Schlumberger

Company: Noble Energy Inc

Well: Longs AC 02-15

Field: Wattenberg

County: Weld State: Colorado

Platform Express

Triple Combo

County: Weld
Field: Wattenberg
Location: Sec 2, T 7N, R 63W
Well: Longs AC 02-15
Company: Noble Energy Inc

Location:			
Sec 2, T 7N, R 63W	Elev.	K.B.	
SHL: 660' FSL X 1920' FEL SWSE		G.L.	4837.00 ft
Lat/Long: 40.597590/-104.401130		D.F.	4850.00 ft
Permanent Datum:	Ground Level	Elev.:	4837.00 f
Log Measured From:	Drill Floor	13.00 ft	above Perm.Datum
Drilling Measured From:	Drill Floor		

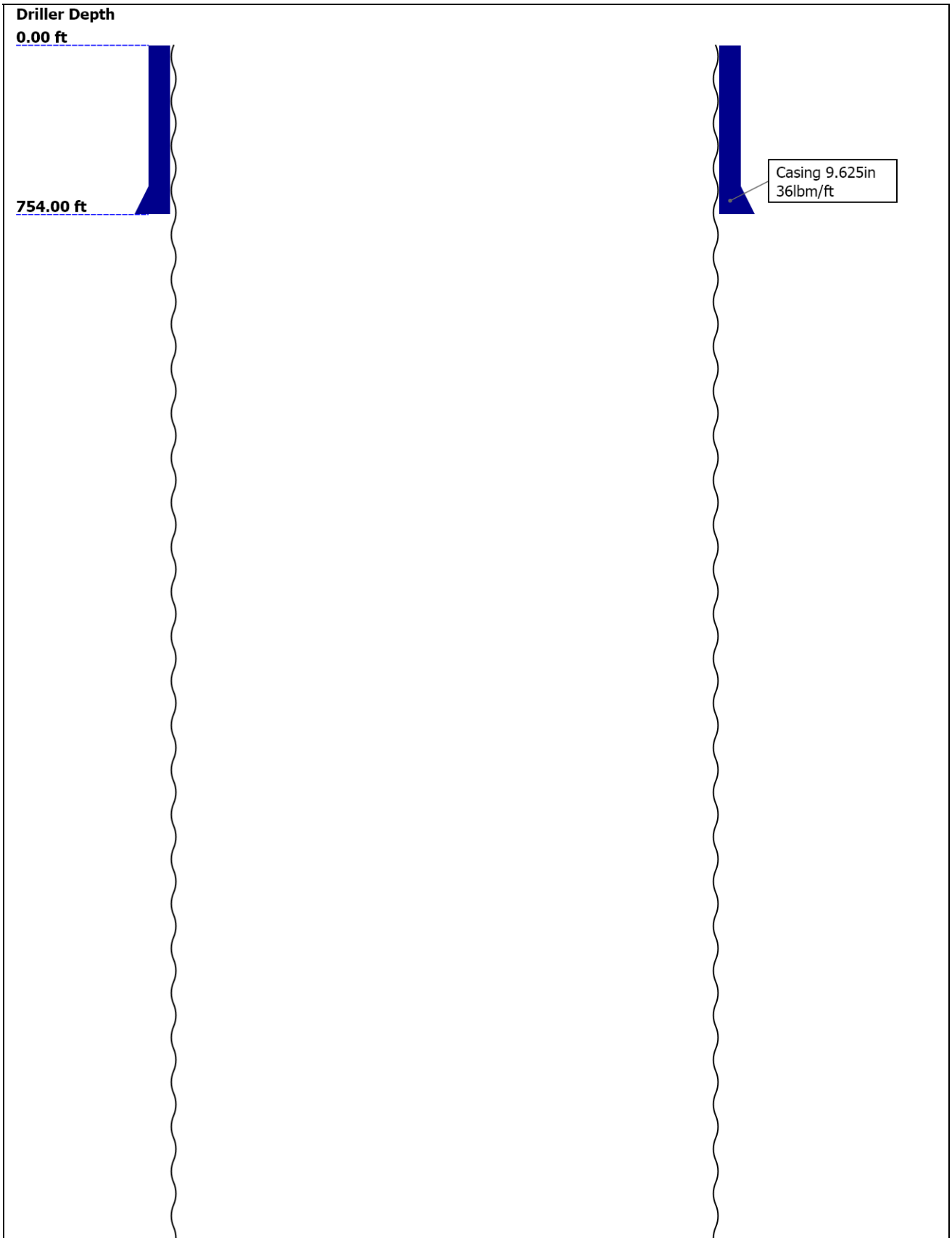
API Serial No.	Section:	Township:	Range:
05-123-35817-0000	2	7N	63W

Logging Date			01-Aug-2012			
Run Number			1			
Depth Driller			8910.00 ft			
Schlumberger Depth			8912.00 ft			
Bottom Log Interval			8906.00 ft			
Top Log Interval			754.00 ft			
Casing Driller Size @ Depth			9.625 in @ 754.00 ft			
Casing Schlumberger			754 ft			
Bit Size			8.75 in			
Type Fluid In Hole			Fresh Water			
MUD	Density	Viscosity	9.05 lbm/gal	11 s		
	Fluid Loss	PH	9.6 cm3	10		
	Source of Sample		Active Tank			
RM @ Meas Temp			1.94 ohm.m @ 73.6 degF			
RMF @ Meas Temp			1.89 ohm.m @ 73.7 degF			
RMC @ Meas Temp			2.43 ohm.m @ 73.6 degF			
Source RMF	RMC		Pressed	Calculated		
RM @ BHT	RMF @ BHT		0.67 @ 227.1	0.65 @ 227.1		
Max Recorded Temperatures			227.1 degF			
Circulation Stopped	Time		31-Jul-2012	22:00:00		
Logger on Bottom	Time		01-Aug-2012	08:15:00		
Unit Number	Location:		3030	Fort Morgan, CO		
Recorded By			Philip Grant			
Witnessed By			Bob Lieber, Roger Foster			

Disclaimer

Contents

Well Sketch



Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	8.75					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	8910					
Bottom Logger (ft)	8912					
Casing						
Size (in)	9.625					
Weight (lbm/ft)	36					
Inner Diameter (in)	8.914					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	754					
Bottom Logger (ft)	754					

Borehole Fluids

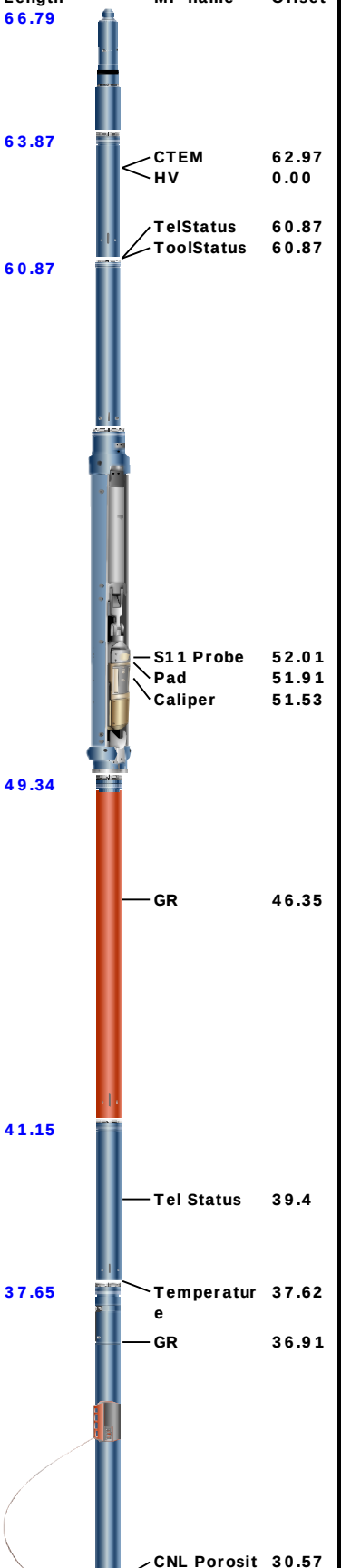
Parameter(unit)	1					
Fluid Type	Water					
Fluid Name	Fresh Water					
Max Recorded Temperatures (degF)	227.1					
Source of Sample	Active Tank					
Salinity (ppm)	1000					
Density (lbm/gal)	9.05					
Funnel Viscosity (s)	11					
Fluid Loss (cm3)	9.6					
PH	10					
Date/Time Circulation Stopped	31-Jul-2012 22:00:00					
Date Logger on Bottom	01-Aug-2012					
Time Logger on Bottom	08:15:00					
Source RMF	Pressed					
RMC	Calculated					
RM @ Meas Temp (ohm.m@degF)	1.94 @ 73.6					
RMF @ Meas Temp (ohm.m@degF)	1.89 @ 73.7					
RMC @ Meas Temp	2.43 @ 73.6					

(ohm.m@degF)						
RM @ BHT (ohm.m@degF)	0.67 @ 227.1					
RMF @ BHT (ohm.m@degF)	0.65 @ 227.1					
RMC @ BHT (ohm.m@degF)	0.84 @ 227.1					
Total Solid (%)						
High Gravity Solids (%)						

Remarks and Equipment Summary

1: Toolstring

Equip name	Length	MP name	Offset
LEH-QT	66.79		
LEH-QT			
DTC-H	63.87		
ECH-KC		**CTEM**	62.97
DTC-H		**HV**	0.00
		TelStatus	60.87
		ToolStatus	60.87
ADT-C	60.87		
HECH-KDB			
ADC-C			
ADS-C			
ADP-C			
		S11 Probe	52.01
		Pad	51.91
		Caliper	51.53
HNGS-BA:347	49.34		
HEH-K:347			
HNGS-BA:347			
		GR	46.35
HNGC-B:605	41.15		
HNGH-A:4089			
HNGC-B:605			
		Tel Status	39.4
HGNS-B	37.65	**Temperatur e**	37.62
HGNH			
NSR-F:2554		**GR**	36.91
NPV-N			
HMCA-B			
HGNS-B			
HACCZ-B:452			
		CNL Porosit	30.57



1: Remarks

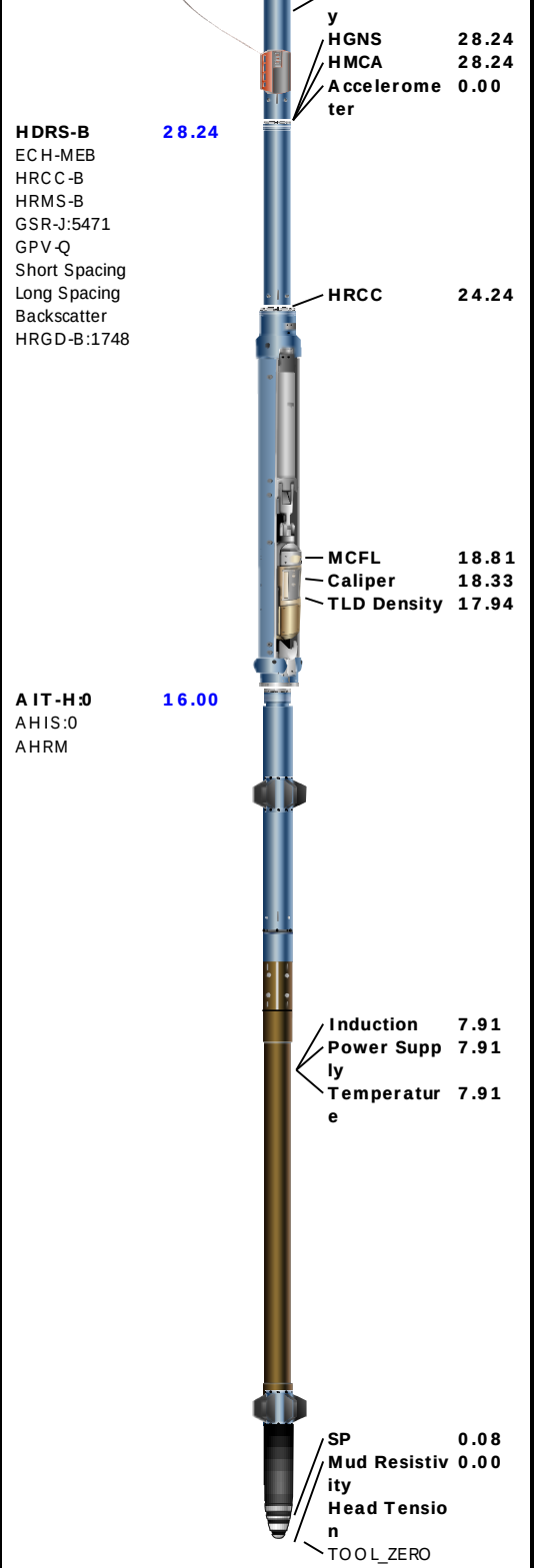
This is the first run in hole and primary depth reference.

Tool run as per tool sketch.

Data may be affected by hole rugosity.

Matrix: Limestone 2.71

Crew: Derrick Hunter, Jake Jump



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

Depth Control Parameters	**1**		
Conveyance Type	Wireline		
Rig Type	Top Drive		
Depth Measuring Device	**1**		
Type	IDW-B		
Wheel Correction 1	1		
Wheel Correction 2	0		
Tension Device	**1**		
Type	CMTD-B/A		

Calibration Points	0		
Logging Cable	**1**		
Type	7-46NT-XS		
Logging Cable Length (ft)	24000.00		

1

5" Triple Combo

Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit

Software Version

Acquisition System	Version
MaxWell	3.1.9755.0
Application Patch	SP-20120723-3.1.9755.1112

Computation	Description	Version
HENVIR	Computation Ensemble for the HGNS Neutron environmental corrections	3.1.9755.0
DepthCorrection	DepthCorrection	3.1.9755.0

Tool Elements	Description	Software Version	Firmware Version
HRGD-B	HILT Resistivity Gamma-Ray Density Device, 125 degC	3.1.9755.0	3.0
AHIS	Array Induction Sonde - H	3.1.9755.1112	
HGNS-B	HILT Gamma-Ray and Neutron Sonde, 125 degC	3.1.9755.0	2.0
HRCC-B	HILT High-Resolution Control Cartridge, 125 degC	3.1.9755.0	2.0

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Depth Shift	Include Parallel Data
1	Log[3]:Up	Up	58.08 ft	8930.71 ft	01-Aug-2012 8:13:39 AM	01-Aug-2012 1:23:11 PM	0.00 ft	

All depths are referenced to toolstring zero

Log

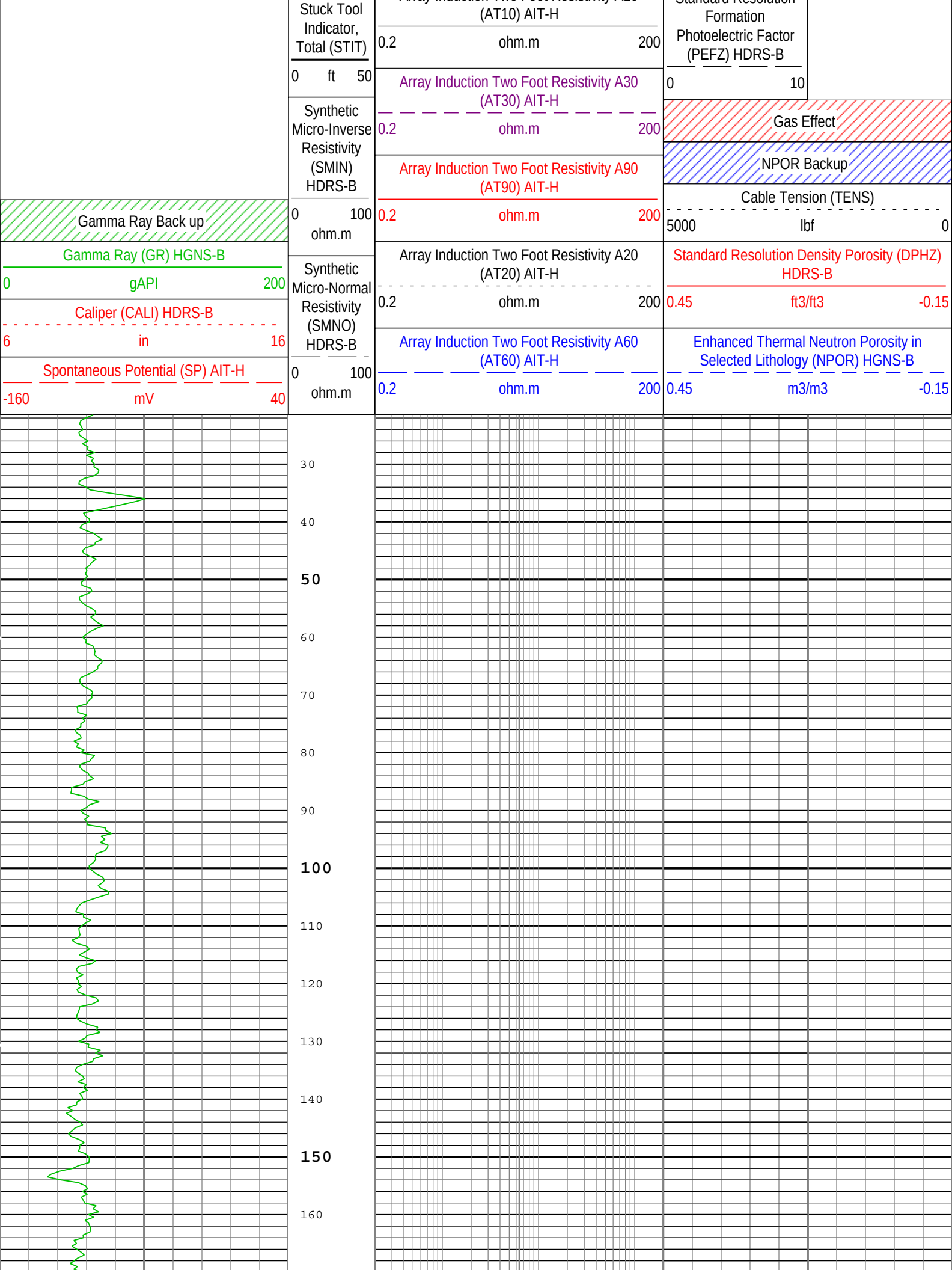
1: Log[3]:Up

Description: HGNS standard resolution porosities for Platform Express Format: Log (KM 5in Triple Combo) Index Scale: 5 in per 100 ft Index Unit: ft
Index Type: Measured Depth Creation Date: 01-Aug-2012 15:42:40

Channel	Source	Sampling
AT10	AIT-H:AHIS:AHIS	3in
AT20	AIT-H:AHIS:AHIS	3in
AT30	AIT-H:AHIS:AHIS	3in
AT60	AIT-H:AHIS:AHIS	3in
AT90	AIT-H:AHIS:AHIS	3in
CALI	HDRS-B:HRCC-B:HRCC-B	1in
DPHZ	HDRS-B:HRMS-B:HRGD-B	2in
GR	HGNS-B:HGNS-B:HGNS-B	6in
NPOR	HGNS-B:HGNS-B:HGNS-B	6in
PEFZ	HDRS-B:HRMS-B:HRGD-B	2in
SMIN	HDRS-B:HRMS-B:HRGD-B	2in
SMNO	HDRS-B:HRMS-B:HRGD-B	2in
SP	AIT-H:AHIS:AHIS	6in
STIT	DepthCorrection	6in
TENS	WLWorkflow	6in
TIME_1900	WLWorkflow	0.1in

TIME_1900 - Time Marked every 60.00 (s)

Array Induction Two Foot Resistivity A10 | Standard Resolution


Stuck Tool Indicator, Total (STIT)
0 ft 50
Synthetic Micro-Inverse Resistivity (SMIN) HDRS-B
0 100
ohm.m
Synthetic Micro-Normal Resistivity (SMNO) HDRS-B
0 100
ohm.m
(AT10) AIT-H
0.2 ohm.m 200
Array Induction Two Foot Resistivity A30 (AT30) AIT-H
0.2 ohm.m 200
Array Induction Two Foot Resistivity A90 (AT90) AIT-H
0.2 ohm.m 200
Array Induction Two Foot Resistivity A20 (AT20) AIT-H
0.2 ohm.m 200
Array Induction Two Foot Resistivity A60 (AT60) AIT-H
0.2 ohm.m 200
Formation Photoelectric Factor (PEFZ) HDRS-B
0 10
Gas Effect
NPOR Backup
Cable Tension (TENS)
5000 lbf 0
Standard Resolution Density Porosity (DPHZ) HDRS-B
0.45 ft3/ft3 -0.15
Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-B
0.45 m3/m3 -0.15
Gamma Ray Back up
Gamma Ray (GR) HGNS-B
0 gAPI 200
Caliper (CALI) HDRS-B
6 in 16
Spontaneous Potential (SP) AIT-H
-160 mV 40
30
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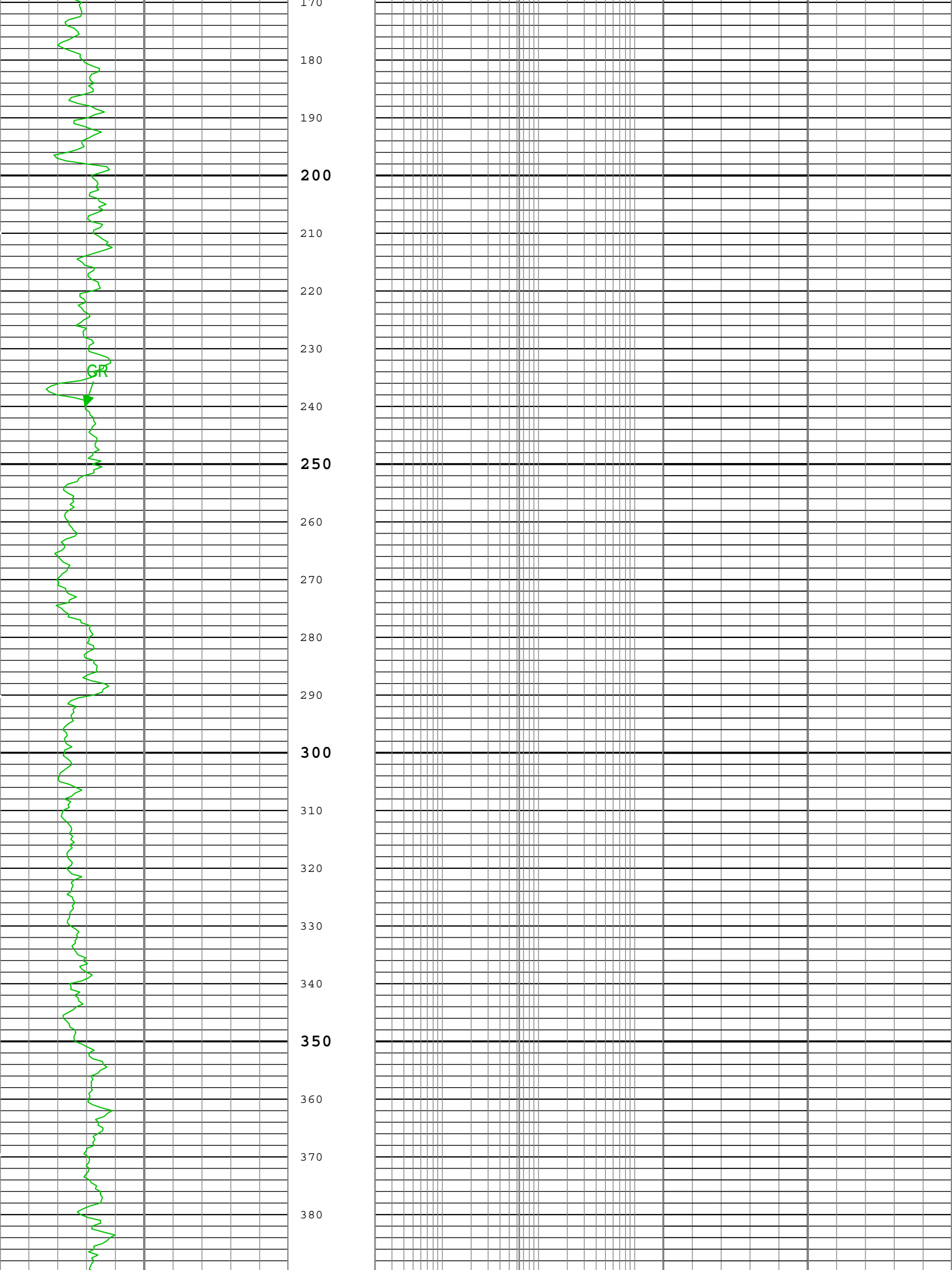
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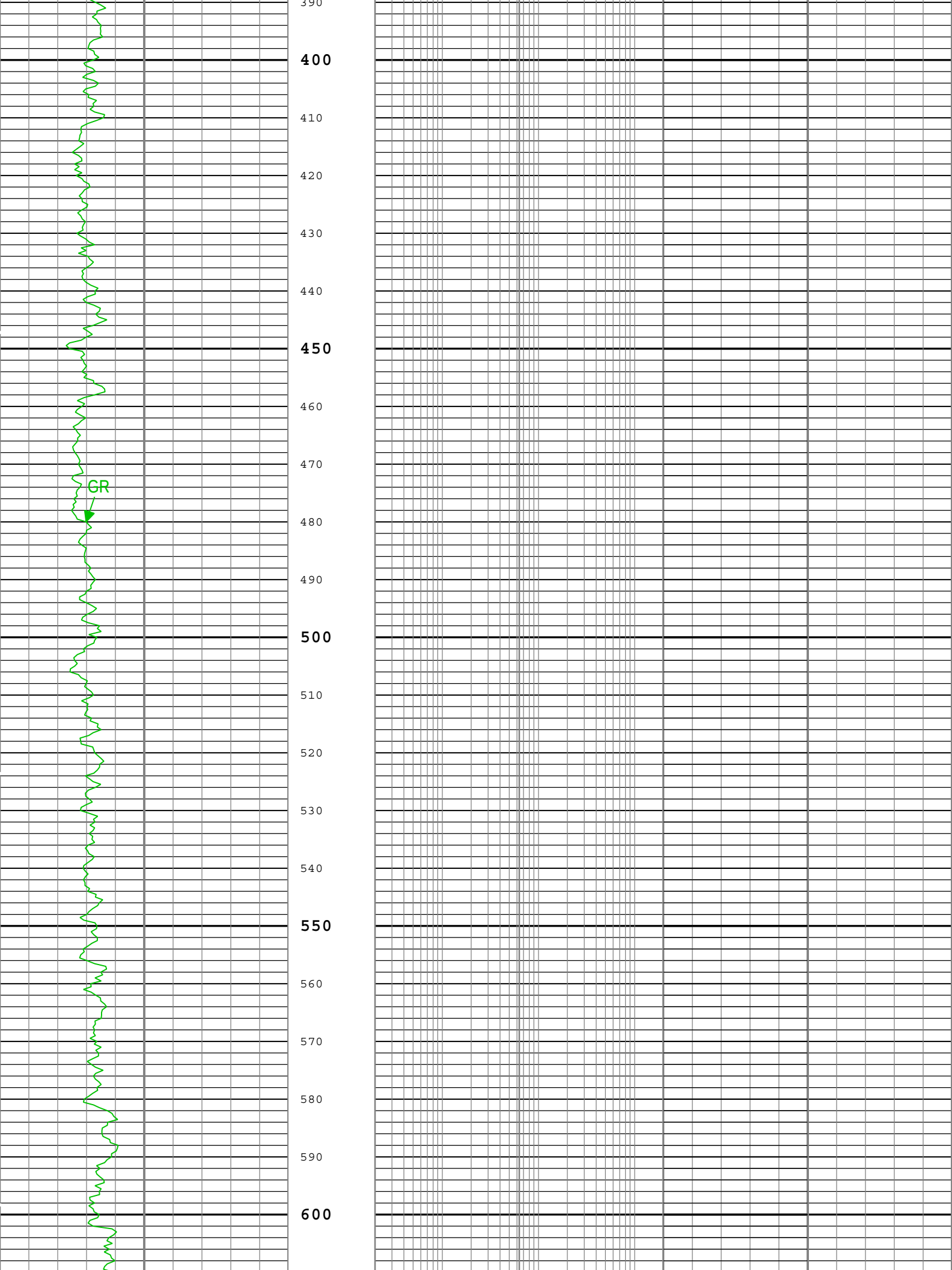
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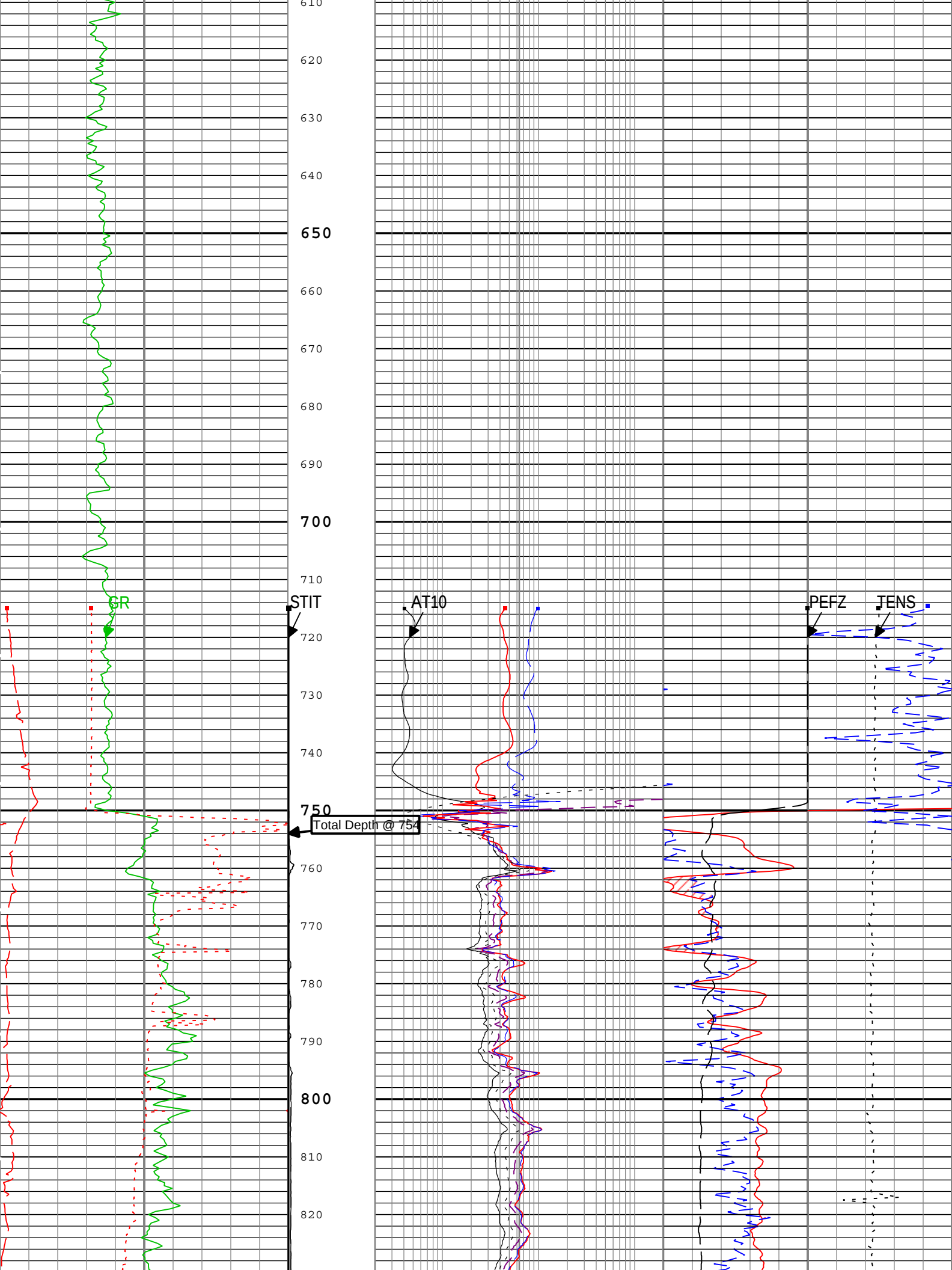
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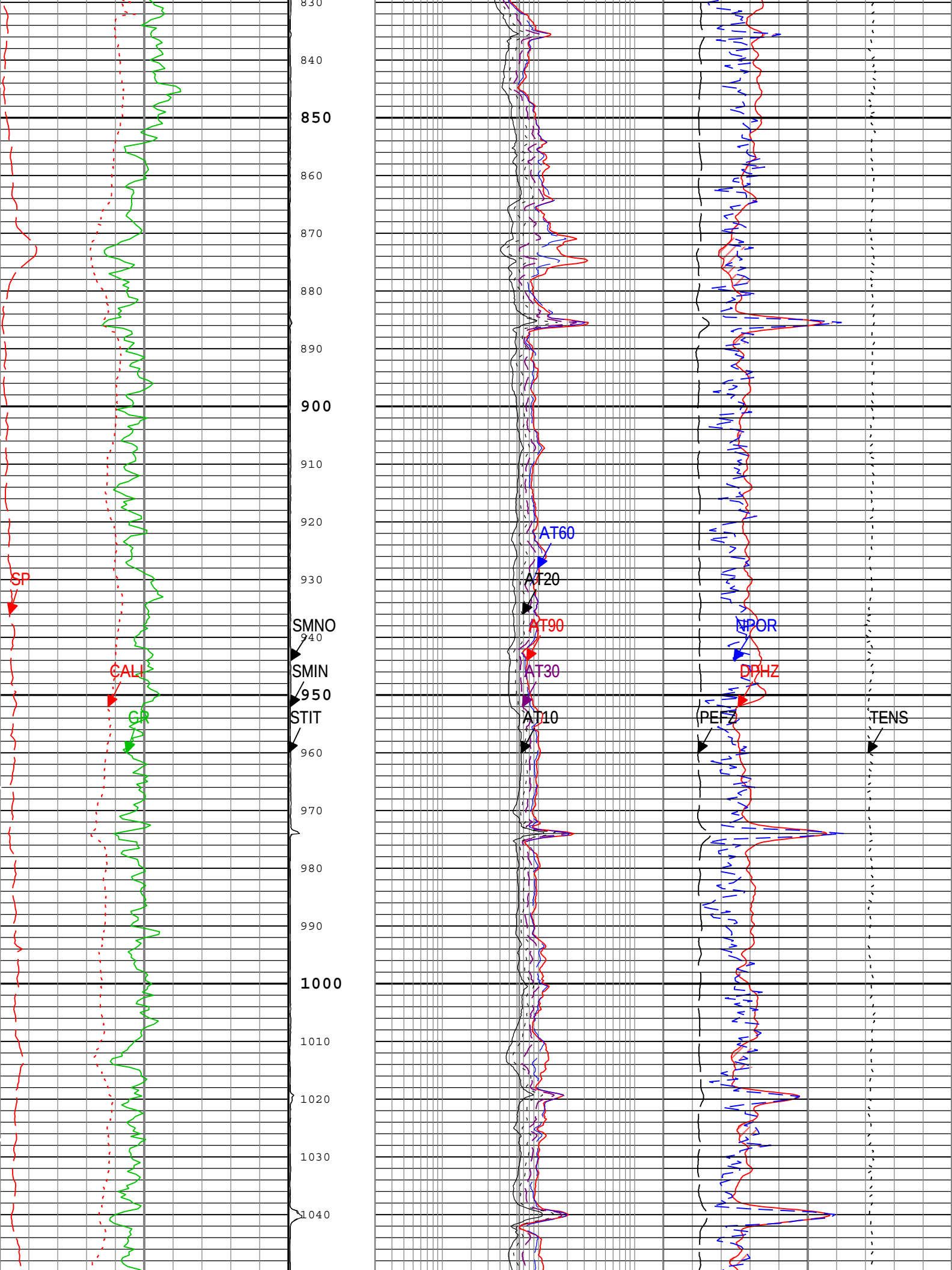
TENS
Total Depth @ 754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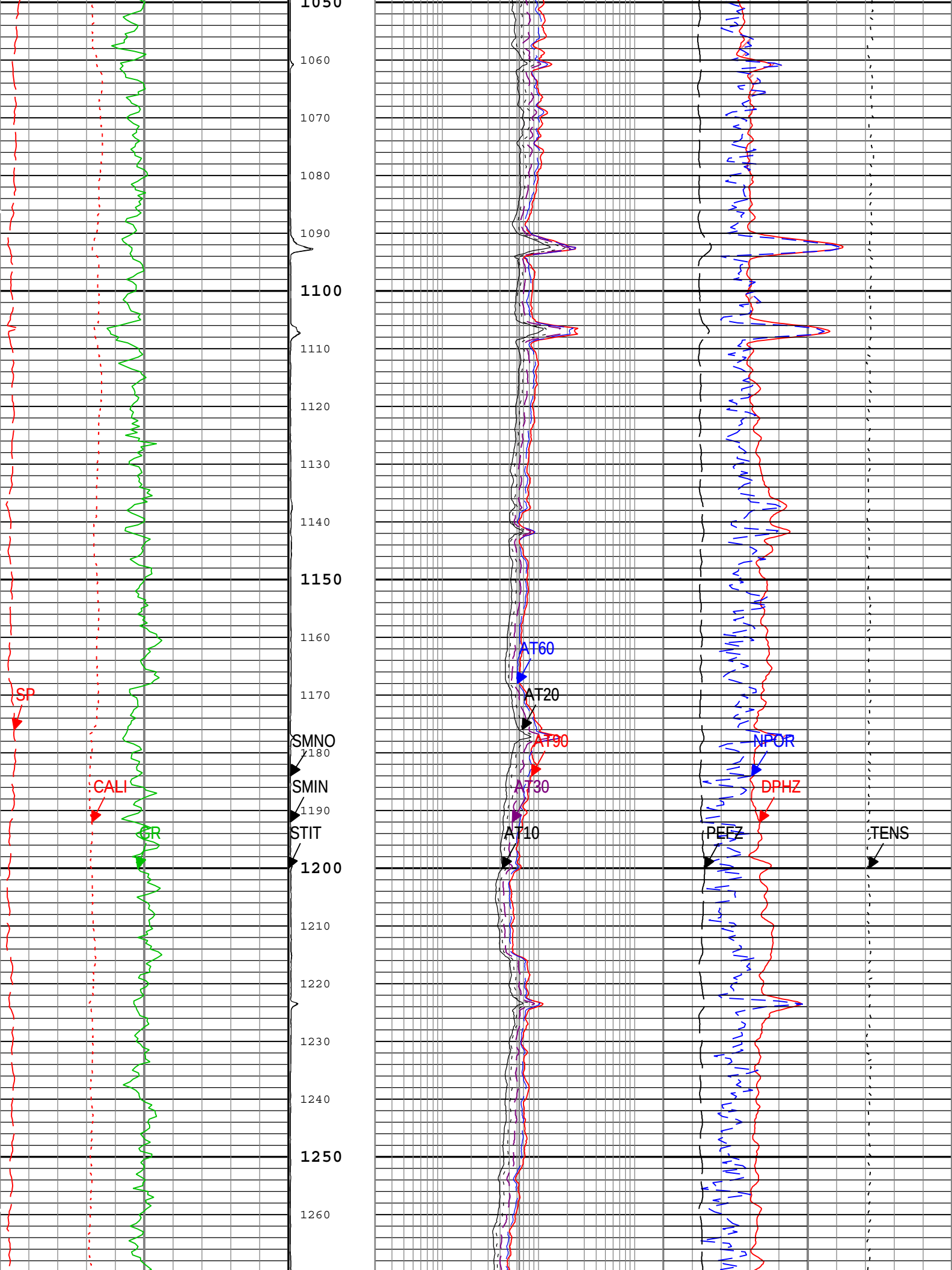
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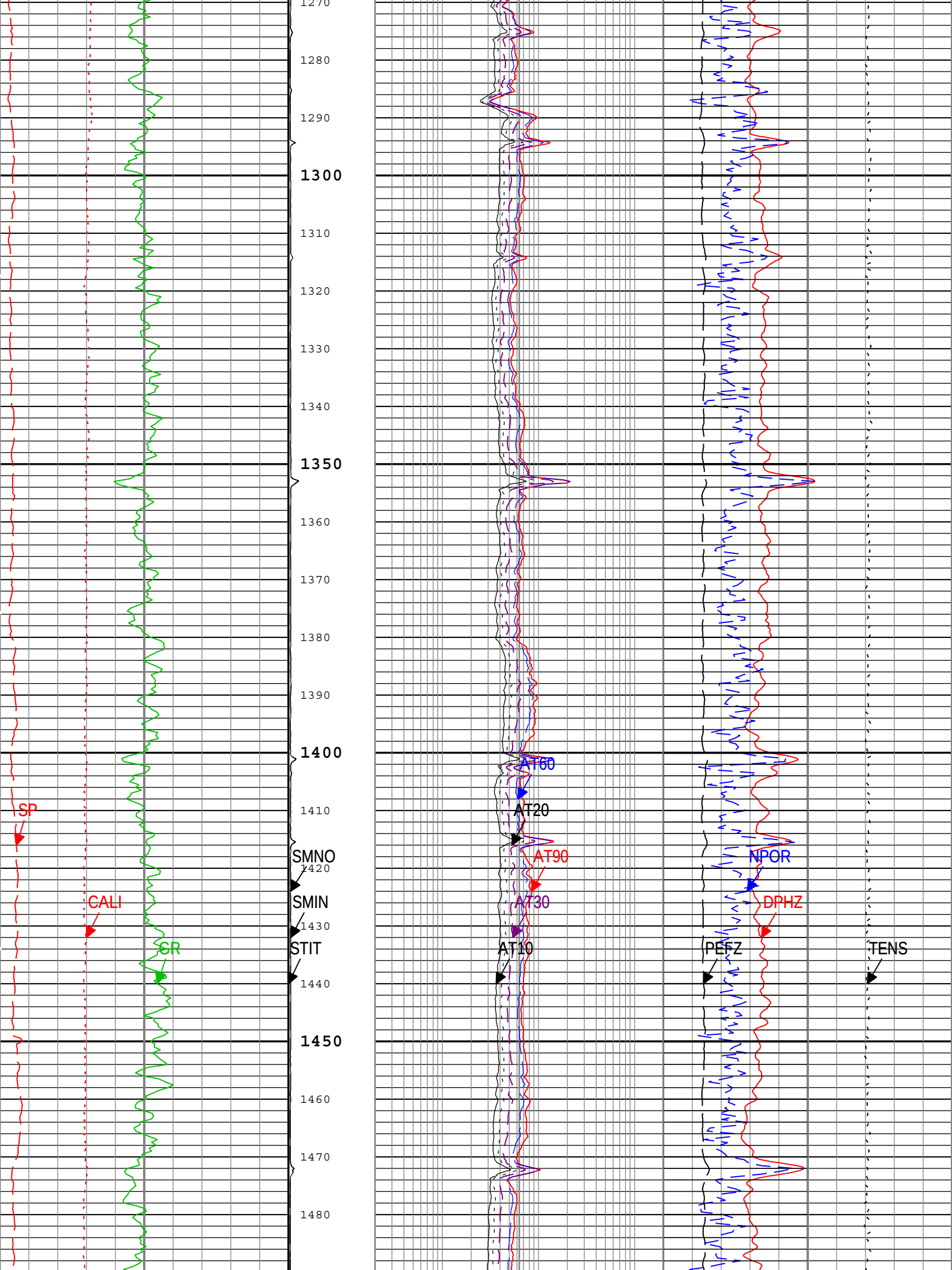
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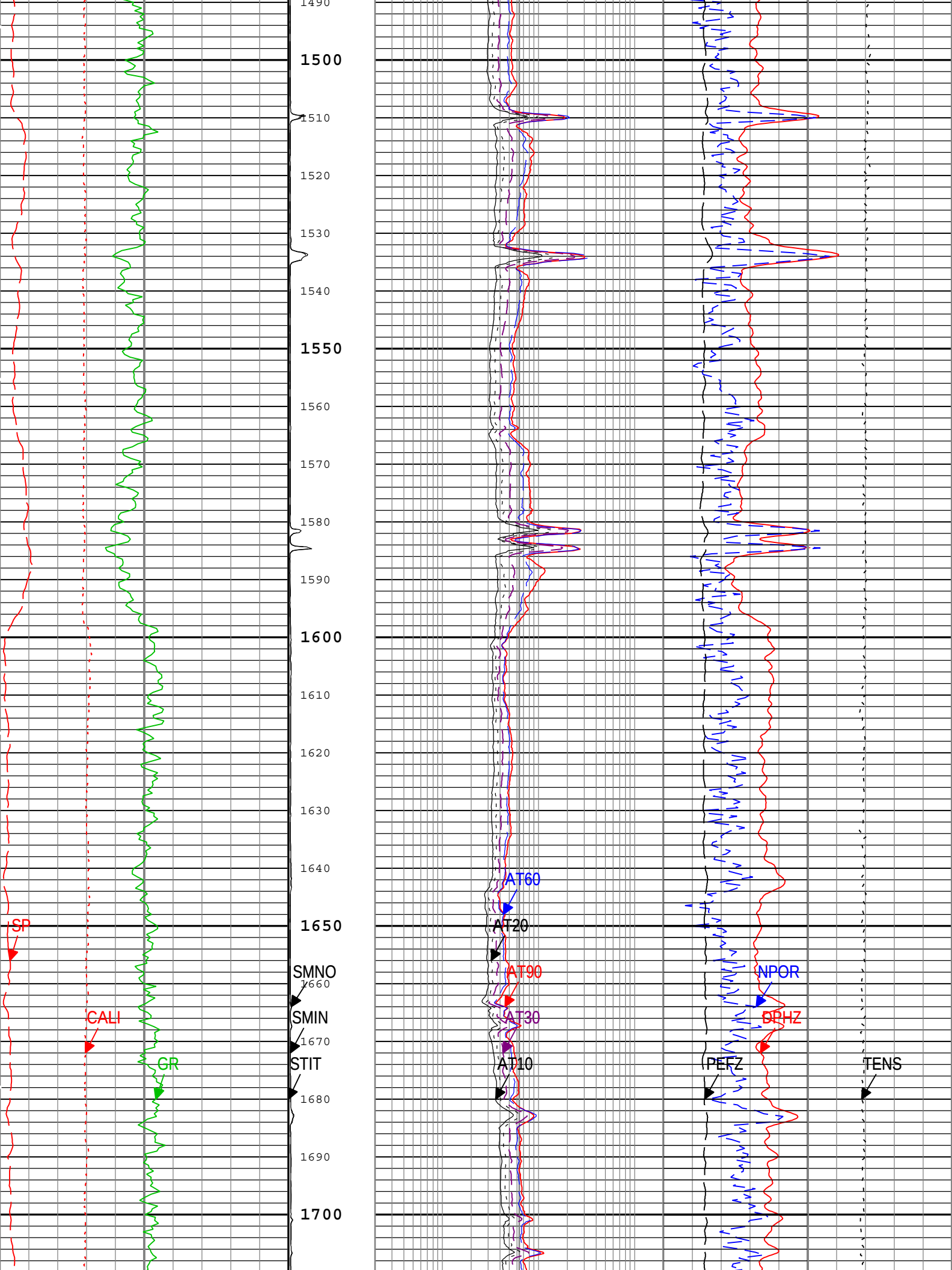
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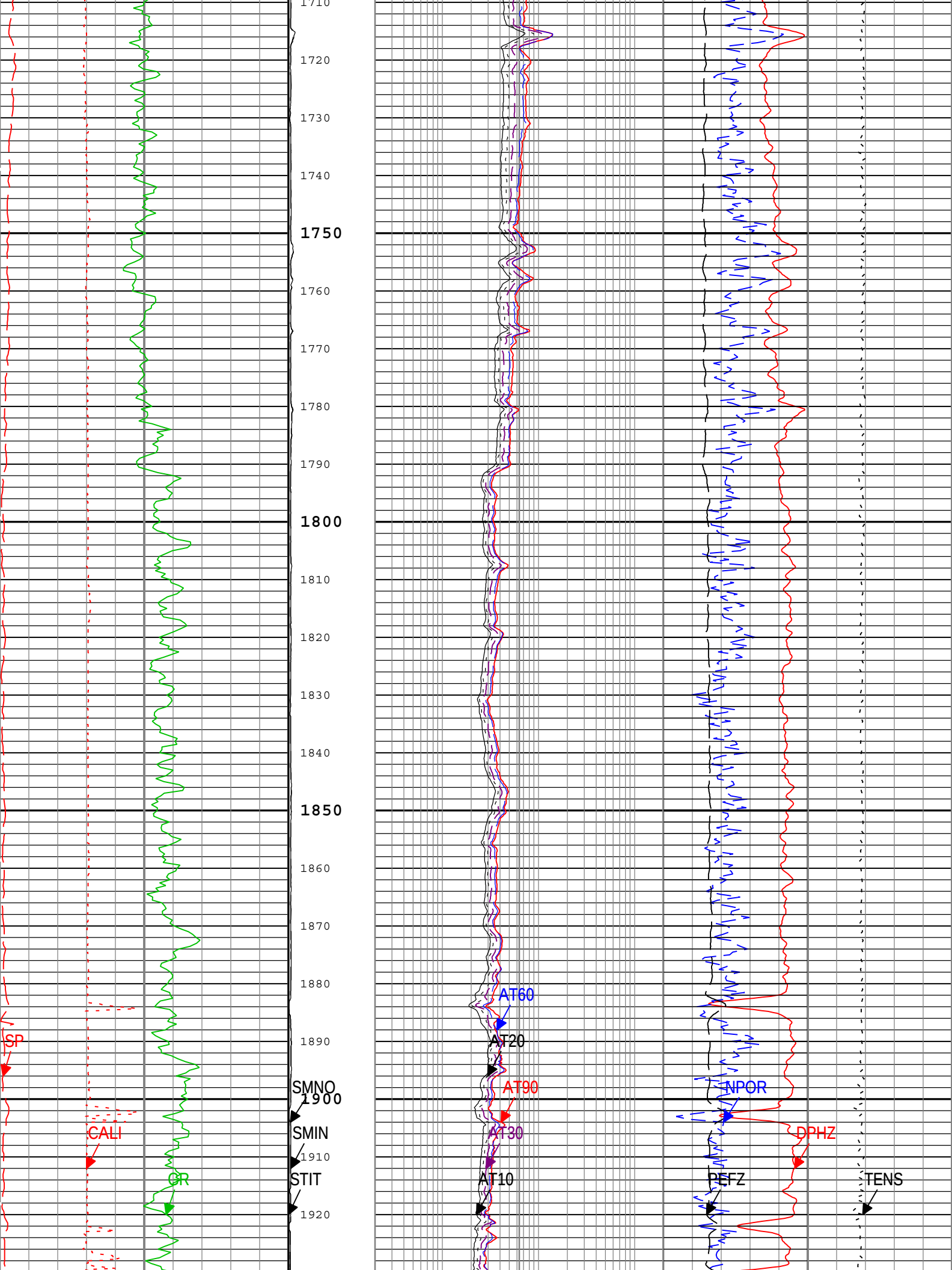
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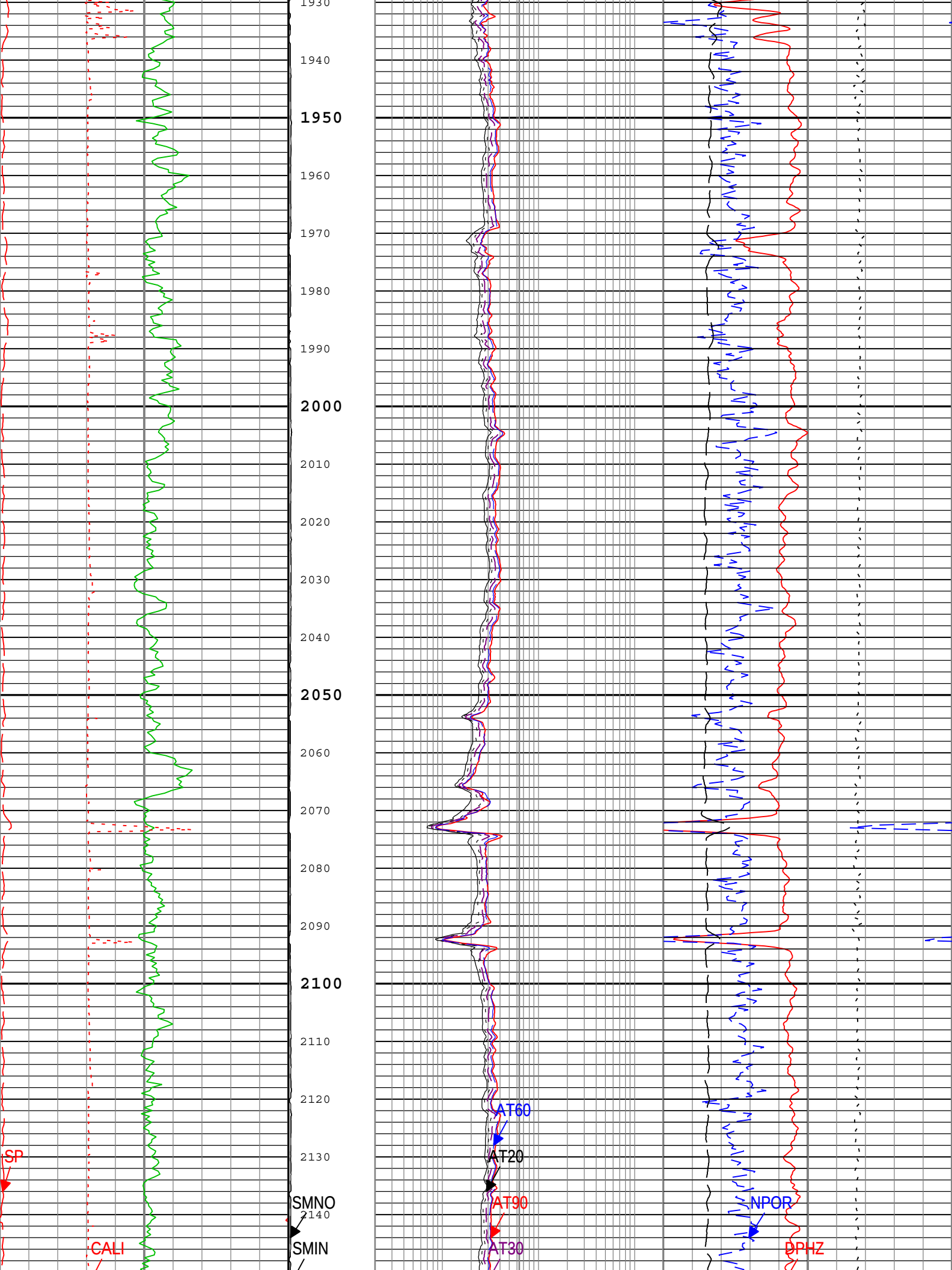
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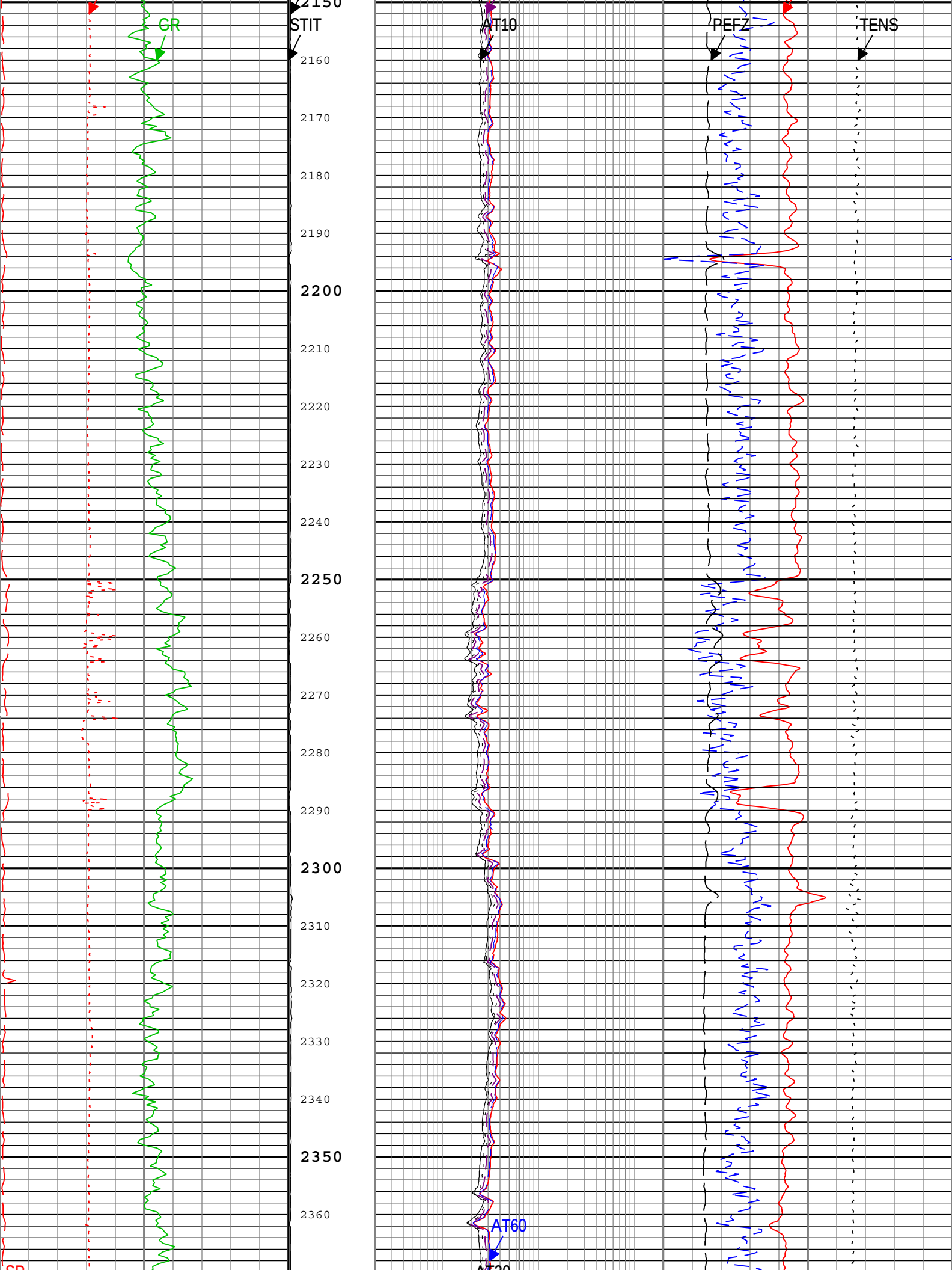
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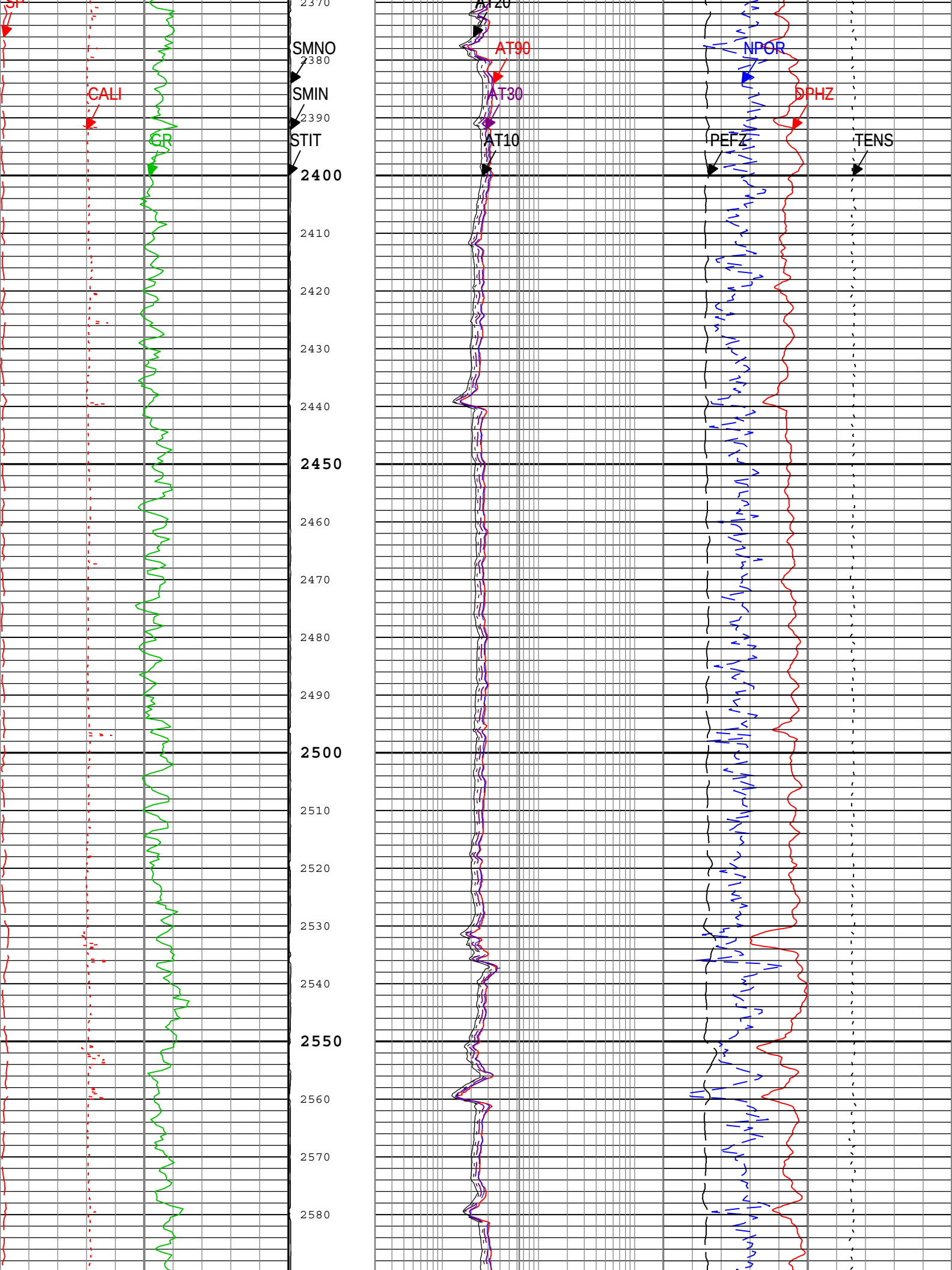
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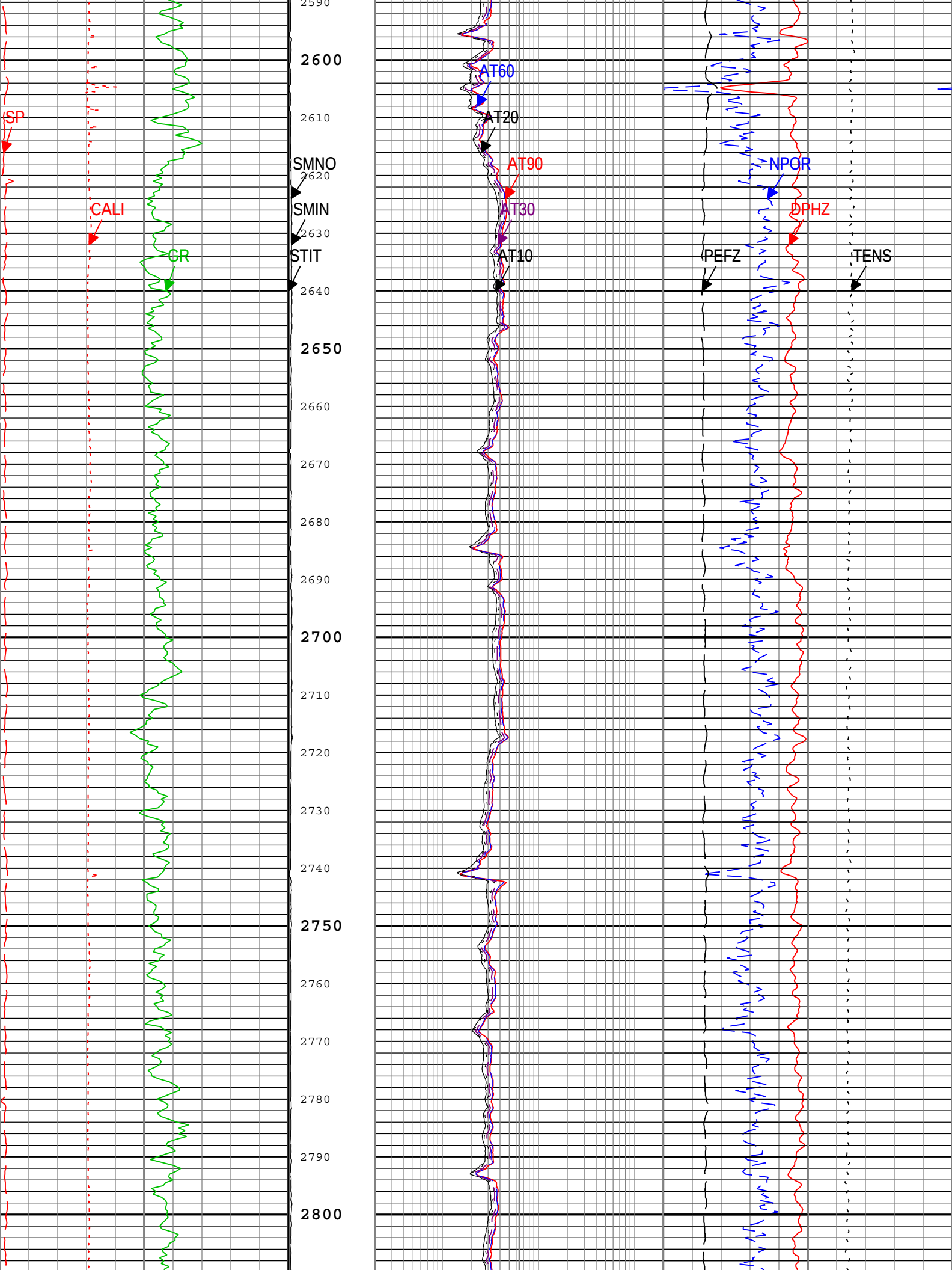
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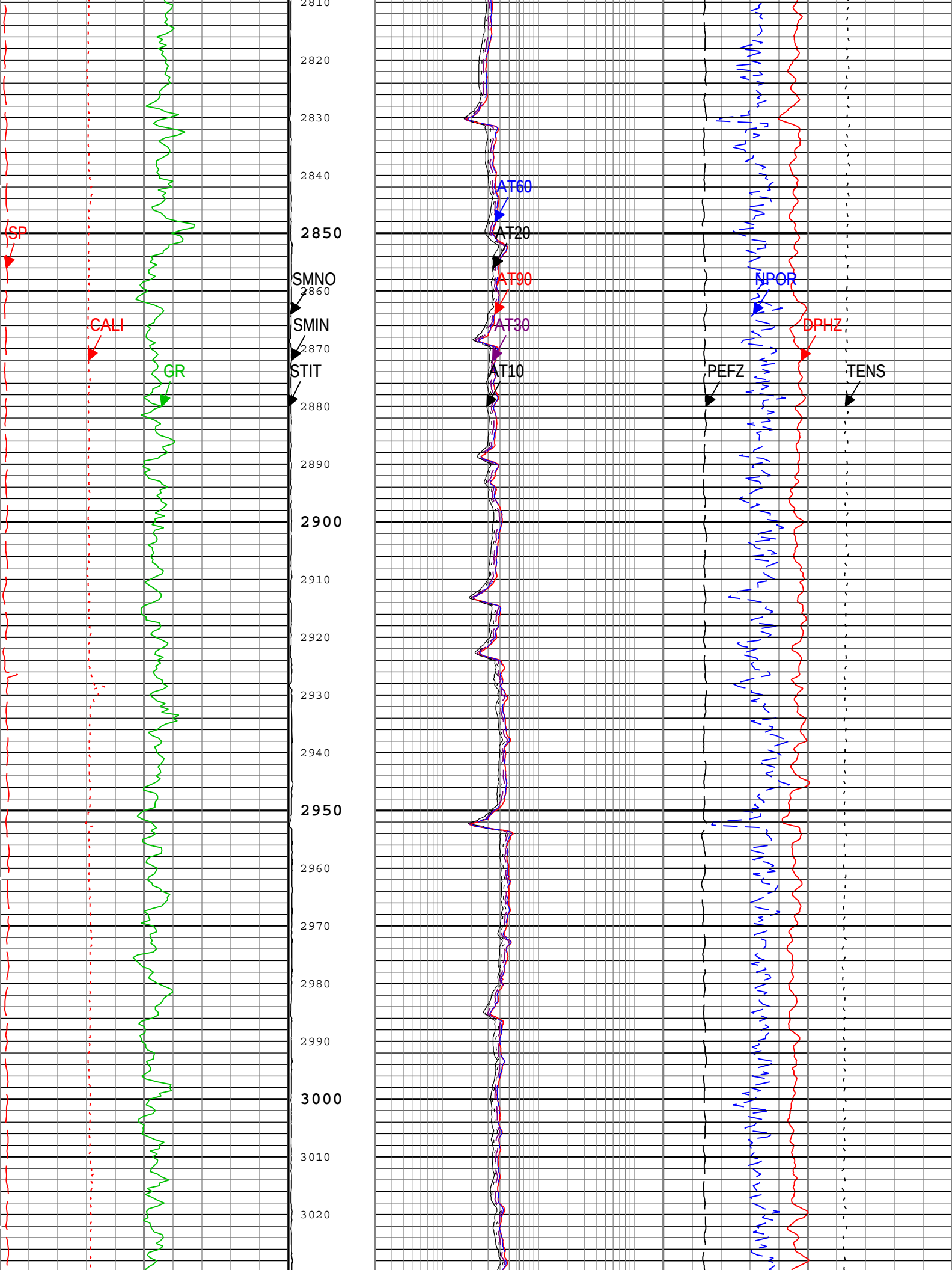
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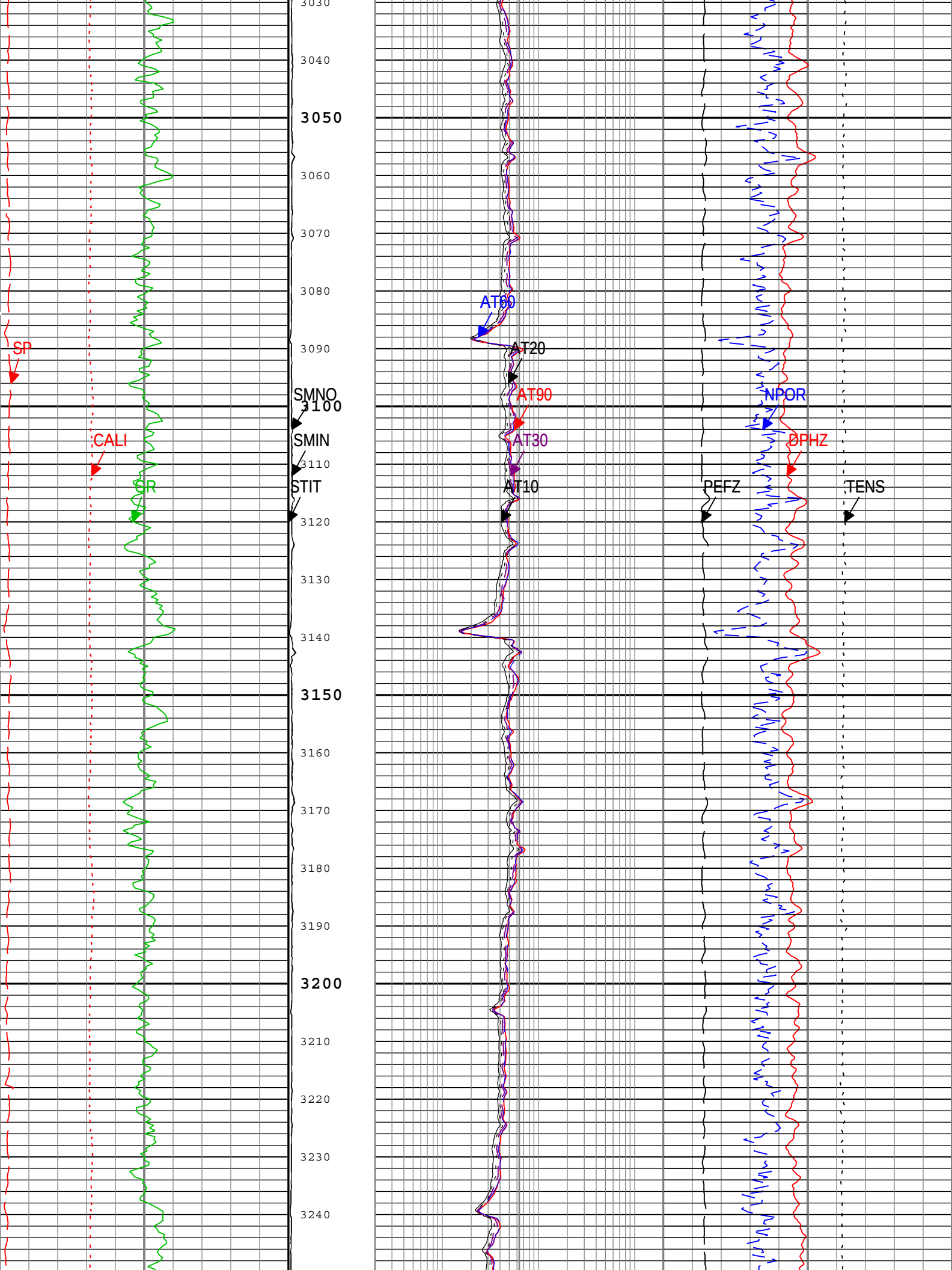
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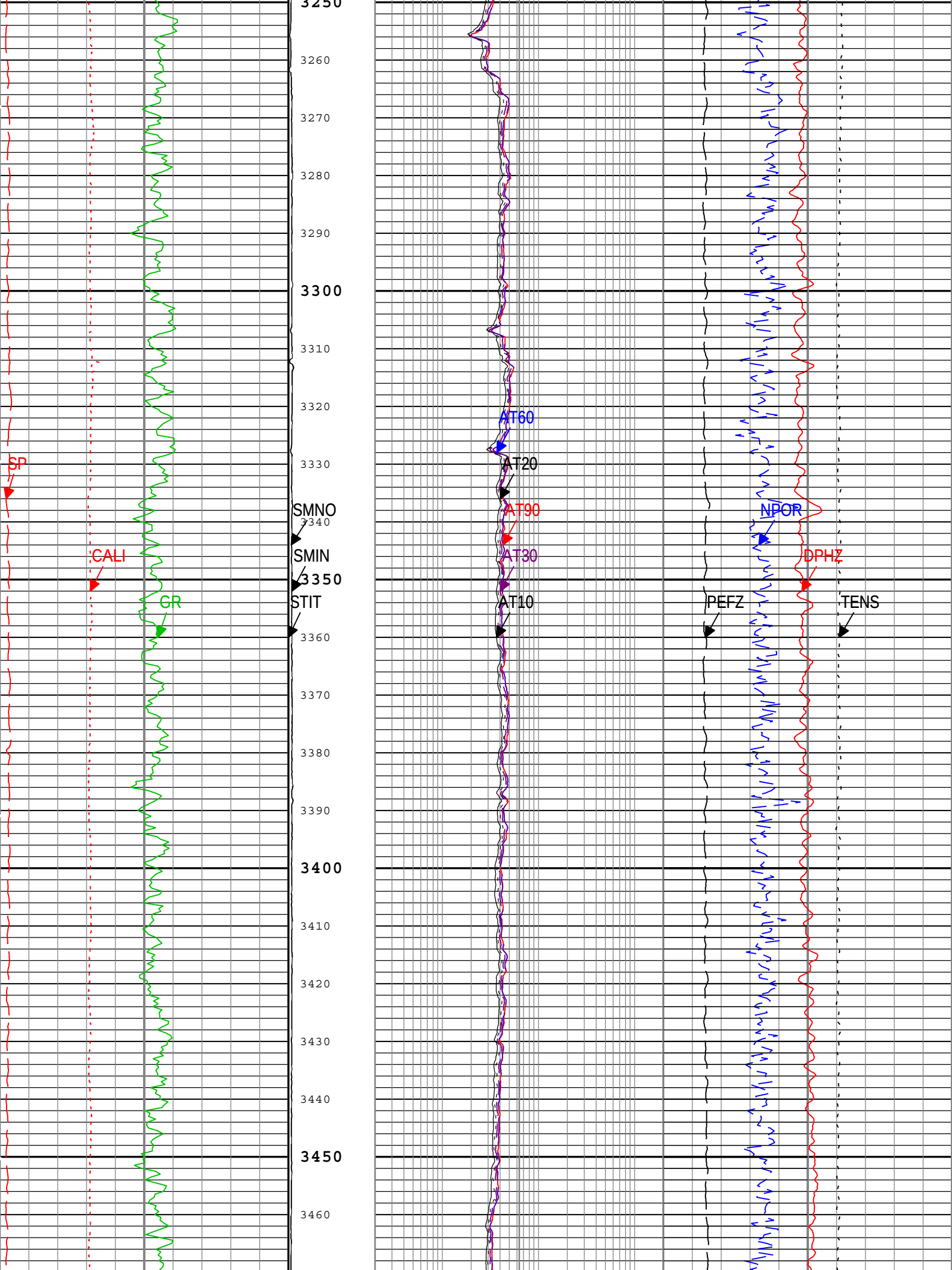
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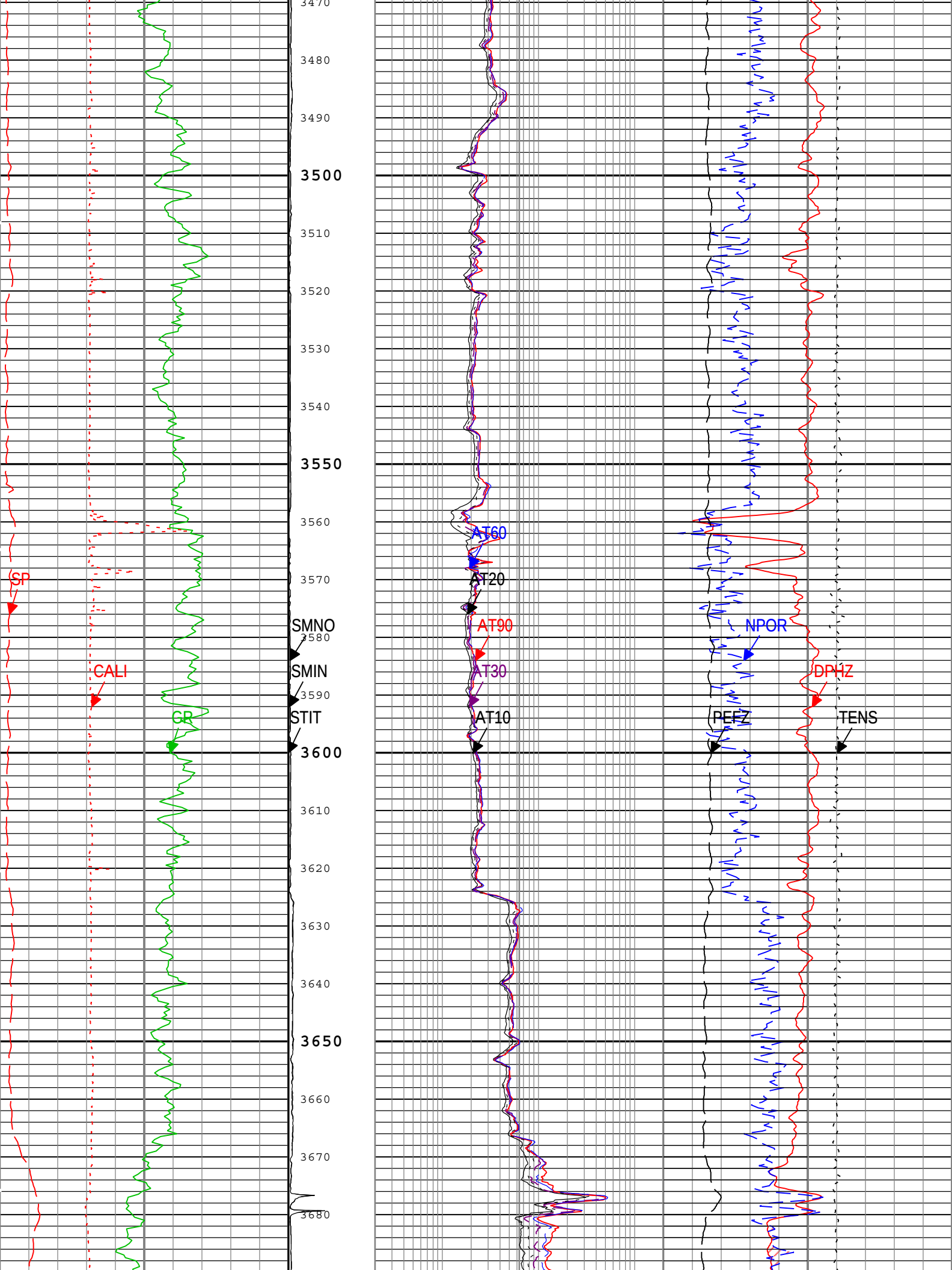
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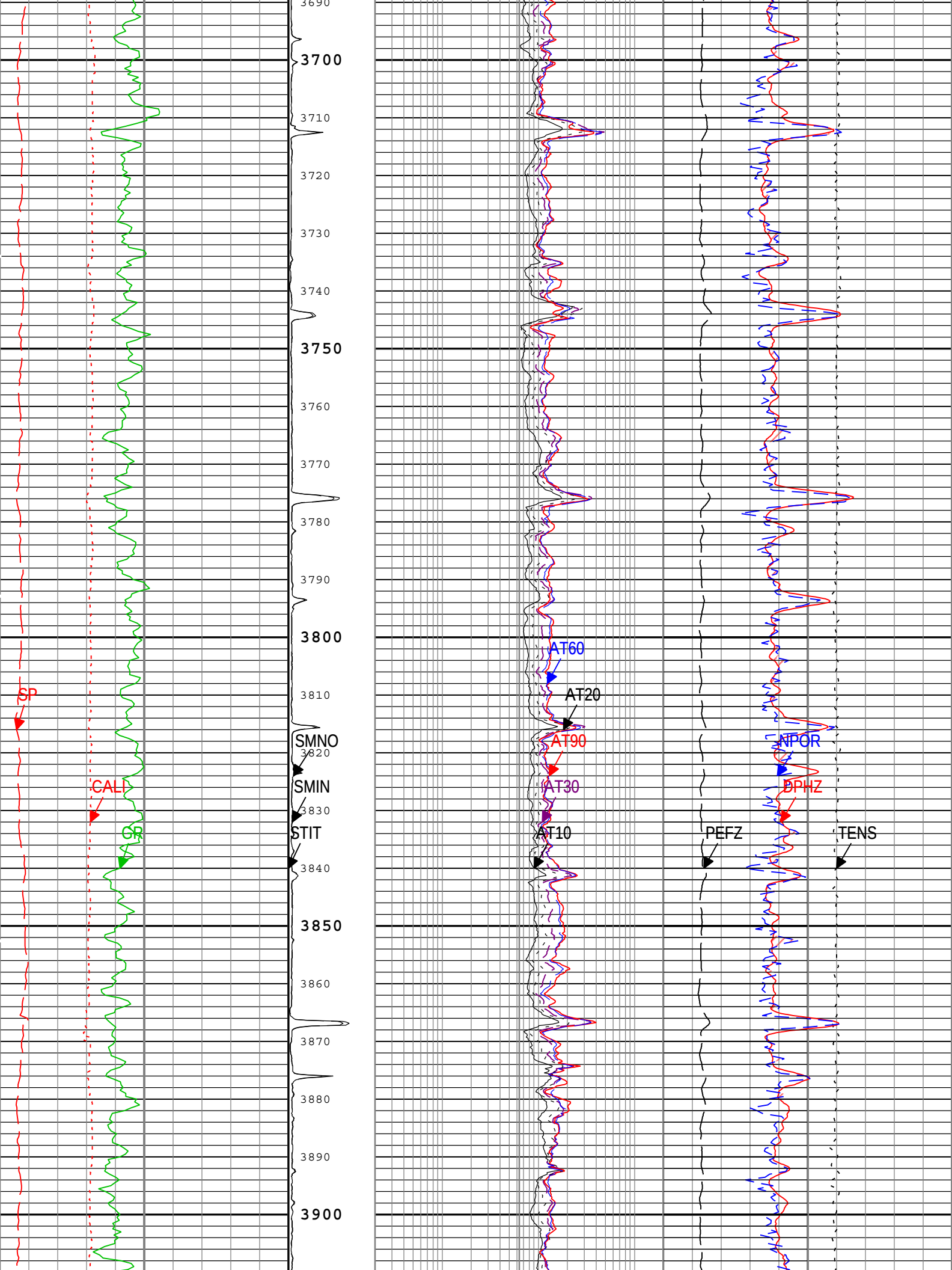
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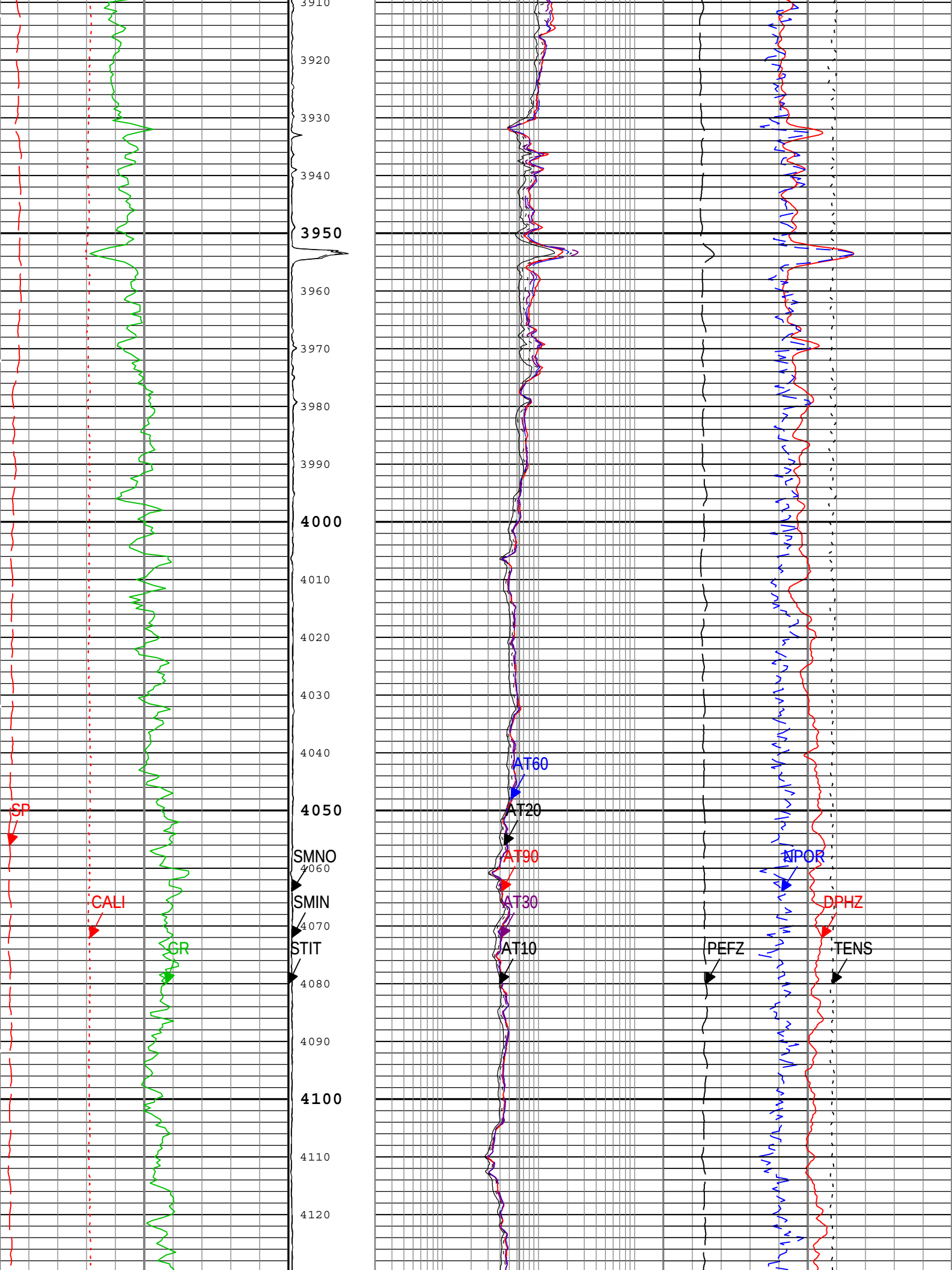
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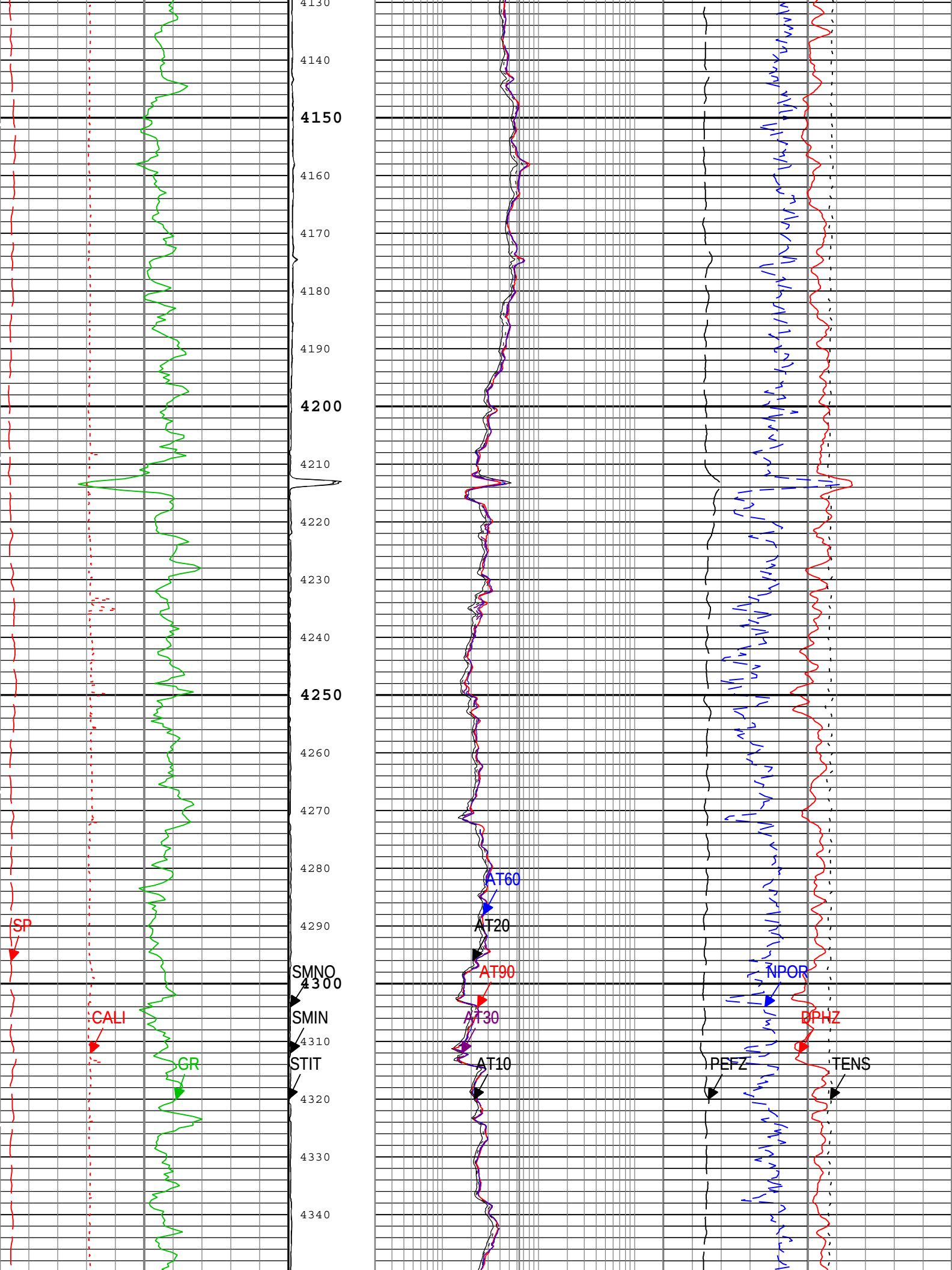
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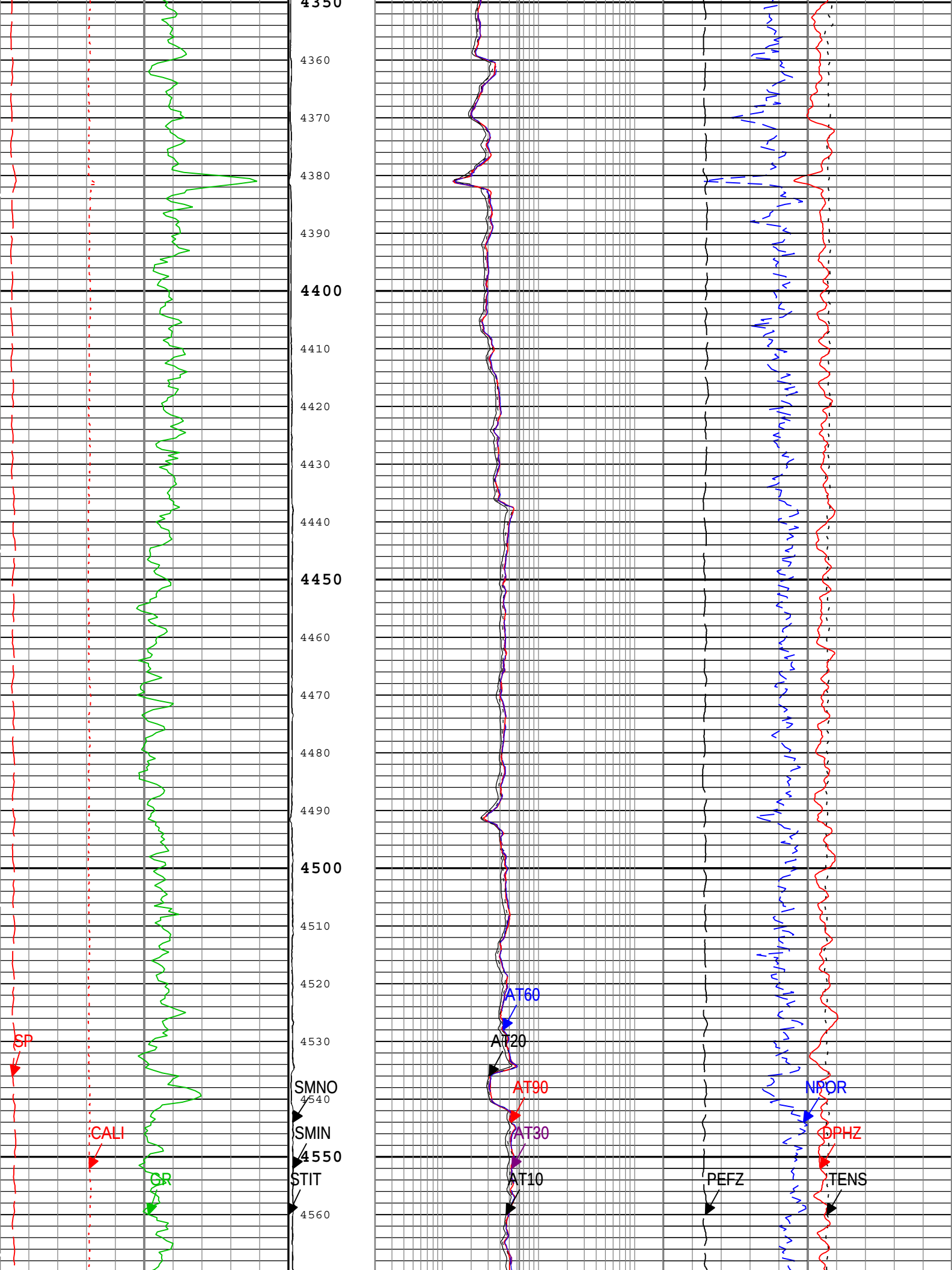
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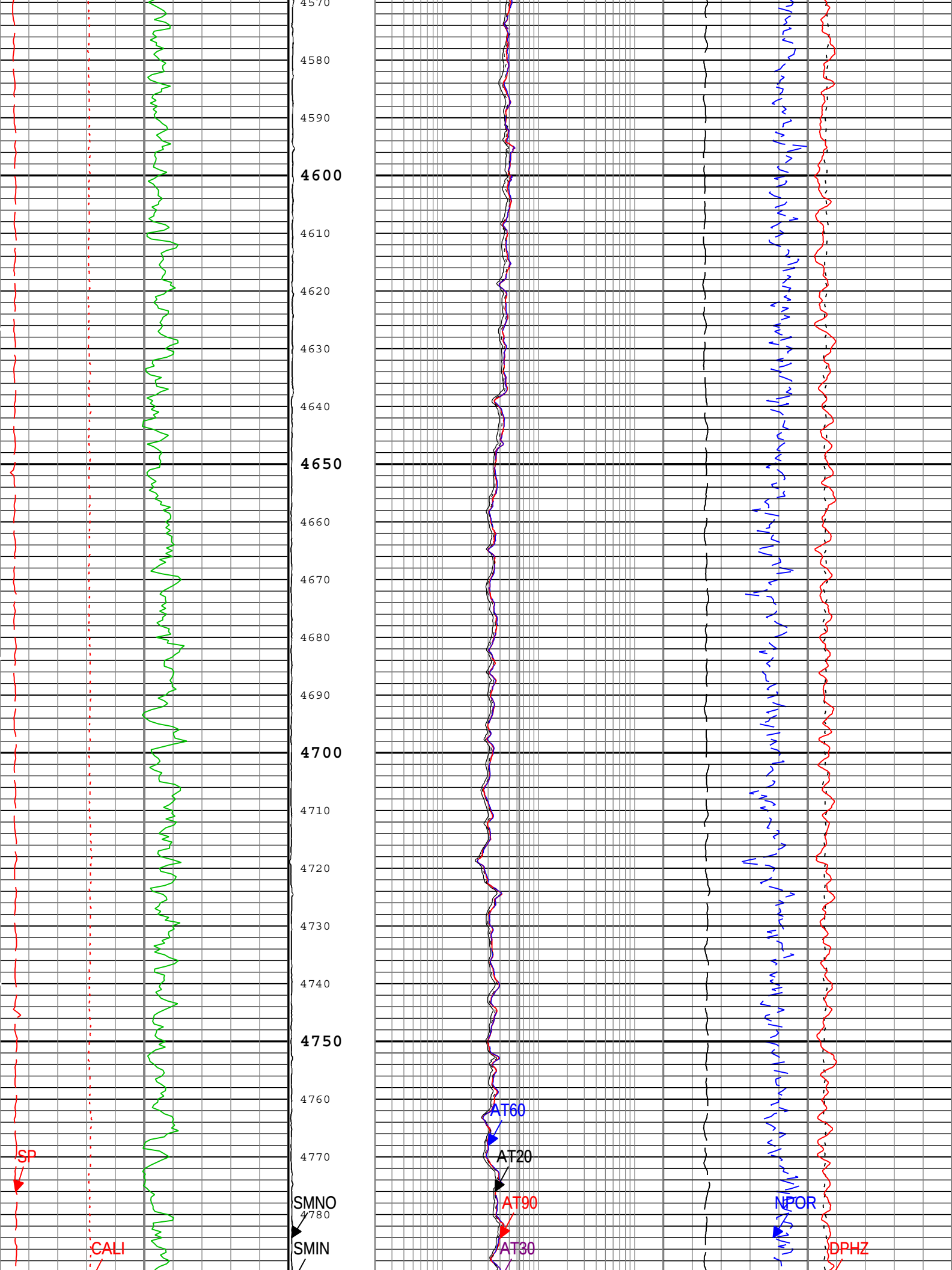
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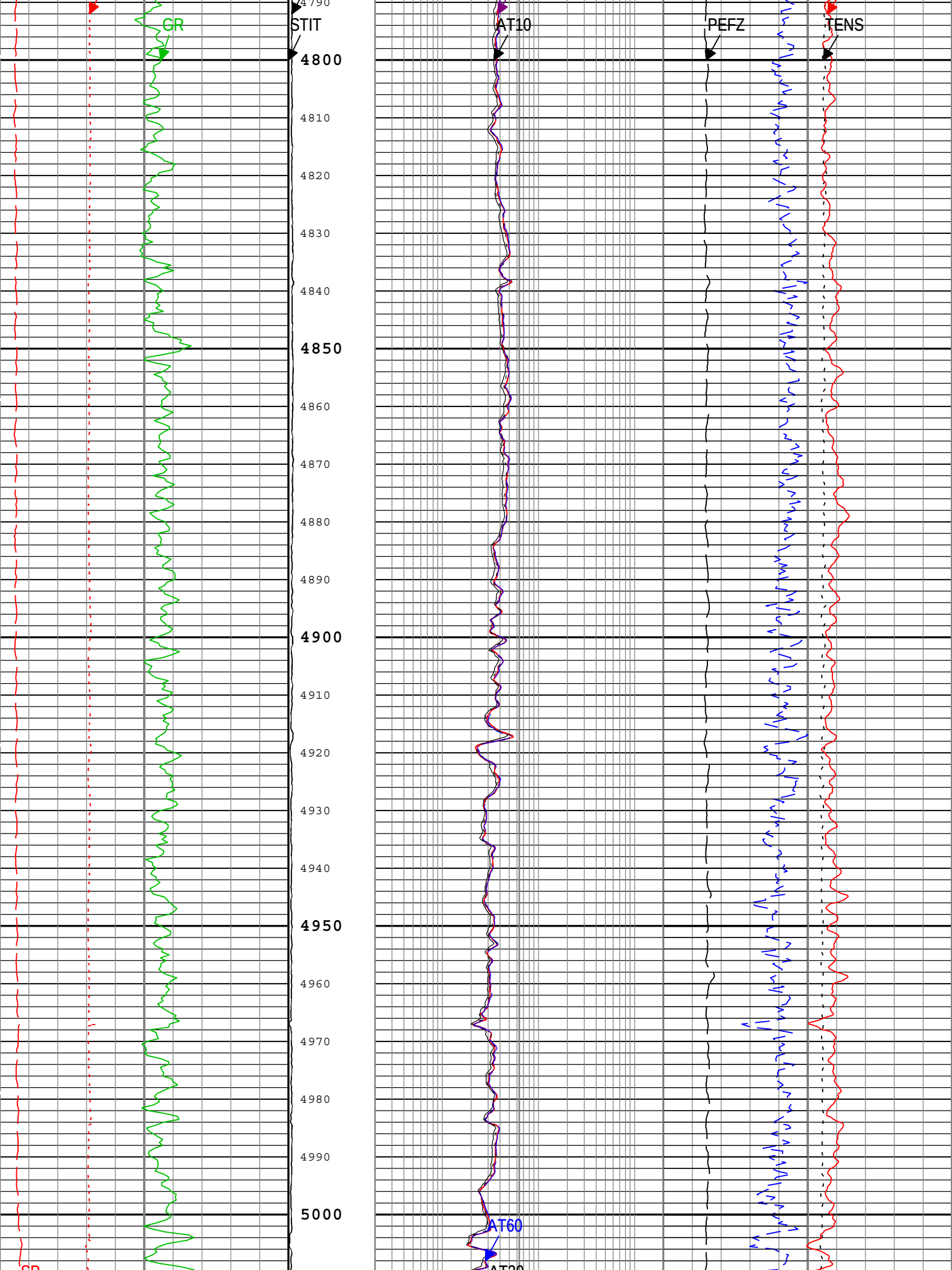
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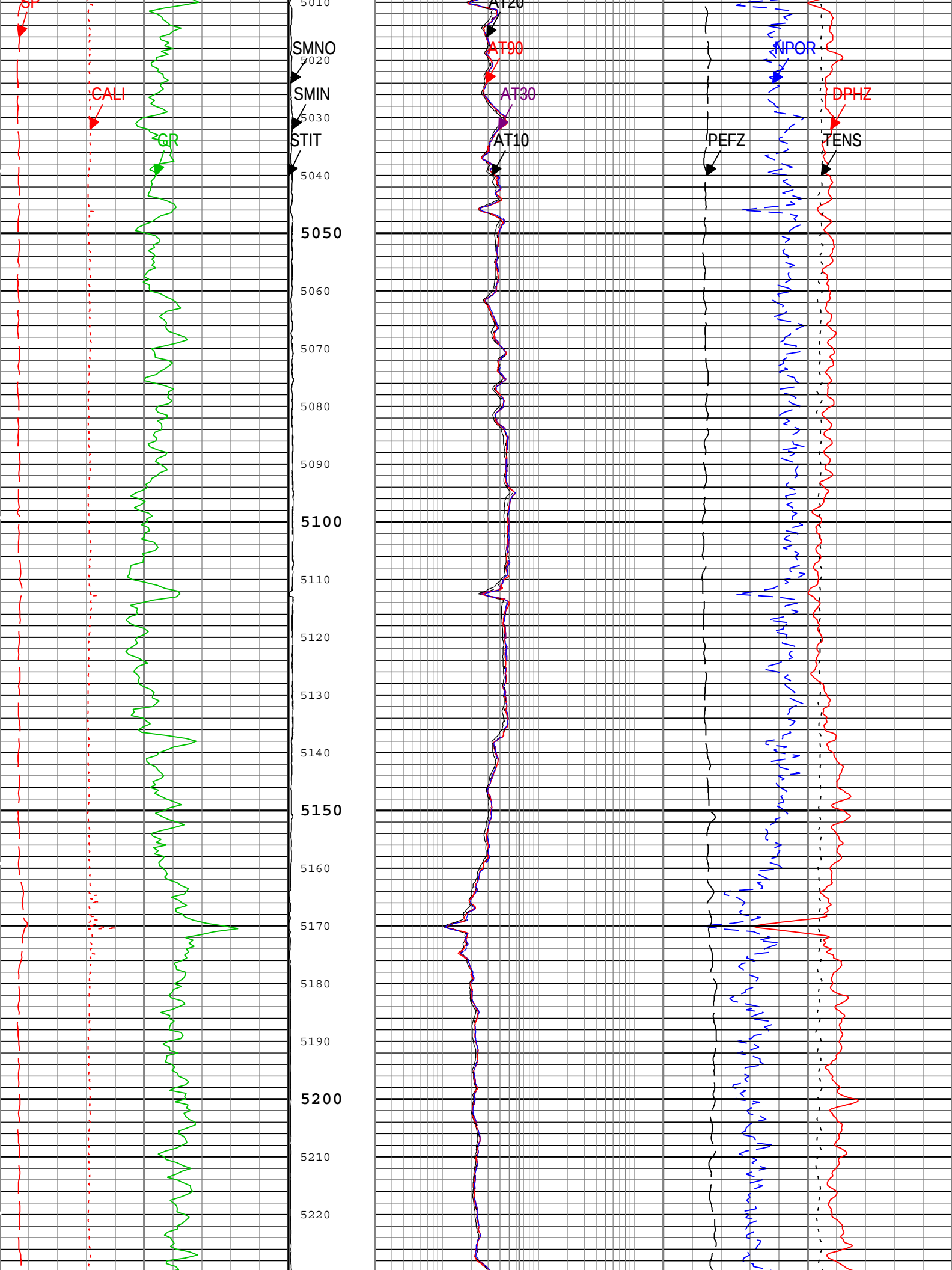
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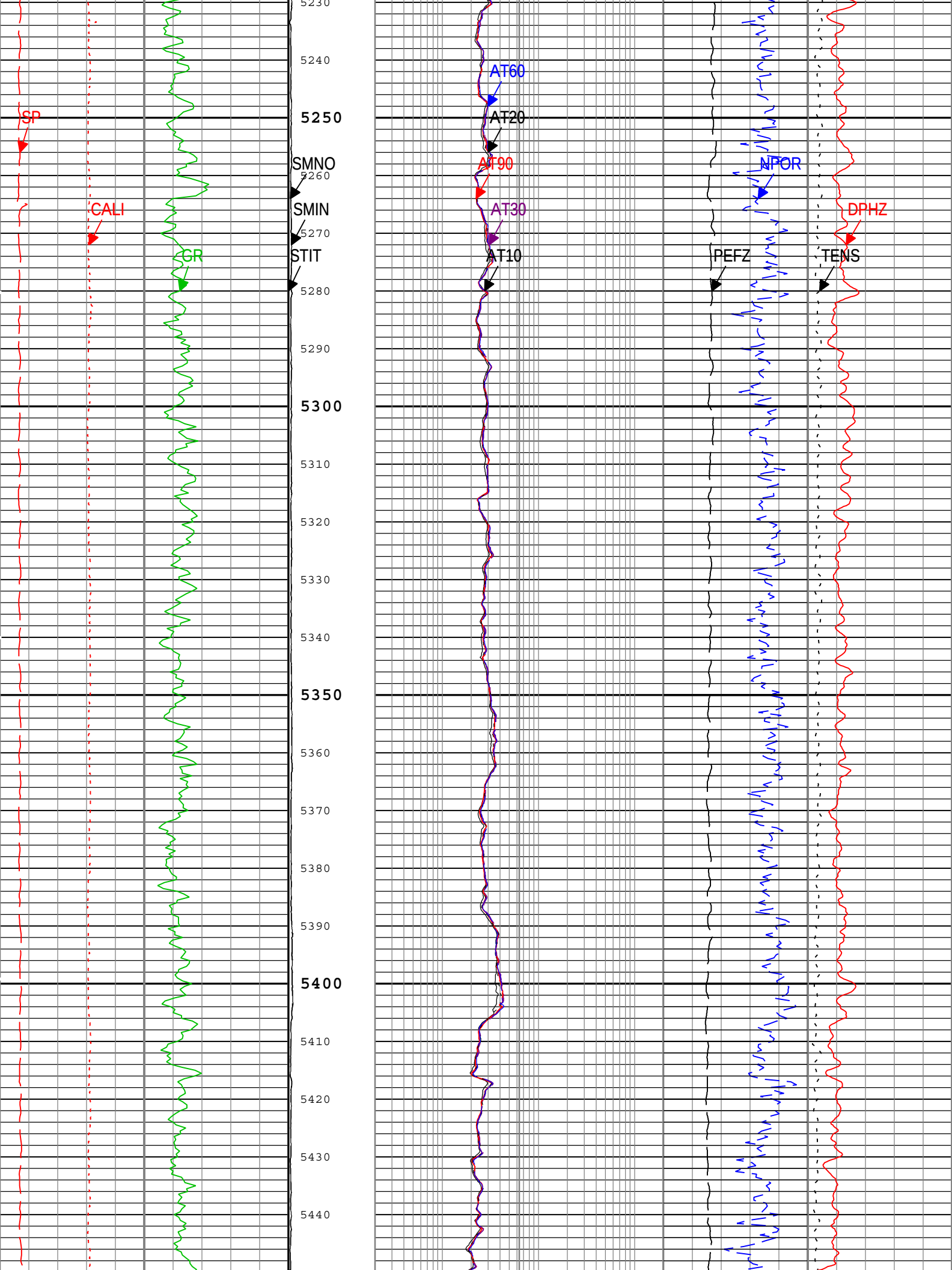
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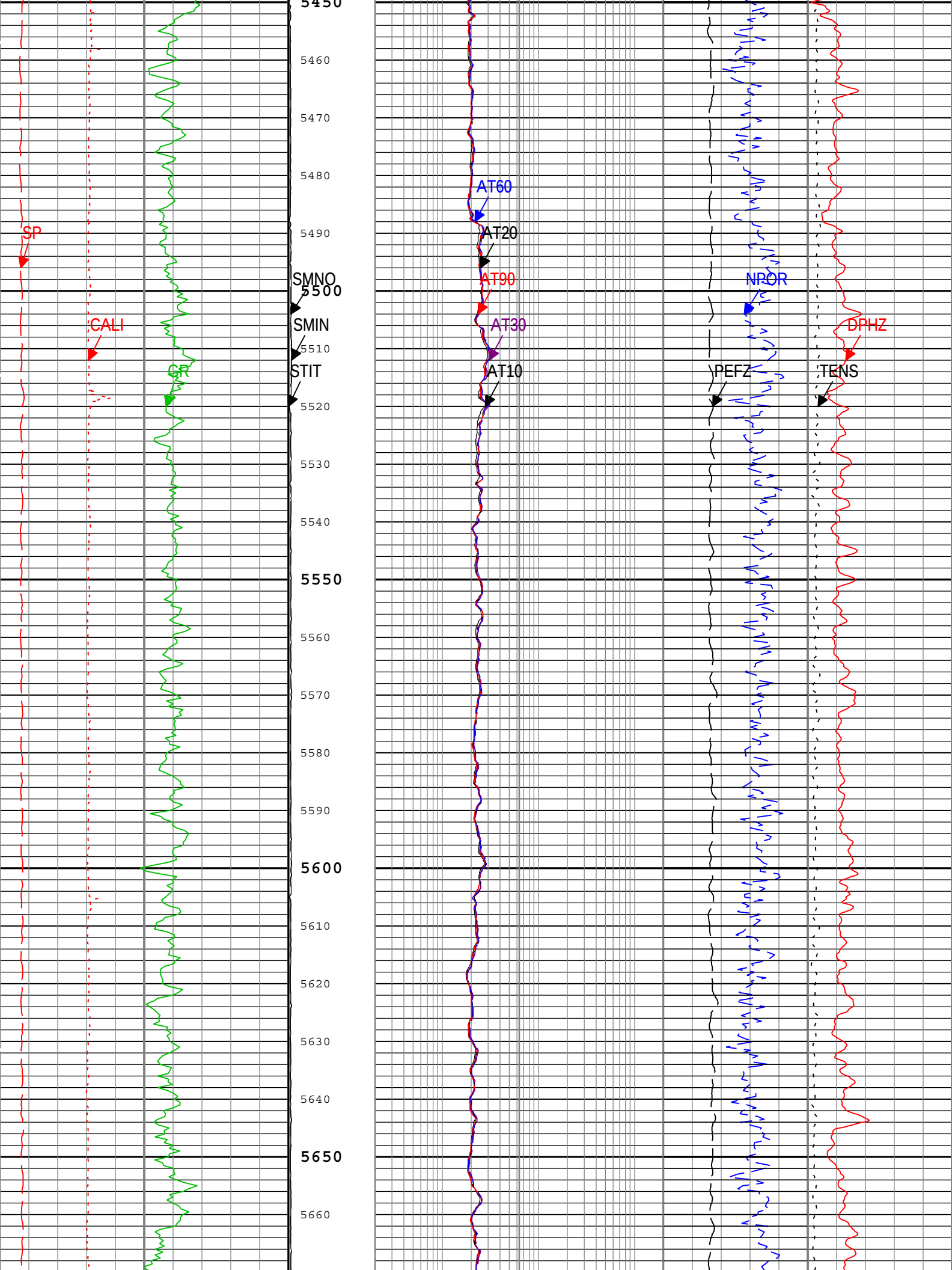
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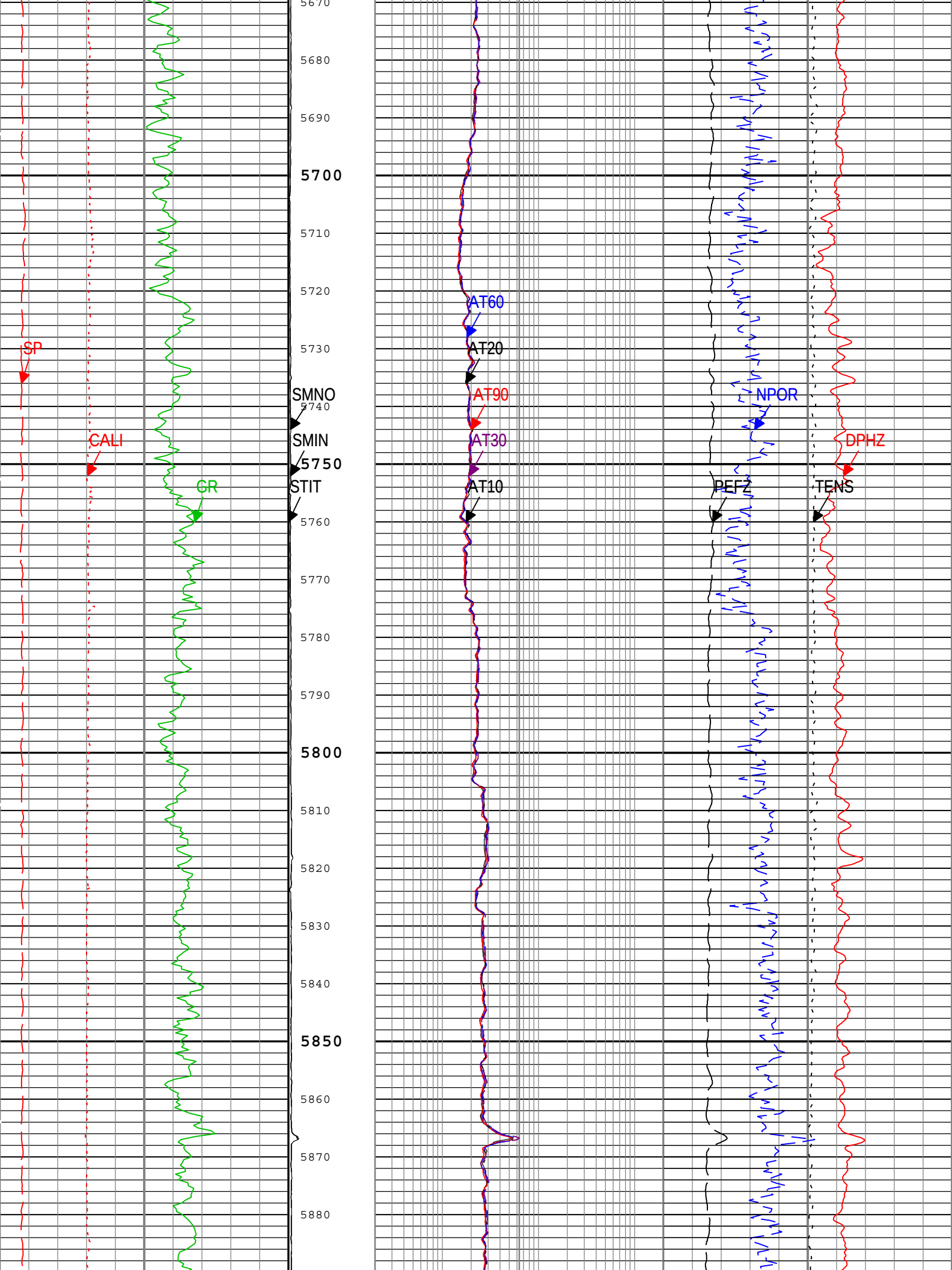
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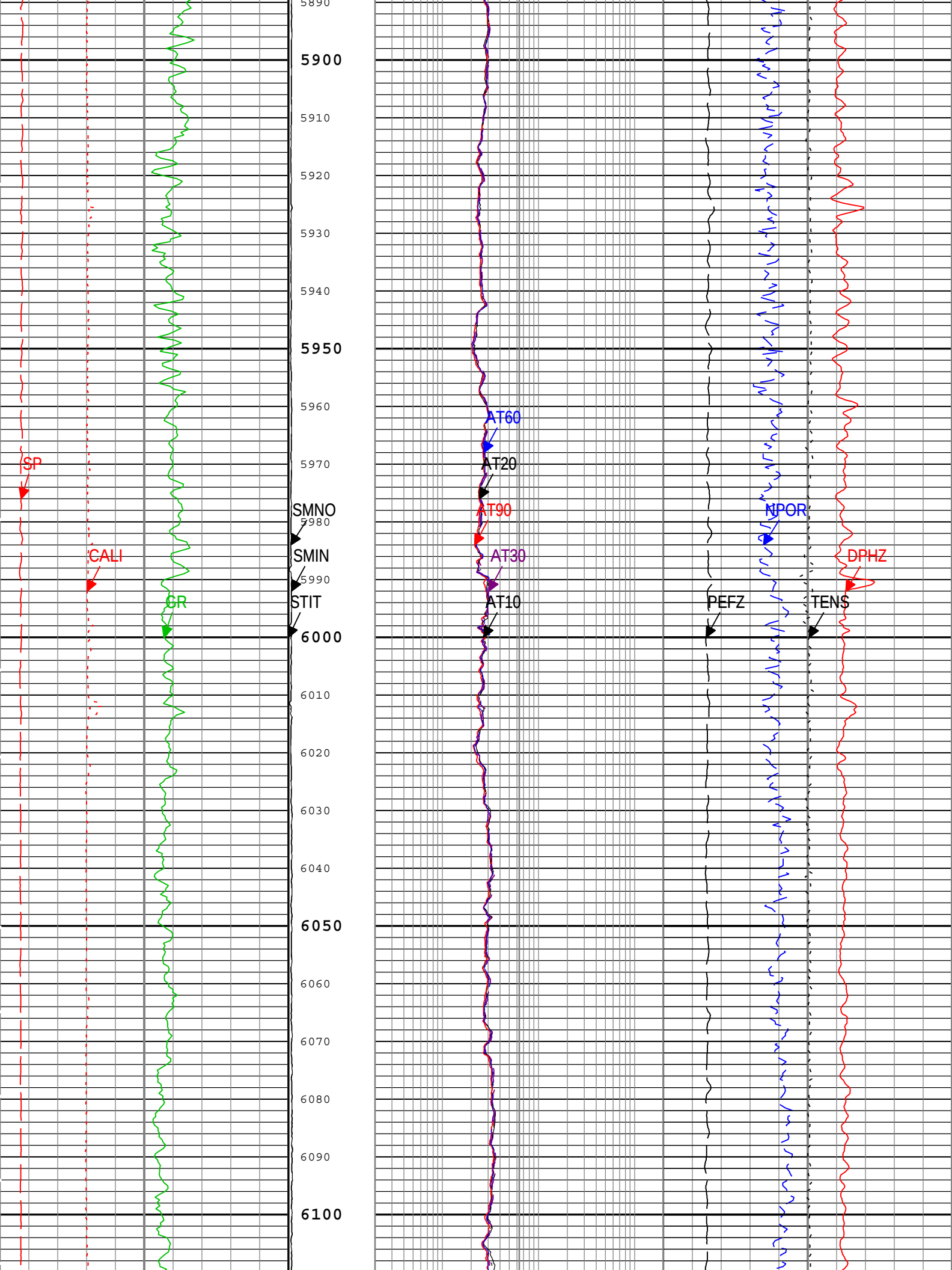
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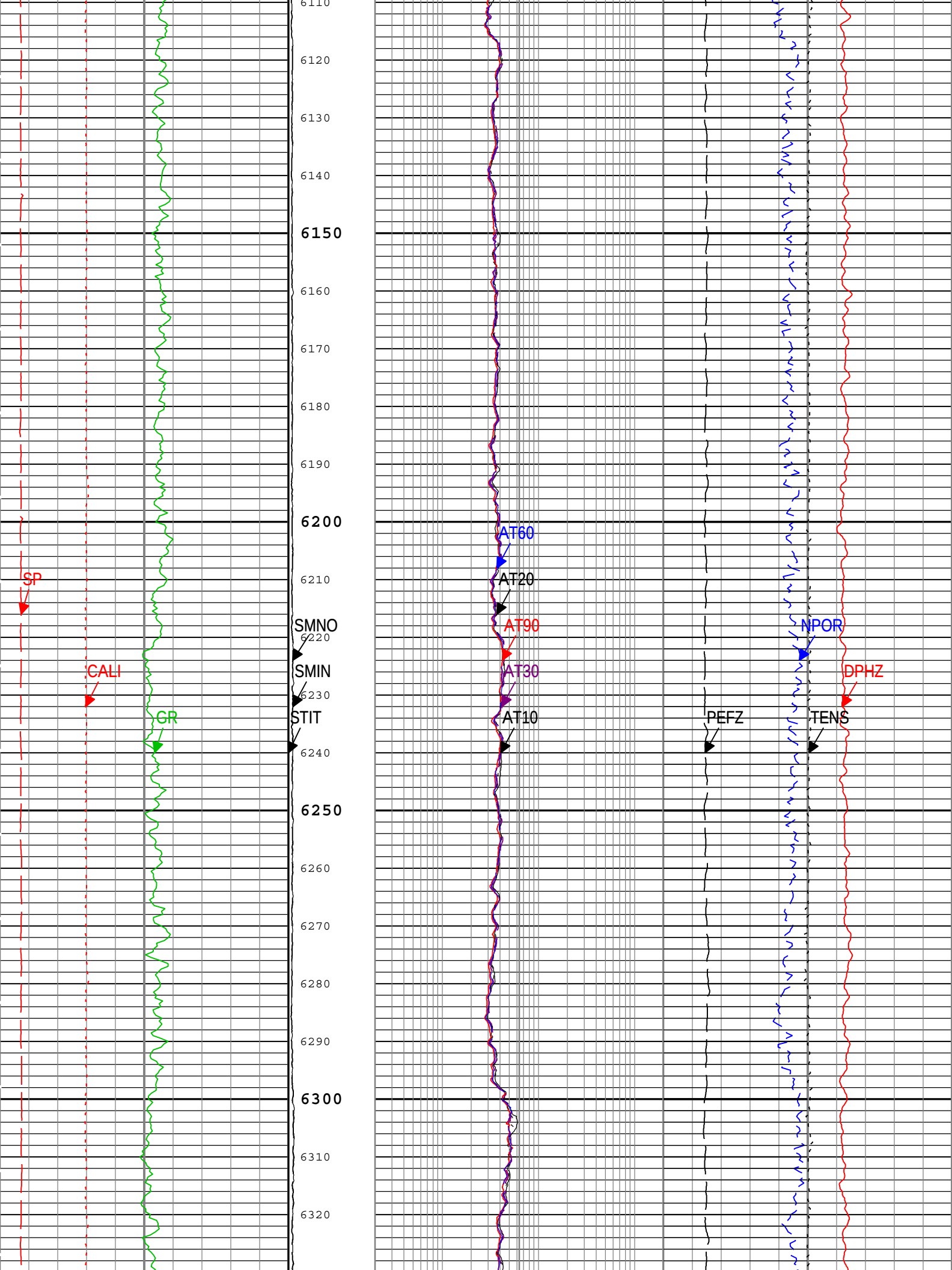
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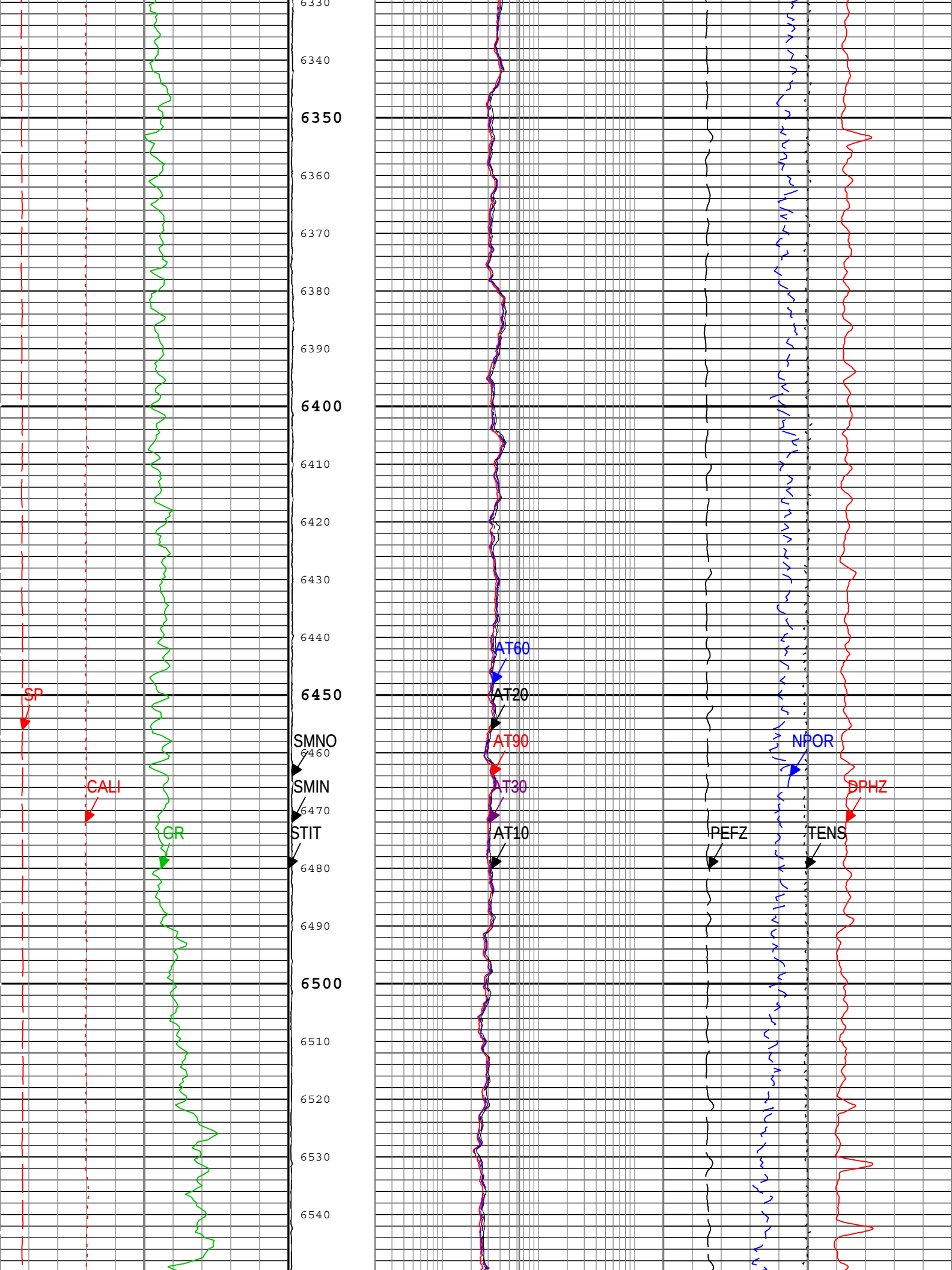
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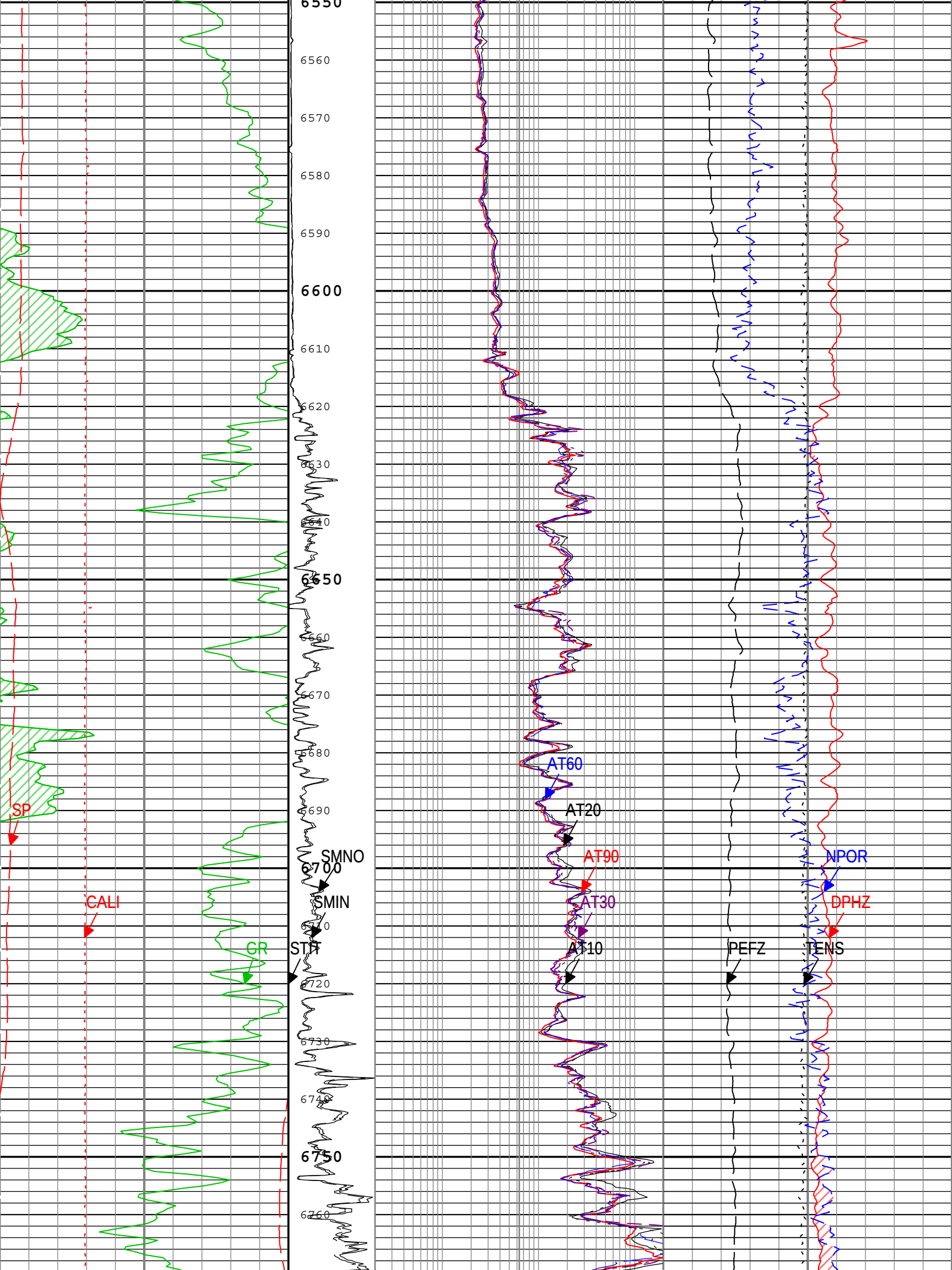
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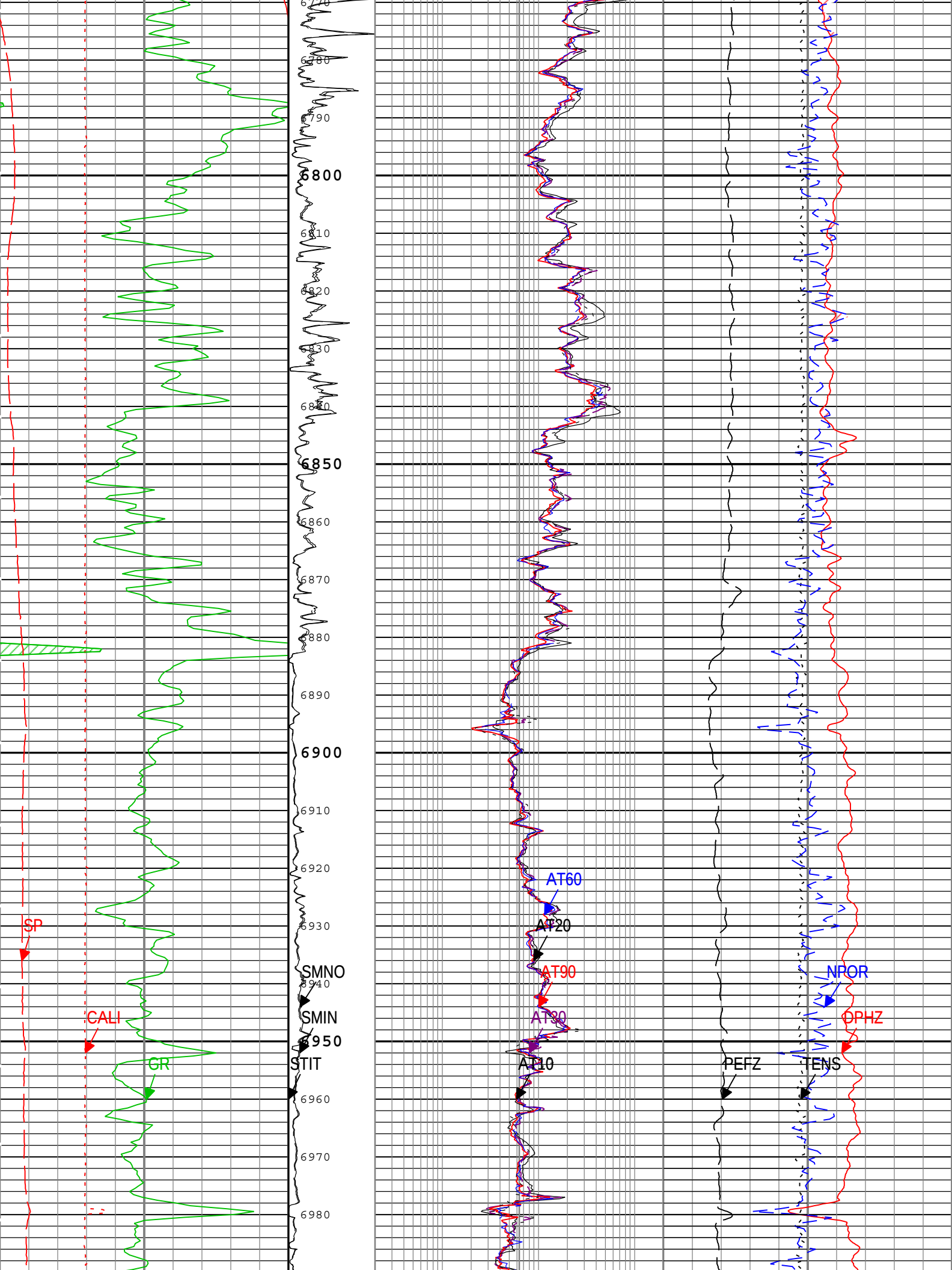
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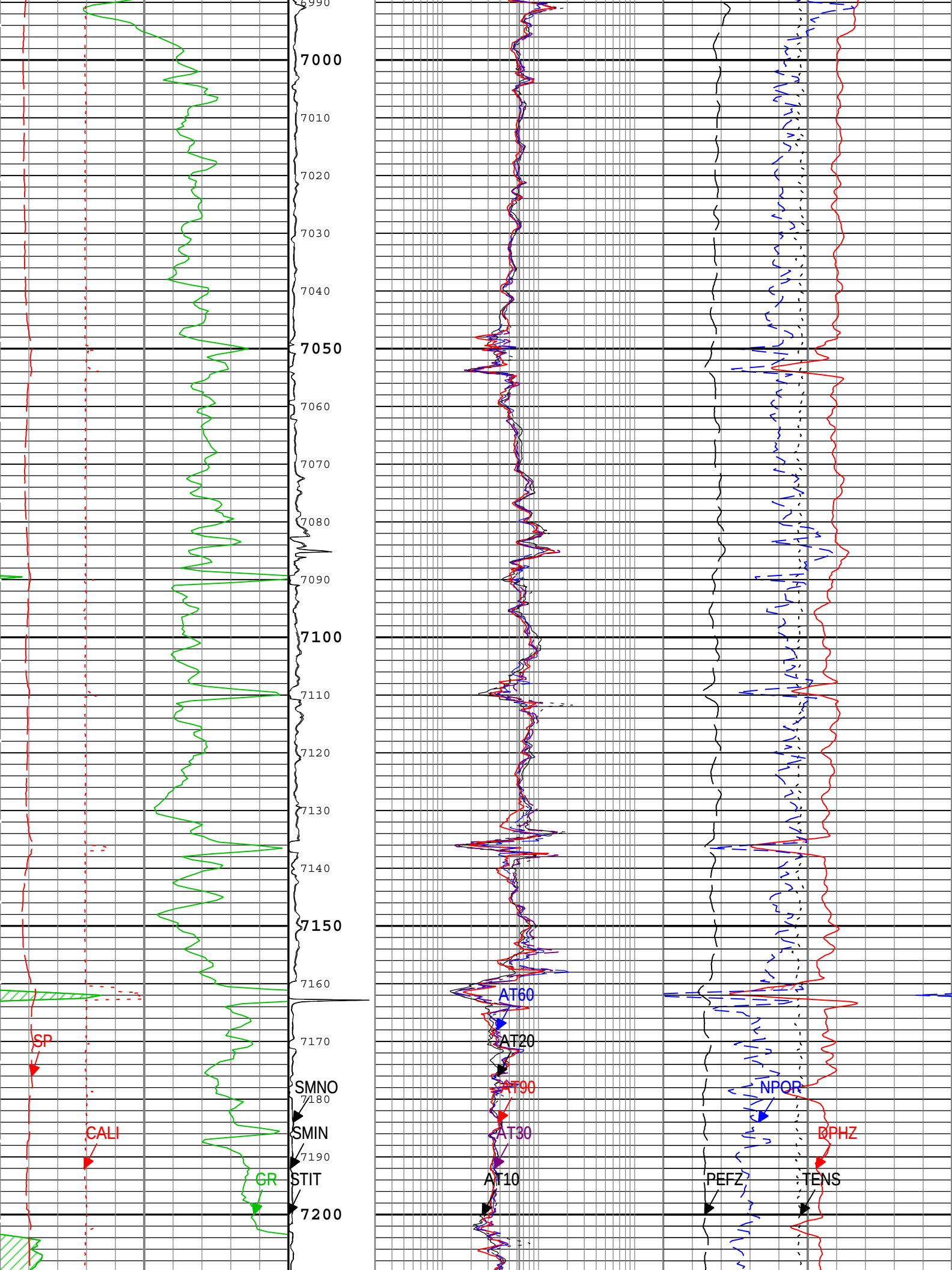
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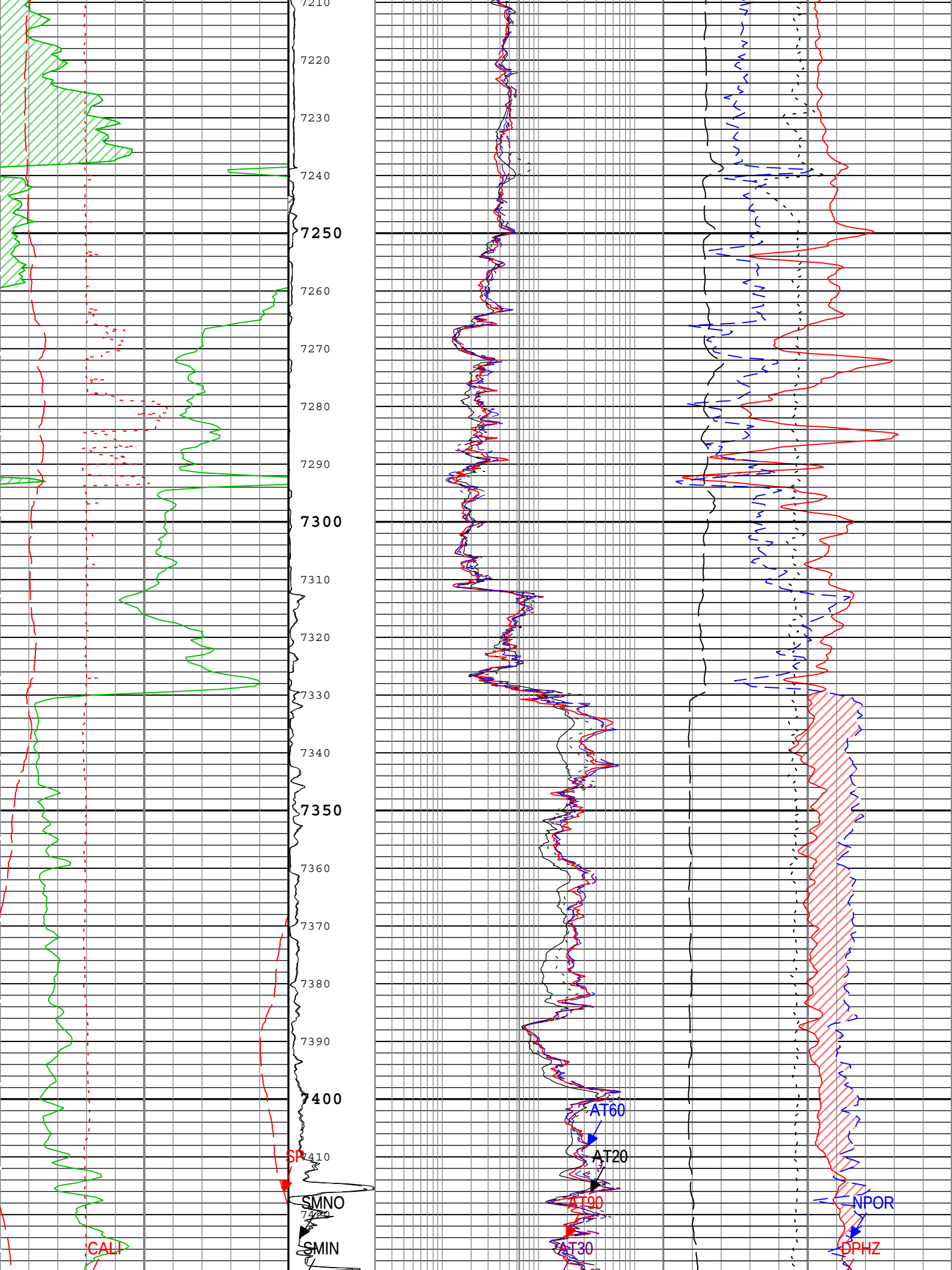
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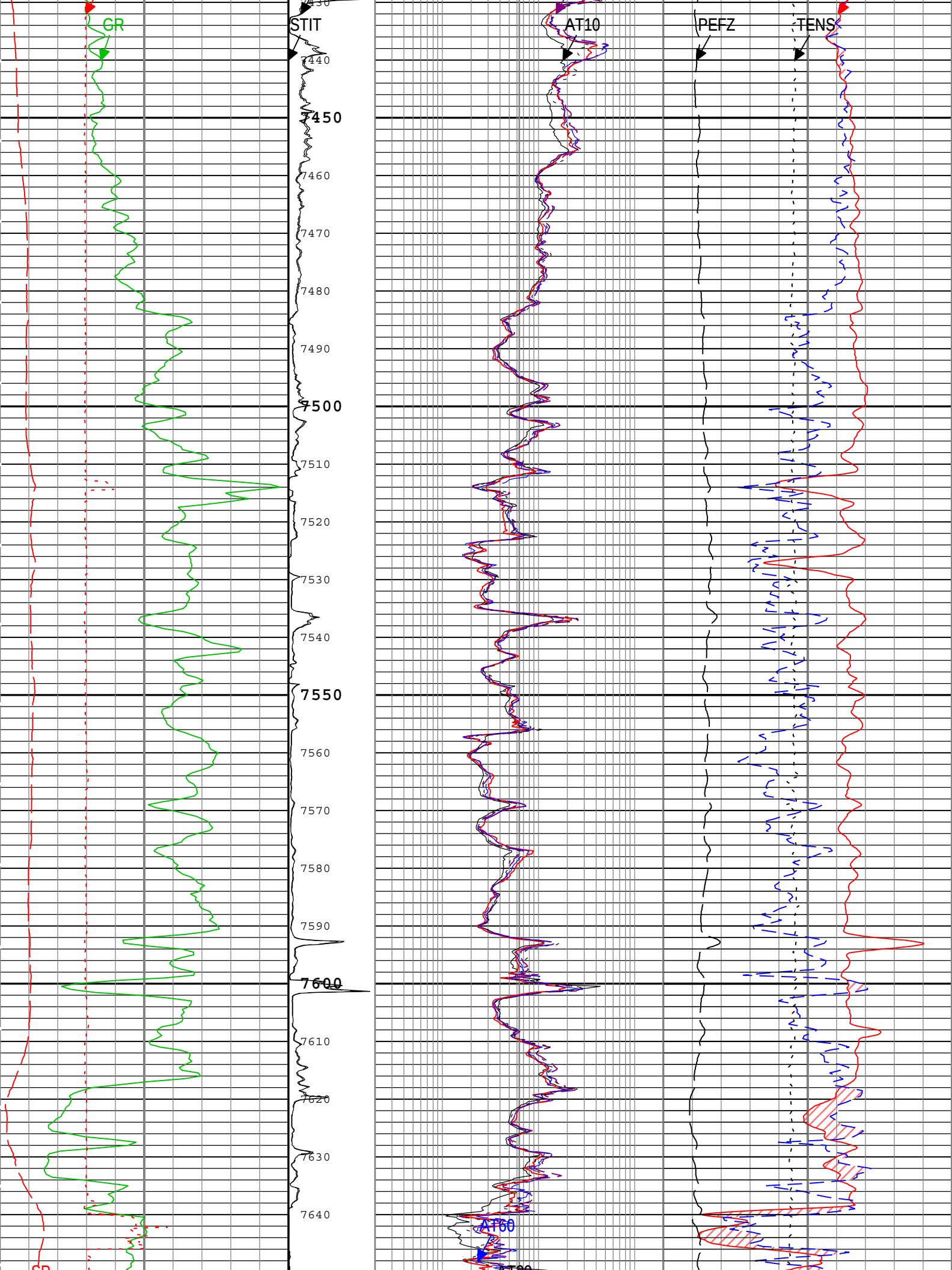
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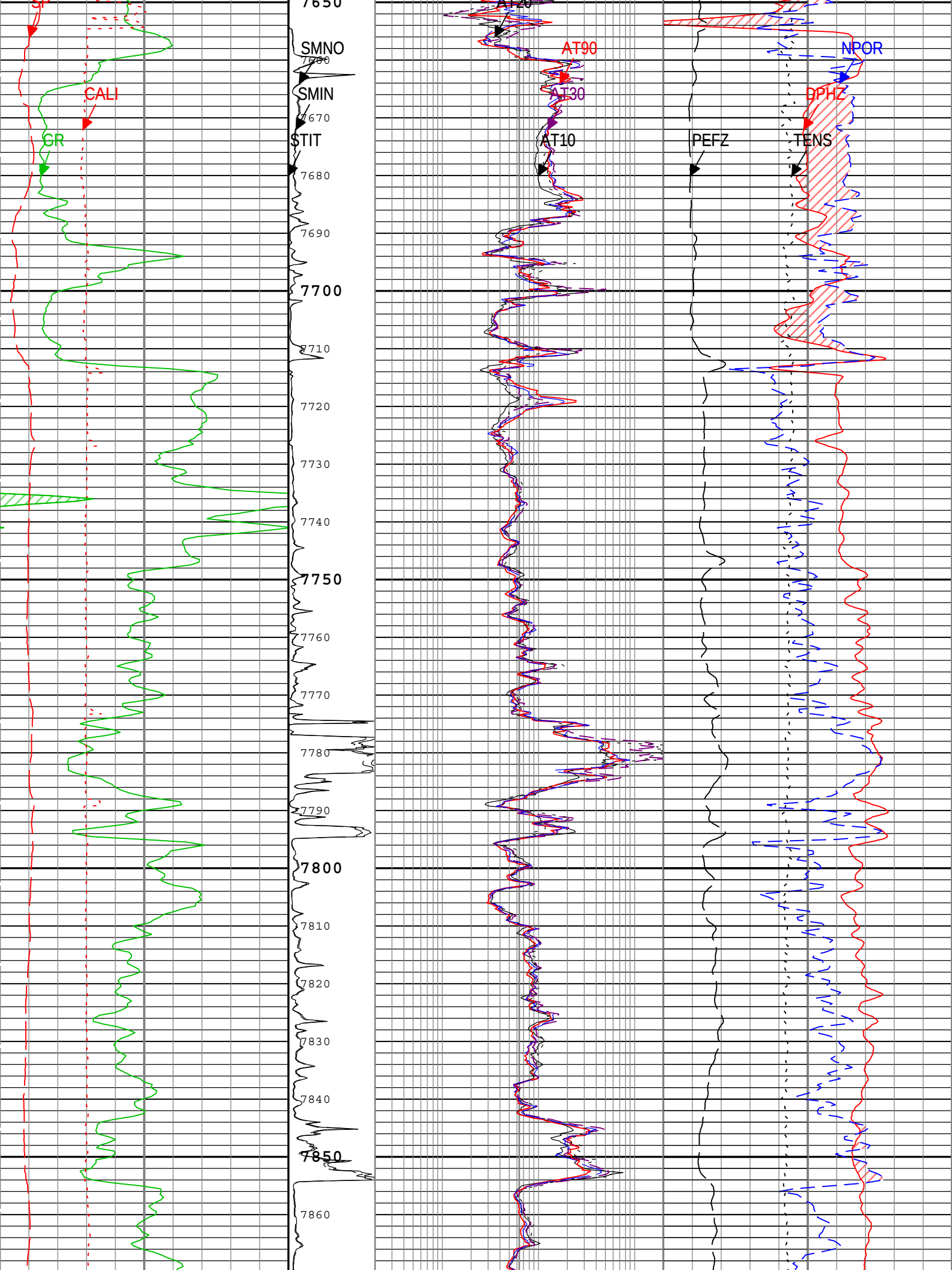
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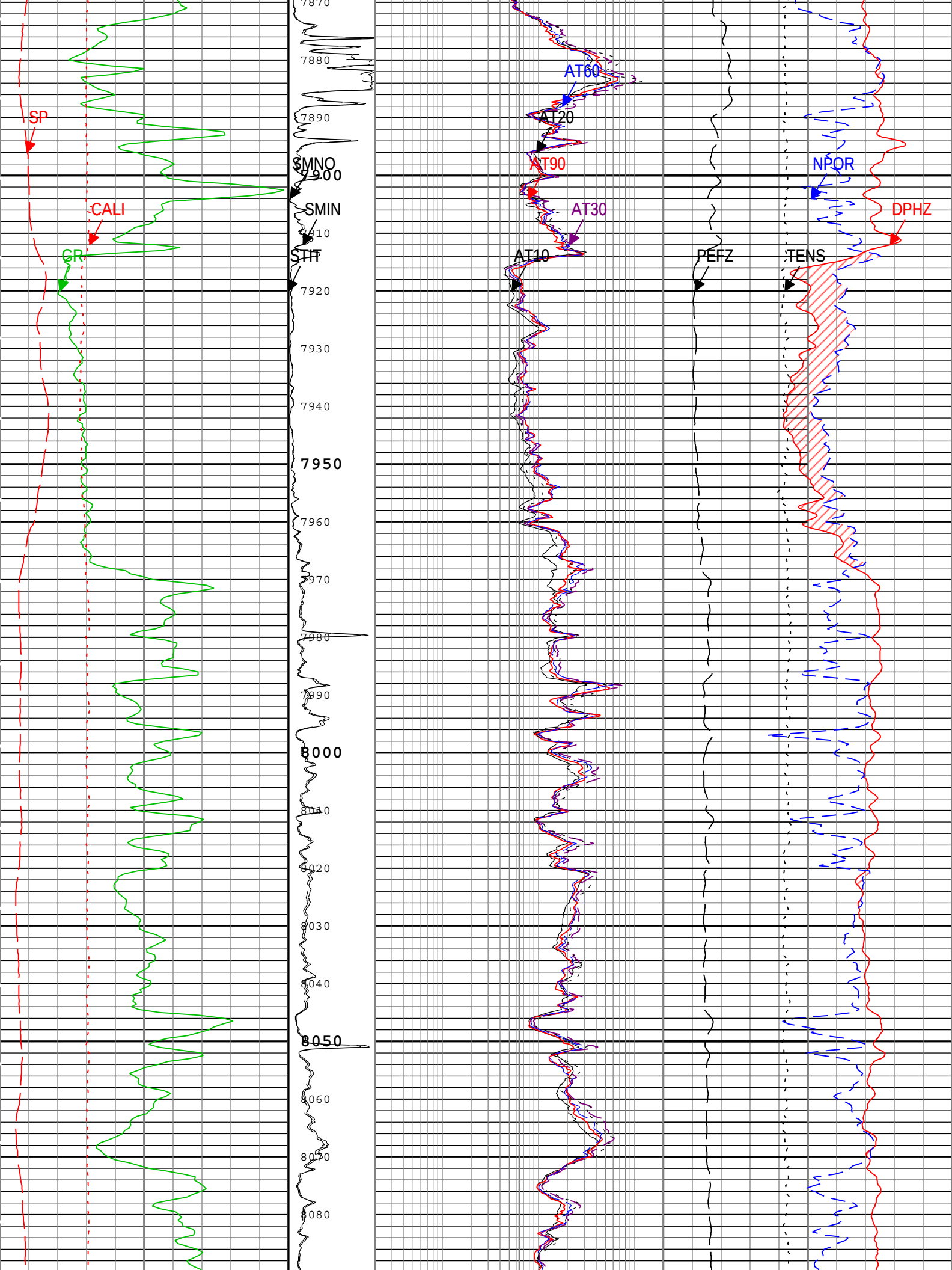
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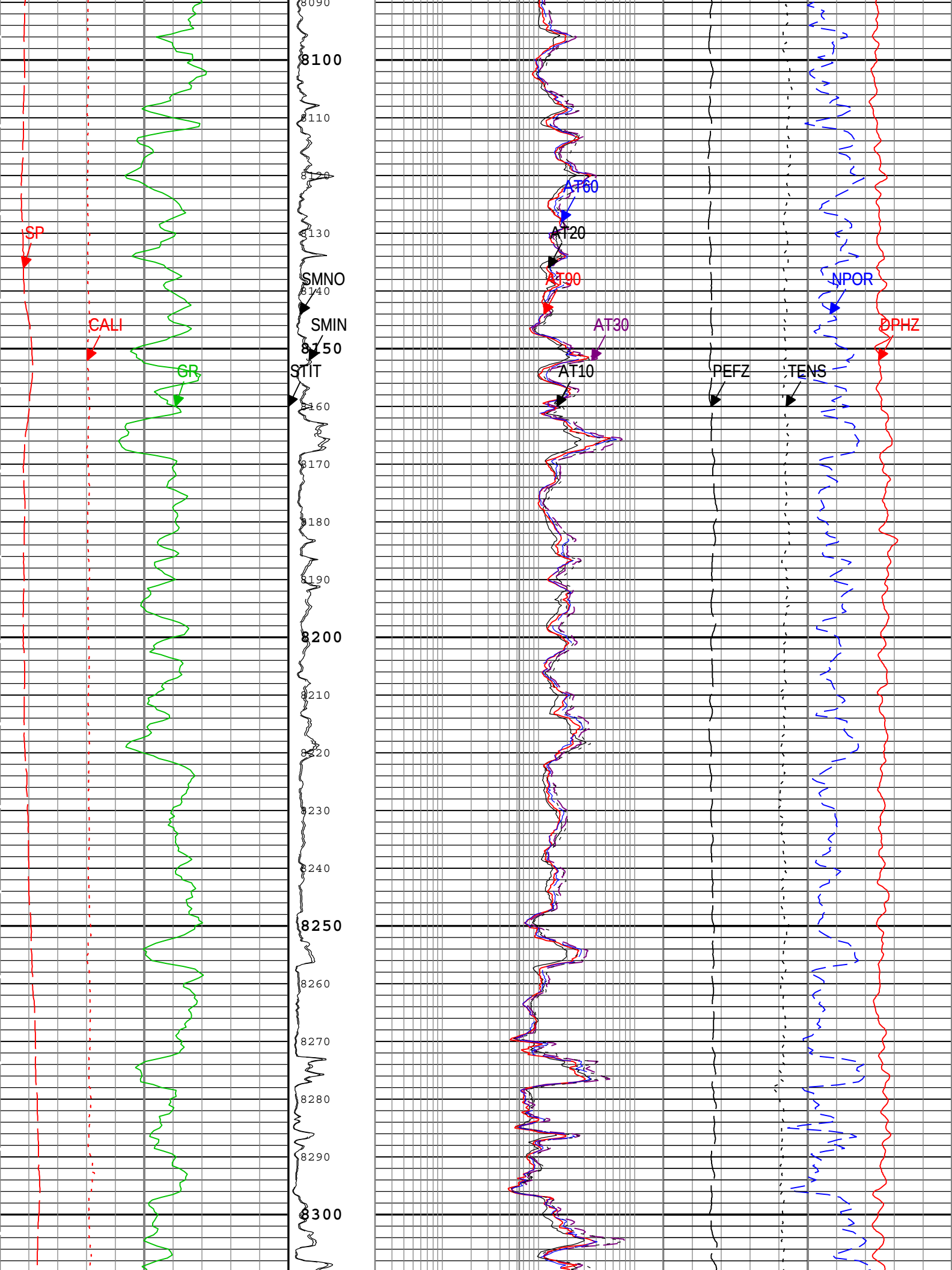
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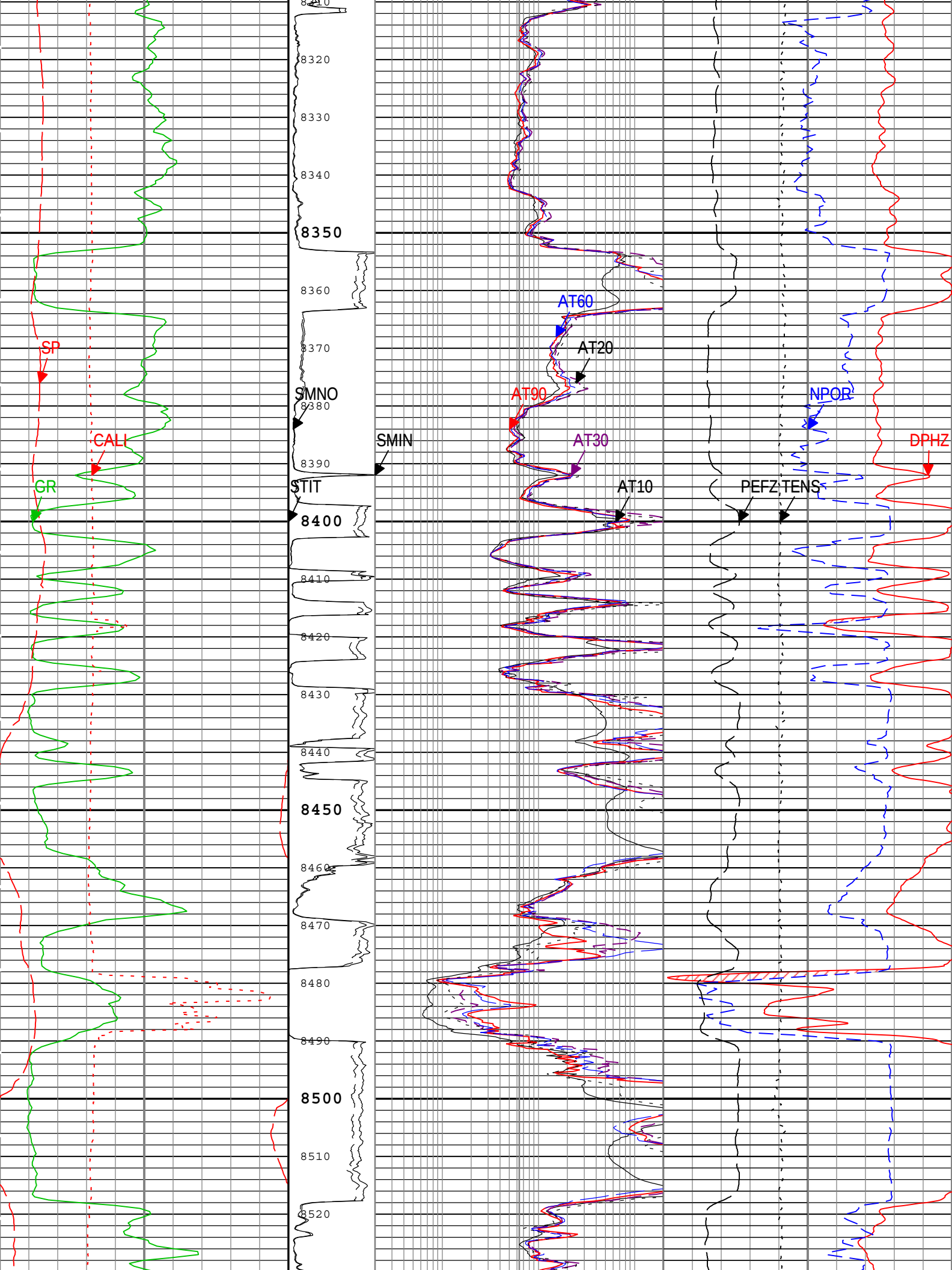
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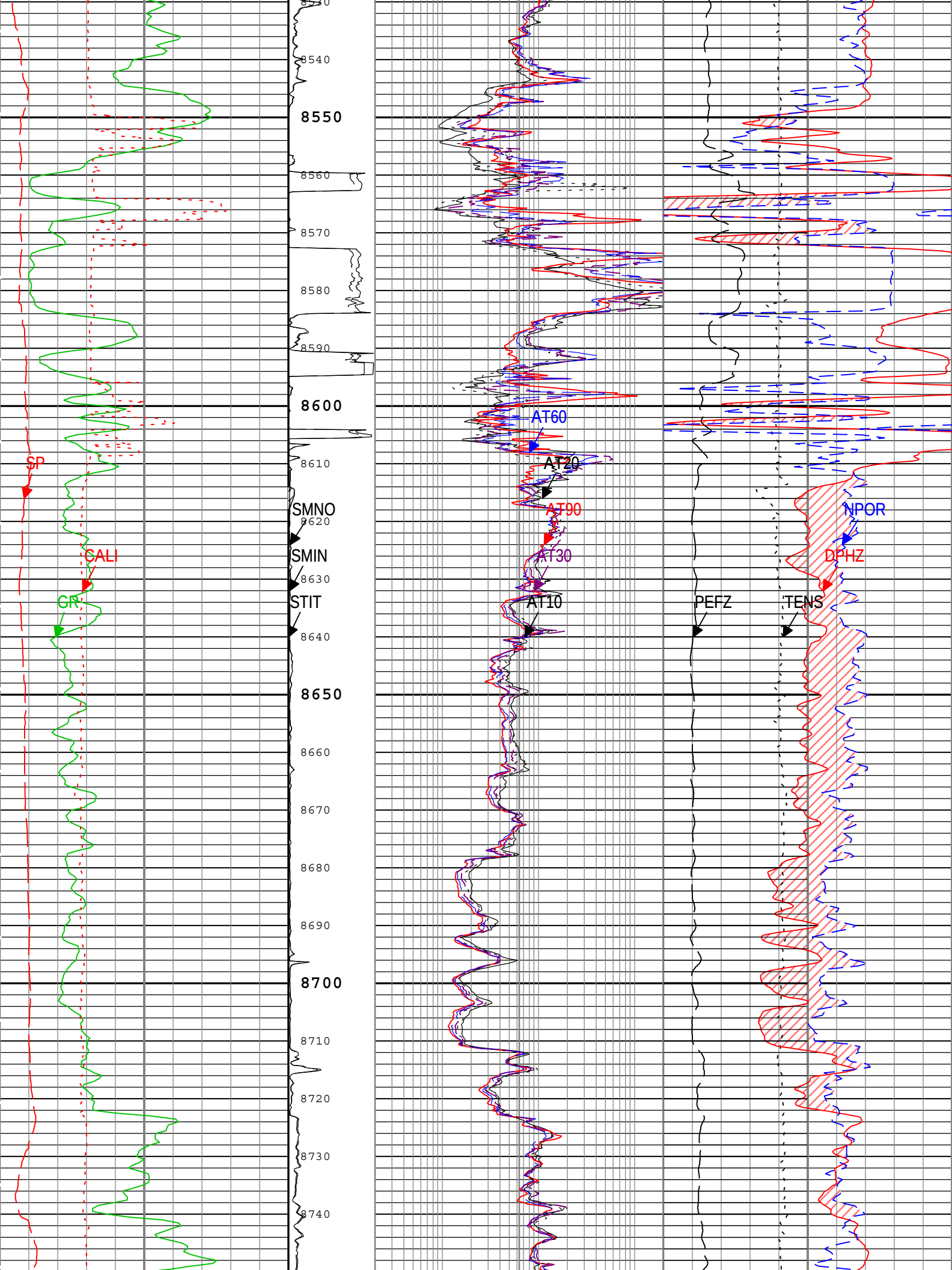
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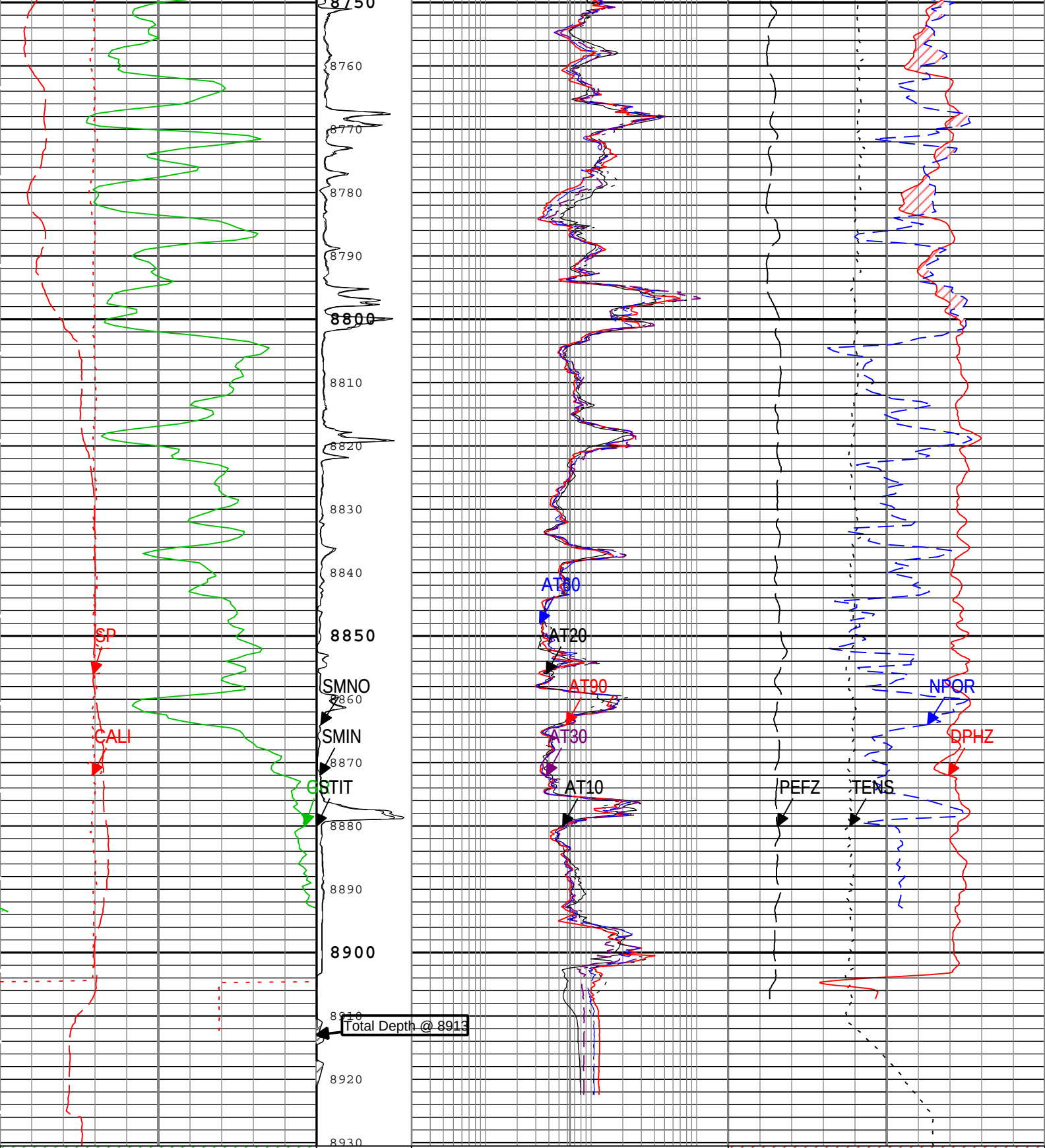


Gamma Ray Back up

Gamma Ray (GR) HGNS-B

0 gAPI 200

Caliper (CALI) HDRS-B

6 in 16

Spontaneous Potential (SP) AIT-H

-160 mV 40

Stuck Tool Indicator, Total (STIT)

0 ft 50

Synthetic Micro-Inverse Resistivity (SMIN) HDRS-B

0 100

Array Induction Two Foot Resistivity A10 (AT10) AIT-H

0.2 ohm.m 200

Array Induction Two Foot Resistivity A30 (AT30) AIT-H

0.2 ohm.m 200

Array Induction Two Foot Resistivity A90 (AT90) AIT-H

Gas Effect

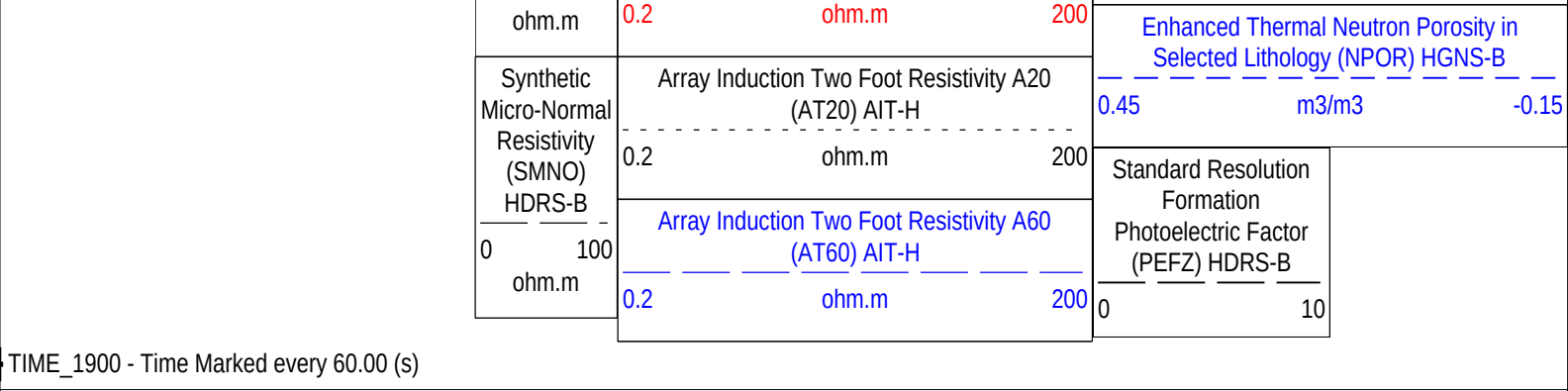
NPOR Backup

Cable Tension (TENS)

5000 lbf 0

Standard Resolution Density Porosity (DPHZ) HDRS-B

0.45 ft3/ft3 -0.15



Description: HGNS standard resolution porosities for Platform Express Format: Log (KM 5in Triple Combo) Index Scale: 5 in per 100 ft Index Unit: ft
Index Type: Measured Depth Creation Date: 01-Aug-2012 15:42:40

Channel Processing Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-H	Compute Standoff	
ABLM	Array Induction Basic Logs Mode	AIT-H	Normal	
ACDE	Array Induction Casing Detection Enable	AIT-H	No	
ASTA	Array Induction Tool Standoff	AIT-H	1	in
BARI	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	8.75	in
BSAL	Borehole Salinity	Borehole	1000	ppm
CALI_SHIFT	CALI Supplementary Offset	HDRS-B	0	in
CBLO	Casing Bottom (Logger)	WLSESSION	754	ft
CDEN	Cement Density	HGNS-B	2	g/cm3
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	9.05	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DFT_WATER	Drilling Fluid Water Type	Borehole	Fresh Water	
DHC	Density Hole Correction	HDRS-B	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-B	Yes	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	LIMESTONE	
MDEN	Matrix Density for Density Porosity	Borehole	2.71	g/cm3
MFST	Mud Filtrate Sample Temperature	Borehole	73.7	degF
NPRM	HRDD Nuclear Processing Mode	HDRS-B	High Resolution	
RMFS	Resistivity of Mud Filtrate Sample	Borehole	1.89	ohm.m
SOCO	Standoff Correction Option	HGNS-B	Yes	
SPDR	SP Drift Per Foot	AIT-H	0	mV/ft
TD	Total Measured Depth	Borehole	8912	ft

Tool Control Parameters

Parameter	Description	Tool	Value	Unit
HMCA_BRD_TYPE	HMCA Board Type	HGNS-B	0	
HRGD_BRD_TYPE	HRGD Board Type	HDRS-B	WITHOUT_HET	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	900	ft/h

STSO_HRDD	Temperature Source for the Density Algorithm	HDRS-B	Decaytime algorithm

Calibration Report

AIT-H (Array Induction Tool - H) Calibration - Run 1

Primary Equipment :

Array Induction Sonde - H — AHIS — 0

Auxiliary Equipment :

AITH Rm/SP Bottom Nose — AHRM

AIT Sonde Calibration - Test Loop Gain

Master (EEPROM): 00:19:39 12-May-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Test Loop Gain - 0		Master	1.000	0.950	1.033	1.050
Test Loop Phase - 0	deg	Master	0	-3.000	-2.386	3.000
Test Loop Gain - 1		Master	1.000	0.950	1.015	1.050
Test Loop Phase - 1	deg	Master	0	-3.000	-2.995	3.000
Test Loop Gain - 2		Master	1.000	0.950	1.025	1.050
Test Loop Phase - 2	deg	Master	0	-3.000	-0.471	3.000
Test Loop Gain - 3		Master	1.000	0.950	1.017	1.050
Test Loop Phase - 3	deg	Master	0	-3.000	1.700	3.000
Test Loop Gain - 4		Master	1.000	0.950	1.000	1.050
Test Loop Phase - 4	deg	Master	0	-3.000	1.712	3.000
Test Loop Gain - 5		Master	1.000	0.950	0.988	1.050
Test Loop Phase - 5	deg	Master	0	-3.000	0.302	3.000
Test Loop Gain - 6		Master	1.000	0.950	0.995	1.050
Test Loop Phase - 6	deg	Master	0	-3.000	0.488	3.000
Test Loop Gain - 7		Master	1.000	0.950	0.991	1.050
Test Loop Phase - 7	deg	Master	0	-3.000	-0.138	3.000

AIT Sonde Calibration - Sonde Error Correction

Master (EEPROM): 00:19:39 12-May-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Sonde Error Correction Real - 0	mS/m	Master	-----	-231.000	-103.990	119.000
Sonde Error Correction Quad - 0		Master	-----	-2250.000	-400.437	2250.000
Sonde Error Correction Real - 1	mS/m	Master	-----	114.000	179.469	204.000
Sonde Error Correction Quad - 1		Master	-----	-625.000	-101.430	625.000
Sonde Error Correction Real - 2	mS/m	Master	-----	66.000	105.845	156.000
Sonde Error Correction Quad - 2		Master	-----	-350.000	-125.620	350.000
Sonde Error Correction Real - 3	mS/m	Master	-----	39.000	60.290	89.000
Sonde Error Correction Quad - 3		Master	-----	-250.000	69.692	250.000
Sonde Error Correction Real - 4	mS/m	Master	-----	15.000	25.327	35.000
Sonde Error Correction Quad - 4		Master	-----	-63.000	-41.419	63.000
Sonde Error Correction Real - 5	mS/m	Master	-----	4.000	11.614	24.000
Sonde Error Correction Quad - 5		Master	-----	-50.000	5.348	50.000
Sonde Error Correction Real - 6	mS/m	Master	-----	5.000	8.715	15.000
Sonde Error Correction Quad - 6		Master	-----	-30.000	-7.499	30.000
Sonde Error Correction Real - 7	mS/m	Master	-----	-5.000	-2.017	5.000
Sonde Error Correction Quad - 7		Master	-----	-30.000	-6.156	30.000

AIT Mud Calibration - Mud Calibration Gain

Master (EEPROM): 00:19:39 12-May-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Coarse Gain		Master	1.000	0.800	0.940	1.200
Fine Gain		Master	1.000	0.800	0.928	1.200

AIT Electronics Check - Thru Calibration Check

Master (EEPROM): 00:19:39 12-May-2012 Before (Measured): 20:51:38 31-Jul-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Thru Cal Mag - 0	V	Master	-----	0.363	0.616	0.847
		Before	-----	0.363	0.624	0.847
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.008	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 0	deg	Master	-----	11.000	72.849	131.000
		Before	-----	11.000	72.922	131.000

		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.073	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 1	V	Master	-----	0.762	1.260	1.778
		Before	-----	0.762	1.276	1.778
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.016	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 1	deg	Master	-----	10.000	71.746	130.000
		Before	-----	10.000	71.805	130.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.059	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 2	V	Master	-----	0.374	0.629	0.872
		Before	-----	0.374	0.637	0.872
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.008	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 2	deg	Master	-----	6.000	68.021	126.000
		Before	-----	6.000	68.054	126.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.033	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 3	V	Master	-----	0.422	0.711	0.986
		Before	-----	0.422	0.720	0.986
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.009	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 3	deg	Master	-----	5.000	67.233	125.000
		Before	-----	5.000	67.264	125.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.031	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 4	V	Master	-----	0.802	1.324	1.872
		Before	-----	0.802	1.341	1.872
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.017	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 4	deg	Master	-----	-1.000	60.986	119.000
		Before	-----	-1.000	60.963	119.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.023	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 5	V	Master	-----	1.173	1.929	2.737
		Before	-----	1.173	1.953	2.737
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.024	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 5	deg	Master	-----	-3.000	59.101	117.000
		Before	-----	-3.000	59.042	117.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.059	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 6	V	Master	-----	1.173	1.928	2.737
		Before	-----	1.173	1.952	2.737
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.024	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 6	deg	Master	-----	-3.000	59.114	117.000
		Before	-----	-3.000	59.055	117.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.059	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 7	V	Master	-----	0.849	1.379	1.981
		Before	-----	0.849	1.393	1.981
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.014	-----
		After-Before	-----	-----	-----	-----

Thru Cal Phase - 7	deg	Master	-----	-7.000	55.741	113.000
		Before	-----	-7.000	55.363	113.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.378	-----
		After-Before	-----	-----	-----	-----
SPA Zero	mV	Master		-50.000	0.052	50.000
		Before		-50.000	0.095	50.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.043	-----
		After-Before	-----	-----	-----	-----
SPA Plus	mV	Master		941.000	993.937	1040.000
		Before		941.000	993.050	1040.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.887	-----
		After-Before	-----	-----	-----	-----
Temperature Zero	V	Master		-0.050	0.000	0.050
		Before		-0.050	0.000	0.050
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.000	-----
		After-Before	-----	-----	-----	-----
Temperature Plus	V	Master		0.870	0.921	0.960
		Before		0.870	0.920	0.960
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.001	-----
		After-Before	-----	-----	-----	-----

HDRS-B (HILT Density and Rxo Sonde, 125 degC) Calibration - Run 1

Primary Equipment :

HILT High-Resolution Control Cartridge, 125 degC	HRCC-B	
HILT Resistivity Gamma-Ray Density Device, 125 degC	HRGD-B	1748

Auxiliary Equipment :

HRDD Backscatter Detector	Backscatter	
HRDD Long Spacing Detector	Long Spacing	
HRDD Short Spacing Detector	Short Spacing	
Cesium 137 Gamma-Ray Logging Source	GSR-J	5471
HILT High-Resolution Control Cartridge, 125 degC	HRCC-B	
HILT High-Resolution Mechanical Sonde, 125 degC	HRMS-B	

Calibration Parameter :

Small Ring Size (Caliper Calibration Small Ring)	6.00
Large Ring Size (Caliper Calibration Large Ring)	12.00

HDRS Caliper Calibration - Caliper Accumulations

Before (Measured): 21:09:42 31-Jul-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Small Ring	in	Before	6.00	4.50	7.09	7.50
Large Ring	in	Before	12.00	9.00	13.50	15.00

HDRS Density Calibration - Inversion Results

Master (EEPROM): 16:10:40 12-Jul-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Rho Aluminum	g/cm3	Master	2.596	2.586	2.599	2.606
Rho Magnesium	g/cm3	Master	1.686	1.676	1.686	1.696
Pe Aluminum		Master	2.570	2.470	2.561	2.670
Pe Magnesium		Master	2.650	2.550	2.636	2.750

HDRS Density Calibration - Deviation Summary

Master (EEPROM): 16:10:40 12-Jul-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Average Deviation	%	Master	0	-0.6000	0.4249	0.6000
BS Max Deviation	%	Master	0	-1.6000	0.9113	1.6000
SS Average Deviation	%	Master	0	-1.0000	0.1710	1.0000
SS Max Deviation	%	Master	0	-2.5000	0.7045	2.5000
LS Average Deviation	%	Master	0	-1.5000	0.4102	1.5000

LS Max Deviation	%	Master	0	-3.5000	1.0564	3.5000

HDRS Density Calibration - Background Summary

Master (EEPROM): 16:10:40 12-Jul-2012 Before (Measured): 20:53:02 31-Jul-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Window Ratio		Master	1.0000		0.7304	
		Before	0.7304	0.6939	0.7301	0.7669
		Before-Master	-----	-----	-0.0003	-----
BS Window Sum	1/s	Master	1		9378	
		Before	9378	8909	9359	9847
		Before-Master	-----	-----	-19	-----
SS Window Ratio		Master	1.0000		0.4771	
		Before	0.4771	0.4532	0.4756	0.5009
		Before-Master	-----	-----	-0.0015	-----
SS Window Sum	1/s	Master	1		9280	
		Before	9280	8816	9257	9744
		Before-Master	-----	-----	-23	-----
LS Window Ratio		Master	1.0000		0.2922	
		Before	0.2922	0.2776	0.2888	0.3068
		Before-Master	-----	-----	-0.0034	-----
LS Window Sum	1/s	Master	1		1025	
		Before	1025	973	1016	1076
		Before-Master	-----	-----	-9	-----

HDRS Density Calibration - Photo-multiplier High Voltages

Master (EEPROM): 16:10:40 12-Jul-2012 Before (Measured): 20:53:02 31-Jul-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS PM High Voltage	V	Master		1000	1687	2400
		Before		1000	1688	2400
		Before-Master	-----	-100	1	100
SS PM High Voltage	V	Master		1000	1448	2400
		Before		1000	1454	2400
		Before-Master	-----	-100	6	100
LS PM High Voltage	V	Master		1000	1529	2400
		Before		1000	1528	2400
		Before-Master	-----	-100	-1	100

HDRS Density Calibration - Crystal Quality Resolutions

Master (EEPROM): 16:10:40 12-Jul-2012 Before (Measured): 20:53:02 31-Jul-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Crystal Resolution	%	Master		5.00	11.73	25.00
		Before		5.00	11.74	25.00
		Before-Master	-----	-1.00	0.01	1.00
SS Crystal Resolution	%	Master		5.00	9.92	20.00
		Before		5.00	10.01	20.00
		Before-Master	-----	-1.00	0.09	1.00
LS Crystal Resolution	%	Master		5.00	8.86	20.00
		Before		5.00	9.00	20.00
		Before-Master	-----	-1.00	0.14	1.00

HDRS MCFL Calibration - MCFL Accumulations

Before (Measured): 20:53:31 31-Jul-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Main Resistivity	ohm.m	Before	3875	3565	3869	4185
Deep Resistivity	ohm.m	Before	3830	3524	3804	4136
Shallow Resistivity	ohm.m	Before	3830	3524	3800	4136

HGNS-B (HILT Gamma-Ray and Neutron Sonde, 125 degC) Calibration - Run 1

Primary Equipment :

HILT Gamma-Ray and Neutron Sonde, 125 degC	HGNS-B	

Auxiliary Equipment :

HGNS Accelerometer, 125 degC	HACCZ-B	452
AmBe Neutron Logging Source	NSR-F	2554

Calibration Parameter :

Water Temperature		
Housing Size		
JIG-BKG (Jig minus background reference)	165	

HGNS Accelerometer Calibration - Accelerometer Accumulations

Before:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
AZ Vertical Measurement - 0	ft/s2	Before	-----	-----	-----	-----

HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM): 00:00:00 15-Dec-1996

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Accelerometer Manufacturer		Master			Sunstrand	
Accelerometer Reference Temperature	degF	Master		30.2	68.0	122.0
Accelerometer Coefficients - 0		Master	-----	-----	51.000	-----
Accelerometer Coefficients - 1		Master	-----	-----	11.800	-----
Accelerometer Coefficients - 2		Master	-----	-----	0.011	-----
Accelerometer Coefficients - 3		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 4		Master	-----	-----	2.182	-----
Accelerometer Coefficients - 5		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 6		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 7		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 8		Master	-----	-----	293.400	-----
Accelerometer Coefficients - 9		Master	-----	-----	0.997	-----

HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM): 13:39:40 31-May-2012 Before (Measured): 20:51:23 31-Jul-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Near Zero Measurement	1/s	Master	0	5.0	28.8	40.0
		Before	0	5.0	28.4	40.0
		After	-----	-----	-----	-----
		Before-Master	-----	-4.3	-0.4	4.3
		After-Before	-----	-----	-----	-----
Far Zero Measurement	1/s	Master	0	5.0	30.4	40.0
		Before	0	5.0	31.6	40.0
		After	-----	-----	-----	-----
		Before-Master	-----	-4.6	1.2	4.6
		After-Before	-----	-----	-----	-----
Near Plus Measurement - 0	1/s	Master	6031.0	4700.0	5681.0	6900.0
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
Far Plus Measurement - 0	1/s	Master	2793.0	1900.0	2423.0	2900.0
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
Near Corrected Plus Measurement - 0	1/s	Master		4700.0	5618.0	6900.0
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
Far Corrected Plus Measurement - 0	1/s	Master		1900.0	2366.0	2900.0
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----

HGNS Gamma-Ray Calibration - Gamma-Ray Accumulations

Before (Measured): 20:57:32 31-Jul-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
RGR Zero Measurement	gAPI	Before	30.0	0	78.5	120.0
		After	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
RGR Plus Measurement	gAPI	Before	185.4	157.1	176.2	206.3
		After			NOT DONE	

		After-Before	-----	-----	-----	-----	
GR Calibration Gain		Before	0.89	0.80	0.94	1.05	
		After	-----	-----	-----	-----	
		After-Before	-----	-----	-----	-----	

HNGS-BA (Hostile-environment Natural Gamma-ray Sonde) Calibration - Run 1

Primary Equipment :

HNGS Sonde Element	HNGS-BA	347

Auxiliary Equipment :

Hostile Natural Gamma Ray Cartridge	HNGC-B	605
HNGS Housing Element	HEH-K	347
		0
Housing for the HNGC	HNGH-A	4089

HNGS Background and Na22 Set Point Determination - Detector 1 Check

Master (EEPROM): 23:07:53 16-Jul-2012 Before (Measured): 20:59:40 31-Jul-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Na 511 Peak Location		Master			39.565	
		Before	40.000	37.500	39.720	42.500
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.155	-----
		After-Before	-----	-----	-----	-----
Na 511 Peak Resolution	%	Master			14.403	
		Before	15.500	12.000	15.532	19.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	1.129	-----
		After-Before	-----	-----	-----	-----
High Voltage DAC Value	V	Master			0.000	
		Before	1150.000	850.000	963.461	1600.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	963.461	-----
		After-Before	-----	-----	-----	-----
Na 1785 Peak Location		Master			142.444	
		Before	142.650	135.000	142.289	150.300
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.155	-----
		After-Before	-----	-----	-----	-----
Na 1785 Peak Resolution	%	Master			8.351	
		Before	8.500	7.000	7.915	11.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.436	-----
		After-Before	-----	-----	-----	-----
Temperature	degF	Master	-----	-----	-----	-----
		Before	59.900	-20.002	114.401	140.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
Na Count Rate	CPS	Master	45.000	10.000	42.745	100.000
		Before	45.000	10.000	43.524	100.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.779	-----
		After-Before	-----	-----	-----	-----

HNGS Background and Na22 Set Point Determination - Detector 2 Check

Master (EEPROM): 23:07:53 16-Jul-2012 Before (Measured): 20:59:40 31-Jul-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Na 511 Peak Location		Master			39.707	
		Before	40.000	37.500	39.627	42.500
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.080	-----
		After-Before	-----	-----	-----	-----
Na 511 Peak Resolution	%	Master			15.736	
		Before	15.500	12.000	16.984	19.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	1.248	-----

		After-Before	-----	-----	-----	-----	
High Voltage DAC Value	V	Master			0.000		
		Before	1150.000	850.000	1020.215	1600.000	
		After	-----	-----	-----	-----	
		Before-Master	-----	-----	1020.215	-----	
		After-Before	-----	-----	-----	-----	
Na 1785 Peak Location		Master			142.447		
		Before	142.650	135.000	142.736	150.300	
		After	-----	-----	-----	-----	
		Before-Master	-----	-----	0.289	-----	
		After-Before	-----	-----	-----	-----	
Na 1785 Peak Resolution	%	Master			8.632		
		Before	8.500	7.000	9.602	11.000	
		After	-----	-----	-----	-----	
		Before-Master	-----	-----	0.970	-----	
		After-Before	-----	-----	-----	-----	
Temperature	degF	Master	-----	-----	-----	-----	
		Before	59.900	-20.002	114.558	140.000	
		After	-----	-----	-----	-----	
		Before-Master	-----	-----	-----	-----	
		After-Before	-----	-----	-----	-----	
Na Count Rate	CPS	Master	45.000	10.000	42.671	100.000	
		Before	45.000	10.000	43.605	100.000	
		After	-----	-----	-----	-----	
		Before-Master	-----	-----	0.934	-----	
		After-Before	-----	-----	-----	-----	

HNGS Background and Na22 Set Point Determination - Ratio of Detector 1 to Detector 2

Master (EEPROM): 23:07:53 16-Jul-2012 Before (Measured): 20:59:40 31-Jul-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Coincidence Count Rate Ratio		Master			0.000	
		Before	1.000	0.950	0.999	1.050
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.999	-----
		After-Before	-----	-----	-----	-----

HNGS Background and Na22 Set Point Determination - Detector 1 Calibration

Master (EEPROM): 23:07:53 16-Jul-2012 Before (Measured): 20:59:40 31-Jul-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Th Peak Location - 0		Master	209.630	201.000	207.865	218.250
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
Th Peak Resolution - 0	%	Master	7.000	5.000	6.840	9.000
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
Background Count Rate	CPS	Master			0.000	
		Before	142.500	10.000	216.812	265.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	216.812	-----
		After-Before	-----	-----	-----	-----
Gain Ratio - 0		Master	1.000	0.940	0.999	1.060
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----

HNGS Background and Na22 Set Point Determination - Detector 2 Calibration

Master (EEPROM): 23:07:53 16-Jul-2012 Before (Measured): 20:59:40 31-Jul-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Th Peak Location - 0		Master	209.630	201.000	211.143	218.250
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
Th Peak Resolution - 0	%	Master	7.000	5.000	7.890	9.000

		Before	-----	-----	-----	-----	
		After	-----	-----	-----	-----	
		Before-Master	-----	-----	-----	-----	
		After-Before	-----	-----	-----	-----	
Background Count Rate	CPS	Master			0.000		
		Before	142.500	10.000	208.687	265.000	
		After	-----	-----	-----	-----	
		Before-Master	-----	-----	208.687	-----	
		After-Before	-----	-----	-----	-----	
Gain Ratio - 0		Master	1.000	0.940	1.012	1.060	
		Before	-----	-----	-----	-----	
		After	-----	-----	-----	-----	
		Before-Master	-----	-----	-----	-----	
		After-Before	-----	-----	-----	-----	

HNGS Background and Na22 Set Point Determination - Detector 1 Calibration

Master (EEPROM): 23:07:53 16-Jul-2012 Before (Measured): 20:59:40 31-Jul-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Na 511 Peak Set Point - 0		Master	40.000	38.000	41.000	43.500
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----

HNGS Background and Na22 Set Point Determination - Detector 2 Calibration

Master (EEPROM): 23:07:53 16-Jul-2012 Before (Measured): 20:59:40 31-Jul-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Na 511 Peak Set Point - 0		Master	40.000	38.000	41.000	43.500
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----

ADT-C (Dielectric Scanner) Calibration - Run 1

Primary Equipment :

ADT Pad Element	ADP-C

Calibration Parameter :

Small Ring Size (Caliper Calibration Small Ring)	8.00
Large Ring Size (Caliper Calibration Large Ring)	12.00

ADT Caliper Calibration - Caliper Accumulations

Before (Measured): 20:56:56 31-Jul-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Small Ring RCAL	in	Before	8.00	4.00	8.15	12.00
Large Ring RCAL	in	Before	12.00	6.00	12.32	18.00

Company: Noble Energy Inc

Schlumberger

Well: Longs AC 02-15

Field: Wattenberg

County: Weld

State: Colorado

Platform Express

Triple Combo