Schlumberger

Company: **BATTELLE MEMORIAL INSTITUTE**

Well: **AEP #1**

Field: **APPALACHIAN POWER CO.**

COUNTY: **MASON** STATE: **WEST VIRGINIA**

LITHO−DENSITY
COMPENSATED NEUTRON
GAMMA RAY / TEMPERATURE

COUNTY: MASON
Field: APPALACHIAN POWER CO.
Location: 6044 FEET W OF LONG 81 DEG 55"
Well: AEP #1
Company: BATTELLE MEMORIAL INSTITUTE

LOCATION

6044 FEET W OF LONG 81 DEG 55"
8118 FEET S OF LAT 39 DEG 00"

Elev.: K.B. 608 ft
G.L. 590 ft
D.F. 603 ft

Permanent Datum: GROUND LEVEL Elev.: 590 ft
Log Measured From: KELLY BUSHING 18.0 ft above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No.	WATERSHED	QUADRANGLE	DISTRICT
47−053−0423	MIDDLE OHIO #2	NEW HAVEN WV−OH	GRAHAM

	Run 1	Run 2	Run
Logging Date	3−Jul−2003		
Run Number	TWO		
Depth Driller	6258 ft		
Schlumberger Depth	6290 ft		
Bottom Log Interval	6982 ft		
Top Log Interval	1800 ft		
Casing Driller Size @ Depth	9.625 in @ 3870 ft	@	
Casing Schlumberger	3865 ft		
Bit Size	8.625 in		
Type Fluid In Hole	AIR		
MUD Density / Viscosity	0 lbm/gal		
MUD Fluid Loss / PH			
MUD Source Of Sample	PREVIOUS L0G		
RM @ Measured Temperature	0.023 ohm.m @ 78 degF	@	
RMF @ Measured Temperature	0.023 ohm.m @ 78 degF	@	
RMC @ Measured Temperature	0.023 ohm.m @ 78 degF	@	
Source RMF / RMC			
RM @ MRT / RMF @ MRT	0.015 @ 125 / 0.015 @ 125	@ / @	
Maximum Recorded Temperatures	125 degF		
Circulation Stopped / Time	3−Jul−2003 / 11:00		
Logger On Bottom / Time	3−Jul−2003 / 19:00		
Unit Number / Location	3046 / CHARLESTON,WV		
Recorded By	JAMES NOEL		
Witnessed By	BILL RIKE & PHIL JAGUCKI		

	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			

Run 3

Run 4

DISCLAIMER

THE USE OF AND RELIANCE UPON THIS RECORDED−DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED−DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE OF AND RELIANCE UPON THE RECORDED−DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED−DATA.

OTHER SERVICES1	OTHER SERVICES2
OS1: ARRAY INDUCTION	OS1:
OS2: CALIPER	OS2:
OS3: AUDIO	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
CORRELATED TO PREVIOUS SHLUMBERGER LOG	
RUN ON 10−JUNE−2003	
NEUTRON AND GAMMA RAY RUN TO 1800 PER CLIENT REQUEST	
MATRIX DENSITY AS NOTED ON LOG	
MUD RESISTIVITY VALUES FROM PREVIOUS LOG	
RUN ON 10−JUNE−2003	
NO REPEAT PASS RUN PER CLIENT REQUEST	
THANK YOU FOR CHOOSING SCHLUMBERGER!!	
YOUR CREW TODAY: K. HELLEMS	

RUN 1		RUN 2	
SERVICE ORDER #:	10613751	SERVICE ORDER #:	
PROGRAM VERSION:	10C0−306	PROGRAM VERSION:	
FLUID LEVEL:		FLUID LEVEL:	

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1 RUN 2

SURFACE EQUIPMENT

CNB−AB
NCT−B
NCS−VB
GSR−U/Y

WITM (CTS)−A

DOWNHOLE EQUIPMENT

LEH−Q
LEH−Q 8510

62.3

TCC−B
ECH−KC 1088
TCC−B

TelStatus
CTEM

60.1

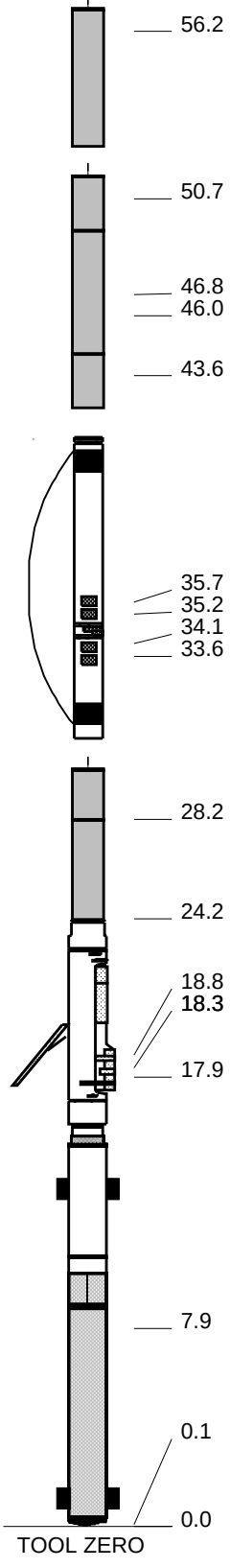
57.1

SGT−L
SGH−K
SGC−SA 603
SGD−TAA

TMT−AB
AGD−B 5
TMT−AA 12
AGD−B 7

CNT−G
CND−NA
NLS−KL
NSR−F 2179
CNC−GA 114
CNH−G 114
BOW−SPR
NPV−N

HILTB−DTB
HTBCC 829
HMCA
HRCC−B
HRMS−B
HRGD
GLS−VJ
MCFL Device
HILT Nucl. LS
HILT Nucl. SS
HILT Nucl. BS
AIT−H
AHIS−BA 216
AHRM−A



MAXIMUM STRING DIAMETER 6.88 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_008LUP	FN:11	PRODUCER	03−Jul−2003 18:56

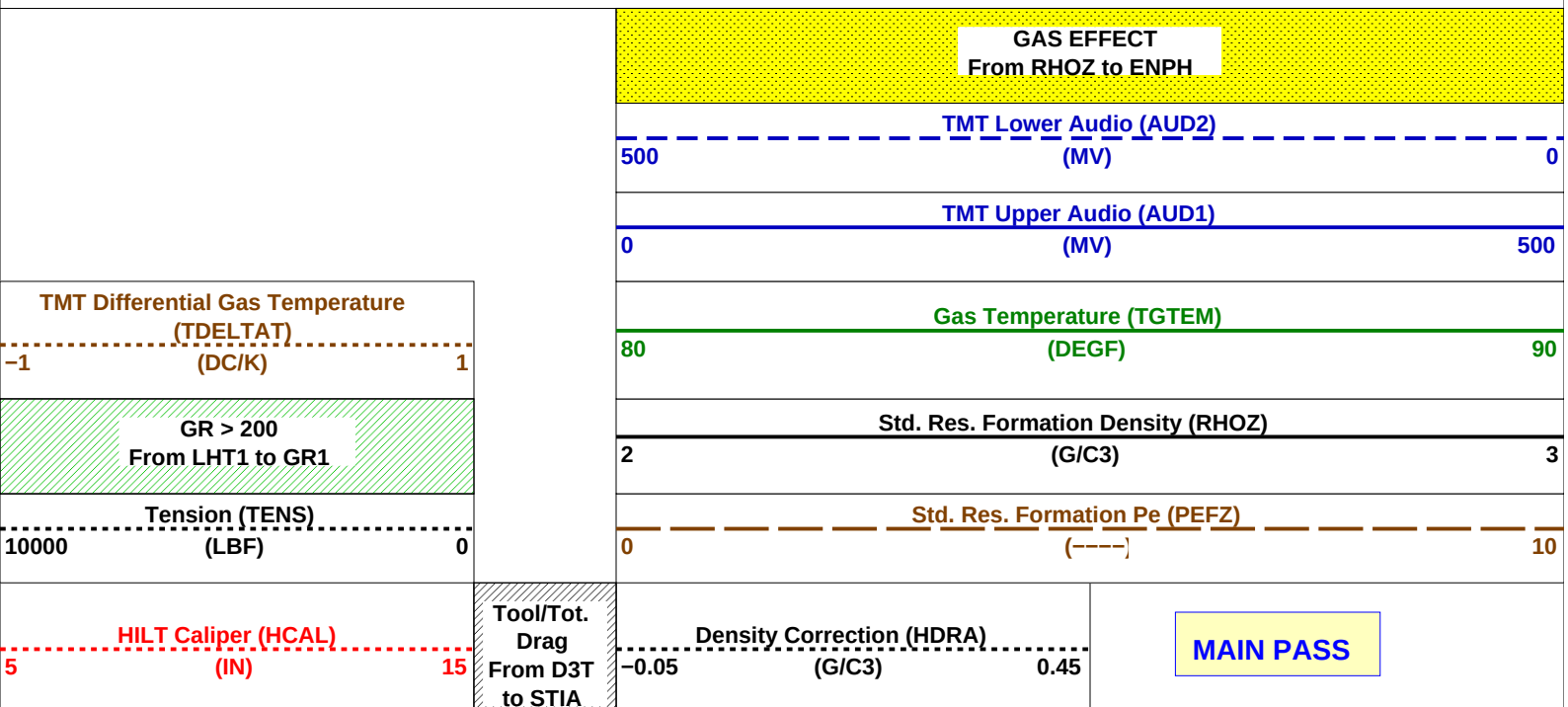
OP System Version: 10C0−306

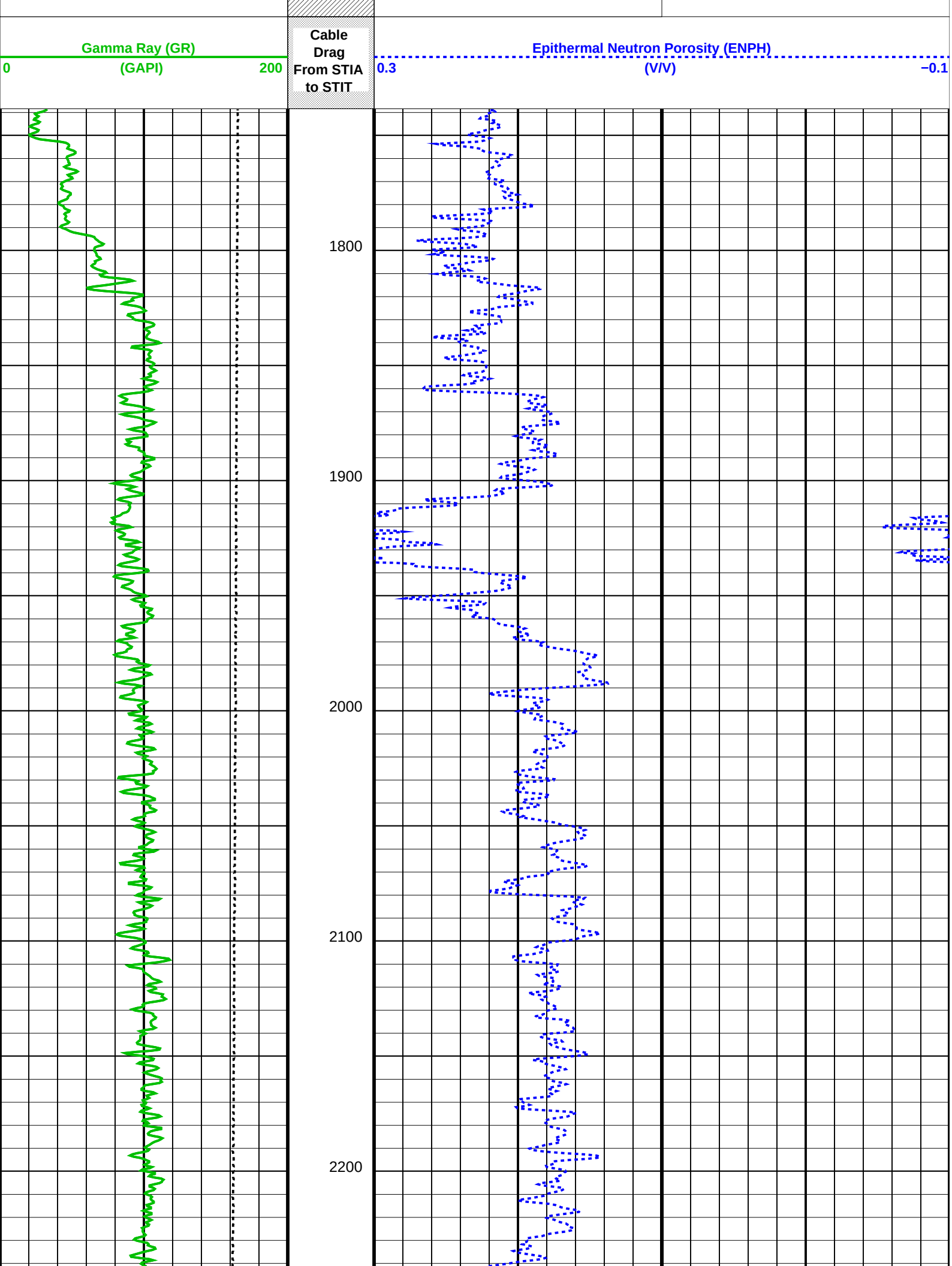
MCM

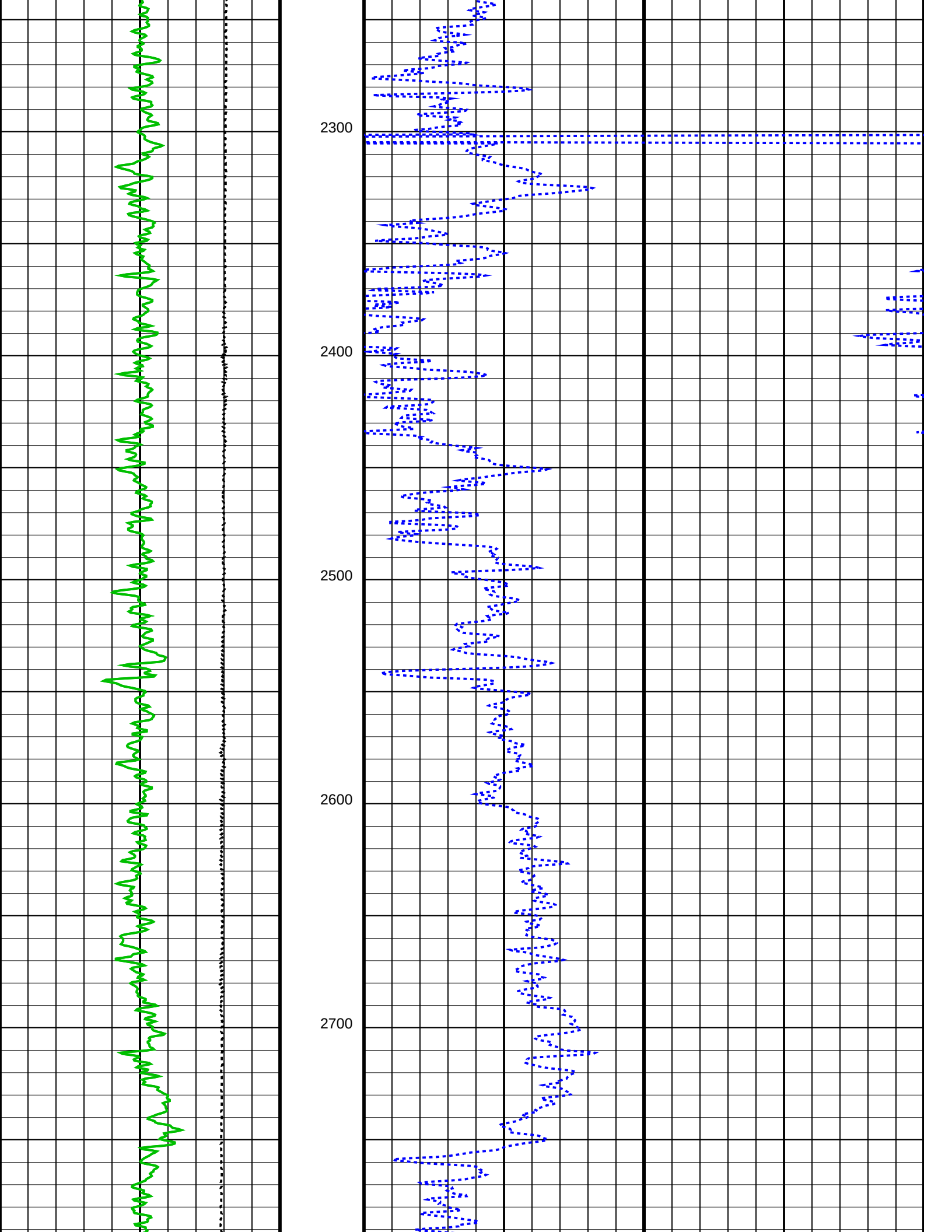
HILTB−DTB	OP10−KP1	CNT−G	10C0−306
TMT−AB	10C0−306	SGT−L	10C0−306
TCC−B	10C0−306		

PIP SUMMARY

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




Gamma Ray (GR)
0
(GAPI)
200
Cable Drag From STIA to STIT
Epithermal Neutron Porosity (ENPH)
0.3
(V/V)
−0.1
1800
1900
2000
2100
2200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2400
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2600
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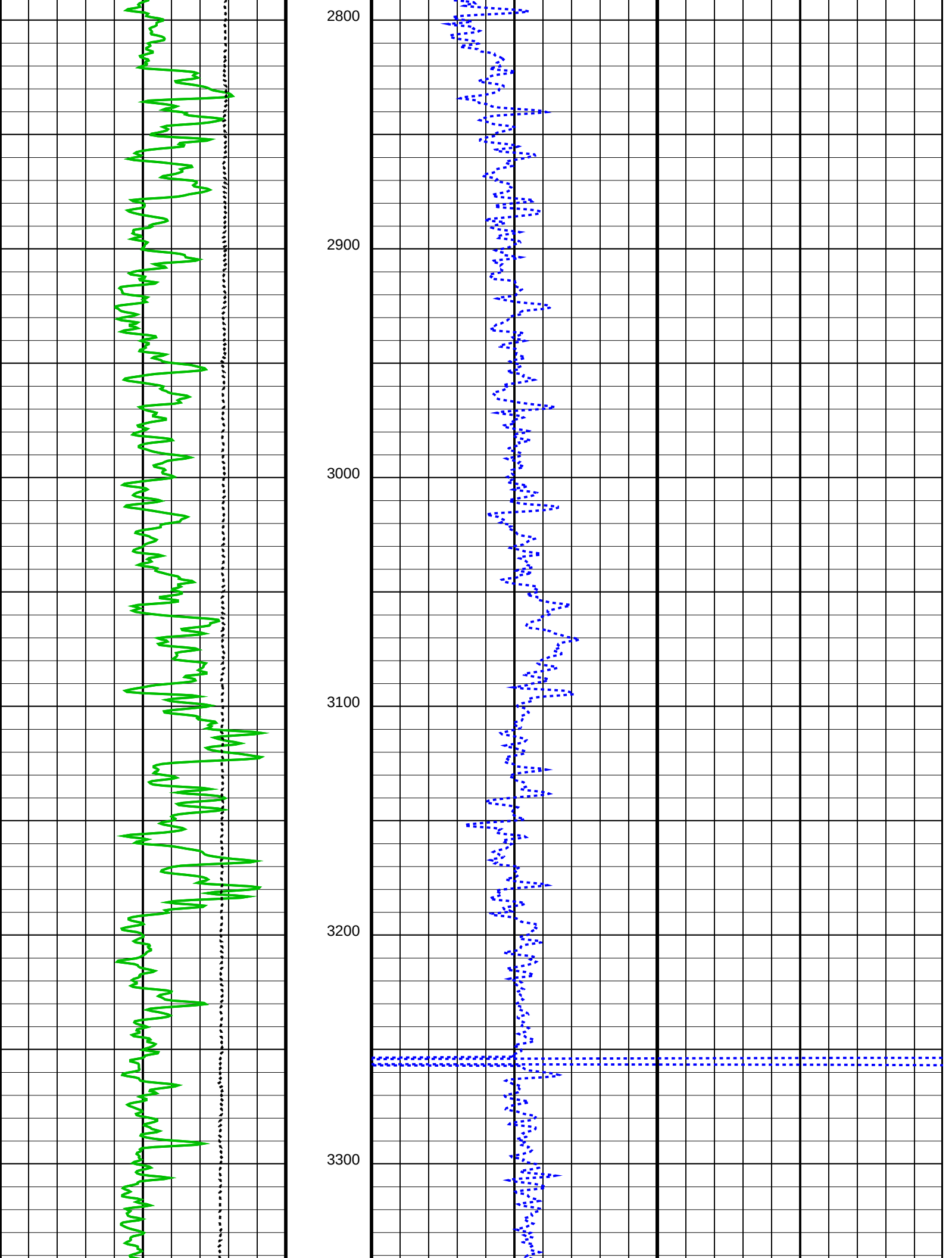
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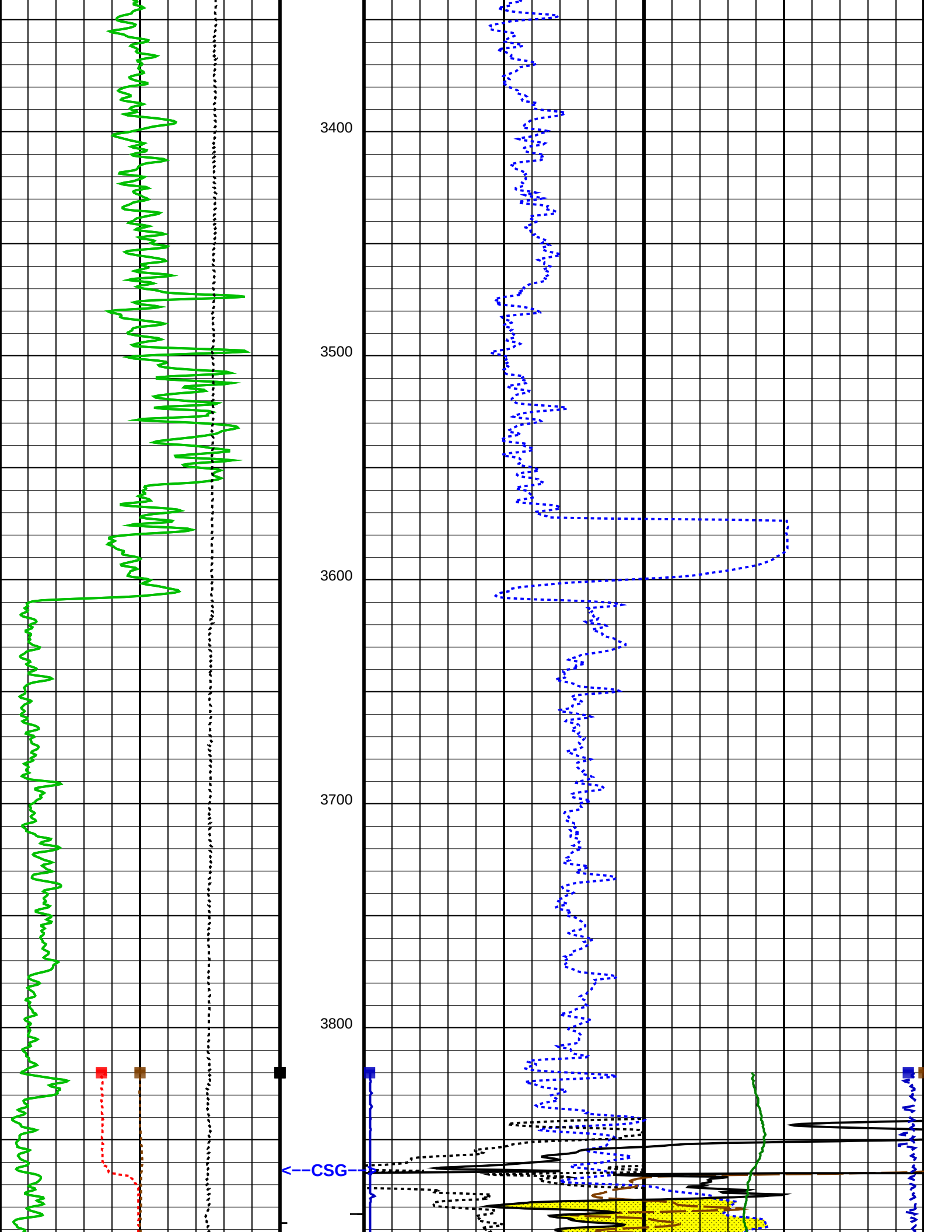
3100
3200
3300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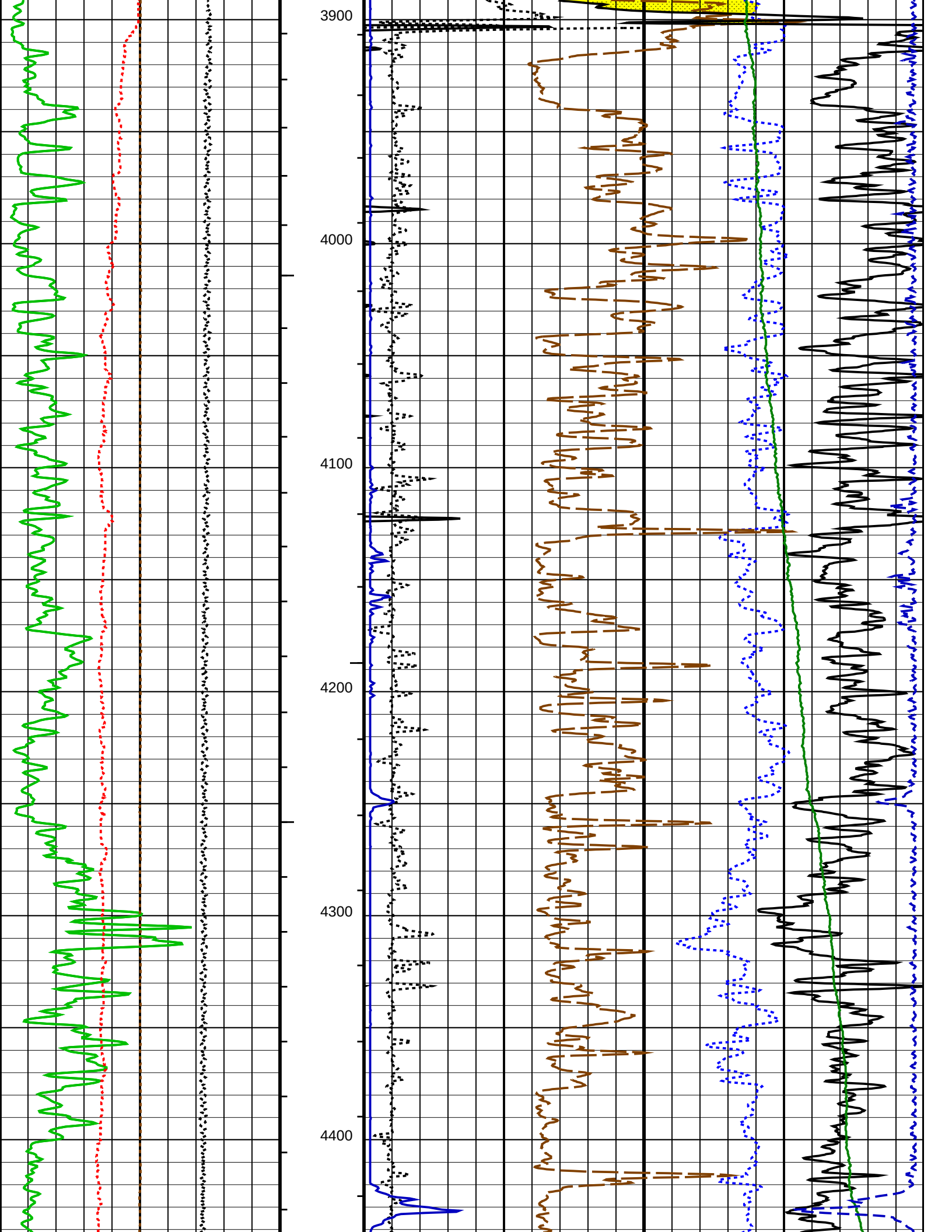
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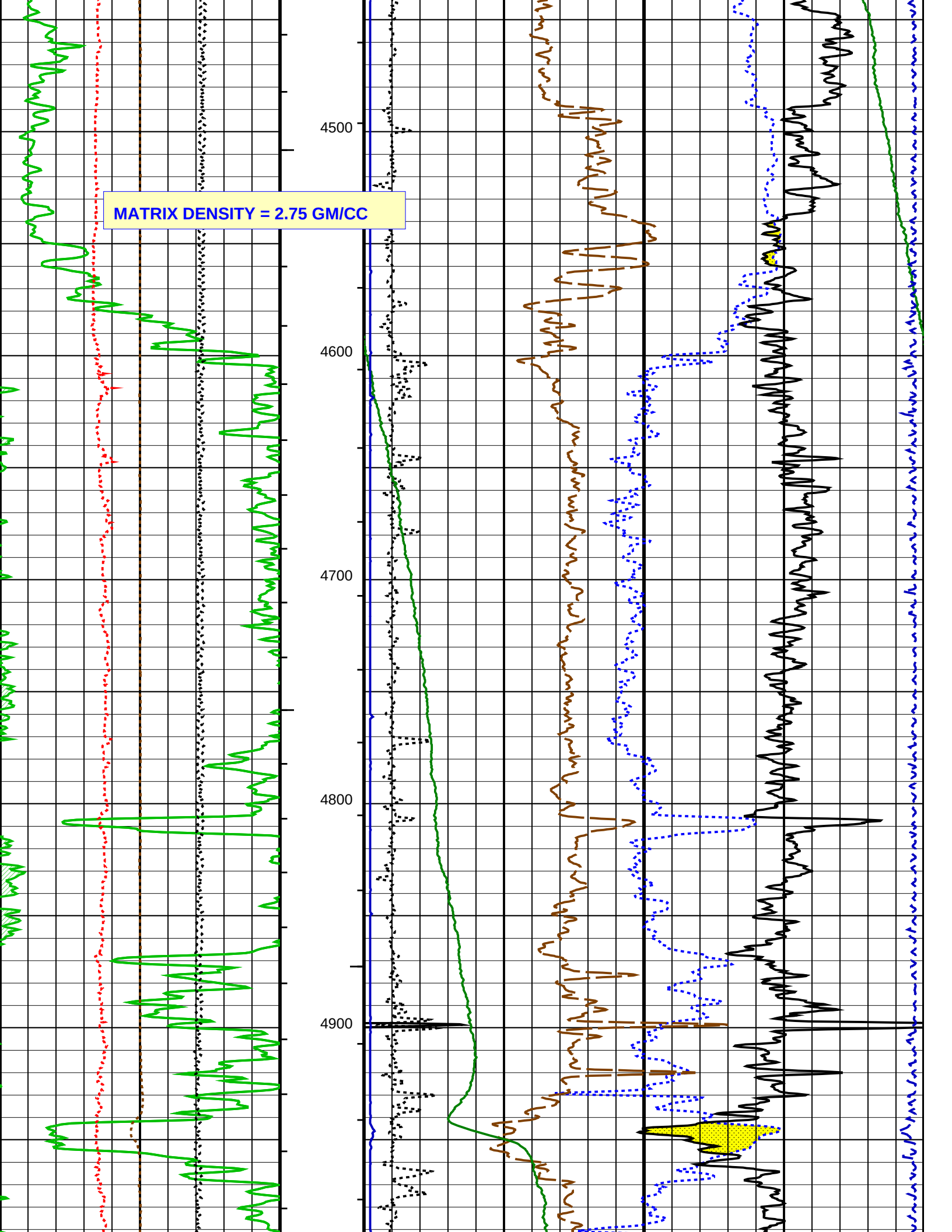
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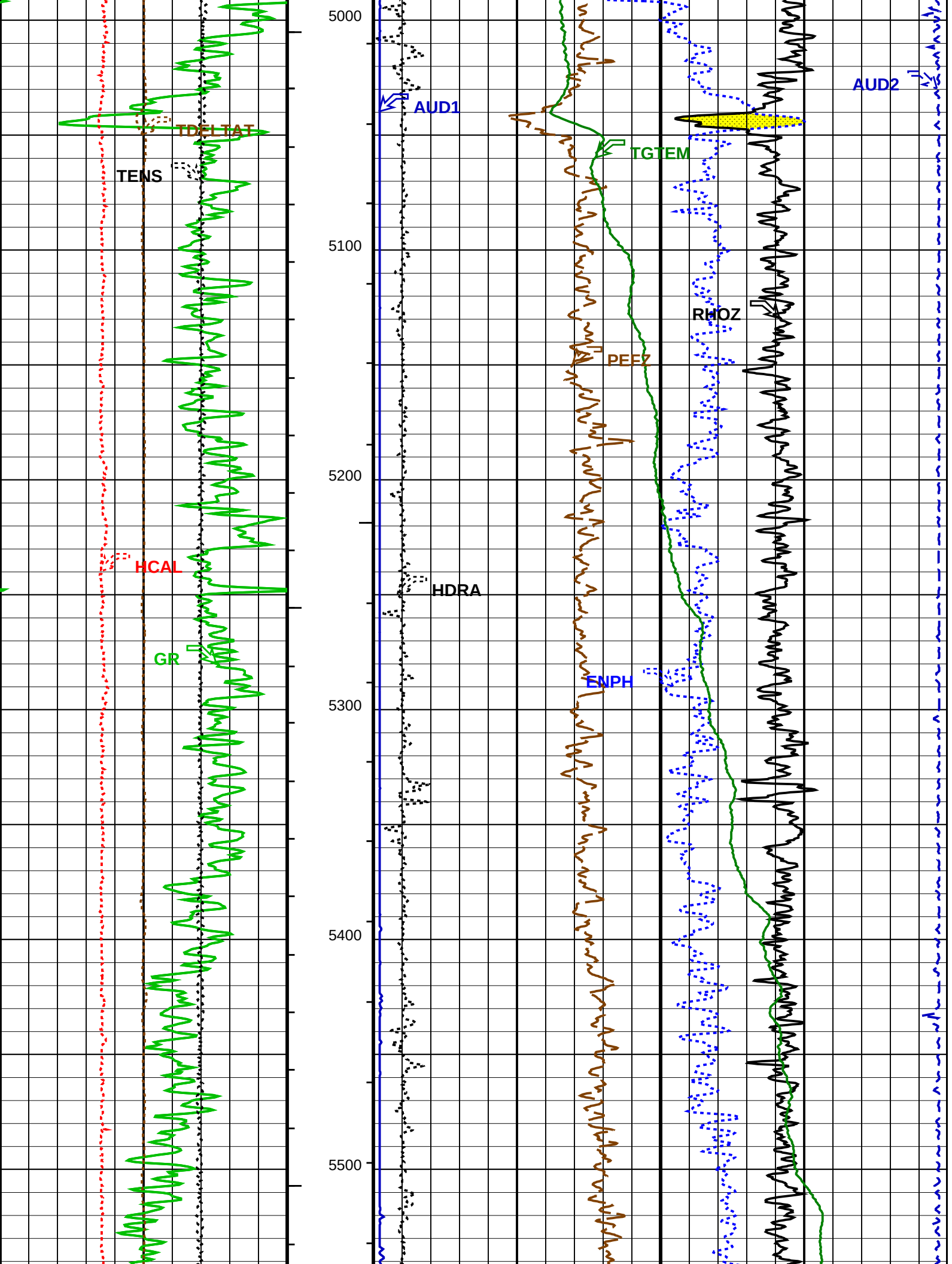
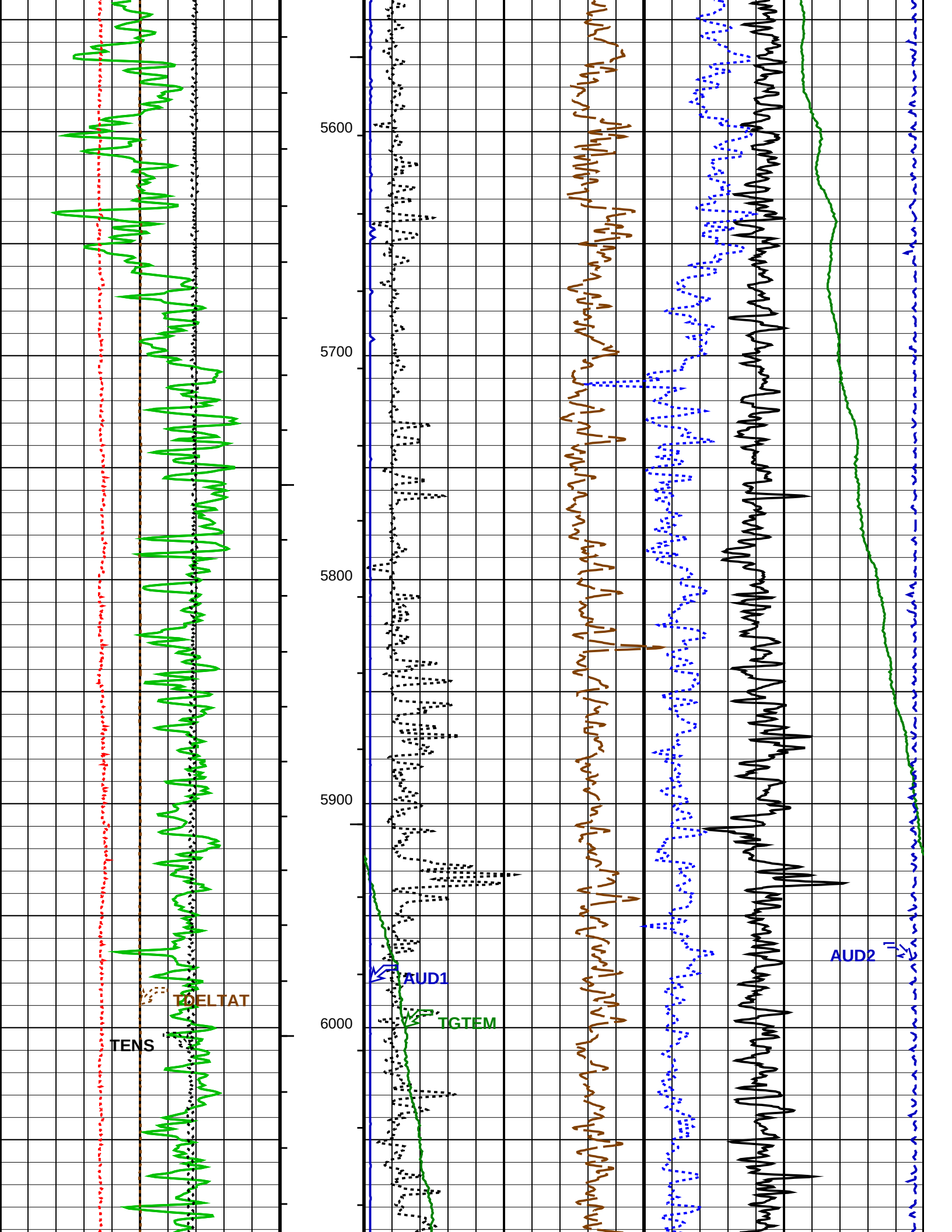
4600
4700
4800
4900


TDELTAT
TENS
HCAL
GR
5000
AUD1
TGTEM
AUD2
5100
RHOZ
PEFZ
5200
HDRA
ENPH
5300
5400
5500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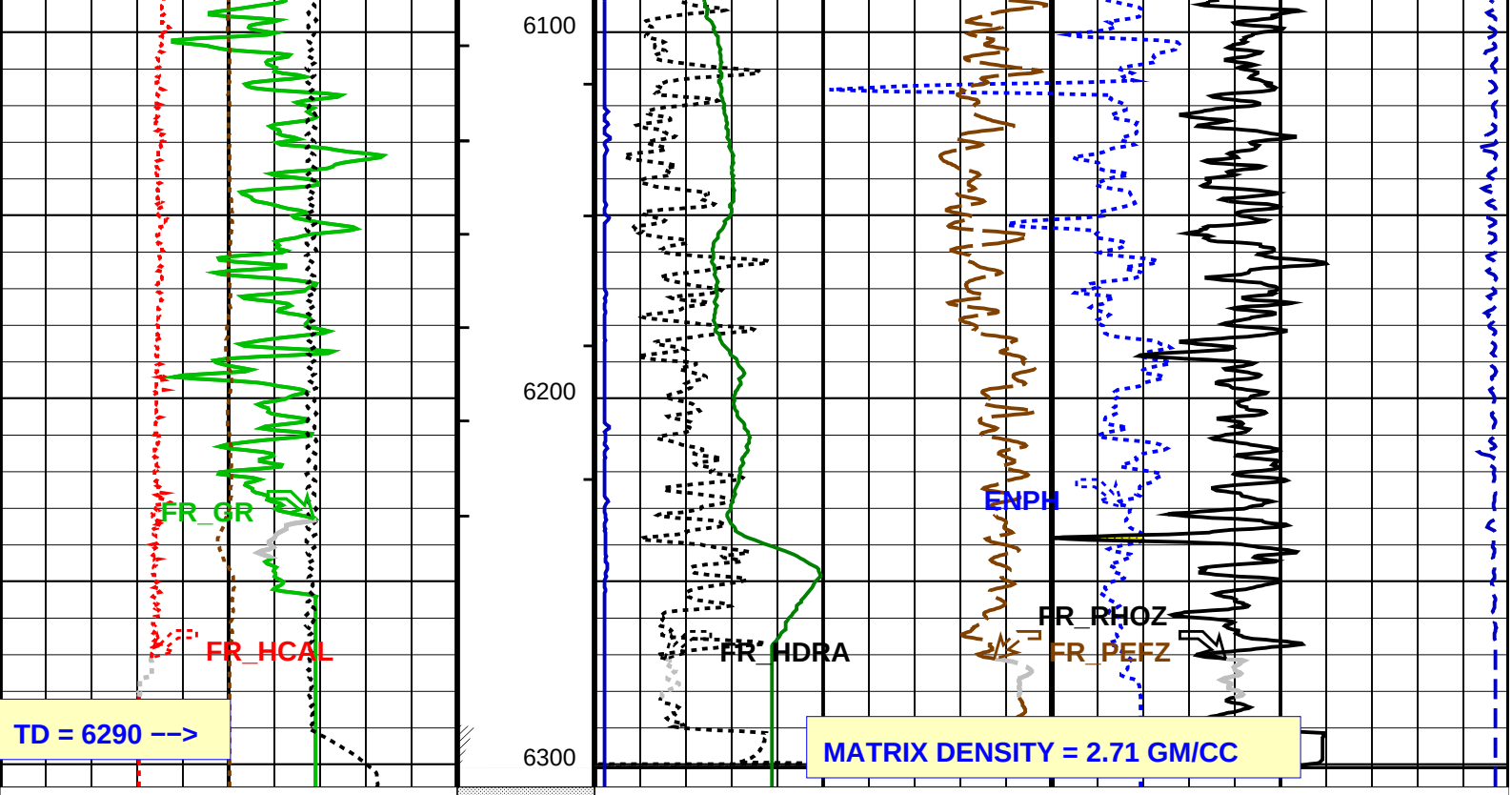
5700
5800
5900
6000
TDELTAT
TENS
AUD1
TGTEM
AUD2



Gamma Ray (GR)
0 (GAPI) 200

Cable Drag From STIA to STIT

Epithermal Neutron Porosity (ENPH)
0.3 (V/V) −0.1

HILT Caliper (HCAL)
5 (IN) 15

Tool/Tot. Drag From D3T to STIA

Density Correction (HDRA)
−0.05 (G/C3) 0.45

MAIN PASS

Tension (TENS)
10000 (LBF) 0

Std. Res. Formation Pe (PEFZ)
0 (−−−−) 10

GR > 200
From LHT1 to GR1

Std. Res. Formation Density (RHOZ)
2 (G/C3) 3

TMT Differential Gas Temperature (TDELTAT)
−1 (DC/K) 1

Gas Temperature (TGTEM)
80 (DEGF) 90

TMT Upper Audio (AUD1)
0 (MV) 500

TMT Lower Audio (AUD2)
500 (MV) 0

GAS EFFECT
From RHOZ to ENPH

PIP SUMMARY

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

Parameters

DLIS Name	Description	Value
	HILTB−DTB: High resolution Integrated Logging Tool−CTS	
BHS	Borehole Status	OPEN
DHC	Density Hole Correction	BS

GCSE	Generalized Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
NAAC	HRDD APS Activation Correction	OFF	
NMT	HILT Nuclear Mud Type	NOBARITE	
NPRM	HRDD Processing Mode	HiRes	
NSAR	HRDD Depth Sampling Rate	1	IN
	CNT−G: Compensated Neutron − G		
BHFL	Borehole Fluid Type	AIR	
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
	TMT−AB: Temperature Manometer Tool		
TMPTST	TMT Pressure Transducer Selection	10_K	
TMT_ATC	TMT Auto Calibration	ALLOWED	
TTDCI	TMT Temperature Differential Interval	1	FT
	SGT−L: Scintillation Gamma−Ray − L		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
	HOLEV: Integrated Hole/Cement Volume		
BHS	Borehole Status	OPEN	
FCD	Future Casing (Outer) Diameter	4.5	IN
GCSE	Generalized Caliper Selection	HCAL	
HVCS	Integrated Hole Volume Caliper Selection	LCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
	STI: Stuck Tool Indicator		
LBFR	Trigger for MAXIS First Reading Label	STI	
STKT	STI Stuck Threshold	1.25	FT
TDD	Total Depth − Driller	6258.00	FT
TDL	Total Depth − Logger	6258.00	FT
	PERT: Preliminary Evaluation − Real Time		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
	System and Miscellaneous		
BS	Bit Size	8.625	IN
DFD	Drilling Fluid Density	0.00	LB/G
TD	Total Depth	6258	FT

Format: DENSITY_2 Vertical Scale: 2" per 100' Graphics File Created: 03−Jul−2003 18:56

OP System Version: 10C0−306

MCM

HILTB−DTB	OP10−KP1	CNT−G	10C0−306
TMT−AB	10C0−306	SGT−L	10C0−306
TCC−B	10C0−306		

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_008LUP	FN:11	PRODUCER	03−Jul−2003 18:56

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_008LUP	FN:11	PRODUCER	03−Jul−2003 18:56

OP System Version: 10C0−306

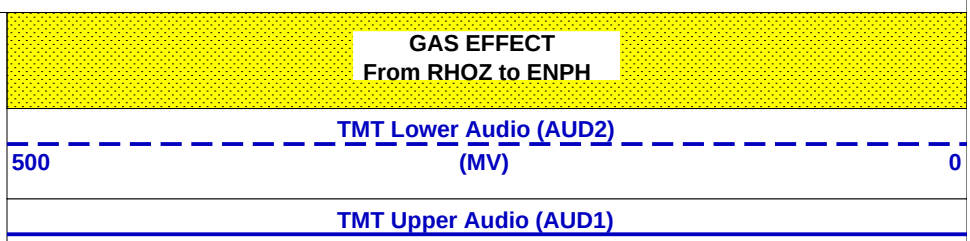
MCM

HILTB−DTB	OP10−KP1	CNT−G	10C0−306
TMT−AB	10C0−306	SGT−L	10C0−306
TCC−B	10C0−306		

PIP SUMMARY

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

Time Mark Every 60 S



0 (MV) 500

TMT Differential Gas Temperature (TDELTAT)
−1 (DC/K) 1

Gas Temperature (TGTEM)
80 (DEGF) 90

GR > 200
From LHT1 to GR1

Std. Res. Formation Density (RHOZ)
2 (G/C3) 3

Tension (TENS)
10000 (LBF) 0

Std. Res. Formation Pe (PEFZ)
0 (−−−−) 10

HILT Caliper (HCAL)
5 (IN) 15

Tool/Tot. Drag From D3T to STIA

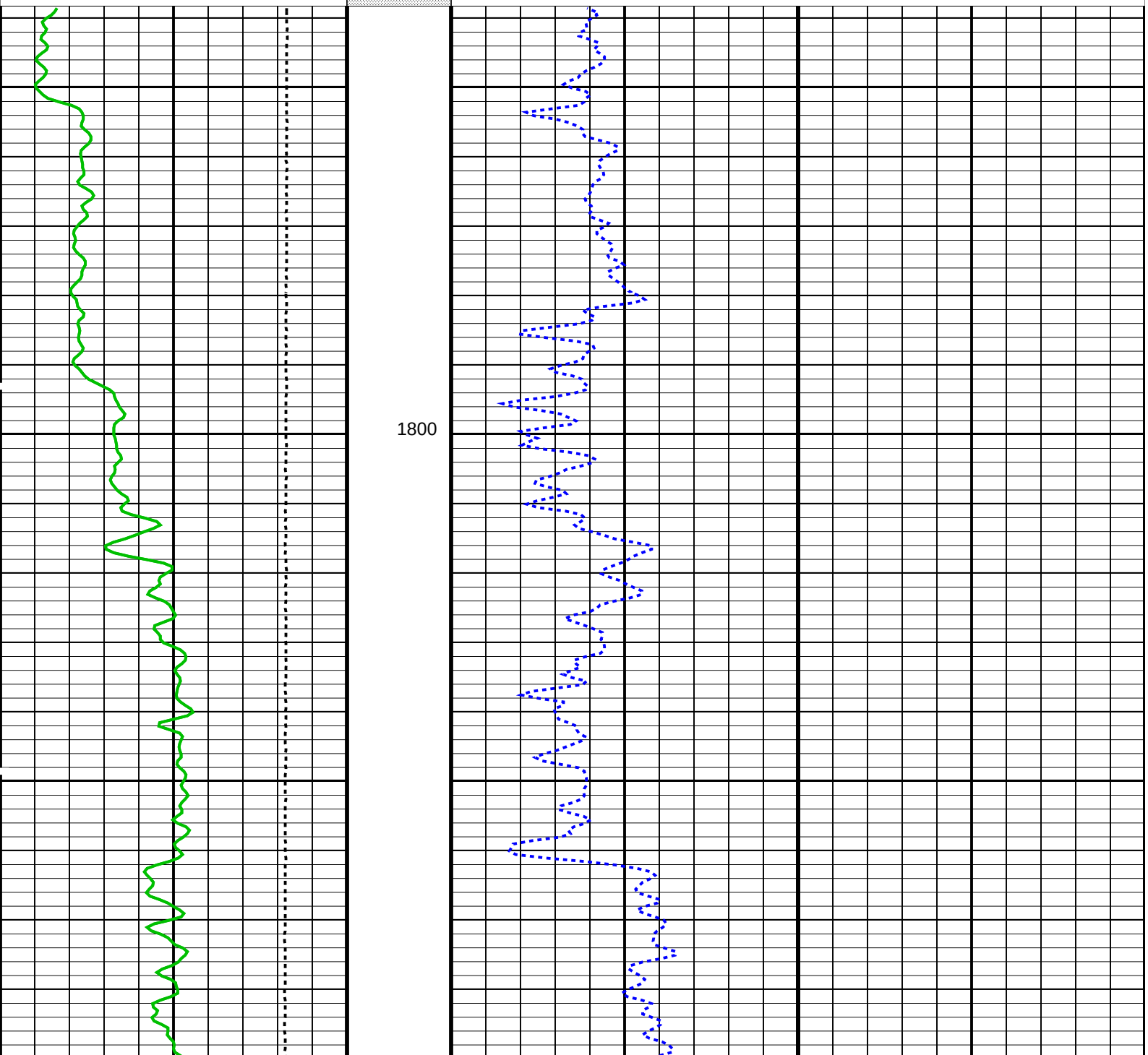
Density Correction (HDRA)
−0.05 (G/C3) 0.45

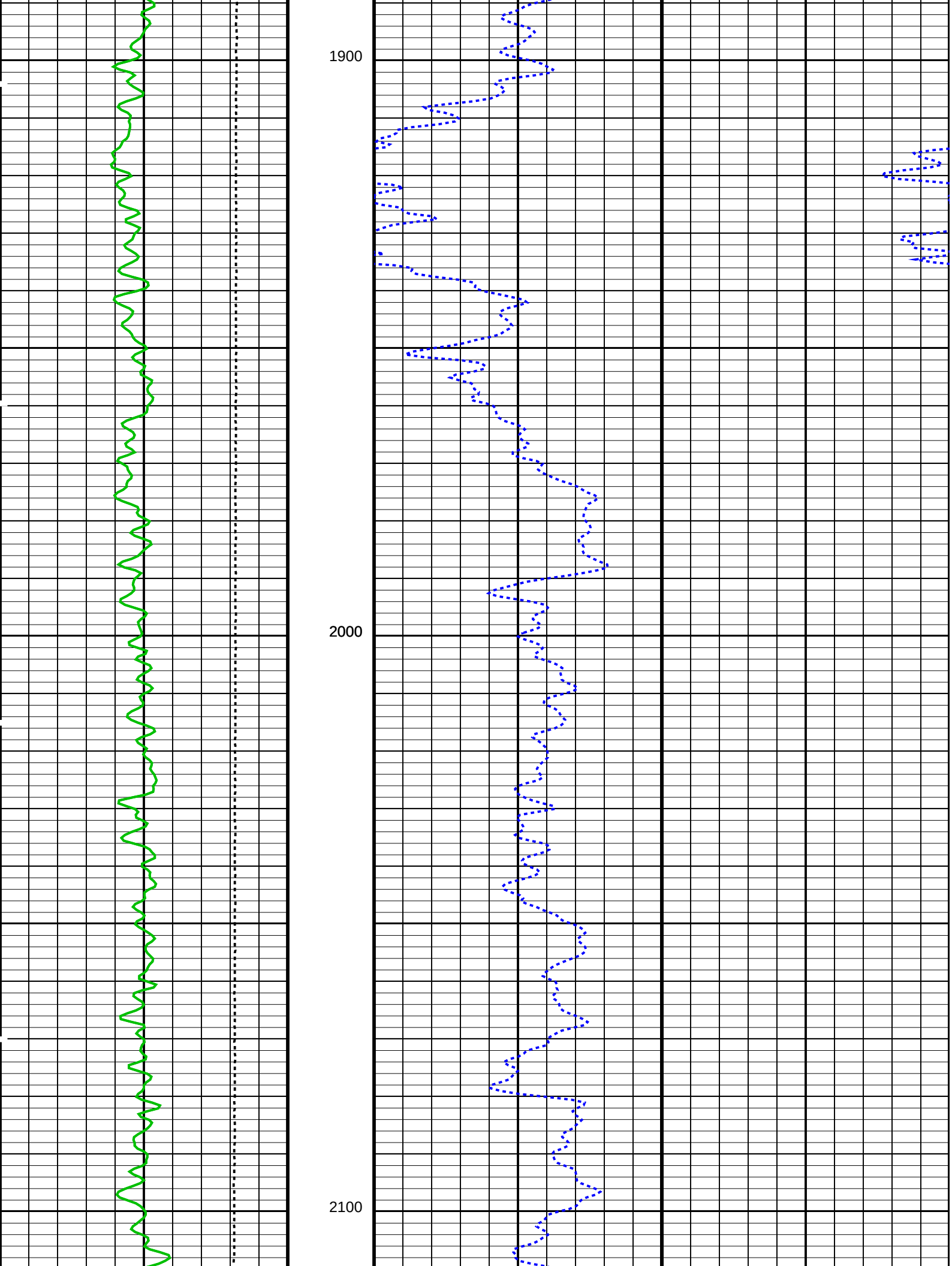
MAIN PASS

Gamma Ray (GR)
0 (GAPI) 200

Cable Drag From STIA to STIT

Epithermal Neutron Porosity (ENPH)
0.3 (V/V) −0.1

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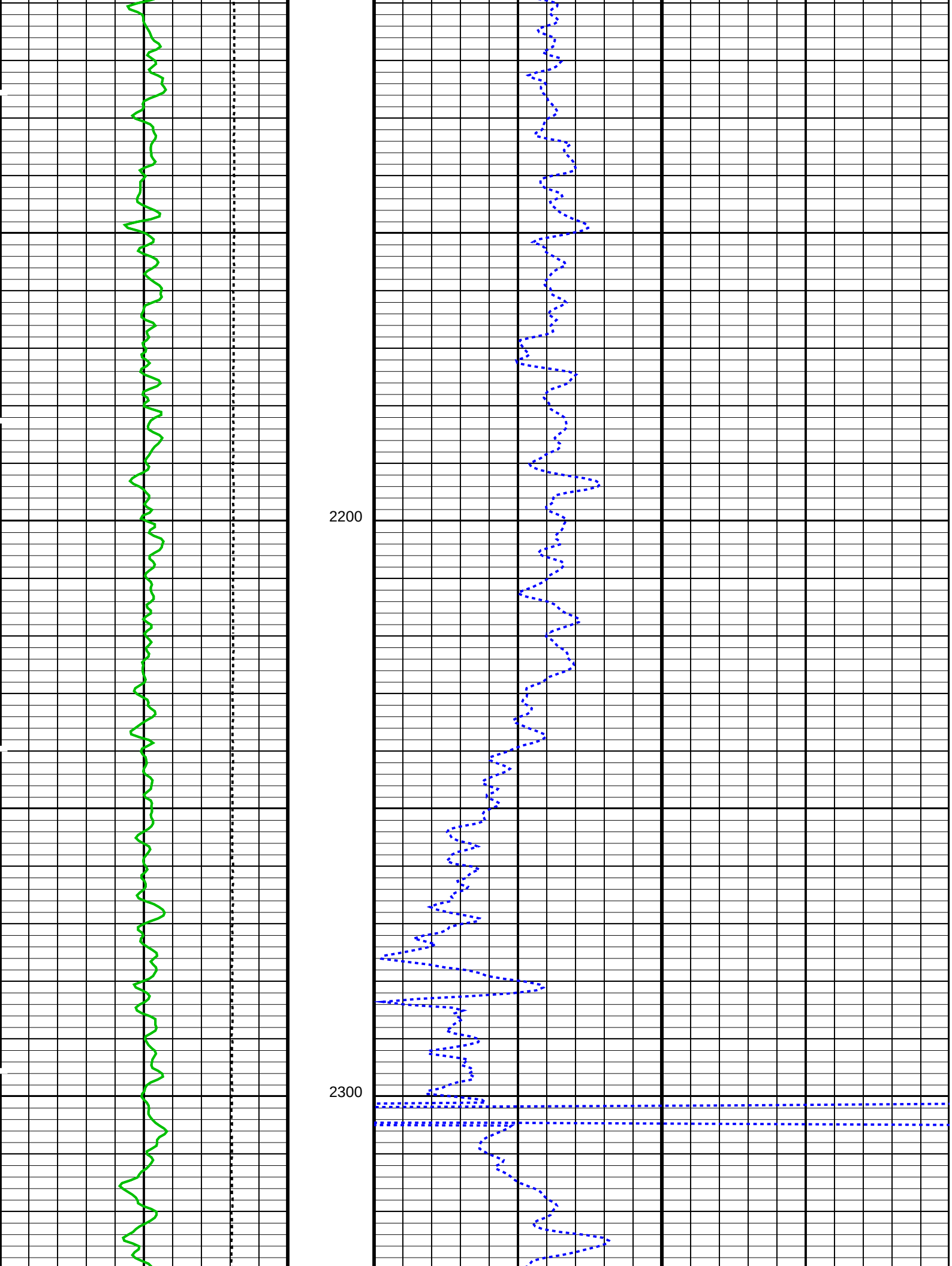
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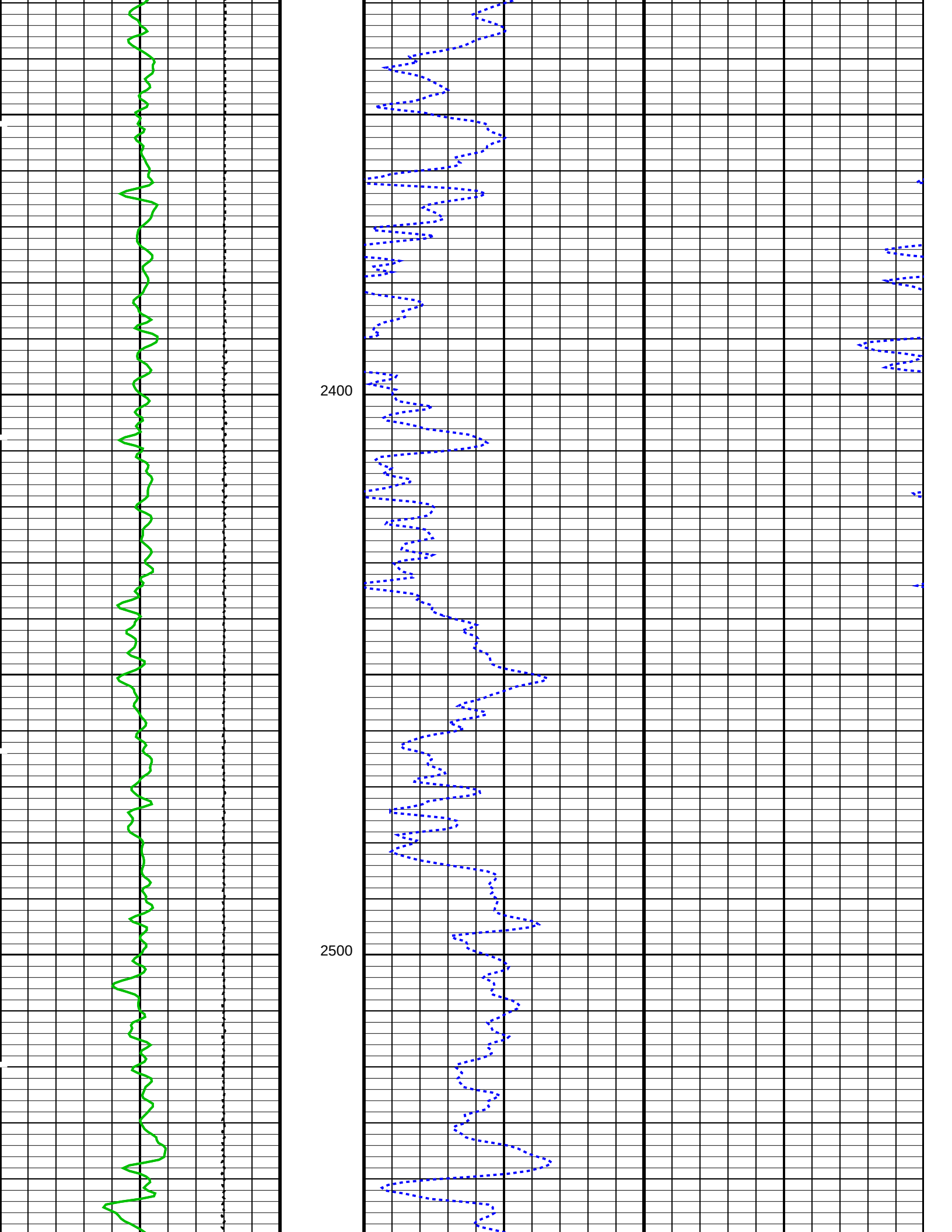
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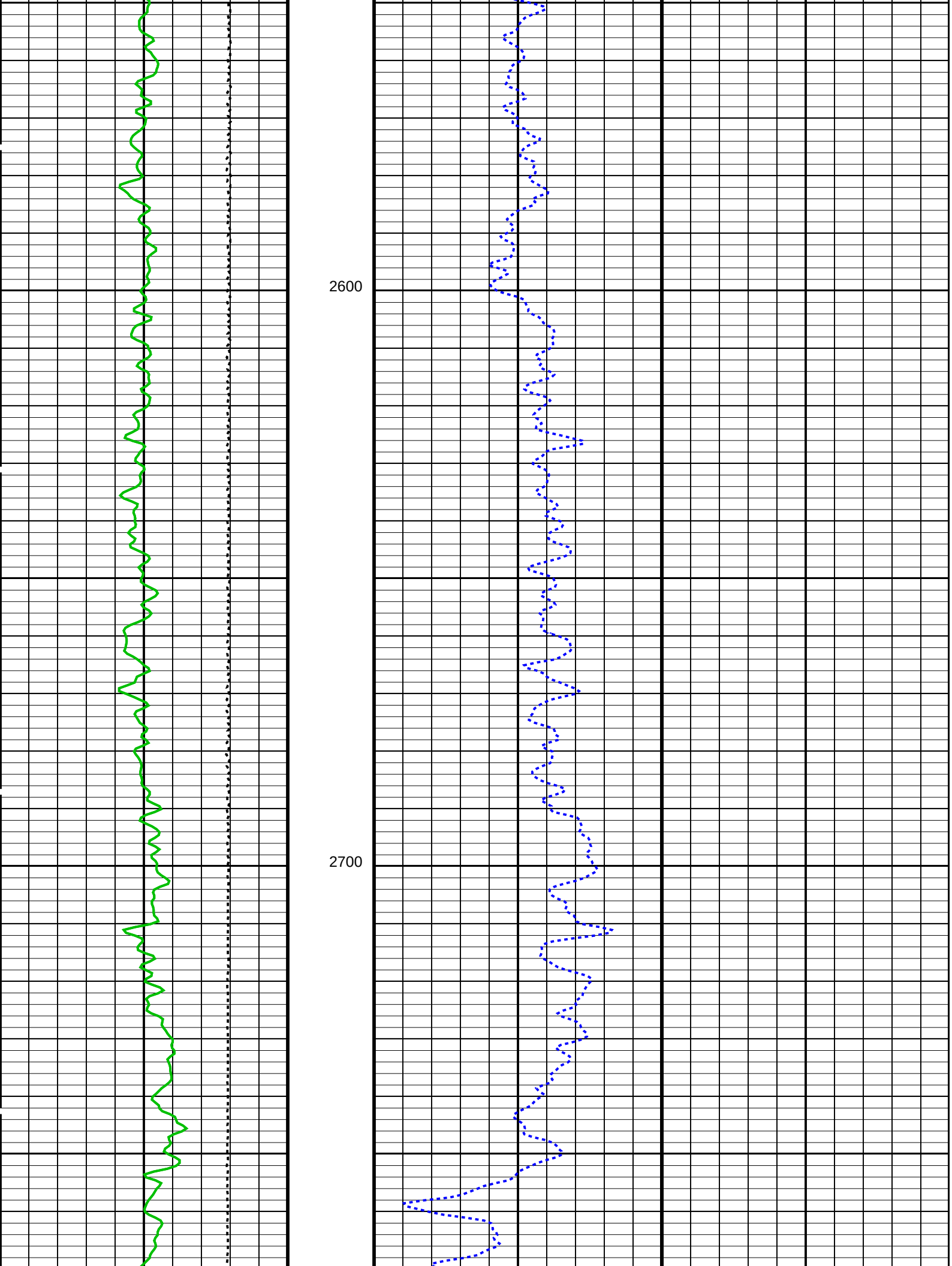
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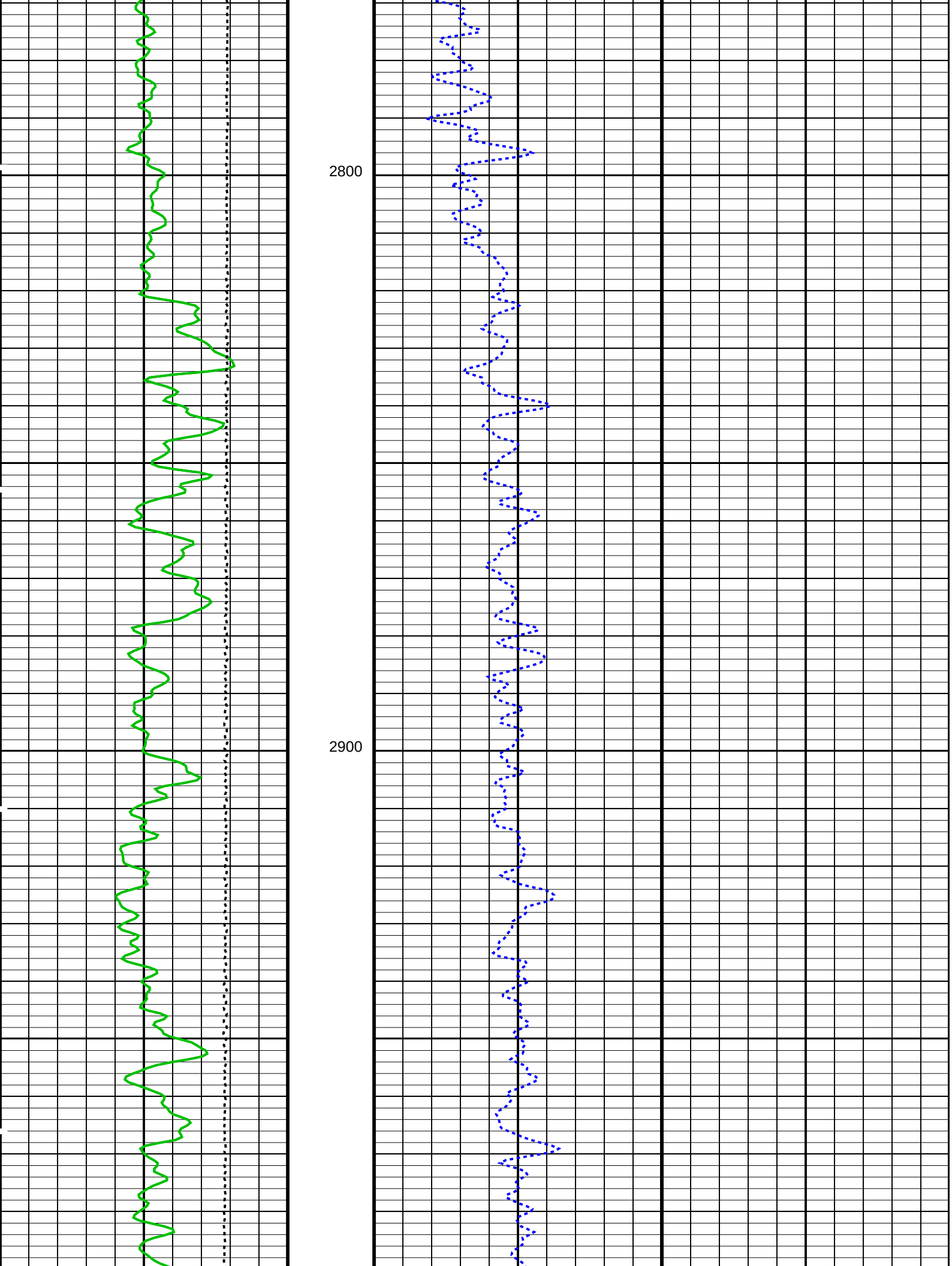
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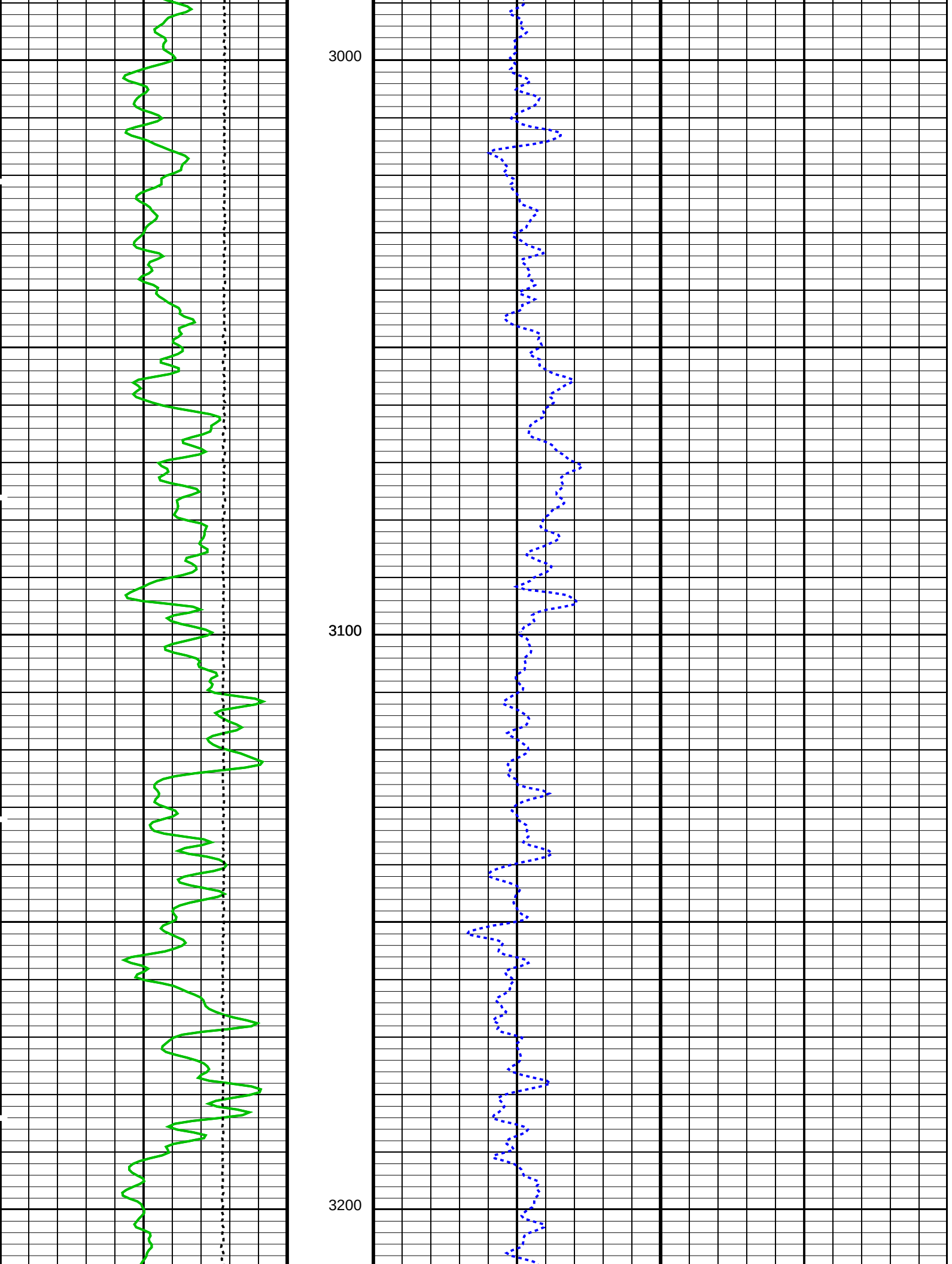
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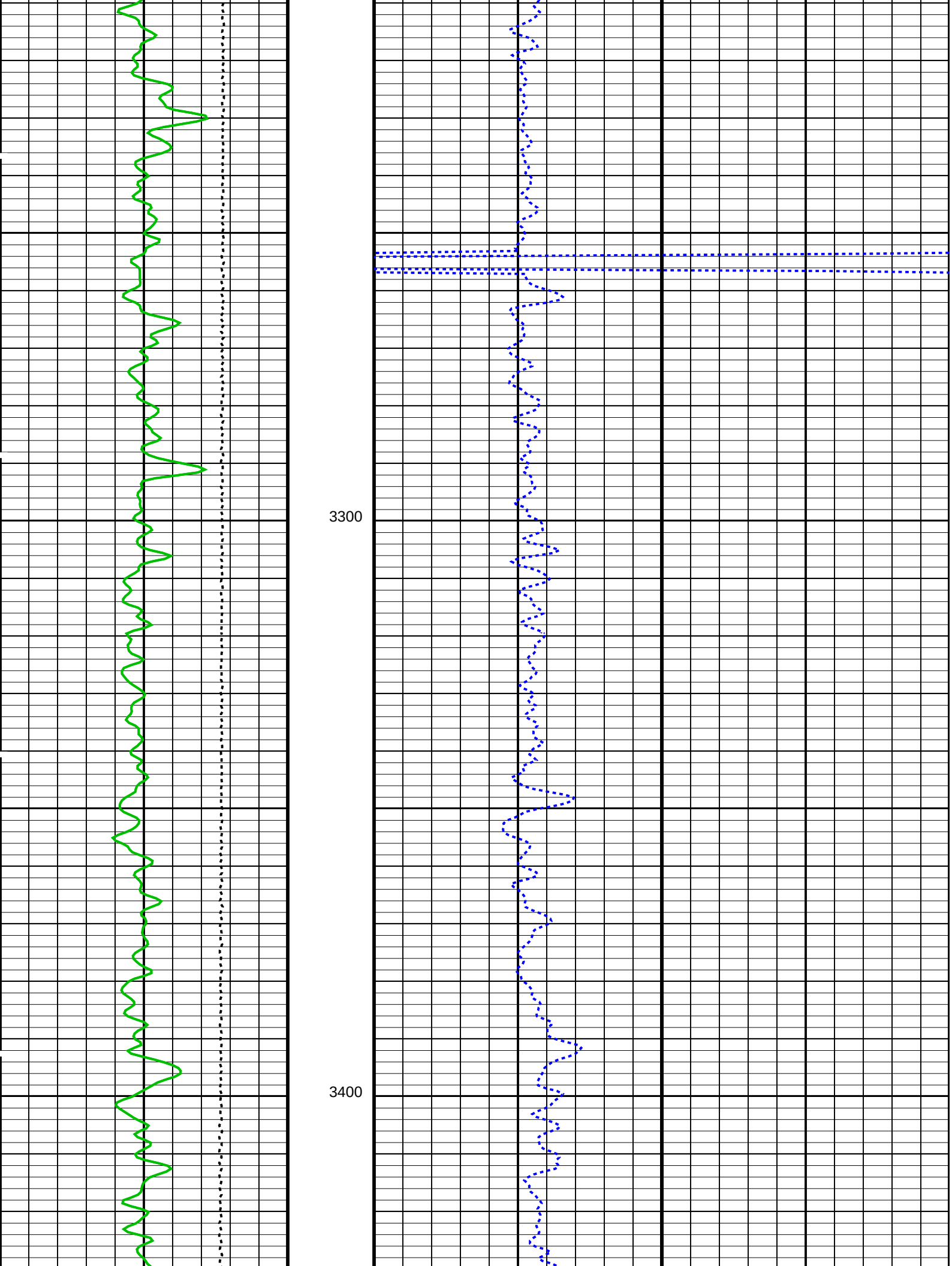
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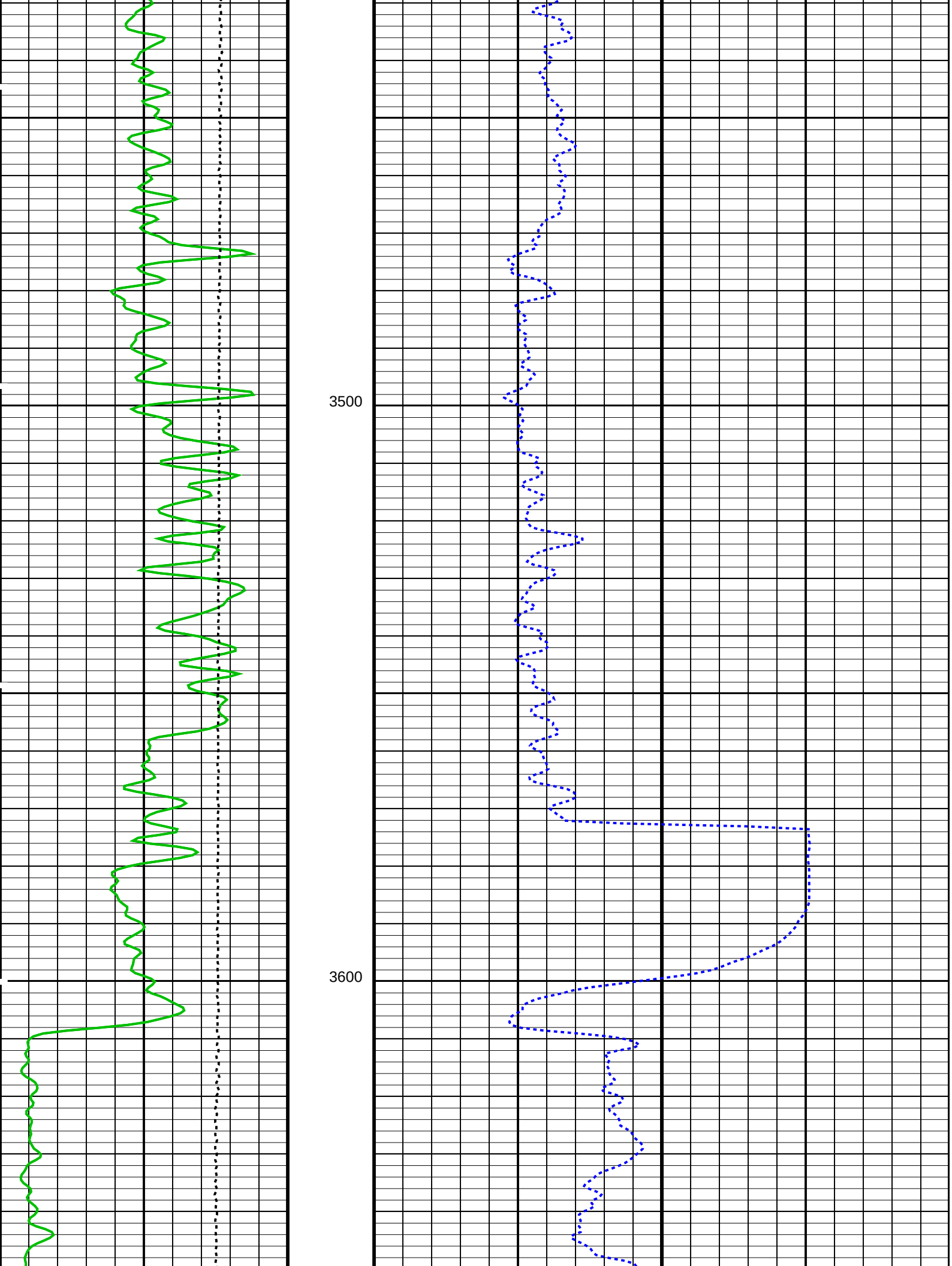
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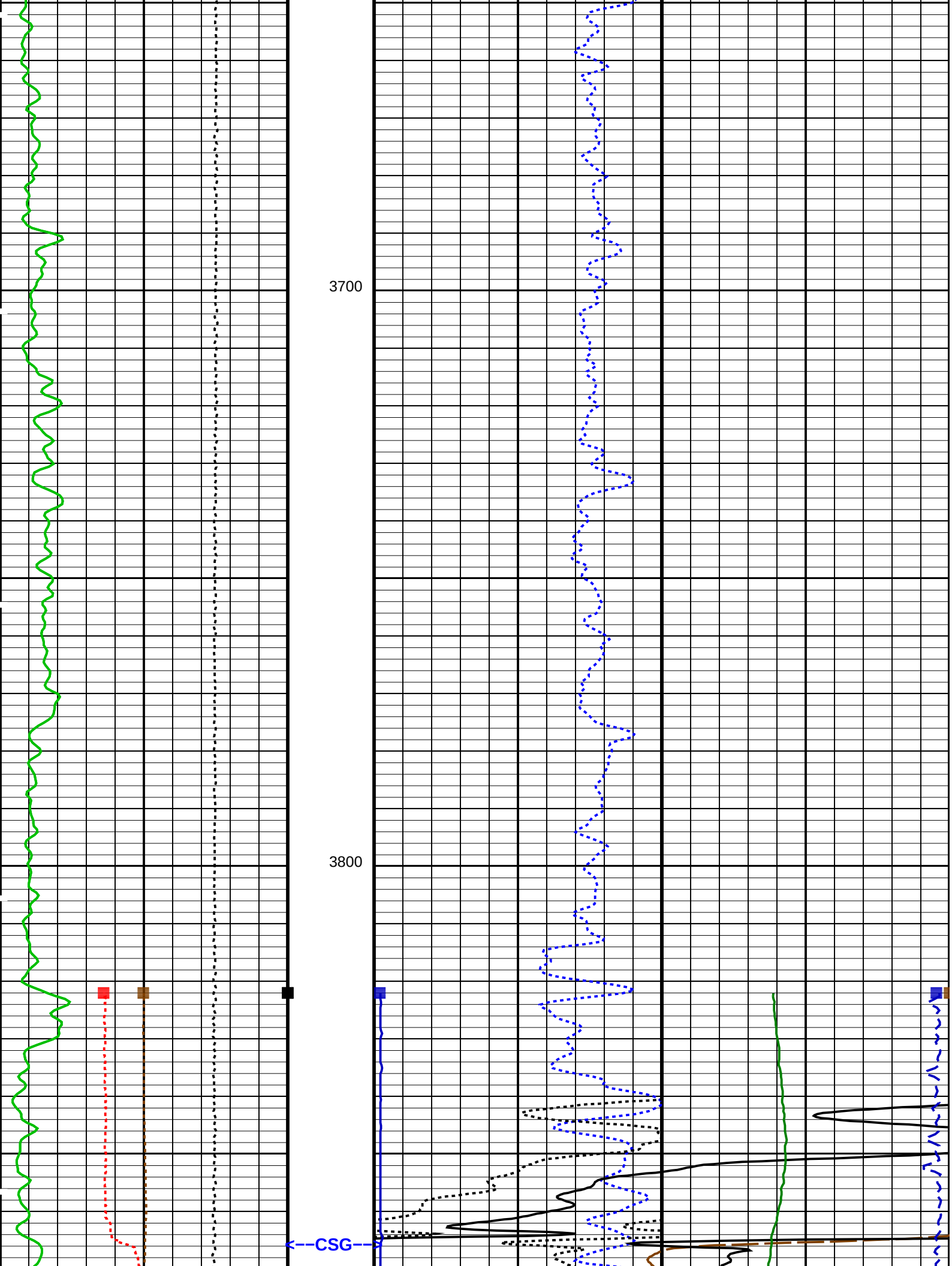
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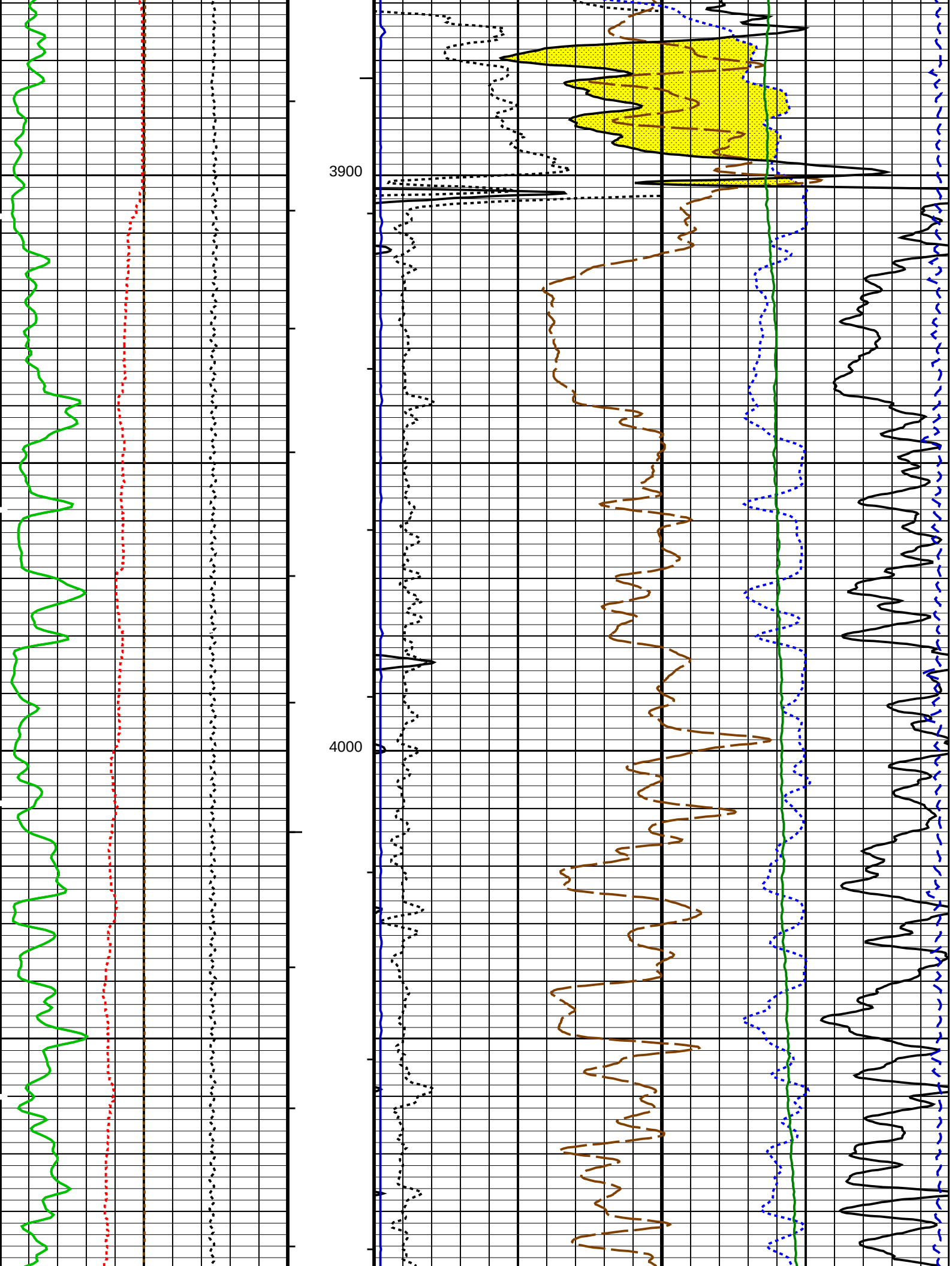
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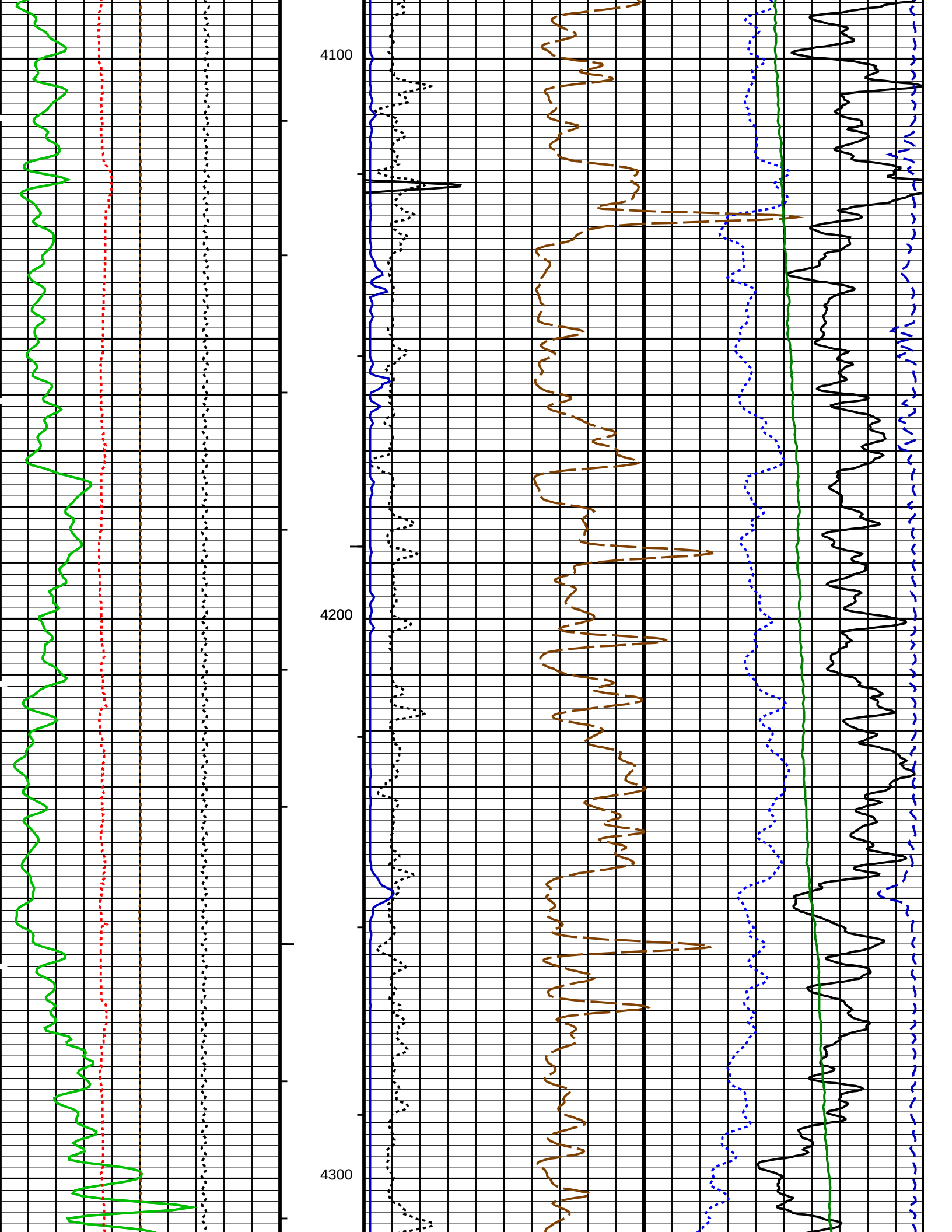
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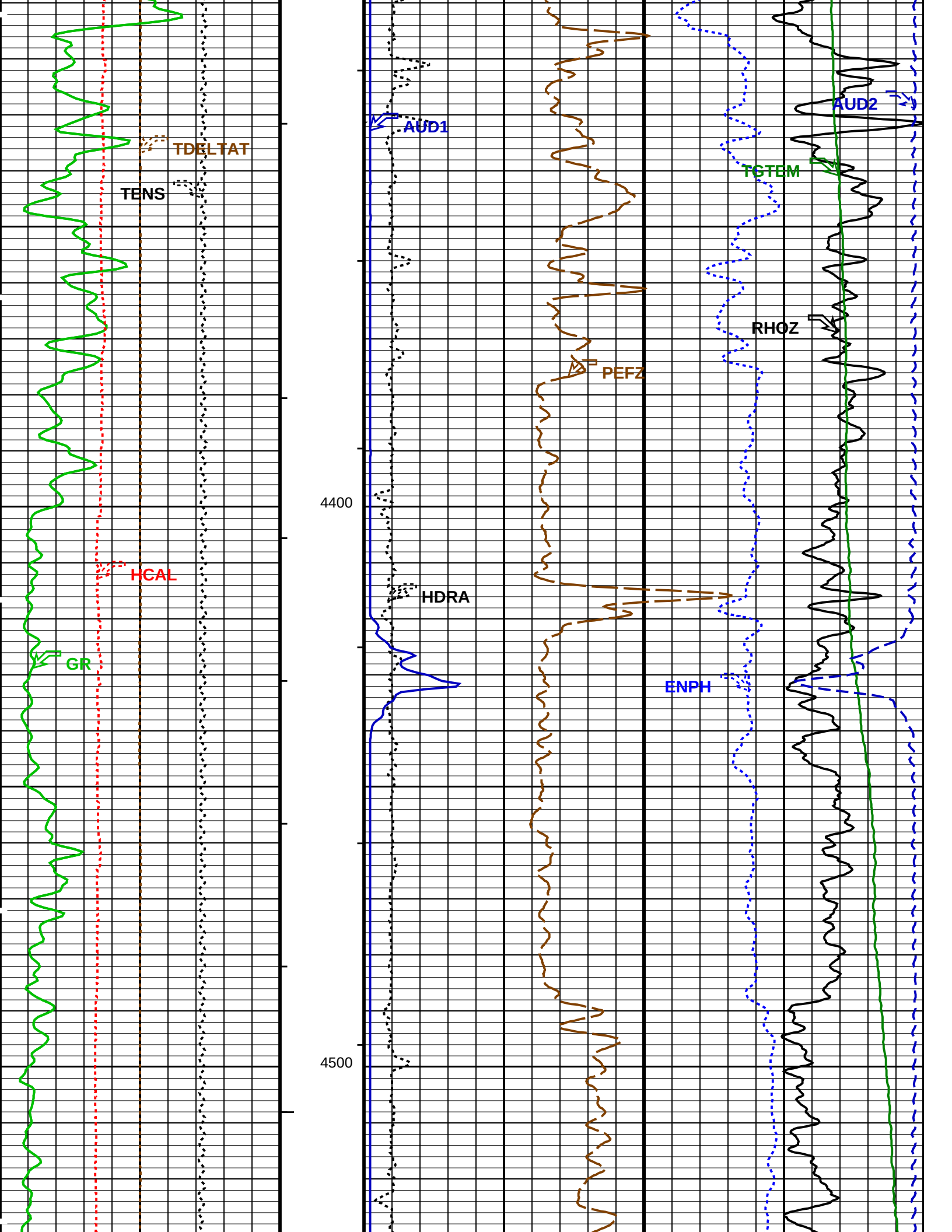
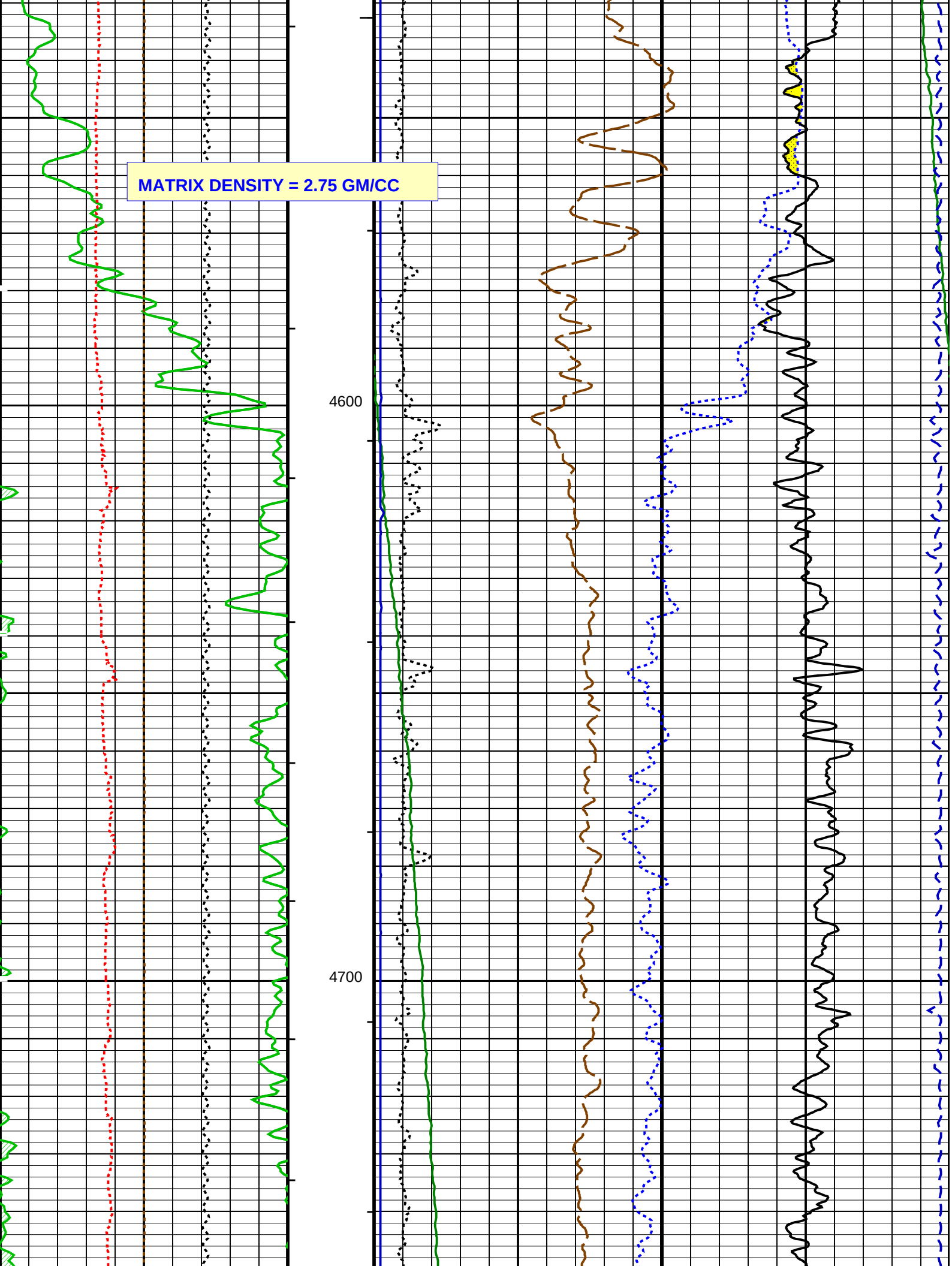

TDELTAT
TENS
HCAL
GR
AUD1
HDRA
4400
4500
PEFZ
AUD2
TGTEM
RHOZ
ENPH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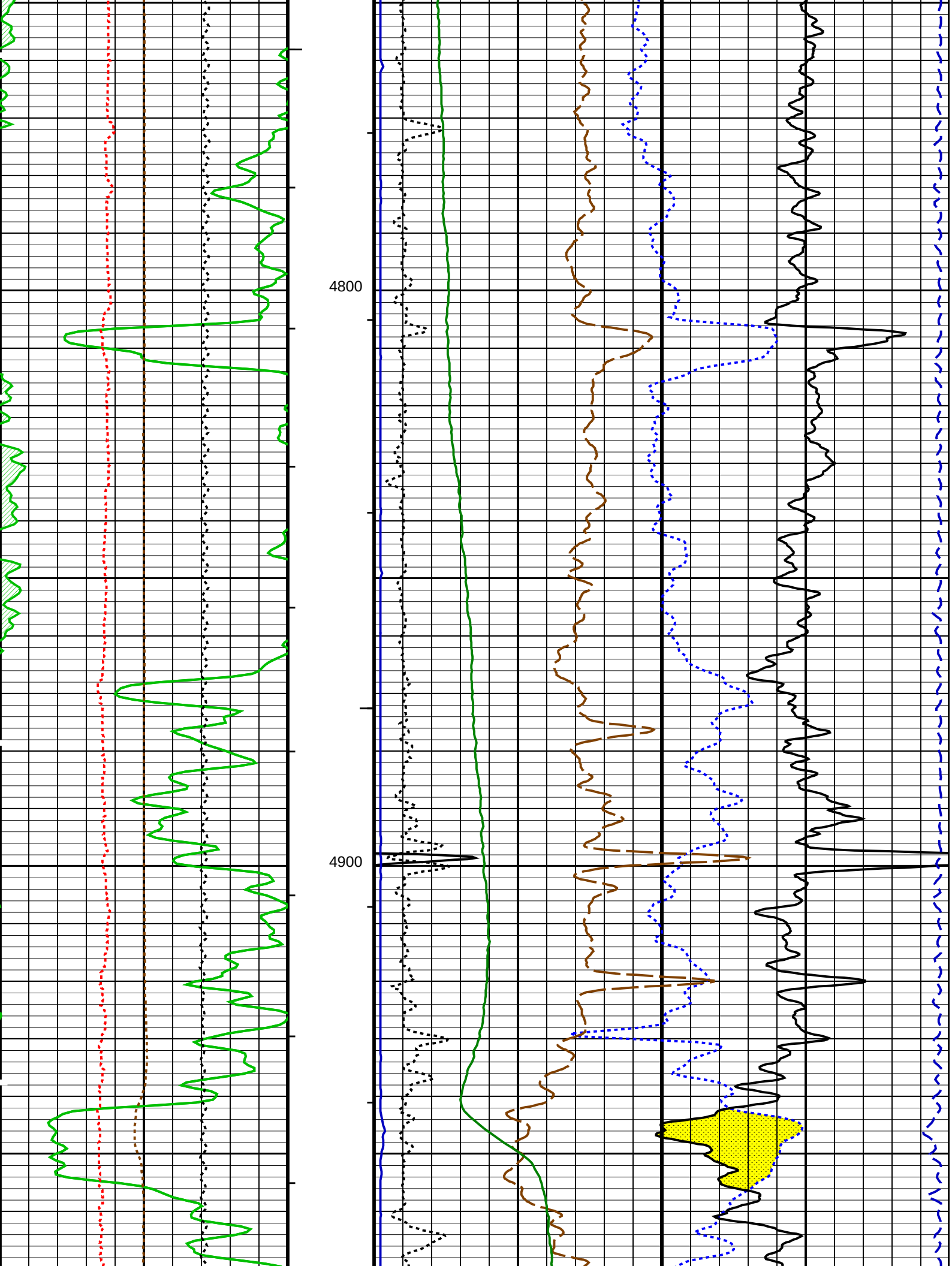
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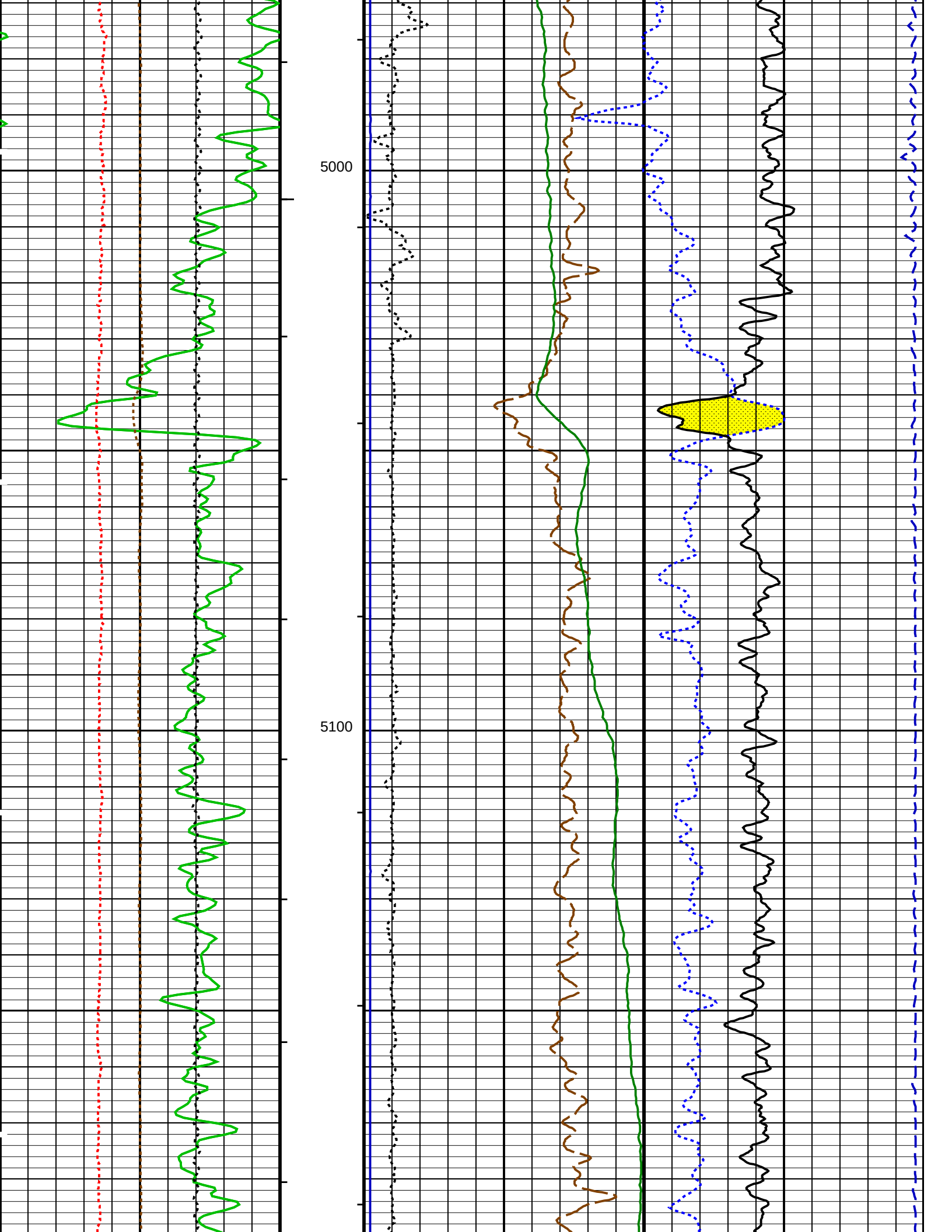
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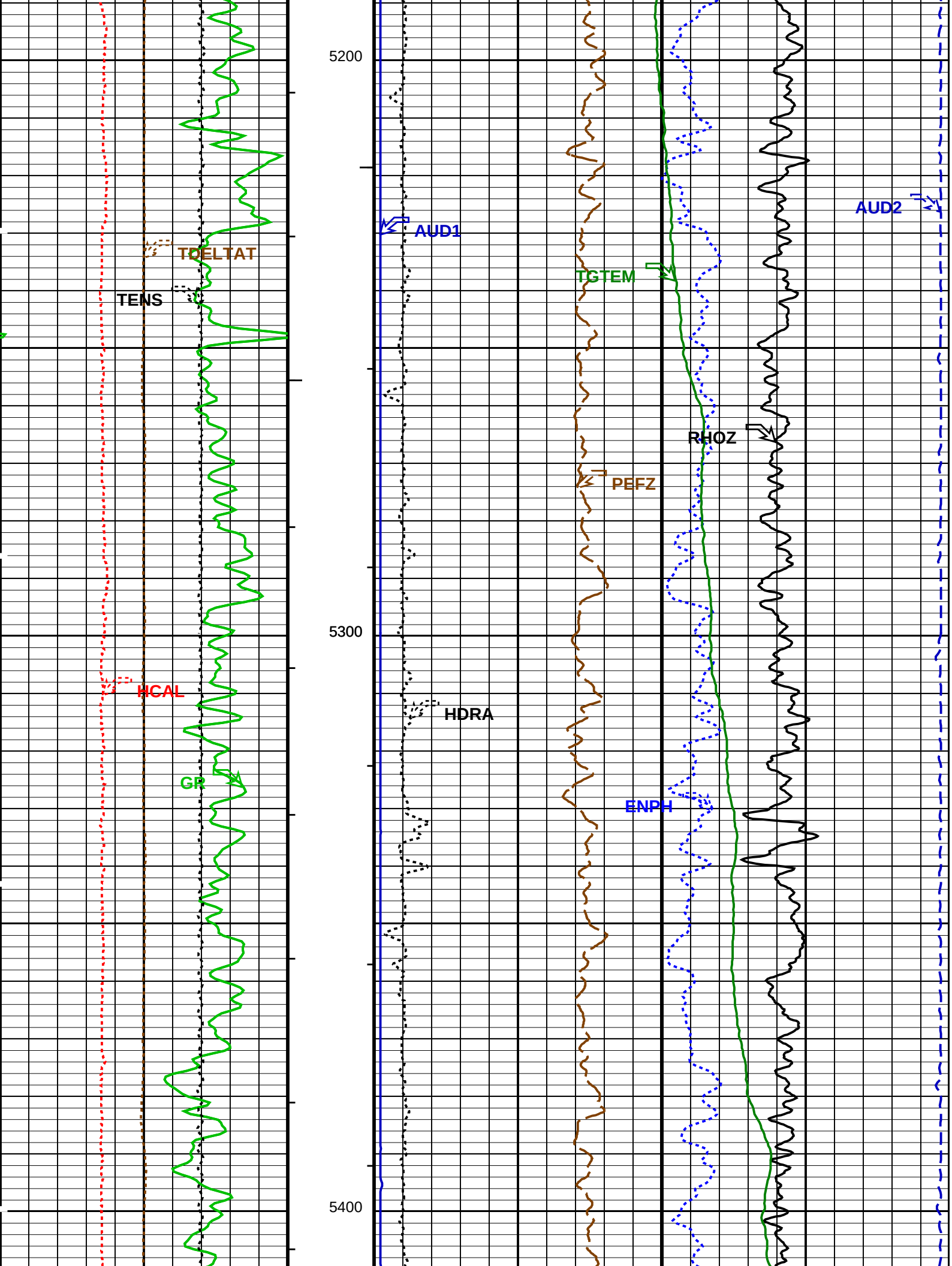
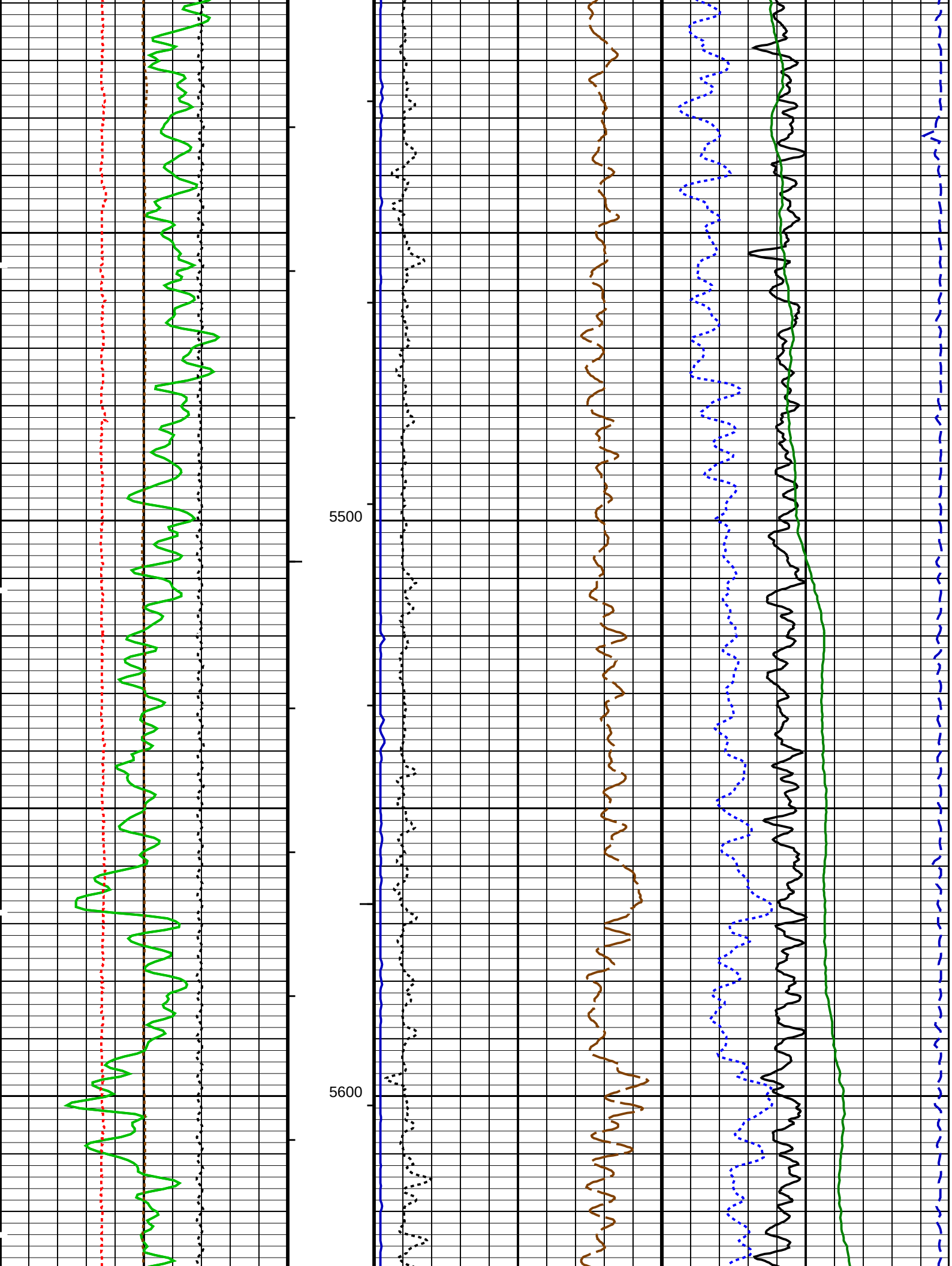

5200
5300
5400
AUD1
AUD2
TDELTAT
TENS
TGTEM
RHOZ
PEFZ
HCAL
HDRA
GR
ENPH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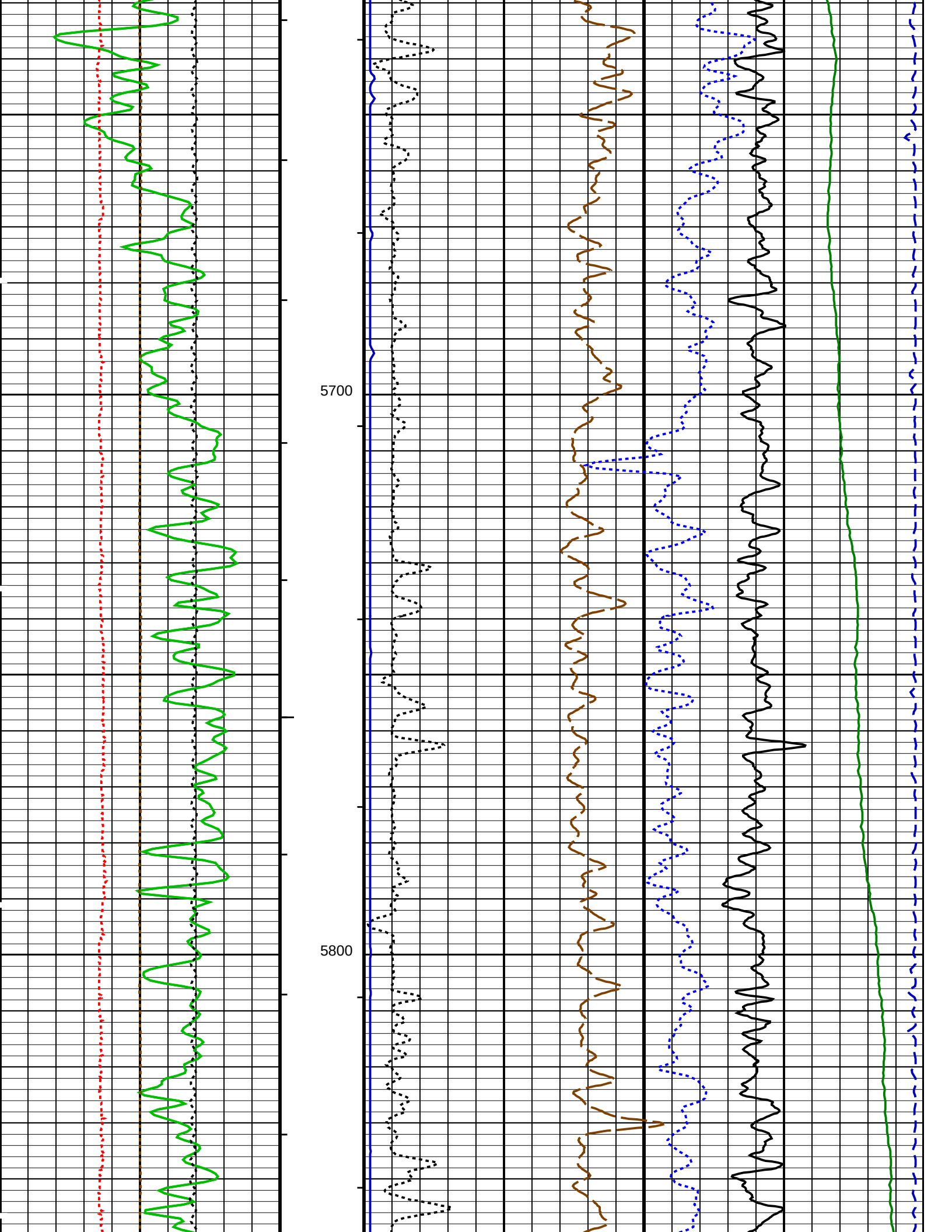
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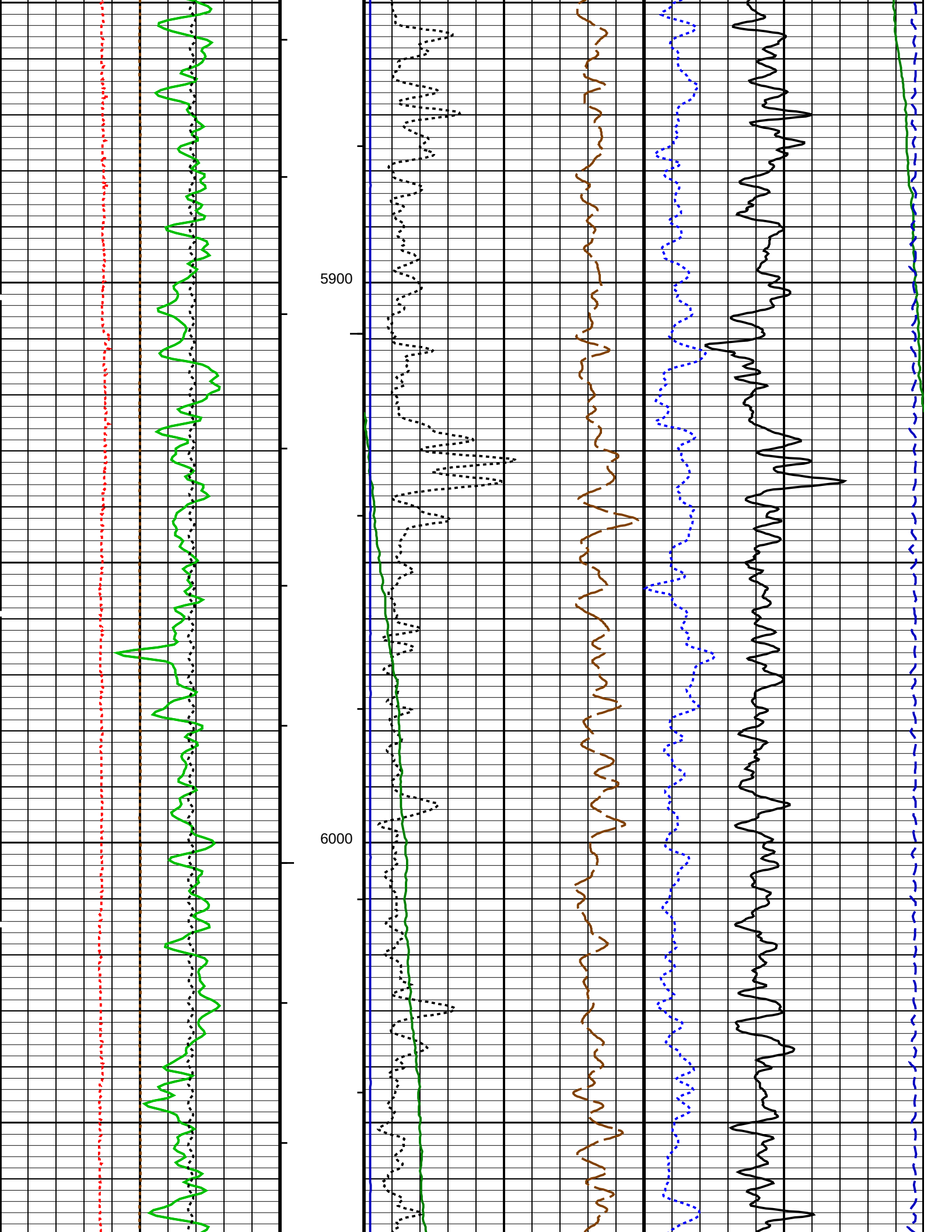
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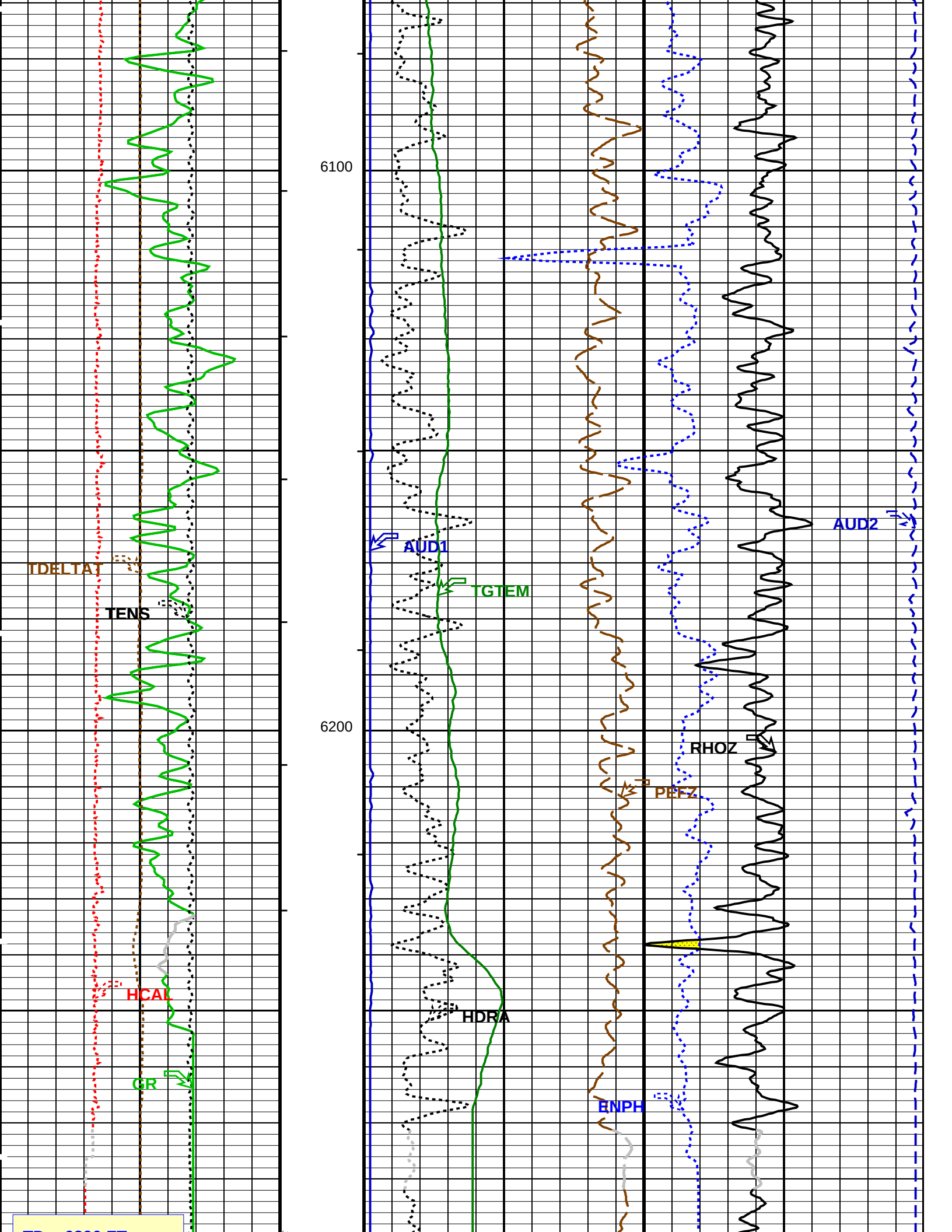
6000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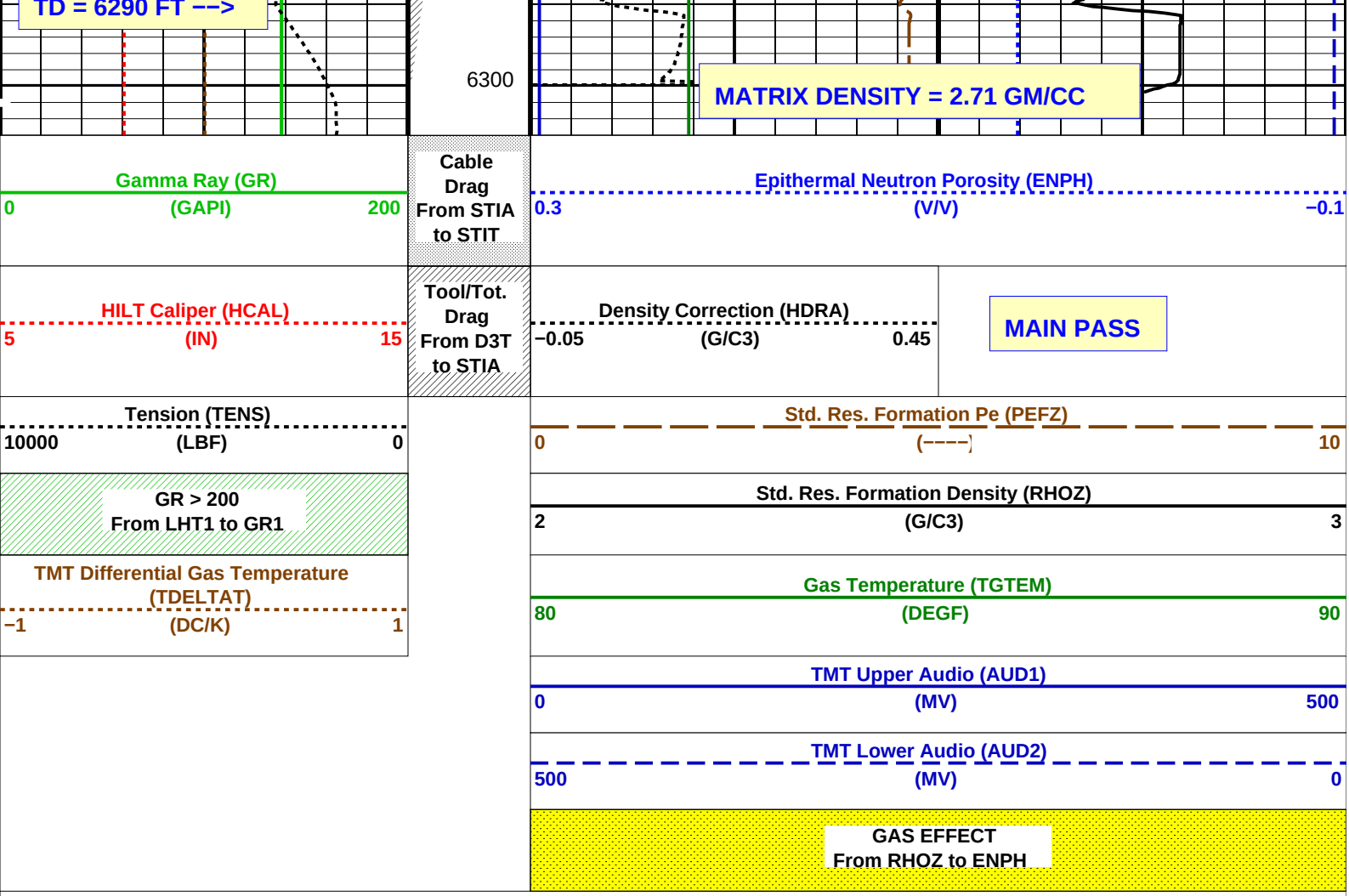
6200
TDELTAT
TENS
HCAL
GR
AUD1
TGTEM
HDRA
AUD2
RHOZ
PEFZ
ENPH



Parameters

DLIS Name	Description	Value	
	HILTB−DTB: High resolution Integrated Logging Tool−CTS		
BHS	Borehole Status	OPEN	
DHC	Density Hole Correction	BS	
GCSE	Generalized Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
NAAC	HRDD APS Activation Correction	OFF	
NMT	HILT Nuclear Mud Type	NOBARITE	
NPRM	HRDD Processing Mode	HiRes	
NSAR	HRDD Depth Sampling Rate	1	IN
	CNT−G: Compensated Neutron − G		
BHFL	Borehole Fluid Type	AIR	
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
	TMT−AB: Temperature Manometer Tool		
TMPTST	TMT Pressure Transducer Selection	10_K	
TMT_ATC	TMT Auto Calibration	ALLOWED	
TTDCI	TMT Temperature Differential Interval	1	FT
	SGT−L: Scintillation Gamma−Ray − L		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
	HOLEV: Integrated Hole/Cement Volume		
BHS	Borehole Status	OPEN	
FCD	Future Casing (Outer) Diameter	4.5	IN
GCSE	Generalized Caliper Selection	HCAL	
HVCS	Integrated Hole Volume Caliper Selection	LCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
	STI: Stuck Tool Indicator		

LBFR	Trigger for MAXIS First Reading Label	STI	
STKT	STI Stuck Threshold	1.25	FT
TDD	Total Depth − Driller	6258.00	FT
TDL	Total Depth − Logger	6258.00	FT
	PERT: Preliminary Evaluation − Real Time		
BHS	Borehole Status	OPEN	
GCSE	Generalized Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
	System and Miscellaneous		
BS	Bit Size	8.625	IN
DFD	Drilling Fluid Density	0.00	LB/G
TD	Total Depth	6258	FT

Format: DENSITY_5 Vertical Scale: 5" per 100' Graphics File Created: 03−Jul−2003 18:56

OP System Version: 10C0−306

MCM

HILTB−DTB	OP10−KP1	CNT−G	10C0−306
TMT−AB	10C0−306	SGT−L	10C0−306
TCC−B	10C0−306		

Output DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_008LUP FN:11 PRODUCER 03−Jul−2003 18:56

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
High resolution Integrated Logging Tool−CTS Wellsite Calibration − Electronics Calibration Check − Thru Cal Mag. & Phase							
Master: Calibration out of date 14−Jan−2003 16:15 Before: 3−Jul−2003 18:05							
Thru Cal Magnitude − 0	0	0.6222	0.6295	N/A	N/A	N/A	V
Thru Cal Magnitude − 1	0	1.278	1.294	N/A	N/A	N/A	V
Thru Cal Magnitude − 2	0	0.6344	0.6423	N/A	N/A	N/A	V
Thru Cal Magnitude − 3	0	0.7161	0.7246	N/A	N/A	N/A	V
Thru Cal Magnitude − 4	0	1.343	1.359	N/A	N/A	N/A	V
Thru Cal Magnitude − 5	0	1.942	1.964	N/A	N/A	N/A	V
Thru Cal Magnitude − 6	0	1.950	1.972	N/A	N/A	N/A	V
Thru Cal Magnitude − 7	0	1.391	1.403	N/A	N/A	N/A	V
Phase − 0	0	65.90	66.94	N/A	N/A	N/A	DEG
Phase − 1	0	64.78	65.80	N/A	N/A	N/A	DEG
Phase − 2	0	61.00	61.99	N/A	N/A	N/A	DEG
Phase − 3	0	60.23	61.22	N/A	N/A	N/A	DEG
Phase − 4	0	53.86	54.81	N/A	N/A	N/A	DEG
Phase − 5	0	51.98	52.89	N/A	N/A	N/A	DEG
Phase − 6	0	51.94	52.85	N/A	N/A	N/A	DEG
Phase − 7	0	48.12	48.73	N/A	N/A	N/A	DEG
High resolution Integrated Logging Tool−CTS Wellsite Calibration − Electronics Calibration Check − Auxilliary							
Master: Calibration out of date 14−Jan−2003 16:15 Before: 3−Jul−2003 18:05							
Array Induction SPA Plus	990.5	995.7	995.1	N/A	N/A	N/A	MV
Array Induction SPA Zero	0	−0.3430	−0.3533	N/A	N/A	N/A	MV
Array Induction Temperature Pl	0.9150	0.9224	0.9219	N/A	N/A	N/A	V
Array Induction Temperature Ze	0	−0.0003400	−0.0003509	N/A	N/A	N/A	V
High resolution Integrated Logging Tool−CTS Wellsite Calibration − Test Loop Gain Correction							
Master: Calibration out of date 14−Jan−2003 16:15							
Test Loop Gain Magnitude − 0	0	1.015	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 1	0	1.021	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 2	0	1.016	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 3	0	1.014	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 4	0	0.9955	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 5	0	0.9839	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 6	0	0.9947	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 7	0	1.004	N/A	N/A	N/A	N/A	V
Phase − 0	0	0.4311	N/A	N/A	N/A	N/A	DEG
Phase − 1	0	0.3746	N/A	N/A	N/A	N/A	DEG
Phase − 2	0	−0.08173	N/A	N/A	N/A	N/A	DEG
Phase − 3	0	−0.05669	N/A	N/A	N/A	N/A	DEG
Phase − 4	0	0.09994	N/A	N/A	N/A	N/A	DEG
Phase − 5	0	−0.1026	N/A	N/A	N/A	N/A	DEG
Phase − 6	0	0.3512	N/A	N/A	N/A	N/A	DEG
Phase − 7	0	0.08647	N/A	N/A	N/A	N/A	DEG
High resolution Integrated Logging Tool−CTS Wellsite Calibration − Sonde Error Correction							

Master: Calibration out of date 14−Jan−2003 16:15

R Sonde Error Correction − 0	0	−62.62	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 1	0	156.0	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 2	0	116.0	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 3	0	57.25	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 4	0	26.78	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 5	0	13.13	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 6	0	9.567	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 7	0	−0.6655	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 0	0	−140.9	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 1	0	165.2	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 2	0	−78.69	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 3	0	−94.79	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 4	0	0.2783	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 5	0	−2.716	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 6	0	−2.277	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 7	0	4.946	N/A	N/A	N/A	N/A	MM/M

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Mud Gain Correction

Master: Calibration out of date 14−Jan−2003 16:15

Coarse − Mag, Real, Imag − 0	0	0.9495	N/A	N/A	N/A	N/A	
Coarse − Mag, Real, Imag − 1	0	0.9495	N/A	N/A	N/A	N/A	
Coarse − Mag, Real, Imag − 2	0	0.9495	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 0	0	0.9447	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 1	0	0.9447	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 2	0	0.9447	N/A	N/A	N/A	N/A	

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Stab Measurement Summary

Before: 26−Jun−2003 12:52

BS Window Ratio	0.7478	N/A	0.7502	N/A	N/A	N/A	
BS Window Sum	12160	N/A	12170	N/A	N/A	N/A	CPS
SS Window Ratio	0.4866	N/A	0.4872	N/A	N/A	N/A	
SS Window Sum	11930	N/A	11930	N/A	N/A	N/A	CPS
LS Window Ratio	0.2942	N/A	0.2935	N/A	N/A	N/A	
LS Window Sum	1312	N/A	1307	N/A	N/A	N/A	CPS

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Photo−multiplier High Voltages Calibrations

Before: 26−Jun−2003 12:52

BS PM High Voltage (Command)	1516	N/A	1510	N/A	N/A	N/A	V
SS PM High Voltage (Command)	2277	N/A	2207	N/A	N/A	N/A	V
LS PM High Voltage (Command)	1848	N/A	1833	N/A	N/A	N/A	V

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Crystal Quality Resolutions Calibration

Before: 26−Jun−2003 12:52

BS Crystal Resolution	12.55	N/A	12.80	N/A	N/A	N/A	%
SS Crystal Resolution	10.87	N/A	10.68	N/A	N/A	N/A	%
LS Crystal Resolution	9.720	N/A	9.764	N/A	N/A	N/A	%

High resolution Integrated Logging Tool−CTS Wellsite Calibration − MCFL Calibration

Before: 21−Jun−2003 17:54

Raw B0 Resistivity	3875	N/A	3895	N/A	N/A	N/A	OHMM
Raw B1 Resistivity	3830	N/A	3851	N/A	N/A	N/A	OHMM
Raw B2 Resistivity	3830	N/A	3859	N/A	N/A	N/A	OHMM

High resolution Integrated Logging Tool−CTS Wellsite Calibration − HILT Caliper Calibration

Before: 26−Jun−2003 12:49

HILT Caliper Zero Measurement	8.000	N/A	8.719	N/A	N/A	N/A	IN
HILT Caliper Plus Measurement	12.00	N/A	12.86	N/A	N/A	N/A	IN

High resolution Integrated Logging Tool−CTS Master Calibration − Inversion results

Master: 21−Jun−2003 19:33

Rho Aluminum	2.596	2.602	−−	−−	−−	−−	G/C3
Rho Magnesium	1.686	1.686	−−	−−	−−	−−	G/C3
Pe Aluminum	2.570	2.604	−−	−−	−−	−−	
Pe Magnesium	2.650	2.621	−−	−−	−−	−−	

High resolution Integrated Logging Tool−CTS Master Calibration − Deviation Summary

Master: 21−Jun−2003 19:33

BS Average Deviation	0	0.4154	−−	−−	−−	−−	%
BS Max Deviation	0	1.028	−−	−−	−−	−−	%
SS Average Deviation	0	0.2399	−−	−−	−−	−−	%
SS Max Deviation	0	0.6941	−−	−−	−−	−−	%
LS Average Deviation	0	1.086	−−	−−	−−	−−	%
LS Max Deviation	0	3.251	−−	−−	−−	−−	%

Compensated Neutron − G Wellsite Calibration − Zero Measurement

Master: 5−Apr−2003 17:48 Before: 26−Jun−2003 12:50

CNTC Background	1.000	0	0	N/A	N/A	N/A	CPS
CFTC Background	0	0	0.5162	N/A	N/A	N/A	CPS
CNEC Background	1.000	0	0	N/A	N/A	N/A	CPS
CFEC Background	0	0	0	N/A	N/A	N/A	CPS

Compensated Neutron − G Wellsite Calibration − Jig Measurement
Master: 5−Apr−2003 18:58 Before: 26−Jun−2003 12:59

CNTC Jig	2793	2793	2771	N/A	N/A	N/A	CPS
CFTC Jig	1353	1353	1360	N/A	N/A	N/A	CPS
CNTC/CFTC (Jig)	2.065	2.065	2.038	N/A	N/A	N/A	
CNEC Jig	621.0	621.0	615.2	N/A	N/A	N/A	CPS
CFEC Jig	614.5	614.5	616.9	N/A	N/A	N/A	CPS
CNEC/CFEC (Jig)	1.011	1.011	0.9973	N/A	N/A	N/A	

Compensated Neutron − G Master Calibration − Tank Measurement
Master: 5−Apr−2003 18:06

Thermal Near Corr. (Tank)	6031	6034	−−	−−	−−	−−	CPS
Thermal Far Corr. (Tank)	2793	2527	−−	−−	−−	−−	CPS
CNTC/CFTC (Tank)	2.159	2.388	−−	−−	−−	−−	
Epi. Near Corr. (Tank)	3304	3075	−−	−−	−−	−−	CPS
Epi. Far Corr. (Tank)	1235	1117	−−	−−	−−	−−	CPS
CNEC/CFEC (Tank)	2.675	2.753	−−	−−	−−	−−	

Scintillation Gamma−Ray − L Wellsite Calibration − Detector Calibration
Before: 26−Jun−2003 12:51

Gamma Ray Background	30.00	N/A	27.83	N/A	N/A	N/A	GAPI
Gamma Ray (Jig − Bkg)	167.6	N/A	167.6	N/A	N/A	15.24	GAPI
Gamma Ray (Calibrated)	168.0	N/A	168.0	N/A	N/A	15.00	GAPI

The GLS−VJ source activity is acceptable.

The CNT Master Calibration Was Done With The Following Parameters :

NCT−B Water Temperature	70.0	DEGF.
Thermal Housing Size	3.334	IN.
Epithermal Housing Size	3.334	IN.

High resolution Integrated Logging Tool−CTS / Equipment Identification

Primary Equipment:

Array Induction Tool − H	AIT − H	
Rm/SP Bottom Nose	AHRM − A	
Array Induction Sonde	AHIS − BA	216
HILT high−Resolution Mechanical Sonde	HRMS − B	
HILT Rxo Gamma−ray Device	HRGD −	
HILT Nuclear Back−Scatter Detector	HILT −	
HILT Nuclear Short−Spacing Detector	HILT −	
HILT Nuclear Long−Spacing Detector	HILT −	

Auxiliary Equipment:

Compensated Neutron − G / Equipment Identification

Primary Equipment:

Compensated Neutron Cartridge	CNC − GA	114
Neutron Logging Source	NLS − KL	
Neutron Source Radioactive	NSR − F	2179
Compensated Neutron Box	CNB − AB	
Neutron Detector without Alpha Source	CND − NA	
Compensated Neutron Box	CNB − AB	

Auxiliary Equipment:

Compensated Neutron Housing	CNH − G	114
Neutron Calibration Tank	NCT − B	

Compensated Neutron − G Wellsite Calibration

Zero Measurement

Phase	CNTC Background CPS	Value
Master		0
Before		0
	−0.010000 (Minimum) 1.000 (Nominal) 5.000 (Maximum)	

Phase	CFTC Background CPS	Value
Master		0
Before		0.5162
	−0.010000 (Minimum) 0 (Nominal) 5.000 (Maximum)	

Phase	CNEC Background CPS	Value
Master		0
Before		0
	−0.010000 (Minimum) 1.000 (Nominal) 5.000 (Maximum)	

Phase	CFEC Background CPS	Value
Master		0
Before		0.5162
	−0.010000 (Minimum) 0 (Nominal) 5.000 (Maximum)	

Master		0	Master		0
Before		0	Before		0
−0.010000 (Minimum)	1.000 (Nominal)	5.000 (Maximum)	−0.010000 (Minimum)	0 (Nominal)	5.000 (Maximum)

Master: 5−Apr−2003 17:48 Before: 26−Jun−2003 12:50

Compensated Neutron − G Wellsite Calibration

Jig Measurement

Phase	CNTC Jig CPS	Value	Phase	CFTC Jig CPS	Value	Phase	CNTC/CFTC (Jig)	Value
Master		2793	Master		1353	Master		2.065
Before		2771	Before		1360	Before		2.038
2654 (Minimum)	2793 (Nominal)	2933 (Maximum)	1285 (Minimum)	1353 (Nominal)	1420 (Maximum)	2.025 (Minimum)	2.065 (Nominal)	2.105 (Maximum)

Phase	CNEC Jig CPS	Value	Phase	CFEC Jig CPS	Value	Phase	CNEC/CFEC (Jig)	Value
Master		621.0	Master		614.5	Master		1.011
Before		615.2	Before		616.9	Before		0.9973
589.9 (Minimum)	621.0 (Nominal)	652.0 (Maximum)	583.8 (Minimum)	614.5 (Nominal)	645.3 (Maximum)	0.9705 (Minimum)	1.011 (Nominal)	1.051 (Maximum)

Master: 5−Apr−2003 18:58 Before: 26−Jun−2003 12:59

Compensated Neutron − G Master Calibration

Tank Measurement

Phase	Thermal Near Corr. (Tank) CPS	Value	Phase	Thermal Far Corr. (Tank) CPS	Value	Phase	CNTC/CFTC (Tank)	Value
Master		6034	Master		2527	Master		2.388
5000 (Minimum)	6031 (Nominal)	7200 (Maximum)	2075 (Minimum)	2793 (Nominal)	3125 (Maximum)	2.120 (Minimum)	2.159 (Nominal)	2.540 (Maximum)

Phase	Epi. Near Corr. (Tank) CPS	Value	Phase	Epi. Far Corr. (Tank) CPS	Value	Phase	CNEC/CFEC (Tank)	Value
Master		3075	Master		1117	Master		2.753
2600 (Minimum)	3304 (Nominal)	4000 (Maximum)	1000 (Minimum)	1235 (Nominal)	1500 (Maximum)	2.400 (Minimum)	2.675 (Nominal)	2.950 (Maximum)

Master: 5−Apr−2003 18:06

Scintillation Gamma−Ray − L / Equipment Identification

Primary Equipment:

Scintillation Gamma Cartridge	SGC − SA	603
Scintillation Gamma Detector	SGD − TAA	

Auxiliary Equipment:

Scintillation Gamma Housing	SGH − K
Gamma Source Radioactive	GSR − U/Y

Scintillation Gamma−Ray − L Wellsite Calibration

Detector Calibration

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig − Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before		27.83	Before		167.6	Before		168.0
0 (Minimum)	30.00 (Nominal)	120.0 (Maximum)	152.4 (Minimum)	167.6 (Nominal)	182.8 (Maximum)	153.0 (Minimum)	168.0 (Nominal)	183.0 (Maximum)

Before: 26−Jun−2003 12:51

Company: **BATTELLE MEMORIAL INSTITUTE**

Schlumberger

Well: **AEP #1**

Field: **APPALACHIAN POWER CO.**

COUNTY:	**MASON**
STATE:	**WEST VIRGINIA**
	LITHO−DENSITY COMPENSATED NEUTRON GAMMA RAY / TEMPERATURE