ThruBit
A Schlumberger Company

ARRAY INDUCTION GAMMA RAY MEMORY LOG

Company SANDRIDGE ENERGY
Well VORNAUF 2-18H
Field STRANATHAN
County HARPER
State KANSAS

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Location: API # : 15-077-21859-0100
300' FNL & 1980' FEL
SEC 7 TWP 35S RGE 7W

Other Services
THRUBIT
PORTAL
BIT

Elevation
K.B. 1338'
D.F. 1338'
G.L. 1323'

Permanent Datum G.L. Elevation 1323'
Log Measured From K.B. 15' ABOVE PERM DATUM
Drilling Measured From K.B.

Date	14 AUG 2012	
Run Number	ONE	
Depth Driller	11772'	
Depth Logger	10181'	
Bottom Logged Interval	10170'	
Top Log Interval	3300'	
Casing Driller	7" @ 5404'	
Casing Logger	5395'	
Bit Size	6.125"	
Type Fluid in Hole	WBM	
Density / Viscosity	9.1 / 28	
pH / Fluid Loss	8.0 / 60	
Source of Sample	MUD SENSOR	
Rm @ Meas. Temp	0.093OHM @ 65DEGF	
Rmf @ Meas. Temp	0.089OHM @ 65DEGF	
Rmc @ Meas. Temp	0.107OHM @ 65DEGF	
Source of Rmf / Rmc	CALCULATED	
Rm @ BHT	6.05OHM @ 127DEGF	
Time Circulation Stopped	16:00 13AUG2012	
Time Logger on Bottom	5:58 14AUG2012	
Maximum Recorded Temperature	127DEGF	
Equipment Number	T005	
Location	OKC,OK	
Recorded By	C. PARKER	B. FRANTOM
Witnessed By	A. LEIJA	

<<< Fold Here >>>

Comments

SERVICE: HORIZONTAL PUMP DOWN MEMORY BIT DEPTH: 10117' LOG TO: 3300'
ALL SCALES AND PRESENTATIONS PER CLIENT REQUEST
LIMESTONE MATRIX, 2.71 g/cc, USED FOR POROSITY MEASUREMENTS
TOOLS RAN WITH DECENTRALIZER AND SWIVEL
TBHV REPRESENTS TOTAL BOREHOLE VOLUME, ft3
ABHV REPRESENTS ANNULAR BOREHOLE VOLUME, ft3, CALCULATED FOR 4.5" CASING
USED RIGMINDER WITH PASON TO ACQUIRE LOG DEPTH
CORRELATED TO MWD LOG PROVIDED BY CUSTOMER
BOTTOM INTERVAL NOT LOGGED DUE TO LOST BHA
RIG: UNIT 310
CREW: C.PARKER R.CRESSWELL B.FRANTOM I.HERNANDEZ

Service Ticket No. 1316 API No. 15-077-21859-0100 PGM Ver WARRIOR 7.0

The Well Name, Location, Borehole Description, and / or Cementing Data Furnished by Client

EQUIPMENT DATA

GAMMA RAY		NEUTRON		DENSITY		INDUCTION	
Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	PS27T	Serial No.	PS27N	Serial No.	PS1D	Serial No.	PS1R
Model No.	PS	Model No.	PS	Model No.	PS	Model No.	PS
Diameter	2.125"	Diameter	2.125"	Diameter	2.125"	Diameter	2.125"

LOGGING DATA

General Data

Pass	Depths		Well Head	Speed	Logging Run Comments
No.	From	To	Pressure	Ft/Min	
ONE	10170'	3300'	0	35 FPM	

	GAMMA RAY		NEUTRON		DENSITY		INDUCTION	
Pass	Scale		Scale		Scale		Scale	
No.	L	R	L	R	L	R	L	L
ONE	0 API	150 API	30%	-10%	30%	-10%	0.2 OHMM	2000 OHMM

DIRECTIONAL INFORMATION

Maximum Deviation	93.04	deg. @	9538'	KOP	4010'

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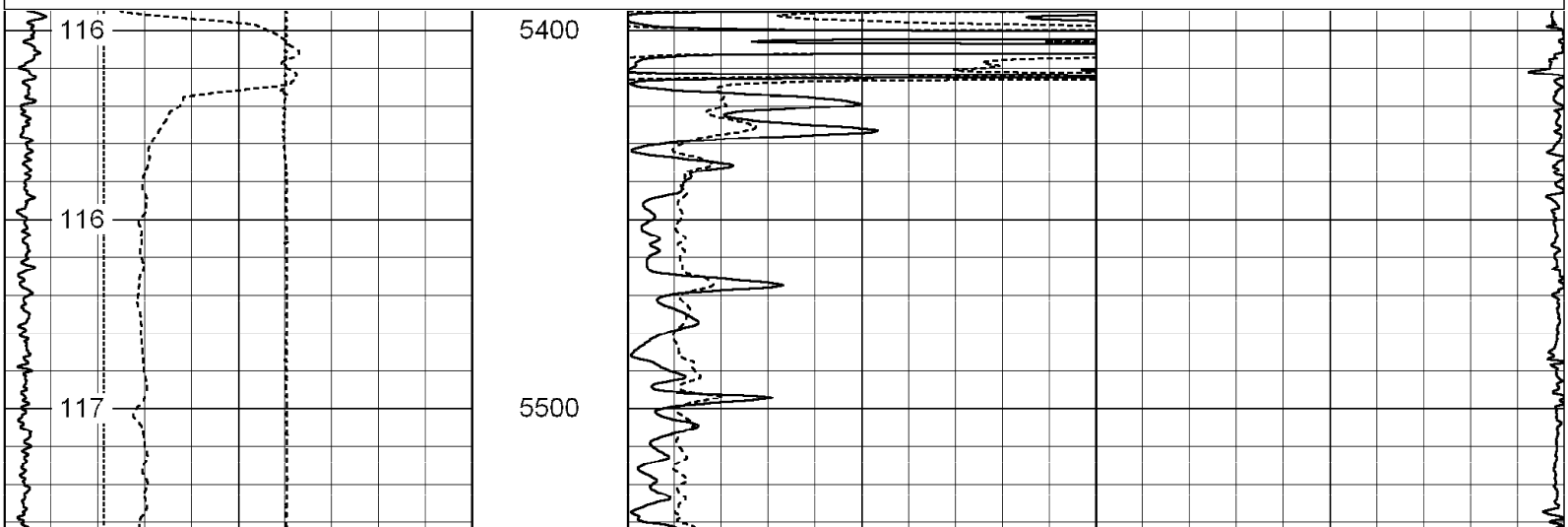
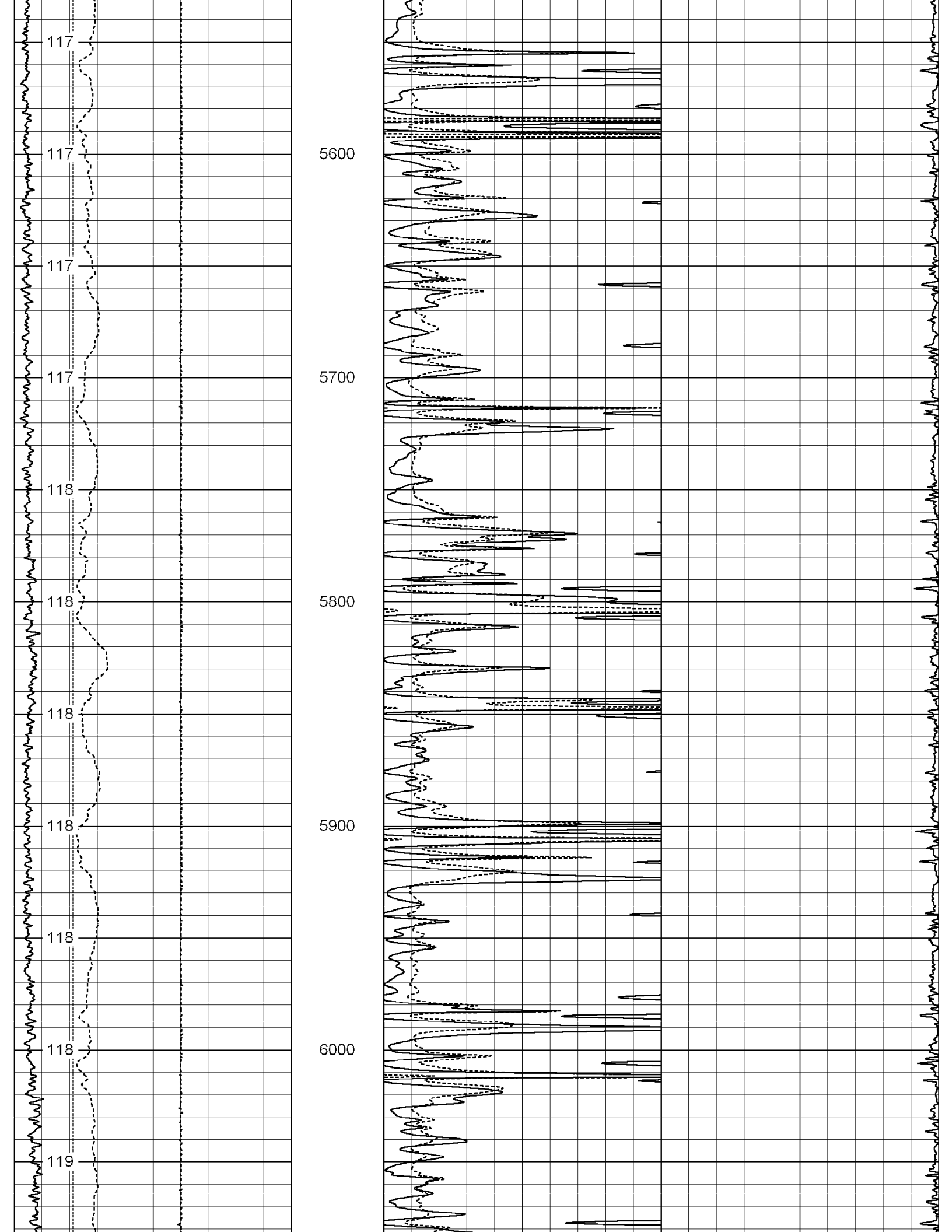
MAIN PASS

Database File: c:\documents and settings\t006\desktop\vornauf2-18h\sandridege_vornauf_mem.db
Dataset Pathname: proc1/pass1.8
Presentation Format: 6_2r_chk
Dataset Creation: Tue Aug 14 14:15:12 2012
Charted by: Depth in Feet scaled 1:600

0	GR (GAPI)	150
4	DCAL (in)	14
-5	ACCY	5
4	BOREID (in)	14
GRTEMP (degF)		

50	20in 2ft Res (Ohm-m)	500
50	90in 2ft Res (Ohm-m)	500
1000	DEEP COND (mmho/m)	0
0	20in 2ft Res (Ohm-m)	50
0	90in 2ft Res (Ohm-m)	50

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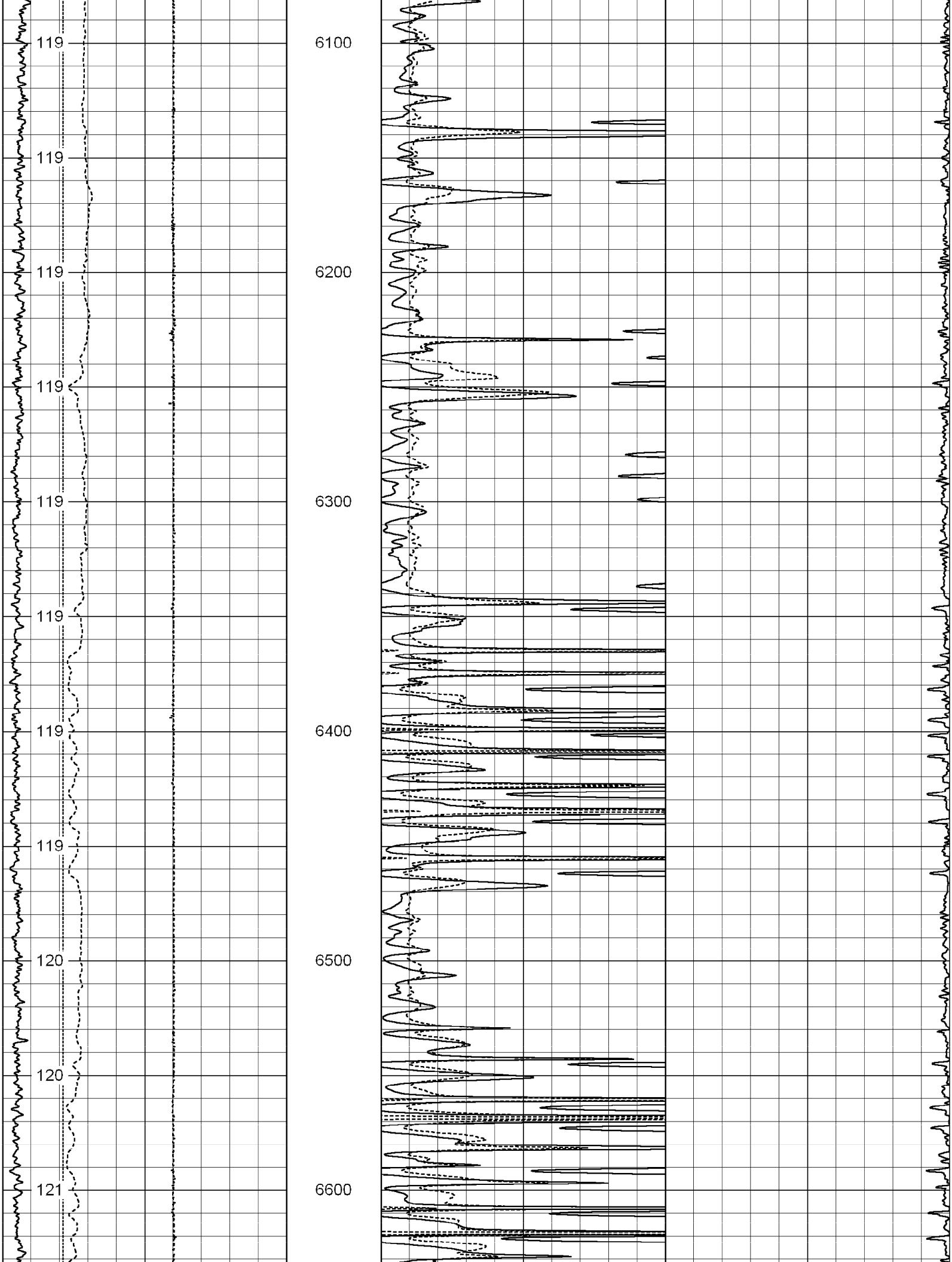
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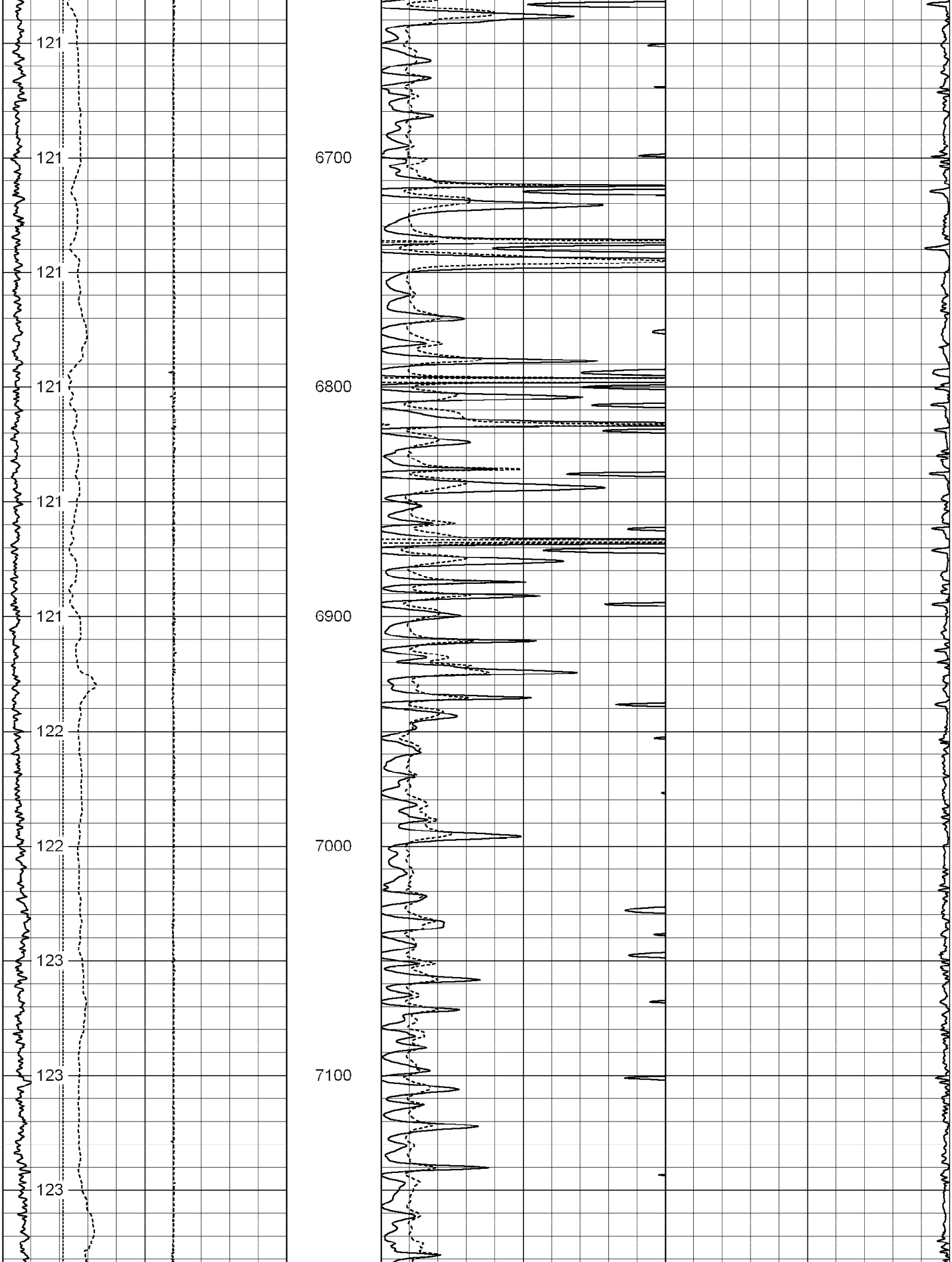
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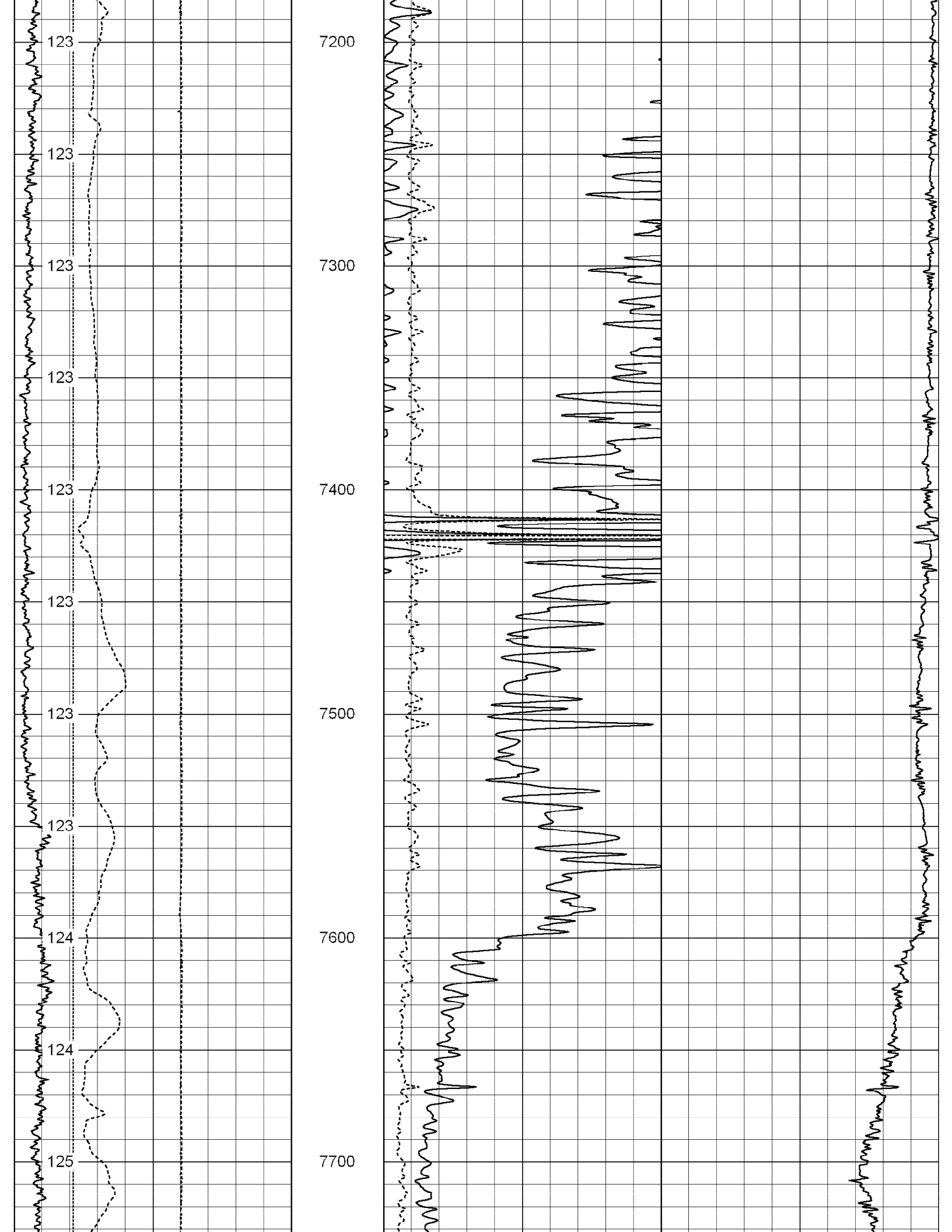
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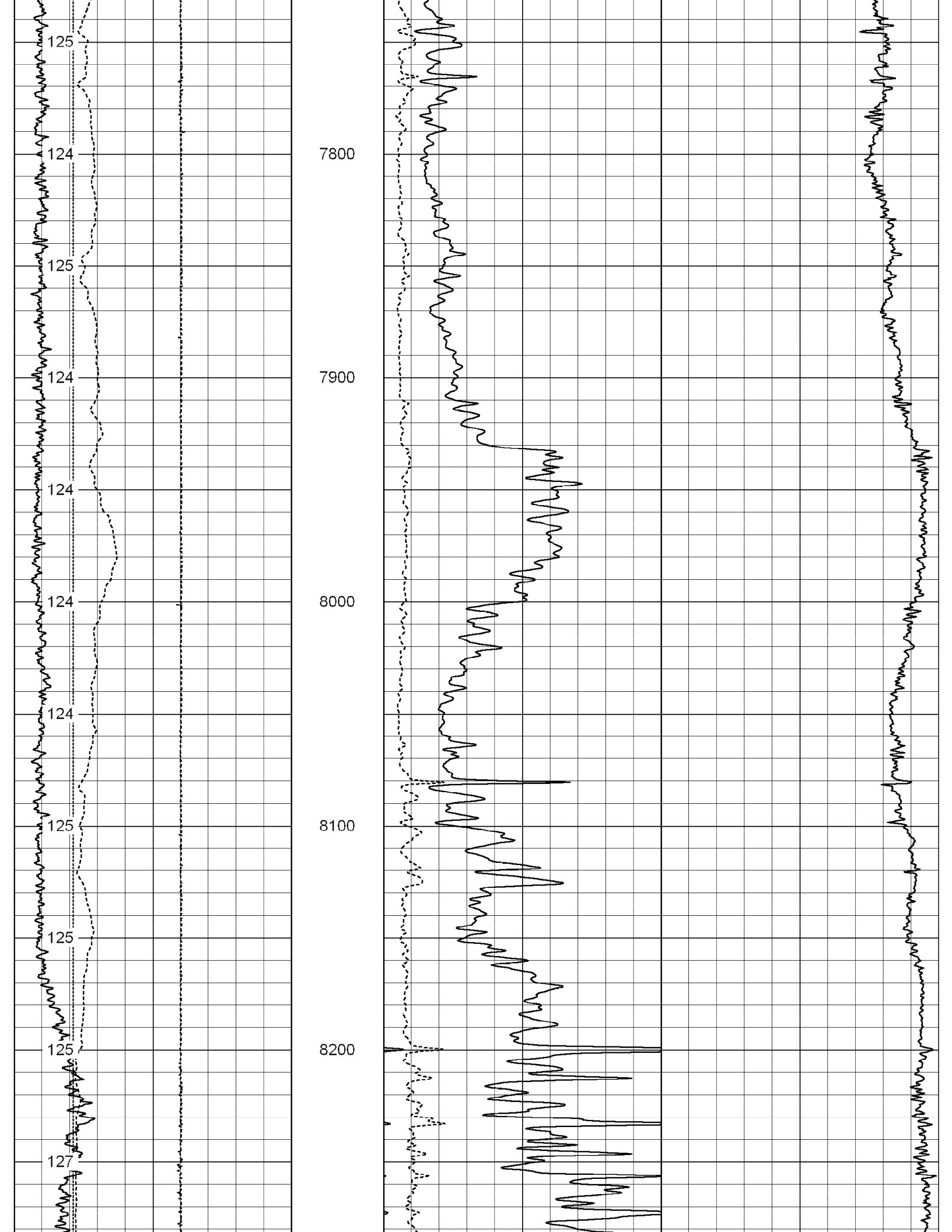
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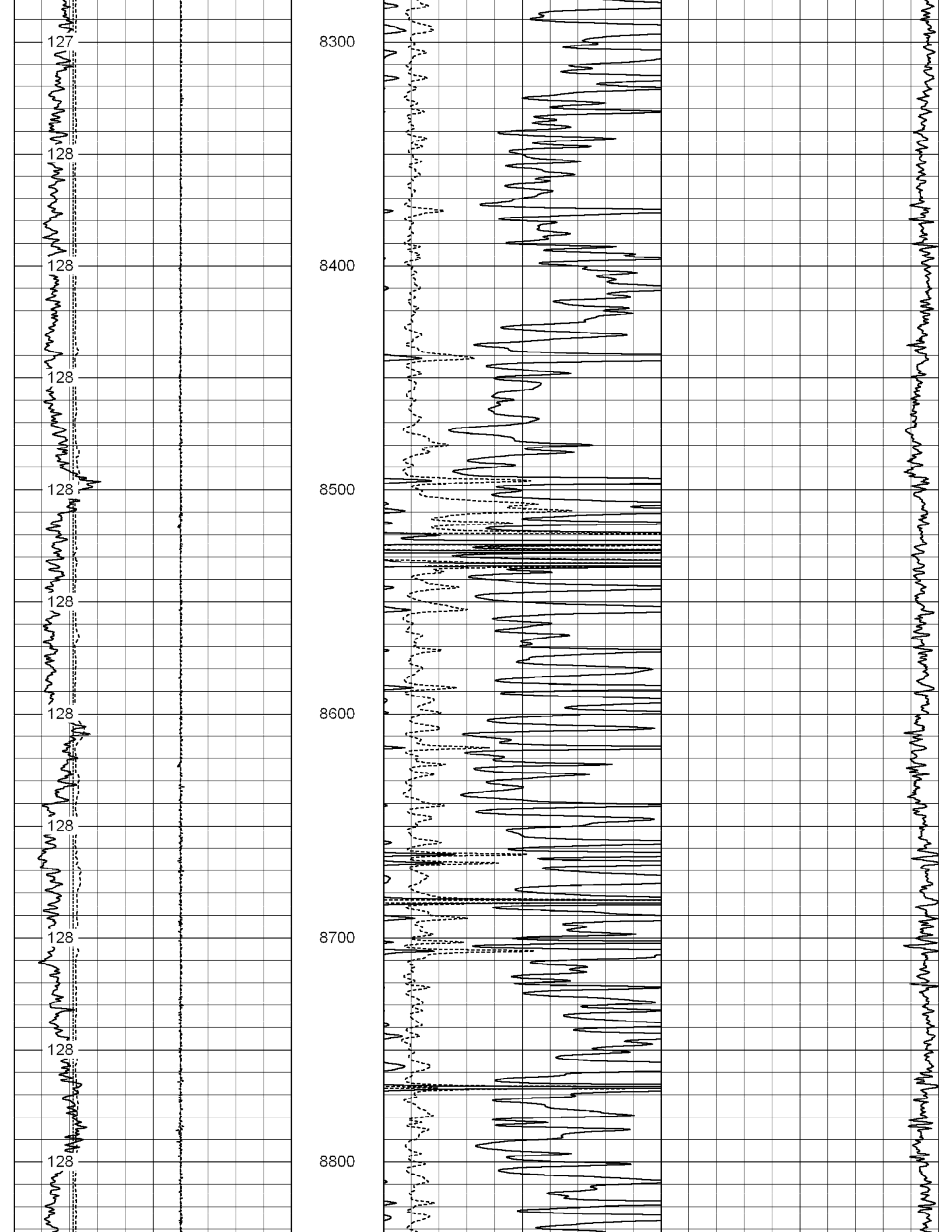
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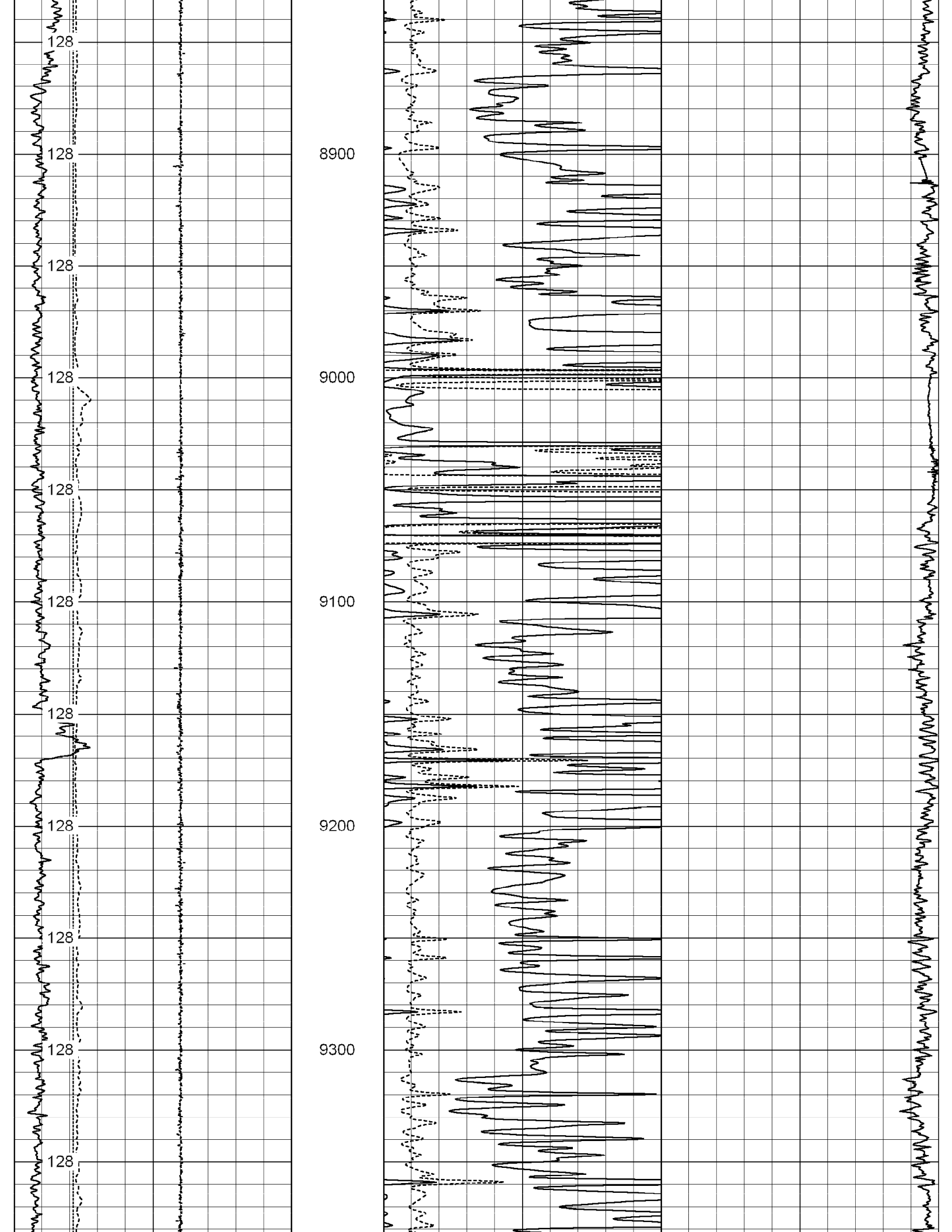
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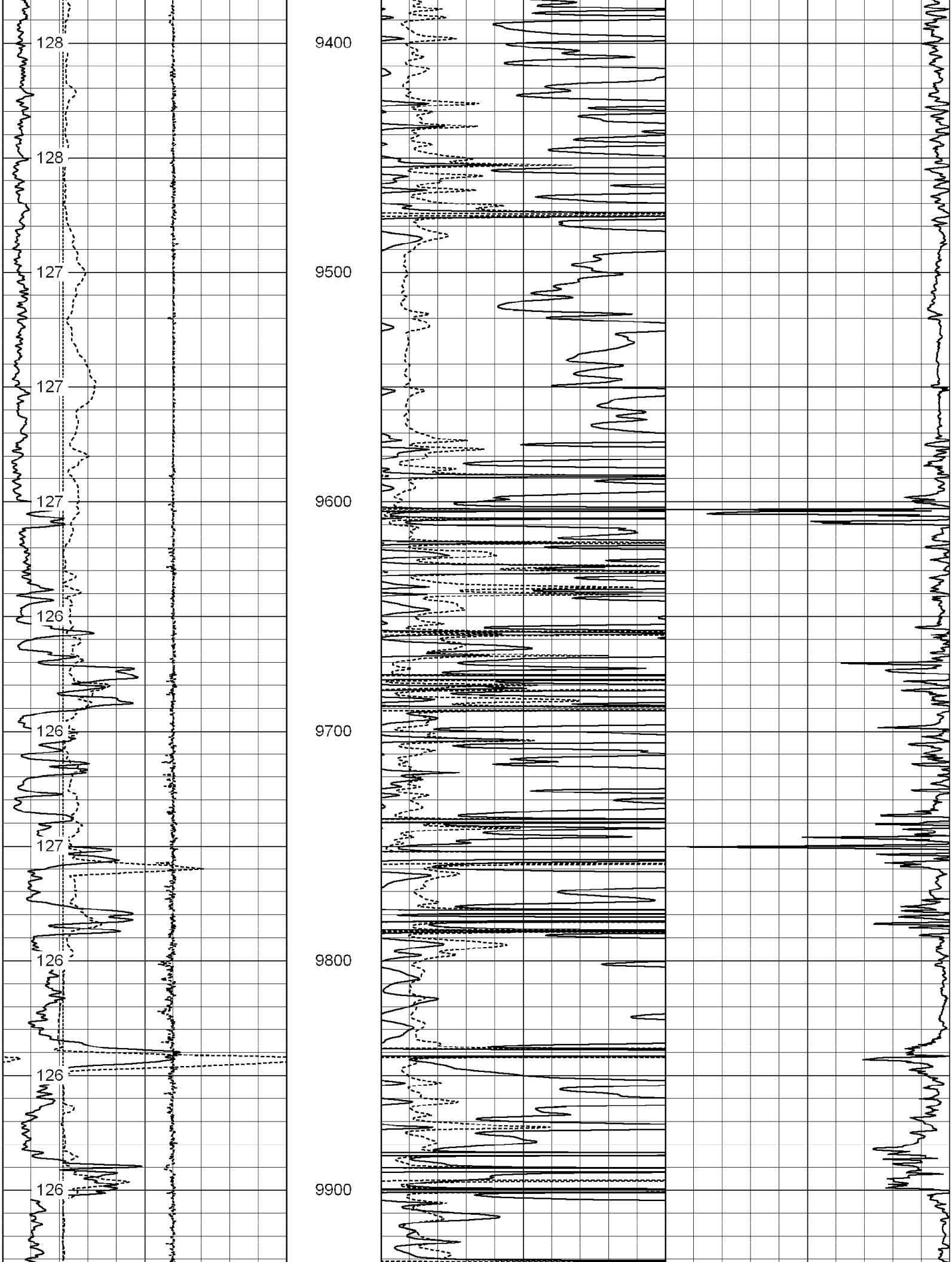
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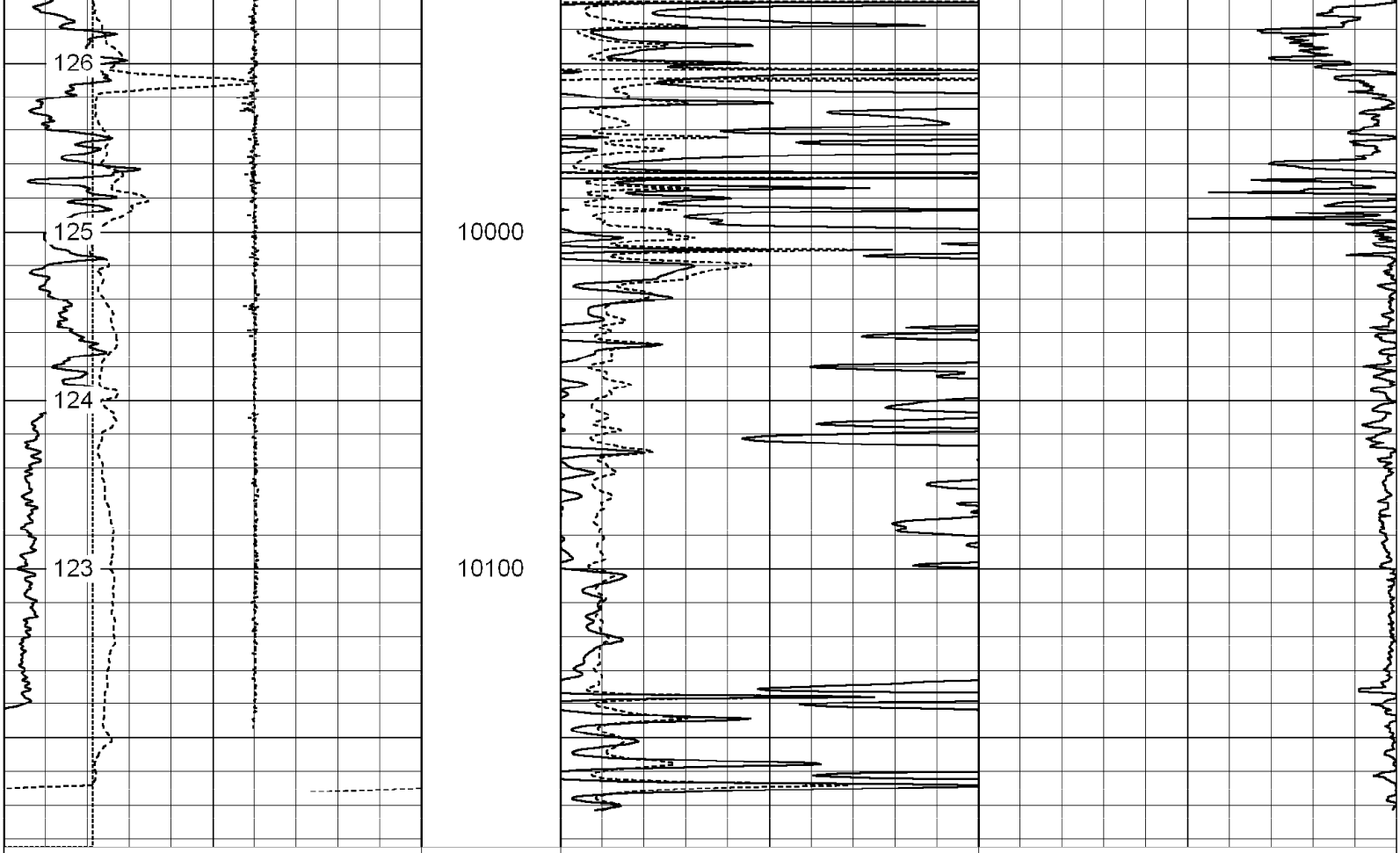

0	GR (GAPI)	150
4	DCAL (in)	14
-5	ACCY	5
4	BOREID (in)	14
GRTEMP (degF)		

50	20in 2ft Res (Ohm-m)	500
50	90in 2ft Res (Ohm-m)	500
1000	DEEP COND (mmho/m)	0
0	20in 2ft Res (Ohm-m)	50
0	90in 2ft Res (Ohm-m)	50

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MAIN PASS

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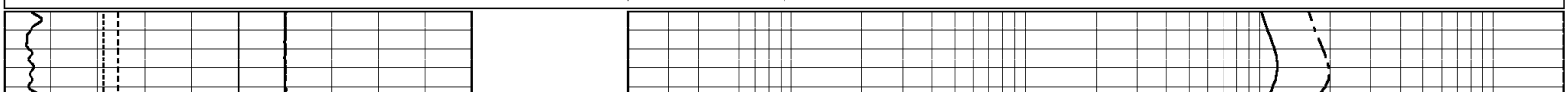
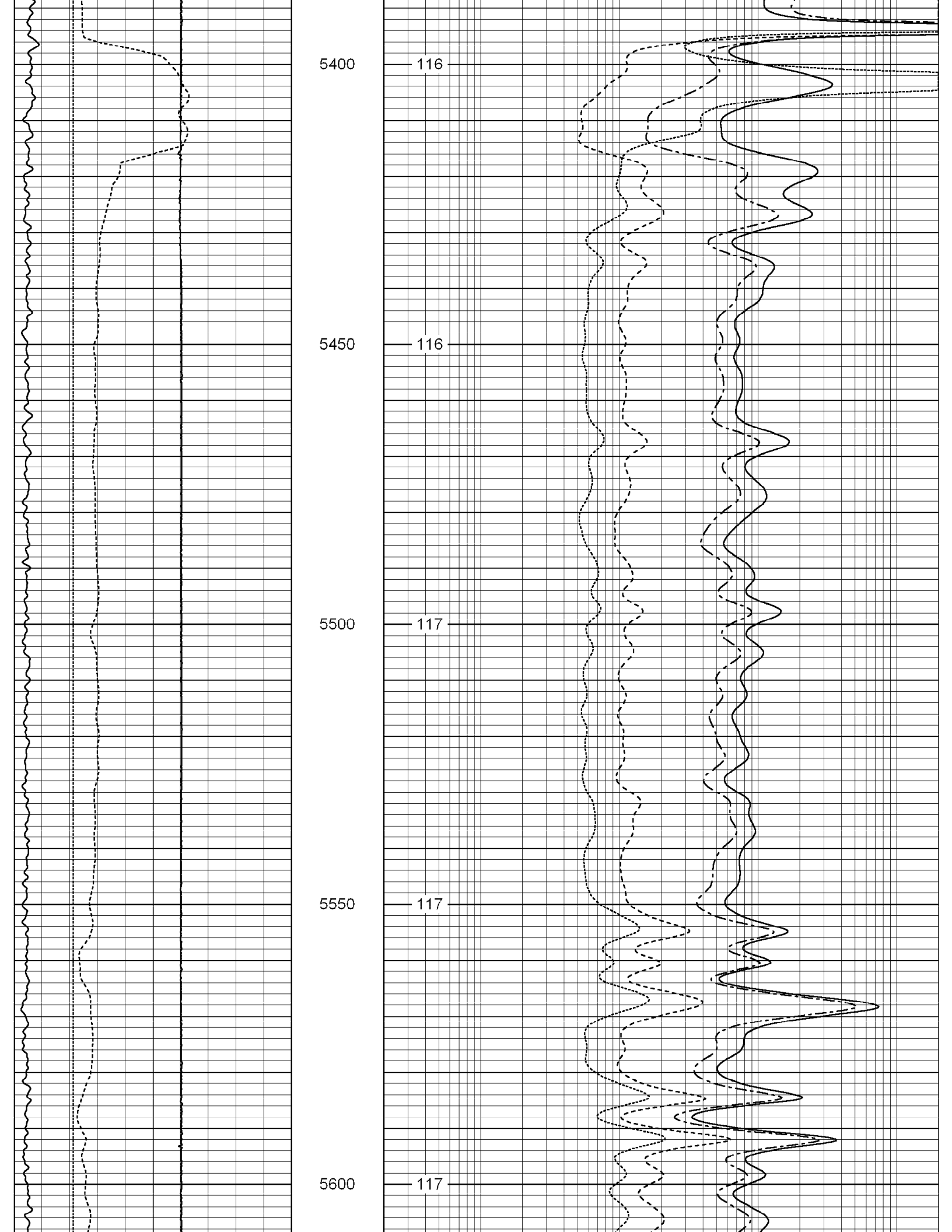
Dataset Pathname:	proc1/pass1.8
Presentation Format:	6_2r_sal
Dataset Creation:	Tue Aug 14 14:15:12 2012
Charted by:	Depth in Feet scaled 1:240

0	GR (GAPI)	150
4	BOREID (in)	14
4	DCAL (in)	14
-5	ACCY	5

0.2	20inRadial (Ohm-m)	2000
0.2	30inRadial (Ohm-m)	2000
0.2	60inRadial (Ohm-m)	2000
0.2	90inRadial (Ohm-m)	2000
GRTEMP (degF)		

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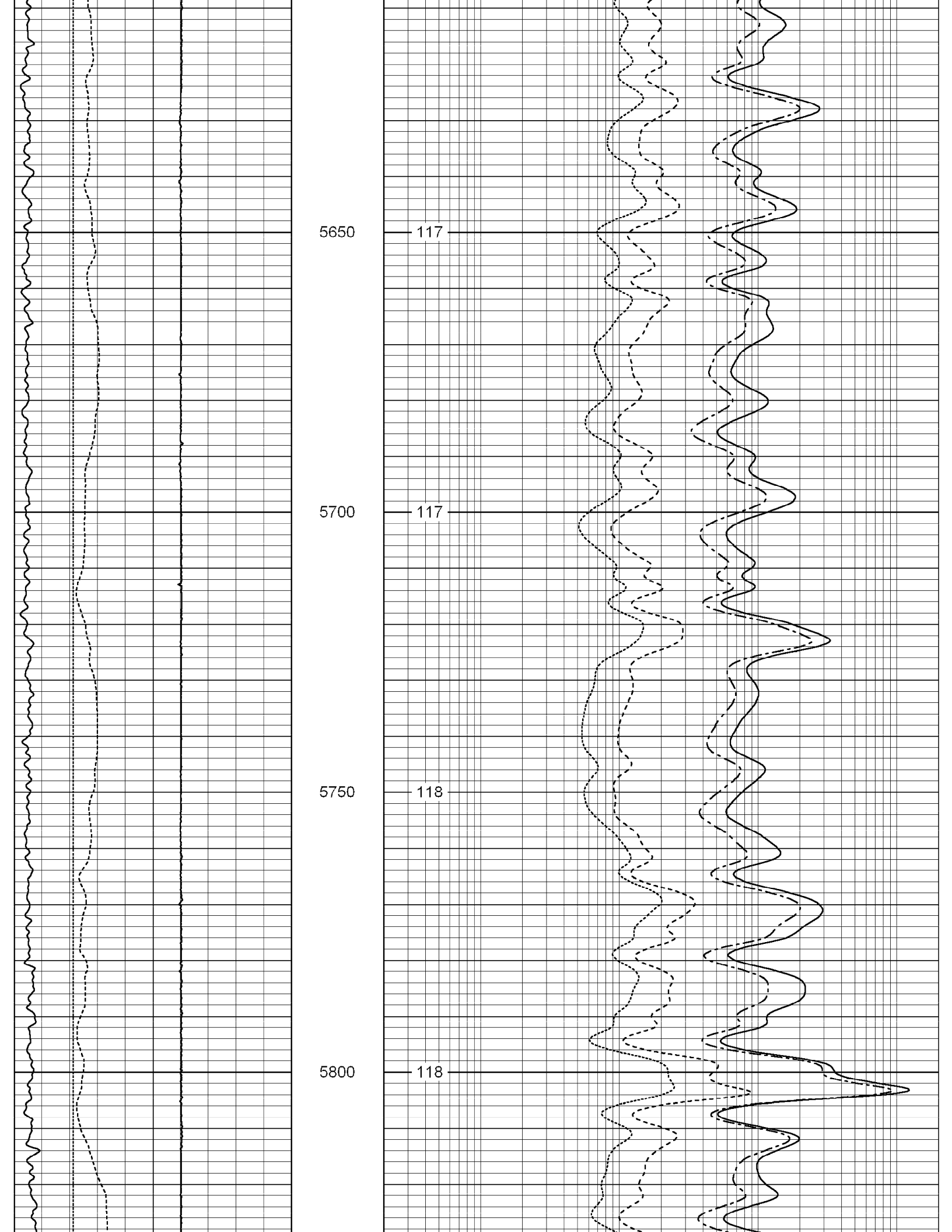
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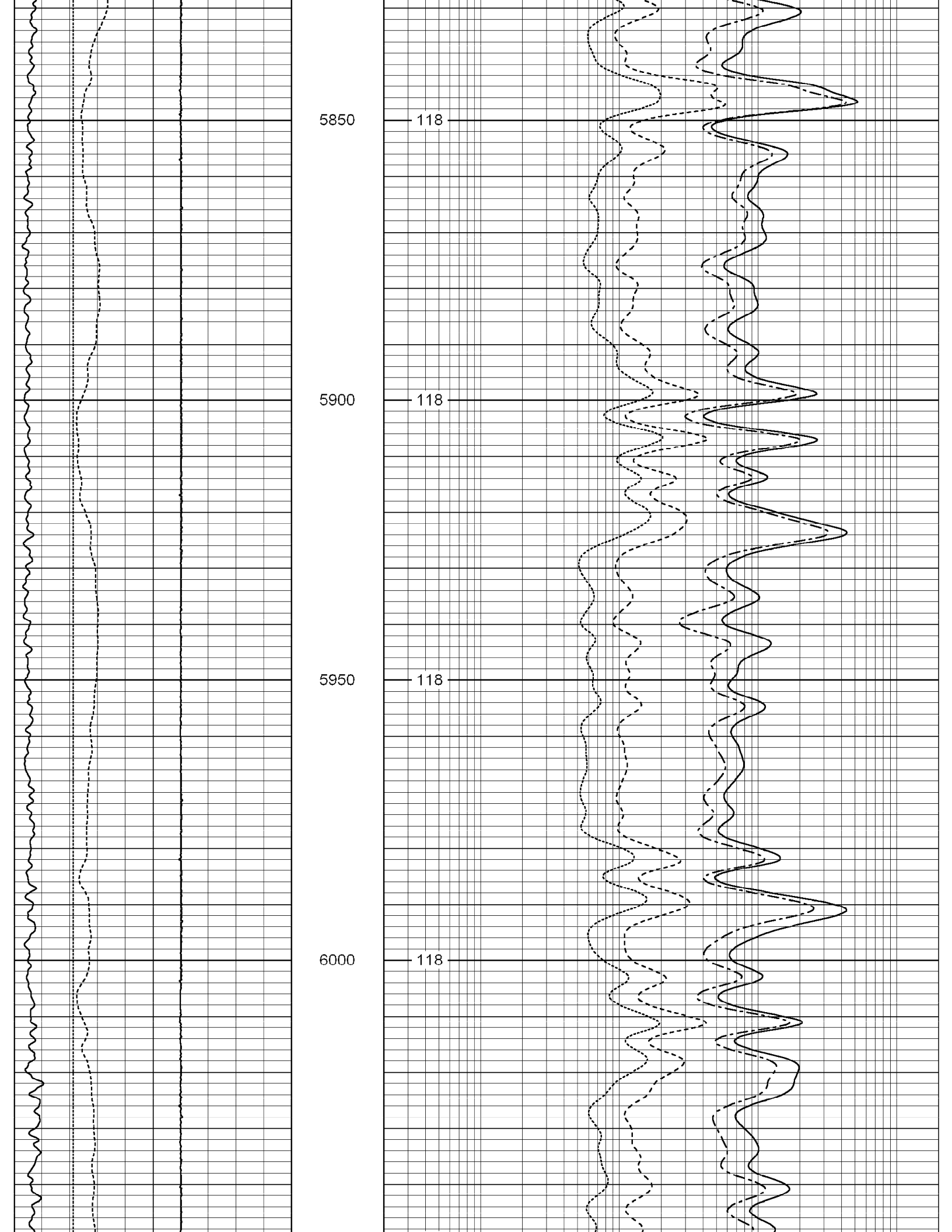
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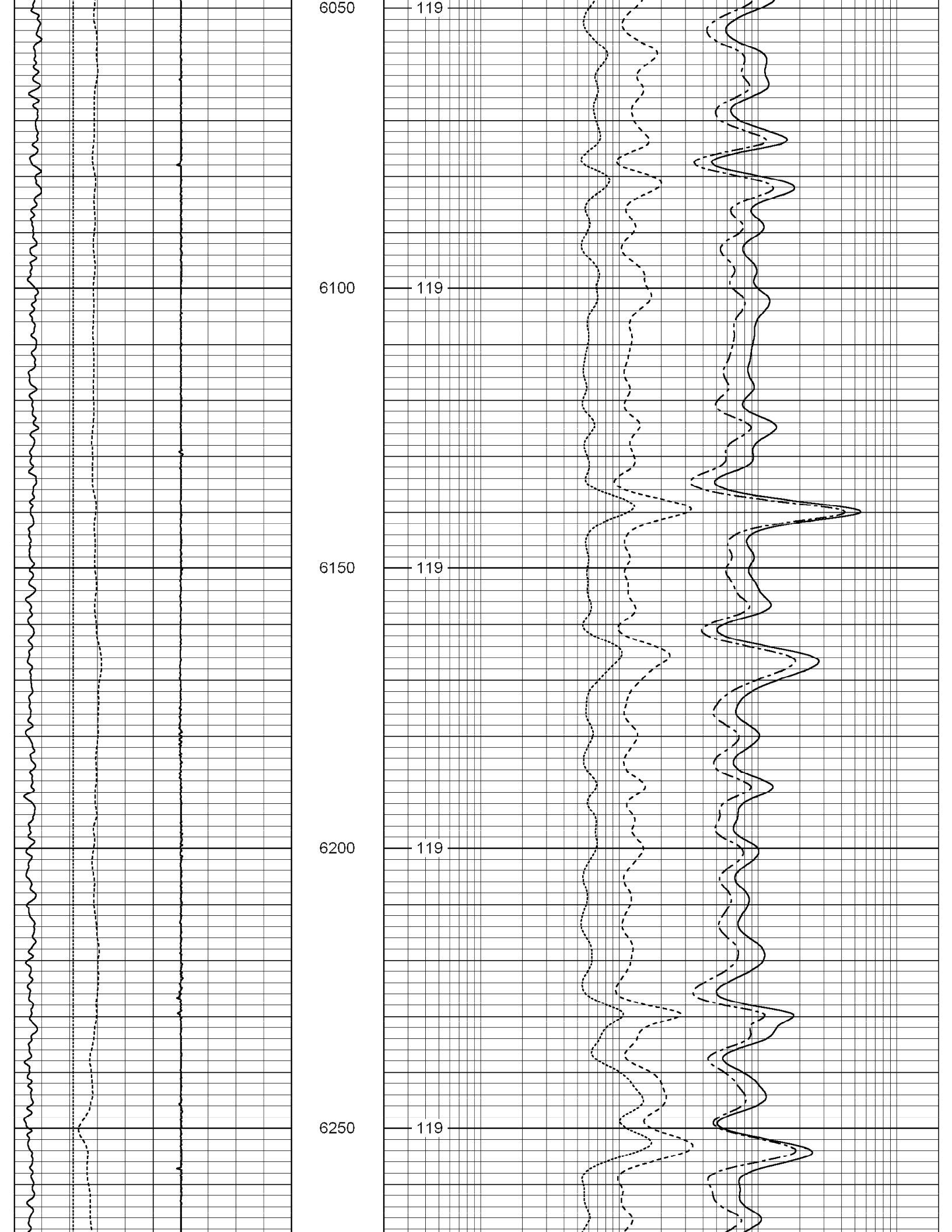
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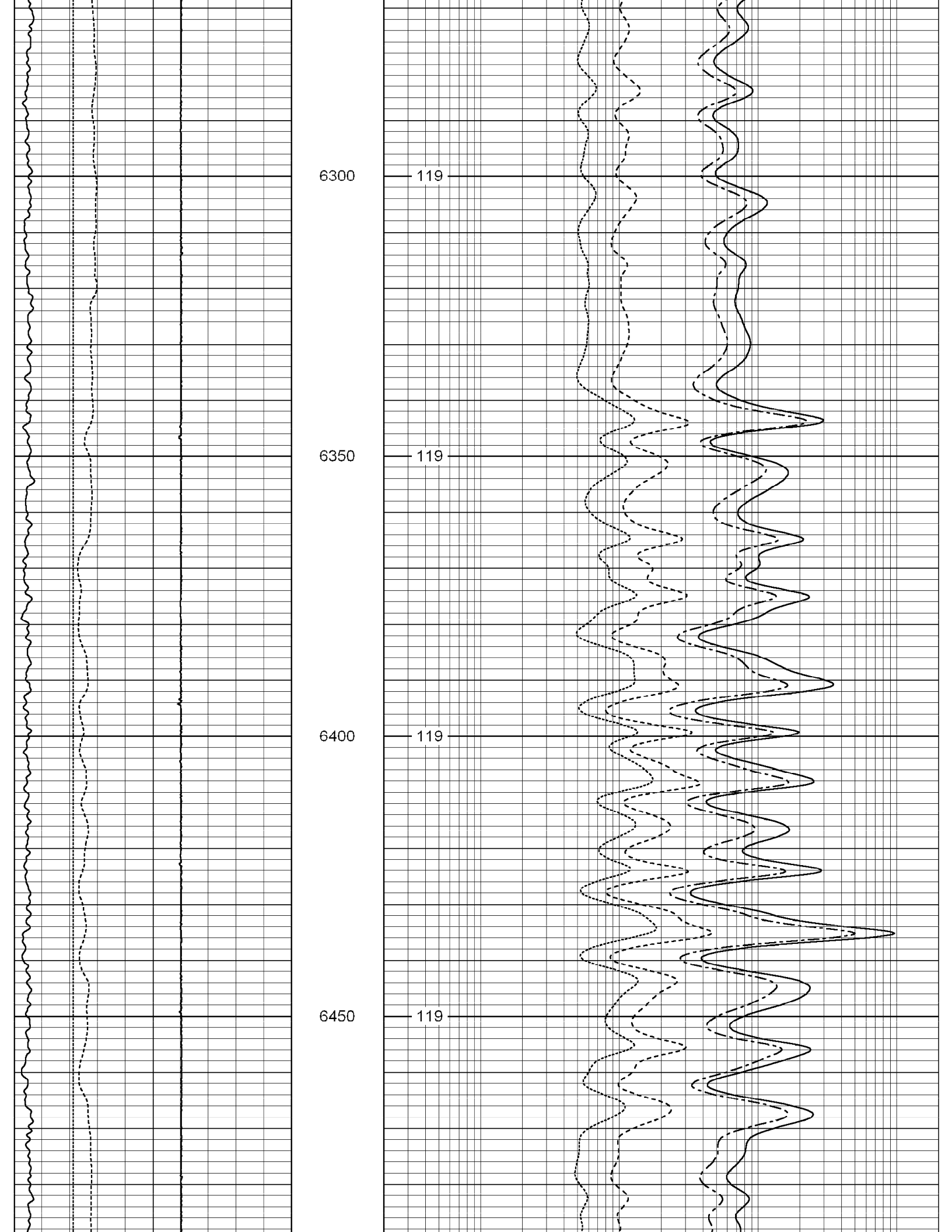
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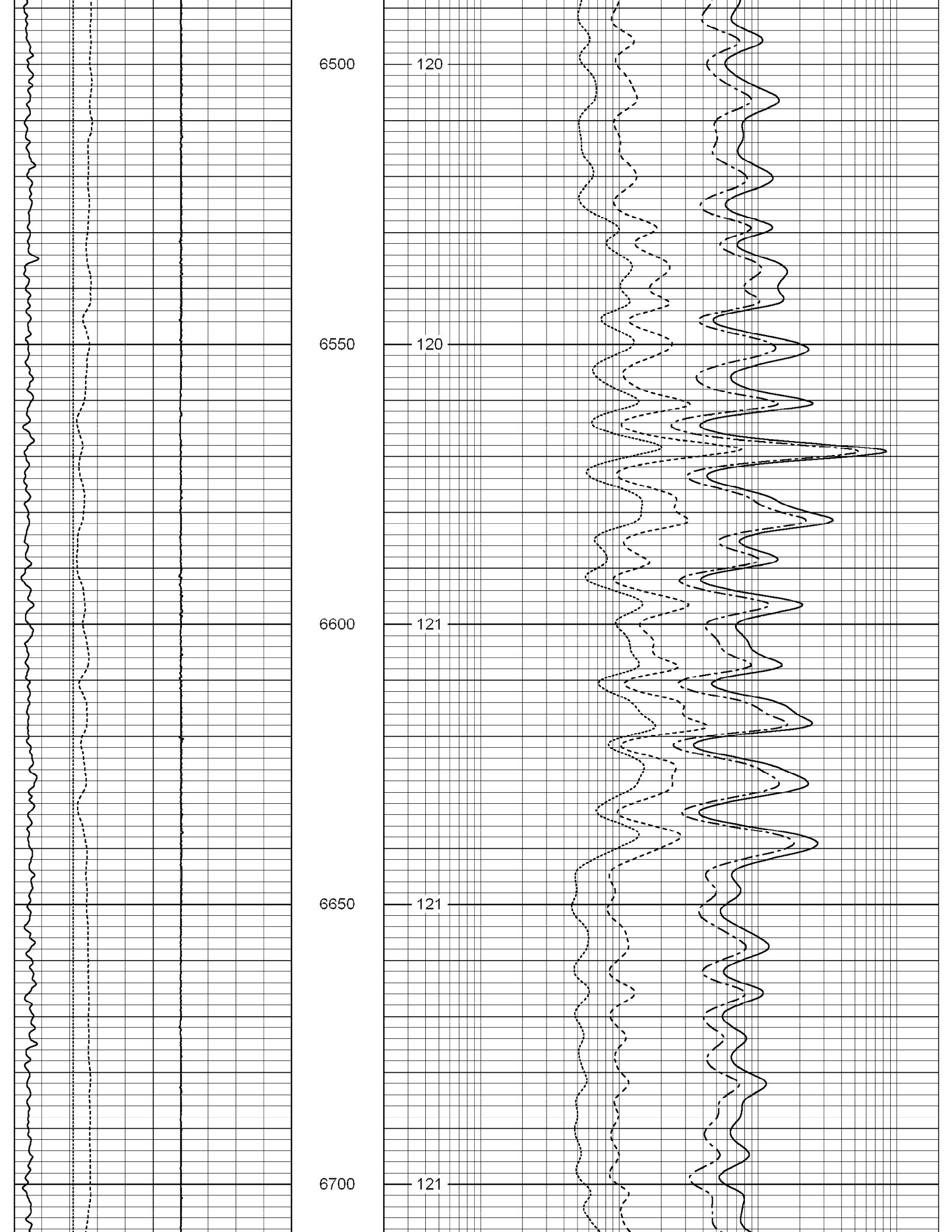
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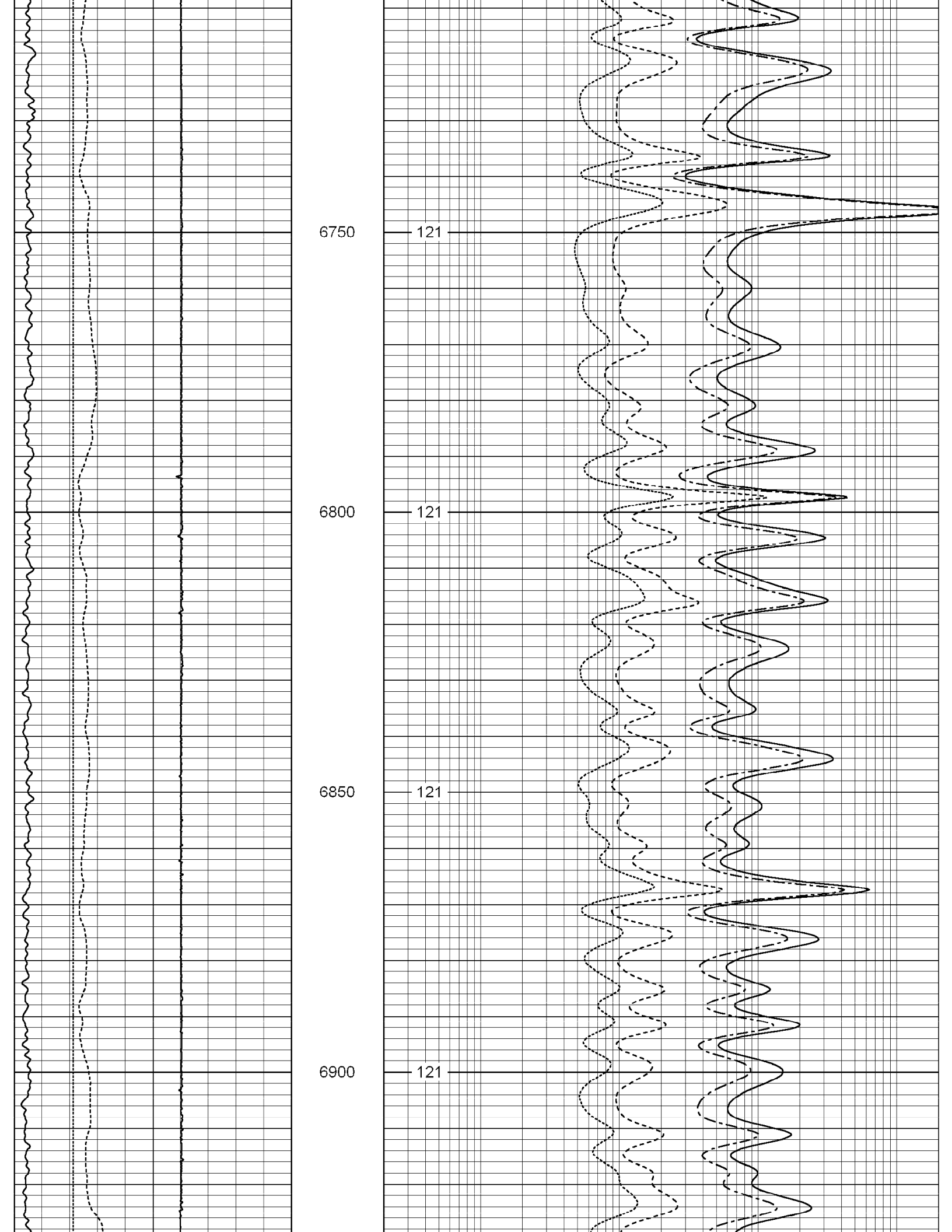
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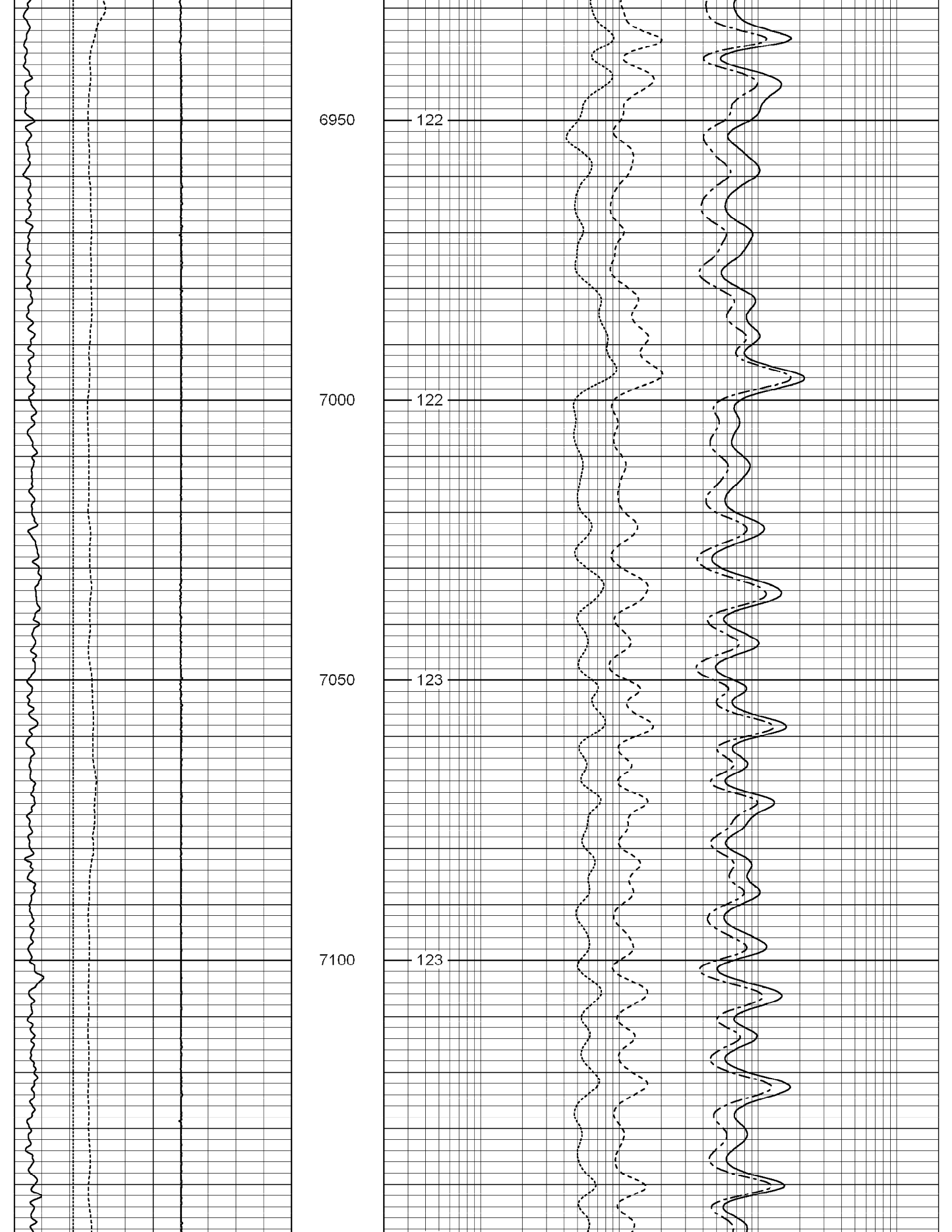
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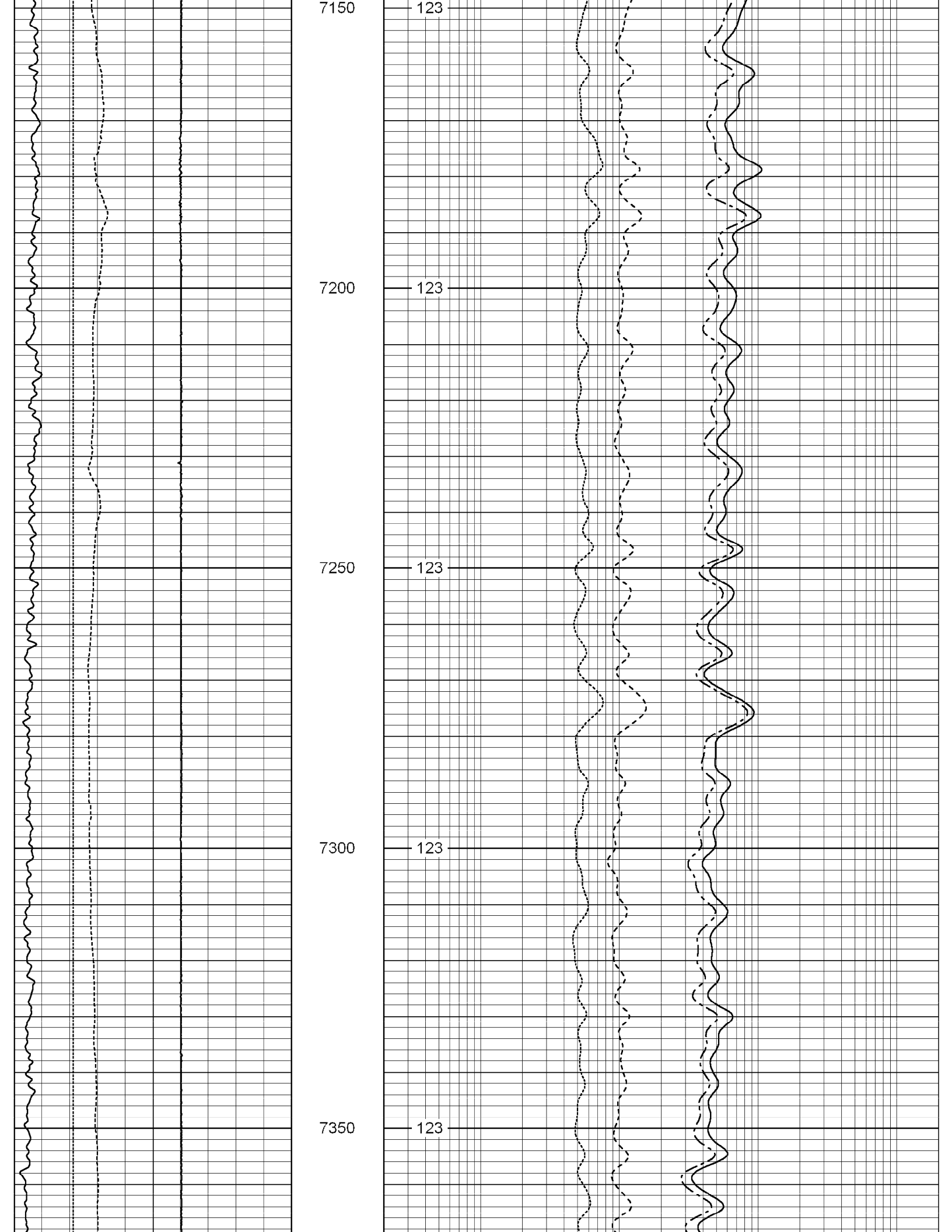
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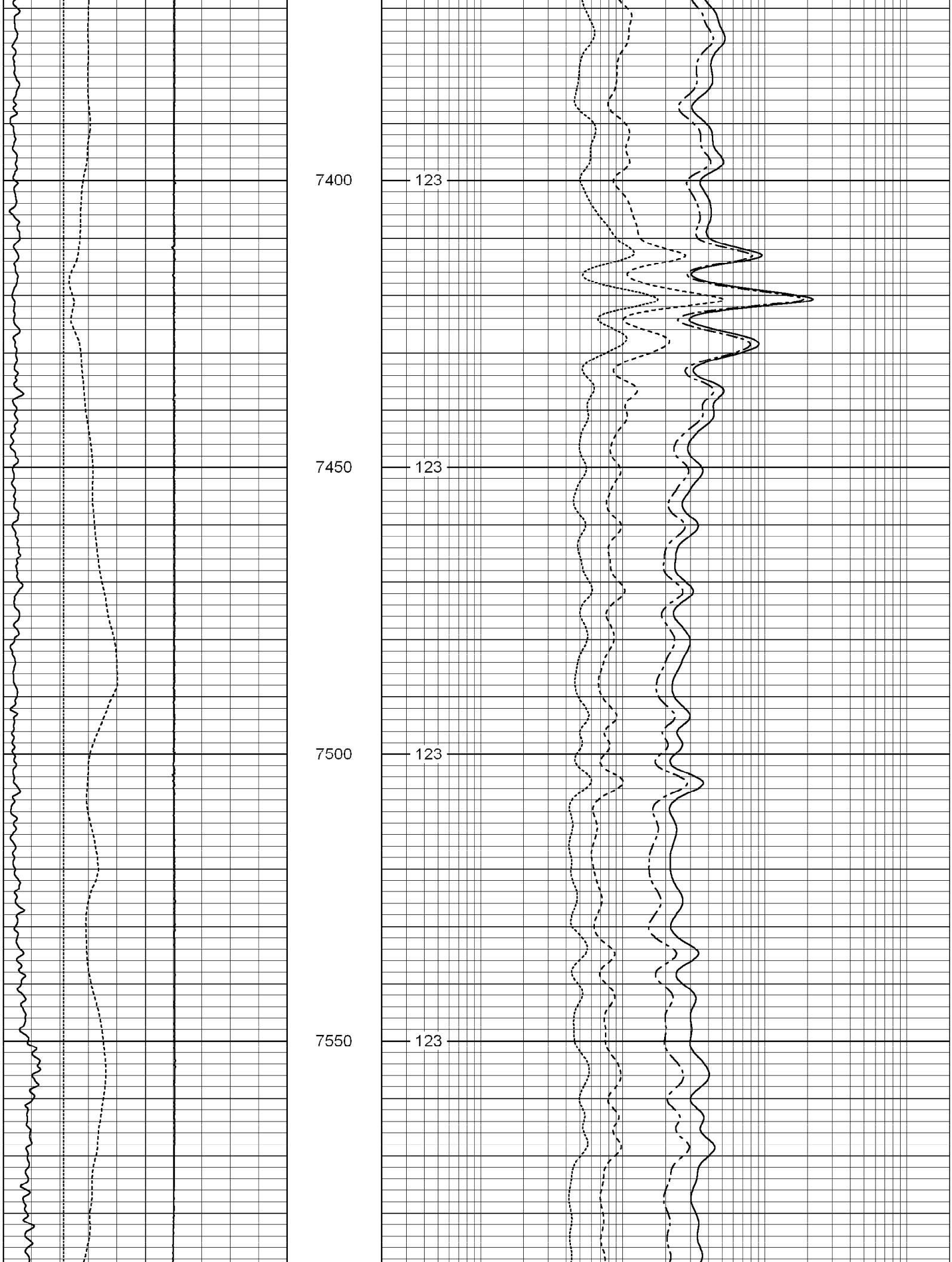
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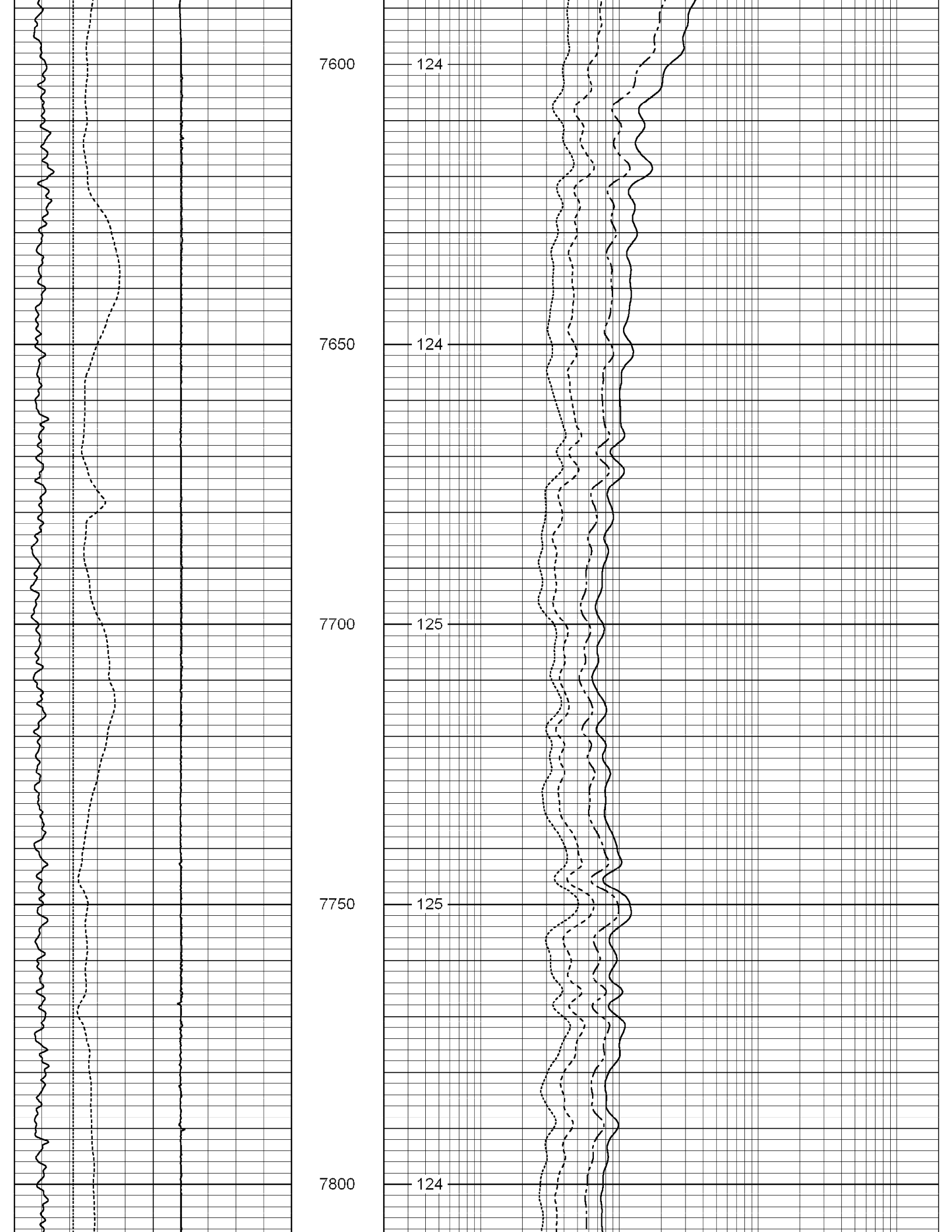
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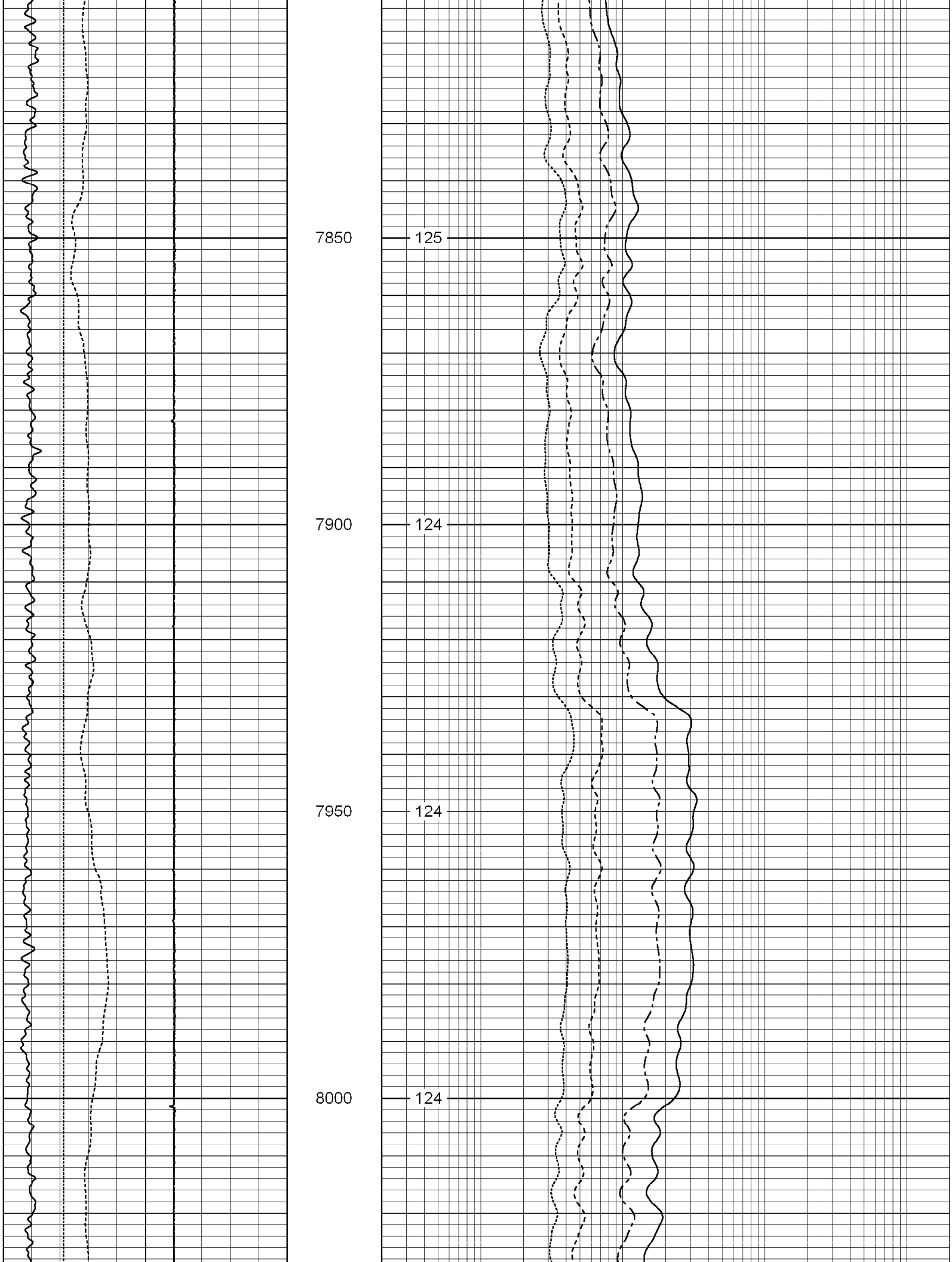
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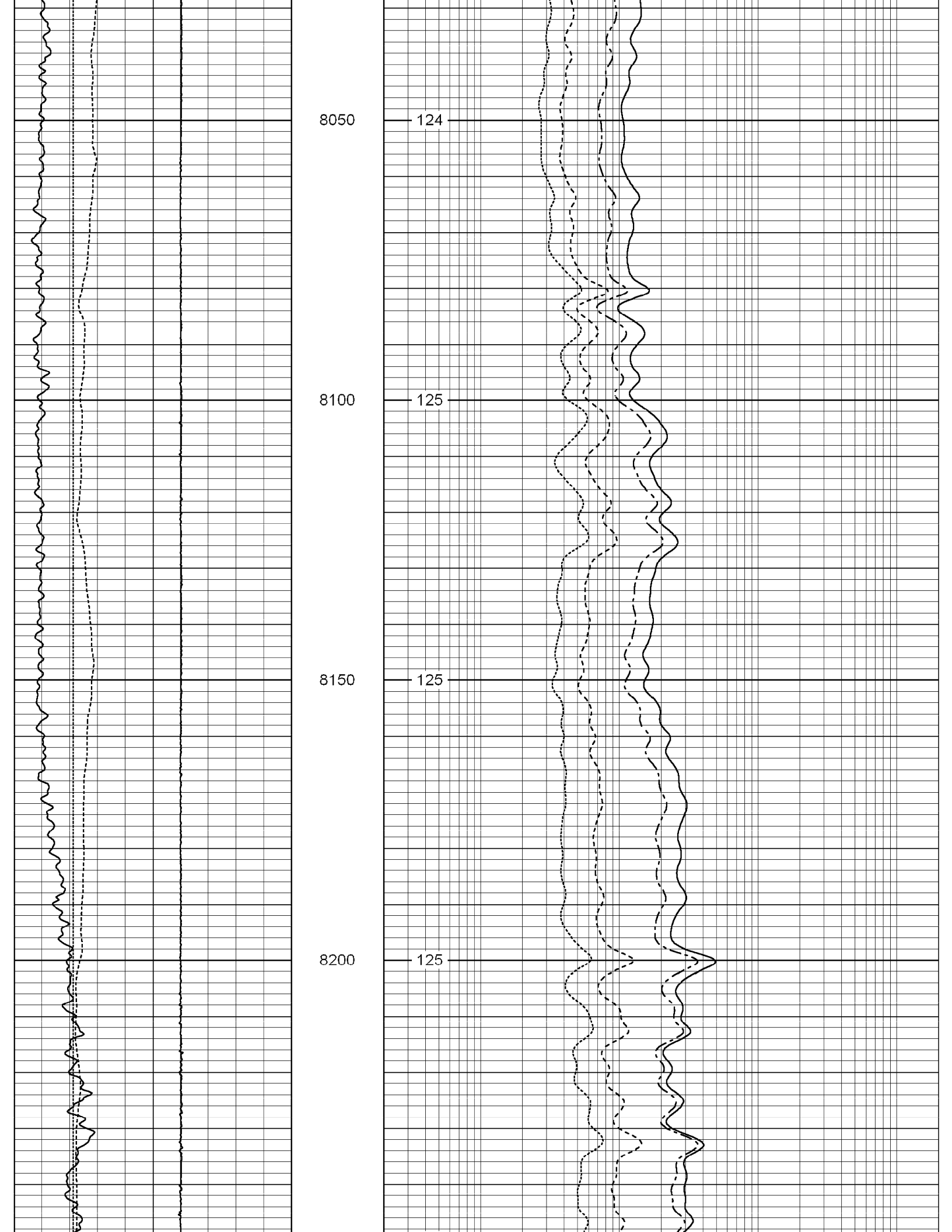
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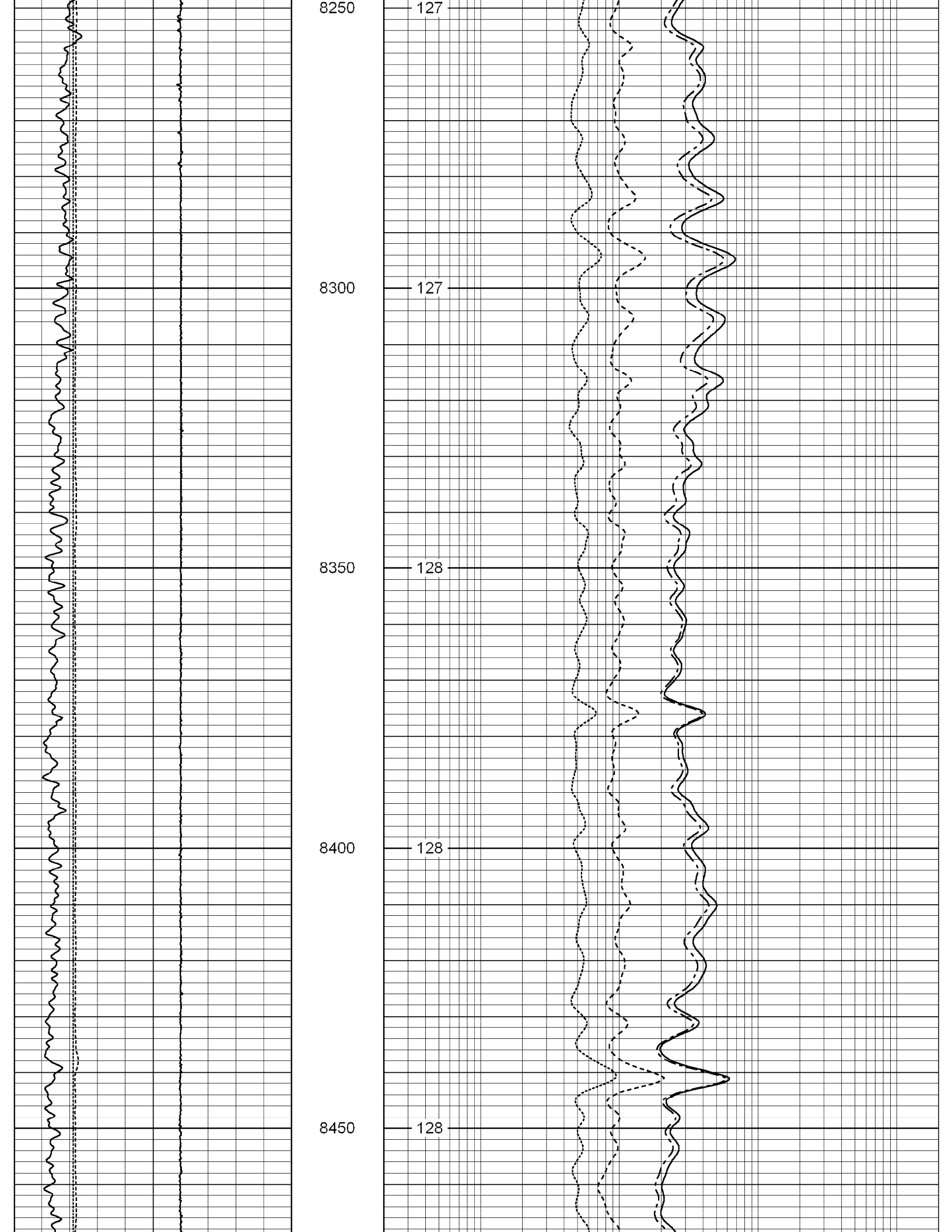
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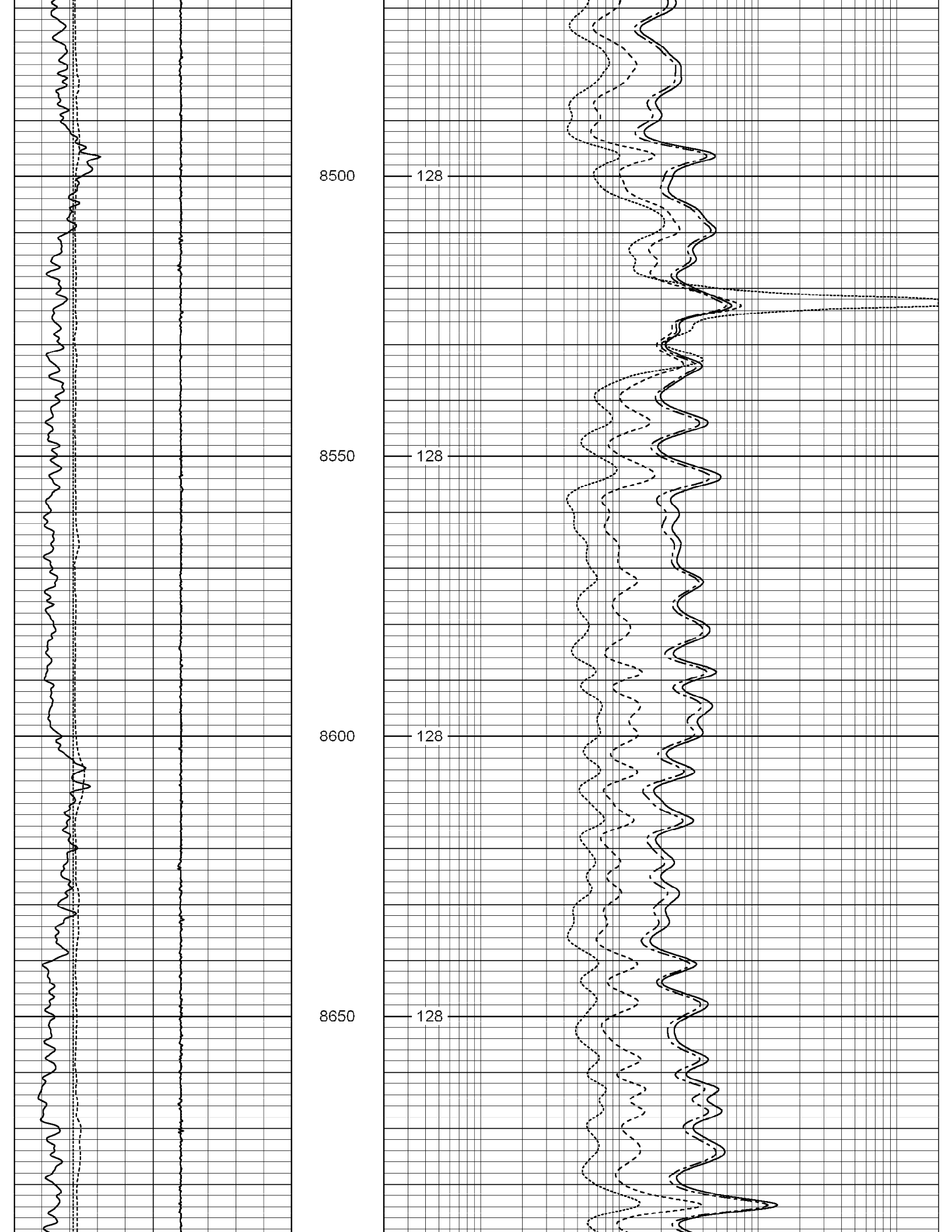
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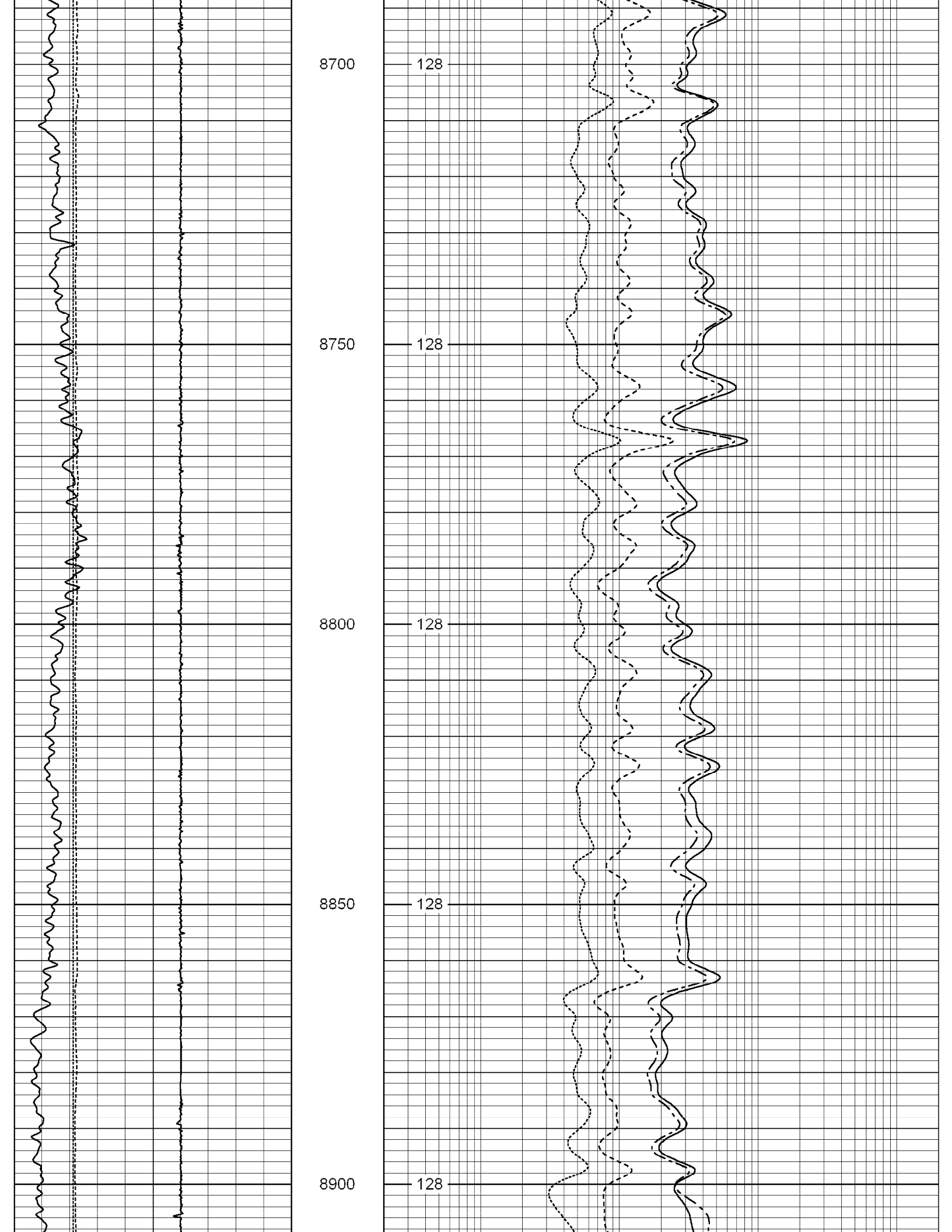
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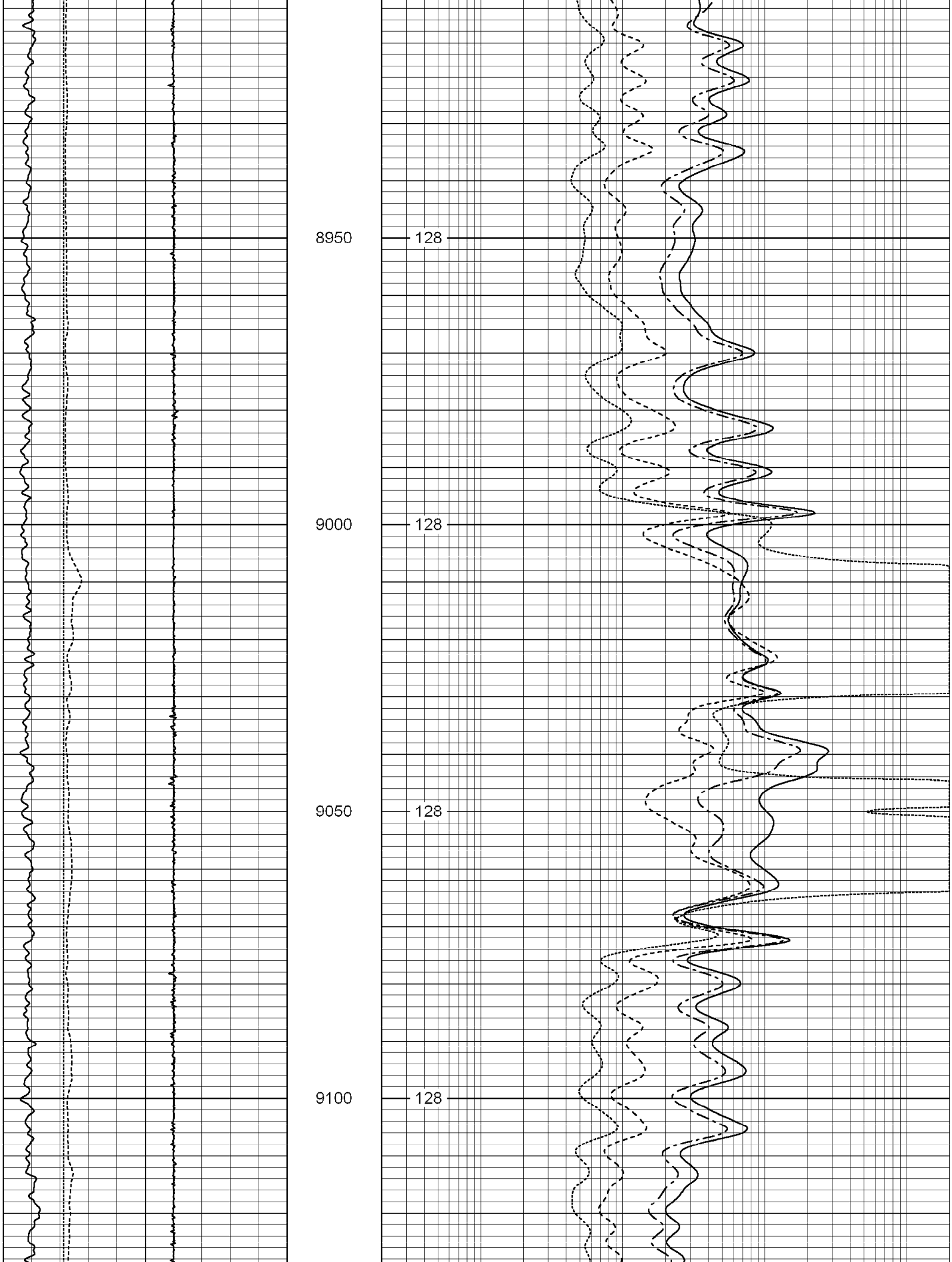
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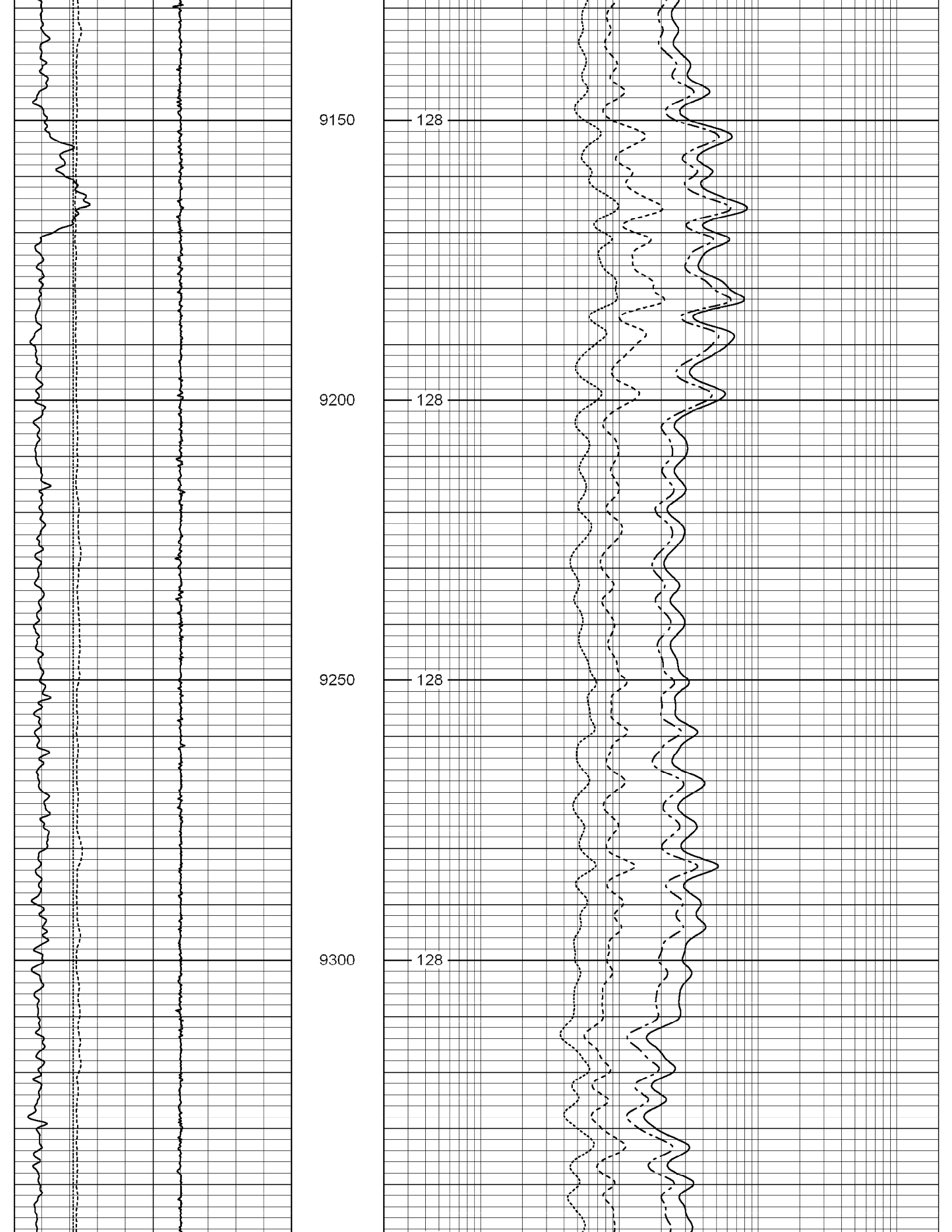
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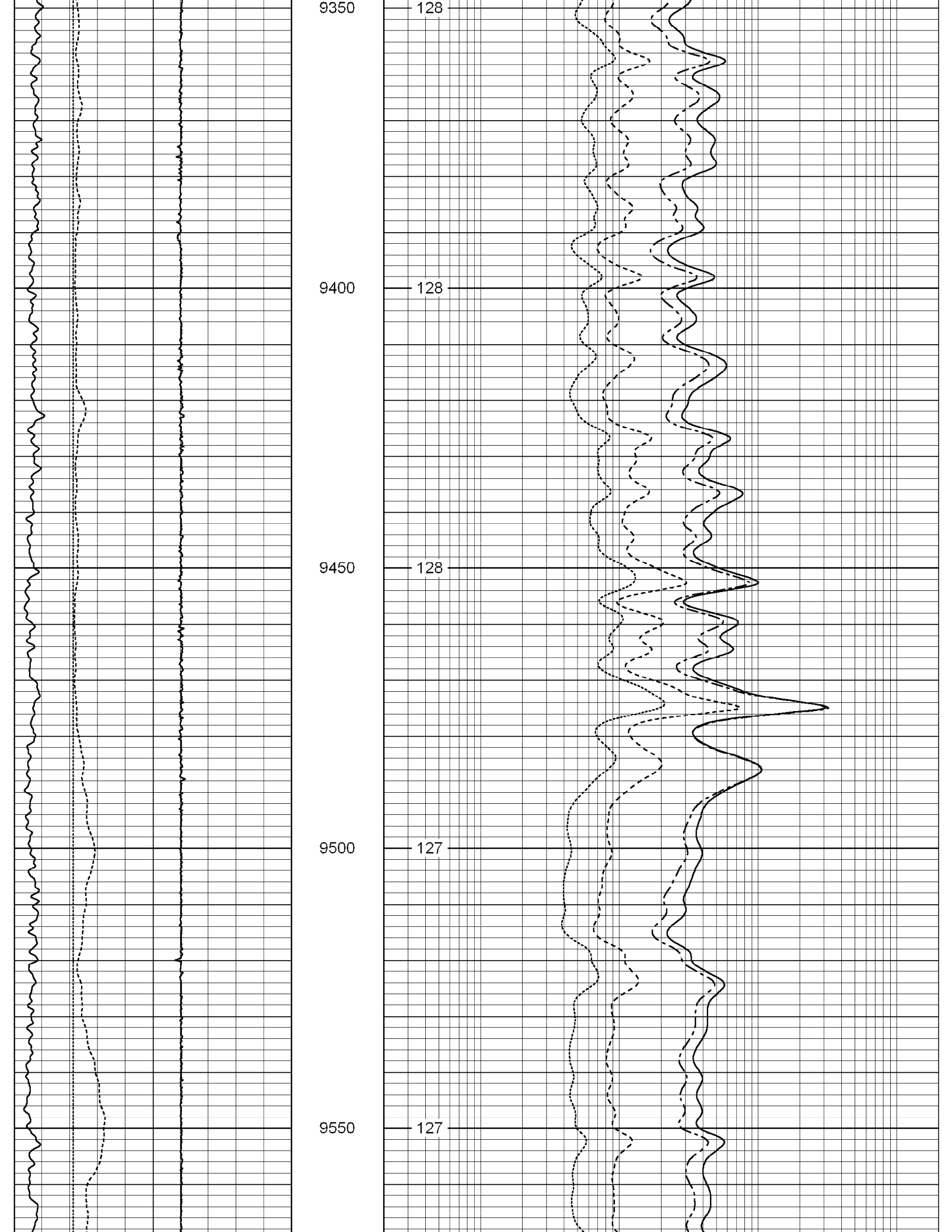
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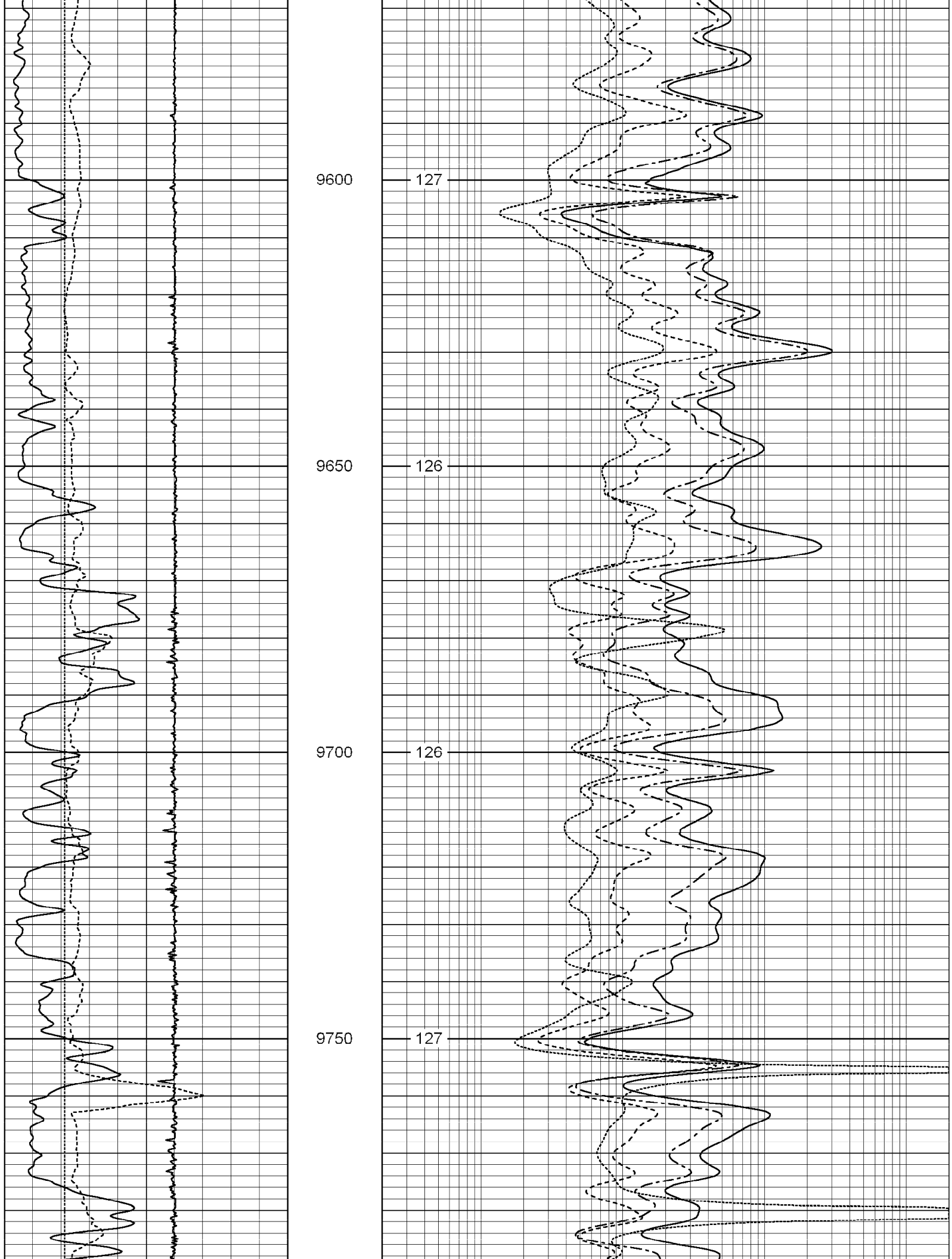
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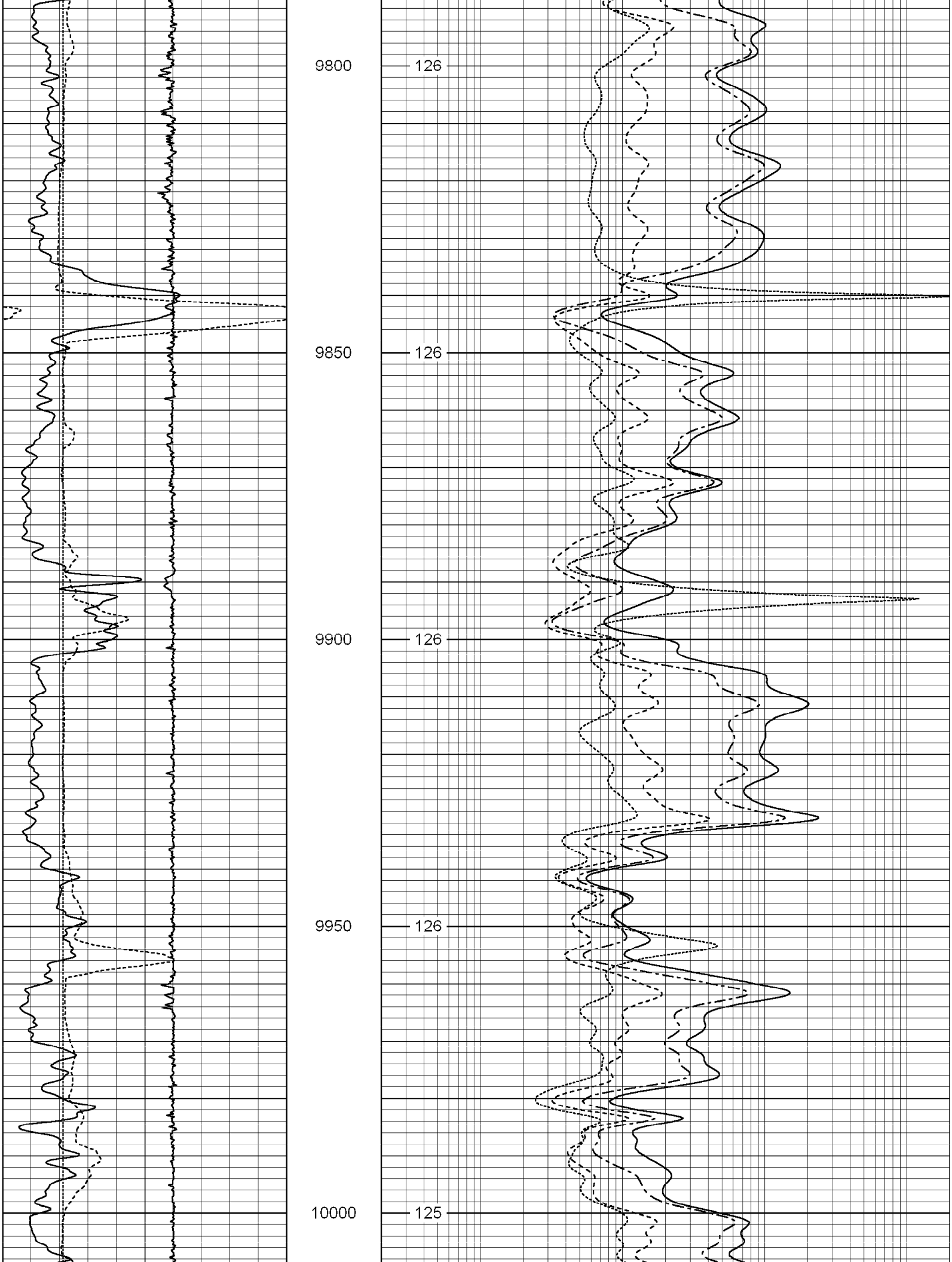
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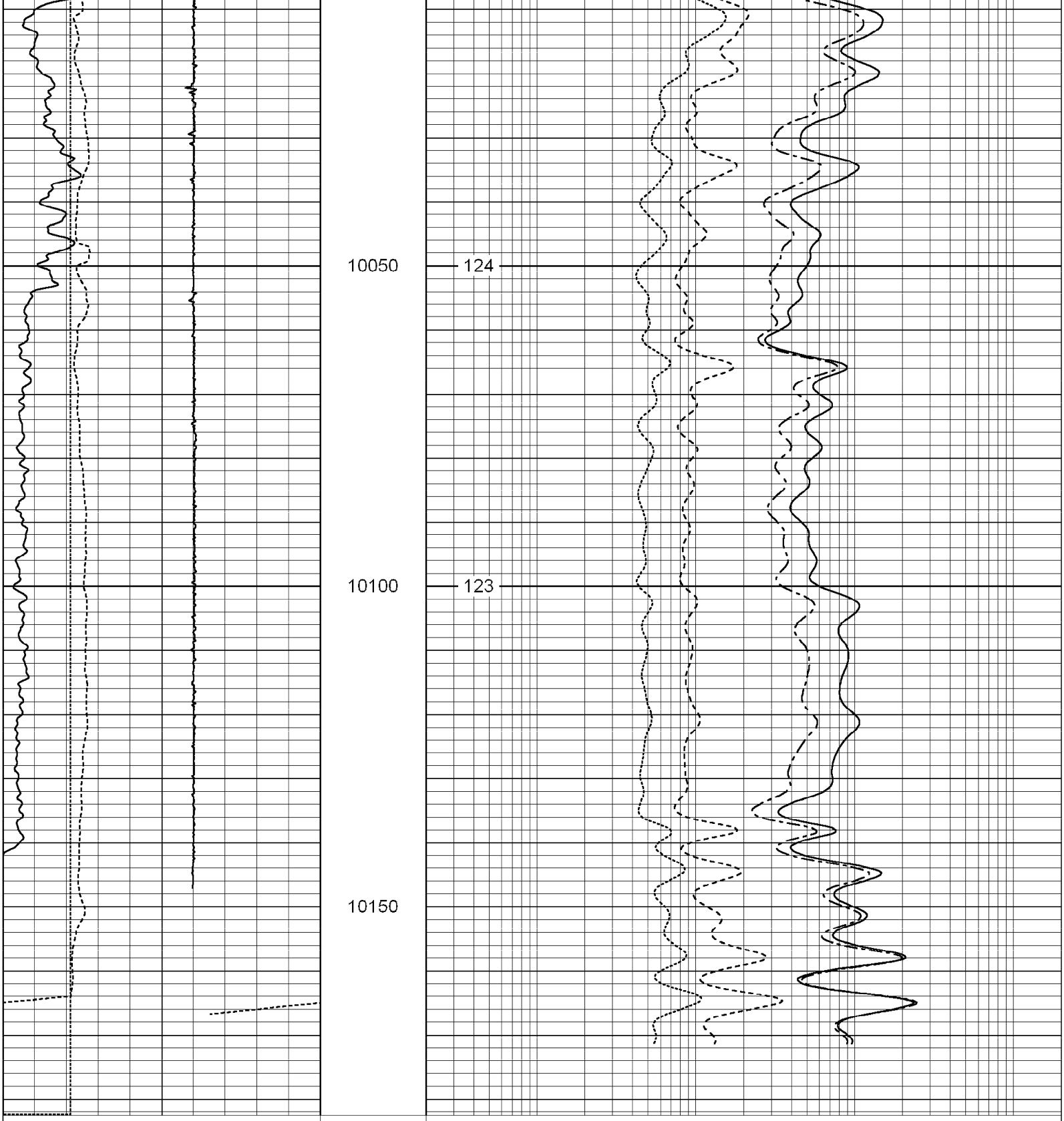


0	GR (GAPI)	150
4	BOREID (in)	14
4	DCAL (in)	14
-5	ACCY	5

0.2	20inRadial (Ohm-m)	2000
0.2	30inRadial (Ohm-m)	2000
0.2	60inRadial (Ohm-m)	2000
0.2	90inRadial (Ohm-m)	2000

GRTEMP (degF)

Log Variables

Database:c:\documents and settings\t006\desktop\vornauf2-18h\sandridege_vornauf_mem.db
Dataset: field/well/proc1/pass1.5

Top - Bottom

BHCOR	BHFL_TYPE	BHFLRES Ohm-m	BHFLRESSRC	BHIDSRC	BOREID in	BOTTEMP degF
On	WBM	1	MUDCELL	CURVE	6.125	128
CASED?	CASEOD in	CASETHCK in	CEMWATERSA kppm	CMNTTHCK in	DPORSEL	FLUIDDEN g/cc
No	4.5	0	0	0	RHOB	1
FRMSALIN kppm	LATNOR	MATRXDEN g/cc	MUDSALIN kppm	MudWgt lb/gal	NPORSEL	PERFS
0	Off	2.71	70	9.1	Limestone	0
RESTMPSRC	SO in	SRFTEMP degF	SZCOR	TDEPTH ft	TMPCOR	TOOLPOS
INTERNAL	0.5	65	On	11772	On	Ec-centered
XXXX						
0						

Calibration Report

Database File: c:\documents and settings\t006\desktop\vornauf2-18h\sandridege_vornauf_mem.db
Dataset Pathname: proc1/pass1.5
Dataset Creation: Tue Aug 14 13:46:30 2012 by Calc Thrubit 110523

ThruBit Induction Calibration Report

Tool Model-Serial Number: PS-PS01R

Shop Calibration Performed: Wed Jul 25 10:03:01 2012

BASELINE

	R	Expected	X	Expected
Freq 1				
A1	-410.8880	[-500.00, -400.00]	427.5210	[-500.00, 500.00]
A2	-130.1030	[-180.00, -100.00]	121.8940	[-500.00, 500.00]
A3	-28.5086	[-50.00, -10.00]	-62.5202	[-500.00, 500.00]
A4	-16.1229	[-30.00, -10.00]	171.2620	[-500.00, 500.00]
A5	-14.8500	[-30.00, -10.00]	102.5790	[-500.00, 500.00]
Freq 2				
A1	-205.7230	[-280.00, -180.00]	242.9590	[-500.00, 500.00]
A2	-83.9072	[-130.00, -50.00]	45.6050	[-500.00, 500.00]
A3	-19.9393	[-50.00, -10.00]	-93.6120	[-500.00, 500.00]
A4	-20.0838	[-30.00, -10.00]	20.4881	[-500.00, 500.00]
A5	-20.2638	[-30.00, -10.00]	-32.8815	[-500.00, 500.00]
Freq 3				
A1	-126.0990	[-180.00, -80.00]	102.5720	[-500.00, 500.00]
A2	-63.1959	[-130.00, -30.00]	-12.7774	[-500.00, 500.00]
A3	-14.8126	[-50.00, -10.00]	-127.4750	[-500.00, 500.00]
A4	-21.8112	[-30.00, -10.00]	-83.7303	[-500.00, 500.00]
A5	-22.9647	[-30.00, -10.00]	-132.8210	[-500.00, 500.00]
Freq 4				
A1	-65.2680	[-120.00, -40.00]	-97.3914	[-500.00, 500.00]
A2	-44.8152	[-110.00, -10.00]	-101.5830	[-500.00, 500.00]
A3	-10.6991	[-50.00, -10.00]	-193.8100	[-500.00, 500.00]
A4	-26.0315	[-30.00, -10.00]	-245.1770	[-500.00, 500.00]

A5	-29.6423	[-30.00, -10.00]	-304.2350	[-500.00, 500.00]

CALIBRATION COEFFICIENTS

	R	Expected	X	Expected
Freq 1				
A1	0.9925	[0.95, 1.05]	0.0012	[-0.05, 0.05]
A2	0.9946	[0.95, 1.05]	0.0024	[-0.05, 0.05]
A3	0.9940	[0.95, 1.05]	-0.0045	[-0.05, 0.05]
A4	0.9898	[0.95, 1.05]	0.0041	[-0.05, 0.05]
A5	0.9963	[0.95, 1.05]	0.0019	[-0.05, 0.05]
Freq 2				
A1	0.9874	[0.95, 1.05]	-0.0076	[-0.05, 0.05]
A2	0.9889	[0.95, 1.05]	-0.0066	[-0.05, 0.05]
A3	0.9827	[0.95, 1.05]	-0.0062	[-0.05, 0.05]
A4	0.9848	[0.95, 1.05]	-0.0047	[-0.05, 0.05]
A5	0.9918	[0.95, 1.05]	-0.0073	[-0.05, 0.05]
Freq 3				
A1	0.9869	[0.95, 1.05]	-0.0092	[-0.05, 0.05]
A2	0.9884	[0.95, 1.05]	-0.0081	[-0.05, 0.05]
A3	0.9821	[0.95, 1.05]	-0.0082	[-0.05, 0.05]
A4	0.9827	[0.95, 1.05]	-0.0062	[-0.05, 0.05]
A5	0.9919	[0.95, 1.05]	-0.0084	[-0.05, 0.05]
Freq 4				
A1	0.9903	[0.95, 1.05]	0.0015	[-0.05, 0.05]
A2	0.9917	[0.95, 1.05]	0.0027	[-0.05, 0.05]
A3	0.9873	[0.95, 1.05]	0.0003	[-0.05, 0.05]
A4	0.9845	[0.95, 1.05]	0.0043	[-0.05, 0.05]
A5	1.0005	[0.95, 1.05]	0.0015	[-0.05, 0.05]
Temperature	37.6770 degC			

ThruBit Density Calibration Report

Tool Model-Serial Number:	PS-PS01D
Source Number:	
Shop Calibration Performed:	Thu Jul 19 10:47:37 2012

REFERENCE

	Density	Units
Aluminium	2.607	g/cc
Magnesium	1.752	g/cc

READINGS

Outputs	Counts	Units	Expected
SS1 Background	123.66	cps	[130.00, 170.00]
LS1 Background	132.03	cps	[130.00, 170.00]
LS4 Background	27.54	cps	[27.00, 35.00]
SS1 Aluminium	4782.00	cps	[4500.00, 5500.00]
LS1 Aluminium	908.63	cps	[750.00, 950.00]
LS4 Aluminium	1016.34	cps	[843.00, 1068.00]
SS1 Magnesium	7901.76	cps	[7000.00, 9000.00]

LS1 Magnesium	6002.95	cps	[5250.00, 6250.00]
LS1 Al + Fe	771.31	cps	[650.00, 800.00]
LS4 Al + Fe	449.12	cps	[382.00, 471.00]

RESULTS

SS Slope	1.67	[1.52, 1.77]
LS Slope	0.42	[0.38, 0.45]
PEF K Factor	4.977	[3.510, 6.170]
PEF B Factor	-0.515	[-0.700, -0.410]

Caliper Shop Calibration performed: Thu Jul 19 10:47:37 2012

RESULTS

Reference	Reading	Units
12.00	1867.53	in
9.00	2024.30	in
6.00	2185.88	in

DENSITY PRE-SURVEY CHECK Performed: Wed Aug 08 08:21:53 2012

Outputs	Counts	Units	Expected
SS1 Background	124.79	cps	[119.95, 127.37]
LS1 Background	132.72	cps	[128.07, 135.99]
LS4 Background	41.33	cps	[25.89, 29.20]

DENSITY POST-SURVEY CHECK Performed: Wed Dec 31 18:00:00 1969

Outputs	Counts	Units	Expected
SS1 Background	0.00	cps	[119.95, 127.37]
LS1 Background	0.00	cps	[128.07, 135.99]
LS4 Background	0.00	cps	[25.89, 29.20]

CALIPER PRE-SURVEY CHECK Performed: Wed Aug 08 08:22:20 2012

Reference	Readings	Units	Expected
6.00	5.88	in	[5.80, 6.20]

CALIPER POST-SURVEY CHECK Performed: Wed Dec 31 18:00:00 1969

Reference	Readings	Units	Expected
0.00	0.00	in	[-0.20, 0.20]

Compensated Neutron Calibration Report

Tool Model-Serial Number: PS-PS27N
Source Number:

Calibration Tank Temperature: 88.0 degF
Shop Calibration Performed: Wed Jul 18 12:12:40 2012

BACKGROUND MEASUREMENT

Outputs	Measured	Units	Expected

SS Counts	0.1	cps	<10
LS Counts	0.1	cps	<4

WATER TANK REFERENCE

Outputs	Measured	Units	Expected
SS Counts	914.6	cps	
LS Counts	31.1	cps	
Tank Ratio Ref	30.9580	SS/LS	
Tank Ratio	29.4457	SS/LS	
Tank Ratio Gain	1.0514		[0.85, 1.15]

ALUMINUM SLEEVE REFERENCE

Outputs	Measured	Units	Expected
SS Counts	10175.5	cps	
LS Counts	1006.0	cps	
Al Ratio Ref	10.797	SS/LS	
Al Ratio	10.634	SS/LS	
Al Ratio Gain	1.02		[0.90, 1.10]
Sleeve Porosity	14.46	pu	

PRE-SURVEY BACKGROUND CHECK Performed: Thu Aug 09 07:44:56 2012

Outputs	Measured	Units	Expected
SS Counts	0.1	cps	<10
LS Counts	0.1	cps	<4

POST-SURVEY BACKGROUND CHECK Performed:

Outputs	Measured	Units	Expected
SS Counts	0.0	cps	<10
LS Counts	0.0	cps	<4

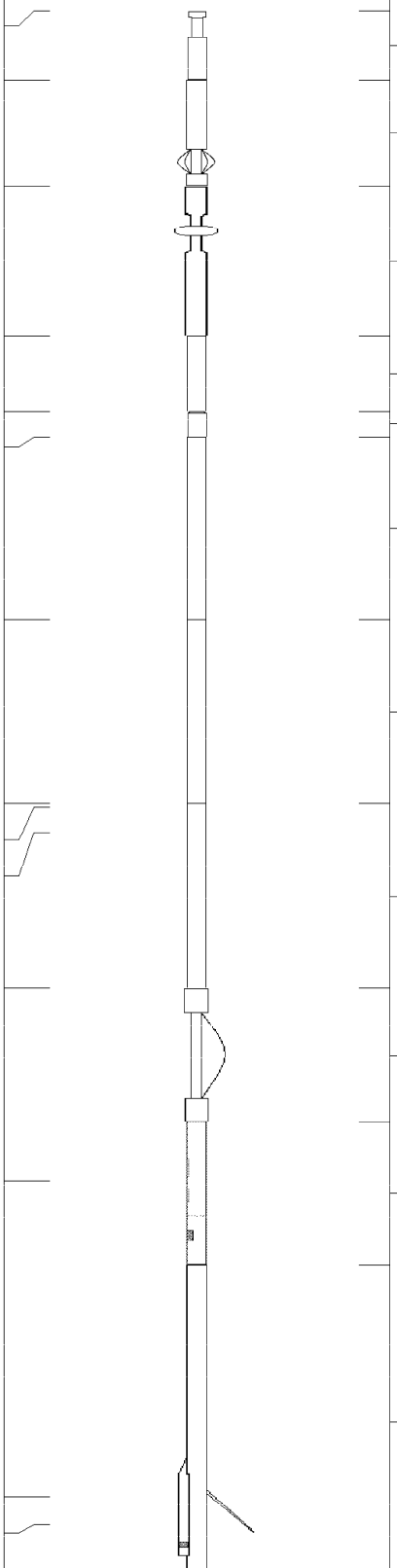
Gamma Ray Calibration Report

Tool Model-Serial Number:	PS-PS27T	
Performed:	Sat Jul 21 08:30:09 2012	
Calibrator Value:	162.7	GAPI
Background Reading:	73.2	cps
Calibrator Reading:	454.7	cps
Sensitivity:	0.3850	GAPI/cps

Inclinometer Calibration Report

Performed: Sun Jun 13 14:33:21 1993

	Low Read.	High Read.	Low Ref.	High Ref.	
X Accelerometer	0.00	1.00	0.00	1.00	gee
Y Accelerometer	0.00	1.00	0.00	1.00	gee
Z Accelerometer	0.00	1.00	0.00	1.00	gee

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
Thrubit	67.64		Cablehead-S Solid Weakpoint	2.31	2.13	5.00
Thrubit	65.33					
			BDOT	3.54	2.25	35.00
Thrubit	61.79					
			HangOff_Tool	5.00	2.38	60.00
Thrubit	56.79					
			Swivel	2.50	2.06	25.00
Thrubit	54.29		10-1	0.88	2.13	3.95
TBBAT2	53.41					
			TBBAT2-A (PS29B) Thrubit Battery	6.13	2.13	40.00
TBBAT	47.29					
			TBBAT-A (PS30B) Thrubit Battery	6.13	2.13	38.20
TMG	41.16					
GR	41.04					
GRTEMP	40.20		TMG-PS (PS27T) ThruBit Telemetry Gamma Ray	6.13	2.13	45.00
Thrubit	35.04					
			Decentralizer Decentralizer (Small)	4.50	2.13	70.00
CNLSC	28.60		TBN-PS (PS27N) ThruBit Neutron	4.77	2.13	63.00
			TBD-PS (PS01D) Thrubit Density	10.48	2.13	91.00
LSW1	18.04					
DCAL	17.13					

A1_P	10.60	TBI-PS (PS01R) Thrubit Induction	15.29	2.13	94.00
A2_P	10.10				
A3_P	9.35				
A4_P	8.35				
A5_P	6.60				

Dataset:	sandridege_vornauf_mem.db: field/well/proc1/pass1.5
Total Length:	67.64 ft
Total Weight:	570.15 lb
O.D.	2.38 in

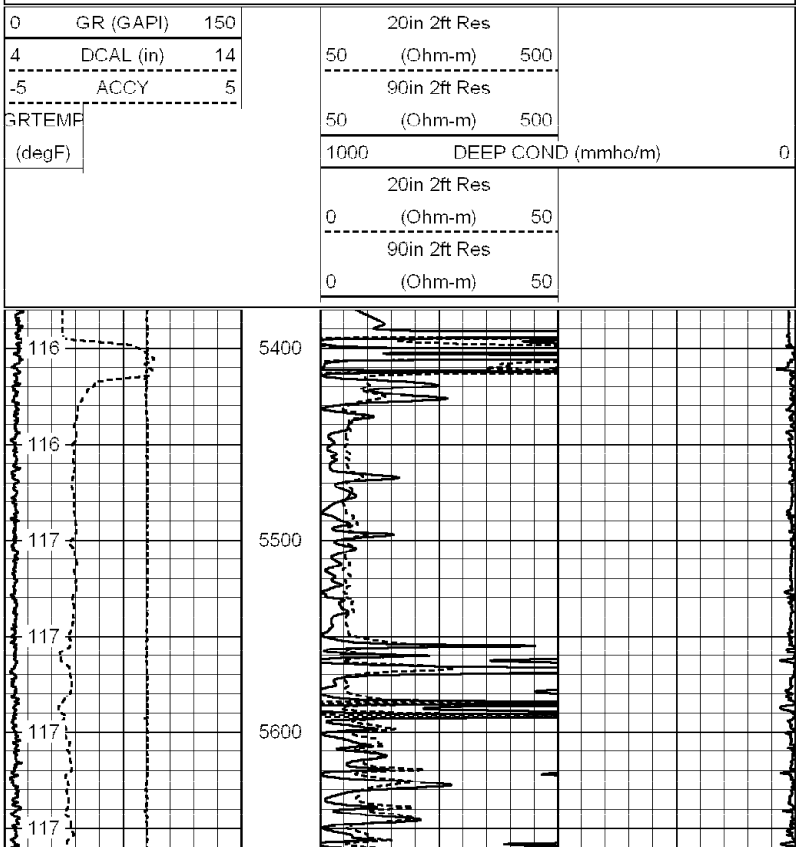
ThruBit
A Schlumberger Company

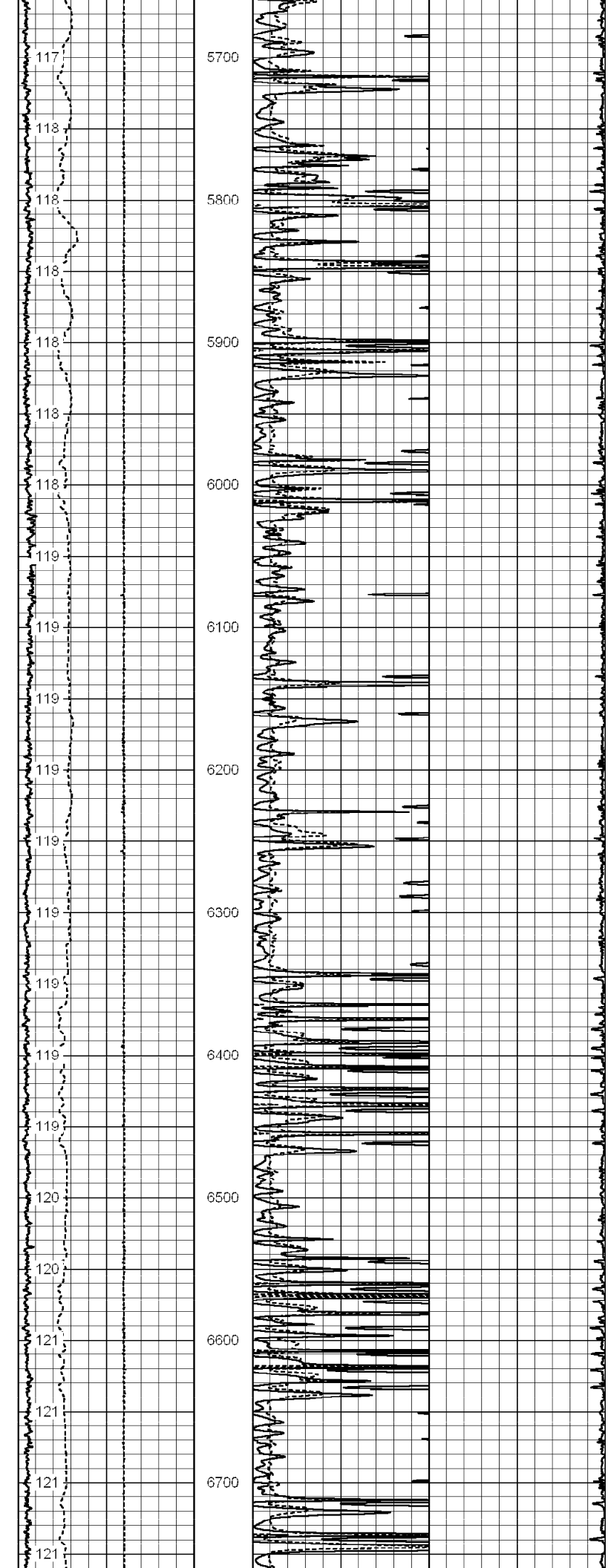
Company	SANDRIDGE ENERGY
Well	VORNAUF 2-18H
Field	STRANATHAN
County	HARPER
State	KANSAS

ThruBit
A Schlumberger Company

MAIN PASS

Database File:	c:\documents and settings\t006\desktop\vornauf2-18h\sandridege_
Dataset Pathname:	proc1/pass1.8
Presentation Format:	6_1r_chk
Dataset Creation:	Tue Aug 14 14:15:12 2012
Charted by:	Depth in Feet scaled 1:1200

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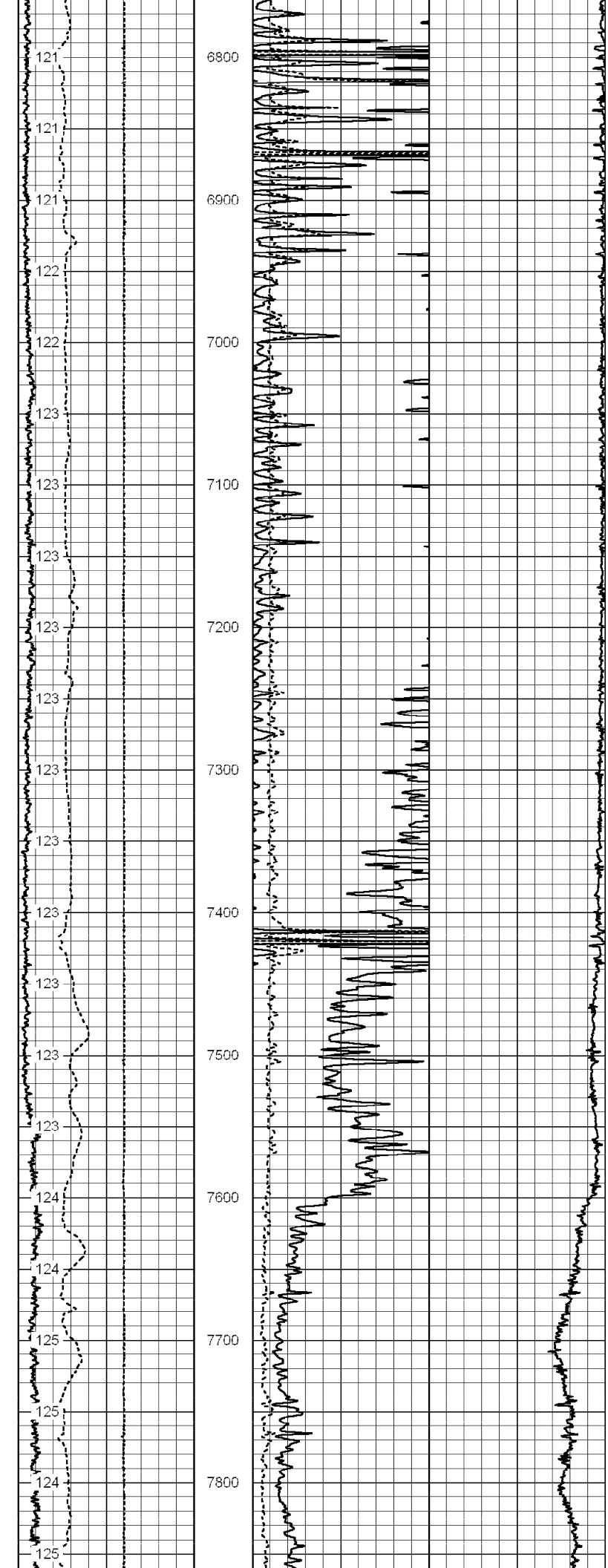
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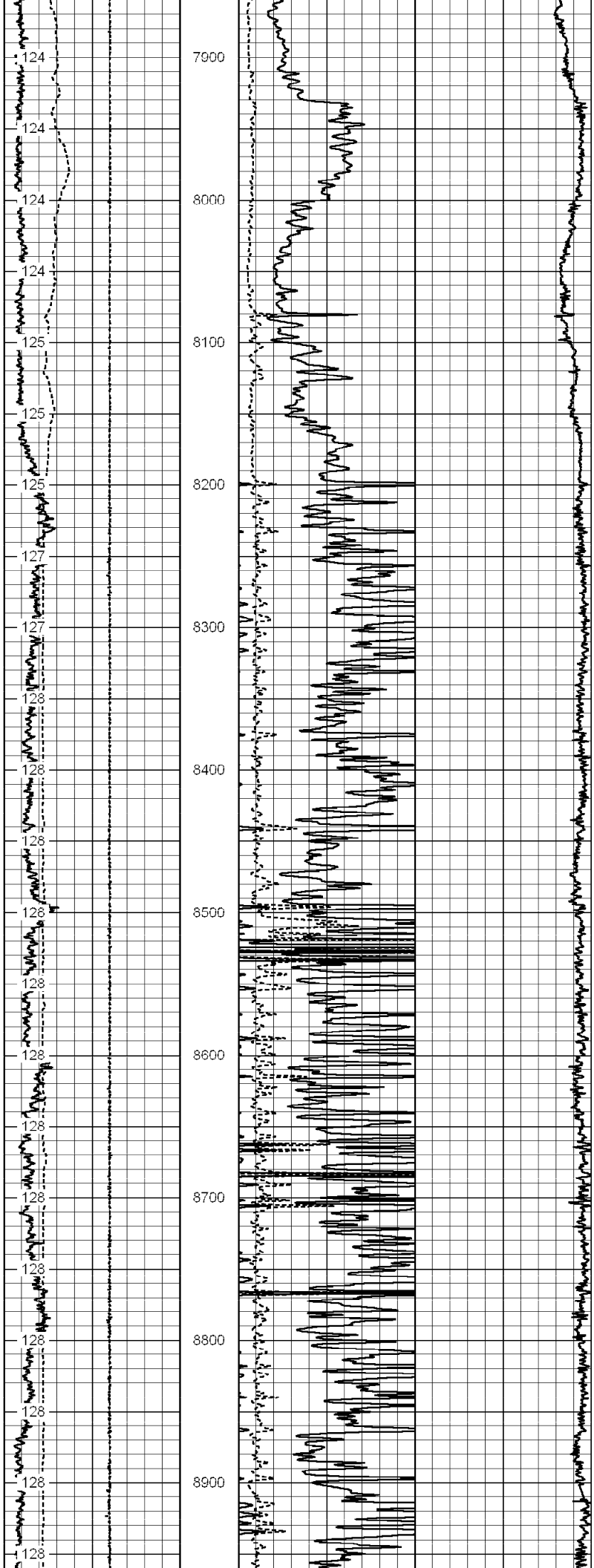
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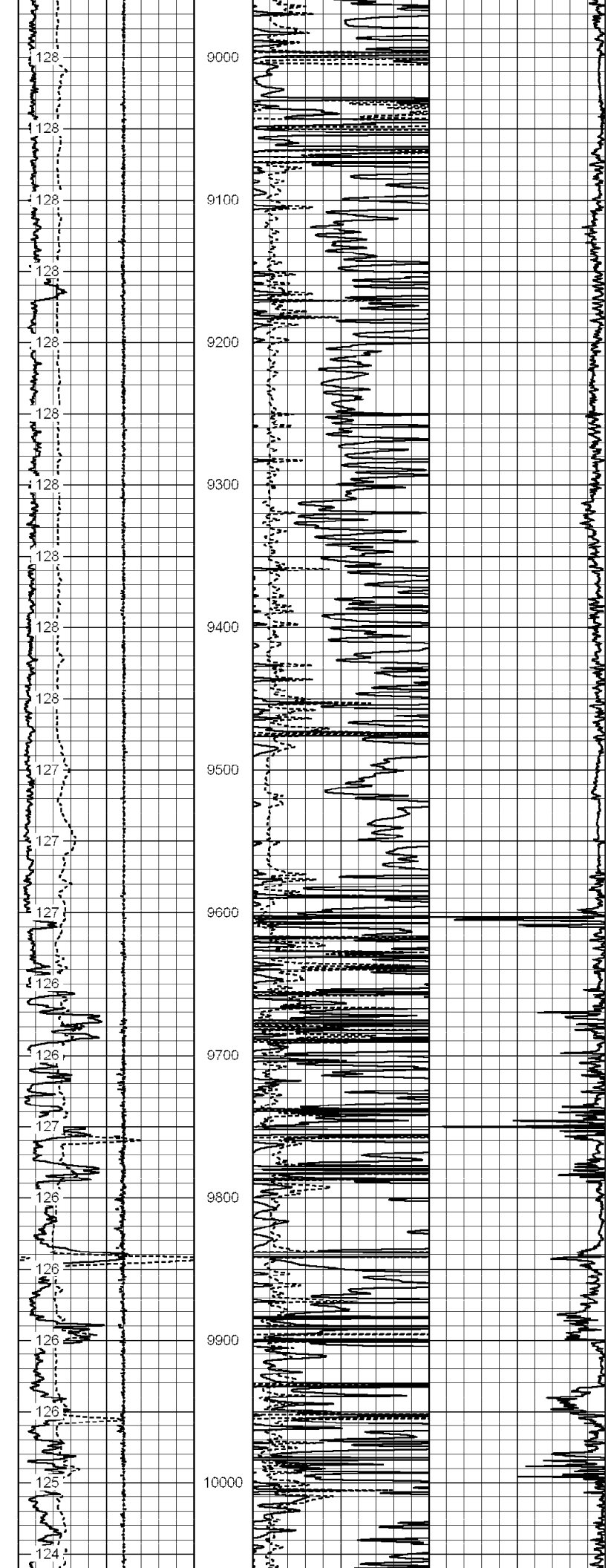
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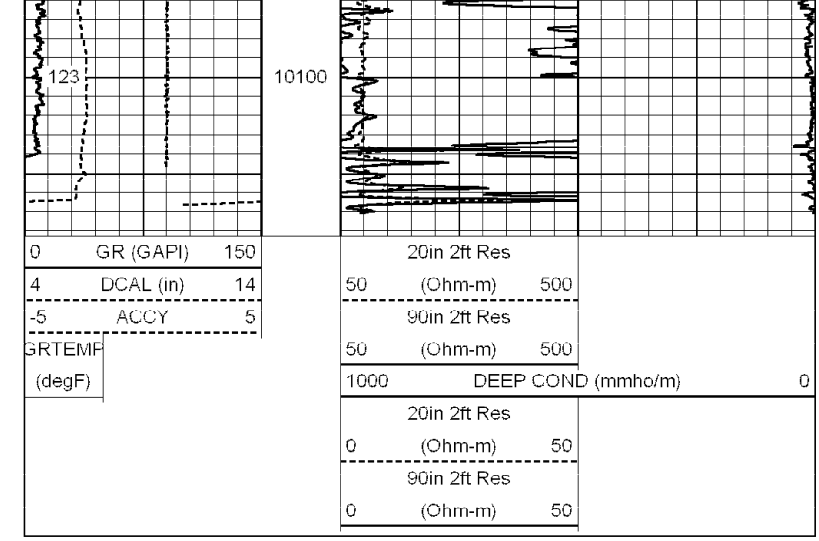

Schlumberger BlueView :