

Company: Noble Energy Inc

Well: Storis E24-75HN

Field: Wattenberg

County: Weld

State: Colorado

Ultrasonic Imager		CO State		Gamma Ray - CCL Log	
Location:		NENE Sec. 24, T6N, R65W SHL: 330' FNL X 1302' FEL		Elev.: K.B. 4709.00 ft G.L. 4685.00 ft D.F. 4708.00 ft	
Permanent Datum:		Ground Level		Elev.: 4685.00 f	
Log Measured From:		Kelly Bushing		24.00 ft above Perm.Datum	
Drilling Measured From:		Kelly Bushing			
API Serial No.		Section: 24		Township: 6N	
05-123-38152-0000				Range: 65W	
Logging Date		22-Jul-2014			
Run Number		Run1: USIT			
Depth Driller		11585.00 ft			
Schlumberger Depth		11585.00 ft			
Bottom Log Interval		7230.00 ft			
Top Log Interval					
Casing Fluid Type		Brine			
Salinity					
Density		8.4 lbm/gal			
Fluid Level		0.00 ft			
BIT/CASING/TUBING STRING					
Bit Size		8.75 in			
From		0.00 ft			
To		11585.00 ft			
Casing/Tubing Size		7 in			
Weight		26 lbm/ft			
Grade		P110			
From		0.00 ft			
To		7412.00 ft			
Max Recorded Temperatures		250 degF			
Logger on Bottom		Time			
Unit Number		Location:			
Recorded By		Tim Hoffman		Ft. Morgan, CO	
Witnessed By		Bill Mansfield			

Disclaimer

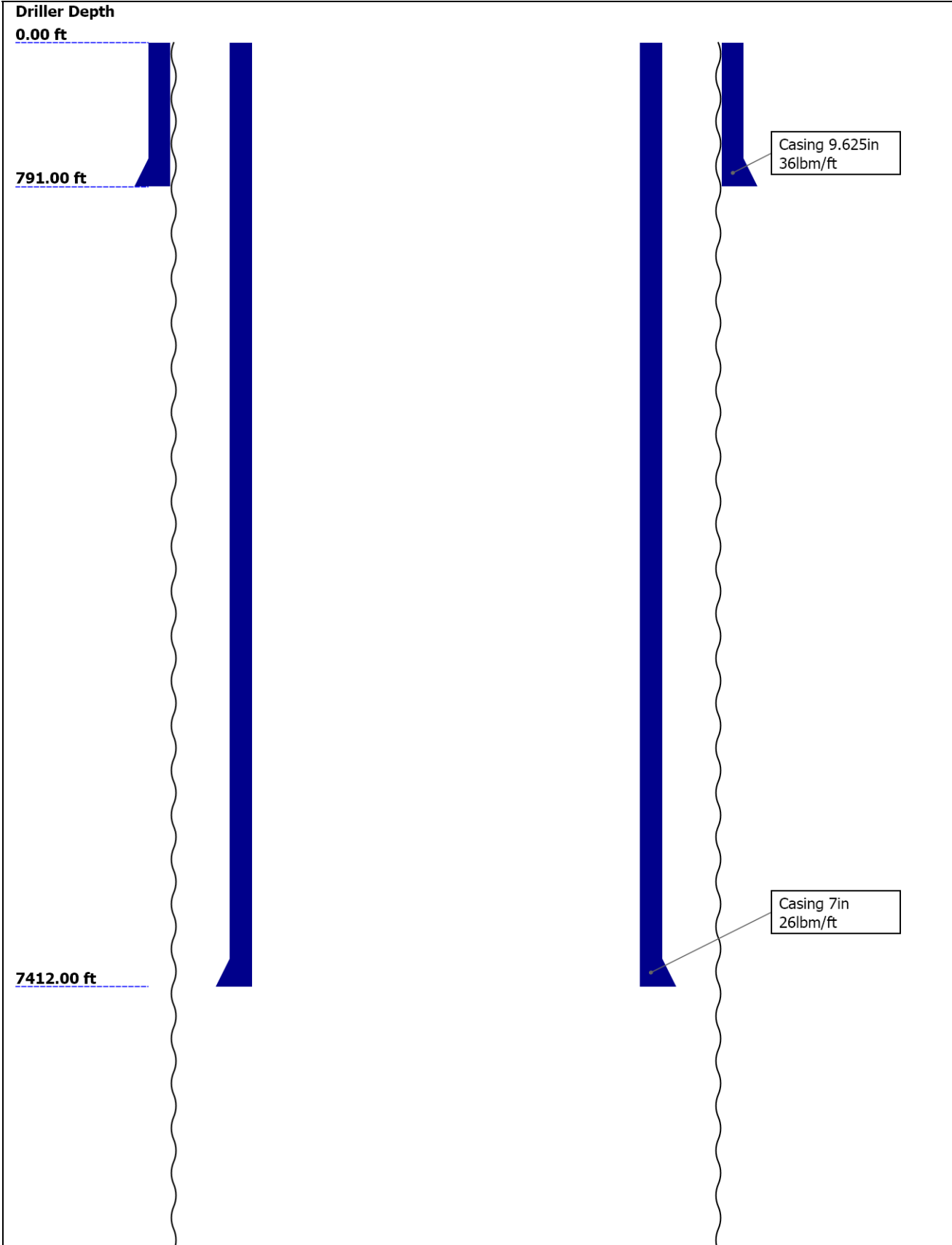
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Well Sketch



11585.00 ft

Open Hole 8.75in

Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	8.75					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	11585					
Bottom Logger (ft)	11585					
Casing						
Size (in)	9.625	7				
Weight (lbm/ft)	36	26				
Inner Diameter (in)	8.921	6.276				
Grade	J55	P110				
Top Driller (ft)	0	0				
Top Logger (ft)	0	0				
Bottom Driller (ft)	791	7412				
Bottom Logger (ft)	791	7412				

Operational Run Summary

Parameter (unit)	Run1: USIT					
Date Log Started	22-Jul-2014					
Time Log Started	07:56:18					
Date Log Finished	22-Jul-2014					
Time Log Finished	10:15:07					
Top Log Interval (ft)						
Bottom Log Interval (ft)						
Total Depth (ft)	11585.00					
Max Hole Deviation (deg)						
Azimuth of Max Deviation (deg)						
Bit Size (in)	8.750					
Logging Unit Number	3022					
Logging Unit Location	Ft. Morgan, CO					
Recorded By	Tim Hoffman					
Witnessed By	Bill Mansfield					
Service Order Number	CX03-00068					

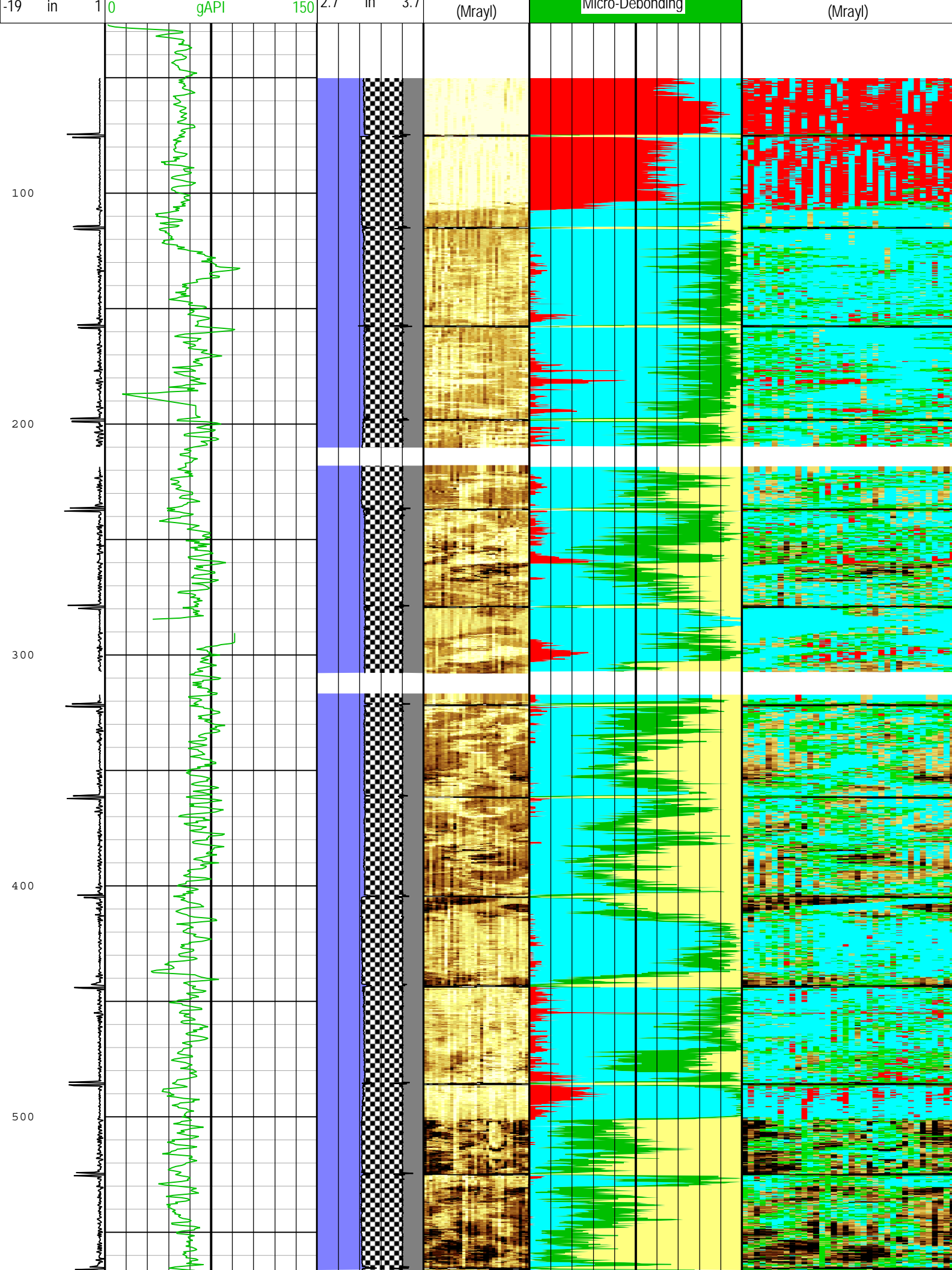
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Depth Summary

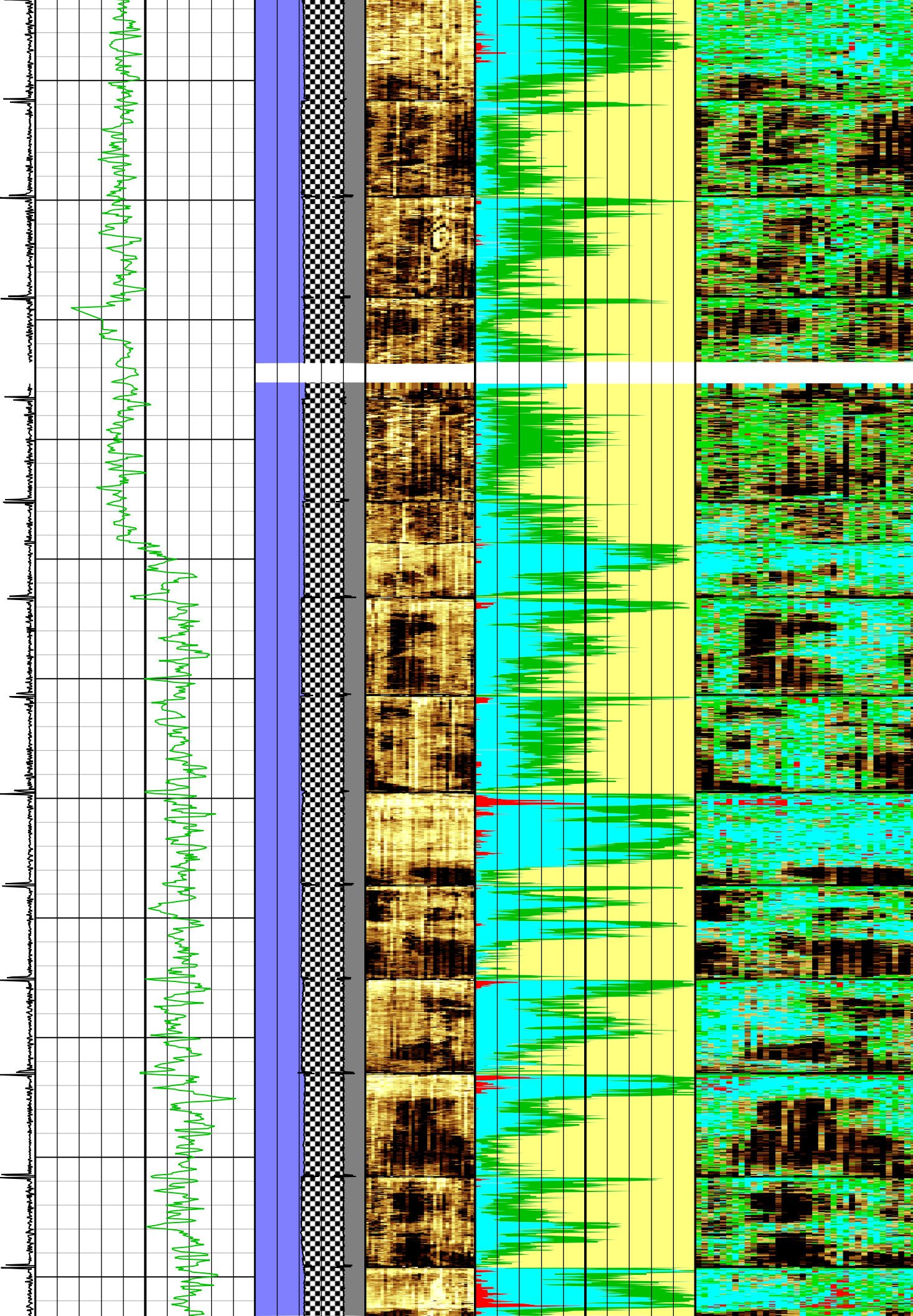
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Tension Device

Tension Device		CMTD-B/A									
Type											
Serial Number											
Calibration Date											
Calibrator Serial Number											
Number of Calibration Points	0										
Logging Cable											
Type	7-46NT-XS										
Serial Number											
Length	24000.00 ft										
Conveyance Type	Wireline										
Rig Type											
Run1: USIT:Depth Control Parameters					Depth Control Remarks						
Log Sequence	First Log In the Well				All Schlumberger depth control policies followed						
Rig Up Length At Surface					IDW used as primary depth reference. Z-chart used as secondary						
Rig Up Length At Bottom											
Rig Up Length Correction											
Stretch Correction											
Tool Zero Check At Surface											
Run1: USIT											
ND State Log											
Software Version											
Acquisition System						Version					
MaxWell						4.0.9163.3000					
Application Patch						Patch-SP-10767_13393-4.0.9163.3001					
Computation		Description					Version				
Cementation		Cementation Computation Application					4.0.9167.3000				
Tool Elements		Description			Software Version		Firmware Version				
USI-SENSOR		USIT Transducer Element			4.0.9265.3000		DSP: v01.82				
SGC-TB		Scintillation Gamma Cartridge			4.0.9033.3000						
Pass Summary											
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data		
Run1: USIT	Log[6]:Up	Up	50.42 ft	7235.94 ft	22-Jul-2014 9:03:36 AM	22-Jul-2014 10:14:54 AM	ON	5.55 ft	No		
All depths are referenced to toolstring zero											
Log						Company:Noble Energy Inc		Well:Storis E24-75HN			
										Run1: USIT: Log[6]:Up:S002	
Description: USI Corrosion Format: Log (ND State Only) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 22-Jul-2014 10:36:46											
TIME_1900 - Time Marked every 60.00 (s)											
		<div>Average Casing Thickness</div>		<div>External Radii Average (ERAV) USIT-E</div>		<div>2.7 in 3.7</div>		<div>Internal Radius Averaged Value (IRAV) USIT-E</div>		<div>2.7 in 3.7</div>	
<div>Casing Collar Locator Ultrasonic (CCLU) USIT-E</div>		<div>Gamma Ray (GR) SGT-N</div>									
								</			



600
700
800
900
1000
1100



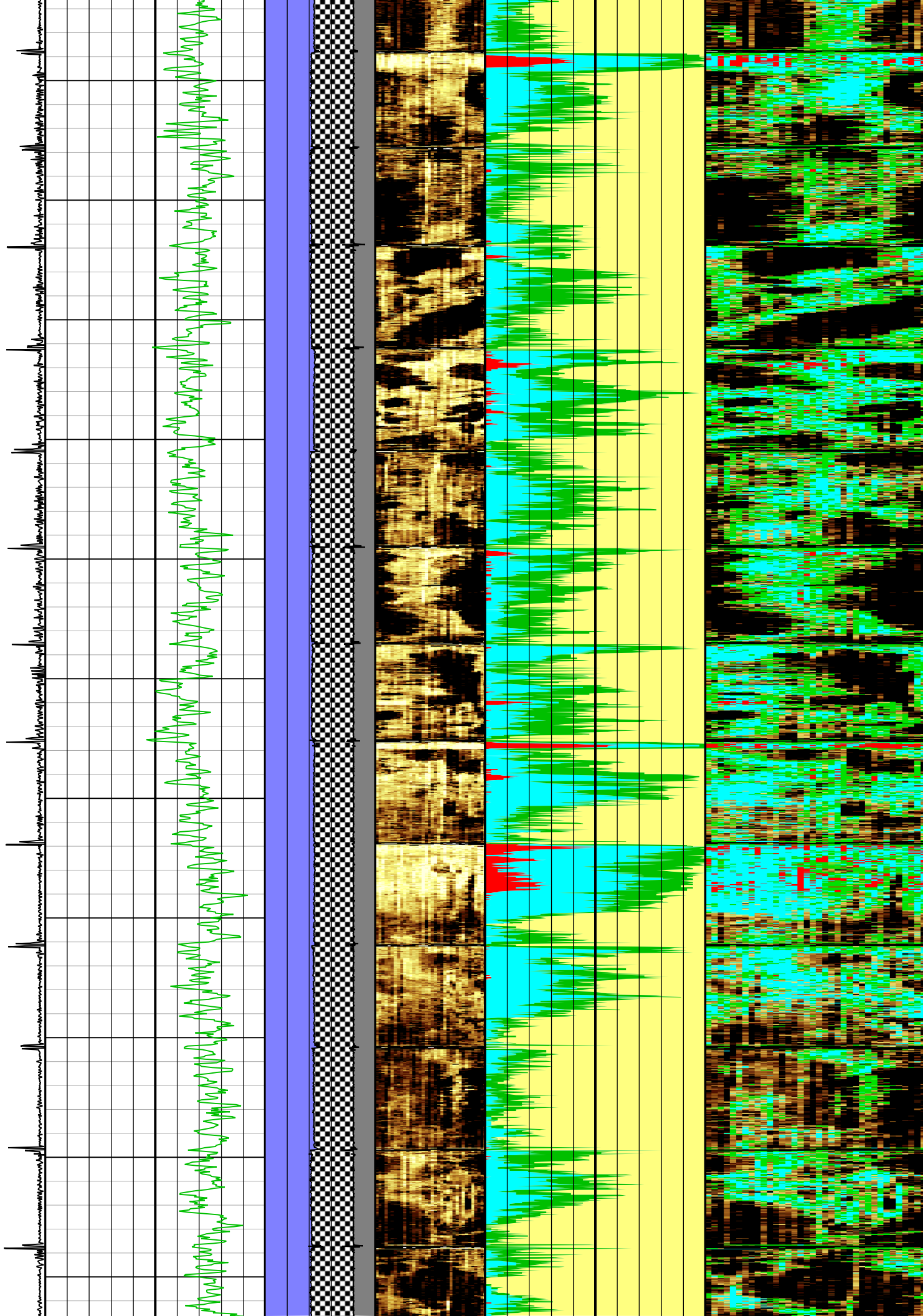
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1300

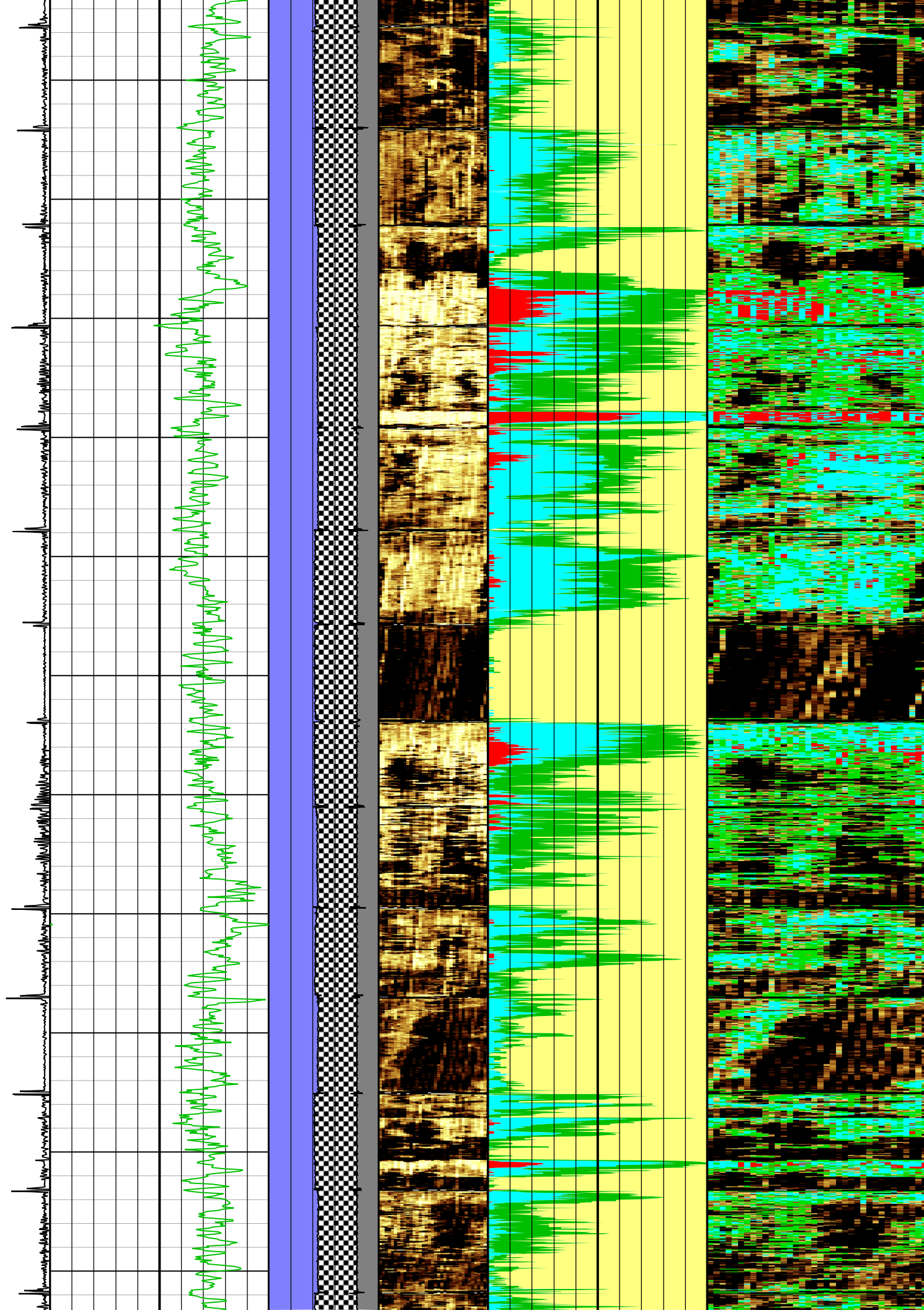
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1500

1600



1700
1800
1900
2000
2100
2200



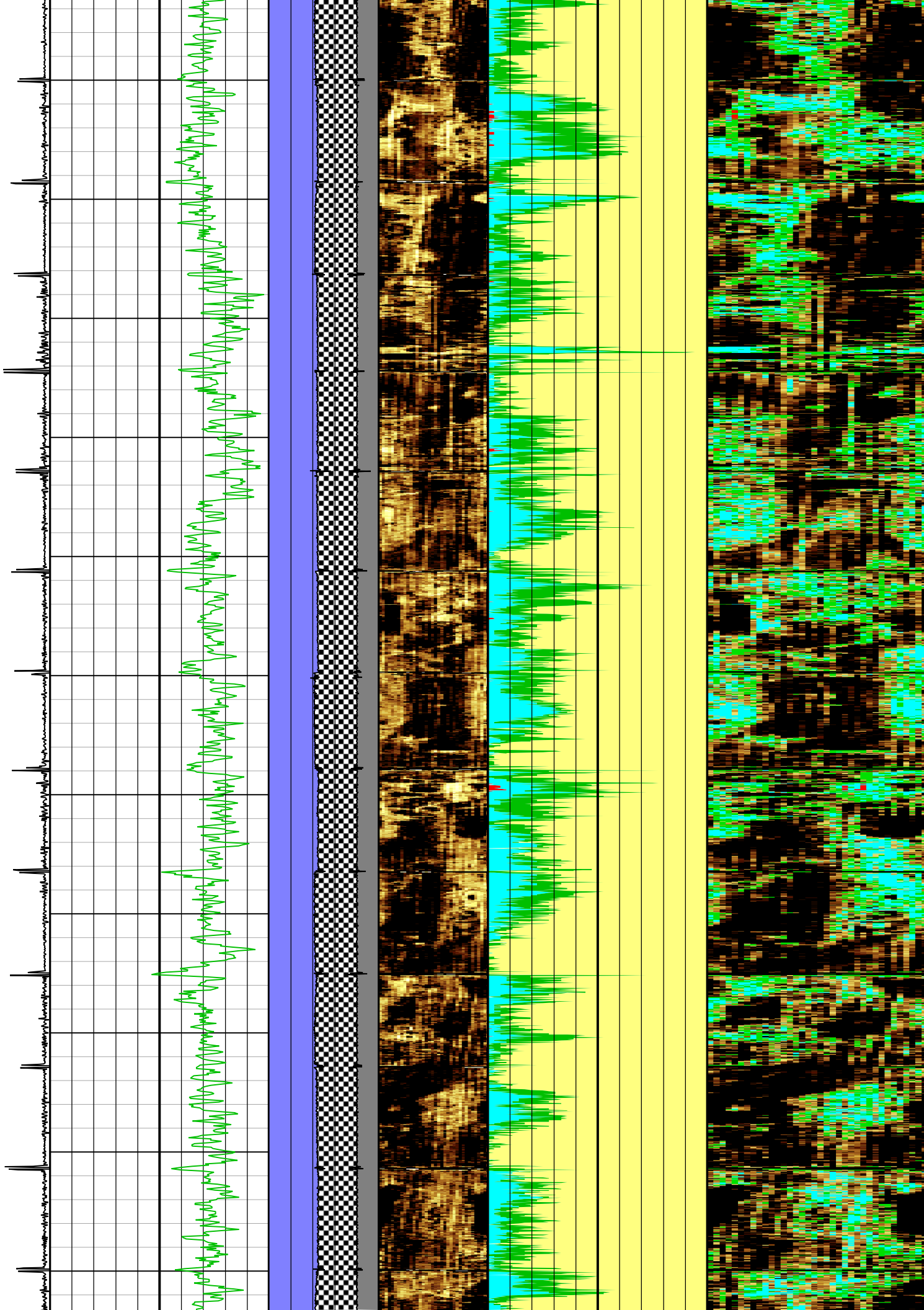
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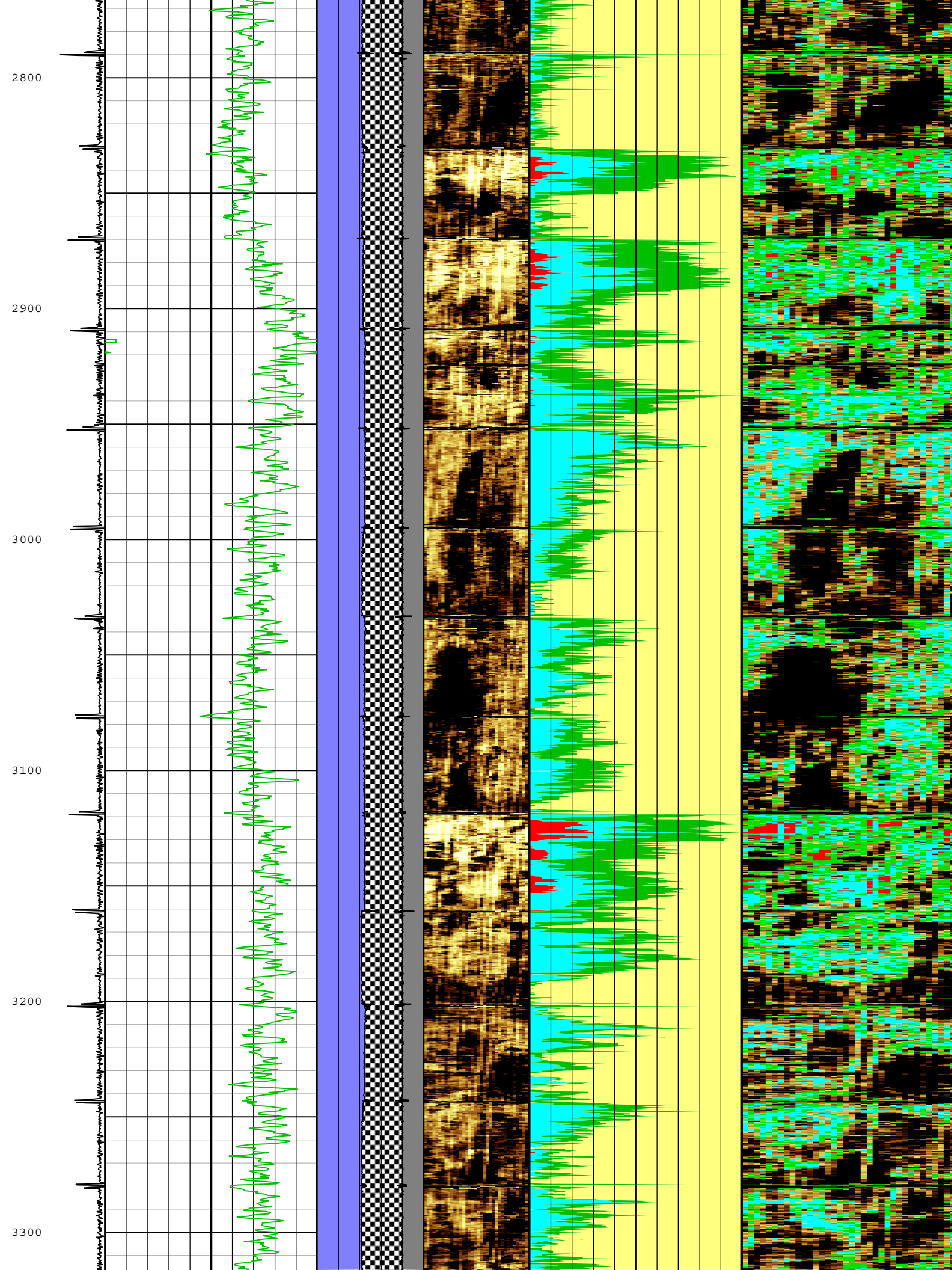
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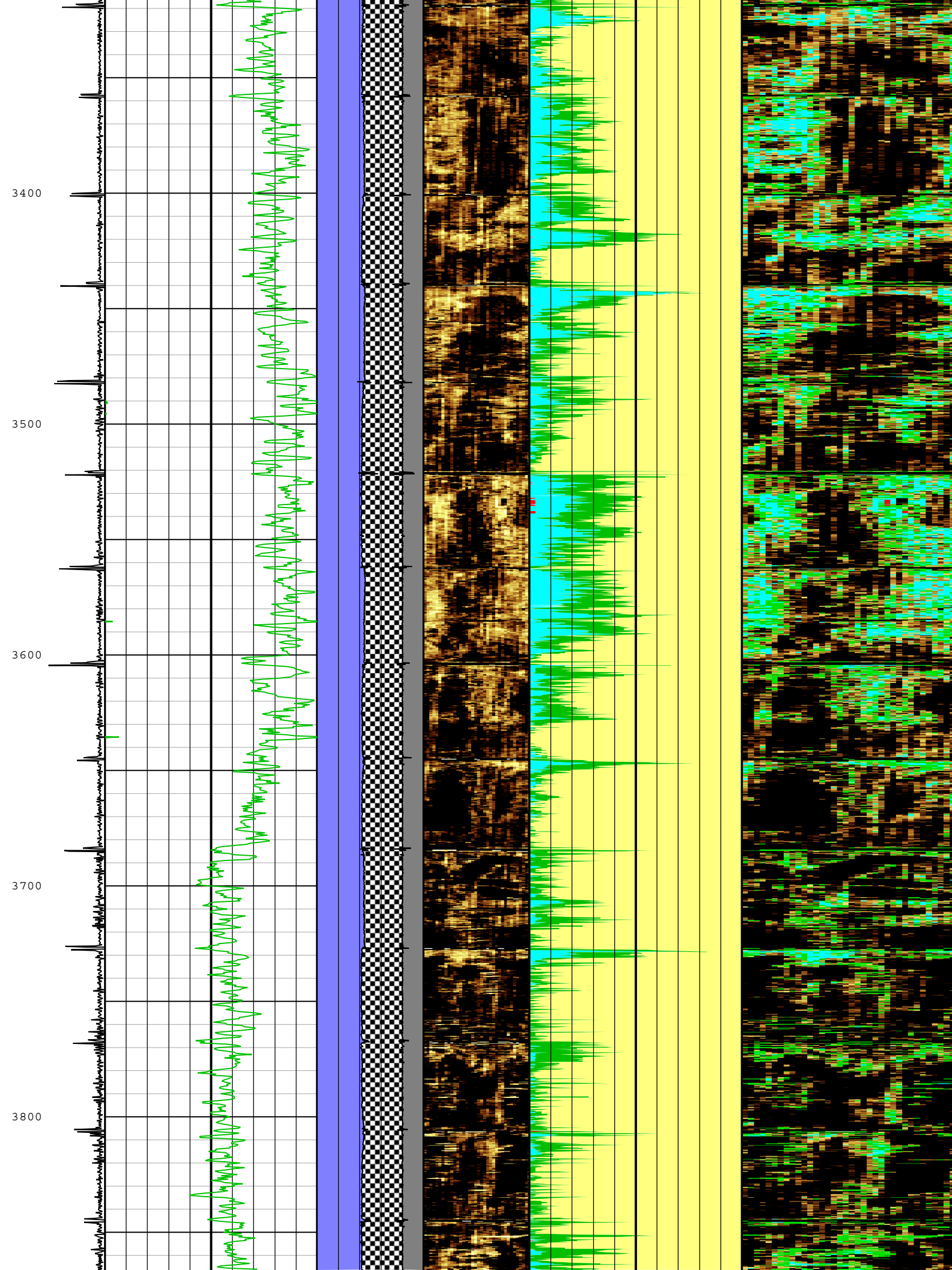
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2600

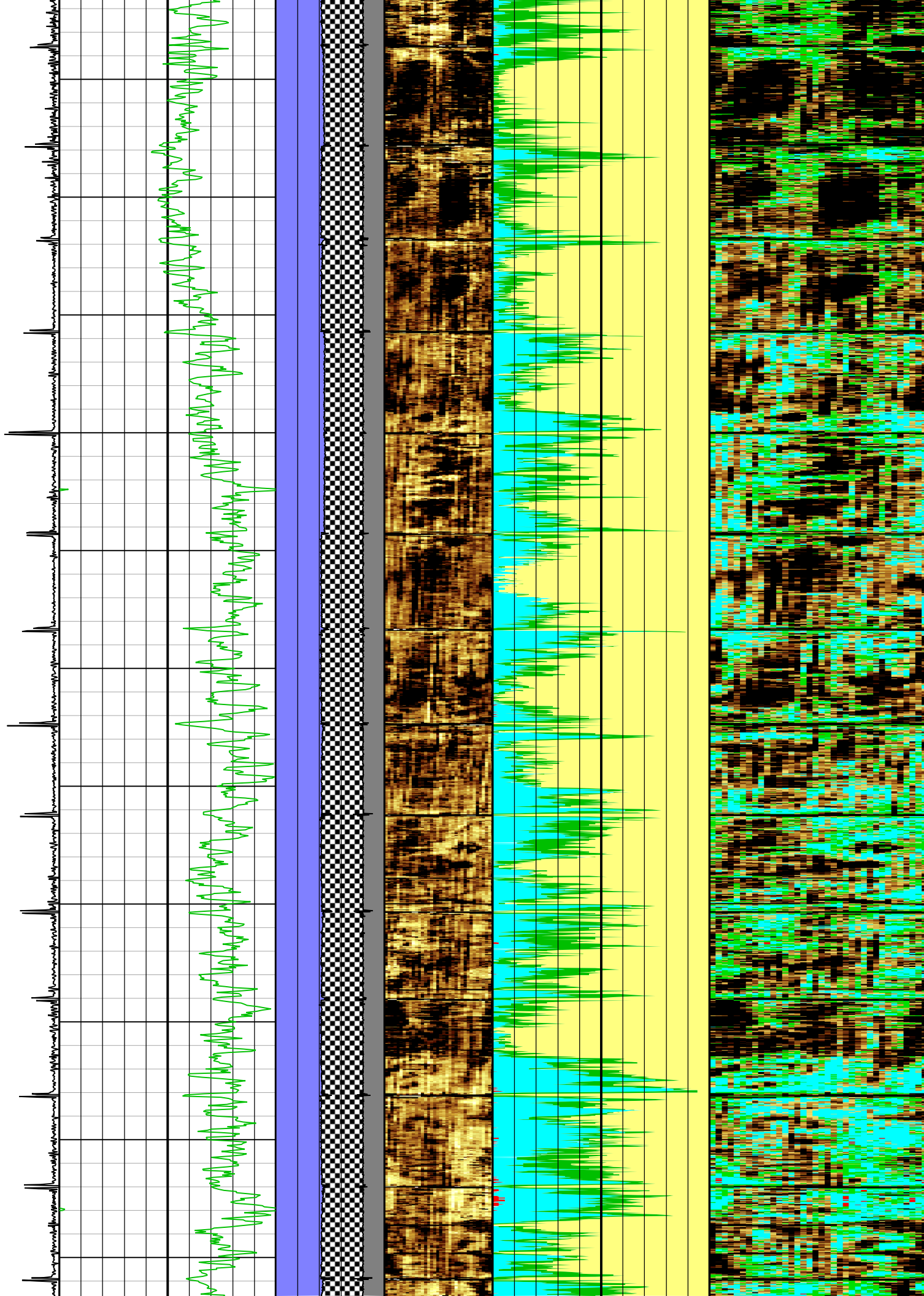
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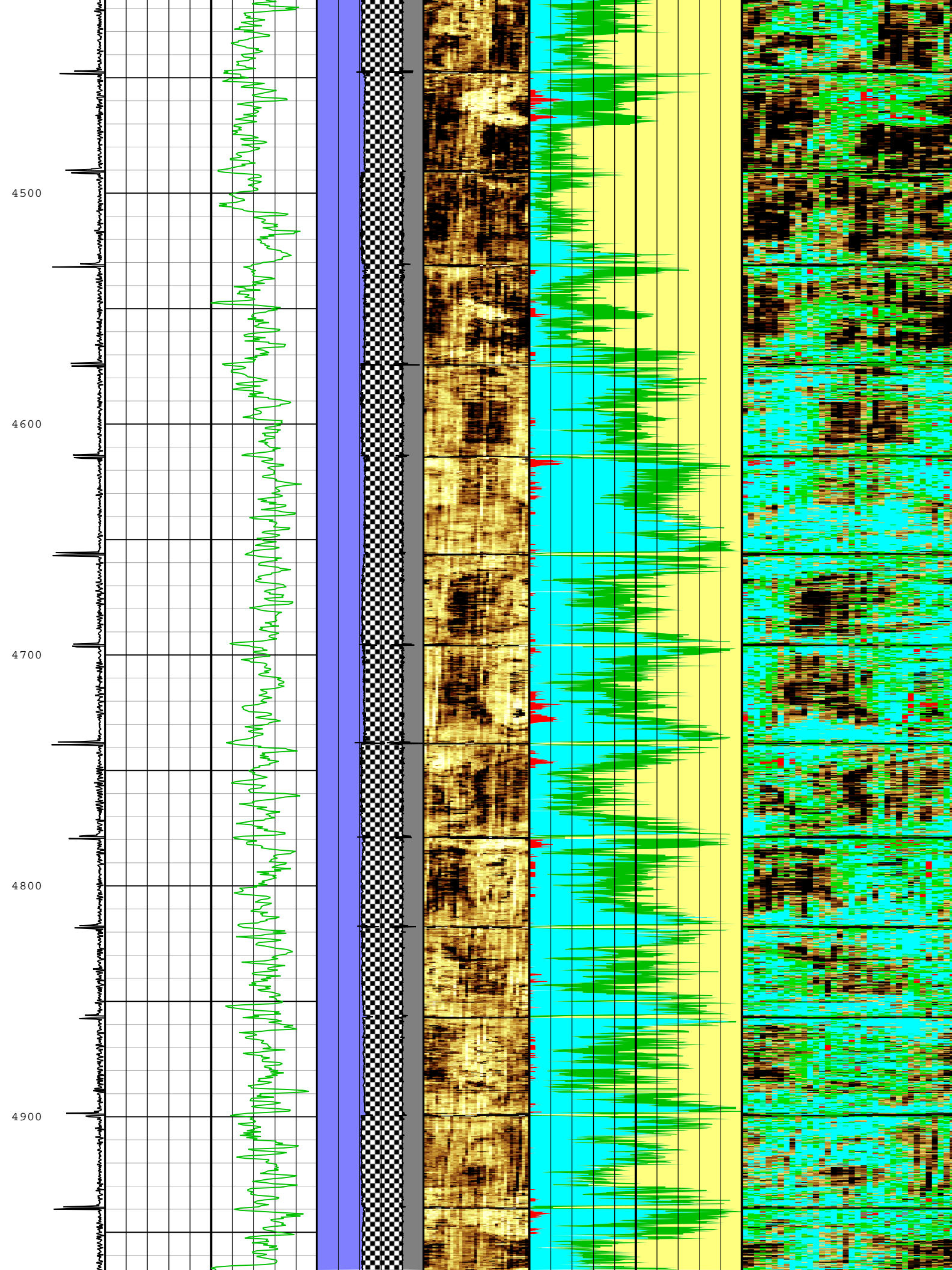


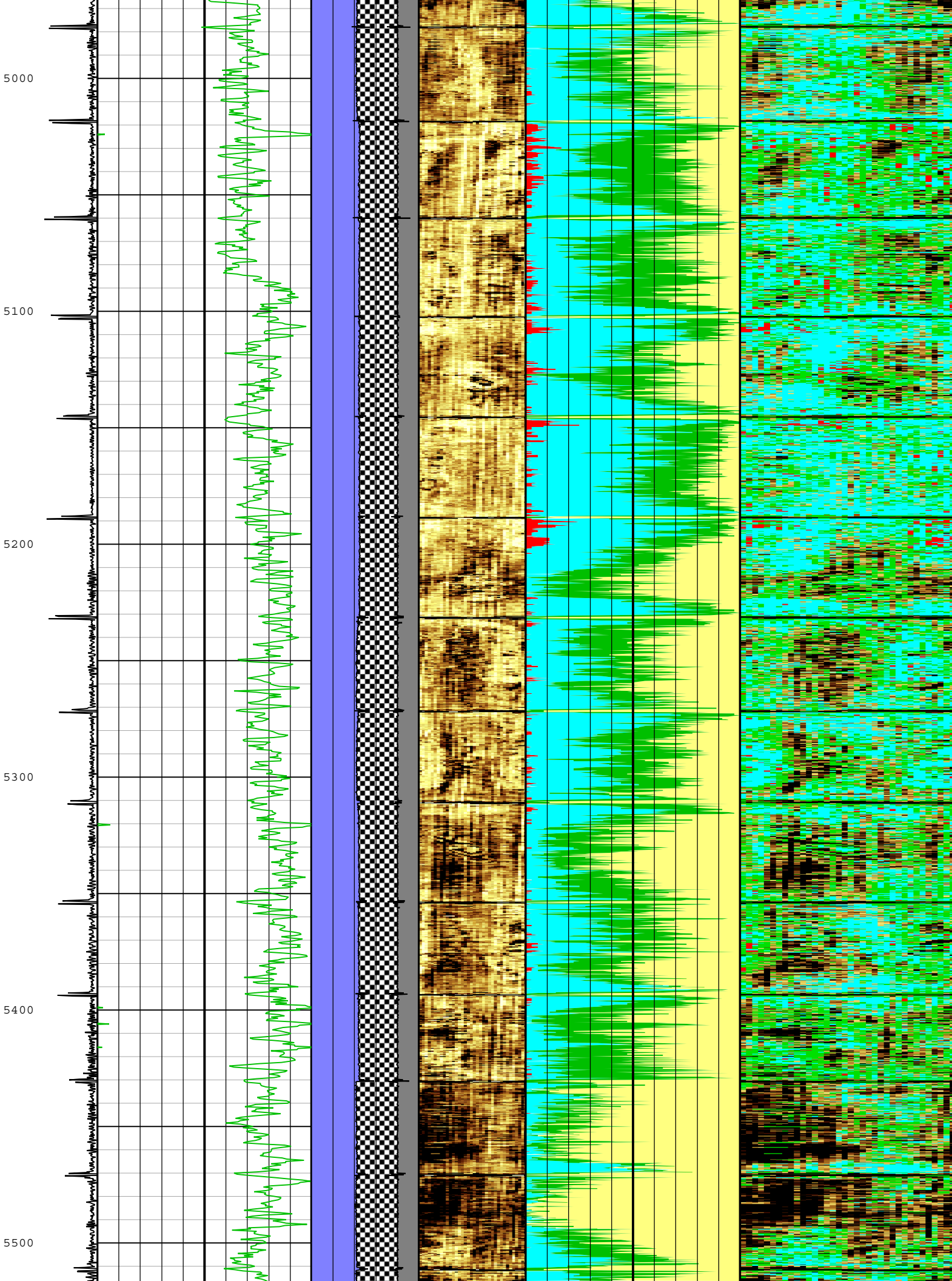


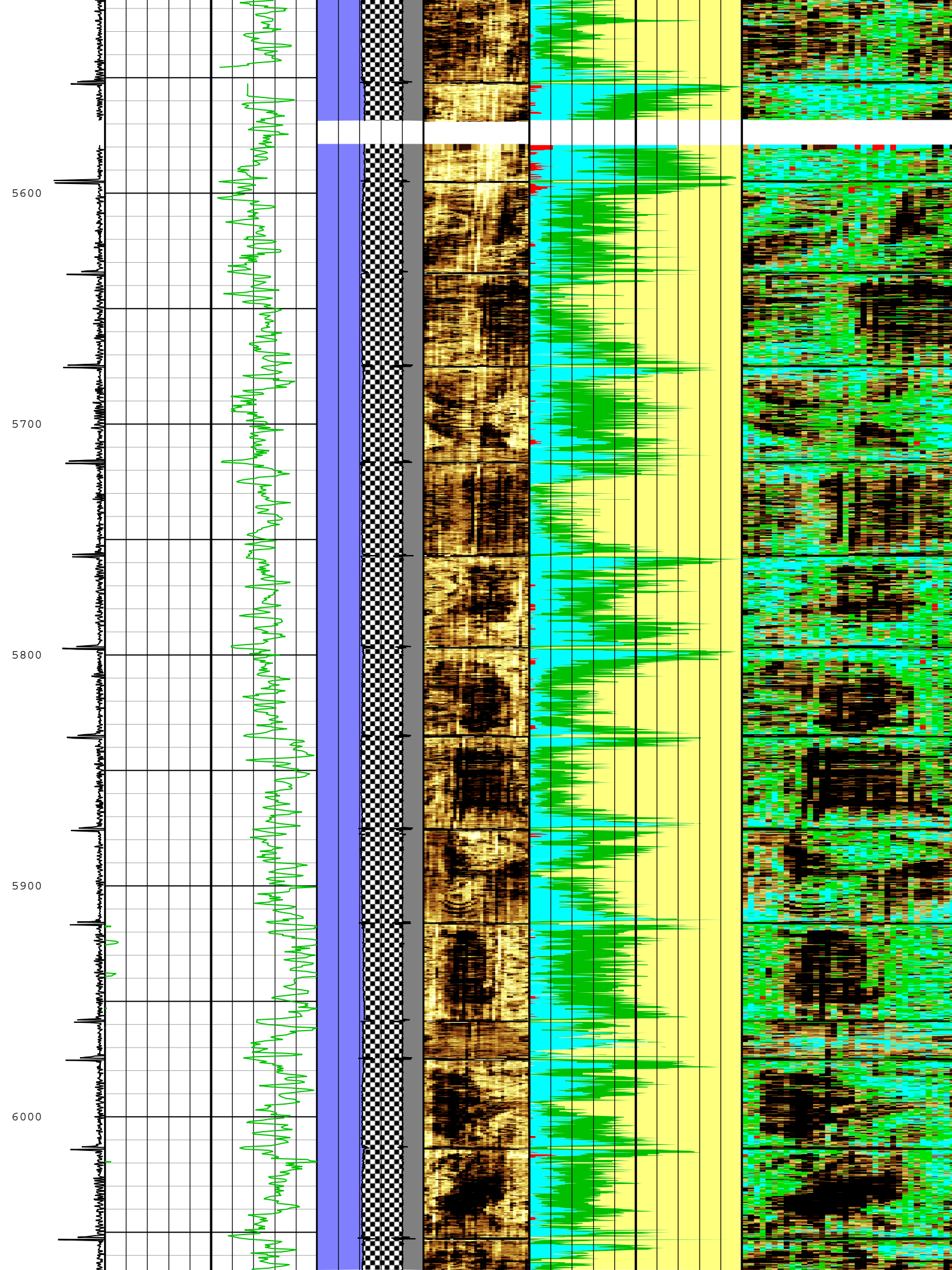


3900
4000
4100
4200
4300
4400

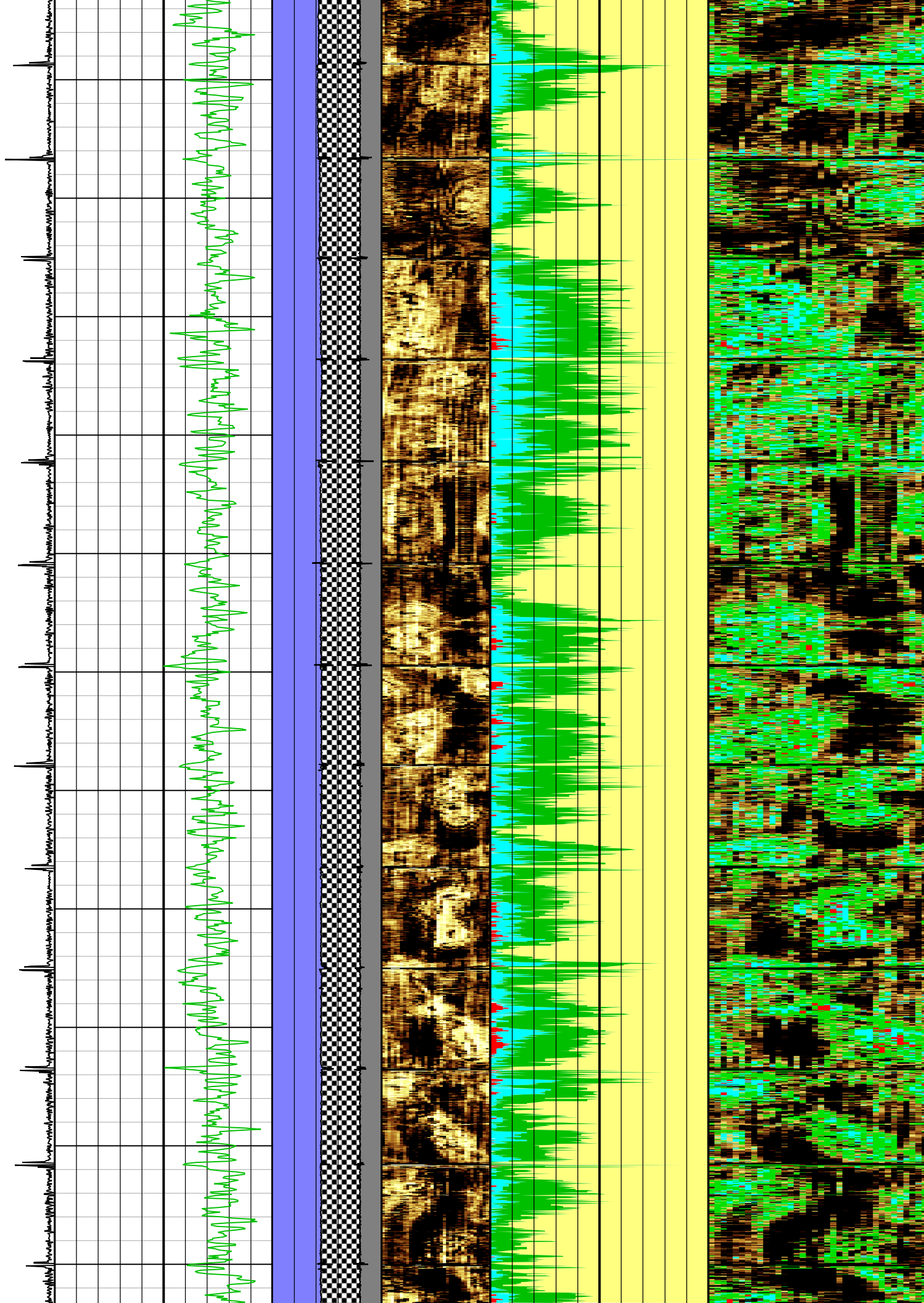


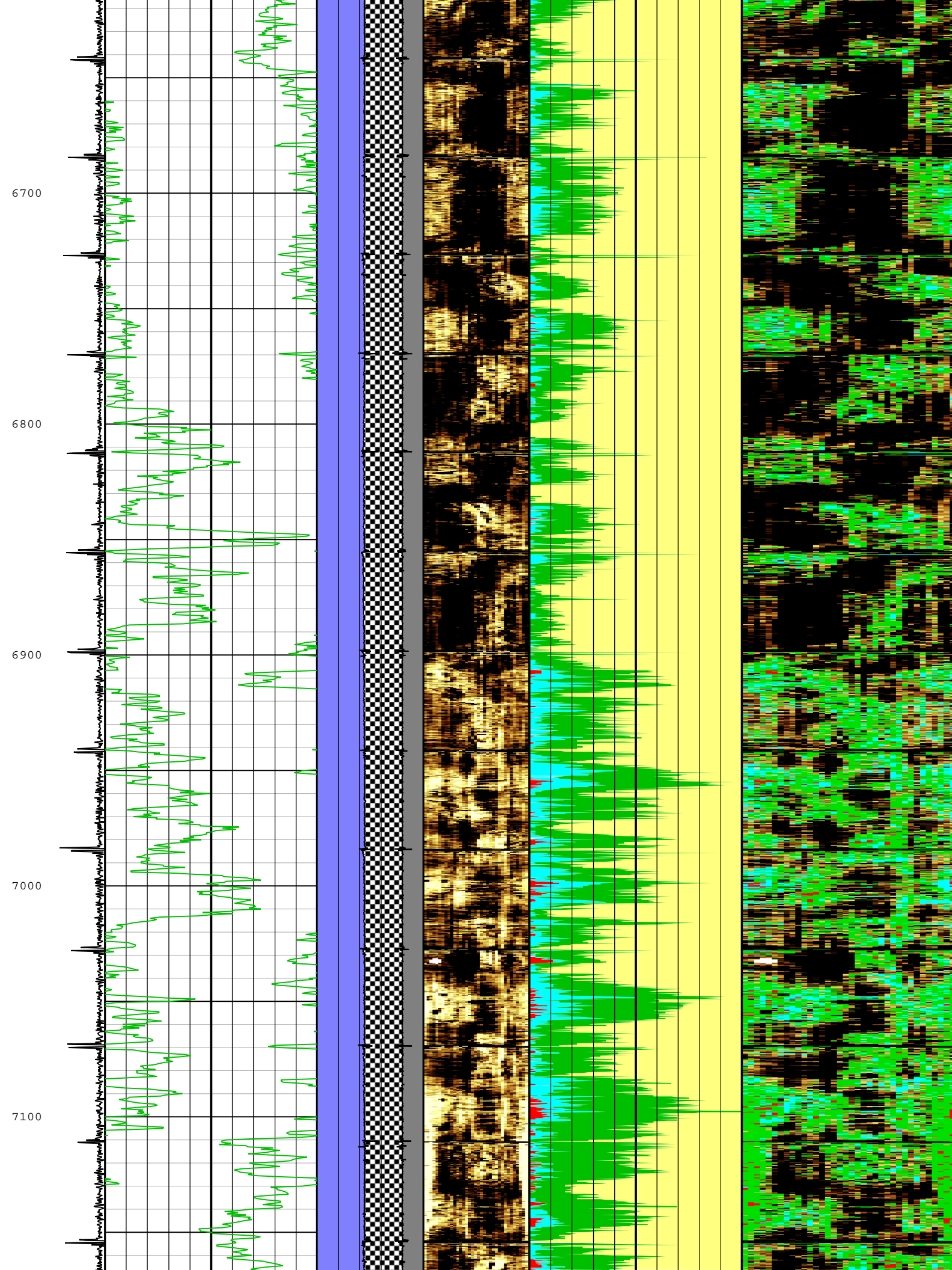


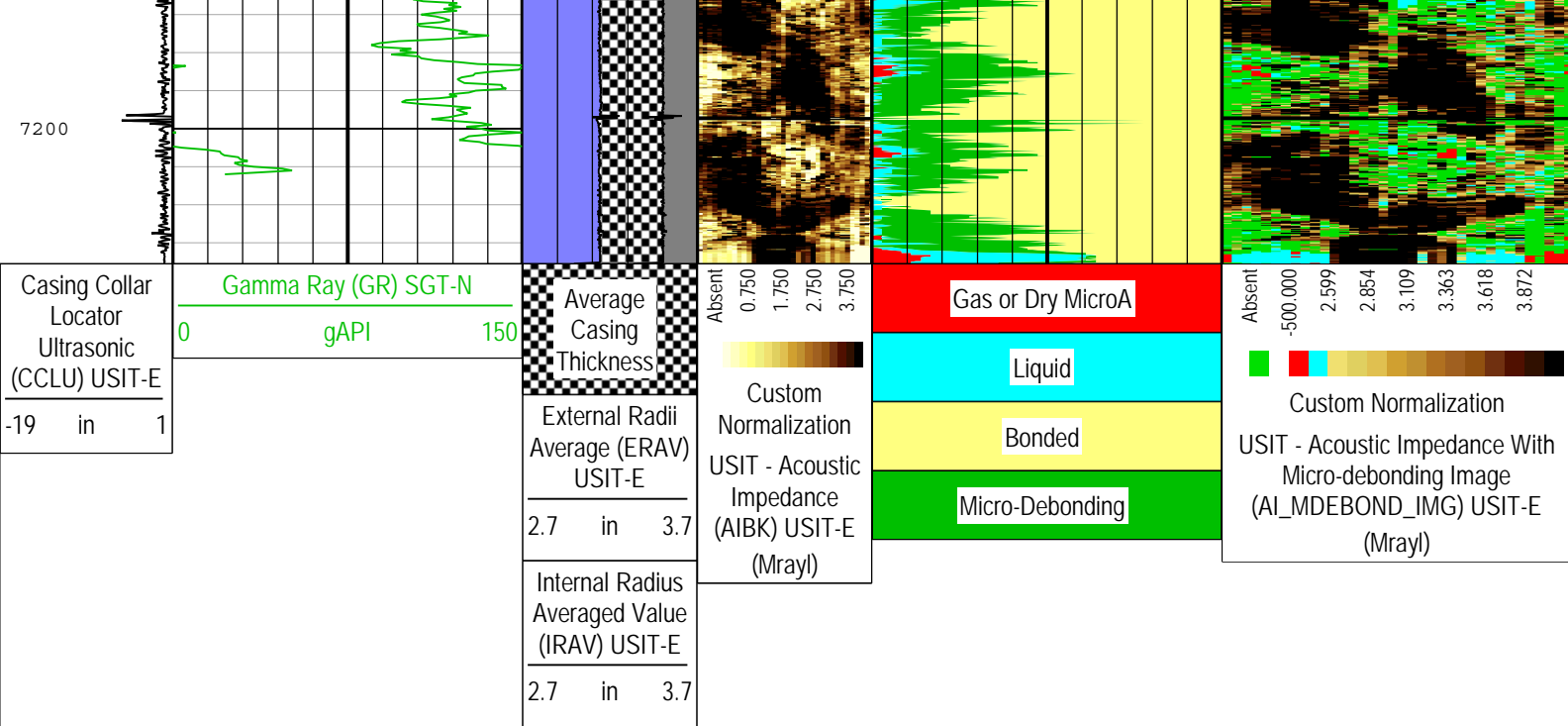




6100
6200
6300
6400
6500
6600







TIME_1900 - Time Marked every 60.00 (s)

Description: USI Corrosion Format: Log (ND State Only) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 22-Jul-2014 10:36:46

Channel Processing Parameters				
Parameter	Description	Tool	Value	Unit
AFVU	Automatic Fluid Velocity Update	USIT-E	On	
BARI	Barite Mud Presence Flag	Borehole	No	
BERJ	Bad Echo Rejection	USIT-E	On	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	8.75	in
CASING_PRATIO	Casing Poisson Ratio	USIT-E	Standard Poisson ratio	
CBLO	Casing Bottom (Logger)	WLSESSION	7412	ft
CDEN	Cement Density	SGT-N	16.69	lbm/gal
CMTY	Cement Type	USIT-E	Light Cement	
CTHILGR	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.352	in
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	190	us/ft
FDII	FPM Data Interpolation Interval	USIT-E	0	ft
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	BS	
GR_MULTIPLIER	Gamma Ray Multiplier	SGT-N	1	
HEMA	Hematite Presence Flag	Borehole	No	
ICE_PROCESS	ICE Processing	USIT-E	Yes	
IMAR	Image Rotation	USIT-E	Off	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-E	Depth Zoned	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	0	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1	
RAPID_OPTION	Rapid Access Computation Option	USIT-E	Off	
RCOD	Reference Calibrator Outer Diameter	USIT-E	7	in
RCSO	Reference Calibrator Standoff	USIT-E	1.181	in
RCTH	Reference Calibrator Thickness	USIT-E	0.295	in
SDNV	Number of Vertical Samples used for Micro-debonding	USIT-E	5	

SDNV	Number of Vertical Samples used for Micro-debonding Computation	USIT-E	3	
SDTHOR	Acoustic Impedance STD Horizontal Threshold for Micro-debonding	USIT-E	0.5	Mrayl
SdTVER	Acoustic Impedance STD Vertical Threshold for Micro-debonding	USIT-E	0.3	Mrayl
SOGR	Standoff Distance of the Gamma Ray Tool	SGT-N	0	in
TCUB	T^3 Processing Level	USIT-E	Loop	
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	130	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	70	%
TPOS	Tool Position: Centered or Eccentered	SGT-N	Centered	
UDFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0	Mrayl
UFGDE	Fiberglass Density	USIT-E	16.27	lbm/gal
UFGPS	Fiberglass Processing Selection	USIT-E	No	
UFGVL	Fiberglass Velocity	USIT-E	9678.48	ft/s
USI_FSOD	USIT USI Fluid Slowness Fits Casing Outer Diameter	USIT-E	0_OFF	
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-E	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-E	Manual	
UTHDP	Thickness Detection Policy	USIT-E	Fundamental	
VCAS	Ultrasonic Transversal Velocity in Casing	USIT-E	51.4	us/ft
ZCAS	Acoustic Impedance of Casing	USIT-E	46.25	Mrayl
ZINI	Initial Estimate of Cement Impedance	USIT-E	-1	Mrayl
ZMUD	Acoustic Impedance of Mud	Borehole	Depth Zoned	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.6	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

Depth Zone Parameters			
Parameter	Value	Start (ft)	Stop (ft)
MEAS_WLEN	22.5	26.5	7235.5
ZMUD	1.63	26.5	200
ZMUD	1.64	200	400
ZMUD	1.65	400	700
ZMUD	1.67	700	1000
ZMUD	1.69	1000	1500
ZMUD	1.71	1500	2000
ZMUD	1.73	2000	2500
ZMUD	1.75	2500	3000
ZMUD	1.76	3000	4000
ZMUD	1.77	4000	7235.5
All depth are actual.			

Tool Control Parameters				
Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	18	dB
DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
DOTF	Distance between Opposite Transducer Faces	USIT-E	2.874	in
EMXV	EMEX Voltage	USIT-E	Time Zoned	V
HRES	Horizontal Resolution	USIT-E	10 deg	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USFR	Ultrasonic Sampling Frequency	USIT-E	500000	Hz
USI_UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
USI_UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 3.0 in L.F.	

USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	7230	ft
VRES	Vertical Resolution	USIT-E	3.0 in	
WINB	Window Begin Time	USIT-E	Time Zoned	us
WINE	Window End Time	USIT-E	73.87	us

Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
EMXV	50	22-Jul-2014 09:03:36	22-Jul-2014 09:39:06	7235.94	3620.44
EMXV	40	22-Jul-2014 09:39:06	22-Jul-2014 09:39:14	3620.44	3605.81
EMXV	30	22-Jul-2014 09:39:14	22-Jul-2014 09:39:34	3605.81	3569.79
EMXV	20	22-Jul-2014 09:39:34	22-Jul-2014 09:39:46	3569.79	3549.61
EMXV	60	22-Jul-2014 09:39:46	22-Jul-2014 09:39:56	3549.61	3530.46
EMXV	40	22-Jul-2014 09:39:56	22-Jul-2014 09:52:17	3530.46	2243.88
EMXV	30	22-Jul-2014 09:52:17	22-Jul-2014 10:14:54	2243.88	50.42
WINB	33.87	22-Jul-2014 09:03:36	22-Jul-2014 09:06:05	7235.94	6998.4
WINB	35.2	22-Jul-2014 09:06:05	22-Jul-2014 09:07:46	6998.4	6823.87
WINB	32.2	22-Jul-2014 09:07:46	22-Jul-2014 10:14:54	6823.87	50.42

All depth are at tool zero.

USI Goodwin

USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Log[6]:Up	7235.94	50.42

Fluid Velocity = "Automatic".
CFVL equals DFSL channel

Start Depth(ft)	Stop Depth(ft)	Start Value(us/ft)	End Value(us/ft)
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Mud Impedance = "Manual".
CZMD uses ZMUD parameter zoned table below

Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
0	200	1.63	1.63
200	400	1.64	1.64
400	700	1.65	1.65
700	1000	1.67	1.67
1000	1500	1.69	1.69
1500	2000	1.71	1.71
2000	2500	1.73	1.73
2500	3000	1.75	1.75
3000	4000	1.76	1.76
4000		1.77	1.77

Run1: USIT

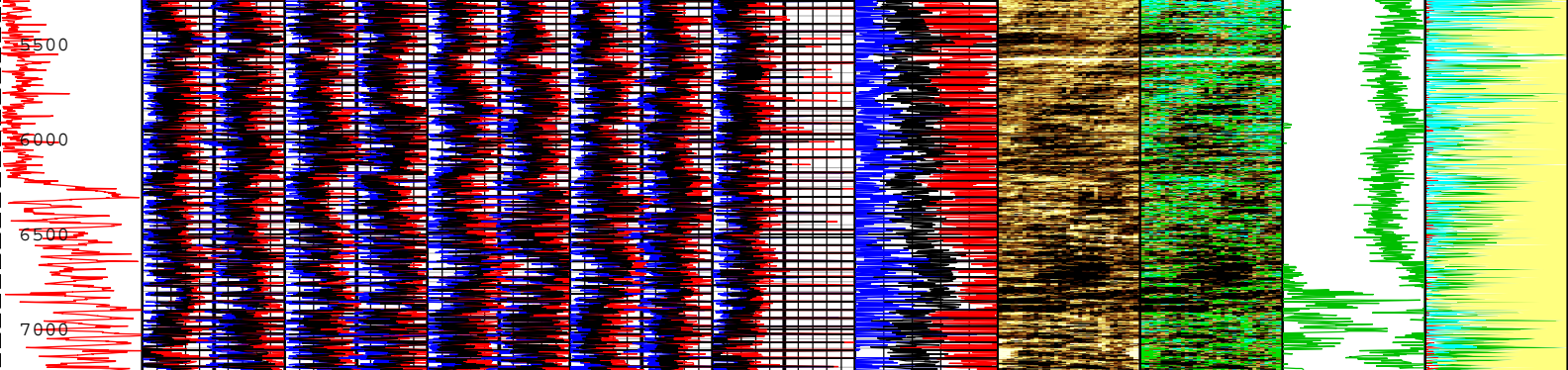
USI Goodwin Compressed

Log	Company:Noble Energy Inc Well:Storis E24-75HN Run1: USIT: Log[6]:Up:S002
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Description: USI Goodwin Format: USI Goodwin Index Scale: 0.1 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 22-Jul-2014 10:36:53

TIME_1900 - Time Marked every 60.00 (s)

Minimum Acoustic Impedance 1 (MIN_AI1) USIT-E	Minimum Acoustic Impedance 3 (MIN_AI3) USIT-E	Minimum Acoustic Impedance 5 (MIN_AI5) USIT-E	Minimum Acoustic Impedance 7 (MIN_AI7) USIT-E
0 - Mread: 15	0 - Mread: 15	0 - Mread: 15	0 - Mread: 15



Amplitude of Eccentering (ECCE) USIT-E 0 in 0.5	Minimum Acoustic Impedance 1 (MIN_AI1) USIT-E 0 Mrayl 15	Minimum Acoustic Impedance 3 (MIN_AI3) USIT-E 0 Mrayl 15	Minimum Acoustic Impedance 5 (MIN_AI5) USIT-E 0 Mrayl 15	Minimum Acoustic Impedance 7 (MIN_AI7) USIT-E 0 Mrayl 15	Minimum Acoustic Impedance 9 (MIN_AI9) USIT-E 0 Mrayl 15	Acoustic Impedance Minimum (AIMN) USIT-E 0 Mrayl 7.5	<div>Absent 0.750 1.750 2.750 3.750</div> <div>Custom Normalization</div> <div>USIT - Acoustic Impedance (AIBK) USIT-E (Mrayl)</div>	<div>Absent 2.599 3.109 3.618</div> <div>Custom Normalization</div> <div>USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)</div>	GR<75 Gamma Ray (GR) SGT-N 0 gAPI 150	Micro-Debonded Gas Liquid Bonded
	Maximum Acoustic Impedance 1 (MAX_AI1) USIT-E 0 Mrayl 15	Maximum Acoustic Impedance 3 (MAX_AI3) USIT-E 0 Mrayl 15	Maximum Acoustic Impedance 5 (MAX_AI5) USIT-E 0 Mrayl 15	Maximum Acoustic Impedance 7 (MAX_AI7) USIT-E 0 Mrayl 15	Maximum Acoustic Impedance 9 (MAX_AI9) USIT-E 0 Mrayl 15	Acoustic Impedance Maximum (AIMX) USIT-E 0 Mrayl 7.5				
	Average Acoustic Impedance 1 (AV_AI1) USIT-E 0 Mrayl 15	Average Acoustic Impedance 3 (AV_AI3) USIT-E 0 Mrayl 15	Average Acoustic Impedance 5 (AV_AI5) USIT-E 0 Mrayl 15	Average Acoustic Impedance 7 (AV_AI7) USIT-E 0 Mrayl 15	Average Acoustic Impedance 9 (AV_AI9) USIT-E 0 Mrayl 15	Acoustic Impedance Average (AIAV) USIT-E 0 Mrayl 7.5				
	Minimum Acoustic Impedance 2 (MIN_AI2) USIT-E -7.5Mrayl 7.5	Minimum Acoustic Impedance 4 (MIN_AI4) USIT-E -7.5Mrayl 7.5	Minimum Acoustic Impedance 6 (MIN_AI6) USIT-E -7.5Mrayl 7.5	Minimum Acoustic Impedance 8 (MIN_AI8) USIT-E -7.5Mrayl 7.5						
	Maximum Acoustic Impedance 2 (MAX_AI2) USIT-E -7.5Mrayl 7.5	Maximum Acoustic Impedance 4 (MAX_AI4) USIT-E -7.5Mrayl 7.5	Maximum Acoustic Impedance 6 (MAX_AI6) USIT-E -7.5Mrayl 7.5	Maximum Acoustic Impedance 8 (MAX_AI8) USIT-E -7.5Mrayl 7.5						
	Average Acoustic Impedance 2 (AV_AI2) USIT-E -7.5Mrayl 7.5	Average Acoustic Impedance 4 (AV_AI4) USIT-E -7.5Mrayl 7.5	Average Acoustic Impedance 6 (AV_AI6) USIT-E -7.5Mrayl 7.5	Average Acoustic Impedance 8 (AV_AI8) USIT-E -7.5Mrayl 7.5						

TIME_1900 - Time Marked every 60.00 (s)

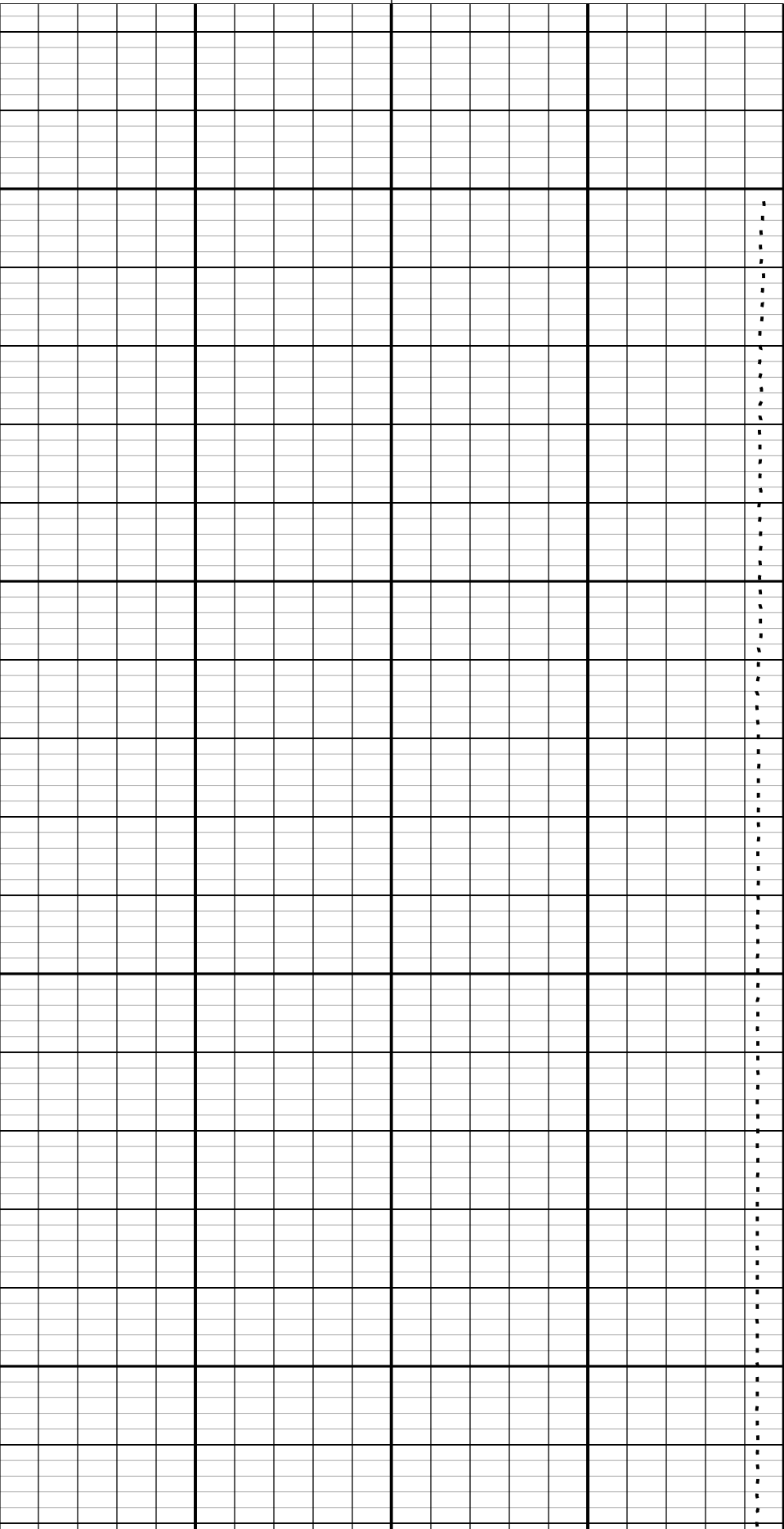
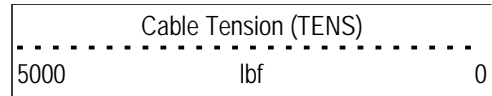
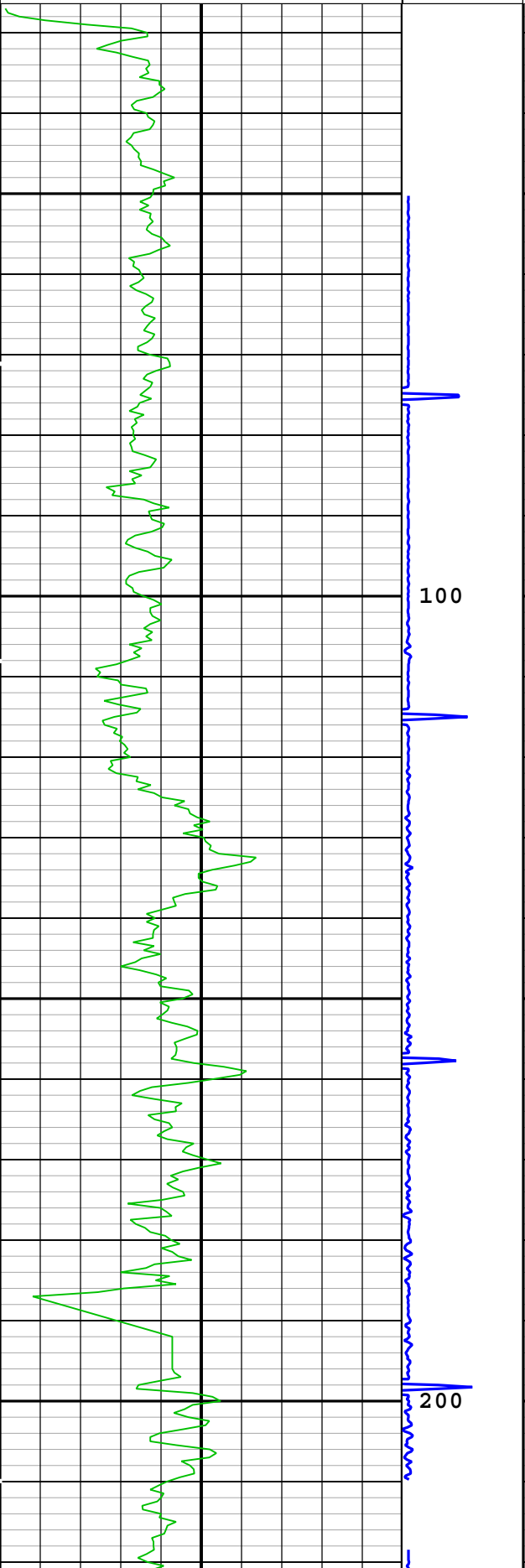
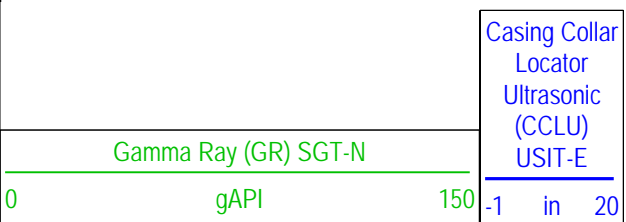
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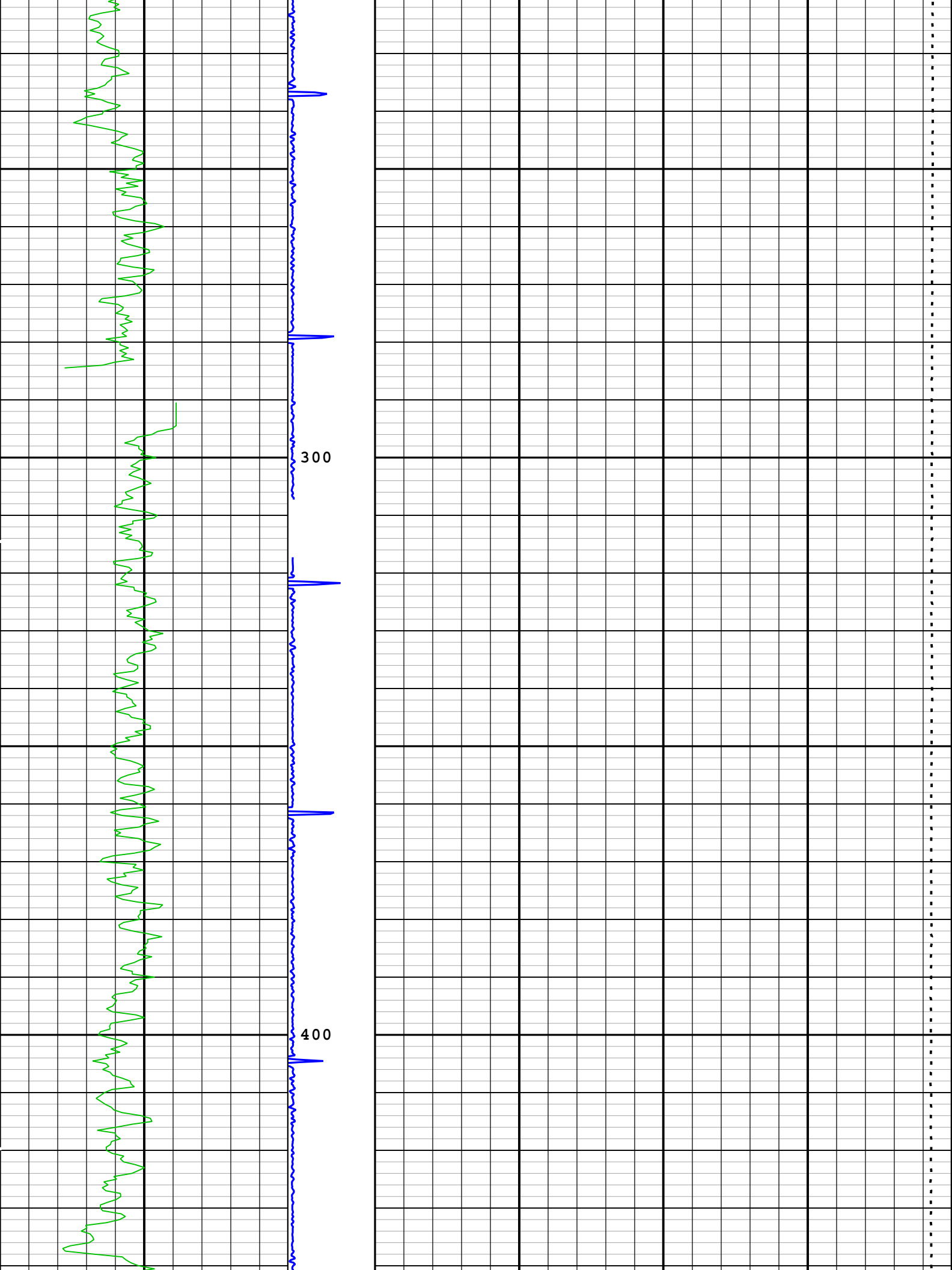
Run1: USIT	
Correlation Log	
Log	Company:Noble Energy Inc Well:Storis E24-75HN Run1: USIT: Log[6]:Up:S002

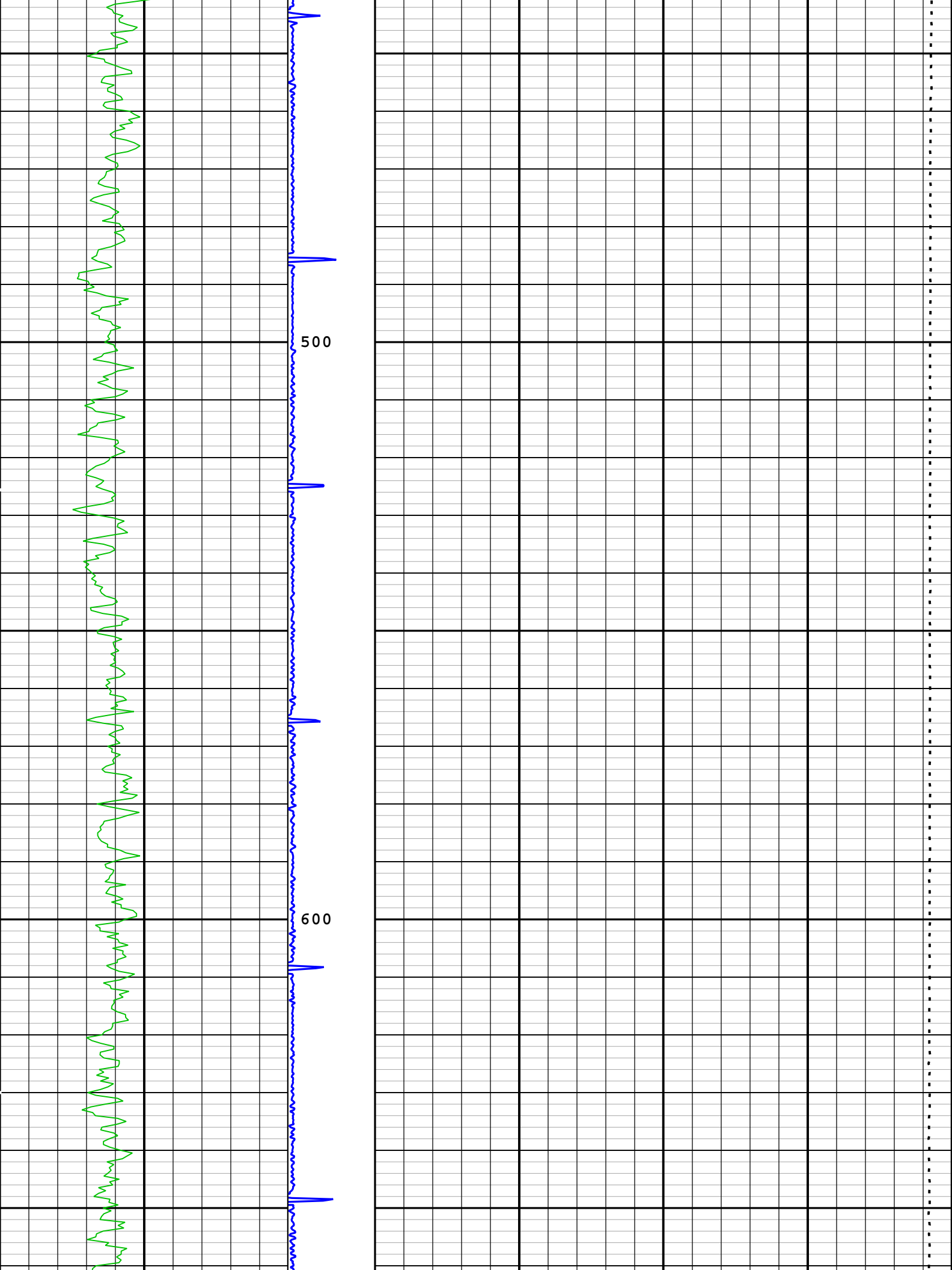
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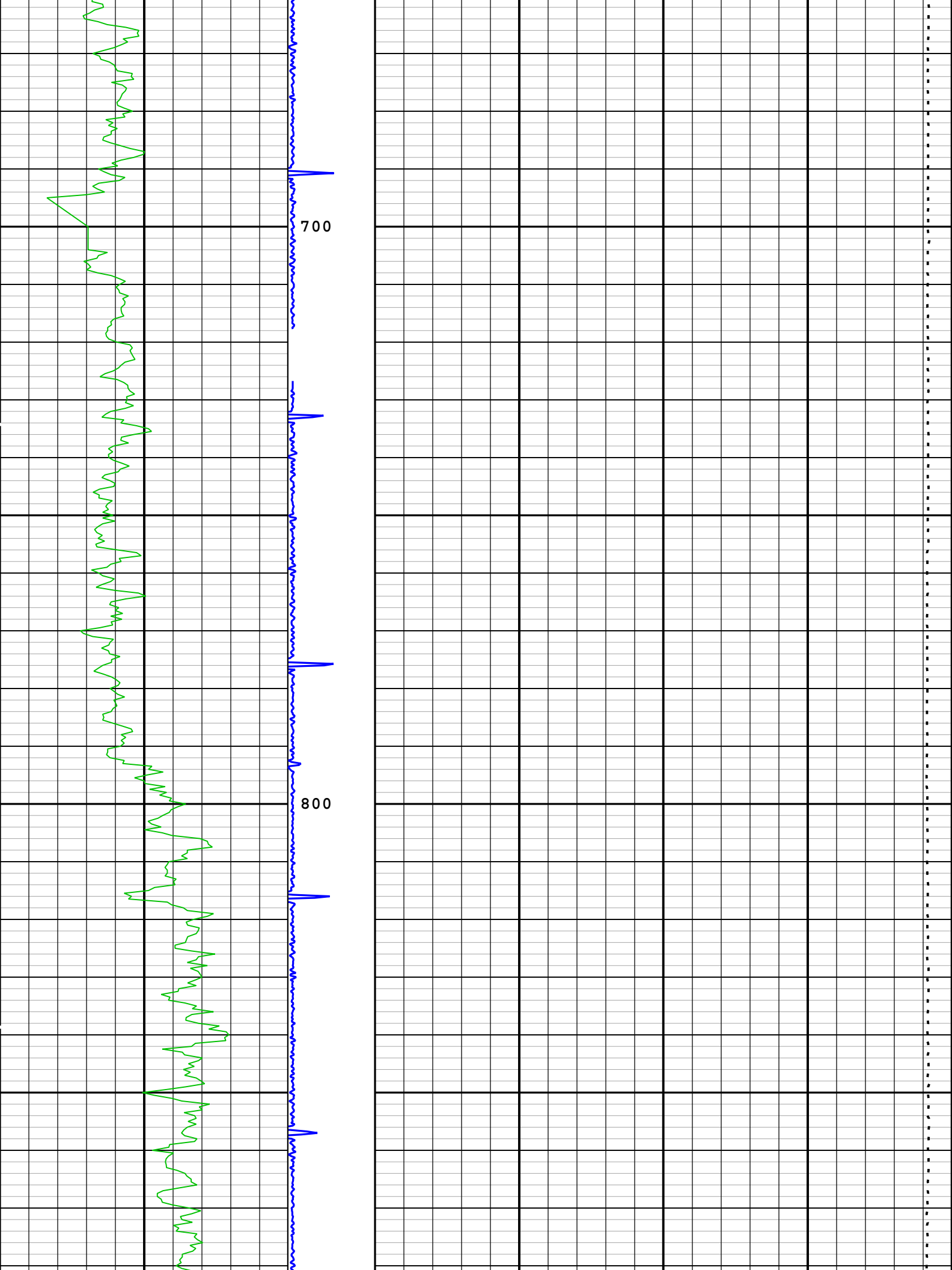
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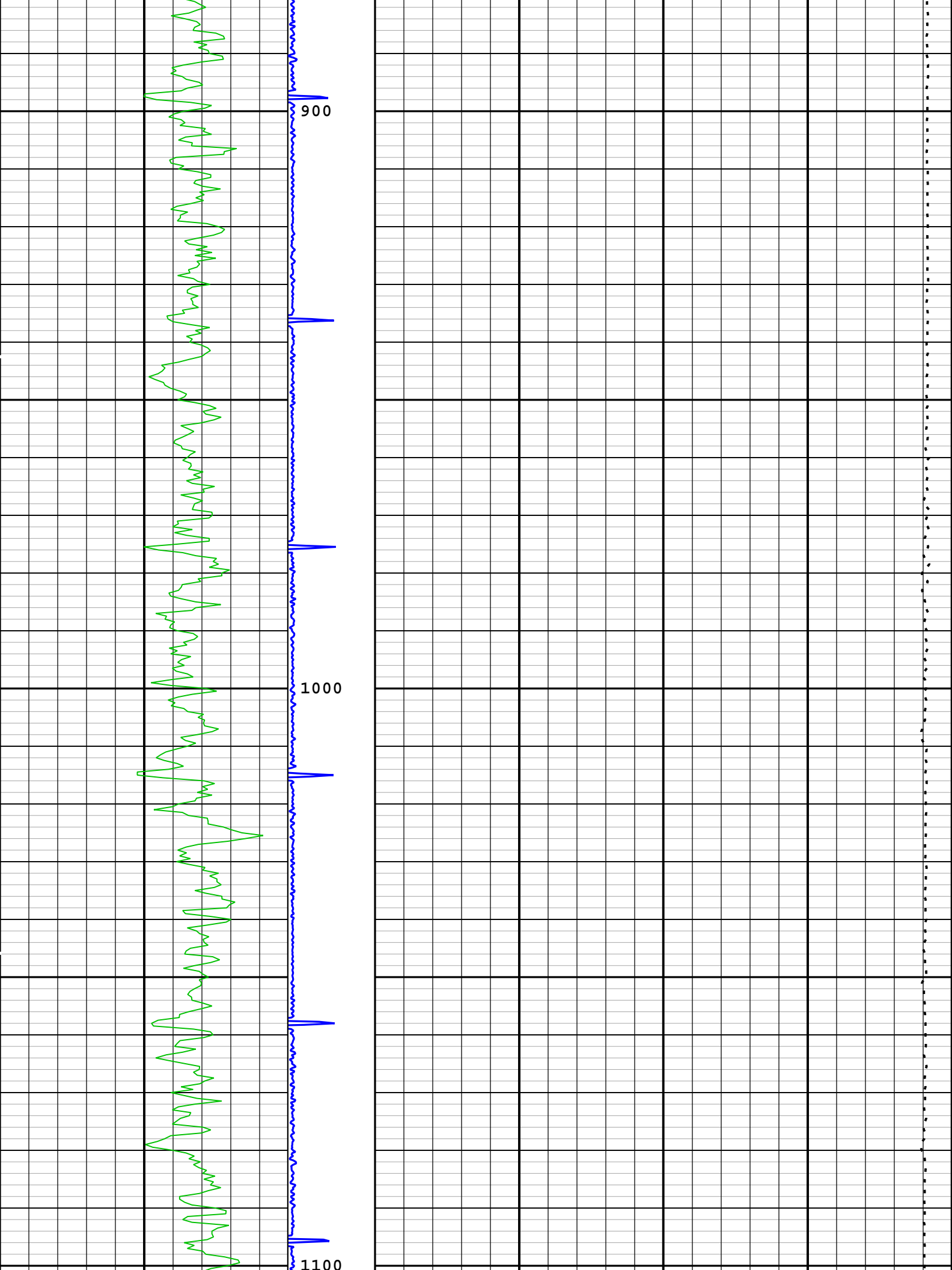
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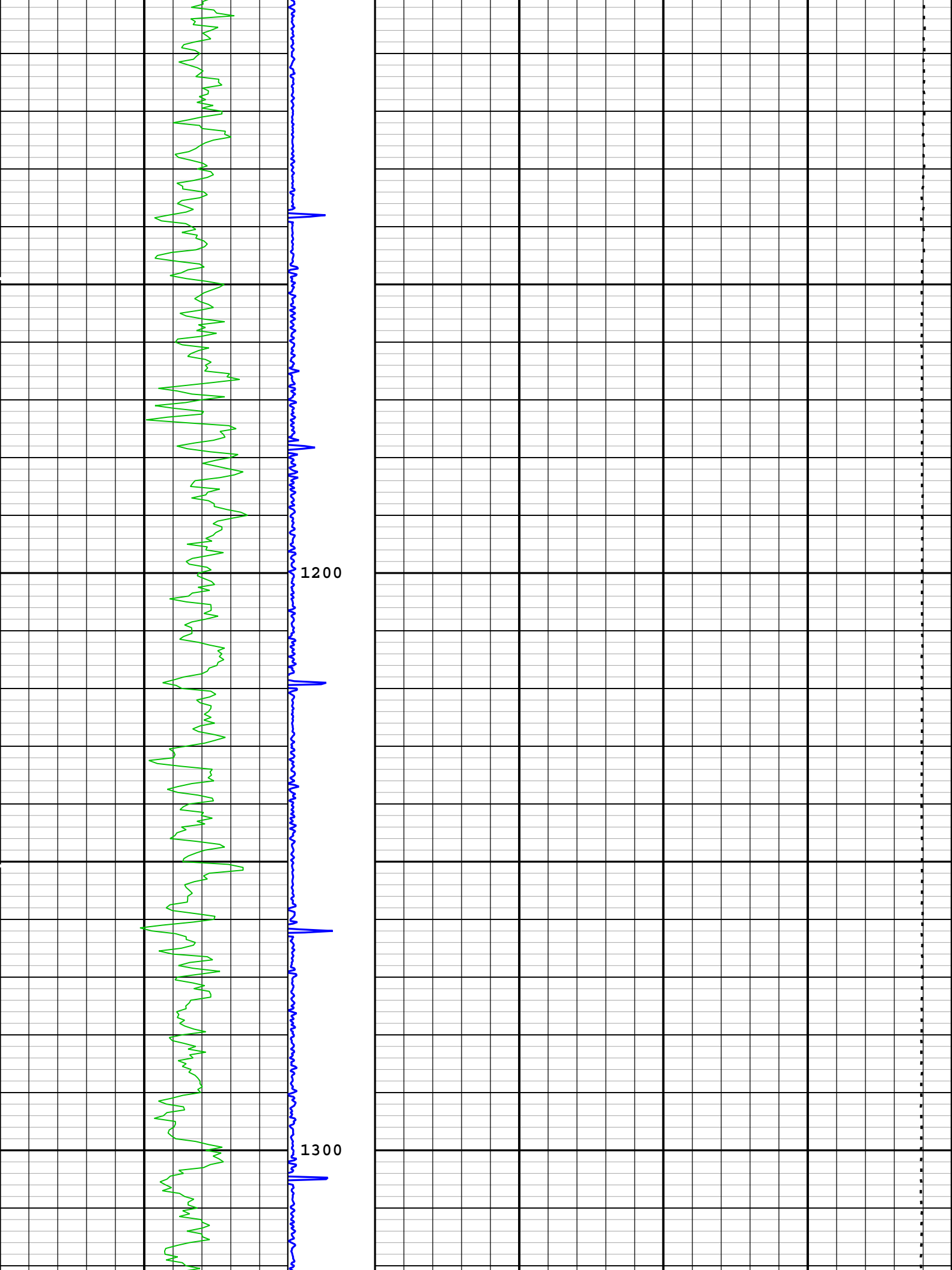


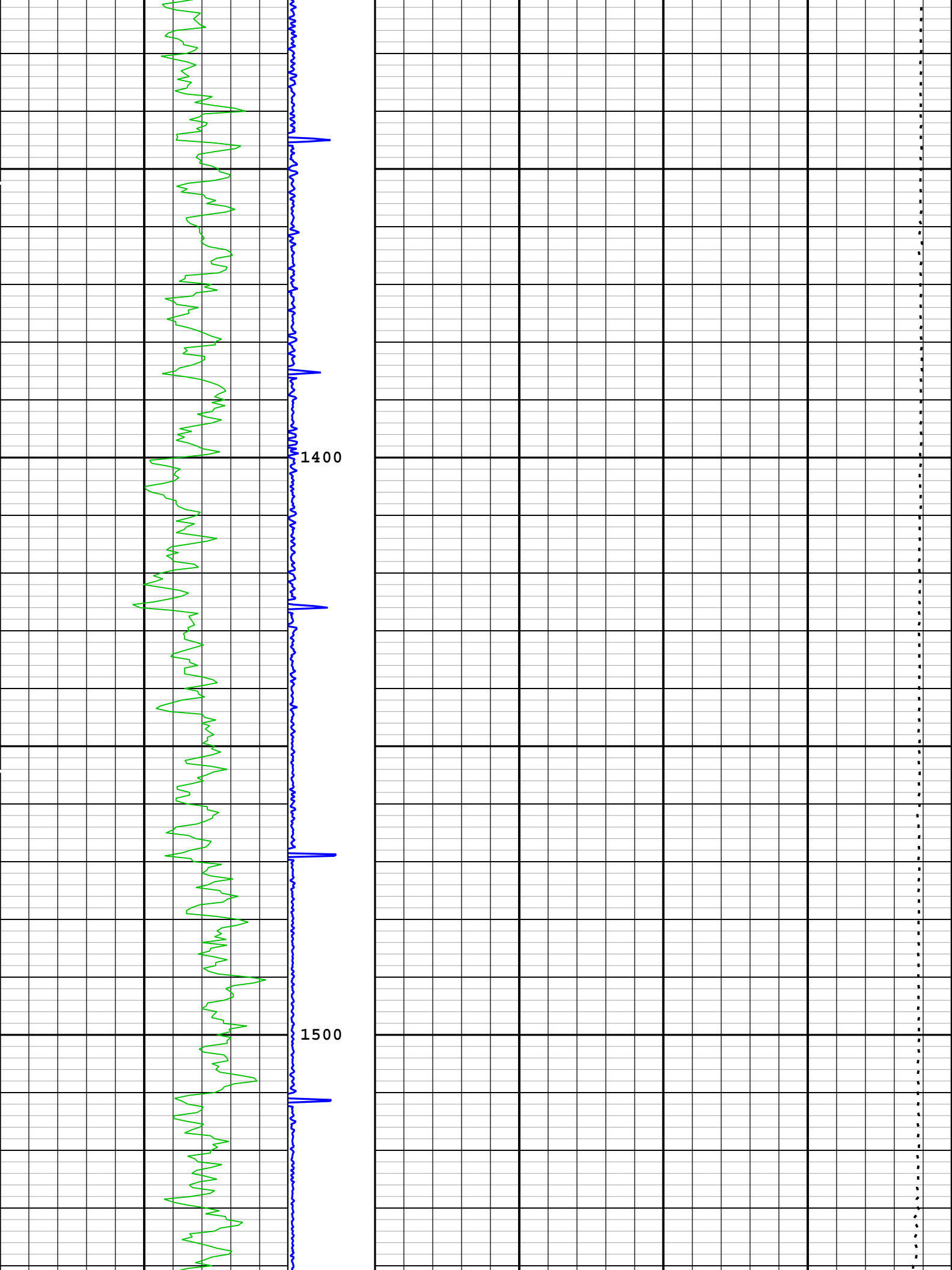


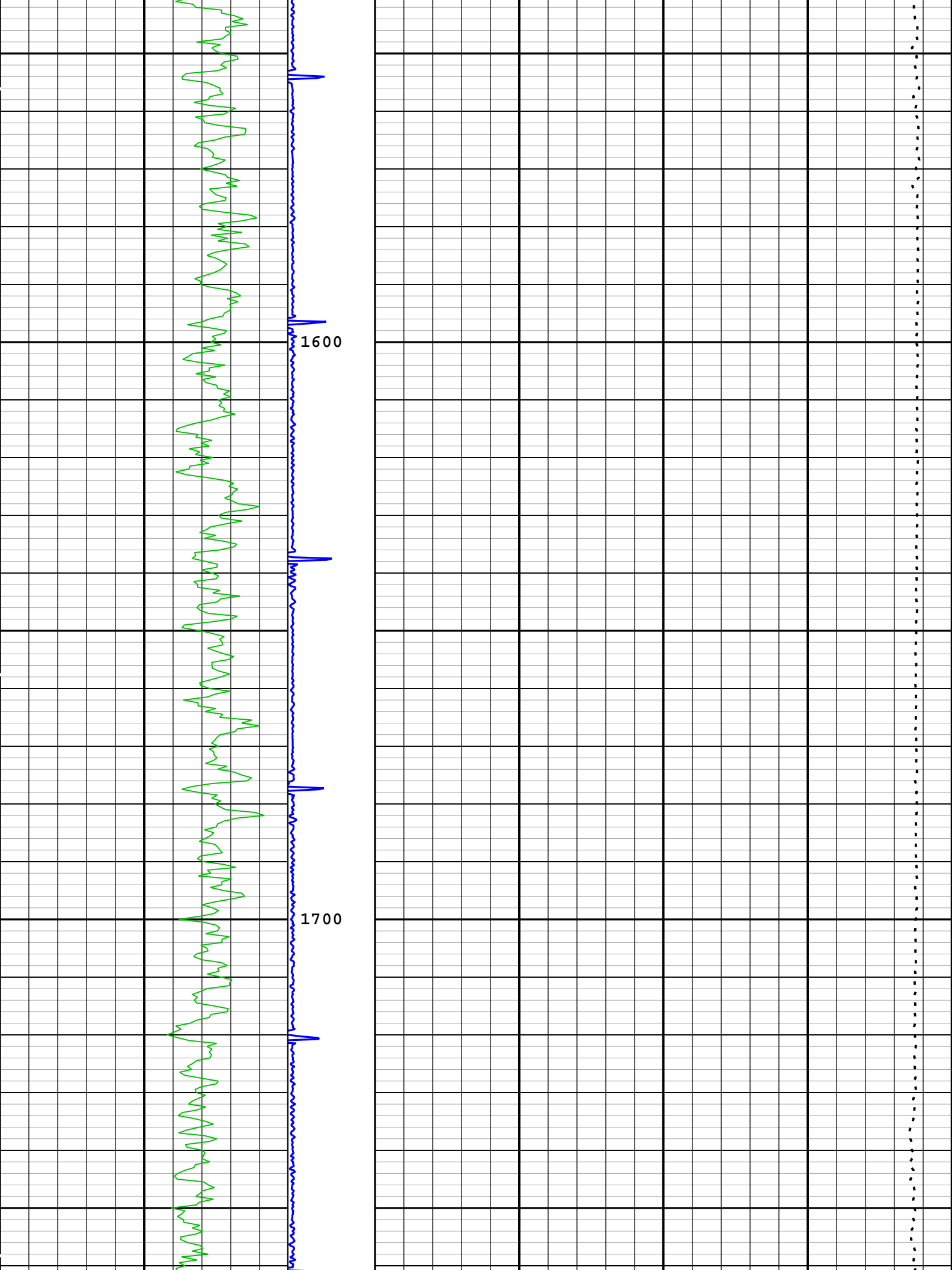


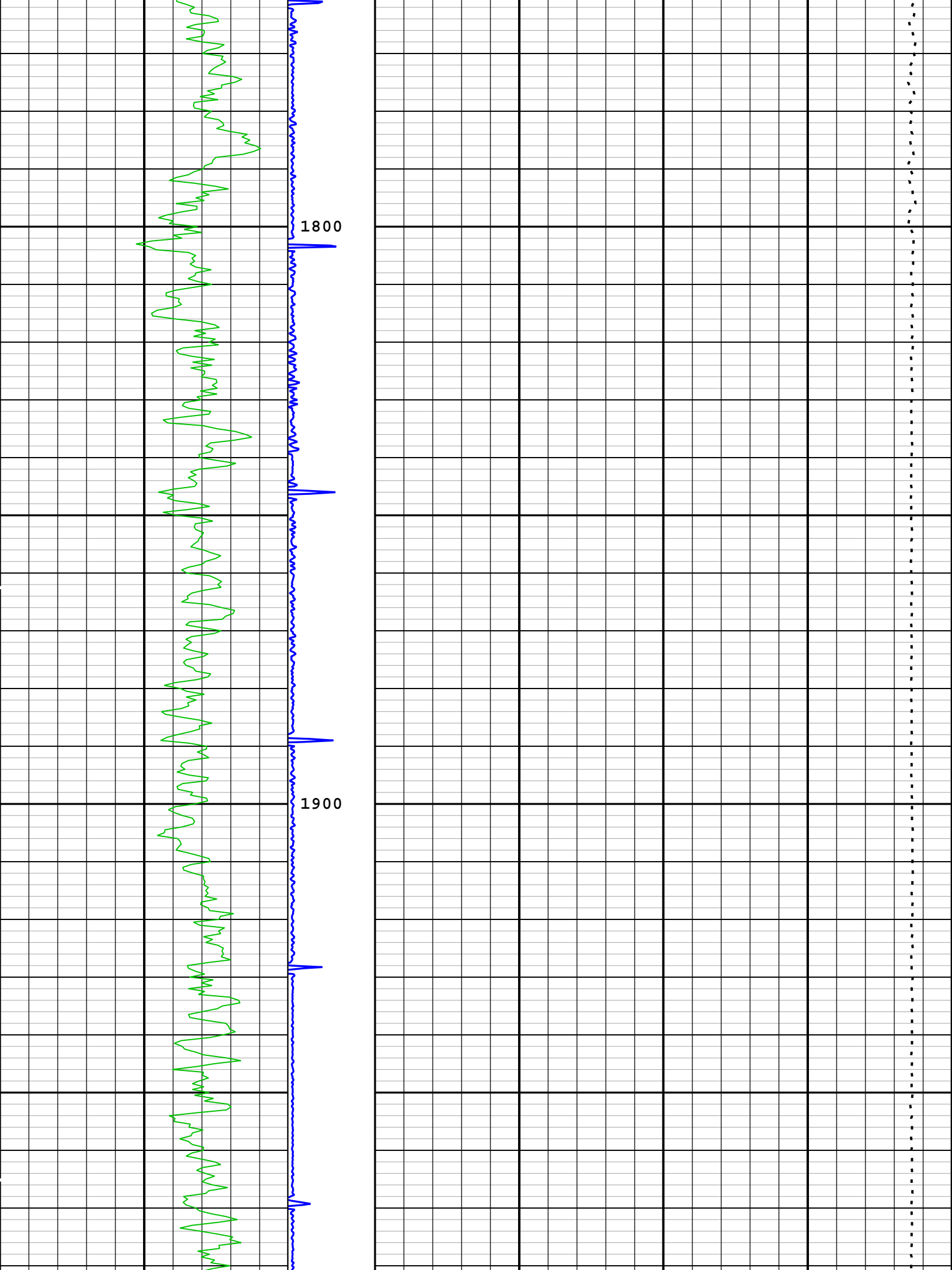


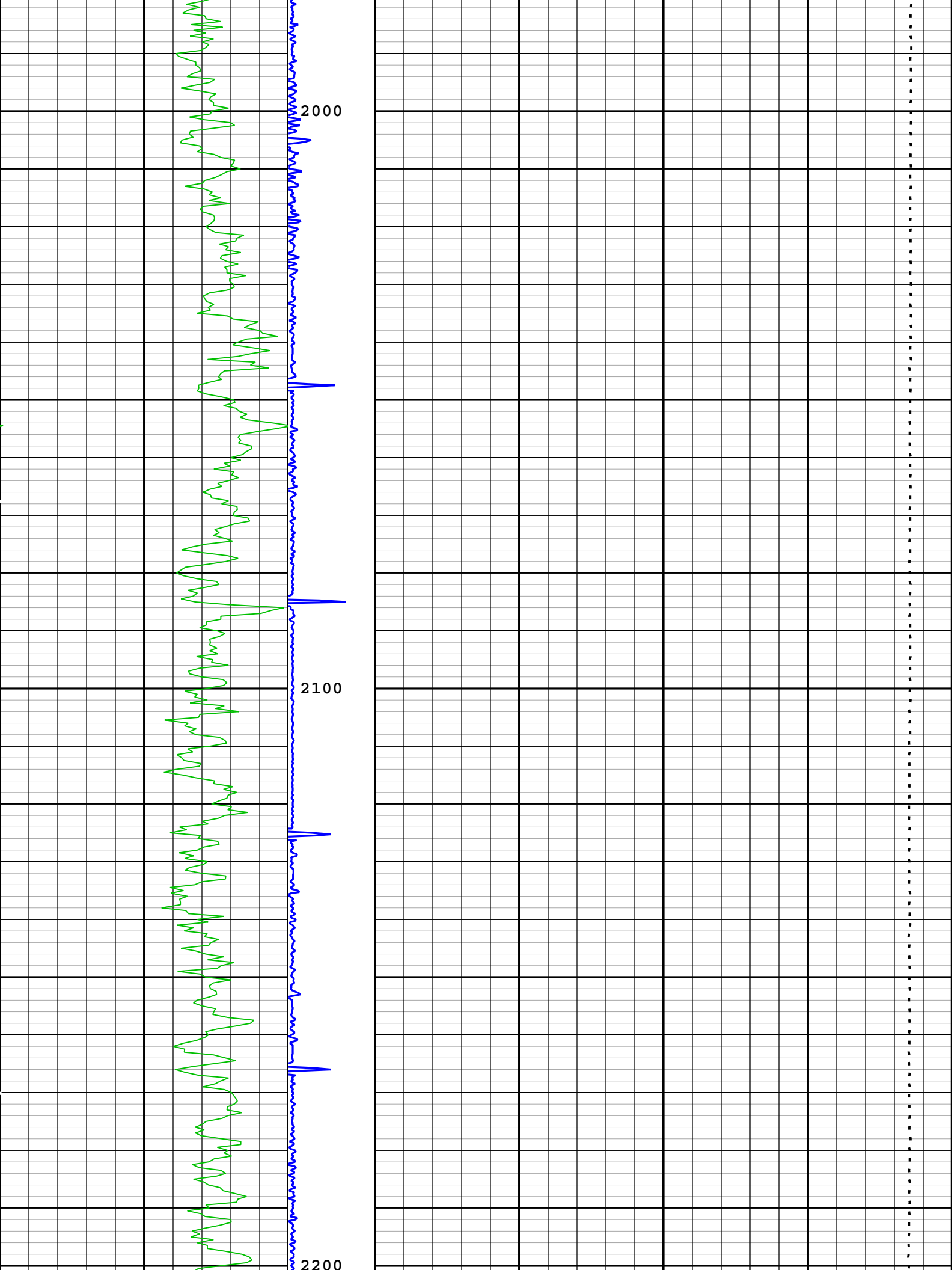


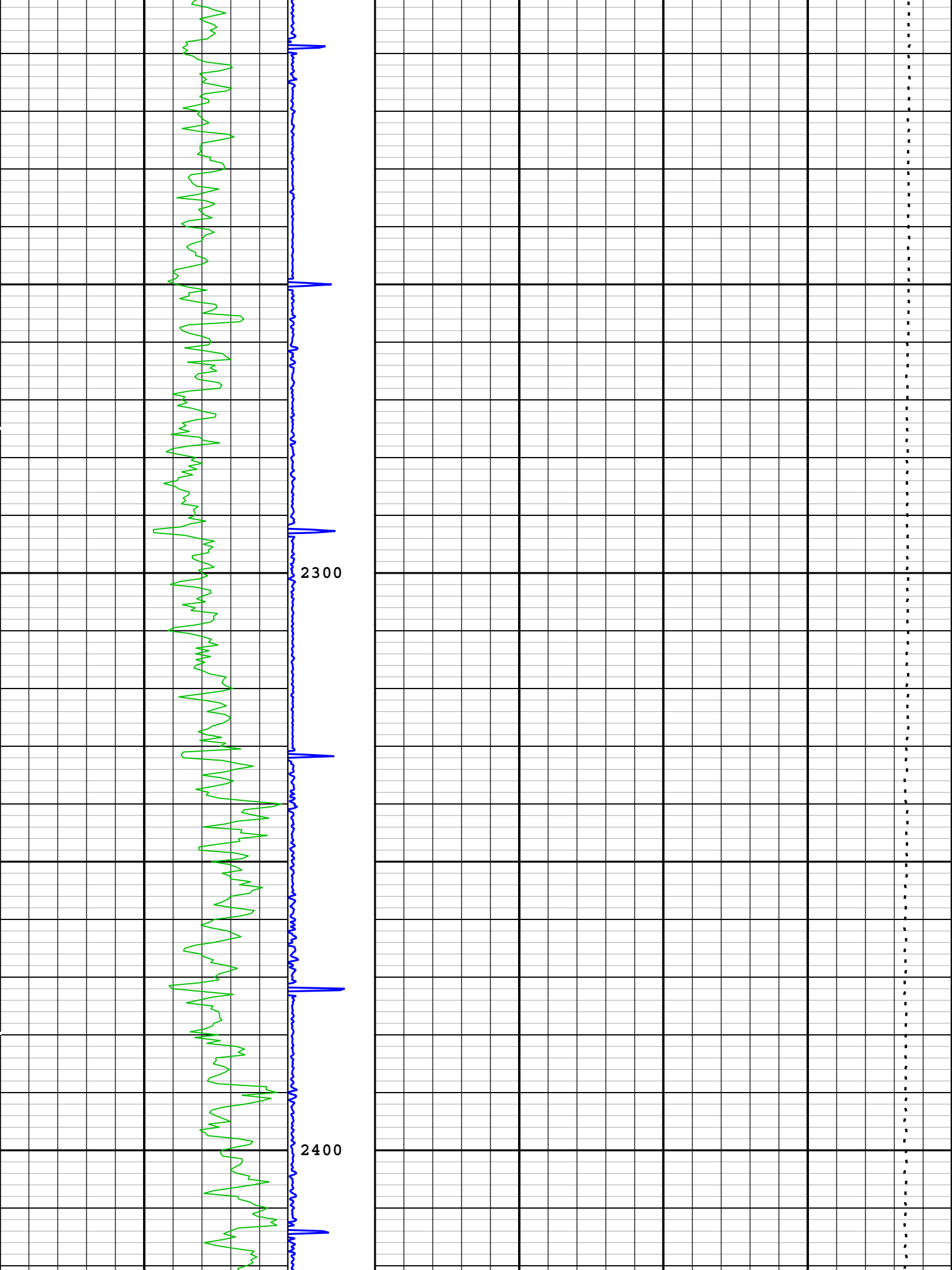


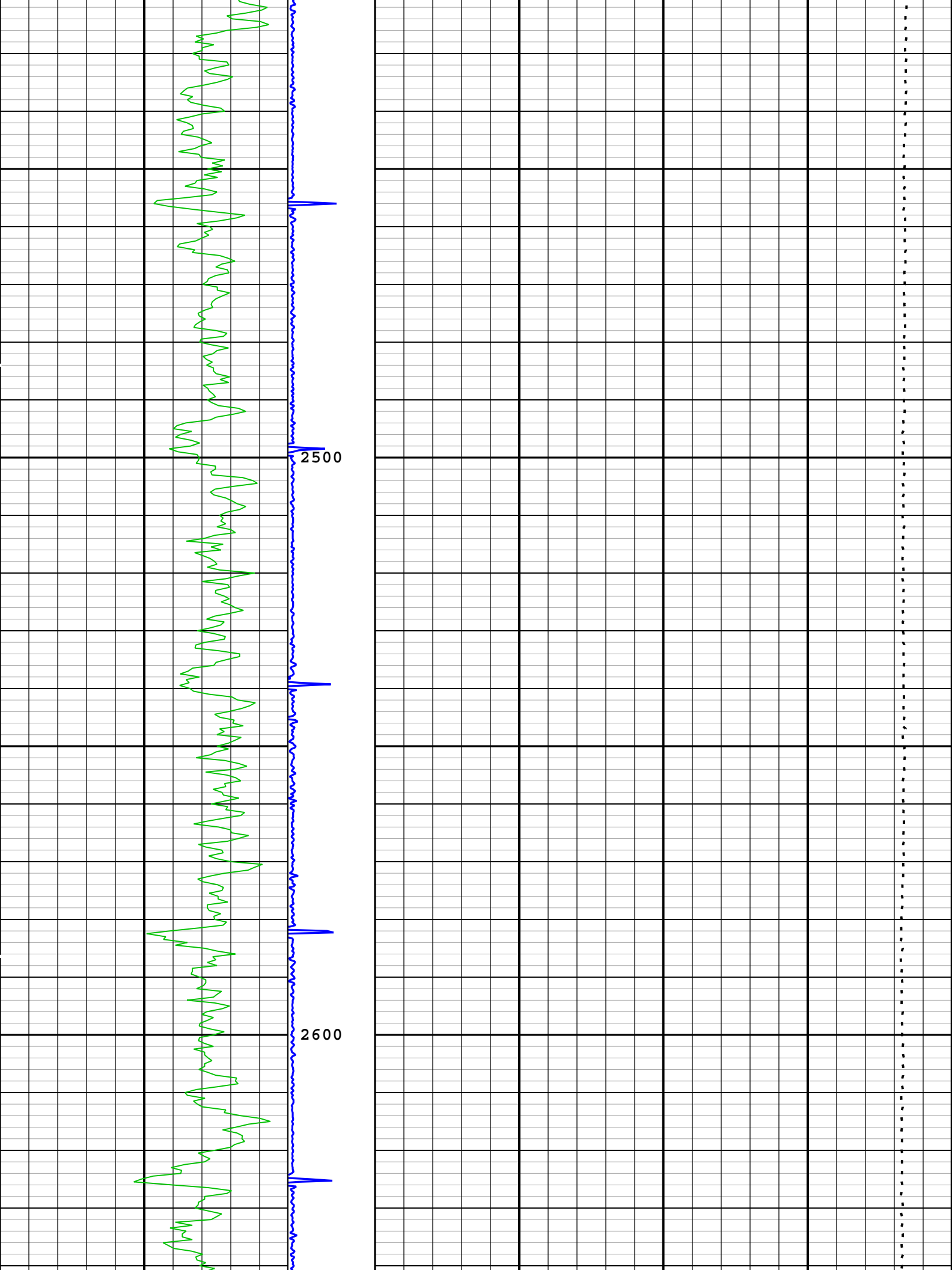


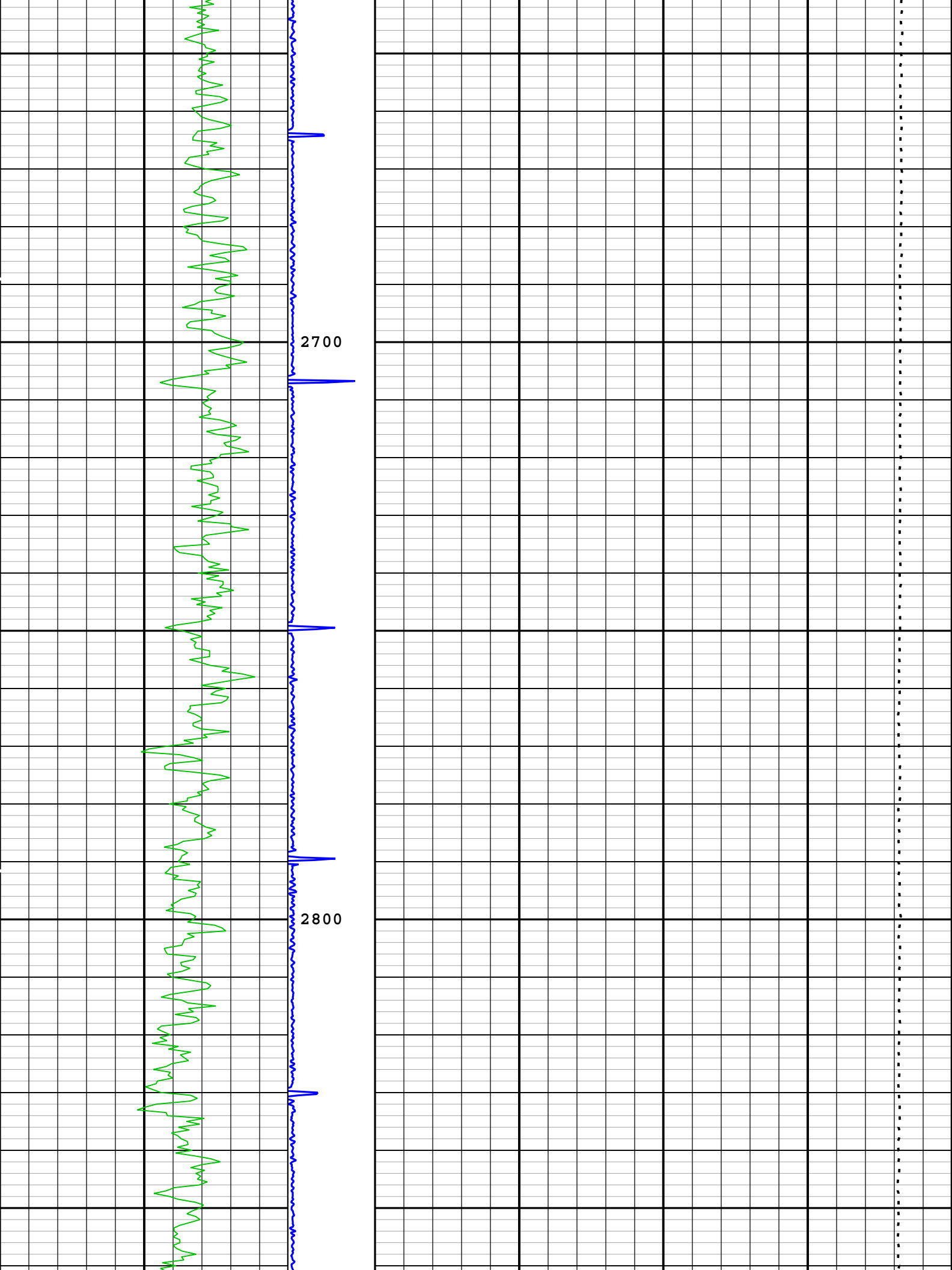


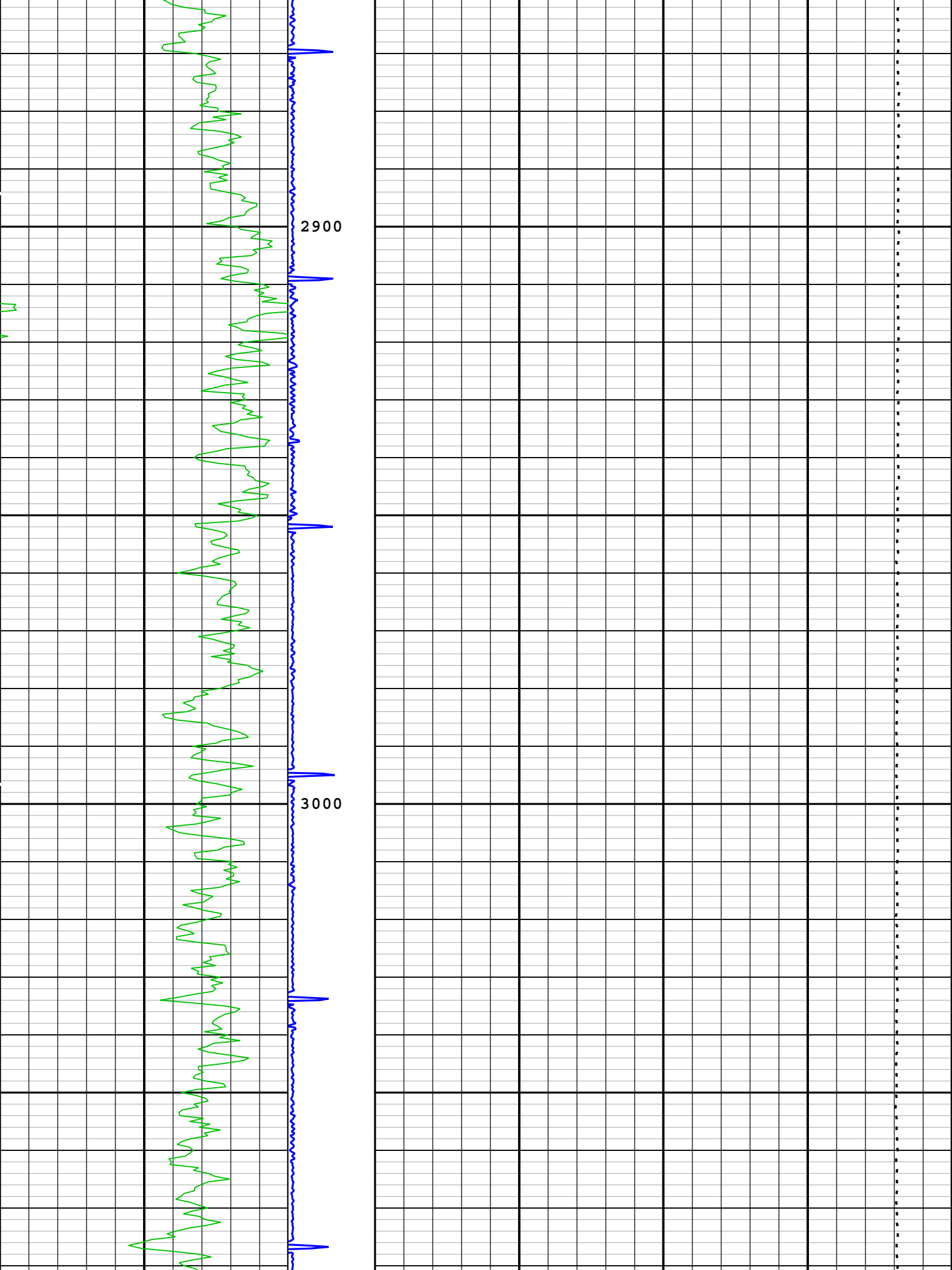


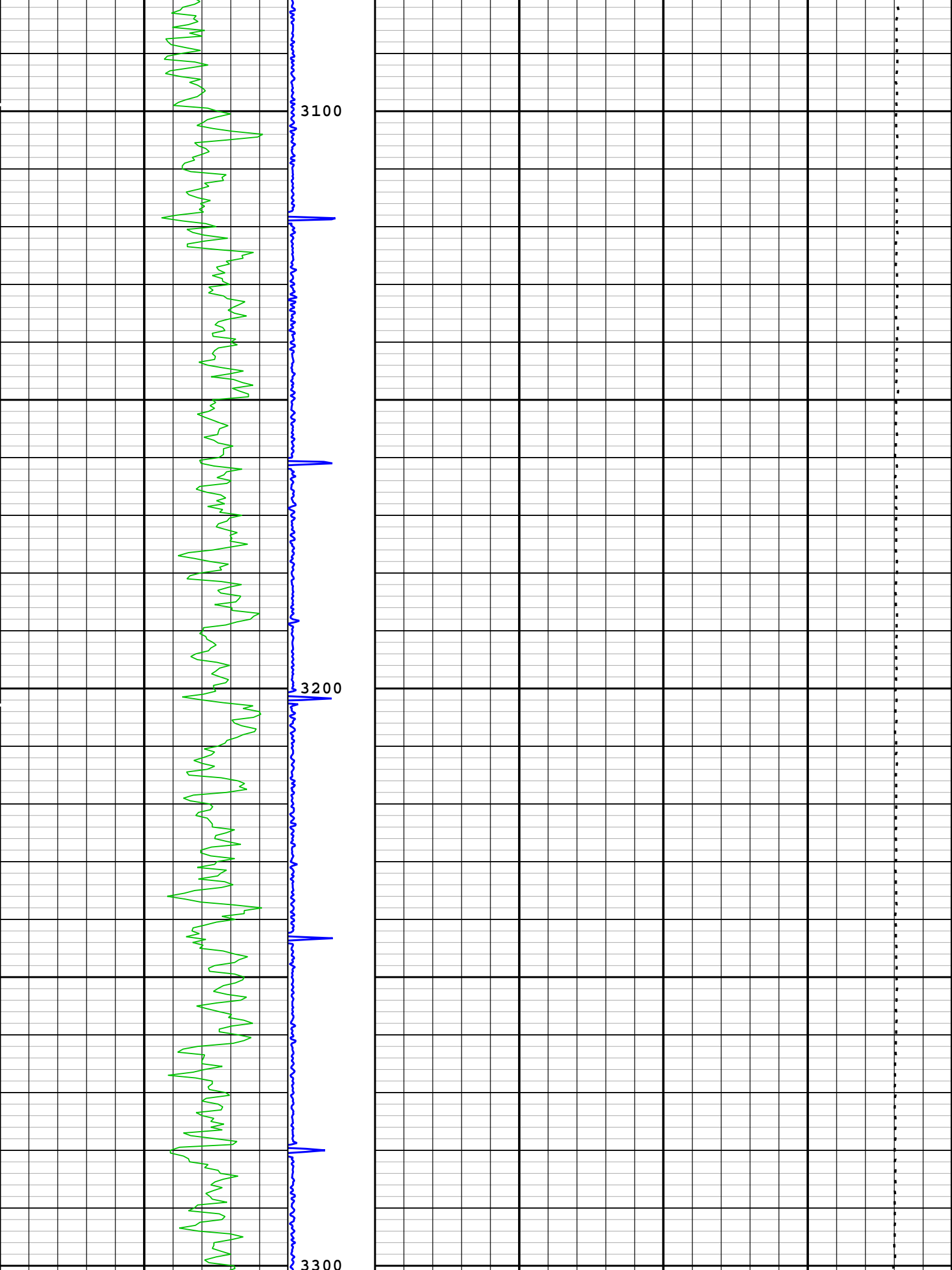


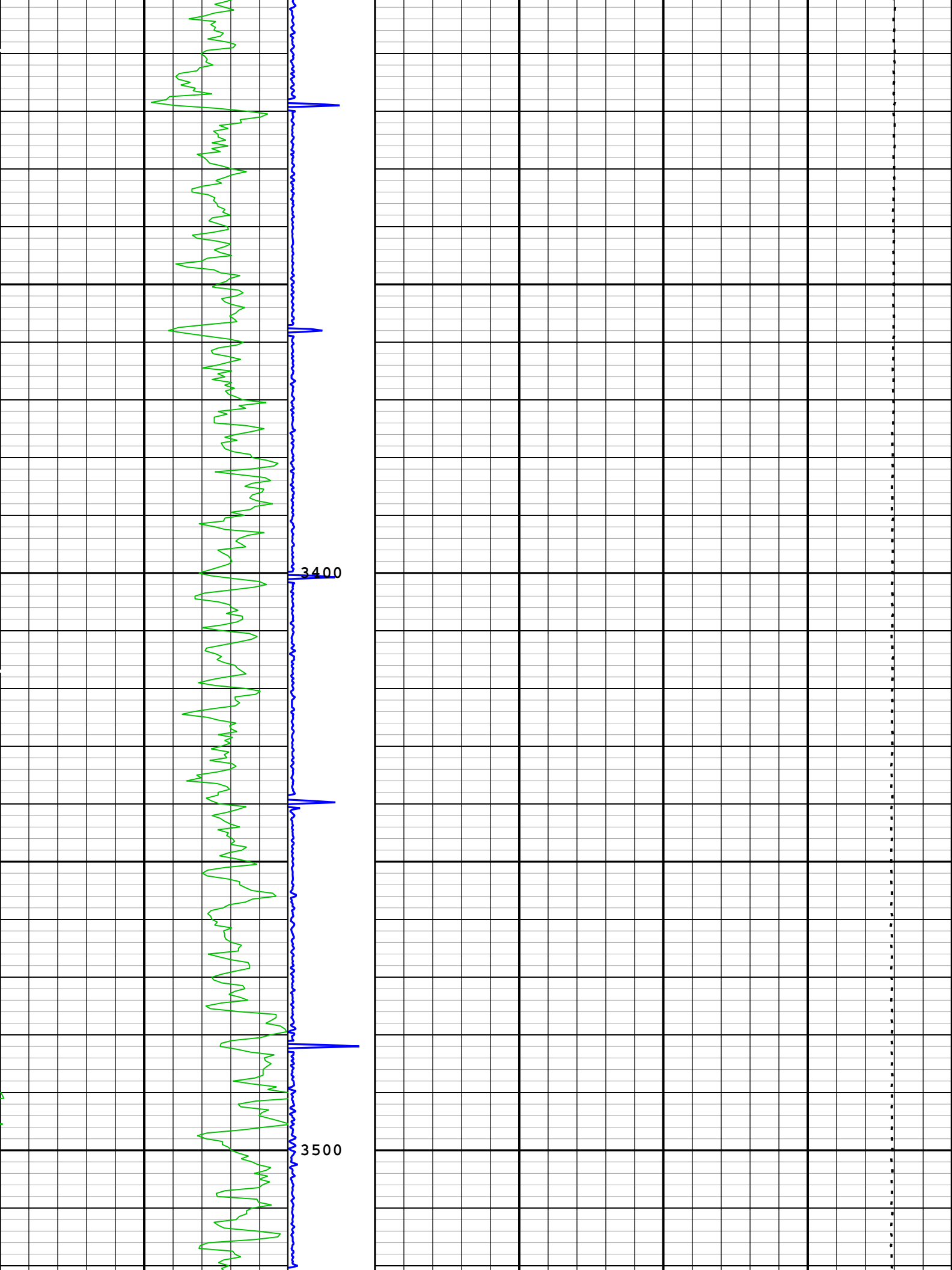


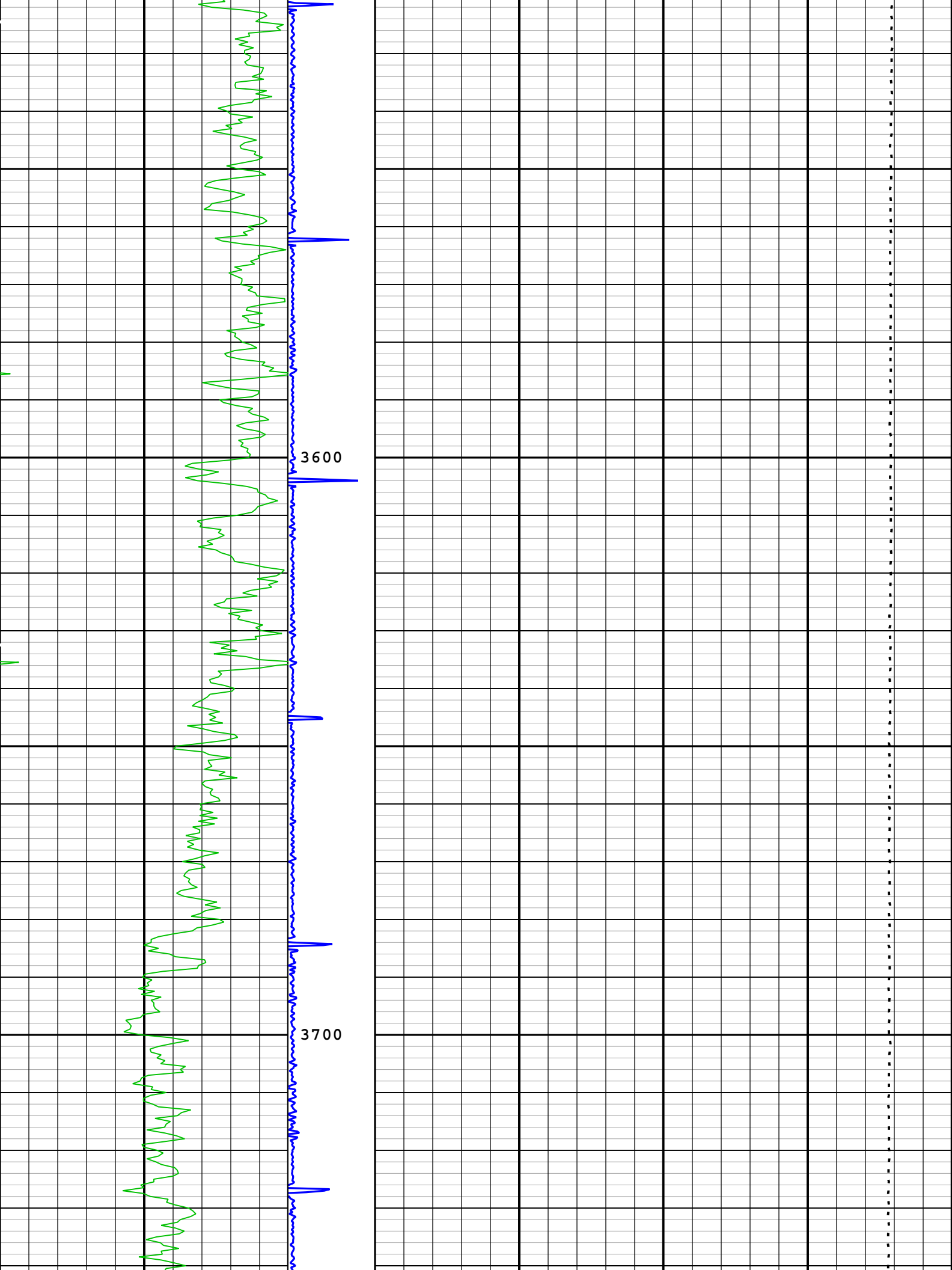


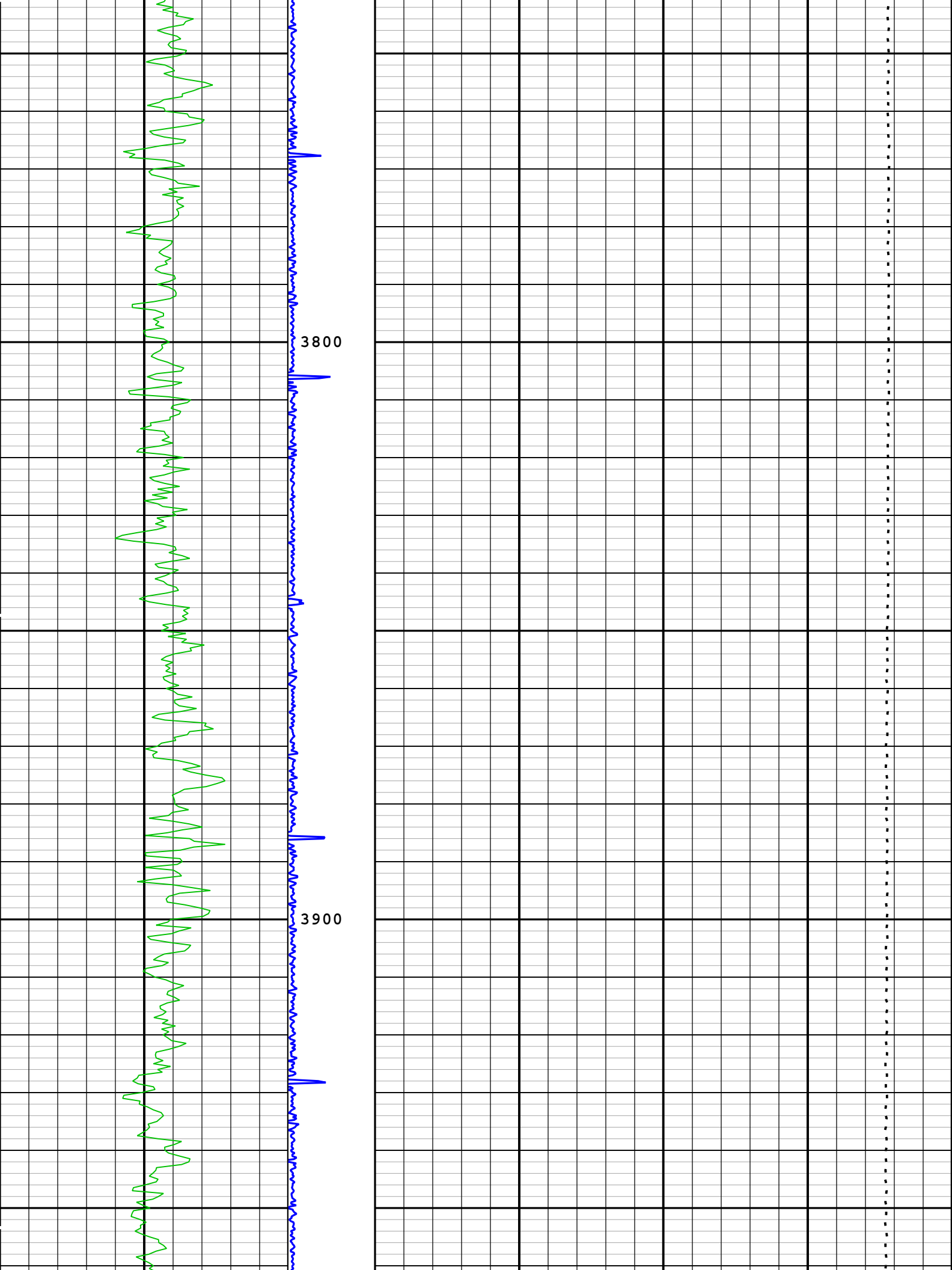


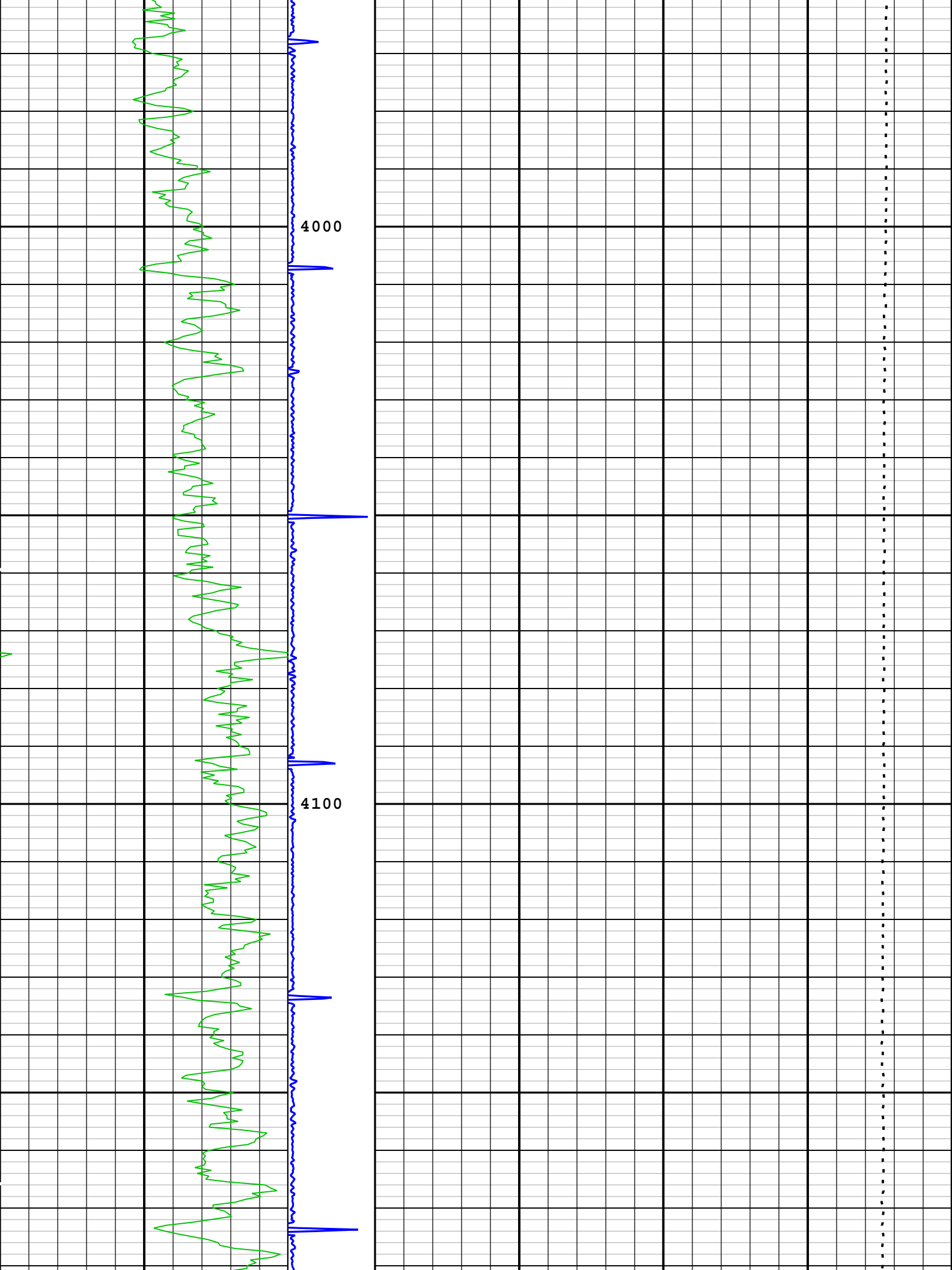


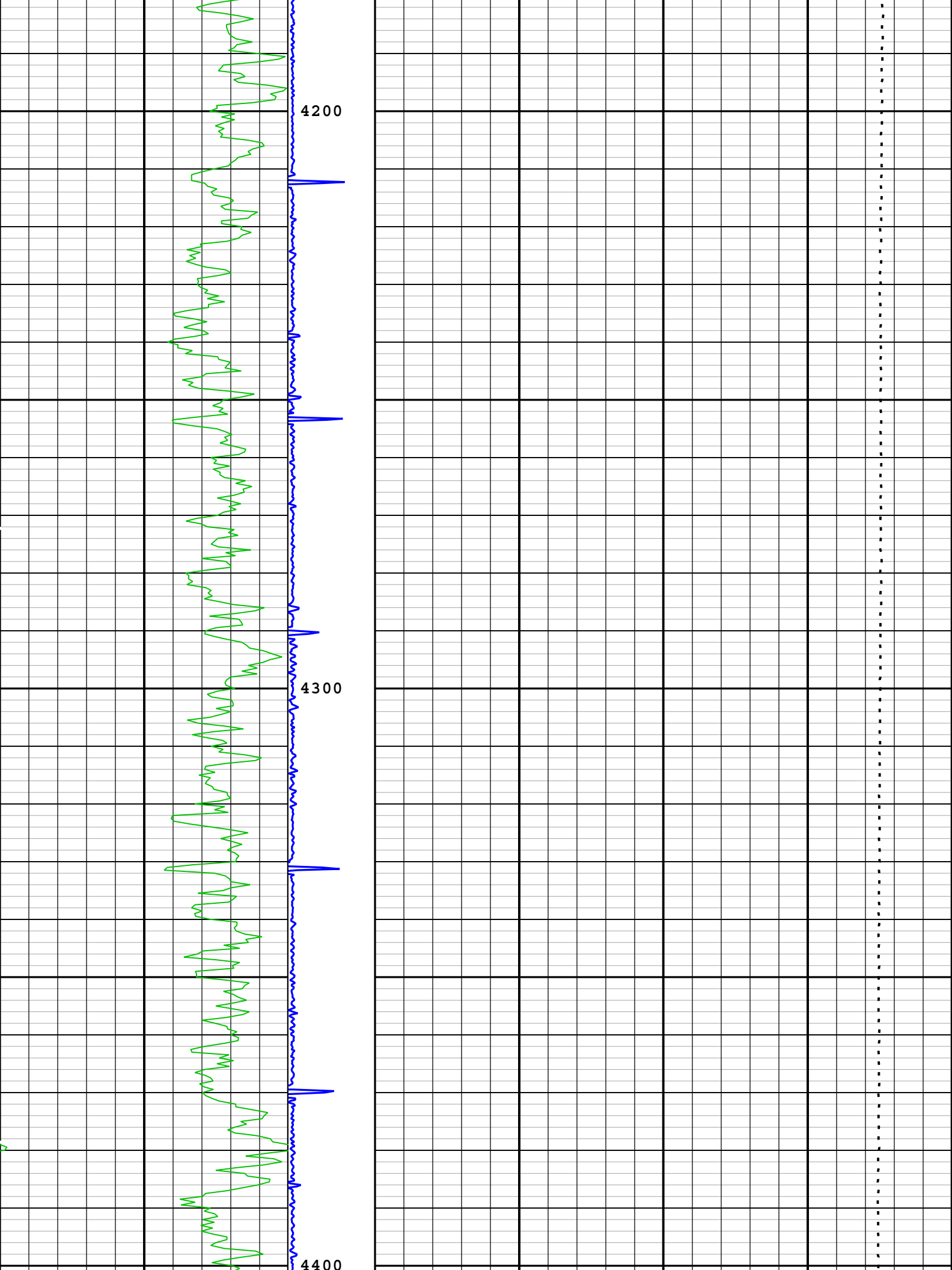


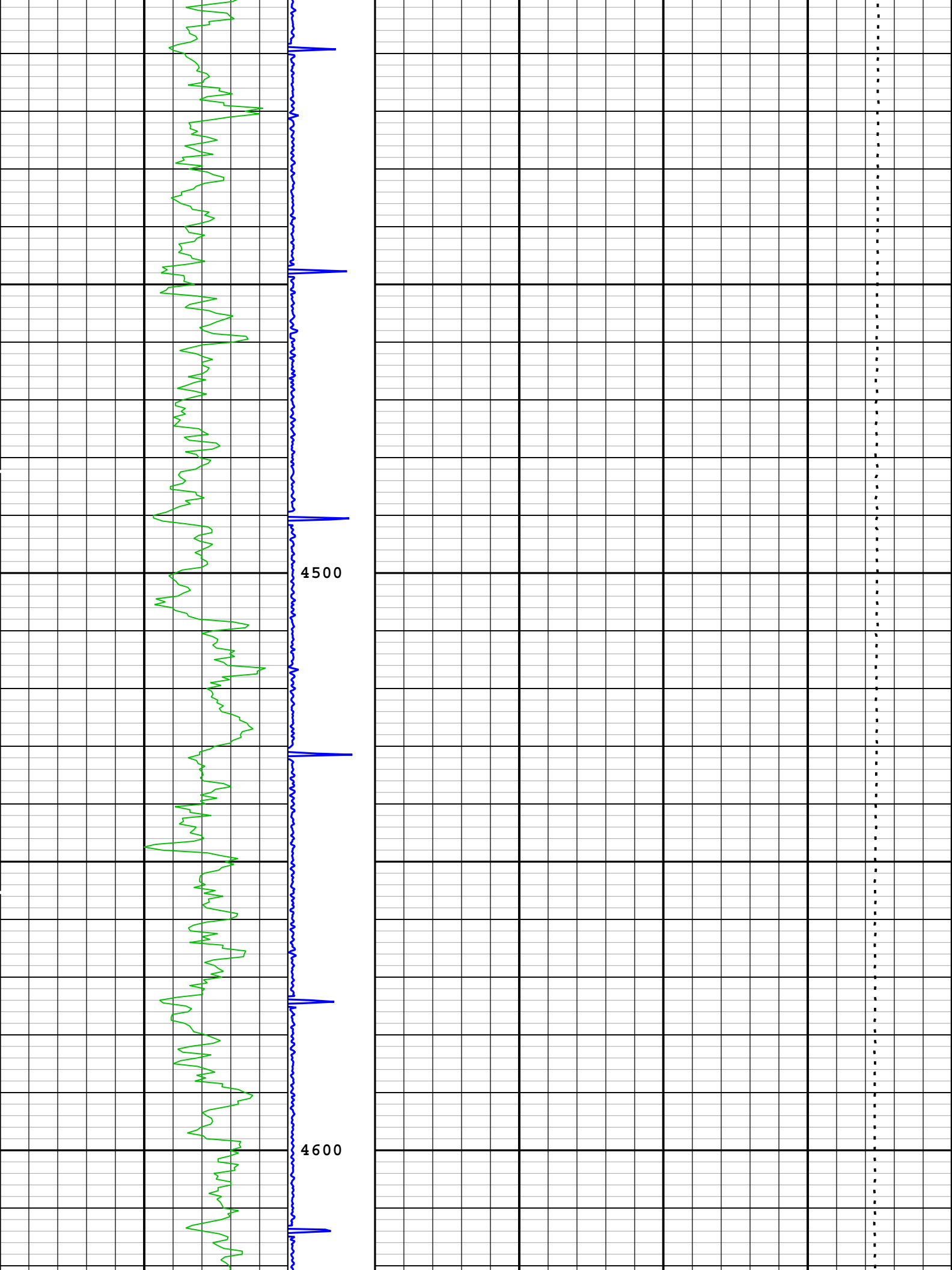


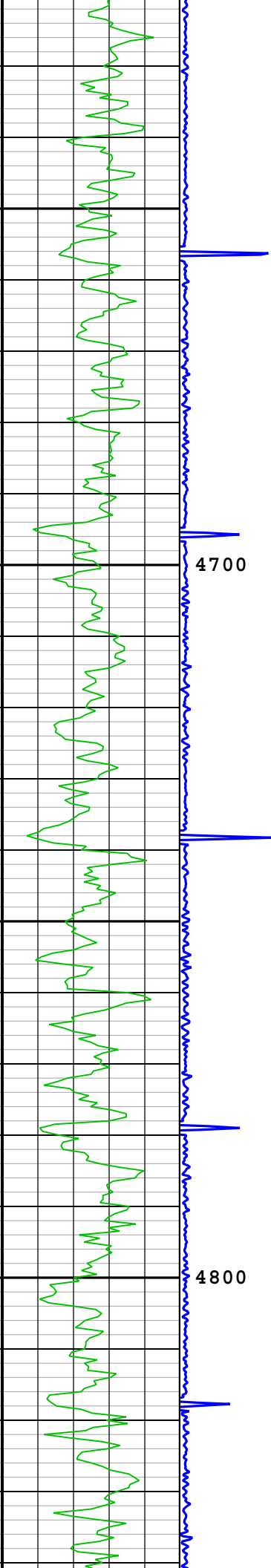


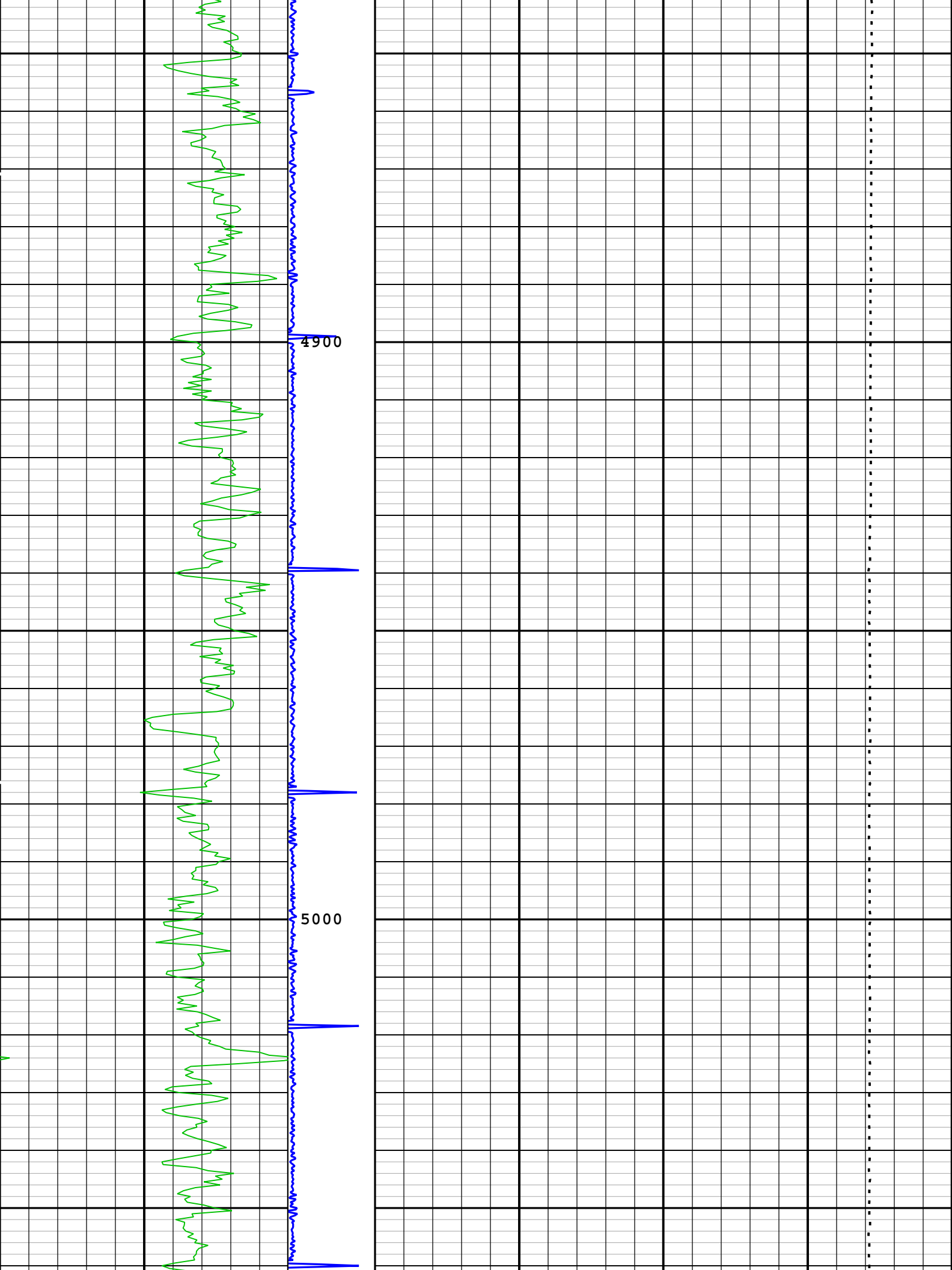


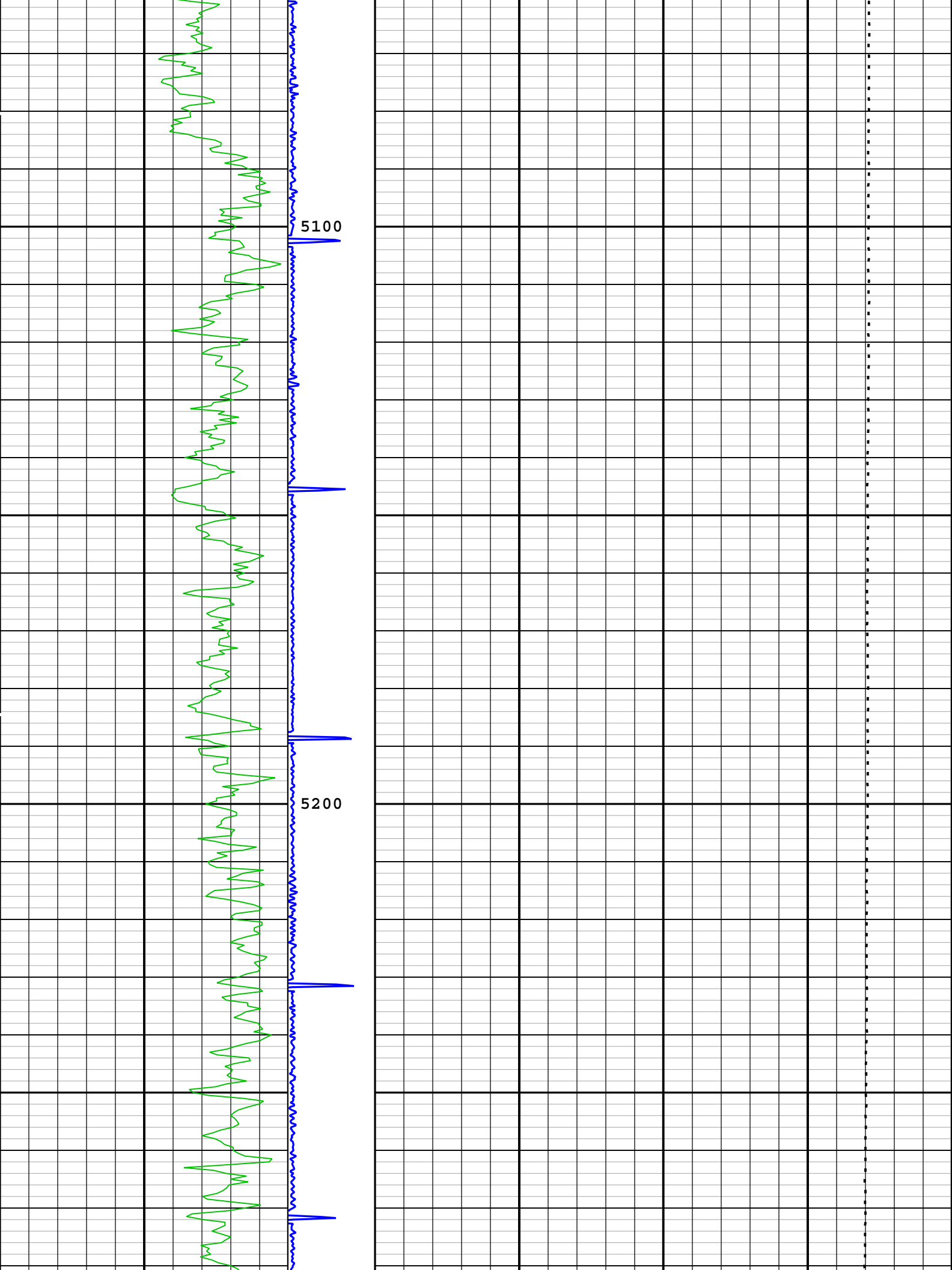


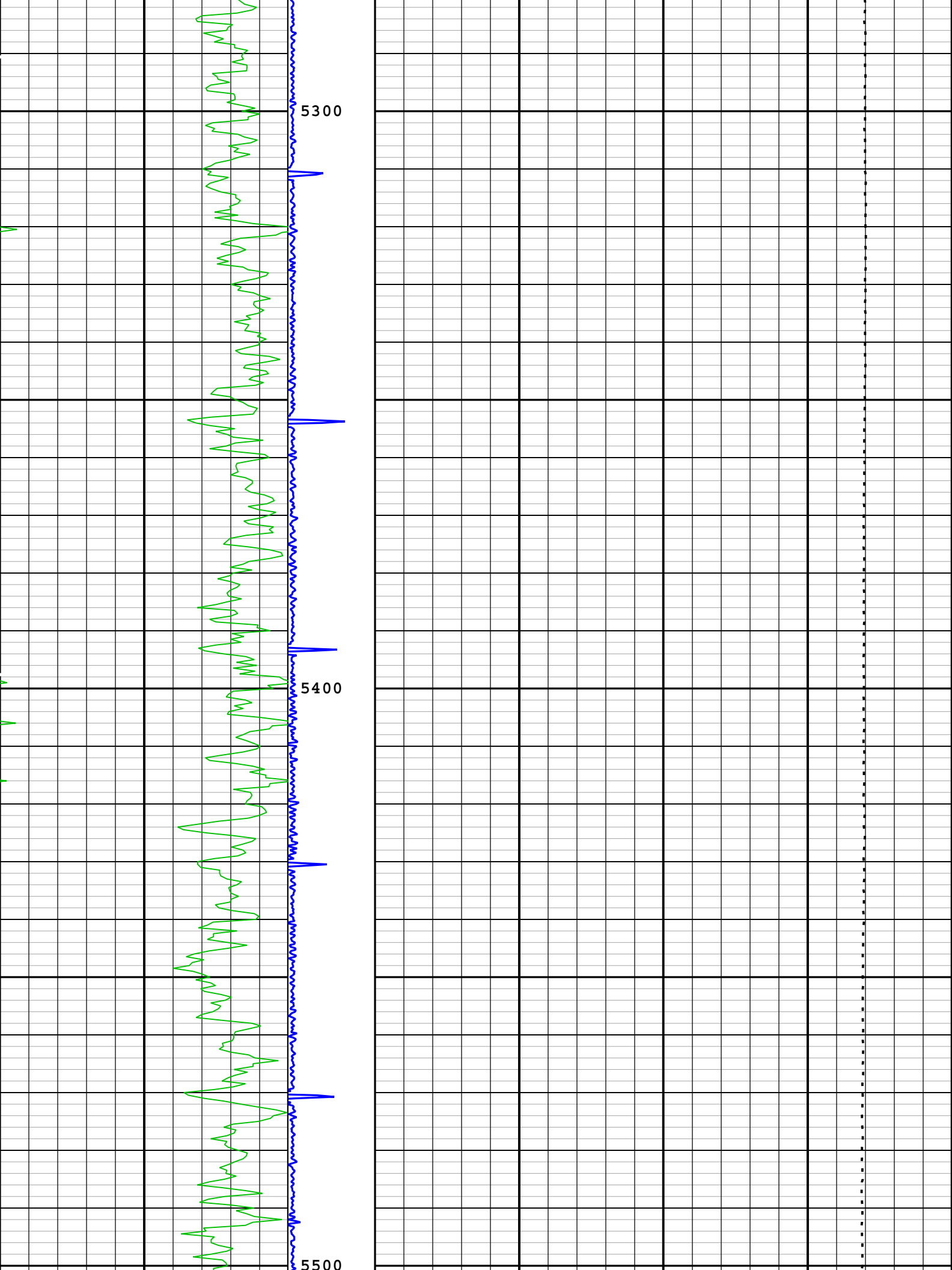


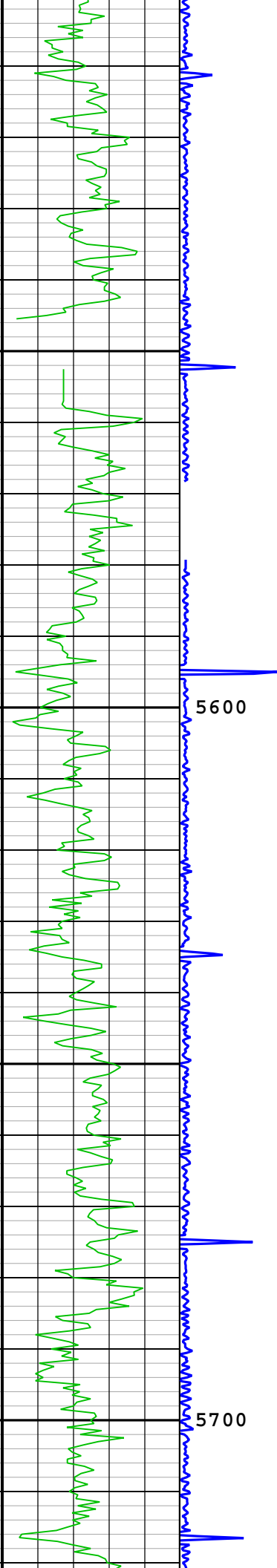


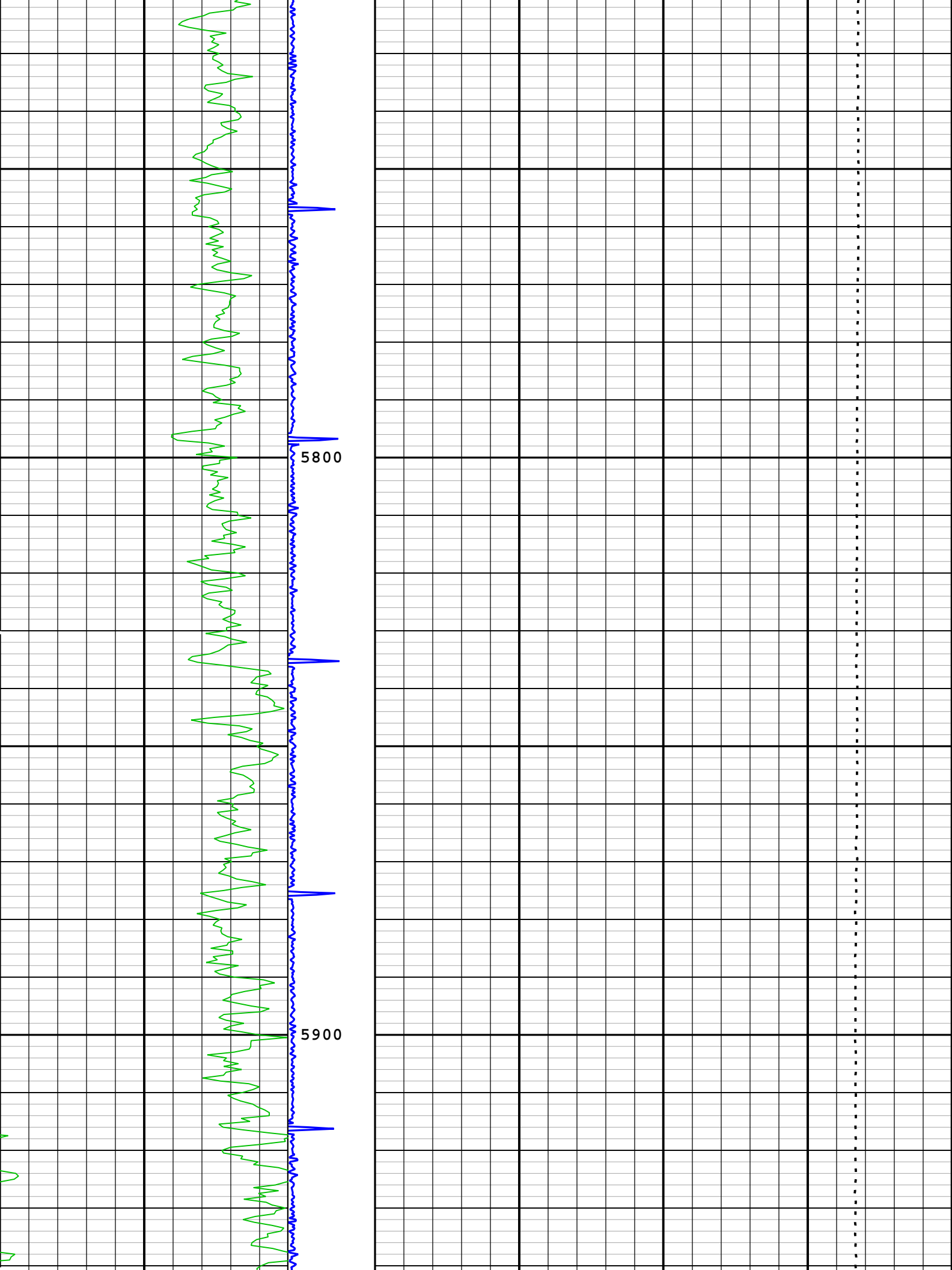


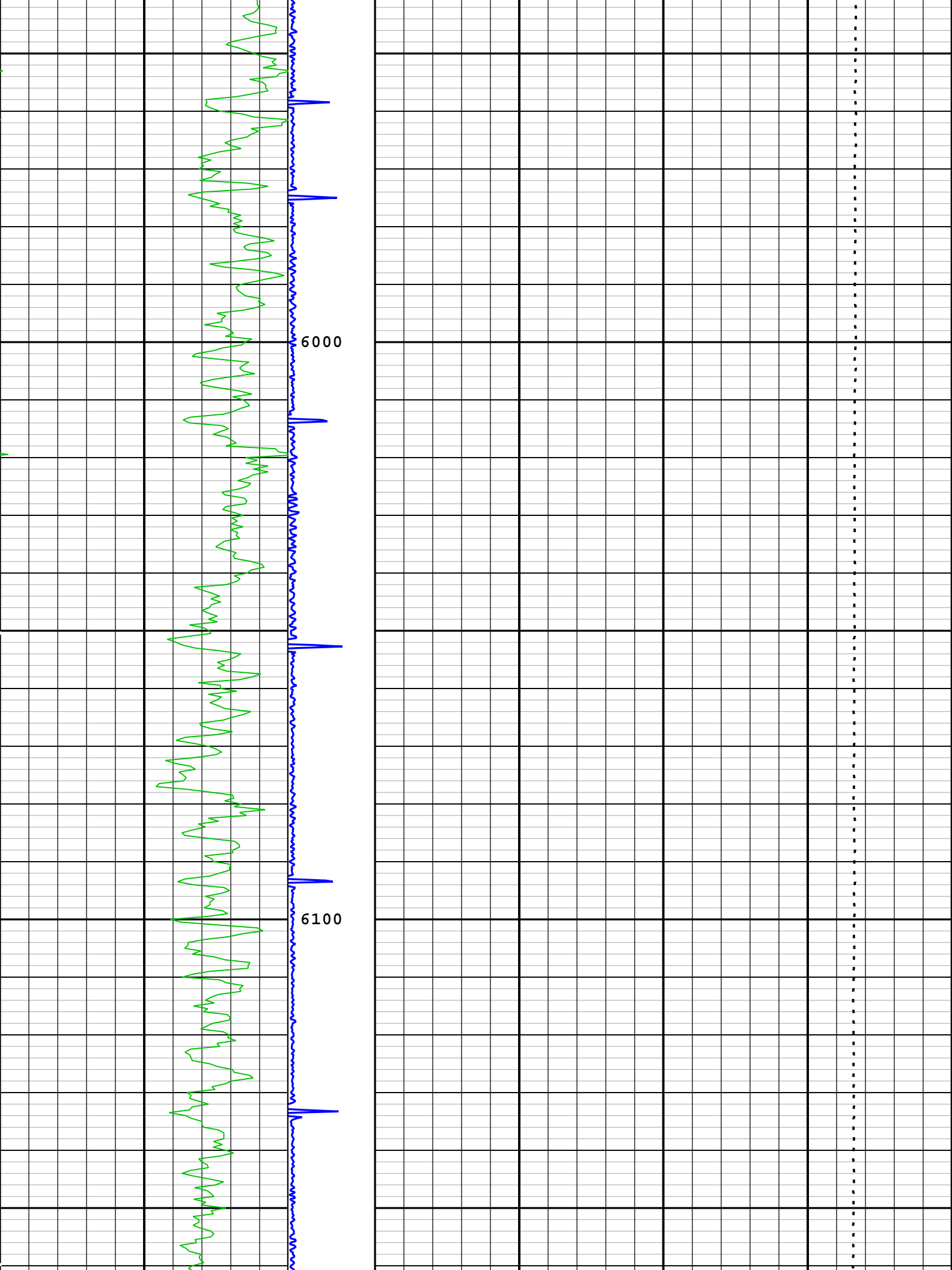


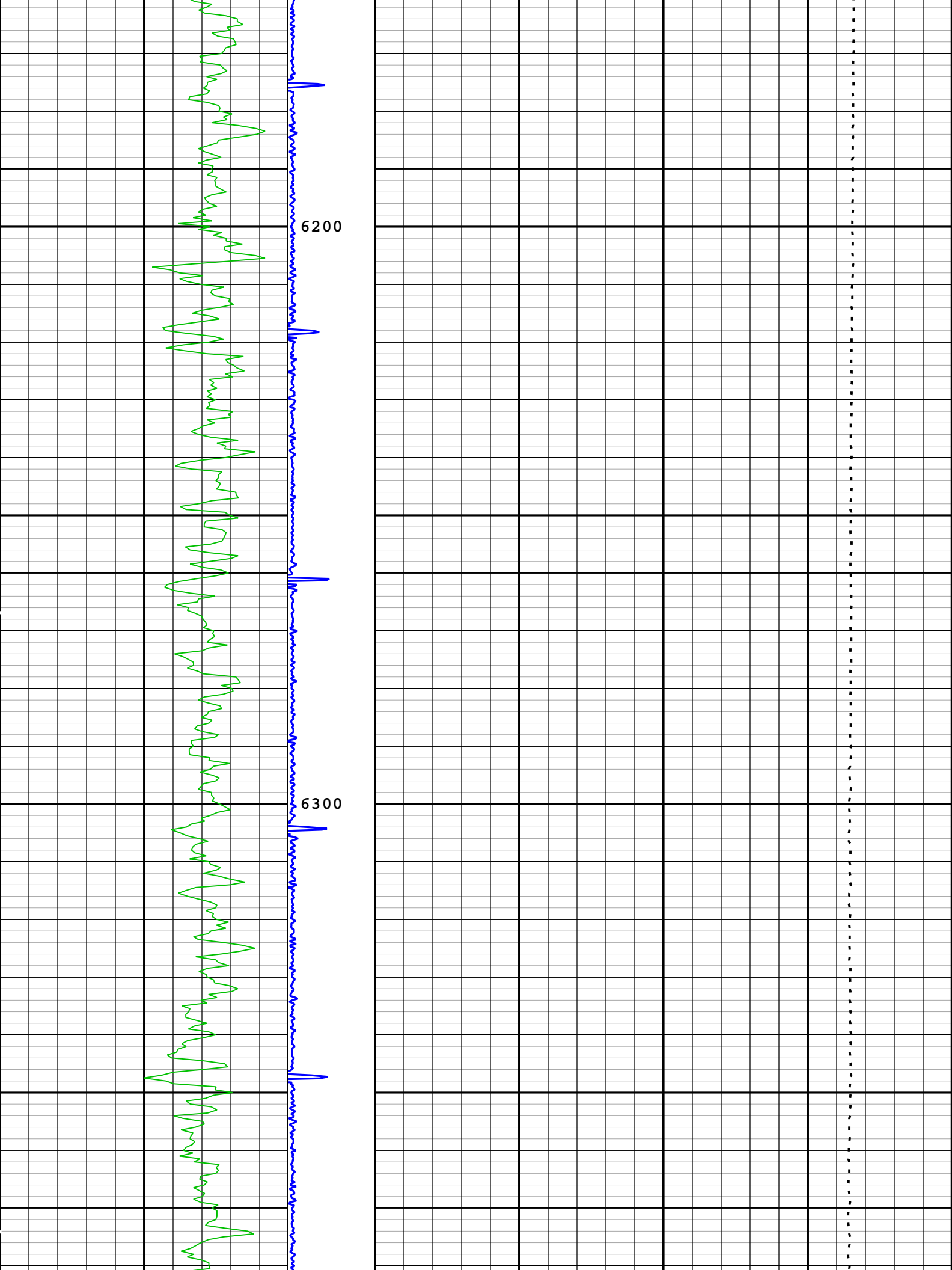


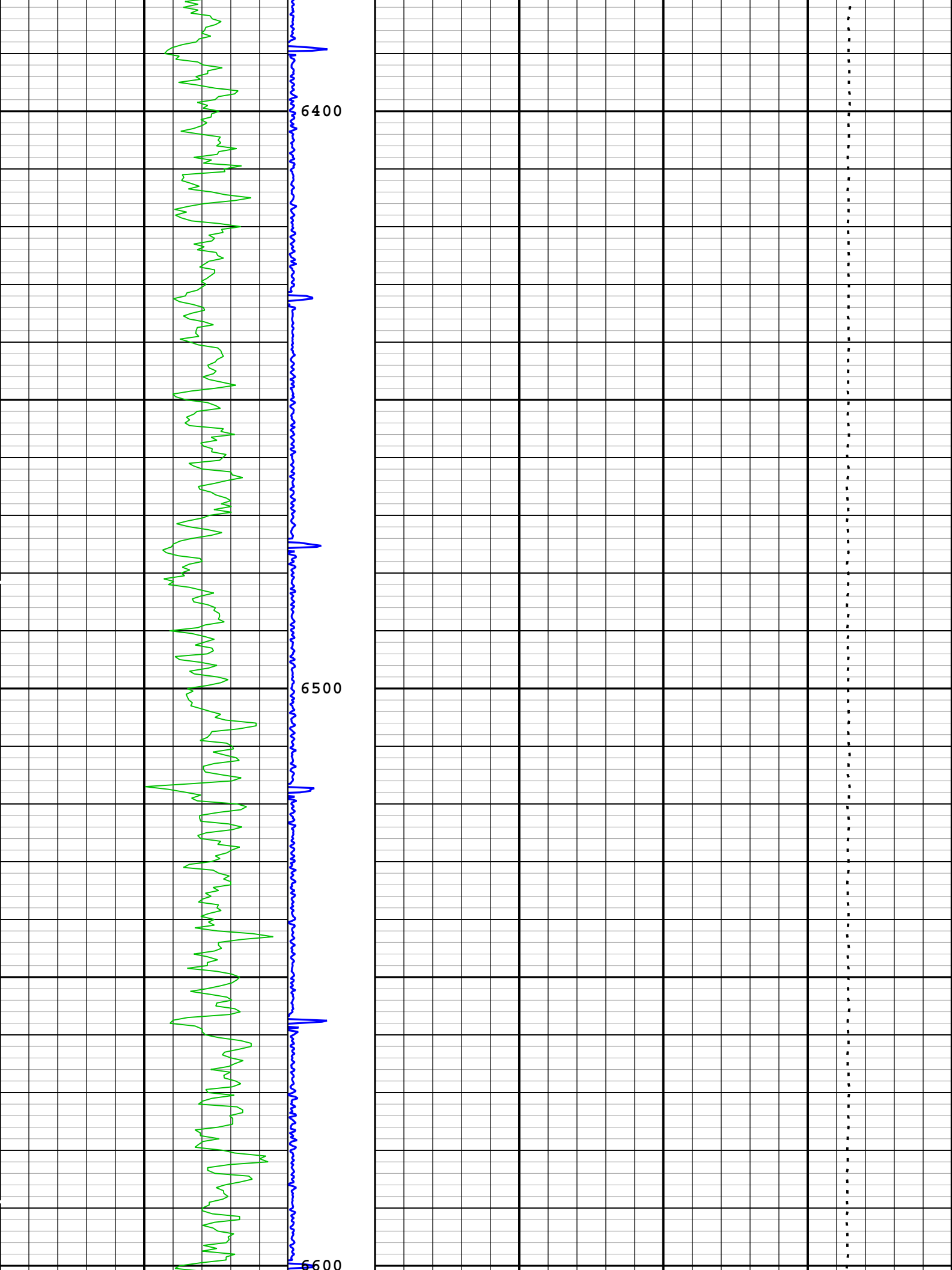


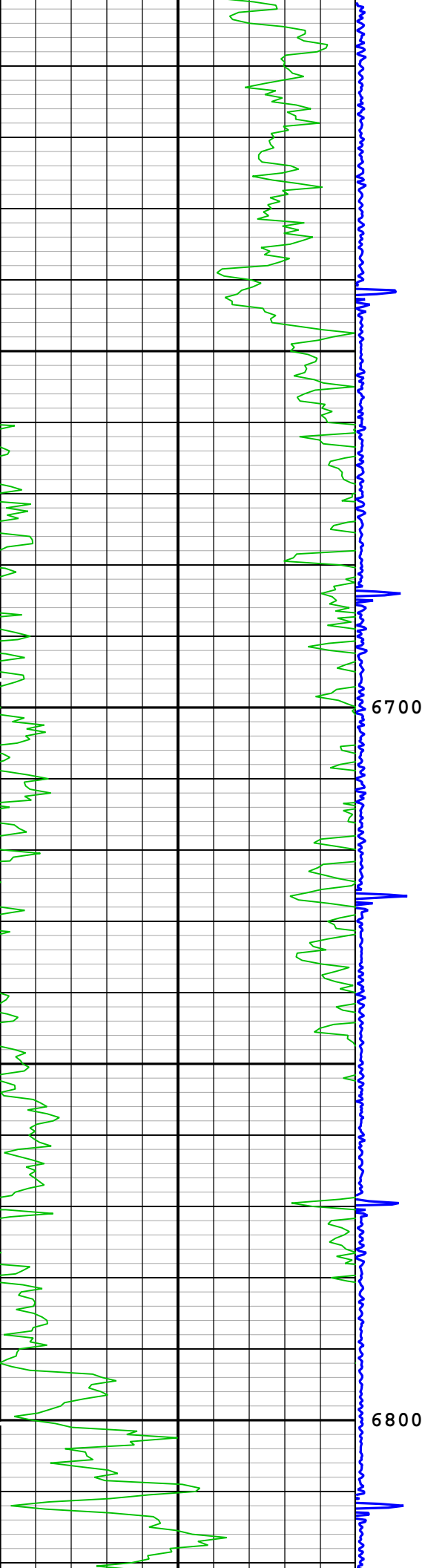


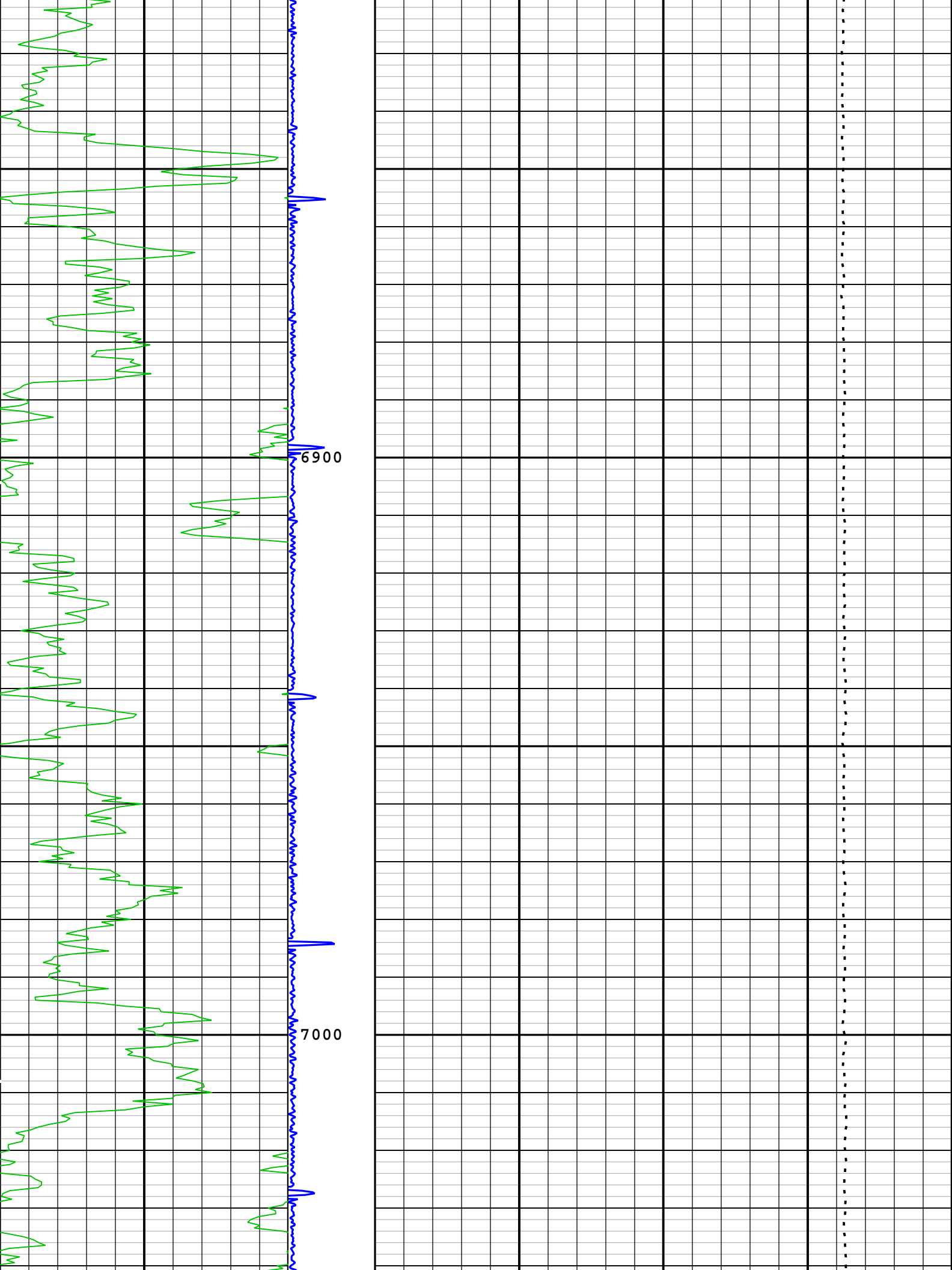


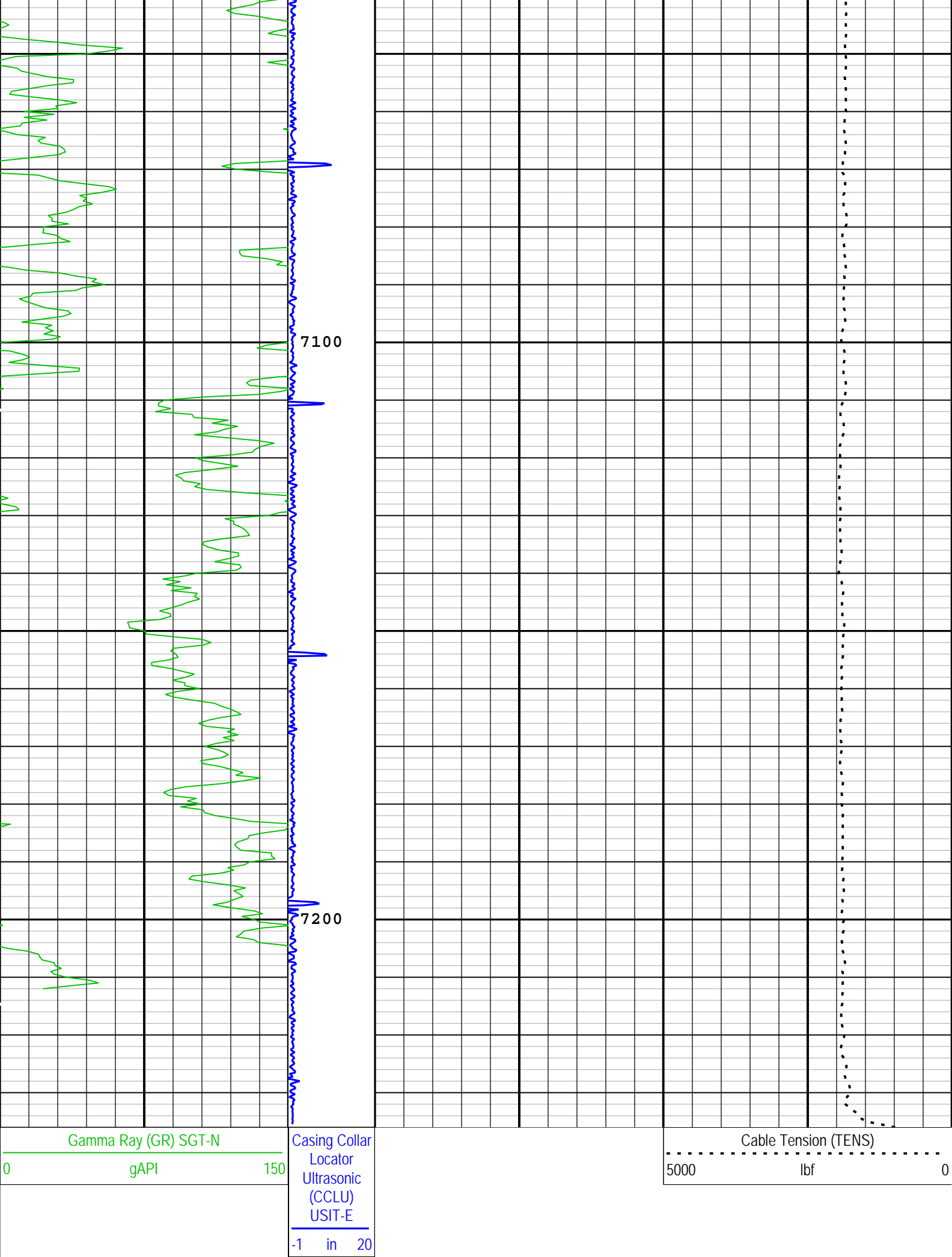












XYZ

Company:Noble Energy Inc

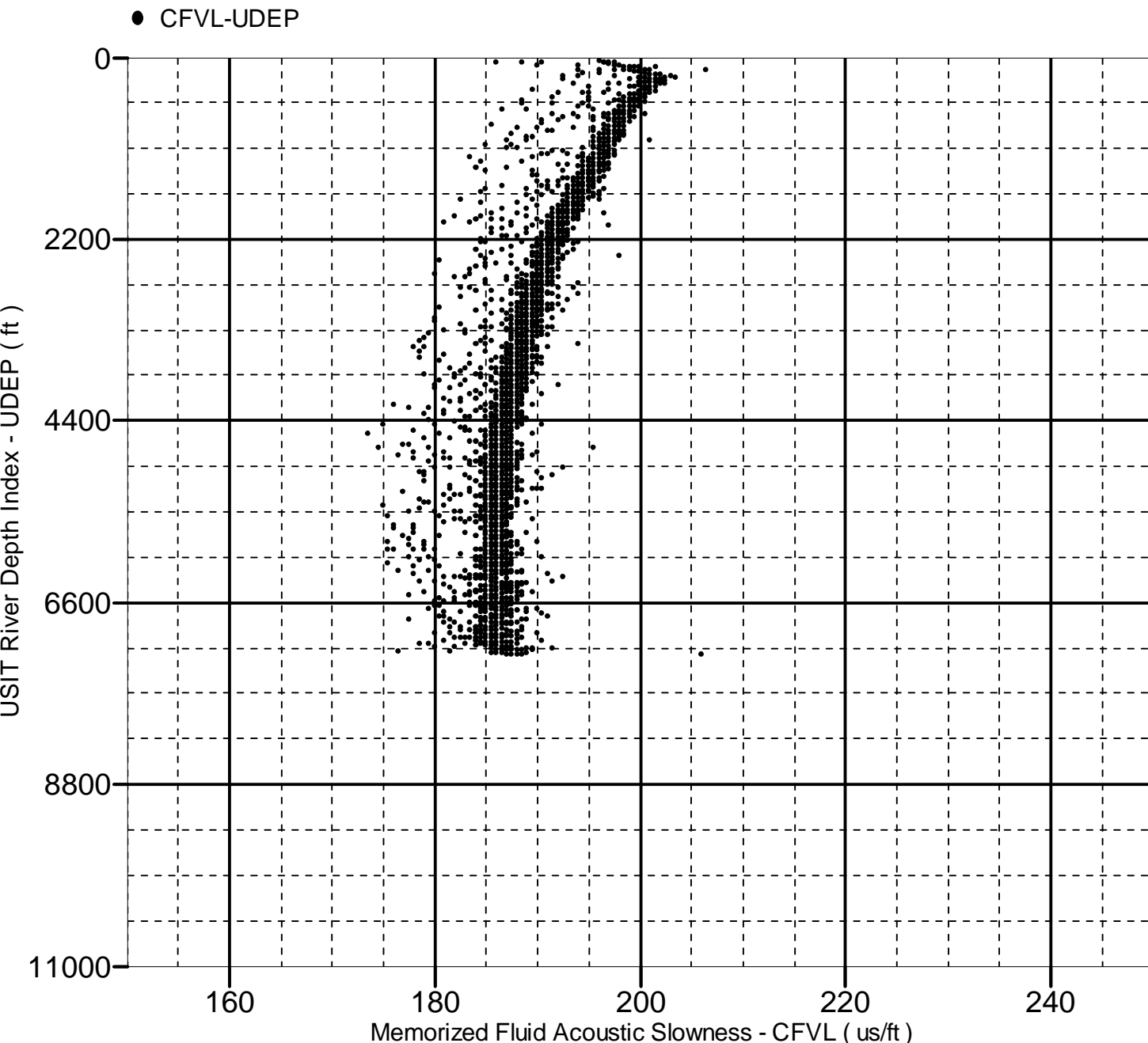
Well:Storis E24-75HN

Run1: USIT: Log[6]:Up:S002

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 7235.50 to 50.25 ft



XYZ

Company:Noble Energy Inc

Well:Storis E24-75HN

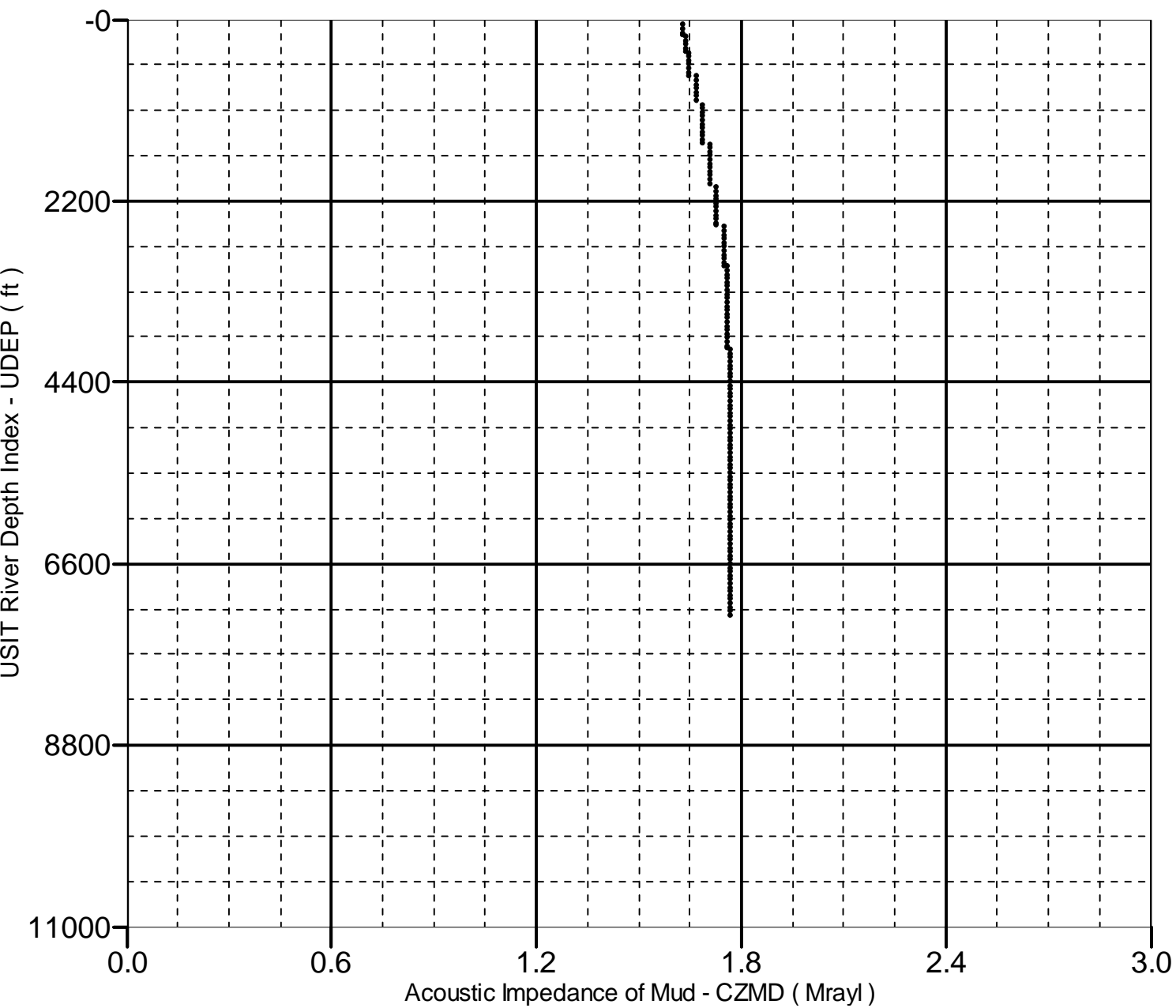
Run1: USIT: Log[6]:Up:S002

Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 7235.50 to 50.25 ft

● CZMD-UDEP



Company:	Noble Energy Inc	Schlumberger
Well:	Storis E24-75HN	
Field:	Wattenberg	
County:	Weld	
State:	Colorado	

Ultrasonic Imager

Ultrasonic Imager

CO State

Gamma Ray - CCL Log