

County: Weld  
Field: Wattenberg

Loggin
Run N
Depth
Schlur
Bottom
Top L
Casing
Casing
Bit Siz
Type 1
Dens
Fluid
Sourc
RM @
RMF (
RMC
Sourc
RM @
Maxim
Circul
Logge
Unit N
Recor
Witne

	Run 1	Run 2	Run 3

<p>Company: <b>Noble Energy, Inc</b></p> <p><b>Schlumberger</b></p>					

[illegible]

id:	Wattenberg		
gemini	00-33		

[illegible]

Compensated Neutron			

SESE Sec. 1 , T 4N , R 6E					
Gemini G 06-33					
Noble Energy, Inc					
LOCATION					
<b>Density Lithology</b>					
SESE Sec. 1 , T 4N , R 66W	Elev.: K.B.	4707.00 ft			
SHL: 1114' FSL / 218' FEL	G.L.	4694.00 ft			
Lat. / Long: 40.337 / -104.716	D.F.	4706.00 ft			
Permanent Datum:	Ground Level	Elev.: 4694.00 ft			
Log Measured From: Kelly Bushing		13.00 ft above Perm. Datum			

Location:		Well:		Company:			
Drilling Measured From:		Kelly Bushing					
API Serial No. 05-123-30688-000C		Section 1		Township 4N		Range 66W	
Logging Date				5-Jan-2010			
Casing Number				1			
Driller				7550 ft			
Schlumberger Depth				7554 ft			
Bottom Log Interval				7546 ft			
Top Log Interval				578 ft			
Casing Driller Size @ Depth				8.625 in @ 577 ft			
Schlumberger				578 ft			
Bit Size				7.875 in			
Type Fluid In Hole				KCL Polymer			
Density				9.6 lbm/gal			
Viscosity				60 s			
PH							
Source Of Sample				Flowline			
RM @ Measured Temperature				1.113 ohm.m @ 64 degF			
RMF @ Measured Temperature				0.835 ohm.m @ 64 degF			
RMC @ Measured Temperature				1.669 ohm.m @ 64 degF			
Source RMF				Calculated			
RM @ MRT				0.384 @ 199 0.288 @ 199			
Maximum Recorded Temperatures				199 degF			
Circulation Stopped				5-Jan-2010 1:00			
Logger On Bottom				5-Jan-2010 8:28			
Unit Number				3055 Fort Morgan, CO			
Recorded By				Jared R. Hoskins			
Witnessed By				Martin Suarez			

Date Created: 5-JAN-2010 11:07:40

## Logging Cable

Type:	7-39P LXS
Serial Number:	708273
Length:	12560 FT
<hr/>	
Conveyance Method:	Wireline
Rig Type:	LAND

Log Sequence:	First Log In the Well
Rig Up Length At Surface:	0.00 FT
Rig Up Length At Bottom:	0.00 FT
Rig Up Length Correction:	0.00 FT
Stretch Correction:	4.40 FT
Tool Zero Check At Surface:	0.00 FT

1. All Schlumberger depth policy procedures applied
2. This is the primary depth reference
- 3.
- 4.
- 5.
- 6.

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 SCHLUMBERGER 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.

OTHER SERVICES2  
OS1:  
OS2:  
OS3:  
OS4:  
OS5:







REMARKS: RUN NUMBER 2

1. This is the first run in hole.
2. Tool run as per tool sketch.
3. Limestone matrix 2.71 g/cc.
4. Toolstring run with minimum jewelry.

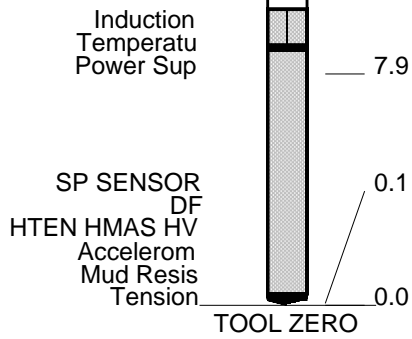
Rig: Ensign 136					
Crew: Roger Wiley & Tim Ludgate					
RUN 1			RUN 2		
SERVICE ORDER #:		AXB6-00079	SERVICE ORDER #:		
PROGRAM VERSION:		17C0-154	PROGRAM VERSION:		
FLUID LEVEL:			FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION					
RUN 1			RUN 2		

SURFACE EQUIPMENT	
GSR-U/Y	GSR-U 1079
NCT-B	WITM (DTS)-A
CNB-AB	
NCS-VB	

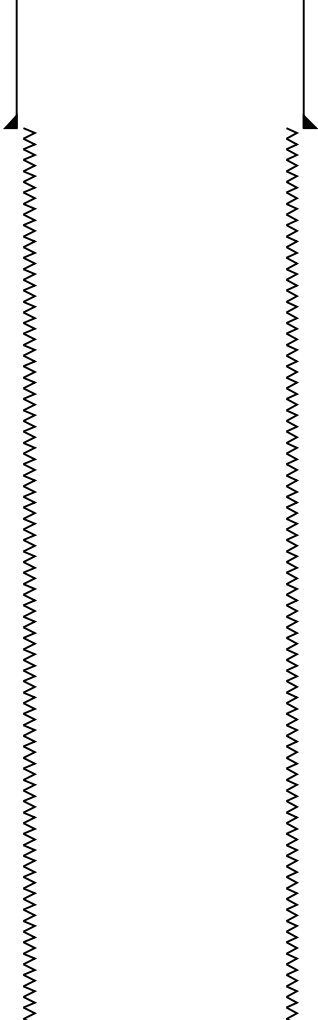
DOWNHOLE EQUIPMENT			
LEH-QT LEH-QT			55.3
DTC-H ECH-KC DTCH0-A DTCH1-A	CTEM TelStatus ToolStatu		51.4 52.3 49.3
HNGS-BA HNGS-BA 239 HNSH-BA 239	Upper_1 Lower_2		49.3 47.1 46.4
HNGC-B HNGH-A HNGC-B 2471	HNGC Stat		41.1 39.4
HILTB-FTB HGNSD-B 1927 HMCA HGNH 1927 NLS-KL NSR-F 5068 HACCZ 749 HCNT HGR HRCC-B 1813 HRMS-B 1716 HRGD-B 1732 GLS-VJ 5416 MCFL Device HILT Nucl. LS 42767 HILT Nucl. SS 42767 HILT Nucl. BS 42767 NPV-N	HGNS HTEM HMCA HGNS Gamm HGNS Neut HGNS Neut HGNS sens HRCC cart		37.6 36.9 31.1 30.6 28.2 24.2
	MCFL HILT cali HRDD-LS HRDD-SS HRDD-PS		18.8 18.3 17.0

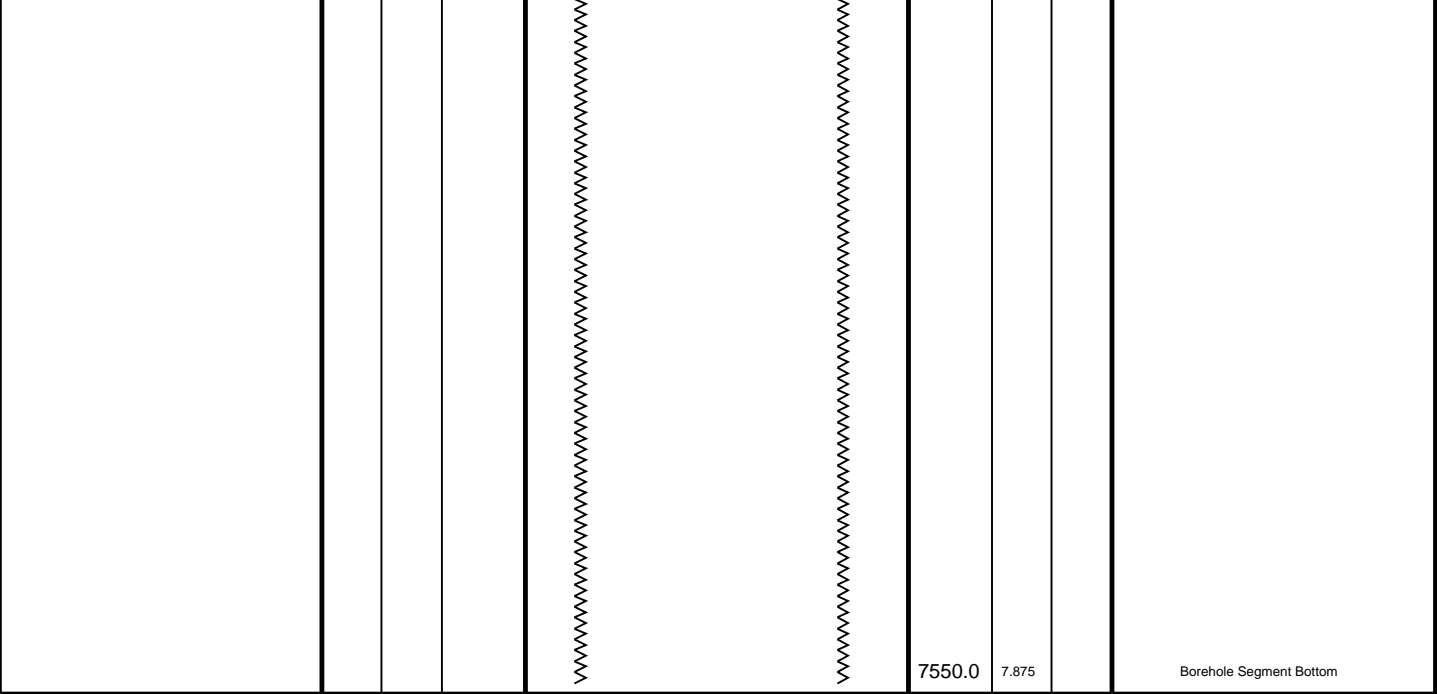
AIT-M  
AMIS-A 1372  
AMRM-A



16.0

MAXIMUM STRING DIAMETER 4.63 IN  
MEASUREMENTS RELATIVE TO TOOL ZERO  
ALL LENGTHS IN FEET

Production String	(in)		(ft)	Well Schematic	(ft)	(in)		Casing String
	OD	ID	MD		MD	OD	ID	
					0.0	8.625		Casing String
					575.0 575.0	8.625 7.875		Casing Shoe Borehole Segment



7550.0 7.875 Borehole Segment Bottom

All depths are driller’s depths

Input DLIS Files						
DEFAULT	SPLICE_AIT_TLD_MCFL_012	FN:1	PRODUCER	05-Jan-2010 11:04	7567.5 FT	547.6 FT

Output DLIS Files						
DEFAULT	AIT_TLD_MCFL_CNL_013PUP	FN:11	PRODUCER	05-Jan-2010 11:05	7567.5 FT	548.0 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 2559.96 F3

Cement Volume = 1789.44 F3 (assuming 4.50 IN casing O.D.)

Computed from 7554.0 FT to 578.0 FT using data channel(s) HCAL

OP System Version: 17C0-154					
AIT-M	17C0-154		HILTB-FTB	17C0-154	
HNGC-B	17C0-154		HNGS-BA	17C0-154	
DTC-H	17C0-154				

PIP SUMMARY

└ Integrated Hole Volume Minor Pip Every 10 F3

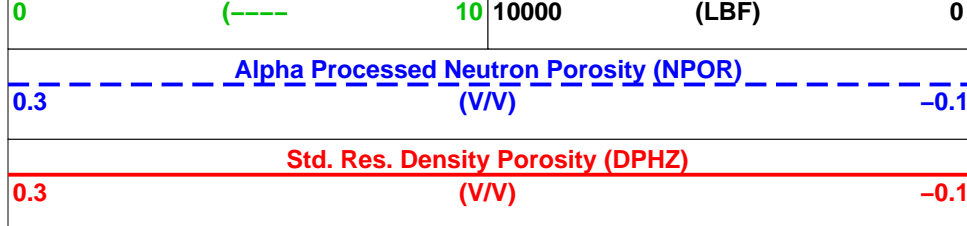
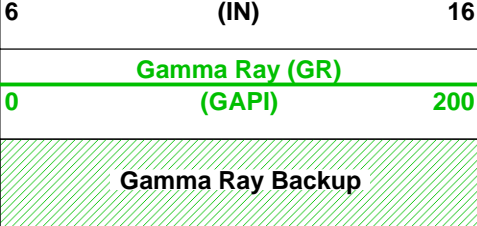
└ Integrated Hole Volume Major Pip Every 100 F3

└ Integrated Cement Volume Minor Pip Every 10 F3

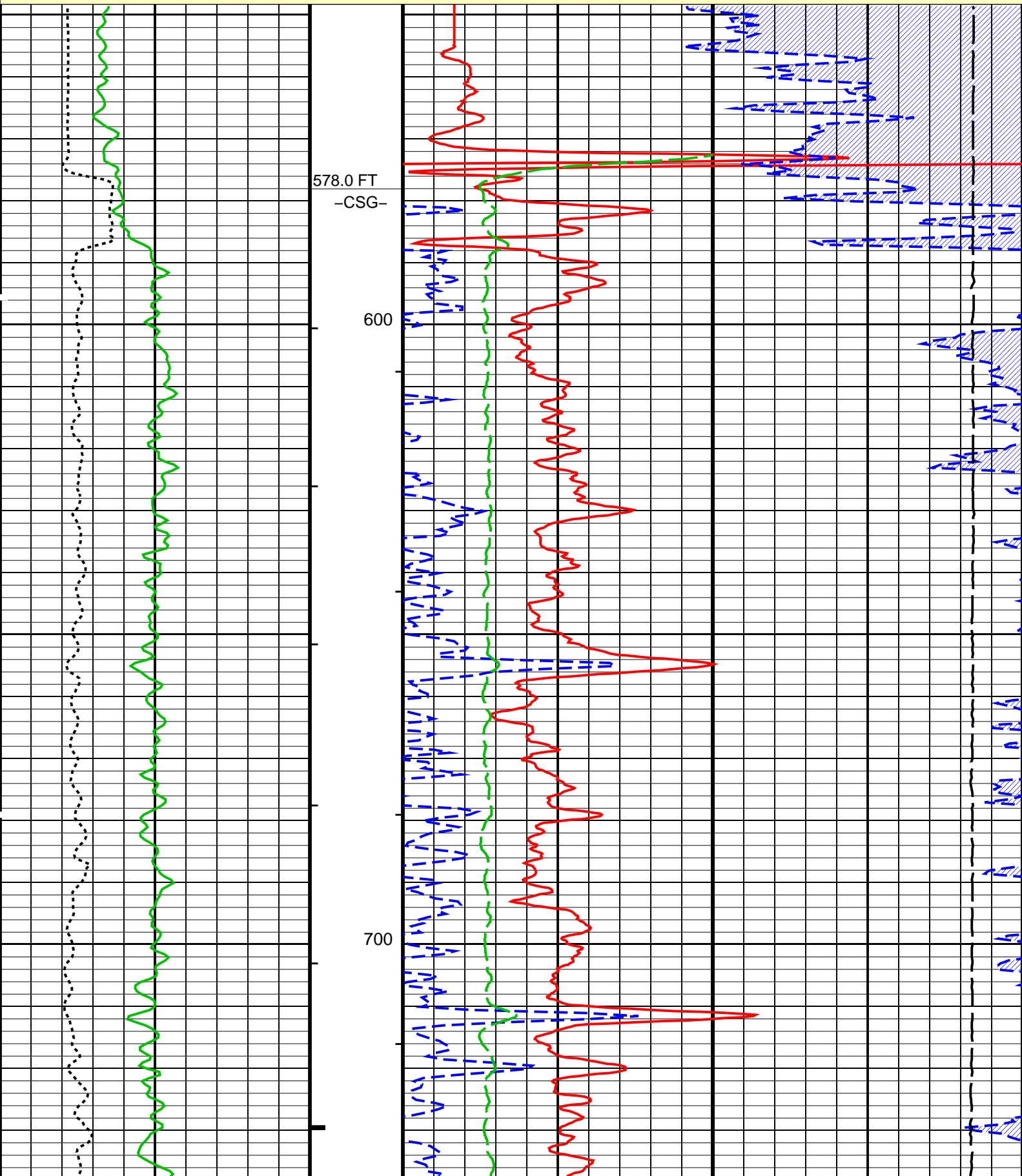
└ Integrated Cement Volume Major Pip Every 100 F3

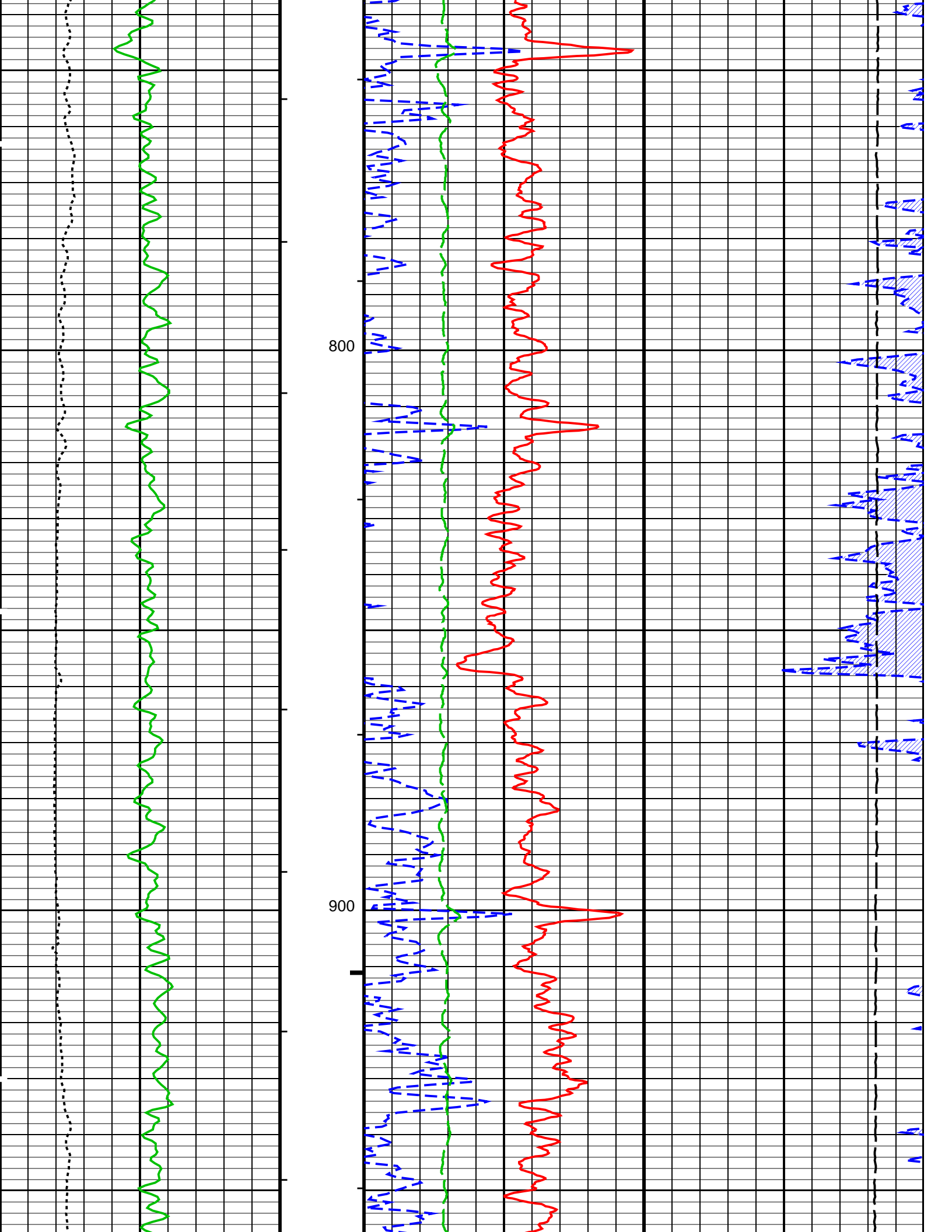
Time Mark Every 60 S

Caliper (HCAL)	NPOR Backup				
	Gas Effect				
	Std. Res. Formation Pe (PEFZ)		Tension (TENS)		

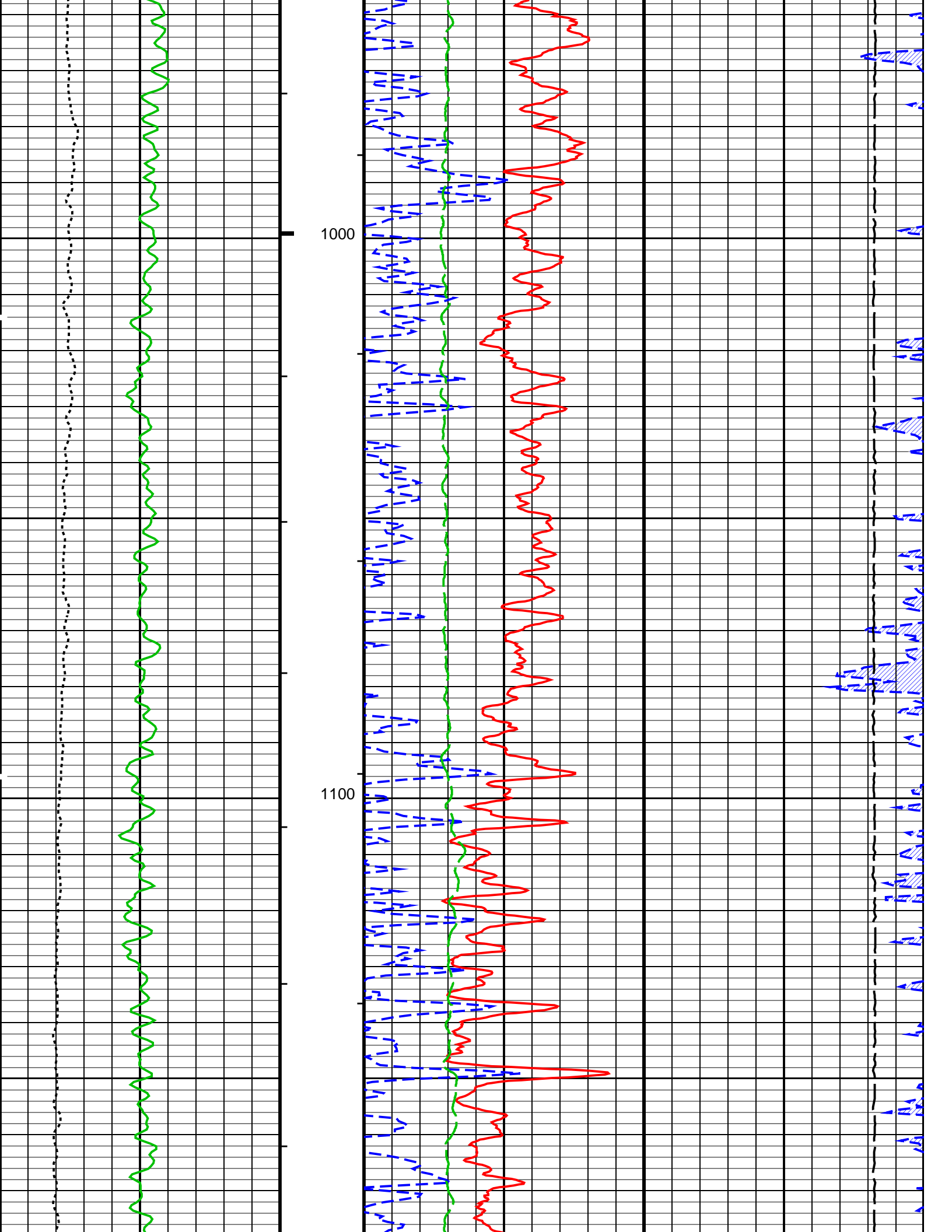


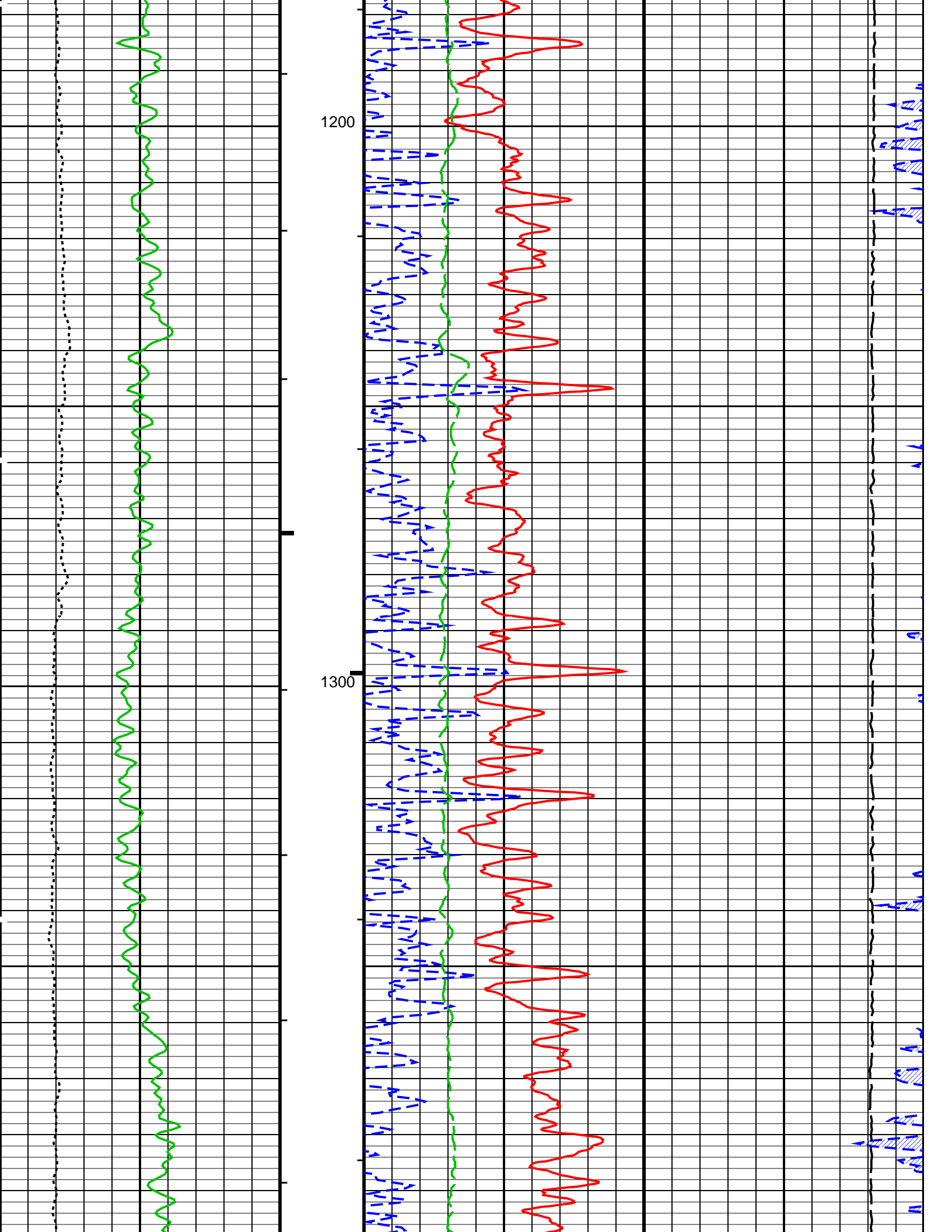
MAIN PASS: \*\*\* PLATFORM EXPRESS - NUCLEAR POROSITY \*\*\*

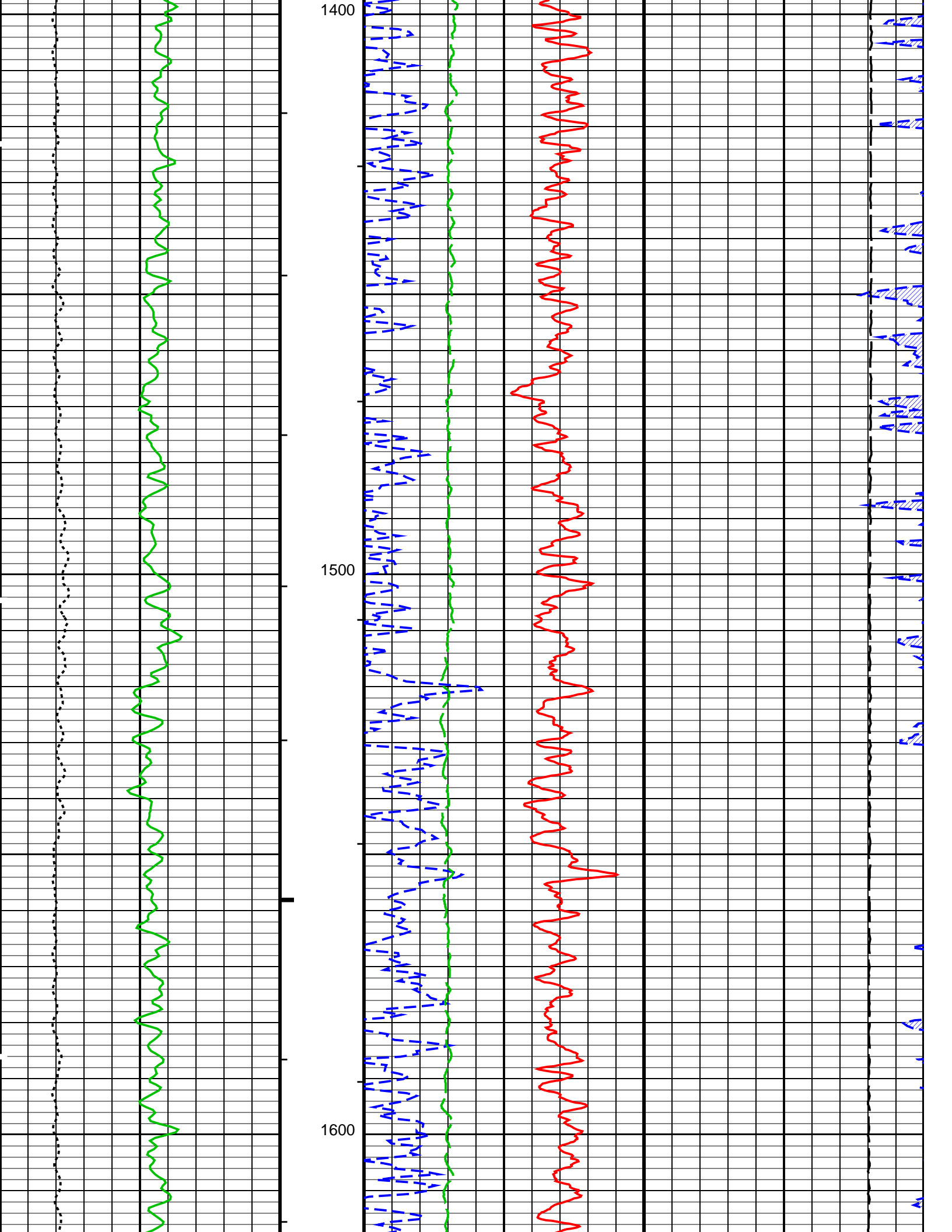


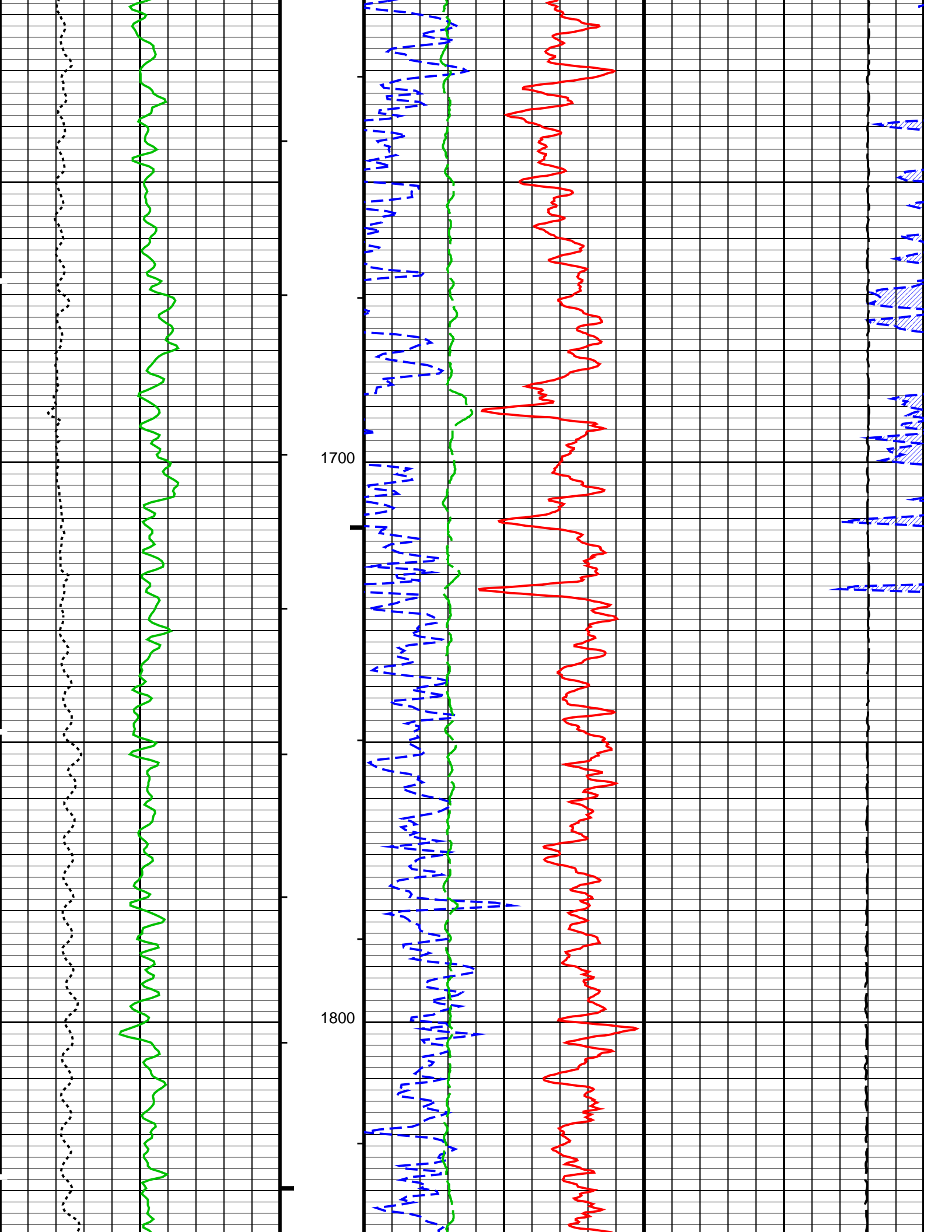


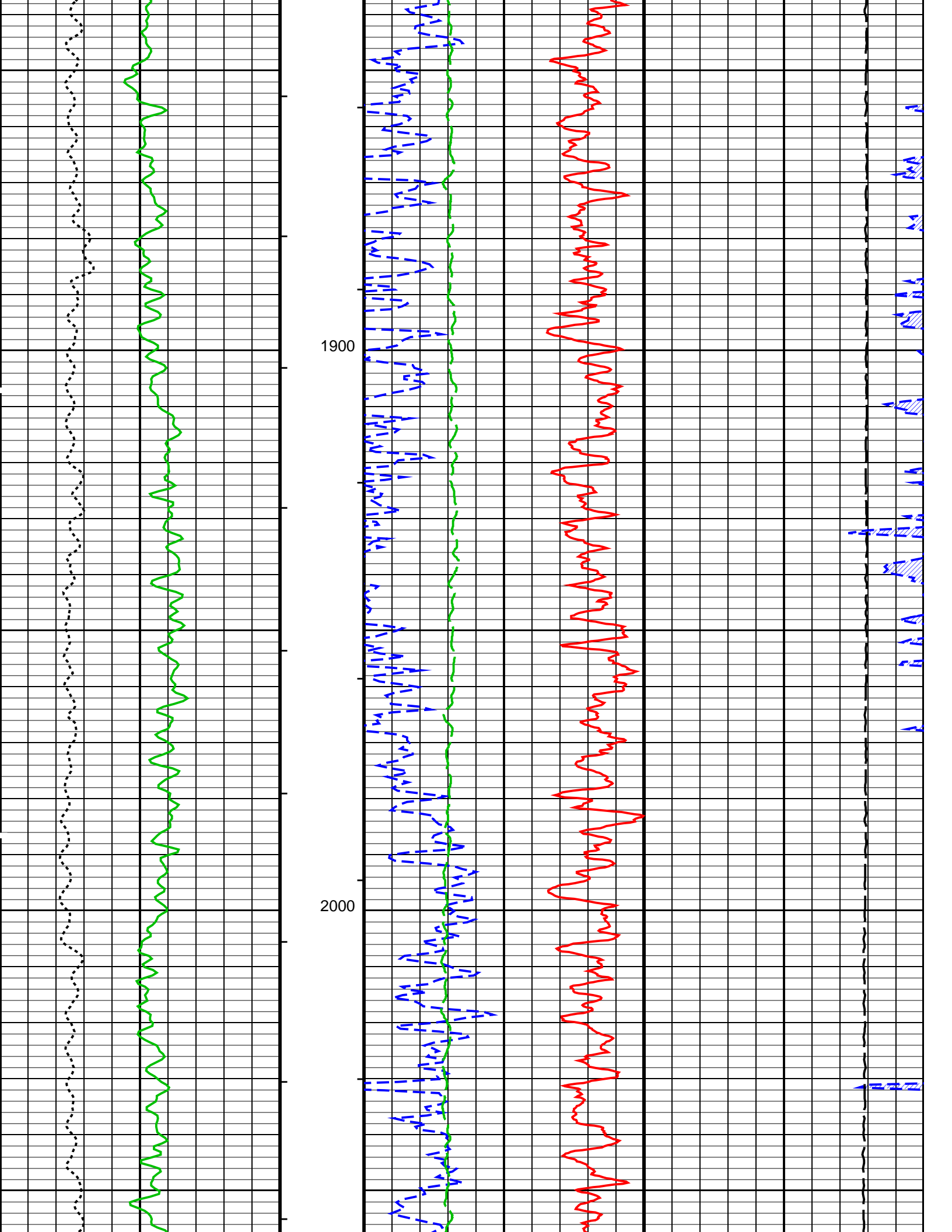


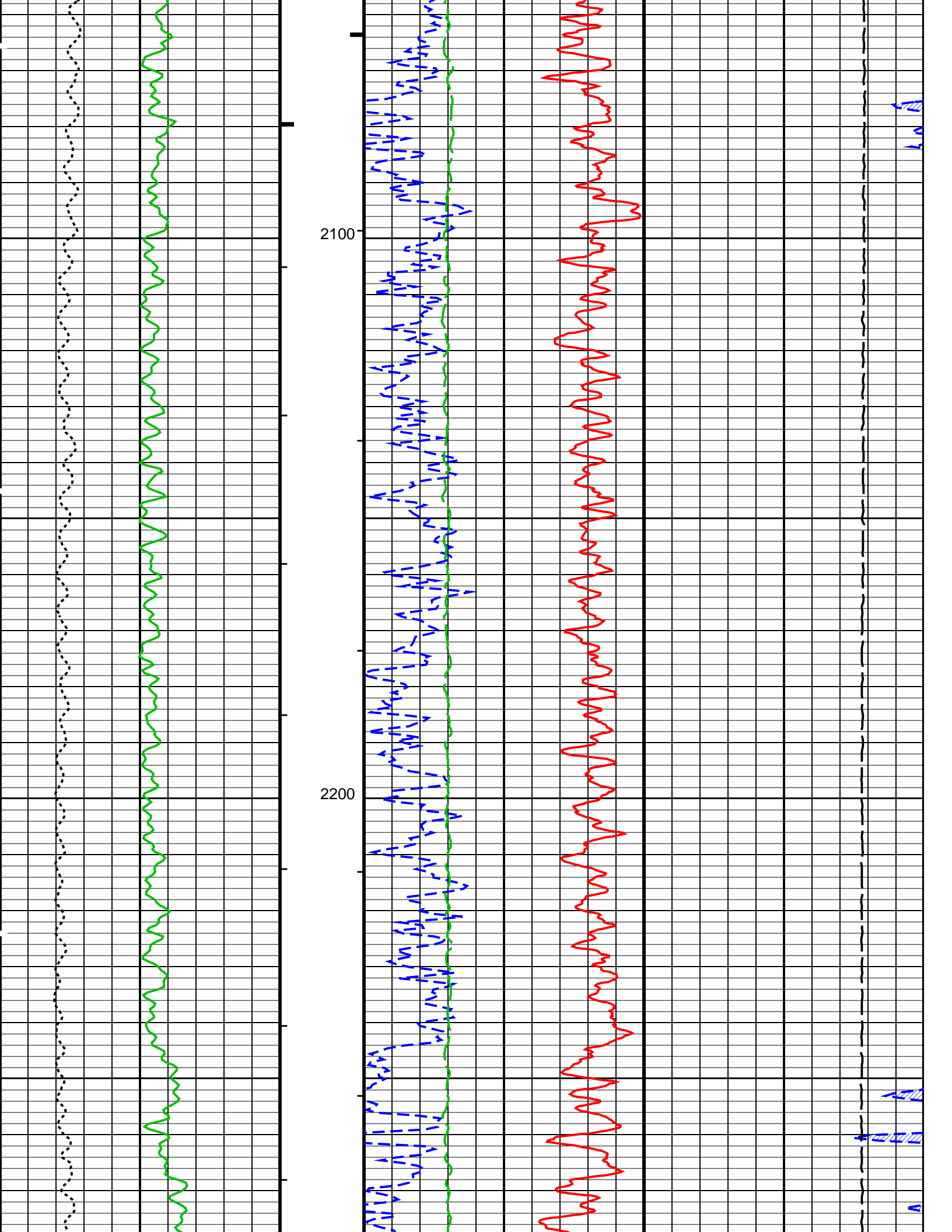


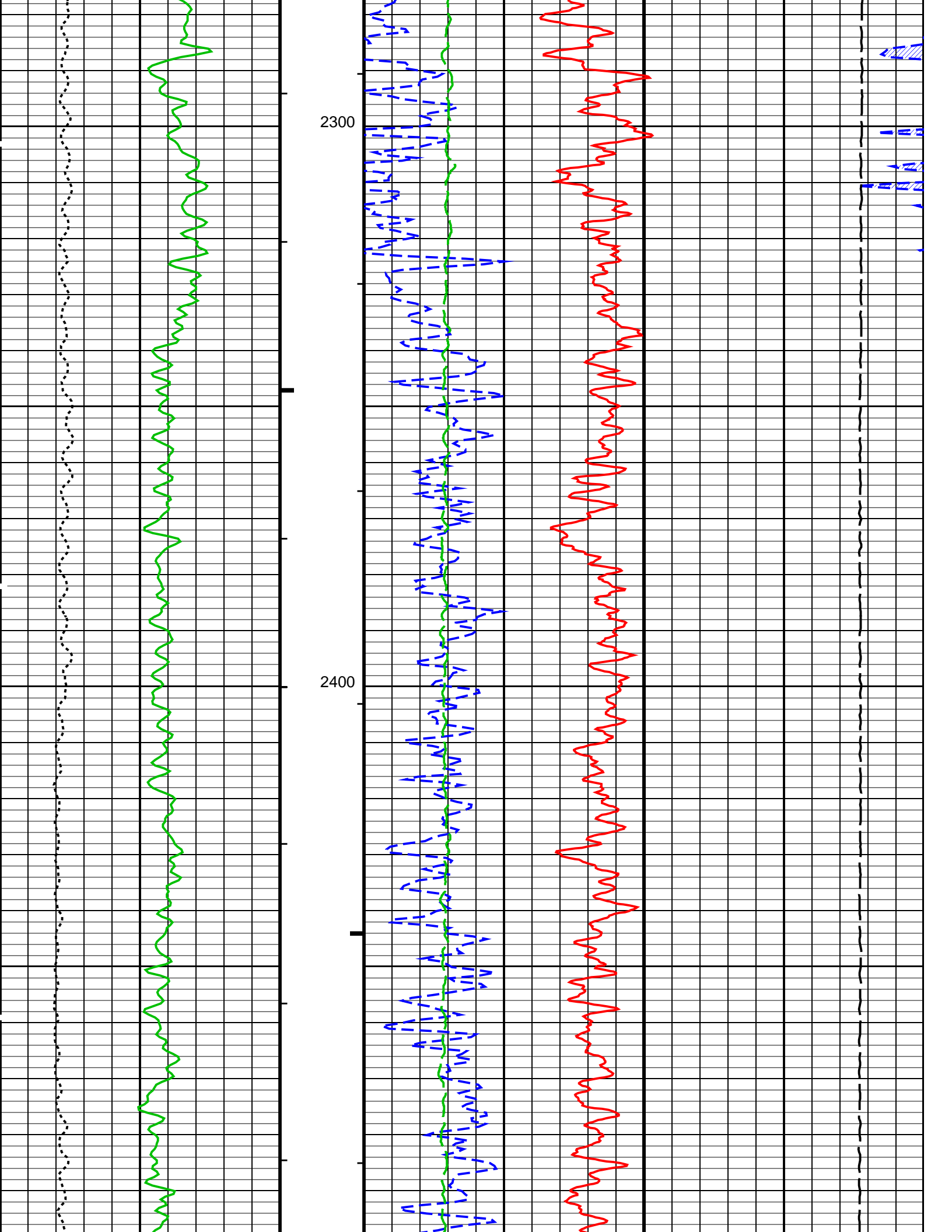


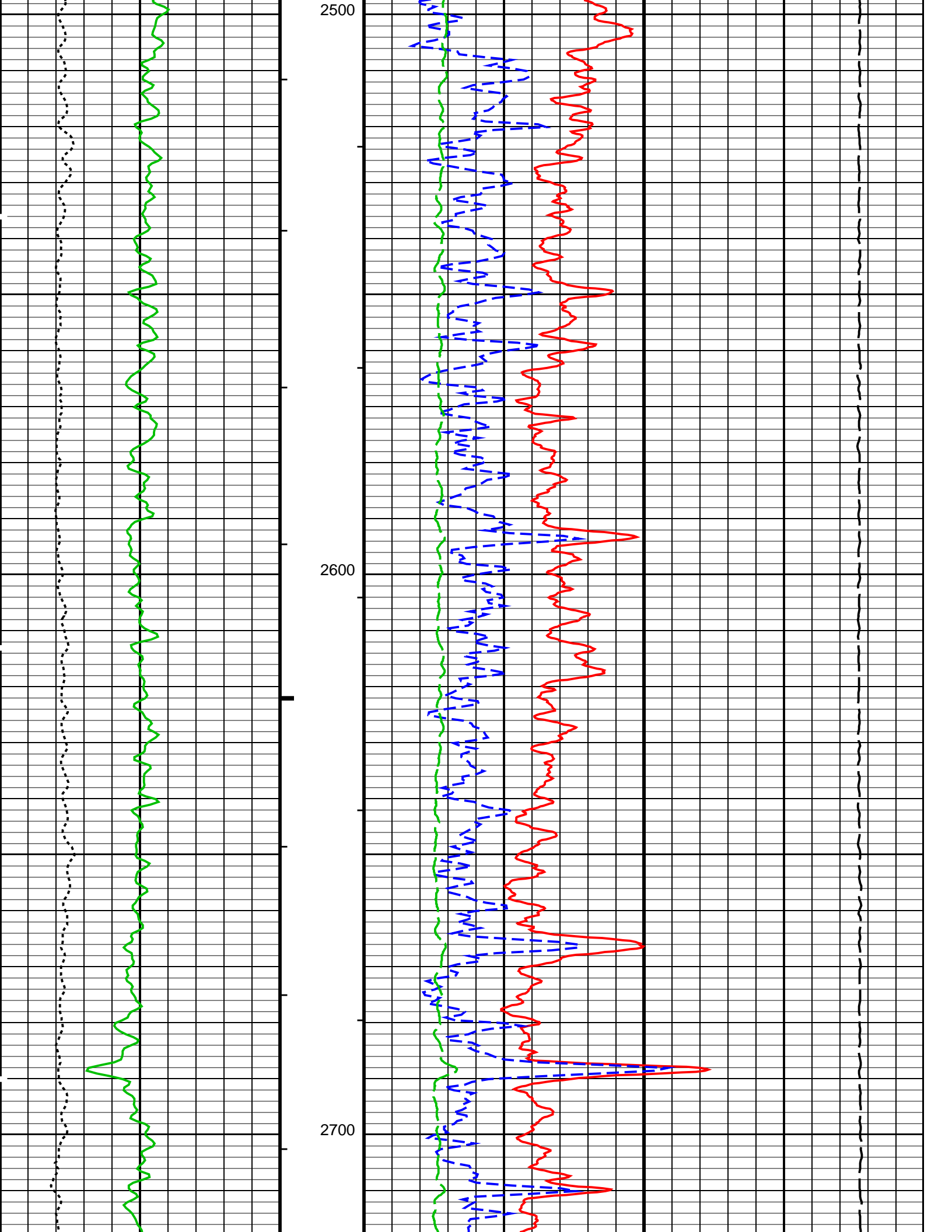




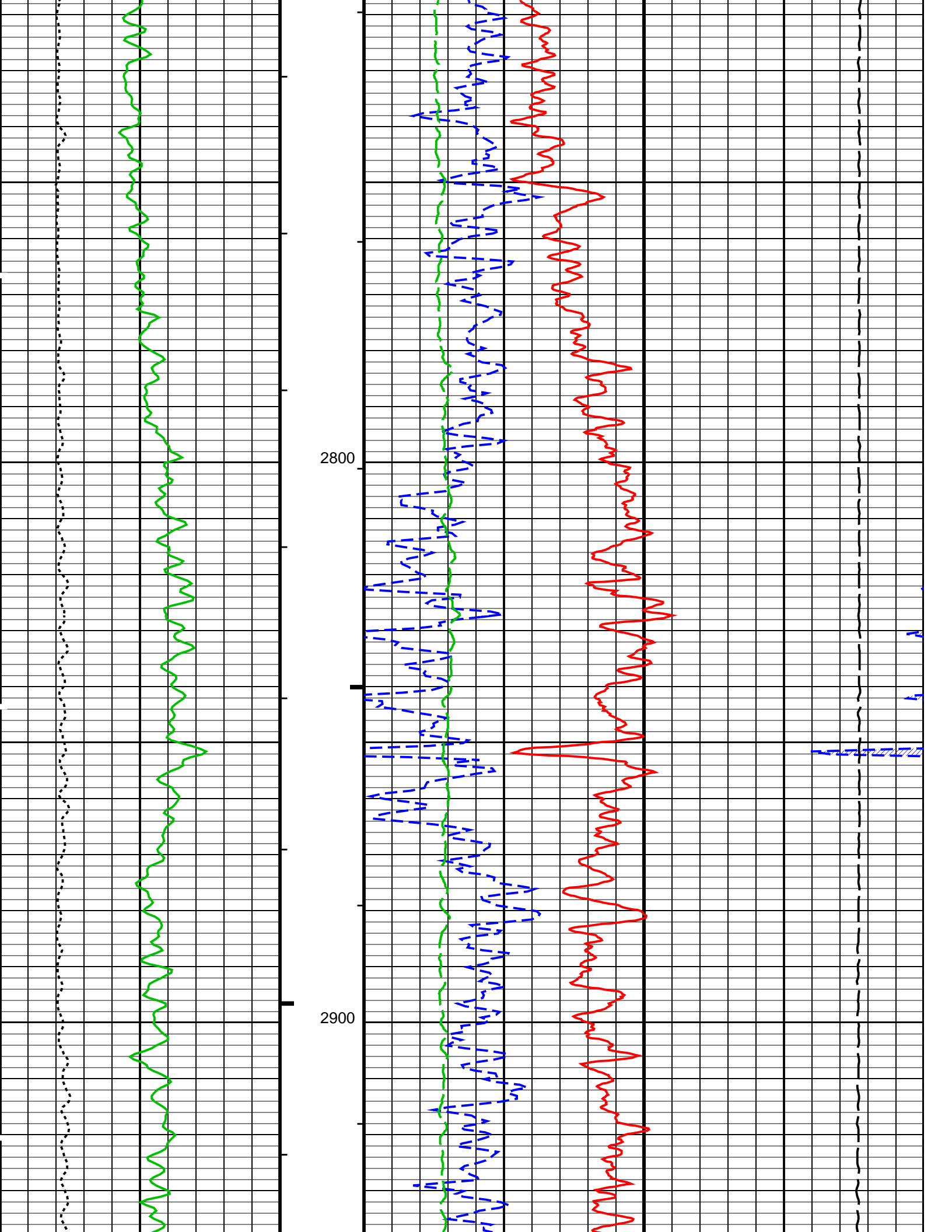


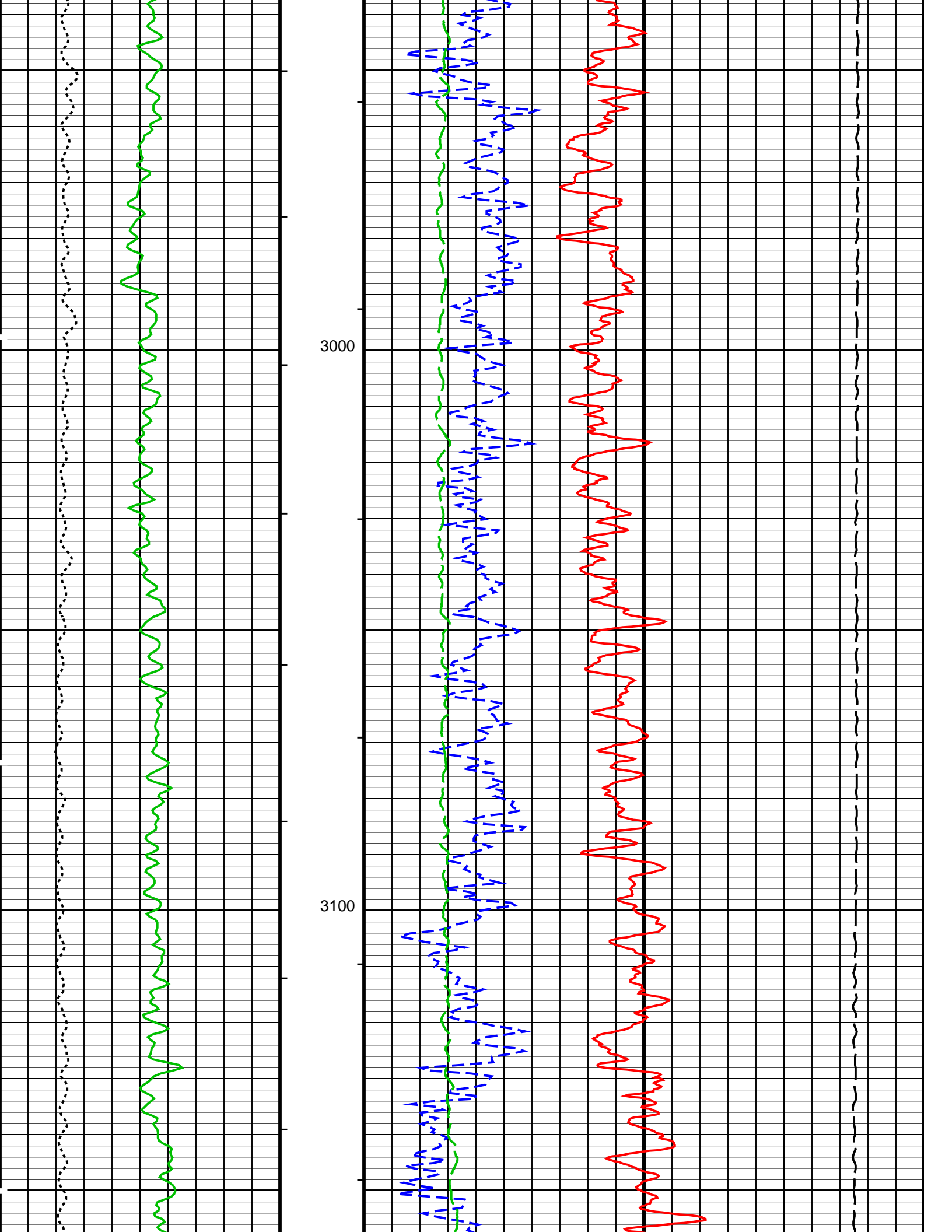


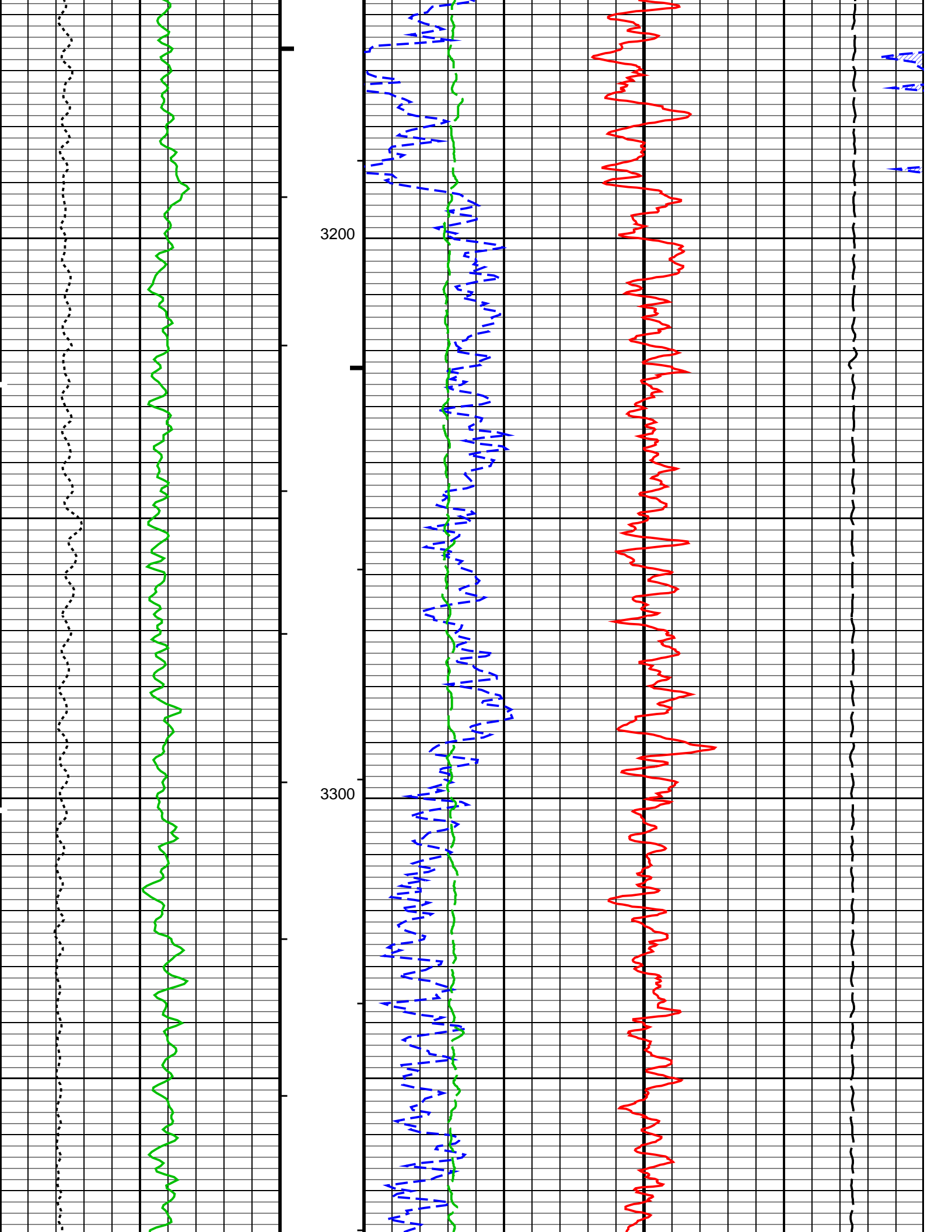


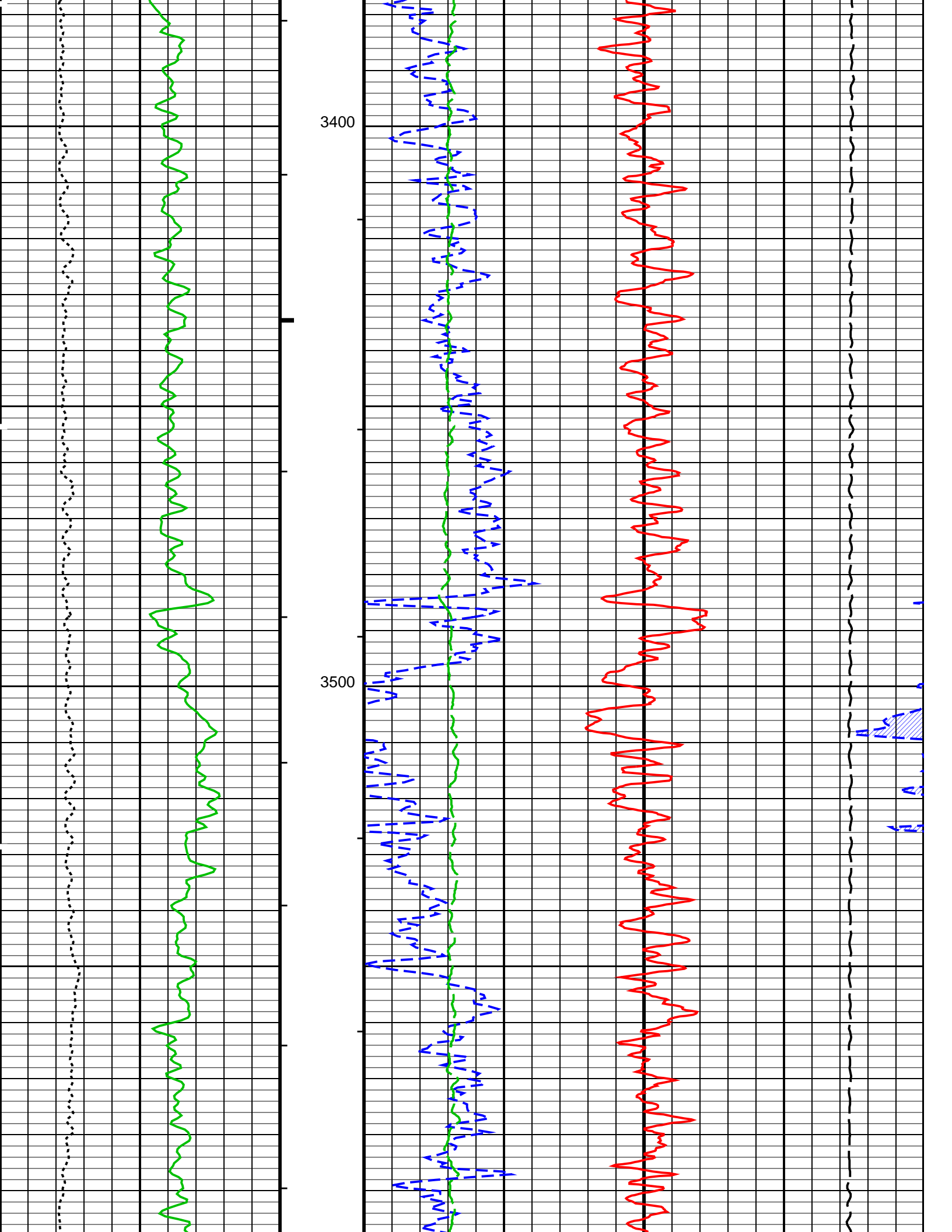


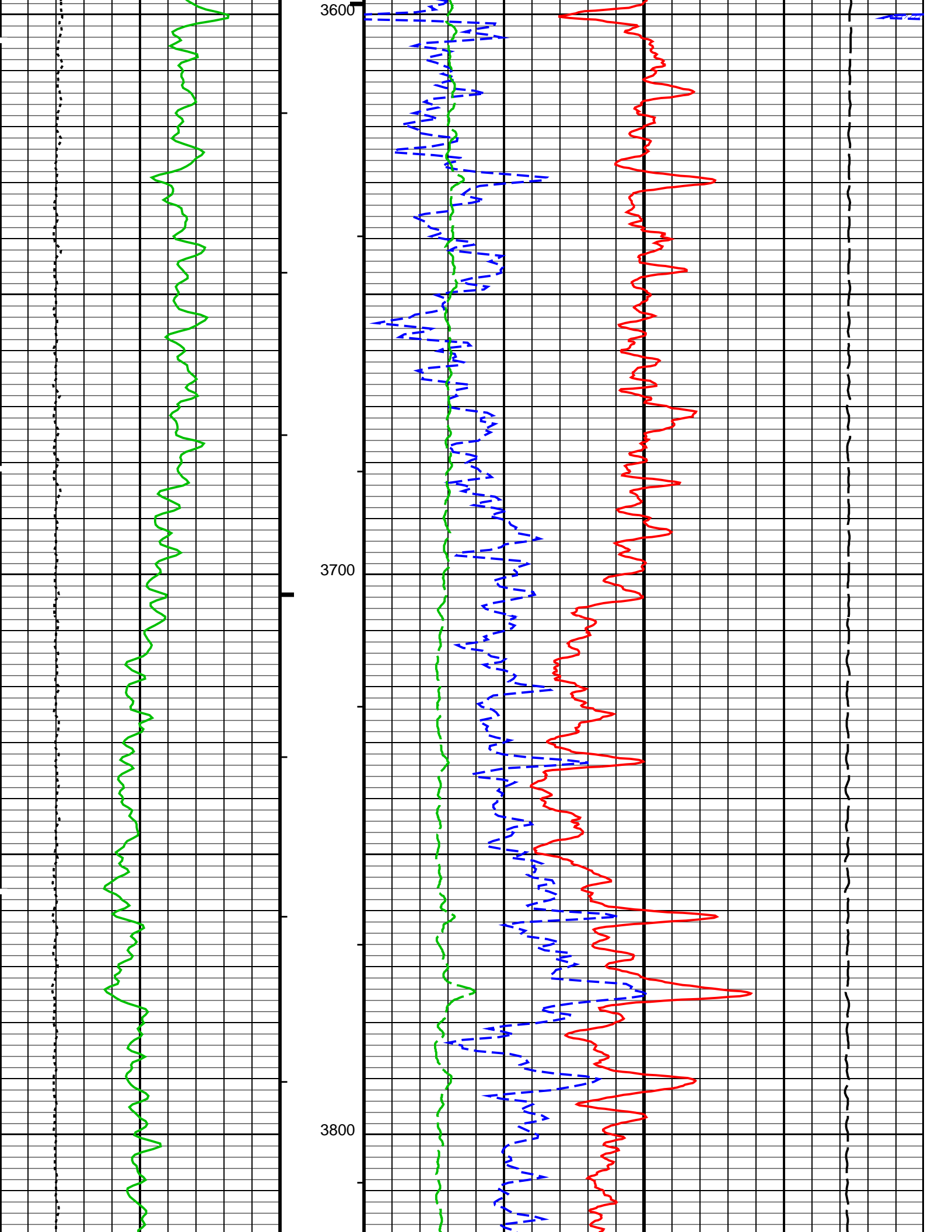


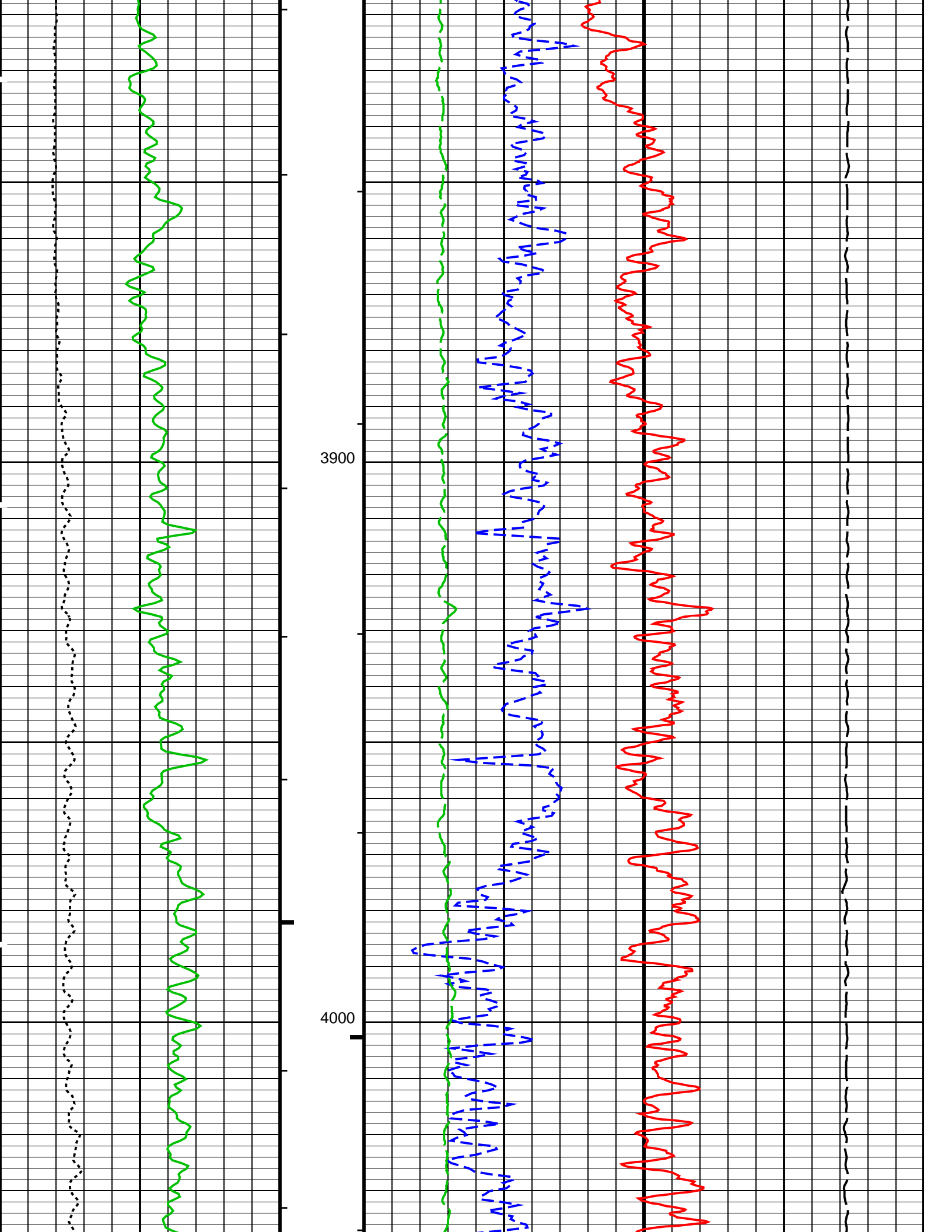


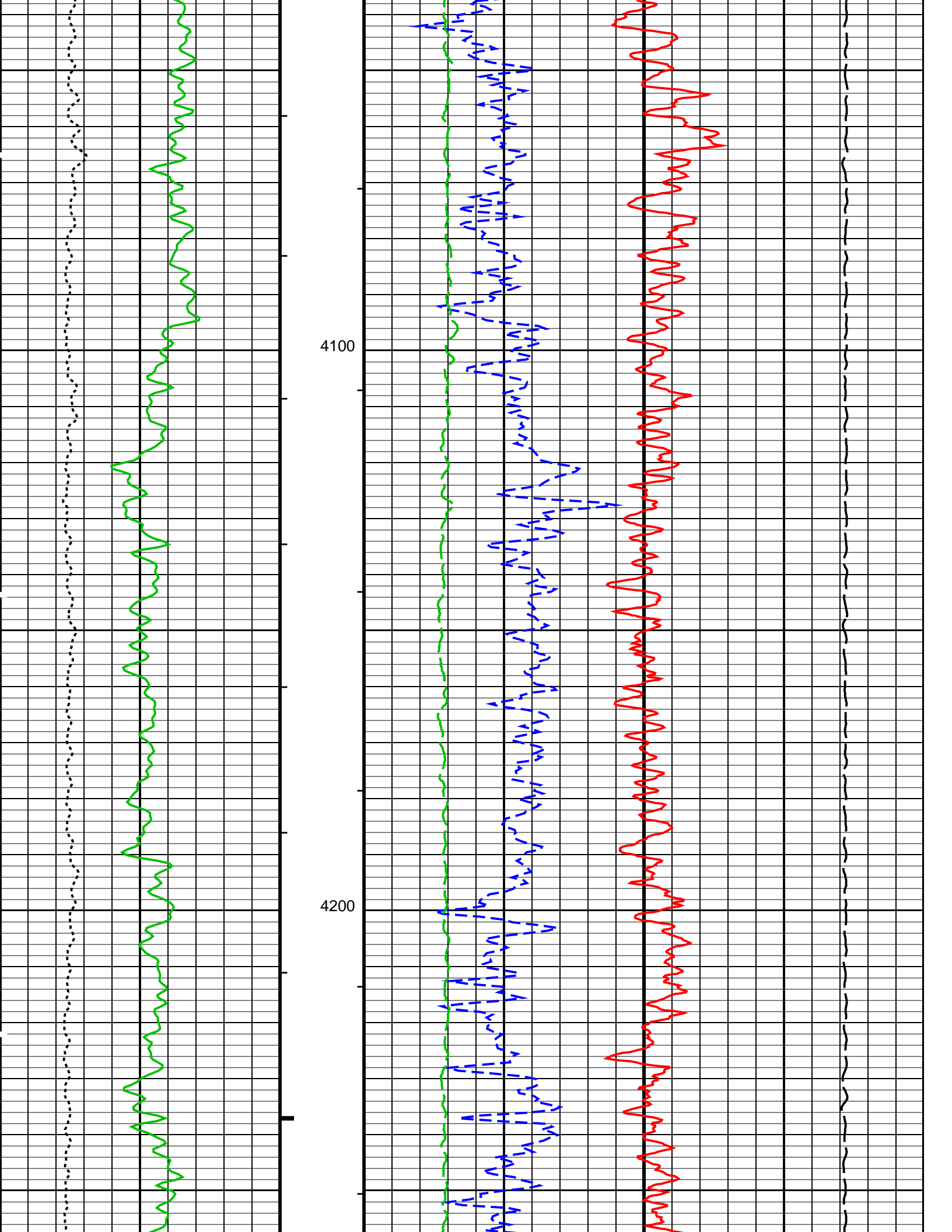


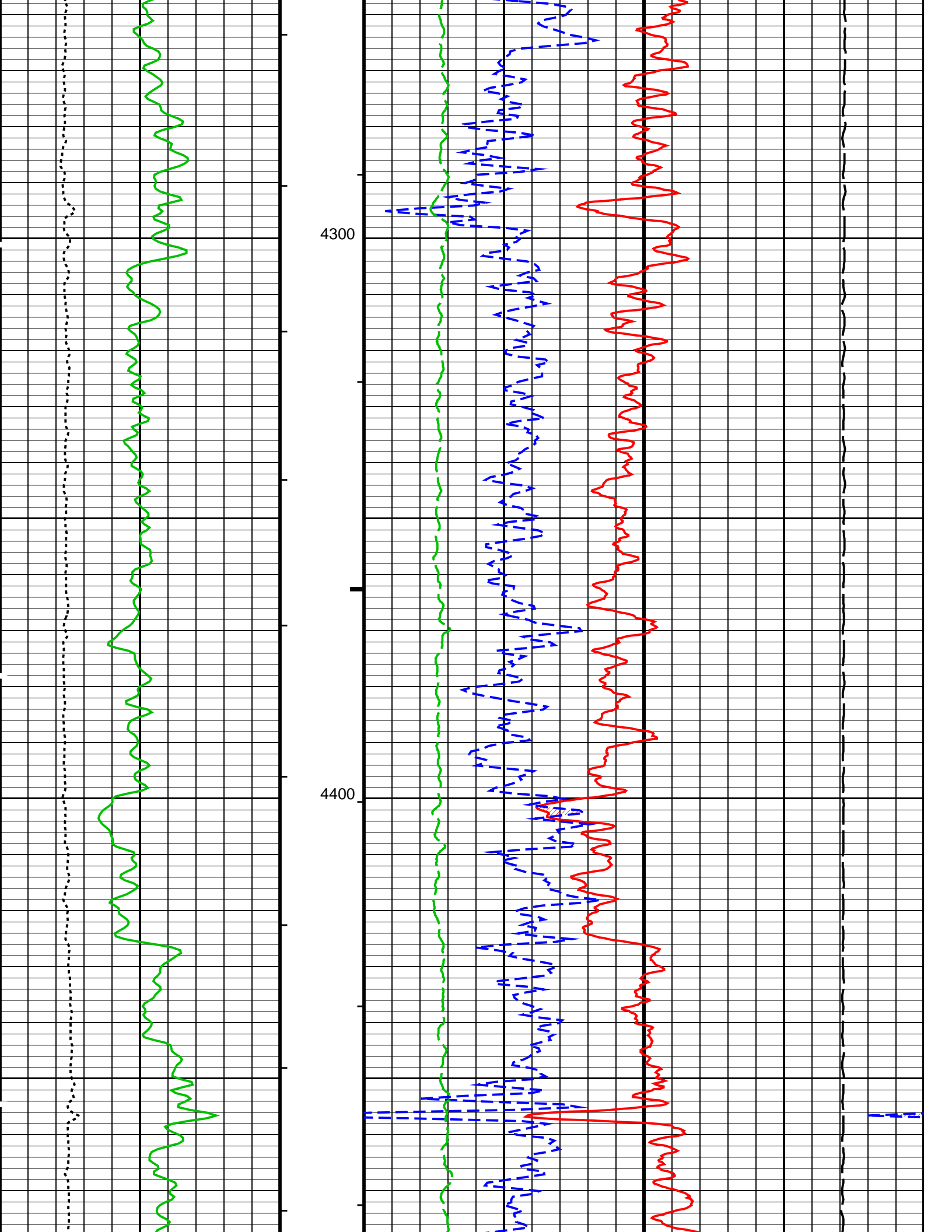




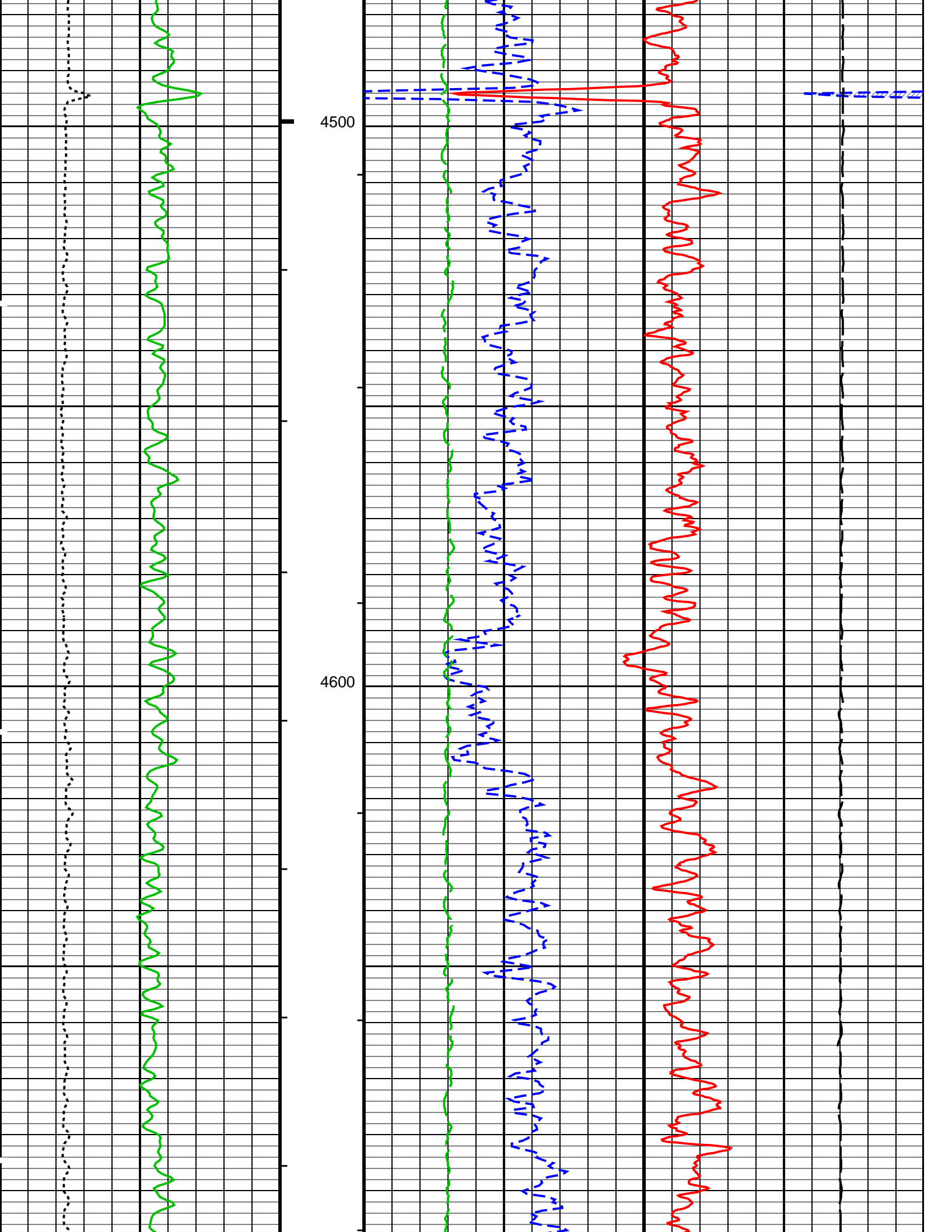


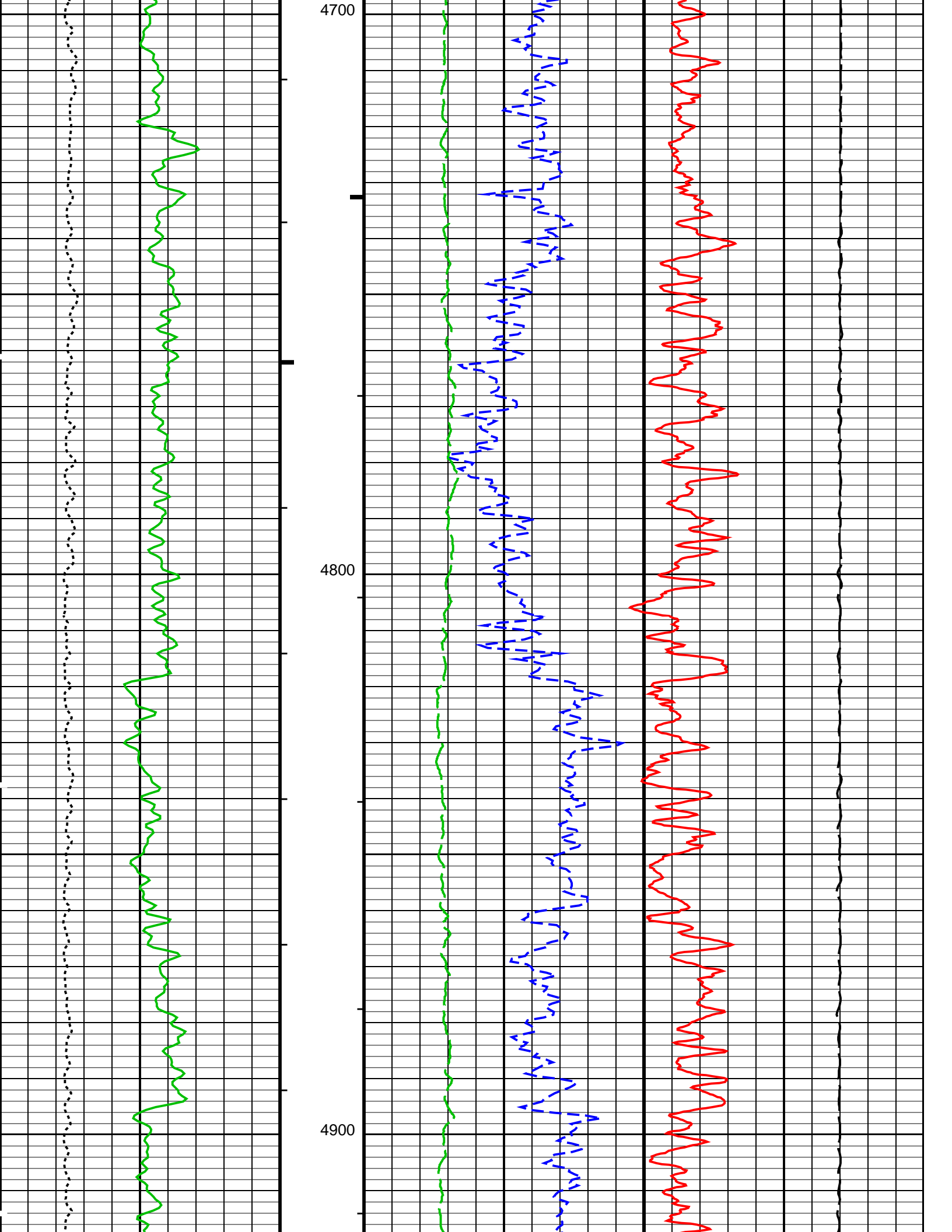


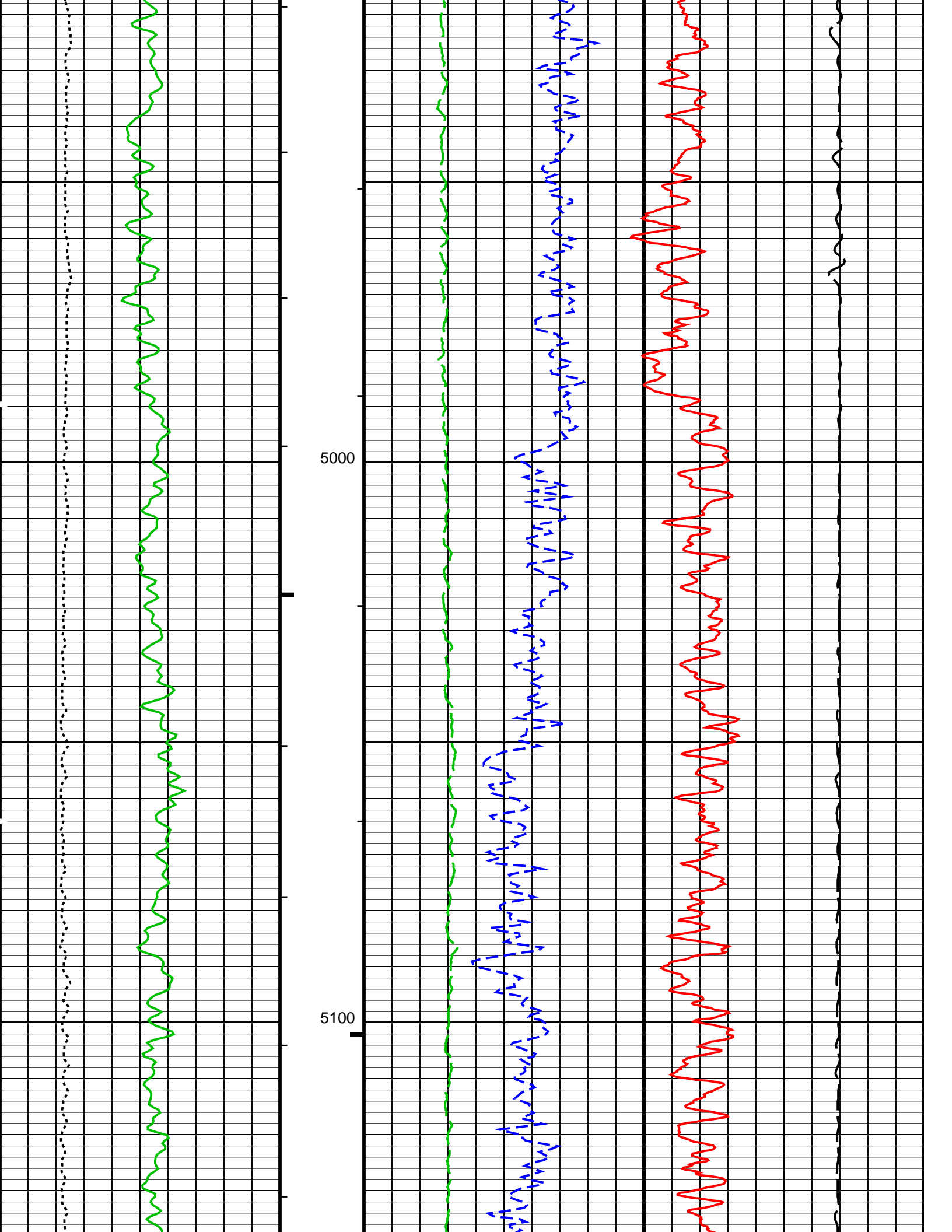


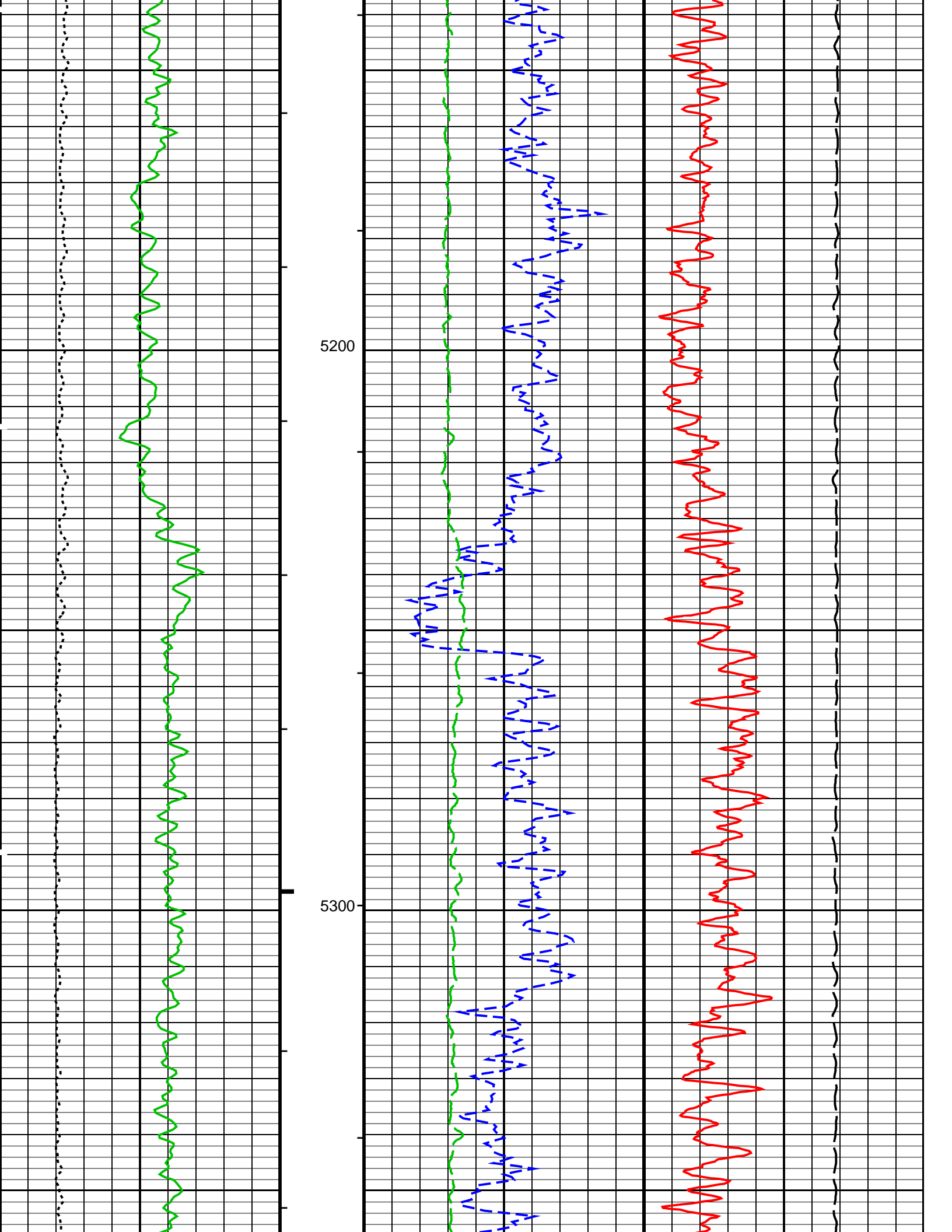


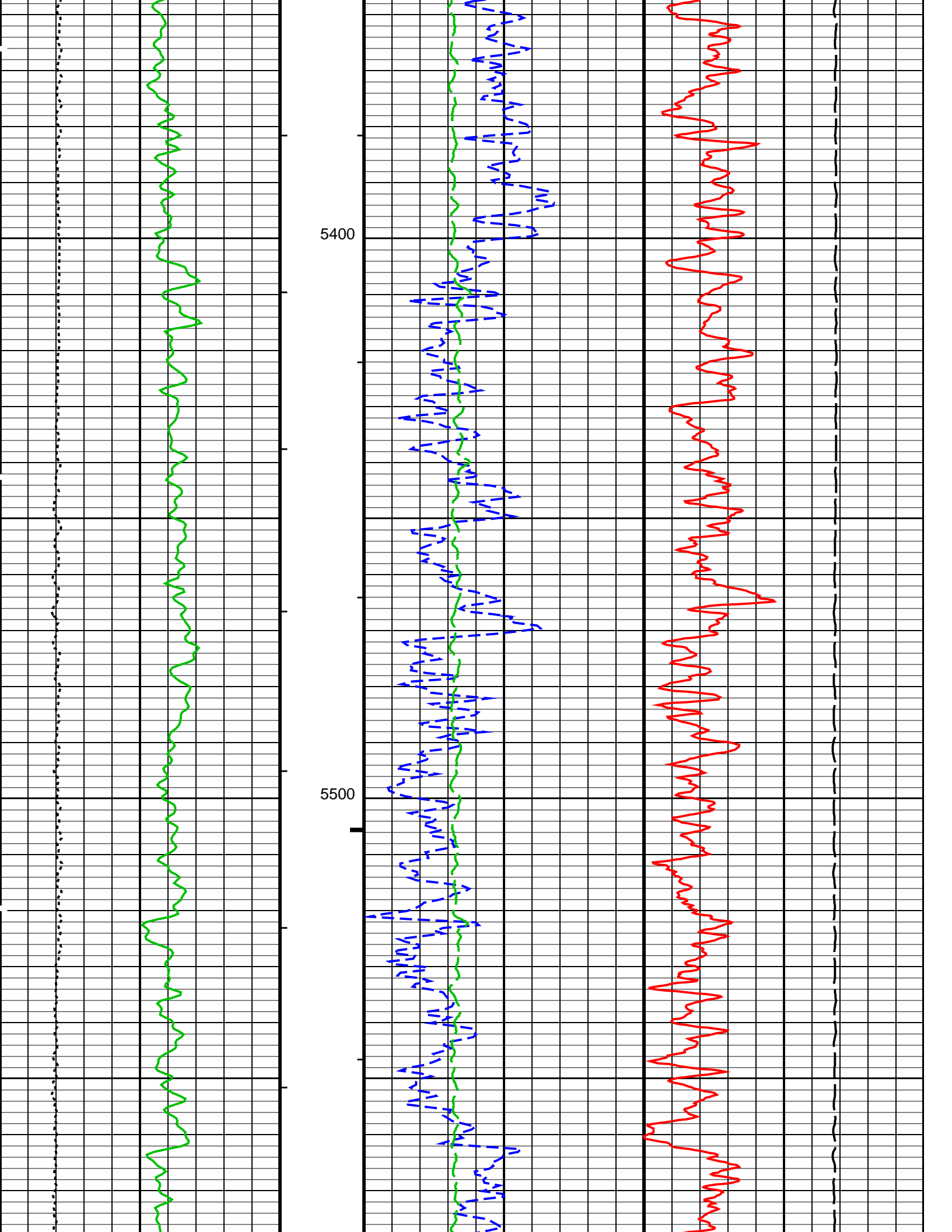


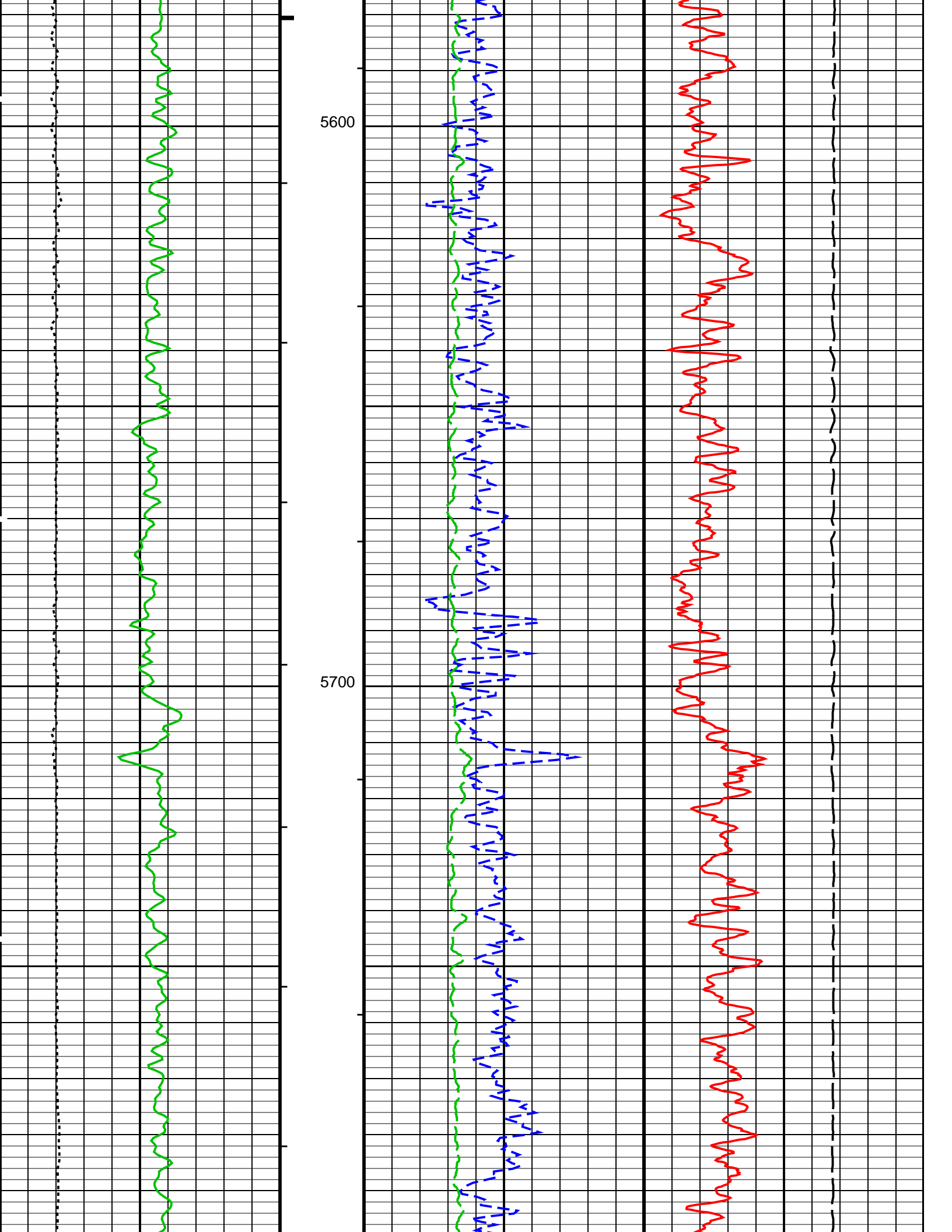


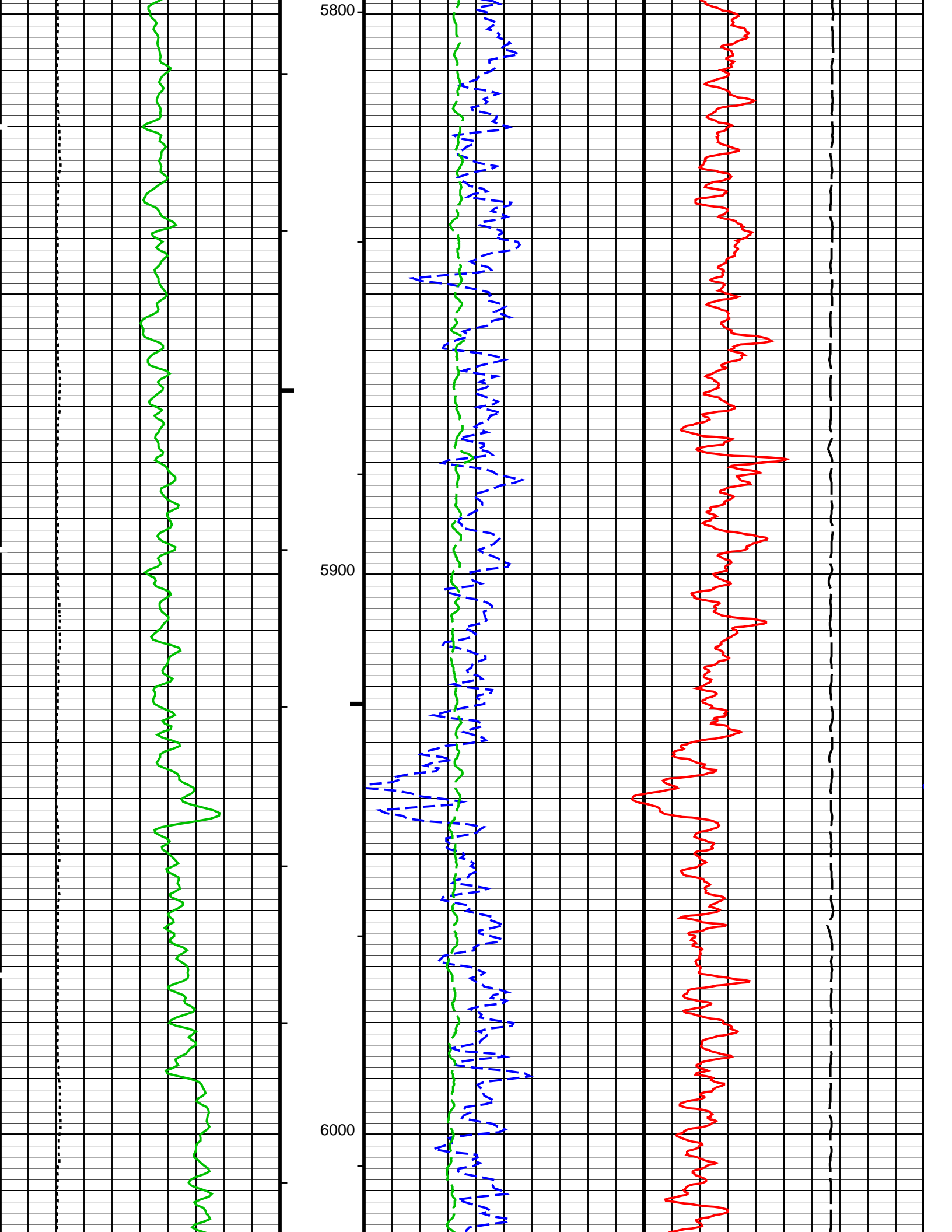


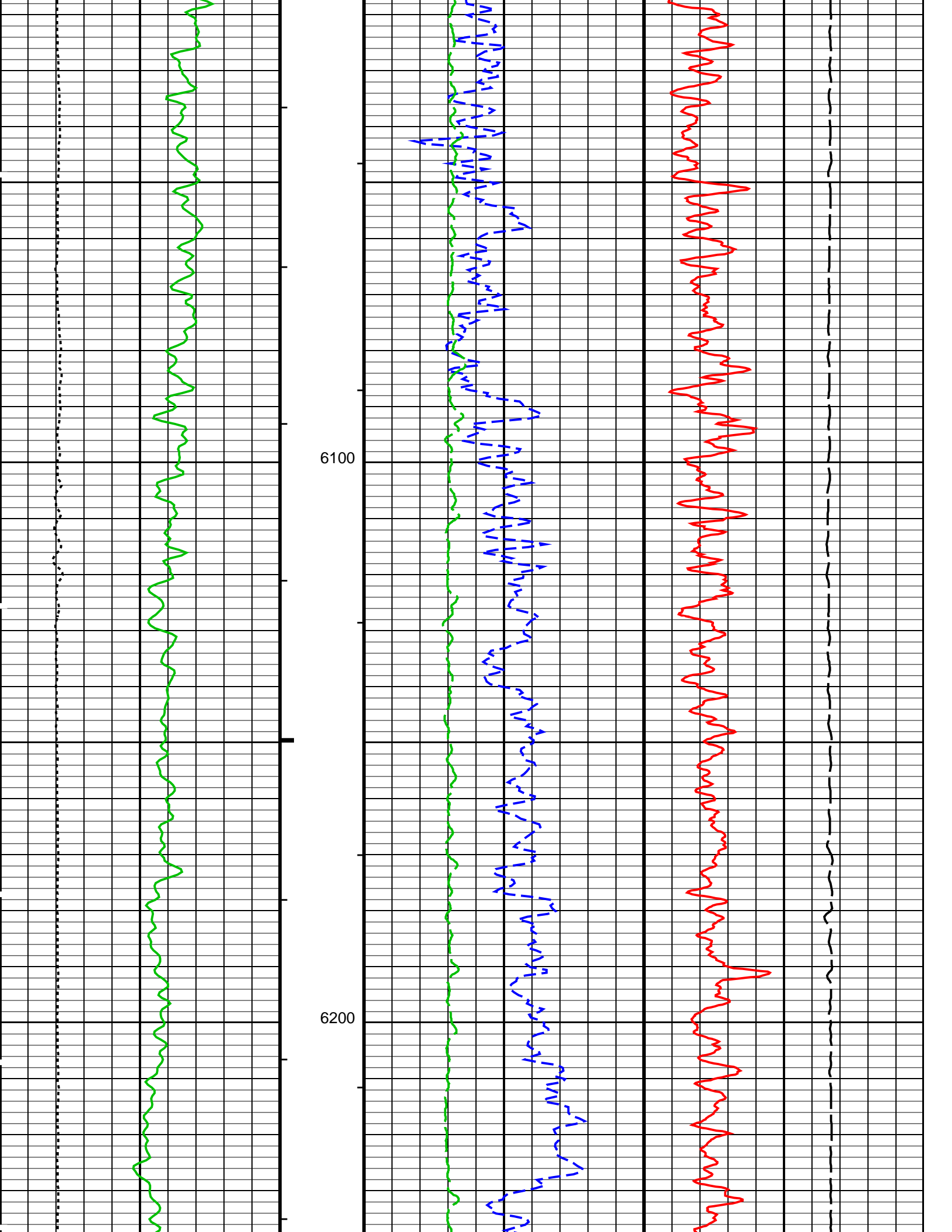




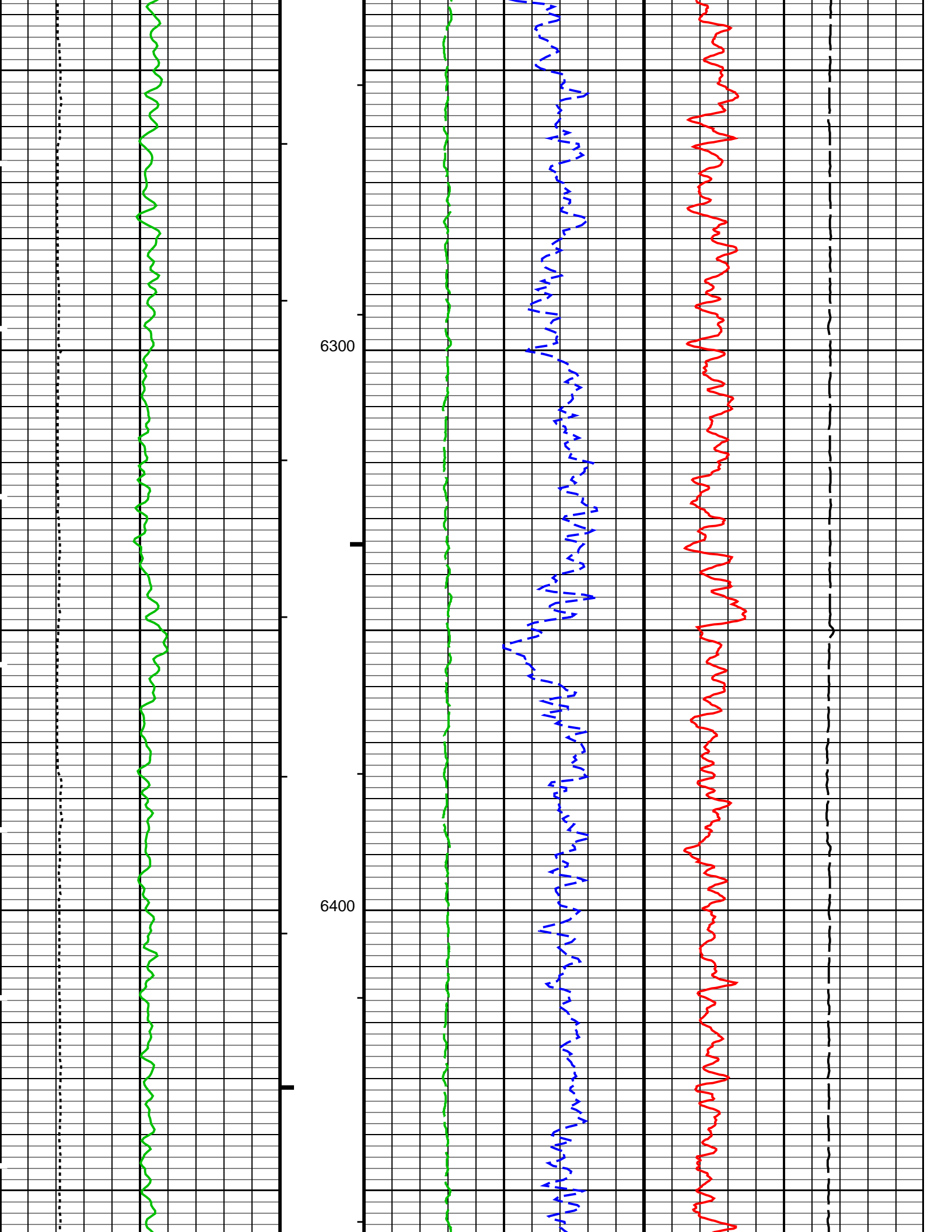


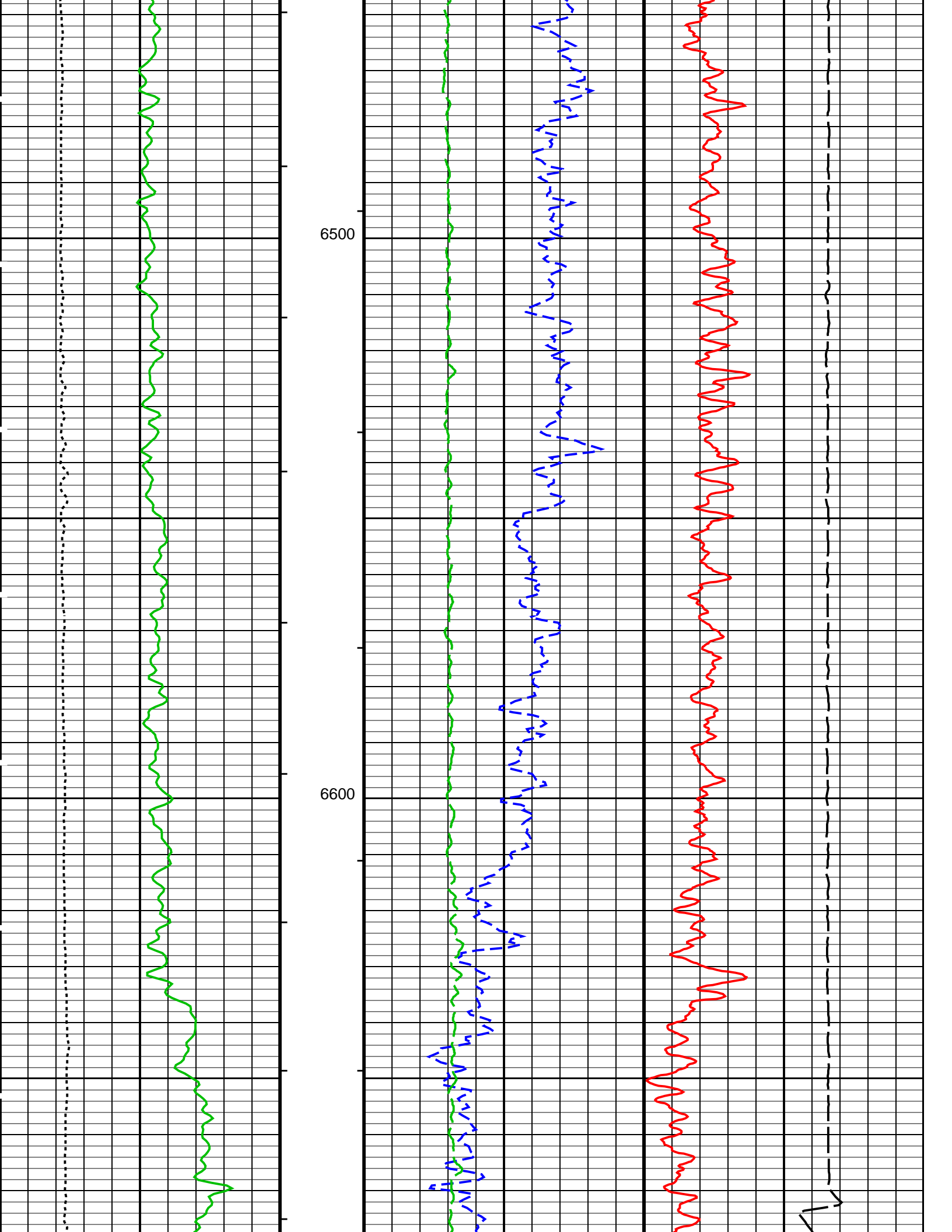


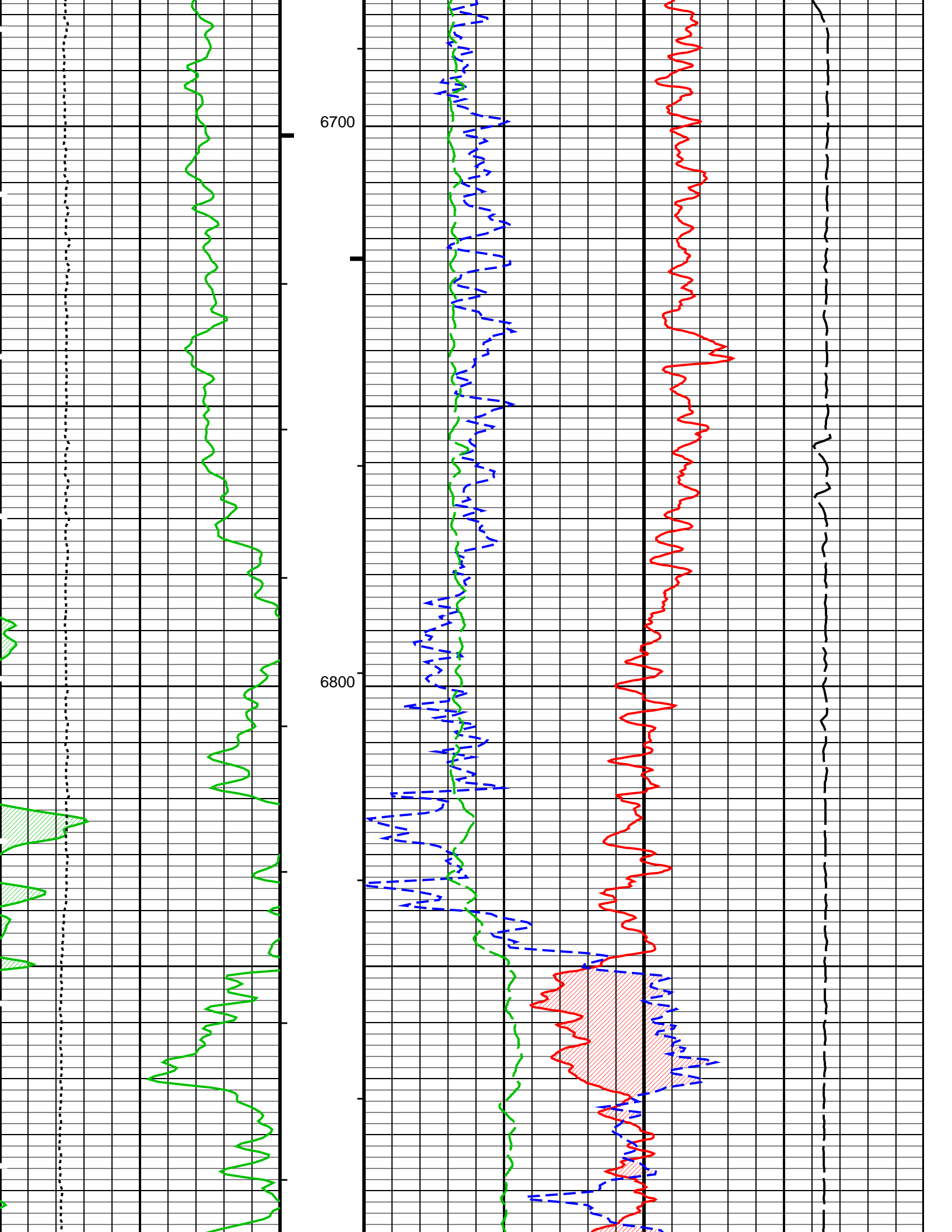


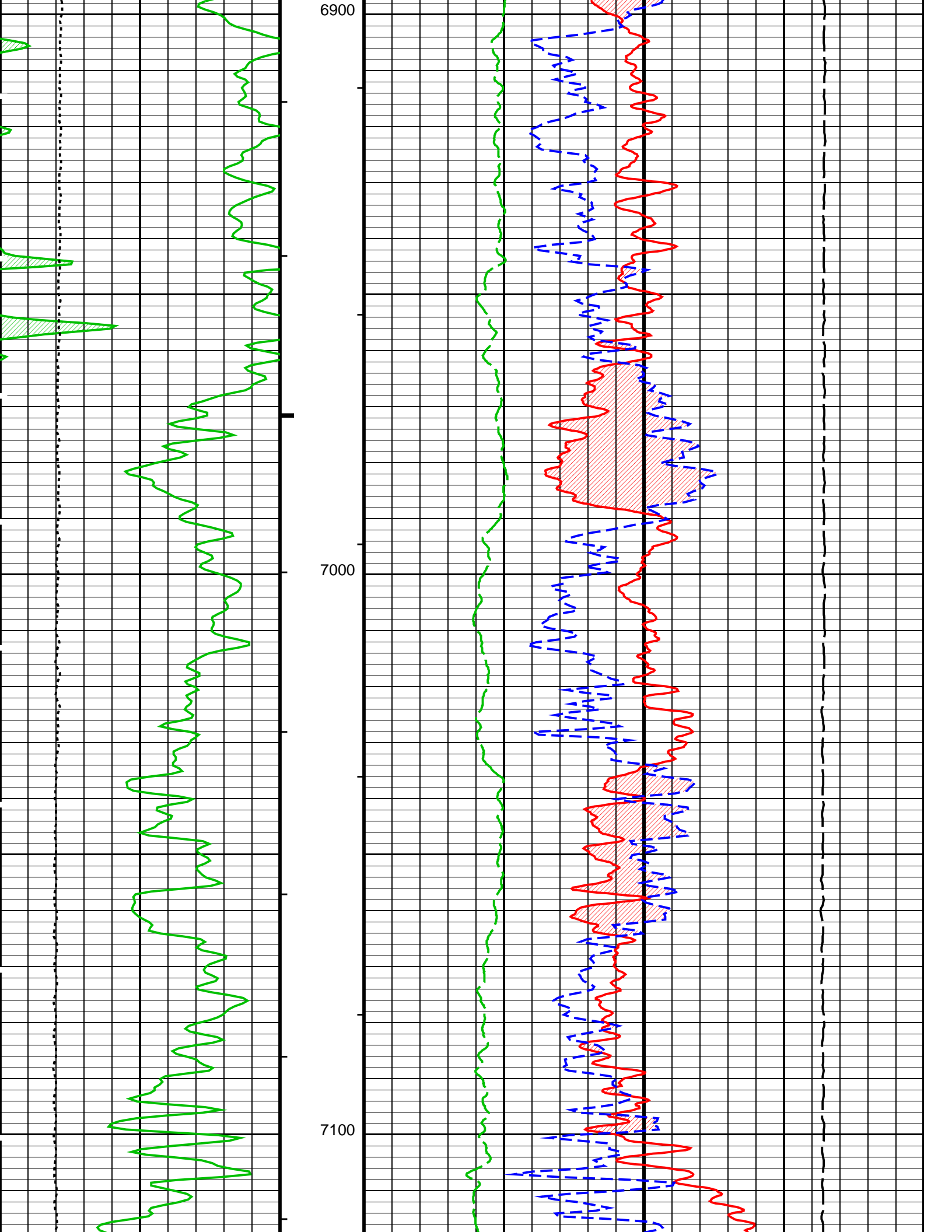


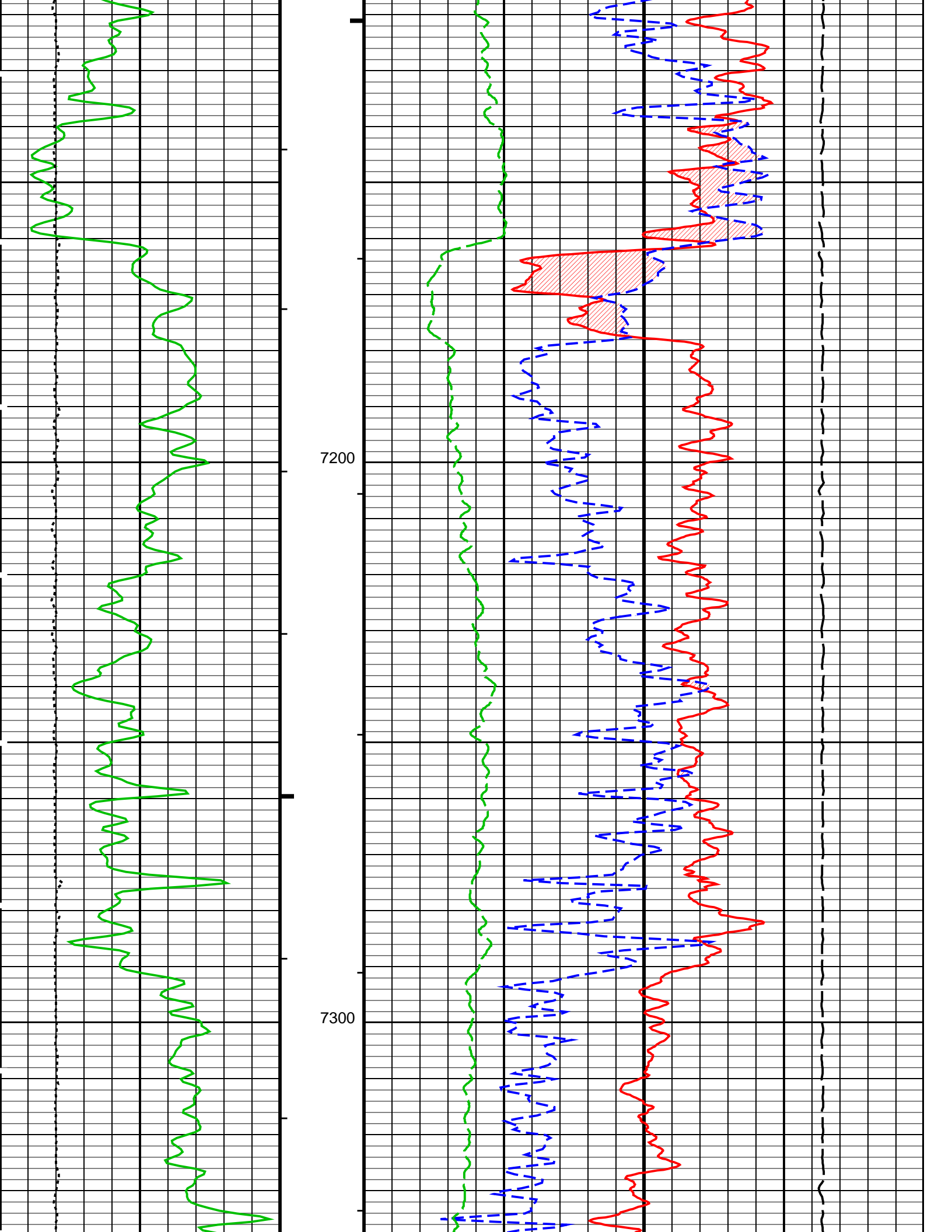


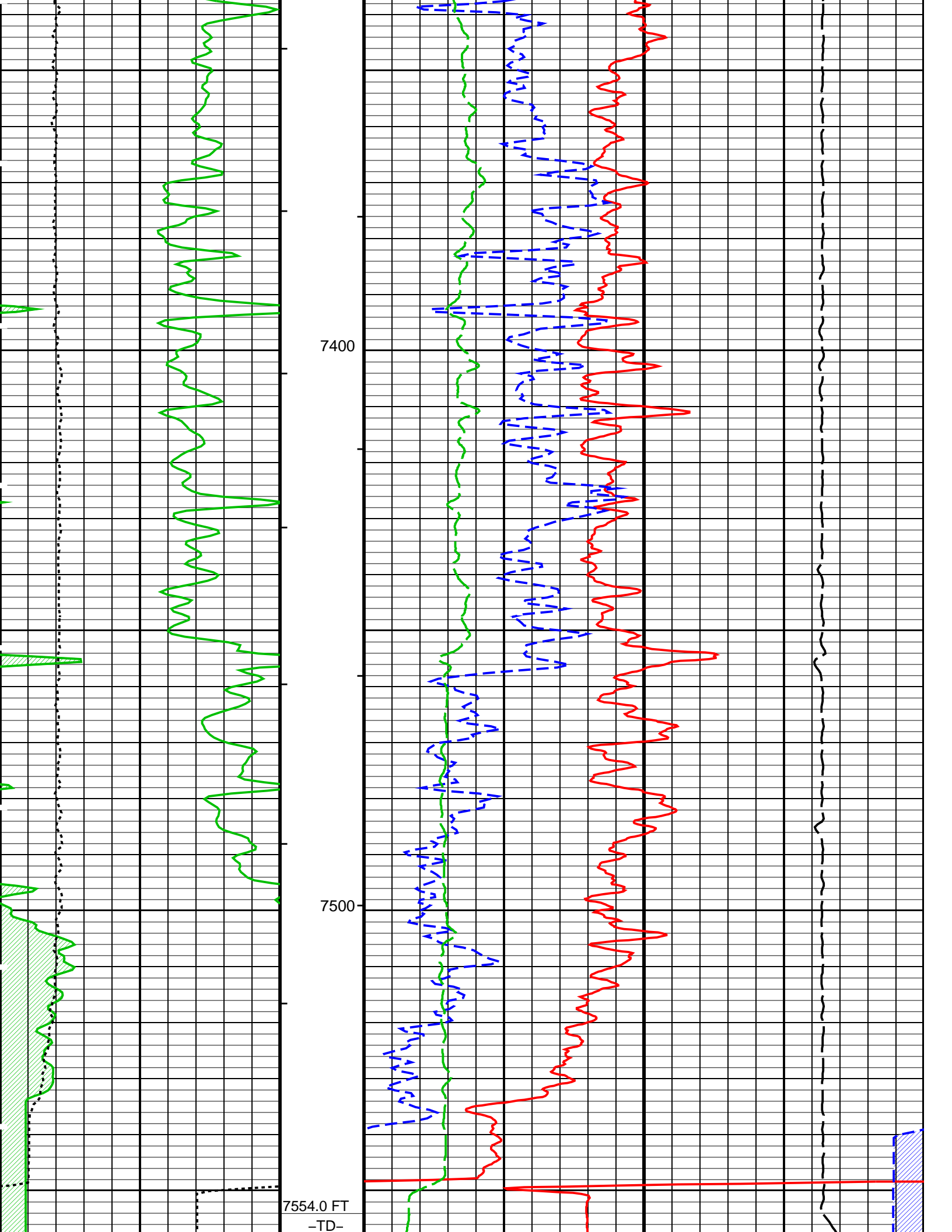












MAIN PASS: \*\*\* PLATFORM EXPRESS – NUCLEAR POROSITY \*\*\*

<div>Gamma Ray Backup</div> <div>Gamma Ray (GR)</div> <div>0 (GAPI) 200</div> <div>Caliper (HCAL)</div> <div>6 (IN) 16</div>	Std. Res. Density Porosity (DPHZ)		
	0.3	(V/V)	-0.1
	Alpha Processed Neutron Porosity (NPOR)		
	0.3	(V/V)	-0.1
	<div>Std. Res. Formation Pe (PEFZ)</div> <div>0 (-----) 10</div>		
		<div>Tension (TENS)</div> <div>10000 (LBF)</div> <div>0</div>	
Gas Effect			
NPOR Backup			

PIP SUMMARY

- └ Integrated Hole Volume Minor Pip Every 10 F3
- ┐ Integrated Hole Volume Major Pip Every 100 F3
- └ Integrated Cement Volume Minor Pip Every 10 F3
- ┐ Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
AIT-M: Array Induction Tool – M			
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	68	DEGF
HILTB-FTB: High resolution Integrated Logging Tool-DTS			
BHFL	Borehole Fluid Type	WATER	
BHFL_TLD	HILT Nuclear Mud Base	WATER	
BHS	Borehole Status	OPEN	
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
DHC	Density Hole Correction	BS	
FD	Fluid Density	1	G/C3
FSAL	Formation Salinity	-50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCLF	Germany Coal-like Formation Option	NO	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2.71	G/C3
MWCO	Mud Weight Correction Option	NO	
NAAC	HRDD APS Activation Correction	OFF	
NMT	HILT Nuclear Mud Type	NOBARITE	
NPRM	HRDD Processing Mode	StdRes	
NSAR	HRDD Depth Sampling Rate	1	IN
PTCO	Pressure/Temperature Correction Option	NO	
SDAT	Standoff Data Source	SOCN	
SHT	Surface Hole Temperature	68	DEGF
SOCN	Standoff Distance	0.125	IN
SOCO	Standoff Correction Option	YES	
HNCS-BA: Hostile Natural Gamma Ray Sonde			
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	68	DEGF
STI: Stuck Tool Indicator			
TDL	Total Depth – Logger	7554.00	FT
PERT: Preliminary Evaluation – Real Time			
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG

GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	68	DEGF
HOLEV: Integrated Hole/Cement Volume			
BHS	Borehole Status	OPEN	
FCD	Future Casing (Outer) Diameter	4.5	IN
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	68	DEGF
System and Miscellaneous			
BS	Bit Size	7.875	IN
BSAL	Borehole Salinity	-50000.00	PPM
CSIZ	Current Casing Size	8.625	IN
CWEI	Casing Weight	24.00	LB/F
DFD	Drilling Fluid Density	9.60	LB/G
DO	Depth Offset for Playback	0.0	FT
MST	Mud Sample Temperature	64.20	DEGF
PP	Playback Processing	NORMAL	
RMFS	Resistivity of Mud Filtrate Sample	0.8347	OHMM
TD	Total Depth	7554	FT

Format: PORO      Vertical Scale: 5" per 100'      Graphics File Created: 05-Jan-2010 11:05

## OP System Version: 17C0-154

AIT-M	17C0-154	HILTB-FTB	17C0-154
HNGC-B	17C0-154	HNGS-BA	17C0-154
DTC-H	17C0-154		

### Input DLIS Files

DEFAULT	SPLICE_AIT_TLD_MCFL_012	FN:1	PRODUCER	05-Jan-2010 11:04	7567.5 FT	547.6 FT
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### Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_013PUP	FN:11	PRODUCER	05-Jan-2010 11:05		
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**Schlumberger**

**MAIN POROSITY LOG 5" = 100'**

MAXIS Field Log

**Schlumberger**

**POROSITY REPEAT ANALYSIS**

MAXIS Field Log

### Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_007PUP	FN:6	PRODUCER	05-Jan-2010 08:44	7579.5 FT	6898.0 FT
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### Output DLIS Files



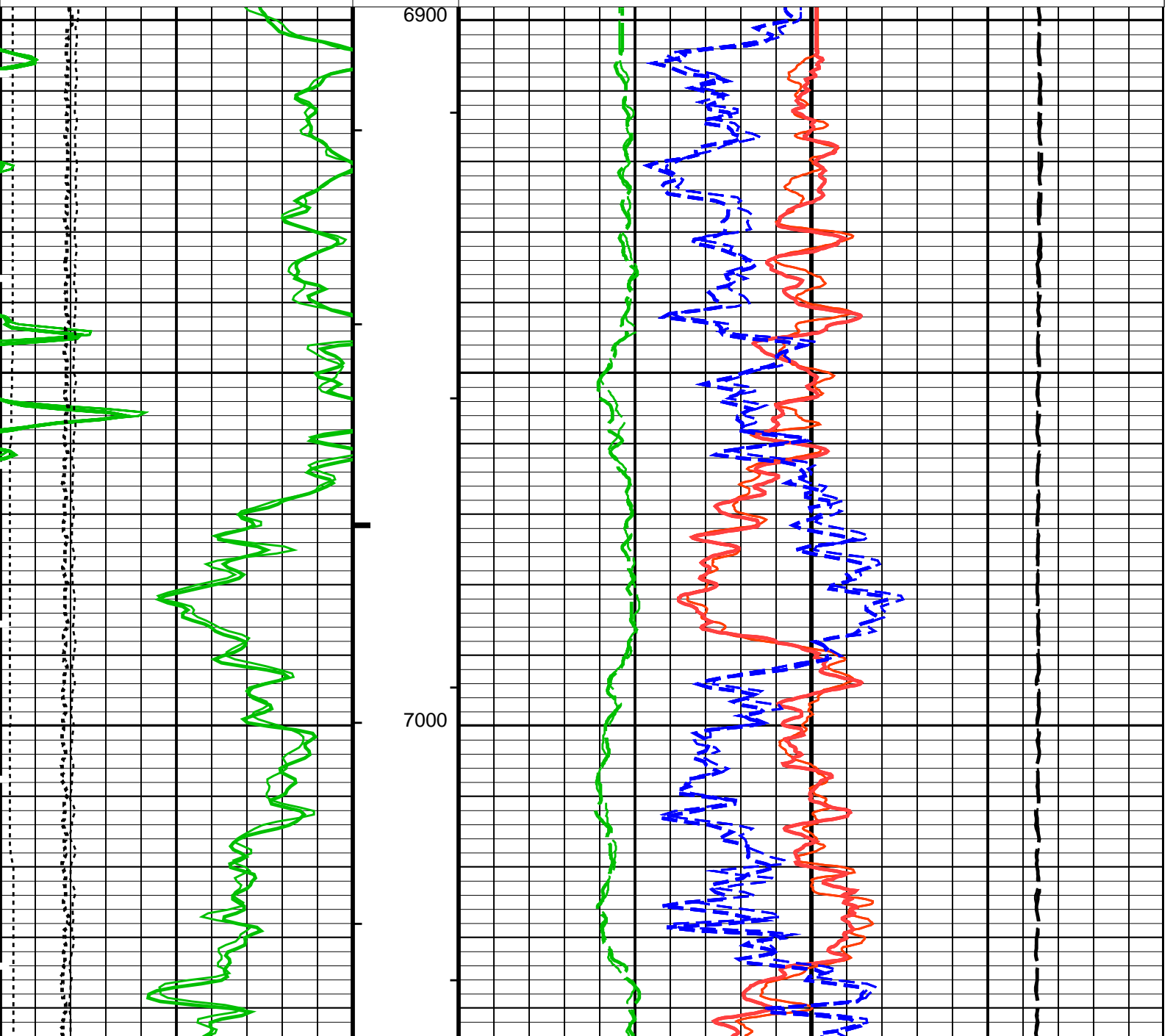
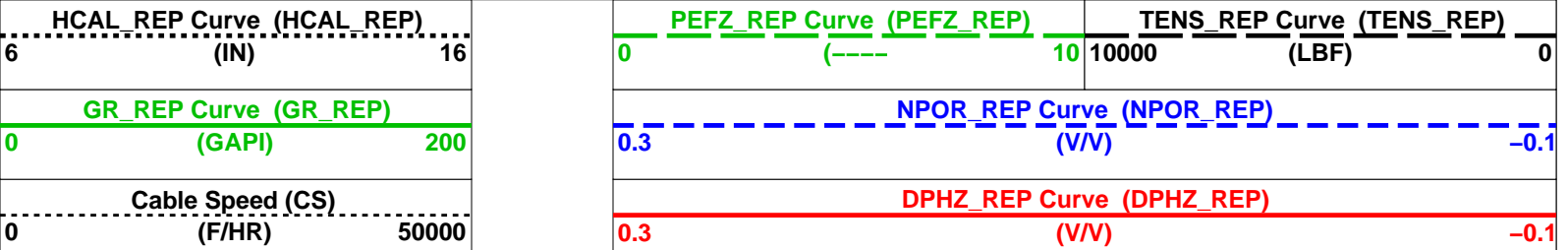
# OP System Version: 17C0-154

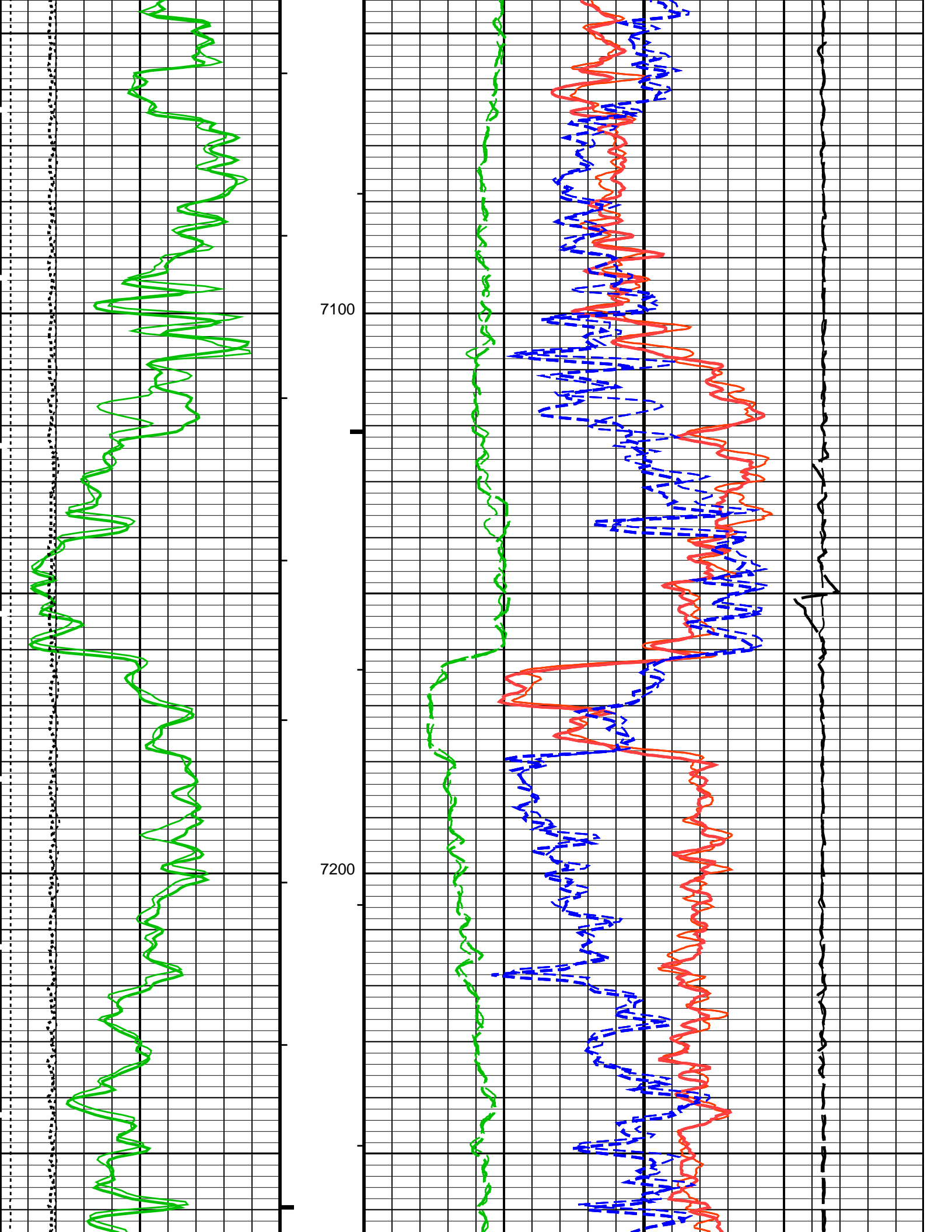
AIT-M	17C0-154	HILTB-FTB	17C0-154
HNGC-B	17C0-154	HNGS-BA	17C0-154
DTC-H	17C0-154		

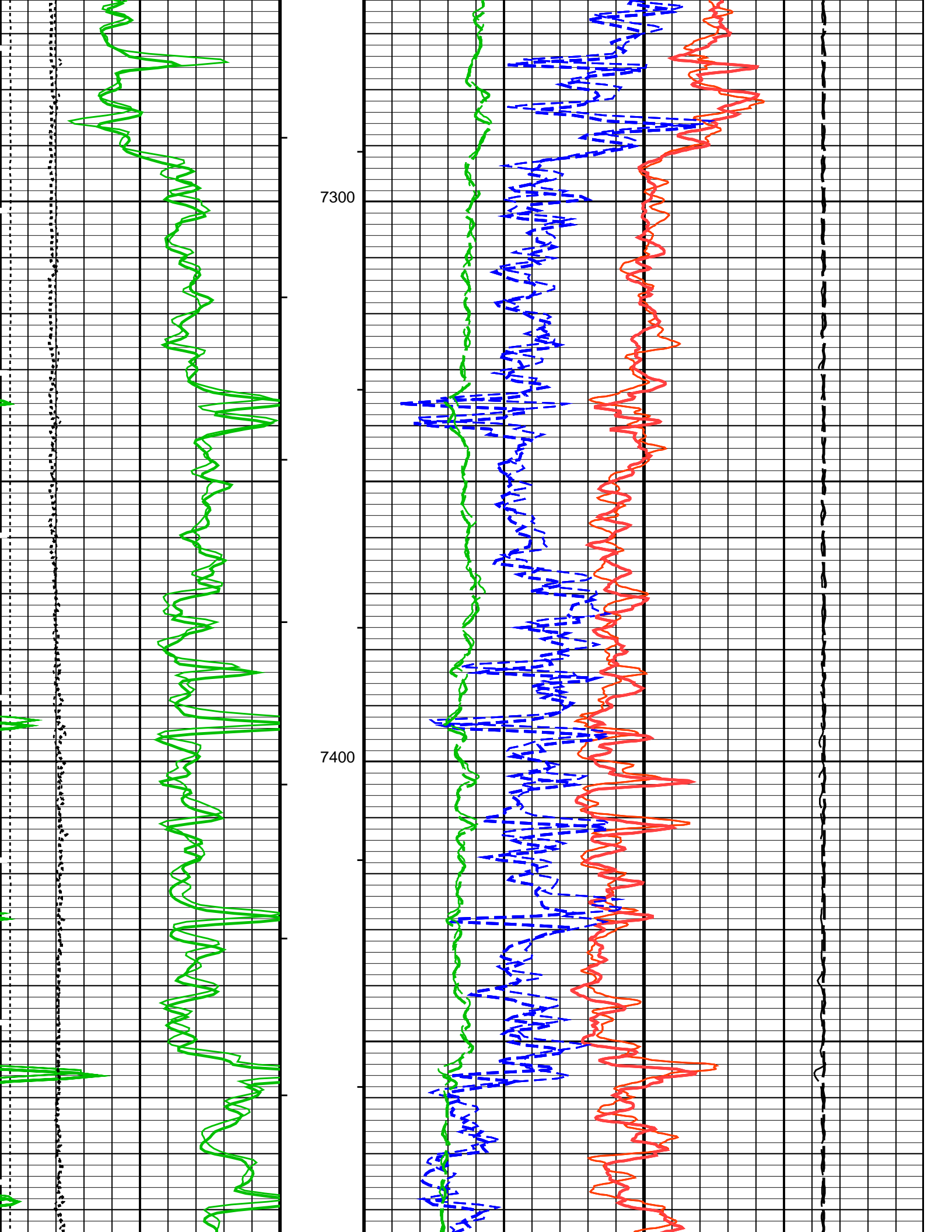
## PIP SUMMARY

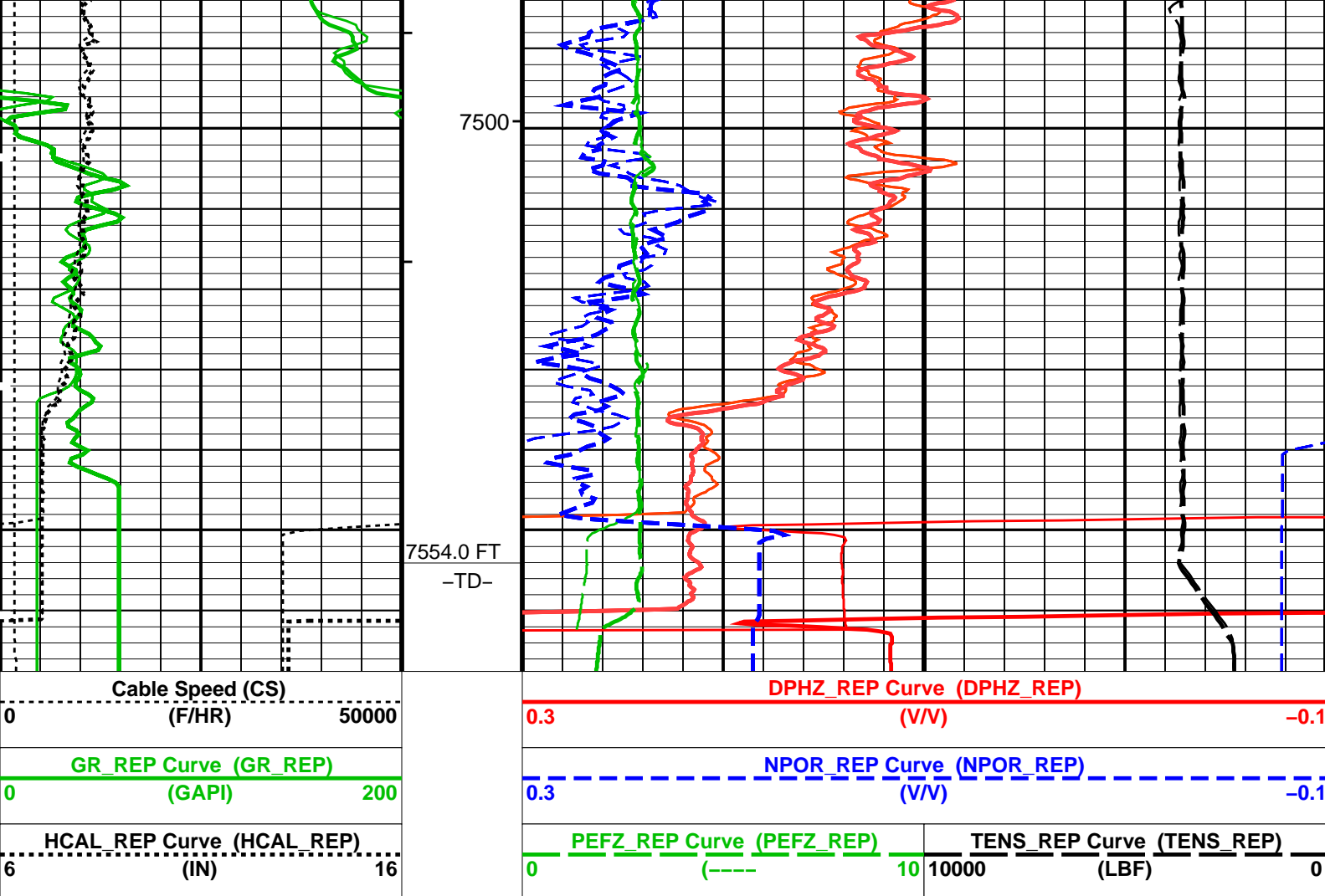
- └ Integrated Hole Volume Minor Pip Every 10 F3
- └ Integrated Hole Volume Major Pip Every 100 F3
- └ Integrated Cement Volume Minor Pip Every 10 F3
- └ Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S









#### PIP SUMMARY

- └ Integrated Hole Volume Minor Pip Every 10 F3
- ┐ Integrated Hole Volume Major Pip Every 100 F3
- └ Integrated Cement Volume Minor Pip Every 10 F3
- ┐ Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

#### Parameters

DLIS Name	Description	Value	
AIT-M: Array Induction Tool – M			
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	68	DEGF
HILTB-FTB: High resolution Integrated Logging Tool-DTS			
BHFL	Borehole Fluid Type	WATER	
BHFL_TLD	HILT Nuclear Mud Base	WATER	
BHS	Borehole Status	OPEN	
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
DHC	Density Hole Correction	BS	
FD	Fluid Density	1	G/C3
FSAL	Formation Salinity	–50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCLF	Germany Coal-like Formation Option	NO	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2.71	G/C3
MWCO	Mud Weight Correction Option	NO	
NAAC	HRDD APS Activation Correction	OFF	

NMT	HILT Nuclear Mud Type	NOBARITE	
NPRM	HRDD Processing Mode	StdRes	1
NSAR	HRDD Depth Sampling Rate		IN
PTCO	Pressure/Temperature Correction Option	NO	
SDAT	Standoff Data Source	SOCN	
SHT	Surface Hole Temperature	68	DEGF
SOCN	Standoff Distance	0.125	IN
SOCO	Standoff Correction Option	YES	
HNGS-BA: Hostile Natural Gamma Ray Sonde			
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	68	DEGF
STI: Stuck Tool Indicator			
TDL	Total Depth – Logger	7554.00	FT
PERT: Preliminary Evaluation – Real Time			
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	68	DEGF
HOLEV: Integrated Hole/Cement Volume			
BHS	Borehole Status	OPEN	
FCD	Future Casing (Outer) Diameter	4.5	IN
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	68	DEGF
System and Miscellaneous			
BS	Bit Size	7.875	IN
BSAL	Borehole Salinity	-50000.00	PPM
CSIZ	Current Casing Size	8.625	IN
CWEI	Casing Weight	24.00	LB/F
DFD	Drilling Fluid Density	9.60	LB/G
DORL	Depth Offset for Repeat Analysis	0.0	FT
MST	Mud Sample Temperature	64.20	DEGF
RMFS	Resistivity of Mud Filtrate Sample	0.8347	OHMM
TD	Total Depth	7554	FT

Format: PORO\_REP      Vertical Scale: 5" per 100'      Graphics File Created: 05-Jan-2010 08:48

## OP System Version: 17C0-154

AIT-M	17C0-154	HILTB-FTB	17C0-154
HNGC-B	17C0-154	HNGS-BA	17C0-154
DTC-H	17C0-154		

## Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_007PUP	FN:6	PRODUCER	05-Jan-2010 08:44	7579.5 FT	6898.0 FT
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## Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_008LUP	FN:7	PRODUCER	05-Jan-2010 08:48		
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**Schlumberger**

**MAIN DENSITY LOG 5" = 100'**

MAXIS Field Log

## Input DLIS Files

DEFAULT	SPLICE_AIT_TLD_MCFL_012	FN:1	PRODUCER	05-Jan-2010 11:04	7567.5 FT	547.6 FT
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# Output DLIS Files

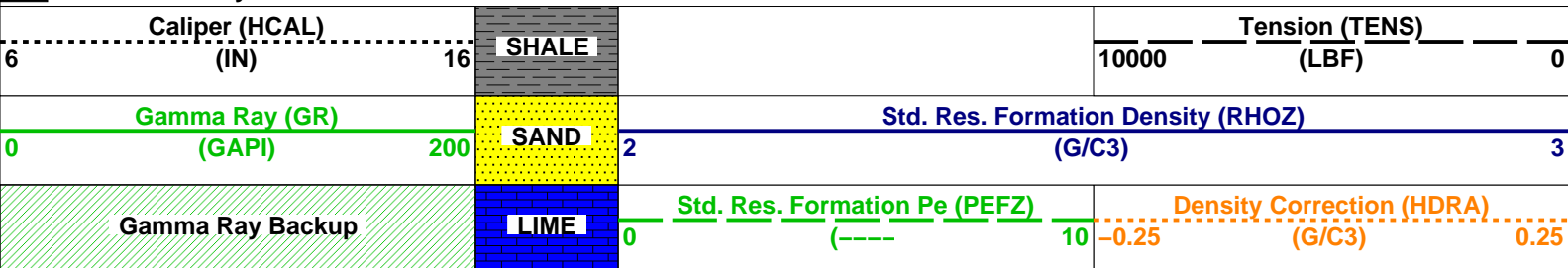
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## OP System Version: 17C0-154

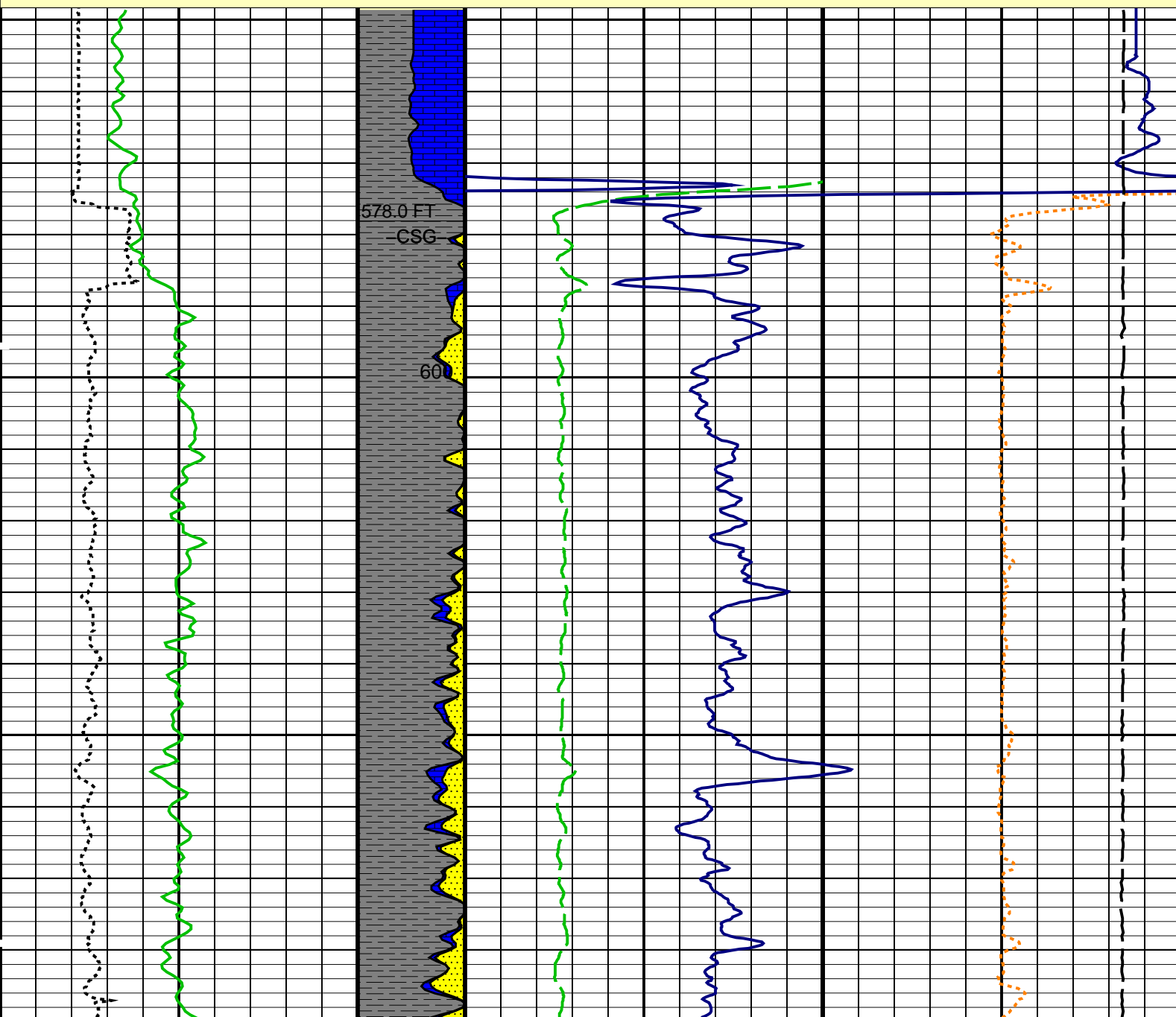
AIT-M	17C0-154	HILTB-FTB	17C0-154
HNGC-B	17C0-154	HNGS-BA	17C0-154
DTC-H	17C0-154		

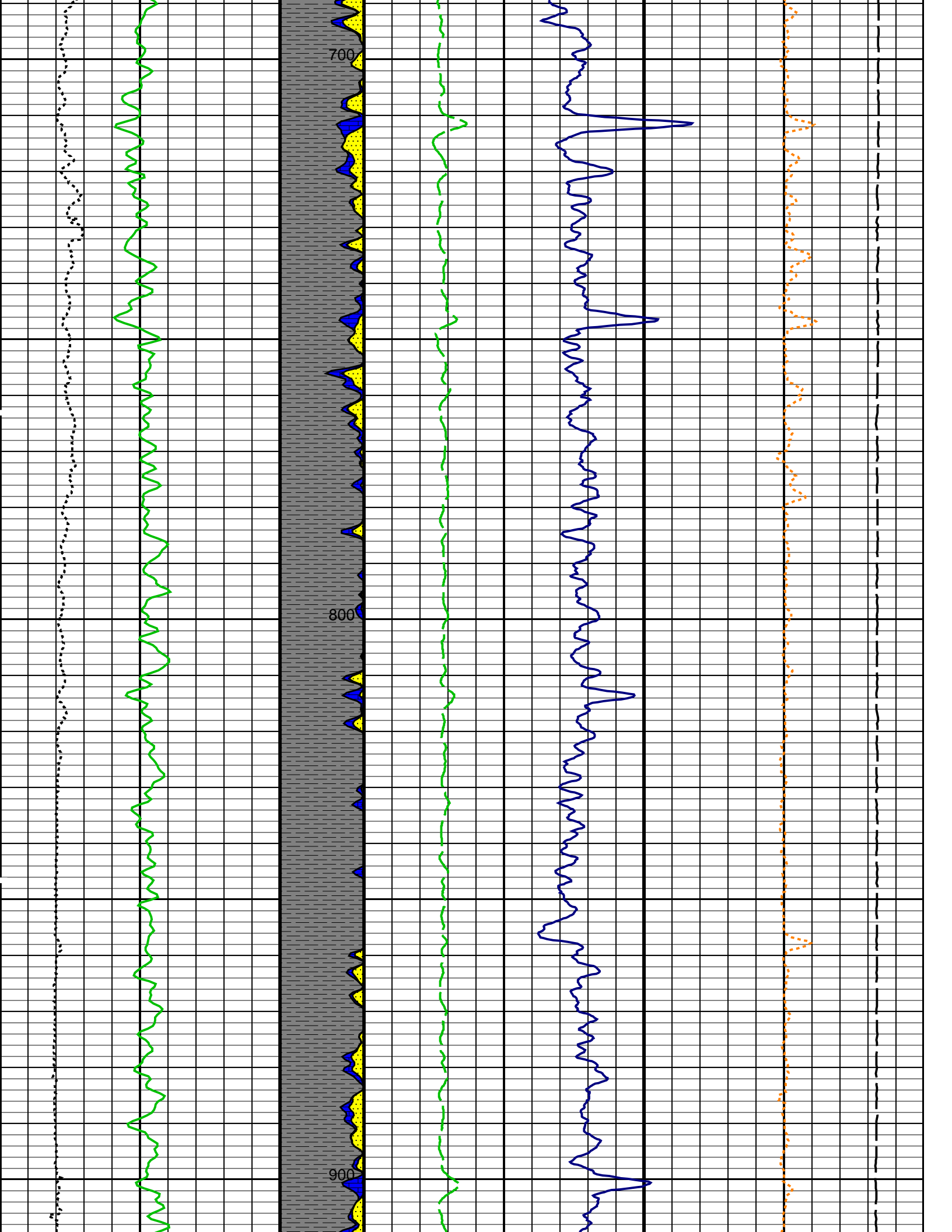
### PIP SUMMARY

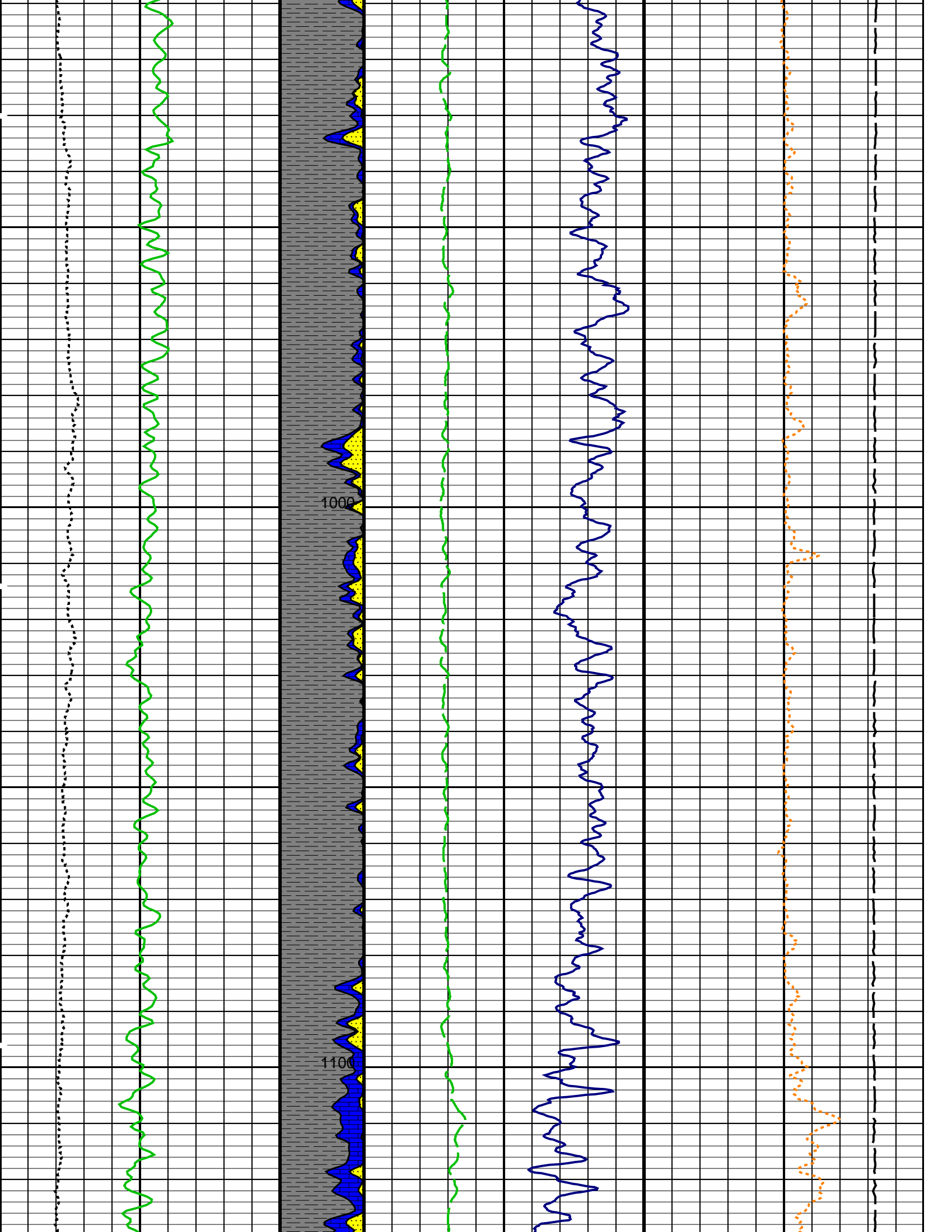
Time Mark Every 60 S



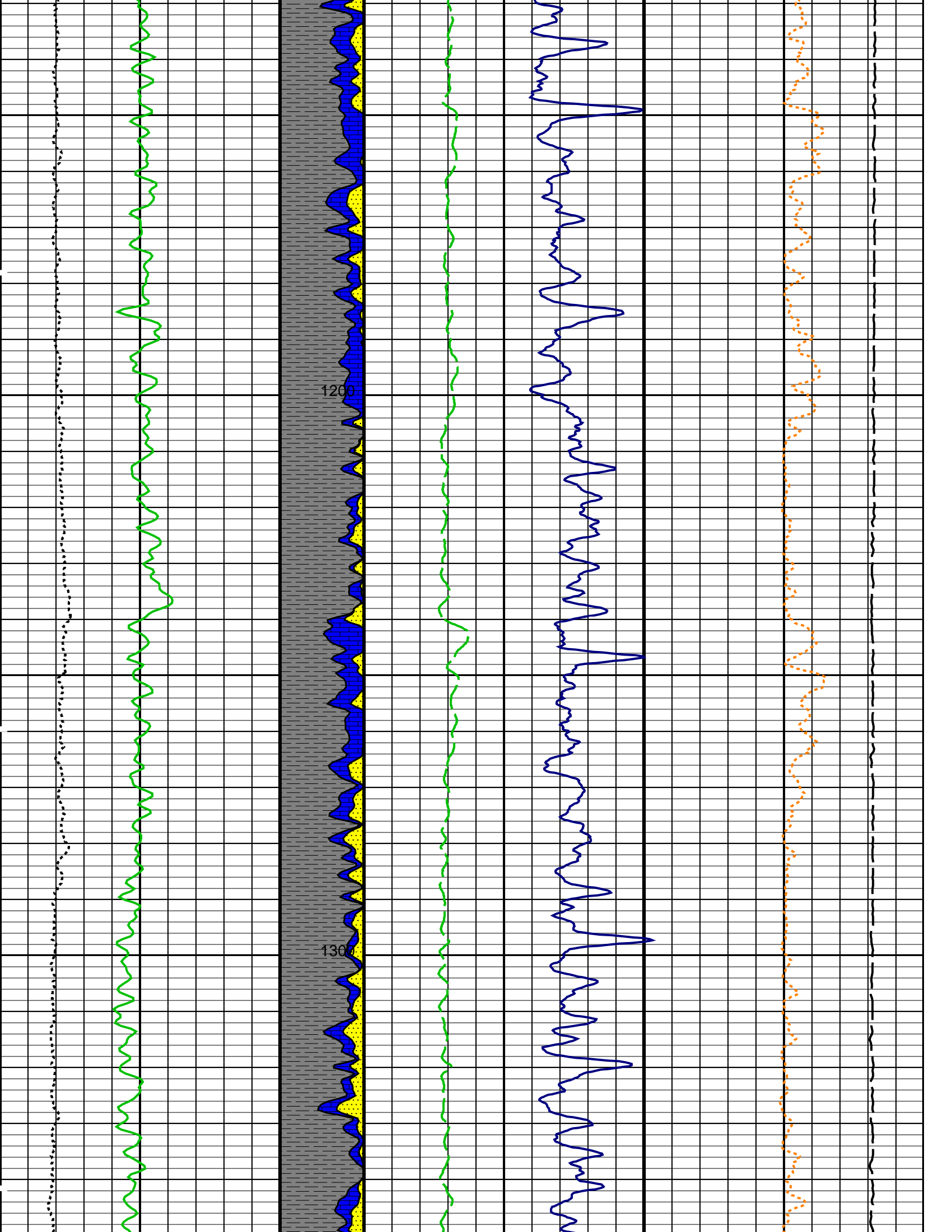
MAIN PASS: \*\*\* PLATFORM EXPRESS - LITHOLOGY DENSITY \*\*\*

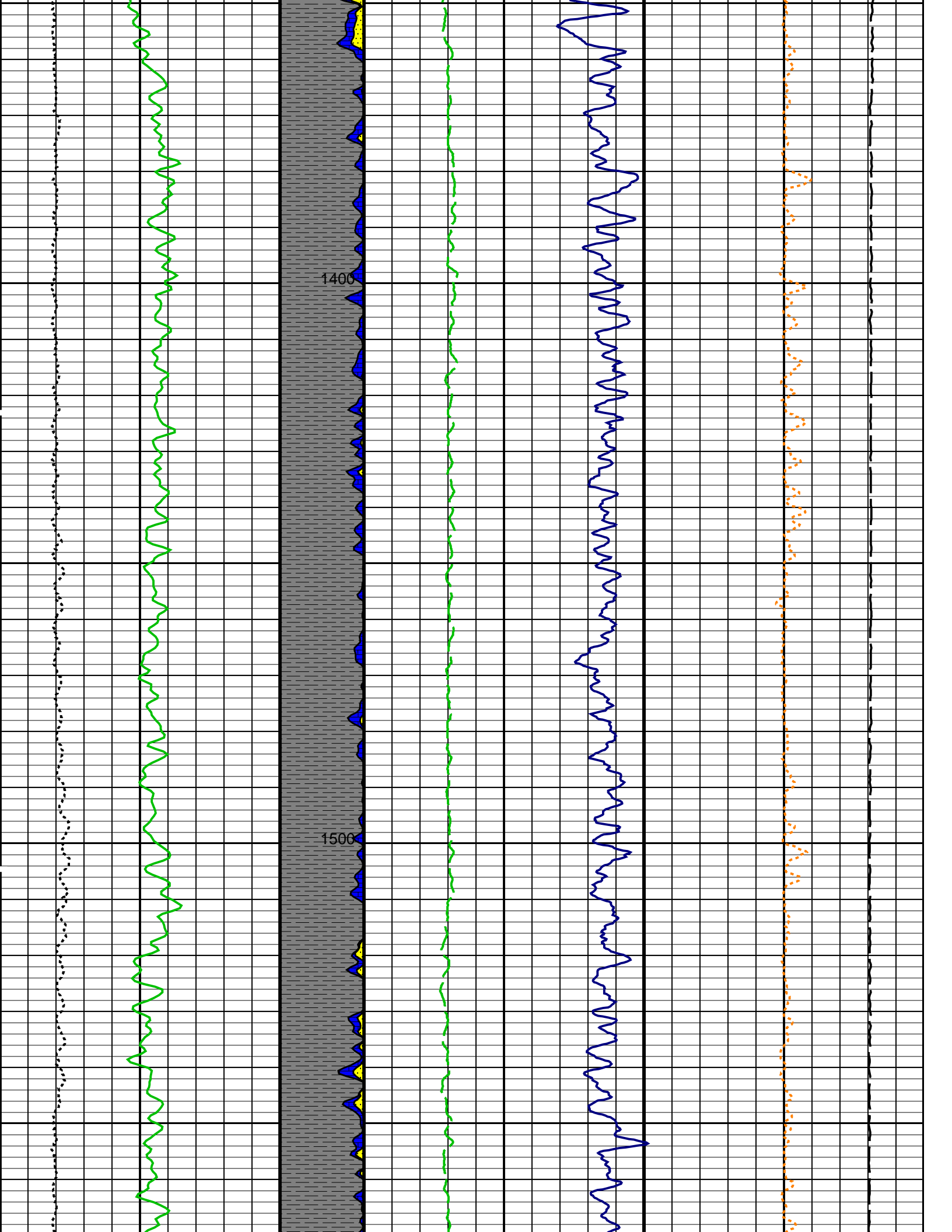


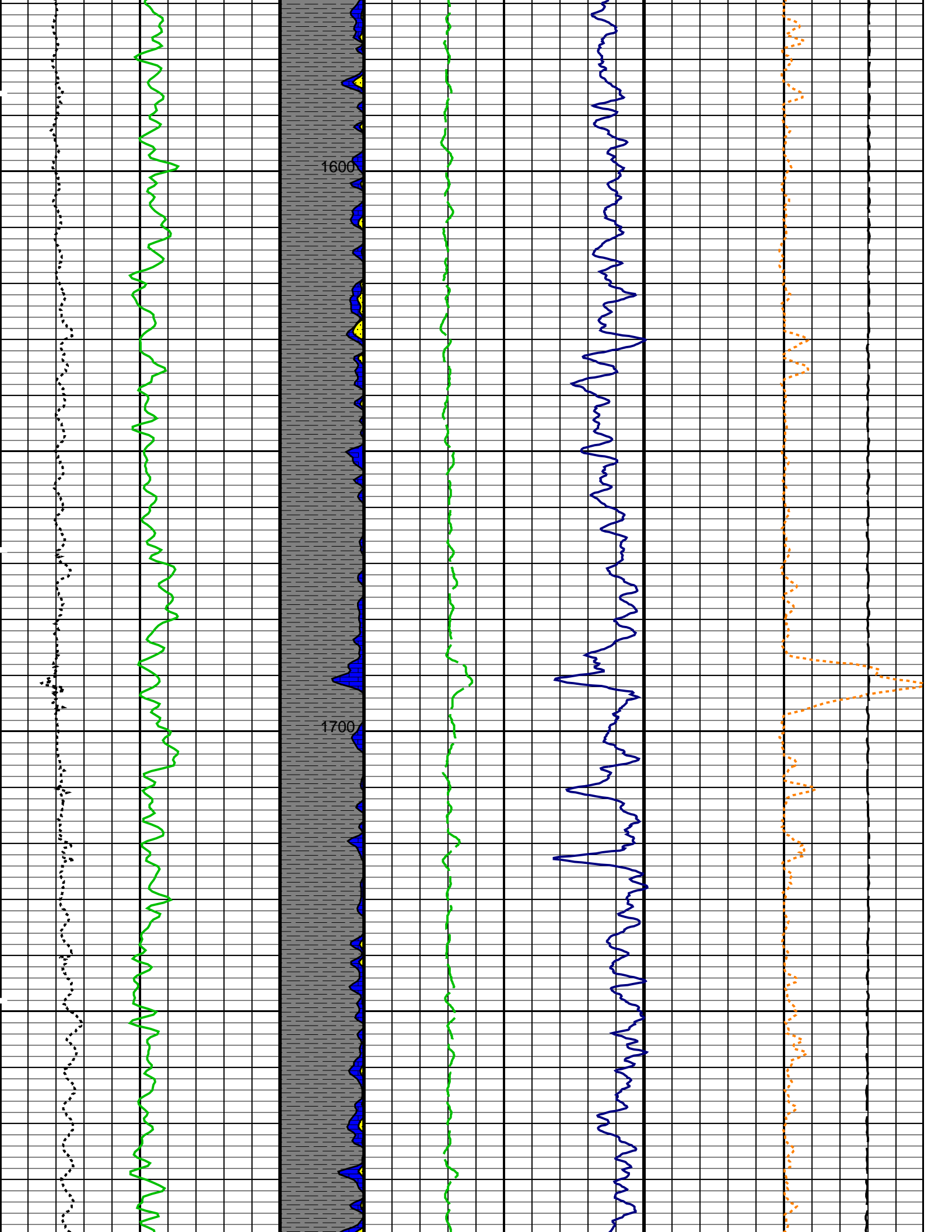


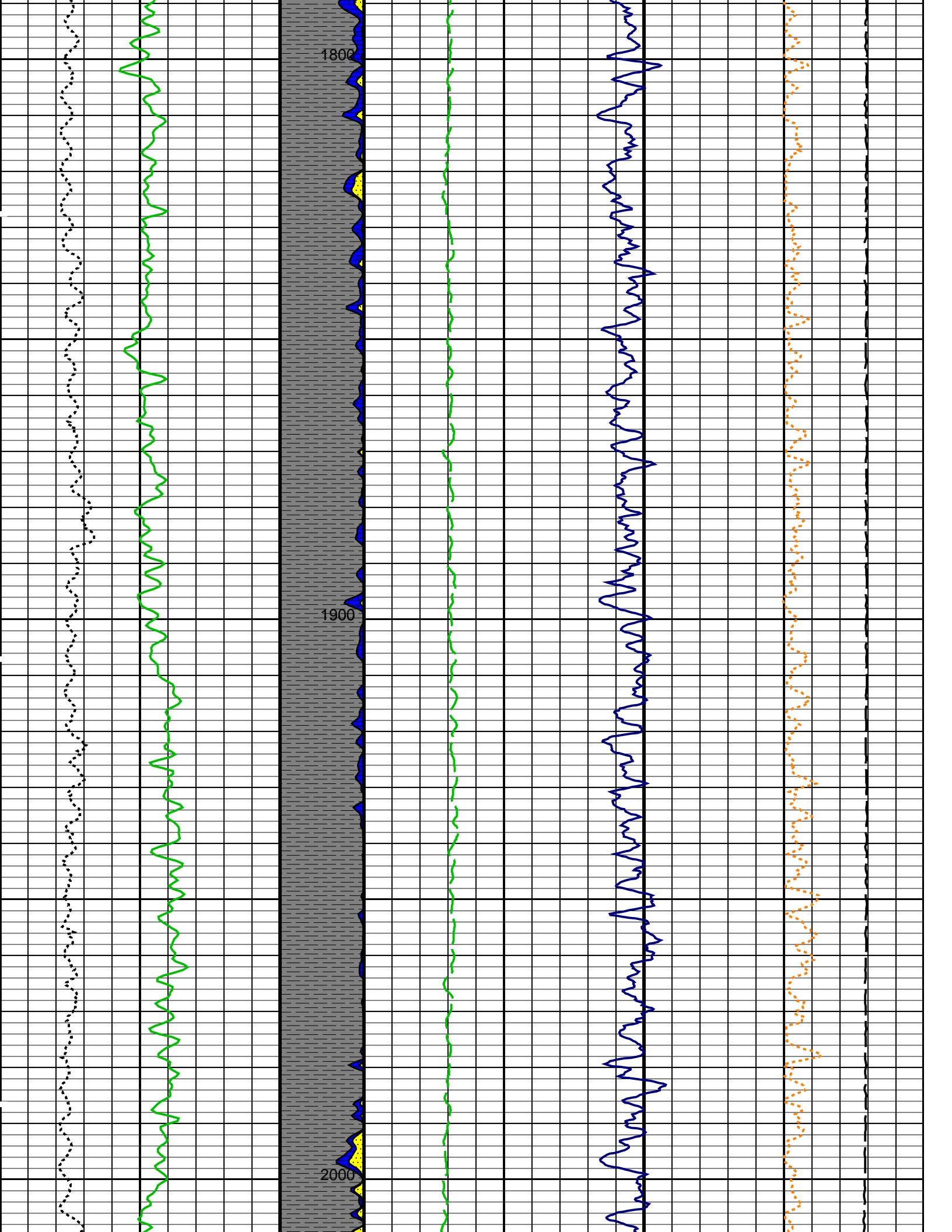


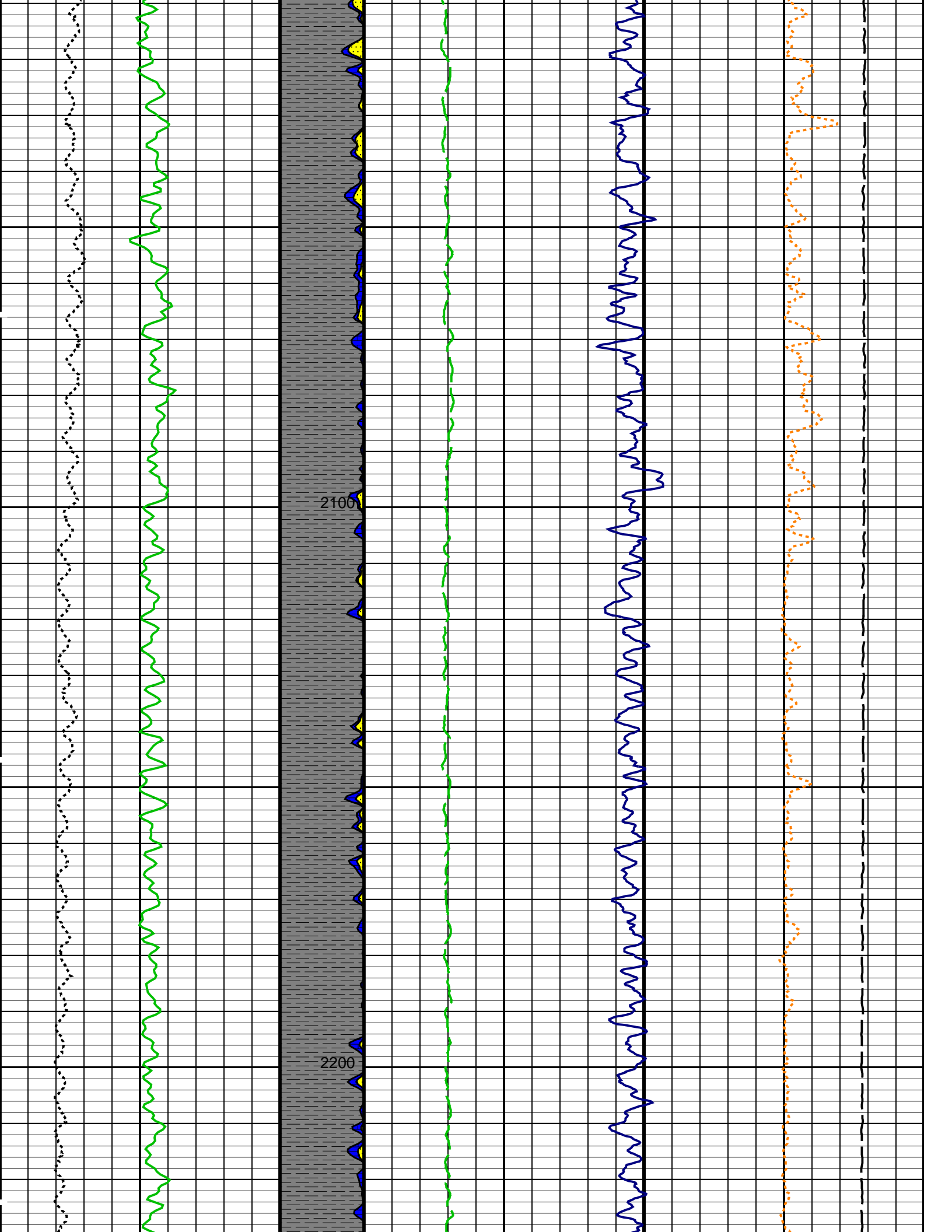


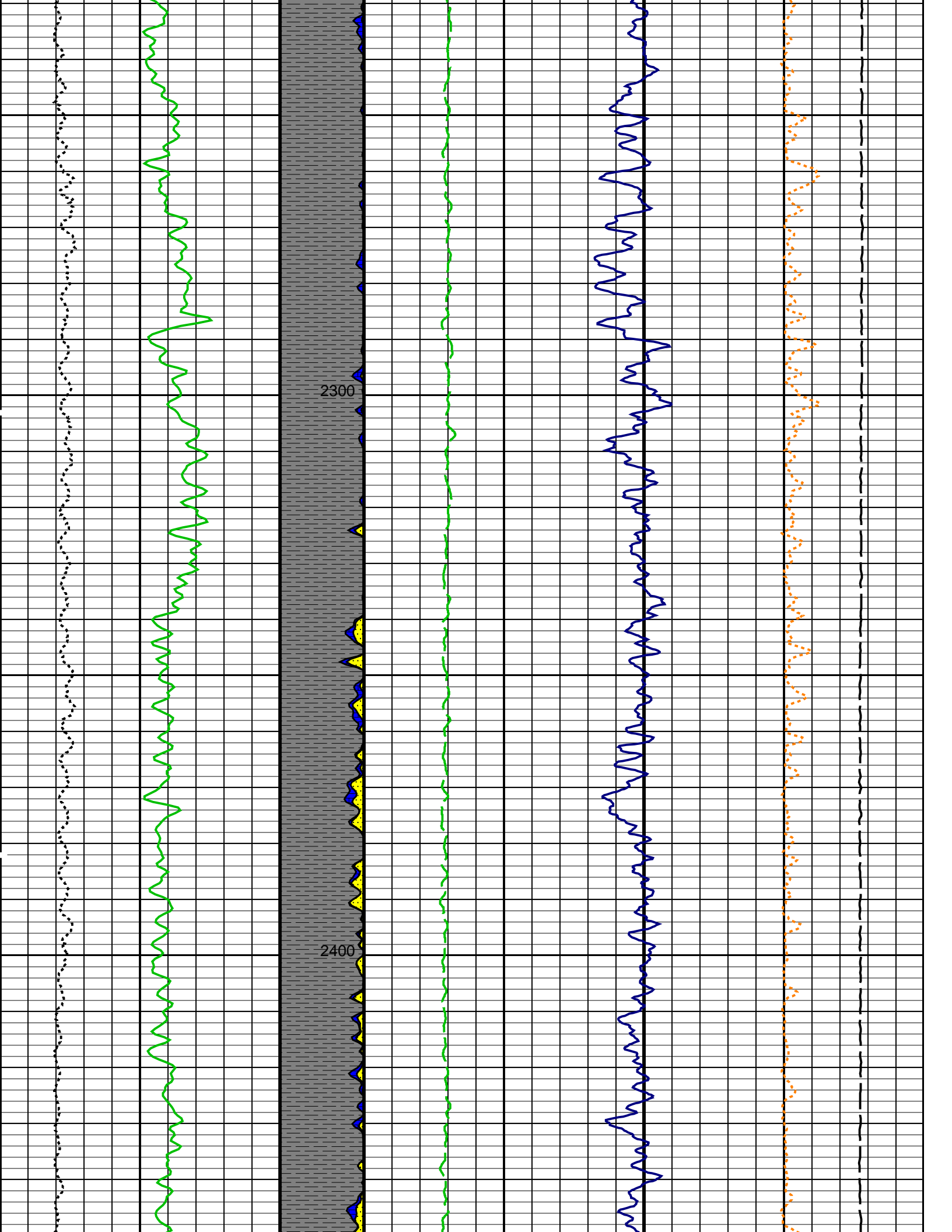


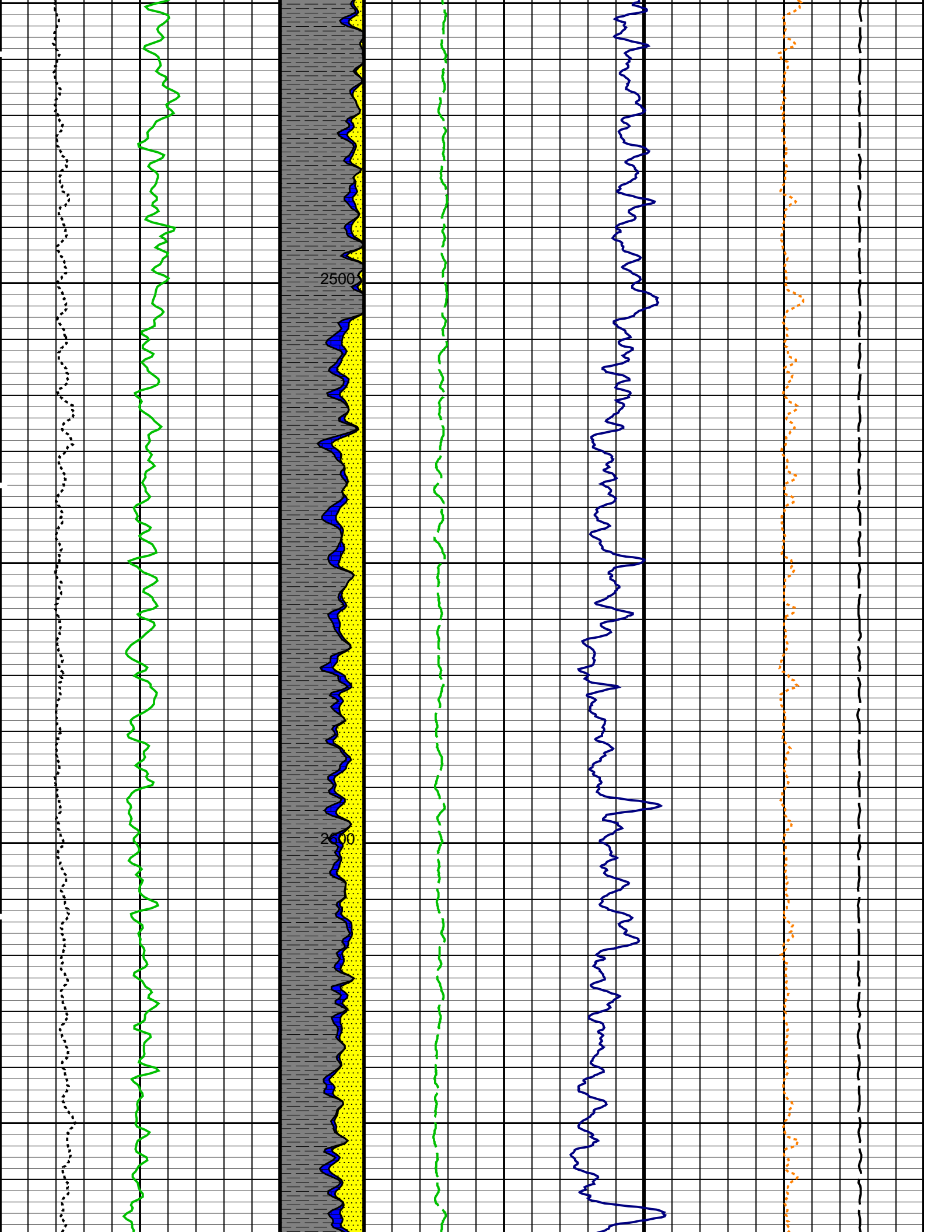


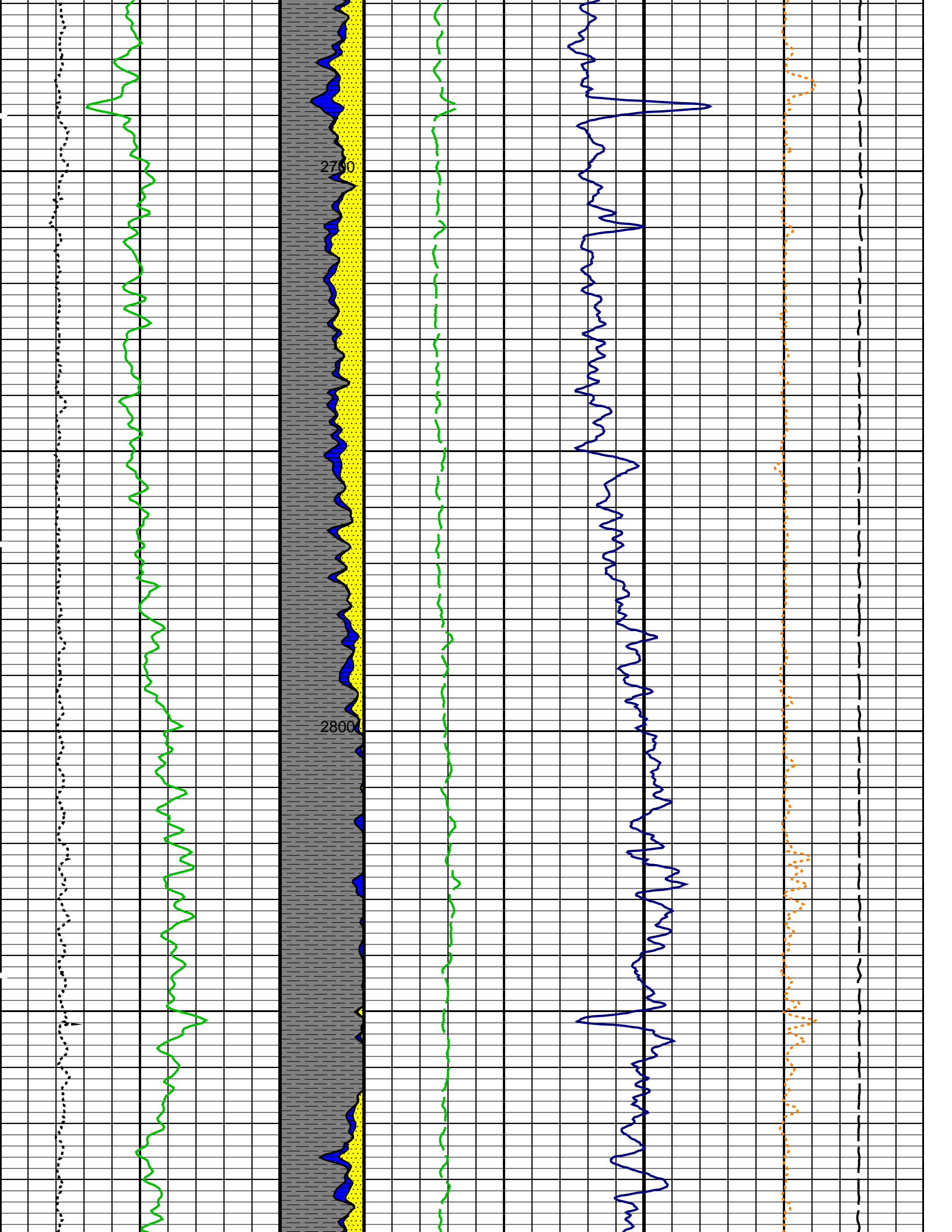




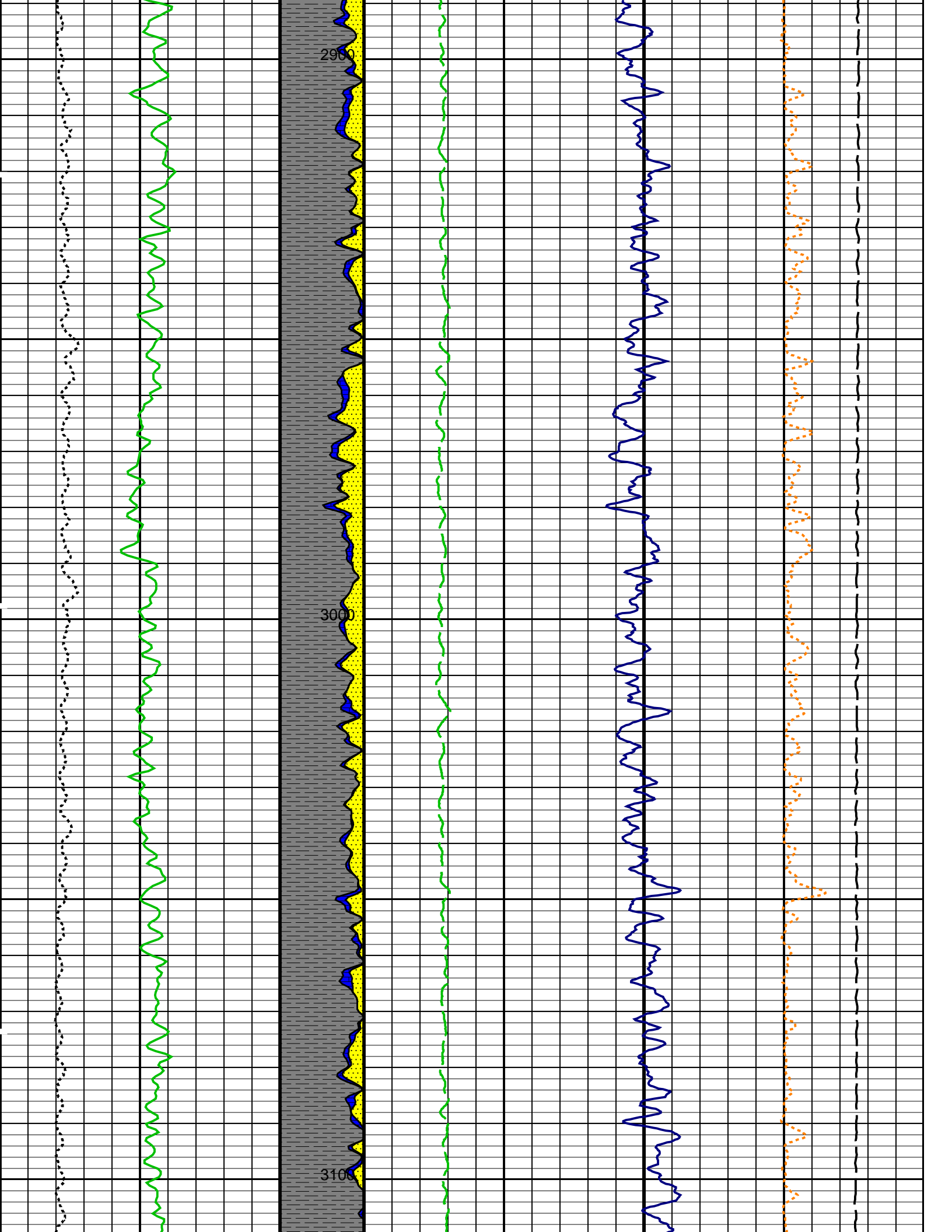


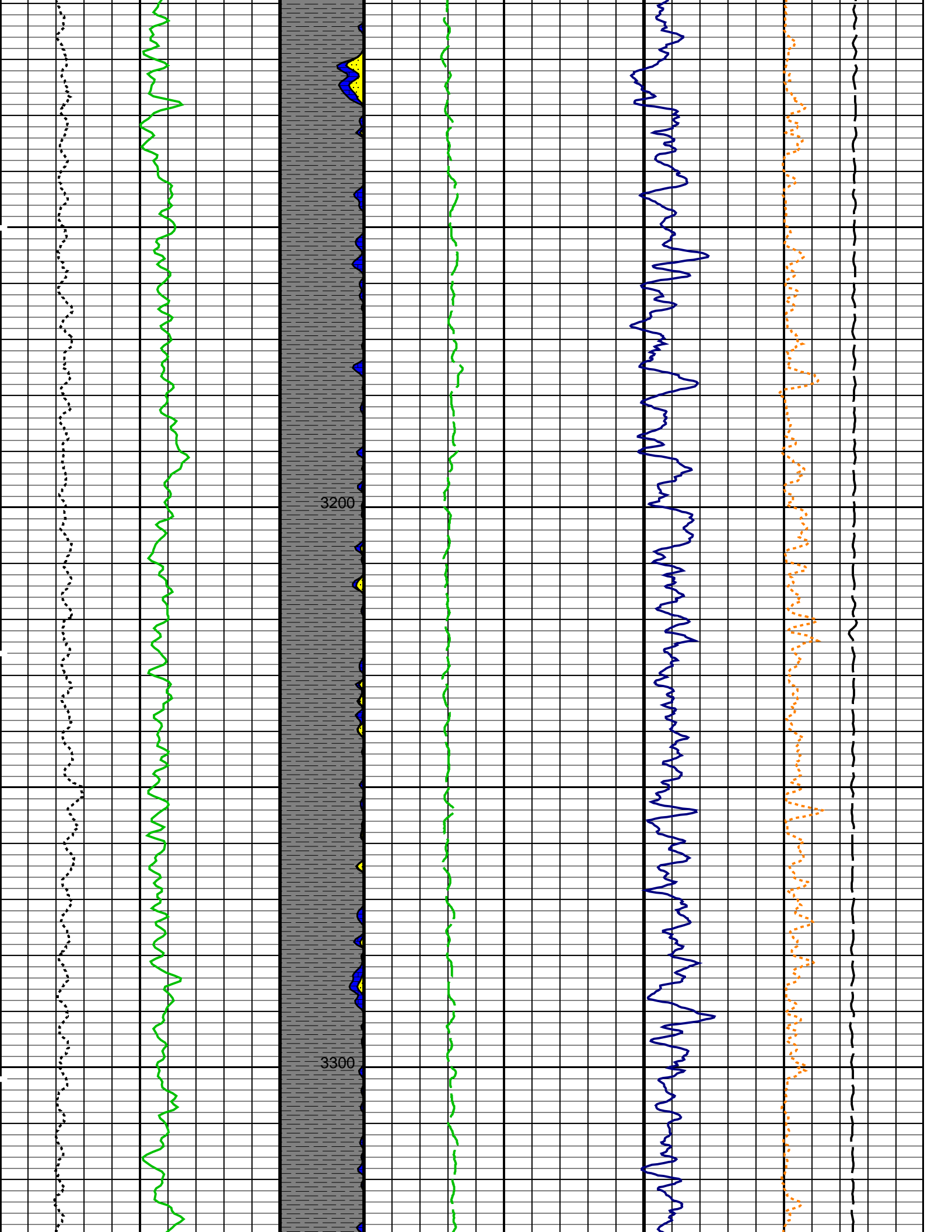


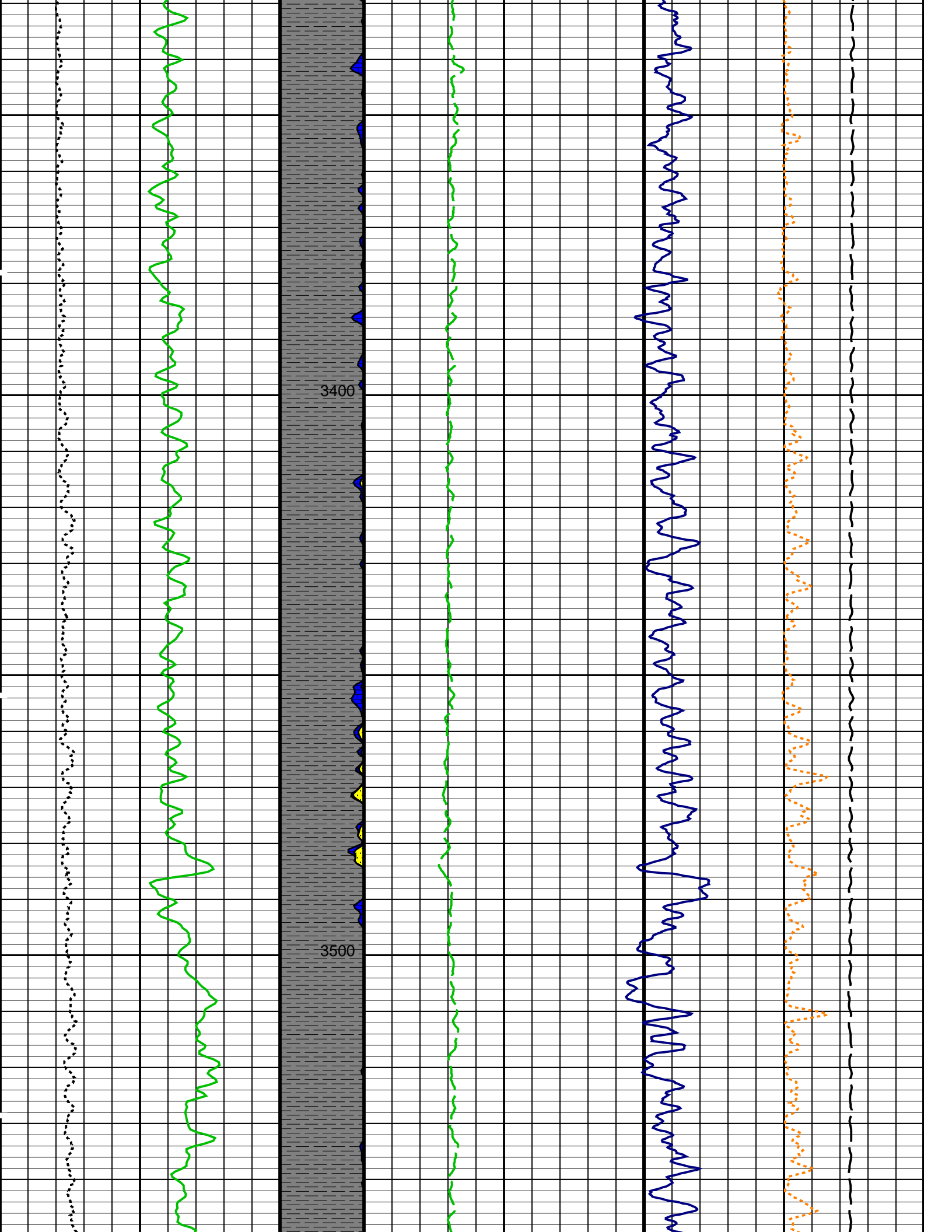


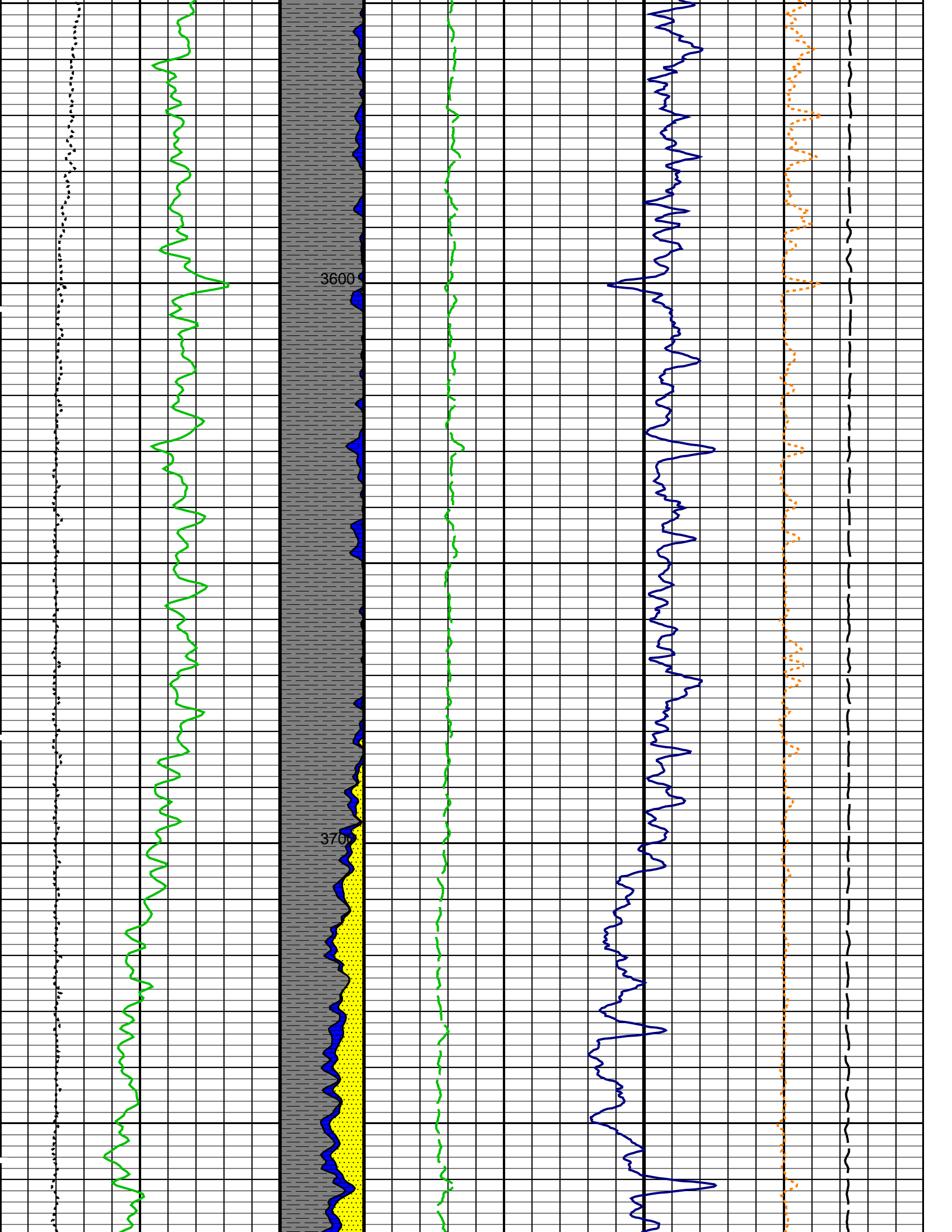


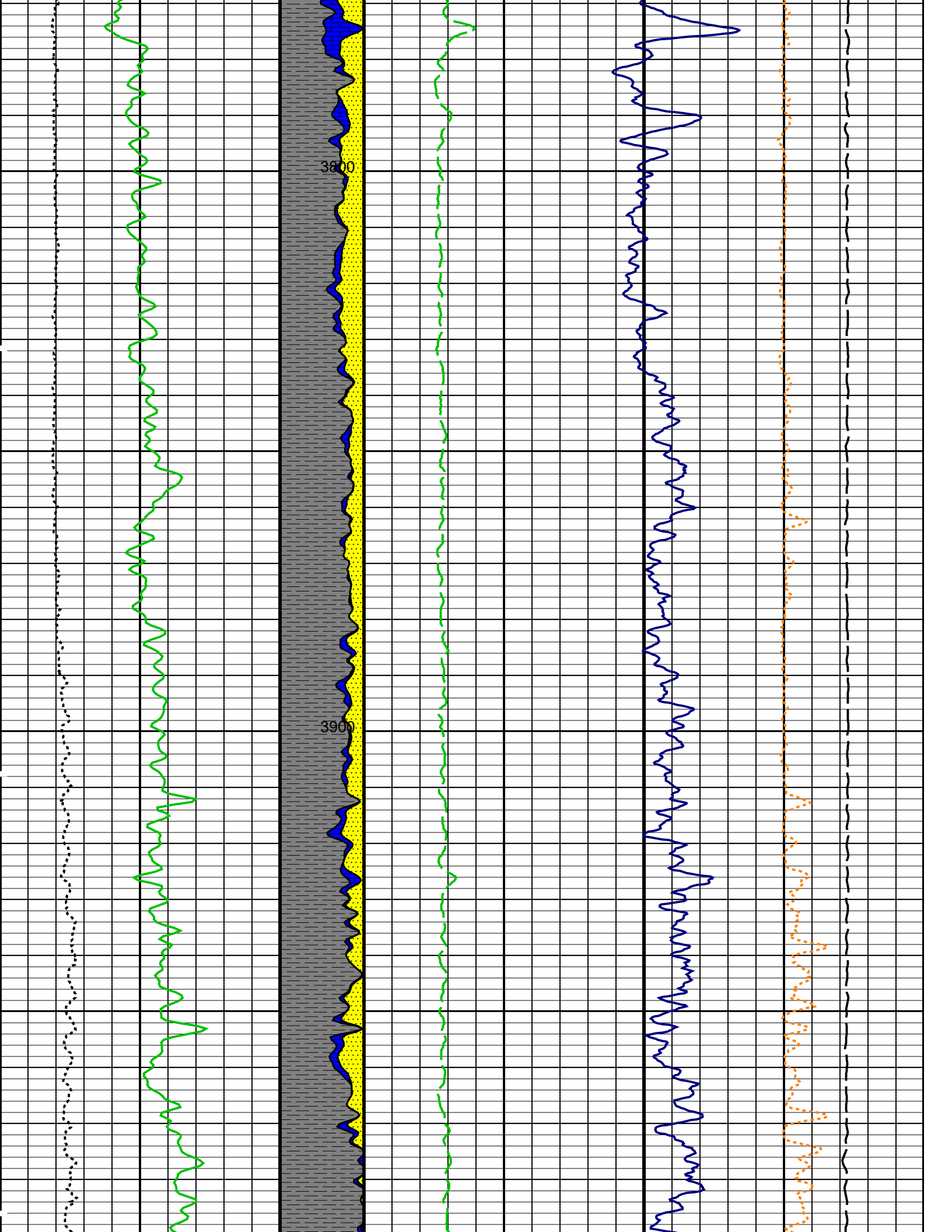


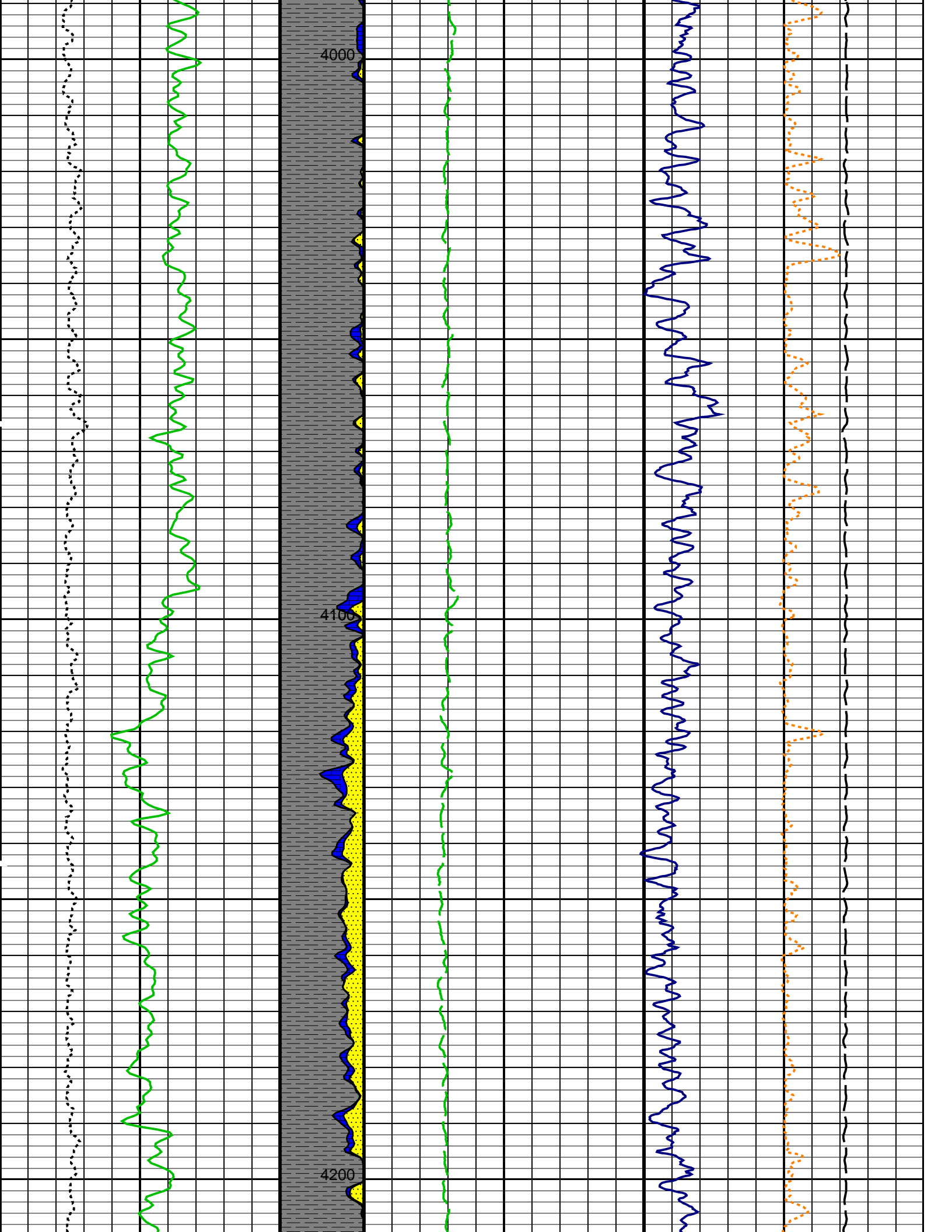


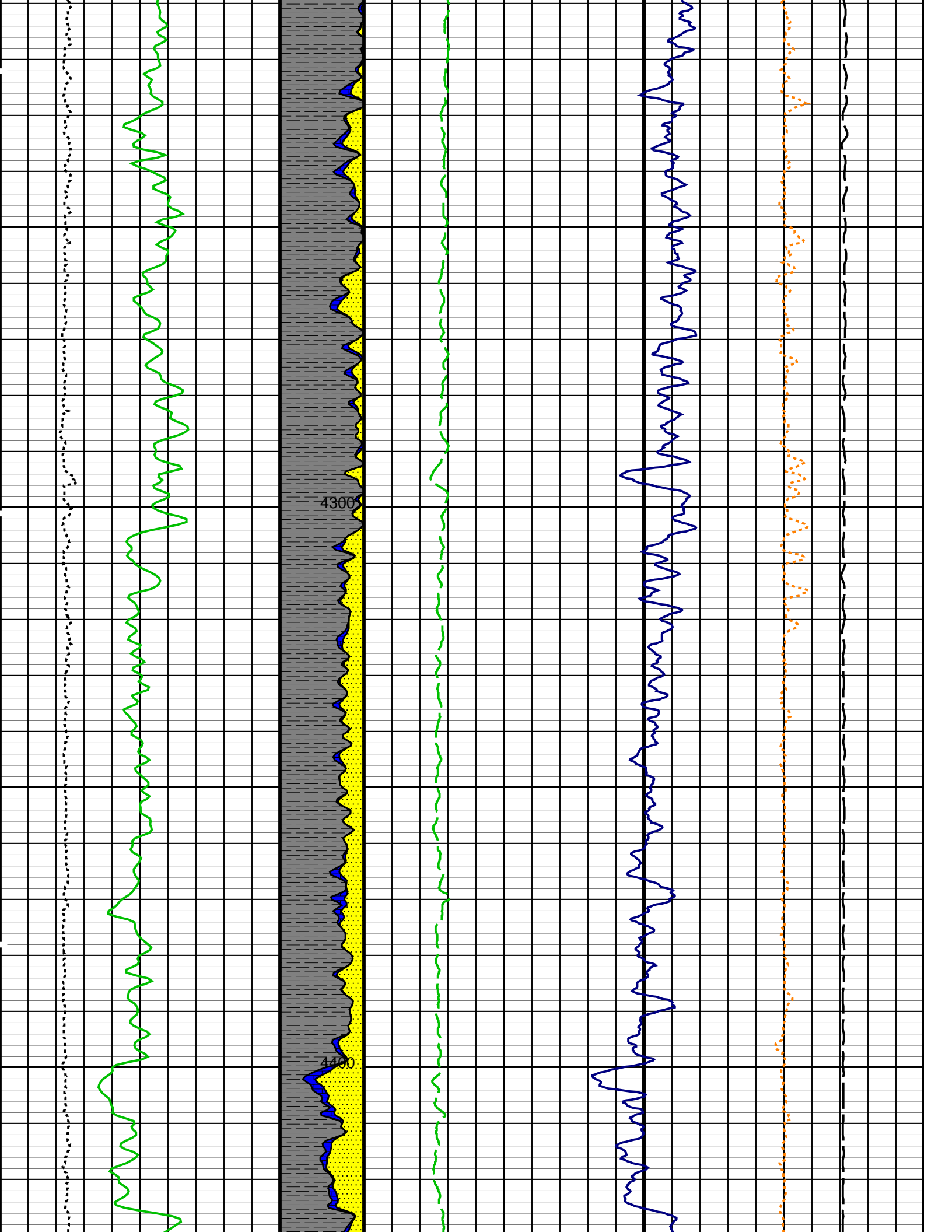


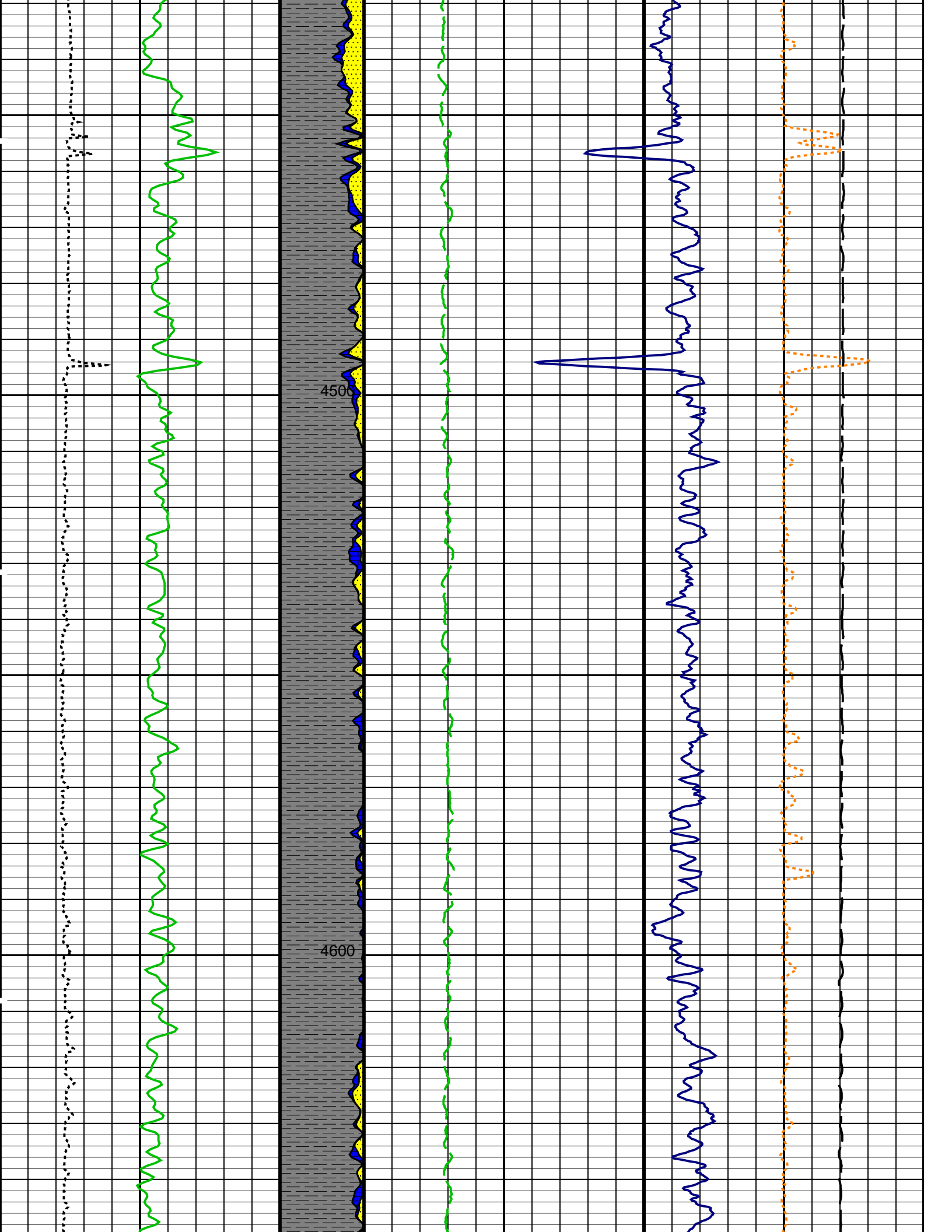




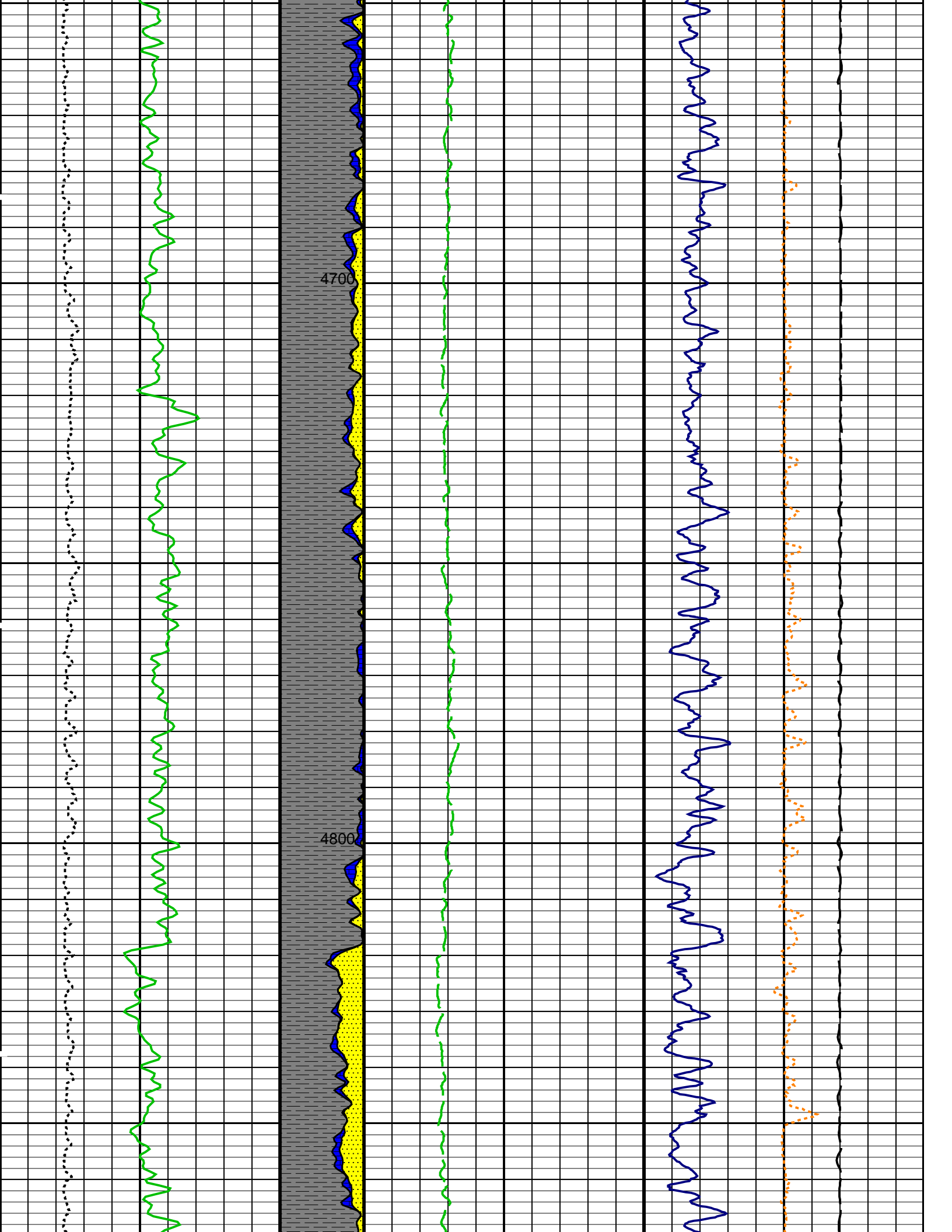


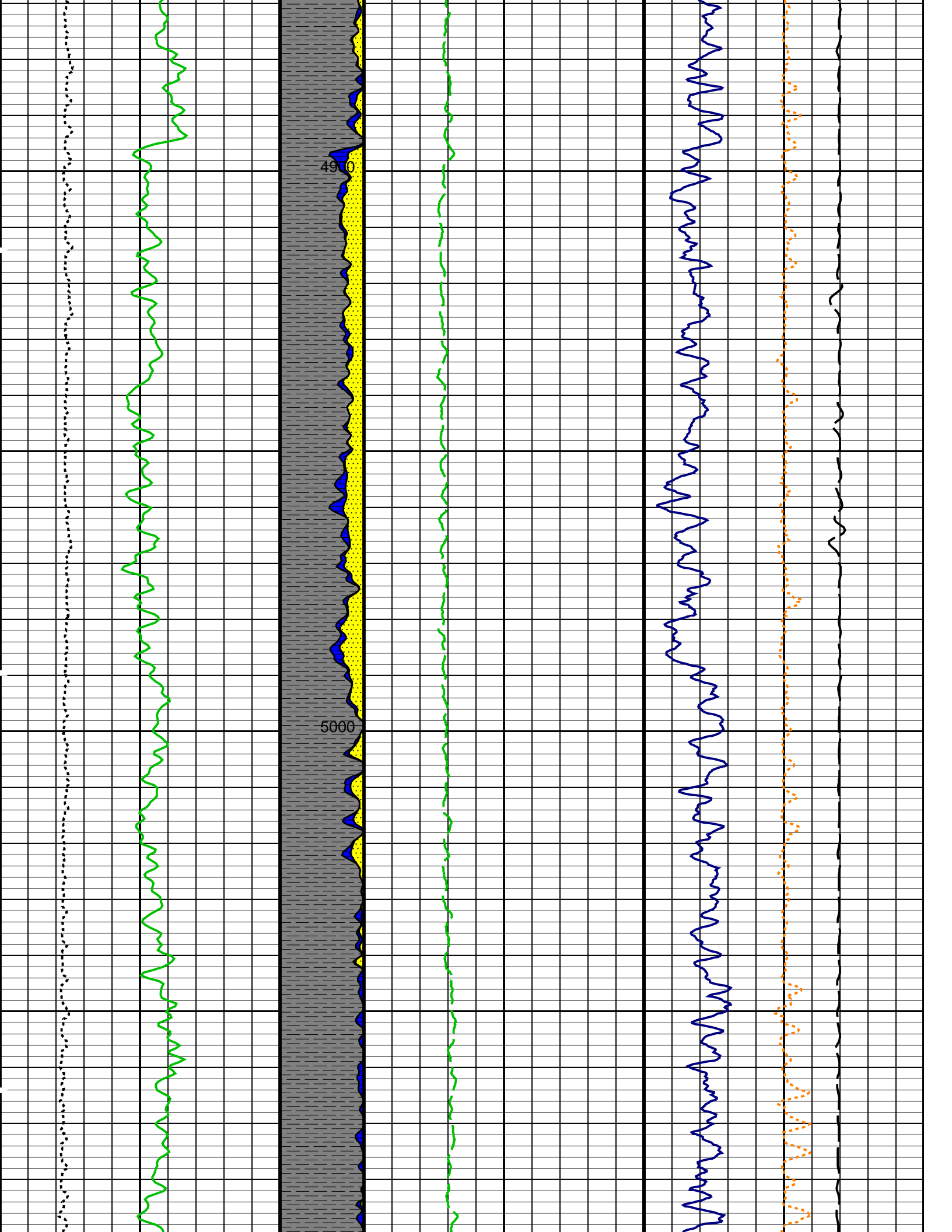


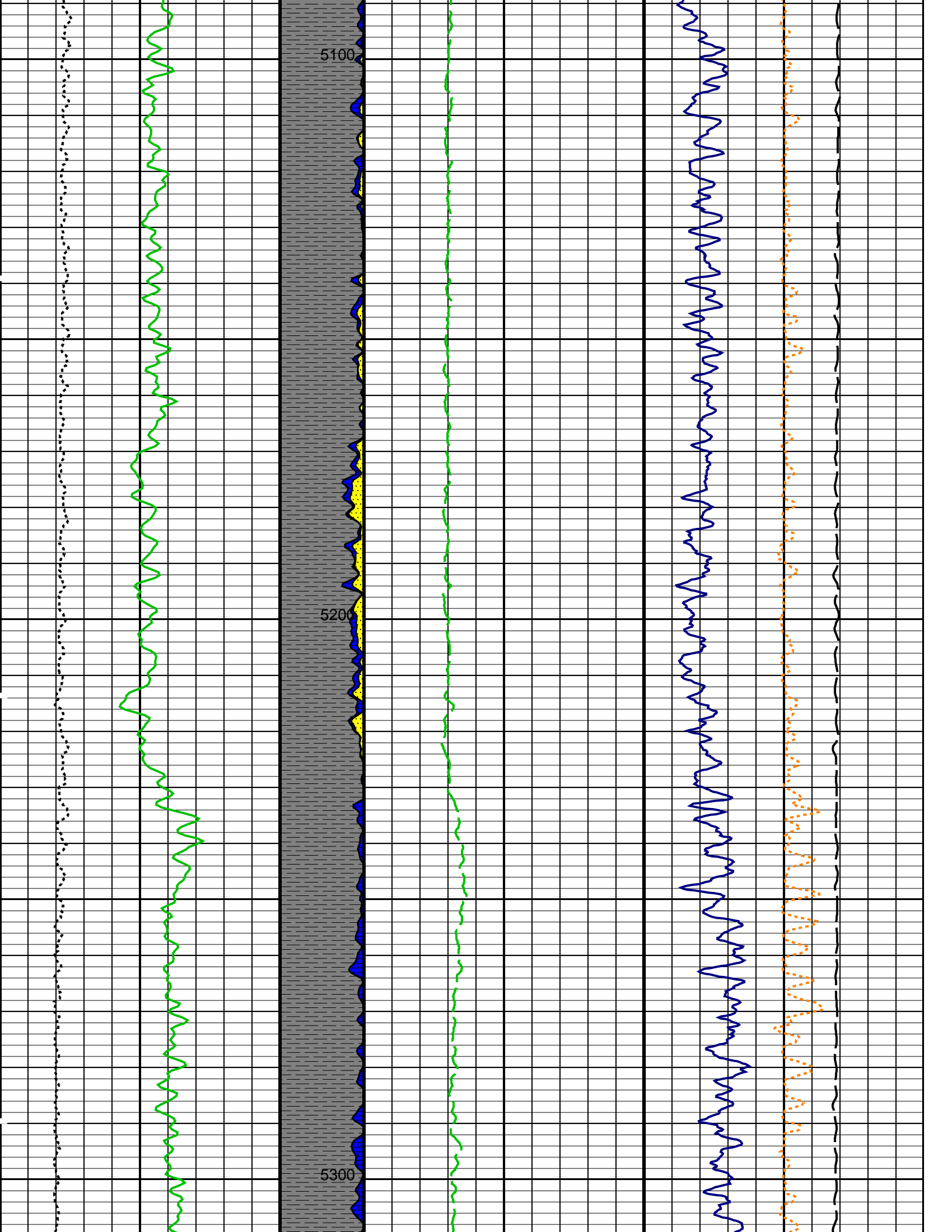


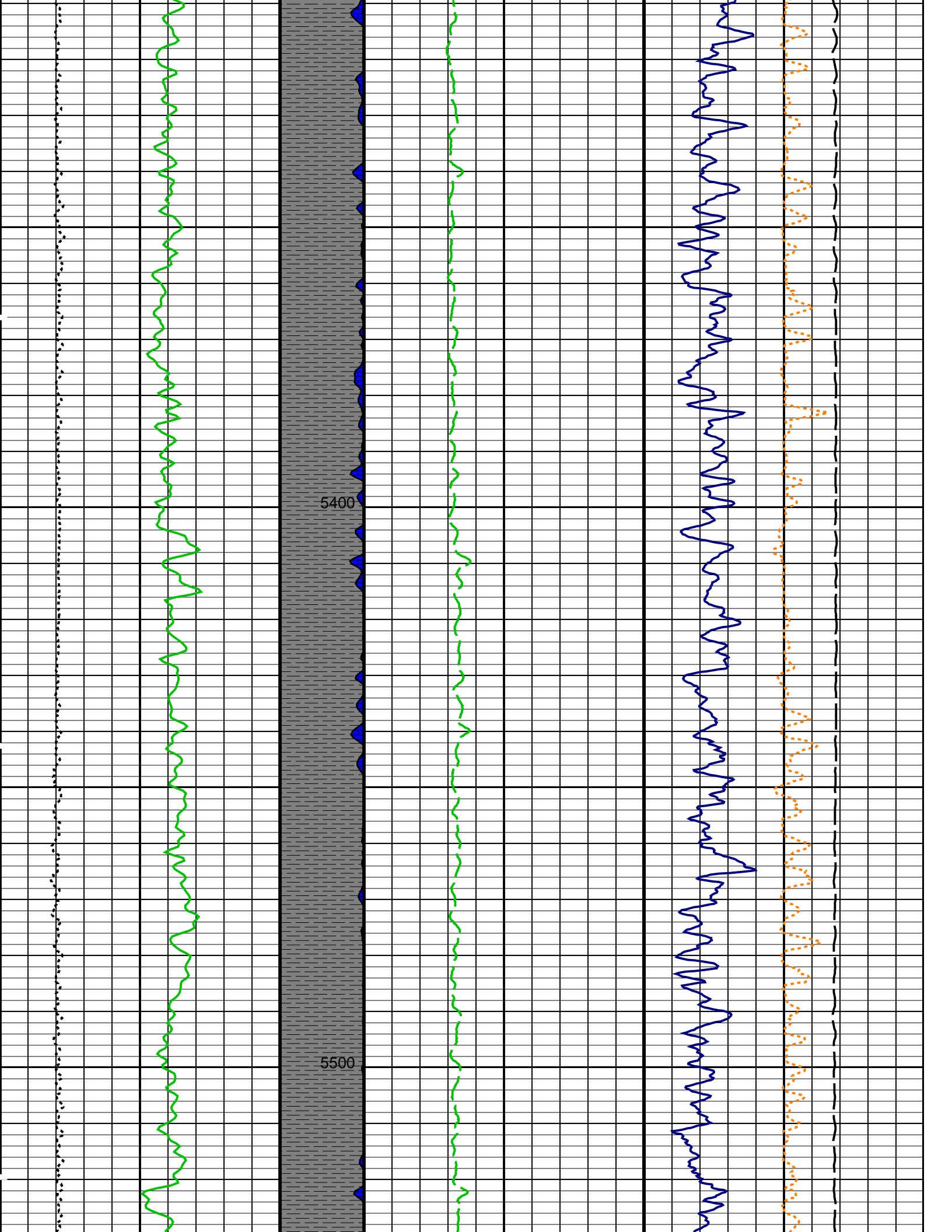


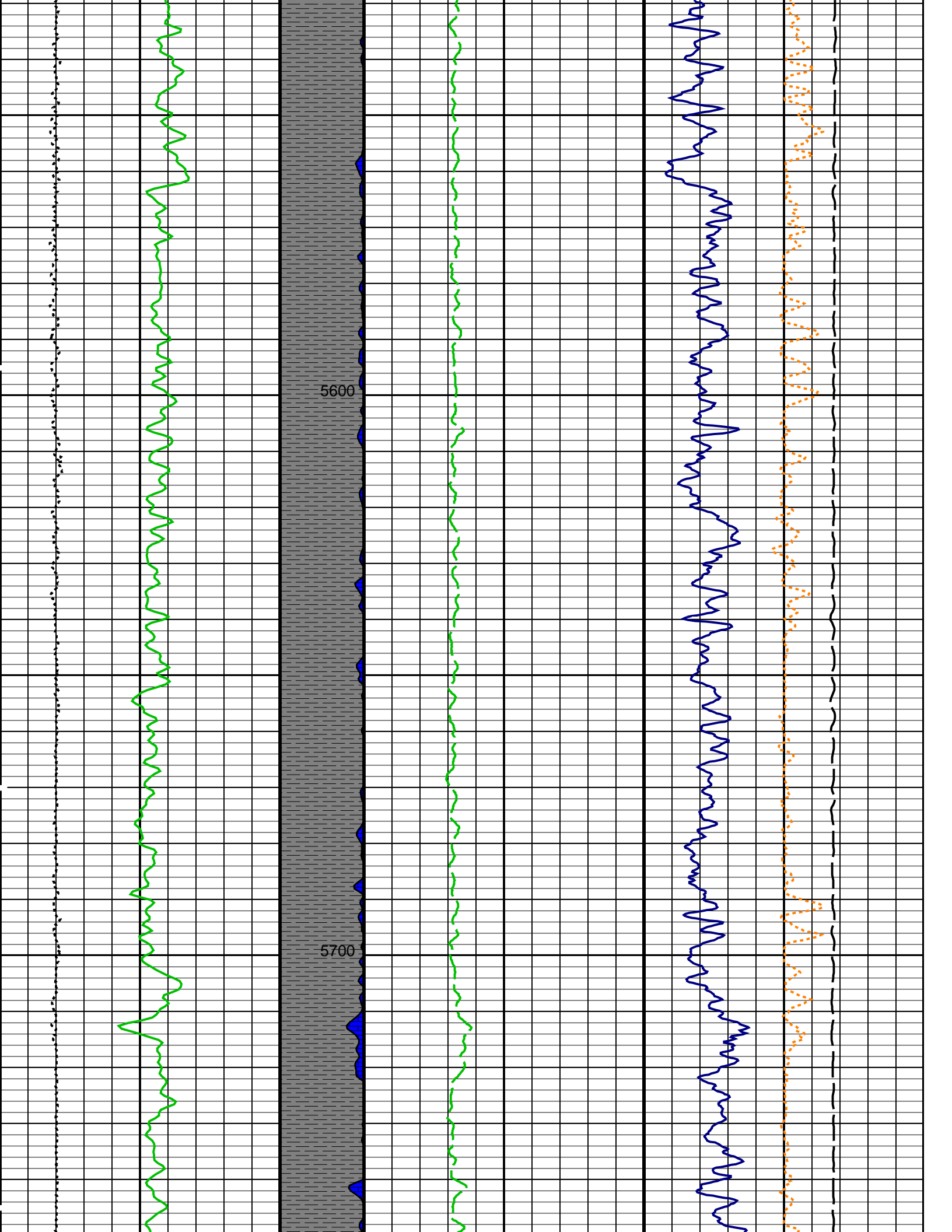


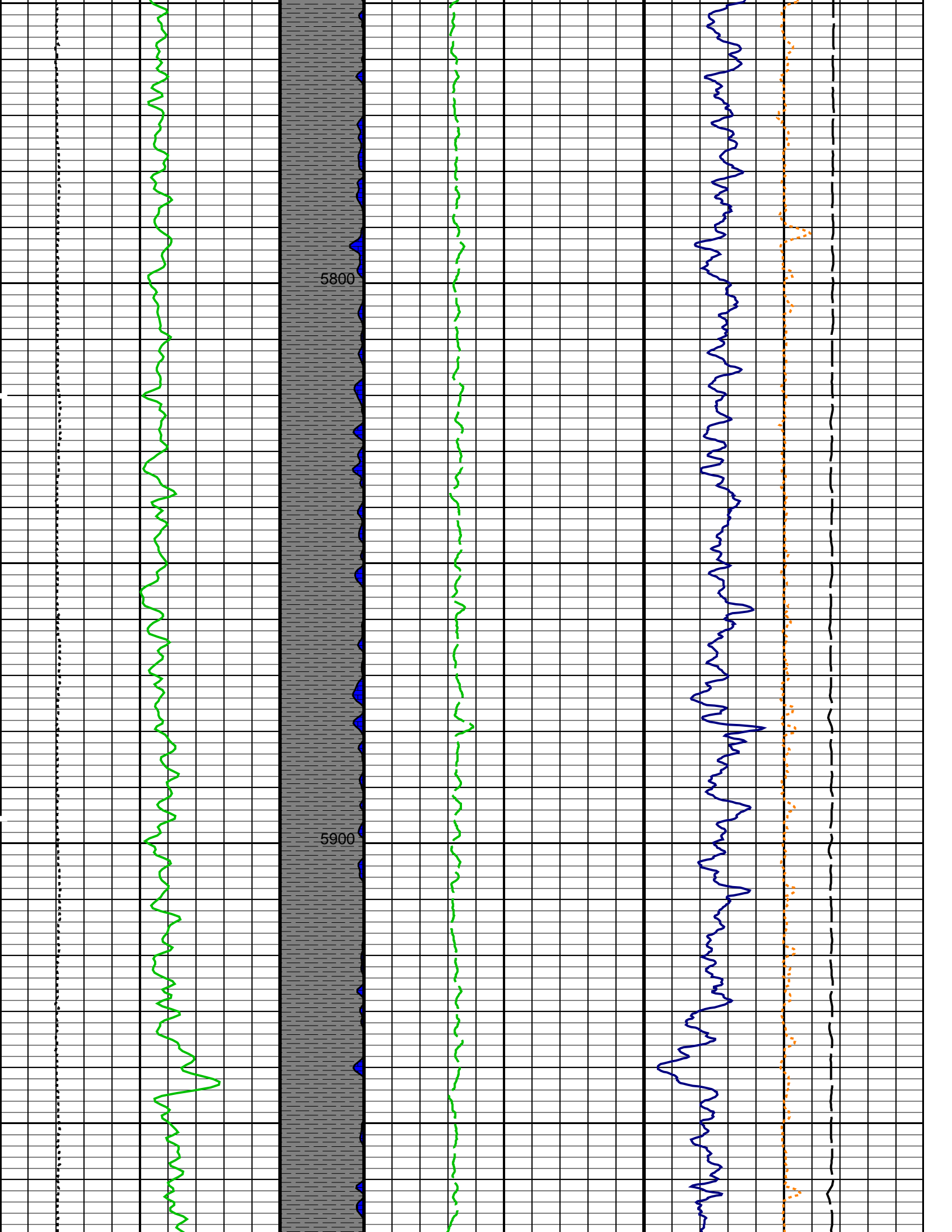


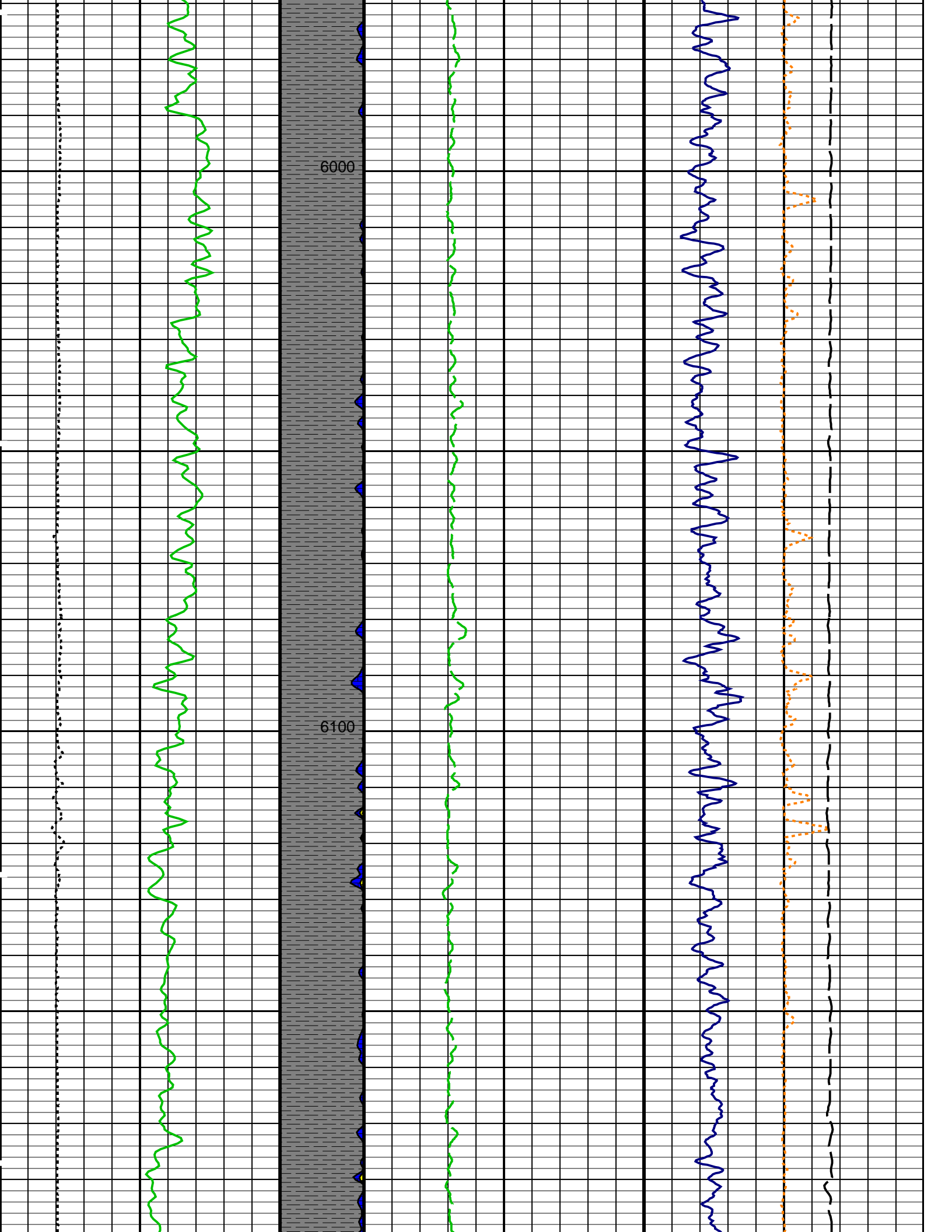


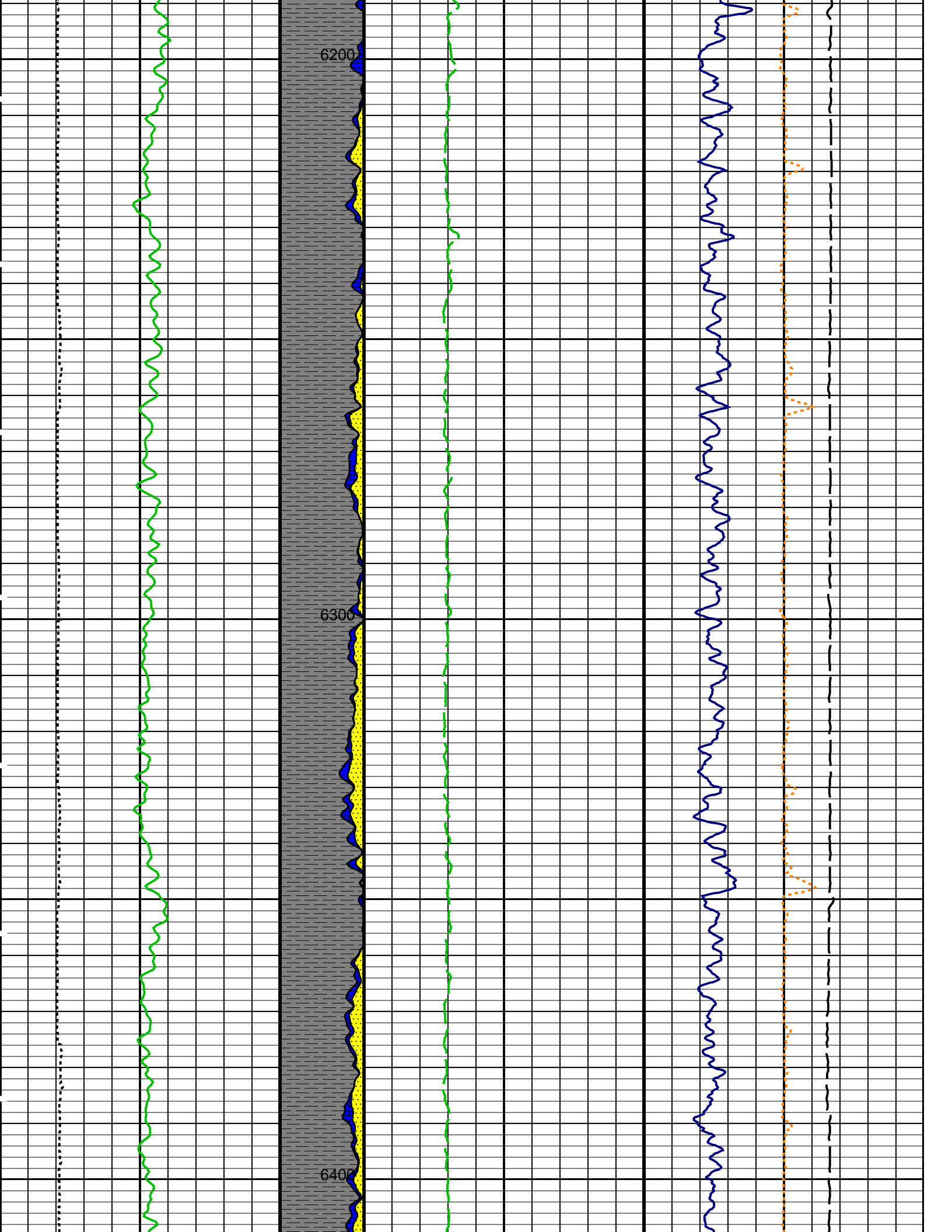




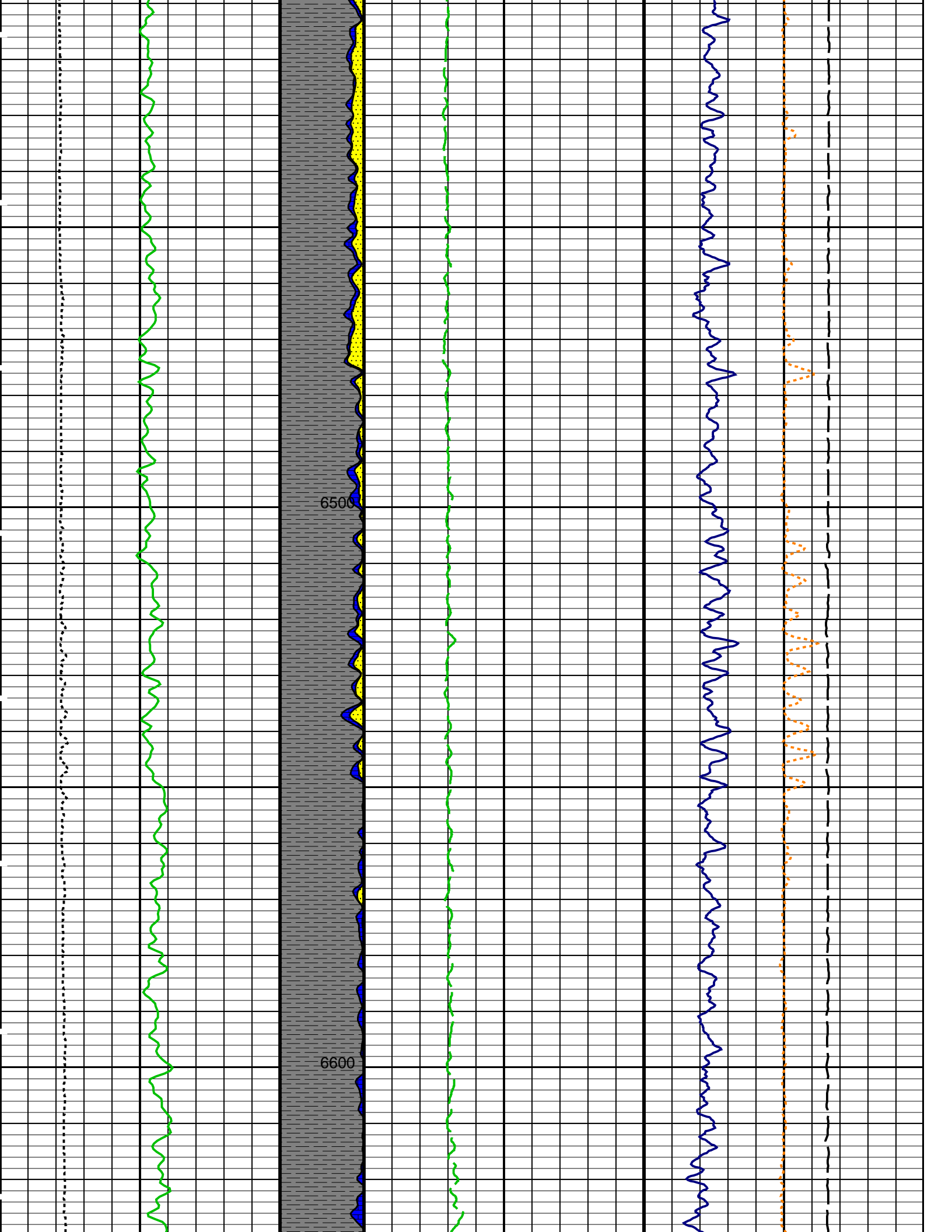


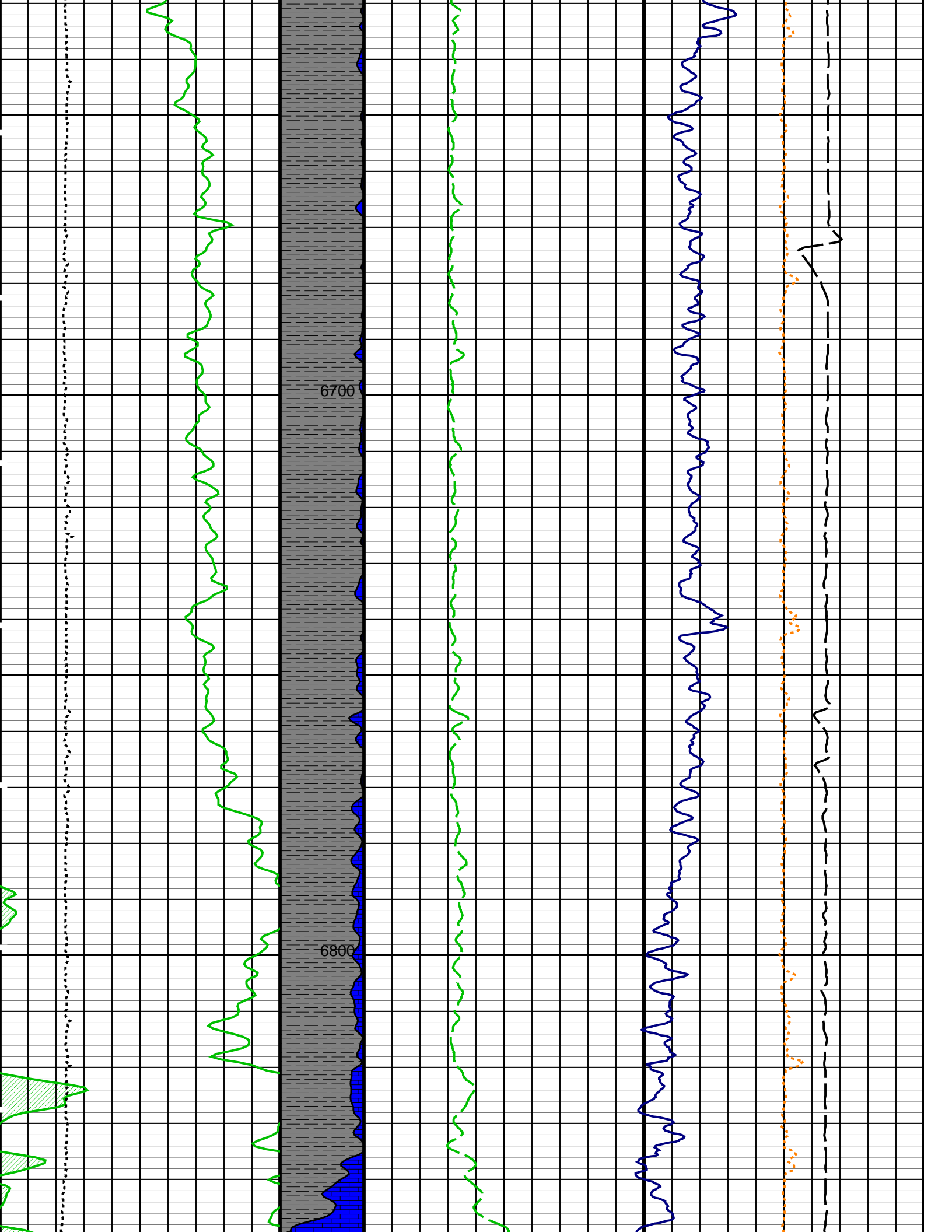


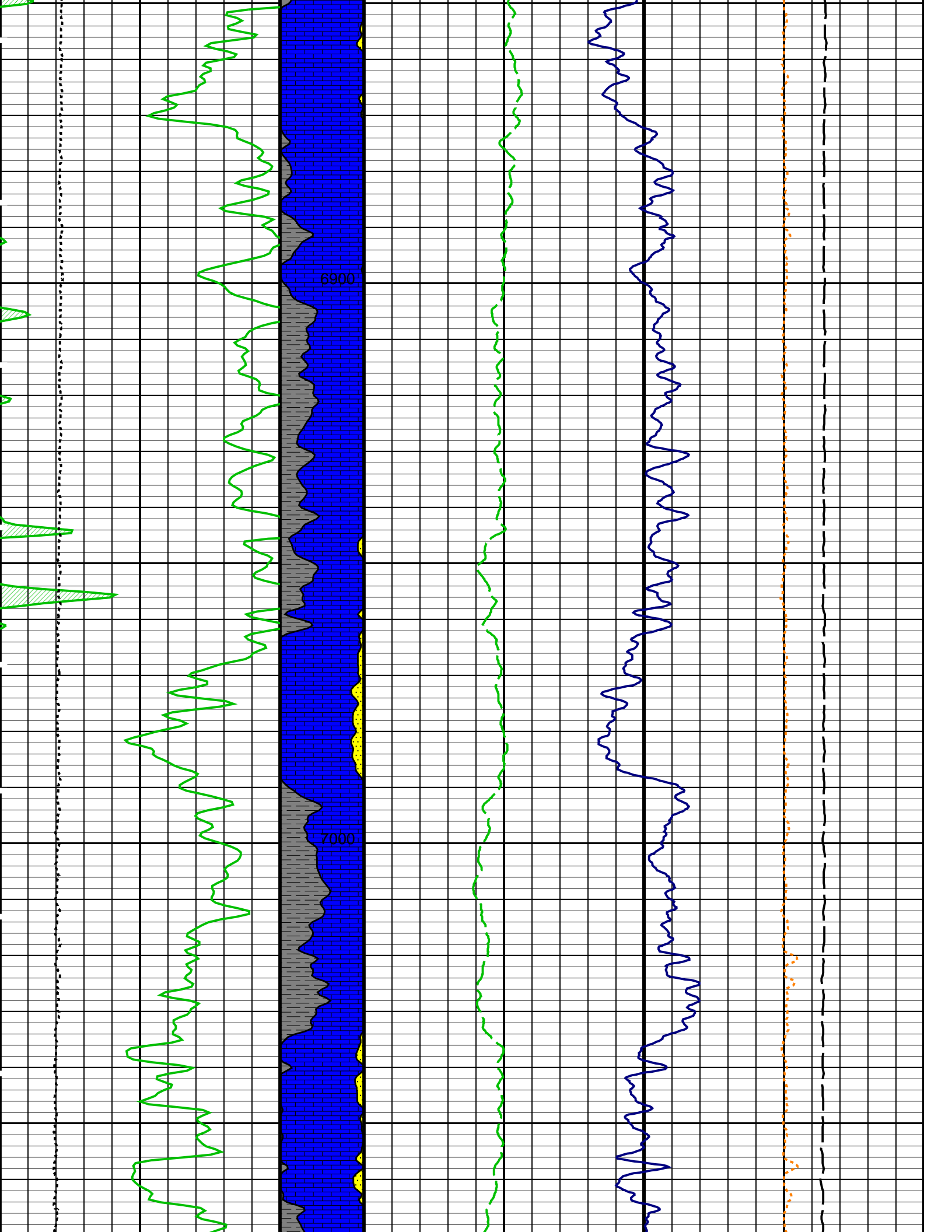


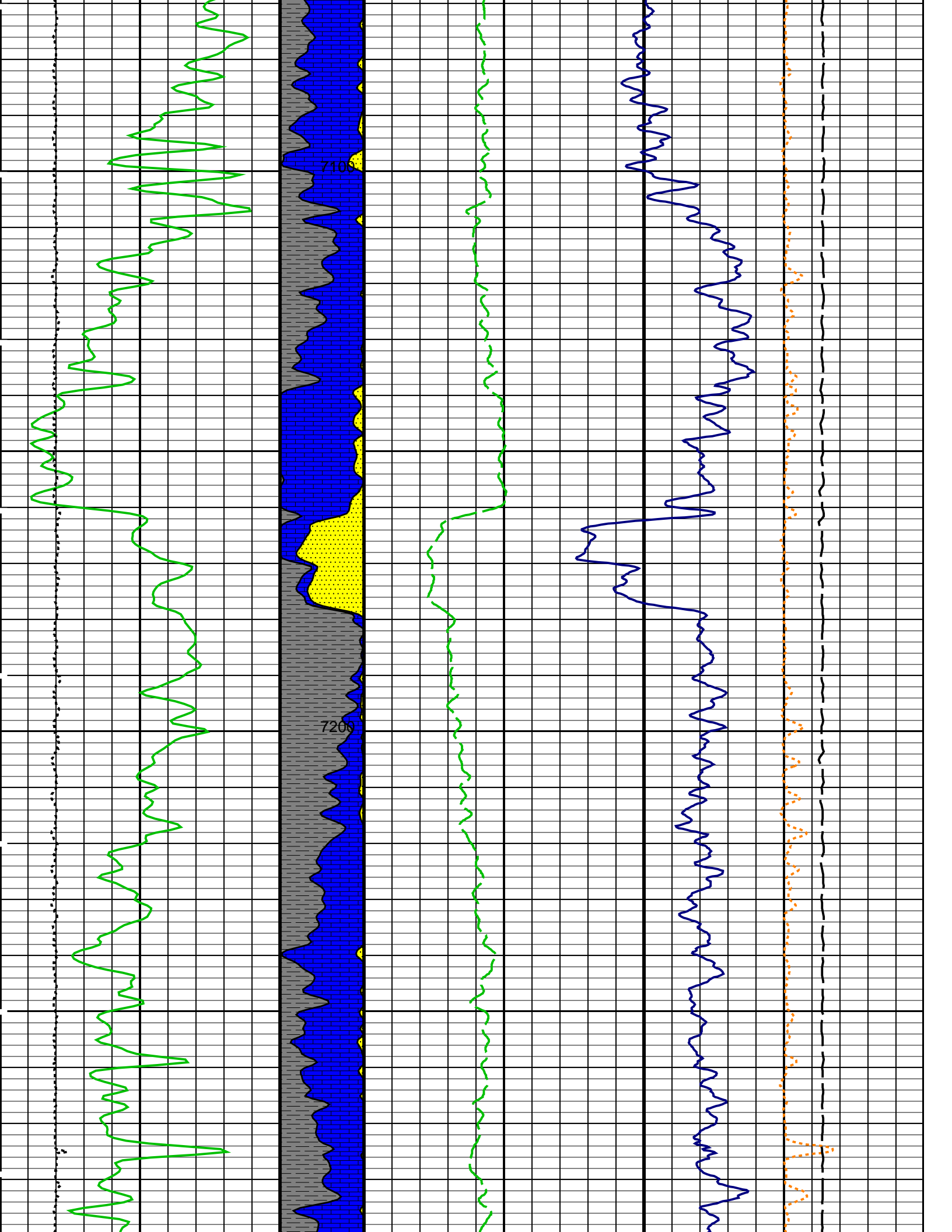


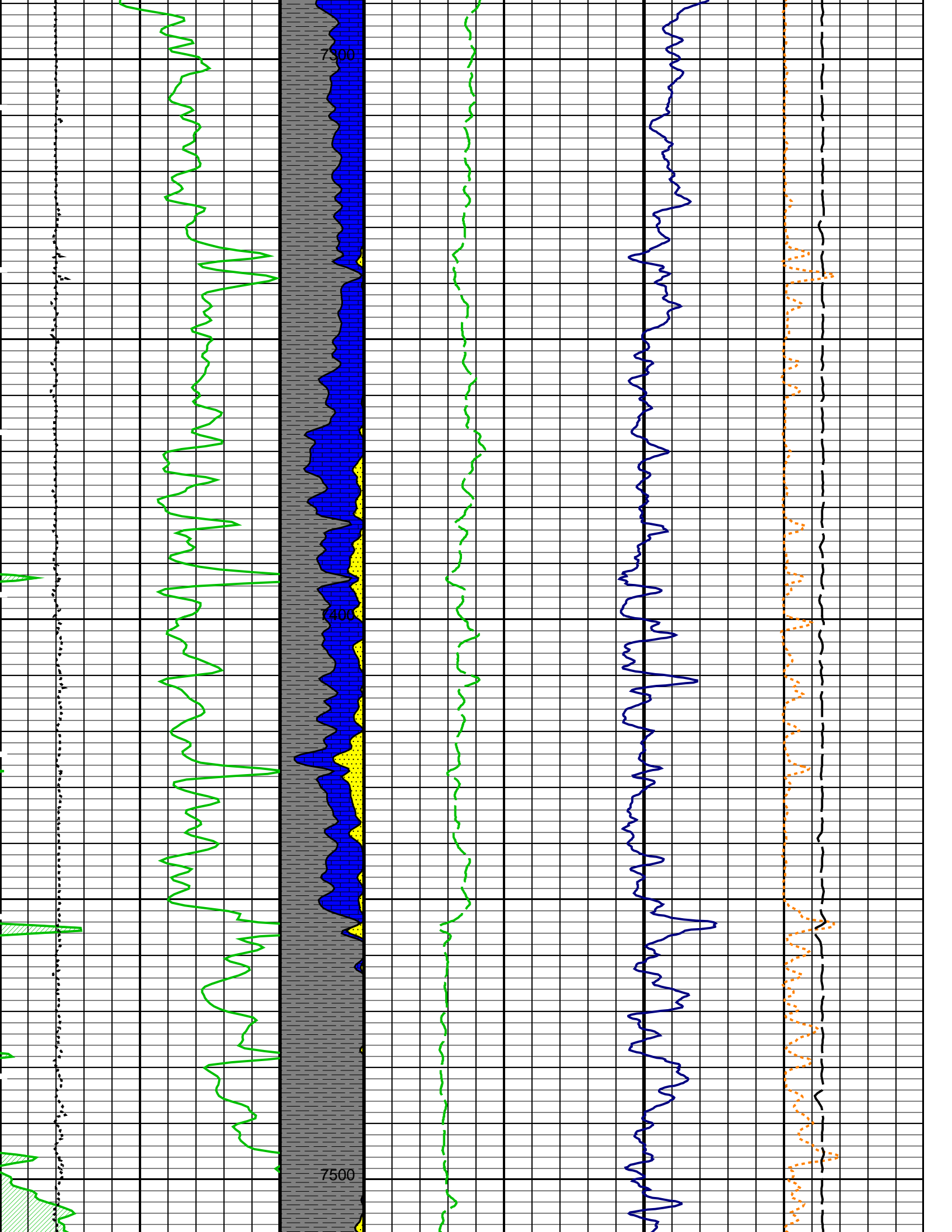


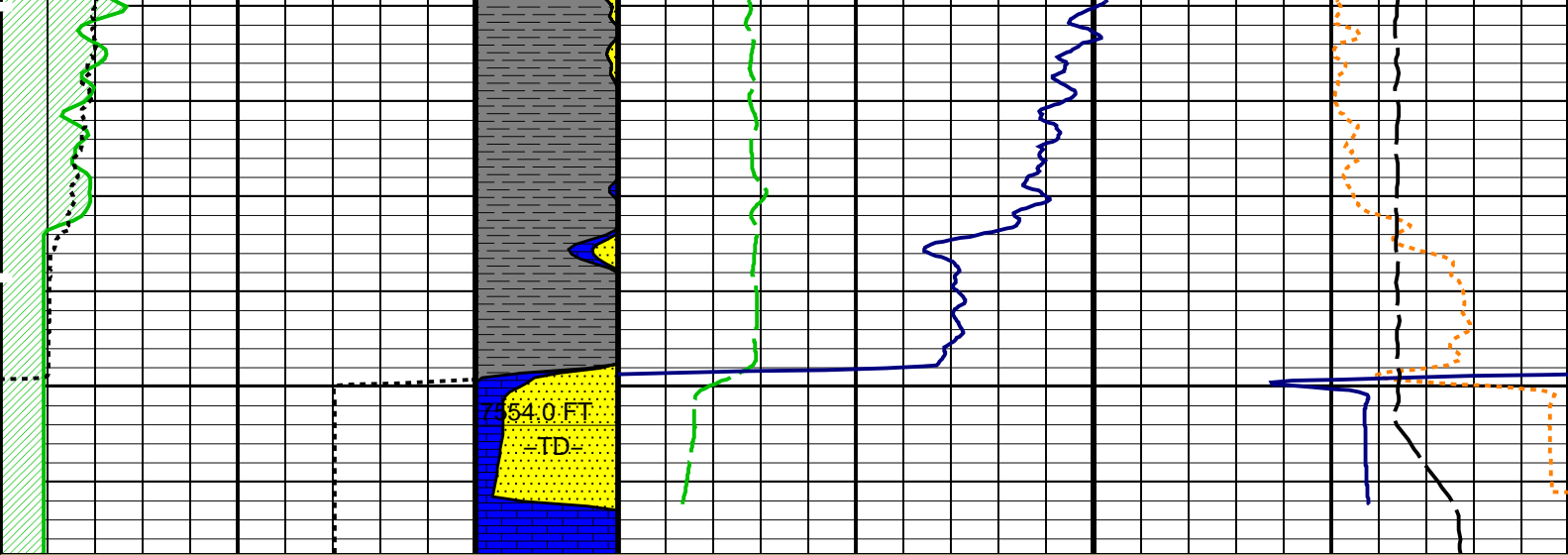












MAIN PASS: \*\*\* PLATFORM EXPRESS – LITHOLOGY DENSITY \*\*\*

Gamma Ray Backup	LIME	Std. Res. Formation Pe (PEFZ)	Density Correction (HDRA)
		(----	(G/C3)
		0	10
			-0.25
			0.25
Gamma Ray (GR)	SAND	Std. Res. Formation Density (RHOZ)	
(GAPI)		(G/C3)	
0		2	3
Caliper (HCAL)	SHALE	Tension (TENS)	
(IN)		(LBF)	
6		10000	0

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
AIT-M: Array Induction Tool – M		
BHT	Bottom Hole Temperature (used in calculations)	199 DEGF
FEXP	Form Factor Exponent	2
FNUM	Form Factor Numerator	1
GGRD	Geothermal Gradient	0.01 DF/F
GTSE	Generalized Temperature Selection	HSTS_HTEM
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE
SHT	Surface Hole Temperature	68 DEGF
HILTB-FTB: High resolution Integrated Logging Tool-DTS		
BHFL_TLD	HILT Nuclear Mud Base	WATER
BHT	Bottom Hole Temperature (used in calculations)	199 DEGF
DHC	Density Hole Correction	BS
FD	Fluid Density	1 G/C3
FEXP	Form Factor Exponent	2
FNUM	Form Factor Numerator	1
GCLF	Germany Coal-like Formation Option	NO
GGRD	Geothermal Gradient	0.01 DF/F
GTSE	Generalized Temperature Selection	HSTS_HTEM
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE
NAAC	HRDD APS Activation Correction	OFF
NMT	HILT Nuclear Mud Type	NOBARITE
NPRM	HRDD Processing Mode	StdRes
NSAR	HRDD Depth Sampling Rate	1 IN
SHT	Surface Hole Temperature	68 DEGF
HNCS-BA: Hostile Natural Gamma Ray Sonde		
BHT	Bottom Hole Temperature (used in calculations)	199 DEGF
GGRD	Geothermal Gradient	0.01 DF/F
GTSE	Generalized Temperature Selection	HSTS_HTEM
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE
SHT	Surface Hole Temperature	68 DEGF
PERT: Preliminary Evaluation – Real Time		
BDPS	Bulk Density Processing Selector	Standard
BHT	Bottom Hole Temperature (used in calculations)	199 DEGF
CLIM	Caliper Limit for Bad Hole	IN
CNPS	Corrected Neutron Porosity Selector	NPHI
DRUL	DRHO Upper Limit	999 G/C3
FCAL	Caliper Presence Flag	PRESENT
FCGR	CGR Presence Flag	PRESENT
FEXP	Form Factor Exponent	2
FLDT	Bulk Density Presence Flag	PRESENT

FNUM	Form Factor Numerator	1	
FSON	Sonic Presence Flag	ABSENT	
GGRD	Geothermal Gradient	0.01	DF/F
GTSE	Generalized Temperature Selection	HSTS_HTEM	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
PMAX	PHI Maximum	0.5	CFCF
POUT	Porosity Output Lithology	LIMESTONE	
RG21	RHO Grain (2-Mineral Model, Min-1)	2.71	G/C3
RG22	RHO Grain (2-Mineral Model, Min-2)	2.644	G/C3
RG23	RHO Grain (2-Mineral Model, Min-3)	2.877	G/C3
RG31	RHO Grain (3-Mineral Model, Min-1)	2.71	G/C3
RG32	RHO Grain (3-Mineral Model, Min-2)	2.644	G/C3
RG33	RHO Grain (3-Mineral Model, Min-3)	2.877	G/C3
RTLF	RT Limit Flag	NO_LIMIT	
RWF	Resistivity of Free Water	0.02	OHMM
SHT	Surface Hole Temperature	68	DEGF
UF	U Fluid	0.398	
UM21	U Matrix (2-Mineral Model, Min-1)	13.77	
UM22	U Matrix (2-Mineral Model, Min-2)	4.779	
UM23	U Matrix (2-Mineral Model, Min-3)	8.997	
UM31	U Matrix (3-Mineral Model, Min-1)	13.77	
UM32	U Matrix (3-Mineral Model, Min-2)	4.779	
UM33	U Matrix (3-Mineral Model, Min-3)	8.997	
	HOLEV: Integrated Hole/Cement Volume		
BHT	Bottom Hole Temperature (used in calculations)	199	DEGF
GGRD	Geothermal Gradient	0.01	DF/F
GTSE	Generalized Temperature Selection	HSTS_HTEM	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	68	DEGF
	FEQL: Formation Evaluation Quick Look		
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
	System and Miscellaneous		
BS	Bit Size	7.875	IN
DFD	Drilling Fluid Density	9.60	LB/G
DO	Depth Offset for Playback	0.0	FT
PP	Playback Processing	NORMAL	
RMFS	Resistivity of Mud Filtrate Sample	0.8347	OHMM
TD	Total Depth	7554	FT
TWS	Temperature of Connate Water Sample	100.00	DEGF

Format: DENS    Vertical Scale: 5" per 100'    Graphics File Created: 05-Jan-2010 11:05

## OP System Version: 17C0-154

AIT-M	17C0-154	HILTB-FTB	17C0-154
HNGC-B	17C0-154	HNGS-BA	17C0-154
DTC-H	17C0-154		

### Input DLIS Files

DEFAULT	SPLICE_AIT_TLD_MCFL_012	FN:1	PRODUCER	05-Jan-2010 11:04	7567.5 FT	547.6 FT
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### Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_013PUP	FN:11	PRODUCER	05-Jan-2010 11:05
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**Schlumberger**

**BEFORE CALIBRATIONS**

MAXIS Field Log

#### Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
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Array Induction Tool – M Wellsite Calibration – Electronics Calibration Check – Thru Cal Mag. & Phase

Master: 14–Oct–2009 18:03 Before: 4–Jan–2010 12:35

Thru Cal Magnitude – 0	0	0.6205	0.6203	N/A	N/A	N/A	V
Thru Cal Magnitude – 1	0	1.271	1.271	N/A	N/A	N/A	V
Thru Cal Magnitude – 2	0	0.6318	0.6316	N/A	N/A	N/A	V
Thru Cal Magnitude – 3	0	0.7131	0.7129	N/A	N/A	N/A	V
Thru Cal Magnitude – 4	0	1.334	1.334	N/A	N/A	N/A	V
Thru Cal Magnitude – 5	0	1.953	1.952	N/A	N/A	N/A	V
Thru Cal Magnitude – 6	0	1.949	1.949	N/A	N/A	N/A	V
Thru Cal Magnitude – 7	0	1.419	1.421	N/A	N/A	N/A	V
Thru Cal Phase – 0	0	180.2	180.5	N/A	N/A	N/A	DEG
Thru Cal Phase – 1	0	179.2	179.4	N/A	N/A	N/A	DEG
Thru Cal Phase – 2	0	175.6	175.9	N/A	N/A	N/A	DEG
Thru Cal Phase – 3	0	174.9	175.1	N/A	N/A	N/A	DEG
Thru Cal Phase – 4	0	168.7	169.0	N/A	N/A	N/A	DEG
Thru Cal Phase – 5	0	167.0	167.3	N/A	N/A	N/A	DEG
Thru Cal Phase – 6	0	167.0	167.3	N/A	N/A	N/A	DEG
Thru Cal Phase – 7	0	166.2	166.5	N/A	N/A	N/A	DEG

Array Induction Tool – M Wellsite Calibration – Electronics Calibration Check – Auxiliary

Master: 14–Oct–2009 18:03 Before: 4–Jan–2010 12:35

Array Induction SPA Plus	991.0	992.7	992.7	N/A	N/A	N/A	MV
Array Induction SPA Zero	0	0.6638	0.6435	N/A	N/A	N/A	MV
Array Induction Temperature PI	0.9170	0.9196	0.9196	N/A	N/A	N/A	V
Array Induction Temperature Ze	0	0.0006632	0.0006417	N/A	N/A	N/A	V

Array Induction Tool – M Wellsite Calibration – Test Loop Gain Correction

Master: 14–Oct–2009 18:03

Test Loop Gain Correctio – 0	0	1.017	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio – 1	0	1.014	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio – 2	0	1.015	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio – 3	0	1.011	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio – 4	0	0.9935	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio – 5	0	0.9888	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio – 6	0	0.9937	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio – 7	0	1.007	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio – 0	0	0.7201	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio – 1	0	0.7620	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio – 2	0	0.2948	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio – 3	0	0.2209	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio – 4	0	0.1146	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio – 5	0	–0.009143	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio – 6	0	0.2984	N/A	N/A	N/A	N/A	DEG
Test Loop Gain Correctio – 7	0	–0.05307	N/A	N/A	N/A	N/A	DEG

Array Induction Tool – M Wellsite Calibration – Sonde Error Correction

Master: 14–Oct–2009 18:03

R Sonde Error Correction – 0	0	–69.04	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 1	0	172.8	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 2	0	116.8	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 3	0	64.65	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 4	0	26.78	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 5	0	12.75	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 6	0	11.98	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 7	0	–2.480	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 0	0	–259.4	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 1	0	103.1	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 2	0	63.05	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 3	0	–22.90	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 4	0	21.47	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 5	0	–15.50	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 6	0	–4.060	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 7	0	–4.950	N/A	N/A	N/A	N/A	MM/M

Array Induction Tool – M Wellsite Calibration – Mud Gain Correction

Master: 14–Oct–2009 18:03

Coarse – Mag, Real, Imag – 0	0	0.8551	N/A	N/A	N/A	N/A	
Coarse – Mag, Real, Imag – 1	0	0.8551	N/A	N/A	N/A	N/A	
Coarse – Mag, Real, Imag – 2	0	0.8551	N/A	N/A	N/A	N/A	
Fine – Mag, Real, Imag – 0	0	0.8573	N/A	N/A	N/A	N/A	
Fine – Mag, Real, Imag – 1	0	0.8573	N/A	N/A	N/A	N/A	
Fine – Mag, Real, Imag – 2	0	0.8573	N/A	N/A	N/A	N/A	

High resolution Integrated Logging Tool–DTS Wellsite Calibration – Stab Measurement Summary

Before: 4–Jan–2010 12:38

BS Window Ratio	0.7094	N/A	0.7097	N/A	N/A	N/A	
BS Window Sum	8629	N/A	8614	N/A	N/A	N/A	CPS
SS Window Ratio	0.4898	N/A	0.4919	N/A	N/A	N/A	
SS Window Sum	9755	N/A	9736	N/A	N/A	N/A	CPS
LS Window Ratio	0.2973	N/A	0.2863	N/A	N/A	N/A	
LS Window Sum	1027	N/A	1020	N/A	N/A	N/A	CPS



























High resolution Integrated Logging Tool–DTS Wellsite Calibration – Photo–multiplier High Voltages Calibrations							
Before: 4–Jan–2010 12:38							
BS PM High Voltage (Command)	1499	N/A	1486	N/A	N/A	N/A	V
SS PM High Voltage (Command)	1689	N/A	1689	N/A	N/A	N/A	V
LS PM High Voltage (Command)	1479	N/A	1489	N/A	N/A	N/A	V
High resolution Integrated Logging Tool–DTS Wellsite Calibration – Crystal Quality Resolutions Calibration							
Before: 4–Jan–2010 12:38							
BS Crystal Resolution	10.47	N/A	10.35	N/A	N/A	N/A	%
SS Crystal Resolution	9.822	N/A	10.01	N/A	N/A	N/A	%
LS Crystal Resolution	10.15	N/A	10.13	N/A	N/A	N/A	%
High resolution Integrated Logging Tool–DTS Wellsite Calibration – MCFL Calibration							
Before: 4–Jan–2010 12:39							
Raw B0 Resistivity	3875	N/A	3853	N/A	N/A	N/A	OHMM
Raw B1 Resistivity	3830	N/A	3795	N/A	N/A	N/A	OHMM
Raw B2 Resistivity	3830	N/A	3794	N/A	N/A	N/A	OHMM
High resolution Integrated Logging Tool–DTS Wellsite Calibration – HILT Caliper Calibration							
Before: 4–Jan–2010 12:34							
HILT Caliper Zero Measurement	8.000	N/A	8.593	N/A	N/A	N/A	IN
HILT Caliper Plus Measurement	12.00	N/A	12.71	N/A	N/A	N/A	IN
High resolution Integrated Logging Tool–DTS Wellsite Calibration – Detector Calibration							
Before: 4–Jan–2010 12:34							
Gamma Ray Background	30.00	N/A	85.46	N/A	N/A	N/A	GAPI
Gamma Ray (Jig – Bkg)	174.8	N/A	174.8	N/A	N/A	15.89	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI
High resolution Integrated Logging Tool–DTS Wellsite Calibration – Zero Measurement							
Master: 8–Oct–2009 14:16 Before: 4–Jan–2010 12:34							
CNTC Background	26.34	26.34	26.88	N/A	N/A	3.951	CPS
CFTC Background	27.85	27.85	27.31	N/A	N/A	4.178	CPS
High resolution Integrated Logging Tool–DTS Wellsite Calibration – Ratio Measurement							
Master: 8–Oct–2009 14:16							
Thermal Near Corr. (Tank)	5800	5423	N/A	N/A	N/A	N/A	CPS
Thermal Far Corr. (Tank)	2400	2272	N/A	N/A	N/A	N/A	CPS
CNTC/CFTC (Tank)	2.159	2.387	N/A	N/A	N/A	N/A	
High resolution Integrated Logging Tool–DTS Wellsite Calibration – Accelerometer Calibration							
Before: 5–Jan–2010 7:51							
Z–Axis Acceleration	32.19	N/A	32.07	N/A	N/A	N/A	F/S2
High resolution Integrated Logging Tool–DTS Master Calibration – Inversion results							
Master: 20–Dec–2009 17:11							
Rho Aluminum	2.596	2.600	---	---	---	---	G/C3
Rho Magnesium	1.686	1.689	---	---	---	---	G/C3
Pe Aluminum	2.570	2.536	---	---	---	---	
Pe Magnesium	2.650	2.630	---	---	---	---	
High resolution Integrated Logging Tool–DTS Master Calibration – Deviation Summary							
Master: 20–Dec–2009 17:11							
BS Average Deviation	0	0.3690	---	---	---	---	%
BS Max Deviation	0	0.6436	---	---	---	---	%
SS Average Deviation	0	0.3737	---	---	---	---	%
SS Max Deviation	0	1.617	---	---	---	---	%
LS Average Deviation	0	0.5129	---	---	---	---	%
LS Max Deviation	0	1.805	---	---	---	---	%
Hostile Natural Gamma Ray Sonde Wellsite Calibration – Detector 1 Check							
Master: 4–Jan–2010 15:45 Before: 4–Jan–2010 15:52							
Na 511 Peak Loc	40.00	38.42	38.49	N/A	N/A	1.000	
Na 511 Peak Res	15.50	16.00	16.31	N/A	N/A	2.000	%
High Voltage	1150	1046	1047	N/A	N/A	N/A	V
Na 1785 Peak Loc	142.6	139.1	138.6	N/A	N/A	7.000	
Na 1785 Peak Res	8.500	7.874	8.667	N/A	N/A	2.000	%
Temperature	59.90	61.96	61.88	N/A	N/A	N/A	DEGF
Na Count Rate	45.00	39.05	38.70	N/A	N/A	8.000	CPS
Hostile Natural Gamma Ray Sonde Wellsite Calibration – Detector 2 Check							
Master: 4–Jan–2010 15:45 Before: 4–Jan–2010 15:52							
Na 511 Peak Loc	40.00	38.62	38.64	N/A	N/A	1.000	
Na 511 Peak Res	15.50	14.84	14.77	N/A	N/A	2.000	%
High Voltage	1150	1028	1028	N/A	N/A	N/A	V
Na 1785 Peak Loc	142.6	138.8	139.2	N/A	N/A	7.000	
Na 1785 Peak Res	8.500	8.270	7.844	N/A	N/A	2.000	%
Temperature	59.90	64.99	65.02	N/A	N/A	N/A	DEGF
Na Count Rate	45.00	39.05	38.81	N/A	N/A	8.000	CPS













Hostile Natural Gamma Ray Sonde Wellsite Calibration – Ratio Of Detector 1 To Detector 2							
Master: 4–Jan–2010 15:45 Before: 4–Jan–2010 15:52							
Coincidence Count Rate Ratio	1.000	0.9979	0.9973	N/A	N/A	0.05000	
Hostile Natural Gamma Ray Sonde Master Calibration – Detector 1 Calibration							
Master: 4–Jan–2010 15:39							
Na 511 Peak Set Point	40.00	40.00	--	--	--	--	
Th Peak Loc	209.6	209.6	--	--	--	--	
Th Peak Res	7.000	7.598	--	--	--	--	%
Background Count Rate	142.5	262.2	--	--	--	--	CPS
Gain Ratio	1.000	1.037	--	--	--	--	
Hostile Natural Gamma Ray Sonde Master Calibration – Detector 2 Calibration							
Master: 4–Jan–2010 15:39							
Na 511 Peak Set Point	40.00	40.00	--	--	--	--	
Th Peak Loc	209.6	210.2	--	--	--	--	
Th Peak Res	7.000	7.097	--	--	--	--	%
Background Count Rate	142.5	259.3	--	--	--	--	CPS
Gain Ratio	1.000	1.035	--	--	--	--	
The GLS–VJ source activity is acceptable.							
The HGNS Neutron Master Calibration was done with the following parameters :							
NCT–B Water Temperature	57.0	DEGF.					
Thermal Housing Size	3.365	IN.					
NSR–F serial number	5068						

Array Induction Tool – M / Equipment Identification			
Primary Equipment:			
Rm/SP Bottom Nose	AMRM – A		
Array Induction Sonde	AMIS – A	1372	
Auxiliary Equipment:			

Array Induction Tool – M Wellsite Calibration							
Electronics Calibration Check – Thru Cal Mag. & Phase							
Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Thru Cal Phase DEG	Nominal
0	Master	0.6205		0.6100	180.2		197.0
	Before	0.6203			180.5		
1	Master	1.271		1.270	179.2		196.0
	Before	1.271			179.4		
2	Master	0.6318		0.6200	175.6		192.0
	Before	0.6316			175.9		
3	Master	0.7131		0.7000	174.9		191.0
	Before	0.7129			175.1		
4	Master	1.334		1.340	168.7		185.0
	Before	1.334			169.0		
5	Master	1.953		1.960	167.0		182.0
	Before	1.952			167.3		
6	Master	1.949		1.960	167.0		181.0
	Before	1.949			167.3		
7	Master	1.419		1.410	166.2		175.0
	Before	1.421			166.5		
		60.00 % (Minimum)	(Nominal)	140.0 % (Maximum)	Nom –60.00 (Minimum)	(Nominal)	Nom + 60.00 (Maximum)
Master: 14–Oct–2009 18:03				Before: 4–Jan–2010 12:35			

Array Induction Tool – M Wellsite Calibration							
Electronics Calibration Check – Auxiliary							
Phase	Array Induction SPA Plus MV		Value	Phase	Array Induction SPA Zero MV		Value
Master			992.7	Master			0.6638
Before			992.7	Before			0.6435
	941.0 (Minimum)	991.0 (Nominal)	1040 (Maximum)		-50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)
Phase	Array Induction Temperature Plus V		Value	Phase	Array Induction Temperature Zero V		Value
Master			0.9196	Master			0.0006632
Before			0.9196	Before			0.0006417
	0.8710 (Minimum)	0.9170 (Nominal)	0.9630 (Maximum)		-0.05000 (Minimum)	0 (Nominal)	0.05000 (Maximum)
Master: 14-Oct-2009 18:03				Before: 4-Jan-2010 12:35			

Array Induction Tool – M Wellsite Calibration								
Test Loop Gain Correction								
Idx	Value	Test Loop Gain	Correction Magnitude V		Value	Test Loop Gain	Correction Phase DEG	DEC
0	1.017				0.7201			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
1	1.014				0.7620			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
2	1.015				0.2948			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
3	1.011				0.2209			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
4	0.9935				0.1146			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
5	0.9888				-0.009143			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
6	0.9937				0.2984			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
7	1.007				-0.05307			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
Master: 14-Oct-2009 18:03								

Array Induction Tool – M Wellsite Calibration							
Sonde Error Correction							
Idx	Value	R Sonde Error Correction MM/M			Value	X Sonde Error Correction MM/M	
0	-69.04				-259.4		
		-231.0 (Minimum)	-56.00 (Nominal)	119.0 (Maximum)		-2250 (Minimum)	0 (Nominal) 2250 (Maximum)
1	172.8				103.1		
		114.0 (Minimum)	159.0 (Nominal)	204.0 (Maximum)		-625.0 (Minimum)	0 (Nominal) 625.0 (Maximum)
2	116.8				63.05		
		66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)		-350.0 (Minimum)	0 (Nominal) 350.0 (Maximum)
3	64.65				-22.90		
		39.00 (Minimum)	64.00 (Nominal)	89.30 (Maximum)		-250.0 (Minimum)	0 (Nominal) 250.0 (Maximum)
4	26.78				21.47		
		15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)		-63.00 (Minimum)	0 (Nominal) 63.00 (Maximum)
5	12.75				-15.50		
		4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)		-50.00 (Minimum)	0 (Nominal) 50.00 (Maximum)

6	11.98				-4.060		
	5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)		-30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)
7	-2.480				-4.950		
	-5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)		-30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)

Master: 14-Oct-2009 18:03

Array Induction Tool – M Wellsite Calibration								
Mud Gain Correction								
Idx	Value	Coarse – Mag, Real, Imag			Value	Fine – Mag, Real, Imag		
0	0.8551	<div><div></div></div>			0.8573	<div><div></div></div>		
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
1	0.8551	<div><div></div></div>			0.8573	<div><div></div></div>		
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
2	0.8551	<div><div></div></div>			0.8573	<div><div></div></div>		
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)

Master: 14-Oct-2009 18:03

Master: 14-Oct-2009 18:03

Array Induction Tool – M Master Calibration							
Electronics Calibration Check – Thru Cal Mag. & Phase							
Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Thru Cal Phase DEG	Nominal
0	Master	0.6205		0.6100	180.2		197.0
1	Master	1.271		1.270	179.2		196.0
2	Master	0.6318		0.6200	175.6		192.0
3	Master	0.7131		0.7000	174.9		191.0
4	Master	1.334		1.340	168.7		185.0
5	Master	1.953		1.960	167.0		182.0
6	Master	1.949		1.960	167.0		181.0
7	Master	1.419		1.410	166.2		175.0
		60.00 % (Minimum)	(Nominal)	140.0 % (Maximum)	Nom -60.00 (Minimum)	(Nominal)	Nom + 60.00 (Maximum)

Master: 14-Oct-2009 18:03

Array Induction Tool – M Master Calibration									
Electronics Calibration Check – Auxiliary									
Phase	Array Induction SPA Plus MV			Value	Phase	Array Induction SPA Zero MV			Value
Master	<div><div></div><div></div><div></div></div>			992.7	Master	<div><div></div><div></div><div></div></div>			0.6638
	941.0 (Minimum)	991.0 (Nominal)	1040 (Maximum)			-50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)	
Phase	Array Induction Temperature Plus V			Value	Phase	Array Induction Temperature Zero V			Value
Master	<div><div></div><div></div><div></div></div>			0.9196	Master	<div><div></div><div></div><div></div></div>			0.0006632
	0.8710 (Minimum)	0.9170 (Nominal)	0.9630 (Maximum)			-0.05000 (Minimum)	0 (Nominal)	0.05000 (Maximum)	
Master: 14-Oct-2009 18:03									

Master: 14-Oct-2009 18:03

Array Induction Tool – M Master Calibration								
Test Loop Gain Correction								
Idx	Value	Test Loop Gain Correction Magnitude V			Value	Test Loop Gain Correction Phase DEG		
0	1.017	<div><div></div></div>			0.7201	<div><div></div></div>		
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
1	1.014	<div><div></div></div>			0.7620	<div><div></div></div>		
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
2	1.015	<div><div></div></div>			0.2948	<div><div></div></div>		
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
3	1.011	<div><div></div></div>			0.2209	<div><div></div></div>		
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)

	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
4	0.9935			0.1146		
	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
5	0.9888			-0.009143		
	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
6	0.9937			0.2984		
	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
7	1.007			-0.05307		
	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)

Master: 14-Oct-2009 18:03

Array Induction Tool – M Master Calibration							
Sonde Error Correction							
Idx	Value	R Sonde Error Correction MM/M			Value	X Sonde Error Correction MM/M	
0	-69.04				-259.4		
		-231.0 (Minimum)	-56.00 (Nominal)	119.0 (Maximum)		-2250 (Minimum)	0 (Nominal) 2250 (Maximum)
1	172.8				103.1		
		114.0 (Minimum)	159.0 (Nominal)	204.0 (Maximum)		-625.0 (Minimum)	0 (Nominal) 625.0 (Maximum)
2	116.8				63.05		
		66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)		-350.0 (Minimum)	0 (Nominal) 350.0 (Maximum)
3	64.65				-22.90		
		39.00 (Minimum)	64.00 (Nominal)	89.30 (Maximum)		-250.0 (Minimum)	0 (Nominal) 250.0 (Maximum)
4	26.78				21.47		
		15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)		-63.00 (Minimum)	0 (Nominal) 63.00 (Maximum)
5	12.75				-15.50		
		4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)		-50.00 (Minimum)	0 (Nominal) 50.00 (Maximum)
6	11.98				-4.060		
		5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)		-30.00 (Minimum)	0 (Nominal) 30.00 (Maximum)
7	-2.480				-4.950		
		-5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)		-30.00 (Minimum)	0 (Nominal) 30.00 (Maximum)
Master: 14-Oct-2009 18:03							

Array Induction Tool – M Master Calibration							
Mud Gain Correction							
Idx	Value	Coarse – Mag, Real, Imag			Value	Fine – Mag, Real, Imag	
0	0.8551	<div><div></div></div>			0.8573	<div><div></div></div>	
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal) 1.200 (Maximum)
1	0.8551	<div><div></div></div>			0.8573	<div><div></div></div>	
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal) 1.200 (Maximum)
2	0.8551	<div><div></div></div>			0.8573	<div><div></div></div>	
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal) 1.200 (Maximum)

Master: 14-Oct-2009 18:03

### High resolution Integrated Logging Tool–DTS / Equipment Identification

#### Primary Equipment:

HILT high-Resolution Mechanical Sonde  
HILT Rxo Gamma-ray Device  
HILT Micro Cylindrically Focused Log Dev







HRMS – B 1716  
HRGD – B 1732  
MCFL –  
216




GR Logging Source  
HILT High Res. Control Cartridge  
HILT Gamma-Ray Neutron Sonde-DTS  
HGNS Gamma-Ray Device  
HGNS Neutron Detector with Alpha Source




GLS - VJ 5416  
HRCC - B 1813  
HGNS - B 1927  
HGR -  
HCNT -




Auxiliary Equipment:  
Neutron Calibration Tank  
Gamma Source Radioactive  
HGNS Housing



NCT - B  
GSR - U/Y  
HGNH - 1927




High resolution Integrated Logging Tool-DTS Wellsite Calibration														
Stab Measurement Summary														
Phase	BS Window Ratio			Value	Phase	SS Window Ratio			Value	Phase	LS Window Ratio			Value
Before				0.7097	Before				0.4919	Before				0.2863
	0.6740 (Minimum)	0.7094 (Nominal)	0.7449 (Maximum)		0.4653 (Minimum)	0.4898 (Nominal)	0.5143 (Maximum)			0.2825 (Minimum)	0.2973 (Nominal)	0.3122 (Maximum)		
Phase	BS Window Sum CPS			Value	Phase	SS Window Sum CPS			Value	Phase	LS Window Sum CPS			Value
Before				8614	Before				9736	Before				1020
	8197 (Minimum)	8629 (Nominal)	9060 (Maximum)		9268 (Minimum)	9755 (Nominal)	10240 (Maximum)			976.1 (Minimum)	1027 (Nominal)	1079 (Maximum)		
Before: 4-Jan-2010 12:38														



High resolution Integrated Logging Tool-DTS Wellsite Calibration														
Photo-multiplier High Voltages Calibrations														
Phase	BS PM High Voltage (Command) V			Value	Phase	SS PM High Voltage (Command) V			Value	Phase	LS PM High Voltage (Command) V			Value
Before				1486	Before				1689	Before				1489
	1399 (Minimum)	1499 (Nominal)	1599 (Maximum)		1589 (Minimum)	1689 (Nominal)	1789 (Maximum)			1379 (Minimum)	1479 (Nominal)	1579 (Maximum)		
Before: 4-Jan-2010 12:38														

High resolution Integrated Logging Tool-DTS Wellsite Calibration											
Crystal Quality Resolutions Calibration											
Phase	BS Crystal Resolution %		Value	Phase	SS Crystal Resolution %		Value	Phase	LS Crystal Resolution %		Value
Before			10.35	Before			10.01	Before			10.13
	9.466 (Minimum)	10.47 (Nominal)	11.47 (Maximum)		8.822 (Minimum)	9.822 (Nominal)	10.82 (Maximum)		9.153 (Minimum)	10.15 (Nominal)	11.15 (Maximum)
Before: 4-Jan-2010 12:38											

High resolution Integrated Logging Tool-DTS Wellsite Calibration														
MCFL Calibration														
Phase	Raw B0 Resistivity OHMM			Value	Phase	Raw B1 Resistivity OHMM			Value	Phase	Raw B2 Resistivity OHMM			Value
Before				3853	Before				3795	Before				3794
	3565 (Minimum)	3875 (Nominal)	4185 (Maximum)		3524 (Minimum)	3830 (Nominal)	4136 (Maximum)		3524 (Minimum)	3830 (Nominal)	4136 (Maximum)			
Before: 4-Jan-2010 12:39														

High resolution Integrated Logging Tool-DTS Wellsite Calibration							
HILT Caliper Calibration							
Phase	HILT Caliper Zero Measurement IN		Value	Phase	HILT Caliper Plus Measurement IN		Value
Before			8.593	Before			12.71
	6.000 (Minimum)	8.000 (Nominal)	10.00 (Maximum)		9.000 (Minimum)	12.00 (Nominal)	15.00 (Maximum)
Before: 4-Jan-2010 12:34							



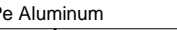
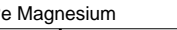
High resolution Integrated Logging Tool-DTS Wellsite Calibration														
Detector Calibration														
Phase	Gamma Ray Background GAPI			Value	Phase	Gamma Ray (Jig - Bkg) GAPI			Value	Phase	Gamma Ray (Calibrated) GAPI			Value
Before				85.46	Before				174.8	Before				165.0
	0 (Minimum)	30.00 (Nominal)	120.0 (Maximum)		158.9 (Minimum)	174.8 (Nominal)	190.7 (Maximum)		150.0 (Minimum)	165.0 (Nominal)	180.0 (Maximum)			
Before: 4-Jan-2010 12:34														

High resolution Integrated Logging Tool-DTS Wellsite Calibration							
Zero Measurement							
Phase	CNTC Background CPS		Value	Phase	CFTC Background CPS		Value
Before			22.2	Before			25.0
	20.0 (Minimum)	22.2 (Nominal)	24.4 (Maximum)		23.0 (Minimum)	25.0 (Nominal)	27.0 (Maximum)



Master		26.34	Master		27.85
Before		26.88	Before		27.31
5.000 (Minimum) 26.34 (Nominal) 40.00 (Maximum)			5.000 (Minimum) 27.85 (Nominal) 40.00 (Maximum)		
Master: 8-Oct-2009 14:16			Before: 4-Jan-2010 12:34		

High resolution Integrated Logging Tool-DTS Wellsite Calibration														
Ratio Measurement														
Phase	Thermal Near Corr. (Tank) CPS			Value	Phase	Thermal Far Corr. (Tank) CPS			Value	Phase	CNTC/CFTC (Tank)			Value
Master				5423	Master				2272	Master				2.387
4700 (Minimum) 5800 (Nominal) 6900 (Maximum)					1900 (Minimum) 2400 (Nominal) 2900 (Maximum)					2.120 (Minimum) 2.159 (Nominal) 2.540 (Maximum)				
Master: 8-Oct-2009 14:16														

High resolution Integrated Logging Tool-DTS Wellsite Calibration		
Accelerometer Calibration		
Phase	Z-Axis Acceleration F/S2	Value
Before		32.07
31.53 (Minimum) 32.19 (Nominal) 32.84 (Maximum)		
Before: 5-Jan-2010 7:51		

High resolution Integrated Logging Tool–DTS Master Calibration							
Inversion results							
Phase	Rho Aluminum G/C3		Value	Phase	Rho Magnesium G/C3		Value
Master			2.600	Master			1.689
	2.586 (Minimum)	2.596 (Nominal)	2.606 (Maximum)		1.676 (Minimum)	1.686 (Nominal)	1.696 (Maximum)
Phase	Pe Aluminum		Value	Phase	Pe Magnesium		Value
Master			2.536	Master			2.630
	2.470 (Minimum)	2.570 (Nominal)	2.670 (Maximum)		2.550 (Minimum)	2.650 (Nominal)	2.750 (Maximum)
Master: 20–Dec–2009 17:11							

High resolution Integrated Logging Tool–DTS Master Calibration																		
Deviation Summary																		
Phase	BS Average Deviation %			Value	Phase	SS Average Deviation %			Value	Phase	LS Average Deviation %			Value				
Master	<div><div></div></div>			0.3690	Master	<div><div></div></div>			0.3737	Master	<div><div></div></div>			0.5129				
–0.6000 (Minimum)				0 (Nominal)	0.6000 (Maximum)					–1.000 (Minimum)				0 (Nominal)	1.000 (Maximum)			
Phase	BS Max Deviation %			Value	Phase	SS Max Deviation %			Value	Phase	LS Max Deviation %			Value				
Master	<div><div></div></div>			0.6436	Master	<div><div></div></div>			1.617	Master	<div><div></div></div>			1.805				
–1.600 (Minimum)				0 (Nominal)	1.600 (Maximum)					–2.500 (Minimum)				0 (Nominal)	2.500 (Maximum)			
–3.500 (Minimum)				0 (Nominal)	3.500 (Maximum)					–3.500 (Minimum)				0 (Nominal)	3.500 (Maximum)			
Master: 20–Dec–2009 17:11																		

High resolution Integrated Logging Tool-DTS Master Calibration									
Zero Measurement									
Phase	CNTC Background CPS			Value	Phase	CFTC Background CPS			Value
Master				26.34	Master				27.85
5.000 (Minimum) 26.34 (Nominal) 40.00 (Maximum)					5.000 (Minimum) 27.85 (Nominal) 40.00 (Maximum)				
Master: 8-Oct-2009 14:16									

High resolution Integrated Logging Tool–DTS Master Calibration														
Tank Measurement														
Phase	Thermal Near Corr. (Tank) CPS			Value	Phase	Thermal Far Corr. (Tank) CPS			Value	Phase	CNTC/CFTC (Tank)			Value
Master				5423	Master				2272	Master				2.387
4700 (Minimum) 5800 (Nominal) 6900 (Maximum)					1900 (Minimum) 2400 (Nominal) 2900 (Maximum)					2.120 (Minimum) 2.159 (Nominal) 2.540 (Maximum)				
Master: 8–Oct–2009 14:16														

Primary Equipment:  
HNGC Cartridge

HNGC – B 2471

Auxiliary Equipment:  
HNGC Housing

HNGH – A

Hostile Natural Gamma Ray Sonde / Equipment Identification

Primary Equipment:  
HNGS Sonde



HNGS – BA 239

Auxiliary Equipment:  
HNGS Sonde Housing  
Gamma Source Radioactive

HNSH – BA 239  
GSR – U 1079

Hostile Natural Gamma Ray Sonde Wellsite Calibration											
Detector 1 Check											
Phase	Na 511 Peak Loc		Value	Phase	Na 511 Peak Res %		Value	Phase	High Voltage V		Value
Master	<div><div></div></div>		38.42	Master	<div><div></div></div>		16.00	Master	<div><div></div></div>		1046
Before	<div><div></div></div>		38.49	Before	<div><div></div></div>		16.31	Before	<div><div></div></div>		1047
37.50 (Minimum)			40.00 (Nominal)	43.50 (Maximum)			12.00 (Minimum)			15.50 (Nominal)	19.00 (Maximum)
Phase	Na 1785 Peak Loc		Value	Phase	Na 1785 Peak Res %		Value	Phase	Temperature DEGF		Value
Master	<div><div></div></div>		139.1	Master	<div><div></div></div>		7.874	Master	<div><div></div></div>		61.96
Before	<div><div></div></div>		138.6	Before	<div><div></div></div>		8.667	Before	<div><div></div></div>		61.88
135.0 (Minimum)			142.6 (Nominal)	150.3 (Maximum)			7.000 (Minimum)			8.500 (Nominal)	11.00 (Maximum)
-20.00 (Minimum)			59.90 (Nominal)	140.0 (Maximum)							
Phase	Na Count Rate CPS		Value								
Master	<div><div></div></div>		39.05								
Before	<div><div></div></div>		38.70								
10.00 (Minimum)			45.00 (Nominal)								
Master: 4-Jan-2010 15:45						Before: 4-Jan-2010 15:52					

Hostile Natural Gamma Ray Sonde Wellsite Calibration														
Detector 2 Check														
Phase	Na 511 Peak Loc			Value	Phase	Na 511 Peak Res %			Value	Phase	High Voltage V			Value
Master	<div><div></div></div>			38.62	Master	<div><div></div></div>			14.84	Master	<div><div></div></div>			1028
Before	<div><div></div></div>			38.64	Before	<div><div></div></div>			14.77	Before	<div><div></div></div>			1028
37.50 (Minimum)40.00 (Nominal)43.50 (Maximum)					12.00 (Minimum)15.50 (Nominal)19.00 (Maximum)					900.0 (Minimum)1150 (Nominal)1600 (Maximum)				
Phase	Na 1785 Peak Loc			Value	Phase	Na 1785 Peak Res %			Value	Phase	Temperature DEGF			Value
Master	<div><div></div></div>			138.8	Master	<div><div></div></div>			8.270	Master	<div><div></div></div>			64.99
Before	<div><div></div></div>			139.2	Before	<div><div></div></div>			7.844	Before	<div><div></div></div>			65.02
135.0 (Minimum)142.6 (Nominal)150.3 (Maximum)					7.000 (Minimum)8.500 (Nominal)11.00 (Maximum)					-20.00 (Minimum)59.90 (Nominal)140.0 (Maximum)				
Phase	Na Count Rate CPS			Value										
Master	<div><div></div></div>			39.05										
Before	<div><div></div></div>			38.81										
10.00 (Minimum)45.00 (Nominal)100.0 (Maximum)														
Master: 4-Jan-2010 15:45														
Before: 4-Jan-2010 15:52														

Hostile Natural Gamma Ray Sonde Wellsite Calibration		
Ratio Of Detector 1 To Detector 2		
Phase	Coincidence Count Rate Ratio	Value
Master		0.9979
Before		0.9973
	0.9500 (Minimum)	1.000 (Nominal)
		1.050 (Maximum)



Hostile Natural Gamma Ray Sonde Master Calibration											
Detector 1 Calibration											
Phase	Na 511 Peak Set Point		Value	Phase	Th Peak Loc		Value	Phase	Th Peak Res %		Value
Master	<div><div></div></div>		40.00	Master	<div><div></div></div>		209.6	Master	<div><div></div></div>		7.598
	38.00 (Minimum)	40.00 (Nominal)	43.00 (Maximum)		201.0 (Minimum)	209.6 (Nominal)	218.3 (Maximum)		5.000 (Minimum)	7.000 (Nominal)	9.000 (Maximum)
Phase	Background Count Rate CPS		Value	Phase	Gain Ratio		Value				
Master	<div><div></div></div>		262.2	Master	<div><div></div></div>		1.037				
	10.00 (Minimum)	142.5 (Nominal)	265.0 (Maximum)		0.9400 (Minimum)	1.000 (Nominal)	1.060 (Maximum)				
Master: 4-Jan-2010 15:39											

Hostile Natural Gamma Ray Sonde Master Calibration											
Detector 2 Calibration											
Phase	Na 511 Peak Set Point		Value	Phase	Th Peak Loc		Value	Phase	Th Peak Res %		Value
Master	<div><div></div></div>		40.00	Master	<div><div></div></div>		210.2	Master	<div><div></div></div>		7.097
	38.00 (Minimum)	40.00 (Nominal)	43.00 (Maximum)		201.0 (Minimum)	209.6 (Nominal)	218.3 (Maximum)		5.000 (Minimum)	7.000 (Nominal)	9.000 (Maximum)
Phase	Background Count Rate CPS		Value	Phase	Gain Ratio		Value				
Master	<div><div></div></div>		259.3	Master	<div><div></div></div>		1.035				
	10.00 (Minimum)	142.5 (Nominal)	265.0 (Maximum)		0.9400 (Minimum)	1.000 (Nominal)	1.060 (Maximum)				
Master: 4-Jan-2010 15:39											

## DTS Telemetry Tool / Equipment Identification

## Primary Equipment:

DTC-H Auxiliary Cartridge  
DTC-H Telemetry Cartridge

DTCH - A  
DTCH - A

## Auxiliary Equipment:

DTCH Telemetry Cartridge Housing

ECH - KC

Company: **Noble Energy, Inc****Schlumberger**Well: **Gemini G 06-33**Field: **Wattenberg**County: **Weld**State: **Colorado**

Platform Express  
Compensated Neutron  
Density Lithology