Schlumberger

Company: **Lamont Doherty Earth Observatory**

Well: **Expedition 351, Site U1438F**
Field: **IBM Arc Origins**
Rig: **JOIDES Resolution** Ocean: **Pacific**

Rig: JOIDES Resolution
Field: IBM Arc Origins
Location: Latitude: N 27.3836116*
Well: Expedition 351, Site U1438F
Company: Lamont Doherty Earth Observatory

Hostile Natural Gamma Sonde (HNGS)
Spectroscopy
Caliper

LOCATION

Latitude: N 27.3836116*
Longitude: E 134.3181633*

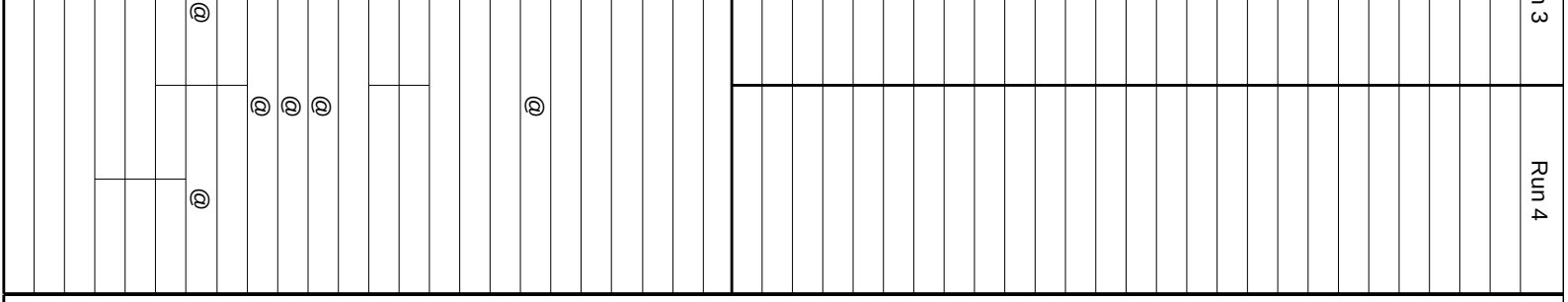
Elev.: K.B. −4711.00 m
G.L. 0.00 m
D.F. −4711.00 m

Permanent Datum: Sea Floor — Elev.: 0.00 m
Log Measured From: Sea Floor — 0.00 m above Perm. Datum
Drilling Measured From: Sea Floor

API Serial No.	N 27.3836116	E 134.3181633	

	Run 1	Run 2	Run
Logging Date	25−Jul−2014		
Run Number	1		
Depth Driller	700 m		
Schlumberger Depth	608 m		
Bottom Log Interval	608 m		
Top Log Interval	0 m		
Casing Driller Size @ Depth	5.500 in @ 94.67 m	@	
Casing Schlumberger	92 m		
Bit Size	9.875 in		
Type Fluid In Hole	Seawater		
MUD Density / Viscosity	1.03 g/cm3		
MUD Fluid Loss / PH			
MUD Source Of Sample	N/A		
RM @ Measured Temperature	@	@	
RMF @ Measured Temperature	@	@	
RMC @ Measured Temperature	@	@	
Source RMF / RMC	N/A / N/A		
RM @ MRT / RMF @ MRT	@ 23 / @ 23	@ / @	
Maximum Recorded Temperatures	23 degC		
Circulation Stopped / Time	25−Jul−2014 / 14:00		
Logger On Bottom / Time	25−Jul−2014 / 14:00		
Unit Number / Location	627314 / Houston		
Recorded By	K. Swain		
Witnessed By	L. Drab		

	Run 1	Run 2	Run
Logging Date			
Run Number			
Depth Driller			
Schlumberger Depth			
Bottom Log Interval			
Top Log Interval			
Casing Driller Size @ Depth	@		
Casing Schlumberger			
Bit Size			
Type Fluid In Hole			
MUD Density / Viscosity			
MUD Fluid Loss / PH			
MUD Source Of Sample			
RM @ Measured Temperature	@		
RMF @ Measured Temperature	@		
RMC @ Measured Temperature	@		
Source RMF / RMC			
RM @ MRT / RMF @ MRT	@ / @		
Maximum Recorded Temperatures			
Circulation Stopped / Time			
Logger On Bottom / Time			
Unit Number / Location			
Recorded By			
Witnessed By			



DISCLAIMER

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OTHER SERVICES1	OTHER SERVICES2
OS1: FMS/DSI	OS1:
OS2:	OS2:
OS3: MSS	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
Hole drilled with RCB rotary cone bit and bottom hole assembly (BHA). 9 7/8 " BS	
Dedicated hole only for logging, no core taken.	
Drill pipe set at 95 mbsf and wireline operation made inside of drillpipe into	
open hole below this depth.	
Lower part of toolstring (MSS and HRLA) centralized using modified MCD inline centralizers.	
Upper part of toolstring (HLDS, HNGS) eccentered using HLDS caliper, as per toolsketch.	
Fluid type was sea water, as used to drill, so no barite corrections were required.	
All logs presented in measured depth below sea floor (MDBSF).	
Maximum observed temperature on the HRLA temperature was 22.6 degC.	
Original log data acquired with drill floor as the reference but later	
played back to sea floor depth as the primary depth reference.	

RUN 1			RUN 2		
SERVICE ORDER #:			SERVICE ORDER #:		
PROGRAM VERSION:		19C0−187	PROGRAM VERSION:		
FLUID LEVEL:			FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

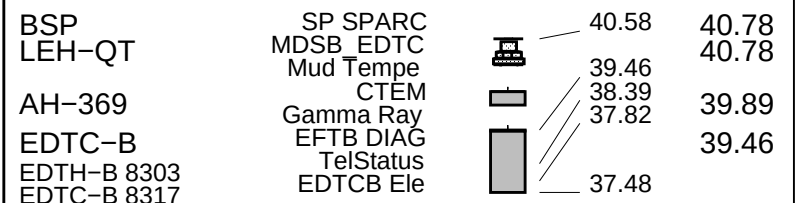
EQUIPMENT DESCRIPTION

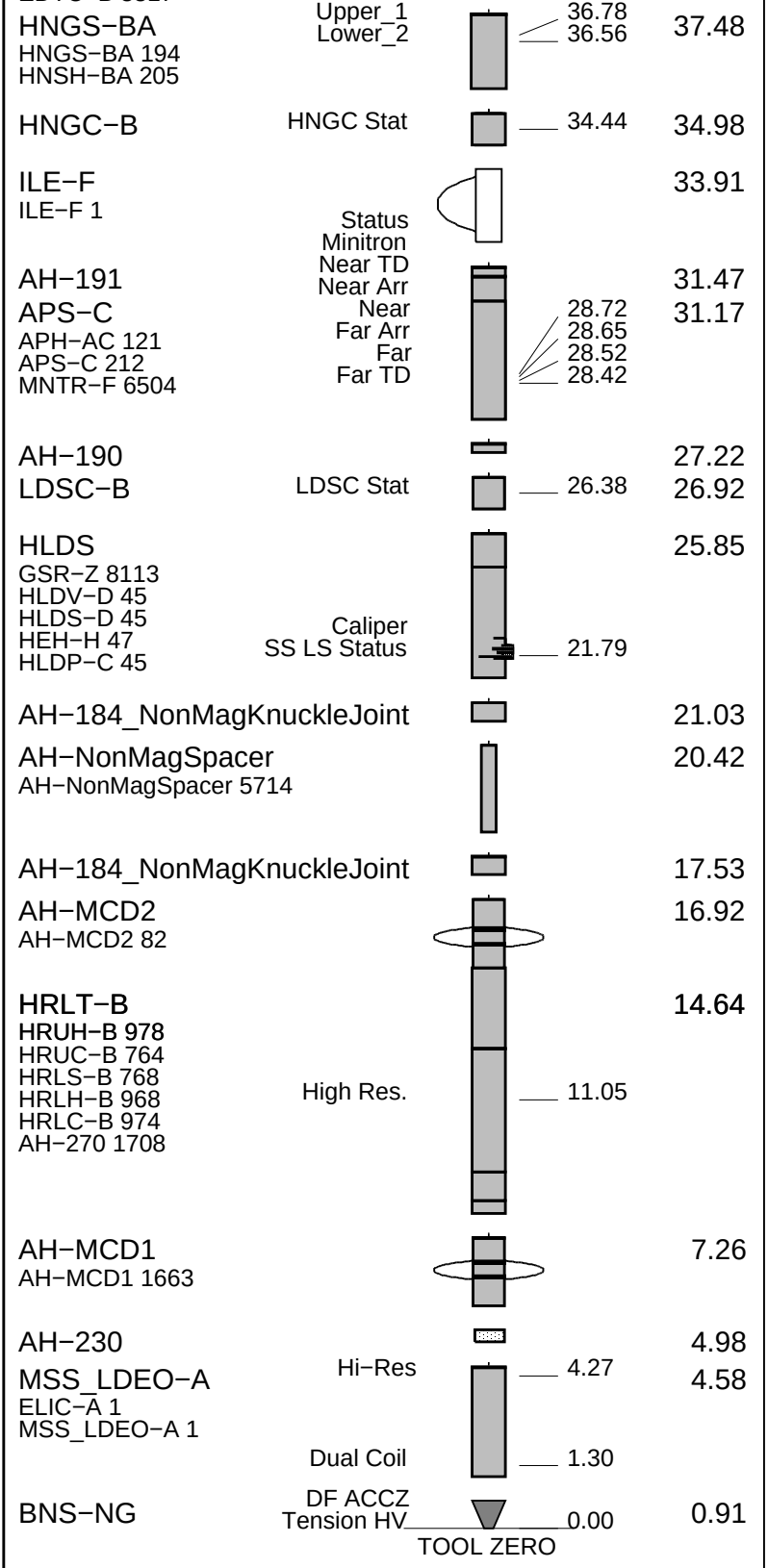
RUN 1	RUN 2

SURFACE EQUIPMENT

SFT−281 1
SFT−178 1
GSR−U 616008
WITM (EDTS)−A 1

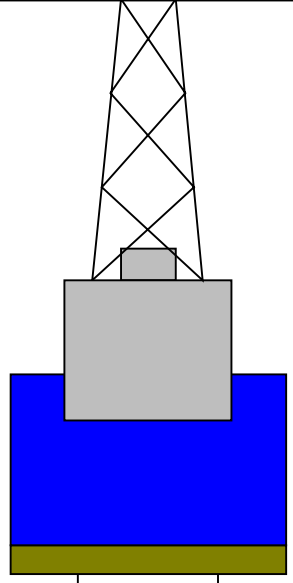
DOWNHOLE EQUIPMENT





MAXIMUM STRING DIAMETER 3.75 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

Production String	(in) OD	(in) ID	(M) MD	Well Schematic	(M) MD	(in) OD	(in) ID	Casing String



Kelly Bushing Elevation	−4711		
Derrick Floor Elevation	−4711		
Mean Sea Level	−4700		
			4.1
Sea Floor		0	4.1
Drill Pipe		94.67	
Open Hole			9.875
Total Depth		700	

Input DLIS Files

DEFAULT	MSS_LDEO_HRLA_LDL_019PUP	FN:30	PRODUCER	25−Jul−2014 17:37	5415.5 M	4700.0 M

Output DLIS Files

DEFAULT	MSS_LDEO_HRLA_LDL_020PUP	FN:32	PRODUCER	25−Jul−2014 17:42	704.5 M	−11.0 M
BACKUP	MSS_LDEO_HRLA_LDL_020PUP	FN:33	PRODUCER	25−Jul−2014 17:42	704.5 M	−11.0 M

OP System Version: 19C0−187

MSS_LDEO−A	19C0−187	HRLT−B	19C0−187
HLDS	19C0−187	LDSC−B	19C0−187
APS−C	19C0−187	HNGC−B	19C0−187
HNGS−BA	19C0−187	EDTC−B	SKK−5169−EDTCB
BSP	19C0−187		

PIP SUMMARY

Time Mark Every 60 S

HNGS Spectroscopy Gamma Ray (HSGR)

0 (GAPI) 100

Area1
From HCGR to HSGR

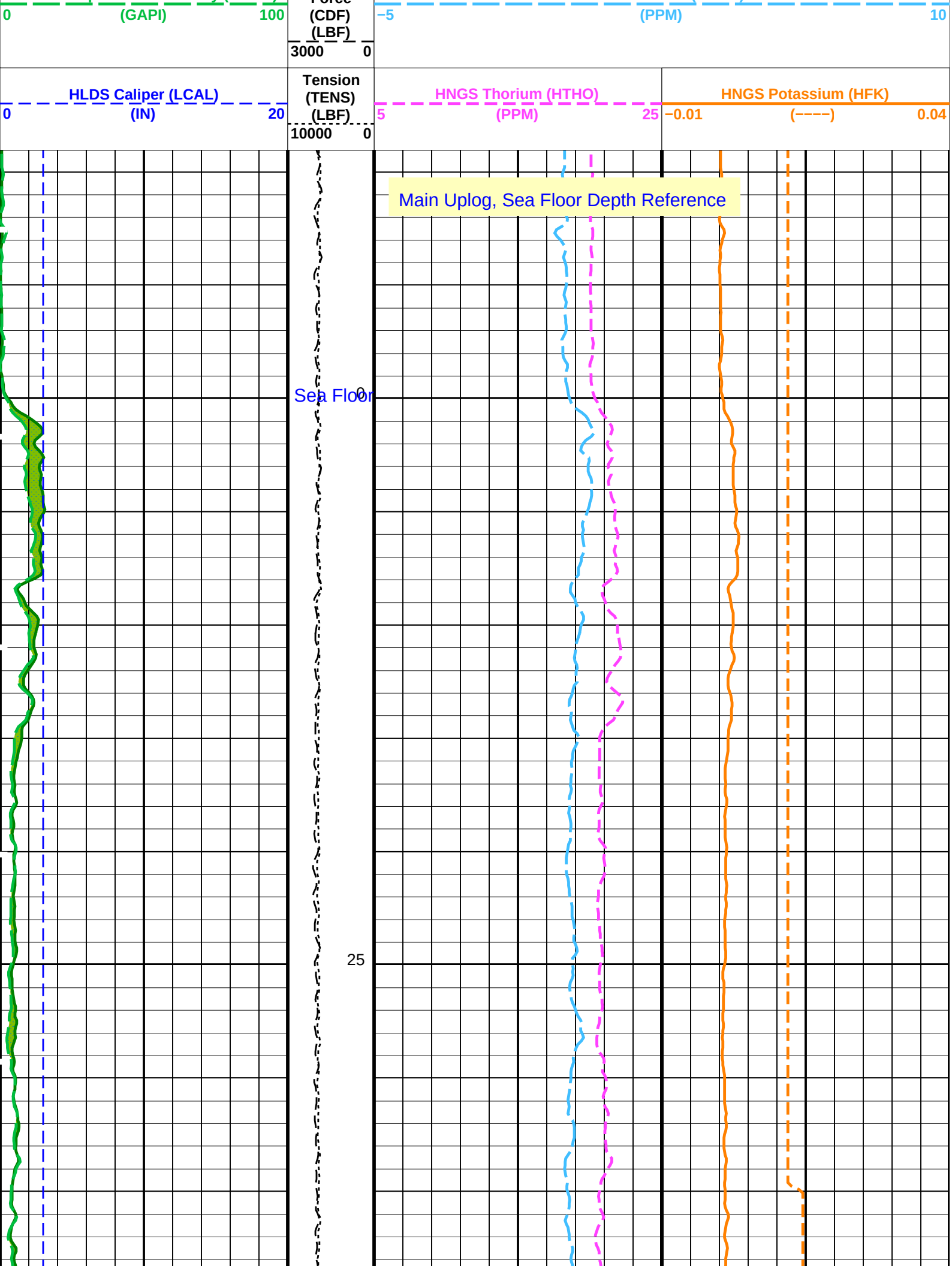
HNGS Borehole Potassium (HBHK)

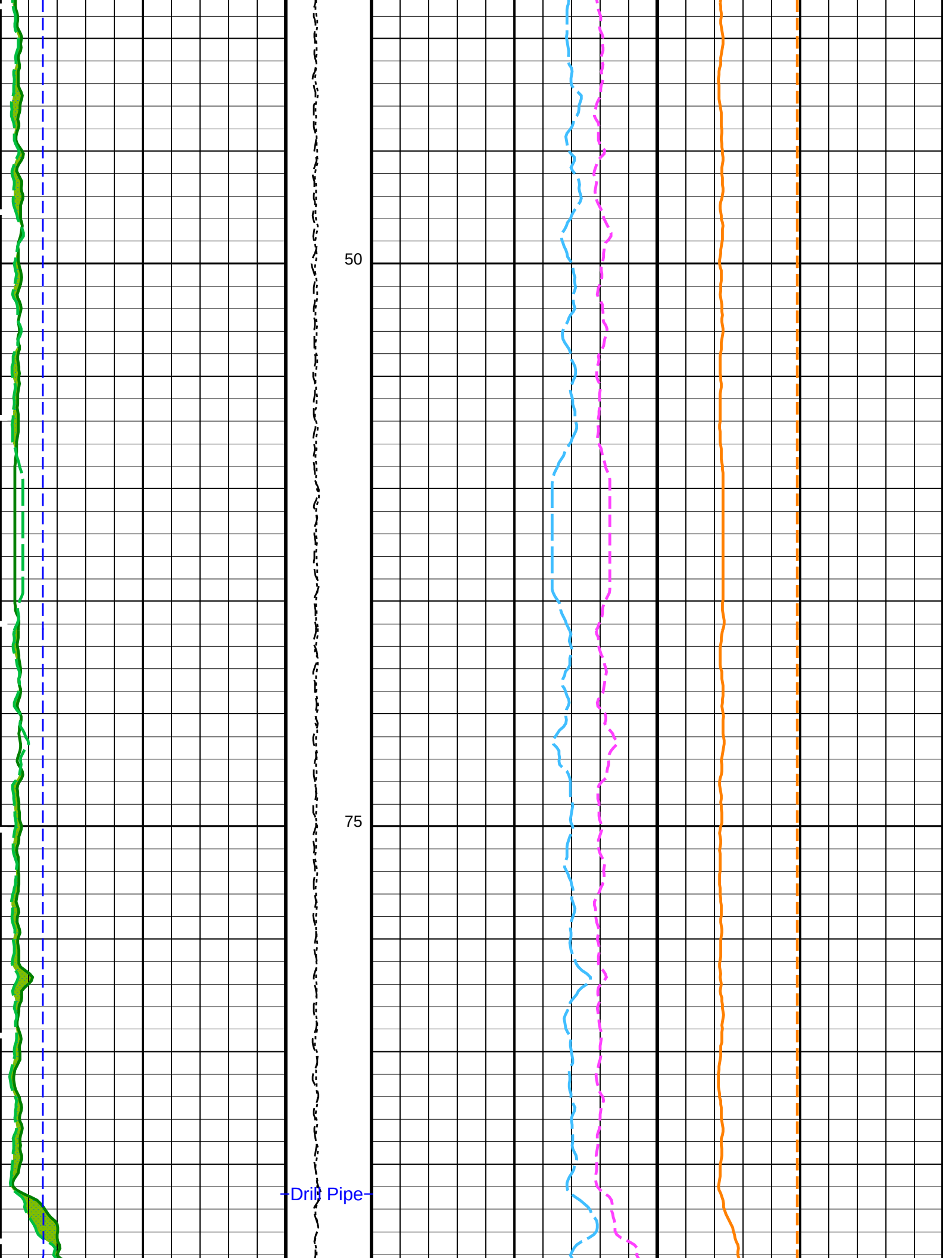
−0.05 (−−−−) 0.05

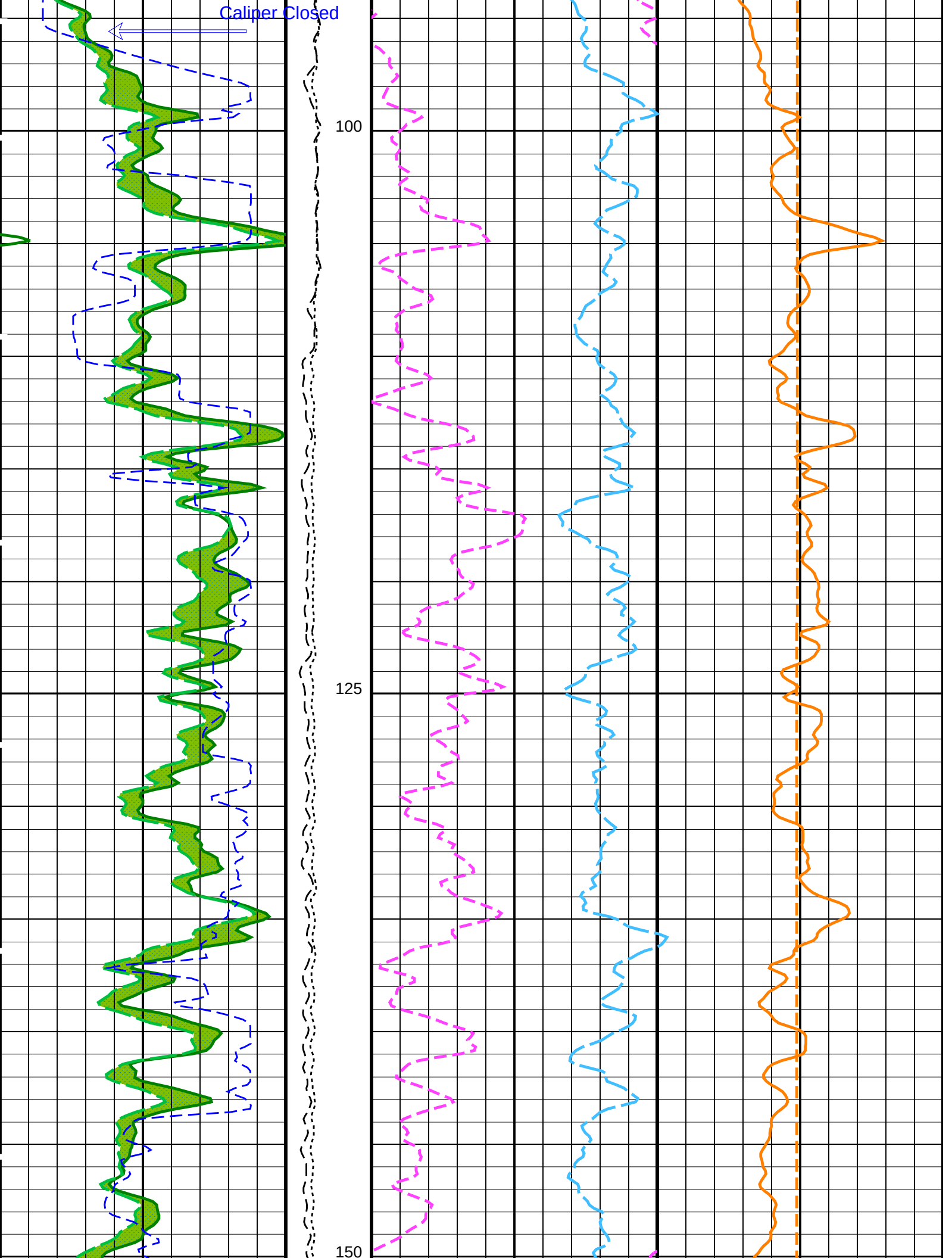
HNGS Computed Gamma Ray (HCGR)

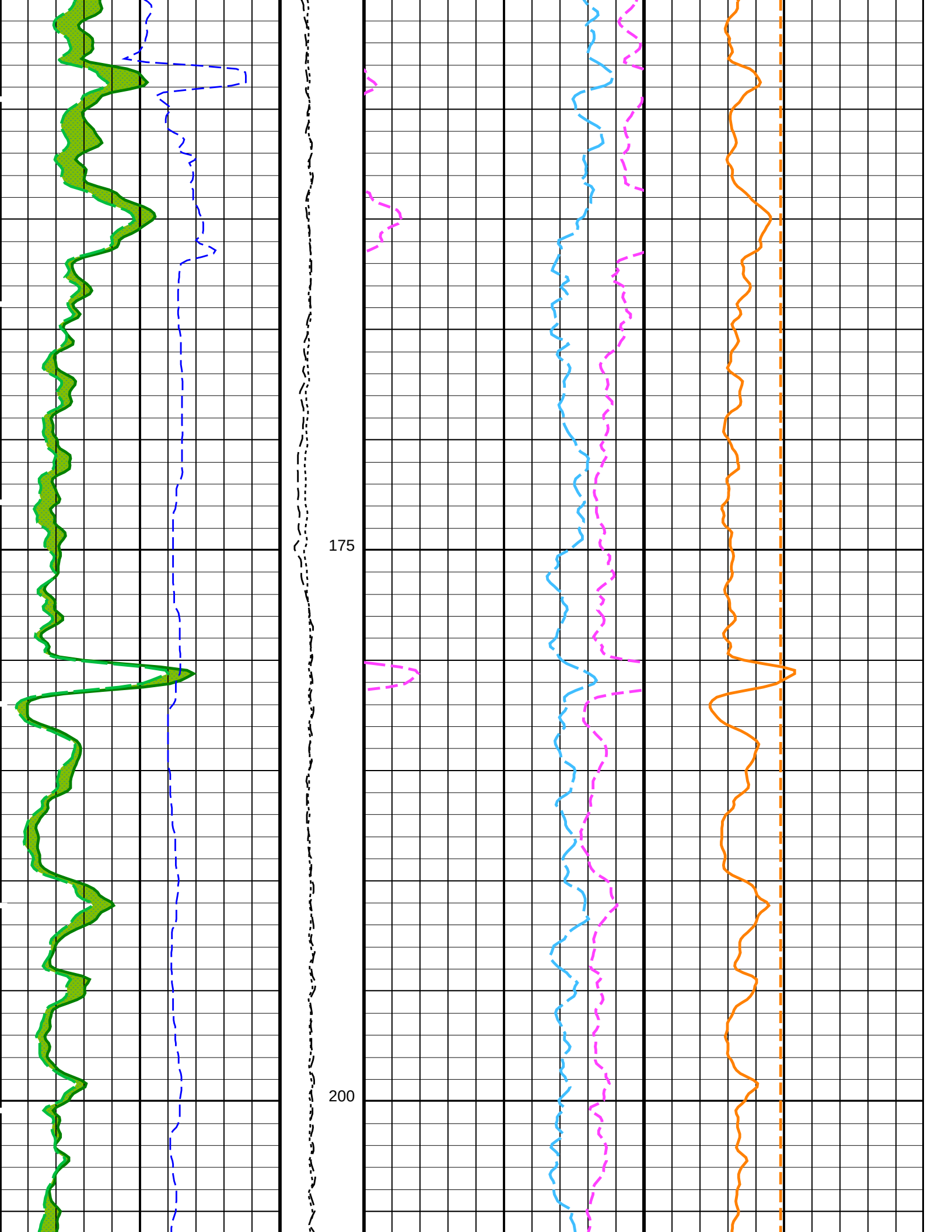
Calibrated Downhole Force

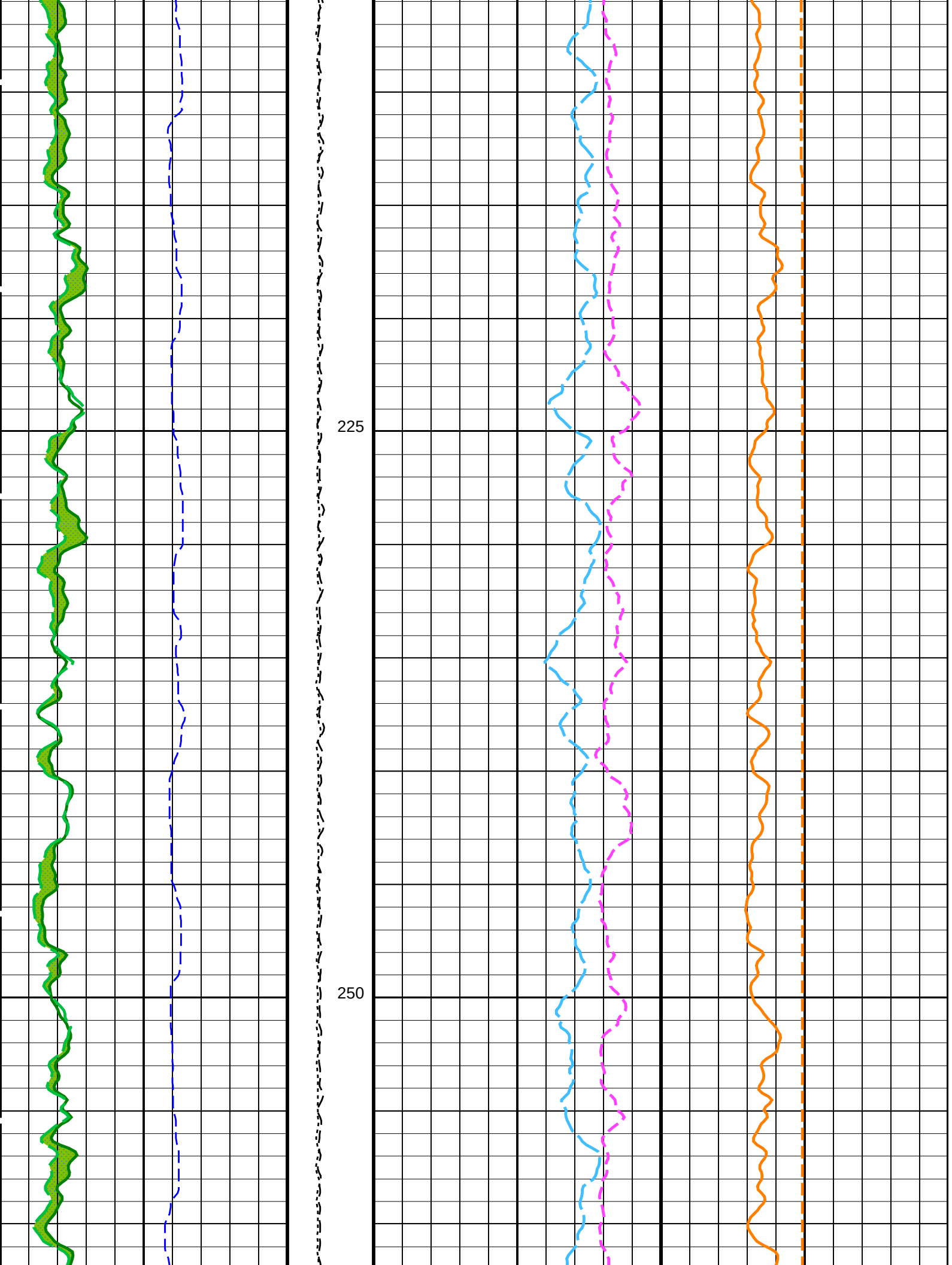
HNGS Uranium (HURA)

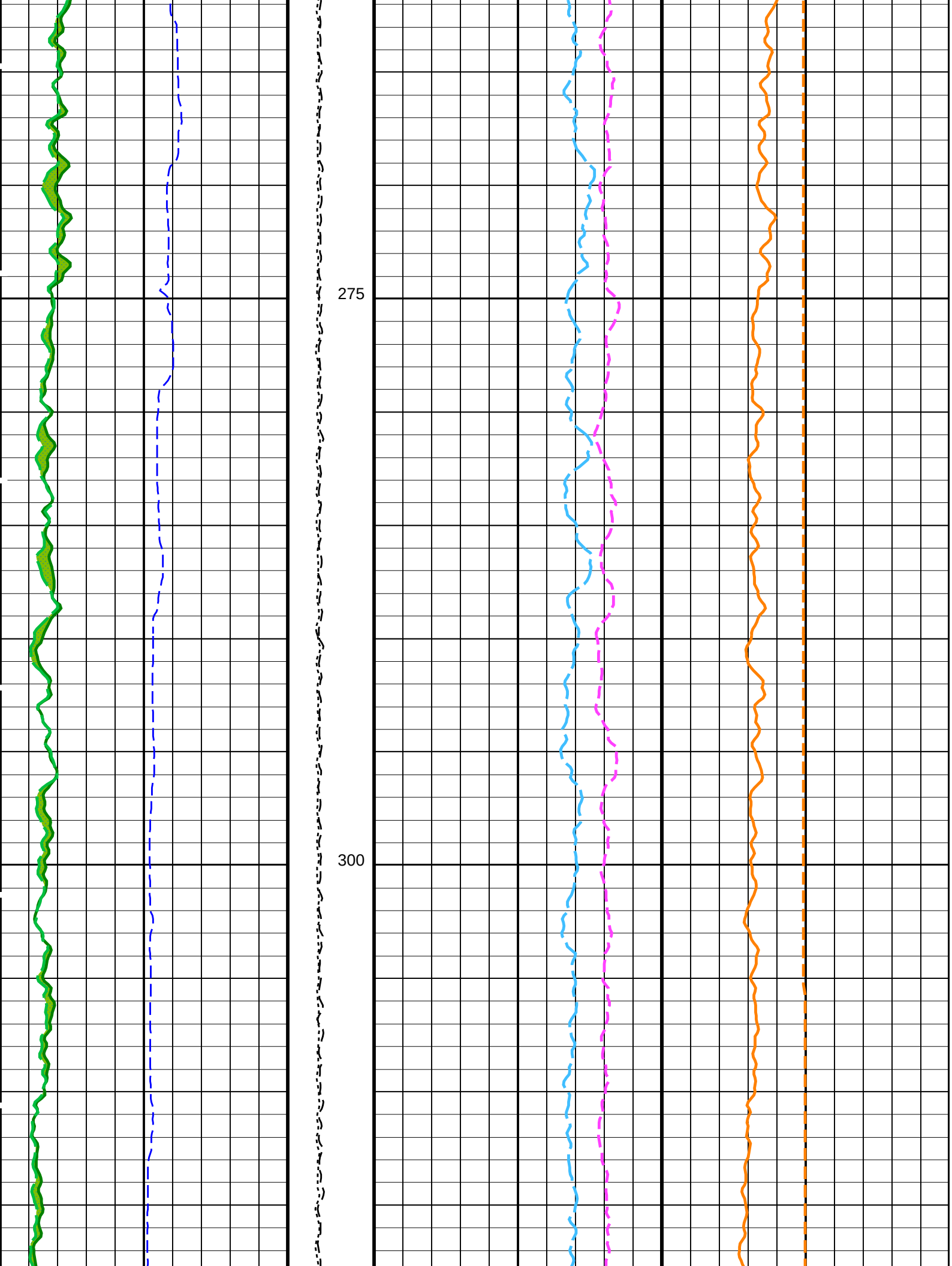

0
(GAPI)
100
Force
(CDF)
(LBF)
3000
0
−5
(PPM)
10
HLDS Caliper (LCAL)
0
(IN)
20
Tension
(TENS)
(LBF)
10000
0
HNGS Thorium (HTHO)
5
(PPM)
25
HNGS Potassium (HFK)
−0.01
(−−−−)
0.04
Main Uplog, Sea Floor Depth Reference
Sea Floor
0
25

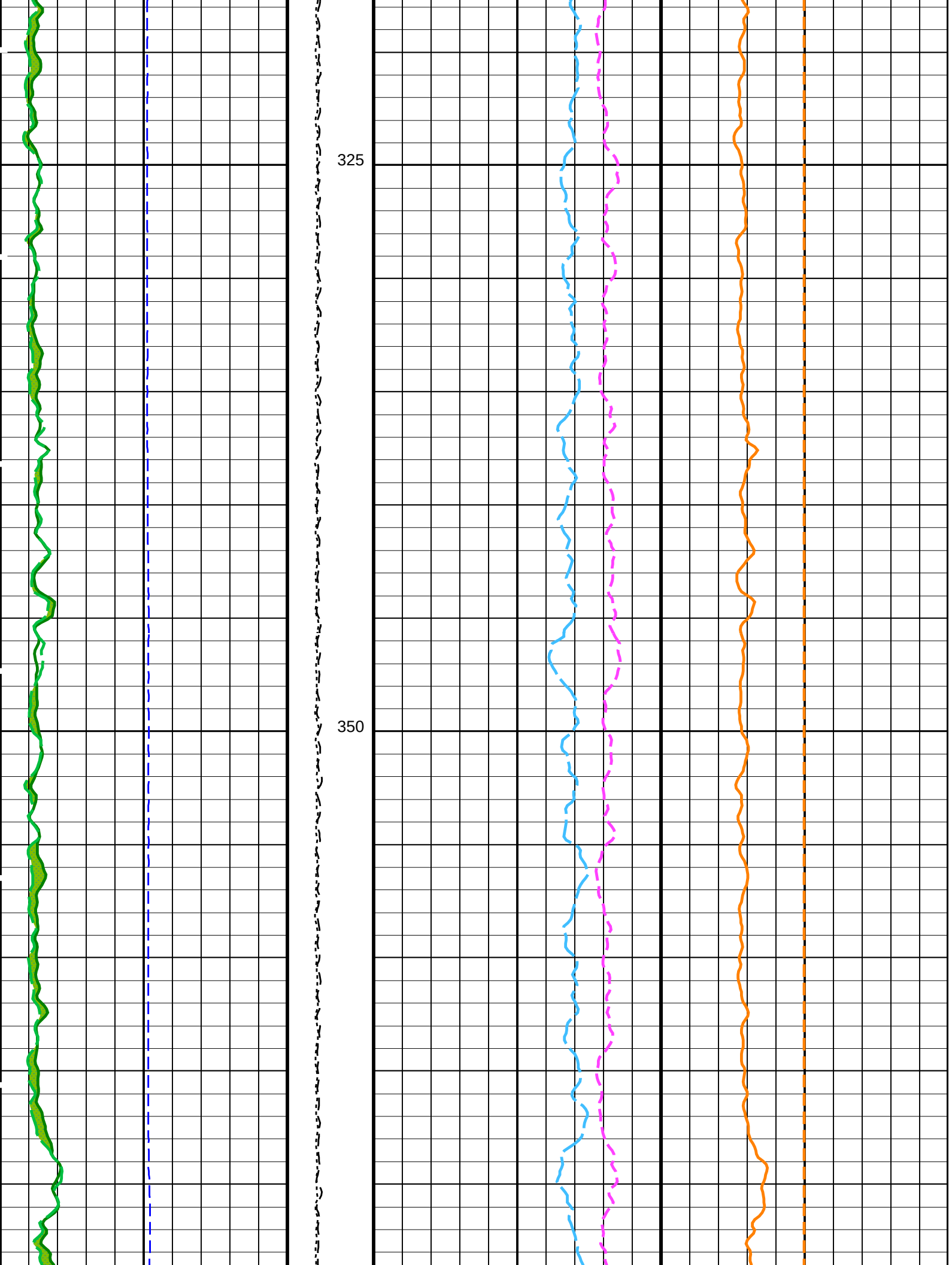

50
75
Drill Pipe

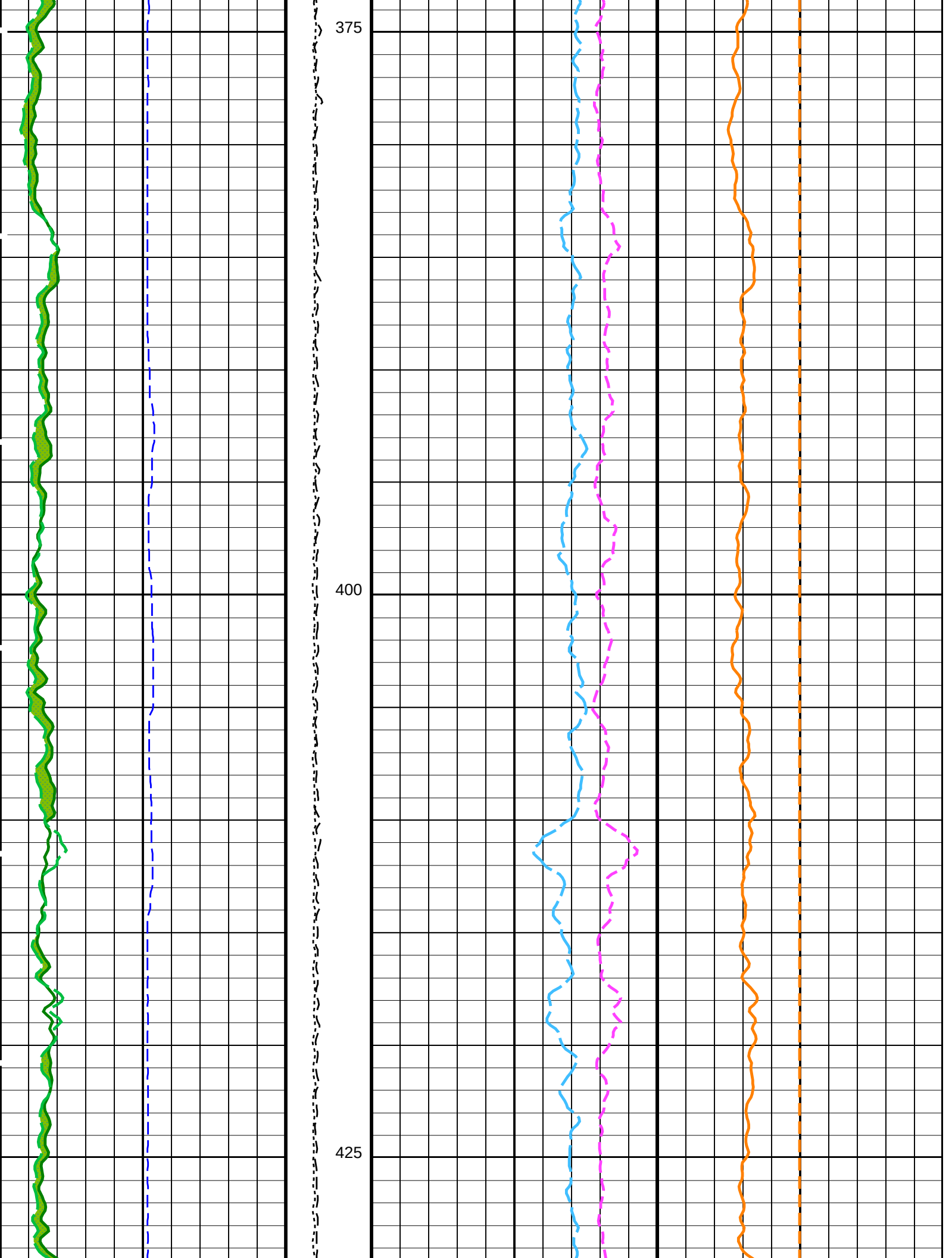

Caliper Closed
100
125
150

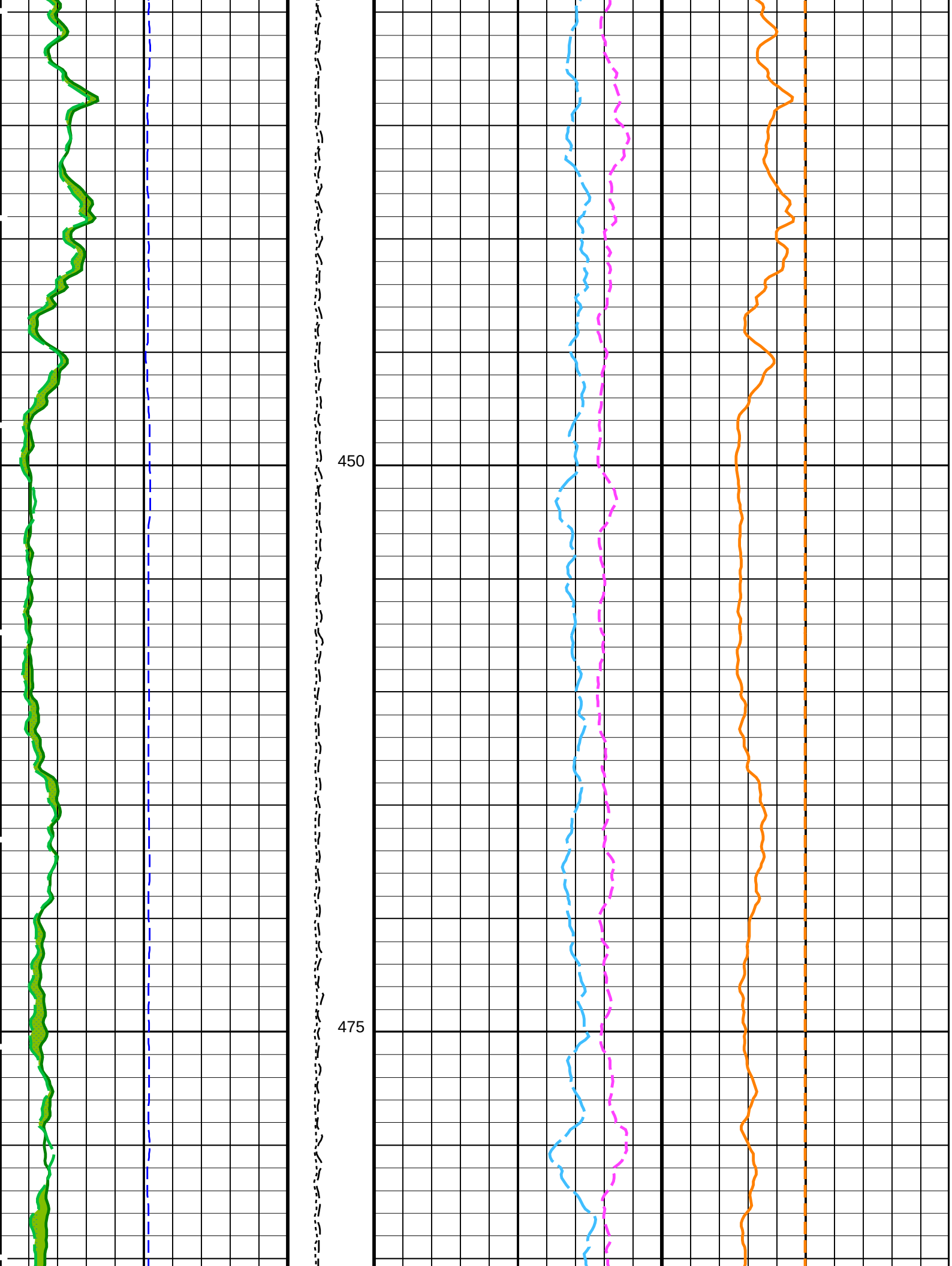

175
200

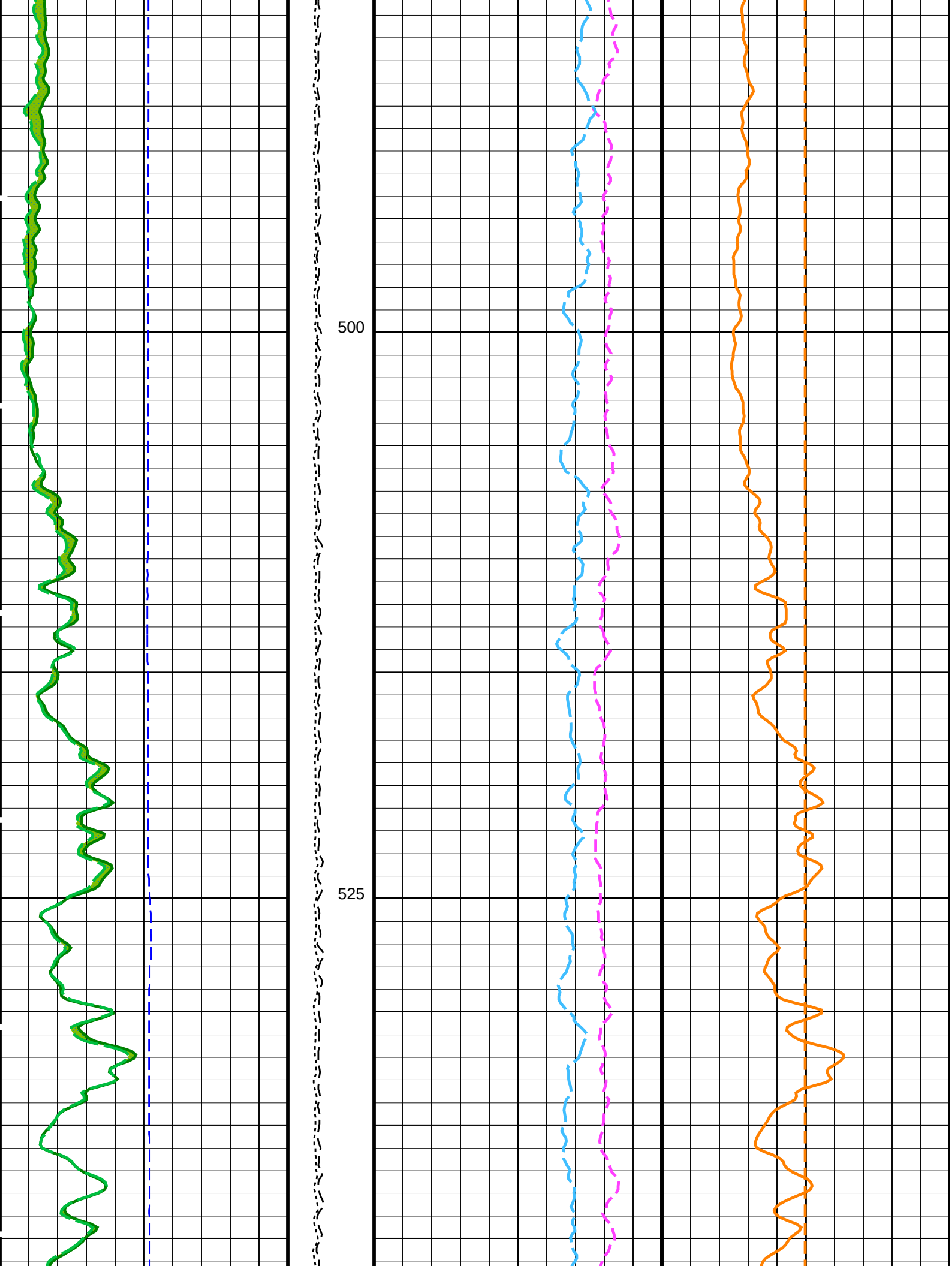

225
250

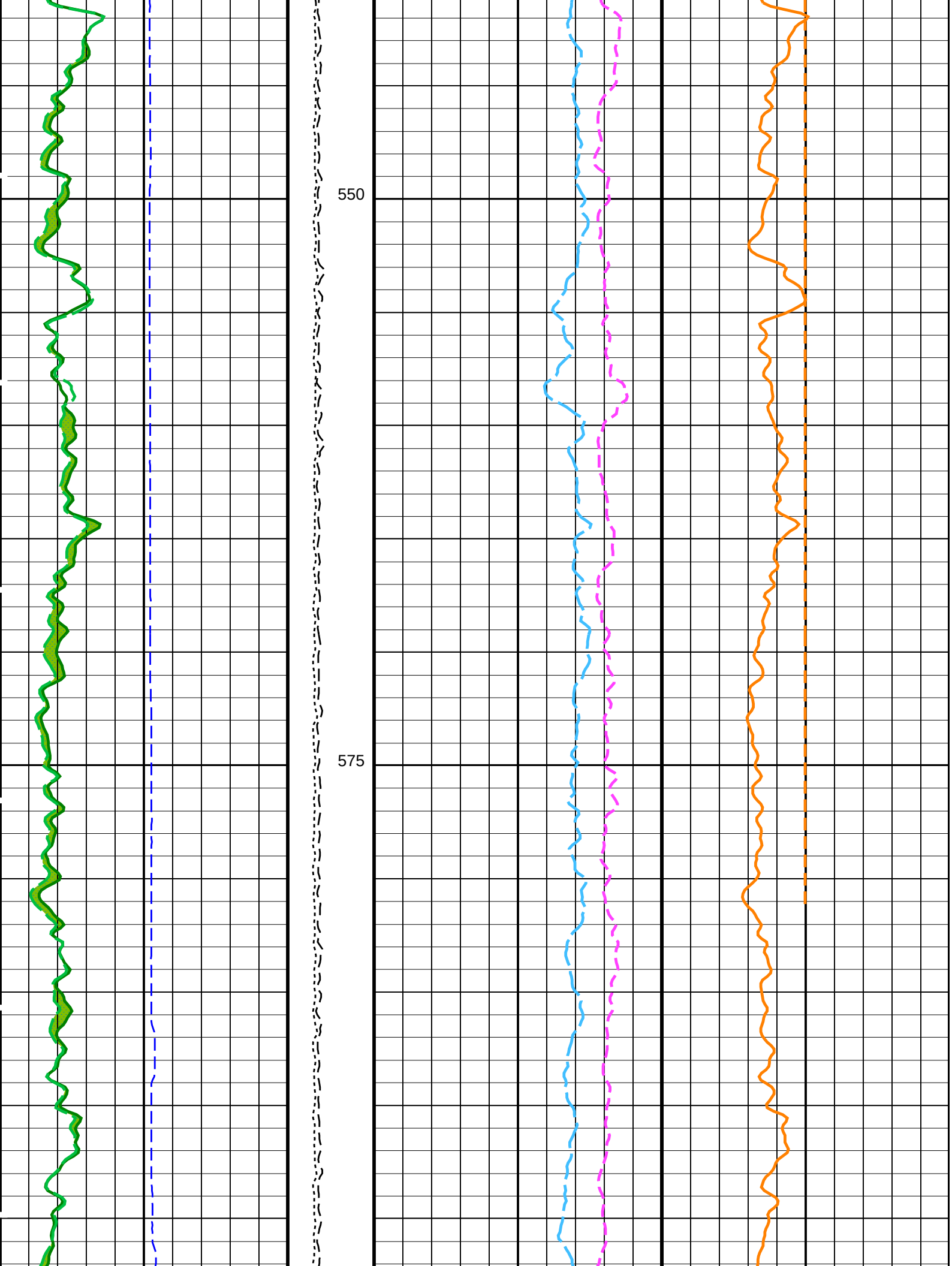

275
300

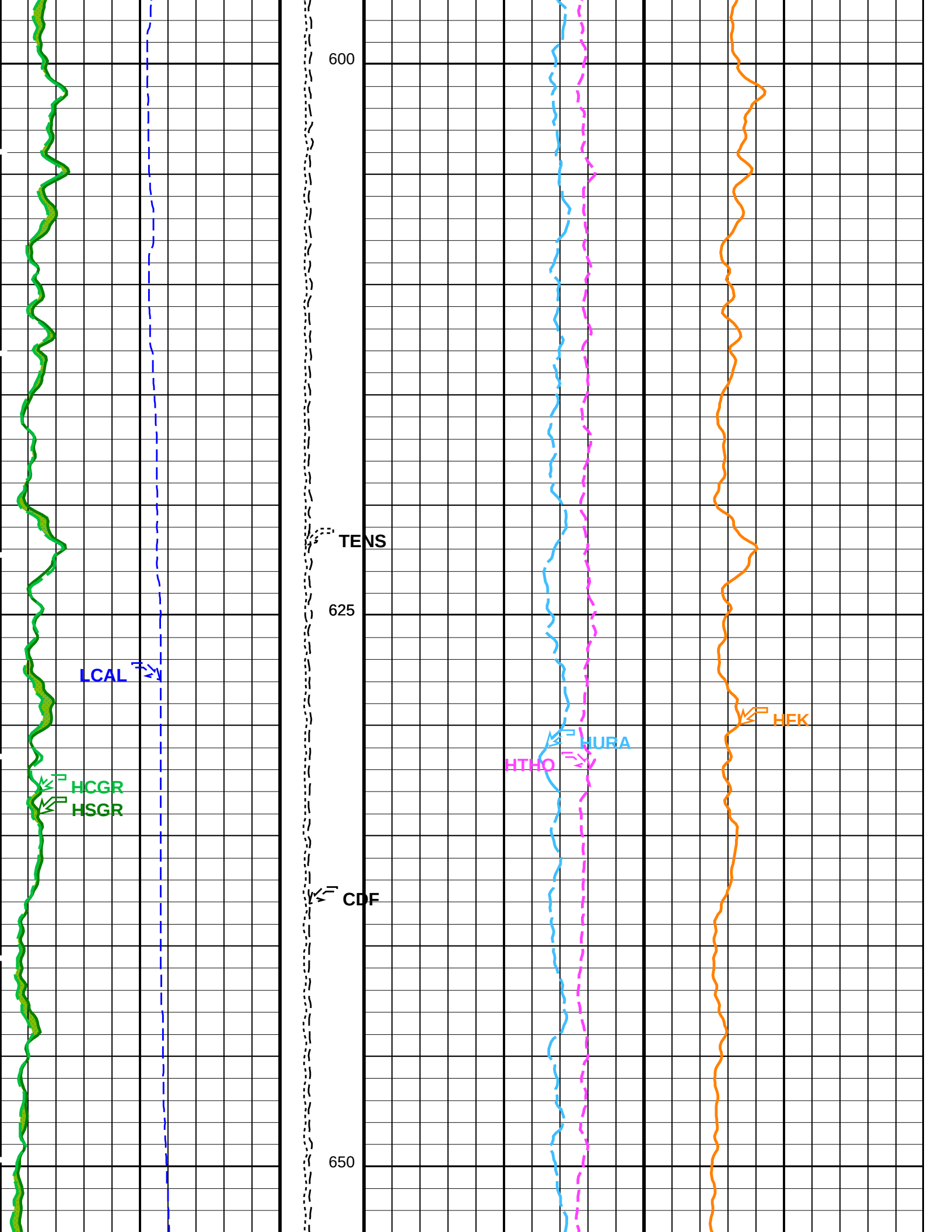

325
350

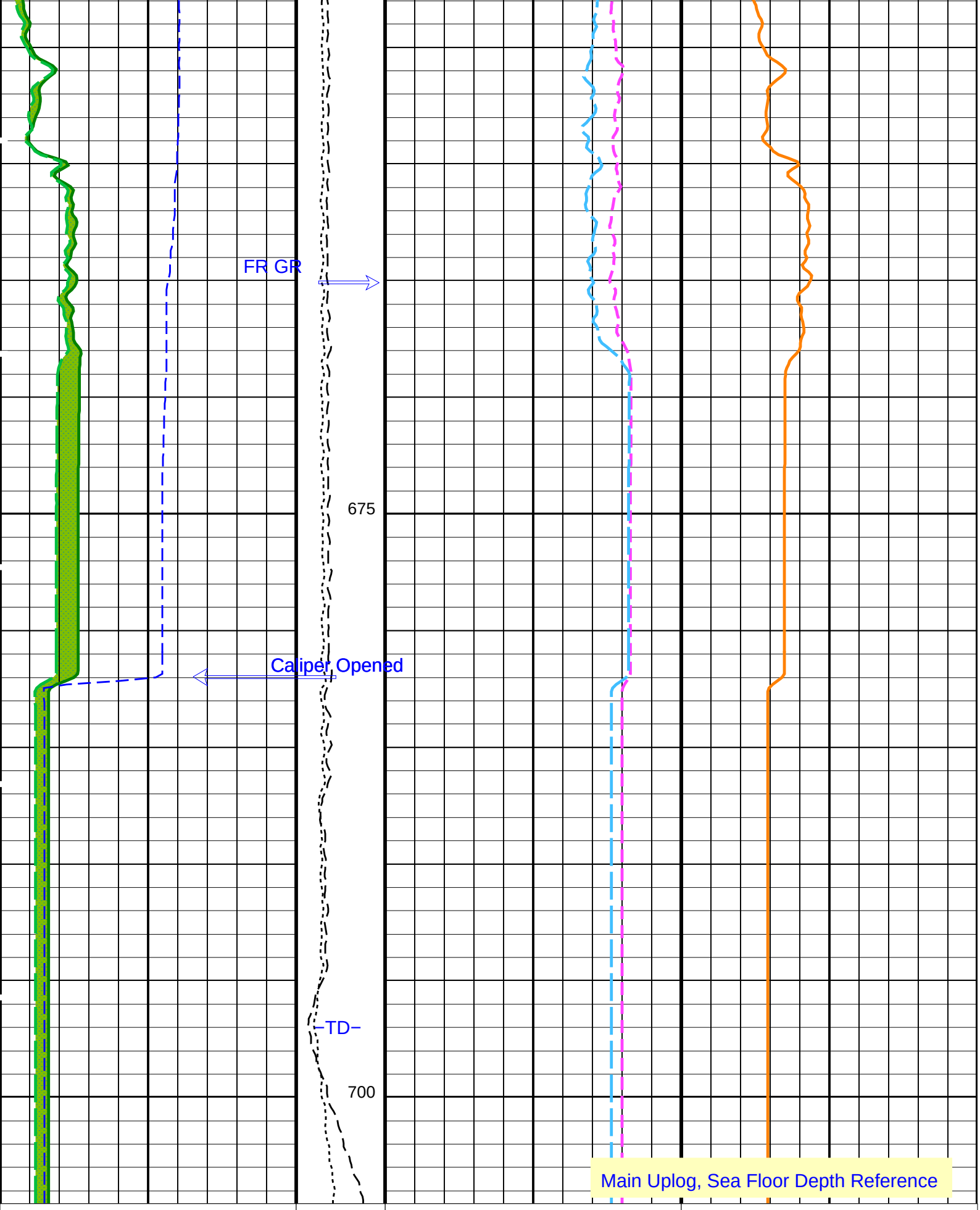

375
400
425


450
475

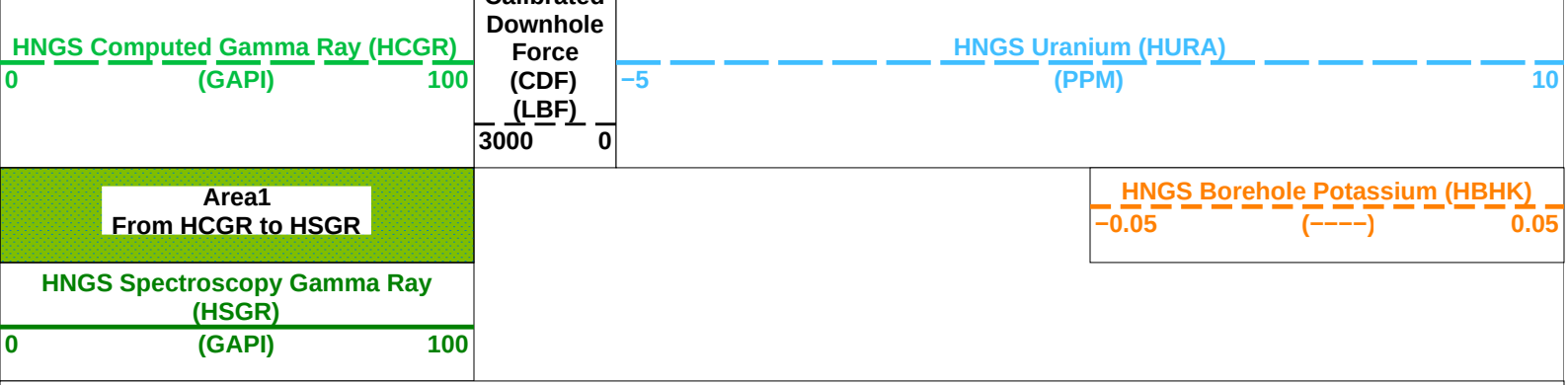

500
525


550
575


600
TENS
625
LCAL
HCGR
HSGR
HTHO
HURA
HFK
CDF
650



HLDS Caliper (LCAL)	Tension (TENS)	HNGS Thorium (HTHO)	HNGS Potassium (HFK)
0 (IN) 20	10000 (LBF) 0	5 (PPM) 25	–0.01 (–––) 0.04
	Calibrated		



PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
	HRLT−B: High Resolution Laterolog Array − B		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	LCAL	
	APS−C: Accelerator−Porosity Tool		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	LCAL	
	HNGS−BA: Hostile Natural Gamma Ray Sonde		
BAR1	HNGS Detector 1 Barite Constant	1	
BAR2	HNGS Detector 2 Barite Constant	1	
BHK	HNGS Borehole Potassium Correction Concentration	0	
BHS	Borehole Status	OPEN	
CSD1	Inner Casing Outer Diameter	0	IN
CSD2	Outer Casing Outer Diameter	0	IN
CSW1	Inner Casing Weight	0	LB/F
CSW2	Outer Casing Weight	0	LB/F
DBCC	HNGS Barite Constant Correction Flag	NONE	
GCSE	Generalized Caliper Selection	LCAL	
H1P	HNGS Detector 1 Allow/Disallow In Processing	ALLOW	
H2P	HNGS Detector 2 Allow/Disallow In Processing	ALLOW	
HABK	HNGS Borehole Potassium Running Average	−0.0015838	
HALF	HNGS Alpha Filter Length	60	IN
HCRB	HNGS Apply Borehole Potassium Correction	NONE	
HMWM	Mud Weighting Material	NATU	
HNPE	HNGS Processing Enable	YES	
S1BI	HNGS Detector 1 Calibration Bismuth Count Rate	1.3	CPS
S2BI	HNGS Detector 2 Calibration Bismuth Count Rate	1.3	CPS
SGRC	HNGS Standard Gamma−Ray Correction Flag	YES	
TPOS	Tool Position	CENT	
VBA1	HNGS Detector 1 Variable Barite Factor Running Average	1.02794	
VBA2	HNGS Detector 2 Variable Barite Factor Running Average	1.01954	
	EDTC−B: Enhanced DTS Cartridge		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	LCAL	
	System and Miscellaneous		
BS	Bit Size	9.875	IN
DFD	Drilling Fluid Density	1.03	G/C3
DO	Depth Offset for Playback	−4711.0	M
PP	Playback Processing	NORMAL	

Format: HNGSYields Vertical Scale: 1:200 Graphics File Created: 25−Jul−2014 17:42

OP System Version: 19C0−187

MSS_LDEO−A	19C0−187	HRLT−B	19C0−187
HLDS	19C0−187	LDSC−B	19C0−187
APS−C	19C0−187	HNGC−B	19C0−187
HNGS−BA	19C0−187	EDTC−B	SKK−5169−EDTCB
BSP	19C0−187		

Input DLIS Files

DEFAULT	MSS_LDEO_HRLA_LDL_019PUP	FN:30	PRODUCER	25−Jul−2014 17:37	5415.5 M	4700.0 M

Output DLIS Files

DEFAULT	MSS_LDEO_HRLA_LDL_020PUP	FN:32	PRODUCER	25−Jul−2014 17:42

BACKUP	MSS_LDEO_HRLA_LDL_020PUP	FN:33	PRODUCER	25−Jul−2014 17:42		

Input DLIS Files

DEFAULT	MSS_LDEO_HRLA_LDL_014PUP	FN:21	PRODUCER	25−Jul−2014 16:41	5412.2 M	4663.1 M

Output DLIS Files

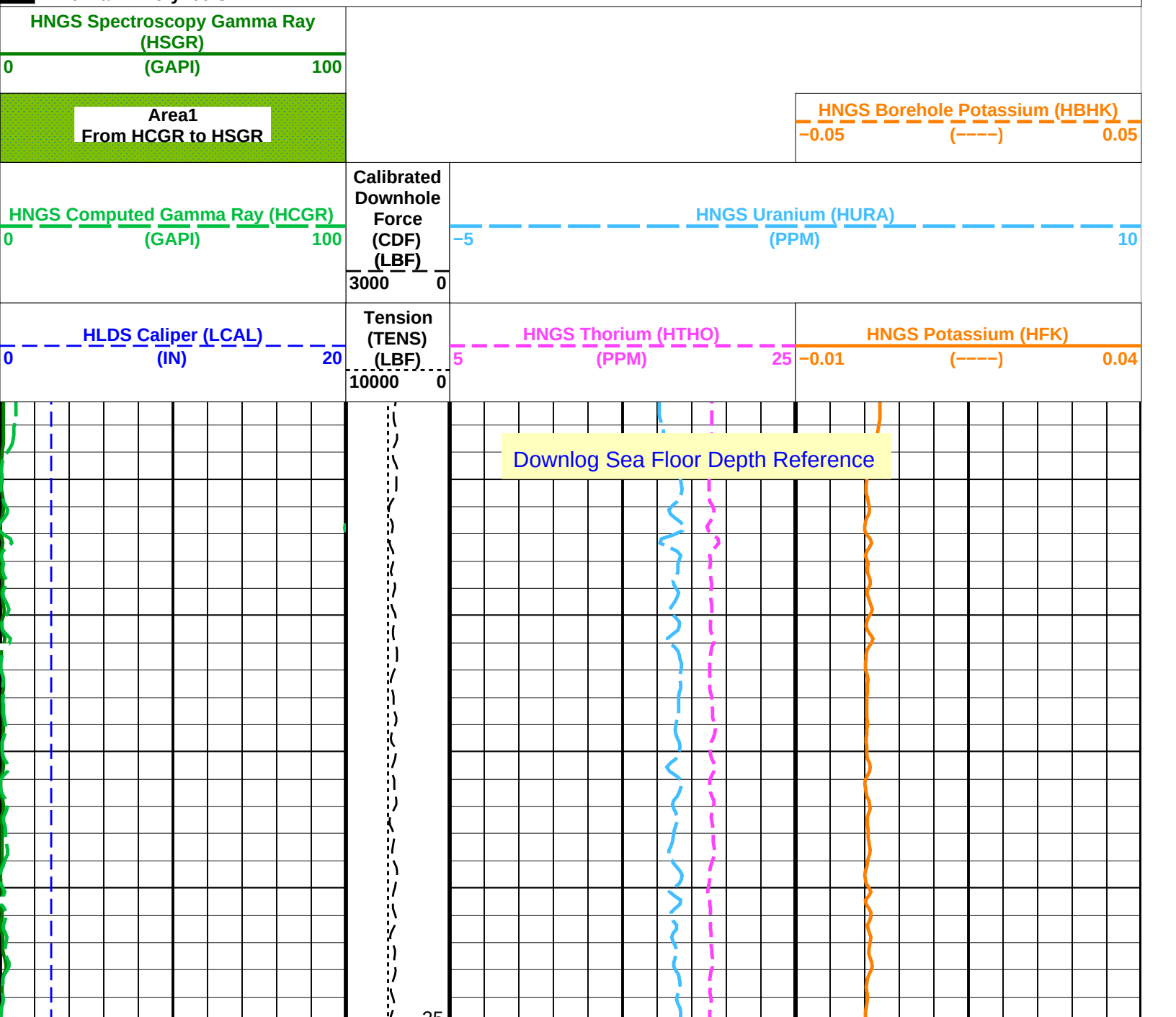
DEFAULT	MSS_LDEO_HRLA_LDL_017PUP	FN:26	PRODUCER	25−Jul−2014 17:31	701.8 M	−47.9 M
BACKUP	MSS_LDEO_HRLA_LDL_017PUP	FN:27	PRODUCER	25−Jul−2014 17:31	701.8 M	−47.9 M

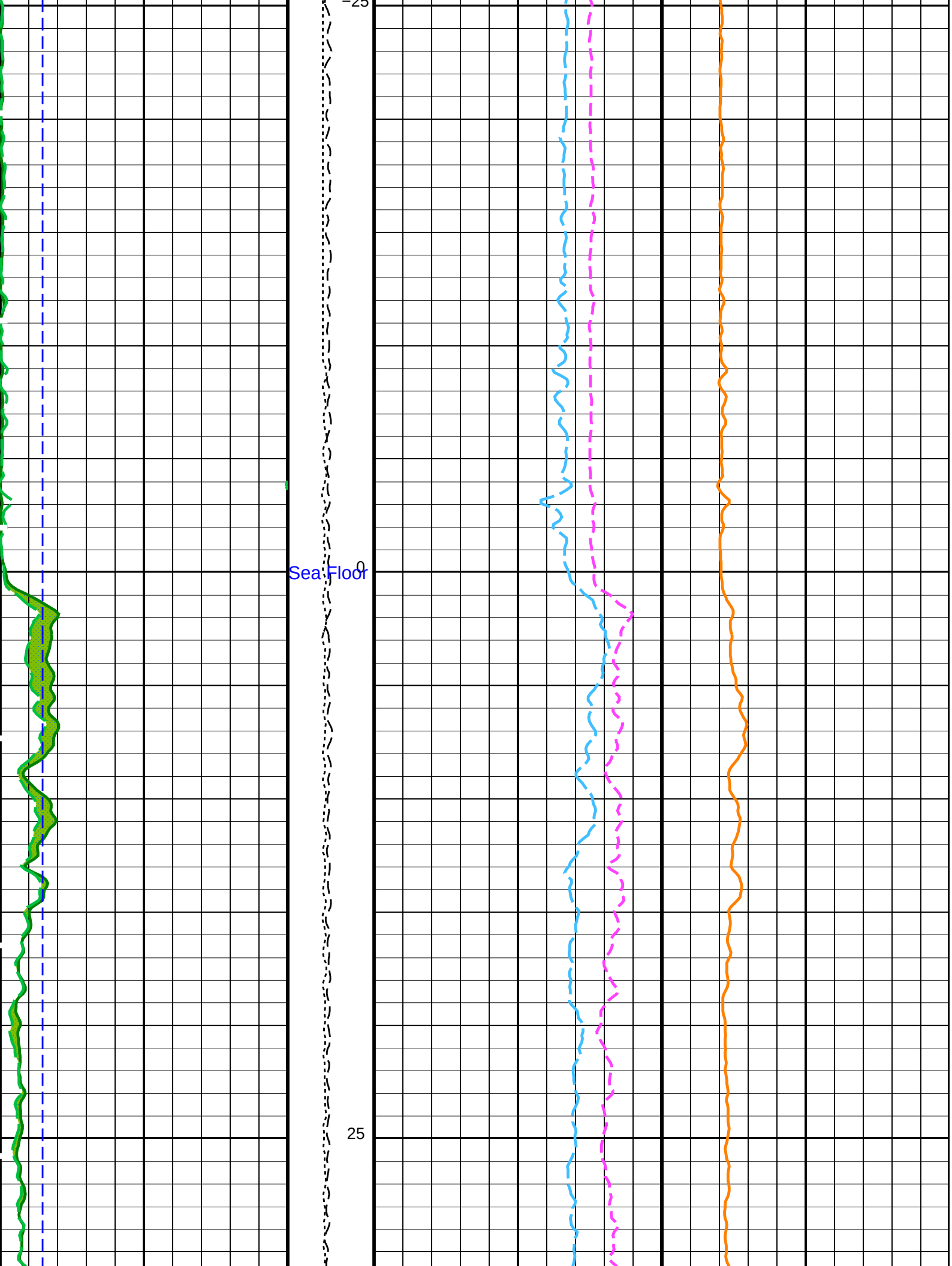
OP System Version: 19C0−187

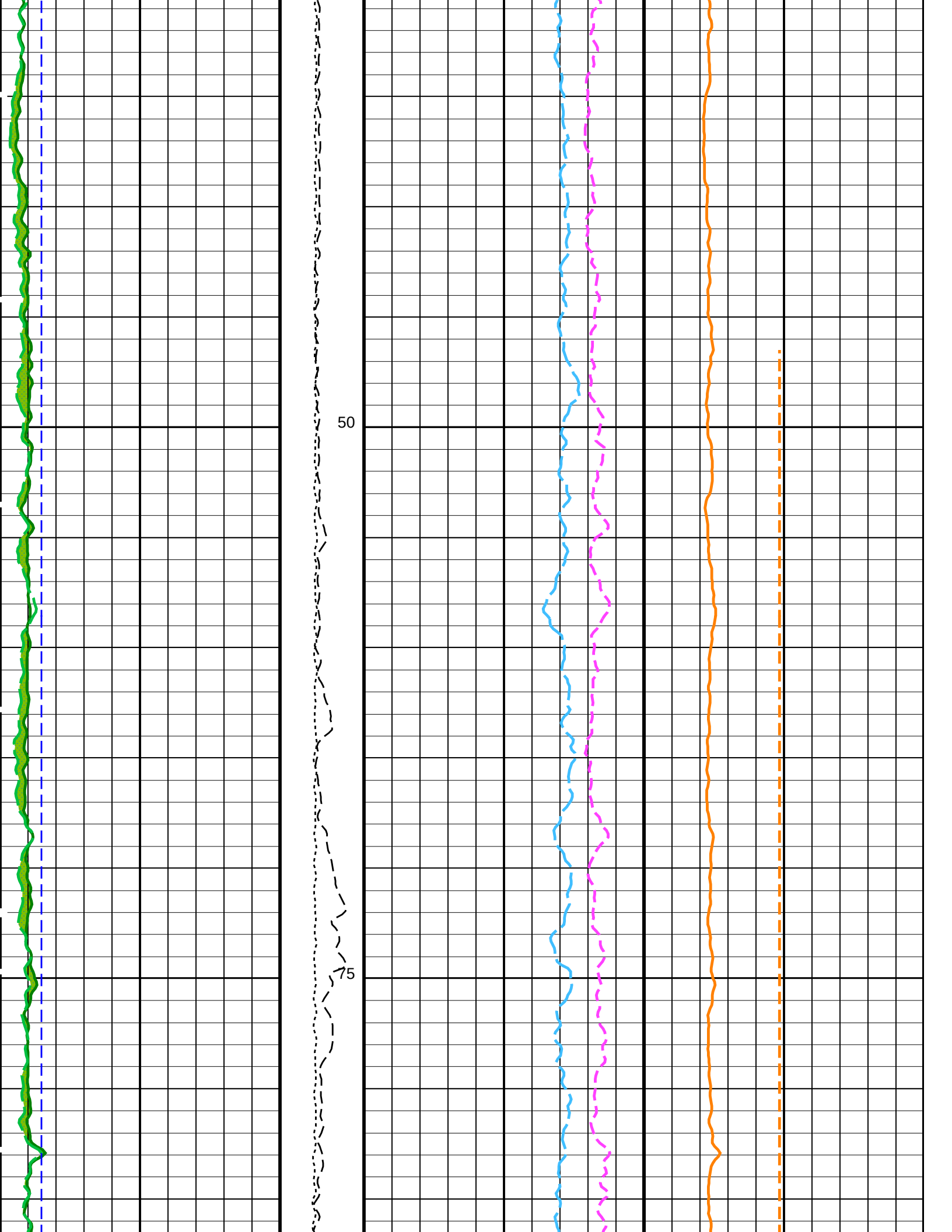
MSS_LDEO−A	19C0−187	HRLT−B	19C0−187
HLDS	19C0−187	LDSC−B	19C0−187
APS−C	19C0−187	HNGC−B	19C0−187
HNGS−BA	19C0−187	EDTC−B	SKK−5169−EDTCB
BSP	19C0−187		

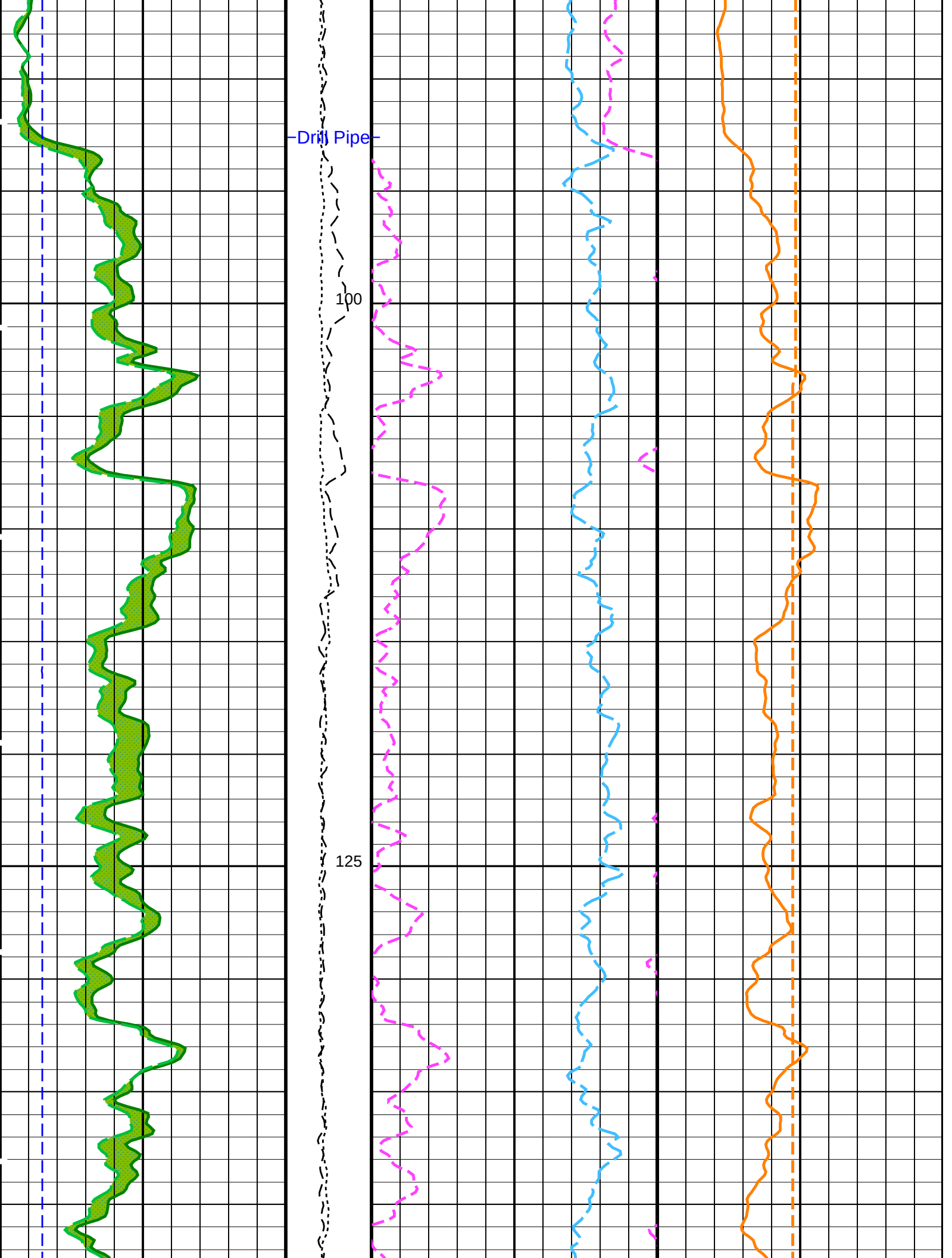
PIP SUMMARY

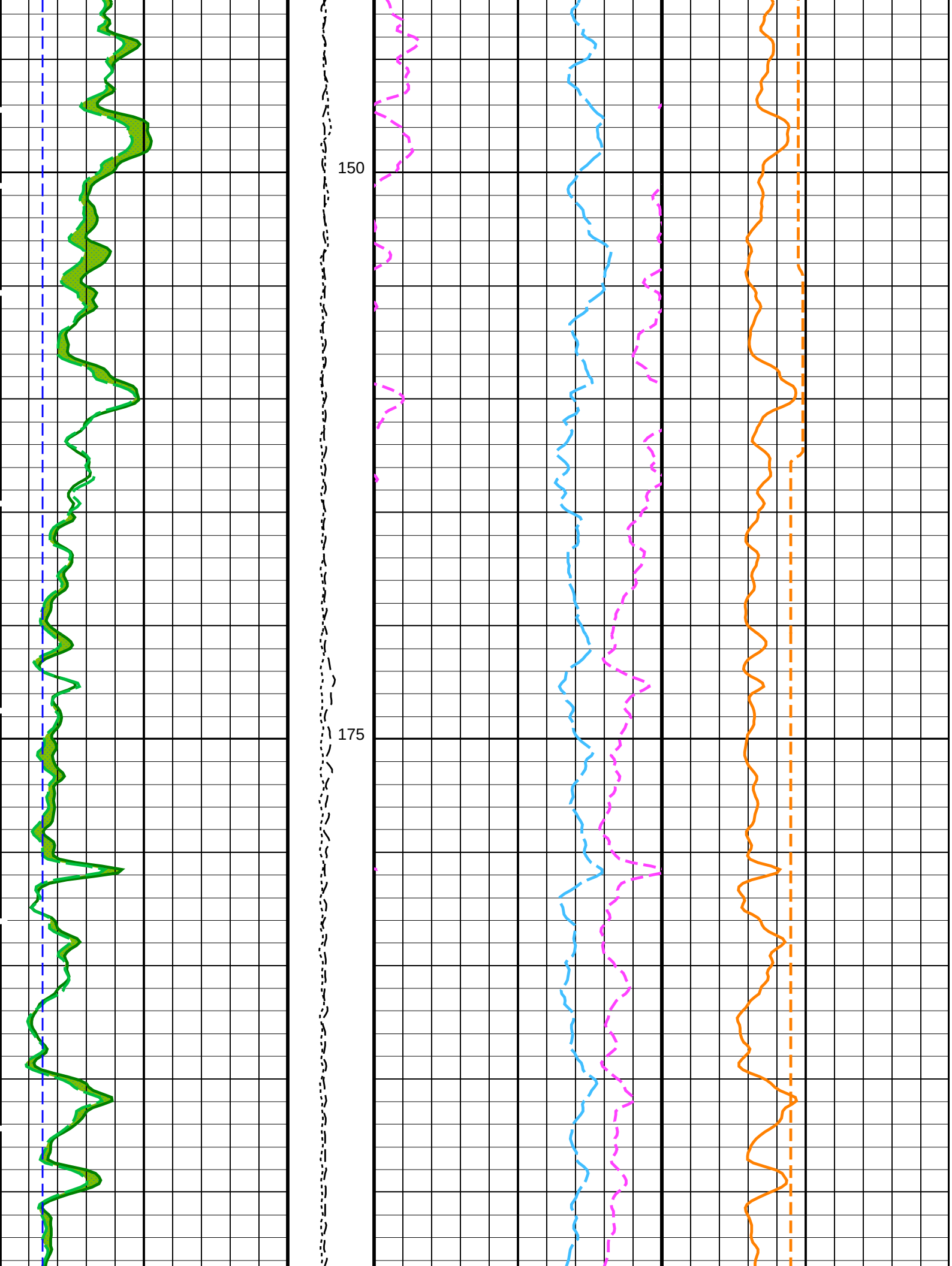
Time Mark Every 60 S

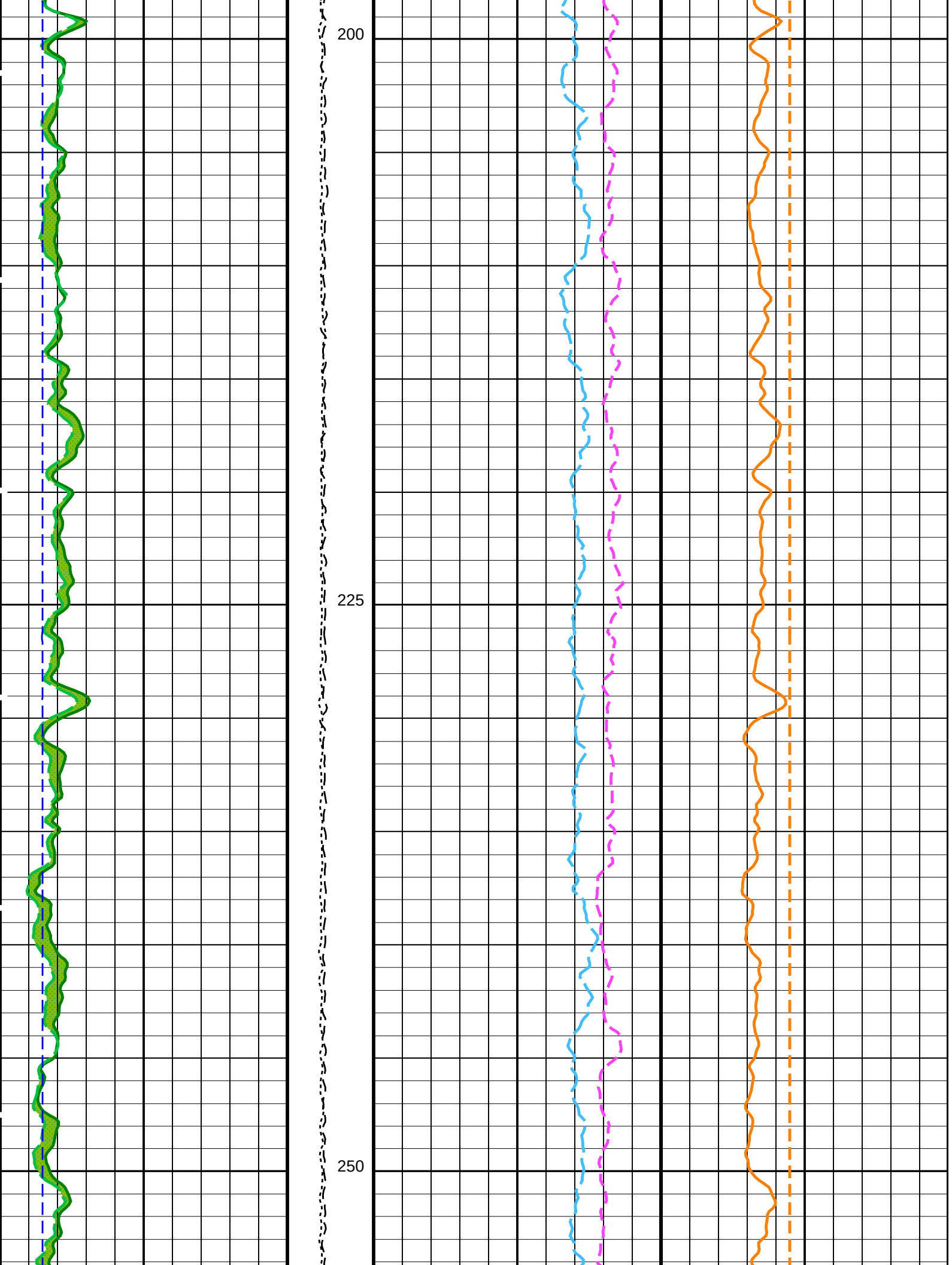


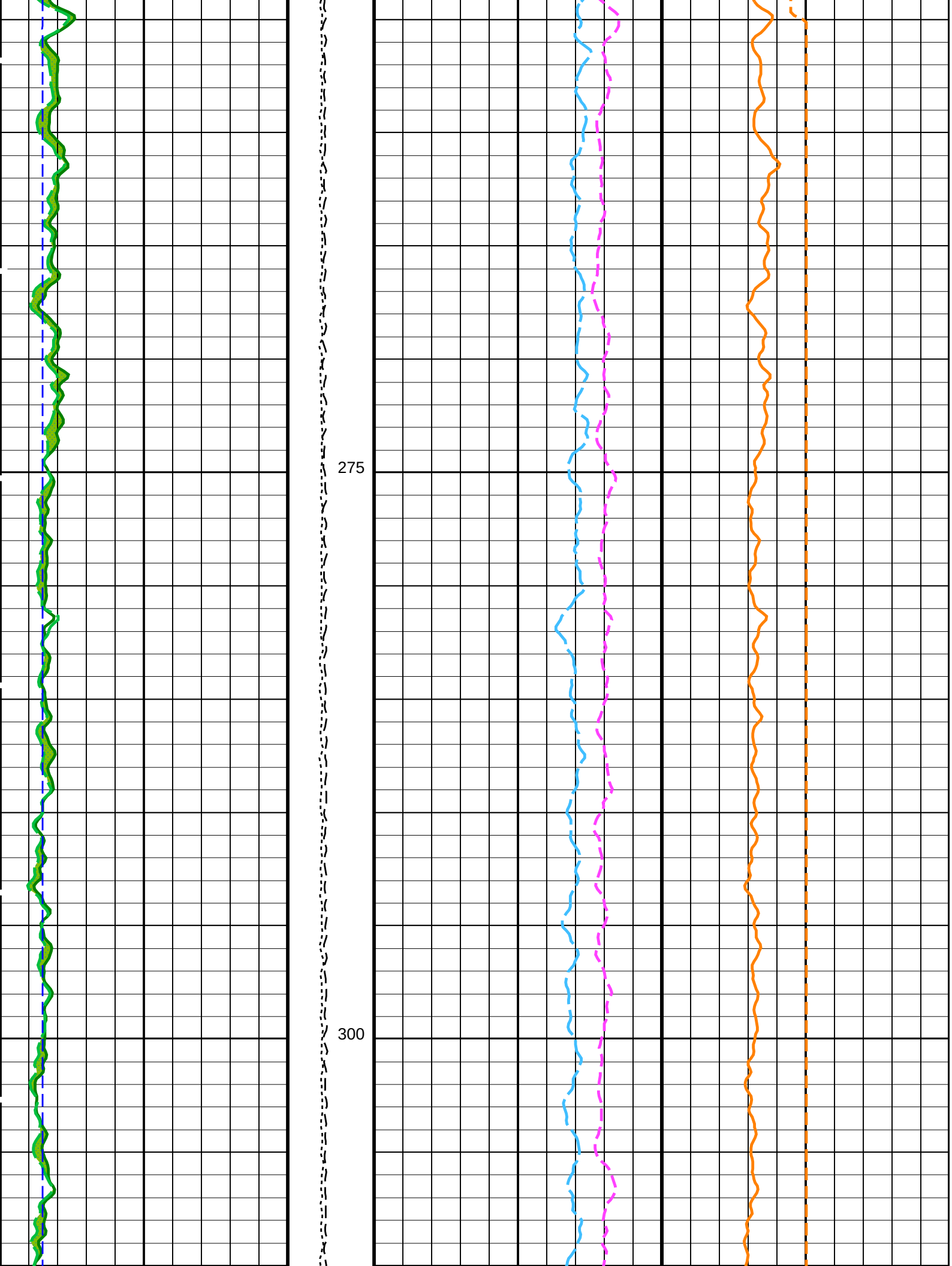

−25
Sea Floor
0
25

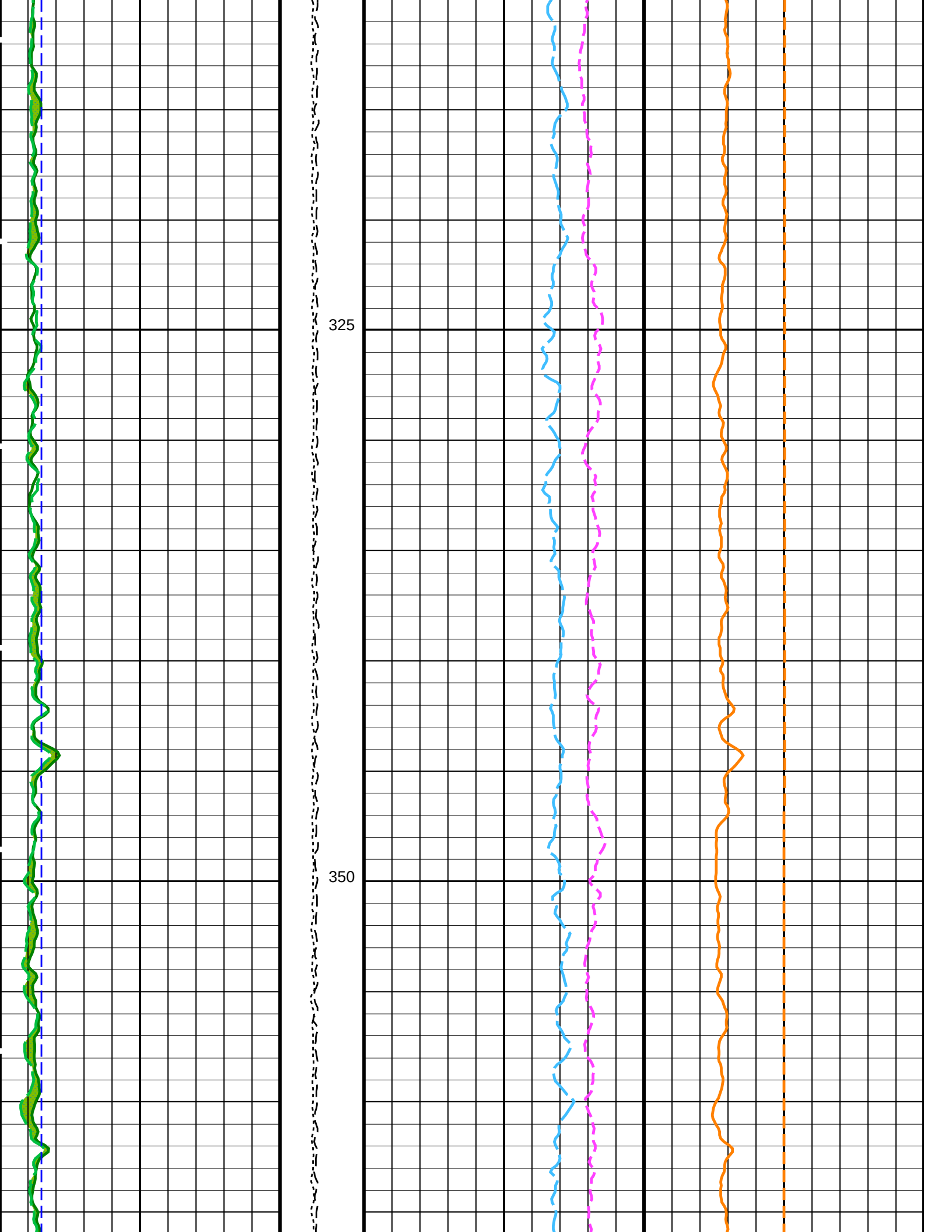

50
75

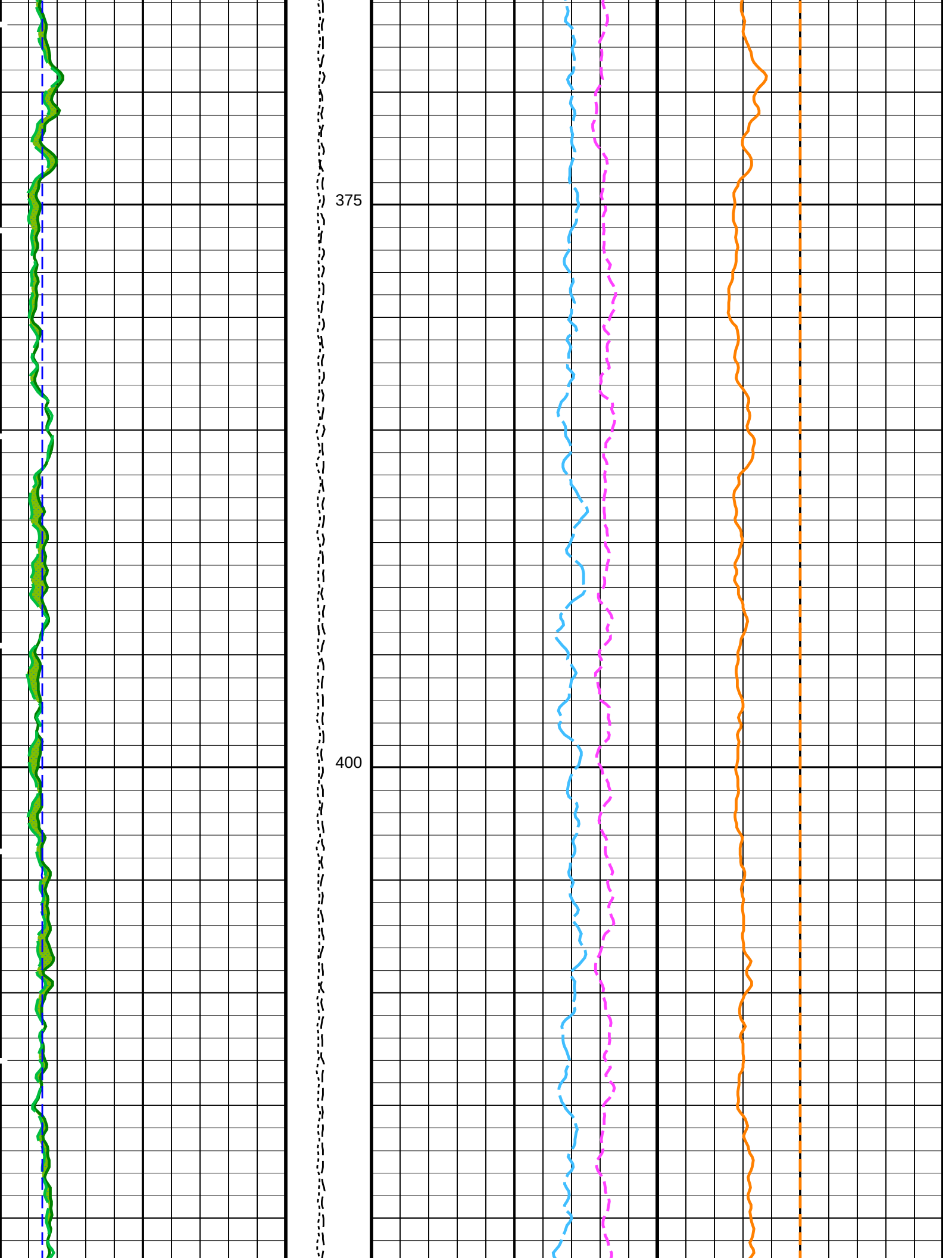

Drill Pipe
100
125

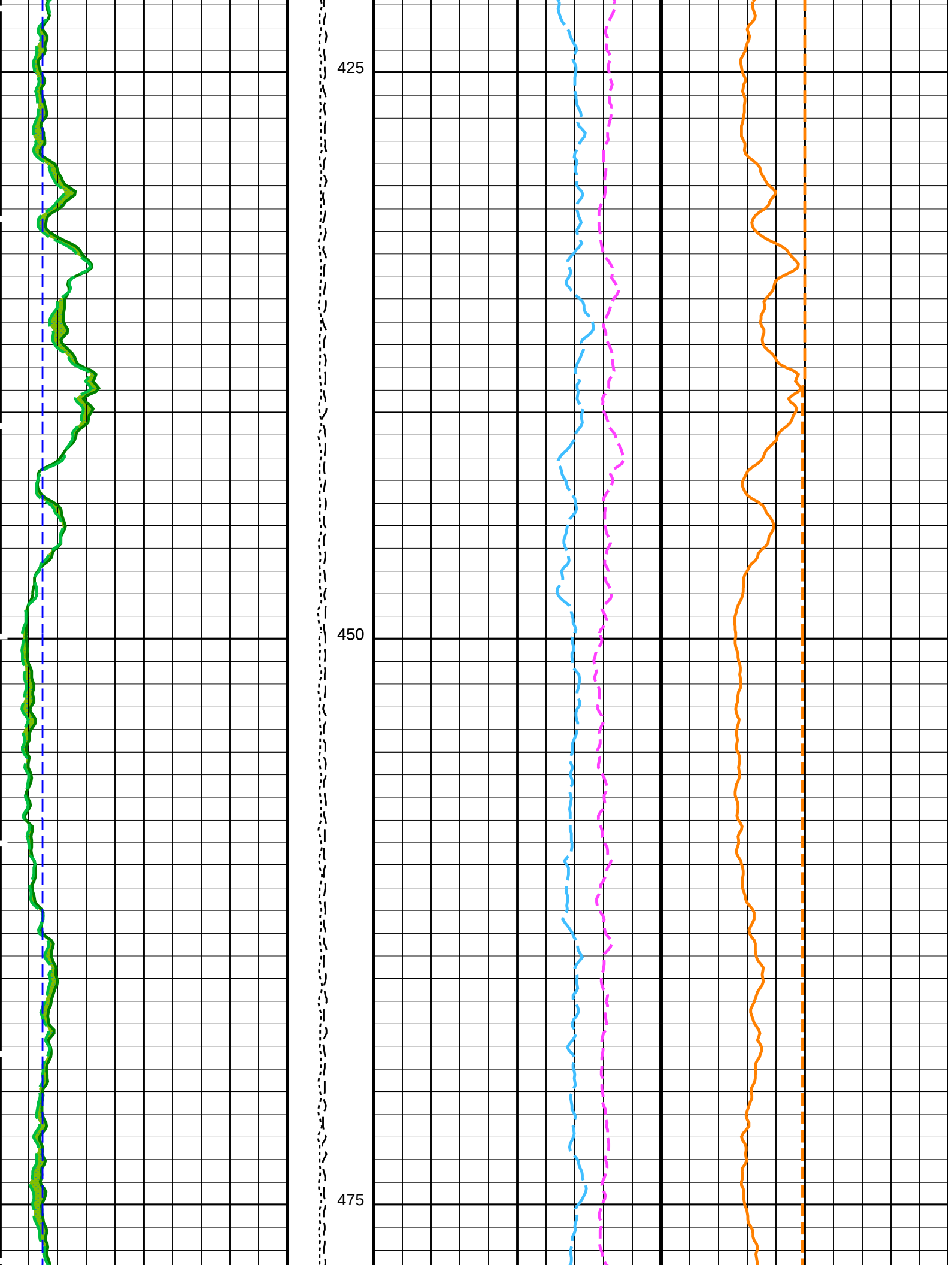

150
175

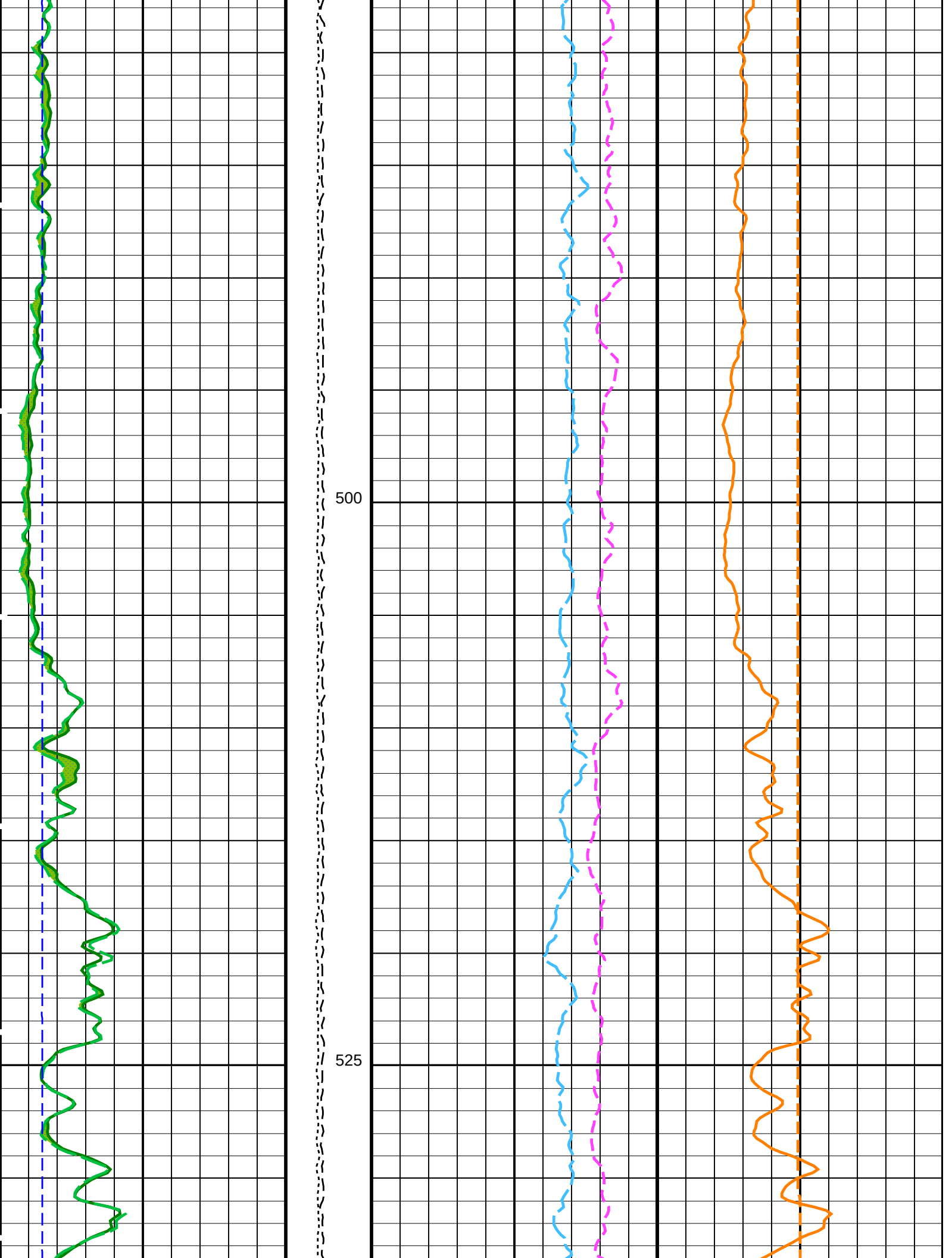

200
225
250

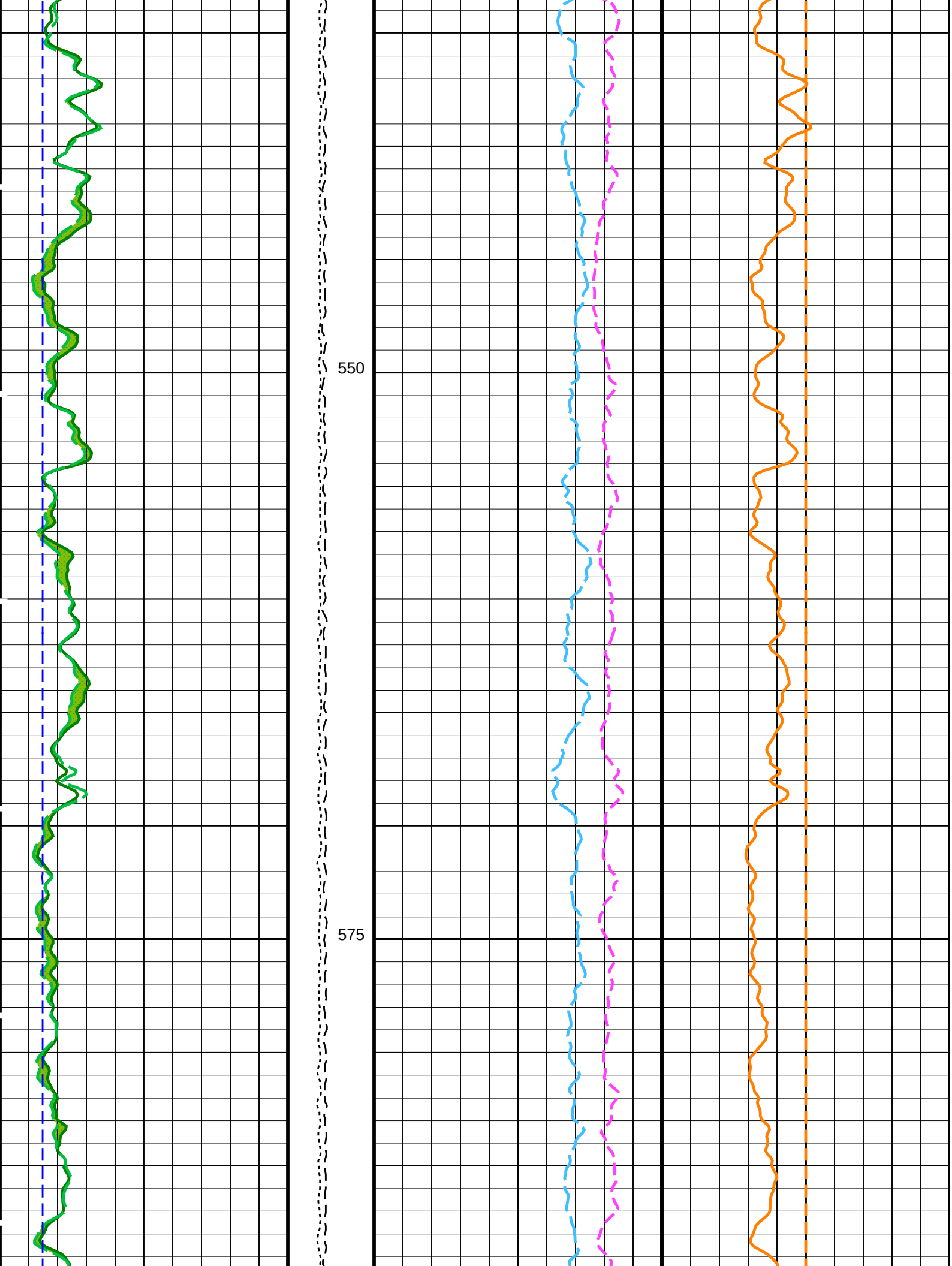

275
300

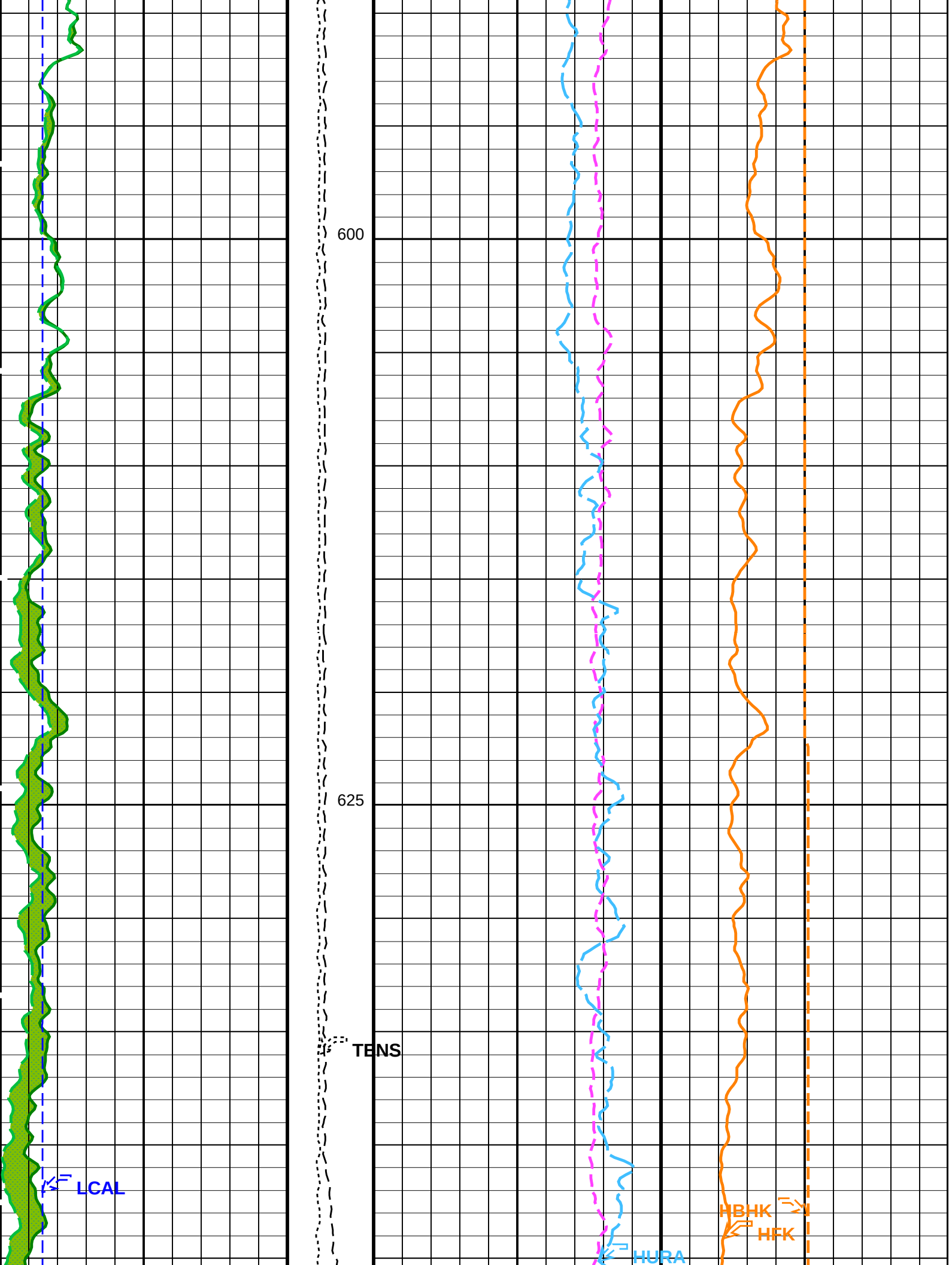

325
350

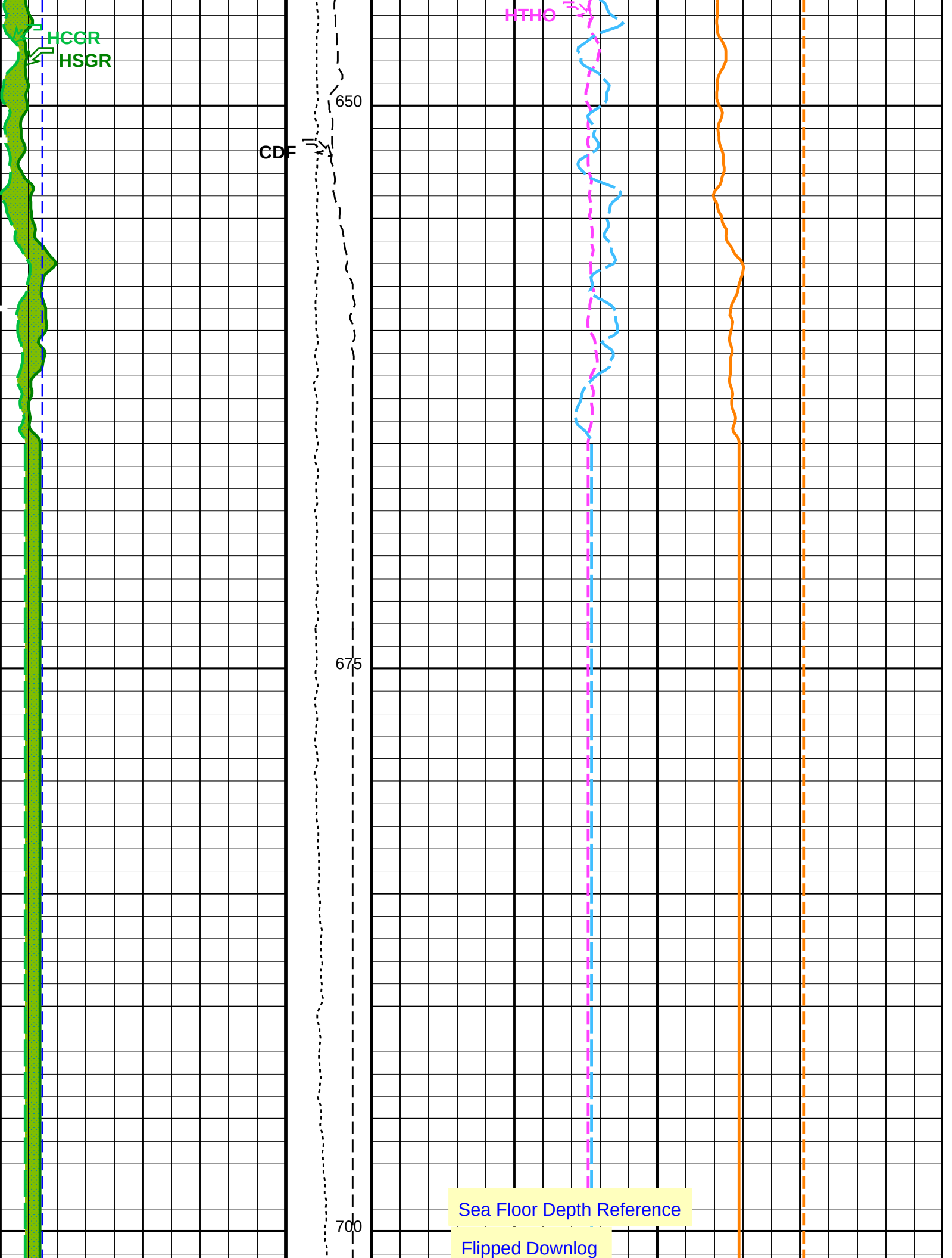

375
400

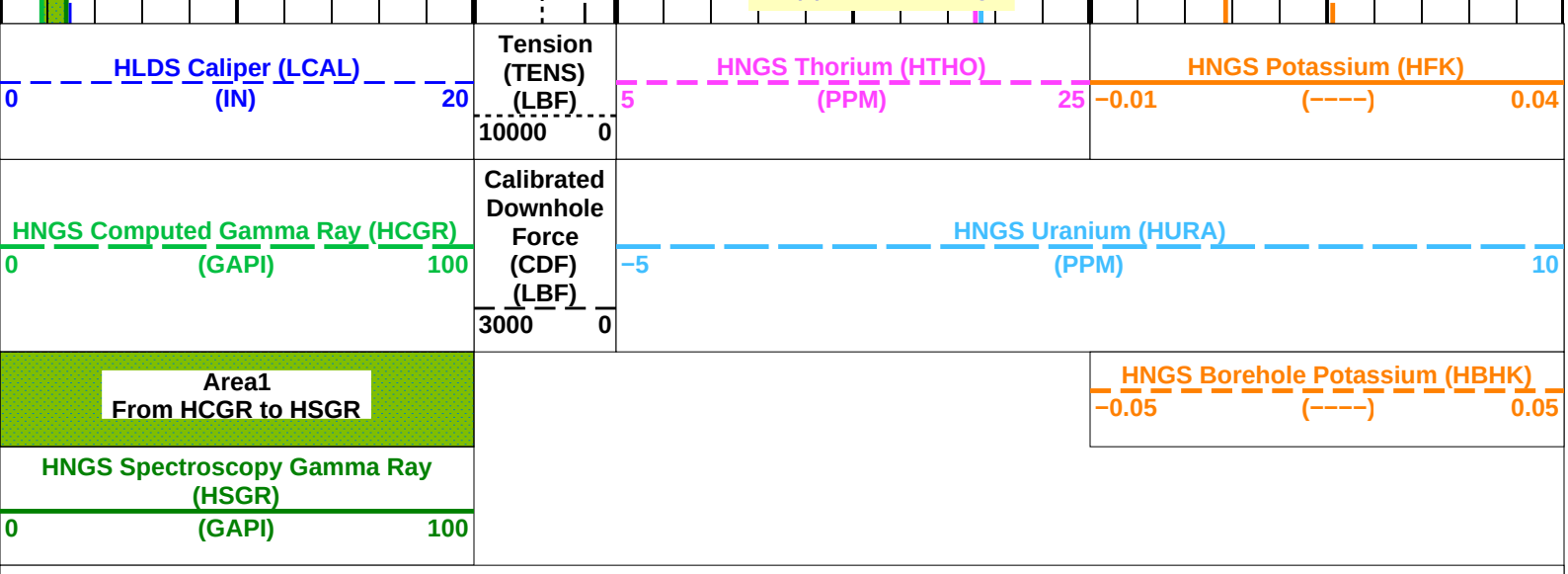

425
450
475


500
525


550
575


600
625
TENS
LCAL
HBHK
HFK
HURA


HCGR
HSGR
CDF
HTHO
650
675
700
Sea Floor Depth Reference
Flipped Downlog



PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
	HRLT−B: High Resolution Laterolog Array − B		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	BS	
	APS−C: Accelerator−Porosity Tool		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	BS	
	HNGS−BA: Hostile Natural Gamma Ray Sonde		
BAR1	HNGS Detector 1 Barite Constant	1	
BAR2	HNGS Detector 2 Barite Constant	1	
BHK	HNGS Borehole Potassium Correction Concentration	0	
BHS	Borehole Status	OPEN	
CSD1	Inner Casing Outer Diameter	0	IN
CSD2	Outer Casing Outer Diameter	0	IN
CSW1	Inner Casing Weight	0	LB/F
CSW2	Outer Casing Weight	0	LB/F
DBCC	HNGS Barite Constant Correction Flag	NONE	
GCSE	Generalized Caliper Selection	BS	
H1P	HNGS Detector 1 Allow/Disallow In Processing	ALLOW	
H2P	HNGS Detector 2 Allow/Disallow In Processing	ALLOW	
HABK	HNGS Borehole Potassium Running Average	−0.0015838	
HALF	HNGS Alpha Filter Length	60	IN
HCRB	HNGS Apply Borehole Potassium Correction	NONE	
HMWM	Mud Weighting Material	NATU	
HNPE	HNGS Processing Enable	YES	
S1BI	HNGS Detector 1 Calibration Bismuth Count Rate	1.3	CPS
S2BI	HNGS Detector 2 Calibration Bismuth Count Rate	1.3	CPS
SGRC	HNGS Standard Gamma−Ray Correction Flag	YES	
TPOS	Tool Position	CENT	
VBA1	HNGS Detector 1 Variable Barite Factor Running Average	1.02794	
VBA2	HNGS Detector 2 Variable Barite Factor Running Average	1.01954	
	EDTC−B: Enhanced DTS Cartridge		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	BS	
	System and Miscellaneous		
BS	Bit Size	9.875	IN
DFD	Drilling Fluid Density	1.03	G/C3
DO	Depth Offset for Playback	−4711.0	M
PP	Playback Processing	NORMAL	

Format: HNGSYields Vertical Scale: 1:200 Graphics File Created: 25−Jul−2014 17:31

OP System Version: 19C0−187

MSS_LDEO−A	19C0−187	HRLT−B	19C0−187
HLDS	19C0−187	LDSC−B	19C0−187
APS−C	19C0−187	HNGC−B	19C0−187
HNGS−BA	19C0−187	EDTC−B	SKK−5169−EDTCB
BSP	19C0−187		

Input DLIS Files

DEFAULT	**MSS_LDEO_HRLA_LDL_014PUP**	**FN:21**	**PRODUCER**	**25−Jul−2014 16:41**	**5412.2 M**	**4663.1 M**

Output DLIS Files

DEFAULT	**MSS_LDEO_HRLA_LDL_017PUP**	**FN:26**	**PRODUCER**	**25−Jul−2014 17:31**
BACKUP	**MSS_LDEO_HRLA_LDL_017PUP**	**FN:27**	**PRODUCER**	**25−Jul−2014 17:31**

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
High Resolution Laterolog Array − B Wellsite Calibration − HRLT M01							
Before: 25−Jul−2014 10:35 After: 25−Jul−2014 16:14							
HRLT M0−M1 Voltage Plus − 0	0	N/A	−318.6	−318.8	−0.1765	9.681	UV
HRLT M0−M1 Voltage Plus − 1	0	N/A	−328.5	−333.5	−5.048	9.681	UV
HRLT M0−M1 Voltage Plus − 2	0	N/A	−331.3	−334.6	−3.287	9.681	UV
HRLT M0−M1 Voltage Plus − 3	0	N/A	−335.4	−338.0	−2.565	9.681	UV
HRLT M0−M1 Voltage Plus − 4	0	N/A	−325.2	−326.2	−1.009	9.681	UV
HRLT M0−M1 Voltage Plus − 5	0	N/A	−321.7	−322.2	−0.5380	9.681	UV
HRLT M0−M1 Voltage Plus − 6	0	N/A	320.5	324.6	4.078	9.681	UV
HRLT M0−M1 Voltage Plus − 7	0	N/A	−322.7	−322.7	0	9.681	UV
High Resolution Laterolog Array − B Wellsite Calibration − HRLT M12							
Before: 25−Jul−2014 10:35 After: 25−Jul−2014 16:14							
HRLT M1−M2 Voltage Plus − 0	0	N/A	1754	1752	−1.392	53.42	UV
HRLT M1−M2 Voltage Plus − 1	0	N/A	1811	1835	23.48	53.42	UV
HRLT M1−M2 Voltage Plus − 2	0	N/A	1821	1834	13.63	53.42	UV
HRLT M1−M2 Voltage Plus − 3	0	N/A	1842	1852	9.989	53.42	UV
HRLT M1−M2 Voltage Plus − 4	0	N/A	1785	1787	2.206	53.42	UV
HRLT M1−M2 Voltage Plus − 5	0	N/A	1767	1766	−0.2141	53.42	UV
HRLT M1−M2 Voltage Plus − 6	0	N/A	−1776	−1794	−17.86	53.42	UV
HRLT M1−M2 Voltage Plus − 7	0	N/A	1781	1781	0	53.42	UV
High Resolution Laterolog Array − B Wellsite Calibration − HRLT M23							
Before: 25−Jul−2014 10:35 After: 25−Jul−2014 16:14							
HRLT M2−M3 Voltage Plus − 0	0	N/A	1740	1738	−2.445	53.42	UV
HRLT M2−M3 Voltage Plus − 1	0	N/A	1811	1832	21.08	53.42	UV
HRLT M2−M3 Voltage Plus − 2	0	N/A	1820	1833	12.35	53.42	UV
HRLT M2−M3 Voltage Plus − 3	0	N/A	1846	1854	8.723	53.42	UV
HRLT M2−M3 Voltage Plus − 4	0	N/A	1782	1783	0.9452	53.42	UV
HRLT M2−M3 Voltage Plus − 5	0	N/A	1764	1763	−0.9287	53.42	UV
HRLT M2−M3 Voltage Plus − 6	0	N/A	−1765	−1780	−15.48	53.42	UV
HRLT M2−M3 Voltage Plus − 7	0	N/A	1781	1781	0	53.42	UV
High Resolution Laterolog Array − B Wellsite Calibration − HRLT V34							
Before: 25−Jul−2014 10:35 After: 25−Jul−2014 16:14							
HRLT A3−A4 Voltage Plus − 0	0	N/A	68350	68360	5.008	2100	UV
HRLT A3−A4 Voltage Plus − 1	0	N/A	70890	71850	954.6	2100	UV
HRLT A3−A4 Voltage Plus − 2	0	N/A	71590	72170	580.9	2100	UV
HRLT A3−A4 Voltage Plus − 3	0	N/A	72820	73280	454.7	2100	UV
HRLT A3−A4 Voltage Plus − 4	0	N/A	70290	70440	145.7	2100	UV
HRLT A3−A4 Voltage Plus − 5	0	N/A	69610	69660	49.84	2100	UV
HRLT A3−A4 Voltage Plus − 6	0	N/A	−68110	−68840	−722.0	2100	UV
HRLT A3−A4 Voltage Plus − 7	0	N/A	70000	70000	0	2100	UV
High Resolution Laterolog Array − B Wellsite Calibration − HRLT V45							
Before: 25−Jul−2014 10:35 After: 25−Jul−2014 16:14							
HRLT A4−A5 Voltage Plus − 0	0	N/A	68630	68640	10.03	2100	UV
HRLT A4−A5 Voltage Plus − 1	0	N/A	71280	72230	950.9	2100	UV
HRLT A4−A5 Voltage Plus − 2	0	N/A	71930	72530	594.0	2100	UV
HRLT A4−A5 Voltage Plus − 3	0	N/A	73150	73630	473.6	2100	UV
HRLT A4−A5 Voltage Plus − 4	0	N/A	70590	70740	146.4	2100	UV
HRLT A4−A5 Voltage Plus − 5	0	N/A	69890	69950	53.08	2100	UV
HRLT A4−A5 Voltage Plus − 6	0	N/A	−68470	−69220	−753.3	2100	UV
HRLT A4−A5 Voltage Plus − 7	0	N/A	70000	70000	0	2100	UV
High Resolution Laterolog Array − B Wellsite Calibration − HRLT V56							
Before: 25−Jul−2014 10:35 After: 25−Jul−2014 16:14							
HRLT A5−A6 Voltage Plus − 0	0	N/A	68530	68540	15.68	2100	UV
HRLT A5−A6 Voltage Plus − 1	0	N/A	71010	71950	941.8	2100	UV
HRLT A5−A6 Voltage Plus − 2	0	N/A	71710	72290	581.7	2100	UV
HRLT A5−A6 Voltage Plus − 3	0	N/A	72970	73430	459.2	2100	UV
HRLT A5−A6 Voltage Plus − 4	0	N/A	70440	70590	150.4	2100	UV
HRLT A5−A6 Voltage Plus − 5	0	N/A	69770	69830	61.48	2100	UV

HRLT A5−A6 Voltage Plus − 6	0	N/A	−68200	−68930	−731.6	2100	UV
HRLT A5−A6 Voltage Plus − 7	0	N/A	70000	70000	0	2100	UV

High Resolution Laterolog Array − B Wellsite Calibration − HRLT VTP
Before: 25−Jul−2014 10:35 After: 25−Jul−2014 16:14

HRLT Torpedo−M0 Voltage − 0	0	N/A	−68200	−68220	−14.38	2100	UV
HRLT Torpedo−M0 Voltage − 1	0	N/A	−71320	−72290	−969.3	2100	UV
HRLT Torpedo−M0 Voltage − 2	0	N/A	−72000	−72610	−611.6	2100	UV
HRLT Torpedo−M0 Voltage − 3	0	N/A	−73260	−73720	−460.8	2100	UV
HRLT Torpedo−M0 Voltage − 4	0	N/A	−70650	−70810	−153.8	2100	UV
HRLT Torpedo−M0 Voltage − 5	0	N/A	−69940	−69980	−45.13	2100	UV
HRLT Torpedo−M0 Voltage − 6	0	N/A	68460	69200	738.8	2100	UV
HRLT Torpedo−M0 Voltage − 7	0	N/A	−70000	−70000	0	2100	UV

High Resolution Laterolog Array − B Wellsite Calibration − HRLT VBD
Before: 25−Jul−2014 10:35 After: 25−Jul−2014 16:14

HRLT Bridle#9−M0 Voltage − 0	0	N/A	−68200	−68210	−11.98	2100	UV
HRLT Bridle#9−M0 Voltage − 1	0	N/A	−71290	−72260	−969.3	2100	UV
HRLT Bridle#9−M0 Voltage − 2	0	N/A	−71970	−72590	−619.4	2100	UV
HRLT Bridle#9−M0 Voltage − 3	0	N/A	−73230	−73700	−468.7	2100	UV
HRLT Bridle#9−M0 Voltage − 4	0	N/A	−70640	−70790	−154.5	2100	UV
HRLT Bridle#9−M0 Voltage − 5	0	N/A	−69920	−69980	−61.20	2100	UV
HRLT Bridle#9−M0 Voltage − 6	0	N/A	68440	69180	740.5	2100	UV
HRLT Bridle#9−M0 Voltage − 7	0	N/A	−70000	−70000	0	2100	UV

High Resolution Laterolog Array − B Wellsite Calibration − HRLT ISO
Before: 25−Jul−2014 10:35 After: 25−Jul−2014 16:14

HRLT Source Current Plus − 0	0	N/A	284.4	284.4	0.01572	8.520	UA
HRLT Source Current Plus − 1	0	N/A	281.1	281.1	0	8.520	UA
HRLT Source Current Plus − 2	0	N/A	281.1	281.1	0	8.520	UA
HRLT Source Current Plus − 3	0	N/A	281.1	281.1	0	8.520	UA
HRLT Source Current Plus − 4	0	N/A	281.1	281.1	0	8.520	UA
HRLT Source Current Plus − 5	0	N/A	281.1	281.1	0	8.520	UA
HRLT Source Current Plus − 6	0	N/A	281.1	281.1	0	8.520	UA
HRLT Source Current Plus − 7	0	N/A	281.1	281.1	0	8.520	UA

High Resolution Laterolog Array − B Wellsite Calibration − HRLT MV
Before: 25−Jul−2014 10:35 After: 25−Jul−2014 16:14

HRLT Vertical Voltage Pl − 0	0	N/A	−321.4	−321.1	0.3200	9.681	UV
HRLT Vertical Voltage Pl − 1	0	N/A	−323.9	−328.1	−4.165	9.681	UV
HRLT Vertical Voltage Pl − 2	0	N/A	−325.7	−328.0	−2.305	9.681	UV
HRLT Vertical Voltage Pl − 3	0	N/A	−327.8	−329.6	−1.758	9.681	UV
HRLT Vertical Voltage Pl − 4	0	N/A	−314.8	−315.2	−0.4297	9.681	UV
HRLT Vertical Voltage Pl − 5	0	N/A	−326.4	−326.4	−0.01053	9.681	UV
HRLT Vertical Voltage Pl − 6	0	N/A	328.9	332.2	3.289	9.681	UV
HRLT Vertical Voltage Pl − 7	0	N/A	−322.7	−322.7	0	9.681	UV

Hostile Litho−Density Sonde Wellsite Calibration − Background Measurement
Master: 16−Jul−2014 4:36 Before: 17−Jul−2014 5:36 After: 17−Jul−2014 5:45

SS Cs Resolution Bkg	9.000	8.061	8.076	7.968	−0.1079	1.800	%
LS Cs Resolution Bkg	9.000	8.137	8.180	8.175	−0.005135	1.800	%
LSW1 Background	100.0	69.74	68.24	70.48	2.248	0.03000	CPS
LSW2 Background	100.0	63.61	64.16	63.74	−0.4206	0.03000	CPS
LSW3 Background	200.0	141.8	137.9	141.1	3.244	0.03000	CPS
LSW4 Background	250.0	172.4	171.0	170.7	−0.2442	0.03000	CPS
LSW5 Background	600.0	395.0	391.5	393.4	1.954	0.03000	CPS
SSW1 Background	100.0	78.54	77.29	78.86	1.570	0.03000	CPS
SSW2 Background	200.0	139.1	138.0	138.2	0.2109	0.03000	CPS
SSW3 Background	500.0	371.9	374.7	371.5	−3.237	0.03000	CPS
SSW4 Background	270.0	195.4	192.7	195.5	2.744	0.03000	CPS
SSW5 Background	200.0	142.5	140.4	142.0	1.542	0.03000	CPS

Hostile Litho−Density Sonde Wellsite Calibration − Aluminum Measurement
Master: 16−Jul−2014 5:05

LSW1 Aluminum	600.0	508.4	N/A	N/A	N/A	N/A	CPS
LSW2 Aluminum	900.0	733.7	N/A	N/A	N/A	N/A	CPS
LSW3 Aluminum	1100	883.4	N/A	N/A	N/A	N/A	CPS
LSW4 Aluminum	580.0	447.4	N/A	N/A	N/A	N/A	CPS
LSW5 Aluminum	570.0	407.5	N/A	N/A	N/A	N/A	CPS
SSW1 Aluminum	2800	2389	N/A	N/A	N/A	N/A	CPS
SSW2 Aluminum	8000	6455	N/A	N/A	N/A	N/A	CPS
SSW3 Aluminum	11600	8951	N/A	N/A	N/A	N/A	CPS
SSW4 Aluminum	5000	3637	N/A	N/A	N/A	N/A	CPS
SSW5 Aluminum	660.0	442.1	N/A	N/A	N/A	N/A	CPS

Hostile Litho−Density Sonde Wellsite Calibration − Lithology Measurement
Master: 16−Jul−2014 4:57

LSW1 Iron	400.0	349.8	N/A	N/A	N/A	N/A	CPS
LSW2 Iron	730.0	590.1	N/A	N/A	N/A	N/A	CPS
LSW3 Iron	1000	785.3	N/A	N/A	N/A	N/A	CPS
LSW4 Iron	520.0	408.9	N/A	N/A	N/A	N/A	CPS
LSW5 Iron	470.0	376.5	N/A	N/A	N/A	N/A	CPS

SSW1 Iron	2100	1743	N/A	N/A	N/A	N/A	CPS
SSW2 Iron	6800	5378	N/A	N/A	N/A	N/A	CPS
SSW3 Iron	10800	8163	N/A	N/A	N/A	N/A	CPS
SSW4 Iron	4600	3323	N/A	N/A	N/A	N/A	CPS
SSW5 Iron	580.0	390.1	N/A	N/A	N/A	N/A	CPS

Hostile Litho−Density Sonde Wellsite Calibration − Caliper Calibration
Before: 17−Jul−2014 5:38

HLDS Caliper Small Ring	12.00	N/A	15.84	N/A	N/A	N/A	IN
HLDS Caliper Large Ring	15.19	N/A	19.69	N/A	N/A	N/A	IN

Accelerator−Porosity Tool Wellsite Calibration − Detector Background
Master: 16−Jul−2014 2:13 Before: 25−Jul−2014 10:41 After: 25−Jul−2014 16:17

Near Det Bkg Cntrate	30.00	26.61	25.31	24.64	−0.6673	N/A	CPS
Far Det Bkg Cntrate	30.00	29.50	28.75	28.13	−0.6175	N/A	CPS
Array−1 Det Bkg Cntrate	30.00	26.43	27.75	25.53	−2.219	N/A	CPS
Array−2 Det Bkg Cntrate	30.00	26.28	25.33	26.88	1.551	N/A	CPS
Array Therm Det Bkg Cntrate	30.00	26.35	26.69	28.83	2.136	N/A	CPS

Accelerator−Porosity Tool Wellsite Calibration − Calibration Ratios
Master: 16−Jul−2014 2:16

Near/Far Calibration Ratio	0.9250	0.9745	N/A	N/A	N/A	N/A	
Near/Array Calibration Ratio	1.030	1.083	N/A	N/A	N/A	N/A	
Near/Array Cal Ratio Up/Down	1.000	1.014	N/A	N/A	N/A	N/A	

Accelerator−Porosity Tool Wellsite Calibration − Tank Check
Master: 16−Jul−2014 2:16

Array−1 Standoff Porosity	11.75	10.47	N/A	N/A	N/A	N/A	PU
Array−2 Standoff Porosity	11.75	10.65	N/A	N/A	N/A	N/A	PU
Average Slowing Down Time	6.000	6.035	N/A	N/A	N/A	N/A	US
Array−1 SDT Ratio Up/Down	1.000	0.9776	N/A	N/A	N/A	N/A	
Array−2 SDT Ratio Up/Down	1.000	0.9742	N/A	N/A	N/A	N/A	
Sigma Formation	27.50	33.77	N/A	N/A	N/A	N/A	CU

Accelerator−Porosity Tool Wellsite Calibration − CCR7 signal boxes
Master: 16−Jul−2014 1:19

Near Detector Plateau Setting	1650	1696	N/A	N/A	N/A	N/A	V
Far Detector Plateau Setting	2000	2035	N/A	N/A	N/A	N/A	V
Array Detector Plateau Setting	2000	1940	N/A	N/A	N/A	N/A	V

Hostile Natural Gamma Ray Sonde Wellsite Calibration − Detector 1 Check
Master: 15−Jul−2014 0:16 Before: 15−Jul−2014 8:28 After: 15−Jul−2014 8:42

Na 511 Peak Loc	40.00	39.57	39.75	39.77	0.02731	1.000	
Na 511 Peak Res	15.50	15.78	15.47	15.60	0.1276	2.000	%
High Voltage	1150	1197	1198	1197	−0.5396	N/A	V
Na 1785 Peak Loc	142.6	142.4	143.3	142.8	−0.5427	7.000	
Na 1785 Peak Res	8.500	9.334	9.234	8.659	−0.5749	2.000	%
Temperature	15.50	37.42	37.47	37.56	0.09754	N/A	DEGC
Na Count Rate	45.00	10.91	10.93	10.90	−0.02571	8.000	CPS

Hostile Natural Gamma Ray Sonde Wellsite Calibration − Detector 2 Check
Master: 15−Jul−2014 0:16 Before: 15−Jul−2014 8:28 After: 15−Jul−2014 8:42

Na 511 Peak Loc	40.00	39.46	39.66	39.81	0.1556	1.000	
Na 511 Peak Res	15.50	16.20	15.73	15.53	−0.2004	2.000	%
High Voltage	1150	1129	1129	1130	1.742	N/A	V
Na 1785 Peak Loc	142.6	141.8	140.1	143.7	3.554	7.000	
Na 1785 Peak Res	8.500	10.06	10.03	8.567	−1.463	2.000	%
Temperature	15.50	38.37	38.33	38.34	0.006504	N/A	DEGC
Na Count Rate	45.00	11.54	11.55	11.30	−0.2470	8.000	CPS

Hostile Natural Gamma Ray Sonde Wellsite Calibration − Ratio Of Detector 1 To Detector 2
Master: 15−Jul−2014 0:16 Before: 15−Jul−2014 8:28 After: 15−Jul−2014 8:42

Coincidence Count Rate Ratio	1.000	0.9495	0.9508	0.9685	0.01775	0.05000	

Hostile Natural Gamma Ray Sonde Master Calibration − Detector 1 Calibration
Master: 14−Jul−2014 23:07

Na 511 Peak Set Point	40.00	41.00	−−	−−	−−	−−	
Th Peak Loc	209.6	210.1	−−	−−	−−	−−	
Th Peak Res	7.000	7.101	−−	−−	−−	−−	%
Background Count Rate	142.5	15.67	−−	−−	−−	−−	CPS
Gain Ratio	1.000	1.010	−−	−−	−−	−−	

Hostile Natural Gamma Ray Sonde Master Calibration − Detector 2 Calibration
Master: 14−Jul−2014 23:07

Na 511 Peak Set Point	40.00	41.00	−−	−−	−−	−−	
Th Peak Loc	209.6	207.2	−−	−−	−−	−−	
Th Peak Res	7.000	7.470	−−	−−	−−	−−	%
Background Count Rate	142.5	15.79	−−	−−	−−	−−	CPS
Gain Ratio	1.000	0.9988	−−	−−	−−	−−	

Enhanced DTS Cartridge Wellsite Calibration − EDTC Accelerometer Calibration

Before: 25−Jul−2014 10:35							
EDTC Z−Axis Acceleration	9.810	N/A	9.756	N/A	N/A	N/A	M/S2
Enhanced DTS Cartridge Wellsite Calibration − Detector Calibration							
Before: 15−Jul−2014 8:25 After: 15−Jul−2014 8:38							
Gamma Ray (Jig − Bkg)	154.0	N/A	154.0	158.6	4.600	14.00	GAPI
Gamma Ray (Calibrated)	164.0	N/A	164.0	168.9	4.899	15.00	GAPI

Accelerator−Porosity Tool − Detector Plateau Settings :

Near Detector Plateau Setting 1696 V
Far Detector Plateau Setting 2035 V
Array Detector Plateau Setting 1940 V

High Resolution Laterolog Array − B / Equipment Identification

Primary Equipment:		
HRLT Sonde	HRLS − B	768
Auxiliary Equipment:		
HRLT lower Housing	HRLH − B	968
HRLT Lower Cartridge	HRLC − B	974
HRLT upper Housing	HRUH − B	978
HRLT Upper Cartridge	HRUC − B	764

Hostile Litho−Density Sonde / Equipment Identification

Primary Equipment:		
Hostile Litho Density Sonde	HLDS − D	45
Hostile Litho Density High Voltage	HLDV − D	45
Gamma Source Radioactive	GSR − Z	8113
Auxiliary Equipment:		
Hostile Litho Density Pad	HLDP − C	45
Hostile Litho Density High Voltage Housi	HEH − H	47

Litho−Density Spectroscopy Cartridge − B / Equipment Identification

Primary Equipment:		
LDSC Cartridge	LDSC − B	521
Auxiliary Equipment:		
LDSC Housing	LDSH − A	319

Accelerator−Porosity Tool / Equipment Identification

Primary Equipment:		
Accelerator−Porosity Sonde	APS − C	212
APS Minitron	MNTR − F	6504
Auxiliary Equipment:		
Accelerator−Porosity Housing	APH − AC	121
APS Calibration Water Tank	SFT − 178	1
APS Aluminum Calibrator Sleeve	SFT − 281	1

Hostile Natural Gamma Ray Cartridge − B / Equipment Identification

Primary Equipment:		
HNGC Cartridge	HNGC − B	300
Auxiliary Equipment:		
HNGC Housing	HNGH − A	115

Hostile Natural Gamma Ray Sonde / Equipment Identification

Primary Equipment:		
HNGS Sonde	HNGS − BA	194
Auxiliary Equipment:		
HNGS Sonde Housing	HNSH − BA	205
Gamma Source Radioactive	GSR − U	616008

Hostile Natural Gamma Ray Sonde Wellsite Calibration

Detector 1 Check

Phase	Na 511 Peak Loc	Value
Master		39.57
Before		39.75
After		39.77
	37.50 (Minimum) 40.00 (Nominal) 43.50 (Maximum)	

Phase	Na 511 Peak Res %	Value
Master		15.78
Before		15.47
After		15.60
	12.00 (Minimum) 15.50 (Nominal) 19.00 (Maximum)	

Phase	High Voltage V	Value
Master		1197
Before		1198
After		1197
	900.0 (Minimum) 1150 (Nominal) 1600 (Maximum)	

Phase	Na 1785 Peak Loc	Value
Master		142.4
Before		143.3
After		142.8
	135.0 (Minimum) 142.6 (Nominal) 150.3 (Maximum)	

Phase	Na 1785 Peak Res %	Value
Master		9.334
Before		9.234
After		8.659
	7.000 (Minimum) 8.500 (Nominal) 11.00 (Maximum)	

Phase	Temperature DEGC	Value
Master		37.42
Before		37.47
After		37.56
	−28.89 (Minimum) 15.50 (Nominal) 60.00 (Maximum)	

Phase	Na Count Rate CPS	Value
Master		10.91
Before		10.93
After		10.90
	10.00 (Minimum) 45.00 (Nominal) 100.0 (Maximum)	

Master: 15−Jul−2014 0:16 Before: 15−Jul−2014 8:28 After: 15−Jul−2014 8:42

Hostile Natural Gamma Ray Sonde Wellsite Calibration

Detector 2 Check

Phase	Na 511 Peak Loc	Value
Master		39.46
Before		39.66
After		39.81
	37.50 (Minimum) 40.00 (Nominal) 43.50 (Maximum)	

Phase	Na 511 Peak Res %	Value
Master		16.20
Before		15.73
After		15.53
	12.00 (Minimum) 15.50 (Nominal) 19.00 (Maximum)	

Phase	High Voltage V	Value
Master		1129
Before		1129
After		1130
	900.0 (Minimum) 1150 (Nominal) 1600 (Maximum)	

Phase	Na 1785 Peak Loc	Value
Master		141.8
Before		140.1
After		143.7
	135.0 (Minimum) 142.6 (Nominal) 150.3 (Maximum)	

Phase	Na 1785 Peak Res %	Value
Master		10.06
Before		10.03
After		8.567
	7.000 (Minimum) 8.500 (Nominal) 11.00 (Maximum)	

Phase	Temperature DEGC	Value
Master		38.37
Before		38.33
After		38.34
	−28.89 (Minimum) 15.50 (Nominal) 60.00 (Maximum)	

Phase	Na Count Rate CPS	Value
Master		11.54
Before		11.55
After		11.30
	10.00 (Minimum) 45.00 (Nominal) 100.0 (Maximum)	

Master: 15−Jul−2014 0:16 Before: 15−Jul−2014 8:28 After: 15−Jul−2014 8:42

Hostile Natural Gamma Ray Sonde Wellsite Calibration

Ratio Of Detector 1 To Detector 2

Phase	Coincidence Count Rate Ratio	Value
Master	EXCEEDS LIMIT	0.9495
Before		0.9508

Before		0.9508
After		0.9685
	0.9500 (Minimum)	1.000 (Nominal) 1.050 (Maximum)

Master: 15−Jul−2014 0:16
Before: 15−Jul−2014 8:28
After: 15−Jul−2014 8:42

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		41.00	Master		210.1	Master		7.101
	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		15.67	Master		1.010
	10.00 (Minimum) 142.5 (Nominal) 265.0 (Maximum)			0.9400 (Minimum) 1.000 (Nominal) 1.060 (Maximum)	

Master: 14−Jul−2014 23:07

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		41.00	Master		207.2	Master		7.470
	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		15.79	Master		0.9988
	10.00 (Minimum) 142.5 (Nominal) 265.0 (Maximum)			0.9400 (Minimum) 1.000 (Nominal) 1.060 (Maximum)	

Master: 14−Jul−2014 23:07

Enhanced DTS Cartridge / Equipment Identification

Primary Equipment:		
EDTC Gamma Ray Detector	EDTG − A/B	8305
Enhanced DTS Cartridge	EDTC − B	8317
Auxiliary Equipment:		
EDTC Housing	EDTH − B	8303

Enhanced DTS Cartridge Wellsite Calibration

EDTC Accelerometer Calibration

Phase	EDTC Z−Axis Acceleration M/S2	Value
Before		9.756
	9.610 (Minimum) 9.810 (Nominal) 10.01 (Maximum)	

Before: 25−Jul−2014 10:35

Enhanced DTS Cartridge Wellsite Calibration

Detector Calibration

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig − Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before		6.019	Before		154.0	Before		164.0
After		5.723	After		158.6	After		168.9
	0 (Minimum) 30.00 (Nominal) 120.0 (Maximum)			140.0 (Minimum) 154.0 (Nominal) 168.0 (Maximum)			149.0 (Minimum) 164.0 (Nominal) 179.0 (Maximum)	

Before: 15−Jul−2014 8:25 After: 15−Jul−2014 8:38

Company:	**Lamont Doherty Earth Observatory**
Well:	**Expedition 351, Site U1438F**
Field:	**IBM Arc Origins**
Rig:	**JOIDES Resolution**
Ocean:	**Pacific**

Schlumberger

Hostile Natural Gamma Sonde (HNGS)
Spectroscopy
Caliper