



**ThruBit**  
A Schlumberger Company

**DUAL SPACED NEUTRON  
SPECTRAL DENSITY  
GAMMA RAY  
MEMORY LOG**

Company	SANDRIDGE ENERGY	Company	SANDRIDGE ENERGY
Well	ELLIS 3119 2-19H	Well	ELLIS 3119 2-19H
Field	ARLIE	Field	ARLIE
County	COMANCHE	County	COMANCHE
State	KANSAS	State	KANSAS
Location:	API #: 15033216600100	Other Services	THRUBIT PORTAL BIT
Permanent Datum	G.L. Elevation 2174'	Elevation	K.B. 2193.6' D.F. 2193.6' G.L. 2174'
Log Measured From	K.B. 19.6' ABOVE PERM DATUM		
Drilling Measured From	K.B.		
	SEC 19 TWP 31S RGE 19W		

Date	15 AUG 2012
Run Number	ONE
Depth Driller	9605'
Depth Logger	9576'
Bottom Logged Interval	9558'
Top Log Interval	5000'
Casing Driller	7" @ 5645'
Casing Logger	7" @ 5635'
Bit Size	6.125"
Type Fluid in Hole	WBM
Density / Viscosity	8.5 / 32
pH / Fluid Loss	11.0 / 9.0
Source of Sample	MUD PIT
Rm @ Meas. Temp	0.42 OHMS @ 90 DEGF
Rmf @ Meas. Temp	0.32 OHMS @ 90 DEGF
Rmc @ Meas. Temp	0.53 OHMS @ 90 DEGF
Source of Rmf / Rmc	CALCULATED
Rm @ BHT	0.29 OHMS @ 133 DEGF
Time Circulation Stopped	23:30 14 AUG 2012
Time Logger on Bottom	01:00 15 AUG 2012
Maximum Recorded Temperature	133 DEGF
Equipment Number	T011
Location	OKC, OK
Recorded By	RICK BROOMFIELD
Witnessed By	JESSIE NEW

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All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

**Comments**

SERVICE: LEVEL 4- HORIZONTAL MEMORY PUMPDOWN - BIT DEPTH 9508' LOG TO 5000'  
ALL SCALES AND PRESENTATION PER CLIENT REQUEST  
LIMESTONE POROSITY , 2.71 G/CC, USED FOR POROSITY CALCULATIONS  
LOG RAN WITH SWIVEL AND SMALL DECENTRALIZER  
TBHV REPRESENTS TOTAL BOREHOLE VOLUME, FT3  
ABHV REPRESENTS ANNULAR BOREHOLE VOLUME, FT3, CALCULATED FOR 4.50" CASING  
RIGMINDER LITE AND RIGSENSE USED TO CREATE DEPTH LOG  
LOG DEPTH CORRELATED TO MWD GAMMA RAY

RIG: LARIAT 45  
CREW: R. BROOMFIELD, J. HIRSCHLER, Z. HOWARD

Service Ticket No.	1347	API No.	15033216600100	PGM Ver	WARRIO 7.0
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The Well Name, Location, Borehole Description, and / or Cementing Data Furnished by Client

**EQUIPMENT DATA**

GAMMA RAY	NEUTRON	DENSITY	INDUCTION
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Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	PS5T	Serial No.	ENP03N	Serial No.	PS52D	Serial No.	PS20R
Model No.	PS	Model No.	ENP	Model No.	PS	Model No.	PS
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	9576'	5000'	0	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

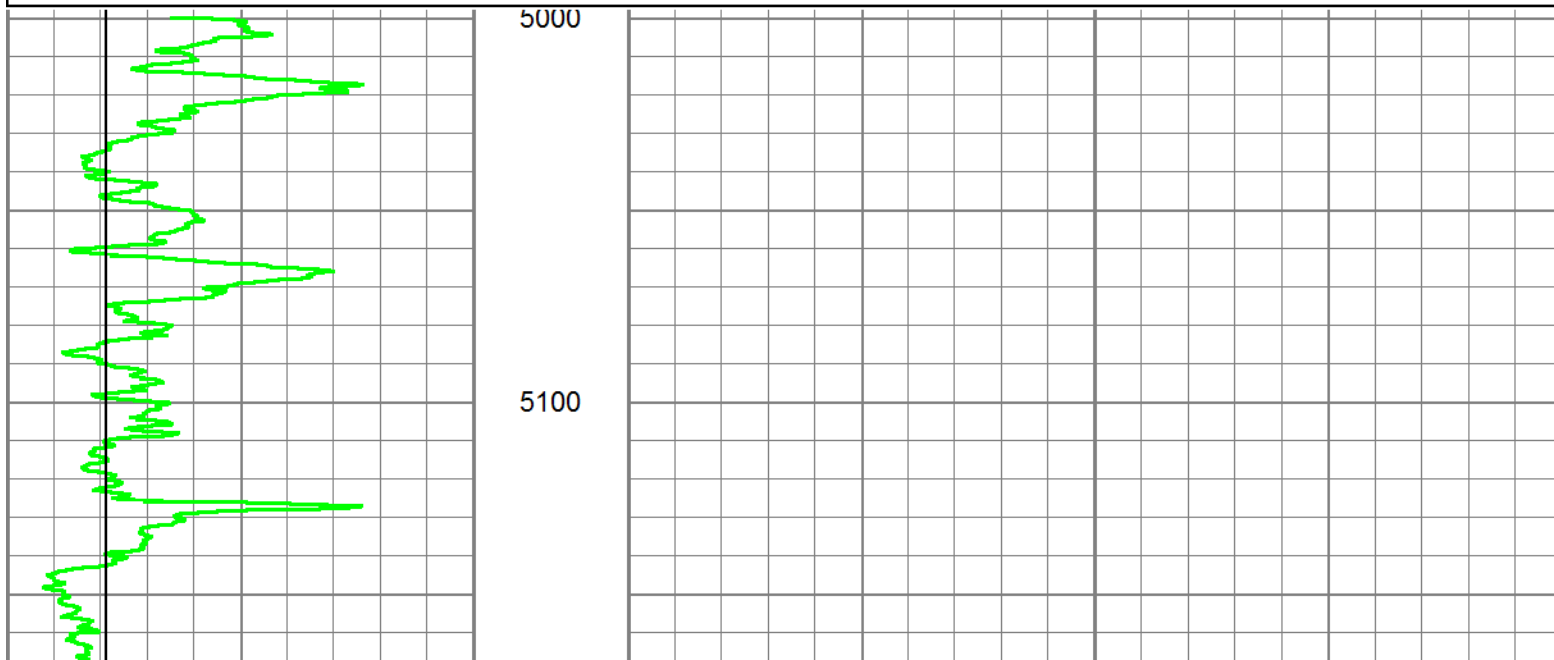
Maximum Deviation	91.4	deg. @	8950'	KOP	4334'	
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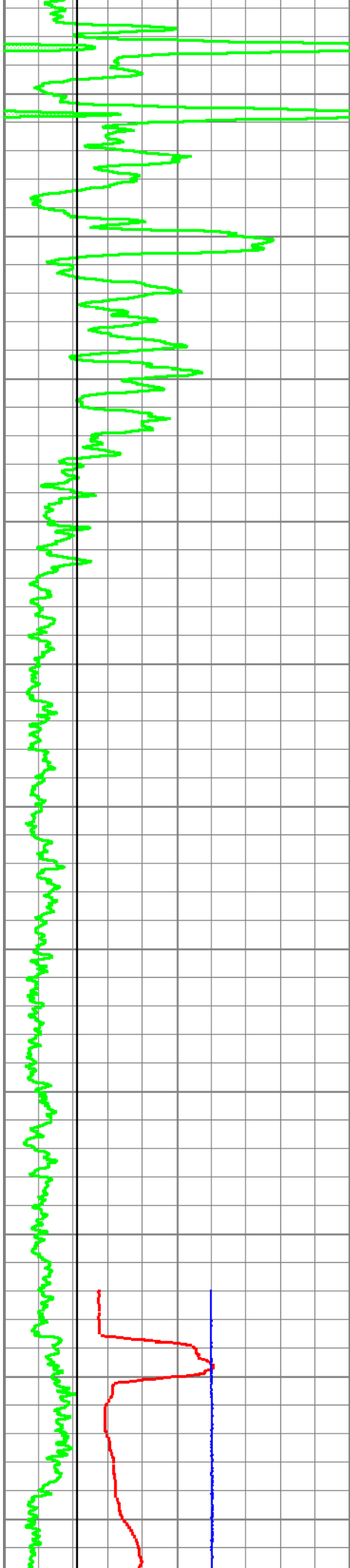


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 Dataset Pathname: proc1/pass1.5  
 Presentation Format: chespk2n  
 Dataset Creation: Wed Aug 15 11:32:28 2012  
 Charted by: Depth in Feet scaled 1:600

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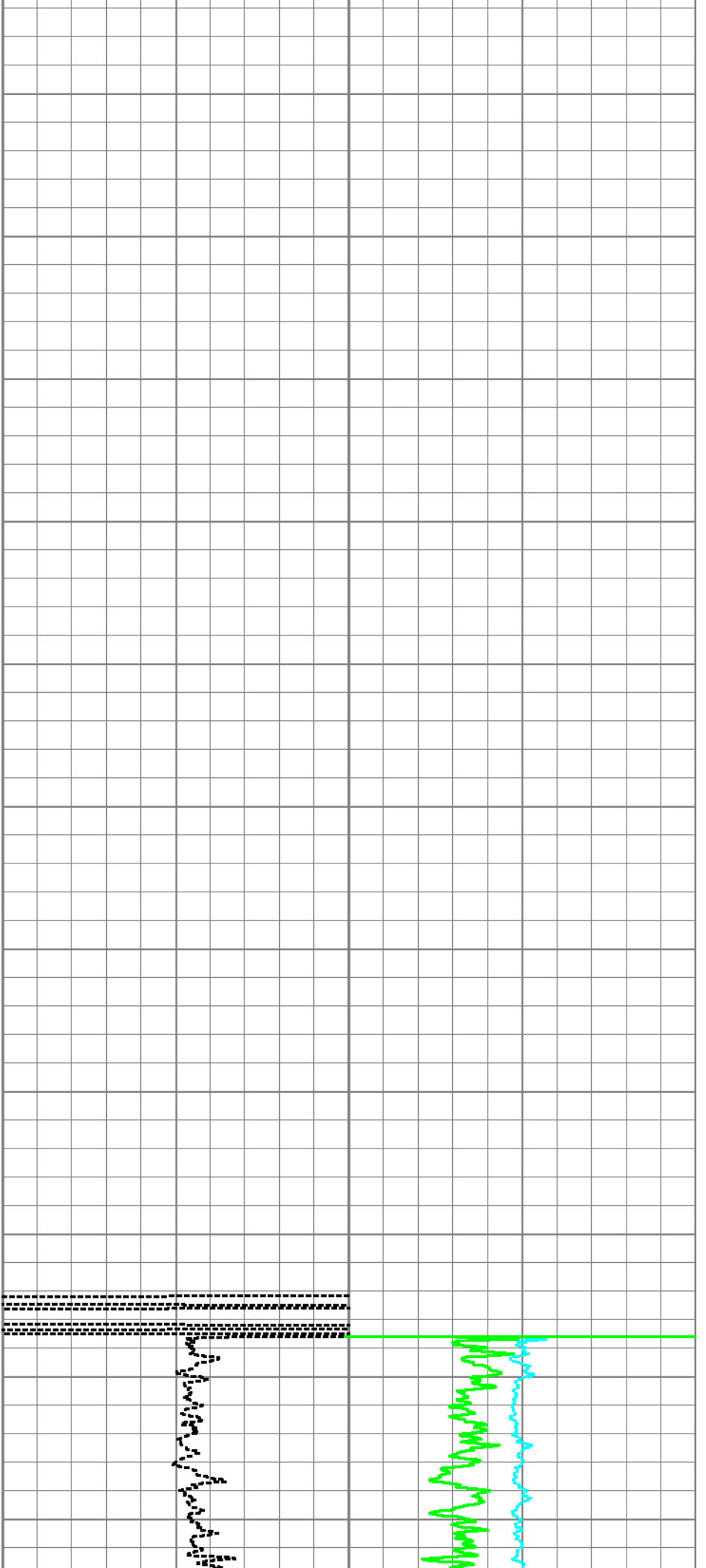
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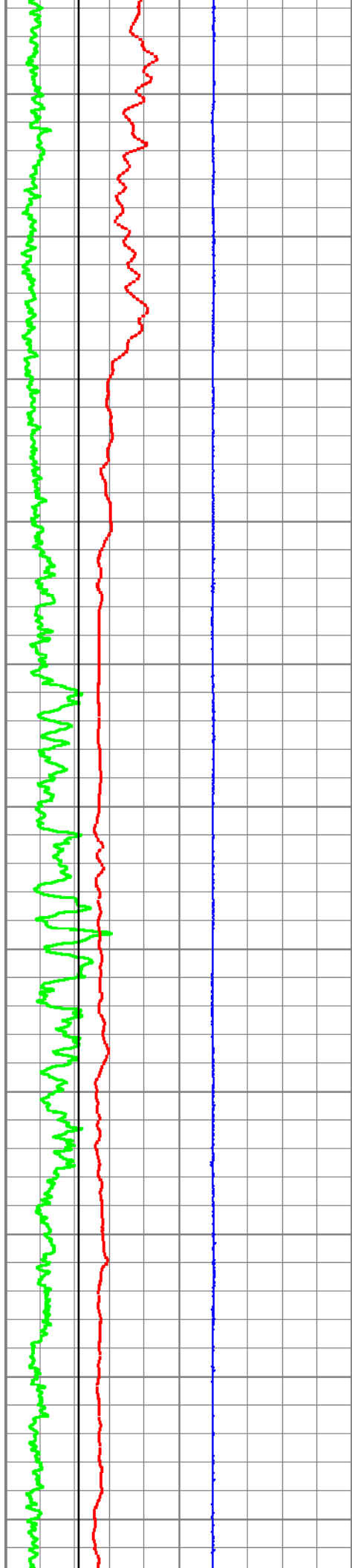
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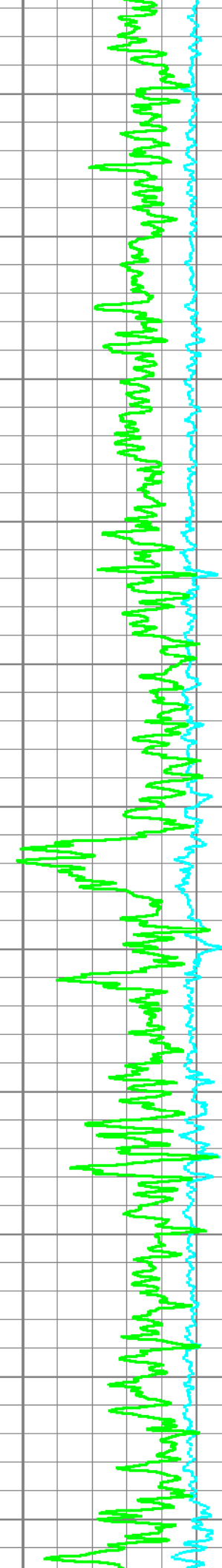
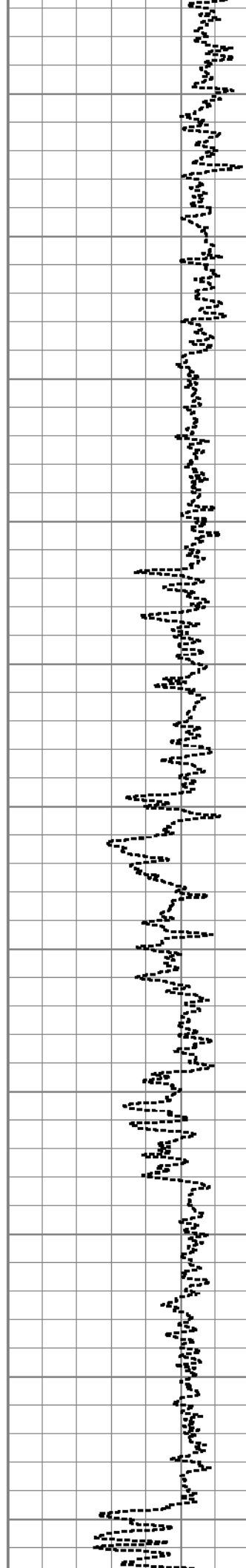
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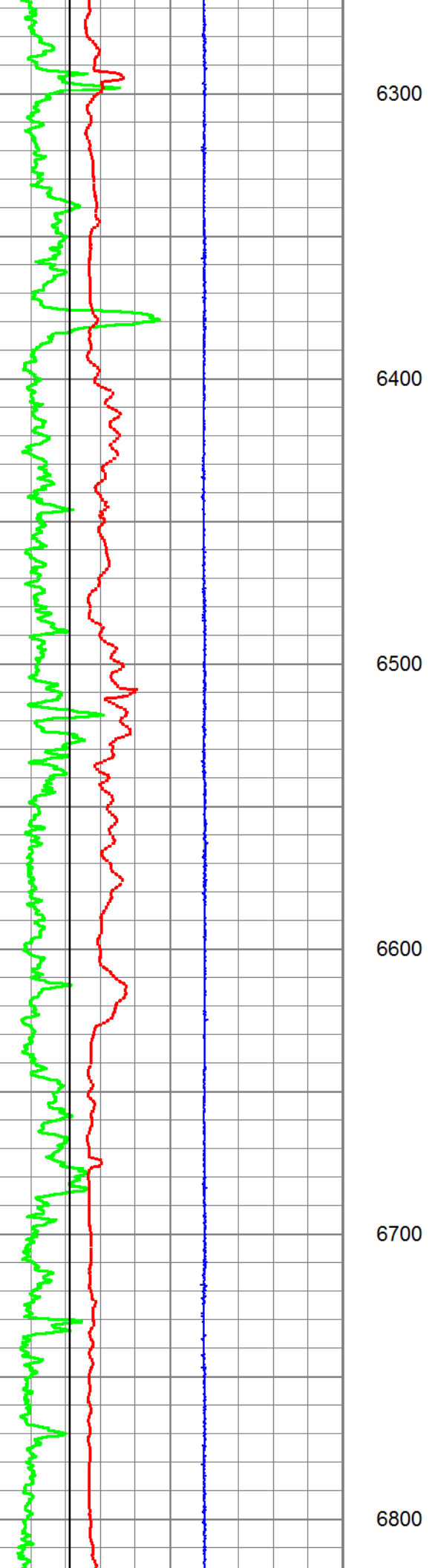
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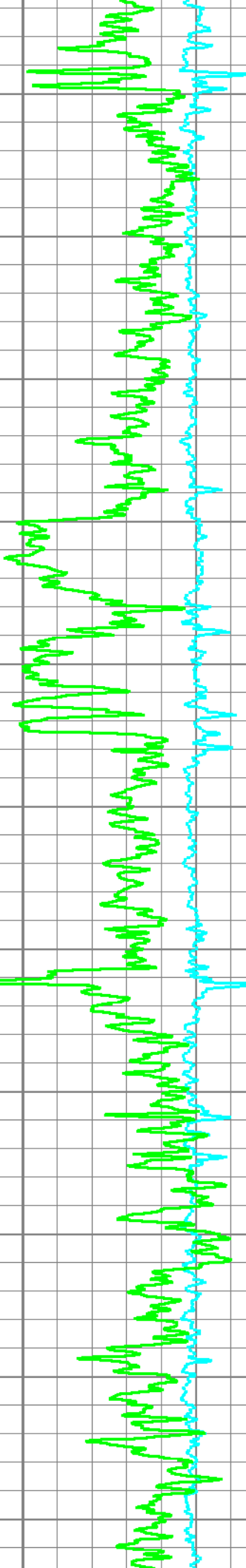
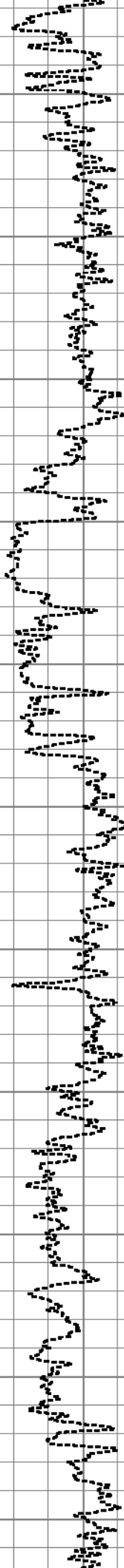
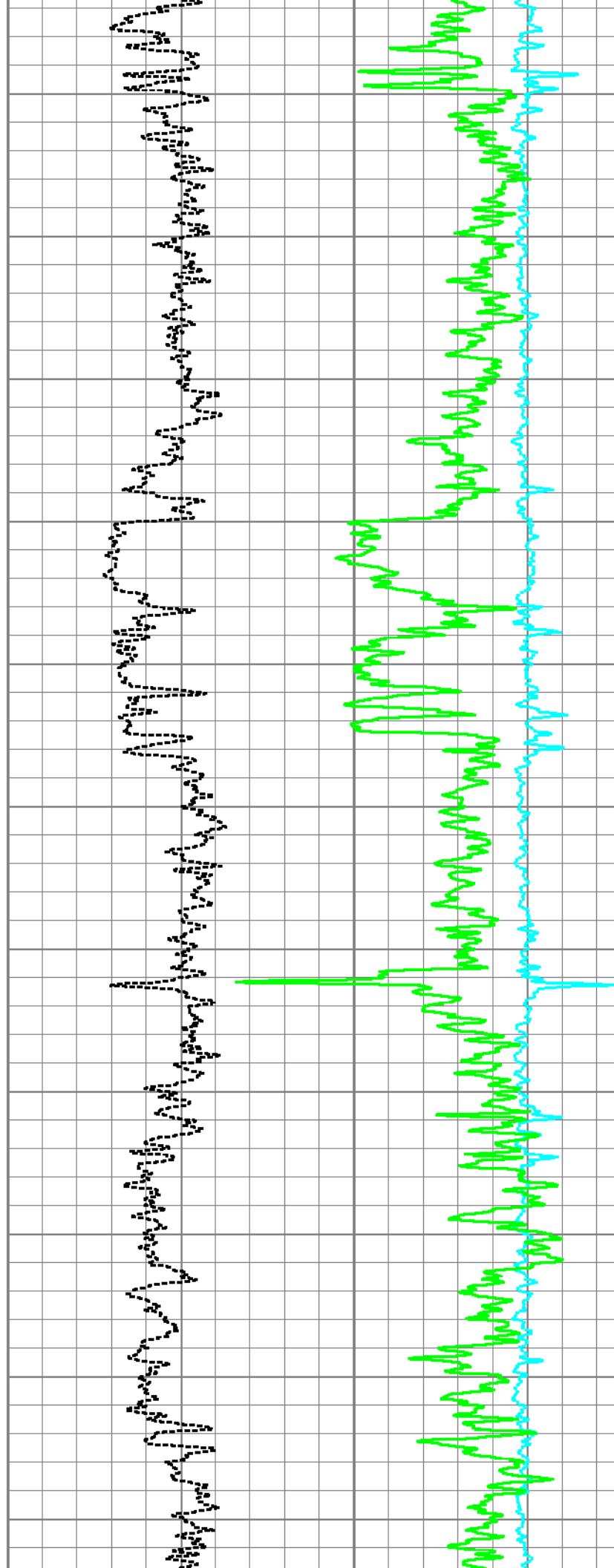
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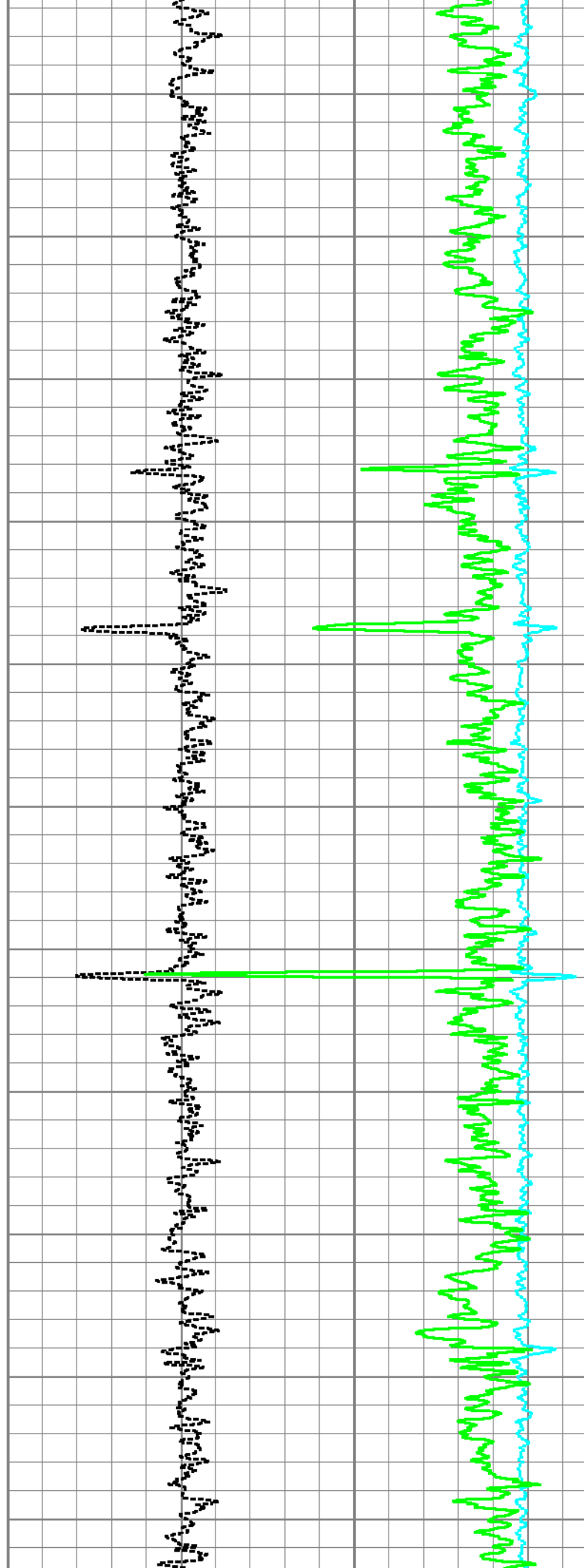
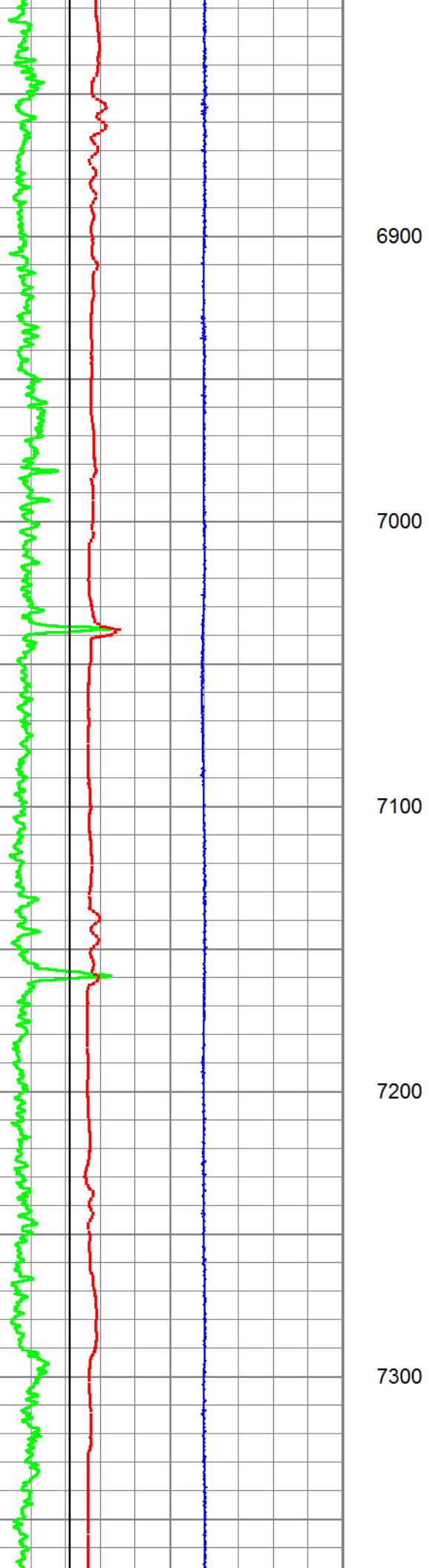
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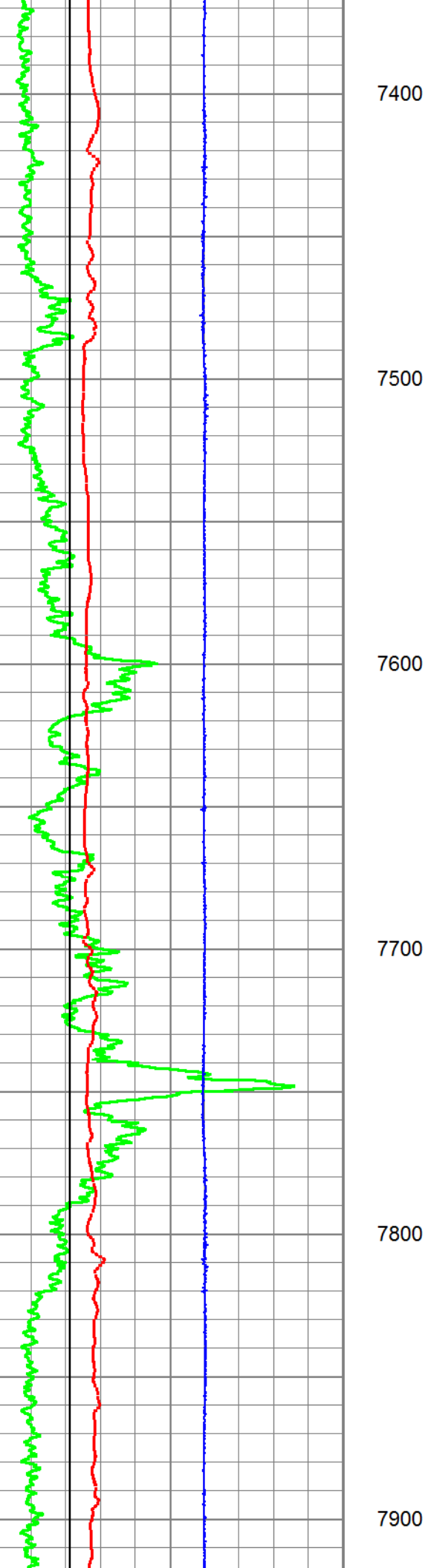
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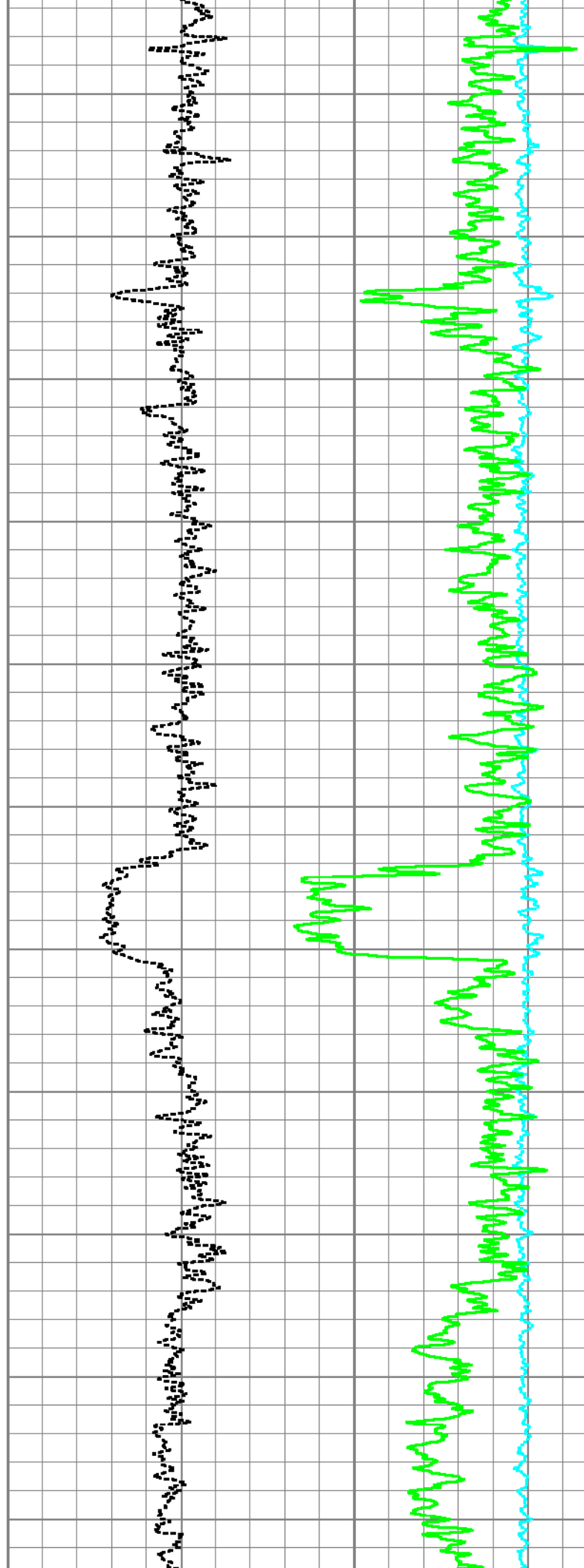
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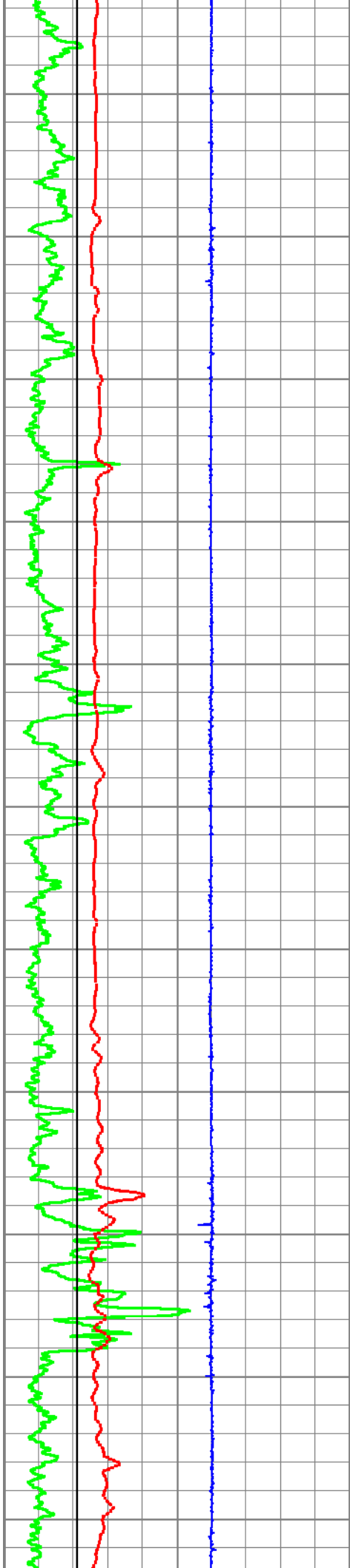
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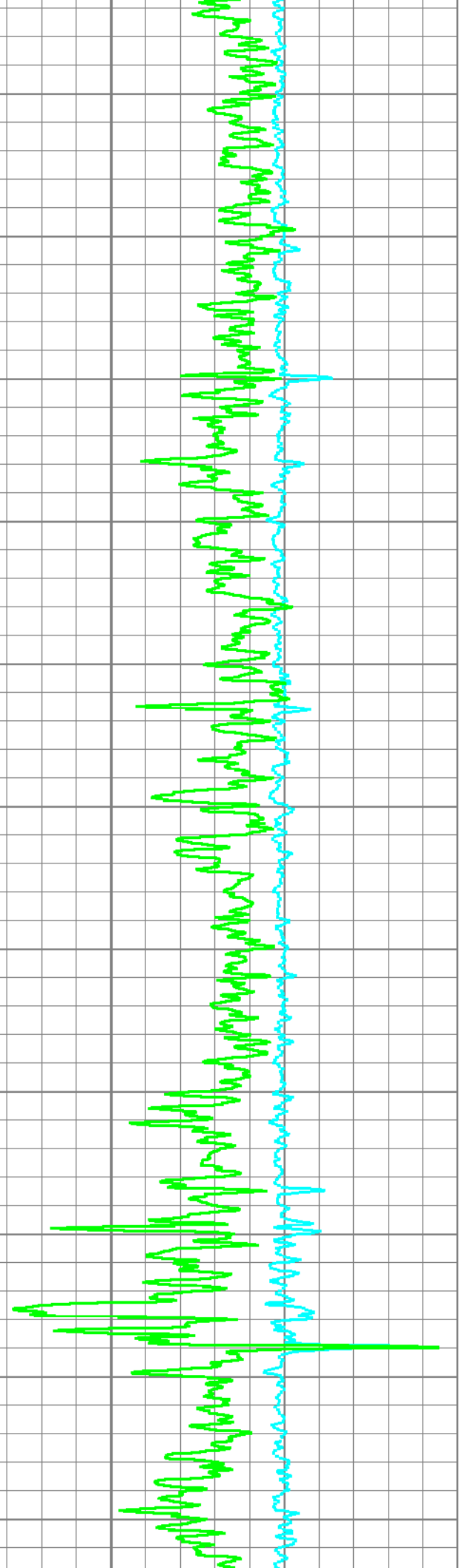
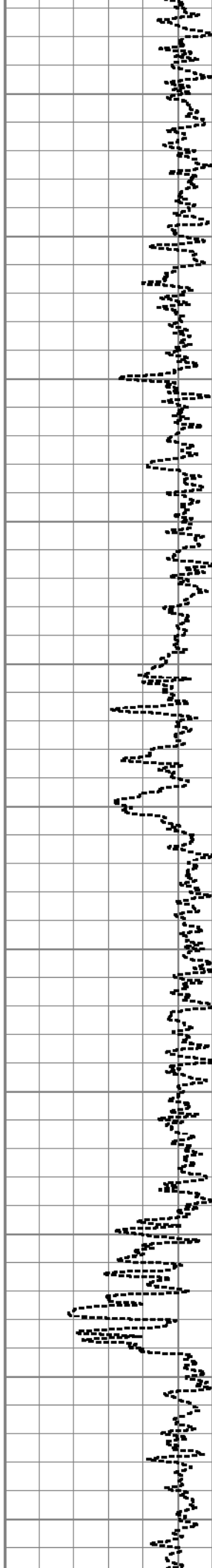
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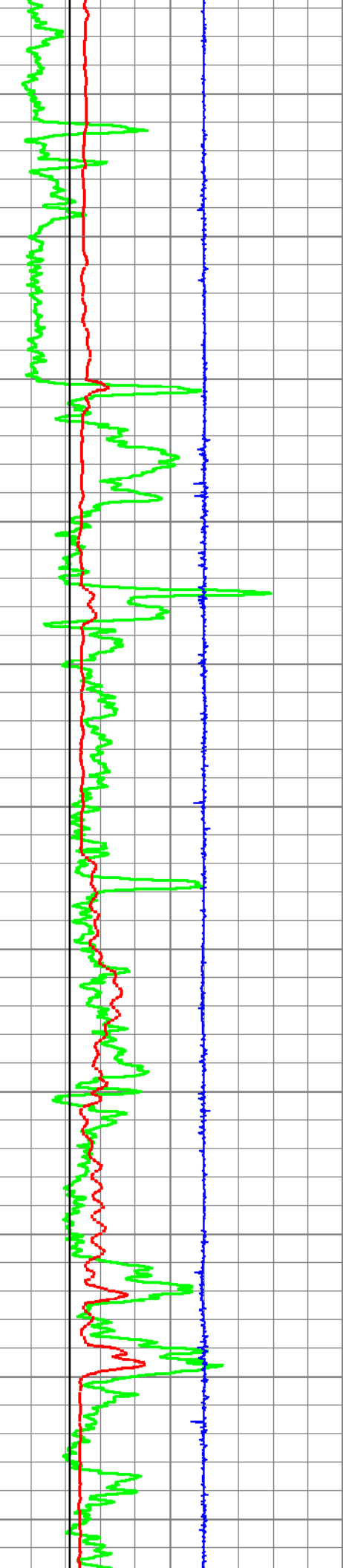
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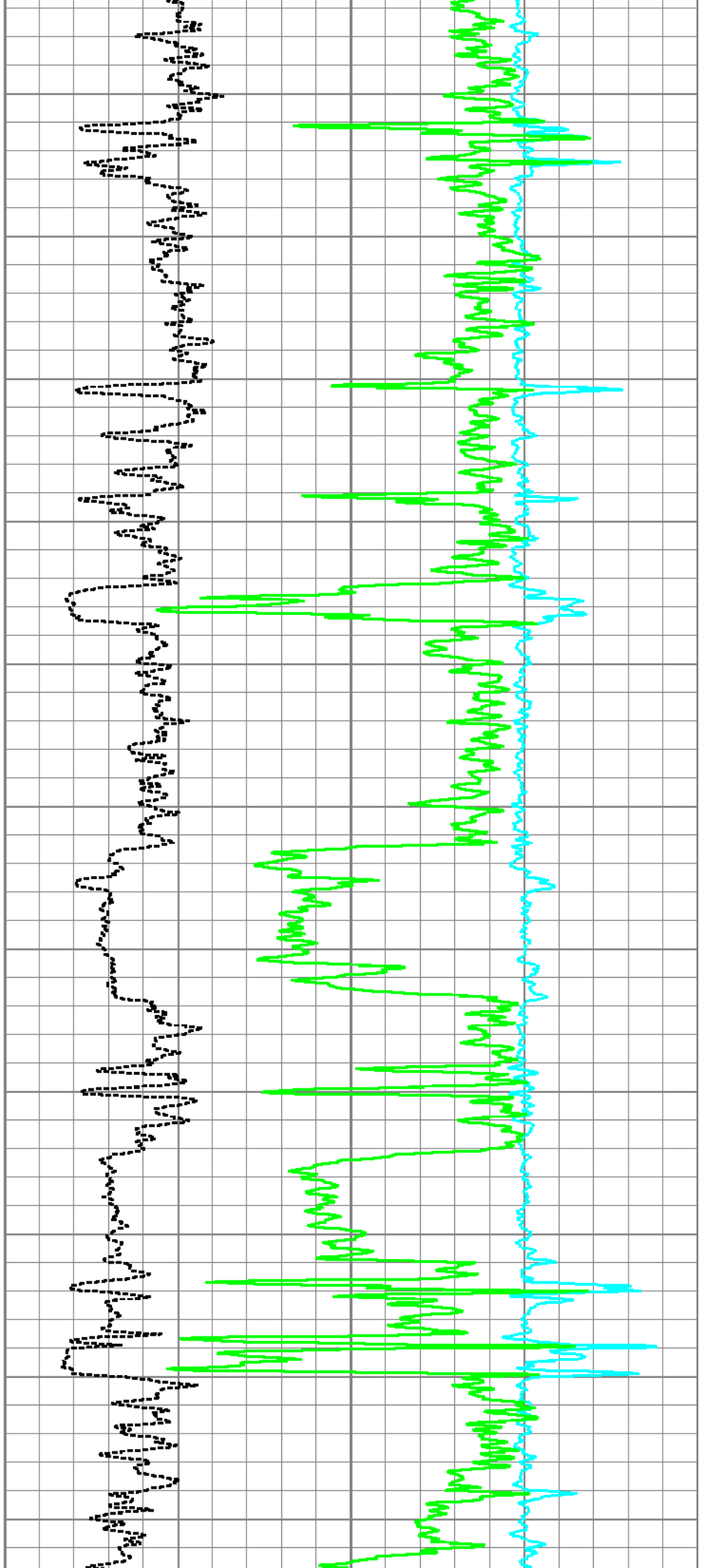
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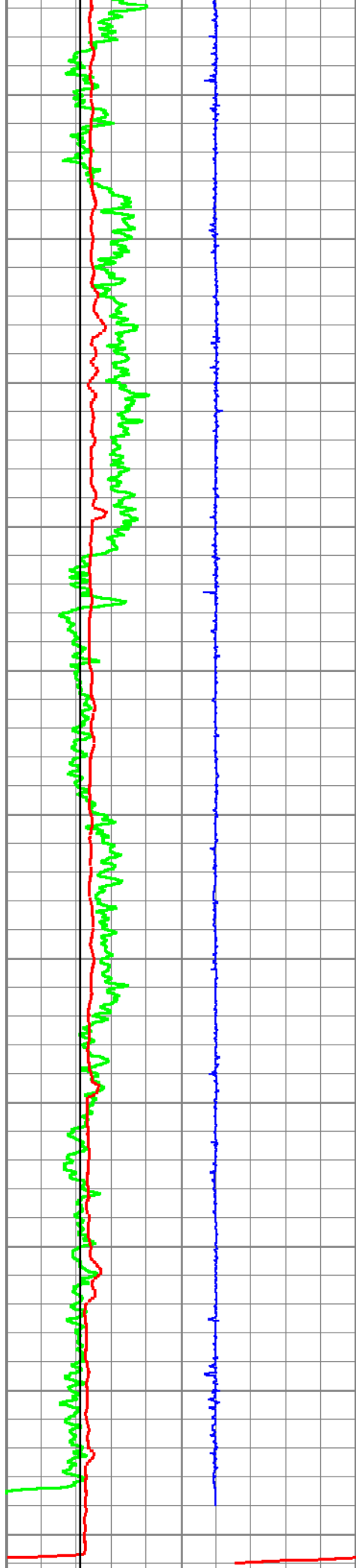
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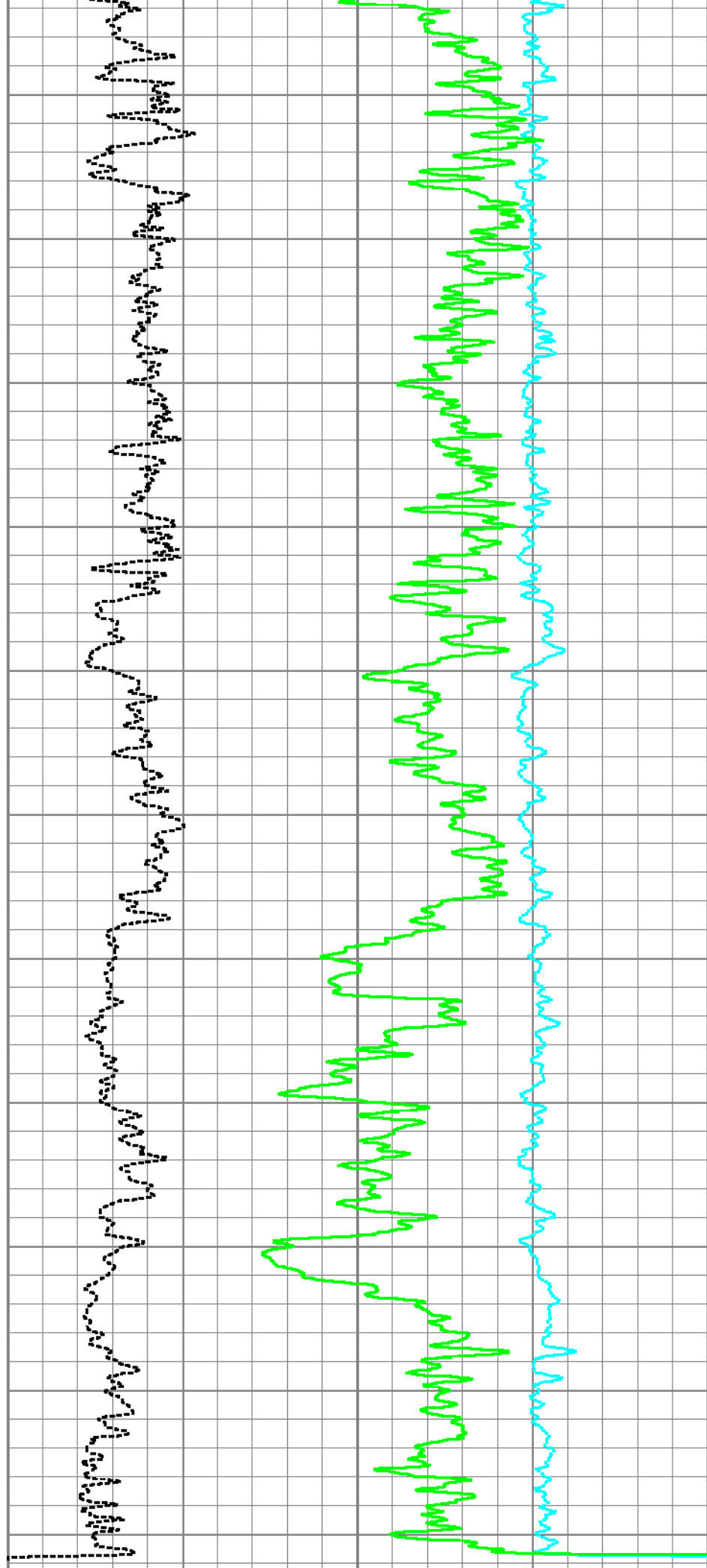
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0	GR (GAPI)	150
4	DCAL (in)	14
4	BOREID (in)	14
-5	ACCY	5

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

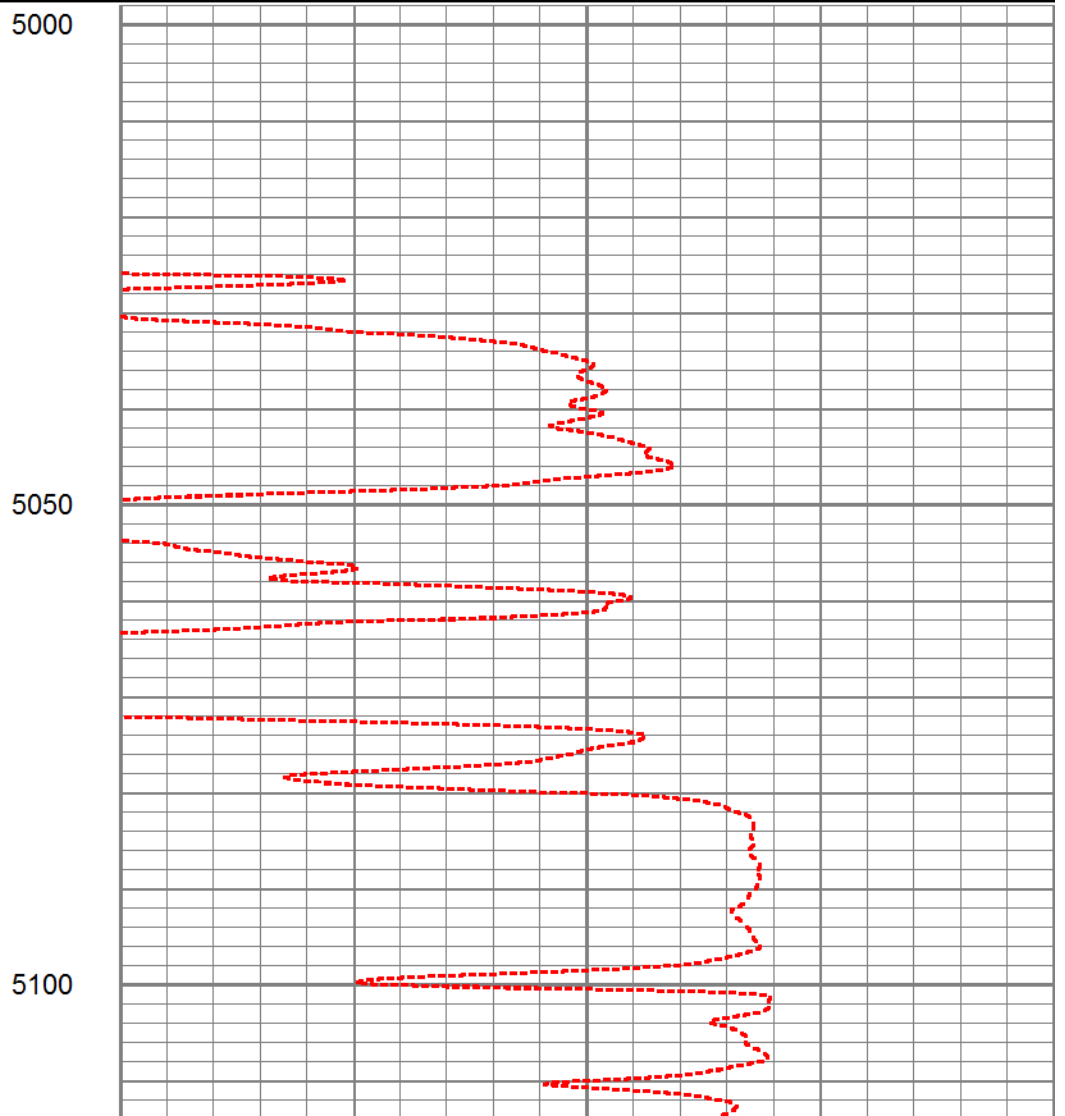
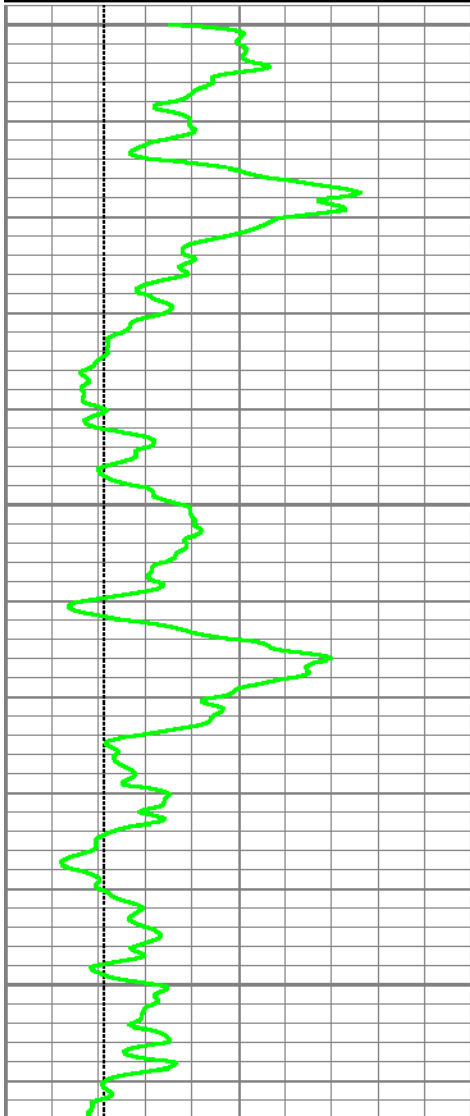


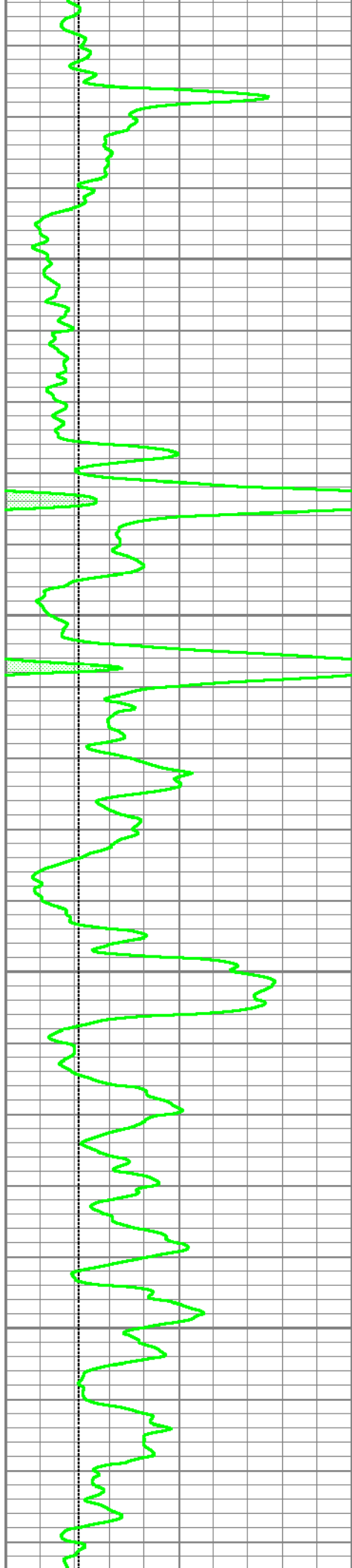
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Database File: sandridge\_ellis\_mem.db  
 Dataset Pathname: proc1/pass1.5  
 Presentation Format: chespk5n  
 Dataset Creation: Wed Aug 15 11:32:28 2012  
 Charted by: Depth in Feet scaled 1:240

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)					



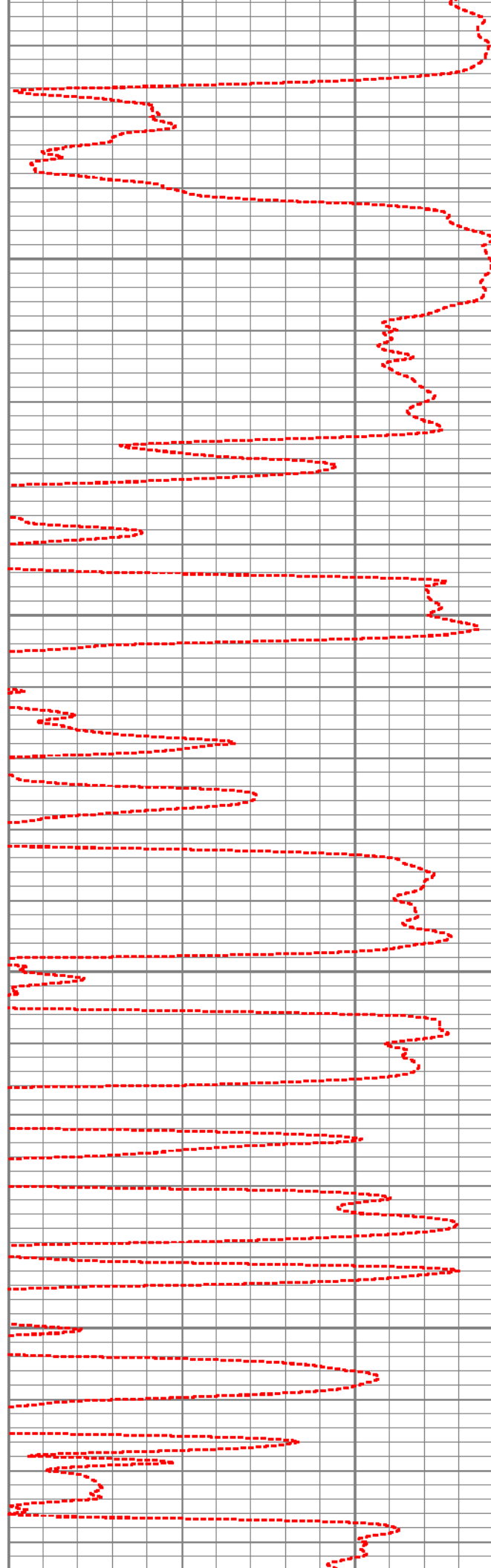


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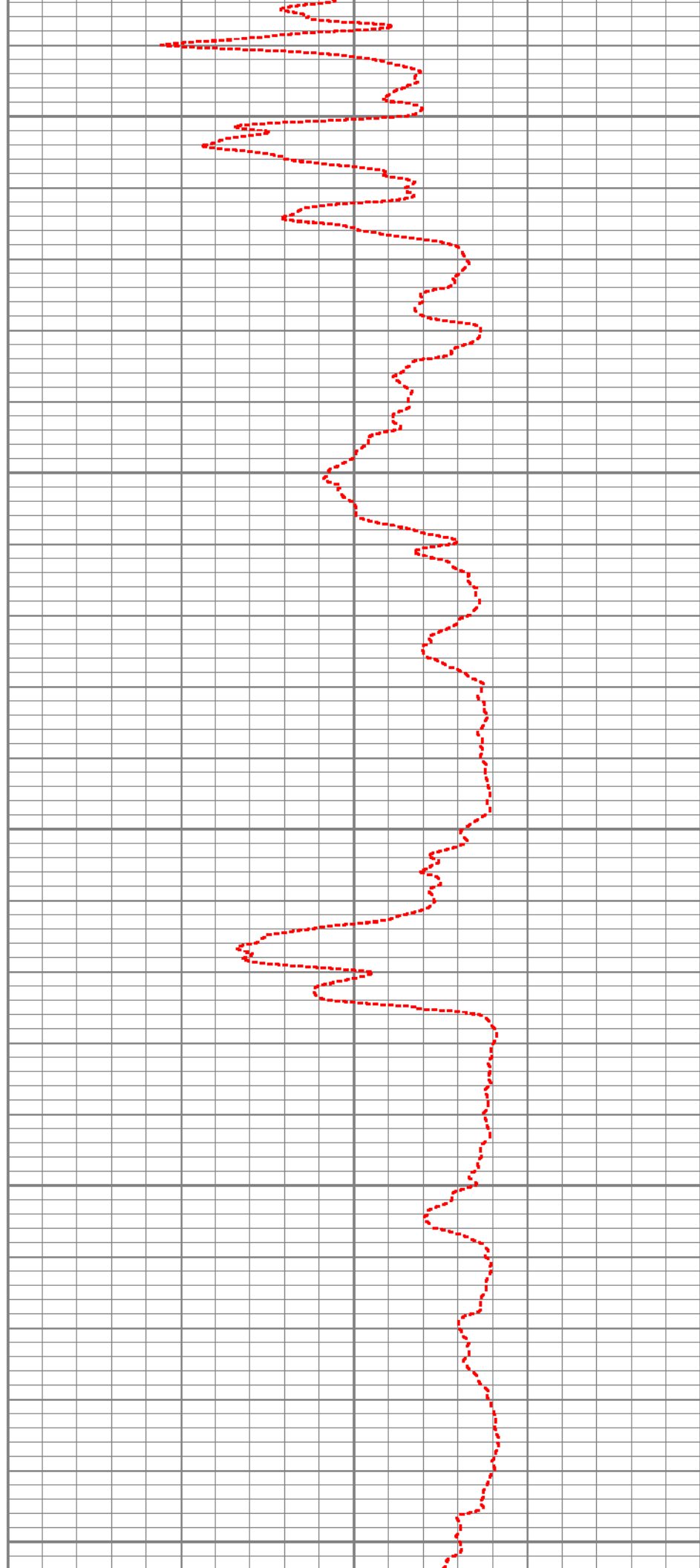
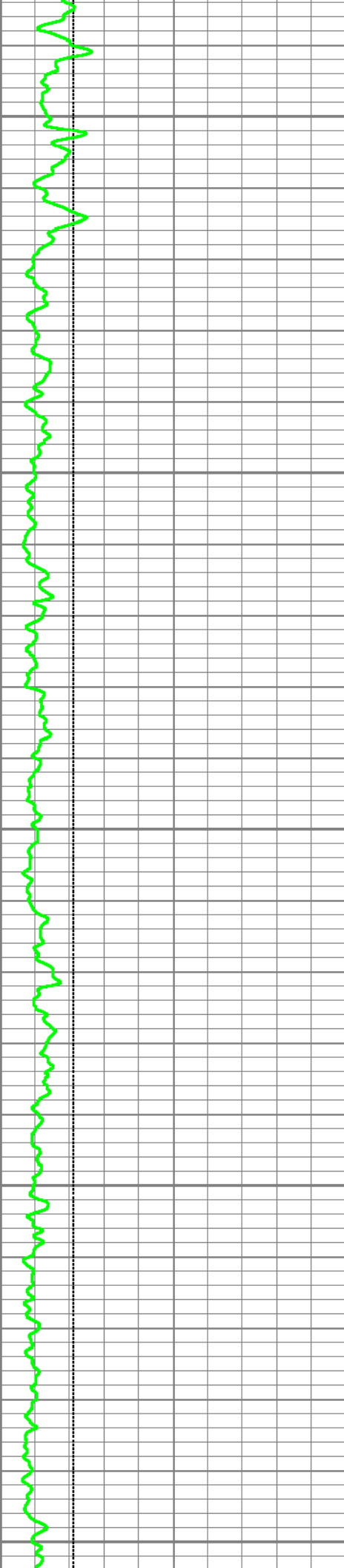
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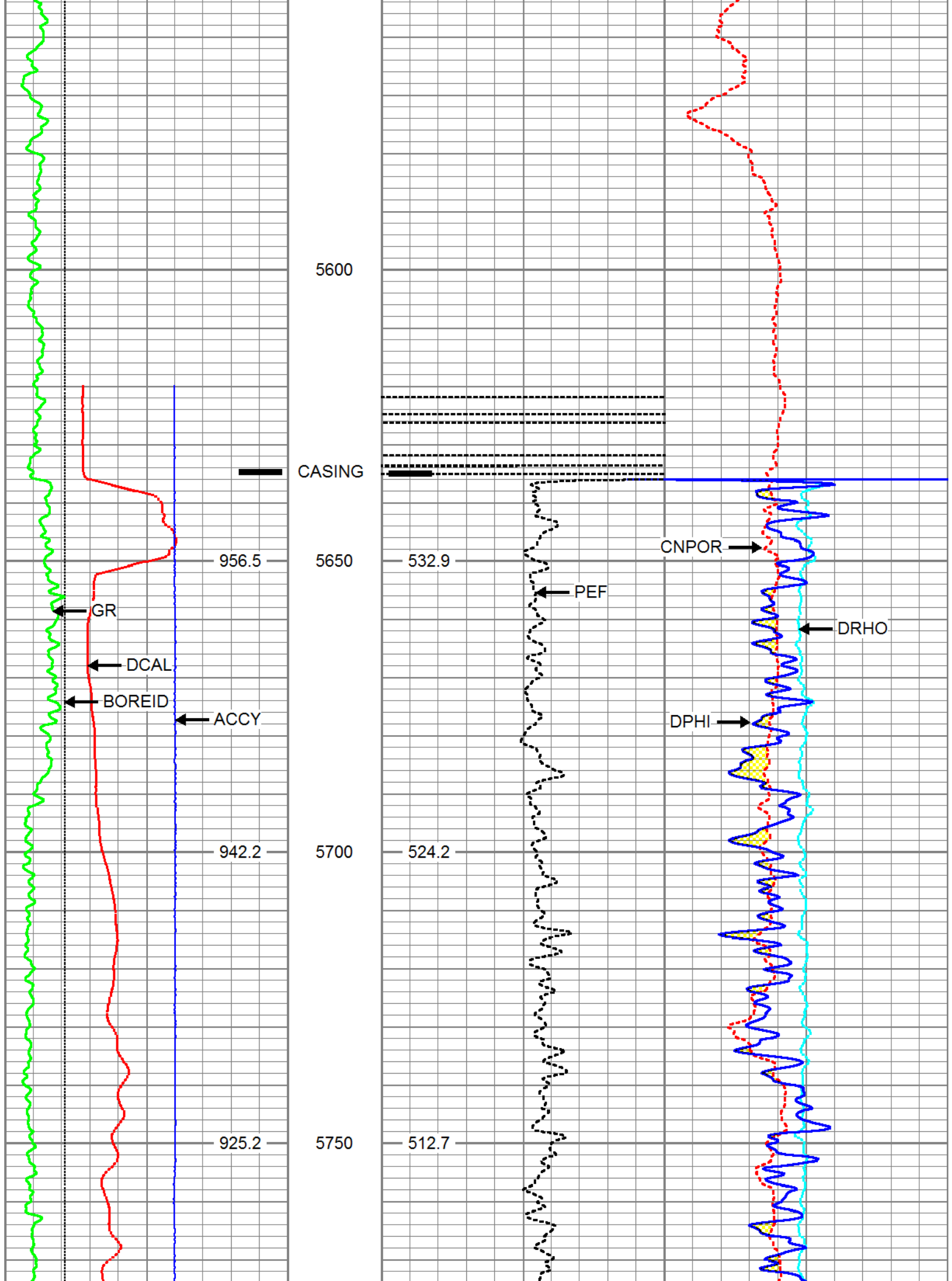
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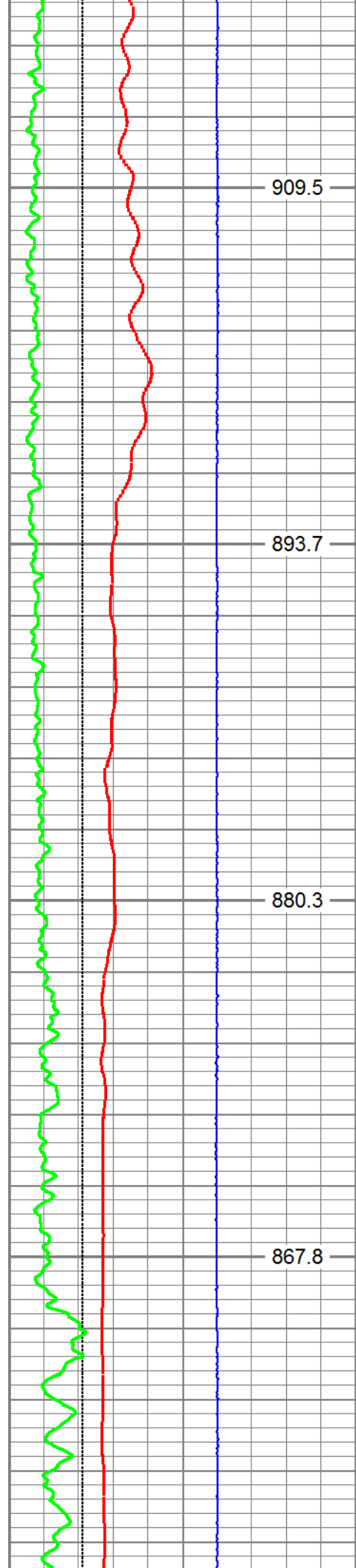
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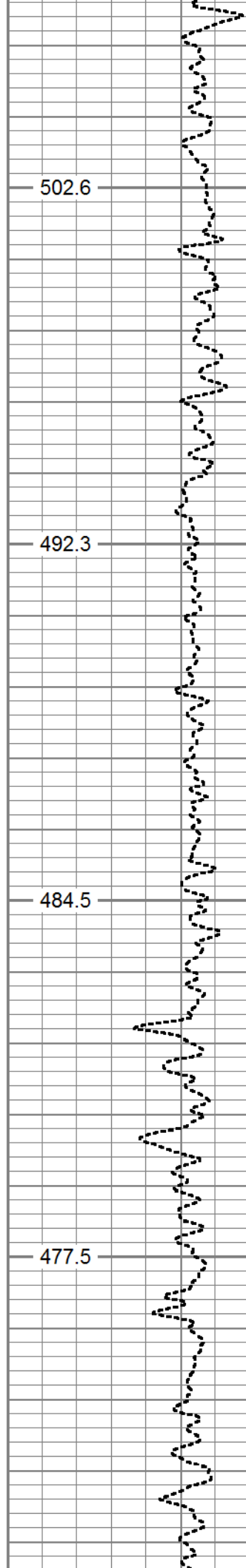


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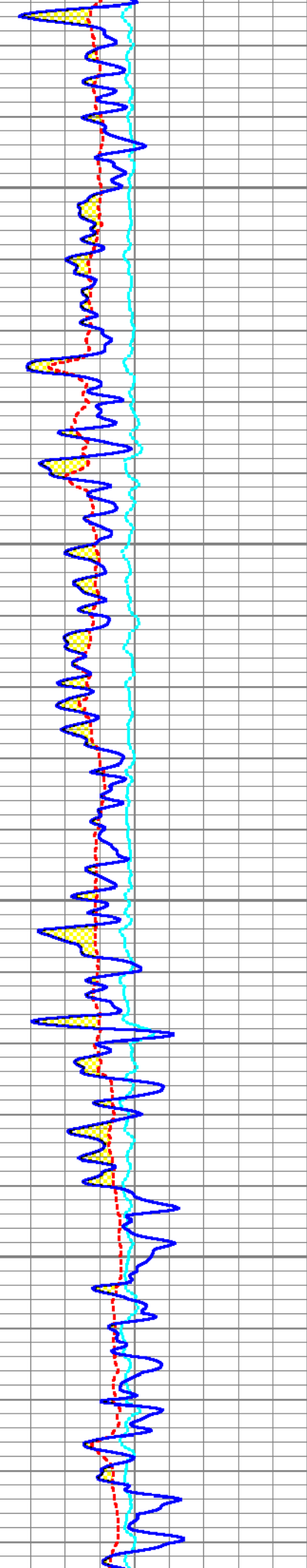


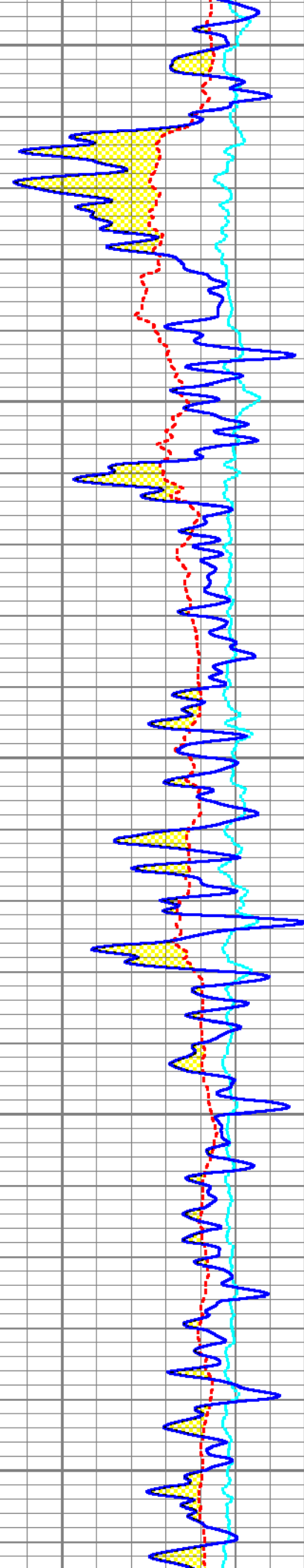
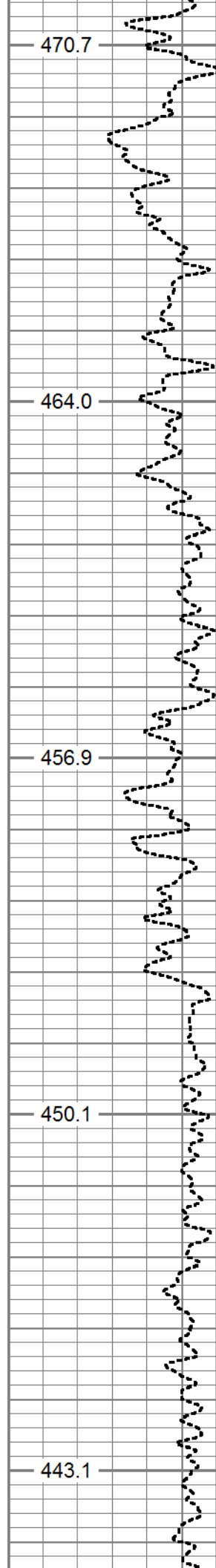
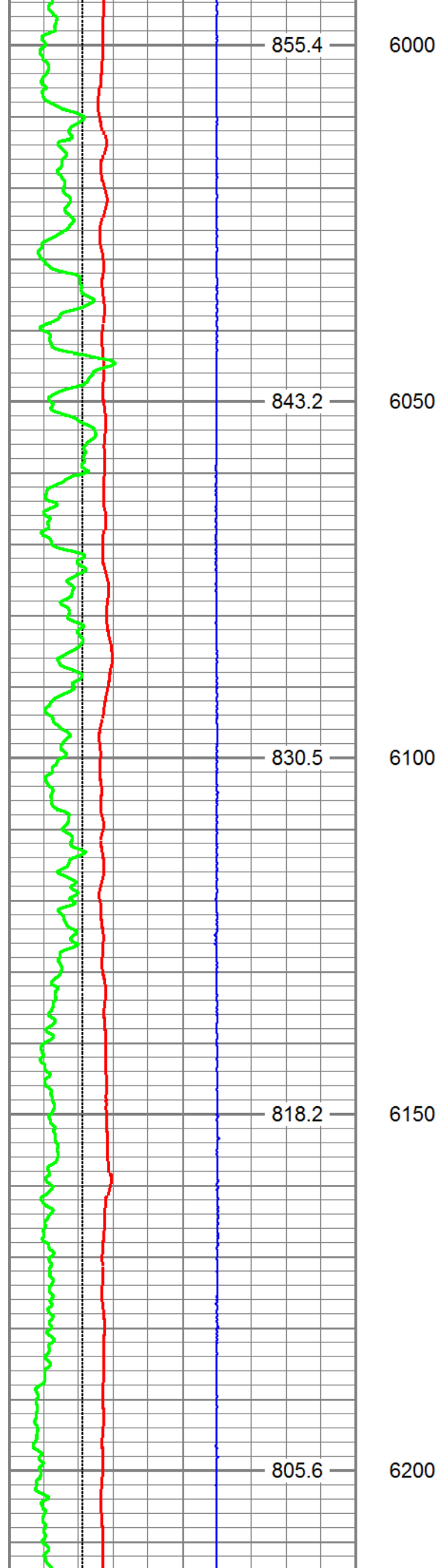
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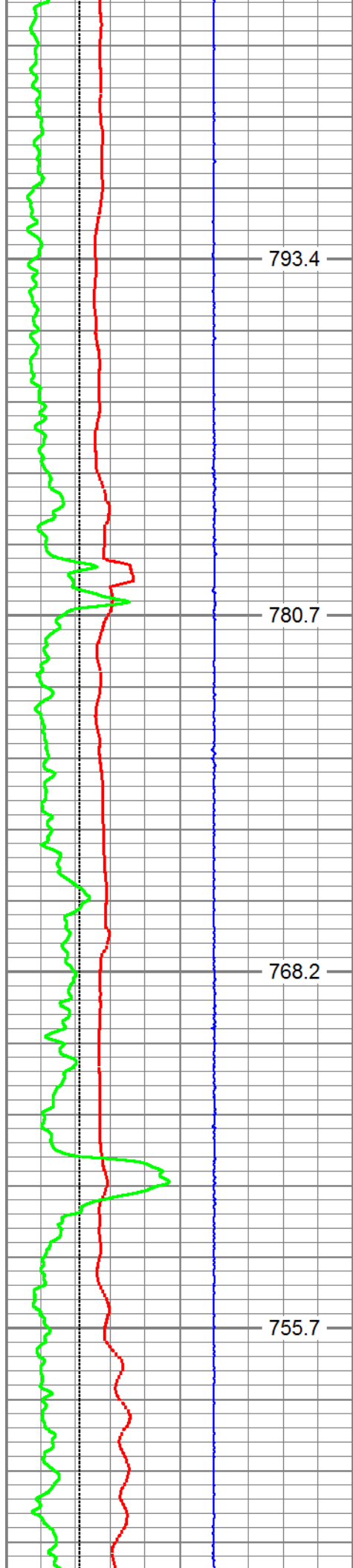
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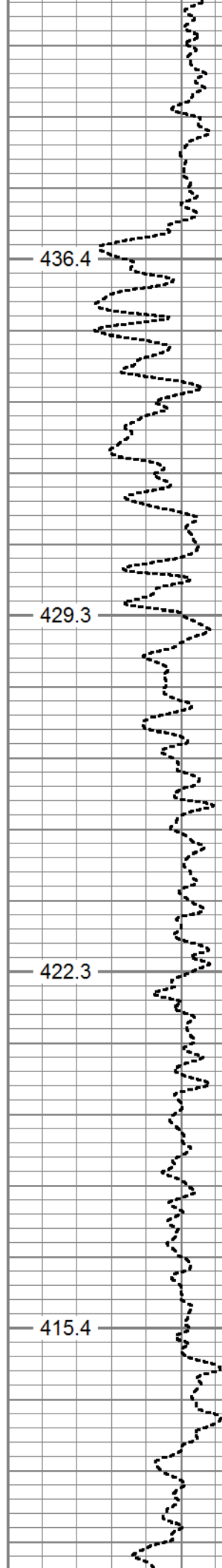


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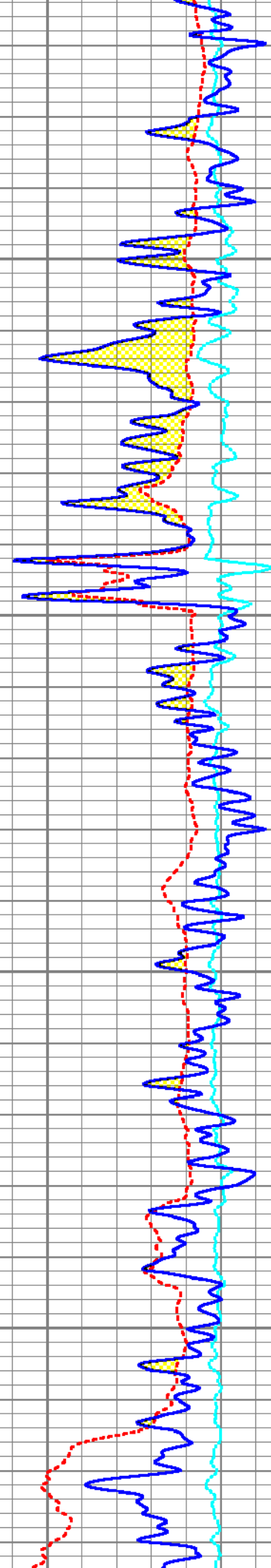


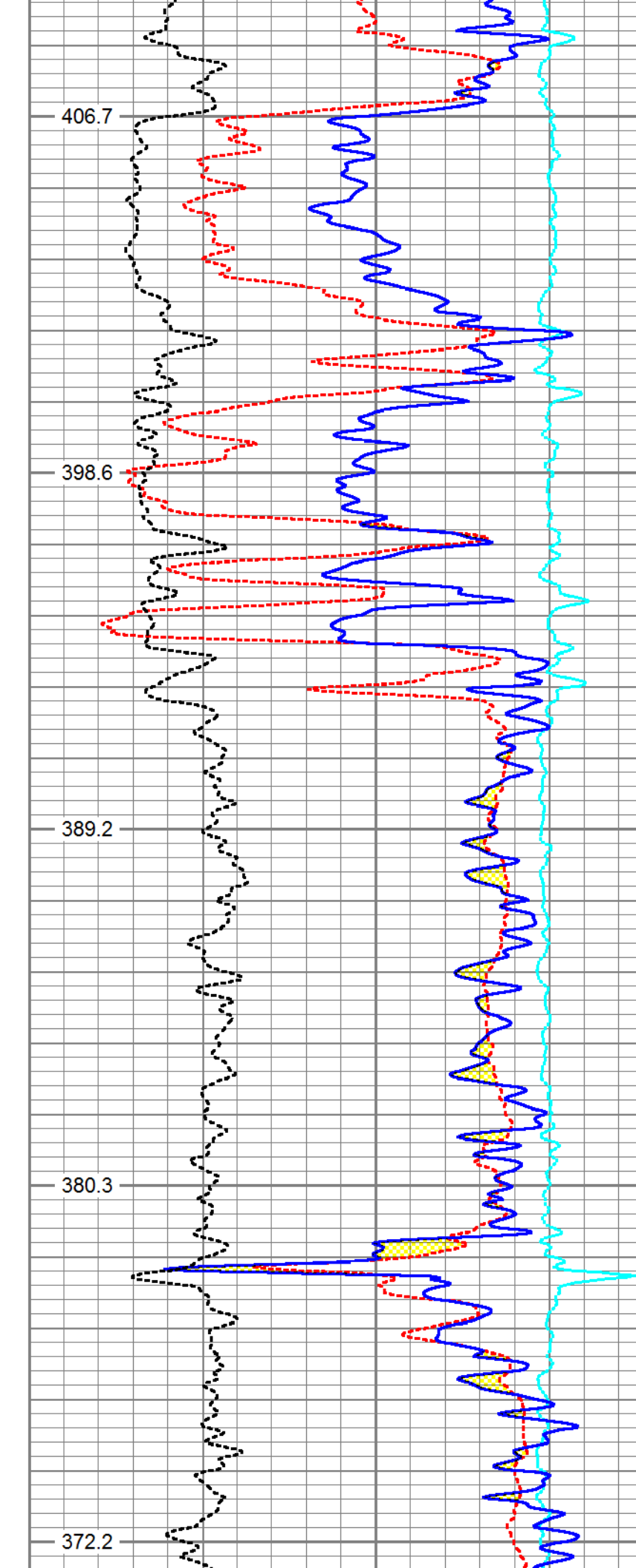
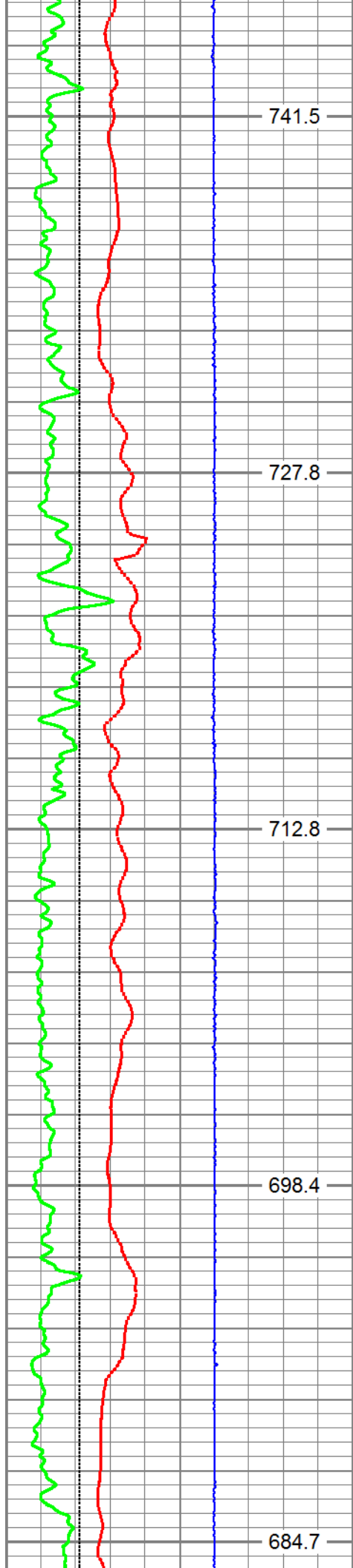
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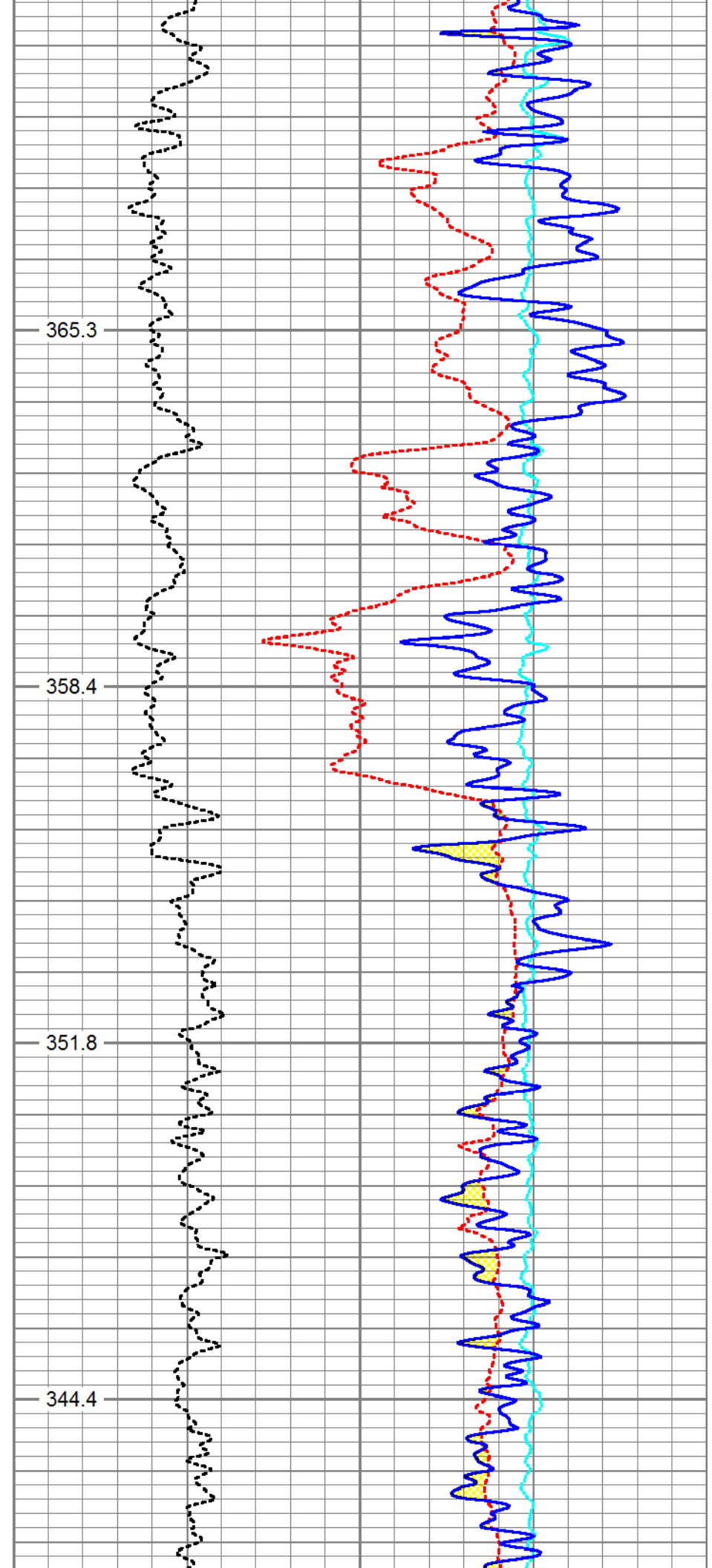
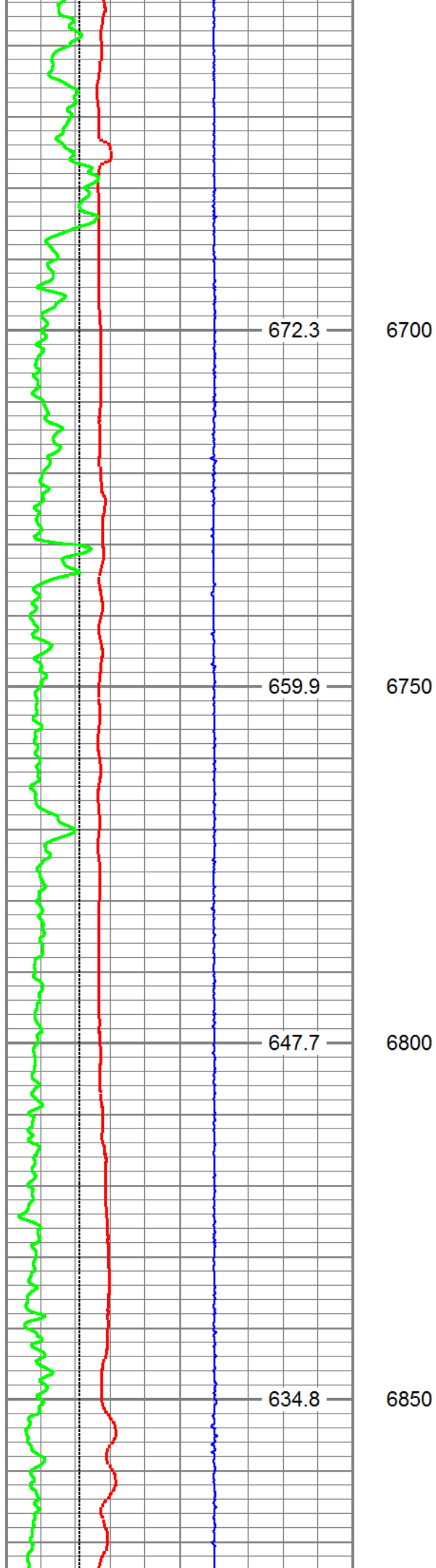
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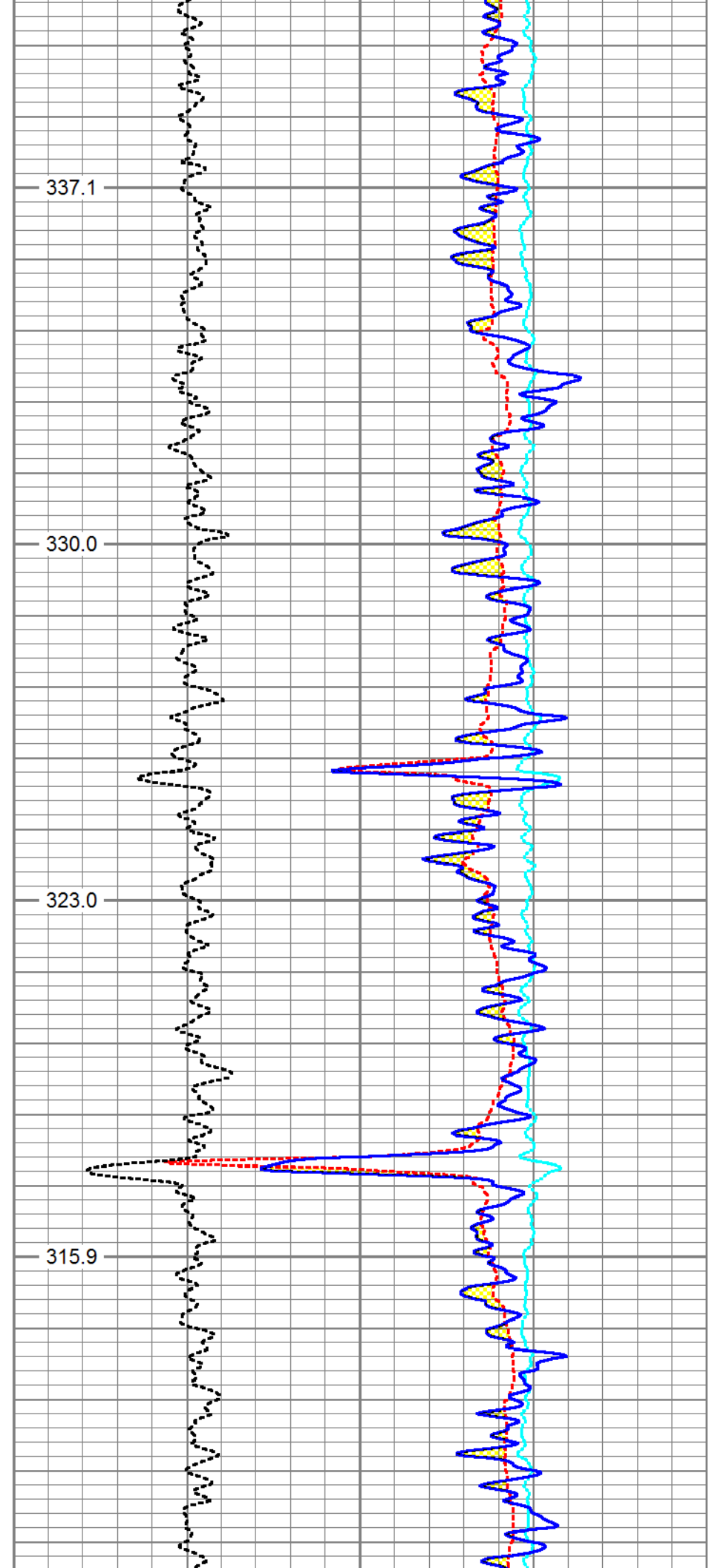
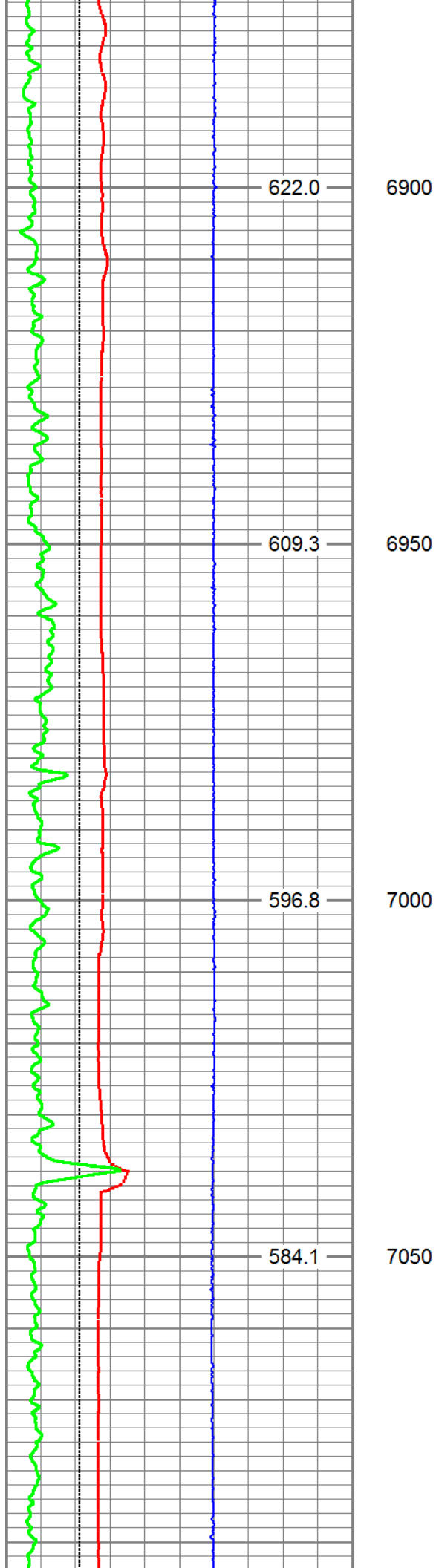
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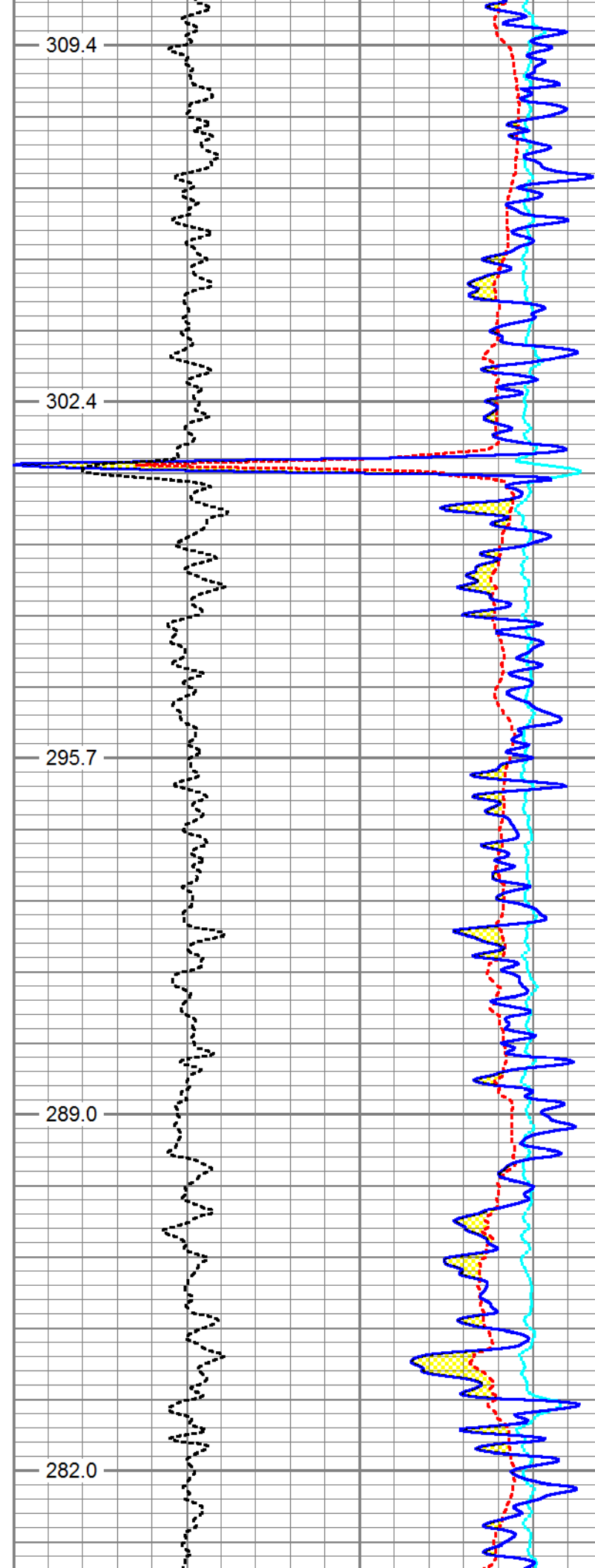
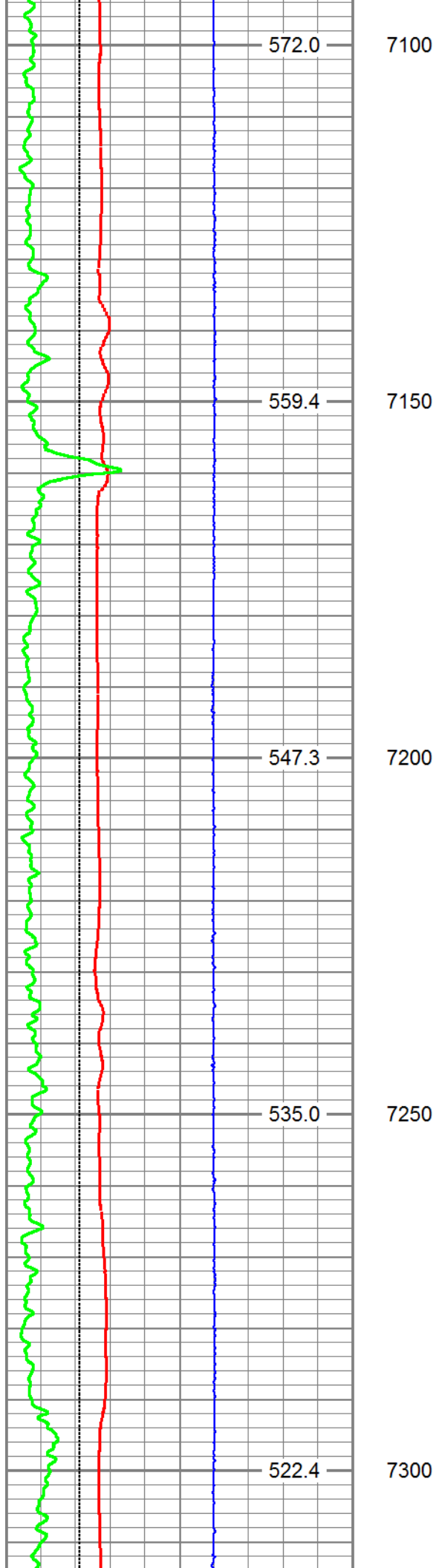
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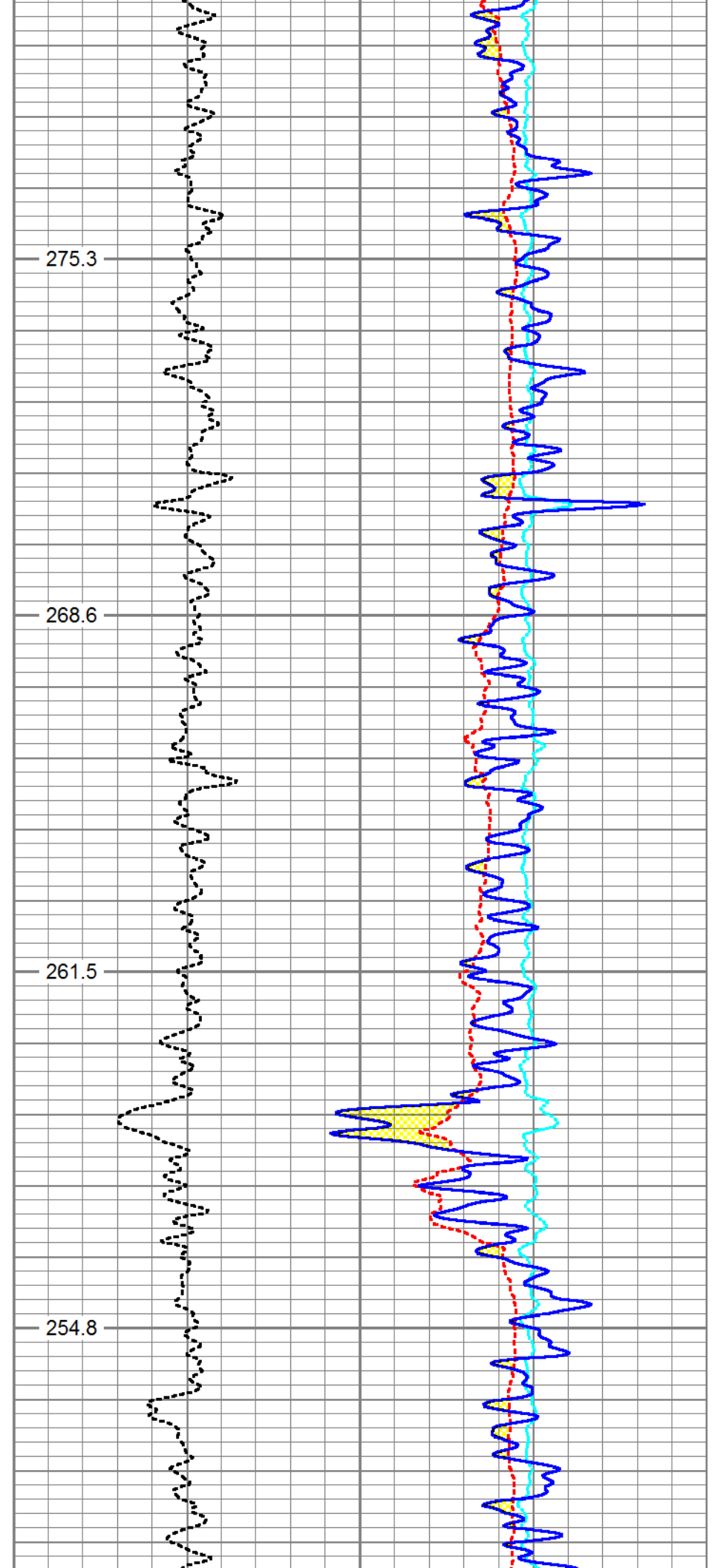
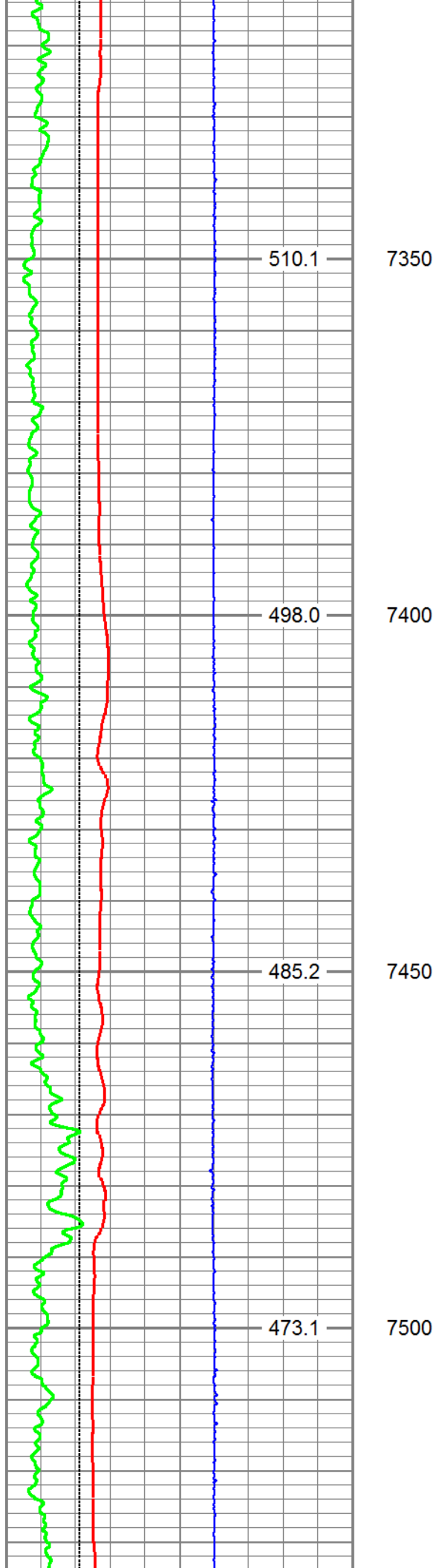


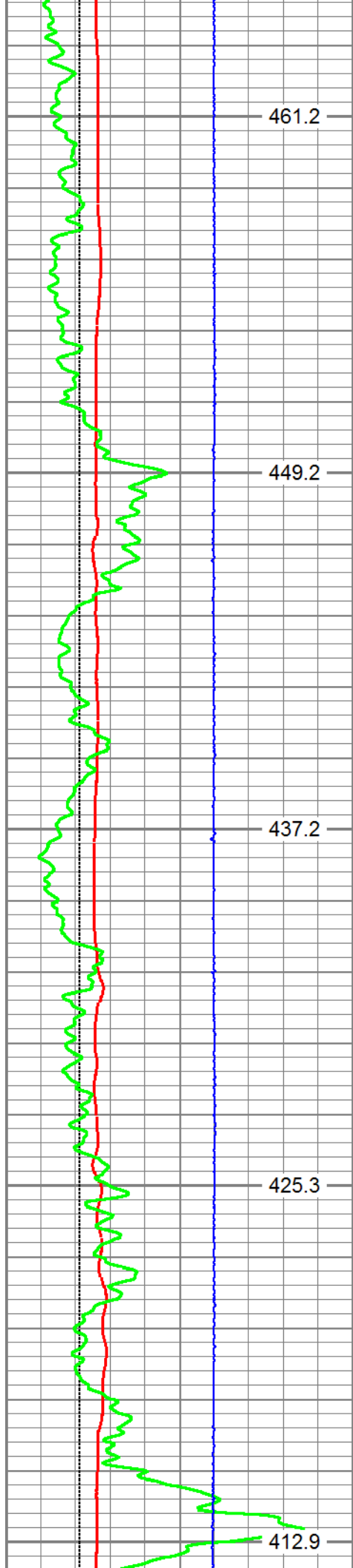




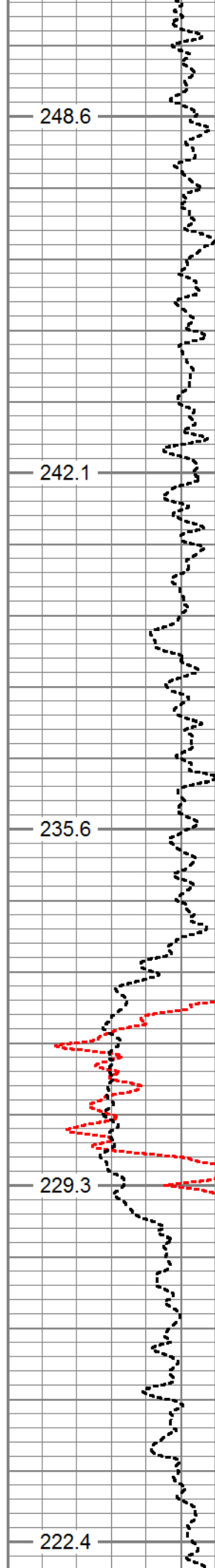




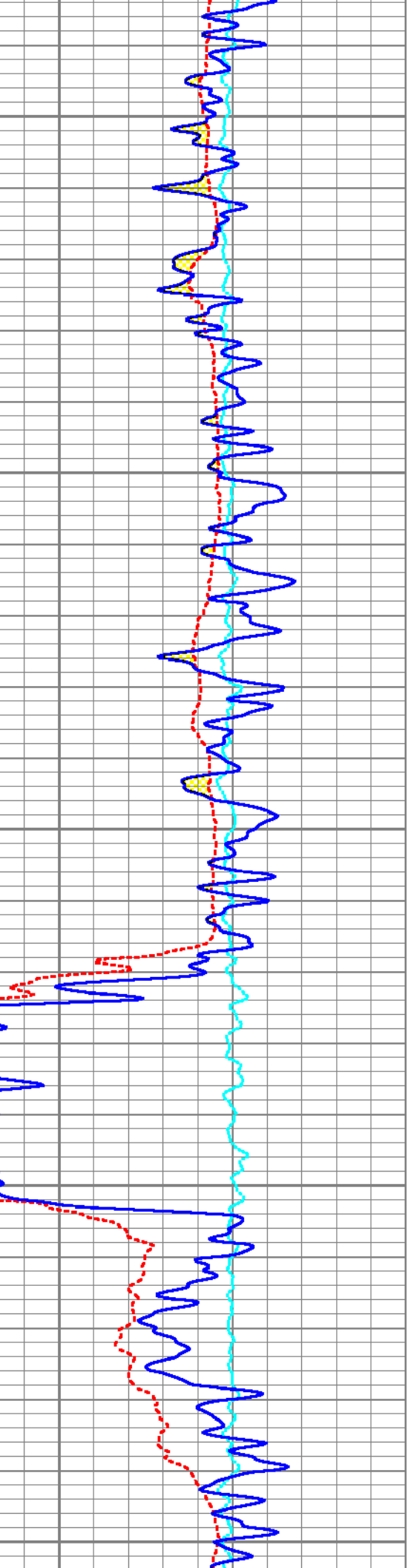


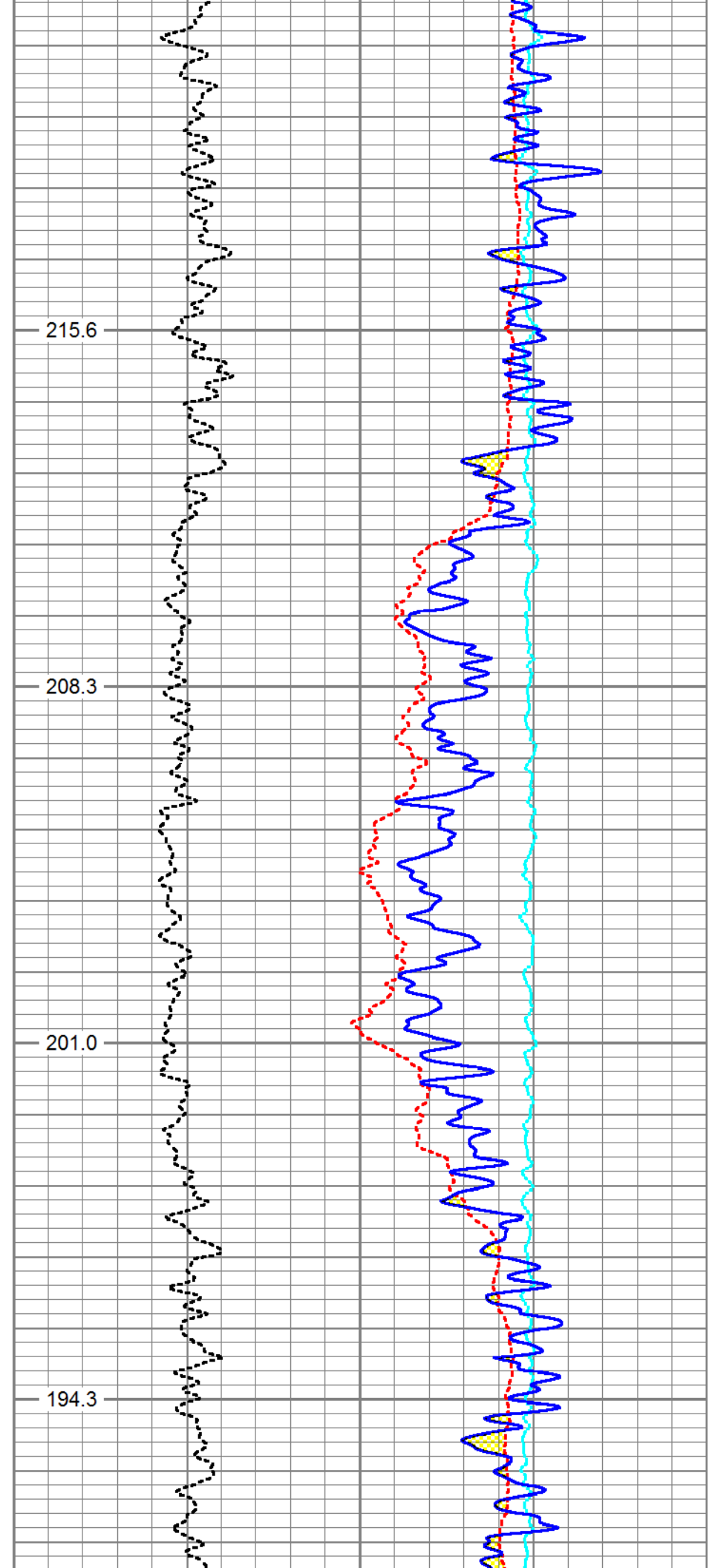
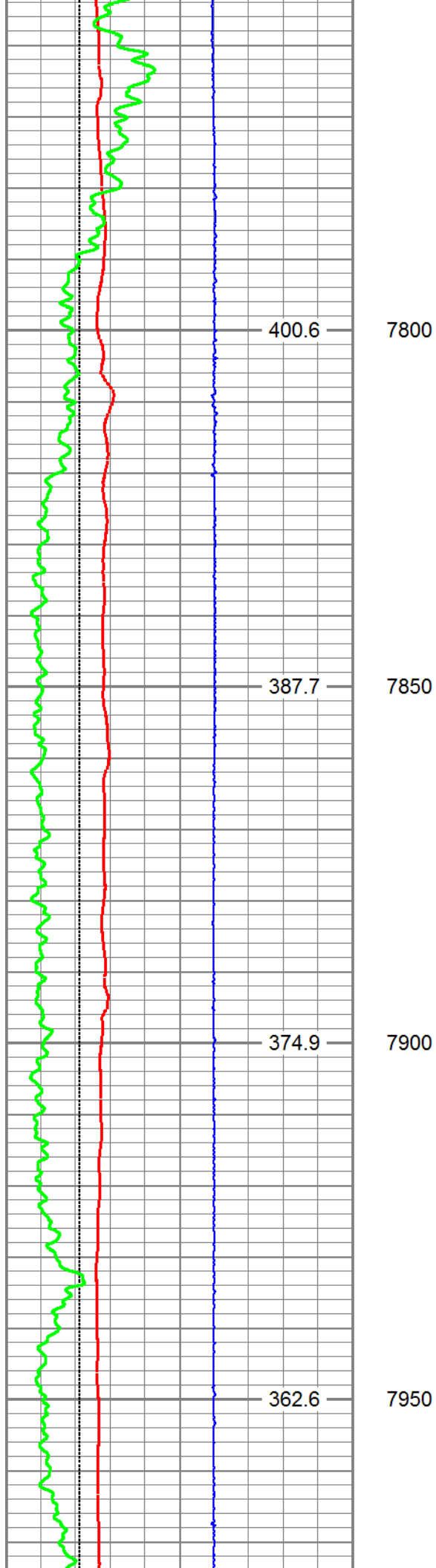


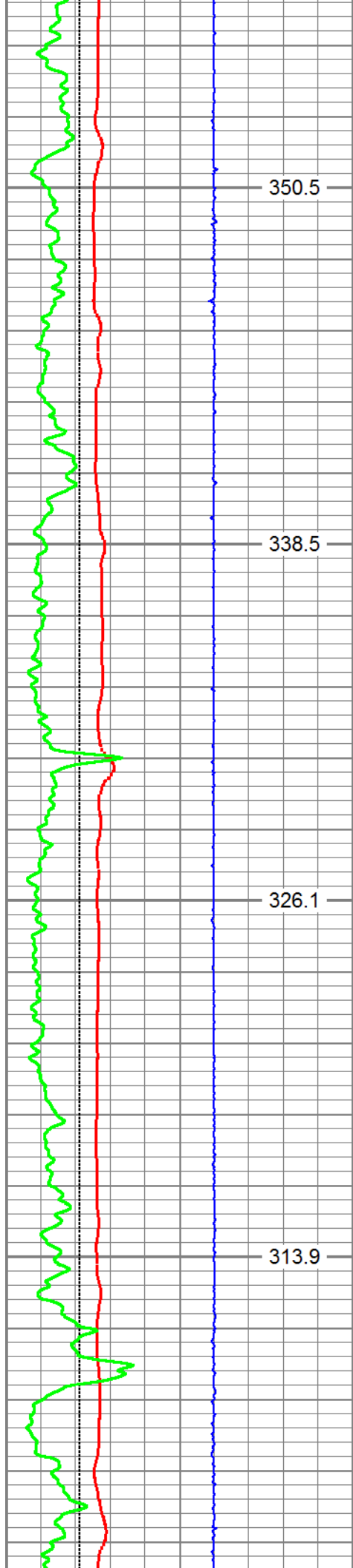
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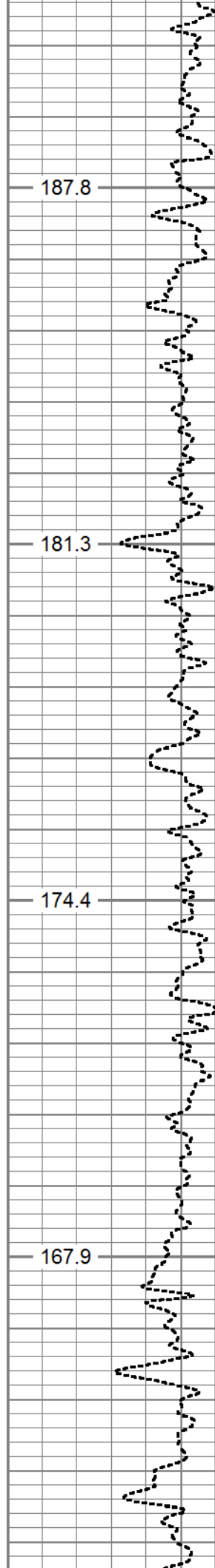


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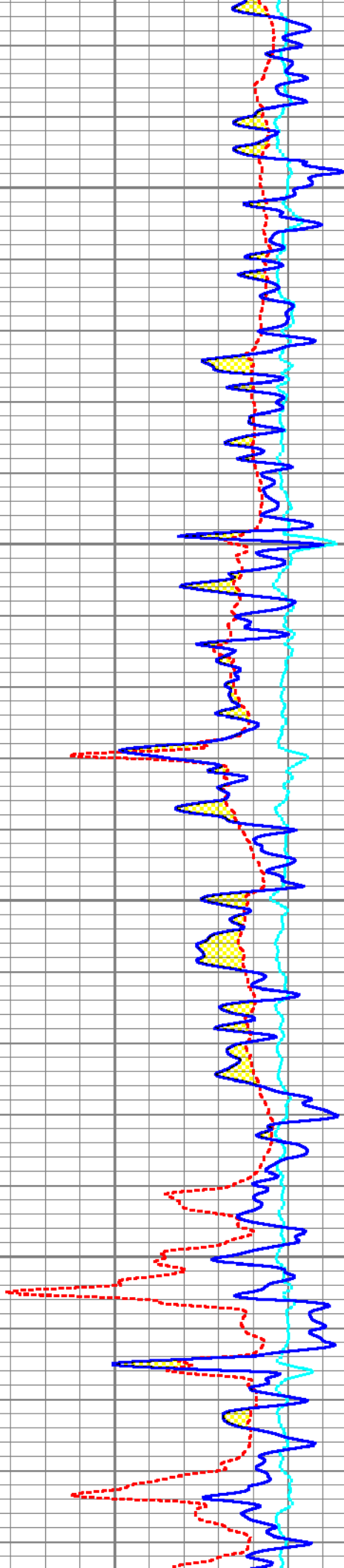


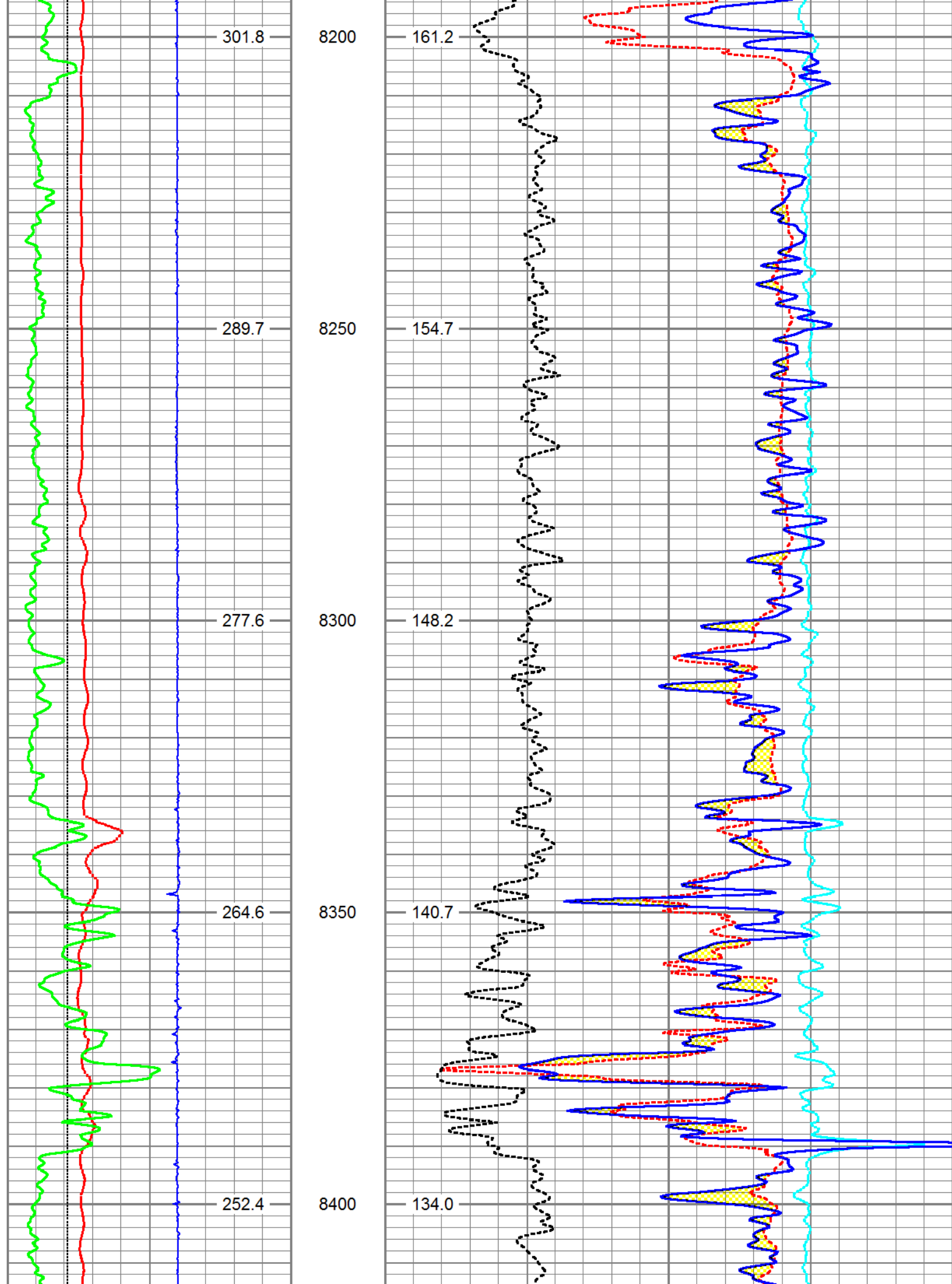
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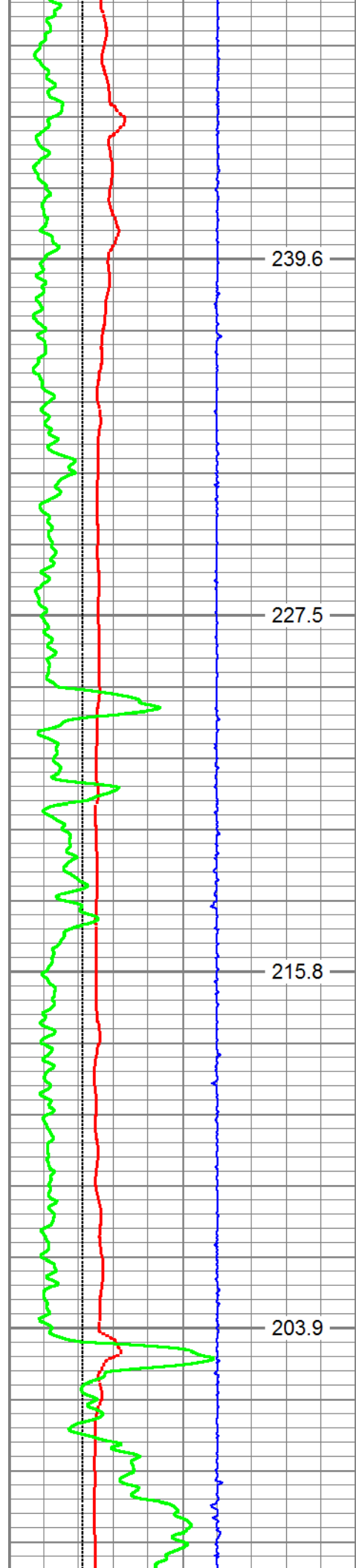
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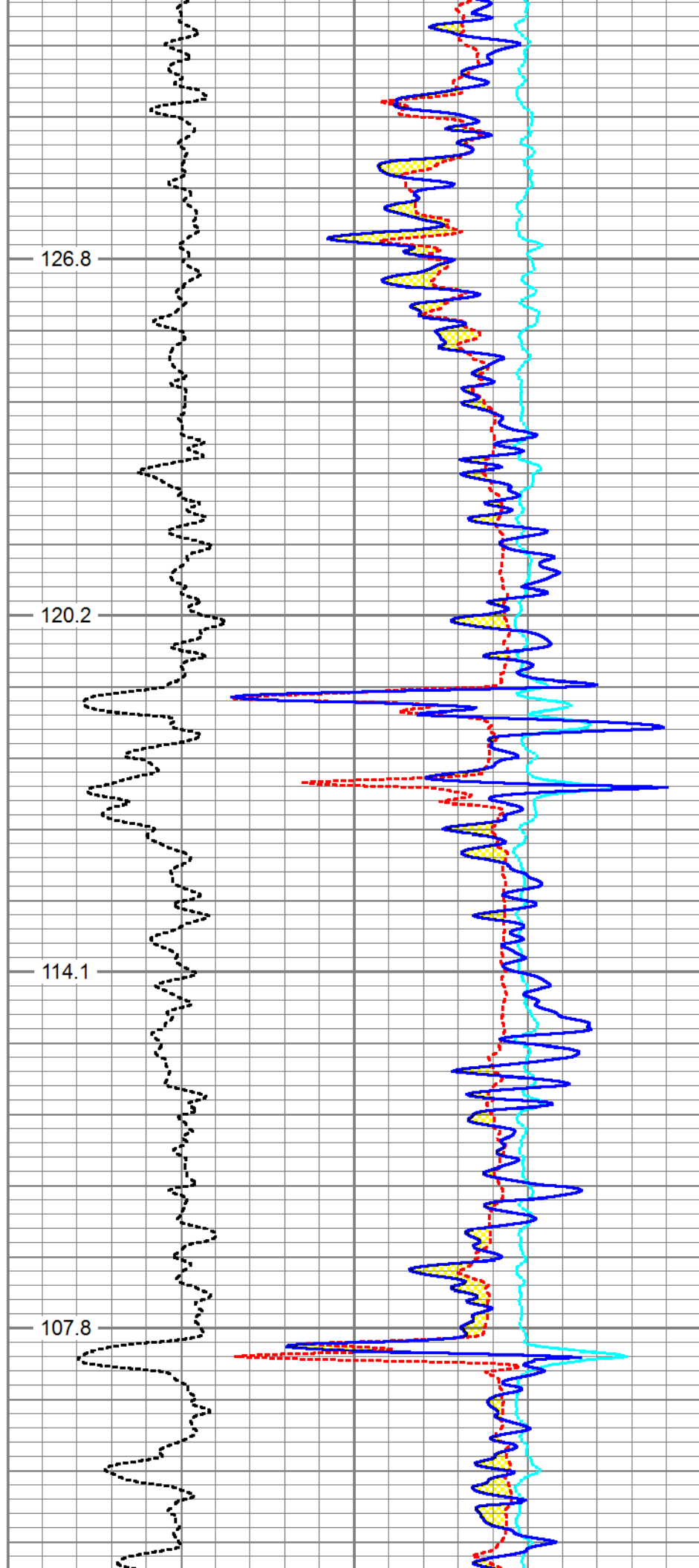


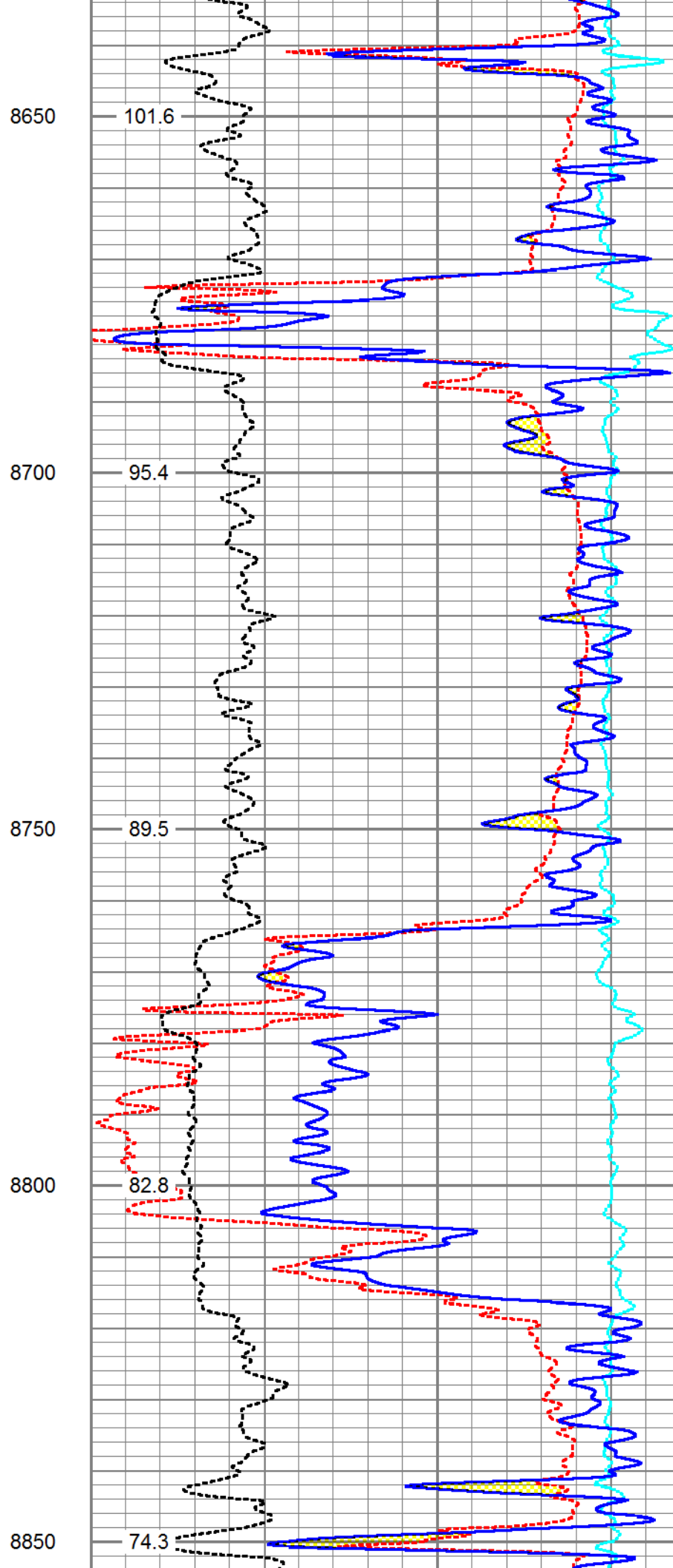
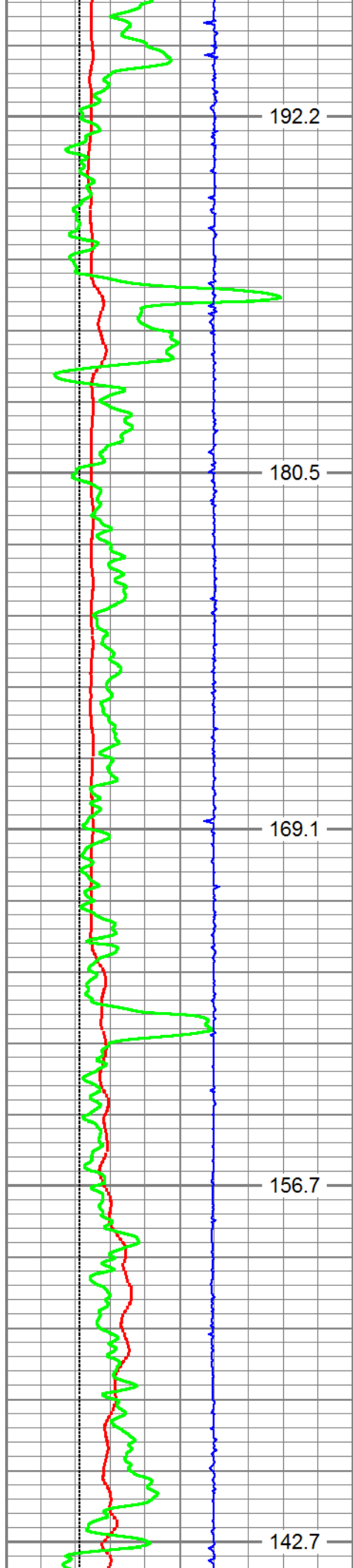
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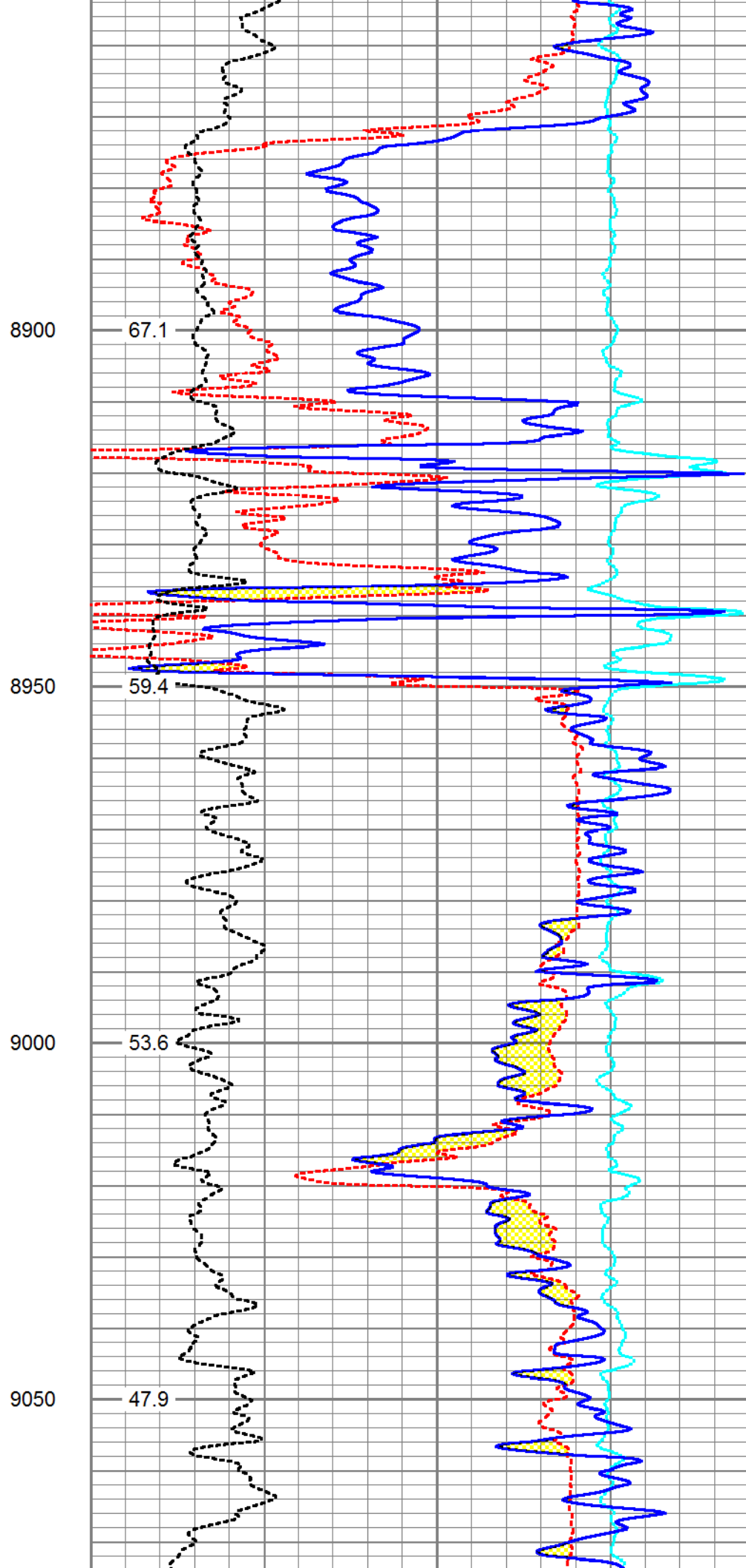
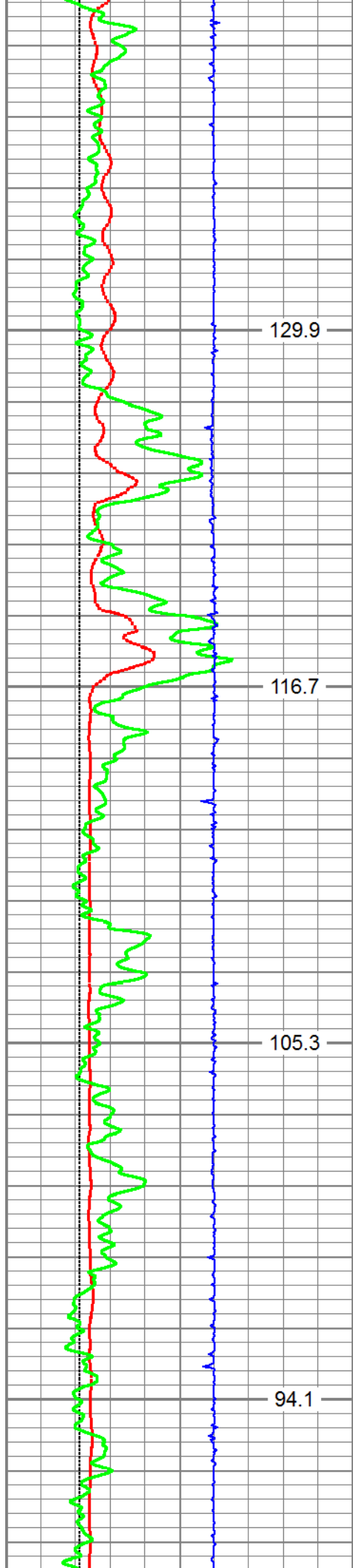
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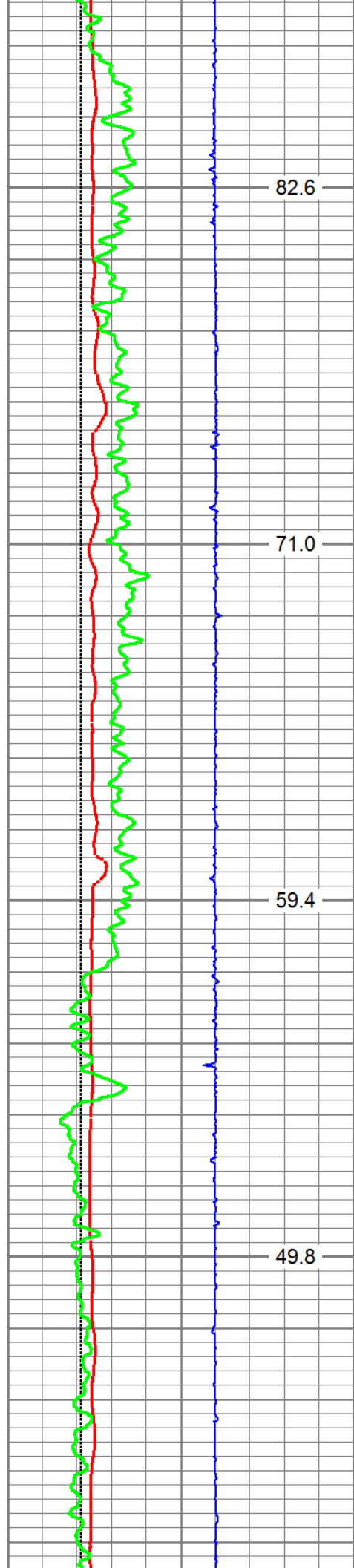
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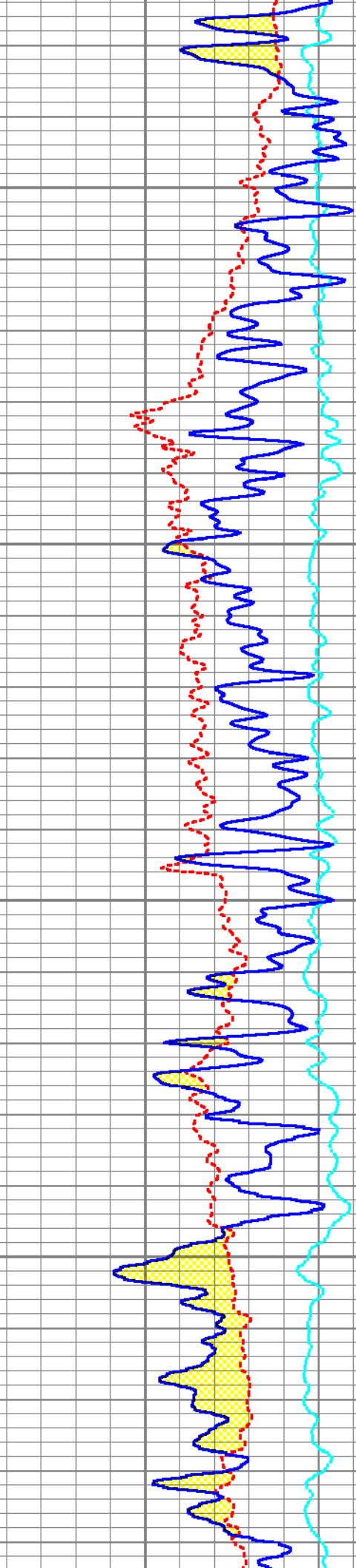
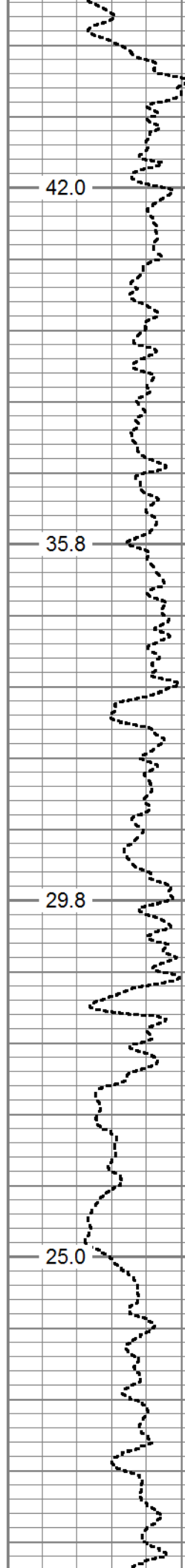


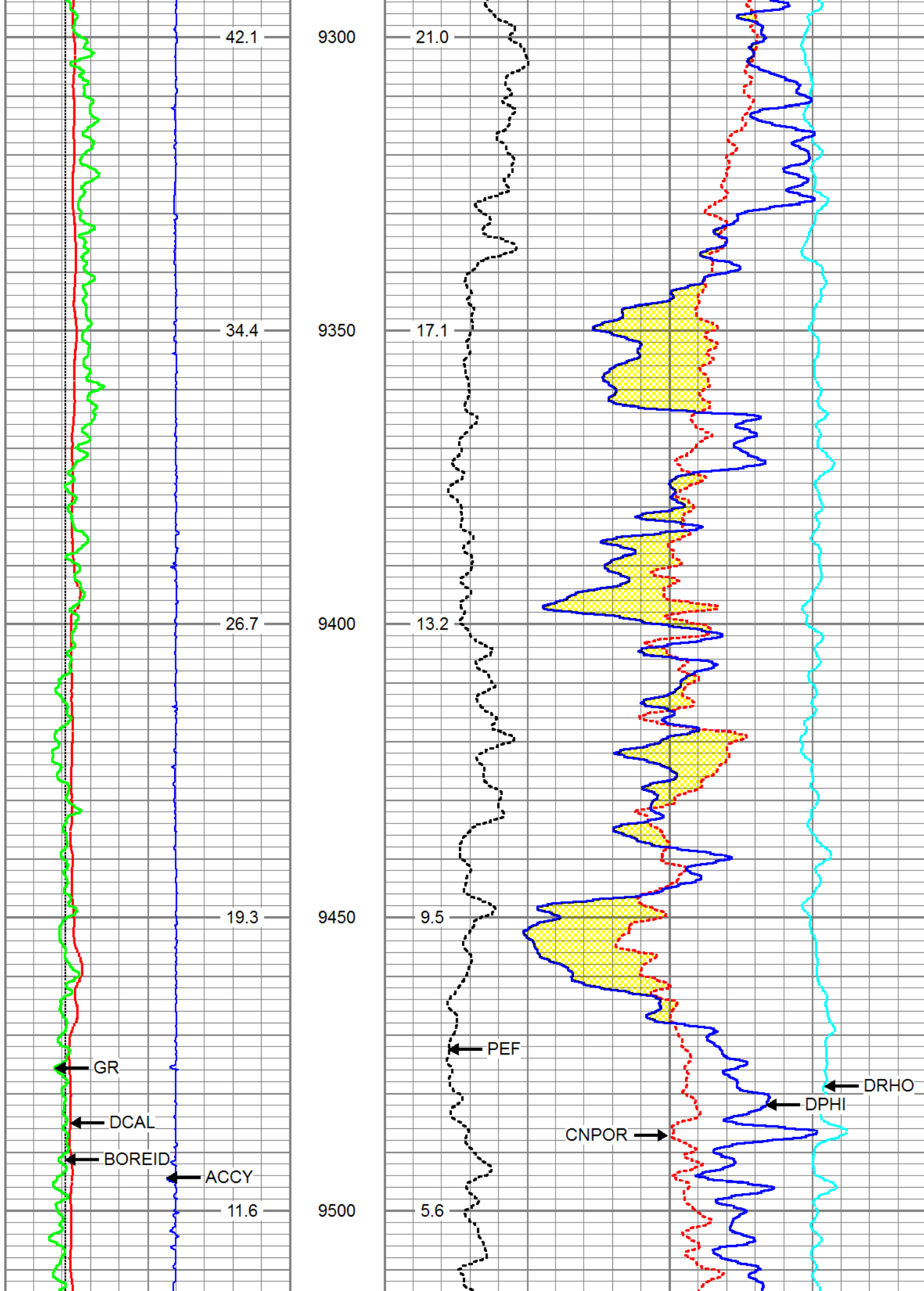
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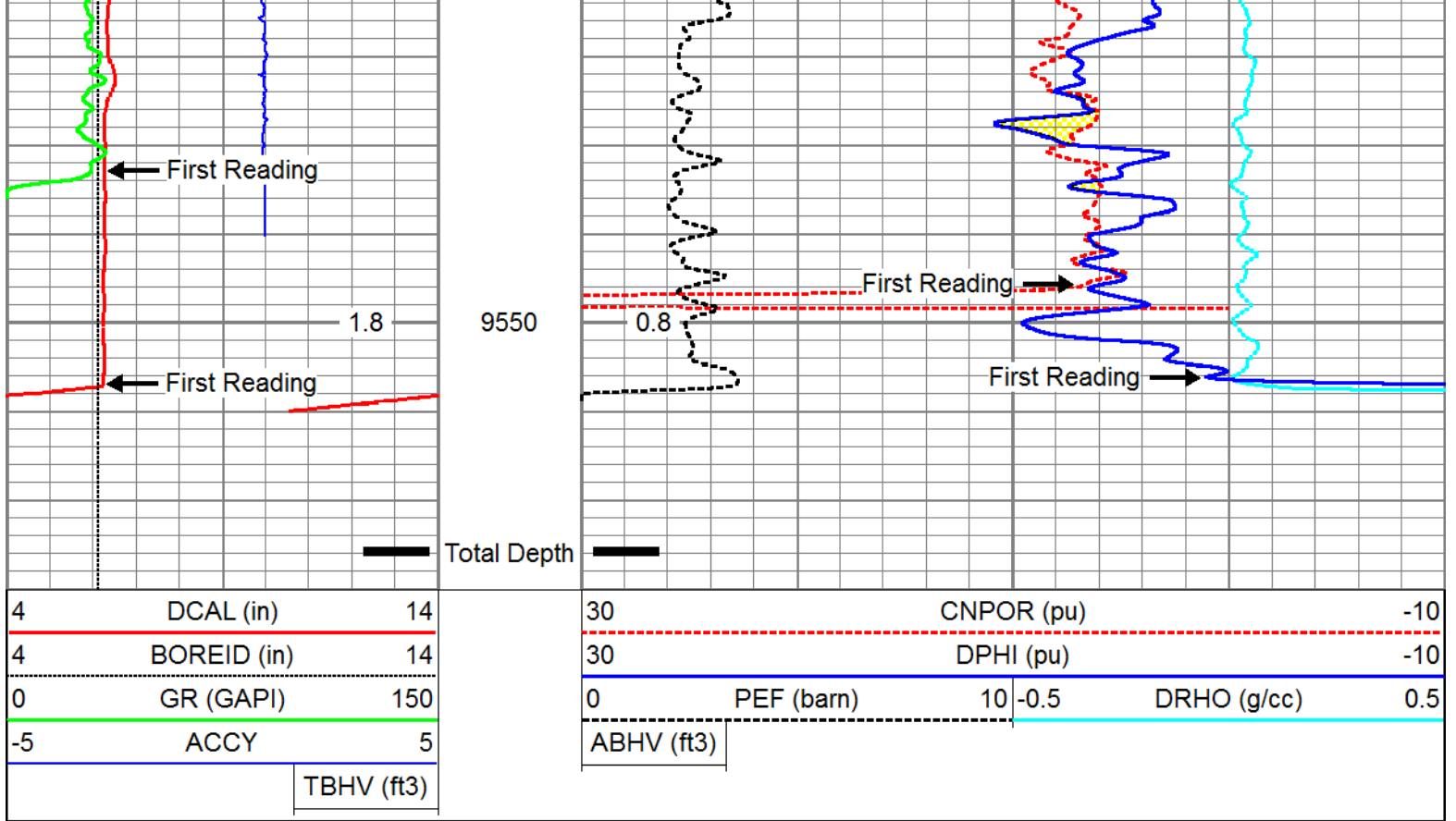
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## Log Variables

Database: C:\Warrior\Data\sandridge\_ellis\_mem.db  
 Dataset: field/well/proc1/pass1.5

### Top - Bottom

BHCOR On	BHFL_TYPE WBM	BHFLRES Ohm-m 1	BHFLRESSRC MUDCELL	BHIDSRC CURVE	BOREID in 6.125	BOTTEMP degF 133
CASED? No	CASEOD in 4.5	CASETHCK in 0	CEMWATERSA kppm 0	CMNTTHCK in 0	DNBHC? NO	DPOSEL RHOB
FLUIDDEN g/cc 1	FRMSALIN kppm 0	LATNOR Off	MATRXDEN g/cc 2.71	MUDSALIN kppm 4	MudWgt lb/gal 8.5	NPOSEL Limestone
PEBHC? YES	PERFS 0	RESTMPSRC INTERNAL	SO in 0.5	SRFTEMP degF 65	SZCOR On	TDEPTH ft 9605
TMPCOR On	TOOLPOS Free					

### Calibration Report

Database File: sandridge\_ellis\_mem.db  
 Dataset Pathname: proc1/pass1.5  
 Dataset Creation: Wed Aug 15 11:32:28 2012

### ThruBit Induction Calibration Report

Tool Model Serial Number:

DS DS20B

## BASELINE

	R	Expected	X	Expected
Freq 1				
A1	-466.3120	[-500.00, -400.00]	274.1160	[-500.00, 500.00]
A2	-137.4230	[-180.00, -100.00]	295.2880	[-500.00, 500.00]
A3	-26.7238	[-50.00, -10.00]	12.1522	[-500.00, 500.00]
A4	-15.3811	[-30.00, -10.00]	321.5260	[-500.00, 500.00]
A5	-12.6010	[-30.00, -10.00]	122.1460	[-500.00, 500.00]
Freq 2				
A1	-246.9050	[-280.00, -180.00]	151.8670	[-500.00, 500.00]
A2	-90.1241	[-130.00, -50.00]	162.9470	[-500.00, 500.00]
A3	-20.5446	[-50.00, -10.00]	-44.4156	[-500.00, 500.00]
A4	-18.1491	[-30.00, -10.00]	126.7500	[-500.00, 500.00]
A5	-17.6529	[-30.00, -10.00]	-12.6931	[-500.00, 500.00]
Freq 3				
A1	-158.0780	[-180.00, -80.00]	42.2089	[-500.00, 500.00]
A2	-69.7733	[-130.00, -30.00]	77.4876	[-500.00, 500.00]
A3	-17.2164	[-50.00, -10.00]	-89.8846	[-500.00, 500.00]
A4	-19.7958	[-30.00, -10.00]	2.4050	[-500.00, 500.00]
A5	-20.2183	[-30.00, -10.00]	-110.5650	[-500.00, 500.00]
Freq 4				
A1	-87.9098	[-120.00, -40.00]	-128.1980	[-500.00, 500.00]
A2	-52.1283	[-110.00, -10.00]	-37.1596	[-500.00, 500.00]
A3	-13.9754	[-50.00, -10.00]	-168.1260	[-500.00, 500.00]
A4	-22.0367	[-30.00, -10.00]	-176.1500	[-500.00, 500.00]
A5	-24.3232	[-30.00, -10.00]	-275.3130	[-500.00, 500.00]

## CALIBRATION COEFFICIENTS

	R	Expected	X	Expected
Freq 1				
A1	0.9944	[0.95, 1.05]	0.0017	[-0.05, 0.05]
A2	0.9923	[0.95, 1.05]	0.0024	[-0.05, 0.05]
A3	0.9985	[0.95, 1.05]	-0.0051	[-0.05, 0.05]
A4	0.9892	[0.95, 1.05]	0.0044	[-0.05, 0.05]
A5	0.9952	[0.95, 1.05]	0.0022	[-0.05, 0.05]
Freq 2				
A1	0.9889	[0.95, 1.05]	-0.0060	[-0.05, 0.05]
A2	0.9865	[0.95, 1.05]	-0.0053	[-0.05, 0.05]
A3	0.9868	[0.95, 1.05]	-0.0053	[-0.05, 0.05]
A4	0.9846	[0.95, 1.05]	-0.0035	[-0.05, 0.05]
A5	0.9927	[0.95, 1.05]	-0.0063	[-0.05, 0.05]
Freq 3				
A1	1.0028	[0.95, 1.05]	-0.0066	[-0.05, 0.05]
A2	1.0008	[0.95, 1.05]	-0.0057	[-0.05, 0.05]
A3	1.0007	[0.95, 1.05]	-0.0062	[-0.05, 0.05]
A4	0.9975	[0.95, 1.05]	-0.0042	[-0.05, 0.05]
A5	1.0093	[0.95, 1.05]	-0.0069	[-0.05, 0.05]
Freq 4				
A1	0.9995	[0.95, 1.05]	0.0020	[-0.05, 0.05]

A1	0.9905	[0.95, 1.05]	0.0029	[-0.05, 0.05]
A2	0.9882	[0.95, 1.05]	0.0036	[-0.05, 0.05]
A3	0.9902	[0.95, 1.05]	0.0011	[-0.05, 0.05]
A4	0.9853	[0.95, 1.05]	0.0046	[-0.05, 0.05]
A5	1.0085	[0.95, 1.05]	0.0003	[-0.05, 0.05]

Temperature 36.9815 degC

### ThruBit Density Calibration Report

Tool Model-Serial Number: PS-PS52D  
 Source Number:  
 Shop Calibration Performed: Tue Jul 31 17:20:35 2012

#### REFERENCE

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

#### READINGS

Outputs	Counts	Units	Expected
SS1 Background	136.99	cps	[130.00, 170.00]
LS1 Background	134.99	cps	[130.00, 170.00]
LS4 Background	29.79	cps	[27.00, 35.00]
SS1 Aluminium	4509.94	cps	[4500.00, 5500.00]
LS1 Aluminium	841.93	cps	[750.00, 950.00]
LS4 Aluminium	965.25	cps	[843.00, 1068.00]
SS1 Magnesium	7455.89	cps	[7000.00, 9000.00]
LS1 Magnesium	5442.06	cps	[5250.00, 6250.00]
LS1 Al + Fe	717.00	cps	[650.00, 800.00]
LS4 Al + Fe	427.17	cps	[382.00, 471.00]

#### RESULTS

SS Slope	1.66	[1.52, 1.77]
LS Slope	0.42	[0.38, 0.45]
PEF K Factor	5.143	[3.510, 6.170]
PEF B Factor	-0.523	[-0.700, -0.410]

Caliper Shop Calibration performed: Tue Jul 31 17:20:35 2012

#### RESULTS

Reference	Reading	Units
12.00	1913.81	in
9.00	2071.73	in
6.00	2230.09	in

DENSITY PRE-SURVEY CHECK Performed: Mon Aug 13 10:55:00 2012

Outputs	Counts	Units	Expected
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SS1 Background	136.88	cps	[132.88, 141.10]
LS1 Background	133.28	cps	[130.94, 139.04]
LS4 Background	30.11	cps	[28.00, 31.58]

CALIPER PRE-SURVEY CHECK Performed: Mon Aug 13 10:52:39 2012

Reference	Readings	Units	Expected
6.00	6.00	in	[5.80, 6.20]

### Compensated Neutron Calibration Report

Tool Model-Serial Number:	ENP-ENP3N
Source Number:	
Calibration Tank Temperature:	90.5 degF
Shop Calibration Performed:	Wed Jul 25 15:06:56 2012

#### 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	3873.3	cps	
LS Counts	118.3	cps	
Tank Ratio Ref	30.9580	SS/LS	
Tank Ratio	32.7391	SS/LS	
Tank Ratio Gain	0.9456		[0.85, 1.15]

#### ALUMINUM SLEEVE REFERENCE

Outputs	Measured	Units	Expected
SS Counts	44270.6	cps	
LS Counts	3786.2	cps	
Al Ratio Ref	10.797	SS/LS	
Al Ratio	11.057	SS/LS	
Al Ratio Gain	0.98		[0.90, 1.10]
Sleeve Porosity	14.46	pu	

PRE-SURVEY BACKGROUND CHECK Performed: Tue Aug 14 09:01:32 2012

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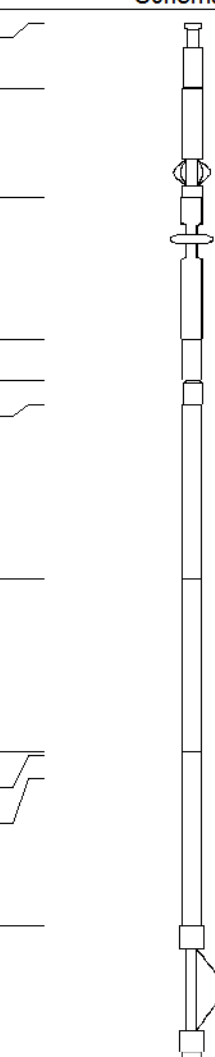
SS Counts	0.0	cps	<10
LS Counts	0.1	cps	<4

### Gamma Ray Calibration Report

Tool Model-Serial Number:	PS-PS05T		
Performed:	Wed Jul 25 14:25:23 2012		
Calibrator Value:	162.7	GAPI	
Background Reading:	72.1	cps	
Calibrator Reading:	442.2	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	66.92		Cablehead-S Solid Weakpoint	2.31	2.13	5.00
ThruBit	64.61		PSBDOT	3.87	2.25	35.00
ThruBit	60.75		HangOff_Tool	5.00	2.38	60.00
ThruBit	55.75		Universal Joint	1.46	2.06	15.00
ThruBit	54.29		10-1	0.88	2.13	3.95
TBBAT	53.41		TBBAT-A (PS07B) ThruBit Battery	6.13	2.13	38.20
TBBAT2	47.29		TBBAT2-A (PS22B) ThruBit Battery	6.13	2.13	40.00
TMG GR GRTEMP	41.16 41.04 40.20		TMG-PS (PS05T) 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-ENP (ENP3N) ThruBit Neutron	4.77	2.13	63.00
LSW1	18.04		TBD-PS (PS52D) ThruBit Density	10.48	2.13	91.00
DCAL	17.13					
A1_P	10.60		TBI-PS (PS20R) ThruBit Induction	15.29	2.13	94.00
A2_P	10.10					
A3_P	9.35					
A4_P	8.35					
A5_P	6.60					

Dataset: sandridge\_ellis\_mem.db: field/well/proc1/pass1.5  
 Total Length: 66.92 ft  
 Total Weight: 560.15 lb  
 O.D. 2.38 in



Company SANDRIDGE ENERGY  
 Well ELLIS 3119 2-19H  
 Field ARLIE  
 County COMANCHE  
 State KANSAS