Schlumberger

Company: Aurora Power Resources Inc

Well: David Bender 1A

Field: Bijou West

County: Morgan State: Colorado

County: Morgan
Field: Bijou West
Location: SHL: NWSW 2441' FSL & 260' FWL
Well: David Bender 1A
Company: Aurora Power Resources Inc

Platform Express

Compensated Neutron Log

LithoDensity

Location:			
SHL: NWSW 2441' FSL & 260' FWL	Elev.:	K.B.	4476.00 ft
Section 12, Township 4N, Range 60W		G.L.	4462.00 ft
Lat: 40.326670, Long: -104.054240		D.F.	4475.00 ft
Permanent Datum: Ground Level	Elev.:	4462.00 f	
Log Measured From: Kelly Bushing	14.00 ft	above Perm.Datum	
Drilling Measured From: Kelly Bushing			

API Serial No.	Section:	Township:	Range:
05-087-08178-00	12	4N	60W

Logging Date		16-Feb-2014			
Run Number		Run 1: PEX-AIT			
Depth Driller		6585.00 ft			
Schlumberger Depth		6585.00 ft			
Bottom Log Interval		6590.00 ft			
Top Log Interval		536.00 ft			
Casing Driller Size @ Depth		8.625 in @ 500.00 ft			
Casing Schlumberger		500 ft			
Bit Size		7.875 in			
Type Fluid In Hole		Chemical Gel			
MUD Density	Viscosity	9.1 lbm/gal	34 s		
MUD Fluid Loss	PH	10 cm3	8.5		
MUD Source of Sample		Flowline			
RM @ Meas Temp		1.2 ohm.m @ 70 degF			
RMF @ Meas Temp		0.9 ohm.m @ 70 degF			
RMC @ Meas Temp		1.5 ohm.m @ 70 degF			
Source RMF	RMC	Calculated	Calculated		
RM @ BHT	RMF @ BHT	0.51 @ 175	0.38 @ 175		
Max Recorded Temperatures		175 degF			
Circulation Stopped	Time	15-Feb-2014	15:00:00		
Logger on Bottom	Time	16-Feb-2014	01:30:34		
Unit Number	Location:	2135	Fort Morgan, CO		
Recorded By		Max Pace			
Witnessed By		Ed Jones			

Disclaimer

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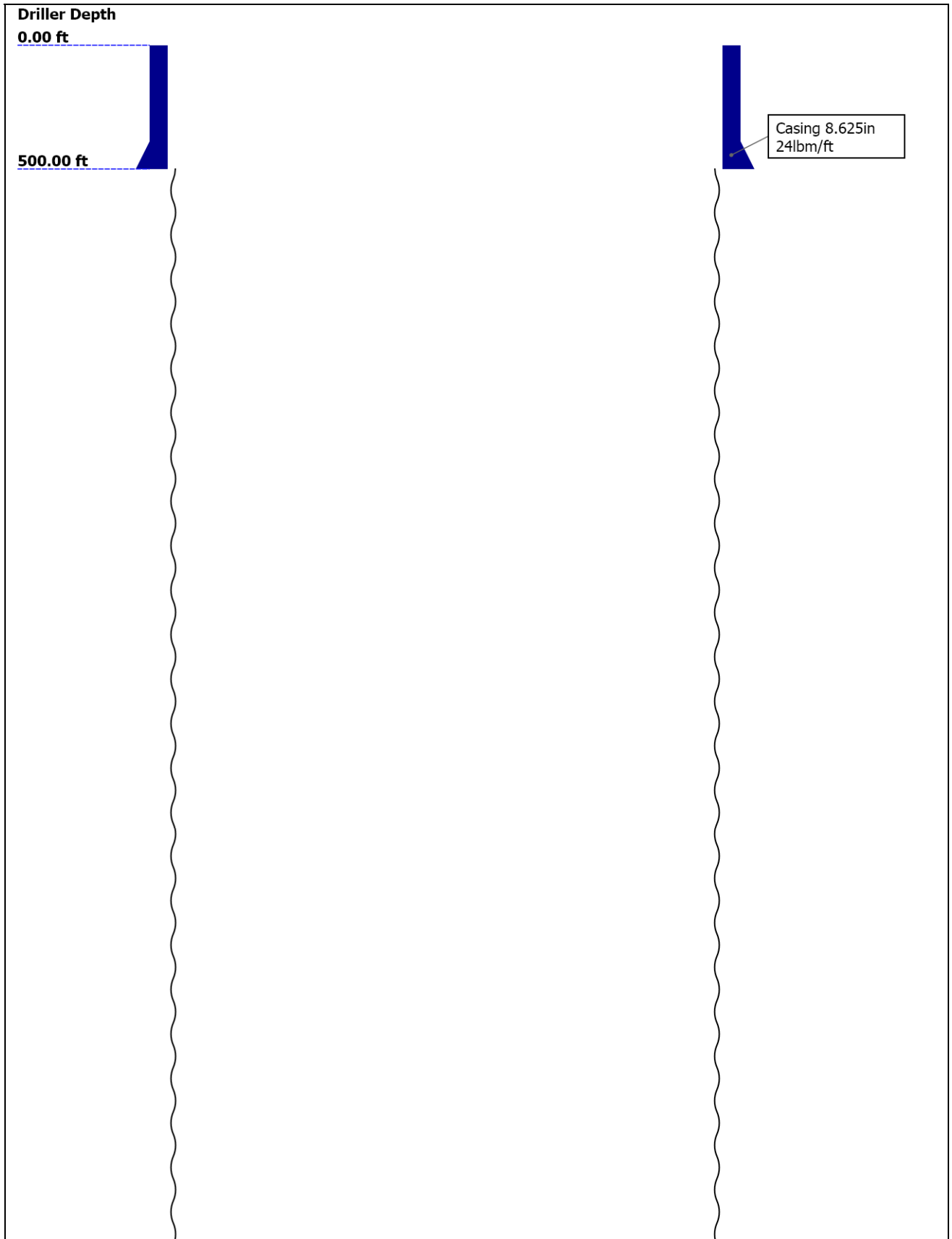
Well Sketch



Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	7.875					
Top Driller (ft)	500					
Top Logger (ft)	500					
Bottom Driller (ft)	6585					
Bottom Logger (ft)	6585					
Casing						
Size (in)	8.625					
Weight (lbm/ft)	24					
Inner Diameter (in)	8.097					
Grade	N80					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	500					
Bottom Logger (ft)	500					

Borehole Fluids

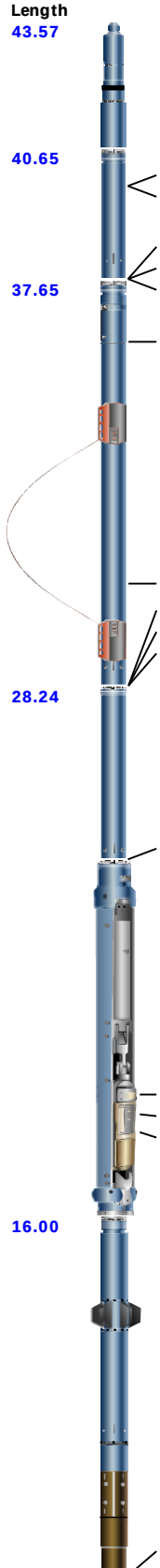
Parameter(unit)	Run 1: PEX-AIT					
Fluid Type	Water					
Fluid Name	Chemical Gel					
Max Recorded Temperatures (degF)	175					
Source of Sample	Flowline					
Salinity (ppm)	0					
Density (lbm/gal)	9.1					
Funnel Viscosity (s)	34					
Fluid Loss (cm3)	10					
PH	8.5					
Date/Time Circulation Stopped	15-Feb-2014 15:00:00					
Date Logger on Bottom	16-Feb-2014					
Time Logger on Bottom	01:30:34					
Source RMF	Calculated					
RMC	Calculated					
RM @ Meas Temp (ohm.m@degF)	1.2 @ 70					
RMF @ Meas Temp (ohm.m@degF)	0.9 @ 70					

(ohm.m@degF)						
RMC @ Meas Temp (ohm.m@degF)	1.5 @ 70					
RM @ BHT (ohm.m@degF)	0.51 @ 175					
RMF @ BHT (ohm.m@degF)	0.38 @ 175					
RMC @ BHT (ohm.m@degF)	0.63 @ 175					
Total Solid (%)						
High Gravity Solids (%)						

Remarks and Equipment Summary

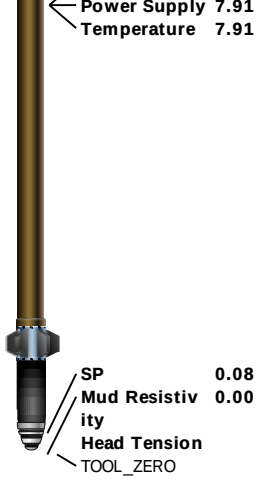
Run 1: PEX-AIT: Toolstring

Equip name	Length	MP name	Offset
LEH-QT LEH-QT	**43.57**		
DTC-H ECH-KC DTC-H	**40.65**	**CTEM** **HV**	**39.75** **0.00**
HGNS-H HGNH NPV-N NSR-F:5215 HACCZ-H:5955 HGNS-H HMCA-H	**37.65**	**ToolStatus** **TelStatus** **Temperature** **GR**	**37.65** **37.65** **37.62** **36.91**
HDRS-H ECH-MEB HRCC-H HRMS-H HRGD-H:4791 GSR-J:5240 Backscatter GPV-Q Short Spacing Long Spacing:289 10	**28.24**	**CNL Porosity** **HGNS** **HMCA** **Accelerometer** **HRCC** **MCFL** **Caliper** **TLD Density**	**30.57** **28.24** **28.24** **0.00** **24.24** **18.81** **18.33** **17.94**
AIT-M:208 AMIS:208 AMRM:208	**16.00**	**Induction**	**7.91**



Run 1: PEX-AIT: Remarks

All Schlumberger depth control procedures followed
IDW used as primary depth reference
Z chart used as secondary depth reference
Matrix type and density zoned as per client request
Tool string run as per tool sketch
Crew: Max Pace, Ian Derry, Jake Jump
This is the first run in hole



Lengths are in ft
Maximum Outer Diameter = 9.000 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

Depth Summary

	Run 1: PEX-AIT		
Depth Measuring Device			
Type	IDW-B		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Calibration Cable Type			
Wheel Correction 1	0		
Wheel Correction 2	0		
Tension Device			
Type	CMTD-B/A		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Number of Calibration Points	0		
Logging Cable			
Type	7-46NT-XS		
Serial Number			
Length	24000.00 ft		
Conveyance Type	Wireline		
Rig Type	Land		

Run 1: PEX-AIT: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		

Run 1: PEX-AIT

5" Porosity

Software Version

Acquisition System	Version
MaxWell	4.0.9163.3000
Application Patch	Patch-SP-10767_13393-4.0.9163.3001

Computation	Description	Version

HENVIR	Computation Ensemble for the HGNS Neutron environmental corrections	4.0.9033.3000
DepthCorrection	DepthCorrection	4.0.9213.3000

Tool Elements	Description	Software Version	Firmware Version
HRCC-H	HILT High-Resolution Control Cartridge, 150 degC	4.0.9231.3000	2.0
HGNS-H	HILT Gamma-Ray and Neutron Sonde, 150 degC	4.0.9231.3000	2.0
HRGD-H	HILT Resistivity Gamma-Ray Density Device, 150 degC	4.0.9231.3000	3.0

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1: PEX-AIT	Main[6]:Up	Up	412.38 ft	6608.73 ft	16-Feb-2014 1:44:28 AM	16-Feb-2014 3:30:23 AM	ON	0.00 ft	No

All depths are referenced to toolstring zero

Log

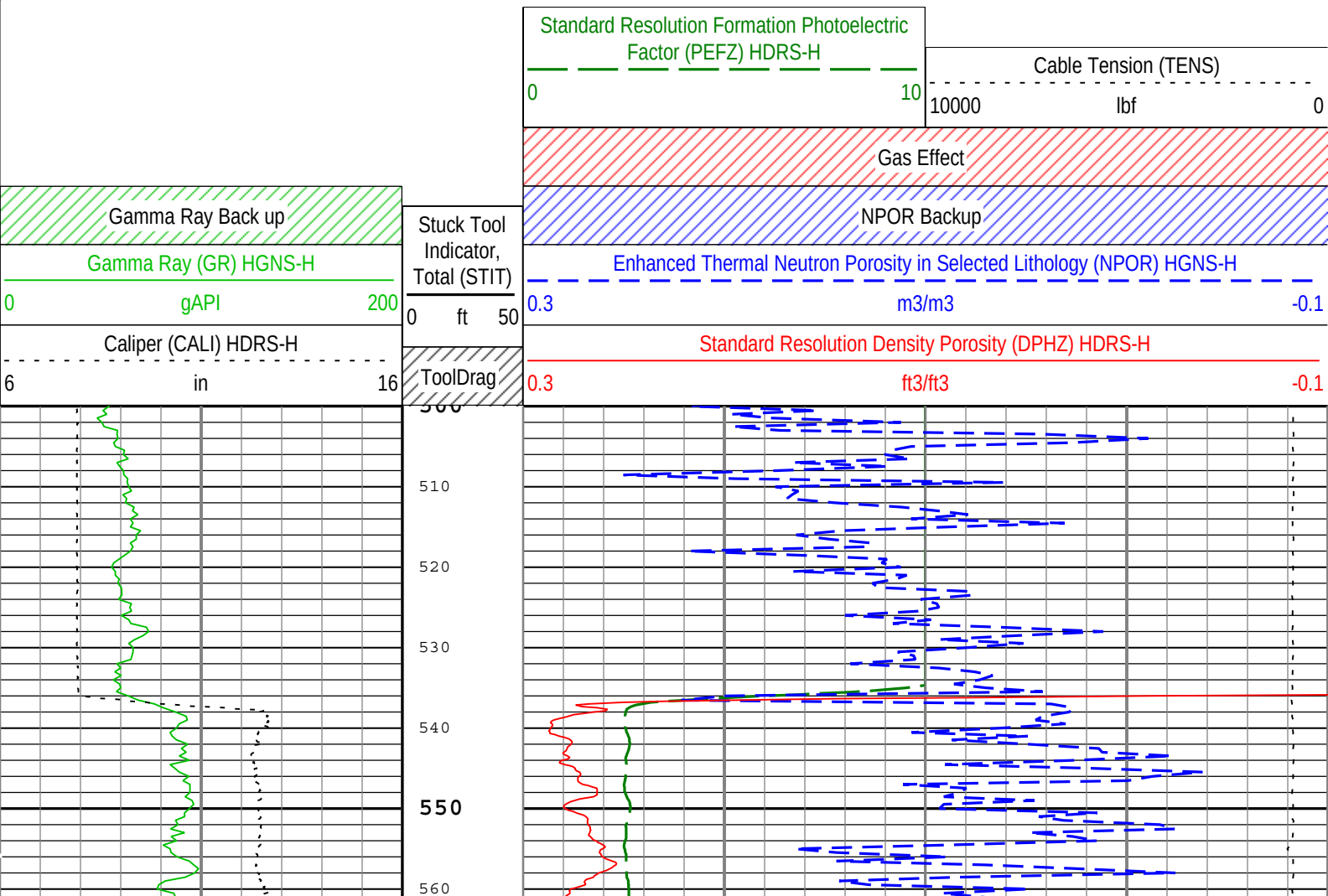
Company:Aurora Power Resources Inc Well:David Bender 1A

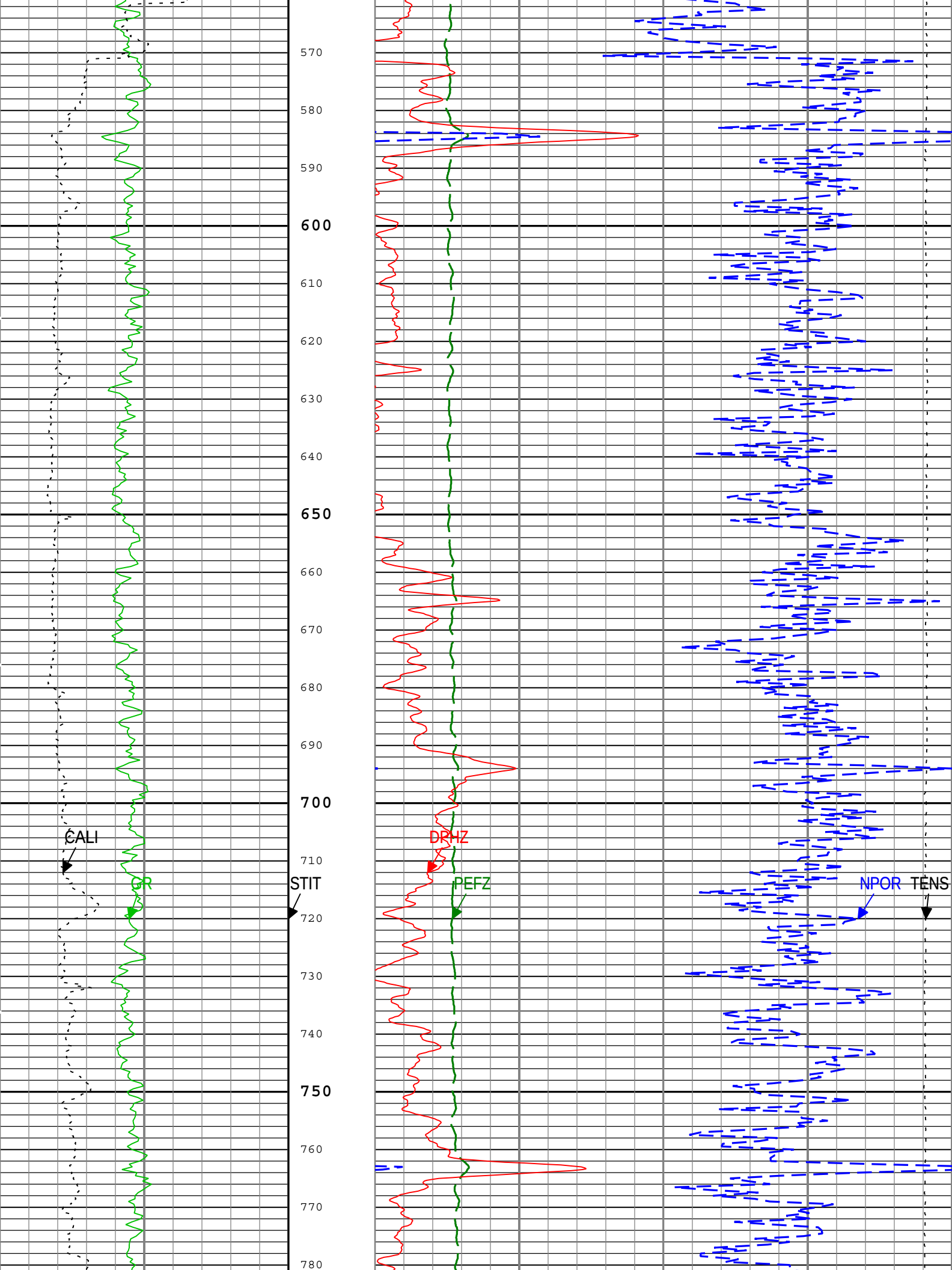
Run 1: PEX-AIT: Main[6]:Up:S003

Description: HGNS standard resolution porosities for Platform Express Format: Log (KM 5in Porosity) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 16-Feb-2014 04:44:02

Channel	Source	Sampling
CALI	HDRS-H:HRCC-H:HRCC-H	1in
DPHZ	HDRS-H:HRMS-H:HRGD-H	2in
GR	HGNS-H:HGNS-H:HGNS-H	6in
NPOR	HGNS-H:HGNS-H:HGNS-H	6in
PEFZ	HDRS-H:HRMS-H:HRGD-H	2in
STIT	DepthCorrection	6in
TENS	WLWorkflow	6in
TIME_1900	WLWorkflow	0.1in

TIME_1900 - Time Marked every 60.00 (s)

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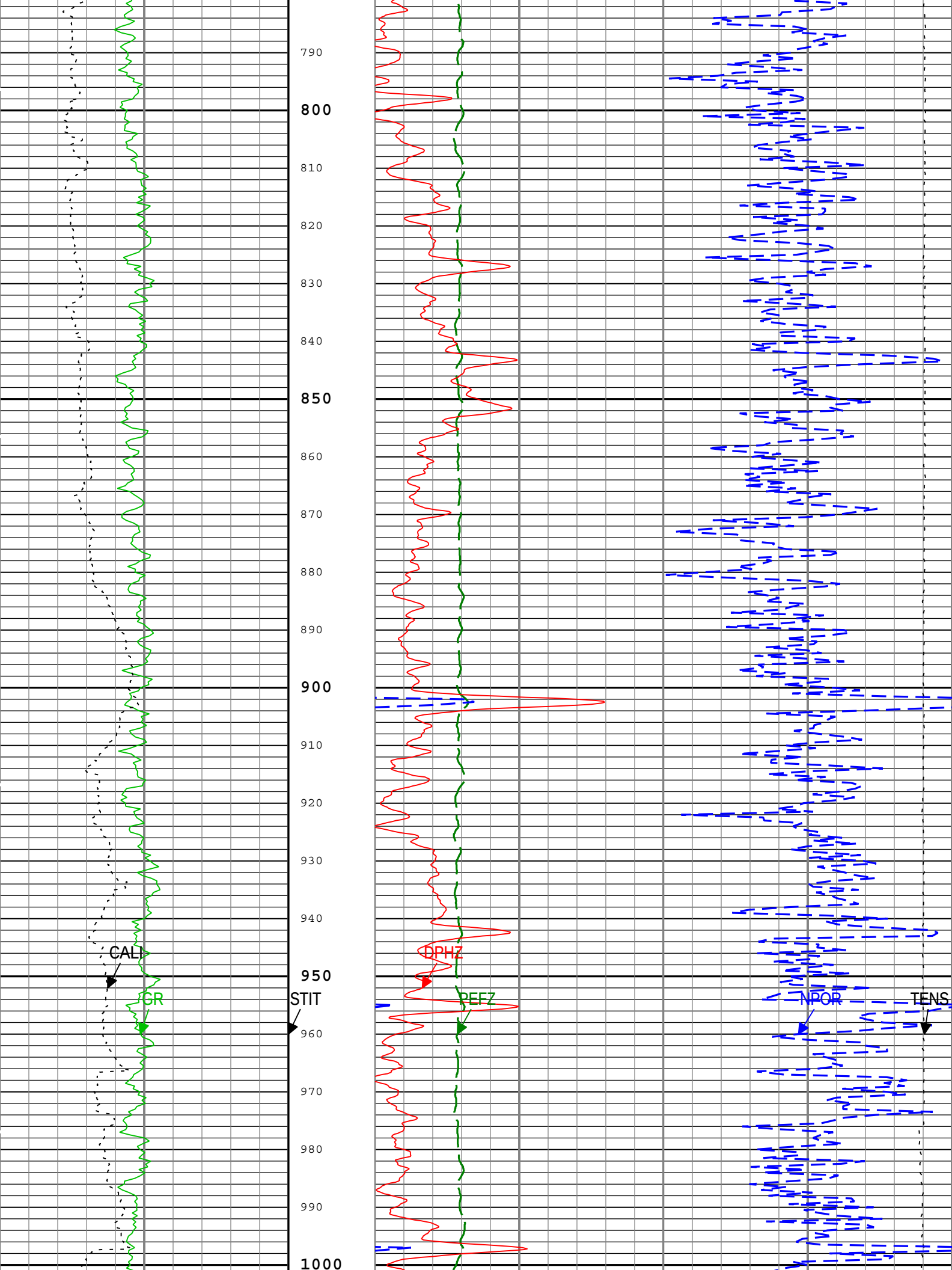
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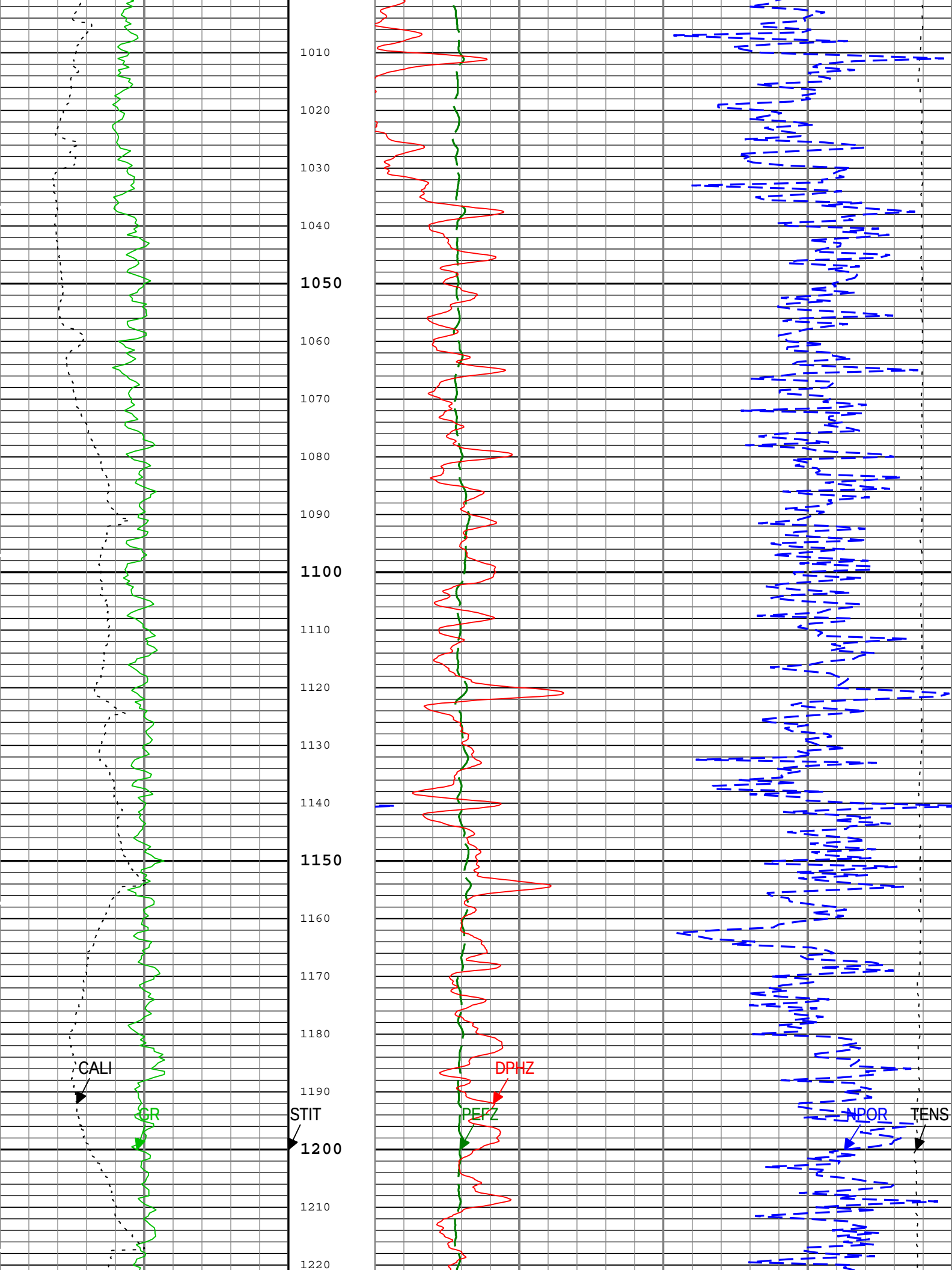
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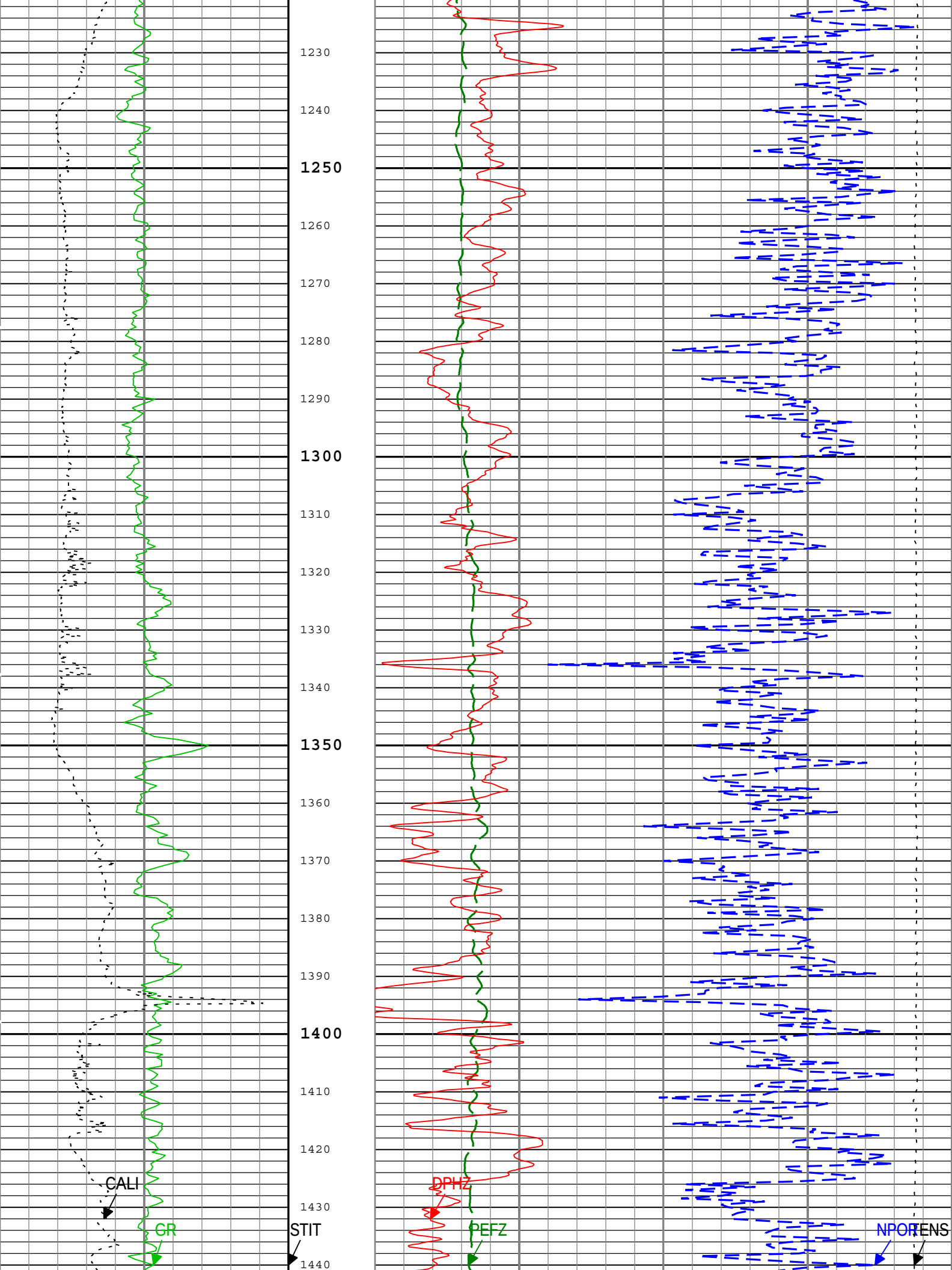
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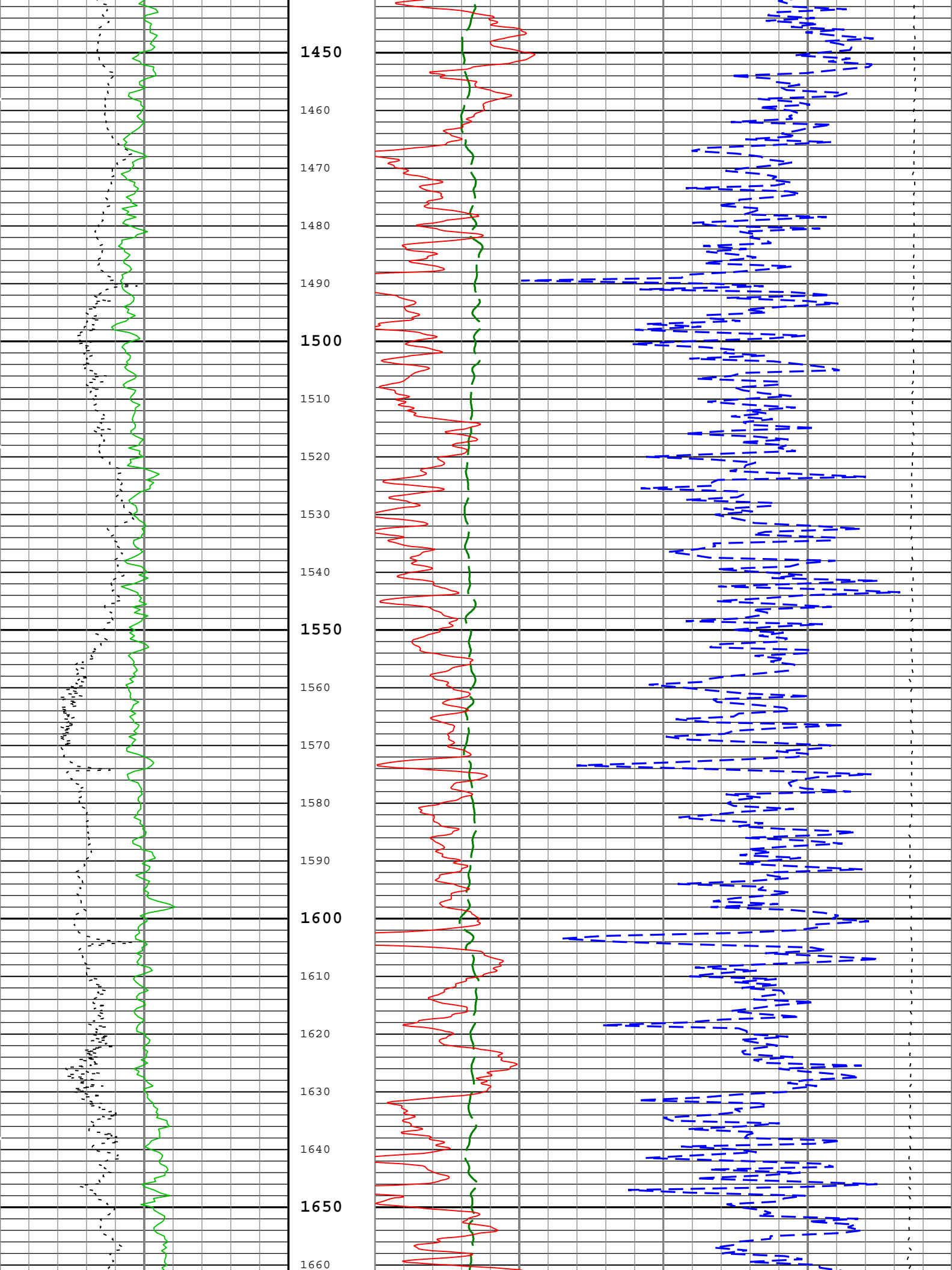
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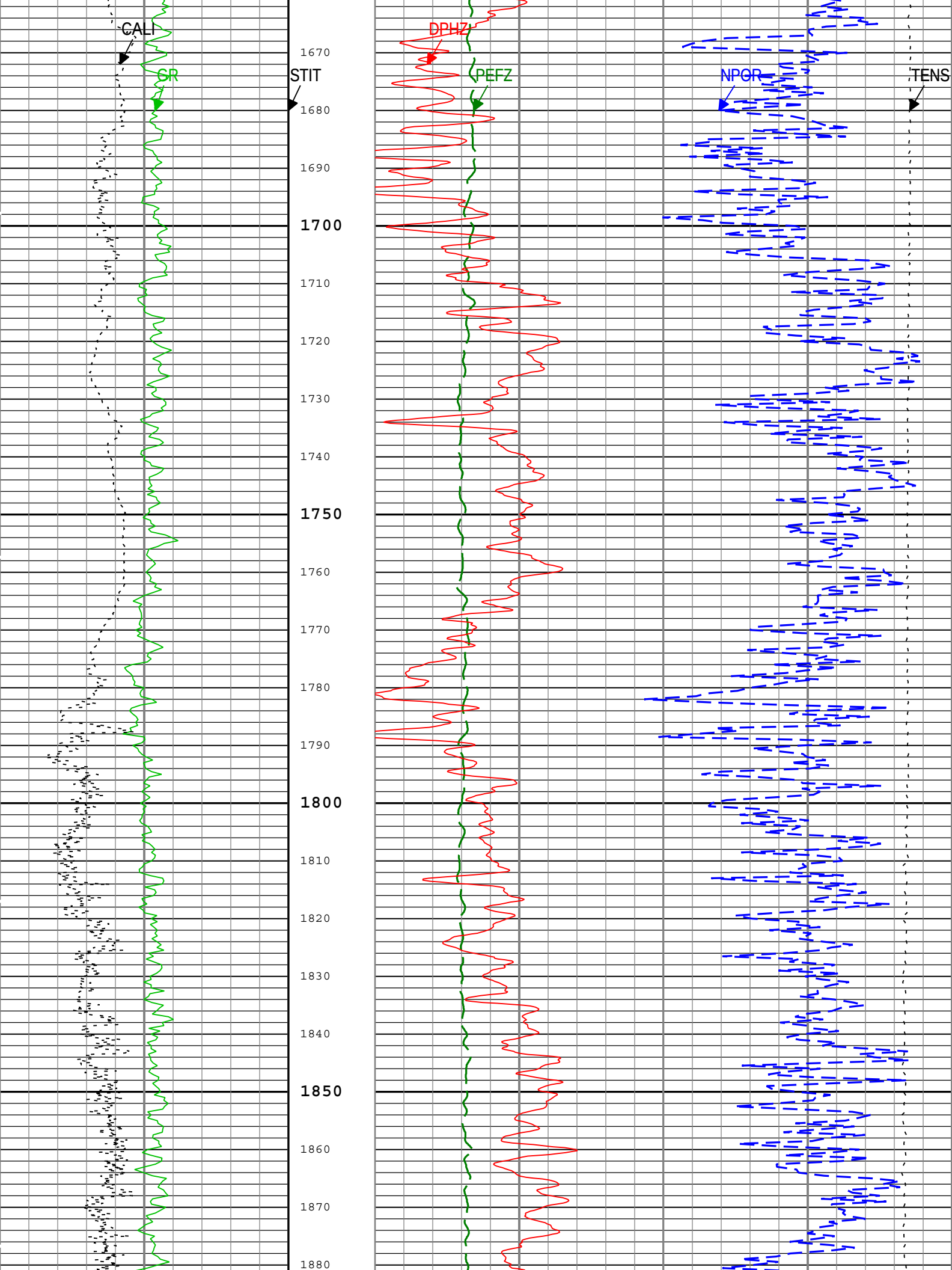
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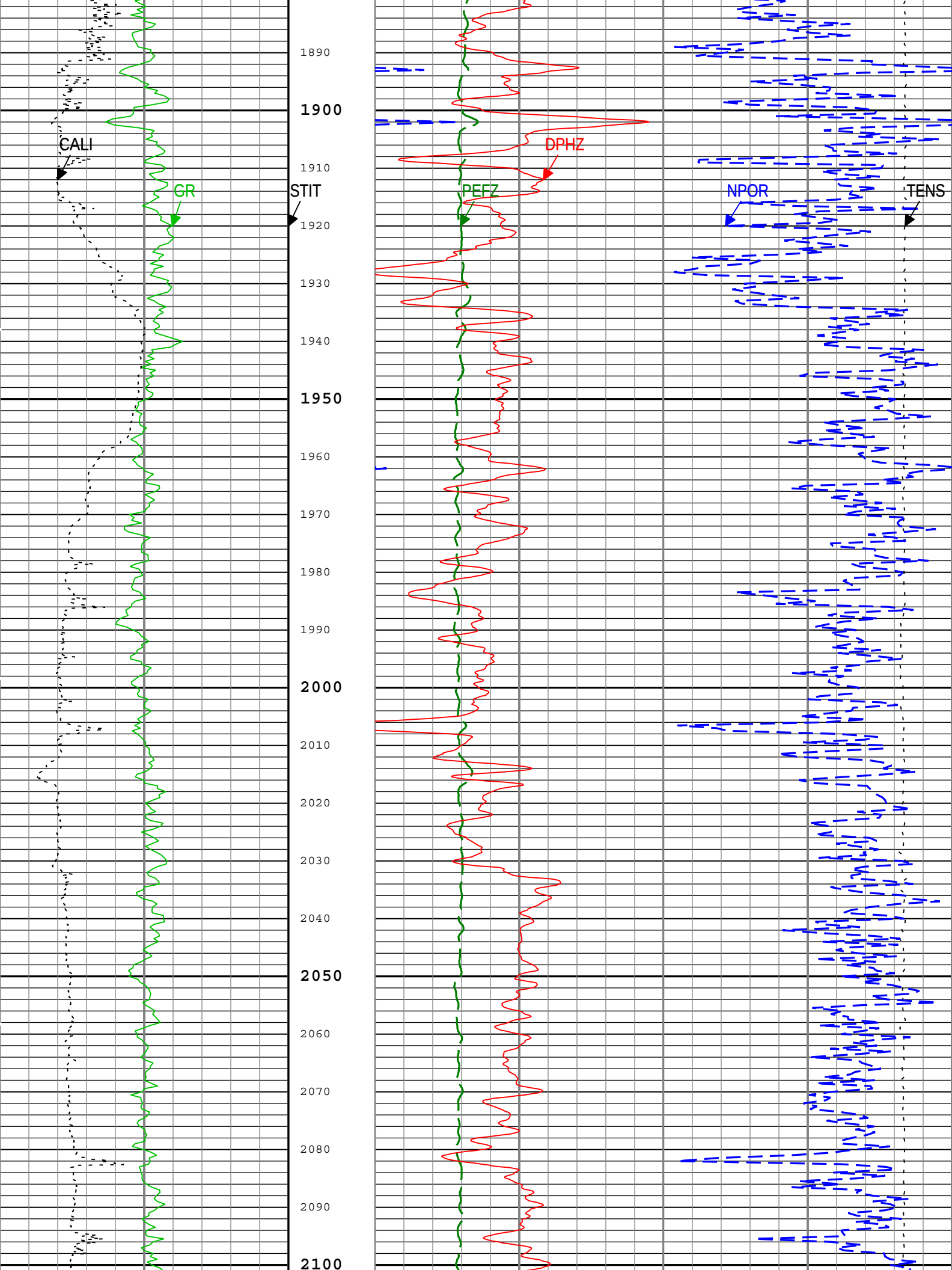
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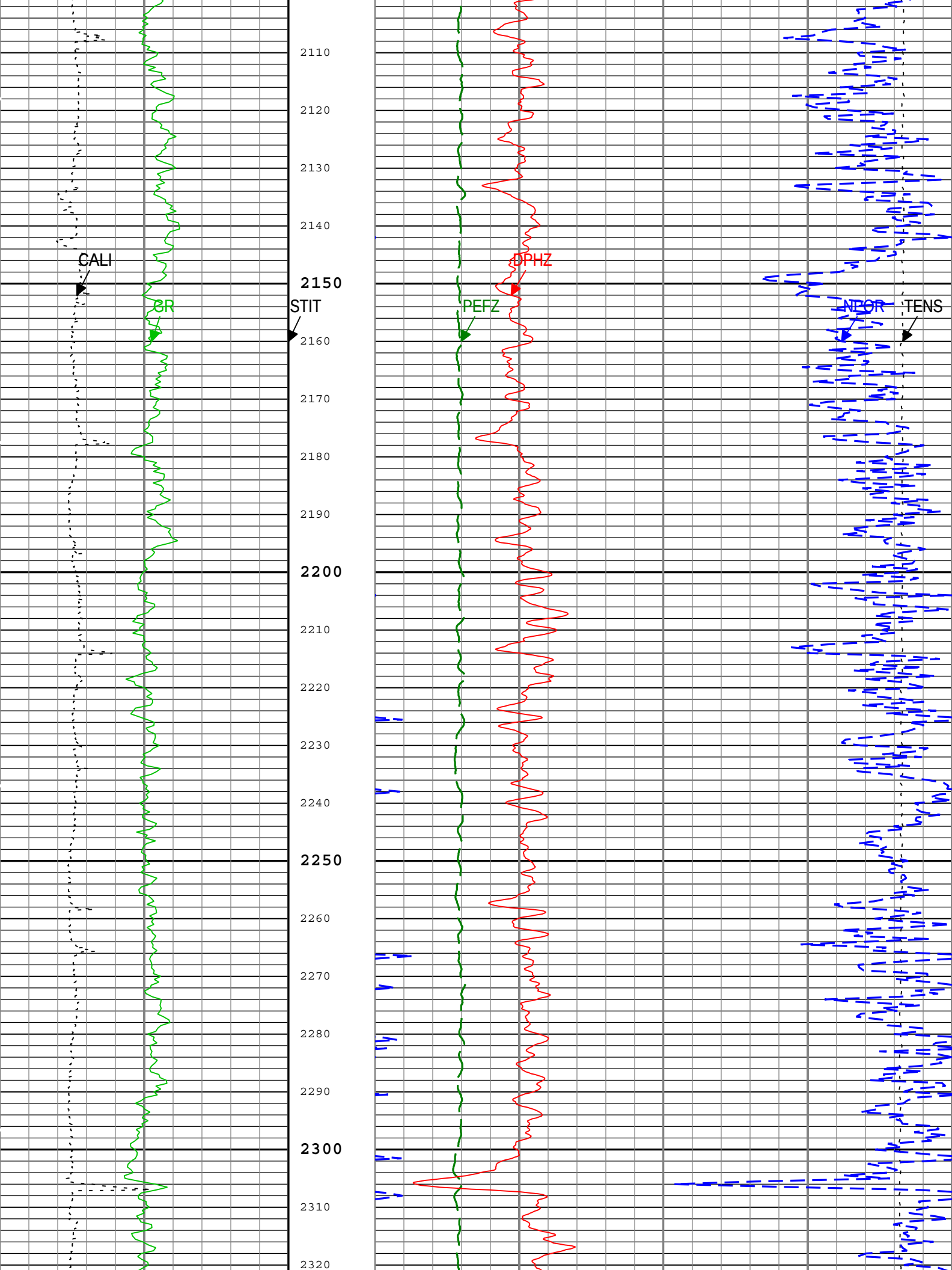
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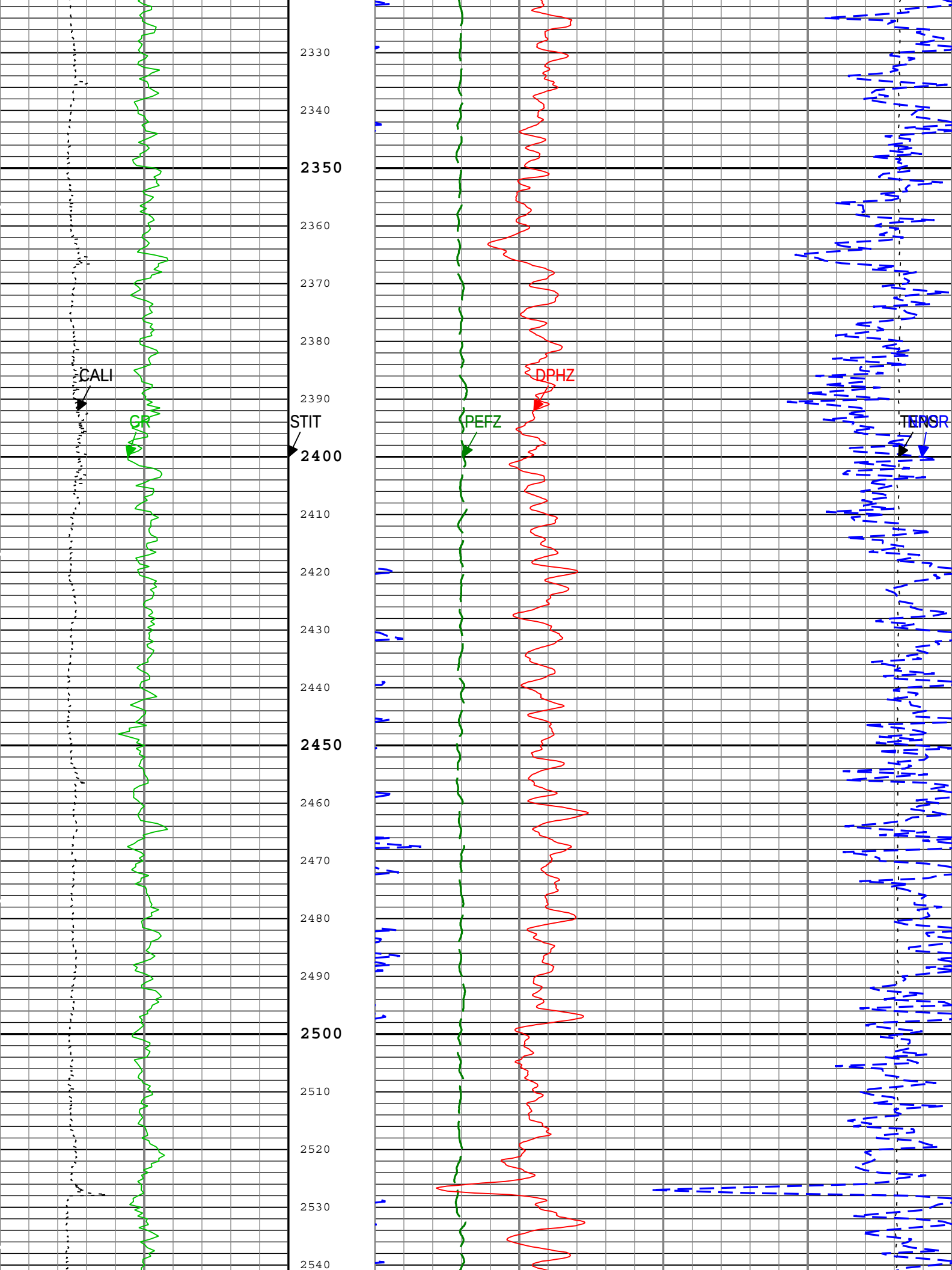
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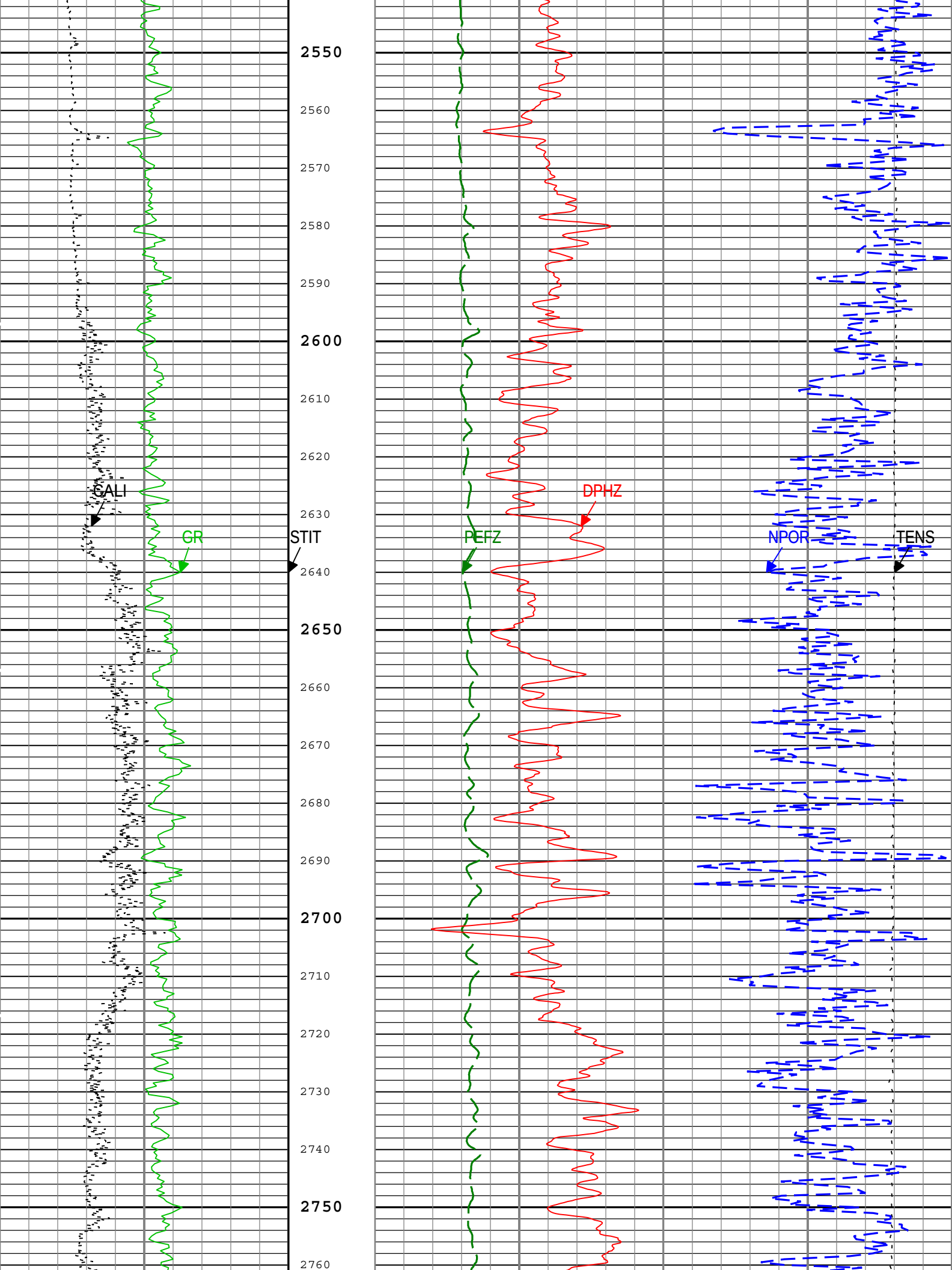
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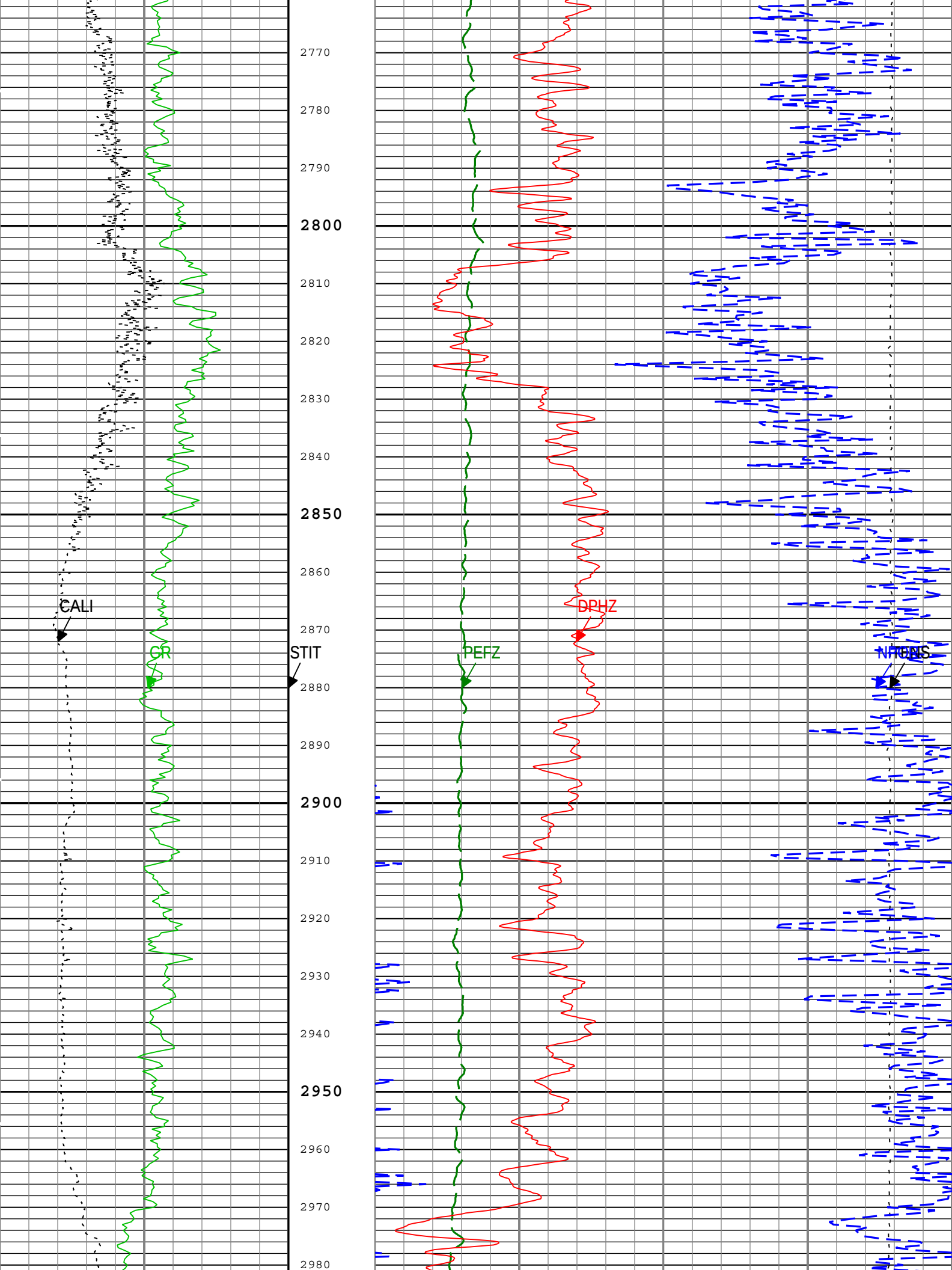
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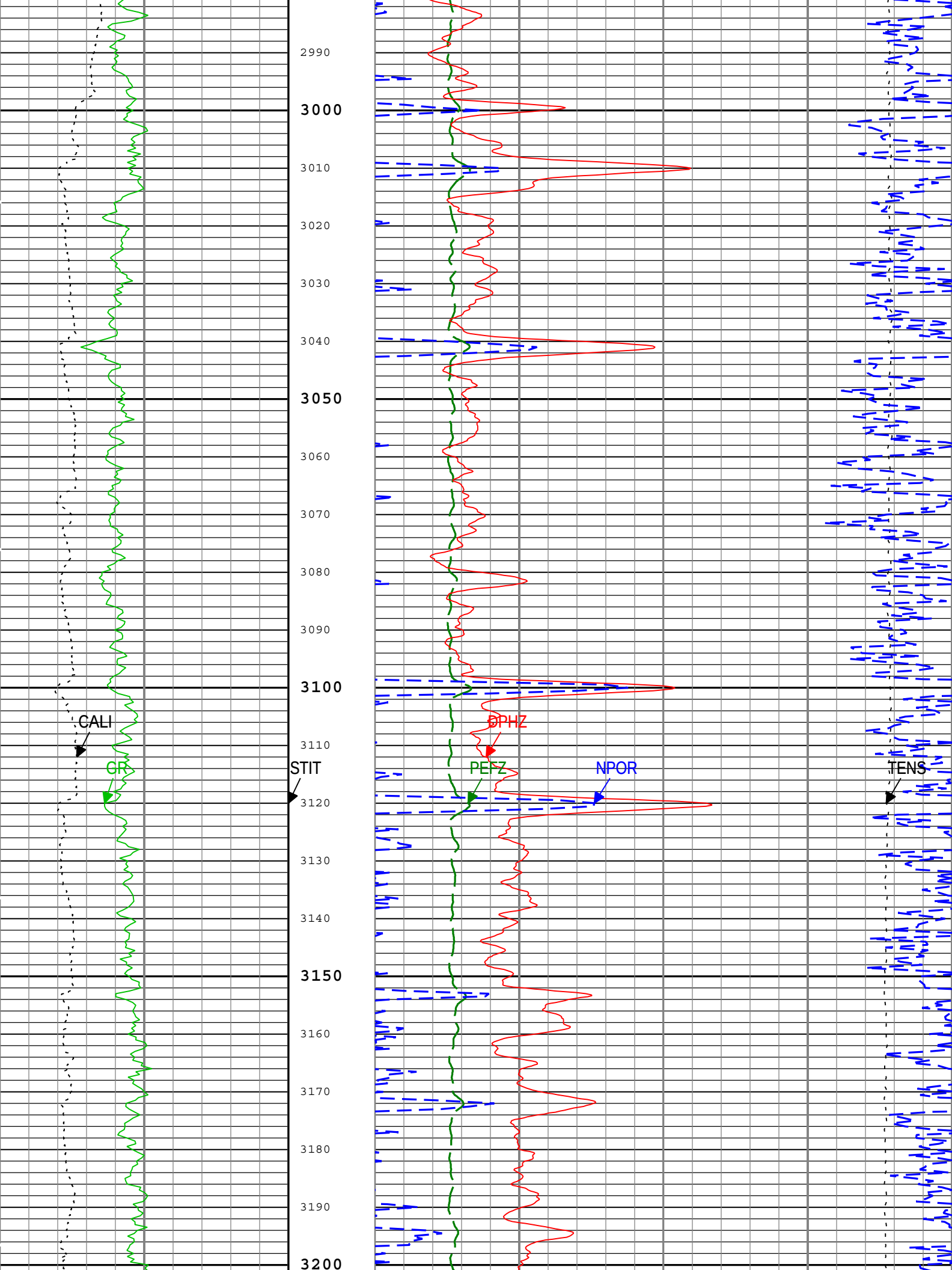
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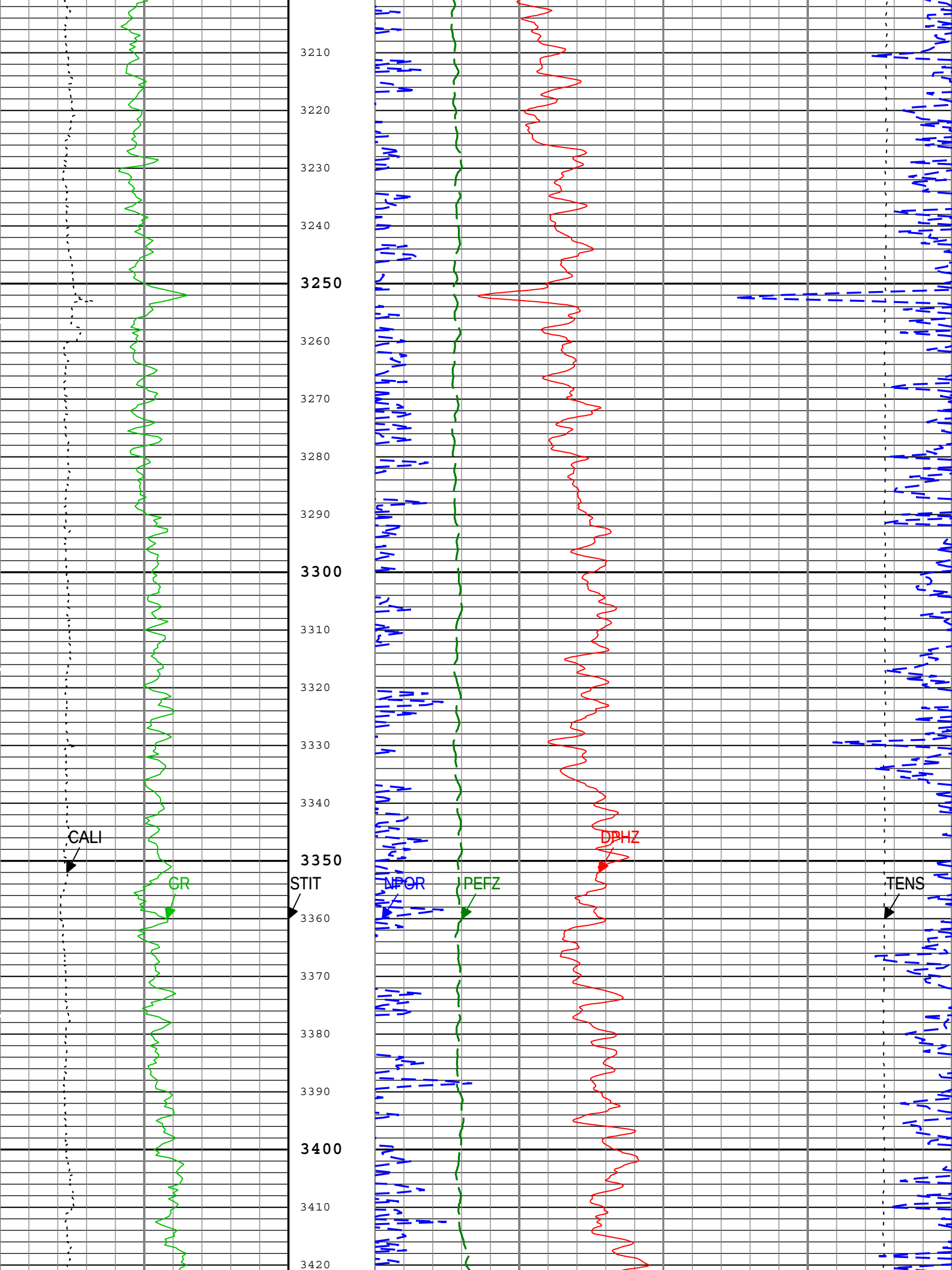
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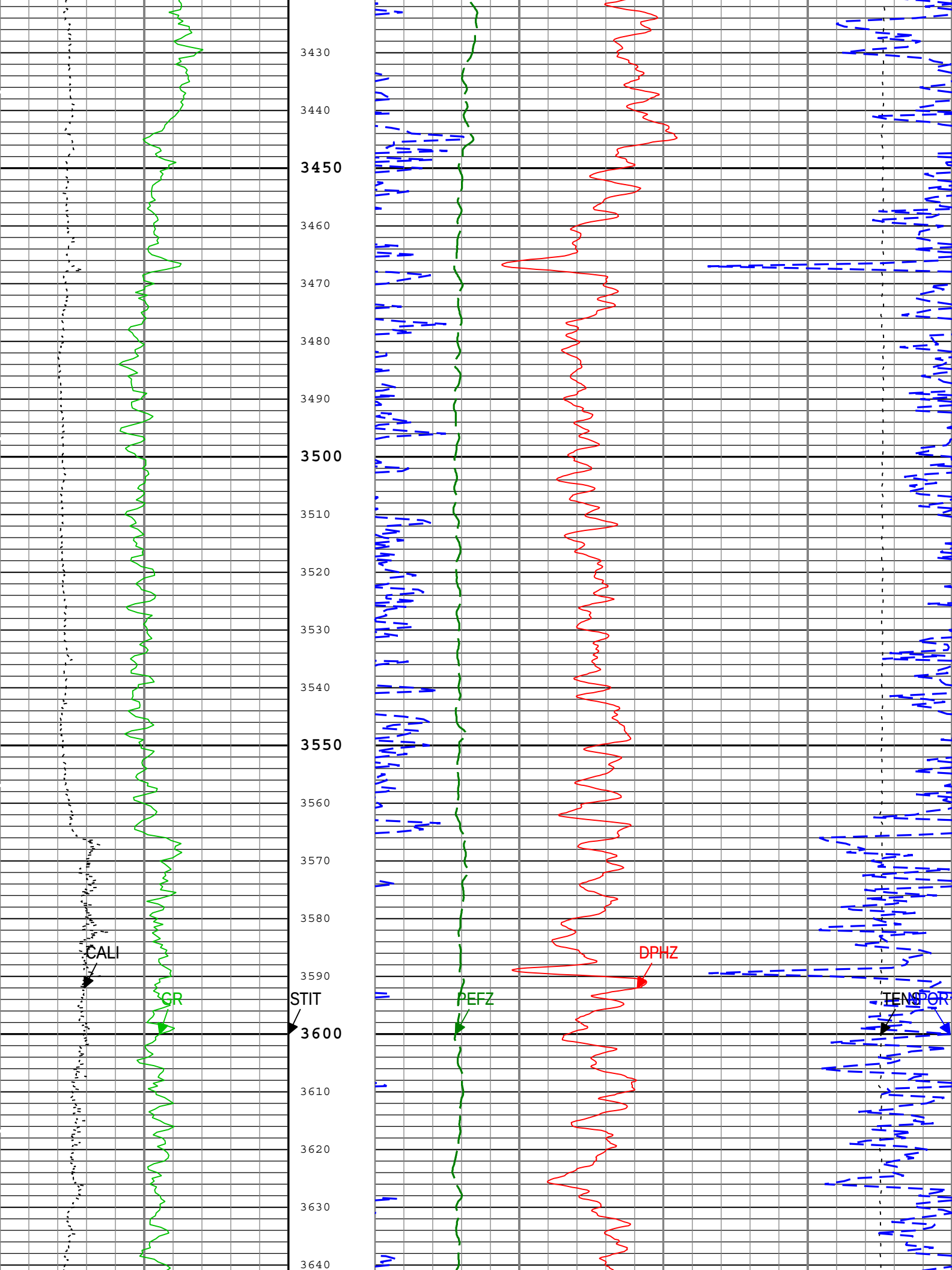
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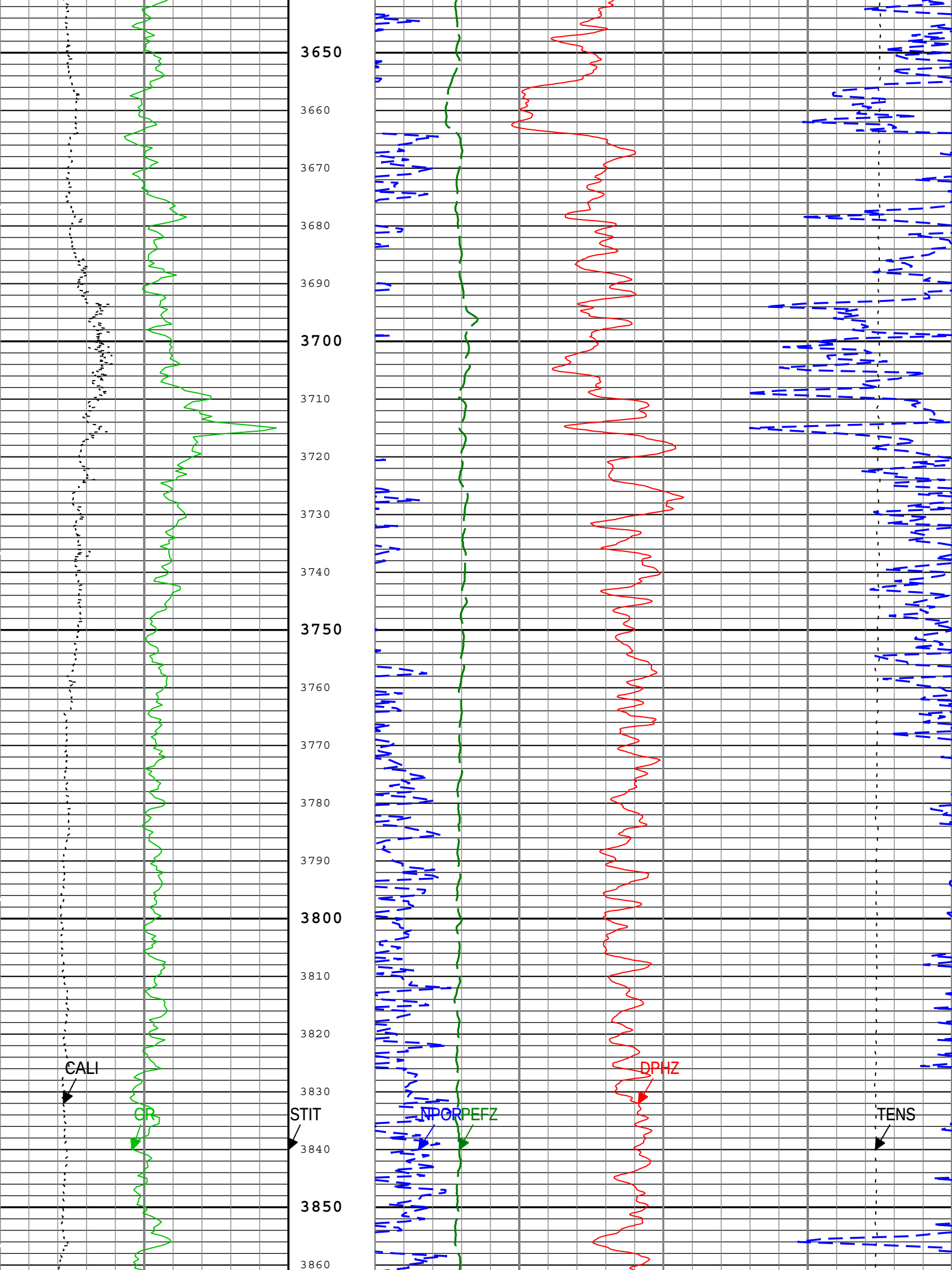
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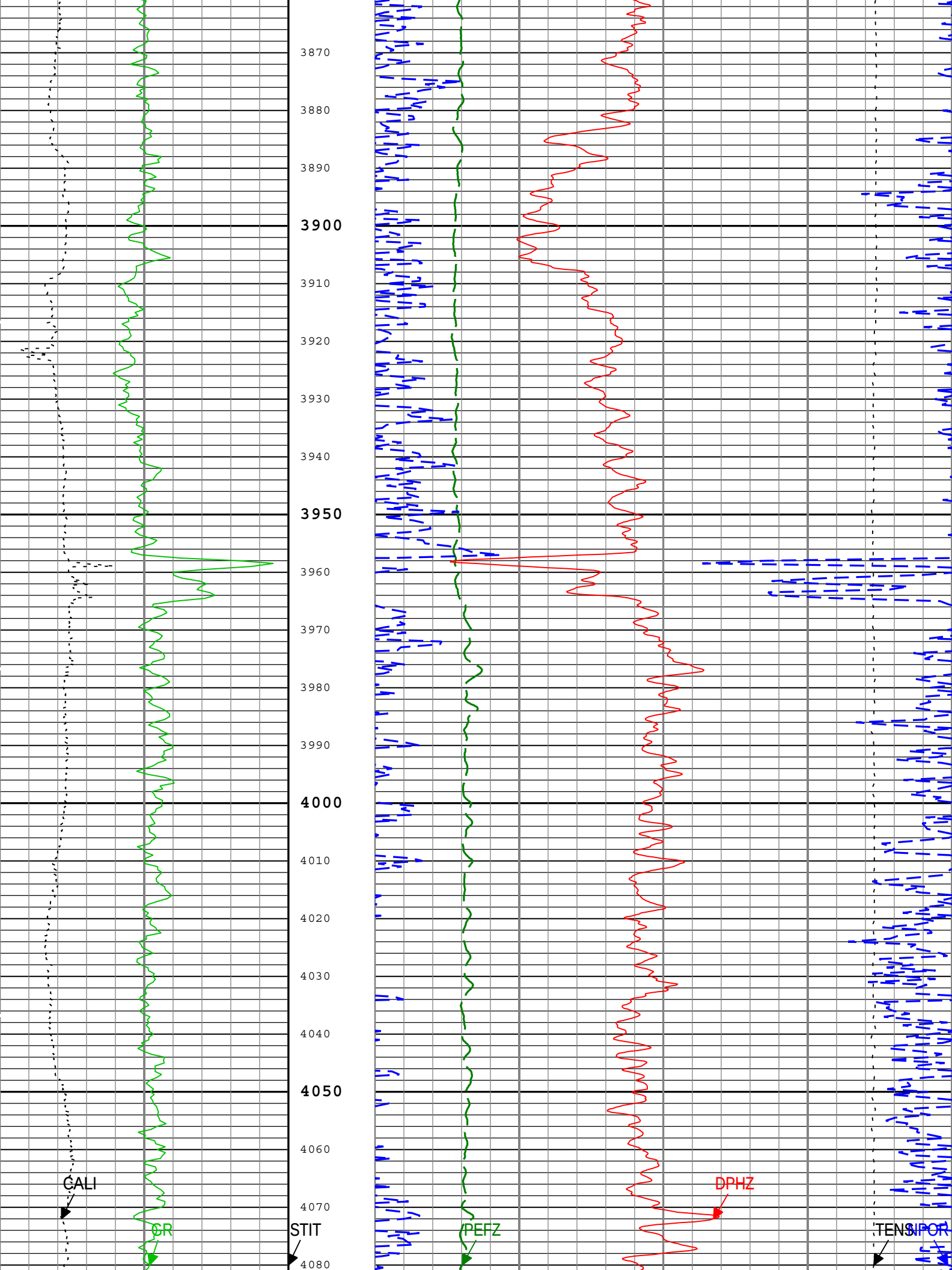
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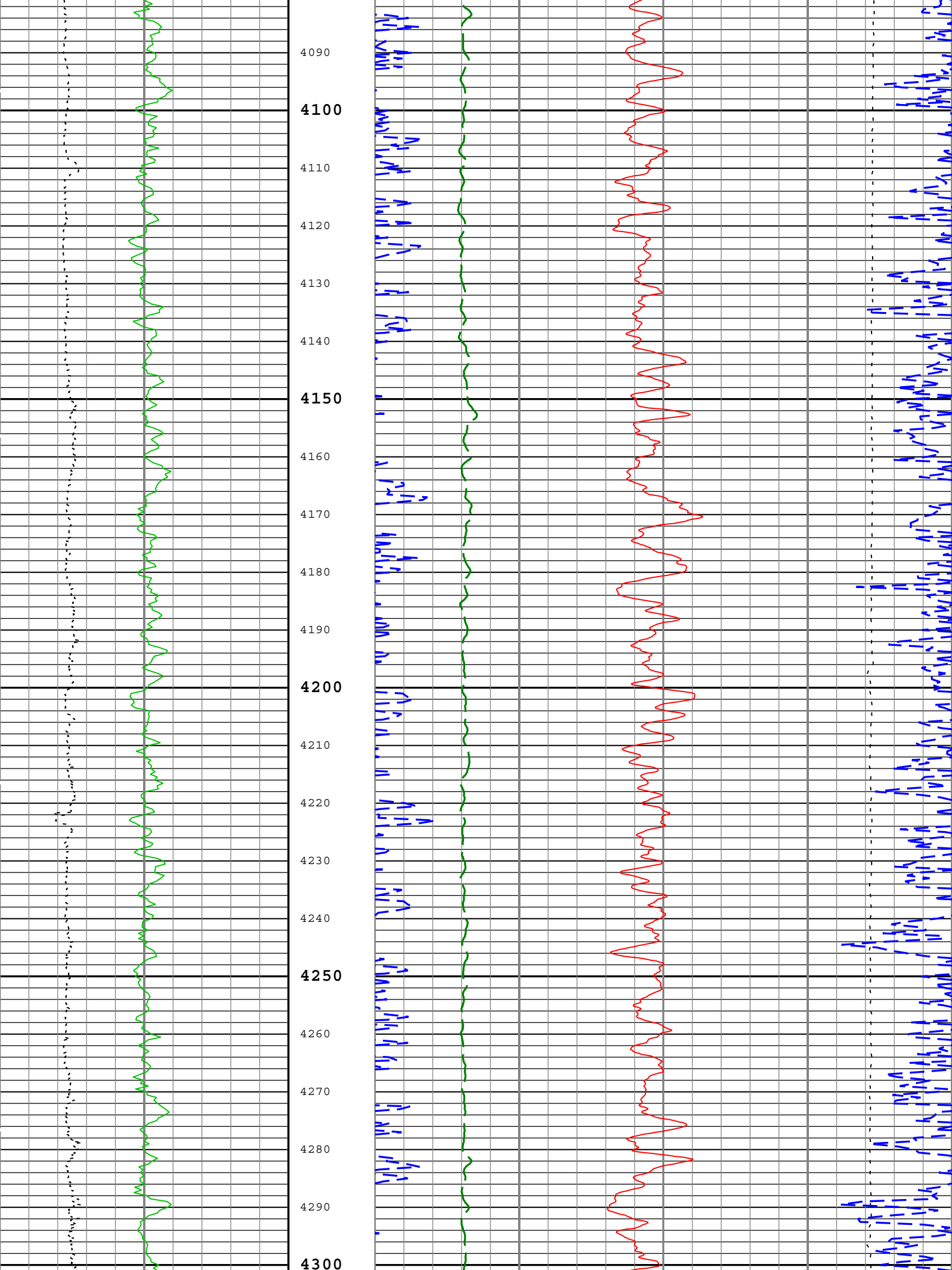
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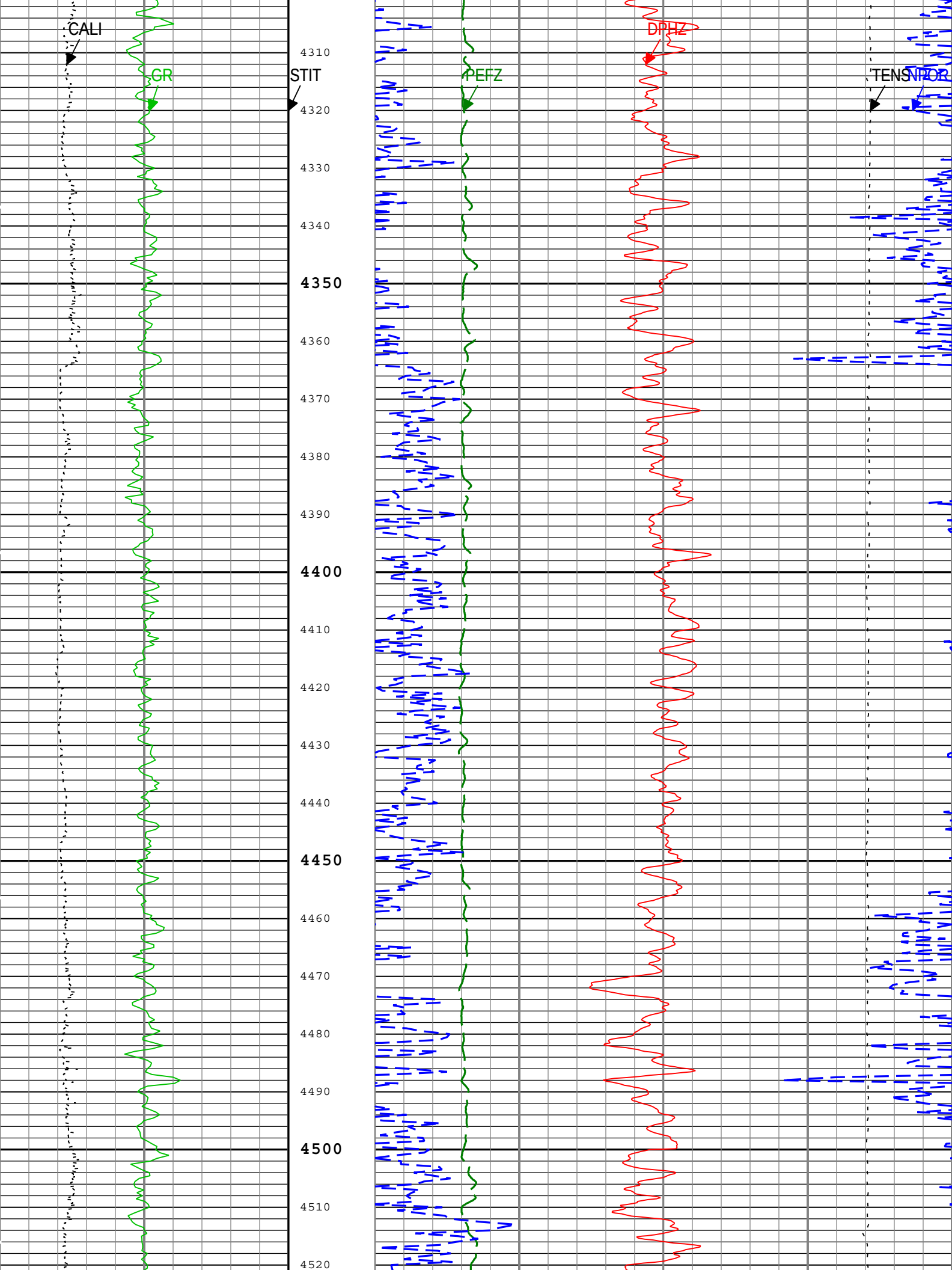
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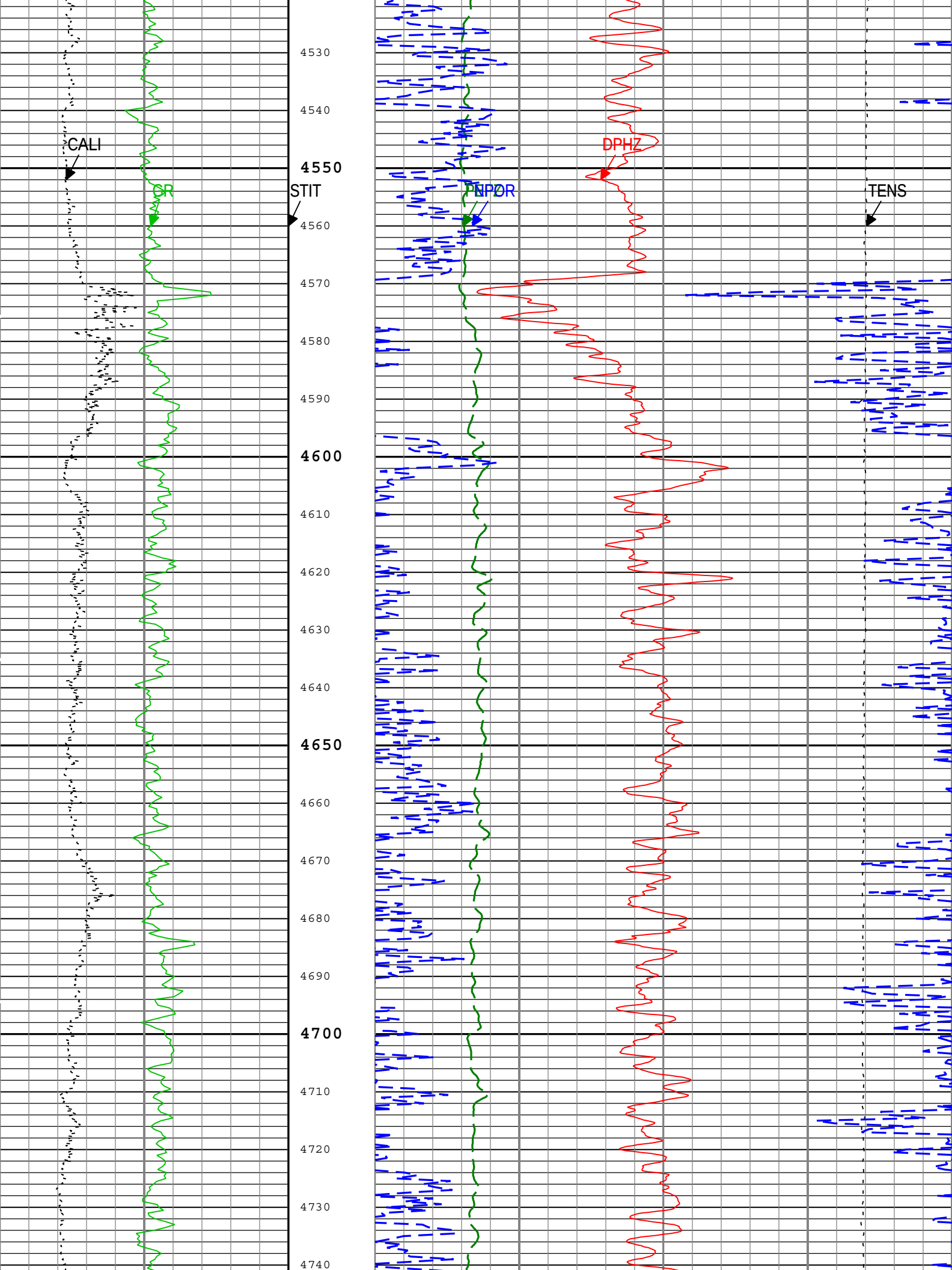
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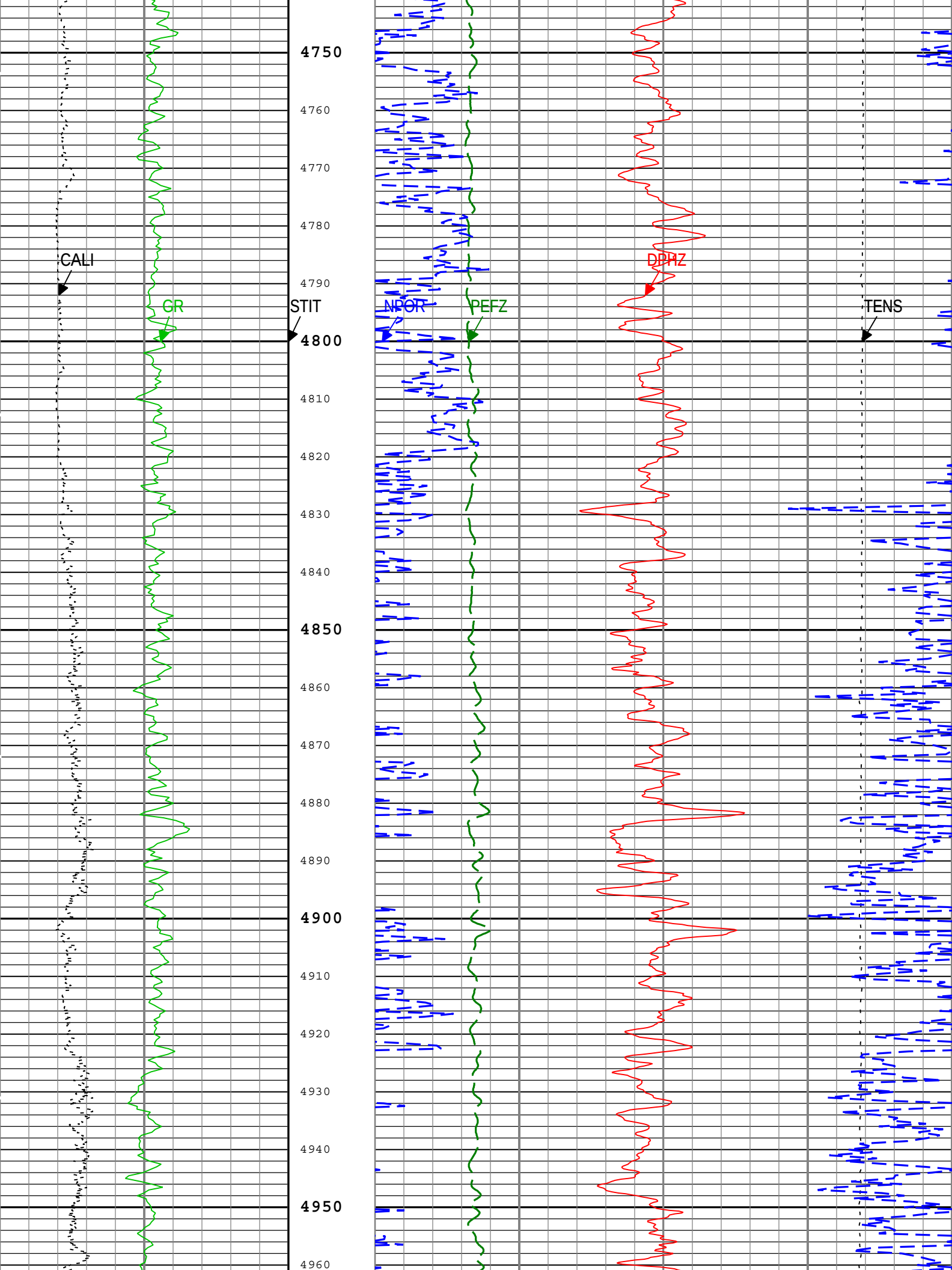
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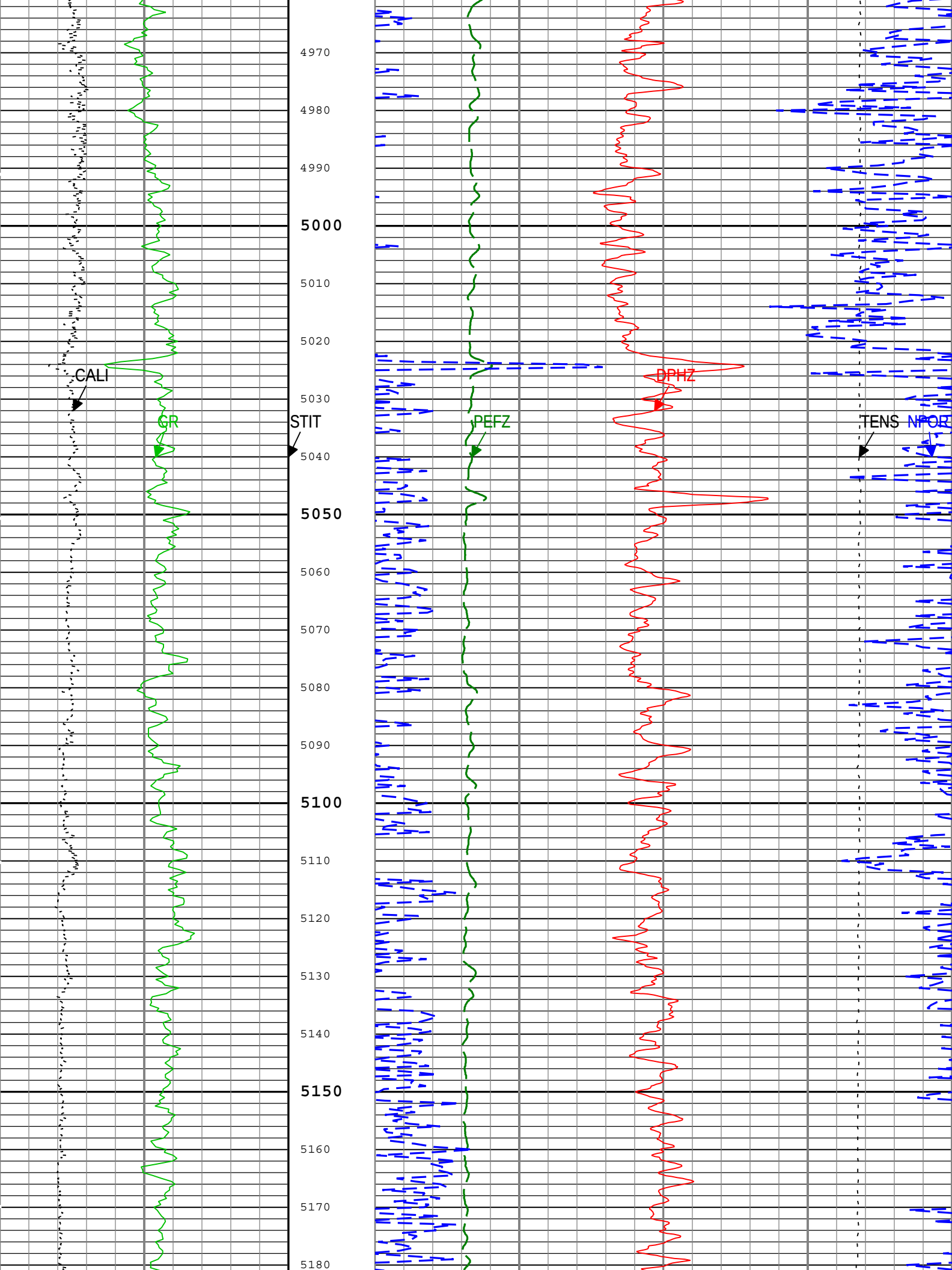
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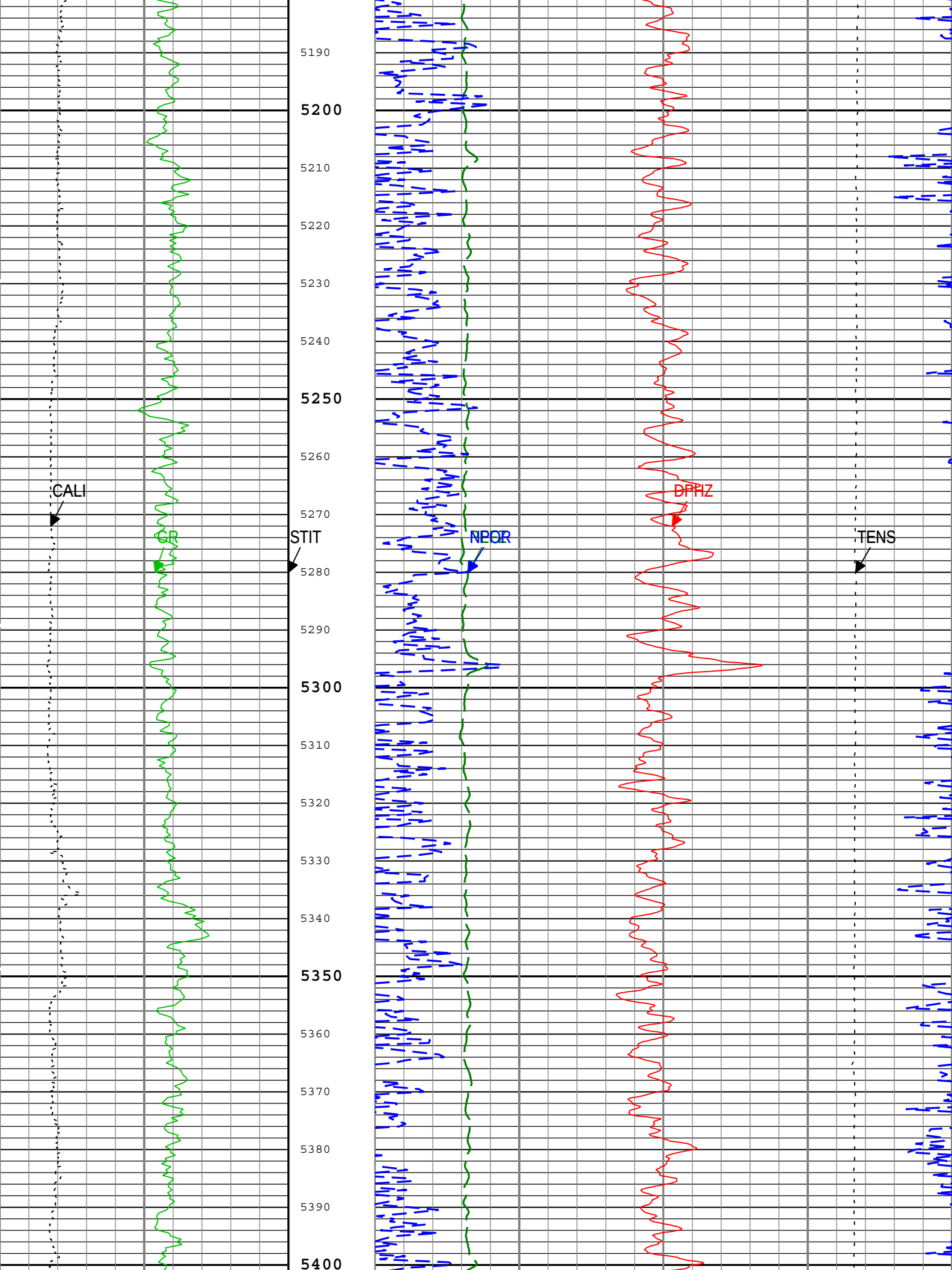
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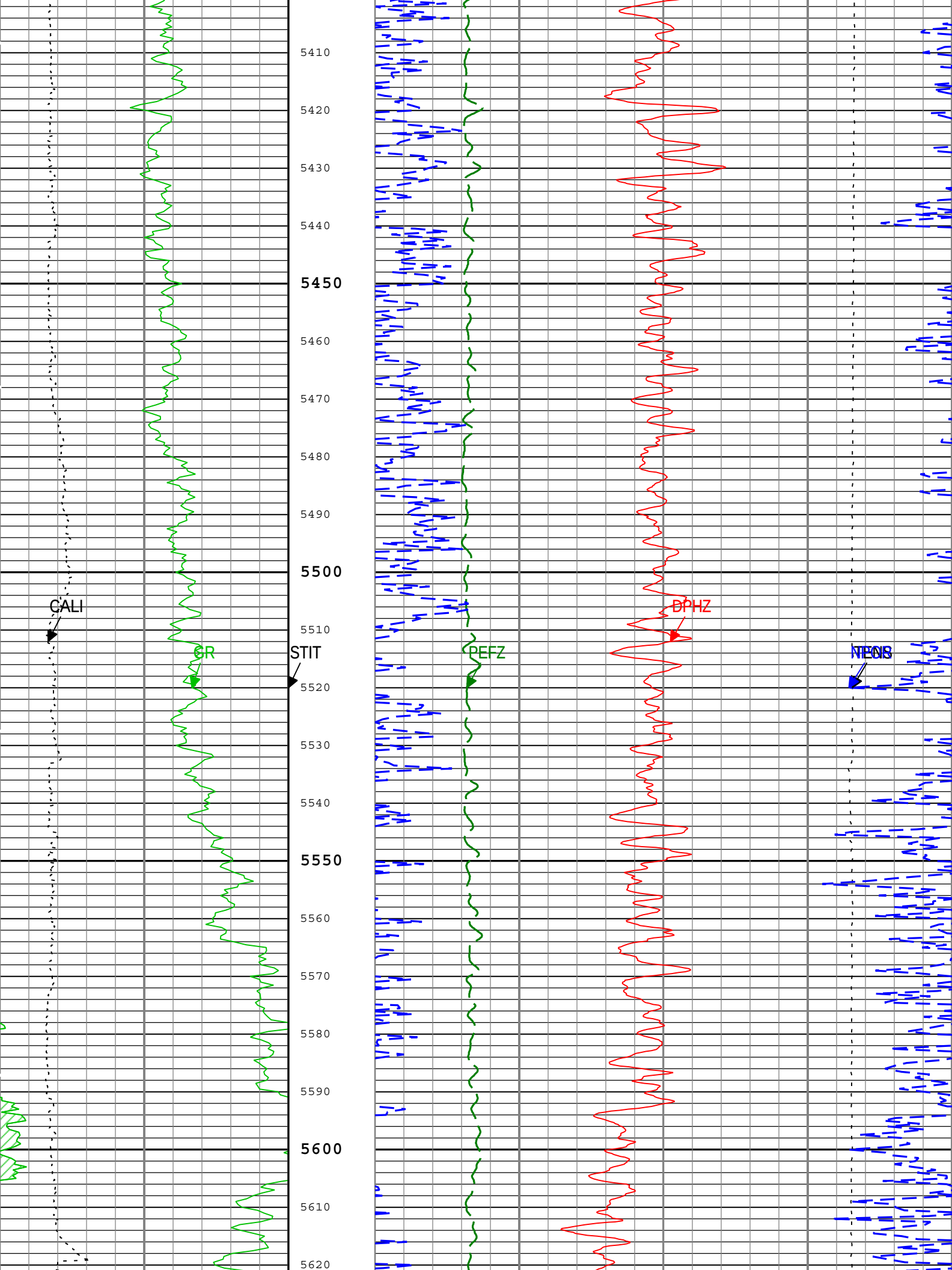
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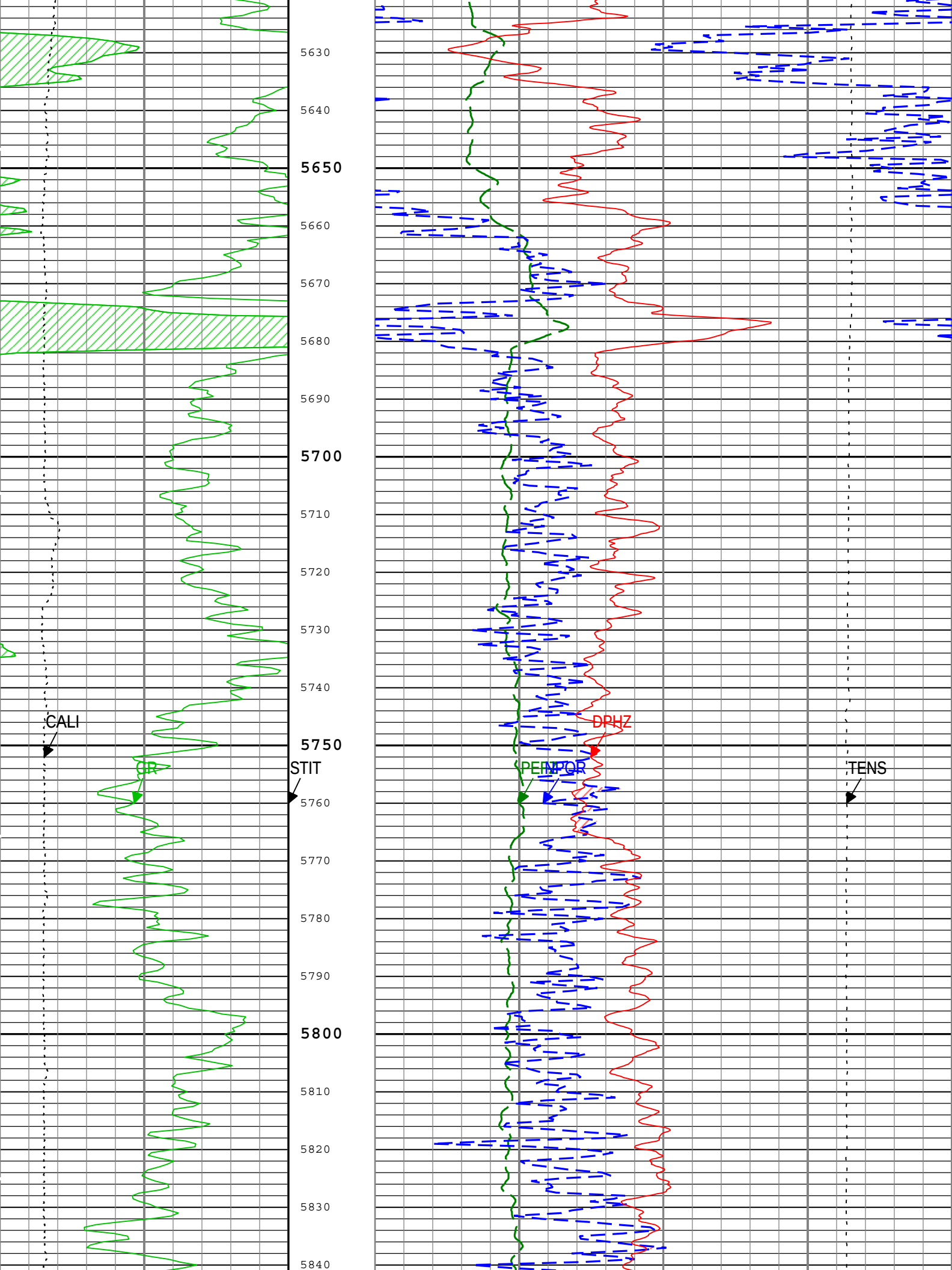
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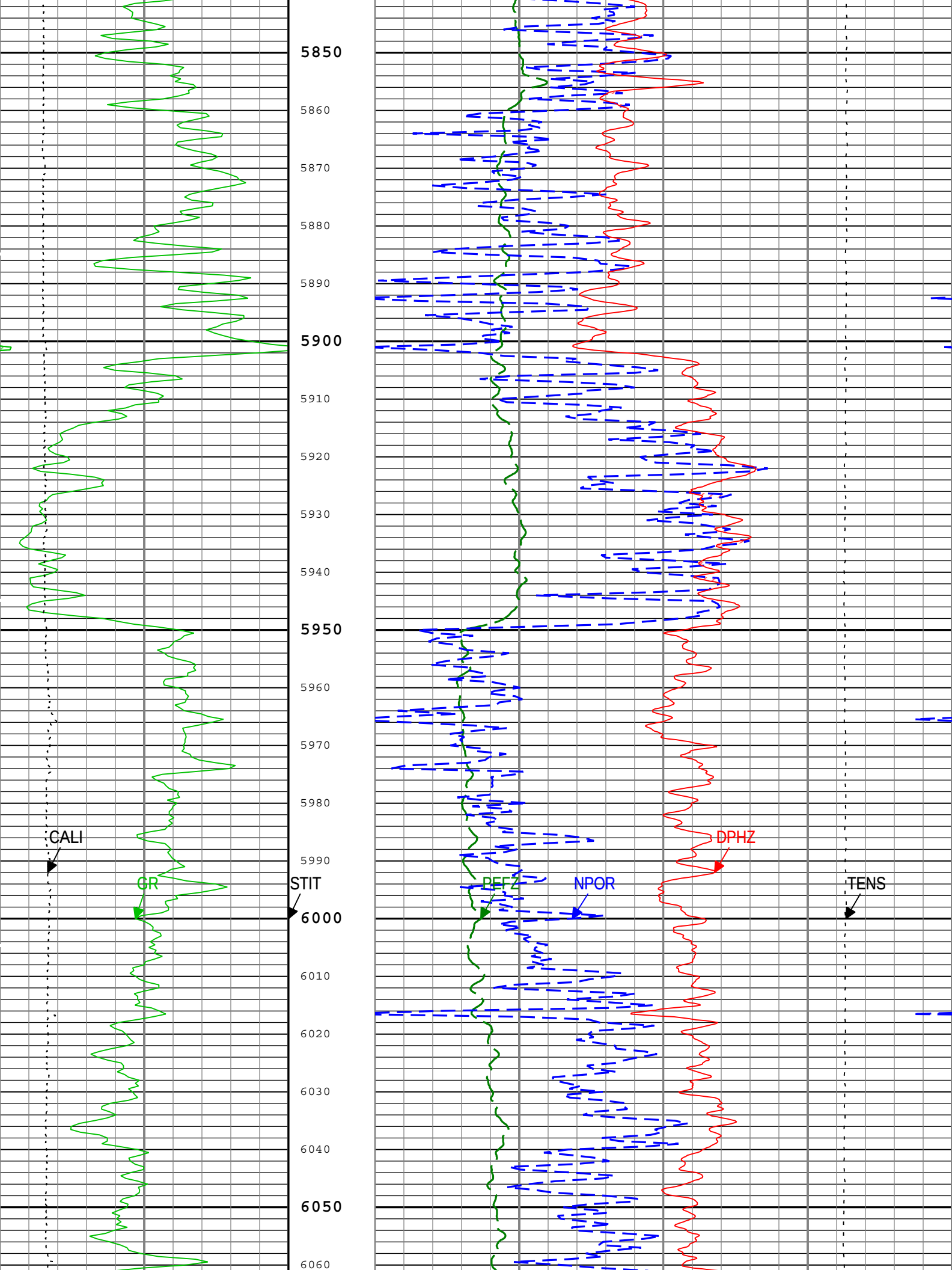
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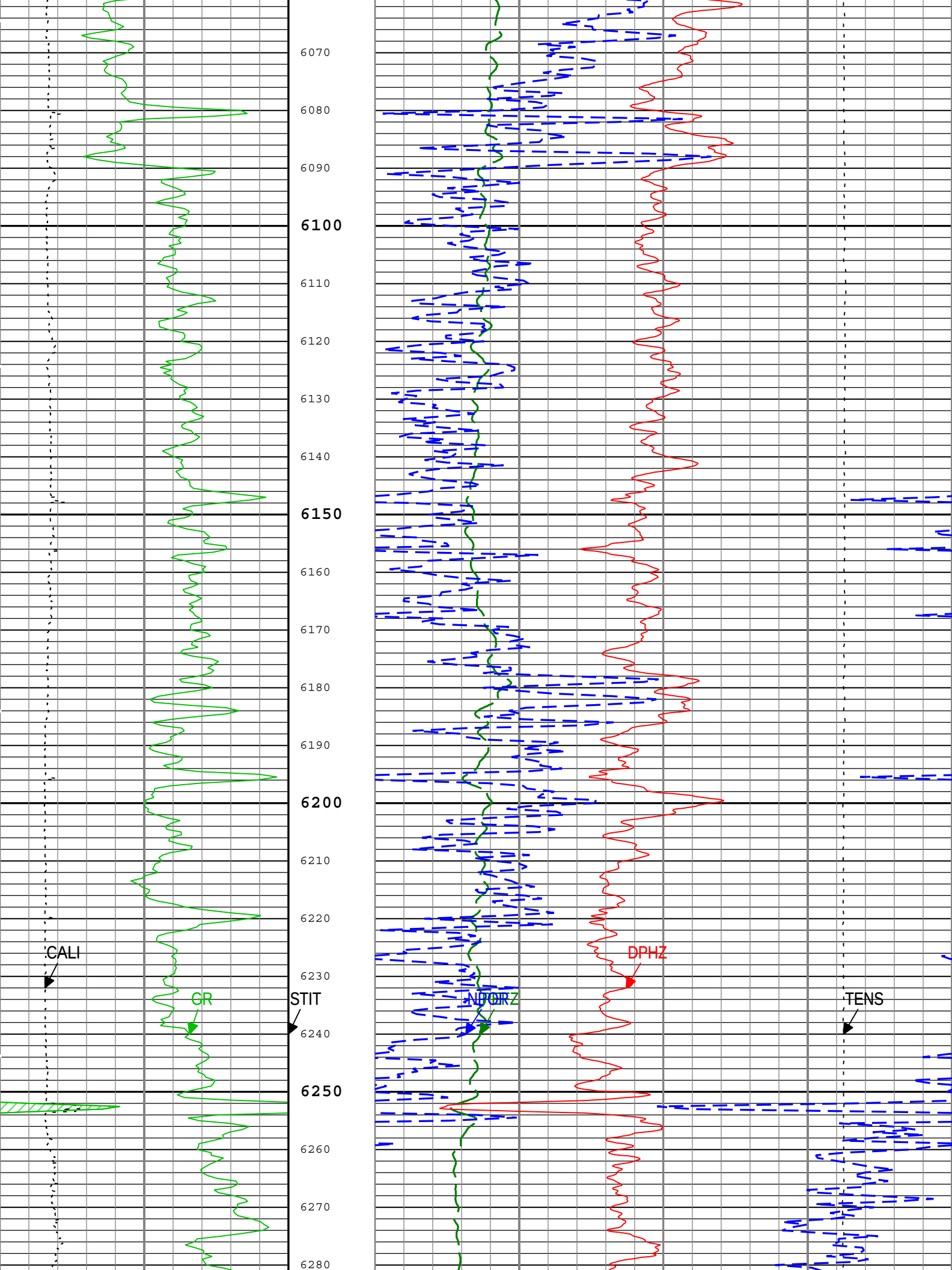
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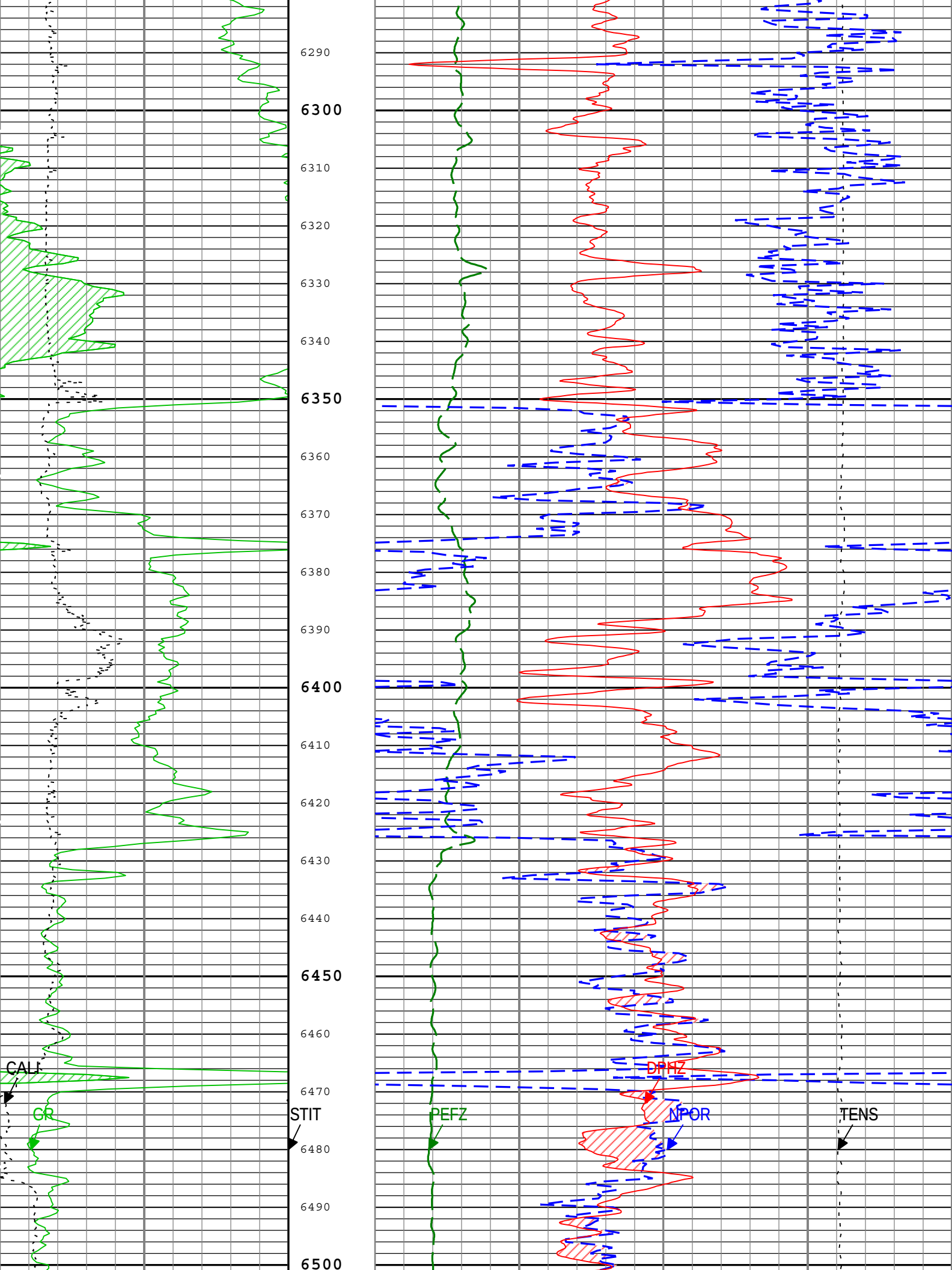
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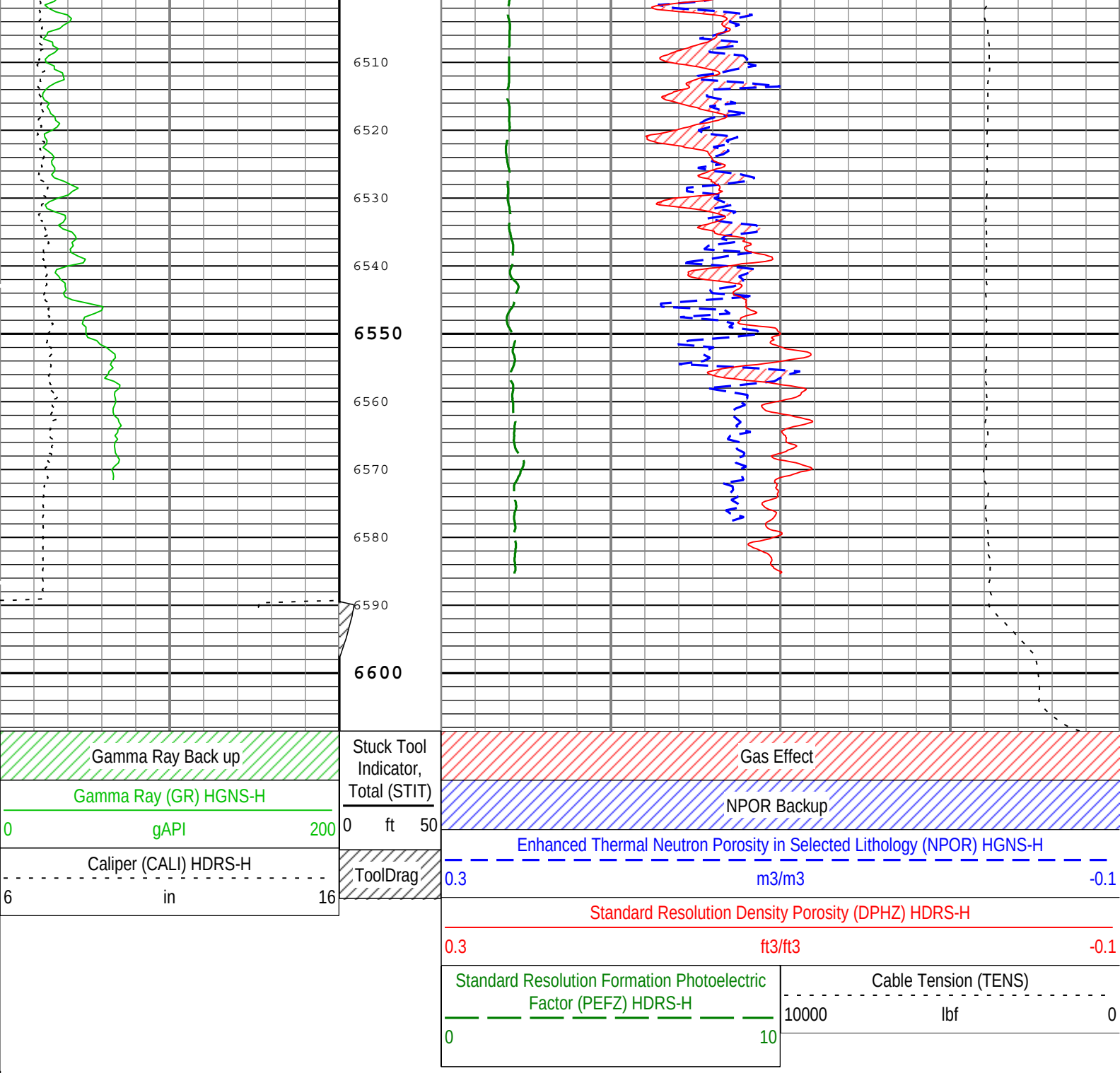


TIME_1900 - Time Marked every 60.00 (s)

Description: HGNS standard resolution porosities for Platform Express Format: Log (KM 5in Porosity) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 16-Feb-2014 04:44:02

Channel Processing Parameters

Parameter	Description	Tool	Value	Unit
BARI	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BHT	Bottom Hole Temperature	Borehole	175	degF
BS	Bit Size	WLSESSION	7.875	in
BSAL	Borehole Salinity	Borehole	0	ppm
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0	in
CBLO	Casing Bottom (Logger)	WLSESSION	500	ft
CDEN	Cement Density	HGNS-H	2	g/cm3
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	

DFD	Drilling Fluid Density	Borehole	9.1	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DFT_WATER	Drilling Fluid Water Type	Borehole	Chemical Gel	
DHC	Density Hole Correction	HDRS-H	Bit Size	
FD	Fluid Density	Borehole	1	g/cm3
FSAL	Formation Salinity	Borehole	0	ppm
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	AMF	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	CTEM	
HSCO	Hole Size Correction Option	HGNS-H	Yes	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	Depth Zoned	
MDEN	Matrix Density for Density Porosity	Borehole	Depth Zoned	g/cm3
MFST	Mud Filtrate Sample Temperature	Borehole	70	degF
RMFS	Resistivity of Mud Filtrate Sample	Borehole	0.9	ohm.m
SOCO	Standoff Correction Option	HGNS-H	Yes	

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
MATR	SANDSTONE	500	4500
MATR	LIMESTONE	4500	6250
MATR	SANDSTONE	6250	6608.5
MDEN	2.68	500	4500
MDEN	2.71	4500	6250
MDEN	2.68	6250	6608.5

All depth are actual.

Tool Control Parameters

Parameter	Description	Tool	Value	Unit
HMCA_BRD_TYPE	HMCA Board Type	HGNS-H	1	
HRGD_BRD_TYPE	HRGD Board Type	HDRS-H	WITH_HET	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h

Run 1: PEX-AIT

5" Porosity Repeat

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1: PEX-AIT	Log[4]:Up	Up	6179.23 ft	6612.05 ft	16-Feb-2014 1:24:37 AM	16-Feb-2014 1:34:44 AM	ON	9.00 ft	No
Run 1: PEX-AIT	Main[6]:Up	Up	412.38 ft	6608.73 ft	16-Feb-2014 1:44:28 AM	16-Feb-2014 3:30:23 AM	ON	0.00 ft	No

All depths are referenced to toolstring zero

Log

Company:Aurora Power Resources Inc Well:David Bender 1A

Run 1: PEX-AIT: Main[6]:Up:S003

Description: HGNS standard resolution porosities for Platform Express Format: Log (KM 5in Porosity RA) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 16-Feb-2014 04:44:04

TIME_1900 - Time Marked every 60.00 (s)

Main To Repeat

Repeat To Main

Main To Repeat

Repeat To Main

Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H

0 10

Cable Tension (TENS)

10000 lbf 0

Main To Repeat

Repeat To Main

Caliper (CALI) HDRS-H

6 in 16

Main To Repeat

Repeat To Main

Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H

-0.1 ft3/ft3 -0.5

Main To Repeat

Repeat To Main

Gamma Ray (GR) HGNS-H

200 gAPI 400

Main To Repeat

Repeat To Main

Standard Resolution Density Porosity (DPHZ) HDRS-H

0.3 ft3/ft3 -0.1

Main To Repeat

Repeat To Main

Gamma Ray (GR) HGNS-H

0 gAPI 200

Main To Repeat

Repeat To Main

Stuck Tool Indicator, Total (STIT)

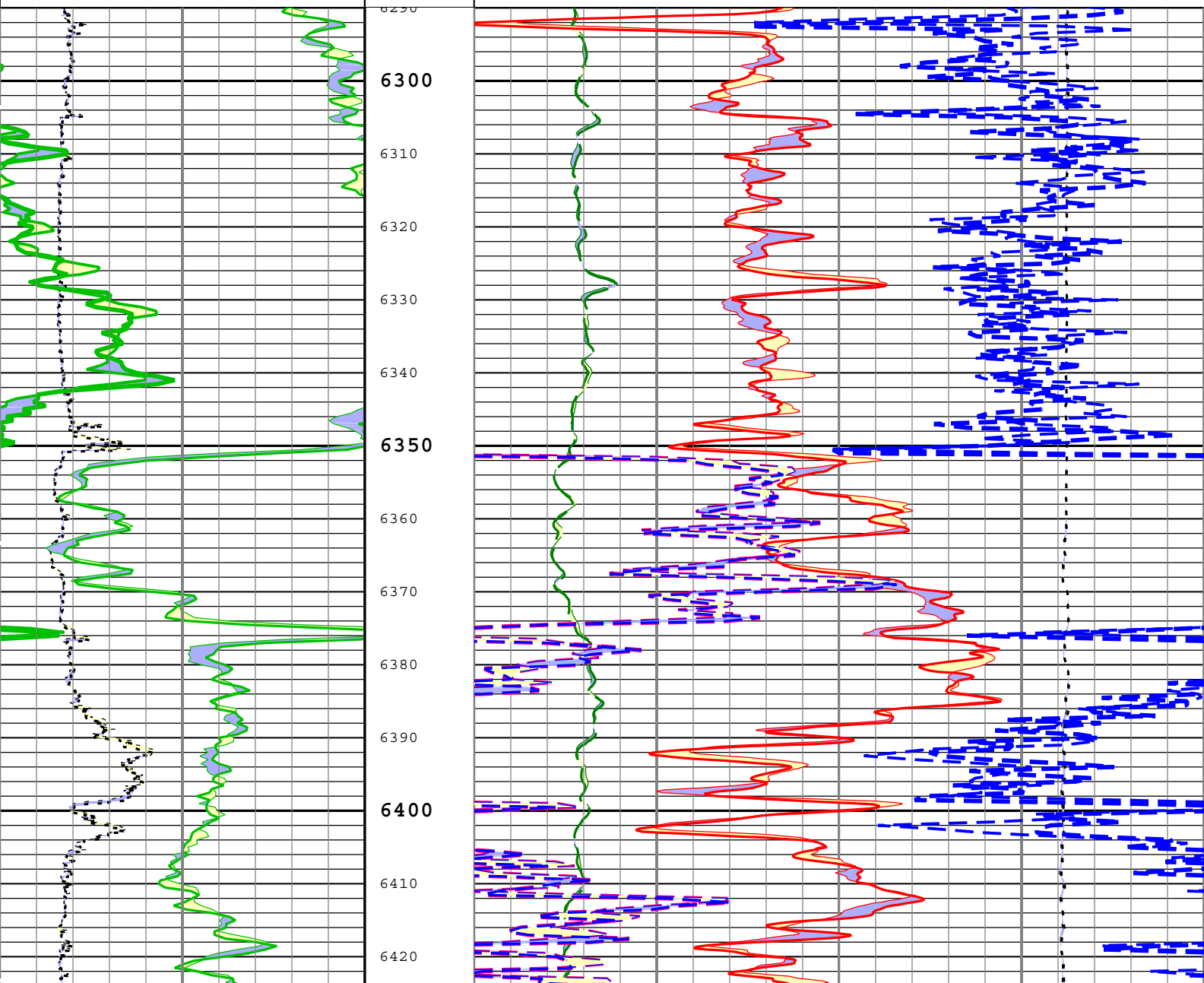
0 ft 50

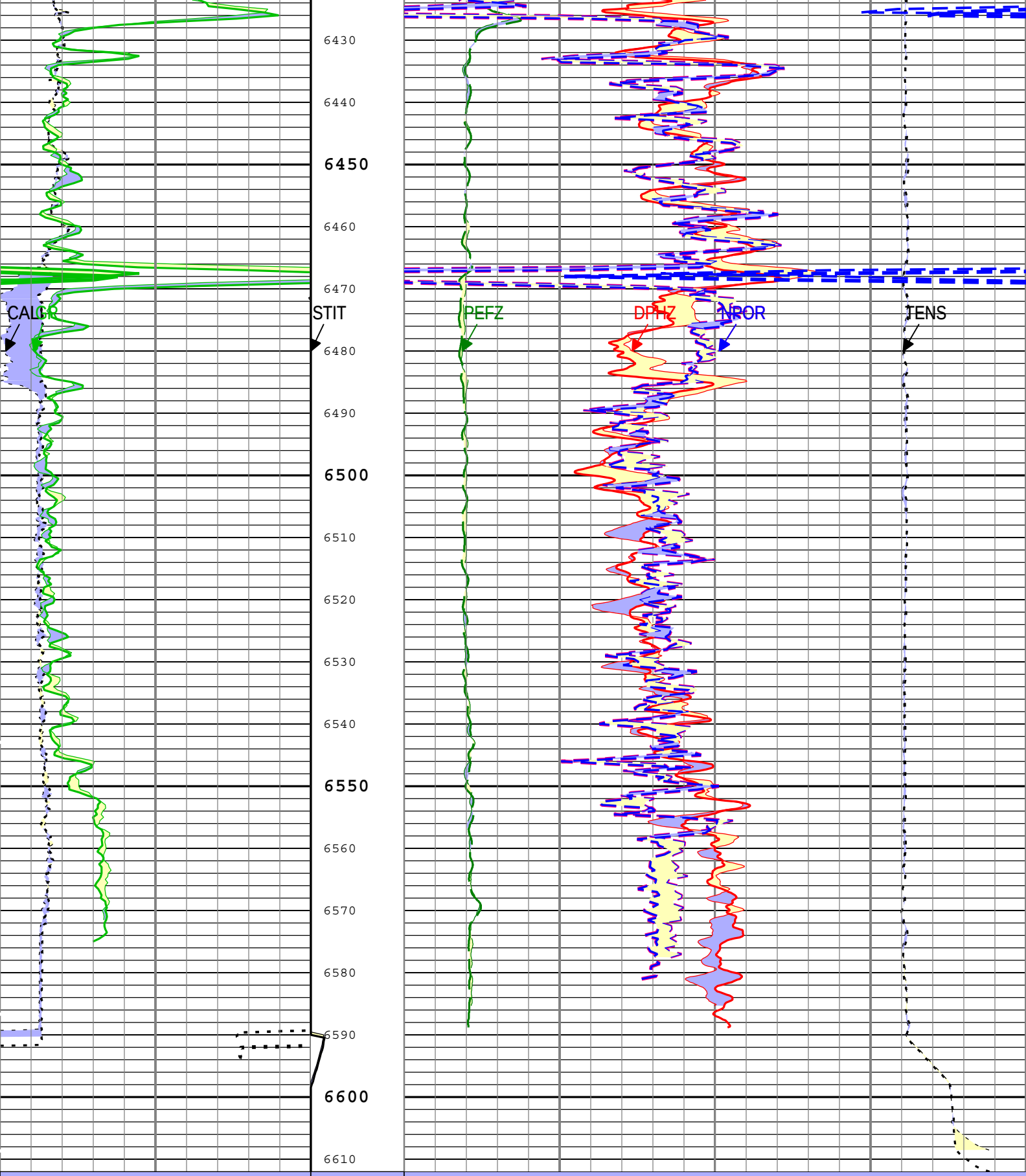
Main To Repeat

Repeat To Main

Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H

0.3 m3/m3 -0.1





Main To Repeat

Repeat To Main

Caliper (CALI) HDRS-H

6 in 16

Main To Repeat

Main To Repeat

Repeat To Main

Stuck Tool Indicator, Total (STIT)

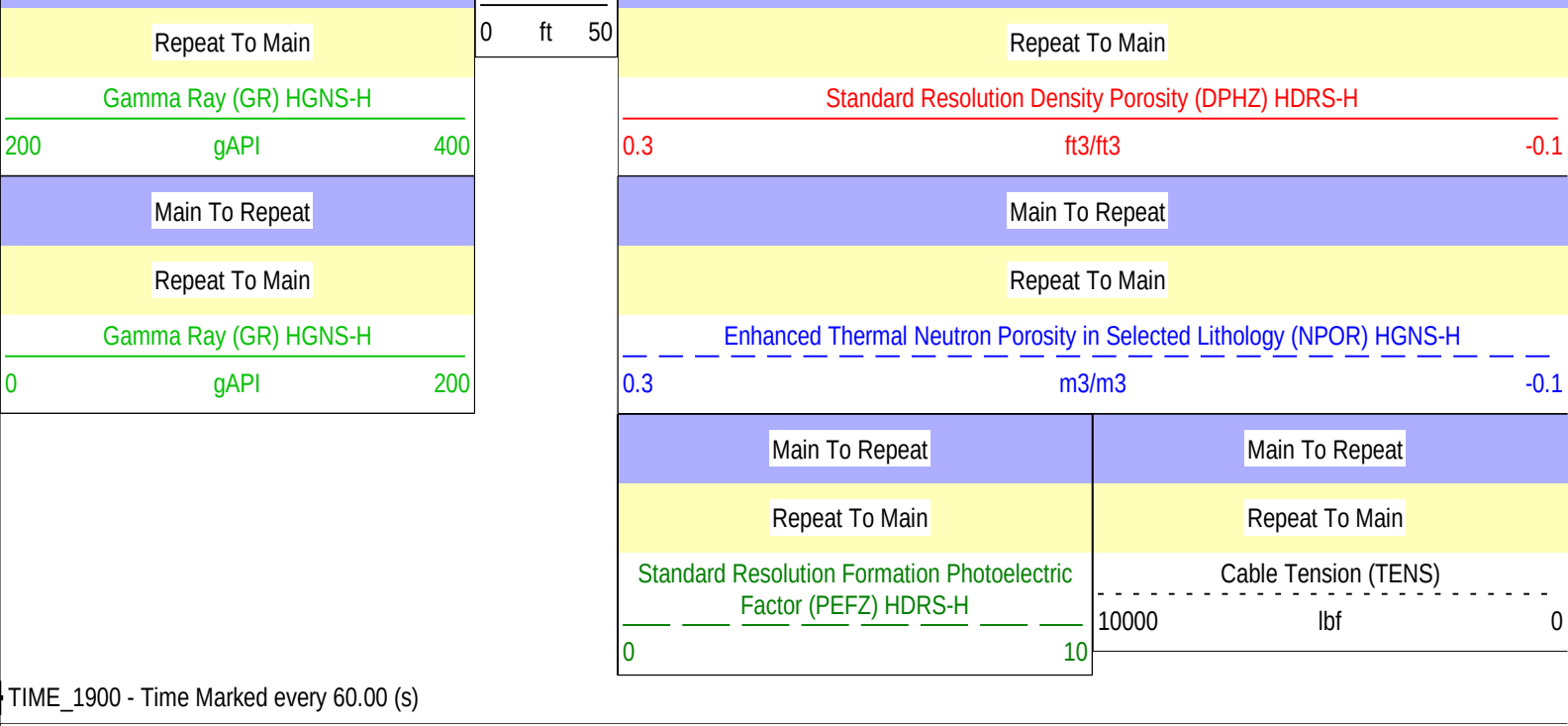
Main To Repeat

Repeat To Main

Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H

-0.1 ft3/ft3 -0.5

Main To Repeat



Description: HGNS standard resolution porosities for Platform Express Format: Log (KM 5in Porosity RA) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 16-Feb-2014 04:44:04

Run 1: PEX-AIT

5" Density

Software Version

Acquisition System	Version
MaxWell	4.0.9163.3000
Application Patch	Patch-SP-10767_13393-4.0.9163.3001

Computation	Description	Version
DepthCorrection	DepthCorrection	4.0.9213.3000

Tool Elements	Description	Software Version	Firmware Version
HRCC-H	HILT High-Resolution Control Cartridge, 150 degC	4.0.9231.3000	2.0
HGNS-H	HILT Gamma-Ray and Neutron Sonde, 150 degC	4.0.9231.3000	2.0
HRGD-H	HILT Resistivity Gamma-Ray Density Device, 150 degC	4.0.9231.3000	3.0

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1: PEX-AIT	Main[6]:Up	Up	412.38 ft	6608.73 ft	16-Feb-2014 1:44:28 AM	16-Feb-2014 3:30:23 AM	ON	0.00 ft	No

All depths are referenced to toolstring zero

Log

Company:Aurora Power Resources Inc Well:David Bender 1A

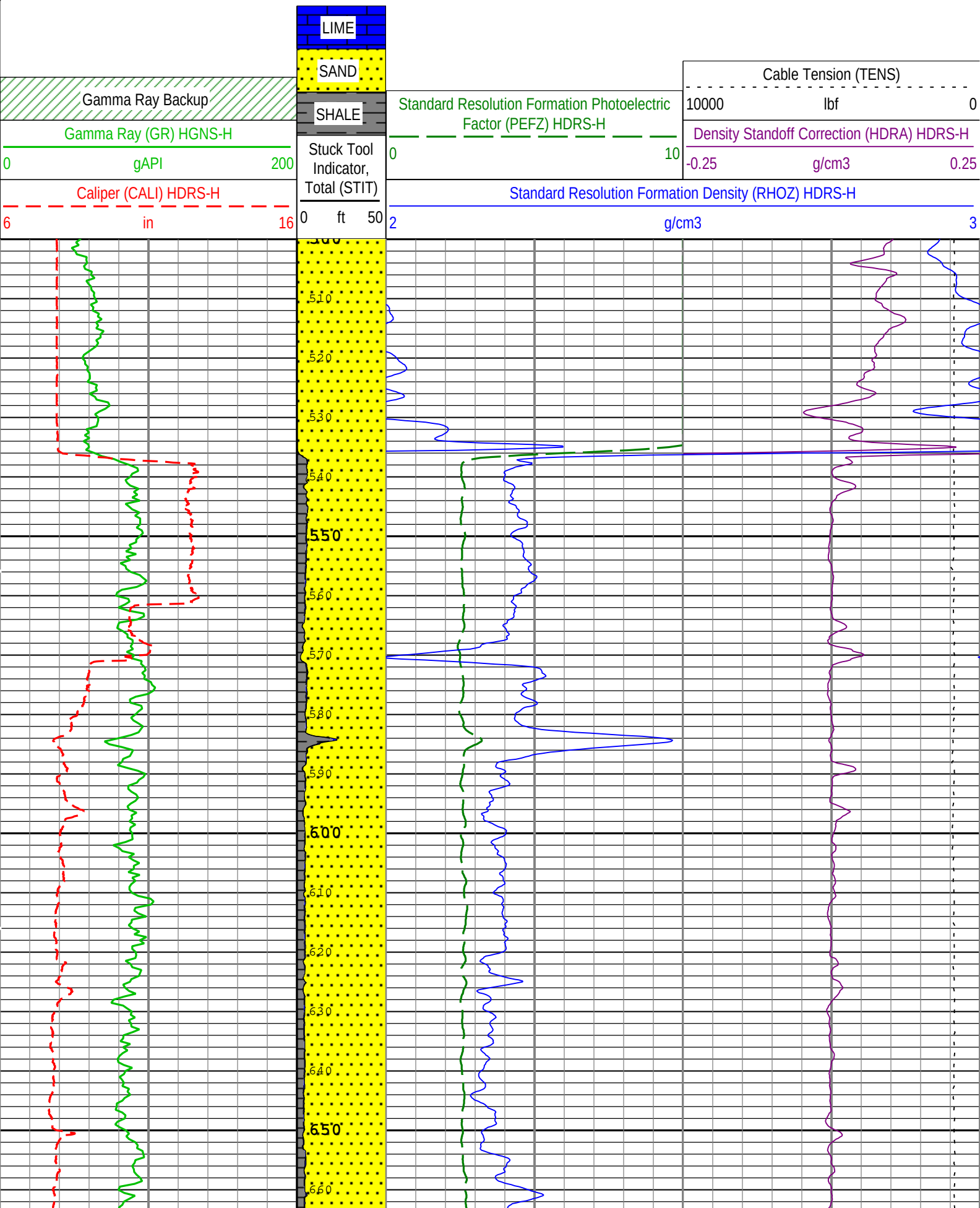
Run 1: PEX-AIT: Main[6]:Up:S003

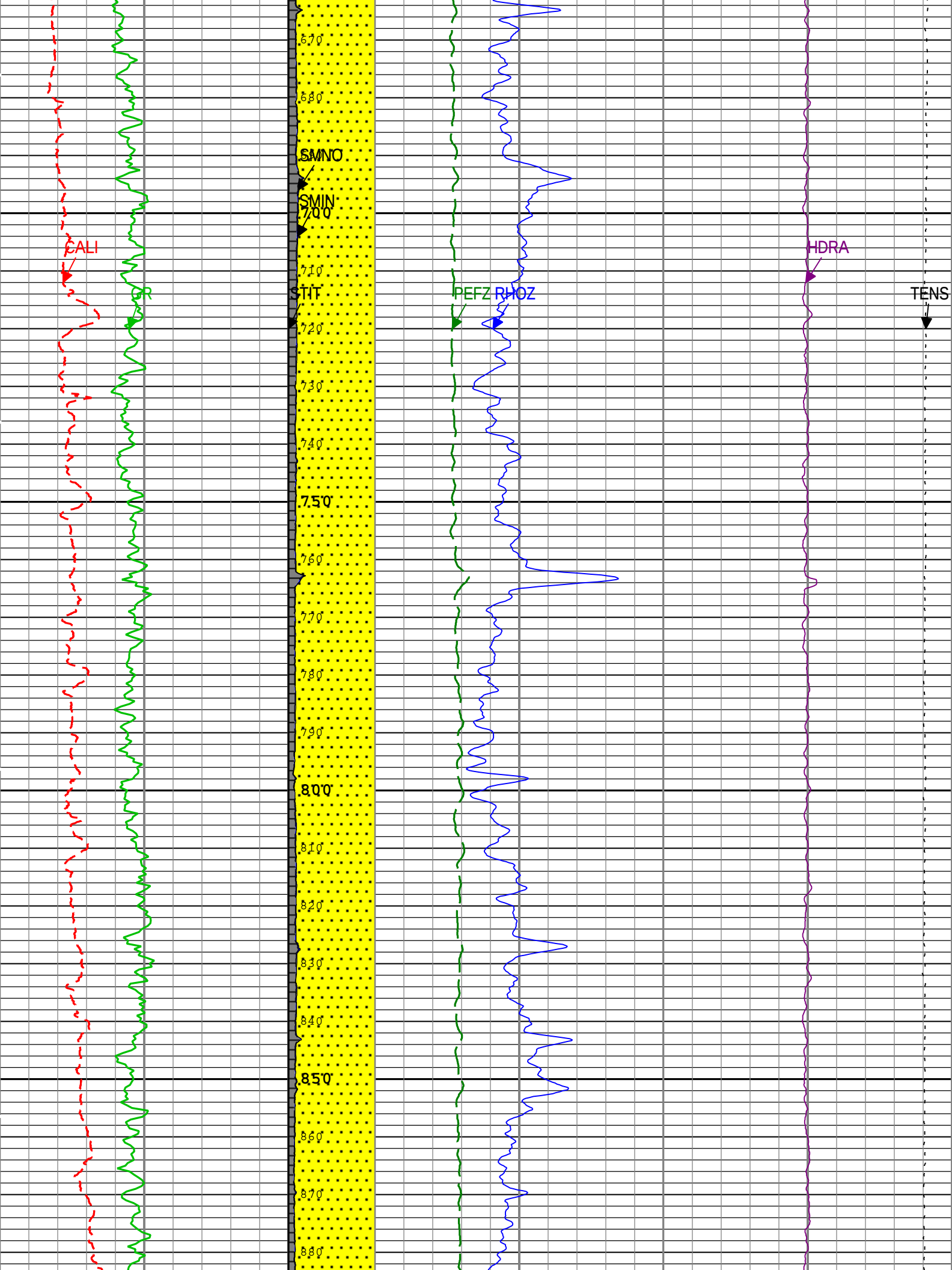
Description: HGNS standard resolution porosities for Platform Express Format: Log (KM 5in Density) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 16-Feb-2014 04:44:05

Channel	Source	Sampling
CALI	HDRS-H:HRCC-H:HRCC-H	1in
GR	HGNS-H:HGNS-H:HGNS-H	6in
HDRA	HDRS-H:HRMS-H:HRGD-H	2in
PEFZ	HDRS-H:HRMS-H:HRGD-H	2in
RHOZ	HDRS-H:HRMS-H:HRGD-H	2in
SMIN	HDRS-H:HRMS-H:HRGD-H	2in
SMNO	HDRS-H:HRMS-H:HRGD-H	2in

STIT	DepthCorrection	6in
TENS	WLWorkflow	6in
TIME_1900	WLWorkflow	0.1in

TIME_1900 - Time Marked every 60.00 (s)

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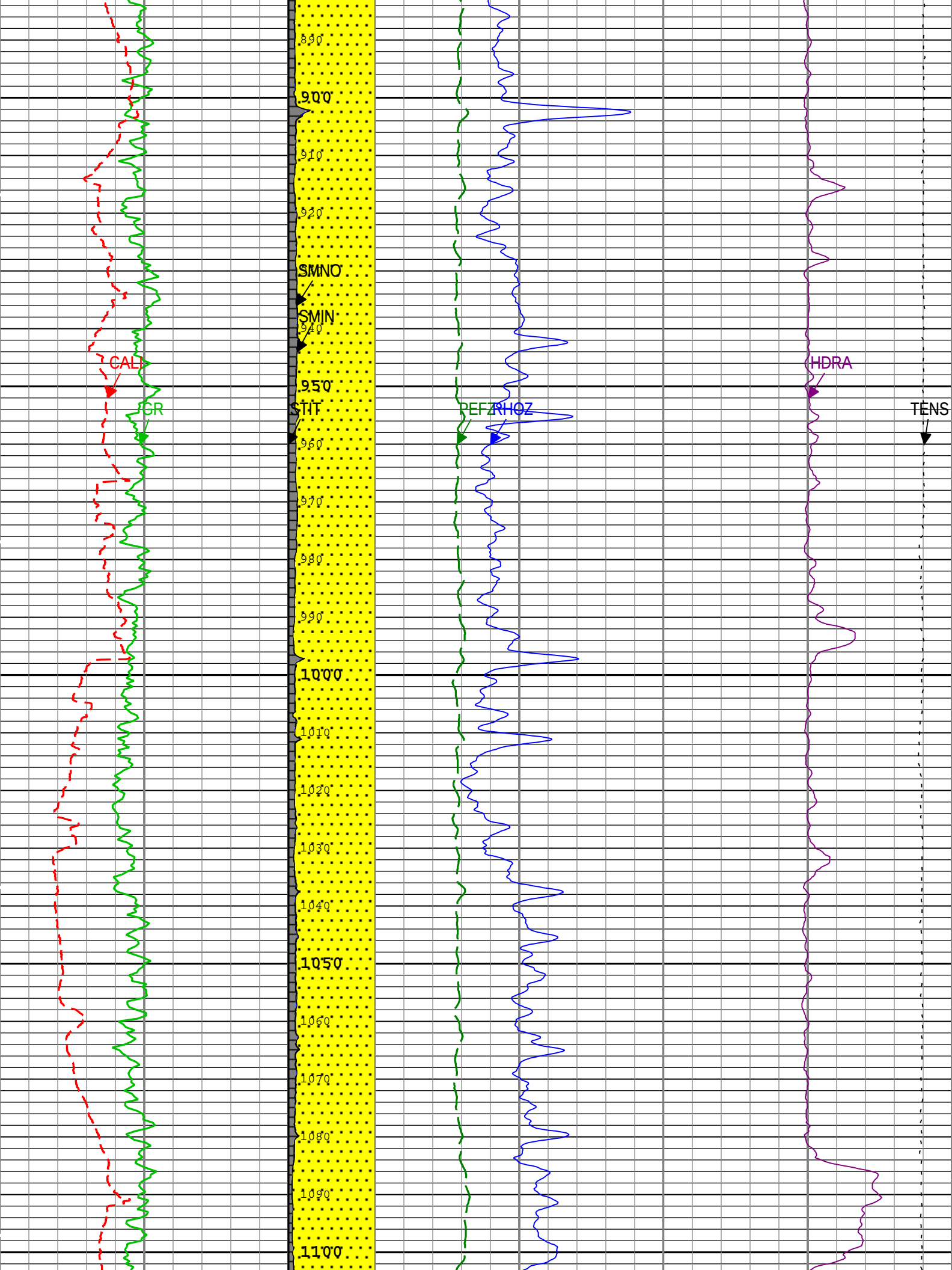
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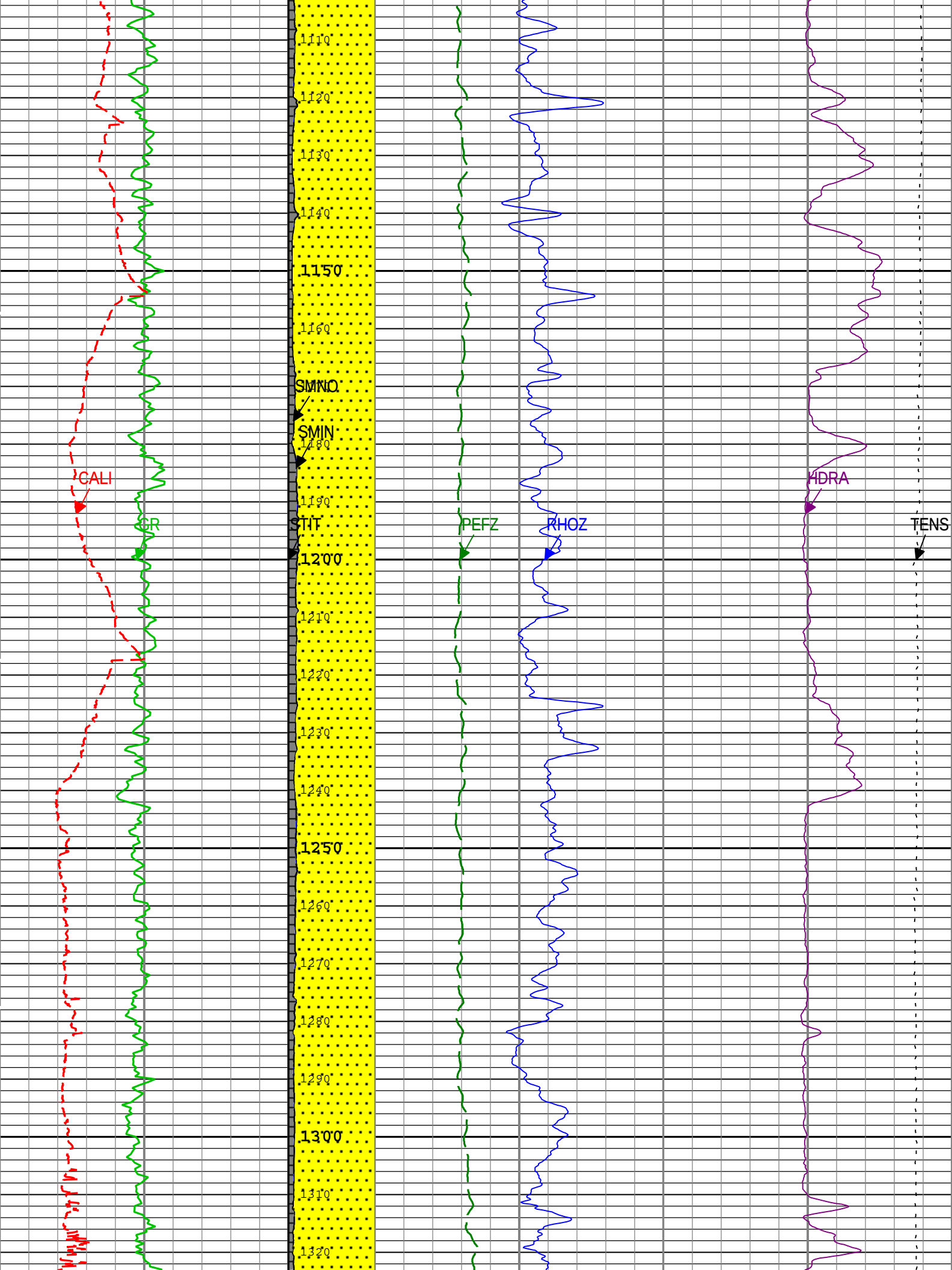
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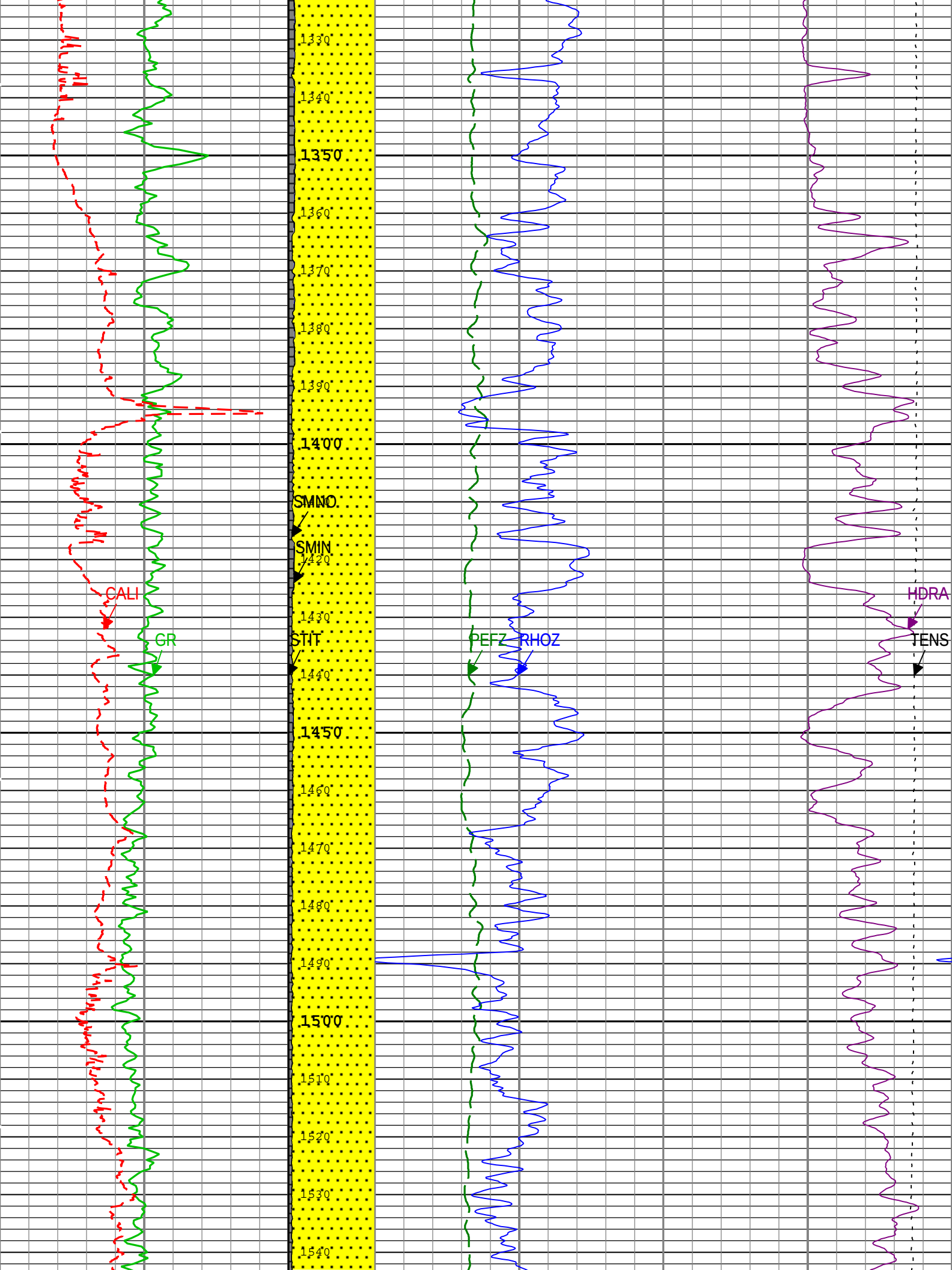
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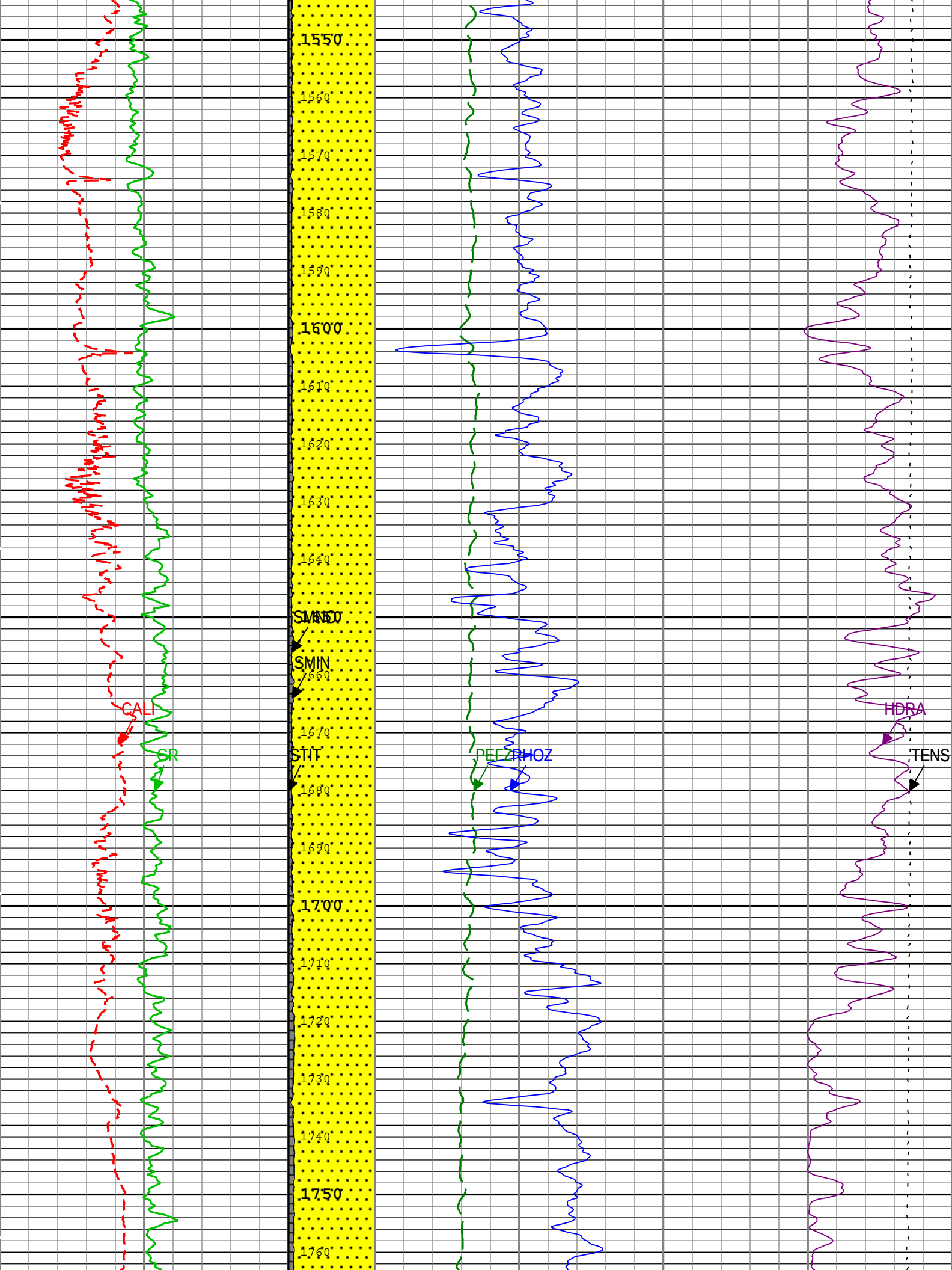
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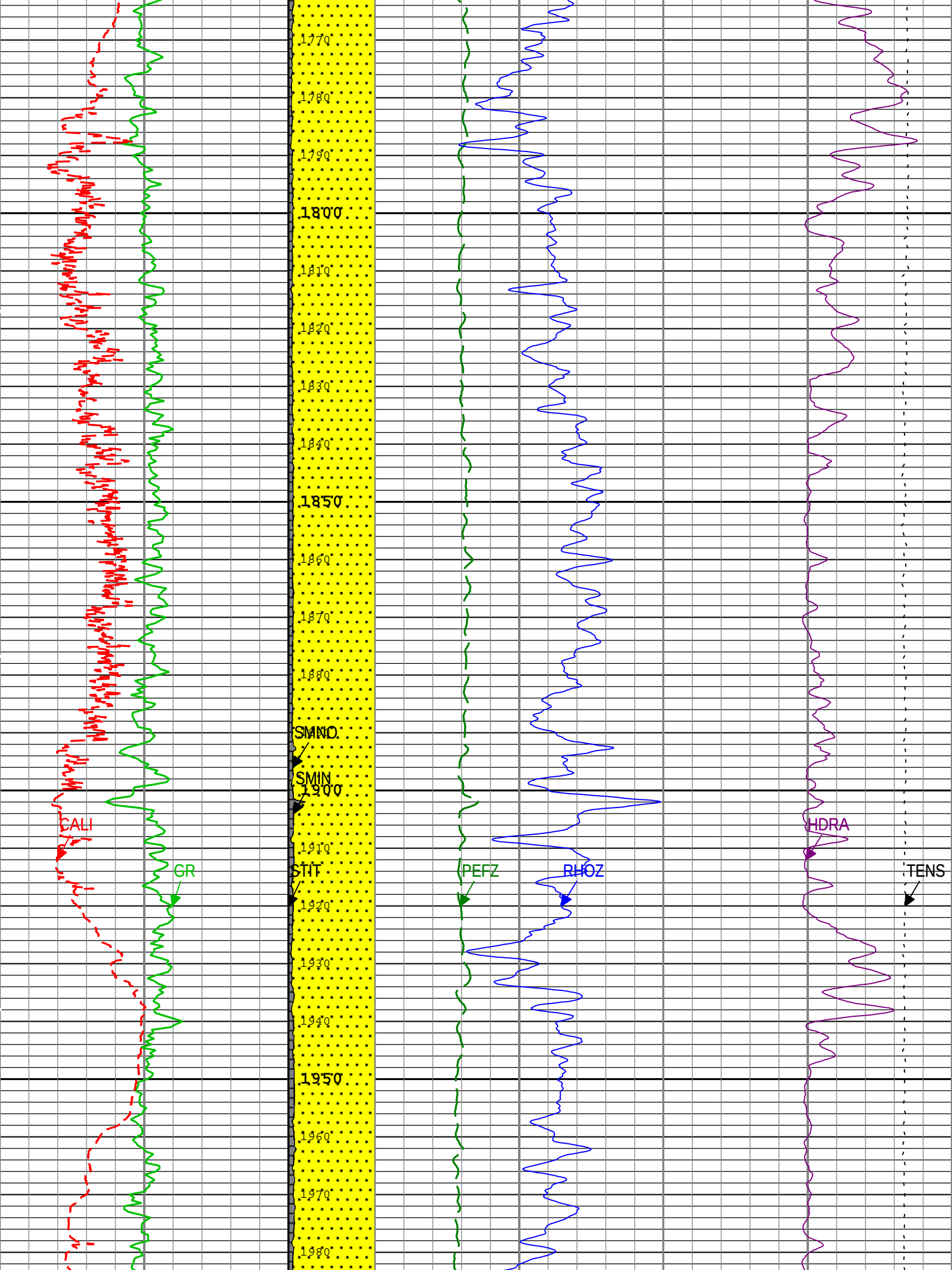
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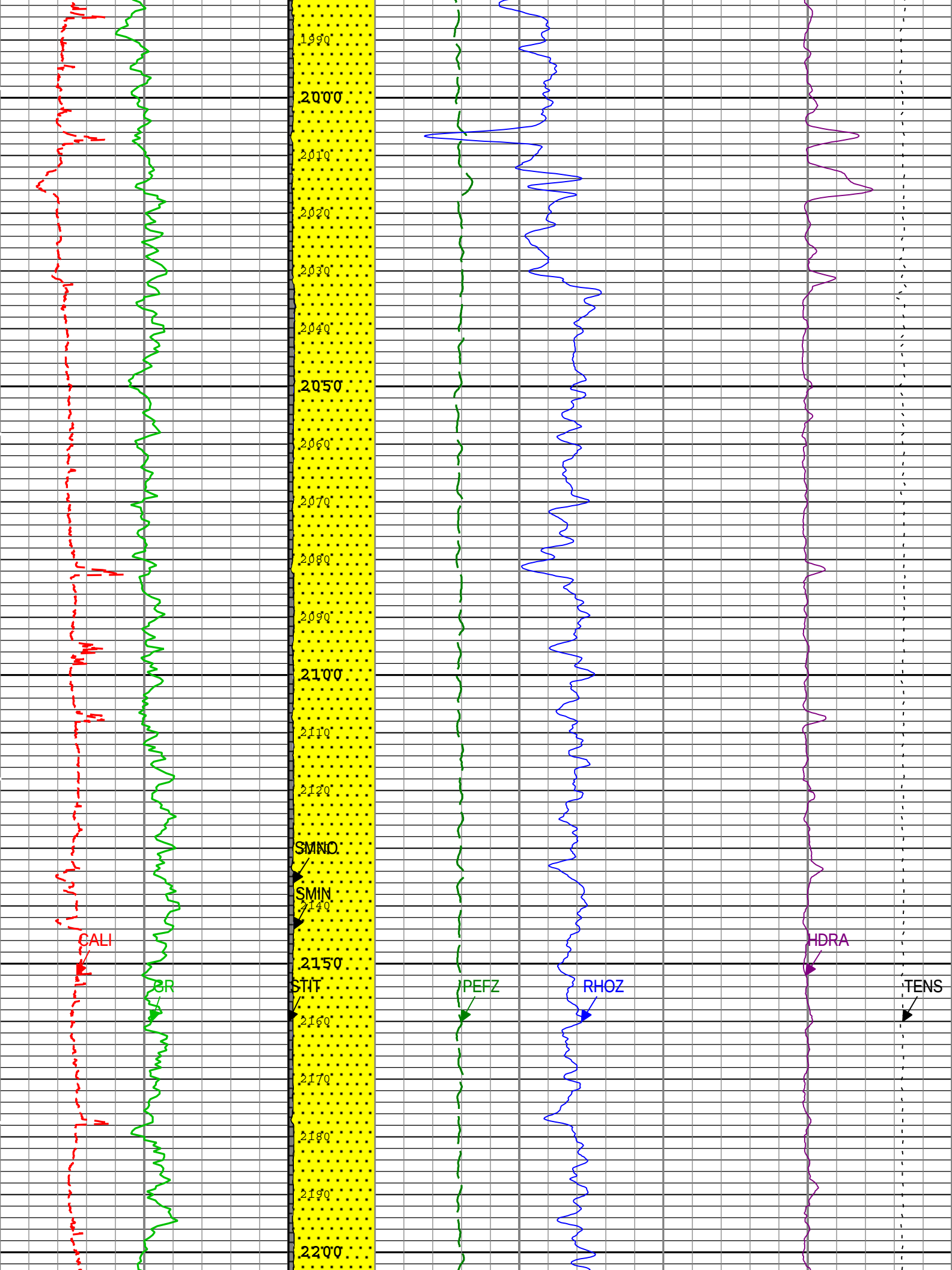
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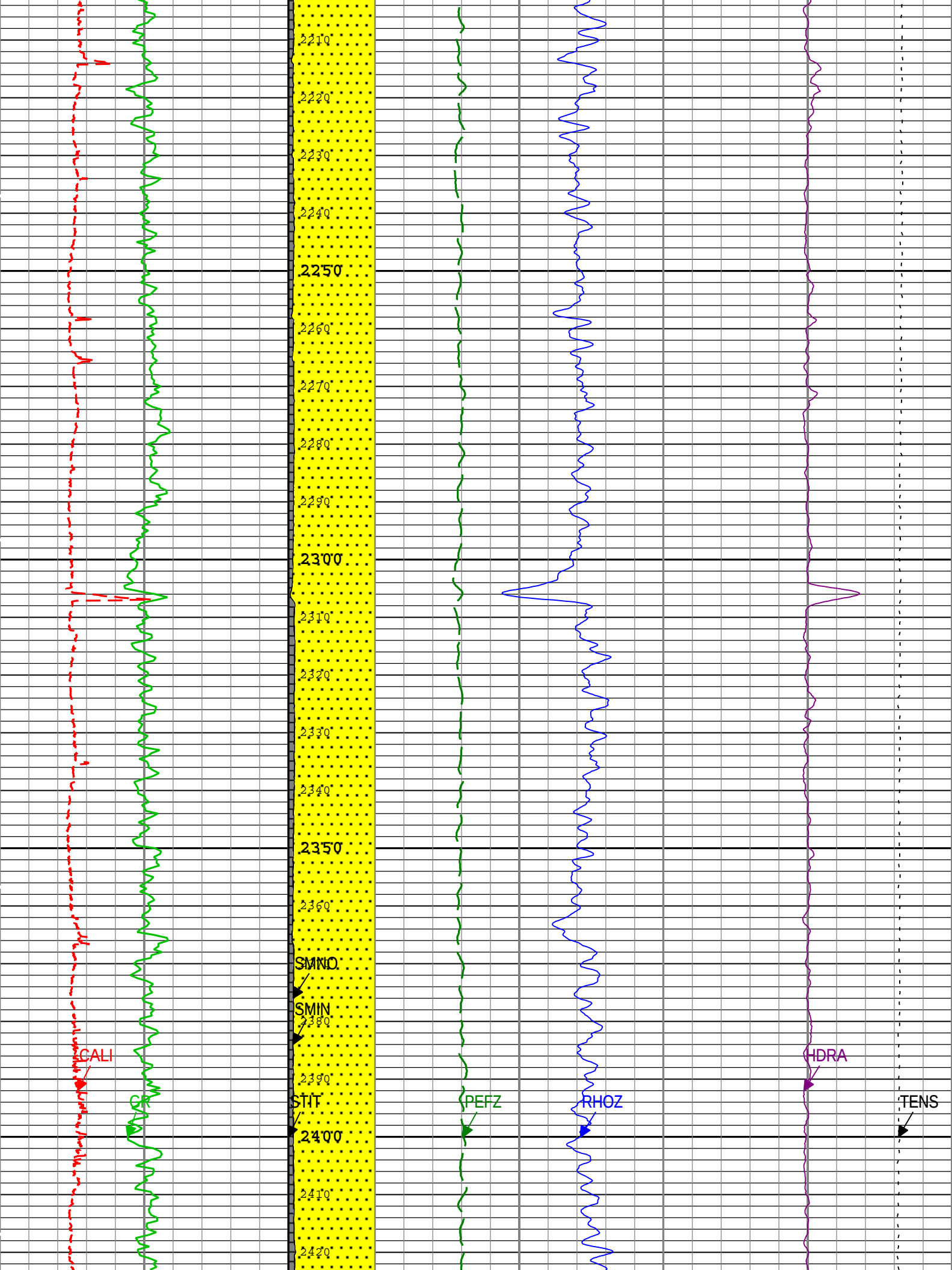
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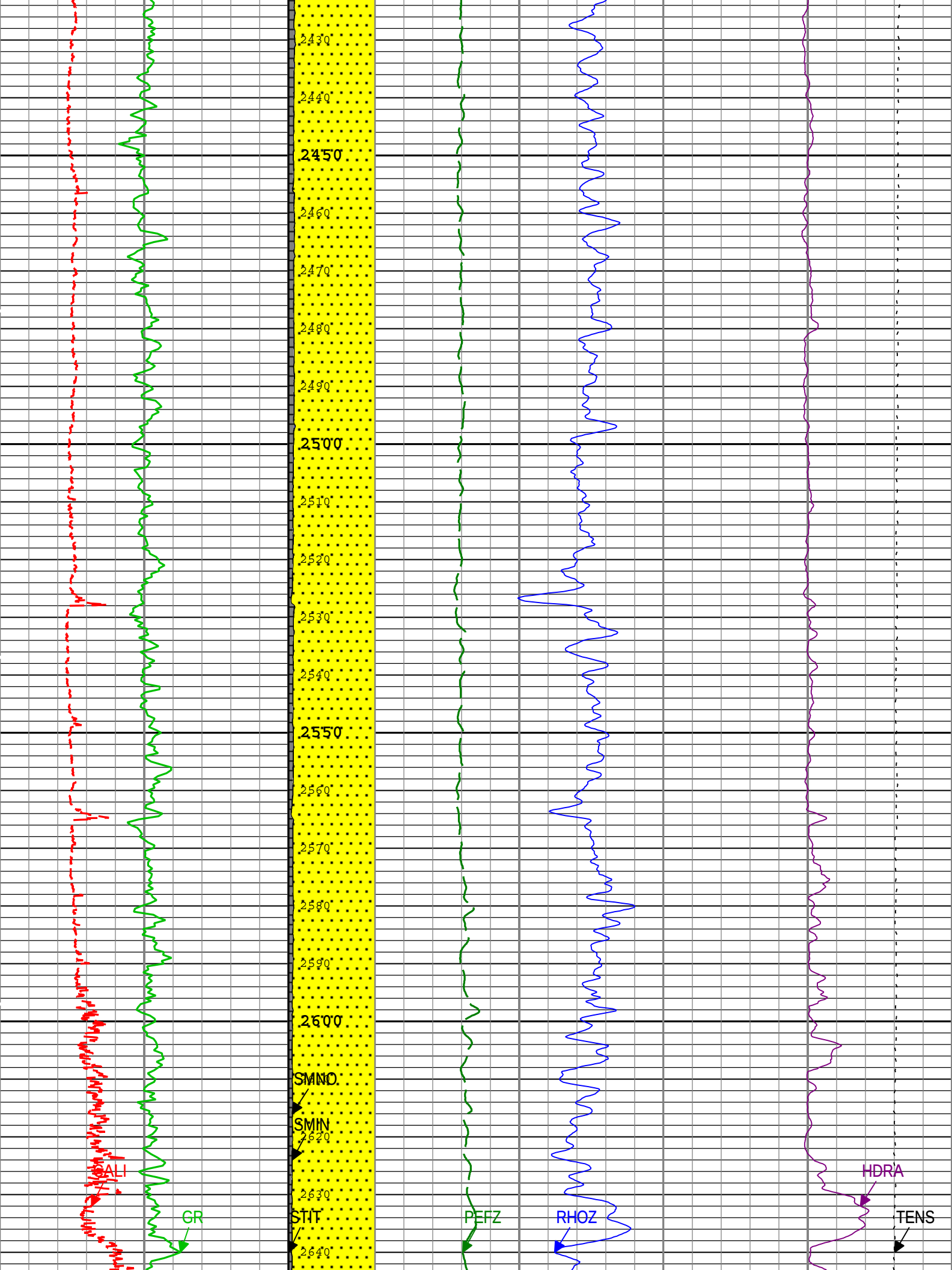
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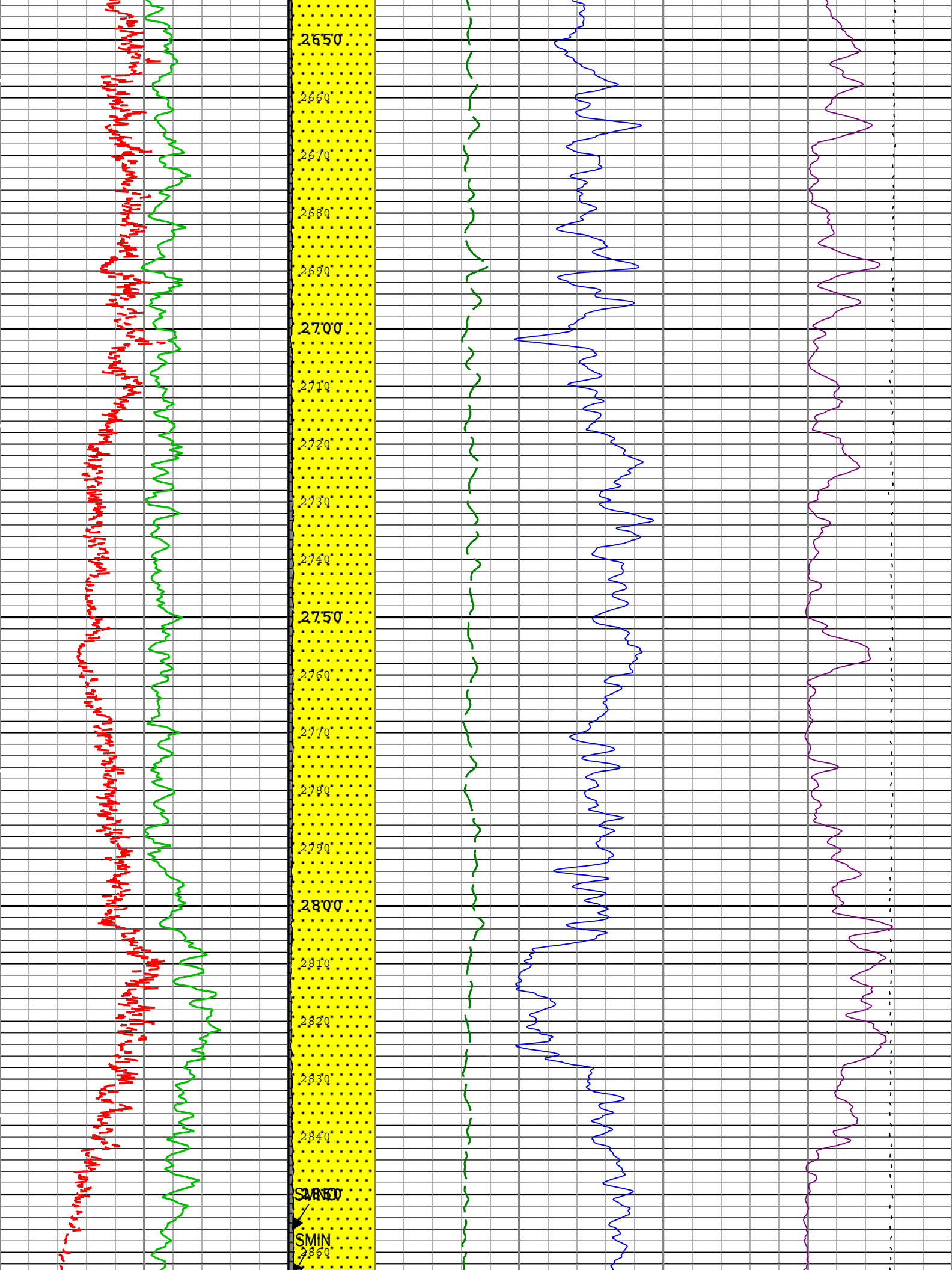
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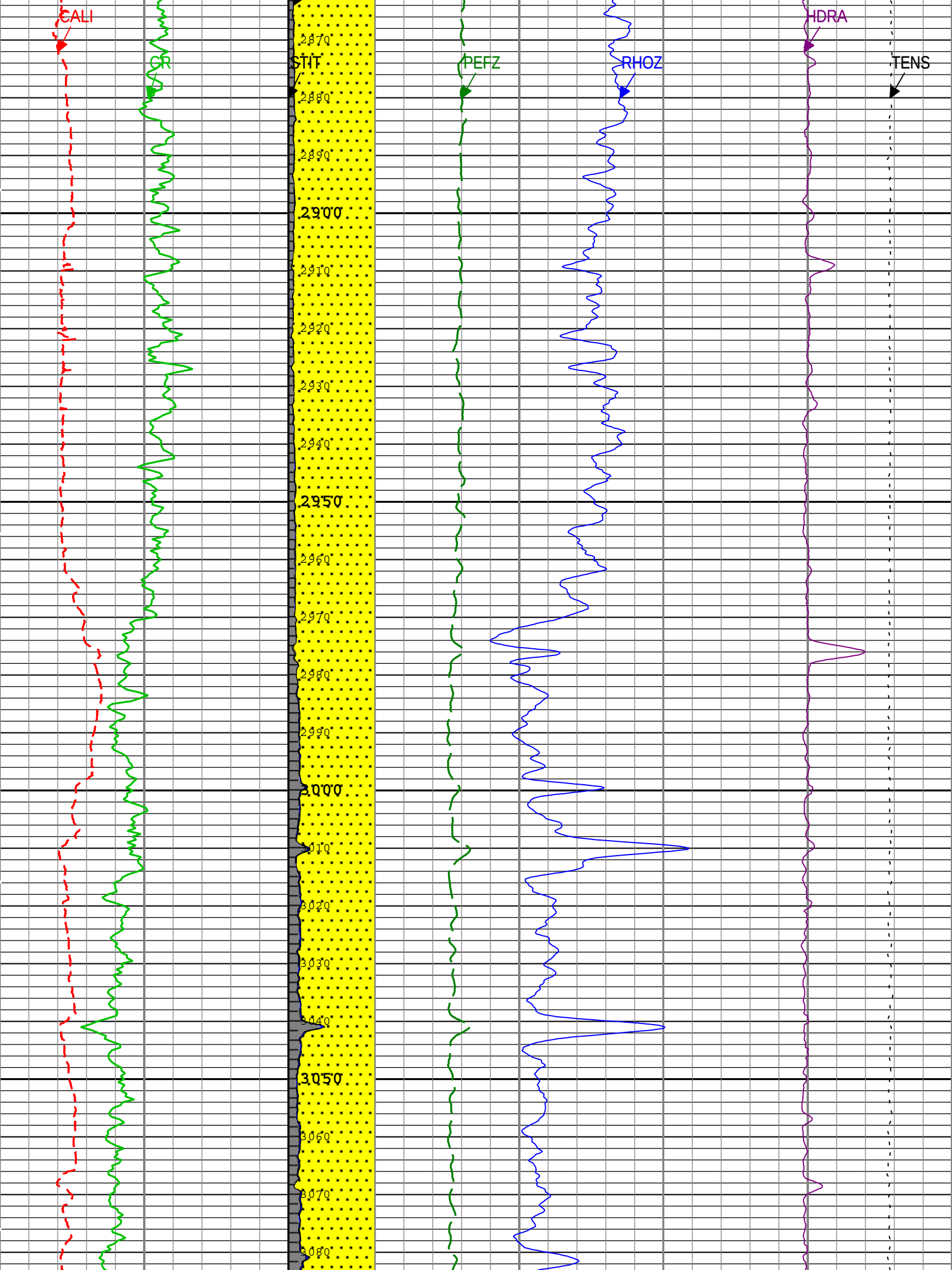
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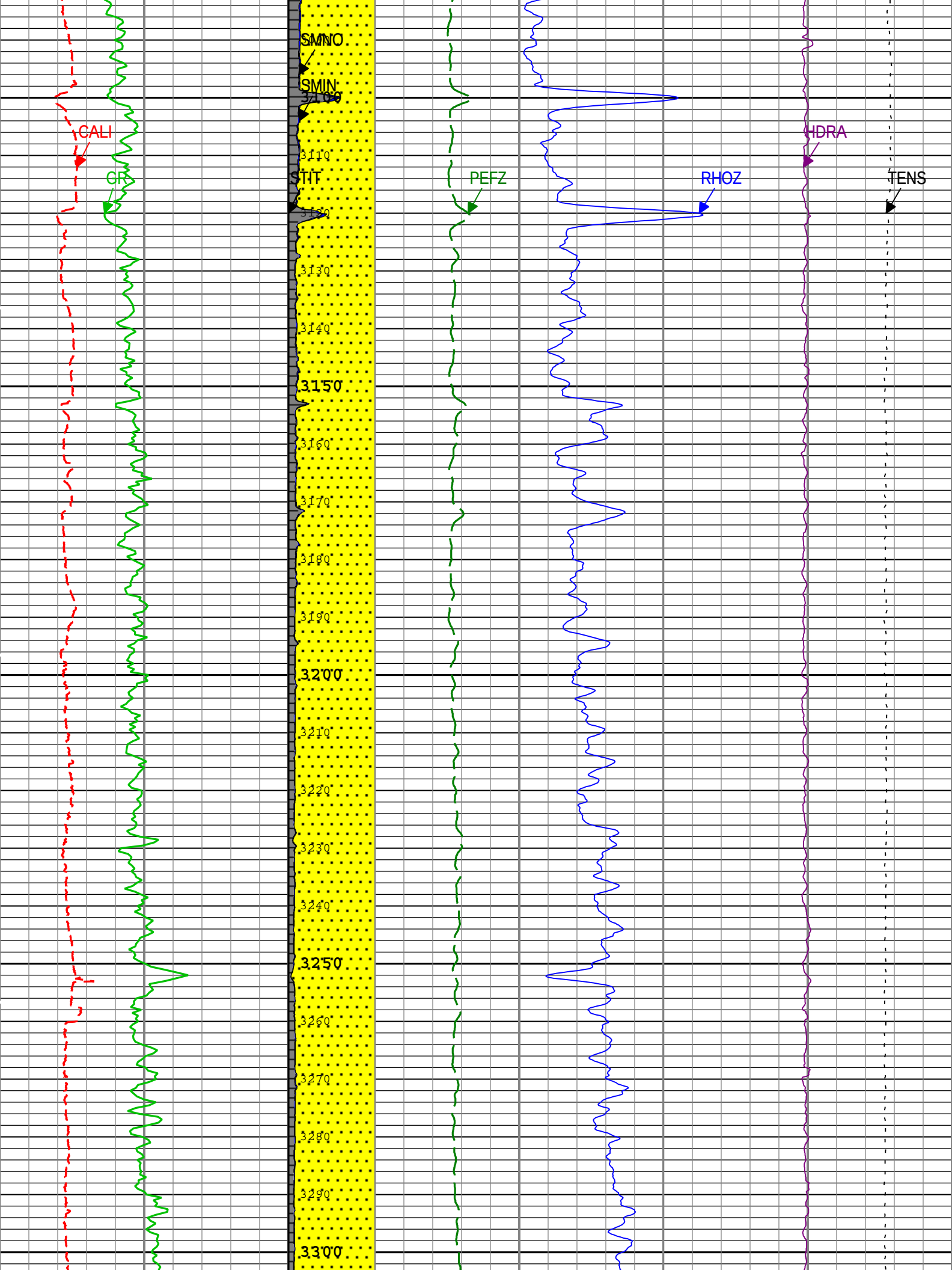
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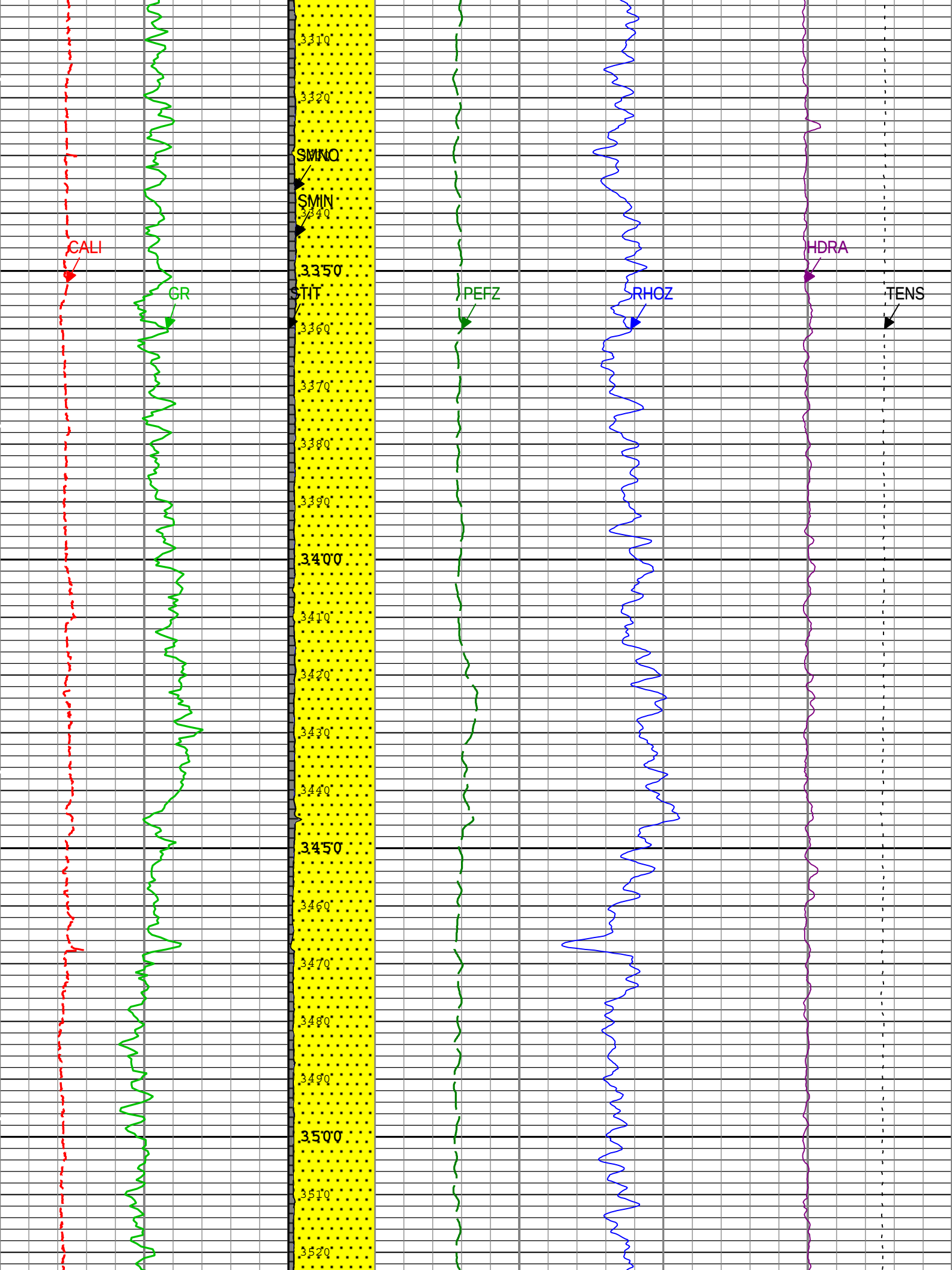
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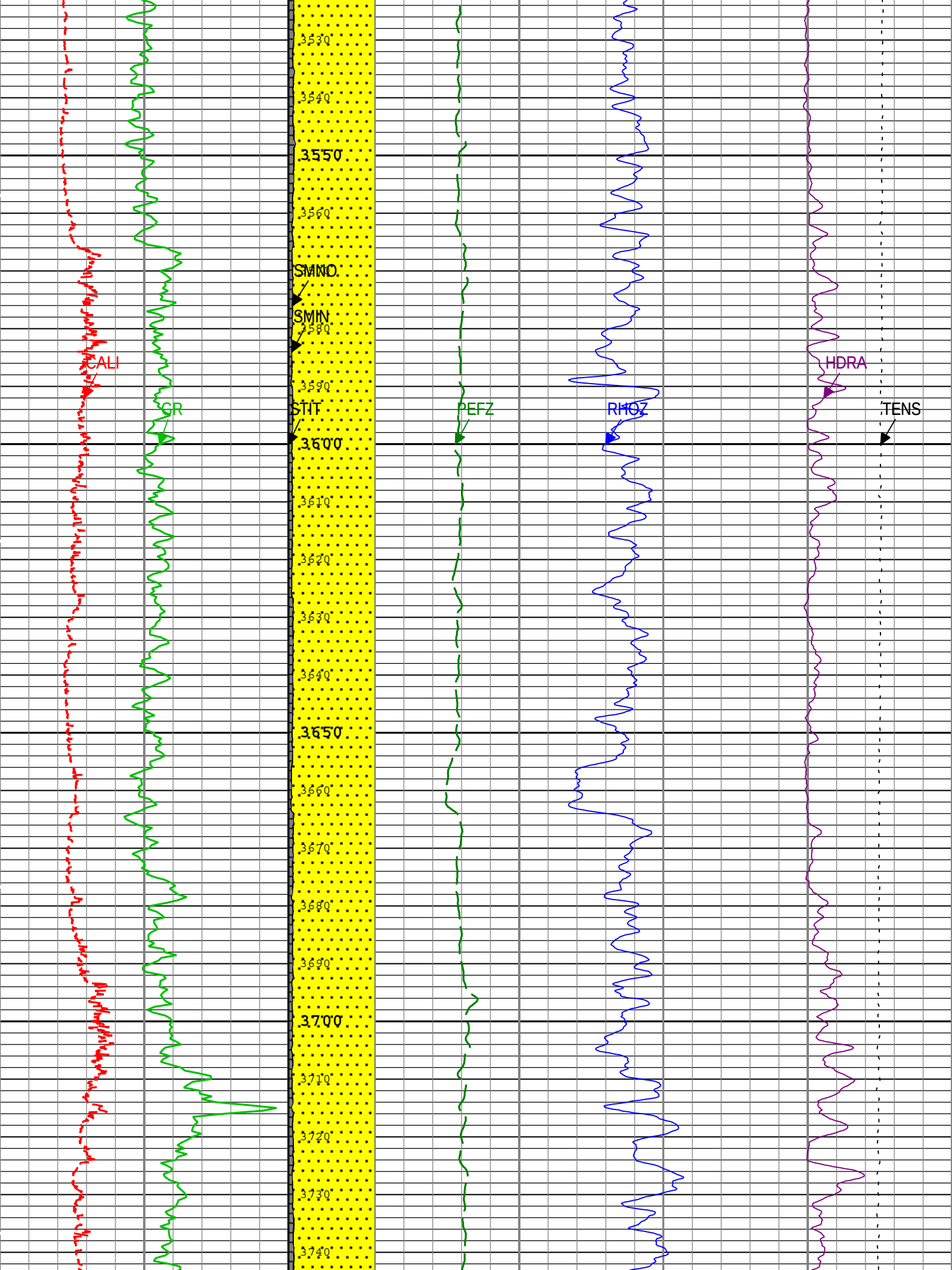
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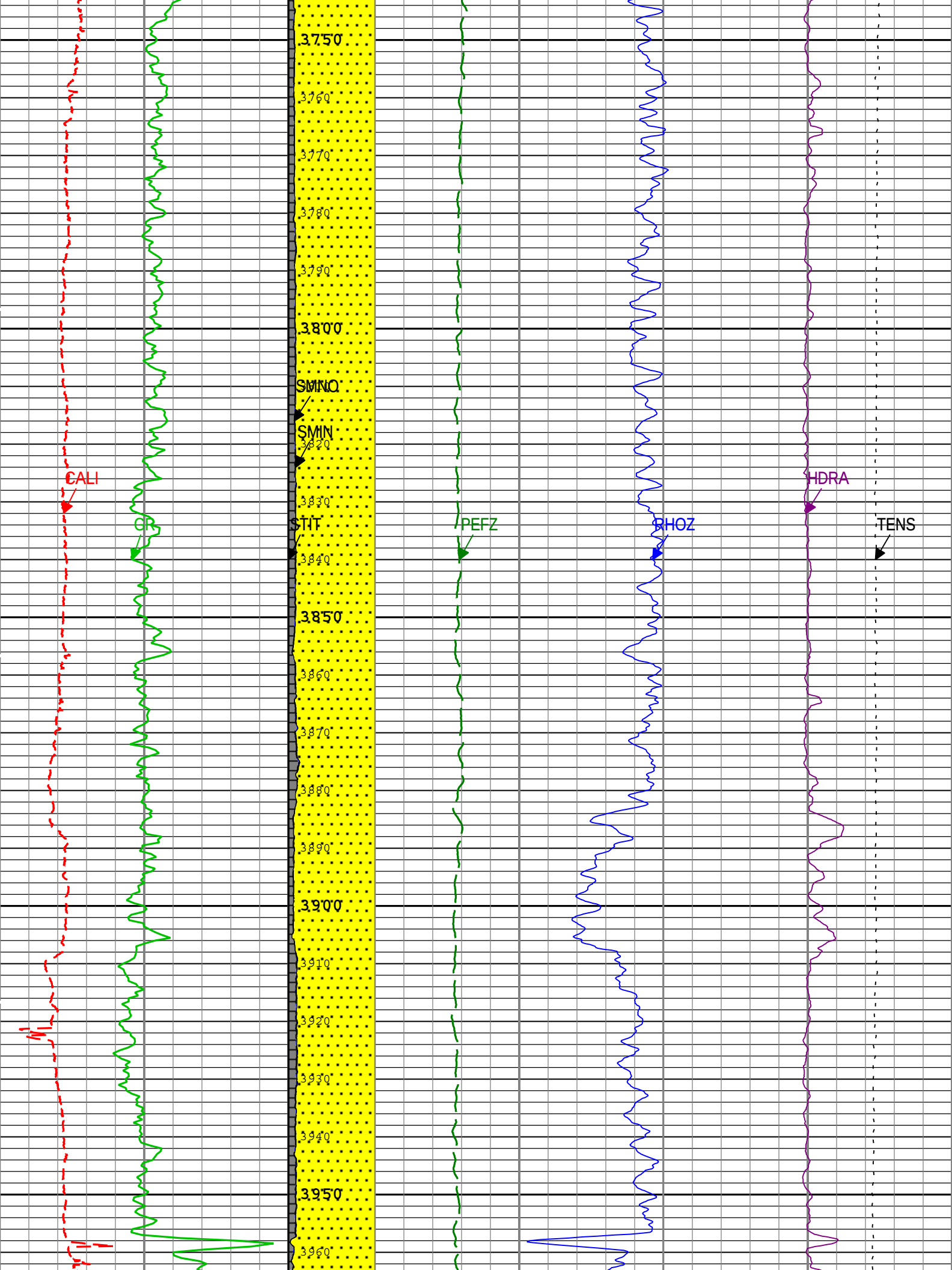
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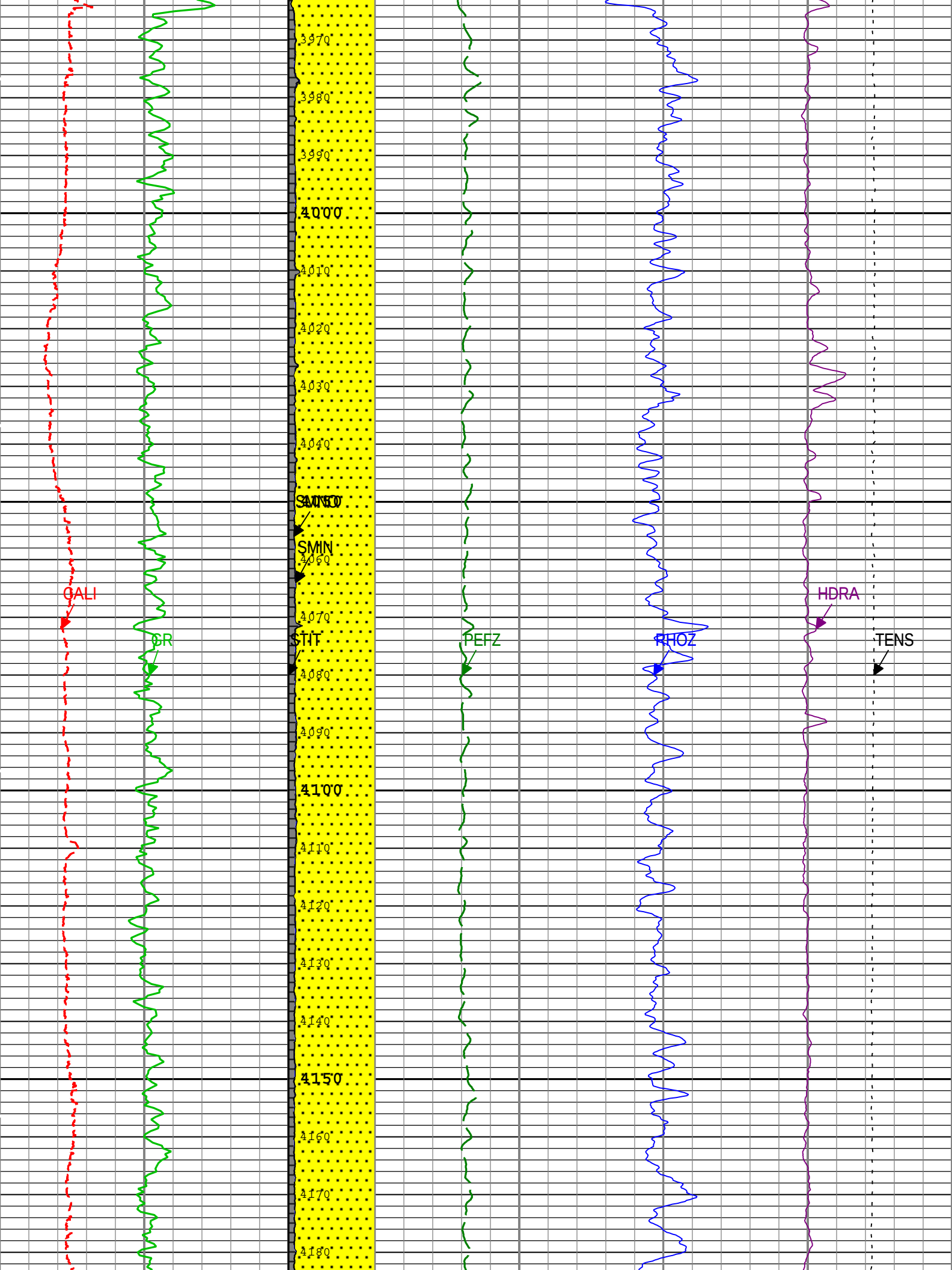
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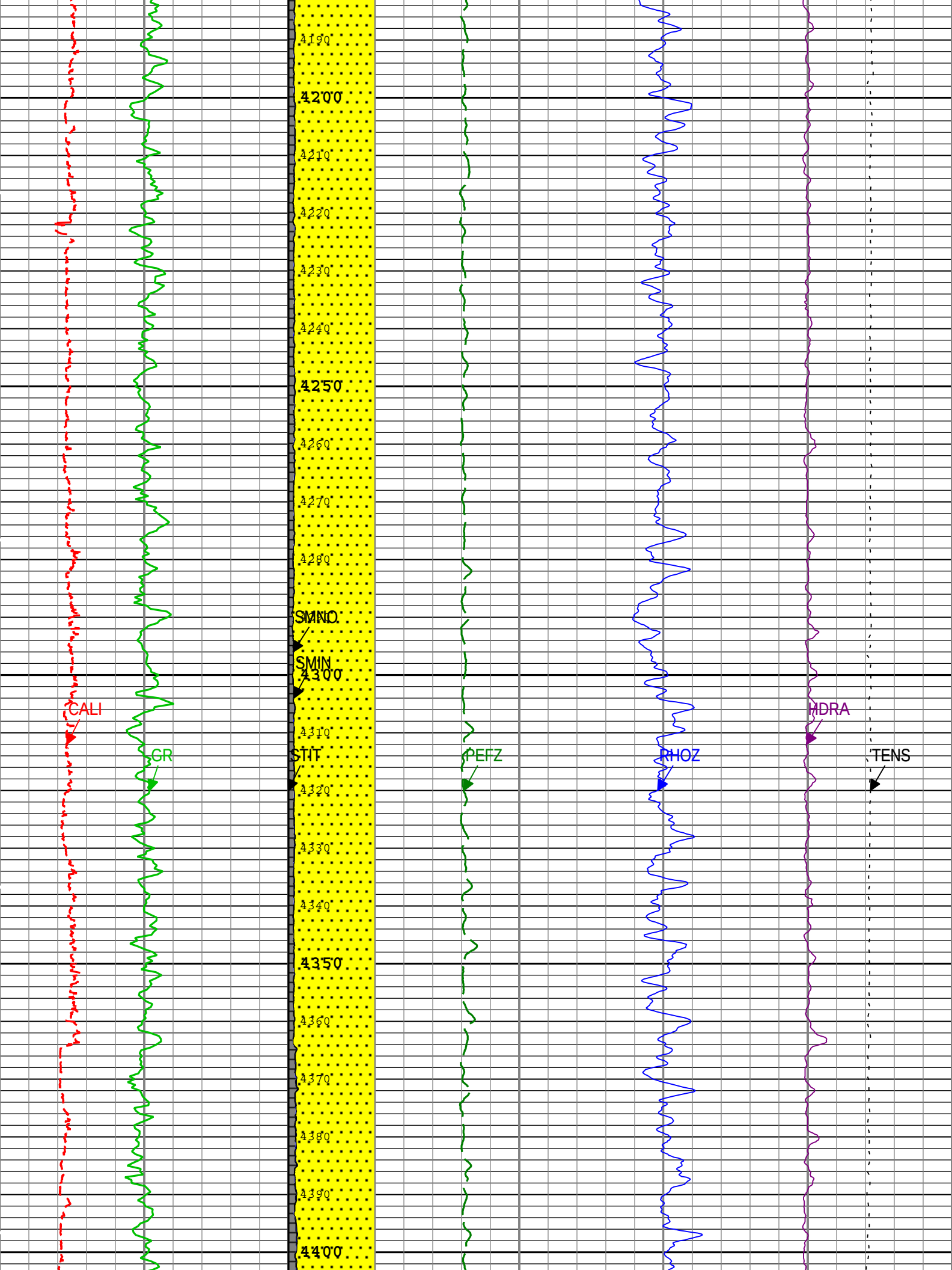
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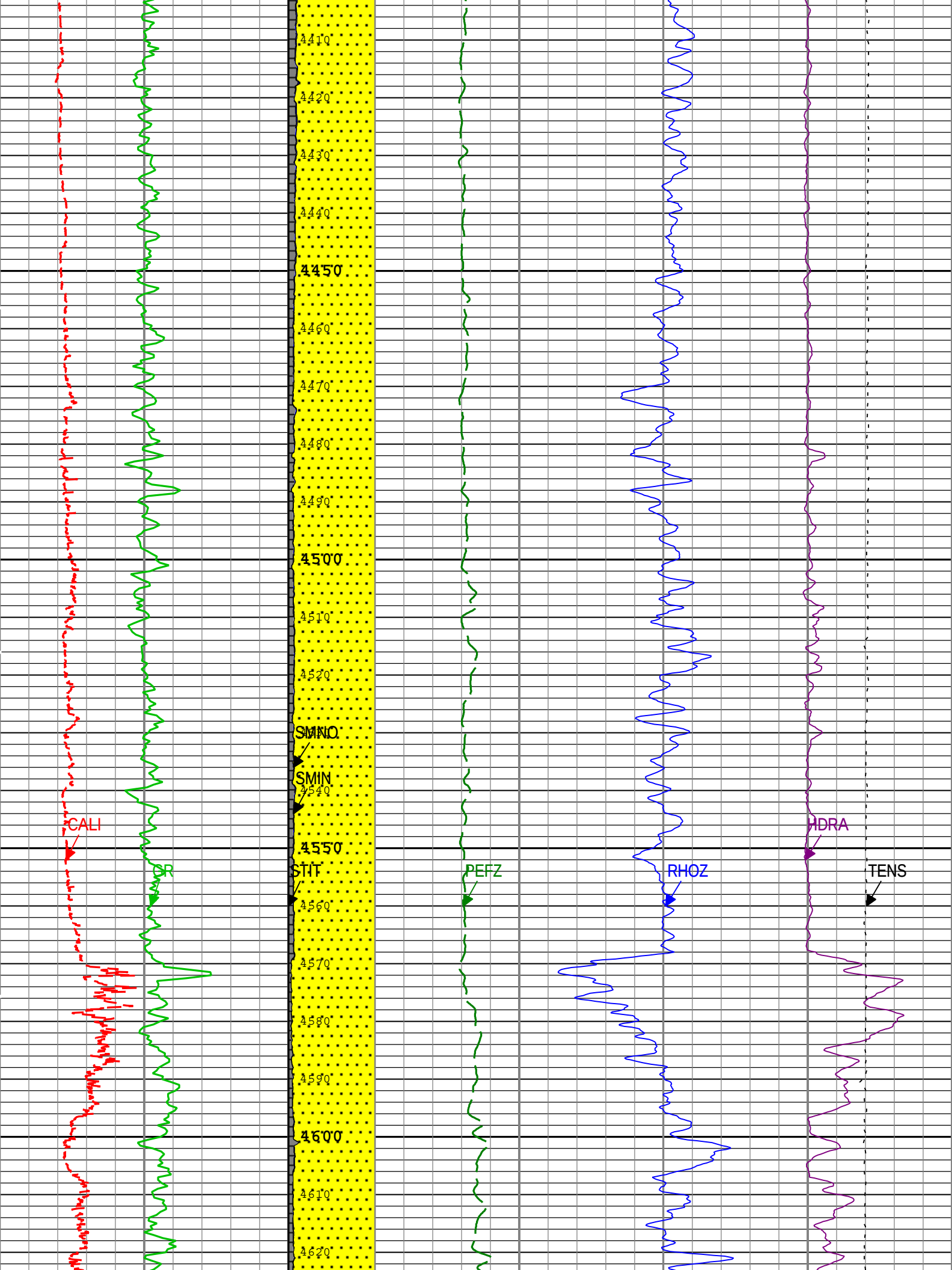
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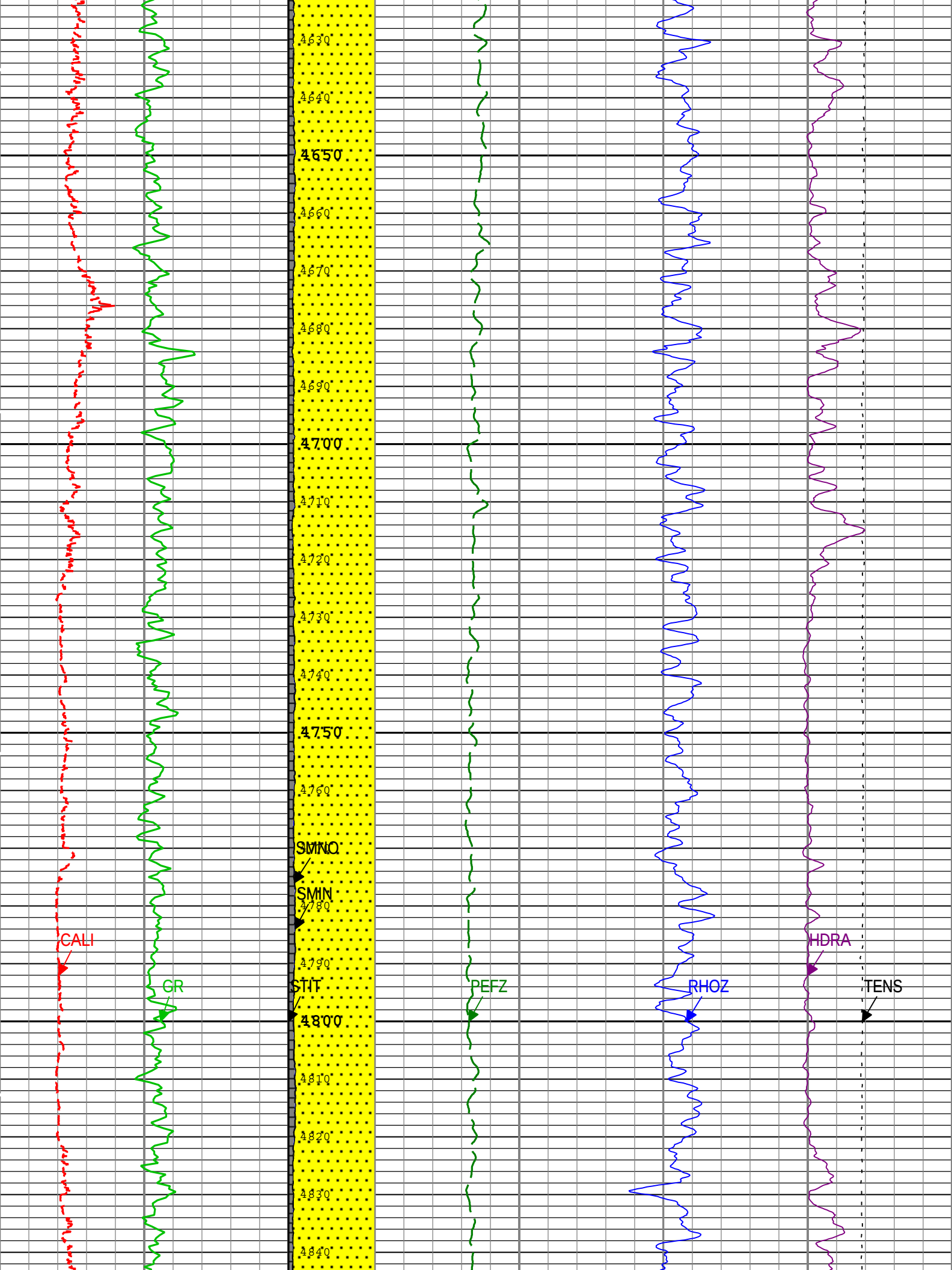
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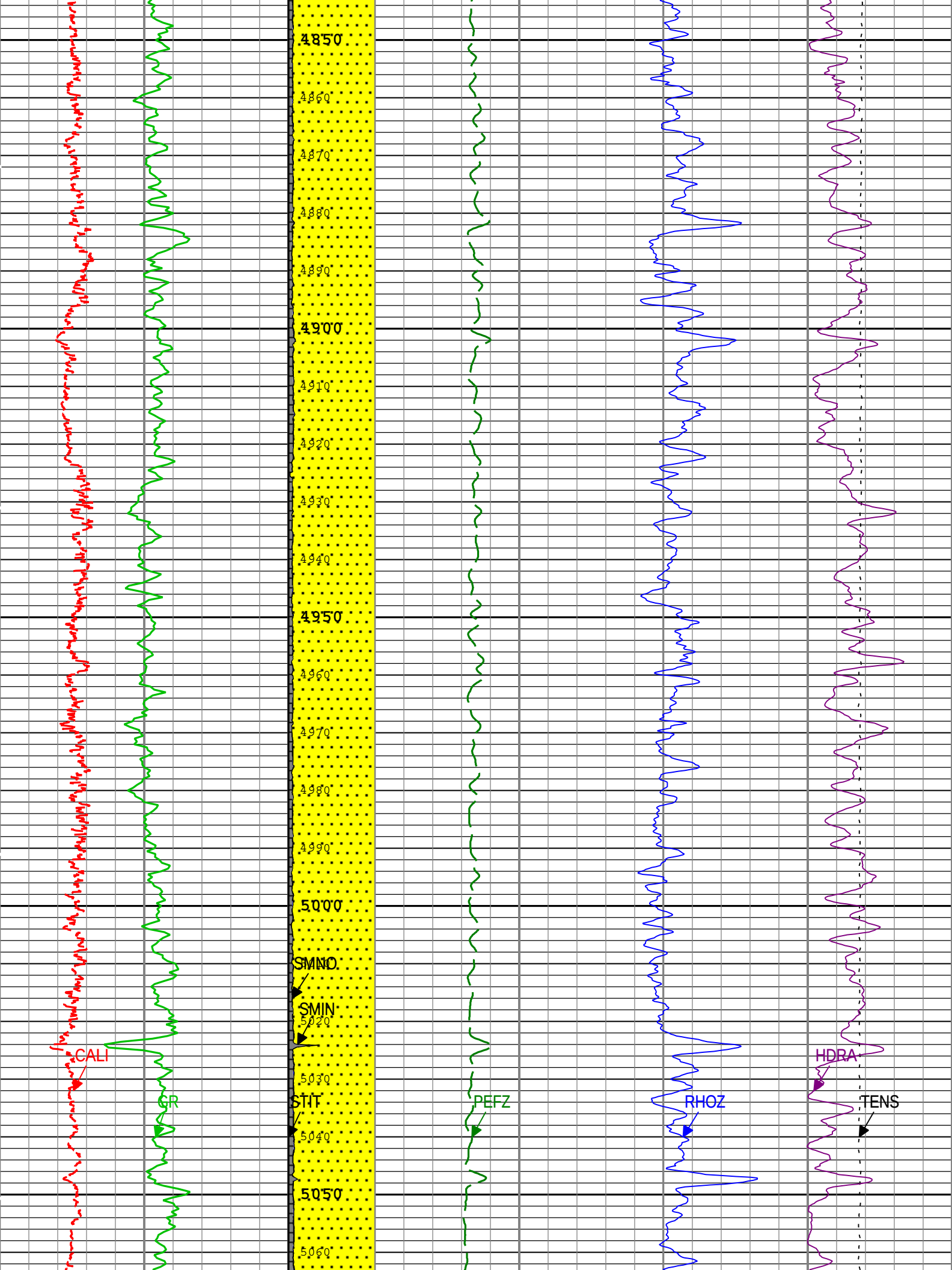
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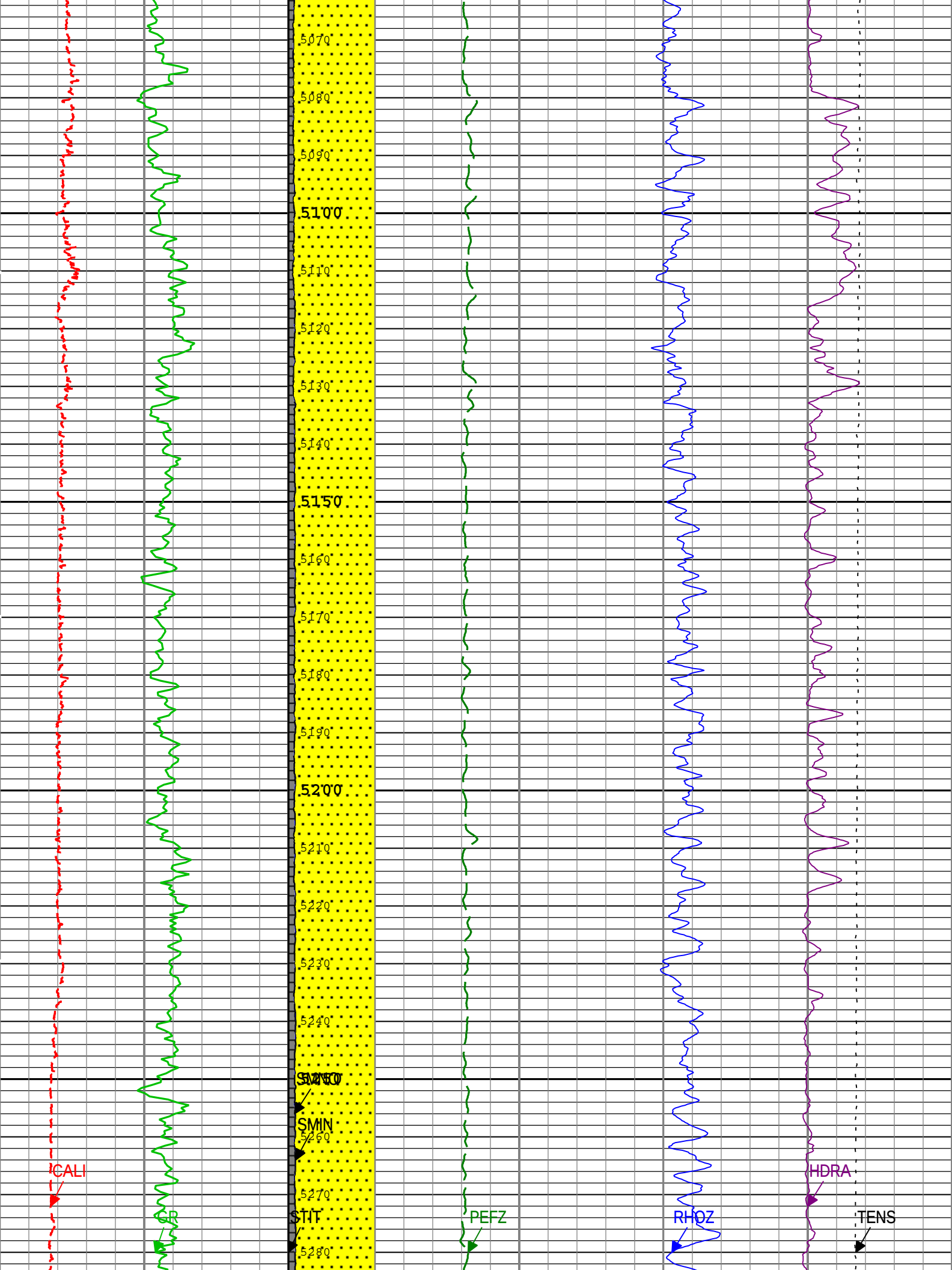
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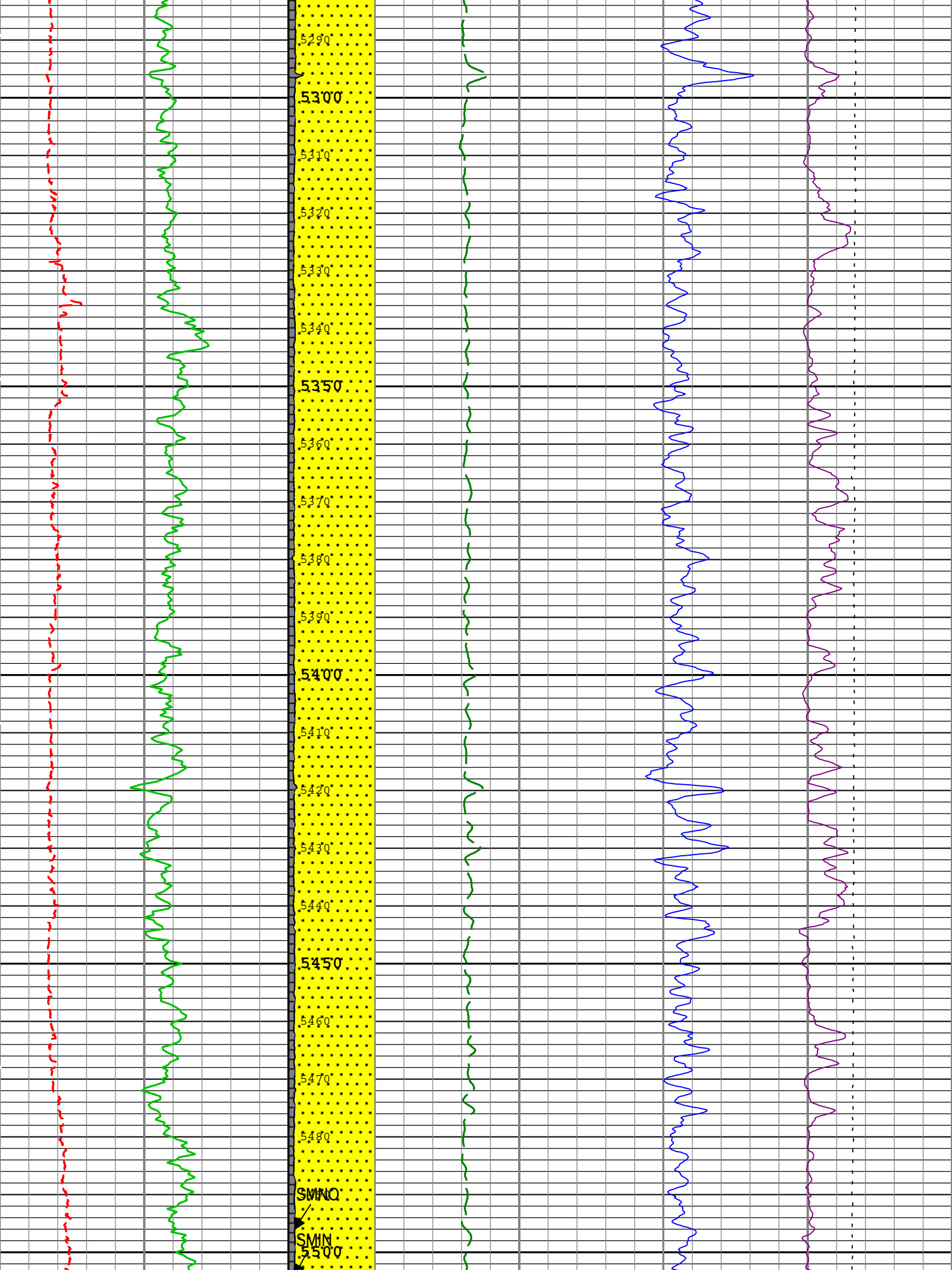
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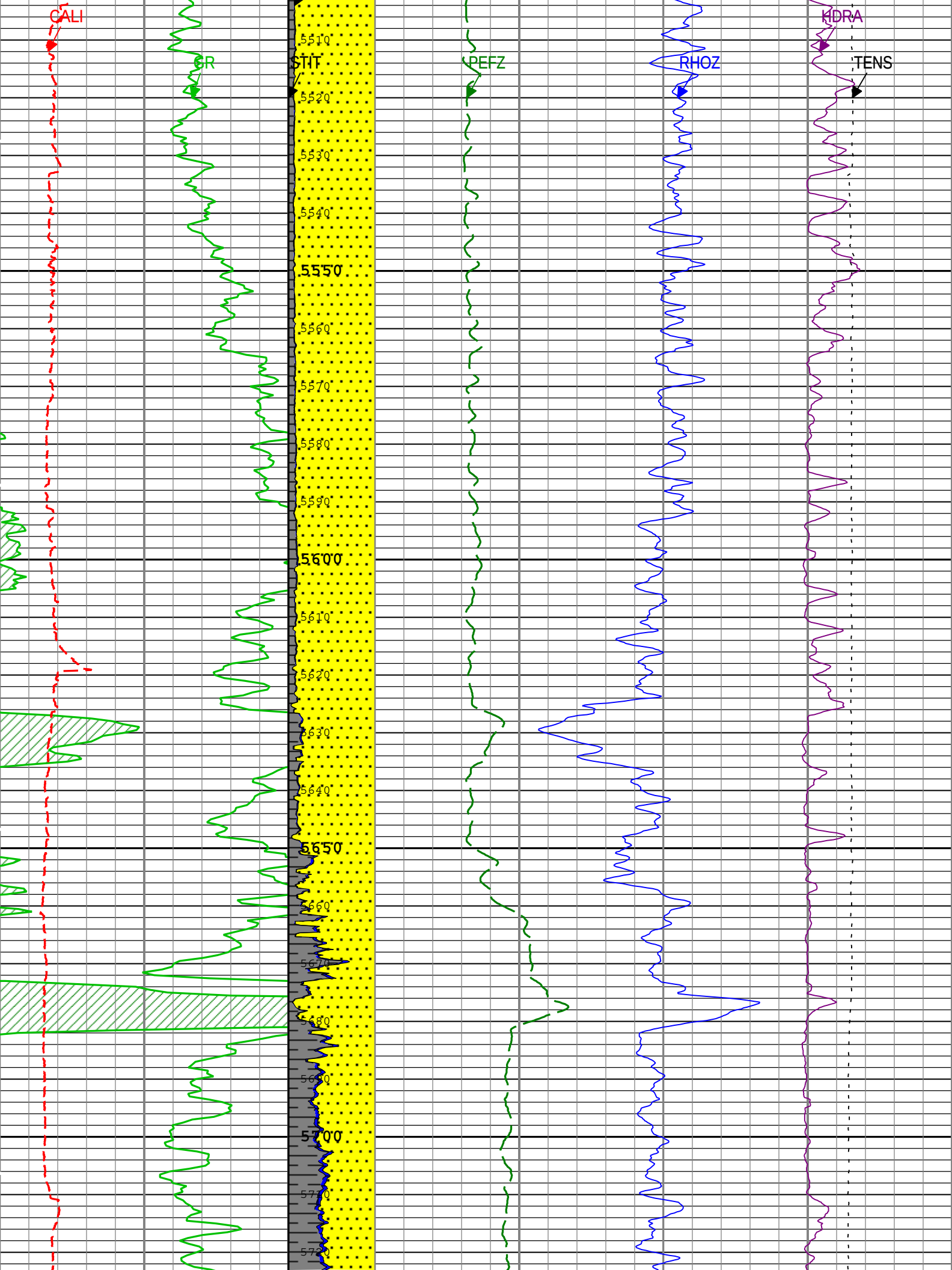
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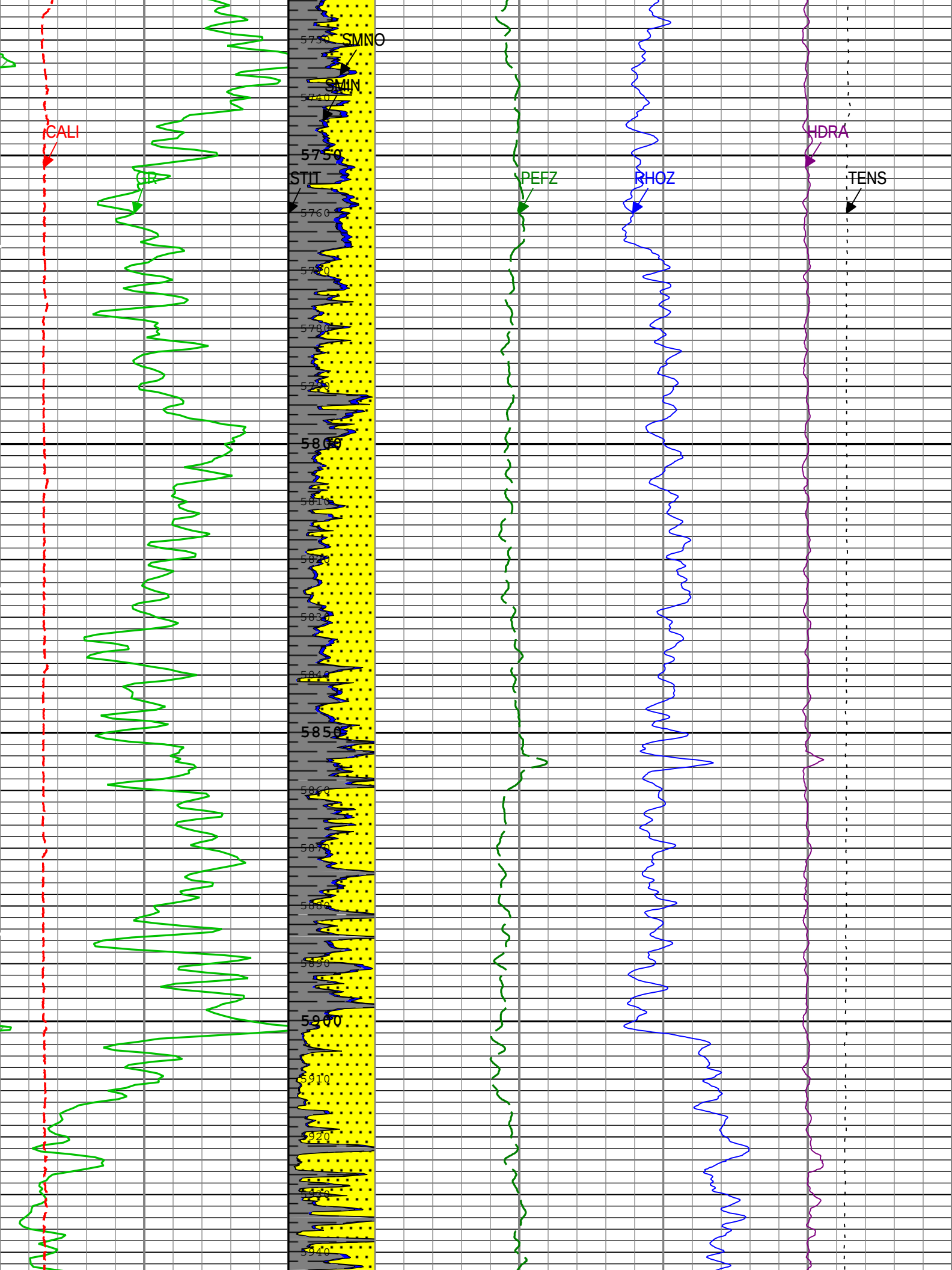
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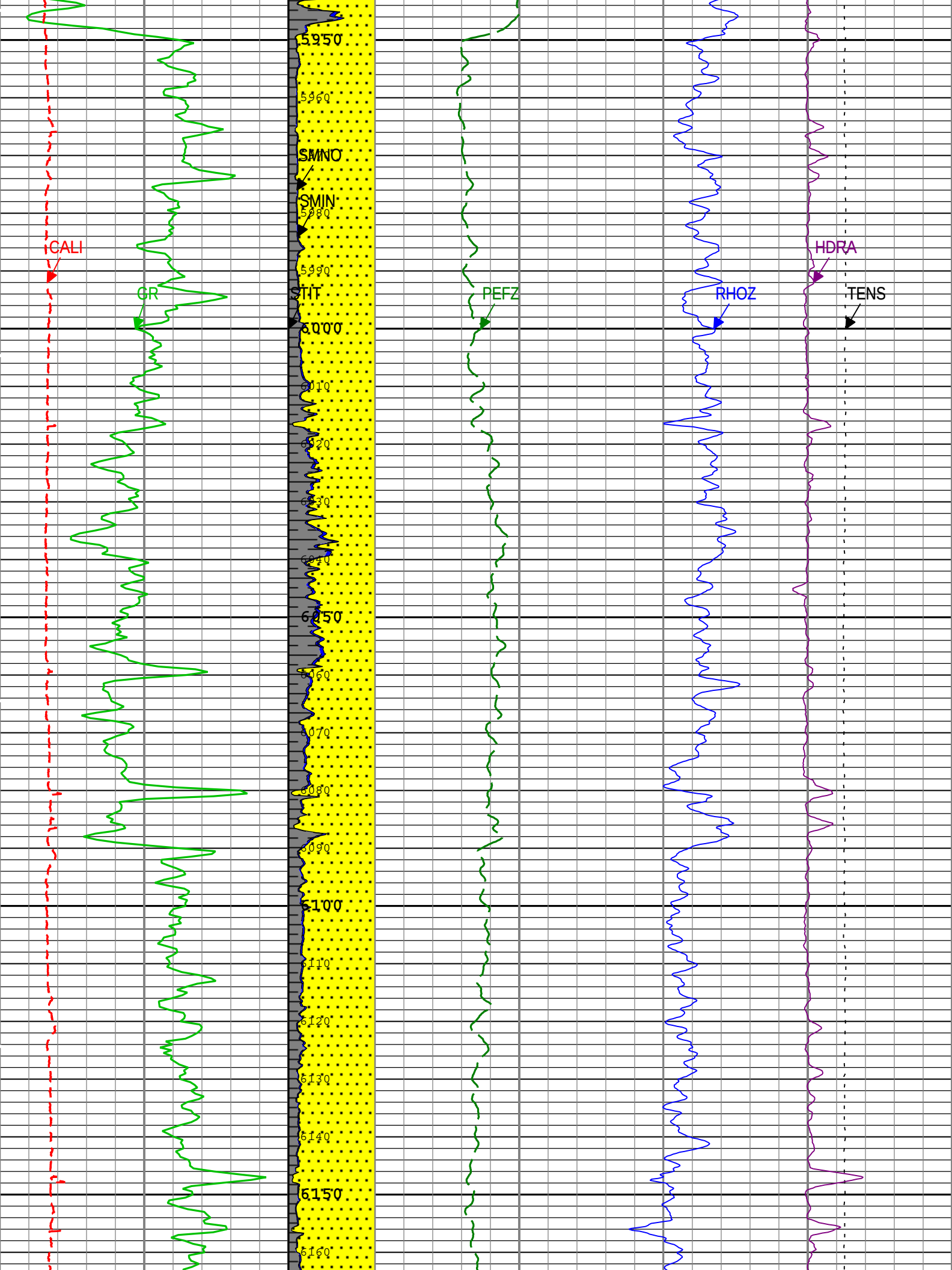
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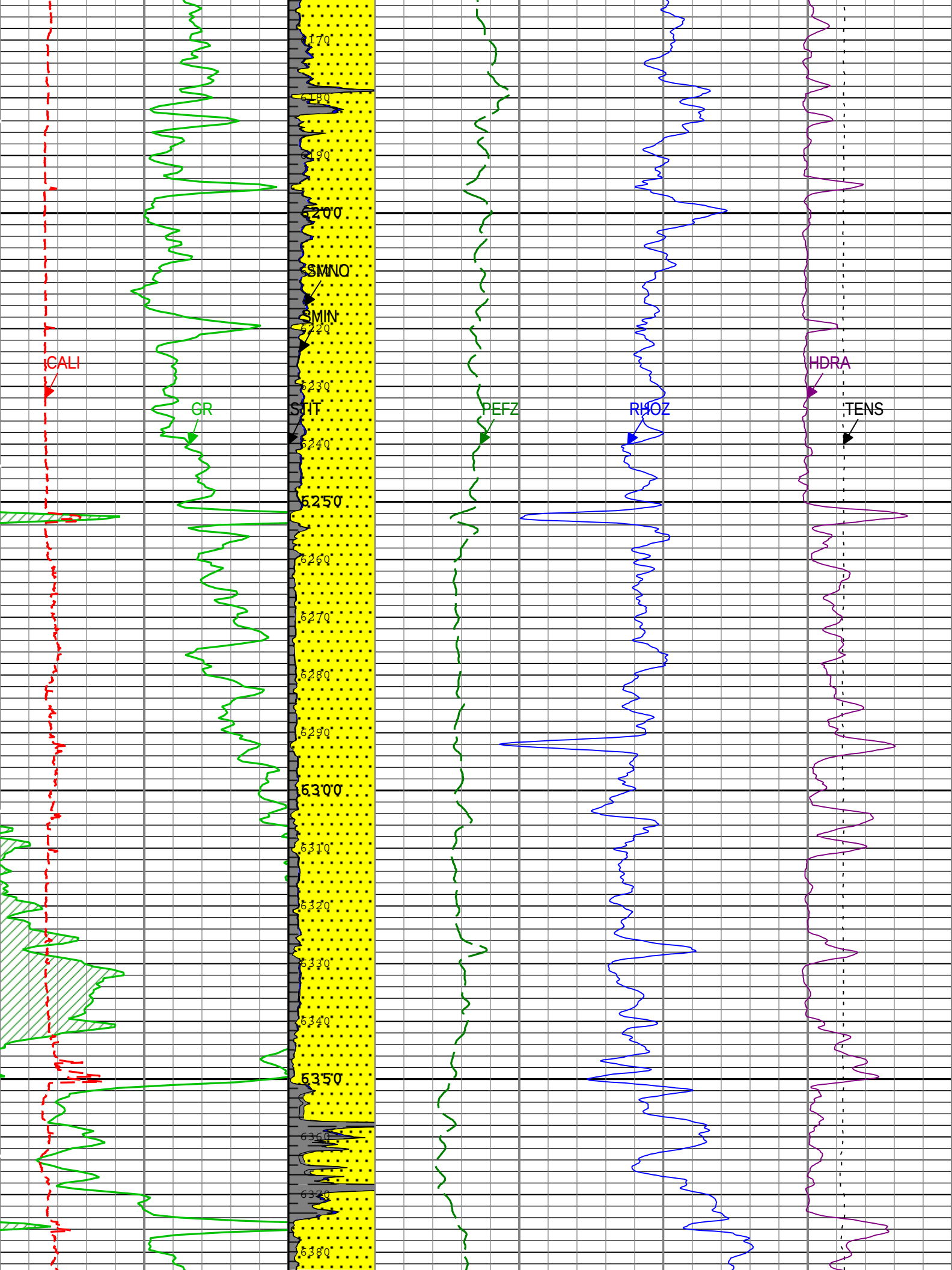
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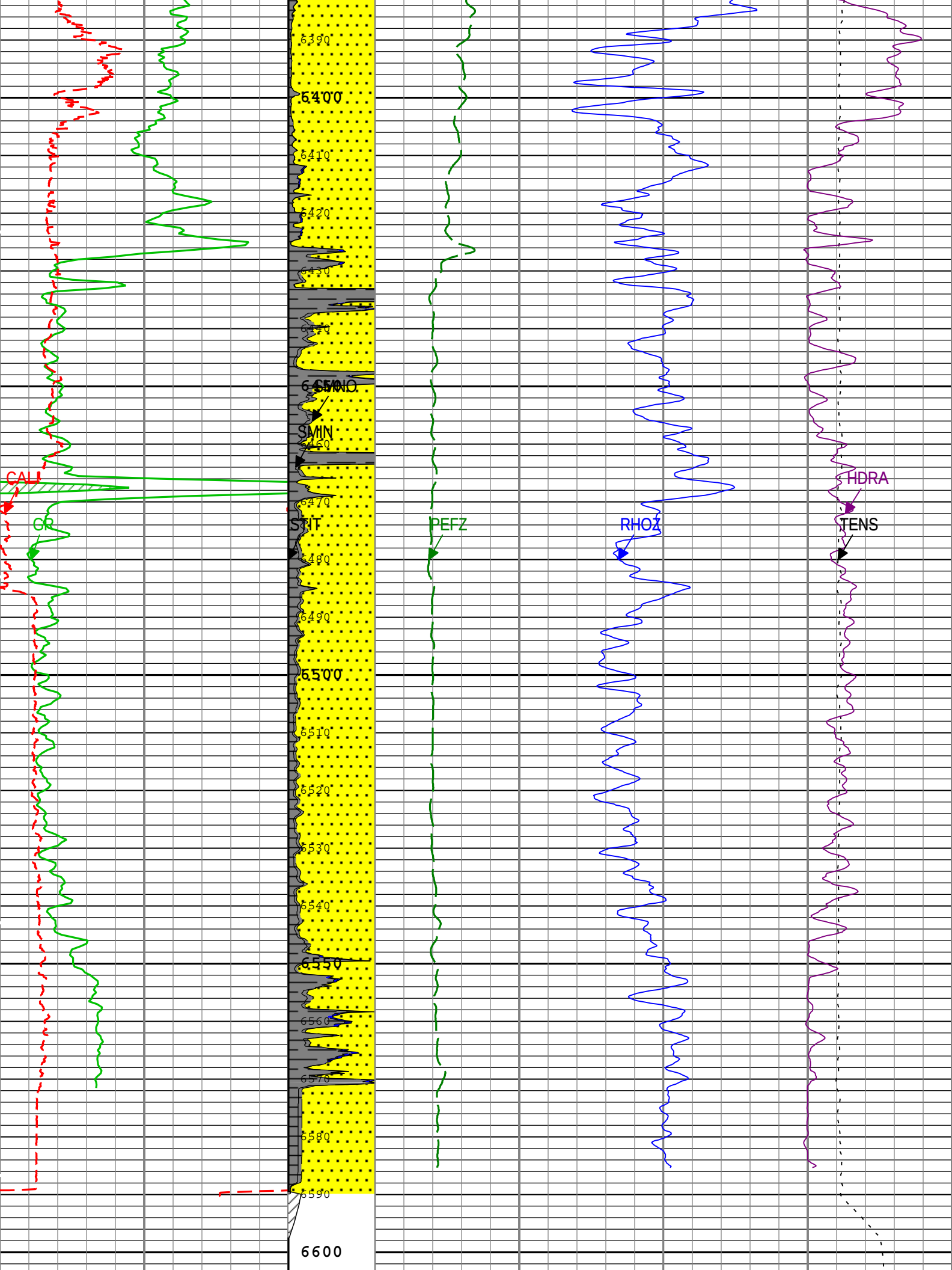
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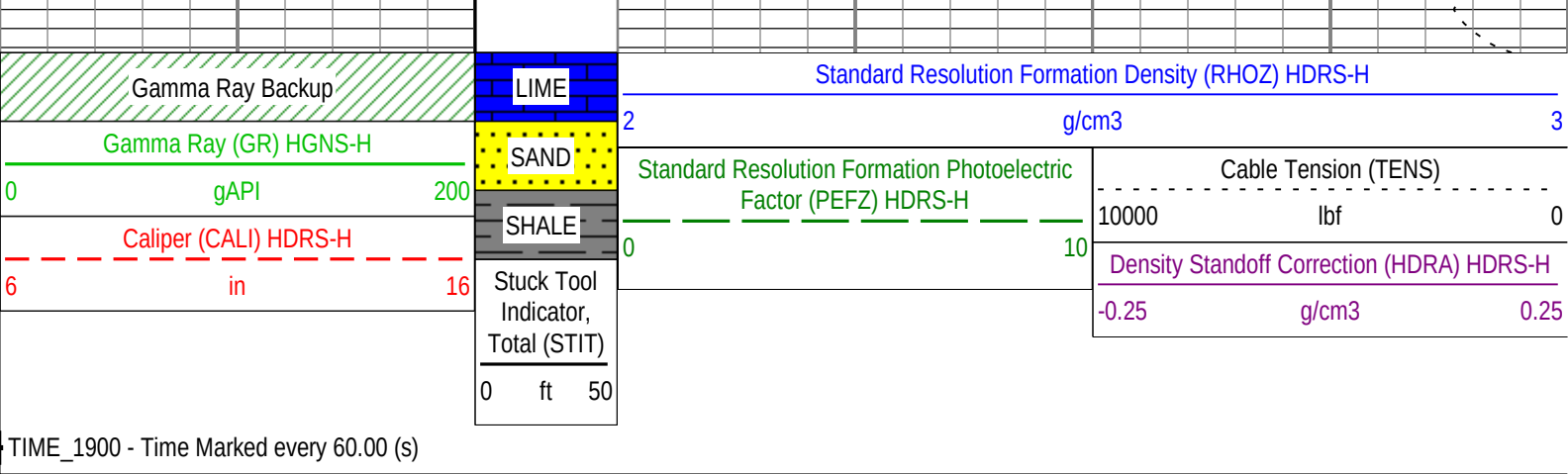

TIME_1900 - Time Marked every 60.00 (s)

Description: HGNS standard resolution porosities for Platform Express Format: Log (KM 5in Density) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 16-Feb-2014 04:44:05

Channel Processing Parameters

Parameter	Description	Tool	Value	Unit
BARI	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	7.875	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0	in
CBLO	Casing Bottom (Logger)	WLSESSION	500	ft
CDEN	Cement Density	HGNS-H	2	g/cm3
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	9.1	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DHC	Density Hole Correction	HDRS-H	Bit Size	
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	AMF	
SOCO	Standoff Correction Option	HGNS-H	Yes	

Tool Control Parameters

Parameter	Description	Tool	Value	Unit
HRGD_BRD_TYPE	HRGD Board Type	HDRS-H	WITH_HET	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h

Company: Aurora Power Resources Inc

Schlumberger

Well: David Bender 1A

Field: Bijou West

County: Morgan

State: Colorado

Platform Express
Compensated Neutron Log

LithoDensity