Schlumberger

Company: Crestone Peak Resources Operating LLC

Well: Sam #3H-25H-M166

Field: Wattenberg

County: Weld State: Colorado

Pulsed Neutron eXtreme

Field Print

County: Weld
Field: Wattenberg
Location: 1343' FSL & 310' FWL
Well: Sam #3H-25H-M166
Company: Crestone Peak Resources Operating LLC

Location:				
1343' FSL & 310' FWL		Elev.:	K.B.	5105.00 ft
NWSW 25 1N 66W			G.L.	5082.00 ft
Lat/Long: 40.018702/-104.733854			D.F.	5105.00 ft
Permanent Datum:	Ground Level	Elev.:		5082.00 f
Log Measured From:	Kelly Bushing	23.00 ft		above Perm.Datum
Drilling Measured From:	Kelly Bushing			

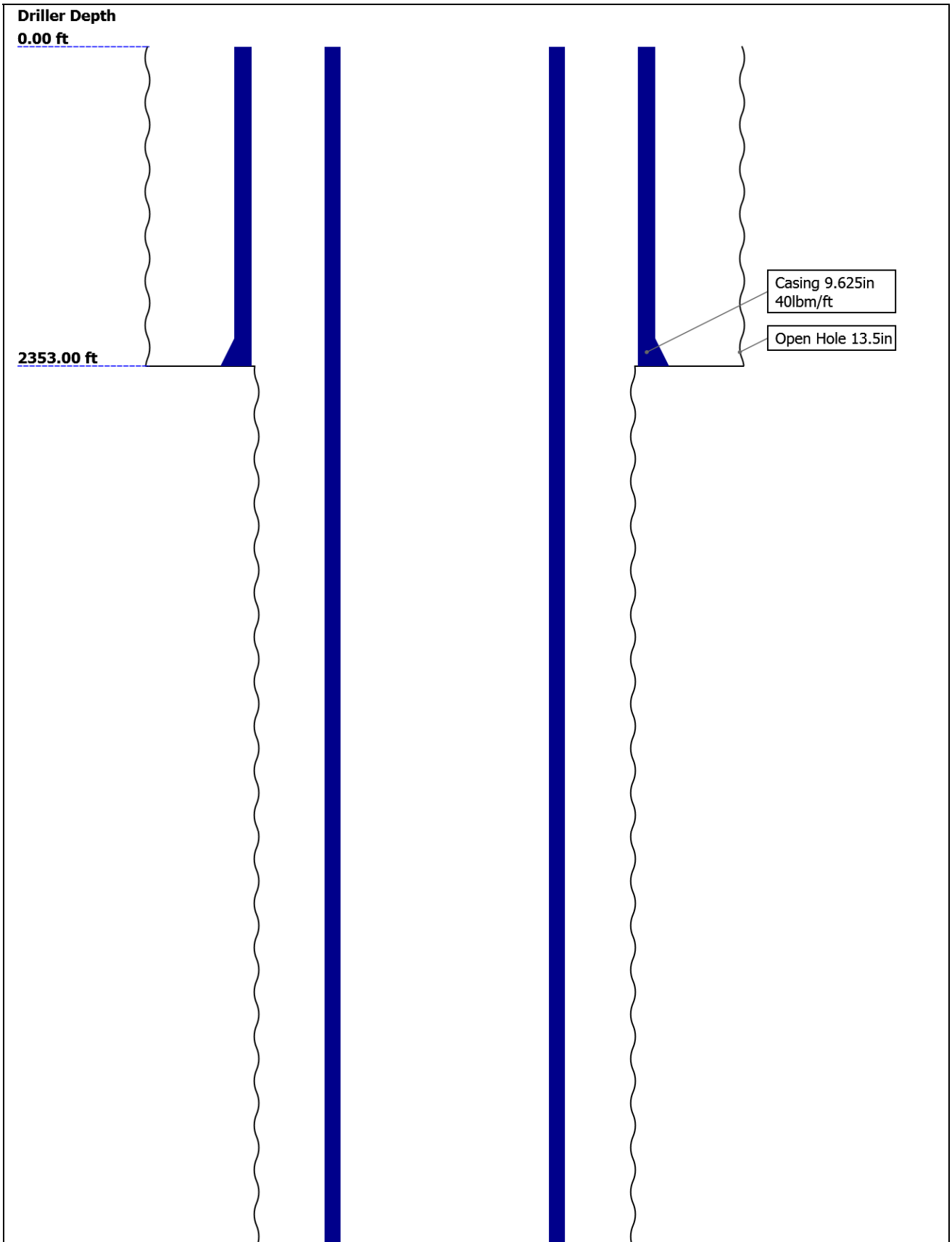
API Serial No.	Section:	Township:	Range:
05-123-46127	25	1N	66W

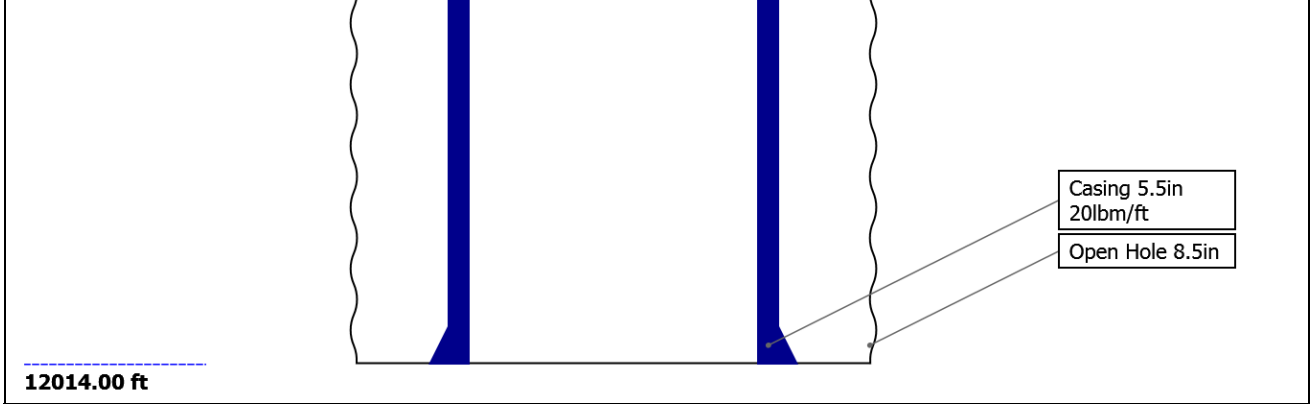
Logging Date	13-Oct-2018		
Run Number	Two		
Depth Driller	12014.00 ft		
Schlumberger Depth	7180.00 ft		
Bottom Log Interval	7180.00 ft		
Top Log Interval	200.00 ft		
Casing Fluid Type	Water		
Salinity			
Density	8.4 lbm/gal		
Fluid Level	8.00 ft		
BIT/CASING/TUBING STRING			
Bit Size	8.50 in		
From	2353.00 ft		
To	12014.00 ft		
Casing/Tubing Size	5.5 in		
Weight	20 lbm/ft		
Grade	N/A		
From	0.00 ft		
To	12014.00 ft		
Max Recorded Temperatures	153 degF		
Logger on Bottom Time	15-Oct-2018	10:00:00	
Unit Number Location:	9108	Fort Morgan	
Recorded By	Alan Moreno		
Witnessed By	Keith Kershisnik		

Disclaimer

Contents

Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	13.5	8.5				
Top Driller (ft)	0	2353				
Top Logger (ft)	0	2353				
Bottom Driller (ft)	2353	12014				
Bottom Logger (ft)	2353	12014				
Casing						
Size (in)	9.625	5.5				
Weight (lbm/ft)	40	20				
Inner Diameter (in)	8.835	4.778				
Grade	N/A	N/A				
Top Driller (ft)	0	0				
Top Logger (ft)	0	0				
Bottom Driller (ft)	2353	12014				
Bottom Logger (ft)	2353	12014				

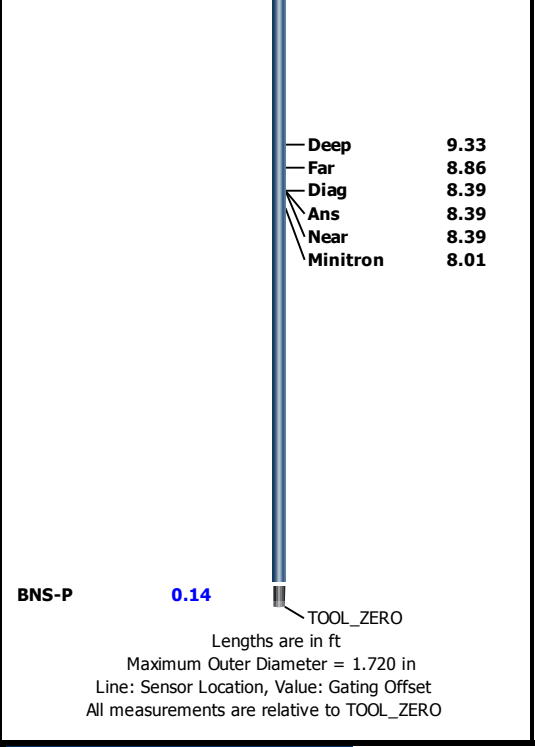
Remarks and Equipment Summary

Two: Toolstring

Equip name	Length	MP name	Offset
PEH-E	**28.81**		
AH-38	**27.13**		
PSTP-A:1872	**26.85**		
PSC-A		**GR**	**23.14**
PSTC-A		**PSTC**	**22.85**
PBMS-A:1872		**PSTC Tool String Bottom**	**0.00**
Sapphire 10kPSI		**Temperature**	**20.06**
		Sapphire Pressure	**19.95**
		CCL	**19.33**
		PBMS	**18.58**
PNX-A:17	**18.58**		
PNCH-A:18			
PNCE-A			
PNSH-A			
PNSE-A:17			
PNG-H			

Two: Remarks

Toolstring ran as per tool sketch
All passes ran under 0psi
GSH-Commercial mode used
Log correlated to first run - IBC
Lead: 12.5ppg
Tail: 13.5ppg
WL cable got a bad wrap, spent a couple of minutes at 6485' then drop down to overlap log. GR spike due to it.



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-B		
Serial Number	6455		
Calibration Date	24-Jul-2018		
Calibrator Serial Number	57		
Calibration Cable Type	7-32ASXS		
Wheel Correction 1	-1		
Wheel Correction 2	1		
Tension Device			
Type	CMTD-B/A		
Serial Number	1703		
Calibration Date	29-Jul-2018		
Calibrator Serial Number	88310A		
Number of Calibration Points	10		
Calibration Root Mean Square Error	6		
Calibration Peak Error	9		
Logging Cable			
Type	7-32AS-XS		
Serial Number			
Length	24000.00 ft		
Conveyance Type	Wireline		
Rig Type	Crane		

Two:Depth Control Parameters		Depth Control Remarks
Log Sequence	Subsequent Log In the Well	All Schlumberger depth control procedures followed
Reference Log Name	Isolation Scanner / Cement Evaluation	IDW used as primary depth control, Z-chart used as secondary
Reference Log Run Number	One	

Reference Log Date	14-Oct-2018

Two

Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Two	Log[4]:Up	Up	202.12 ft	6602.33 ft	15-Oct-2018 11:03:11 AM	15-Oct-2018 2:42:56 PM	ON	2.25 ft	No

All depths are referenced to toolstring zero

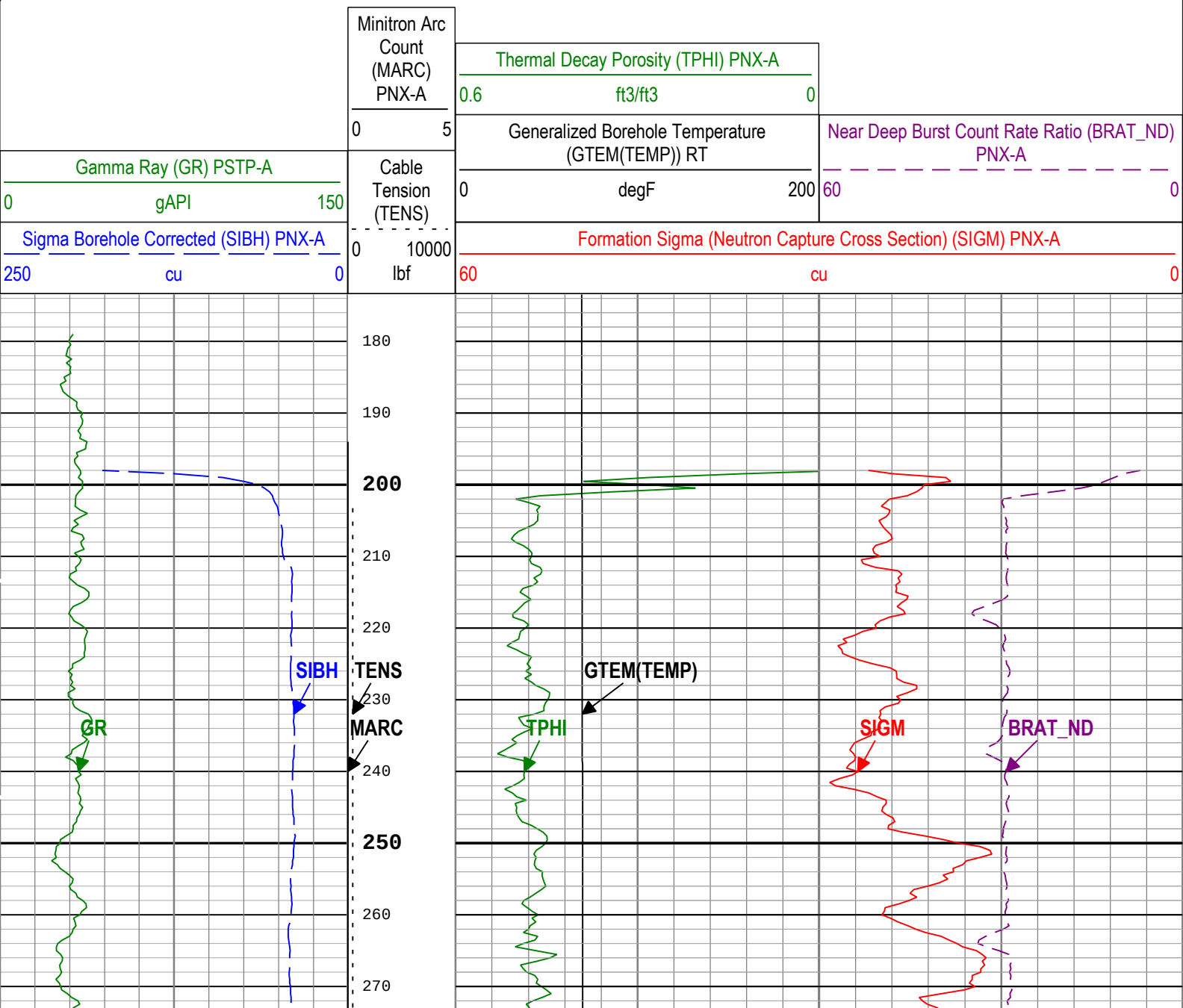
Log

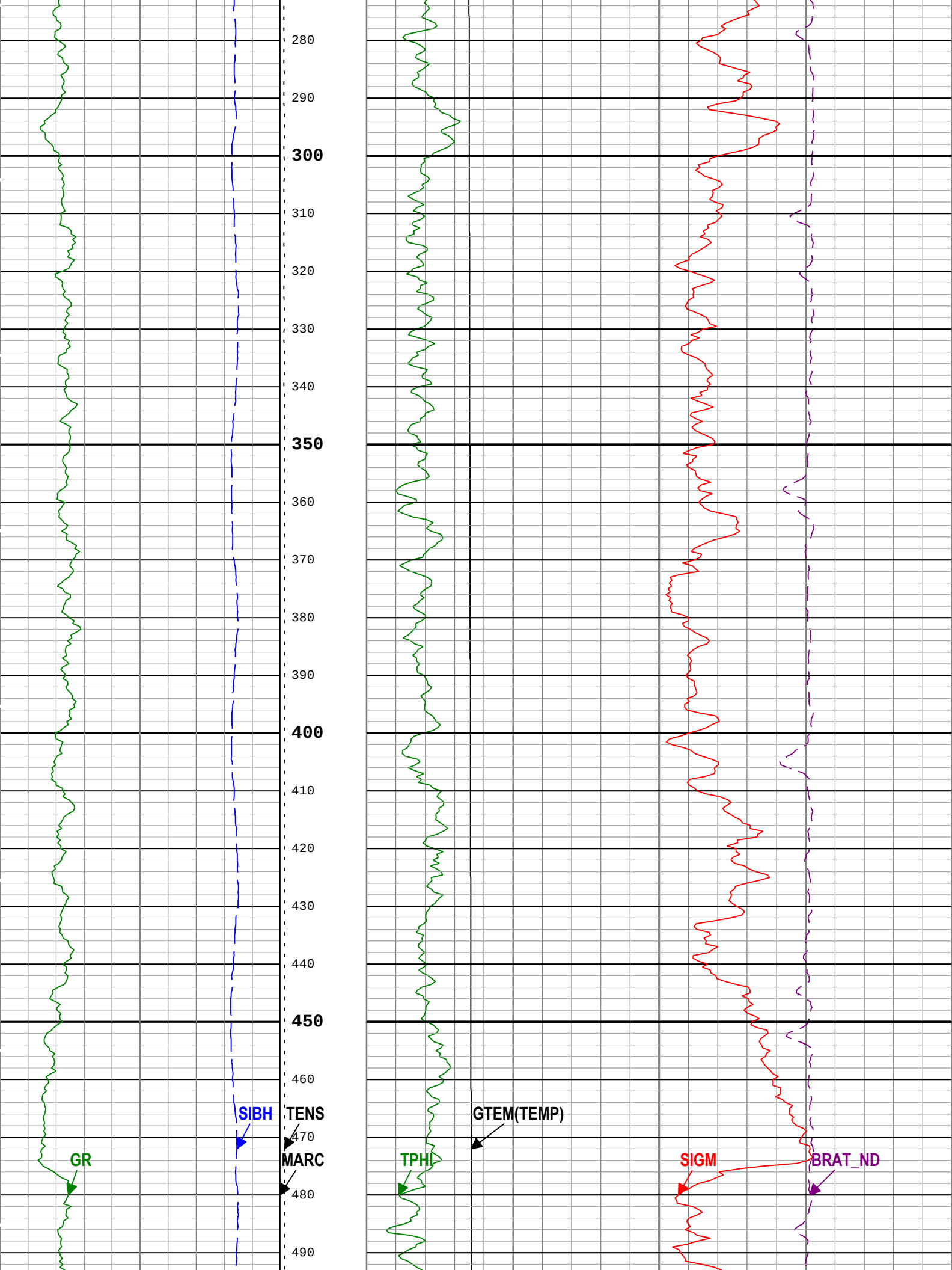
Company:Crestone Peak Resources Operating LLC Well:Sam #3H-25H-M166

Two: Log[4]:Up:S017

Description: Pulsar (PNX) Sigma Format: Log (Pulsar (PNX) Sigma) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 15-Oct-2018 15:12:06

TIME_1900 - Time Marked every 60.00 (s)

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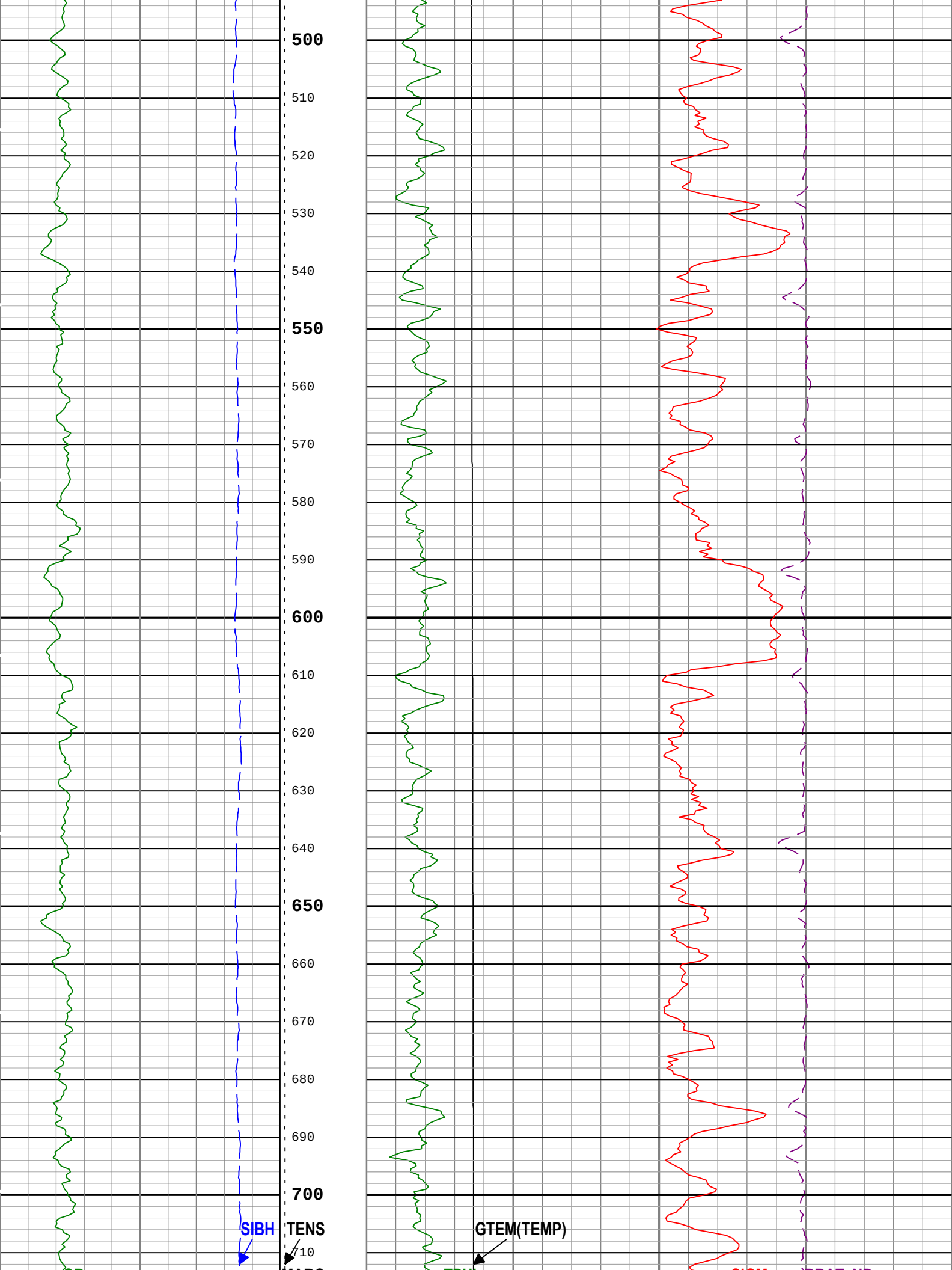
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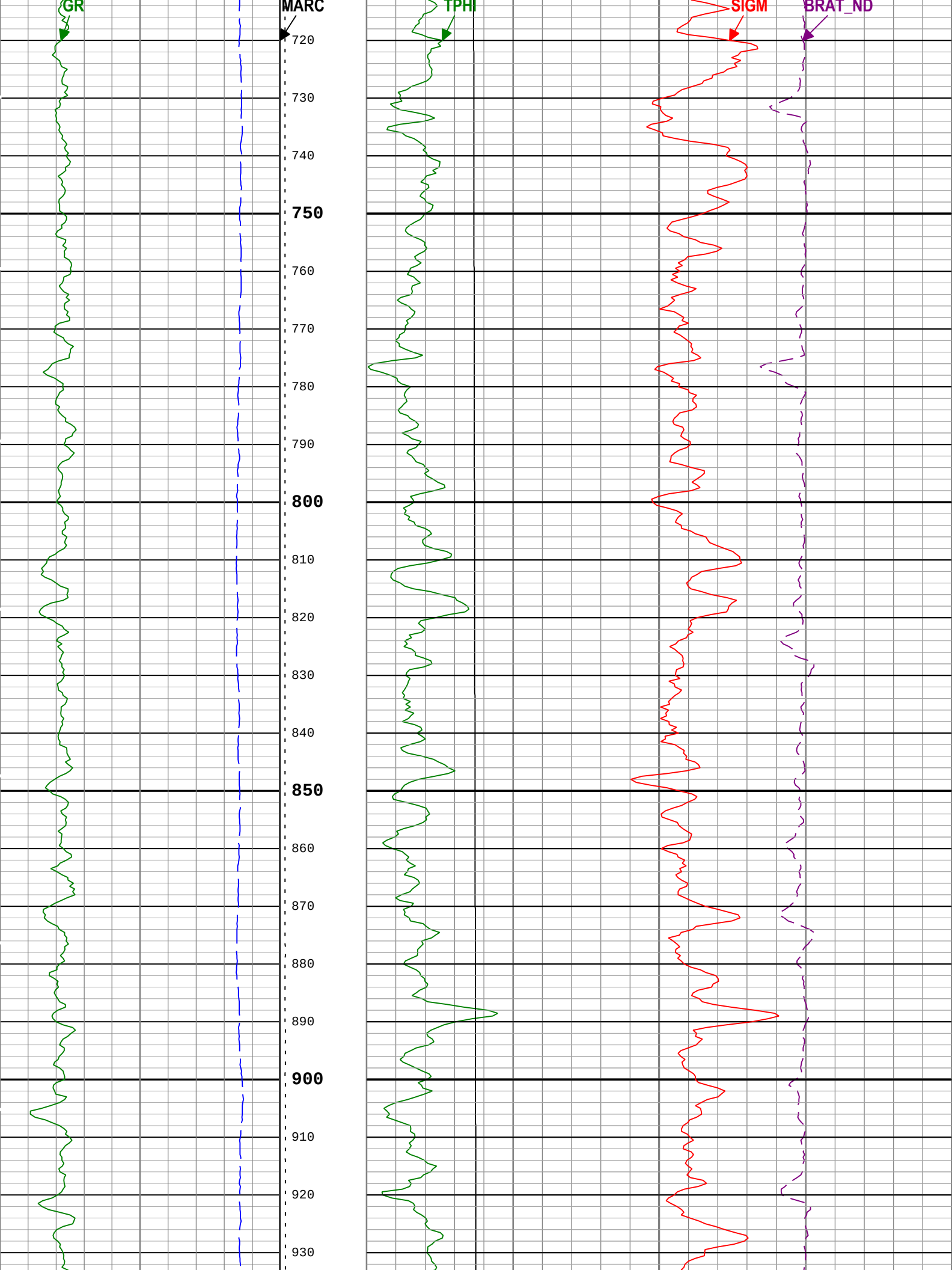
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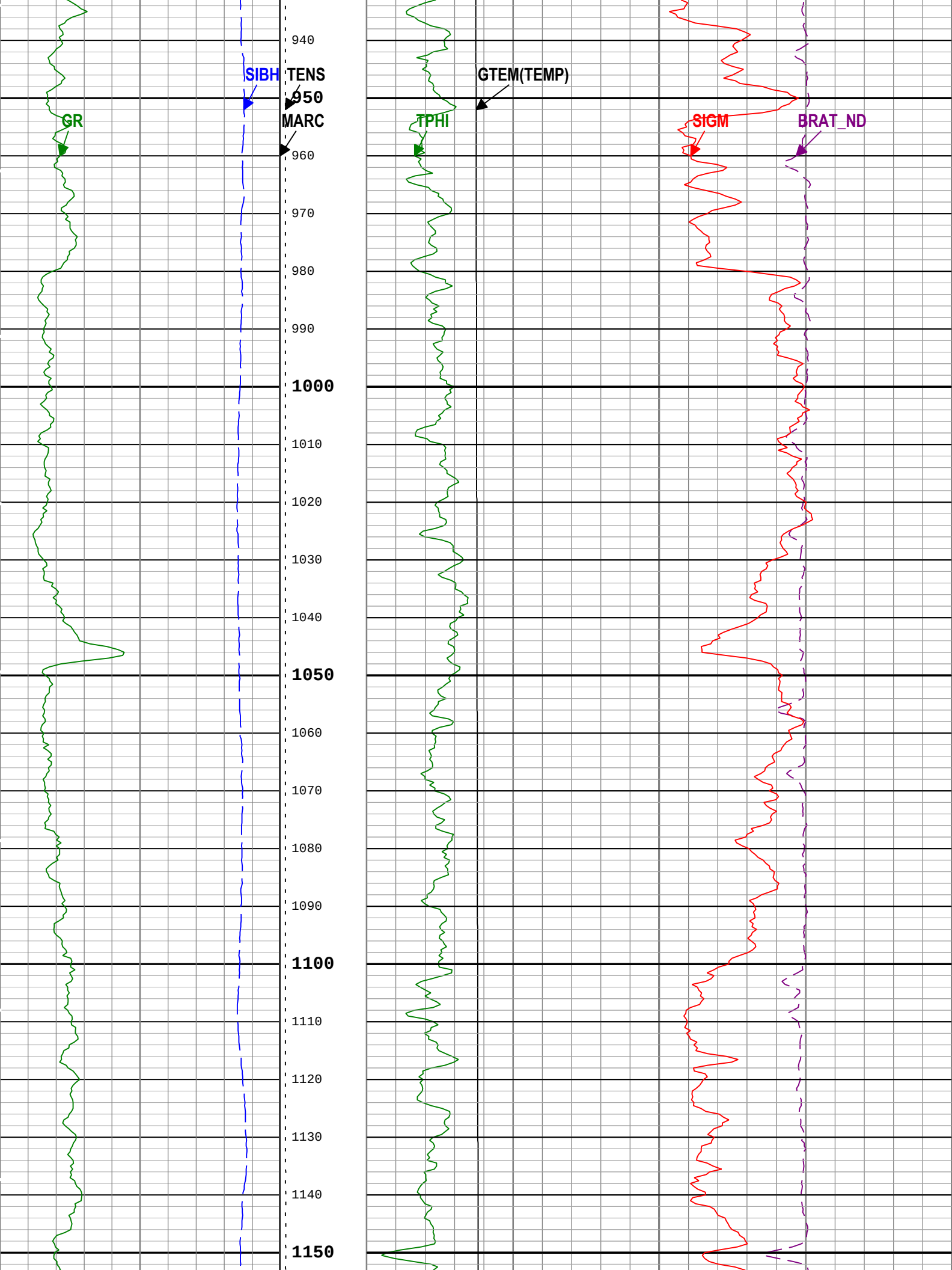
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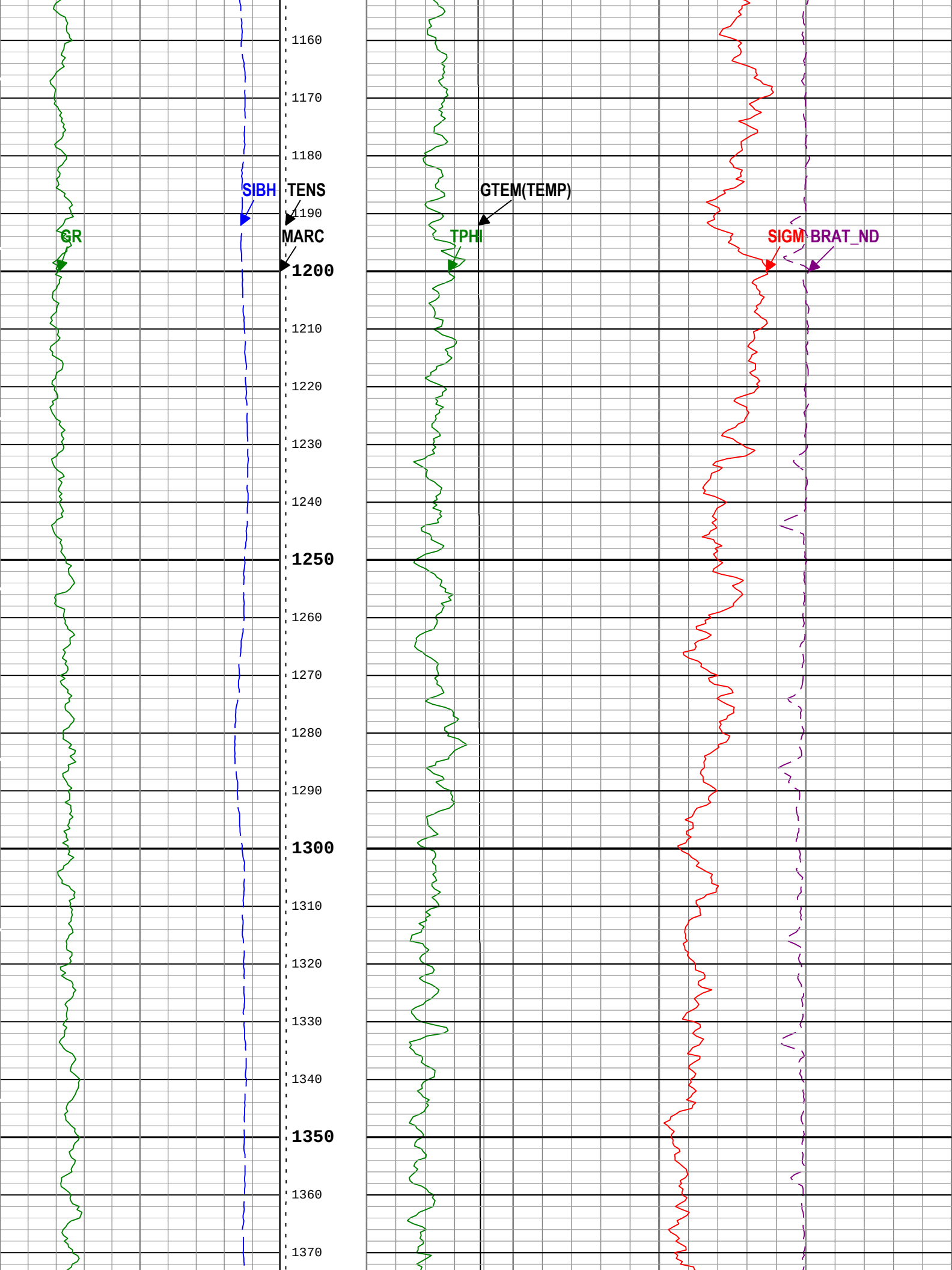
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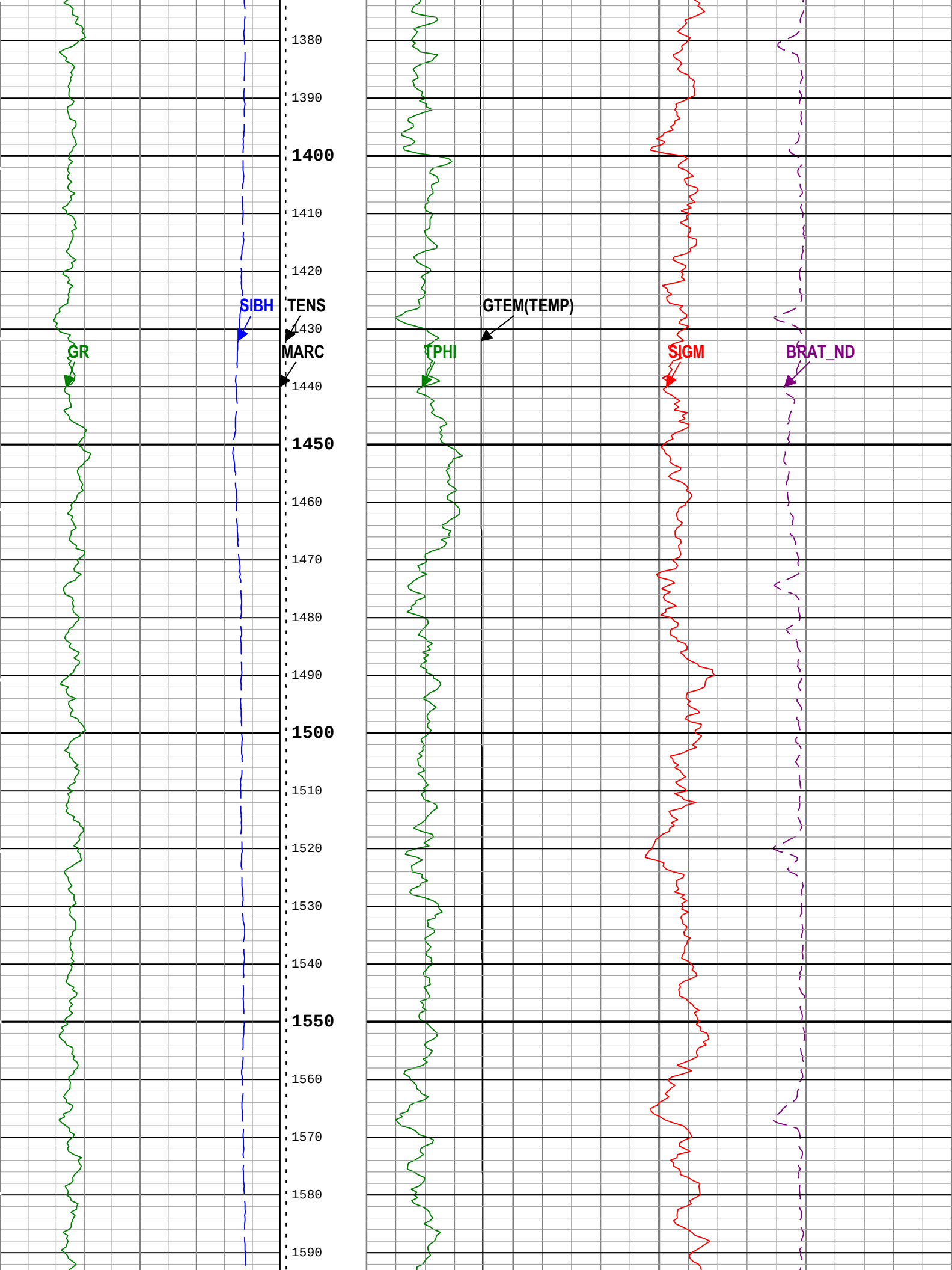
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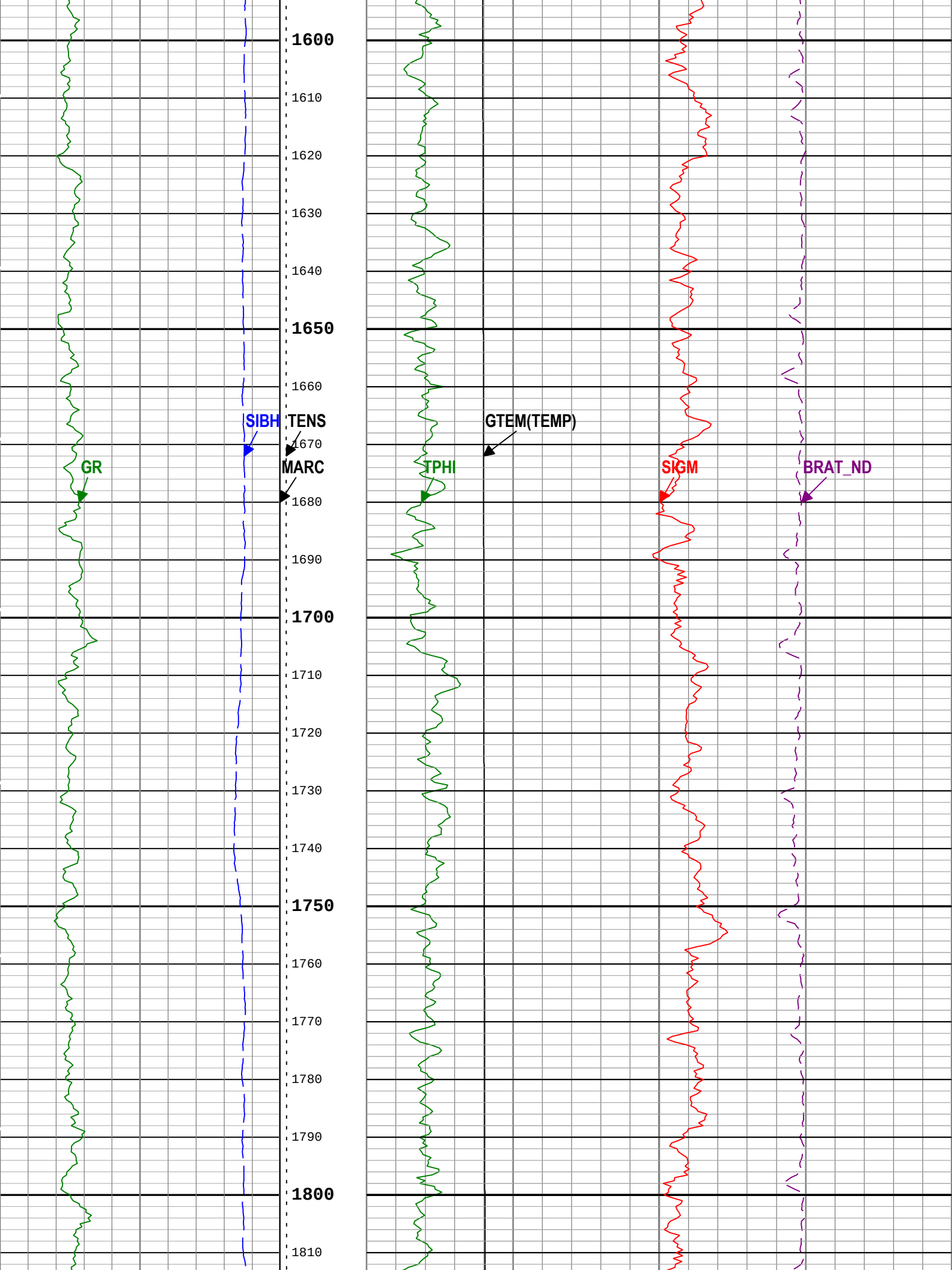
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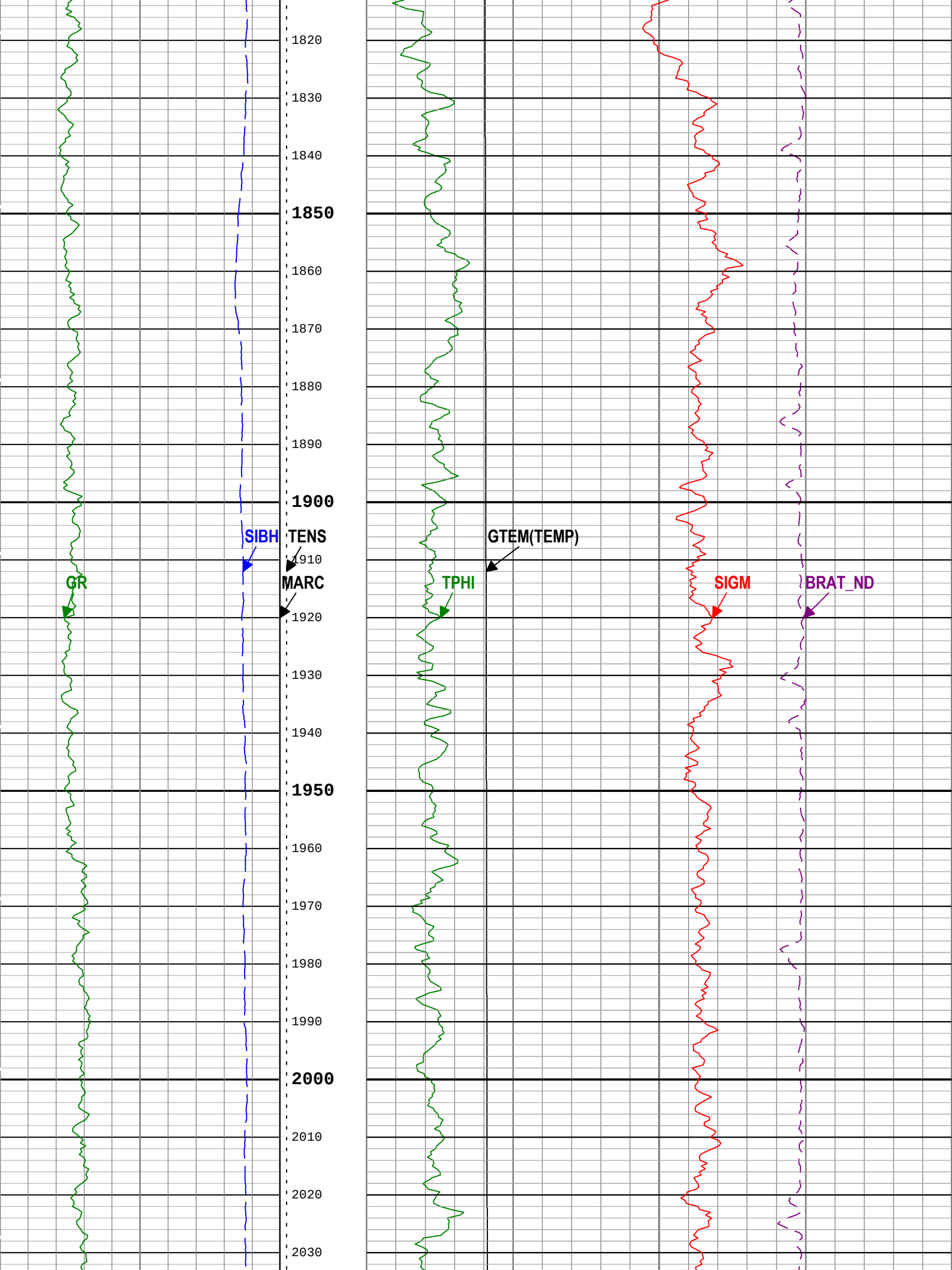
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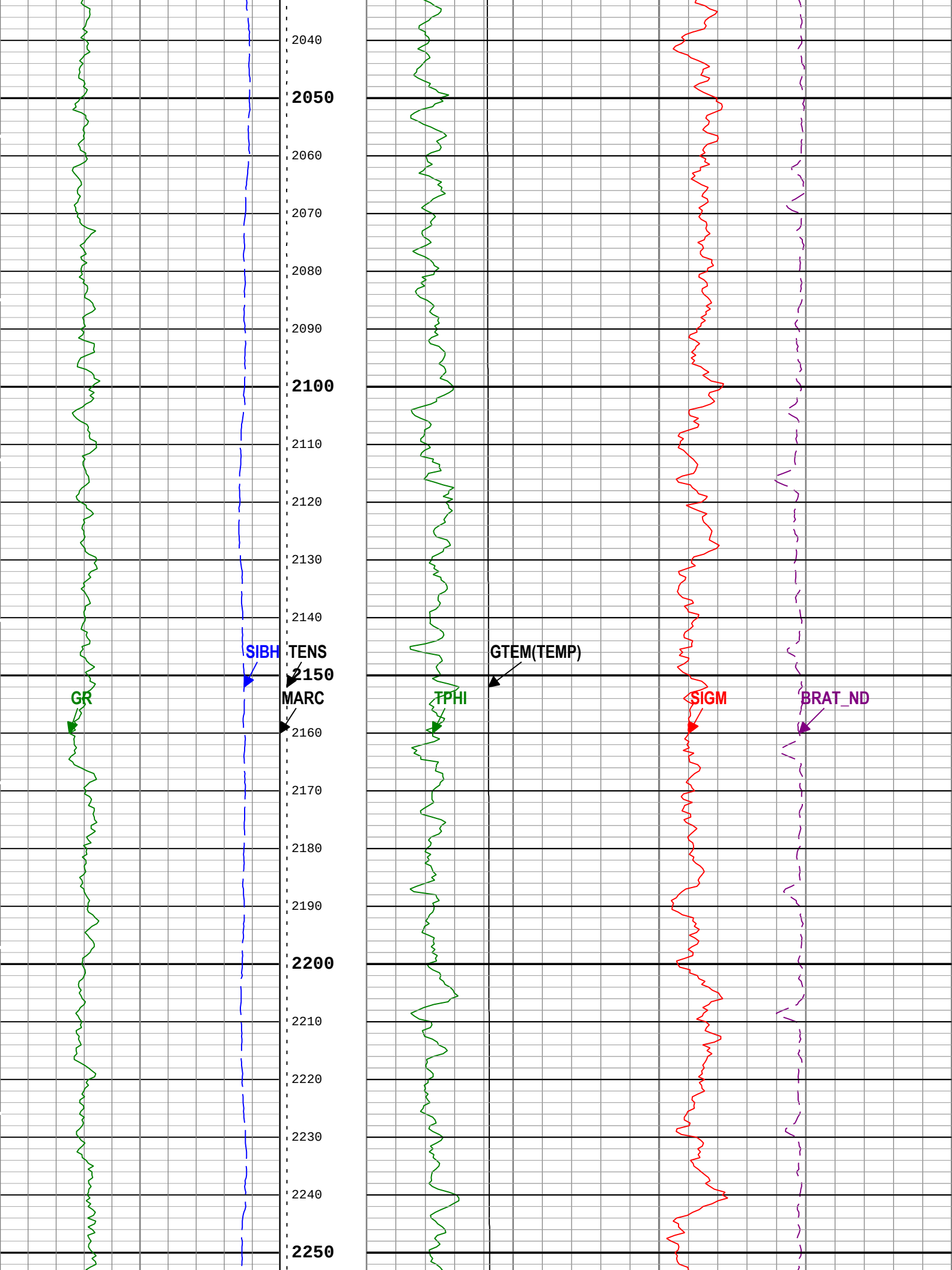
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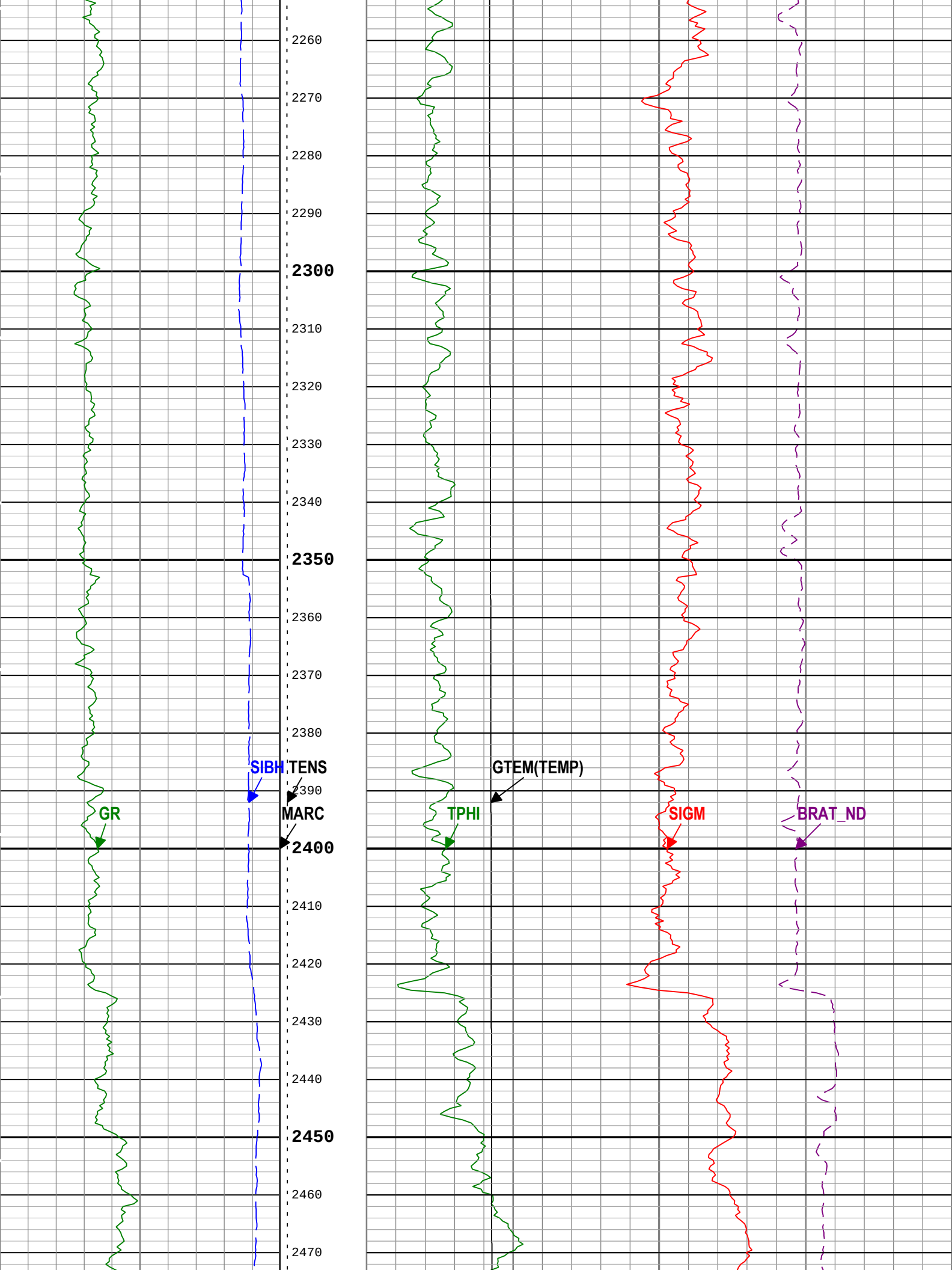
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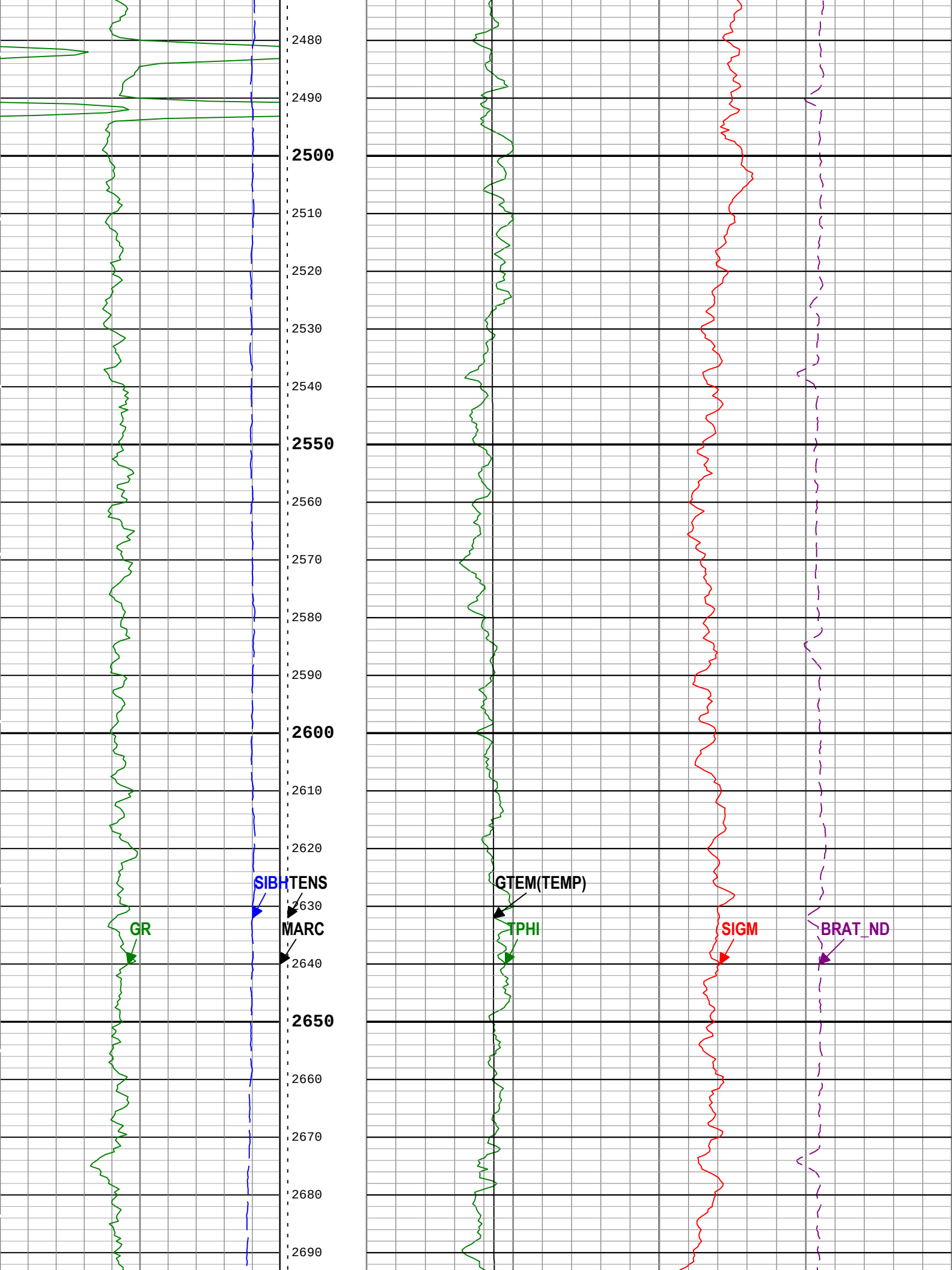
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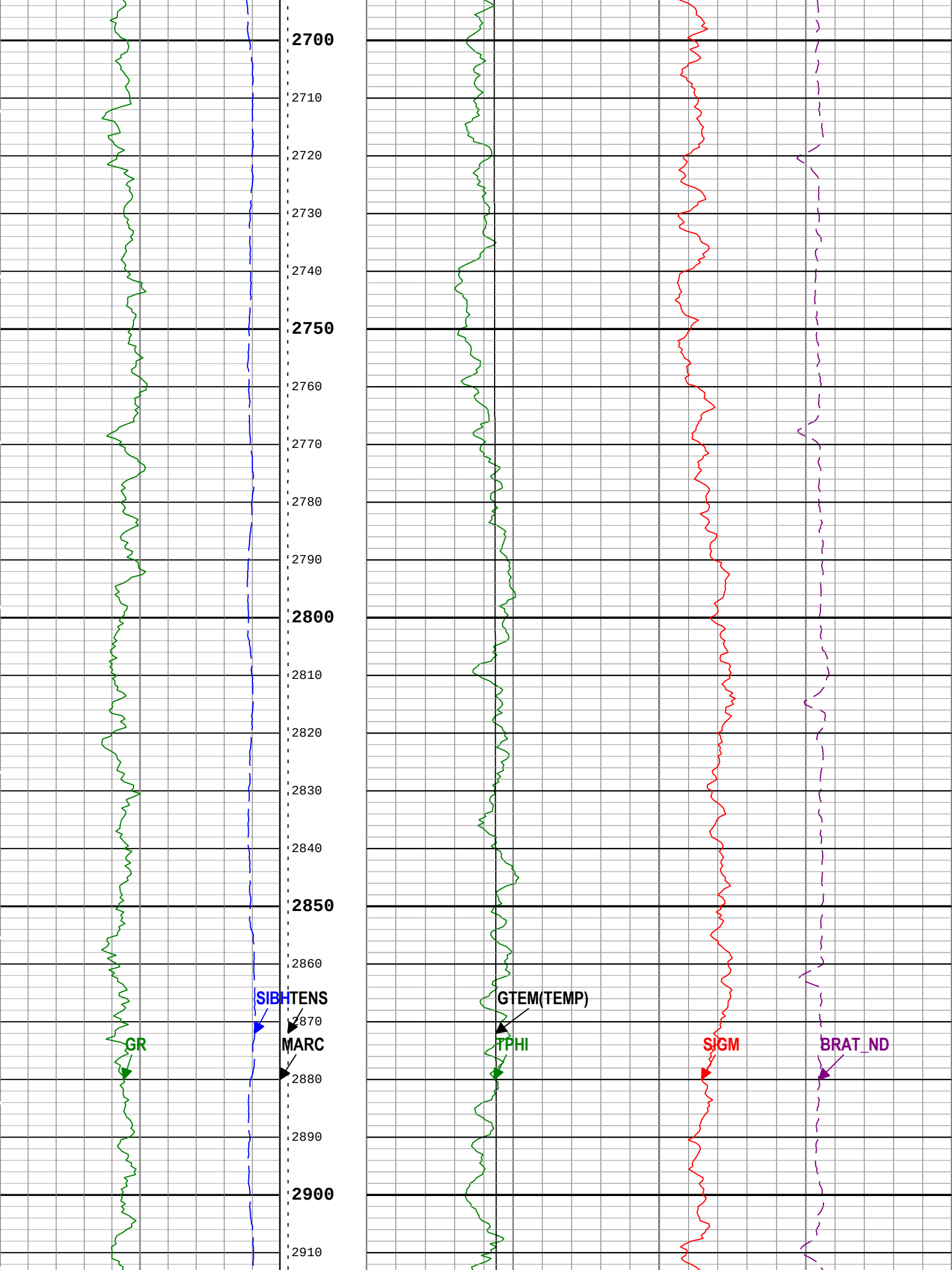
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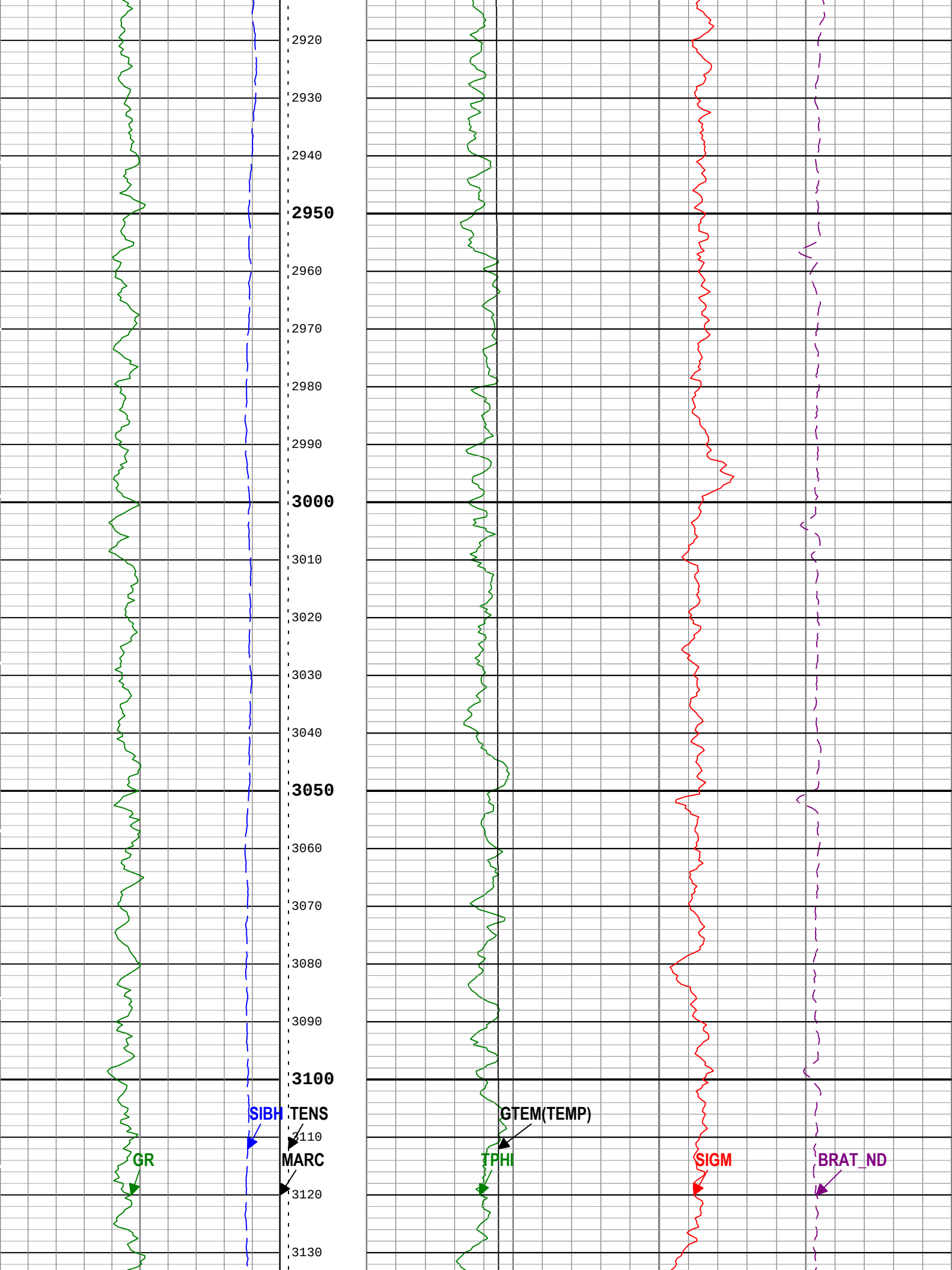
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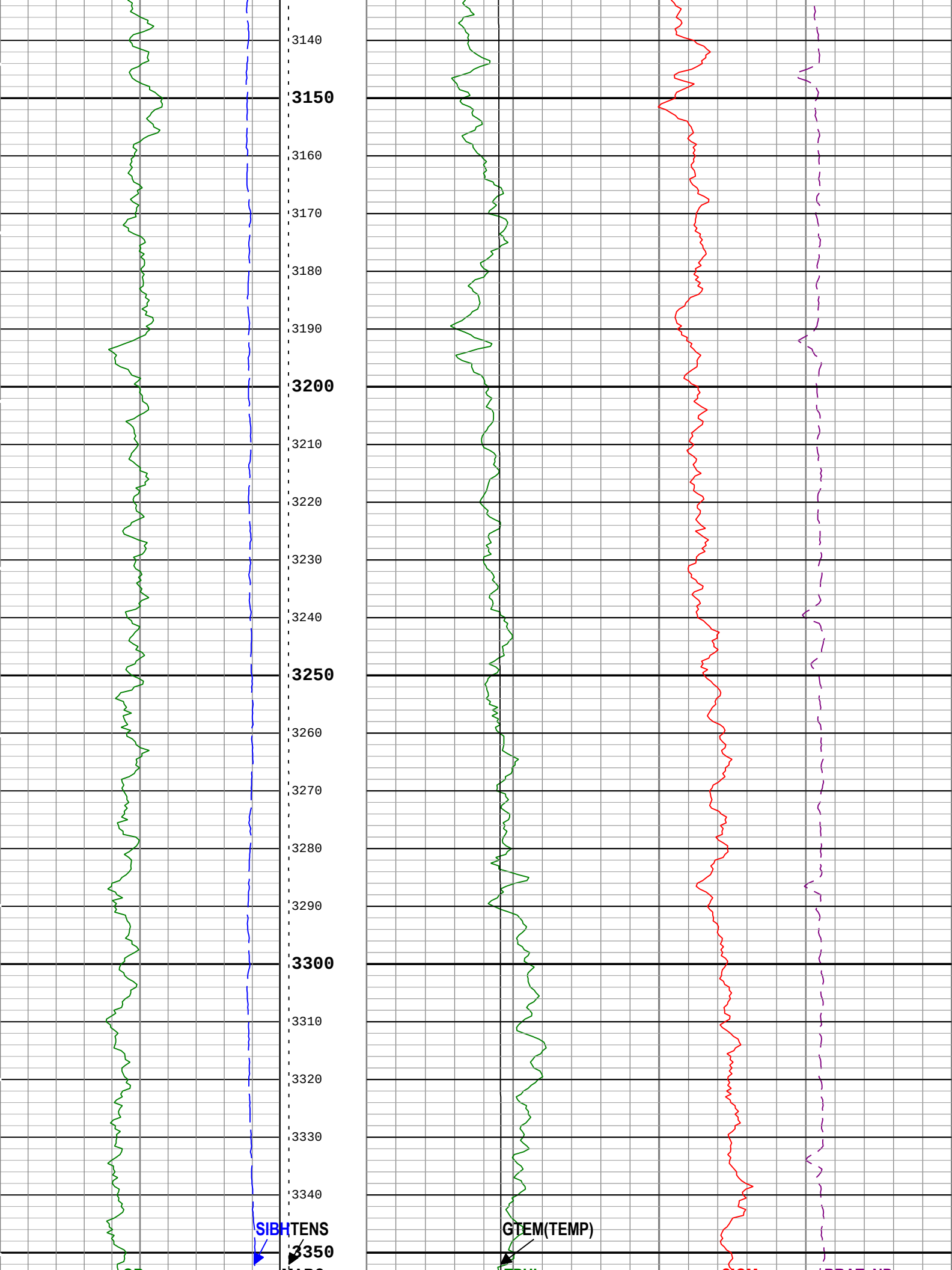
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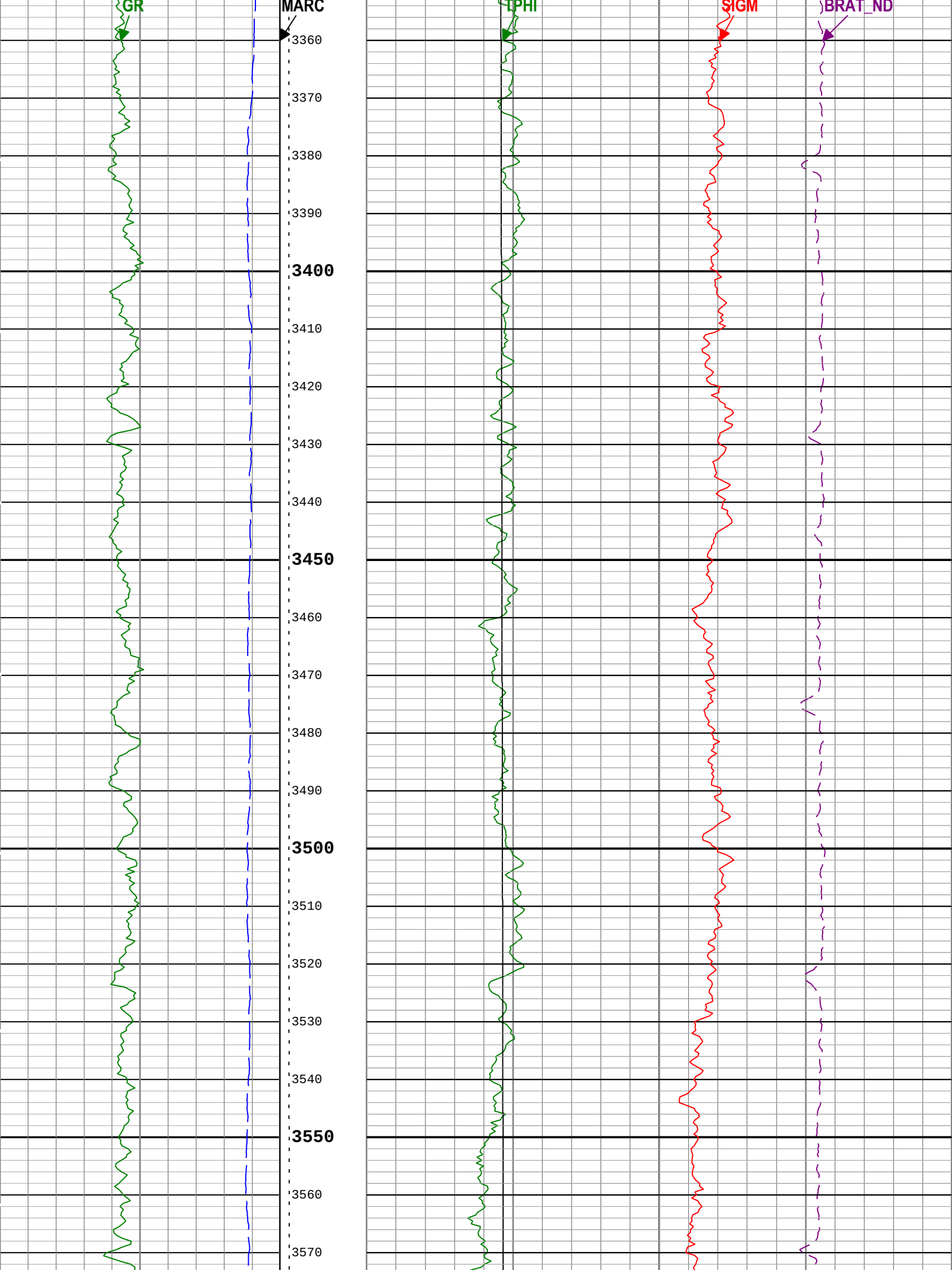
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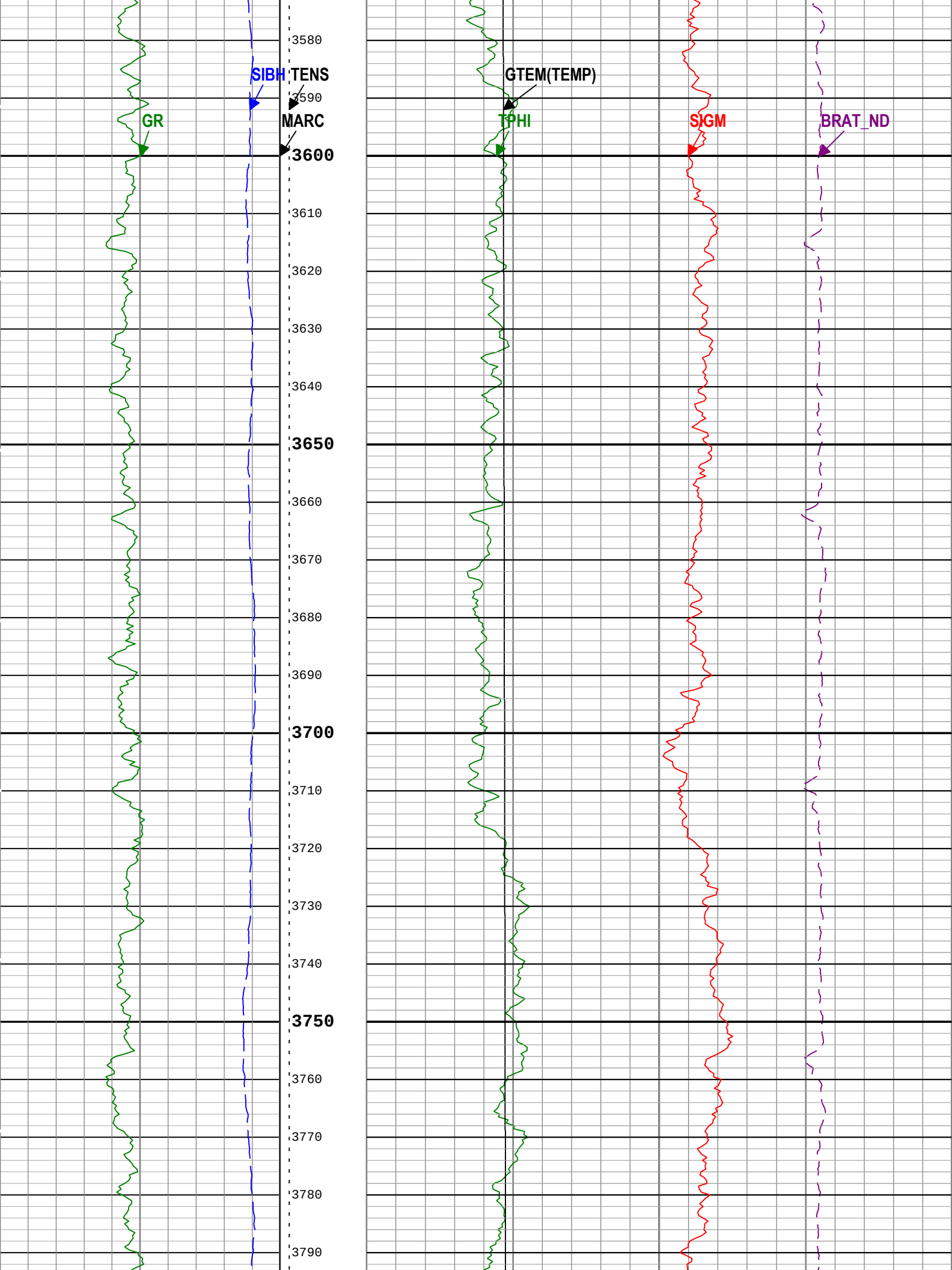
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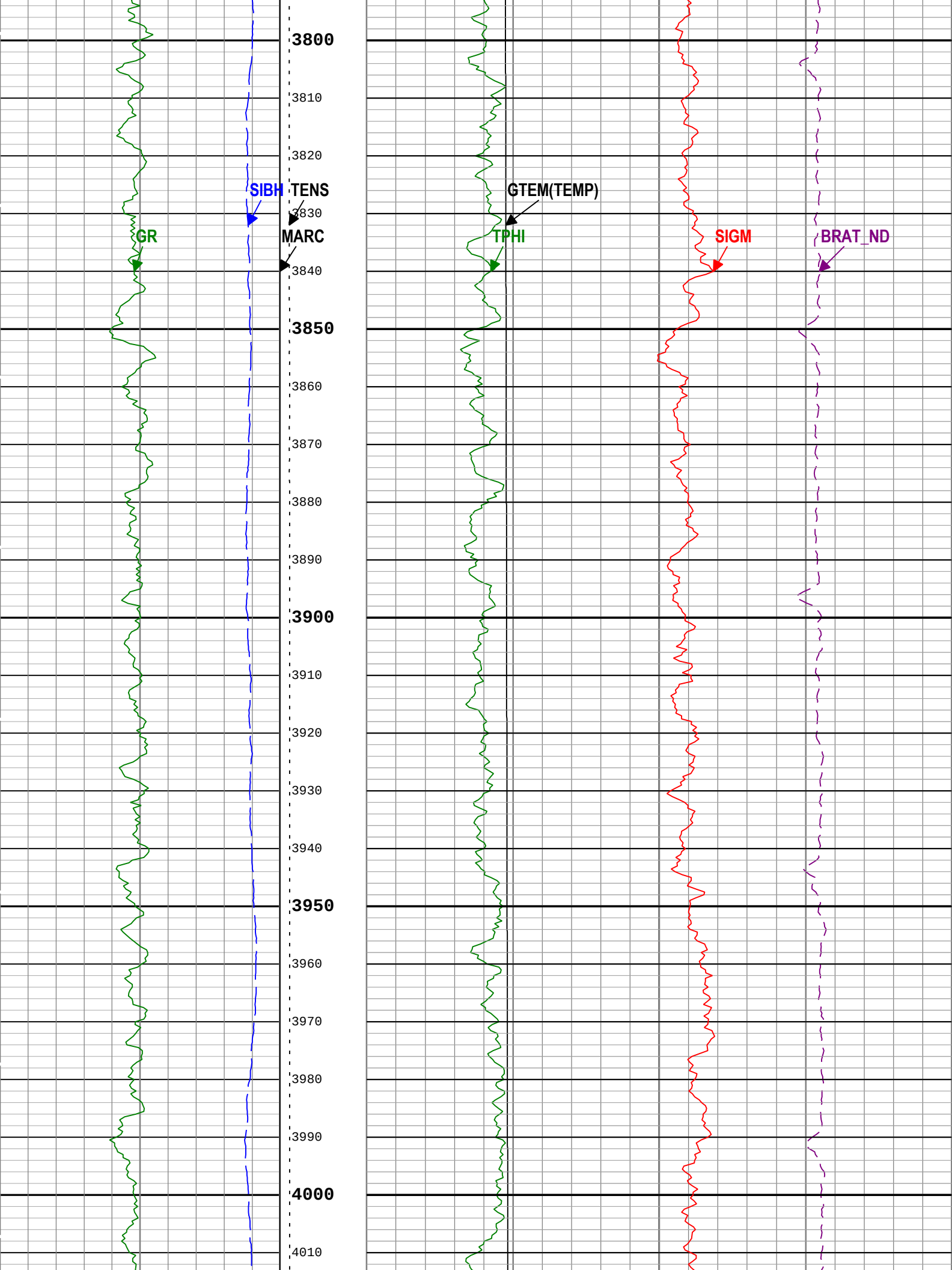
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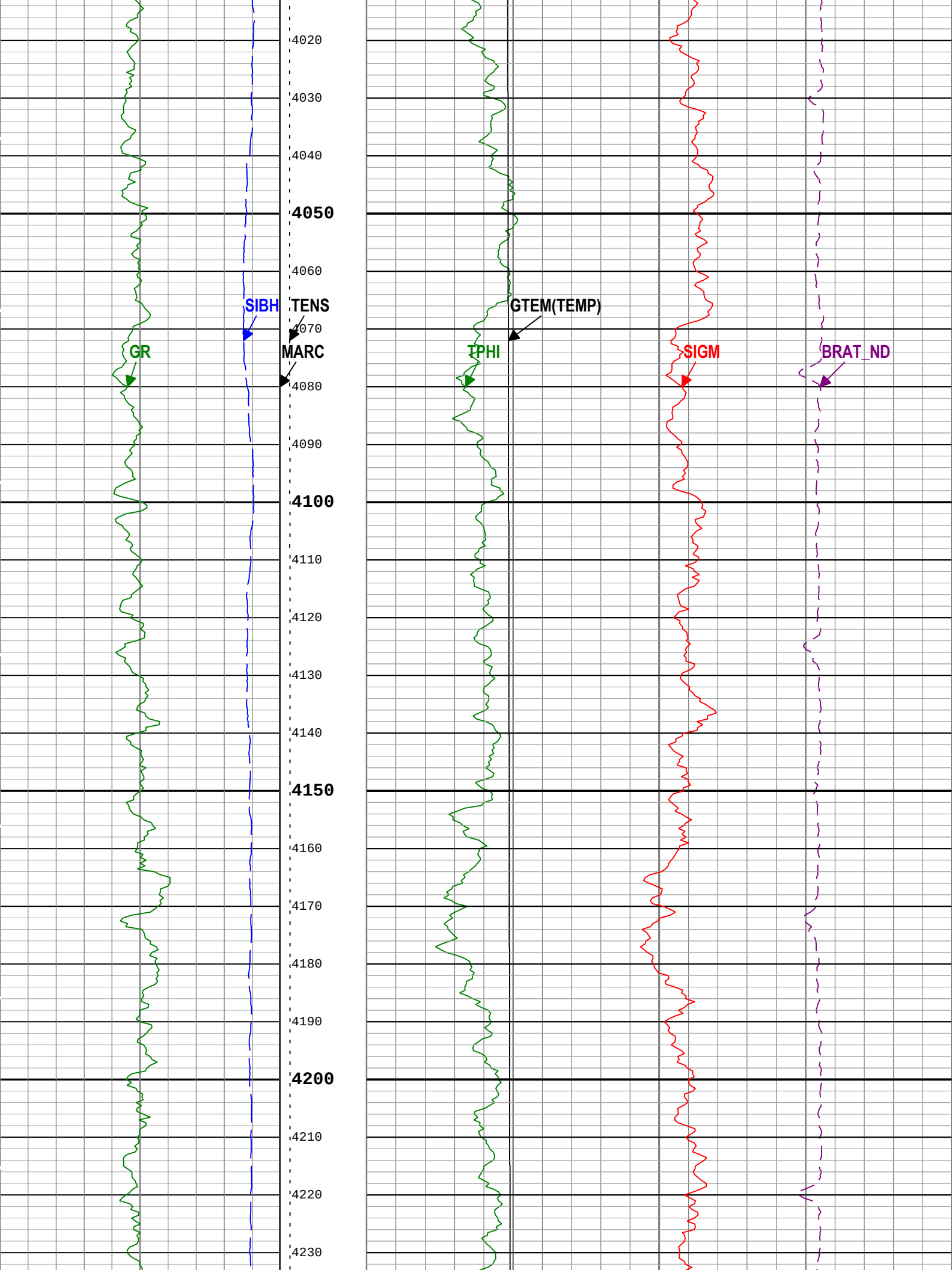
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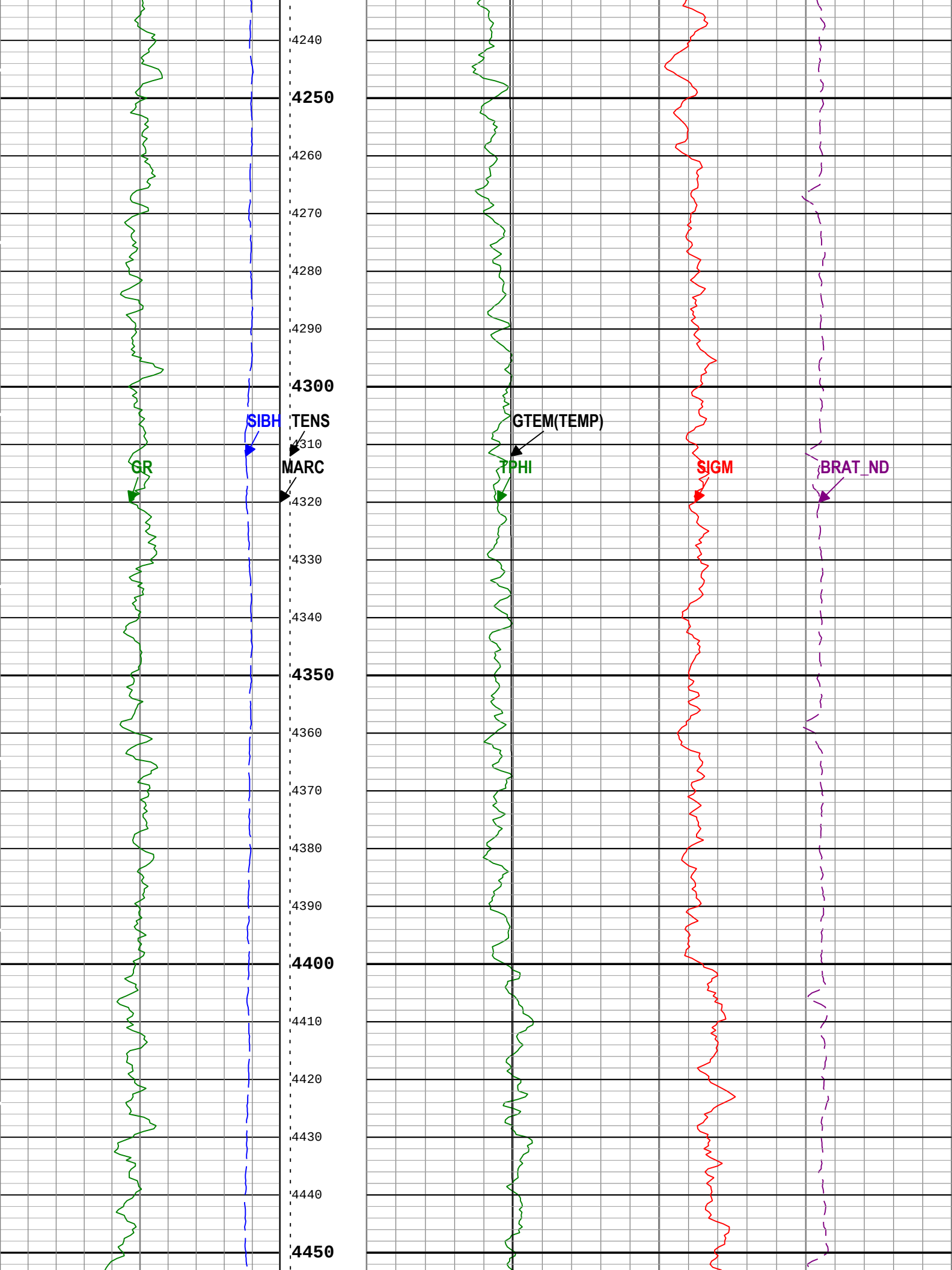
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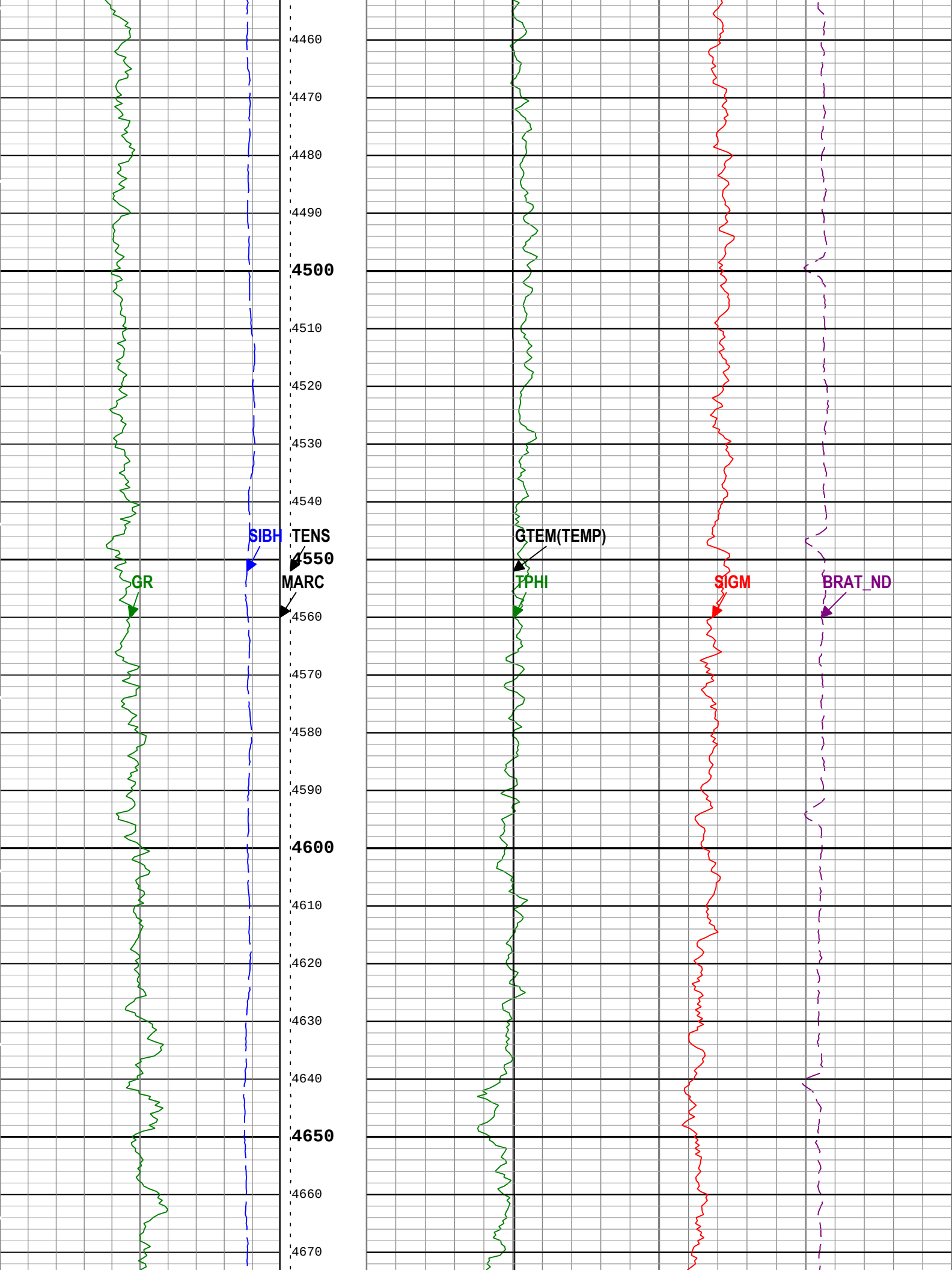
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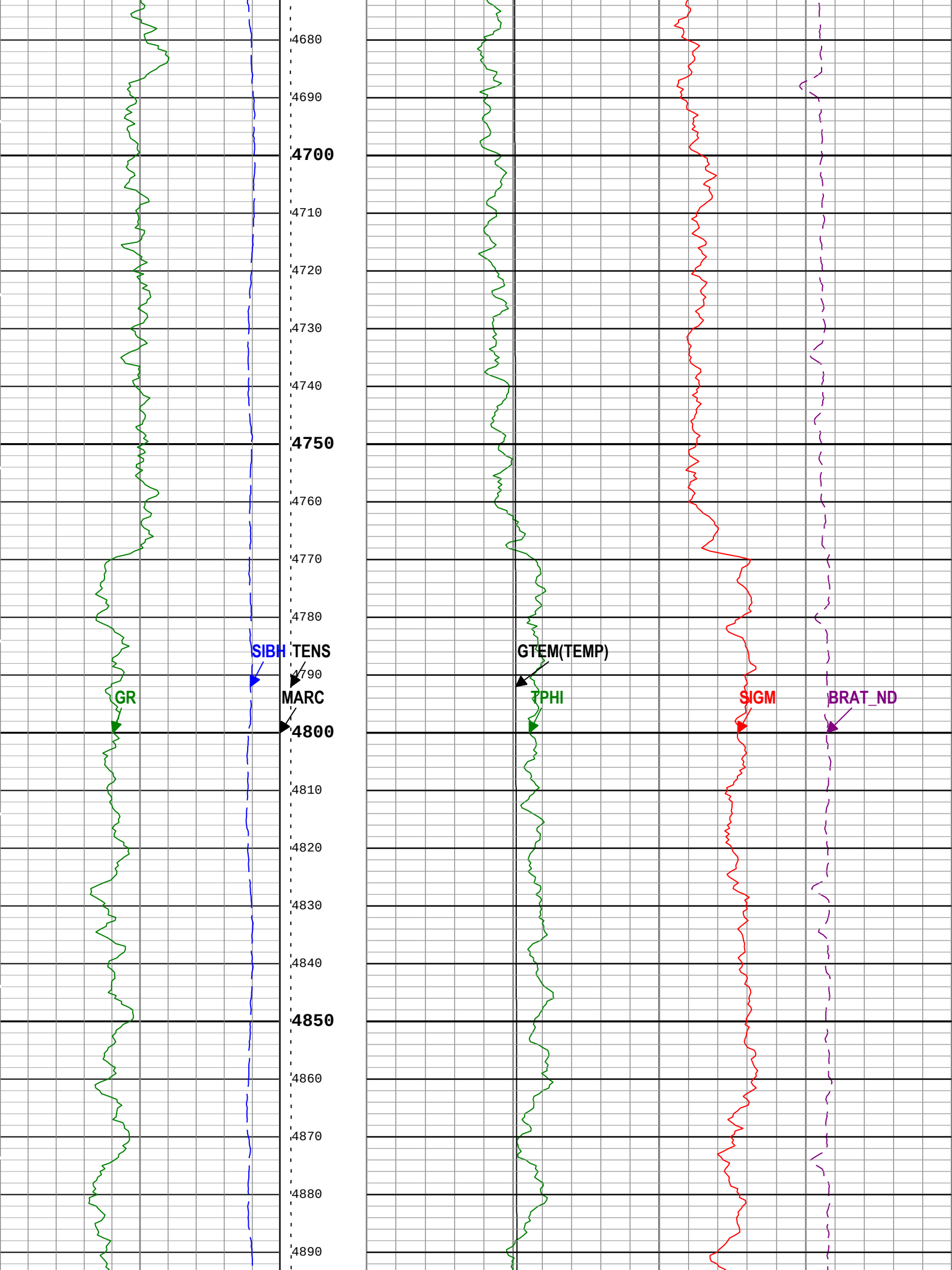
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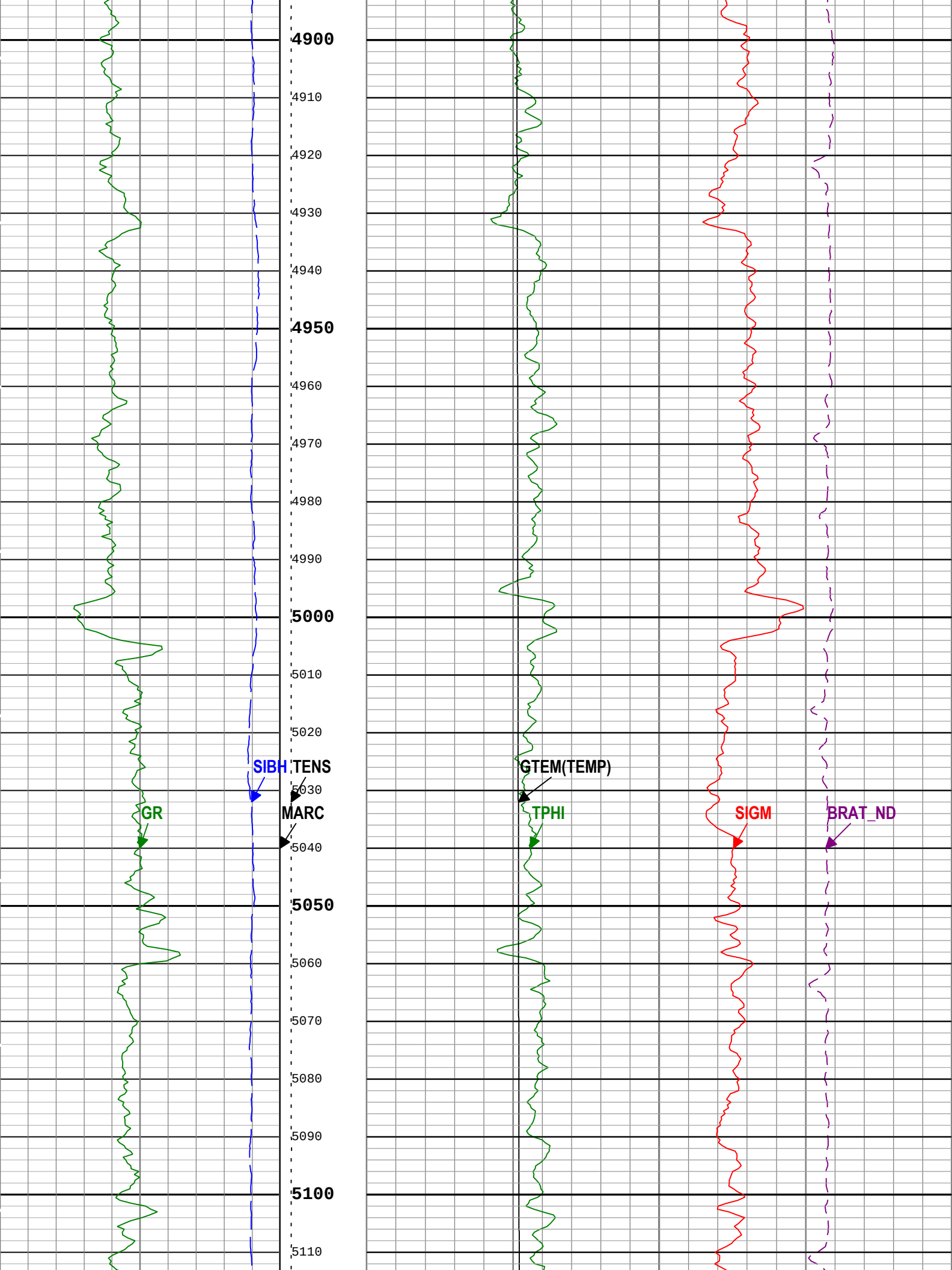
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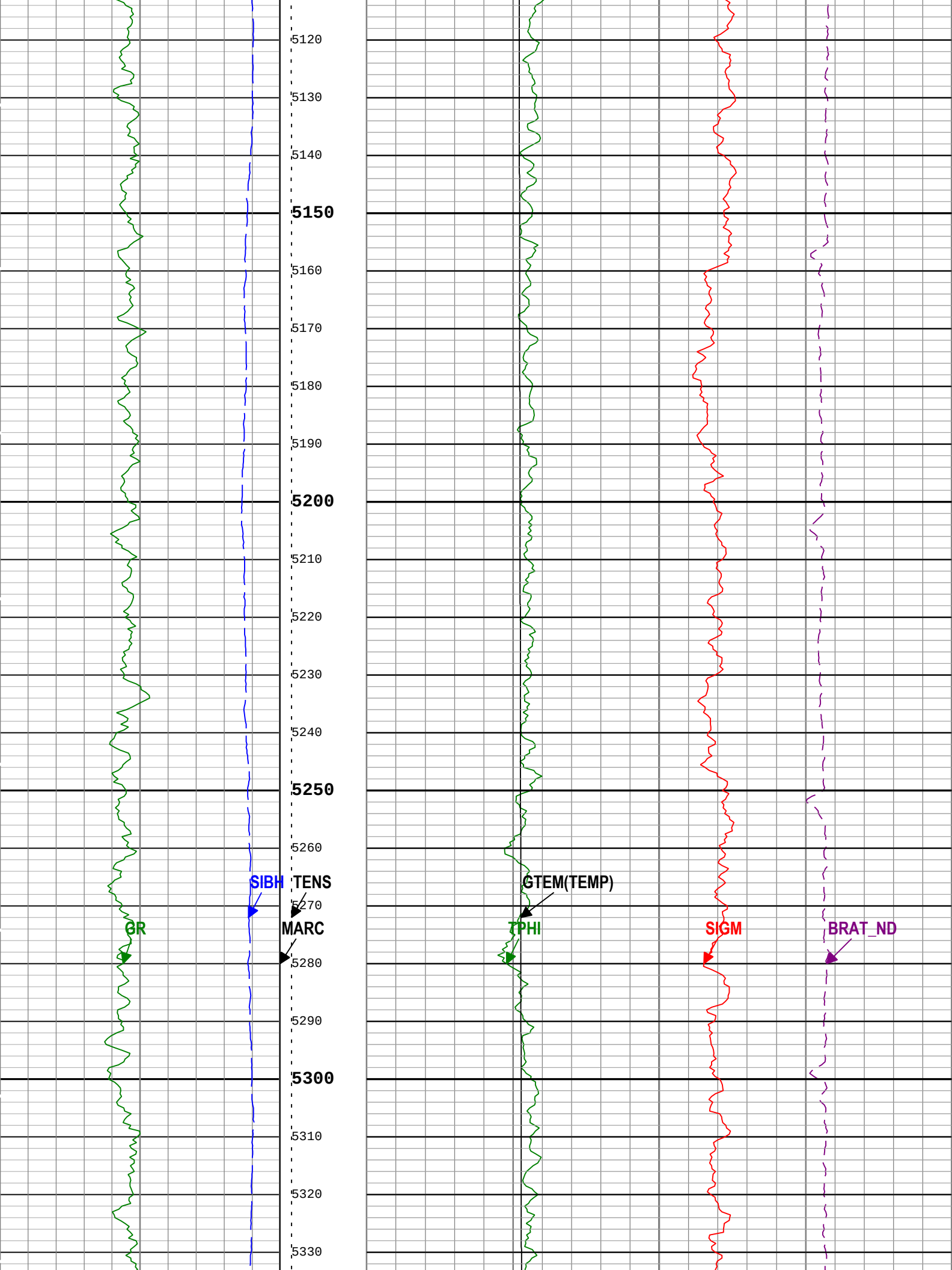
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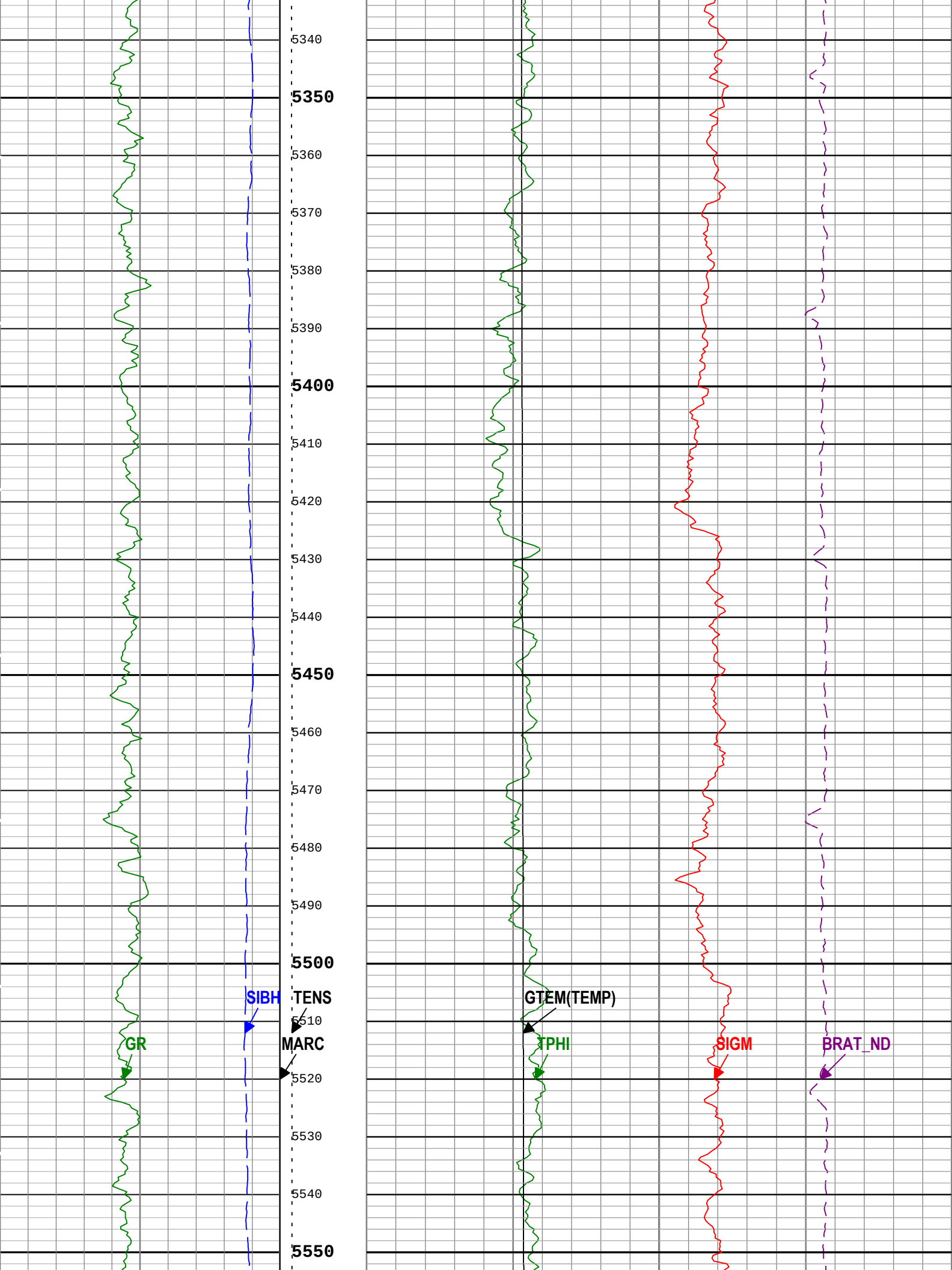
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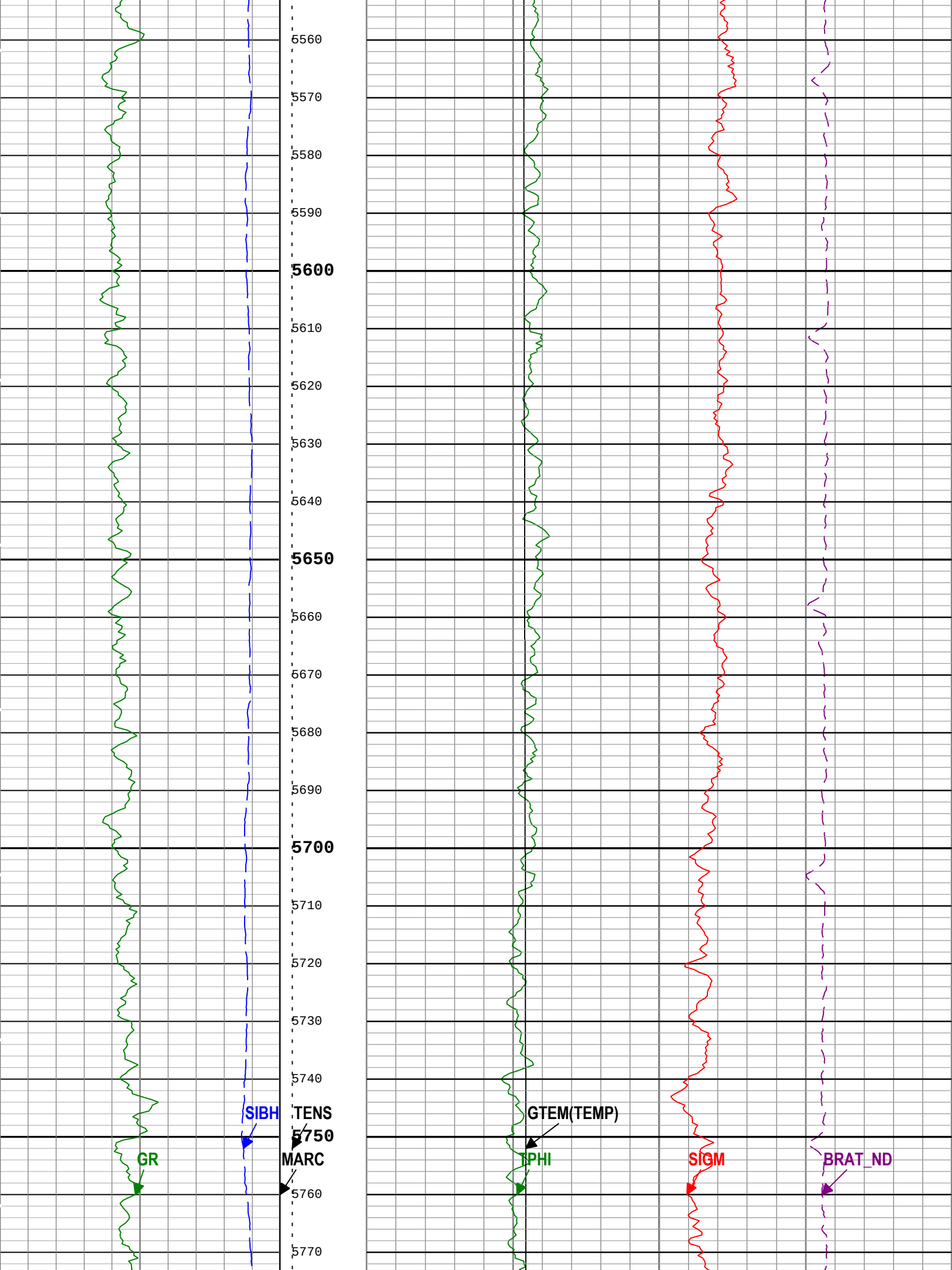
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GTEM(TEMP)
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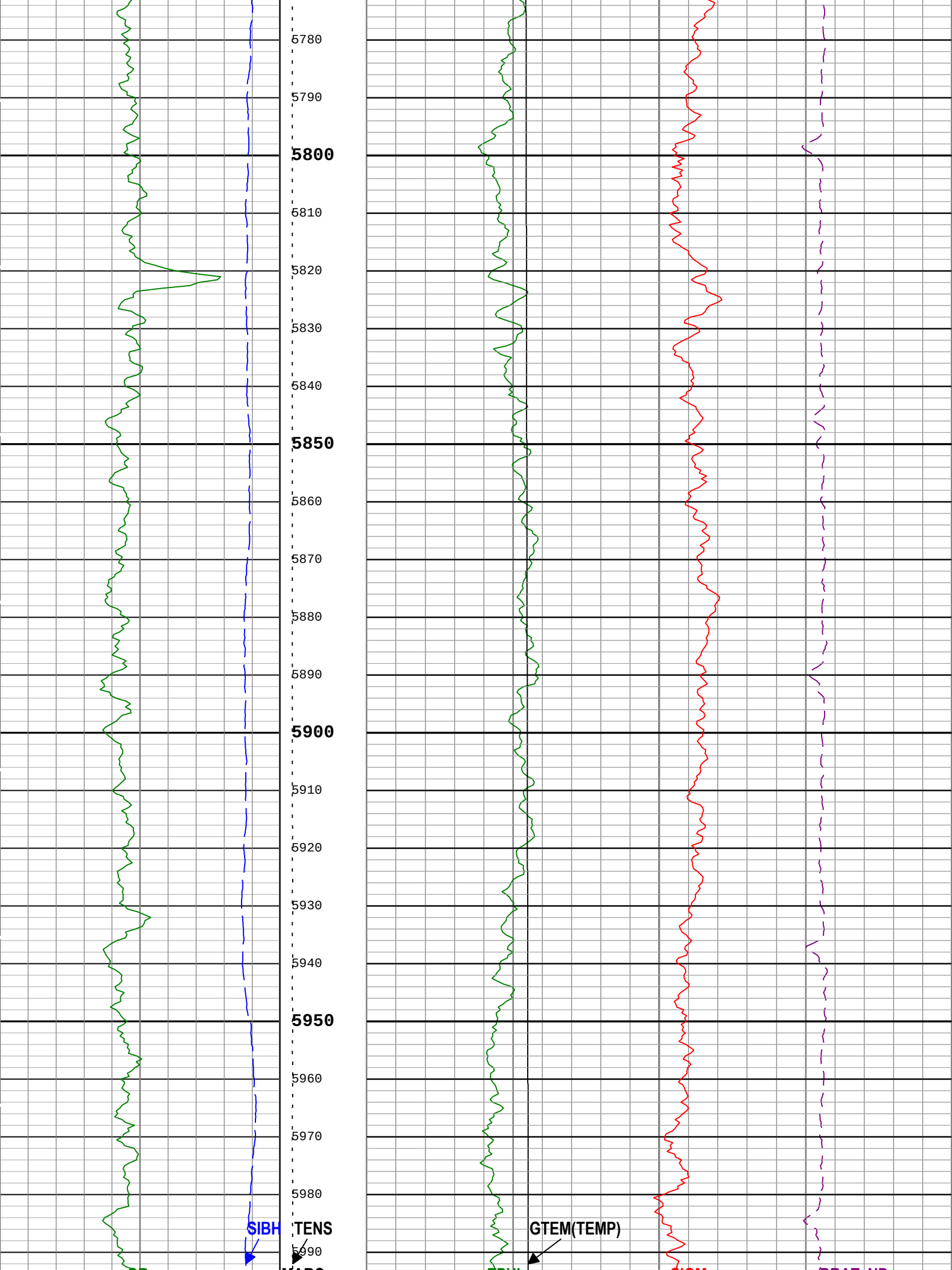
BRAT_ND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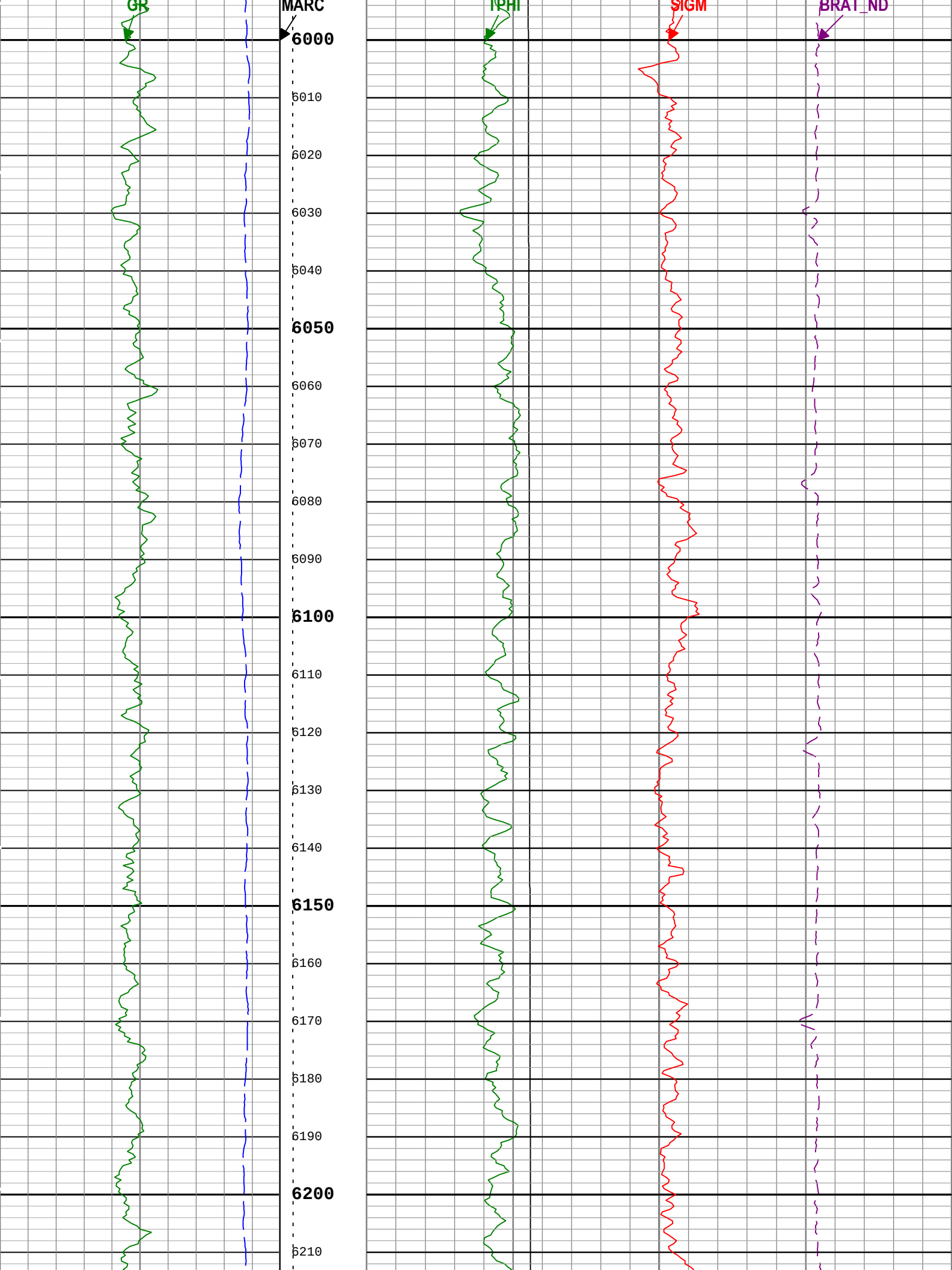
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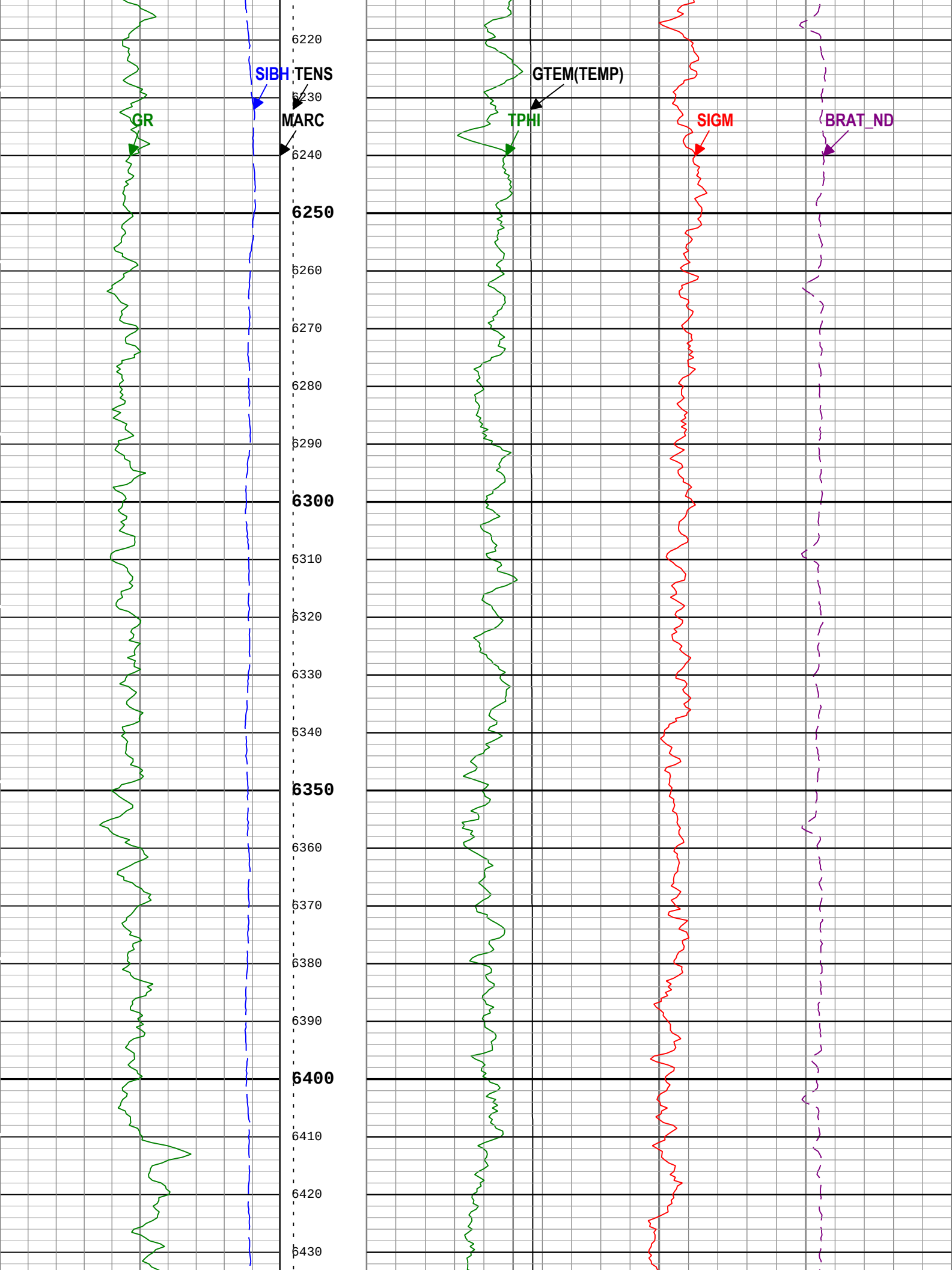
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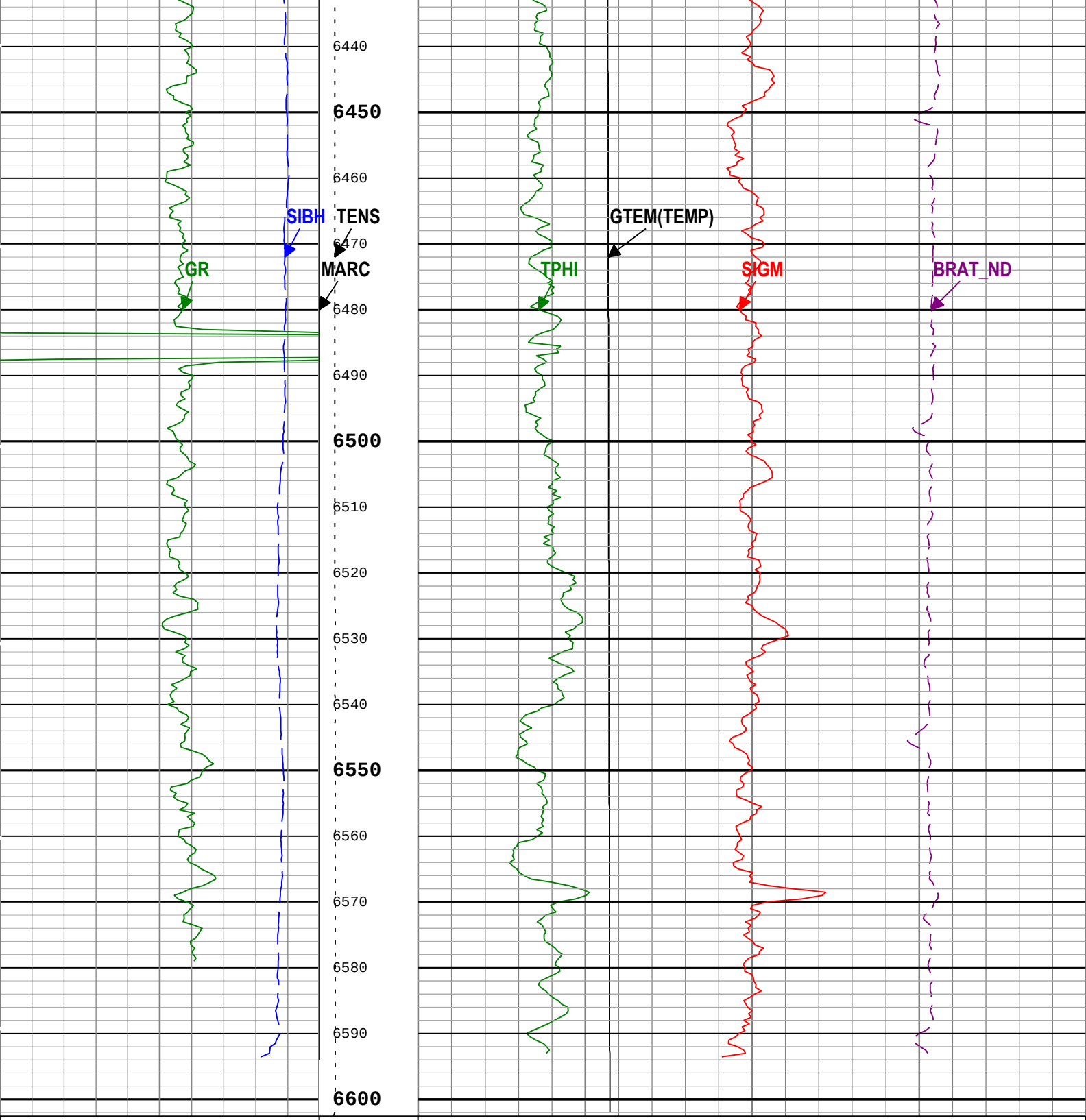


Gamma Ray (GR) PSTP-A 0 gAPI 150	Minitron Arc Count (MARC) PNX-A 0 5	Formation Sigma (Neutron Capture Cross Section) (SIGM) PNX-A 60 cu 0
Sigma Borehole Corrected (SIBH) PNX-A 250 cu 0	Thermal Decay Porosity (TPHI) PNX-A 0.6 ft3/ft3 0	Near Deep Burst Count Rate Ratio (BRAT_ND) PNX-A 60 0
	Cable Tension (TENS) 0 10000 lbf	Generalized Borehole Temperature (GTEM(TEMP)) RT 0 degF 200

TIME_1900 - Time Marked every 60.00 (s)

Description: Pulsar (PNX) Sigma Format: Log (Pulsar (PNX) Sigma) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 15 Oct 2018 15:12:06

Channel Processing Parameters

Two: Parameters

Parameter	Description	Tool	Value	Unit
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BHT	Bottom Hole Temperature	Borehole	153	degF
BS	Bit Size	WLSESSION	Depth Zoned	in
EDF	Elevation of Derrick Floor Above Permanent Datum	WLSESSION	23	ft
EPD	Elevation of Permanent Datum (PDAT) above Mean Sea Level	WLSESSION	5082	ft
GGRD	Geothermal Gradient	Borehole	1	0.01 degF/ft
GSHPV	GSH Processing Version	PNX-A	3.34A0_8	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	GTEM_LINEST(RT)	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	LIMESTONE	
PDAT	Permanent Datum	WLSESSION	GL	
SHT	Surface Hole Temperature	Borehole	68	degF
TD	Total Measured Depth	Borehole	12014	ft

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	13.5	173.5	2353
BS	8.5	2353	6602.5

All depth are actual.

Tool Control Parameters

Two: Parameters

Parameter	Description	Tool	Value	Unit
GRAT_CAL	Gas Ratio Calibration Coefficient	PNX-A	1.12	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h
MAX_TOOL_SPEED	Maximum service speed allowed for, or attained by, a logging tool.	PNX-A	3600	ft/h
PCCG	PSP Downhole CCL Gain	PSTP-A	Time Zoned	

Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
PCCG	12 dB	15-Oct-2018 11:03:11	15-Oct-2018 11:20:08	6602.33	6106.48
PCCG	0 dB	15-Oct-2018 11:20:08	15-Oct-2018 11:35:50	6106.48	5652.02
PCCG	12 dB	15-Oct-2018 11:35:50	15-Oct-2018 14:42:56	5652.02	202.12

All depth are at tool zero.

Two

Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Two	Log[3]:Up	Up	6420.68 ft	7202.97 ft	15-Oct-2018 10:08:37 AM	15-Oct-2018 10:44:35 AM	ON	2.25 ft	No

All depths are referenced to toolstring zero

Log

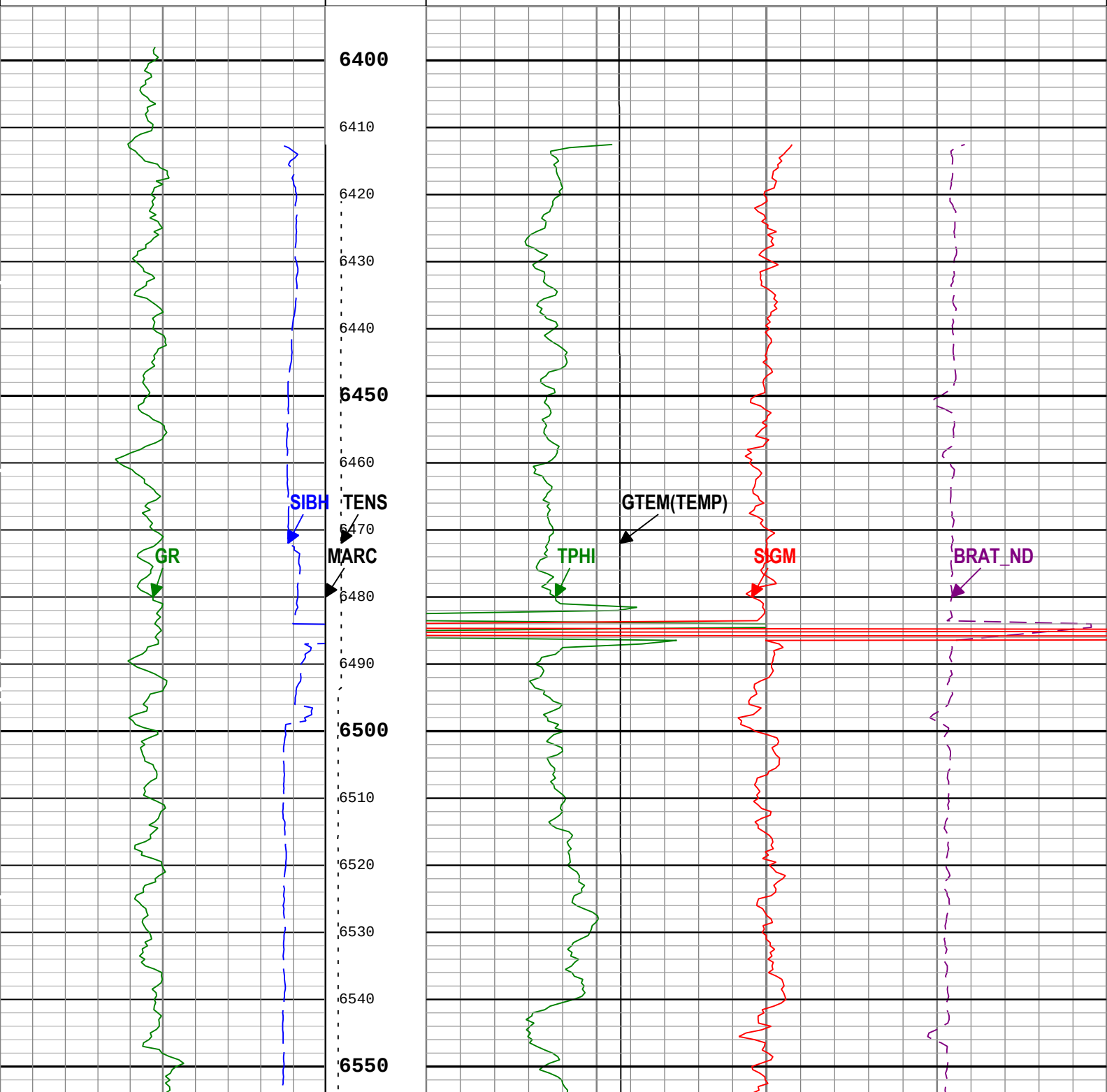
Company:Crestone Peak Resources Operating LLC Well:Sam #3H-25H-M166

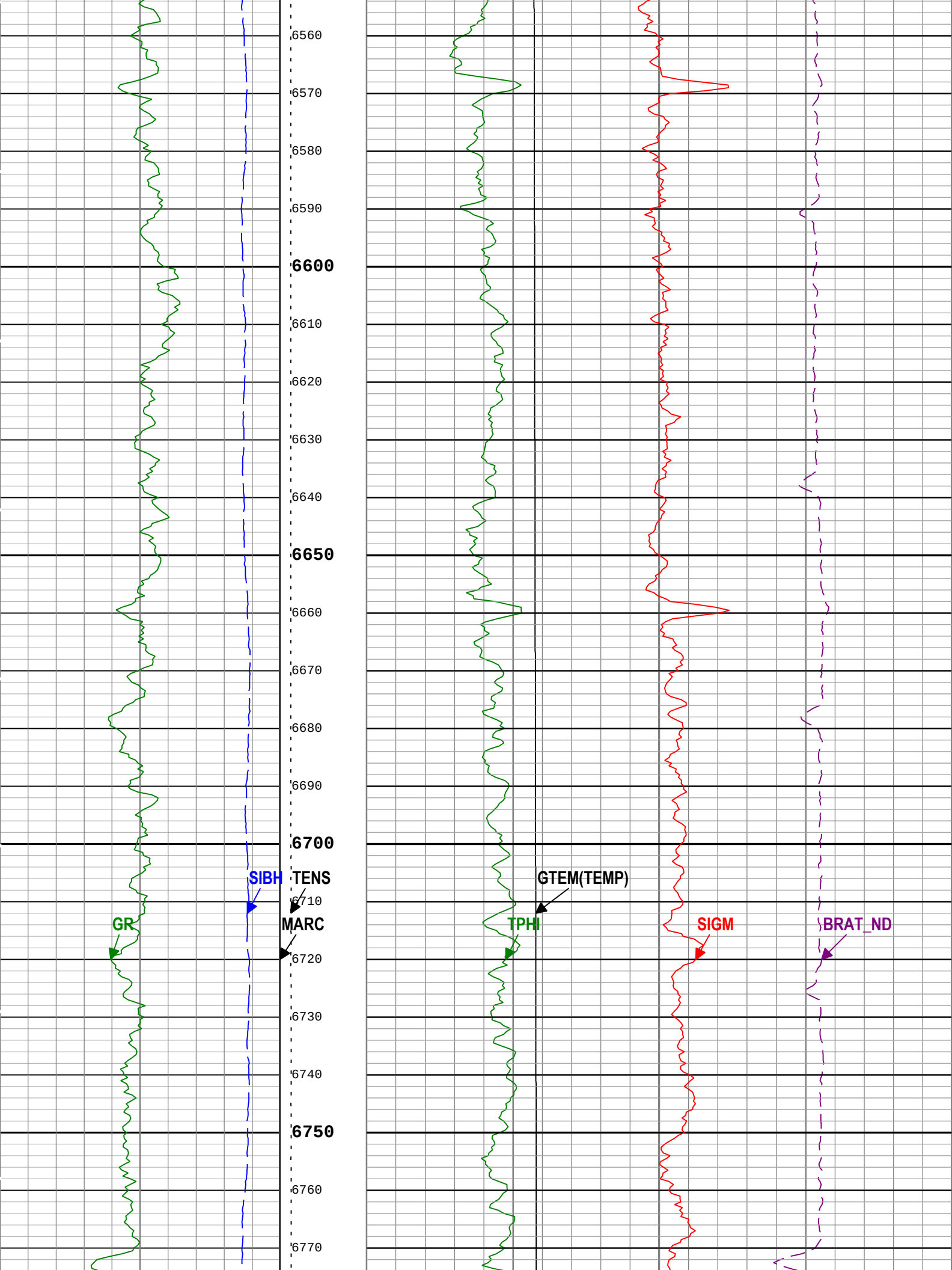
Two: Log[3]:Up:S017

Description: Pulsar (PNX) Sigma Format: Log (Pulsar (PNX) Sigma) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 15-Oct-2018 15:12:09

TIME_1900 - Time Marked every 60.00 (s)

Gamma Ray (GR) PSTP-A	Minitron Arc Count (MARC) PNX-A	Thermal Decay Porosity (TPHI) PNX-A	Near Deep Burst Count Rate Ratio (BRAT_ND) PNX-A
0 gAPI 150	0 5	0.6 ft3/ft3 0	60 0
	Cable Tension (TENS)	Generalized Borehole Temperature (GTEM(TEMP)) RT	
	0 10000 lbf	0 degF 200	
Sigma Borehole Corrected (SIBH) PNX-A		Formation Sigma (Neutron Capture Cross Section) (SIGM) PNX-A	
250 cu 0		60 cu 0	

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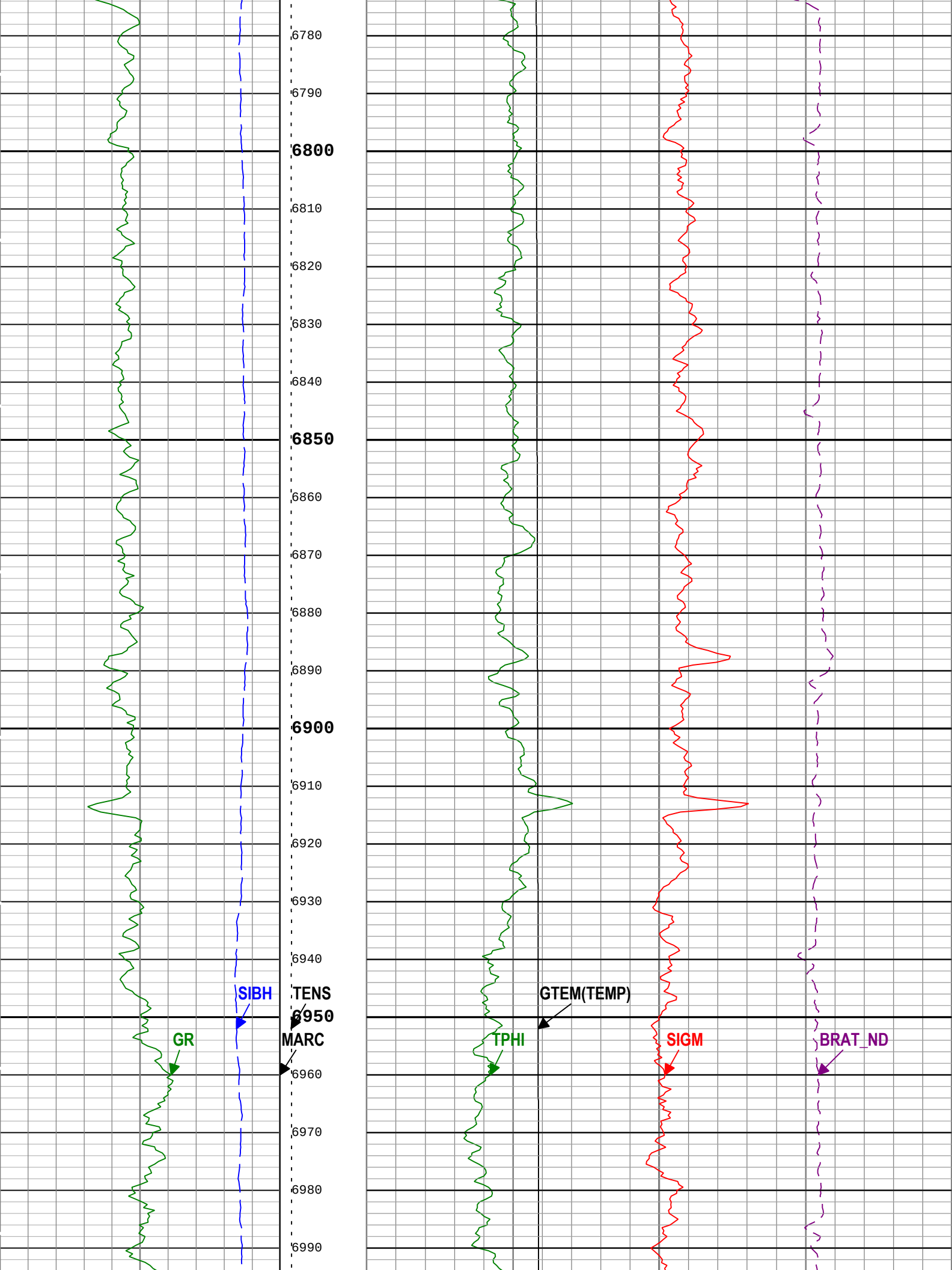
TENS
MARC
GR
GTEM(TEMP)
TPHI
SIGM
BRAT_ND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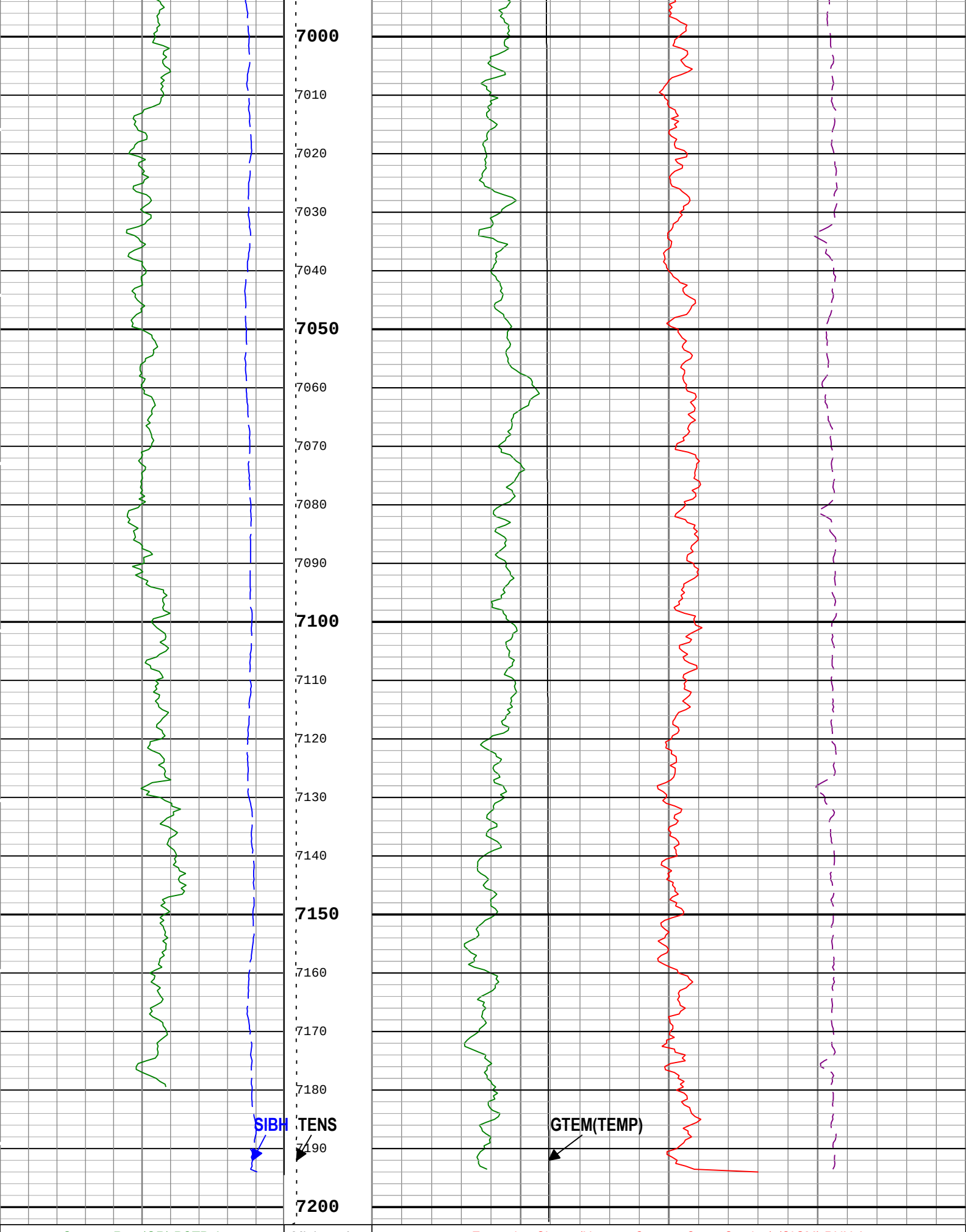
GTEM(TEMP)
TPHI
SIGM
BRAT_ND



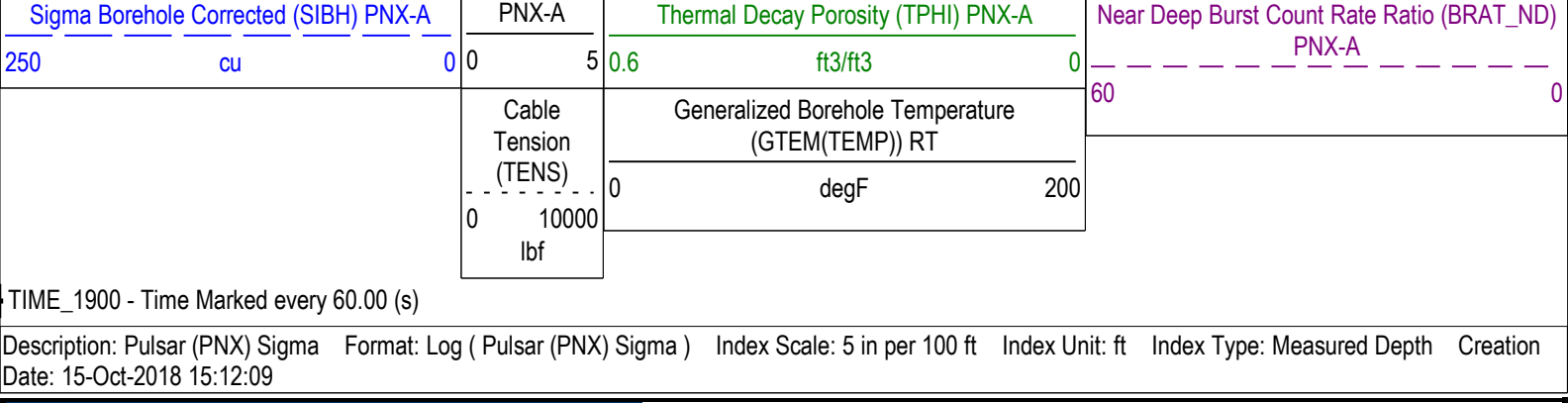
Gamma Ray (GR) PSTP-A

0 gAPI 150

Minitron Arc Count (MARC)

Formation Sigma (Neutron Capture Cross Section) (SIGM) PNX-A

60 cu 0



Description: Pulsar (PNX) Sigma Format: Log (Pulsar (PNX) Sigma) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 15-Oct-2018 15:12:09

Channel Processing Parameters

Two: Parameters

Parameter	Description	Tool	Value	Unit
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BHT	Bottom Hole Temperature	Borehole	153	degF
BS	Bit Size	WLSESSION	8.5	in
EDF	Elevation of Derrick Floor Above Permanent Datum	WLSESSION	23	ft
EPD	Elevation of Permanent Datum (PDAT) above Mean Sea Level	WLSESSION	5082	ft
GGRD	Geothermal Gradient	Borehole	1	0.01 degF/ft
GSHPV	GSH Processing Version	PNX-A	3.34A0_8	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	GTEM_LINEST(RT)	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	LIMESTONE	
PDAT	Permanent Datum	WLSESSION	GL	
SHT	Surface Hole Temperature	Borehole	68	degF
TD	Total Measured Depth	Borehole	12014	ft

Tool Control Parameters

Two: Parameters

Parameter	Description	Tool	Value	Unit
GRAT_CAL	Gas Ratio Calibration Coefficient	PNX-A	1.12	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h
MAX_TOOL_SPEED	Maximum service speed allowed for, or attained by, a logging tool.	PNX-A	3600	ft/h
PCCG	PSP Downhole CCL Gain	PSTP-A	Time Zoned	

Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
PCCG	36 dB	15-Oct-2018 10:08:37	15-Oct-2018 10:23:56	7202.97	6788.3
PCCG	24 dB	15-Oct-2018 10:23:56	15-Oct-2018 10:27:01	6788.3	6699.65
PCCG	12 dB	15-Oct-2018 10:27:01	15-Oct-2018 10:44:35	6699.65	6420.68

All depth are at tool zero.

Two

Repeat Pass

Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data

Two	Log[1]:Up	Up	1973.33 ft	2500.99 ft	15-Oct-2018 9:19:02 AM	15-Oct-2018 9:41:13 AM	ON	1.00 ft	No

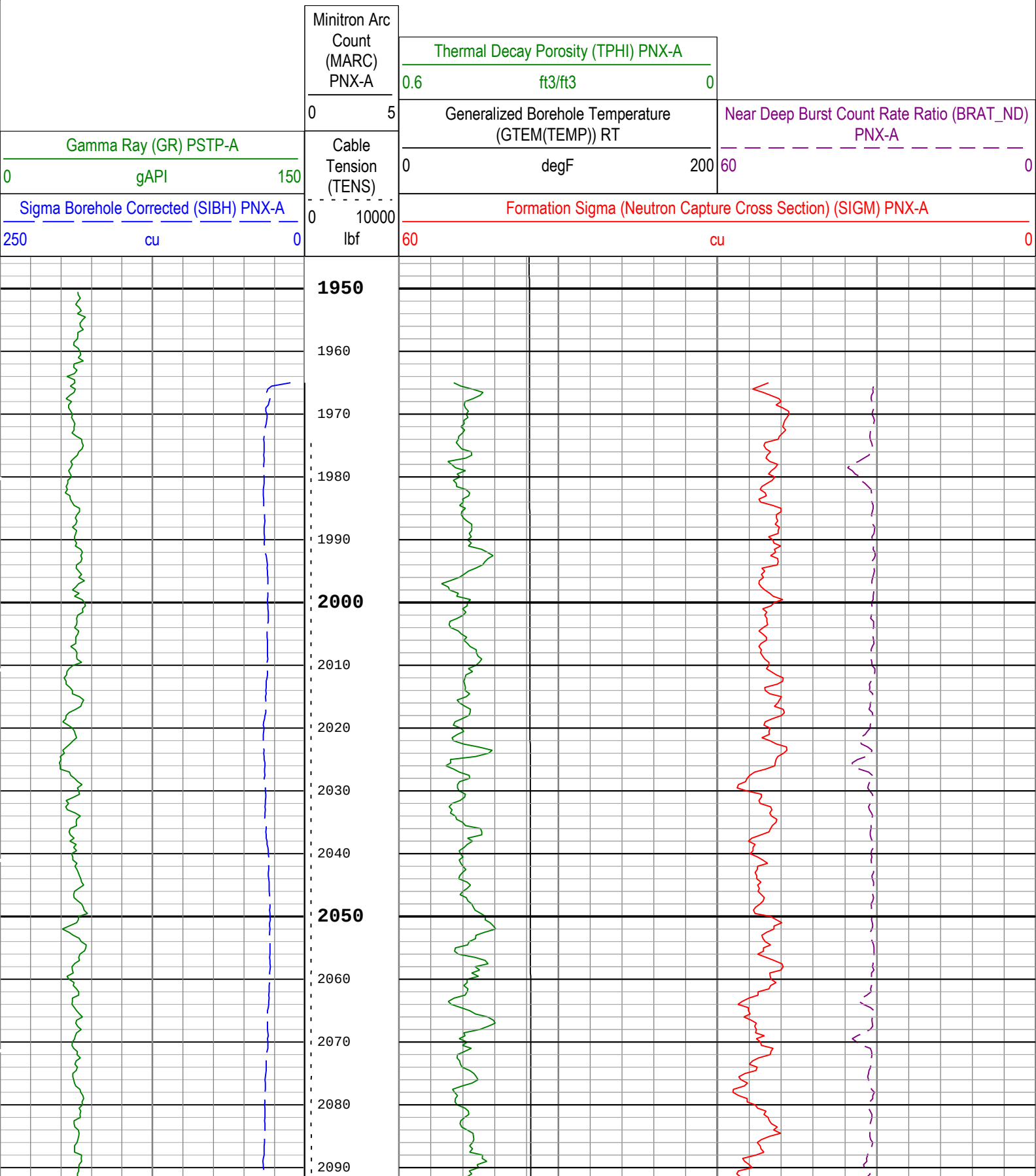
All depths are referenced to toolstring zero

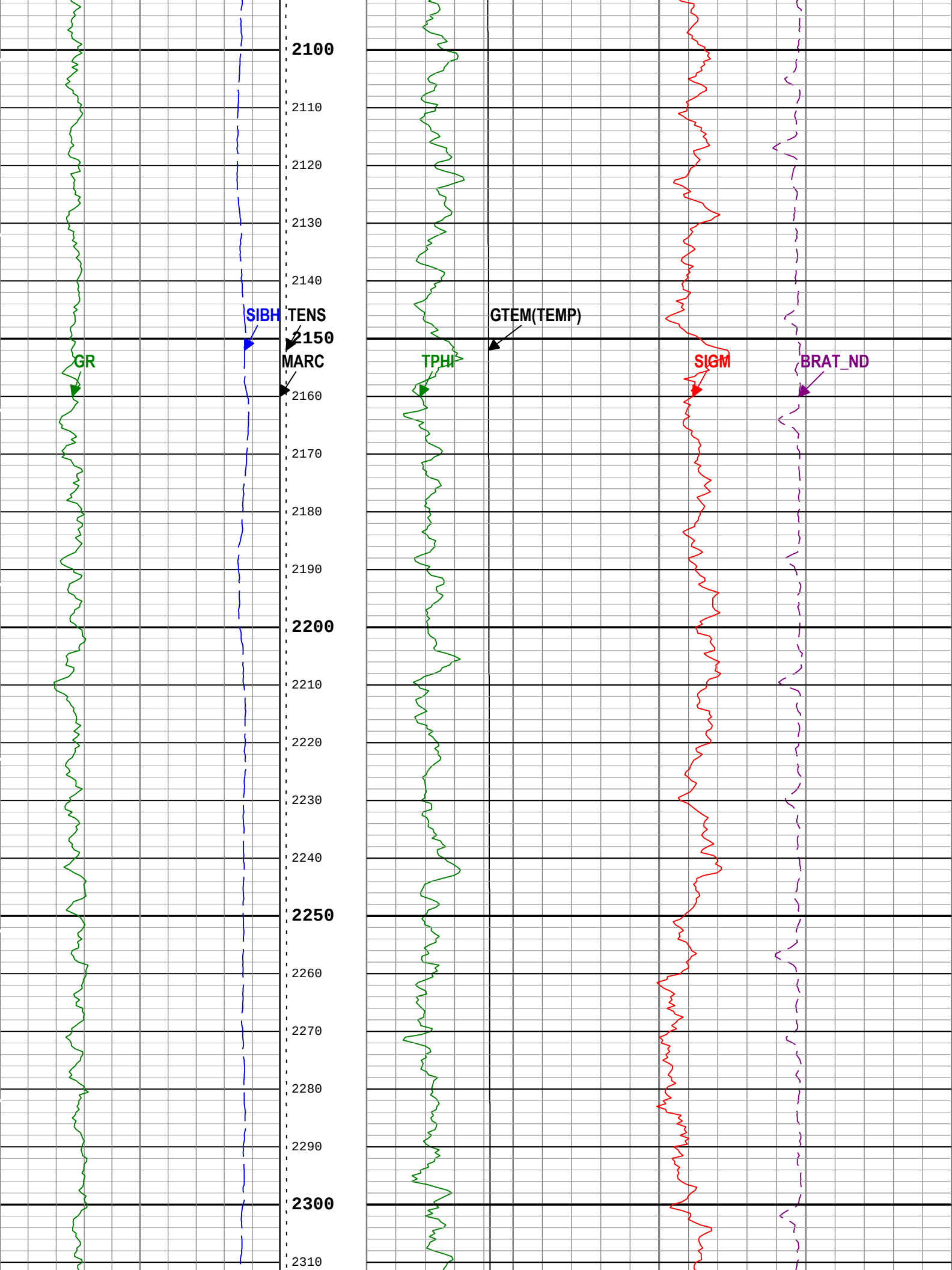
Log Company:Crestone Peak Resources Operating LLC Well:Sam #3H-25H-M166

Two: Log[1]:Up:S017

Description: Pulsar (PNX) Sigma Format: Log (Pulsar (PNX) Sigma) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 15-Oct-2018 15:12:11

TIME_1900 - Time Marked every 60.00 (s)

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GTEM(TEMP)
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SIGM
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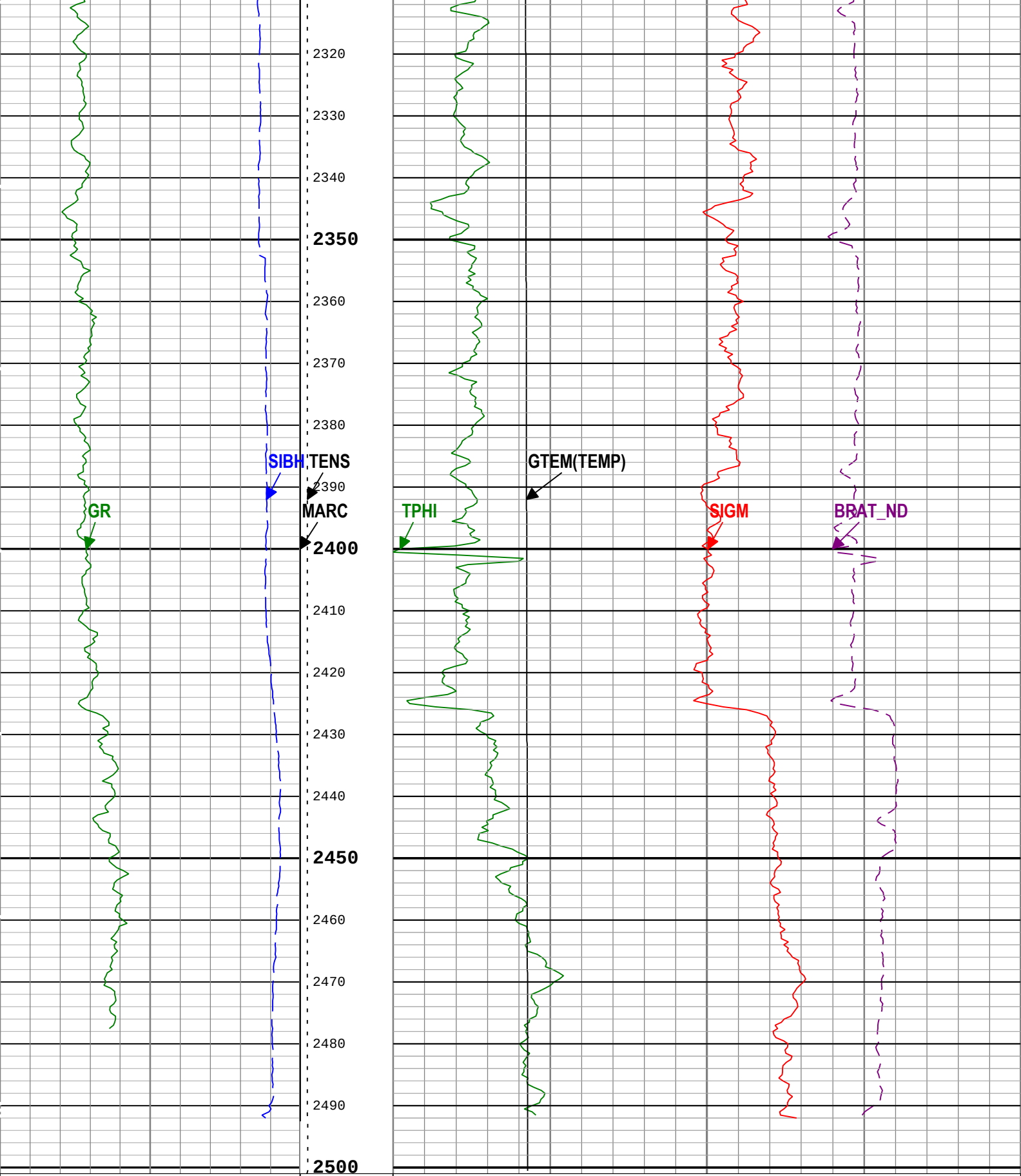
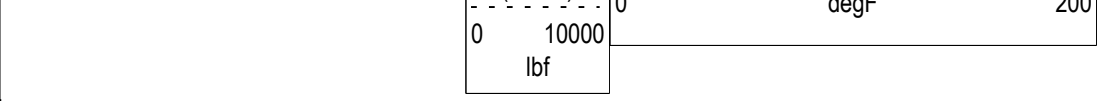


Gamma Ray (GR) PSTP-A 0 gAPI 150	Minitron Arc Count (MARC) PNX-A 0 5	Formation Sigma (Neutron Capture Cross Section) (SIGM) PNX-A 60 cu 0
Sigma Borehole Corrected (SIBH) PNX-A 250 cu 0	Thermal Decay Porosity (TPHI) PNX-A 0.6 ft3/ft3 0	Near Deep Burst Count Rate Ratio (BRAT_ND) PNX-A 60 0
	Cable Tension (TENS) 0 lbf 200	Generalized Borehole Temperature (GTEM(TEMP)) RT 0 degF 200



TIME_1900 - Time Marked every 60.00 (s)

Description: Pulsar (PNX) Sigma Format: Log (Pulsar (PNX) Sigma) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 15-Oct-2018 15:12:11

Channel Processing Parameters

Two: Parameters

Parameter	Description	Tool	Value	Unit
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BHT	Bottom Hole Temperature	Borehole	153	degF
BS	Bit Size	WLSESSION	Depth Zoned	in
EDF	Elevation of Derrick Floor Above Permanent Datum	WLSESSION	23	ft
EPD	Elevation of Permanent Datum (PDAT) above Mean Sea Level	WLSESSION	5082	ft
GGRD	Geothermal Gradient	Borehole	1	0.01 degF/ft
GSHPV	GSH Processing Version	PNX-A	Time Zoned	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	GTEM_LINEST(RT)	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	LIMESTONE	
PDAT	Permanent Datum	WLSESSION	GL	
SHT	Surface Hole Temperature	Borehole	68	degF
TD	Total Measured Depth	Borehole	12014	ft

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	13.5	1945	2353
BS	8.5	2353	2501

All depth are actual.

Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
GSHPV		15-Oct-2018 09:19:02	15-Oct-2018 09:21:36	2500.99	2500.88
GSHPV	3.34A0_8	15-Oct-2018 09:21:36	15-Oct-2018 09:41:13	2500.88	1973.33

All depth are at tool zero.

Tool Control Parameters

Two: Parameters

Parameter	Description	Tool	Value	Unit
GRAT_CAL	Gas Ratio Calibration Coefficient	PNX-A	1.12	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h
MAX_TOOL_SPEED	Maximum service speed allowed for, or attained by, a logging tool.	PNX-A	3600	ft/h
PCCG	PSP Downhole CCL Gain	PSTP-A	Time Zoned	

Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
PCCG	36 dB	15-Oct-2018 09:19:02	15-Oct-2018 09:40:20	2500.99	2000.41
PCCG	24 dB	15-Oct-2018 09:40:20	15-Oct-2018 09:41:13	2000.41	1973.33

All depth are at tool zero.

Calibration Report

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

Primary Equipment :

PBMS-A PBMS-A 1872

Calibration Parameter :

JIG-BKGD

PBMS Well Temp Master Calibration

Master (EEPROM): 18:00:00 12-Jun-2018

PBMS_RTD_THERM (Master) RTD Coefficients

	Tt**0	Tt**1	Tt**2	Tt**3	Tt**4	Tt**5
Tt**0	-88.54722	-129.1039	78.4099	-11.65017	0.6695477	0

PBMS Gamma Ray Master Calibration

Master (EEPROM): 18:00:00 19-Jun-2002

PBMS_GR_MODEL (Master) GR Coefficients

	Rt**0	Rt**1
Rt**0	2000	4370

PBMS A Reference Clock Master Calibration

Master (EEPROM): 18:00:00 12-Jun-2018

PBMS_REF_CLOCK (Master) PBMS A Clock Coefficients

	Temp**0	Temp**1	Temp**2	Temp**3	Temp**4	Temp**5
Temp**0	-276.7041	0.6440434	-0.1898467	0.001524388	-2.797904E-07	0

PBMS A Sapphire Master Calibration

Master (EEPROM): 18:00:00 12-Jun-2018

PBMS_P_GAUGE_PRES (Master) Sapphire Pressure Model Coefficients

	Tt**0	Tt**1	Tt**2	Tt**3	Tt**4	Tt**5
Tp**0	-118.1123	12.00272	-322.7074	49.25692	-2.523703	0
Tp**1	5604.955	-4462.01	1879.447	-306.8184	18.58897	0
Tp**2	3.520729	4.017319	-2.119178	0	0	0
Tp**3	-2.093915	0.5863814	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	-254.7271	19.14842	-4.964984	1.551756	-0.1355999	0
Tt**1	39.25549	-10.72749	0.8563822	-0.3659577	0.03180046	0
Tt**2	13.39578	2.459145	0.07533749	0	0	0
Tt**3	-0.7798195	-0.2329093	0	0	0	0
Tt**4	0	0	0	0	0	0
Tt**5	0	0	0	0	0	0

Company:	Crestone Peak Resources Operating LLC
Well:	Sam #3H-25H-M166
Field:	Wattenberg
County:	Weld
State:	Colorado

Schlumberger

Pulsed Neutron eXtreme
Field Print