



ThruBit
A Schlumberger Company

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

Company	CHEVRON PRODUCTION COMPANY	Company	CHEVRON PRODUCTION COMPANY
Well	FEE 162Y	Well	FEE 162Y
Field	RANGELY	Field	RANGELY
County	RIO BLANCO	County	RIO BLANCO
State	COLORADO	State	COLORADO
Location:	API # : 05-103-11945-0000 566' FNL & 1443' FEL LAT=40.119750, LONG=-108.844017 SEC 28 TWP 2N RGE 102W	Other Services INDUCTION SONIC	
Permanent Datum	G.L.	Elevation	5320'
Log Measured From	K.B. @ 22' ABOVE PERM DATUM	K.B. 5342' D.F. 5341' G.L. 5320'	
Drilling Measured From	K.B.		
Date	12/13/12		
Run Number	ONE		
Depth Driller	6677'		
Depth Logger	6655'		
Bottom Logged Interval	6613'		
Top Log Interval	1990'		
Casing Driller	2011'		
Casing Logger	2002'		
Bit Size	8.75"		
Type Fluid in Hole	WBM		
Density / Viscosity	10.3 / 51		
pH / Fluid Loss	11.5 / 16		
Source of Sample	FLOWLINE		
Rm @ Meas. Temp	0.85 OHM @ 75 DEGF		
Rmt @ Meas. Temp	0.66 OHM @ 72.9 DEGF		
Rmc @ Meas. Temp	1.04 OHM @ 72.6 DEGF		
Source of Rmt / Rmc	MEASURED		
Rm @ BHT	0.33 OHM @ 139 DEGF		
Time Circulation Stopped	0500 13DEC12		
Time Logger on Bottom	0645 13DEC12		
Maximum Recorded Temperature	139 DEGF		
Equipment Number	T009		
Location	BRIGHTON, CO		
Recorded By	J. TOEDTEMEIER	K. BANGE	
Witnessed By	T. ZUNICH		

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The use of and reliance upon this recorded-data by the herein named company (and any of its affiliates, partners, representatives, agents, consultants and employees) is subject to the terms and conditions agreed upon between ThruBit LLC and the company, including: (a) Restrictions on use of the recorded-data; (b) Disclaimers and waivers of warranties and representations regarding company's use of and reliance upon the recorded-data; and (c) Customer's full and sole responsibility for any inference drawn or decision made in connection with the use of this recorded-data.

Comments

VERTICAL MEMORY BIT DEPTH SET AT 6550' LOGGED TO 2000'
ALL SCALES AND PRESENTATIONS PER CLIENT REQUEST
SANDSTONE MATRIX, 2.65 g/cc USED FOR POROSITY MEASUREMENTS
TOOLSTRING RAN WITH CENTRALIZERS, LARGE DECENTRALIZER, TWO KNUCKLES
TBHV REPRESENTS TOTAL BOREHOLE VOLUME, ft³
ABHV REPRESENTS ANNULAR HOLE VOLUME, CALCULATED FOR 7" CSG, ft³
DEPTH REFERENCE: DOWN LOG
PIPE TALLY IS INVALID AND WAS NOT USED

RIG: NABORS M11
CREW: J. TOEDTEMEIER, K. BANGE, J. SHEETS, T. HATCH

Service Ticket No.	1626	API No.	05-103-11945-0000	PGM Ver	WARRIOR 7.0
The Well Name, Location, Borehole Description, and / or Cementing Data Furnished by Client					
EQUIPMENT DATA					
GAMMA RAY		NEUTRON		INDUCTION	

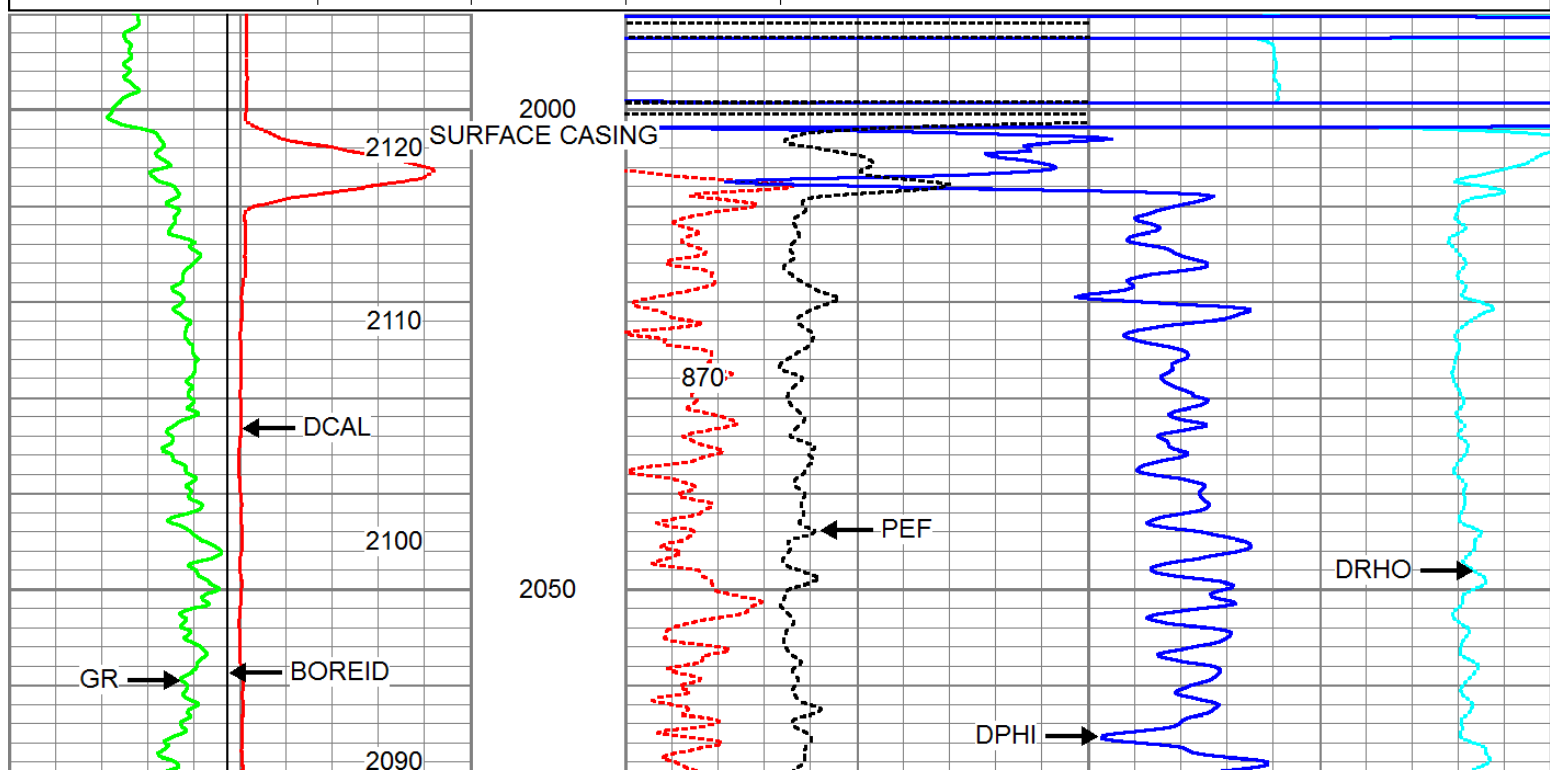
Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE	
Serial No.	PS23T	Serial No.	PS09N	Serial No.	PS25D	Serial No.	PS30R	
Model No.	PS	Model No.	PS	Model No.	PS	Model No.	PS	
Diameter	2.125"	Diameter	2.125"	Diameter	2.125"	Diameter	2.125"	
LOGGING DATA								
General Data								
Pass	Depths		Well Head	Speed	Logging Run Comments			
No.	From	To	Pressure	Ft/Min				
ONE	6646'	2000'	N/A	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		2.73	deg. @	6622'	KOP	NONE		

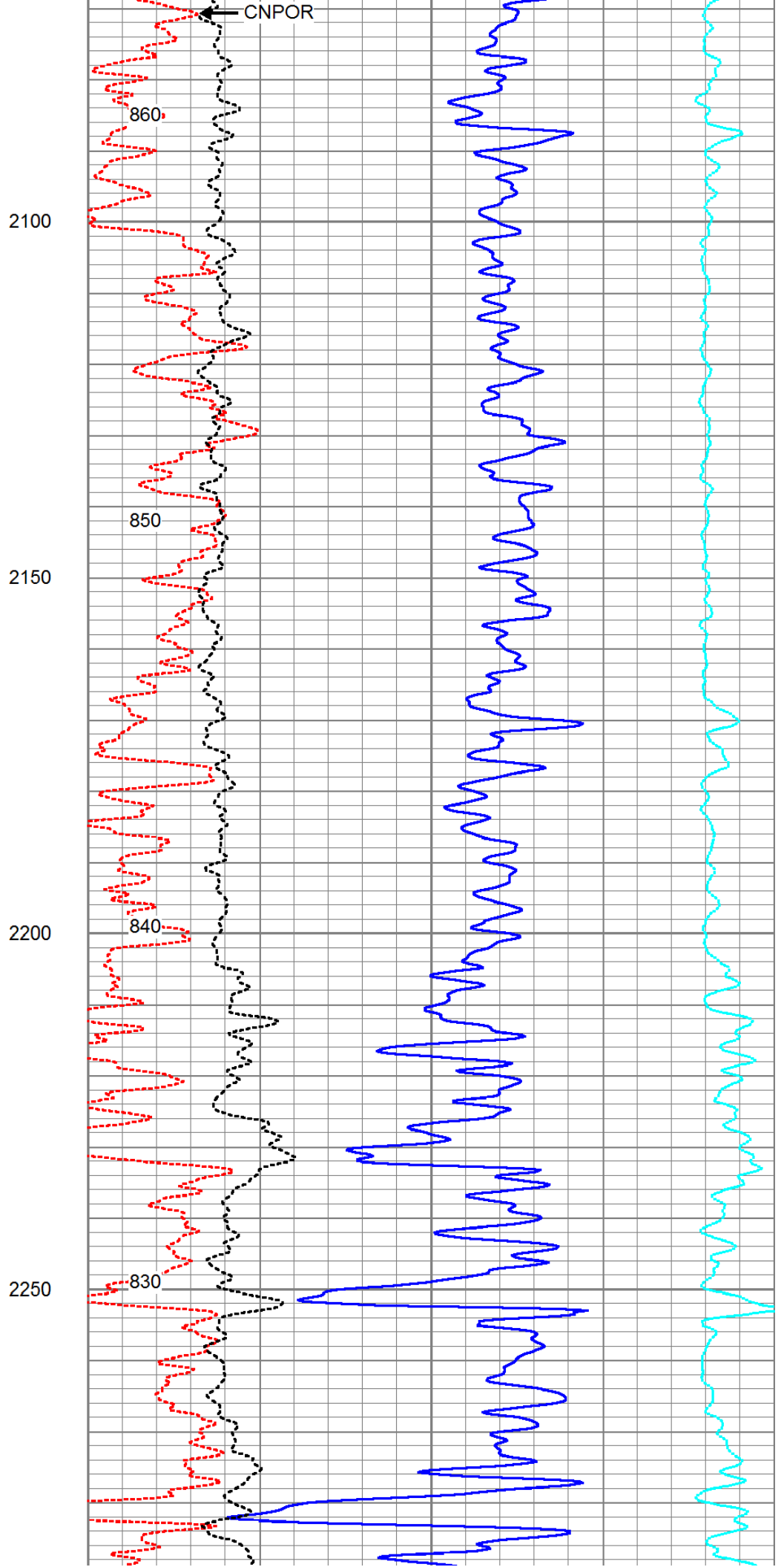
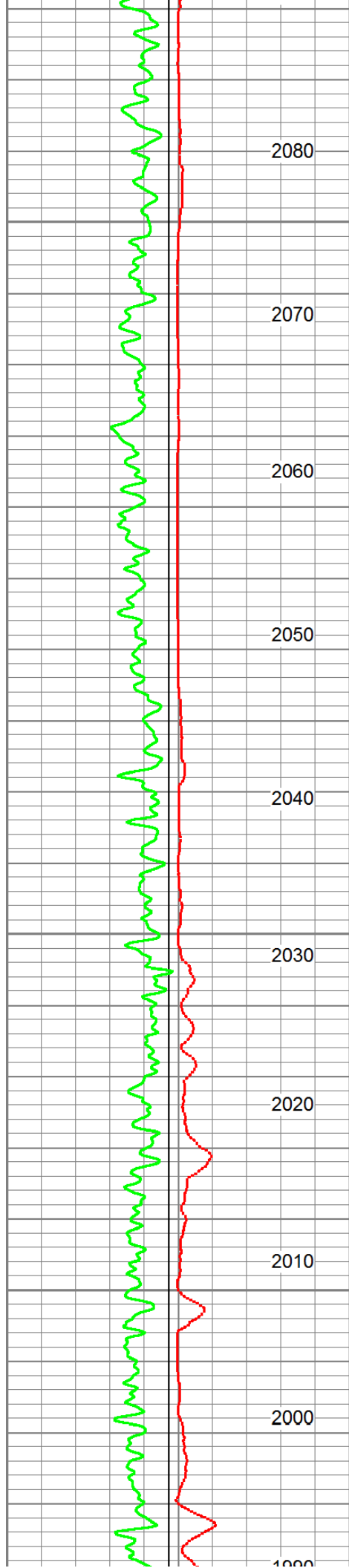


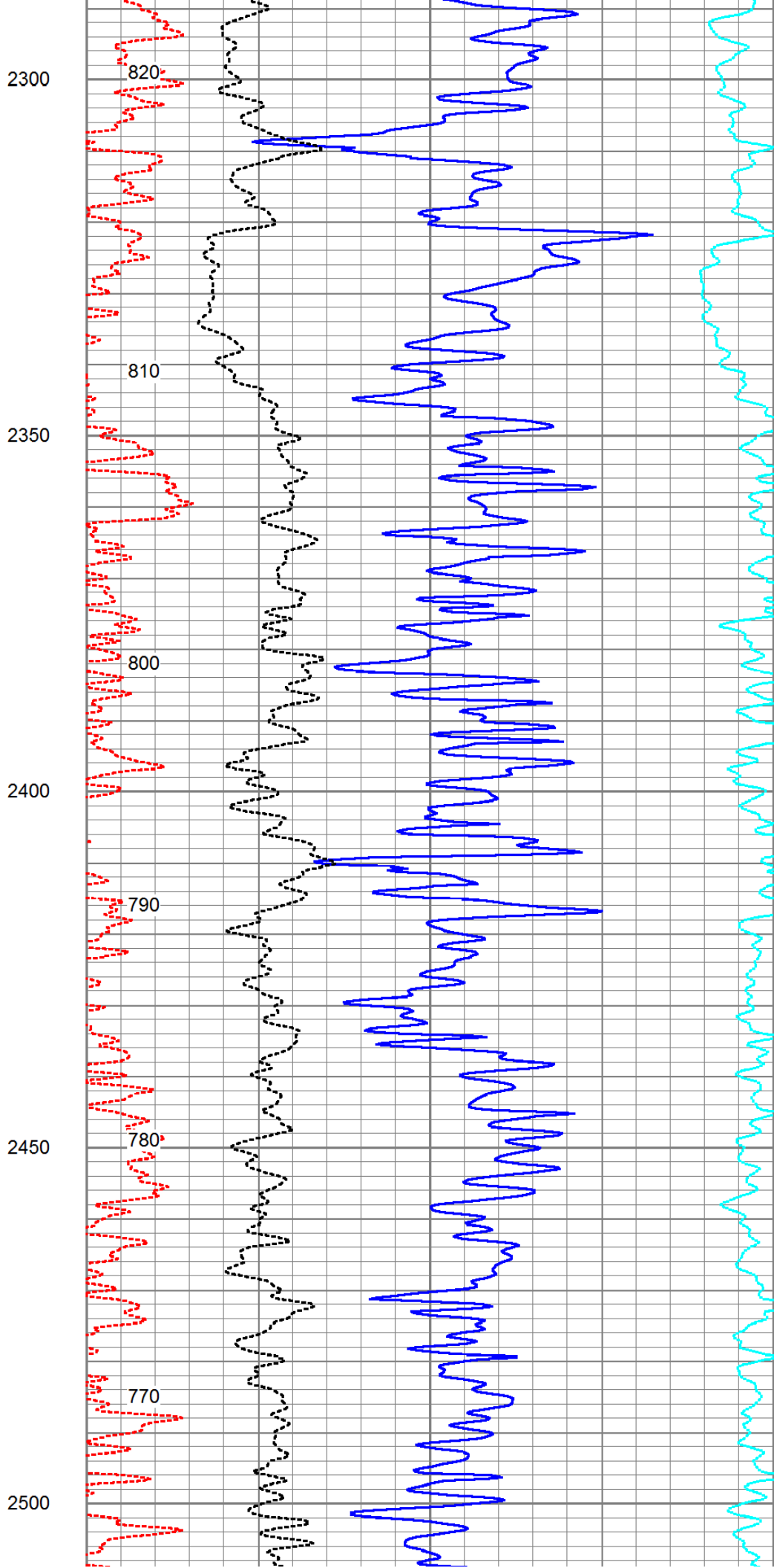
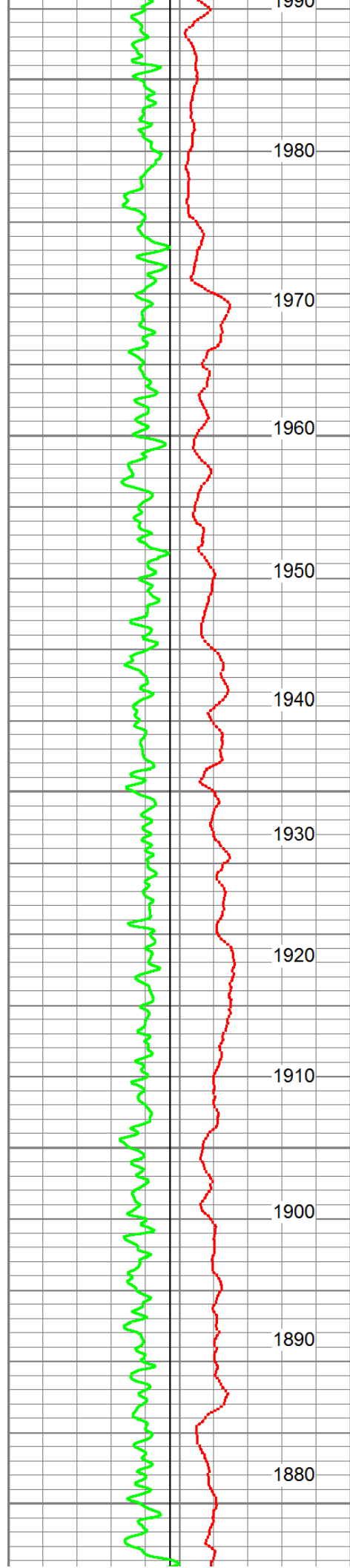
MAIN PASS

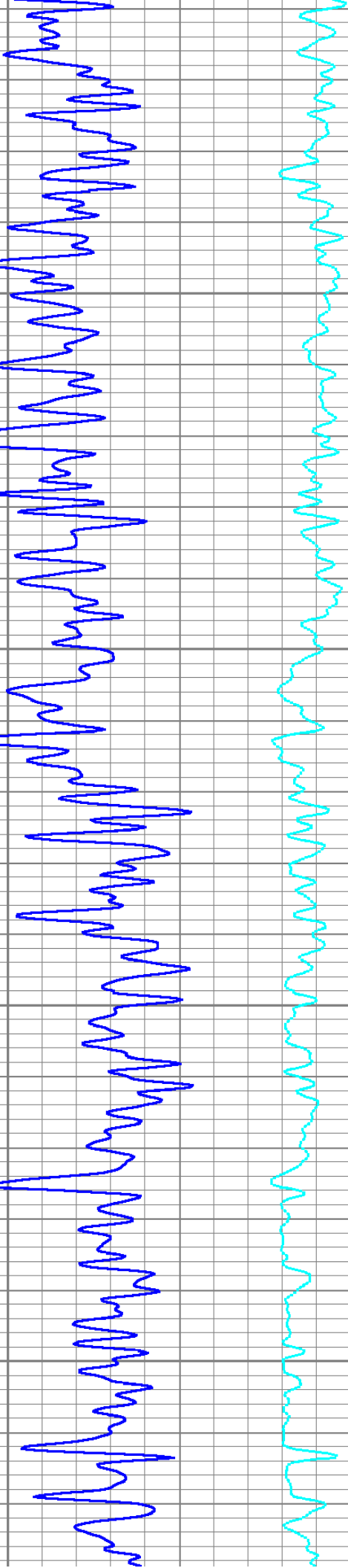
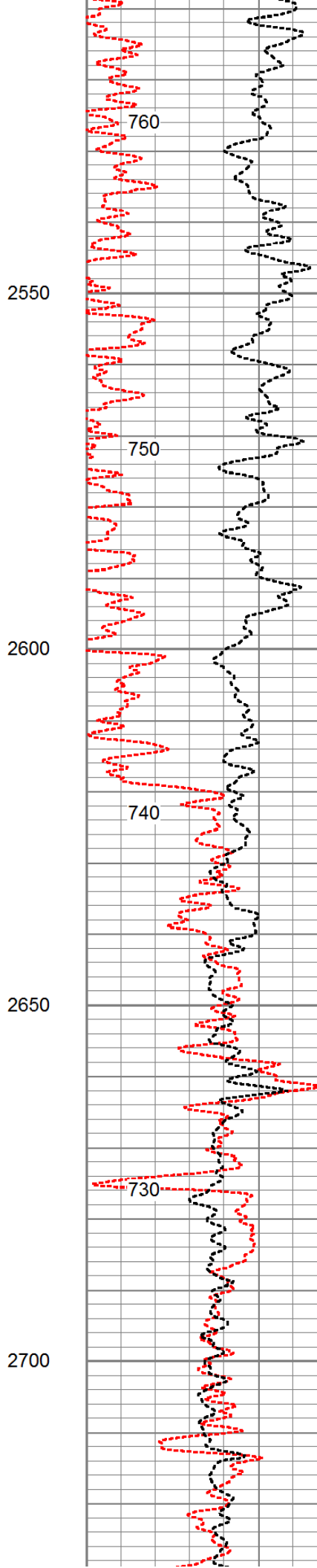
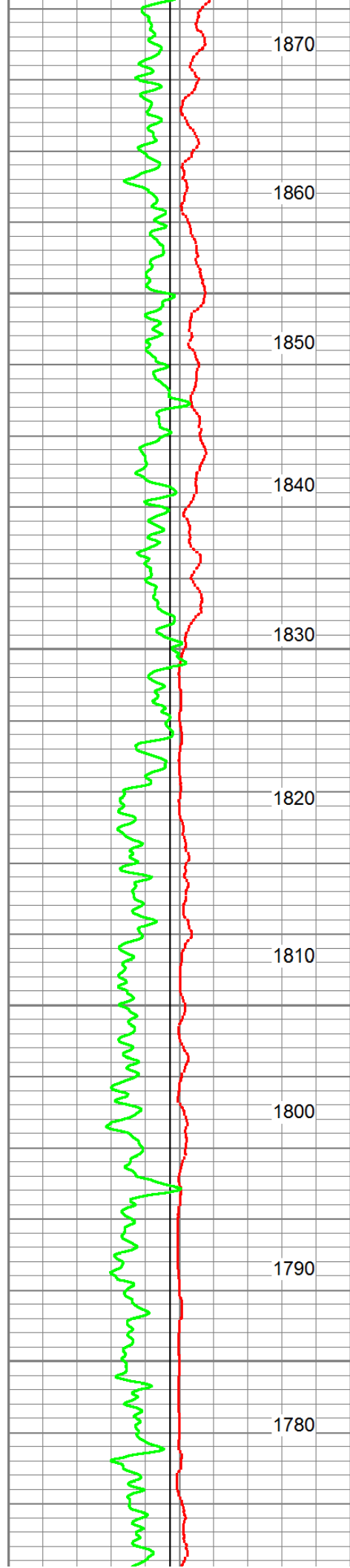
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 Dataset Pathname: proc1/merge3
 Presentation Format: chev5p
 Dataset Creation: Thu Dec 13 20:28:04 2012
 Charted by: Depth in Feet scaled 1:240

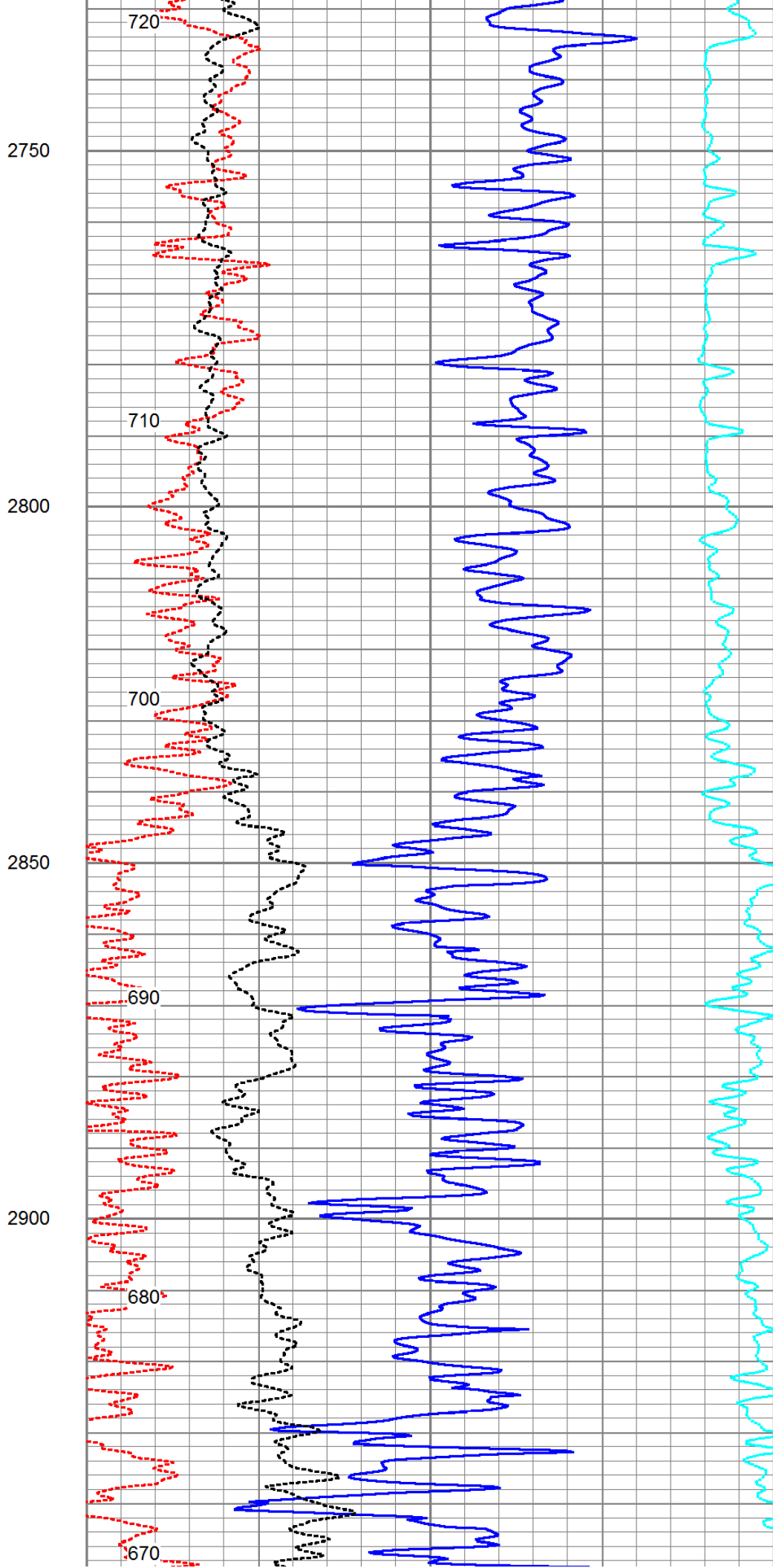
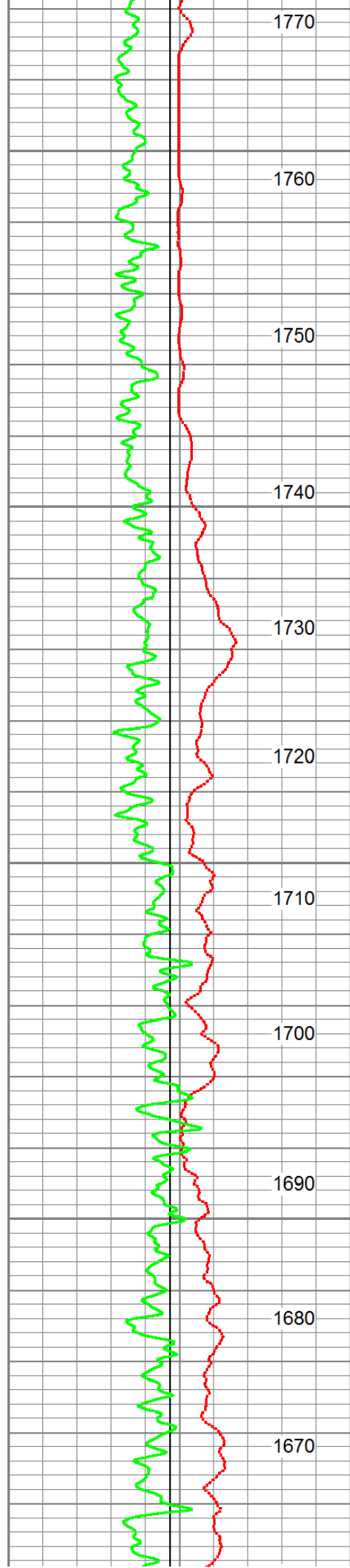
4	DCAL (in)	14	30	CNPOR (pu)	-10
4	BOREID (in)	14	30	DPHI (pu)	-10
0	GR (GAPI)	150	0	PEF (barn)	10 -0.8
	TBHV (ft3)		ABHV (ft3)	DRHO (g/cc)	0.2

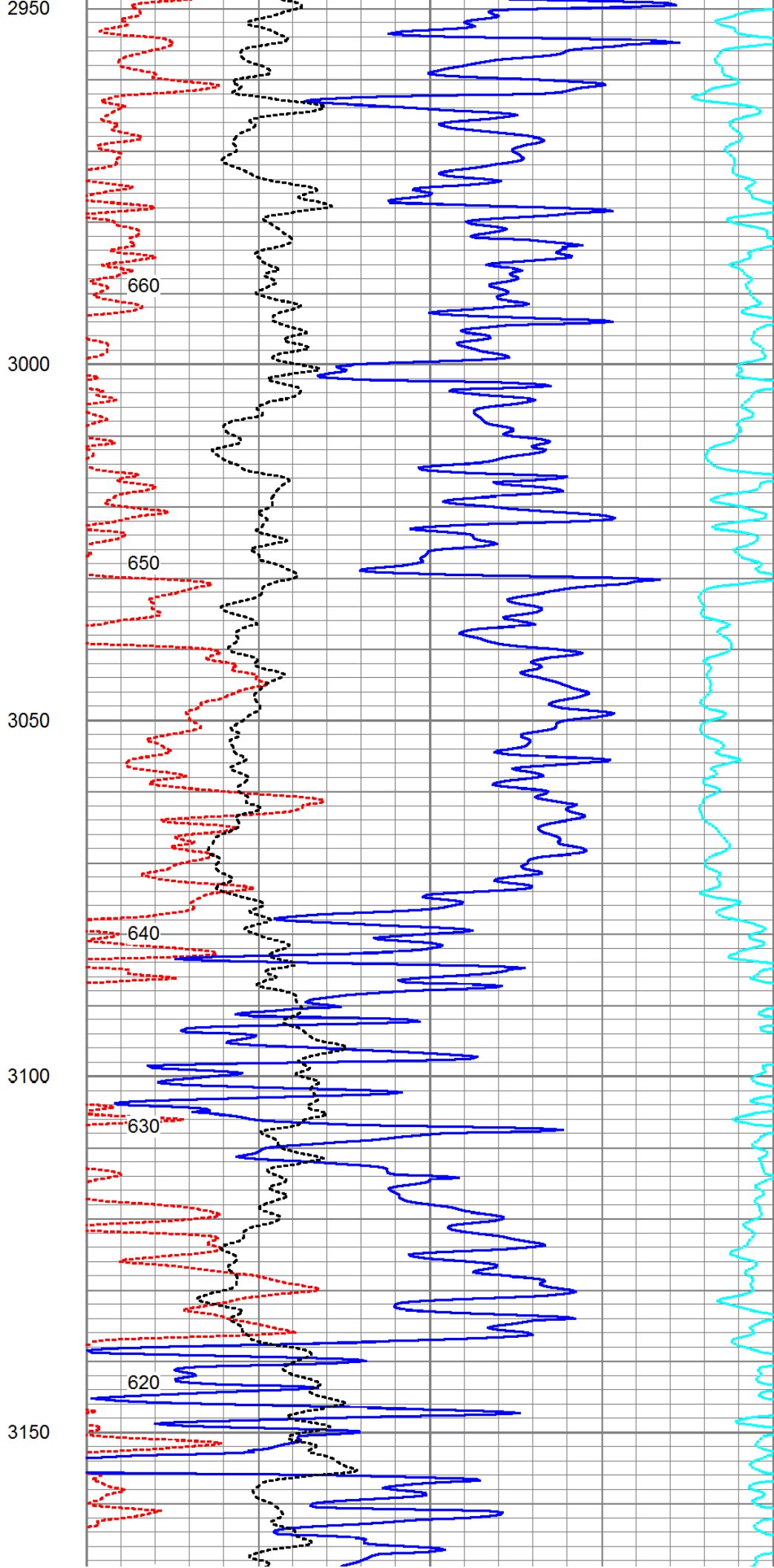
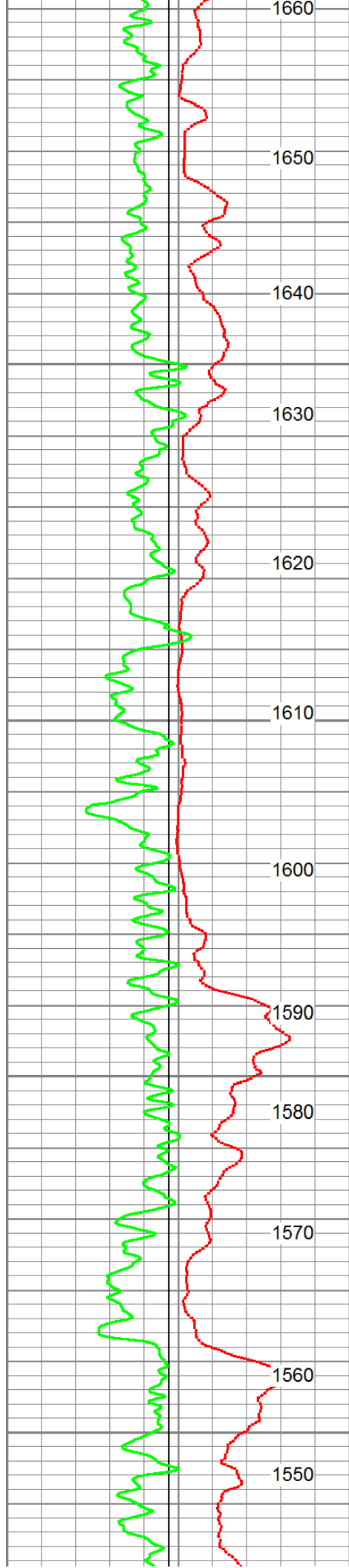


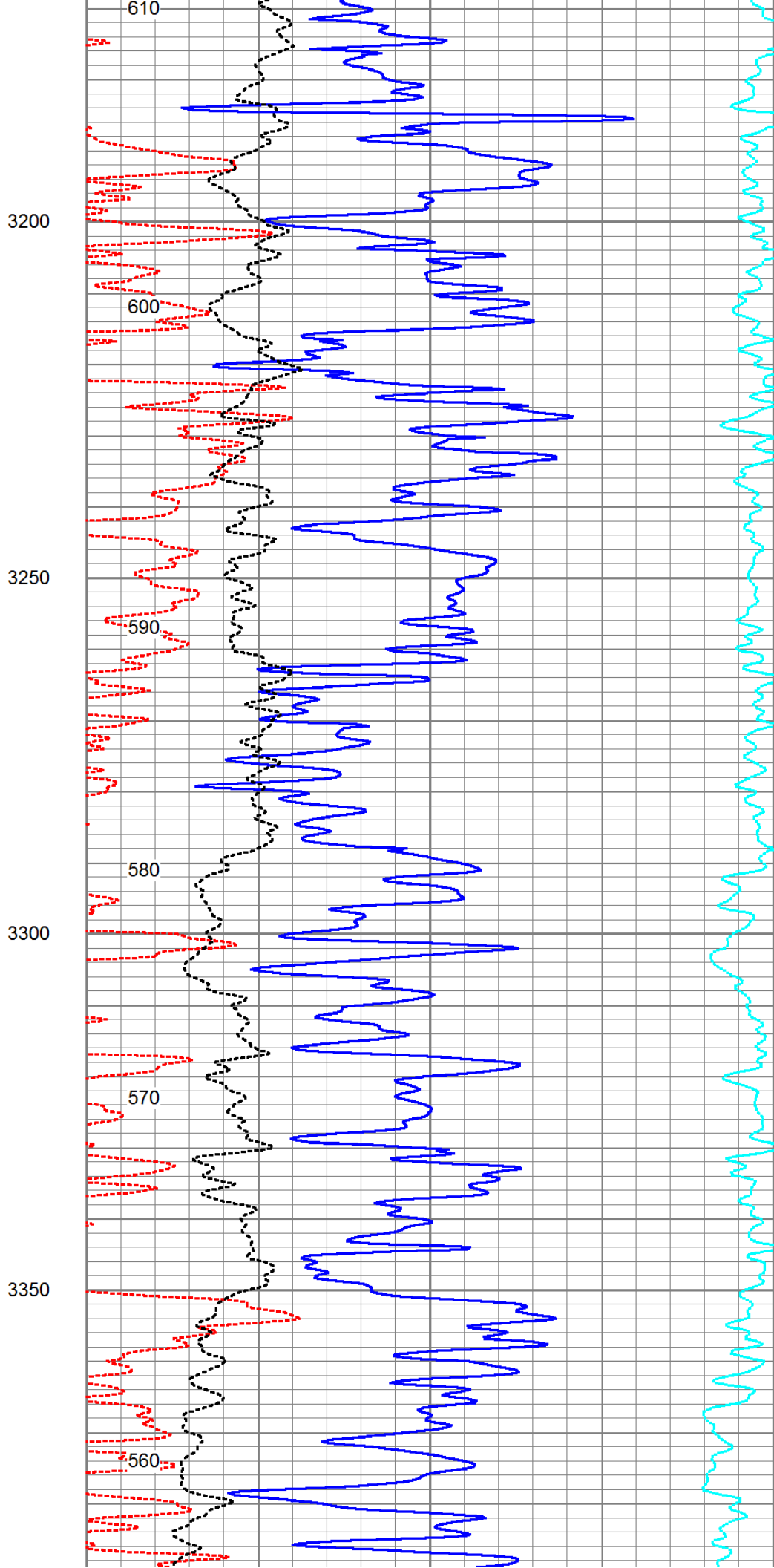
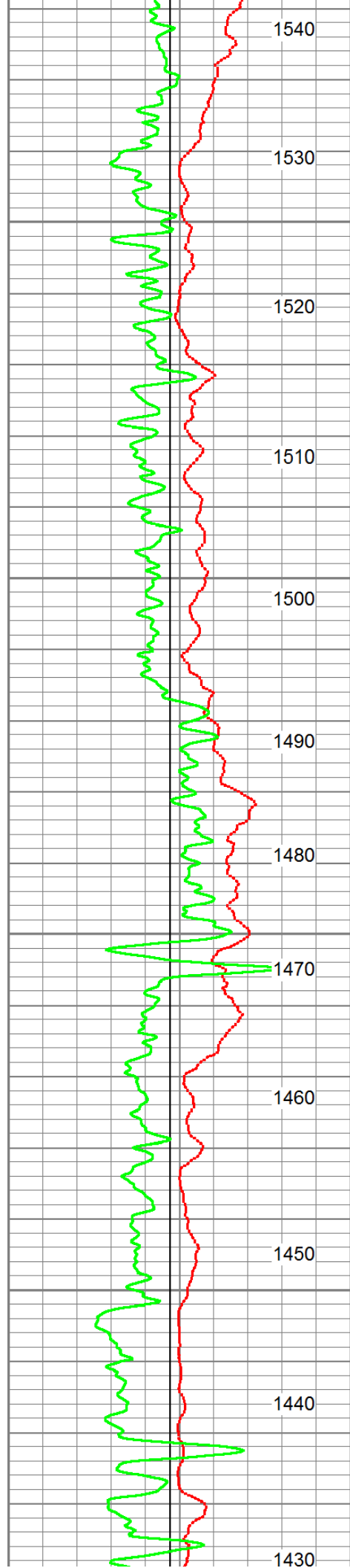


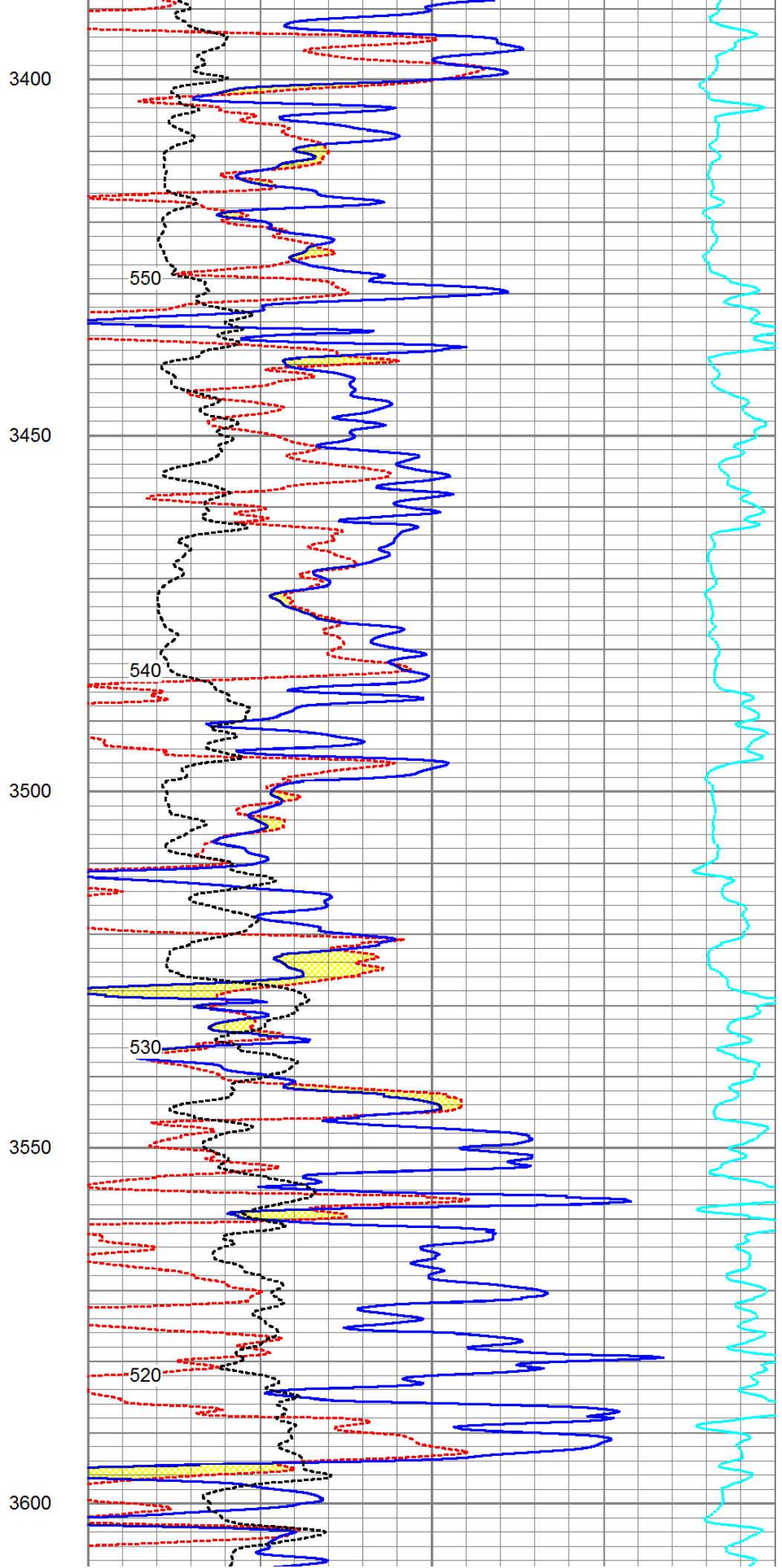
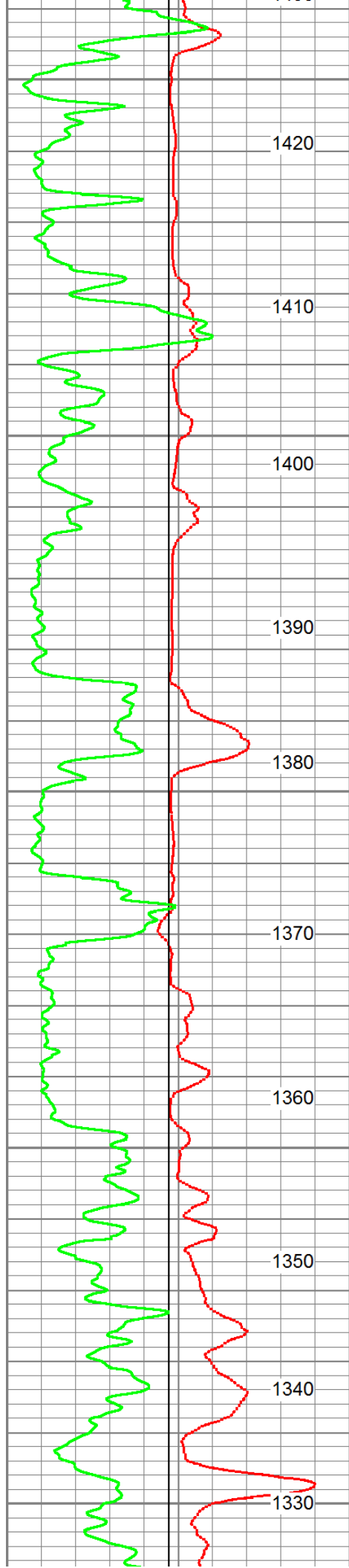


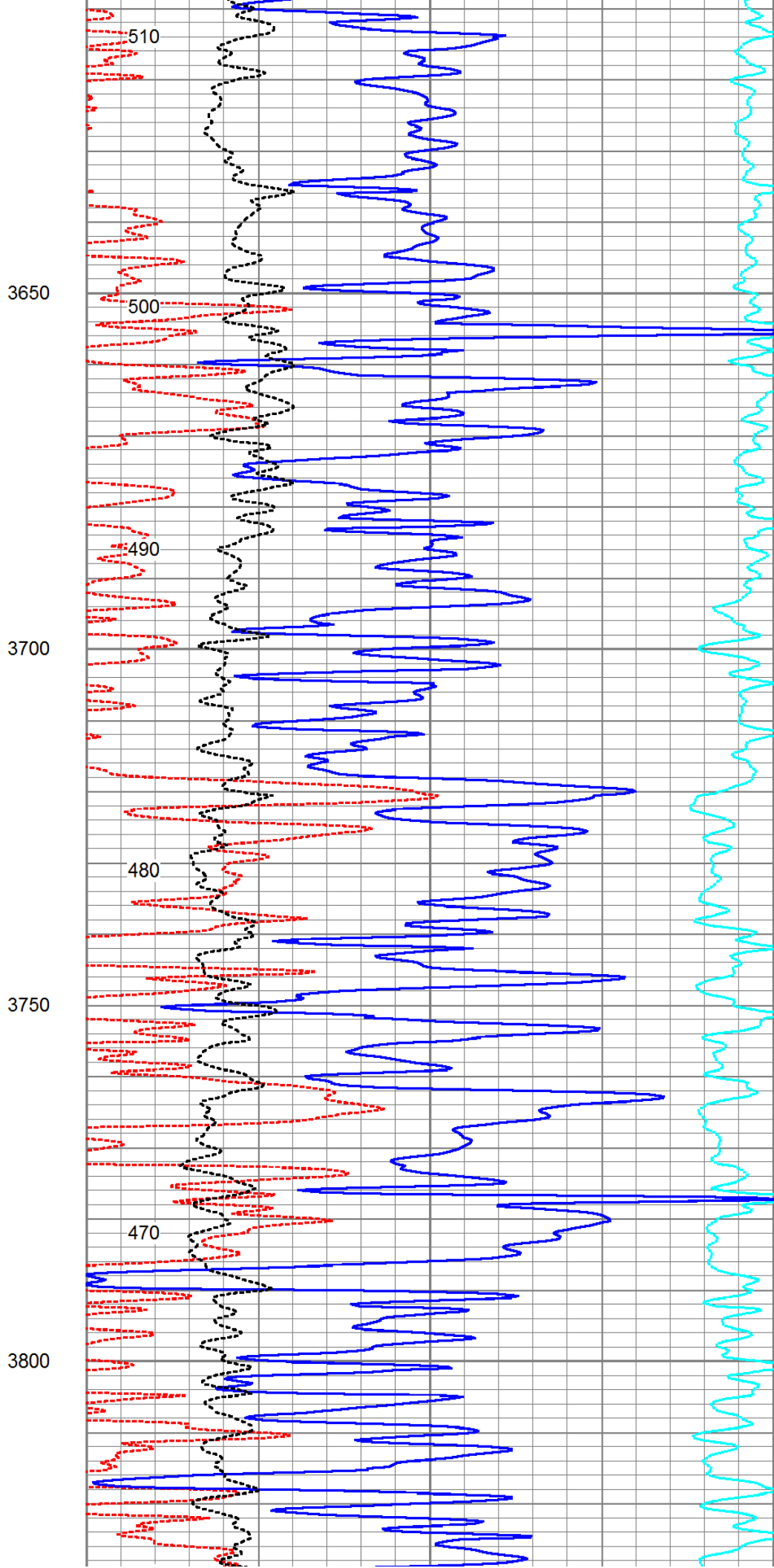
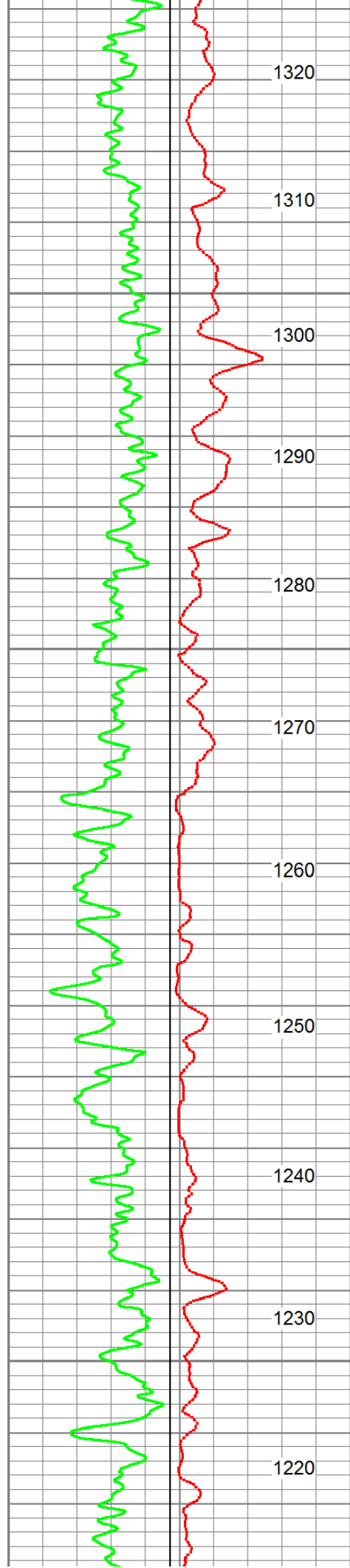


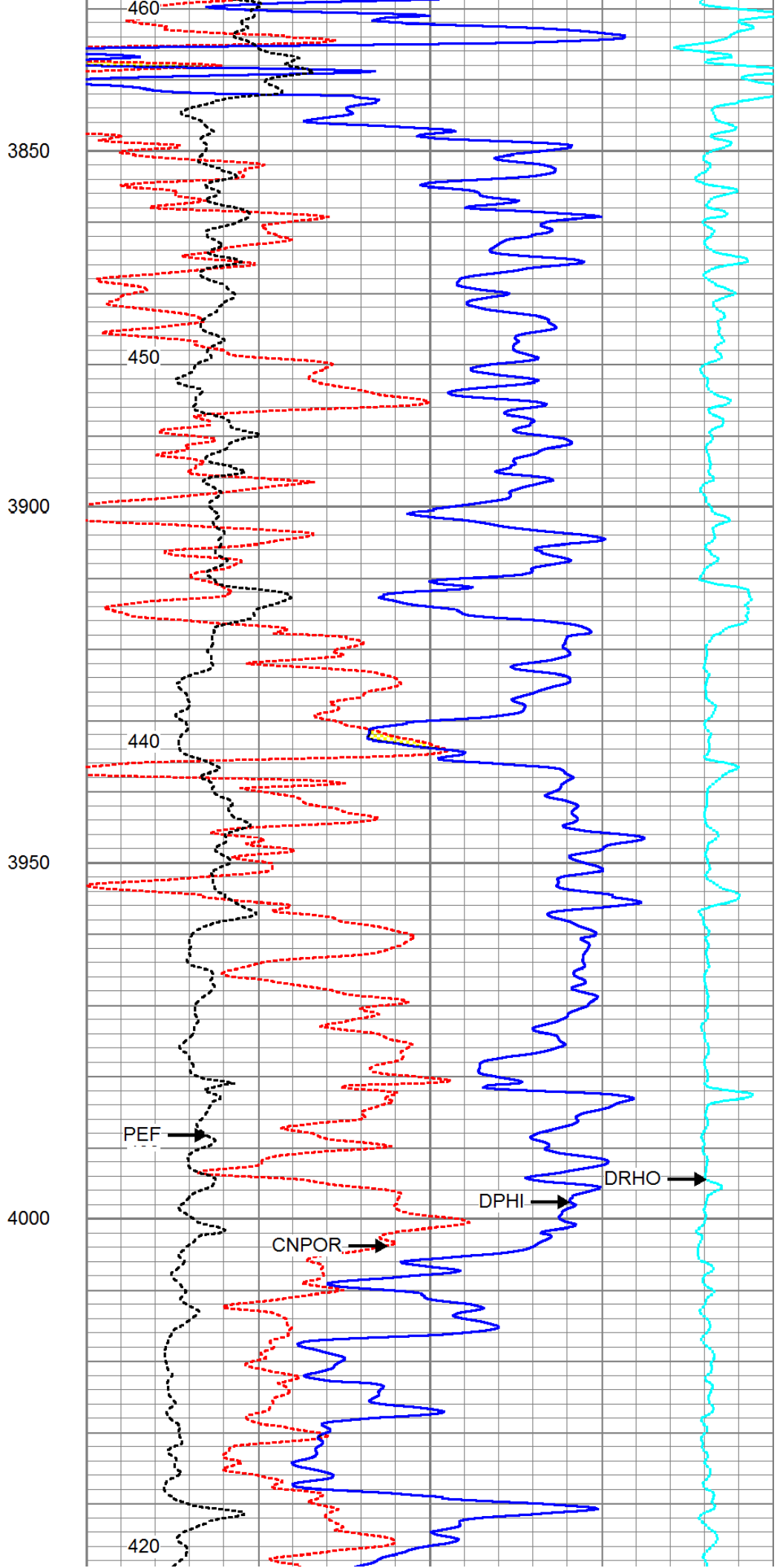
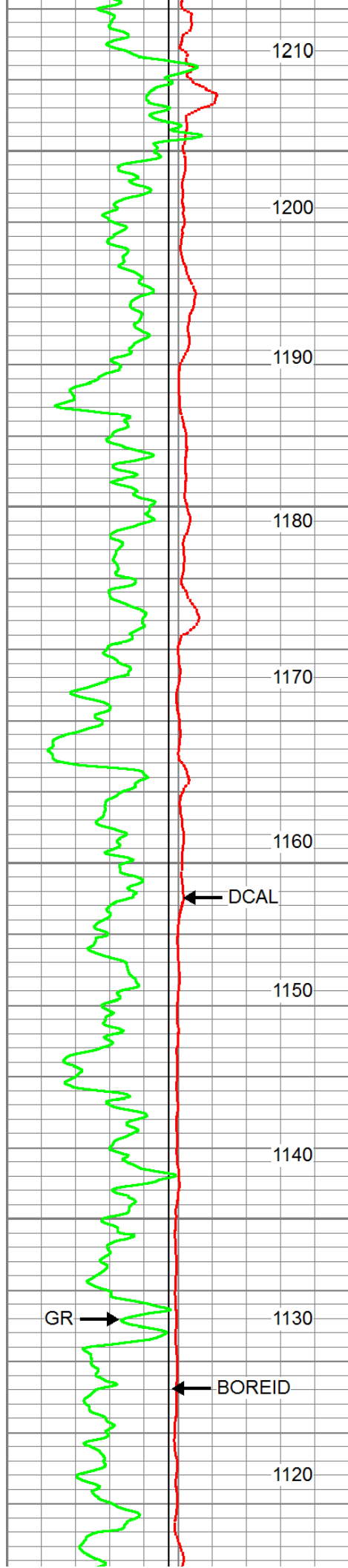


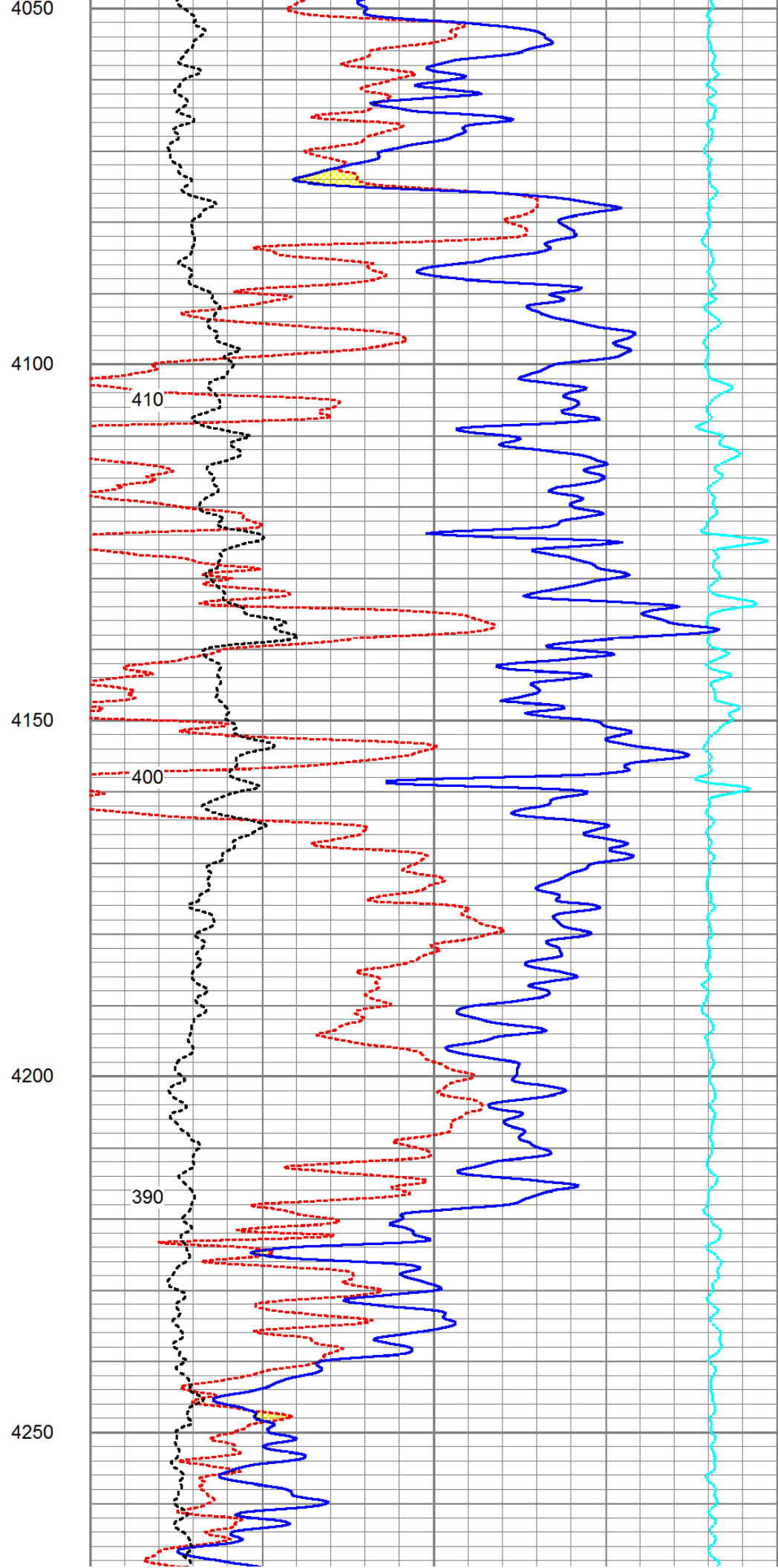
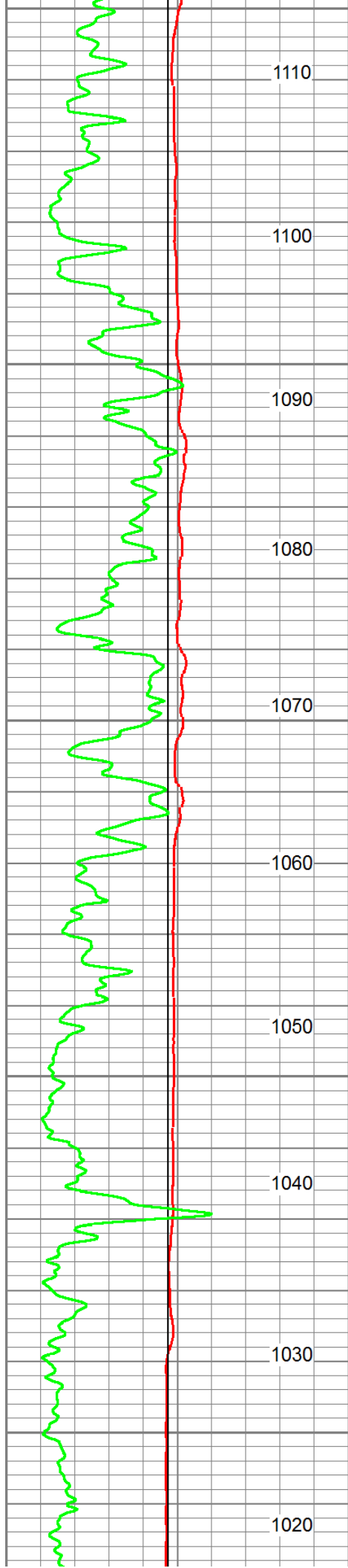


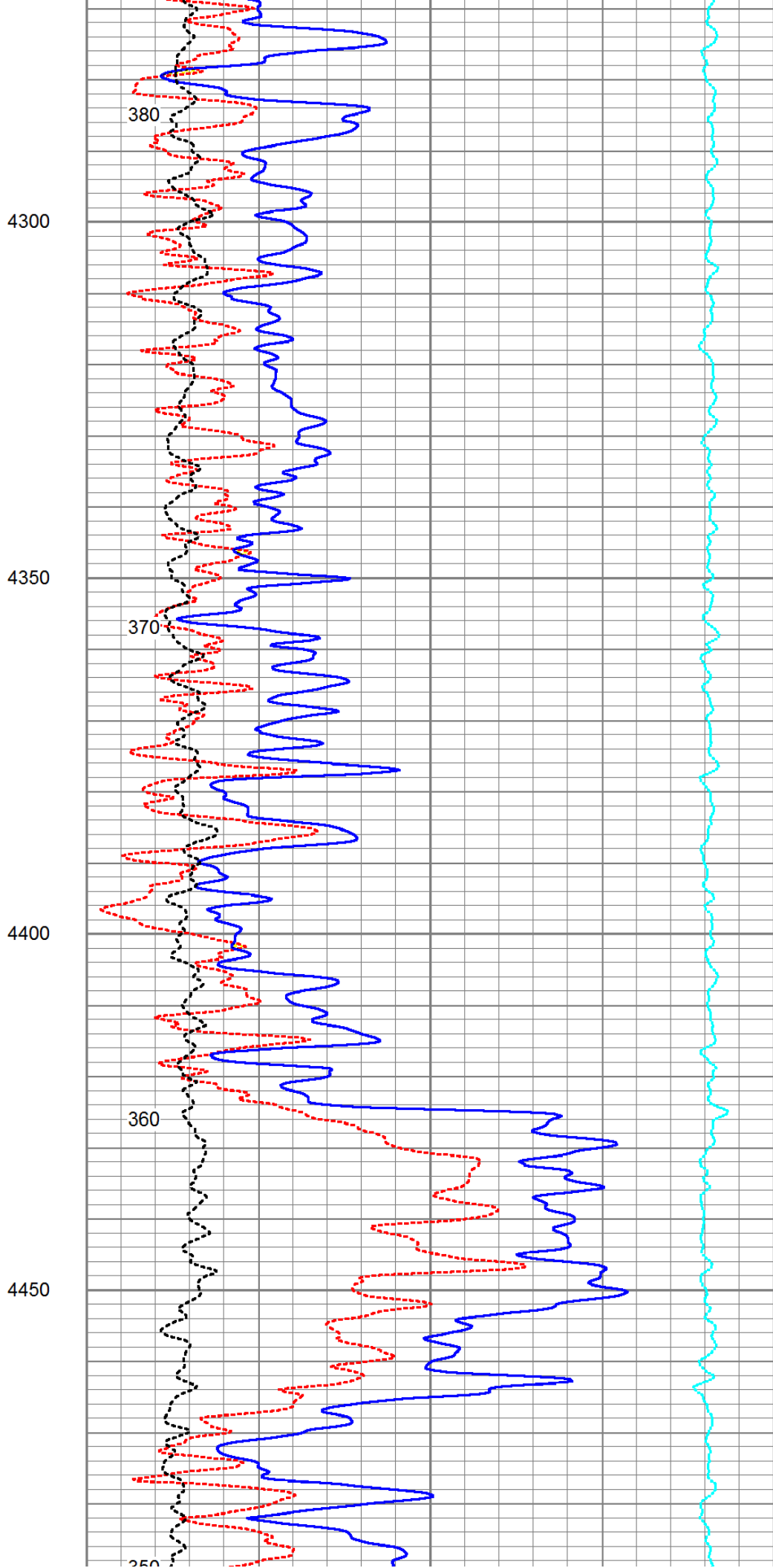
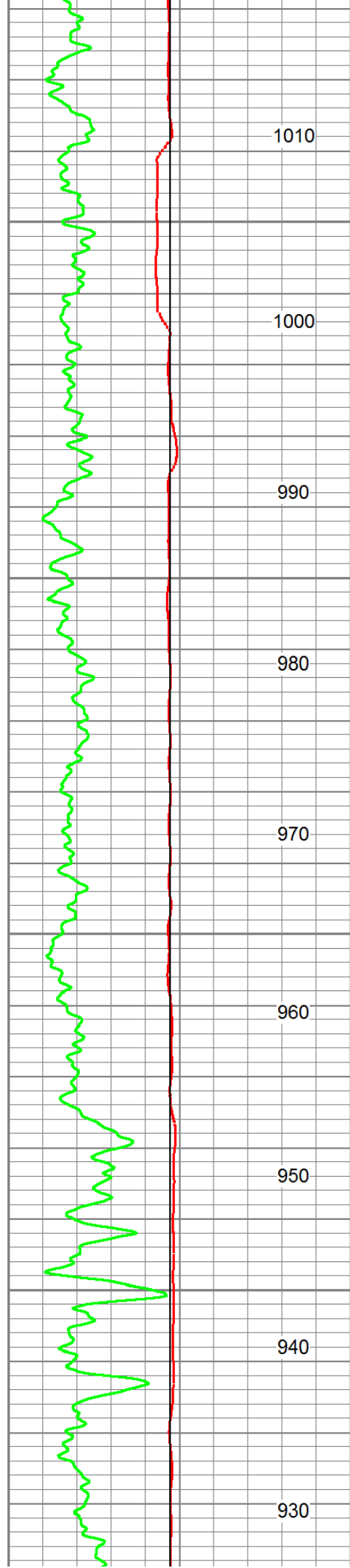


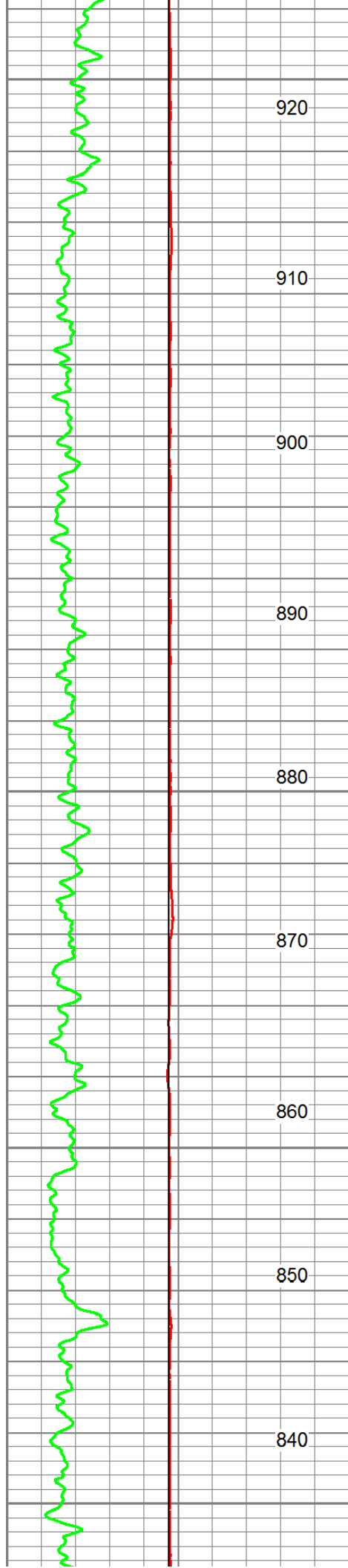












4500

920

4550

900

4600

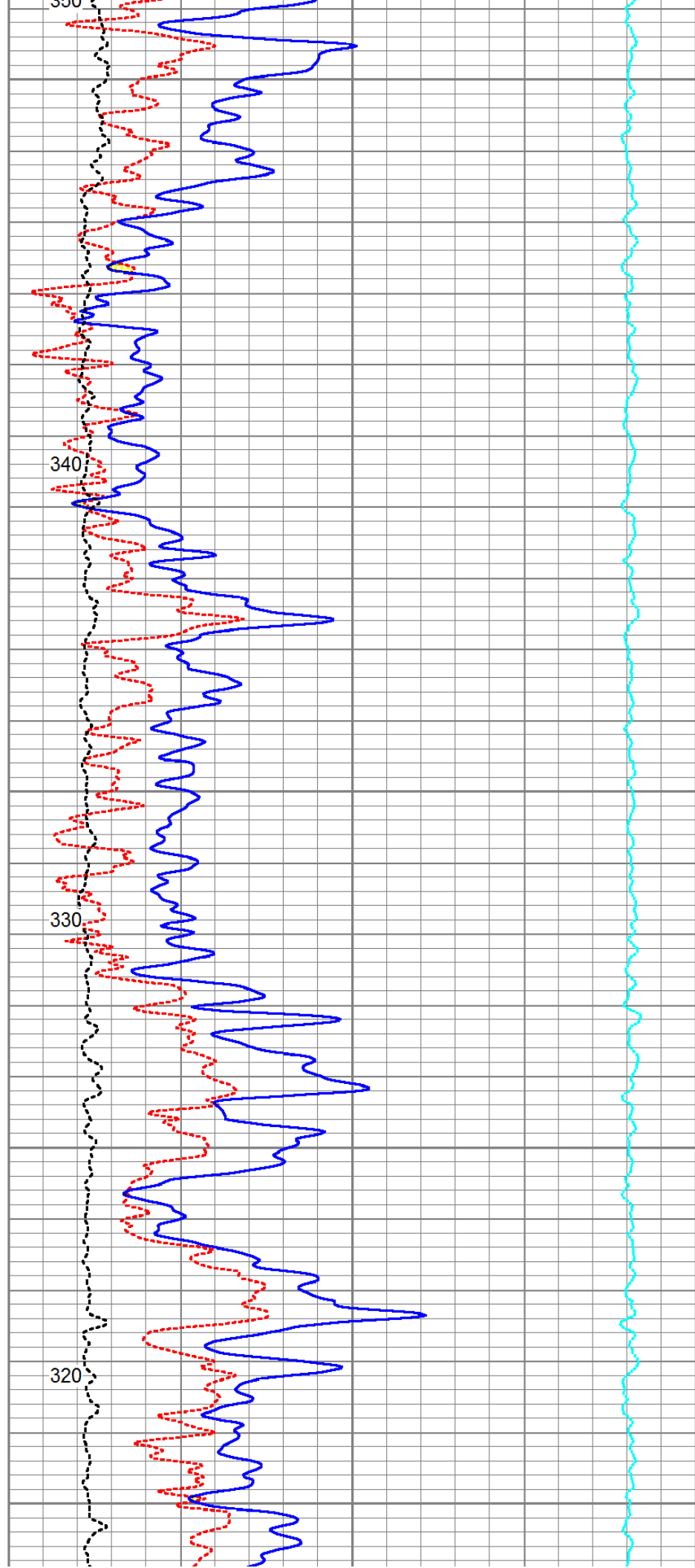
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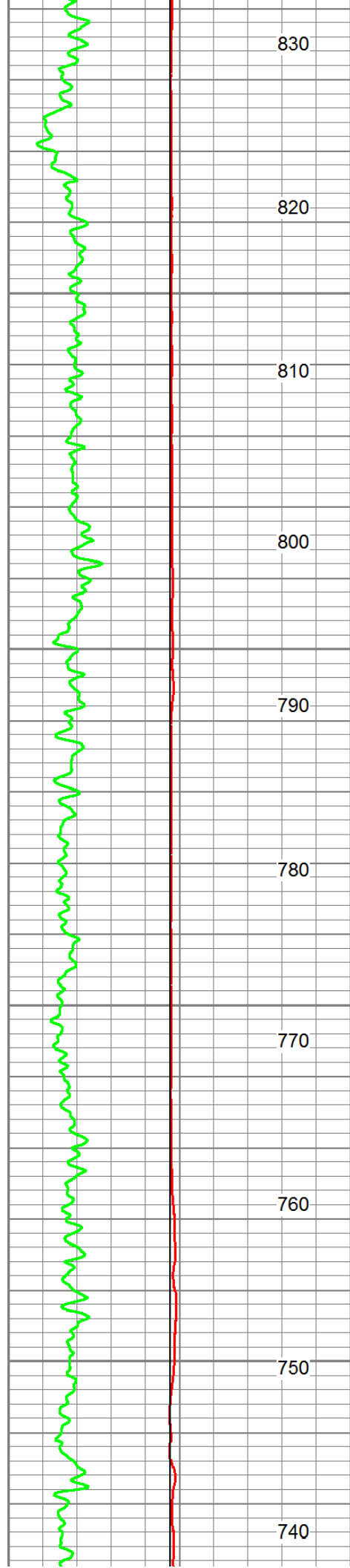
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860

4700

840





830

820

810

800

790

780

770

760

750

740

4750

4800

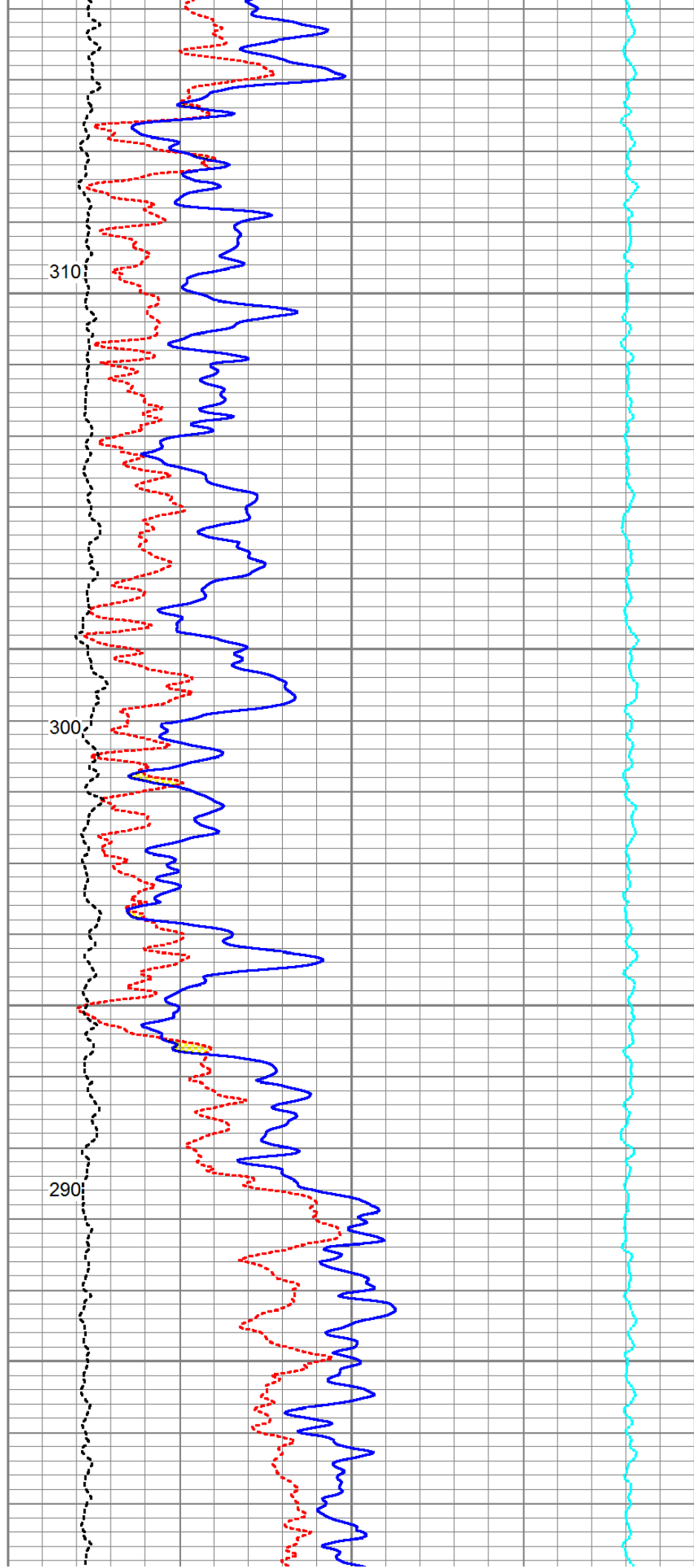
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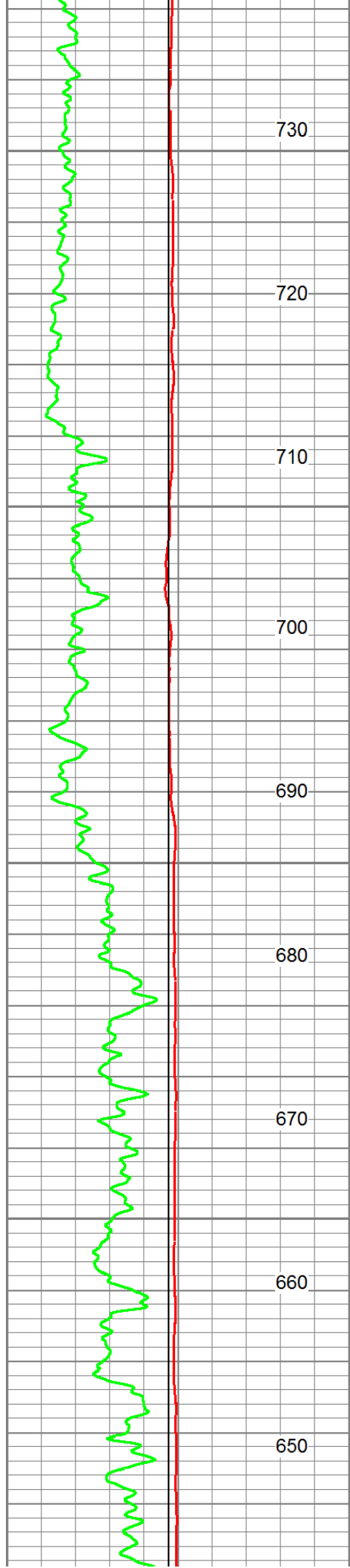
4900

310

300

290



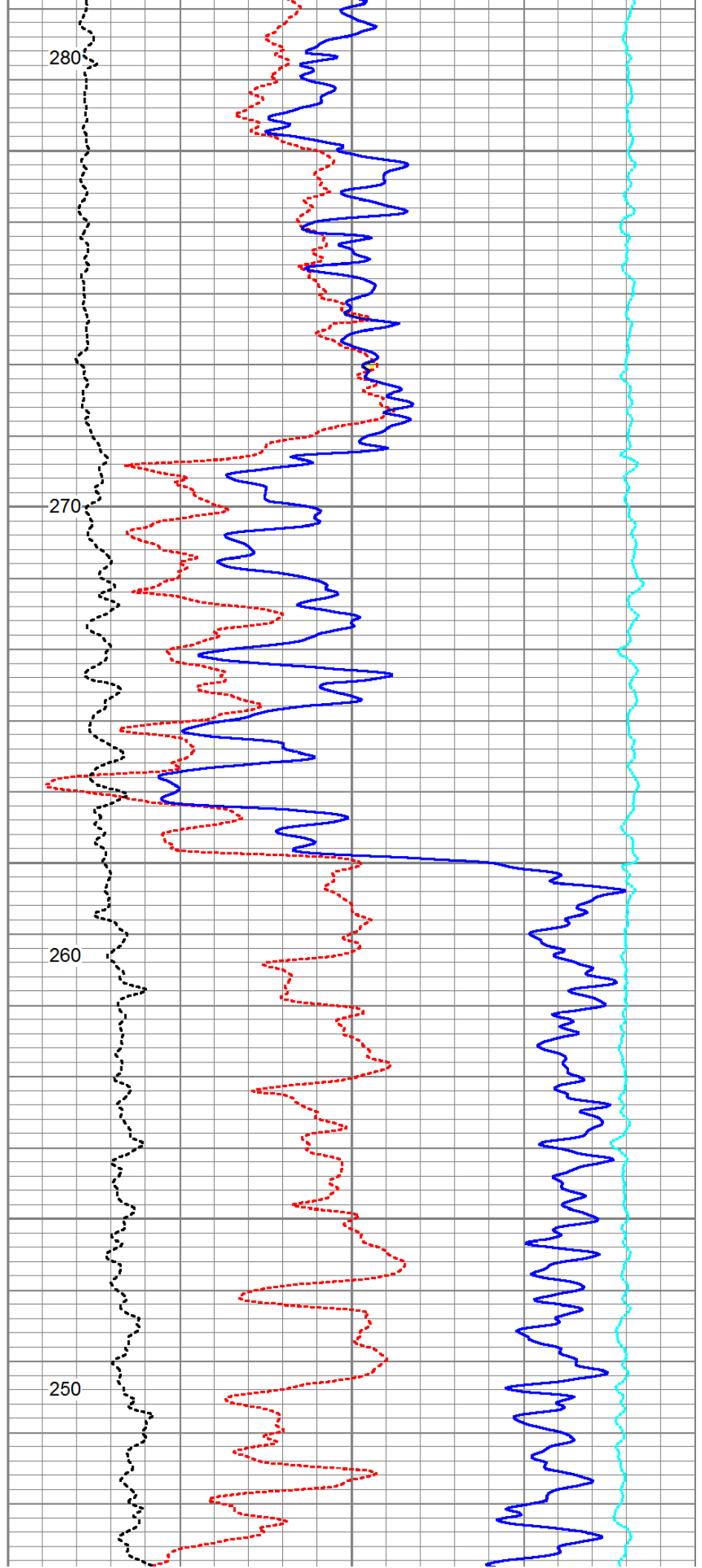


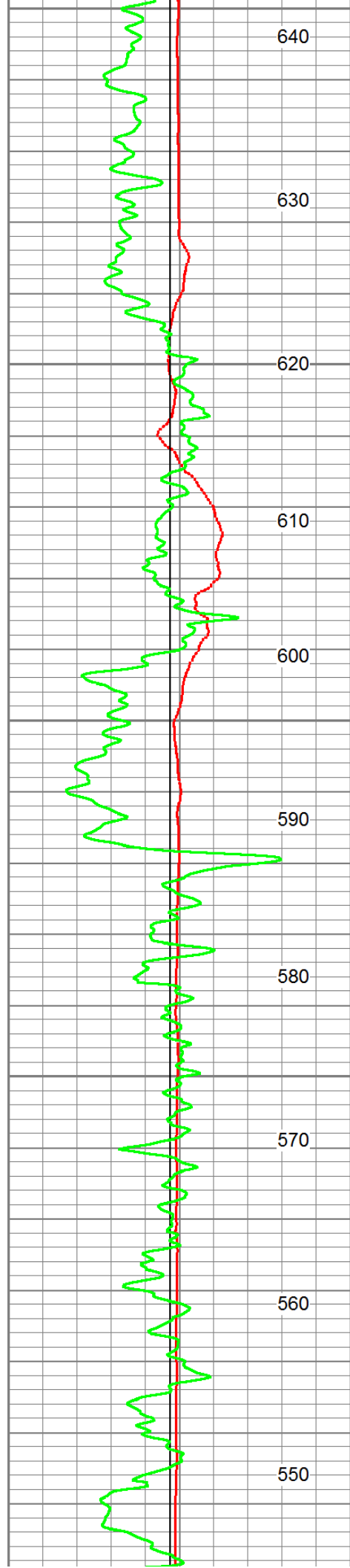
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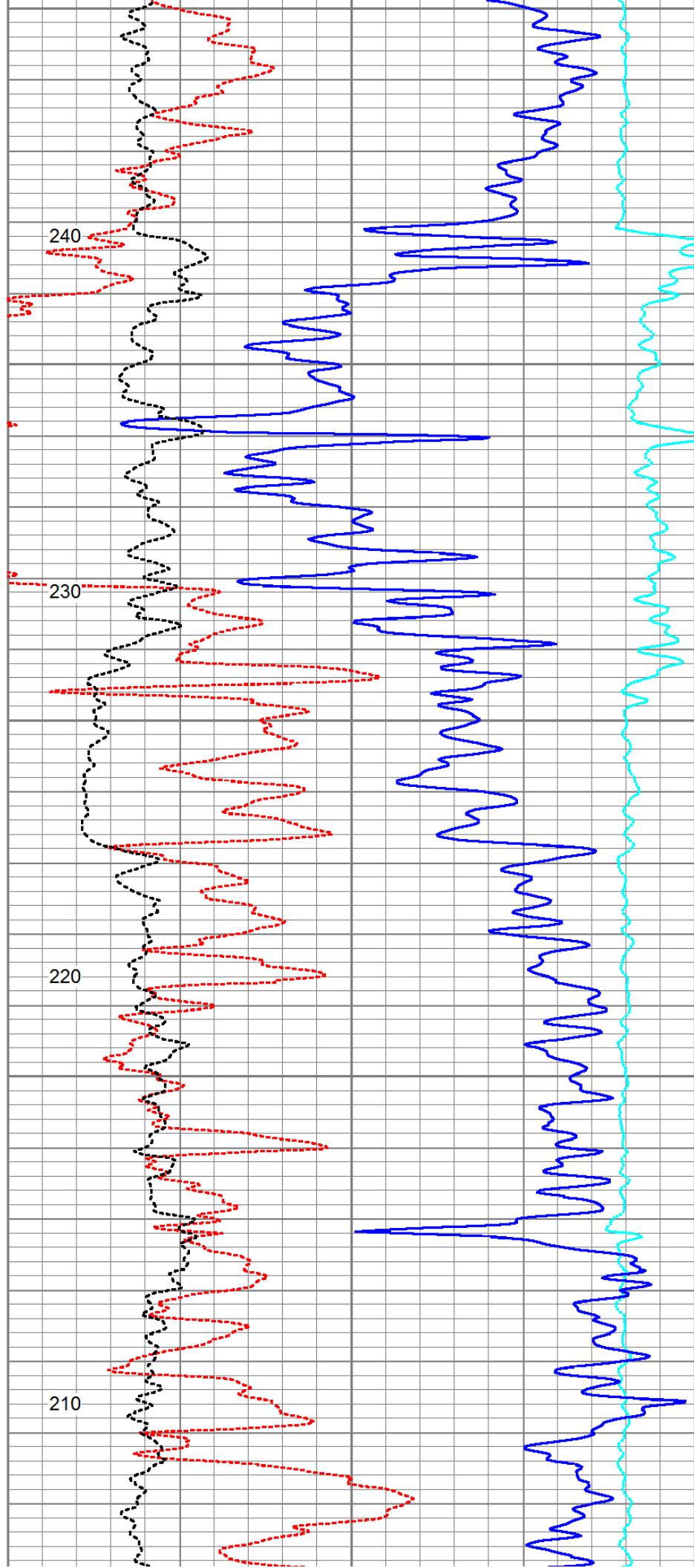
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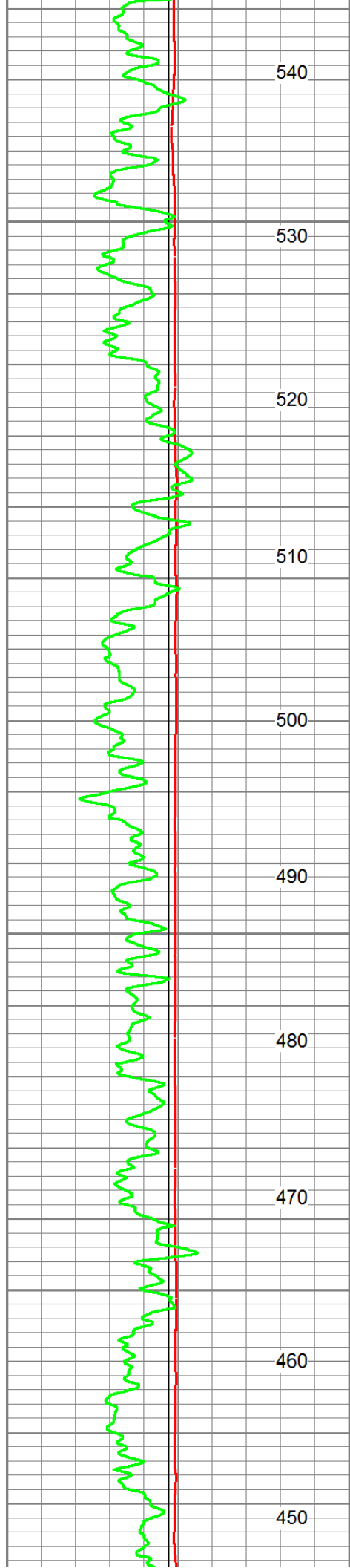
5100





5150
5200
5250
5300
5350



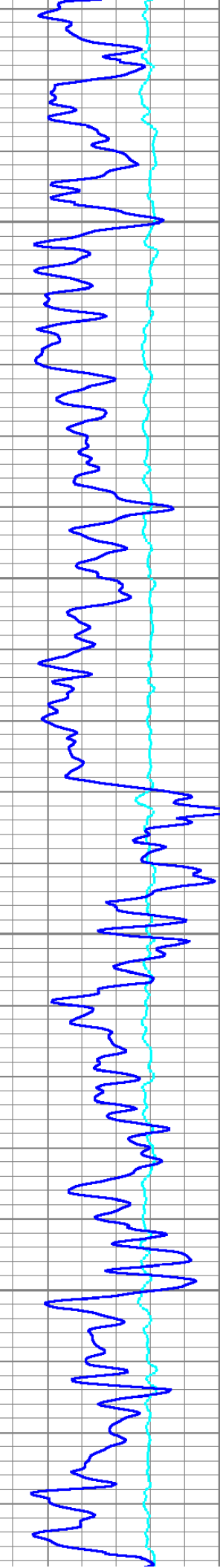
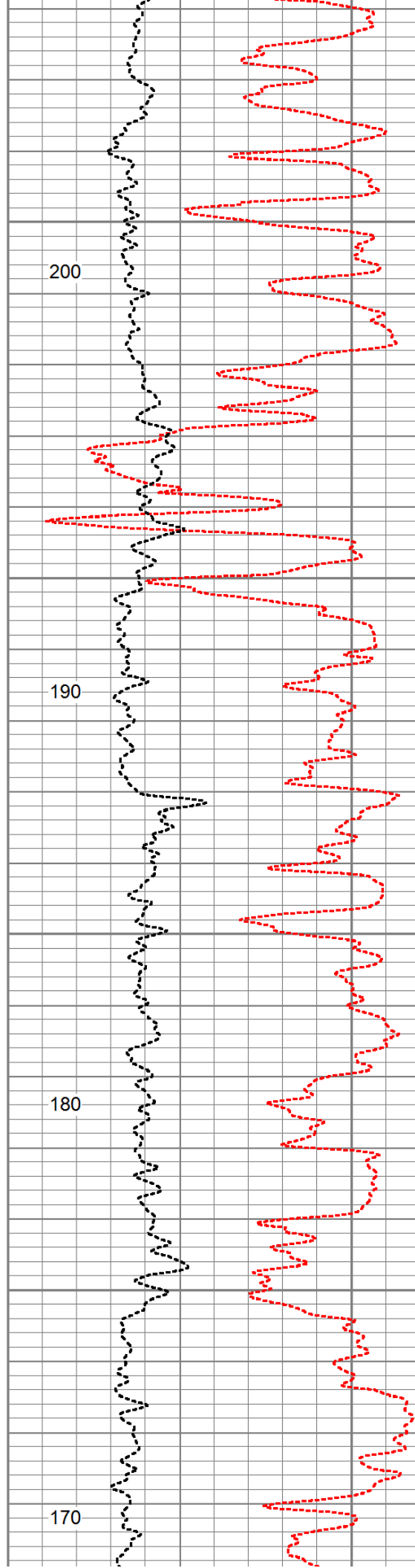


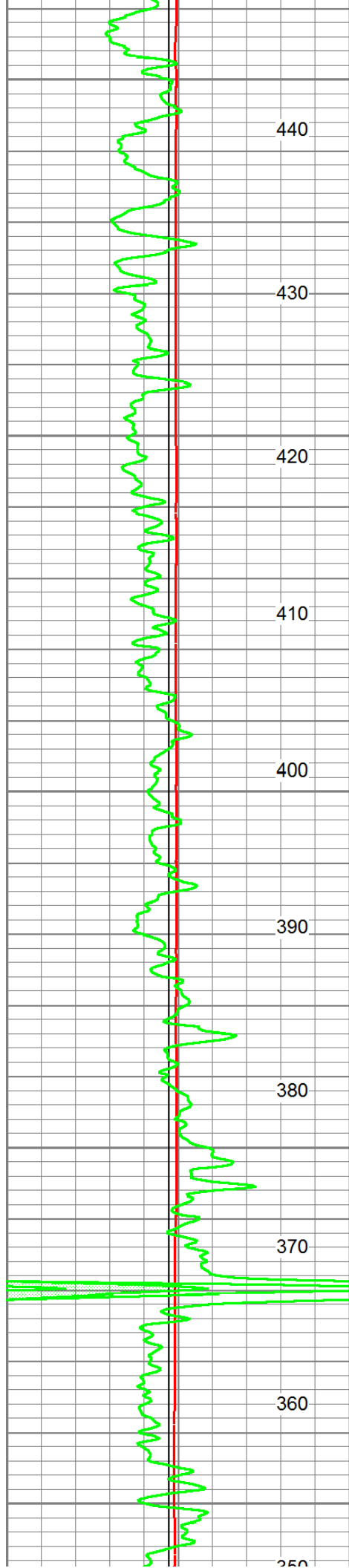
5400

5450

5500

5550





5600

440

430

420

410

400

390

380

370

360

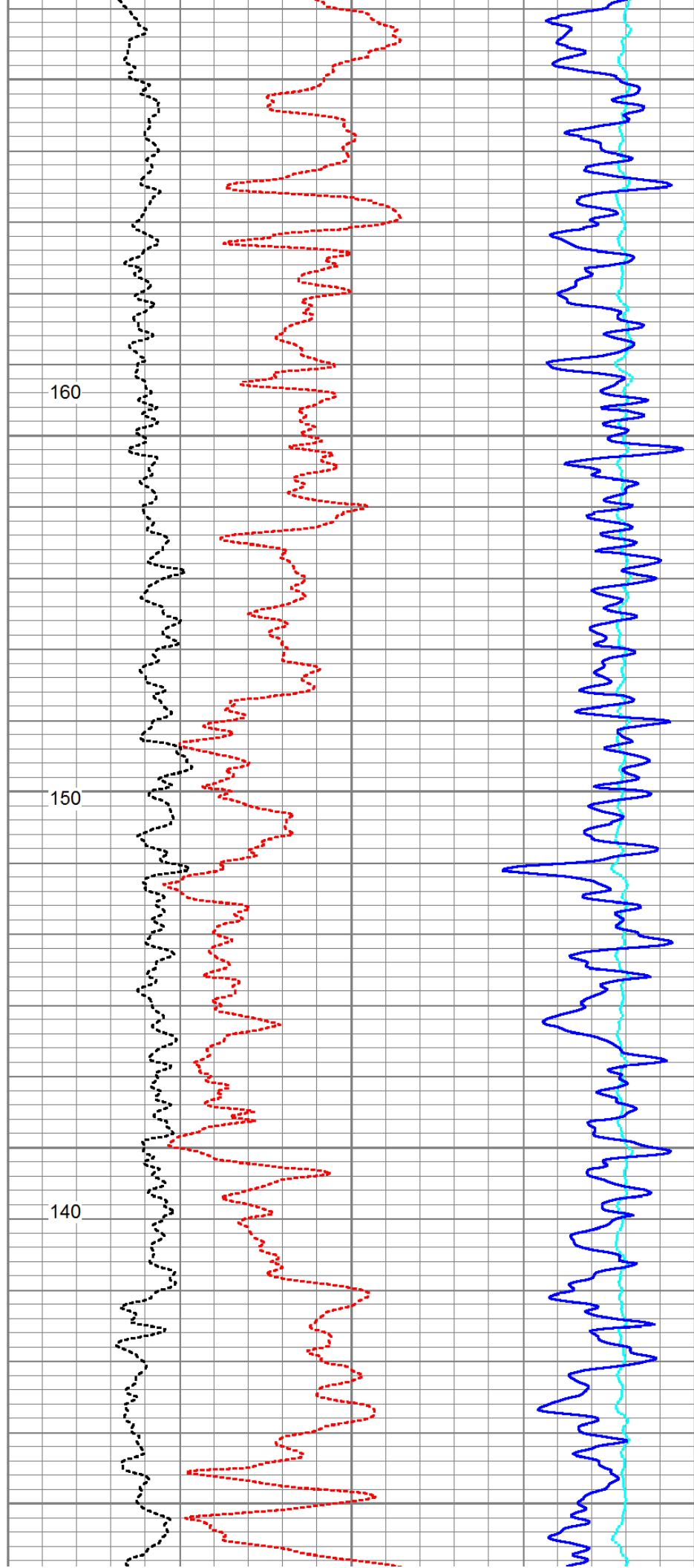
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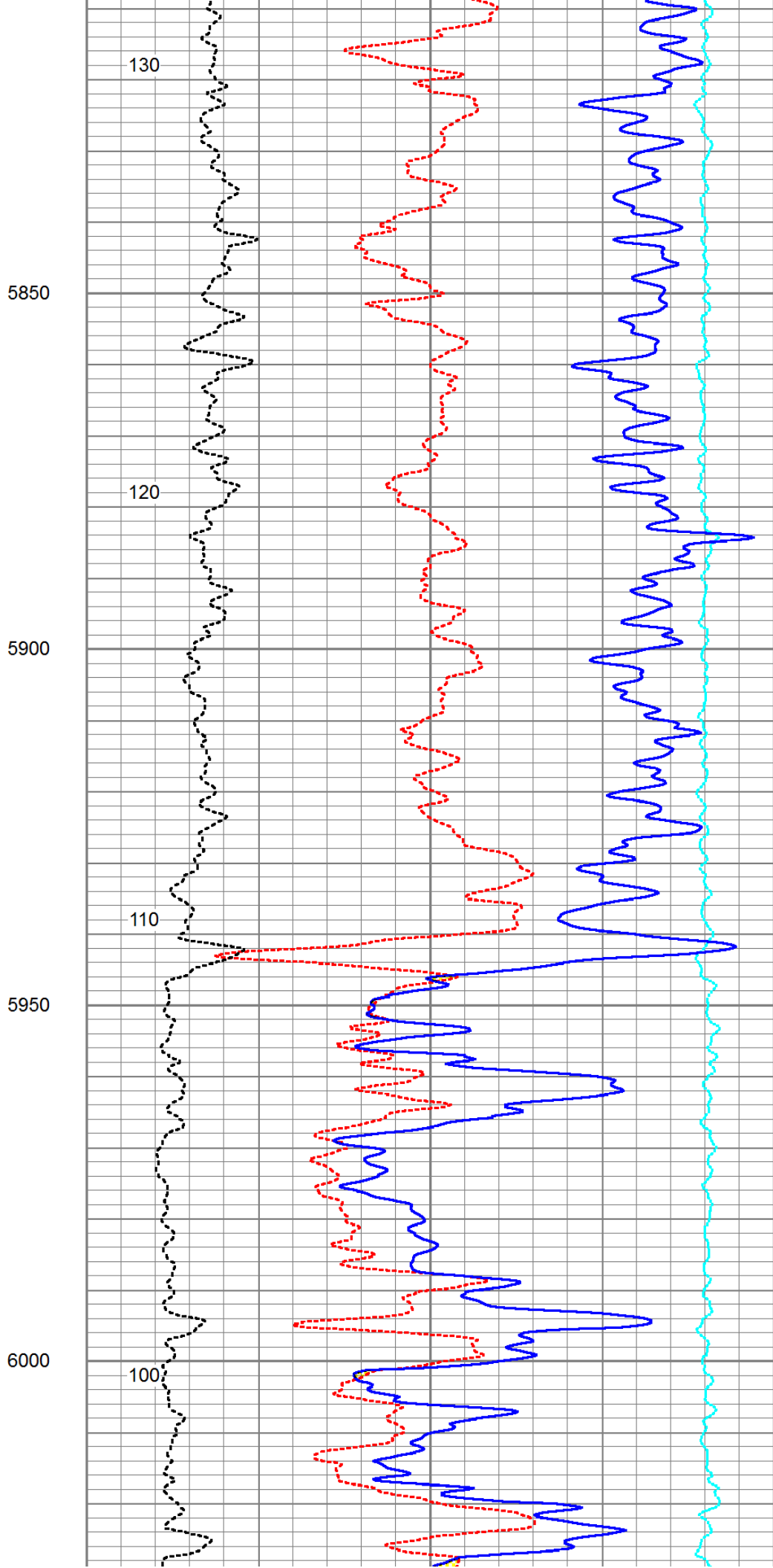
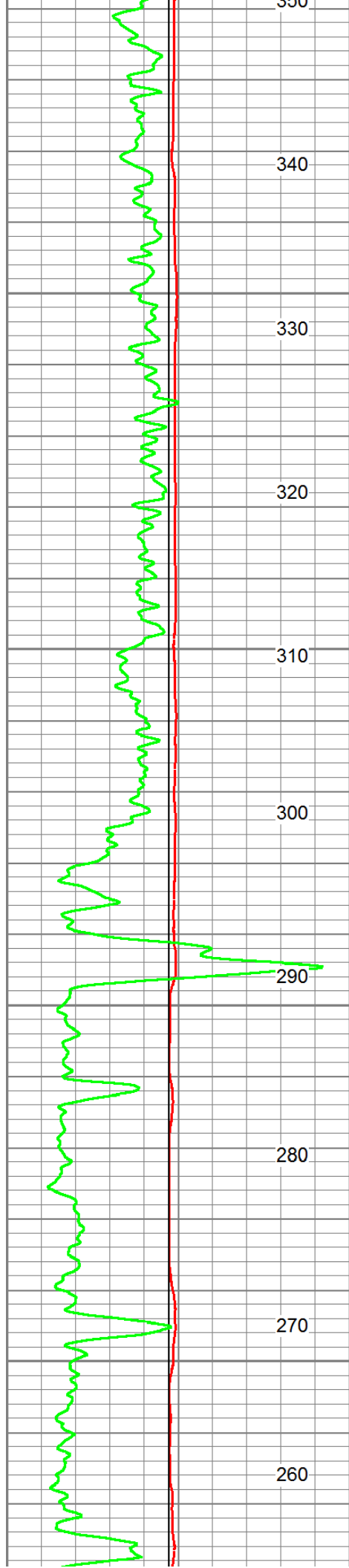
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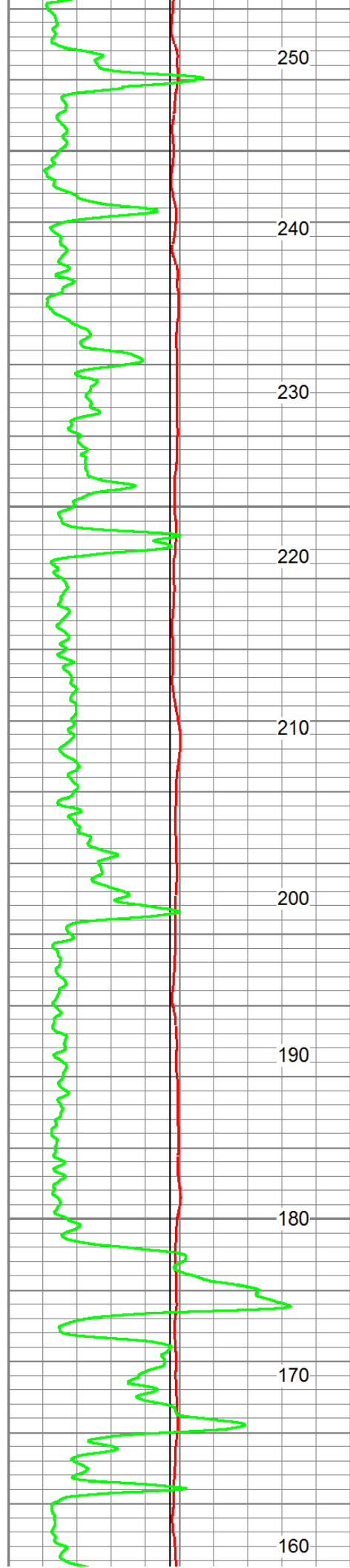
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5750

5800





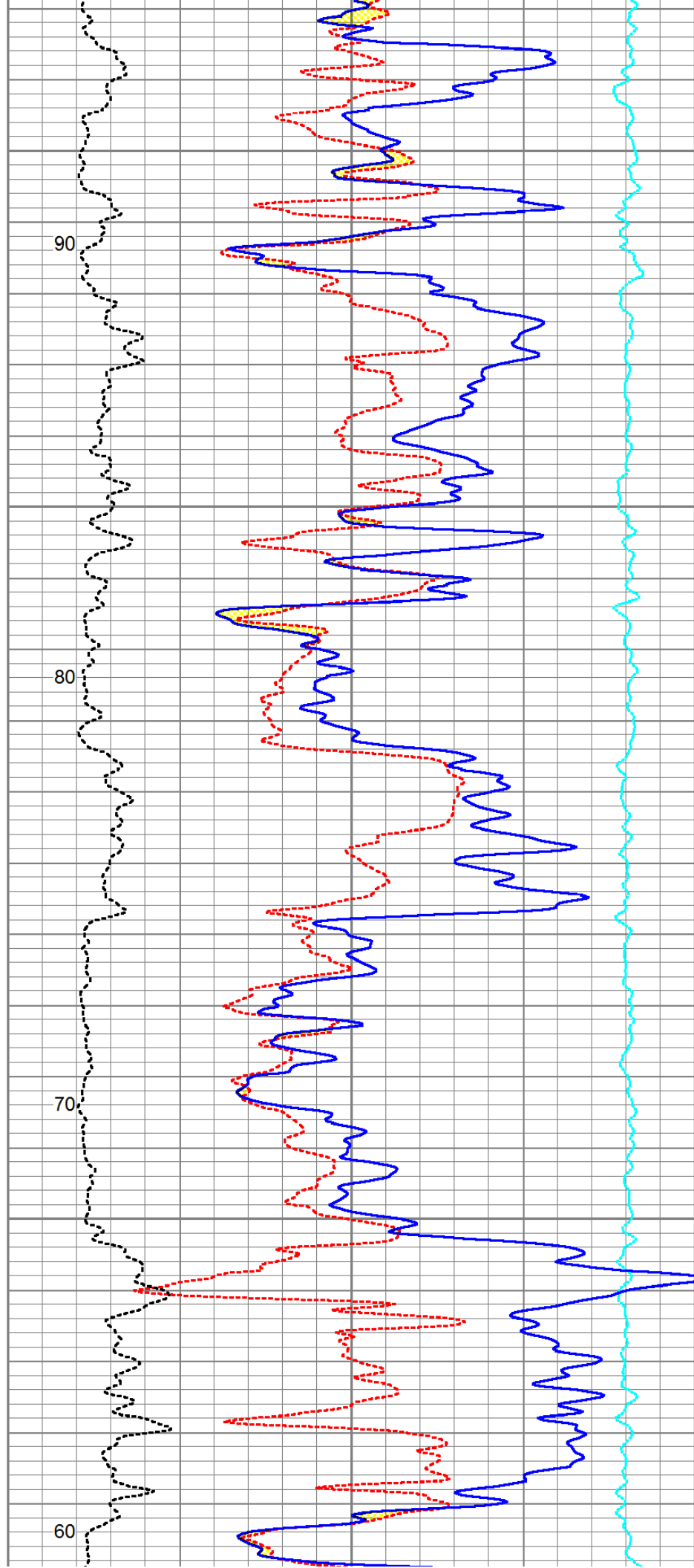


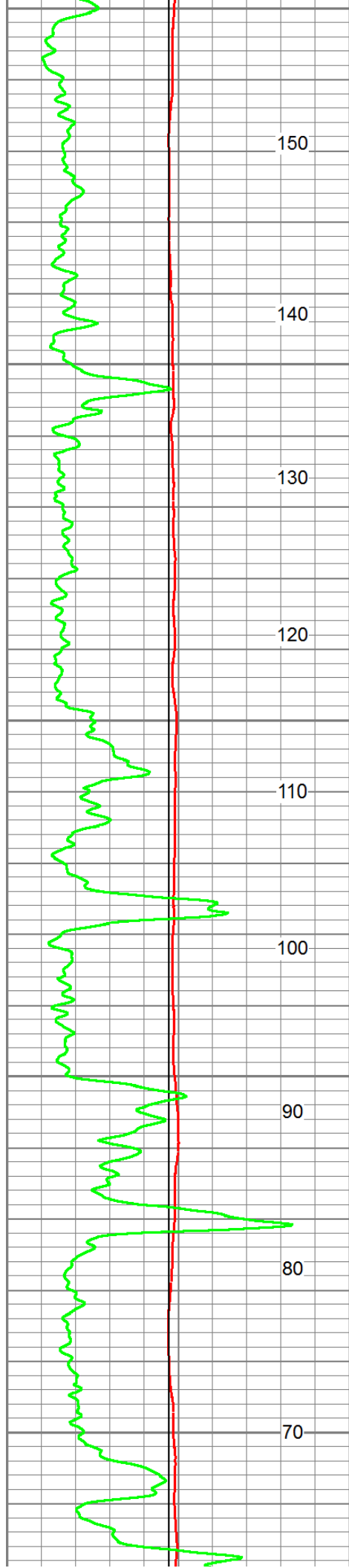
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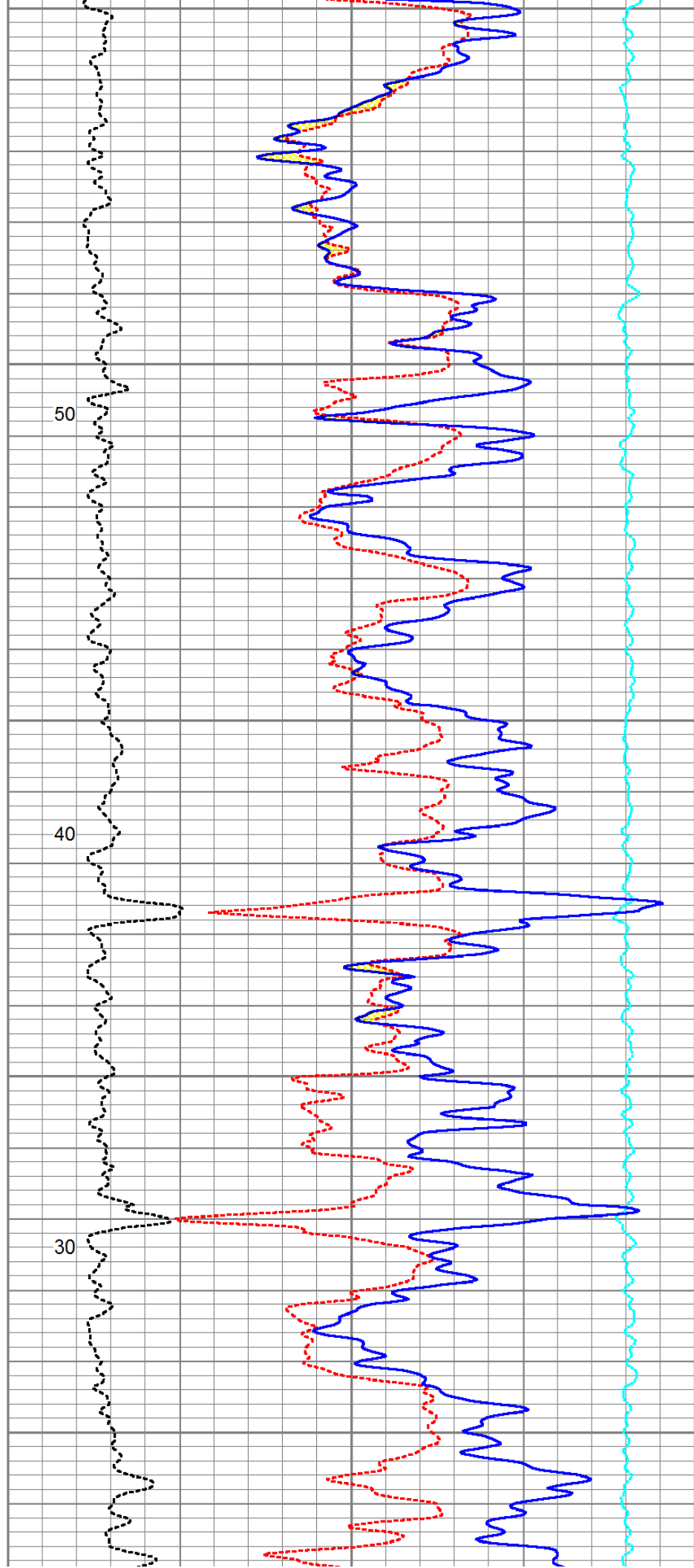
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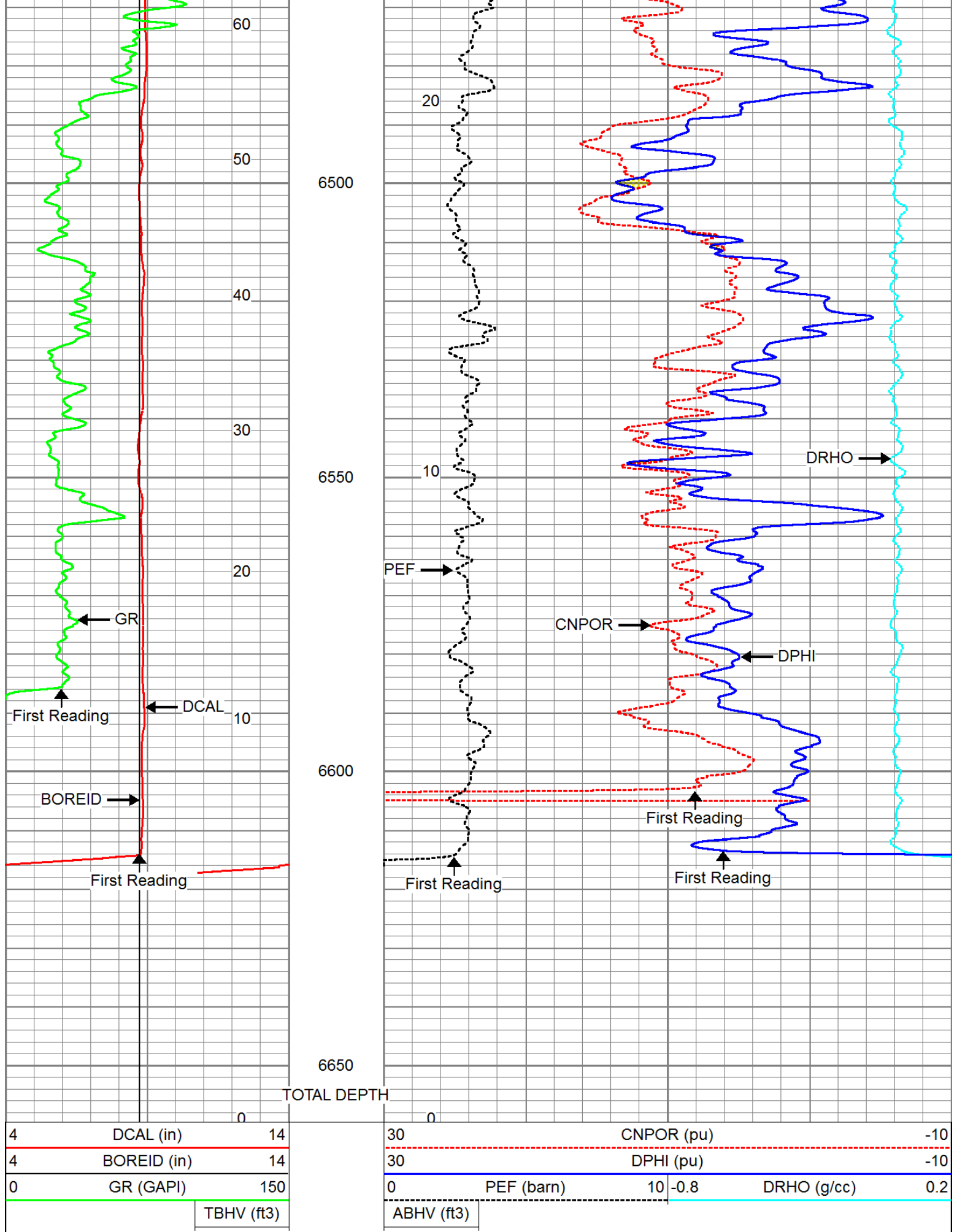
6200





6250
6300
6350
6400
6450





Log Variables

Database: C:\Warrior\Data\chevron_fee 162y_12dec12_mem_2.db

Top - Bottom

A 1	BHCOR On	BHFL_TYPE WBM	BHFLRES Ohm-m 1	BHFLRESSRC MUDCELL	BHIDSRC CURVE	BOREID in 8.75
BOTTEMP degF 139	CASED? No	CASEOD in 7	CASETHCK in 0	CEMWATERSA kppm 0	CMNTTHCK in 0	DNBHC? NO
DPORSEL RHOB	FLUIDDEN g/cc 1	FRMSALIN kppm 0	LATNOR Off	M 2	MATRXDEN g/cc 2.65	MUDSALIN kppm 1.5
MudWgt lb/gal 10.3	NPORSEL Sandstone	PEBHC? YES	PERFS 0	RESTMP SRC INTERNAL	SO in 0.5	SRFTEMP degF 50
SZCOR On	TDEPTH ft 6677	TMPCOR On	TOOLPOS Ec-centered			

Calibration Report

Database File: chevron_fee 162y_12dec12_mem_2.db
Dataset Pathname: proc1/merge3
Dataset Creation: Thu Dec 13 20:28:04 2012

ThruBit Induction Calibration Report

Tool Model-Serial Number: PS-PS30R
Shop Calibration Performed: Mon Nov 05 13:21:19 2012

BASELINE

	R	Expected	X	Expected
Freq 1				
A1	-495.2720	[-500.00, -400.00]	190.0120	[-500.00, 500.00]
A2	-146.4770	[-180.00, -100.00]	228.4770	[-500.00, 500.00]
A3	-33.4289	[-50.00, -10.00]	-155.2450	[-500.00, 500.00]
A4	-12.8630	[-30.00, -10.00]	169.5560	[-500.00, 500.00]
A5	-13.3159	[-30.00, -10.00]	147.6370	[-500.00, 500.00]
Freq 2				
A1	-261.5620	[-280.00, -180.00]	94.6992	[-500.00, 500.00]
A2	-94.6773	[-130.00, -50.00]	119.3040	[-500.00, 500.00]
A3	-24.5804	[-50.00, -10.00]	-153.2150	[-500.00, 500.00]
A4	-18.5526	[-30.00, -10.00]	22.2971	[-500.00, 500.00]
A5	-19.3178	[-30.00, -10.00]	4.8192	[-500.00, 500.00]
Freq 3				
A1	-167.7400	[-180.00, -80.00]	1.5089	[-500.00, 500.00]
A2	-71.9144	[-130.00, -30.00]	45.2805	[-500.00, 500.00]
A3	-20.1534	[-50.00, -10.00]	-170.3120	[-500.00, 500.00]
A4	-21.0598	[-30.00, -10.00]	-78.5149	[-500.00, 500.00]
A5	-22.3728	[-30.00, -10.00]	-96.2811	[-500.00, 500.00]
Freq 4				
A1	-94.2902	[-120.00, -40.00]	-155.6130	[-500.00, 500.00]
A2	-53.2222	[-110.00, -10.00]	-57.6754	[-500.00, 500.00]
A3	-16.6611	[-50.00, -10.00]	-217.7570	[-500.00, 500.00]
A4	-25.9104	[-30.00, -10.00]	-232.7350	[-500.00, 500.00]
A5	-29.4735	[-30.00, -10.00]	-261.0810	[-500.00, 500.00]

CALIBRATION COEFFICIENTS

	R	Expected	X	Expected
Freq 1				
A1	1.0164	[0.95, 1.05]	-0.0162	[-0.05, 0.05]
A2	1.0105	[0.95, 1.05]	-0.0104	[-0.05, 0.05]
A3	1.0195	[0.95, 1.05]	-0.0171	[-0.05, 0.05]
A4	1.0139	[0.95, 1.05]	-0.0062	[-0.05, 0.05]
A5	1.0167	[0.95, 1.05]	-0.0110	[-0.05, 0.05]
Freq 2				
A1	1.0053	[0.95, 1.05]	-0.0255	[-0.05, 0.05]
A2	0.9993	[0.95, 1.05]	-0.0216	[-0.05, 0.05]
A3	1.0022	[0.95, 1.05]	-0.0211	[-0.05, 0.05]
A4	1.0042	[0.95, 1.05]	-0.0174	[-0.05, 0.05]
A5	1.0079	[0.95, 1.05]	-0.0244	[-0.05, 0.05]
Freq 3				
A1	1.0053	[0.95, 1.05]	-0.0207	[-0.05, 0.05]
A2	0.9999	[0.95, 1.05]	-0.0176	[-0.05, 0.05]
A3	1.0024	[0.95, 1.05]	-0.0172	[-0.05, 0.05]
A4	1.0039	[0.95, 1.05]	-0.0137	[-0.05, 0.05]
A5	1.0102	[0.95, 1.05]	-0.0209	[-0.05, 0.05]
Freq 4				
A1	1.0078	[0.95, 1.05]	-0.0249	[-0.05, 0.05]
A2	1.0016	[0.95, 1.05]	-0.0226	[-0.05, 0.05]
A3	1.0063	[0.95, 1.05]	-0.0251	[-0.05, 0.05]
A4	1.0081	[0.95, 1.05]	-0.0191	[-0.05, 0.05]
A5	1.0232	[0.95, 1.05]	-0.0316	[-0.05, 0.05]
Temperature	24.7107 degC			

ThruBit Density Calibration Report

Tool Model-Serial Number: PS-PS25D

Source Number:

Shop Calibration Performed: Mon Nov 26 10:05:15 2012

REFERENCE

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

READINGS

Outputs	Counts	Units	Expected
SS1 Background	139.66	cps	[130.00, 170.00]
LS1 Background	134.09	cps	[130.00, 170.00]
LS4 Background	27.38	cps	[27.00, 35.00]
SS1 Aluminium	4873.94	cps	[4500.00, 5500.00]
LS1 Aluminium	857.85	cps	[750.00, 950.00]
LS4 Aluminium	978.32	cps	[843.00, 1068.00]
SS1 Magnesium	8194.89	cps	[7000.00, 9000.00]
LS1 Magnesium	5801.44	cps	[5250.00, 6250.00]
LS1 Al + Fe	715.16	cps	[650.00, 800.00]

LS4 Al + Fe	431.66	cps	[382.00, 471.00]
RESULTS			
SS Slope	1.61		[1.52, 1.77]
LS Slope	0.42		[0.38, 0.45]
PEF K Factor	4.995		[3.510, 6.170]
PEF B Factor	-0.569		[-0.700, -0.410]

Caliper Shop Calibration performed: Mon Nov 26 10:05:15 2012			
RESULTS			
Reference	Reading	Units	
12.00	1895.69	in	
9.00	2063.78	in	
6.00	2224.25	in	

DENSITY PRE-SURVEY CHECK Performed: Wed Dec 12 20:53:38 2012			
Outputs	Counts	Units	Expected
SS1 Background	140.52	cps	[135.47, 143.85]
LS1 Background	135.03	cps	[130.06, 138.11]
LS4 Background	28.33	cps	[25.74, 29.02]

CALIPER PRE-SURVEY CHECK Performed: Tue Dec 04 11:50:02 2012			
Reference	Readings	Units	Expected
6.00	5.97	in	[5.80, 6.20]

Compensated Neutron Calibration Report			
Tool Model-Serial Number:		PS-PS09N	
Source Number:			
Calibration Tank Temperature:		68.0 degF	
Shop Calibration Performed:		Mon Dec 10 11:32:25 2012	
BACKGROUND MEASUREMENT			
Outputs	Measured	Units	Expected
SS Counts	0.5	cps	<10
LS Counts	0.7	cps	<4
WATER TANK REFERENCE			
Outputs	Measured	Units	Expected
SS Counts	2611.9	cps	
LS Counts	84.0	cps	
Tank Ratio Ref	30.9580	SS/LS	
Tank Ratio	31.0973	SS/LS	
Tank Ratio Gain	0.9955		[0.85, 1.15]
ALUMINUM SLEEVE REFERENCE			
Outputs	Measured	Units	Expected

Outputs	Measured	Units	Expected
SS Counts	29117.2	cps	
LS Counts	2700.2	cps	
AI Ratio Ref	10.797	SS/LS	
AI Ratio	10.735	SS/LS	
AI Ratio Gain	1.01		[0.90, 1.10]
Sleeve Porosity	14.46	pu	

PRE-SURVEY BACKGROUND CHECK Performed:		Wed Dec 12 21:44:59 2012	
Outputs	Measured	Units	Expected
SS Counts	0.2	cps	<10
LS Counts	0.4	cps	<4

Gamma Ray Calibration Report			
Tool Model-Serial Number:	PS-PS23T		
Performed:	Tue Dec 04 11:06:53 2012		
Calibrator Value:	1.0	GAPI	
Background Reading:	0.0	cps	
Calibrator Reading:	1.0	cps	
Sensitivity:	0.3750	GAPI/cps	

Inclinometer Calibration Report					
Performed:	Sun Jun 13 13:33:21 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	94.67		Cablehead-S	2.31	2.13	5.00
Thrubit	92.36		Solid Weakpoint			
			PSBDOT	3.87	2.25	35.00
Thrubit	88.49		HangOff_Tool	5.00	2.38	60.00
Thrubit	83.49		10-1	0.88	2.13	3.95
TBBAT2	82.62		TBBAT2-A (PS26B) Thrubit Battery	6.13	2.13	80.00
TBBAT	76.49		TBBAT-A (PS21B) Thrubit Battery	6.13	2.13	38.20
TMG	70.37					
CP	70.34					

GR	70.24			TMG-PS (PS23T) ThruBit Telemetry Gamma Ray	6.13	2.13	45.00
GRTEMP	69.41						
ThruBit	64.24						
				Decentralizer (Big)	8.45	2.13	70.00
CNLSC	53.85			TBN-PS (PS09N) ThruBit Neutron	4.77	2.13	63.00
				TBD-PS (PS25D) ThruBit Density	10.48	2.13	91.00
LSW1	43.29						
DCAL	42.38						
ThruBit	40.54			Knuckle	1.42	2.13	11.50
ThruBit	39.13			Knuckle	1.42	2.13	11.50
DT	31.04						
TT	31.04			TBS-A (TBS17) ThruBit Sonic -- Initial Support	16.46	2.13	75.00
RmbPk	31.04						
WVF1	31.04						
WVF2	31.04						
WVF3	31.04						
WVF4	31.04			Sonic Centralizer	2.96	2.13	22.60
WVF5	31.04						
WVF6	31.04						
WVF7	31.04						
ThruBit	21.25						
A1_P	13.60			TBI-PS (PS30R) ThruBit Induction	15.29	2.13	94.00
A2_P	13.10						
A3_P	12.35						
A4_P	11.35						
A5_P	9.60						
ThruBit	3.00			CaseholeCent	3.00	1.69	13.35
Dataset: chevron_fee 162y_12dec12_mem_2.db: field/well/proc1/merge3 Total Length: 94.67 ft Total Weight: 719.10 lb O.D. 2.38 in							



ThruBit
A Schlumberger Company

Company	CHEVRON PRODUCTION COMPANY
Well	FEE 162Y
Field	RANGELY
County	RIO BLANCO
State	COLORADO