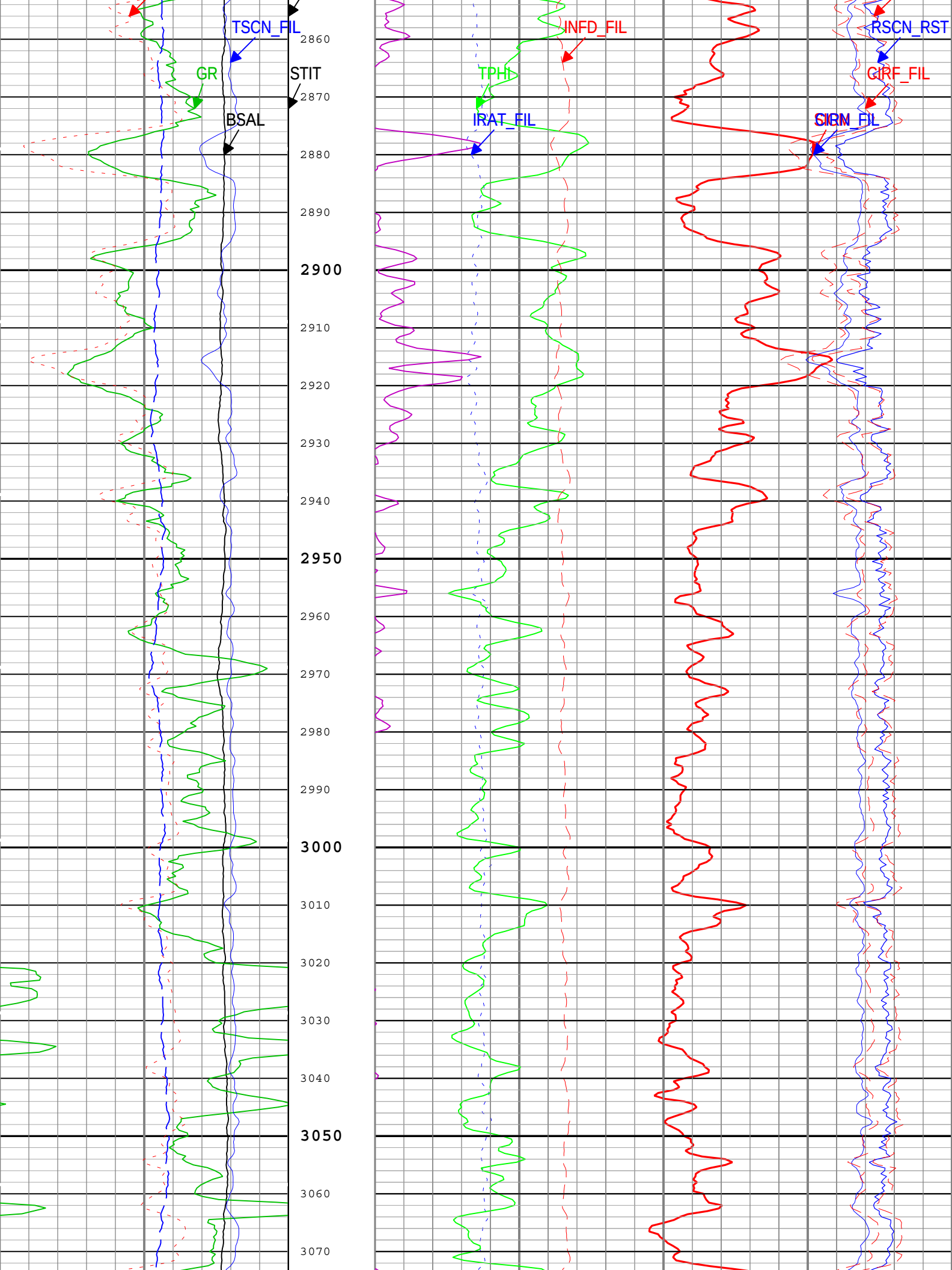
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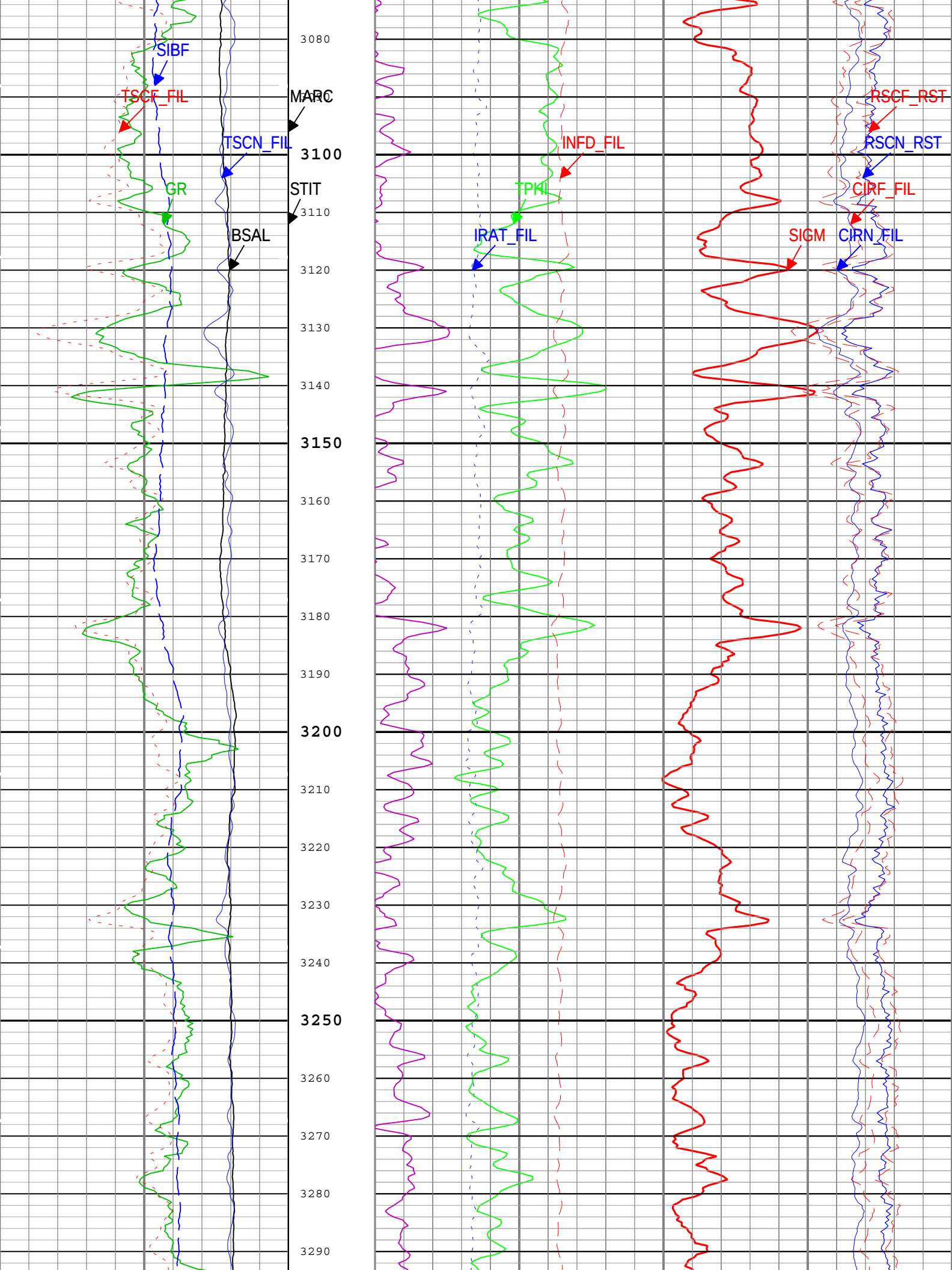
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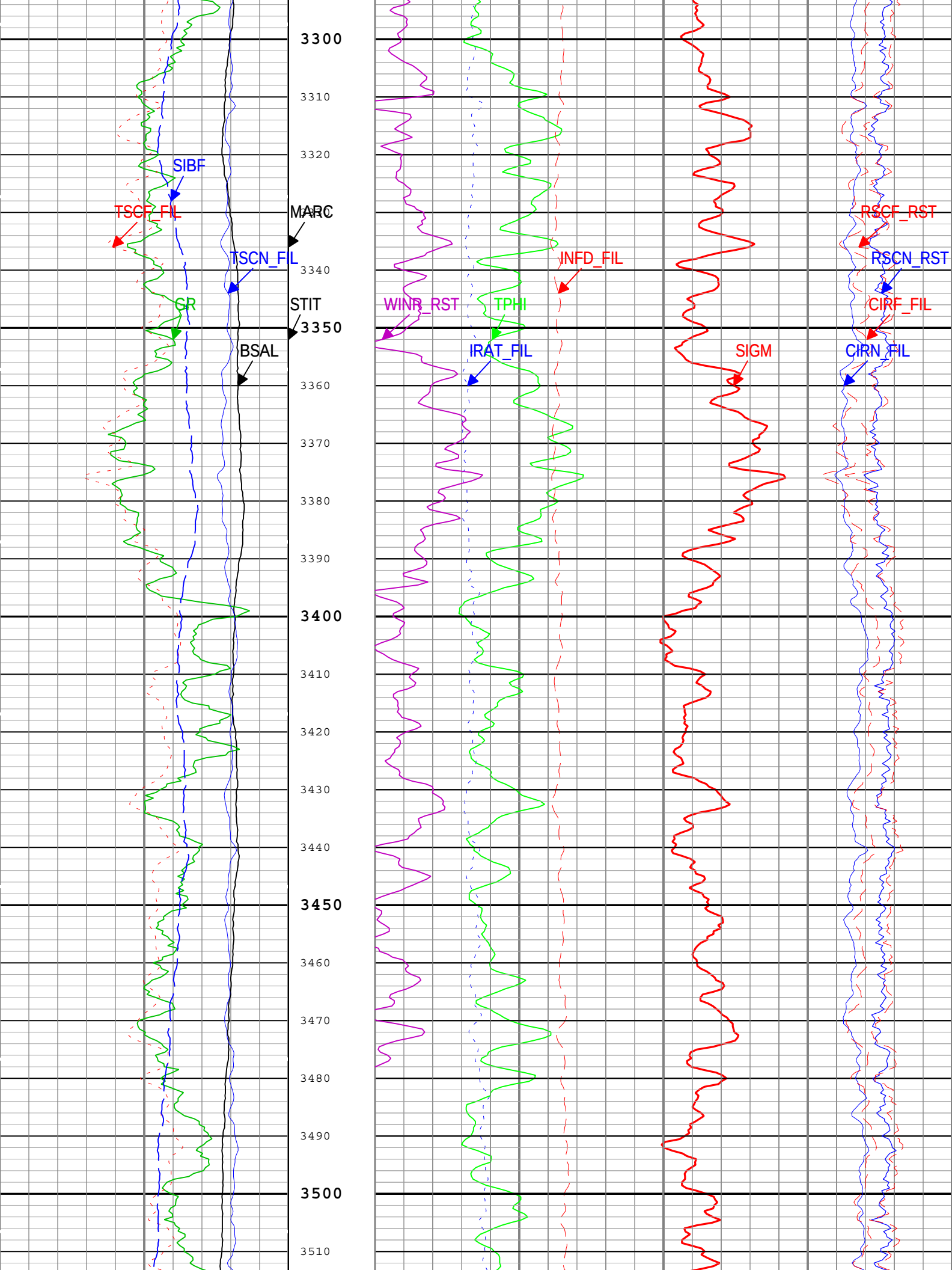
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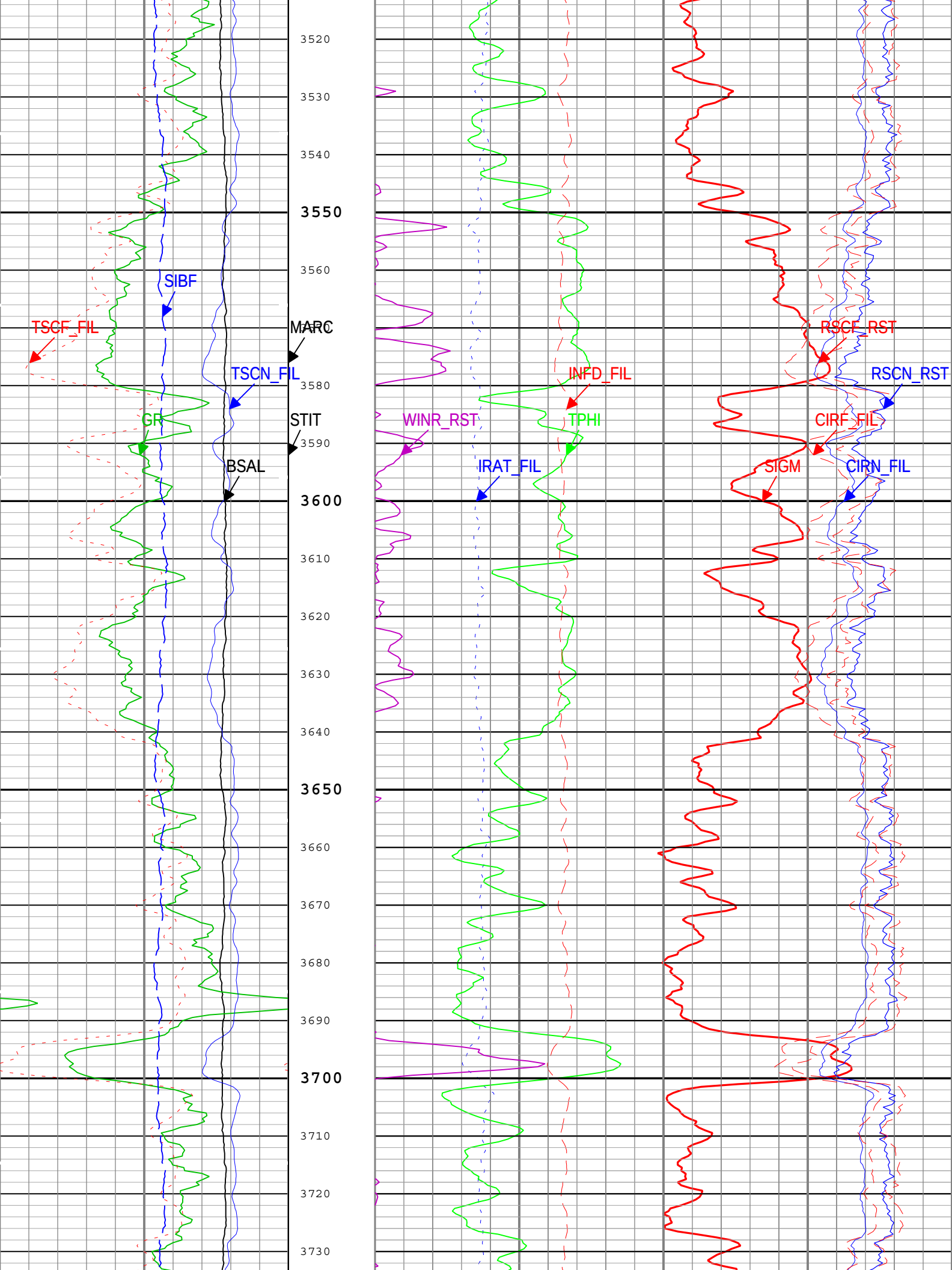
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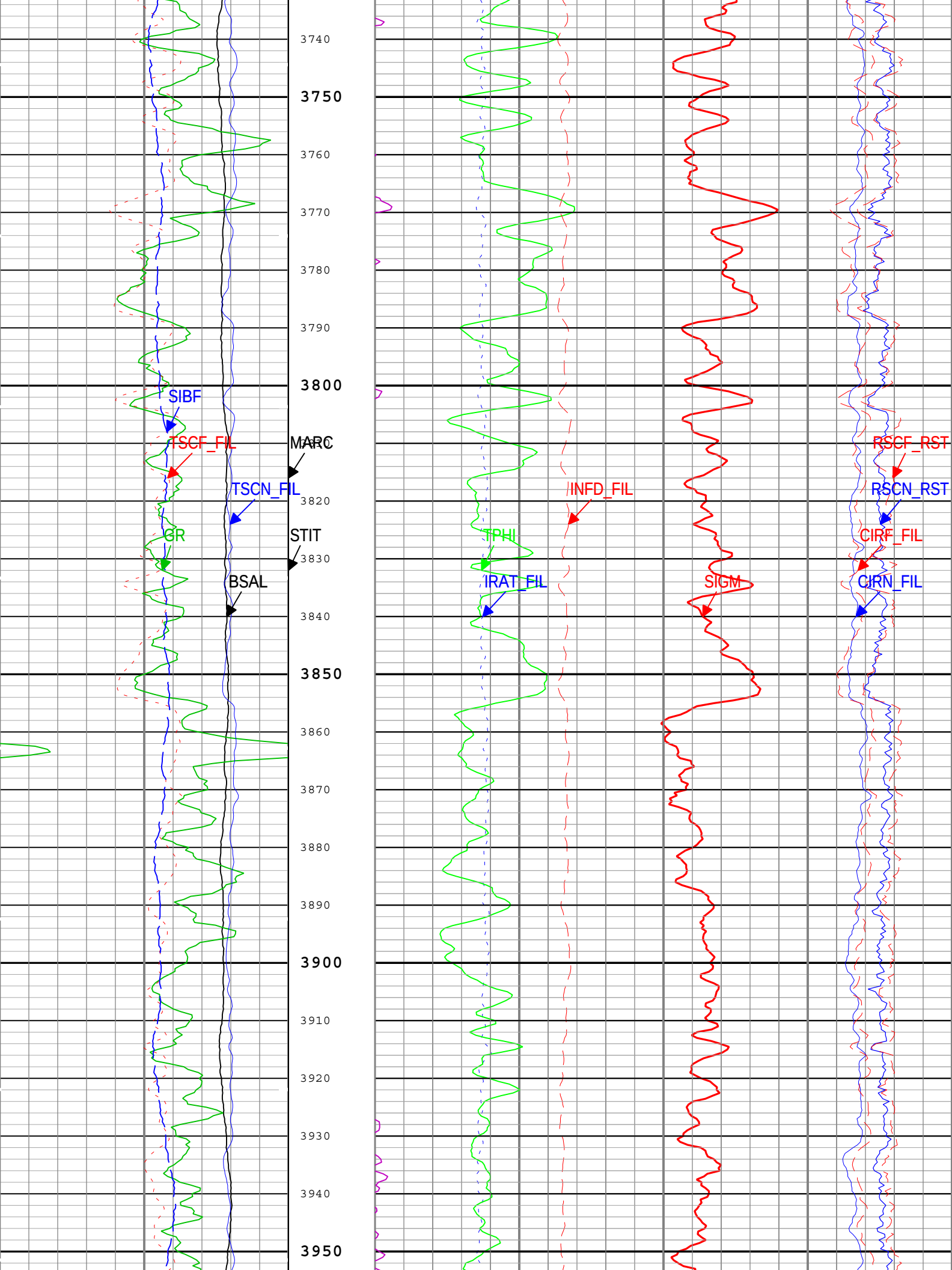
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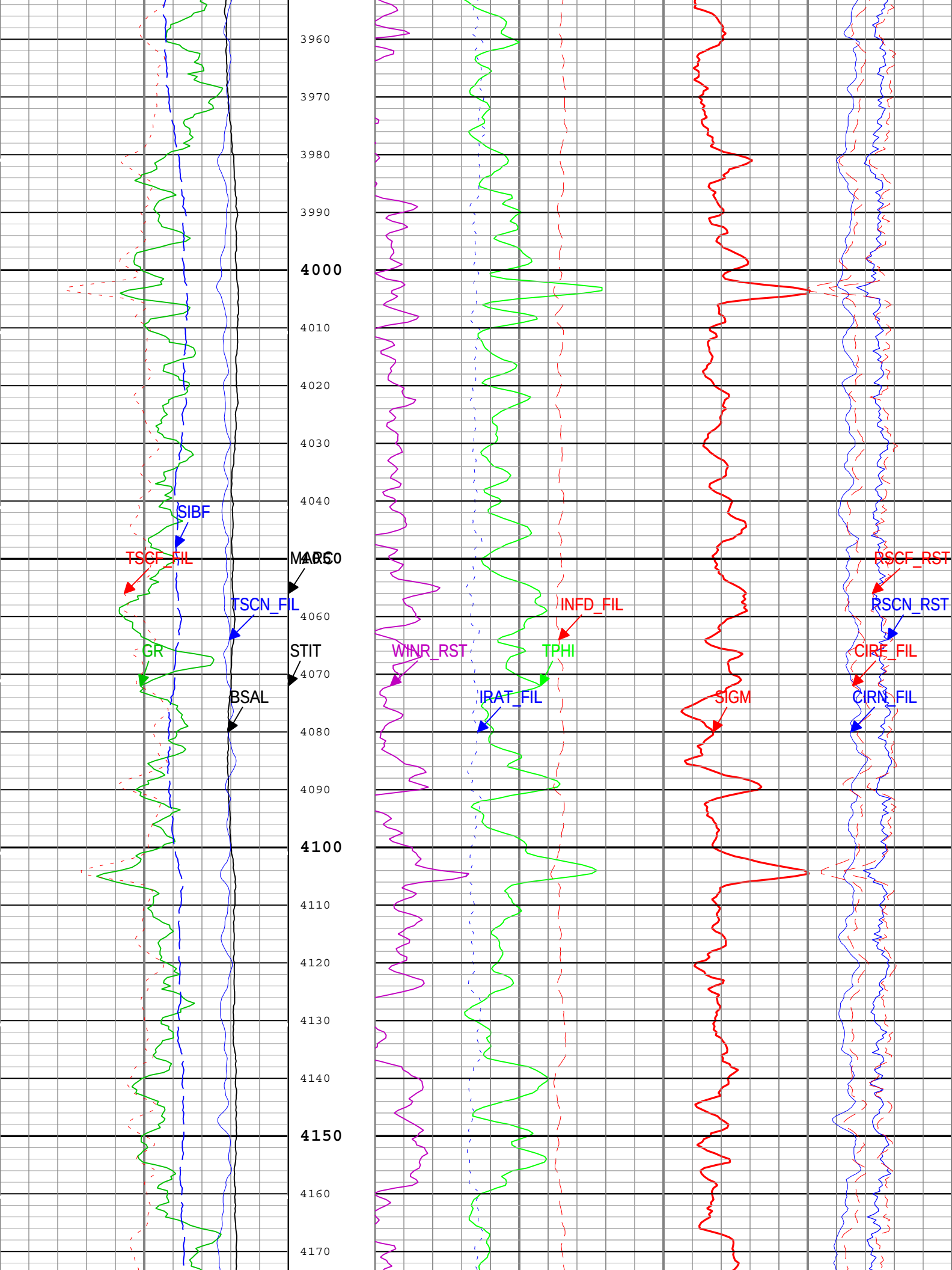
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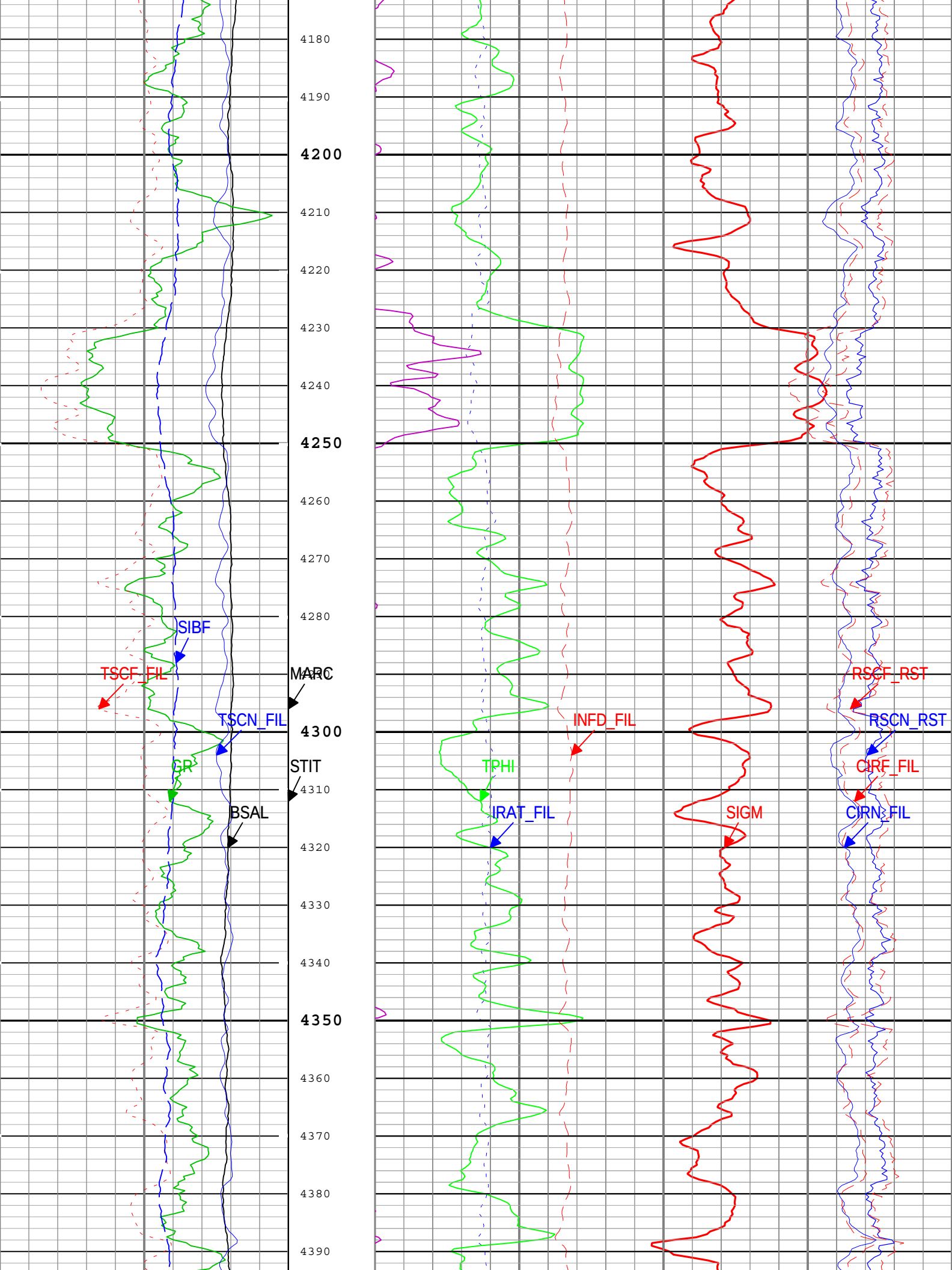
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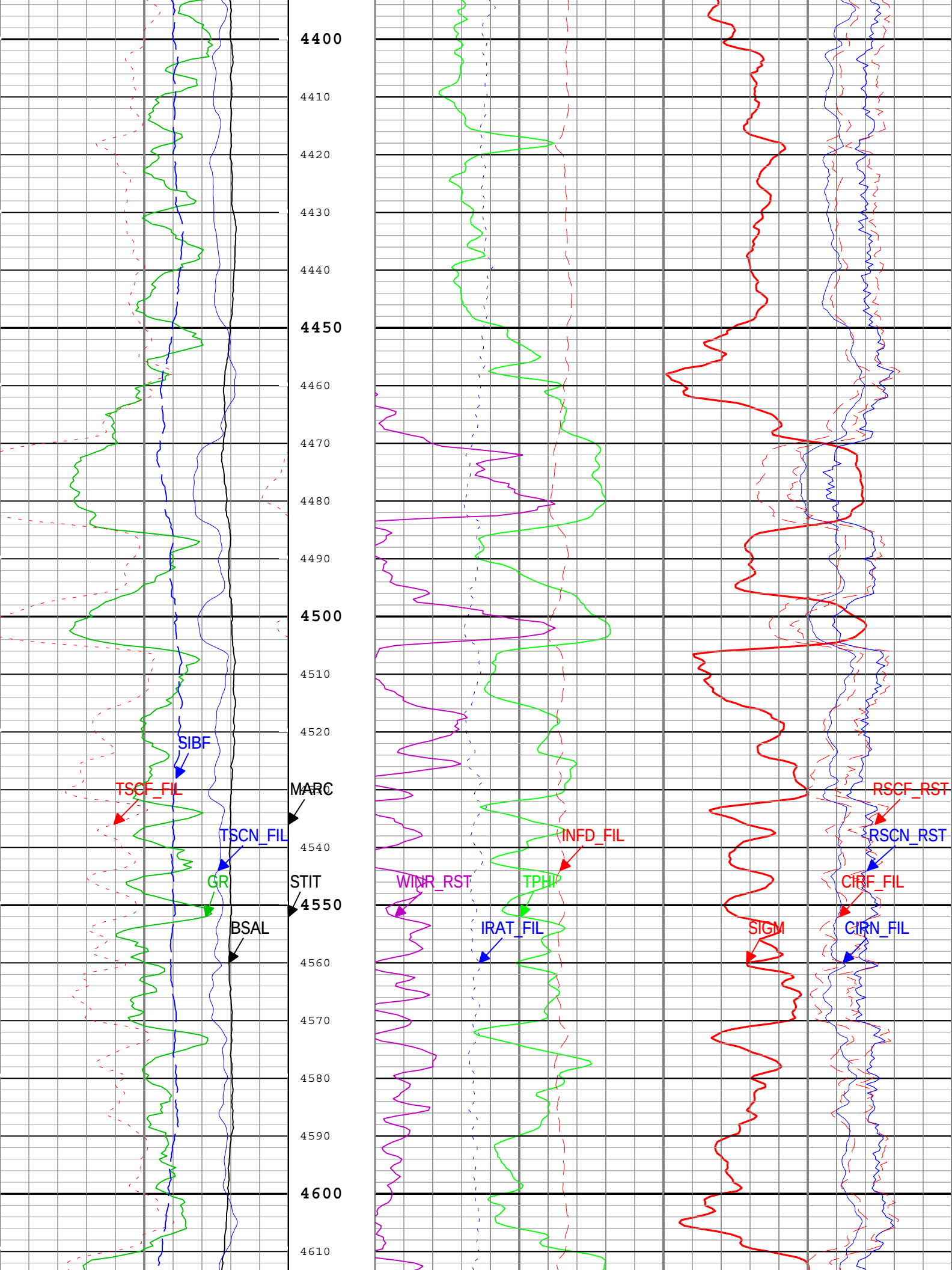
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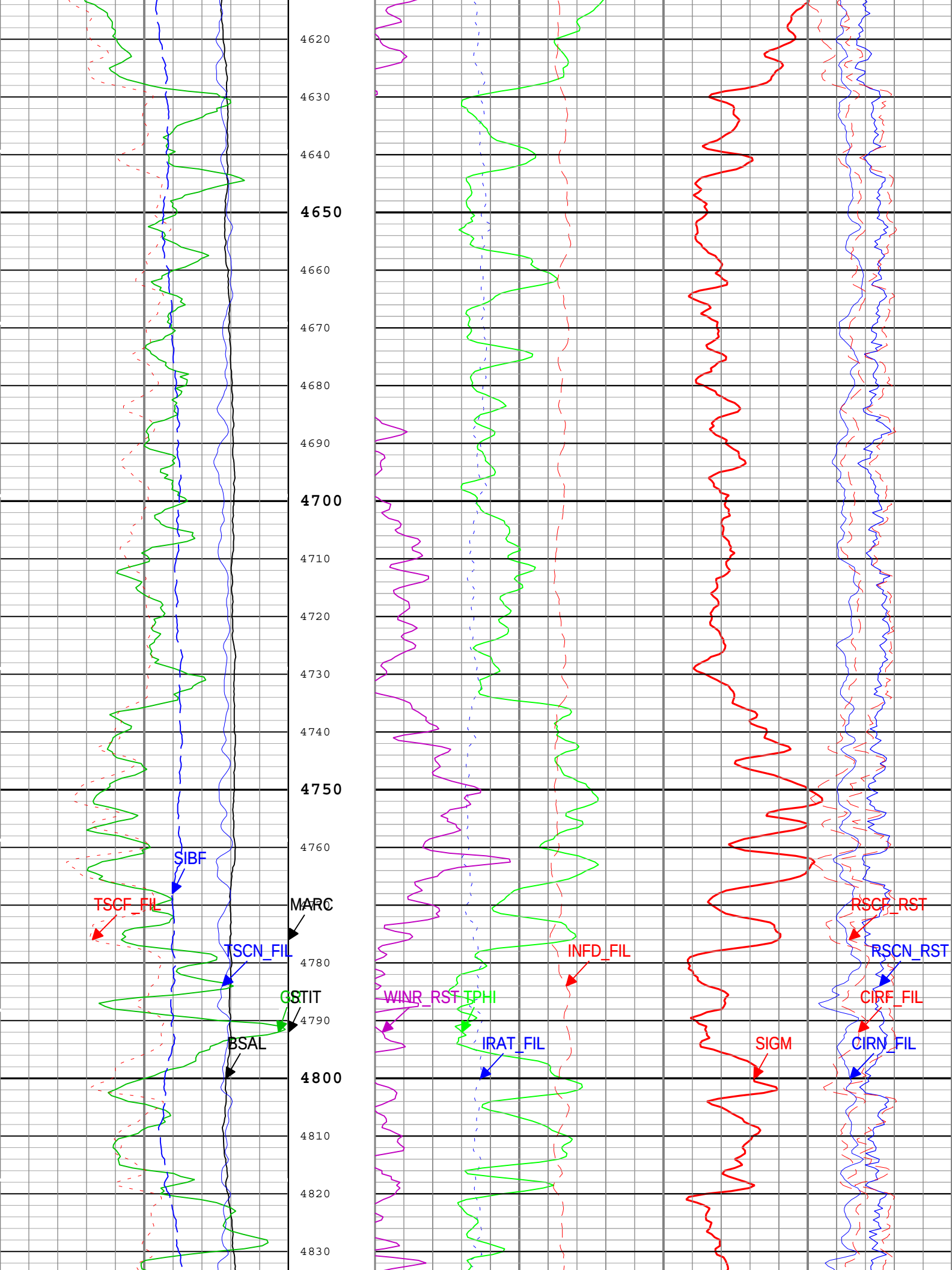
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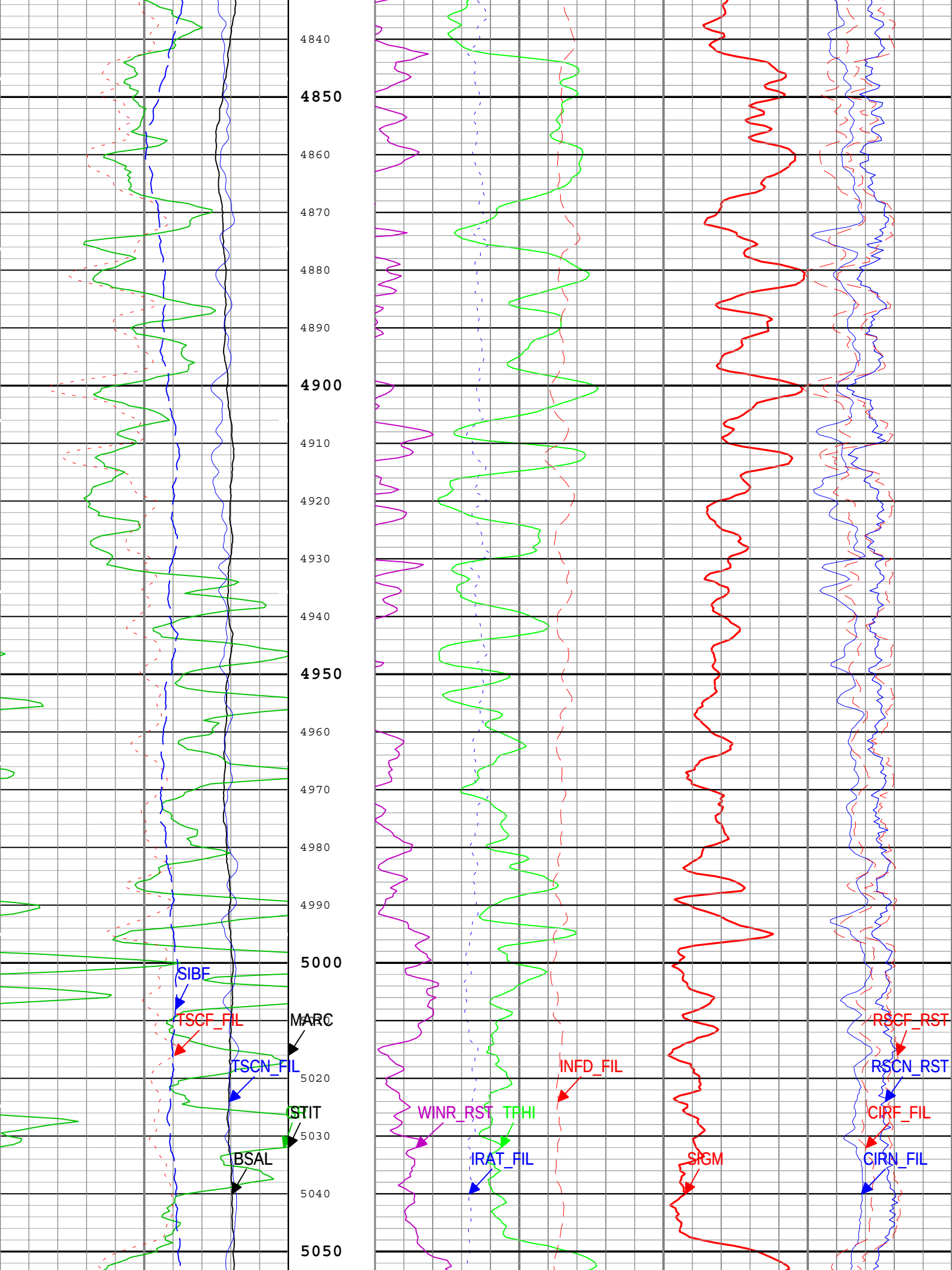
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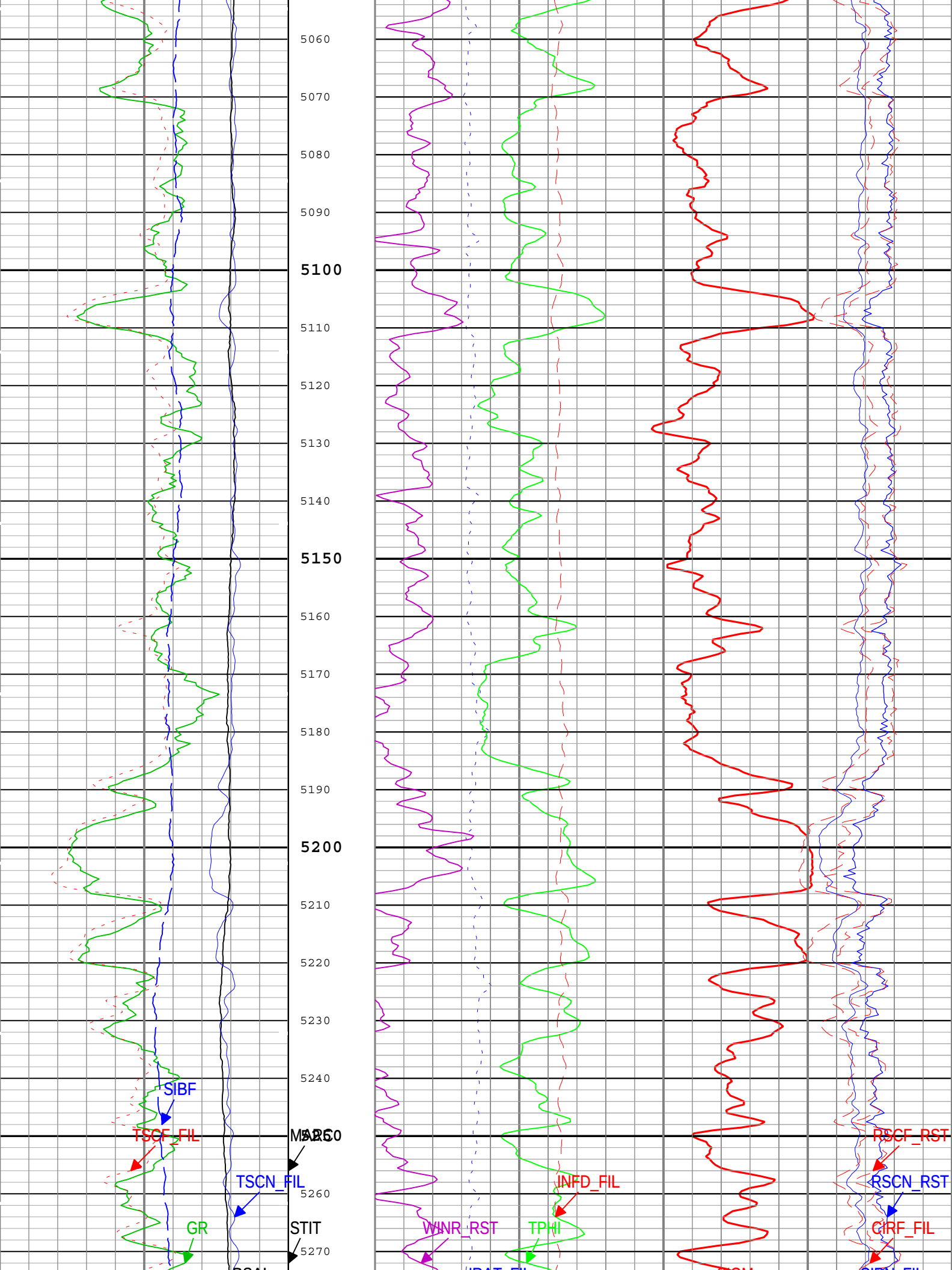
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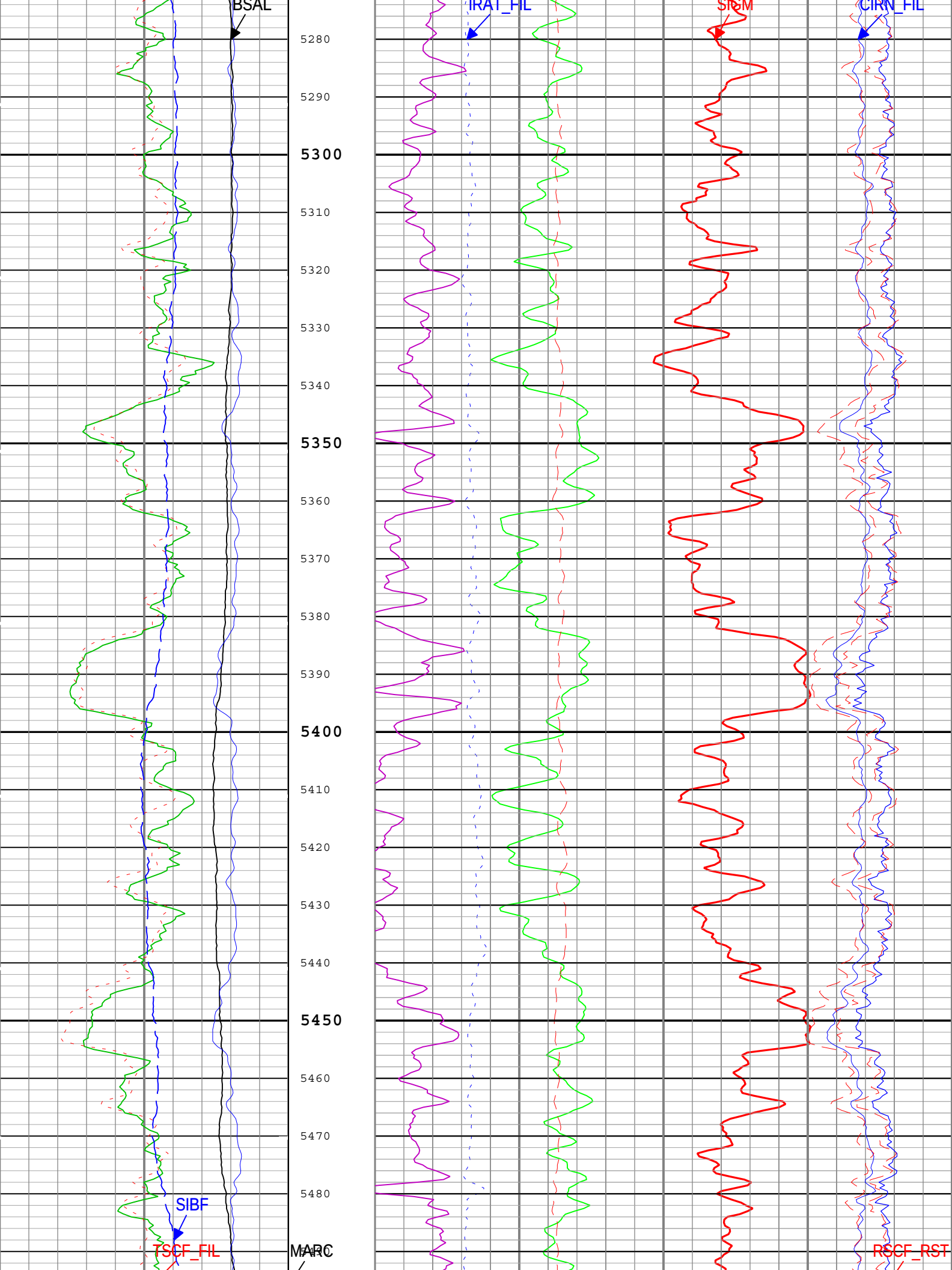
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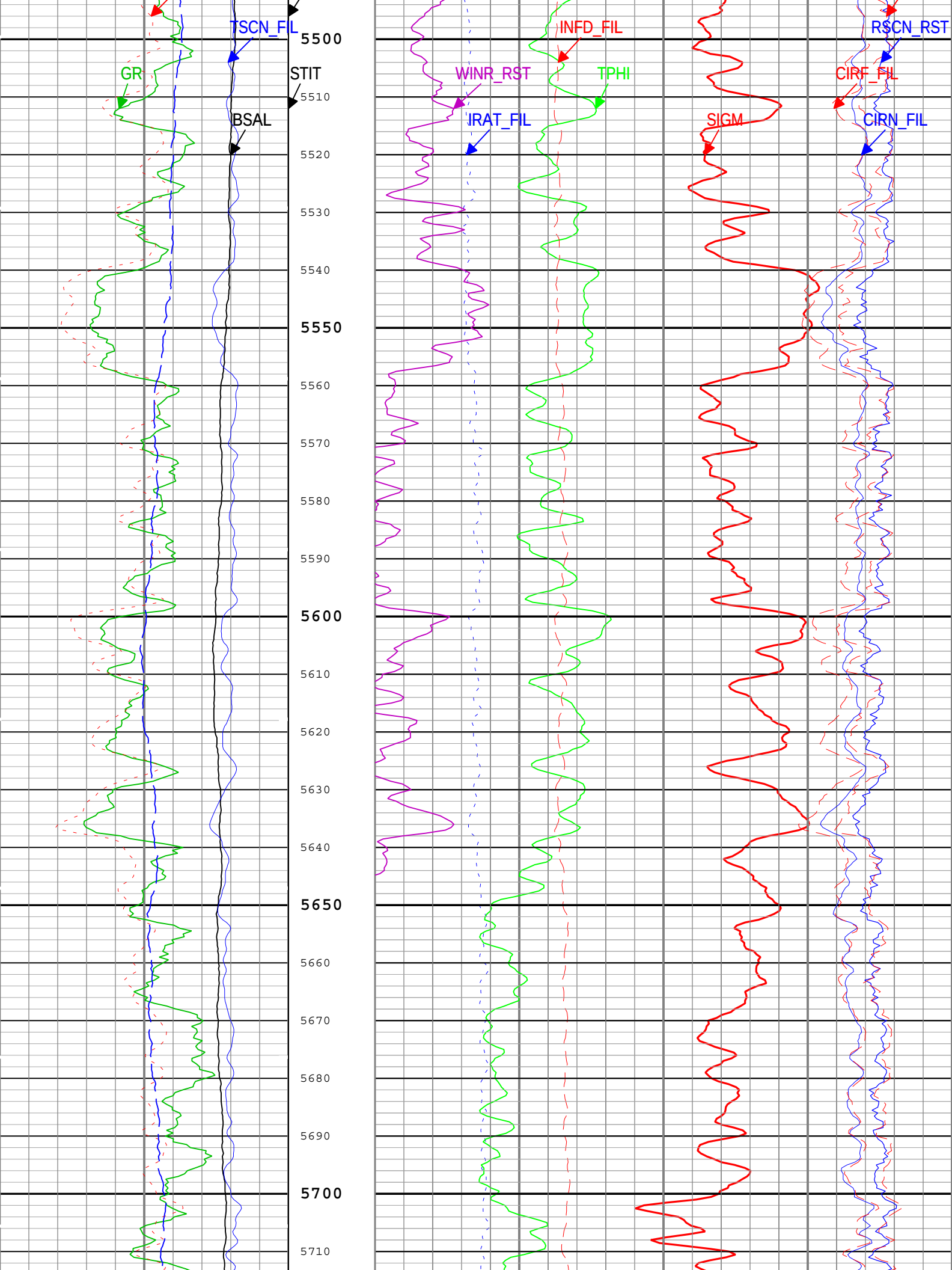
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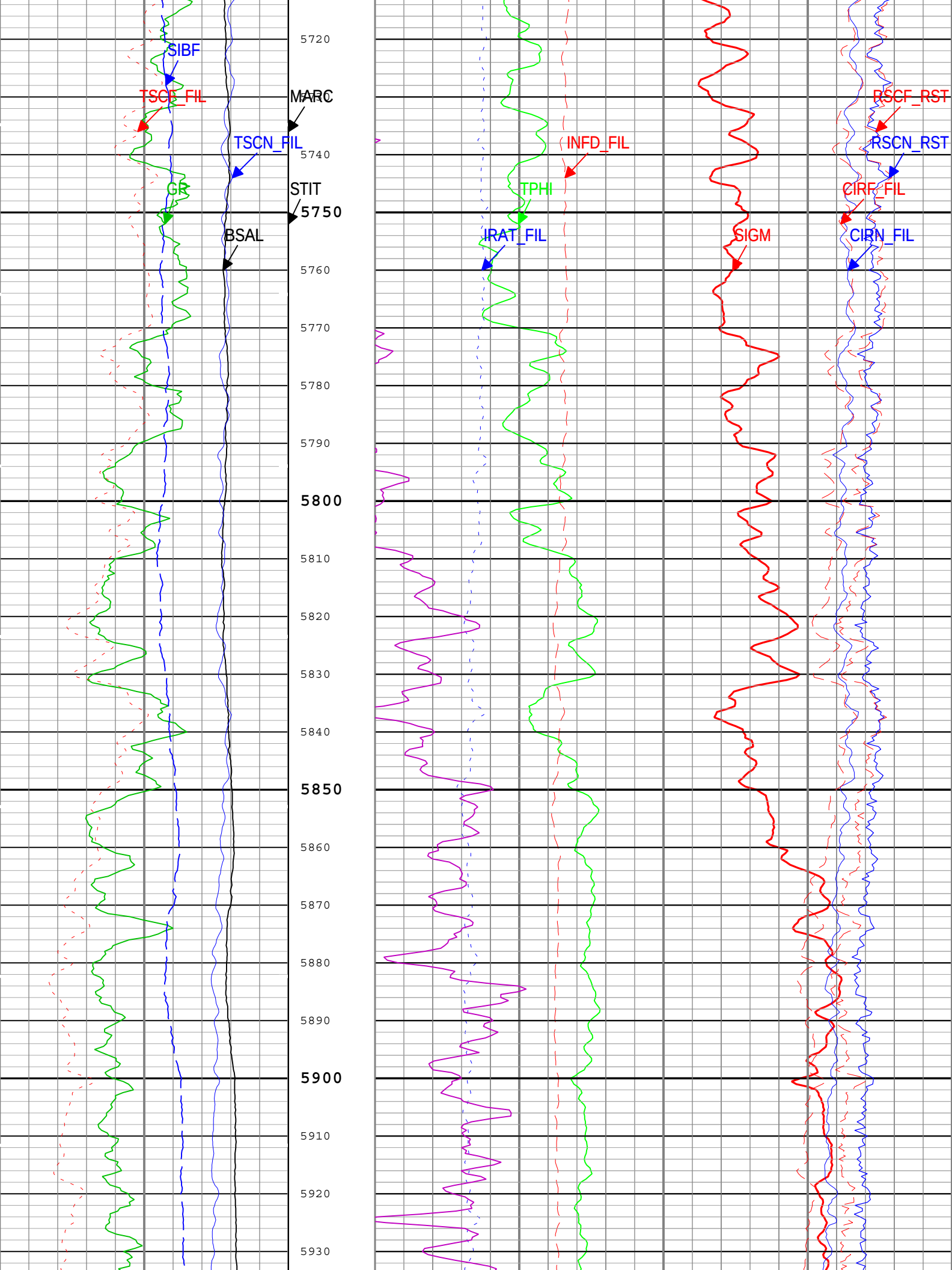
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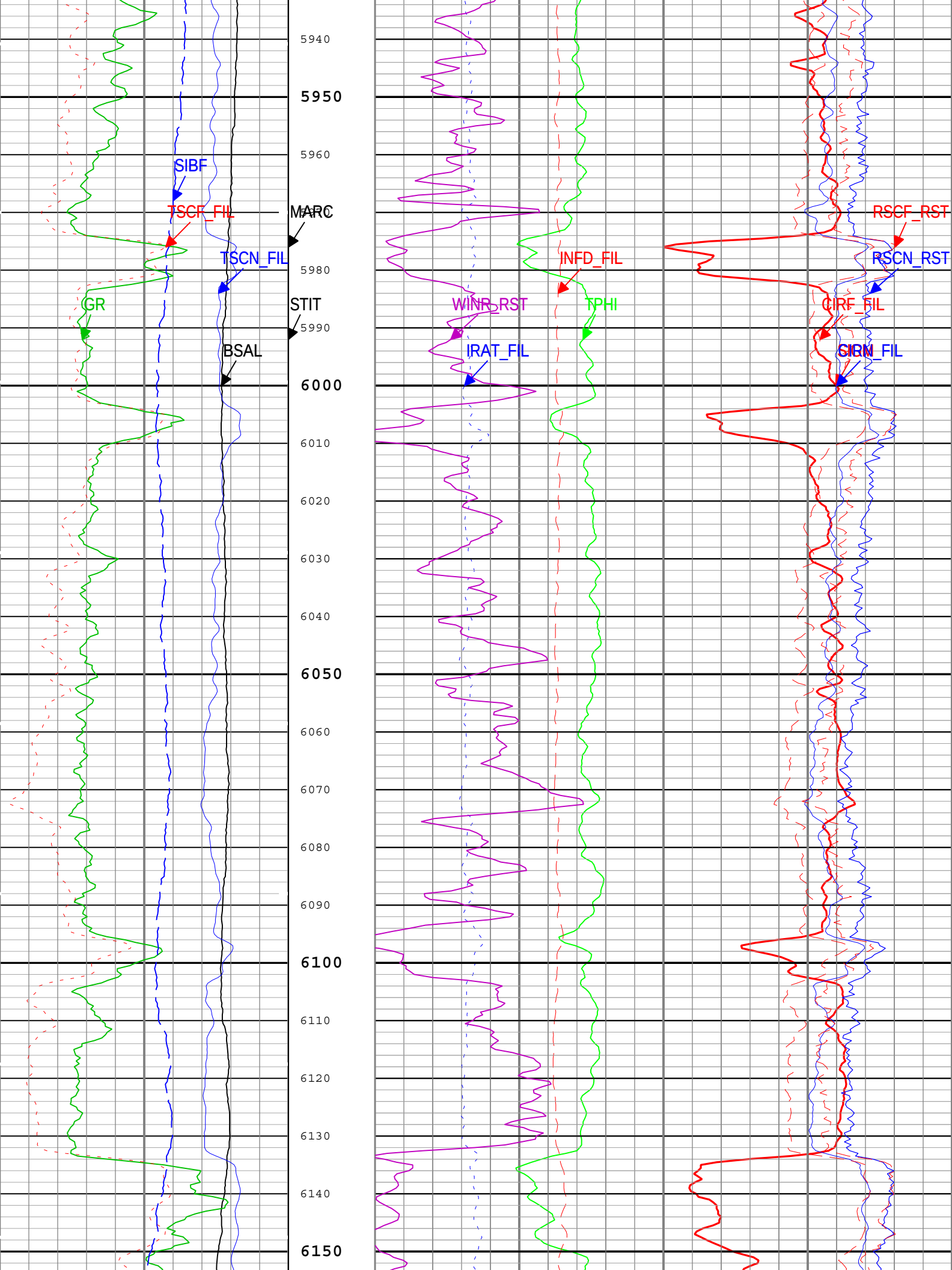
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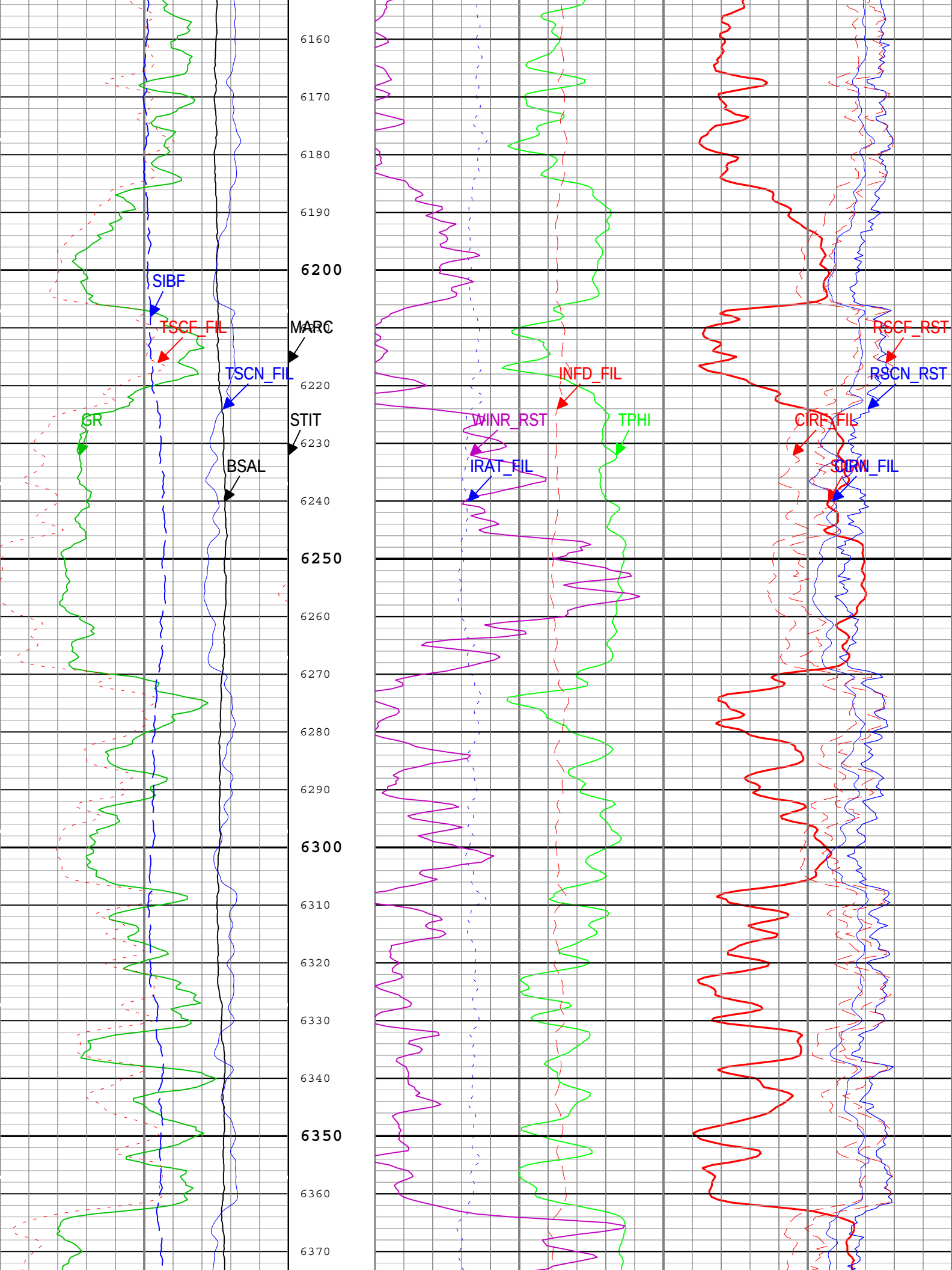
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TSCF_FIL
TSCN_FIL
GR
MARC
STIT
BSAL
INFD_FIL
WINR_RST
IRAT_FIL
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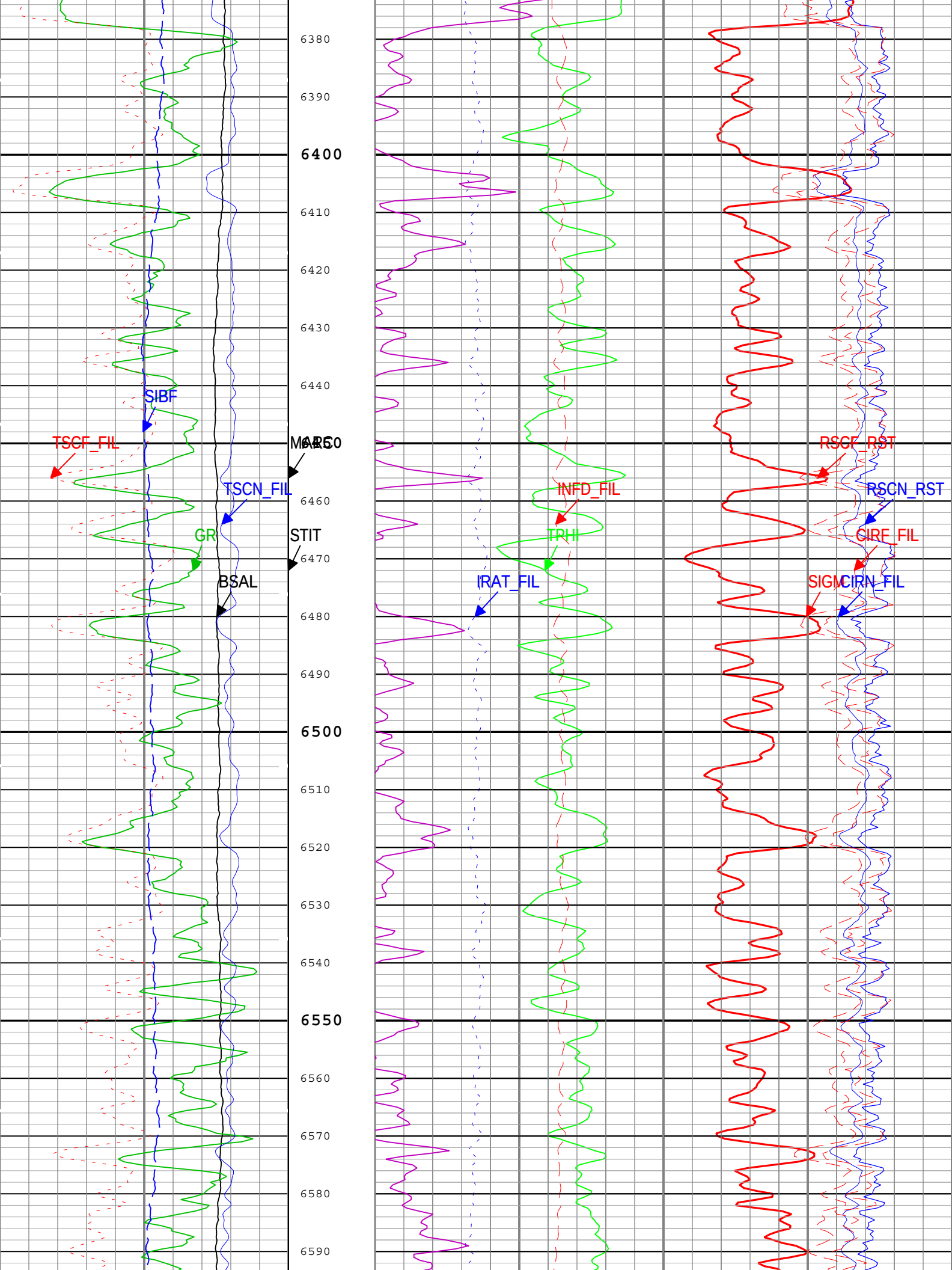
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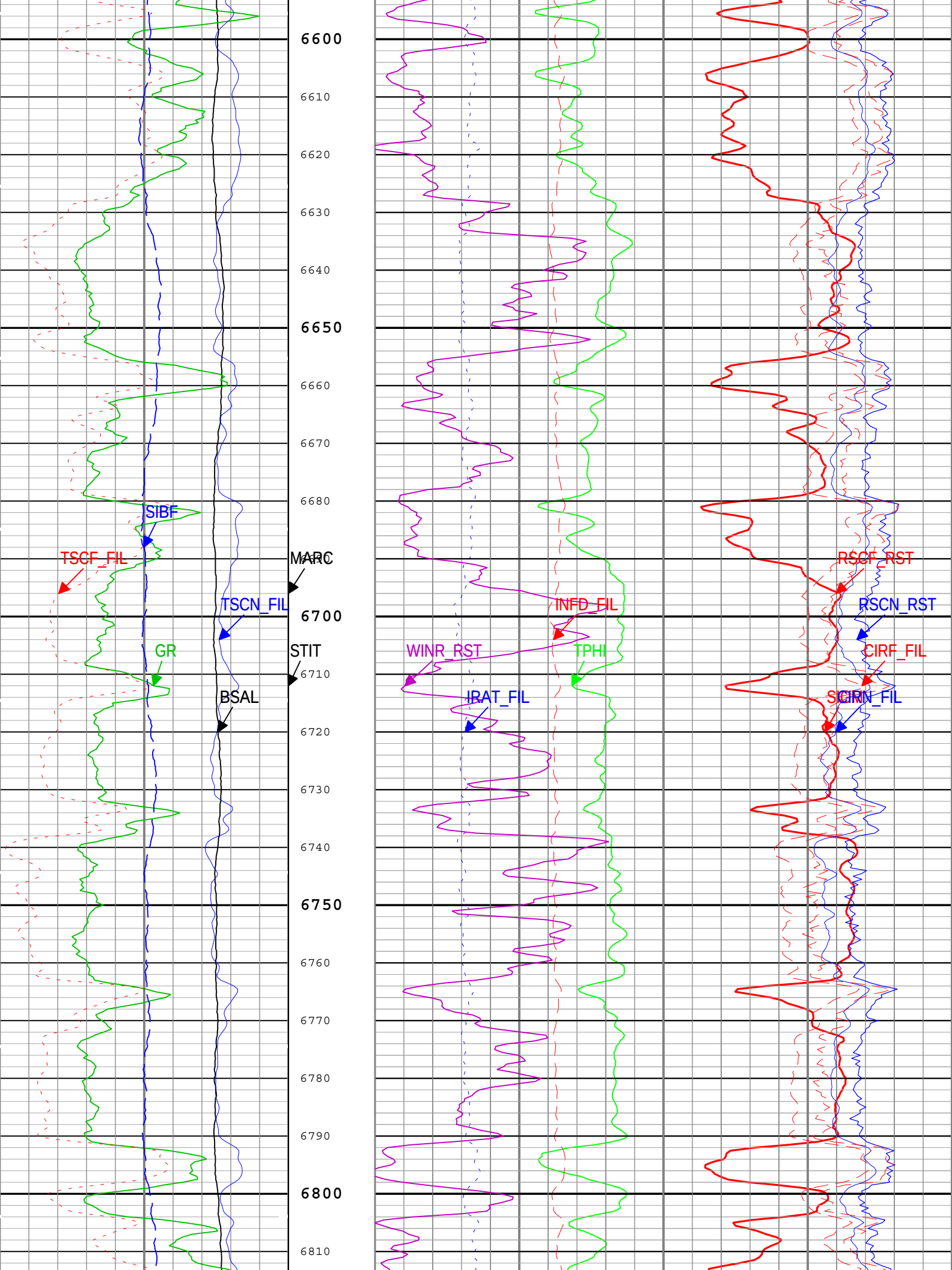
CIRF_FIL
SIGM
CIRN_FIL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TSCF_FIL
MARC
TSCN_FIL
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RSCN_RST
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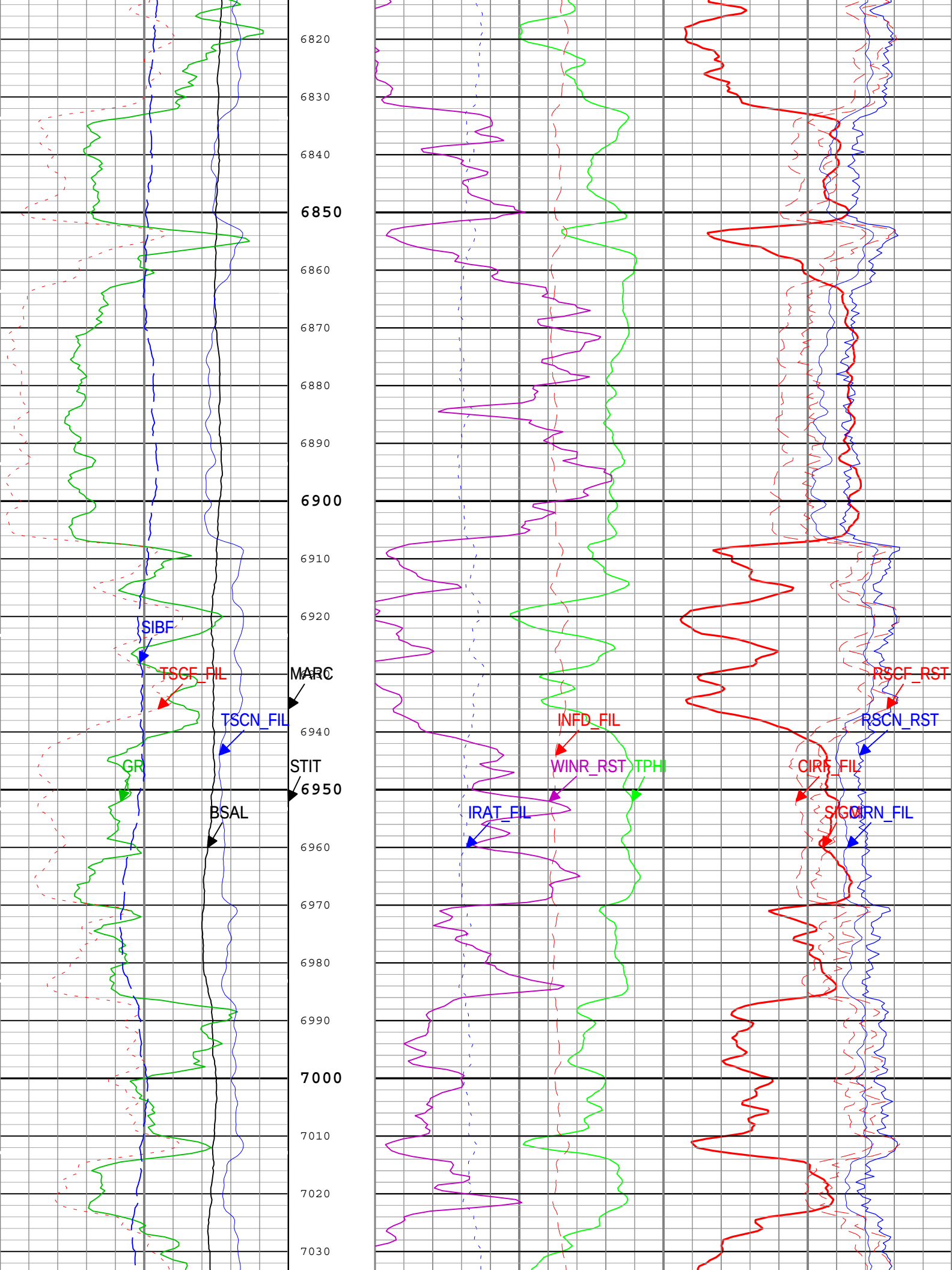
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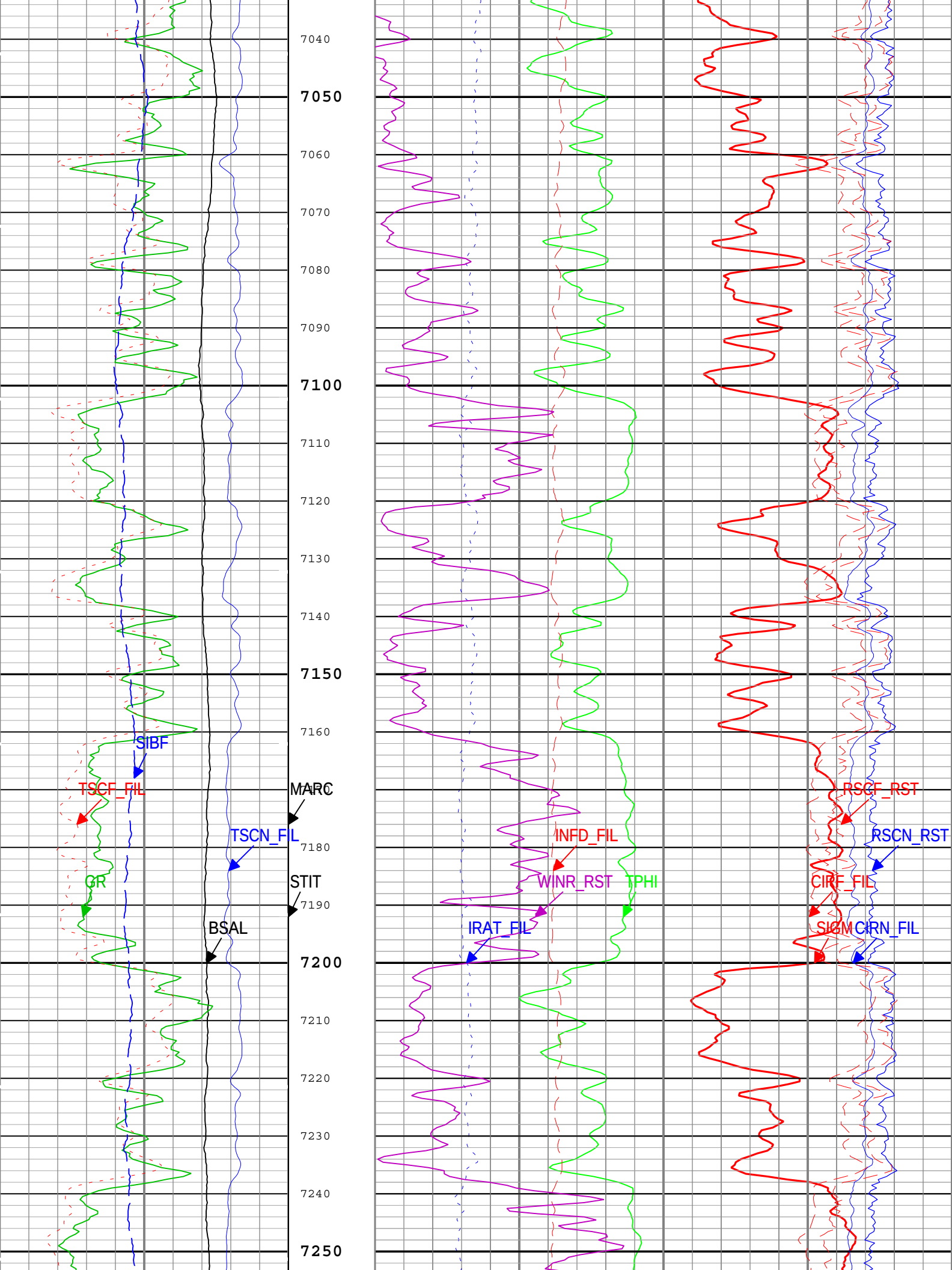
RSCN_RST
CIRF_FIL
SIGM
CIRN_FIL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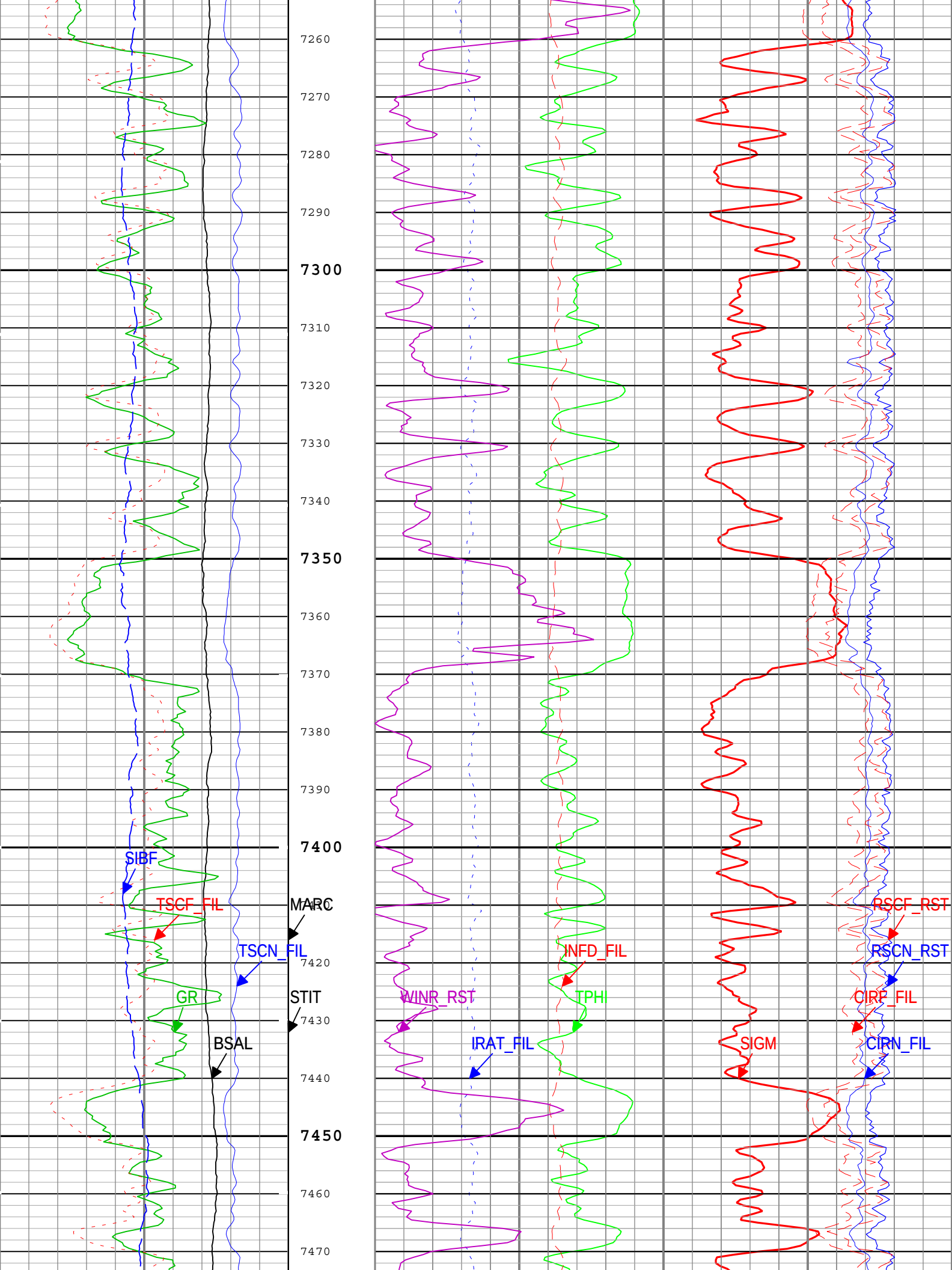
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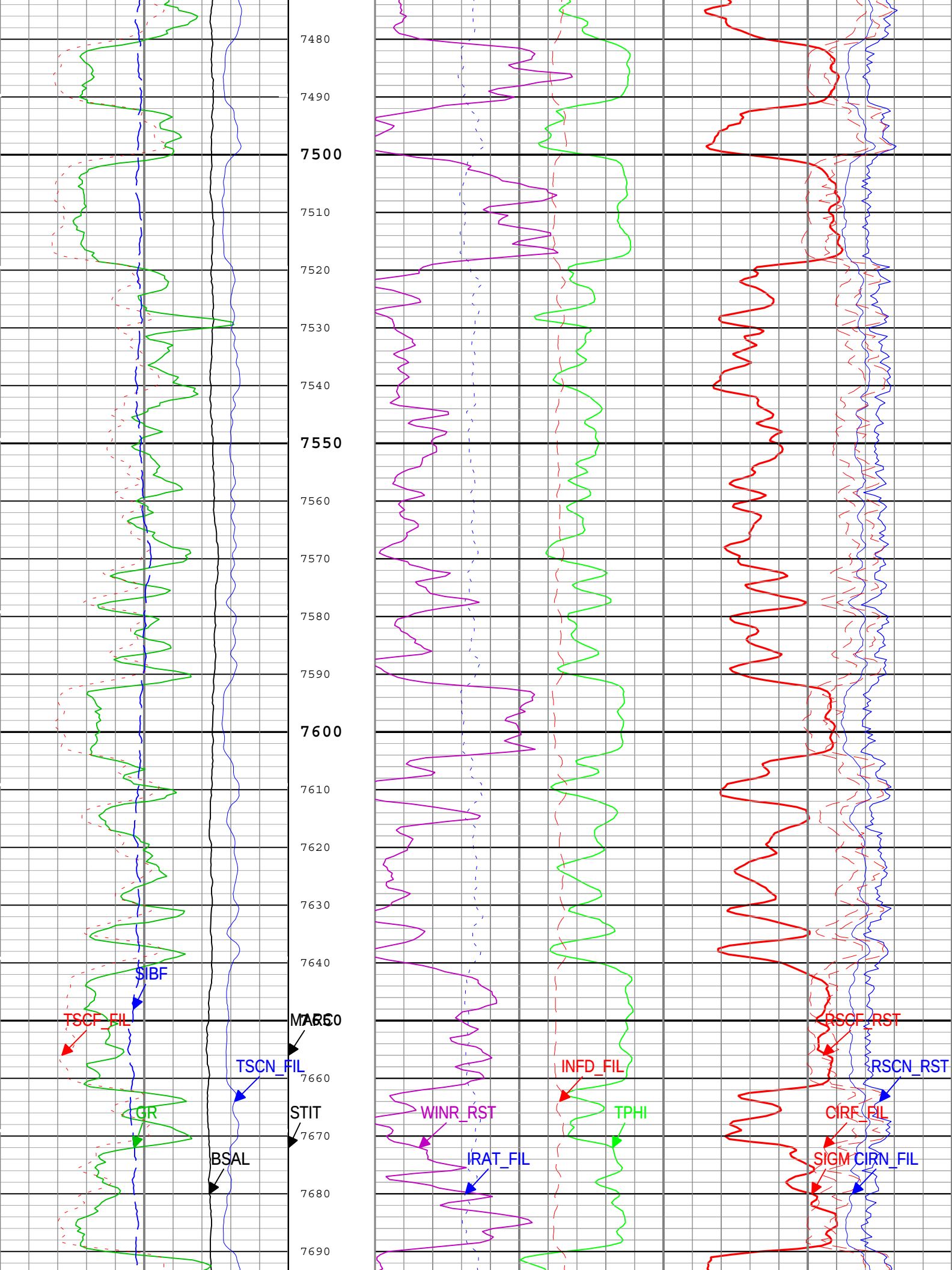
RSCN_RST
CIRF_FIL
CIRN_FIL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TSCF_FIL
MARC
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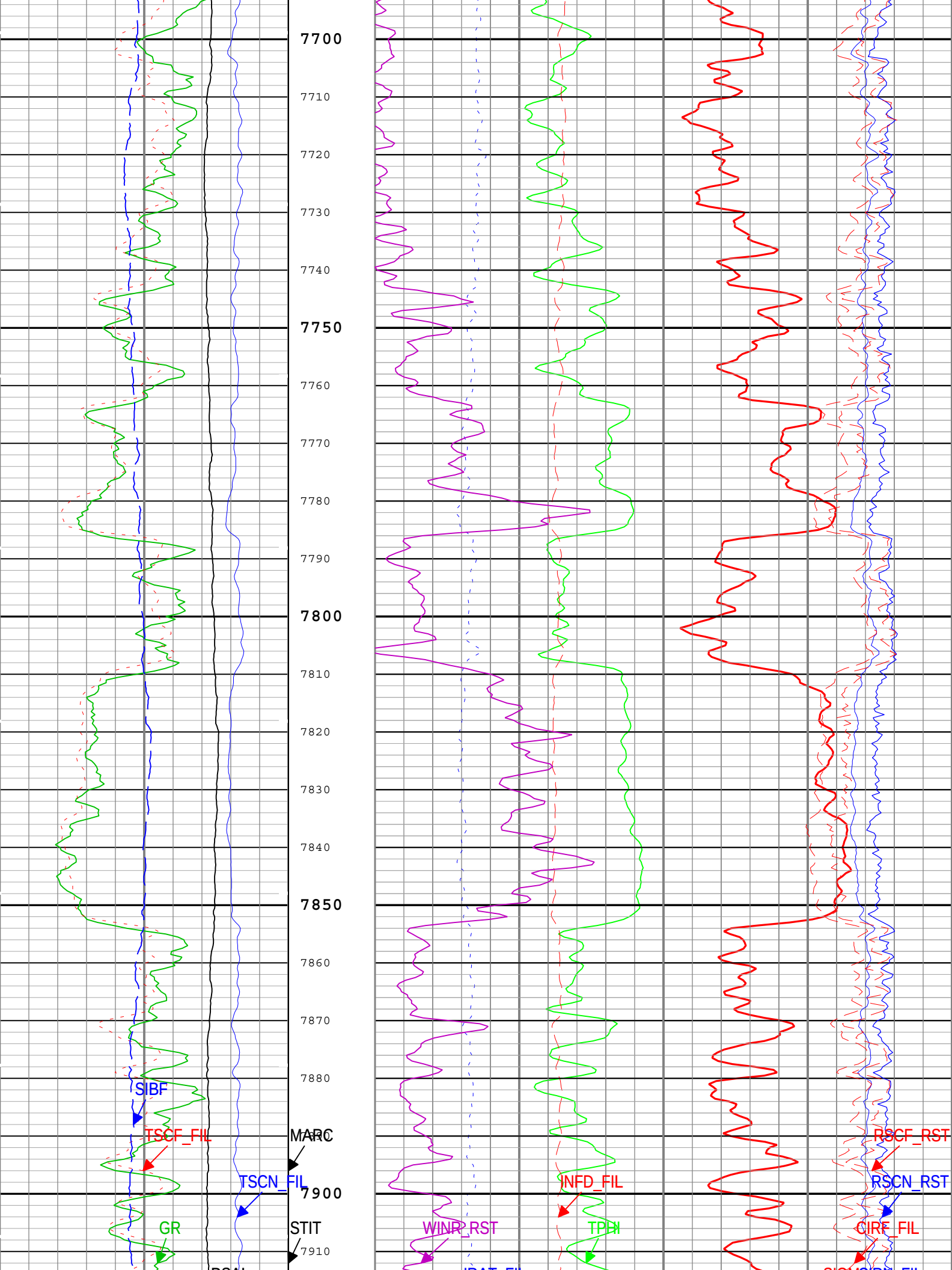
RSCN_RST
CIRF_FIL
SIGM
CIRN_FIL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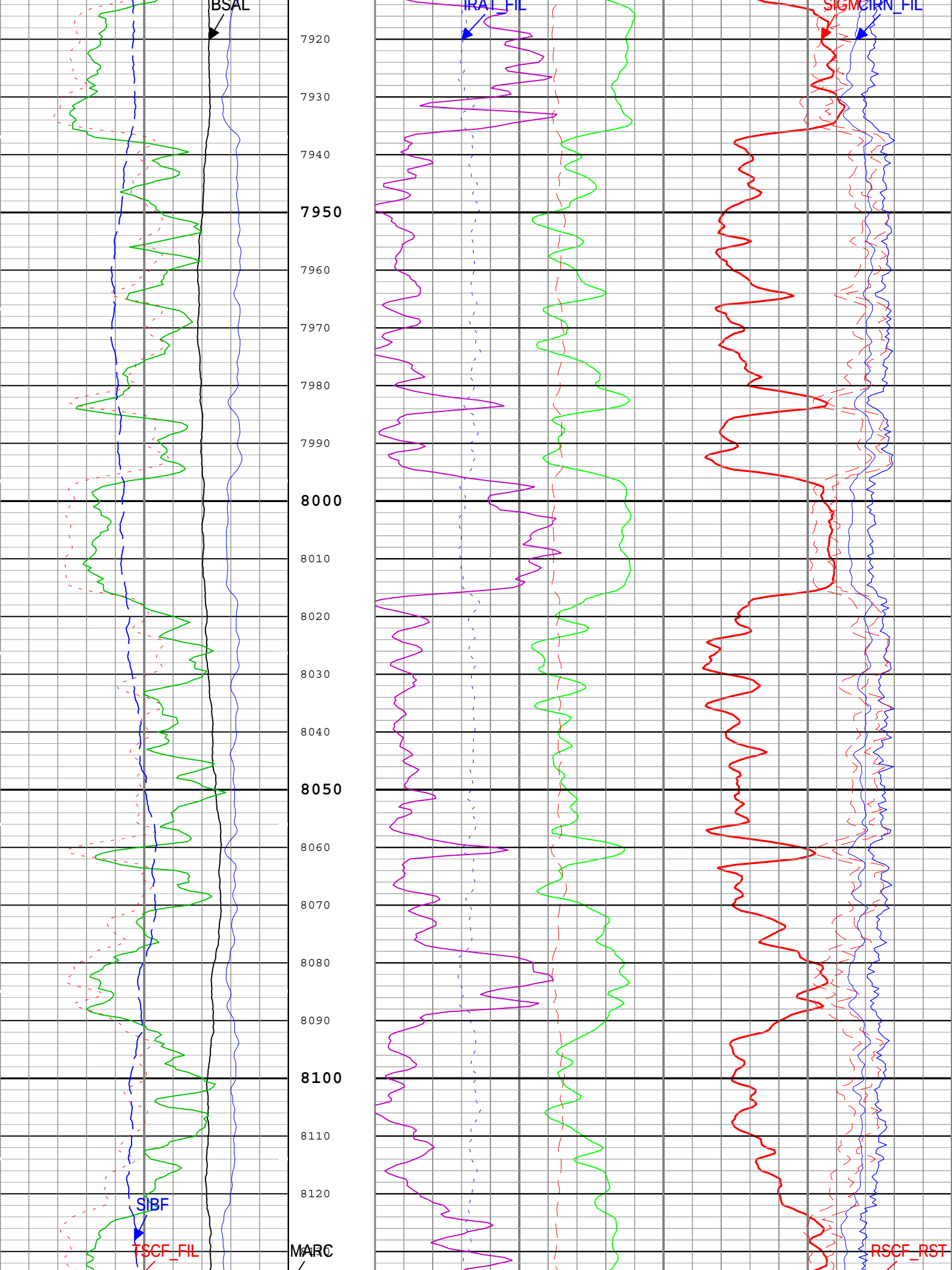
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IRAT_FIL
SIGMCIRN_FIL
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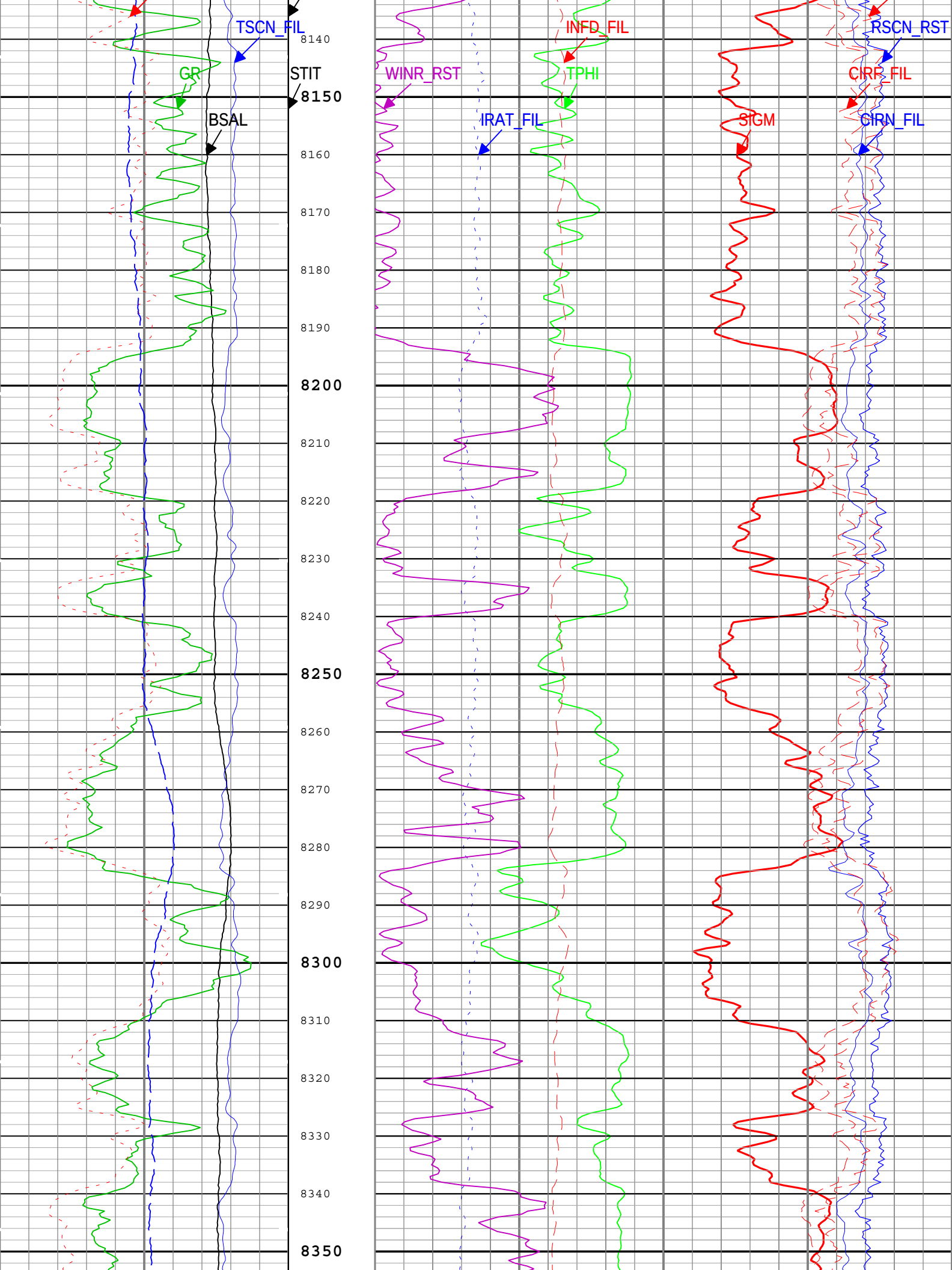
TSCF_FIL
MARC
RSCF_RST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WINR_RST
IRAT_FIL
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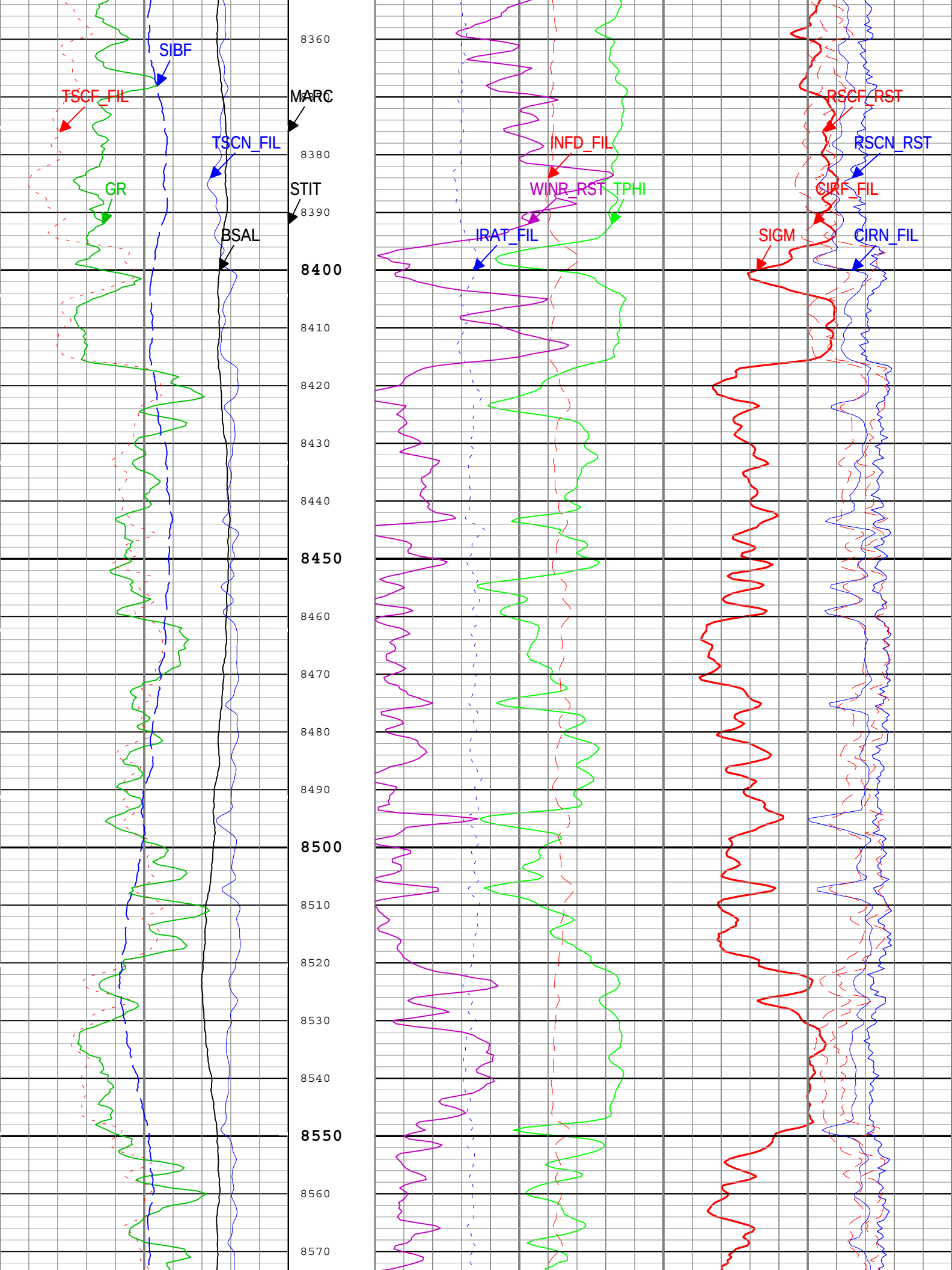
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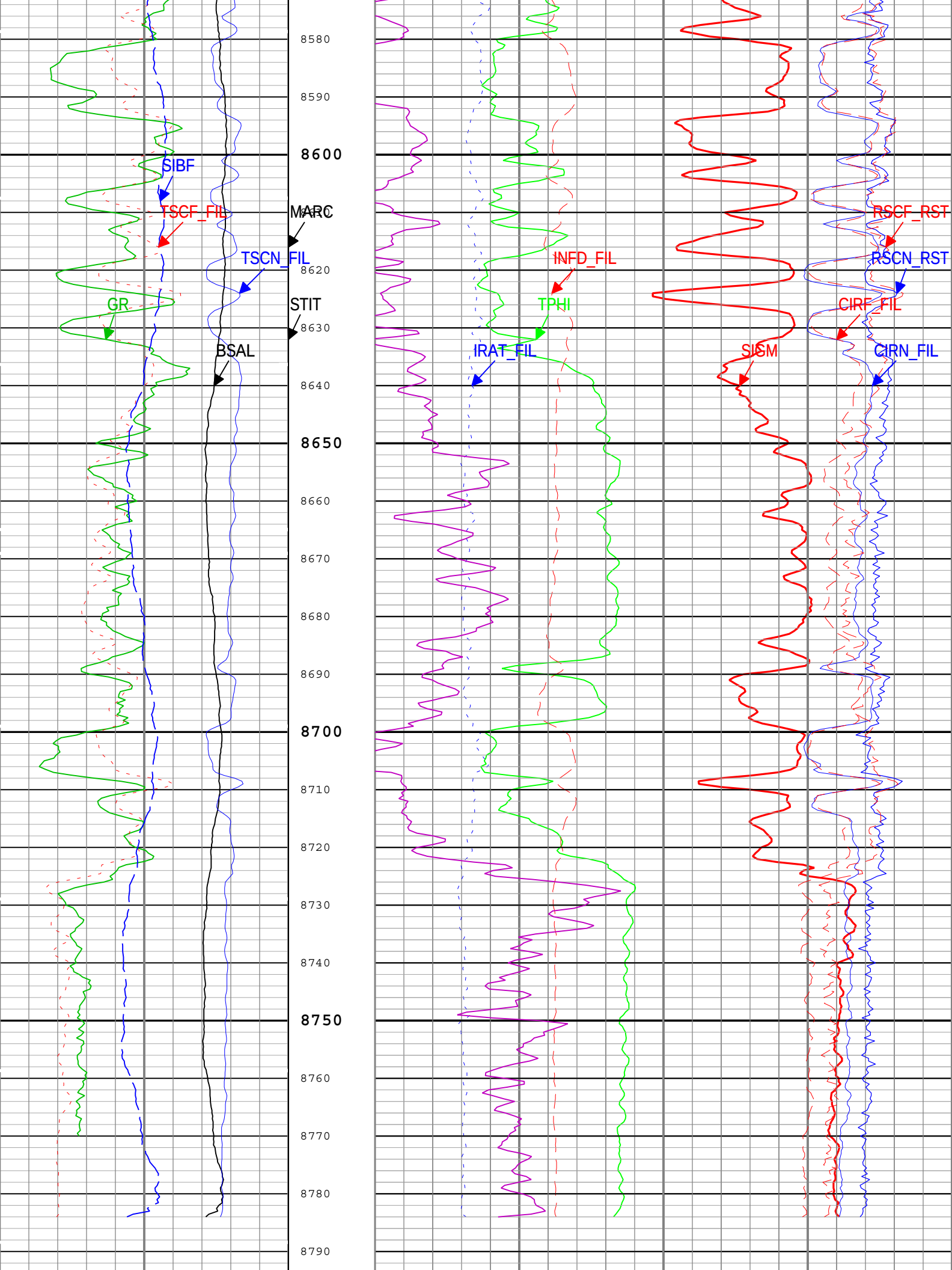
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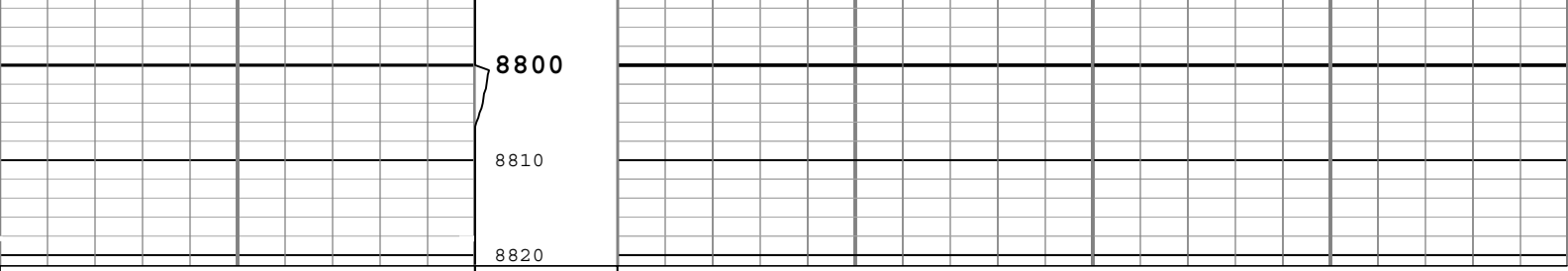
CIRN_FIL



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

Gamma Ray (GR) PSTP-A
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

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

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)
- 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: 21-May-2015 01:17:58

Channel Processing Parameters

Run 1: 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	Drilling Fluid Type	Borehole	Water	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	SANDSTONE	
TD	Total Measured Depth	Borehole	8940	ft

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	14.75	2420	2550
BS	8.75	2550	8821.12

All depth are actual.

Tool Control Parameters

Run 1: Parameters

Parameter	Description	Tool	Value	Unit
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	150	ft/h
RST_DLM	Depth Log Mode	RST-C	Sigma	

Run 1

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1	Log[2]:Up	Up	4003.80 ft	5004.45 ft	20-May-2015 8:07:20 PM	20-May-2015 8:40:40 PM	ON	2.44 ft	No
Run 1	Main[4]:Up	Up	2408.03 ft	8821.13 ft	20-May-2015 9:14:47 PM	21-May-2015 12:51:44 AM	ON	0.00 ft	No

All depths are referenced to toolstring zero

Log

Company:Caerus Piceance LLC Well:Puckett 43A-2

Run 1: Main[4]:Up:S004

Description: RST SIGMA Answer Format: Log (RST SIGMA Answer RA) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth

Creation Date: 21-May-2015 01:18:02

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

IHV - Integrated Hole Volume every 10.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

IHV - Integrated Hole Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

Main To Repeat

Repeat To Main

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

45 0

Main To Repeat

Repeat To Main

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

45 0

Main To Repeat

Repeat To Main

Borehole Salinity (BSAL) RST-C

450 ppk -50

Main To Repeat

Repeat To Main

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

10000 1/s 0

Main To Repeat

Repeat To Main

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

2.5 0

Main To Repeat

Repeat To Main

Sigma Borehole Fluid (SIBF) RST-C

100 cu 0

Main To Repeat

Repeat To Main

Inelastic Ratio Filtered (IRAT_FIL) RST-C

0.75 0

Main To Repeat

Repeat To Main

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

5 0

Main To Repeat

Repeat To Main

Cable Speed (CS)

0 ft/h 50000

Main To Repeat

Main To

Main To Repeat

Repeat To Main

Total Selected Count Rate Near Detector Filtered (TSCN_FIL) RST-C

30000 1/s 0

Main To Repeat

Repeat To Main

Total Selected Count Rate Far Detector Filtered (TSCF_FIL) RST-C

12000 1/s 0

Main To Repeat

Repeat To Main

Gamma Ray (GR) PSTP-A

0 gAPI 150

Main To Repeat

Repeat To Main

Minitron Arc Count (MARC) RST-C

0 5

Main To Repeat

Repeat To Main

Stuck Tool Indicator, Total (STIT)

0 ft 50

Main To Repeat

Repeat To Main

Thermal Decay Porosity (TPHI) RST-C

0.6 ft3/ft3 0

Main To Repeat

Repeat To Main

Cable Tension (TENS)

5000 lbf 0

Main To Repeat

Repeat To Main

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

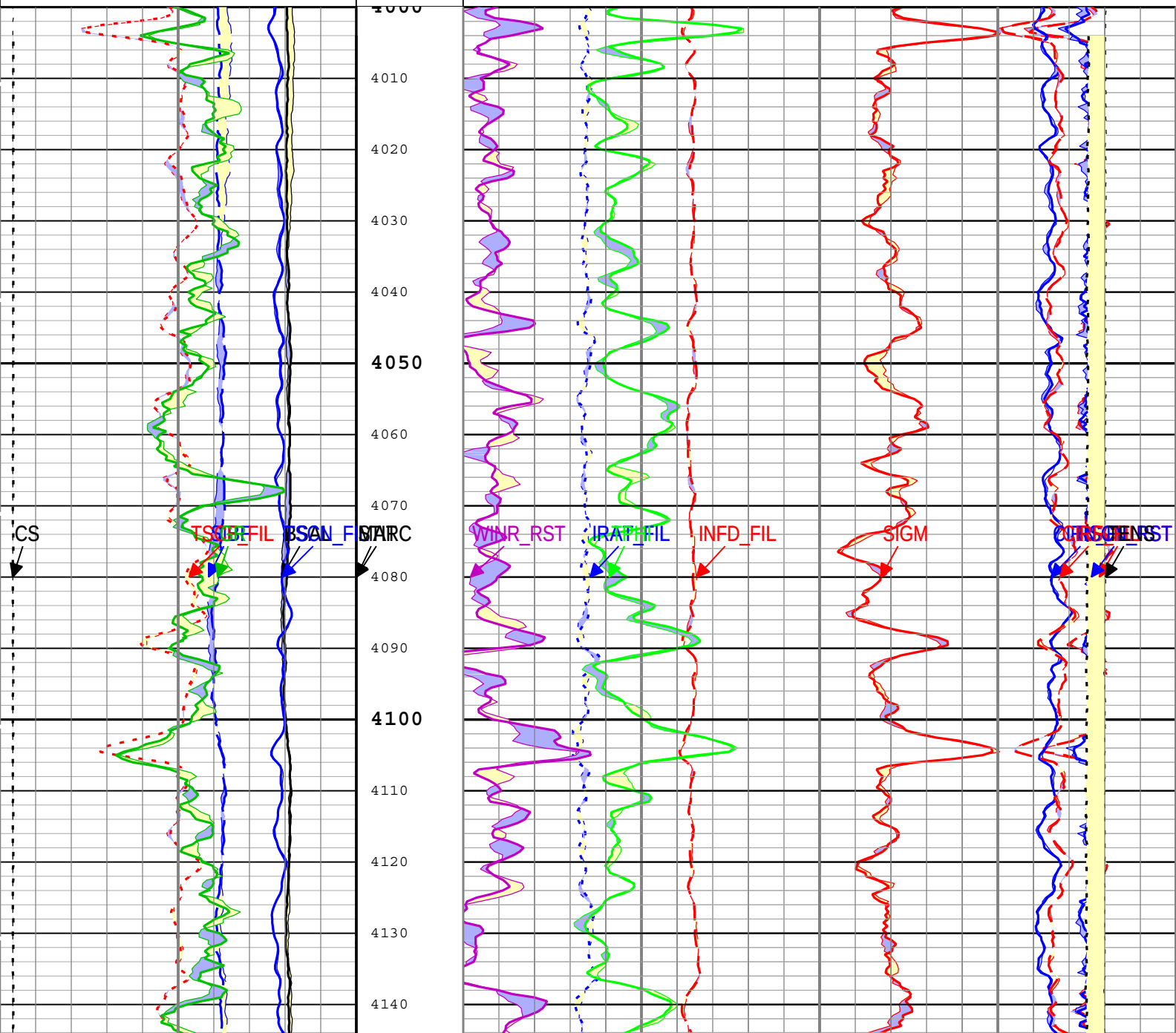
60 cu 0

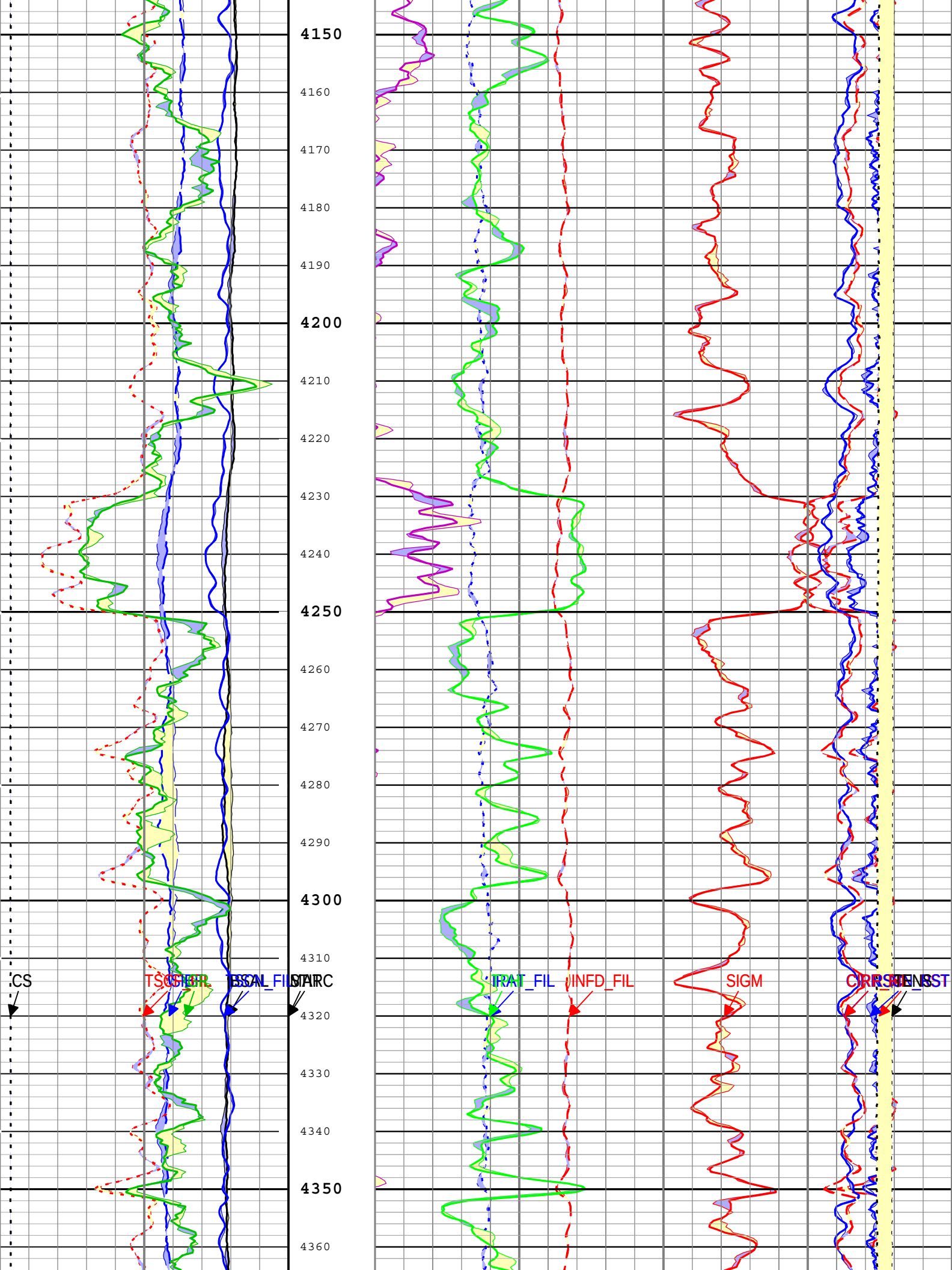
Main To Repeat

Repeat To Main

Weighted Inelastic Ratio (WINR_RST) RST-C

0 0.4

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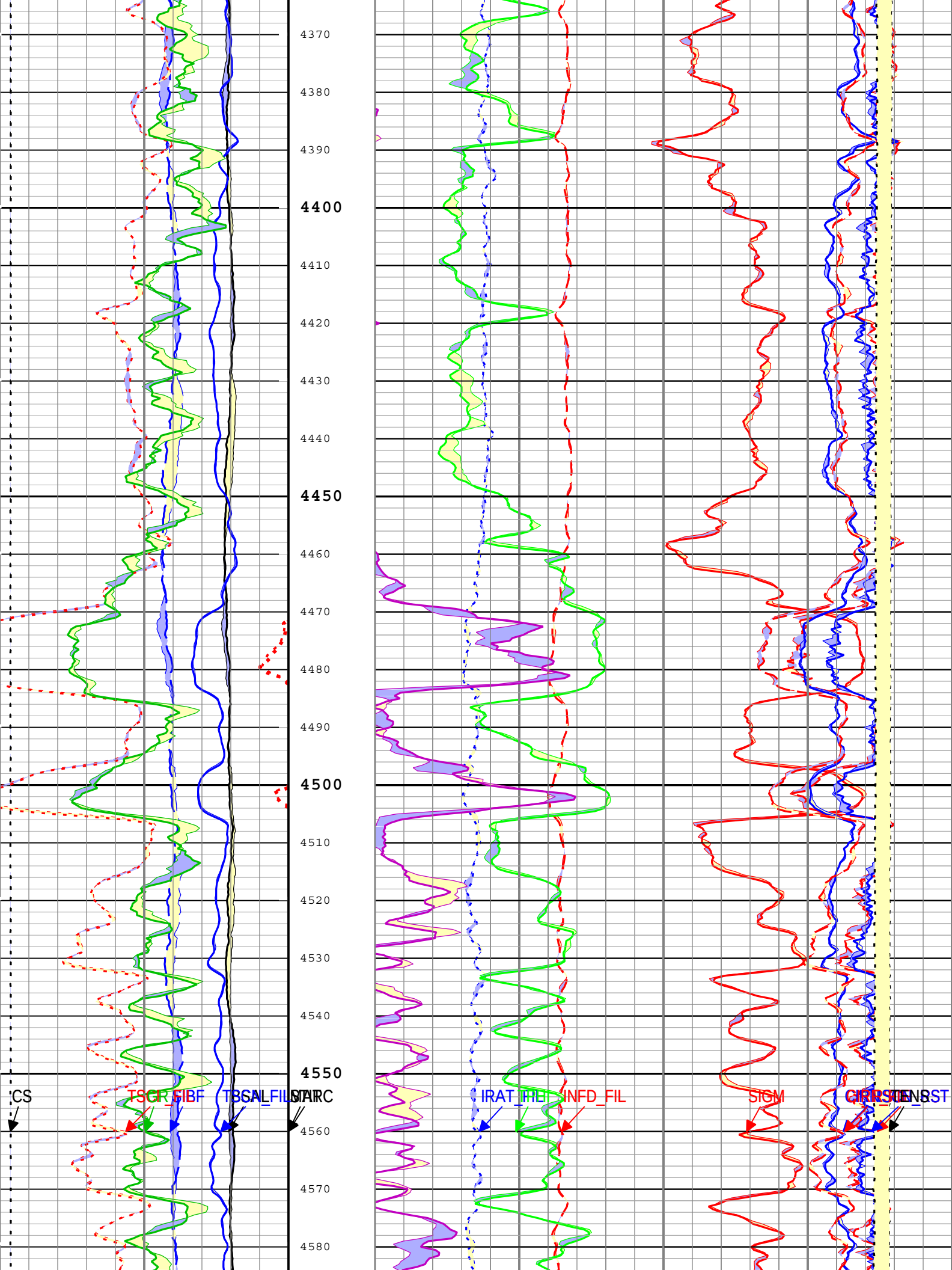
TS
IRAT_FIL
INFD_FIL
SIGM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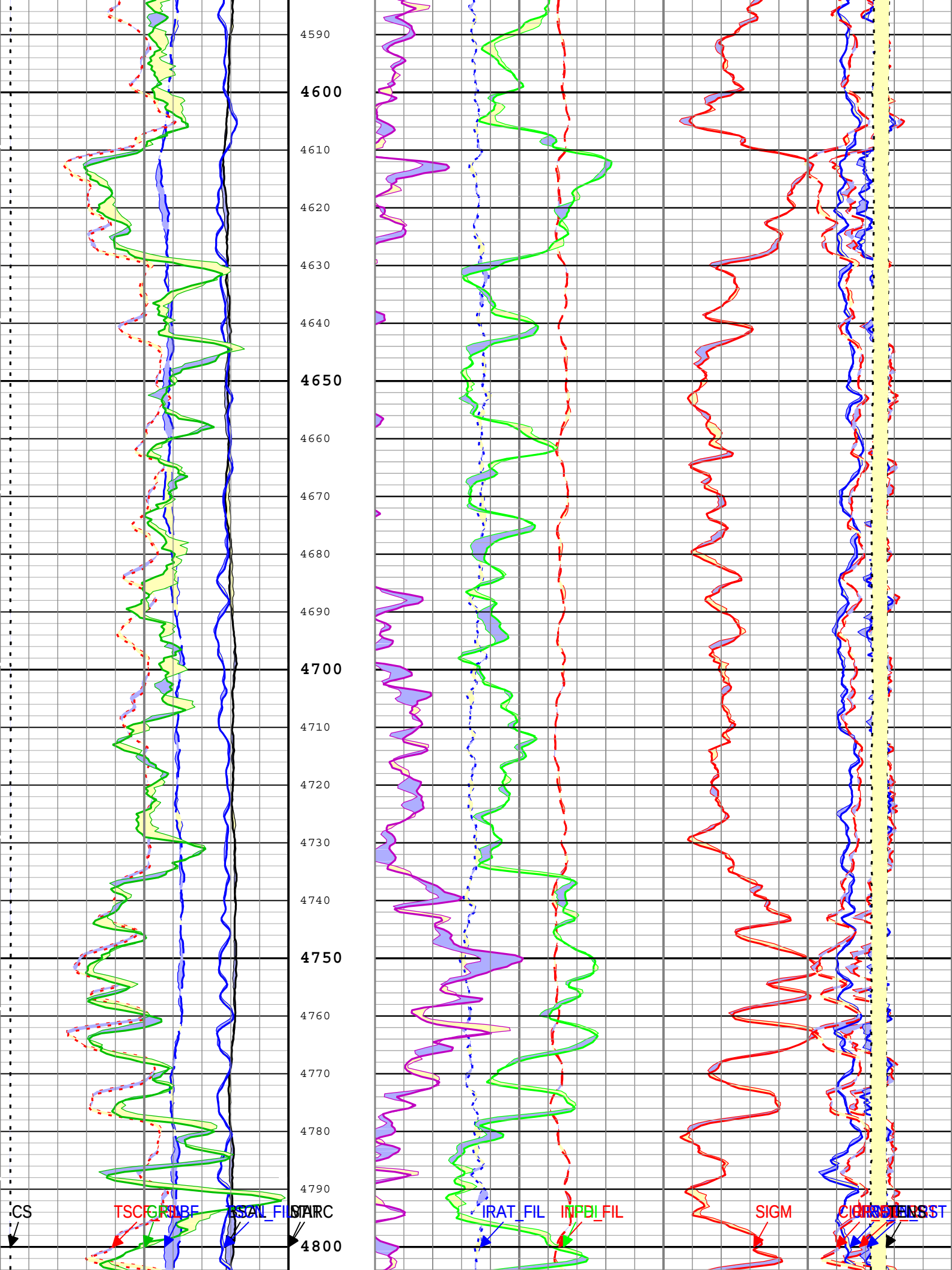
IRAT_IHIL
INFD_FIL
SIGM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CS
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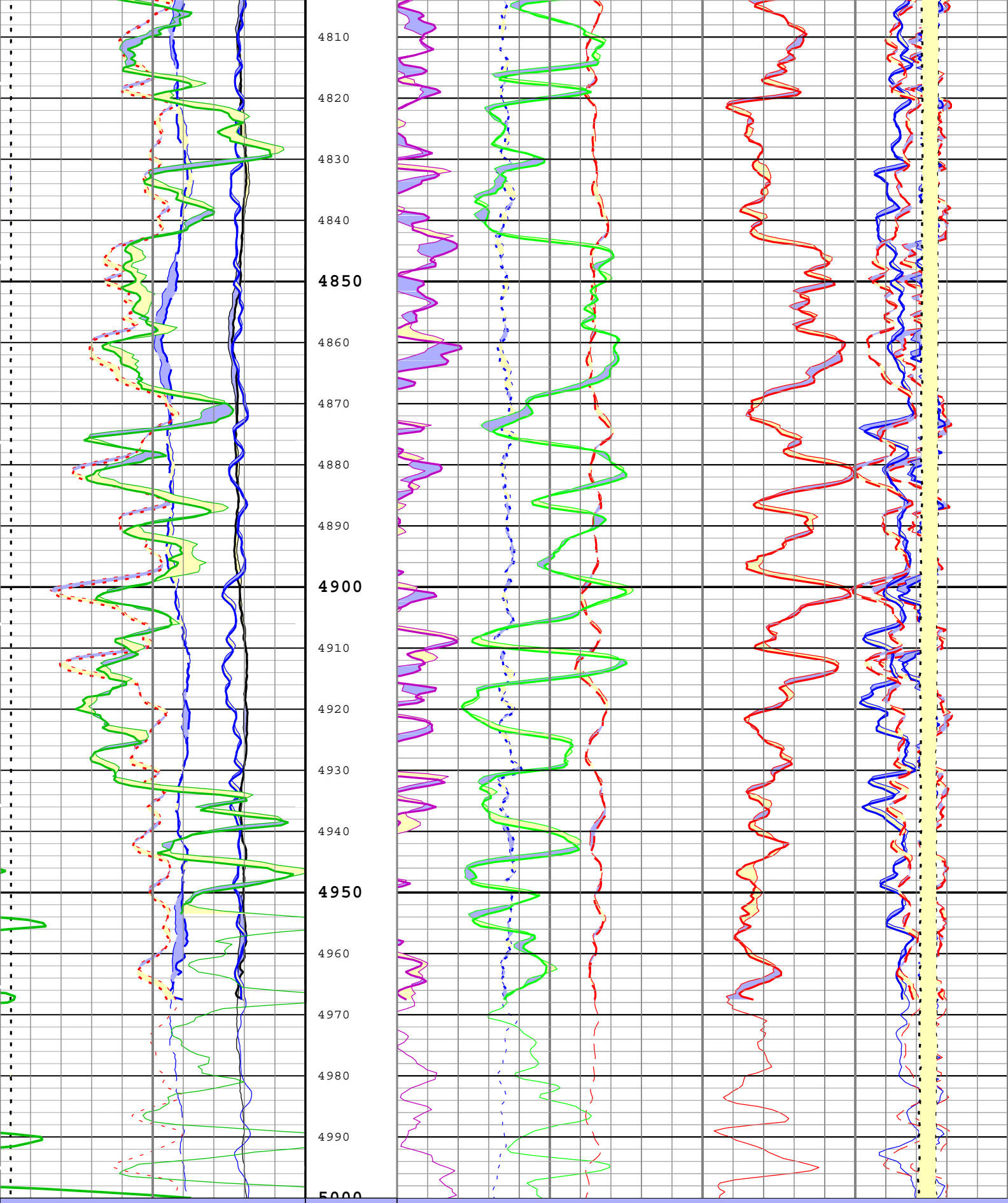
GR
IRAT_FIL
INPD_FIL
SIGM



Main To Repeat

Repeat To Main

Borehole Salinity (BSAL) RST-C

450 ppk -50

Main To Repeat

Repeat To Main

Minitron Arc

Main To Repeat

Repeat To Main

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

60 cu 0

Main To Repeat

Repeat To Main

Sigma Borehole Fluid (SIBF) RST-C

100 cu 0

Main To Repeat

Repeat To Main

Cable Speed (CS)

0 ft/h 50000

Main To Repeat

Repeat To Main

Total Selected Count Rate Near Detector Filtered (TSCN_FIL) RST-C

30000 1/s 0

Main To Repeat

Repeat To Main

Total Selected Count Rate Far Detector Filtered (TSCF_FIL) RST-C

12000 1/s 0

Main To Repeat

Repeat To Main

Gamma Ray (GR) PSTP-A

0 gAPI 150

Minitron Arc Count (MARC) RST-C

0 5

Main To Repeat

Repeat To Main

Stuck Tool Indicator, Total (STIT)

0 ft 50

Main To Repeat

Repeat To Main

Weighted Inelastic Ratio (WINR_RST) RST-C

0 0.4

Main To Repeat

Repeat To Main

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

10000 1/s 0

Main To Repeat

Repeat To Main

Inelastic Ratio Filtered (IRAT_FIL) RST-C

0.75 0

Main To Repeat

Repeat To Main

Thermal Decay Porosity (TPHI) RST-C

0.6 ft3/ft3 0

Main To Repeat

Repeat To Main

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

45 0

Main To Repeat

Repeat To Main

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

45 0

Main To Repeat

Repeat To Main

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

2.5 0

Main To Repeat

Repeat To Main

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

5 0

Main To Repeat

Repeat To Main

Cable Tension (TENS)

5000 lbf 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)

TIME_1900 - Time Marked every 60.00 (s)

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 RA) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 21-May-2015 01:18:02

Calibration Report

RST-C (Reservoir Saturation Pro Tool C) Calibration - Run 1

Primary Equipment :

RSC Acquisition Cartridge	RSC-E	279

PSTP-A (PSP Telemetry Platform A - Sapphire) Calibration - Run 1

Primary Equipment :

PBMS-A PBMS-A 3869

Calibration Parameter :

JIG-BKGD

PBMS Well Temp Master Calibration

Master (EEPROM): 00:00:00 18-Jul-2007

PBMS_RTD_THERM (Master) RTD Coefficients

	Tt**0	Tt**1	Tt**2	Tt**3	Tt**4	Tt**5
Tt**0	-756.3505	527.1629	-155.9385	25.88661	-1.571709	0

PBMS Gamma Ray Master Calibration

Master (EEPROM): 00:00:00 18-Jan-2007

PBMS_GR_MODEL (Master) GR Coefficients

	Rt**0	Rt**1
Rt**0	2000	2000

PBMS A Reference Clock Master Calibration

Master (EEPROM): 00:00:00 18-Jul-2007

PBMS_REF_CLOCK (Master) PBMS A Clock Coefficients

	Temp**0	Temp**1	Temp**2	Temp**3	Temp**4	Temp**5
Temp**0	-192.7617	-5.343637	-0.09015581	0.000751289	2.272868E-06	0

PBMS A Sapphire Master Calibration

Master (EEPROM): 00:00:00 18-Jul-2007

PBMS_P_GAUGE_PRES (Master) Sapphire Pressure Model Coefficients

	Tt**0	Tt**1	Tt**2	Tt**3	Tt**4	Tt**5
Tp**0	-10607.24	9983.964	-4422.383	811.7886	-55.39267	0
Tp**1	7317.382	-6510.243	3075.83	-562.8201	38.05563	0
Tp**2	27.61189	-4.173877	-2.572291	0	0	0
Tp**3	-4.186021	1.156646	0	0	0	0
Tp**4	0	0	0	0	0	0
Tp**5	0	0	0	0	0	0

PBMS_P_GAUGE_TEMP (Master) Sapphire Temperature Model Coefficients

	Tp**0	Tp**1	Tp**2	Tp**3	Tp**4	Tp**5
Tt**0	-413.3419	3.522647	0.6707032	-0.5251858	0.07300035	0
Tt**1	168.969	-2.795898	-0.08934408	0.1774101	-0.0245917	0
Tt**2	-15.60143	0.6837218	-0.04823068	0	0	0
Tt**3	1.587509	-0.04120504	0	0	0	0
Tt**4	0	0	0	0	0	0
Tt**5	0	0	0	0	0	0

Company:	Caerus Piceance LLC
Well:	Puckett 43A-2
Field:	Wildcat
County:	Garfield
State:	Colorado

Schlumberger

Reservoir Saturation Tool

Sigma