Location	
Rupture	
Depth	
Screen	
Bottom	
Total	
Casing	
Casing	
Bit	
Type	
MUD	
Flow	
Density	
RM	
RM	
RM	
RM	
Solids	
RM	
Mesh	
Circ	
Lost	
Unit	
Recv	
Wire	

County: Weld

Schlumberger

Company: **Orr Energy LLC**

Well: **South 6−21D**

Field: **Wattenburg**

County: **Weld** State: **Colorado**

Platform Express
Array Induction
Linear Correlation

Field: Wattenburg
Location: NENW Sec. 6, T5N, R66W
Well: South 6−21D
Company: Orr Energy LLC

LOCATION

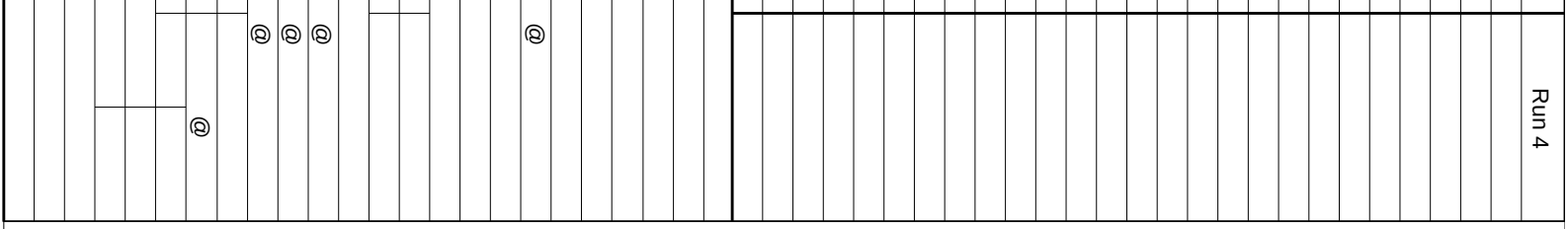
NENW Sec. 6, T5N, R66W
2573' FNL X 2660' FWL (Surface)
694' FNL X 2226' FWL (Projected Bottom)

Elev.: K.B. 4810 ft
G.L. 4794 ft
D.F. 4809 ft

Permanent Datum: Ground Level Elev.: 4794 ft
Log Measured From: Kelly Bushing 16.0 ft above Perm. Datum
Drilling Measured From: Kelly Bushing

API Serial No.	Section	Township	Range
05−123−25982−0(	6	5N	66W

	Run 1	Run 2	Run 3
Logging Date	13−Dec−2007		
Run Number	1		
Depth Driller	8035 ft		
Schlumberger Depth	8048 ft		
Bottom Log Interval	8040 ft		
Top Log Interval	849 ft		
Casing Driller Size @ Depth	8.625 in @ 847 ft	@	
Casing Schlumberger	849 ft		
Bit Size	7.875 in		
Type Fluid In Hole	KCL Polymer		
MUD Density / Viscosity	9.3 lbm/gal / 55 s		
MUD Fluid Loss / PH	/		
Source Of Sample	AIT − Mud Sensor		
RM @ Measured Temperature	1.300 ohm.m @ 115 degF	@	
RMF @ Measured Temperature	1.040 ohm.m @ 115 degF	@	
RMC @ Measured Temperature	1.560 ohm.m @ 115 degF	@	
Source RMF / RMC	Calculated / Calculated		
RM @ MRT / RMF @ MRT	0.683 @ 225 / 0.546 @ 225	@ / @	@ / @ / @
Maximum Recorded Temperatures	225 degF		
Circulation Stopped Time	13−Dec−2007 14:00		
Logger On Bottom Time	13−Dec−2007 18:30		
Unit Number / Location	3003 / Fort Morgan, CO		
Recorded By	Matt Baldwin		
Witnessed By	Don Libhart & Mark Scanniello		



DEPTH SUMMARY LISTING

Date Created: 13−DEC−2007 18:47:13

Depth System Equipment

Depth Measuring Device		Tension Device		Logging Cable	
Type:	IDW−B	Type:	CMTD−B/A	Type:	7−39P−LXS
Serial Number:	−999	Serial Number:	1937	Serial Number:	4142
Calibration Date:	6−Nov−2007	Calibration Date:	15−Nov−2007	Length:	14680.00 FT
Calibrator Serial Number:	1	Calibrator Serial Number:	100513		
Calibration Cable Type:	7−46P	Calibration Gain:	0.99	Conveyance Method:	Wireline
Wheel Correction 1:	−4	Calibration Offset:	261.00	Rig Type:	LAND
Wheel Correction 2:	−5				

Depth Control Parameters

Log Sequence:	First Log In the Well
Rig Up Length At Surface:	0.00 FT
Rig Up Length At Bottom:	0.00 FT
Rig Up Length Correction:	0.00 FT
Stretch Correction:	10.00 FT
Tool Zero Check At Surface:	0.20 FT

Depth Control Remarks

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

OTHER SERVICES1	OTHER SERVICES2
OS1: None	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
This is first run in hole	
Tool run as per tool sketch	
Matrix changes noted on porosity log	

Rig: Ensign 7

Crew: Matt Baldwin, Ian Derry, & David Marquez

RUN 1			RUN 2		
SERVICE ORDER #:	11989844		SERVICE ORDER #:		
PROGRAM VERSION:	15C0−309		PROGRAM VERSION:		
FLUID LEVEL:	5 ft		FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1 RUN 2

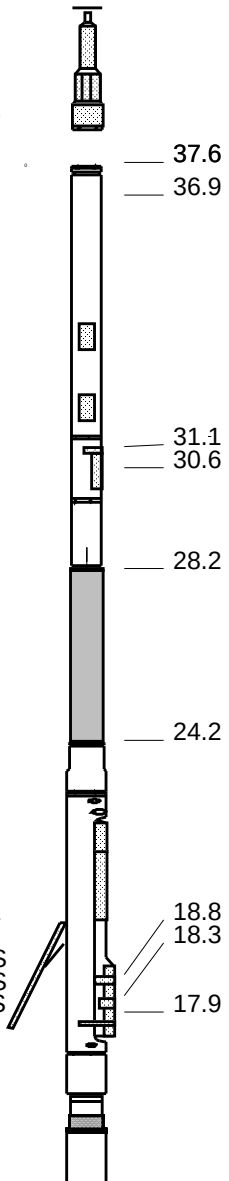
SURFACE EQUIPMENT

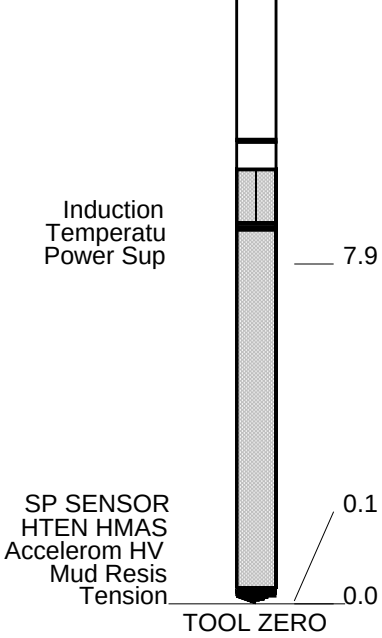
WITM (CTS)−A
GSR−U/Y
NCT−B
CNB−AB
NCS−VB

DOWNHOLE EQUIPMENT

LEH−QT
LEH−QT — 40.6

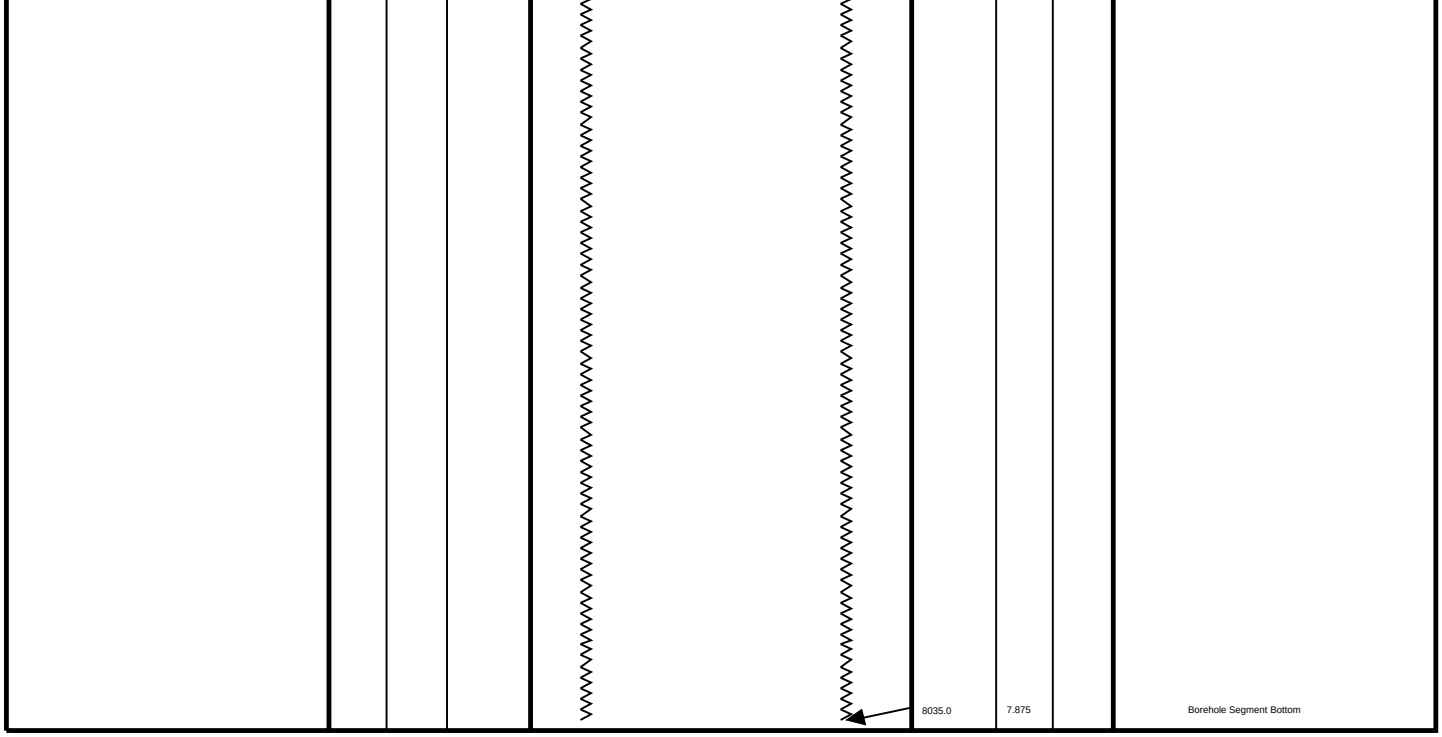
HILTB−CTS — 37.6
HGNSC−B
HMCA
TCC−B
HGNH
NLS−KL
NSR−F 940
HACCZ
HCNT
HGR
HRCC−B
HRMS−B
HRGD−B
GLS−VJ 5094
MCFL Device
HILT Nucl. LS 42767
HILT Nucl. SS 42767
HILT Nucl. BS 42767
AIT−H
AHIS−BA 374
AHRM−A
NPV−N





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

Production String	(in) OD	(in) ID	(ft) MD	Well Schematic	(ft) MD	(in) OD	(in) ID	Casing String
					0.0	8.625		Casing String, 24.0 lbm/ft
					847.0	8.625		Casing Shoe
					847.0	7.875		Borehole Segment



ALL DEPTHS AS PER DRILLER

Schlumberger

RESISTIVITY LINEAR 2" = 100’

MAXIS Field Log

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_009LUP	FN:8	PRODUCER	13−Dec−2007 19:00	8070.0 FT	818.0 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_015PUP	FN:14	PRODUCER	13−Dec−2007 20:33	8070.5 FT	822.5 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 2741.48 F3

Cement Volume = 1946.35 F3 (assuming 4.50 IN casing O.D.)

Computed from 8048.0 FT to 849.0 FT using data channel(s) HCAL

OP System Version: 15C0−309

MCM

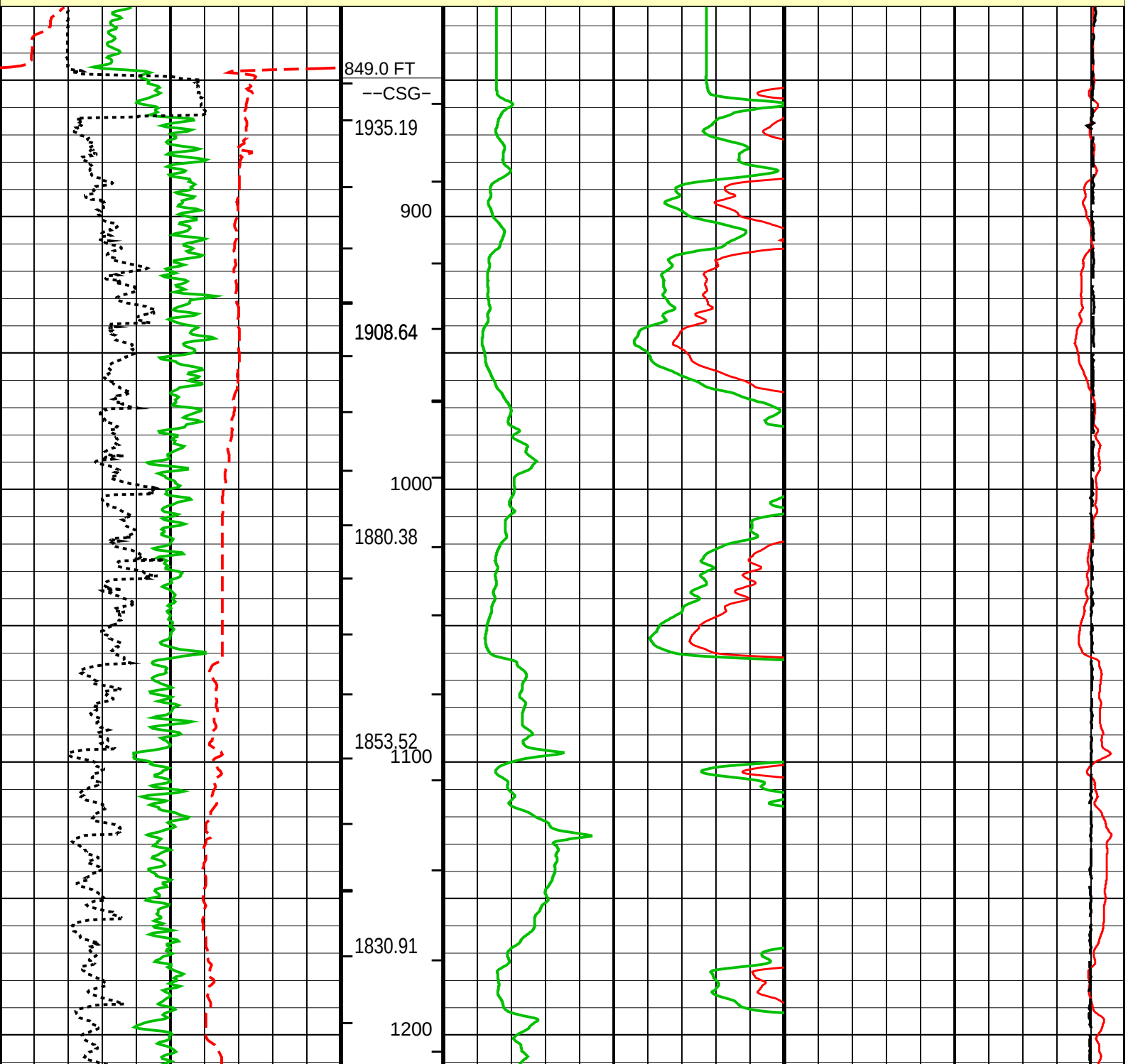
HILTB−CTS	SRPC−3497−NOV_2007

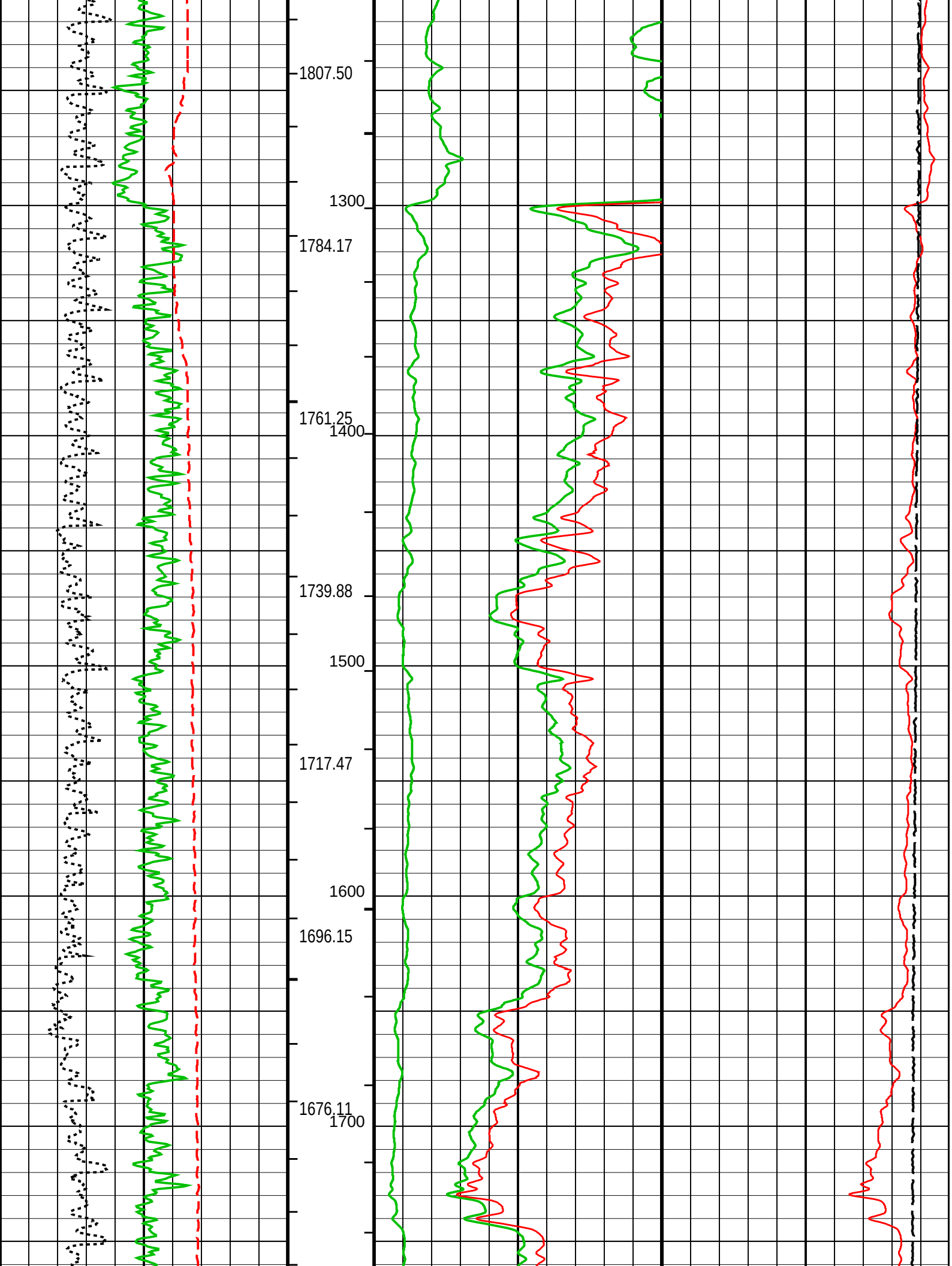
PIP SUMMARY

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

SP (SP) −160 (MV) 40		
Caliper (HCAL) 6 (IN) 16		AIT−H 90 Inch Investigation (AHF90) 0 (OHMM) 10
Gamma Ray (GR) 0 (GAPI) 200		AIT−H 10 Inch Investigation (AHF10) 0 (OHMM) 10
		Tension (TENS) 10000 (LBF) 0
Gamma Ray Backup	Cement Volume (ICV) (F3)	AIT−H 10 Inch Investigation (AHF10) 0 (OHMM) 50
		AIT−H 90 Inch Investigation Conductivity (AHFCO90) 1000 (MM/M) 0

MAIN PASS: *** PLATFORM EXPRESS − ARRAY INDUCTION ***

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1761.25
1400
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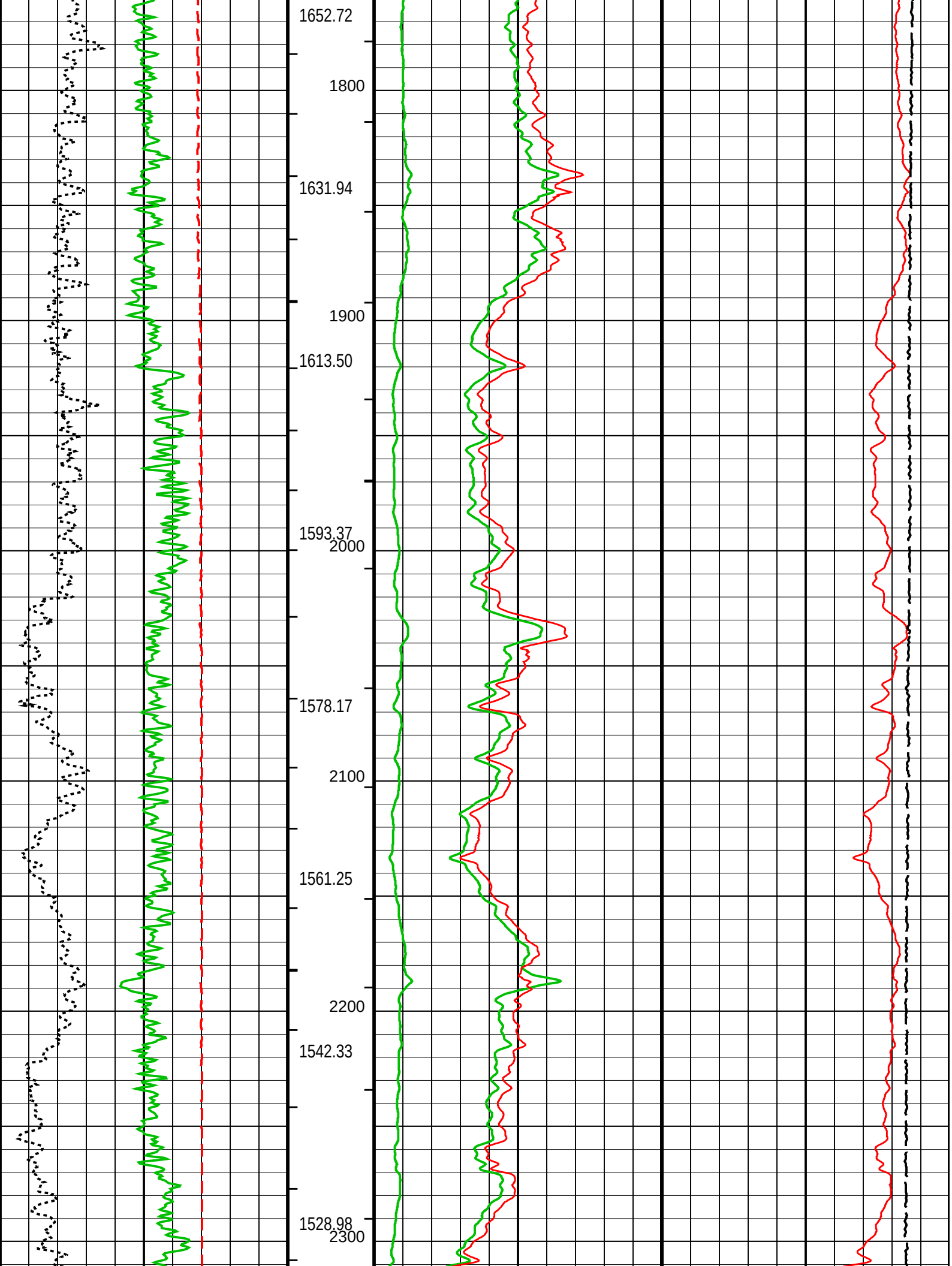
1500
1717.47
1600
1696.15
1676.11
1700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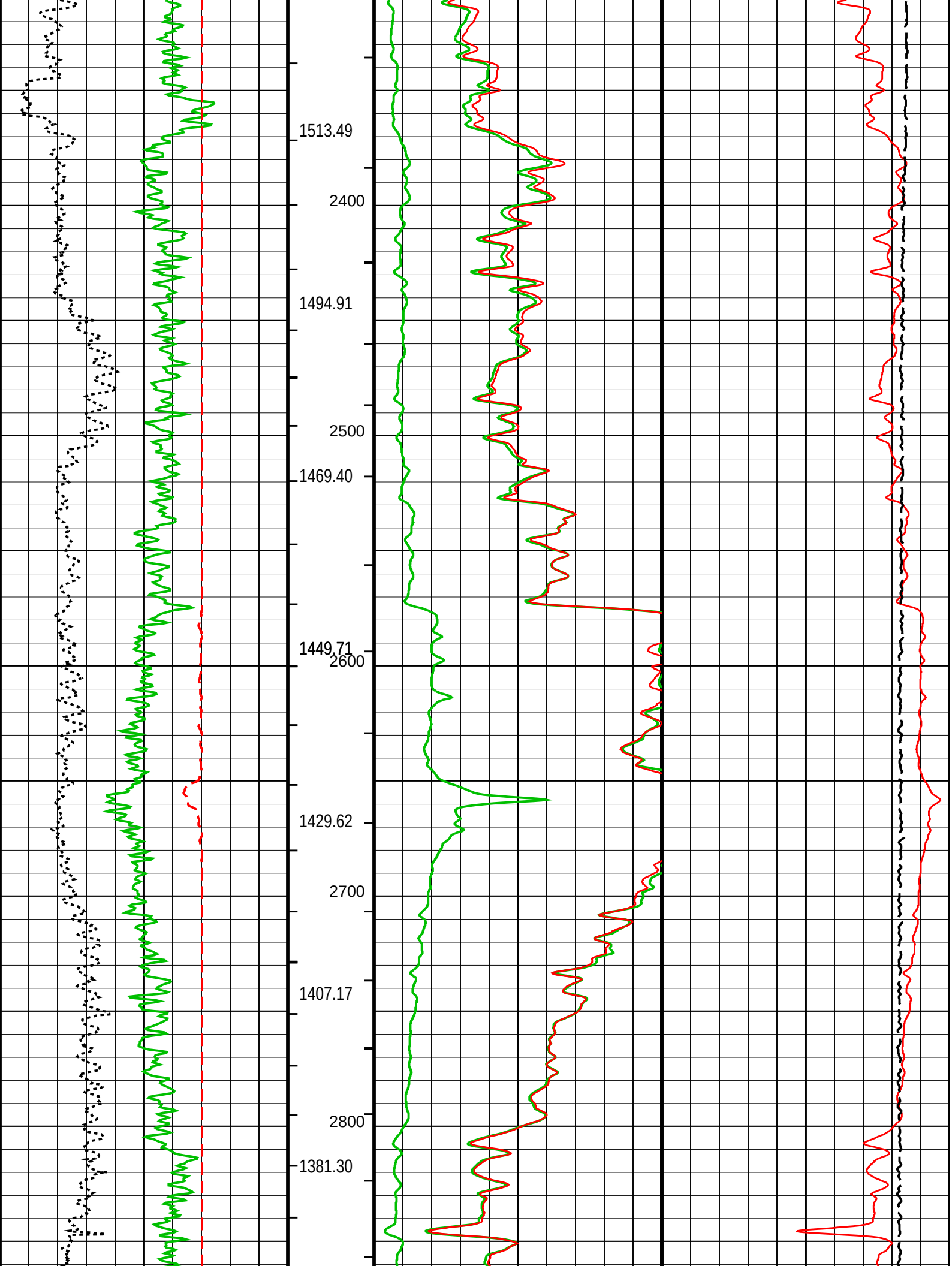
1900
1613.50
1593.37
2000
1578.17
2100
1561.25
2200
1542.33
1528.98
2300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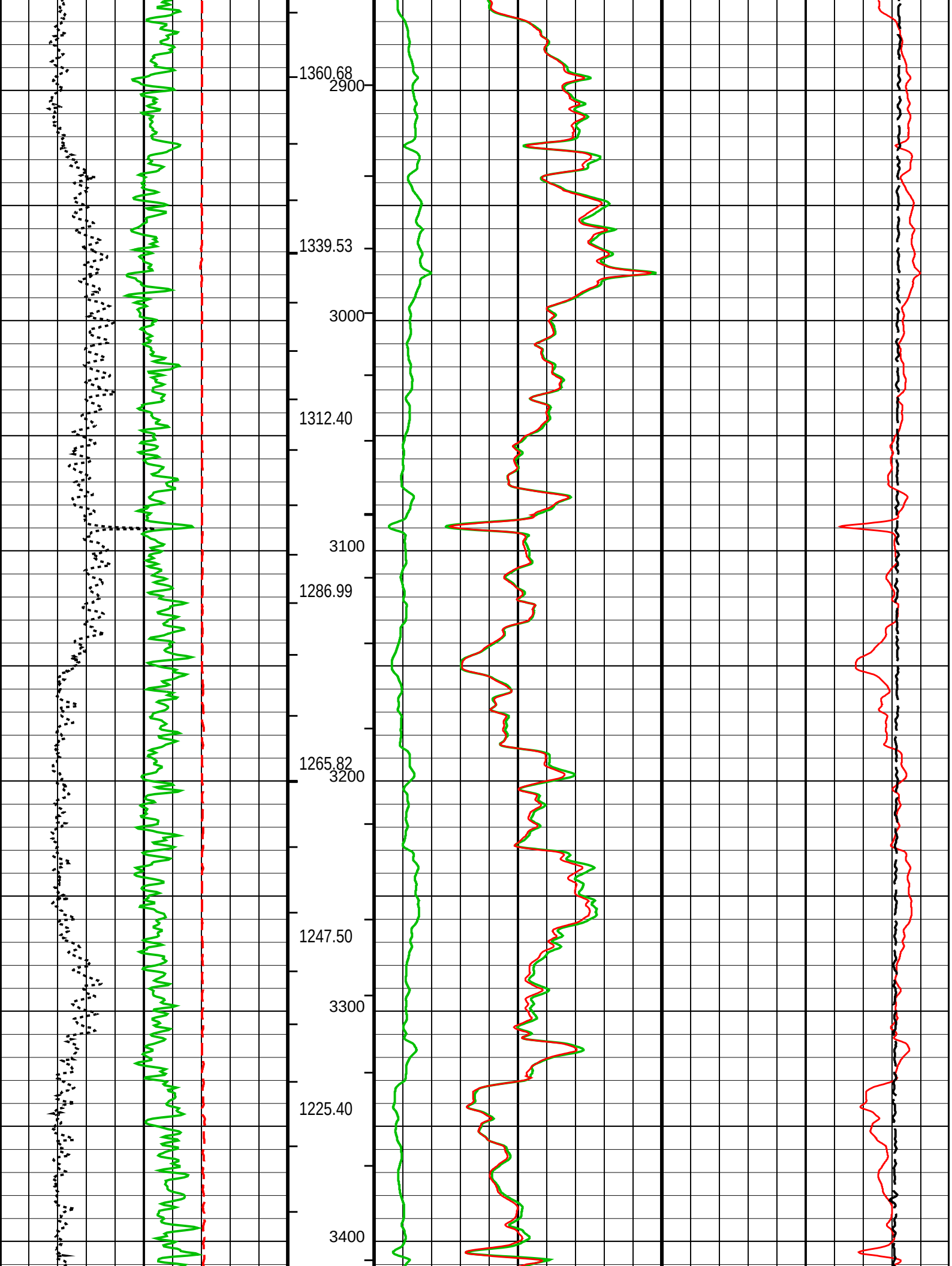
2600
1429.62
2700
1407.17
2800
1381.30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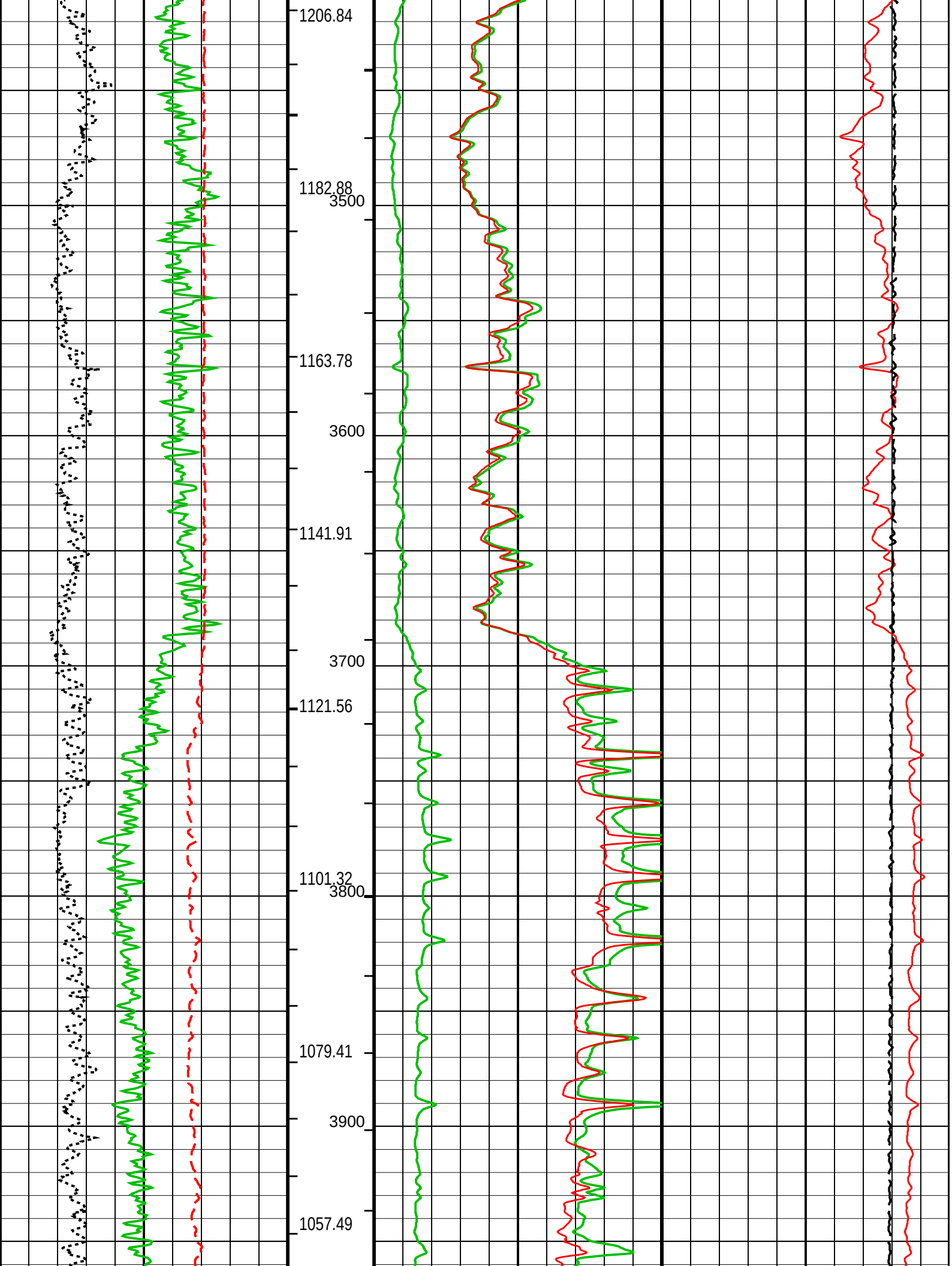
1286.99
1265.82
3200
1247.50
3300
1225.40
3400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1182.88
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3600
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3700
1121.56
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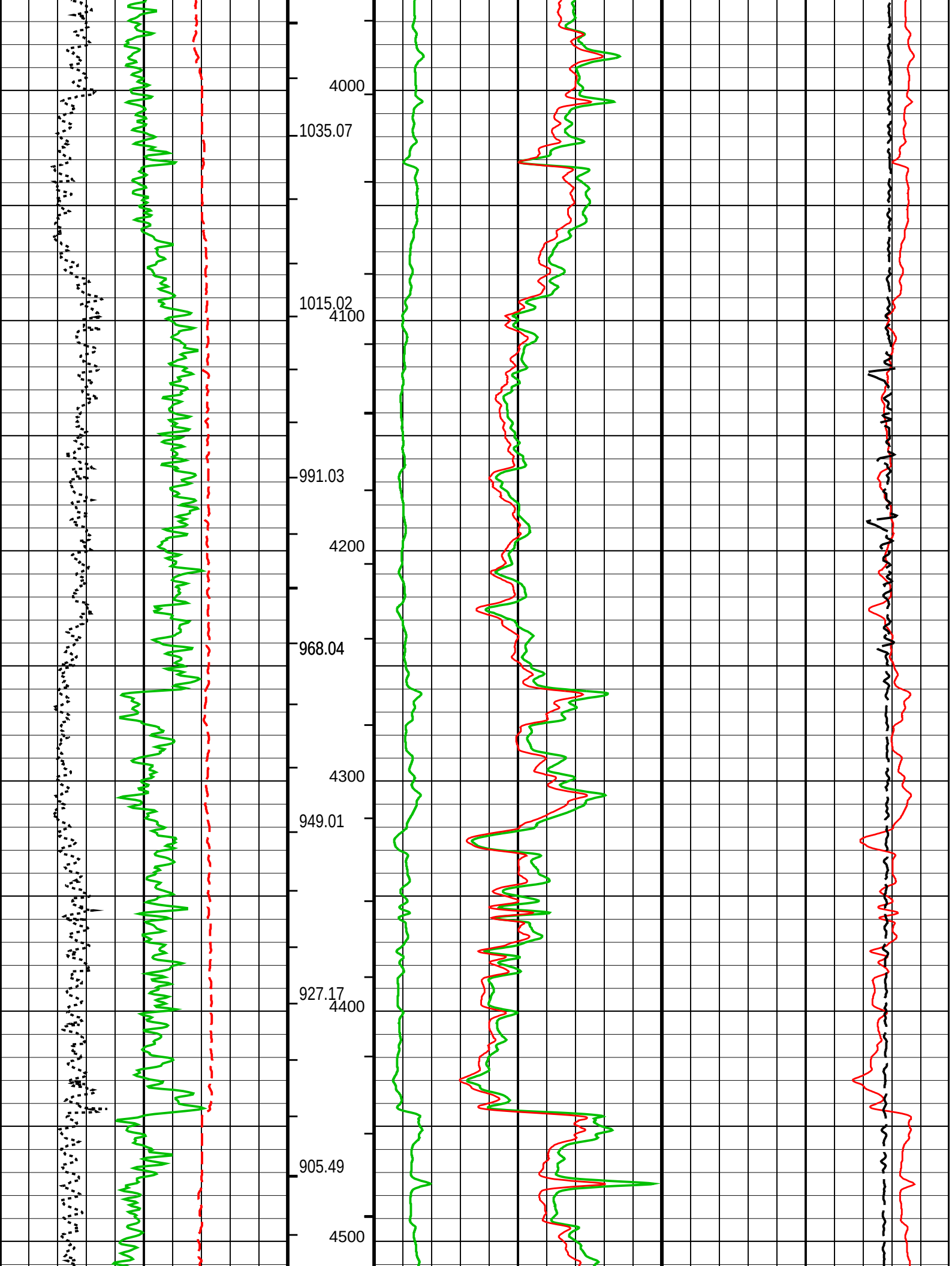
3800
1079.41
3900
1057.49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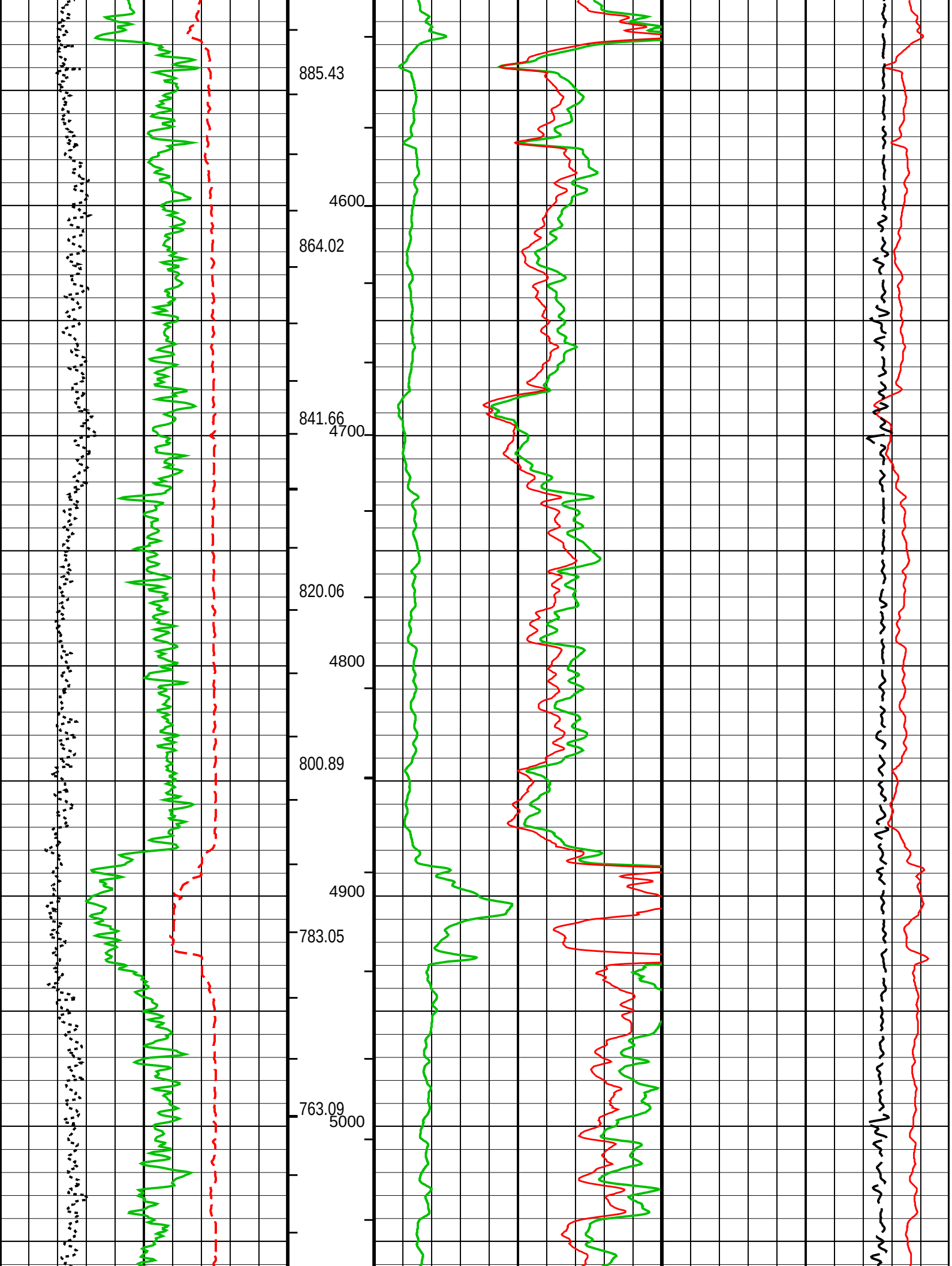
4100
991.03
4200
968.04
4300
949.01
927.17
4400
905.49
4500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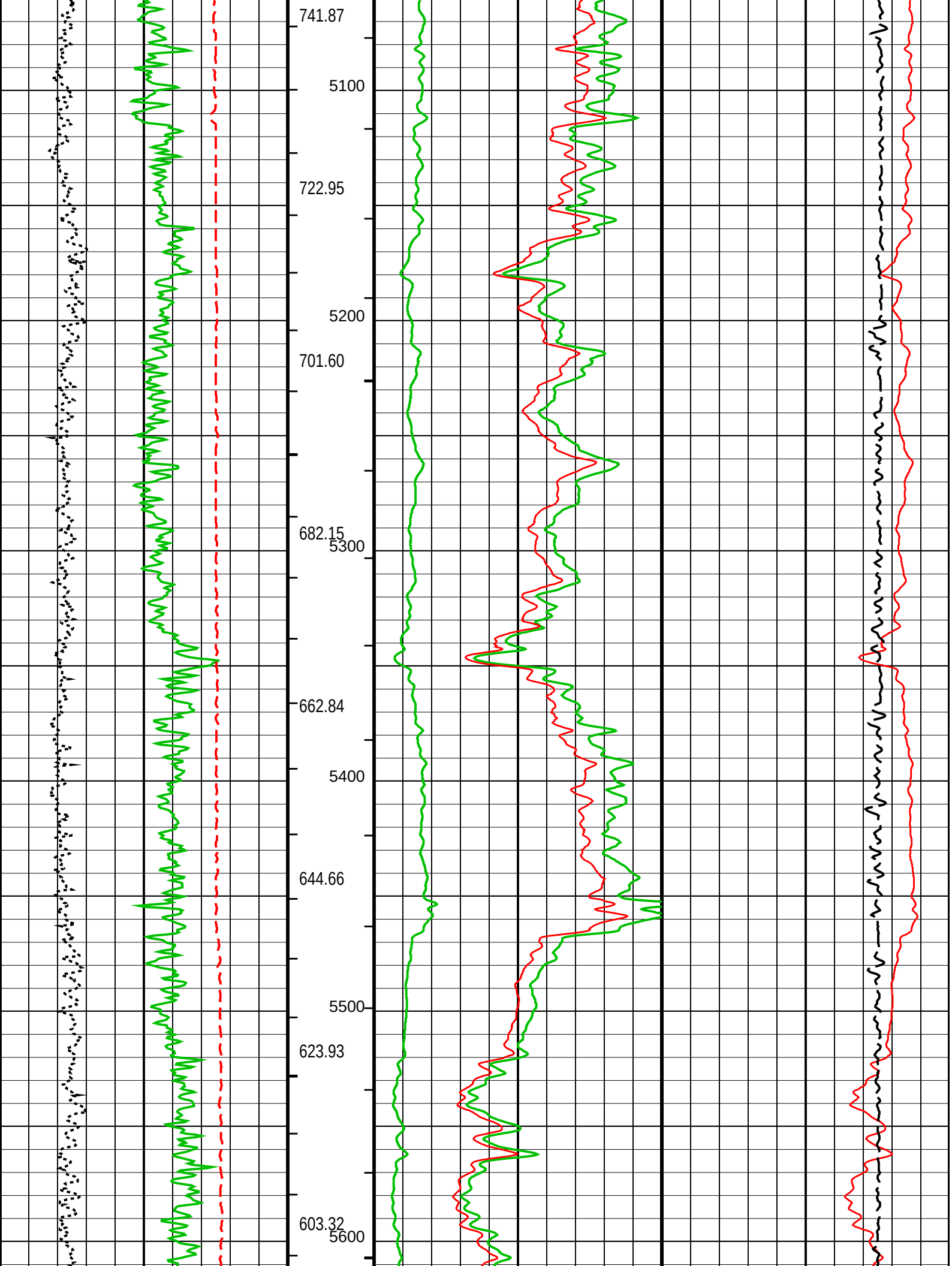
4800
800.89
4900
783.05
763.09
5000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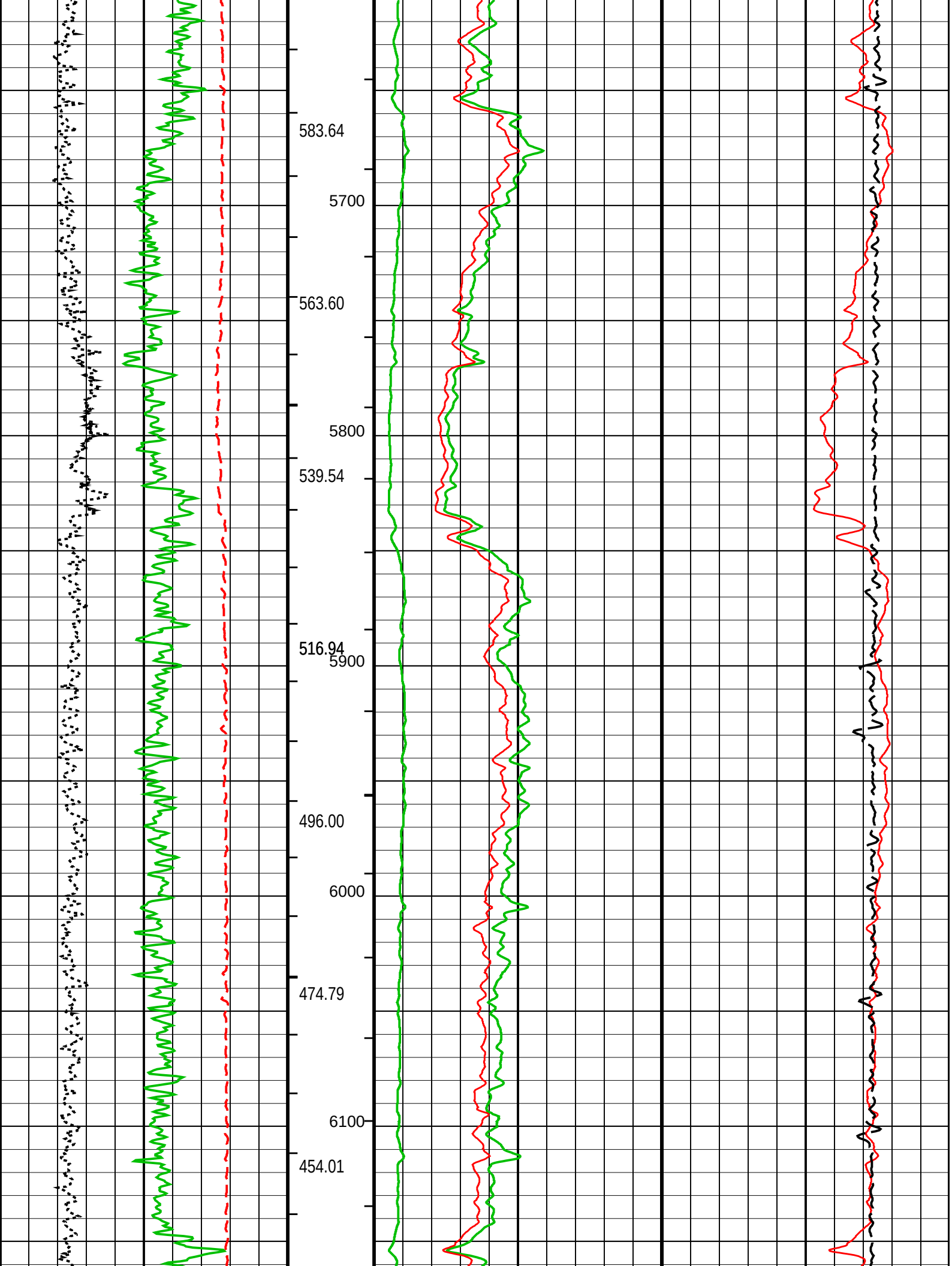
5600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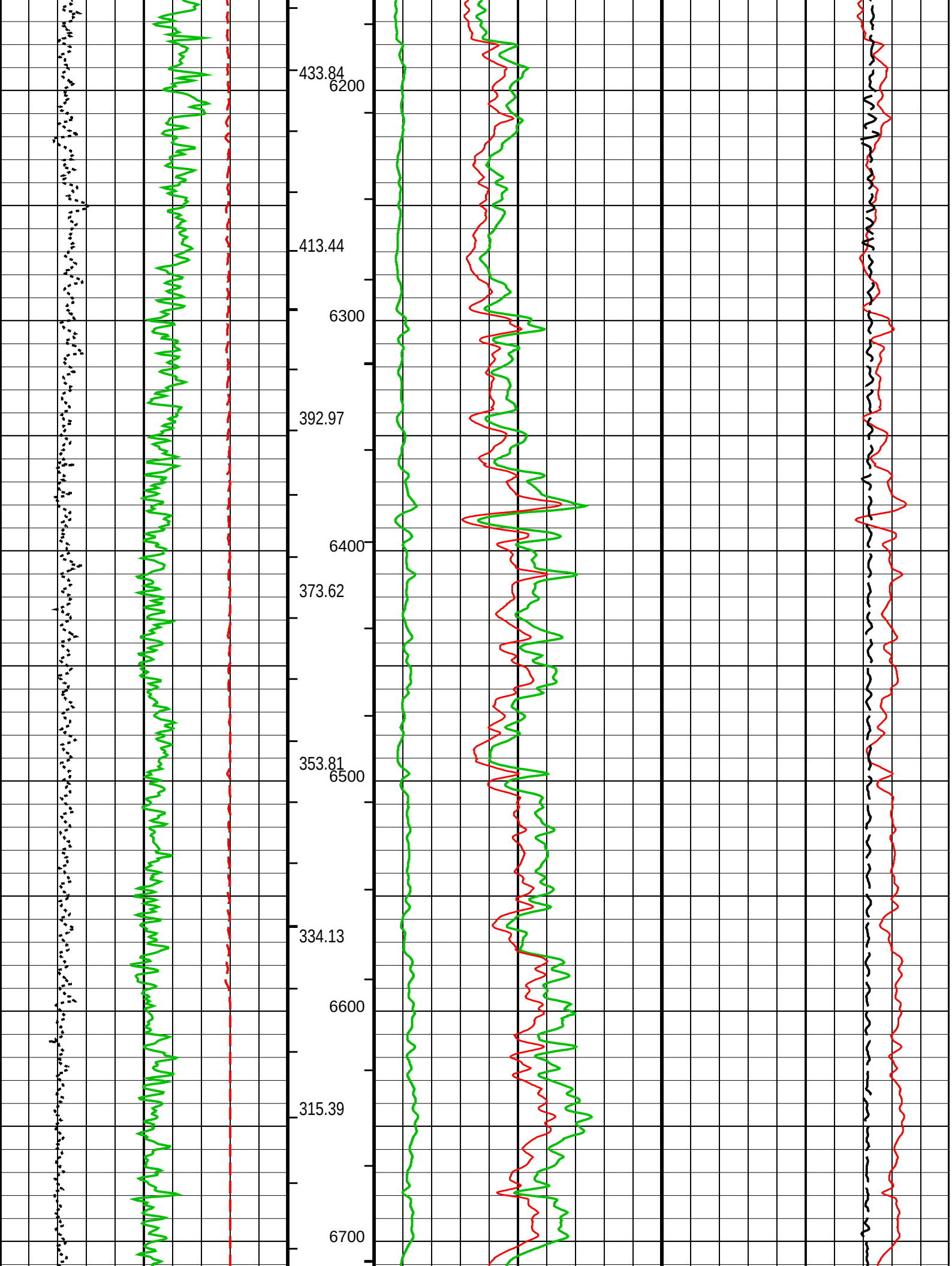
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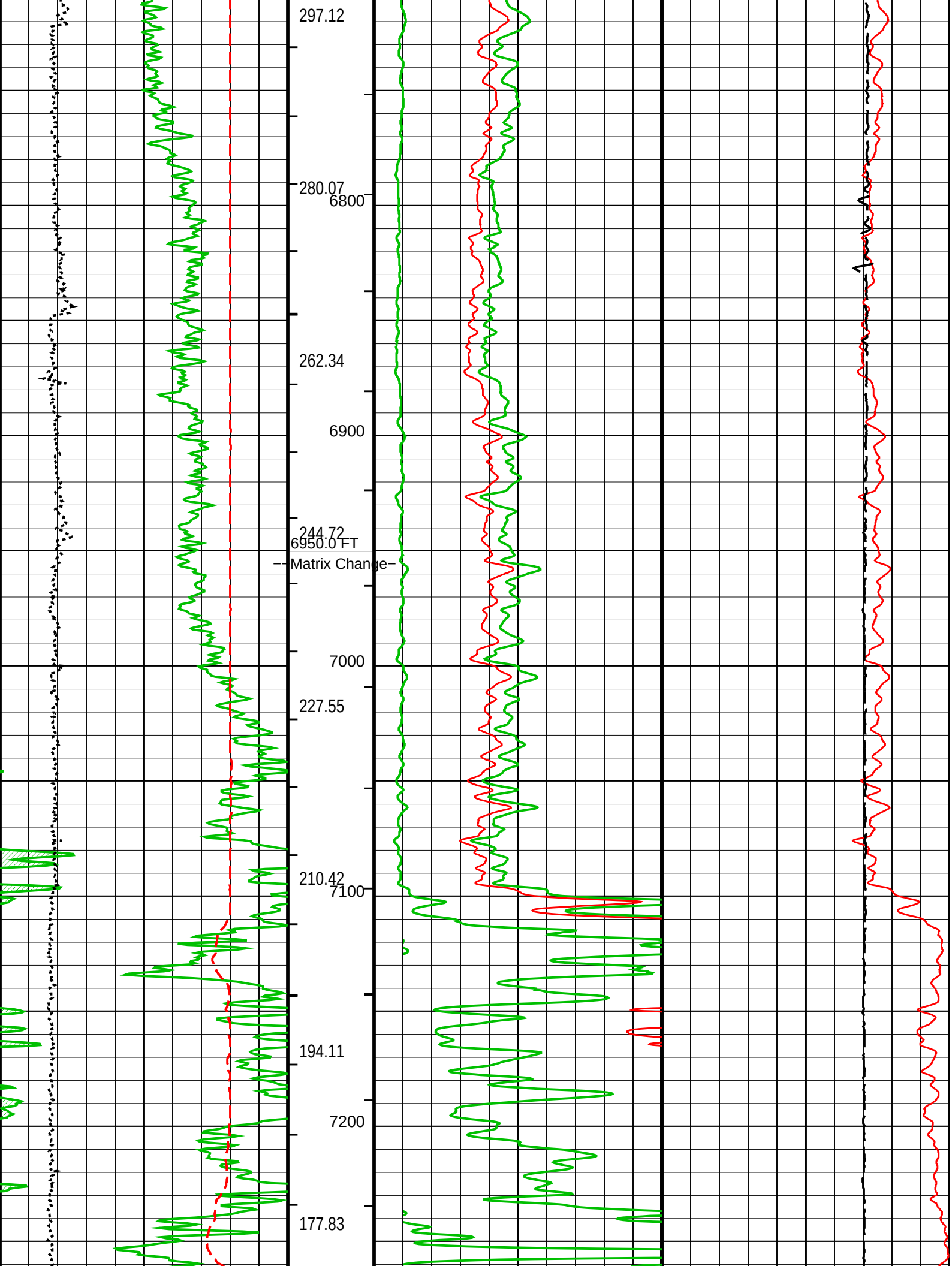
6500
334.13
6600
315.39
6700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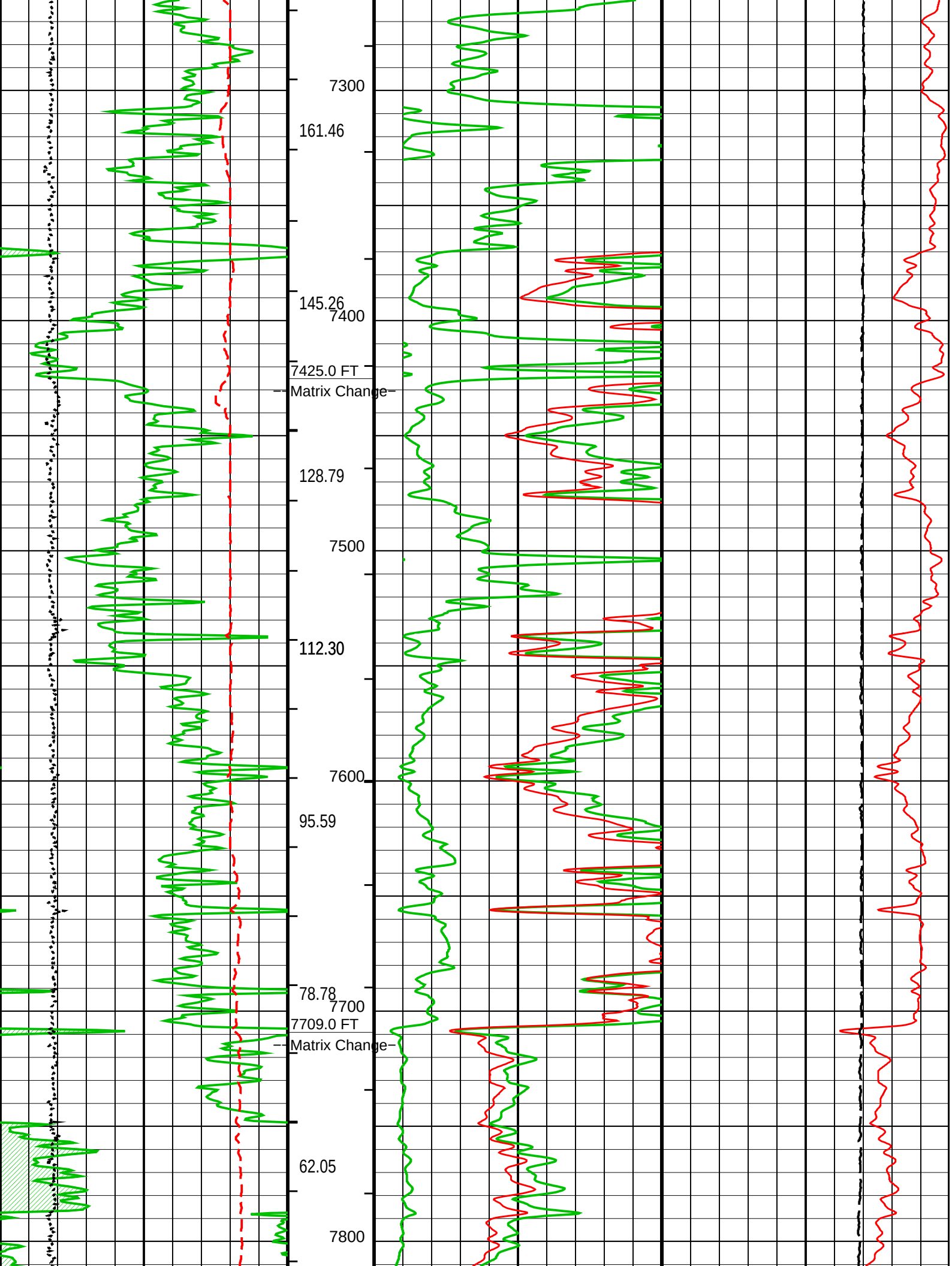
7200
177.83


7300
161.46
145.26
7400
7425.0 FT
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7700
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Matrix Change
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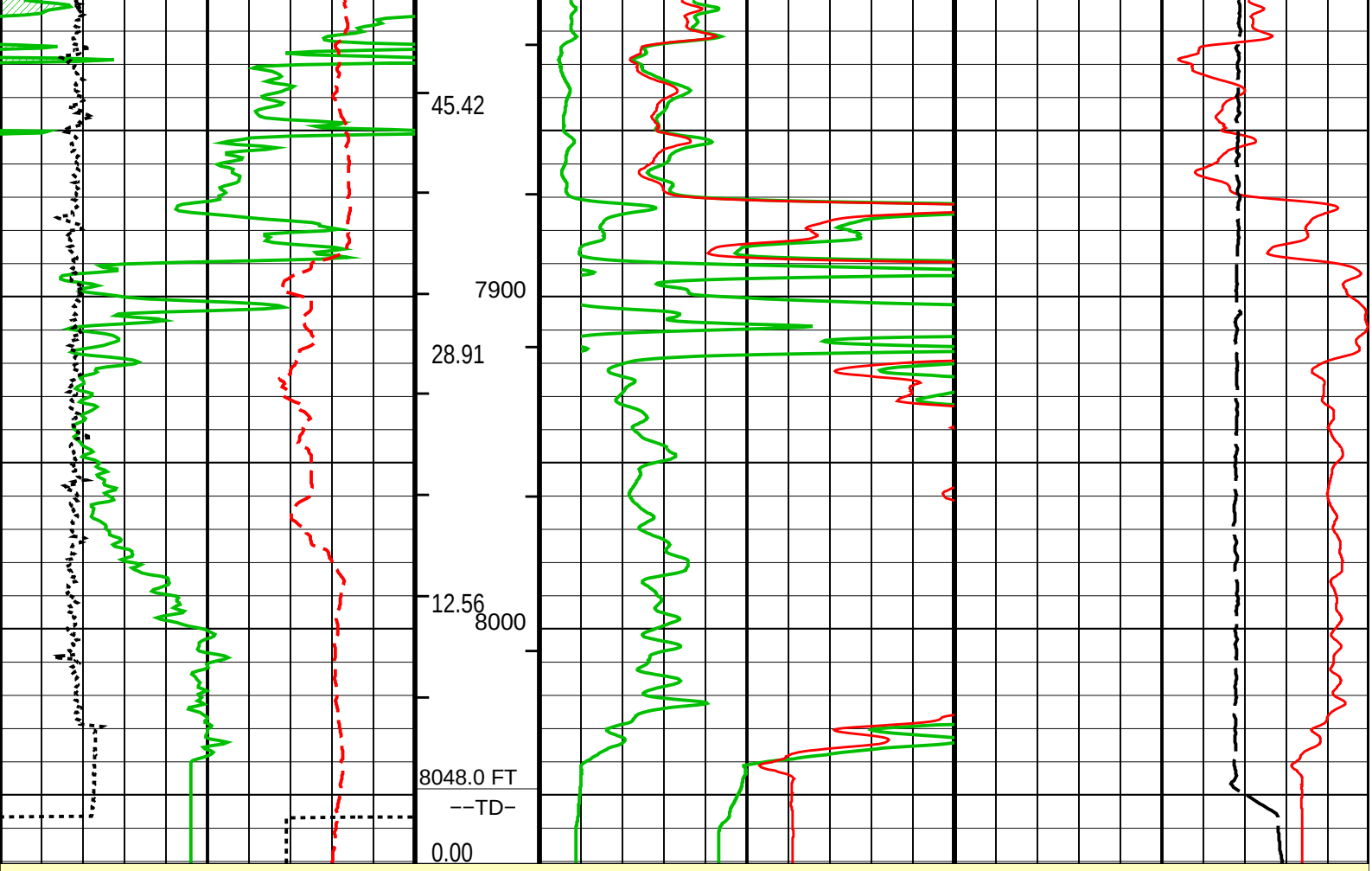


MAIN PASS: *** PLATFORM EXPRESS - ARRAY INDUCTION ***

Gamma Ray Backup	Cement Volume (ICV) (F3)	AIT-H 10 Inch Investigation (AHF10) 0 (OHMM) 50	AIT-H 90 Inch Investigation Conductivity (AHFCO90) 1000 (MM/M) 0
Gamma Ray (GR) 0 (GAPI) 200		AIT-H 10 Inch Investigation (AHF10) 0 (OHMM) 10	Tension (TENS) 10000 (LBF) 0
Caliper (HCAL) 6 (IN) 16		AIT-H 90 Inch Investigation (AHF90) 0 (OHMM) 10	
SP (SP) -160 (MV) 40			

PIP SUMMARY

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

Parameters

DLIS Name	Description	Value	
	HILTB-CTS: High resolution Integrated Logging Tool-CTS		
AHBHM	Array Induction Borehole Correction Mode	2_ComputeStandoff	
AHBHV	Array Induction Borehole Correction Code Version Number	900	
AHBLM	Array Induction Basic Logs Mode	6_One_Two_and_Four	
AHBLV	Array Induction Basic Logs Code Version Number	223	
AHCDE	Array Induction Casing Detection Enable	Yes	
AHCEN	Array Induction Tool Centering Flag (in Borehole)	Eccentered	
AHFRSV	Array Induction Response Set Version for Four ft Resolution	41.70.24.20	
AHMRF	Array Induction Mud Resistivity Factor	1	
AHORSV	Array Induction Response Set Version for One ft Resolution	41.70.24.20	
AHRFV	Array Induction Radial Profiling Code Version Number	701	
AHRPV	Array Induction Radial Parametrization Code Version Number	232	
AHSTA	Array Induction Tool Standoff	0.125	IN
AHTRSV	Array Induction Response Set Version for Two ft Resolution	41.70.24.20	

BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68	DEGF
SPNV	SP Next Value	0	MV
FEQL: Formation Evaluation Quick Look			
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
HOLEV: Integrated Hole/Cement Volume			
BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
FCD	Future Casing (Outer) Diameter	4.5	IN
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
SHT	Surface Hole Temperature	68	DEGF
PERT: Preliminary Evaluation − Real Time			
BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68	DEGF
System and Miscellaneous			
BS	Bit Size	7.875	IN
DFD	Drilling Fluid Density	9.30	LB/G
DO	Depth Offset for Playback	0.5	FT
FLEV	Fluid Level	5.00	FT
MST	Mud Sample Temperature	115.00	DEGF
PP	Playback Processing	NORMAL	
TD	Total Depth	8048	FT

Format: ERES_S2 Vertical Scale: 2" per 100’ Graphics File Created: 13−Dec−2007 20:33

OP System Version: 15C0−309

MCM

HILTB−CTS SRPC−3497−NOV_2007

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_009LUP	FN:8	PRODUCER	13−Dec−2007 19:00	8070.0 FT	818.0 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_015PUP	FN:14	PRODUCER	13−Dec−2007 20:33

Schlumberger

UPPER RESISTIVITY LOG 5" = 100’

MAXIS Field Log

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_009LUP	FN:8	PRODUCER	13−Dec−2007 19:00	8070.0 FT	818.0 FT

Output DLIS Files

DEFAULT AIT_TLD_MCFL_CNL_018PUP FN:17 PRODUCER 13−Dec−2007 20:42 5200.0 FT 2203.5 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 1170.04 F3

Cement Volume = 839.10 F3 (assuming 4.50 IN casing O.D.)

Computed from 5200.0 FT to 2204.0 FT using data channel(s) HCAL

OP System Version: 15C0−309

MCM

HILTB−CTS SRPC−3497−NOV_2007

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

Tension (TENS)
10000 (LBF) 0

AIT−H 90 Inch Investigation (AHT90)
0.2 (OHMM) 2000

SP (SP)
−160 (MV) 40

AIT−H 60 Inch Investigation (AHT60)
0.2 (OHMM) 2000

Caliper (HCAL)
6 (IN) 16

Stuck Stretch (STIT)
0 (F) 50

AIT−H 30 Inch Investigation (AHT30)
0.2 (OHMM) 2000

Gamma Ray (GR)
0 (GAPI) 200

Tool/Tot. Drag

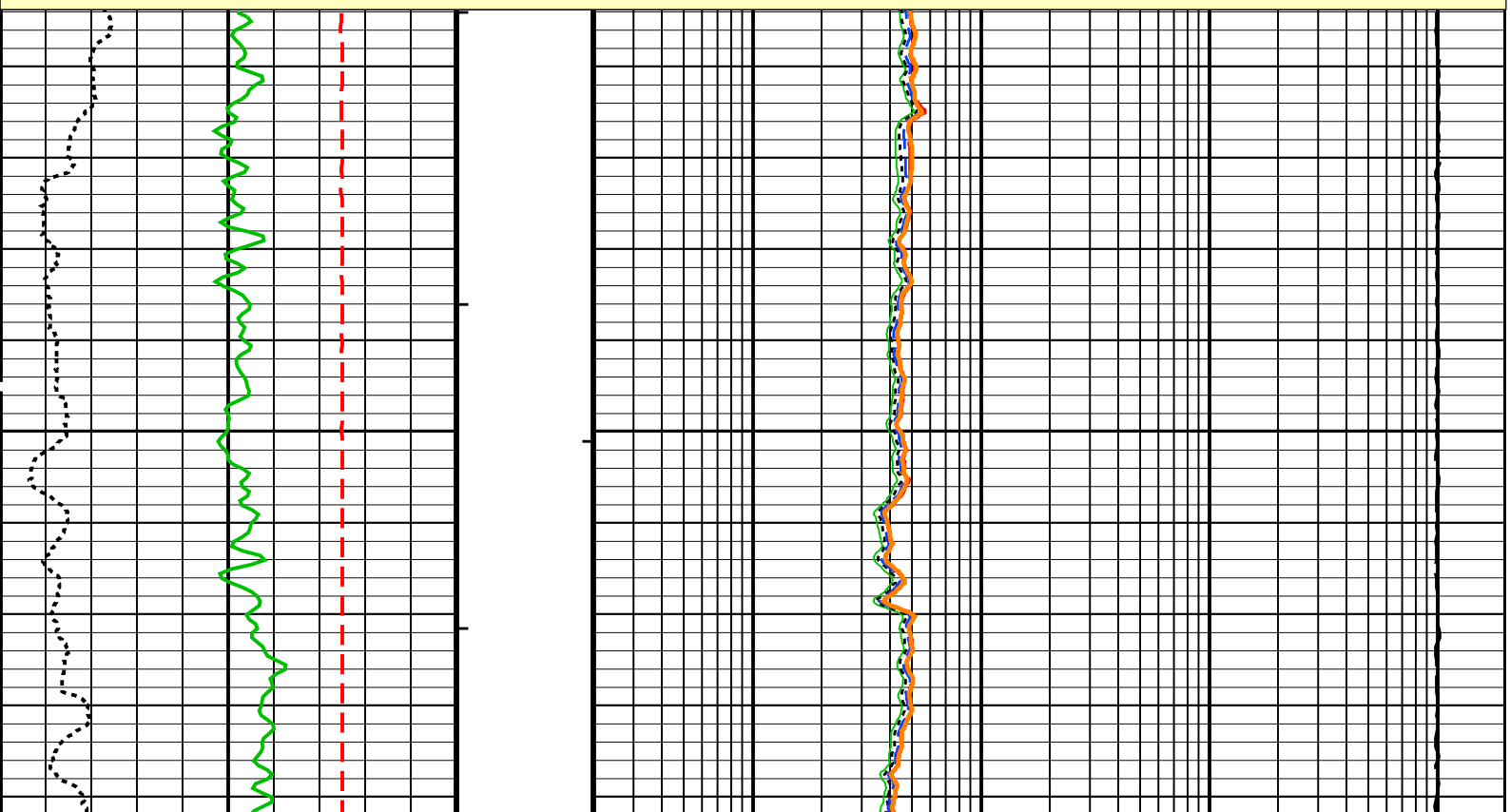
AIT−H 20 Inch Investigation (AHT20)
0.2 (OHMM) 2000

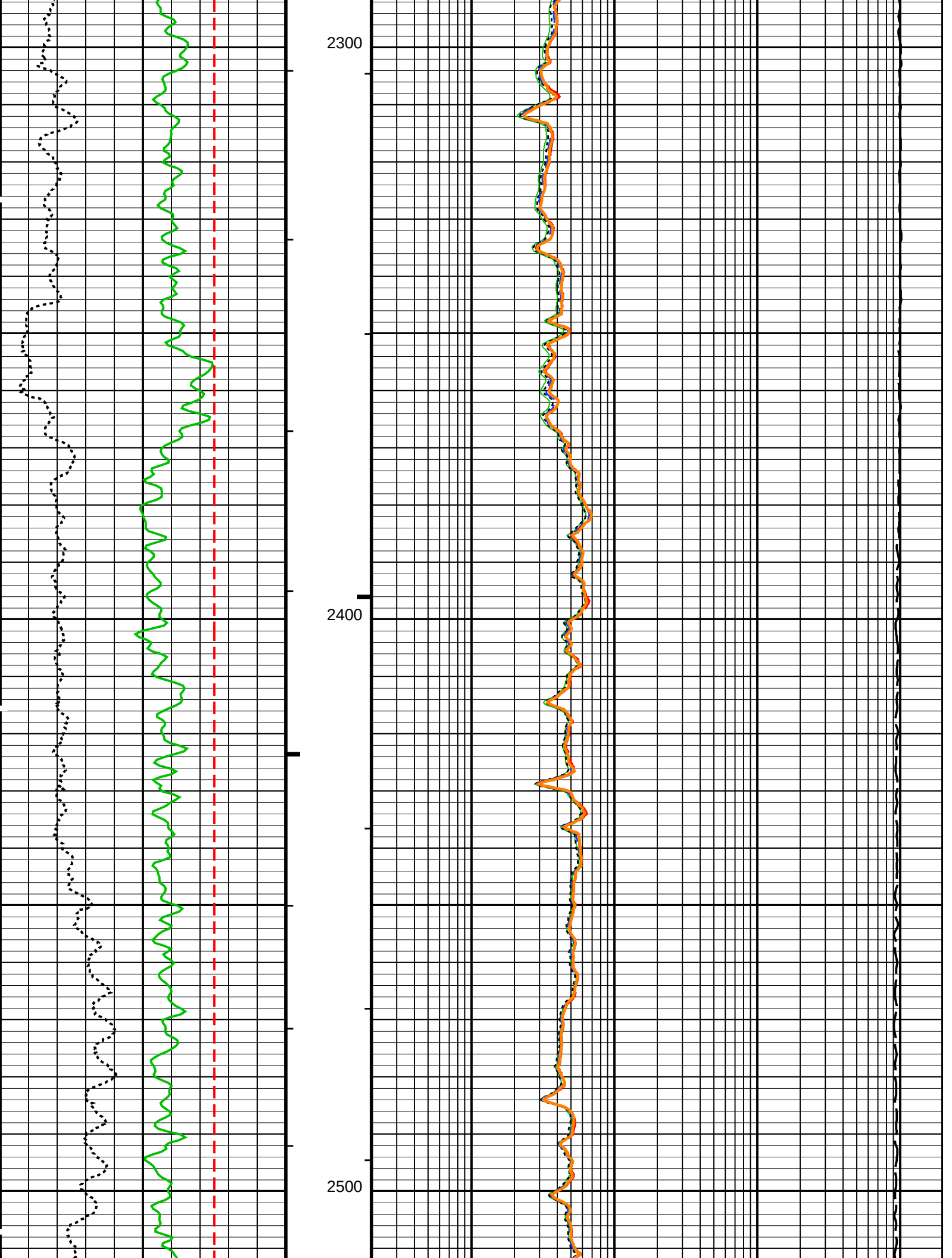
Gamma Ray Backup

Cable Drag

AIT−H 10 Inch Investigation (AHT10)
0.2 (OHMM) 2000

MAIN PASS: *** PLATFORM EXPRESS − ARRAY INDUCTION ***

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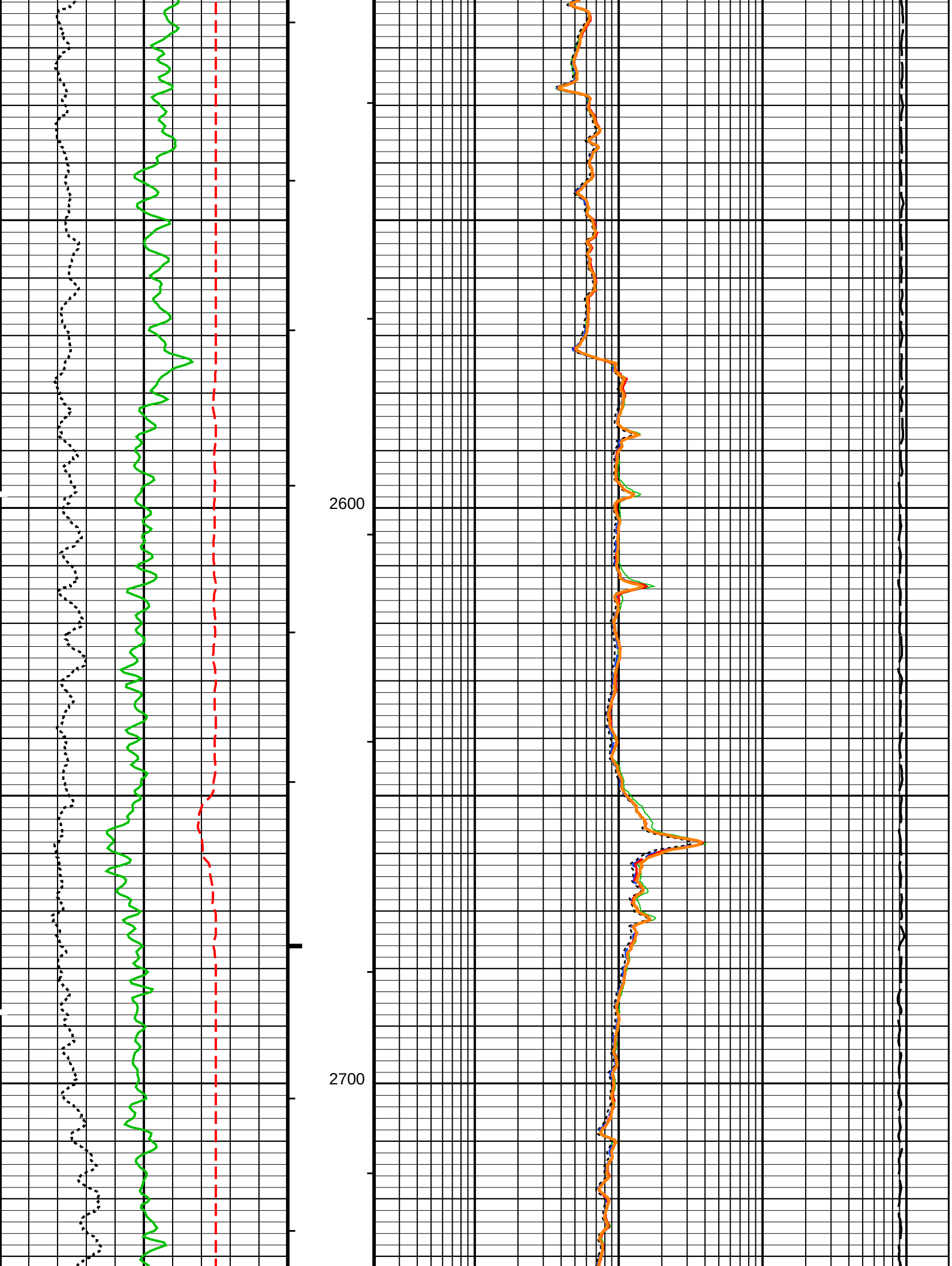
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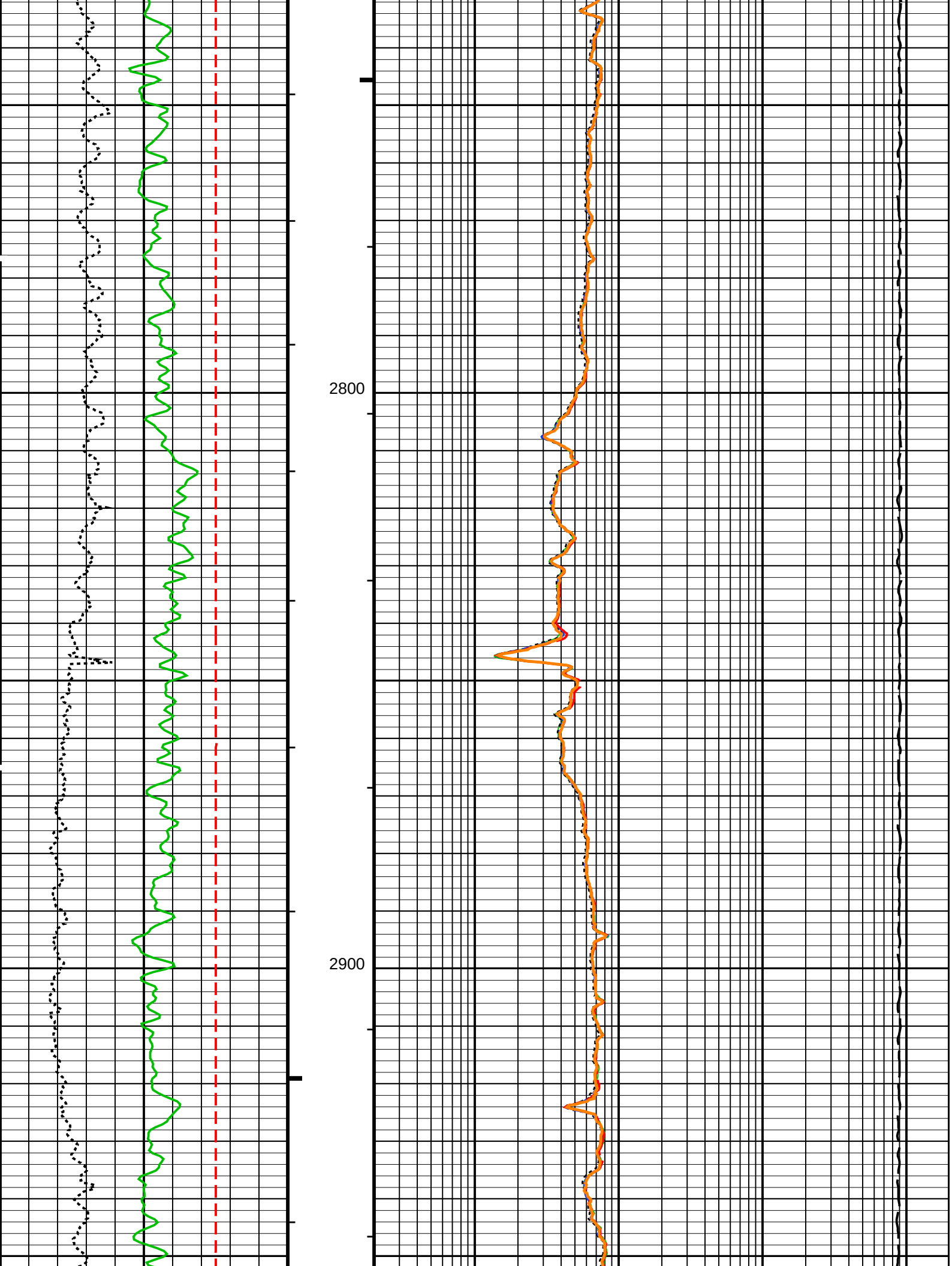
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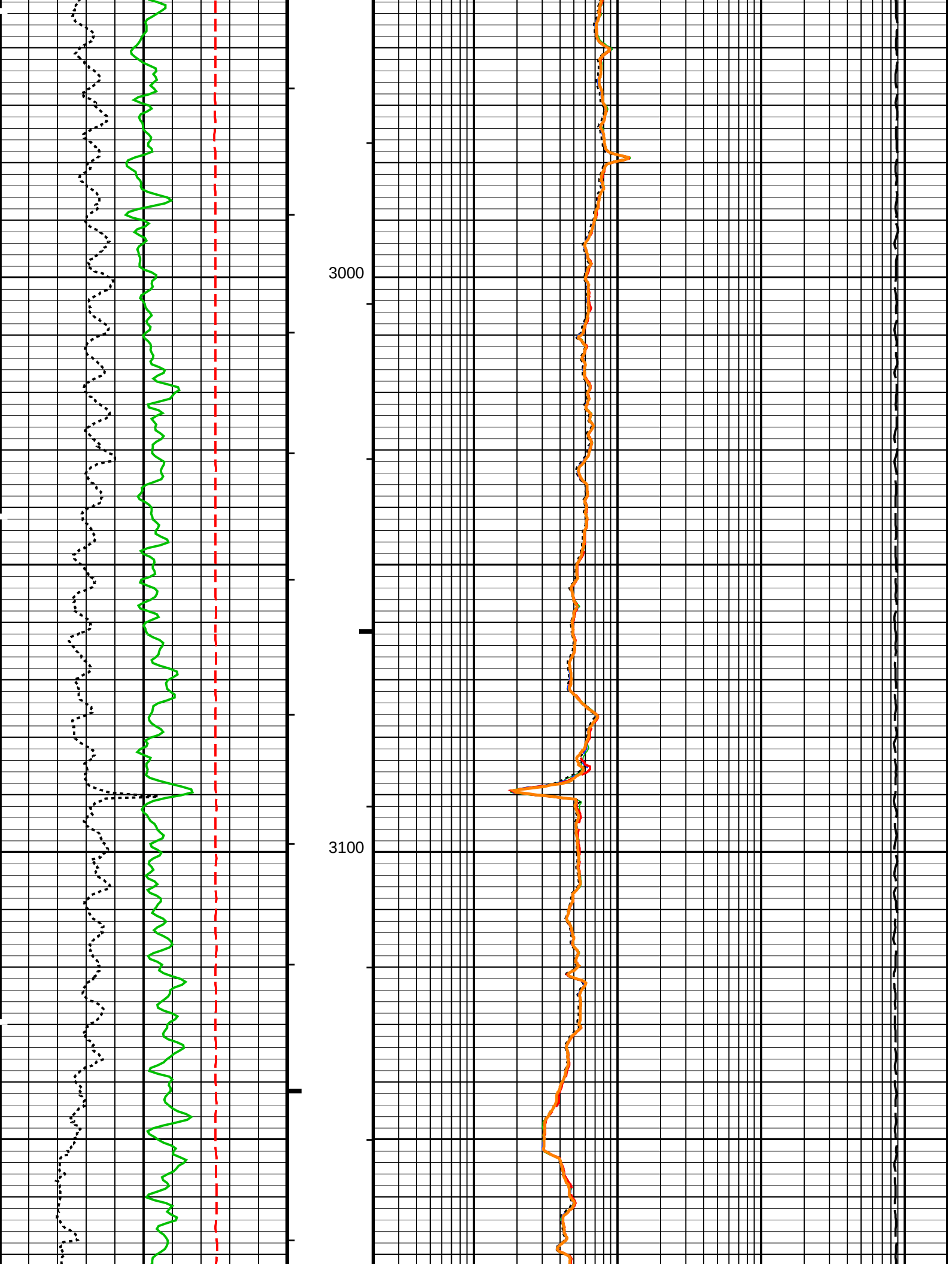
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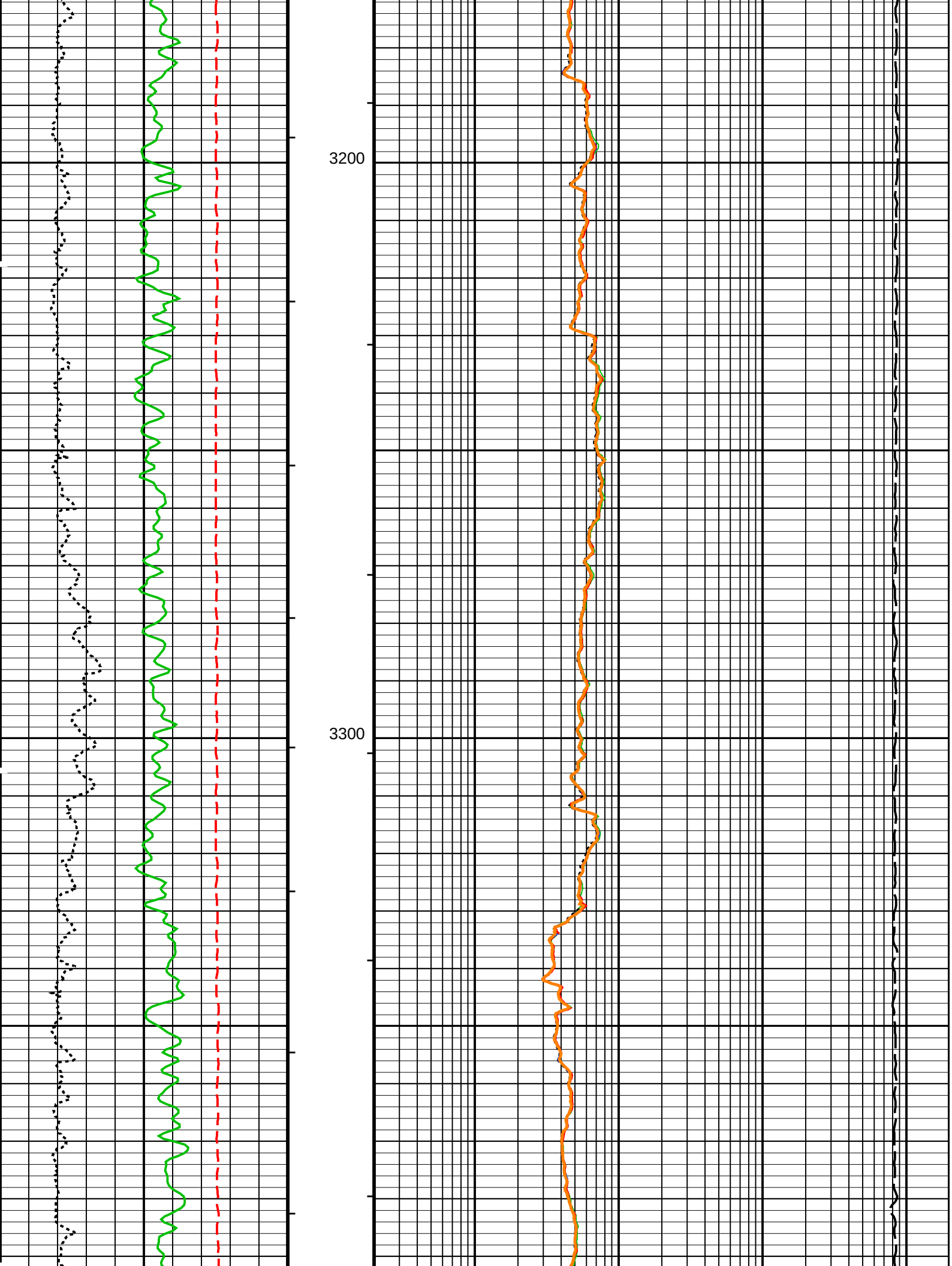
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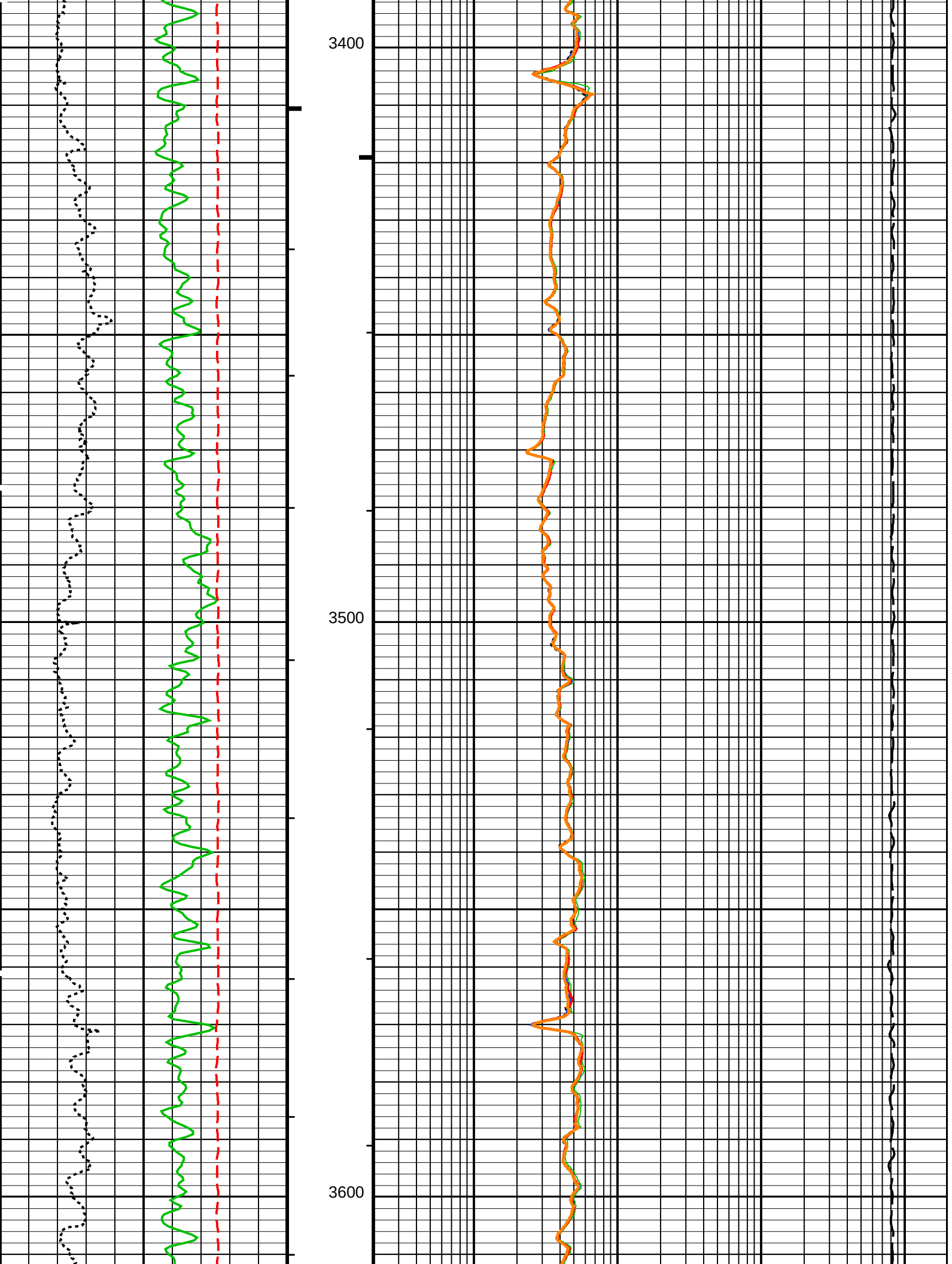
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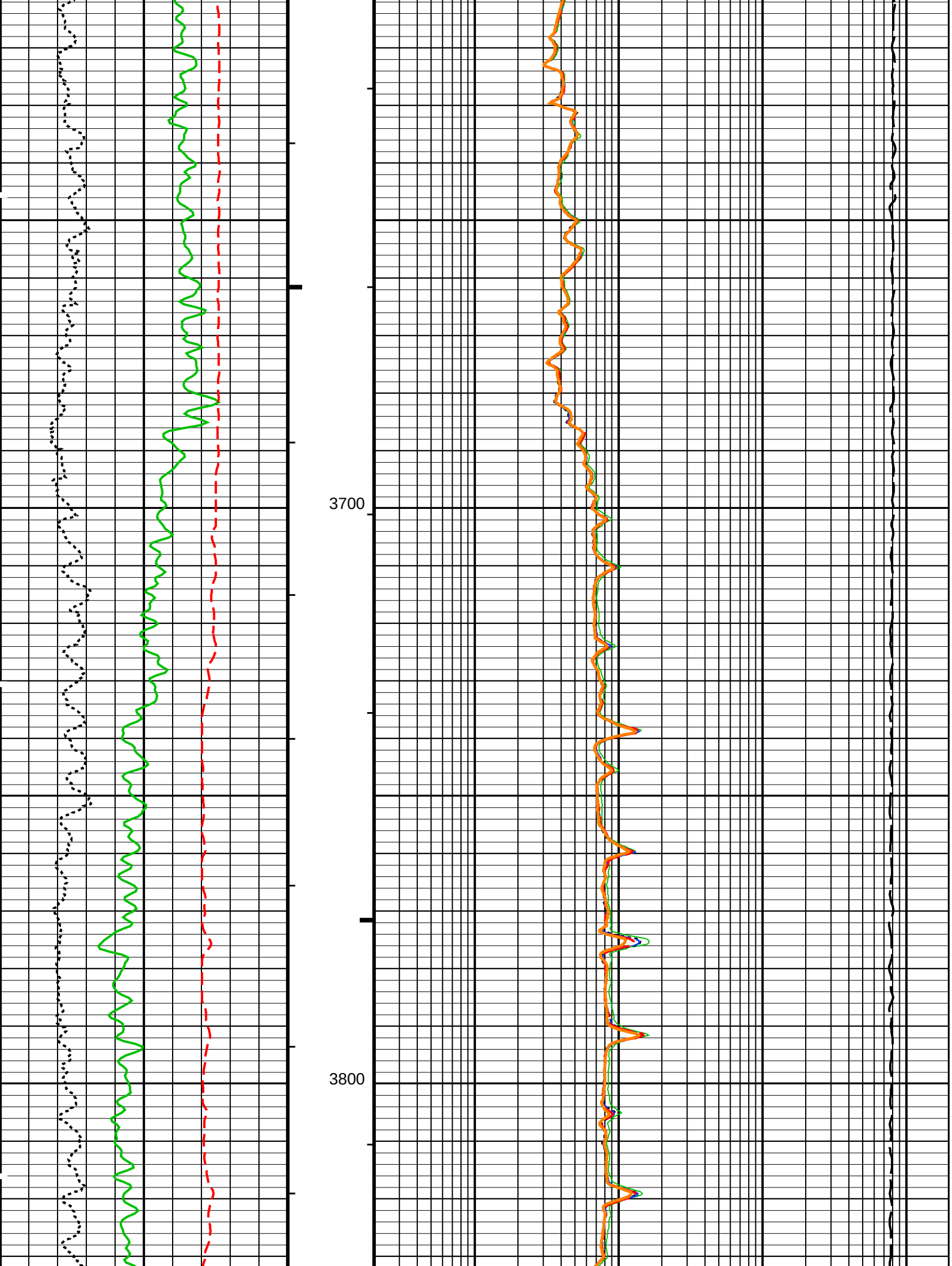
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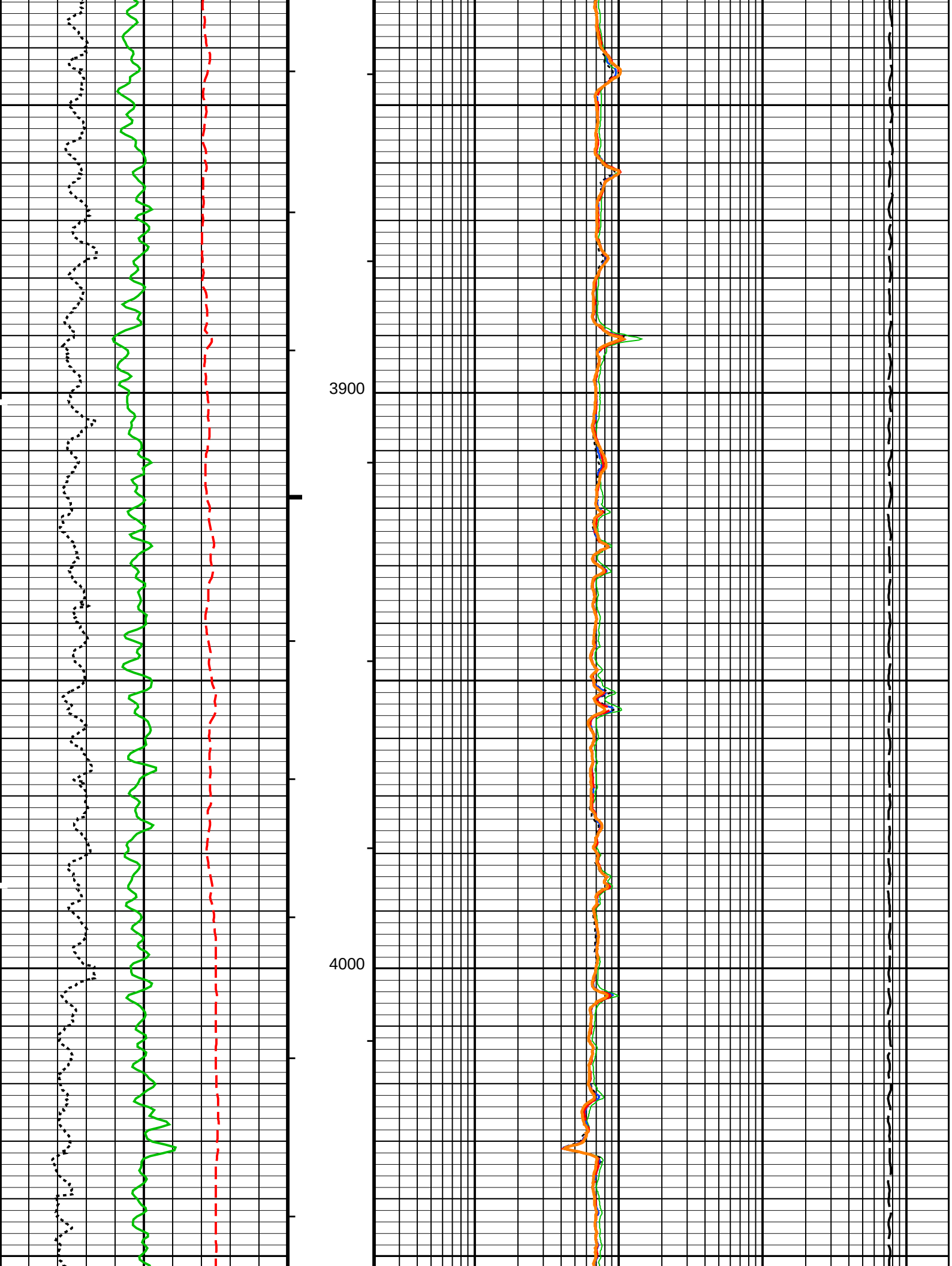
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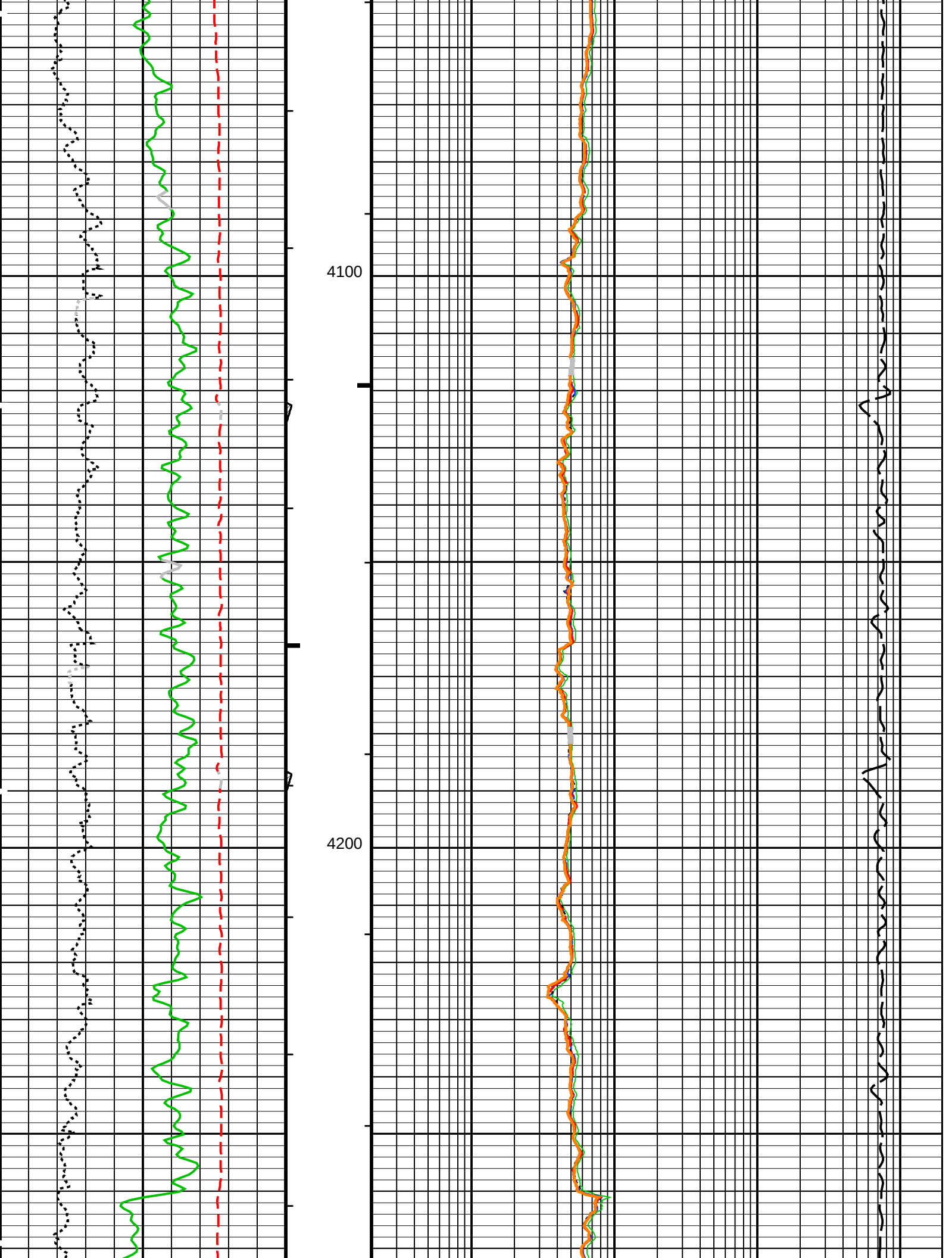
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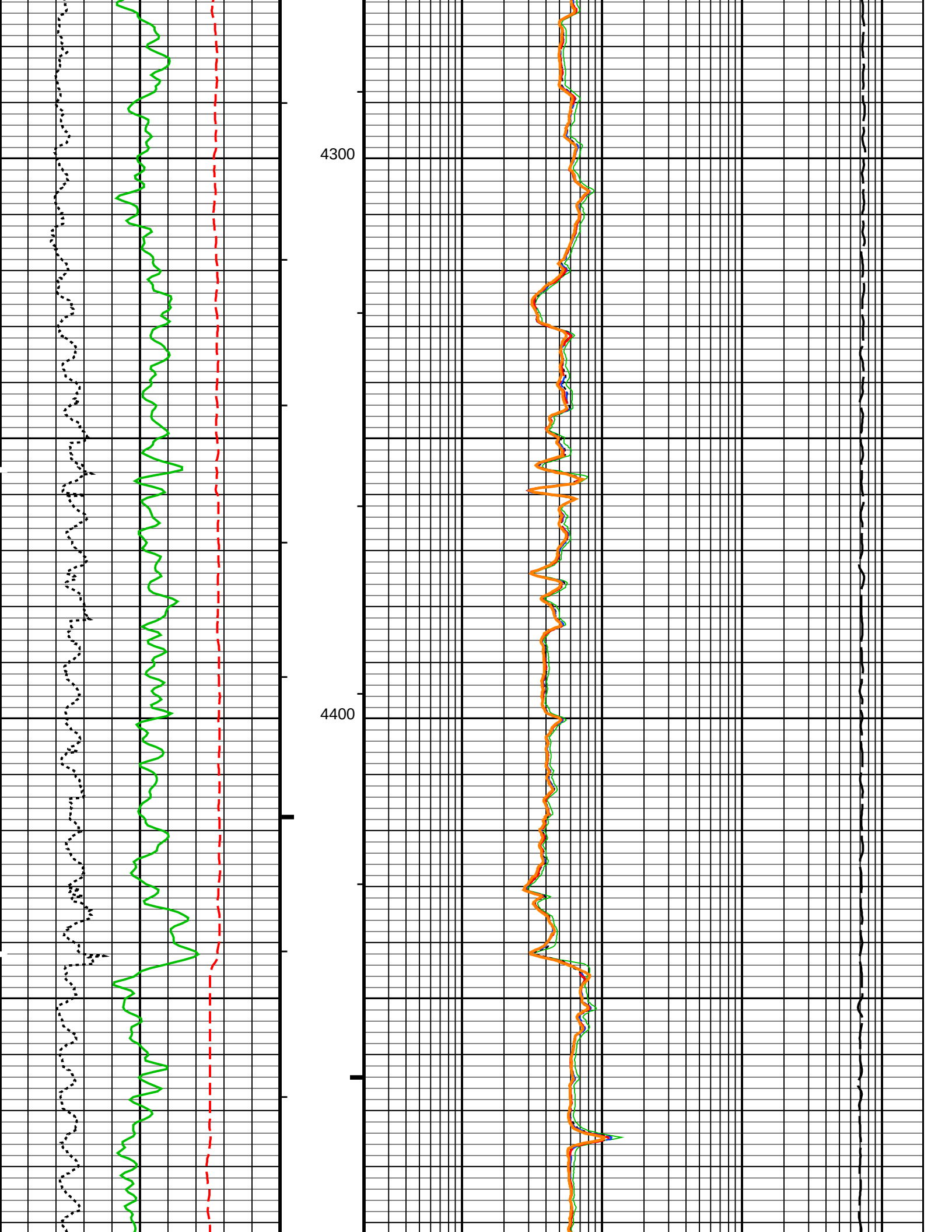
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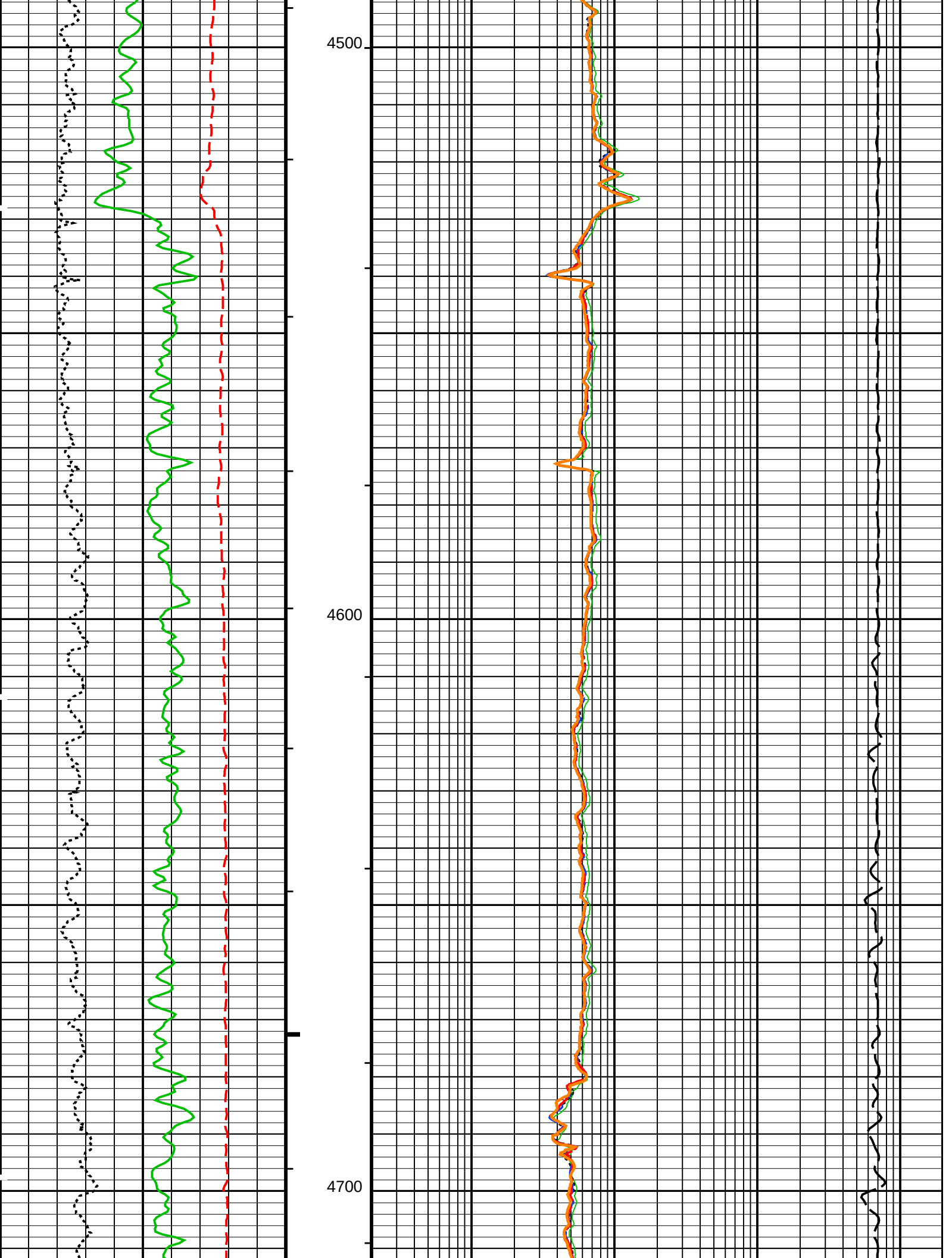
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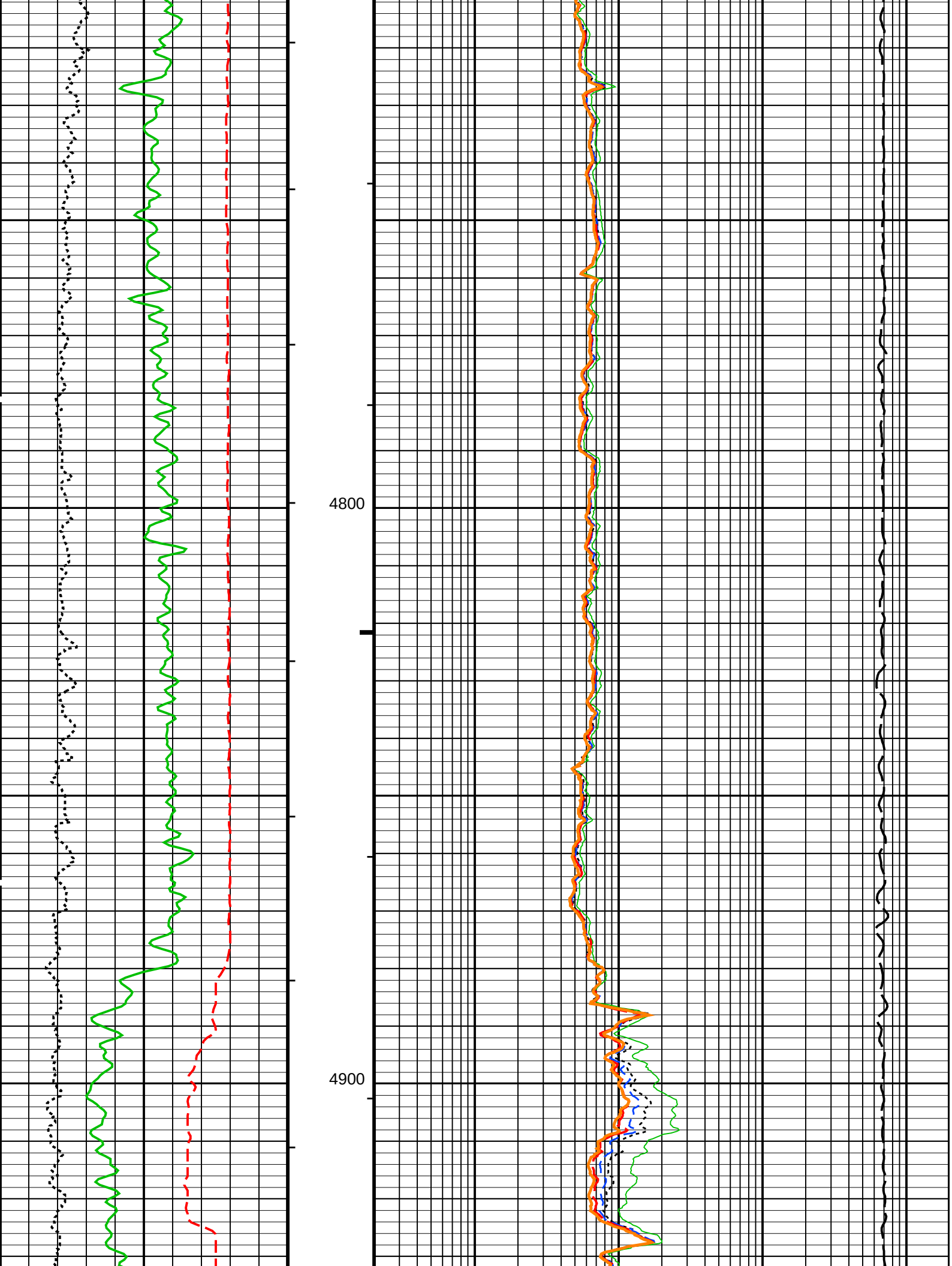
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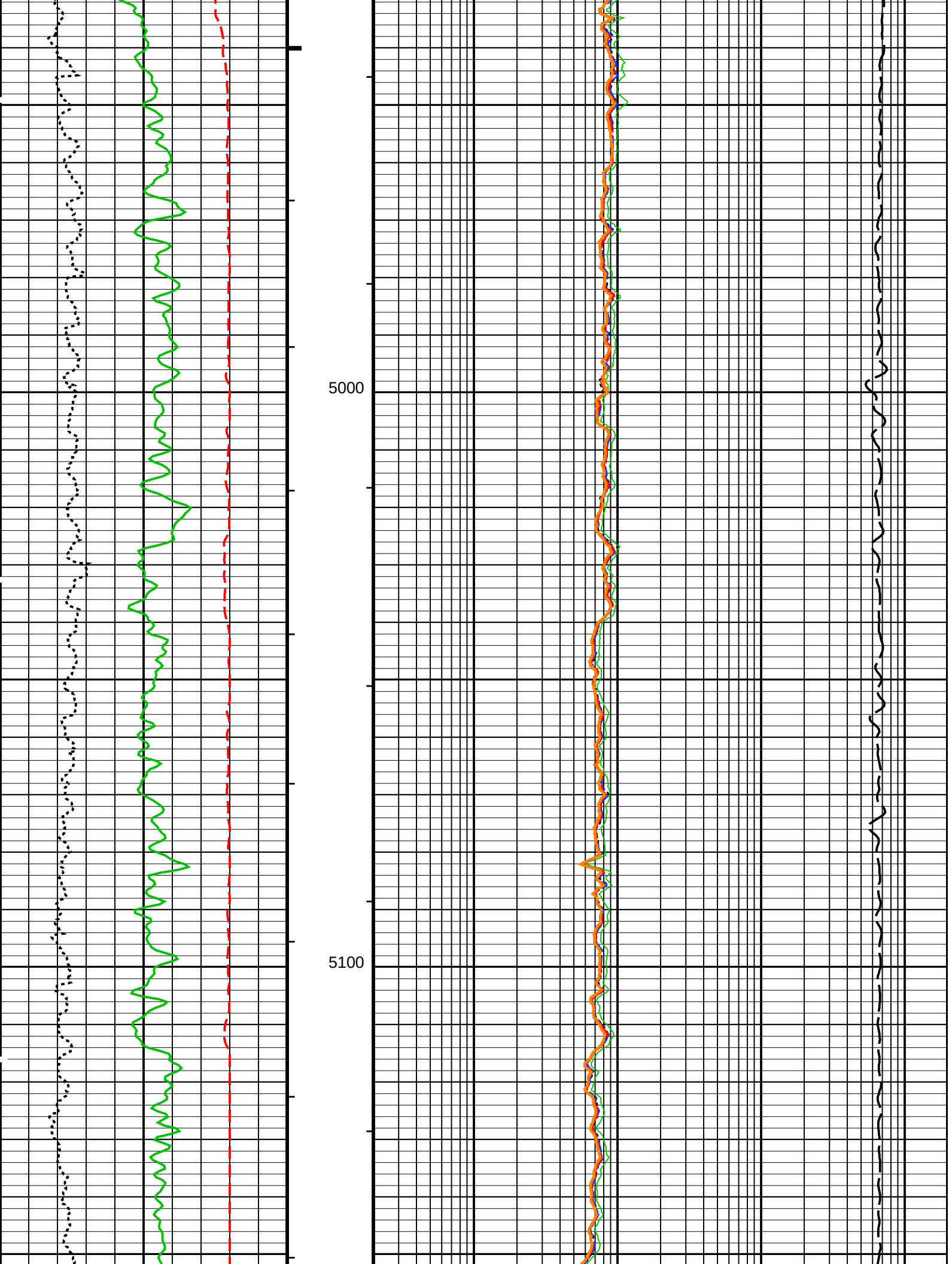
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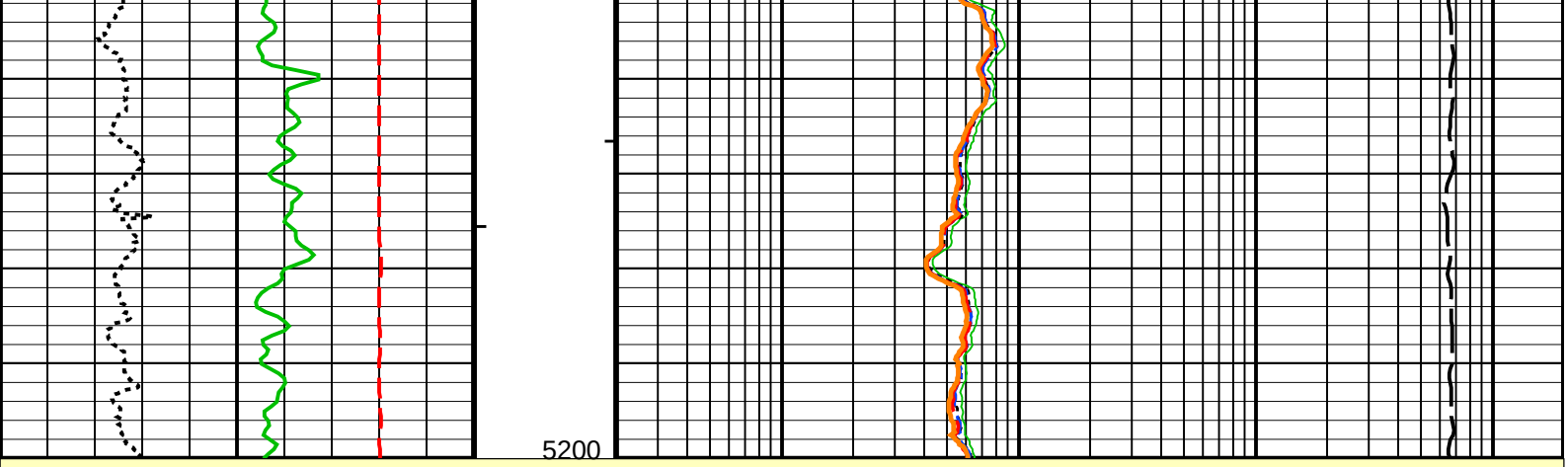


MAIN PASS: * PLATFORM EXPRESS − ARRAY INDUCTION ***

Gamma Ray Backup	Cable Drag	AIT−H 10 Inch Investigation (AHT10) 0.2 (OHMM) 2000
Gamma Ray (GR) 0 (GAPI) 200	Tool/Tot. Drag	AIT−H 20 Inch Investigation (AHT20) 0.2 (OHMM) 2000
Caliper (HCAL) 6 (IN) 16	Stuck Stretch (STIT) 0 (F) 50	AIT−H 30 Inch Investigation (AHT30) 0.2 (OHMM) 2000
SP (SP) −160 (MV) 40		AIT−H 60 Inch Investigation (AHT60) 0.2 (OHMM) 2000
		AIT−H 90 Inch Investigation (AHT90) 0.2 (OHMM) 2000
		Tension (TENS) 10000 (LBF) 0

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

AIT−H Answer Product Processing Summary. Data taken with Tool # 374 (AHTNO)

...Acquired data from HILT/HAIT

***** Borehole Correction *****

Effective Tool Standoff computed. Borehole diameter and mud res. taken as input (see GCSE and GRSE parameters)

Tool is run in ECCENTERED mode with a tool stand−off of 0.13 IN. Bit Size is 7.88 IN.

***** Input Selections to AIT−H Answer Product Processing *****

Caliper (GCSE): HCAL Mud Resistivity (GRSE): AHMF Temperature (GTSE): HTEM Porosity (FPHI): DPHZ

***** Other Parameters used by AIT−H Answer Product Processing *****

Form Factor Exponent (FEXP)	2.000	Form Factor Numerator (FNUM)	1.000
Mud Filtrate Sample Resistivity (RMFS)	1.040 OHMM	Mud Filtrate Sample Temperature (MFST)	115.000 DEGF
Resitivity Connate Water (RW)	1.000 OHMM		

***** AIT−H Answer Product Processing Control Parameters *****

Playback Mode: NORMAL

Parameters

DLIS Name	Description	Value
HILTB−CTS: High resolution Integrated Logging Tool−CTS		
AHBHM	Array Induction Borehole Correction Mode	2_ComputeStandoff
AHBHV	Array Induction Borehole Correction Code Version Number	000

AHBHV	Array Induction Borehole Correction Code Version Number	900	
AHBLM	Array Induction Basic Logs Mode	6_One_Two_and_Four	
AHBLV	Array Induction Basic Logs Code Version Number	223	
AHCDE	Array Induction Casing Detection Enable	Yes	
AHCEN	Array Induction Tool Centering Flag (in Borehole)	Eccentered	
AHFRSV	Array Induction Response Set Version for Four ft Resolution	41.70.24.20	
AHMRF	Array Induction Mud Resistivity Factor	1	
AHORSV	Array Induction Response Set Version for One ft Resolution	41.70.24.20	
AHRFV	Array Induction Radial Profiling Code Version Number	701	
AHRPV	Array Induction Radial Parametrization Code Version Number	232	
AHSTA	Array Induction Tool Standoff	0.125	IN
AHTRSV	Array Induction Response Set Version for Two ft Resolution	41.70.24.20	
BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68	DEGF
SPNV	SP Next Value	0	MV
FEQL: Formation Evaluation Quick Look			
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
HOLEV: Integrated Hole/Cement Volume			
BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
FCD	Future Casing (Outer) Diameter	4.5	IN
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
SHT	Surface Hole Temperature	68	DEGF
PERT: Preliminary Evaluation − Real Time			
BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68	DEGF
STI: Stuck Tool Indicator			
LBFR	Trigger for MAXIS First Reading Label	TDL	
STKT	STI Stuck Threshold	2.5	FT
TDD	Total Depth − Driller	8035.00	FT
TDL	Total Depth − Logger	8048.00	FT
System and Miscellaneous			
BS	Bit Size	7.875	IN
DFD	Drilling Fluid Density	9.30	LB/G
DO	Depth Offset for Playback	0.5	FT
FLEV	Fluid Level	5.00	FT
MST	Mud Sample Temperature	115.00	DEGF
PP	Playback Processing	NORMAL	
TD	Total Depth	8048	FT

Format: GRES Vertical Scale: 5" per 100' Graphics File Created: 13−Dec−2007 20:42

OP System Version: 15C0−309

MCM

HILTB−CTS SRPC−3497−NOV_2007

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_009LUP	FN:8	PRODUCER	13−Dec−2007 19:00	8070.0 FT	818.0 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_018PUP	FN:17	PRODUCER	13−Dec−2007 20:42

Schlumberger

MAIN RESISTIVITY LOG 5" = 100'

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_009LUP	FN:8	PRODUCER	13−Dec−2007 19:00	8070.0 FT	818.0 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_016PUP	FN:15	PRODUCER	13−Dec−2007 20:39	8070.5 FT	6853.5 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 397.81 F3

Cement Volume = 265.89 F3 (assuming 4.50 IN casing O.D.)

Computed from 8048.0 FT to 6854.0 FT using data channel(s) HCAL

OP System Version: 15C0−309

MCM

HILTB−CTS SRPC−3497−NOV_2007

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

Tension (TENS) 10000 (LBF) 0

AIT−H 90 Inch Investigation (AHT90) 0.2 (OHMM) 2000

SP (SP) −160 (MV) 40

AIT−H 60 Inch Investigation (AHT60) 0.2 (OHMM) 2000

Caliper (HCAL) 6 (IN) 16

Stuck Stretch (STIT) 0 (F) 50

AIT−H 30 Inch Investigation (AHT30) 0.2 (OHMM) 2000

Gamma Ray (GR) 0 (GAPI) 200

Tool/Tot. Drag

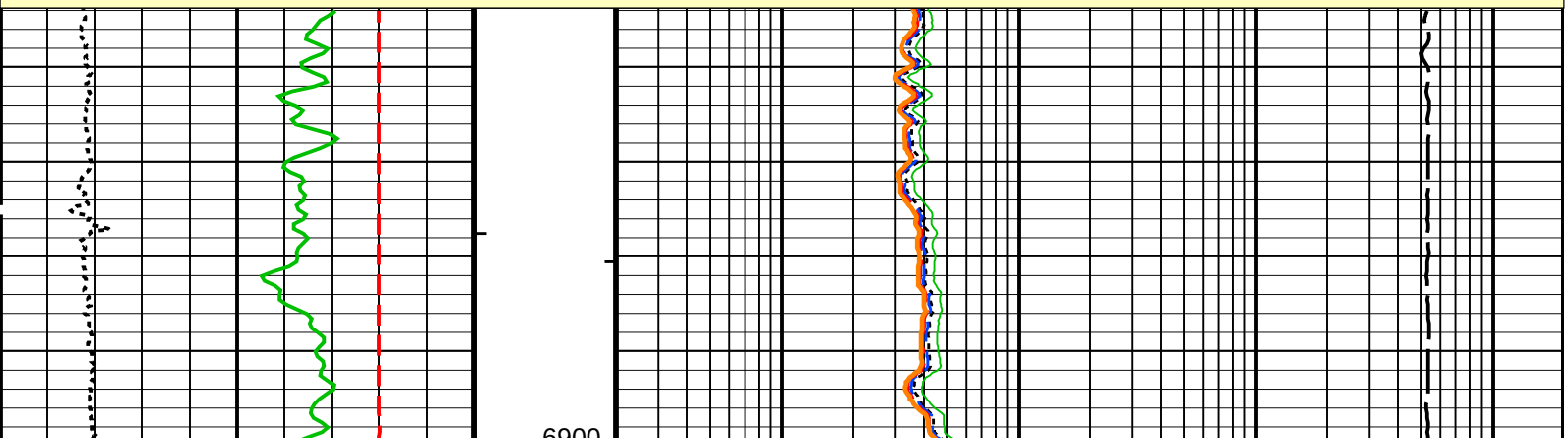
AIT−H 20 Inch Investigation (AHT20) 0.2 (OHMM) 2000

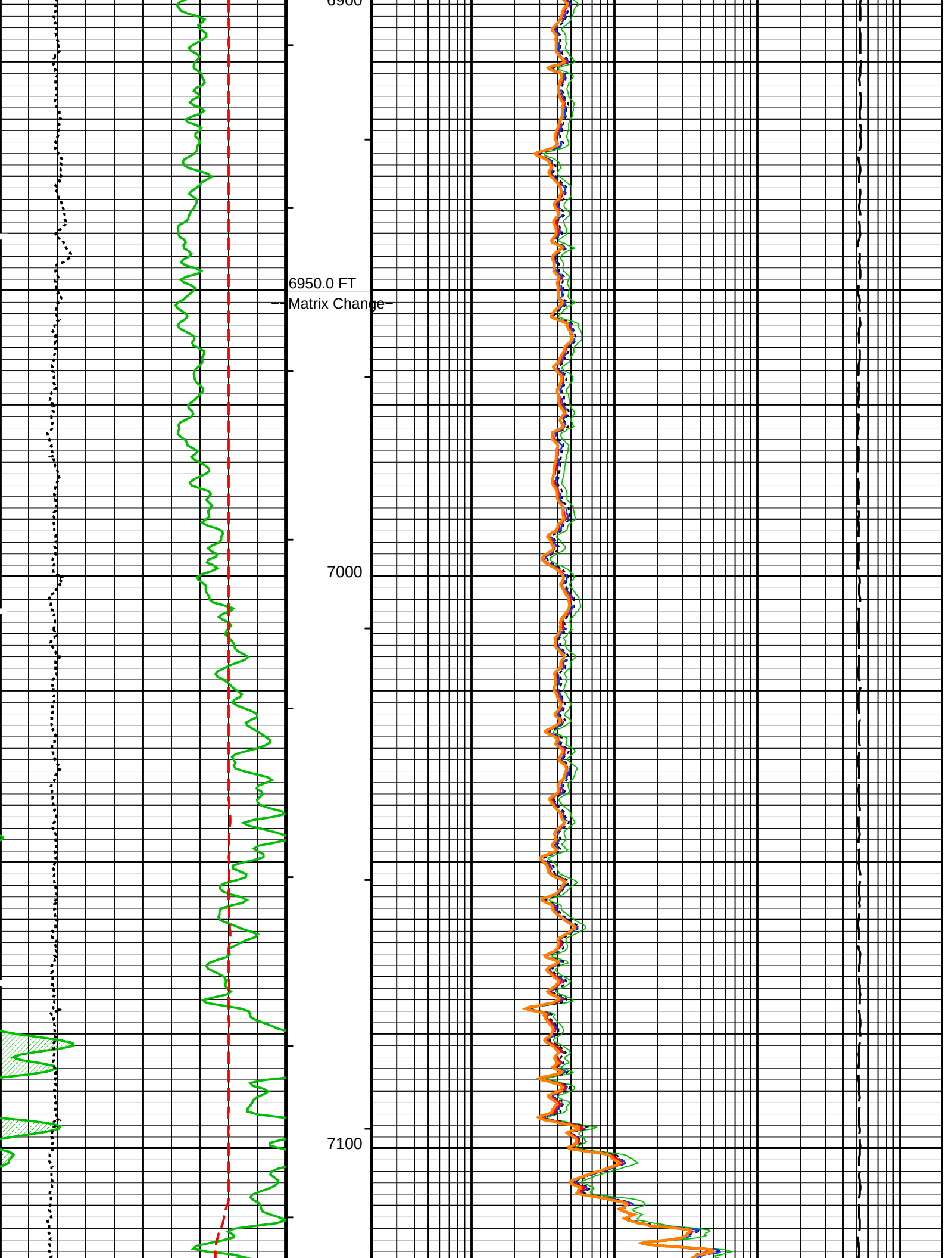
Gamma Ray Backup

Cable Drag

AIT−H 10 Inch Investigation (AHT10) 0.2 (OHMM) 2000

MAIN PASS: * PLATFORM EXPRESS − ARRAY INDUCTION ***

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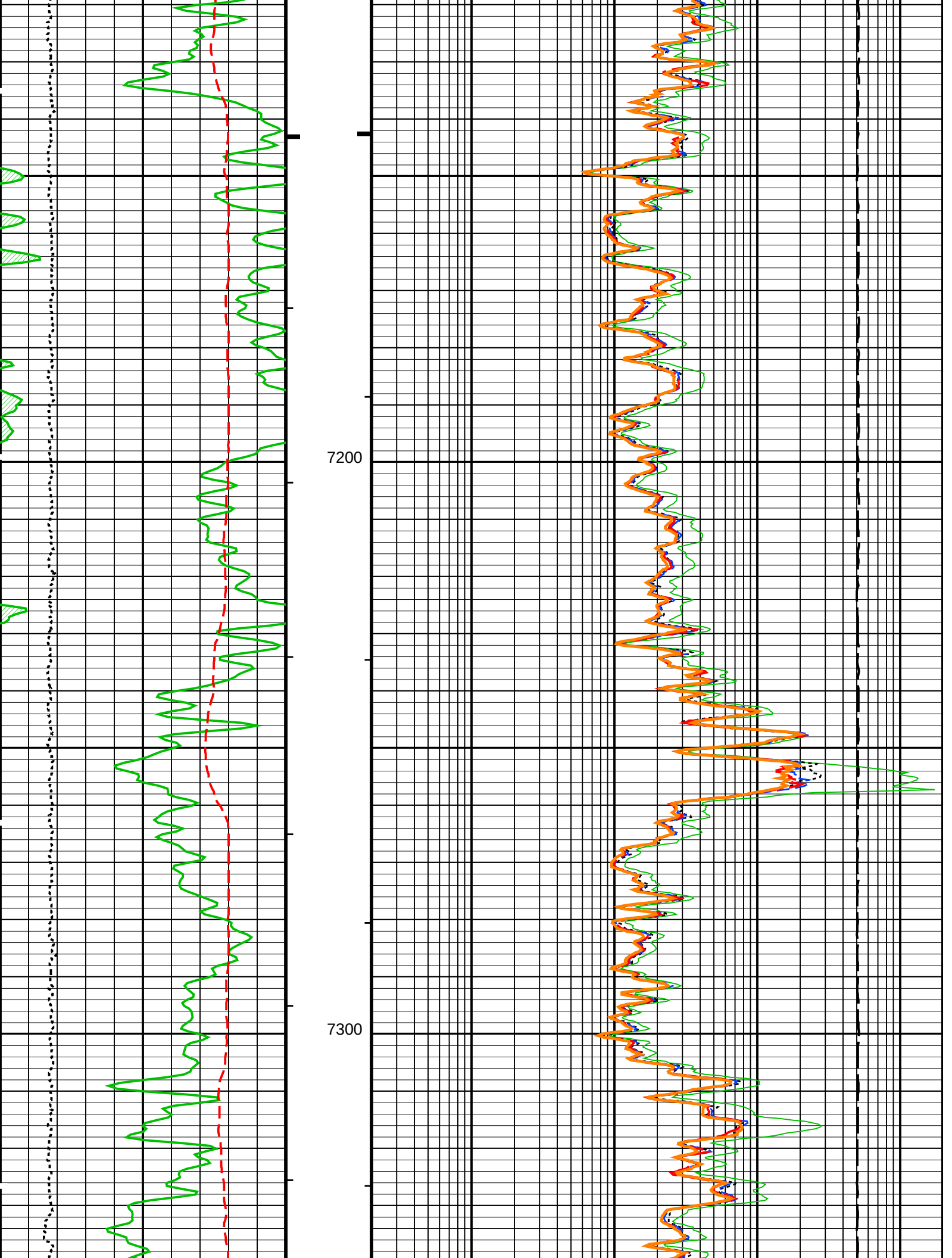
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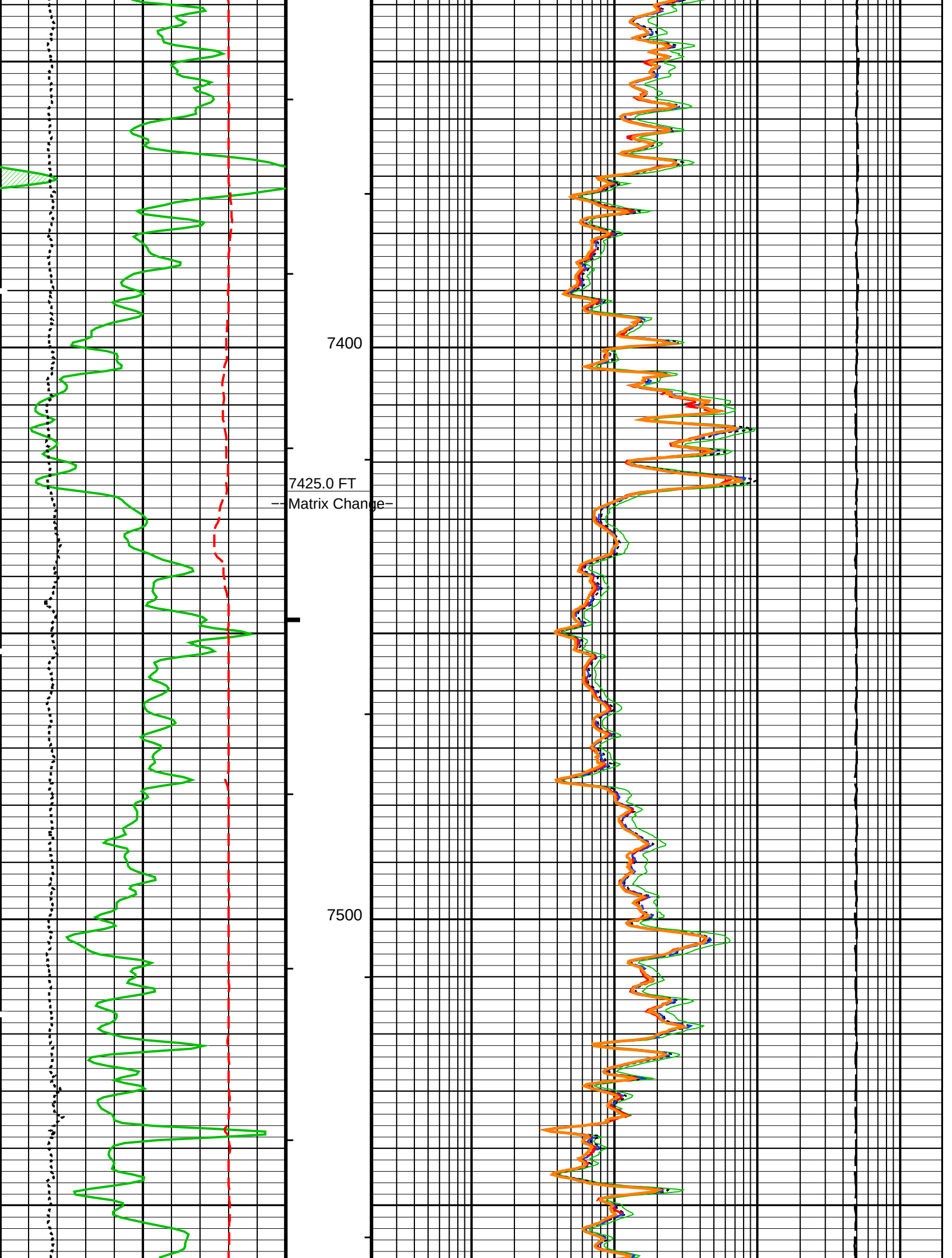
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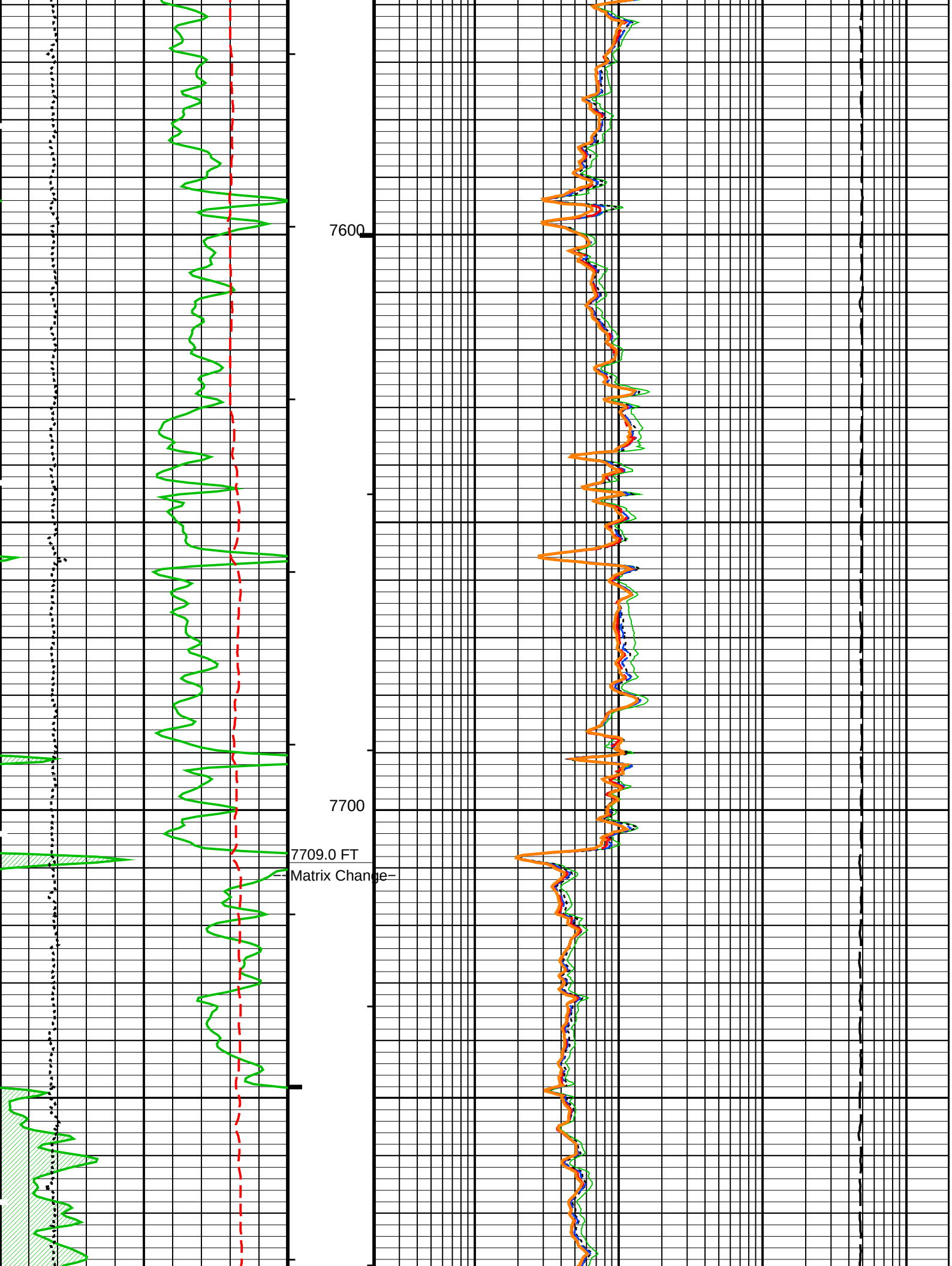
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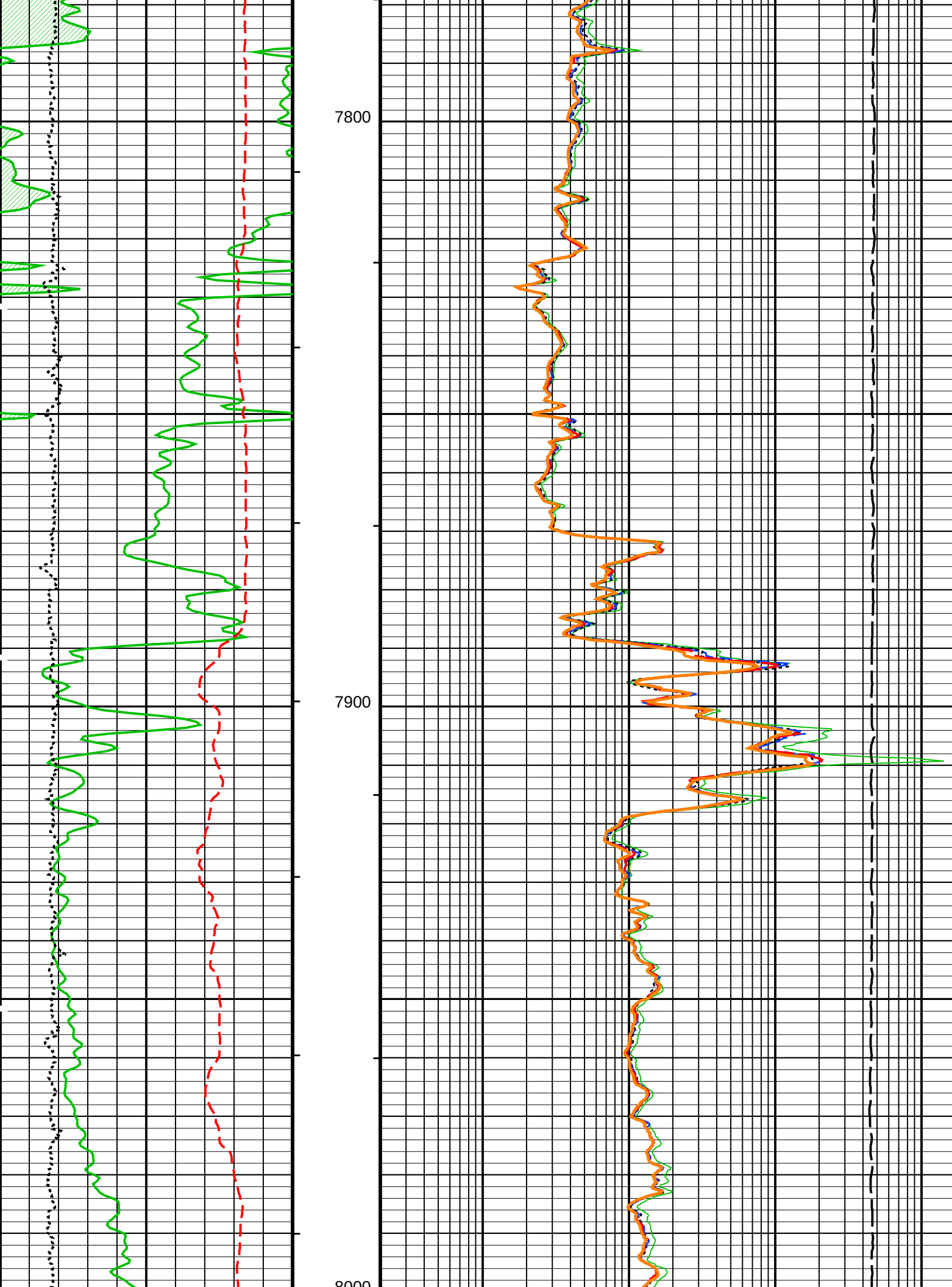
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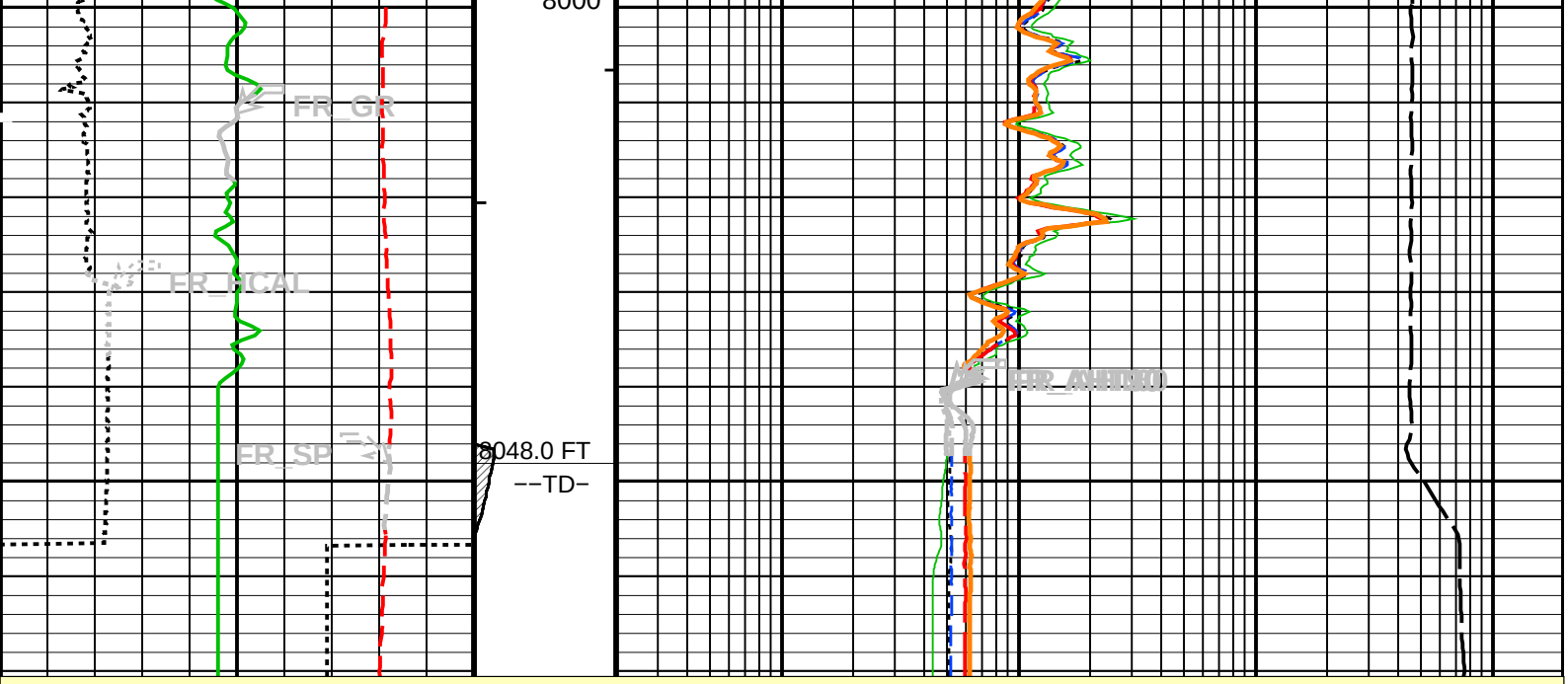


MAIN PASS: * PLATFORM EXPRESS − ARRAY INDUCTION ***

Gamma Ray Backup	Cable Drag	AIT−H 10 Inch Investigation (AHT10) 0.2 (OHMM) 2000
Gamma Ray (GR) 0 (GAPI) 200	Tool/Tot. Drag	AIT−H 20 Inch Investigation (AHT20) 0.2 (OHMM) 2000
Caliper (HCAL) 6 (IN) 16	Stuck Stretch (STIT) 0 (F) 50	AIT−H 30 Inch Investigation (AHT30) 0.2 (OHMM) 2000
SP (SP) −160 (MV) 40		AIT−H 60 Inch Investigation (AHT60) 0.2 (OHMM) 2000
		AIT−H 90 Inch Investigation (AHT90) 0.2 (OHMM) 2000
		Tension (TENS) 10000 (LBF) 0

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

AIT−H Answer Product Processing Summary. Data taken with Tool # 374 (AHTNO)

...Acquired data from HILT/HAIT

***** Borehole Correction *****

Effective Tool Standoff computed. Borehole diameter and mud res. taken as input (see GCSE and GRSE parameters)

Tool is run in ECCENTERED mode with a tool stand−off of 0.13 IN. Bit Size is 7.88 IN.

***** Input Selections to AIT−H Answer Product Processing *****

Caliper (GCSE): HCAL Mud Resistivity (GRSE): AHMF Temperature (GTSE): HTEM Porosity (FPHI): DPHZ

***** Other Parameters used by AIT−H Answer Product Processing *****

Form Factor Exponent (FEXP)	2.000	Form Factor Numerator (FNUM)	1.000
Mud Filtrate Sample Resistivity (RMFS)	1.040 OHMM	Mud Filtrate Sample Temperature (MFST)	115.000 DEGF
Resitivity Connate Water (RW)	1.000 OHMM		

***** AIT−H Answer Product Processing Control Parameters *****

Playback Mode: NORMAL

Parameters

DLIS Name	Description	Value	
	HILTB−CTS: High resolution Integrated Logging Tool−CTS		
AHBHM	Array Induction Borehole Correction Mode	2_ComputeStandoff	
AHBHV	Array Induction Borehole Correction Code Version Number	900	
AHBLM	Array Induction Basic Logs Mode	6_One_Two_and_Four	
AHBLV	Array Induction Basic Logs Code Version Number	223	
AHCDE	Array Induction Casing Detection Enable	Yes	
AHCEN	Array Induction Tool Centering Flag (in Borehole)	Eccentered	
AHFRSV	Array Induction Response Set Version for Four ft Resolution	41.70.24.20	
AHMRF	Array Induction Mud Resistivity Factor	1	
AHORSV	Array Induction Response Set Version for One ft Resolution	41.70.24.20	
AHRFV	Array Induction Radial Profiling Code Version Number	701	
AHRPV	Array Induction Radial Parametrization Code Version Number	232	
AHSTA	Array Induction Tool Standoff	0.125	IN
AHTRSV	Array Induction Response Set Version for Two ft Resolution	41.70.24.20	
BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68	DEGF
SPNV	SP Next Value	0	MV
	FEQL: Formation Evaluation Quick Look		
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
	HOLEV: Integrated Hole/Cement Volume		
BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
FCD	Future Casing (Outer) Diameter	4.5	IN
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
SHT	Surface Hole Temperature	68	DEGF
	PERT: Preliminary Evaluation − Real Time		
BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68	DEGF
	STI: Stuck Tool Indicator		
LBFR	Trigger for MAXIS First Reading Label	TDL	
STKT	STI Stuck Threshold	2.5	FT
TDD	Total Depth − Driller	8035.00	FT
TDL	Total Depth − Logger	8048.00	FT
	System and Miscellaneous		
BS	Bit Size	7.875	IN
DFD	Drilling Fluid Density	9.30	LB/G
DO	Depth Offset for Playback	0.5	FT
DORL	Depth Offset for Repeat Analysis	0.0	FT
FLEV	Fluid Level	5.00	FT
MST	Mud Sample Temperature	115.00	DEGF
PP	Playback Processing	NORMAL	
TD	Total Depth	8048	FT

Format: LOWER_GRES Vertical Scale: 5" per 100' Graphics File Created: 13−Dec−2007 20:39

OP System Version: 15C0−309

MCM

HILTB−CTS SRPC−3497−NOV_2007

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_009LUP	FN:8	PRODUCER	13−Dec−2007 19:00	8070.0 FT	818.0 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_016PUP	FN:15	PRODUCER	13−Dec−2007 20:39

Schlumberger

REPEAT ANALYSIS

MAXIS Field Log

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_006PUP	FN:5	PRODUCER	13−Dec−2007 19:03	8073.0 FT	7190.5 FT
DEFAULT	AIT_TLD_MCFL_CNL_009LUP	FN:8	PRODUCER	13−Dec−2007 19:00	8070.0 FT	818.0 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_016PUP	FN:15	PRODUCER	13−Dec−2007 20:39	8070.5 FT	6853.5 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 397.81 F3

Cement Volume = 265.89 F3 (assuming 4.50 IN casing O.D.)

Computed from 8048.0 FT to 6854.0 FT using data channel(s) HCAL

OP System Version: 15C0−309

MCM

HILTB−CTS SRPC−3497−NOV_2007

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

TENS_REP Curve (TENS_REP)
10000 (LBF) 0

AHT90_REP Curve (AHT90_REP)
0.2 (OHMM) 2000

SP_REP Curve (SP_REP)
−160 (MV) 40

AHT60_REP Curve (AHT60_REP)
0.2 (OHMM) 2000

HCAL_REP Curve (HCAL_REP)
6 (IN) 16

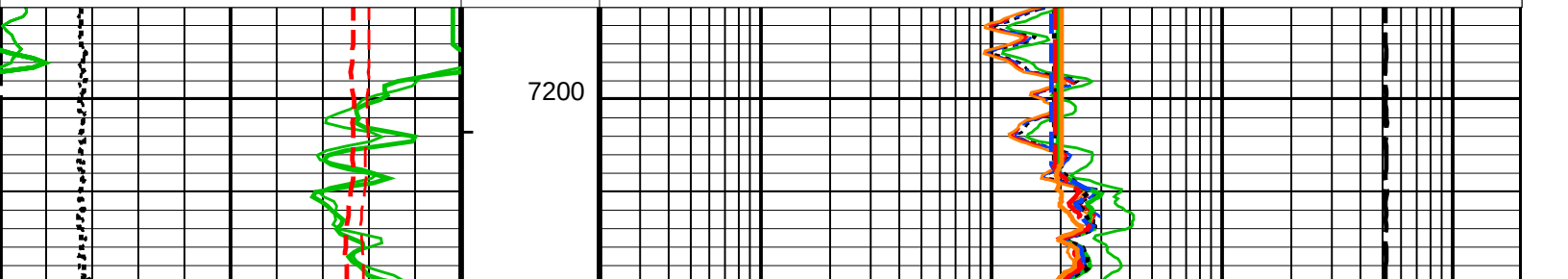
AHT30_REP Curve (AHT30_REP)
0.2 (OHMM) 2000

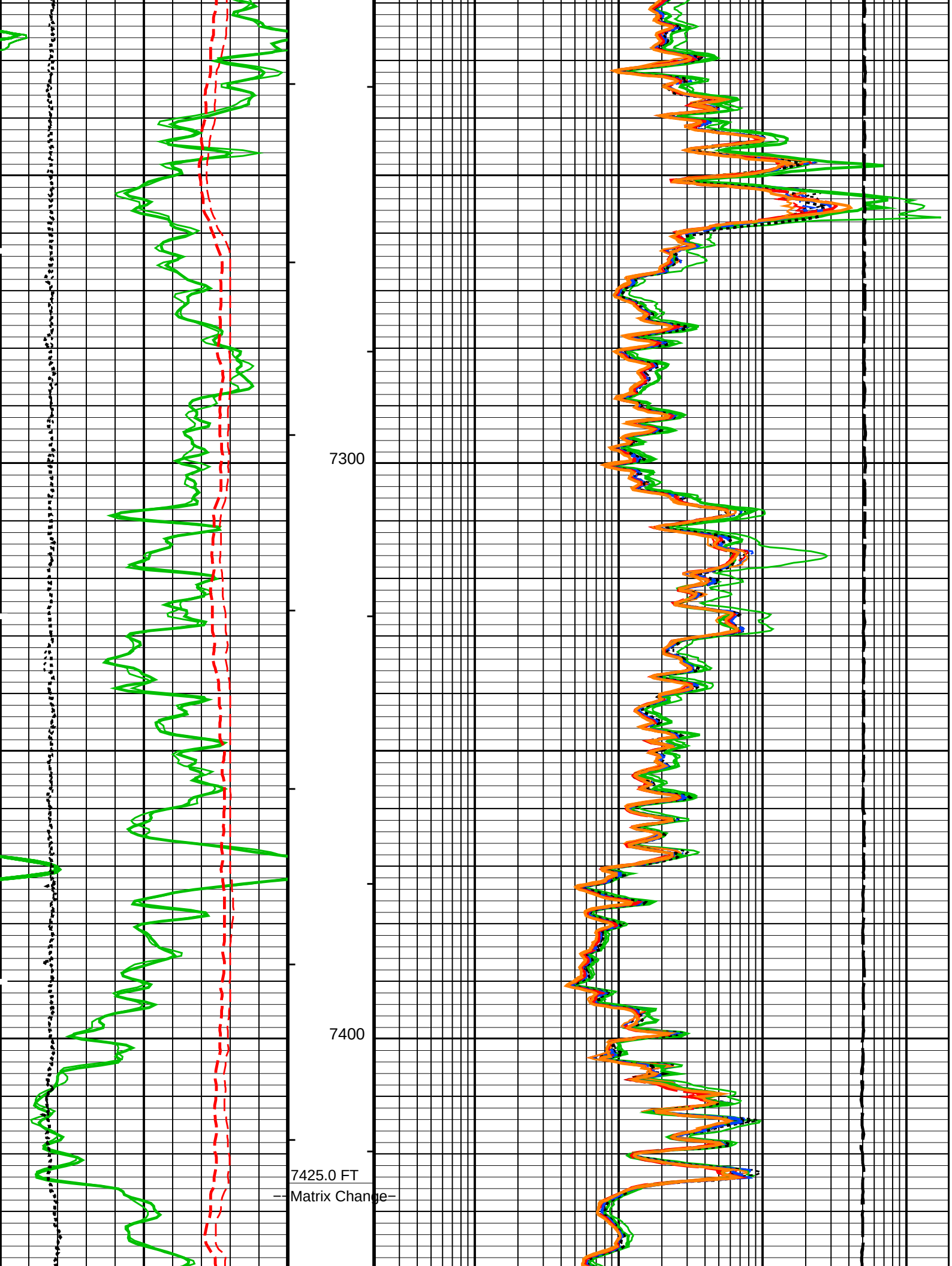
GR1_REP Curve (GR_REP)
200 (GAPI) 400

AHT20_REP Curve (AHT20_REP)
0.2 (OHMM) 2000

GR_REP Curve (GR_REP)
0 (GAPI) 200

AHT10_REP Curve (AHT10_REP)
0.2 (OHMM) 2000

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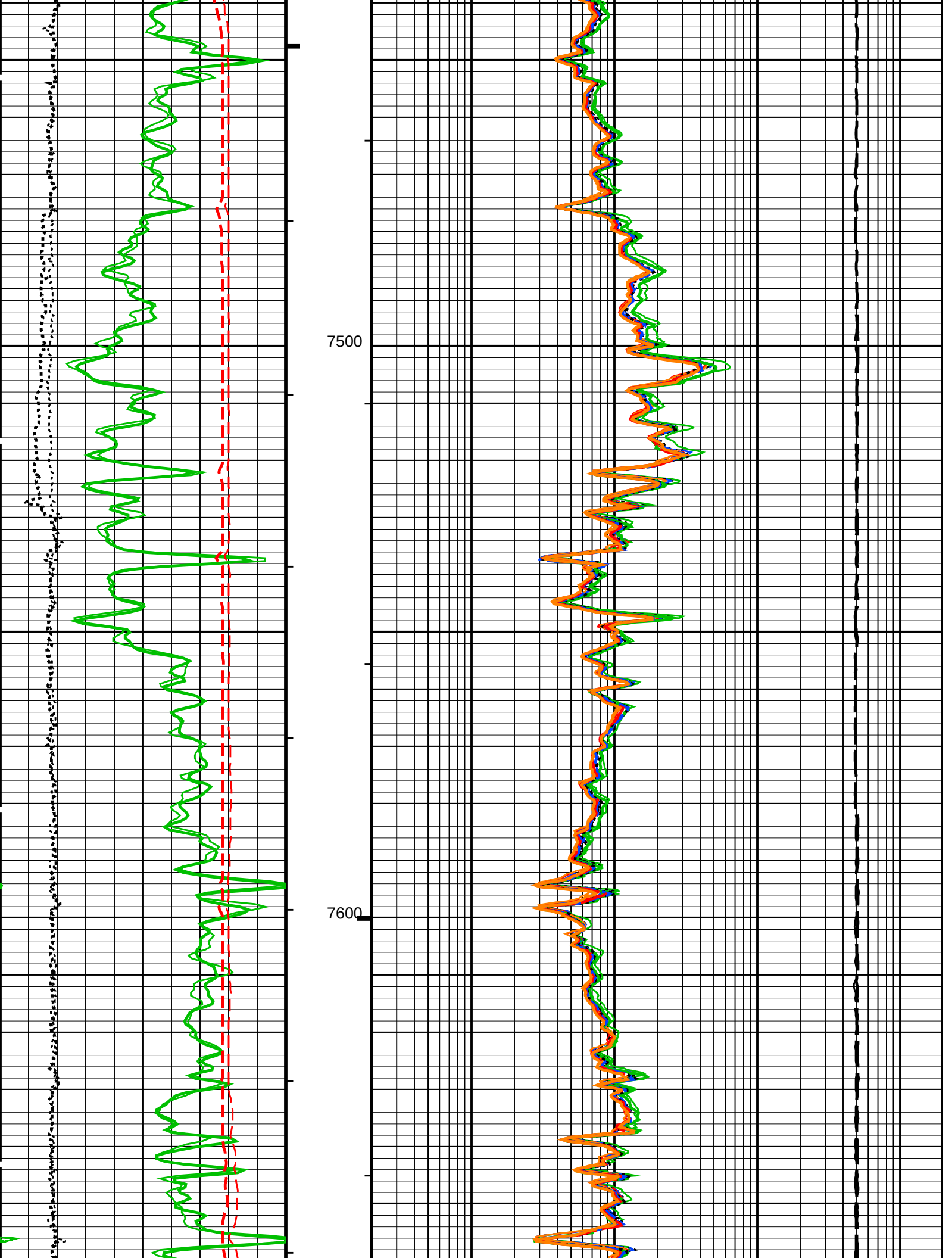
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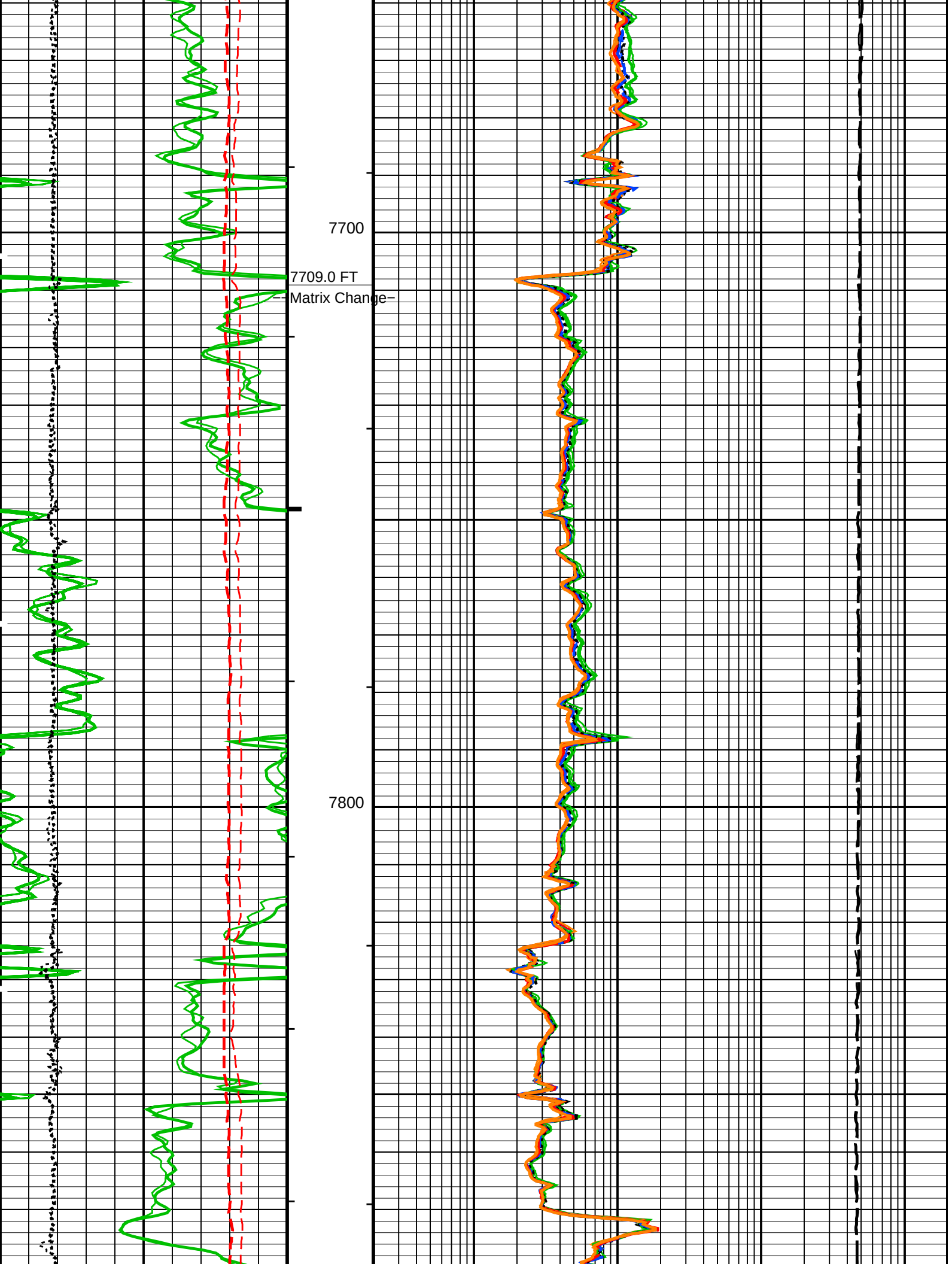
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7709.0 FT
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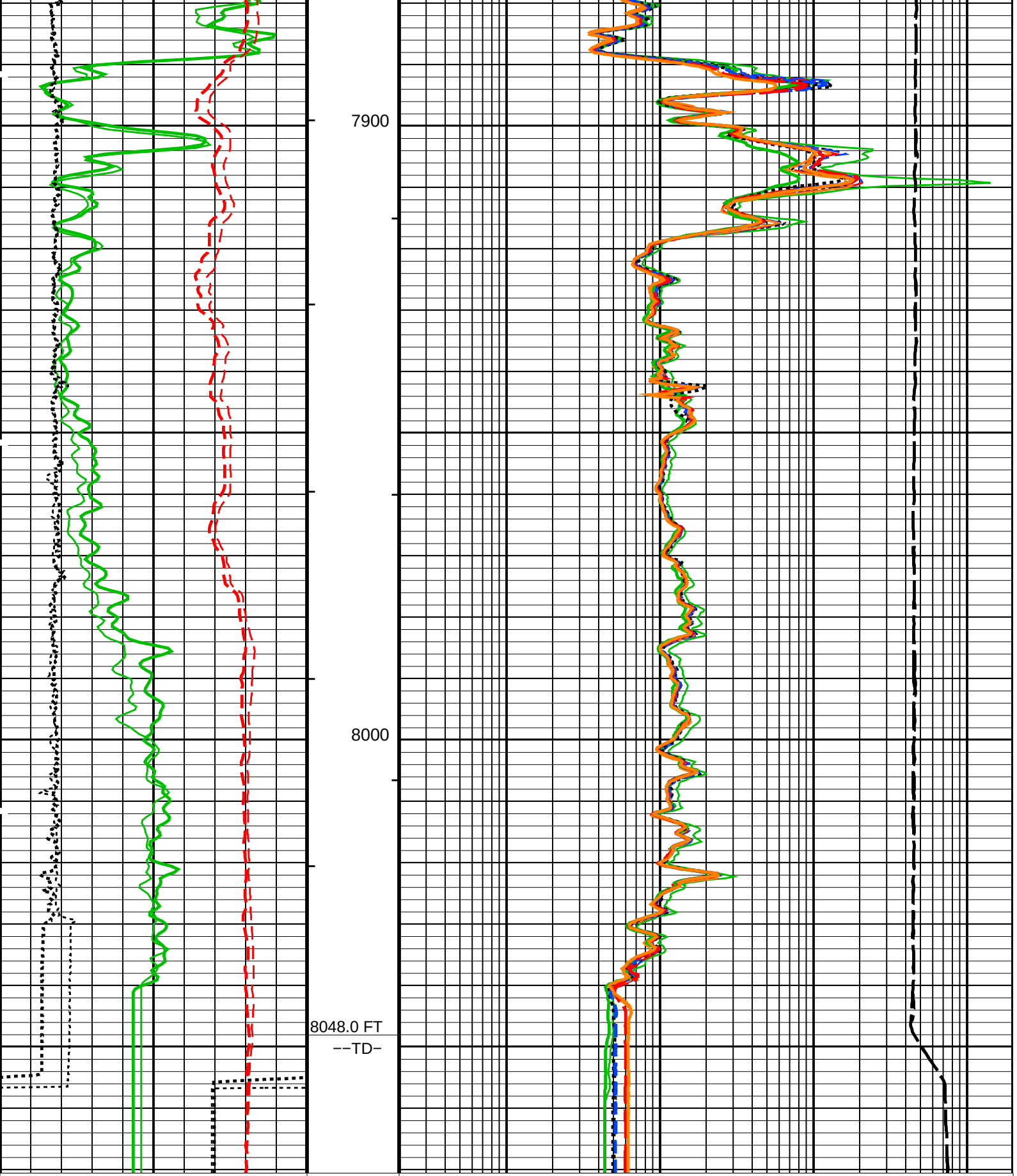

GR_REP Curve (GR_REP)
0 (GAPI) 200

GR1_REP Curve (GR_REP)
200 (GAPI) 400

HCAL_REP Curve (HCAL_REP)
6 (IN) 16

AHT10_REP Curve (AHT10_REP)
0.2 (OHMM) 2000

AHT20_REP Curve (AHT20_REP)
0.2 (OHMM) 2000

AHT30_REP Curve (AHT30_REP)
0.2 (OHMM) 2000

SP_REP Curve (SP_REP)

−160 (MV) 40

AHT60_REP Curve (AHT60_REP)

0.2 (OHMM) 2000

AHT90_REP Curve (AHT90_REP)

0.2 (OHMM) 2000

TENS_REP Curve (TENS_REP)

10000 (LBF) 0

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

AIT−H Answer Product Processing Summary. Data taken with Tool # 374 (AHTNO)

...Acquired data from HILT/HAIT

***** Borehole Correction *****

Effective Tool Standoff computed. Borehole diameter and mud res. taken as input (see GCSE and GRSE parameters)

Tool is run in ECCENTERED mode with a tool stand−off of 0.13 IN. Bit Size is 7.88 IN.

***** Input Selections to AIT−H Answer Product Processing *****

Caliper (GCSE): HCAL Mud Resistivity (GRSE): AHMF Temperature (GTSE): HTEM Porosity (FPHI): DPHZ

***** Other Parameters used by AIT−H Answer Product Processing *****

Form Factor Exponent (FEXP)	2.000	Form Factor Numerator (FNUM)	1.000
Mud Filtrate Sample Resistivity (RMFS)	1.040 OHMM	Mud Filtrate Sample Temperature (MFST)	115.000 DEGF
Resitivity Connate Water (RW)	1.000 OHMM		

***** AIT−H Answer Product Processing Control Parameters *****

Playback Mode: NORMAL

Parameters

DLIS Name	Description	Value	
	HILTB−CTS: High resolution Integrated Logging Tool−CTS		
AHBHM	Array Induction Borehole Correction Mode	2_ComputeStandoff	
AHBHV	Array Induction Borehole Correction Code Version Number	900	
AHBLM	Array Induction Basic Logs Mode	6_One_Two_and_Four	
AHBLV	Array Induction Basic Logs Code Version Number	223	
AHCDE	Array Induction Casing Detection Enable	Yes	
AHCEN	Array Induction Tool Centering Flag (in Borehole)	Eccentered	
AHFRSV	Array Induction Response Set Version for Four ft Resolution	41.70.24.20	
AHMRF	Array Induction Mud Resistivity Factor	1	
AHORSV	Array Induction Response Set Version for One ft Resolution	41.70.24.20	
AHRFV	Array Induction Radial Profiling Code Version Number	701	
AHRPV	Array Induction Radial Parametrization Code Version Number	232	
AHSTA	Array Induction Tool Standoff	0.125	IN
AHTRSV	Array Induction Response Set Version for Two ft Resolution	41.70.24.20	
BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68	DEGF
SPNV	SP Next Value	0	MV
	FEQL: Formation Evaluation Quick Look		
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
	HOLEV: Integrated Hole/Cement Volume		
BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
FCD	Future Casing (Outer) Diameter	4.5	IN
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
SHT	Surface Hole Temperature	68	DEGF
	PEPT: Preliminary Evaluation ... Real-Time		

	PERT: Preliminary Evaluation − Real Time		
BHT	Bottom Hole Temperature (used in calculations)	225	DEGF
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
SHT	Surface Hole Temperature	68	DEGF
	System and Miscellaneous		
BS	Bit Size	7.875	IN
DFD	Drilling Fluid Density	9.30	LB/G
DO	Depth Offset for Playback	0.5	FT
DORL	Depth Offset for Repeat Analysis	0.0	FT
FLEV	Fluid Level	5.00	FT
MST	Mud Sample Temperature	115.00	DEGF
PP	Playback Processing	NORMAL	
TD	Total Depth	8048	FT

Format: GRES_REP **Vertical Scale: 5" per 100'** **Graphics File Created: 13−Dec−2007 20:39**

OP System Version: 15C0−309

MCM

HILTB−CTS **SRPC−3497−NOV_2007**

Input DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_006PUP	FN:5	PRODUCER	13−Dec−2007 19:03	8073.0 FT	7190.5 FT
DEFAULT	AIT_TLD_MCFL_CNL_009LUP	FN:8	PRODUCER	13−Dec−2007 19:00	8070.0 FT	818.0 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_016PUP	FN:15	PRODUCER	13−Dec−2007 20:39

Schlumberger

BEFORE CALIBRATIONS

MAXIS Field Log

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: 27−Sep−2007 11:01 Before: 11−Dec−2007 1:30							
Thru Cal Magnitude − 0	0	0.6092	0.6098	N/A	N/A	N/A	V
Thru Cal Magnitude − 1	0	1.249	1.250	N/A	N/A	N/A	V
Thru Cal Magnitude − 2	0	0.6210	0.6216	N/A	N/A	N/A	V
Thru Cal Magnitude − 3	0	0.7034	0.7042	N/A	N/A	N/A	V
Thru Cal Magnitude − 4	0	1.311	1.313	N/A	N/A	N/A	V
Thru Cal Magnitude − 5	0	1.894	1.896	N/A	N/A	N/A	V
Thru Cal Magnitude − 6	0	1.898	1.900	N/A	N/A	N/A	V
Thru Cal Magnitude − 7	0	1.335	1.338	N/A	N/A	N/A	V
Phase − 0	0	49.73	49.80	N/A	N/A	N/A	DEG
Phase − 1	0	48.71	48.79	N/A	N/A	N/A	DEG
Phase − 2	0	44.61	44.69	N/A	N/A	N/A	DEG
Phase − 3	0	43.74	43.82	N/A	N/A	N/A	DEG
Phase − 4	0	36.98	37.08	N/A	N/A	N/A	DEG
Phase − 5	0	34.80	34.93	N/A	N/A	N/A	DEG
Phase − 6	0	34.77	34.90	N/A	N/A	N/A	DEG
Phase − 7	0	28.85	29.12	N/A	N/A	N/A	DEG
High resolution Integrated Logging Tool−CTS Wellsite Calibration − Electronics Calibration Check − Auxilliary							
Master: 27−Sep−2007 11:01 Before: 11−Dec−2007 1:30							

Master: 27−Sep−2007 11:01 Before: 11−Dec−2007 1:30

Array Induction SPA Plus	990.5	990.0	989.7	N/A	N/A	N/A	MV
Array Induction SPA Zero	0	0.1585	0.1567	N/A	N/A	N/A	MV
Array Induction Temperature Pl	0.9150	0.9167	0.9165	N/A	N/A	N/A	V
Array Induction Temperature Ze	0	0.0001591	0.0001640	N/A	N/A	N/A	V

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Test Loop Gain Correction
Master: 27−Sep−2007 11:01

Test Loop Gain Magnitude − 0	0	1.019	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 1	0	1.020	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 2	0	1.024	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 3	0	1.021	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 4	0	1.004	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 5	0	0.9951	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 6	0	1.005	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude − 7	0	1.012	N/A	N/A	N/A	N/A	V
Phase − 0	0	0.5429	N/A	N/A	N/A	N/A	DEG
Phase − 1	0	0.5581	N/A	N/A	N/A	N/A	DEG
Phase − 2	0	−0.03639	N/A	N/A	N/A	N/A	DEG
Phase − 3	0	−0.005282	N/A	N/A	N/A	N/A	DEG
Phase − 4	0	−0.03332	N/A	N/A	N/A	N/A	DEG
Phase − 5	0	−0.08879	N/A	N/A	N/A	N/A	DEG
Phase − 6	0	0.1686	N/A	N/A	N/A	N/A	DEG
Phase − 7	0	−0.4128	N/A	N/A	N/A	N/A	DEG

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Sonde Error Correction
Master: 27−Sep−2007 11:01

R Sonde Error Correction − 0	0	−110.7	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 1	0	161.5	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	59.72	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 4	0	23.64	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 5	0	12.92	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 6	0	9.047	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction − 7	0	−0.7151	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 0	0	−219.3	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 1	0	−205.6	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 2	0	−40.24	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 3	0	34.19	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 4	0	20.51	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 5	0	11.70	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 6	0	5.787	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction − 7	0	0.9127	N/A	N/A	N/A	N/A	MM/M

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Mud Gain Correction
Master: 27−Sep−2007 11:01

Coarse − Mag, Real, Imag − 0	0	0.8865	N/A	N/A	N/A	N/A	
Coarse − Mag, Real, Imag − 1	0	0.8865	N/A	N/A	N/A	N/A	
Coarse − Mag, Real, Imag − 2	0	0.8865	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 0	0	0.8929	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 1	0	0.8929	N/A	N/A	N/A	N/A	
Fine − Mag, Real, Imag − 2	0	0.8929	N/A	N/A	N/A	N/A	

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Stab Measurement Summary
Before: 11−Dec−2007 1:33

BS Window Ratio	0.7104	N/A	0.7122	N/A	N/A	N/A	
BS Window Sum	8992	N/A	8974	N/A	N/A	N/A	CPS
SS Window Ratio	0.4968	N/A	0.4965	N/A	N/A	N/A	
SS Window Sum	10290	N/A	10260	N/A	N/A	N/A	CPS
LS Window Ratio	0.2932	N/A	0.2946	N/A	N/A	N/A	
LS Window Sum	1080	N/A	1068	N/A	N/A	N/A	CPS

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Photo−multiplier High Voltages Calibrations
Before: 11−Dec−2007 1:33

BS PM High Voltage (Command)	1446	N/A	1446	N/A	N/A	N/A	V
SS PM High Voltage (Command)	1580	N/A	1582	N/A	N/A	N/A	V
LS PM High Voltage (Command)	1411	N/A	1426	N/A	N/A	N/A	V

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Crystal Quality Resolutions Calibration
Before: 11−Dec−2007 1:33

BS Crystal Resolution	10.31	N/A	10.33	N/A	N/A	N/A	%
SS Crystal Resolution	9.688	N/A	9.680	N/A	N/A	N/A	%
LS Crystal Resolution	8.772	N/A	8.700	N/A	N/A	N/A	%

High resolution Integrated Logging Tool−CTS Wellsite Calibration − MCFL Calibration
Before: 11−Dec−2007 1:33

Raw B0 Resistivity	3875	N/A	3852	N/A	N/A	N/A	OHMM
Raw B1 Resistivity	3830	N/A	3793	N/A	N/A	N/A	OHMM
Raw B2 Resistivity	3830	N/A	3792	N/A	N/A	N/A	OHMM

High resolution Integrated Logging Tool−CTS Wellsite Calibration − HILT Caliper Calibration
Before: 11−Dec−2007 1:30

HILT Caliper Zero Measurement	8.000	N/A	8.311	N/A	N/A	N/A	IN
HILT Caliper Plus Measurement	12.00	N/A	12.47	N/A	N/A	N/A	IN

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Detector Calibration
Before: 11−Dec−2007 1:43

Gamma Ray Background	30.00	N/A	81.58	N/A	N/A	N/A	GAPI
Gamma Ray (Jig − Bkg)	174.1	N/A	174.1	N/A	N/A	15.83	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Zero Measurement
Master: 14−Sep−2007 17:57 Before: 11−Dec−2007 1:31

CNTC Background	27.59	27.59	27.71	N/A	N/A	4.139	CPS
CFTC Background	29.13	29.13	27.95	N/A	N/A	4.370	CPS

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Ratio Measurement
Master: 14−Sep−2007 17:57

Thermal Near Corr. (Tank)	5800	5348	N/A	N/A	N/A	N/A	CPS
Thermal Far Corr. (Tank)	2400	2176	N/A	N/A	N/A	N/A	CPS
CNTC/CFTC (Tank)	2.159	2.458	N/A	N/A	N/A	N/A	

High resolution Integrated Logging Tool−CTS Wellsite Calibration − Accelerometer Calibration
Before: 13−Dec−2007 18:06

Z−Axis Acceleration	32.19	N/A	32.21	N/A	N/A	N/A	F/S2

High resolution Integrated Logging Tool−CTS Master Calibration − Inversion results
Master: 25−Nov−2007 15:21

Rho Aluminum	2.596	2.600	−−	−−	−−	−−	G/C3
Rho Magnesium	1.686	1.687	−−	−−	−−	−−	G/C3
Pe Aluminum	2.570	2.555	−−	−−	−−	−−	
Pe Magnesium	2.650	2.631	−−	−−	−−	−−	

High resolution Integrated Logging Tool−CTS Master Calibration − Deviation Summary
Master: 25−Nov−2007 15:21

BS Average Deviation	0	0.3446	−−	−−	−−	−−	%
BS Max Deviation	0	1.006	−−	−−	−−	−−	%
SS Average Deviation	0	0.2535	−−	−−	−−	−−	%
SS Max Deviation	0	0.8238	−−	−−	−−	−−	%
LS Average Deviation	0	0.4908	−−	−−	−−	−−	%
LS Max Deviation	0	0.9686	−−	−−	−−	−−	%

The GLS−VJ source activity is acceptable.

The HGNS Neutron Master Calibration was done with the following parameters :

NCT−B Water Temperature 71.0 DEGF.
Thermal Housing Size 3.363 IN.
NSR−F serial number 940

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	374
HILT high−Resolution Mechanical Sonde	HRMS − B	
HILT Rxo Gamma−ray Device	HRGD − B	
HILT Micro Cylindrically Focused Log Dev	MCFL −	
GR Logging Source	GLS − VJ	5094
HILT High Res. Control Cartridge	HRCC − B	

Auxiliary Equipment:

High resolution Integrated Logging Tool−CTS Wellsite Calibration
Electronics Calibration Check − Thru Cal Mag. & Phase

Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.6092		0.6050	49.73		71.00
	Before	0.6098			49.80		
1	Master	1.249		1.270	48.71		70.00
	Before	1.250			48.79		

2	Master	0.6210	0.6230	44.61	66.00
	Before	0.6216		44.69	
3	Master	0.7034	0.7040	43.74	65.00
	Before	0.7042		43.82	
4	Master	1.311	1.337	36.98	59.00
	Before	1.313		37.08	
5	Master	1.894	1.955	34.80	57.00
	Before	1.896		34.93	
6	Master	1.898	1.955	34.77	57.00
	Before	1.900		34.90	
7	Master	1.335	1.415	28.85	53.00
	Before	1.338		29.12	
		60.00 % (Minimum) (Nominal)	140.0 % (Maximum)	Nom −60.00 (Minimum) (Nominal)	Nom + 60.00 (Maximum)

Master: 27−Sep−2007 11:01 Before: 11−Dec−2007 1:30

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Electronics Calibration Check − Auxilliary

Phase	Array Induction SPA Plus MV	Value
Master		990.0
Before		989.7
	941.0 (Minimum) 990.5 (Nominal) 1040 (Maximum)	

Phase	Array Induction SPA Zero MV	Value
Master		0.1585
Before		0.1567
	−50.00 (Minimum) 0 (Nominal) 50.00 (Maximum)	

Phase	Array Induction Temperature Plus V	Value
Master		0.9167
Before		0.9165
	0.8700 (Minimum) 0.9150 (Nominal) 0.9600 (Maximum)	

Phase	Array Induction Temperature Zero V	Value
Master		0.0001591
Before		0.0001640
	−0.05000 (Minimum) 0 (Nominal) 0.05000 (Maximum)	

Master: 27−Sep−2007 11:01 Before: 11−Dec−2007 1:30

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Test Loop Gain Correction

Idx	Value	Test Loop Gain Magnitude V	Value	Phase DEG
0	1.019		0.5429	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
1	1.020		0.5581	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
2	1.024		−0.03639	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
3	1.021		−0.005282	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
4	1.004		−0.03332	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
5	0.9951		−0.08879	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
6	1.005		0.1686	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
7	1.012		−0.4128	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)

Master: 27−Sep−2007 11:01

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Sonde Error Correction

Idx	Value	R Sonde Error Correction MM/M			Value	X Sonde Error Correction MM/M		
0	−110.7				−219.3			
		−231.0 (Minimum)	−56.00 (Nominal)	119.0 (Maximum)		−2250 (Minimum)	0 (Nominal)	2250 (Maximum)
1	161.5				−205.6			
		114.0 (Minimum)	159.0 (Nominal)	204.0 (Maximum)		−625.0 (Minimum)	0 (Nominal)	625.0 (Maximum)
2	116.0				−40.24			
		66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)		−350.0 (Minimum)	0 (Nominal)	350.0 (Maximum)
3	59.72				34.19			
		39.00 (Minimum)	64.00 (Nominal)	89.00 (Maximum)		−250.0 (Minimum)	0 (Nominal)	250.0 (Maximum)
4	23.64				20.51			
		15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)		−63.00 (Minimum)	0 (Nominal)	63.00 (Maximum)
5	12.92				11.70			
		4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)		−50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)
6	9.047				5.787			
		5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)		−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)
7	−0.7151				0.9127			
		−5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)		−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)

Master: 27−Sep−2007 11:01

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Mud Gain Correction

Idx	Value	Coarse − Mag, Real, Imag			Value	Fine − Mag, Real, Imag		
0	0.8865				0.8929			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
1	0.8865				0.8929			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
2	0.8865				0.8929			
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)

Master: 27−Sep−2007 11:01

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Stab Measurement Summary

Phase	BS Window Ratio			Value	Phase	SS Window Ratio			Value	Phase	LS Window Ratio			Value
Before				0.7122	Before				0.4965	Before				0.2946
	0.6749 (Minimum)	0.7104 (Nominal)	0.7459 (Maximum)			0.4719 (Minimum)	0.4968 (Nominal)	0.5216 (Maximum)			0.2786 (Minimum)	0.2932 (Nominal)	0.3079 (Maximum)	

Phase	BS Window Sum CPS			Value	Phase	SS Window Sum CPS			Value	Phase	LS Window Sum CPS			Value
Before				8974	Before				10260	Before				1068
	8542 (Minimum)	8992 (Nominal)	9442 (Maximum)			9773 (Minimum)	10290 (Nominal)	10800 (Maximum)			1026 (Minimum)	1080 (Nominal)	1134 (Maximum)	

Before: 11−Dec−2007 1:33

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Photo−multiplier High Voltages Calibrations

Phase	BS PM High Voltage (Command) V			Value	Phase	SS PM High Voltage (Command) V			Value	Phase	LS PM High Voltage (Command) V			Value
Before				1446	Before				1582	Before				1426
	1346 (Minimum)	1446 (Nominal)	1546 (Maximum)			1480 (Minimum)	1580 (Nominal)	1680 (Maximum)			1311 (Minimum)	1411 (Nominal)	1511 (Maximum)	

Before: 11−Dec−2007 1:33

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Crystal Quality Resolutions Calibration

Phase	BS Crystal Resolution %	Value	Phase	SS Crystal Resolution %	Value	Phase	LS Crystal Resolution %	Value
Before		10.33	Before		9.680	Before		8.700
	9.315 (Minimum) 10.31 (Nominal) 11.31 (Maximum)			8.688 (Minimum) 9.688 (Nominal) 10.69 (Maximum)			7.772 (Minimum) 8.772 (Nominal) 9.772 (Maximum)	

Before: 11−Dec−2007 1:33

High resolution Integrated Logging Tool−CTS Wellsite Calibration

MCFL Calibration

Phase	Raw B0 Resistivity OHMM	Value	Phase	Raw B1 Resistivity OHMM	Value	Phase	Raw B2 Resistivity OHMM	Value
Before		3852	Before		3793	Before		3792
	3565 (Minimum) 3875 (Nominal) 4185 (Maximum)			3524 (Minimum) 3830 (Nominal) 4136 (Maximum)			3524 (Minimum) 3830 (Nominal) 4136 (Maximum)	

Before: 11−Dec−2007 1:33

High resolution Integrated Logging Tool−CTS Wellsite Calibration

HILT Caliper Calibration

Phase	HILT Caliper Zero Measurement IN	Value	Phase	HILT Caliper Plus Measurement IN	Value
Before		8.311	Before		12.47
	6.000 (Minimum) 8.000 (Nominal) 10.00 (Maximum)			9.000 (Minimum) 12.00 (Nominal) 15.00 (Maximum)	

Before: 11−Dec−2007 1:30

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Detector Calibration

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig − Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before		81.58	Before		174.1	Before		165.0
	0 (Minimum) 30.00 (Nominal) 120.0 (Maximum)			158.3 (Minimum) 174.1 (Nominal) 189.9 (Maximum)			150.0 (Minimum) 165.0 (Nominal) 180.0 (Maximum)	

Before: 11−Dec−2007 1:43

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Zero Measurement

Phase	CNTC Background CPS	Value	Phase	CFTC Background CPS	Value
Master		27.59	Master		29.13
Before		27.71	Before		27.95
	5.000 (Minimum) 27.59 (Nominal) 40.00 (Maximum)			5.000 (Minimum) 29.13 (Nominal) 40.00 (Maximum)	

Master: 14−Sep−2007 17:57 Before: 11−Dec−2007 1:31

High resolution Integrated Logging Tool−CTS Wellsite Calibration

Ratio Measurement

Phase	Thermal Near Corr. (Tank) CPS	Value	Phase	Thermal Far Corr. (Tank) CPS	Value	Phase	CNTC/CFTC (Tank)	Value
Master		5348	Master		2176	Master		2.458
	4700 (Minimum) 5800 (Nominal) 6900 (Maximum)			1900 (Minimum) 2400 (Nominal) 2900 (Maximum)			2.120 (Minimum) 2.159 (Nominal) 2.540 (Maximum)	

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High resolution Integrated Logging Tool−CTS

Wellsite Calibration

Accelerometer Calibration

Phase	Z−Axis Acceleration F/S2	Value
Before		32.21
	31.53 (Minimum) 32.19 (Nominal) 32.84 (Maximum)	

Before: 13−Dec−2007 18:06

High resolution Integrated Logging Tool−CTS Master Calibration

Electronics Calibration Check − Thru Cal Mag. & Phase

Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.6092		0.6050	49.73		71.00
1	Master	1.249		1.270	48.71		70.00
2	Master	0.6210		0.6230	44.61		66.00
3	Master	0.7034		0.7040	43.74		65.00

4	Master	1.311		1.337	36.98		59.00
5	Master	1.894		1.955	34.80		57.00
6	Master	1.898		1.955	34.77		57.00
7	Master	1.335		1.415	28.85		53.00
		60.00 % (Minimum)	(Nominal)	140.0 % (Maximum)	Nom −60.00 (Minimum)	(Nominal)	Nom + 60.00 (Maximum)

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High resolution Integrated Logging Tool−CTS Master Calibration

Electronics Calibration Check − Auxilliary

Phase	Array Induction SPA Plus MV	Value
Master		990.0
	941.0 (Minimum) 990.5 (Nominal) 1040 (Maximum)	

Phase	Array Induction SPA Zero MV	Value
Master		0.1585
	−50.00 (Minimum) 0 (Nominal) 50.00 (Maximum)	

Phase	Array Induction Temperature Plus V	Value
Master		0.9167
	0.8700 (Minimum) 0.9150 (Nominal) 0.9600 (Maximum)	

Phase	Array Induction Temperature Zero V	Value
Master		0.0001591
	−0.05000 (Minimum) 0 (Nominal) 0.05000 (Maximum)	

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High resolution Integrated Logging Tool−CTS Master Calibration

Test Loop Gain Correction

Idx	Value	Test Loop Gain Magnitude V	Value	Phase DEG
0	1.019		0.5429	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
1	1.020		0.5581	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
2	1.024		−0.03639	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
3	1.021		−0.005282	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
4	1.004		−0.03332	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
5	0.9951		−0.08879	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
6	1.005		0.1686	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	
7	1.012		−0.4128	
	0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		−3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)	

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High resolution Integrated Logging Tool−CTS Master Calibration

Sonde Error Correction

Idx	Value	R Sonde Error Correction MM/M	Value	X Sonde Error Correction MM/M
0	−110.7		−219.3	
	−231.0 (Minimum) −56.00 (Nominal) 119.0 (Maximum)		−2250 (Minimum) 0 (Nominal) 2250 (Maximum)	
1	161.5		−205.6	
	114.0 (Minimum) 159.0 (Nominal) 204.0 (Maximum)		−625.0 (Minimum) 0 (Nominal) 625.0 (Maximum)	
2	116.0		−40.24	
	66.00 (Minimum) 111.0 (Nominal) 156.0 (Maximum)		−350.0 (Minimum) 0 (Nominal) 350.0 (Maximum)	
3	59.72		34.19	
	39.00 (Minimum) 64.00 (Nominal) 89.00 (Maximum)		−250.0 (Minimum) 0 (Nominal) 250.0 (Maximum)	

4	23.64				20.51		
	15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)		−63.00 (Minimum)	0 (Nominal)	63.00 (Maximum)
5	12.92				11.70		
	4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)		−50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)
6	9.047				5.787		
	5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)		−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)
7	−0.7151				0.9127		
	−5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)		−30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)

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High resolution Integrated Logging Tool−CTS Master Calibration

Mud Gain Correction

Idx	Value	Coarse − Mag, Real, Imag			Value	Fine − Mag, Real, Imag		
0	0.8865				0.8929			
	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	
1	0.8865				0.8929			
	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	
2	0.8865				0.8929			
	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	

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High resolution Integrated Logging Tool−CTS Master Calibration

Inversion results

Phase	Rho Aluminum G/C3			Value	Phase	Rho Magnesium G/C3			Value
Master				2.600	Master				1.687
	2.586 (Minimum)	2.596 (Nominal)	2.606 (Maximum)			1.676 (Minimum)	1.686 (Nominal)	1.696 (Maximum)	
Phase	Pe Aluminum			Value	Phase	Pe Magnesium			Value
Master				2.555	Master				2.631
	2.470 (Minimum)	2.570 (Nominal)	2.670 (Maximum)			2.550 (Minimum)	2.650 (Nominal)	2.750 (Maximum)	

Master: 25−Nov−2007 15:21

High resolution Integrated Logging Tool−CTS Master Calibration

Deviation Summary

Phase	BS Average Deviation %			Value	Phase	SS Average Deviation %			Value	Phase	LS Average Deviation %			Value
Master				0.3446	Master				0.2535	Master				0.4908
	−0.6000 (Minimum)	0 (Nominal)	0.6000 (Maximum)			−1.000 (Minimum)	0 (Nominal)	1.000 (Maximum)			−1.500 (Minimum)	0 (Nominal)	1.500 (Maximum)	
Phase	BS Max Deviation %			Value	Phase	SS Max Deviation %			Value	Phase	LS Max Deviation %			Value
Master				1.006	Master				0.8238	Master				0.9686
	−1.600 (Minimum)	0 (Nominal)	1.600 (Maximum)			−2.500 (Minimum)	0 (Nominal)	2.500 (Maximum)			−3.500 (Minimum)	0 (Nominal)	3.500 (Maximum)	

Master: 25−Nov−2007 15:21

High resolution Integrated Logging Tool−CTS Master Calibration

Zero Measurement

Phase	CNTC Background CPS			Value	Phase	CFTC Background CPS			Value
Master				27.59	Master				29.13
	5.000 (Minimum)	27.59 (Nominal)	40.00 (Maximum)			5.000 (Minimum)	29.13 (Nominal)	40.00 (Maximum)	

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High resolution Integrated Logging Tool−CTS Master Calibration

Tank Measurement

Phase	Thermal Near Corr. (Tank) CPS			Value	Phase	Thermal Far Corr. (Tank) CPS			Value	Phase	CNTC/CFTC (Tank)			Value
Master				5348	Master				2176	Master				2.458
	4700	5800	6900			1900	2400	2900			2.120	2.159	2.540	

(Minimum)	(Nominal)	(Maximum)	(Minimum)	(Nominal)	(Maximum)	(Minimum)	(Nominal)	(Maximum)

Master: 14−Sep−2007 17:57

Company:	**Orr Energy LLC**
Well:	**South 6−21D**
Field:	**Wattenburg**
County:	**Weld**
State:	**Colorado**

Schlumberger

Platform Express
Array Induction
Linear Correlation