

## **APPENDIX B**

### **MID-WAY MECHANICAL INTEGRITY TEST REPORT 2022**





**A & M Engineering and  
Environmental Services, Inc.**  
Consulting - Design - Construction - Remediation

April 14, 2023

Ms. Hillary Young, P.E.  
Chief Engineer  
Land Protection Division  
Oklahoma Department of Environmental Quality  
707 North Robinson  
P.O. Box 1677  
Oklahoma City, Oklahoma 73101-1677

**RE: 5-Year Mechanical Integrity Test (MIT) Report - 2022  
Mid-Way Environmental Services, Inc.  
Class I Non-Hazardous Injection Well  
Davenport, Oklahoma  
Permit Number IW-NH-41001-OP**

Dear Ms. Young:

Enclosed for your review and files are the results of the permit required 5-Year Mechanical Integrity Test (MIT) recently conducted at the above referenced facility. This report is being submitted in accordance with the facility's Class I Non-hazardous Injection Well Operating Permit. Weatherford Wireline Services conducted the MIT on November 14, 2023.

The results of the MIT show no movement of water within the tubing annulus or outside of the well casing, especially in the areas of the confining layer and surface casing seat.

If you have any questions on the attached MIT Report, or if you require any additional information, please do not hesitate to contact me.

Sincerely,  
A&M Engineering and Environmental Services, Inc.

Orphius Mohammad, PhD, P.E.  
Senior Environmental Engineer

Enclosure: 5-Year Mechanical Integrity Test Report

Cc: Mr. John Mitsdarfer, DEQ  
Ms. Brigitte Haley, DEQ  
Mr. Tolga Ertugrul, P.E., President, Mid-Way

**MID-WAY ENVIRONMENTAL SERVICES, INC.**  
**CLASS I NON-HAZARDOUS WASTE INJECTION WELL**  
**MES #1**  
**PERMIT NO. IW-NH-41001-OP**

**5-YEAR MECHANICAL INTEGRITY TEST REPORT**



**PREPARED FOR:**  
**MID-WAY ENVIRONMENTAL SERVICES, INC.**  
**120 NORTH 8<sup>TH</sup> AVENUE**  
**STROUD, OKLAHOMA 74079**

**APRIL 2023**

**PREPARED BY:**  
**A & M ENGINEERING AND ENVIRONMENTAL SERVICES, INC.**  
**10010 EAST 16TH STREET**  
**TULSA, OKLAHOMA 74128-4813**  
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**A & M Engineering and  
Environmental Services, Inc.**  
Consulting - Design - Construction - Remediation

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## **5-YEAR MECHANICAL INTEGRITY TEST (MIT) REPORT**

**MID-WAY ENVIRONMENTAL SERVICES, INC.**  
CLASS I NON-HAZARDOUS INJECTION WELL  
DAVENPORT, OKLAHOMA  
PERMIT NO. IW-NH-41001-OP

### **1.0 INTRODUCTION**

Mid-Way Environmental Services, Inc. (Mid-Way) conducted the required 5-Year Mechanical Integrity Test (MIT) for its Class I, Non-Hazardous Injection Well (MES-1) in Davenport, Oklahoma on November 14, 2022. The MIT was implemented in accordance with the permit requirements, Oklahoma Department of Environmental Quality (DEQ) regulations governing non-hazardous injection wells and the 5-Year MIT Plan dated October 2022.

The injection well is operated under permit number IW-NH-41001-OP and was originally issued on August 11, 2014. The well began operations in January 2015 and has since been in operation without any incidents or major problems.

### **2.0 WELL CONSTRUCTION**

The Mid-Way injection well was drilled to a total depth of 7,040 feet and was completed as open hole in the Arbuckle Group (injection zone). The Woodford Shale is the primary confining zone at a depth of 4,413-4,445 feet. Other shales stratigraphically located both below and above the Woodford provide additional confinement.

The well is cased with an 8 5/8" diameter long string to 5,173 feet and with a 13 3/8" surface casing to 350 feet. Both surface and long string casings were cemented by circulating cement to the surface. The well is completed with a 4 1/2" J-55 internally coated tubing and D&L Tools ASI-X retrievable packer set at a depth of 5,054 feet.

In February 2017, and at the direction of the Oklahoma Department of Environmental Quality (DEQ), a cement plug was installed in the bottom of the injection well. It has recently been



verified that the top of the cement plug (with fill material on top of cement plug) is at a depth of 6,035 feet below ground surface and extends to the total depth of the well. The plug effectively isolates the bottom 100 feet of the Arbuckle Formation and the underlying granite wash and granite bedrock. **Figure 1** shows a cross section of the subsurface construction of the injection well.

### **3.0 MIT METHOD**

An Oxygen Activation Log (OAL) was utilized to demonstrate the mechanical integrity of MES-1. Weatherford provided logging services with their Water Flow Log. The Water Flow Log is a station logging tool where specific stations in the well are selected for logging. When the logging tool is on station, a burst of neutrons generated by the tool are emitted. These neutrons are of the appropriate speed and intensity to create an oxygen isotope in any water that is encountered. The radioactive oxygen has a very short half-life. Three gamma ray detectors above the neutron source are then utilized to measure the passage of the radioactive oxygen, if there is any upward water flow outside the well casing or in the tubing casing annulus. The two lowest gamma ray detectors are only six inches apart so that they can detect very low velocity water movement. Because of their proximity to the neutron source, the two lower detectors will show an increased counting rate when the source is activated. If there is no flow past the detectors, the counting rate will rapidly die out to the natural background count. If there is flow behind the casing, the detector records the passage of the oxygen isotopes. This data is used to calculate the velocity of water flow behind the casing. The upper most gamma ray detector is used for obtaining a correlation gamma ray log; therefore, it is more sensitive than the lower detectors. This detector will only show the effects of very high-water velocity behind the casing.

### **4.0 MIT IMPLEMENTATION**

A correlation check and background log was performed to locate casing and packer depths. Following the guidelines of 40 CFR 146, four stations were selected for testing. During the testing at each station an injection rate of approximately 235 gallons per minute was maintained. The stations selected were: at 5,044.5 feet below ground surface (bgs), which is 9 feet above the packer; at 4,541.5 feet bgs, which is at upper part of the Sylvan Shale; at 4,419.7 feet bgs, which

is near the top of the Woodford Shale; and at 351.3 feet bgs, which is at the surface casing seat. The Weatherford log of the total procedure is provided in **Appendix A**.

Logging began at the highest station and proceeded down the hole to the other stations. The logging procedure requires that the tool be positioned at the desired station. The neutron generating device is then triggered (pulsed) for a short period of time and then is off during a short recording period. This is typically repeated for 6 to 16 cycles at each station and the gamma ray counters are actively recording for the entire series of cycles. The actual pulse/record period can be varied to aid in identifying different water velocities. **Table 1** presents the typical pulse and record periods associated with various number of cycles.

<b>Water Flow Log Timing</b>	<b>Pulse Period (in sec)</b>	<b>Recording Period (in sec)</b>	<b>Number of Cycles</b>
Fast	5	45	16
Normal	12	108	10
Slow	15	120	6

During the Mid-Way MIT procedure, all three water flow regimes (fast, normal and slow) were evaluated at each station. The logging stations are noted on **Figure 1**. The tool's configuration is provided as a figure in the Weatherford log in **Appendix A**. The tool was configured to detect up flow behind the tubing, casing, cement, or in the formation.

#### **4.1 STATION AT 5,044.5 FEET**

The lowest station was established at a depth of 5,044.5 feet bgs, which is approximately nine feet above the retrievable packer. This location was selected for logging to determine if there is any water movement or leakage past the packer. Review of the normalized count rate graphs for all the water velocity modes show no apparent water flow.

## **4.2 STATION AT 4,541.5 FEET**

The next Station was established at 4,541 feet bgs which is near the upper part of the Sylvan Shale. The Sylvan Shale lies below the primary confining layer (the Woodford Shale) and represents another thick shale sequence that potentially acts as a confining layer. This location was selected for logging in an effort to determine if there was any vertical movement of water within this area. However, because the Sylvan lies immediately below the Hunton Formation (a developed gas producing zone in the area) potential formation water movement in the upper part of the Sylvan Shale associated with gas production was considered to be a possibility.

At this Station, 16 cycles of pulse and pause in the fast mode were made; 10 cycles in the normal mode; and 6 cycles in the slow mode. Review of the normalized count rate graphs for all the water velocity modes show no apparent water flow.

## **4.3 STATION AT 4,419.7 FEET**

The next station was established at 4,419.7 feet bgs which is near to top of the Woodford Shale, the primary confining layer. At this Station, 16 cycles of pulse and pause in the fast mode were made; 12 cycles in the normal mode; and 6 cycles in the slow mode. Review of the normalized count rate graphs show the pulse from the neutron generator but they show no sustained elevated counting rate. When considering the results from all three modes of water velocity at this station, it is concluded that there is no vertical movement of water in the area of the primary confining layer.

## **4.4 STATION AT 351.3 FEET**

The final station was established at 351.3 feet bgs which is at the surface casing seat in the Vanoss Group. The surface casing is set at a minimum of 100 feet below the uppermost source of drinking water at the site. This station was selected to test the sealing effectiveness of the surface casing. 16 cycles of pulse and pause were made at this station for the fast mode of water velocity; 10 cycles for the normal mode; and 6 cycles for the slow mode. Review of the normalized count rate graphs show the pulse from the neutron generator but they show no sustained elevated counting rate. When considering the results from all three modes of water



velocity at this station, it is concluded that there is no vertical movement of water in the area of the surface casing seat.

## **5.0 ANNULUS TESTING**

The 5-Year MIT Plan anticipated completing an annulus test after completion of the Oxygen Activation Log. However, upon completion of the logging and after the tool was removed from the well and the well head replaced, it was observed that the facility ran out of nitrogen. Also because of injection during MIT, the system was required to be stabilized as well prior annulus test. So, the annulus test was performed at a later date (December 2, 2022).

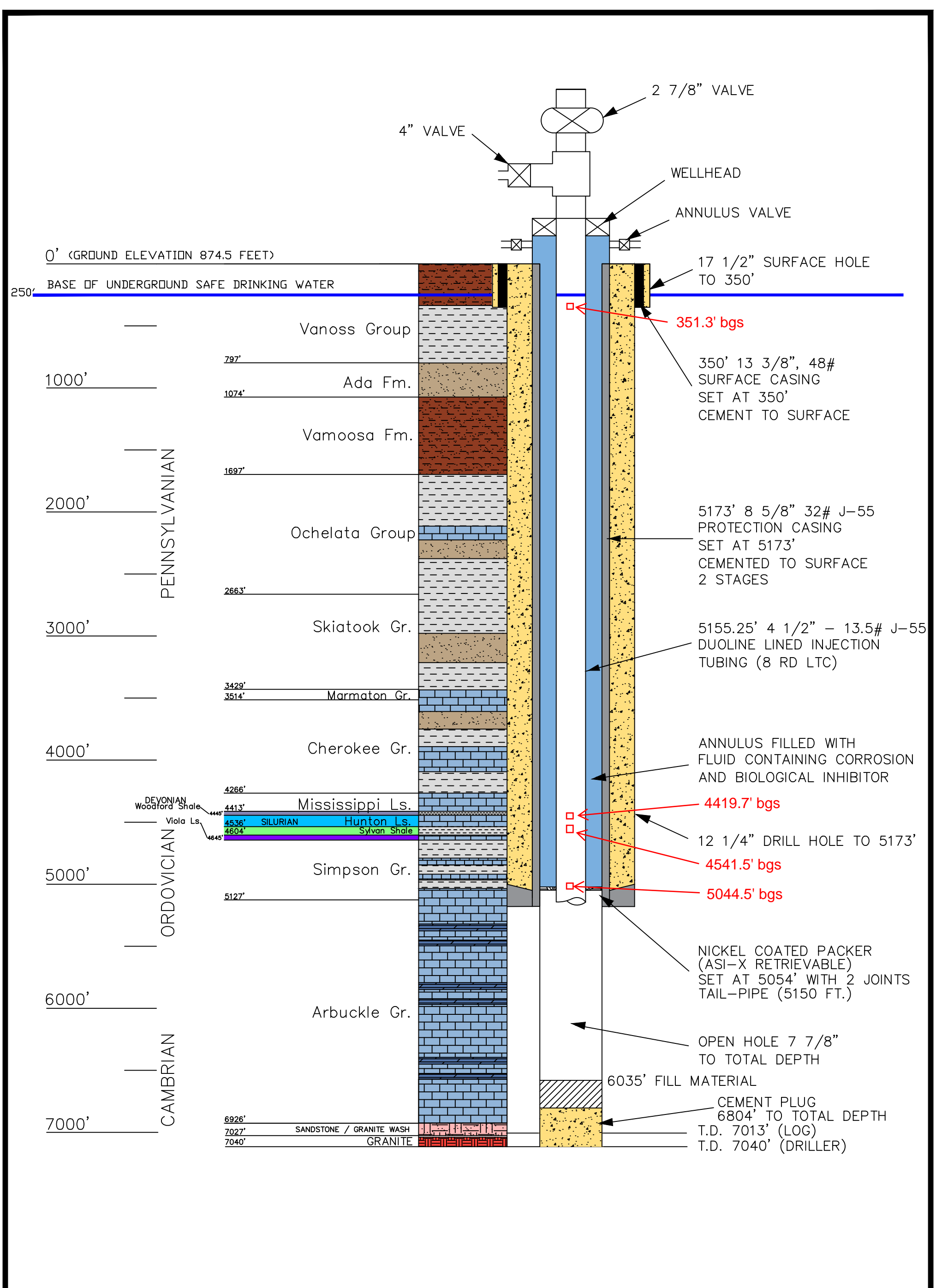
A copy of the facility annulus monitoring data is included in **Appendix B**. Based on the annulus pressure information gathered and knowledge that DEQ had conducted a successful annulus test less than three (3) months prior to conducting the OAL (August 25, 2022), it can be concluded that the annulus and packer are performing appropriately with no apparent leaks.

## **6.0 CONCLUSION**

Based on all the data gathered and reviewed, absence of fluid movement behind the casing and with no leakage observed within the casing validates the mechanical integrity of the Injection Well (MES-1).



## FIGURES



**A & M Engineering and Environmental Services, Inc.**  
Consulting - Design - Construction - Remediation

WELL CONSTRUCTION SCHEMATIC OF  
MID-WAY ENVIRONMENTAL SERVICES, INC.  
INJECTION WELL MES #1

SCALE: AS SHOWN	DATE: 10/29/2021	FIGURE NO. 1
APPROVED BY: TAT	DRAWN BY: TMF	PROJECT NO. 1706-006

**APPENDIX A**  
**Weatherford MIT Report - Water Flow Log**





Weatherford  
2000 St. James Place  
Houston, TX 77056

Mid-Way Environmental Services, Inc.

RE: Midway Environmental Well #1

On November 5<sup>th</sup>, 2022, logging operations were started on the Midway Environmental Number 1 well on behalf of Mid-Way Environmental Services, Inc. by Weatherford International. The purpose of the survey was to detect up flow outside the 7 5/8" casing using the Raptor® pulsed Neutron Logging tool. Oxygen activation was the logging mode used for this operation.

Station measurements were taken at depths of 5044.5, 4541.5, 4419.7 and 351.3 feet. Three radioactive source on/off cycles were used at each station. These were 16 cycles at 5/45 seconds, 10 cycles at 12/108 seconds and 6 cycles at 15/120 seconds. The results of the station measurements were:

351.3' – not indicative of flow  
4,419.7' – not indicative of flow  
4,541.5 – not indicative of flow  
5,044.5 – not indicative of flow

A Gamma Ray, Pressure and Temperature pass was then run from 4,150' to 5,180, with the Gamma Ray providing depth confirmation of the stations.

Bruce Thomas  
US Sales Manager  
Bruce.thomas@weatherford.com

In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to the logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysis may differ. Accordingly any interpretation or recommendation resulting from the services will be at the sole risk of the Company and the Contractor cannot and does not warrant the accuracy, correctness or completeness of any such interpretation or recommendation, which interpretations and recommendations should not, therefore, under any circumstances be relied upon as the sole or main basis for any drilling, completion, well treatment, production or financial decision, or any procedure involving any risk to the safety of any drilling activity, drilling rig or its crew or any other individual. The Company has full responsibility for all decisions concerning the services.

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USA

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[www.weatherford.com](http://www.weatherford.com)



**Weatherford®**

**RAPTOR WATERFLOW LOG**

COMPANY			MID-WAY ENVIRONMENTAL SERVICES									
WELL			MIDWAY ENVIRONMENTAL NUMBER 1									
FIELD			DAVENPORT									
COUNTY			LINCOLN									
STATE			OKLAHOMA									
LOCATION			150' FNL & 933.5' FWL									
SEC	TWP	RGE	Other Services NONE									
Latitude			Permanent Datum GROUND, Elevation 874.5 feet Log Measured From KB, 12.00 feet above Permanent Datum Drilling Measured From KB									
Longitude												
API Number												
									Elevations:		feet	
									KB		886.50	
									DF		886.50	
									GL		874.50	
Date	14-NOV-2022		PERFORATION RECORD									
Run Number	ONE		Shot	Number	Depth From	Depth To						
Service Order	7817-354614169		Density	of Shots	feet	feet						
Type Log	CRE											
Depth Driller	7040.00		feet									
Depth Logger	5710.00		feet									
Top Log Interval	12.00		feet									
Bottom Log Interval	5208.00		feet									
Hole Fluid Type	WATER											
Hole Fluid Level	0.00		feet									
Restriction ID	3.920		inches	Gun Type	xxxxxxxxxxxxxxxxxxxxxx							
Max Recorded Temp	109.00		deg F	Gun Size	xxxxxxxxxxxxxxxxxxxxxx							
Well Head Pressure	435.00		CASING / TUBING RECORD									
Well Head Equipment	GREASE		Size	Weight	Depth From	Depth To						
Time Well Ready	17:30		inches	pounds/ft	feet	feet						
Time Logger Bottom	19:15		13.325	48.00	0.00	350.00						
Unit	PRECISION		8.625	32.00	0.00	5173.00						
Equipment Name	WSSD		4.500	13.50	0.00	5234.00						
Base	US SPECIALTY											
Recorded By	T. PAWLUK											
Witnessed By	D. OSBORNE											

In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.

BOREHOLE RECORD							Last Edited: 14-NOV-2022 17:49	
Bit Size inches		Depth From feet			Depth To feet			
17.500		0.00			350.00			
12.250		350.00			5173.00			
7.625		5173.00			7040.00			
CASING / TUBING RECORD								
Type	Grade	TypeJoint	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	Nom Thk inches	
SURFACE			13.325	0.00	350.00	48.00	0.346	
PROTECTION	J-55		8.625	0.00	5173.00	32.00	0.352	
TUBING DOULINE	J-55		4.500	0.00	5234.00	13.50	0.290	

## REMARKS

DEPTH CORRECTED TO PACKER AT 5138' ON PRECISION WIRELINE CCL LOG FROM 2020.

INJECTION AT SURFACE: 235GPM AND 435PSI

STATIONS WITH GENERATOR AT 5044.5, 4541.5, 4419.7 AND 351.3' WITH 16 ON/OFF CYCLES OF 5/45 SECONDS, 10CYLES OF 12/108 AND 6 CYCLES OF 15/120.

FAST SHOTS OF 5 SECONDS SHOWED MINIMAL RESPONSE AND WERE VERY STATISTCAL.

NO FLOW EVIDENT AT ANY OF THE STATIONS.

THE LOG AT THE END OVERLAYING THE PRESSURE AND TEMPERATURE RUNNING IN SHUT-IN (SOLID) AND WHILE INJECTING (DOT).

### WELL DIAGRAM

13.32 in Casing: 0.00 ft

8.62 in Casing: 0.00 ft

17.50 in Bit size: 0.00 - 350.00 ft

4.50 in Casing: 0.00 ft

13.32 in Casing shoe: 350.00 ft

12.25 in Bit size: 350.00 - 5173.00 ft

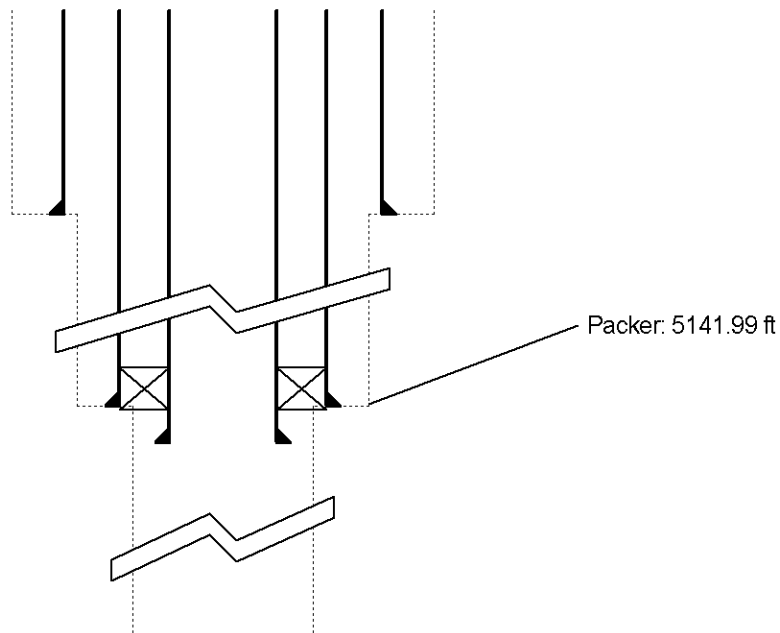
7.63 in Bit size: 5173.00 - 7040.00 ft

8.62 in Casing shoe: 5173.00 ft

4.50 in Casing shoe: 5234.00 ft

Total bit depth: 7040.00 ft

Temperature: 109.00 Degrees F



### DOWNHOLE EQUIPMENT

C:\1 WLS\la&m\Midway 1\Field\351-5-45\_002.dta

Mono-Cablehead

MCH-AA 0 LG: 1.03 ft WT: 2.2 lb OD: 1.457 in

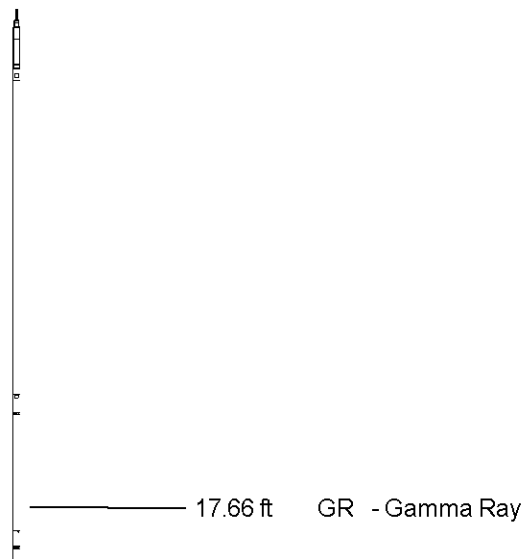
Communication Cartridge 10pin 1-11/16"

WCC-CB 139 LG: 5.97 ft WT: 24.3 lb OD: 1.693 in

Gamma Ray K

UGR-KA 141 LG: 2.34 ft WT: 17.6 lb OD: 1.693 in

Quartz Press. Dual LTR 42mm



Quartz Press, Dual ITB, 43mm  
QPG-EA 106 LG: 2.23 ft WT: 8.8 lb OD: 1.693 in

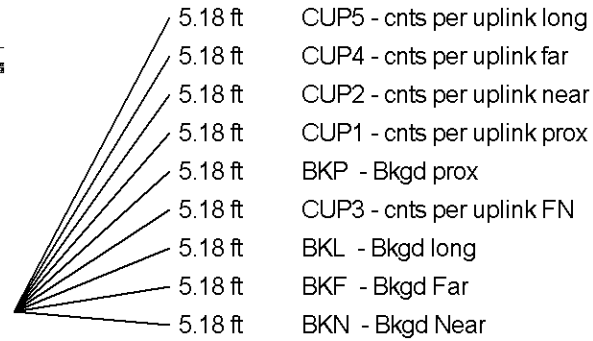
Tool Temperature, 43mm, 177C, 10-pin ITB  
TMP-NA 140 LG: 1.93 ft WT: 8.8 lb OD: 1.693 in

CRE series II processor section  
CRP-BA 139 LG: 3.31 ft WT: 15.4 lb OD: 1.693 in

Casing Reservoir Evaluation Tool Sonde  
CRM-BA 139 LG: 9.19 ft WT: 46.3 lb OD: 1.693 in

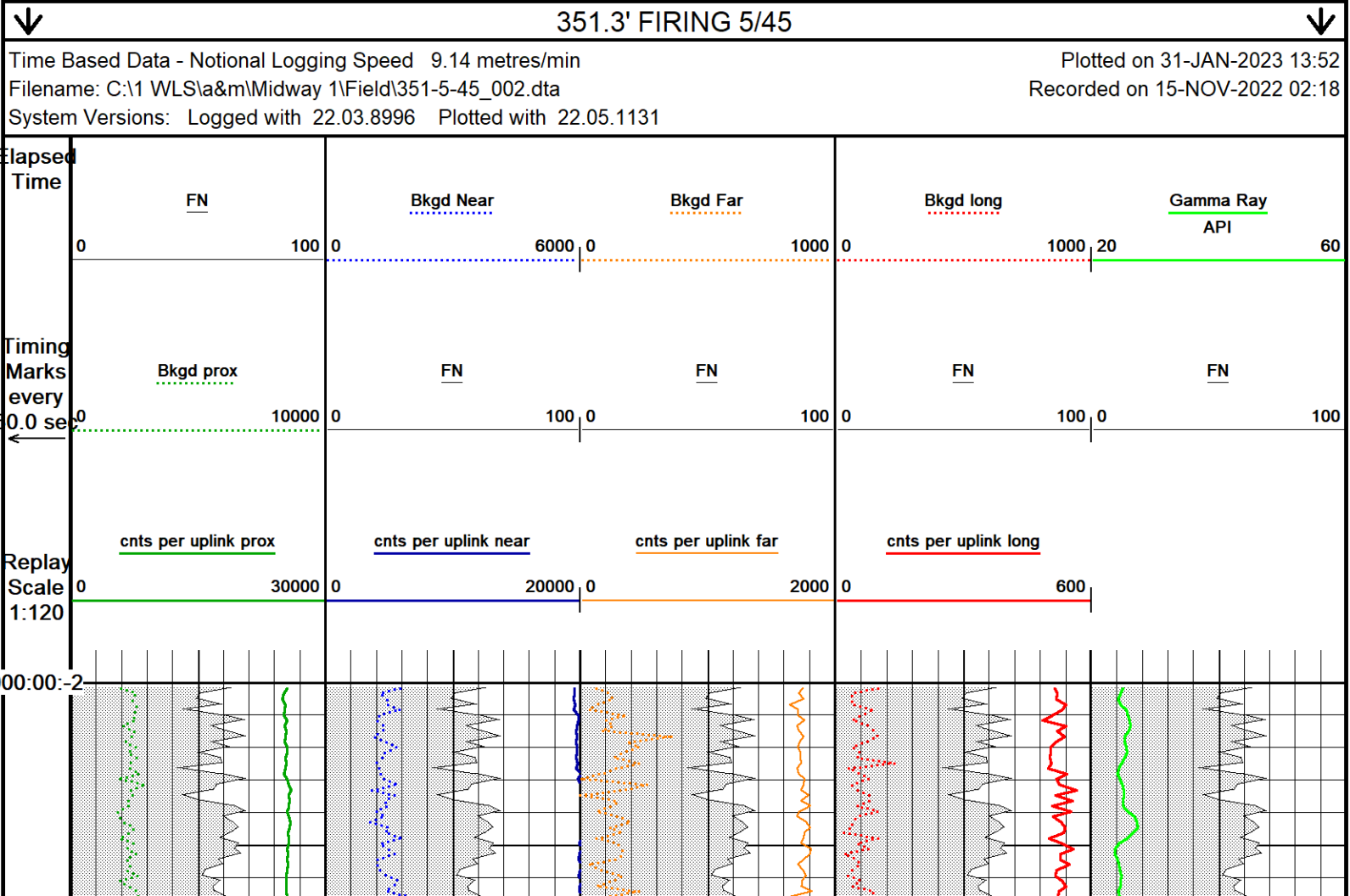
Terminator sub  
TSH-C 0 LG: 0.27 ft WT: 2.2 lb OD: 1.654 in

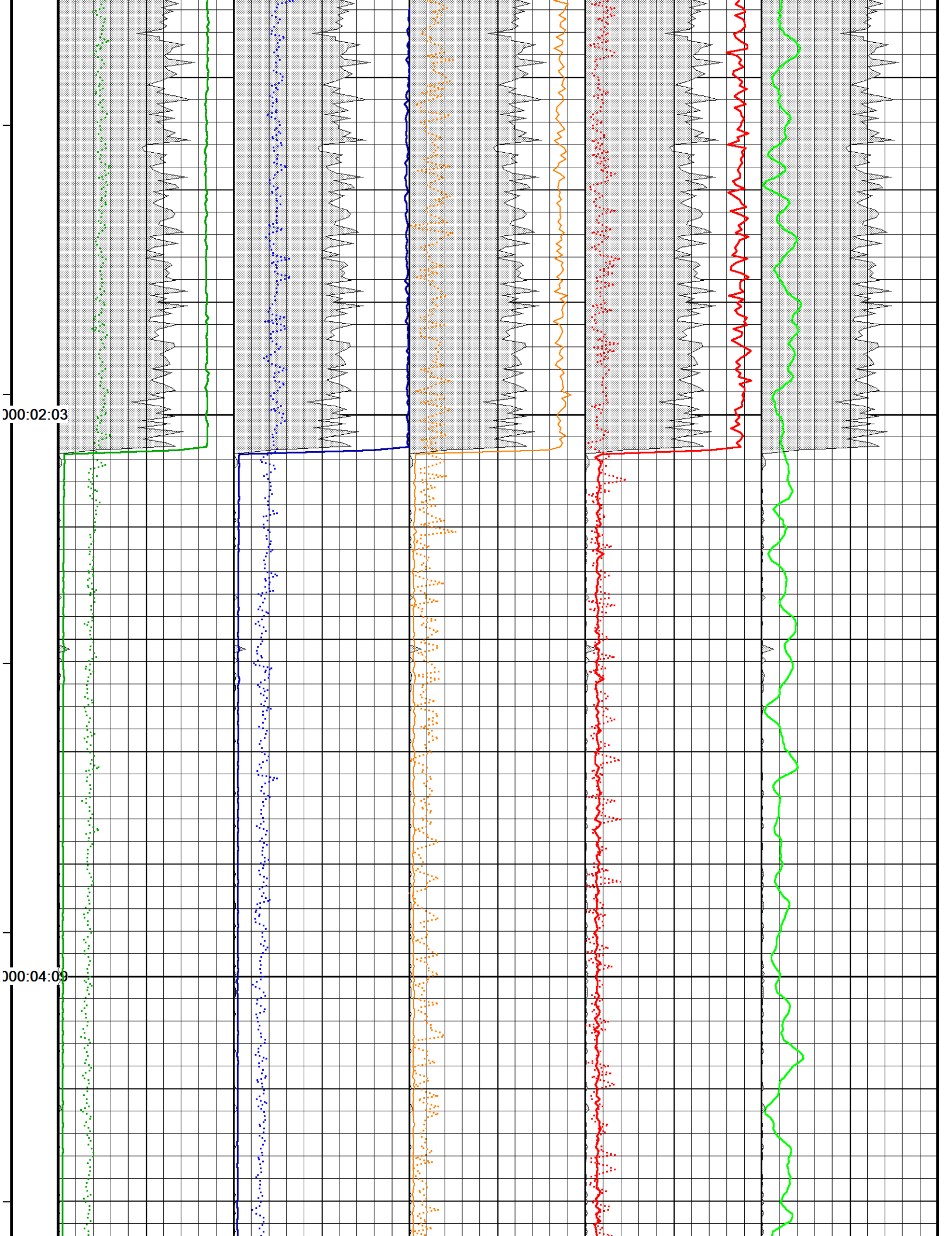
Total Length: 26.26 ft Weight: 125.7 lb

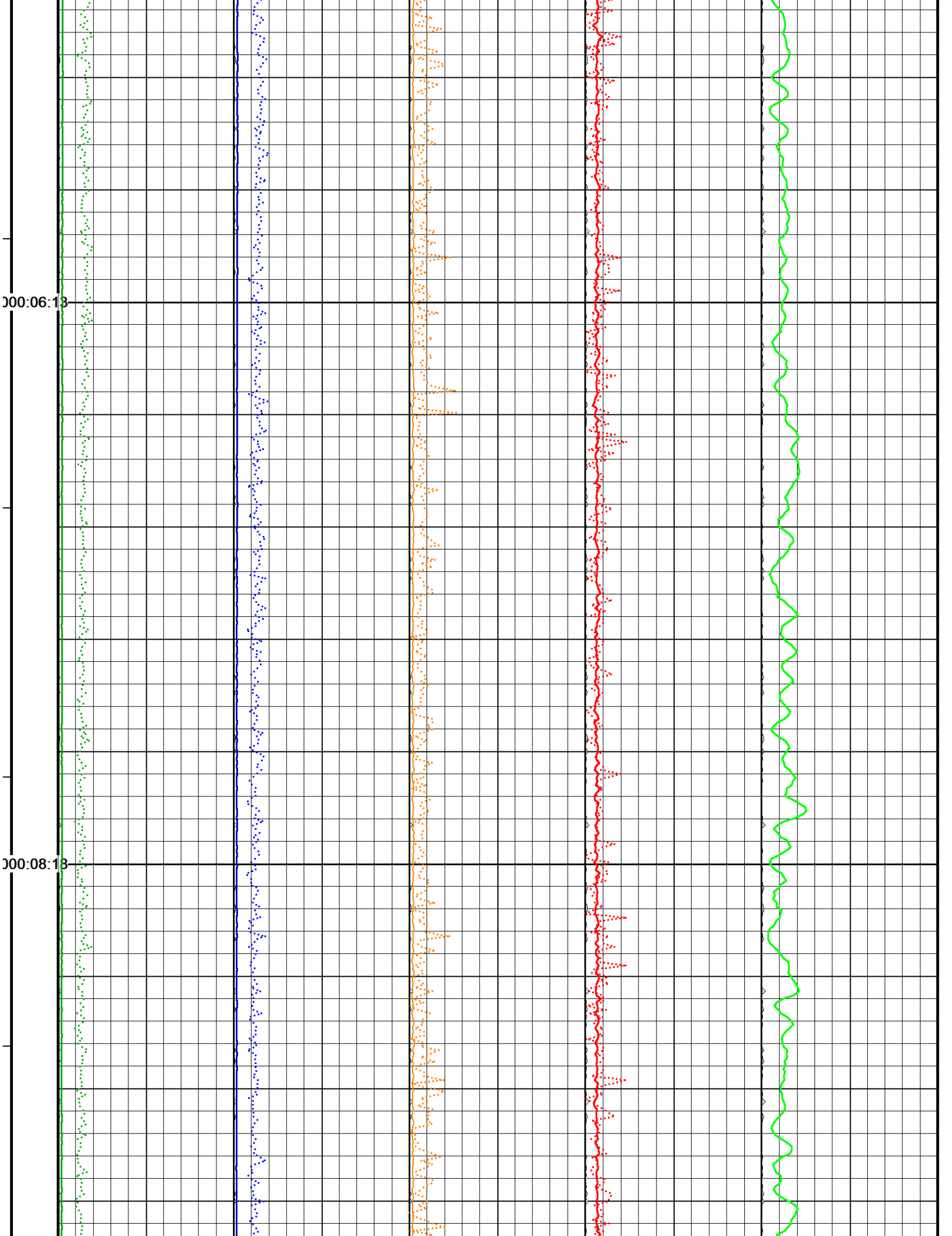


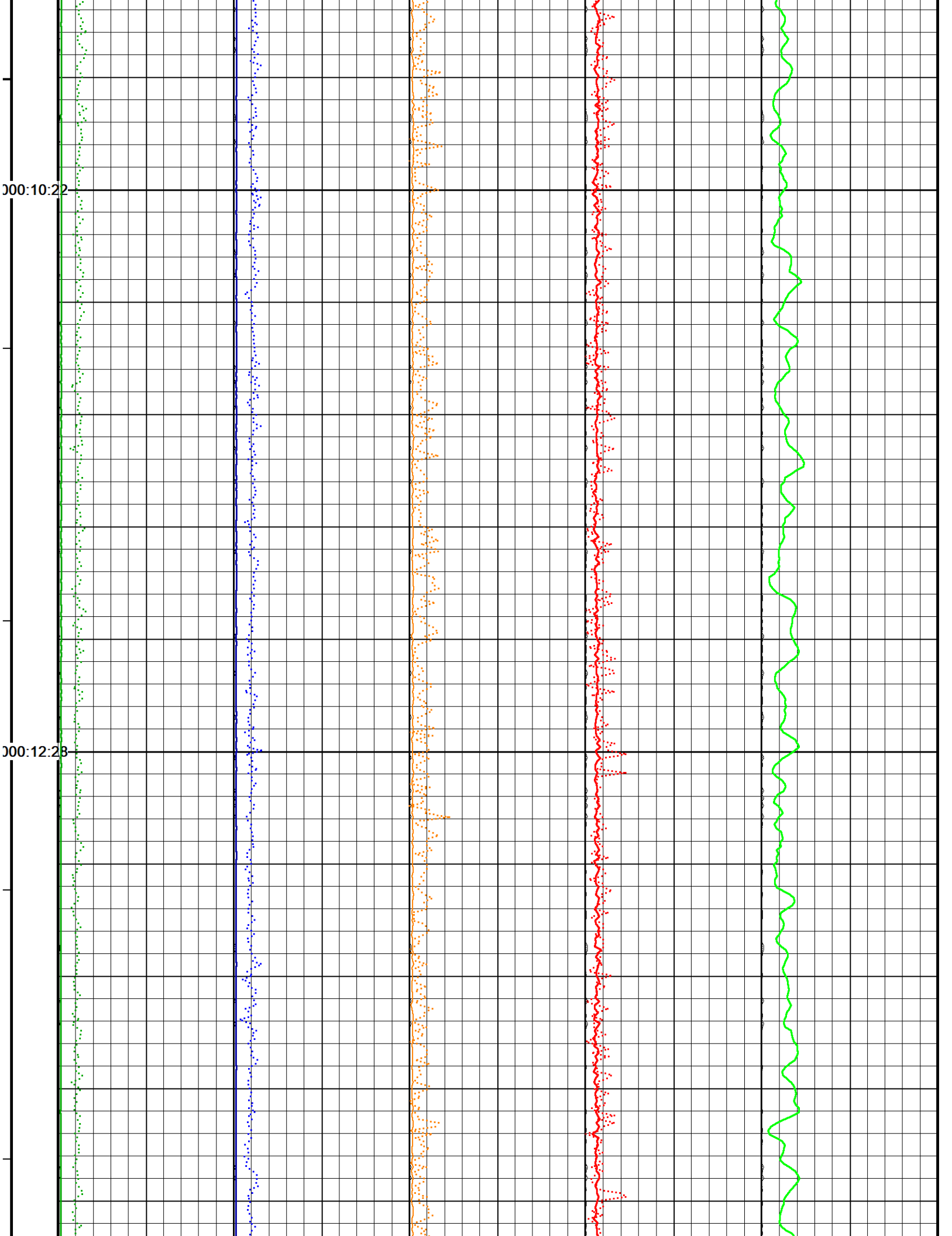
Tool Zero (0.00ft from bottom)

All measurements relative to tool zero.

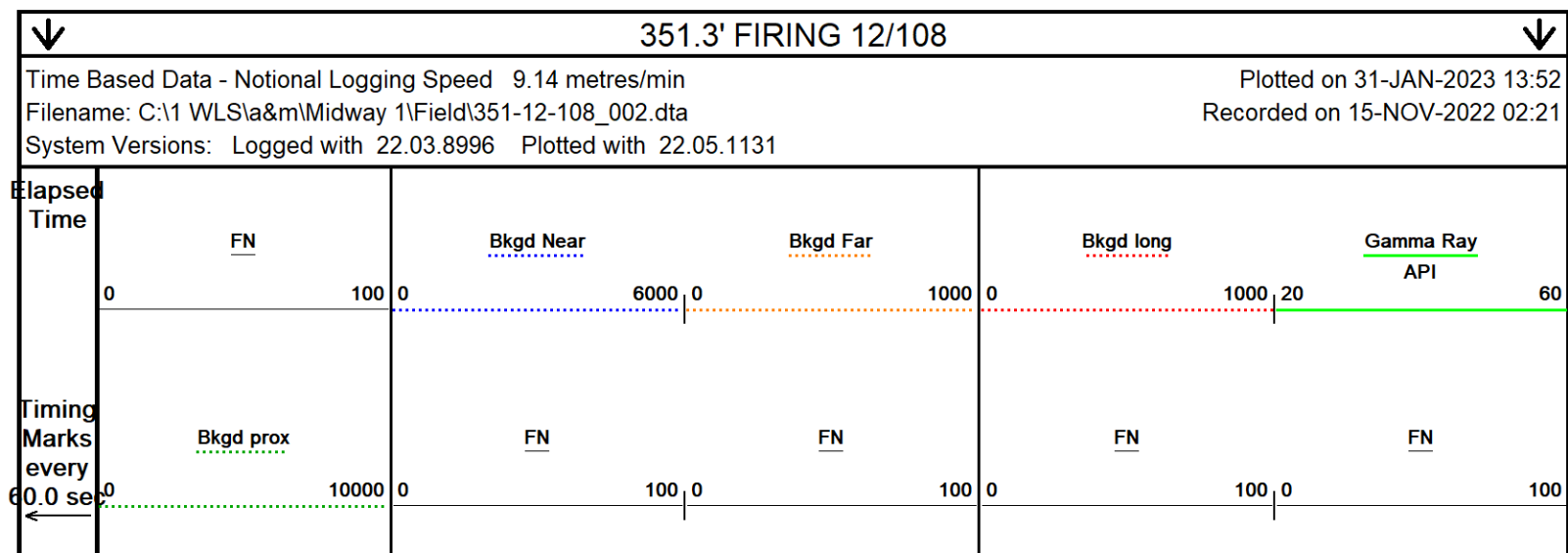
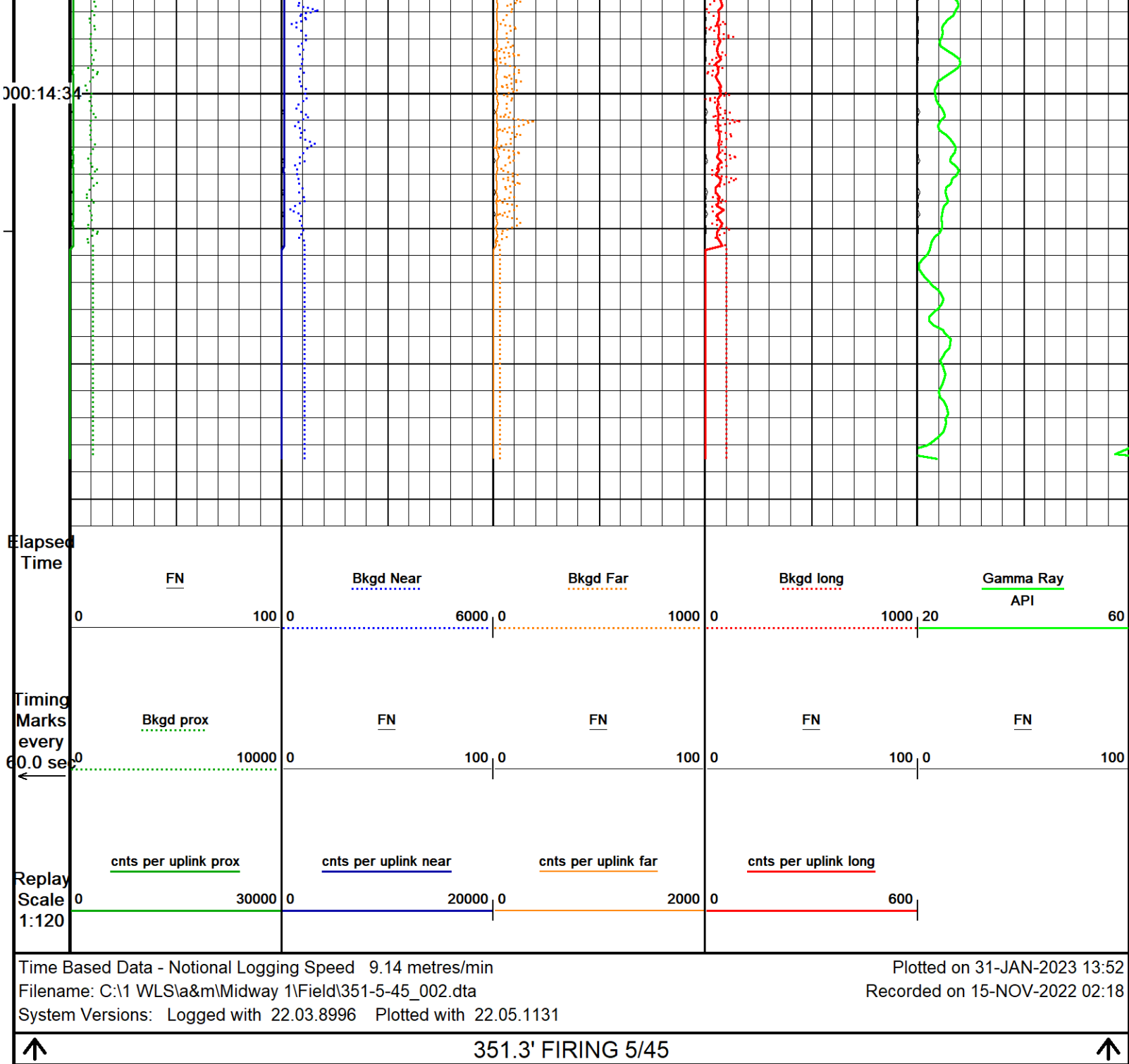




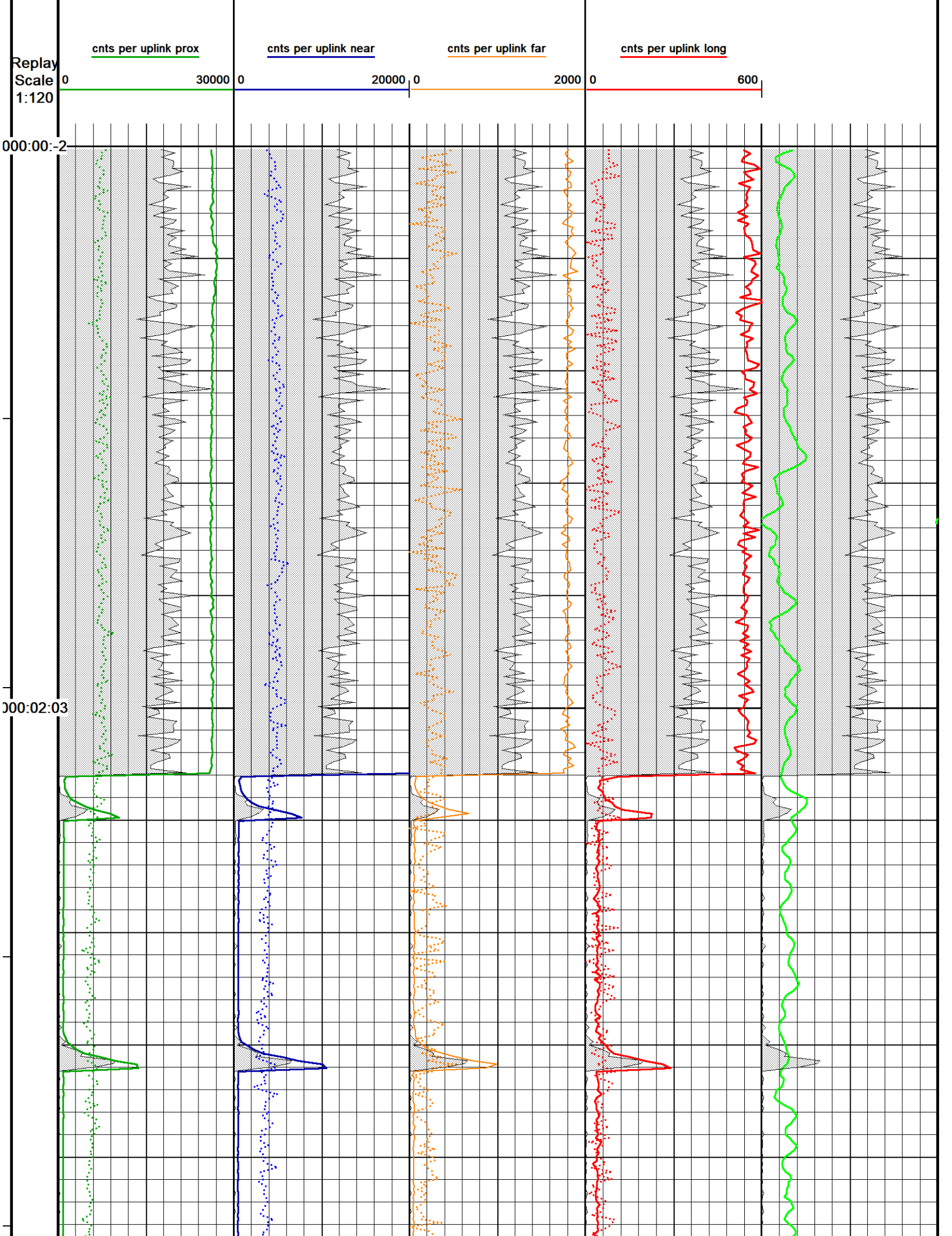


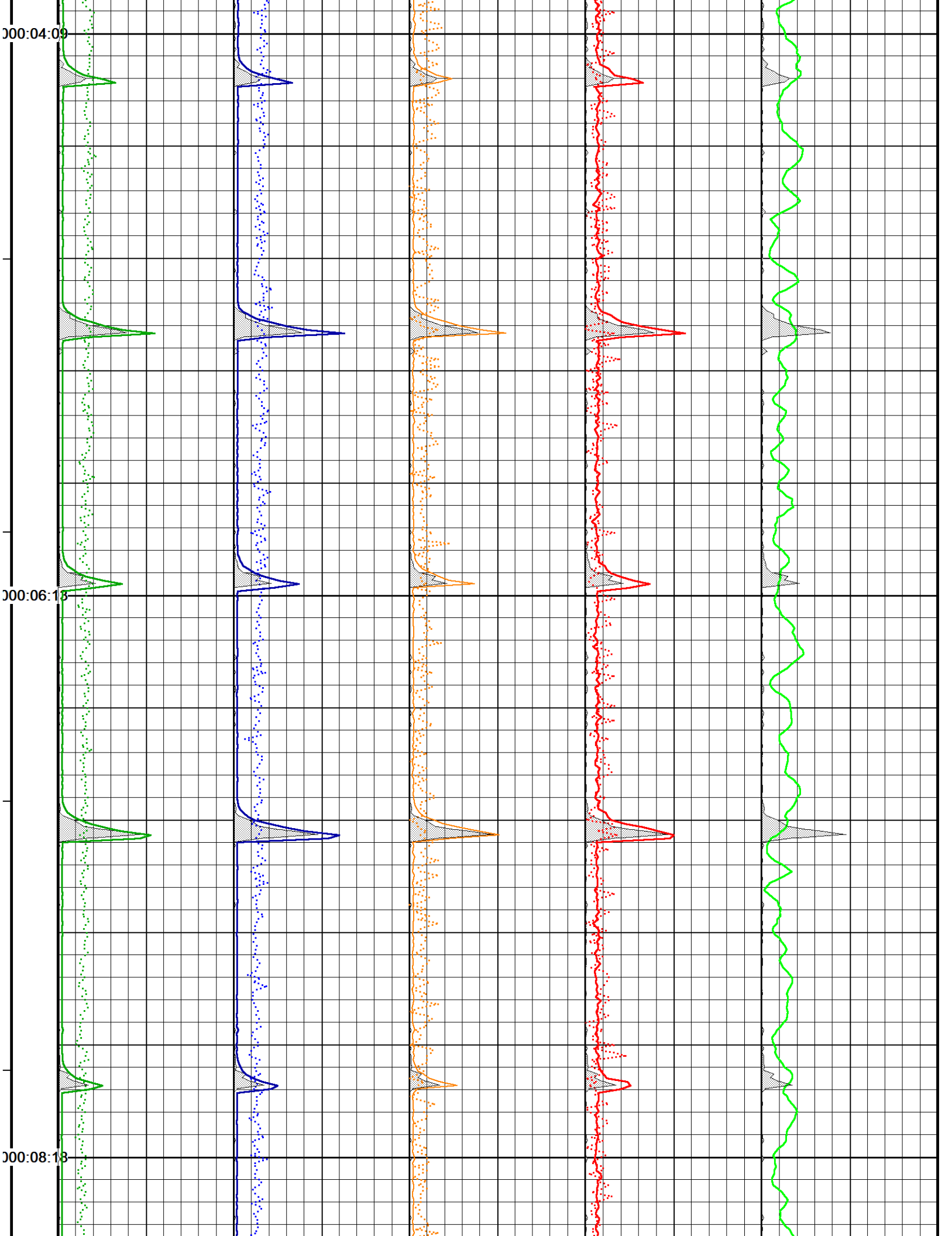


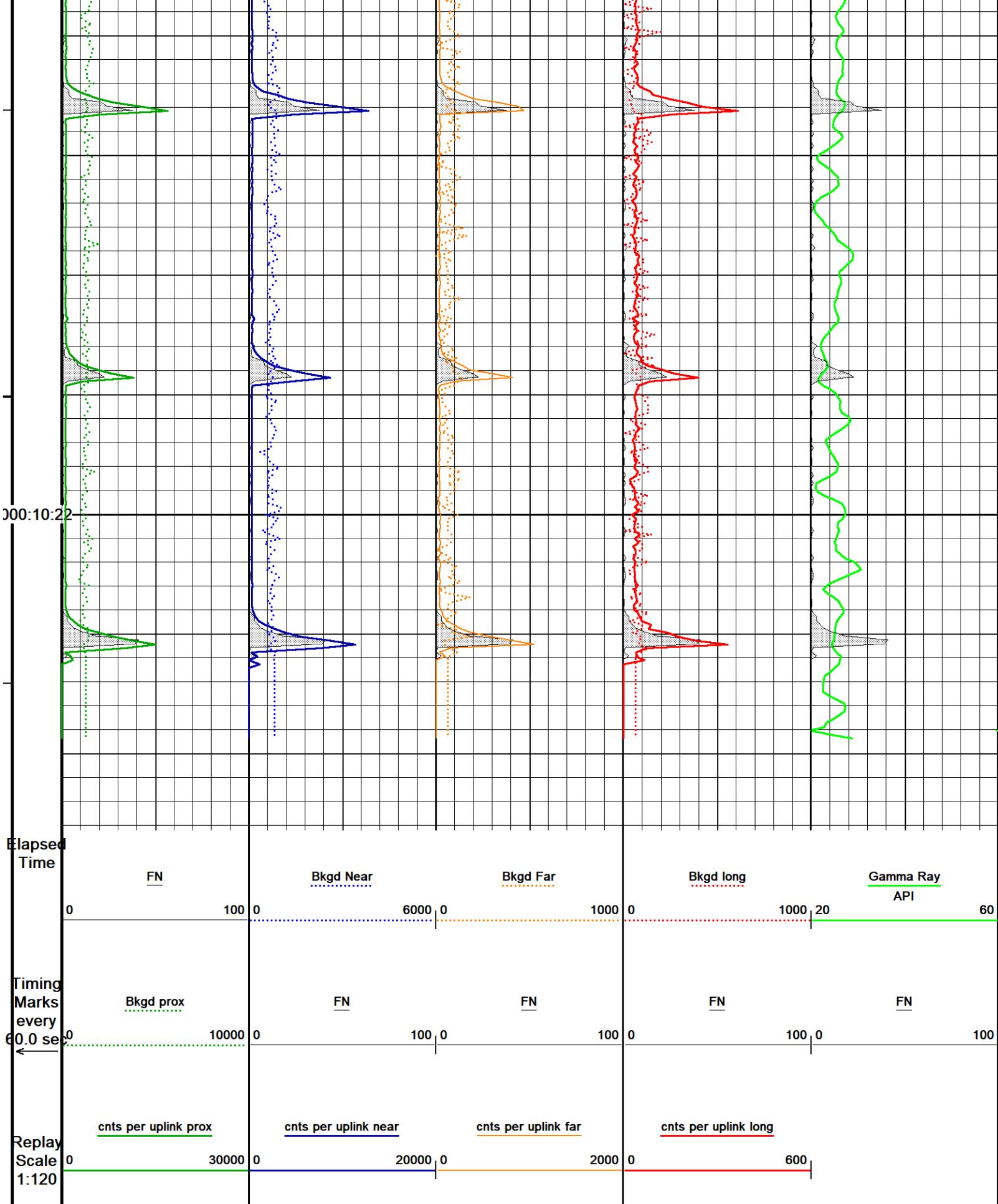


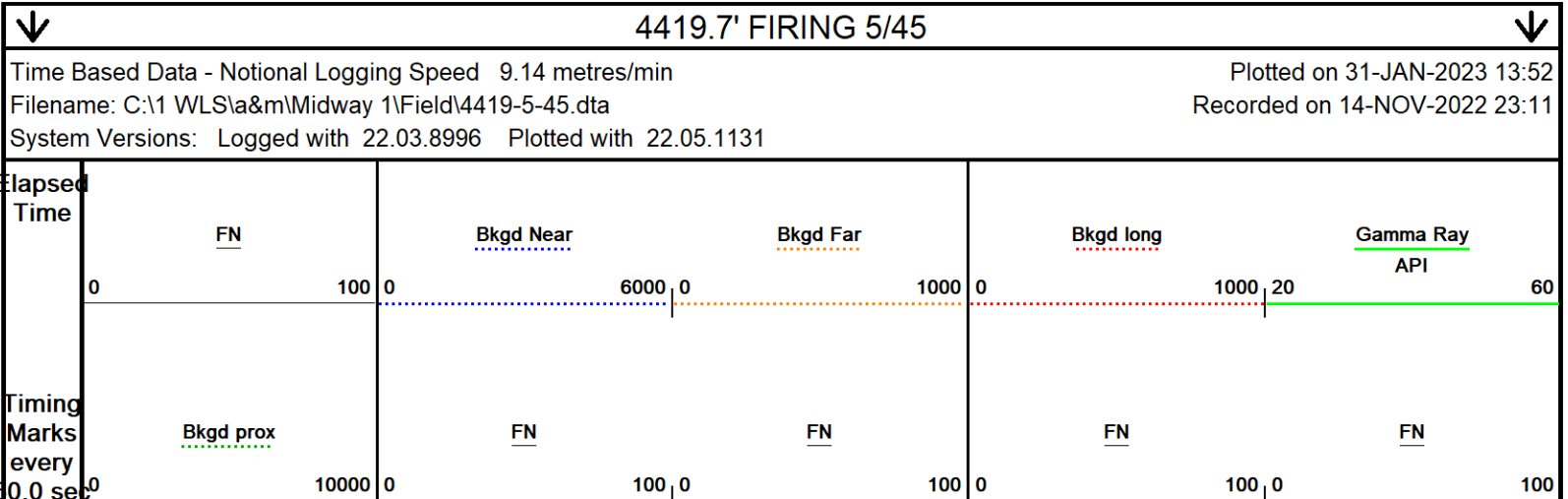
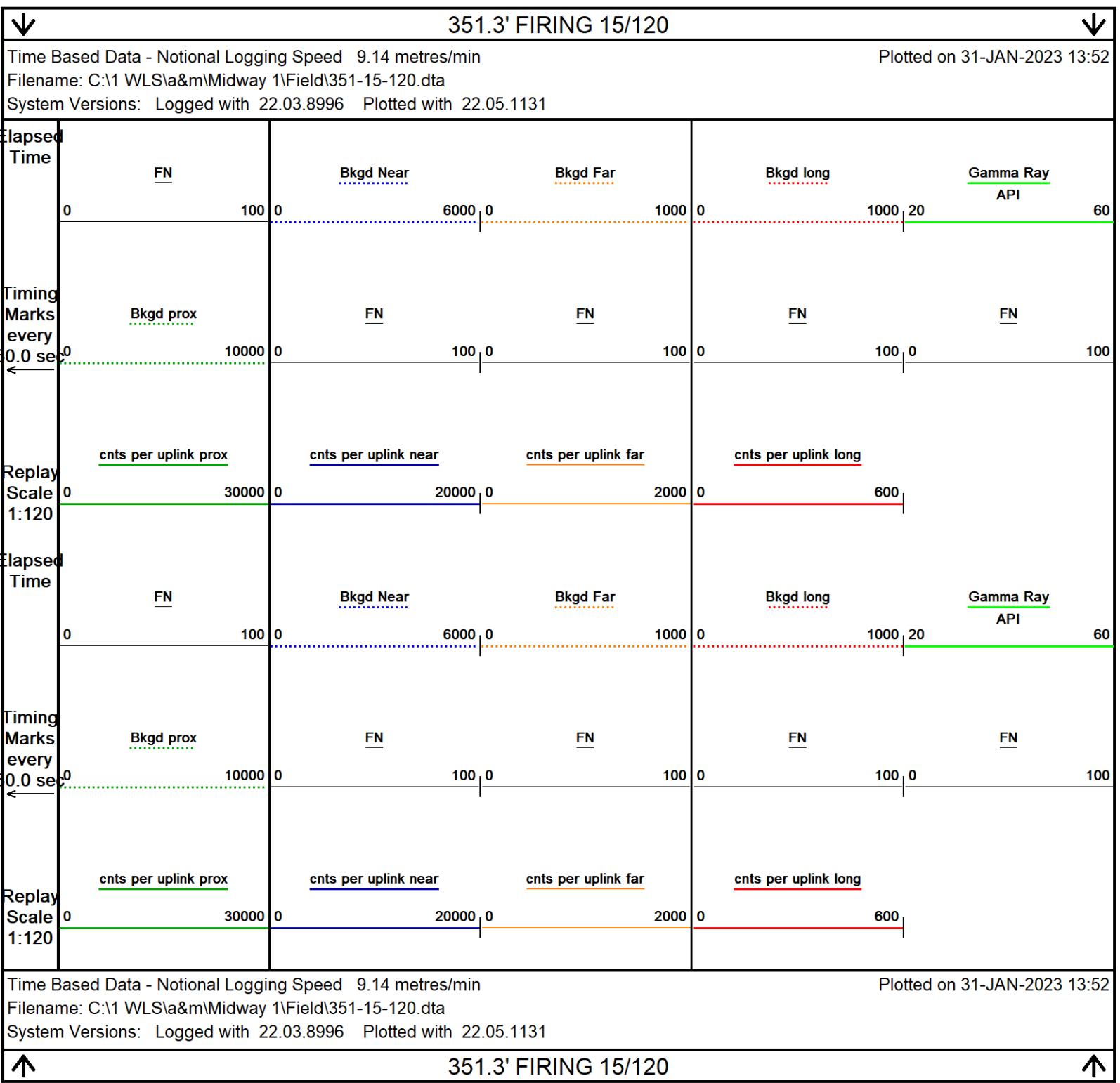




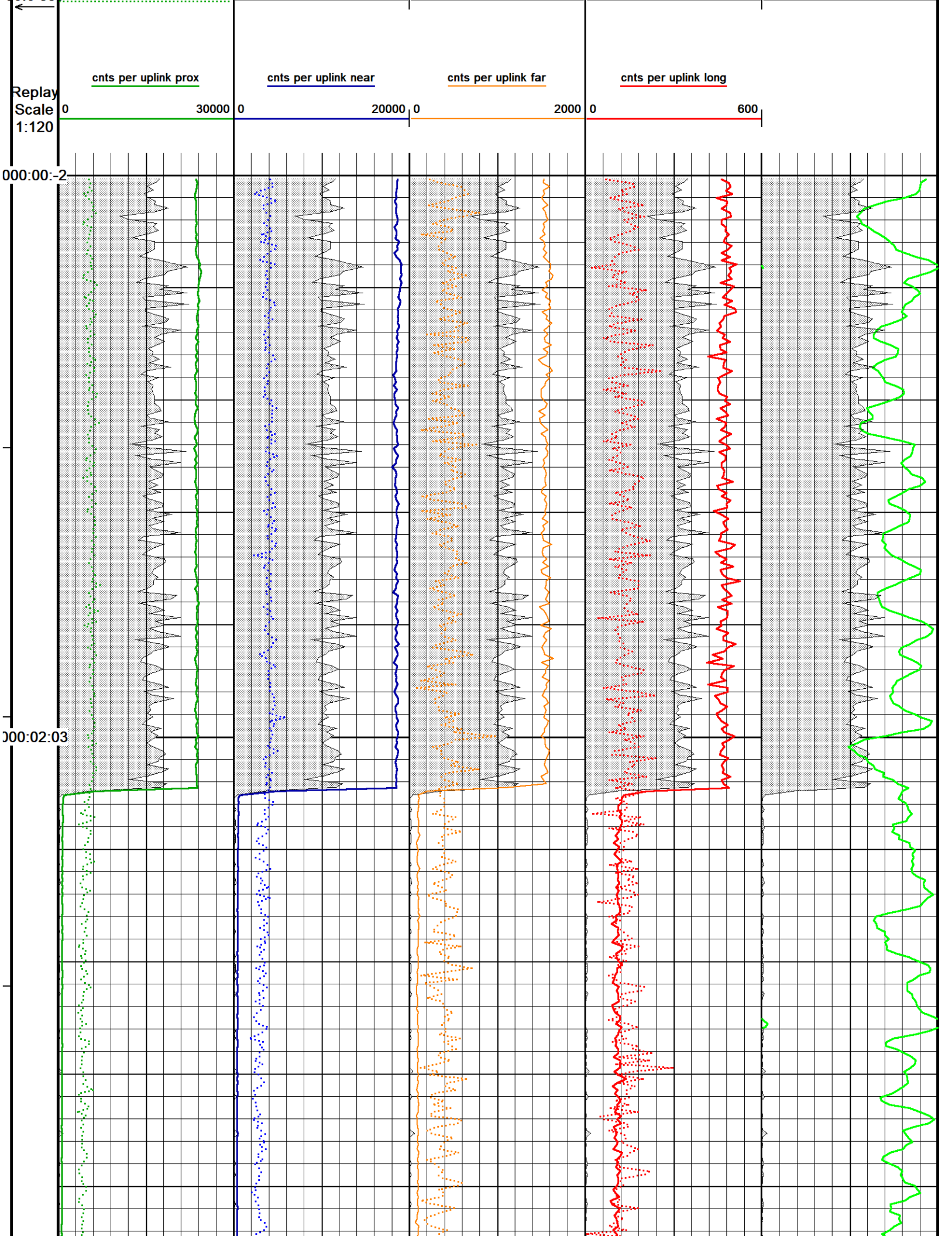


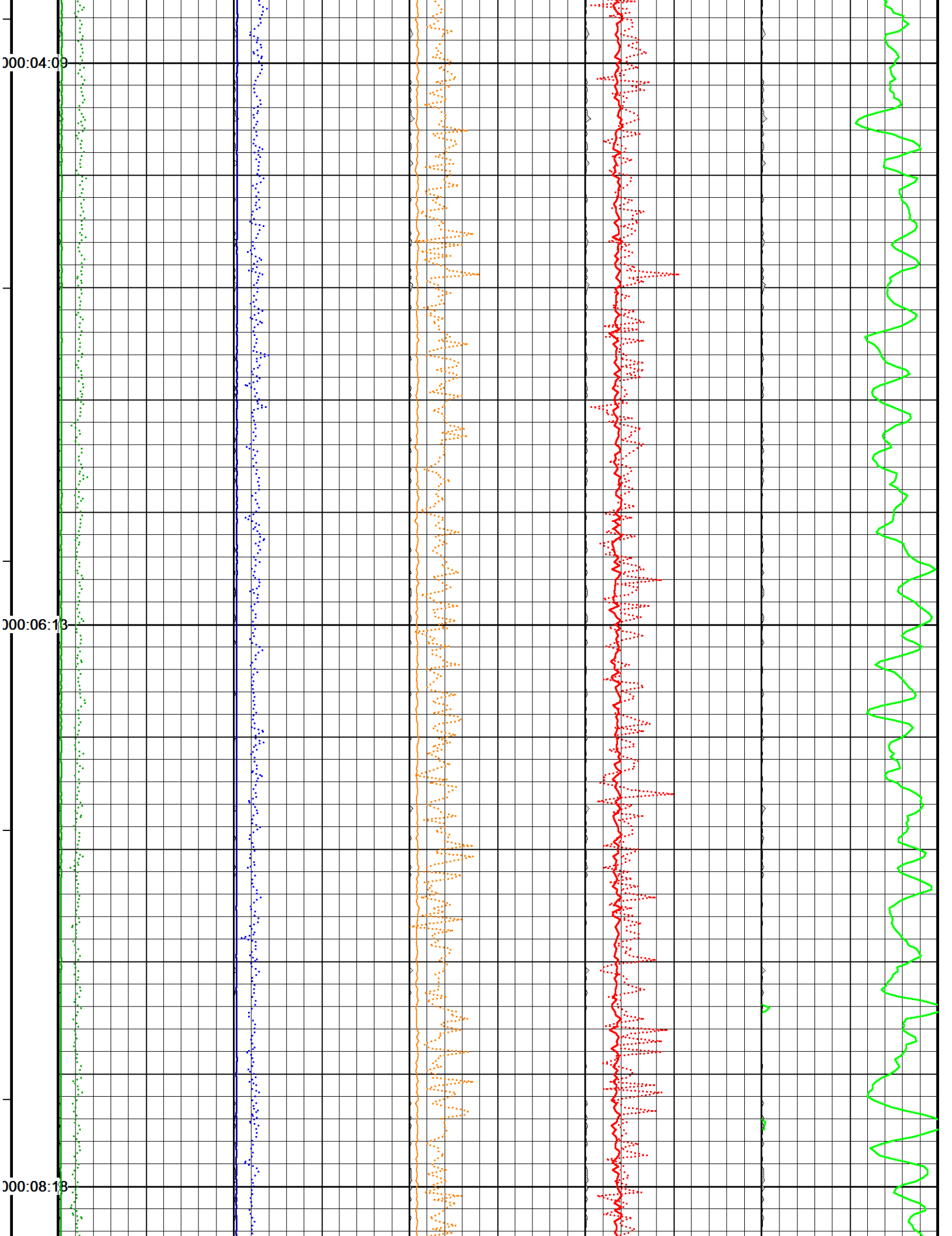


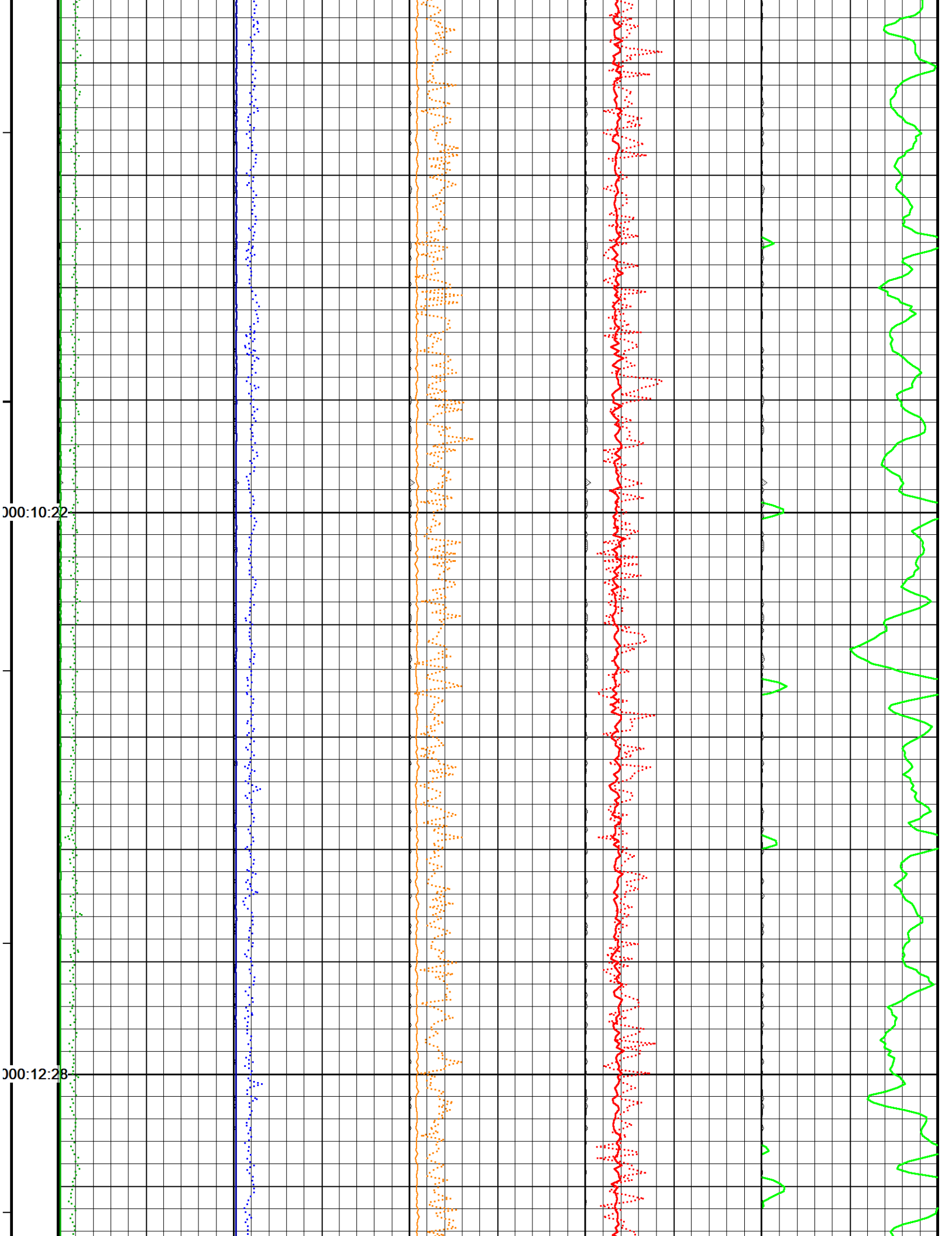


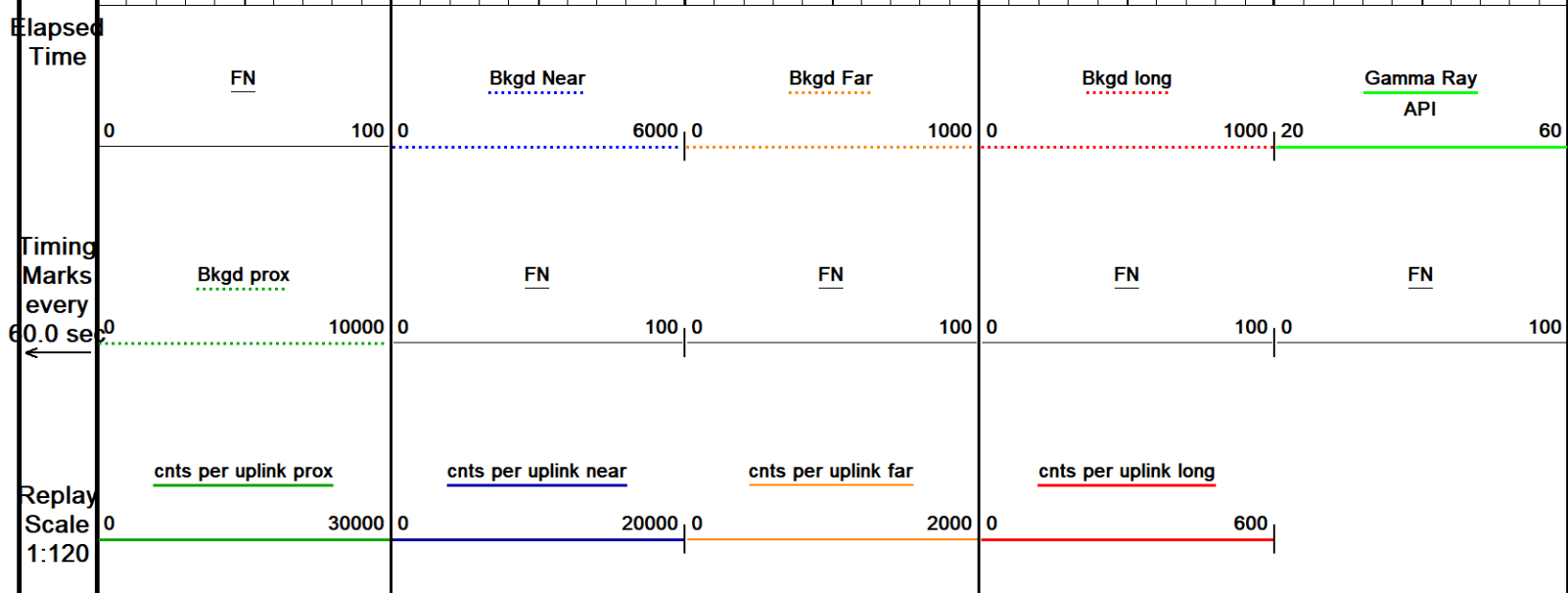
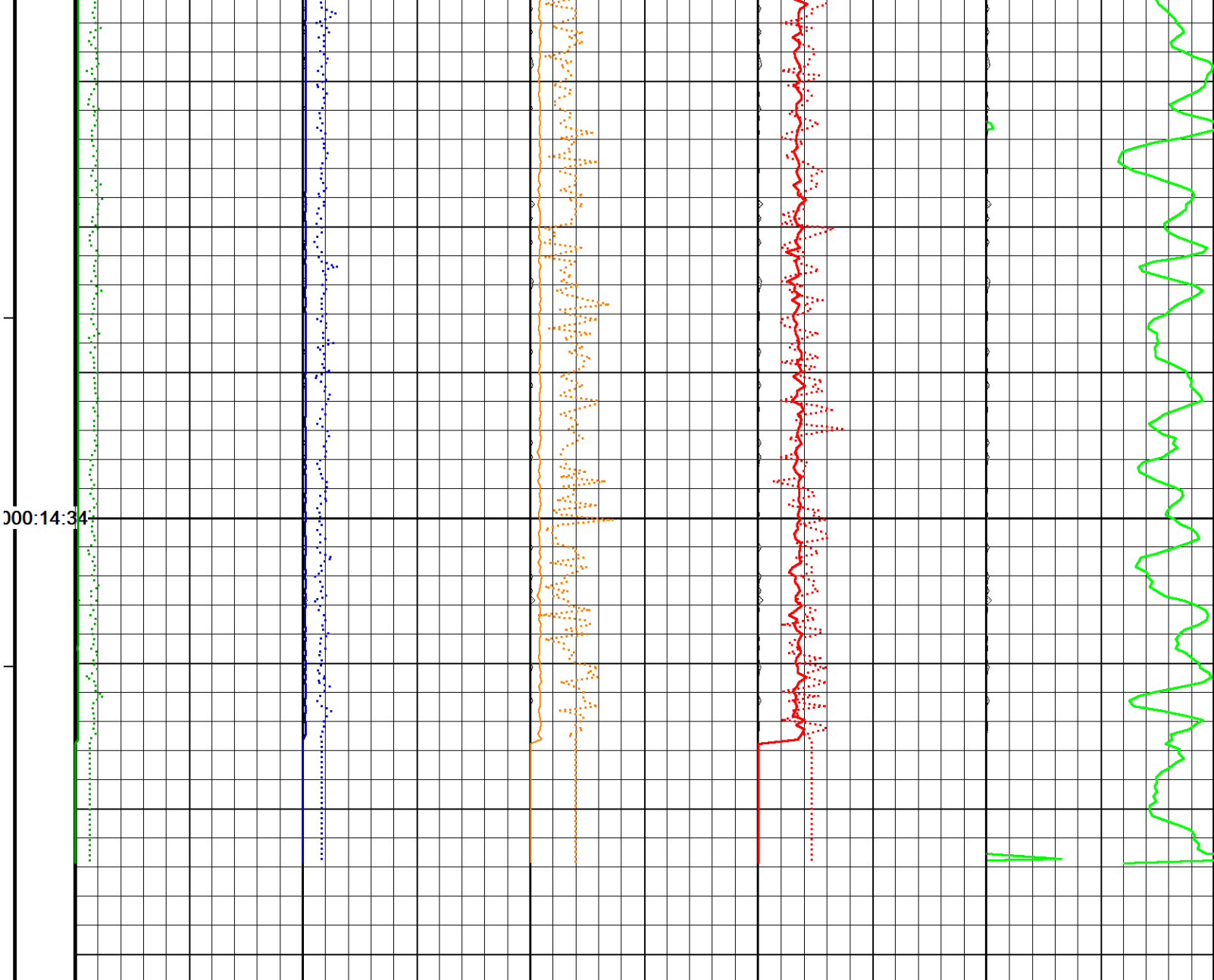








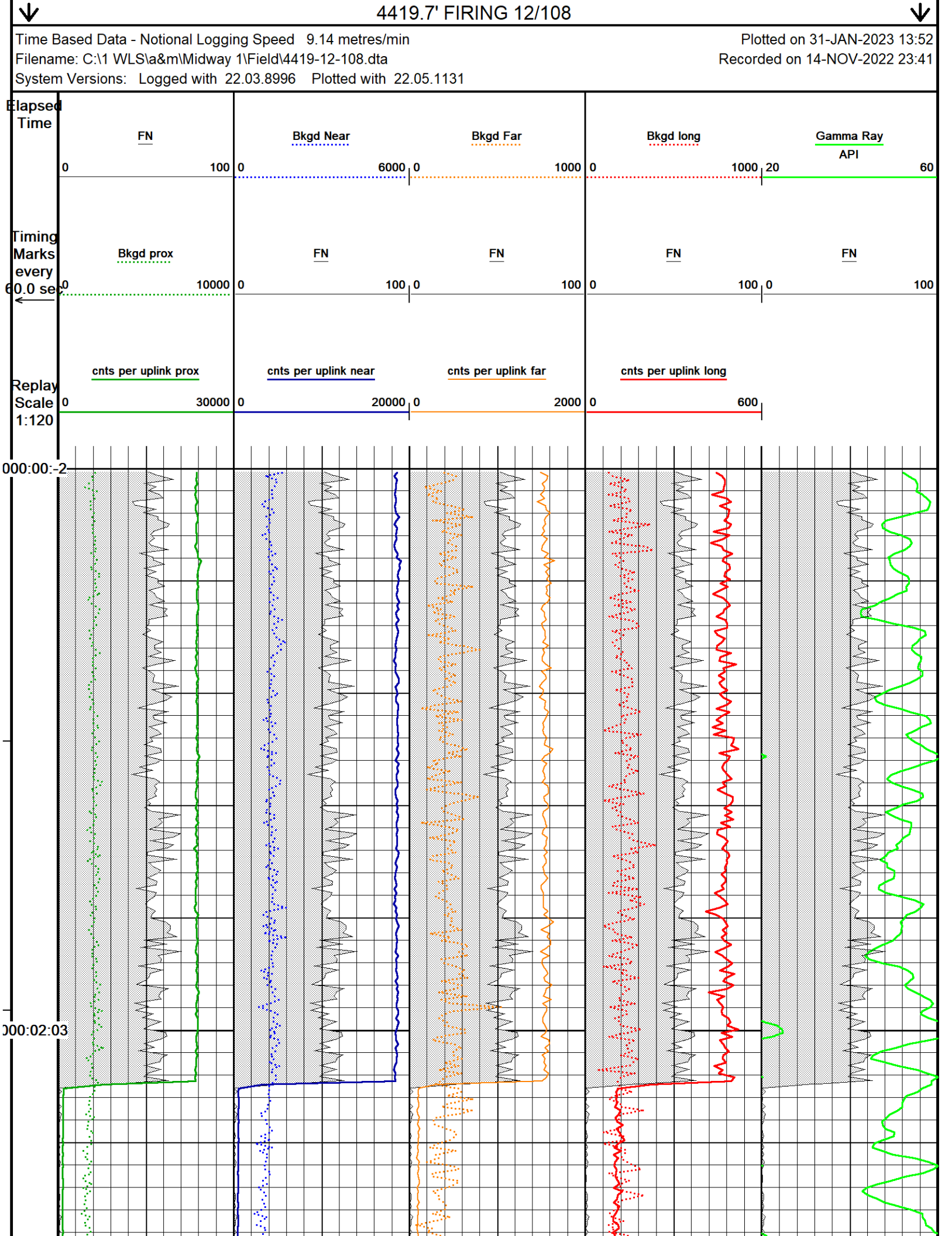


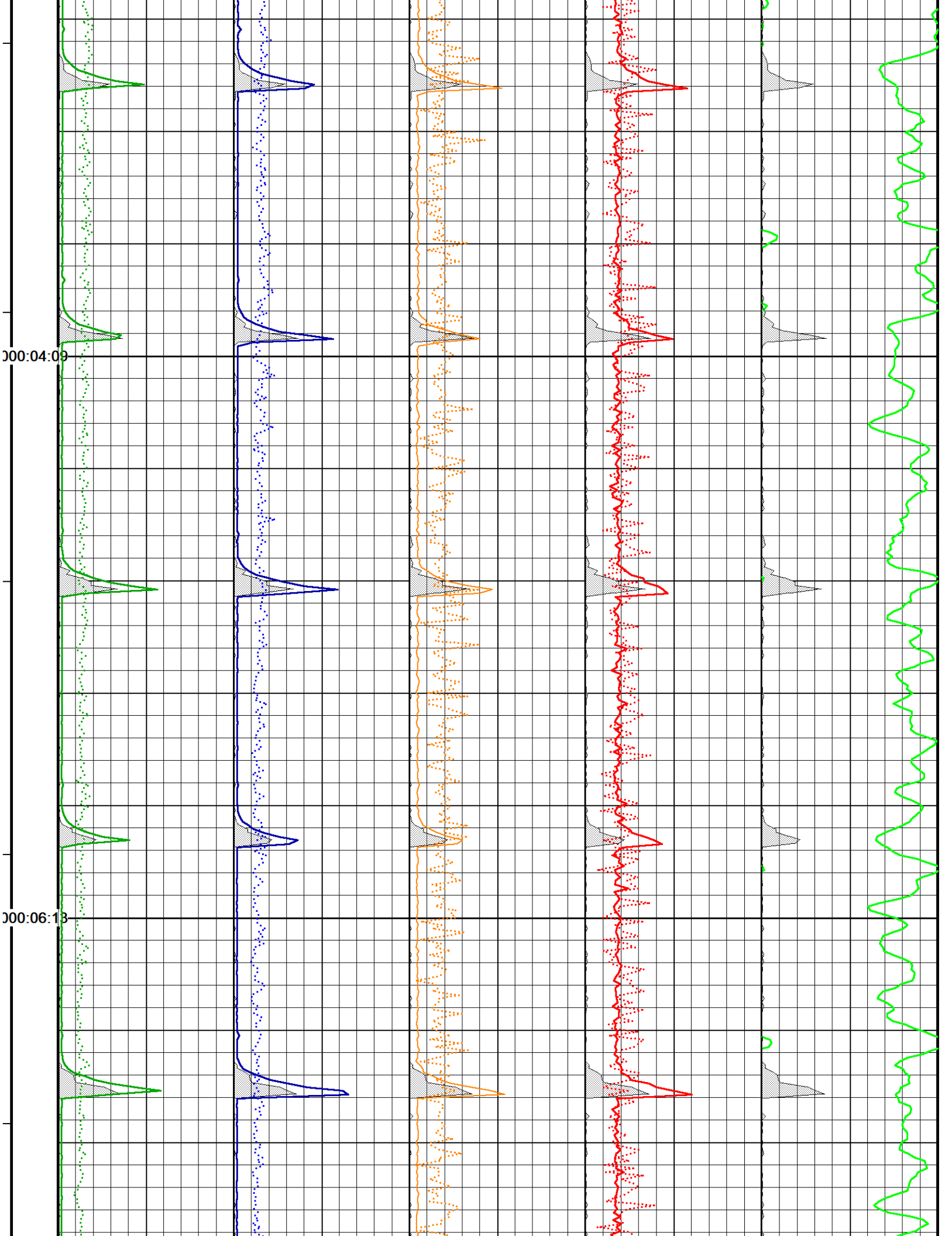


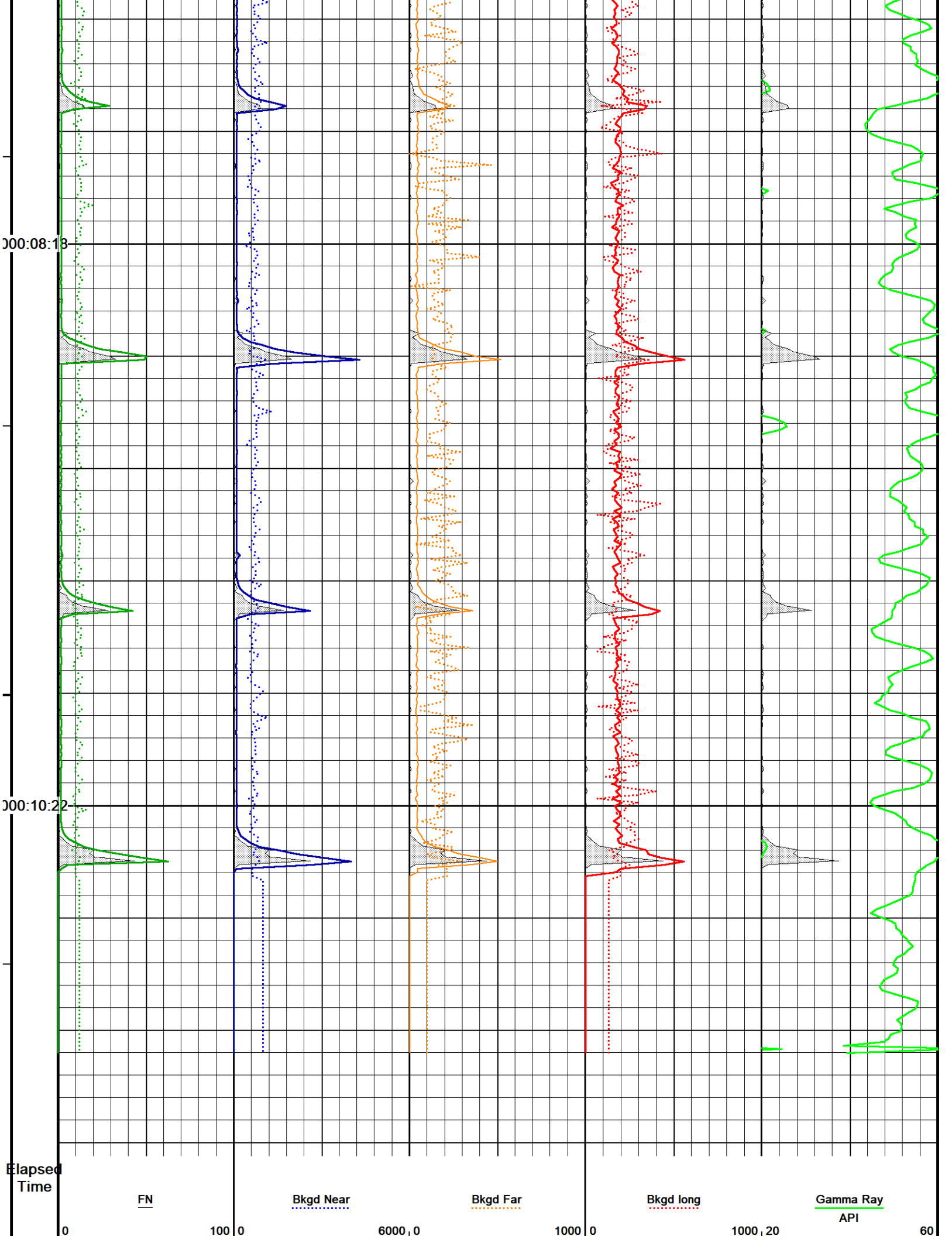
Time Based Data - Notional Logging Speed 9.14 metres/min  
 Filename: C:\1 WLS\la&m\Midway 1\Field\4419-5-45.dta  
 System Versions: Logged with 22.03.8996 Plotted with 22.05.1131

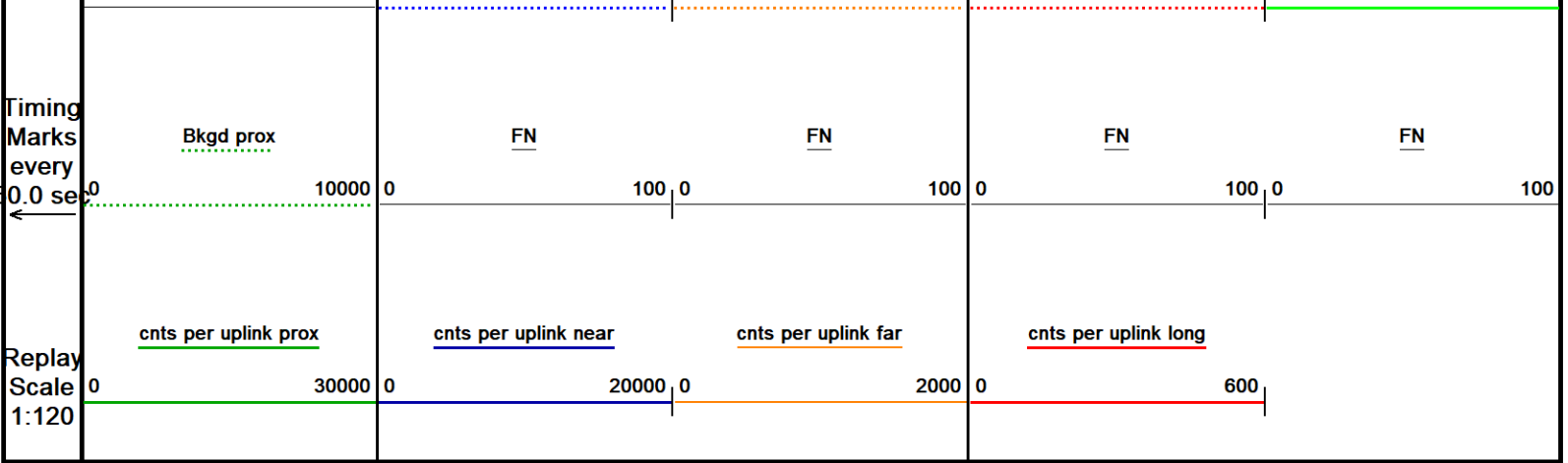
Plotted on 31-JAN-2023 13:52  
 Recorded on 14-NOV-2022 23:11











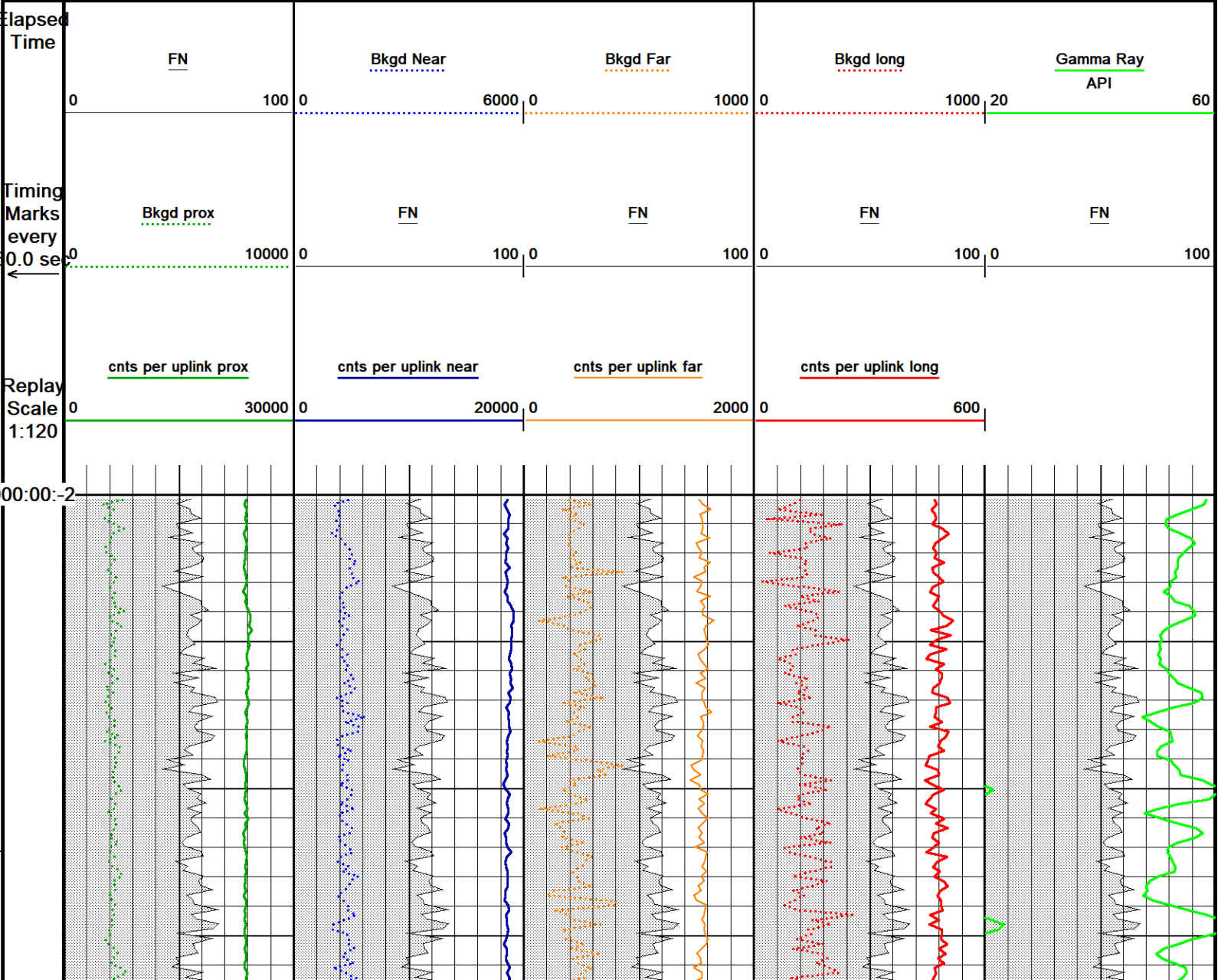
Time Based Data - Notional Logging Speed 9.14 metres/min	Plotted on 31-JAN-2023 13:52
Filename: C:\1 WLS\la&m\Midway 1\Field\4419-12-108.dta	Recorded on 14-NOV-2022 23:41
System Versions: Logged with 22.03.8996 Plotted with 22.05.1131	

↑

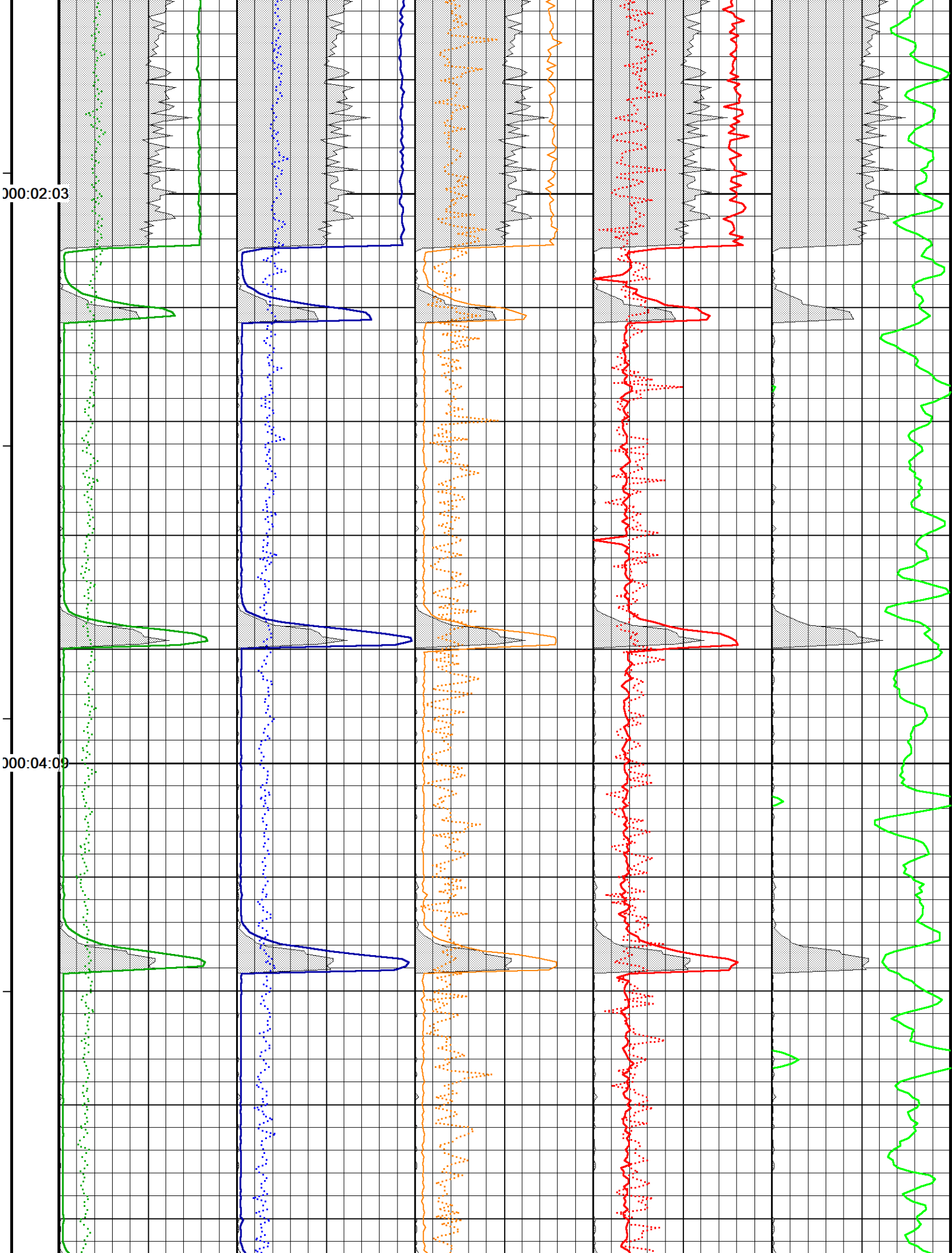
4419.7' FIRING 12/108

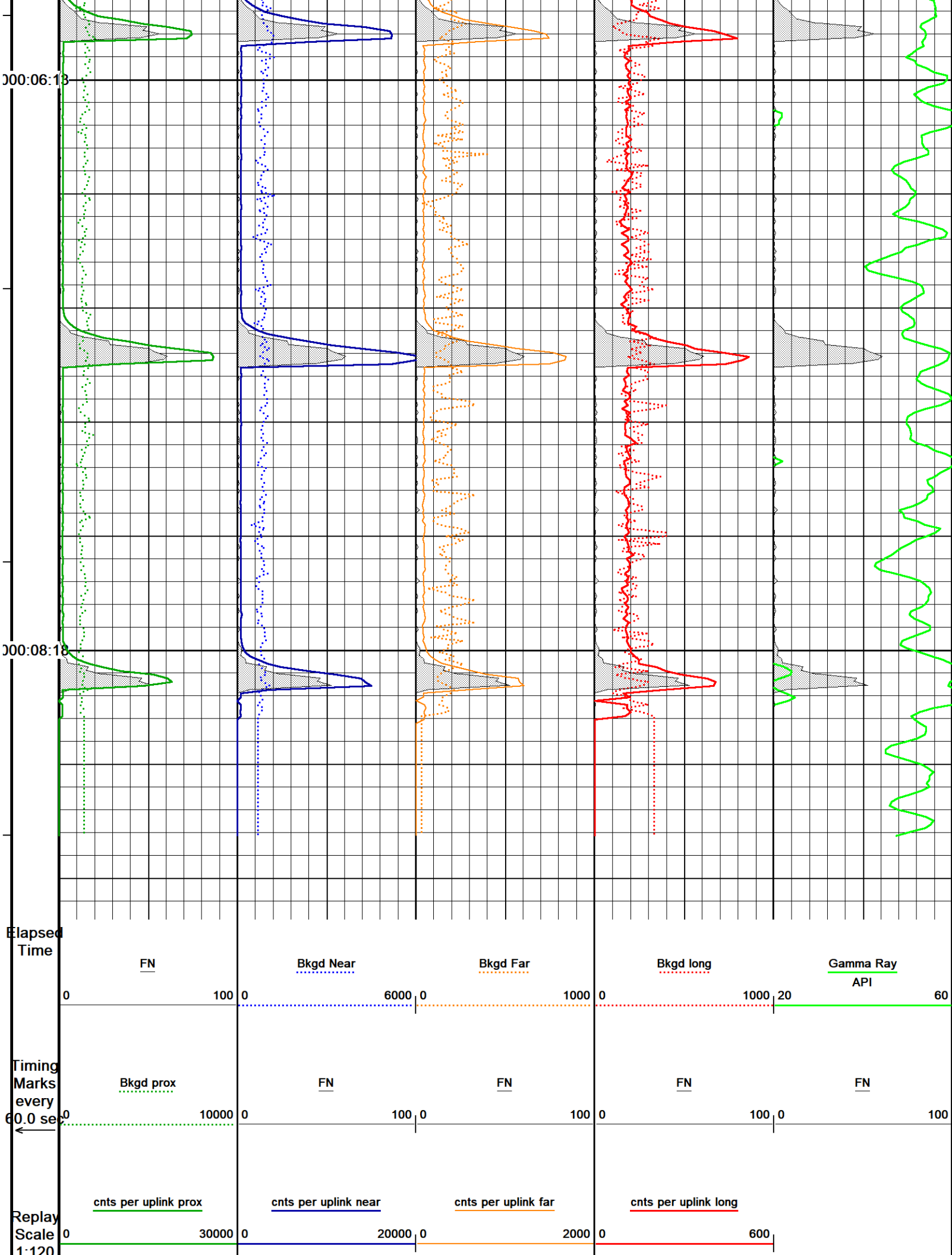
↑

↓	4419.7' FIRING 15/120	↓
Time Based Data - Notional Logging Speed 9.14 metres/min		Plotted on 31-JAN-2023 13:52
Filename: C:\1 WLS\la&m\Midway 1\Field\4419-15-120.dta		Recorded on 15-NOV-2022 00:03
System Versions: Logged with 22.03.8996 Plotted with 22.05.1131		









↑

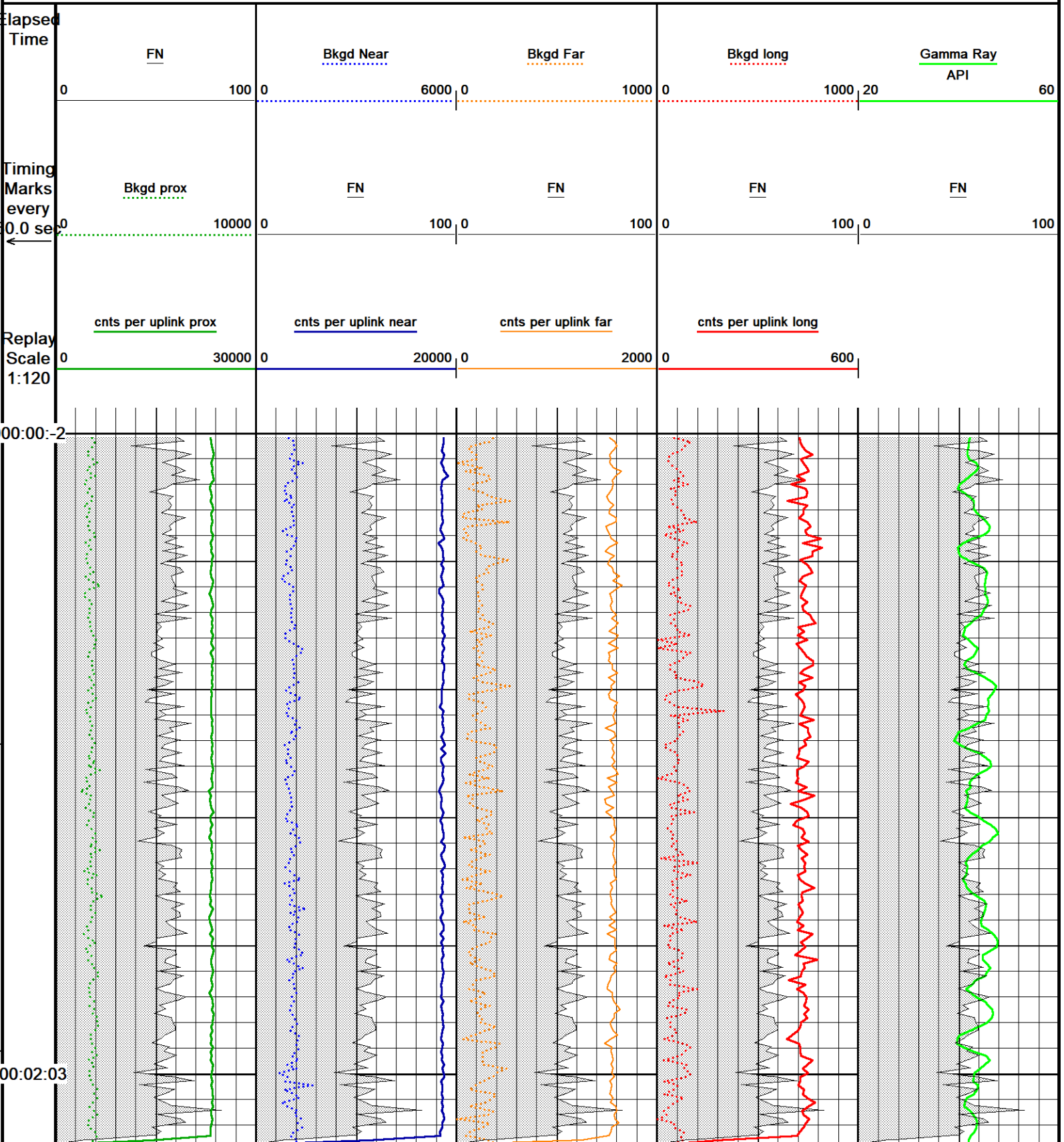
4419.7' FIRING 15/120

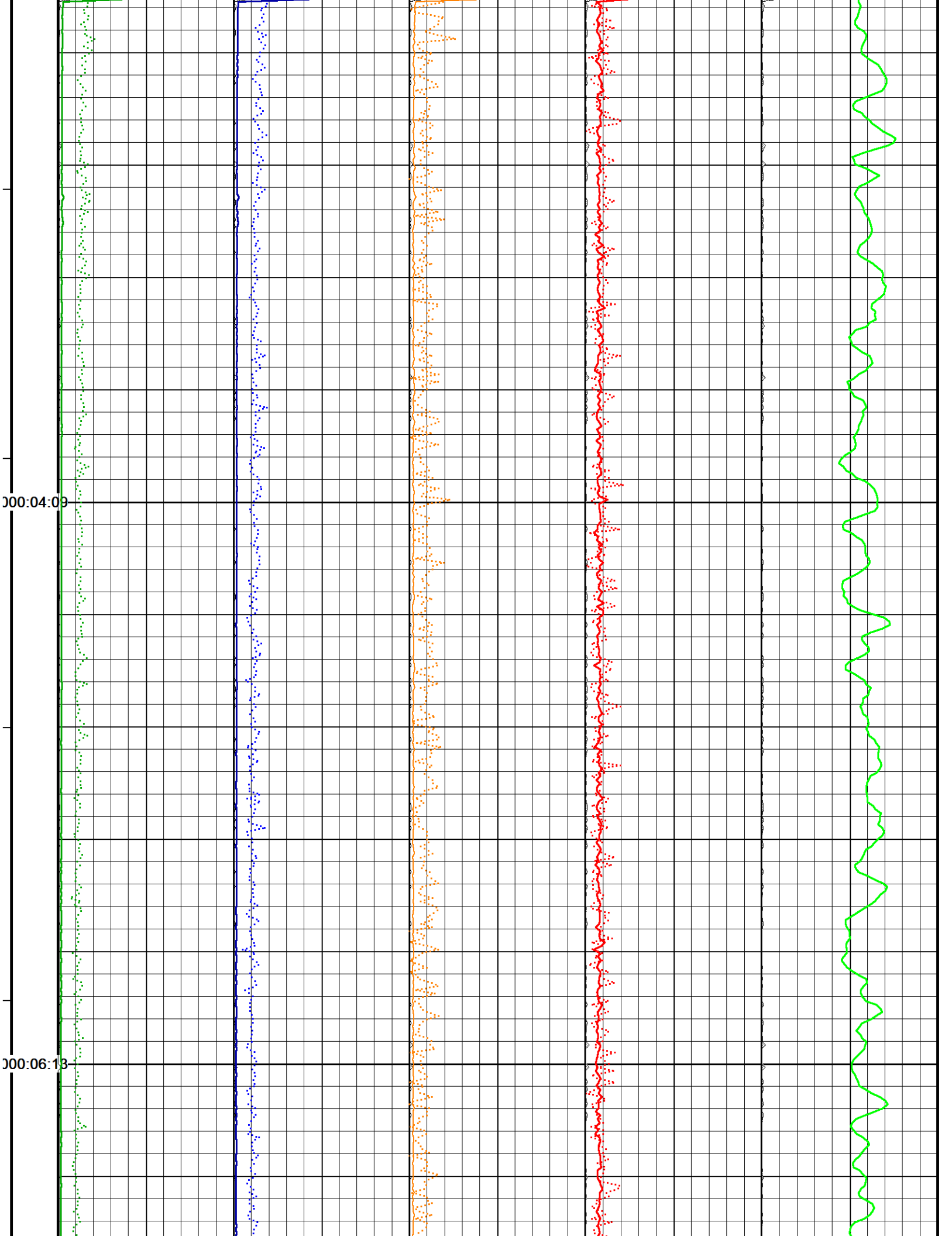
↑

↓

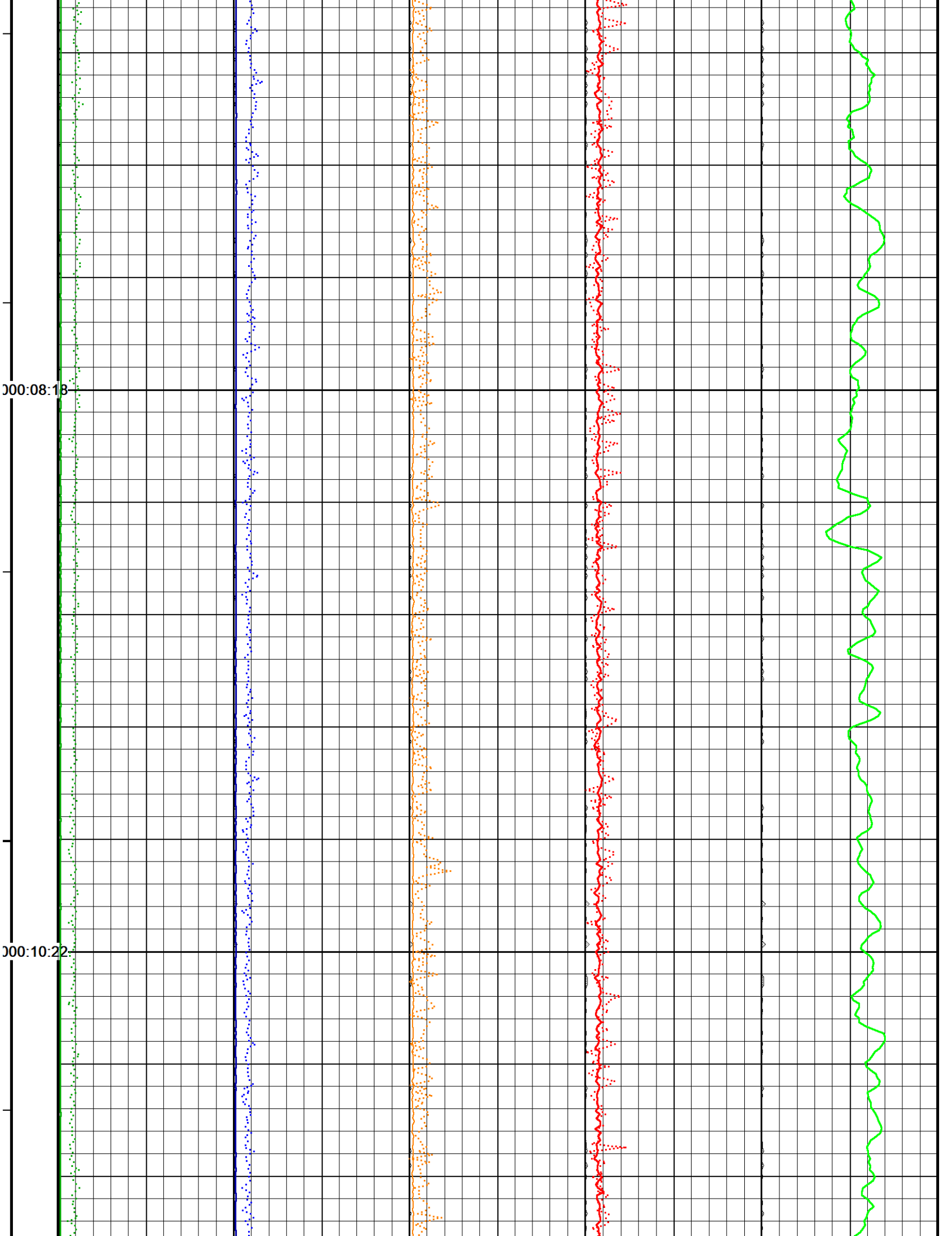
4541.5' FIRING 5/45

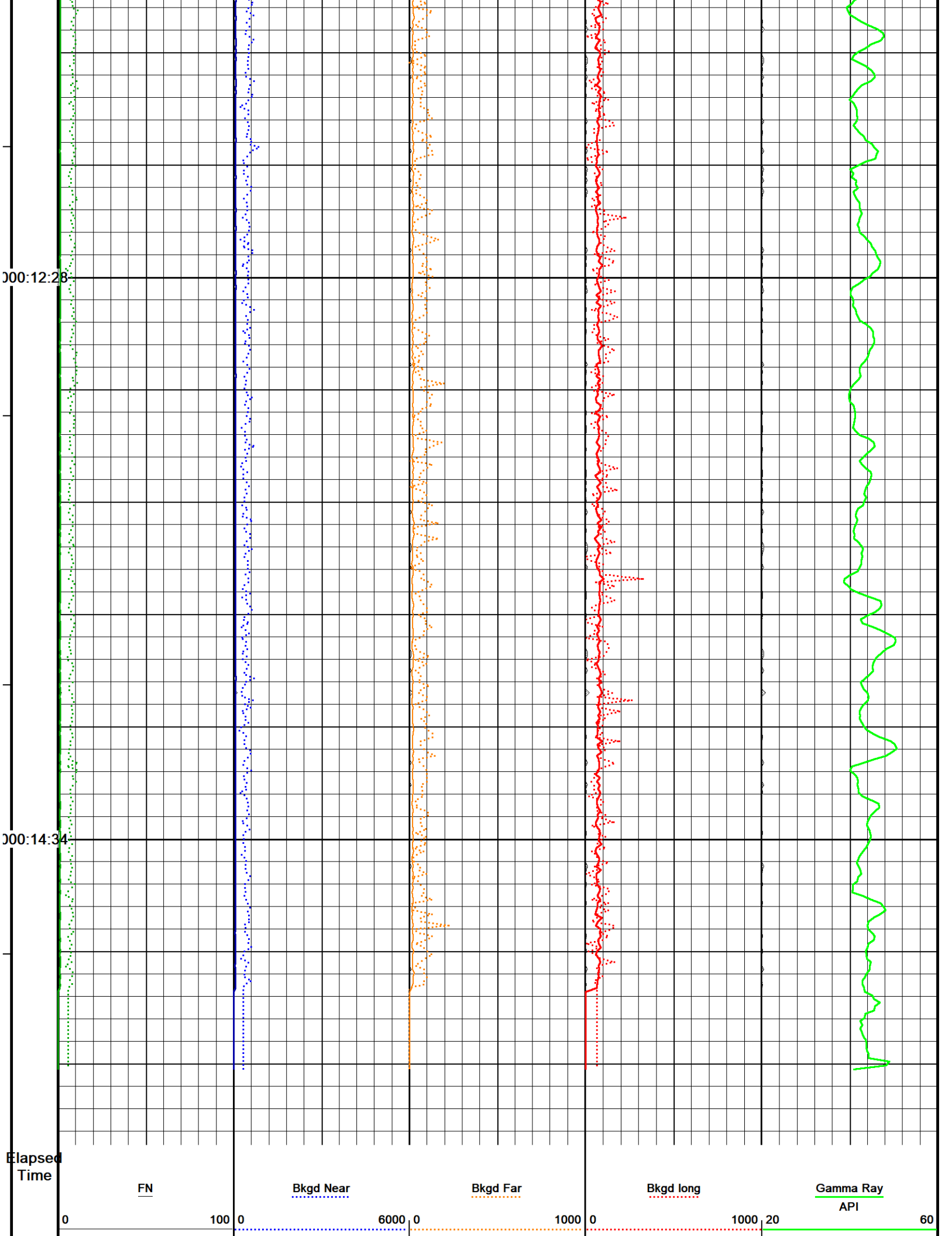
↓











Timing  
Marks  
every  
60.0 se

Replay  
Scale  
1:120

Time Based Data - Notional Logging Speed 9.14 metres/min  
Filename: C:\1 WLS\A&M\Midway 1\Field\4541-5-45.dta  
System Versions: Logged with 22.03.8996 Plotted with 22.05.1131

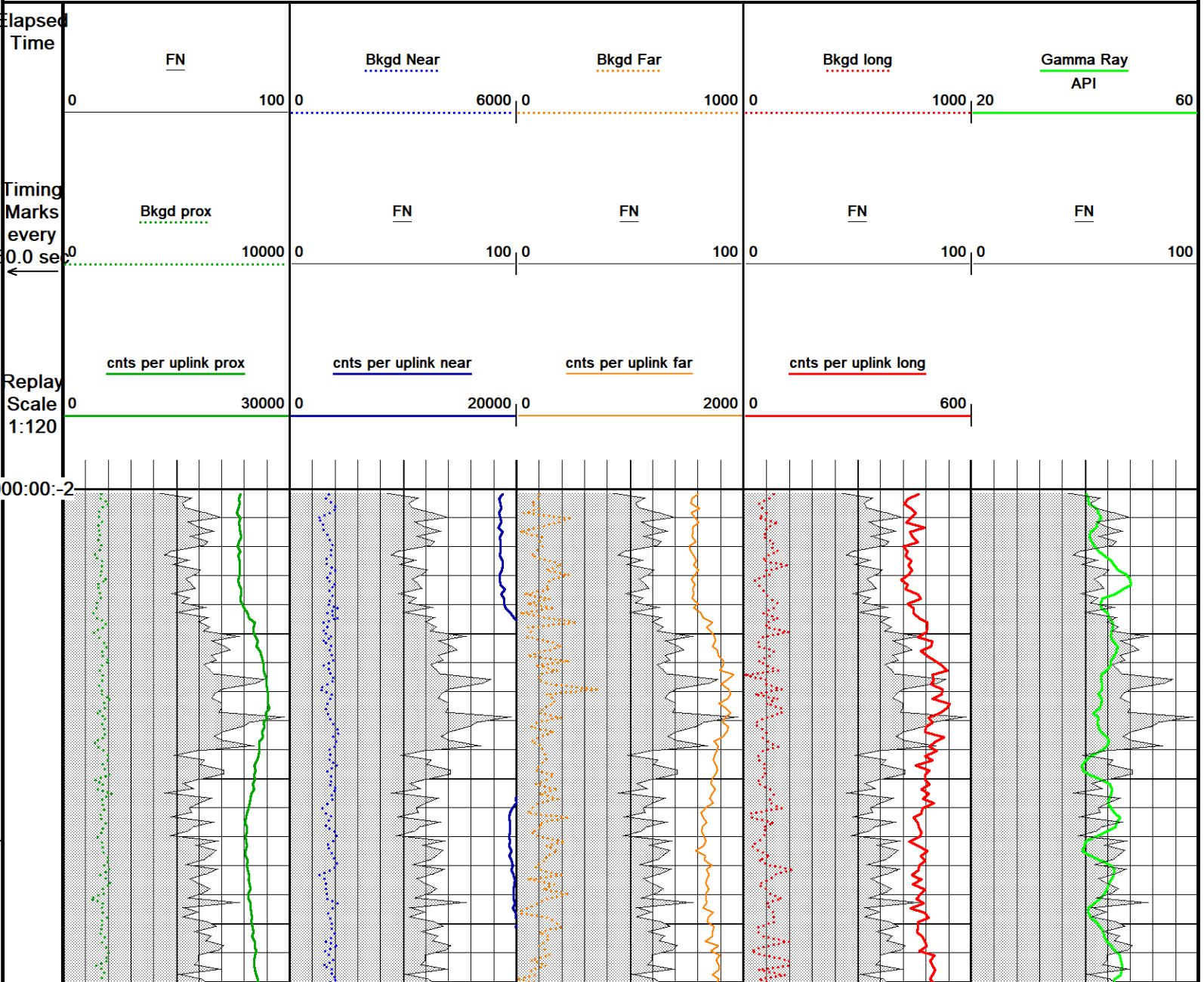
Plotted on 31-JAN-2023 13:52  
Recorded on 14-NOV-2022 22:03

4541.5' FIRING 5/45

4541.5' FIRING 12/108

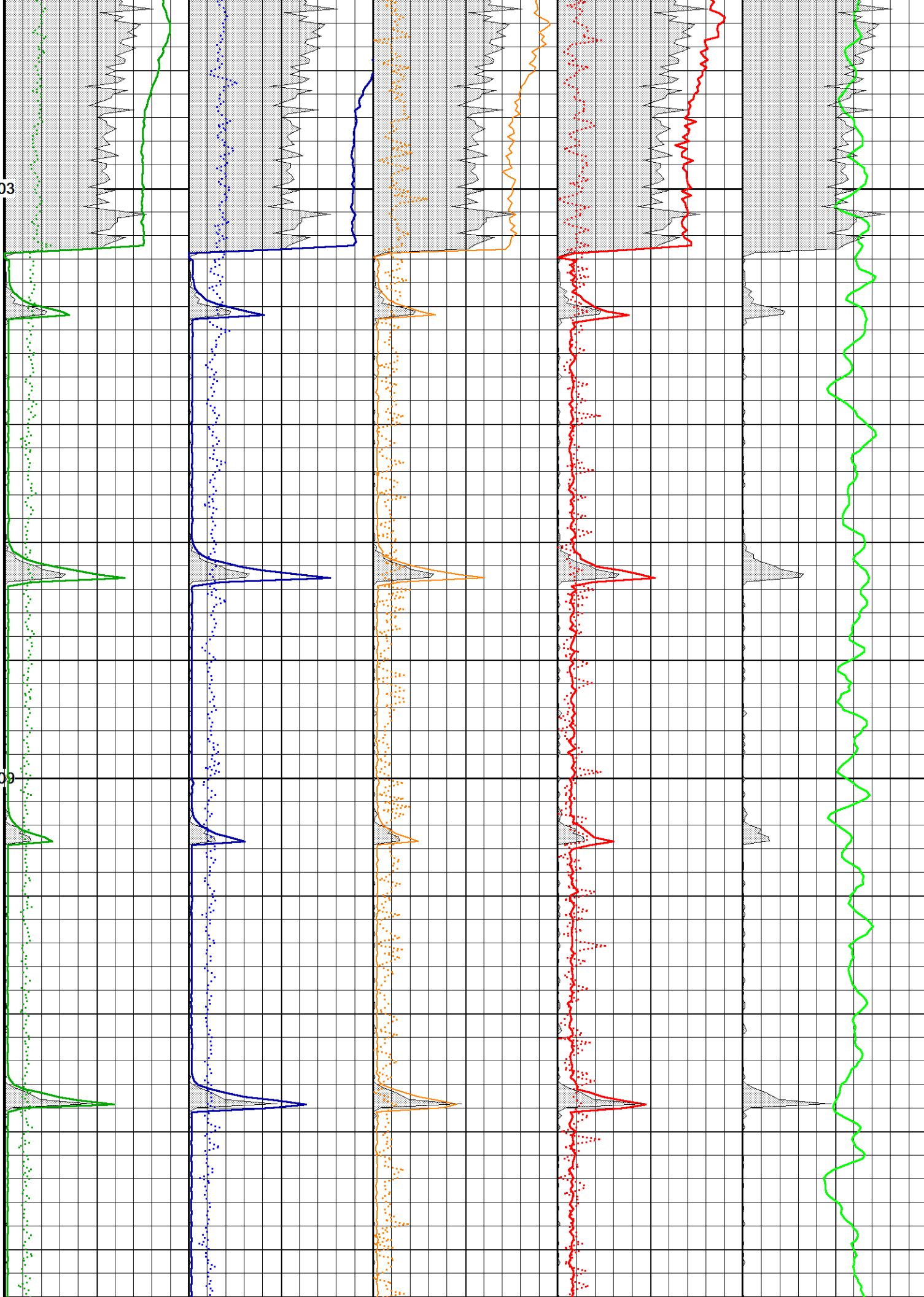
Time Based Data - Notional Logging Speed 9.14 metres/min  
Filename: C:\1 WLS\A&M\Midway 1\Field\4541-12-108.dta  
System Versions: Logged with 22.03.8996 Plotted with 22.05.1131

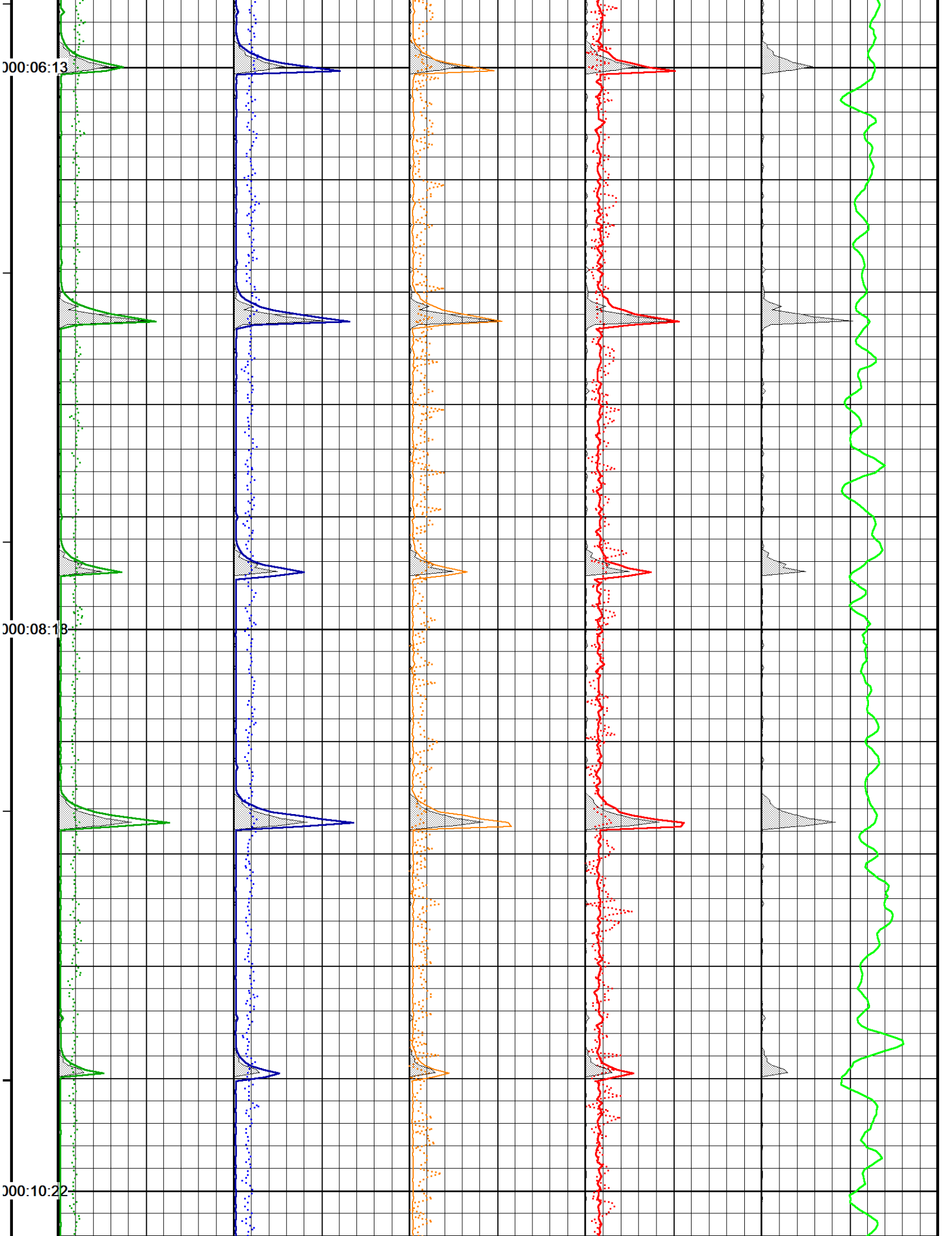
Plotted on 31-JAN-2023 13:52  
Recorded on 14-NOV-2022 22:26

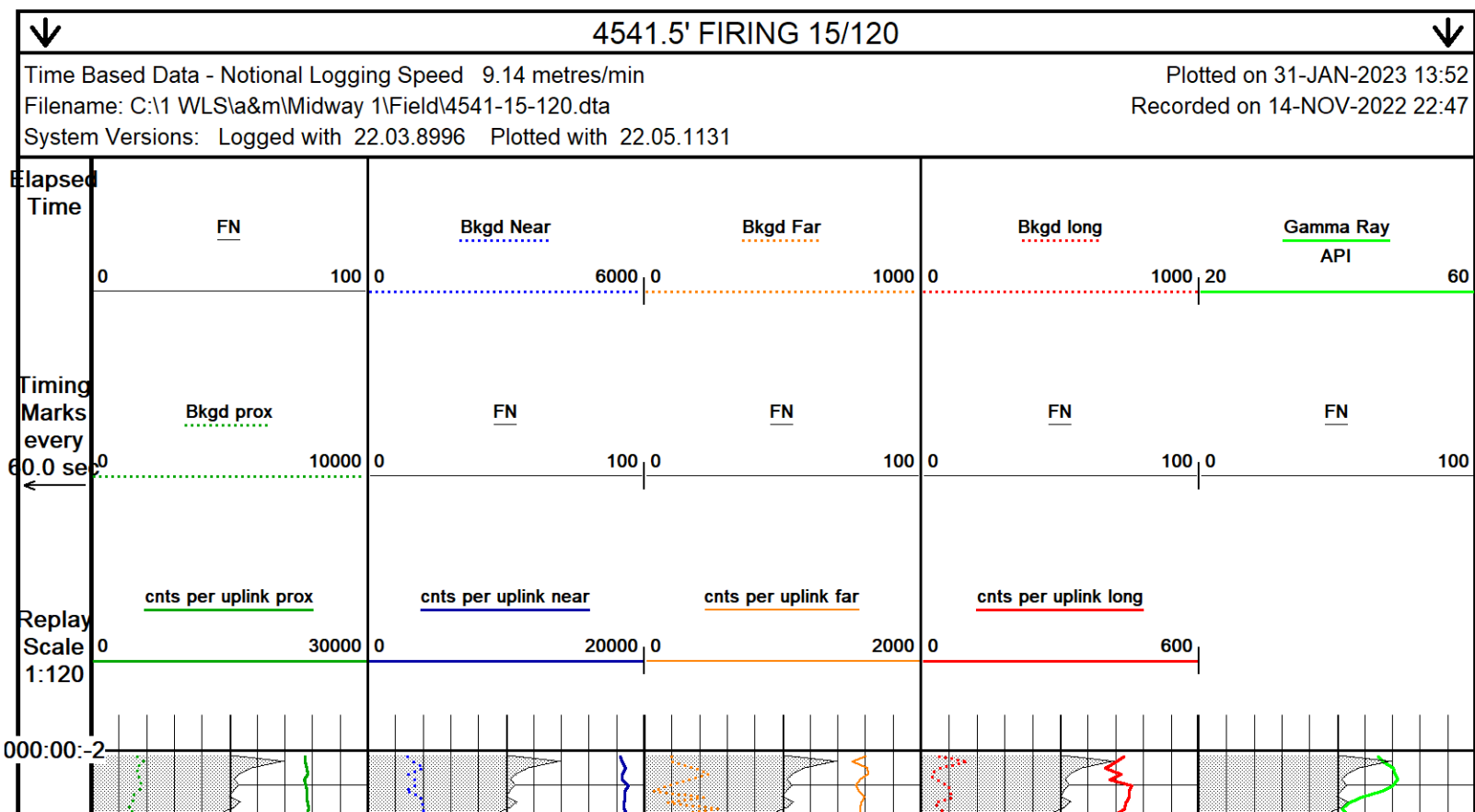
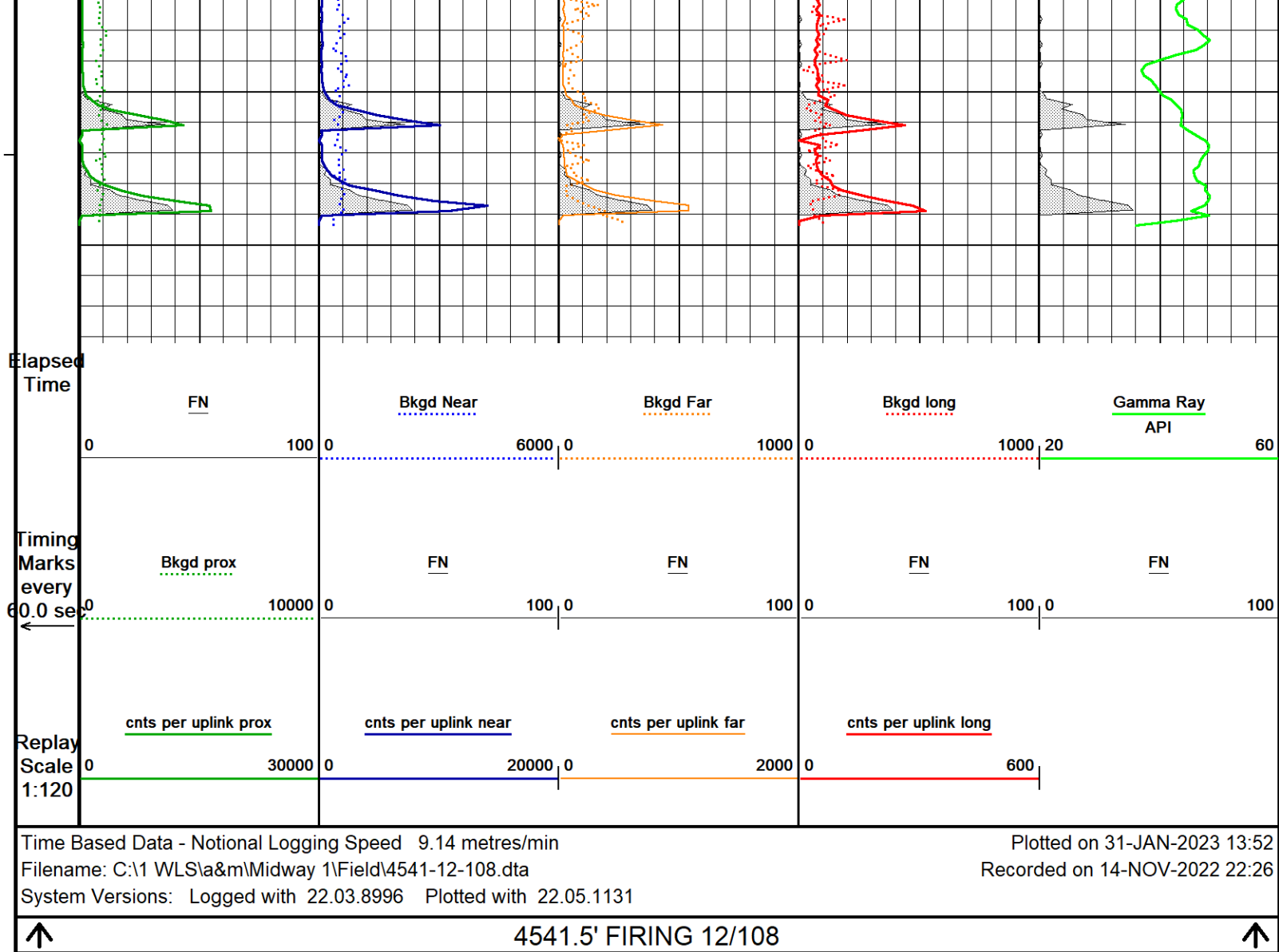


00:02:03

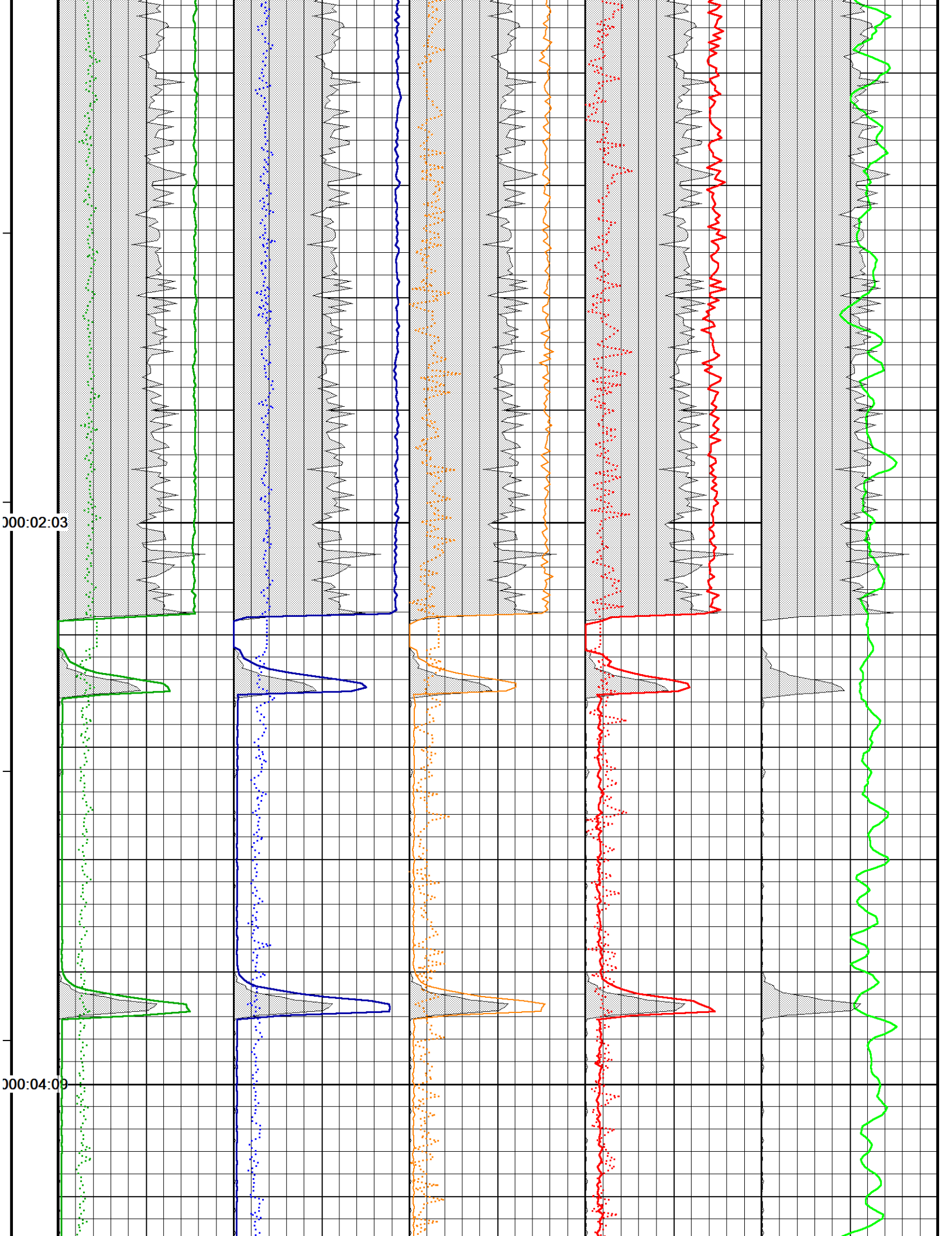
00:04:09

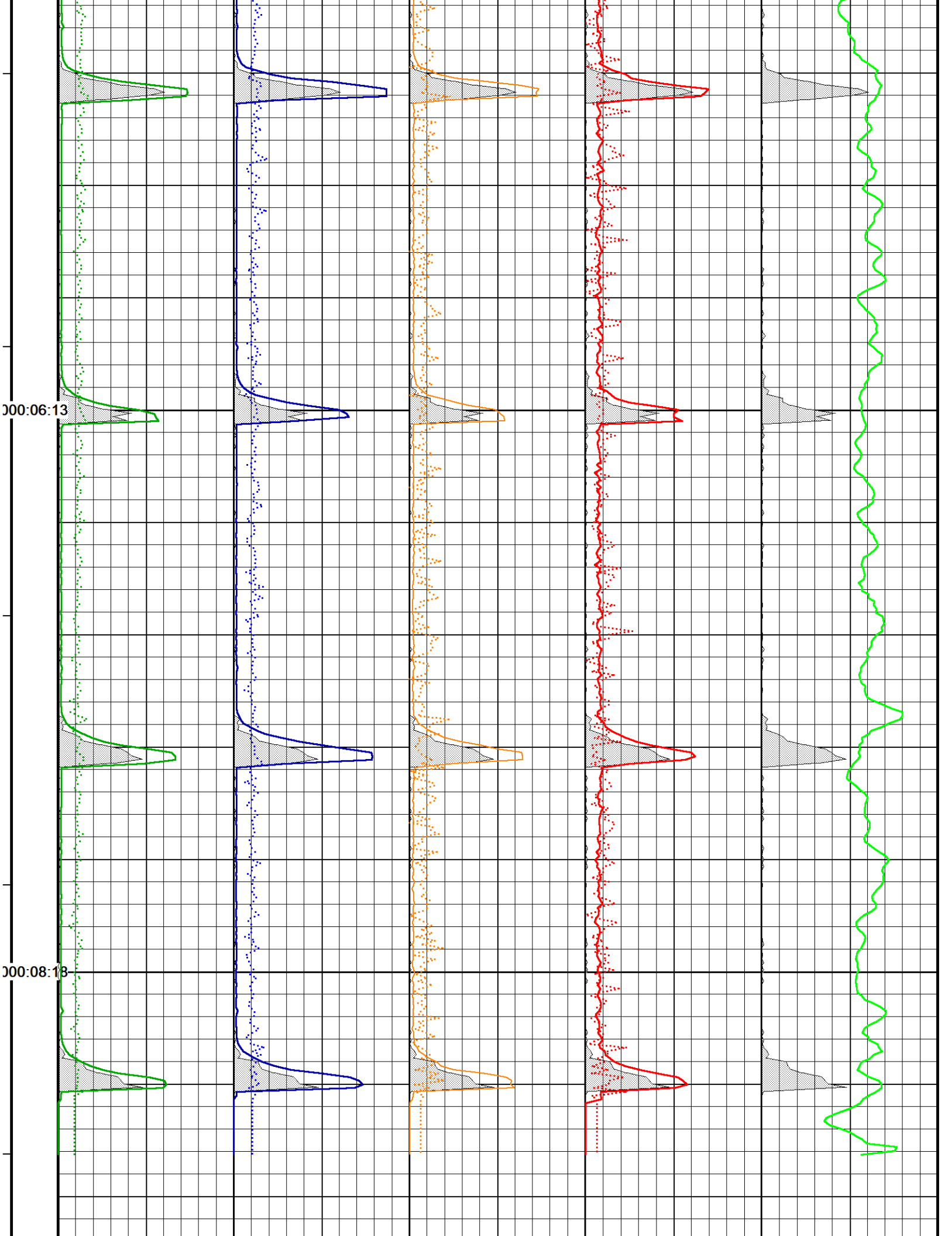




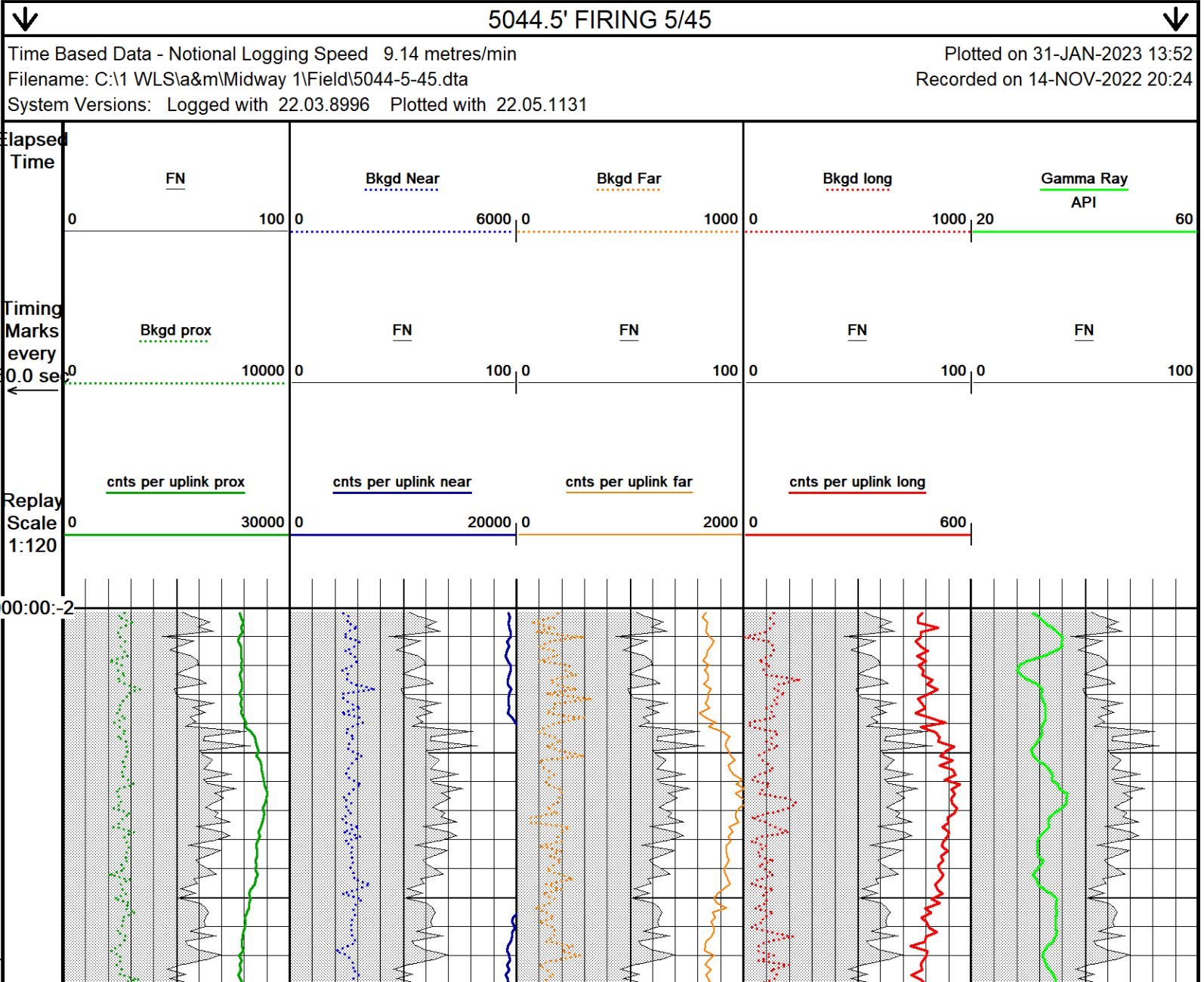
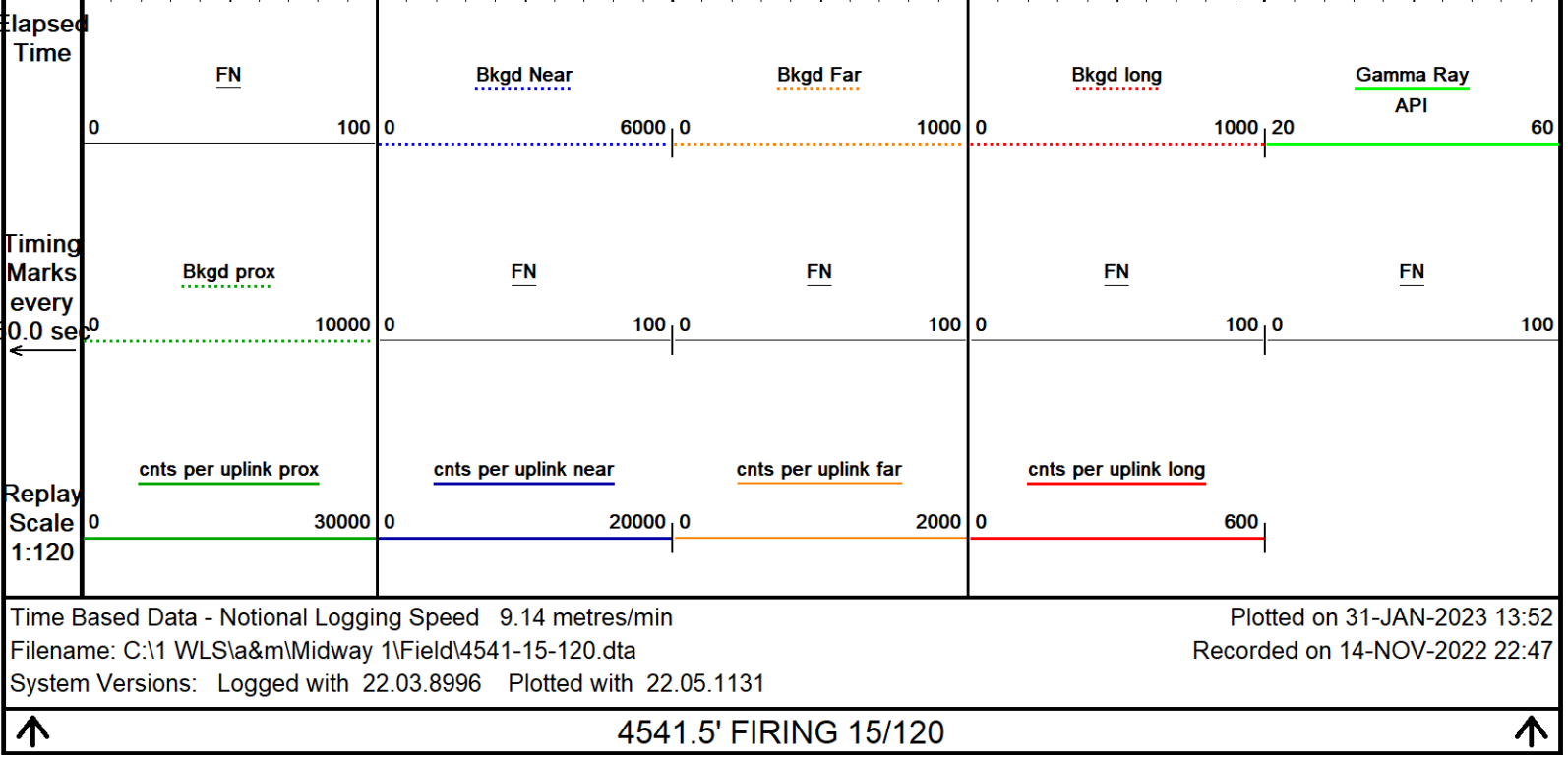


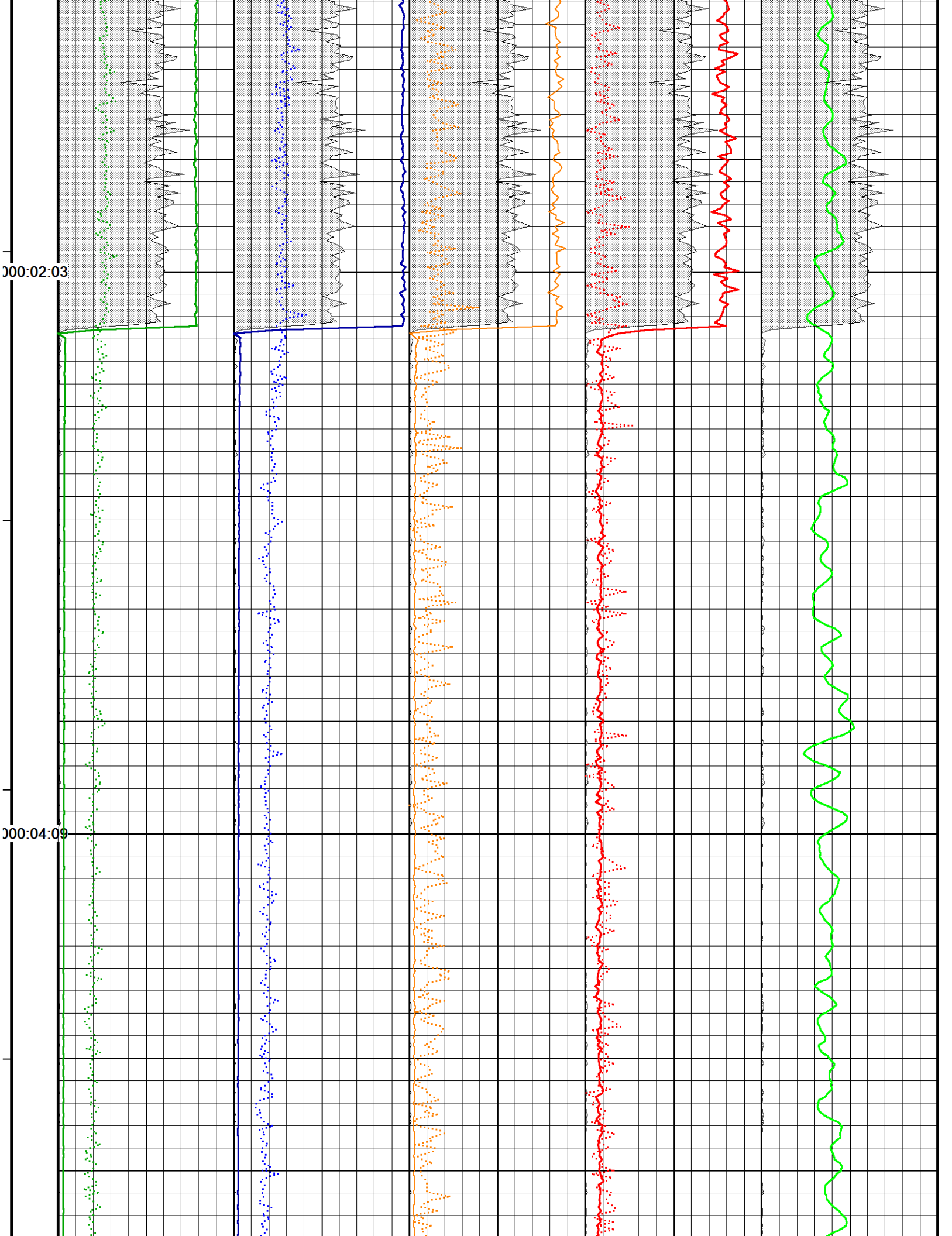


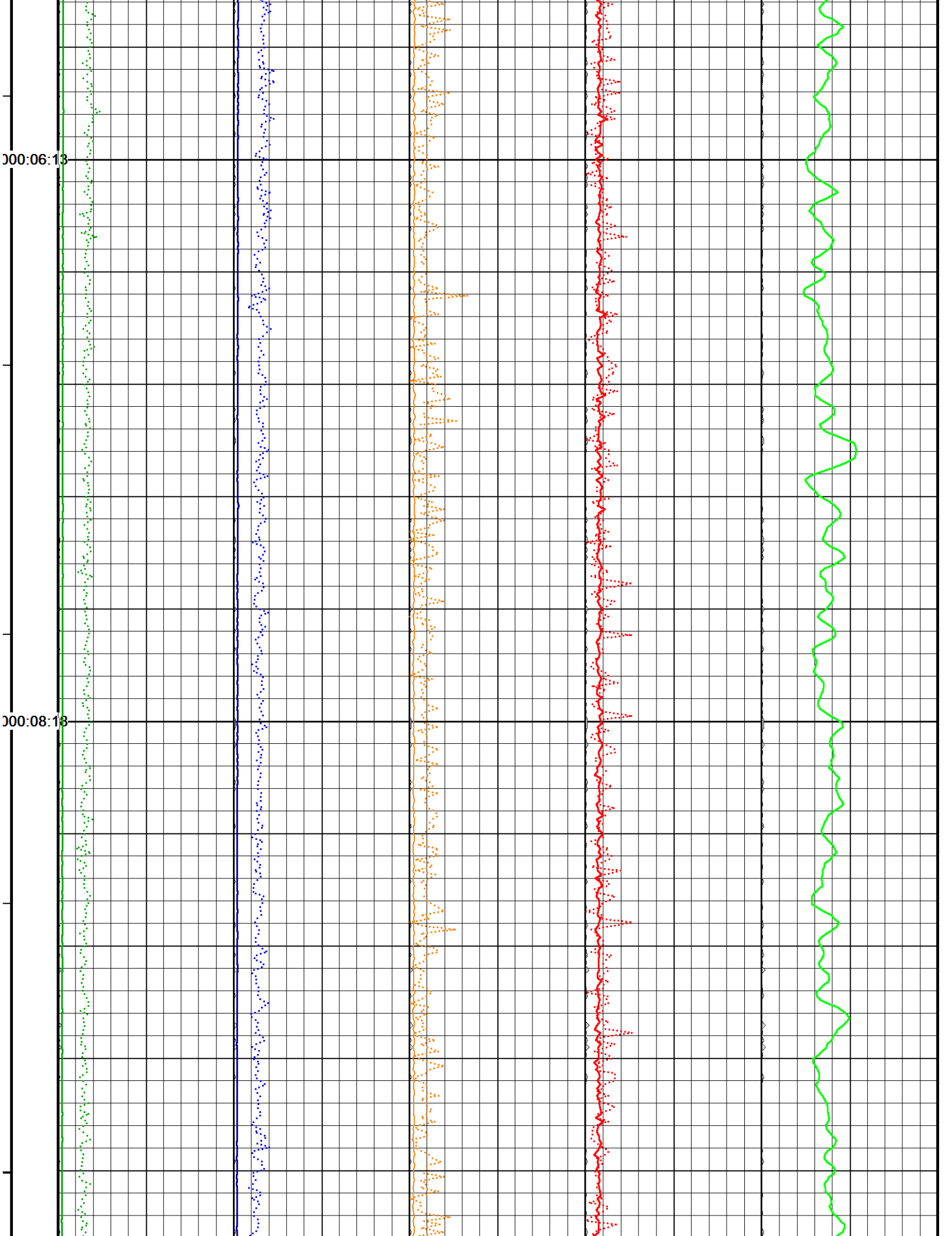


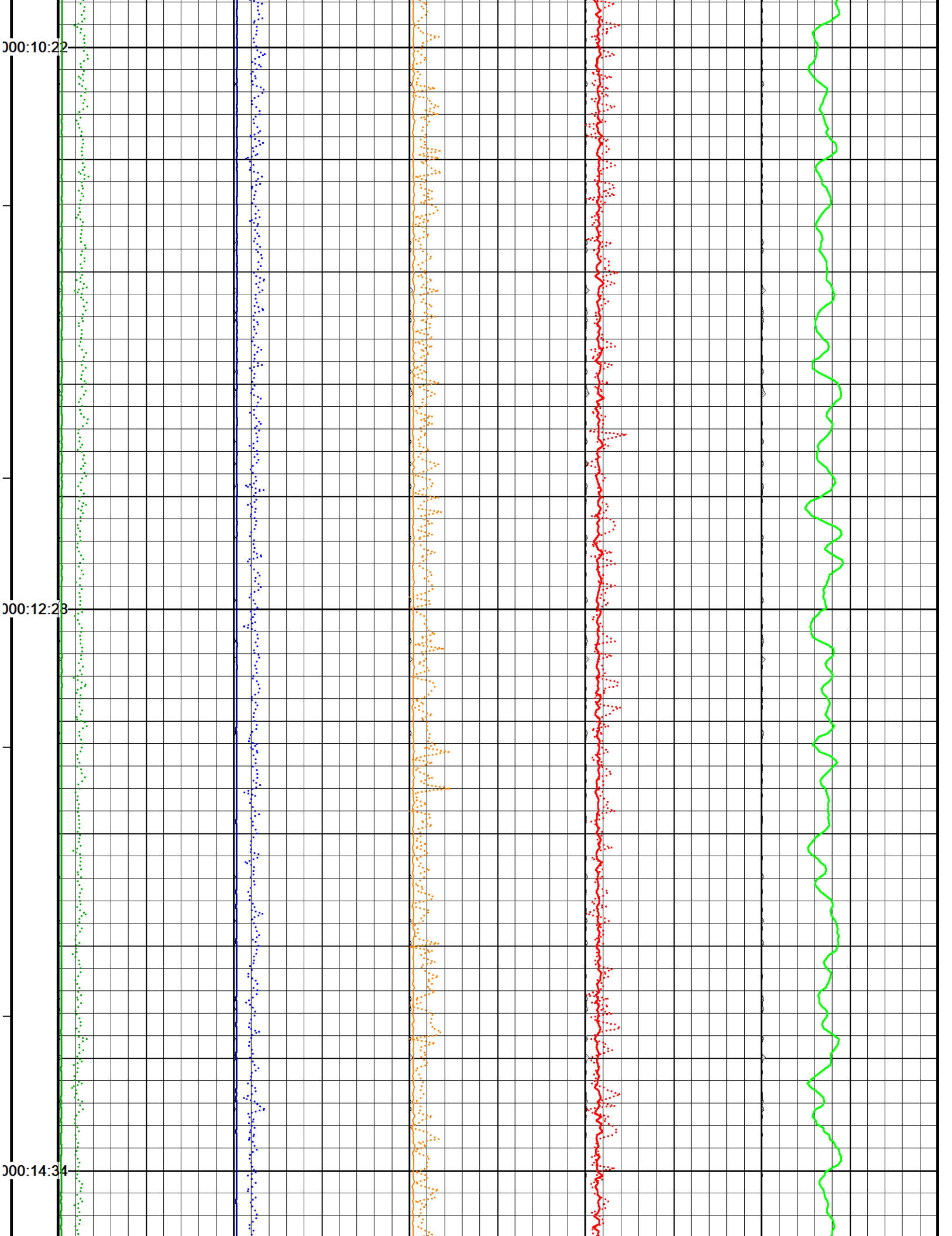


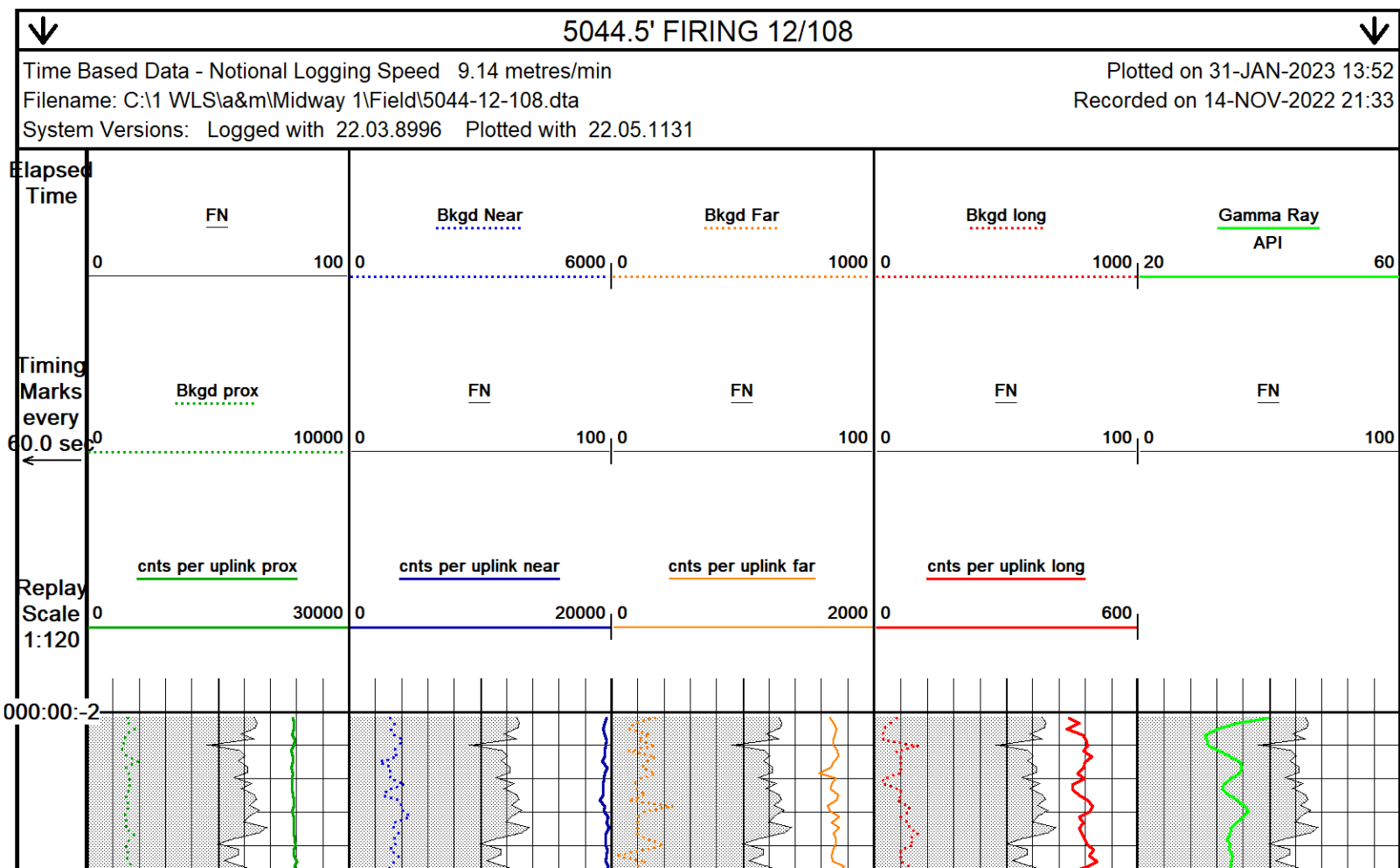
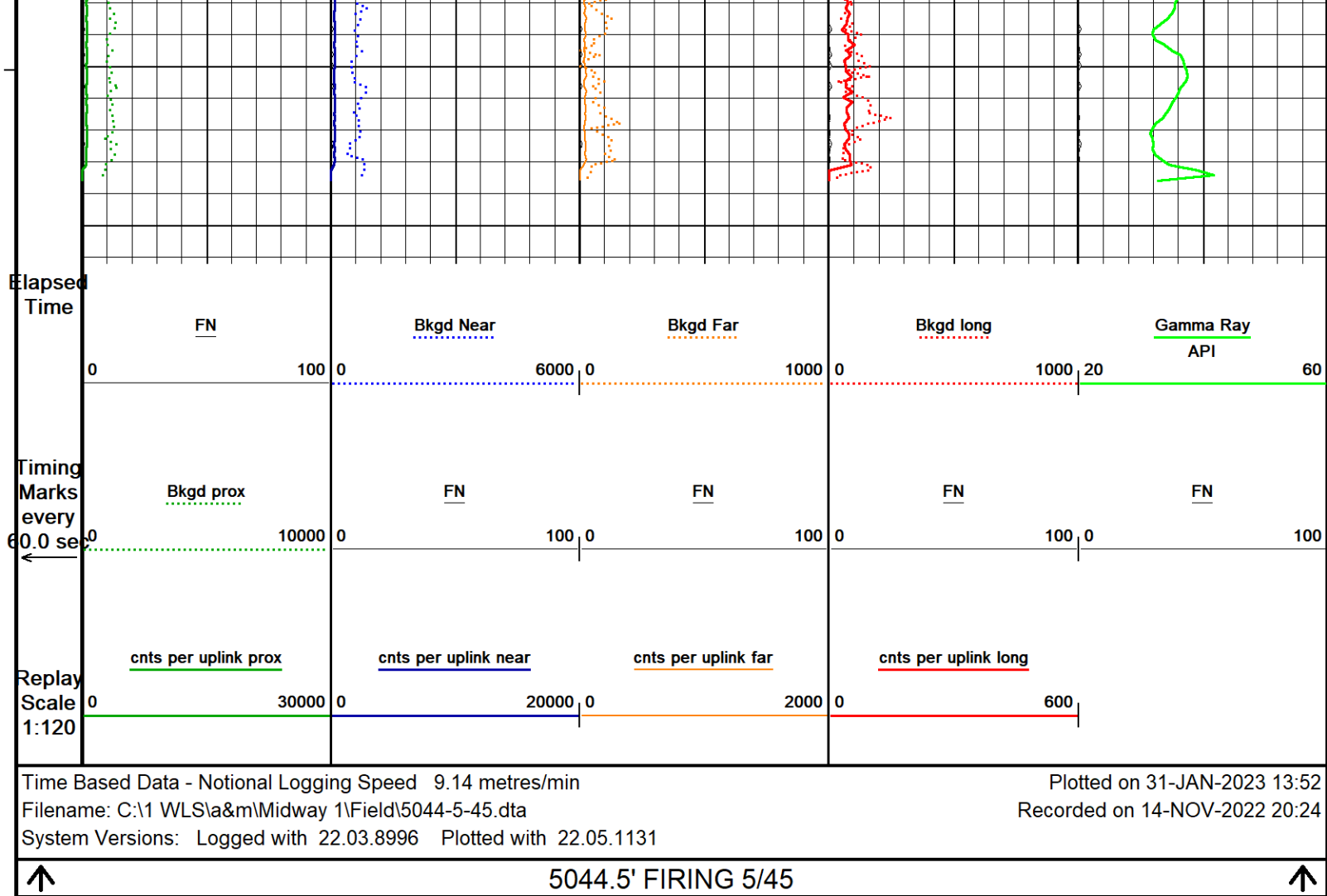




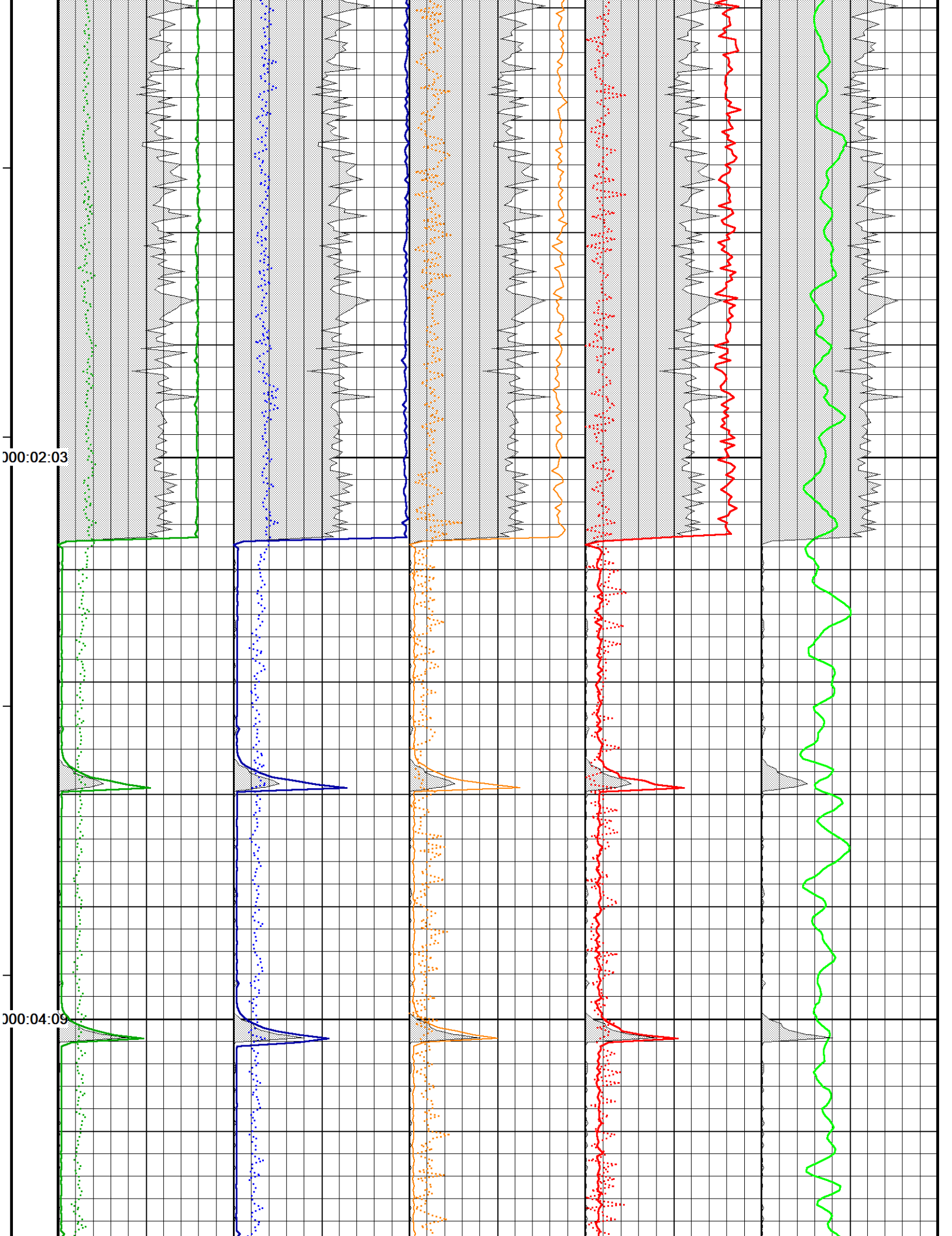


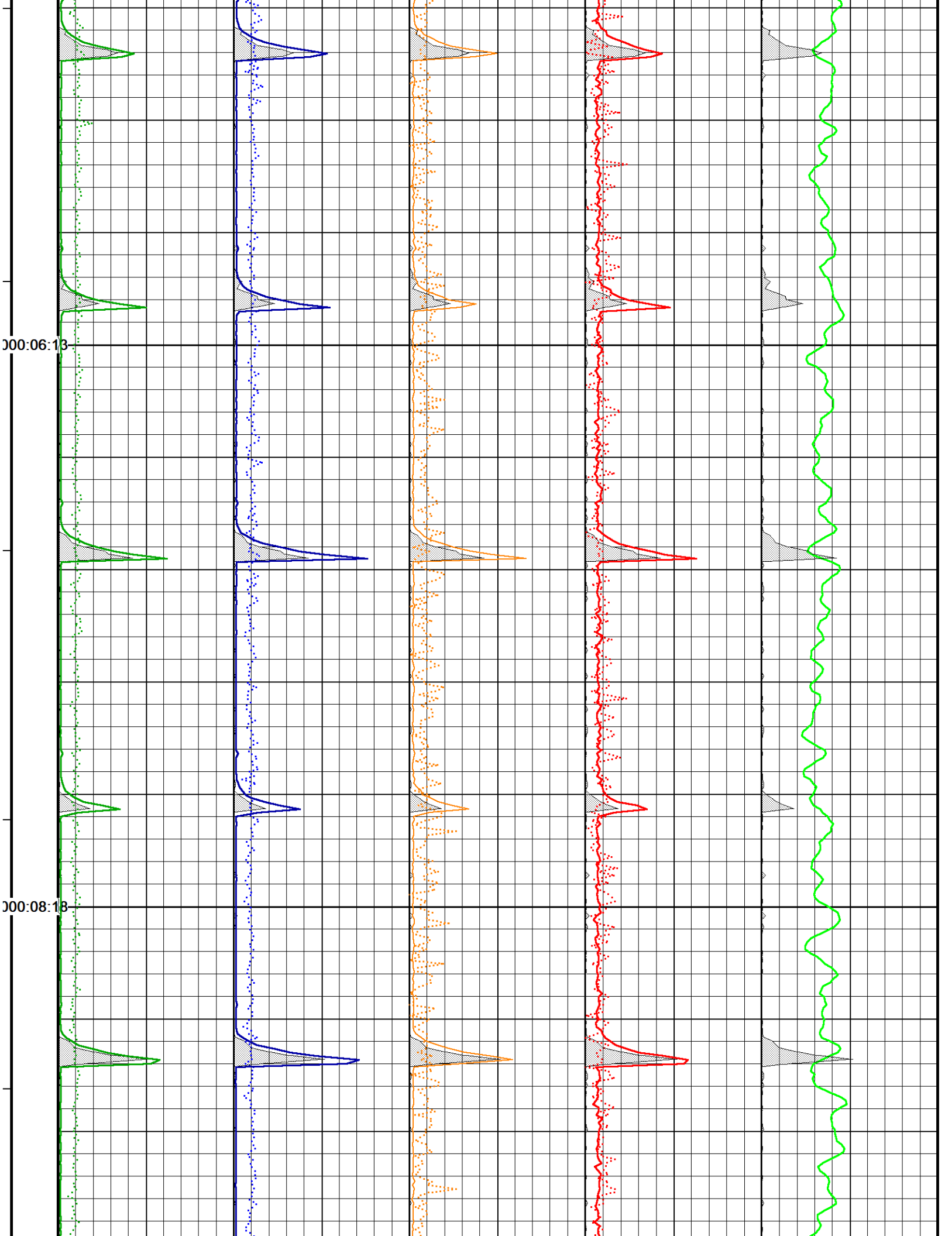




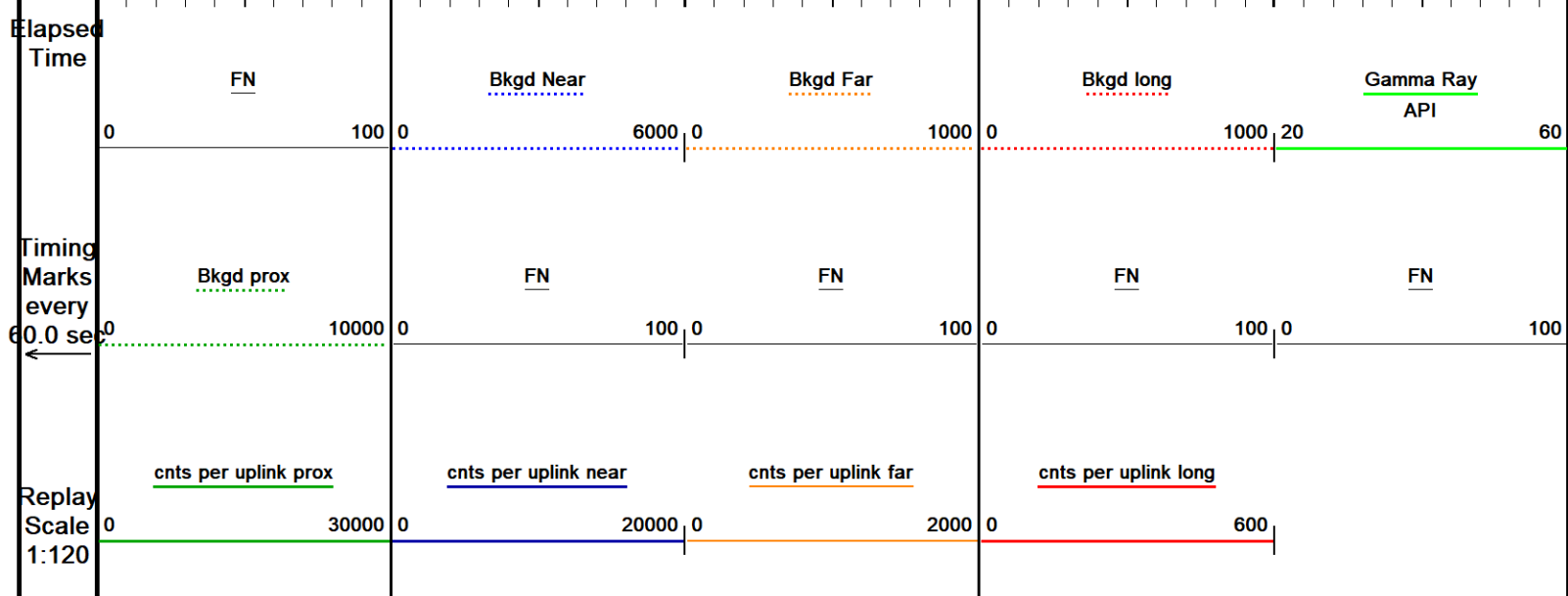
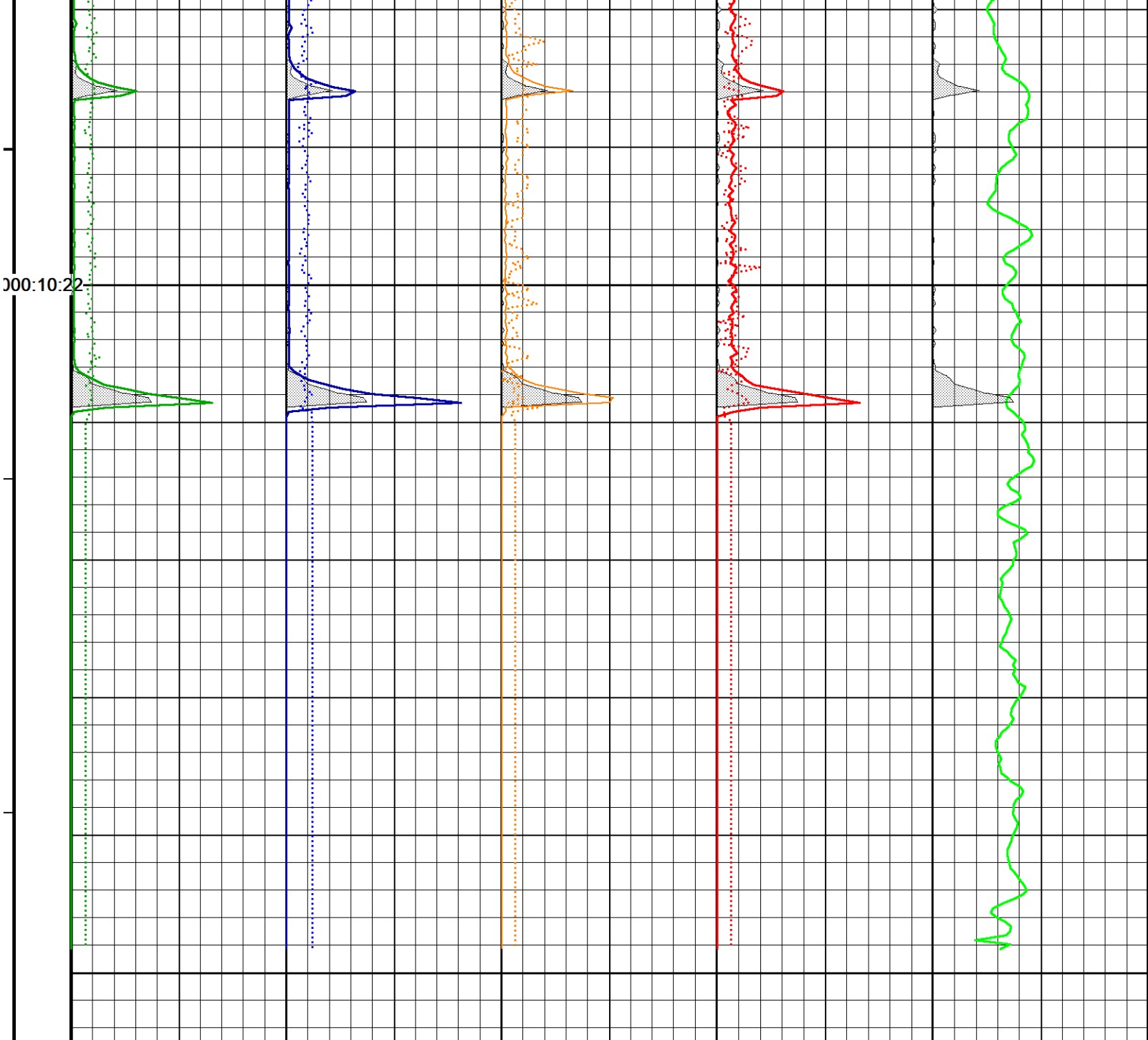












↑

5044.5' FIRING 12/108

↑

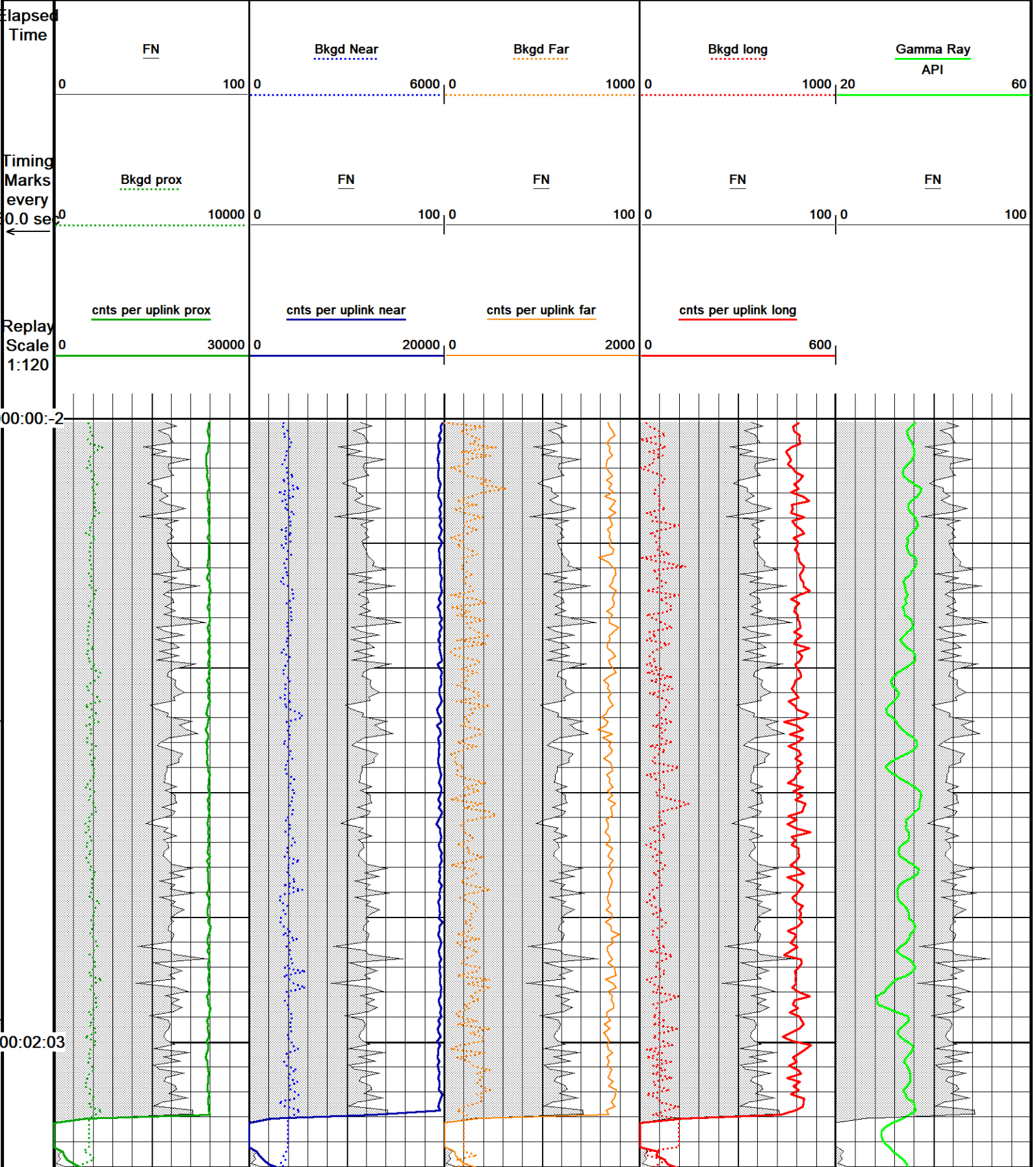
↓

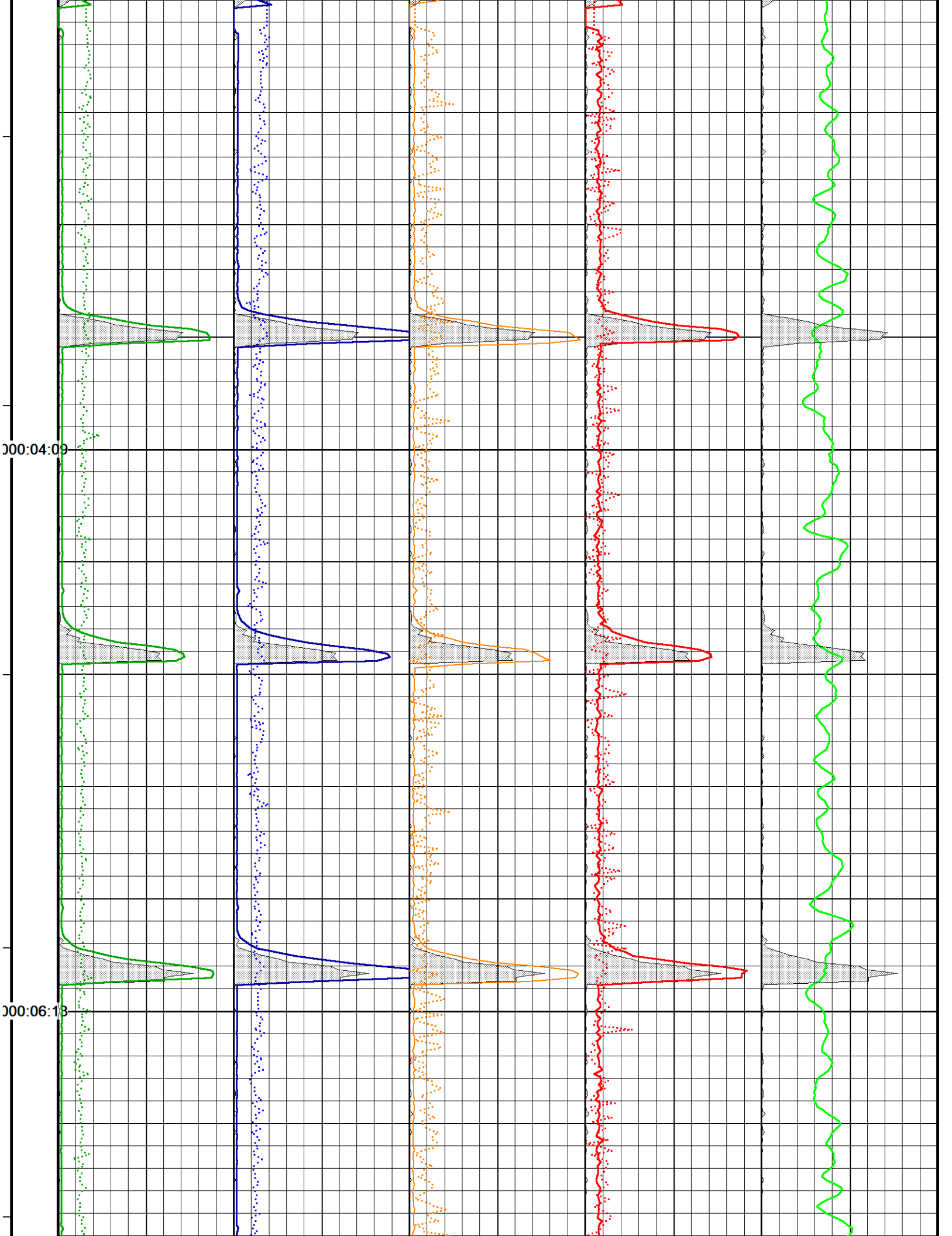
5044.5' FIRING 15/120

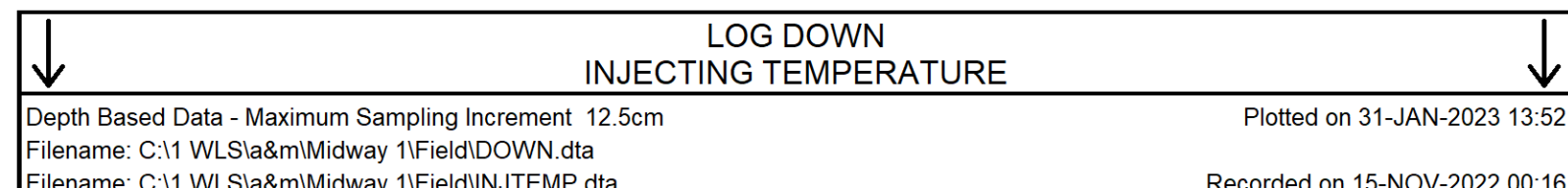
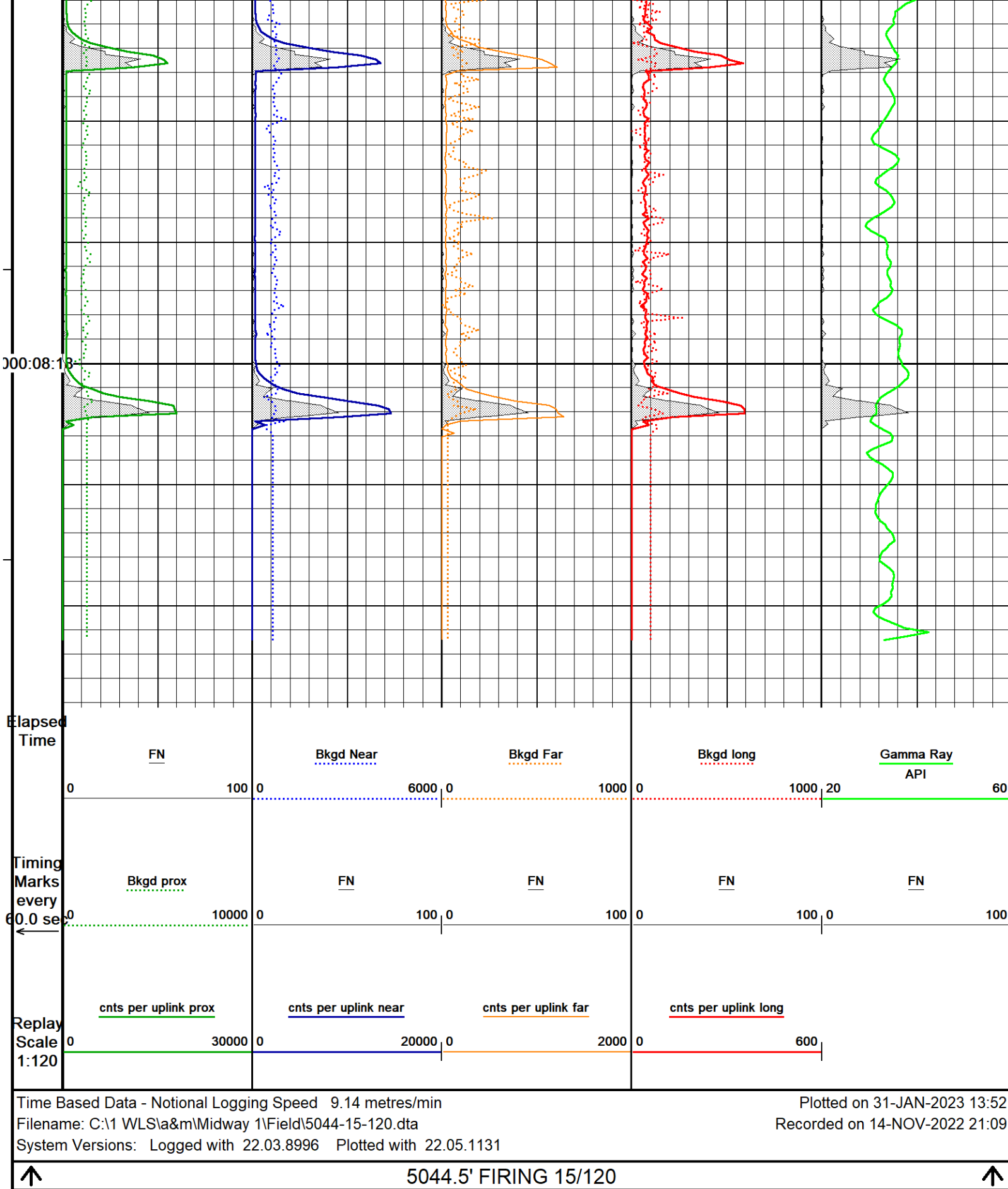
↓

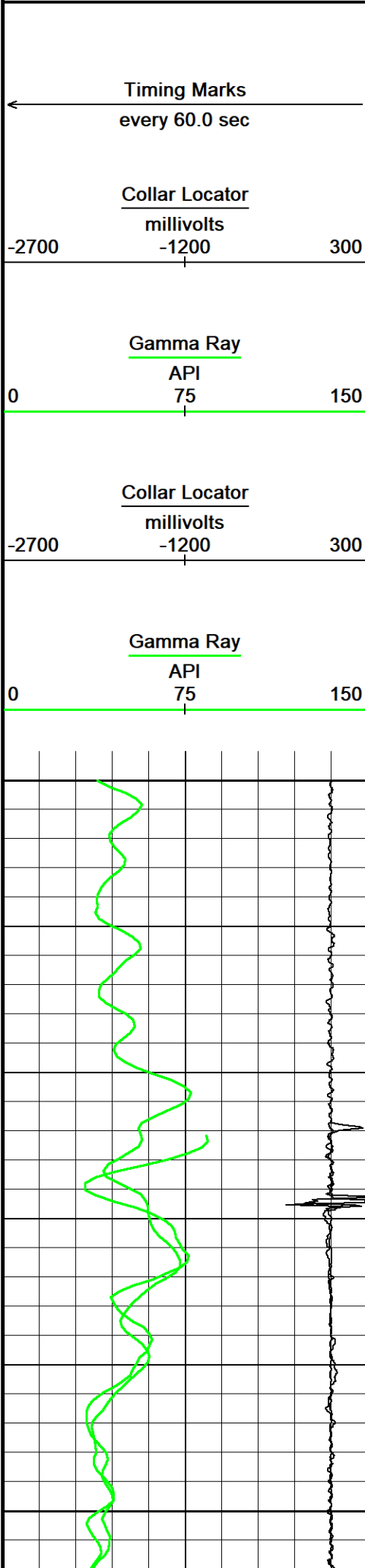
Time Based Data - Notional Logging Speed 9.14 metres/min  
Filename: C:\1 WLS\la&m\Midway 1\field\5044-15-120.dta  
System Versions:    Logged with 22.03.8996    Plotted with 22.05.1131

Plotted on 31-JAN-2023 13:52  
Recorded on 14-NOV-2022 21:09







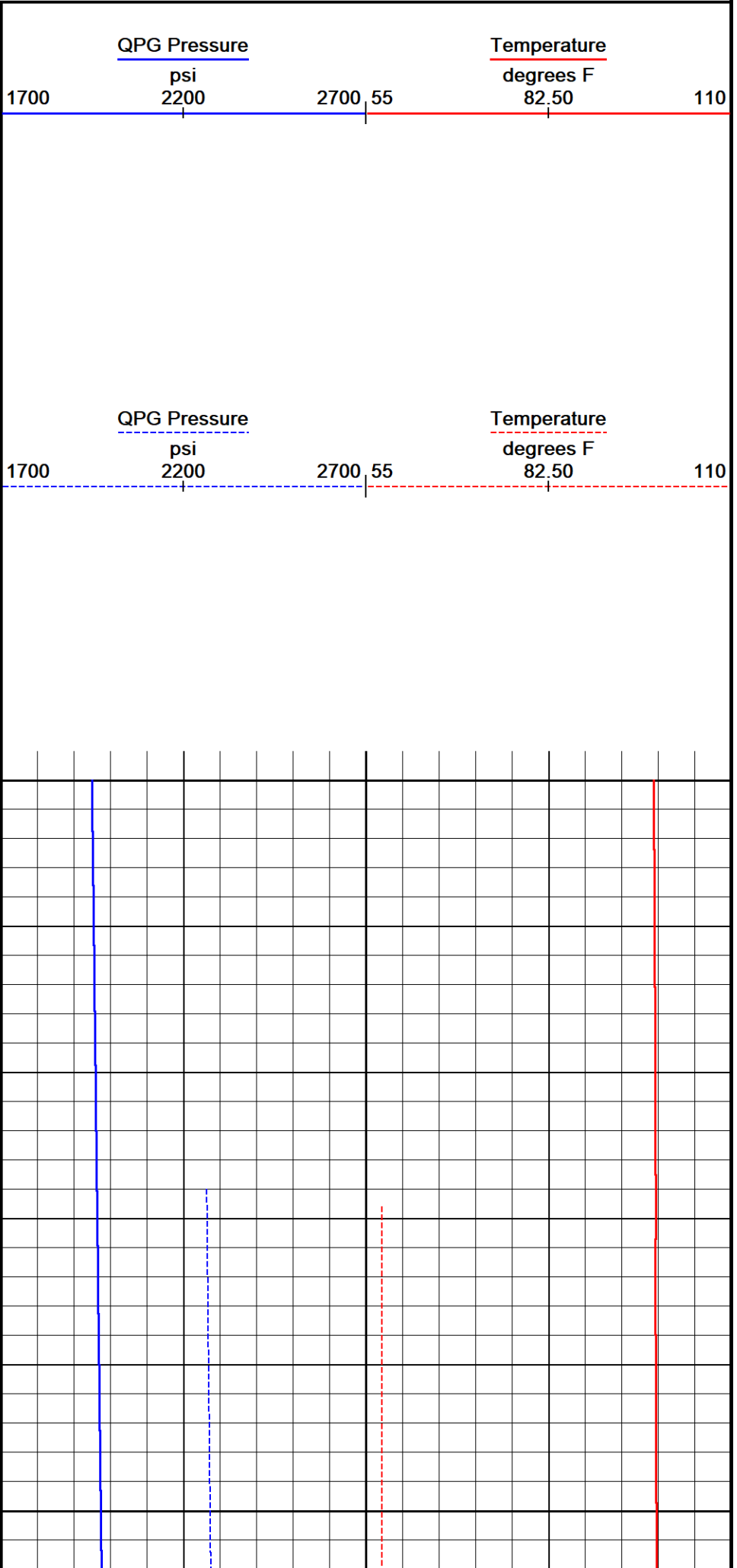


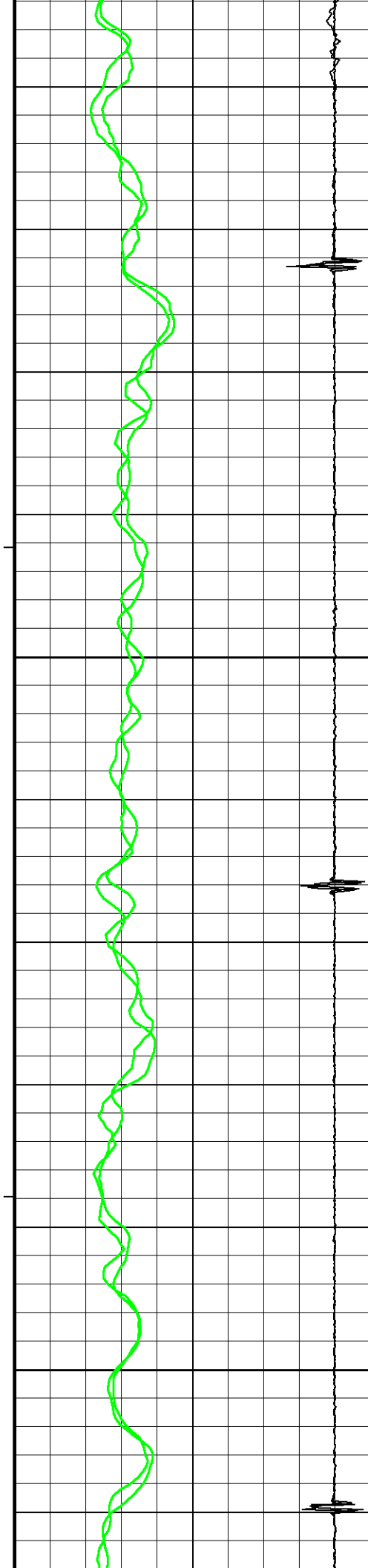
Depth  
in  
Feet

Replay  
Scale  
1:120

Down Log  
4150

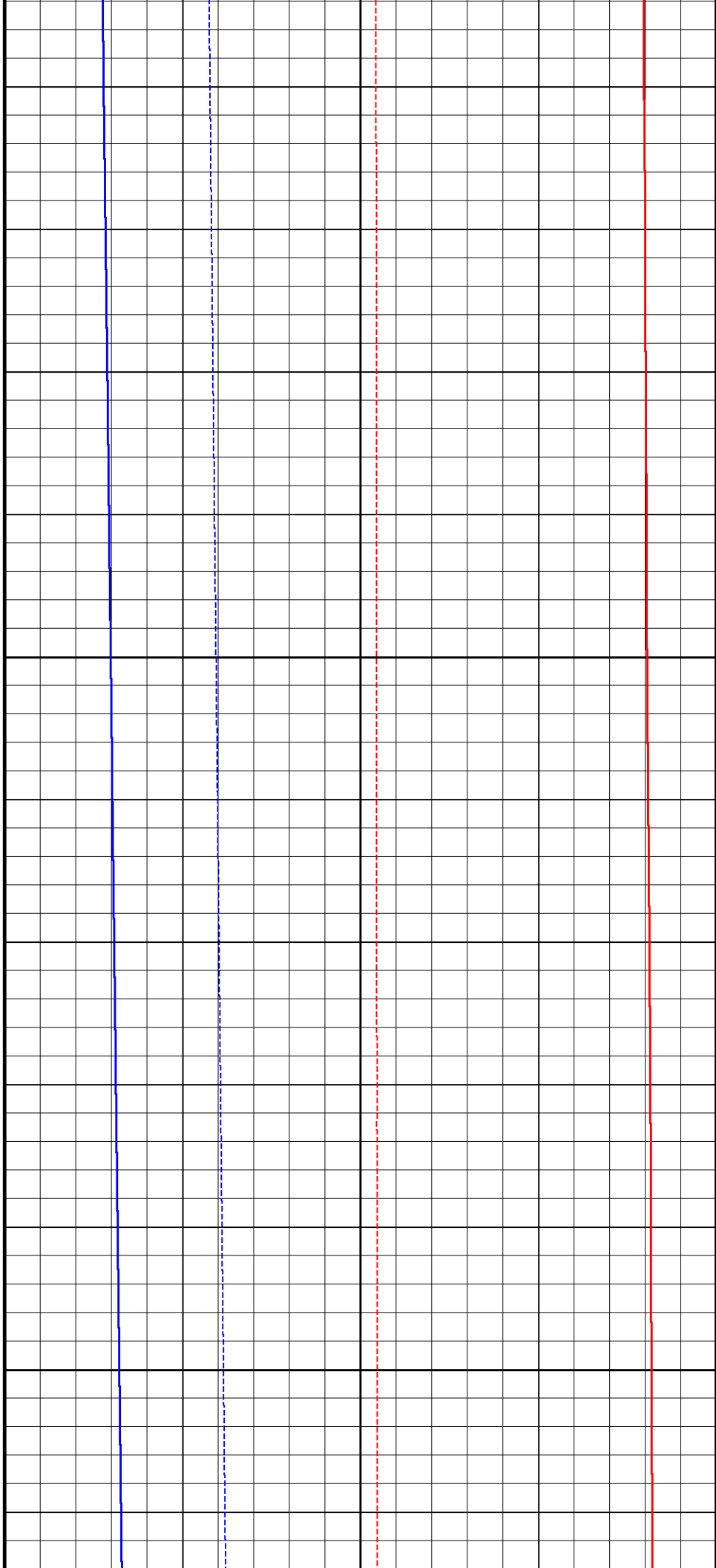
Down Log  
4200

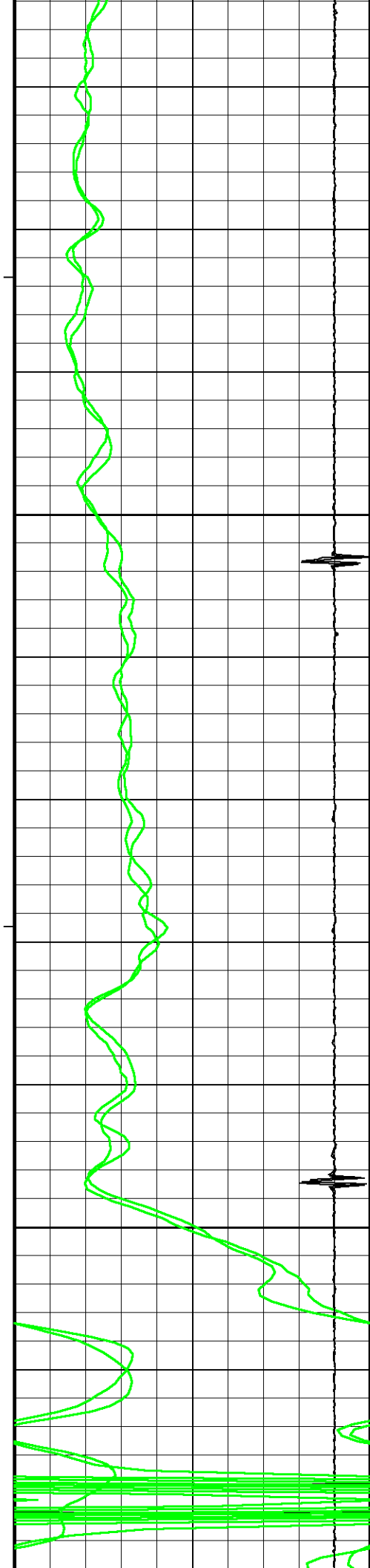




Down Log  
4250

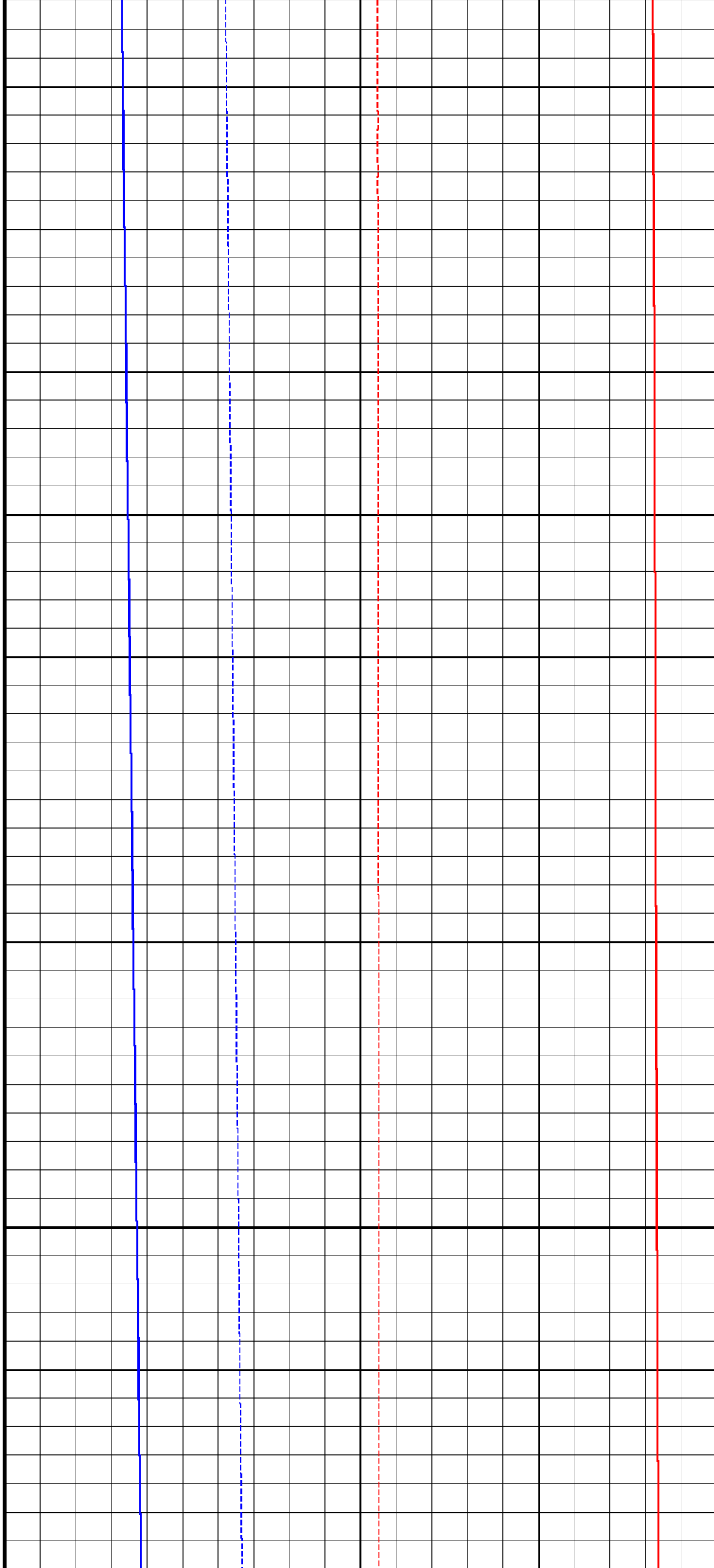
Down Log  
4300



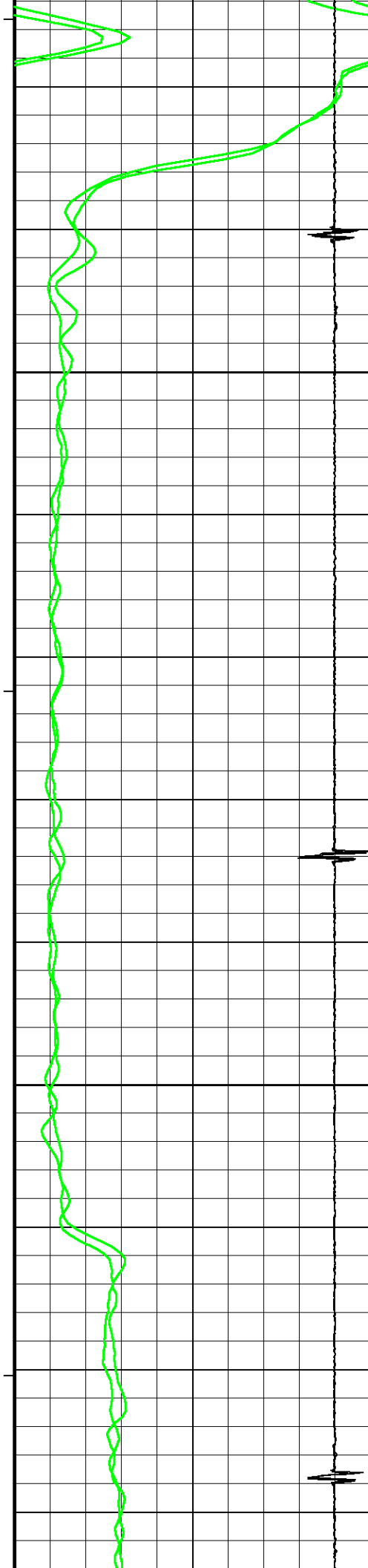


Down Log  
4350

Down Log  
4400

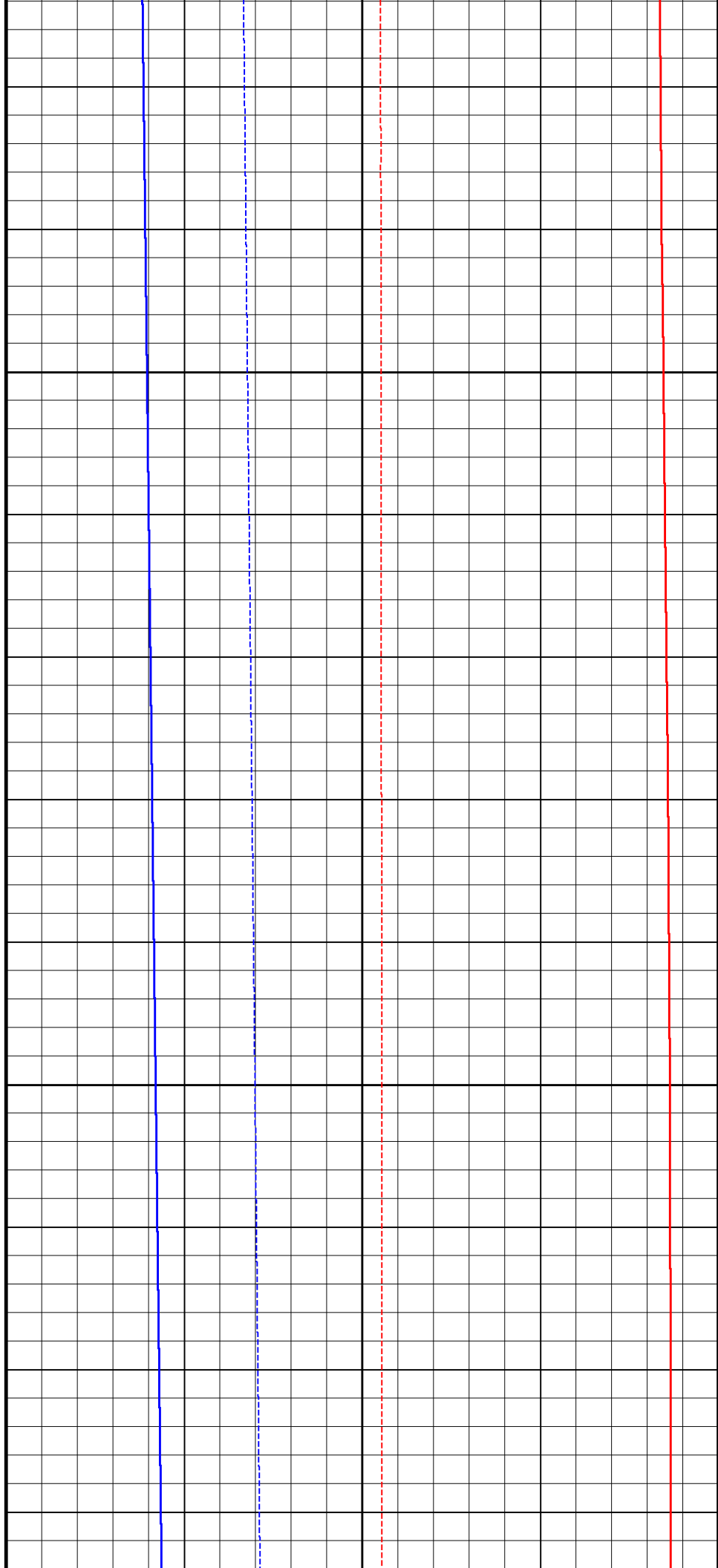


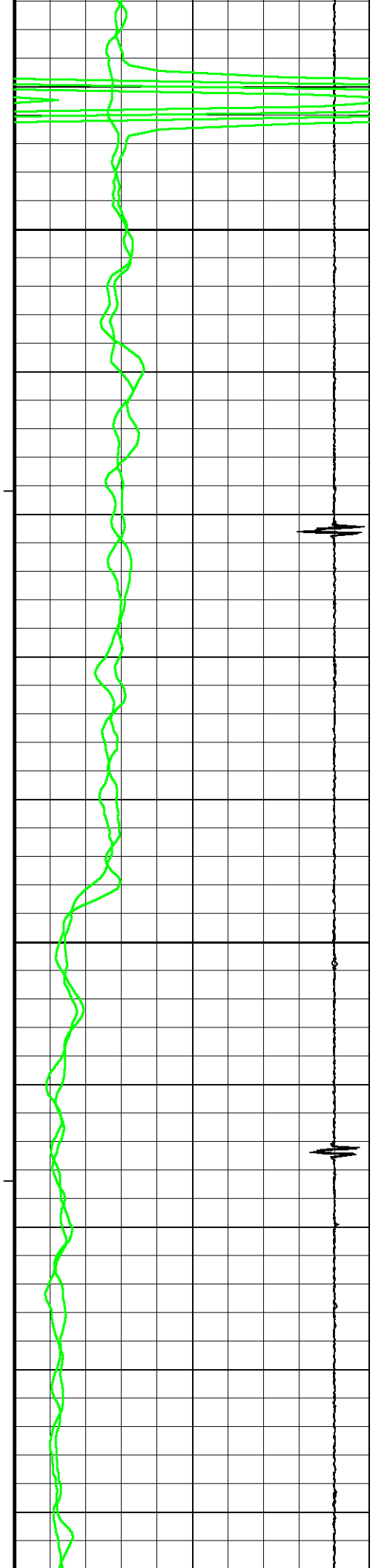




Down Log  
4450

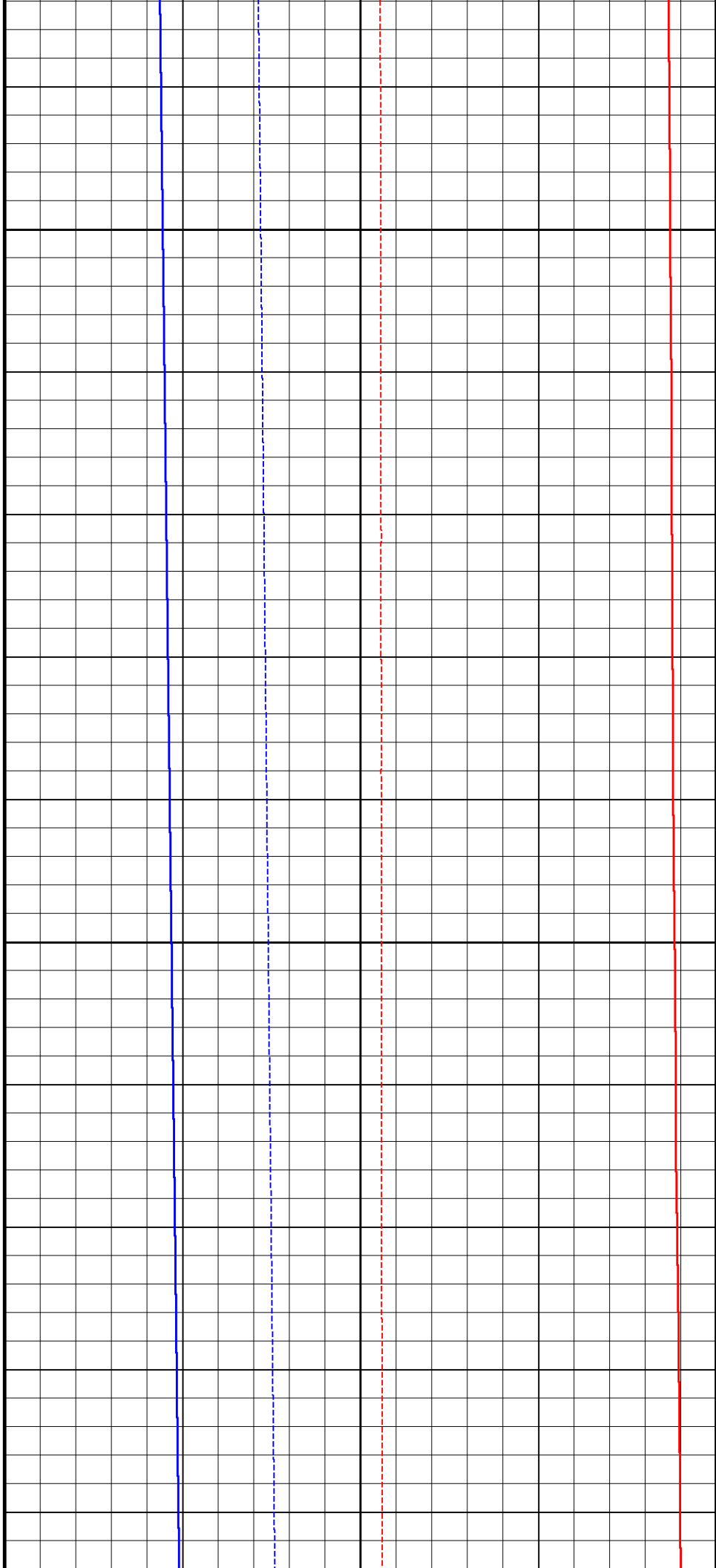
Down Log  
4500

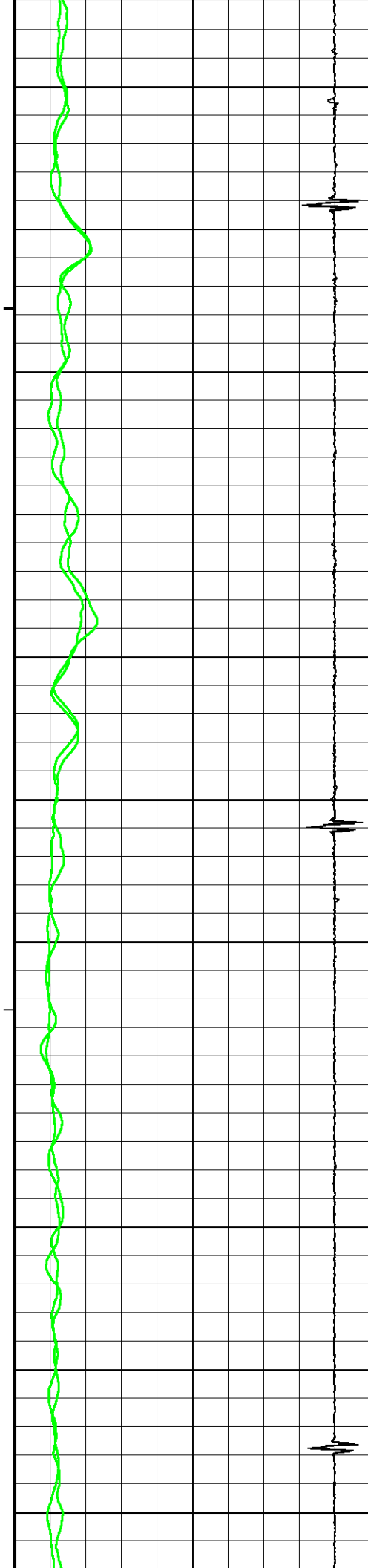




Down Log  
4550

Down Log  
4600

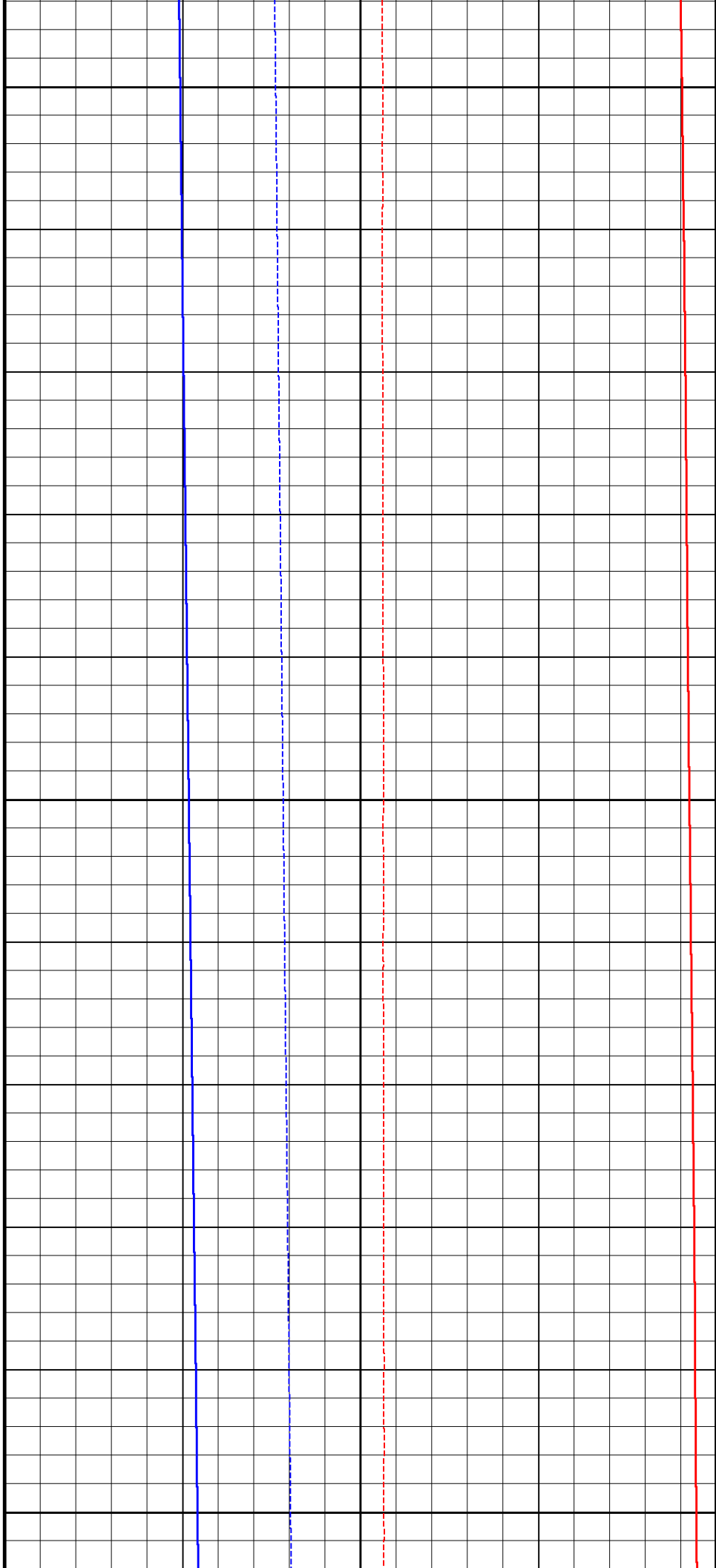


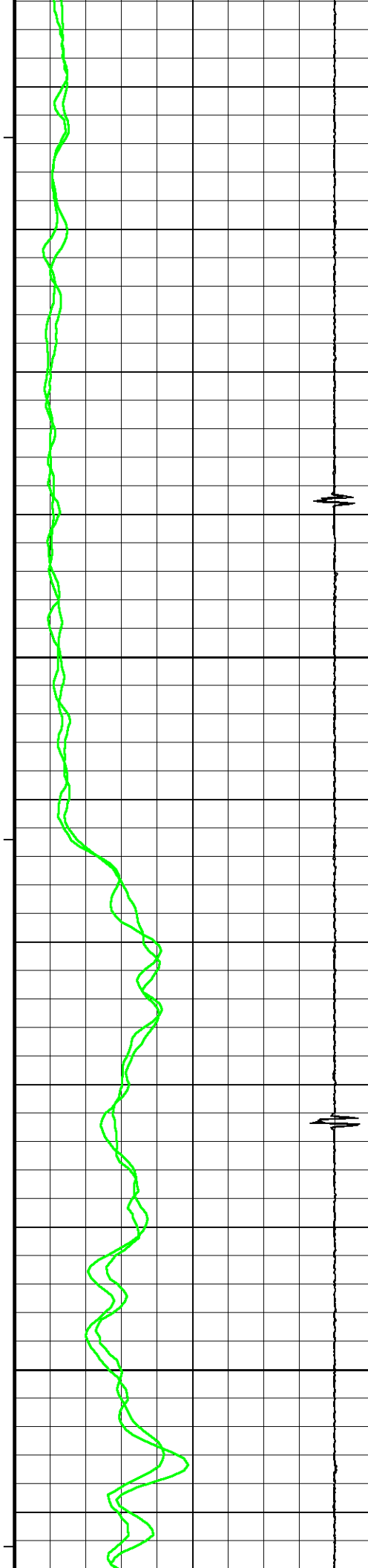


Down Log  
4650

Down Log  
4700

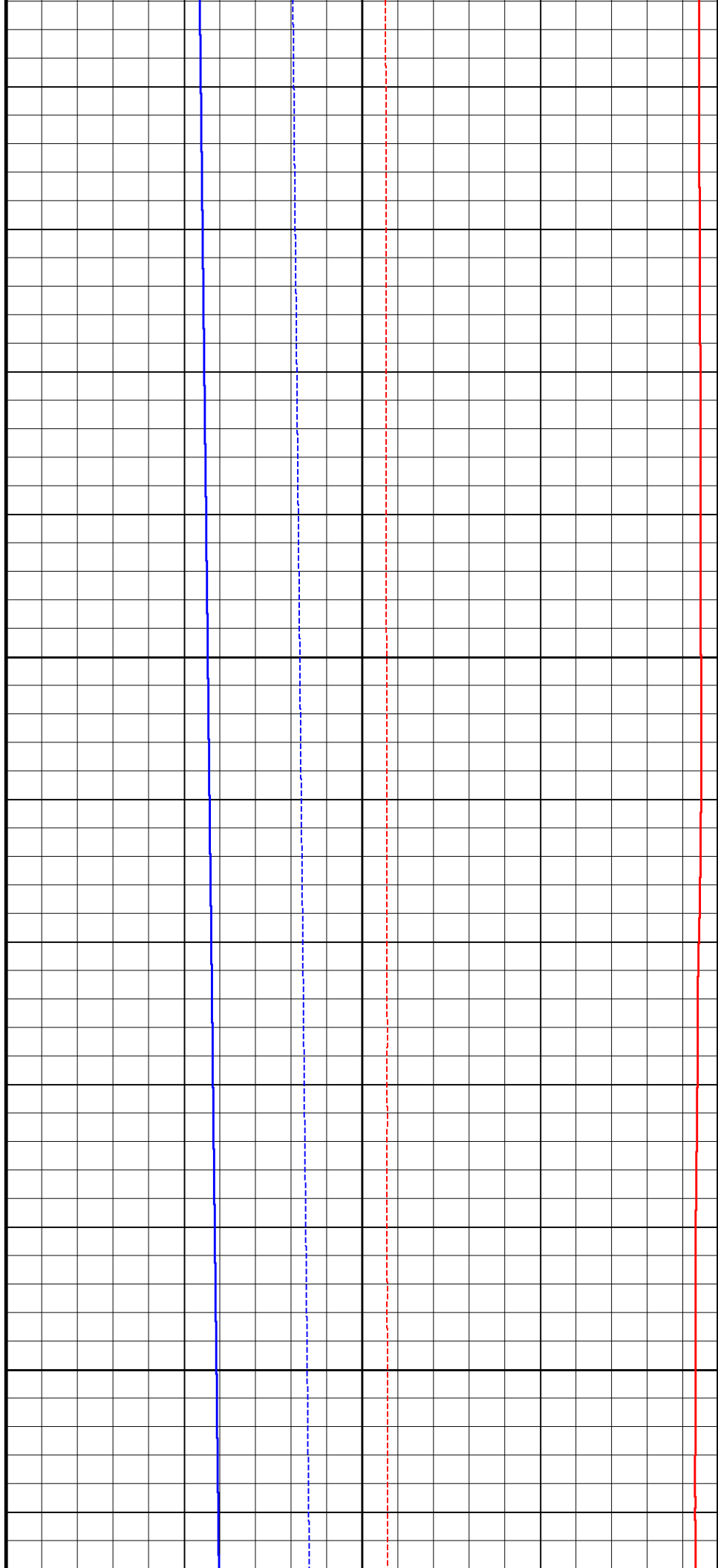
Down Log  
4750

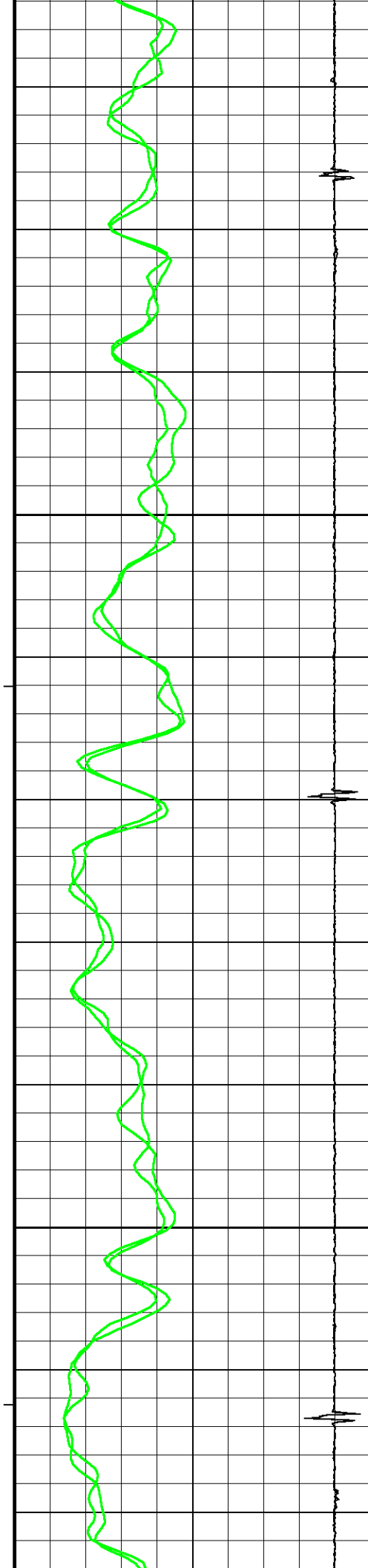




Down Log  
4800

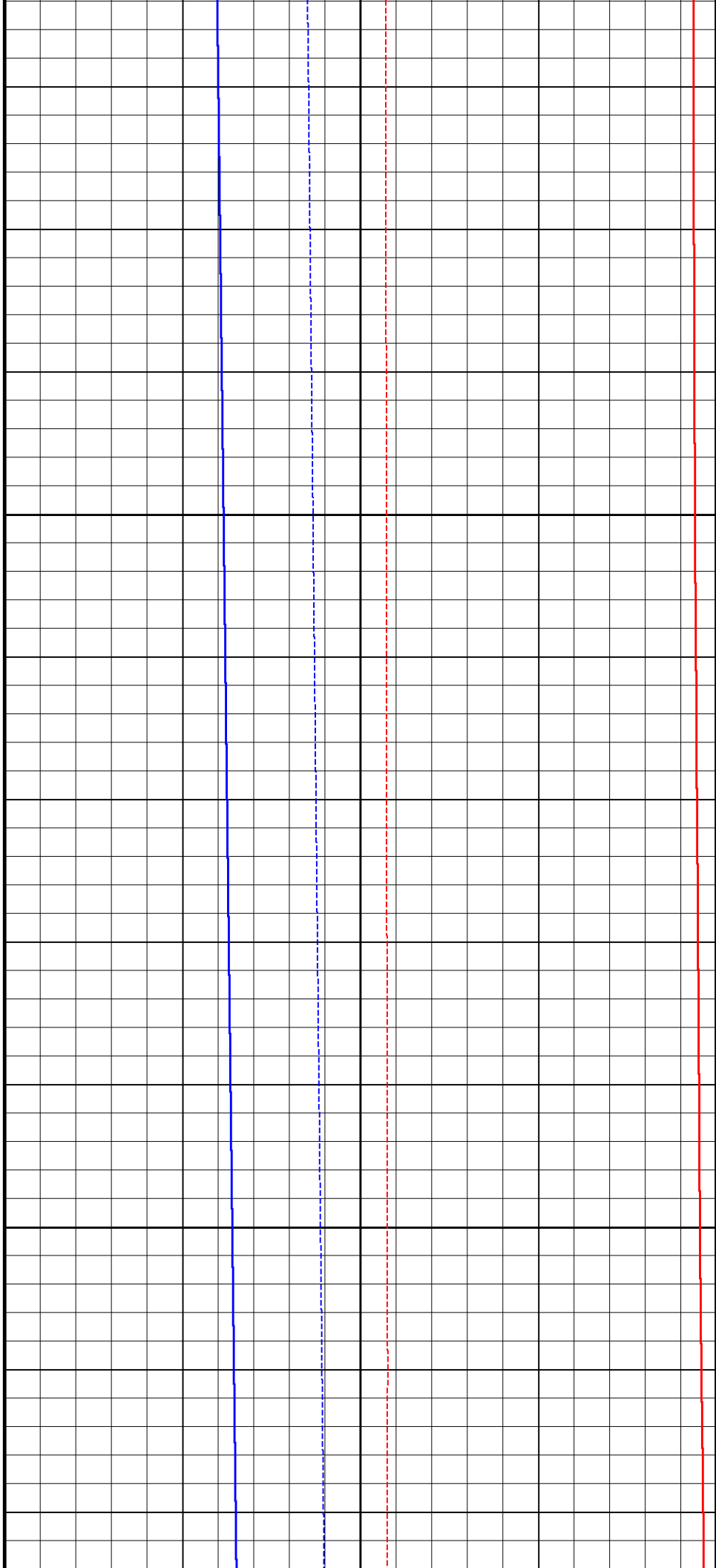
Down Log  
4850

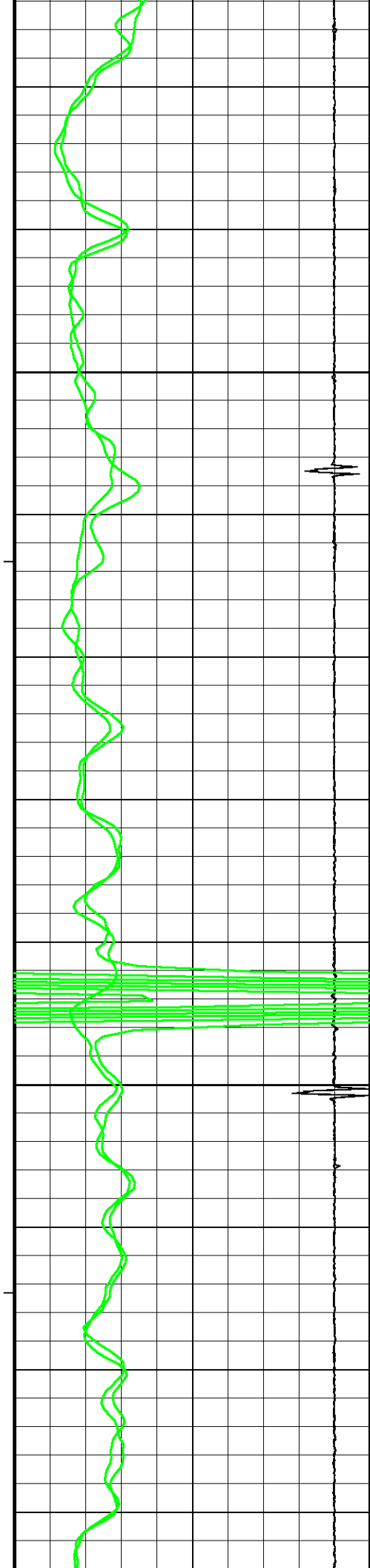




Down Log  
4900

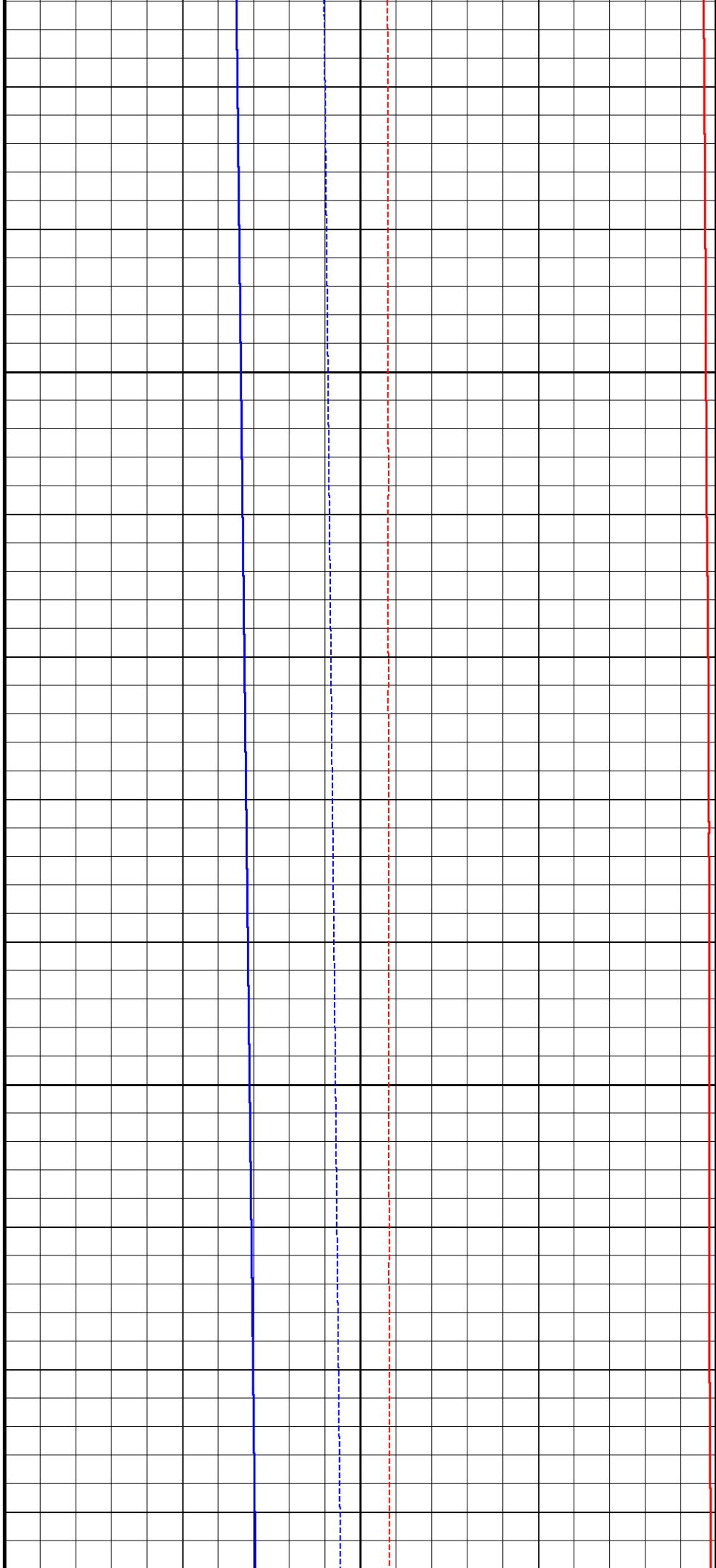
Down Log  
4950

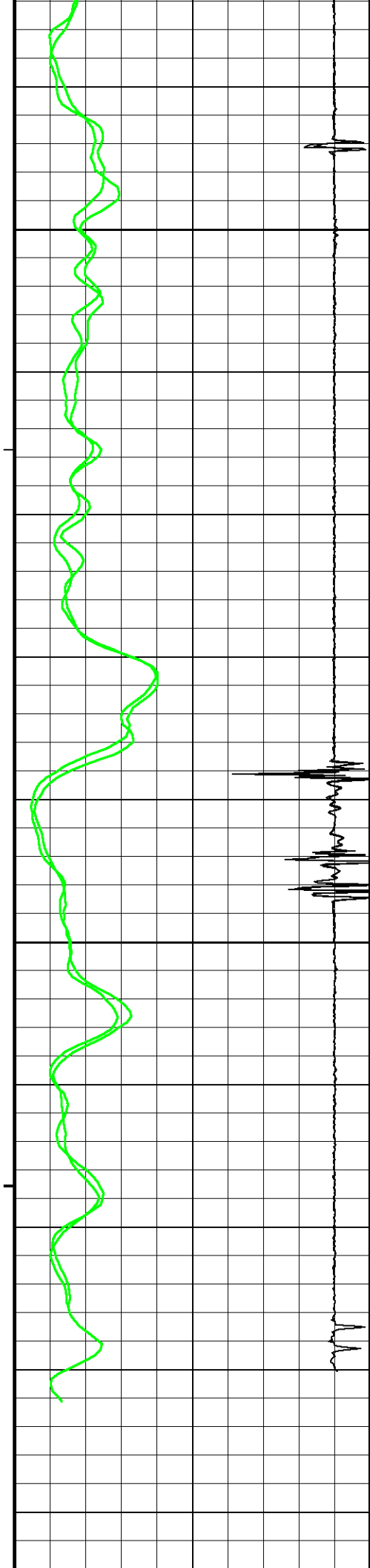




Down Log  
5000

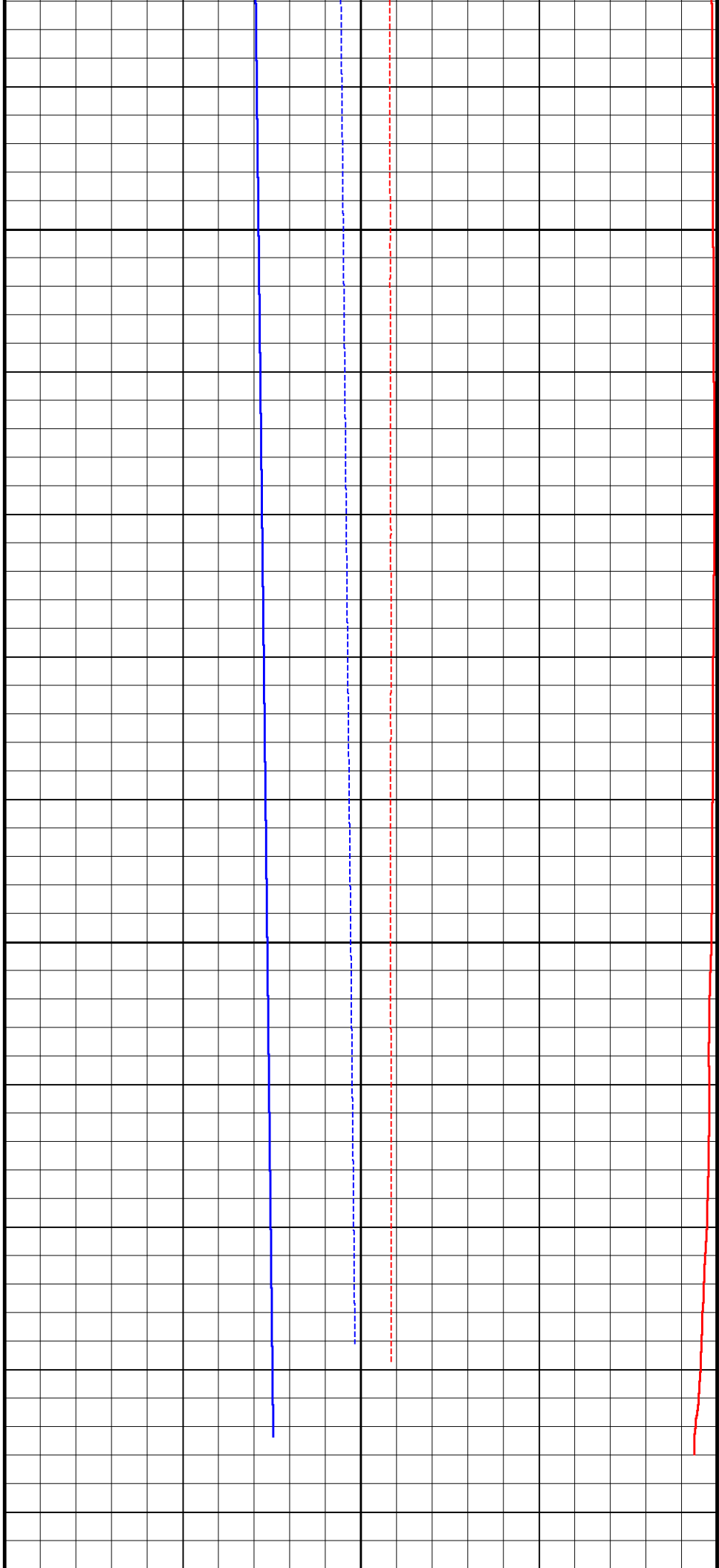
Down Log  
5050



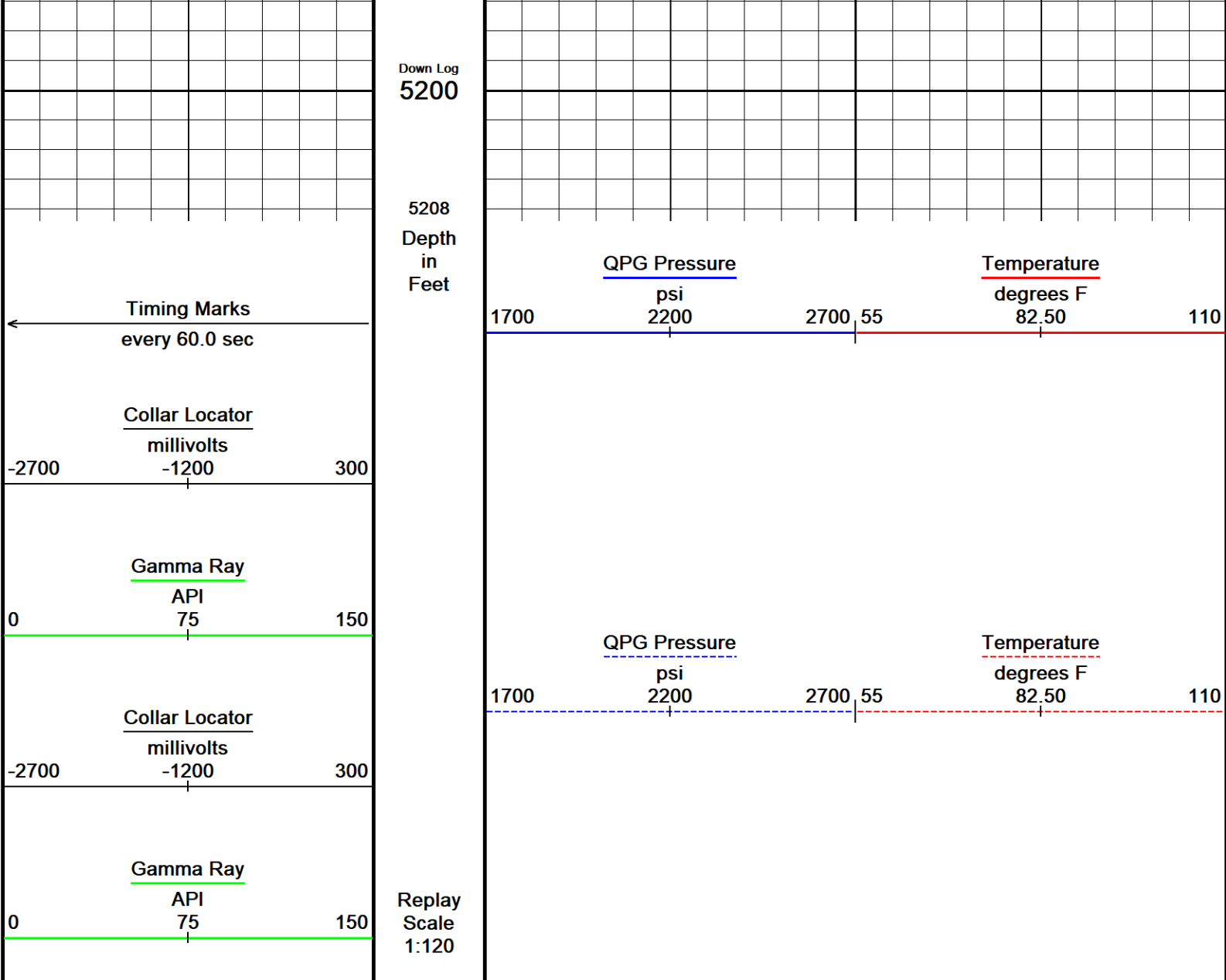


Down Log  
5100

Down Log  
5150







Depth Based Data - Maximum Sampling Increment 12.5cm Plotted on 31-JAN-2023 13:52  
Filename: C:\1 WLS\la&m\Midway 1\Field\DOWN.dta  
Filename: C:\1 WLS\la&m\Midway 1\Field\INJTEMP.dta Recorded on 15-NOV-2022 00:16  
System Versions: Logged with 22.03.8996 Processed with 22.03.8996 Plotted with 22.05.1131

↑ LOG DOWN INJECTING TEMPERATURE ↑

SHOP AND FIELD CALIBRATIONS			
C:\1 WLS\la&m\Midway 1\Field\351-5-45.dta			
Gamma Calibration UGR-KA 141			
Calibrator No:		Field Calibration on 05-SEP-2022 11:08	
Background 36.4	Calibrator 803.0	Standard 470.2	Units API
Delta Counts/Second: 766.6		CPS/API = 1.630	
		<div><div>1.567</div><div>1.650</div><div>1.733</div></div>	

QPG Master Calibration QPG-EA 106

Gauge

Serial Number	220928	Calibration Date	15 Sep 2012
Gauge Type	QHB108-16-177	Base Check Date	
Max Pressure	16000 PSI	Max Temperature	177 Deg C
Min Pressure	13 PSI	Min Temperature	25 Deg C

Pressure

Pressure polynomial order			3			Temperature polynomial order			3					
T0			T1			T2			T3			T4		
P0	13.6402		-0.585455		-0.0197893		9.3116e-06							
P1	42.1819		-0.0208838		2.62627e-05		-5.38063e-08							
P2	-0.00199429		8.64228e-06		-3.99023e-08		3.69856e-11							
P3	6.96299e-07		4.3671e-10		5.12647e-11		4.4574e-14							
P4														

Temperature

Temperature polynomial order					3				
T0		T1		T2		T3		T4	
25.2302		-0.731527		-0.000858522		-6.86634e-07			

Temperature Tool Shop Survey Calibration TMP-NA 140

Temperature Tool Shop Survey Calibration

Tool Type: TMP-NA                      Serial No: 140

calibration		
Standard		Measured
32	DEGF	36714 Hz
212	DEGF	50849 Hz

COMPANY	MID-WAY ENVIRONMENTAL SERVICES
WELL	MIDWAY ENVIRONMENTAL NUMBER 1
FIELD	DAVENPORT
PROVINCE/COUNTY	LINCOLN
COUNTRY/STATE	OKLAHOMA

Elevation Kelly Bushing	886.50	feet	Top Log Interval	12.00	feet
Elevation Drill Floor	886.50	feet	Bottom Log Interval	5208.00	feet
Elevation Ground Level	874.50	feet	Depth Driller	7040.00	feet
			Depth Logger	5710.00	feet

**Weatherford®**

## RAPTOR WATERFLOW LOG

**APPENDIX B**

**FACILITY ANNULUS MONITORING DATA**

**AND**

**ANNULUS PRESSURE RECORDING CHART**

Mid-Way Environmental Services, Inc.  
Facility Conducted Annulus Test  
Davenport, Oklahoma



Date: 12-2-22  
Time: 335 pm

Start-Up Procedures: annulus at 620 psi - added nitrogen INSERT DESCRIPTION OF ACTIVITIES  
to system - bring up to 802 psi - Start test 945 am Stop test 330 pm.  
nitrogen was cold when added to system - as day went by - psi increased.

Tubing Pressure: Begin: 173 psi  
End: 173 psi

Annulus Pressure: Begin: 620 psi (prior to pressuring up)  
End: 809 psi (after bleeding back)

Company Representatives: Mid-Way DEQ A & M Engineering  
Dave Osborne

	Pressure (psi)	Time
Initial:	802	945.
1st Min.	803	1030 am
2nd Min.	803	1100 am
3rd Min.	804	1200 pm
4th Min.	804	100 pm
5th Min.	804	130 pm
30th Min.	807	200 pm
60th Min.	808	230 pm
90th Min.	809	300 pm
120th Min	809	330 pm

Initial Annulus Pressure: 802 psi

Final Annulus Pressure: 809 psi

% Change = (initial psig-final psig/initial psig) X 100

% Change =

"PASSED"

"FAILED"

(circle one)

Test Conducted by: David Osborne

Signature: David Osborne