Weatherford®

CML WELL SHUTTLE
COMPACT ARRAY INDUCTION
LOG

COMPANY	UNIT PETROLEUM
WELL	LOUDENBACK 7-1H
FIELD	WILDCAT
PROVINCE/COUNTY	RENO
COUNTRY/STATE	USA / KANSAS
LOCATION	150' FWL & 850' FEL
	NE NW NE NE

SEC	TWP	RGE	Other Services
7	25 S	10 W	MPD/MDN
API Number 15-155-21662-01			CMI
Permit Number			

Permanent Datum G.L., Elevation 1770 feet
Log Measured From KB
Drilling Measured From K.B.

Elevations:	feet
KB	1784.00
DF	1784.00
GL	1770.00

Date	02-AUG-2013		
Run Number	ONE		
Depth Driller	8615.00	feet	
Depth Logger	8482.00	feet	
First Reading	8478.00	feet	
Last Reading	4326.00	feet	
Casing Driller	4320.00	feet	
Casing Logger	4326.00	feet	
Bit Size	6.125	inches	
Hole Fluid Type	WBM		
Density / Viscosity	8.50 lb/USg	28.00 CP	
PH / Fluid Loss	8.00	99.00 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	2.10 @ 77.0	ohm-m	
Rmf @ Measured Temp	1.68 @ 77.0	ohm-m	
Rmc @ Measured Temp	2.52 @ 77.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	1.23 @131.0	ohm-m	
Time Since Circulation	1 HOUR		
Max Recorded Temp	131.00	deg F	
Equipment Name	COMPACT		
Equipment / Base	18064	OKC	
Recorded By	C. GRIFFIN		J.SCHULER
Witnessed By	R. WILSON		
S.O.#/AFE	3540222 / 1307200		

BOREHOLE RECORD

Last Edited: 02-AUG-2013 15:13

Bit Size inches	Depth From feet	Depth To feet
6.125	4320.00	8615.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
INTERMED	7.000	0.00	4320.00	26.00

REMARKS

WLS SOFTWARE VERSION 13.03. USED.

TOOLS RUN ON DRILLPIPE USING COMPACT WELL SHUTTLE DEPLOYMENT TECHNIQUE.

DEPTH MEASURED USING ADVANTAGE RIG DEPTH CORRECTED TO PIPE TALLY.

TOOLS DEPLOYED WITH MULE SHOE SITTING AT 8379 FT.
AFTER DEPLOYMENT LOGGING TOOL WAS AT 8482 FT.

4.5 " PRODUCTION CASING USED TO CALCULATE ANNULAR HOLE VOLUMES.

OPERATORS: G. GARCIA, C. ALEXANDER
RIG: UNIT 331

employees. These interpretations are also subject to our general terms and conditions in our price schedule.

DSC

Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Data\Unit\Unit Loudenback 7-1H\MSS 166 Depth Log2.dta
System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

Plotted on 03-AUG-2013 11:13
Recorded on 03-AUG-2013 10:21

Timing Marks
every 60.0 sec

MGS Gamma Ray
API
0 75 150
150 225 300

Depth In Feet

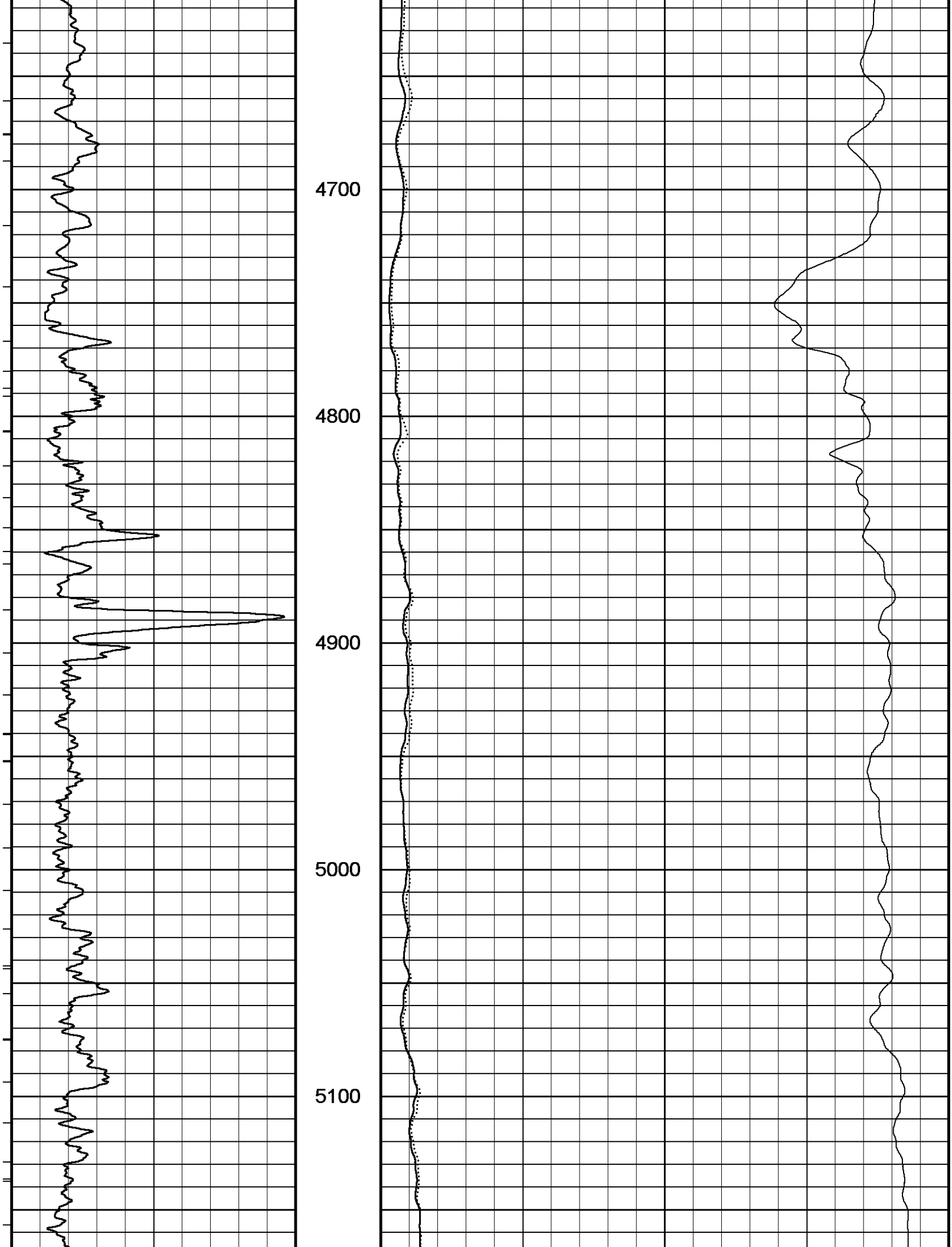
Replay Scale 1:600

Array Ind. Six Cond Ct
mmhos
1000 750 500 250 0
2000 1750 1500 1250 1000

Array Ind. Six Res 20
ohm metres
0 50 100
0 500 1000

Array Ind. Six Res Rt
ohm metres
0 50 100
0 500 1000

4300
4400
4500
4600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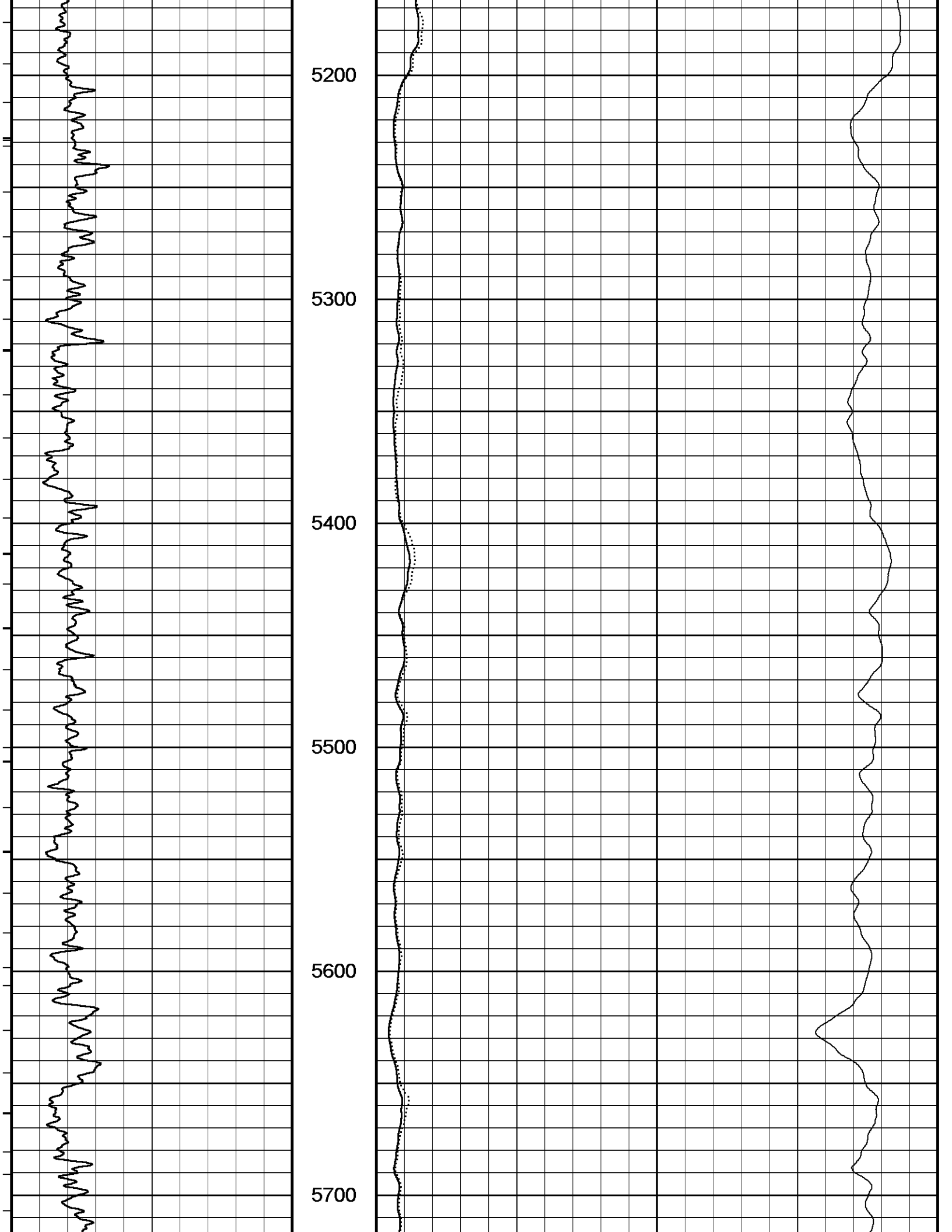
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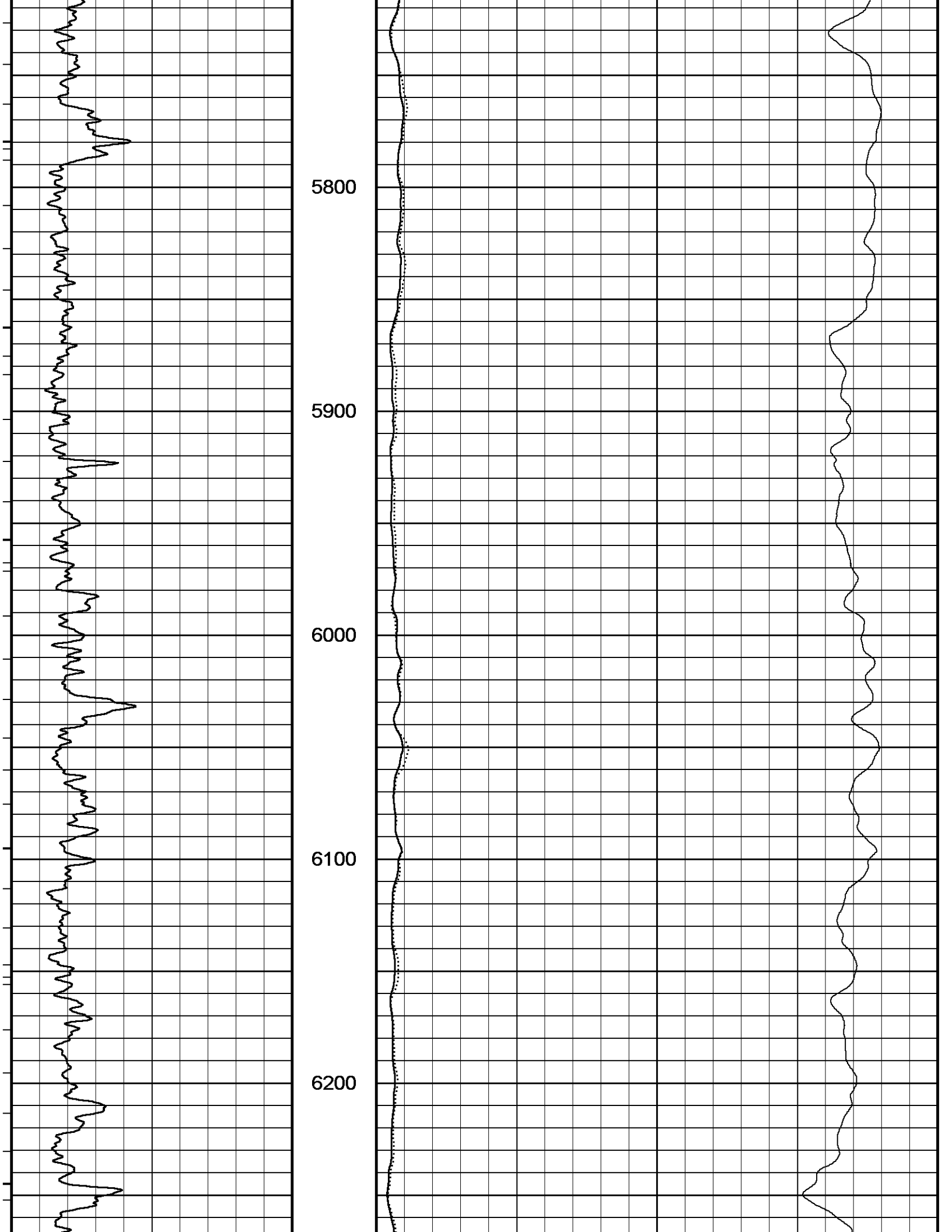
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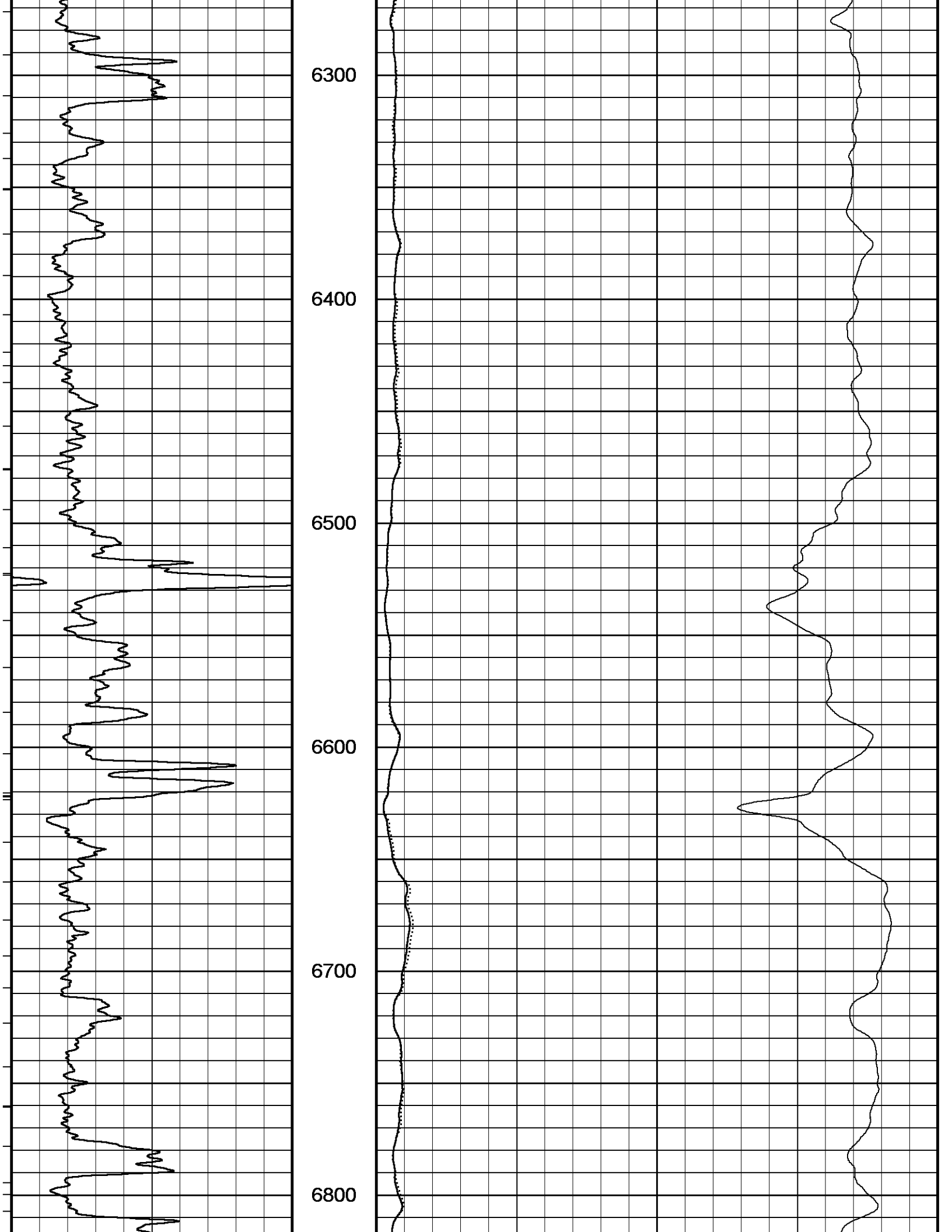
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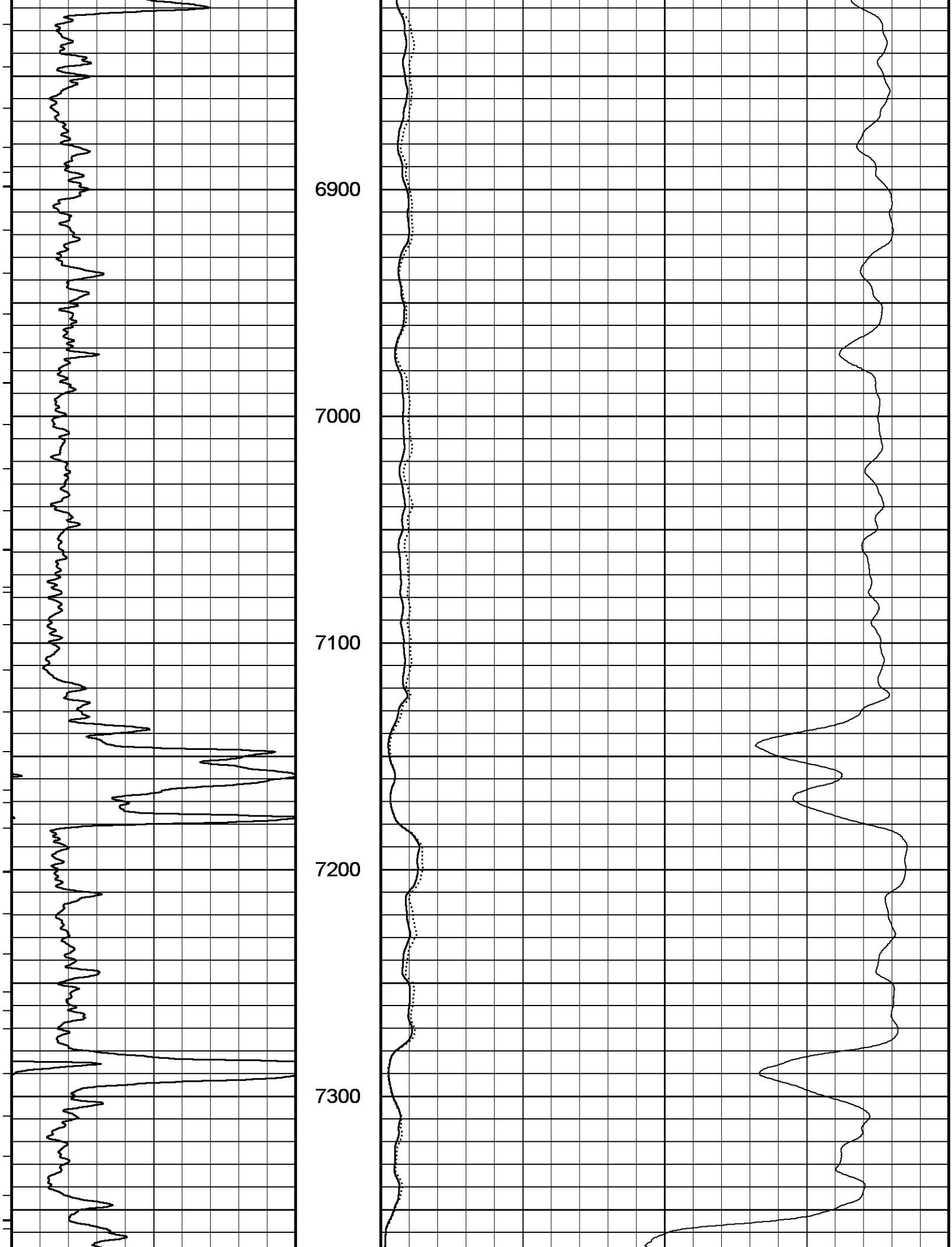
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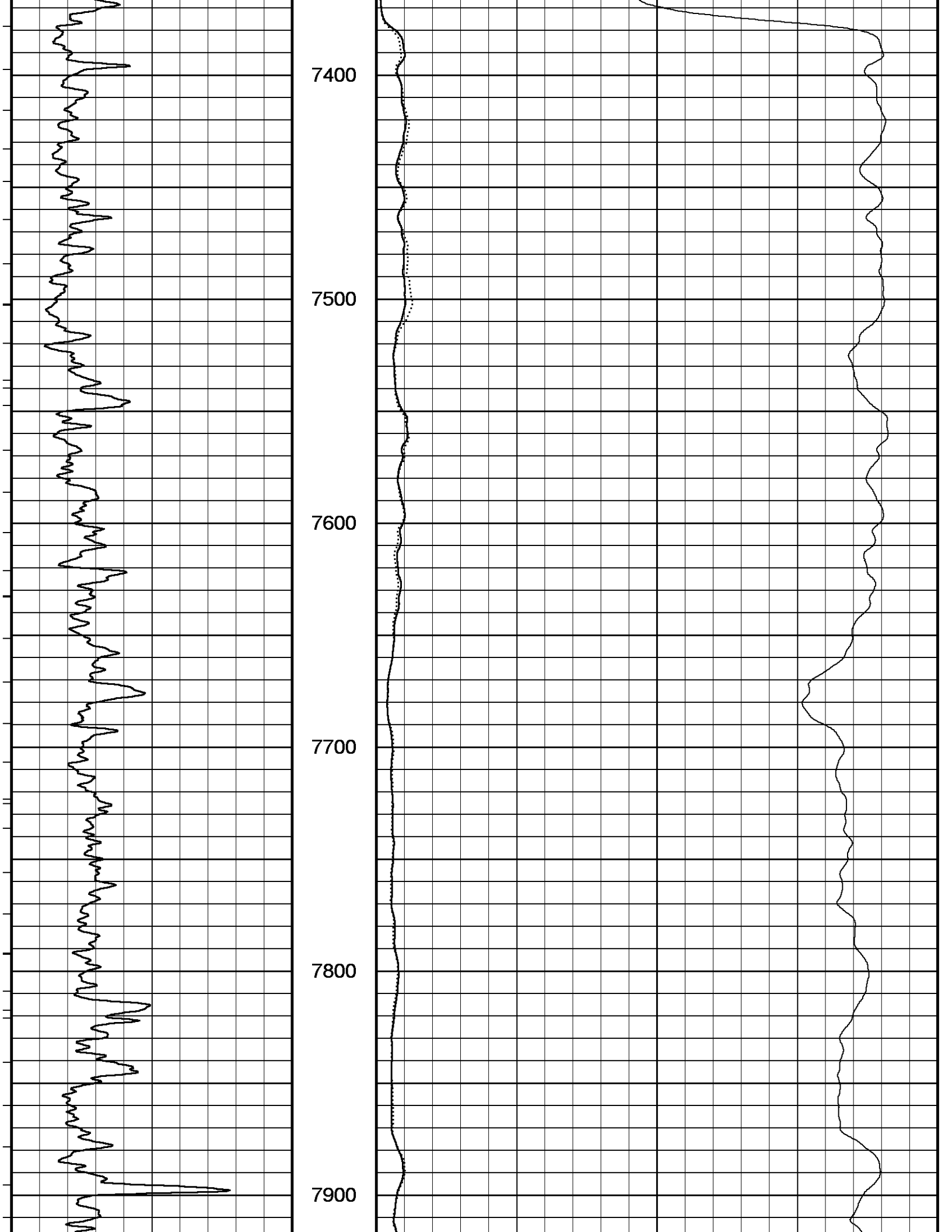
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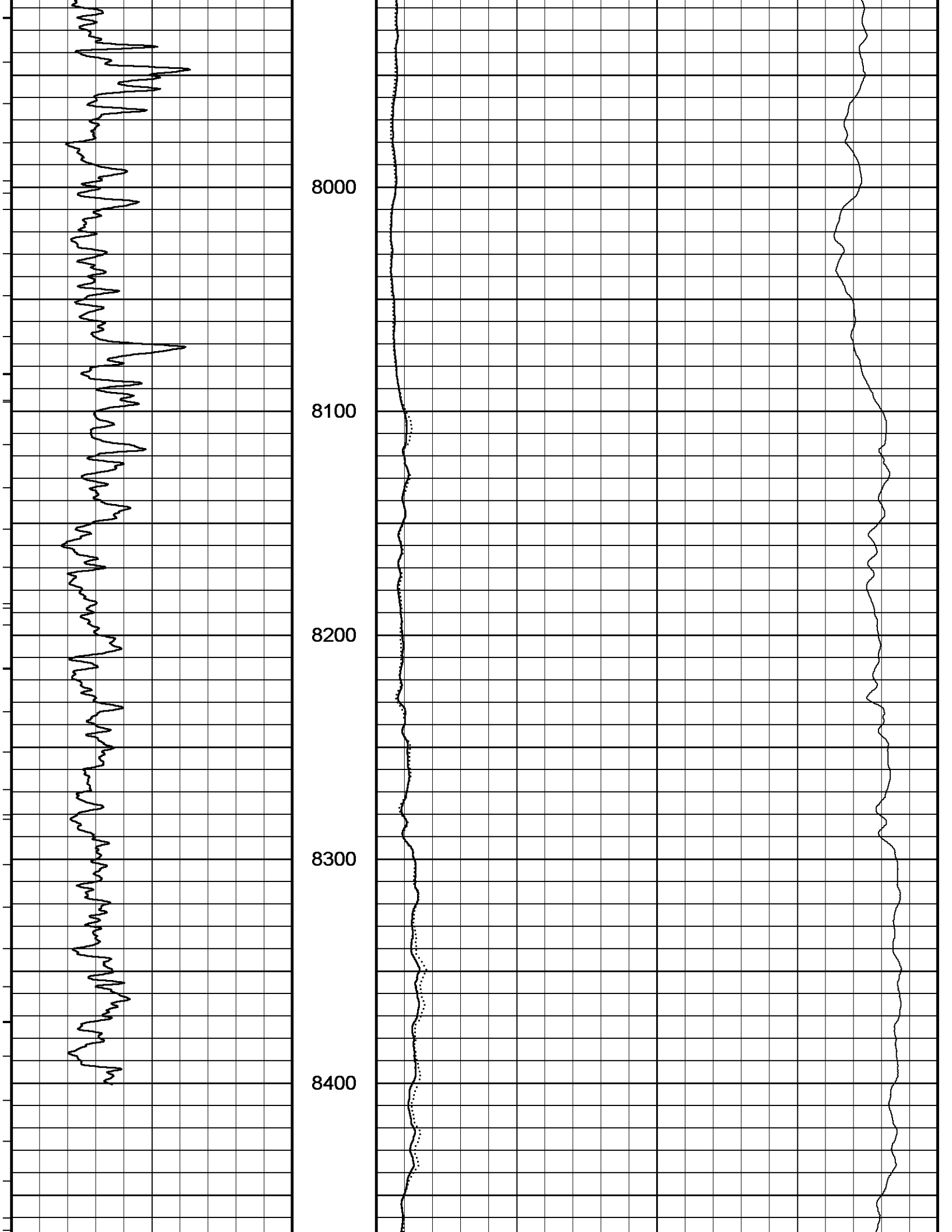
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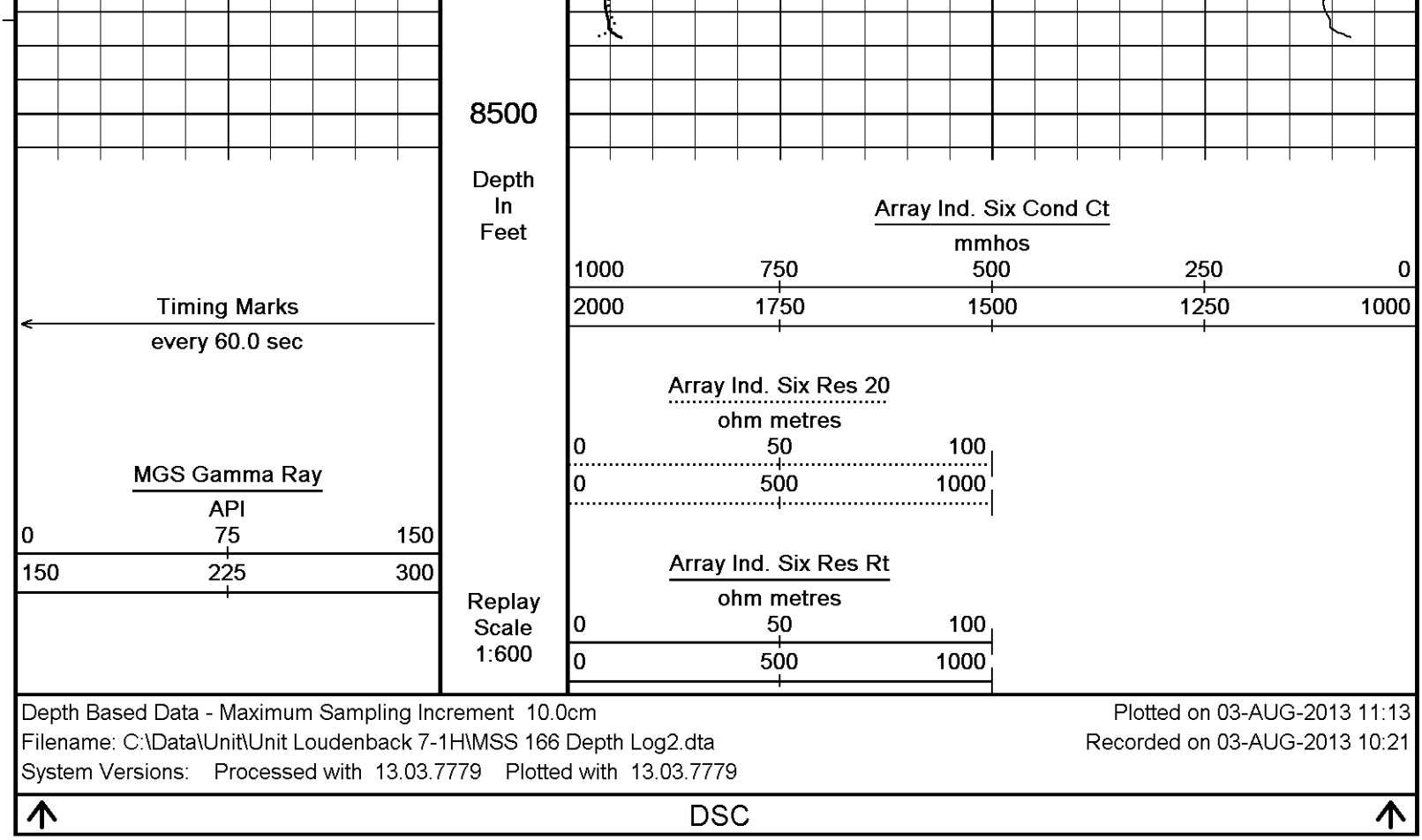
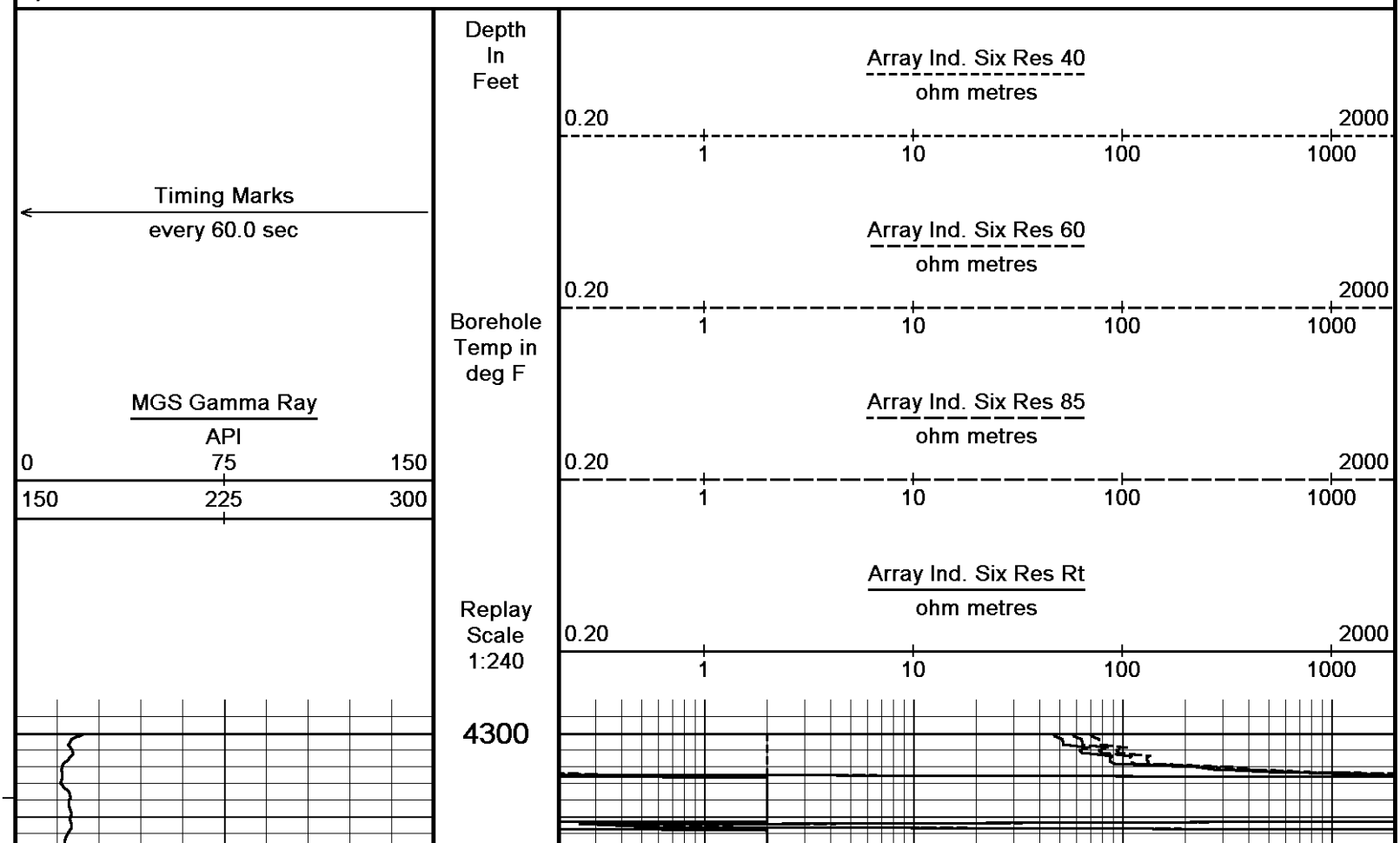


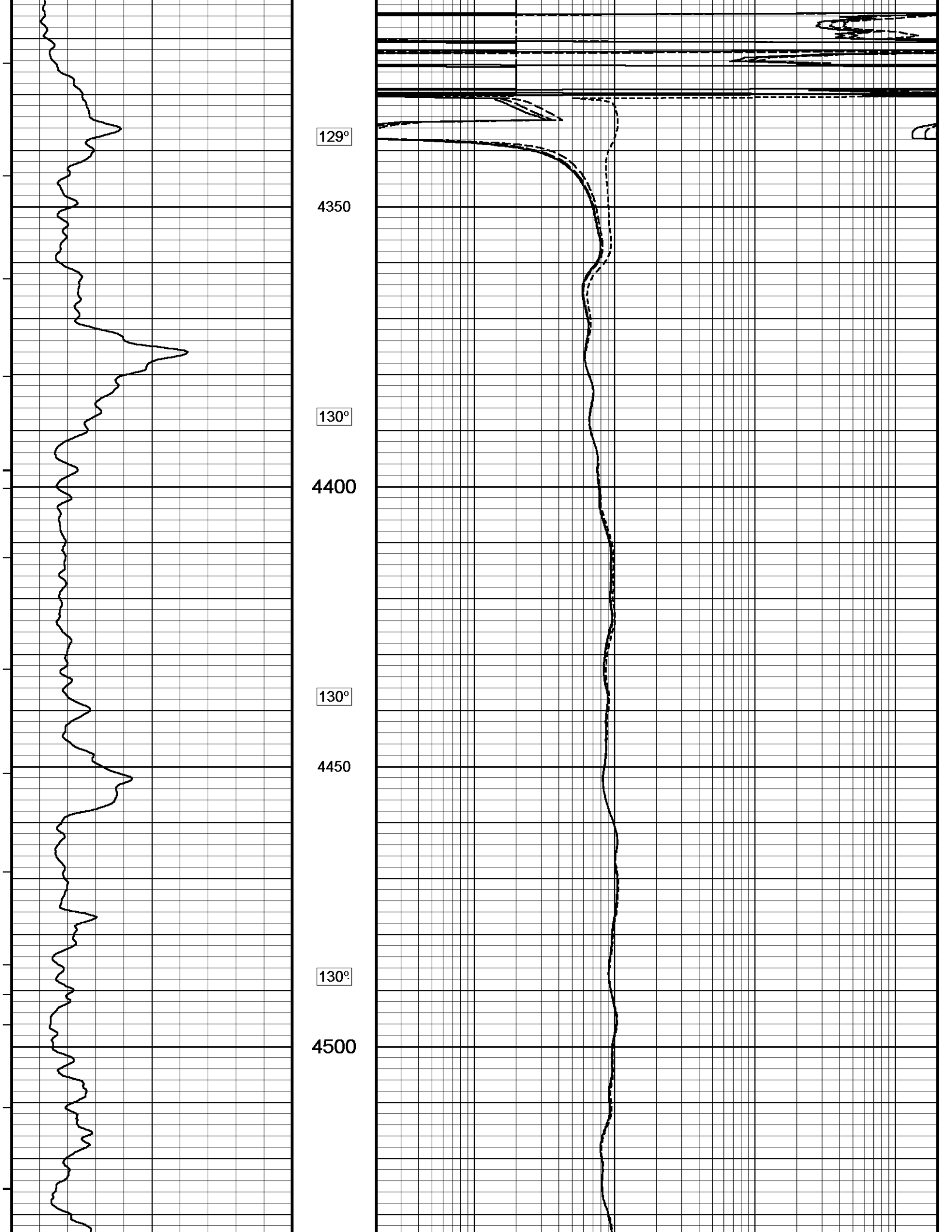
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 03-AUG-2013 11:13
Filename: C:\Data\Unit\Unit Loudenback 7-1H\MSS 166 Depth Log2.dta
Recorded on 03-AUG-2013 10:21
System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

DSC

DSC

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 03-AUG-2013 11:13
Filename: C:\Data\Unit\Unit Loudenback 7-1H\MSS 166 Depth Log2.dta
Recorded on 03-AUG-2013 10:21
System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

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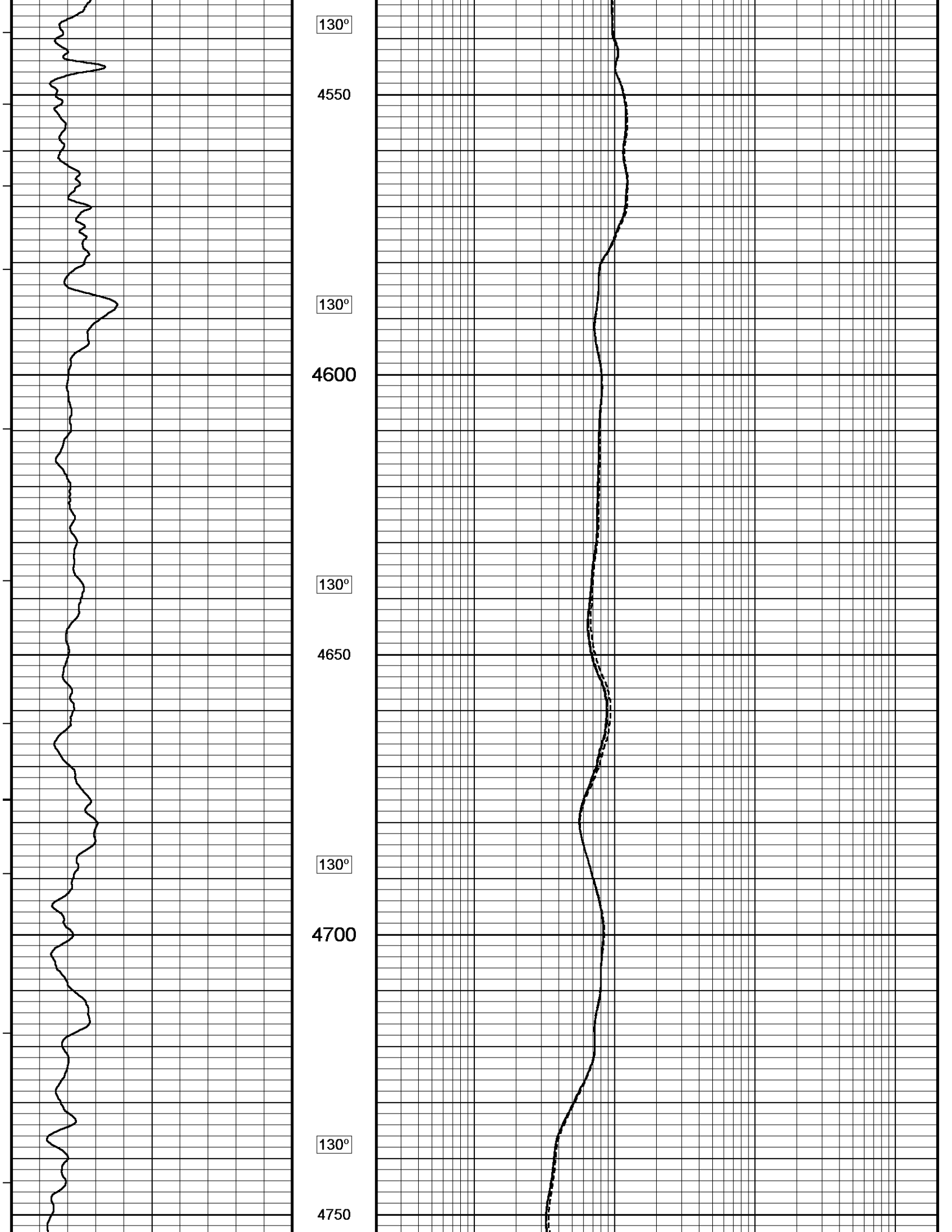
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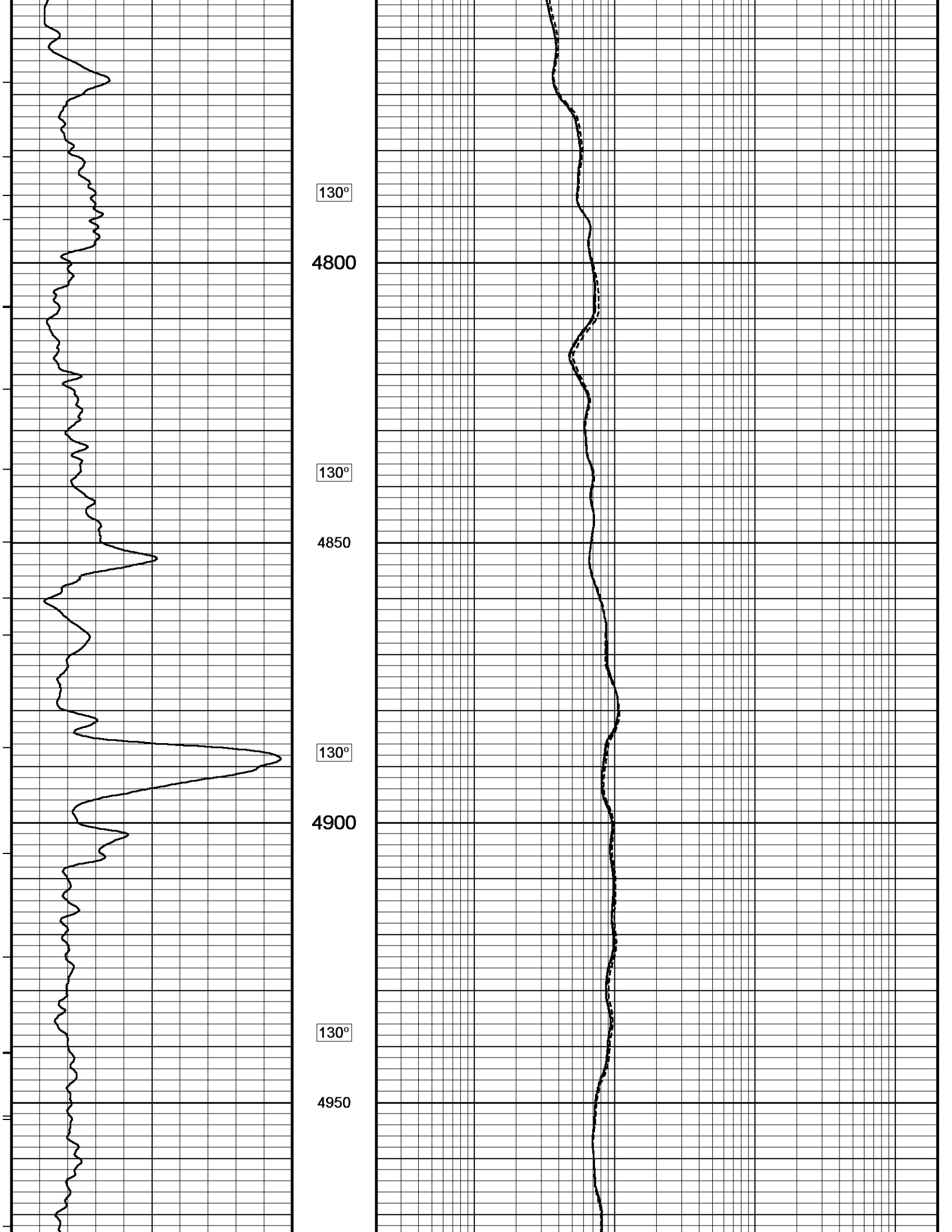
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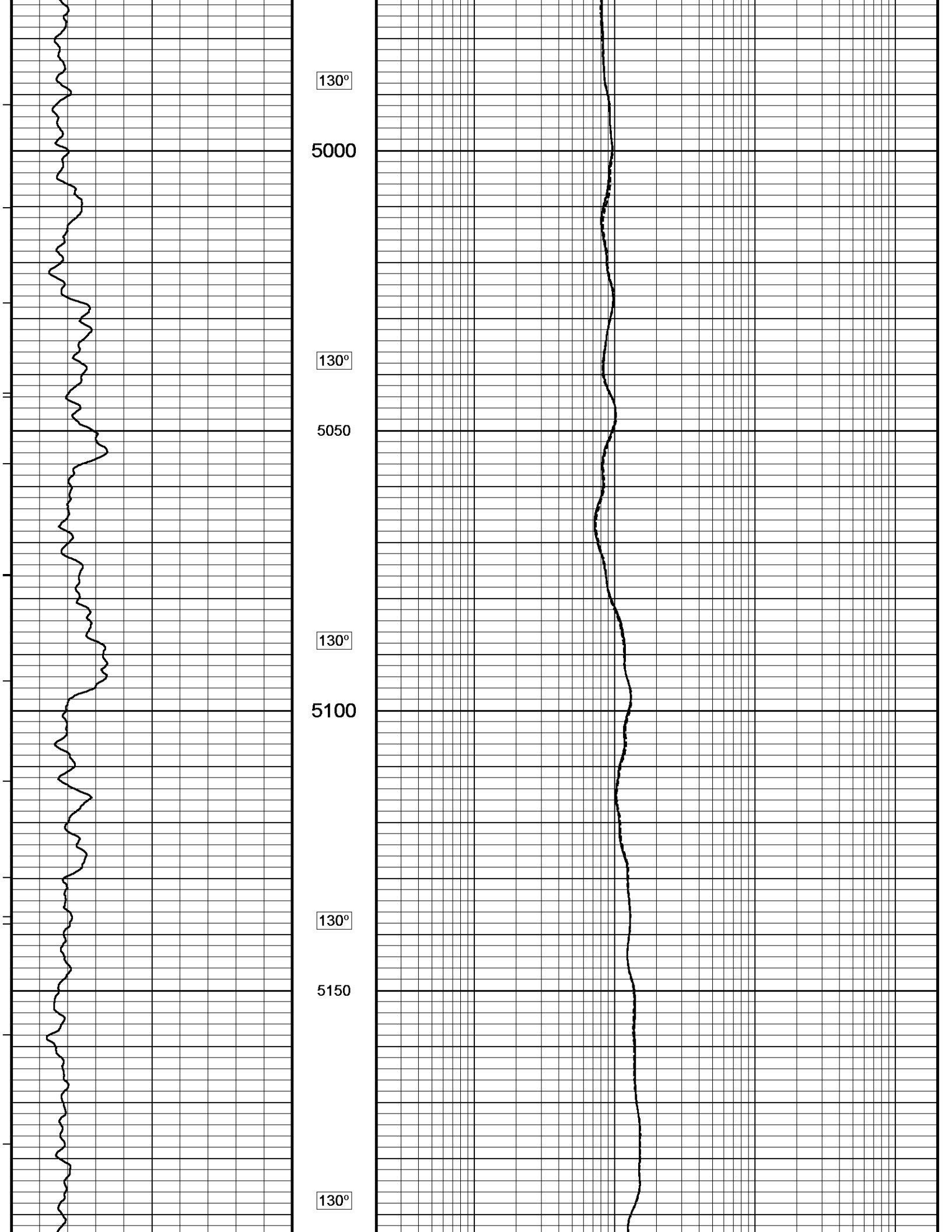
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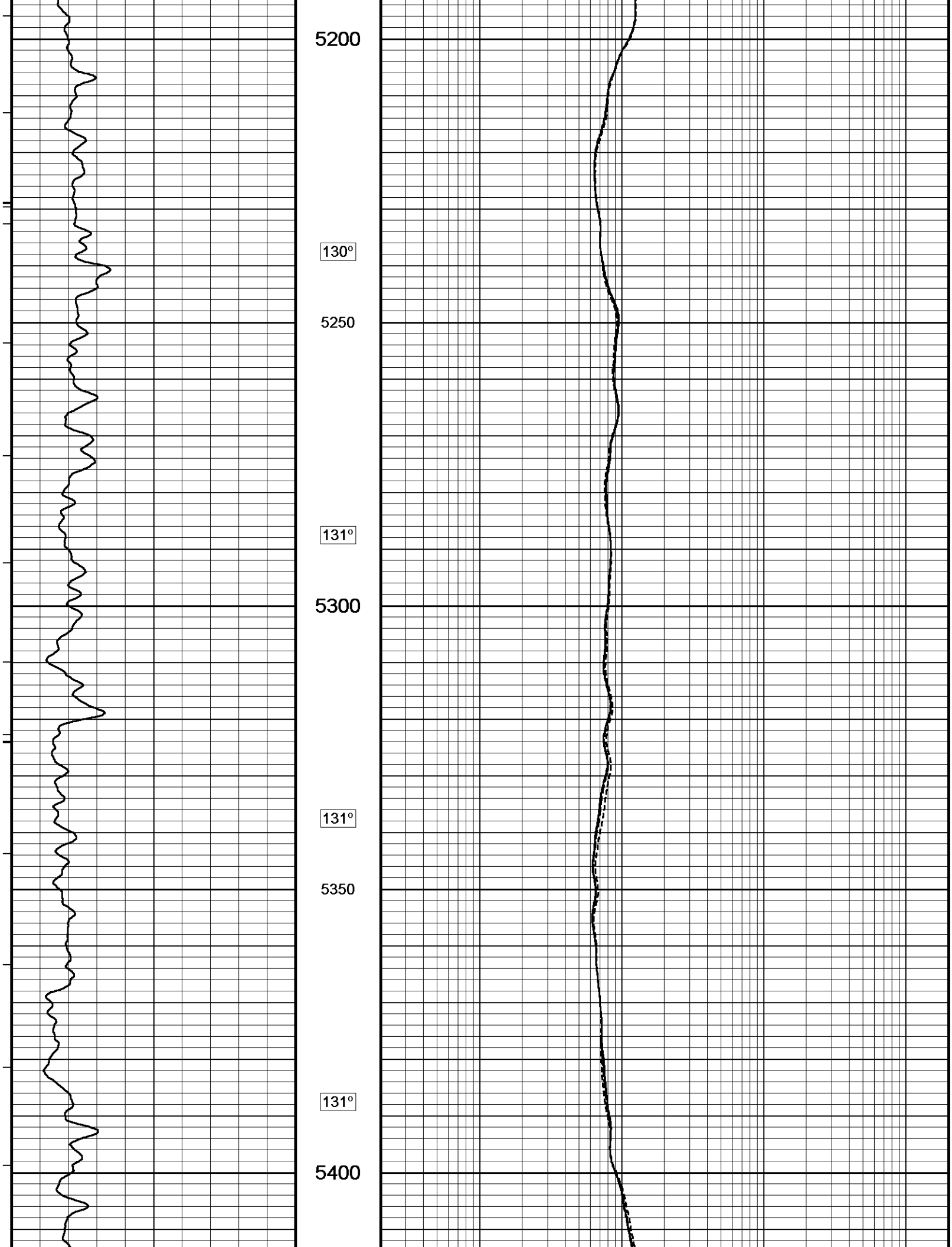
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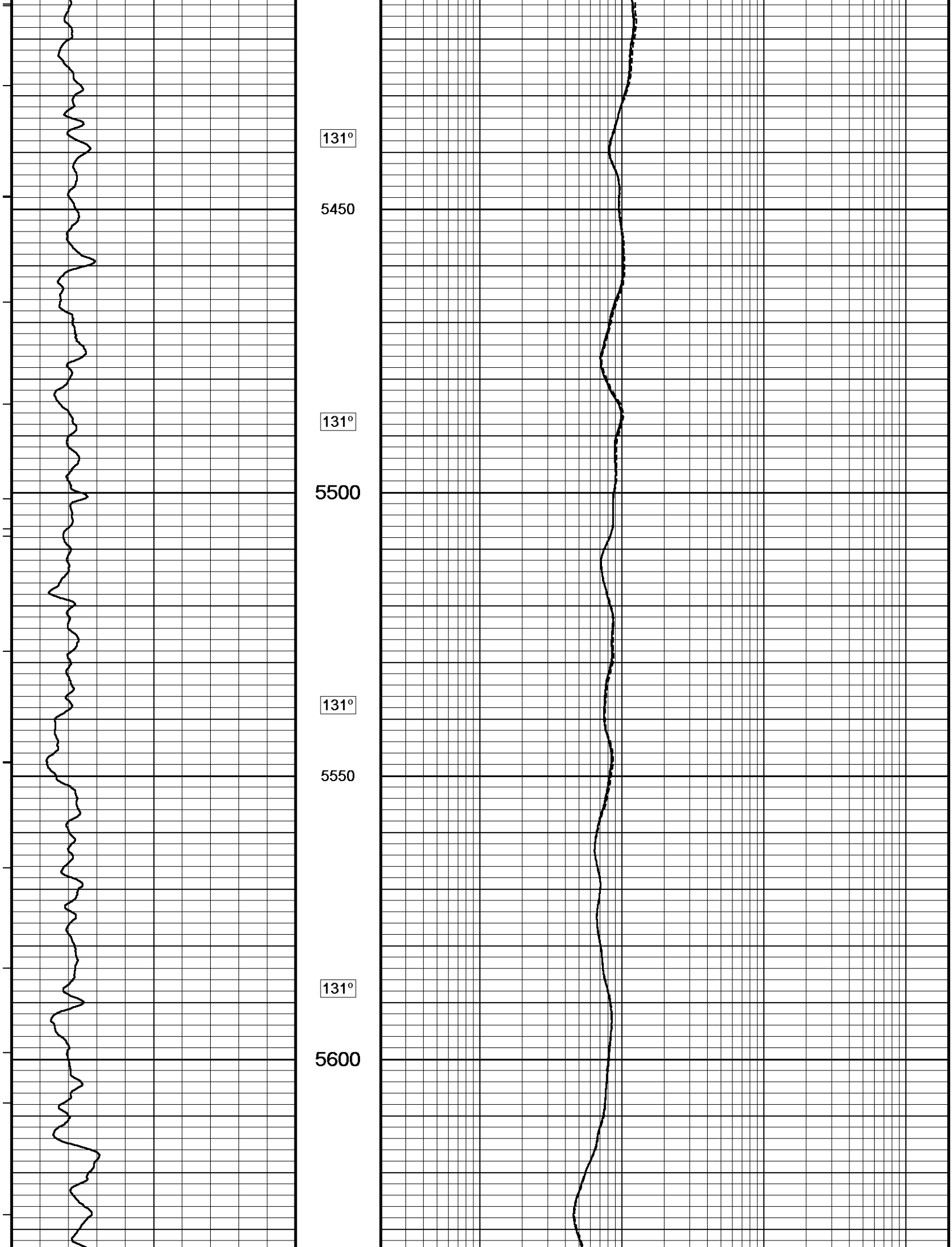
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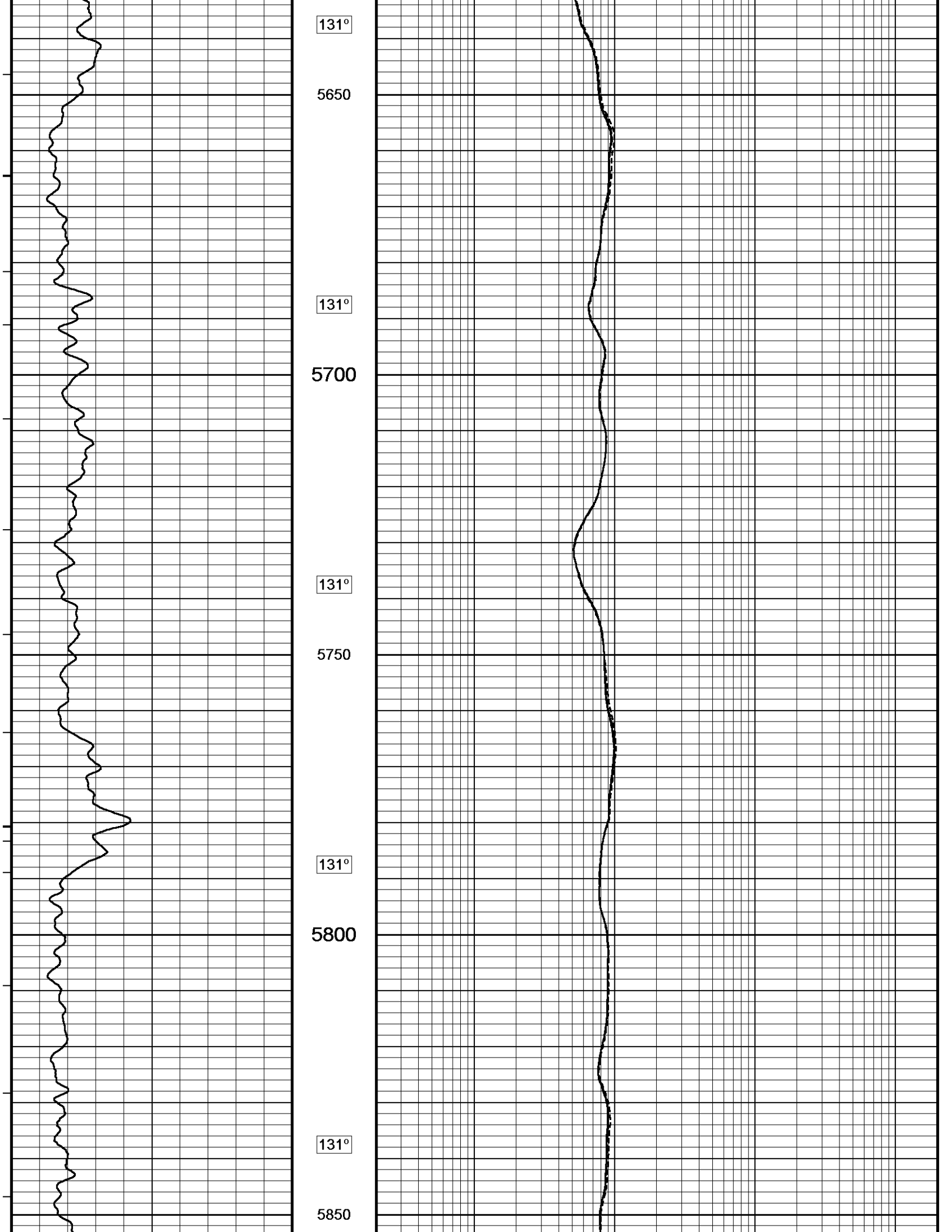
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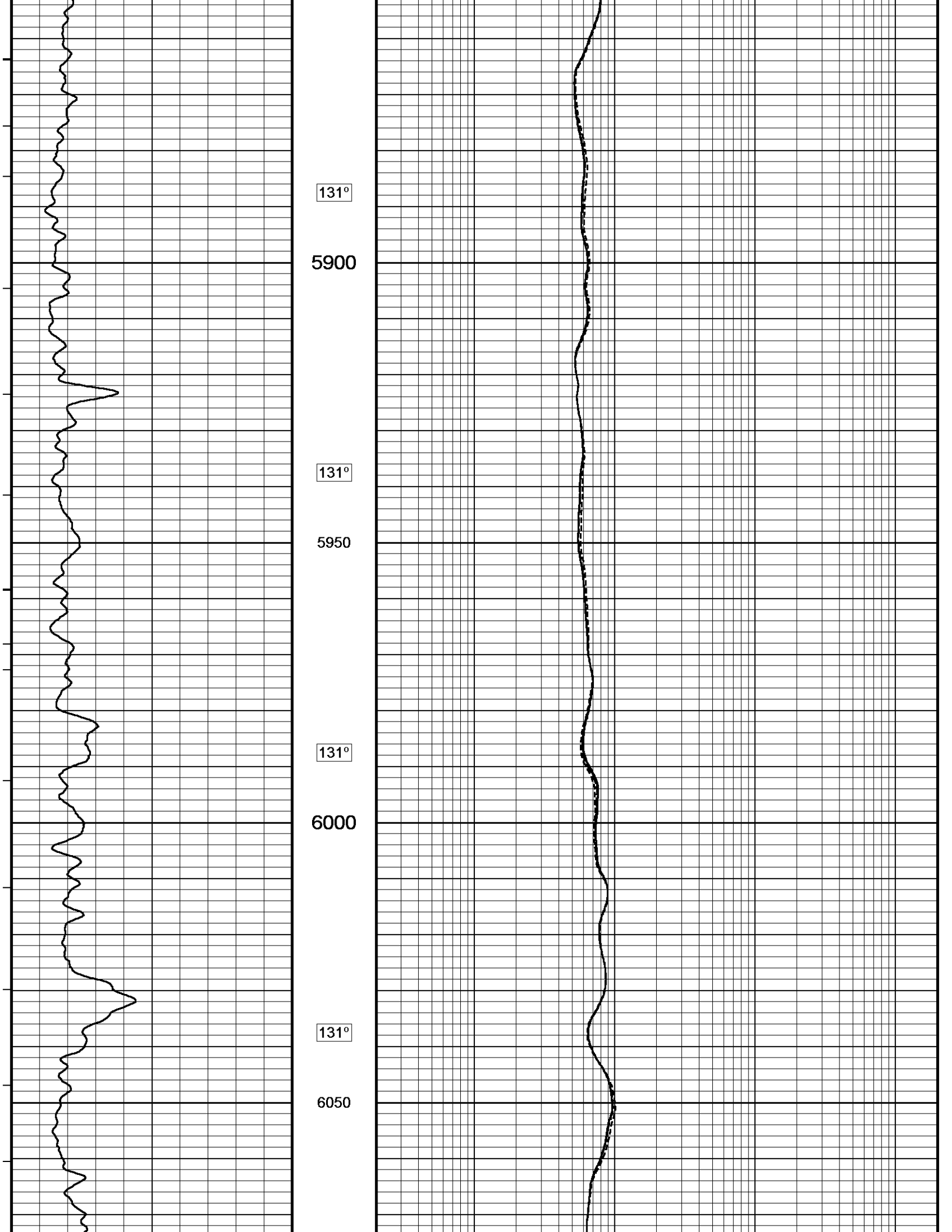
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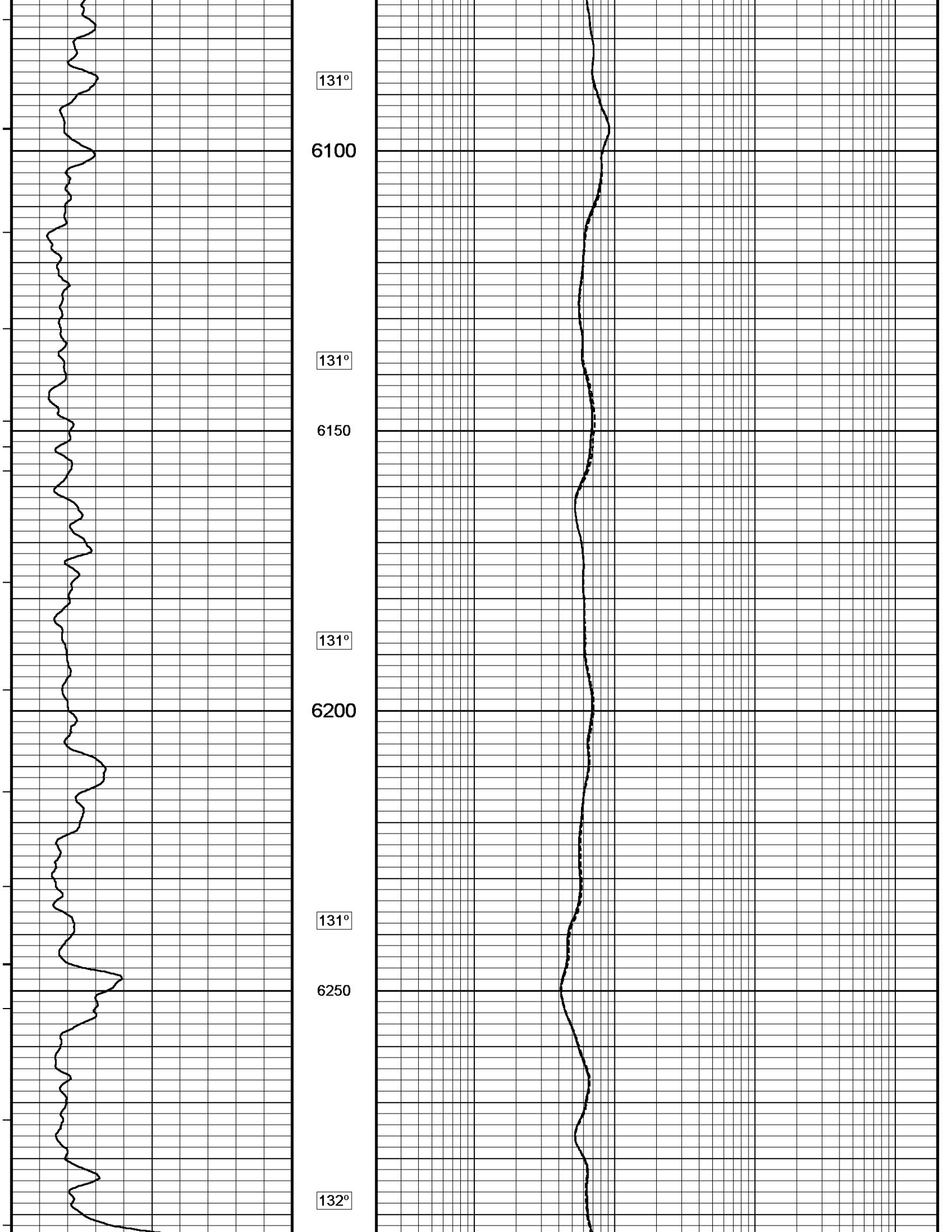
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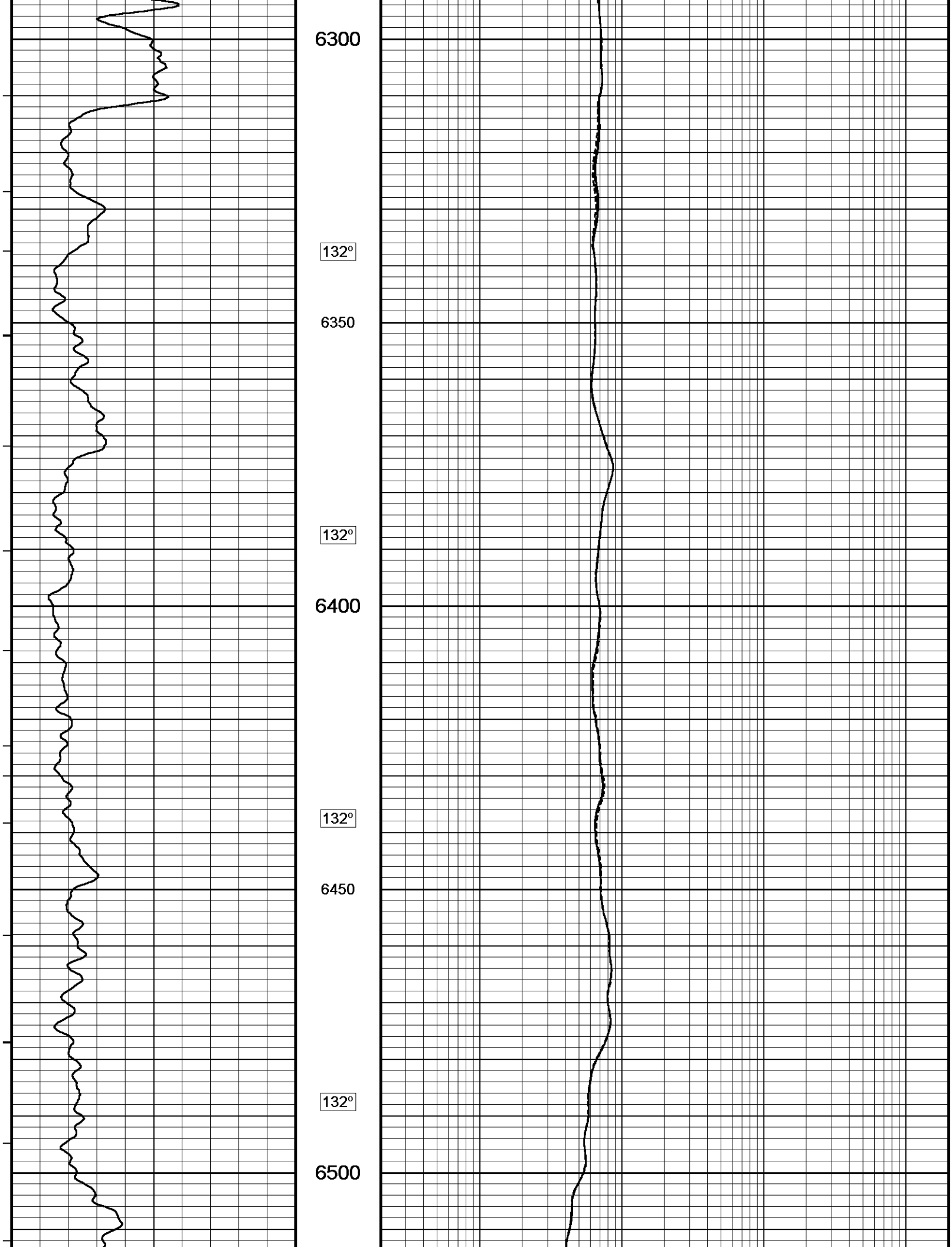
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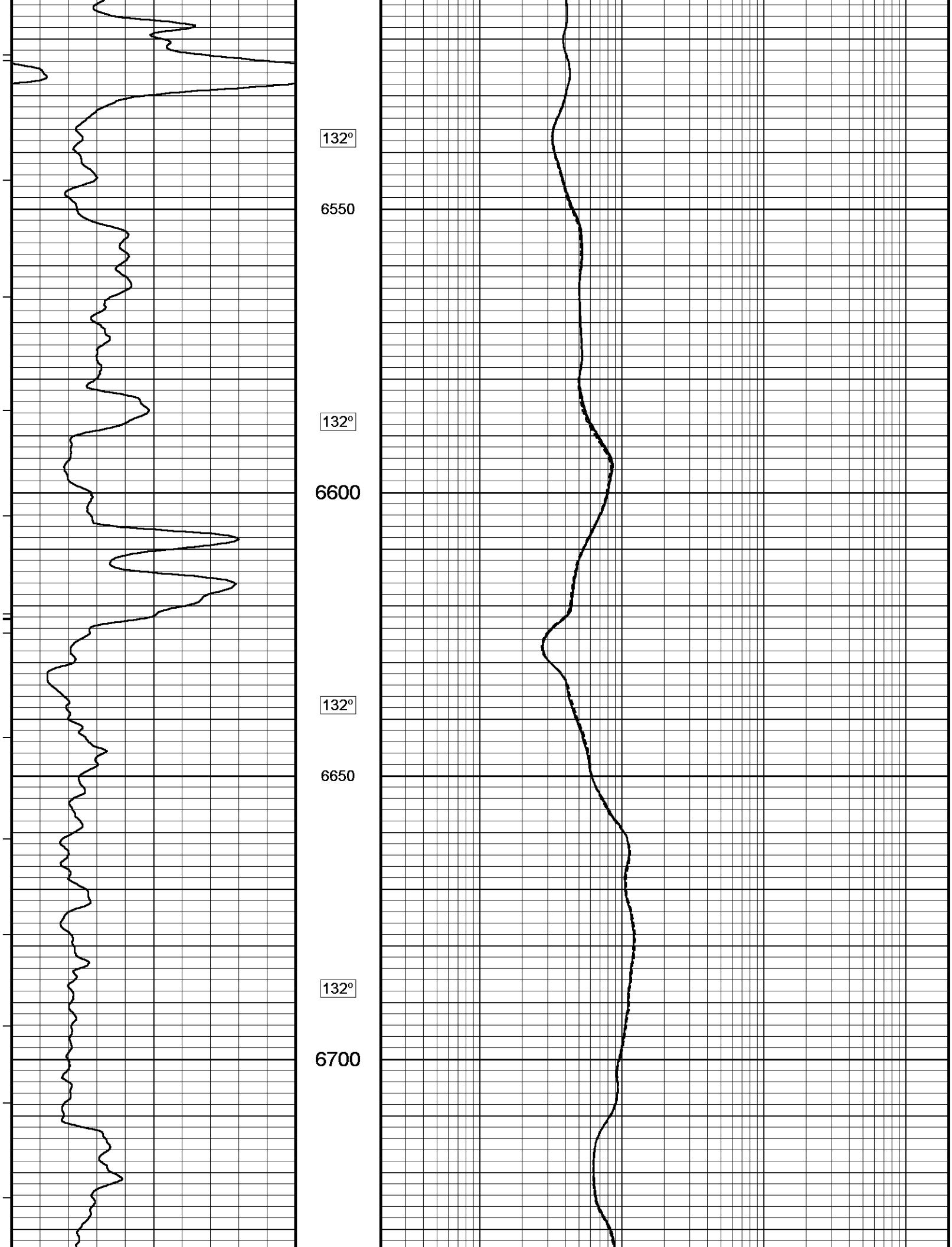
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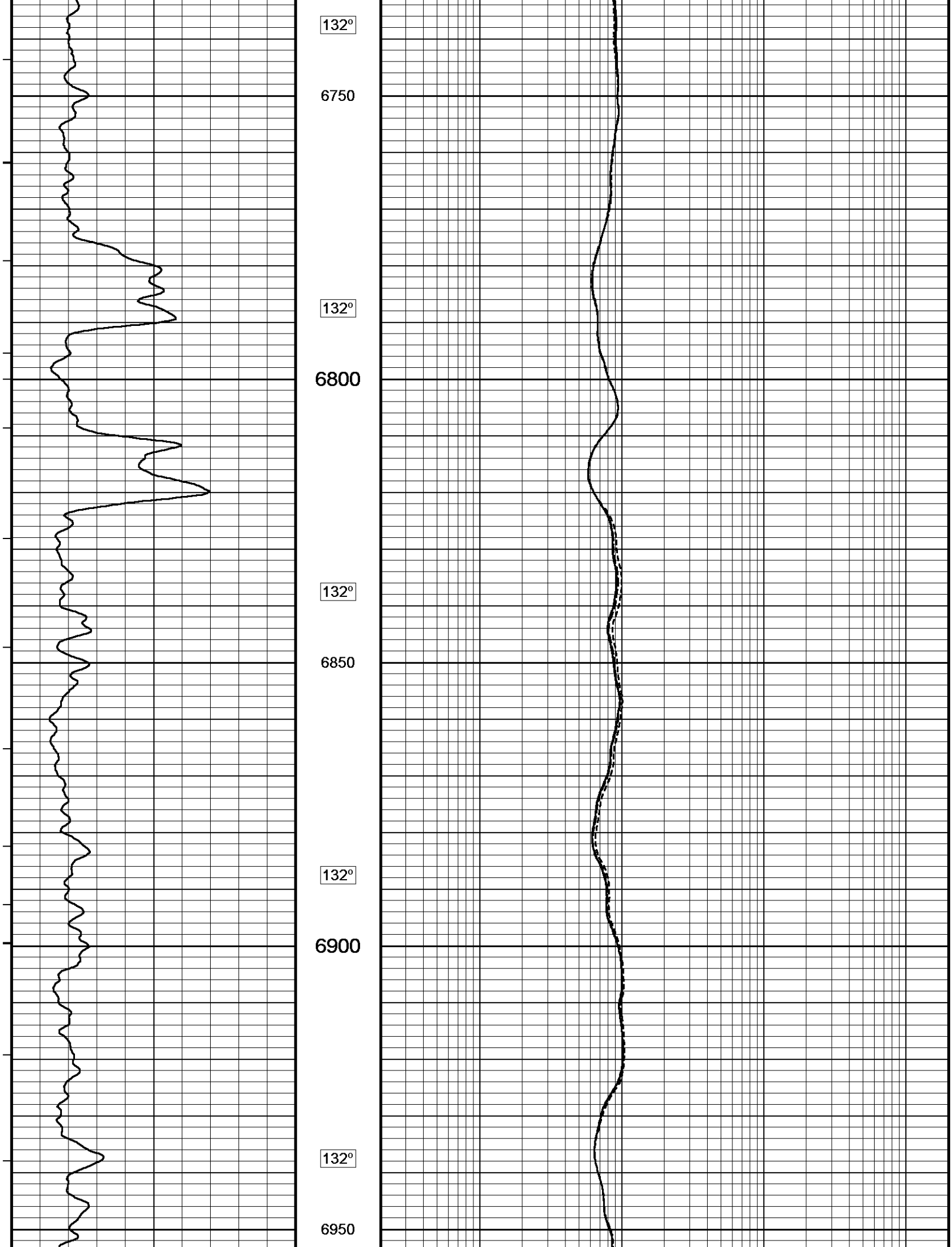
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132°
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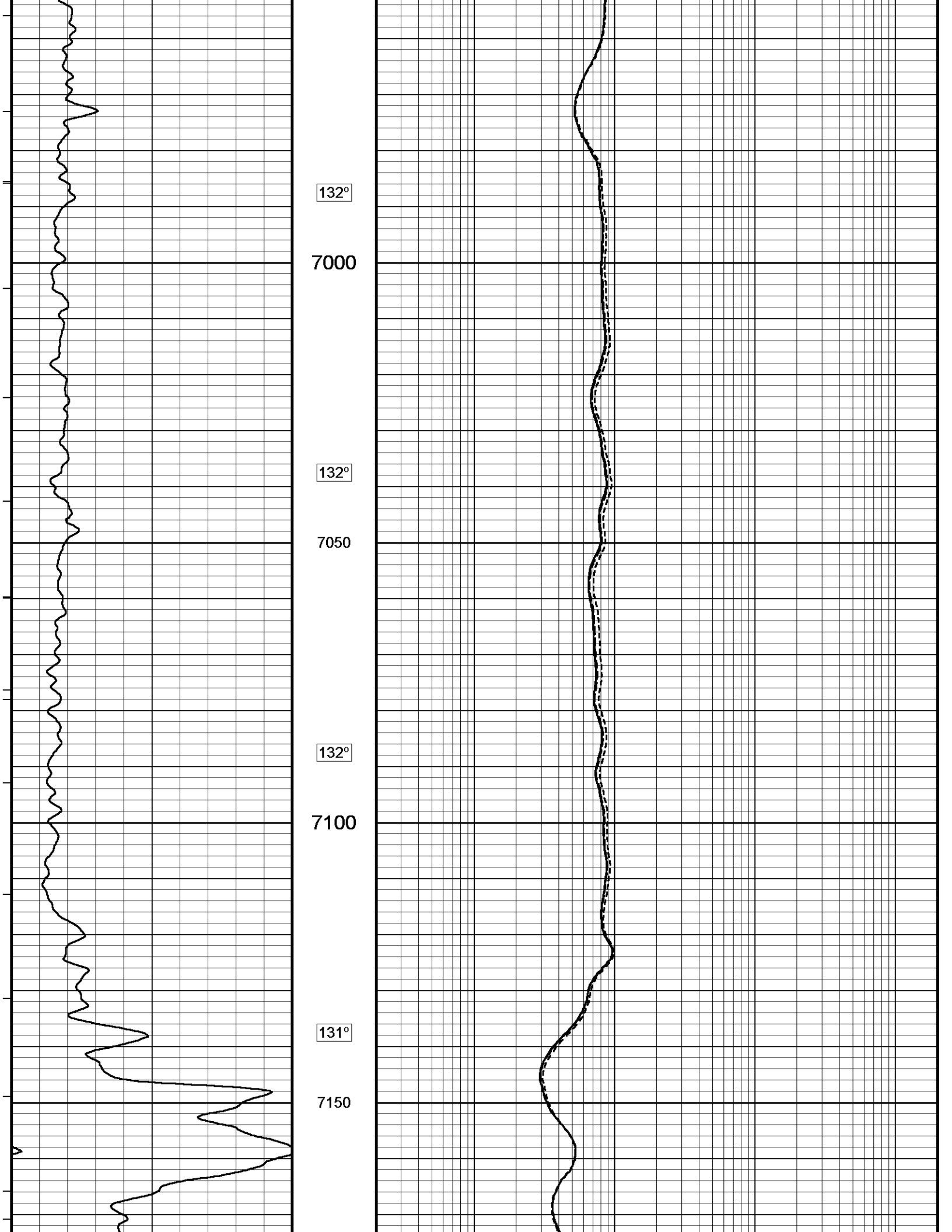
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131°
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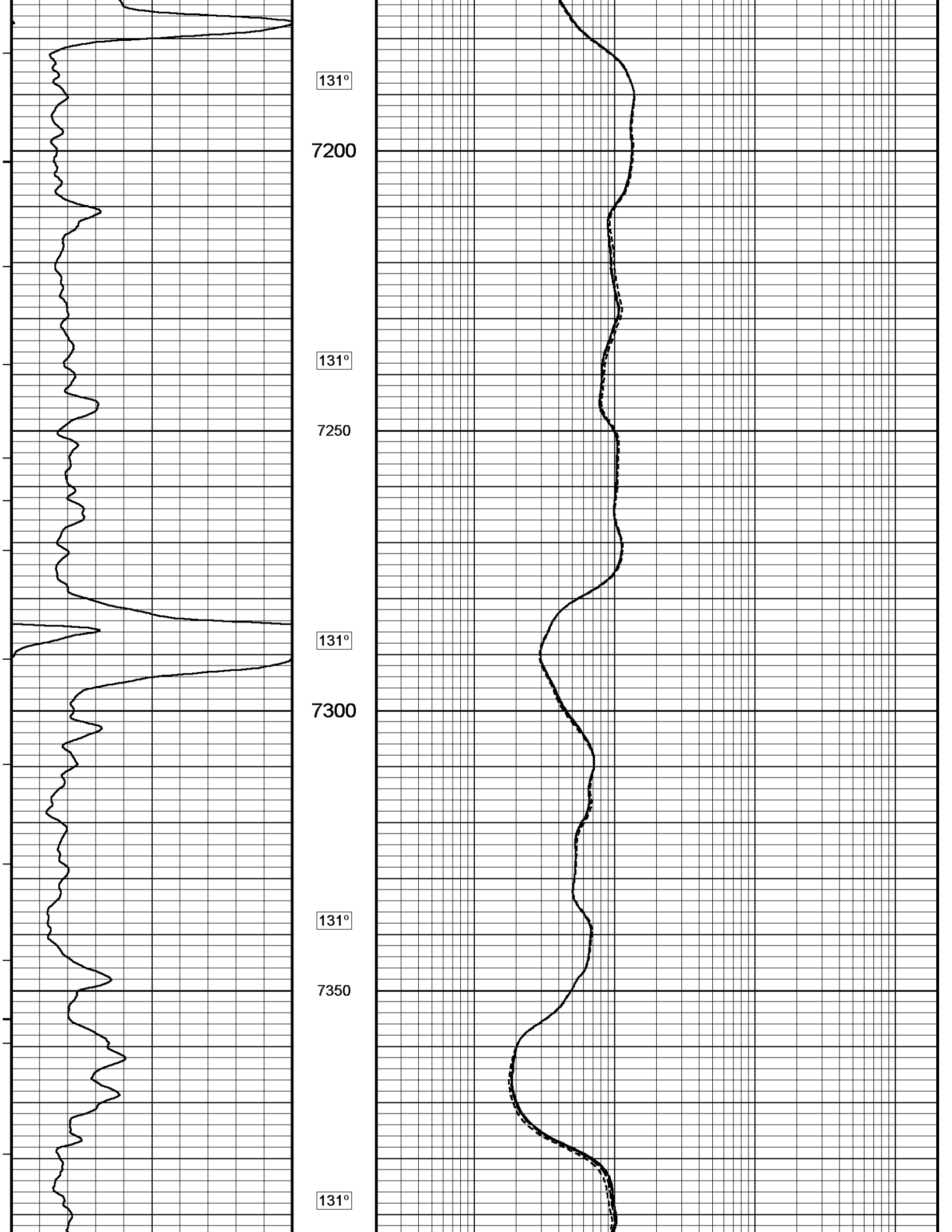
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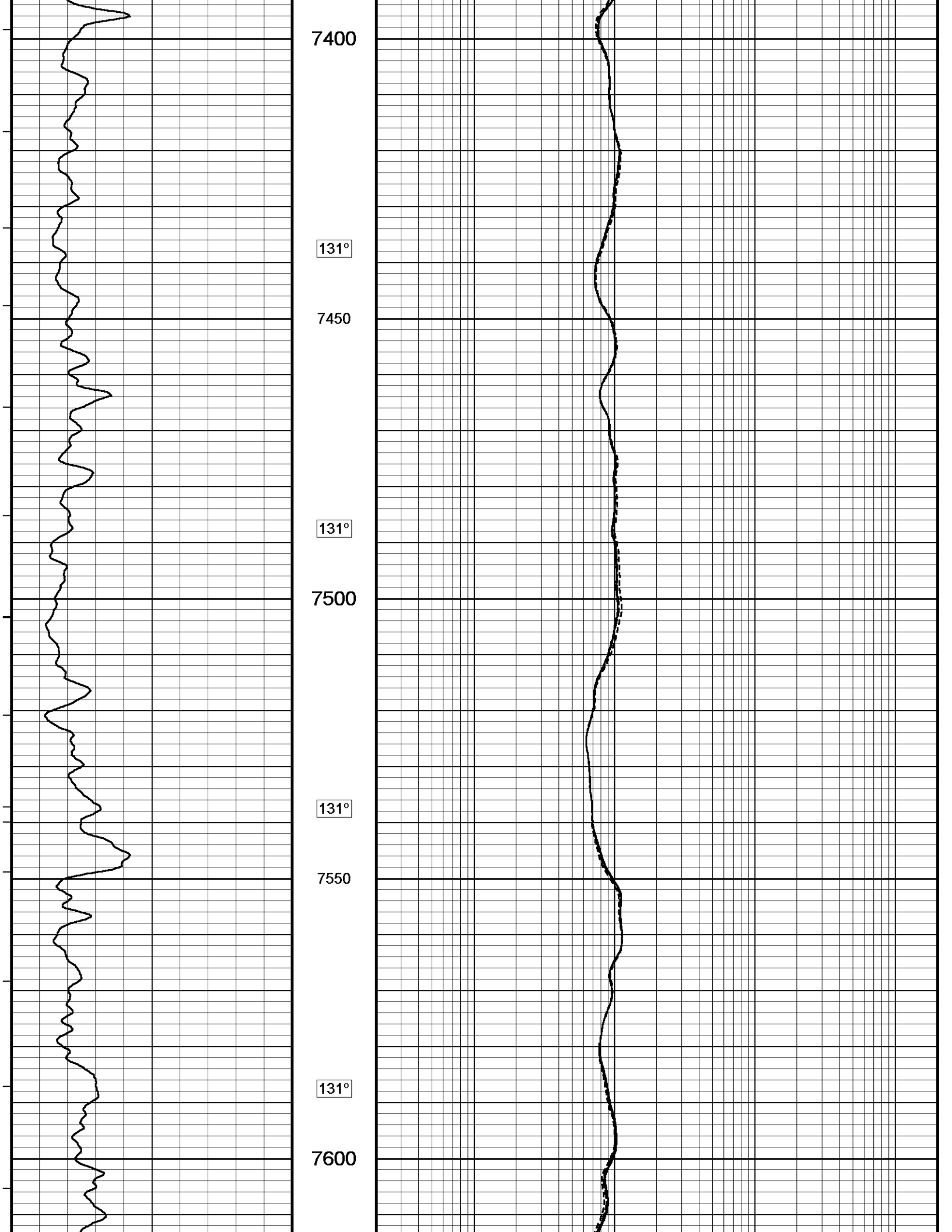
131°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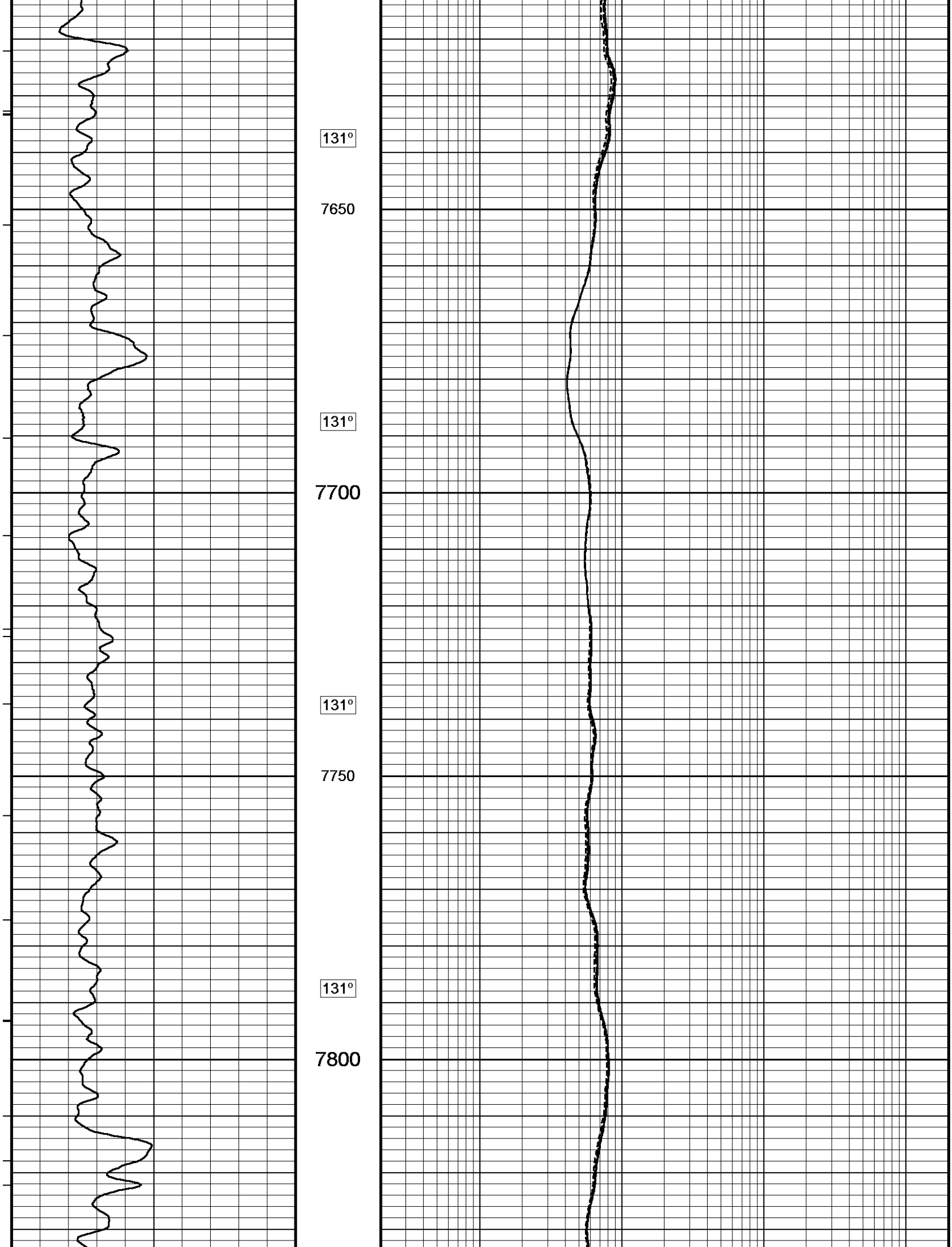
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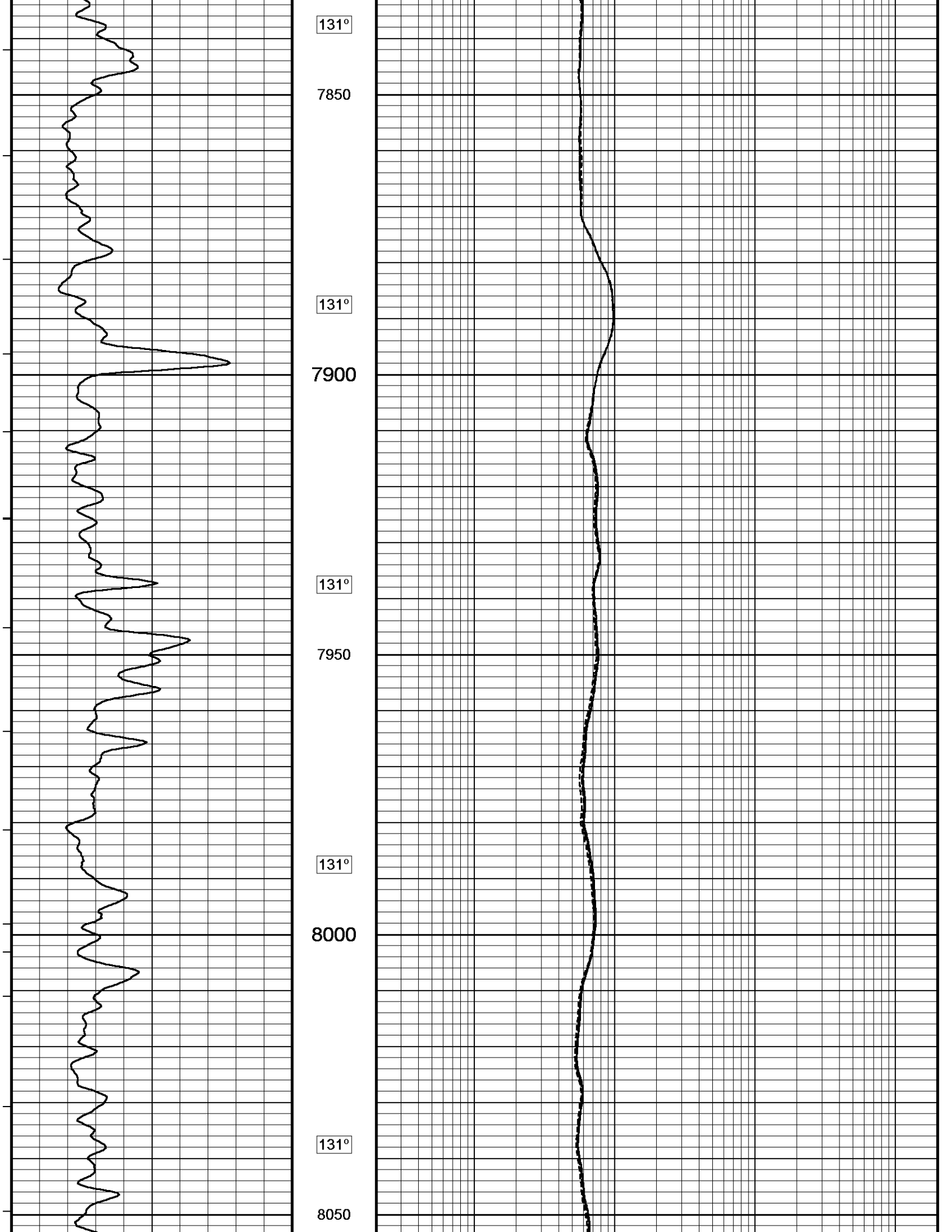
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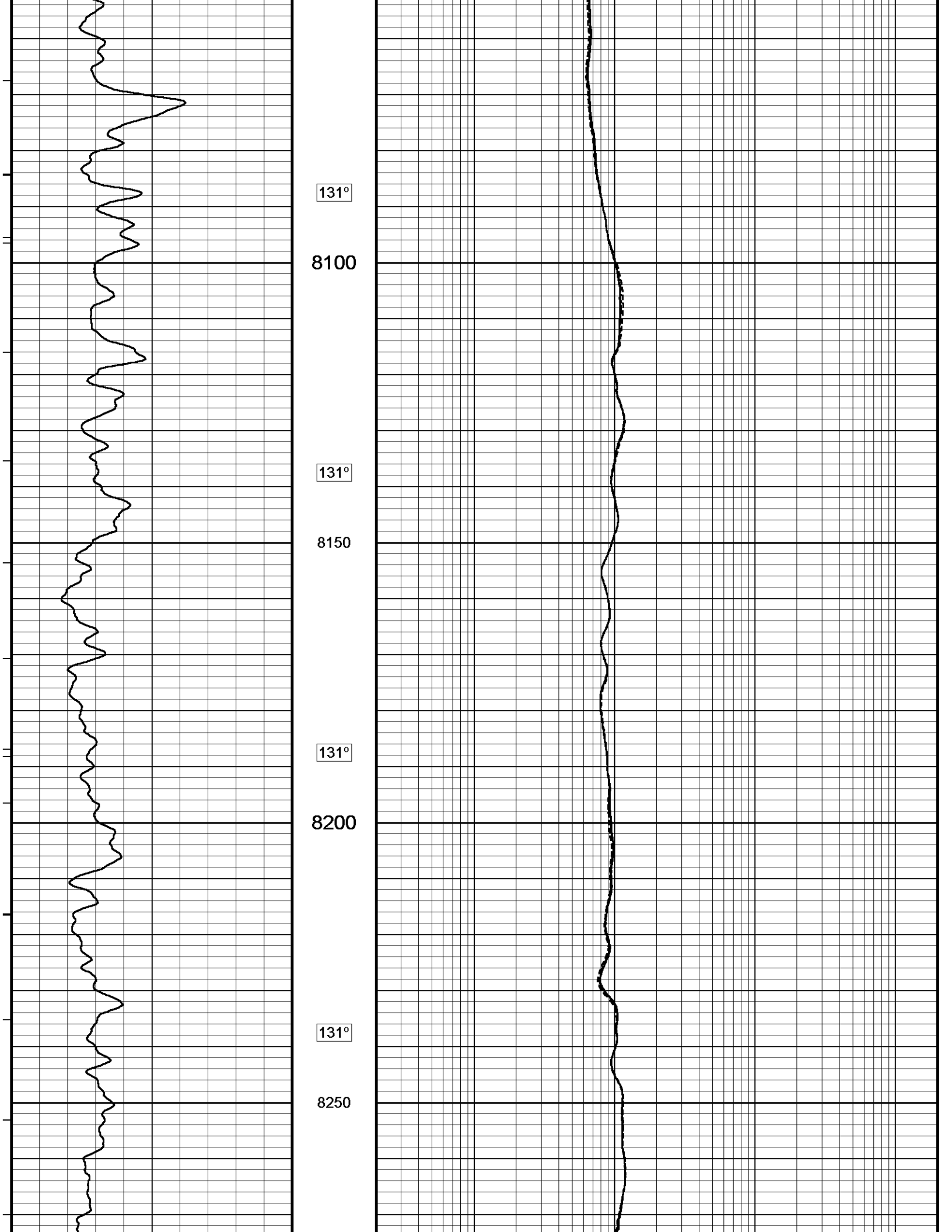
8050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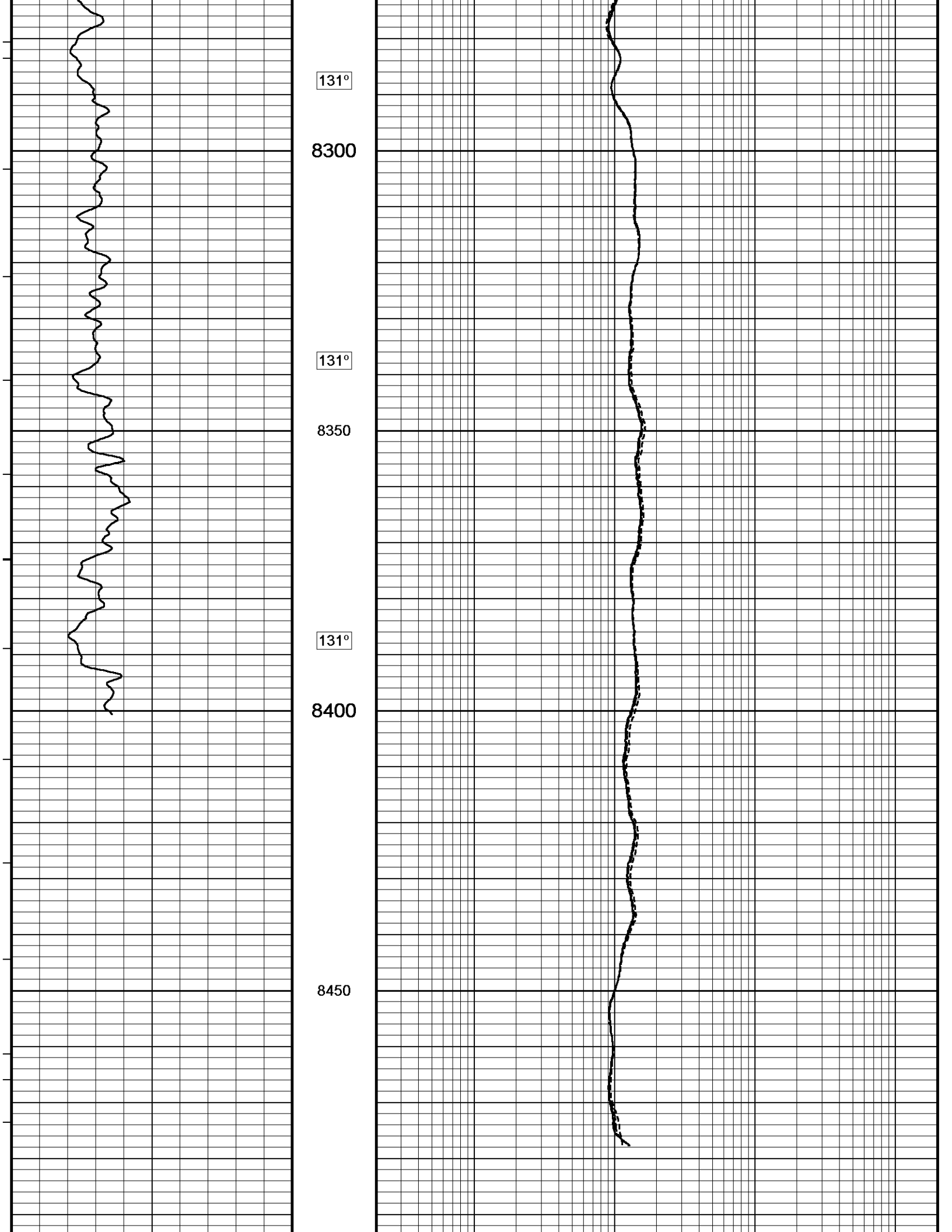
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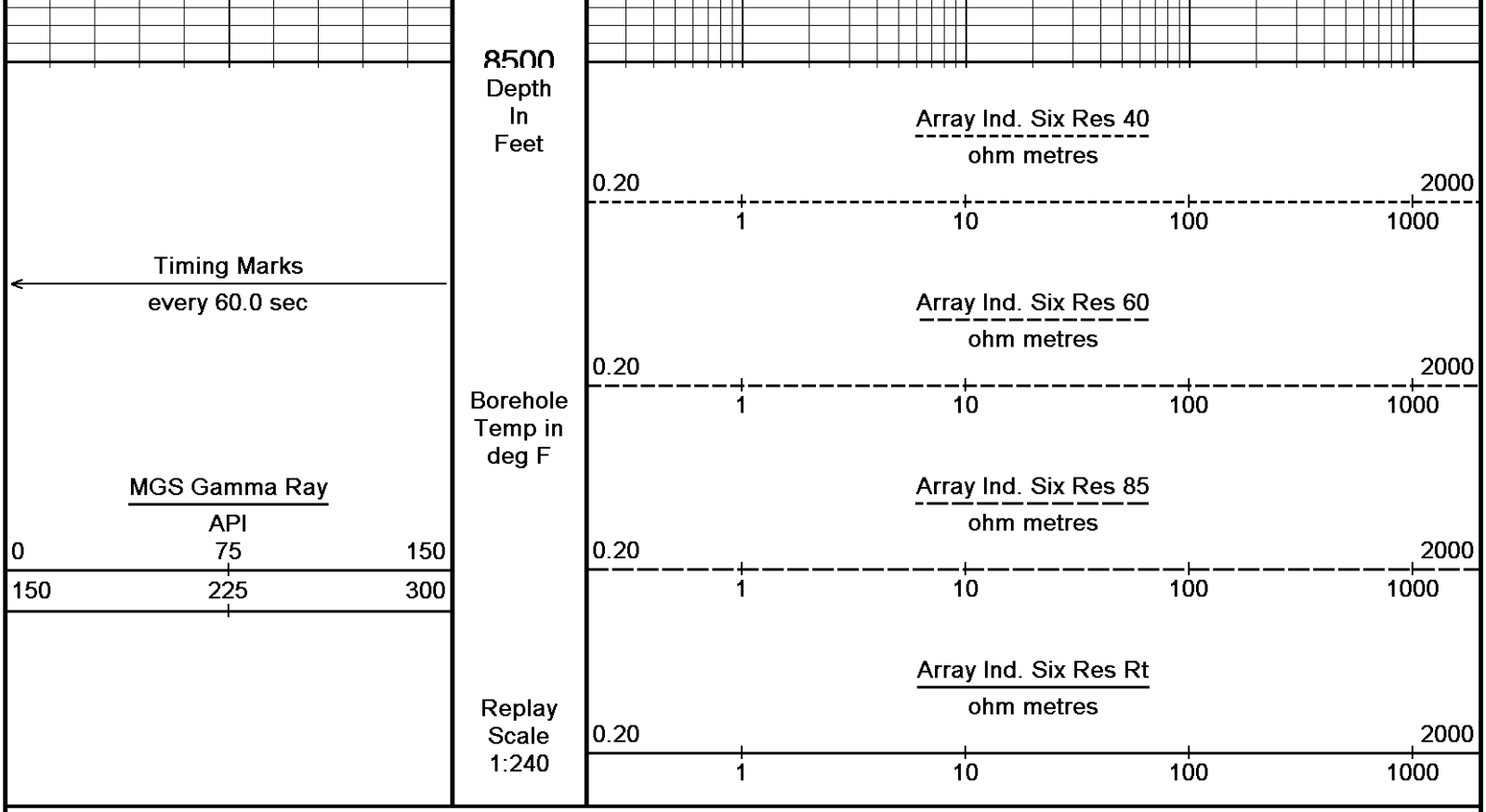


Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 03-AUG-2013 11:13
Filename: C:\Data\Unit\Unit Loudenback 7-1H\MSS 166 Depth Log2.dta — Recorded on 03-AUG-2013 10:21
System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

DSC

BEFORE SURVEY CALIBRATION

C:\Data\Unit\Unit Loudenback 7-1H\MSS 166 Depth Log2.dta

General Constants All 000

Last Edited on 03-AUG-2013,10:28

General Parameters		
Mud Resistivity	2.100	ohm-metres
Mud Resistivity Temperature	77.900	degrees F
Water Level	0.000	feet
Density/Neutron Processing	Wet Hole	
Hole/Annular Volume and Differential Caliper Parameters		
HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	Density Caliper	
Rwa Parameters		
Porosity used	Base Neutron Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

Down-hole Tension Calibration SMS 0

Field Calibration on 05-SEP-2012,13:01

Reading No	Measured	Calibrated (lbs)
1	15152.07	0.00
2	18386.74	2000.00

Strain Gauge Constants MMS-E.B 166

Last Edited on 30-JAN-2013,09:56

Atmospheric Pressure	14.70	psi
Serial Number	262005	
Calibration Date	04-Jan-2011	

Base Check Date	
Dead Weight Serial Number	0
Dead Weight Gravitational Correction	1.0

Temperature	75.0		150.0		250.0		350.0	degrees F
Pressure psia	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.
0.0	0.096	0.097	0.113	0.113	0.129	0.129	0.138	0.139
3000.0	5.275	5.280	5.290	5.294	5.303	5.306	5.307	5.310
6000.0	10.464	10.472	10.478	10.485	10.488	10.494	10.487	10.494
9000.0	15.664	15.672	15.676	15.684	15.683	15.691	15.679	15.687
12000.0	20.876	20.882	20.888	20.893	20.892	20.898	20.885	20.890
15000.0	26.101		26.111		26.114		26.103	

Gamma Calibration MGS-C.J 133

Field Calibration on 02-AUG-2013 08:33

	Measured	Calibrated (API)
Background	118	82
Calibrator (Gross)	1938	1343
Calibrator (Net)	1820	1261

Gamma Constants MGS-C.J 133

Last Edited on 24-JUL-2013,07:01

Gamma Calibrator Number	46	
Mud Density	1.05	gm/cc
Caliper Source for Processing	MIE Caliper X	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

SP Calibration MGS-C.J 133

Field Calibration on 07-FEB-2013 10:52

	Measured	Calibrated (mV)
Reference 1	-100.0	-100.0
Reference 2	100.0	100.0

High Resolution Temperature Calibration MGS-C.J 133

Field Calibration on 09-FEB-2013,12:46

	Measured	Calibrated(Deg F)
Lower	0.00	0.00
Upper	0.00	0.00

High Resolution Temperature Constants MGS-C.J 133

Last Edited on 20-MAR-2013,13:25

Pre-filter Length	11

Neutron Calibration MDN-B.J 423

Base Calibration on 31-JUL-2013 08:30
Field Check on 02-AUG-2013 08:28

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2937	90	3714	110
Ratio	32.765		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	1295	1933
Ratio	0.670	

Field Check

	Calibrated (cps)	
	1333	1985
Ratio	0.671	

Neutron Constants MDN-B.J 423

Last Edited on 02-AUG-2013,08:22

Neutron Source Id	000	
Neutron Jig Number	000	
Epithermal Neutron	No	
Caliper Source for Processing	Bit Size	
Stand-off	0.00	inches
Mud Density	1.05	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	

Temperature Source	Constant Value	
Temperature	20.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	N/A	kppm
Barite Mud Correction	Not Applied	

Magnetometer Parameters MIE-A.A 205

Date Of Last Magnetometer Calibration 03-NOV-2010,10:42

	X Magnetometer	Y Magnetometer	Z Magnetometer
Slope	-1.000000	-1.009681	-1.005139
Offset	0.010971	-0.020272	0.014048

Magnetometer Constants MIE-A.A 205

Last Edited on

Magnetometer Calibrator Number 000

Accelerometer Parameters MIE-A.A 205

Date Of Last Accelerometer Calibration 01-NOV-2010,20:15

	X Accelerometer	Y Accelerometer	Z Accelerometer
Slope	-1.102577	-1.095892	-1.099279
Offset	0.005245	0.001380	-0.006964

Accelerometer Constants MIE-A.A 205

Last Edited on 01-NOV-2010,20:18

Accelerometer Calibrator Number 000

Accelerometer Temperature Characterisation

X Accelerometer

Serial Number	829			
Calibration Date	01-Jan-1998			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	3.85446e-005	-3.97712e-008	1.22710e-010
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.75555e-004	4.16325e-007	4.80125e-010

Y Accelerometer

Serial Number	901			
Calibration Date	12-Apr-2010			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	1.24151e-005	-6.79414e-009	7.96660e-011
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.38432e-004	6.40058e-007	-1.92725e-010

Z Accelerometer

Serial Number	890			
Calibration Date	10-Apr-2010			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	9.15265e-006	-6.81619e-009	1.46787e-010
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.78599e-004	2.72844e-007	9.01795e-010

Caliper Calibration MIE-A.A 205

Base Calibration on 01-NOV-2010 20:12

Field Calibration on

Base Calibration

Reading No	Pads 1-5 Meas.	Pads 3-7 Meas.	Calibrator Size (in)
1	27006	26164	5.96
2	37039	36625	7.97
3	46872	46116	9.84
4	58291	57849	11.91
5	0	0	0.00

Reading No	Pad 2 Meas.	Pad 4 Meas.	Pad 6 Meas.	Pad 8 Meas.	Calibrator Size (in)
1	25116	23882	25036	24789	5.96
2	33940	32930	33993	33467	7.97
3	41946	41141	42331	41802	9.84
4	51857	51034	52212	51630	11.91
5	0	0	0	0	0.00

Field Calibration

Measured Measured Actual

Measured Measured Measured Measured Actual

Caliper Constants MIE-A.A 205

Last Edited on 02-NOV-2010,12:29

Caliper Difference for BRKT	0.120	inches

Navigation Constants MIE-A.A 205

Last Edited on

Magnetic Declination	0.00	degrees	East

Imager Pad Check MIE-A.A 205

Field Check on

Pad 1	Pad Not Tested	Pad 5	Pad Not Tested
Pad 2	Pad Not Tested	Pad 6	Pad Not Tested
Pad 3	Pad Not Tested	Pad 7	Pad Not Tested
Pad 4	Pad Not Tested	Pad 8	Pad Not Tested

Compact Micro Imager Constants MIE-A.A 205

Last Edited on 02-AUG-2013,09:07

Sonde Configuration	Imager Mode	
Arm-Pad Kit	Normal Pads (12.25 in)	
Arm-Pad Kit Serial Number	N/A	
Centre Pad 1 Rotational Offset	0.00	degrees
Image/Borehole Ovality Reference	Azimuth of Pad 1	
Non Active Buttons	Omit	
Search Angle	0.00	degrees
Correlation Interval	3.28	feet
Correlation Step	1.64	feet
Current Offset	0.0000	mAmp
Squasher Start	0.0500	mAmp
Image Processing	Enabled	

High Resolution Temperature Calibration MAI-B.J 392

Field Calibration on 23-APR-2013,20:26

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	100.00

High Resolution Temperature Constants MAI-B.J 392

Last Edited on 23-APR-2013,20:26

Pre-filter Length	11	

Induction Calibration MAI-B.J 392

Base Calibration on 23-APR-2013,20:27
Field Check on 02-AUG-2013 08:13

Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	15.4	450.7	9.3	966.2
2	5.4	363.0	7.6	821.4
3	3.4	248.8	5.2	566.0
4	2.1	125.2	2.6	279.2

Array Temperature	24.2	Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			17.9	4026.6
2			33.5	3712.2
3			30.0	3181.6
4			20.6	2210.9
Deep			17.4	2094.0
Medium			43.8	4157.8
Shallow			51.6	5468.9

Array Temperature	79.4	Deg F

Induction Constants MAI-B.J 392

Last Edited on 03-AUG-2013,10:28

Induction Model	PtAR WBM

Induction Model	RAI-WBM	
Caliper for Borehole Corr.	Density Caliper	
Hole Size for Borehole Correction	N/A	inches
Tool Centred	No	
Stand-off Type	Fins	
Stand-off	0.50	inches
Number of Fins on Stand-off	6.0000	
Stand-off Fin Angle	60.00	degrees
Stand-off Fin Width	0.5000	inches
Borehole Corr. Rm Source	Temperature Corr	
Temp. for Rm Corr.	MGS External Temperature	
Squasher Start	0.0020	mhos/metre
Squasher Offset	N/A	mhos/metre

Borehole Normalisation

DRM1	0.0000	DRC1	0.0000
DRM2	0.0000	DRC2	0.0000
MRM1	0.0000	MRC1	0.0000
MRM2	0.0000	MRC2	0.0000
SRM1	0.0000	SRC1	0.0000
SRM2	0.0000	SRC2	0.0000

Calibration Site Corrections

Channel 1	0.00	mmhos/metre
Channel 2	0.00	mmhos/metre
Channel 3	0.00	mmhos/metre
Channel 4	0.00	mmhos/metre

Apparent Porosity and Water Saturation Constants

Archie Constant (A)	1.00	
Cementation Exponent (M)	2.00	
Saturation Exponent (N)	2.00	
Saturation of Water for Apor	100.00	percent
Resistivity of Water for Apor and Sw	0.05	ohm-m
Resistivity of Mud Filtrate for Sw	0.00	ohm-m
Source for Rt	0.00	
Source for Rxo	0.00	

Photo Density Calibration MPD-D.A 471

Base Calibration on 31-JUL-2013 10:32
Field Check on 02-AUG-2013 08:17

Density Calibration

Base Calibration	Measured Near	Measured Far	Calibrated (sdu) Near	Calibrated (sdu) Far
Reference 1	52204	26606	59494	30754
Reference 2	22924	2688	26390	2598

Field Check at Base

1258.9	1453.5

Field Check

1258.8	1461.4

PE Calibration

Base Calibration	WS	Measured WH	Measured Ratio	Calibrated Ratio
Background	243	1129		
Reference 1	22789	52005	0.443	0.367
Reference 2	7166	22780	0.320	0.270

Field Check at Base

242.9	1128.6

Field Check

242.0	1126.0

Density Constants MPD-D.A 471

Last Edited on 08-JUL-2013,06:46

Density Source Id	243
Nylon Calibrator Number	633
Aluminium Calibrator Number	633
Density Shoe Profile	4 inch

Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.05	gm/cc
Mud Density Z/A Multiplier	1.11	
Mud Filtrate Density	1.00	gm/cc
Dry Hole Mud Filtrate Density	1.00	gm/cc
DNCT	0.00	gm/cc
CRCT	0.00	gm/cc
Density Z/A Correction	Hybrid	

Matrix Density (gm/cc)	Depth (ft)
2.71	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

Caliper Calibration MPD-D.A 471

Base Calibration on 31-JUL-2013 10:58
Field Calibration on 02-AUG-2013 08:20

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	17903	3.99
2	26260	5.97
3	34744	7.99
4	42995	9.86
5	52322	11.93
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.88	5.97

DOWNHOLE EQUIPMENT

C:\Data\Unit\Unit Loudenback 7-1H\MSS 166 Depth Log2.dta

Shuttle Running Tool 3.5")
SRT-A.A 40 LG: 6.62 ft WT: 37.5 lb OD: 2.52 in

Empty Battery
MLK-A 2 LG: 14.23 ft WT: 30.9 lb OD: 2.24 in

Empty Battery
MLK-A 3 LG: 14.23 ft WT: 30.9 lb OD: 2.24 in

MBS-F.A 200v Compact Battery Sub
MBS-F.A 114 LG: 17.06 ft WT: 123.5 lb OD: 2.24 in

Compact Memory Sub E.B
MMS-E.B 166 LG: 5.20 ft WT: 37.5 lb OD: 2.24 in

Compact Tool Isolator sub.
MTI-B.A 63 LG: 1.54 ft WT: 13.2 lb OD: 2.24 in

Compact Short Gamma
MGS-C.J 133 LG: 3.41 ft WT: 24.3 lb OD: 2.24 in

Compact Collar Locator
MCL-B.J 72 LG: 3.17 ft WT: 26.5 lb OD: 2.24 in

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 165 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SHA-J.A Compact Swivel Head Adaptor
SHA-J.A 432 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

MIS-A.A Compact Inline Bowspring sub
MIS-A.A 247 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

Compact Neutron
MDN-B.J 423 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-D.A 471 LG: 9.59 ft WT: 90.4 lb OD: 2.24 in

MIS-D.A Compact Inline Bowspring sub
MIS-D.A 435 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SHA-J.B Compact Swivel Head Adaptor
SHA-J.B 595 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 480 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

MIS-A.A Compact Inline Bowspring sub
MIS-A.A 275 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

Compact MMI Memory Section
MIM-B.A 254 LG: 4.65 ft WT: 26.5 lb OD: 2.24 in

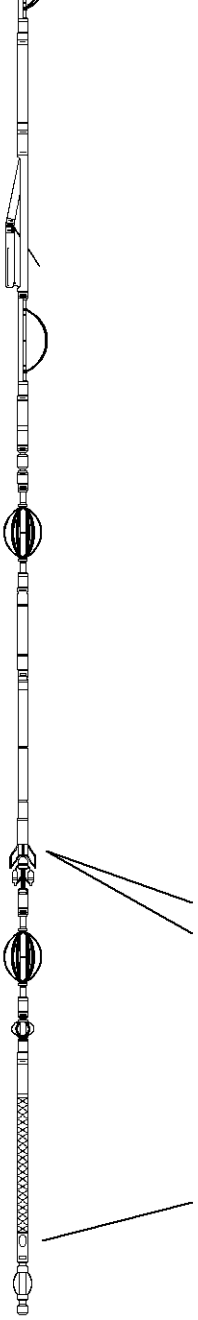
Compact MMI Electrode Section
MIE-A.A 205 LG: 13.96 ft WT: 99.2 lb OD: 4.09 in

MIS-D.B Compact Inline Bowspring sub
MIS-D.B 707 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

MIS-E.B Compact Inline Standoff sub
MIS-E.B 597 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Induction
MAI-B.J 392 LG: 12.52 ft WT: 48.5 lb OD: 2.24 in

Total Length: 145.08 ft Weight: 879.6 lb



20.89 ft IECY - MIE Caliper Y
20.89 ft IECX - MIE Caliper X

Tool Zero (1.84ft from bottom)
All measurements relative to tool zero.

COMPANY	UNIT PETROLEUM
WELL	LOUDENBACK 7-1H
FIELD	WILDCAT
PROVINCE/COUNTY	RENO
COUNTRY/STATE	USA / KANSAS

Elevation Kelly Bushing	1784.00	feet	First Reading	8478.00	feet
Elevation Drill Floor	1784.00	feet	Depth Driller	8615.00	feet
Elevation Ground Level	1770.00	feet	Depth Logger	8482.00	feet

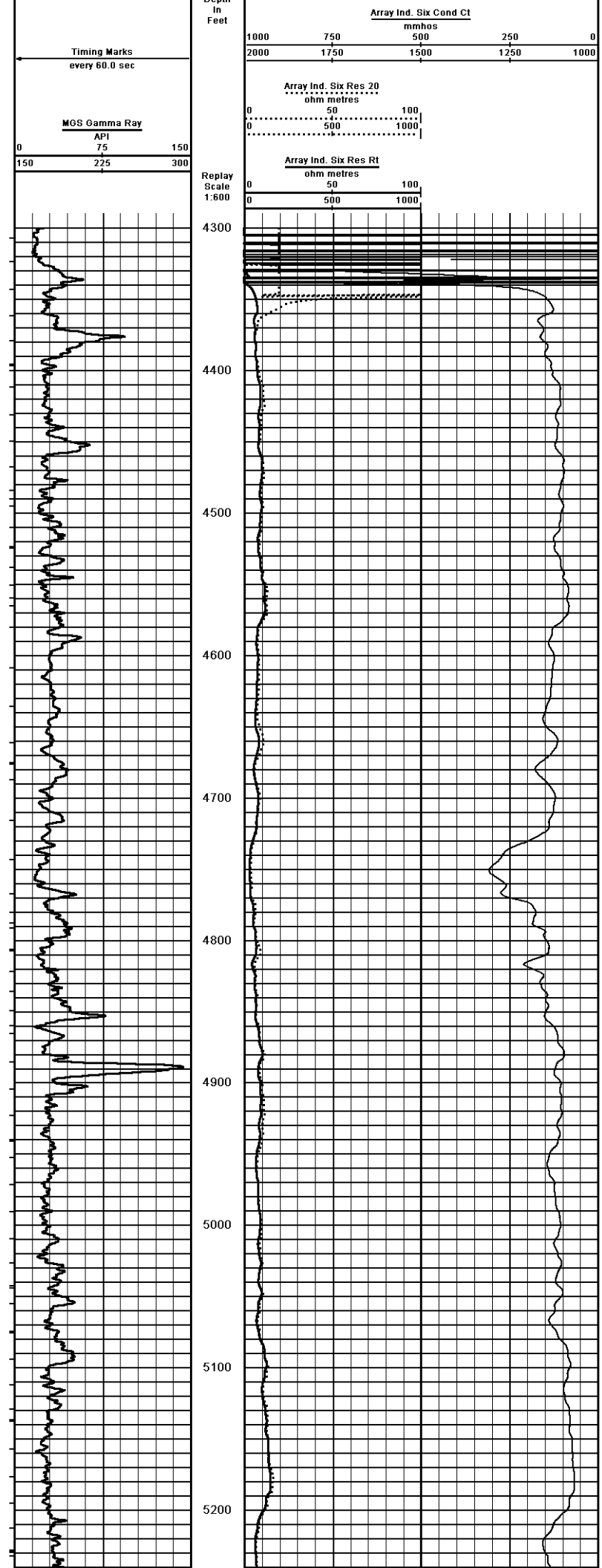
Weatherford®

CML WELL SHUTTLE
COMPACT ARRAY INDUCTION
LOG

DSC

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 03-AUG-2013 11:13
Filename: C:\Data\Unit\Unit Loudenback 7-1H\MSS 166 Depth Log2.dta
Recorded on 03-AUG-2013 10:21
System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

Depth


Depth In Feet
Timing Marks
every 60.0 sec
MGS Gamma Ray
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75
150
150
225
300
Array Ind. Six Cond Ct
mmhos
1000
750
500
250
0
2000
1750
1500
1250
1000
Array Ind. Six Res 20
ohm metres
0
50
100
0
500
1000
Array Ind. Six Res Rt
ohm metres
0
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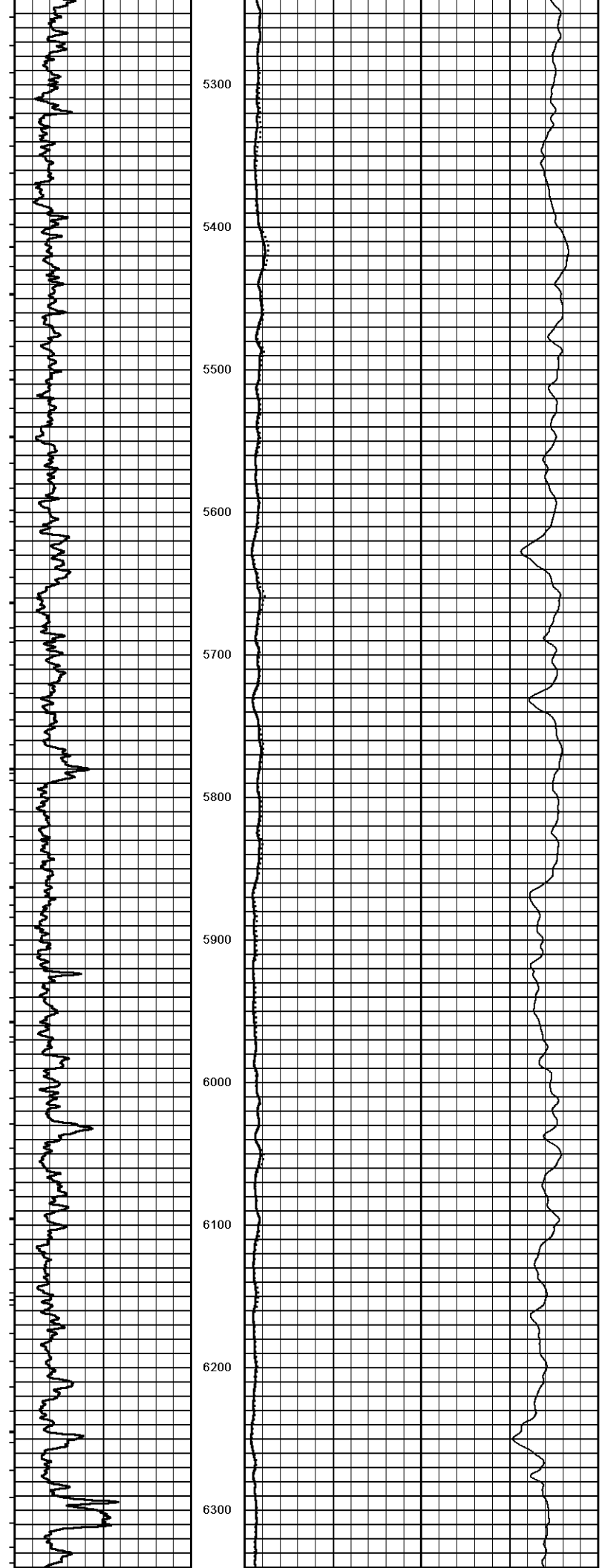
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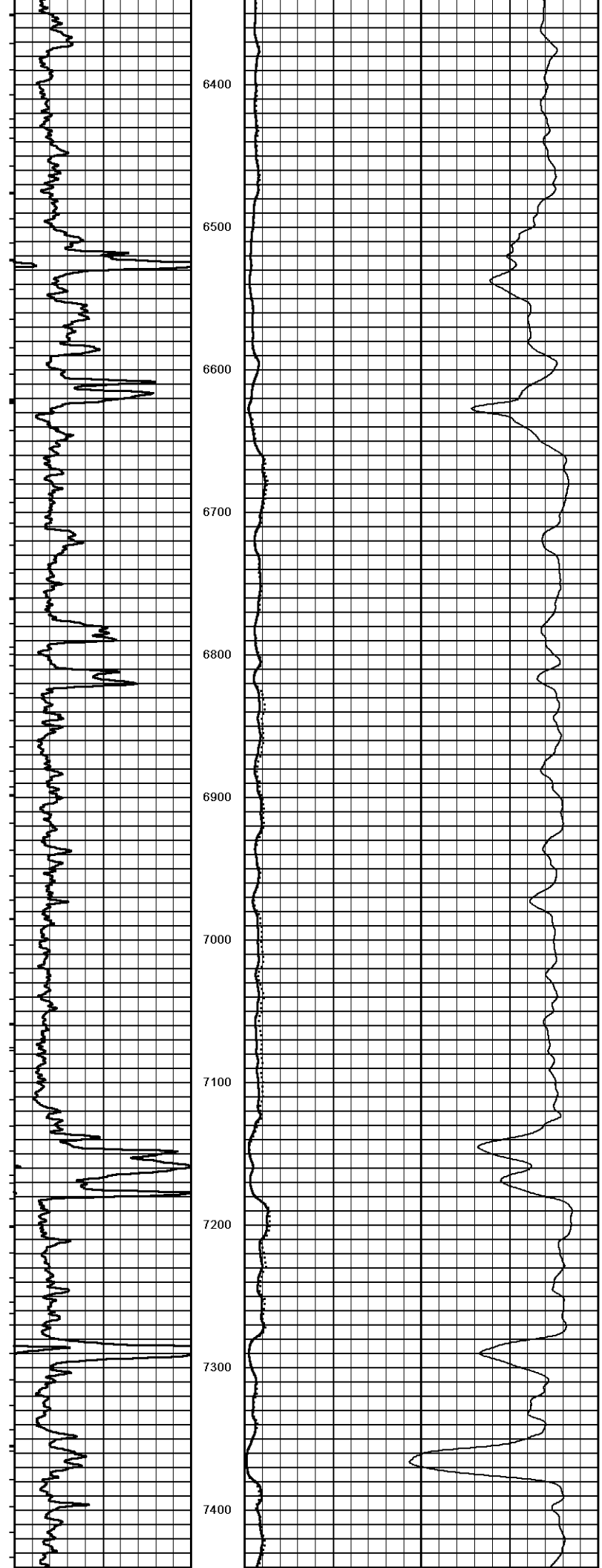
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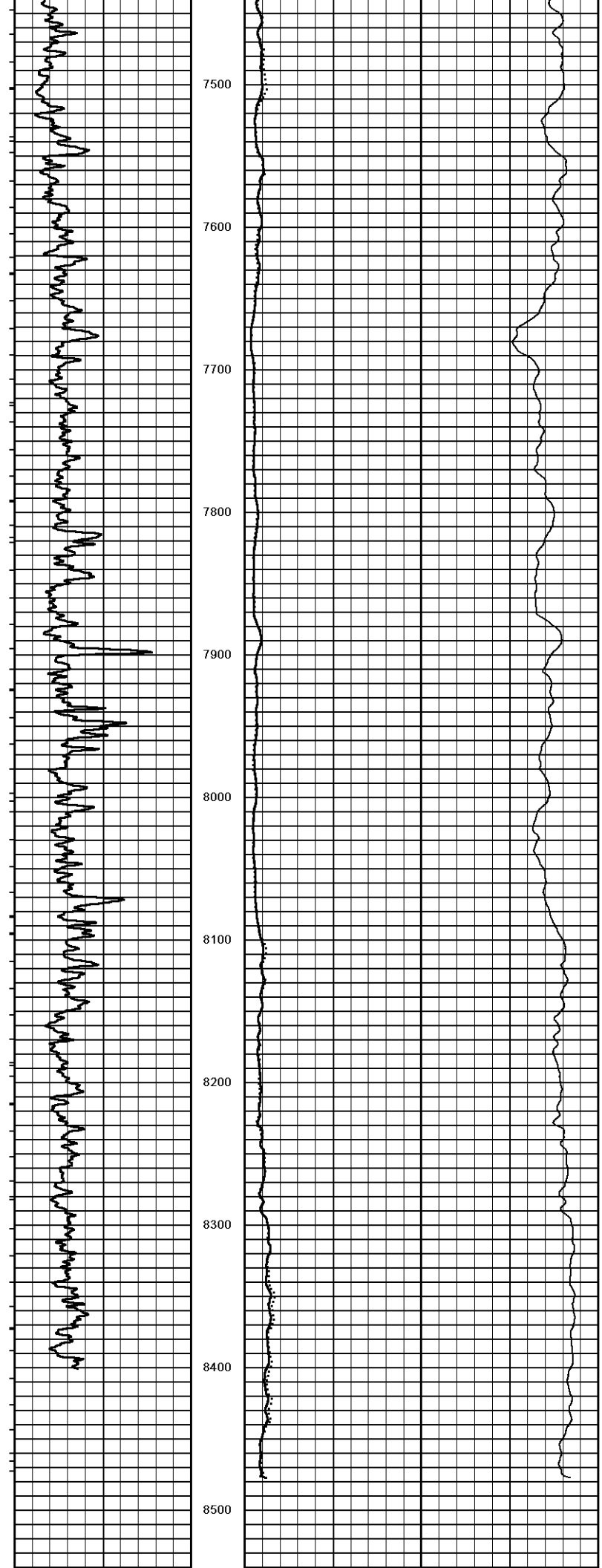
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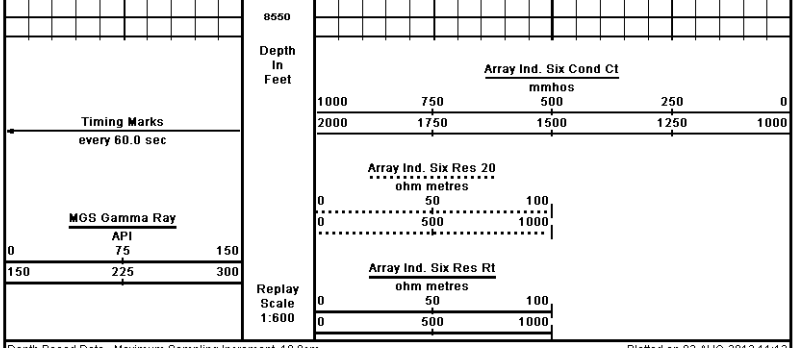

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 03-AUG-2013 11:13
Filename: C:\Data\Unit\Unit Loudenback 7-1H\MSS 166 Depth Log2.dta — Recorded on 03-AUG-2013 10:21
System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

DSC

COMPANY	UNIT PETROLEUM
WELL	LOUDENBACK 7-1H
FIELD	WILDCAT
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COUNTRY/STATE	USA / KANSAS

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