

Company: Caerus Operating LLC

Well: NPR 11B-15 596

Field: NPR

County: Garfield State: Colorado

Reservoir Saturation Tool

Sigma Mode

Gamma Ray - Collar locator Log

County: Garfield  
 Field: NPR  
 Location: K10-596  
 Well: NPR 11B-15 596  
 Company: Caerus Operating LLC

Location:		K10-596		Elev.: K.B. 6733.00 ft G.L. 6709.00 ft D.F.	
Permanent Datum:	Ground Level	6709.00 f			
Log Measured From:	Kelly Bushing	24.00 ft		above Perm.Datum	
Drilling Measured From:	Kelly Bushing				
API Serial No.	Section:	10	Township:	5S	Range:
05045237540000					96W

Logging Date	20-Sep-2018
Run Number	TWO
Depth Driller	9908.00 ft
Schlumberger Depth	9852.00 ft
Bottom Log Interval	9852.00 ft
Top Log Interval	1800.00 ft
Casing Fluid Type	2% KCL Water
Salinity	
Density	8.49 lbn/gal
Fluid Level	8.00 ft
BIT/CASING/TUBING STRING	
Bit Size	8.75 in
From	2068.00 ft
To	9908.00 ft
Casing/Tubing Size	4.5 in
Weight	11.6 lbn/ft
Grade	P110
From	0.00 ft
To	9864.00 ft
Max Recorded Temperatures	275.5 degF
Logger on Bottom	20-Sep-2018 09:24:00
Unit Number	3007
Recorded By	Beatriz Guaita
Witnessed By	Trent Ray

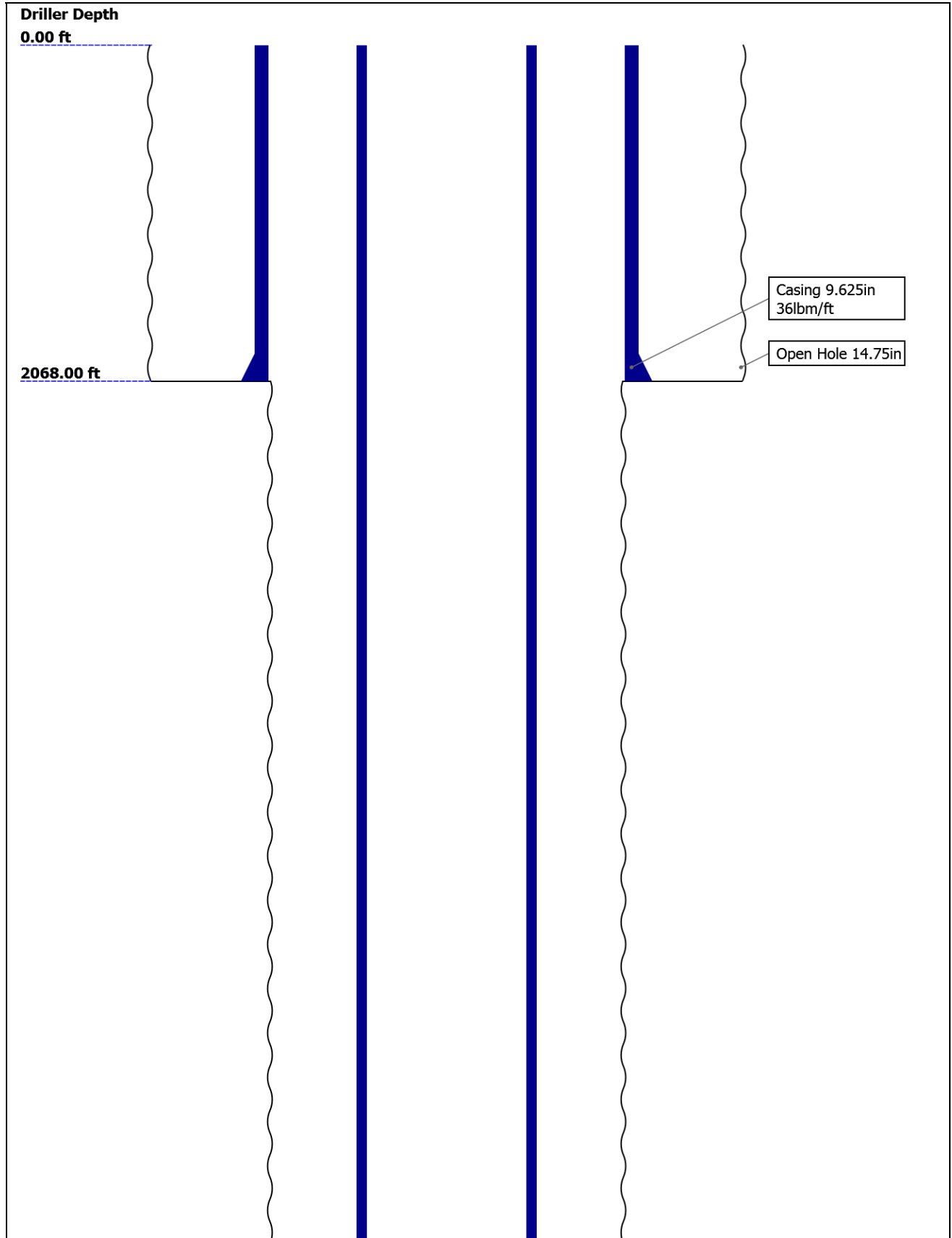
## Disclaimer

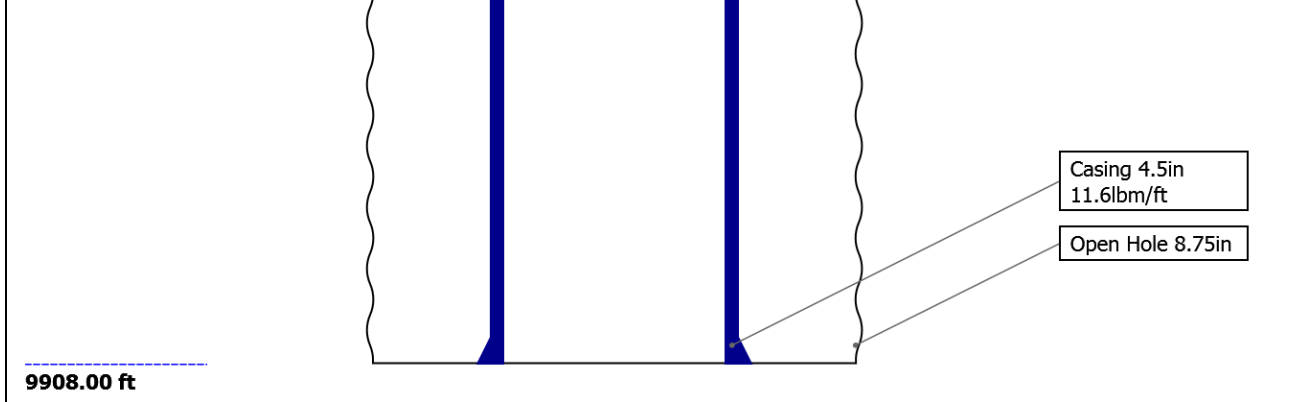
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## Well Sketch





## Borehole Size/Casing/Tubing Record

Bit					
Bit Size ( in )	14.75	8.75			
Top Driller ( ft )	0	2068			
Top Logger ( ft )	0	2068			
Bottom Driller ( ft )	2068	9908			
Bottom Logger ( ft )	2068	9908			
Casing					
Size ( in )	9.625	4.5			
Weight ( lbm/ft )	36	11.6			
Inner Diameter ( in )	8.921	4			
Grade	N/A	P110			
Top Driller ( ft )	0	0			
Top Logger ( ft )	0	0			
Bottom Driller ( ft )	2068	9908			
Bottom Logger ( ft )	2068	9864			

## Remarks and Equipment Summary

TWO: Toolstring				TWO: Remarks	
<b>Equip name</b>	<b>Length</b>	<b>MP name</b>	<b>Offset</b>	Thank you for choosing Schlumberger!!	
PEH-E	33.4			Toolstring ran as per toolsketch	
AH-38	31.71			RST Mode: Sigma	
PSTP-B:2826	31.43			Matrix: Sanstone	
PSC-A		GR	27.73	Max Recorded Temp: 275.5DegF	
PSTC-A:2826		PSTC	27.43	SLB Depth: 9852ft	
PBMS-B:2826		PSTC Tool String Bottom Temperature	0.00	SCMT and RST ran separately	
		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		

Far 14.05  
Near 13.55

BNS-P 0.14 RSX-E 0.14

TOOL\_ZERO

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

TWO

### 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	Crane

TWO:Depth Control Parameters

Depth Control Remarks

Log Sequence	First Log In the Well	All Schlumberger depth control policies 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		Log Down use as a reference Log
Stretch Correction		
Tool Zero Check At Surface		

## Composite 1

## RST Main Pass

### Software Version

Acquisition System	Version
Maxwell 2017 SP3	7.3.92069.3100
Application Patch	Wireline_Hotfix-RTDLIS-2017SP3_7.3.92363
	Wireline_Hotfix-SML-2017SP3_7.3.101161

### Composite Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
TWO	Log[4]:Up	Up	3151.02 ft	9879.11 ft	20-Sep-2018 8:02:53 AM	20-Sep-2018 10:39:53 AM	ON	8.04 ft	Yes
TWO	Log[5]:Up	Up	1743.39 ft	3464.96 ft	20-Sep-2018 10:58:47 AM	20-Sep-2018 11:39:43 AM	ON	7.14 ft	Yes

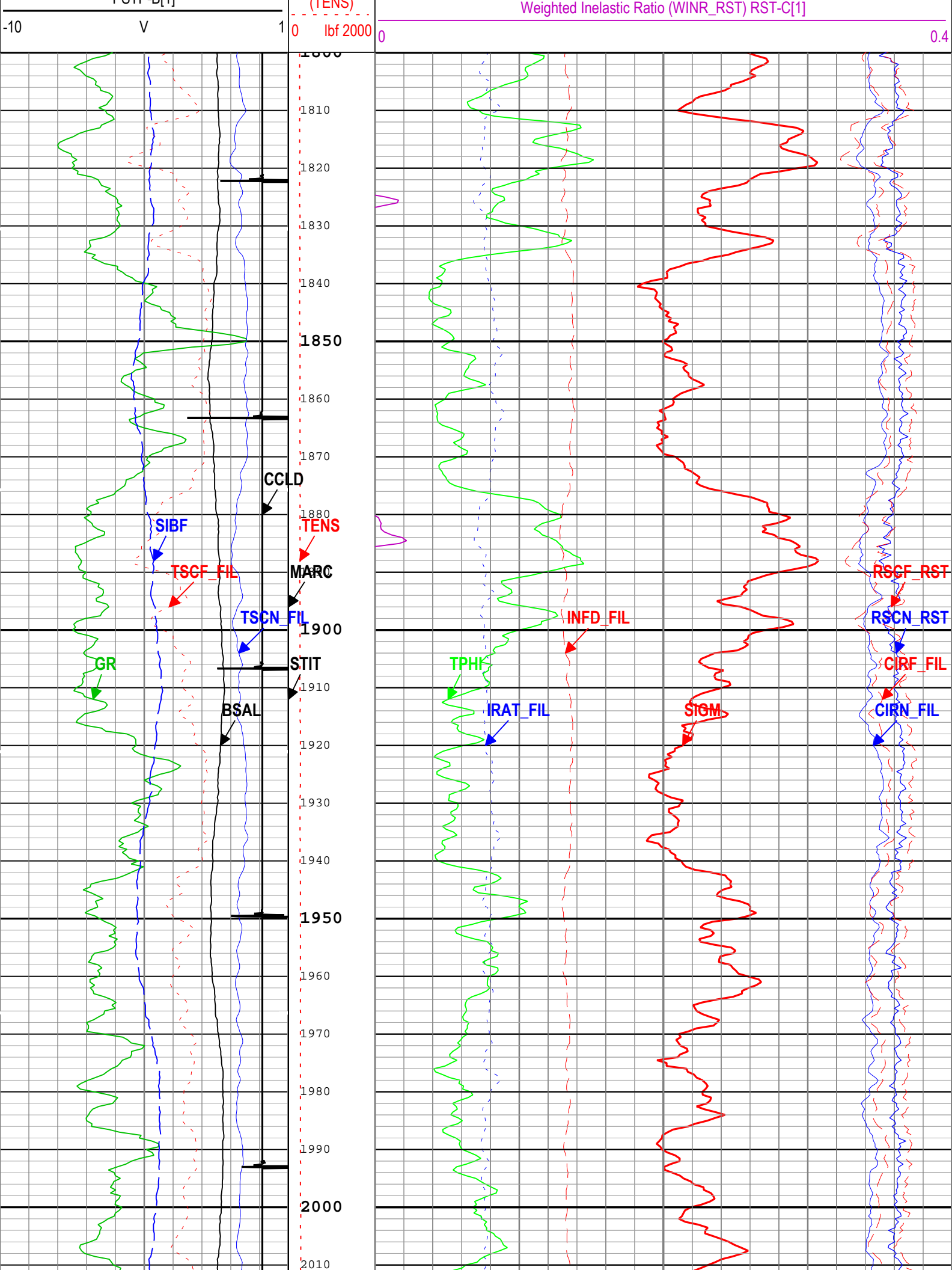
All depths are referenced to toolstring zero

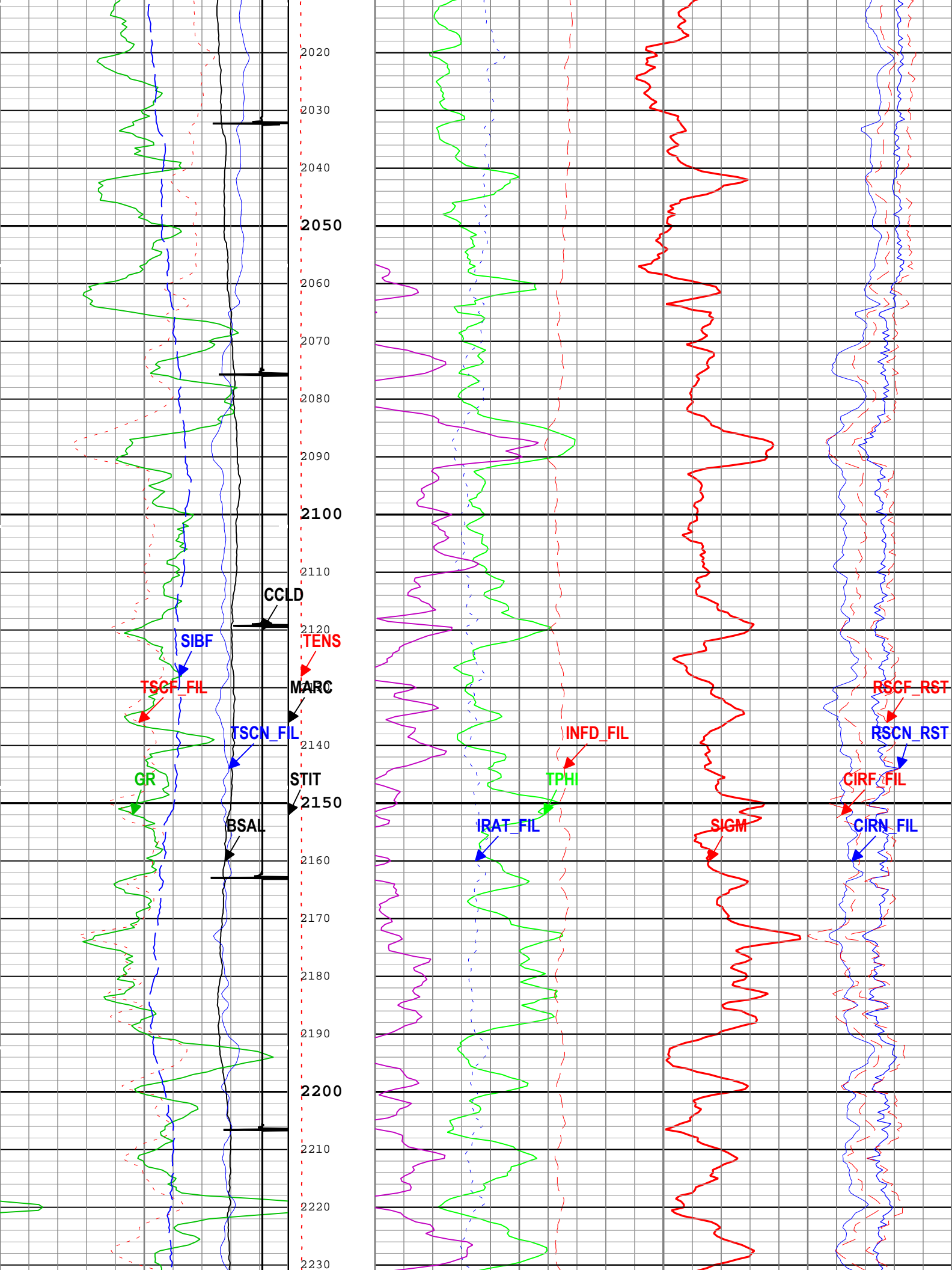
### Log

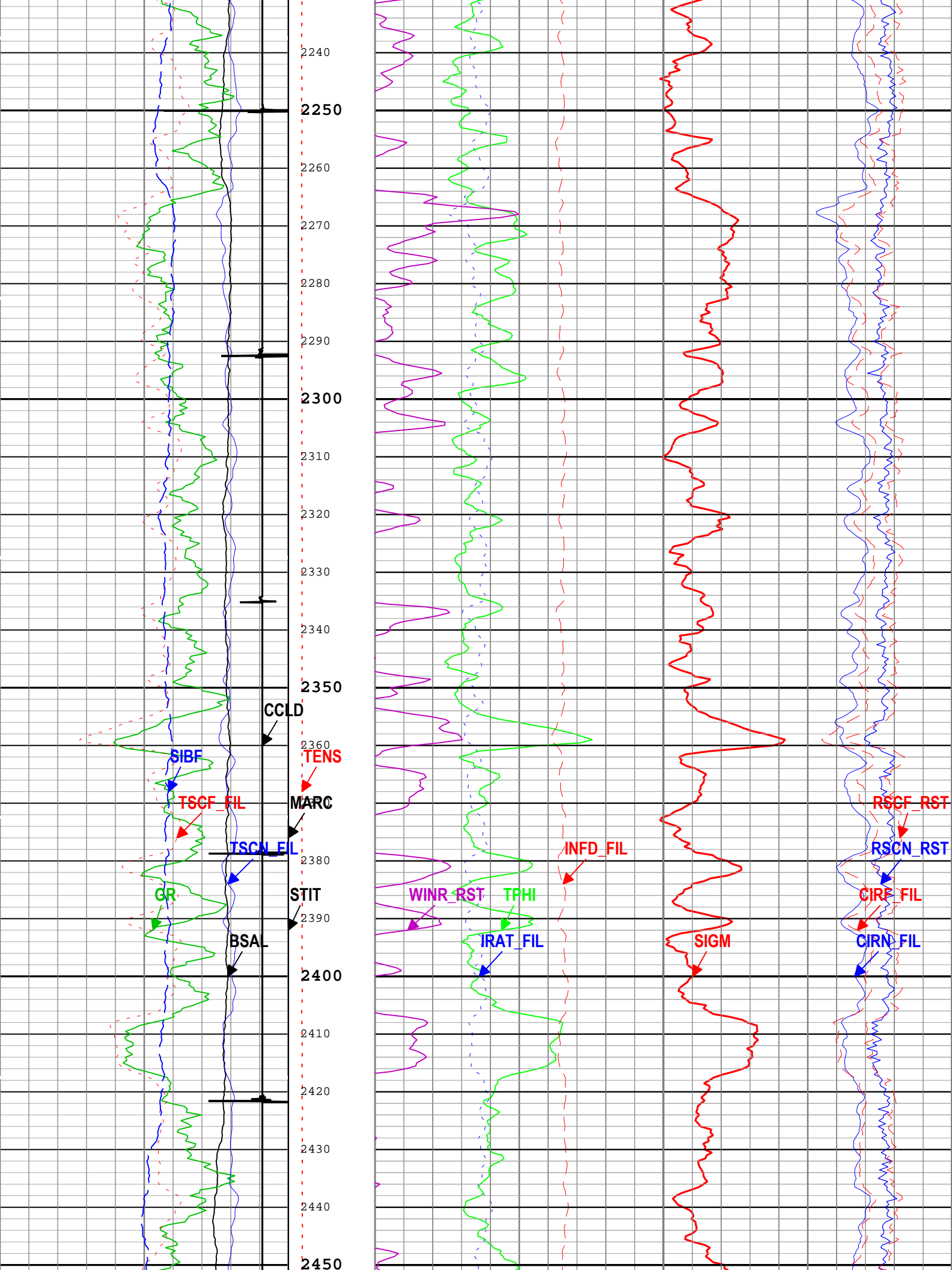
Company:Caerus Operating LLC    Well:NPR 11B-15 596  
Composite 1:S011

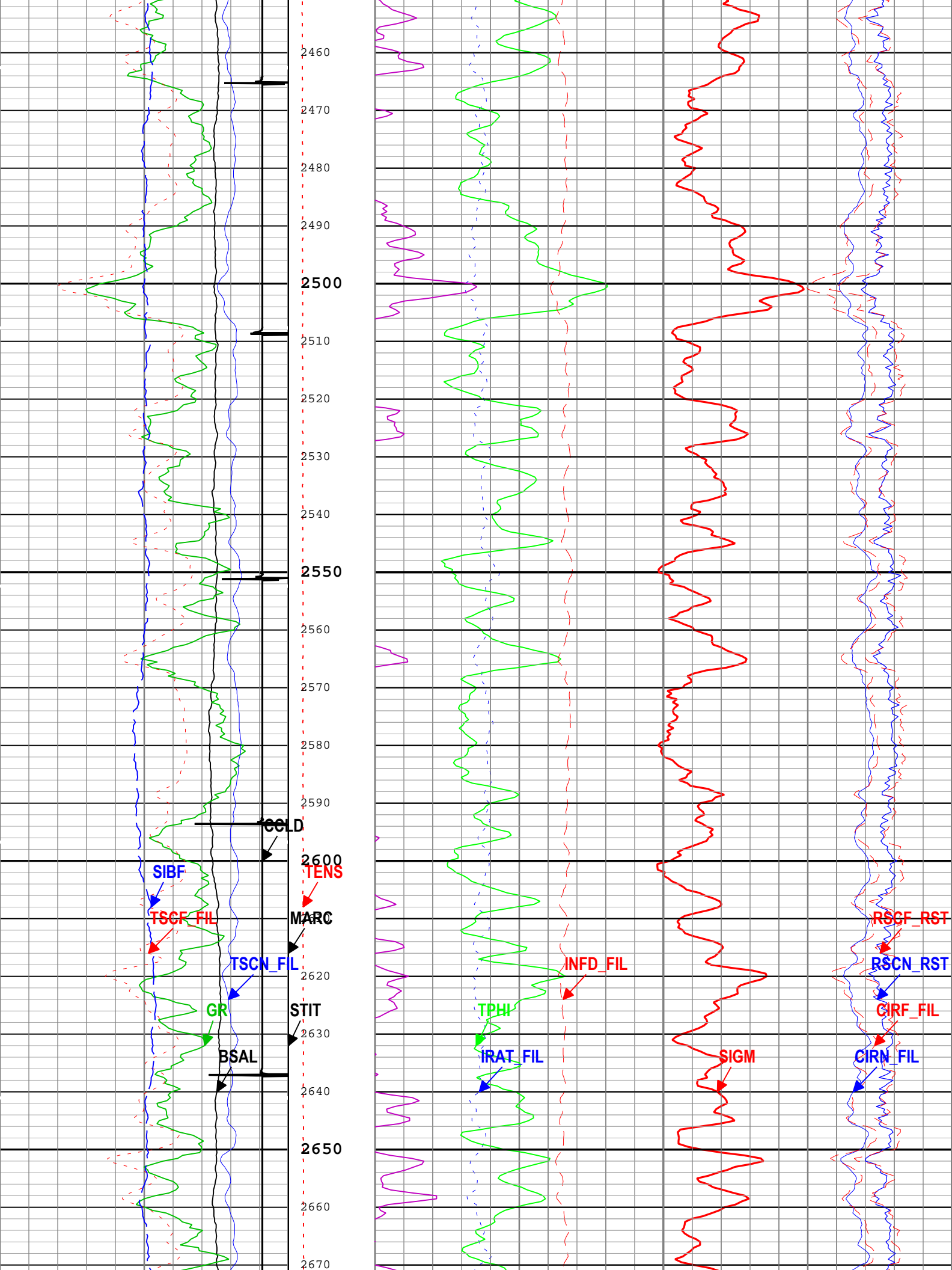
Description: RST SIGMA Answer    Format: Log ( RST SIGMA Answer )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 20-Sep-2018 18:38:53

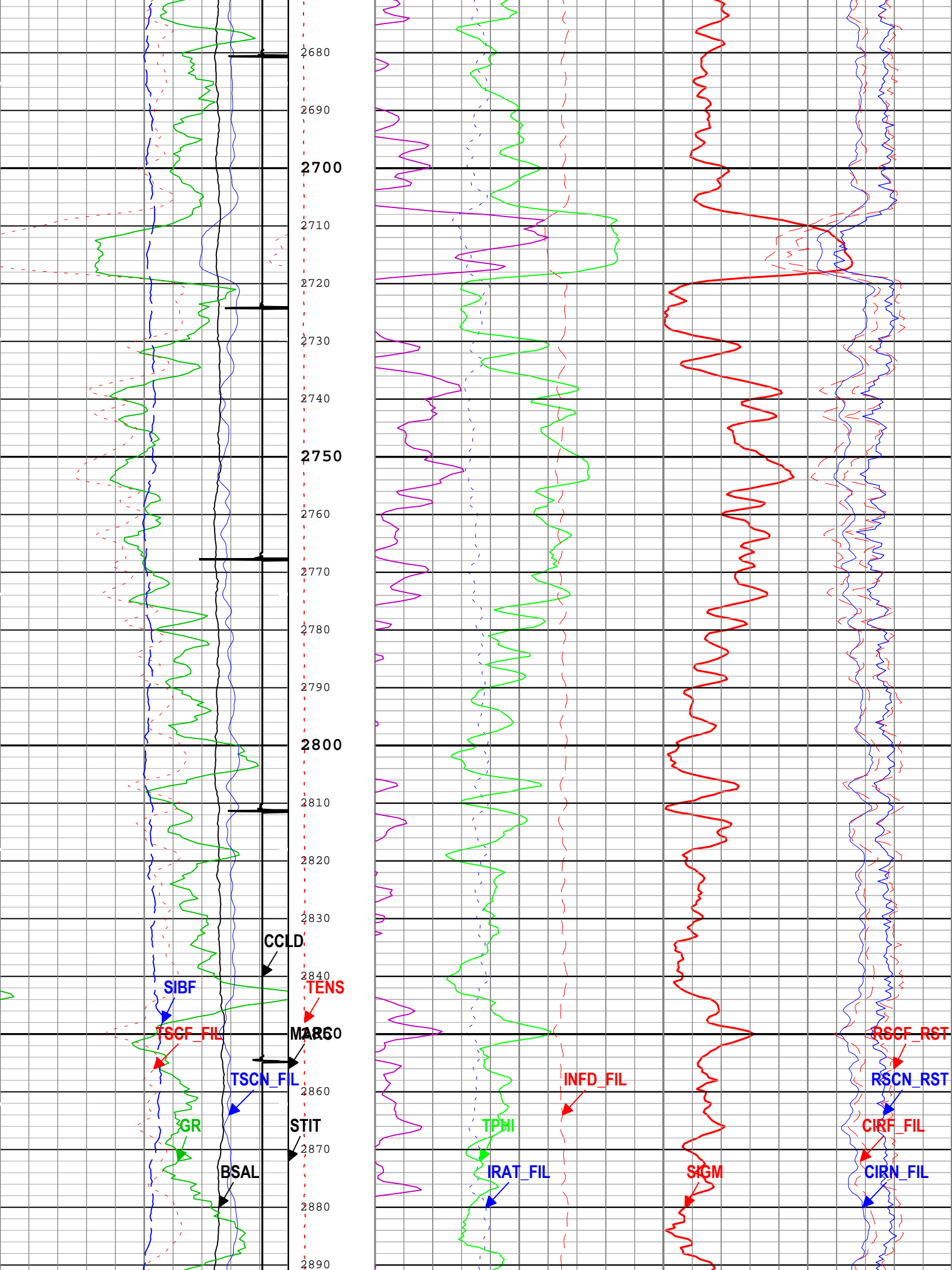
TIME_1900 - Elapsed time since midnight, 30 December 1899 every 60.00 (s)		
TIME_1900 - Time Marked every 60.00 (s)		
-  IHV - Integrated Hole Volume every 10.00 (ft3)		
-  IHV - Integrated Hole Volume every 100.00 (ft3)		
-  ICV - Integrated Cement Volume every 10.00 (ft3)		
-  ICV - Integrated Cement Volume every 100.00 (ft3)		
	Stuck Tool Indicator, Total (STIT)	
	0    ft    50	
Borehole Salinity (BSAL) RST-C[1]	Cable Drag From STIA to STIT	Capture to Inelastic Ratio Near Filtered (CIRN_FIL) RST-C[1]
450    ppk    -50	0    50	2.5    0
Gamma Ray (GR) PSTP-B[1]	Tool_Tot. Drag From D3T to STIT	Capture to Inelastic Ratio Far Filtered (CIRF_FIL) RST-C[1]
0    gAPI    150	0    5	5    0
Total Selected Count Rate Near Detector Filtered (TSCN_FIL) RST-C[1]	Minitron Arc Count (MARC) RST-C[1]	Inelastic Ratio Filtered (IRAT_FIL) RST-C[1]
30000    1/s    0	0    5	0.75    0
Total Selected Count Rate Far Detector Filtered (TSCF_FIL) RST-C[1]	Cable Tension (TENC) RST-C[1]	Thermal Decay Porosity (TPHI) RST-C[1]
12000    1/s    0	60    cu    0	0.6    ft3/ft3    0
Sigma Borehole Fluid (SIBF) RST-C[1]		Gross Inelastic Count Rate Far Detector Filtered (INFD_FIL) RST-C[1]
100    cu    0		10000    1/s    0
CCL Discriminated Amplitude (CCLD) PSTP-B[1]		Far Detector Effective Unregulated Capture Count Rate (RSCN_RST) RST-C[1]
		45    0
		Formation Sigma (Neutron Capture Cross Section) (SIGM) RST-C[1]
		60    cu    0

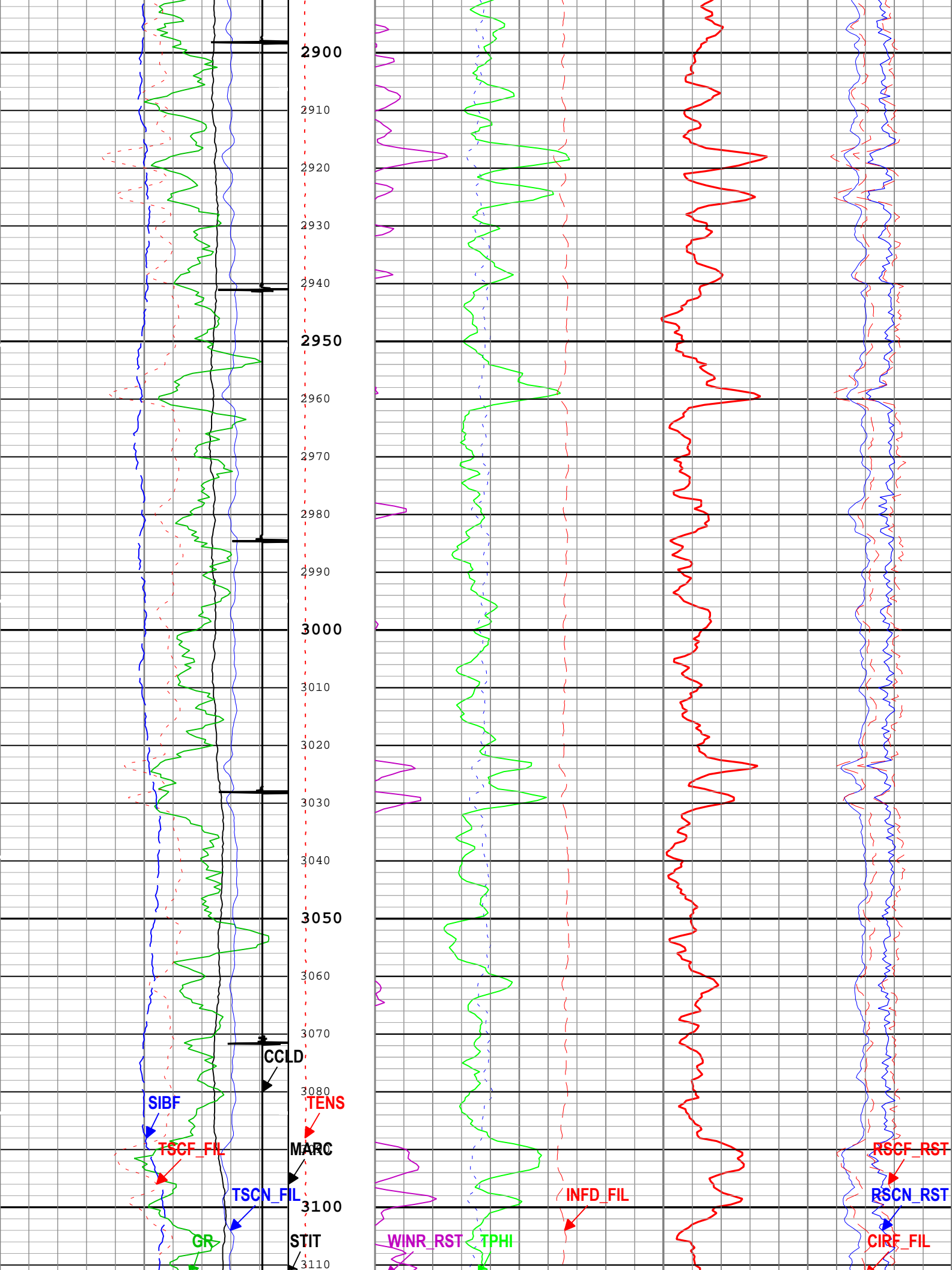


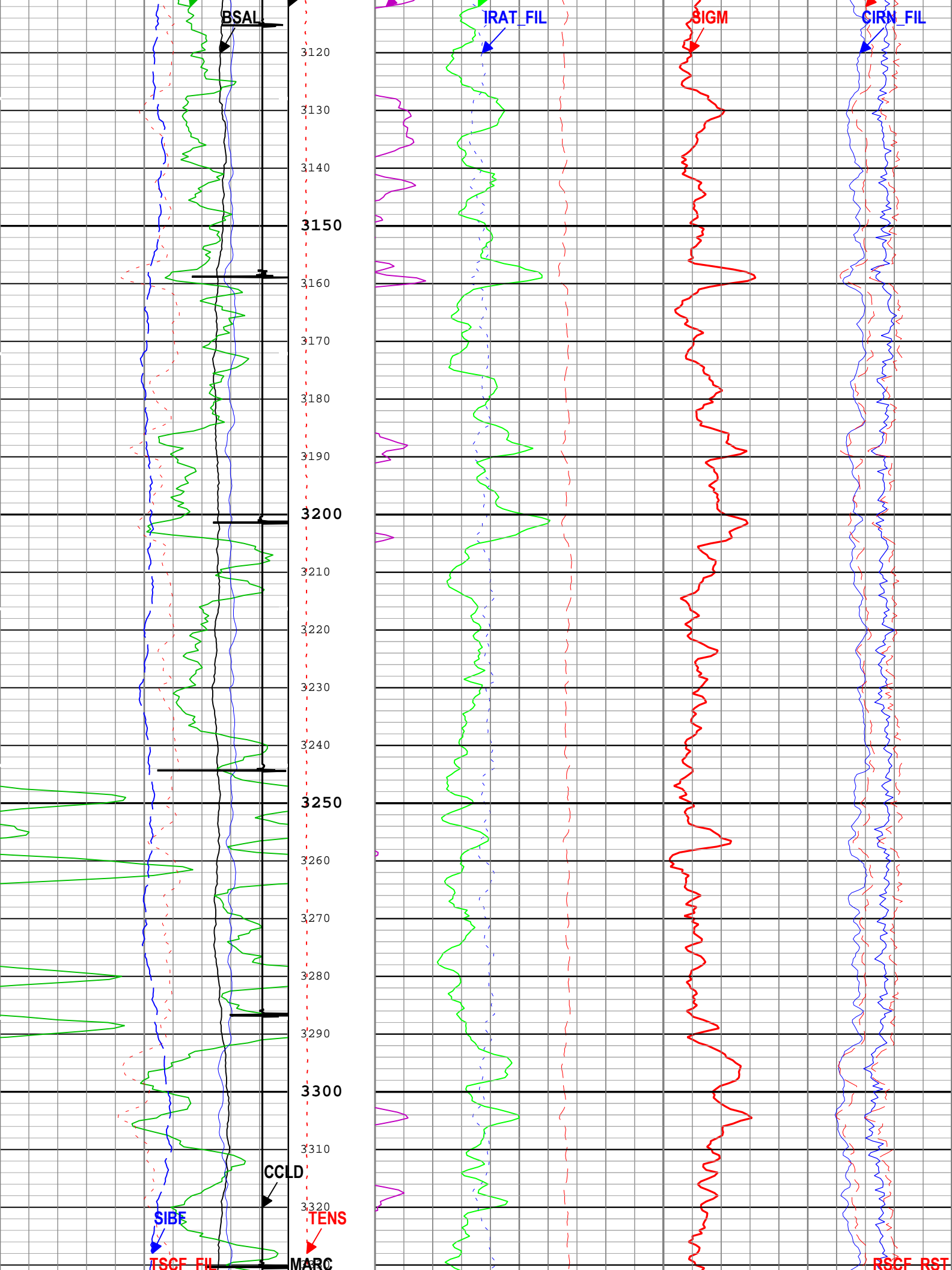


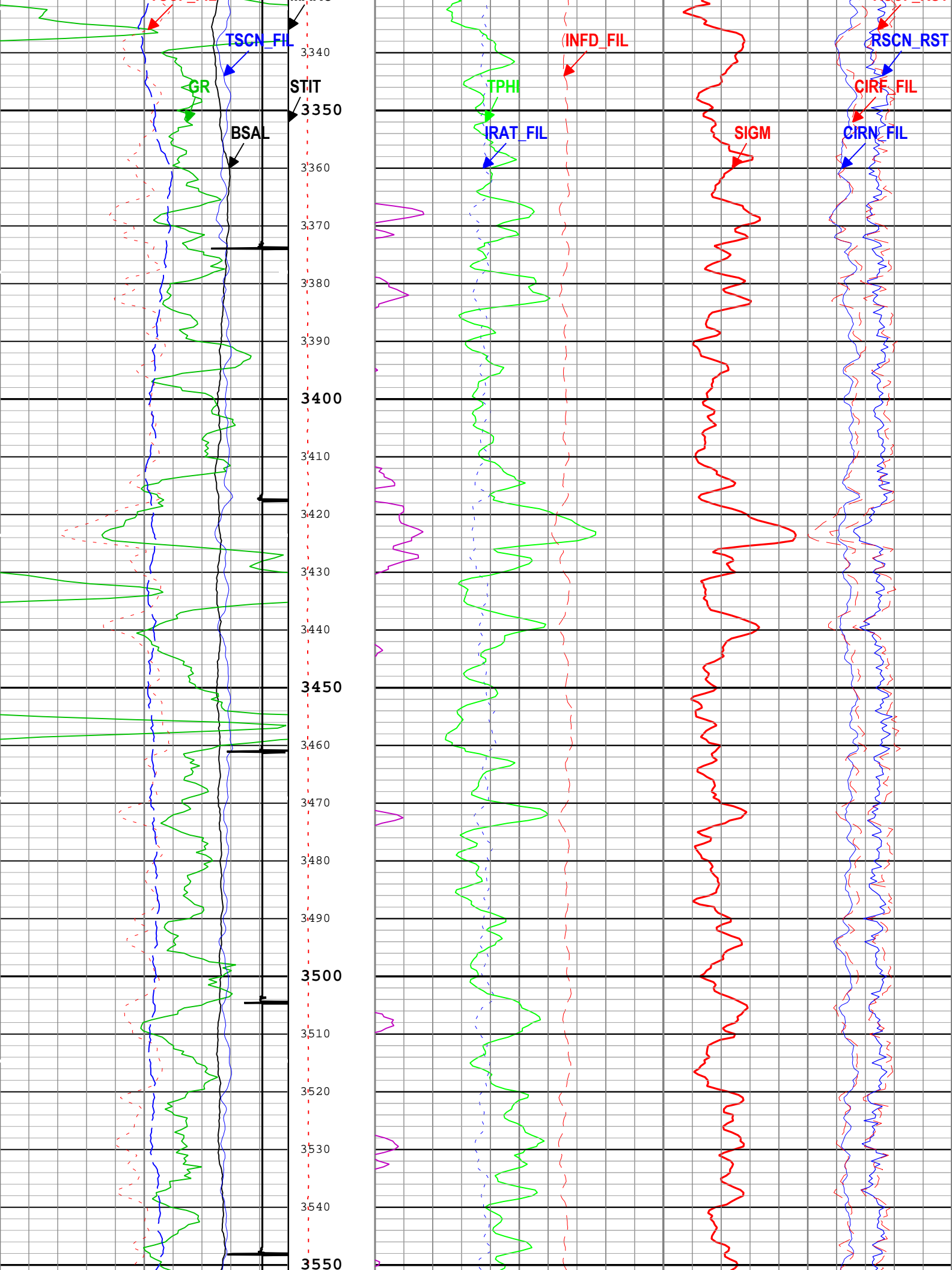


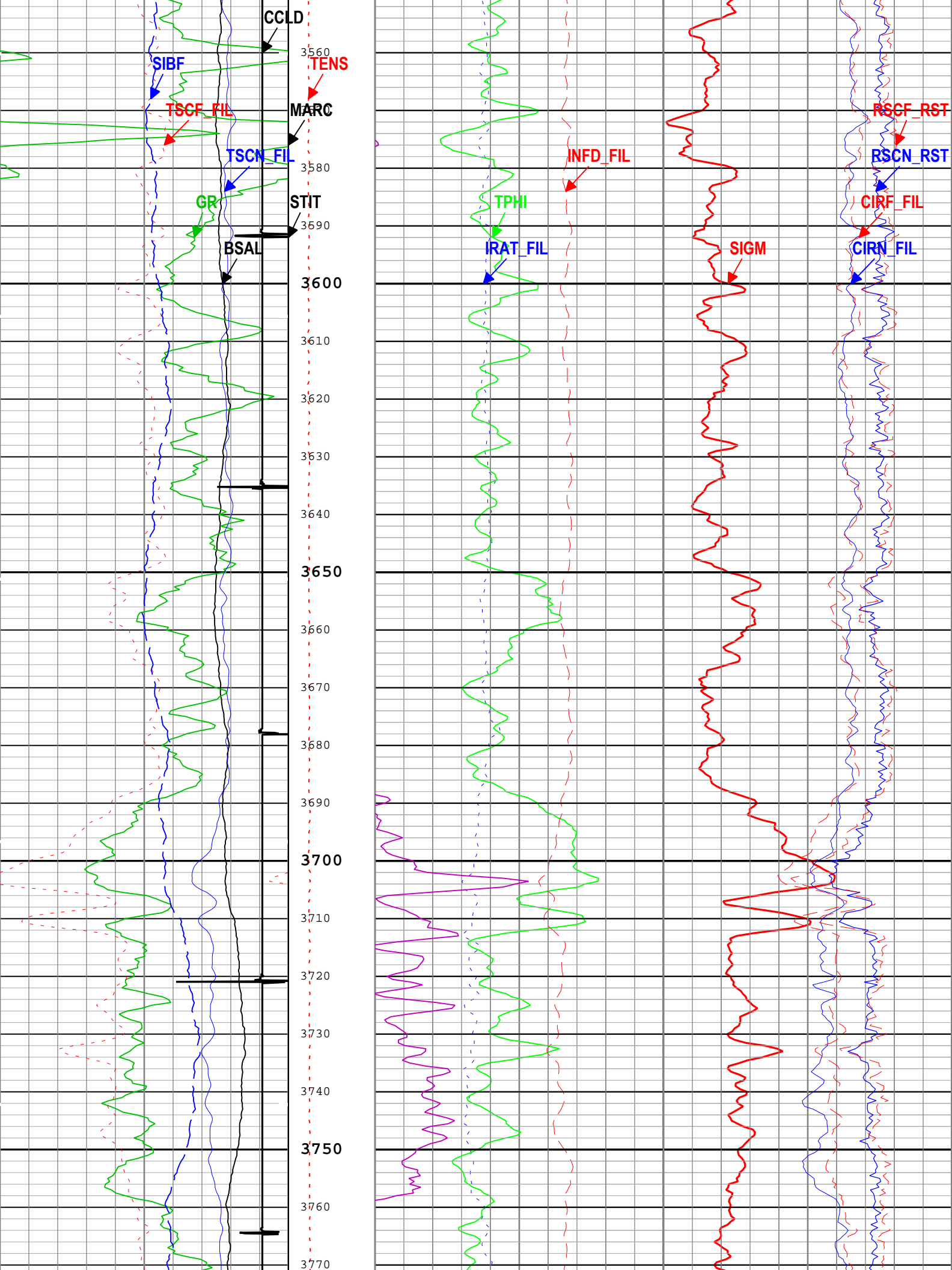


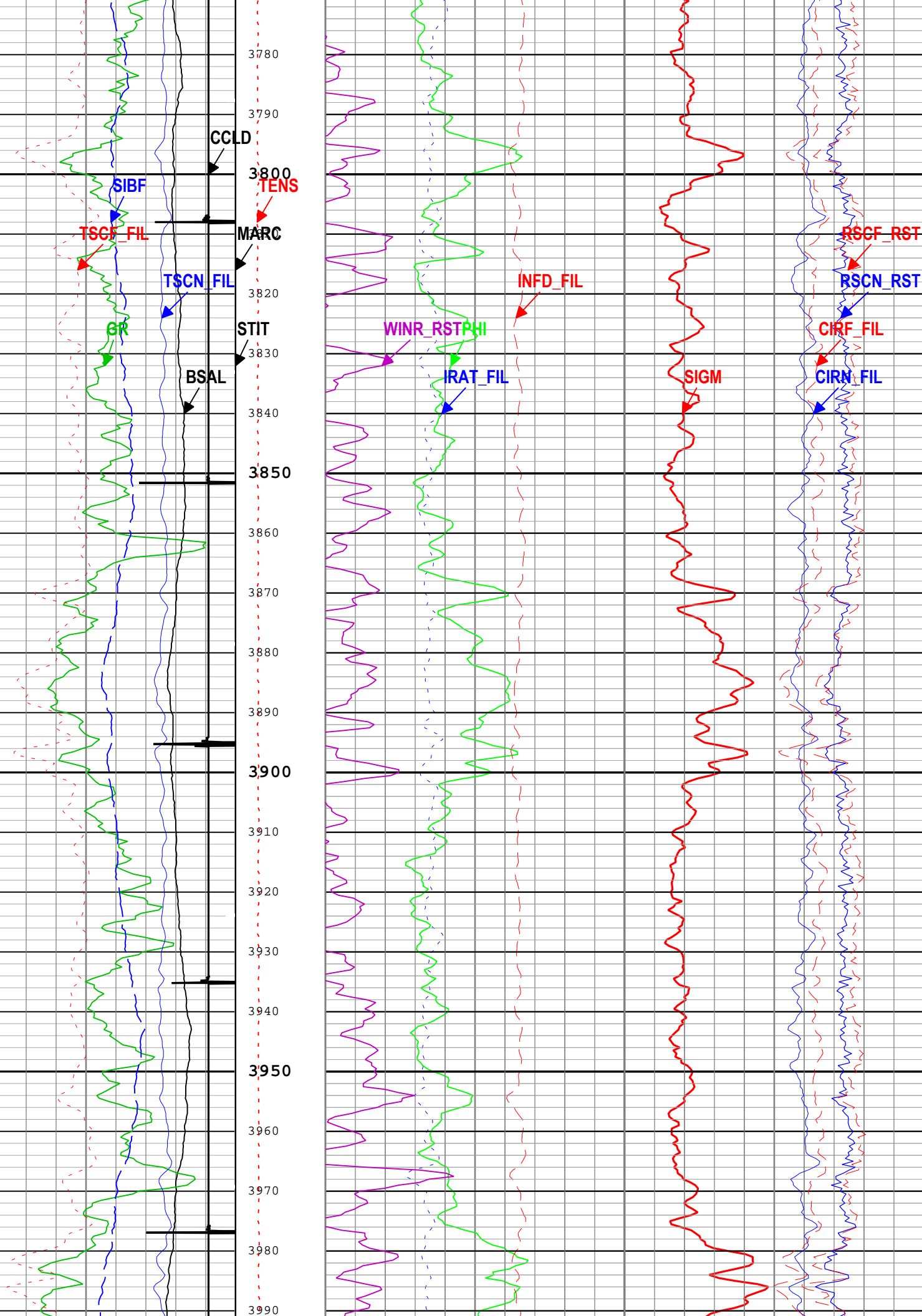


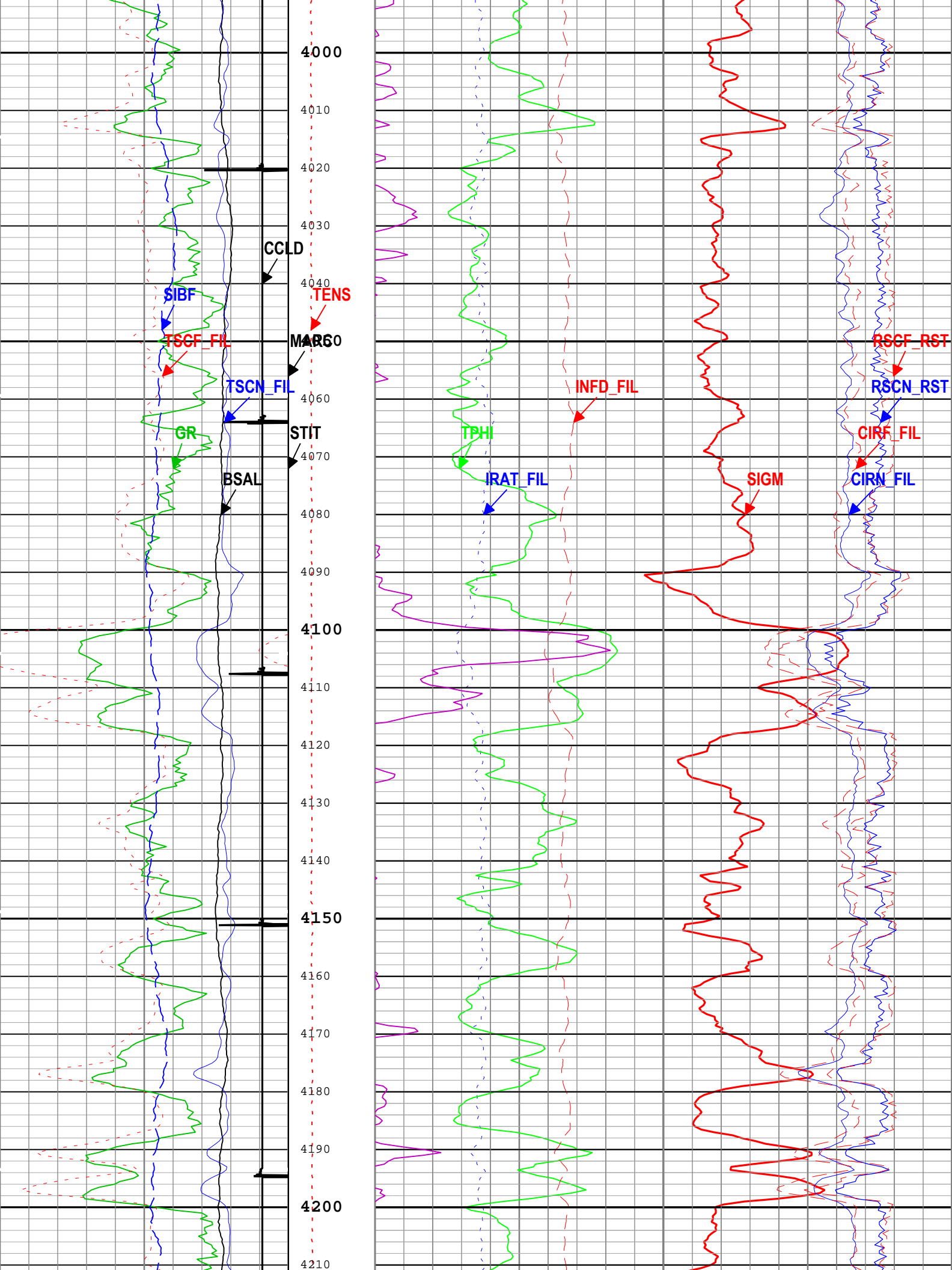


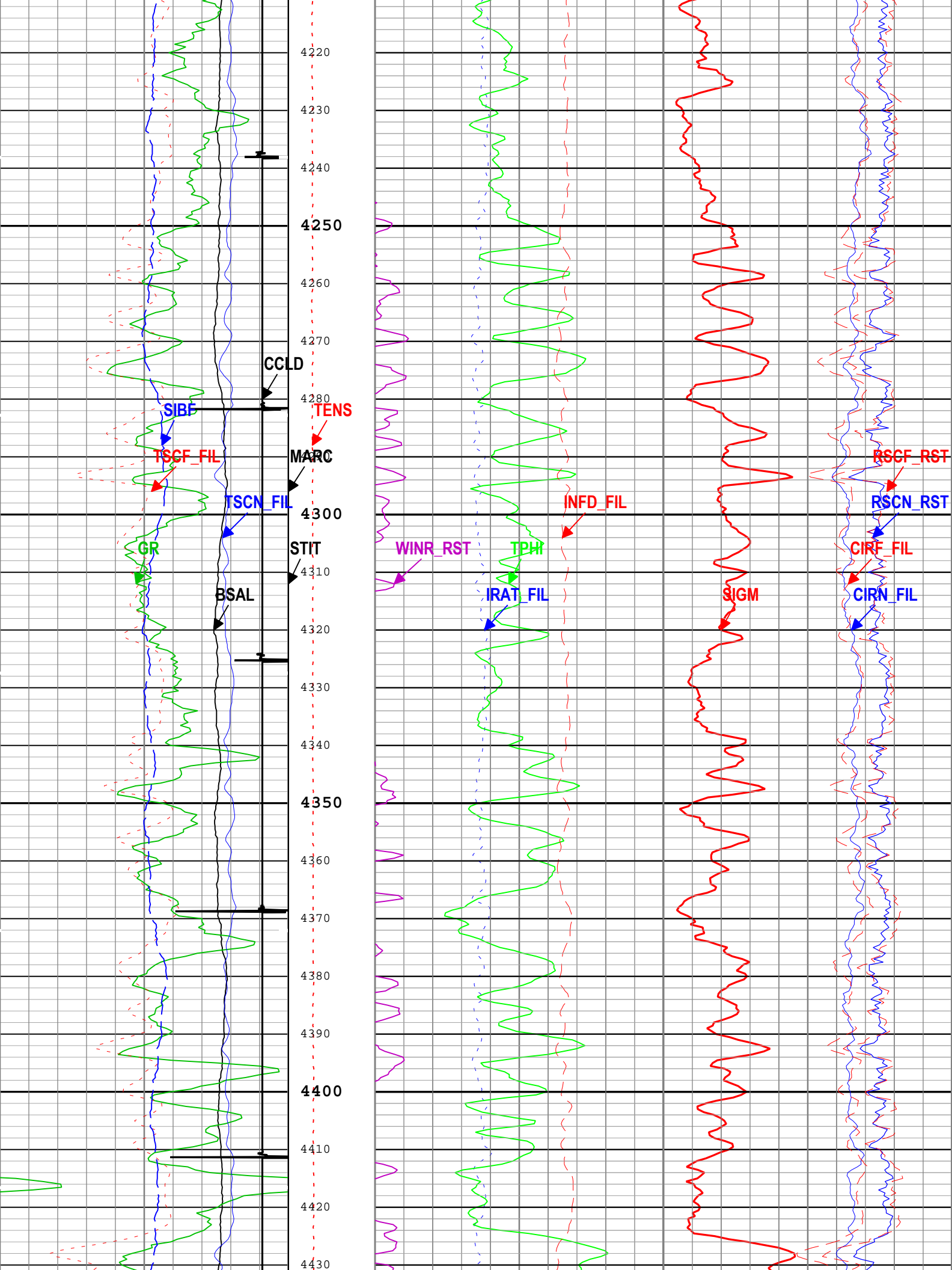


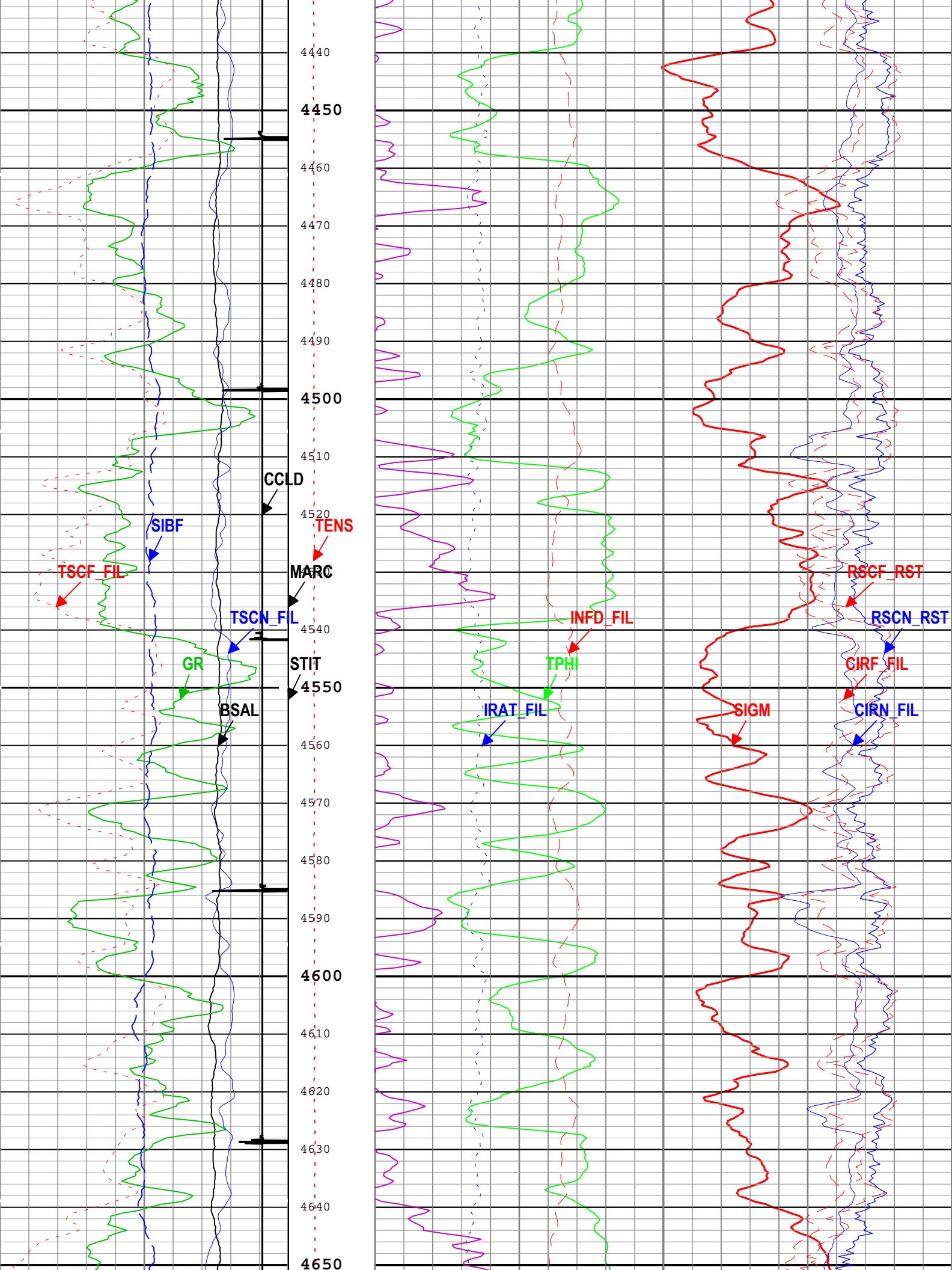


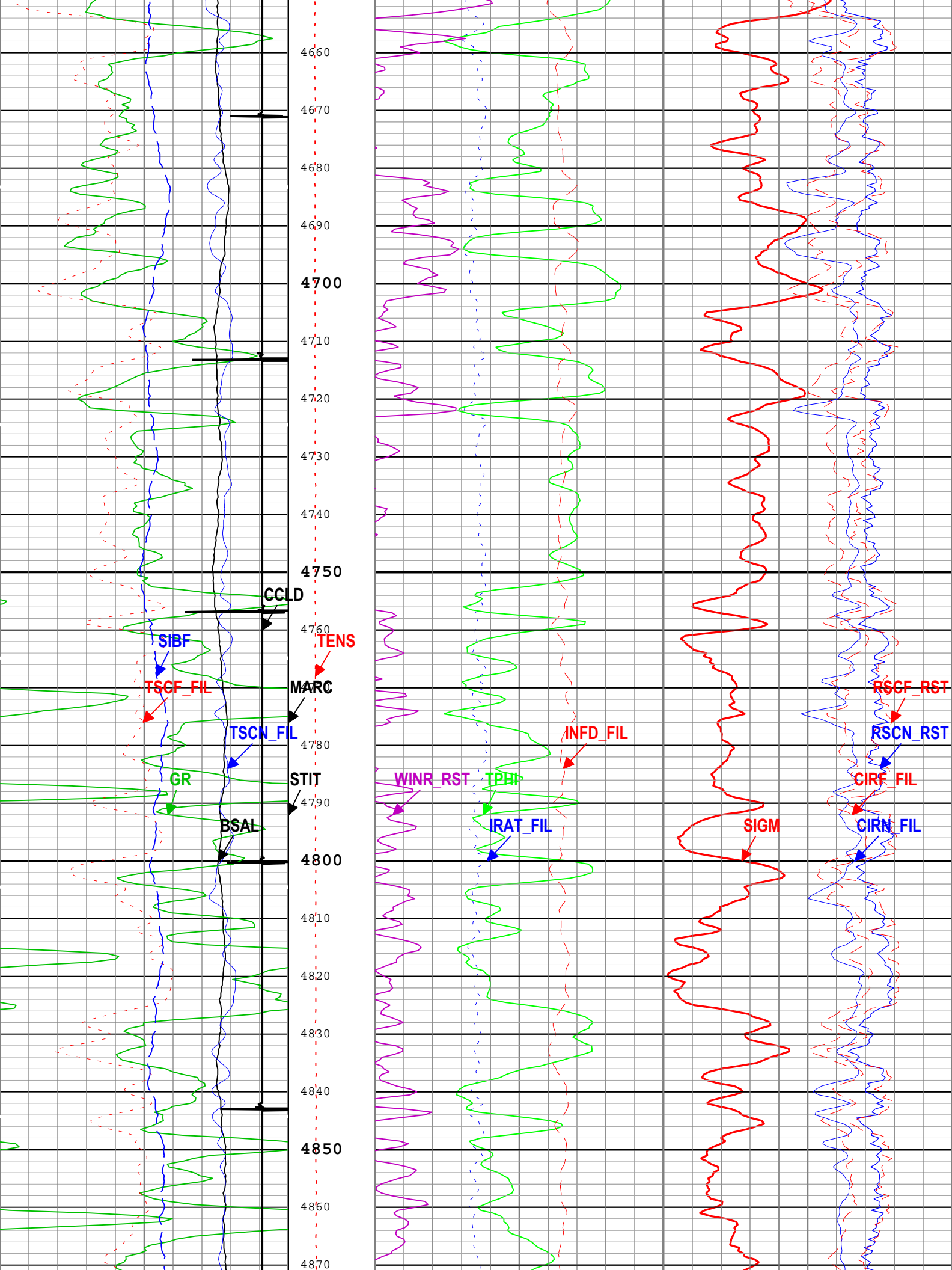


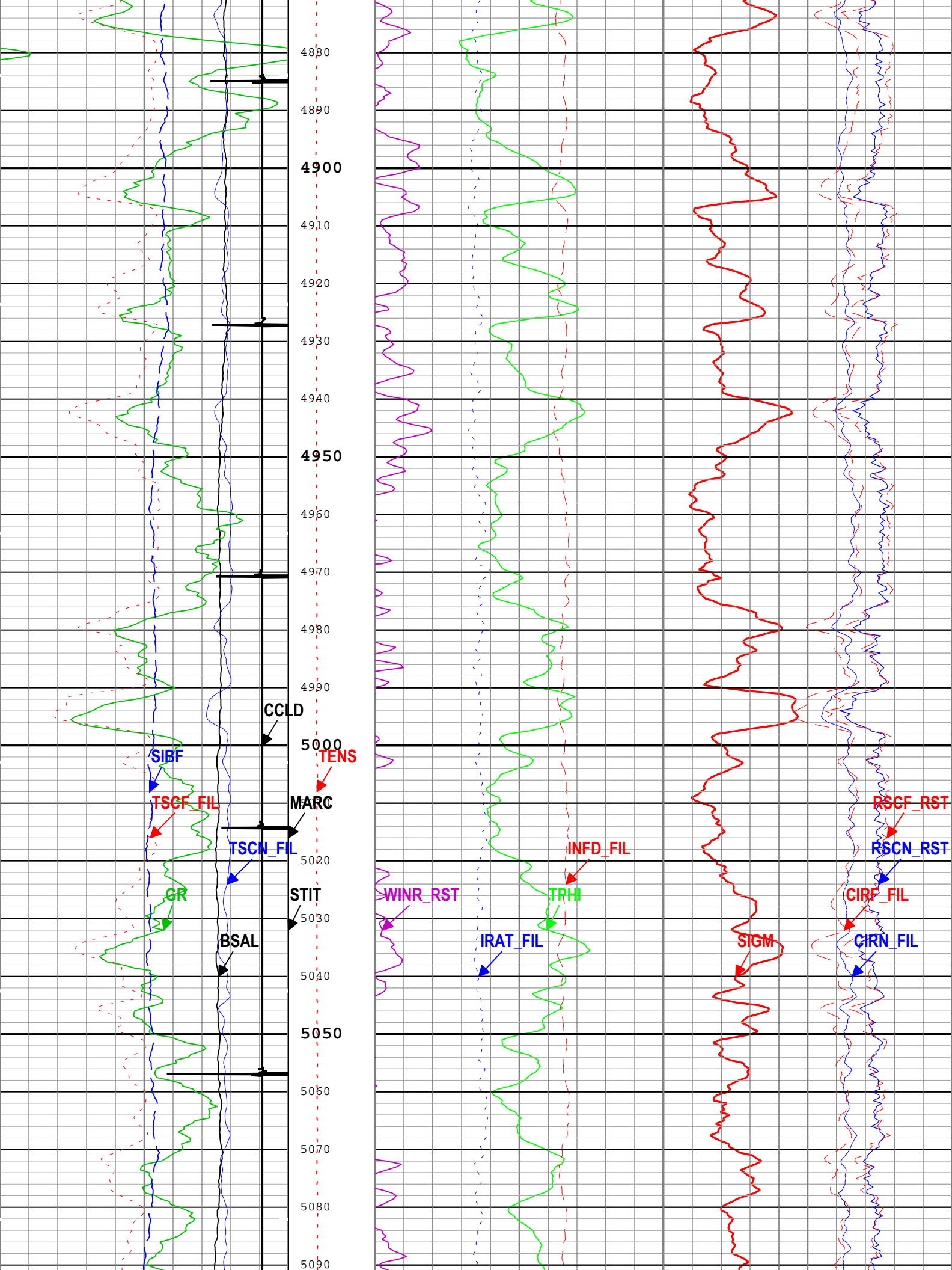


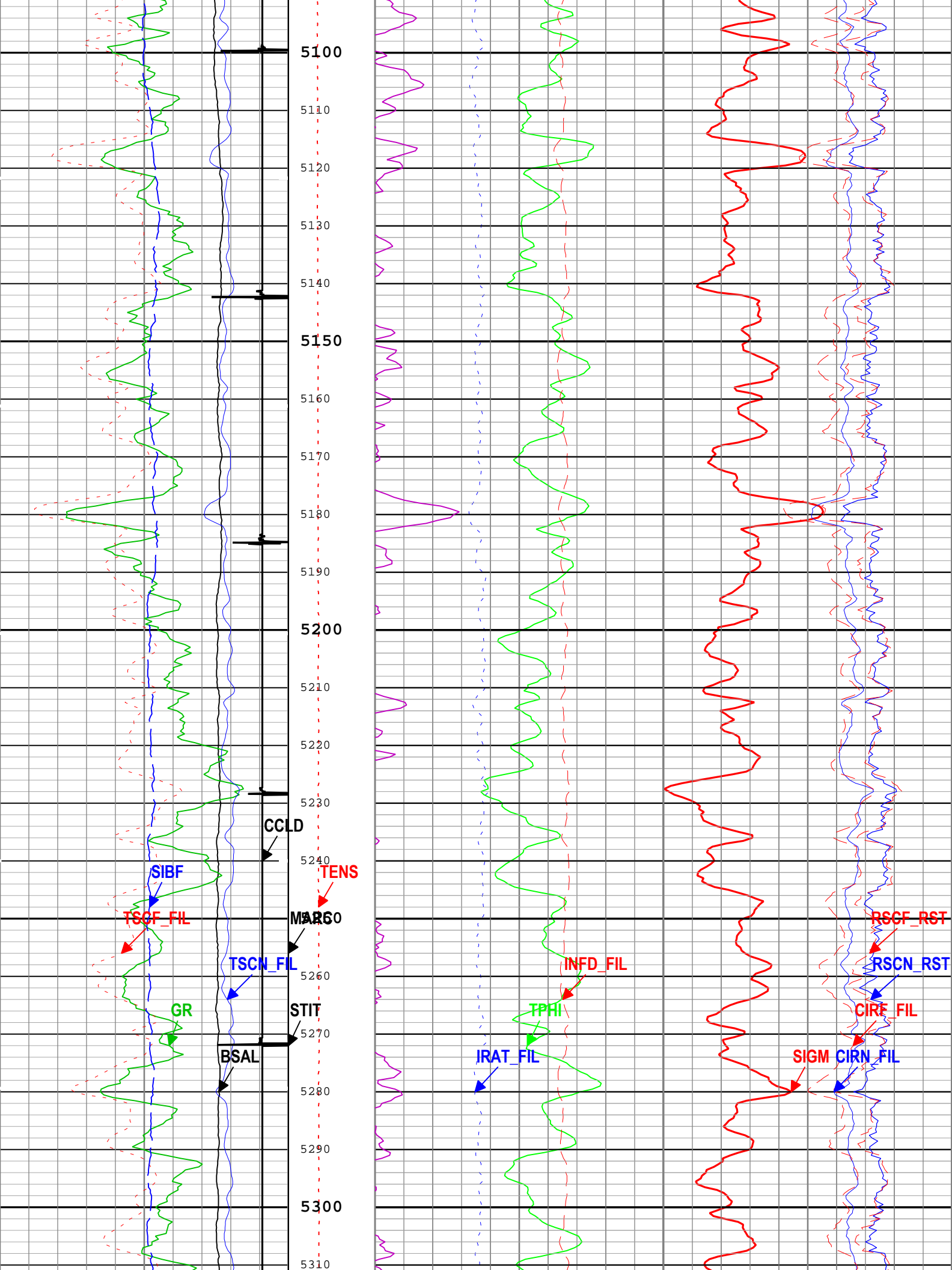


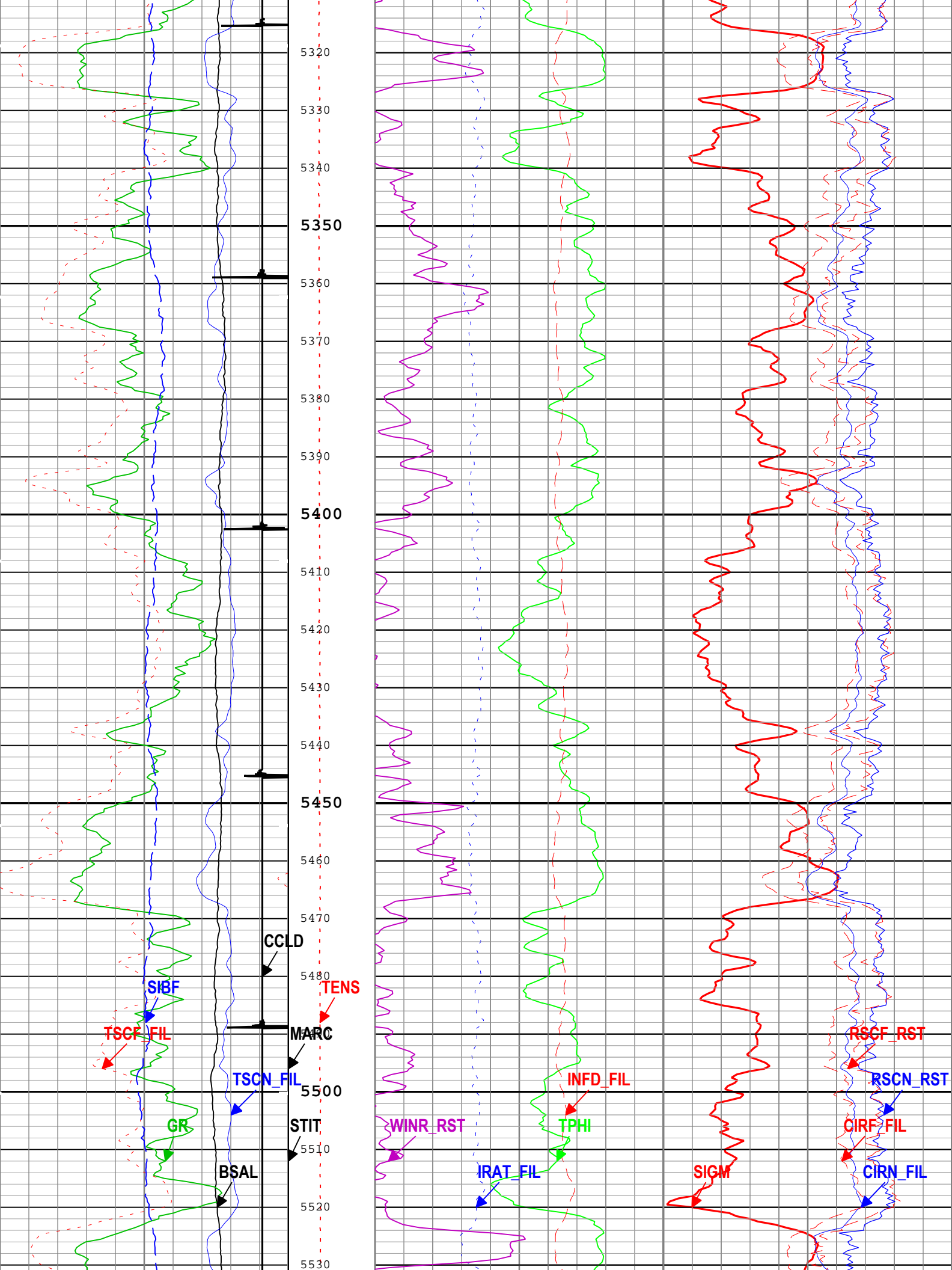


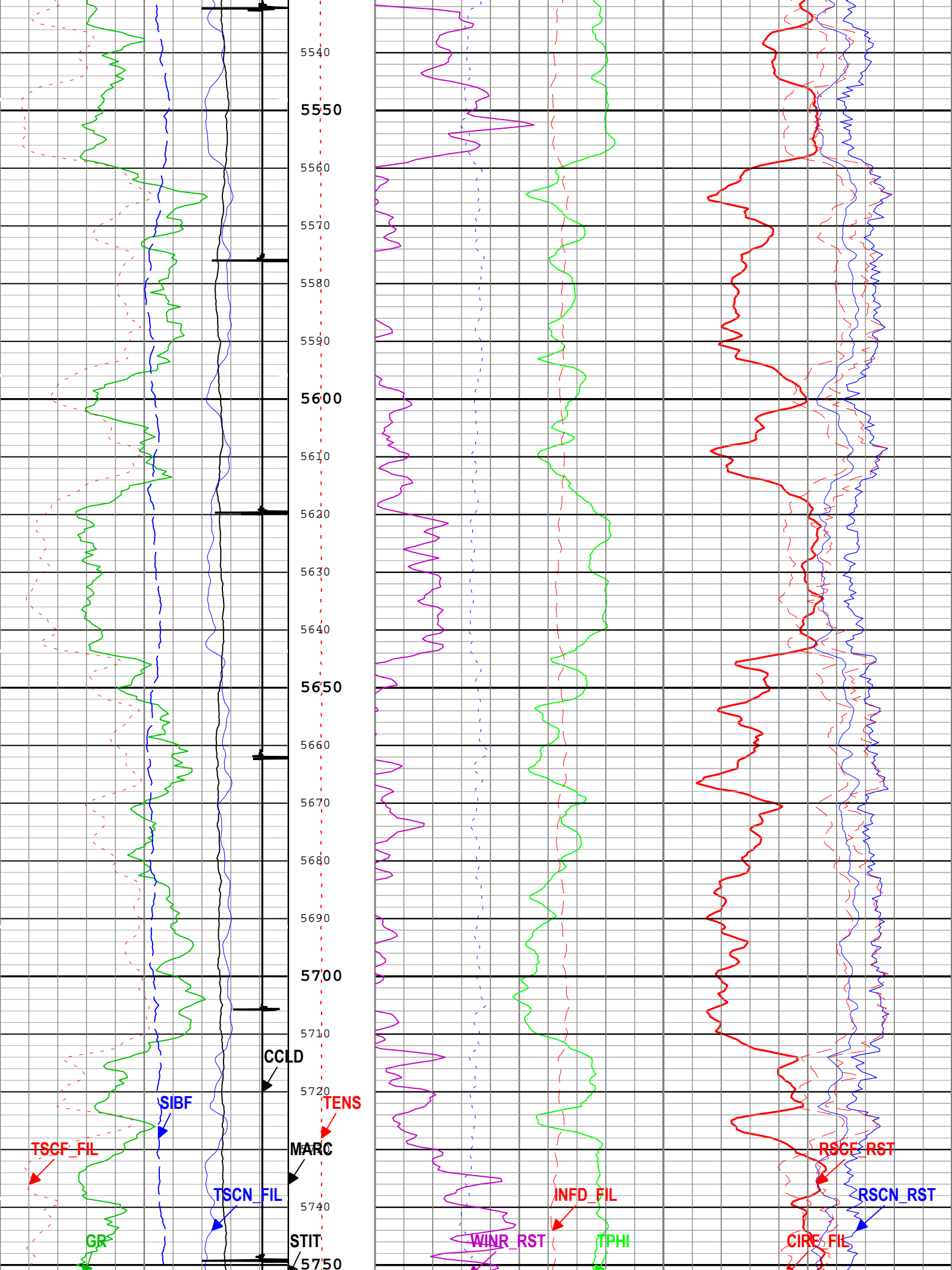


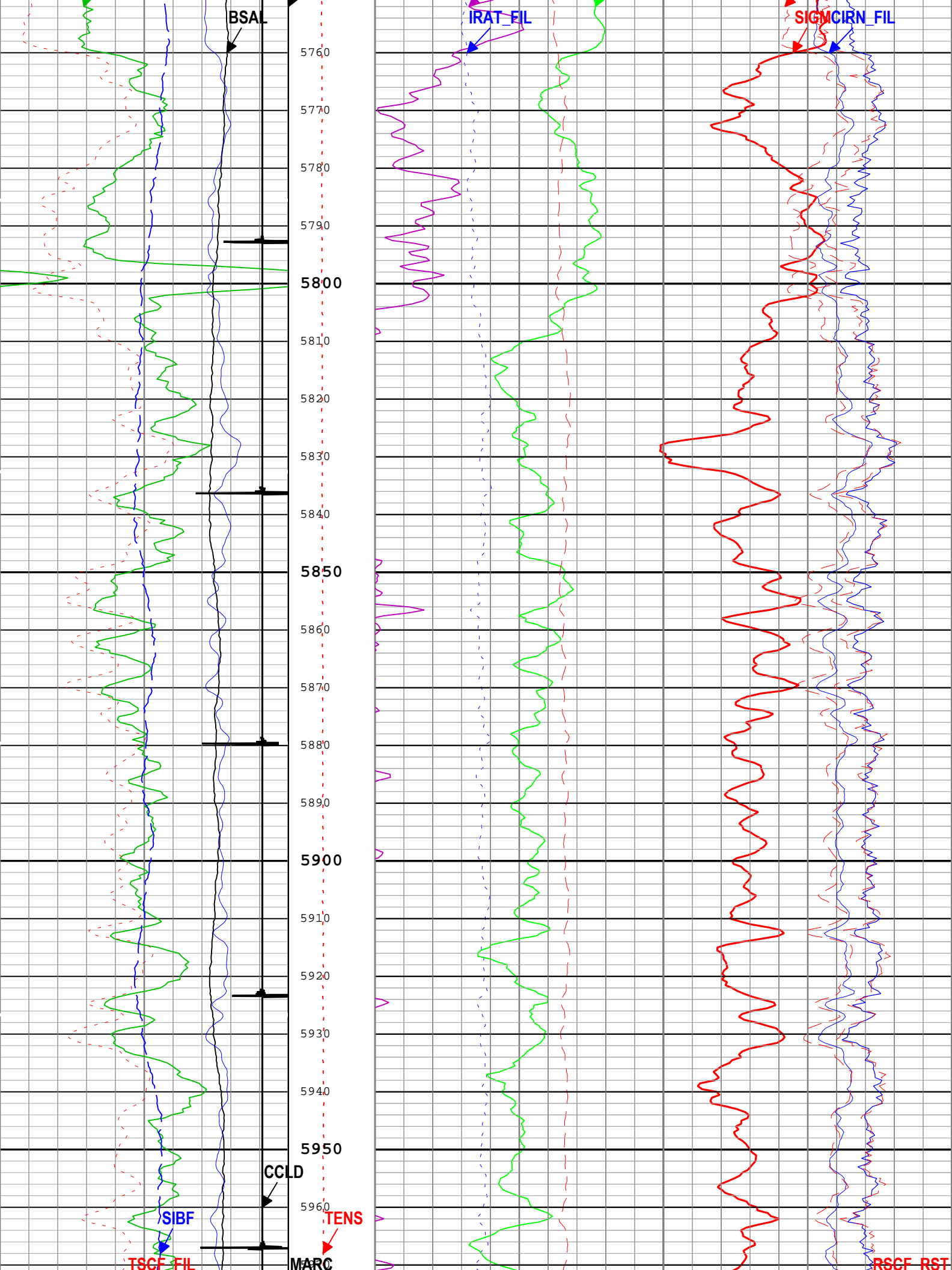


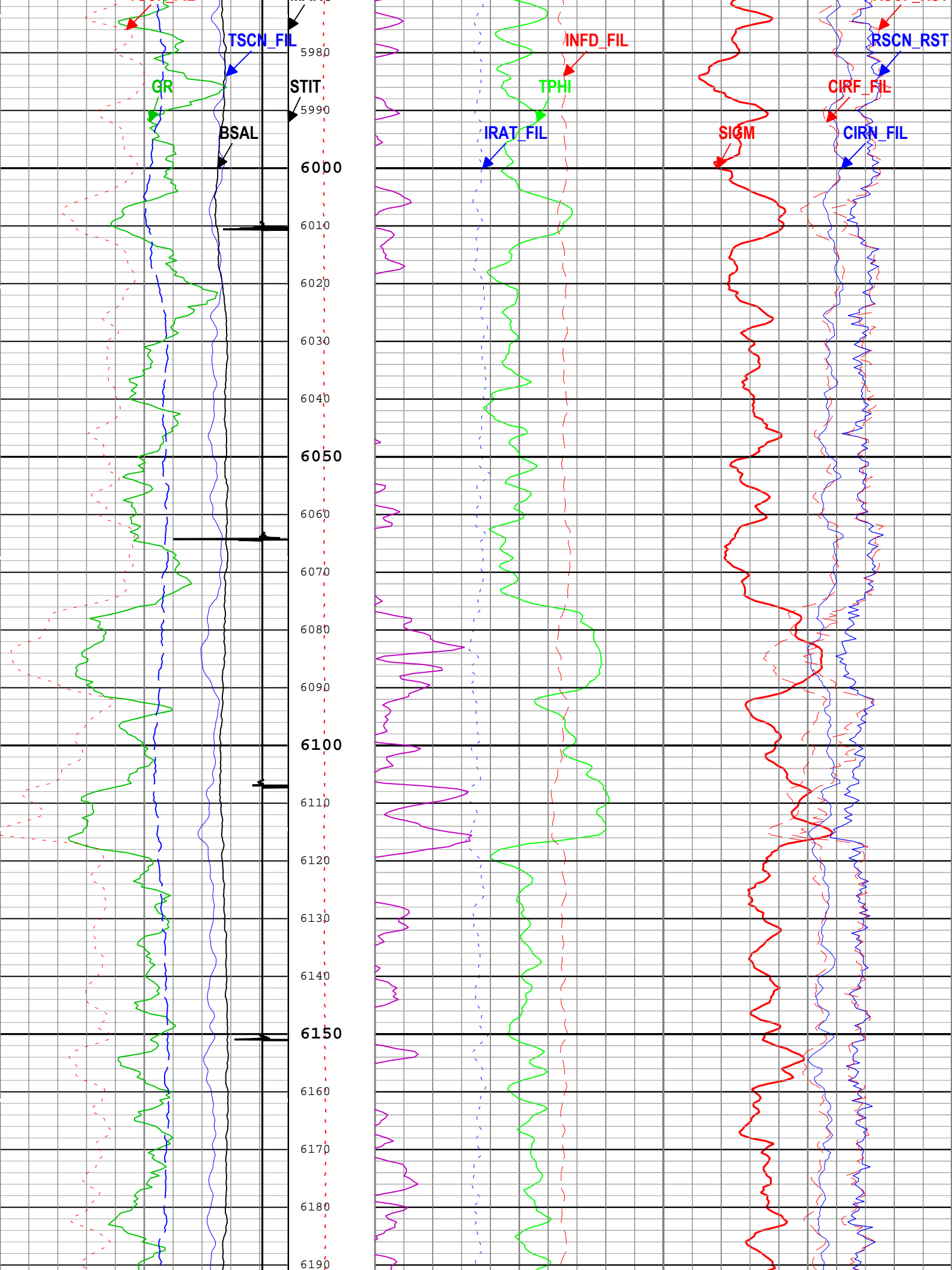


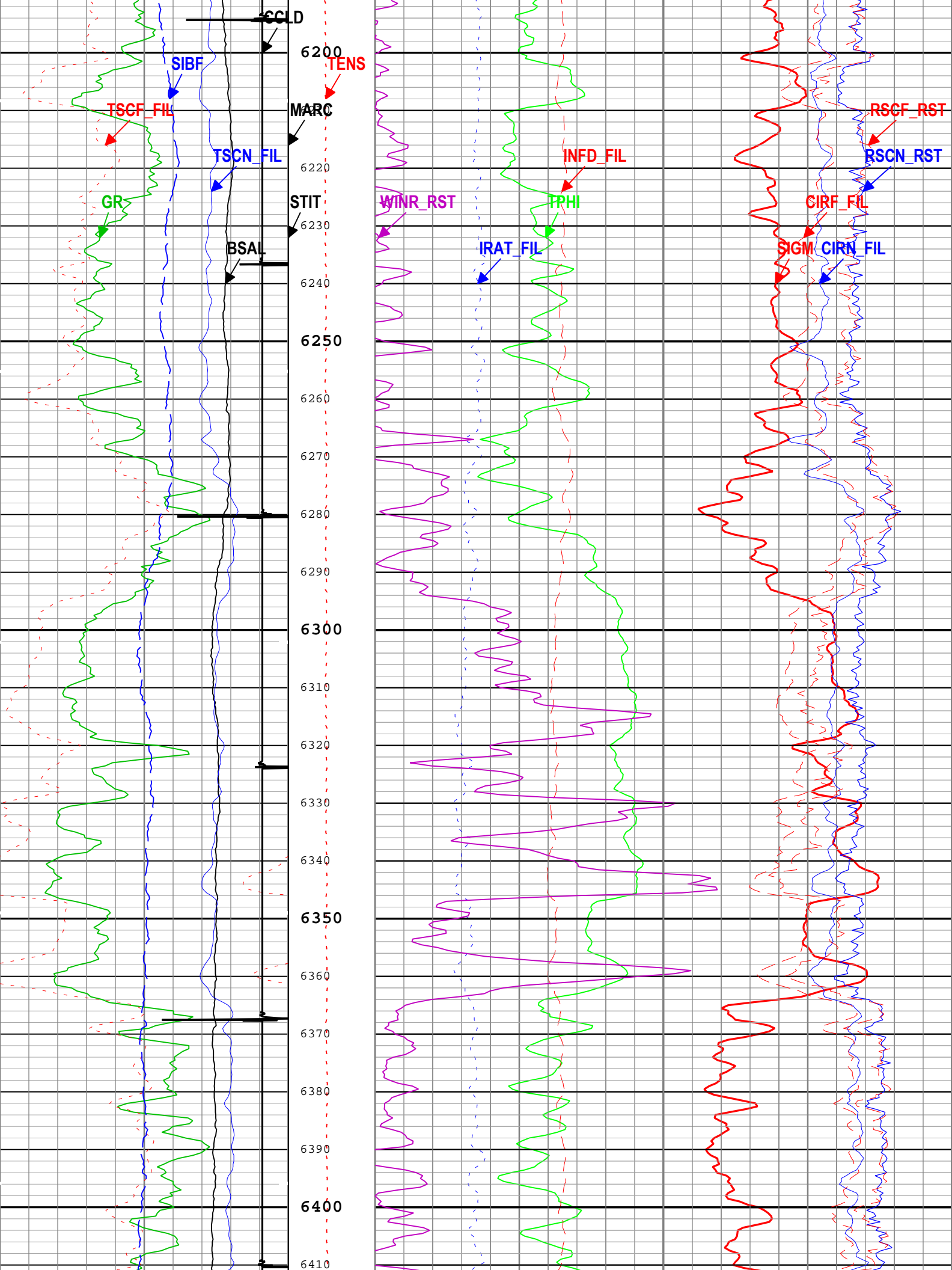


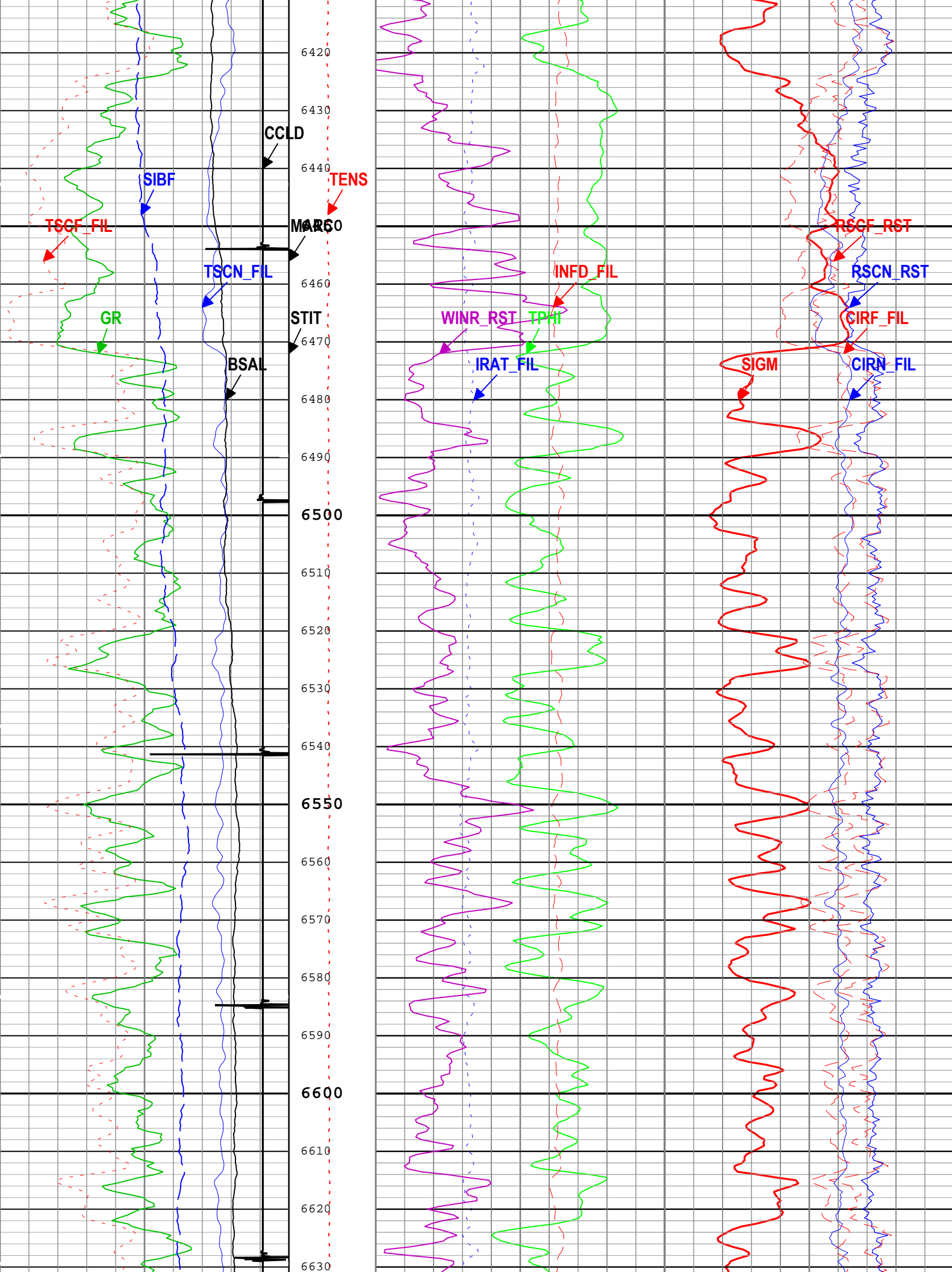


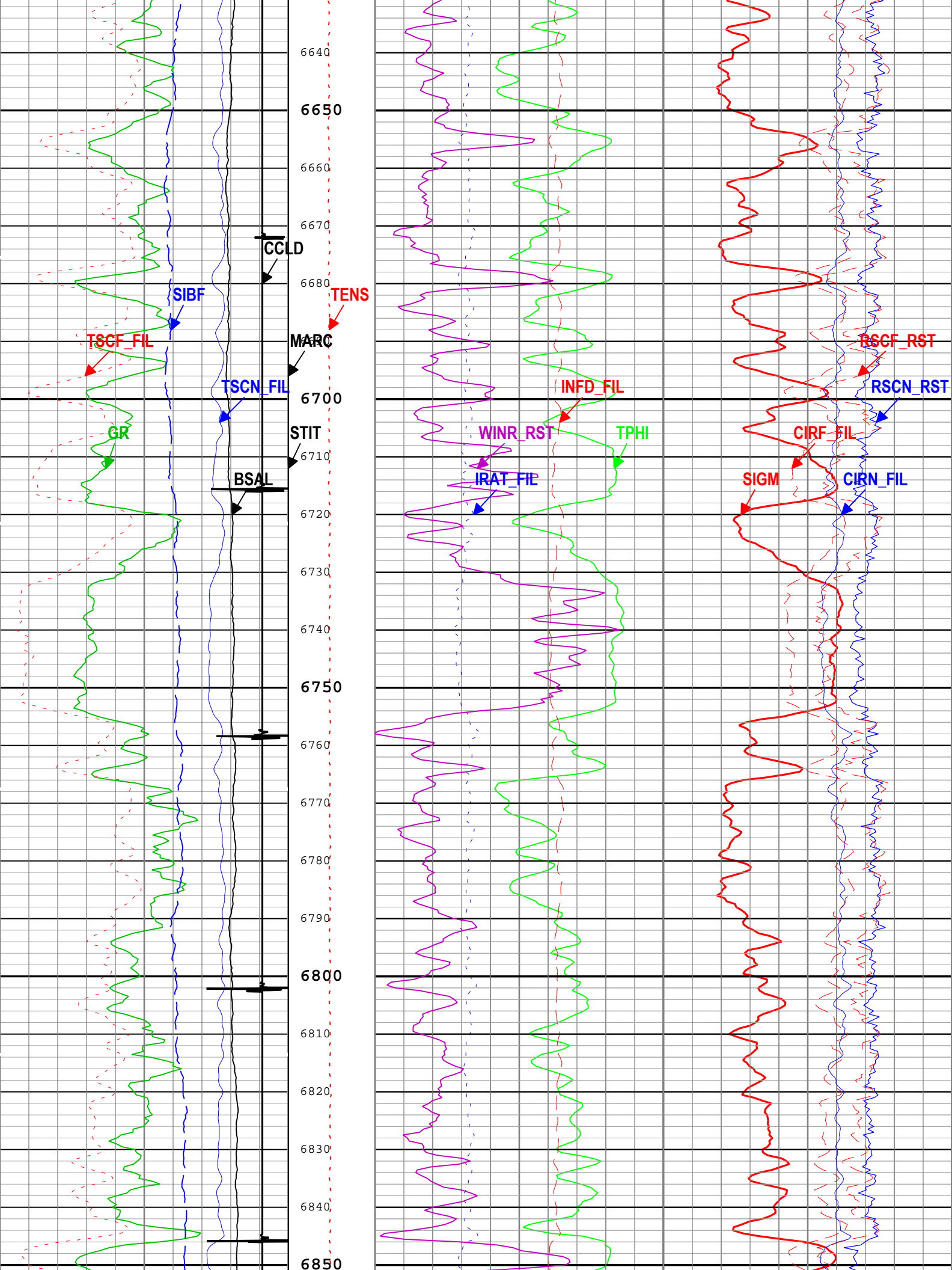


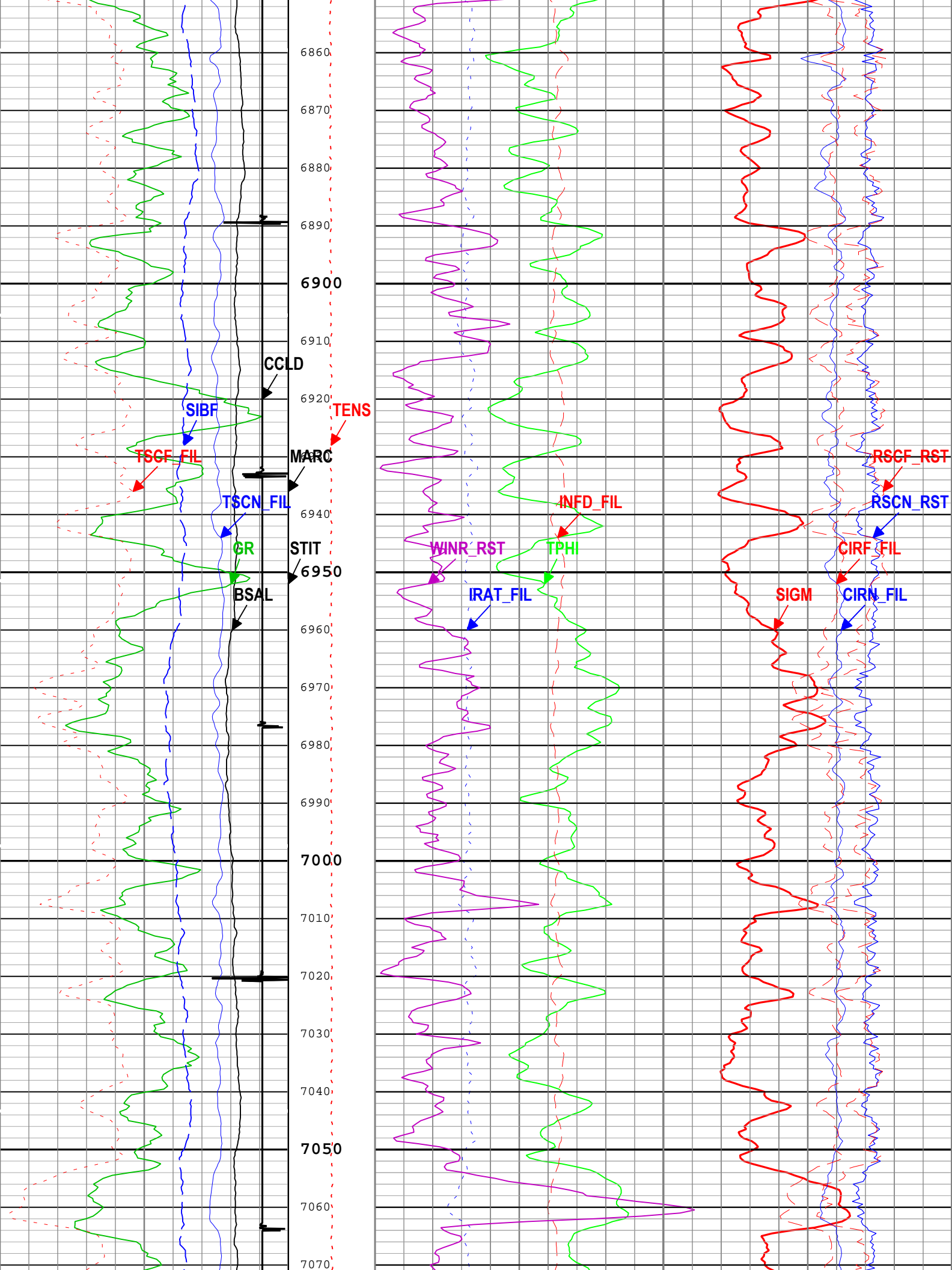


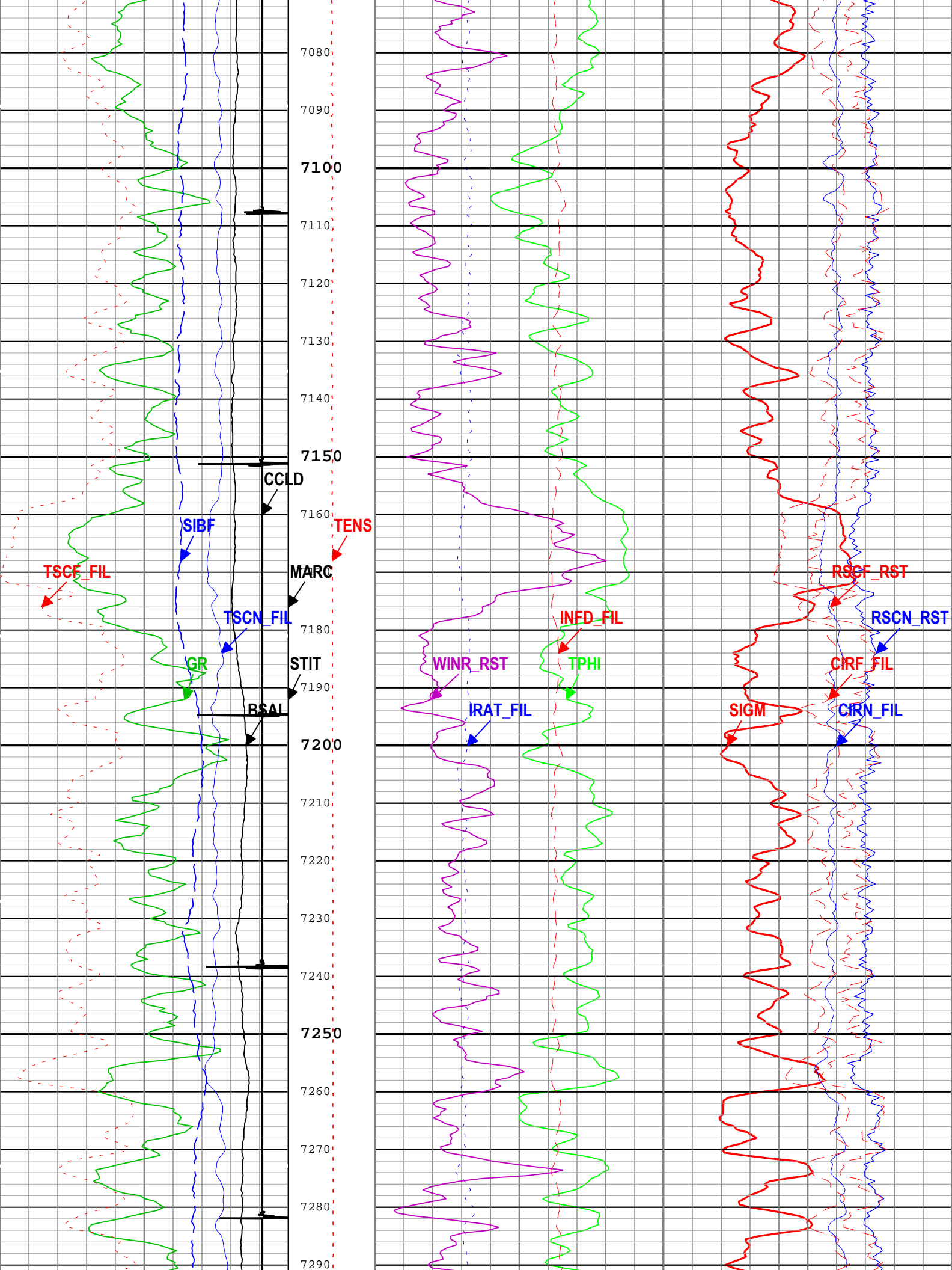


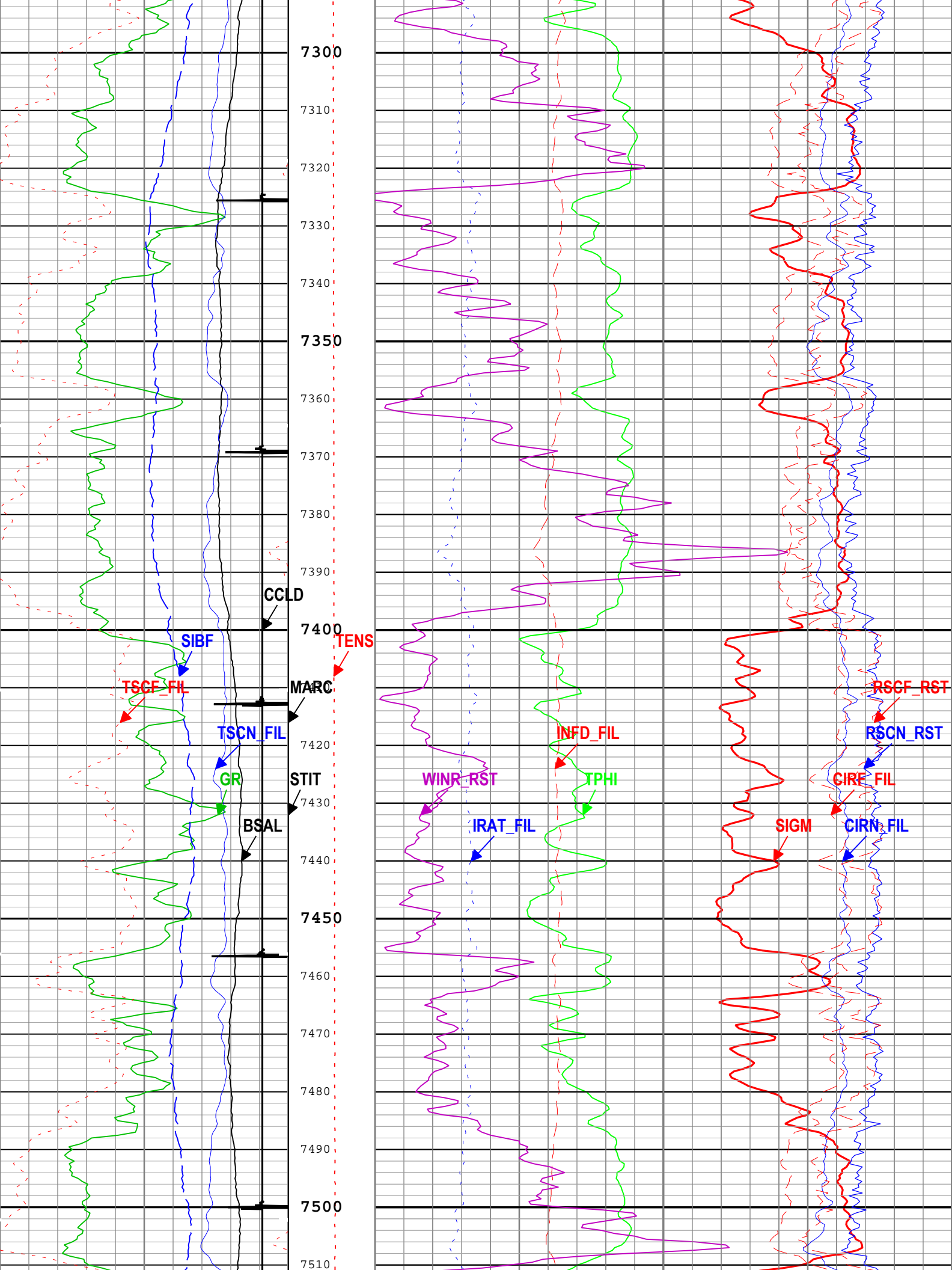


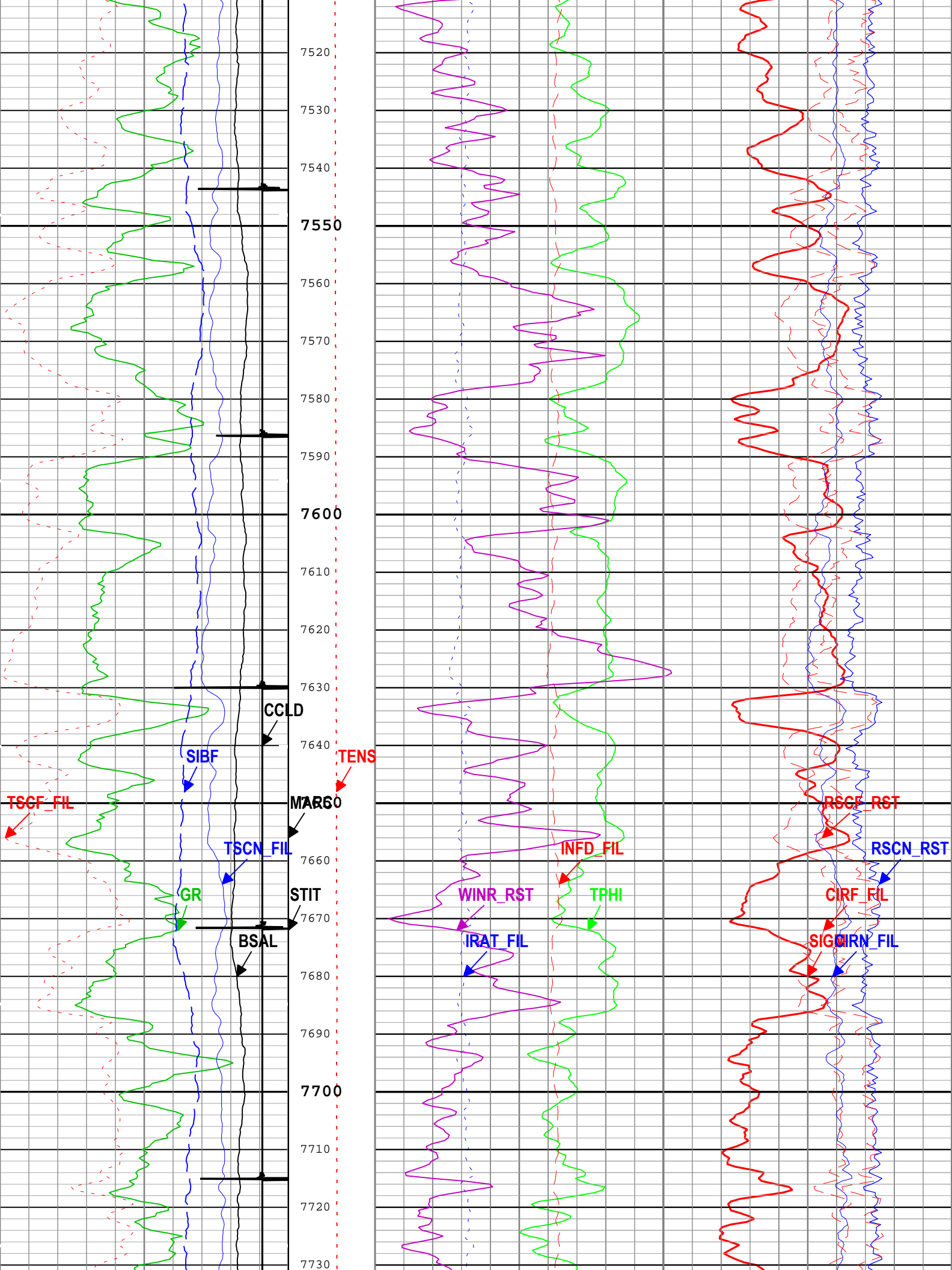


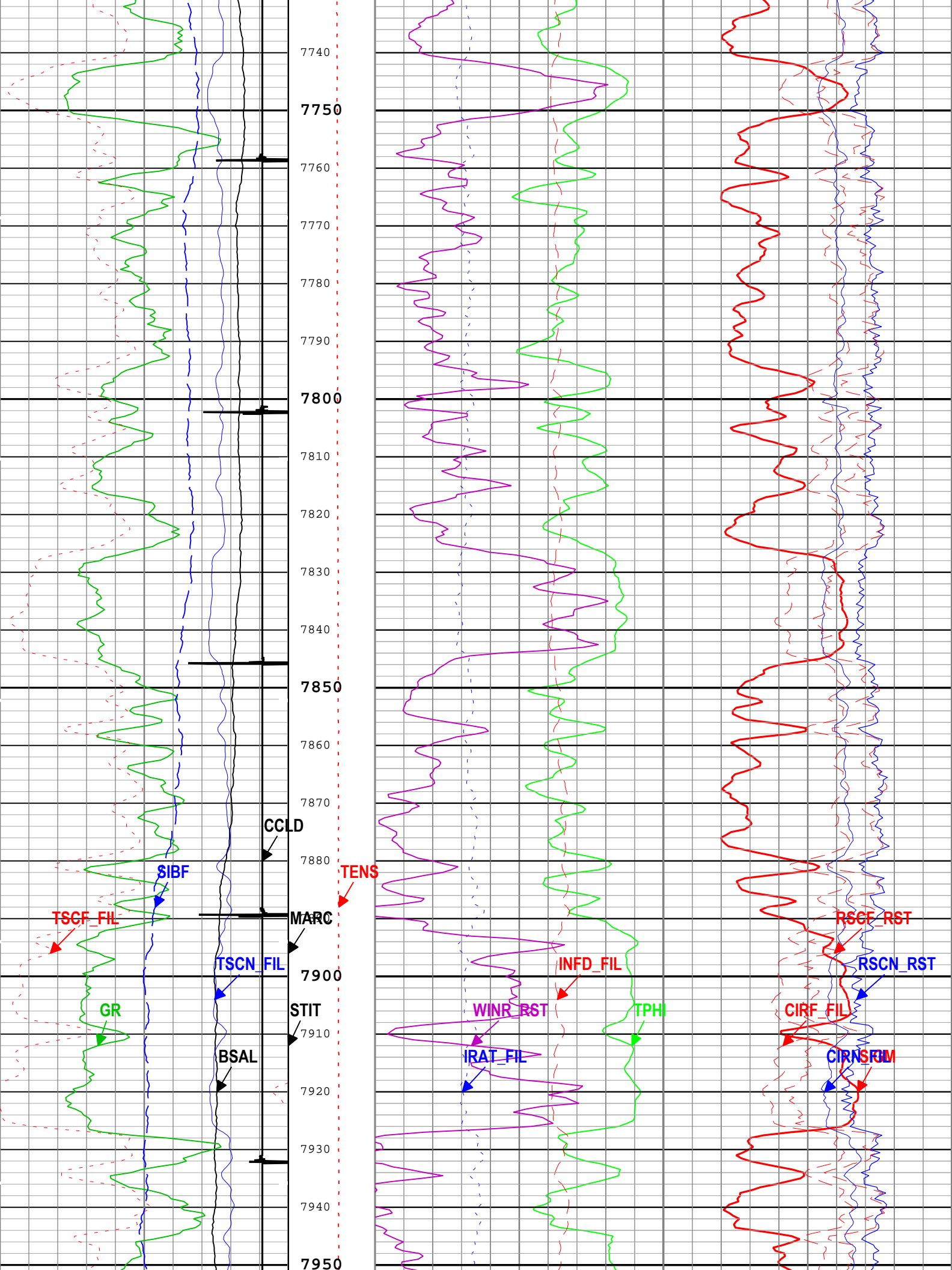




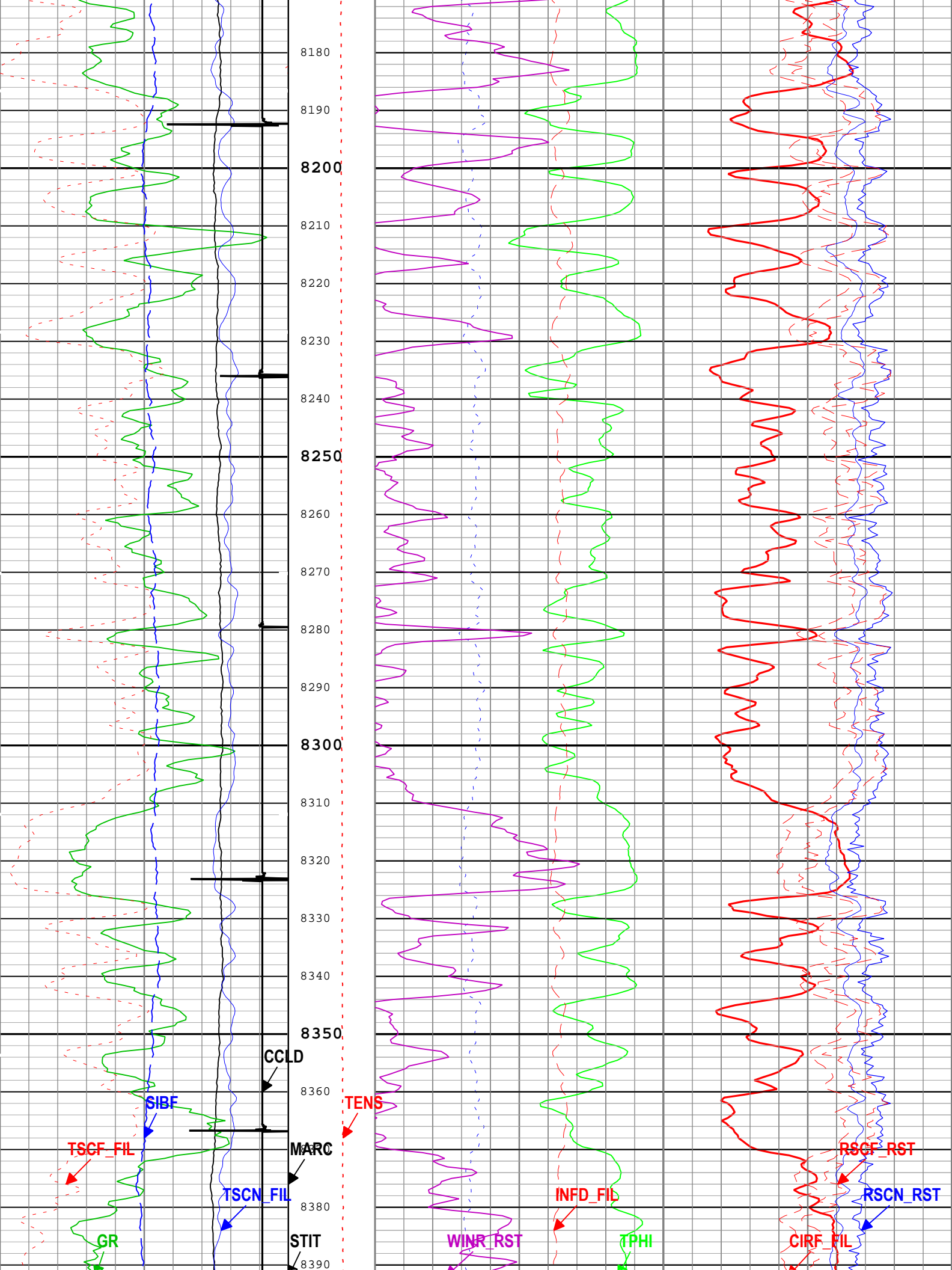


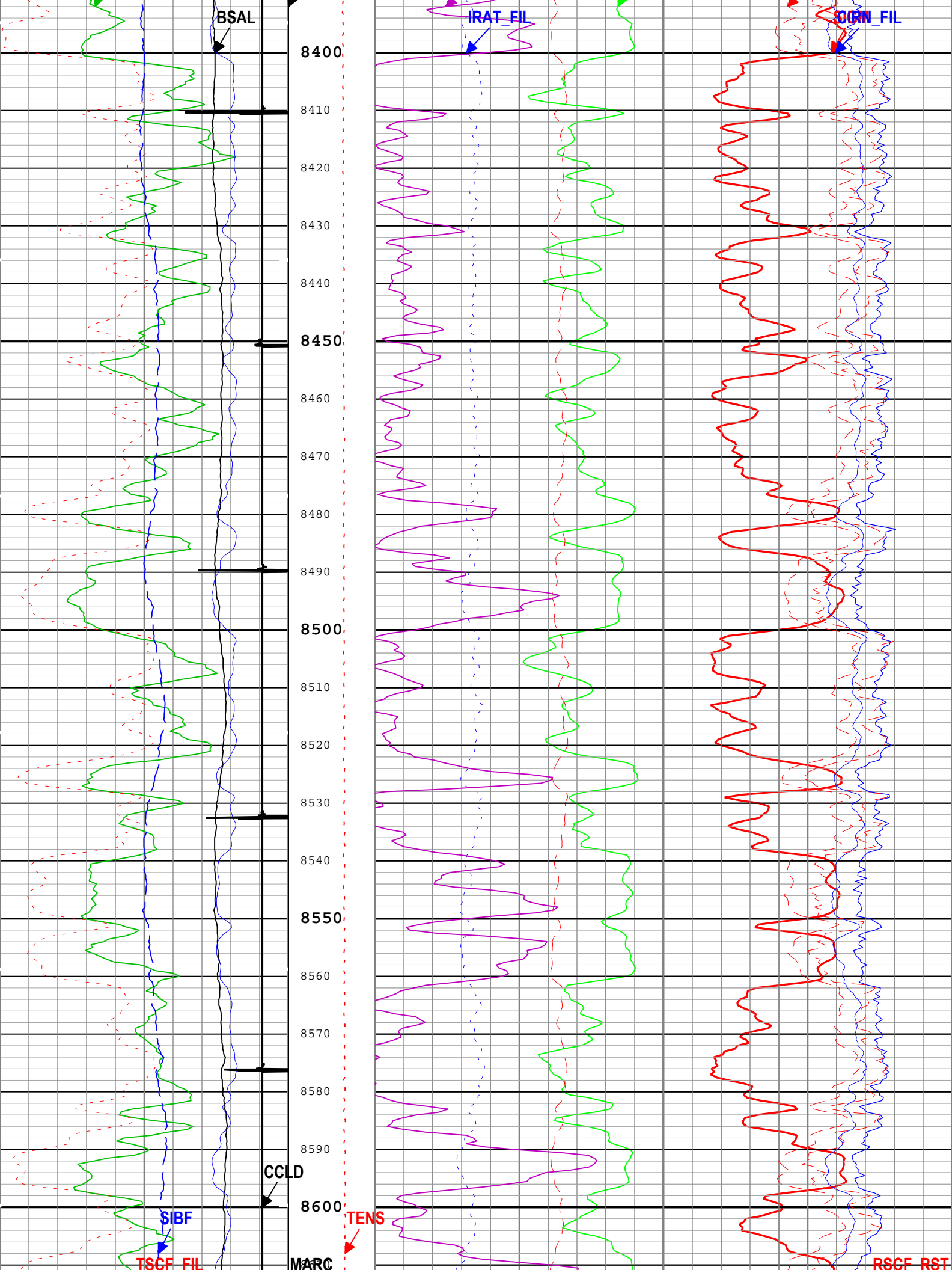


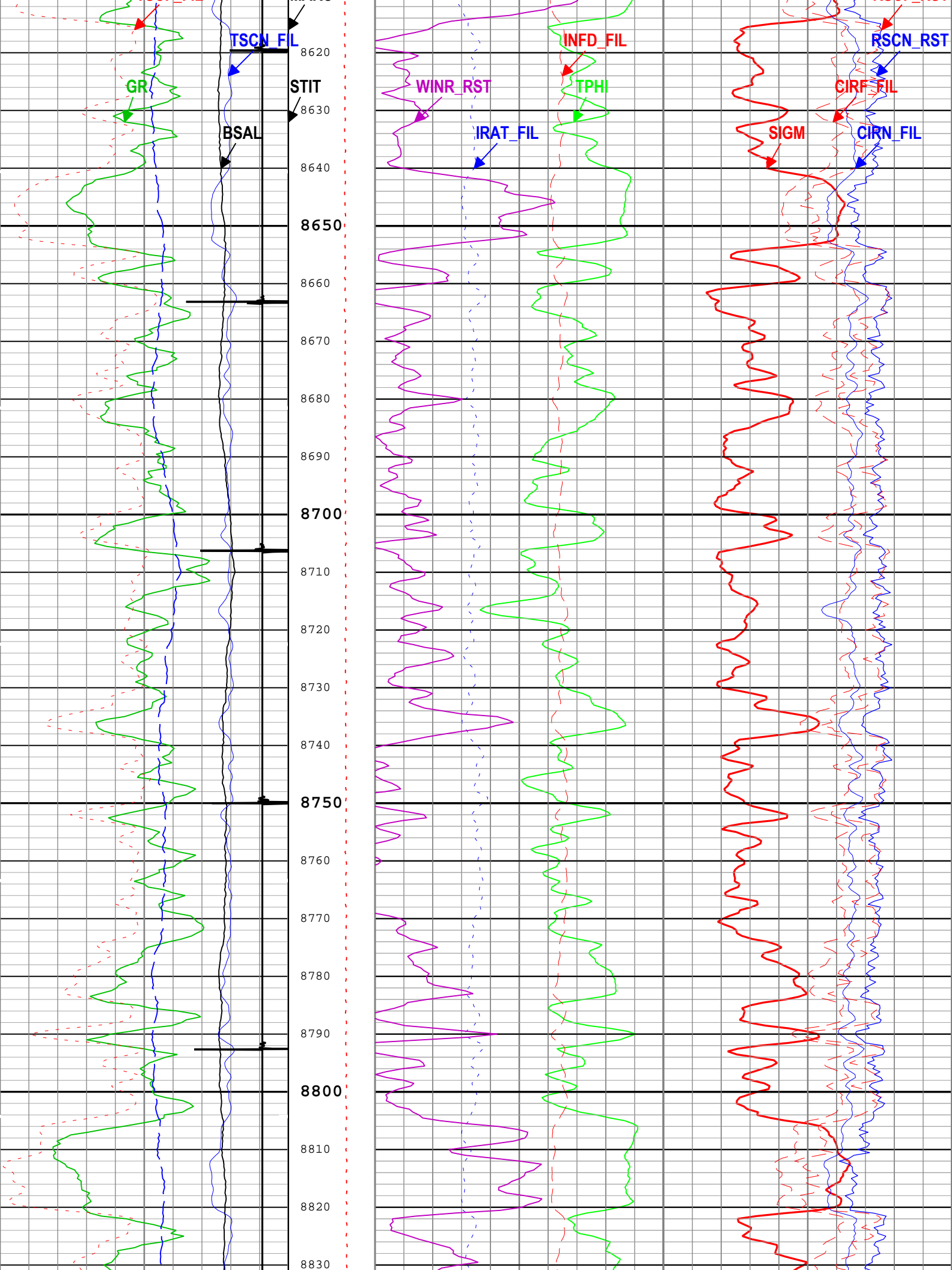


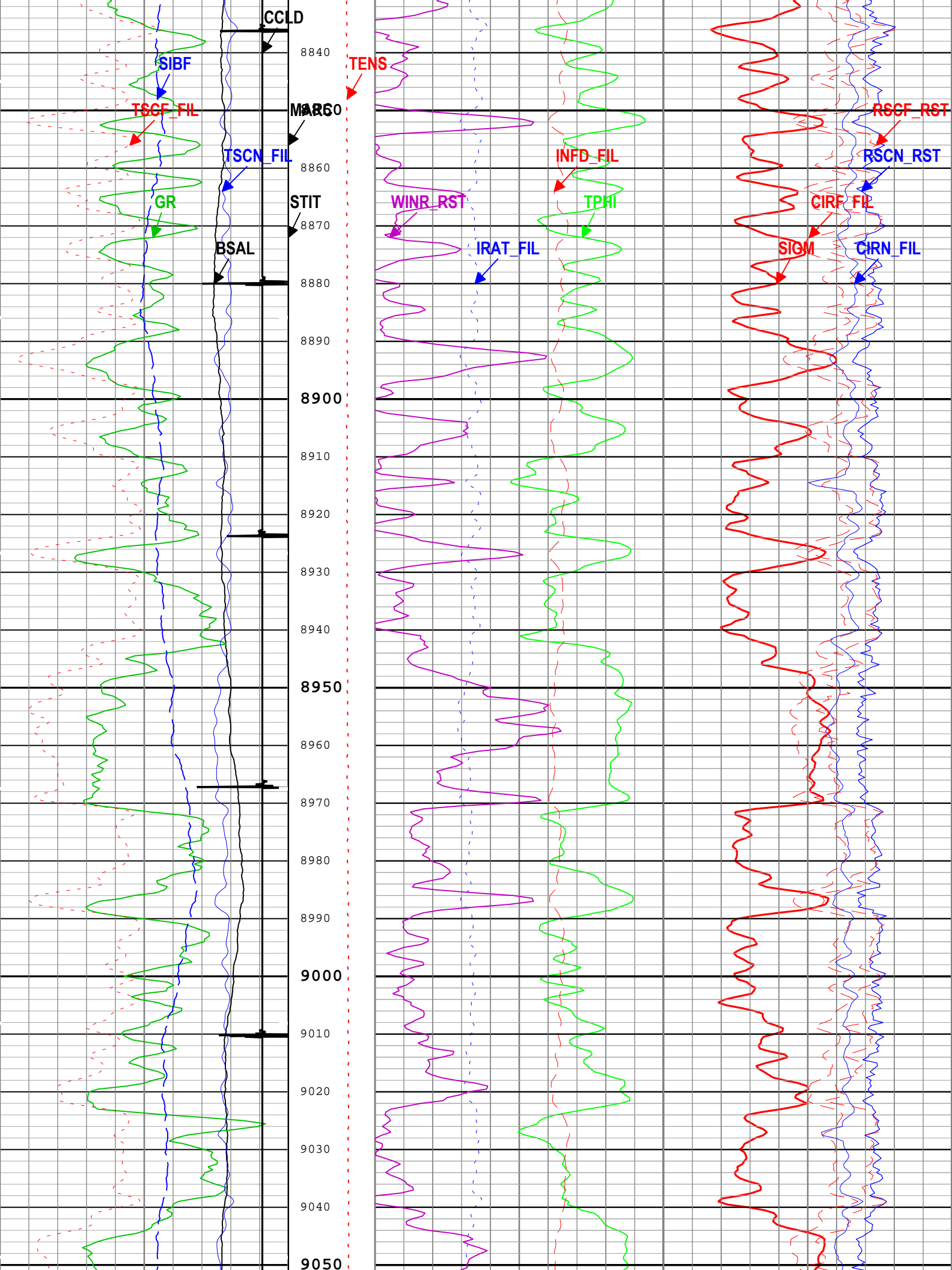


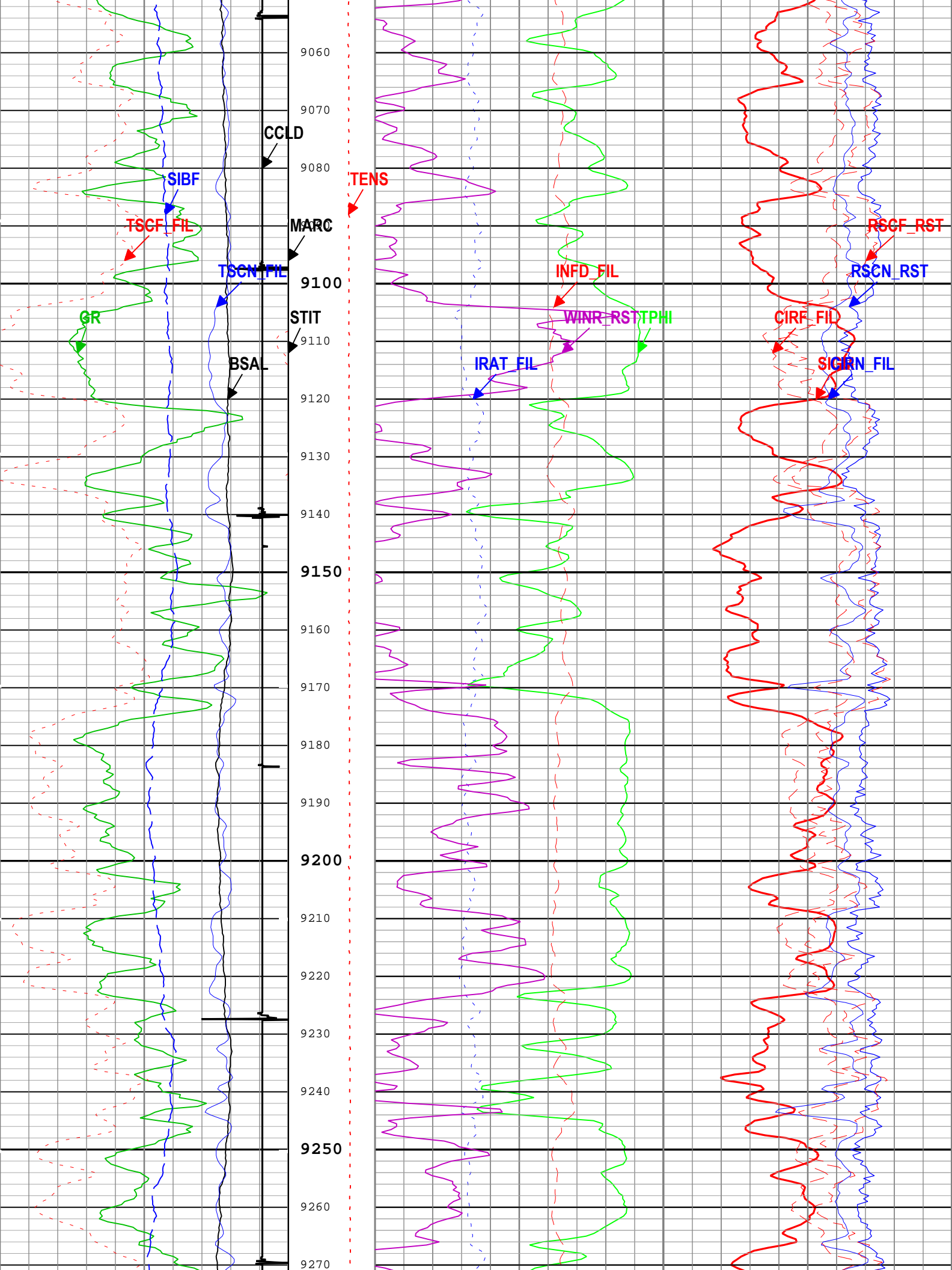


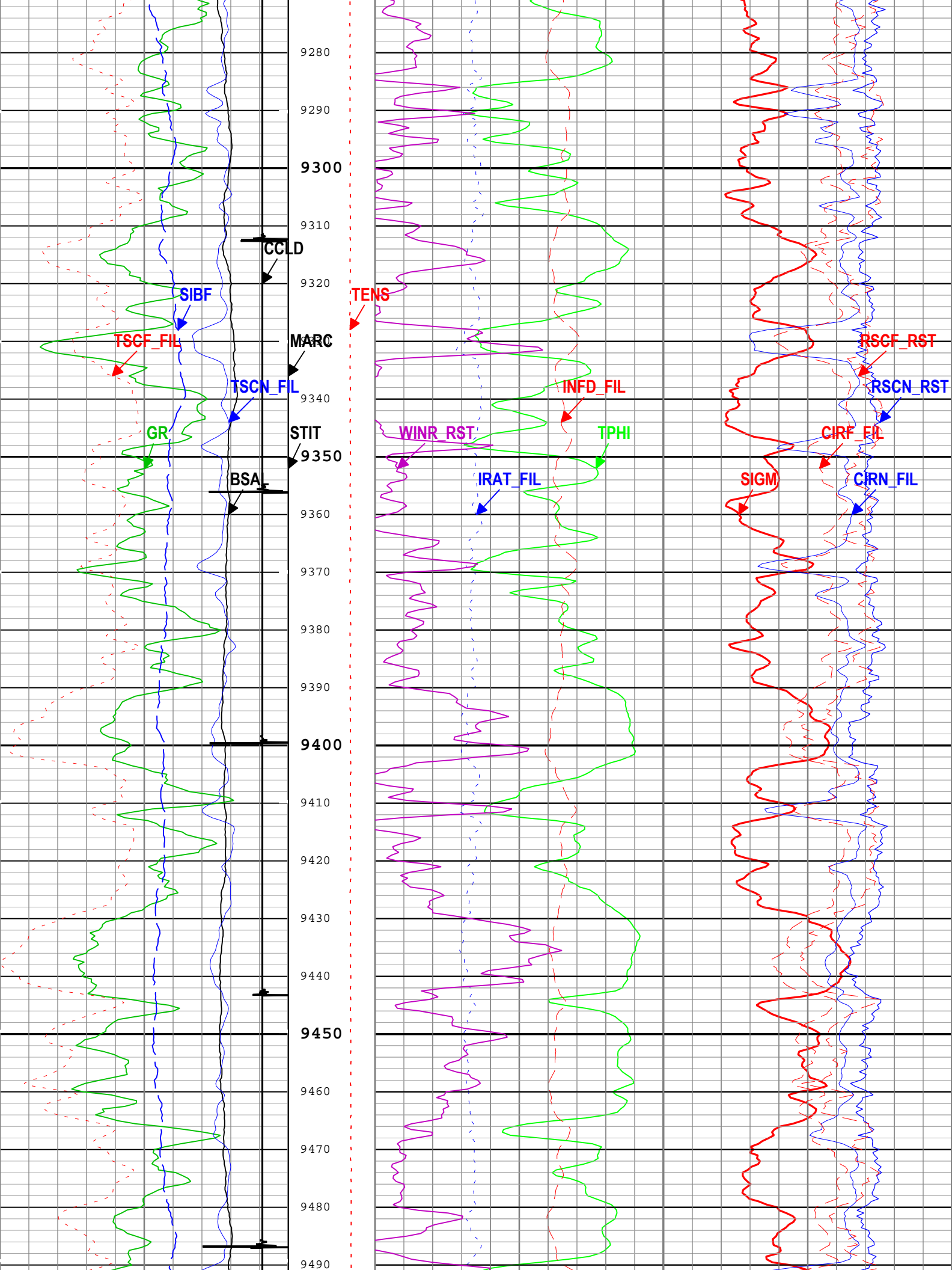


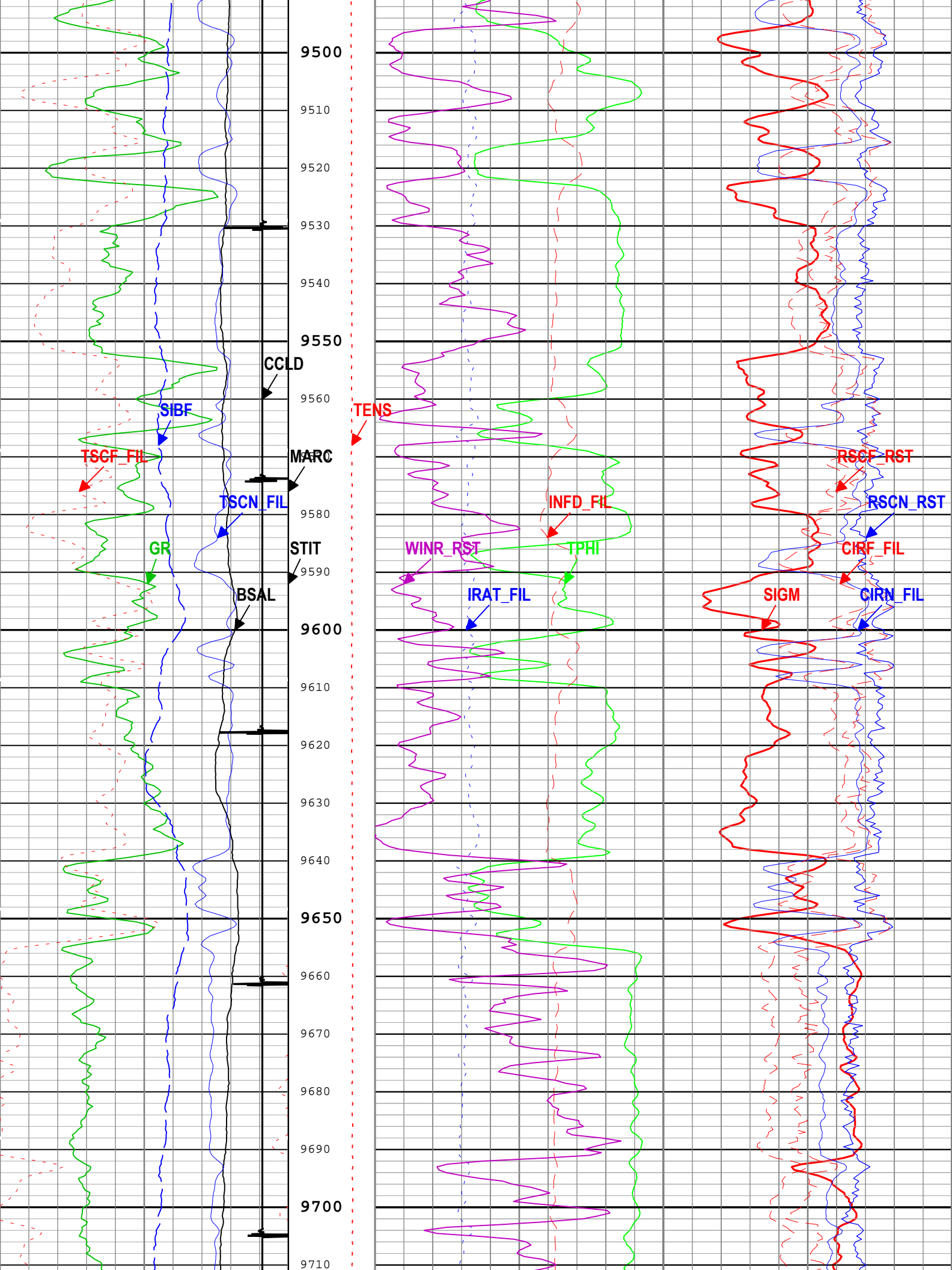


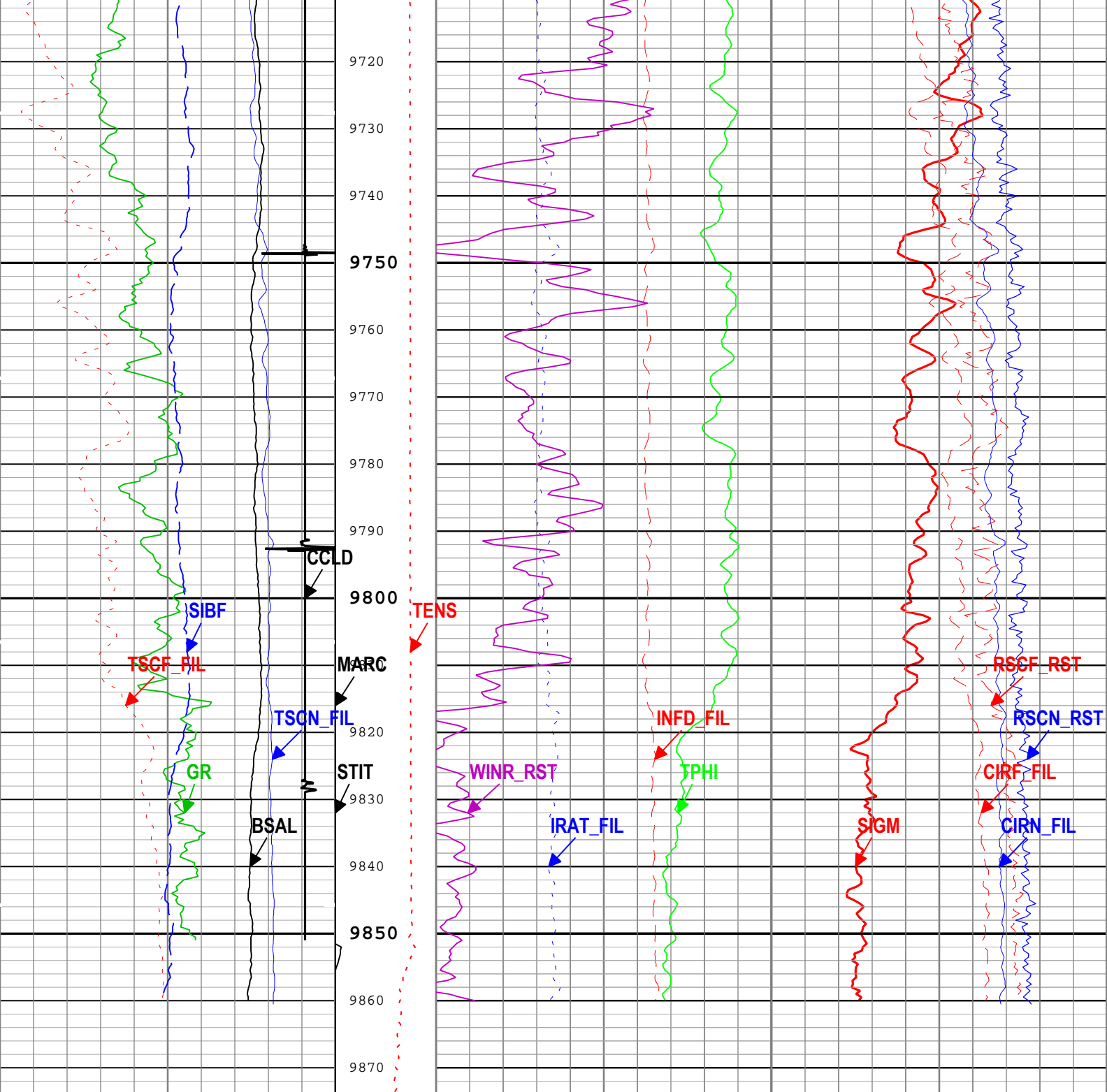












Borehole Salinity (BSAL) RST-C[1]		Stuck Tool Indicator, Total (STIT)		Formation Sigma (Neutron Capture Cross Section) (SIGM) RST-C[1]	
450	ppk	-50		60	cu
Gamma Ray (GR) PSTP-B[1]		Cable Drag From STIA to STIT		Weighted Inelastic Ratio (WINR_RST) RST-C[1]	
0	gAPI	150		0	0.4
Total Selected Count Rate Near Detector Filtered (TSCN_FIL) RST-C[1]		Tool Tot. Drag From D3T to STIT		Inelastic Ratio Filtered (IRAT_FIL) RST-C[1]	
30000	1/s	0		0.75	0
Total Selected Count Rate Far Detector Filtered (TSCF_FIL) RST-C[1]		Minitron Arc Count (CCLD)		Capture to Inelastic Ratio Near Filtered (CIRN_FIL) RST-C[1]	
12000	1/s	0		2.5	0
Sigma Borehole Fluid (SIBF) RST-C[1]				Capture to Inelastic Ratio Far Filtered (CIRF_FIL) RST-C[1]	
100	cu	0		5	0
				Near Detector Effective Unregulated Capture Count Rate (RSCN_RST) RST-C[1]	
				10000	1/s
				0	
				45	

CCL Discriminated Amplitude (CCLD)  
PSTP-B[1]

(MARC)  
RST-C[1]

-10 V 1

0 5

Far Detector Effective Unregulated Capture  
Count Rate (RSCF\_RST) RST-C[1]  
45 0

Cable  
Tension  
(TENS)  
0 lbf 2000

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 - Time Marked every 60.00 (s)

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: 20-Sep-2018 18:38:54

## Channel Processing Parameters

### TWO: 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	
TD	Total Measured Depth	Borehole	9864	ft

### TWO Depth Zoned Parameters

Parameter	Value	Start ( ft )	Stop ( ft )
BS	14.75	1800	2068
BS	8.75	2068	9874.17

All depth are actual.

## Tool Control Parameters

### TWO: 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	

## TWO

## RST Repeat Pass

## Software Version

Acquisition System	Version
Maxwell 2017 SP3	7.3.92069.3100
Application Patch	Wireline_Hotfix-RTDLIS-2017SP3_7.3.92363 Wireline_Hotfix-SML-2017SP3_7.3.101161

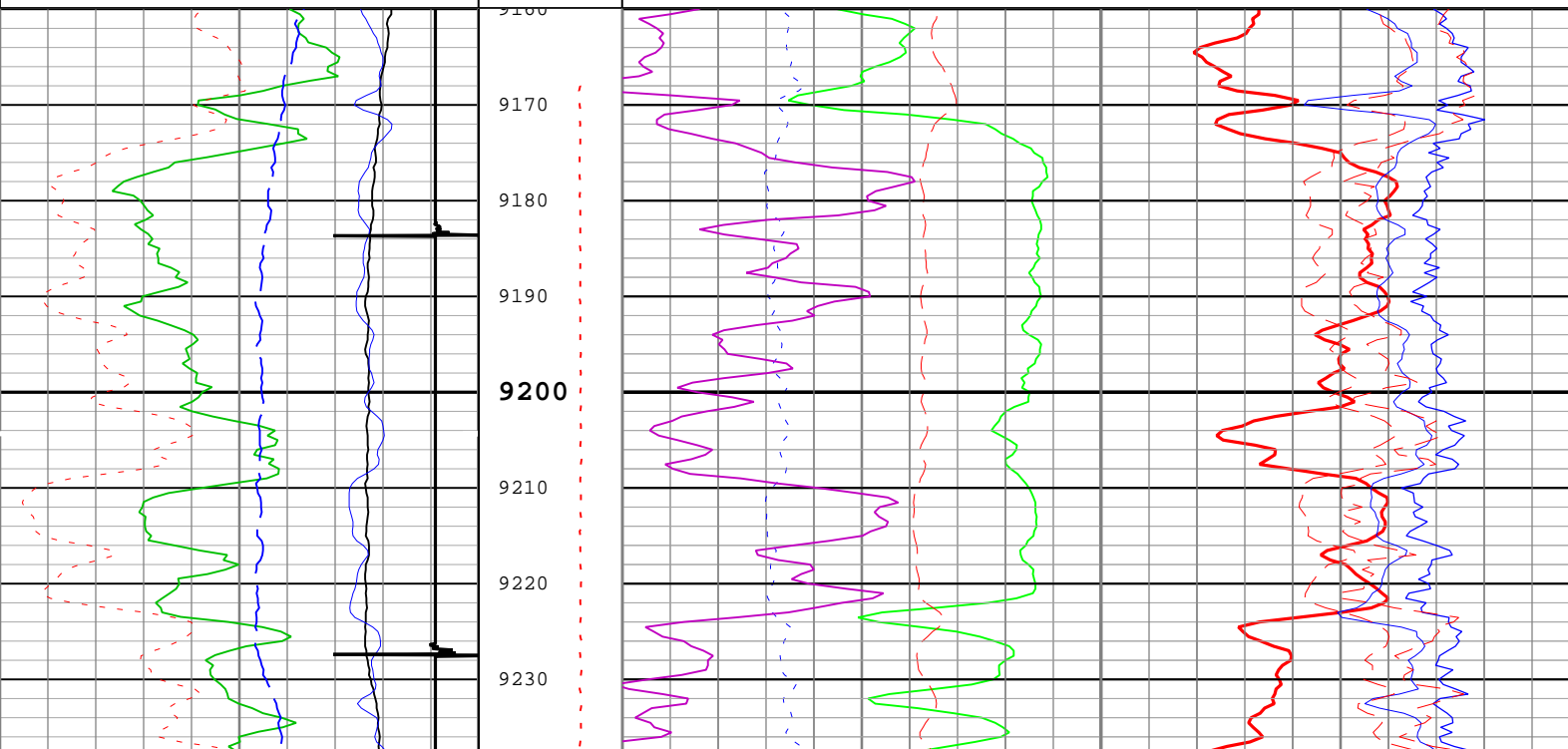
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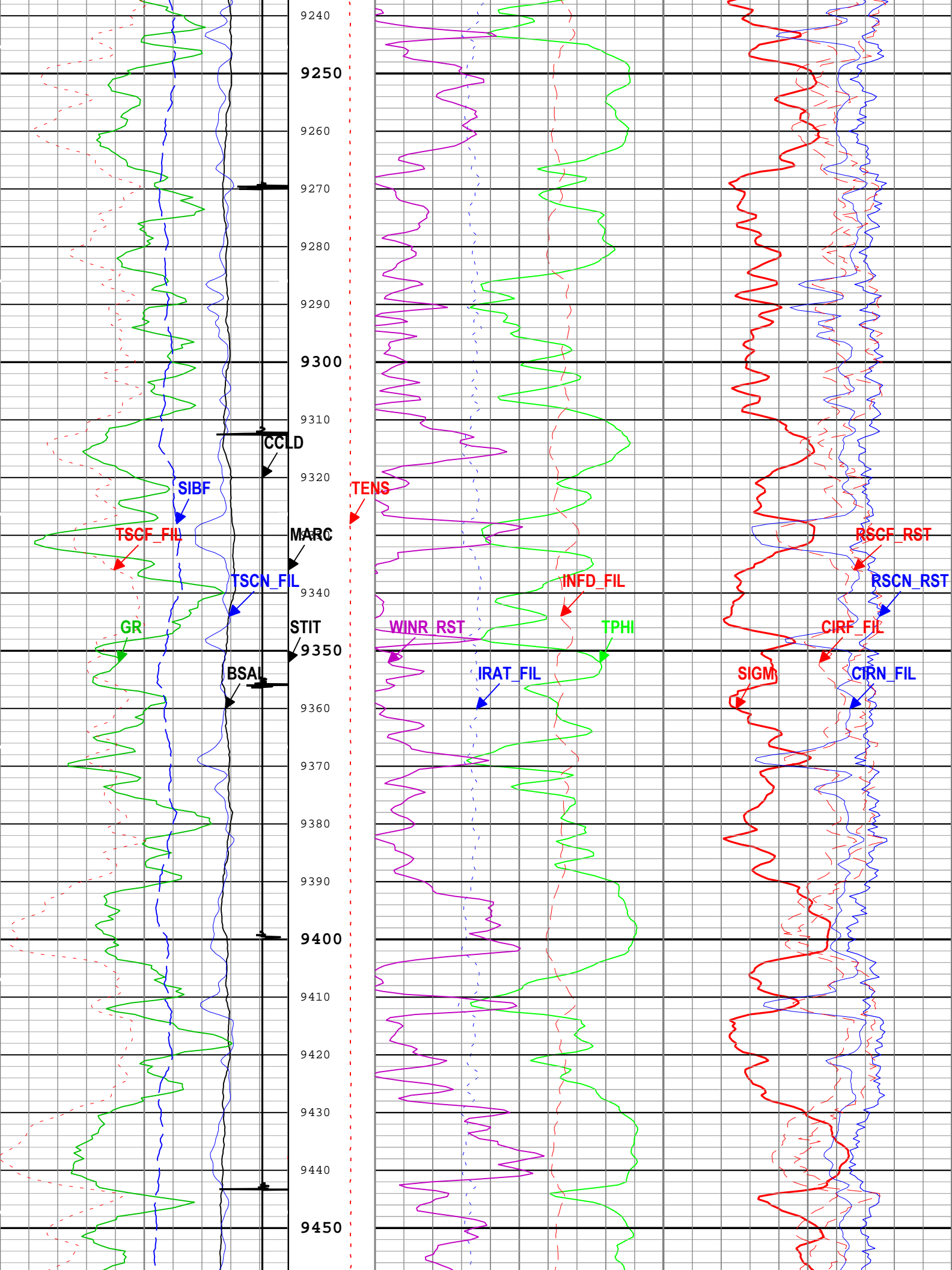
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
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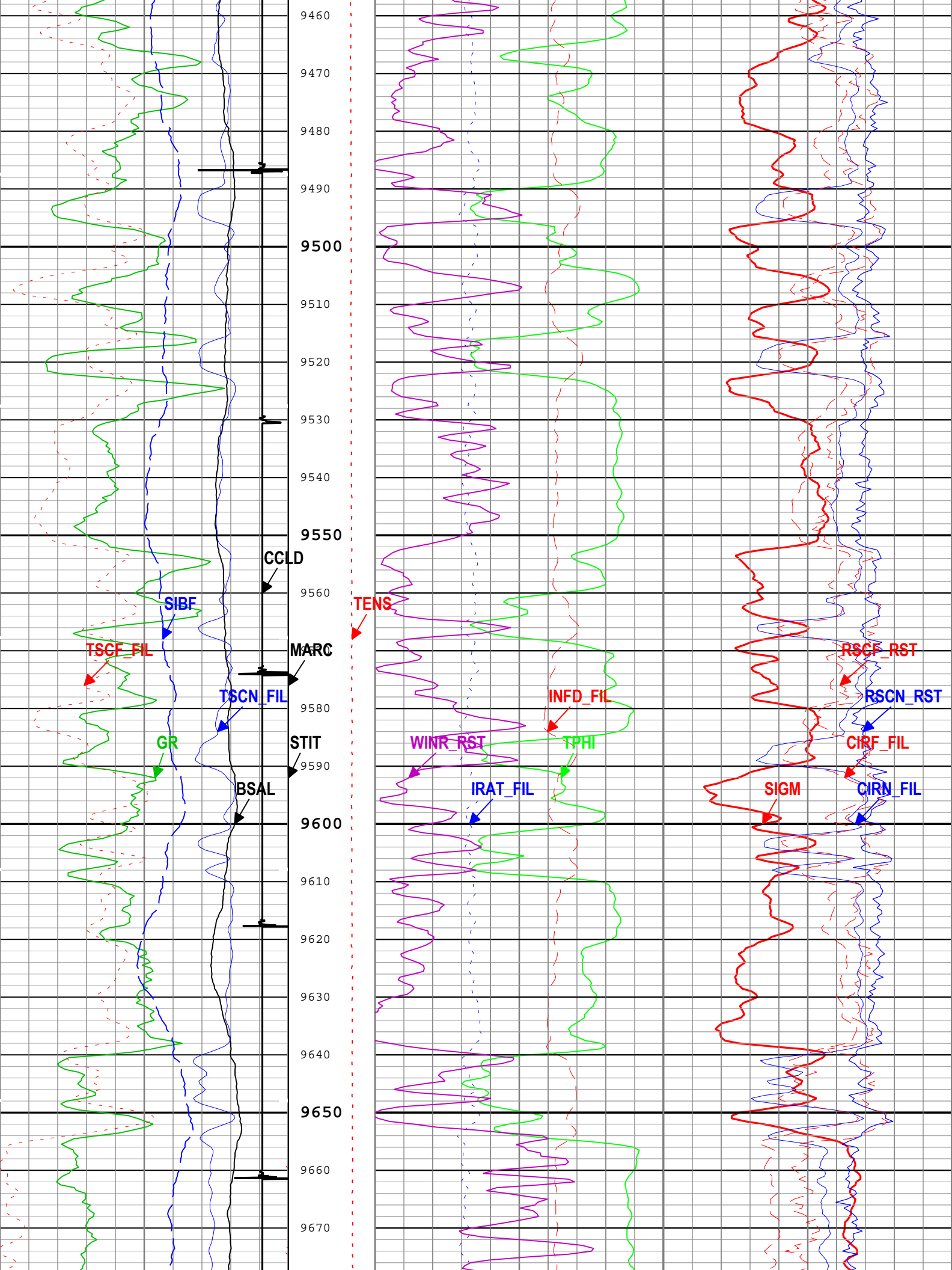
All depths are referenced to toolstring zero

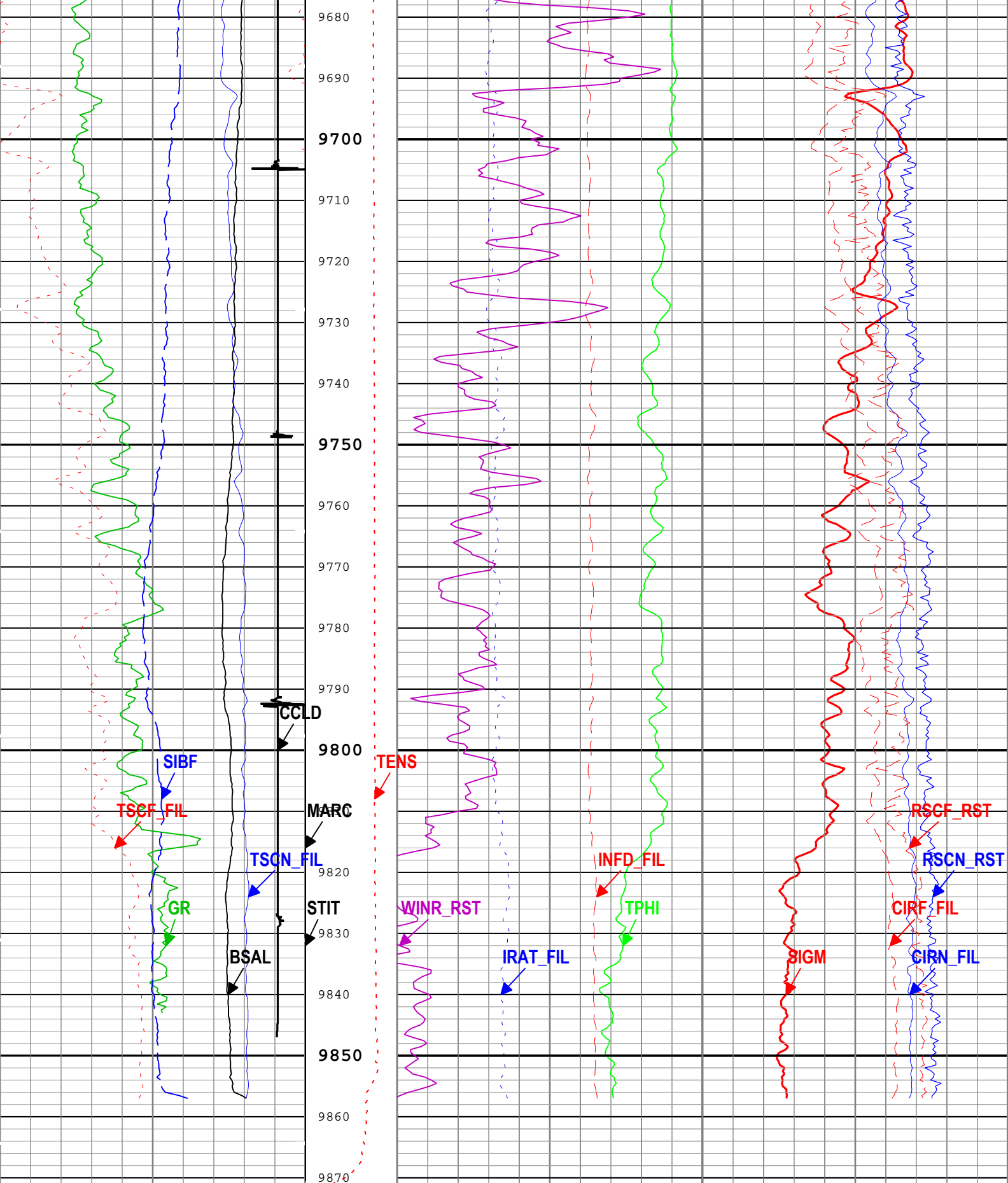
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TIME_1900 - Elapsed time since midnight, 30 December 1899 every 60.00 (s)			- IHV - Integrated Hole Volume every 10.00 (ft3)		
TIME_1900 - Time Marked every 60.00 (s)			- IHV - Integrated Hole Volume every 100.00 (ft3)		
- ICV - Integrated Cement Volume every 10.00 (ft3)			- ICV - Integrated Cement Volume every 100.00 (ft3)		
Stuck Tool Indicator, Total (STIT)			0 ft 50		
Borehole Salinity (BSAL) RST-C			Cable Drag From STIA to STIT		
450	ppk	-50	Inelastic Ratio Filtered (IRAT_FIL) RST-C		
Gamma Ray (GR) PSTP-B			2.5		
0	gAPI	150	Capture to Inelastic Ratio Far Filtered (CIRF_FIL) RST-C		
Total Selected Count Rate Near Detector Filtered (TSCN_FIL) RST-C			5		
30000	1/s	0	Near Detector Effective Unregulated Capture Count Rate (RSCN_RST) RST-C		
Total Selected Count Rate Far Detector Filtered (TSCF_FIL) RST-C			0.75		
12000	1/s	0	Thermal Decay Porosity (TPHI) RST-C		
Sigma Borehole Fluid (SIBF) RST-C			0.6 ft3/ft3		
100	cu	0	Gross Inelastic Count Rate Far Detector Filtered (INFD_FIL) RST-C		
CCL Discriminated Amplitude (CCLD) PSTP-B			10000 1/s 0 45		
-10	V	1	Far Detector Effective Unregulated Capture Count Rate (RSCF_RST) RST-C		
Cable Tension (TENS)			Formation Sigma (Neutron Capture Cross Section) (SIGM) RST-C		
0	lbf 2000	0	60 cu 0		
Minitron Arc Count (MARC) RST-C			Weighted Inelastic Ratio (WINR_RST) RST-C		
0		5	0 0.4		









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-B 0 gAPI 150	Cable Drag From STIA	Weighted Inelastic Ratio (WINR_RST) RST-C 0 0.4	
Total Selected Count Rate Near Detector Filtered (TSCN_FIL) RST-C	Inelastic Ratio Filtered (IRAT_FIL) RST-C	Capture to Inelastic Ratio Near Filtered (CIRN_FIL) RST-C	

30000	1/s	0	0.75	0	2.5	0
Total Selected Count Rate Far Detector Filtered (TSCF_FIL) RST-C			Thermal Decay Porosity (TPHI) RST-C		Capture to Inelastic Ratio Far Filtered (CIRF_FIL) RST-C	
12000	1/s	0	0.6	ft3/ft3	5	0
Sigma Borehole Fluid (SIBF) RST-C			Gross Inelastic Count Rate Far Detector Filtered (INFD_FIL) RST-C		Near Detector Effective Unregulated Capture Count Rate (RSCN_RST) RST-C	
100	cu	0	10000	1/s	45	0
CCL Discriminated Amplitude (CCLD) PSTP-B			Minitron Arc Count (MARC) RST-C		Far Detector Effective Unregulated Capture Count Rate (RSCF_RST) RST-C	
-10	V	1	0	5	45	0
			Cable Tension (TENS)			
			0 lbf 2000			
			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 ) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 20-Sep-2018 18:39:03

## Channel Processing Parameters

TWO: 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	
TD	Total Measured Depth	Borehole	9864	ft

## Tool Control Parameters

TWO: 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

**Schlumberger**

Well: NPR 11B-15 596

Field: NPR

County: Garfield

State: Colorado

Reservoir Saturation Tool

Sigma Mode

Gamma Ray - Collar locator Log