Schlumberger

Company: FIDELITY EXPLORATION & PRODUCTION COMPANY

Well: EDAM 15-22H

Field: WILDCAT

County: RICHLAND State: MONTANA

County: RICHLAND
Field: WILDCAT
Location: NENW
Well: EDAM 15-22H
Company: FIDELITY EXPLORATION & PRODUCTION CO

PLATFORM EXPRESS

COMPENSATED NEUTRON LOG

THREE DETECTOR DENSITY

Location:			
NENW 250.3' FNL & 1348.5' FWL	Elev.	K.B.	2330.70 ft
		G.L.	2305.70 ft
		D.F.	2330.70 ft

Permanent Datum:	Ground Level	Elev.:	2305.70 f
Log Measured From:	Kelly Bushing	25.00 ft	above Perm.Datum
Drilling Measured From:	Kelly Bushing		

API Serial No.	Section:	Township:	Range:
25-083-22920	15	21 N	57 E

Logging Date		09-May-2012			
Run Number		1			
Depth Driller		1734.00 ft			
Schlumberger Depth		10405.00 ft			
Bottom Log Interval		10405.00 ft			
Top Log Interval		8299.00 ft			
Casing Driller Size @ Depth		9.625 in @ 1734.00 ft			
Casing Schlumberger		1734 ft			
Bit Size		8.75 in			
Type Fluid In Hole		Oil			
MUD Density	Viscosity	9.55 lbm/gal	68 s		
MUD Fluid Loss	PH				
MUD Source of Sample		N/A			
RM @ Meas Temp		N/A			
RMF @ Meas Temp		N/A			
RMC @ Meas Temp		N/A			
Source RMF	RMC	N/A	N/A		
RM @ BHT	RMF @ BHT	N/A	N/A		
Max Recorded Temperatures		210 degF			
Circulation Stopped	Time	09-May-2012	04:00:00		
Logger on Bottom	Time	09-May-2012	20:53:53		
Unit Number	Location:	2105	WILLISTON		
Recorded By		Sneh Williams			
Witnessed By		John Merkel			

Disclaimer

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

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Remarks and Equipment Summary

1: Toolstring

Equip name	Length
LEH-QT:2600 LEH-QT:2600	**117.4**
EDTC-B:8102 EDTH-B:8102 EDTG-A EDTC-B:8102	**114.48**
PPC-B[2]:8194 PPC-B:8194	**107.98**
MAST-B:8432 ECH-SF:8055 MAPC-BA:8055 MAMS-BA:8432 MASS-BA:8079 MAXS-BA:8355	**101.47**

MP name	Offset
CTEM	**110.98**
ACCZ	**0.00**
HV	**0.00**
Gamma Ray	**109.11**
TelStatus	**107.98**
PPC-B Calipers	**106.84**
MAMS	**86.07**

1: Remarks

THANK YOU FOR CHOOSING SCHLUMBERGER

ALL LOGS RECORDED IN CENTRAL STANDARD TIME

SCHLUMBERGER CREW: MATT FERNANDEZ, MILES GERVAIS

TOOLSTRING RUN AS PER TOOLSKETCH

PPC USED FOR CENTRALIZATION OF THE SONIC SCANNER

CME-Z'S USED TO HELP CENTRALIZE THE SONIC SCANNER

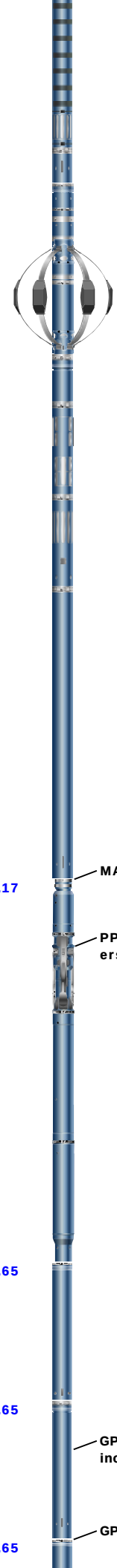
NON-MAGNETIC HOUSING PLACED ABOVE AND BELOW THE GPIT

2 KNUCKLE JOINTS PLACED ABOVE THE NEUTRON TOOL TO DECOUPLE THE NEUTRON

HOLE SIZE AND STAND-OFF CORRECTION APPLIED TO THE NEUTRON TOOL

CEMENT AND HOLE VOLUME CALCULATED ASSUMING A FUTURE CASING DIAMETER OF 7 INCHES

STANDOFFS PLACED ON THE SONDE OF THE RESISTIVITY TOOL


MAXS 60.17
PPC-B[1]:8046 60.17
PPC-B:8046
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Adaptor_Head [2]:1973 53.65
GPIT-F:1707 49.65
GPIH-B:2865
DHRU-F
GPIC-F:1707
GPIT-F Inclinometer 48.23
GPIT 0.00
Adaptor_Head [1]:1775 45.65

AH-107[2]:711 41.65

AH-107[1]:925 39.65

HGNS-H:4985 37.65
HGNH:4838
NSR-F:1653
NPV-N
HMCA-H
HACCZ-H:8100
HGNS-H:4985

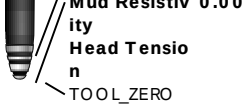
- **Temperature** 37.62
- **GR** 36.91
- **CNL Porosity** 30.57
- **HGNS** 28.24
- **HMCA** 28.24
- **Accelerometer** 0.00

HDRS-H:4849 28.24
ECH-MEB:2798
HRCC-H:3768
HRMS-H:4849
GPV-Q
Backscatter:41211
Long Spacing:43162
Short Spacing:42231
HRGD-H:4957
GSR-J:5088

- **HRCC** 24.24
- **MCFL** 18.81
- **Caliper** 18.33
- **TLD Density** 17.94

AIT-M:155 16.00
AMIS:155
AMRM:155

- **Temperature** 7.91
- **Power Supply** 7.91
- **Induction** 7.91
- **SP** 0.08



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		
Log Sequence	FIRST RUN IN HOLE		
Stretch Correction (ft)	7.29		
Tool Zero Reference Check at Surface (ft)	0.34		
Depth Remark Parameters	**1**		
Depth Remark 1	ALL PROCEDURES FOLLOWED AS PER SCHLUMBERGER DEPTH CONTROL POLICY		
Depth Remark 2	IDW USED AS PRIMARY DEPTH CONTROL DEVICE.		
Depth Remark 3	Z-CHART USED AS SECONDARY DEPTH CONTROL		
Depth Measuring Device	**1**		
Type	IDW-B		
Serial Number	6067		
Calibration Date	01-JAN-2012		
Calibration Cable Type	7-46 P-XS		
Wheel Correction 1	-6		
Wheel Correction 2	-6		
Tension Device	**1**		
Type	CMTD-B/A		
Serial Number	1194		
Calibration Date	20-APR-2012		
Calibrator Serial Number	1148		
Calibration Points	10		
Calibration RMS	10		
Calibration Peak Error	16		
Logging Cable	**1**		
Type	7-46P-XS		
Logging Cable Length (ft)	14300.00		

1

Main Pass 2"/100'

Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
IHV	Integrated Hole Volume	GCSE_UP_PASS	867.72	ft3
ICV	Integrated Cement Volume	GCSE_UP_PASS, FCD	290.84	ft3

Software Version

Acquisition System	Version
MaxWell	3.0.9609.0
Application Patch	EXP_APL-SEC-3.0.9609.1645
	EXP_APL-ADT-3.0.9609.1558
	SP-20120409-3.0.9609.1919

EXP_APL-OPElevation-3.0.9609.1966

Computation	Description	Version
Borehole	Borehole Ensemble provides common Borehole Parameters and Channels	3.0.9609.1919

Tool Elements	Description	Software Version	Firmware Version
HRCC-H	HILT High-Resolution Control Cartridge, 150 degC	3.0.9609.0	2.0
HGNS-H	HILT Gamma-Ray and Neutron Sonde, 150 degC	3.0.9609.1919	2.0
HRGD-H	HILT Resistivity Gamma-Ray Density Device, 150 degC	3.0.9609.0	3.0

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Depth Shift	Include Parallel Data
1	Log[4]:Up	Up	2040.57 ft	10418.51 ft	09-May-2012 11:00:32 PM	10-May-2012 4:16:09 AM	0.00 ft	true

All depths are referenced to toolstring zero

Log

1: Log[4]:Up 36FE58E5-62F1-4B2A-8BDD-9C025FD81621

Description: Density count rates for Platform Express Format: Log (PEX Densit_2inch) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 10-May-2012 09:40:05

Channel	Source	Sampling
CALI	HDRS-H:HRCC-H:HRCC-H	1in
GR	HGNS-H:HGNS-H:HGNS-H	2in
HDRA	HDRS-H:HRMS-H:HRGD-H	2in
ICV	Borehole	6in
IHV	Borehole	6in
PEFZ	HDRS-H:HRMS-H:HRGD-H	2in
RHOZ	HDRS-H:HRMS-H:HRGD-H	2in
TENS	WLWorkflow	1in
TIME_1900	WLWorkflow	0.1in

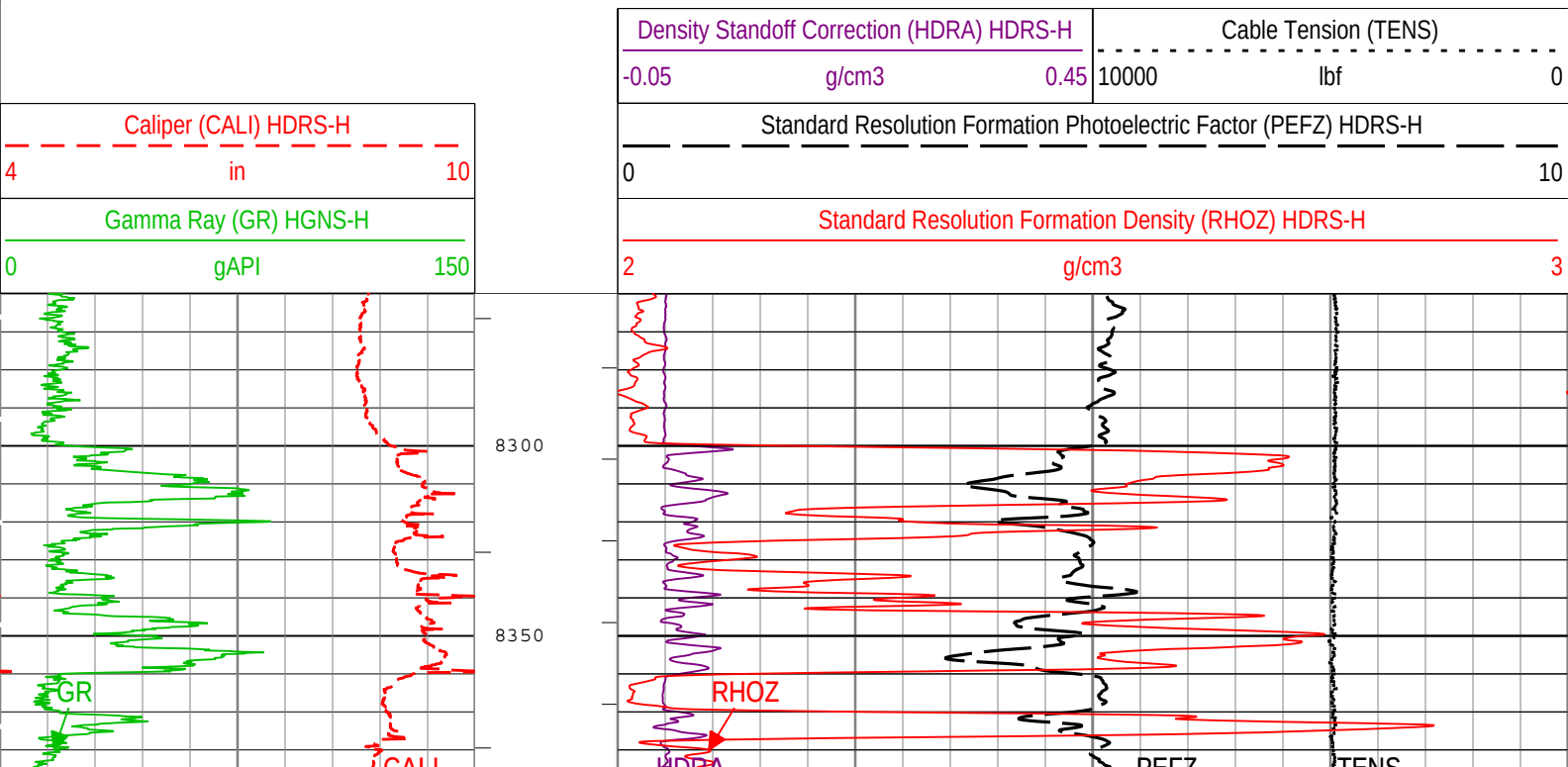
IHV - Integrated Hole Volume every 10.00 (ft3)

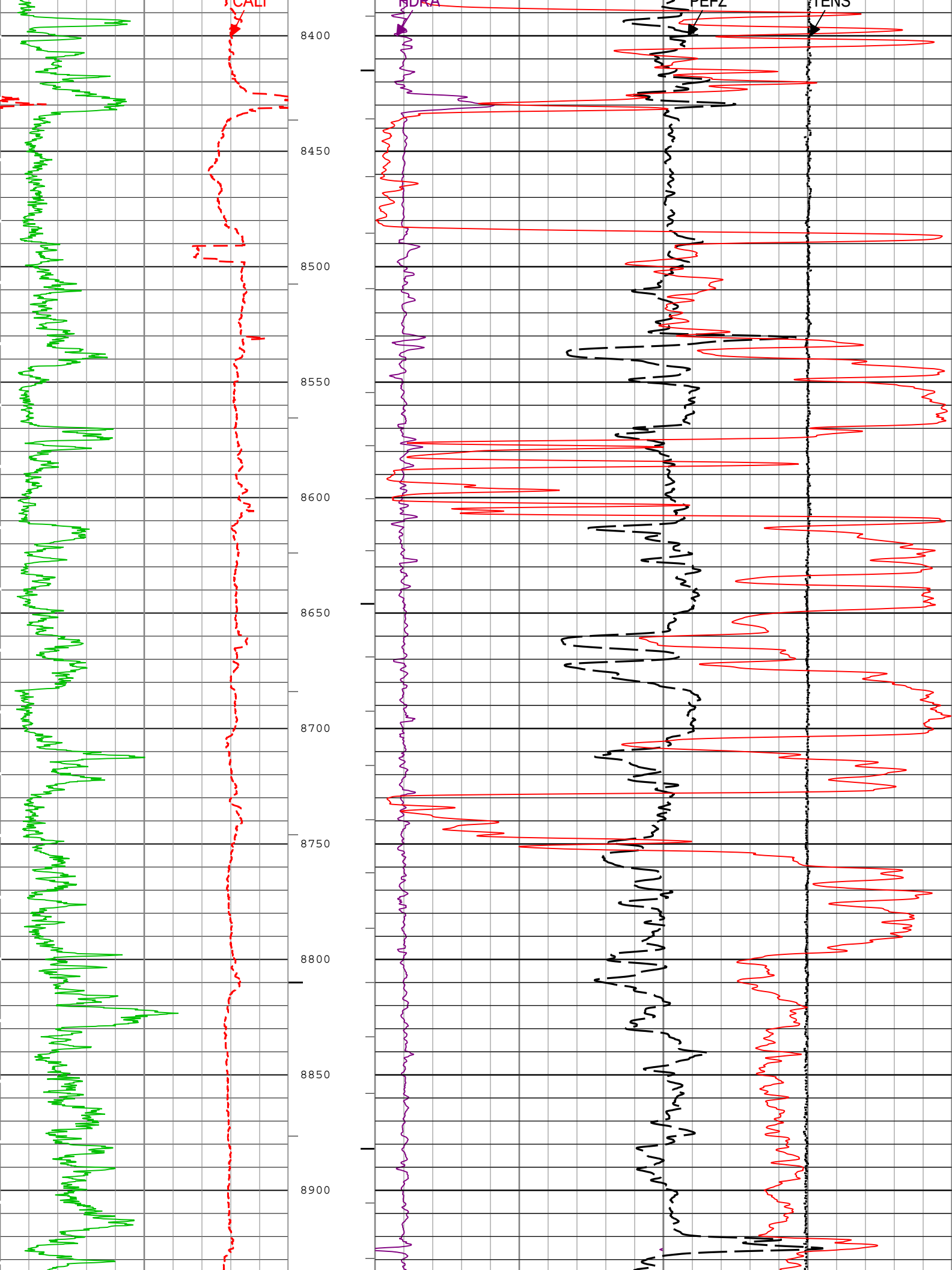
ICV - Integrated Cement Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

IHV - Integrated Hole Volume every 100.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

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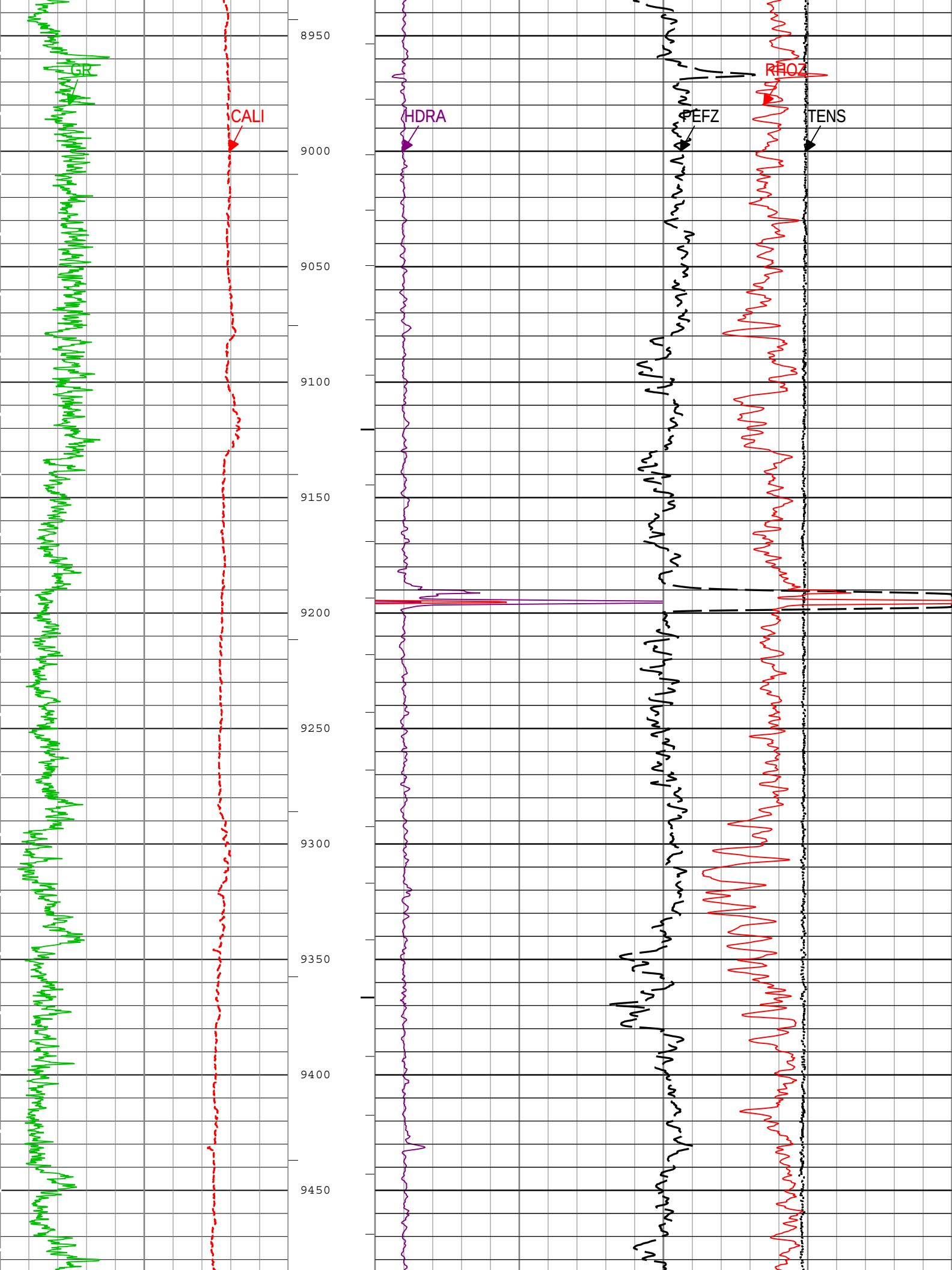
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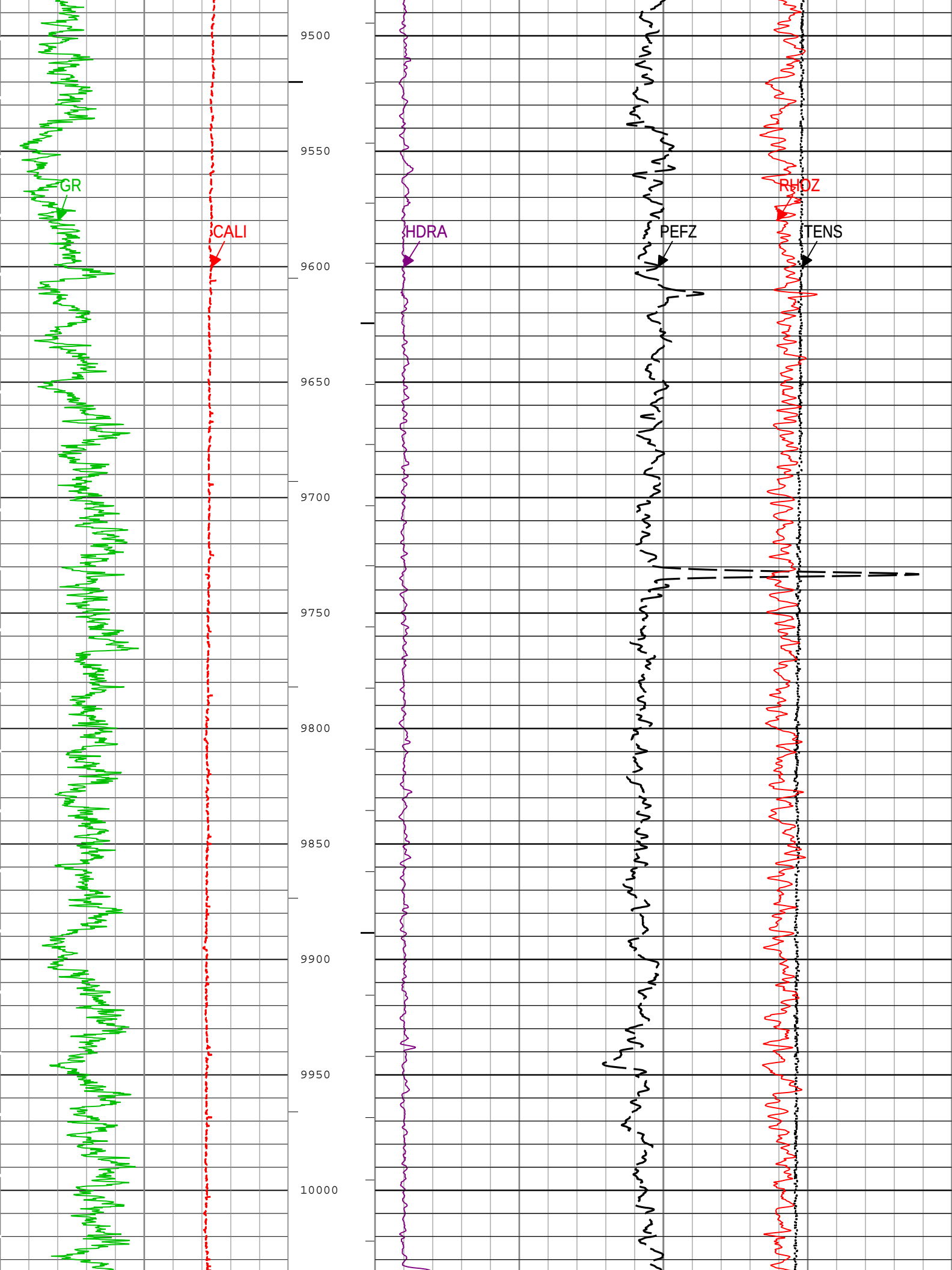
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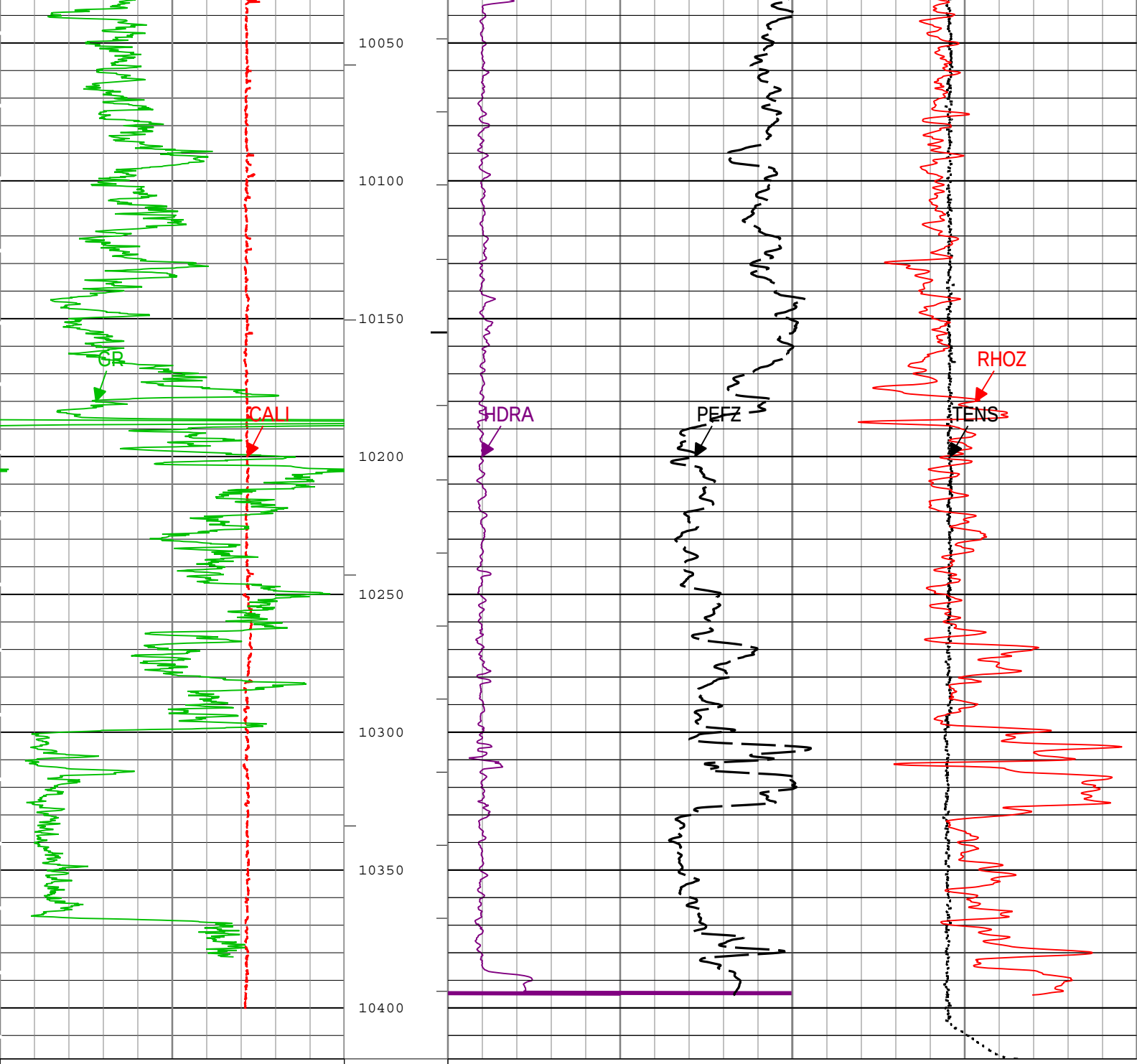


TIME_1900 - Time Marked every 60.00 (s)

IHV - Integrated Hole Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

IHV - Integrated Hole Volume every 10.00 (ft3)

Description: Density count rates for Platform Express Format: Log (PEX Densit_2inch) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 10-May-2012 09:40:05

Channel Processing Parameters

Channel Processing Parameters

Parameter	Description	ToolPath	Value	Unit
BARI	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	COMPLETION	8.75	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H:HRCC-H:HRCC-H	0	in
CBLO	Casing Bottom (Logger)	COMPLETION	1734	ft
CDEN	Cement Density	HGNS-H:HGNS-H:HGNS-H	2	g/cm3
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	9.55	lbm/gal
DFT	Drilling Fluid Type	Borehole	Oil	
DHC	Density Hole Correction	HDRS-H:HRMS-H:HRGD-H	Bit Size	
FCD	Future Casing (Outer) Diameter	COMPLETION	7	in
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	
NPRM	HRDD Nuclear Processing Mode	HDRS-H:HRMS-H:HRGD-H	High Resolution	
SOCO	Standoff Correction Option	HGNS-H:HGNS-H:HGNS-H	Yes	

Tool Control Parameters

Parameter	Description	ToolPath	Value	Unit
HRGD_BRD_TYPE	HRGD Board Type	HDRS-H:HRMS-H:HRGD-H	WITH_HET	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed		1800	ft/h

1

Main Pass 5"/100'

Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
IHV	Integrated Hole Volume	GCSE_UP_PASS	867.72	ft3
ICV	Integrated Cement Volume	GCSE_UP_PASS, FCD	290.84	ft3

Software Version

Acquisition System	Version
MaxWell	3.0.9609.0
Application Patch	EXP_APL-SEC-3.0.9609.1645
	EXP_APL-ADT-3.0.9609.1558
	SP-20120409-3.0.9609.1919
	EXP_APL-OPElevation-3.0.9609.1966

Computation	Description	Version
Borehole	Borehole Ensemble provides common Borehole Parameters and Channels	3.0.9609.1919
HENVIR	Computation Ensemble for the HGNS Neutron environmental corrections	3.0.9609.0
PEQL	Platform Express Quicklook	3.0.9609.0

Tool Elements	Description	Software Version	Firmware Version
HRCC-H	HILT High-Resolution Control Cartridge, 150 degC	3.0.9609.0	2.0
HRGD-H	HILT Resistivity Gamma-Ray Density Device, 150 degC	3.0.9609.0	3.0
HGNS-H	HILT Gamma-Ray and Neutron Sonde, 150 degC	3.0.9609.1919	2.0

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Depth Shift	Include Parallel Data
1	Log[4]:Up	Up	2040.57 ft	10418.51 ft	09-May-2012 11:00:32 PM	10-May-2012 4:16:09 AM	0.00 ft	true

All depths are referenced to toolstring zero

Description: Density count rates for Platform Express Format: Log (PEX porosity_5inch) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 10-May-2012 09:40:09

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
HDRA	HDRS-H:HRMS-H:HRGD-H	2in
ICV	Borehole	6in
IHV	Borehole	6in
NPOR	HGNS-H:HGNS-H:HGNS-H	6in
PEFZ	HDRS-H:HRMS-H:HRGD-H	2in
PXND	PEQL	6in
TENS	WLWorkflow	1in
TIME_1900	WLWorkflow	0.1in

IHV - Integrated Hole Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

ICV - Integrated Cement Volume every 100.00 (ft3)

IHV - Integrated Hole Volume every 100.00 (ft3)

Density Standoff Correction (HDRA) HDRS-H
-0.05 g/cm3 0.45

Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H
0 10

Cable Tension (TENS)
10000 lbf 0

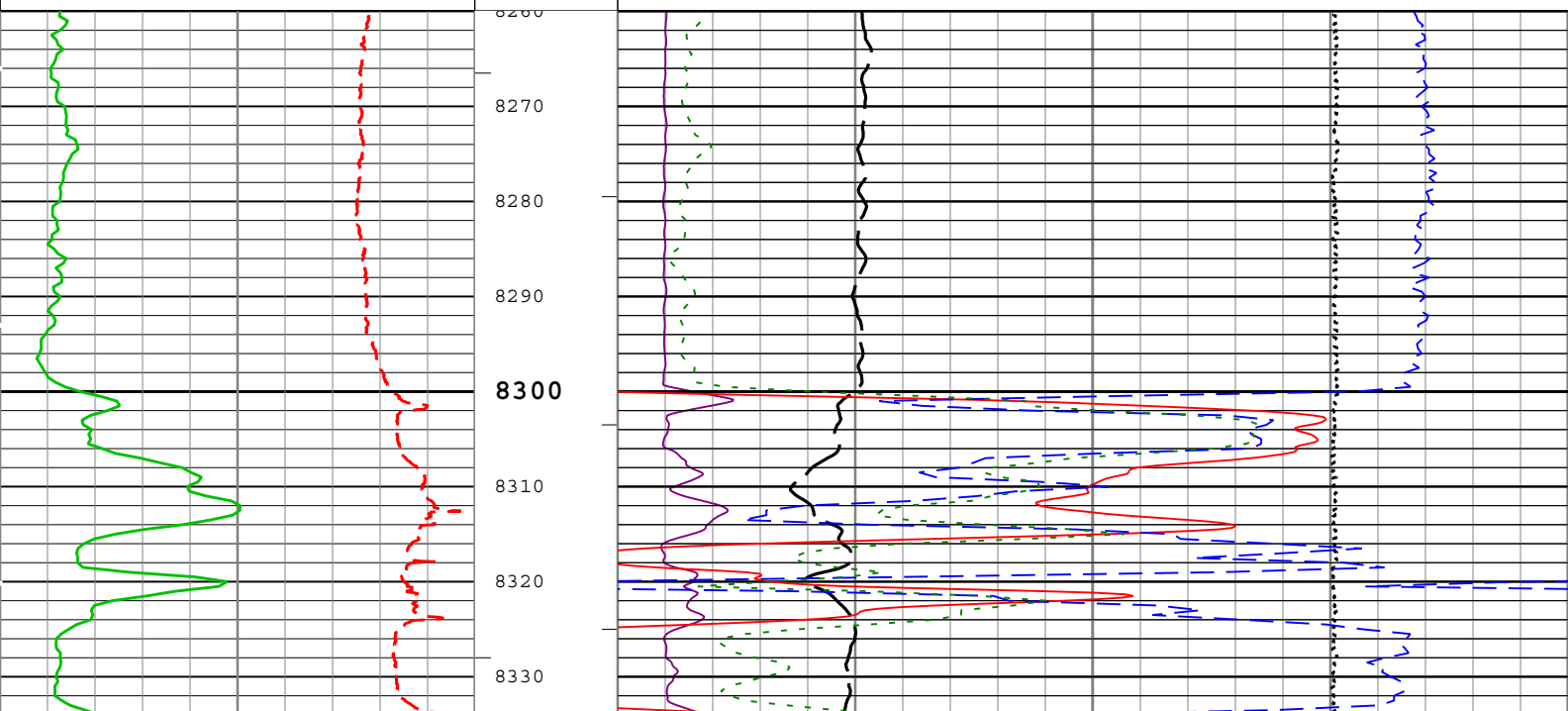
Standard Resolution Density Porosity (DPHZ) HDRS-H
0.3 ft3/ft3 -0.1

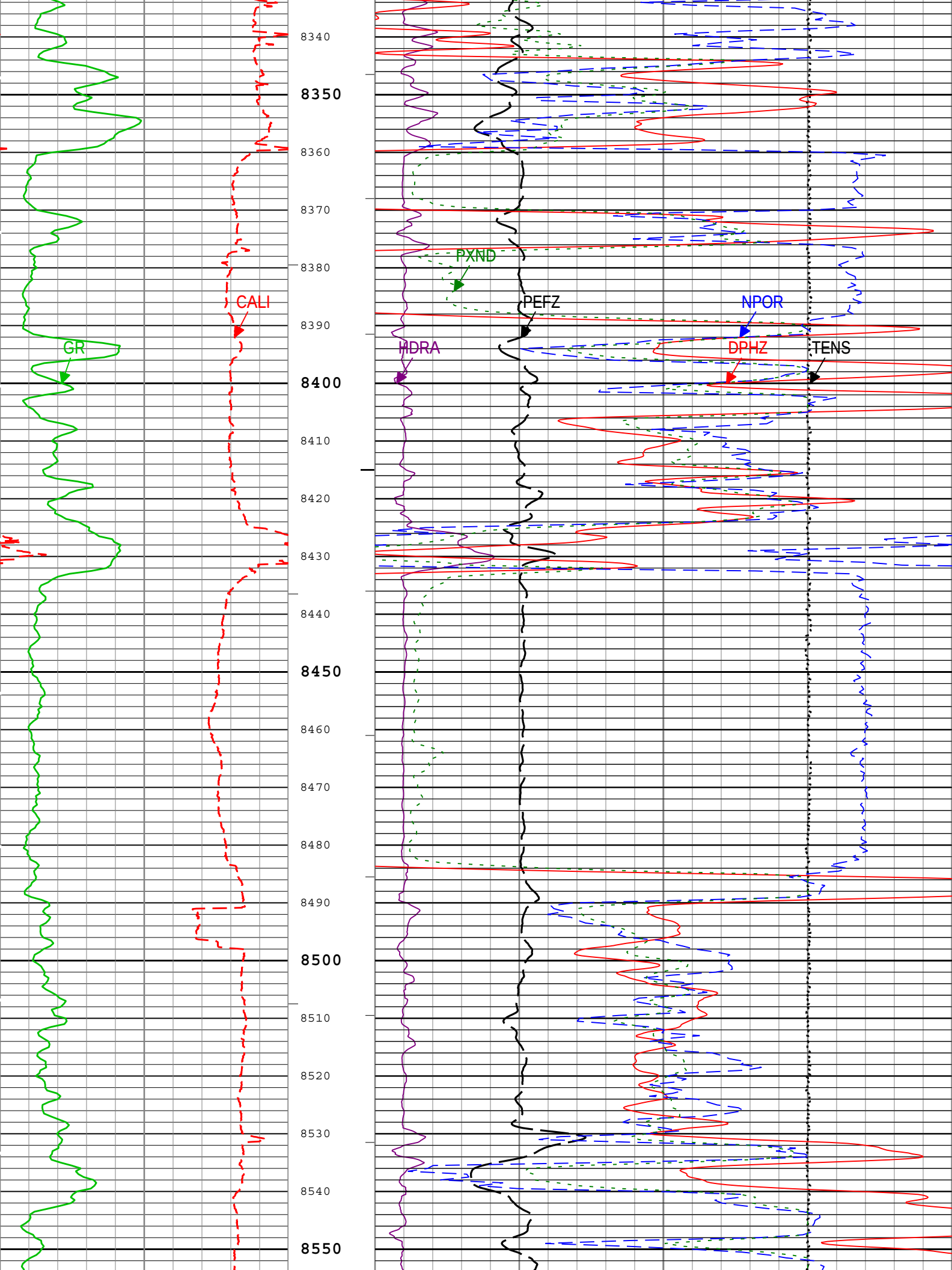
Gamma Ray (GR) HGNS-H
0 gAPI 150

Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H
0.3 ft3/ft3 -0.1

Caliper (CALI) HDRS-H
4 in 10

Crossplot Porosity for Neutron-Density (PXND)
0.3 ft3/ft3 -0.1

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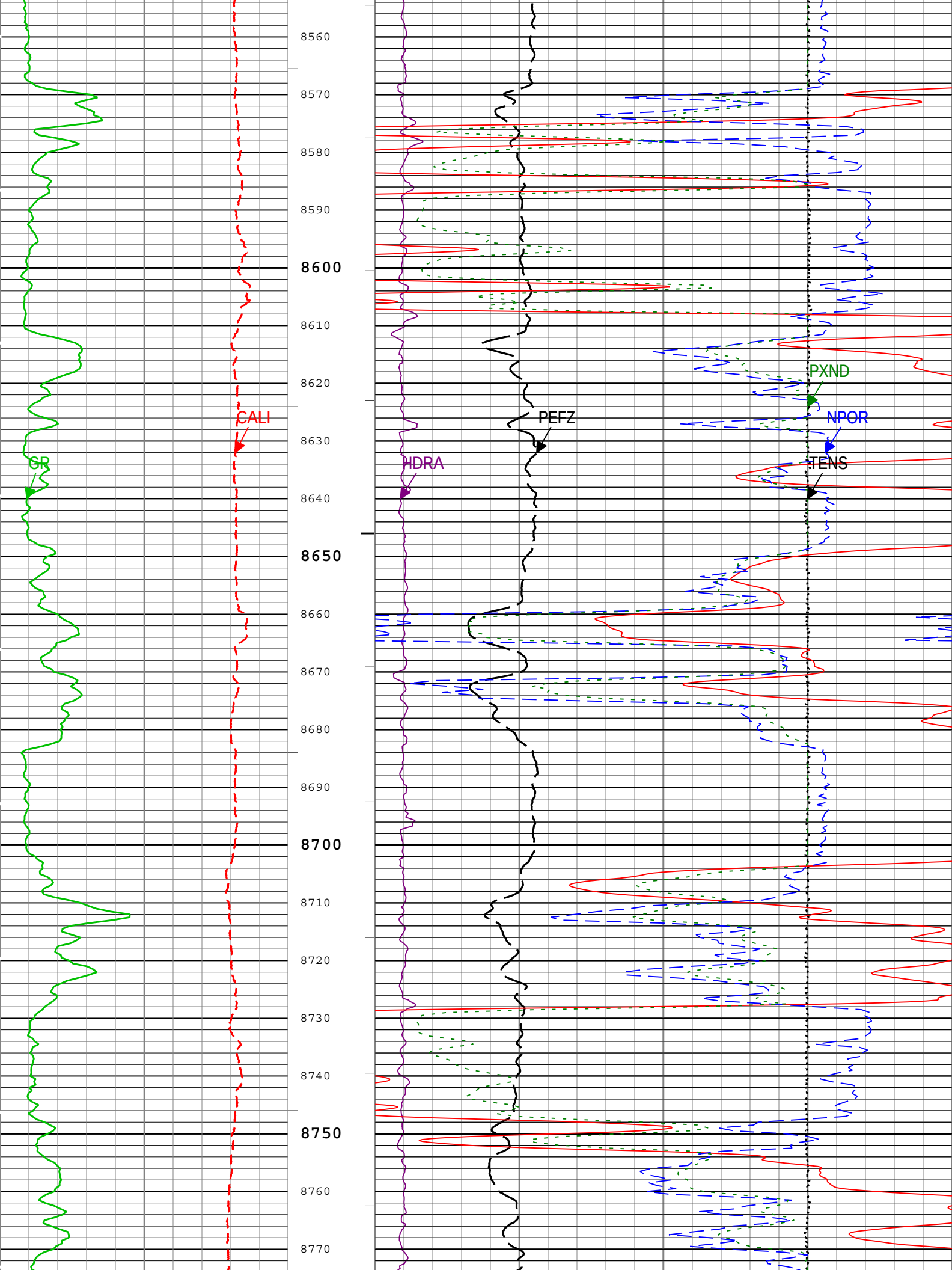
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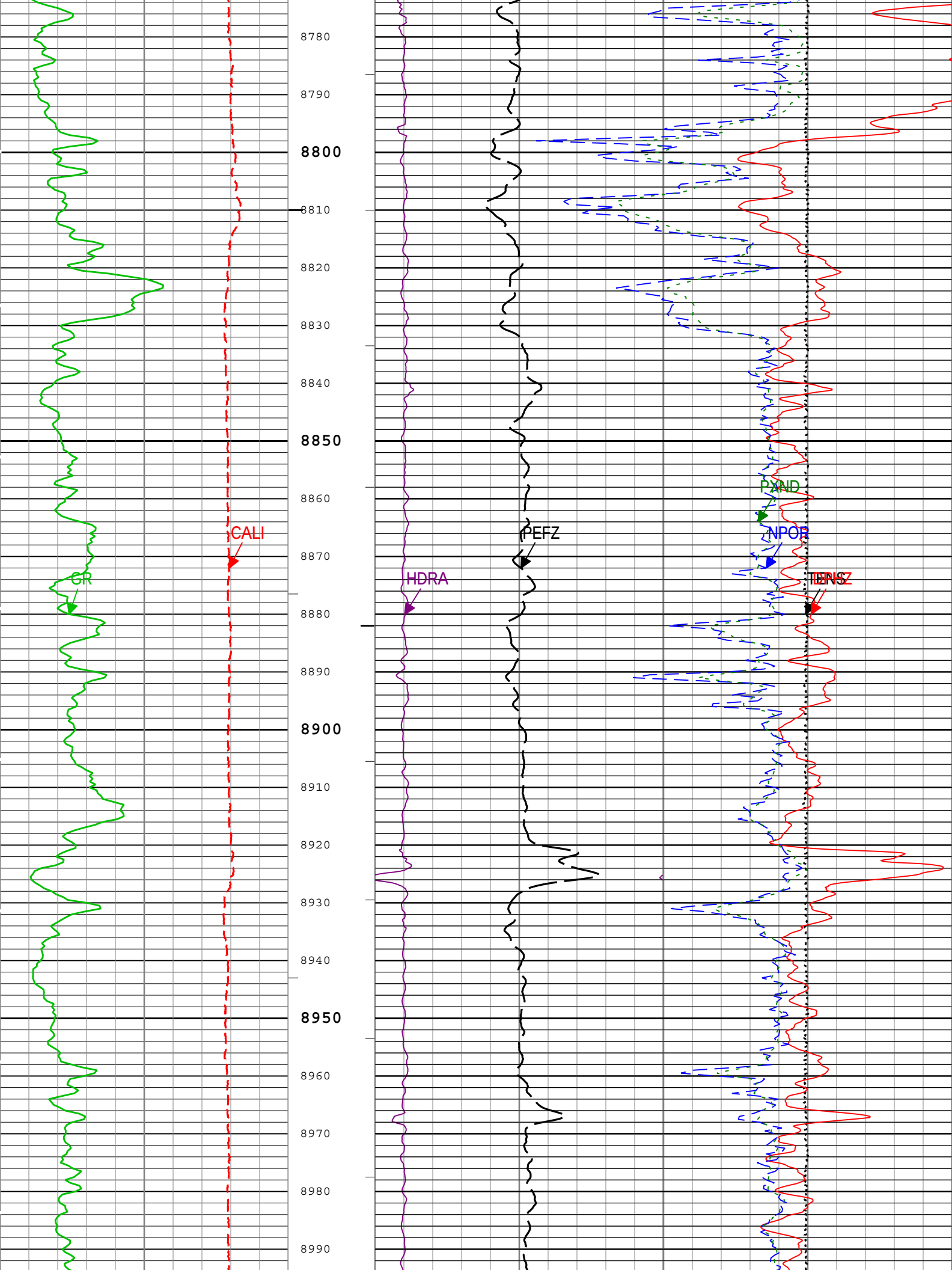
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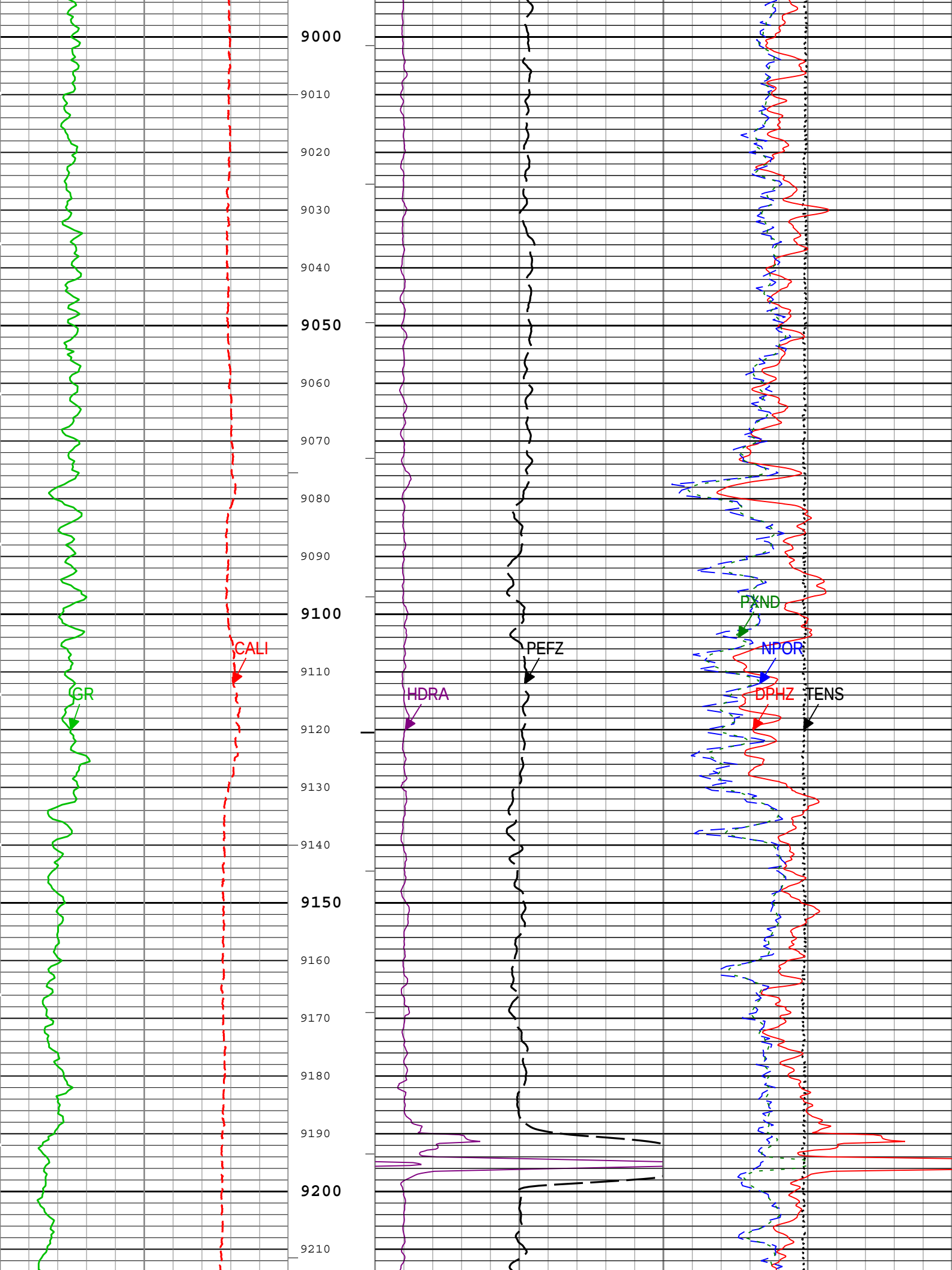
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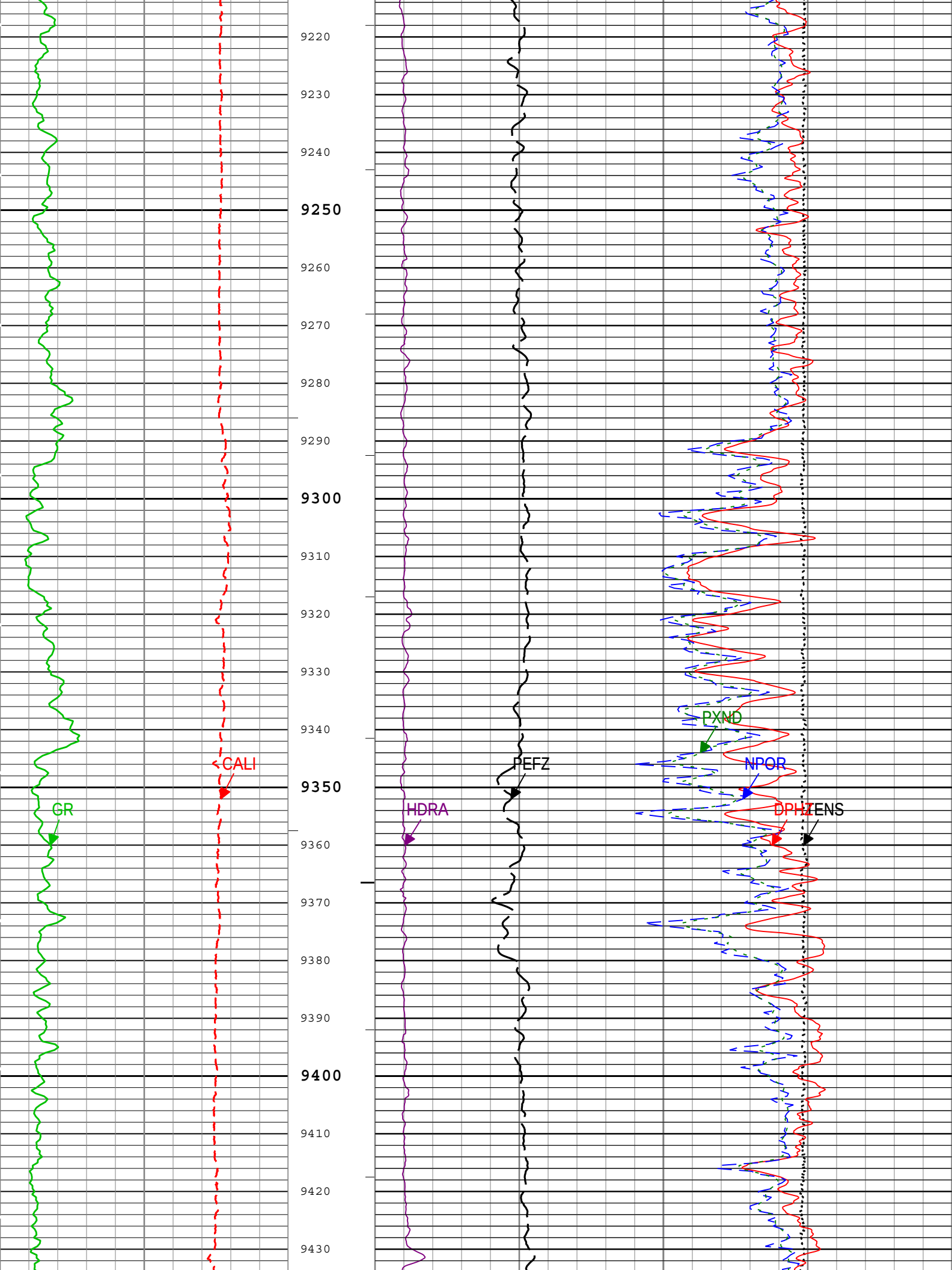
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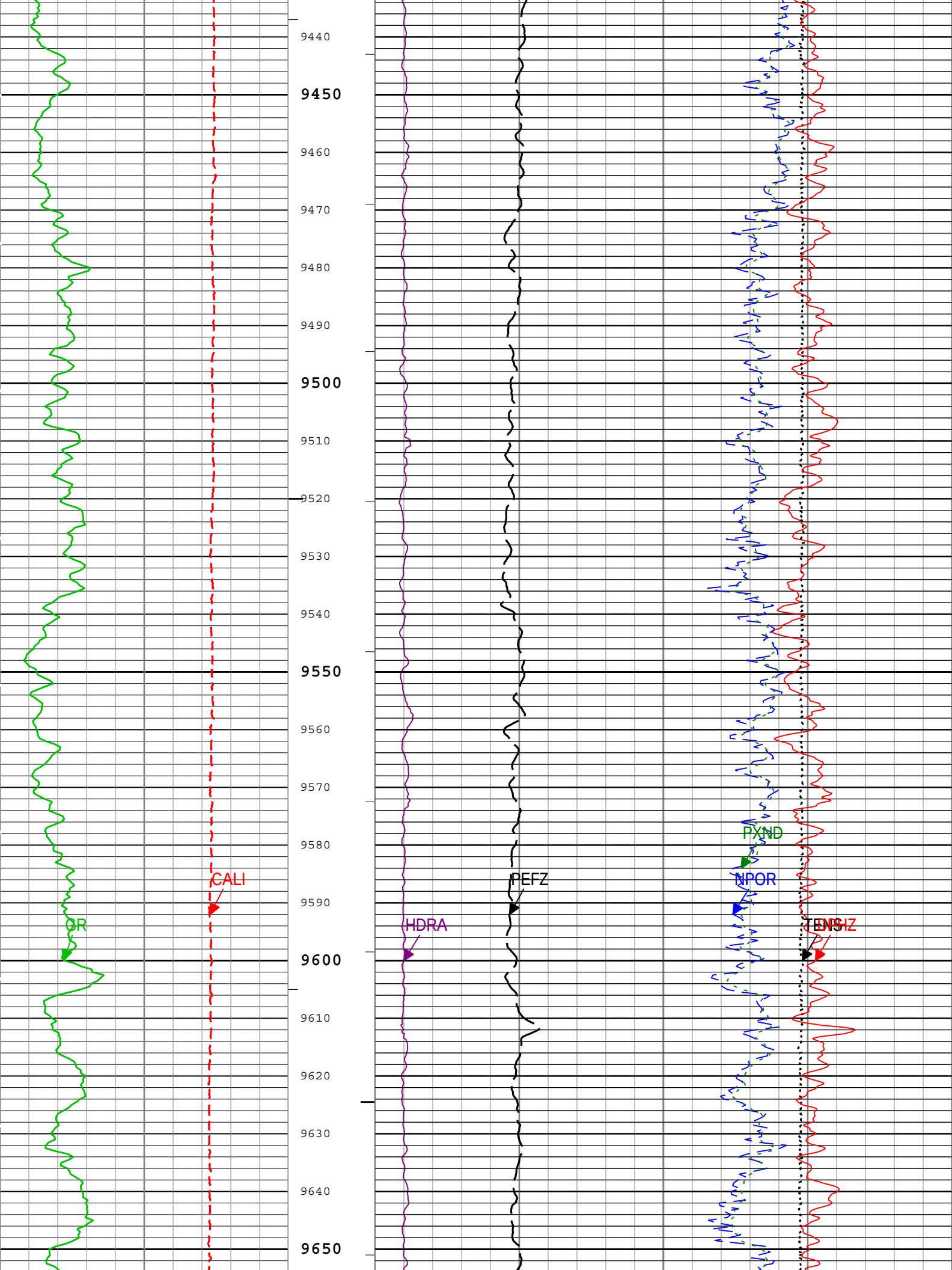
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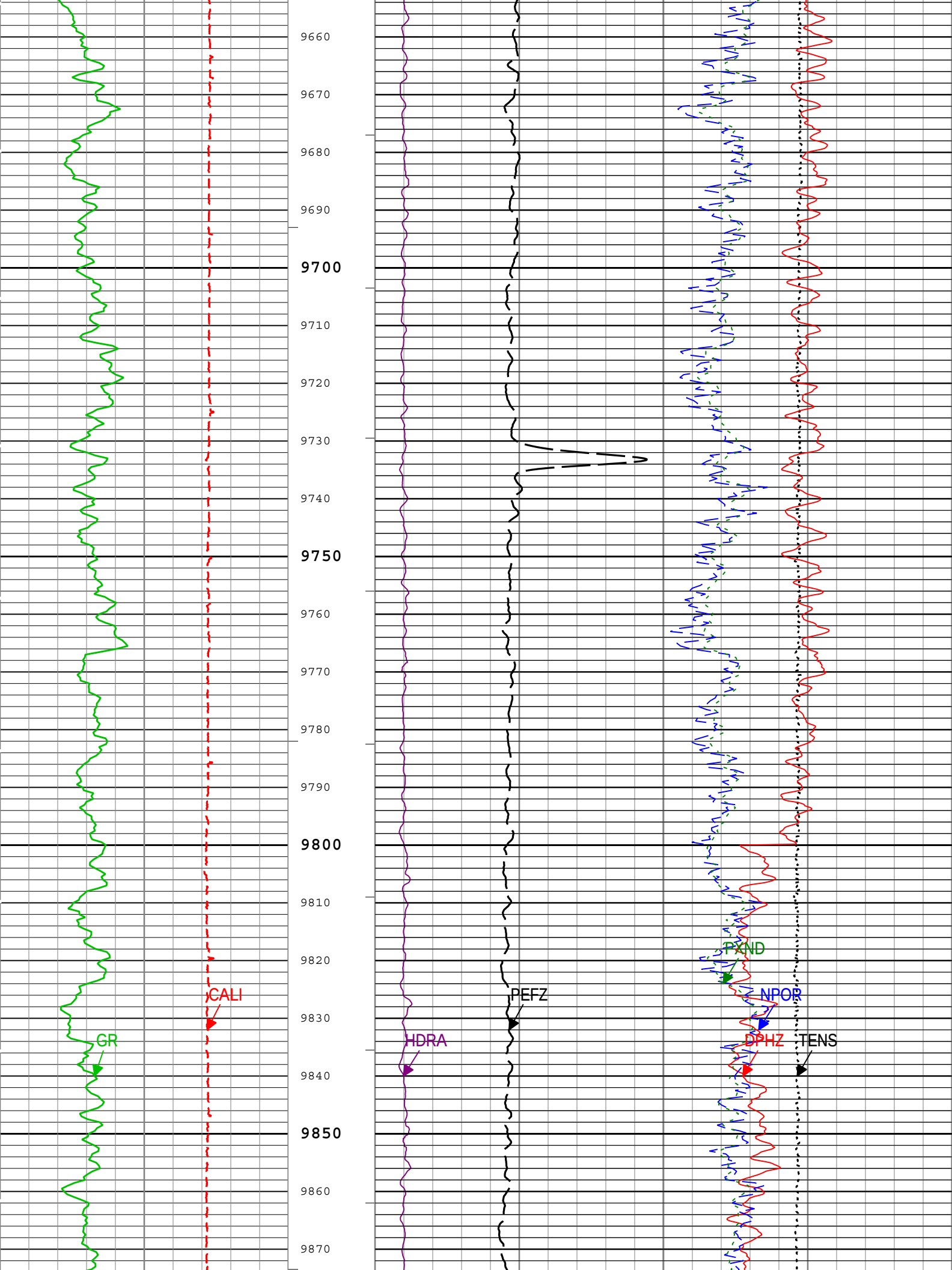
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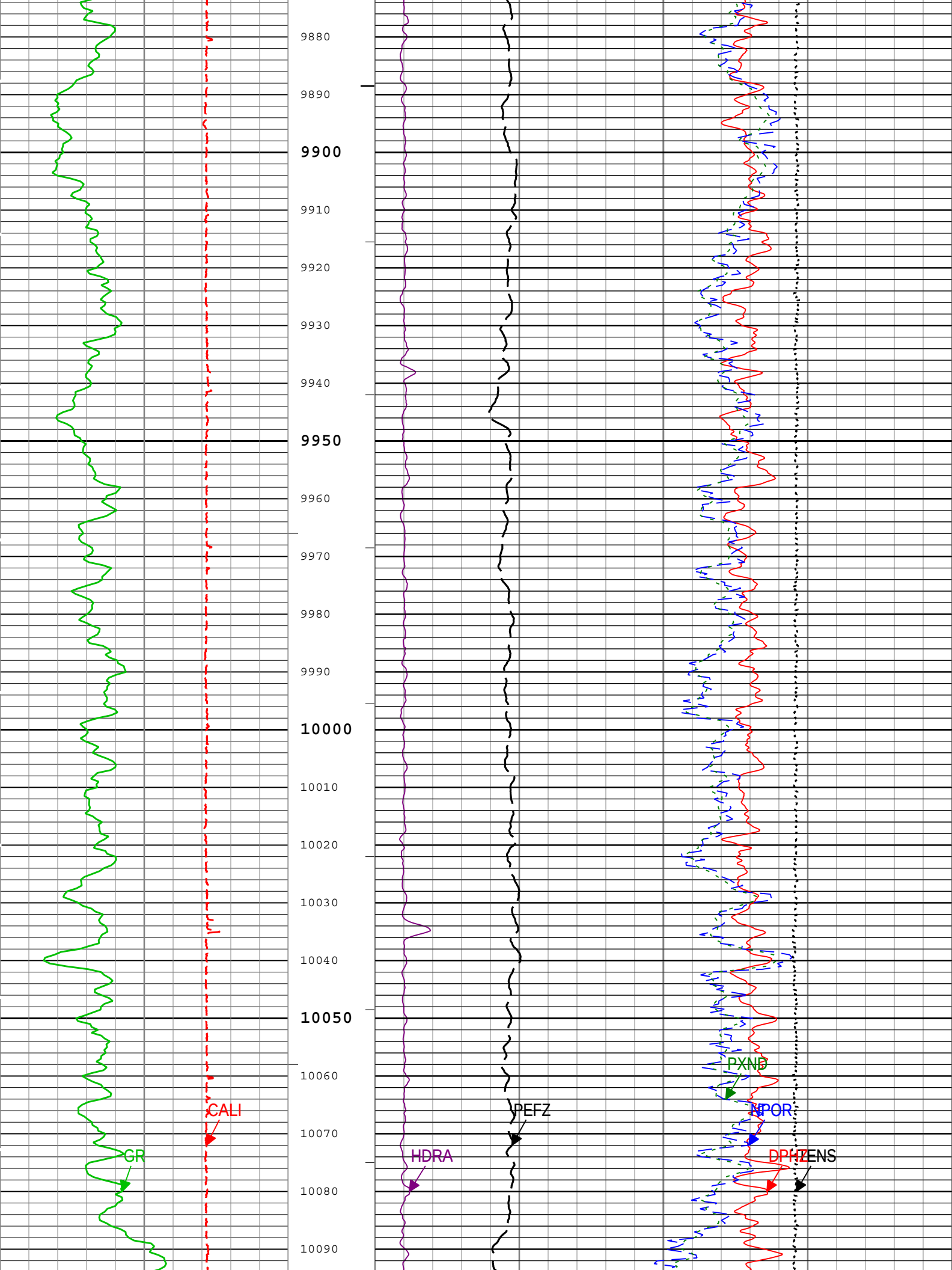
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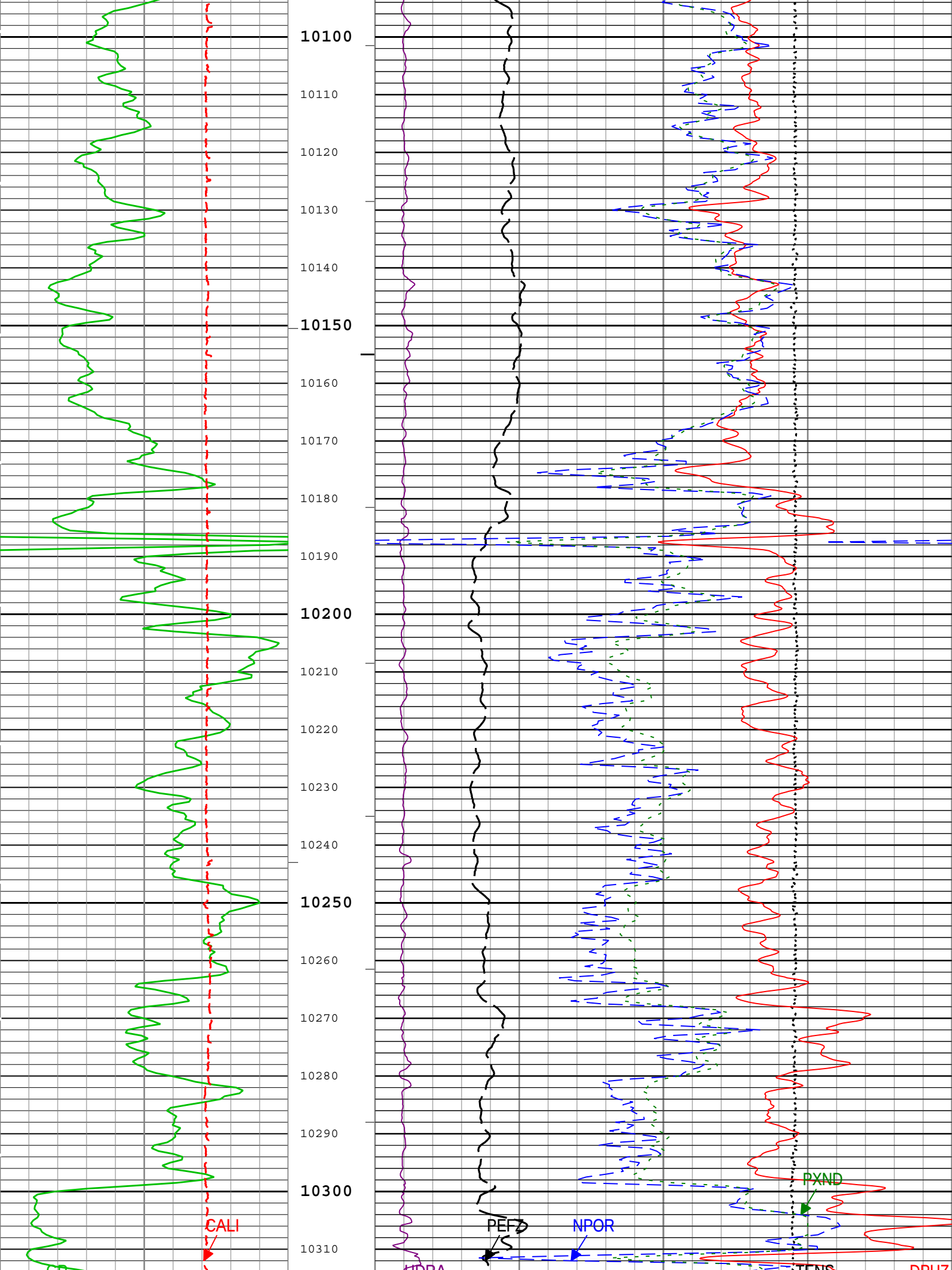
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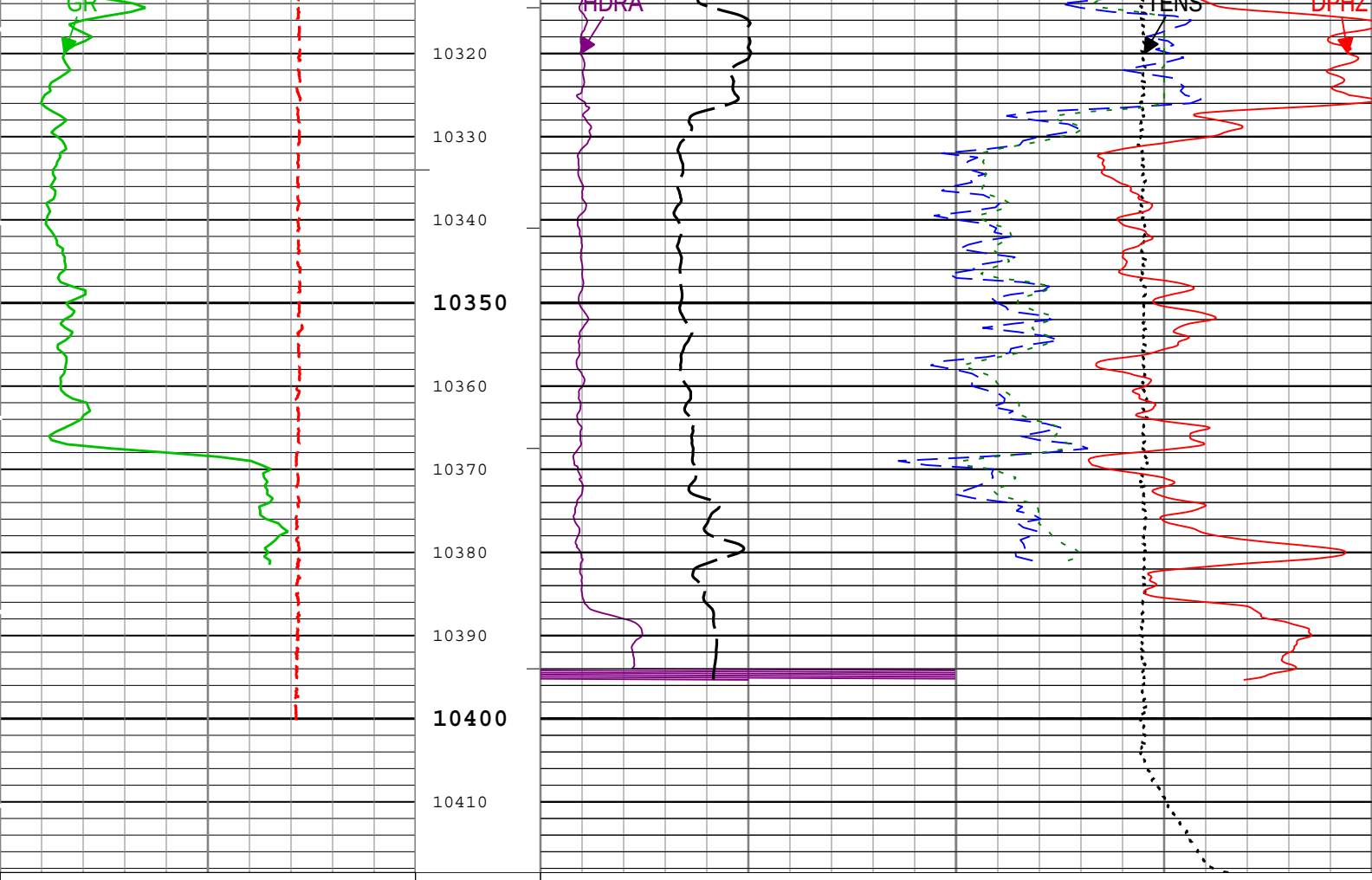
DRHZ



Gamma Ray (GR) HGNS-H
0 gAPI 150

Caliper (CALI) HDRS-H
4 in 10

Standard Resolution Density Porosity (DPHZ) HDRS-H
0.3 ft3/ft3 -0.1

Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H
0.3 ft3/ft3 -0.1

Crossplot Porosity for Neutron-Density (PXND)
0.3 ft3/ft3 -0.1

Density Standoff Correction (HDRA) HDRS-H
-0.05 g/cm3 0.45

Cable Tension (TENS)
10000 lbf 0

Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H
0 10

IHV - Integrated Hole Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

ICV - Integrated Cement Volume every 10.00 (ft3)

IHV - Integrated Hole Volume every 10.00 (ft3)

Description: Density count rates for Platform Express Format: Log (PEX porosity_5inch) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 10-May-2012 09:40:09

Channel Processing Parameters

Parameter	Description	ToolPath	Value	Unit
BARI	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	COMPLETION	8.75	in
BSAL	Borehole Salinity	Borehole	45000	ppm

CALI_SHIFT	CALI Supplementary Offset	HDRS-H:HRCC-H:HRCC-H	0	in
CBLO	Casing Bottom (Logger)	COMPLETION	1734	ft
CDEN	Cement Density	HGNS-H:HGNS-H:HGNS-H	2	g/cm3
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	9.55	lbm/gal
DFT	Drilling Fluid Type	Borehole	Oil	
DHC	Density Hole Correction	HDRS-H:HRMS-H:HRGD-H	Bit Size	
FCD	Future Casing (Outer) Diameter	COMPLETION	7	in
FD	Fluid Density	Borehole	1	g/cm3
FSAL	Formation Salinity	Borehole	6126.75	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	REMS	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	CTEM	
HSCO	Hole Size Correction Option	HGNS-H:HGNS-H:HGNS-H	Yes	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	Depth Zoned	
MDEN	Matrix Density for Density Porosity	Borehole	Depth Zoned	g/cm3
NPRM	HRDD Nuclear Processing Mode	HDRS-H:HRMS-H:HRGD-H	High Resolution	
SOCO	Standoff Correction Option	HGNS-H:HGNS-H:HGNS-H	Yes	

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
MATR	LIMESTONE	8260	9800
MATR	DOLOMITE	9800	10418.5
MDEN	2.71	8260	9800
MDEN	2.78	9800	10418.5

All depth are actual.

Tool Control Parameters

Parameter	Description	ToolPath	Value	Unit
HMCA_BRD_TYPE	HMCA Board Type	HGNS-H:HGNS-H:HMCA-H	1	
HRGD_BRD_TYPE	HRGD Board Type	HDRS-H:HRMS-H:HRGD-H	WITH_HET	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed		1800	ft/h

1

Main Pass 12"/100'

Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
IHV	Integrated Hole Volume	GCSE_UP_PASS	124.31	ft3
ICV	Integrated Cement Volume	GCSE_UP_PASS, FCD	36.52	ft3

Software Version

Acquisition System	Version
MaxWell	3.0.9609.0
Application Patch	EXP_APL-SEC-3.0.9609.1645
	EXP_APL-ADT-3.0.9609.1558
	SP-20120409-3.0.9609.1919
	EXP_APL-OPElevation-3.0.9609.1966

Computation	Description	Version
Borehole	Borehole Ensemble provides common Borehole Parameters and Channels	3.0.9609.1919

HENVIR	Computation Ensemble for the HGNS Neutron environmental corrections	3.0.9609.0
PEQL	Platform Express Quicklook	3.0.9609.0

Tool Elements	Description	Software Version	Firmware Version
HRCC-H	HILT High-Resolution Control Cartridge, 150 degC	3.0.9609.0	2.0
HRGD-H	HILT Resistivity Gamma-Ray Density Device, 150 degC	3.0.9609.0	3.0
HGNS-H	HILT Gamma-Ray and Neutron Sonde, 150 degC	3.0.9609.1919	2.0

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Depth Shift	Include Parallel Data
1	Log[4]:Up	Up	2040.57 ft	10418.51 ft	09-May-2012 11:00:32 PM	10-May-2012 4:16:09 AM	0.00 ft	true

All depths are referenced to toolstring zero

Log

1: Log[4]:Up 36FE58E5-62F1-4B2A-8BDD-9C025FD81621

Description: Density count rates for Platform Express Format: Log (PEX porosity_5inch) Index Scale: 12 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 10-May-2012 09:40:13

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
HDRA	HDRS-H:HRMS-H:HRGD-H	2in
ICV	Borehole	6in
IHV	Borehole	6in
NPOR	HGNS-H:HGNS-H:HGNS-H	6in
PEFZ	HDRS-H:HRMS-H:HRGD-H	2in
PXND	PEQL	6in
TENS	WLWorkflow	1in
TIME_1900	WLWorkflow	0.1in

TIME_1900 - Time Marked every 60.00 (s)

IHV - Integrated Hole Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

IHV - Integrated Hole Volume every 100.00 (ft3)

Density Standoff Correction (HDRA) HDRS-H
-0.05 g/cm3 0.45

Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H
0 10

Cable Tension (TENS)
10000 lbf 0

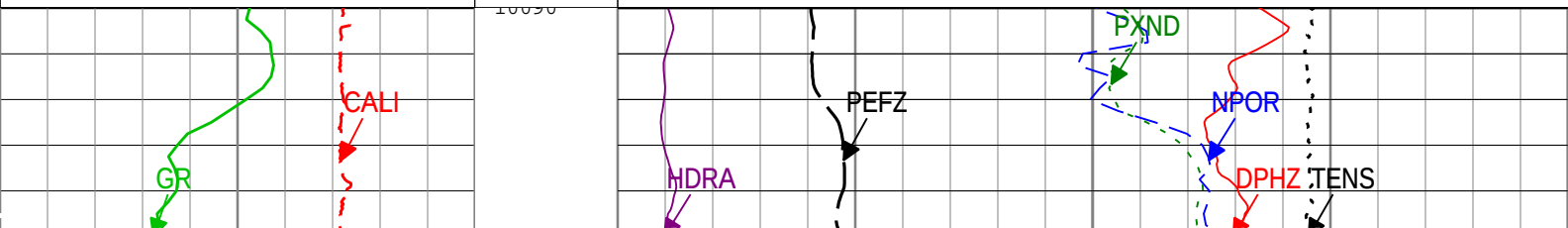
Standard Resolution Density Porosity (DPHZ) HDRS-H
0.3 ft3/ft3 -0.1

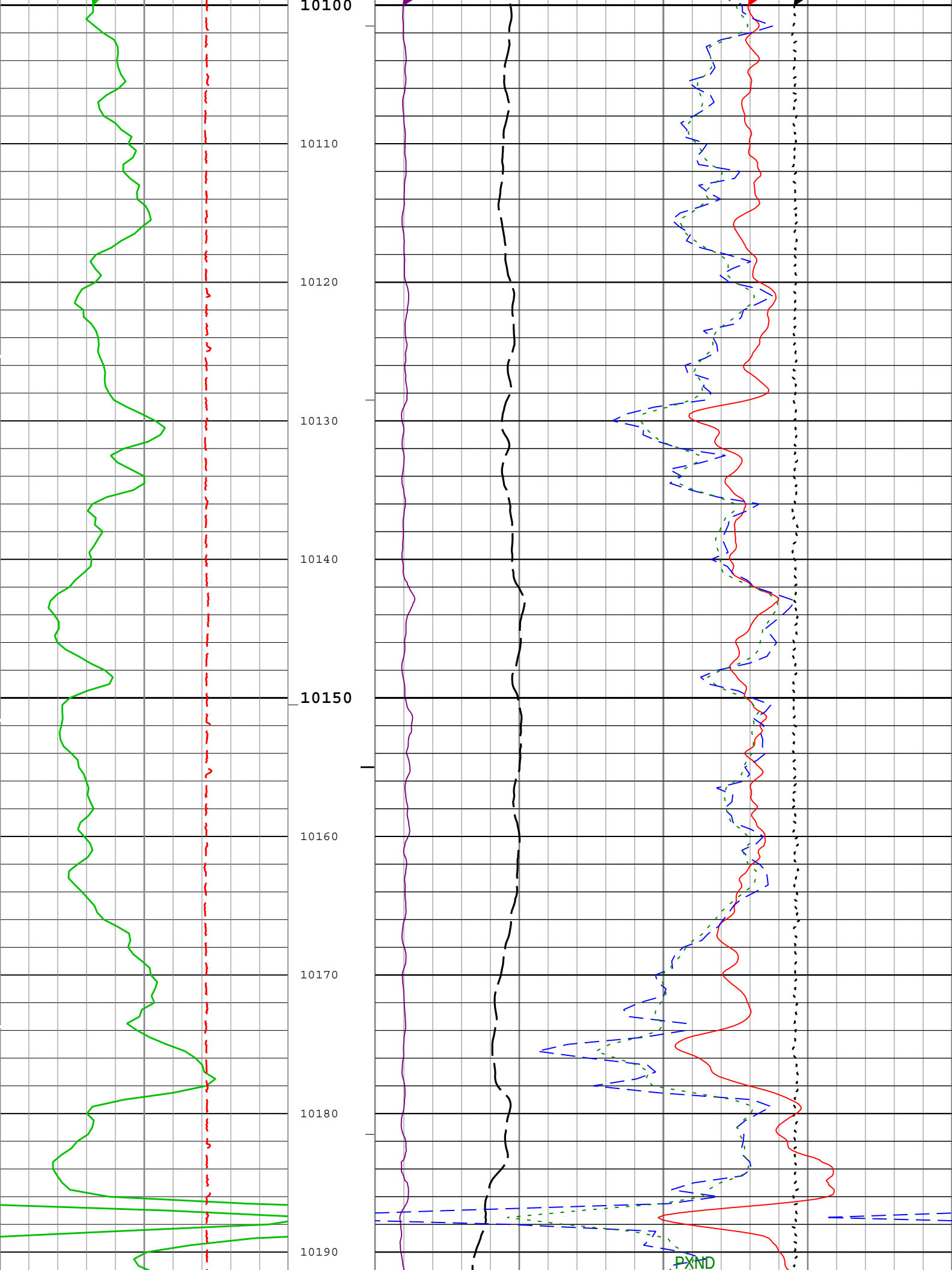
Gamma Ray (GR) HGNS-H
0 gAPI 150

Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H
0.3 ft3/ft3 -0.1

Caliper (CALI) HDRS-H
4 in 10

Crossplot Porosity for Neutron-Density (PXND)
0.3 ft3/ft3 -0.1

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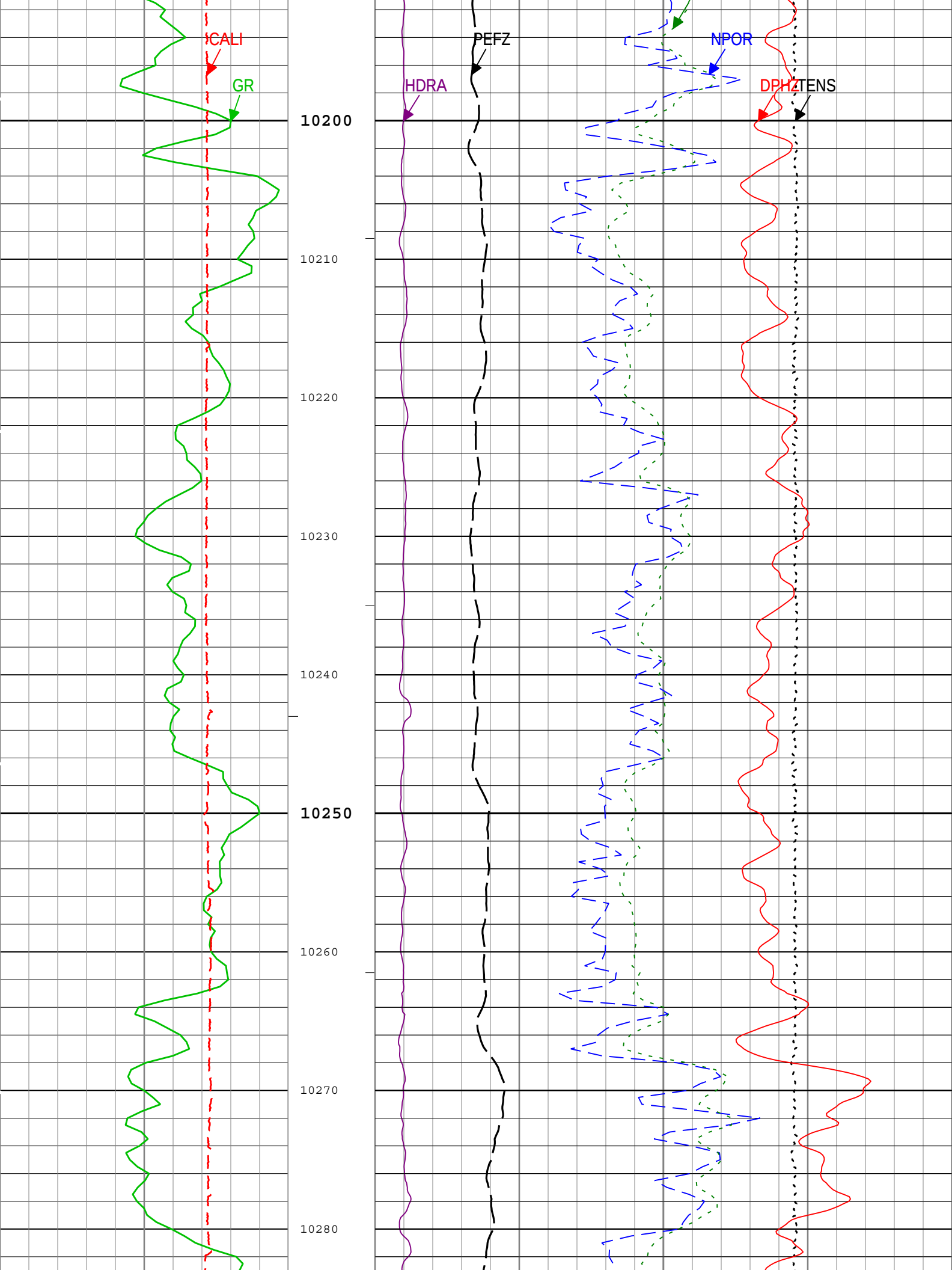
PXND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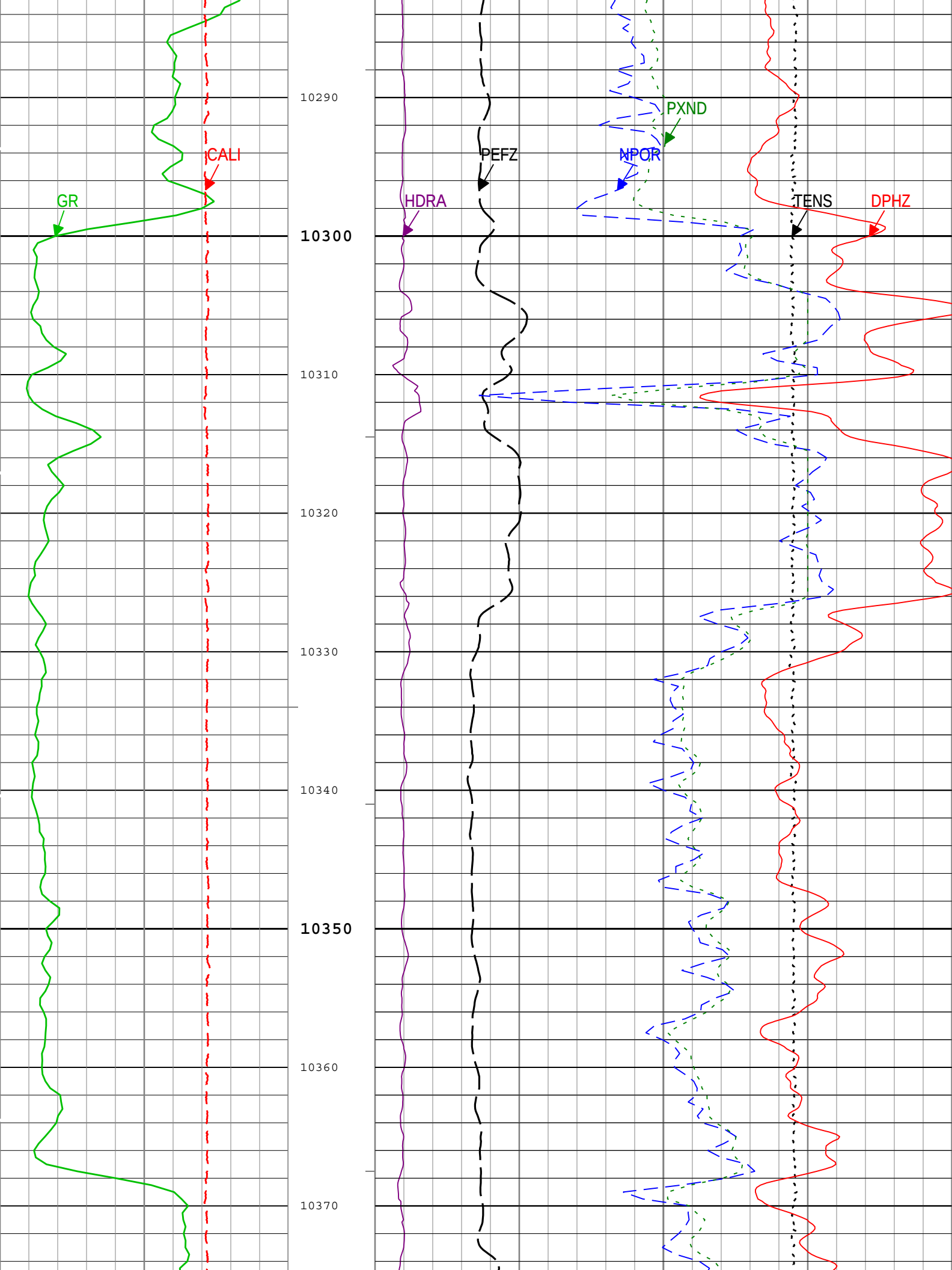
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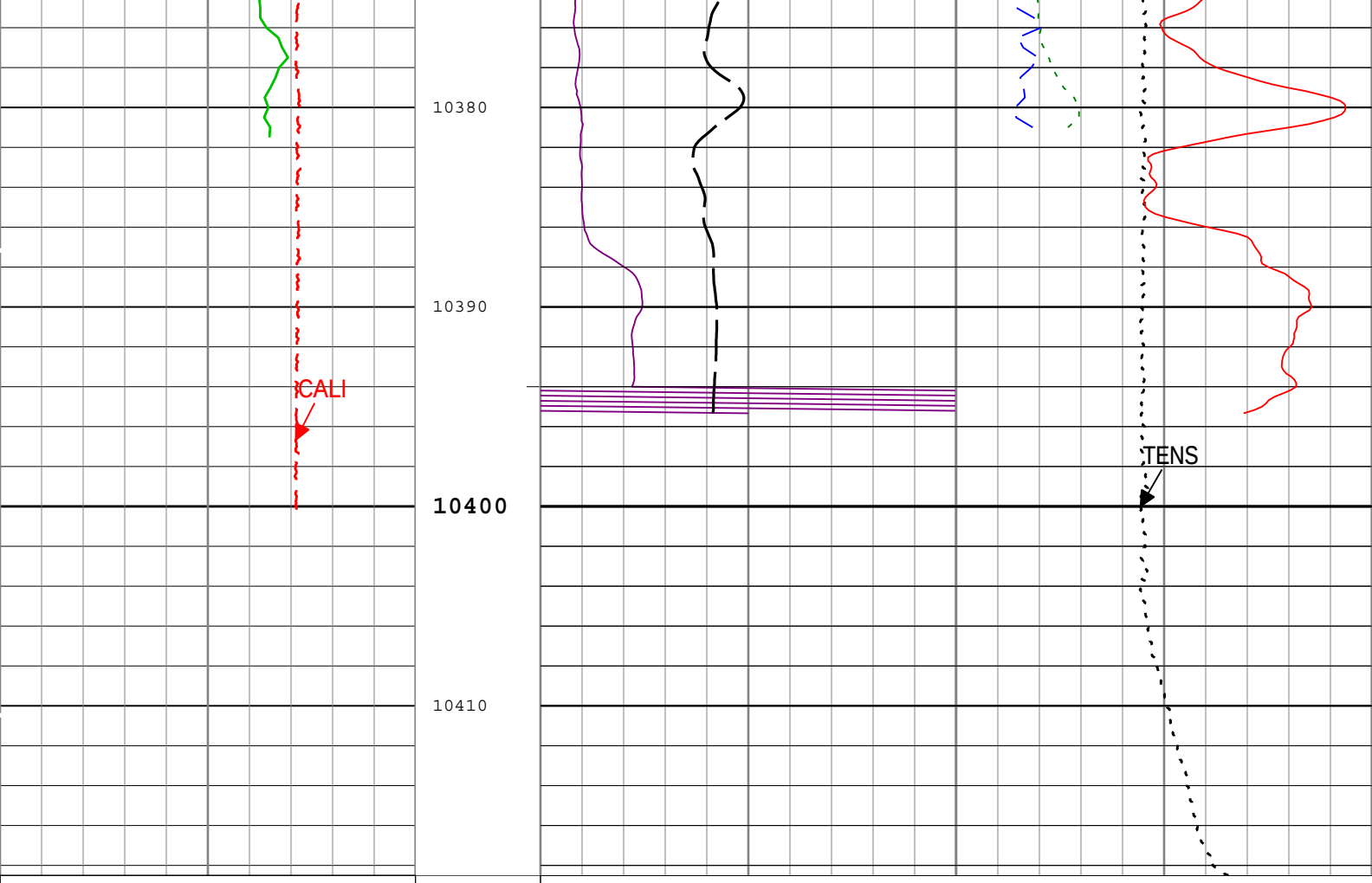


Gamma Ray (GR) HGNS-H		
0	gAPI	150

Caliper (CALI) HDRS-H		
4	in	10

Standard Resolution Density Porosity (DPHZ) HDRS-H		
0.3	ft3/ft3	-0.1

Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H		
0.3	ft3/ft3	-0.1

Crossplot Porosity for Neutron-Density (PXND)		
0.3	ft3/ft3	-0.1

Density Standoff Correction (HDRA) HDRS-H		
-0.05	g/cm3	0.45

Cable Tension (TENS)		
10000	lbf	0

Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H	
0	10

IHV - Integrated Hole Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

IHV - Integrated Hole Volume every 10.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

Description: Density count rates for Platform Express Format: Log (PEX porosity_5inch) Index Scale: 12 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 10-May-2012 09:40:13

Channel Processing Parameters

Parameter	Description	ToolPath	Value	Unit
BARI	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	COMPLETION	8.75	in
BSAL	Borehole Salinity	Borehole	45000	ppm

CALI_SHIFT	CALI Supplementary Offset	HDRS-H:HRCC-H:HRCC-H	0	in
CBLO	Casing Bottom (Logger)	COMPLETION	1734	ft
CDEN	Cement Density	HGNS-H:HGNS-H:HGNS-H	2	g/cm3
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	9.55	lbm/gal
DFT	Drilling Fluid Type	Borehole	Oil	
DHC	Density Hole Correction	HDRS-H:HRMS-H:HRGD-H	Bit Size	
FCD	Future Casing (Outer) Diameter	COMPLETION	7	in
FD	Fluid Density	Borehole	1	g/cm3
FSAL	Formation Salinity	Borehole	6126.75	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	REMS	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	CTEM	
HSCO	Hole Size Correction Option	HGNS-H:HGNS-H:HGNS-H	Yes	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	DOLOMITE	
MDEN	Matrix Density for Density Porosity	Borehole	2.78	g/cm3
NPRM	HRDD Nuclear Processing Mode	HDRS-H:HRMS-H:HRGD-H	High Resolution	
SOCO	Standoff Correction Option	HGNS-H:HGNS-H:HGNS-H	Yes	

Tool Control Parameters

Parameter	Description	ToolPath	Value	Unit
HMCA_BRD_TYPE	HMCA Board Type	HGNS-H:HGNS-H:HMCA-H	1	
HRGD_BRD_TYPE	HRGD Board Type	HDRS-H:HRMS-H:HRGD-H	WITH_HET	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed		1800	ft/h

1

Repeat Analysis

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Depth Shift	Include Parallel Data
1	Log[3]:Up	Up	10107.35 ft	10415.28 ft	09-May-2012 10:32:25 PM	09-May-2012 10:45:52 PM	7.29 ft	true
1	Log[4]:Up	Up	2040.57 ft	10418.51 ft	09-May-2012 11:00:32 PM	10-May-2012 4:16:09 AM	0.00 ft	true

All depths are referenced to toolstring zero

Log

1: Log[3]:Up 00268AD1-AEE1-4FF9-A0D1-13875141C99B

Description: Density count rates for Platform Express Format: Log (PEX porosity_5inch RA) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 10-May-2012 09:40:15

Channel	Source	Sampling
ICV	Borehole	6in
IHV	Borehole	6in
TIME_1900	WLWorkflow	0.1in

IHV - Integrated Hole Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

IHV - Integrated Hole Volume every 100.00 (ft3)

Main To Repeat

Repeat To Main

Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H

0 10

Main To Repeat

Repeat To Main

Density Standoff Correction (HDRA) HDRS-H

-0.05 g/cm3 0.45

Main To Repeat

Repeat To Main

Cable Tension (TENS)

10000 lbf 0

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

Caliper (CALI) HDRS-H

6 in 16

Main To Repeat

Repeat To Main

Crossplot Porosity for Neutron-Density (PXND)

0.3 ft3/ft3 -0.1

Main To Repeat

Repeat To Main

Gamma Ray (GR) HGNS-H

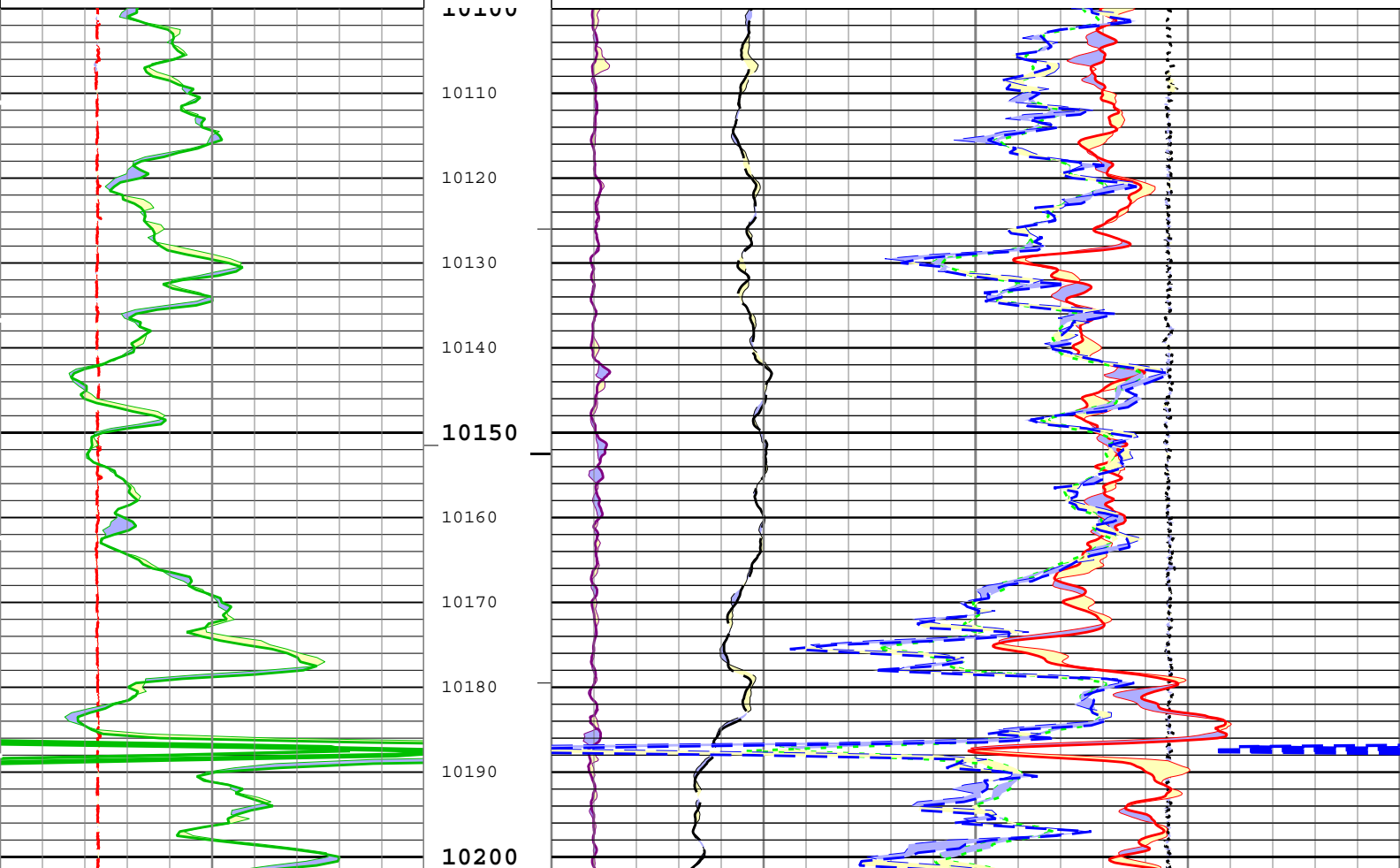
0 gAPI 150

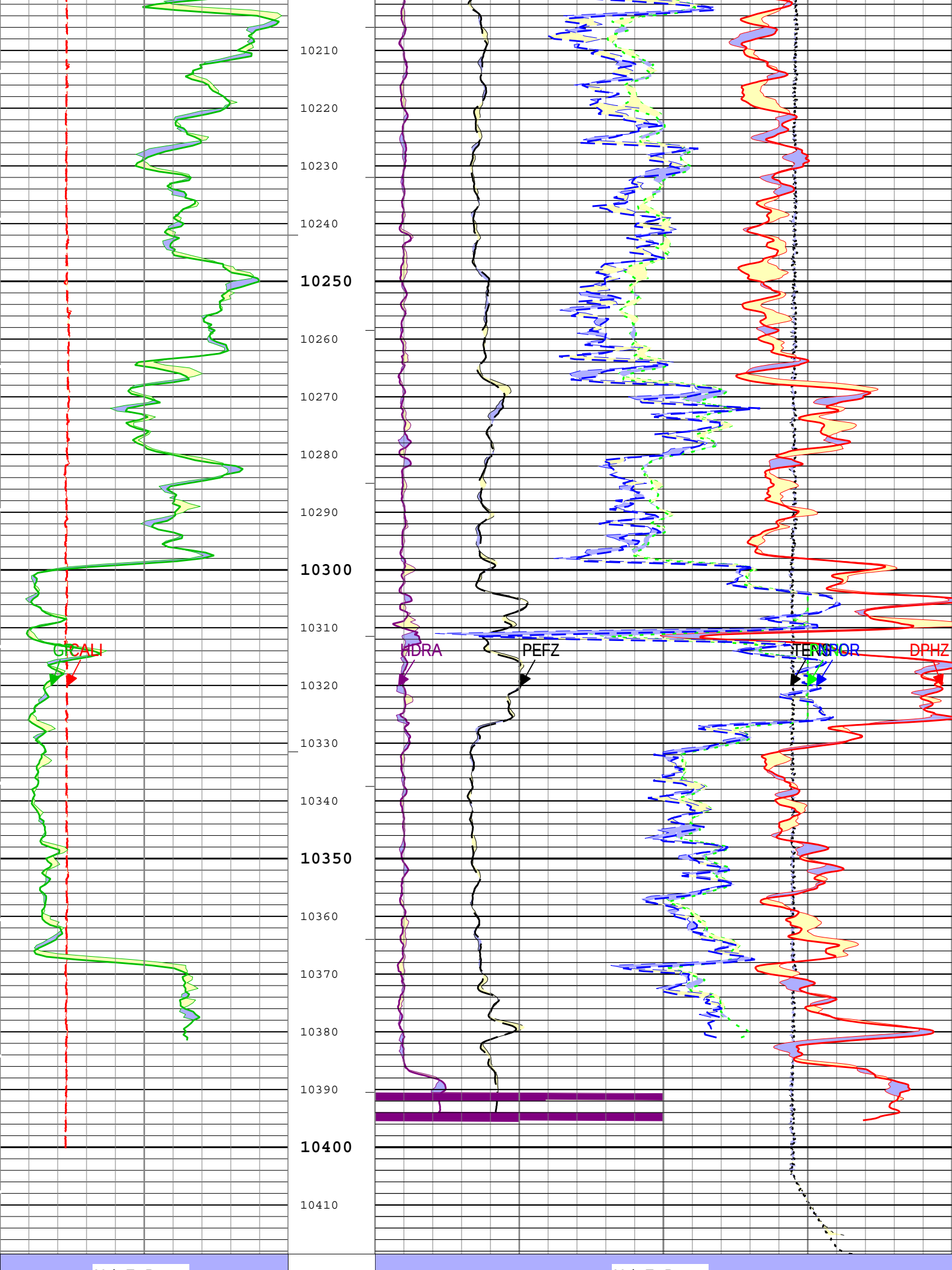
Main To Repeat

Repeat To Main

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

0.3 ft3/ft3 -0.1

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10410
CALI
HDRA
PEFZ
TENS
NPOR
DPHZ

Main To Repeat

Repeat To Main

Caliper (CALI) HDRS-H

6 in 16

Main To Repeat

Repeat To Main

Gamma Ray (GR) HGNS-H

0 gAPI 150

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

Crossplot Porosity for Neutron-Density (PXND)

0.3 ft3/ft3 -0.1

Main To Repeat

Repeat To Main

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

0.3 ft3/ft3 -0.1

Main To Repeat

Repeat To Main

Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H

0 10

Main To Repeat

Repeat To Main

Cable Tension (TENS)

10000 lbf 0

Main To Repeat

Repeat To Main

Density Standoff Correction (HDRA) HDRS-H

-0.05 g/cm3 0.45

IHV - Integrated Hole Volume every 100.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

ICV - Integrated Cement Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

IHV - Integrated Hole Volume every 10.00 (ft3)

Description: Density count rates for Platform Express Format: Log (PEX porosity_5inch RA) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 10-May-2012 09:40:15

Calibration Report

HDRS-H (HILT Density and Rxo Sonde, 150 degC) Calibration - Run 1

Primary Equipment :

HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	3768
HILT Resistivity Gamma-Ray Density Device, 150 degC	HRGD-H	4957

Auxiliary Equipment :

HRDD Backscatter Detector	Backscatter	41211
HRDD Long Spacing Detector	Long Spacing	43162
HRDD Short Spacing Detector	Short Spacing	42231
Cesium 137 Gamma-Ray Logging Source	GSR-J	5088
HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	3768
HILT High-Resolution Mechanical Sonde, 150 degC	HRMS-H	4849

Calibration Parameter :

Small Ring Size (Caliper Calibration Small Ring)	8.00

Large Ring Size (Caliper Calibration Large Ring) 12.00

HDRS Caliper Calibration - Caliper Accumulations

Before (Measured): 20:55:46 08-May-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Small Ring	in	Before	8.00	6.00	7.82	10.00
Large Ring	in	Before	12.00	9.00	12.01	15.00

HDRS Density Calibration - Inversion Results

Master (EEPROM): 18:06:40 16-Apr-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Rho Aluminum	g/cm3	Master	2.596	2.586	2.597	2.606
Rho Magnesium	g/cm3	Master	1.686	1.676	1.689	1.696
Pe Aluminum		Master	2.570	2.470	2.539	2.670
Pe Magnesium		Master	2.650	2.550	2.610	2.750

HDRS Density Calibration - Deviation Summary

Master (EEPROM): 18:06:40 16-Apr-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Average Deviation	%	Master	0	-0.6000	0.2572	0.6000
BS Max Deviation	%	Master	0	-1.6000	0.7150	1.6000
SS Average Deviation	%	Master	0	-1.0000	0.2723	1.0000
SS Max Deviation	%	Master	0	-2.5000	1.1225	2.5000
LS Average Deviation	%	Master	0	-1.5000	0.5005	1.5000
LS Max Deviation	%	Master	0	-3.5000	1.8357	3.5000

HDRS Density Calibration - Background Summary

Master (EEPROM): 18:06:40 16-Apr-2012 Before (Measured): 20:06:53 08-May-2012 Expired by 1 days

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Window Ratio		Master	1.0000	-----	0.7445	-----
		Before	0.7445	0.7073	0.7452	0.7818
		Before-Master	-----	-----	0.0007	-----
BS Window Sum	1/s	Master	1	-----	27548	-----
		Before	27548	26170	27389	28925
		Before-Master	-----	-----	-159	-----
SS Window Ratio		Master	1.0000	-----	0.4691	-----
		Before	0.4691	0.4457	0.4679	0.4926
		Before-Master	-----	-----	-0.0012	-----
SS Window Sum	1/s	Master	1	-----	12265	-----
		Before	12265	11652	12241	12878
		Before-Master	-----	-----	-24	-----
LS Window Ratio		Master	1.0000	-----	0.2972	-----
		Before	0.2972	0.2824	0.2975	0.3121
		Before-Master	-----	-----	0.0003	-----
LS Window Sum	1/s	Master	1	-----	1359	-----
		Before	1359	1291	1354	1427
		Before-Master	-----	-----	-5	-----

HDRS Density Calibration - Photo-multiplier High Voltages

Master (EEPROM): 18:06:40 16-Apr-2012 Before (Measured): 20:06:53 08-May-2012 Expired by 1 days

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS PM High Voltage	V	Master	-----	1000	1620	2400
		Before	-----	1000	1625	2400
		Before-Master	-----	-100	5	100
SS PM High Voltage	V	Master	-----	1000	1642	2400
		Before	-----	1000	1625	2400
		Before-Master	-----	-100	-17	100
LS PM High Voltage	V	Master	-----	1000	1289	2400
		Before	-----	1000	1303	2400
		Before-Master	-----	-100	14	100

HDRS Density Calibration - Crystal Quality Resolutions

Master (EEPROM): 18:06:40 16-Apr-2012 Before (Measured): 20:06:53 08-May-2012 Expired by 1 days

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Crystal Resolution	%	Master	-----	5.00	10.43	25.00
		Before	-----	5.00	10.46	25.00
		Before-Master	-----	-1.00	0.03	1.00
SS Crystal Resolution	%	Master	-----	5.00	9.11	20.00

		Before	-----	5.00	9.08	20.00
		Before-Master	-----	-1.00	-0.03	1.00
LS Crystal Resolution	%	Master	-----	5.00	8.36	20.00
		Before	-----	5.00	8.36	20.00
		Before-Master	-----	-1.00	0.00	1.00

HDRS MCFL Calibration - MCFL Accumulations

Before (Measured): 20:09:22 08-May-2012 Expired by 1 days

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Main Resistivity	ohm.m	Before	3875	3565	3851	4185
Deep Resistivity	ohm.m	Before	3830	3524	3776	4136
Shallow Resistivity	ohm.m	Before	3830	3524	3784	4136

HGNS-H (HILT Gamma-Ray and Neutron Sonde, 150 degC) Calibration - Run 1

Primary Equipment :

HILT Gamma-Ray and Neutron Sonde, 150 degC	HGNS-H	4985

Auxiliary Equipment :

HGNS Accelerometer, 150 degC	HACCZ-H	8100
AmBe Neutron Logging Source	NSR-F	1653

Calibration Parameter :

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

HGNS Accelerometer Calibration - Accelerometer Accumulations

Before (Measured): 21:00:21 09-May-2012

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
AZ Vertical Measurement	ft/s2	Before	32.2	31.5	32.2	32.8

HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM): 00:00:00 15-Jun-2008

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Accelerometer Manufacturer		Master	-----	-----	QAT_160	-----
Accelerometer Reference Temperature	degF	Master	-----	30.2	77.0	122.0
Accelerometer Coefficients - 0		Master	-----	-----	6484.000	-----
Accelerometer Coefficients - 1		Master	-----	-----	-12.231	-----
Accelerometer Coefficients - 2		Master	-----	-----	-0.007	-----
Accelerometer Coefficients - 3		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 4		Master	-----	-----	2.751	-----
Accelerometer Coefficients - 5		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 6		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 7		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 8		Master	-----	-----	300.000	-----
Accelerometer Coefficients - 9		Master	-----	-----	0.998	-----

HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM): 11:56:16 20-Feb-2012 Before (Measured): 20:05:10 08-May-2012 Expired by 1 days After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Near Zero Measurement	1/s	Master	0	5.0	27.2	40.0
		Before	0	5.0	27.5	40.0
		After	-----	-----	-----	-----
		Before-Master	-----	-4.1	0.3	4.1
		After-Before	-----	-----	-----	-----
Far Zero Measurement	1/s	Master	0	5.0	28.6	40.0
		Before	0	5.0	33.1	40.0
		After	-----	-----	-----	-----
		Before-Master	-----	-4.3	4.5	4.3
		After-Before	-----	-----	-----	-----
Near Plus Measurement - 0	1/s	Master	6031.0	4700.0	5311.0	6900.0
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----

		After-Before	-----	-----	-----	-----
Far Plus Measurement - 0	1/s	Master	2793.0	1900.0	2279.0	2900.0
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
Near Corrected Plus Measurement - 0	1/s	Master	-----	4700.0	5271.0	6900.0
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
Far Corrected Plus Measurement - 0	1/s	Master	-----	1900.0	2237.0	2900.0
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----

HGNS Gamma-Ray Calibration - Gamma-Ray Accumulations

Before (Measured): 21:05:14 08-May-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
RGR Zero Measurement	gAPI	Before	30.0	0	36.1	120.0
		After	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
RGR Plus Measurement	gAPI	Before	185.4	157.1	173.3	206.3
		After	-----	-----	NOT DONE	-----
		After-Before	-----	-----	-----	-----
GR Calibration Gain		Before	0.89	0.80	0.95	1.05
		After	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----

Company: FIDELITY EXPLORATION & PRODUCTION COMP

Schlumberger

Well: EDAM 15-22H

Field: WILDCAT

County: RICHLAND

State: MONTANA

PLATFORM EXPRESS

COMPENSATED NEUTRON LOG

THREE DETECTOR DENSITY