ThruBit
A Schlumberger Company

SPECTRAL DENSITY
DUAL SPACED NEUTRON
GAMMA RAY
MEMORY LOG

Company SANDRIDGE ENERGY, INC.
Well STARKS 3408 2-35H
Field HARPER, KS / MISS LIME
County HARPER
State KANSAS

Company SANDRIDGE ENERGY, INC.

Well STARKS 3408 2-35H

Field HARPER, KS / MISS LIME

County HARPER State KANSAS

Location: API # : 15077219030000

SURF LOC: 200' FSL & 1980' FEL

SEC 35 TWP 34S RGE 8W

Other Services
THRUBIT
PORTAL
BIT

Elevation
K.B. 1294'
D.F. 1294'
G.L. 1277'

Permanent Datum	G.L.	Elevation 1277'
Log Measured From	D.F.	17' ABOVE PERM DATUM
Drilling Measured From	D.F.	

Date	10 FEBRUARY 2013		
Run Number	ONE		
Depth Driller	8535'		
Depth Logger	8518'		
Bottom Logged Interval	8500'		
Top Log Interval	2500'		
Casing Driller	7" @ 5210'		
Casing Logger	7" @ 5212'		
Bit Size	6.125"		
Type Fluid in Hole	WATER		
Density / Viscosity	8.4 / 27		
pH / Fluid Loss	9.0 / NA		
Source of Sample	SUCTION PIT		
Rm @ Meas. Temp	1.3 OHMS@ 62 DEGF		
Rmf @ Meas. Temp	.98 OHMS@ 62 DEGF		
Rmc @ Meas. Temp	1.6 OHMS@ 62 DEGF		
Source of Rmf / Rmc	CALCULATED		
Rm @ BHT	0.6 OHMS@ 137 DEGF		
Time Circulation Stopped	10:30 10FEB2013		
Time Logger on Bottom	11:50 10FEB2013		
Maximum Recorded Temperature	137 DEGF		
Equipment Number	T004		
Location	OKC, OK		
Recorded By	D. THOMAS		
Witnessed By	ERIC VERNON		

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Comments

SERVICE: LEVEL 4 - HORIZONTAL MEMORY PUMP DOWN - BIT DEPTH: 8462' LOG TO: 2500'
ALL SCALES AND PRESENTATIONS PER CLIENT REQUEST
LIMESTONE MATRIX, 2.71 G/CC, USED TO CALCULATE POROSITIES
TOOL STRING RAN WITH S. DECENTRALIZER, SWIVEL, NO STANDOFFS
TBHV = TOTAL BOREHOLE VOLUME, FT3
ABHV = ANNULAR BOREHOLE VOLUME, FT3, CALCULATED FOR 4.50" CSG
RIG MINDER LITE AND PASON USED TO CREATE LOG DEPTH
LOG DEPTH CORRELATED TO MWD GAMMA RAY AT CUSTOMERS REQUEST

RIG: UNIT 310
CREW: D. THOMAS, J. DOTY, E. PRICE

Service Ticket No. 1739 API No. 15077219030000 PGM Ver WARRIOR 7.0

The Well Name, Location, Borehole Description, and / or Cementing Data Furnished by Client

EQUIPMENT DATA

GAMMA RAY	NEUTRON	DENSITY	INDUCTION

Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	PS30T	Serial No.	PS6N	Serial No.	PS03D	Serial No.	ENP6R
Model No.	PS	Model No.	PS	Model No.	PS	Model No.	ENP
Diameter	2.125"	Diameter	2.125"	Diameter	2.125"	Diameter	2.125"

LOGGING DATA

General Data

Pass	Depths		Well Head	Speed	Logging Run Comments
No.	From	To	Pressure	Ft/Min	
ONE	8518'	2500'		30	

	GAMMA RAY		NEUTRON		DENSITY		INDUCTION	
Pass	Scale		Scale		Scale		Scale	
No.	L	R	L	R	L	R	L	L
ONE	0 API	150 API	30 %	-10 %	30 %	-10 %	0.2 OHM-M	2000 OHM-M

DIRECTIONAL INFORMATION

Maximum Deviation	94.08	deg. @	7623'	KOP	3879'	

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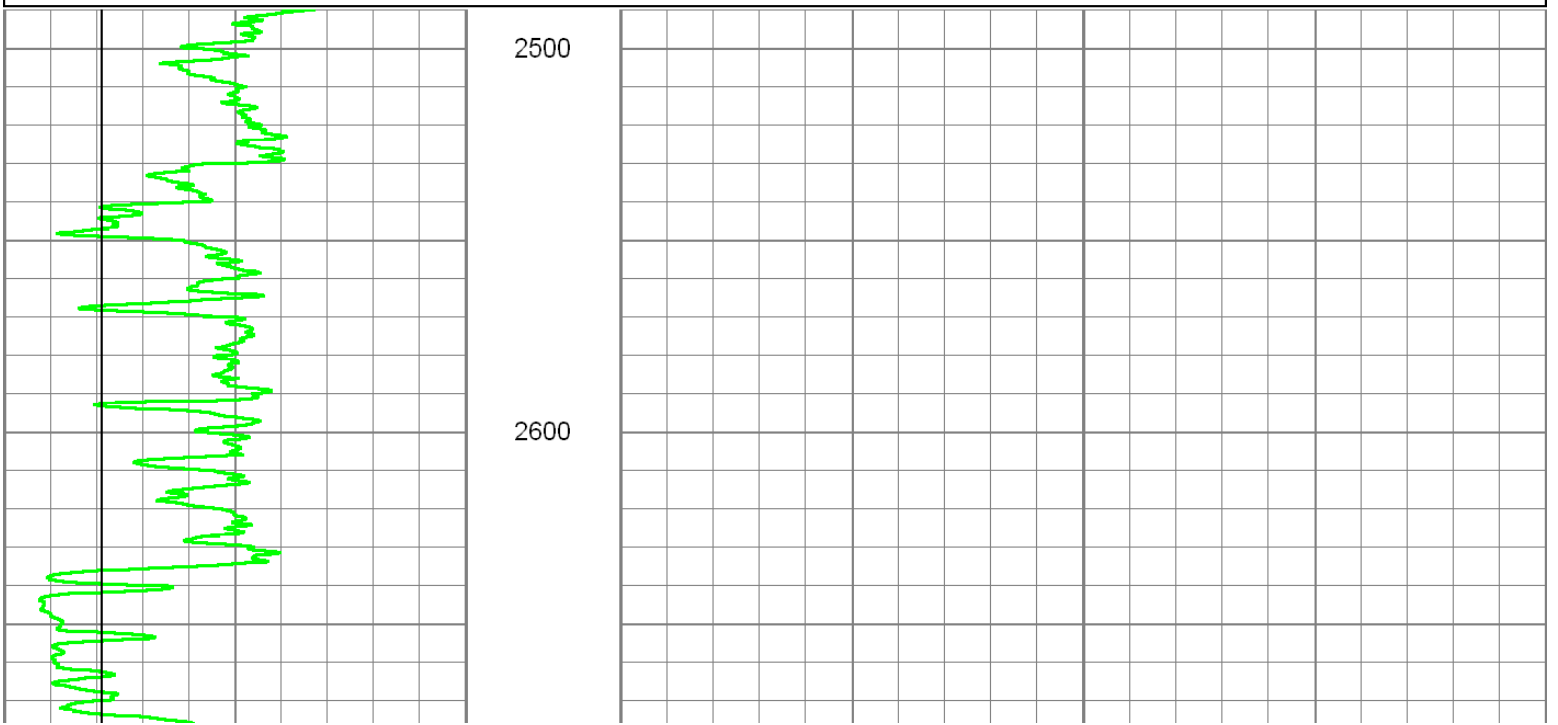
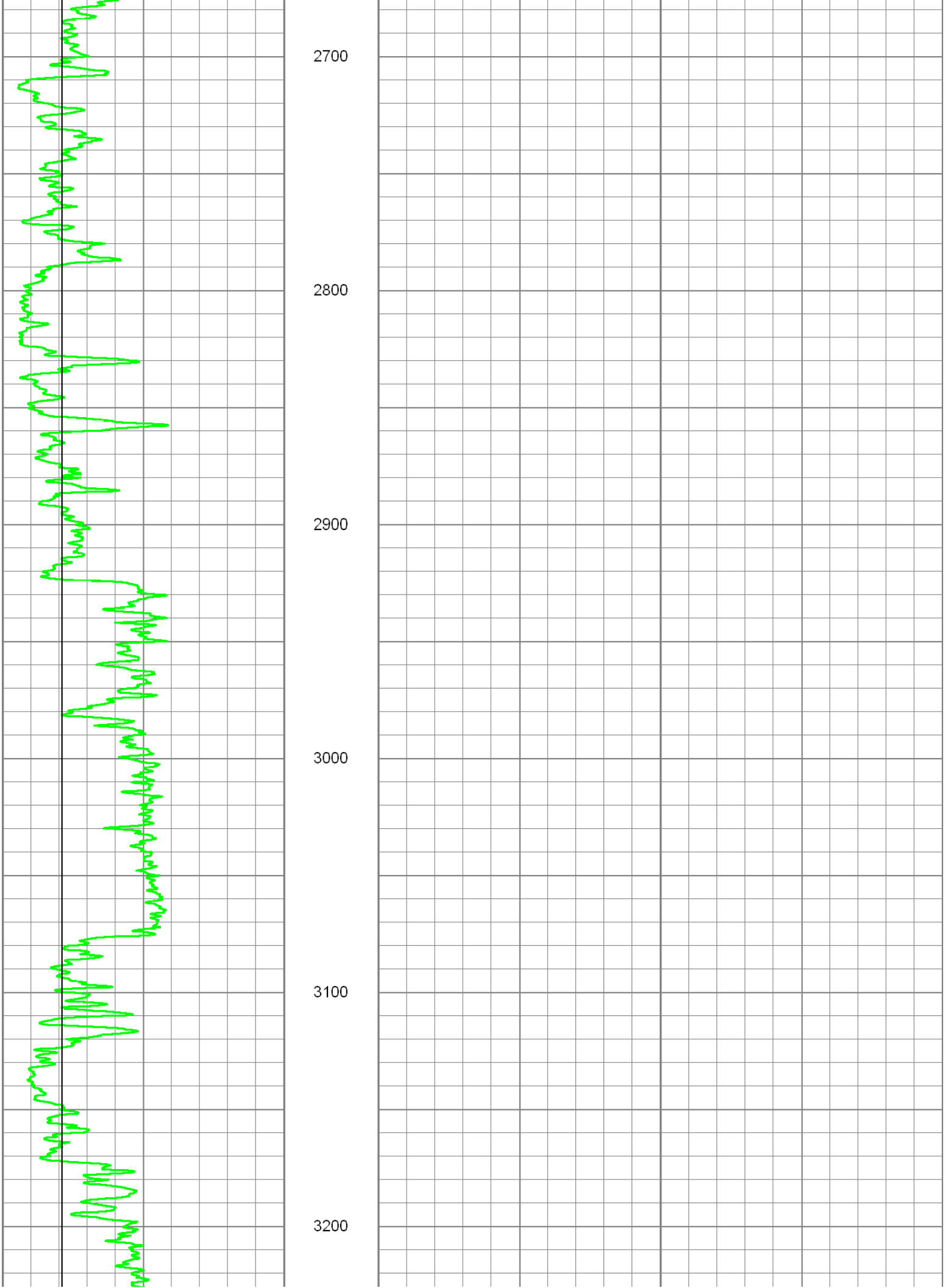
MAIN PASS

Database File: starks_mem.db
Dataset Pathname: proc2/pass1.4
Presentation Format: 6_2n_chk
Dataset Creation: Sun Feb 10 20:33:47 2013
Charted by: Depth in Feet scaled 1:600

0	GR (GAPI)	150	0	PEF (barn)	10	-0.5	DRHO (g/cc)	0.5
4	DCAL (in)	14	2	RHOB (g/cc)	3			
4	BOREID (in)	14						
-5	ACCY	5						

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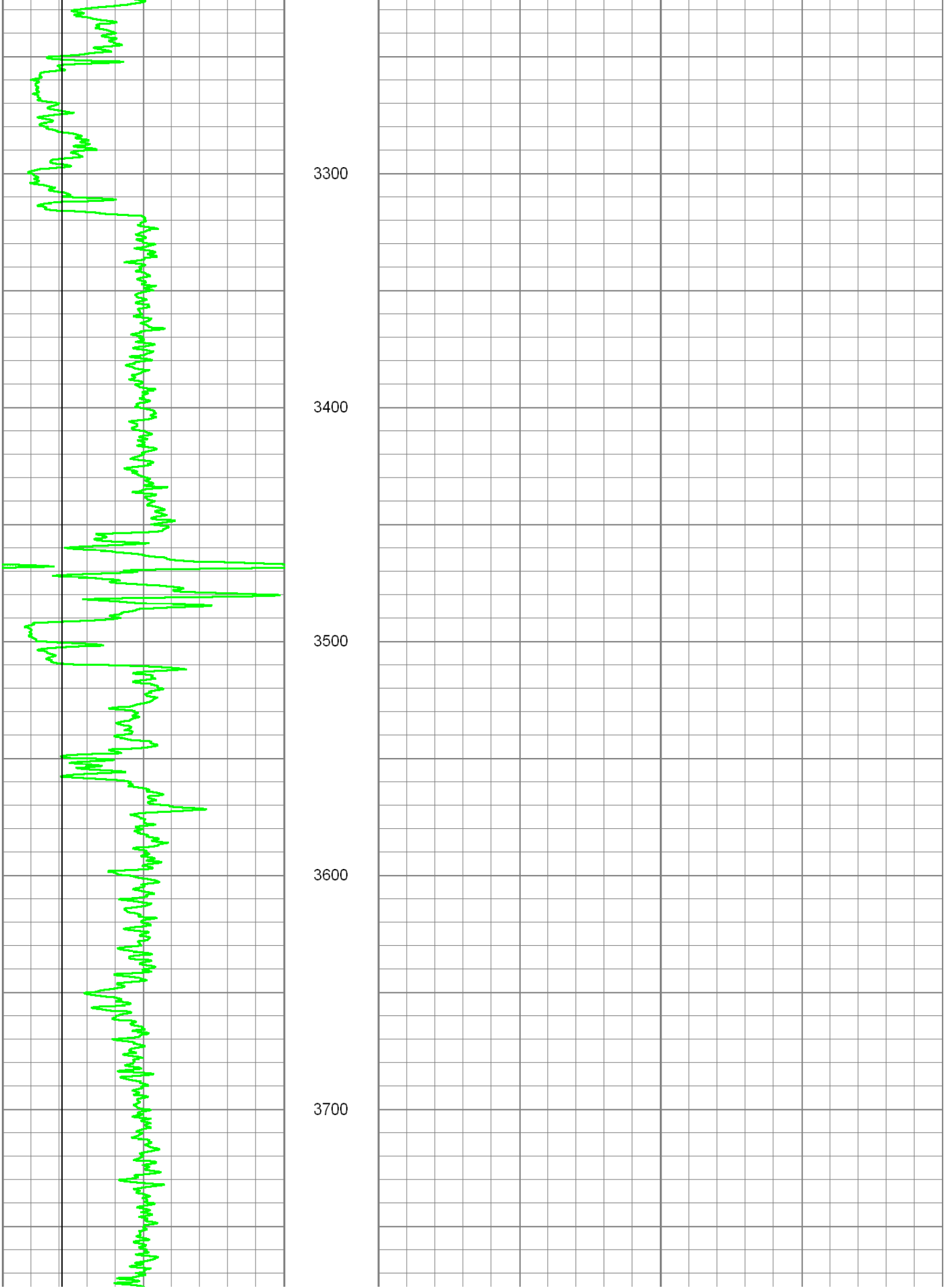
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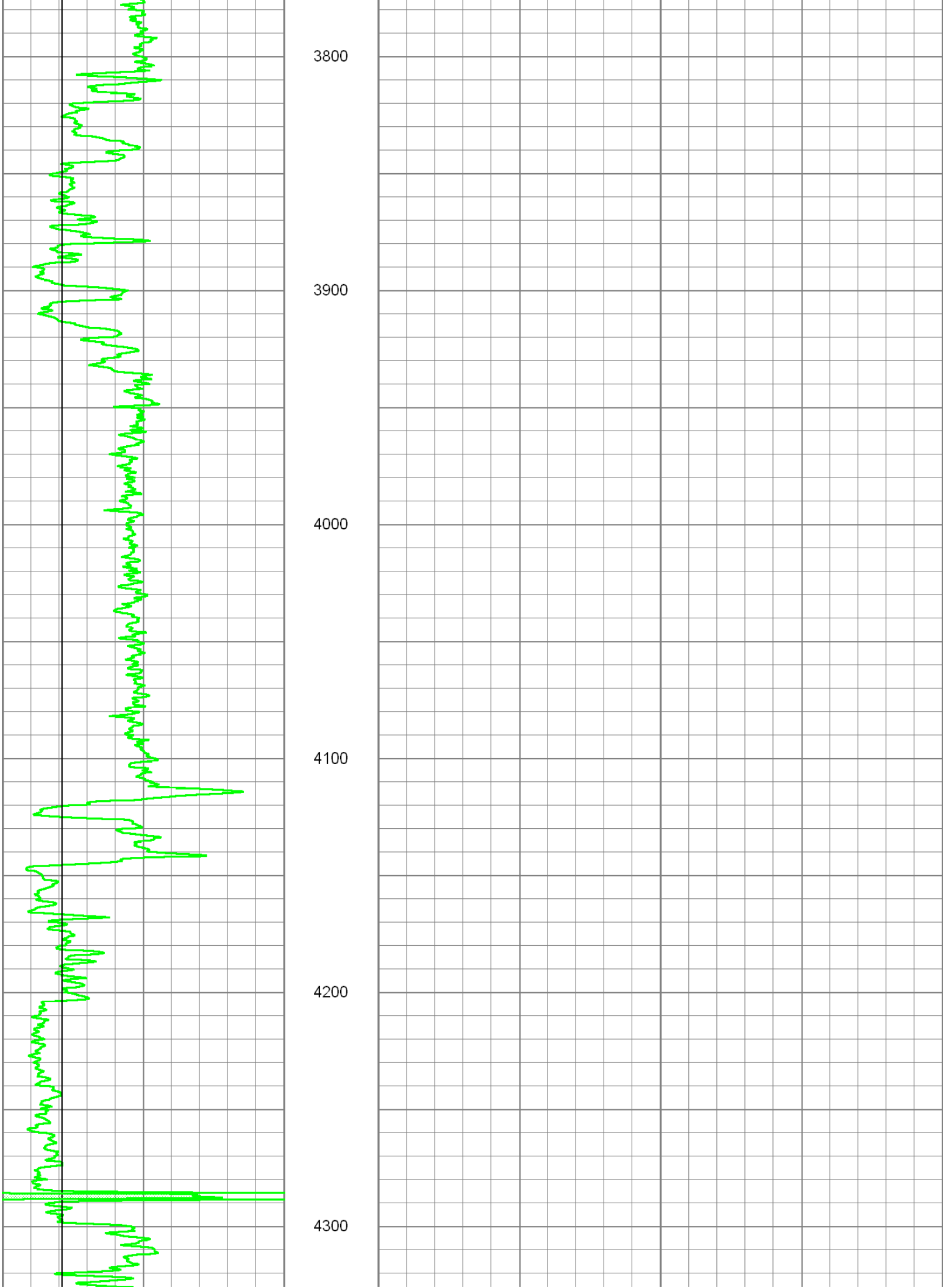
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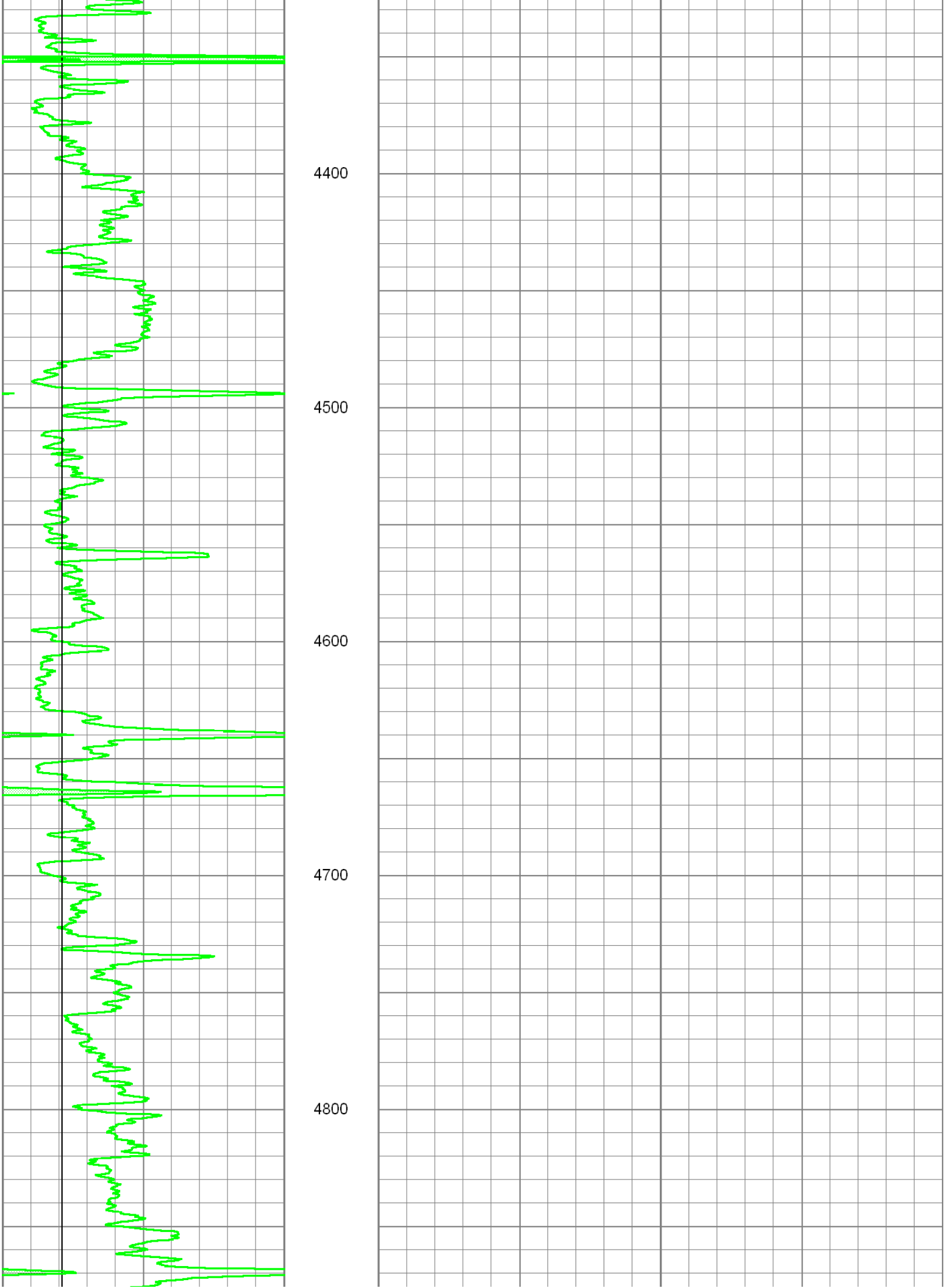
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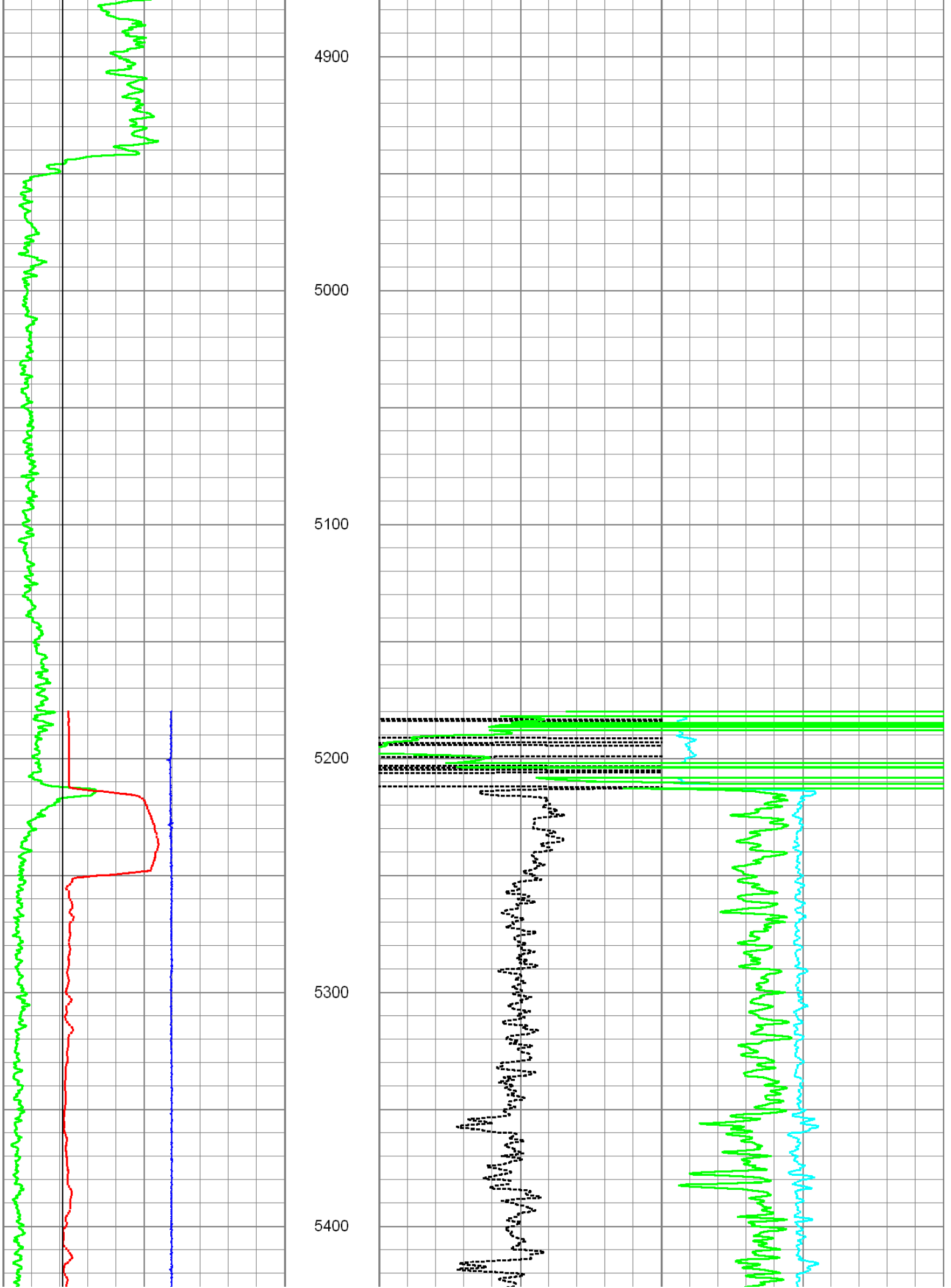
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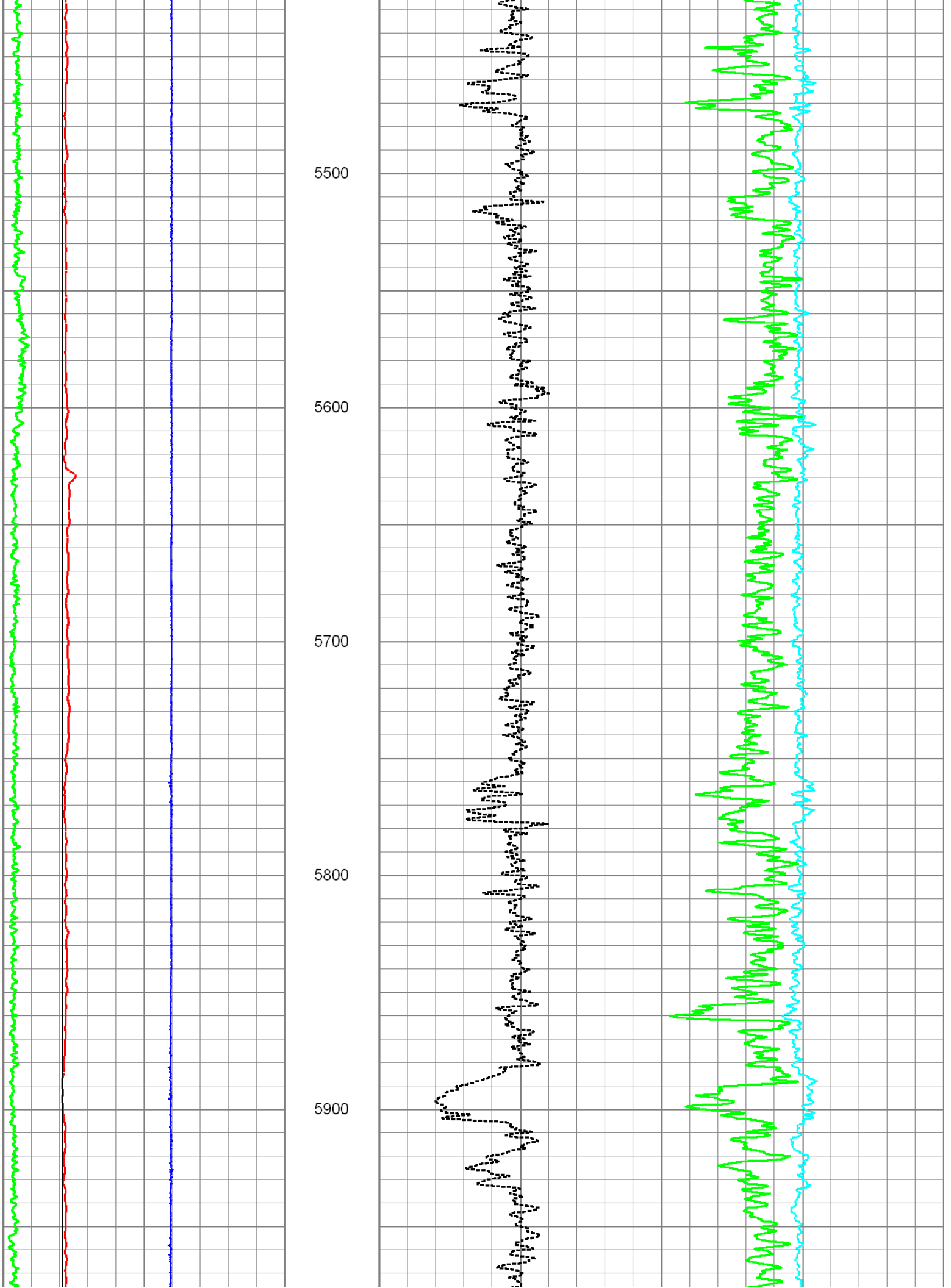
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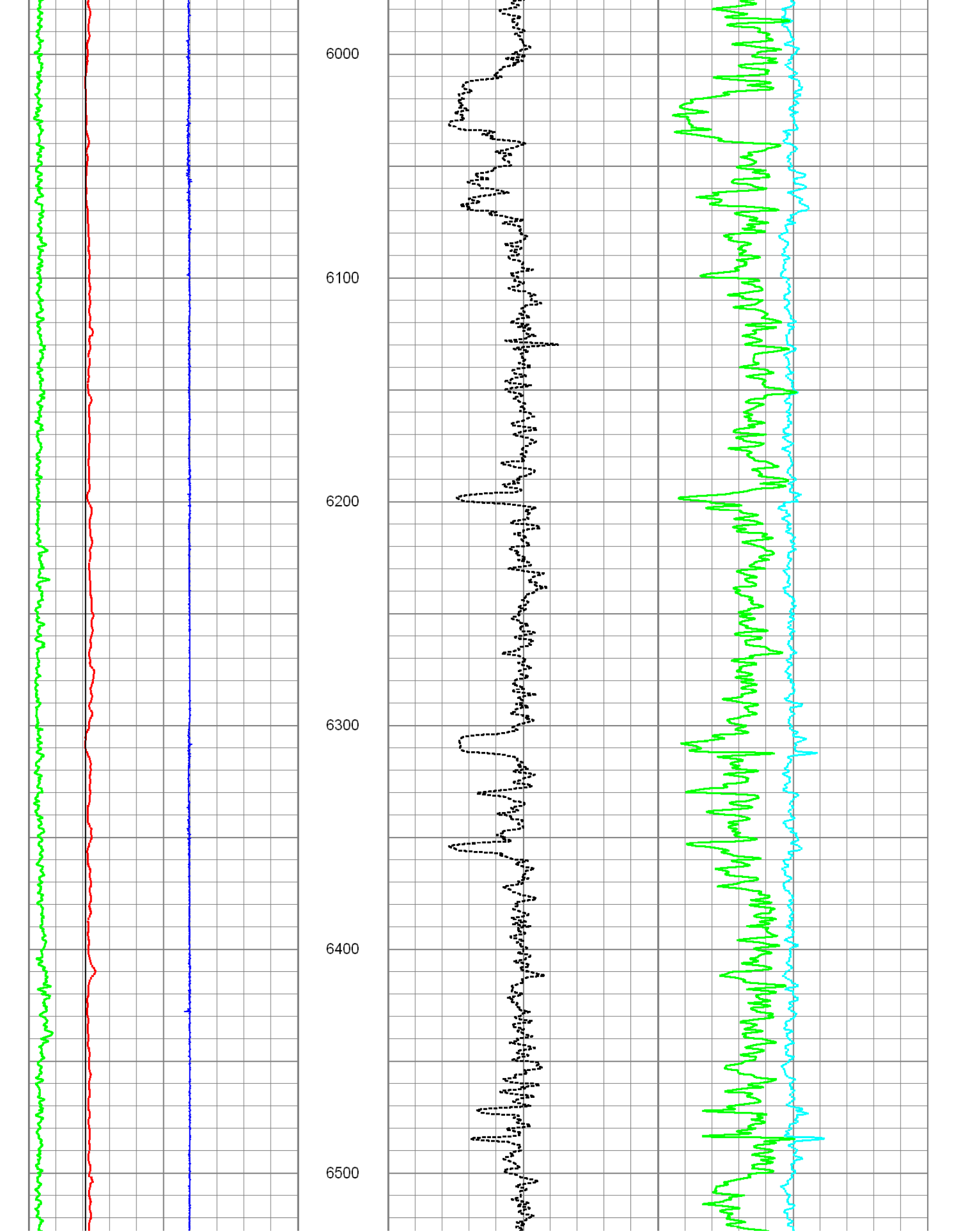
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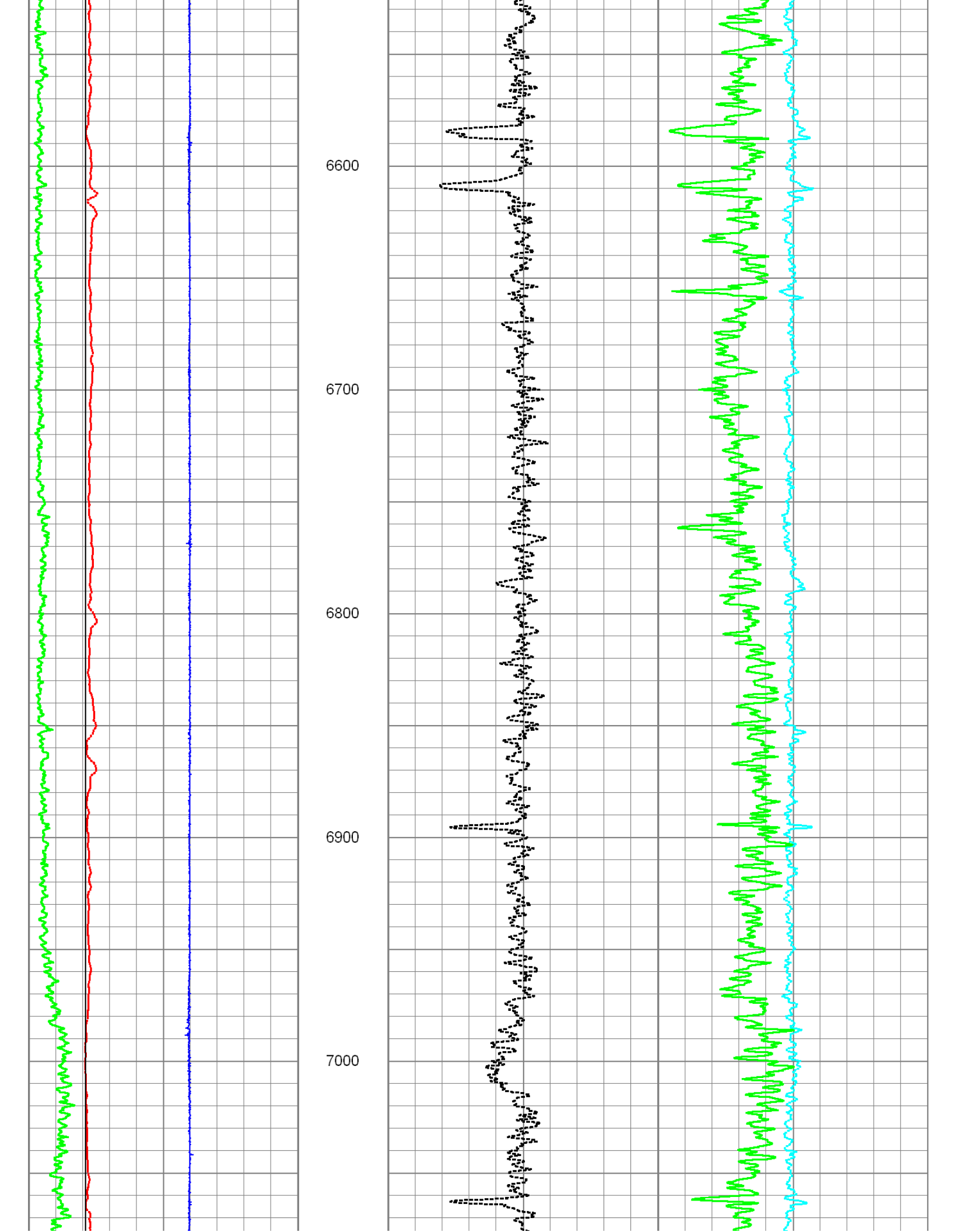
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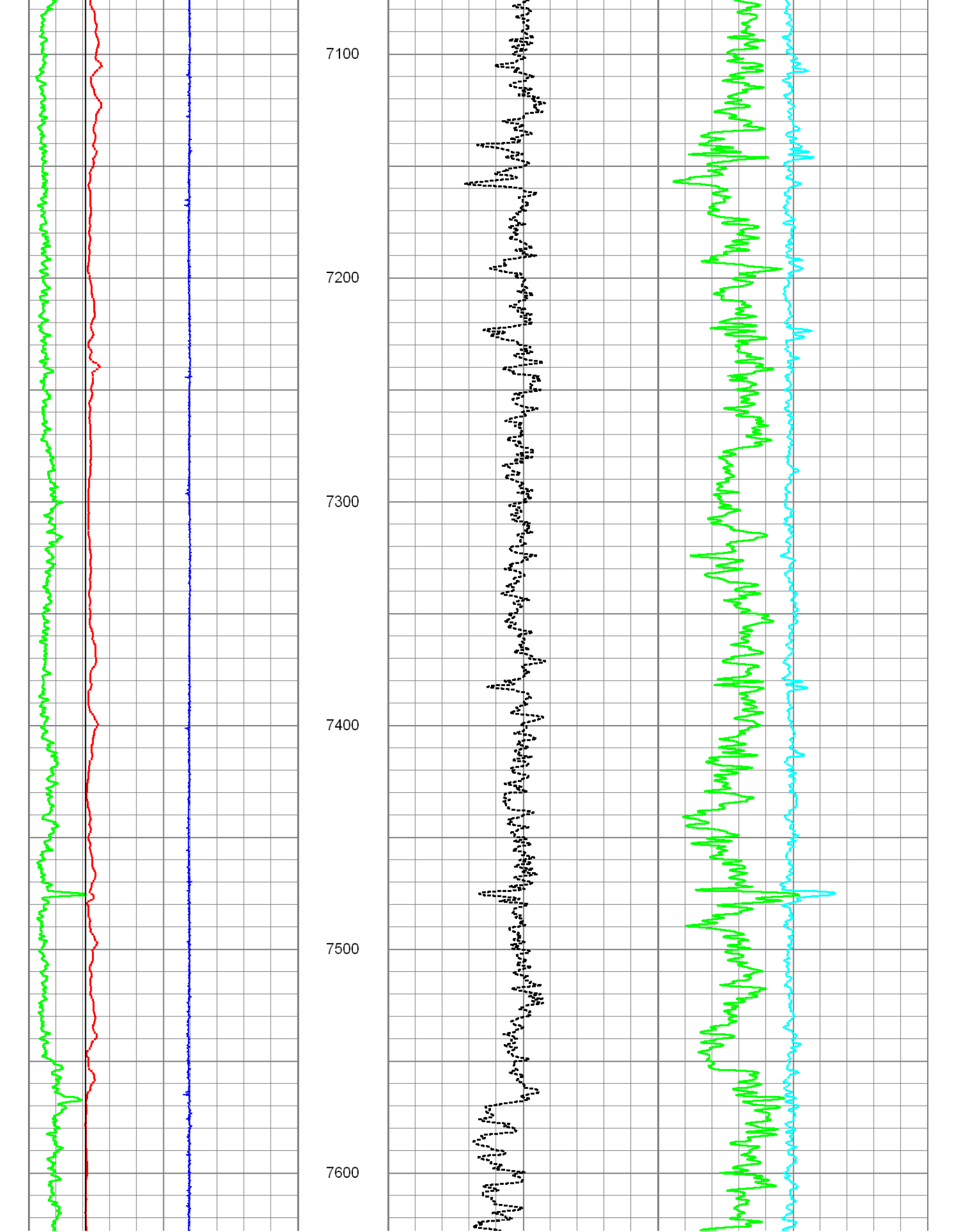
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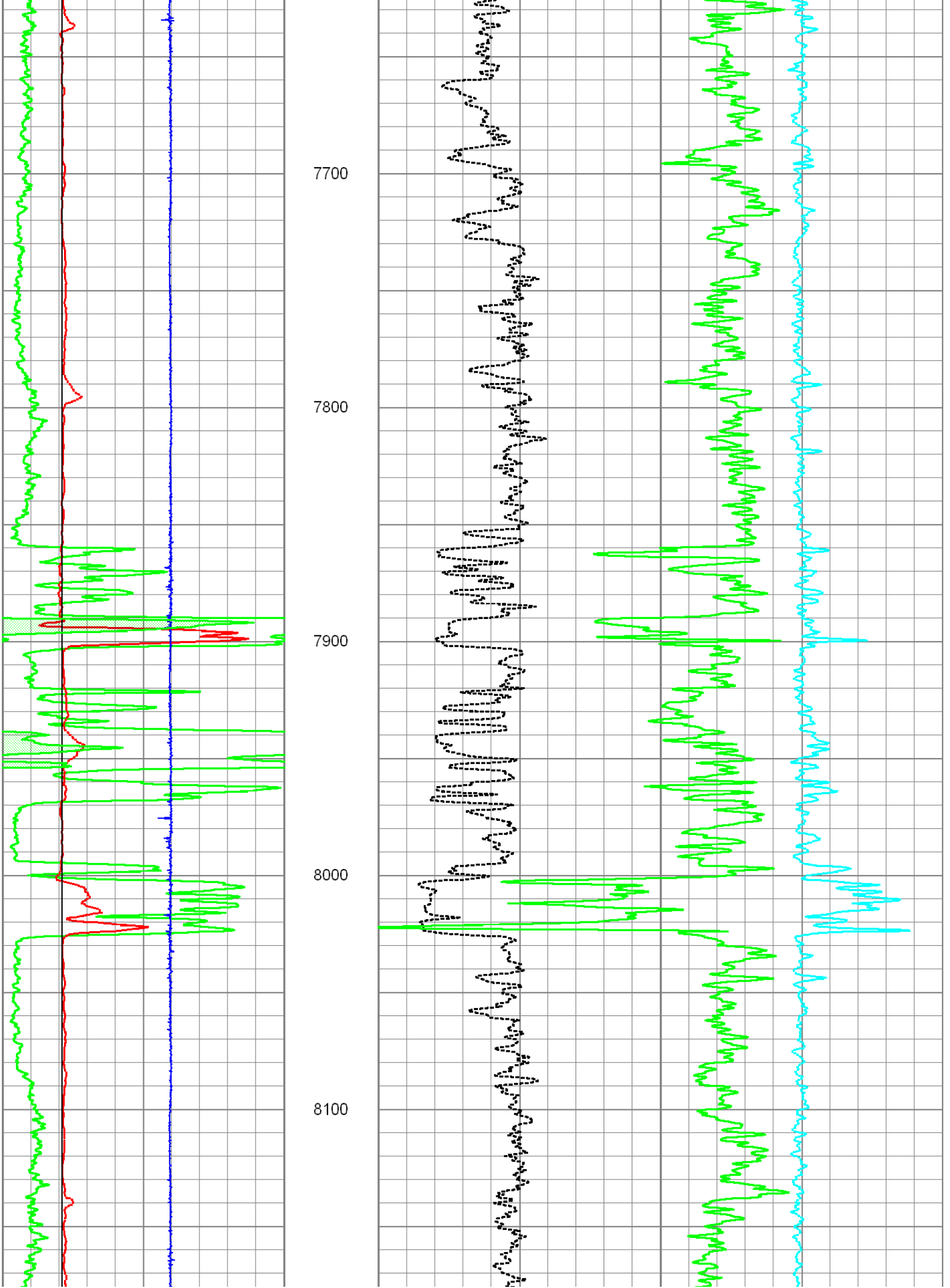
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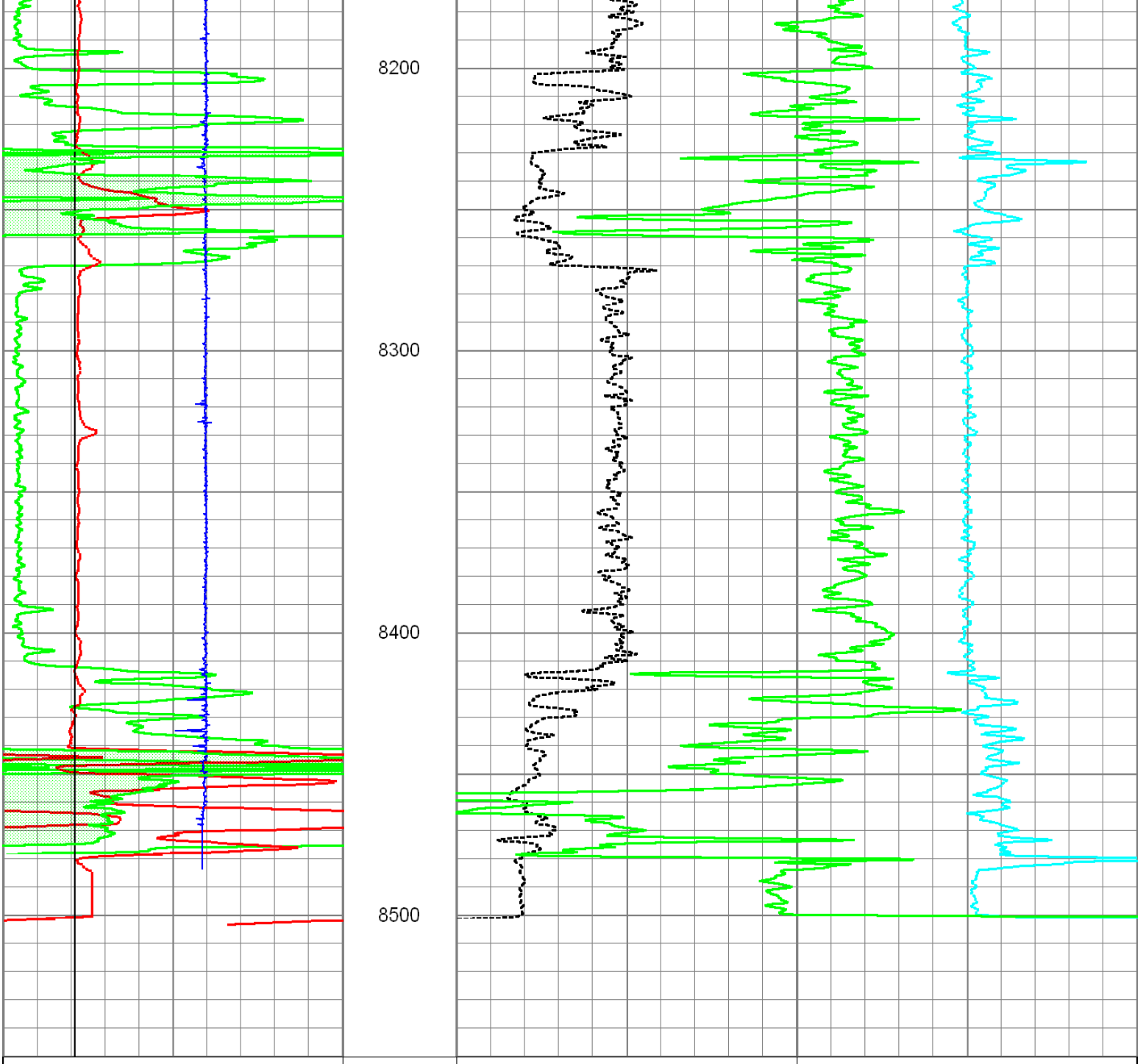

0	GR (GAPI)	150
4	DCAL (in)	14
4	BOREID (in)	14
-5	ACCY	5

0	PEF (barn)	10	-0.5 DRHO (g/cc)	0.5
2	RHOB (g/cc)	3		

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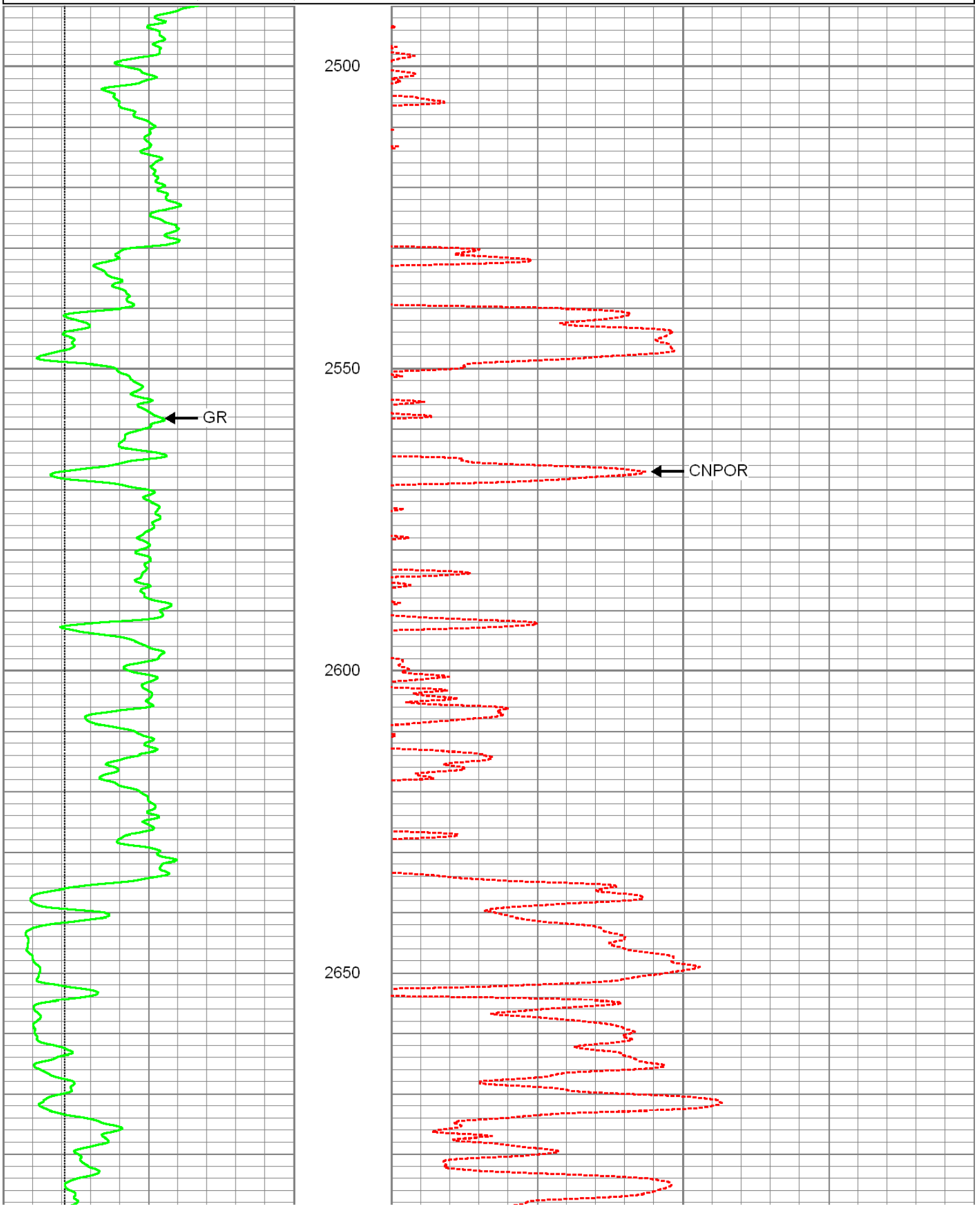
MAIN PASS

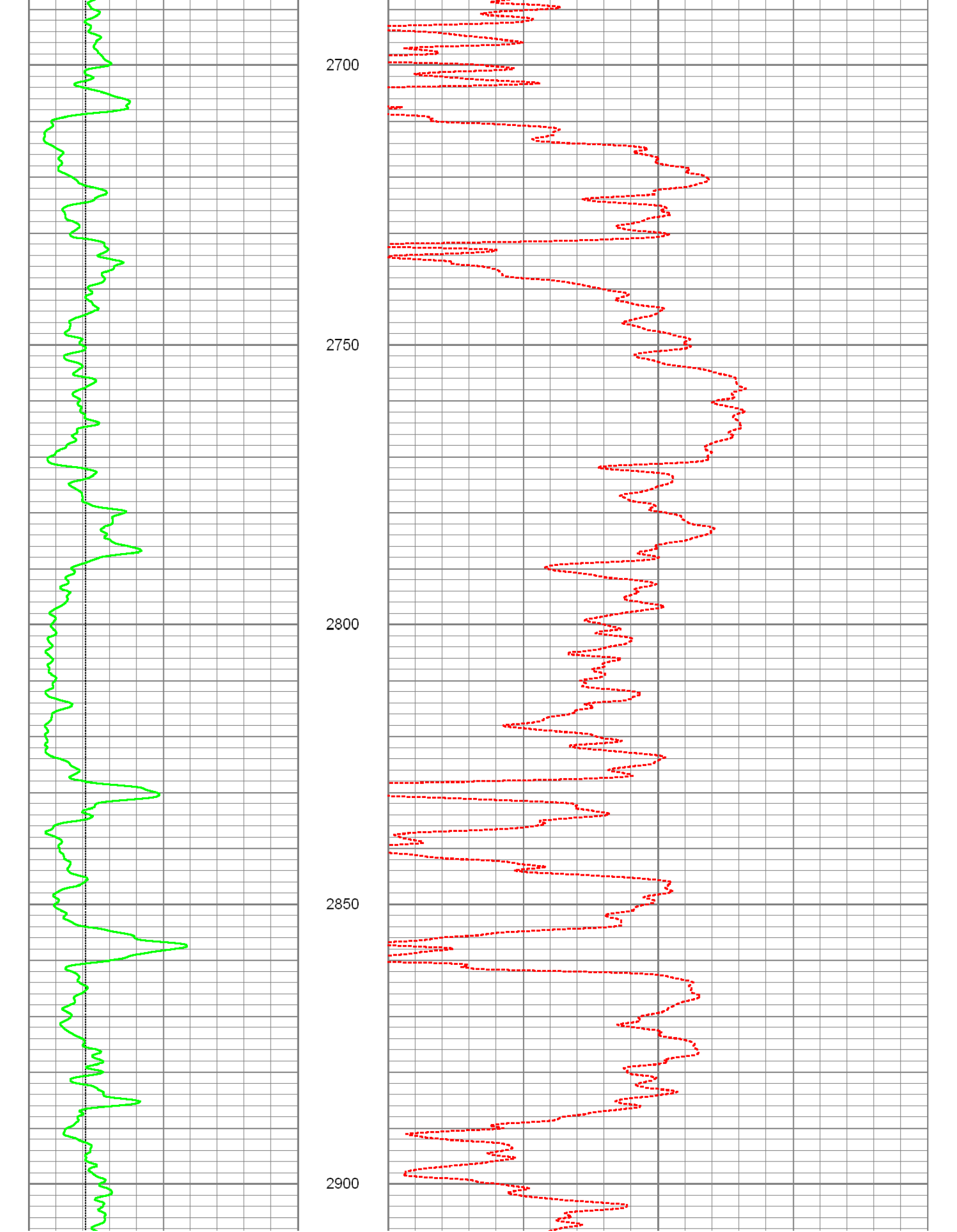
Database File:	starks_mem.db
Dataset Pathname:	proc2/pass1.4
Presentation Format:	6_5n_chk
Dataset Creation:	Sun Feb 10 20:33:47 2013
Charted by:	Depth in Feet scaled 1:240

4	DCAL (in) 14	30	CNPOR (pu) 10

4	DCAL (in)	14
4	BOREID (in)	14
0	GR (GAPI)	150
-5	ACCY	5
	TBHV (ft3)	

30	CNPOR (pu)	-10
30	DPHI (pu)	-10
0	PEF (barn) 10	-0.5 DRHO (g/cc) 0.5
	ABHV (ft3)	

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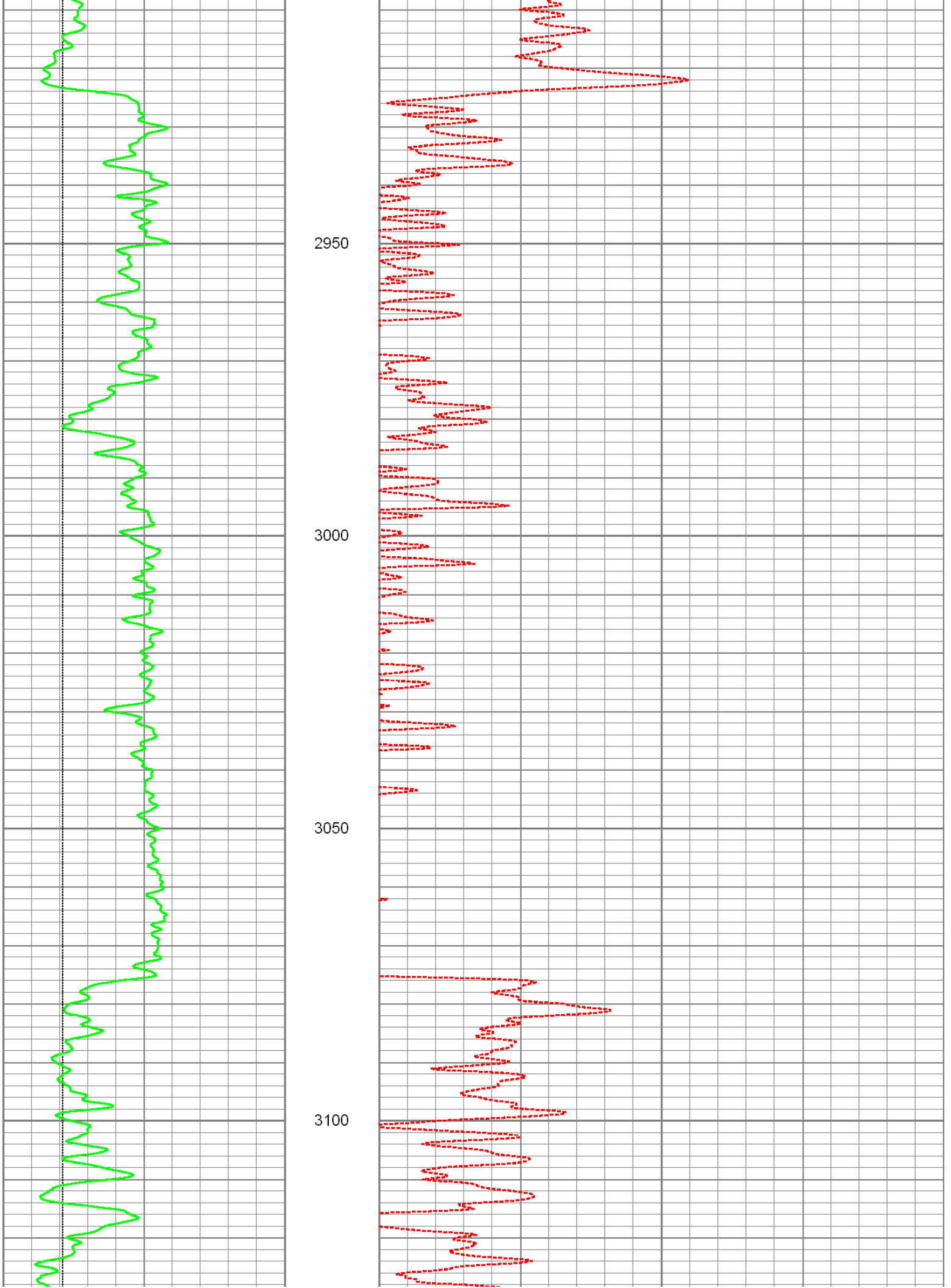
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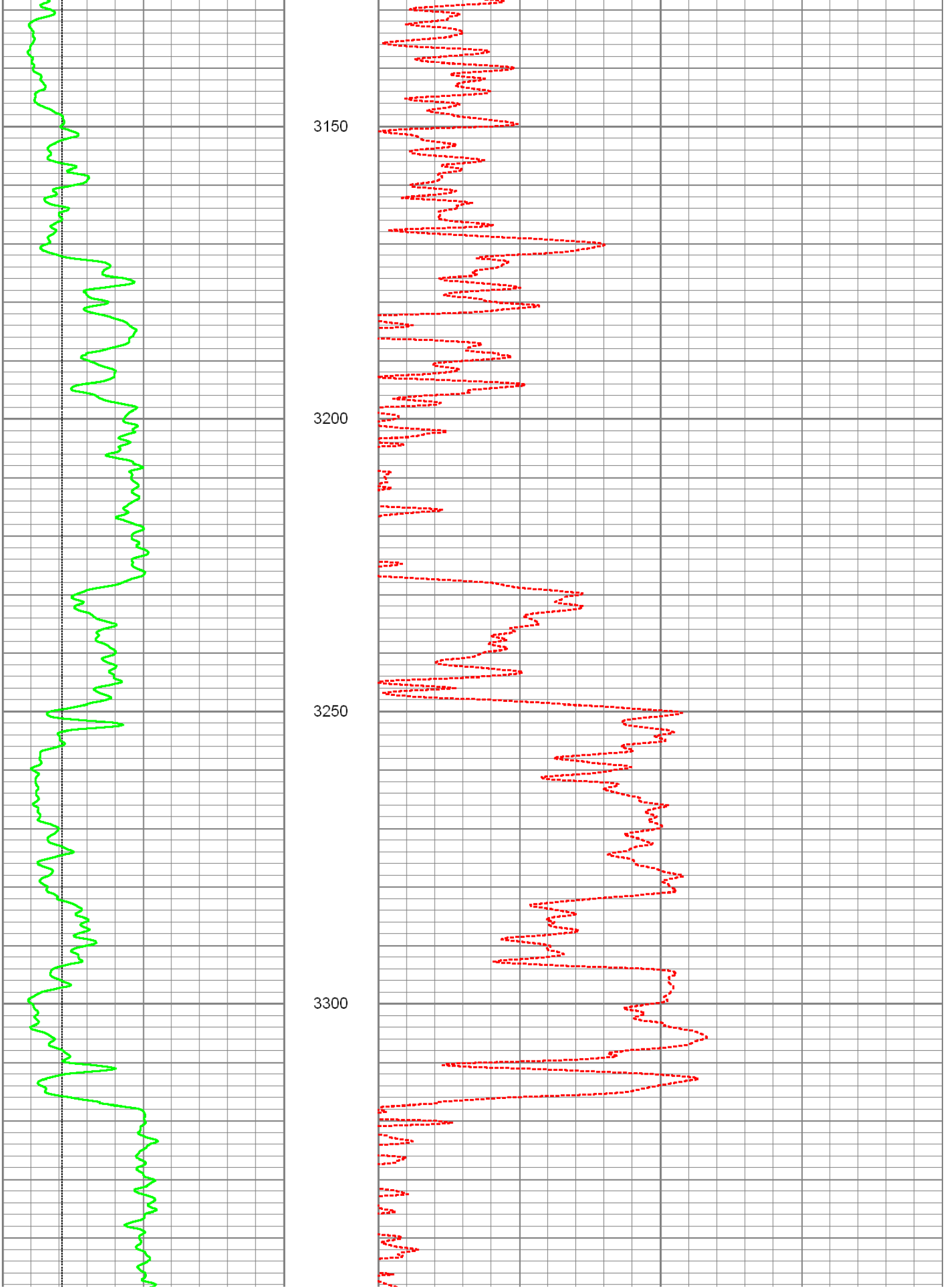
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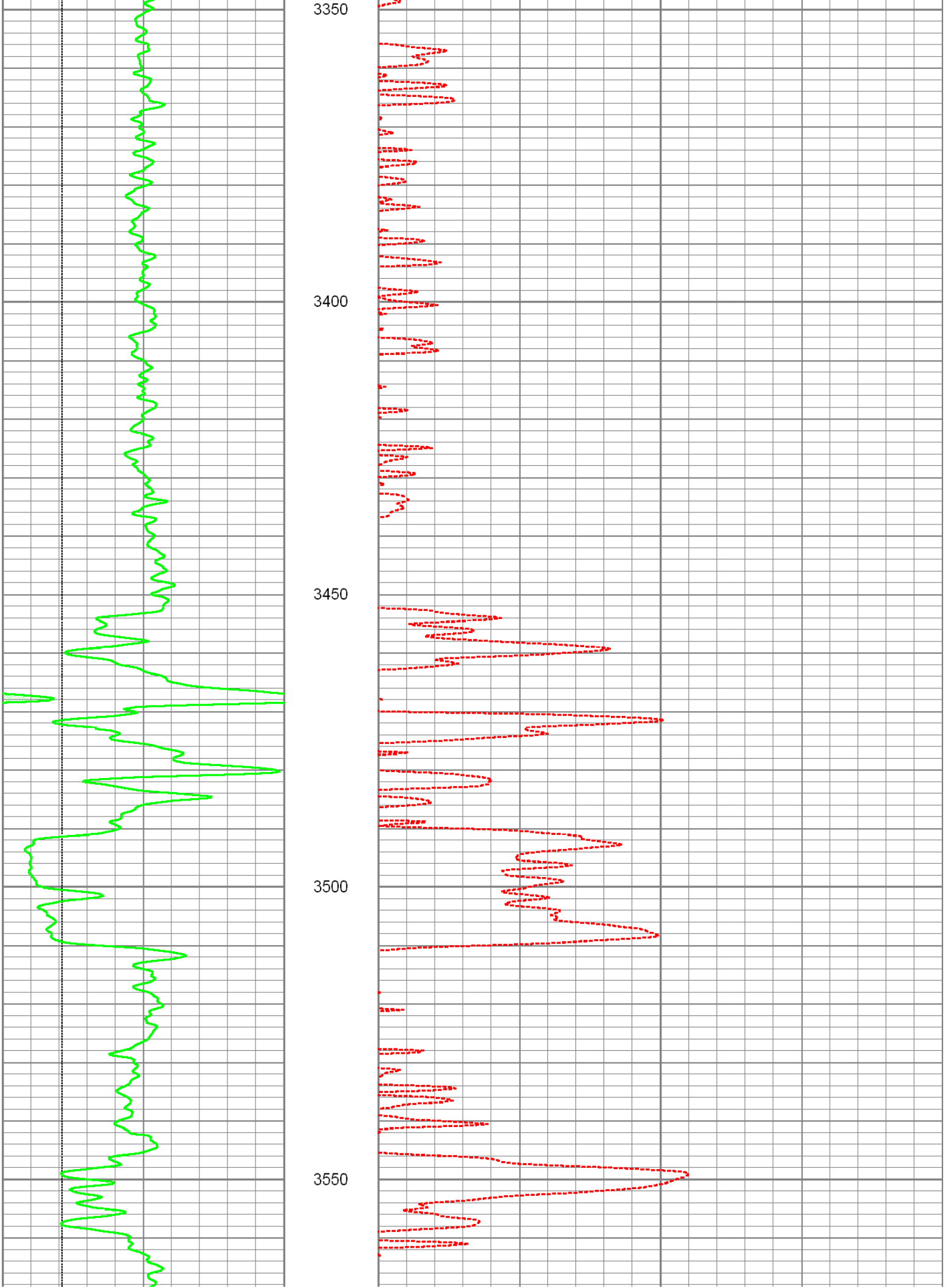
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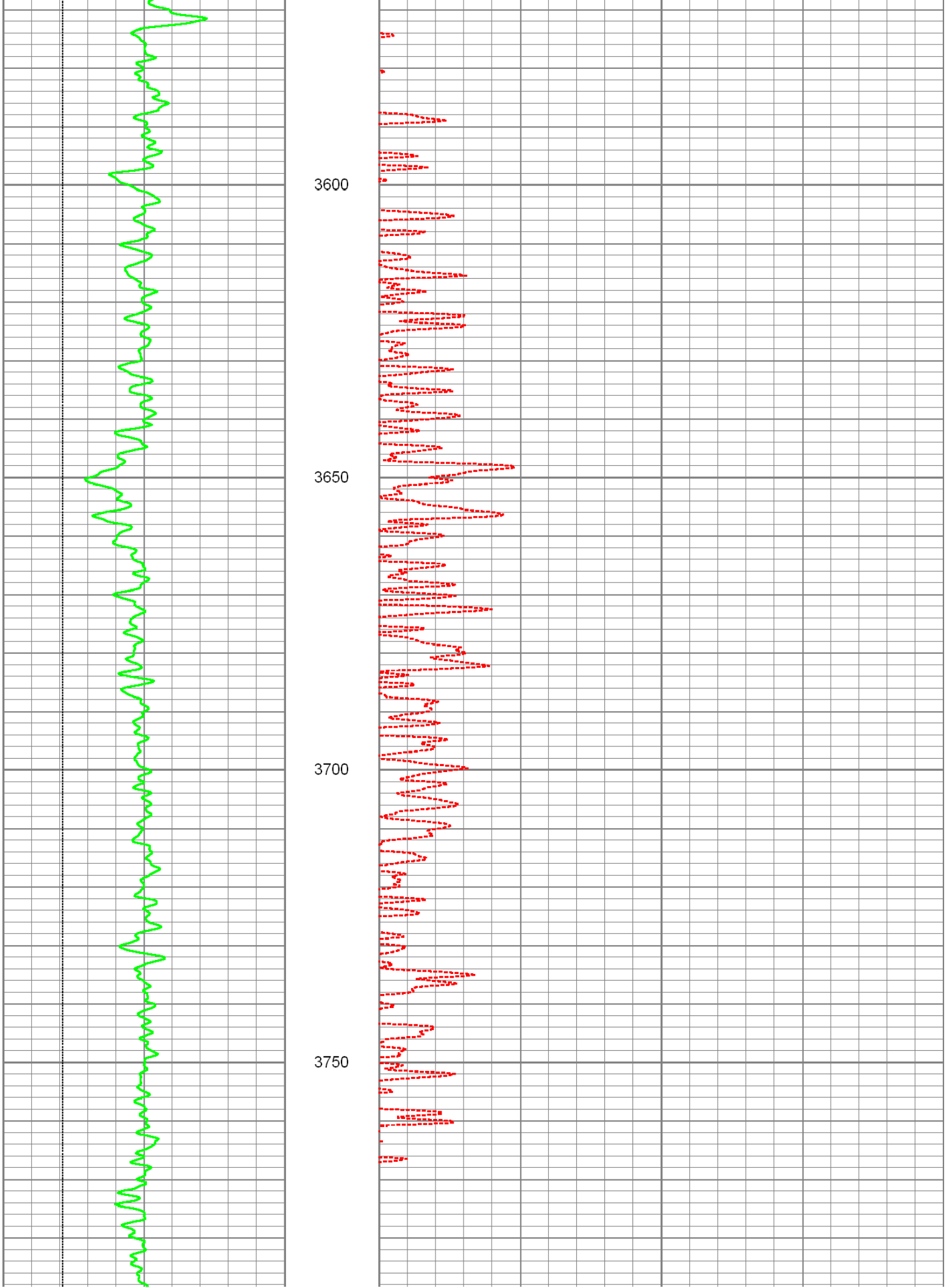
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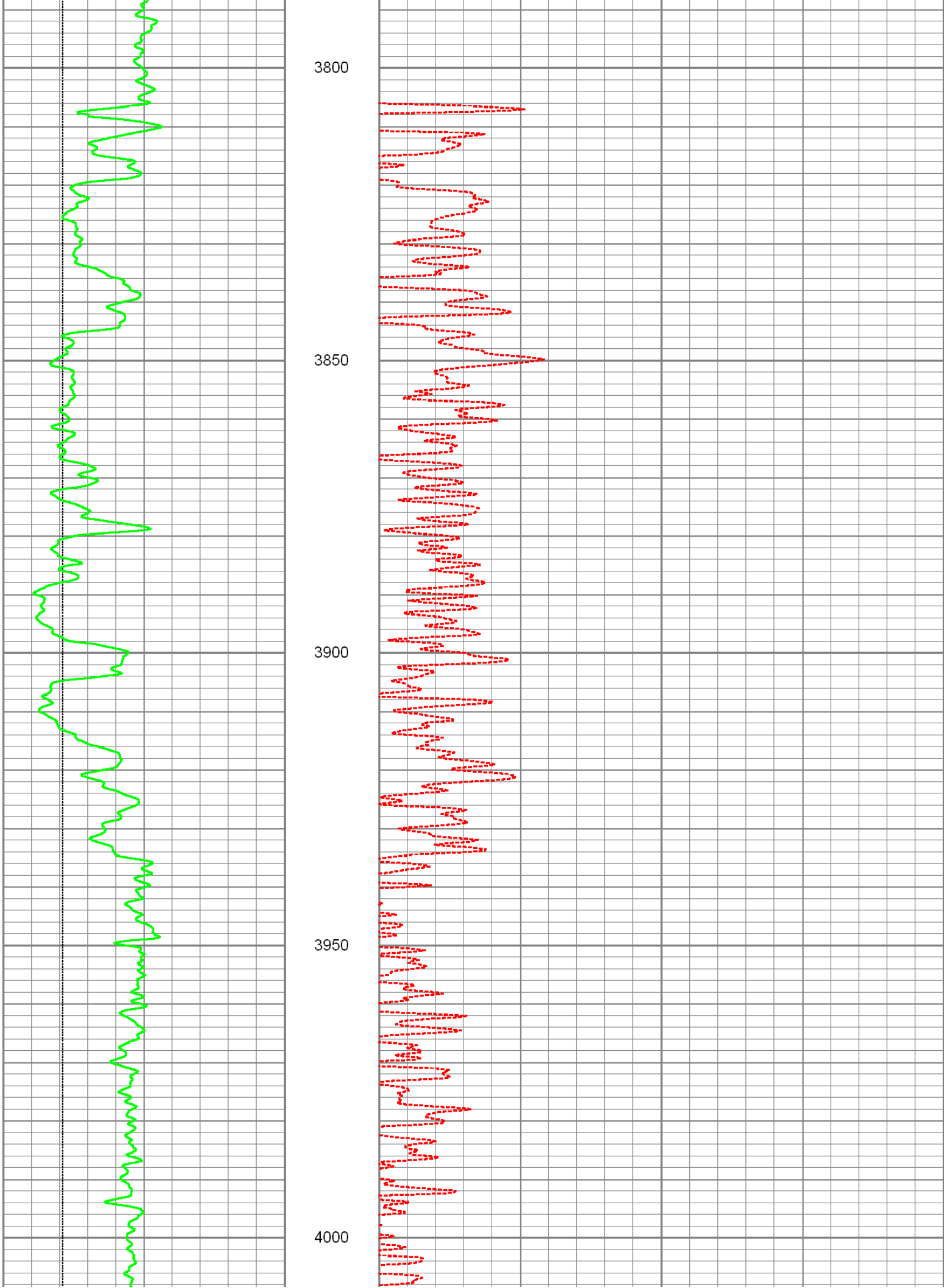
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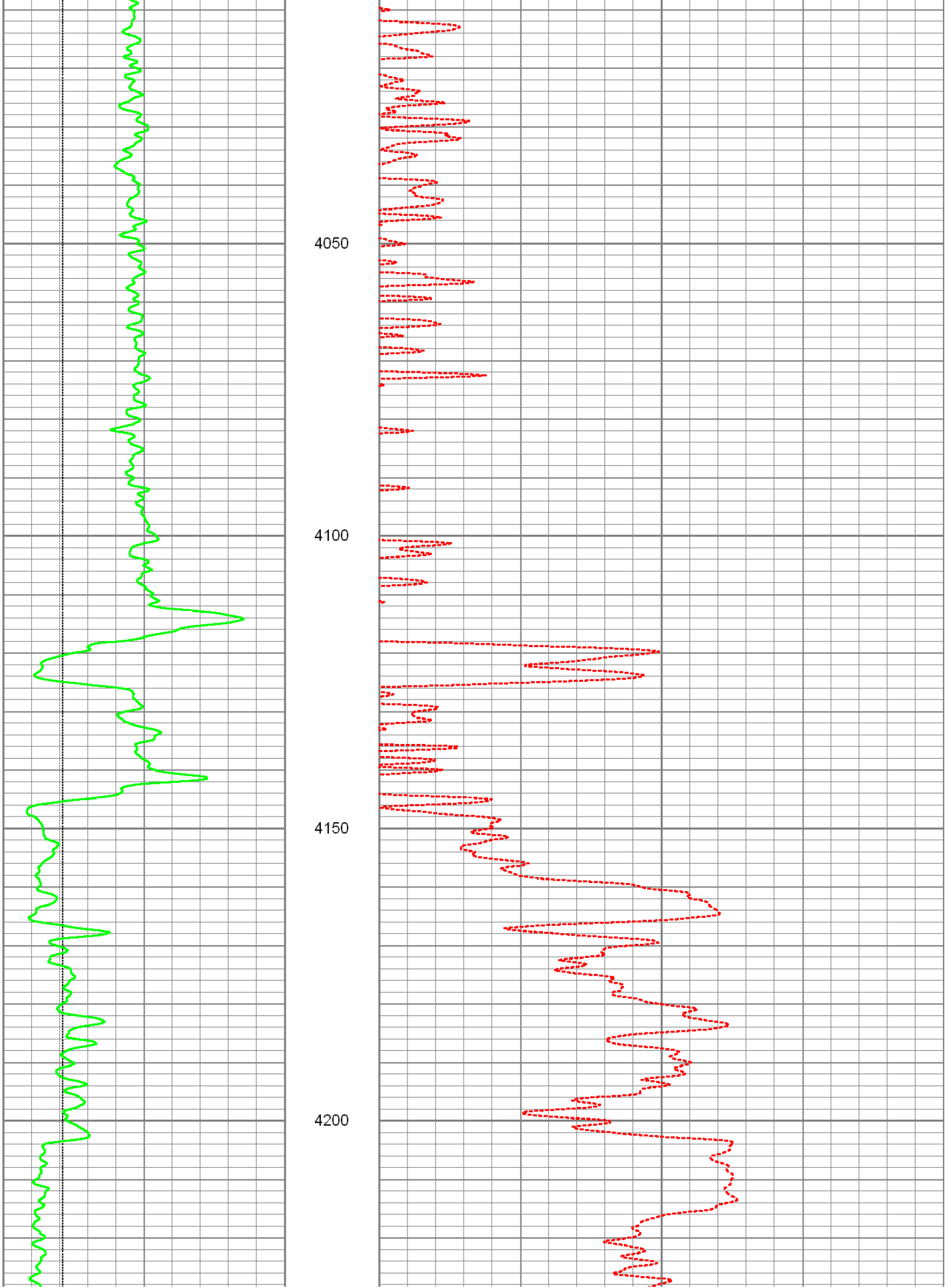
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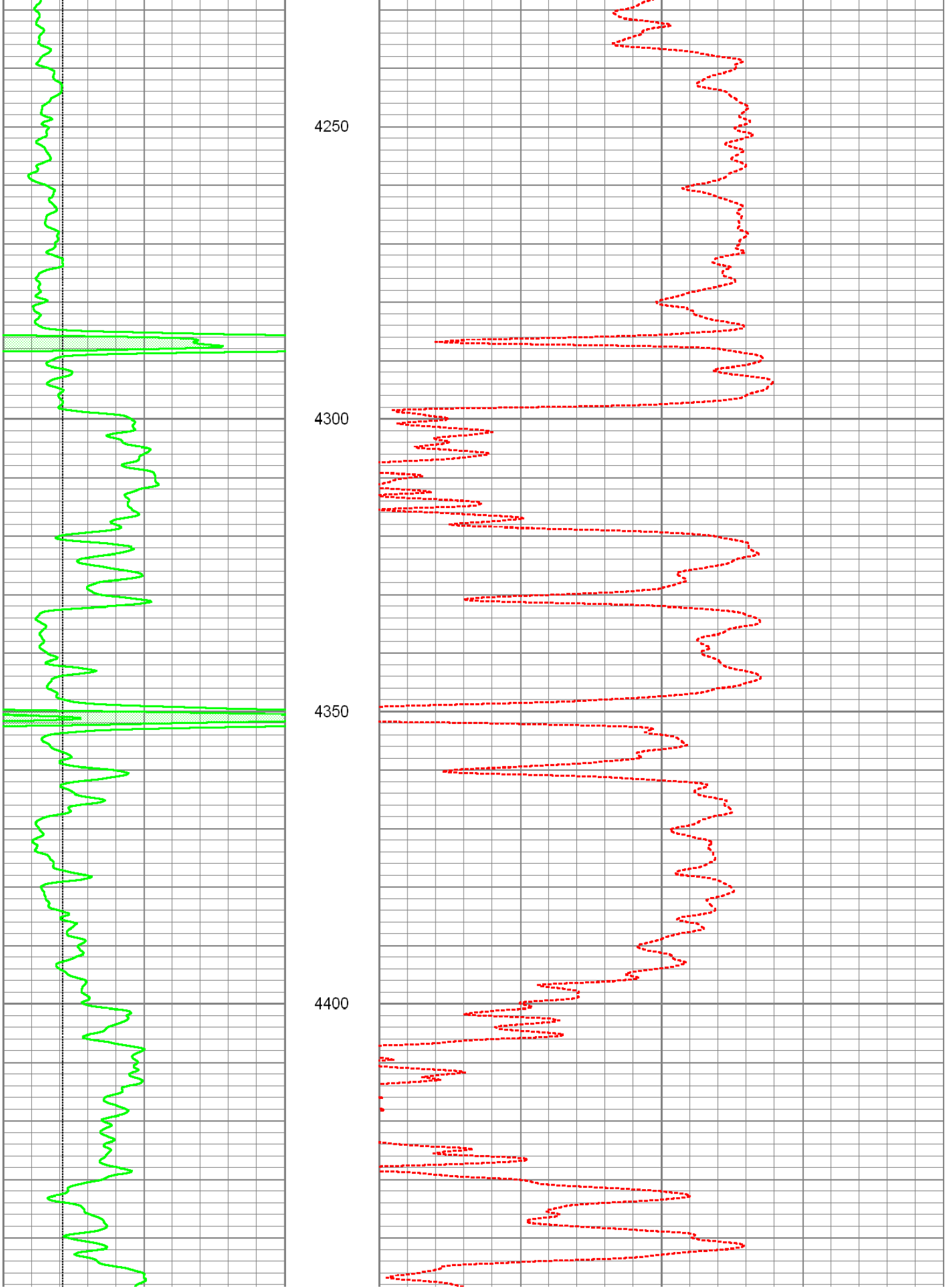
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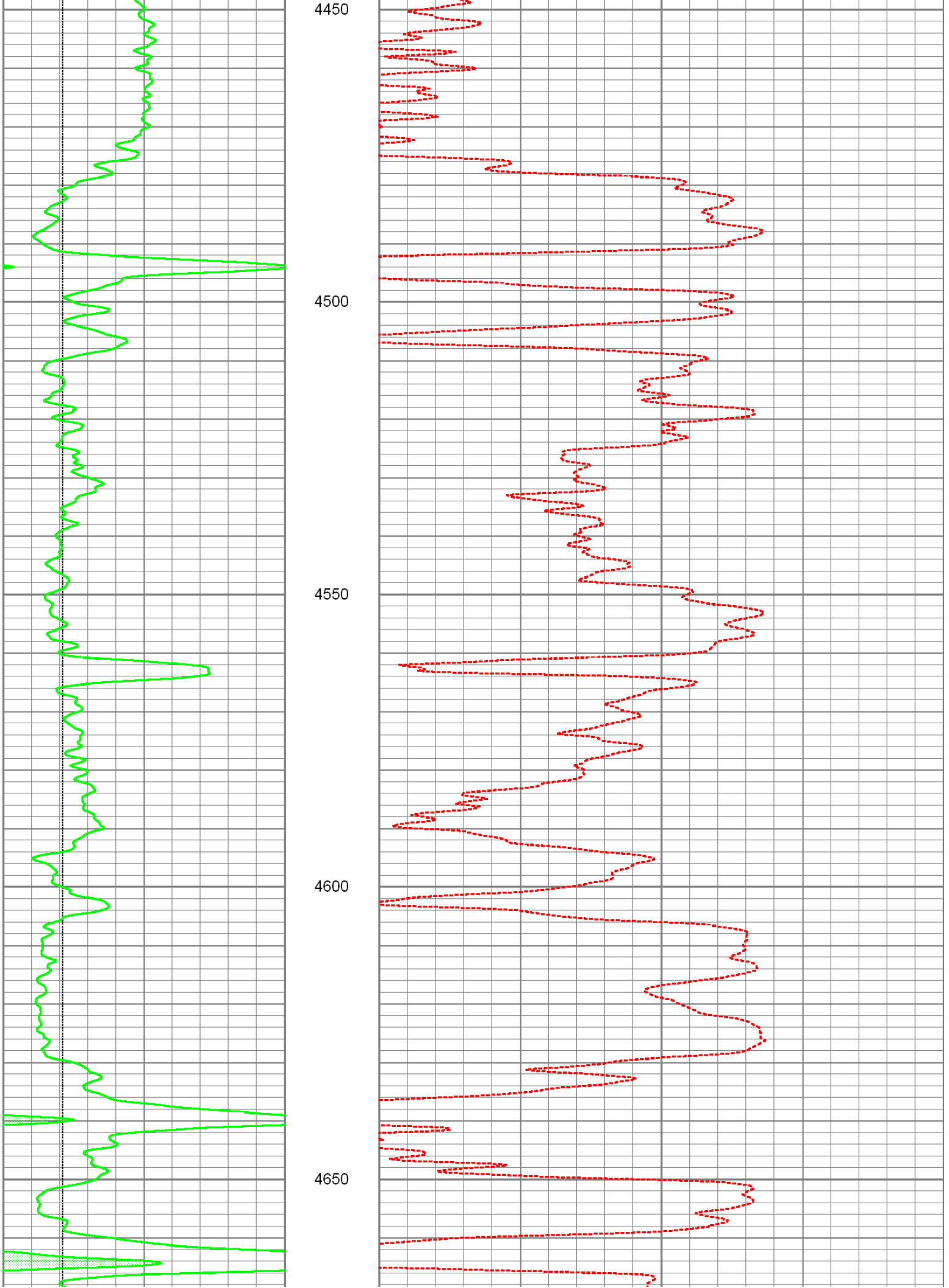
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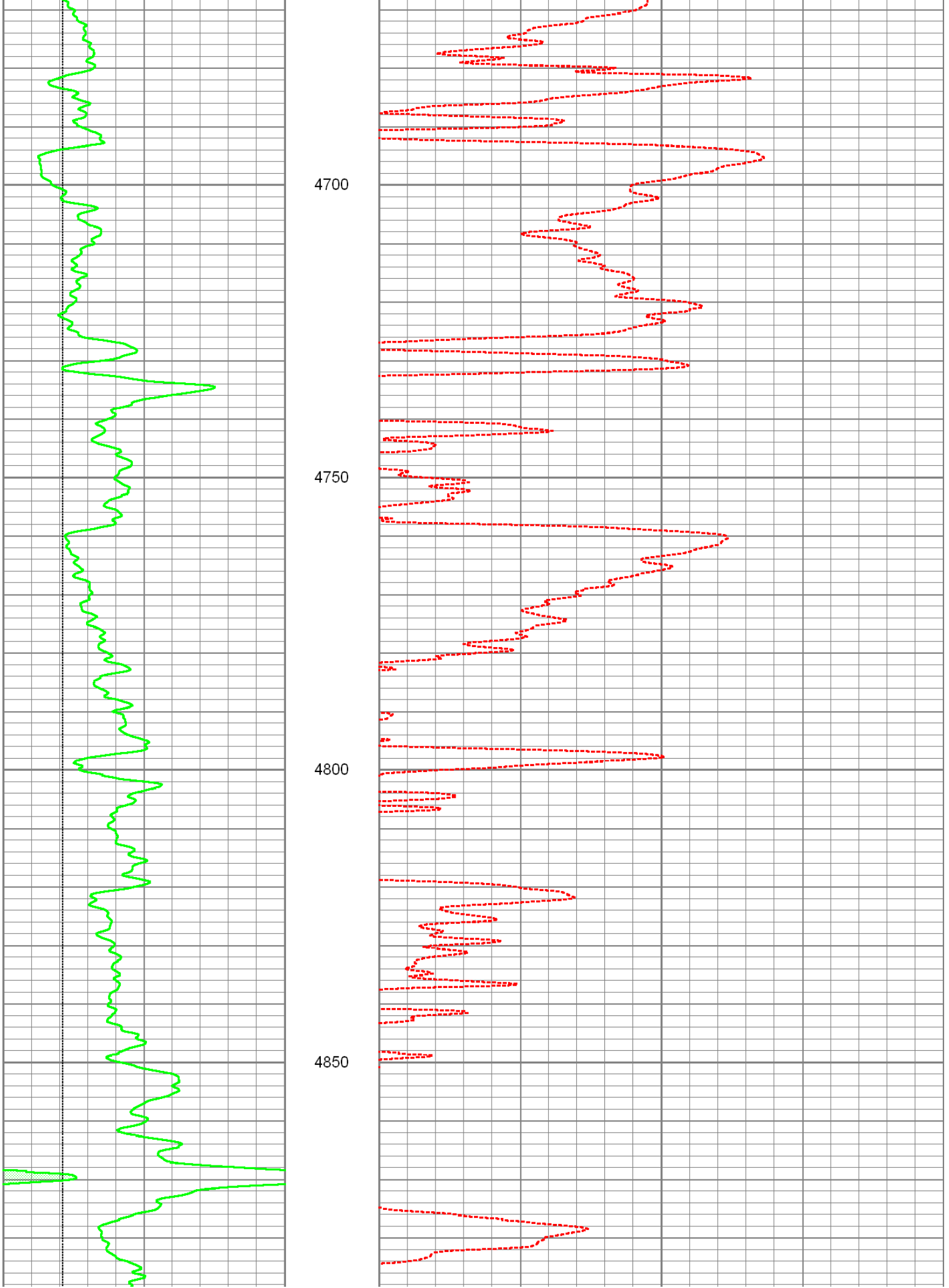
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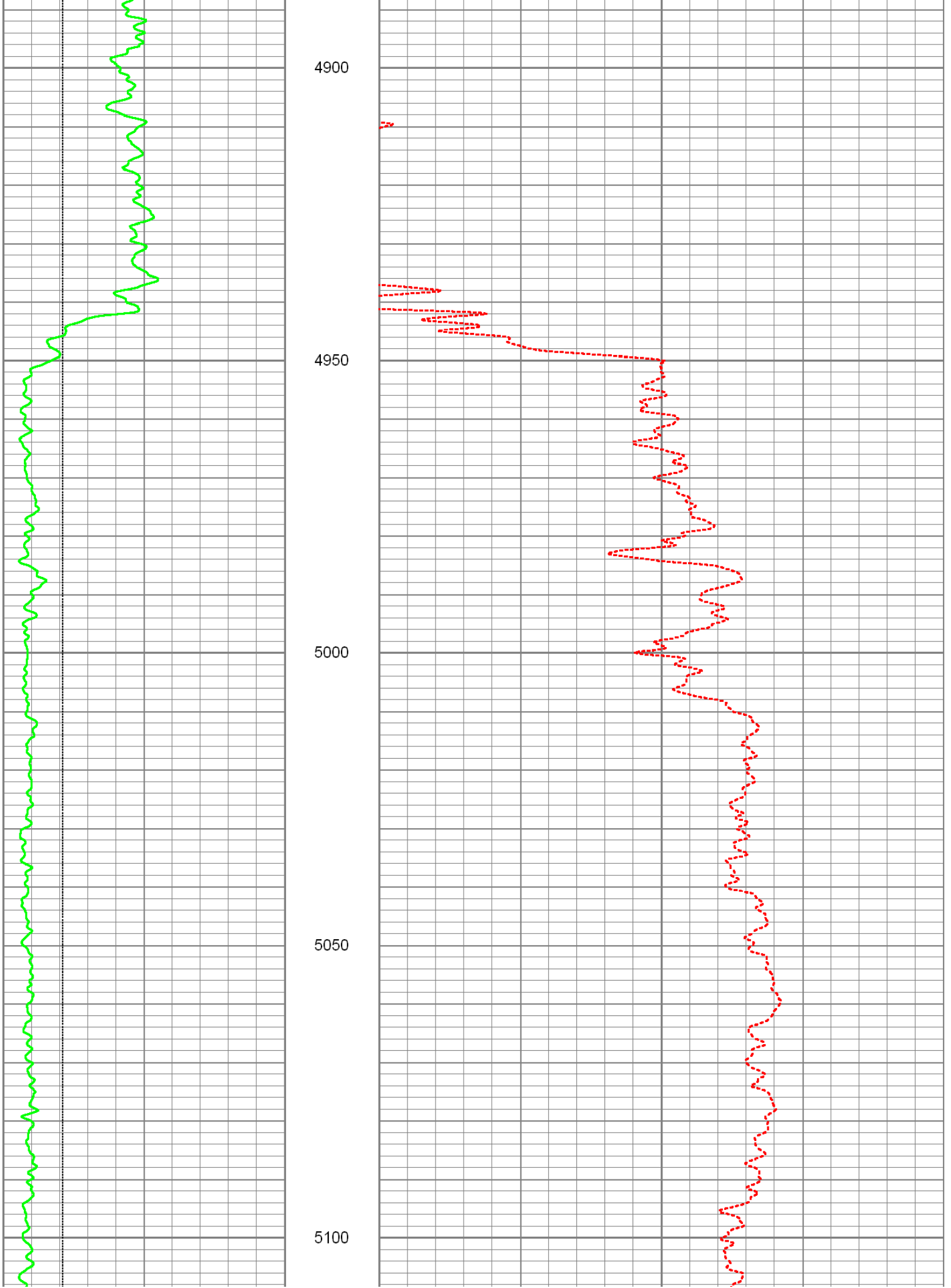
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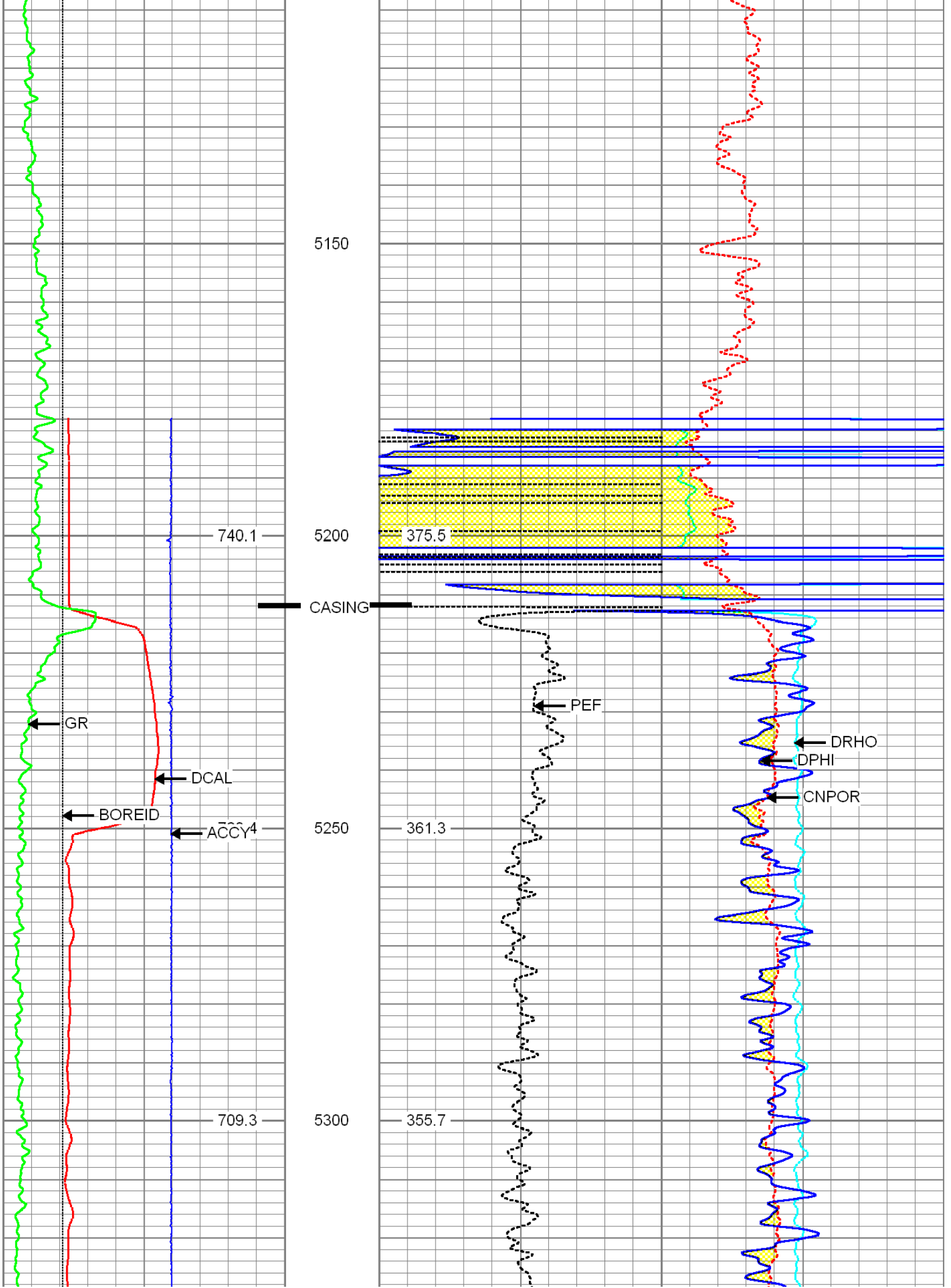
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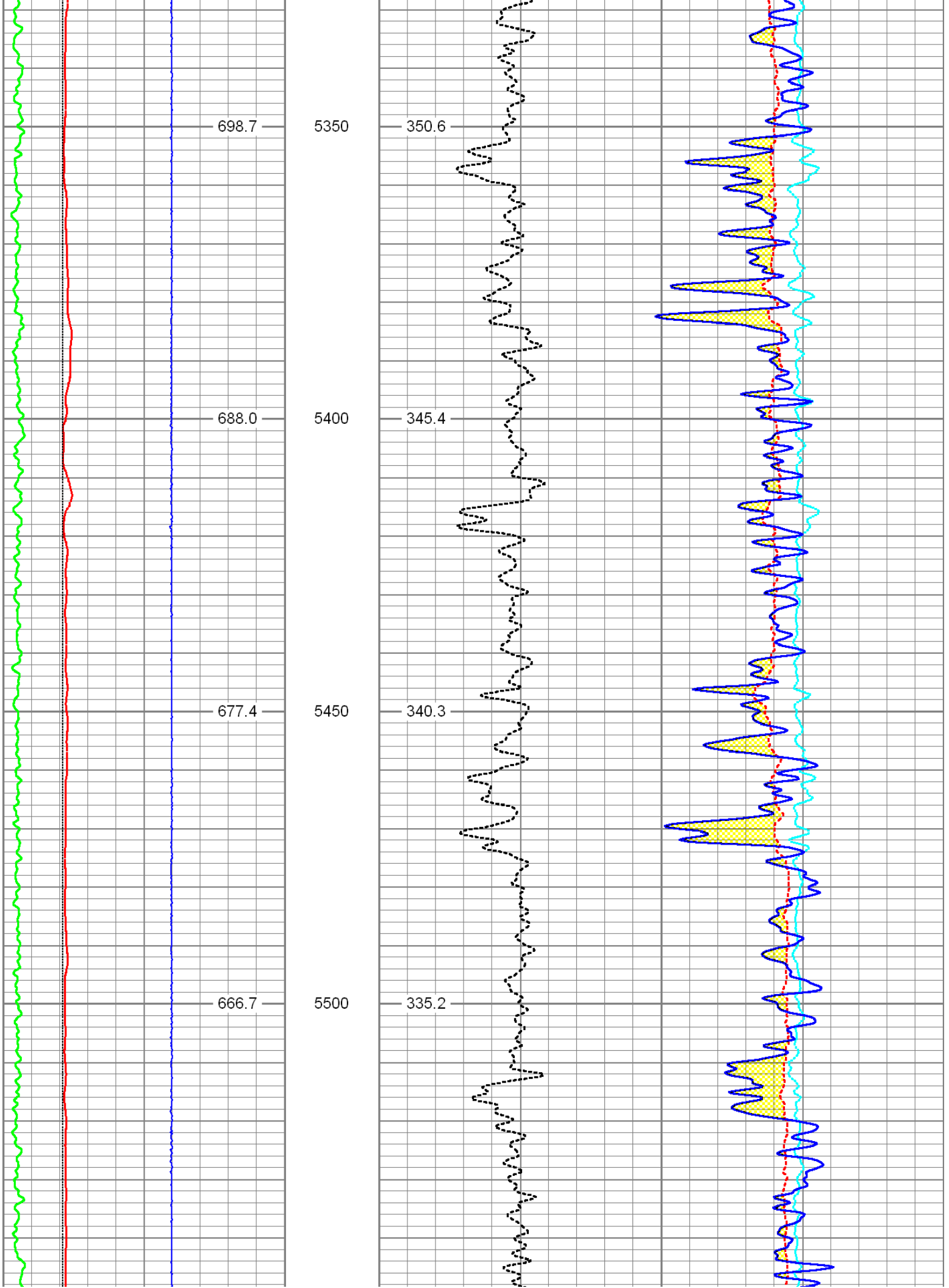
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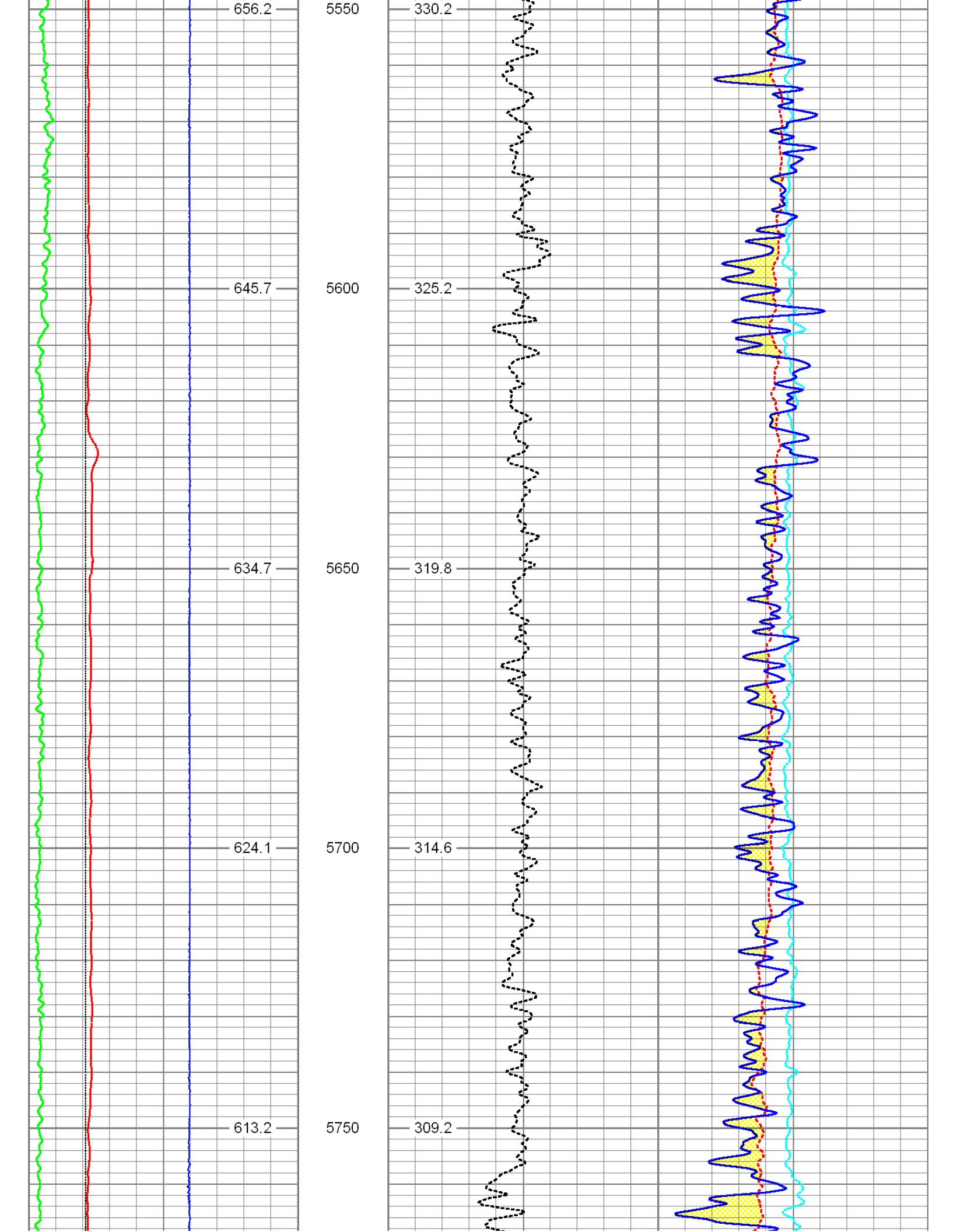
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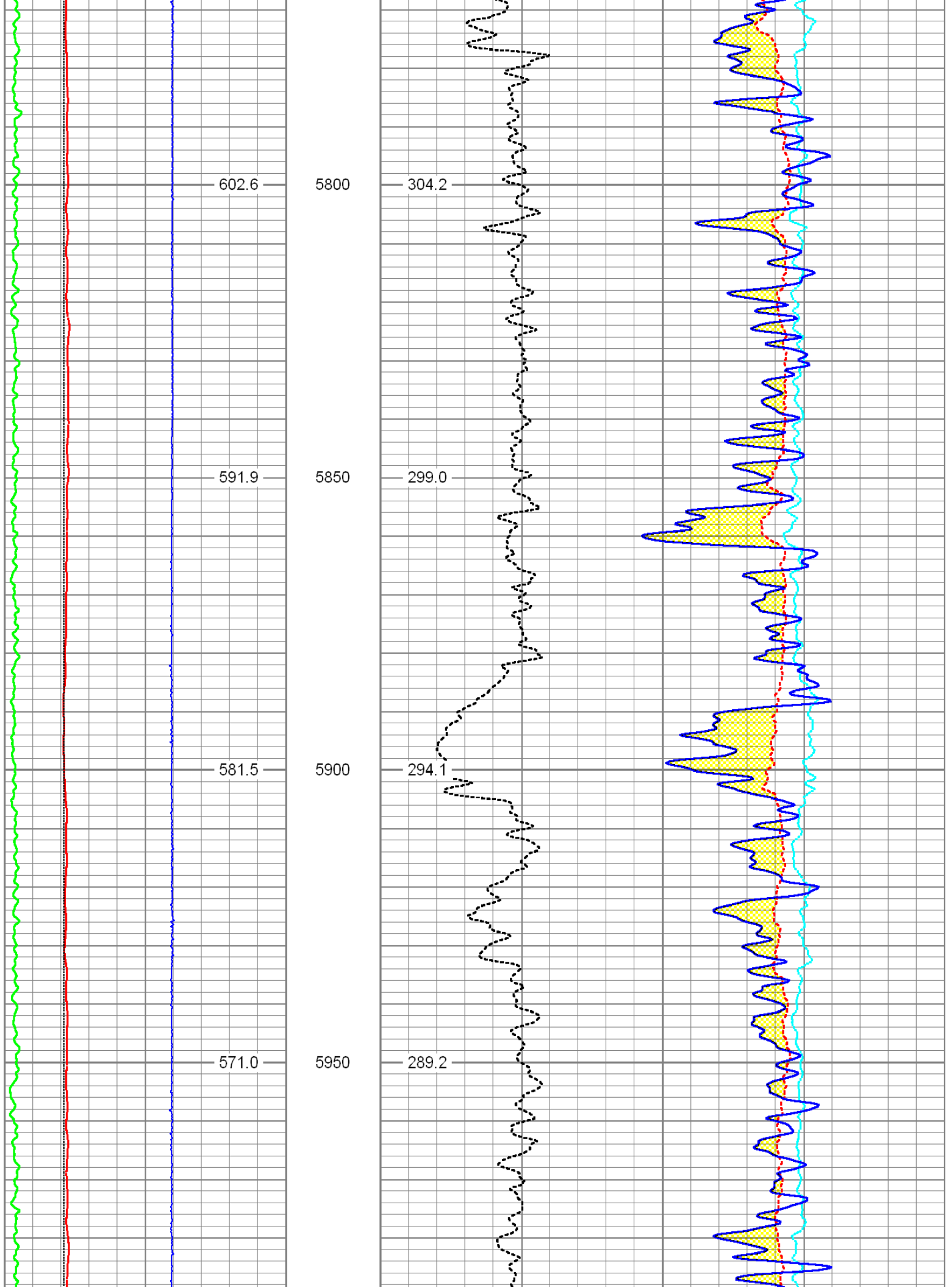
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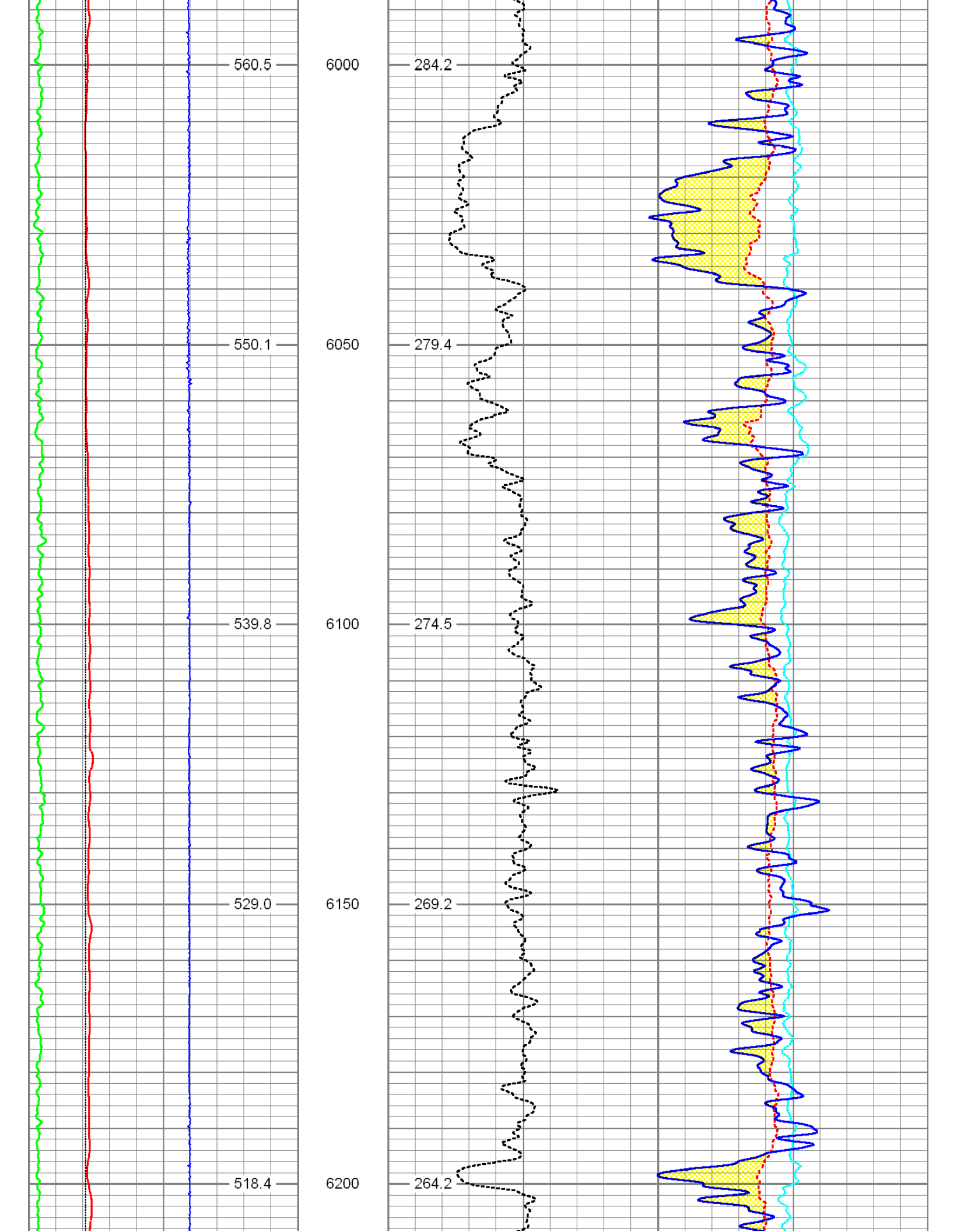
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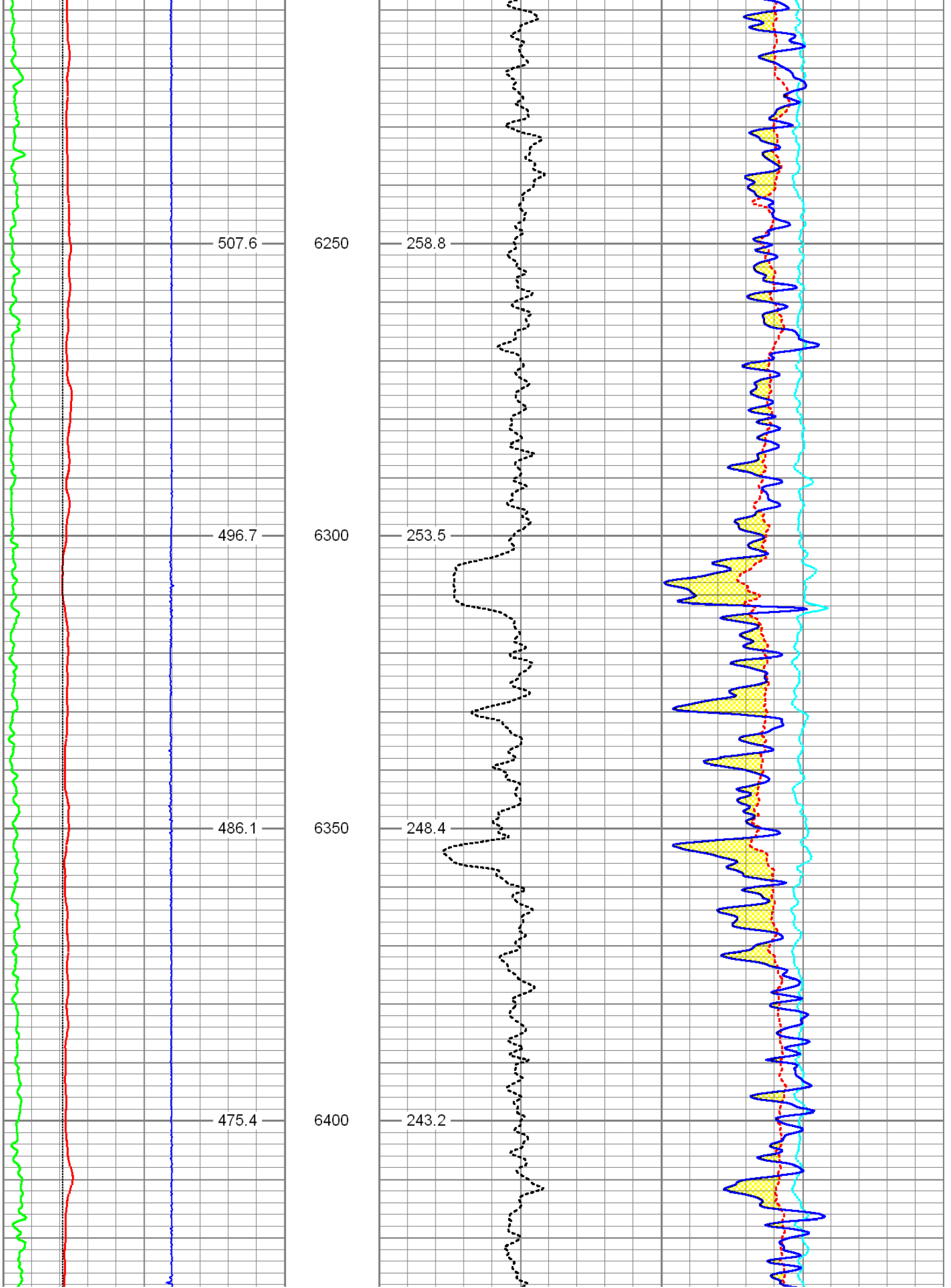
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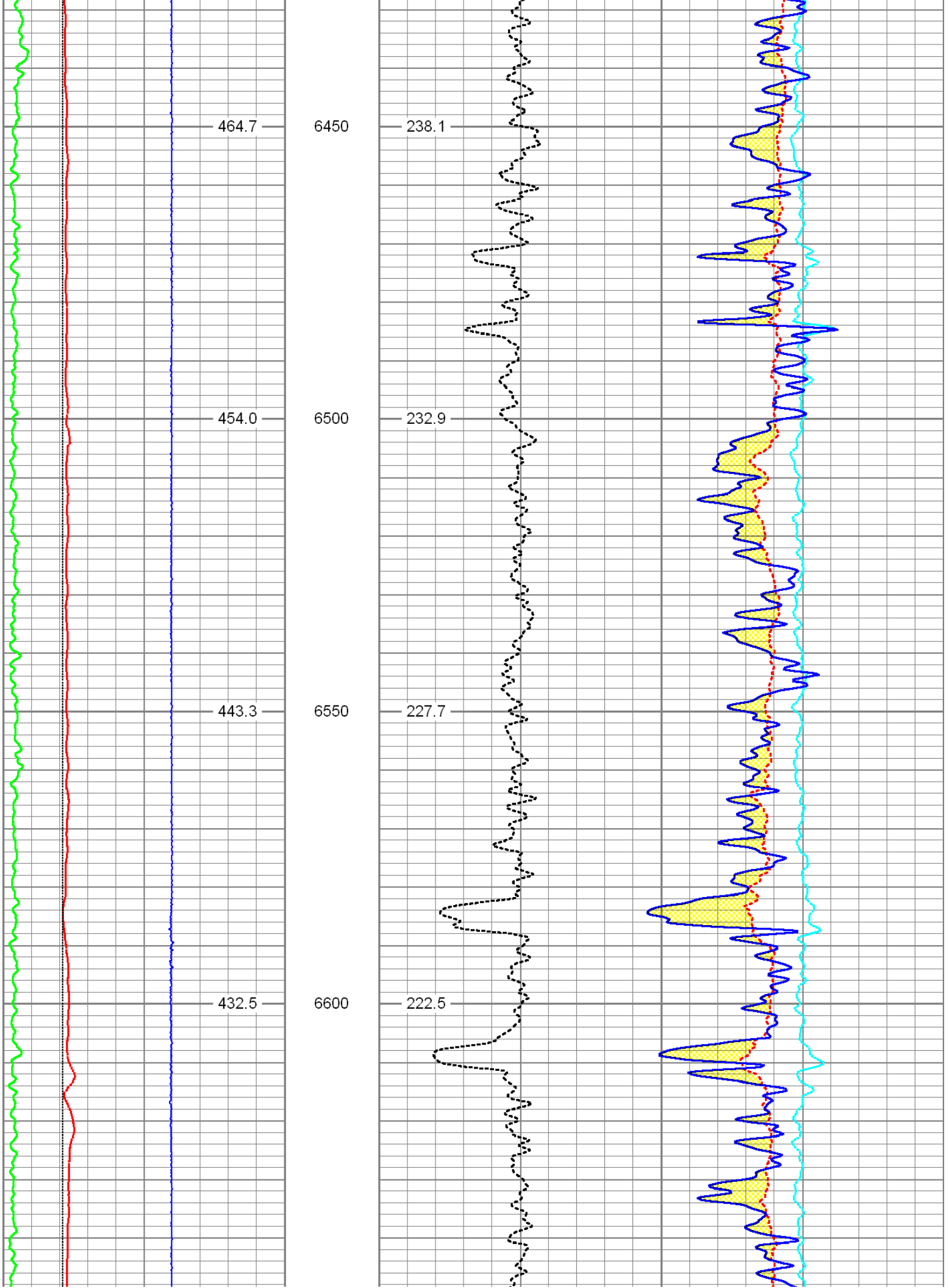
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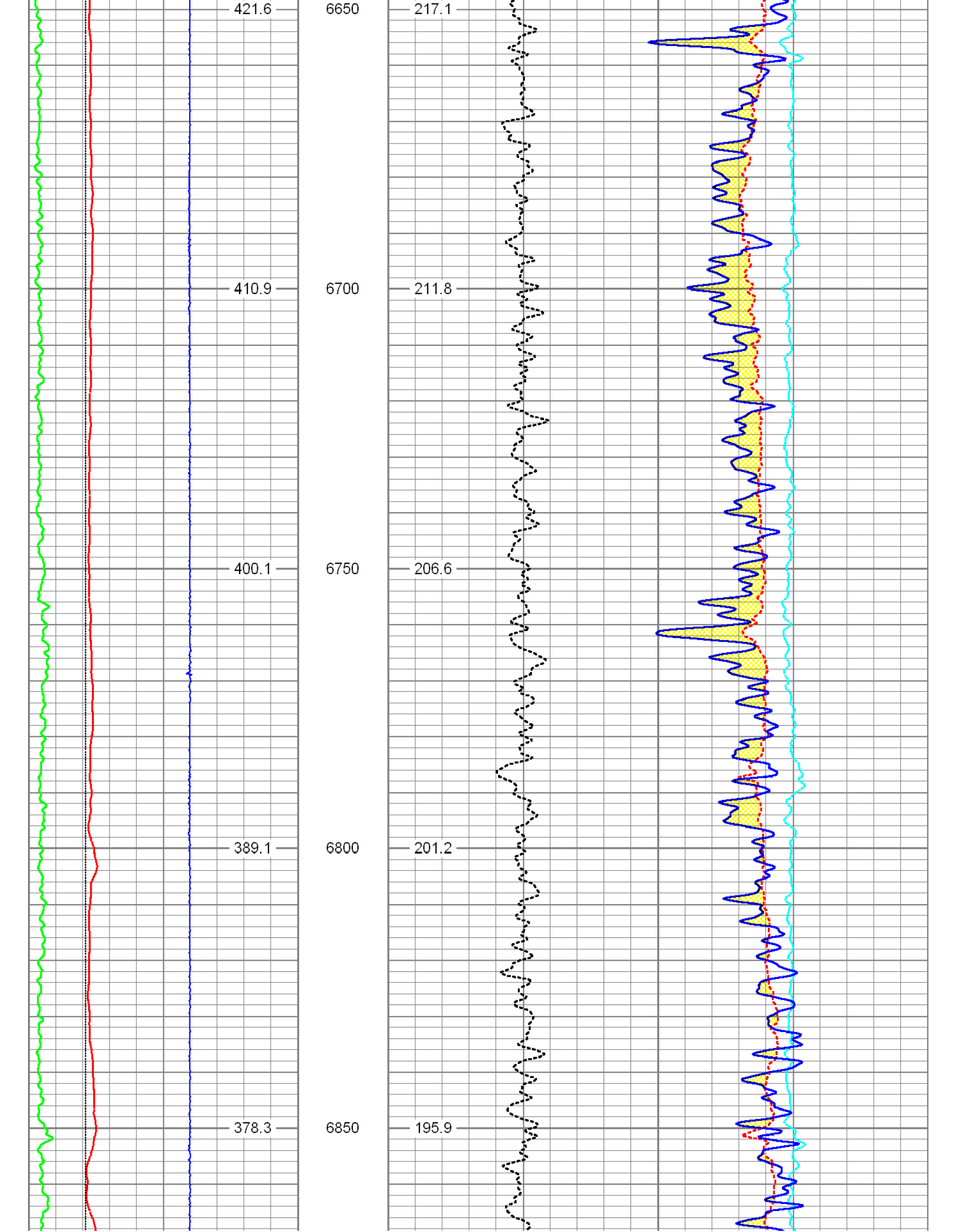
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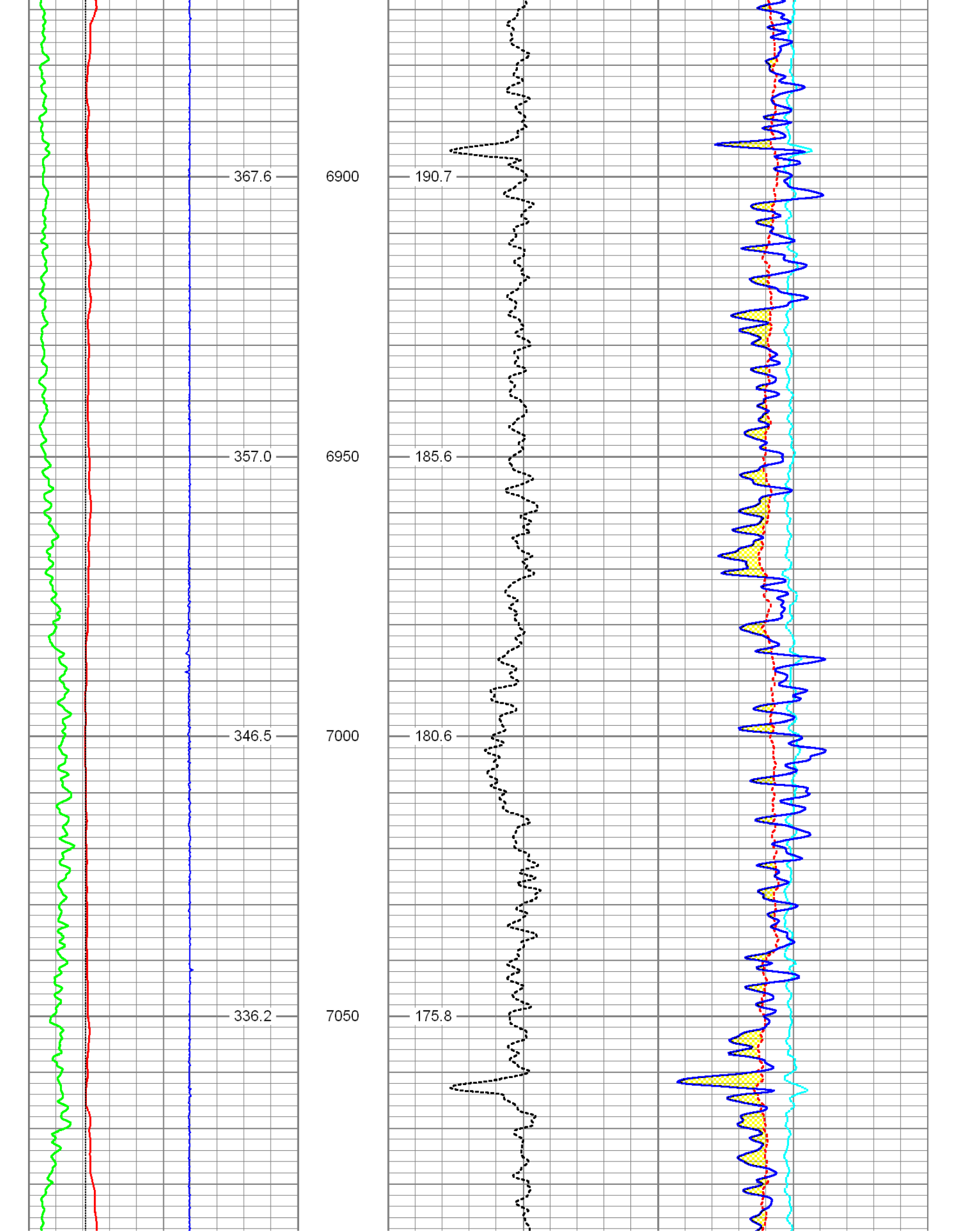
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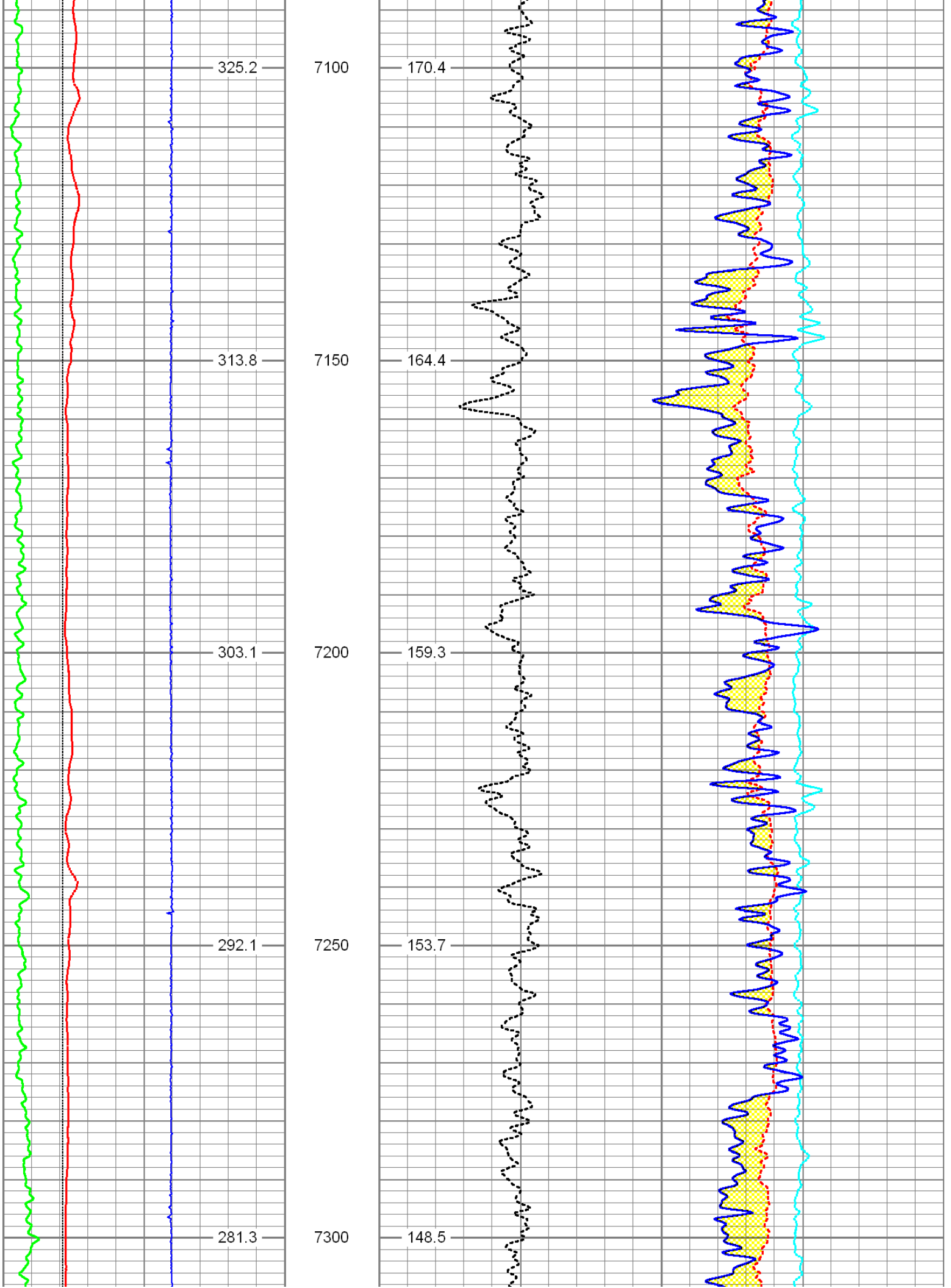
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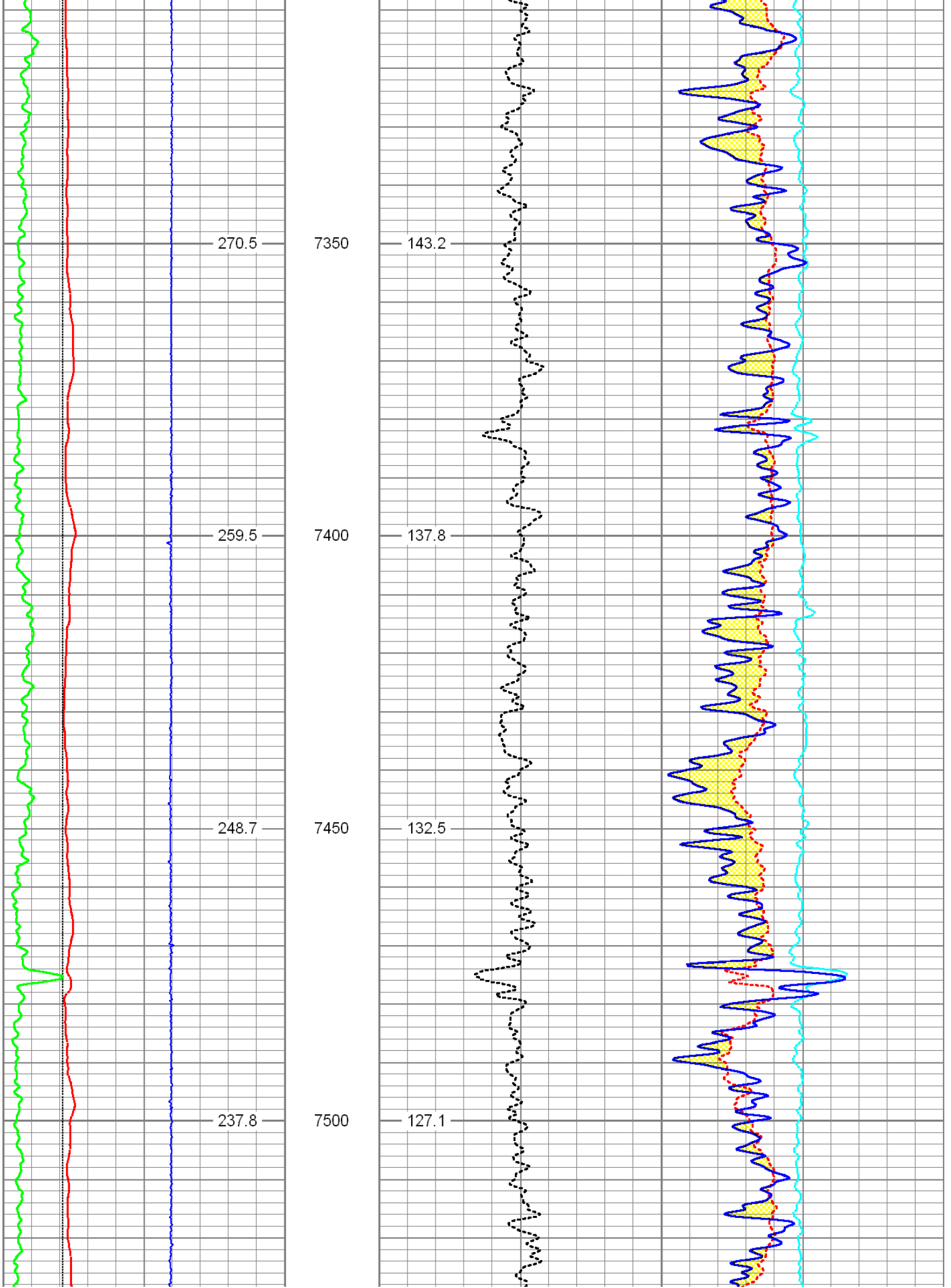
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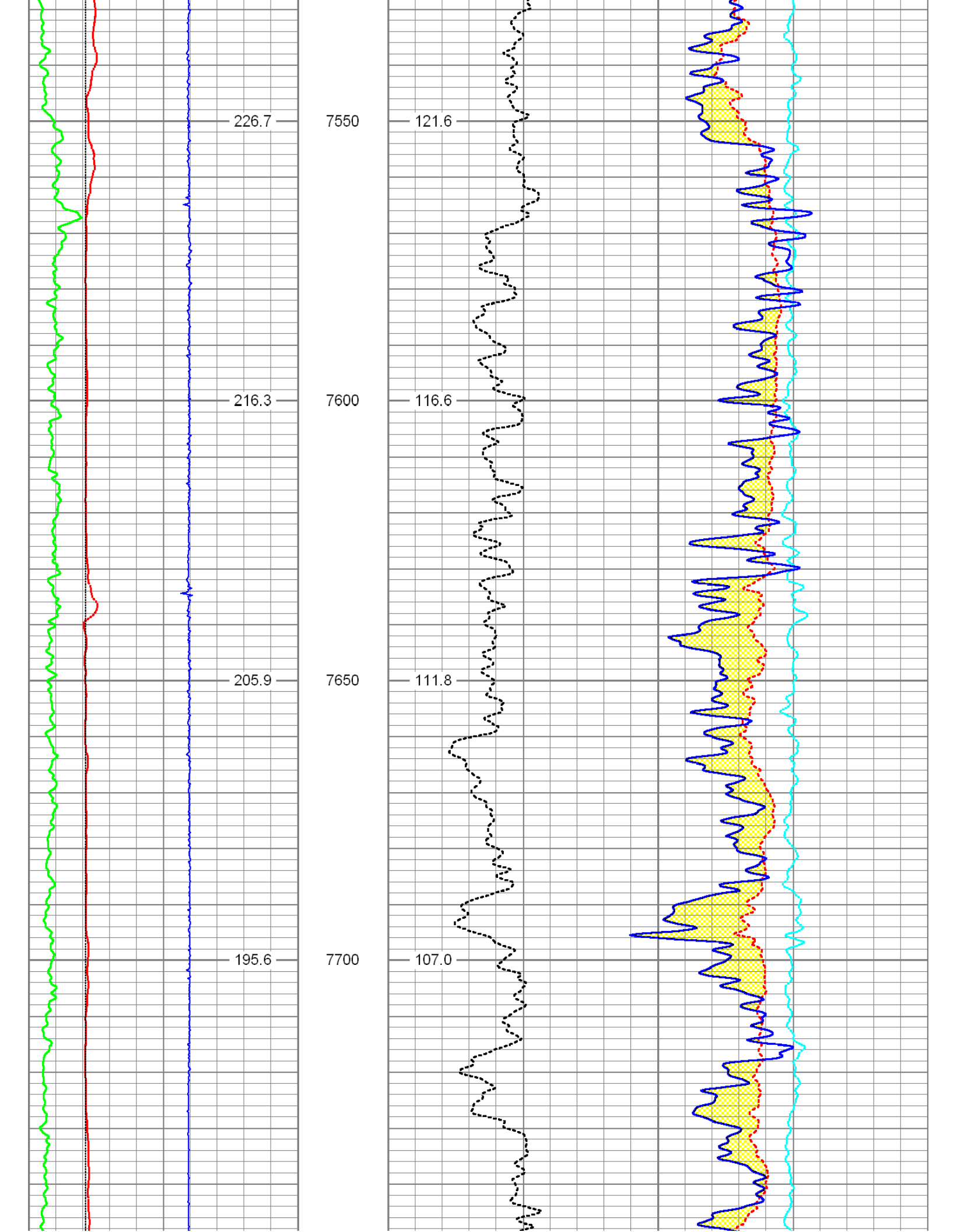
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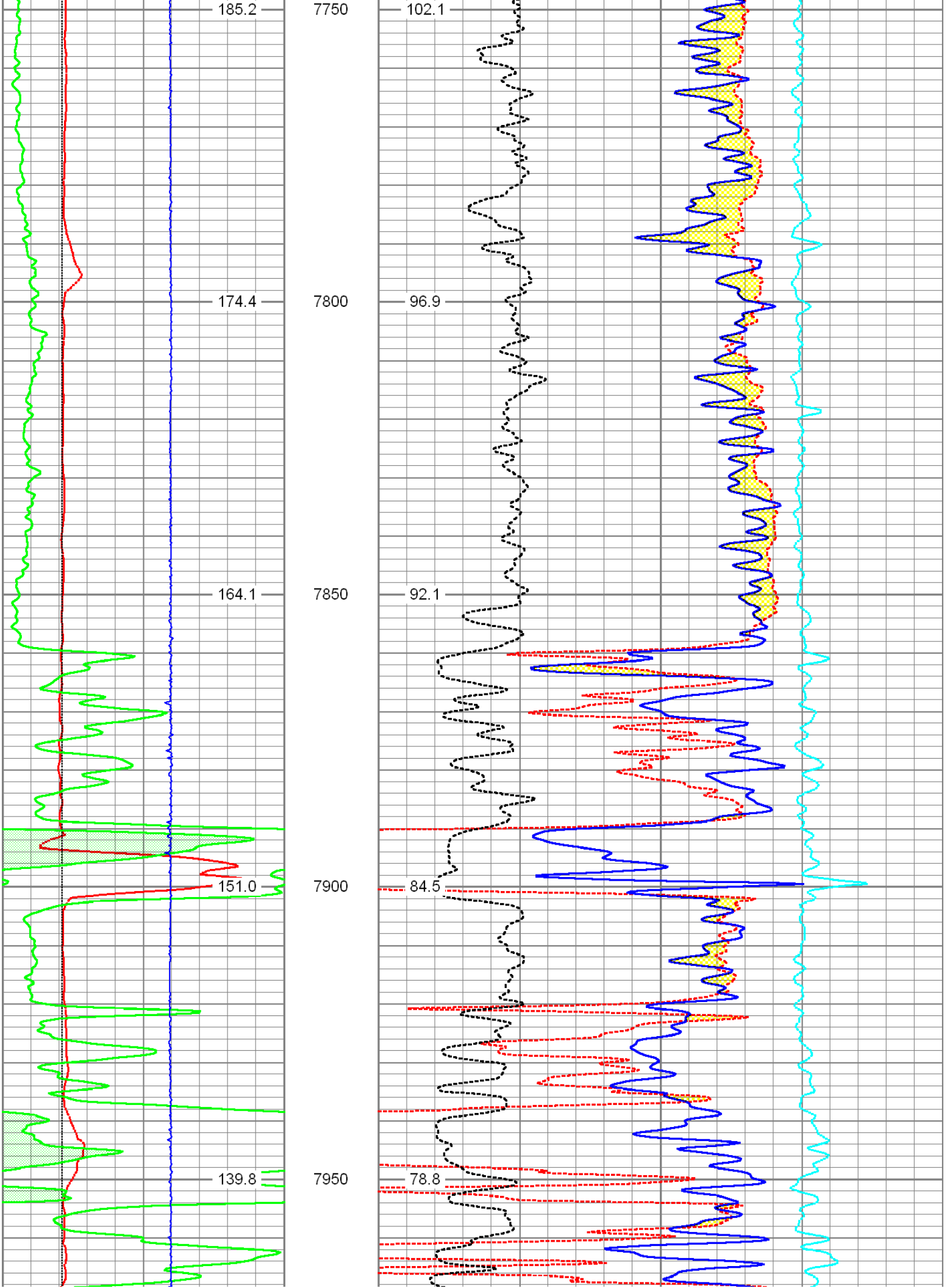
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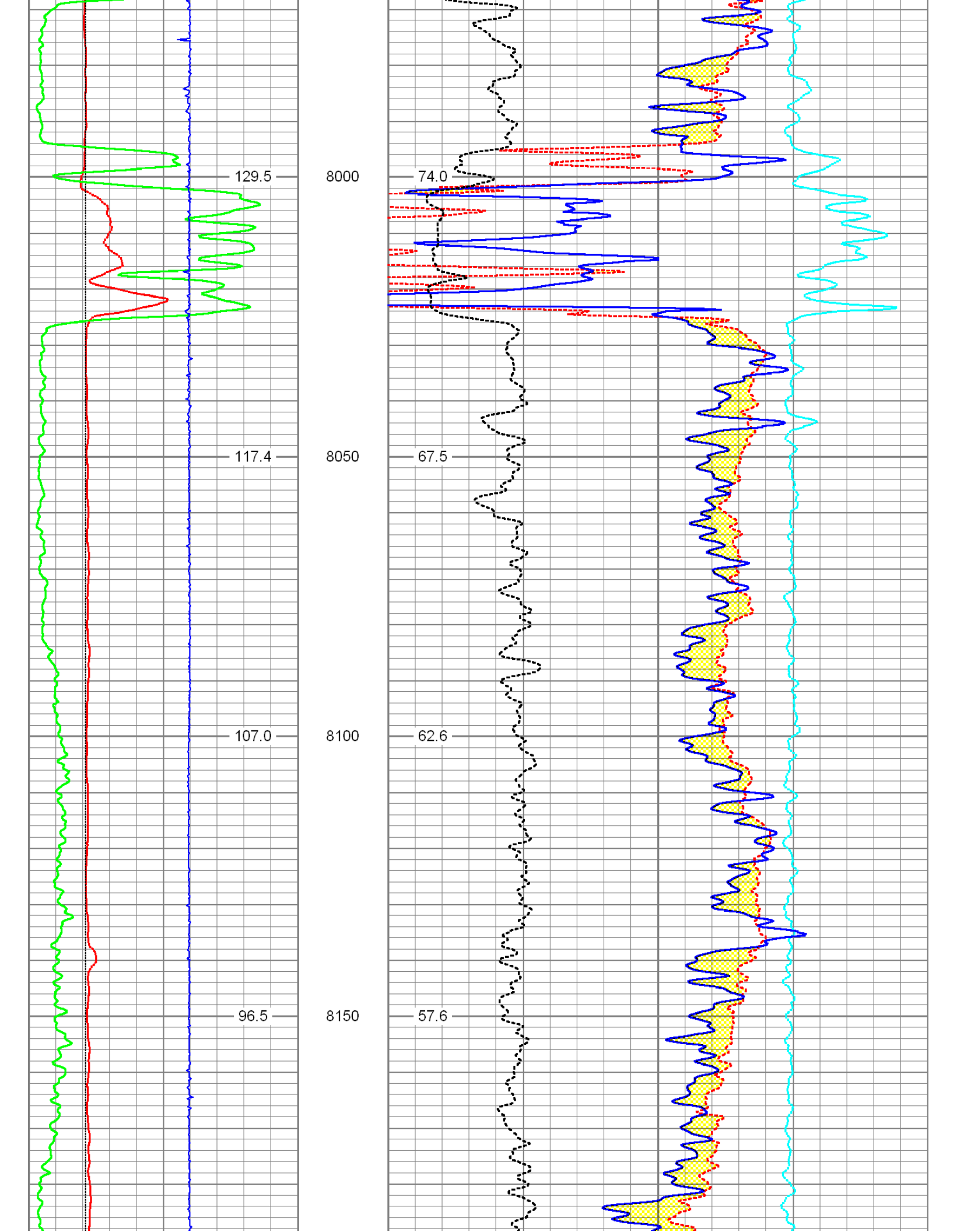
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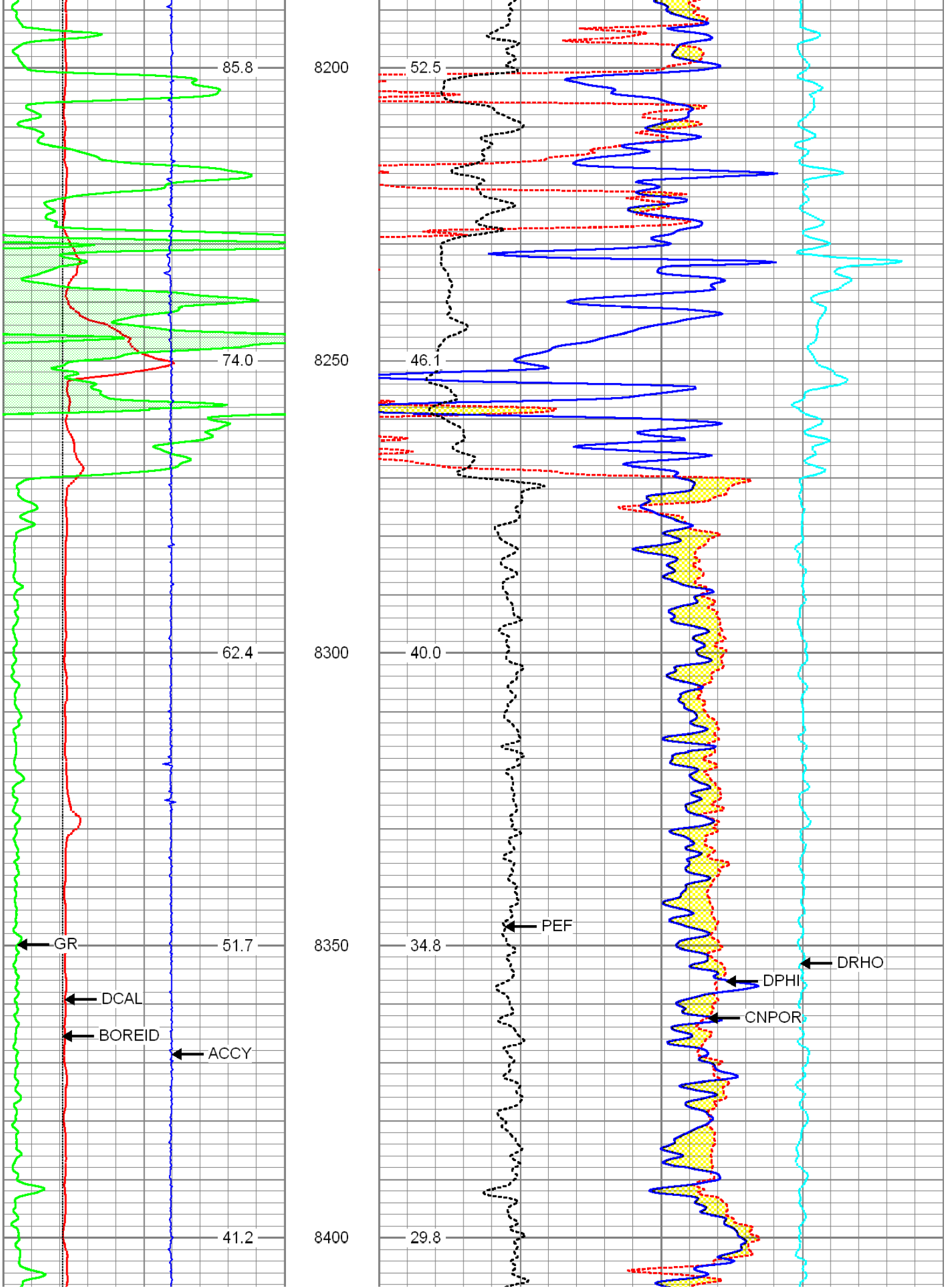
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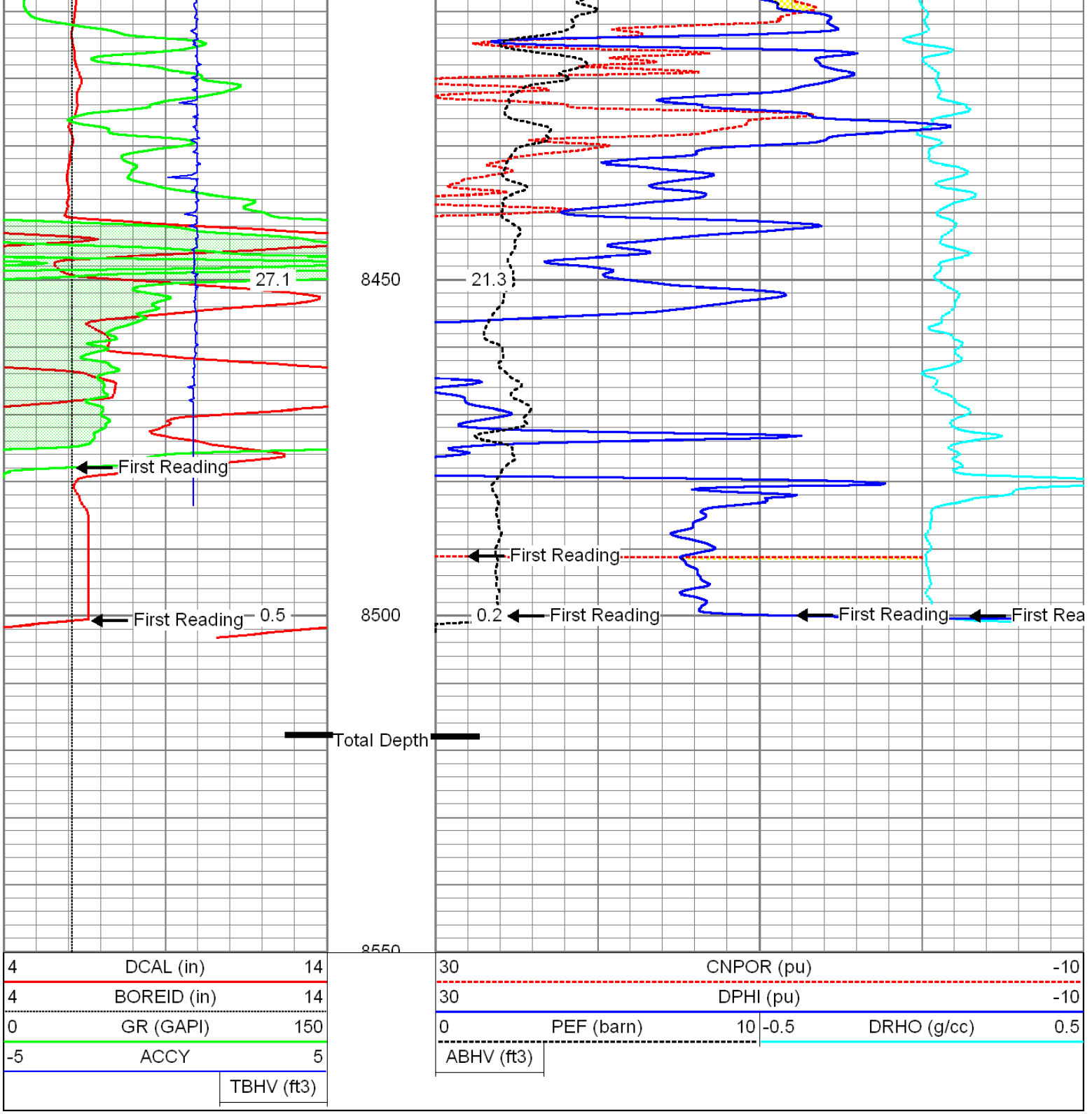
DCAL
BOREID
ACCY
PEF
DRHO
DPHI
CNPOR



Log Variables

Database:C:\Warrior\Data\starks_mem.db
Dataset: field/well/proc2/pass1.4

Top - Bottom

A	BHCOR	BHFL_TYPE	BHFLRES Ohm-m	BHFLRESSRC	BHIDSRC	BOREID in
1	On	WBM	1	MUDCELL	CURVE	6.125
BOTTEMP degF	CASED?	CASEOD in	CASETHCK in	CEMWATERSA kppm	CMNTTHCK in	DNBHC?
137	No	4.5	0	0	0	NO
DPORSEL	FLUIDDEN g/cc	FRMSALIN kppm	LATNOR	M	MATRXDEN g/cc	MUDSALIN kppm

RHOB	1	0	Off	2	2.71	1.2

MudWgt lb/gal 8.4	NPORSEL Limestone	PEBHC? YES	PERFS 0	RESTMPSRC INTERNAL	SO in 0.5	SRFTEMP degF 65

SZCOR On	TDEPTH ft 8535	TMPCOR On	TOOLPOS Ec-centered

Calibration Report

Database File: starks_mem.db
Dataset Pathname: proc2/pass1.4
Dataset Creation: Sun Feb 10 20:33:47 2013

ThruBit Induction Calibration Report

Tool Model-Serial Number: ENP-ENP6R

Shop Calibration Performed: Fri Jan 11 13:29:57 2013

BASELINE

	R	Expected	X	Expected
Freq 1				
A1	-470.1520	[-500.00, -400.00]	277.7640	[-500.00, 500.00]
A2	-136.2750	[-180.00, -100.00]	272.7460	[-500.00, 500.00]
A3	-28.8302	[-50.00, -10.00]	116.1660	[-500.00, 500.00]
A4	-14.9210	[-30.00, -10.00]	269.3470	[-500.00, 500.00]
A5	-12.3449	[-30.00, -10.00]	139.1730	[-500.00, 500.00]
Freq 2				
A1	-247.3840	[-280.00, -180.00]	157.7290	[-500.00, 500.00]
A2	-86.2367	[-130.00, -50.00]	151.0320	[-500.00, 500.00]
A3	-21.1861	[-50.00, -10.00]	28.7889	[-500.00, 500.00]
A4	-18.0336	[-30.00, -10.00]	98.5082	[-500.00, 500.00]
A5	-17.2337	[-30.00, -10.00]	6.0911	[-500.00, 500.00]
Freq 3				
A1	-158.6900	[-180.00, -80.00]	51.9287	[-500.00, 500.00]
A2	-65.3752	[-130.00, -30.00]	71.1079	[-500.00, 500.00]
A3	-16.9573	[-50.00, -10.00]	-32.2877	[-500.00, 500.00]
A4	-19.6522	[-30.00, -10.00]	-12.4078	[-500.00, 500.00]
A5	-19.5998	[-30.00, -10.00]	-88.9966	[-500.00, 500.00]
Freq 4				
A1	-88.0041	[-120.00, -40.00]	-113.4070	[-500.00, 500.00]
A2	-46.8848	[-110.00, -10.00]	-36.3872	[-500.00, 500.00]
A3	-13.3532	[-50.00, -10.00]	-121.8090	[-500.00, 500.00]
A4	-22.4069	[-30.00, -10.00]	-172.7230	[-500.00, 500.00]
A5	-24.3034	[-30.00, -10.00]	-244.0490	[-500.00, 500.00]

CALIBRATION COEFFICIENTS

	R	Expected	X	Expected
Freq 1				
A1	0.9813	[0.95, 1.05]	0.0025	[-0.05, 0.05]
A2	0.9888	[0.95, 1.05]	0.0028	[-0.05, 0.05]
A3	0.9894	[0.95, 1.05]	-0.0037	[-0.05, 0.05]
A4	0.9837	[0.95, 1.05]	0.0053	[-0.05, 0.05]
A5	0.9923	[0.95, 1.05]	0.0014	[-0.05, 0.05]

Freq 2				
A1	0.9763	[0.95, 1.05]	-0.0061	[-0.05, 0.05]
A2	0.9833	[0.95, 1.05]	-0.0054	[-0.05, 0.05]
A3	0.9777	[0.95, 1.05]	-0.0058	[-0.05, 0.05]
A4	0.9803	[0.95, 1.05]	-0.0028	[-0.05, 0.05]
A5	0.9899	[0.95, 1.05]	-0.0075	[-0.05, 0.05]
Freq 3				
A1	0.9829	[0.95, 1.05]	-0.0031	[-0.05, 0.05]
A2	0.9906	[0.95, 1.05]	-0.0025	[-0.05, 0.05]
A3	0.9844	[0.95, 1.05]	-0.0040	[-0.05, 0.05]
A4	0.9871	[0.95, 1.05]	-0.0000	[-0.05, 0.05]
A5	0.9986	[0.95, 1.05]	-0.0047	[-0.05, 0.05]
Freq 4				
A1	0.9889	[0.95, 1.05]	0.0060	[-0.05, 0.05]
A2	0.9965	[0.95, 1.05]	0.0067	[-0.05, 0.05]
A3	0.9886	[0.95, 1.05]	0.0033	[-0.05, 0.05]
A4	0.9954	[0.95, 1.05]	0.0092	[-0.05, 0.05]
A5	1.0158	[0.95, 1.05]	0.0017	[-0.05, 0.05]
Temperature	34.1472 degC			

ThruBit Density Calibration Report

Tool Model-Serial Number:	PS-PS03D
Source Number:	
Shop Calibration Performed:	Wed Feb 06 10:00:07 2013

REFERENCE

	Density	Units
Aluminium	2.607	g/cc
Magnesium	1.752	g/cc

READINGS

Outputs	Counts	Units	Expected
SS1 Background	142.57	cps	[130.00, 170.00]
LS1 Background	154.98	cps	[130.00, 170.00]
LS4 Background	32.54	cps	[27.00, 35.00]
SS1 Aluminium	4664.78	cps	[4500.00, 5500.00]
LS1 Aluminium	847.37	cps	[750.00, 950.00]
LS4 Aluminium	914.25	cps	[843.00, 1068.00]
SS1 Magnesium	7697.75	cps	[7000.00, 9000.00]
LS1 Magnesium	5378.37	cps	[5250.00, 6250.00]
LS1 Al + Fe	728.12	cps	[650.00, 800.00]
LS4 Al + Fe	420.59	cps	[382.00, 471.00]

RESULTS

SS Slope	1.67	[1.52, 1.77]
LS Slope	0.42	[0.38, 0.45]
PEF K Factor	4.783	[3.510, 6.170]
PEF B Factor	-0.564	[-0.700, -0.410]

Caliper Shop Calibration performed: Wed Feb 06 10:00:07 2013

RESULTS

Reference	Reading	Units

Reference	Reading	Units
12.00	1965.82	in
9.00	2133.31	in
6.00	2294.06	in

DENSITY PRE-SURVEY CHECK Performed: Thu Feb 07 09:54:34 2013

Outputs	Counts	Units	Expected
SS1 Background	143.28	cps	[138.30, 146.85]
LS1 Background	152.53	cps	[150.33, 159.63]
LS4 Background	33.12	cps	[30.59, 34.49]

CALIPER PRE-SURVEY CHECK Performed: Thu Feb 07 09:54:58 2013

Reference	Readings	Units	Expected
9.00	8.95	in	[8.80, 9.20]

Compensated Neutron Calibration Report

Tool Model-Serial Number:	PS-PS06N
Source Number:	
Calibration Tank Temperature:	61.3 degF
Shop Calibration Performed:	Wed Feb 06 13:27:37 2013

BACKGROUND MEASUREMENT

Outputs	Measured	Units	Expected
SS Counts	0.0	cps	<10
LS Counts	0.0	cps	<4

WATER TANK REFERENCE

Outputs	Measured	Units	Expected
SS Counts	775.2	cps	
LS Counts	27.0	cps	
Tank Ratio Ref	30.9580	SS/LS	
Tank Ratio	28.7125	SS/LS	
Tank Ratio Gain	1.0782		[0.85, 1.15]

ALUMINUM SLEEVE REFERENCE

Outputs	Measured	Units	Expected
SS Counts	8554.5	cps	
LS Counts	836.3	cps	
Al Ratio Ref	10.797	SS/LS	
Al Ratio	11.029	SS/LS	
Al Ratio Gain	0.98		[0.90, 1.10]
Sleeve Porosity	14.46	pu	

PRE-SURVEY BACKGROUND CHECK Performed: Thu Feb 07 09:59:40 2013

Outputs	Measured	Units	Expected
SS Counts	0.0	cps	<10
LS Counts	0.1	cps	<4

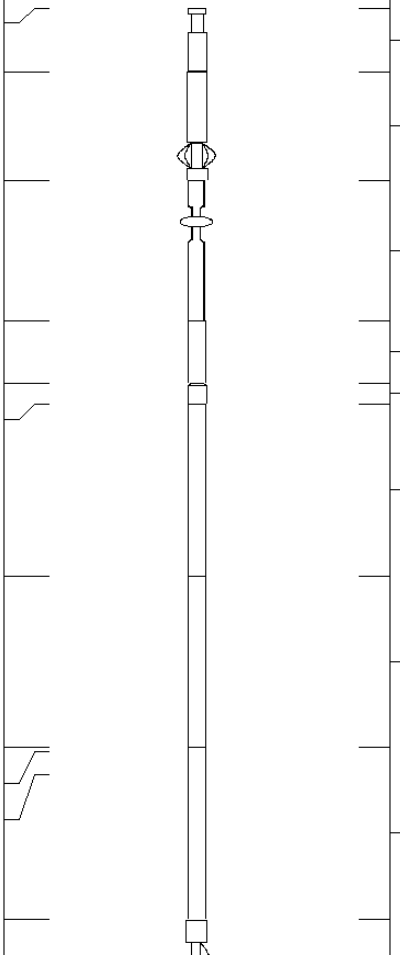
Gamma Ray Calibration Report

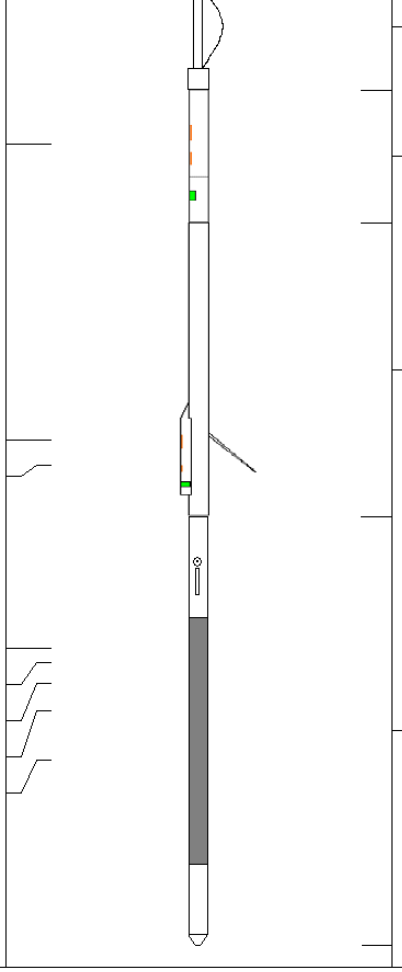
Tool Model-Serial Number:	PS-PS30T	
Performed:	Wed Feb 06 13:36:07 2013	
Calibrator Value:	170.8	GAPI
Background Reading:	74.2	cps
Calibrator Reading:	452.4	cps
Sensitivity:	0.3750	GAPI/cps

Inclinometer Calibration Report

Performed: Sun Jun 13 14:33:21 1993

	Low Read.	High Read.	Low Ref.	High Ref.	
X Accelerometer	0.00	1.00	0.00	1.00	gee
Y Accelerometer	0.00	1.00	0.00	1.00	gee
Z Accelerometer	0.00	1.00	0.00	1.00	gee

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
Thrubit	67.59		Cablehead-S Solid Weakpoint	2.31	2.13	5.00
Thrubit	65.28					
			PSBDOT	3.87	2.25	35.00
Thrubit	61.41					
			HangOff_Tool	5.00	2.38	60.00
Thrubit	56.41					
			Swivel	2.25	2.06	25.00
Thrubit	54.16		10-1	0.75	2.13	3.95
TBBAT	53.41					
			TBBAT-A (PS07B) Thrubit Battery	6.13	2.13	38.20
TBBAT2	47.29					
			TBBAT2-A (PS40B) Thrubit Battery	6.13	2.13	40.00
TMG	41.16					
GR	41.04					
GRTEMP	40.20		TMG-PS (PS30T) ThruBit Telemetry Gamma Ray	6.13	2.13	45.00
Thrubit	35.04					

			Decentralizer Decentralizer (Small)	4.50	2.13	70.00
CNLSC	28.60		TBN-PS (PS06N) ThruBit Neutron	4.77	2.13	63.00
			TBD-PS (PS03D) Thrubit Density	10.48	2.13	91.00
LSW1	18.04					
DCAL	17.13					
A1_P	10.60					
A2_P	10.10					
A3_P	9.35		TBI-ENP (ENP6R) Thrubit Induction	15.29	2.13	94.00
A4_P	8.35					
A5_P	6.60					

Dataset:	starks_mem.db: field/well/proc2/pass1.4
Total Length:	67.59 ft
Total Weight:	570.15 lb
O.D.	2.38 in

ThruBit
A Schlumberger Company

Company	SANDRIDGE ENERGY, INC
Well	STARKS 3408 2-35H
Field	HARPER, KS / MISS LIME
County	HARPER
State	KS