Schlumberger

Company: GRMR Oil & Gas LLC

Well: Hamill 19 16D

Field: Wildcat

County: Moffat State: Colorado

Platform Express

Triple Combo

w/ Array Induction

County: Moffat
Field: Wildcat
Location: SHL: SESE 152' FSL & 247 FEL
Well: Hamill 19 16D
Company: GRMR Oil & Gas LLC

Location:				
SHL: SESE 152' FSL & 247' FEL		Elev.:	K.B.	6478.00 ft
Section 19, Township 5N, Range 90W			G.L.	6455.00 ft
Lat: 40.364225, Long: -107.529442			D.F.	6477.00 ft
Permanent Datum:	Ground Level	Elev.:	6455.00 f	
Log Measured From:	Kelly Bushing	23.00 ft	above Perm.Datum	
Drilling Measured From:	Kelly Bushing			

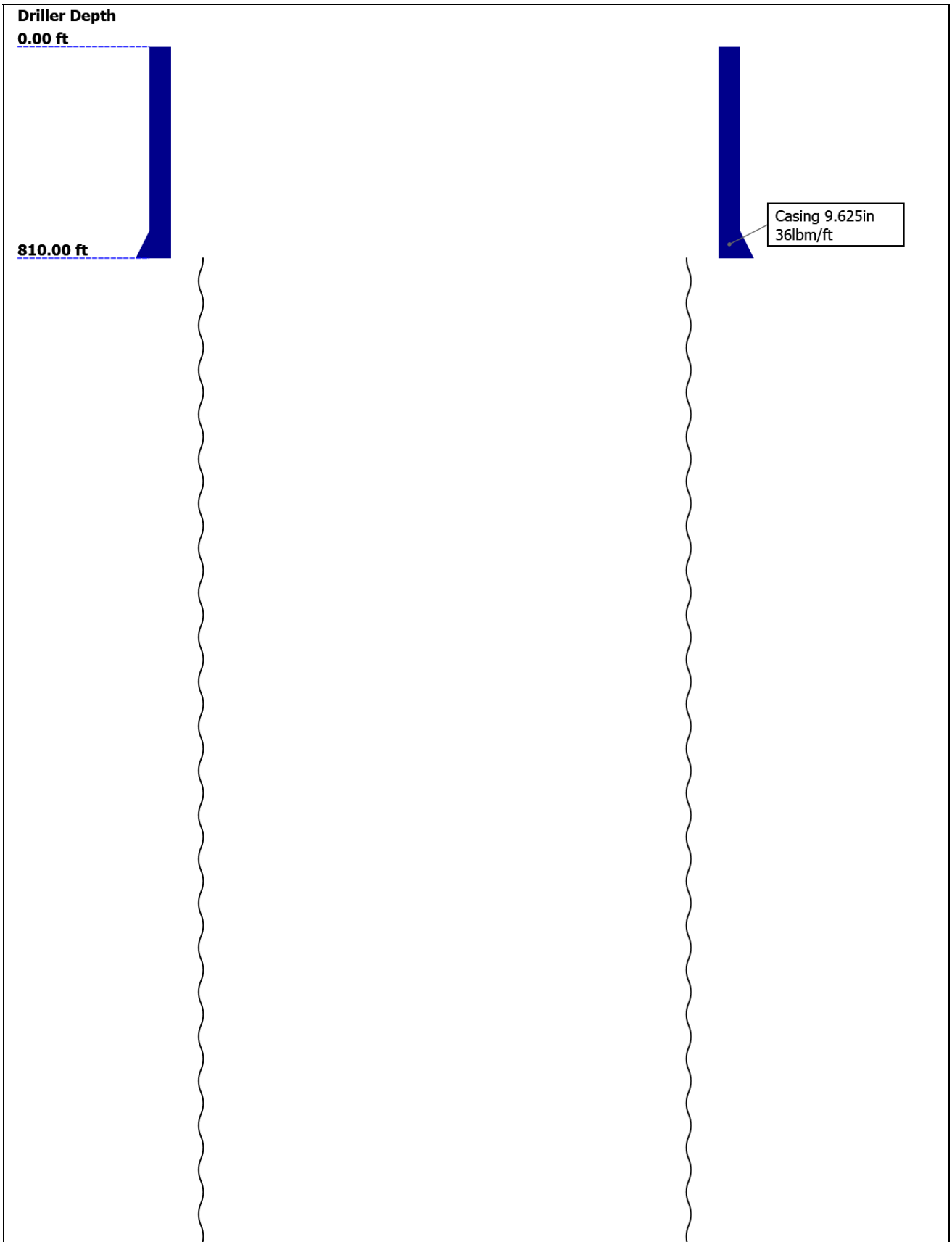
API Serial No.	Section:	Township:	Range:
05-081-07820-00	19	5N	90W

Logging Date			25-Oct-2015			
Run Number			Run 1			
Depth Driller			6980.00 ft			
Schlumberger Depth			6980.00 ft			
Bottom Log Interval						
Top Log Interval						
Casing Driller Size @ Depth			9.625 in @ 810.00 ft			
Casing Schlumberger			810 ft			
Bit Size			7.875 in			
Type Fluid In Hole			Chemical Gel			
MUD	Density	Viscosity	8.7 lbm/gal	39 s		
	Fluid Loss	PH	8.8 cm3	10.5		
	Source of Sample		Active Tank			
RM @ Meas Temp			0.7 ohm.m @ 69 degF			
RMF @ Meas Temp			0.52 ohm.m @ 69 degF			
RMC @ Meas Temp			0.88 ohm.m @ 69 degF			
Source RMF	RMC		Calculated	Calculated		
RM @ BHT	RMF @ BHT		0.3 @ 168	0.23 @ 168		
Max Recorded Temperatures			168 degF			
Circulation Stopped	Time		25-Oct-2015	14:00:00		
Logger on Bottom	Time		25-Oct-2015	21:40:00		
Unit Number	Location:		9108	Fort Morgan, CO		
Recorded By			Max Pace			
Witnessed By			Lyman Rudolph/Bill Eucker			

Disclaimer

Contents

Well Sketch



Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	7.875					
Top Driller (ft)	810					
Top Logger (ft)	810					
Bottom Driller (ft)	6980					
Bottom Logger (ft)	6980					
Casing						
Size (in)	9.625					
Weight (lbm/ft)	36					
Inner Diameter (in)	8.921					
Grade	J55					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	810					
Bottom Logger (ft)	810					

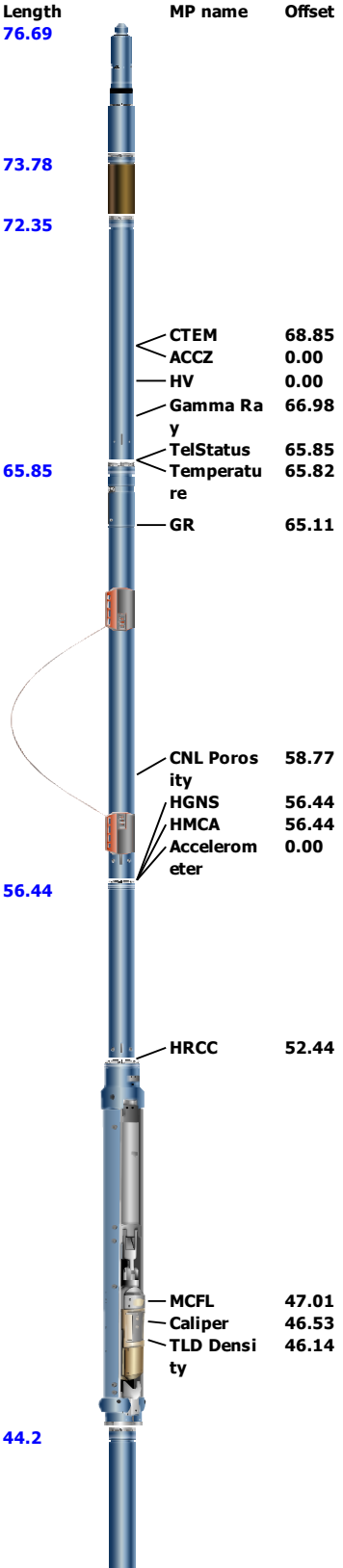
Borehole Fluids

Parameter(unit)	Run 1					
Fluid Type	Water					
Fluid Name	Chemical Gel					
Max Recorded Temperatures (degF)	168					
Source of Sample	Active Tank					
Salinity (ppm)	1000					
Density (lbm/gal)	8.7					
Funnel Viscosity (s)	39					
Fluid Loss (cm3)	8.8					
PH	10.5					
Date/Time Circulation Stopped	25-Oct-2015 14:00:00					
Date Logger on Bottom	25-Oct-2015					
Time Logger on Bottom	21:40:00					
Source RMF	Calculated					
RMC	Calculated					
RM @ Meas Temp (ohm.m@degF)	0.7 @ 69					

RMF @ Meas Temp (ohm.m@degF)	0.52 @ 69					
RMC @ Meas Temp (ohm.m@degF)	0.88 @ 69					
RM @ BHT (ohm.m@degF)	0.3 @ 168					
RMF @ BHT (ohm.m@degF)	0.23 @ 168					
RMC @ BHT (ohm.m@degF)	0.38 @ 168					
Total Solid (%)						
High Gravity Solids (%)						

Remarks and Equipment Summary

Run 1: Toolstring



Equip name	Length	MP name	Offset
LEH-QT LEH-QT	**76.69**		
AH-369:1793	**73.78**		
EDTC-B EDTH-B EDTG-A EDTC-B	**72.35**		
		CTEM	**68.85**
		ACCZ	**0.00**
		HV	**0.00**
		Gamma Ray	**66.98**
		TelStatus	**65.85**
HGNS-H HGNH NPV-N NSR-F:5138 HMCA-H:4269 HGNS-H HACCZ-H:4269	**65.85**	**Temperature**	**65.82**
		GR	**65.11**
		CNL Porosity	**58.77**
		HGNS	**56.44**
		HMCA	**56.44**
		Accelerometer	**0.00**
HDRS-H ECH-MEB HRCC-H HRMS-H GSR-J:5234 Short Spacing Backscatter HRGD-H:3871 GPV-Q Long Spacing :28629	**56.44**		
		HRCC	**52.44**
		MCFL	**47.01**
		Caliper	**46.53**
		TLD Density	**46.14**
HRLT-B:1867 HRUH-B:866 HRUC-B:865 HRLS-B:1867 HRLH-B:1857	**44.2**		

Run 1: Remarks

This is the first run in hole

Tool string run as per tool sketch

Matrix: Sandstone, 2.68 density

HRLC-B:1854
AH-270

Resistivity 32.43

AH-184[2] **20.00**

AH-184[1] **18.00**

AIT-M:1538 **16.00**
AMIS:1538
AMRM:1251

Power Supply **7.91**
Induction **7.91**
Temperature **7.91**

SP **0.08**
Mud Resistivity **0.00**
Head Tension
TOOL_ZERO

Lengths are in ft
Maximum Outer Diameter = 5.000 in

Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

Depth Summary

	Run 1		
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	7-46A-XS		
Serial Number			
Length	16500.00 ft		
Conveyance Type	Wireline		
Rig Type	Land		

Run 1: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		

Survey Record

Survey Calculation

Method :	Minimum Radius of Curvature	DLS Method :	Lubinski
North Reference :	True North	Total Correction Formula :	Magnetic Dec

Rig Location

Latitude :	40° 21' 51.21" N	Longitude :	107° 31' 45.984" W

Tie In Point

Measured Depth:	0.00 ft	Inclination:	0.00 deg	Azimuth:	0.00 deg
True Vertical Depth:	0.00 ft	North Displacement:	0.00 ft	East Displacement:	0.00 ft

Survey Quality Index

9 : Manual — 28 : Tie-In Point

Survey Correction Index

0 : No correction

Survey Description Index

0 : Not Flagged Survey

Seq	MD	Incl	Azim	Course	TVD	V Sec	N/ -S	E/ -W	Closure	at Azim	DLS	Tool Type	QI	CI	DI

	(ft)	(deg)	(deg)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(deg)	deg/100ft				
1	0.00	0.00	0.00	- - - -	0.00	0.00	0.00	0.00	0.00	90.00	0.00	TIP	28	0	0
2	137.00	0.70	204.60	137.00	137.00	-0.76	-0.76	-0.35	0.85	204.60	0.51	Other	9	0	0
3	229.00	0.80	199.70	92.00	228.99	-1.88	-1.88	-0.80	2.03	203.06	0.13	Other	9	0	0
4	320.00	0.80	203.10	91.00	319.98	-3.06	-3.06	-1.26	3.31	202.42	0.05	Other	9	0	0
5	411.00	0.90	188.20	91.00	410.97	-4.35	-4.35	-1.61	4.63	200.35	0.27	Other	9	0	0
6	502.00	0.60	219.40	91.00	501.96	-5.43	-5.43	-2.02	5.77	200.40	0.55	Other	9	0	0
7	594.00	0.80	177.40	92.00	593.96	-6.44	-6.44	-2.29	6.82	199.61	0.58	Other	9	0	0
8	684.00	1.00	167.80	90.00	683.94	-7.84	-7.84	-2.10	8.10	195.00	0.28	Other	9	0	0
9	769.00	1.00	155.20	85.00	768.93	-9.23	-9.23	-1.63	9.38	190.02	0.26	Other	9	0	0
10	874.00	1.10	159.40	105.00	873.91	-11.01	-11.01	-0.89	11.06	184.64	0.12	Other	9	0	0
11	969.00	1.20	155.50	95.00	968.90	-12.77	-12.77	-0.16	12.76	180.72	0.13	Other	9	0	0
12	1064.00	1.50	165.50	95.00	1063.87	-14.88	-14.88	0.56	14.90	177.83	0.40	Other	9	0	0
13	1158.00	3.10	172.60	94.00	1157.79	-18.59	-18.59	1.20	18.64	176.31	1.73	Other	9	0	0
14	1254.00	5.10	173.80	96.00	1253.54	-25.41	-25.41	1.99	25.49	175.51	2.09	Other	9	0	0
15	1349.00	8.70	182.00	95.00	1347.84	-36.79	-36.79	2.20	36.84	176.58	3.92	Other	9	0	0
16	1444.00	8.00	175.70	95.00	1441.83	-50.56	-50.56	2.45	50.62	177.23	1.21	Other	9	0	0
17	1540.00	6.90	168.30	96.00	1537.02	-62.87	-62.87	4.12	62.99	176.25	1.52	Other	9	0	0
18	1636.00	6.70	177.30	96.00	1632.35	-74.11	-74.11	5.55	74.31	175.72	1.13	Other	9	0	0
19	1731.00	6.20	197.70	95.00	1726.76	-84.54	-84.54	4.25	84.65	177.12	2.45	Other	9	0	0
20	1826.00	6.00	196.80	95.00	1821.22	-94.18	-94.18	1.26	94.19	179.24	0.23	Other	9	0	0
21	1920.00	5.50	191.70	94.00	1914.75	-103.29	-103.29	-1.08	103.28	180.60	0.76	Other	9	0	0
22	2016.00	6.20	191.80	96.00	2010.25	-112.87	-112.87	-3.07	112.93	181.56	0.73	Other	9	0	0
23	2111.00	7.80	197.00	95.00	2104.54	-124.06	-124.06	-6.01	124.21	182.77	1.81	Other	9	0	0
24	2206.00	7.40	193.10	95.00	2198.71	-136.18	-136.18	-9.28	136.48	183.90	0.69	Other	9	0	0
25	2302.00	6.80	189.50	96.00	2293.97	-147.81	-147.81	-11.62	148.26	184.49	0.78	Other	9	0	0
26	2397.00	8.00	204.60	95.00	2388.19	-159.37	-159.37	-15.30	160.10	185.48	2.39	Other	9	0	0
27	2493.00	7.20	202.00	96.00	2483.34	-171.02	-171.02	-20.33	172.21	186.78	0.91	Other	9	0	0
28	2588.00	6.60	200.10	95.00	2577.65	-181.67	-181.67	-24.44	183.30	187.66	0.68	Other	9	0	0
29	2683.00	8.30	195.00	95.00	2671.85	-193.42	-193.42	-28.09	195.44	188.26	1.92	Other	9	0	0
30	2778.00	7.30	191.40	95.00	2765.97	-205.96	-205.96	-31.06	208.30	188.58	1.17	Other	9	0	0
31	2873.00	6.70	188.00	95.00	2860.26	-217.36	-217.36	-33.02	219.85	188.64	0.77	Other	9	0	0
32	2968.00	8.10	199.10	95.00	2954.47	-229.17	-229.17	-35.98	231.99	188.92	2.10	Other	9	0	0
33	3063.00	7.20	196.60	95.00	3048.63	-241.20	-241.20	-39.87	244.49	189.39	1.01	Other	9	0	0
34	3158.00	6.40	192.70	95.00	3142.96	-252.08	-252.08	-42.74	255.68	189.62	0.97	Other	9	0	0
35	3253.00	8.20	196.20	95.00	3237.18	-263.75	-263.75	-45.79	267.68	189.85	1.95	Other	9	0	0
36	3348.00	7.20	195.00	95.00	3331.33	-276.00	-276.00	-49.22	280.35	190.11	1.07	Other	9	0	0
37	3443.00	6.10	190.70	95.00	3425.69	-286.71	-286.71	-51.70	291.34	190.22	1.27	Other	9	0	0
38	3538.00	7.60	198.50	95.00	3520.01	-297.63	-297.63	-54.63	302.59	190.40	1.85	Other	9	0	0
39	3634.00	6.50	197.00	96.00	3615.28	-308.85	-308.85	-58.24	314.30	190.68	1.16	Other	9	0	0
40	3729.00	5.70	195.50	95.00	3709.74	-318.54	-318.54	-61.07	324.34	190.85	0.86	Other	9	0	0
41	3824.00	4.80	192.70	95.00	3804.34	-326.96	-326.96	-63.20	333.01	190.94	0.98	Other	9	0	0
42	3920.00	4.20	193.70	96.00	3900.05	-334.30	-334.30	-64.92	340.55	190.99	0.63	Other	9	0	0
43	4014.00	3.50	192.30	94.00	3993.83	-340.44	-340.44	-66.35	346.85	191.03	0.75	Other	9	0	0
44	4110.00	2.90	194.20	96.00	4089.68	-345.66	-345.66	-67.57	352.20	191.06	0.63	Other	9	0	0
45	4205.00	2.30	196.70	95.00	4184.59	-349.82	-349.82	-68.70	356.50	191.11	0.64	Other	9	0	0
46	4301.00	1.90	200.30	96.00	4280.52	-353.15	-353.15	-69.81	359.97	191.18	0.44	Other	9	0	0
47	4396.00	1.30	191.80	95.00	4375.48	-355.69	-355.69	-70.58	362.63	191.22	0.68	Other	9	0	0
48	4491.00	1.20	196.00	95.00	4470.46	-357.70	-357.70	-71.07	364.70	191.24	0.14	Other	9	0	0
49	4587.00	1.10	195.70	96.00	4566.44	-359.55	-359.55	-71.60	366.60	191.26	0.10	Other	9	0	0
50	4682.00	1.20	218.30	95.00	4661.42	-361.21	-361.21	-72.46	368.41	191.34	0.49	Other	9	0	0
51	4777.00	0.90	220.90	95.00	4756.41	-362.55	-362.55	-73.56	369.95	191.47	0.32	Other	9	0	0

51	4777.00	0.90	220.90	95.00	4756.41	-362.55	-362.55	-73.56	369.95	191.47	0.32	Other	9	0	0
52	4872.00	1.00	216.70	95.00	4851.39	-363.78	-363.78	-74.55	371.36	191.58	0.13	Other	9	0	0
53	4967.00	1.00	221.60	95.00	4946.38	-365.07	-365.07	-75.59	372.80	191.70	0.09	Other	9	0	0
54	5062.00	0.90	227.00	95.00	5041.37	-366.20	-366.20	-76.69	374.15	191.83	0.14	Other	9	0	0
55	5158.00	0.80	250.00	96.00	5137.36	-366.94	-366.94	-77.87	375.10	191.98	0.37	Other	9	0	0
56	5251.00	0.70	274.90	93.00	5230.35	-367.11	-367.11	-79.05	375.52	192.15	0.36	Other	9	0	0
57	5346.00	0.60	271.90	95.00	5325.34	-367.05	-367.05	-80.12	375.69	192.31	0.11	Other	9	0	0
58	5440.00	0.70	290.90	94.00	5419.34	-366.83	-366.83	-81.15	375.69	192.47	0.25	Other	9	0	0
59	5535.00	0.40	326.10	95.00	5514.33	-366.34	-366.34	-81.88	375.39	192.60	0.46	Other	9	0	0
60	5632.00	0.50	1.00	97.00	5611.33	-365.64	-365.64	-82.06	374.74	192.65	0.30	Other	9	0	0
61	5727.00	0.60	350.70	95.00	5706.32	-364.73	-364.73	-82.13	373.85	192.69	0.15	Other	9	0	0
62	5822.00	0.90	349.40	95.00	5801.32	-363.51	-363.51	-82.35	372.74	192.76	0.32	Other	9	0	0
63	5918.00	2.20	196.50	96.00	5897.30	-364.54	-364.54	-83.01	373.85	192.83	3.16	Other	9	0	0
64	6013.00	2.30	222.30	95.00	5992.23	-367.69	-367.69	-84.81	377.36	192.99	1.06	Other	9	0	0
65	6108.00	3.00	241.00	95.00	6087.13	-370.31	-370.31	-88.27	380.68	193.41	1.16	Other	9	0	0
66	6203.00	1.70	280.60	95.00	6182.05	-371.26	-371.26	-91.83	382.45	193.89	2.11	Other	9	0	0
67	6298.00	1.50	280.70	95.00	6277.01	-370.77	-370.77	-94.44	382.61	194.29	0.21	Other	9	0	0
68	6394.00	1.70	282.80	96.00	6372.98	-370.22	-370.22	-97.06	382.74	194.69	0.22	Other	9	0	0
69	6489.00	0.80	310.20	95.00	6467.95	-369.48	-369.48	-98.94	382.48	194.99	1.11	Other	9	0	0
70	6582.00	1.00	313.40	93.00	6560.94	-368.50	-368.50	-100.03	381.82	195.19	0.22	Other	9	0	0
71	6677.00	1.30	298.10	95.00	6655.92	-367.42	-367.42	-101.58	381.20	195.45	0.45	Other	9	0	0
72	6770.00	1.50	297.10	93.00	6748.89	-366.37	-366.37	-103.59	380.74	195.79	0.22	Other	9	0	0
73	6865.00	2.20	271.30	95.00	6843.85	-365.76	-365.76	-106.52	380.97	196.24	1.13	Other	9	0	0
74	6939.00	1.90	272.00	74.00	6917.80	-365.69	-365.69	-109.17	381.63	196.62	0.41	Other	9	0	0
75	6980.00	1.90	272.00	41.00	6958.78	-365.64	-365.64	-110.53	381.99	196.82	0.00	Other	9	0	0

Run 1

5" Triple Combo

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1	Main[3]:Up	Up	68.54 ft	6998.98 ft	25-Oct-2015 9:47:43 PM	25-Oct-2015 11:40:39 PM	ON	0.00 ft	No

All depths are referenced to toolstring zero

Log

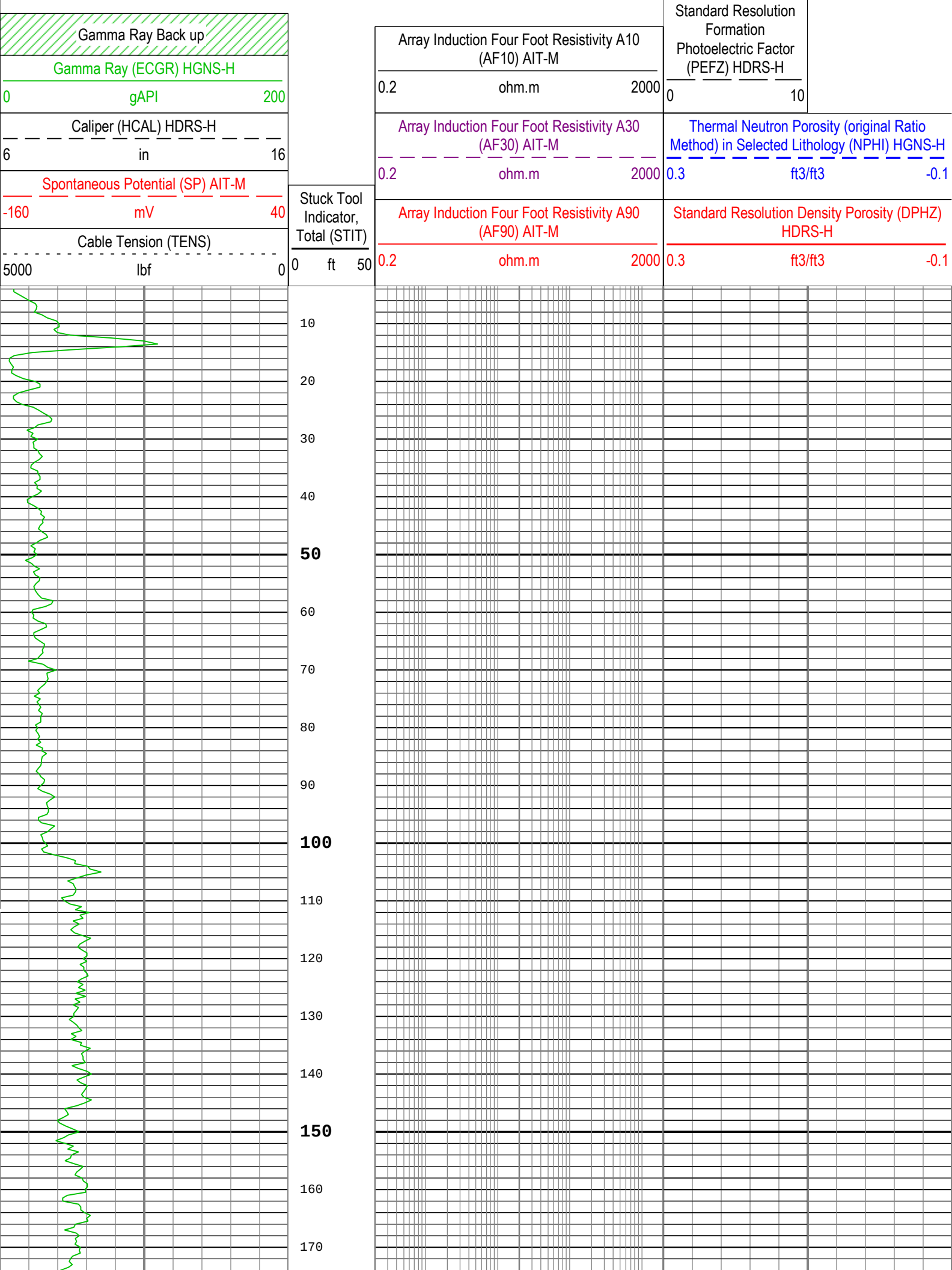
Company:GRMR Oil & Gas LLC Well:Hamill 19 16D

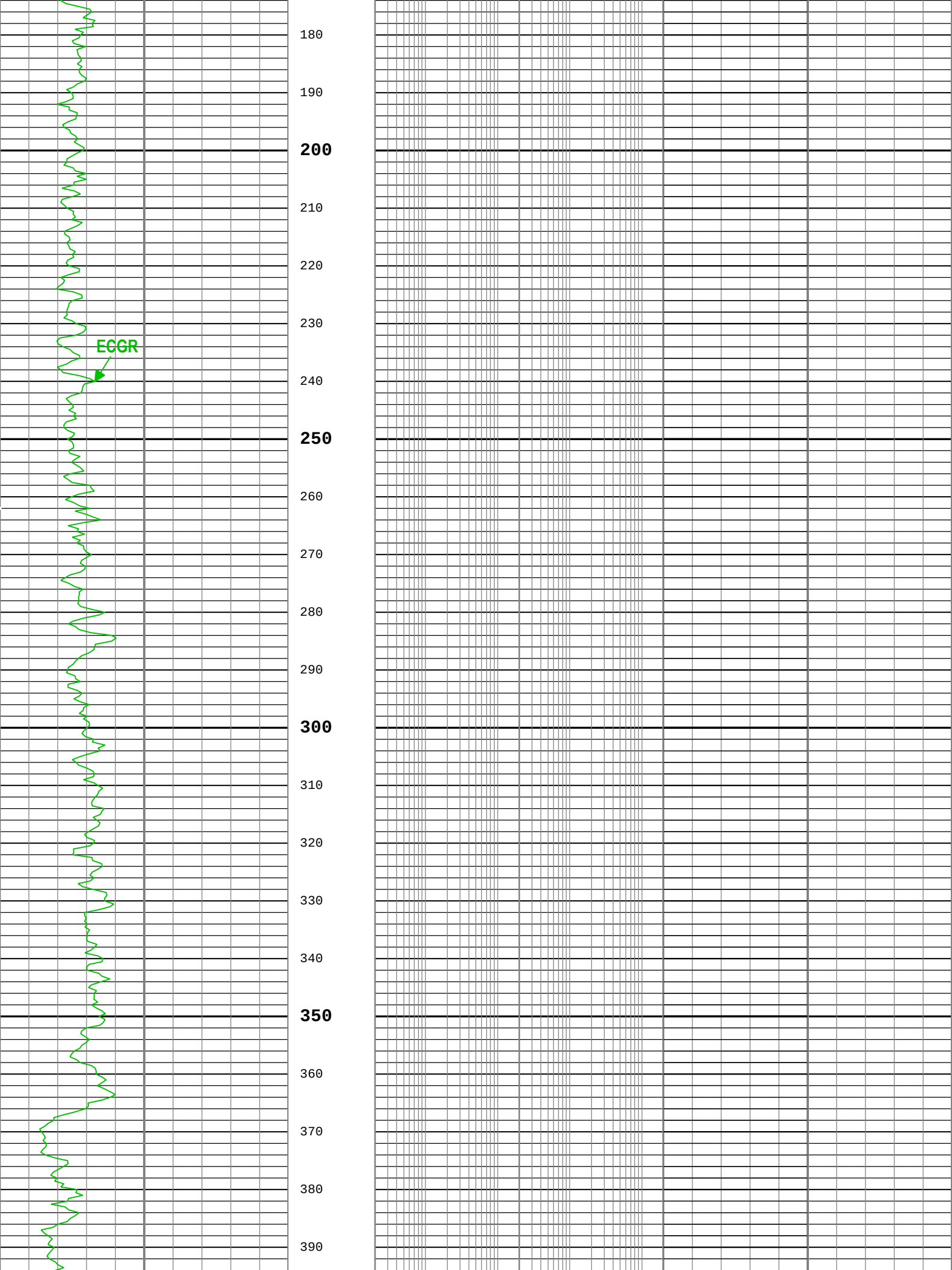
Run 1: Main[3]:Up:S008

Description: HGNS standard resolution porosities for Platform Express Format: Log (Import of TripleCombo-5) Index Scale: 5 in per 100 ft Index Unit: ft
Index Type: Measured Depth Creation Date: 25-Oct-2015 23:52:46

Channel	Source	Sampling
AF10	AIT-M:AMIS:AMIS	3in
AF30	AIT-M:AMIS:AMIS	3in
AF90	AIT-M:AMIS:AMIS	3in
CALI	HDRS-H:HRCC-H:HRCC-H	1in
DPHZ	HDRS-H:HRMS-H:HRGD-H	2in
GR	HGNS-H:HGNS-H:HGNS-H	6in
NPHI	HGNS-H:HGNS-H:HGNS-H	6in
PEFZ	HDRS-H:HRMS-H:HRGD-H	2in
SP	AIT-M:AMIS:AMIS	6in
STIT	DepthCorrection	6in
TENS	WLWorkflow	6in
TIME_1900	WLWorkflow	0.1in

TIME_1900 - Time Marked every 60.00 (s)


Gamma Ray Back up
Gamma Ray (ECGR) HGNS-H
0
gAPI
200
Caliper (HCAL) HDRS-H
6
in
16
Spontaneous Potential (SP) AIT-M
-160
mV
40
Cable Tension (TENS)
5000
lbf
0
Stuck Tool Indicator, Total (STIT)
0
ft
50
Array Induction Four Foot Resistivity A10 (AF10) AIT-M
0.2
ohm.m
2000
Array Induction Four Foot Resistivity A30 (AF30) AIT-M
0.2
ohm.m
2000
Array Induction Four Foot Resistivity A90 (AF90) AIT-M
0.2
ohm.m
2000
Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H
0
10
Thermal Neutron Porosity (original Ratio Method) in Selected Lithology (NPHI) HGNS-H
0.3
ft3/ft3
-0.1
Standard Resolution Density Porosity (DPHZ) HDRS-H
0.3
ft3/ft3
-0.1
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170


ECGR
180
190
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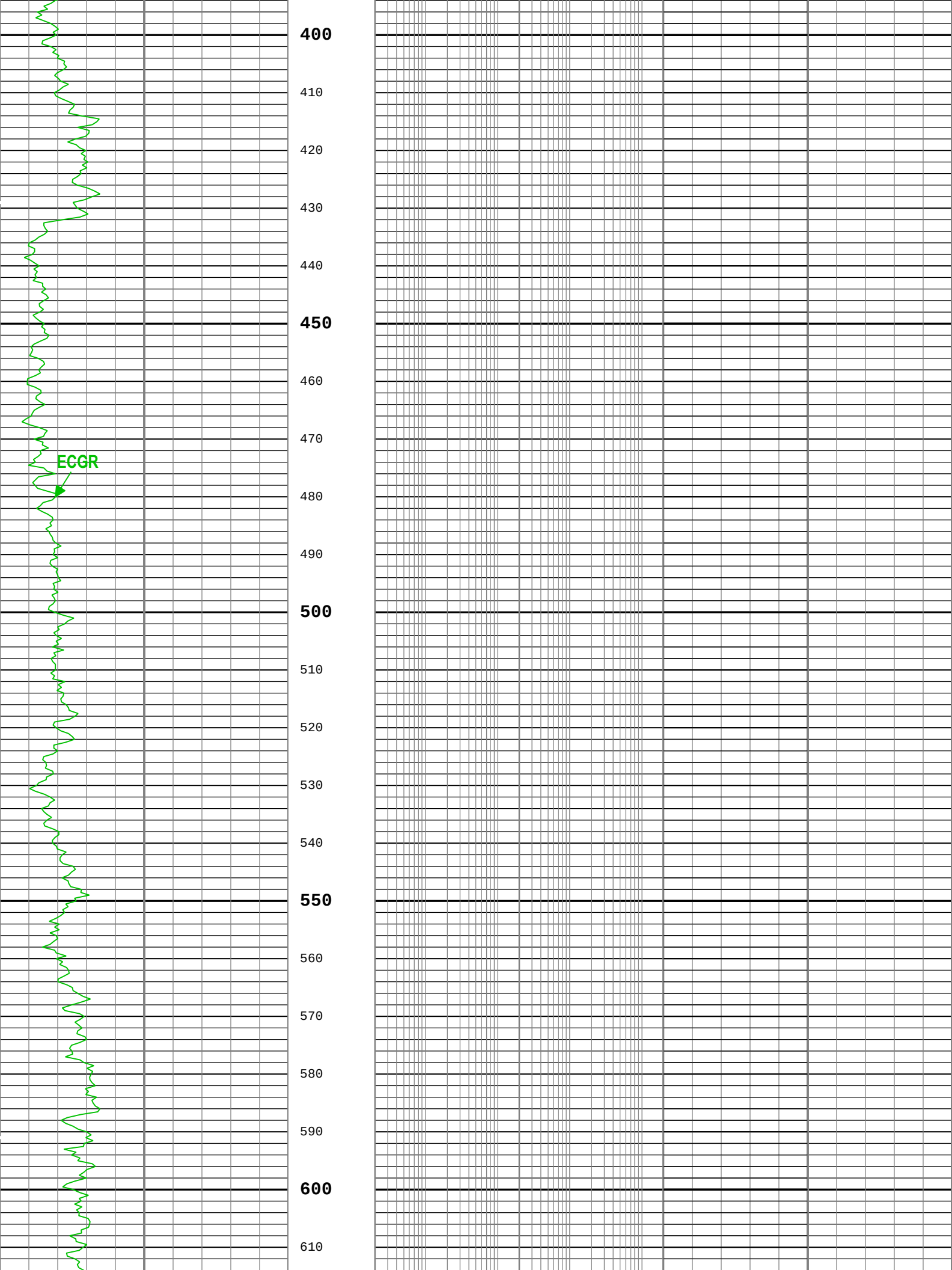
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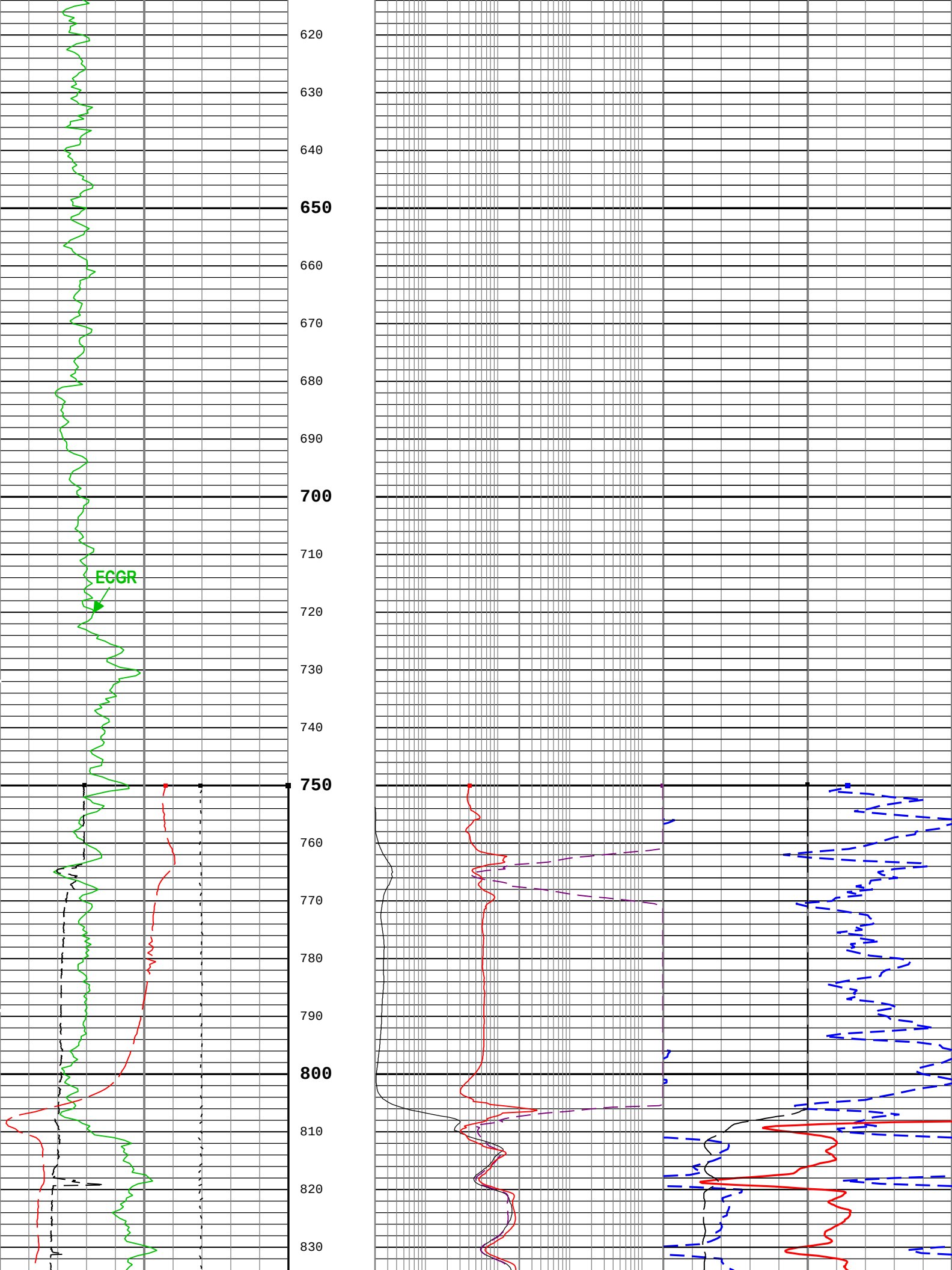
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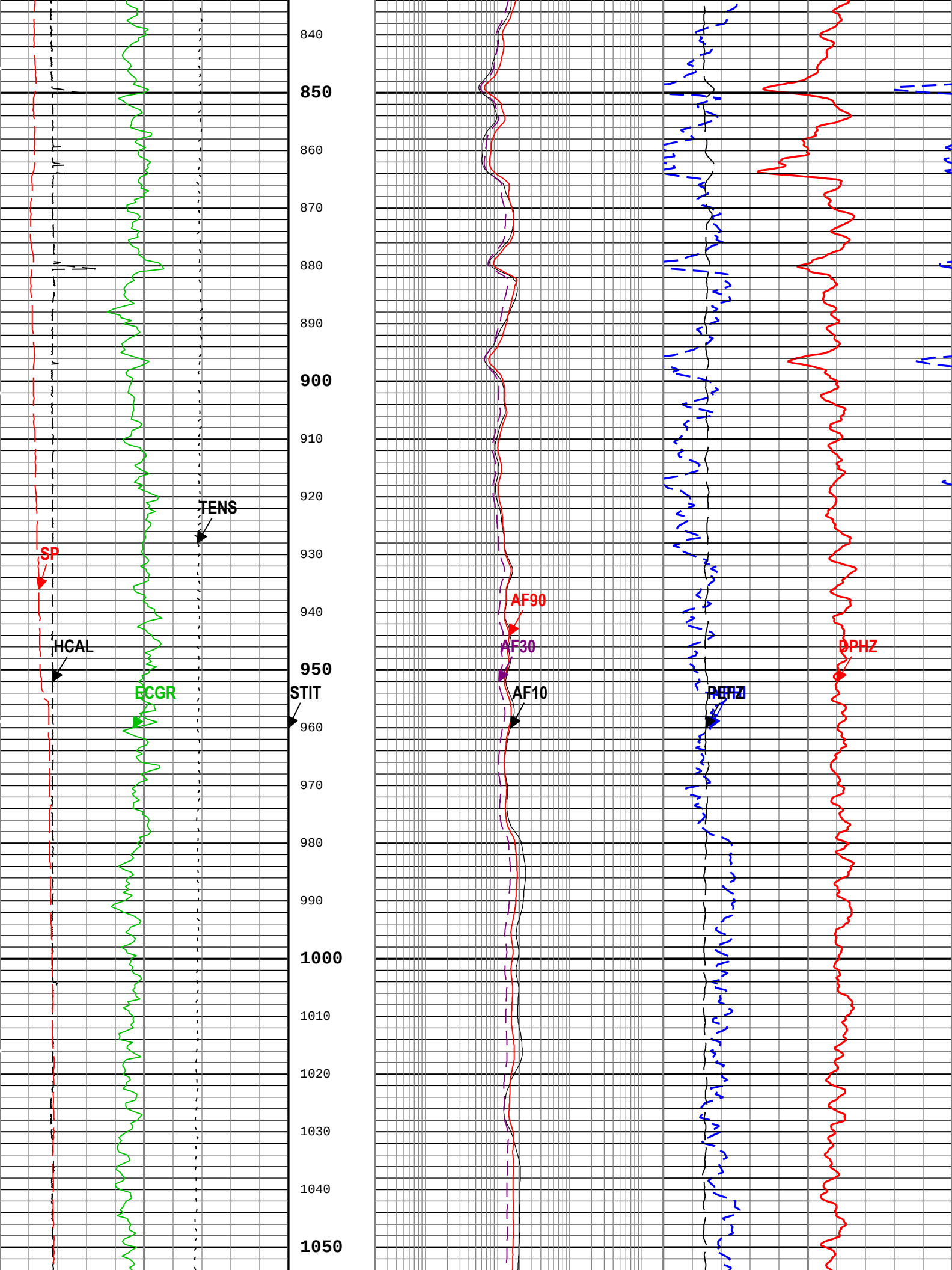
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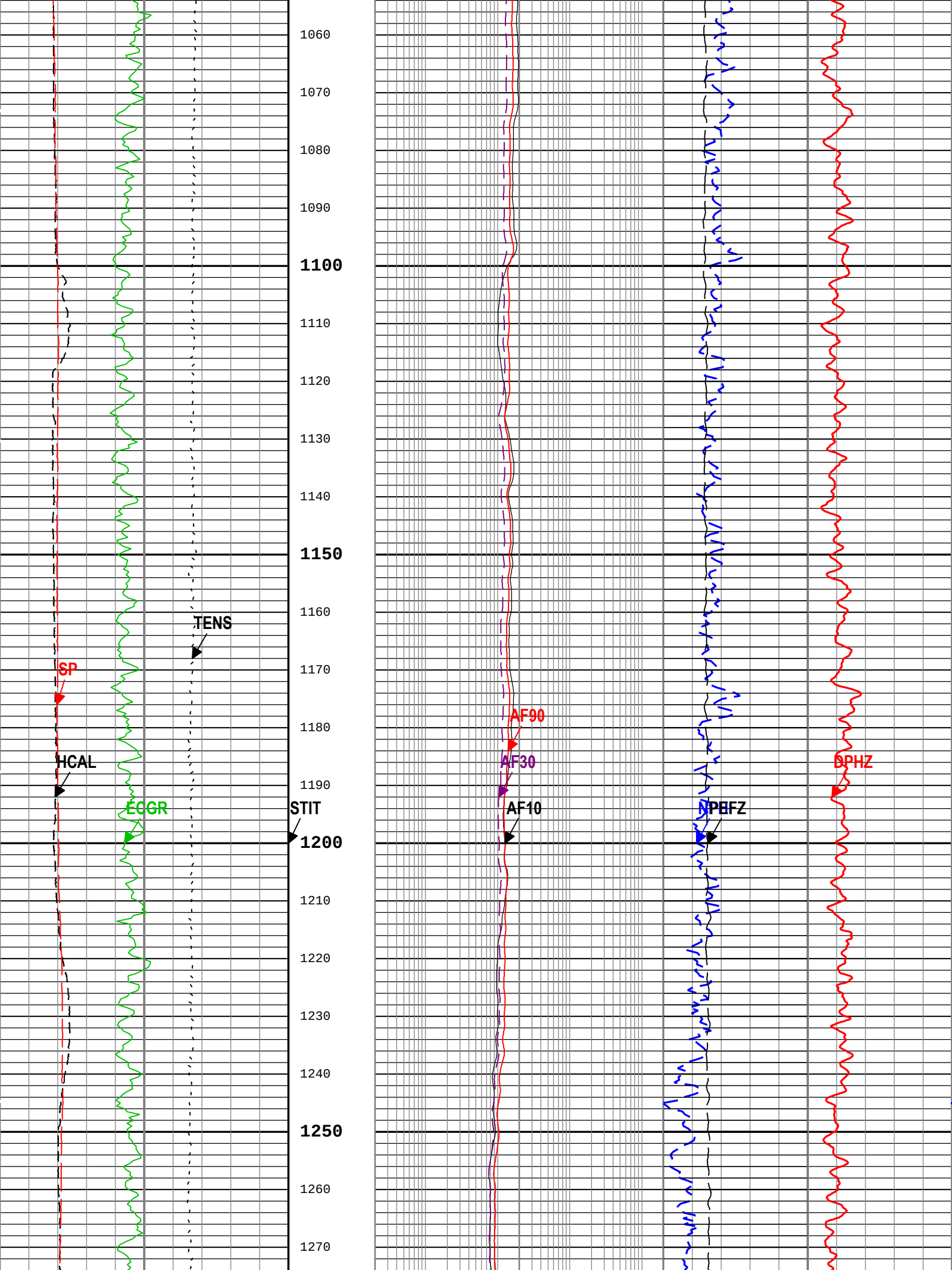
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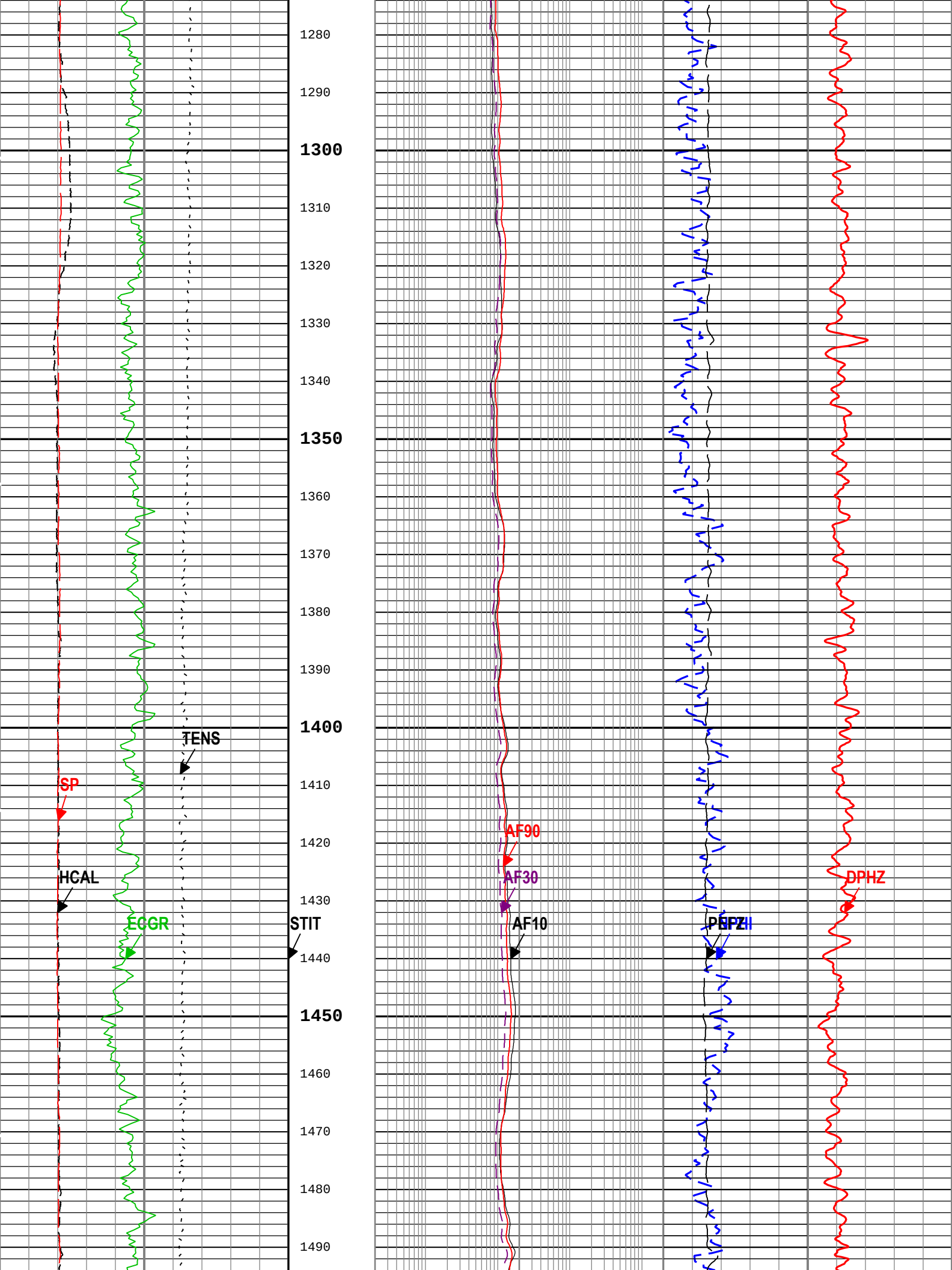
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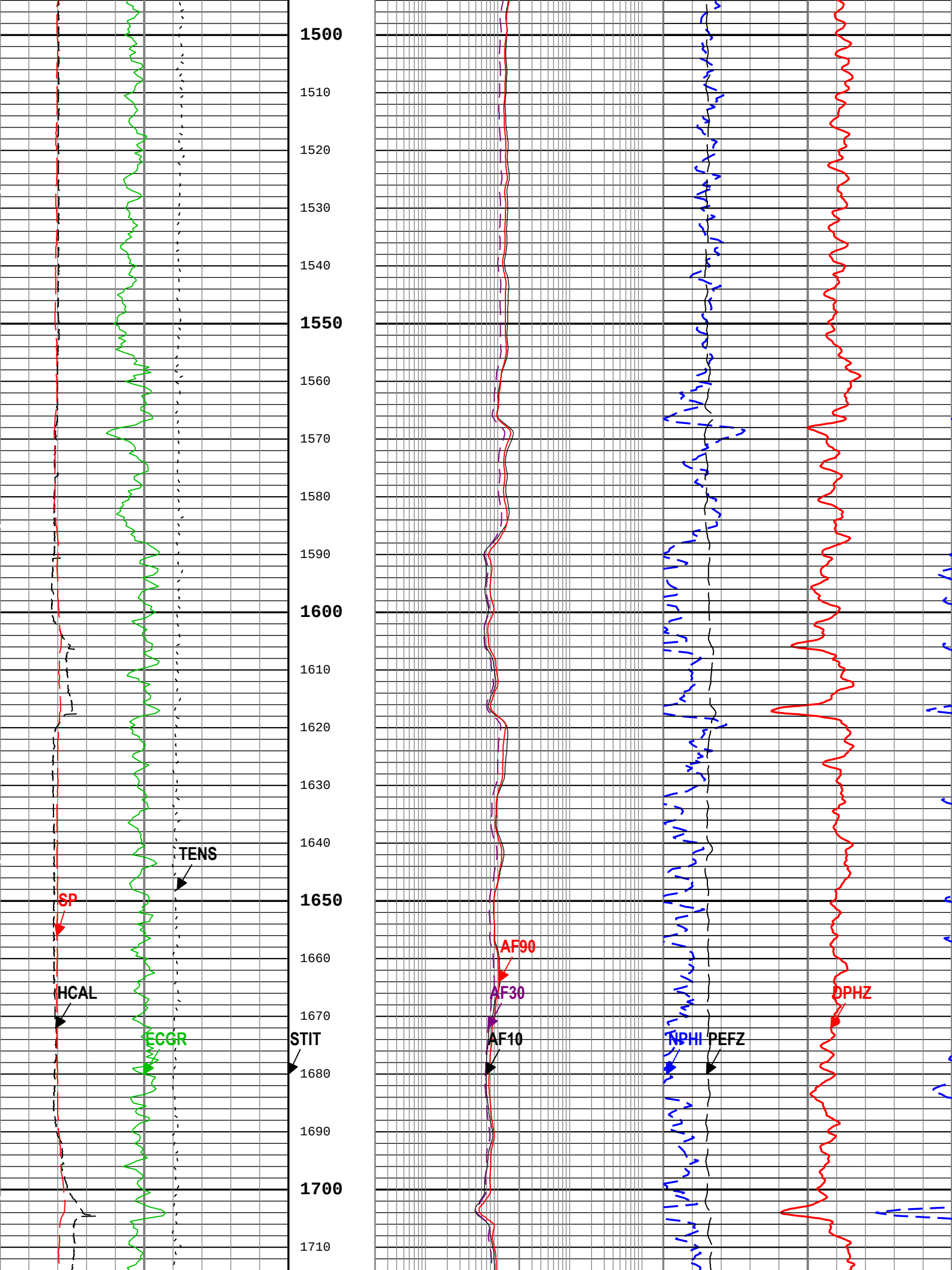
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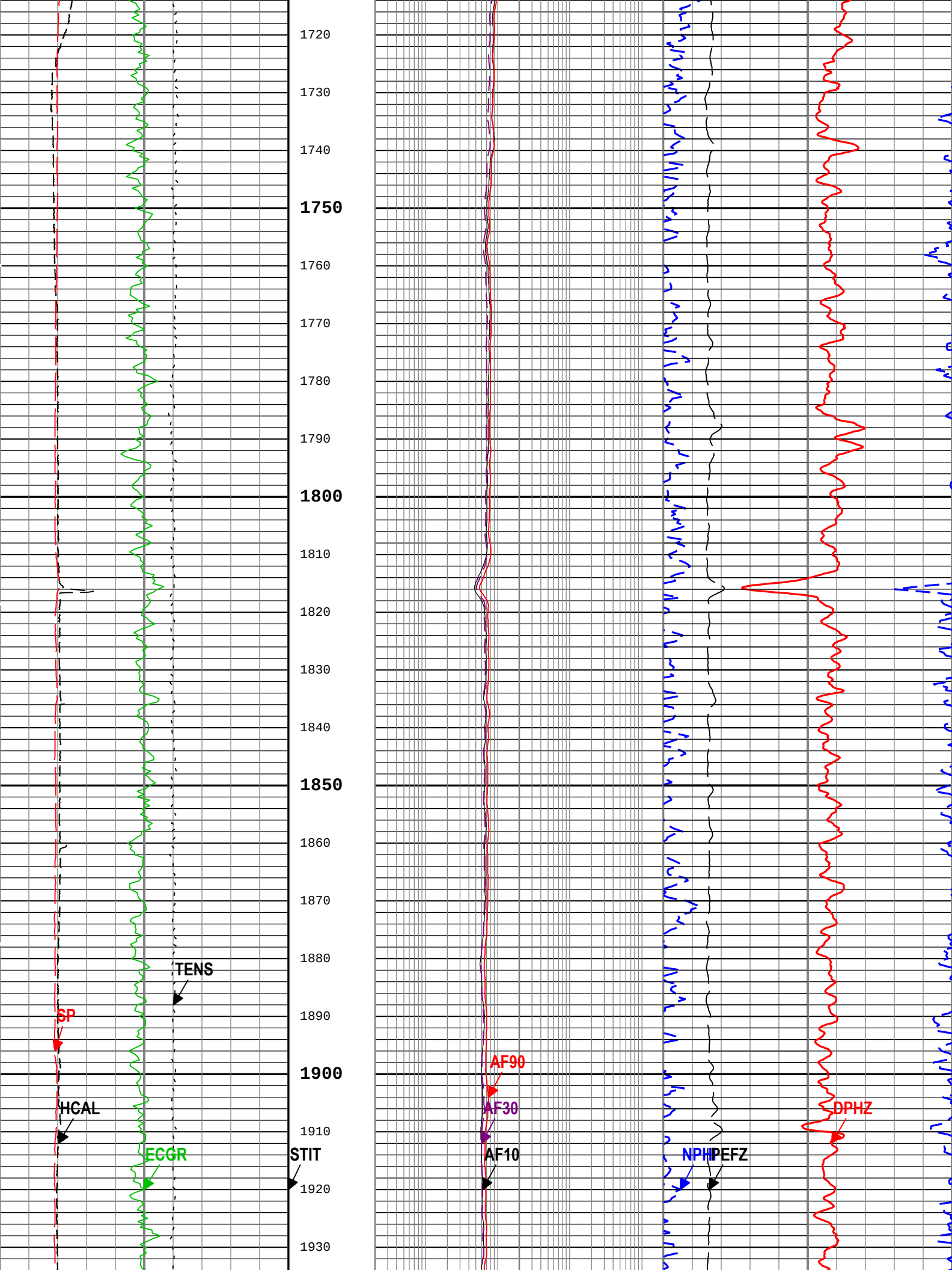
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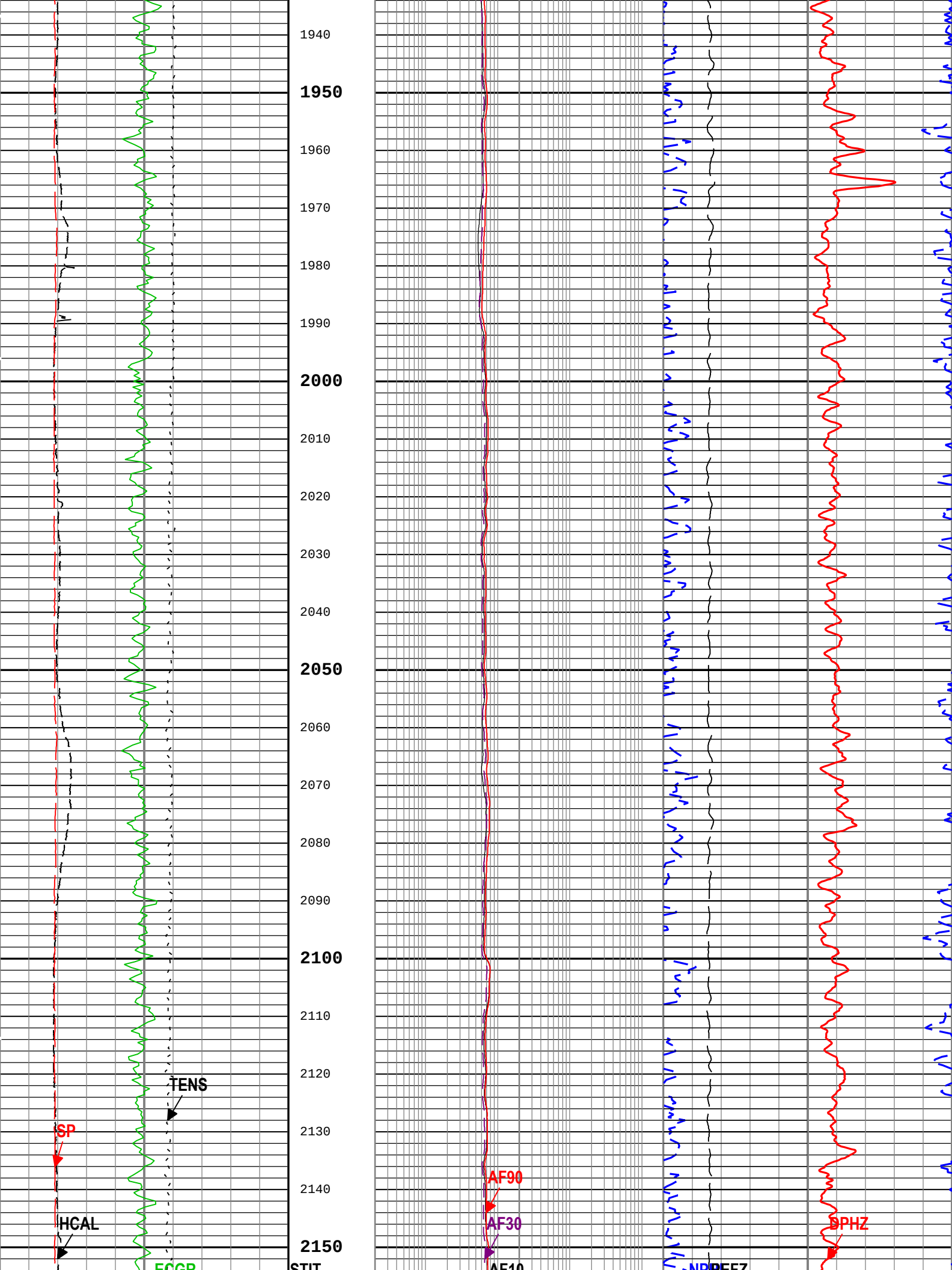
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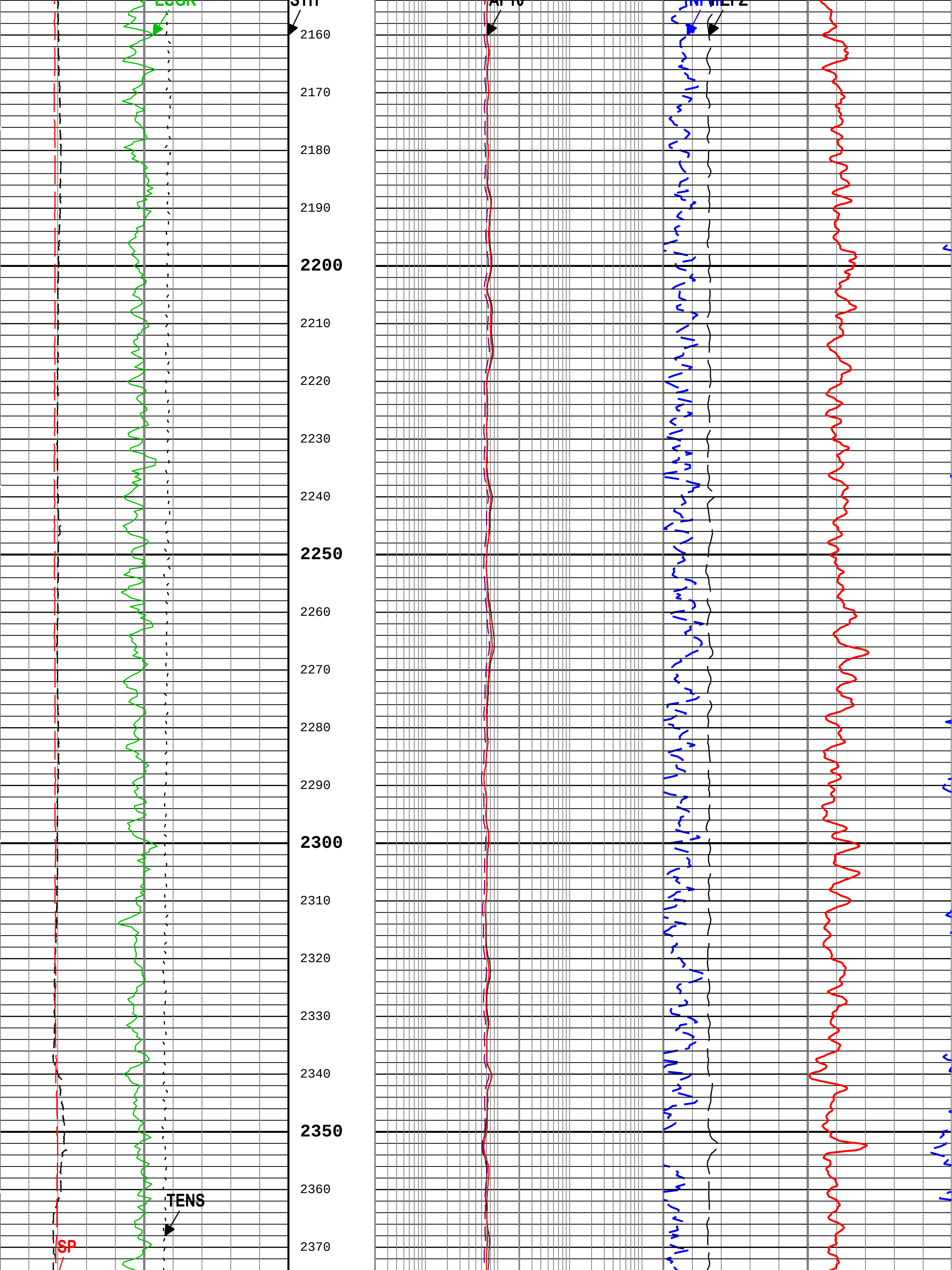
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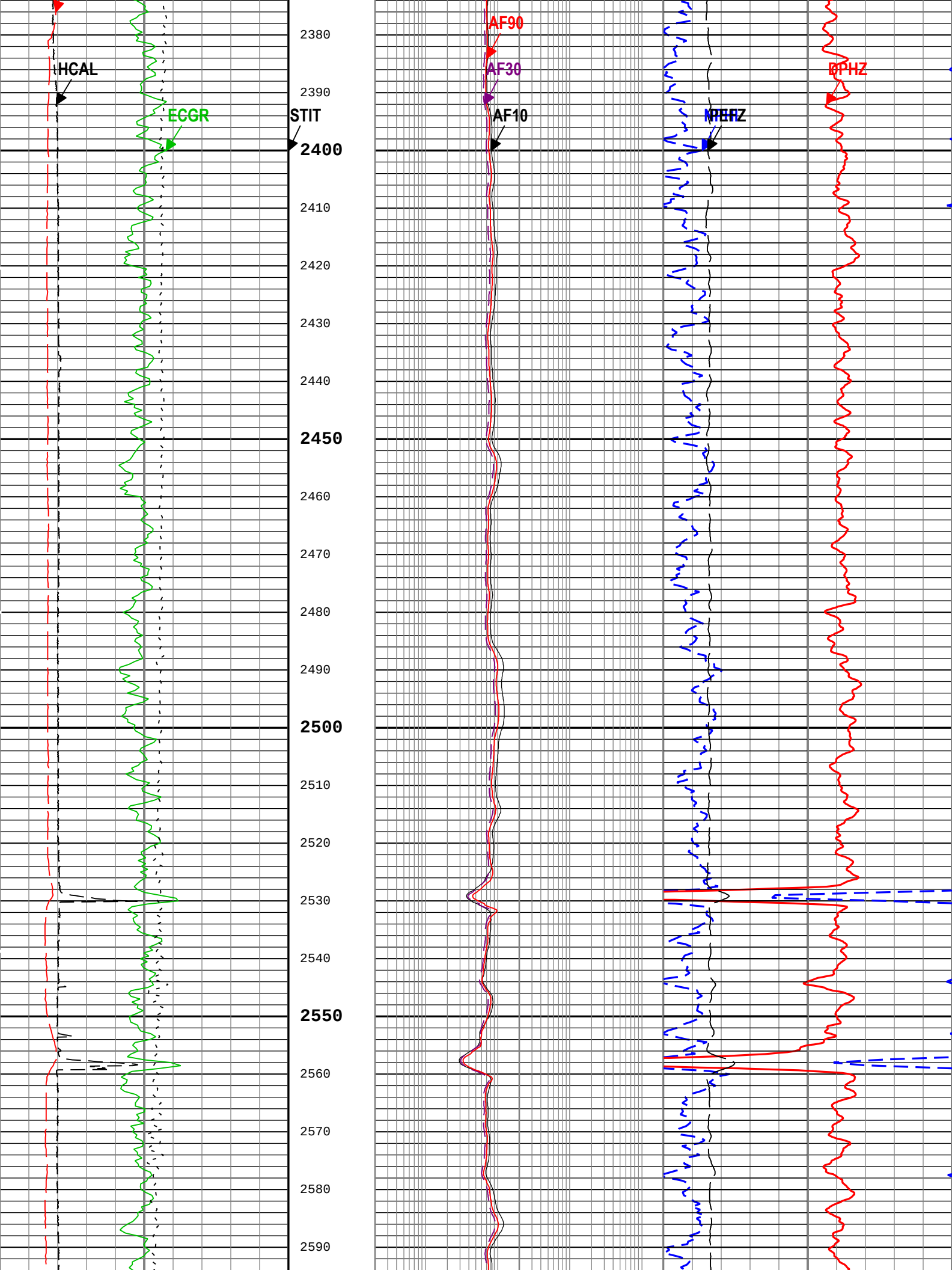
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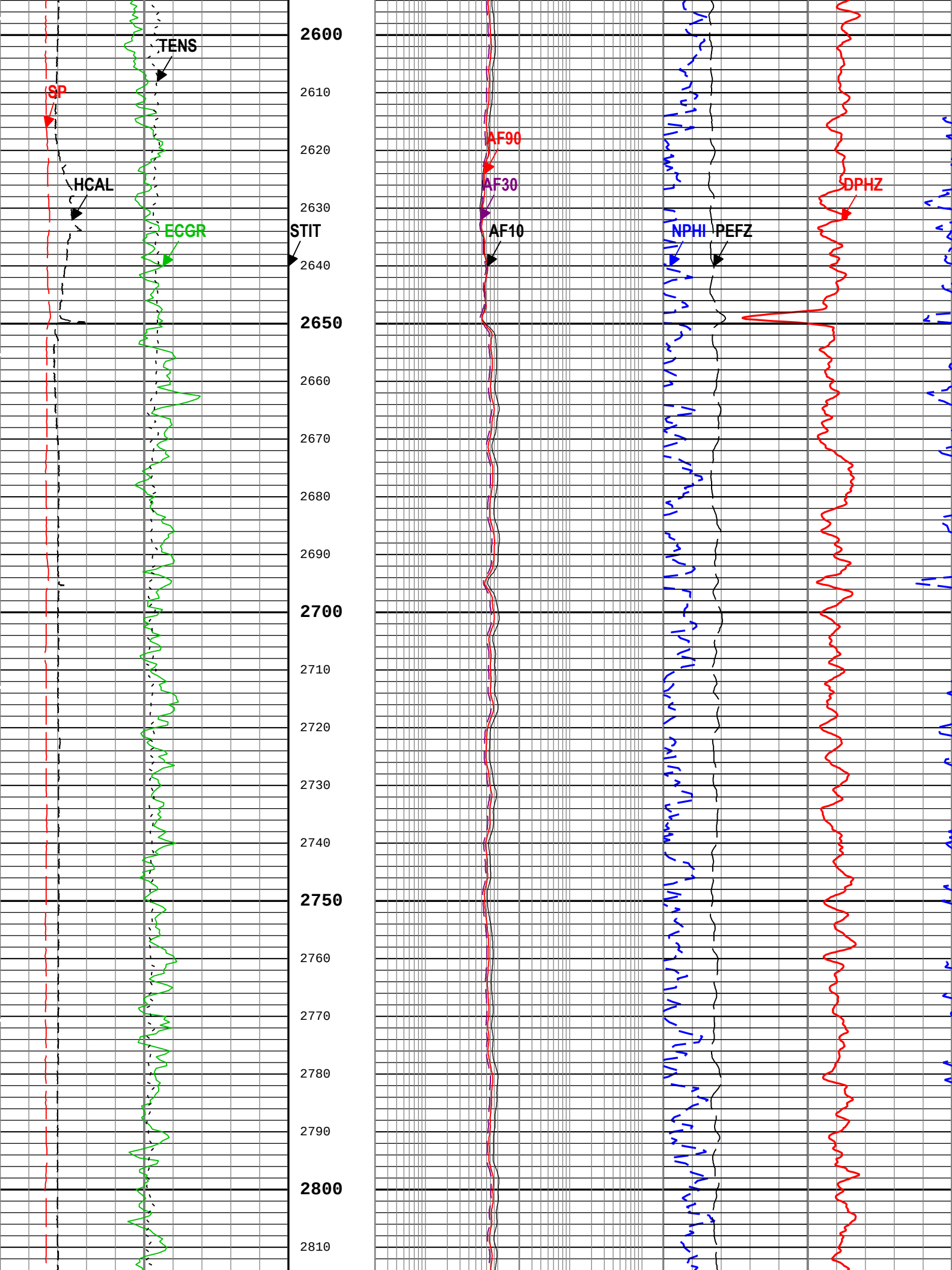
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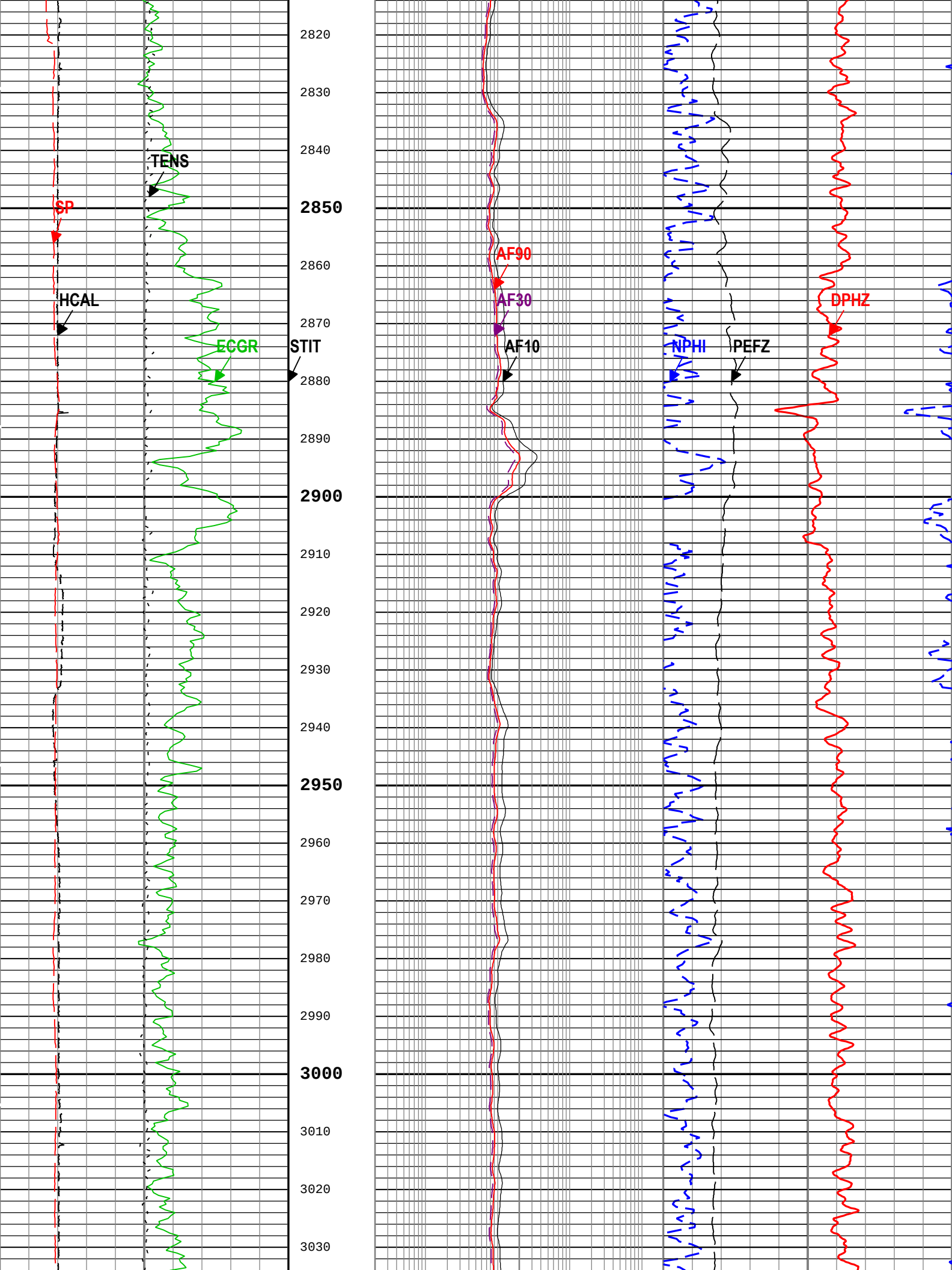
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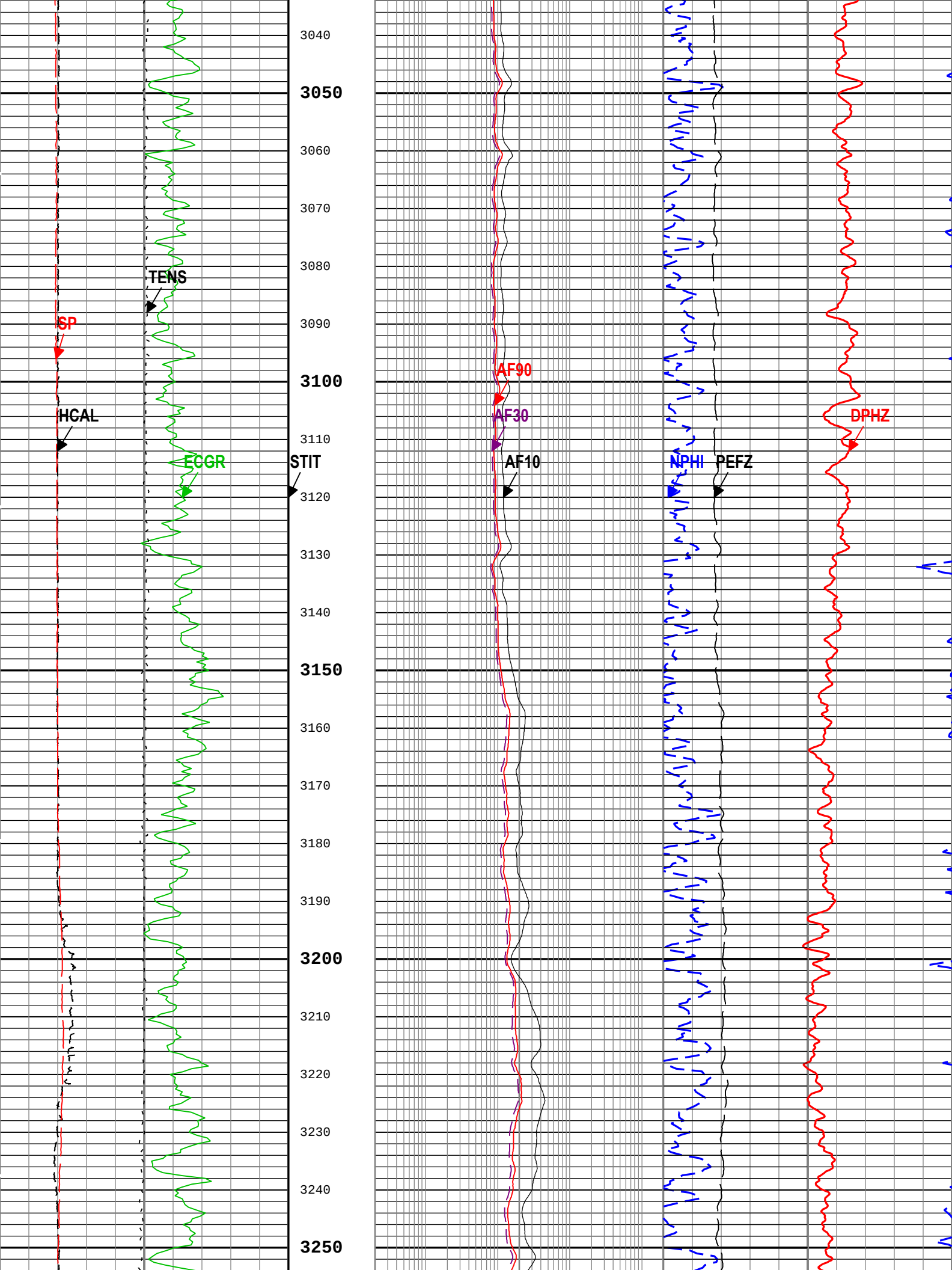
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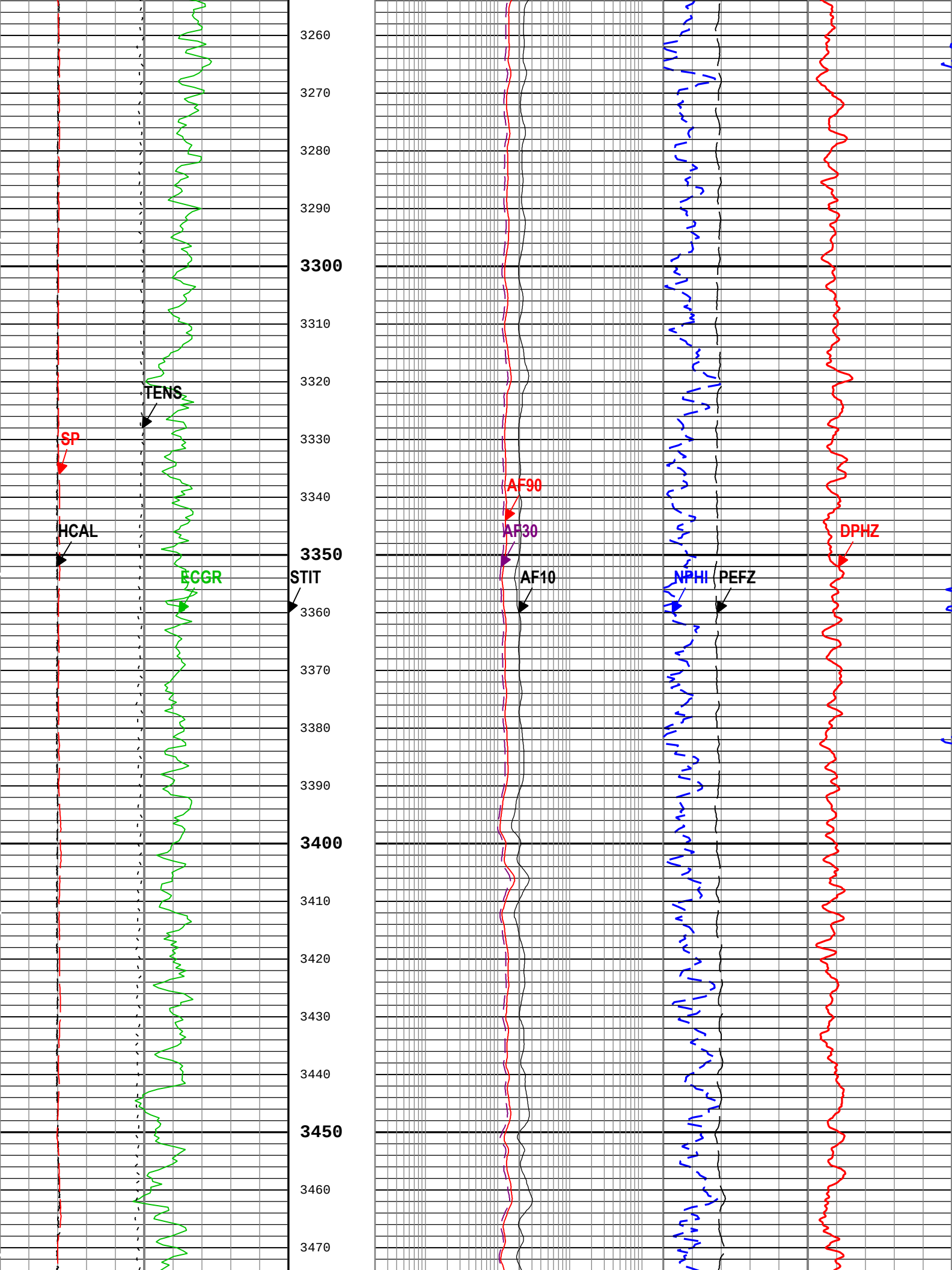
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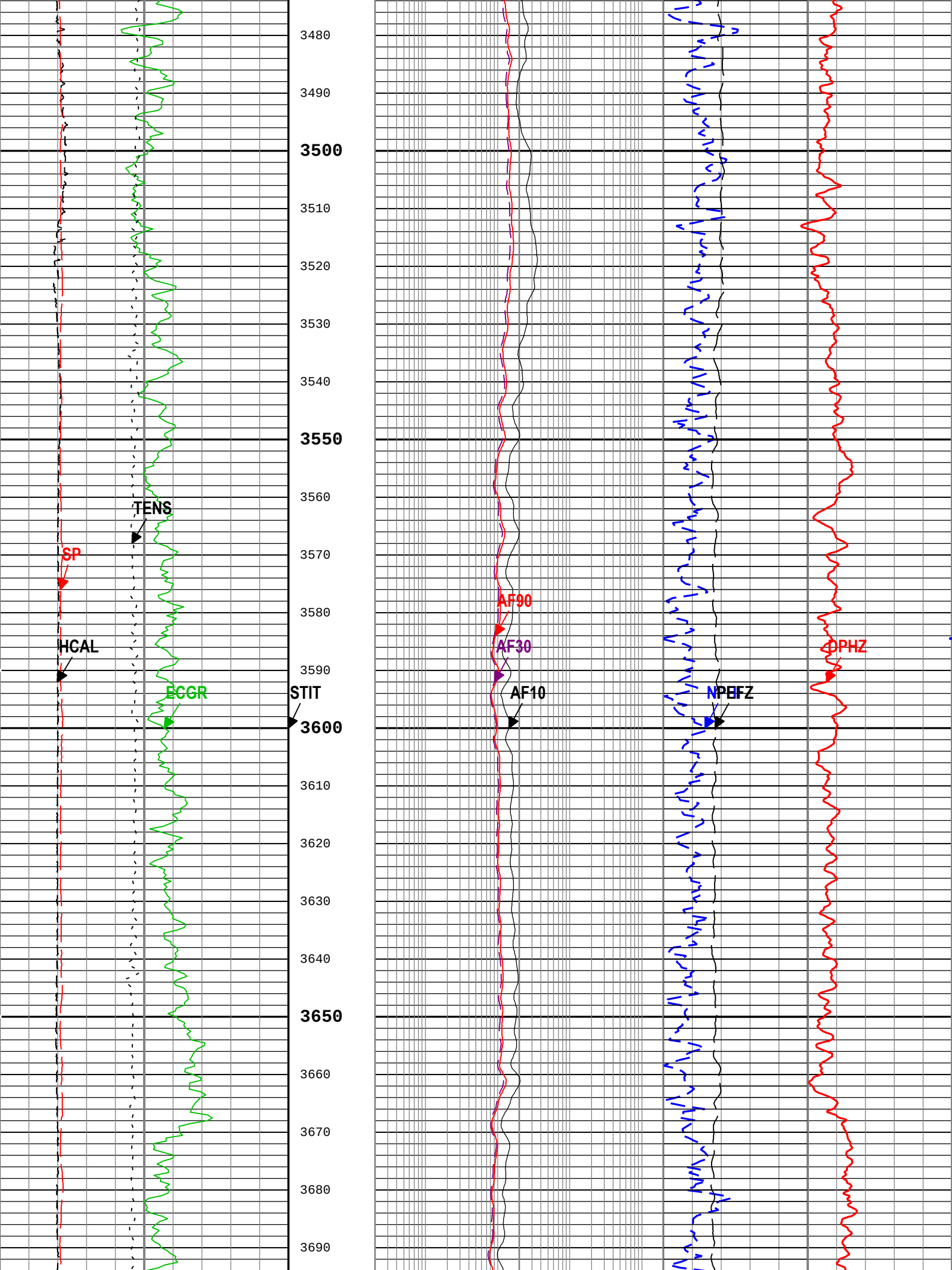
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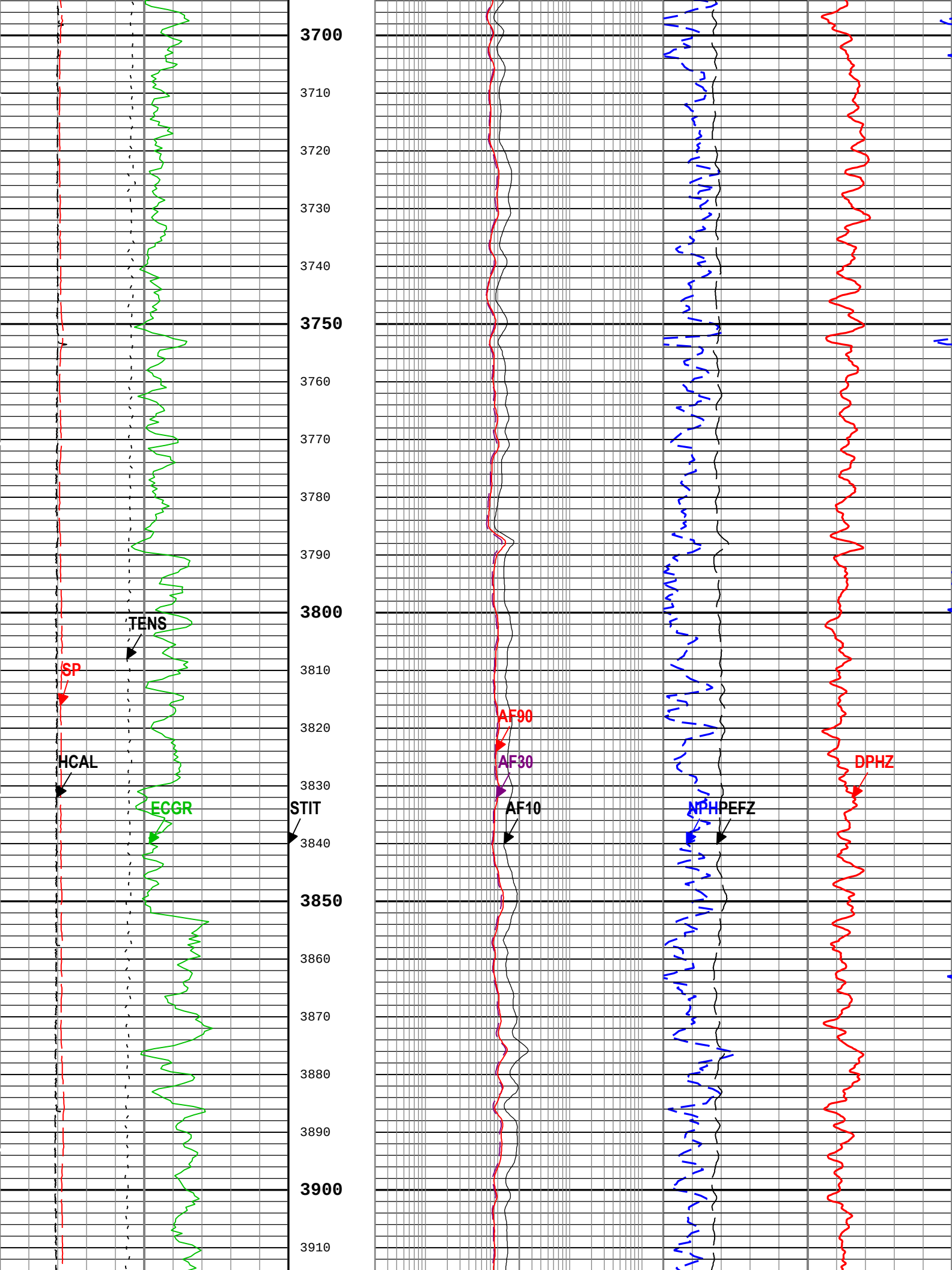
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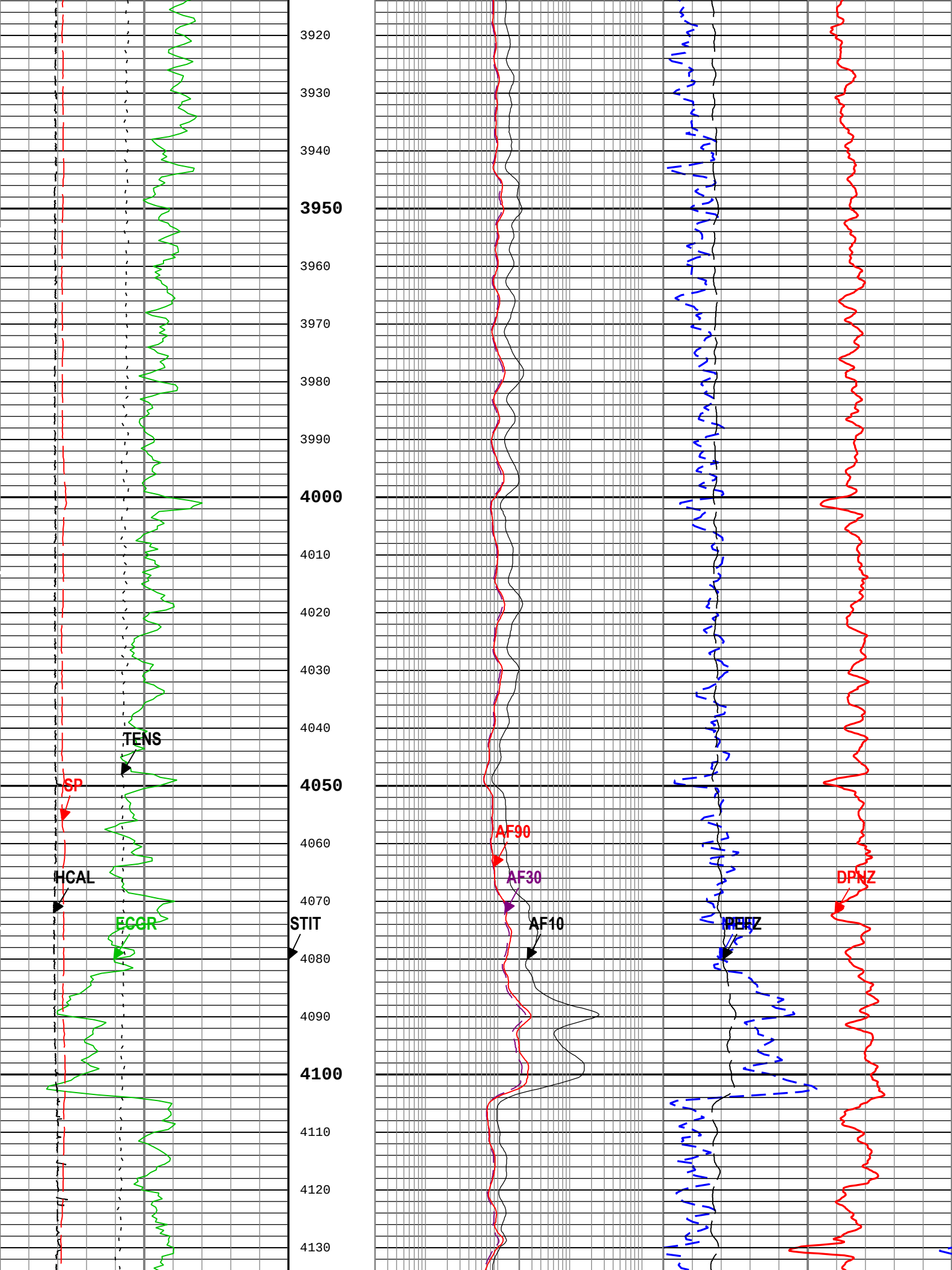
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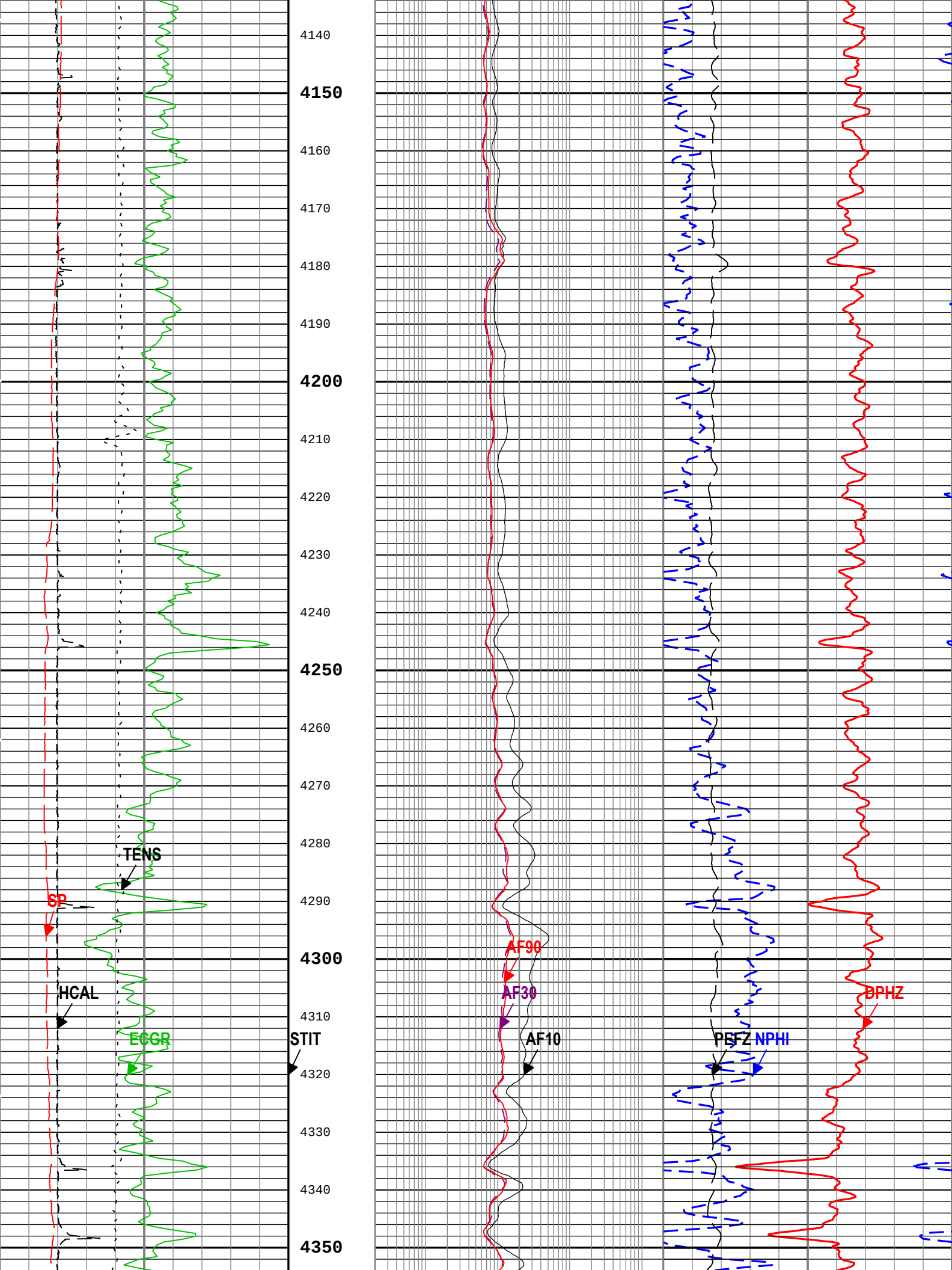
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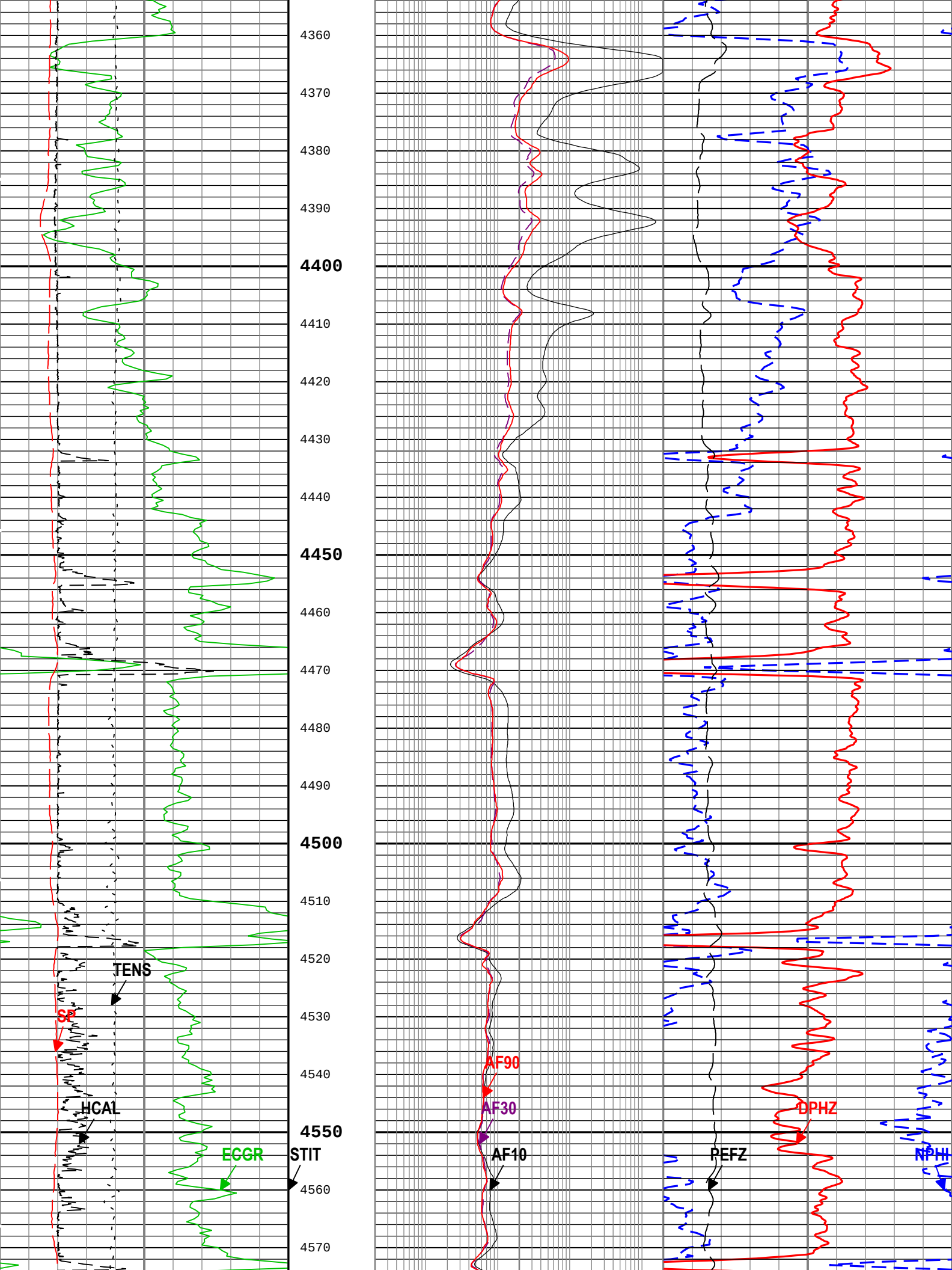
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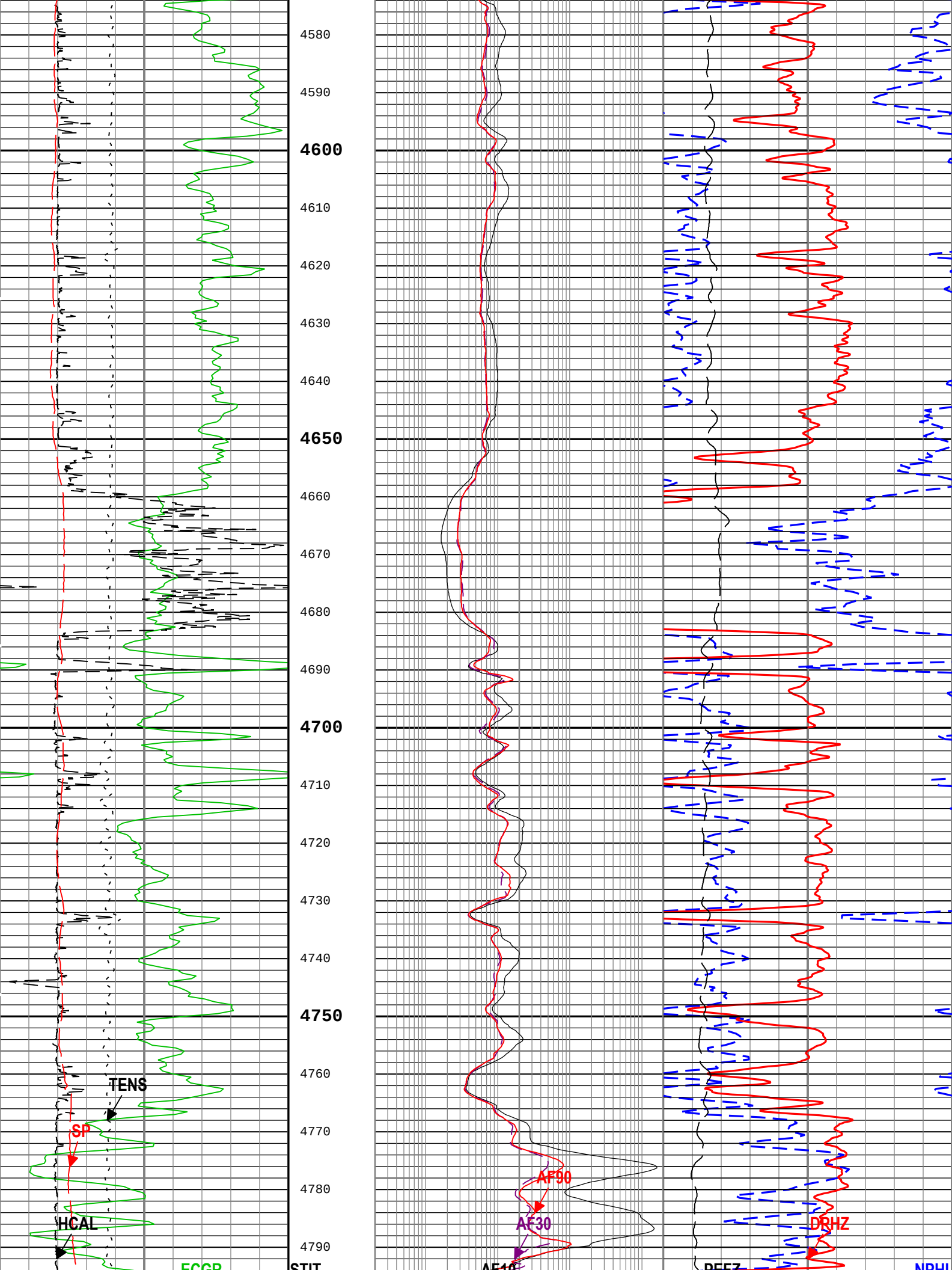
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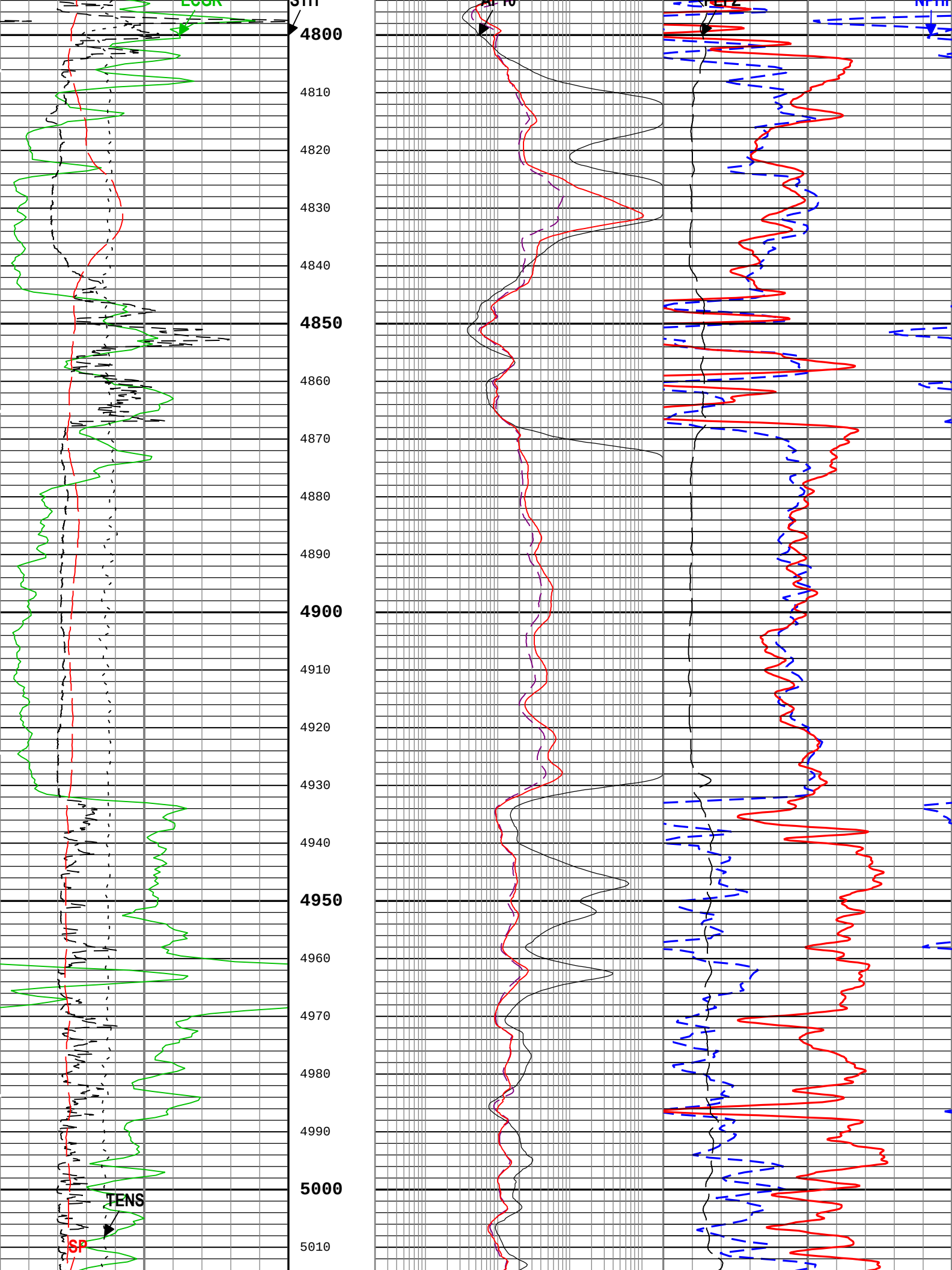
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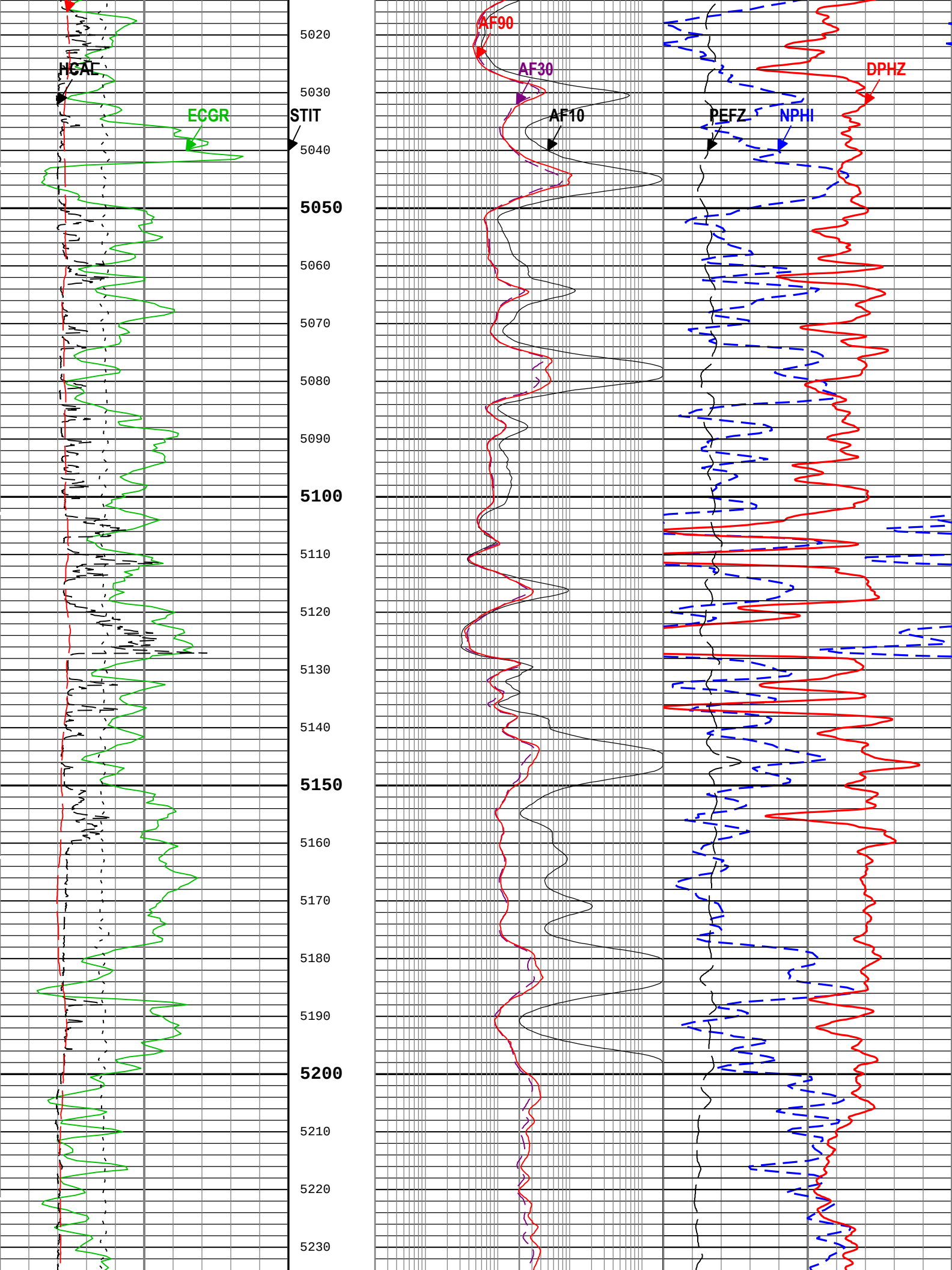
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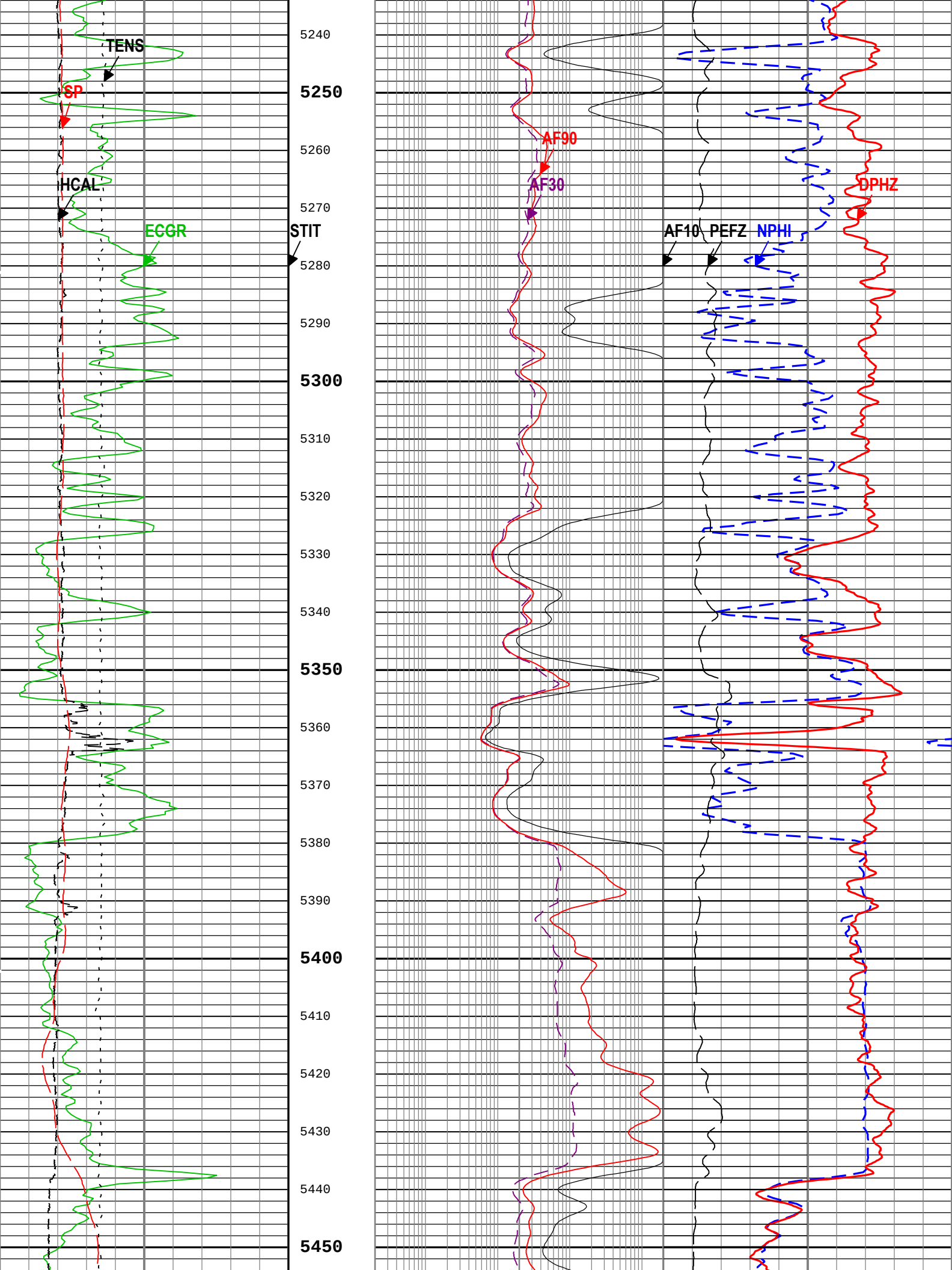
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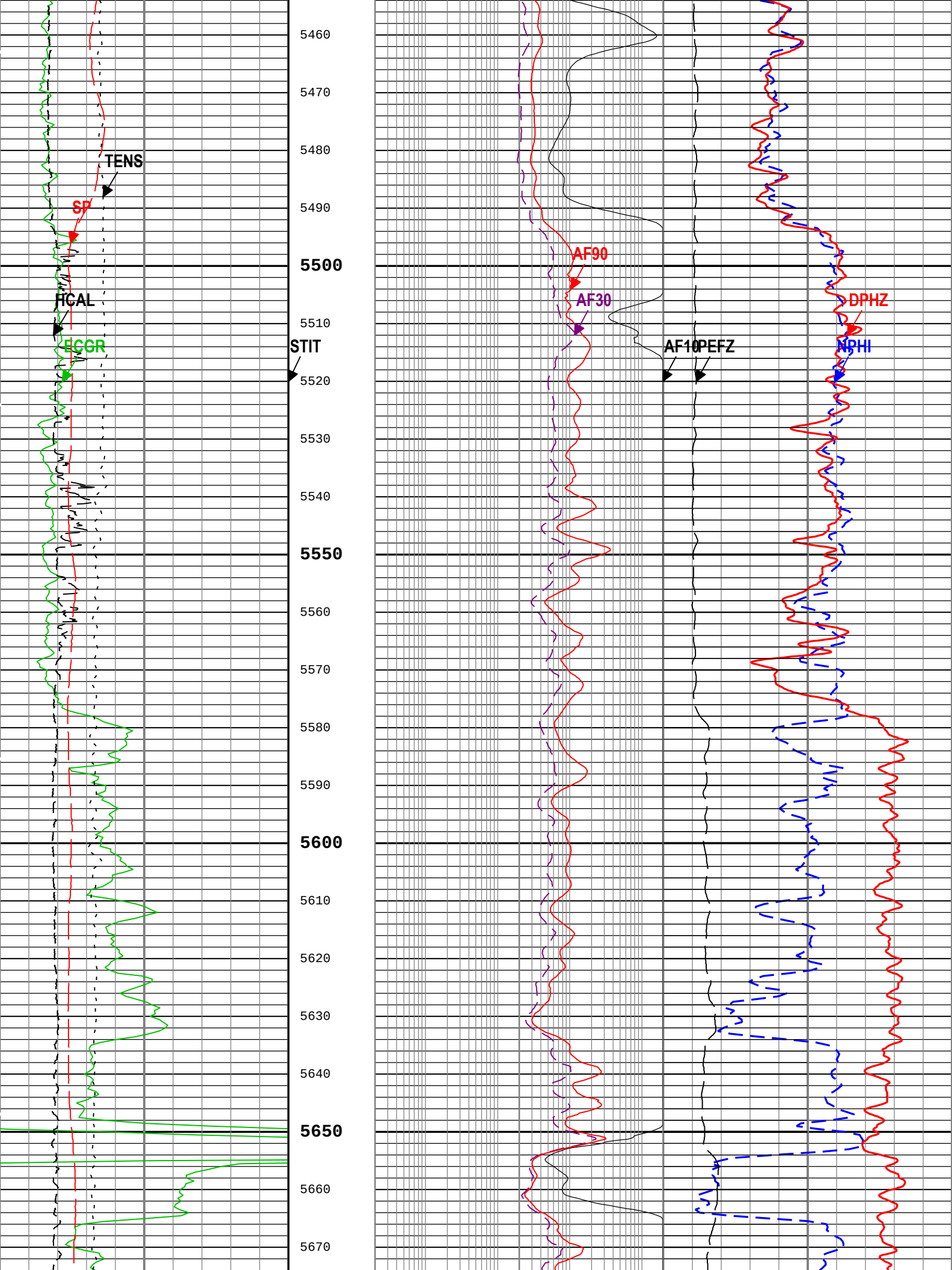
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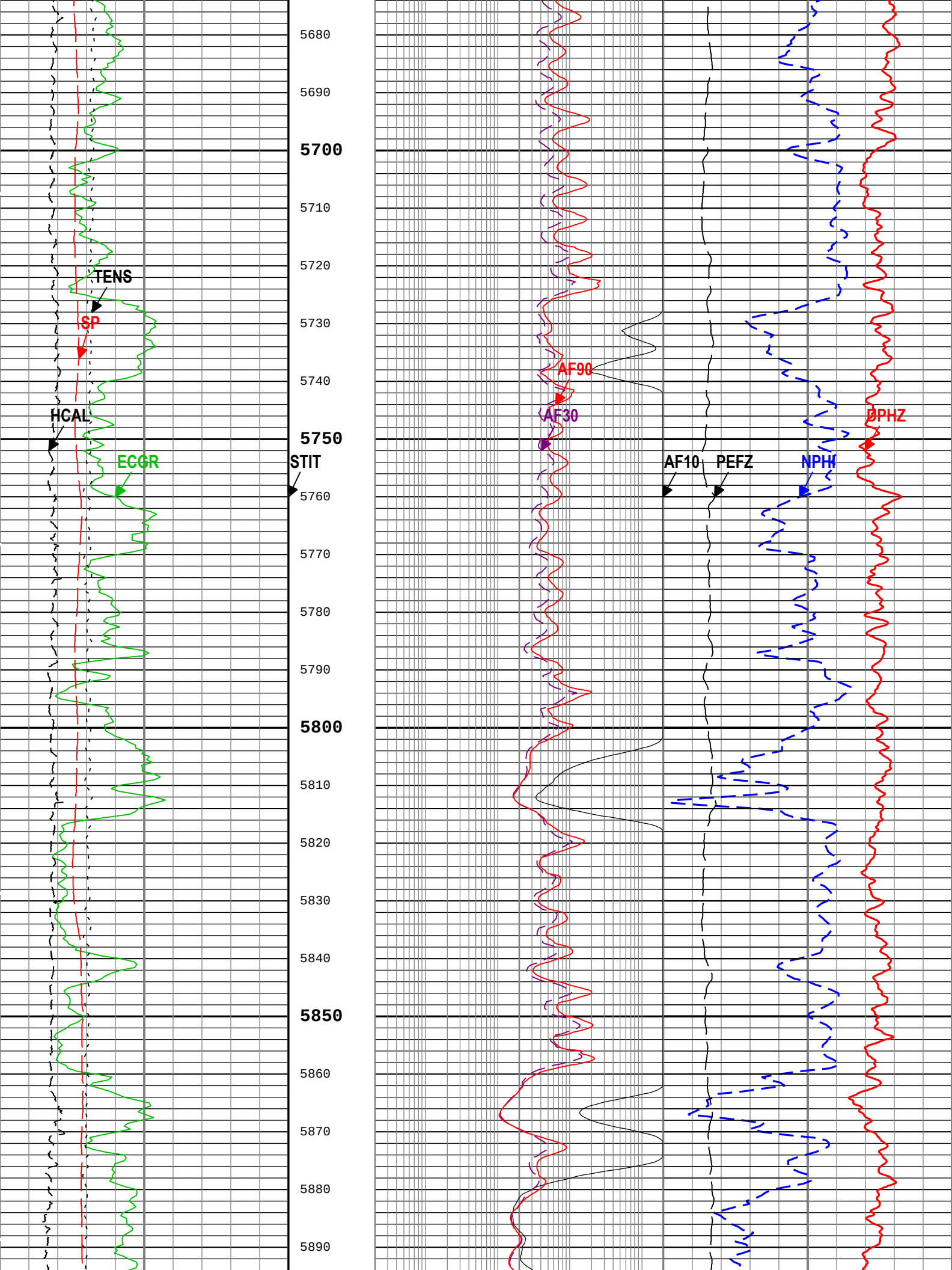
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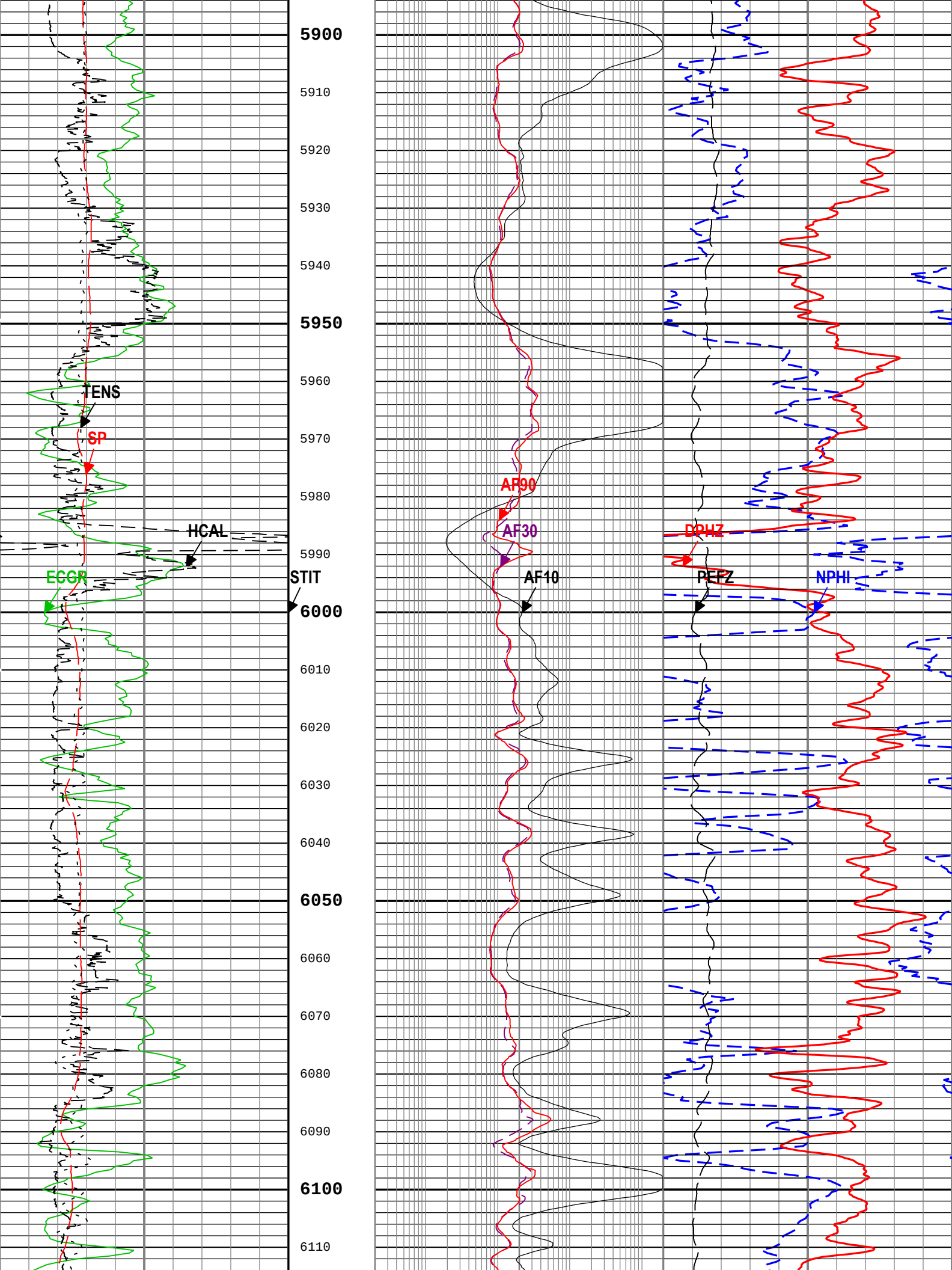
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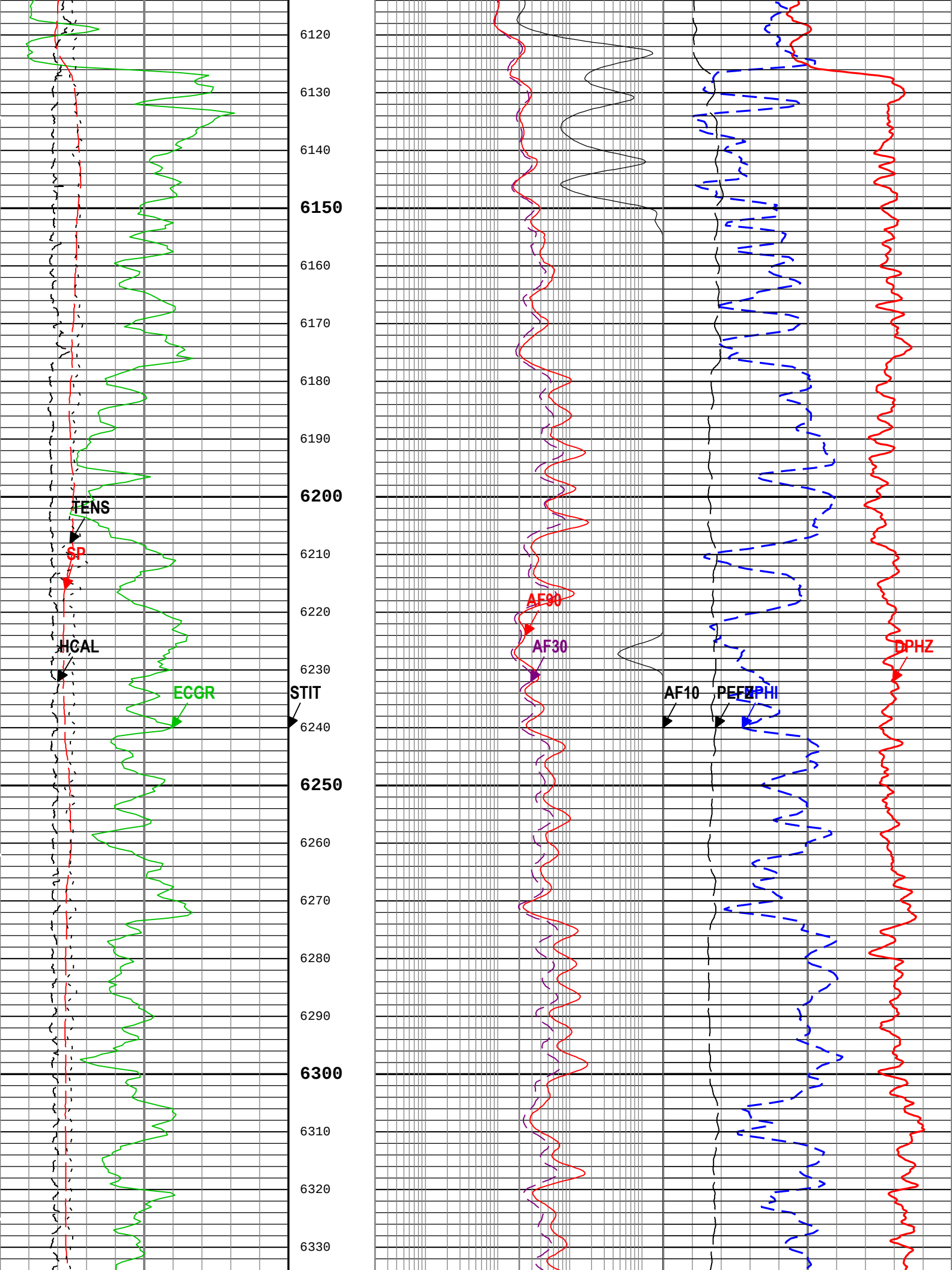
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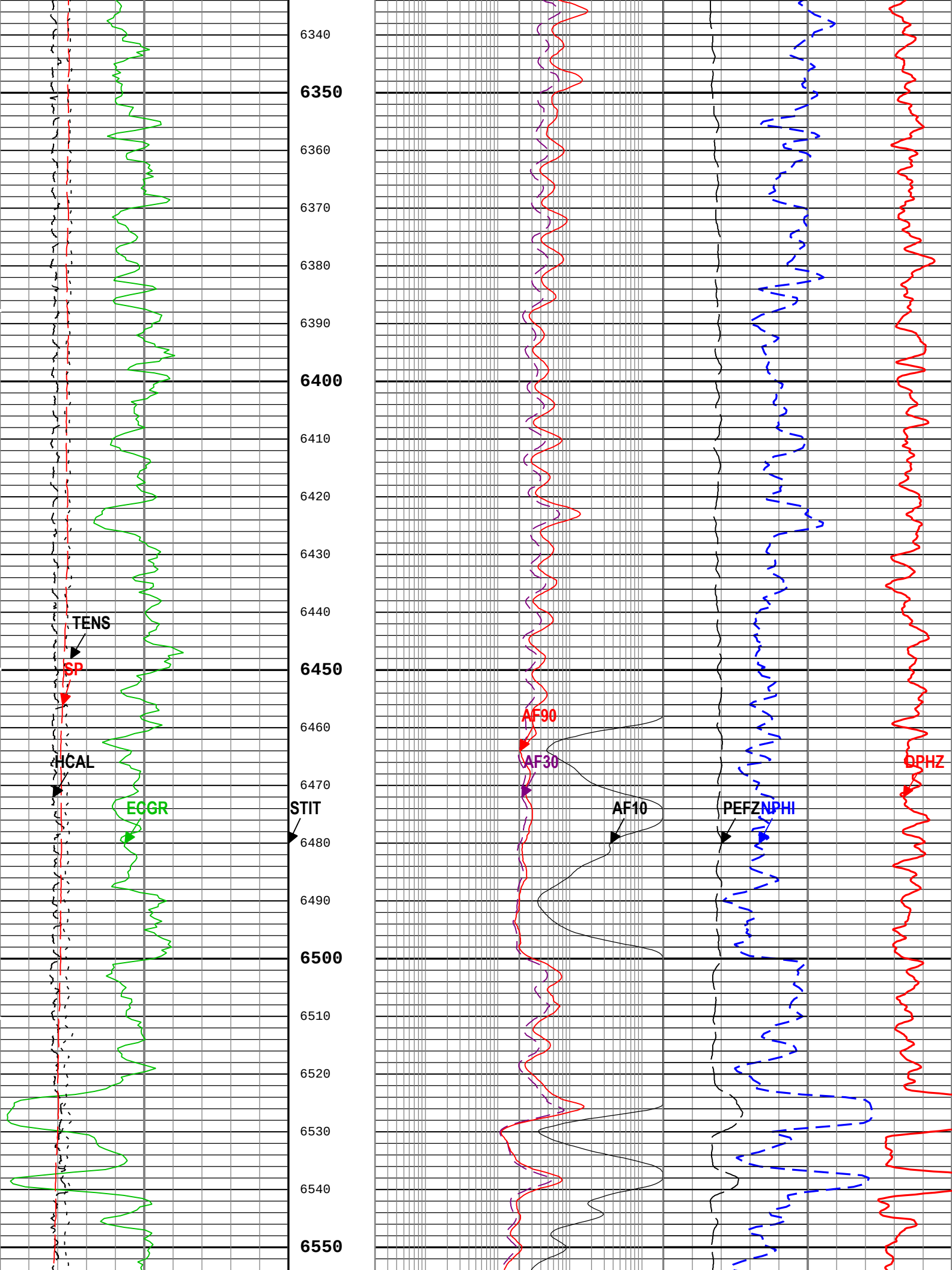
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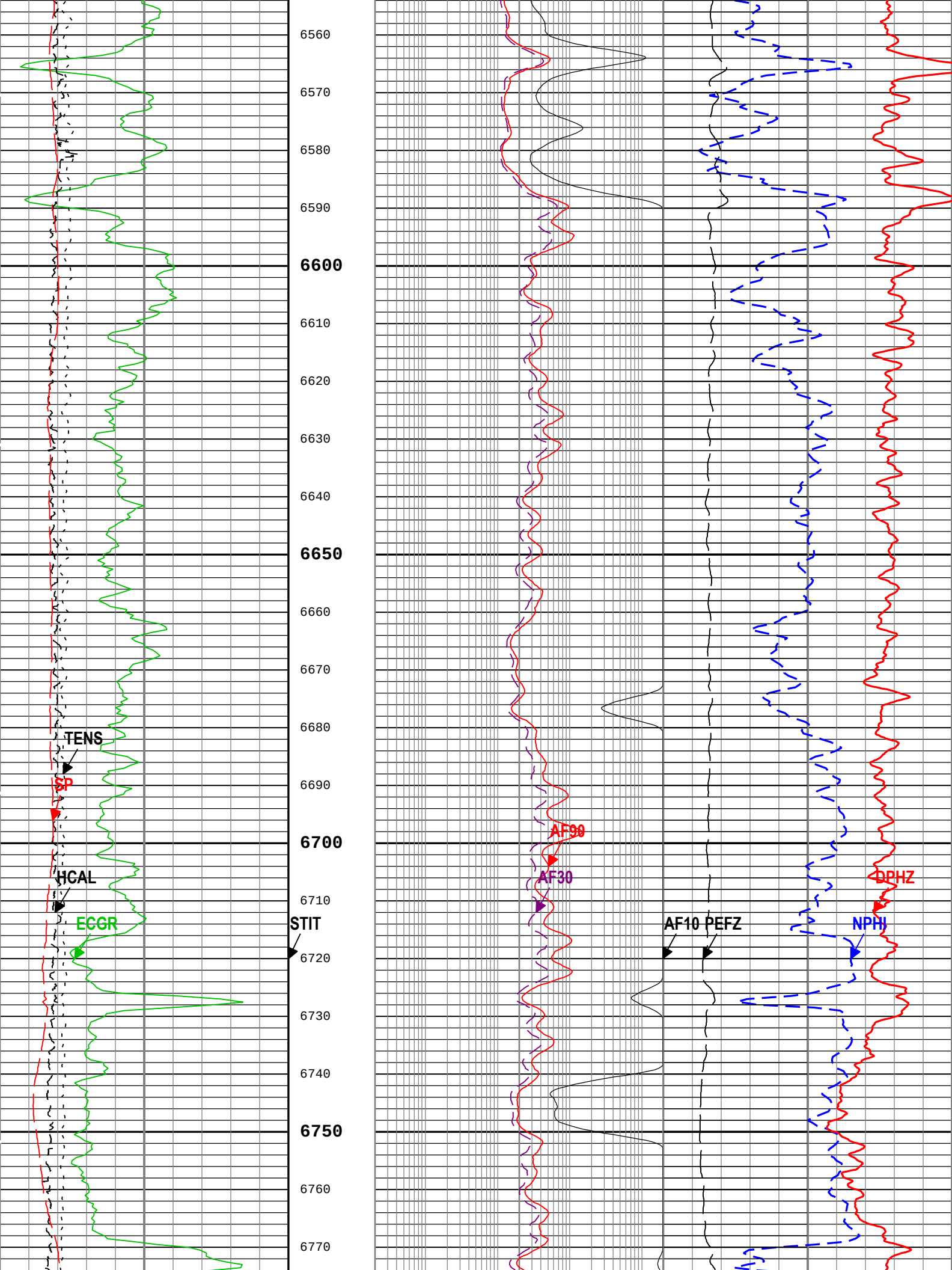
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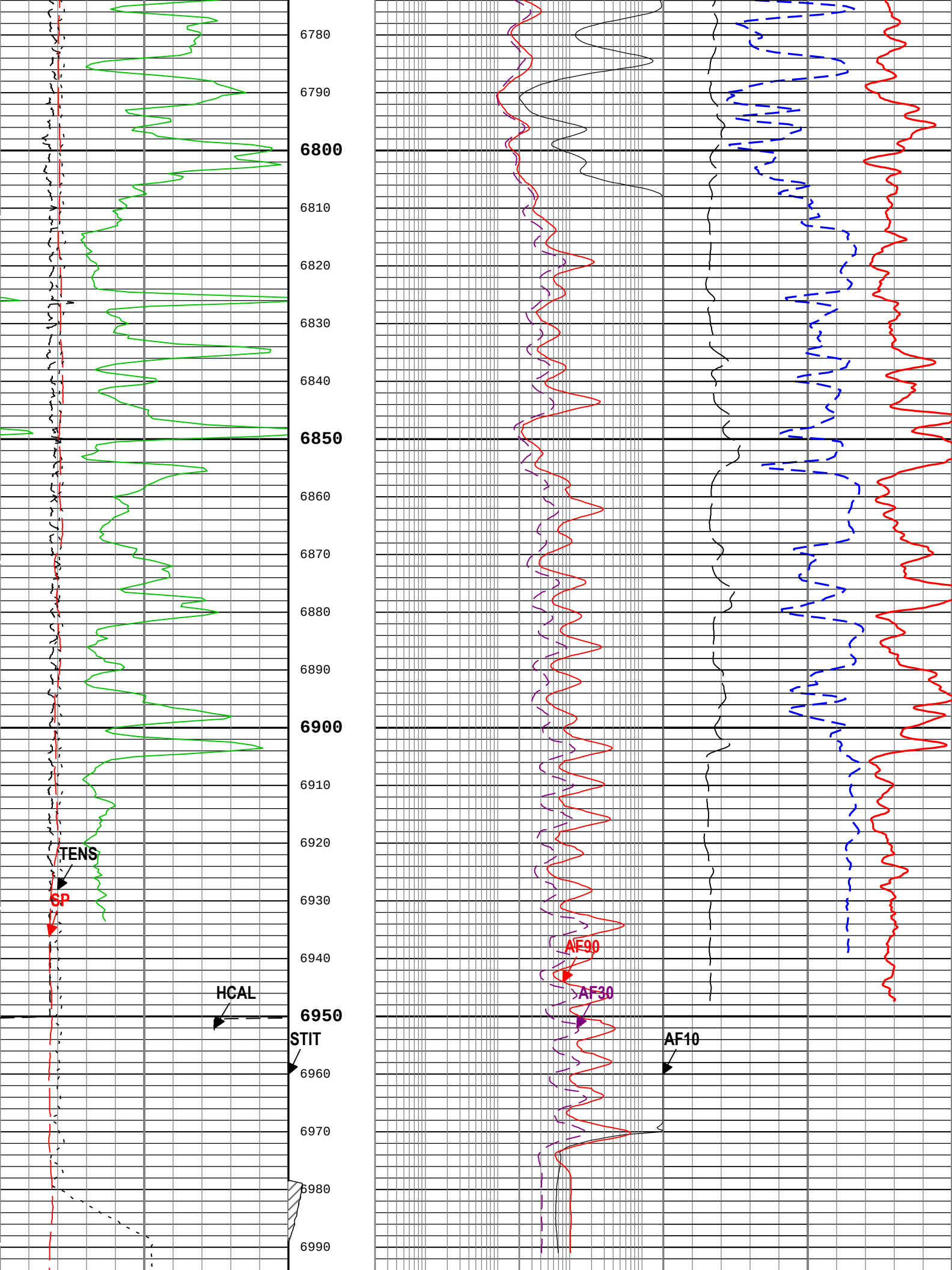
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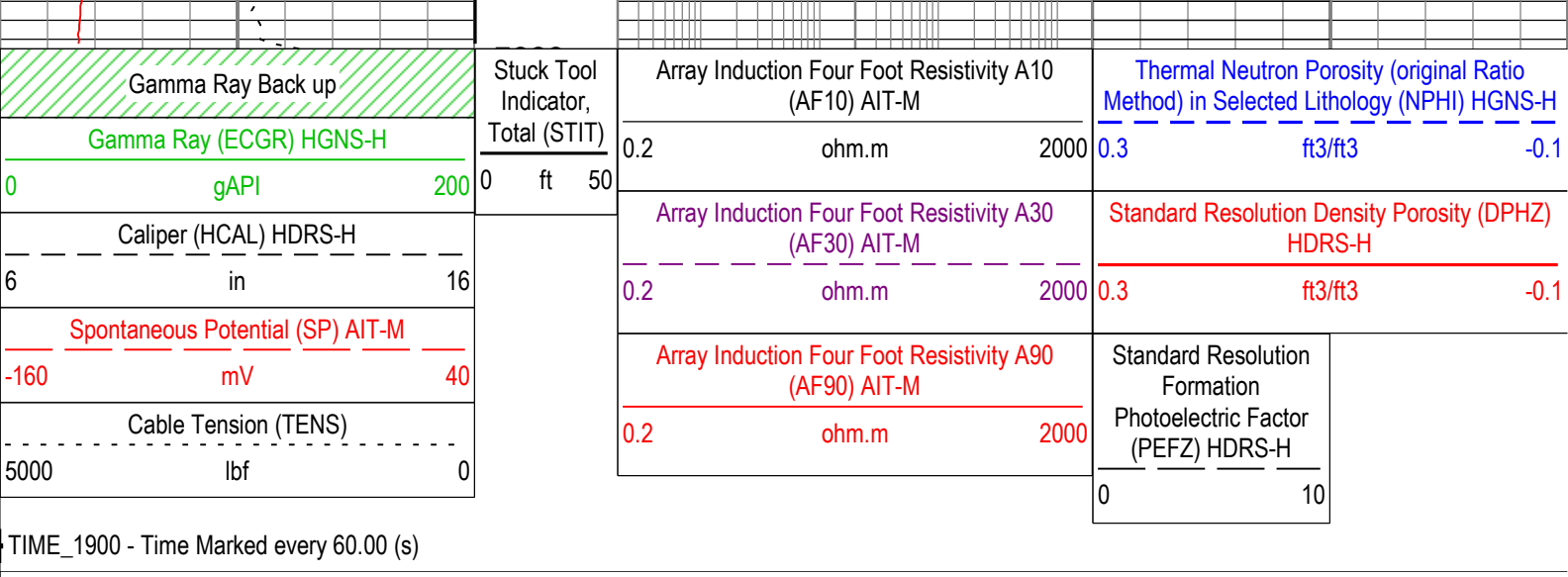


Description: HGNS standard resolution porosities for Platform Express Format: Log (Import of TripleCombo-5) Index Scale: 5 in per 100 ft Index Unit: ft
Index Type: Measured Depth Creation Date: 25-Oct-2015 23:52:46

Channel Processing Parameters

Run 1: Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Standoff	
ISSBAR	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	0.6	in
CBLO	Casing Bottom (Logger)	WLSESSION	810	ft
CDEN	Cement Density	HGNS-H	2	g/cm3
DFD	Drilling Fluid Density	Borehole	8.7	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DHC	Density Hole Correction	HDRS-H	Bit Size	
FD	Fluid Density	Borehole	1	g/cm3
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	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	SANDSTONE	
MDEN	Matrix Density for Density Porosity	Borehole	2.68	g/cm3
SOCO	Standoff Correction Option	HGNS-H	Yes	
SPDR	SP Drift Per Foot	AIT-M	0	mV/ft
TD	Total Measured Depth	Borehole	6980	ft

Tool Control Parameters

Run 1: Parameters

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

Run 1

5" Triple Combo

Pass Summary

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

Run 1	Main[3]:Up	Up	68.54 ft	6998.98 ft	25-Oct-2015 9:47:43 PM	25-Oct-2015 11:40:39 PM	ON	0.00 ft	No

All depths are referenced to toolstring zero

Log

Company:GRMR Oil & Gas LLC Well:Hamill 19 16D

Run 1: Main[3]:Up:S008

Description: HGNS standard resolution porosities for Platform Express Format: Log (Import of TripleCombo-5) Index Scale: 2 in per 100 ft Index Unit: ft
Index Type: Measured Depth Creation Date: 25-Oct-2015 23:52:49

Channel	Source	Sampling
AF10	AIT-M:AMIS:AMIS	3in
AF30	AIT-M:AMIS:AMIS	3in
AF90	AIT-M:AMIS:AMIS	3in
CALI	HDRS-H:HRCC-H:HRCC-H	1in
DPHZ	HDRS-H:HRMS-H:HRGD-H	2in
GR	HGNS-H:HGNS-H:HGNS-H	6in
NPHI	HGNS-H:HGNS-H:HGNS-H	6in
PEFZ	HDRS-H:HRMS-H:HRGD-H	2in
SP	AIT-M:AMIS:AMIS	6in
STIT	DepthCorrection	6in
TENS	WLWorkflow	6in
TIME_1900	WLWorkflow	0.1in

TIME_1900 - Time Marked every 60.00 (s)

Gamma Ray Back up

Gamma Ray (ECGR) HGNS-H
0 gAPI 200

Caliper (HCAL) HDRS-H
6 in 16

Spontaneous Potential (SP) AIT-M
-160 mV 40

Cable Tension (TENS)
5000 lbf 0

Stuck Tool Indicator, Total (STIT)
0 ft 50

Array Induction Four Foot Resistivity A10 (AF10) AIT-M
0.2 ohm.m 2000

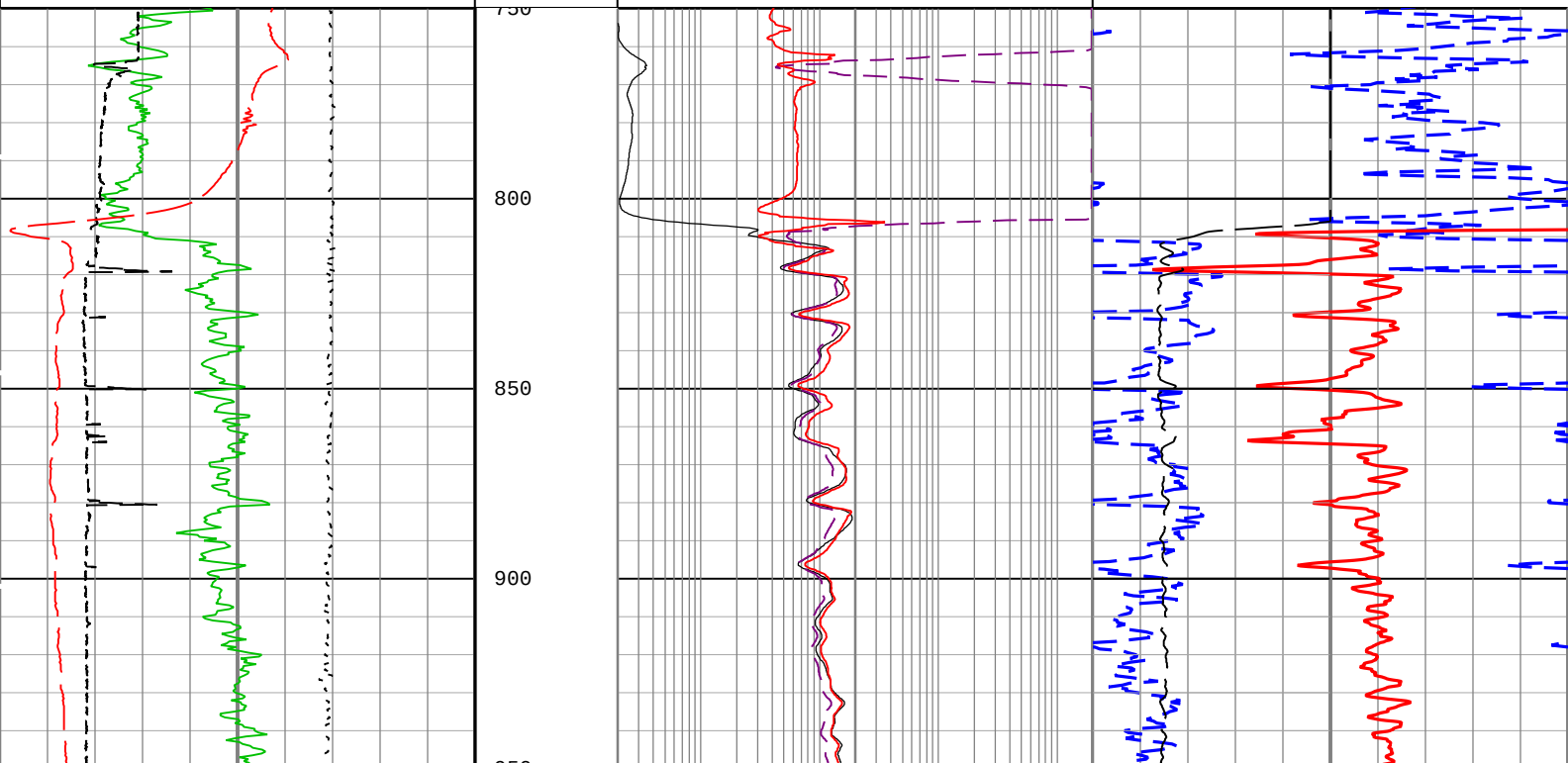
Array Induction Four Foot Resistivity A30 (AF30) AIT-M
0.2 ohm.m 2000

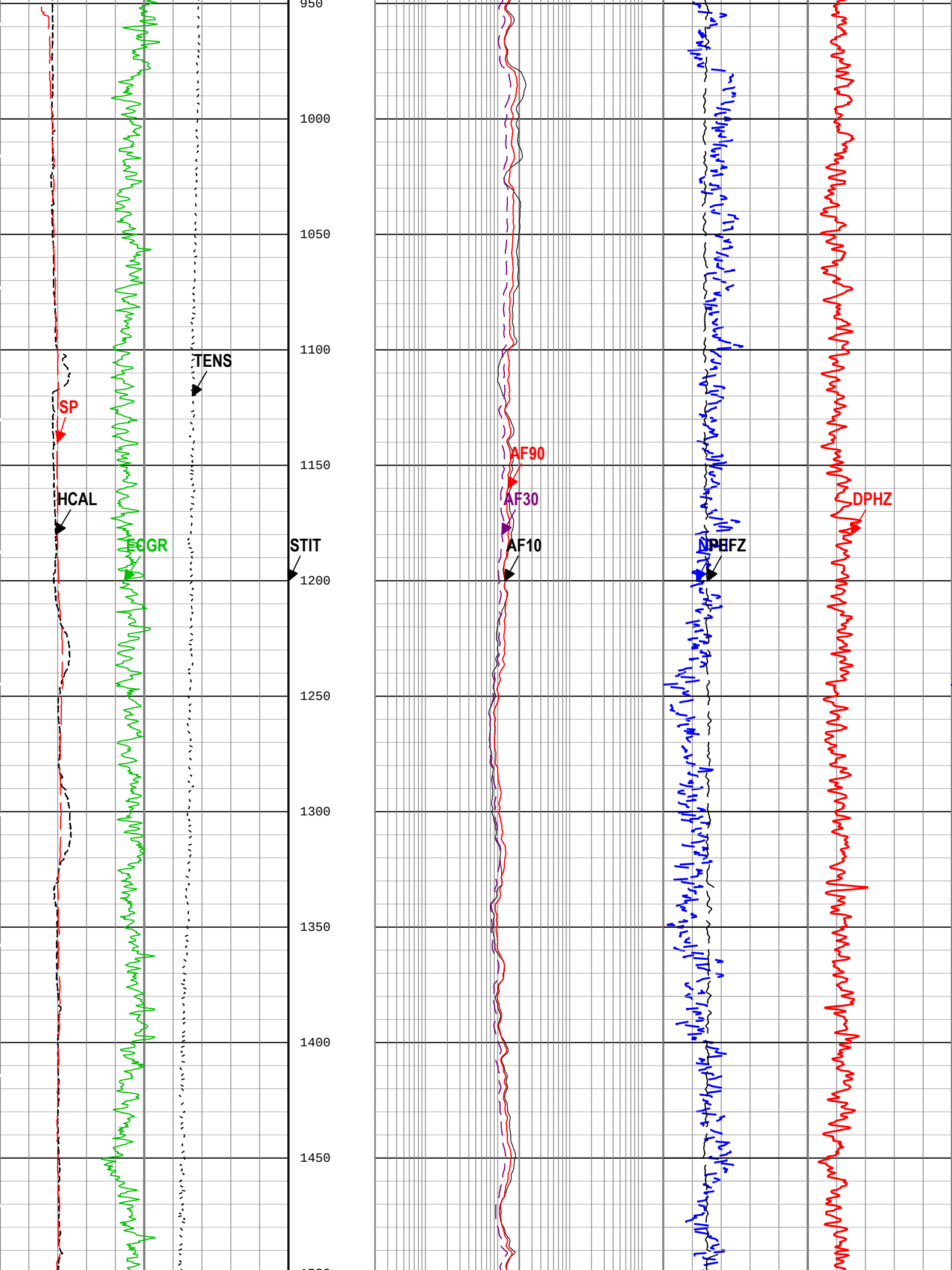
Array Induction Four Foot Resistivity A90 (AF90) AIT-M
0.2 ohm.m 2000

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

Thermal Neutron Porosity (original Ratio Method) in Selected Lithology (NPHI) HGNS-H
0.3 ft3/ft3 -0.1

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

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1200
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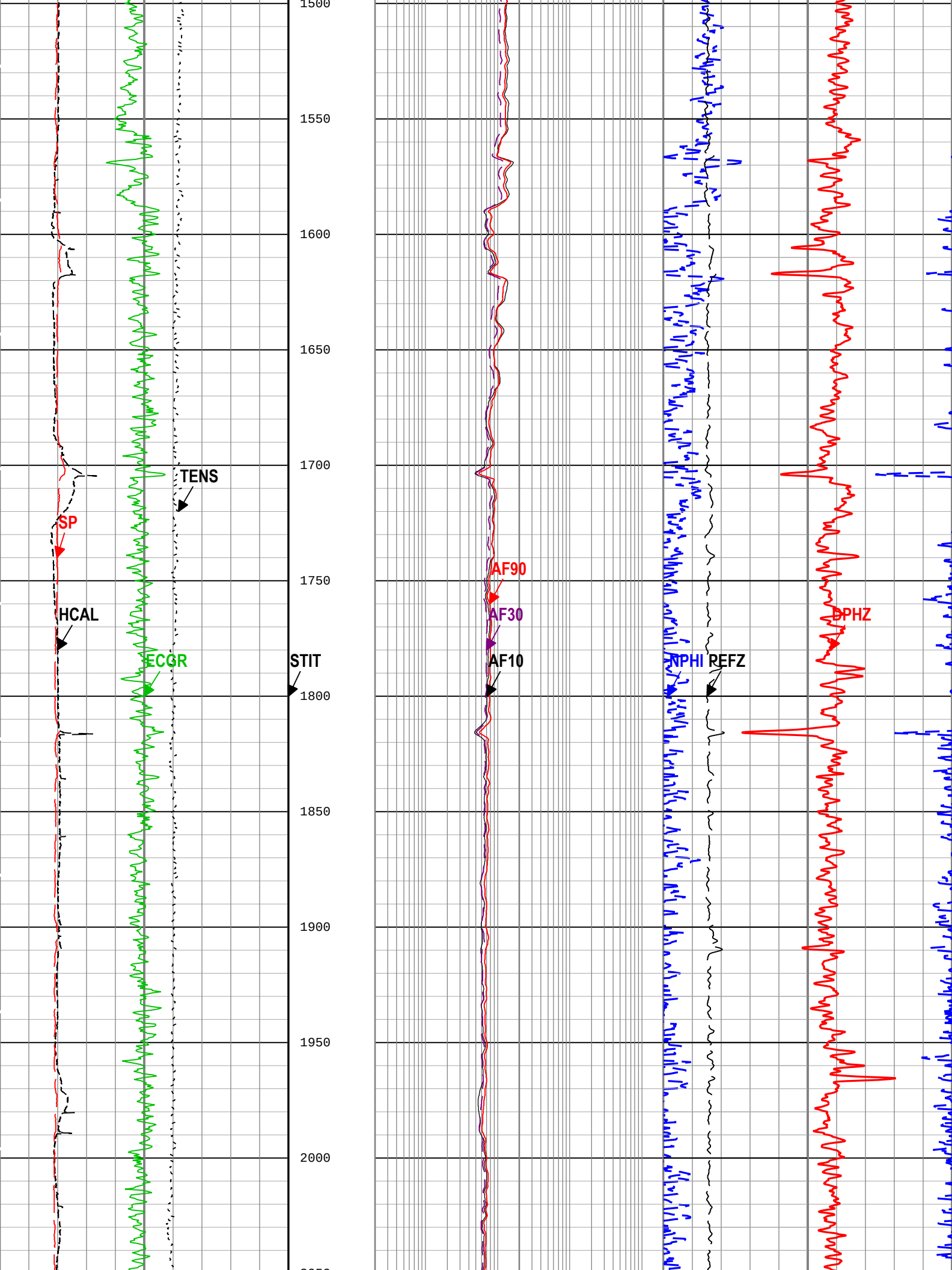
TENS
SP
HCAL
GGR
STIT
AF90
AF30
AF10
DPHZ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1900
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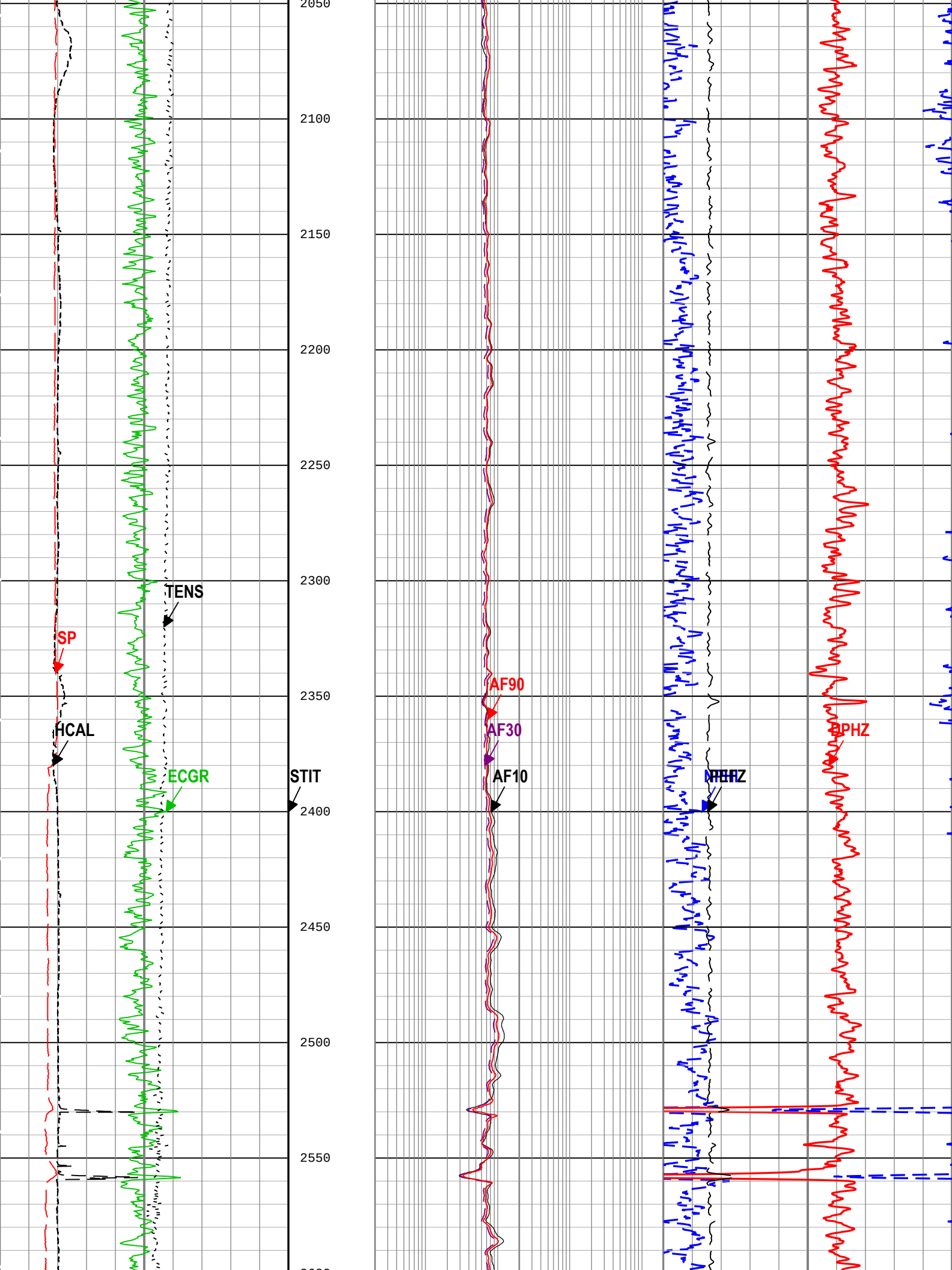
2000
TENS
SP
HCAL
ECGR
STIT
AF90
AF30
AF10
NPHI
REFZ
DPHZ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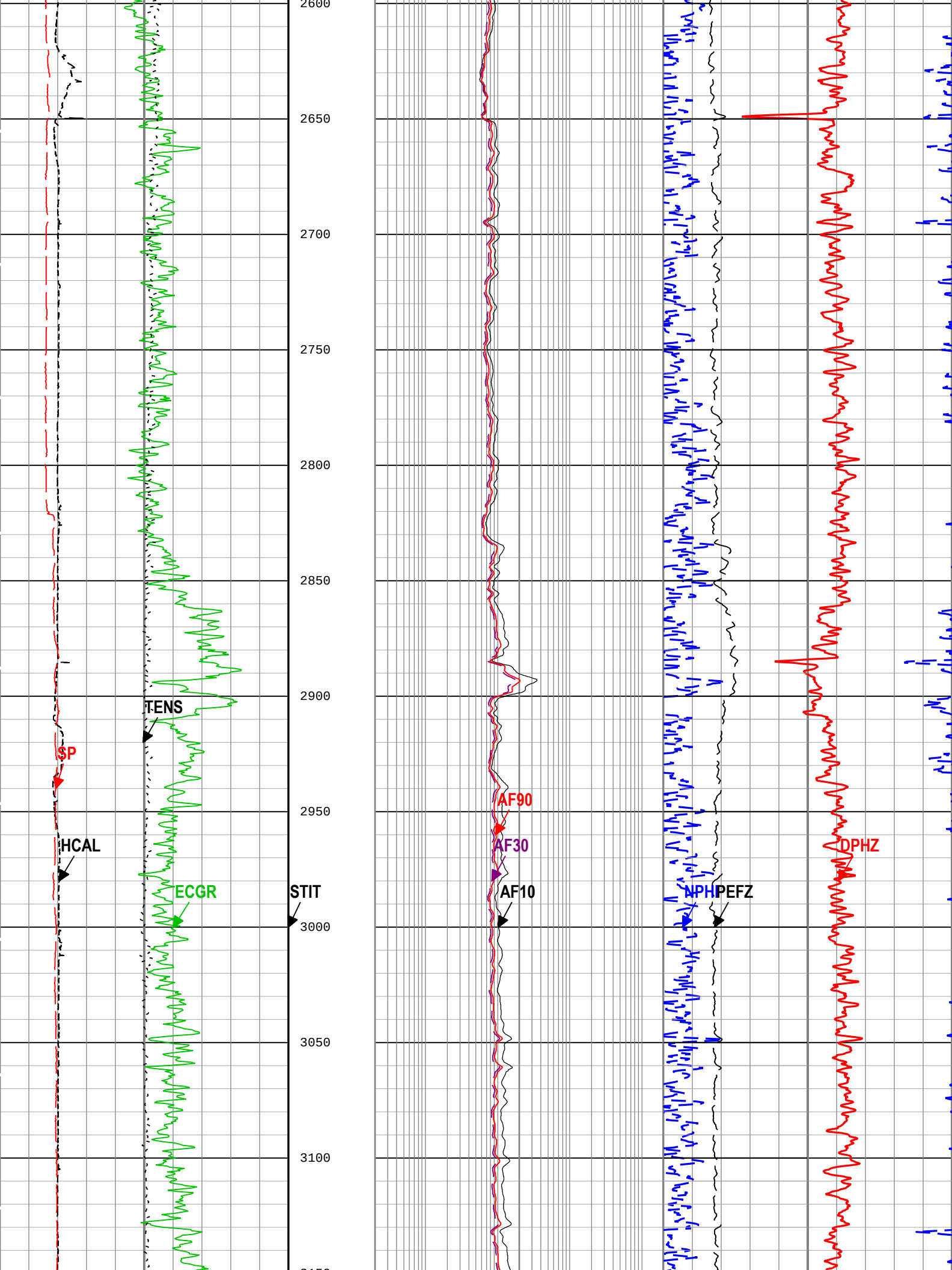
ECGR
STIT
AF90
AF30
AF10
APHZ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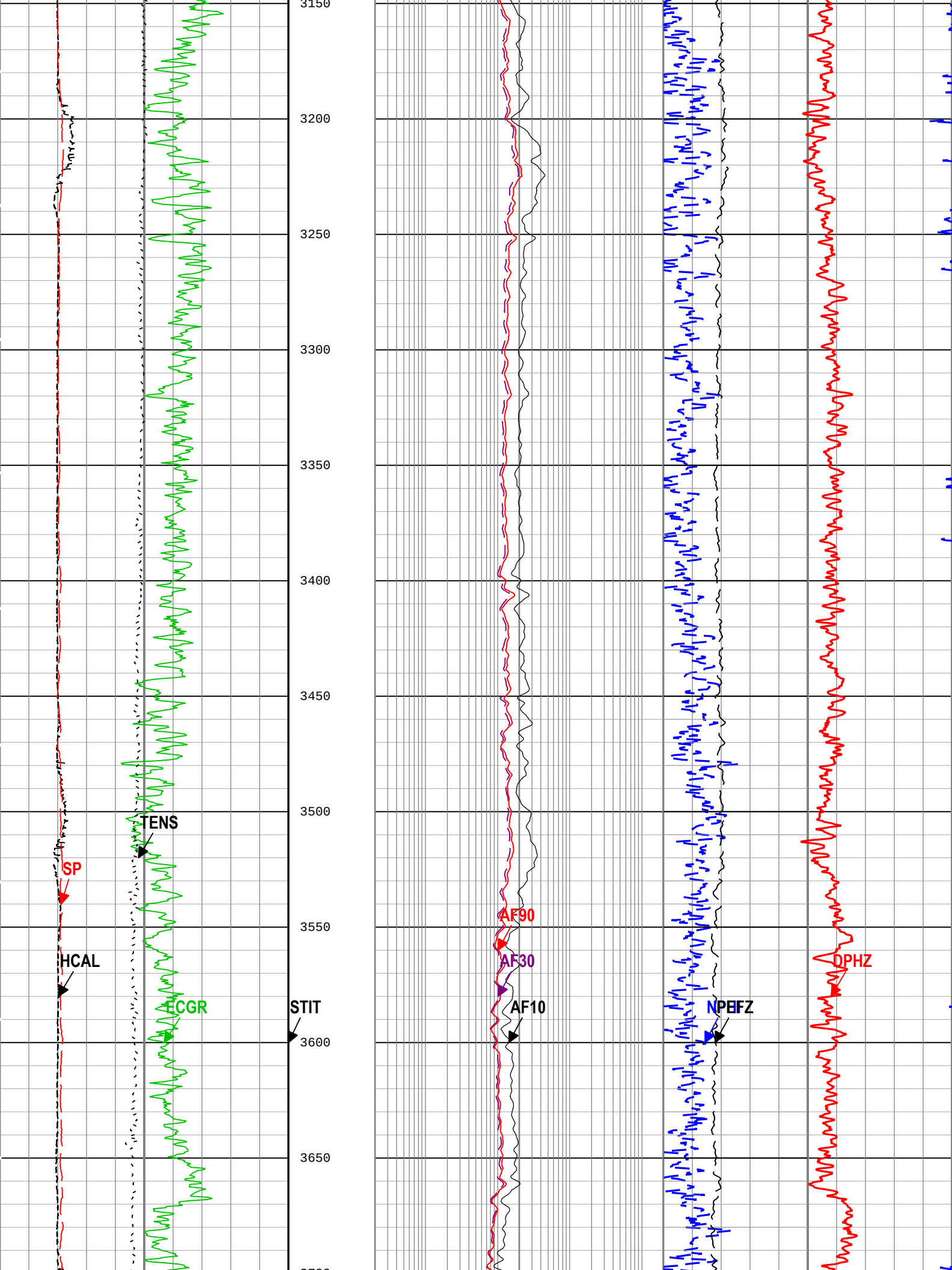
ECGR
STIT
AF90
AF30
AF10
NPHI
PEFZ
DPHZ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STIT
AF90
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AF10
NPHIFZ
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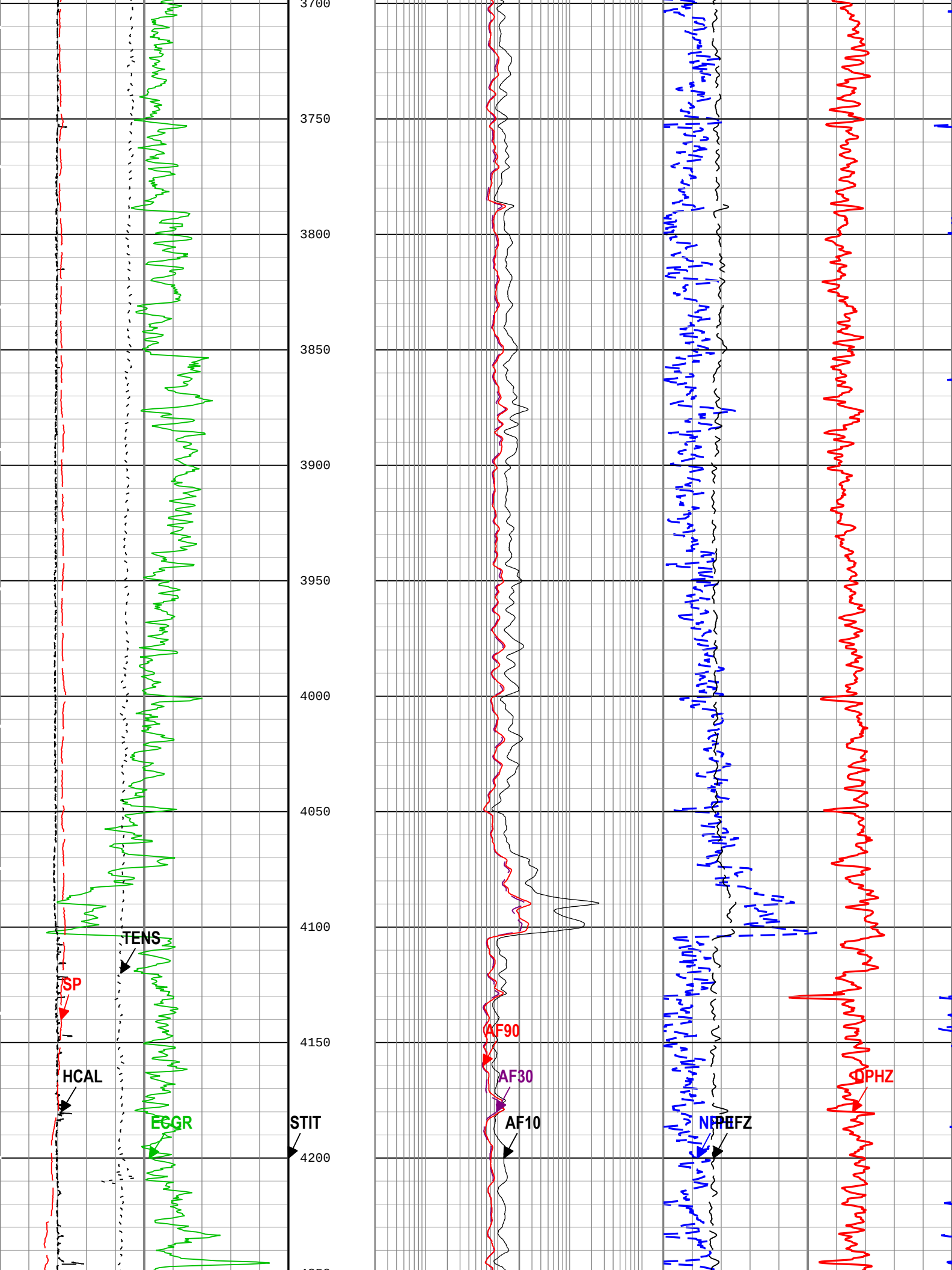
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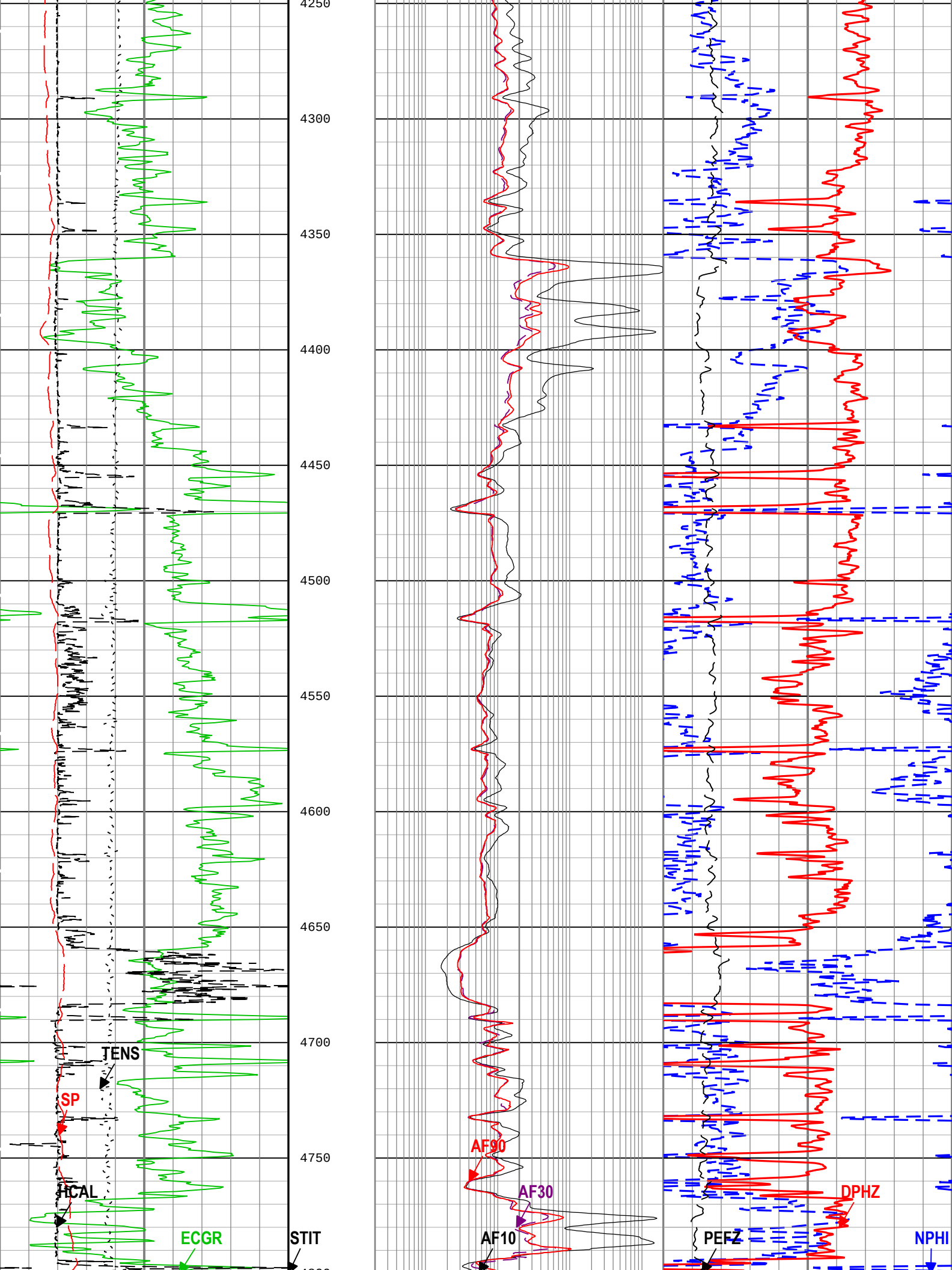
STIT
AF90
AF30
AF10
NPHIEFZ
DPHZ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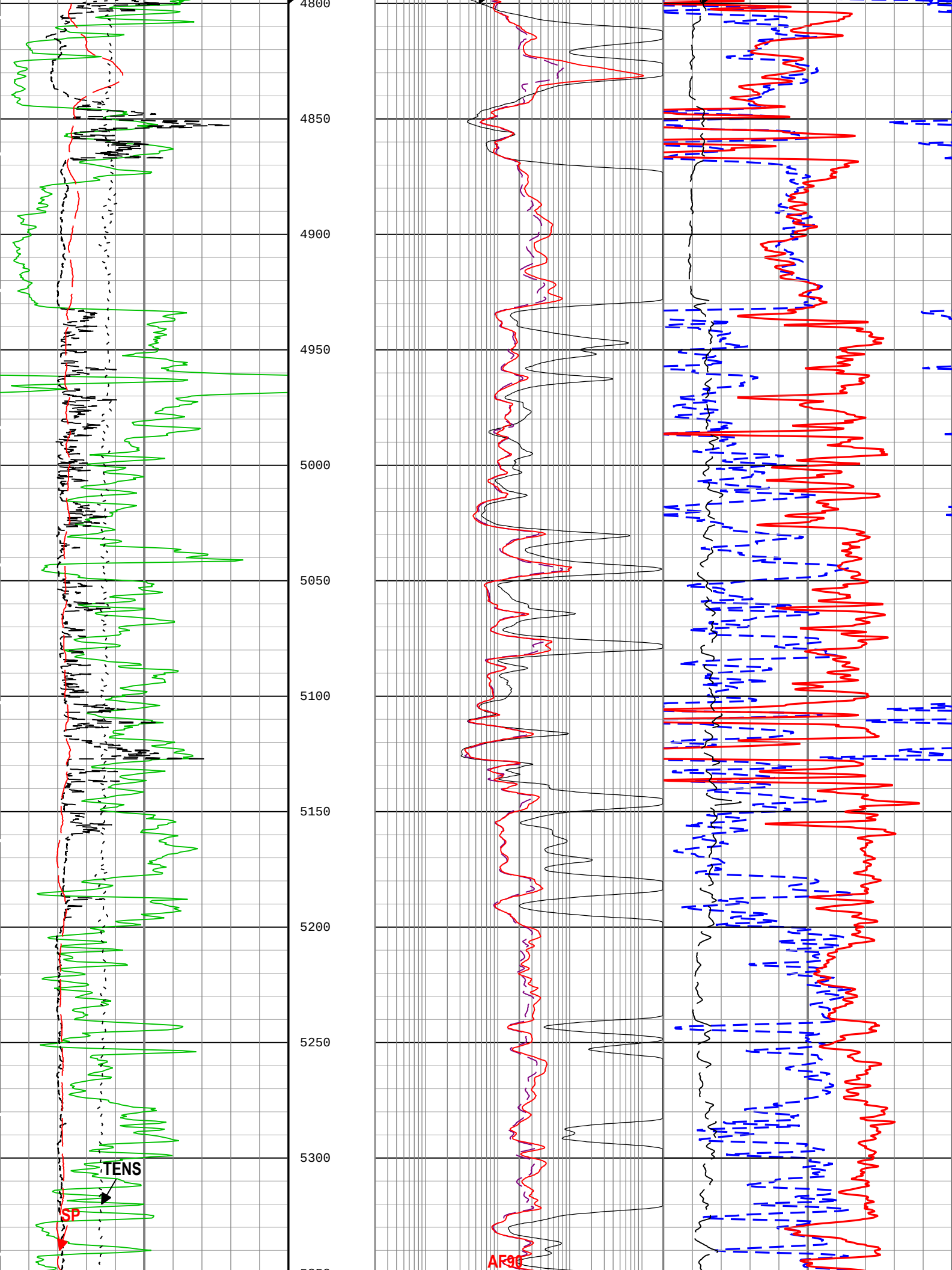
SP
HCAL
ECGR
STIT
AF90
AF30
AF10
DPHZ
PEFZ
NPHI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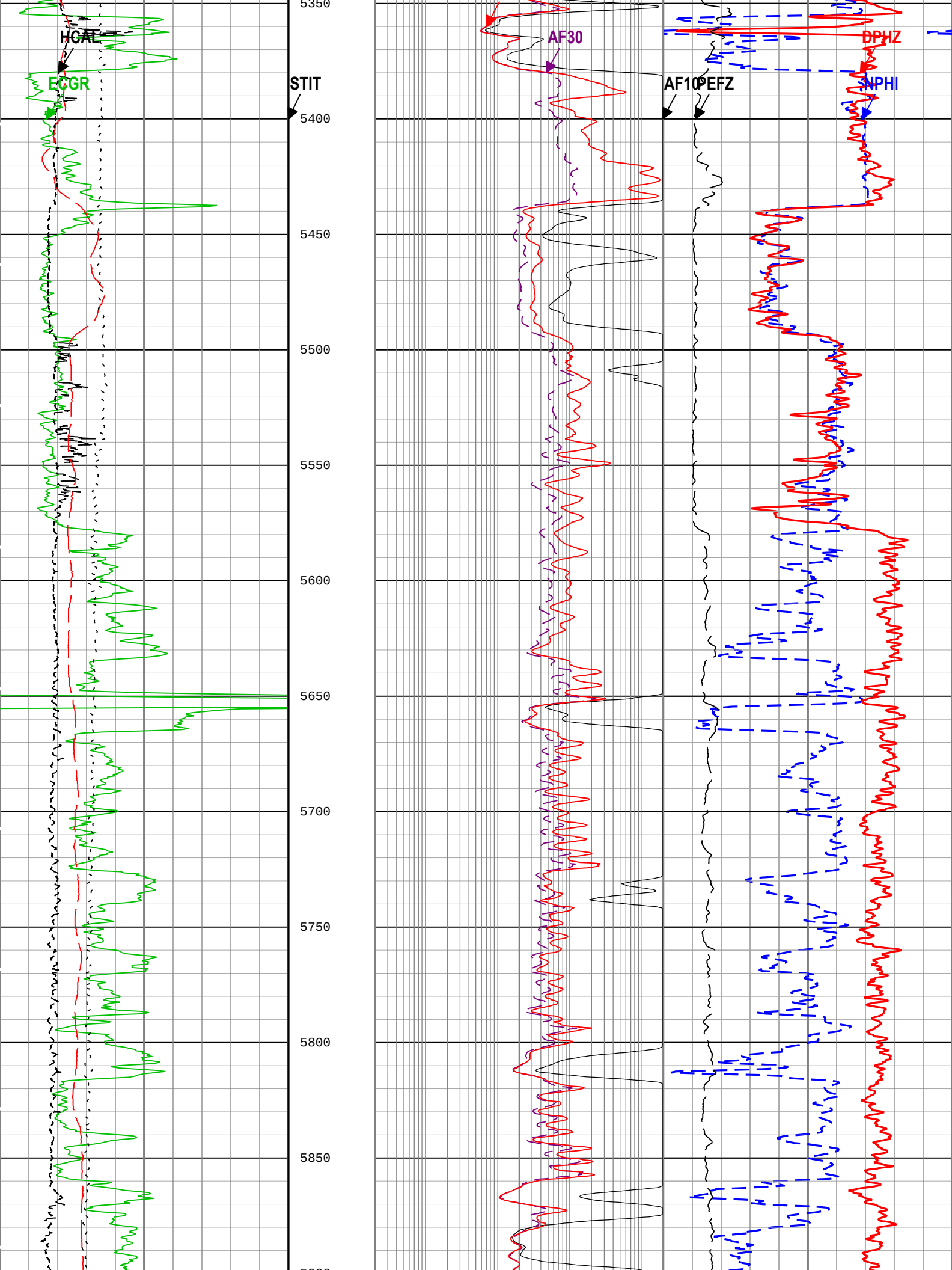
5000
5050
5100
5150
5200
5250
5300
TENS
SP
AF90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ECGR
STIT
AF30
AF10
PEFZ
DPHZ
NPHI
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5400
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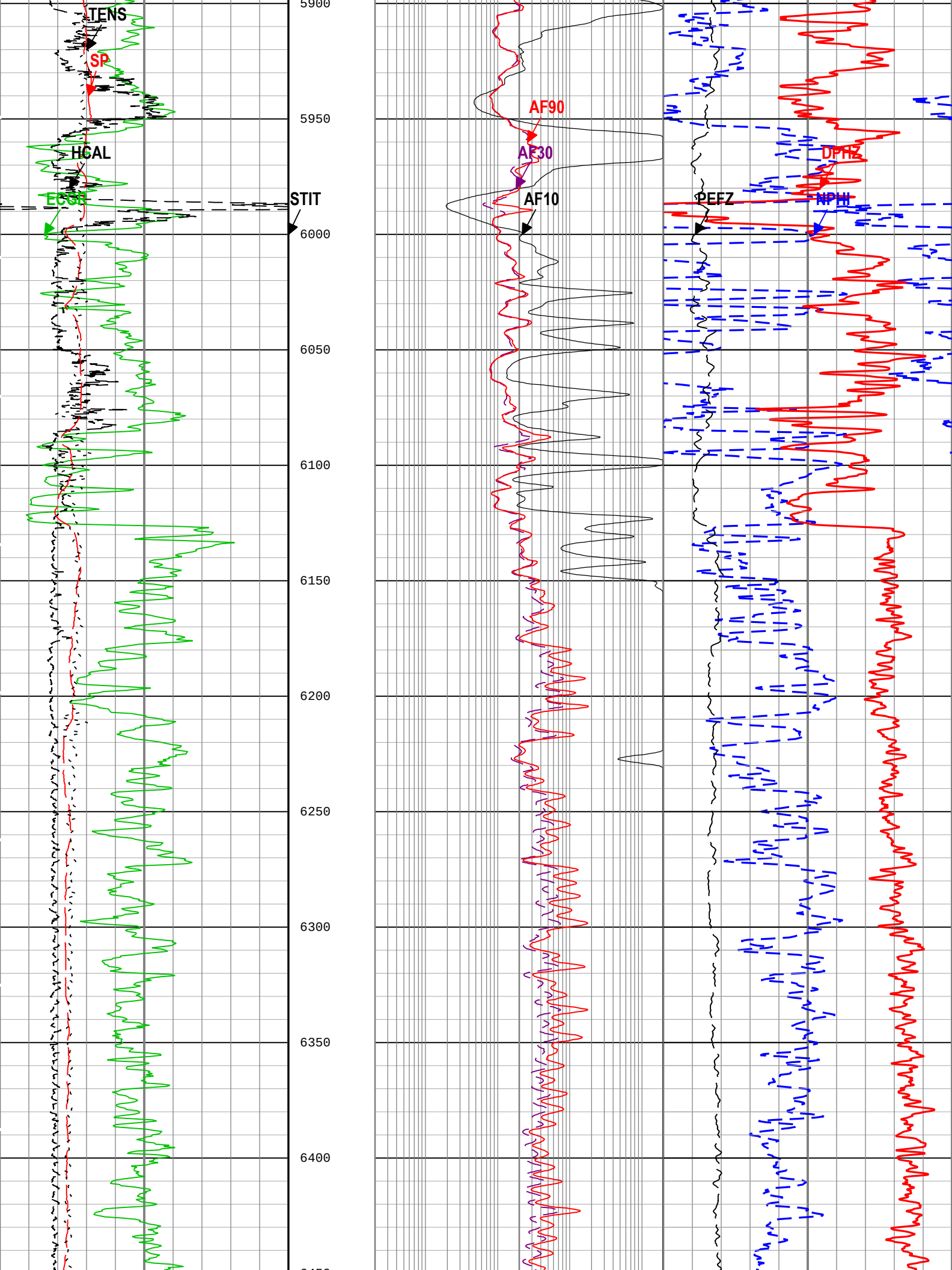
5700
5750
5800
5850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SP
HCAL
ECGR
STIT
AF90
AF30
AF10
PEFZ
DPHZ
NPHI
5900
5950
6000
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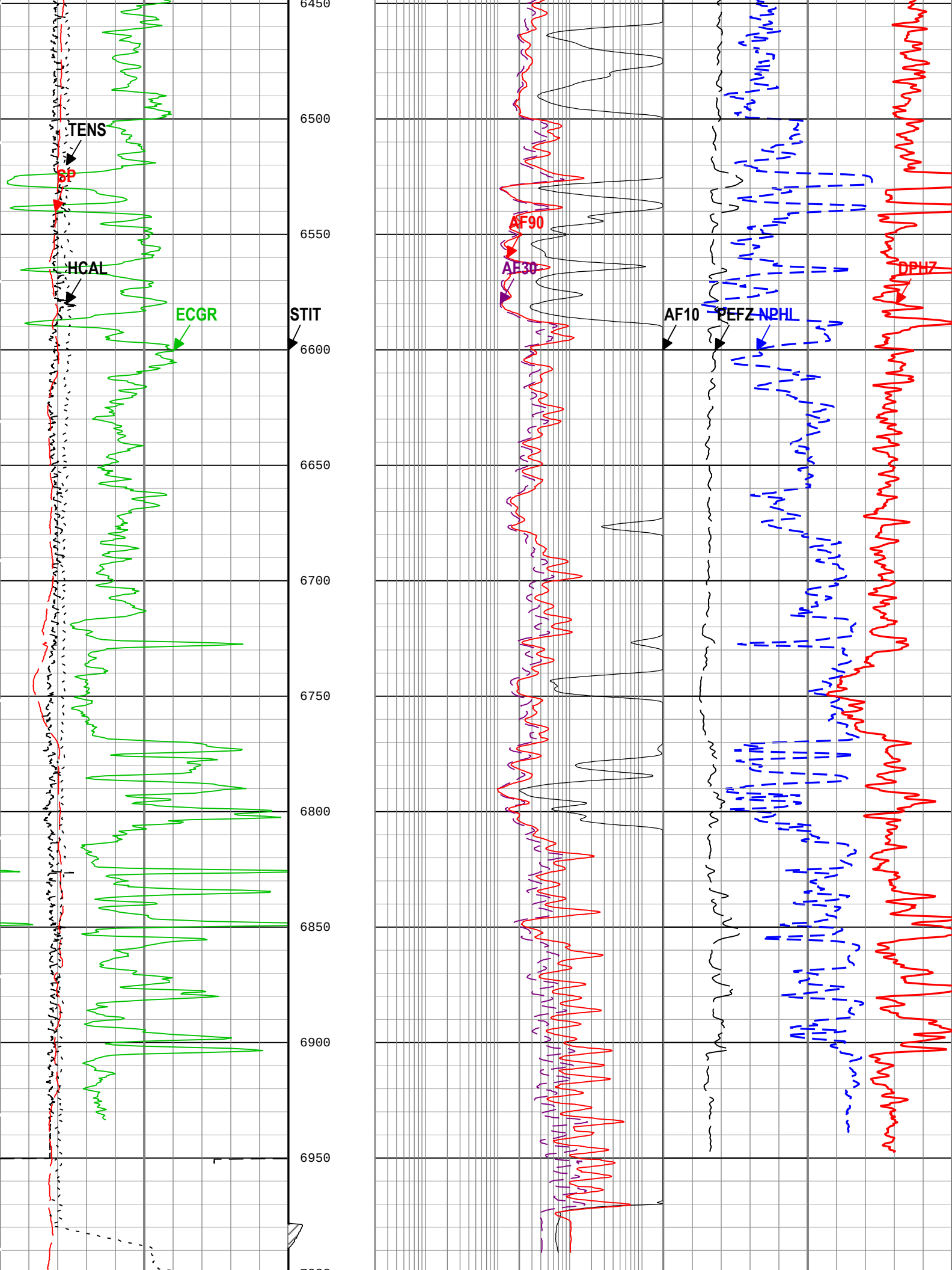
6100
6150
6200
6250
6300
6350
6400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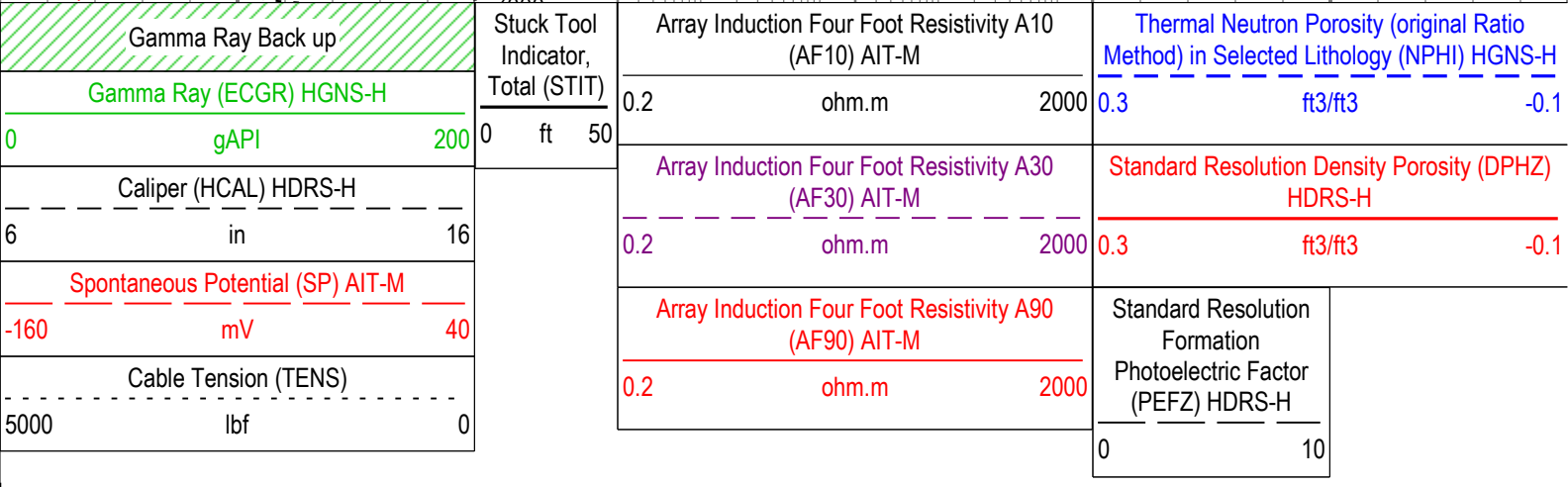
AE30
AF10
PEFZ
NPHL
DPHZ



Description: HGNS standard resolution porosities for Platform Express Format: Log (Import of TripleCombo-5) Index Scale: 2 in per 100 ft Index Unit: ft
Index Type: Measured Depth Creation Date: 25-Oct-2015 23:52:49

Channel Processing Parameters

Run 1: Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Standoff	
ISSBAR	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	0.6	in
CBLO	Casing Bottom (Logger)	WLSESSION	810	ft
CDEN	Cement Density	HGNS-H	2	g/cm3
DFD	Drilling Fluid Density	Borehole	8.7	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DHC	Density Hole Correction	HDRS-H	Bit Size	
FD	Fluid Density	Borehole	1	g/cm3
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	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	SANDSTONE	
MDEN	Matrix Density for Density Porosity	Borehole	2.68	g/cm3
SOCO	Standoff Correction Option	HGNS-H	Yes	
SPDR	SP Drift Per Foot	AIT-M	0	mV/ft
TD	Total Measured Depth	Borehole	6980	ft

Tool Control Parameters

Run 1: Parameters

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

Run 1

5" Triple Combo

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1	Repeat[2]:Up	Up	6559.83 ft	7008.58 ft	25-Oct-2015	25-Oct-2015	ON	5.79 ft	No

Run 1	Main[3]:Up	Up	68.54 ft	6998.98 ft	25-Oct-2015 9:47:43 PM	25-Oct-2015 11:40:39 PM	ON	0.00 ft	No

All depths are referenced to toolstring zero

Log

Company:GRMR Oil & Gas LLC Well:Hamill 19 16D

Run 1: Main[3]:Up:S008

Description: HGNS standard resolution porosities for Platform Express Format: Import of TripleCombo-5 RA_1 Index Scale: 5 in per 100 ft Index Unit: ft
Index Type: Measured Depth Creation Date: 25-Oct-2015 23:52:52

TIME_1900 - Time Marked every 60.00 (s)

Main To Repeat
Repeat To Main
Caliper (HCAL) HDRS-H
6 in 16

Main To Repeat
Repeat To Main
Spontaneous Potential (SP) AIT-M
-160 mV 40

Main To Repeat
Repeat To Main
Cable Tension (TENS)
5000 lbf 0

Main To Repeat
Repeat To Main
Gamma Ray (ECGR) 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
Array Induction Two Foot Resistivity A90 (AT90) AIT-M
0.2 ohm.m 2000

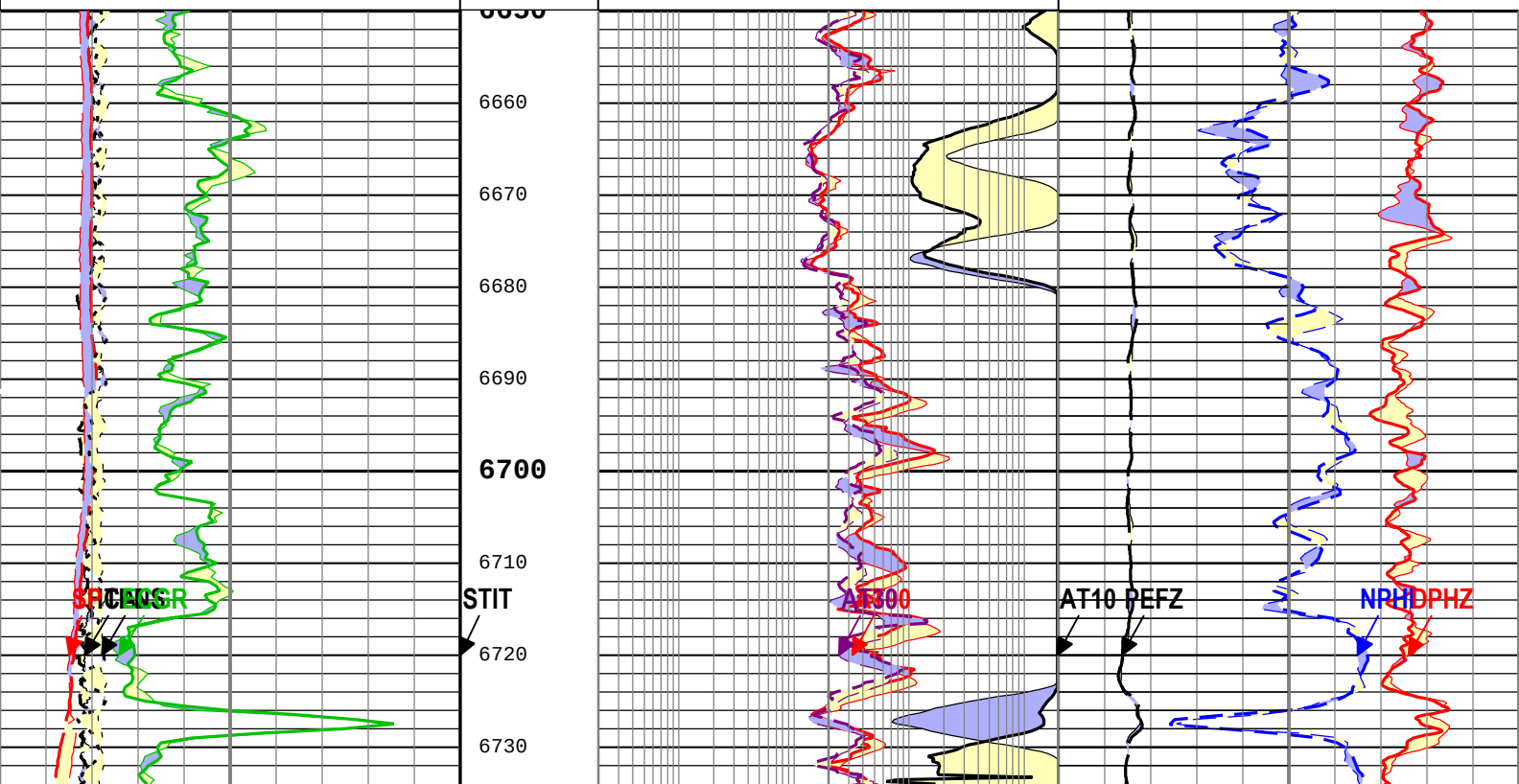
Main To Repeat
Repeat To Main
Array Induction Two Foot Resistivity A30 (AT30) AIT-M
0.2 ohm.m 2000

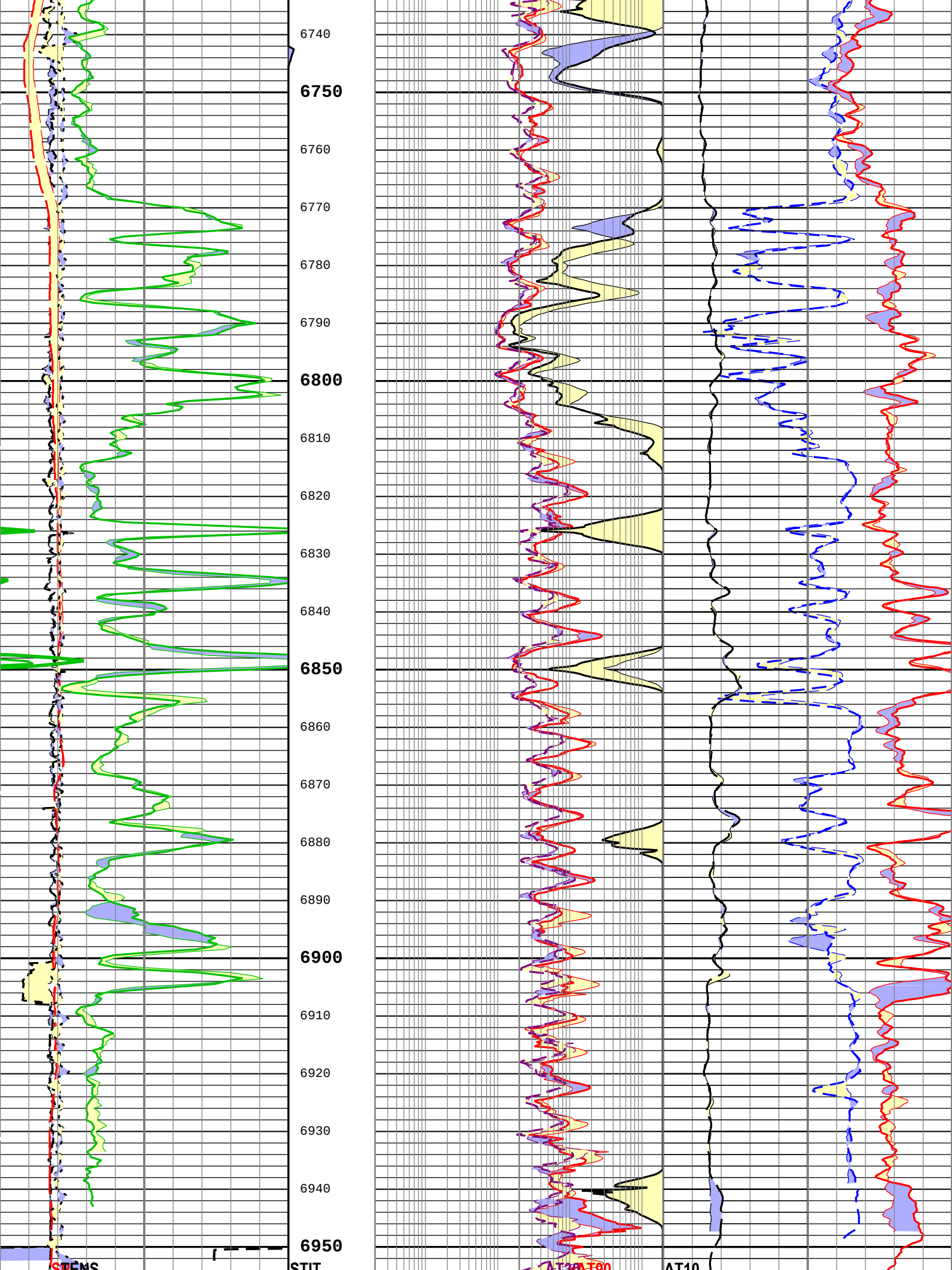
Main To Repeat
Repeat To Main
Array Induction Two Foot Resistivity A10 (AT10) AIT-M
0.2 ohm.m 2000

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

Main To Repeat
Repeat To Main
Thermal Neutron Porosity (original Ratio Method) in Selected Lithology (NPHI) HGNS-H
0.3 ft3/ft3 -0.1

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

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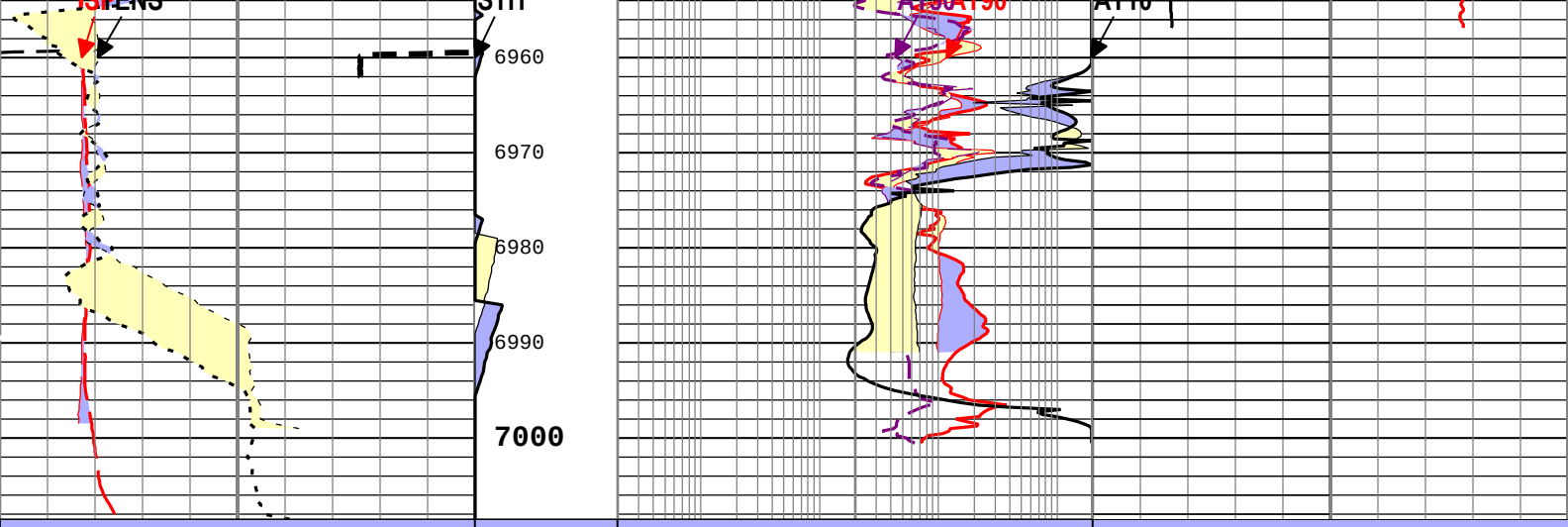
AT10



Main To Repeat

Repeat To Main

Caliper (HCAL) HDRS-H

6 in 16

Main To Repeat

Repeat To Main

Spontaneous Potential (SP) AIT-M

-160 mV 40

Main To Repeat

Repeat To Main

Cable Tension (TENS)

5000 lbf 0

Main To Repeat

Repeat To Main

Gamma Ray (ECGR) 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

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

0.2 ohm.m 2000

Main To Repeat

Repeat To Main

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

0.2 ohm.m 2000

Main To Repeat

Repeat To Main

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

0.2 ohm.m 2000

Main To Repeat

Repeat To Main

Thermal Neutron Porosity (original Ratio Method) in Selected Lithology (NPHI) HGNS-H

0.3 ft3/ft3 -0.1

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

Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H

0 10

TIME_1900 - Time Marked every 60.00 (s)

Description: HGNS standard resolution porosities for Platform Express Format: Import of TripleCombo-5 RA_1 Index Scale: 5 in per 100 ft Index Unit: ft
Index Type: Measured Depth Creation Date: 25-Oct-2015 23:52:52

Calibration Report

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

Primary Equipment :

File code for AIT-MA Sonde Tool Element	AMIS	1538

Auxiliary Equipment :

AITM Rm/SP Bottom Nose	AMRM	1251

AIT Sonde Calibration - Test Loop Gain

Master (EEPROM): 11:28:18 30-Sep-2015

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Test Loop Gain - 0		Master	1.000	0.950	1.045	1.050
Test Loop Phase - 0	deg	Master	0	-3.000	2.682	3.000
Test Loop Gain - 1		Master	1.000	0.950	1.012	1.050
Test Loop Phase - 1	deg	Master	0	-3.000	0.552	3.000

Test Loop Phase - 1	deg	Master	0	-3.000	0.552	3.000
Test Loop Gain - 2		Master	1.000	0.950	1.021	1.050
Test Loop Phase - 2	deg	Master	0	-3.000	-0.213	3.000
Test Loop Gain - 3		Master	1.000	0.950	1.021	1.050
Test Loop Phase - 3	deg	Master	0	-3.000	0.022	3.000
Test Loop Gain - 4		Master	1.000	0.950	0.997	1.050
Test Loop Phase - 4	deg	Master	0	-3.000	0.035	3.000
Test Loop Gain - 5		Master	1.000	0.950	0.986	1.050
Test Loop Phase - 5	deg	Master	0	-3.000	-0.211	3.000
Test Loop Gain - 6		Master	1.000	0.950	1.033	1.050
Test Loop Phase - 6	deg	Master	0	-3.000	0.131	3.000
Test Loop Gain - 7		Master	1.000	0.950	1.011	1.050
Test Loop Phase - 7	deg	Master	0	-3.000	-0.116	3.000

AIT Sonde Calibration - Sonde Error Correction

Master (EEPROM): 11:28:18 30-Sep-2015

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Sonde Error Correction Real - 0	mS/m	Master	-----	-231.000	-18.541	119.000
Sonde Error Correction Quad - 0		Master	-----	-2250.000	-1668.751	2250.000
Sonde Error Correction Real - 1	mS/m	Master	-----	114.000	140.266	204.000
Sonde Error Correction Quad - 1		Master	-----	-625.000	75.932	625.000
Sonde Error Correction Real - 2	mS/m	Master	-----	66.000	118.522	156.000
Sonde Error Correction Quad - 2		Master	-----	-350.000	19.765	350.000
Sonde Error Correction Real - 3	mS/m	Master	-----	39.000	60.864	89.000
Sonde Error Correction Quad - 3		Master	-----	-250.000	-9.553	250.000
Sonde Error Correction Real - 4	mS/m	Master	-----	15.000	25.191	35.000
Sonde Error Correction Quad - 4		Master	-----	-63.000	14.704	63.000
Sonde Error Correction Real - 5	mS/m	Master	-----	4.000	14.280	24.000
Sonde Error Correction Quad - 5		Master	-----	-50.000	3.489	50.000
Sonde Error Correction Real - 6	mS/m	Master	-----	5.000	9.725	15.000
Sonde Error Correction Quad - 6		Master	-----	-30.000	5.888	30.000
Sonde Error Correction Real - 7	mS/m	Master	-----	-5.000	-2.126	5.000
Sonde Error Correction Quad - 7		Master	-----	-30.000	0.045	30.000

AIT Mud Calibration - Mud Calibration Gain

Master (EEPROM): 11:28:18 30-Sep-2015

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Coarse Gain		Master	1.000	0.800	1.055	1.200
Fine Gain		Master	1.000	0.800	1.054	1.200

AIT Electronics Check - Thru Calibration Check

Master (EEPROM): 11:28:18 30-Sep-2015

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Thru Cal Mag - 0	V	Master	-----	0.366	0.617	0.854
Thru Cal Phase - 0	deg	Master	-----	137.000	-174.089	-103.000
Thru Cal Mag - 1	V	Master	-----	0.762	1.264	1.778
Thru Cal Phase - 1	deg	Master	-----	136.000	-175.134	-104.000
Thru Cal Mag - 2	V	Master	-----	0.372	0.627	0.868
Thru Cal Phase - 2	deg	Master	-----	132.000	-178.500	-108.000
Thru Cal Mag - 3	V	Master	-----	0.420	0.708	0.980
Thru Cal Phase - 3	deg	Master	-----	131.000	-179.225	-109.000
Thru Cal Mag - 4	V	Master	-----	0.804	1.330	1.876
Thru Cal Phase - 4	deg	Master	-----	125.000	174.907	-115.000
Thru Cal Mag - 5	V	Master	-----	1.176	1.940	2.744
Thru Cal Phase - 5	deg	Master	-----	122.000	173.314	-118.000
Thru Cal Mag - 6	V	Master	-----	1.176	1.934	2.744
Thru Cal Phase - 6	deg	Master	-----	121.000	173.379	-119.000
Thru Cal Mag - 7	V	Master	-----	0.846	1.391	1.974
Thru Cal Phase - 7	deg	Master	-----	115.000	172.460	-125.000
SPA Zero	mV	Master		-50.000	-0.067	50.000
SPA Plus	mV	Master		941.000	985.278	1040.000
Temperature Zero	V	Master		-0.050	0.000	0.050
Temperature Plus	V	Master		0.870	0.913	0.960

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

Primary Equipment :

HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	
HILT Resistivity Gamma-Ray Density Device, 150 degC	HRGD-H	3871

Auxiliary Equipment :

HRDD Backscatter Detector	Backscatter	
HRDD Long Spacing Detector	Long Spacing	28629
HRDD Short Spacing Detector	Short Spacing	
Cesium 137 Gamma-Ray Logging Source	GSR-J	5234
HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	
HILT High-Resolution Mechanical Sonde, 150 degC	HRMS-H	

Calibration Parameter :

Small Ring Size

Large Ring Size

HDRS Density Calibration - Inversion Results

Master (EEPROM): 12:12:40 23-Oct-2015

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	1.687	1.696
Pe Aluminum		Master	2.570	2.470	2.573	2.670
Pe Magnesium		Master	2.650	2.550	2.599	2.750

HDRS Density Calibration - Deviation Summary

Master (EEPROM): 12:12:40 23-Oct-2015

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Average Deviation	%	Master	0	-0.6000	0.3337	0.6000
BS Max Deviation	%	Master	0	-1.6000	0.6768	1.6000
SS Average Deviation	%	Master	0	-1.0000	0.2820	1.0000
SS Max Deviation	%	Master	0	-2.5000	0.7992	2.5000
LS Average Deviation	%	Master	0	-1.5000	0.6769	1.5000
LS Max Deviation	%	Master	0	-3.5000	1.4884	3.5000

HDRS Density Calibration - Background Summary

Master (EEPROM): 12:12:40 23-Oct-2015

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Window Ratio		Master	1.0000		0.7427	
BS Window Sum	1/s	Master	1		22343	
SS Window Ratio		Master	1.0000		0.4873	
SS Window Sum	1/s	Master	1		10265	
LS Window Ratio		Master	1.0000		0.2983	
LS Window Sum	1/s	Master	1		1185	

HDRS Density Calibration - Photo-multiplier High Voltages

Master (EEPROM): 12:12:40 23-Oct-2015

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS PM High Voltage	V	Master		1000	1394	2400
SS PM High Voltage	V	Master		1000	1717	2400
LS PM High Voltage	V	Master		1000	1377	2400

HDRS Density Calibration - Crystal Quality Resolutions

Master (EEPROM): 12:12:40 23-Oct-2015

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Crystal Resolution	%	Master		5.00	10.43	25.00
SS Crystal Resolution	%	Master		5.00	10.22	20.00
LS Crystal Resolution	%	Master		5.00	8.46	20.00

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	

Auxiliary Equipment :

HGNS Accelerometer, 150 degC	HACCZ-H	4269
AmBe Neutron Logging Source	NSR-F	5138

Calibration Parameter :

Water Temperature (Calibration Tank Water Temperature)	59.5
Housing Size (Thermal Housing Size)	3.37
JIG-BKG	

HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM): 00:00:00 15-Aug-2005

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	-----	-----	336.900	-----
Accelerometer Coefficients - 1		Master	-----	-----	37.580	-----
Accelerometer Coefficients - 2		Master	-----	-----	-0.019	-----
Accelerometer Coefficients - 3		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 4		Master	-----	-----	2.730	-----
Accelerometer Coefficients - 5		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 6		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 7		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 8		Master	-----	-----	299.000	-----
Accelerometer Coefficients - 9		Master	-----	-----	1.007	-----

HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM): 13:10:00 23-Oct-2015

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Near Zero Measurement	1/s	Master	0	5.0	28.0	40.0
Far Zero Measurement	1/s	Master	0	5.0	26.3	40.0
Near Plus Measurement	1/s	Master	6031.0	4700.0	4945.0	6900.0
Far Plus Measurement	1/s	Master	2793.0	1900.0	2073.0	2900.0
Near Corrected Plus Measurement	1/s	Master		4700.0	4971.0	6900.0
Far Corrected Plus Measurement	1/s	Master		1900.0	2080.0	2900.0

Field:	Wildcat
County:	Moffat
State:	Colorado

Platform Express

Triple Combo

w/ Array Induction