Schlumberger

Company: **Lamont Doherty**

Well: **Expedition 339, Site U1387 GC−09A**
Field: **Mediterranean Outflow (Portugal)**
Rig: **JOIDES Resolution** Ocean: **Atlantic**

Hostile Natural Gamma Ray Spectroscopy

Rig: JOIDES Resolution
Field: Mediterranean Outflow (Portugal)
Location: Latitude: N 36* 48.32'
Well: Expedition 339, Site U1387 GC−
Company: Lamont Doherty

LOCATION

Latitude: N 36* 48.32'
Longitude: W 7* 43.14'

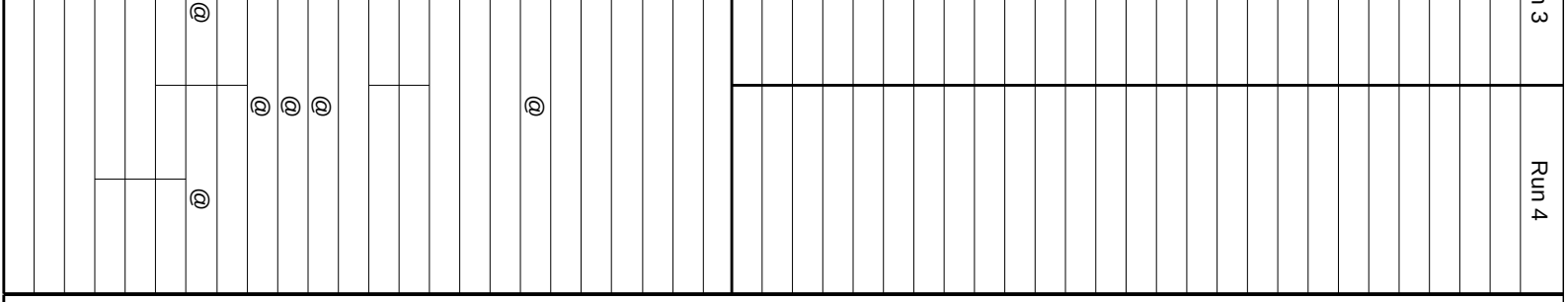
Elev.: K.B. 11.00 m
G.L. −558.80 m
D.F. 11.00 m

Permanent Datum: Mean Sea Level
Elev.: 0.00 m
Log Measured From: Drill Floor
11.00 m above Perm. Datum
Drilling Measured From: Drill Floor

API Serial No.	Max. Hole Devi. 0 deg	Longitude W 7* 43.14'	Latitude N 36* 48.32

	Run 1	Run 2	Run
Logging Date	17−Dec−2011		
Run Number	1		
Depth Driller	870 m		
Schlumberger Depth	650 m		
Bottom Log Interval	0 m		
Top Log Interval	0 m		
Casing Driller Size @ Depth	10.750 in @ 104 m	@	
Casing Schlumberger	103 m		
Bit Size	9.875 in		
Type Fluid In Hole	Seawater Gel		
MUD Density / Viscosity	1.25 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	@ 21 / @ 21	@ / @	
Maximum Recorded Temperatures	21 degC		
Circulation Stopped / Time	17−Dec−2011 / 0:00		
Logger On Bottom / Time	17−Dec−2011 / 4:00		
Unit Number / Location	625003 / Houston	/	
Recorded By	K. Swain		
Witnessed By	T. Williams, J. Lofi		

	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: DSI	OS1:
OS2: VSI	OS2:
OS3: FMS	OS3:
OS4: HLDS/APS/HNGS	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
Hole GC−09A Hole C was drilled with a 9 7/8" RCB bit to TDD of 1440 mbrf.	
Hole depth referenced from sea floor based on driller measurement is 569.8 m.	
HRLA run centralized with 2 MCD centralizers using 4 knuckle joints separating	
the HLDS and tools above.	
Drill pipe affecting HRLA measurement (spikes) within 60m of drillpipe.	
Large hole sizes will affect the shallow HRLA curves. The quality control log	
will indicate these areas.	
All logs recorded via wireline thru 5.5" drillpipe and RCB coring BHA.	
consisting of a bit release sub, Kinley sub, drill collars. The rotary coring	
bit was released on bottom prior to logging.	
HRLA inversion using BS of 9 7/8" for holesize during logging and playback.	
Downlog flipped and presented for a repeat section, caliper not opened	
for downlog. Density may not be reading the borehole wall in the downlog.	
For density measurements refer to the uplog.	
Logs played back with sea floor reference using drilling depth as the primary	
depth for sea floor. The main uplog is the primary wireline log.	

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

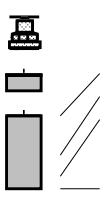
EQUIPMENT DESCRIPTION

RUN 1 RUN 2

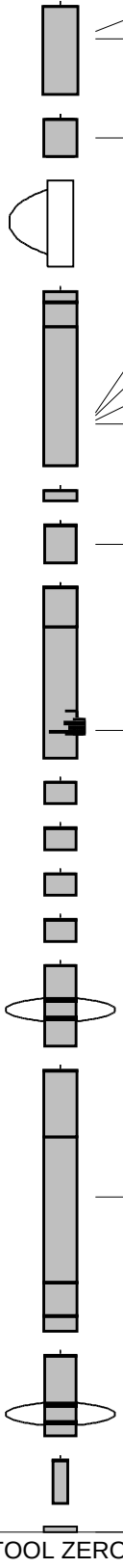
SURFACE EQUIPMENT

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

DOWNHOLE EQUIPMENT



LEH−QT	MDSB_EDTC		35.48
	Mud Tempe	34.16	
AH−369	CTEM	33.09	34.59
	Gamma Ray	32.52	
EDTC−B	EFTB DIAG		34.16
EDTH−B 8528	TelStatus		
EDTC−B 8529	EDTCB Ele	32.18	



HNGS−BA 32.18
HNGS−BA 194
HNSH−BA 205

HNGC−B 29.68
HNGH−A 115

ILE−F 28.61
ILE−F 14

AH−191 26.17

APS−C 25.87
APH−AC 22
APS−C 22
MNTR−F 5978

AH−190 21.92

LDSC−B 21.62
LDSH−A 319

HLDS 20.55
GSR−Z 2397
HLDV−D 45
HLDS−D 45
HEH−H 47
HLDP−C 45

AH−107 15.73

AH−107 15.12

AH−107 14.51

AH−knuckle 13.90

AH−MCD2 13.29
AH−MCD2 22

HRLT−B 11.01
HRUH−B 769
HRUC−B 769
HRLS−B 969
HRLH−B 759
HRLC−B 759
AH−270 773

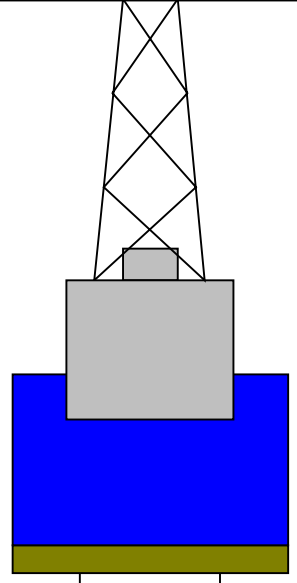
AH−MCD 3.64
AH−MCD 1

AH−GPIH 1.36
AH−GPIH 1

BNS−CCS 0.14

MAXIMUM STRING DIAMETER 4.50 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	−570			
Derrick Floor Elevation	−570			
Mean Sea Level	−559			
		4.1		
	0	3.80	Sea Floor	
	104	9.875	Open Hole	
	650		Total Depth	

Input DLIS Files

DEFAULT	HRLA_LDL_APS_NGS_054PUP	FN:73	PRODUCER	25−Dec−2011 22:46	1218.4 M	560.4 M

Output DLIS Files

DEFAULT	HRLA_LDL_APS_NGS_068PUP	FN:86	PRODUCER	29−Dec−2011 00:01	651.5 M	−7.6 M

OP System Version: 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	19C0−187		

PIP SUMMARY

Time Mark Every 60 S

HNGS Spectroscopy Gamma Ray (HSGR)
0 (GAPI) 75

Area1
From HCGR to HSGR

HNGS Computed Gamma Ray (HCGR)
0 (GAPI) 75

Main Uplog, Sea Floor Depth Reference

Playback with LCAL for holesize and Barite mud

HNGS Borehole Potassium (HBHK)
−0.05 (−−−−) 0.05

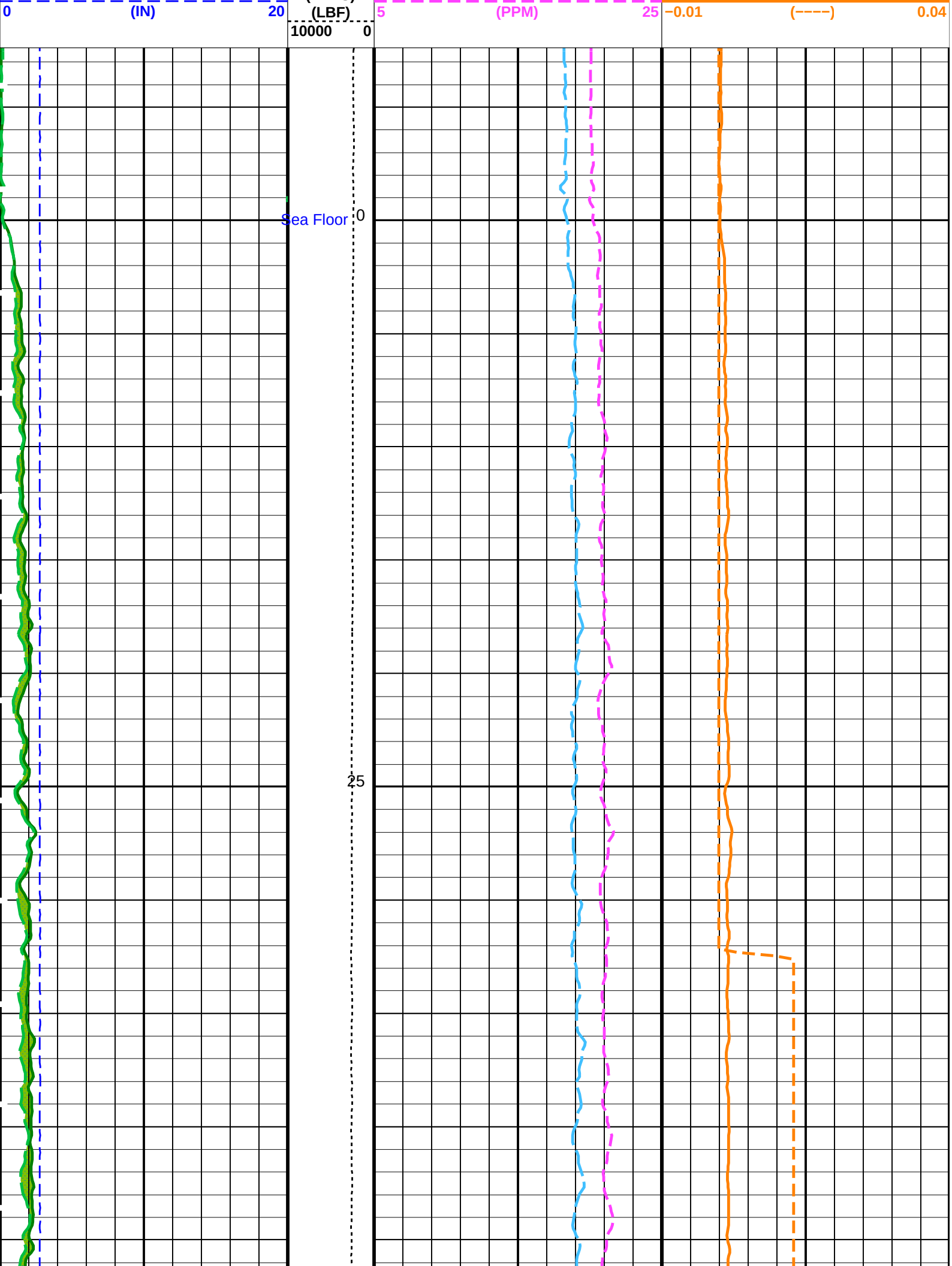
HNGS Uranium (HURA)
−5 (PPM) 10

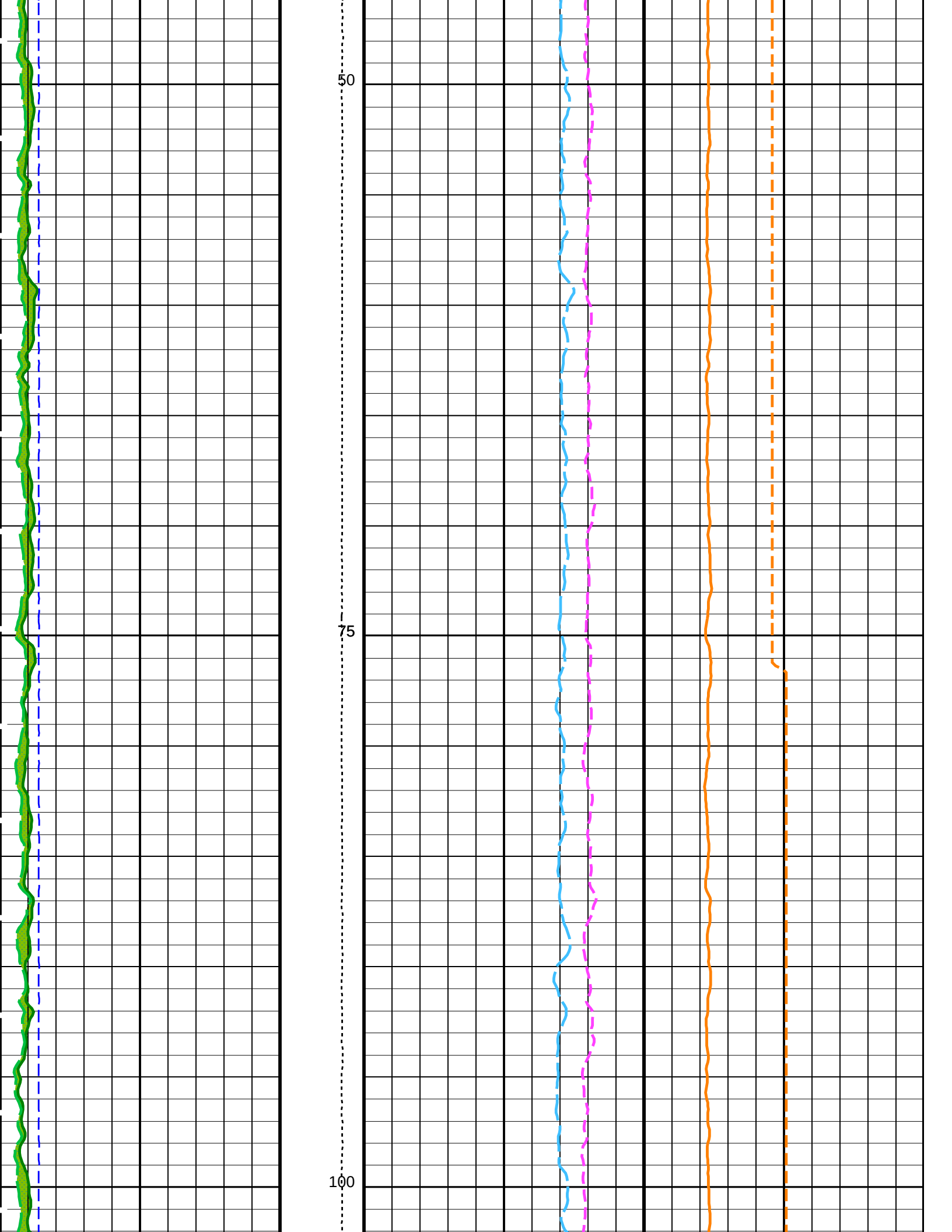
HLDS Caliper (LCAL)

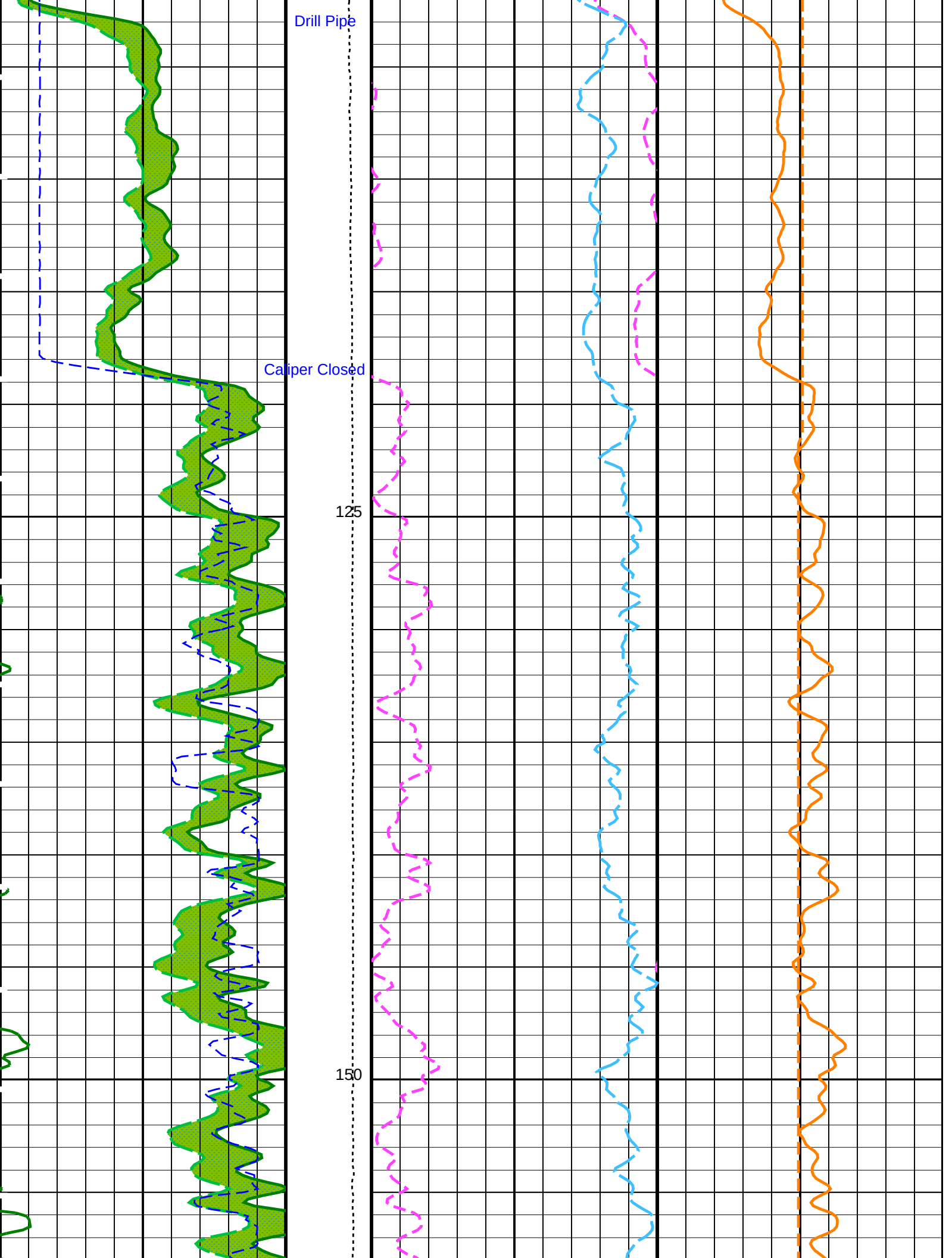
Tension (TENS)

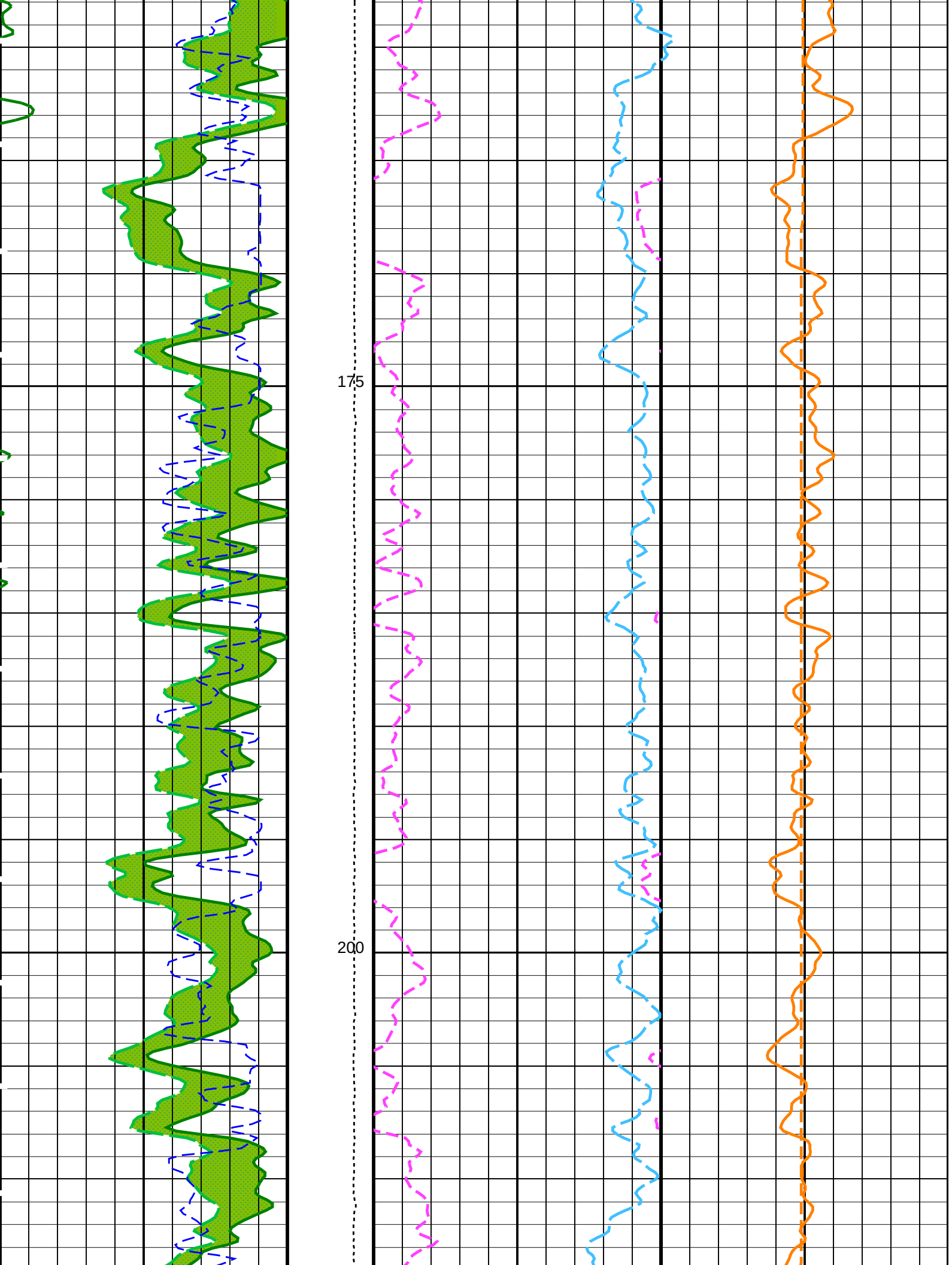
HNGS Thorium (HTHO)

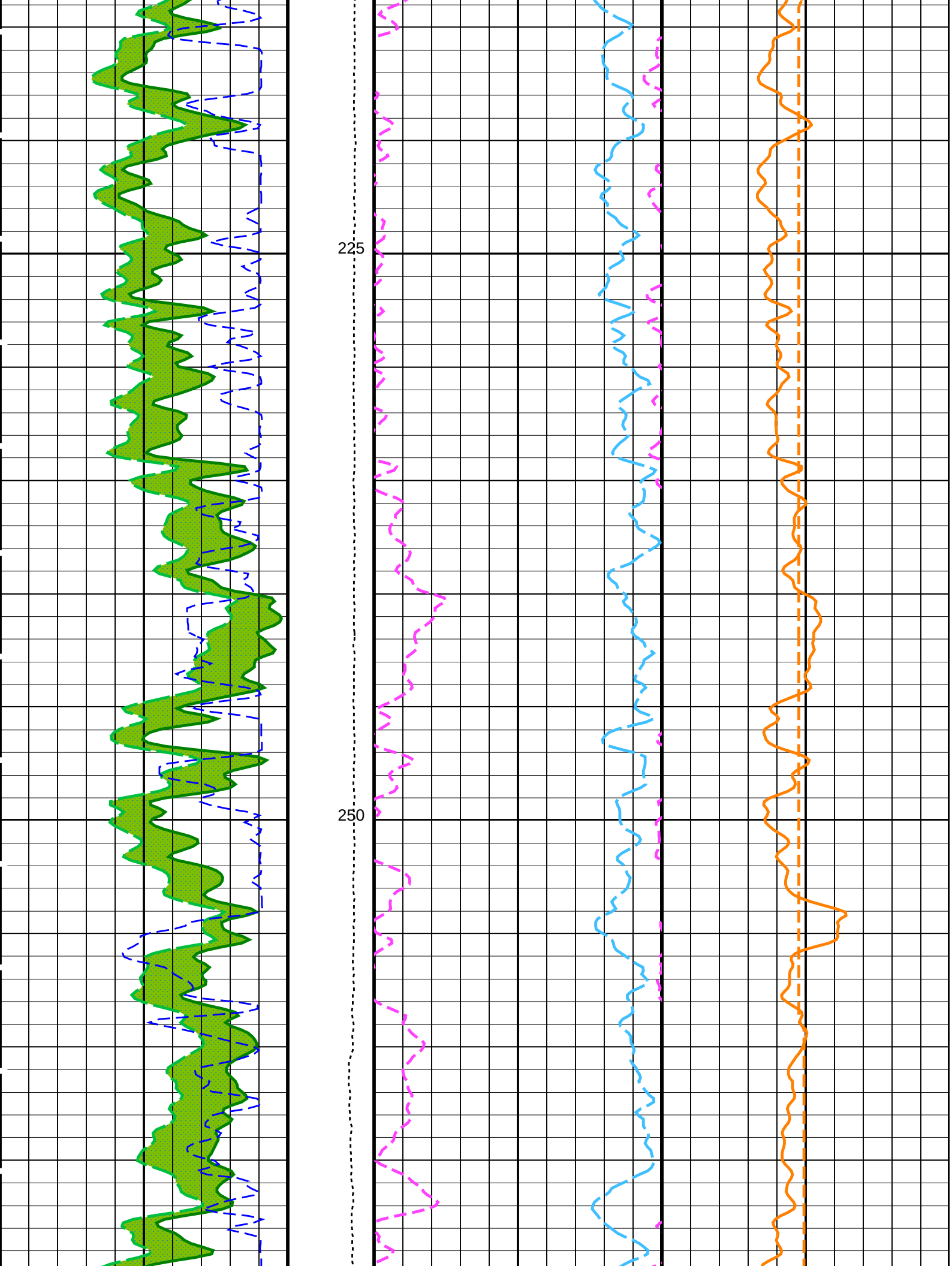
HNGS Potassium (HFK)


0
(IN)
20
(LBF)
10000
0
5
(PPM)
25
−0.01
(−−−−)
0.04
Sea Floor
0
25


50
75
100


Drill Pipe
Caliper Closed
125
150


175
200


225
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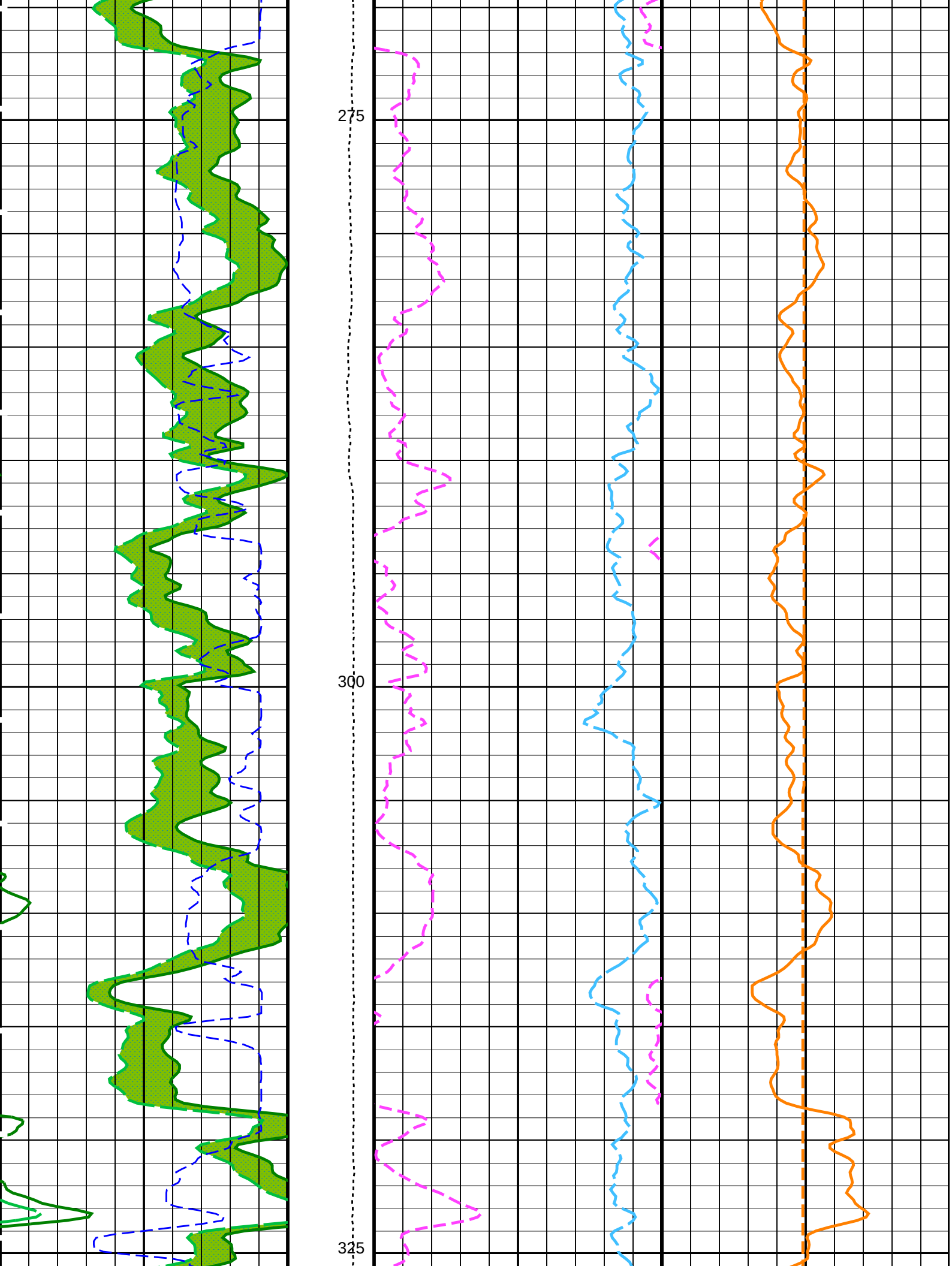
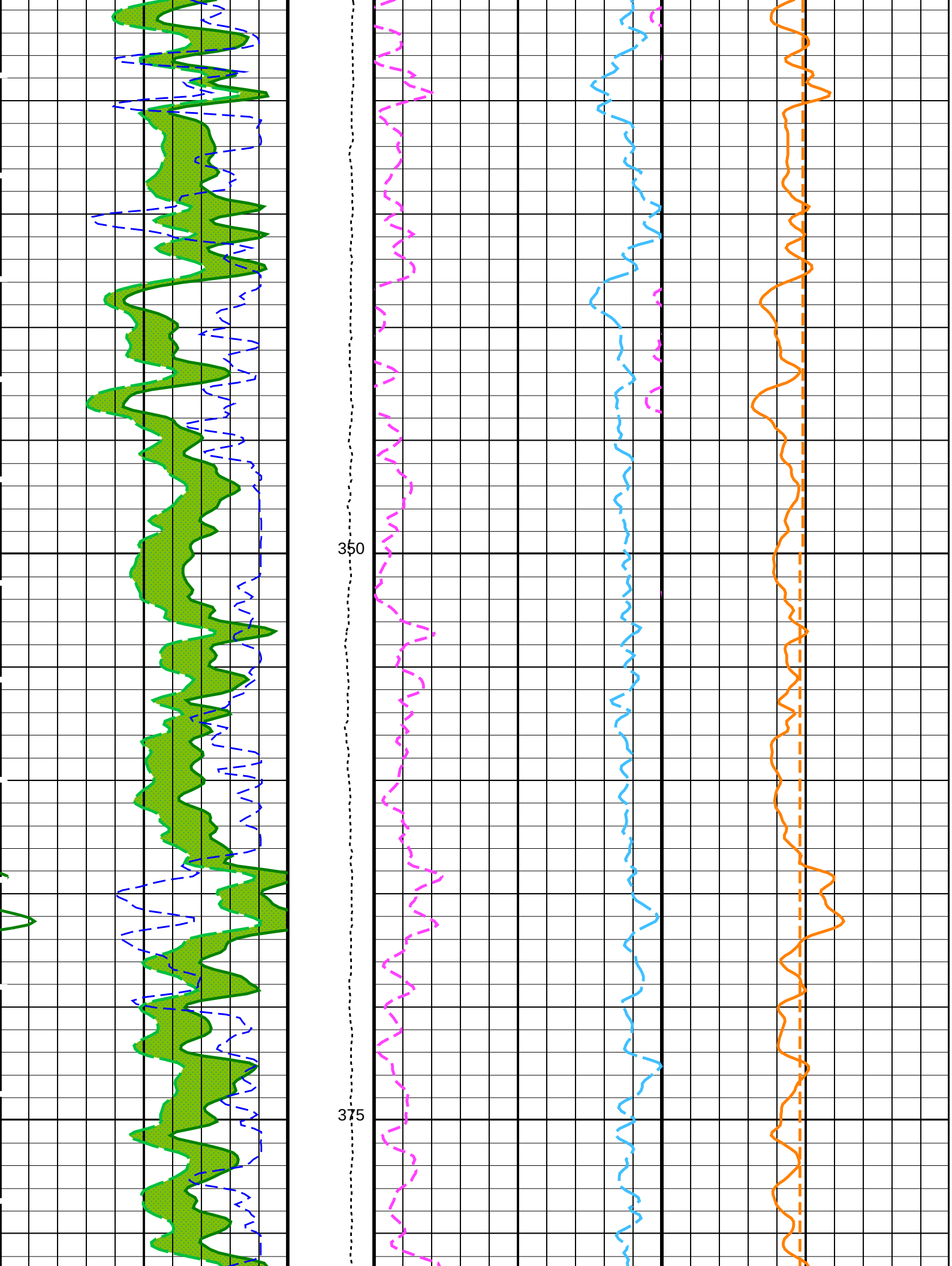
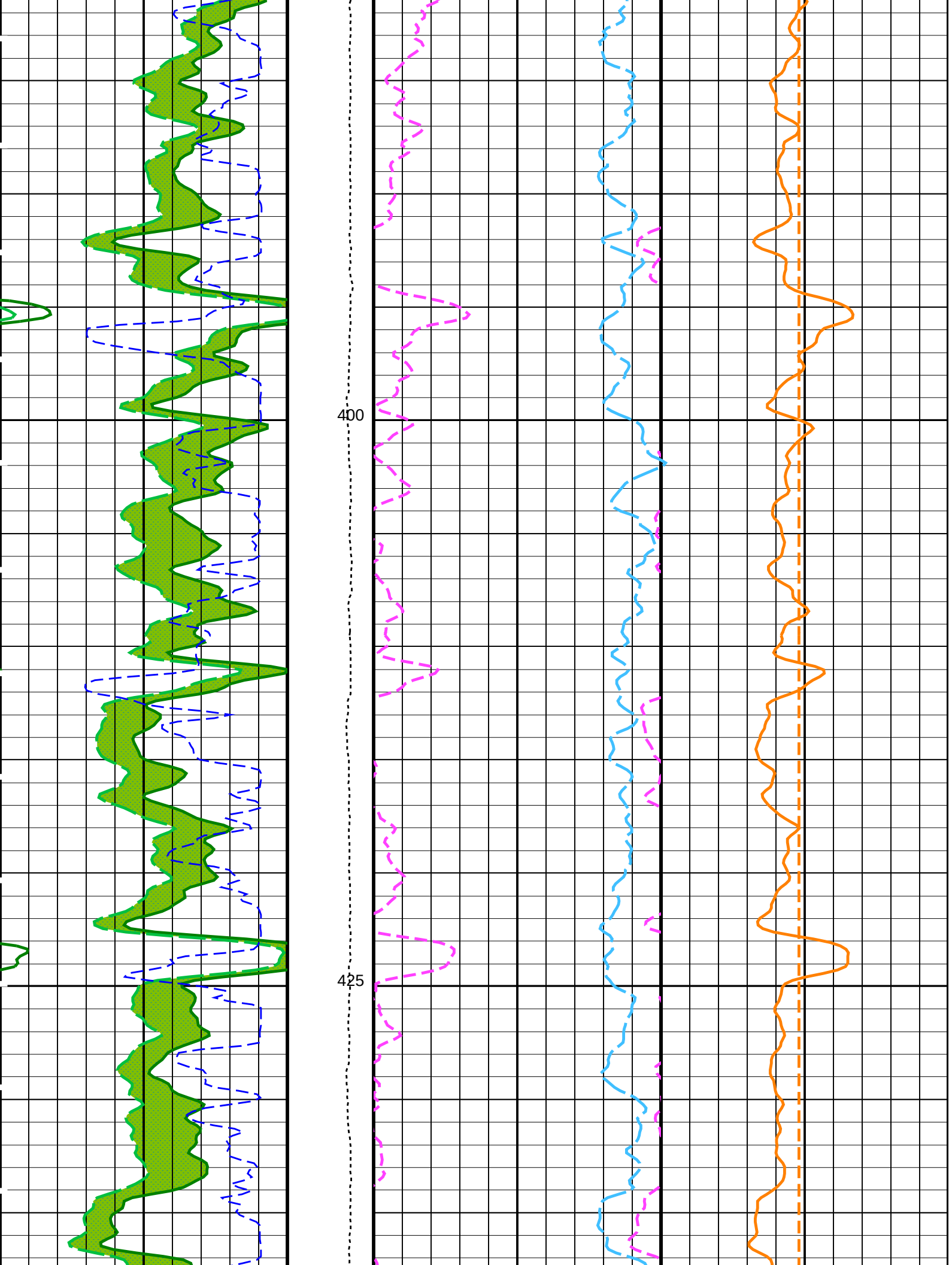
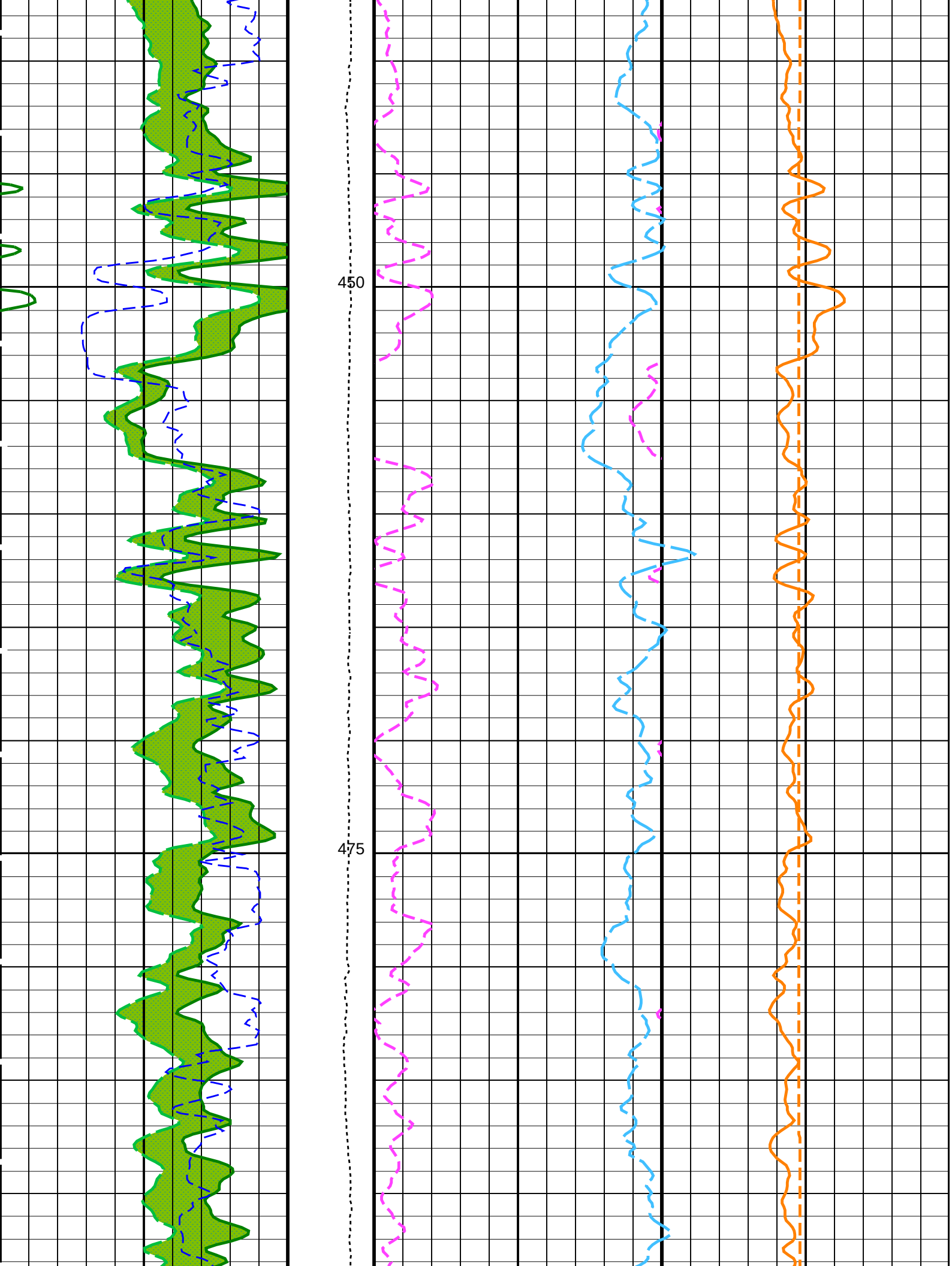

275
300
325


350
375


400
425


450
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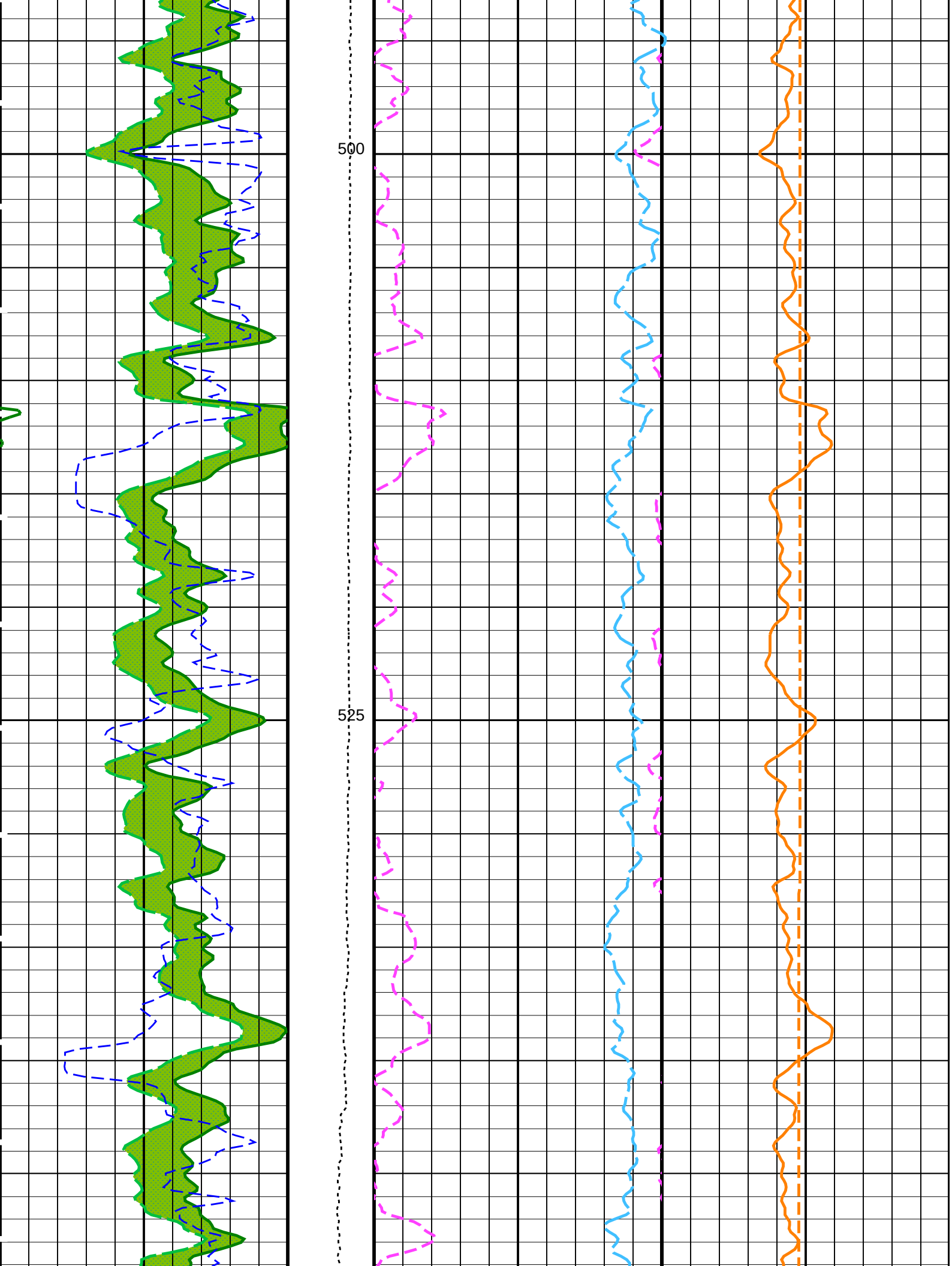
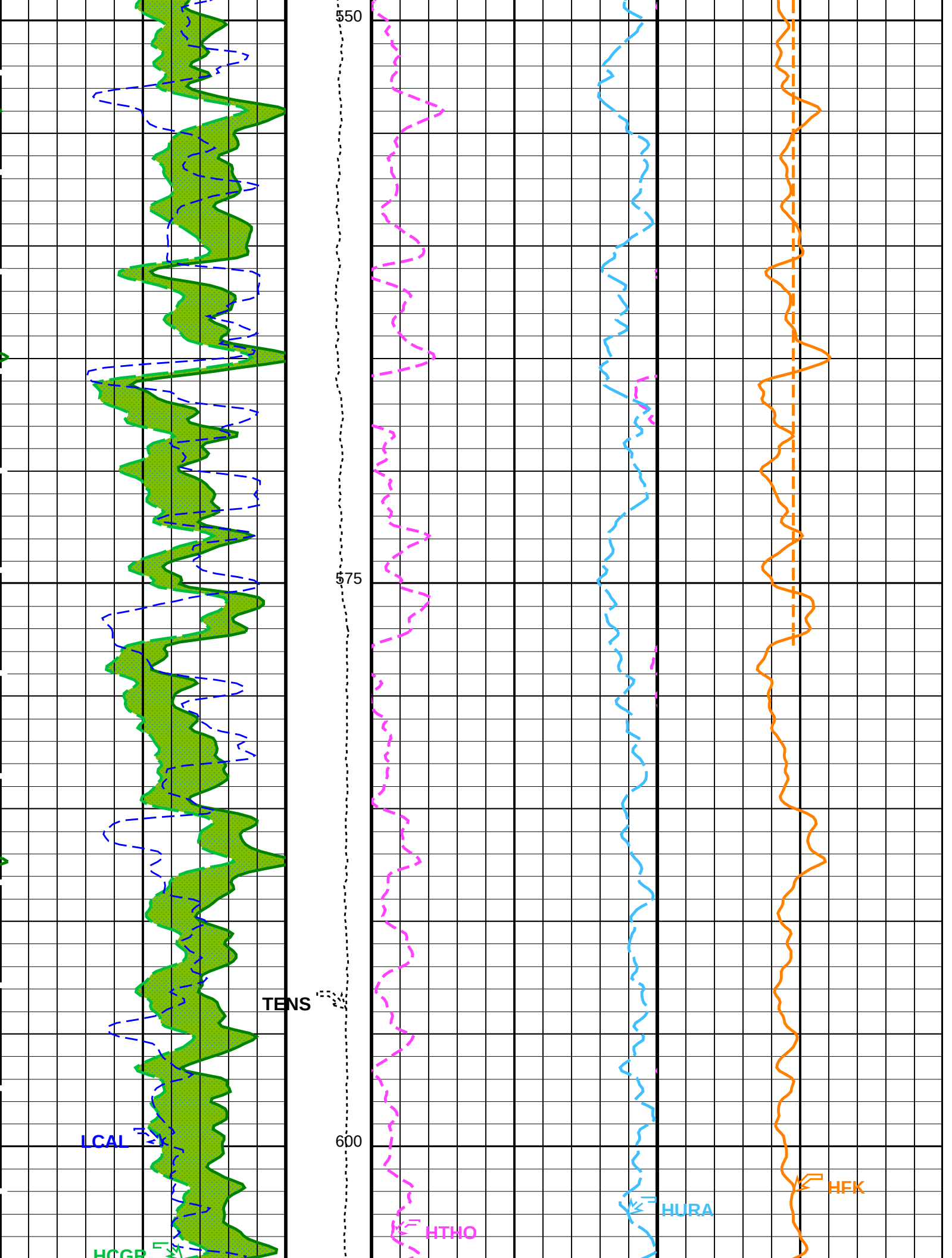
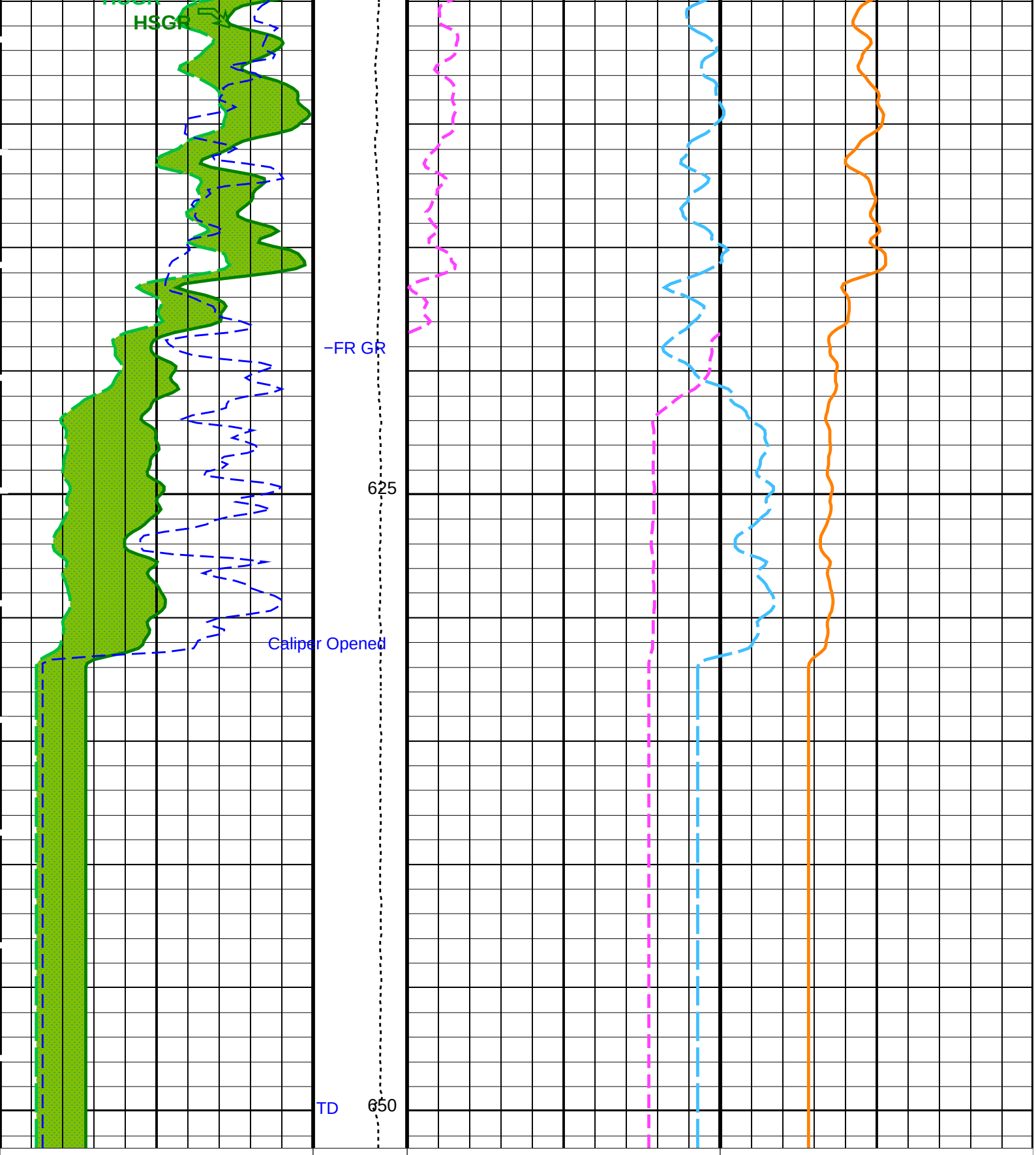

500
525


550
575
600
TENS
LCAL
HCGR
HTHO
HURA
HFK



HLDS Caliper (LCAL)
0 (IN) 20

Tension (TENS) (LBF)
10000 0

HNGS Thorium (HTHO)
5 (PPM) 25

HNGS Potassium (HFK)
−0.01 (−−−−) 0.04

HNGS Computed Gamma Ray (HCGR)
0 (GAPI) 75

HNGS Uranium (HURA)
−5 (PPM) 10

Area1
From HCGR to HSGR

Main Uplog, Sea Floor Depth Reference

HNGS Borehole Potassium (HBHK)
−0.05 (−−−−) 0.05

HNGS Spectroscopy Gamma Ray

HNGS Spectroscopy Gamma Ray (HSGR)		
0	(GAPI)	75

Playback with LCAL for holesize and Barite mud

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	−0.00405156	
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	ECCE	
VBA1	HNGS Detector 1 Variable Barite Factor Running Average	0.993378	
VBA2	HNGS Detector 2 Variable Barite Factor Running Average	0.984839	
	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	1.25	G/C3
DO	Depth Offset for Playback	−568.0	M
PP	Playback Processing	OFF	

Format: HNGSYields **Vertical Scale: 1:200** **Graphics File Created: 29−Dec−2011 00:01**

OP System Version: 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	19C0−187		

Input DLIS Files

DEFAULT	HRLA_LDL_APS_NGS_054PUP	FN:73	PRODUCER	25−Dec−2011 22:46	1218.4 M	560.4 M

Output DLIS Files

DEFAULT	HRLA_LDL_APS_NGS_068PUP	FN:86	PRODUCER	29−Dec−2011 00:01		

Input DLIS Files

DEFAULT	HRLA_LDL_APS_NGS_037PUP	FN:49	PRODUCER	17−Dec−2011 14:10	1218.4 M	560.4 M

Output DLIS Files

DEFAULT	HRLA_LDL_APS_NGS_060PUP	FN:78	PRODUCER	28−Dec−2011 22:41	651.5 M	−7.6 M

OP System Version: 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	19C0−187		

PIP SUMMARY

Time Mark Every 60 S

Main Uplog, Sea Floor Depth Reference

HNGS Spectroscopy Gamma Ray (HSGR)
0 (GAPI) 75

Area1
From HCGR to HSGR

HNGS Computed Gamma Ray (HCGR)
0 (GAPI) 75

HNGS Borehole Potassium (HBHK)
−0.05 (−−−−) 0.05

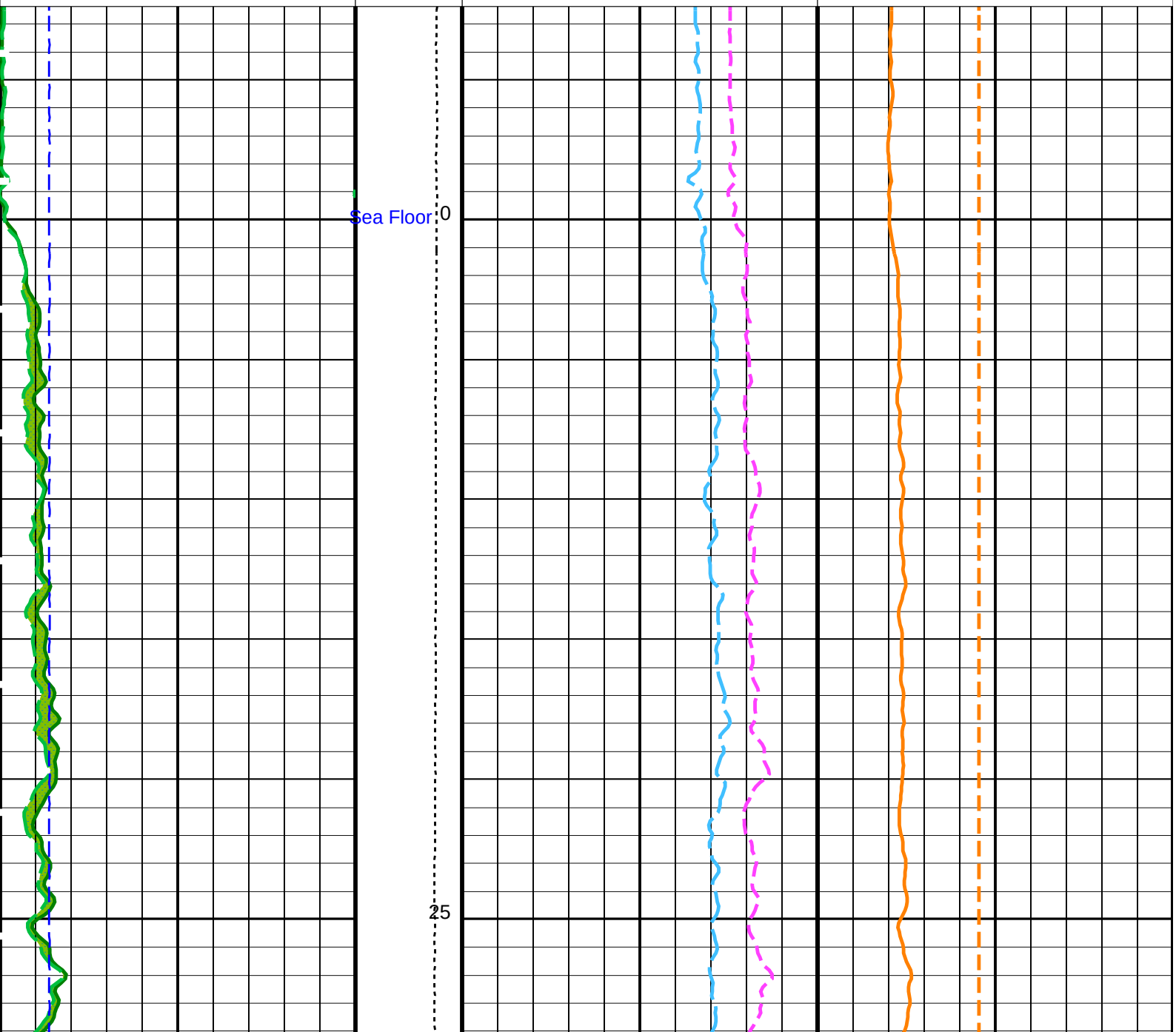
HNGS Uranium (HURA)
−5 (PPM) 10

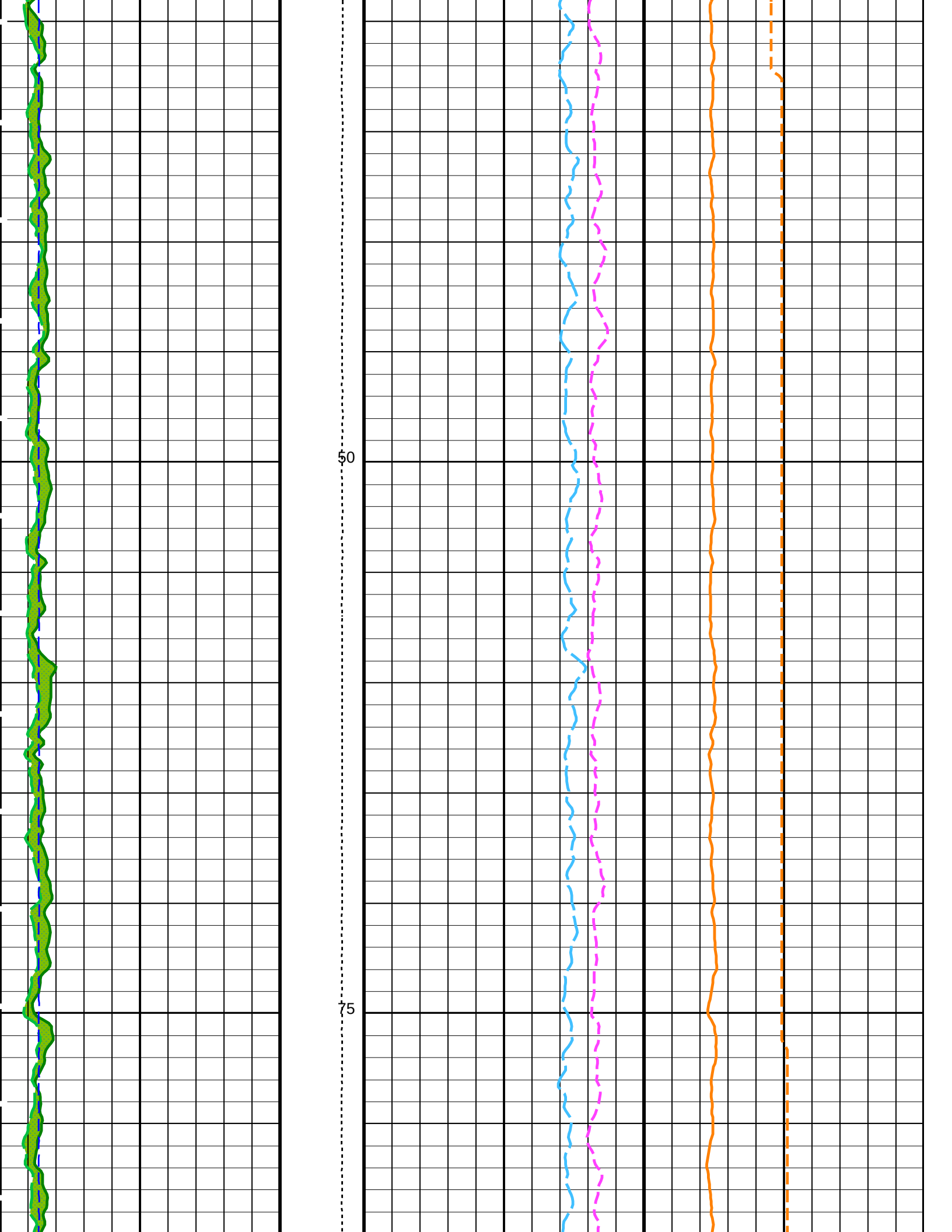
HLDS Caliper (LCAL)
0 (IN) 20

Tension (TENS) (LBF)
10000 0

HNGS Thorium (HTHO)
5 (PPM) 25

HNGS Potassium (HFK)
−0.01 (−−−−) 0.04

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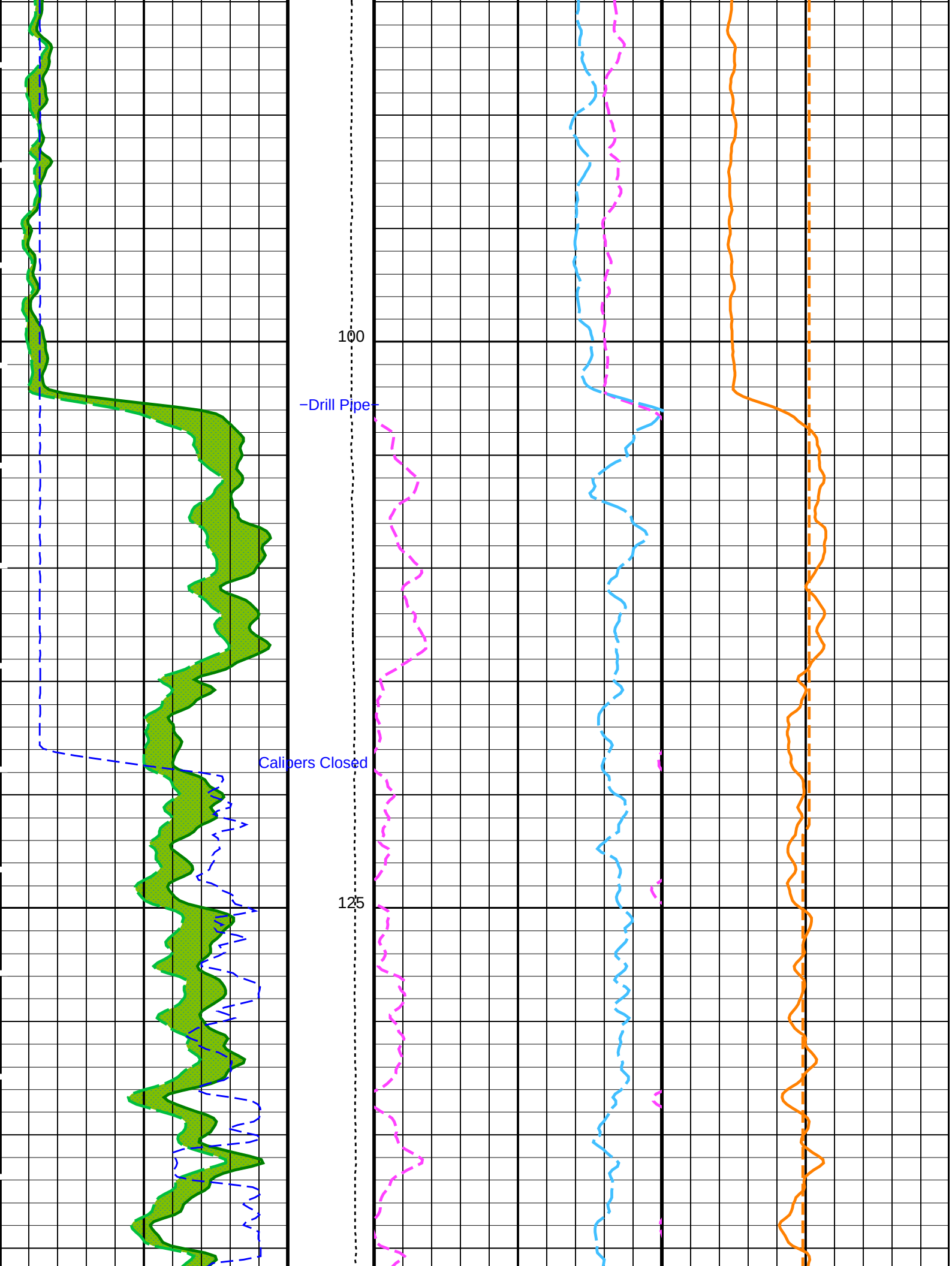
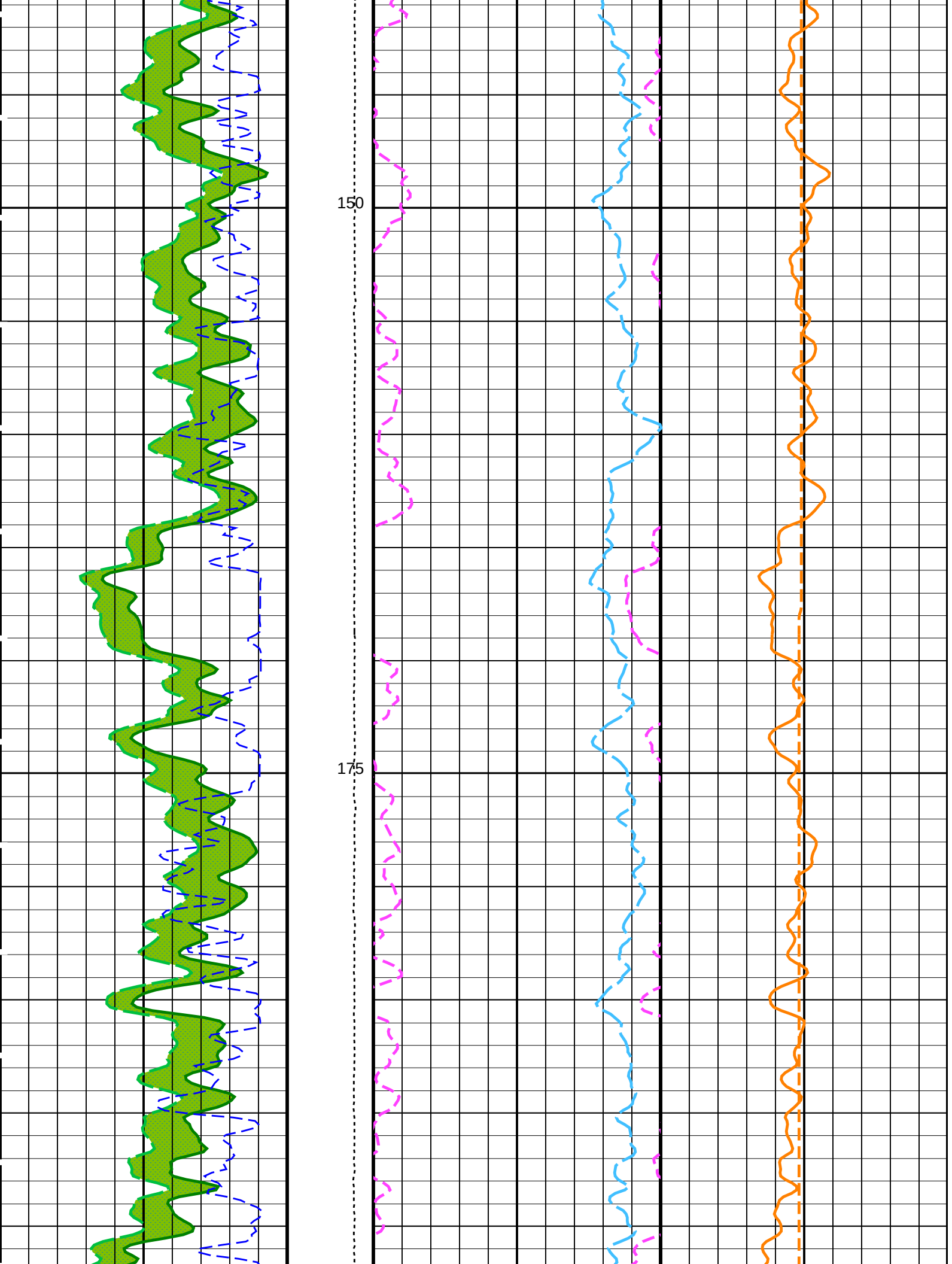

100
Drill Pipe
Calipers Closed
125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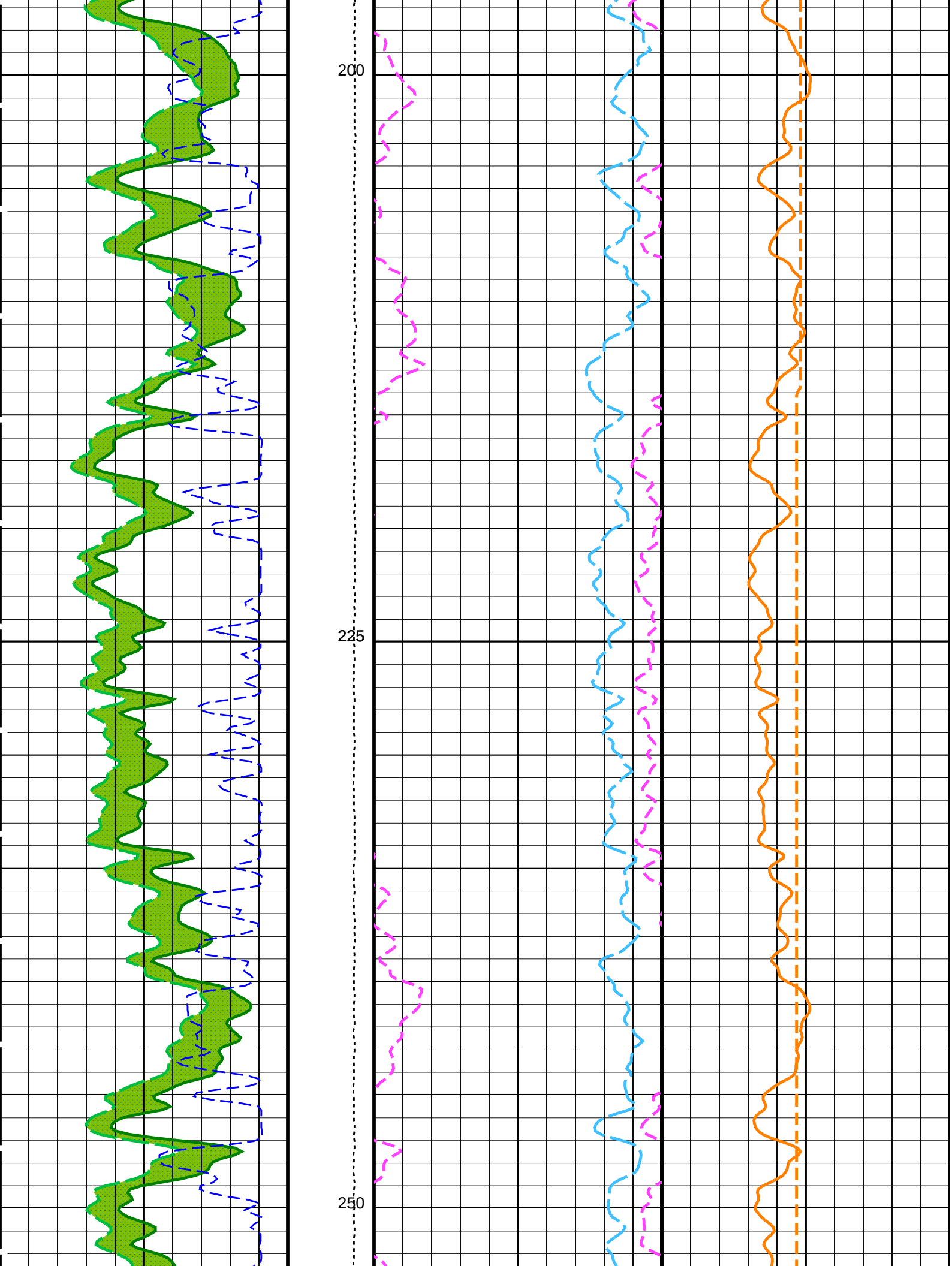
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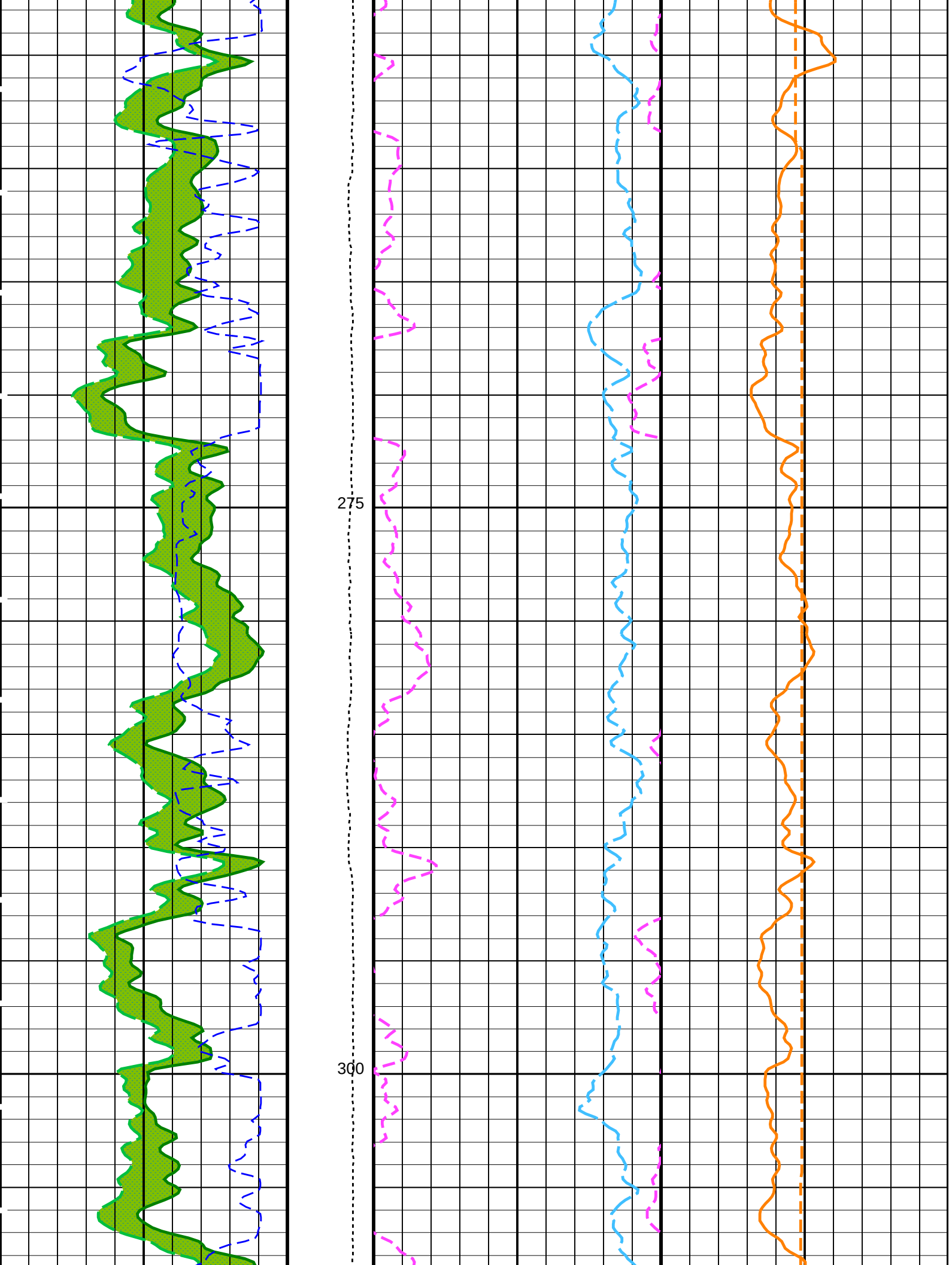
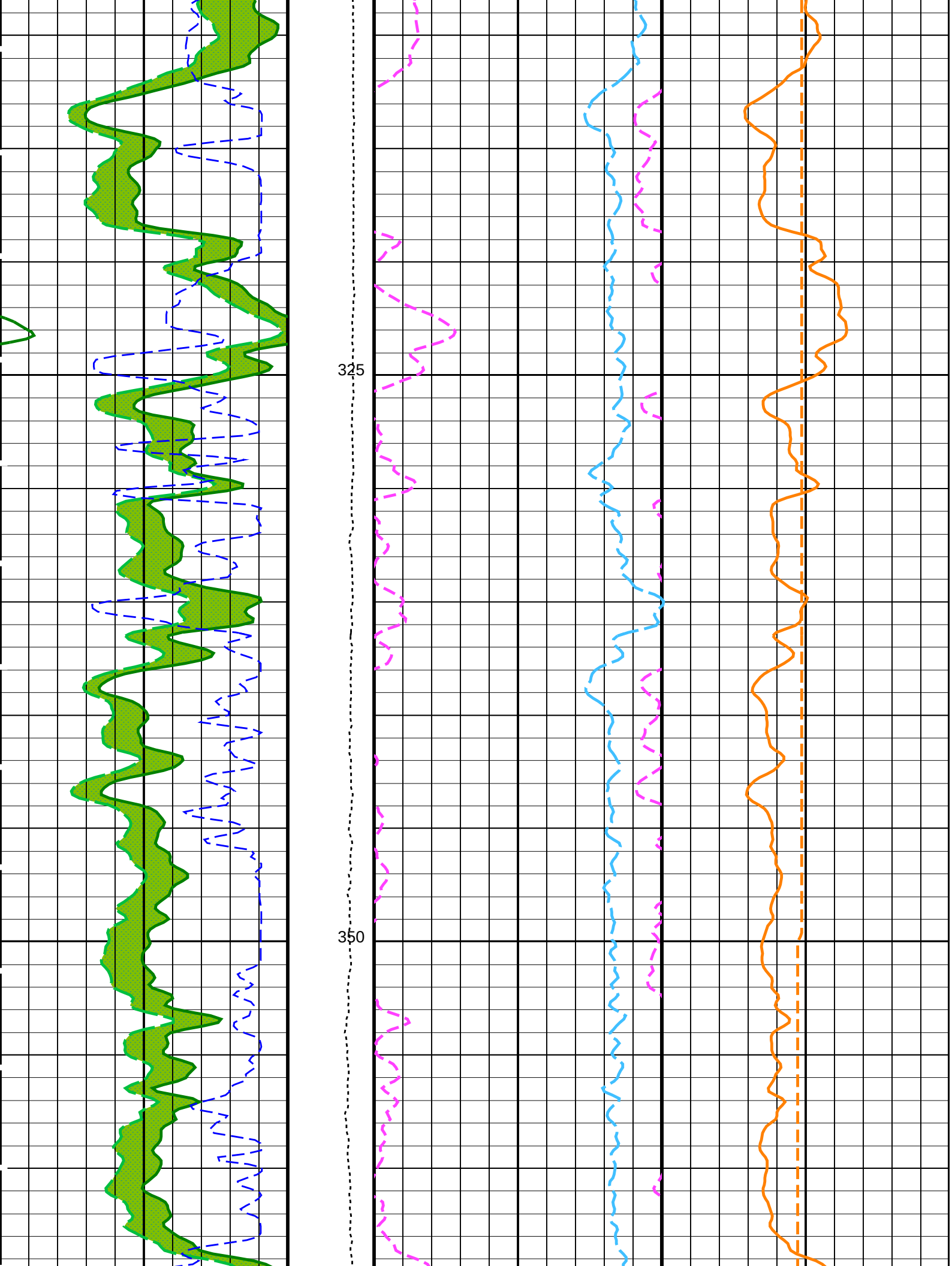

275
300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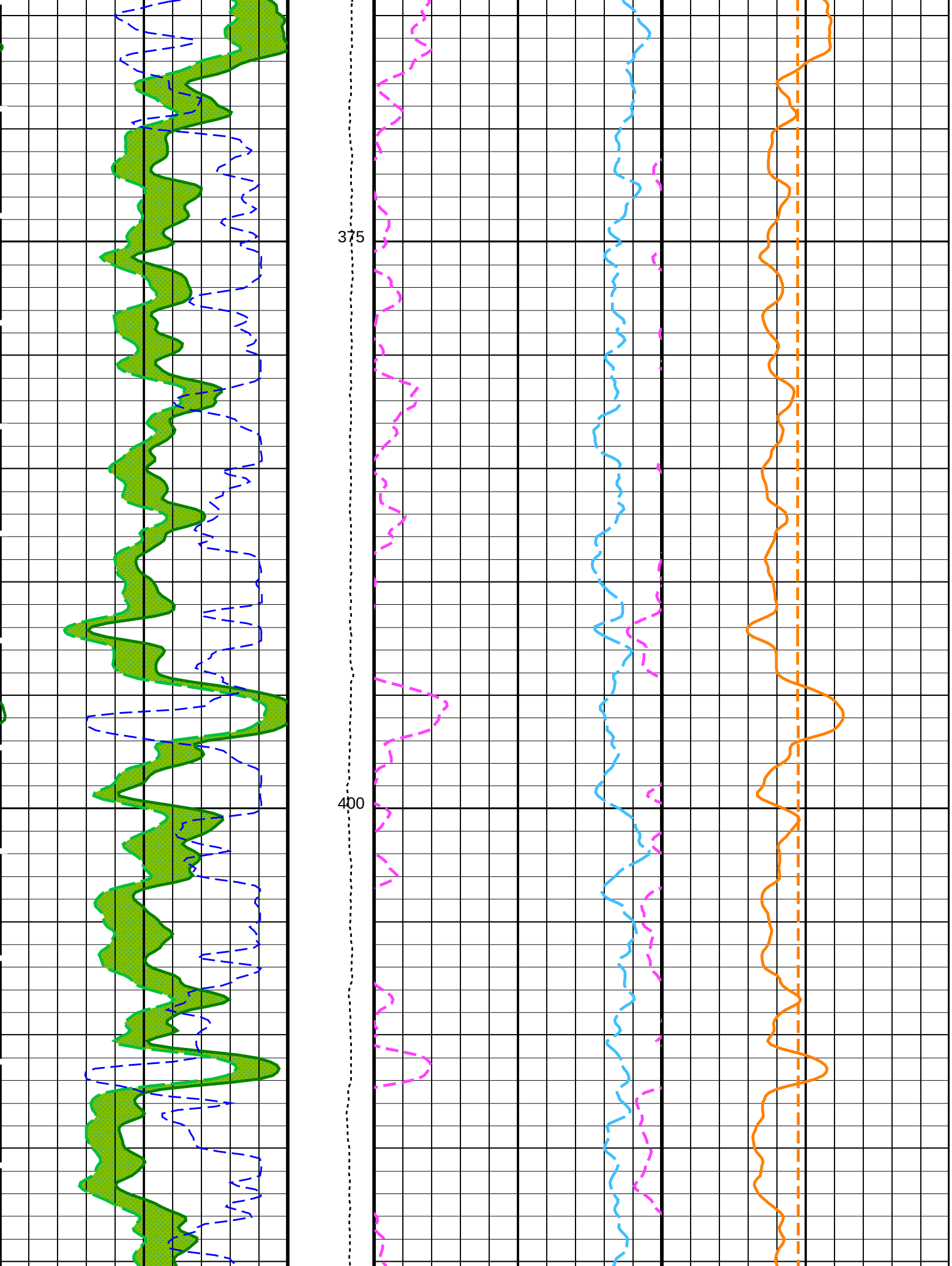
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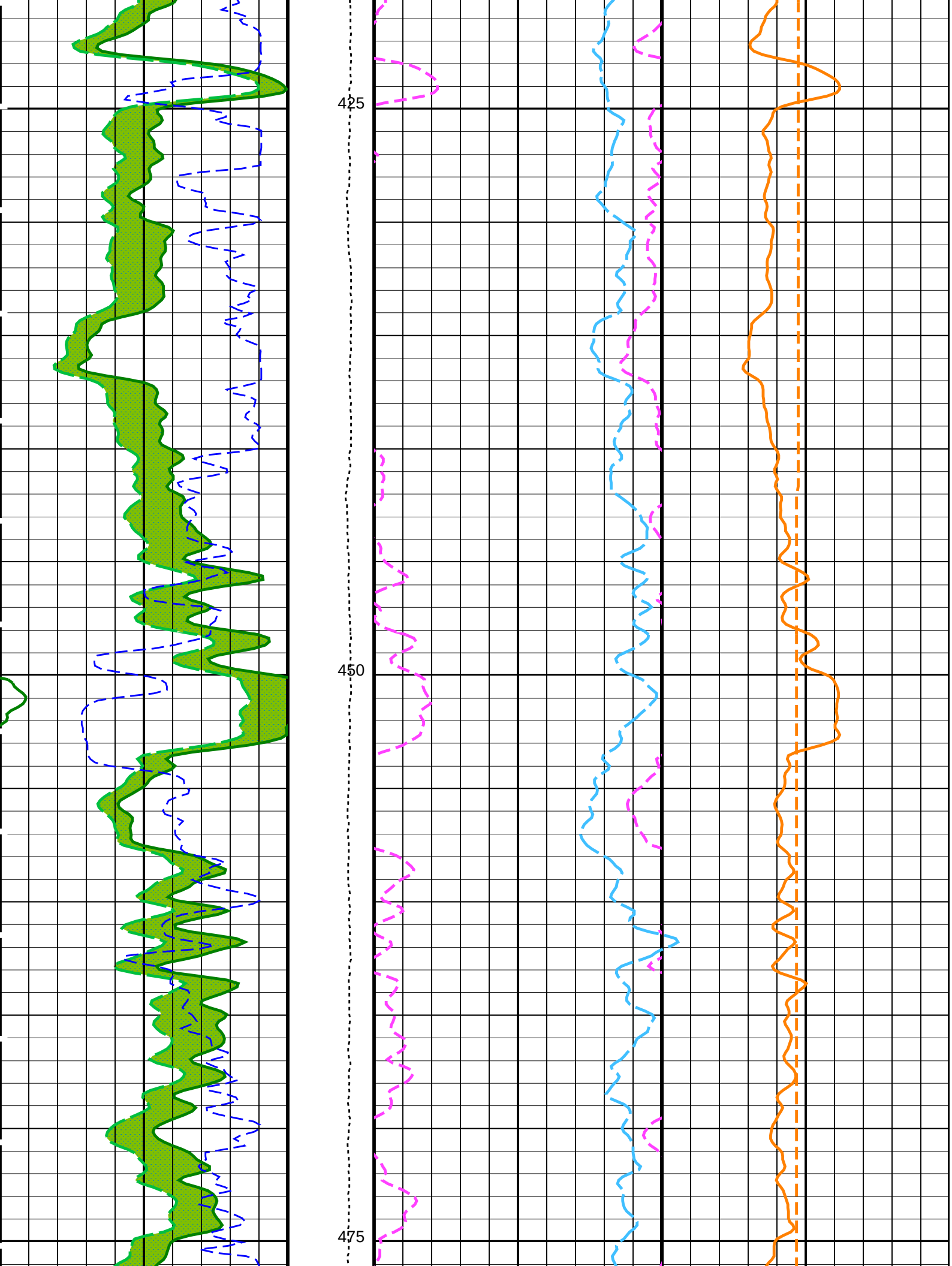
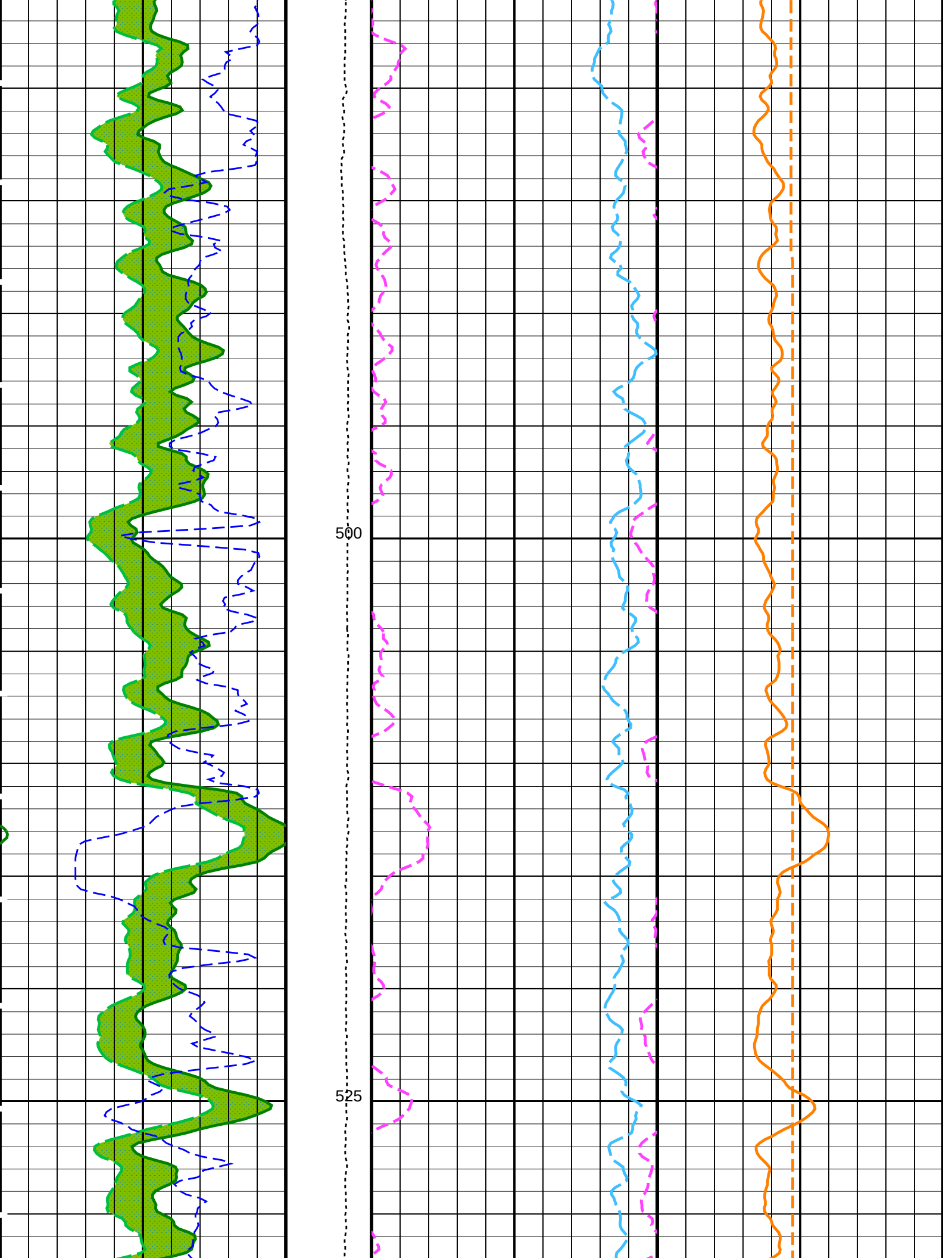
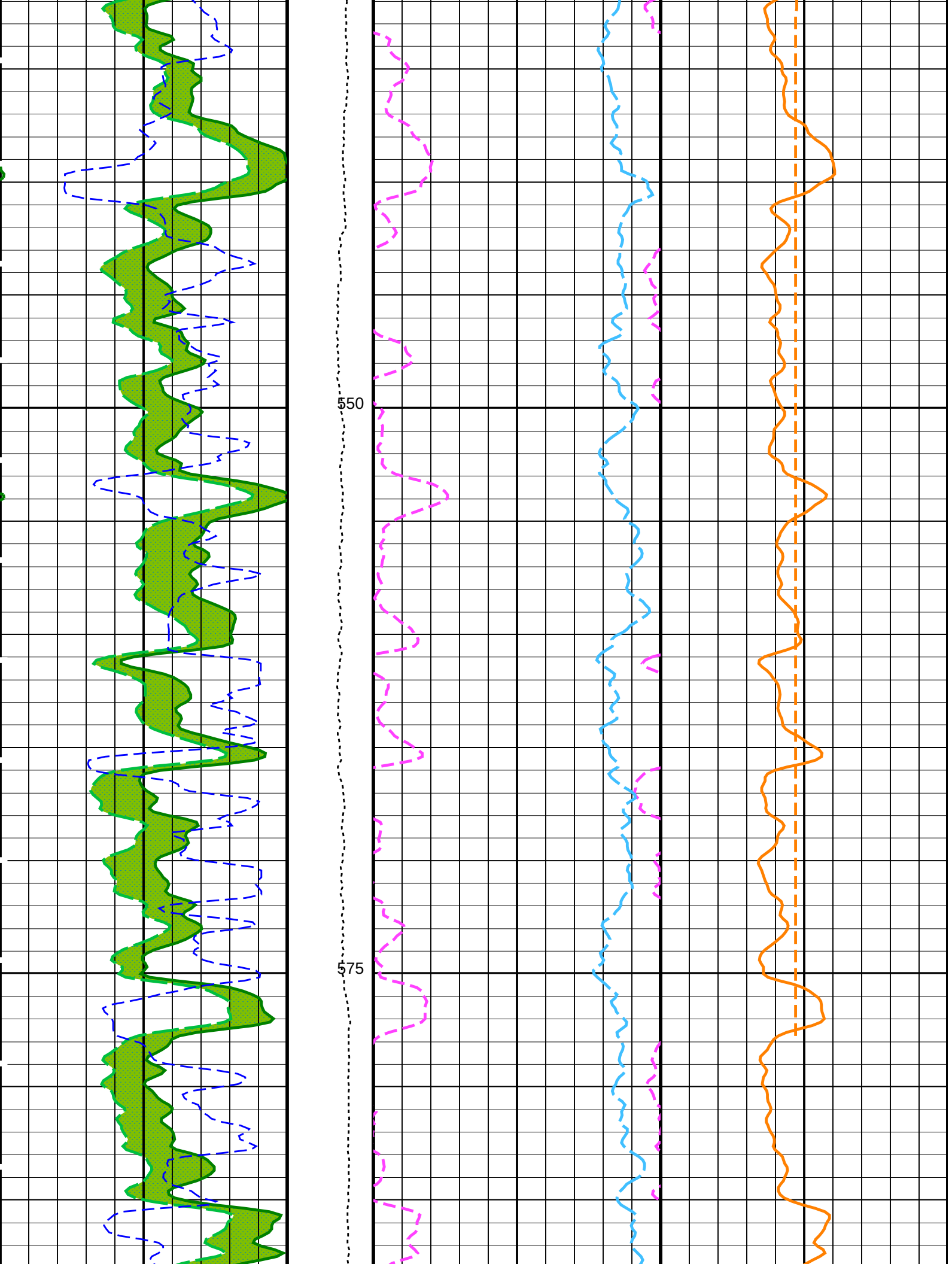
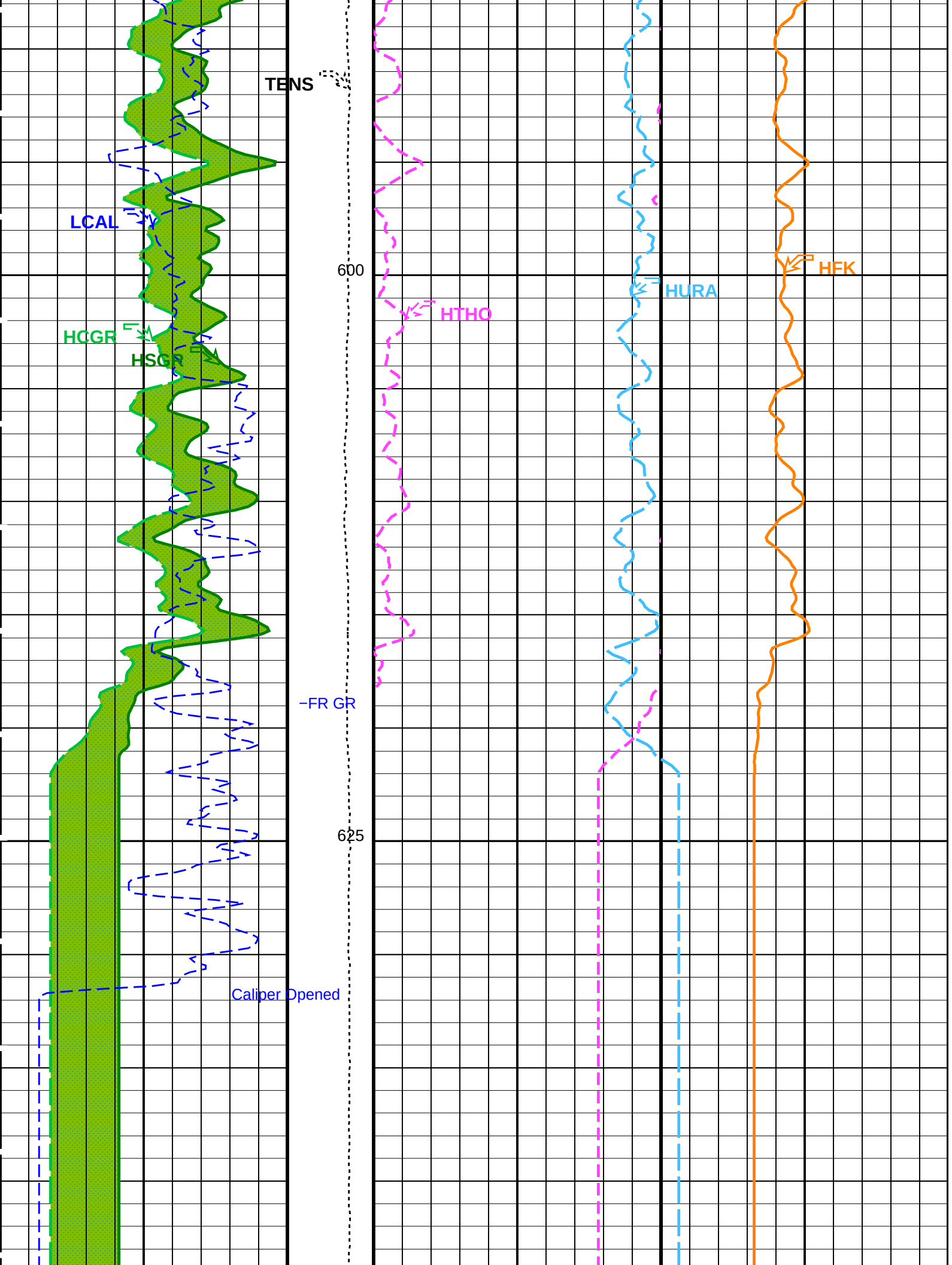
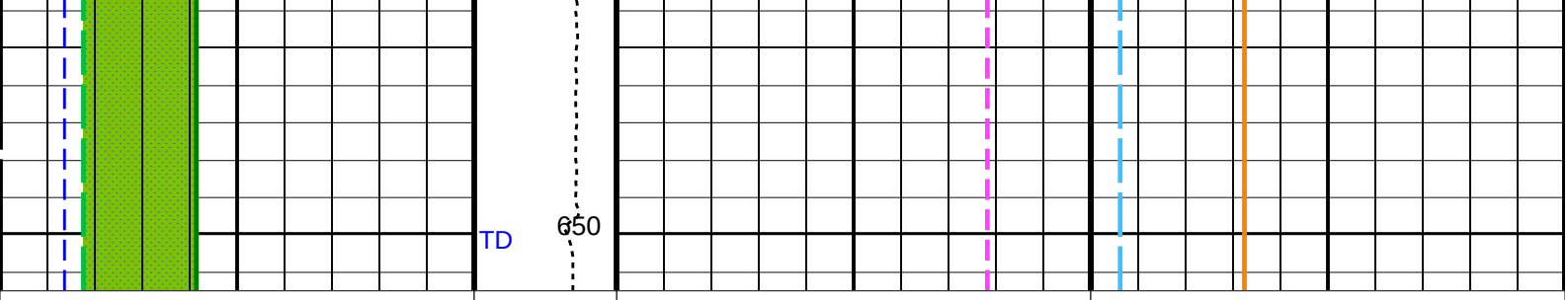

425
450
475


500
525


550
575


TENS
LCAL
600
HTHO
HCGR
HSGR
HURA
HFK
FR GR
625
Caliper Opened



HLDS Caliper (LCAL)
0 (IN) 20

Tension (TENS) (LBF)
10000 0

HNGS Thorium (HTHO)
5 (PPM) 25

HNGS Potassium (HFK)
−0.01 (−−−−) 0.04

HNGS Computed Gamma Ray (HCGR)
0 (GAPI) 75

HNGS Uranium (HURA)
−5 (PPM) 10

Area1
From HCGR to HSGR

Main Uplog, Sea Floor Depth Reference

HNGS Borehole Potassium (HBHK)
−0.05 (−−−−) 0.05

HNGS Spectroscopy Gamma Ray (HSGR)
0 (GAPI) 75

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	−0.00256348	
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	ECCE	
VBA1	HNGS Detector 1 Variable Barite Factor Running Average	0.972325	
VBA2	HNGS Detector 2 Variable Barite Factor Running Average	0.970487	
	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	1.25	G/C3
DO	Depth Offset for Playback	−568.0	M
PP	Playback Processing	NORMAL	

Format: HNGSYields Vertical Scale: 1:200 Graphics File Created: 28−Dec−2011 22:41

OP System Version: 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	19C0−187		

Input DLIS Files

DEFAULT	HRLA_LDL_APS_NGS_037PUP	FN:49	PRODUCER	17−Dec−2011 14:10	1218.4 M	560.4 M

Output DLIS Files

DEFAULT	HRLA_LDL_APS_NGS_060PUP	FN:78	PRODUCER	28−Dec−2011 22:41		

Input DLIS Files

DEFAULT	Flip_HRLA_LDL_APS_055LUP		PRODUCER	28−Dec−2011 22:18	1189.6 M	491.5 M

Output DLIS Files

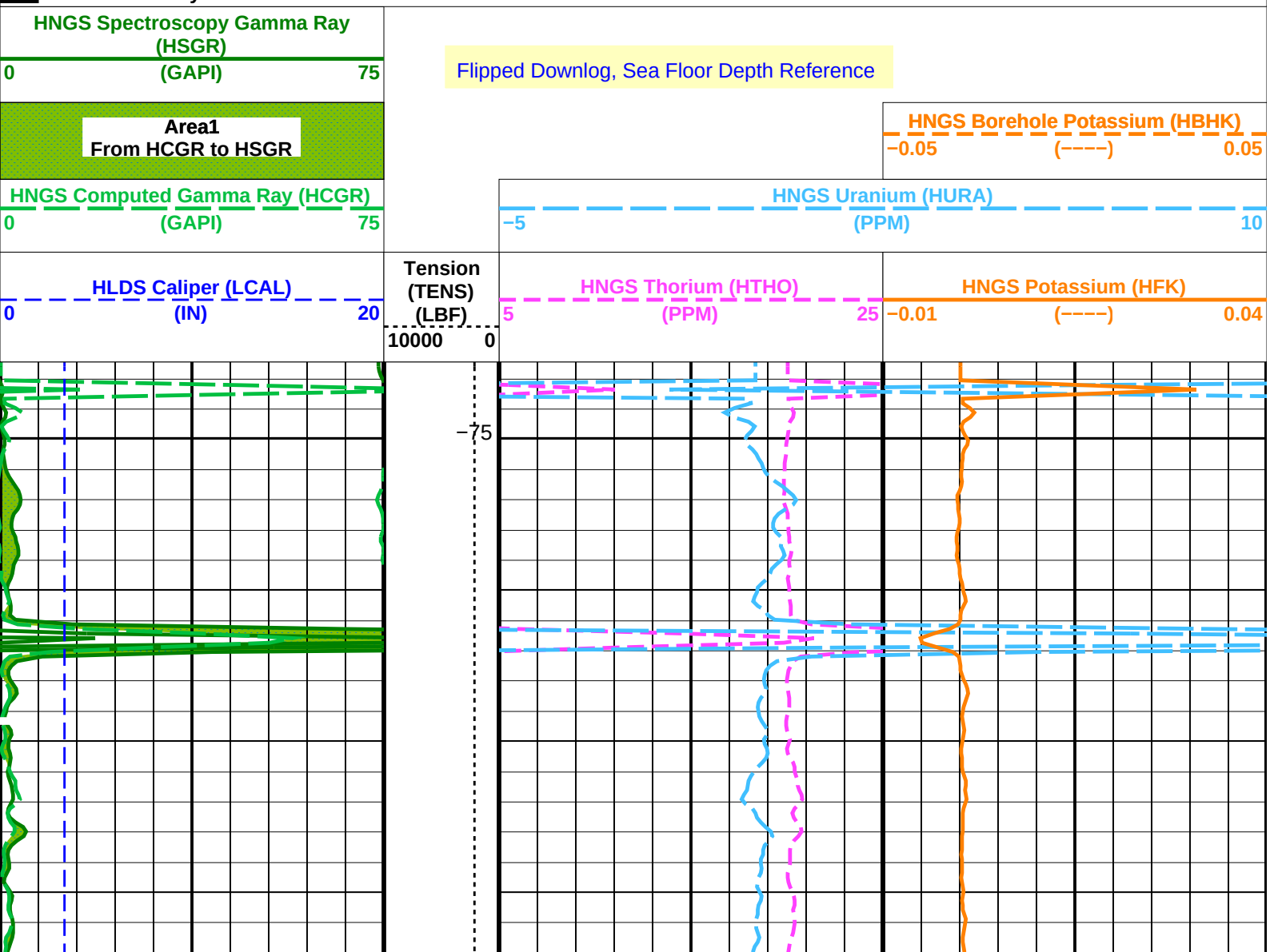
DEFAULT	HRLA_LDL_APS_NGS_061PUP	FN:79	PRODUCER	28−Dec−2011 23:07	620.6 M	−77.6 M

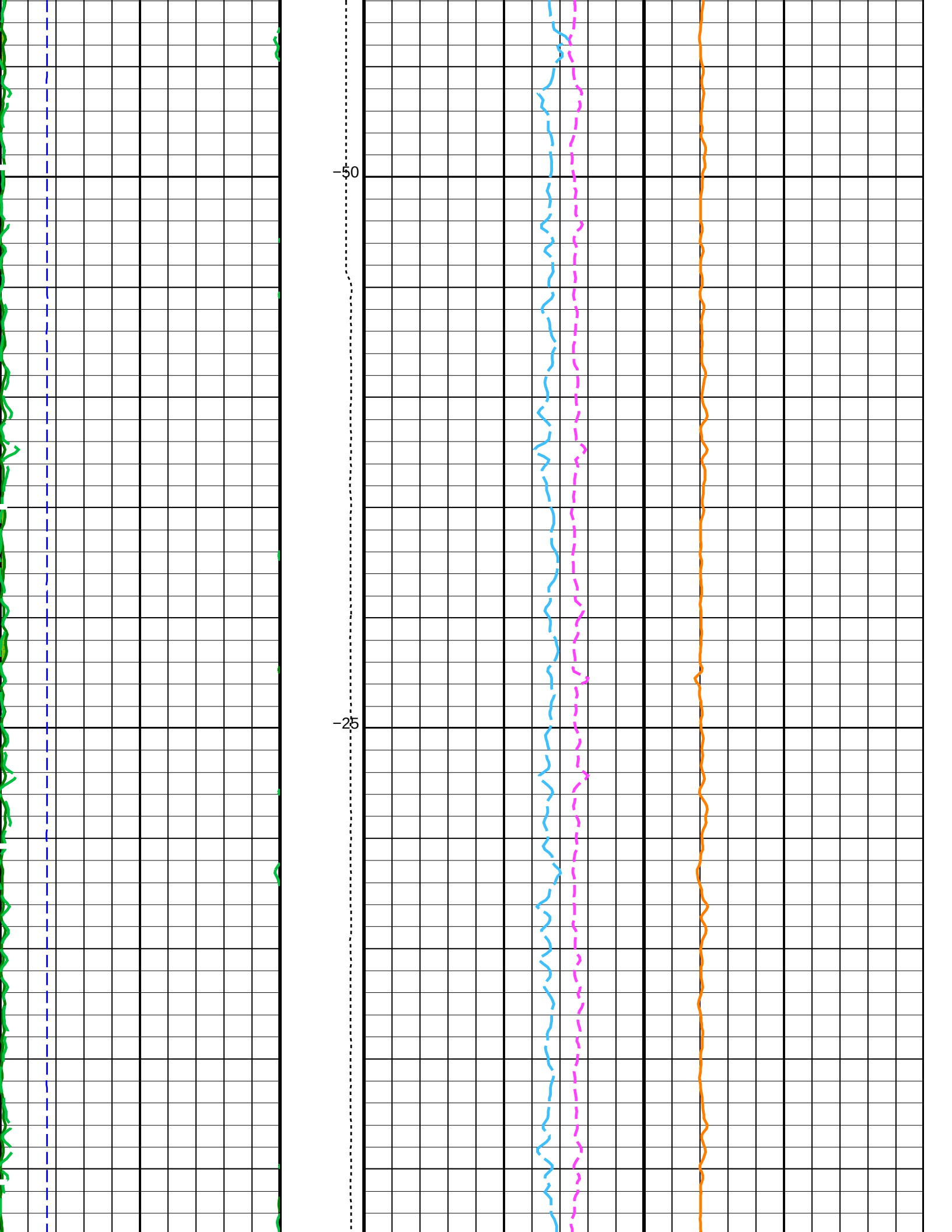
OP System Version: 19C0−187

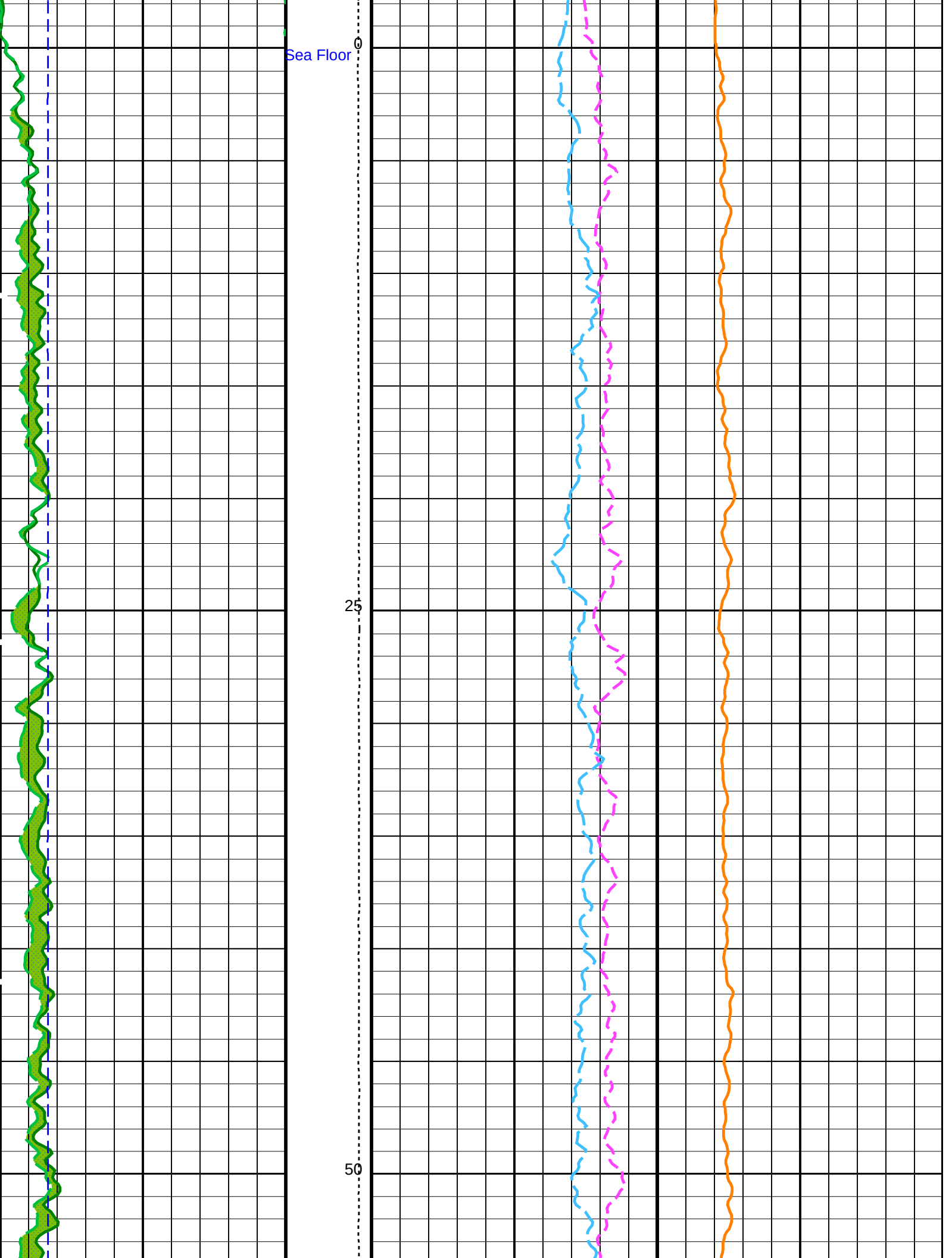
HRLT−B	19C0−187	HLDS	19C0−187
LDSC−B	19C0−187	APS−C	19C0−187
HNGC−B	19C0−187	HNGS−BA	19C0−187
EDTC−B	19C0−187		

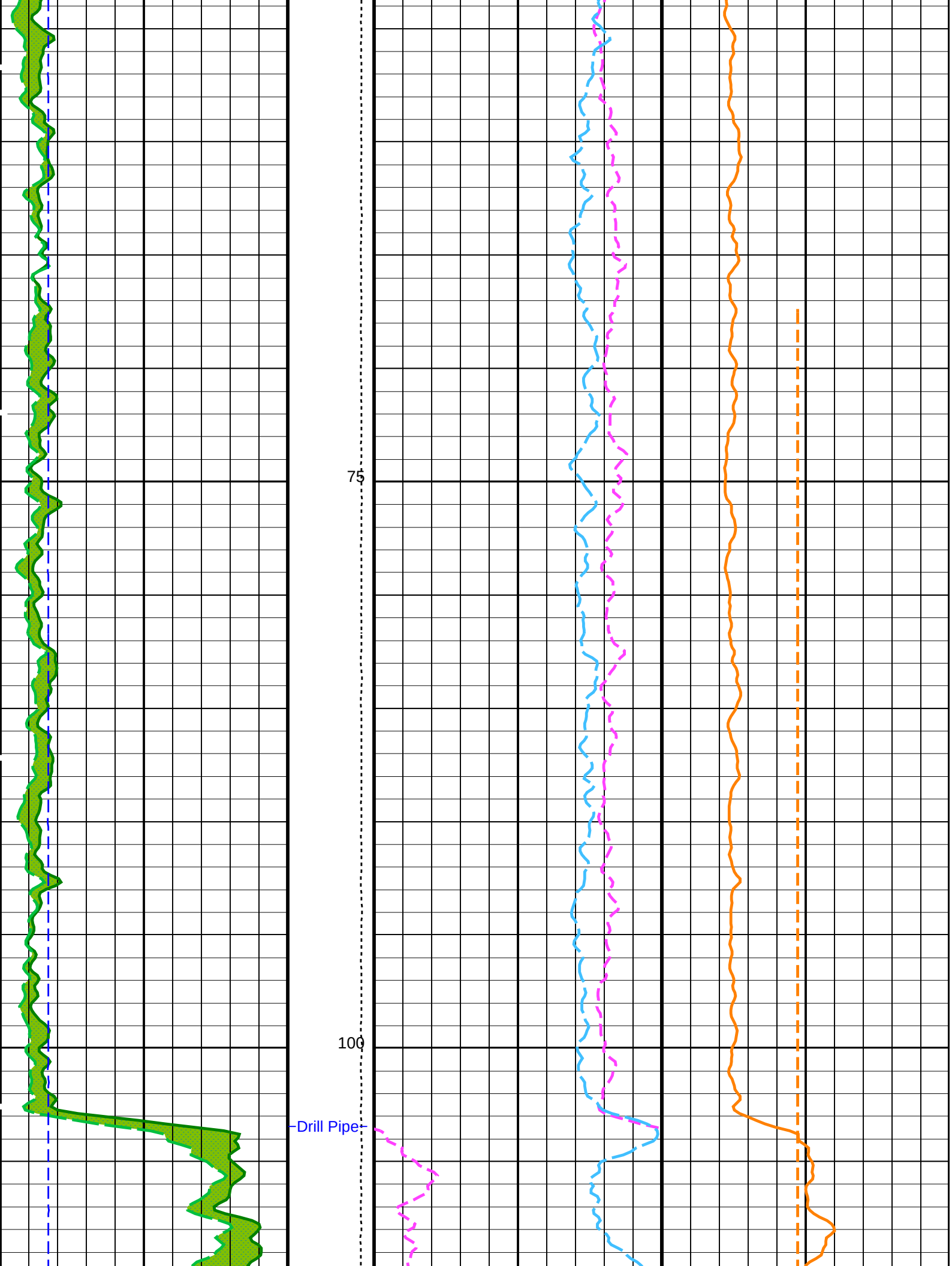
PIP SUMMARY

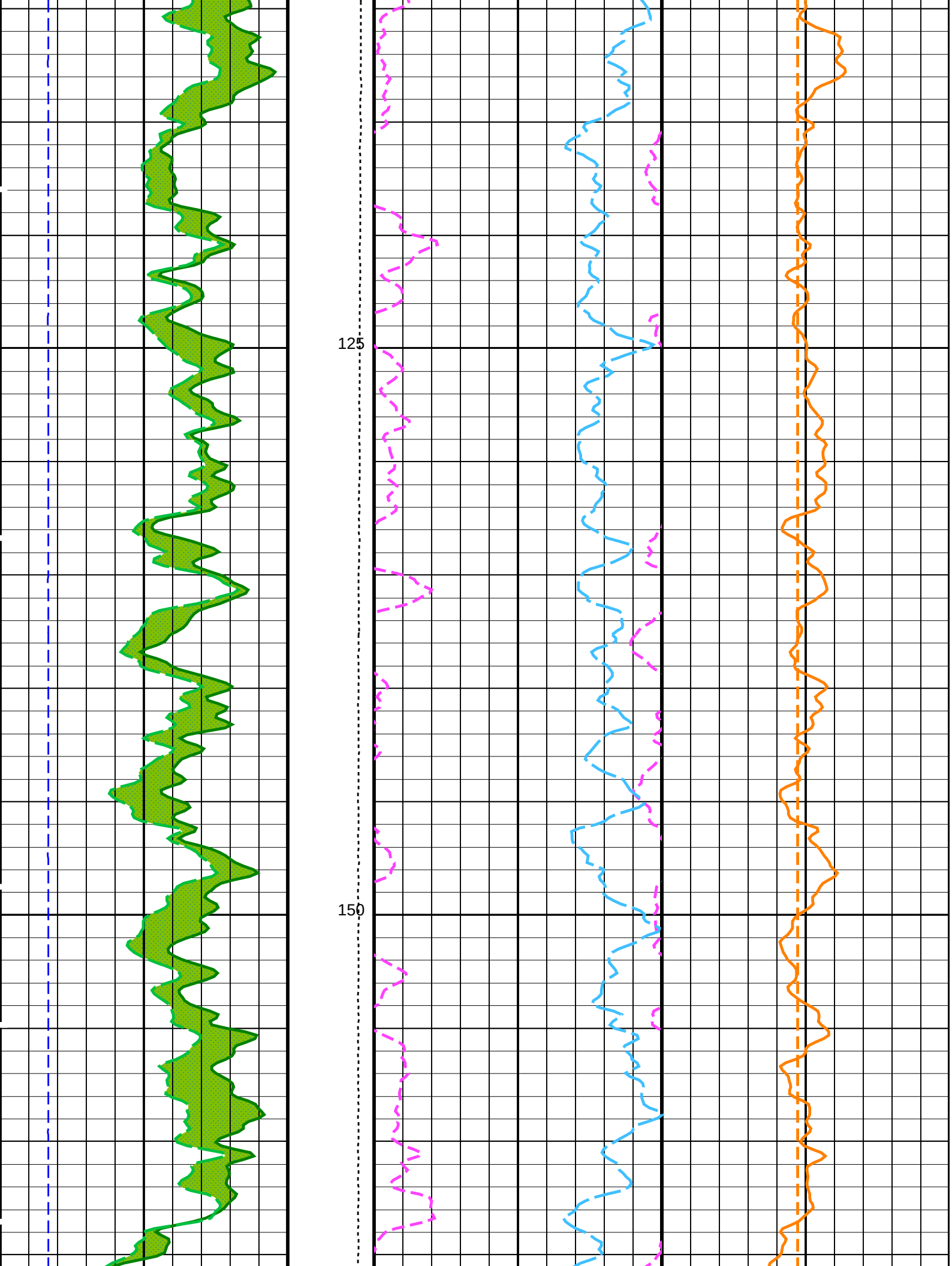
Time Mark Every 60 S

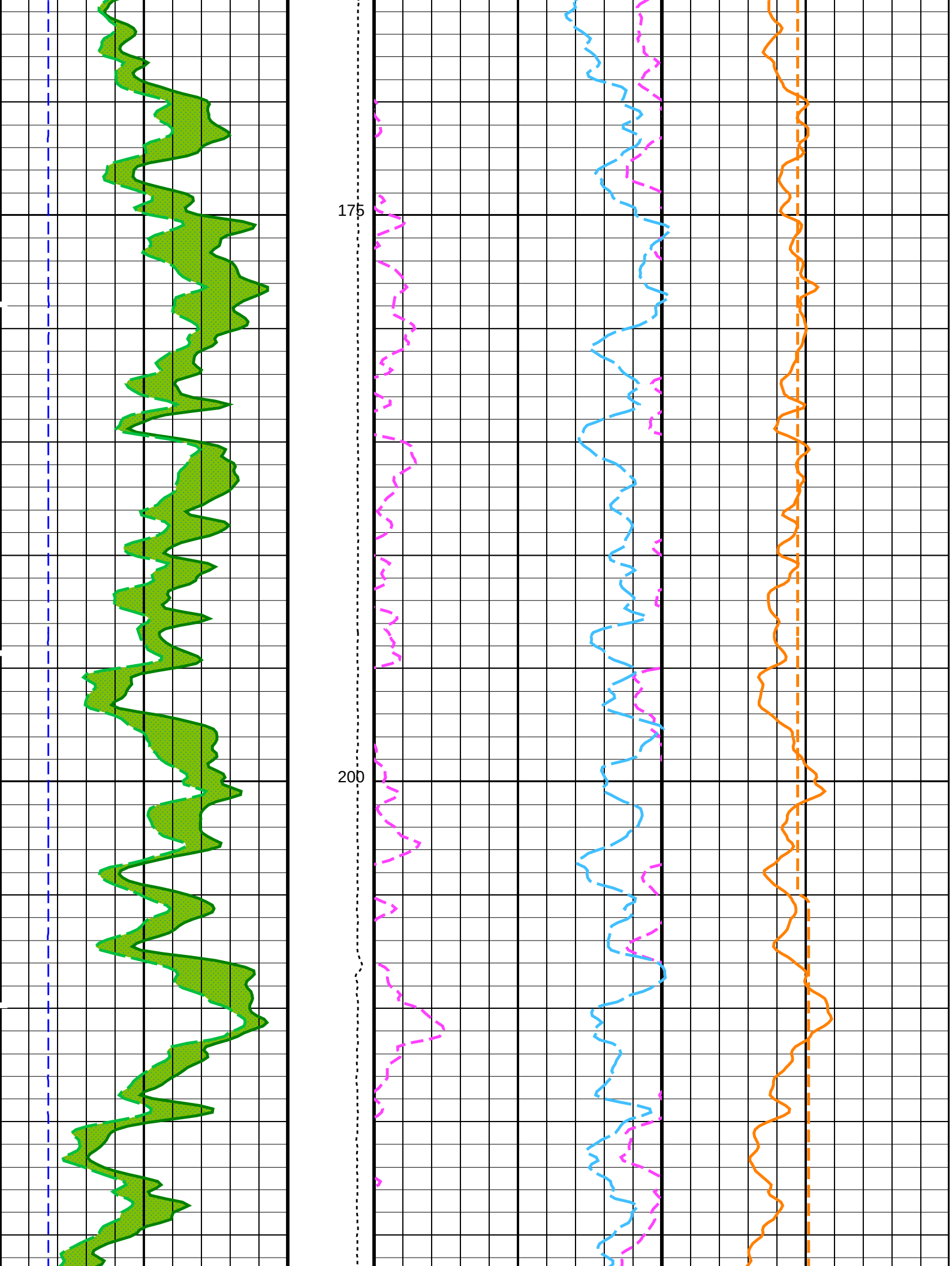


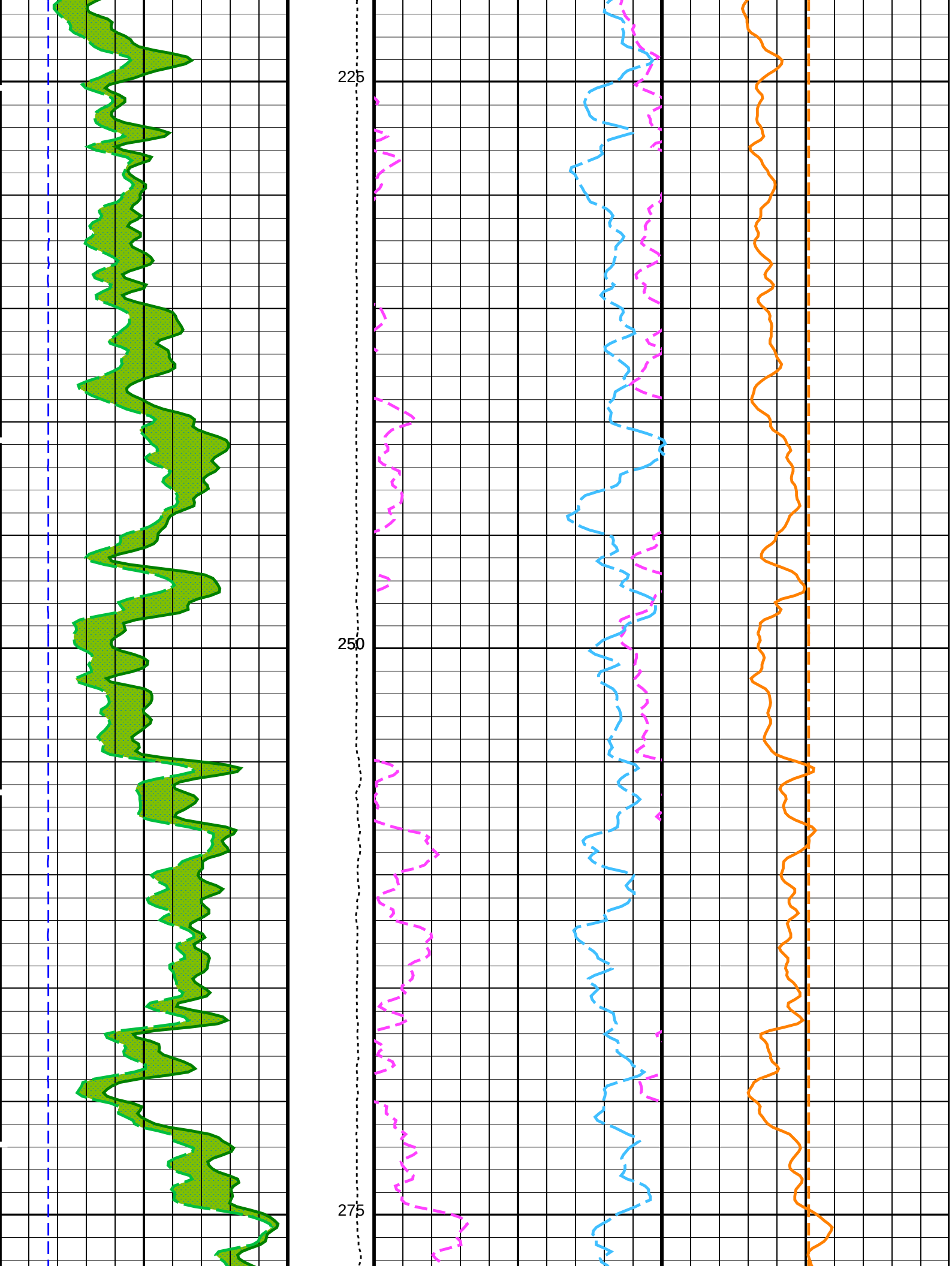

−50
−25

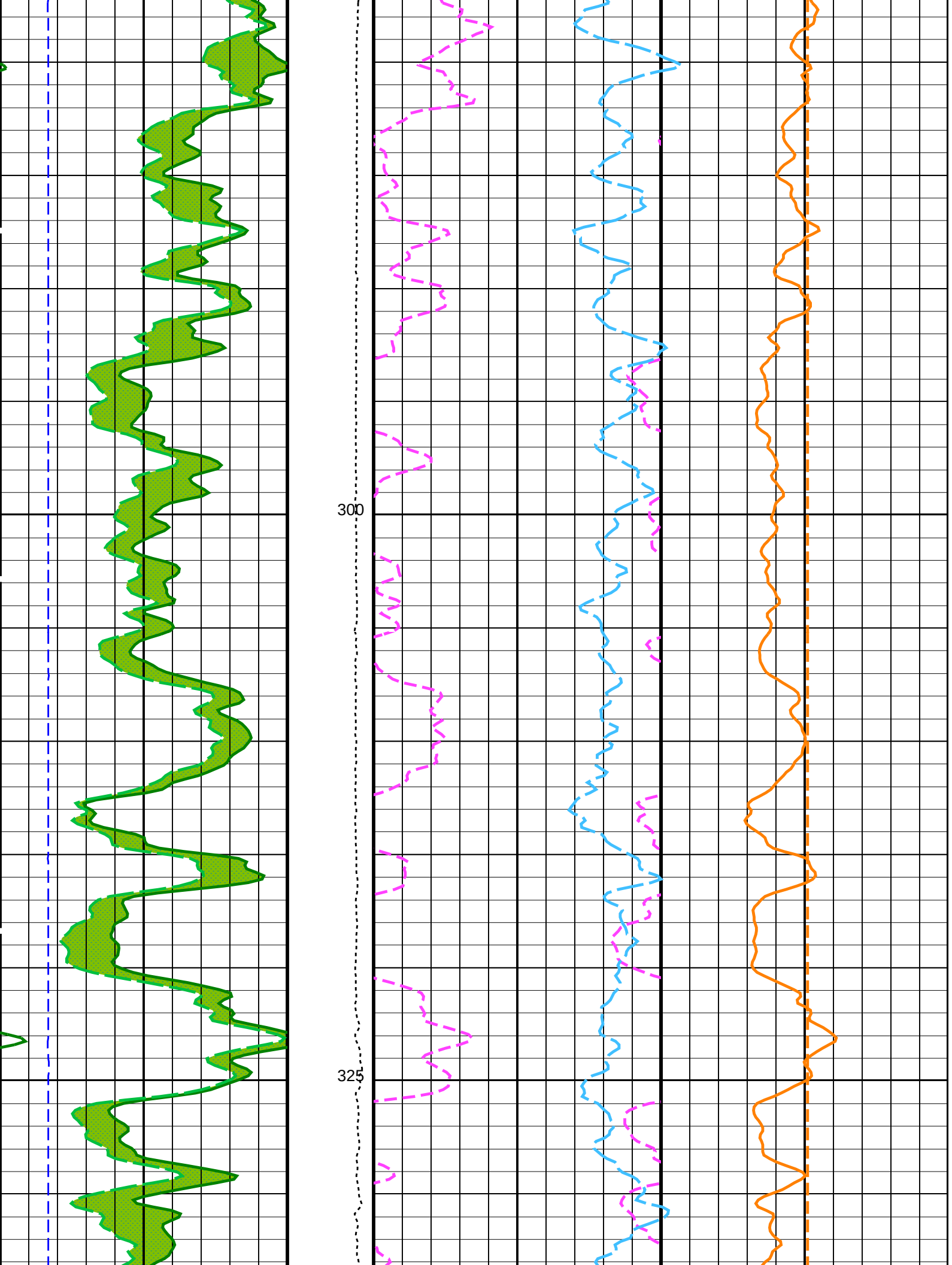

Sea Floor
0
25
50

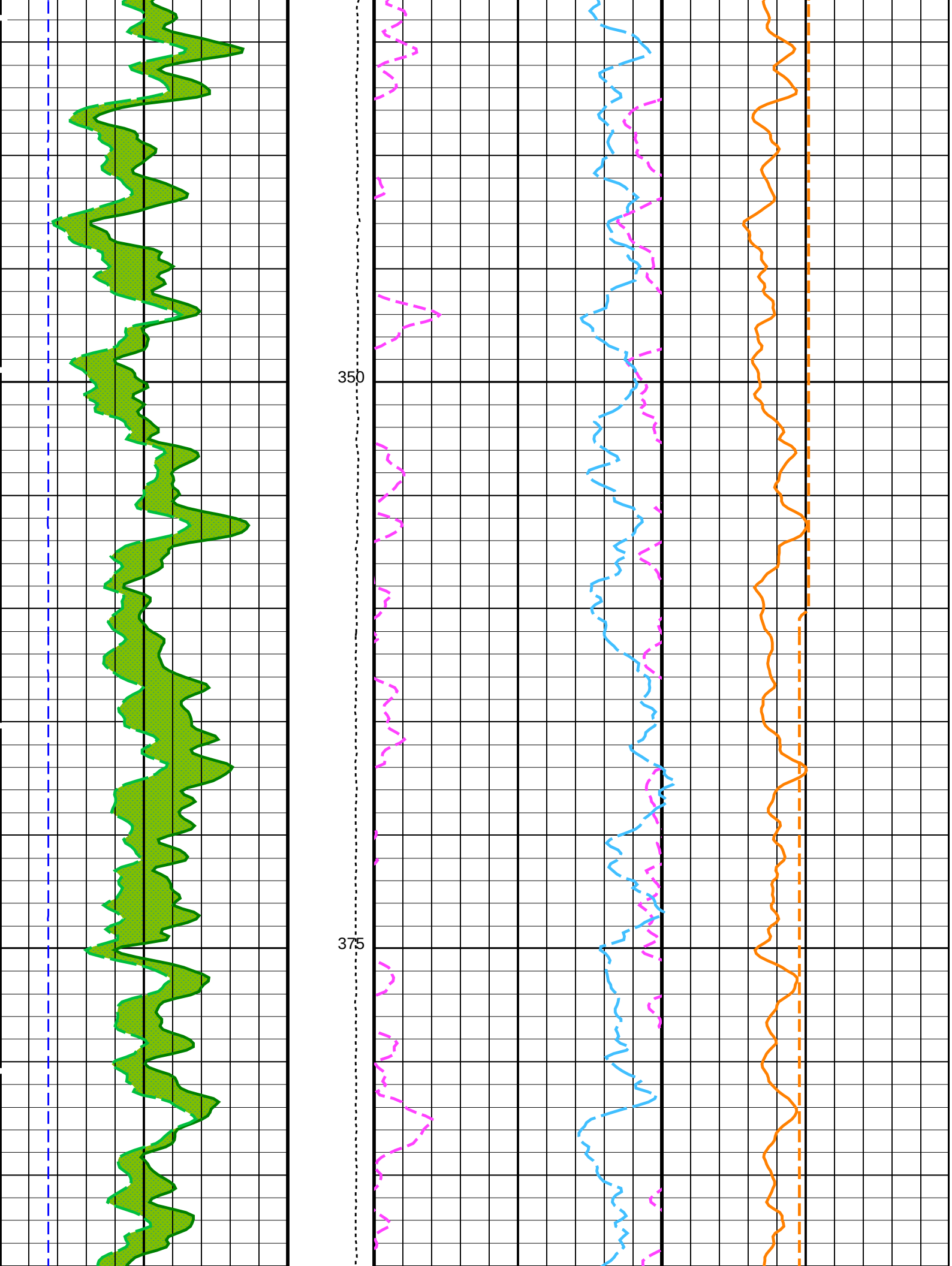

75
100
Drill Pipe

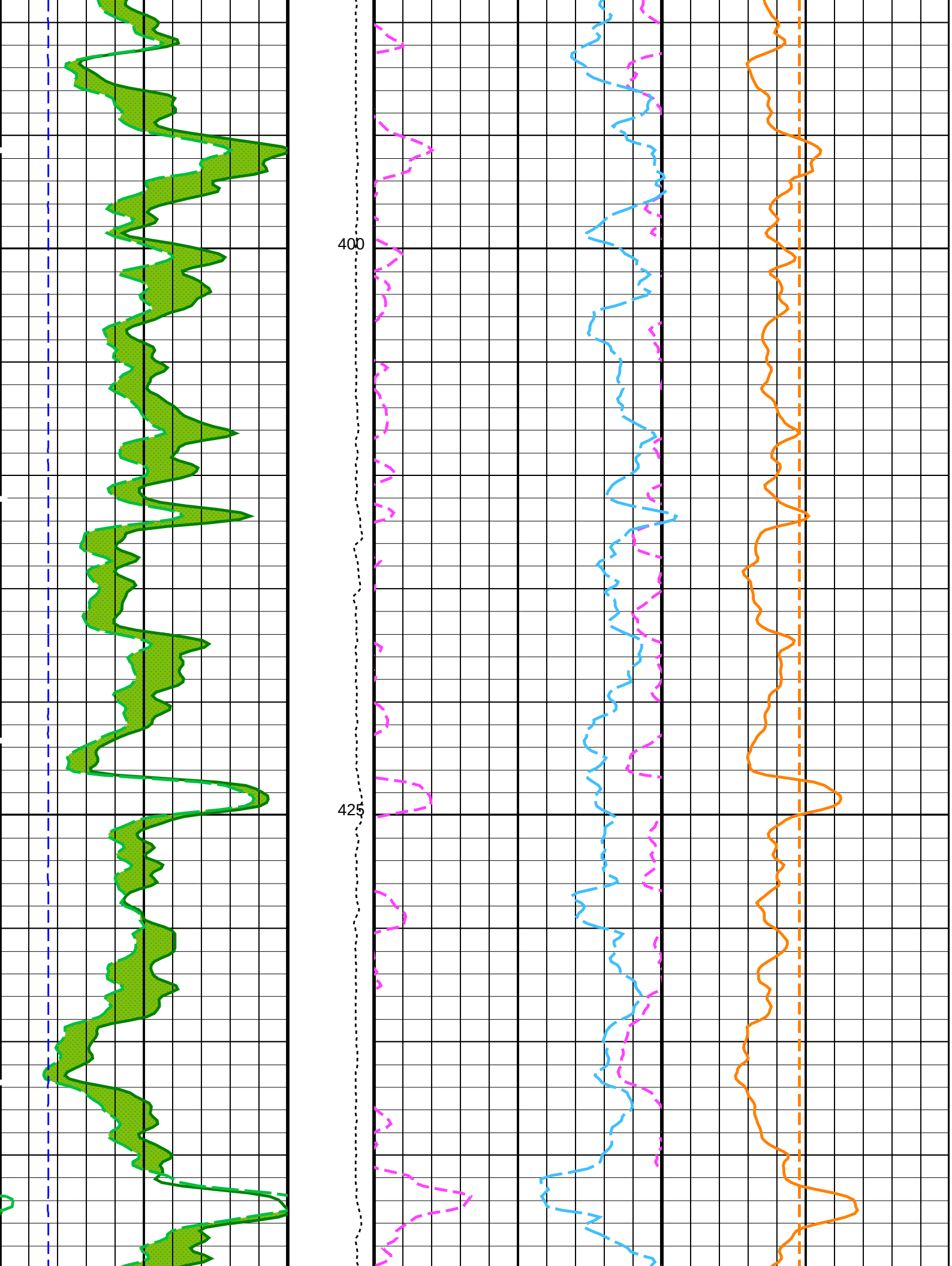

125
150

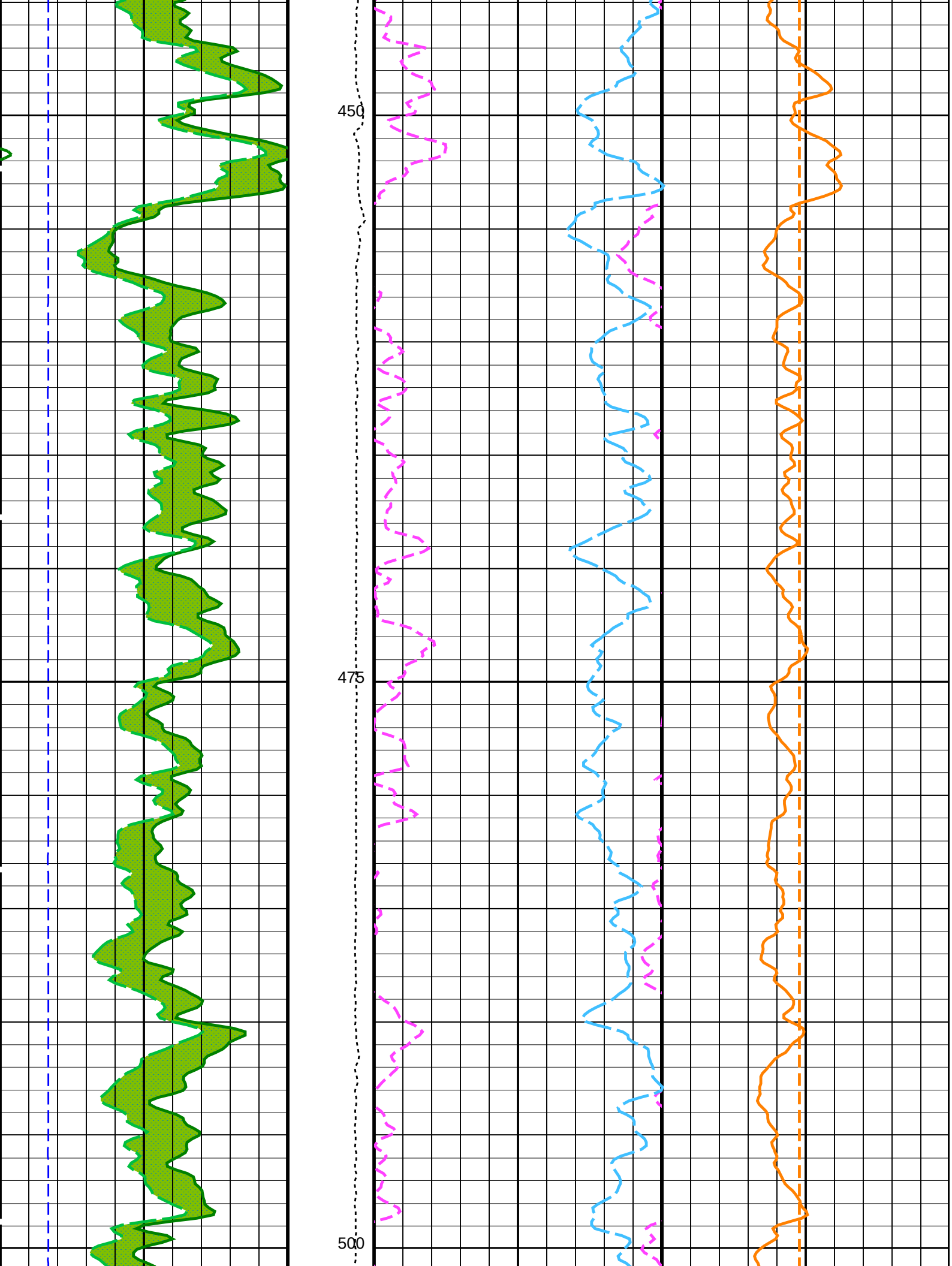

175
200

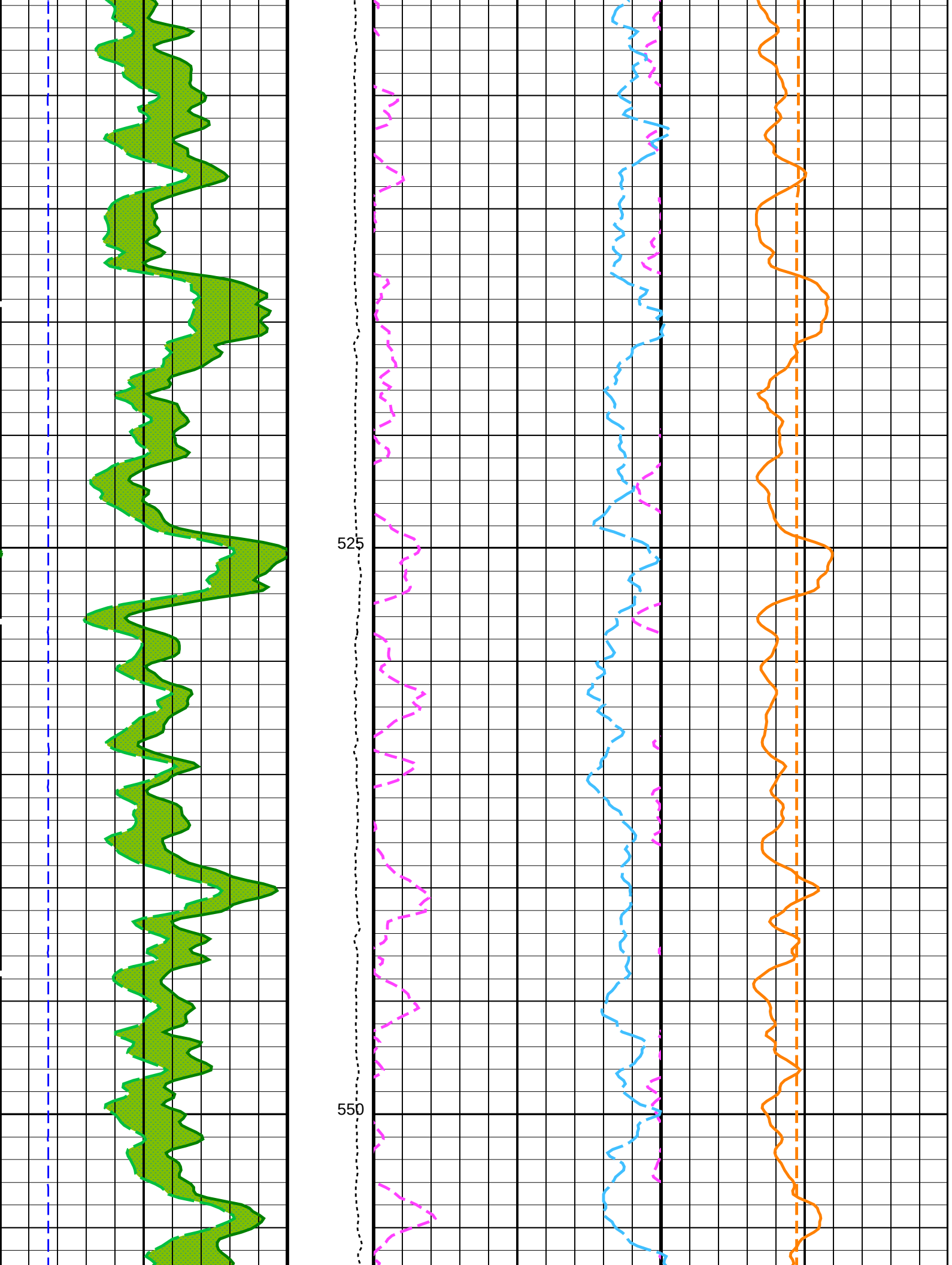

225
250
275

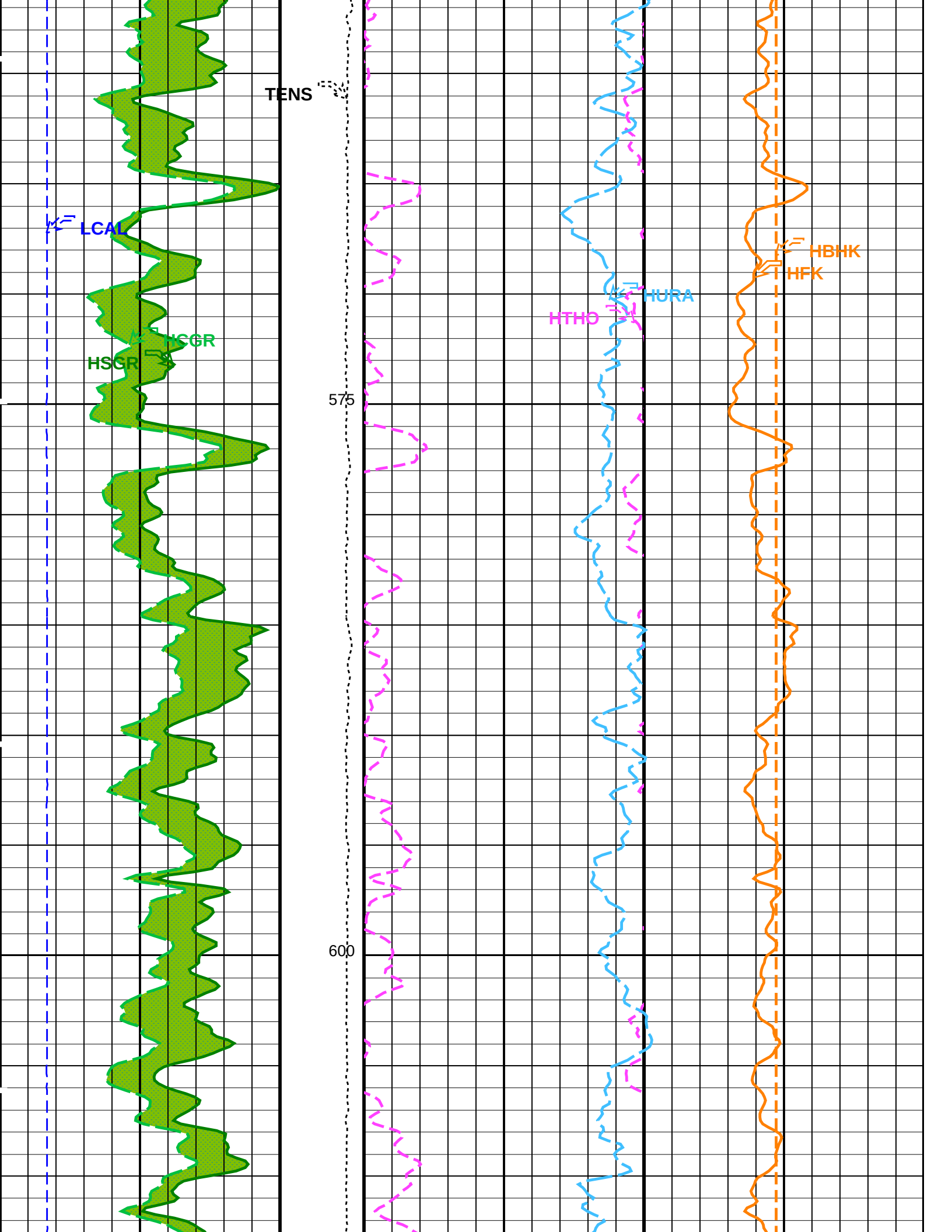

300
325

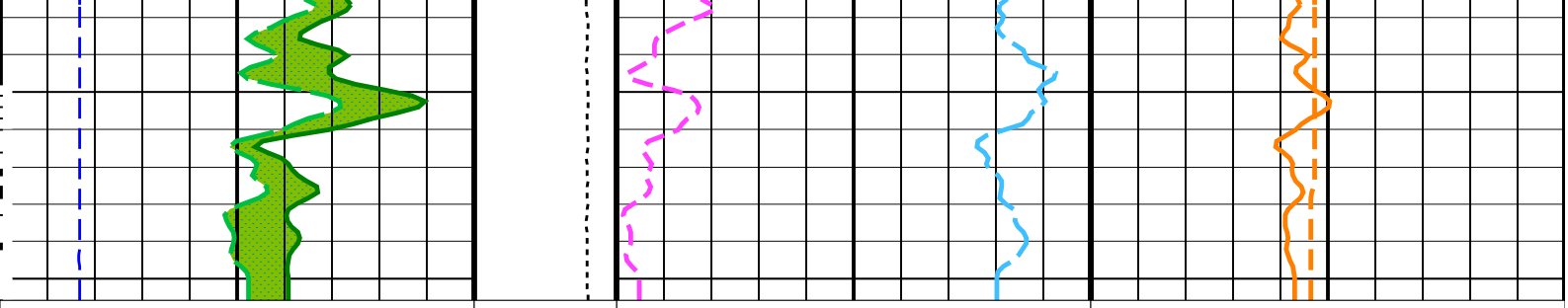

350
375


400
425


450
475
500


525
550


TENS
LCAL
HCGR
HSGR
575
HTHO
HURA
HBHK
HFK
600



HLDS Caliper (LCAL)
0 (IN) 20

Tension (TENS) (LBF)
10000 0

HNGS Thorium (HTHO)
5 (PPM) 25

HNGS Potassium (HFK)
−0.01 (−−−−) 0.04

HNGS Computed Gamma Ray (HCGR)
0 (GAPI) 75

HNGS Uranium (HURA)
−5 (PPM) 10

Area1
From HCGR to HSGR

HNGS Borehole Potassium (HBHK)
−0.05 (−−−−) 0.05

HNGS Spectroscopy Gamma Ray (HSGR)
0 (GAPI) 75

Flipped Downlog, Sea Floor Depth Reference

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	−0.00256348	
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	ECCE	
VBA1	HNGS Detector 1 Variable Barite Factor Running Average	0.972325	
VBA2	HNGS Detector 2 Variable Barite Factor Running Average	0.970487	
	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	1.25	G/C3
DO	Depth Offset for Playback	−569.0	M
PP	Playback Processing	NORMAL	

Format: HNGSYields Vertical Scale: 1:200 Graphics File Created: 28−Dec−2011 23:07

OP System Version: 19C0−187

HRLT−B	19C0−187	HLDS	19C0−187
LDSC−B	19C0−187	APS−C	19C0−187

EDSC−B	**19C0−187**	**APS−C**	**19C0−187**
HNGC−B	**19C0−187**	**HNGS−BA**	**19C0−187**
EDTC−B	**19C0−187**		

Input DLIS Files

DEFAULT	**Flip_HRLA_LDL_APS_055LUP**	**PRODUCER**	**28−Dec−2011 22:18**	**1189.6 M**	**491.5 M**

Output DLIS Files

DEFAULT	**HRLA_LDL_APS_NGS_061PUP**	**FN:79**	**PRODUCER**	**28−Dec−2011 23:07**

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
High Resolution Laterolog Array − B Wellsite Calibration − HRLT M01							
Before: 17−Dec−2011 2:13 After: 17−Dec−2011 8:15							
HRLT M0−M1 Voltage Plus − 0	0	N/A	−319.1	−318.5	0.6041	9.681	UV
HRLT M0−M1 Voltage Plus − 1	0	N/A	−334.0	−331.6	2.329	9.681	UV
HRLT M0−M1 Voltage Plus − 2	0	N/A	−335.1	−333.4	1.640	9.681	UV
HRLT M0−M1 Voltage Plus − 3	0	N/A	−338.3	−336.7	1.649	9.681	UV
HRLT M0−M1 Voltage Plus − 4	0	N/A	−326.3	−325.3	1.021	9.681	UV
HRLT M0−M1 Voltage Plus − 5	0	N/A	−322.4	−321.5	0.8535	9.681	UV
HRLT M0−M1 Voltage Plus − 6	0	N/A	326.4	322.6	−3.747	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: 17−Dec−2011 2:13 After: 17−Dec−2011 8:15							
HRLT M1−M2 Voltage Plus − 0	0	N/A	1755	1752	−2.796	53.42	UV
HRLT M1−M2 Voltage Plus − 1	0	N/A	1835	1822	−12.68	53.42	UV
HRLT M1−M2 Voltage Plus − 2	0	N/A	1836	1828	−7.900	53.42	UV
HRLT M1−M2 Voltage Plus − 3	0	N/A	1855	1846	−8.424	53.42	UV
HRLT M1−M2 Voltage Plus − 4	0	N/A	1790	1785	−4.618	53.42	UV
HRLT M1−M2 Voltage Plus − 5	0	N/A	1770	1767	−3.615	53.42	UV
HRLT M1−M2 Voltage Plus − 6	0	N/A	−1801	−1781	20.46	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: 17−Dec−2011 2:13 After: 17−Dec−2011 8:15							
HRLT M2−M3 Voltage Plus − 0	0	N/A	1741	1739	−2.432	53.42	UV
HRLT M2−M3 Voltage Plus − 1	0	N/A	1834	1822	−12.40	53.42	UV
HRLT M2−M3 Voltage Plus − 2	0	N/A	1837	1829	−7.651	53.42	UV
HRLT M2−M3 Voltage Plus − 3	0	N/A	1858	1850	−8.055	53.42	UV
HRLT M2−M3 Voltage Plus − 4	0	N/A	1787	1782	−4.191	53.42	UV
HRLT M2−M3 Voltage Plus − 5	0	N/A	1768	1765	−3.490	53.42	UV
HRLT M2−M3 Voltage Plus − 6	0	N/A	−1789	−1769	19.77	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: 17−Dec−2011 2:13 After: 17−Dec−2011 8:15							
HRLT A3−A4 Voltage Plus − 0	0	N/A	68420	68310	−112.3	2100	UV
HRLT A3−A4 Voltage Plus − 1	0	N/A	71860	71360	−500.1	2100	UV
HRLT A3−A4 Voltage Plus − 2	0	N/A	72250	71940	−310.5	2100	UV
HRLT A3−A4 Voltage Plus − 3	0	N/A	73370	73030	−339.3	2100	UV
HRLT A3−A4 Voltage Plus − 4	0	N/A	70520	70340	−180.5	2100	UV
HRLT A3−A4 Voltage Plus − 5	0	N/A	69790	69660	−134.6	2100	UV
HRLT A3−A4 Voltage Plus − 6	0	N/A	−69090	−68290	804.4	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: 17−Dec−2011 2:13 After: 17−Dec−2011 8:15							
HRLT A4−A5 Voltage Plus − 0	0	N/A	68700	68590	−106.0	2100	UV
HRLT A4−A5 Voltage Plus − 1	0	N/A	72220	71730	−487.4	2100	UV
HRLT A4−A5 Voltage Plus − 2	0	N/A	72600	72290	−304.8	2100	UV
HRLT A4−A5 Voltage Plus − 3	0	N/A	73720	73380	−339.3	2100	UV
HRLT A4−A5 Voltage Plus − 4	0	N/A	70810	70640	−164.4	2100	UV
HRLT A4−A5 Voltage Plus − 5	0	N/A	70060	69930	−130.1	2100	UV
HRLT A4−A5 Voltage Plus − 6	0	N/A	−69460	−68660	807.9	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: 17−Dec−2011 2:13 After: 17−Dec−2011 8:15							
HRLT A5−A6 Voltage Plus − 0	0	N/A	68590	68490	−101.0	2100	UV
HRLT A5−A6 Voltage Plus − 1	0	N/A	71940	71460	−485.5	2100	UV

HRLT A5−A6 Voltage Plus − 2	0	N/A	72350	72050	−299.9	2100	UV
HRLT A5−A6 Voltage Plus − 3	0	N/A	73500	73190	−316.5	2100	UV
HRLT A5−A6 Voltage Plus − 4	0	N/A	70690	70490	−190.5	2100	UV
HRLT A5−A6 Voltage Plus − 5	0	N/A	69940	69800	−141.7	2100	UV
HRLT A5−A6 Voltage Plus − 6	0	N/A	−69170	−68390	781.0	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: 17−Dec−2011 2:13 After: 17−Dec−2011 8:15

HRLT Torpedo−M0 Voltage − 0	0	N/A	−68280	−68170	102.4	2100	UV
HRLT Torpedo−M0 Voltage − 1	0	N/A	−72280	−71790	488.5	2100	UV
HRLT Torpedo−M0 Voltage − 2	0	N/A	−72660	−72360	300.3	2100	UV
HRLT Torpedo−M0 Voltage − 3	0	N/A	−73800	−73480	323.3	2100	UV
HRLT Torpedo−M0 Voltage − 4	0	N/A	−70870	−70700	171.1	2100	UV
HRLT Torpedo−M0 Voltage − 5	0	N/A	−70100	−69970	136.6	2100	UV
HRLT Torpedo−M0 Voltage − 6	0	N/A	69450	68650	−801.5	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: 17−Dec−2011 2:13 After: 17−Dec−2011 8:15

HRLT Bridle#9−M0 Voltage − 0	0	N/A	−68270	−68160	112.0	2100	UV
HRLT Bridle#9−M0 Voltage − 1	0	N/A	−72250	−71760	493.8	2100	UV
HRLT Bridle#9−M0 Voltage − 2	0	N/A	−72650	−72320	323.8	2100	UV
HRLT Bridle#9−M0 Voltage − 3	0	N/A	−73780	−73450	328.4	2100	UV
HRLT Bridle#9−M0 Voltage − 4	0	N/A	−70870	−70690	175.5	2100	UV
HRLT Bridle#9−M0 Voltage − 5	0	N/A	−70100	−69960	140.3	2100	UV
HRLT Bridle#9−M0 Voltage − 6	0	N/A	69430	68640	−796.5	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: 17−Dec−2011 2:13 After: 17−Dec−2011 8:15

HRLT Source Current Plus − 0	0	N/A	284.7	284.2	−0.4252	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: 17−Dec−2011 2:13 After: 17−Dec−2011 8:15

HRLT Vertical Voltage Pl − 0	0	N/A	−321.5	−321.1	0.4413	9.681	UV
HRLT Vertical Voltage Pl − 1	0	N/A	−328.2	−326.0	2.258	9.681	UV
HRLT Vertical Voltage Pl − 2	0	N/A	−328.5	−327.2	1.317	9.681	UV
HRLT Vertical Voltage Pl − 3	0	N/A	−330.1	−328.7	1.466	9.681	UV
HRLT Vertical Voltage Pl − 4	0	N/A	−315.7	−315.0	0.7631	9.681	UV
HRLT Vertical Voltage Pl − 5	0	N/A	−327.1	−326.5	0.5655	9.681	UV
HRLT Vertical Voltage Pl − 6	0	N/A	333.5	329.9	−3.597	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: 17−Nov−2011 16:03 Before: 17−Nov−2011 15:55 After: 17−Dec−2011 8:50

SS Cs Resolution Bkg	9.000	7.741	7.618	7.594	−0.02418	1.800	%
LS Cs Resolution Bkg	9.000	8.089	8.025	8.065	0.04037	1.800	%
LSW1 Background	100.0	87.45	87.45	87.53	0.08757	3.000	CPS
LSW2 Background	100.0	80.38	80.38	79.58	−0.7984	3.000	CPS
LSW3 Background	200.0	180.0	180.0	180.4	0.3738	6.000	CPS
LSW4 Background	250.0	224.8	224.8	226.5	1.701	7.500	CPS
LSW5 Background	600.0	526.0	526.0	519.3	−6.693	18.00	CPS
SSW1 Background	100.0	85.28	85.28	84.82	−0.4580	3.000	CPS
SSW2 Background	200.0	147.3	147.3	146.1	−1.170	6.000	CPS
SSW3 Background	500.0	409.2	409.2	411.5	2.230	15.00	CPS
SSW4 Background	270.0	221.7	221.7	221.2	−0.4445	8.100	CPS
SSW5 Background	200.0	158.7	158.7	157.7	−1.014	6.000	CPS

Hostile Litho−Density Sonde Wellsite Calibration − Aluminum Measurement
Master: 17−Nov−2011 16:33

LSW1 Aluminum	600.0	560.2	N/A	N/A	N/A	N/A	CPS
LSW2 Aluminum	900.0	815.4	N/A	N/A	N/A	N/A	CPS
LSW3 Aluminum	1100	984.8	N/A	N/A	N/A	N/A	CPS
LSW4 Aluminum	580.0	493.4	N/A	N/A	N/A	N/A	CPS
LSW5 Aluminum	570.0	450.2	N/A	N/A	N/A	N/A	CPS
SSW1 Aluminum	2800	2639	N/A	N/A	N/A	N/A	CPS
SSW2 Aluminum	8000	7196	N/A	N/A	N/A	N/A	CPS
SSW3 Aluminum	11600	10050	N/A	N/A	N/A	N/A	CPS
SSW4 Aluminum	5000	4135	N/A	N/A	N/A	N/A	CPS
SSW5 Aluminum	660.0	504.7	N/A	N/A	N/A	N/A	CPS

Hostile Litho−Density Sonde Wellsite Calibration − Lithology Measurement
Master: 17−Nov−2011 16:29

LSW1 Iron	400.0	389.4	N/A	N/A	N/A	N/A	CPS

LSW1 Iron	400.0	389.4	N/A	N/A	N/A	N/A	CPS
LSW2 Iron	730.0	674.0	N/A	N/A	N/A	N/A	CPS
LSW3 Iron	1000	897.0	N/A	N/A	N/A	N/A	CPS
LSW4 Iron	520.0	464.0	N/A	N/A	N/A	N/A	CPS
LSW5 Iron	470.0	424.7	N/A	N/A	N/A	N/A	CPS
SSW1 Iron	2100	1967	N/A	N/A	N/A	N/A	CPS
SSW2 Iron	6800	6145	N/A	N/A	N/A	N/A	CPS
SSW3 Iron	10800	9395	N/A	N/A	N/A	N/A	CPS
SSW4 Iron	4600	3871	N/A	N/A	N/A	N/A	CPS
SSW5 Iron	580.0	460.2	N/A	N/A	N/A	N/A	CPS

Hostile Litho−Density Sonde Wellsite Calibration − Caliper Calibration
Before: 17−Dec−2011 9:53

HLDS Caliper Small Ring	12.00	N/A	14.33	N/A	N/A	N/A	IN
HLDS Caliper Large Ring	15.19	N/A	18.10	N/A	N/A	N/A	IN

Accelerator−Porosity Tool Wellsite Calibration − Detector Background
Master: 16−Nov−2011 15:14 Before: 17−Dec−2011 2:21 After: 16−Nov−2011 15:18

Near Det Bkg Cntrate	30.00	31.42	31.43	31.77	0.3362	N/A	CPS
Far Det Bkg Cntrate	30.00	33.69	33.21	32.51	−0.7060	N/A	CPS
Array−1 Det Bkg Cntrate	30.00	30.06	29.74	28.01	−1.725	N/A	CPS
Array−2 Det Bkg Cntrate	30.00	29.35	29.57	29.48	−0.08990	N/A	CPS
Array Therm Det Bkg Cntrate	30.00	30.97	30.41	31.05	0.6424	N/A	CPS

Accelerator−Porosity Tool Wellsite Calibration − Calibration Ratios
Master: 16−Nov−2011 15:12

Near/Far Calibration Ratio	0.9250	0.8880	N/A	N/A	N/A	N/A	
Near/Array Calibration Ratio	1.030	1.057	N/A	N/A	N/A	N/A	
Near/Array Cal Ratio Up/Down	1.000	1.006	N/A	N/A	N/A	N/A	

Accelerator−Porosity Tool Wellsite Calibration − Tank Check
Master: 16−Nov−2011 15:14

Array−1 Standoff Porosity	11.75	11.83	N/A	N/A	N/A	N/A	PU
Array−2 Standoff Porosity	11.75	11.78	N/A	N/A	N/A	N/A	PU
Average Slowing Down Time	6.000	5.843	N/A	N/A	N/A	N/A	US
Array−1 SDT Ratio Up/Down	1.000	0.9874	N/A	N/A	N/A	N/A	
Array−2 SDT Ratio Up/Down	1.000	1.012	N/A	N/A	N/A	N/A	
Sigma Formation	27.50	29.40	N/A	N/A	N/A	N/A	CU

Accelerator−Porosity Tool Wellsite Calibration − CCR7 signal boxes
Master: 16−Nov−2011 14:29

Near Detector Plateau Setting	1650	1732	N/A	N/A	N/A	N/A	V
Far Detector Plateau Setting	2000	2082	N/A	N/A	N/A	N/A	V
Array Detector Plateau Setting	2000	1962	N/A	N/A	N/A	N/A	V

Hostile Natural Gamma Ray Sonde Wellsite Calibration − Detector 1 Check
Master: 17−Nov−2011 7:57 Before: 26−Nov−2011 0:21 After: 8−Dec−2011 1:11

Na 511 Peak Loc	40.00	39.70	39.69	39.60	−0.09224	1.000	
Na 511 Peak Res	15.50	15.50	15.07	14.85	−0.2178	2.000	%
High Voltage	1150	1176	1168	1164	−3.540	N/A	V
Na 1785 Peak Loc	142.6	142.1	141.8	143.0	1.198	7.000	
Na 1785 Peak Res	8.500	8.309	8.731	7.037	−1.693	2.000	%
Temperature	15.50	29.76	21.55	20.40	−1.158	N/A	DEGC
Na Count Rate	45.00	20.77	21.01	20.72	−0.2956	8.000	CPS

Hostile Natural Gamma Ray Sonde Wellsite Calibration − Detector 2 Check
Master: 17−Nov−2011 7:57 Before: 26−Nov−2011 0:21 After: 8−Dec−2011 1:11

Na 511 Peak Loc	40.00	39.60	39.49	39.54	0.04988	1.000	
Na 511 Peak Res	15.50	16.99	15.91	15.93	0.01764	2.000	%
High Voltage	1150	1109	1091	1088	−3.384	N/A	V
Na 1785 Peak Loc	142.6	142.6	142.3	140.3	−1.968	7.000	
Na 1785 Peak Res	8.500	9.914	8.591	8.815	0.2231	2.000	%
Temperature	15.50	29.91	21.84	22.02	0.1821	N/A	DEGC
Na Count Rate	45.00	21.44	20.97	21.04	0.06492	8.000	CPS

Hostile Natural Gamma Ray Sonde Wellsite Calibration − Ratio Of Detector 1 To Detector 2
Master: 17−Nov−2011 7:57 Before: 26−Nov−2011 0:21 After: 8−Dec−2011 1:11

Coincidence Count Rate Ratio	1.000	0.9705	1.004	0.9862	−0.01783	0.05000	

Hostile Natural Gamma Ray Sonde Master Calibration − Detector 1 Calibration
Master: 17−Nov−2011 7:52

Na 511 Peak Set Point	40.00	41.00	−−	−−	−−	−−	
Th Peak Loc	209.6	210.8	−−	−−	−−	−−	
Th Peak Res	7.000	6.865	−−	−−	−−	−−	%
Background Count Rate	142.5	24.91	−−	−−	−−	−−	CPS
Gain Ratio	1.000	1.010	−−	−−	−−	−−	

Hostile Natural Gamma Ray Sonde Master Calibration − Detector 2 Calibration
Master: 17−Nov−2011 7:52

Na 511 Peak Set Point	40.00	41.00	−−	−−	−−	−−	
Th Peak Loc	209.6	208.5	−−	−−	−−	−−	
Th Peak Res	7.000	6.879	−−	−−	−−	−−	%

Background Count Rate	142.5	24.15	−−	−−	−−	−−	CPS
Gain Ratio	1.000	1.001	−−	−−	−−	−−	

Enhanced DTS Cartridge Wellsite Calibration − EDTC Accelerometer Calibration
Before: 17−Dec−2011 2:08

EDTC Z−Axis Acceleration	9.810	N/A	9.831	N/A	N/A	N/A	M/S2

Enhanced DTS Cartridge Wellsite Calibration − Detector Calibration
Before: Calibration out of date 26−Nov−2011 0:18

Gamma Ray (Jig − Bkg)	163.8	N/A	163.8	N/A	N/A	14.89	GAPI
Gamma Ray (Calibrated)	164.0	N/A	164.0	N/A	N/A	15.00	GAPI

Accelerator−Porosity Tool − Detector Plateau Settings :

Near Detector Plateau Setting 1732 V
Far Detector Plateau Setting 2082 V
Array Detector Plateau Setting 1962 V

High Resolution Laterolog Array − B / Equipment Identification

Primary Equipment:		
HRLT Sonde	HRLS − B	969
Auxiliary Equipment:		
HRLT lower Housing	HRLH − B	759
HRLT Lower Cartridge	HRLC − B	759
HRLT upper Housing	HRUH − B	769
HRLT Upper Cartridge	HRUC − B	769

High Resolution Laterolog Array − B Wellsite Calibration
HRLT M01

Idx	Phase	HRLT M0−M1 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		−319.1	−322.7	−280.7	−379.7
	After		−318.5			
1	Before		−334.0	−322.7	−280.7	−379.7
	After		−331.6			
2	Before		−335.1	−322.7	−280.7	−379.7
	After		−333.4			
3	Before		−338.3	−322.7	−280.7	−379.7
	After		−336.7			
4	Before		−326.3	−322.7	−280.7	−379.7
	After		−325.3			
5	Before		−322.4	−322.7	−280.7	−379.7
	After		−321.5			
6	Before		326.4	322.7	379.7	280.7
	After		322.6			
7	Before		−322.7	−322.7	−280.7	−379.7
	After		−322.7			
		(Minimum) (Nominal) (Maximum)				

Before: 17−Dec−2011 2:13
After: 17−Dec−2011 8:15

High Resolution Laterolog Array − B Wellsite Calibration
HRLT M12

Idx	Phase	HRLT M1−M2 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		1755	1781	2095	1549
	After		1752			

	After					
1	Before		1835	1781	2095	1549
	After		1822			
2	Before		1836	1781	2095	1549
	After		1828			
3	Before		1855	1781	2095	1549
	After		1846			
4	Before		1790	1781	2095	1549
	After		1785			
5	Before		1770	1781	2095	1549
	After		1767			
6	Before		−1801	−1781	−1549	−2095
	After		−1781			
7	Before		1781	1781	2095	1549
	After		1781			
	(Minimum)	(Nominal)	(Maximum)			

Before: 17−Dec−2011 2:13

After: 17−Dec−2011 8:15

High Resolution Laterolog Array − B Wellsite Calibration

HRLT M23

Idx	Phase	HRLT M2−M3 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		1741	1781	2095	1549
	After		1739			
1	Before		1834	1781	2095	1549
	After		1822			
2	Before		1837	1781	2095	1549
	After		1829			
3	Before		1858	1781	2095	1549
	After		1850			
4	Before		1787	1781	2095	1549
	After		1782			
5	Before		1768	1781	2095	1549
	After		1765			
6	Before		−1789	−1781	−1549	−2095
	After		−1769			
7	Before		1781	1781	2095	1549
	After		1781			
	(Minimum)	(Nominal)	(Maximum)			

Before: 17−Dec−2011 2:13

After: 17−Dec−2011 8:15

High Resolution Laterolog Array − B Wellsite Calibration

HRLT V34

Idx	Phase	HRLT A3−A4 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		68420	70000	82360	60900
	After		68310			
1	Before		71860	70000	82360	60900
	After		71360			

	After	71500			
2	Before	72250	70000	82360	60900
	After	71940			
3	Before	73370	70000	82360	60900
	After	73030			
4	Before	70520	70000	82360	60900
	After	70340			
5	Before	69790	70000	82360	60900
	After	69660			
6	Before	−69090	−70000	−60900	−82360
	After	−68290			
7	Before	70000	70000	82360	60900
	After	70000			
	(Minimum) (Nominal) (Maximum)				

Before: 17−Dec−2011 2:13

After: 17−Dec−2011 8:15

High Resolution Laterolog Array − B Wellsite Calibration

HRLT V45

Idx	Phase	HRLT A4−A5 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		68700	70000	82360	60900
	After		68590			
1	Before		72220	70000	82360	60900
	After		71730			
2	Before		72600	70000	82360	60900
	After		72290			
3	Before		73720	70000	82360	60900
	After		73380			
4	Before		70810	70000	82360	60900
	After		70640			
5	Before		70060	70000	82360	60900
	After		69930			
6	Before		−69460	−70000	−60900	−82360
	After		−68660			
7	Before		70000	70000	82360	60900
	After		70000			
	(Minimum) (Nominal) (Maximum)					

Before: 17−Dec−2011 2:13

After: 17−Dec−2011 8:15

High Resolution Laterolog Array − B Wellsite Calibration

HRLT V56

Idx	Phase	HRLT A5−A6 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		68590	70000	82360	60900
	After		68490			
1	Before		71940	70000	82360	60900
	After		71460			
2	Before		72350	70000	82360	60900
	After		72050			

	After	72050			
3	Before	73500	70000	82360	60900
	After	73190			
4	Before	70690	70000	82360	60900
	After	70490			
5	Before	69940	70000	82360	60900
	After	69800			
6	Before	−69170	−70000	−60900	−82360
	After	−68390			
7	Before	70000	70000	82360	60900
	After	70000			
	(Minimum) (Nominal) (Maximum)				

Before: 17−Dec−2011 2:13

After: 17−Dec−2011 8:15

High Resolution Laterolog Array − B Wellsite Calibration

HRLT VTP

Idx	Phase	HRLT Torpedo−M0 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		−68280	−70000	−60900	−82360
	After		−68170			
1	Before		−72280	−70000	−60900	−82360
	After		−71790			
2	Before		−72660	−70000	−60900	−82360
	After		−72360			
3	Before		−73800	−70000	−60900	−82360
	After		−73480			
4	Before		−70870	−70000	−60900	−82360
	After		−70700			
5	Before		−70100	−70000	−60900	−82360
	After		−69970			
6	Before		69450	70000	82360	60900
	After		68650			
7	Before		−70000	−70000	−60900	−82360
	After		−70000			
	(Minimum) (Nominal) (Maximum)					

Before: 17−Dec−2011 2:13

After: 17−Dec−2011 8:15

High Resolution Laterolog Array − B Wellsite Calibration

HRLT VBD

Idx	Phase	HRLT Bridle#9−M0 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		−68270	−70000	−60900	−82360
	After		−68160			
1	Before		−72250	−70000	−60900	−82360
	After		−71760			
2	Before		−72650	−70000	−60900	−82360
	After		−72320			
3	Before		−73780	−70000	−60900	−82360
	After		−73450			

	After		−73450			
4	Before		−70870	−70000	−60900	−82360
	After		−70690			
5	Before		−70100	−70000	−60900	−82360
	After		−69960			
6	Before		69430	70000	82360	60900
	After		68640			
7	Before		−70000	−70000	−60900	−82360
	After		−70000			
	(Minimum)	(Nominal)	(Maximum)			

Before: 17−Dec−2011 2:13

After: 17−Dec−2011 8:15

High Resolution Laterolog Array − B Wellsite Calibration

HRLT ISO

Idx	Phase	HRLT Source Current Plus UA	Value	Nominal	Maximum	Minimum
0	Before		284.7	284.0	334.1	247.0
	After		284.2			
1	Before		281.1	281.1	330.7	244.4
	After		281.1			
2	Before		281.1	281.1	330.7	244.4
	After		281.1			
3	Before		281.1	281.1	330.7	244.4
	After		281.1			
4	Before		281.1	281.1	330.7	244.4
	After		281.1			
5	Before		281.1	281.1	330.7	244.4
	After		281.1			
6	Before		281.1	281.1	330.7	244.4
	After		281.1			
7	Before		281.1	281.1	330.7	244.4
	After		281.1			
	(Minimum)	(Nominal)	(Maximum)			

Before: 17−Dec−2011 2:13

After: 17−Dec−2011 8:15

High Resolution Laterolog Array − B Wellsite Calibration

HRLT MV

Idx	Phase	HRLT Vertical Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		−321.5	−322.7	−280.7	−379.7
	After		−321.1			
1	Before		−328.2	−322.7	−280.7	−379.7
	After		−326.0			
2	Before		−328.5	−322.7	−280.7	−379.7
	After		−327.2			
3	Before		−330.1	−322.7	−280.7	−379.7
	After		−328.7			
4	Before		−315.7	−322.7	−280.7	−379.7
	After					

	After	−315.0			
5	Before	−327.1	−322.7	−280.7	−379.7
	After	−326.5			
6	Before	333.5	322.7	379.7	280.7
	After	329.9			
7	Before	−322.7	−322.7	−280.7	−379.7
	After	−322.7			
	(Minimum) (Nominal) (Maximum)				

Before: 17−Dec−2011 2:13

After: 17−Dec−2011 8:15

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	2397
Auxiliary Equipment:		
Hostile Litho Density Pad	HLDP − C	45
Hostile Litho Density High Voltage Housi	HEH − H	47

Hostile Litho−Density Sonde Wellsite Calibration

Background Measurement

Phase	SS Cs Resolution Bkg %	Value
Master		7.741
Before		7.618
After		7.594
	7.000 (Minimum) 9.000 (Nominal) 11.00 (Maximum)	

Phase	LS Cs Resolution Bkg %	Value
Master		8.089
Before		8.025
After		8.065
	7.000 (Minimum) 9.000 (Nominal) 11.00 (Maximum)	

Phase	LSW1 Background CPS	Value
Master		87.45
Before		87.45
After		87.53
	55.00 (Minimum) 100.0 (Nominal) 150.0 (Maximum)	

Phase	LSW2 Background CPS	Value
Master		80.38
Before		80.38
After		79.58
	50.00 (Minimum) 100.0 (Nominal) 140.0 (Maximum)	

Phase	LSW3 Background CPS	Value
Master		180.0
Before		180.0
After		180.4
	110.0 (Minimum) 200.0 (Nominal) 290.0 (Maximum)	

Phase	LSW4 Background CPS	Value
Master		224.8
Before		224.8
After		226.5
	140.0 (Minimum) 250.0 (Nominal) 360.0 (Maximum)	

Phase	LSW5 Background CPS	Value
Master		526.0
Before		526.0
After		519.3
	330.0 (Minimum) 600.0 (Nominal) 830.0 (Maximum)	

Phase	SSW1 Background CPS	Value
Master		85.28
Before		85.28
After		84.82
	55.00 (Minimum) 100.0 (Nominal) 150.0 (Maximum)	

Phase	SSW2 Background CPS	Value
Master		147.3
Before		147.3
After		146.1
	100.0 (Minimum) 200.0 (Nominal) 260.0 (Maximum)	

Phase	SSW3 Background CPS	Value
Master		409.2
Before		409.2
After		411.5
	280.0 (Minimum) 500.0 (Nominal) 700.0 (Maximum)	

Phase	SSW4 Background CPS	Value
Master		221.7
Before		221.7
After		221.2
	150.0 (Minimum) 270.0 (Nominal) 380.0 (Maximum)	

Phase	SSW5 Background CPS	Value
Master		158.7
Before		158.7
After		157.7
	110.0 (Minimum) 200.0 (Nominal) 270.0 (Maximum)	

Master: 17−Nov−2011 16:03 Before: 17−Nov−2011 15:55 After: 17−Dec−2011 8:50

Hostile Litho−Density Sonde Master Calibration

Detector Background Measurement

Phase	LSW1 Background CPS	Value
Master		87.45
	55.00 (Minimum) 100.0 (Nominal) 150.0 (Maximum)	

Phase	LSW2 Background CPS	Value
Master		80.38
	50.00 (Minimum) 100.0 (Nominal) 140.0 (Maximum)	

Phase	LSW3 Background CPS	Value
Master		180.0
	110.0 (Minimum) 200.0 (Nominal) 290.0 (Maximum)	

Phase	LSW4 Background CPS	Value
Master		

Phase	LSW5 Background CPS	Value
Master		

Phase	LS Cs Resolution Bkg %	Value
Master		

Phase		Value
Master		224.8
	140.0 (Minimum) 250.0 (Nominal) 360.0 (Maximum)	

Phase		Value
Master		526.0
	330.0 (Minimum) 600.0 (Nominal) 830.0 (Maximum)	

Phase		Value
Master		8.089
	7.000 (Minimum) 9.000 (Nominal) 11.00 (Maximum)	

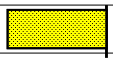
Phase	SSW1 Background CPS	Value
Master		85.28
	55.00 (Minimum) 100.0 (Nominal) 150.0 (Maximum)	

Phase	SSW2 Background CPS	Value
Master		147.3
	100.0 (Minimum) 200.0 (Nominal) 260.0 (Maximum)	

Phase	SSW3 Background CPS	Value
Master		409.2
	280.0 (Minimum) 500.0 (Nominal) 700.0 (Maximum)	

Phase	SSW4 Background CPS	Value
Master		221.7
	150.0 (Minimum) 270.0 (Nominal) 380.0 (Maximum)	

Phase	SSW5 Background CPS	Value
Master		158.7
	110.0 (Minimum) 200.0 (Nominal) 270.0 (Maximum)	

Phase	SS Cs Resolution Bkg %	Value
Master		7.741
	7.000 (Minimum) 9.000 (Nominal) 11.00 (Maximum)	

Master: 17−Nov−2011 16:03

Hostile Litho−Density Sonde Master Calibration

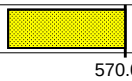
Detector Aluminum Measurement (bkgd−subtracted)

Phase	LSW1 Aluminum CPS	Value
Master		560.2
	420.0 (Minimum) 600.0 (Nominal) 770.0 (Maximum)	

Phase	LSW2 Aluminum CPS	Value
Master		815.4
	650.0 (Minimum) 900.0 (Nominal) 1150 (Maximum)	

Phase	LSW3 Aluminum CPS	Value
Master		984.8
	800.0 (Minimum) 1100 (Nominal) 1450 (Maximum)	

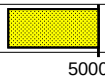
Phase	LSW4 Aluminum CPS	Value
Master		493.4
	410.0 (Minimum) 580.0 (Nominal) 740.0 (Maximum)	

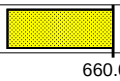
Phase	LSW5 Aluminum CPS	Value
Master		450.2
	410.0 (Minimum) 570.0 (Nominal) 740.0 (Maximum)	

Phase	SSW1 Aluminum CPS	Value
Master		2639
	2000 (Minimum) 2800 (Nominal) 3200 (Maximum)	

Phase	SSW2 Aluminum CPS	Value
Master		7196
	5800 (Minimum) 8000 (Nominal) 9300 (Maximum)	

Phase	SSW3 Aluminum CPS	Value
Master		10050
	8300 (Minimum) 11600 (Nominal) 13500 (Maximum)	

Phase	SSW4 Aluminum CPS	Value
Master		4135
	3500 (Minimum) 5000 (Nominal) 5800 (Maximum)	

Phase	SSW5 Aluminum CPS	Value
Master		504.7
	430.0 (Minimum) 660.0 (Nominal) 770.0 (Maximum)	

Master: 17−Nov−2011 16:33

Hostile Litho−Density Sonde Master Calibration

Detector Litholog Measurement (bkgd−subtracted)

Phase	LSW1 Iron CPS	Value
Master		389.4
	290.0 (Minimum) 400.0 (Nominal) 560.0 (Maximum)	

Phase	LSW2 Iron CPS	Value
Master		674.0
	520.0 (Minimum) 730.0 (Nominal) 950.0 (Maximum)	

Phase	LSW3 Iron CPS	Value
Master		897.0
	720.0 (Minimum) 1000 (Nominal) 1350 (Maximum)	

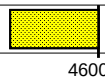
Phase	LSW4 Iron CPS	Value
Master		464.0
	370.0 (Minimum) 520.0 (Nominal) 700.0 (Maximum)	

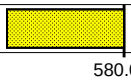
Phase	LSW5 Iron CPS	Value
Master		424.7
	340.0 (Minimum) 470.0 (Nominal) 750.0 (Maximum)	

Phase	SSW1 Iron CPS	Value
Master		1967
	1500 (Minimum) 2100 (Nominal) 2400 (Maximum)	

Phase	SSW2 Iron CPS	Value
Master		6145
	4900 (Minimum) 6800 (Nominal) 7900 (Maximum)	

Phase	SSW3 Iron CPS	Value
Master		9395
	7800 (Minimum) 10800 (Nominal) 12600 (Maximum)	

Phase	SSW4 Iron CPS	Value
Master		3871
	3300 (Minimum) 4600 (Nominal) 5400 (Maximum)	

Phase	SSW5 Iron CPS	Value
Master		460.2
	420.0 (Minimum) 580.0 (Nominal) 680.0 (Maximum)	

Master: 17−Nov−2011 16:29

Hostile Litho−Density Sonde Master Calibration

Quality Ratios

Phase	AL CALIBRATION RATIO 1	Value
Master		1.044
	0.9000 (Minimum) 1.000 (Nominal) 1.100 (Maximum)	

Phase	AL CALIBRATION RATIO 2	Value
Master		2.167
	1.900 (Minimum) 2.100 (Nominal) 2.300 (Maximum)	

Phase	AL CALIBRATION RATIO 3	Value
Master		0.5937
	0.4500 (Minimum) 0.5500 (Nominal) 0.6500 (Maximum)	

Phase	AL CALIBRATION RATIO 4	Value
Master		0.5690
	0.4000 (Minimum) 0.5500 (Nominal) 0.6500 (Maximum)	

Phase	Pad−Wear SS Ratio	Value
Master		0.9915
	0.9800 (Minimum) 0.9880 (Nominal) 0.9960 (Maximum)	

Phase	Pad−Wear LS Ratio	Value
Master		0.9856
	0.9800 (Minimum) 0.9880 (Nominal) 0.9960 (Maximum)	

Phase	Pad−Position SS Ratio	Value
Master		1.003

Phase	Pad−Position LS Ratio	Value
Master		0.9882

0.9900 (Minimum)	0.9940 (Nominal)	1.015 (Maximum)	0.9850 (Minimum)	0.9940 (Nominal)	1.010 (Maximum)

Master: 17−Nov−2011 16:35

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	22
APS Minitron	MNTR − F	5978
Auxiliary Equipment:		
Accelerator−Porosity Housing	APH − AC	22
APS Calibration Water Tank	SFT − 178	1
APS Aluminum Calibrator Sleeve	SFT − 281	1

Accelerator−Porosity Tool Wellsite Calibration

Detector Background

Phase	Near Det Bkg Cntrate CPS	Value
Master		31.42
Before		31.43
After		31.77

1.000 (Minimum) 30.00 (Nominal) 50.00 (Maximum)

Phase	Far Det Bkg Cntrate CPS	Value
Master		33.69
Before		33.21
After		32.51

1.000 (Minimum) 30.00 (Nominal) 50.00 (Maximum)

Phase	Array−1 Det Bkg Cntrate CPS	Value
Master		30.06
Before		29.74
After		28.01

1.000 (Minimum) 30.00 (Nominal) 50.00 (Maximum)

Phase	Array−2 Det Bkg Cntrate CPS	Value
Master		29.35
Before		29.57
After		29.48

1.000 (Minimum) 30.00 (Nominal) 50.00 (Maximum)

Phase	Array Therm Det Bkg Cntrate CPS	Value
Master		30.97
Before		30.41
After		31.05

1.000 (Minimum) 30.00 (Nominal) 50.00 (Maximum)

Master: 16−Nov−2011 15:14 Before: 17−Dec−2011 2:21 After: 16−Nov−2011 15:18

Accelerator−Porosity Tool Wellsite Calibration

Calibration Ratios

Phase	Near/Far Calibration Ratio	Value
Master		0.8880

0.8000 (Minimum) 0.9250 (Nominal) 1.050 (Maximum)

Phase	Near/Array Calibration Ratio	Value
Master		1.057

0.9000 (Minimum) 1.030 (Nominal) 1.170 (Maximum)

Phase	Near/Array Cal Ratio Up/Down	Value
Master		1.006

0.9700 (Minimum) 1.000 (Nominal) 1.030 (Maximum)

Master: 16−Nov−2011 15:12

Accelerator−Porosity Tool Wellsite Calibration

Tank Check

Phase	Array−1 Standoff Porosity PU	Value
Master		11.83

9.900 (Minimum) 11.75 (Nominal) 13.60 (Maximum)

Phase	Array−2 Standoff Porosity PU	Value
Master		11.78

9.900 (Minimum) 11.75 (Nominal) 13.60 (Maximum)

Phase	Average Slowing Down Time US	Value
Master		5.843

5.500 (Minimum) 6.000 (Nominal) 6.250 (Maximum)

Phase	Array−1 SDT Ratio Up/Down	Value
Master		0.9874

0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)

Phase	Array−2 SDT Ratio Up/Down	Value
Master		1.012

0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)

Phase	Sigma Formation CU	Value
Master		29.40

20.00 (Minimum) 27.50 (Nominal) 35.00 (Maximum)

Master: 16−Nov−2011 15:14

Accelerator−Porosity Tool Master Calibration

Detector Calibration

Phase	Near/Far Calibration Ratio	Value

Phase	Near/Array Calibration Ratio	Value

Phase	Near/Array Cal Ratio Up/Down	Value

Master		0.8880	Master		1.057	Master		1.006
0.8000 (Minimum)	0.9250 (Nominal)	1.050 (Maximum)	0.9000 (Minimum)	1.030 (Nominal)	1.170 (Maximum)	0.9700 (Minimum)	1.000 (Nominal)	1.030 (Maximum)

Master: 16−Nov−2011 15:12

Accelerator−Porosity Tool Master Calibration

Tank Check

Phase	Array−1 Standoff Porosity PU	Value	Phase	Array−2 Standoff Porosity PU	Value	Phase	Average Slowing Down Time US	Value
Master		11.83	Master		11.78	Master		5.843
9.900 (Minimum)	11.75 (Nominal)	13.60 (Maximum)	9.900 (Minimum)	11.75 (Nominal)	13.60 (Maximum)	5.500 (Minimum)	6.000 (Nominal)	6.250 (Maximum)

Phase	Array−1 SDT Ratio Up/Down	Value	Phase	Array−2 SDT Ratio Up/Down	Value	Phase	Sigma Formation CU	Value
Master		0.9874	Master		1.012	Master		29.40
0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	20.00 (Minimum)	27.50 (Nominal)	35.00 (Maximum)

Master: 16−Nov−2011 15:14

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	Phase	Na 511 Peak Res %	Value	Phase	High Voltage V	Value
Master		39.70	Master		15.50	Master		1176
Before		39.69	Before		15.07	Before		1168
After		39.60	After		14.85	After		1164
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 DEGC	Value
Master		142.1	Master		8.309	Master		29.76
Before		141.8	Before		8.731	Before		21.55
After		143.0	After		7.037	After		20.40
135.0 (Minimum)	142.6 (Nominal)	150.3 (Maximum)	7.000 (Minimum)	8.500 (Nominal)	11.00 (Maximum)	−28.89 (Minimum)	15.50 (Nominal)	60.00 (Maximum)

Phase	Na Count Rate CPS	Value
Master		20.77
Before		21.01
After		20.72
10.00 (Minimum)	45.00 (Nominal)	100.0 (Maximum)

Master: 17−Nov−2011 7:57 Before: 26−Nov−2011 0:21 After: 8−Dec−2011 1:11

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		39.60	Master		16.99	Master		1109

Phase	Value
Before	39.49
After	39.54

37.50 (Minimum) 40.00 (Nominal) 43.50 (Maximum)

Phase	Value
Before	15.91
After	15.93

12.00 (Minimum) 15.50 (Nominal) 19.00 (Maximum)

Phase	Value
Before	1091
After	1088

900.0 (Minimum) 1150 (Nominal) 1600 (Maximum)

Phase	Na 1785 Peak Loc	Value
Master		142.6
Before		142.3
After		140.3

135.0 (Minimum) 142.6 (Nominal) 150.3 (Maximum)

Phase	Na 1785 Peak Res %	Value
Master		9.914
Before		8.591
After		8.815

7.000 (Minimum) 8.500 (Nominal) 11.00 (Maximum)

Phase	Temperature DEGC	Value
Master		29.91
Before		21.84
After		22.02

−28.89 (Minimum) 15.50 (Nominal) 60.00 (Maximum)

Phase	Na Count Rate CPS	Value
Master		21.44
Before		20.97
After		21.04

10.00 (Minimum) 45.00 (Nominal) 100.0 (Maximum)

Master: 17−Nov−2011 7:57 Before: 26−Nov−2011 0:21 After: 8−Dec−2011 1:11

Hostile Natural Gamma Ray Sonde Wellsite Calibration

Ratio Of Detector 1 To Detector 2

Phase	Coincidence Count Rate Ratio	Value
Master		0.9705
Before		1.004
After		0.9862

0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)

Master: 17−Nov−2011 7:57
Before: 26−Nov−2011 0:21
After: 8−Dec−2011 1:11

Hostile Natural Gamma Ray Sonde Master Calibration

Detector 1 Calibration

Phase	Na 511 Peak Set Point	Value
Master		41.00

38.00 (Minimum) 40.00 (Nominal) 43.00 (Maximum)

Phase	Th Peak Loc	Value
Master		210.8

201.0 (Minimum) 209.6 (Nominal) 218.3 (Maximum)

Phase	Th Peak Res %	Value
Master		6.865

5.000 (Minimum) 7.000 (Nominal) 9.000 (Maximum)

Phase	Background Count Rate CPS	Value
Master		24.91

10.00 (Minimum) 142.5 (Nominal) 265.0 (Maximum)

Phase	Gain Ratio	Value
Master		1.010

0.9400 (Minimum) 1.000 (Nominal) 1.060 (Maximum)

Master: 17−Nov−2011 7:52

Hostile Natural Gamma Ray Sonde Master Calibration

Detector 2 Calibration

Phase	Na 511 Peak Set Point	Value
Master		41.00

38.00 (Minimum) 40.00 (Nominal) 43.00 (Maximum)

Phase	Th Peak Loc	Value
Master		208.5

201.0 (Minimum) 209.6 (Nominal) 218.3 (Maximum)

Phase	Th Peak Res %	Value
Master		6.879

5.000 (Minimum) 7.000 (Nominal) 9.000 (Maximum)

Phase	Background Count Rate CPS	Value
Master		24.15

10.00 (Minimum) 142.5 (Nominal) 265.0 (Maximum)

Phase	Gain Ratio	Value
Master		1.001

0.9400 (Minimum) 1.000 (Nominal) 1.060 (Maximum)

Master: 17−Nov−2011 7:52

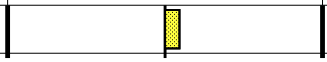
Enhanced DTS Cartridge / Equipment Identification

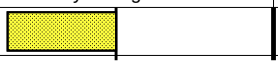
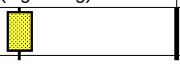
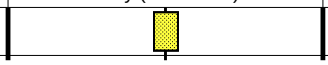
Primary Equipment:

EDTC Gamma Ray Detector	EDTG − A/B	77693
Enhanced DTS Cartridge	EDTC − B	8529

Auxiliary Equipment:

EDTC Housing	EDTH − B	8528

Enhanced DTS Cartridge Wellsite Calibration		
EDTC Accelerometer Calibration		
Phase	EDTC Z−Axis Acceleration M/S2	Value
Before		9.831
9.610 (Minimum)	9.810 (Nominal)	10.01 (Maximum)
Before: 17−Dec−2011 2:08		

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		9.201	Before		163.8	Before		164.0
0 (Minimum)	30.00 (Nominal)	120.0 (Maximum)	148.9 (Minimum)	163.8 (Nominal)	178.7 (Maximum)	149.0 (Minimum)	164.0 (Nominal)	179.0 (Maximum)
Before: Calibration out of date 26−Nov−2011 0:18								

Company: **Lamont Doherty**

Schlumberger

Well: **Expedition 339, Site U1387 GC−09A**
Field: **Mediterranean Outflow (Portugal)**
Rig: **JOIDES Resolution**
Ocean: **Atlantic**

Hostile Natural Gamma Ray Spectroscopy