CML MESSENGER SHUTTLE
COMPACT PHOTO DENSITY
COMPENSATED NEUTRON LOG

Weatherford®

COMPANY	SANDRIDGE ENERGY
WELL	JEFFERSON 3306 1-27H
FIELD	STOHRVILLE
PROVINCE/COUNTY	HARPER
COUNTRY/STATE	USA \ KANSAS
LOCATION	SW SW SE SE
PERMIT NUMBER	200' FSL & 1245' FEL

SEC 27	TWP 33S	RGE 6W	Other Services
Latitude	37.1278595378		MAI
Longitude	97.9099537438		
API Number	15-077-21938		

Permanent Datum GL, Elevation 1288 feet
Log Measured From KB
Drilling Measured From KB @ 22' AGL

Elevations:	feet
KB	1310.00
DF	1310.00
GL	1288.00

Date	07-JUL-2013			
Run Number	ONE			
Service Order	3540178			
Depth Driller	8865.00	feet		
Depth Logger	8865.00	feet		
First Reading	8796.00	feet		
Last Reading	2980.00	feet		
Casing Driller	5152.00	feet		
Casing Logger	5152.00	feet		
Bit Size	6.125	inches		
Hole Fluid Type	WATER			
Density / Viscosity	9.00 lb/USg	40.00 CP		
PH / Fluid Loss	9.00	6.00 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	1.60 @ 99.0	ohm-m		
Rmf @ Measured Temp	1.28 @ 99.0	ohm-m		
Rmc @ Measured Temp	1.92 @ 99.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	1.15 @140.0	ohm-m		
Time Since Circulation	18 HOURS			
Max Recorded Temp	140.00	deg F		
Equipment / Base	18108	OKC		
Recorded By	GUTHMUELLER			
Witnessed By	J LYNCH		T ALCORN	
AFFE# DC12981				

BOREHOLE RECORD

Last Edited: 08-JUL-2013 09:21

Bit Size inches	Depth From feet	Depth To feet
12.250	0.00	681.00
8.750	681.00	5177.00
6.125	5177.00	8865.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURF	9.625	0.00	681.00	36.00
INTER	7.000	0.00	5152.00	26.00

REMARKS

LOGGED WITH WLS_13.06.9804 SOFWARE

LOGGED USING MESSENGER METHOD OF DEPLOYMENT AND MEMORY LOGGING SYSTEM
LOGGED WITH ADVANTAGE DEPTH SYSTEM _CORRECTED BACK TO PIPE STRAP

LOGGING STRING: SRT-079,MBS-131, MTI-076,MGS-135,MCL-069,SKJ-455,SHA-185,MISD-603,MDN-422,MPD-472,MISD-733, SHA-594,SKJ-472,MISE-575,MFE-396,MISE-564,MAI-389

HARDWARE: MAI: MISE 0.5 INCH STANDOFF ABOVE AND ISA 0.5 INCH STANDOFF BELOW
MFE: MISE 0.5 INCH STANDOFF ABOVE
MPD: 4" PROFILE PLATE, MISD SINGLE BOWSPRING DECENTRALIZER BELOW
MDN: MISD DOUBLE BOWSPRING DECENTRALIZER ABOVE

2.71 G/CC DENSITY MATRIX USED TO CALCULATE DENSITY POROSITY
ALL INTERVALS LOGGED AND SCALED PER CUSTOMER REQUEST

ALL INTERVALS LOGGED AND SCALED PER CUSTOMER REQUEST

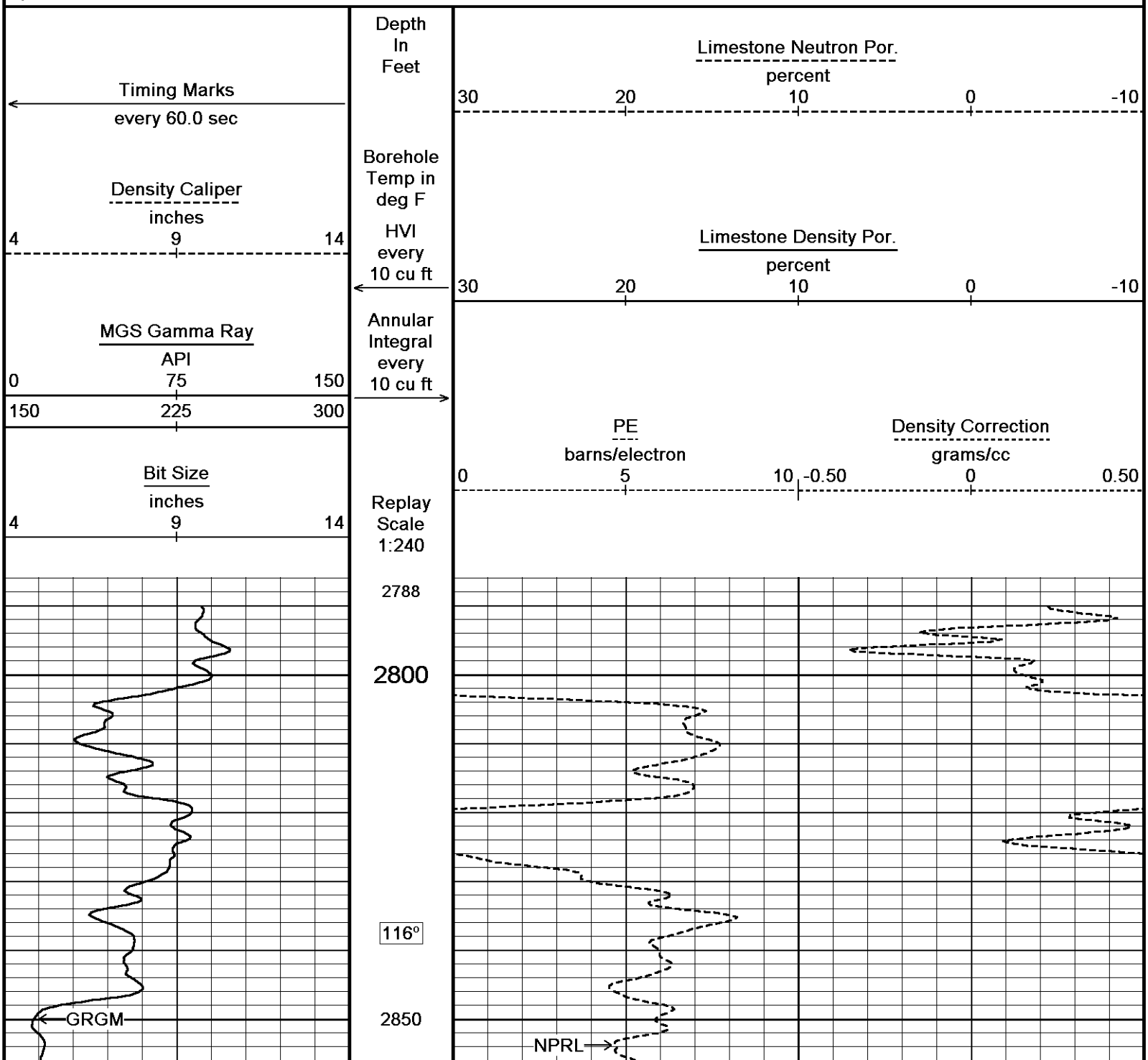
DRILL PIPE DEPTH DURING DEPLOYMENT - 8750
LOGGING TOOL DEPTH AFTER DEPLOYMENT - 8835

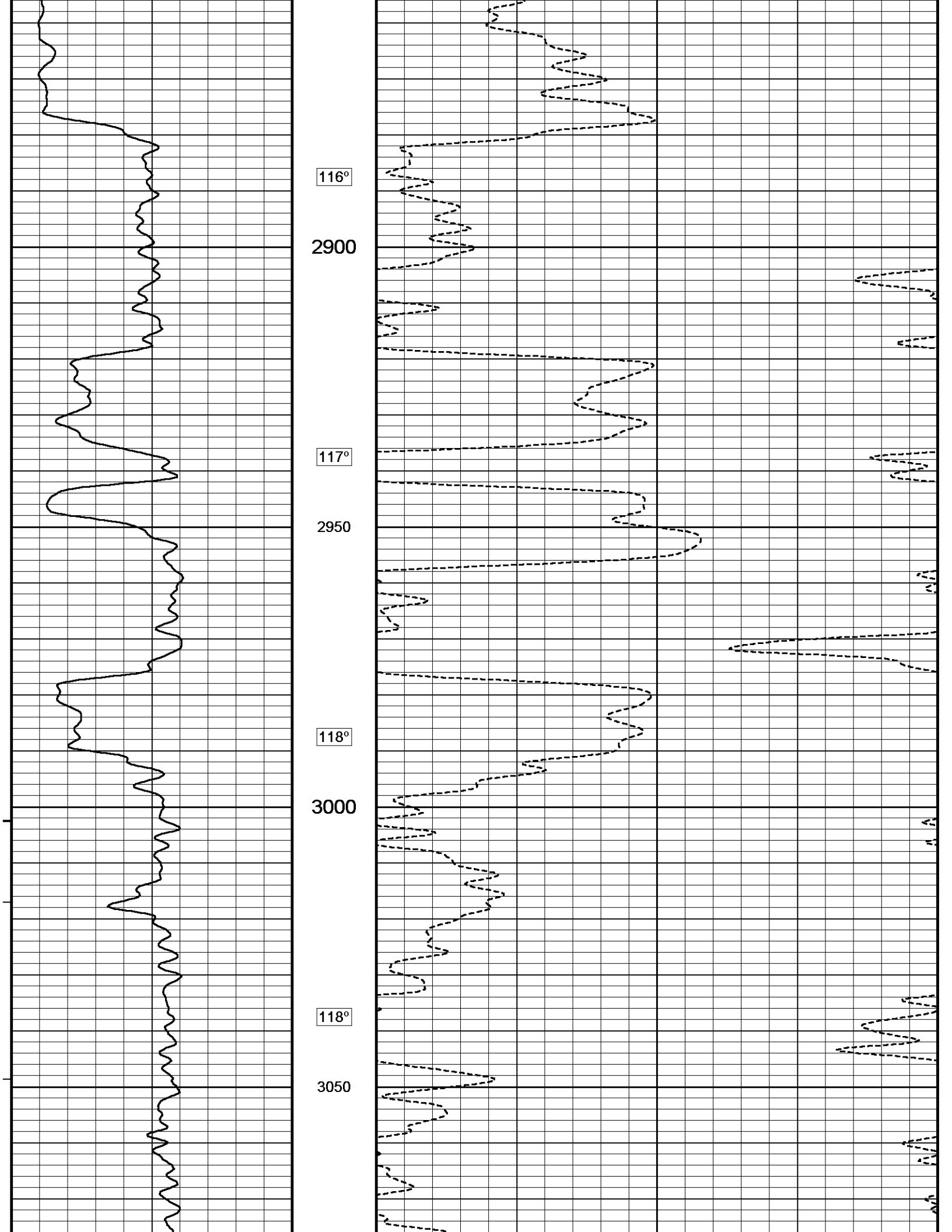
SERVICE ORDER # 3540178
RIG: UNIT 9

OPERATERS: BURGER; WORLEY

5 INCH MAIN LOG

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 08-JUL-2013 09:22
Filename: C:\13_06_9804\DATA\15077219380100 Jefferson 3306 1-27H\27166RTAP.dta
Recorded on 08-JUL-2013 07:59
System Versions: Processed with 13.06.9804 Plotted with 13.06.9804

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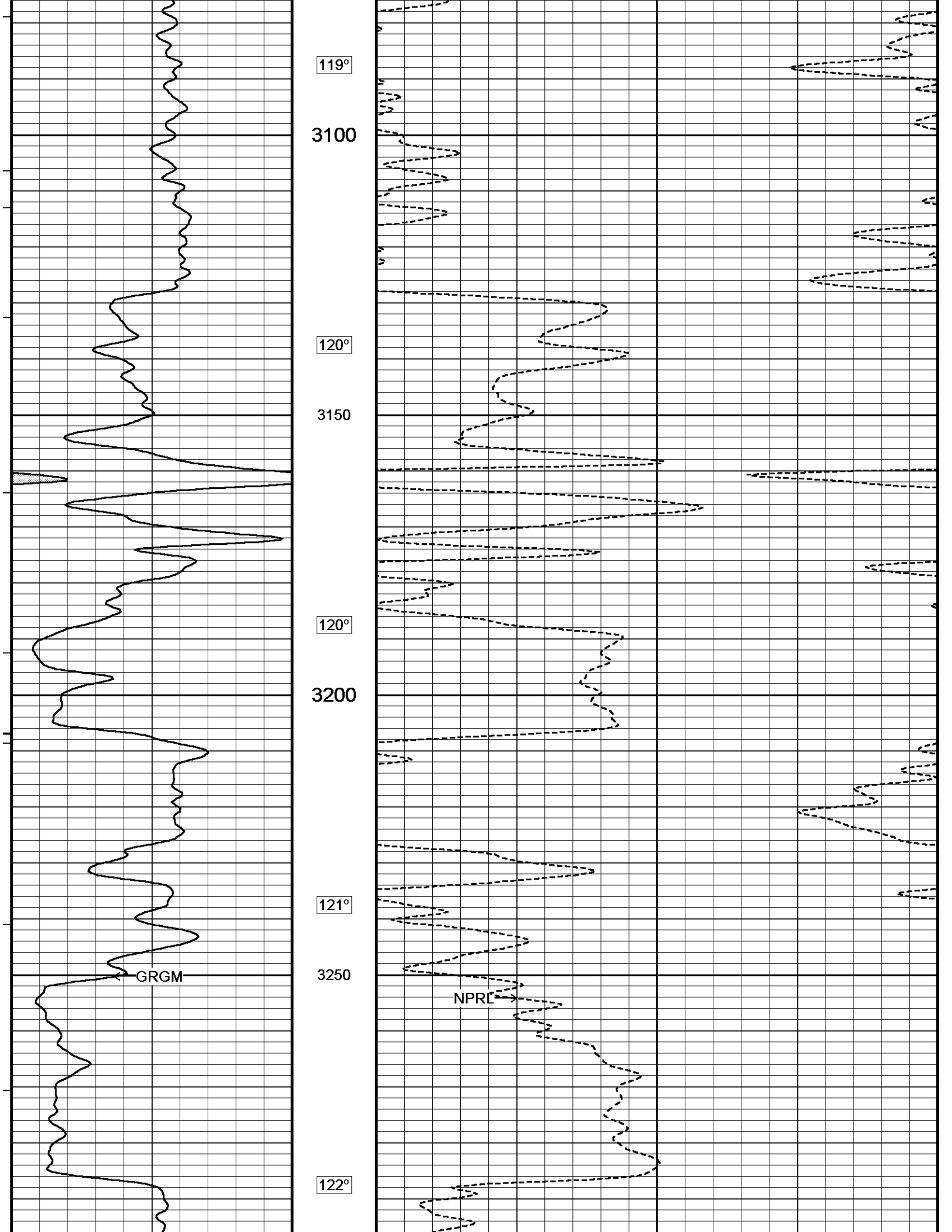
2900
117°
2950
118°
3000
118°
3050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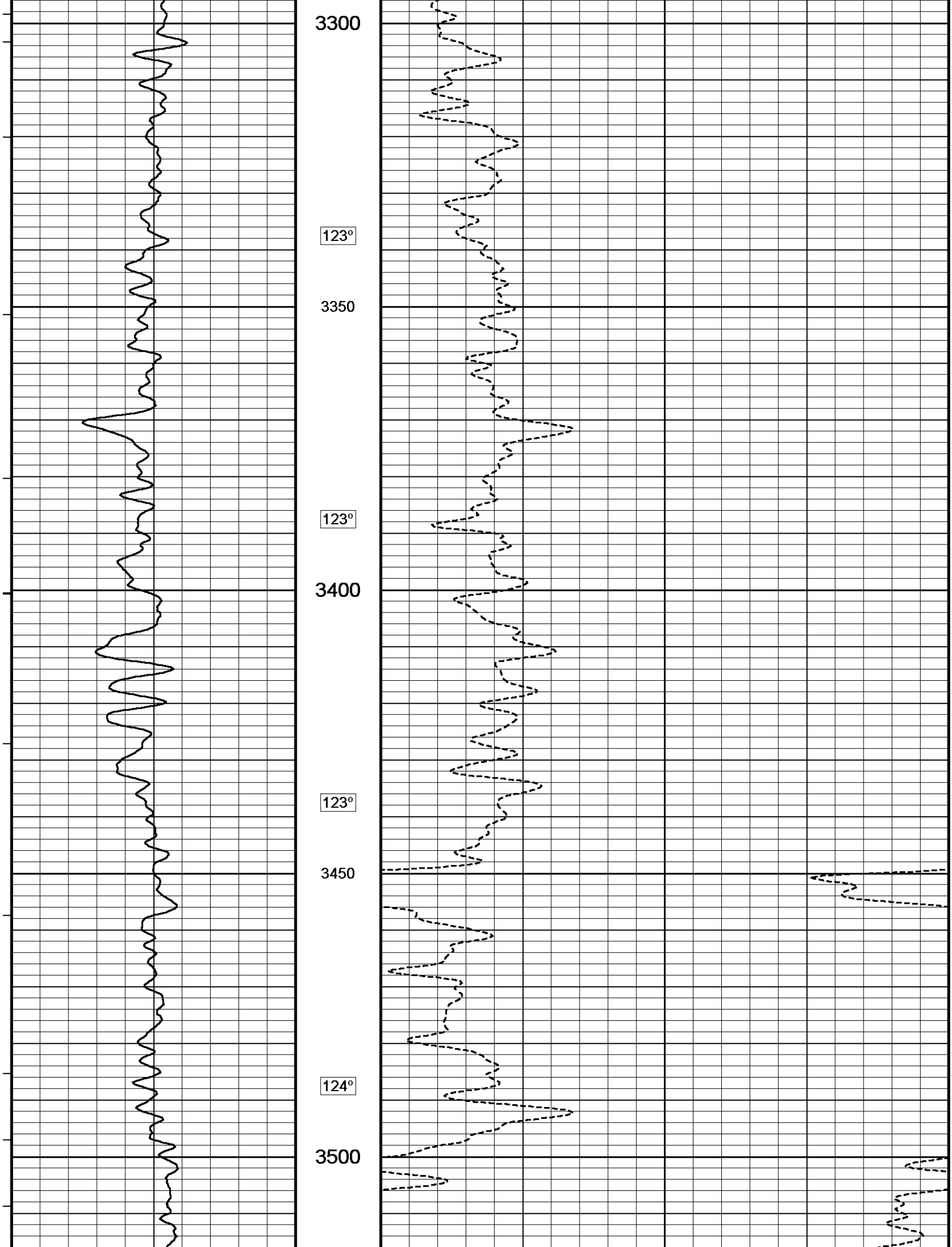
120°
3150
120°
3200
121°
3250
122°
GRGM
NPRL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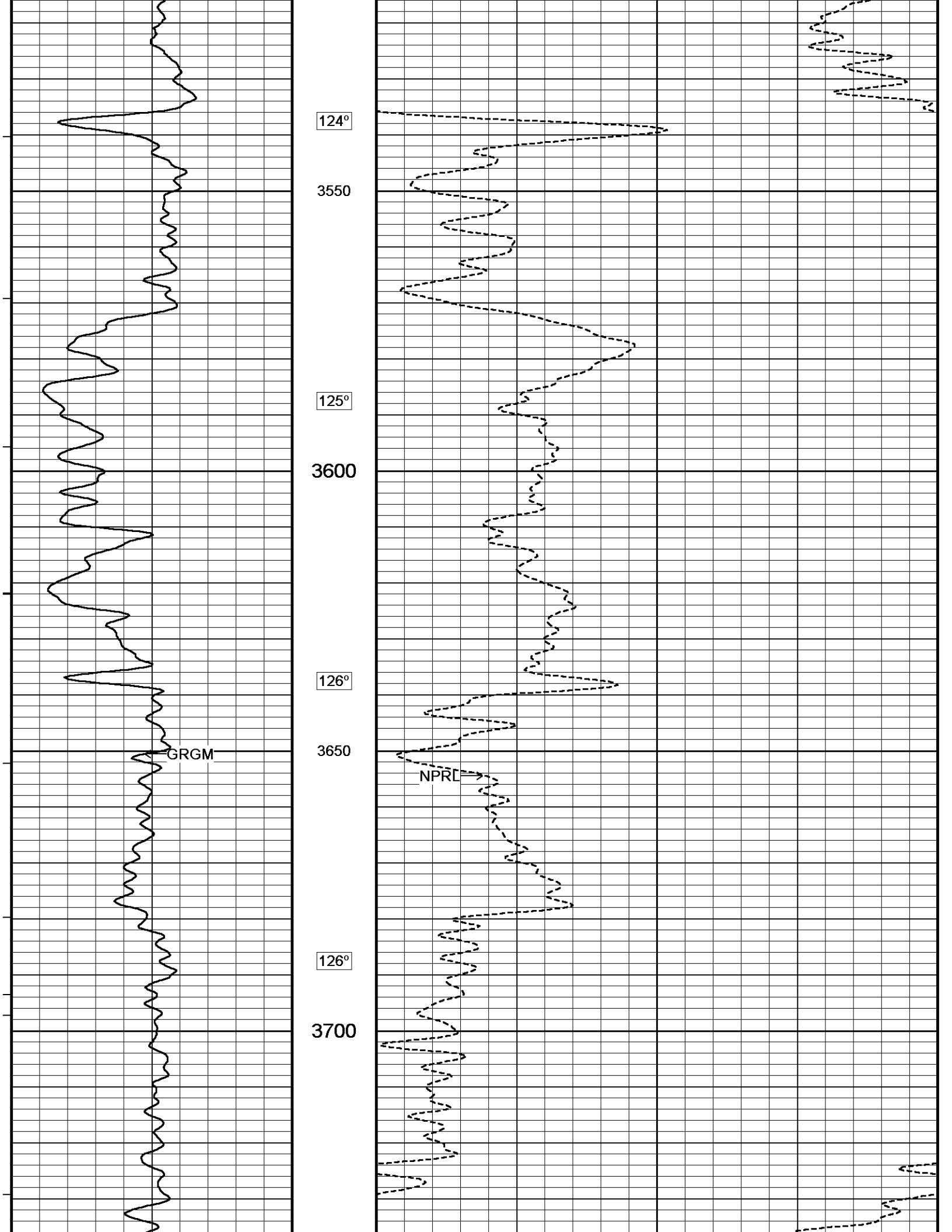
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NPRL
126°
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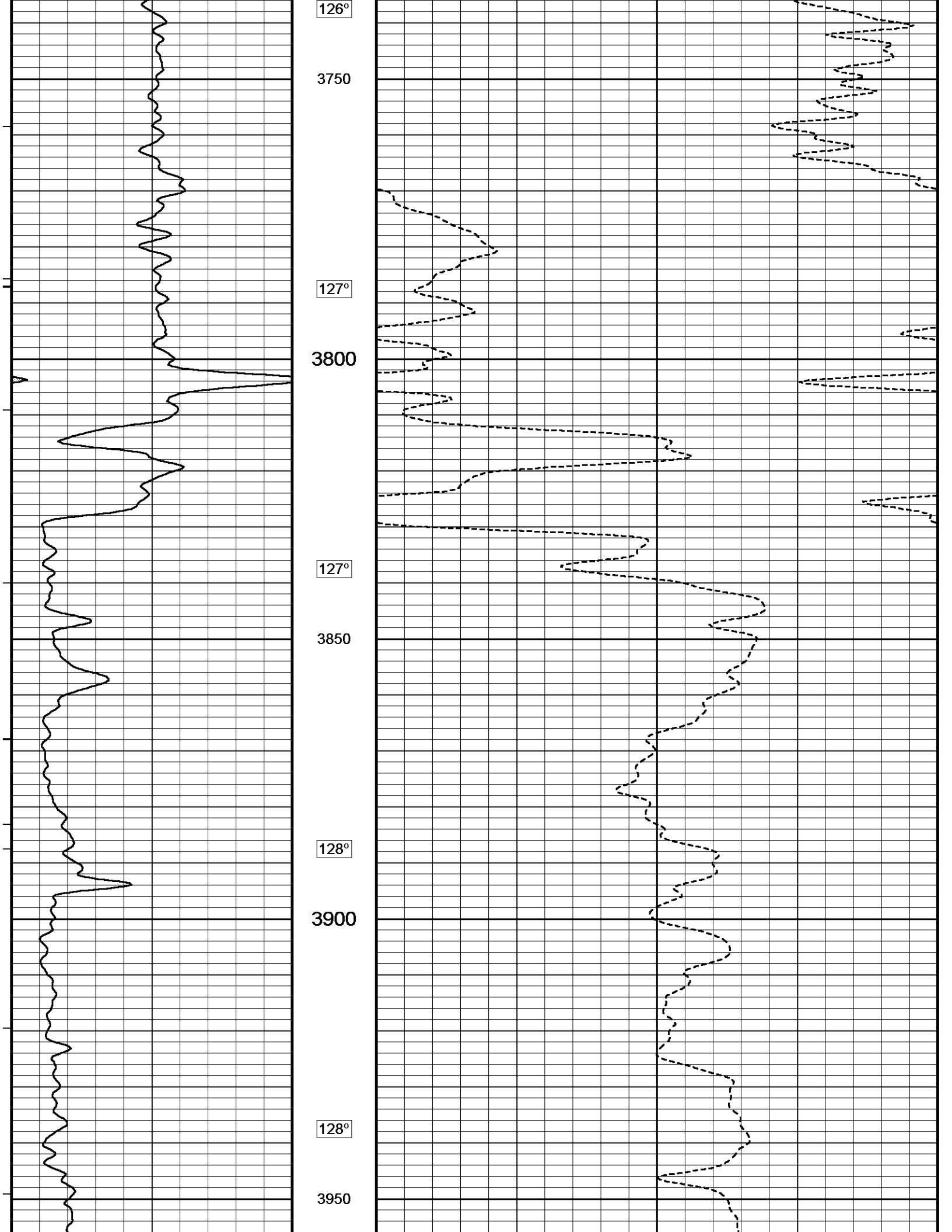
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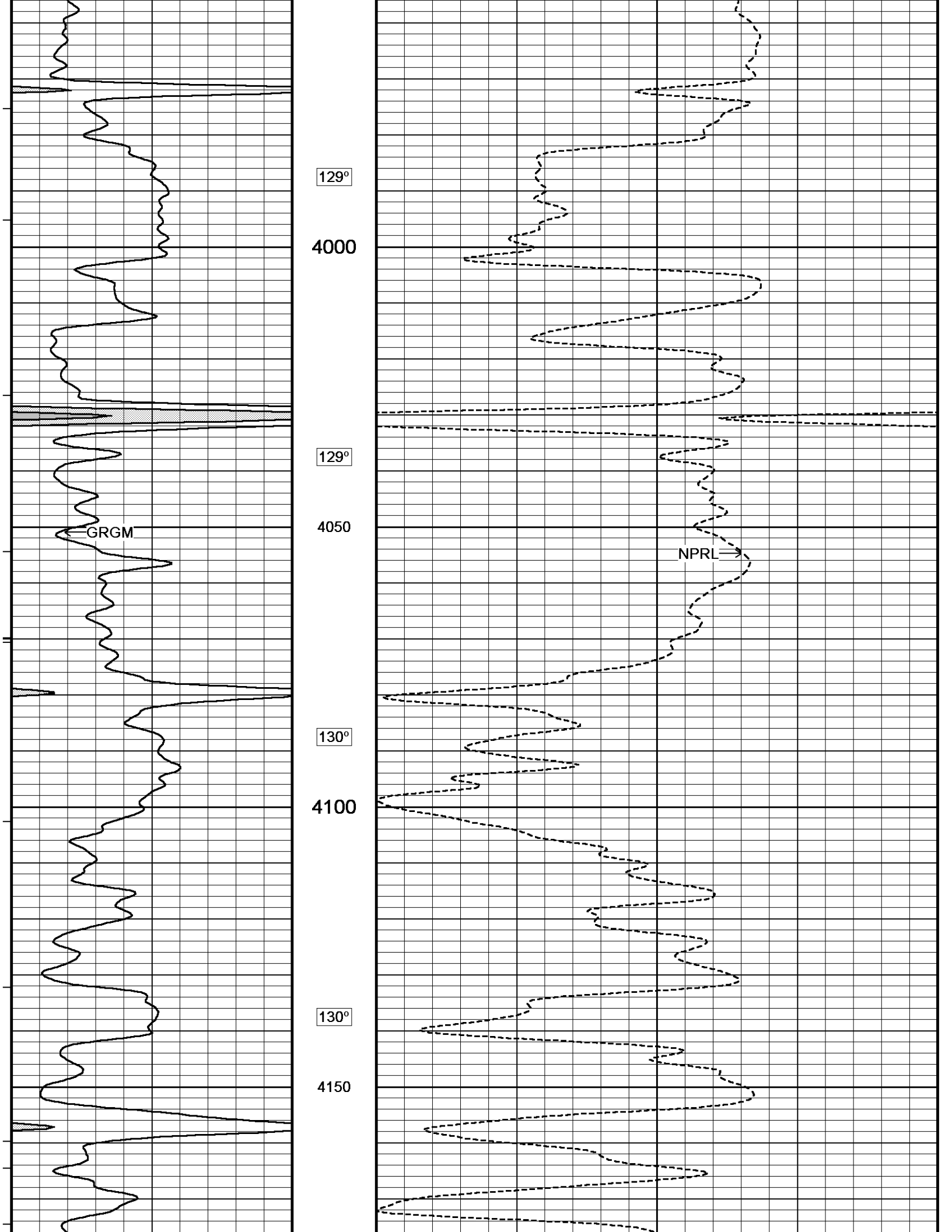
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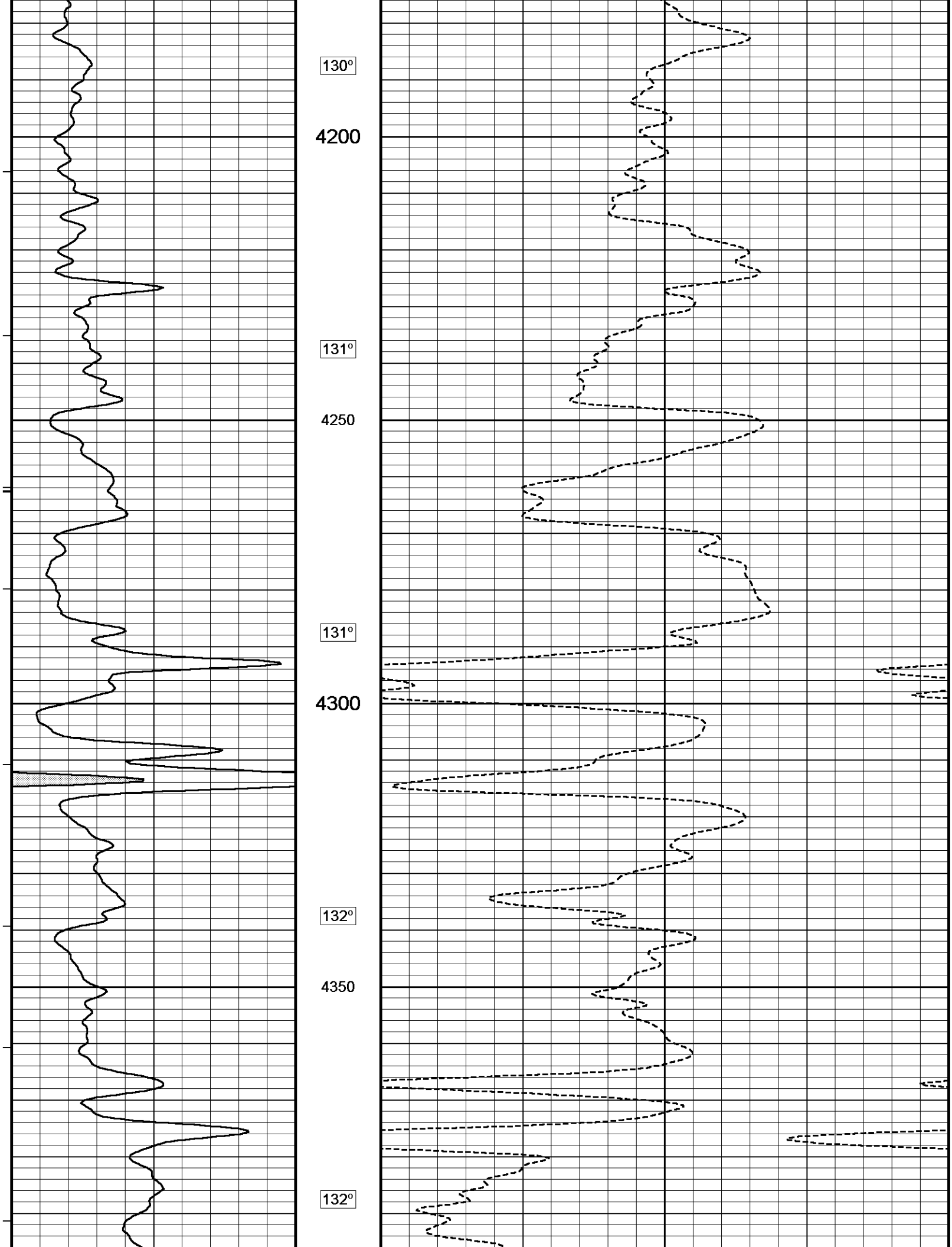
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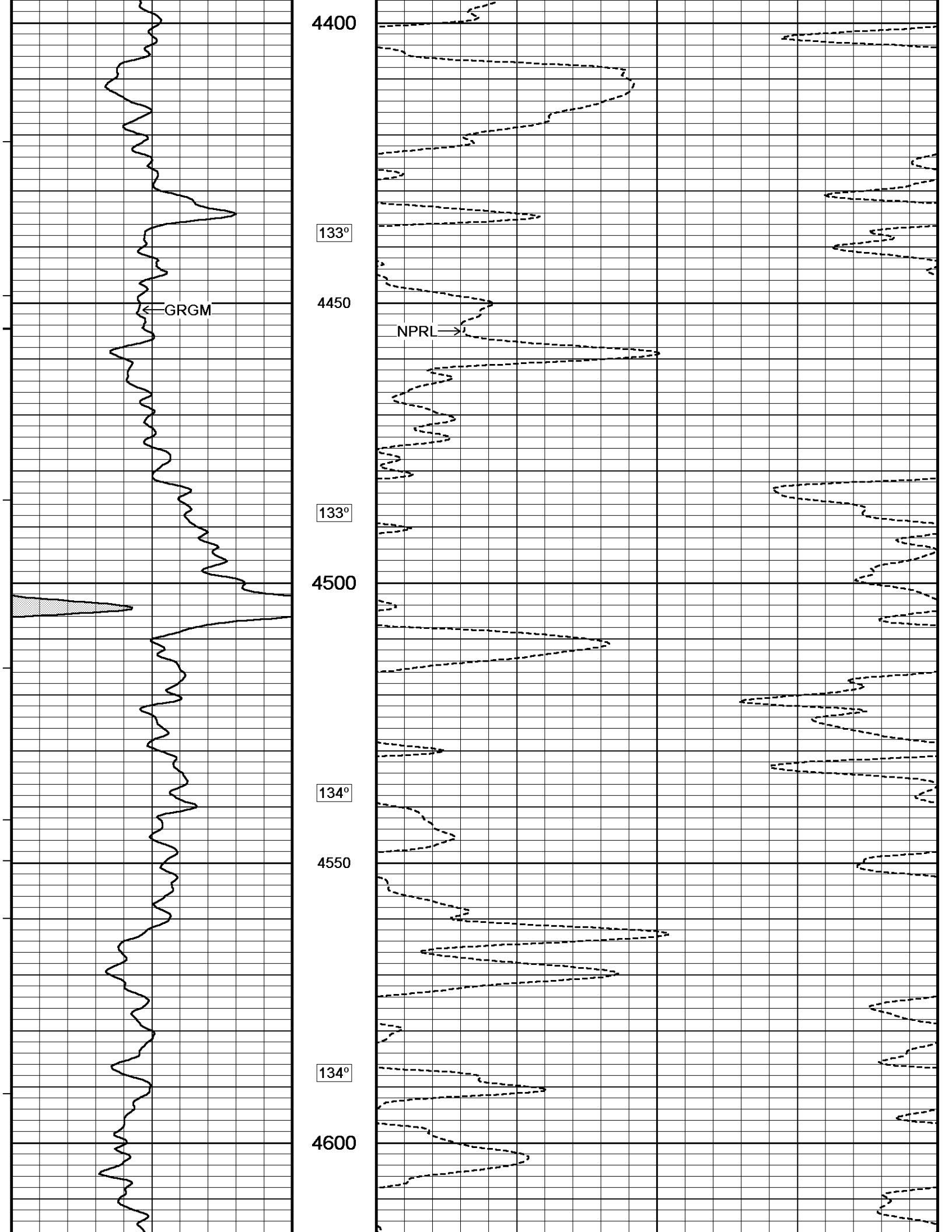
132°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134°
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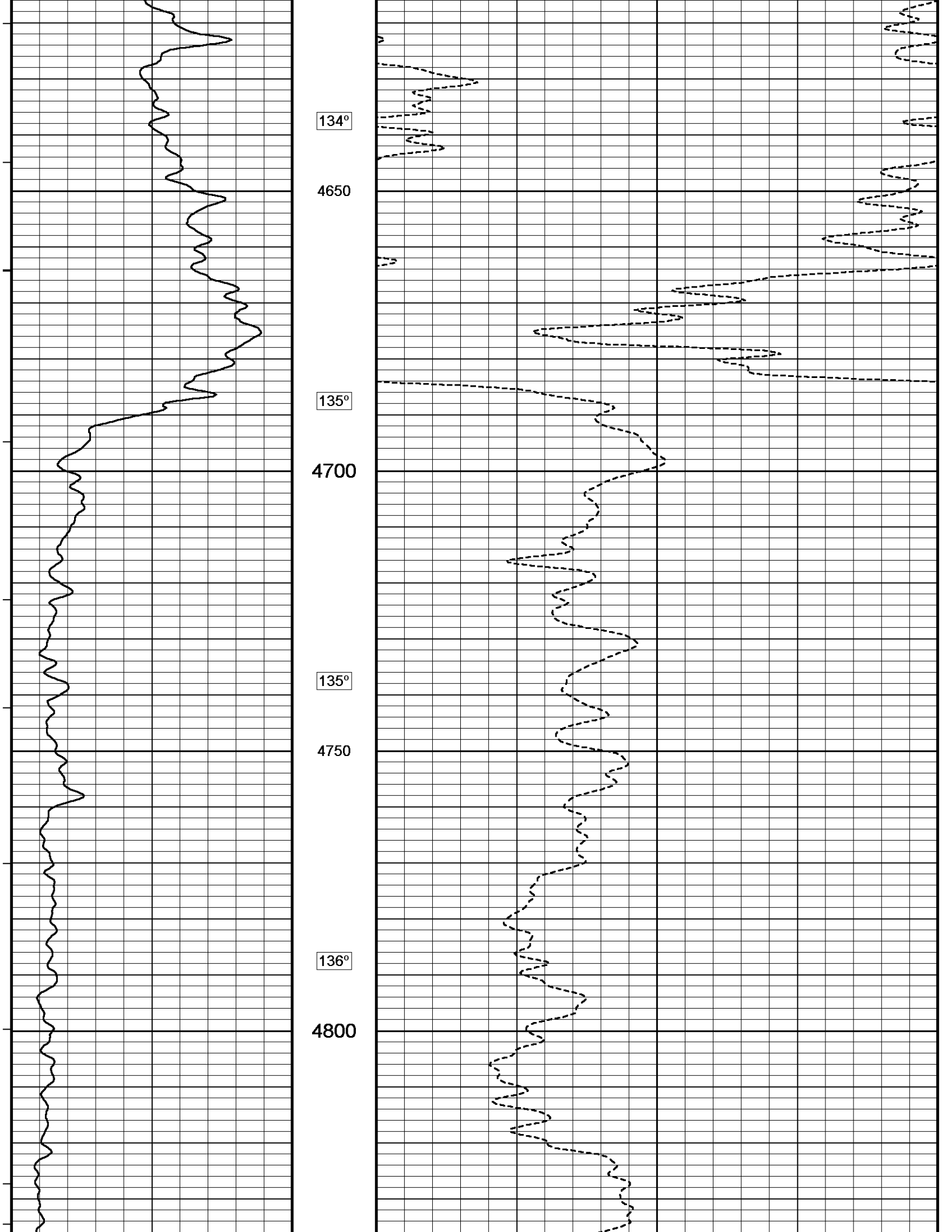
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135°
4750
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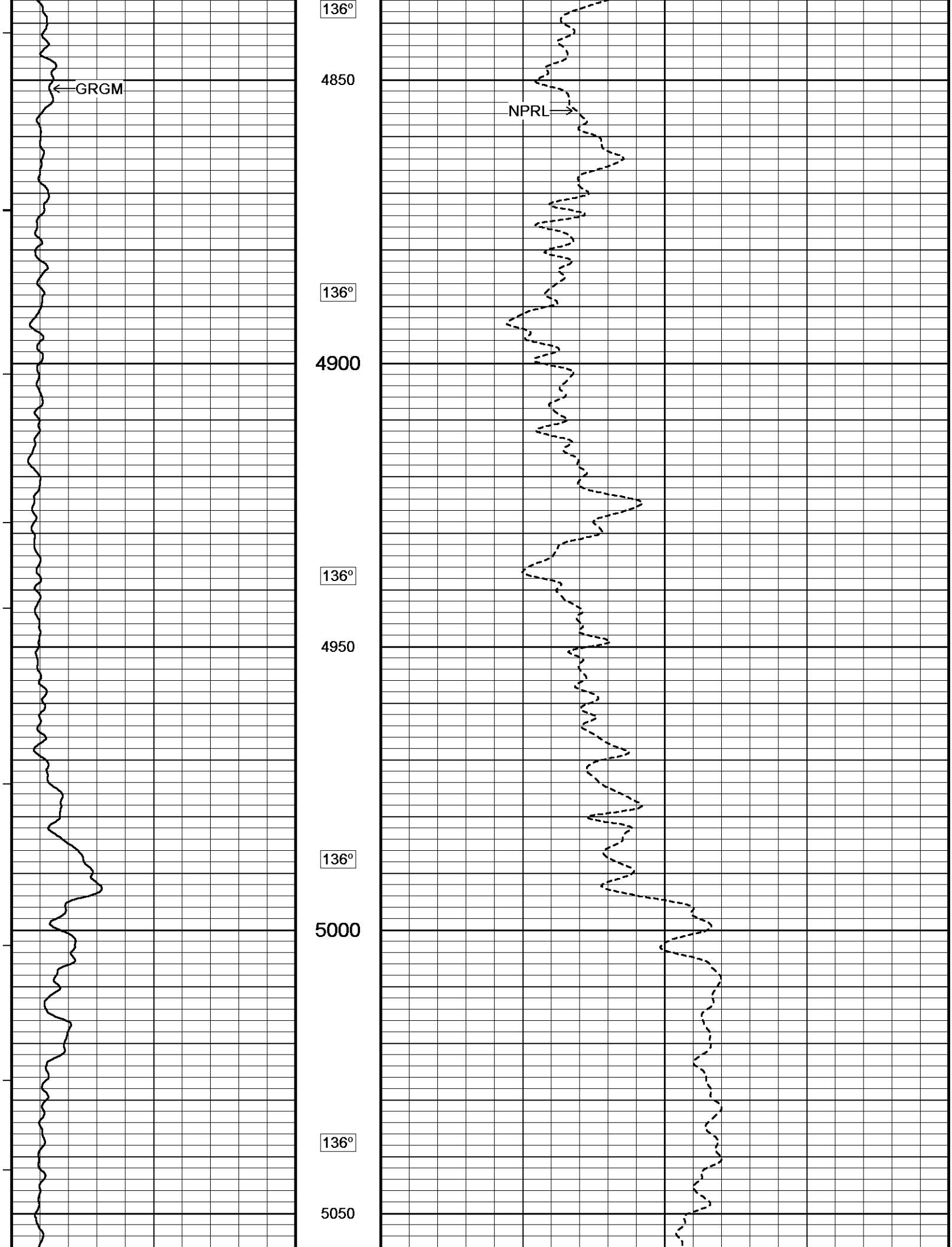
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GRGM
NPRL
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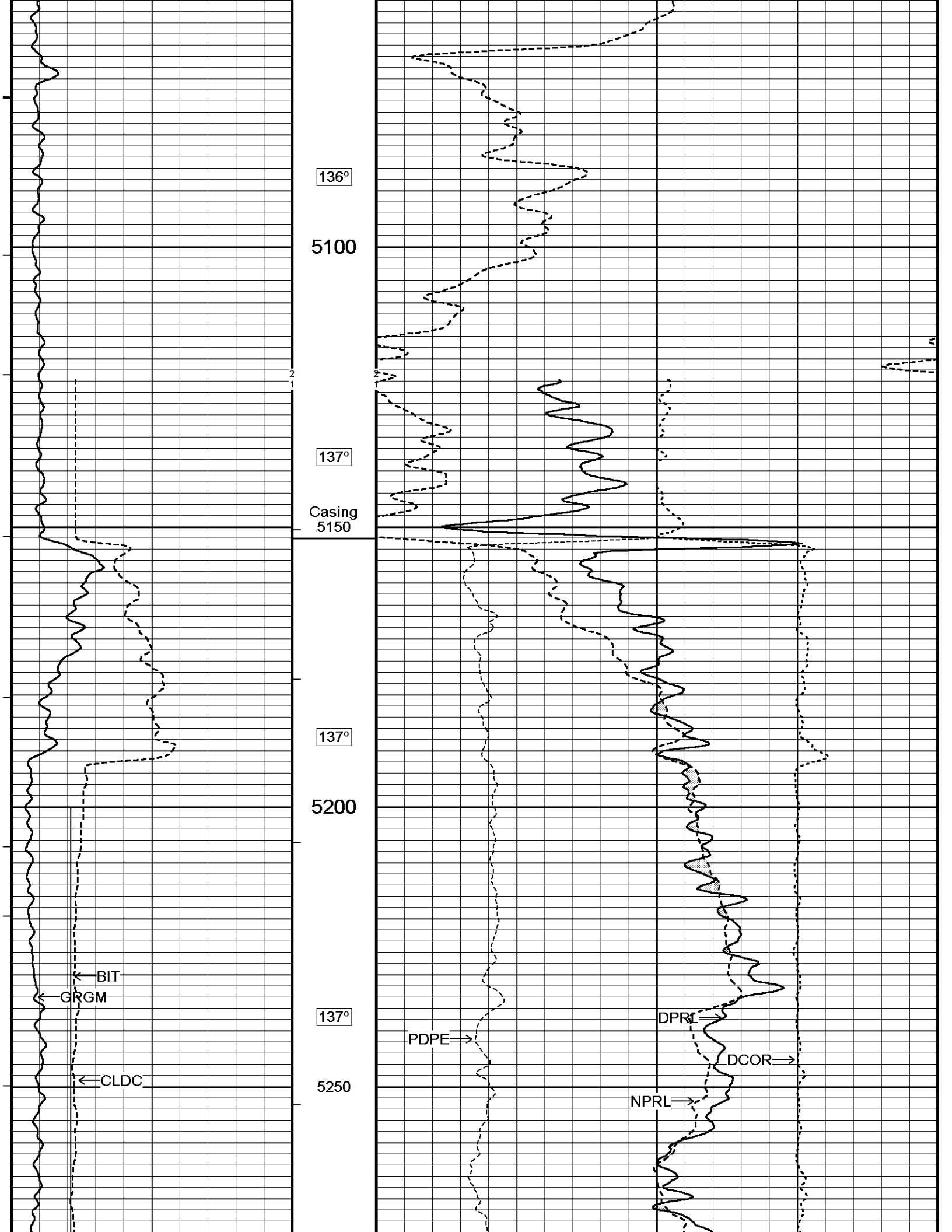
136°
4950
136°
5000
136°
5050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137°
Casing
5150
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BIT
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CLDC
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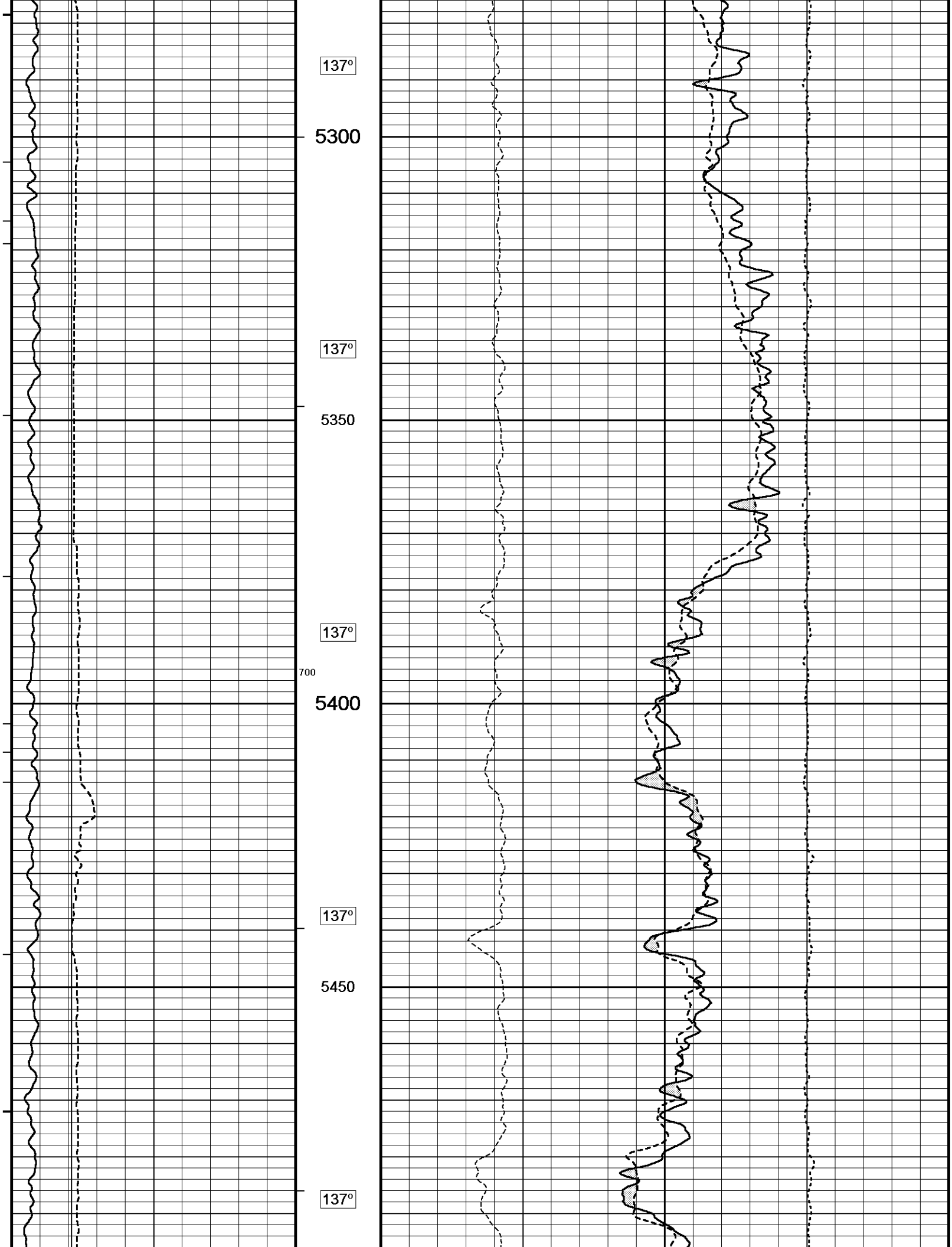
DCOR
NPRL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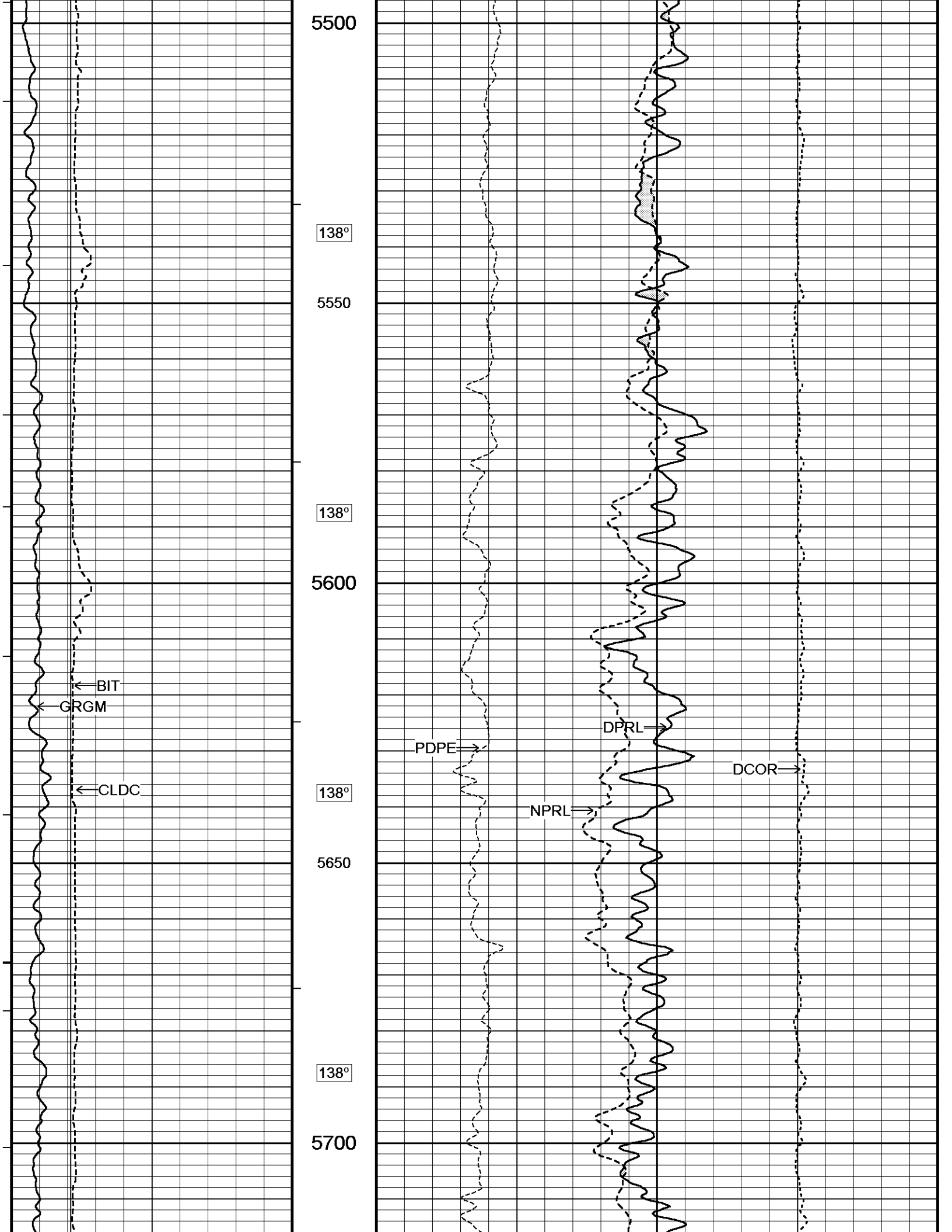
137°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DCOR
NPRL
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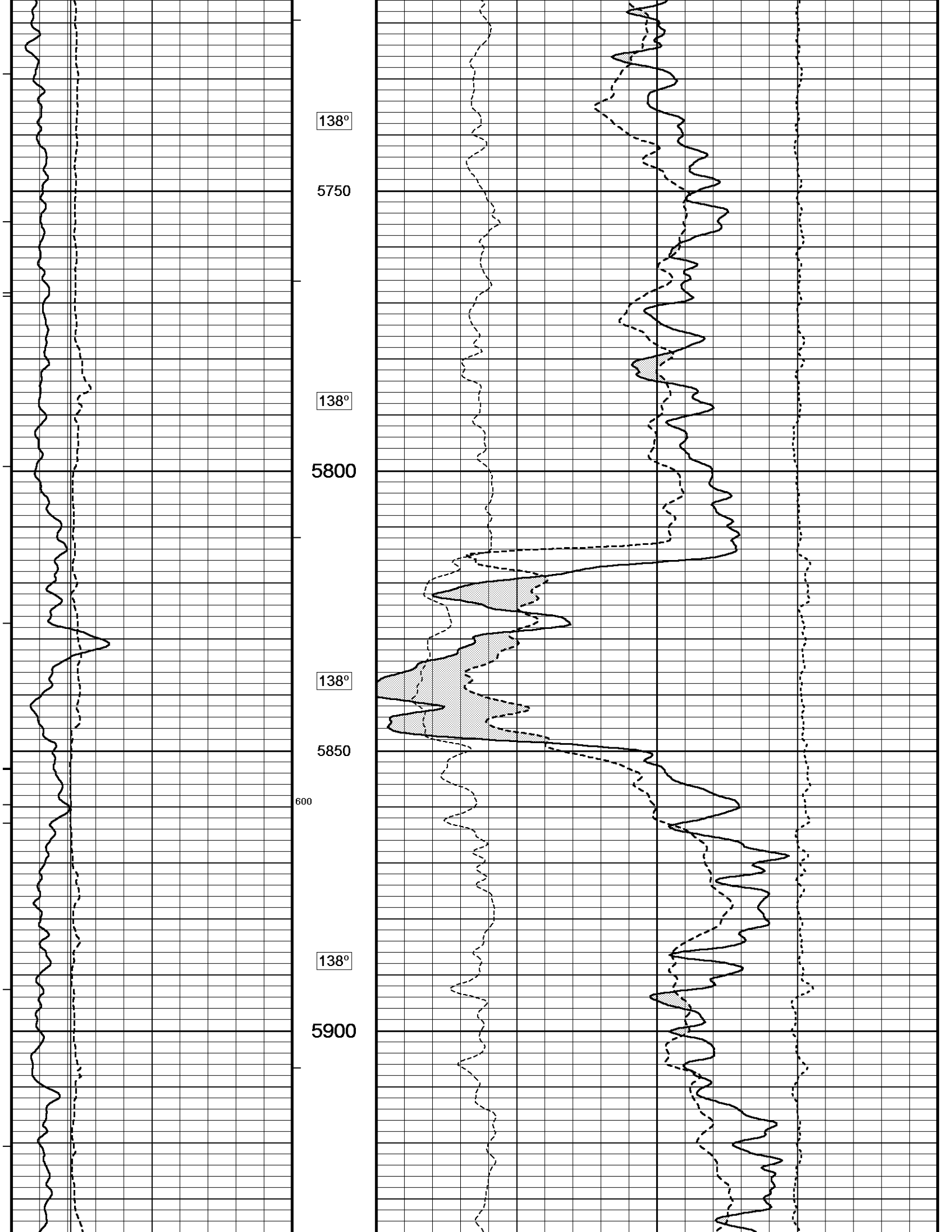
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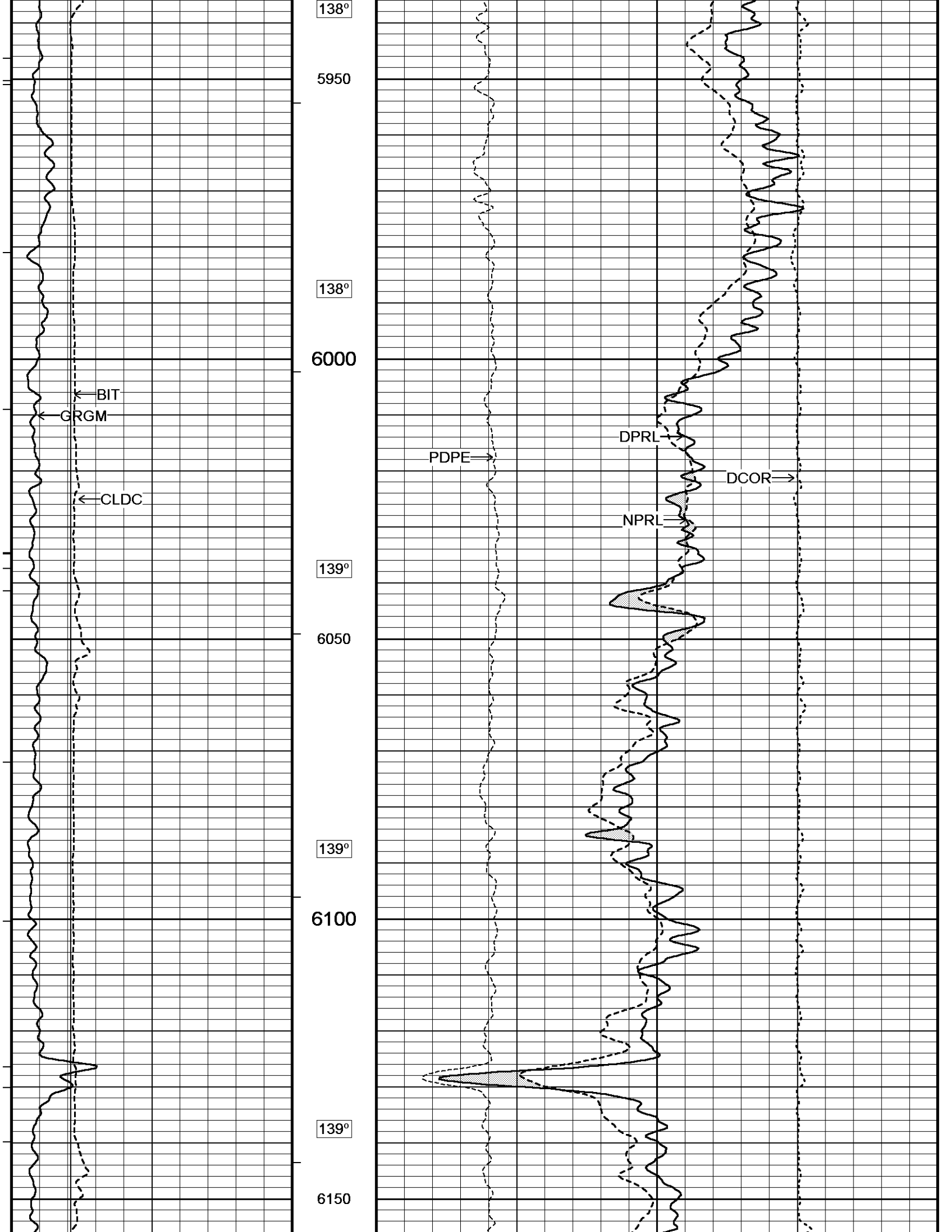
138°
5850
600
138°
5900


138°
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BIT
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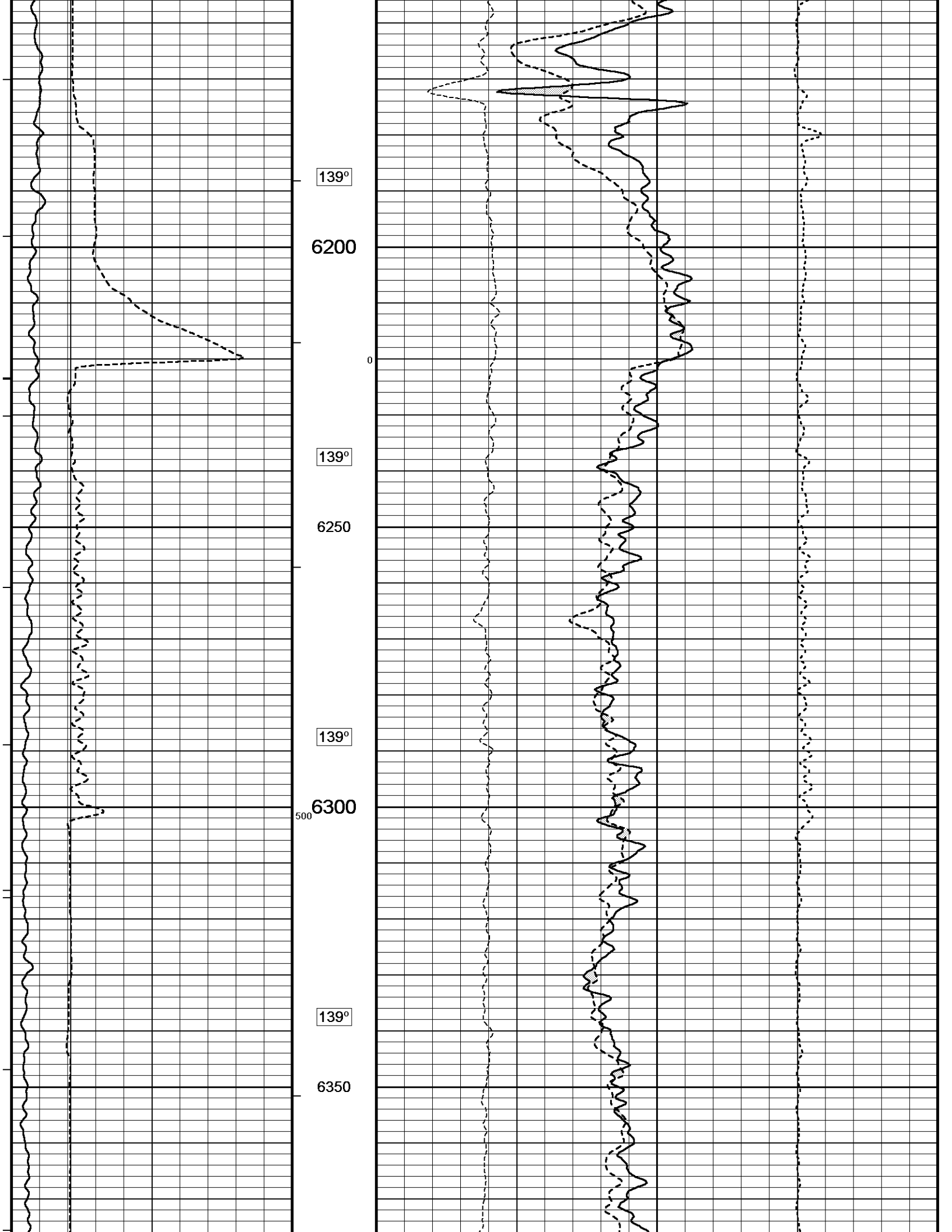
CLDC
PDPE
DPRL
DCOR
NPRL
139°
6050
139°
6100
139°
6150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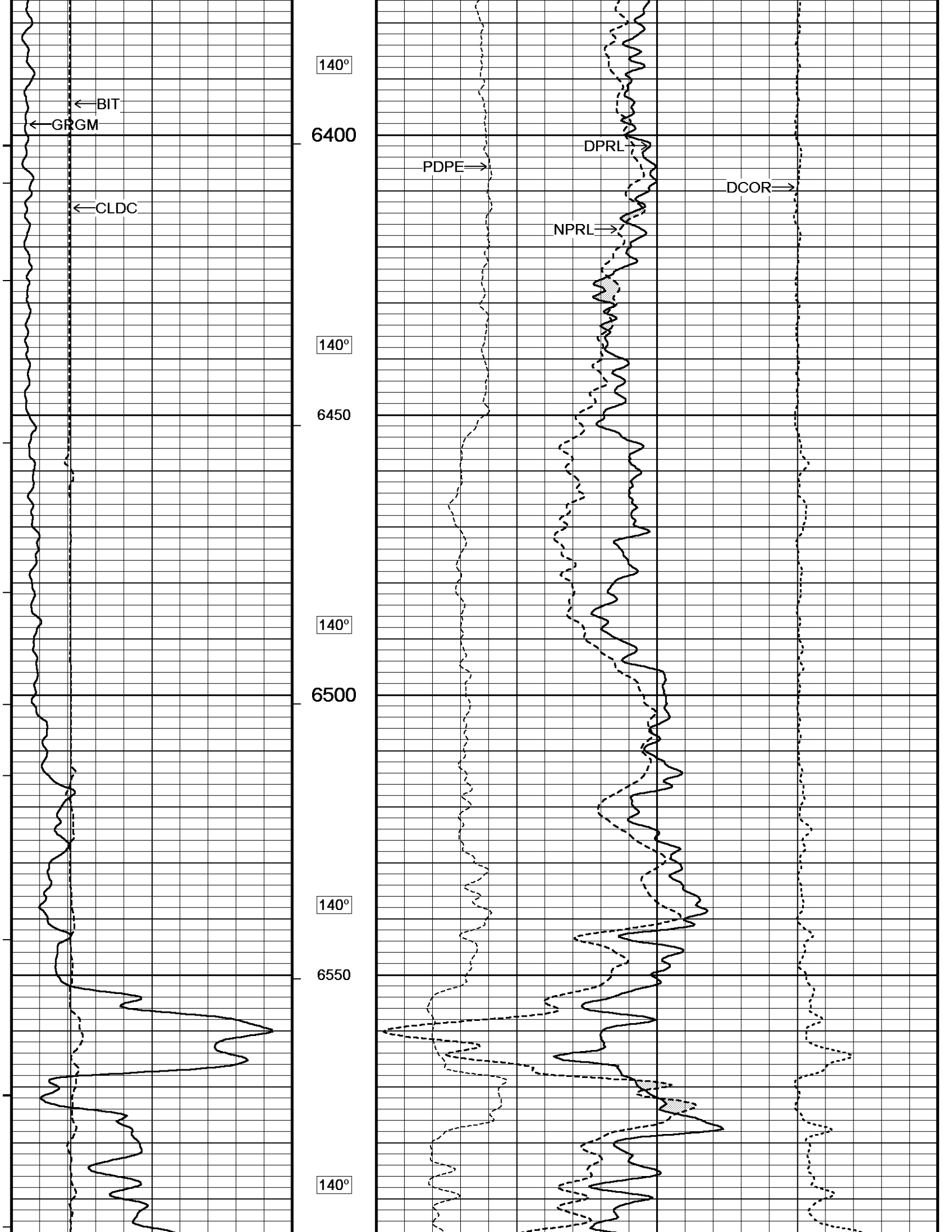
6250
139°
500
6300
139°
6350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BIT
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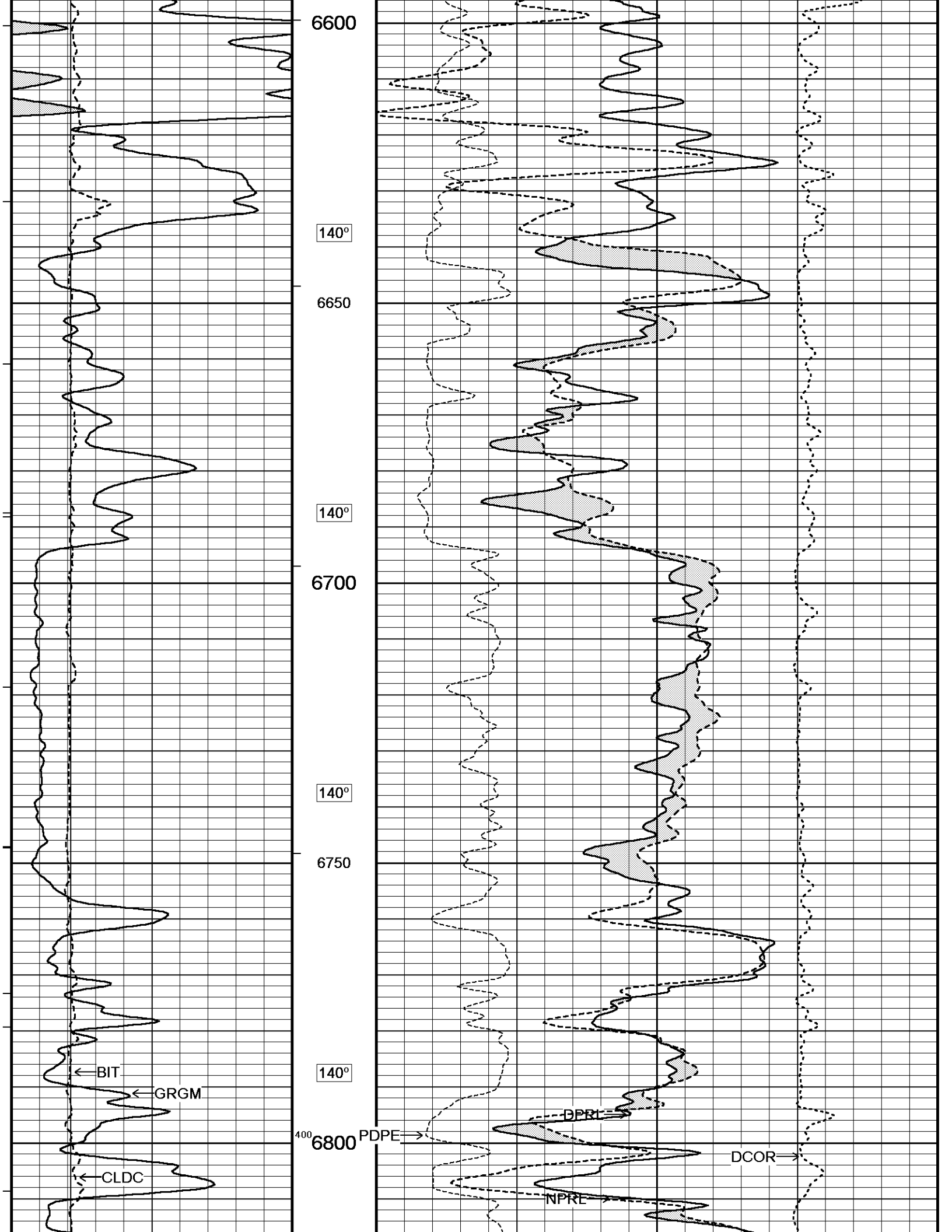
PDPE
DCOR
CLDC
NPRL
140°
6450
140°
6500
140°
6550
140°


6600
140°
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140°
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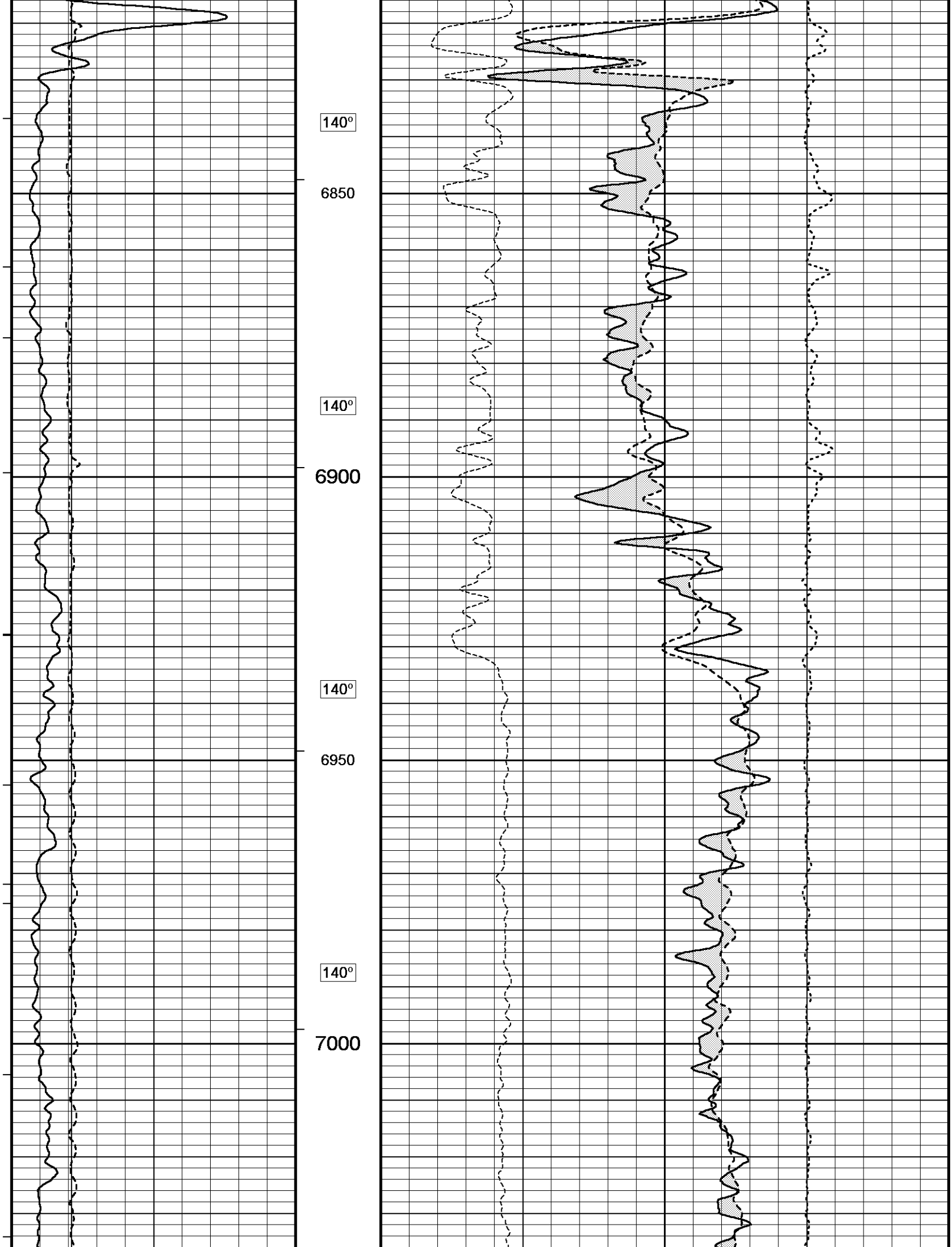
140°
6800
400
BIT
GRGM
CLDC
PDPE
DPRL
NPRE
DCOR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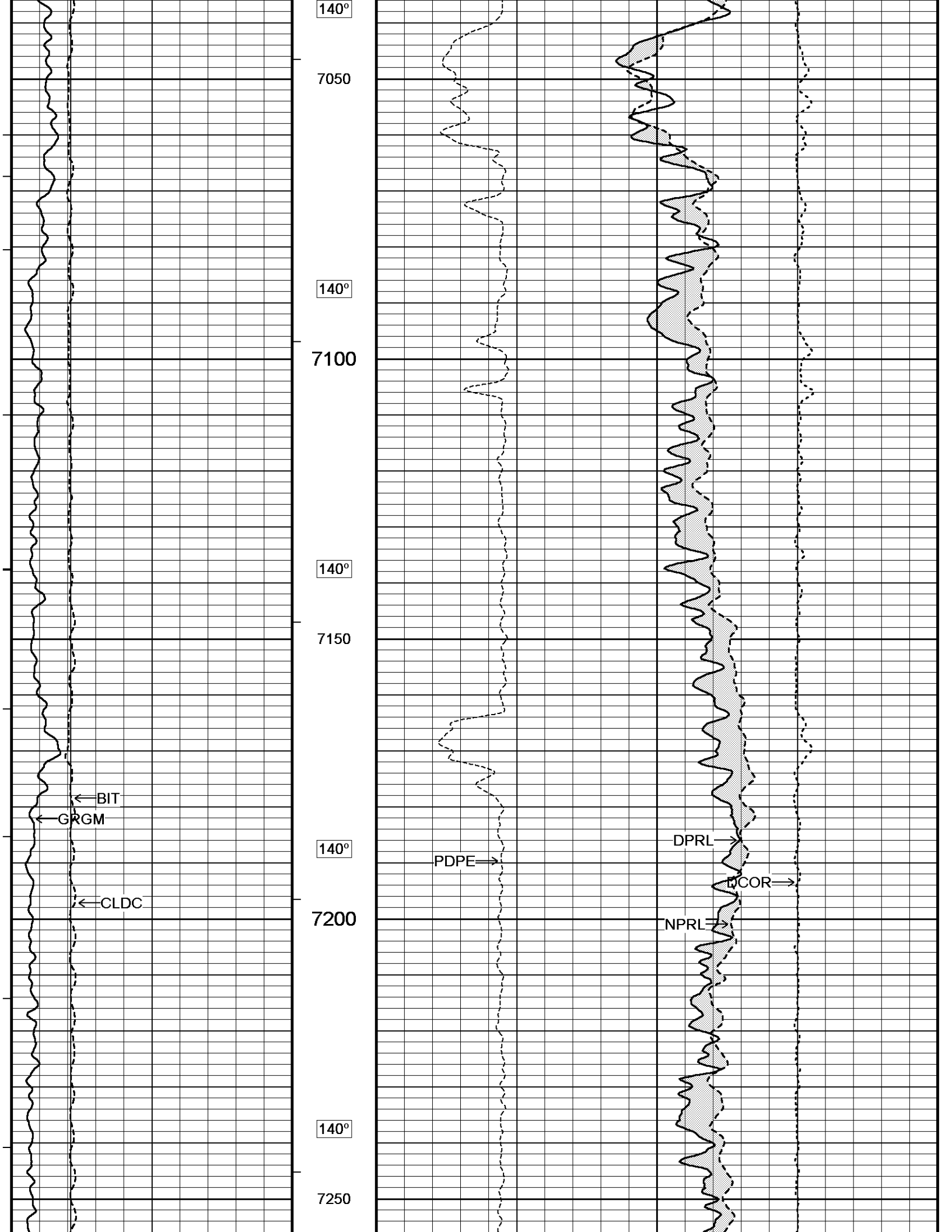
140°
6950
140°
7000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140°
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140°
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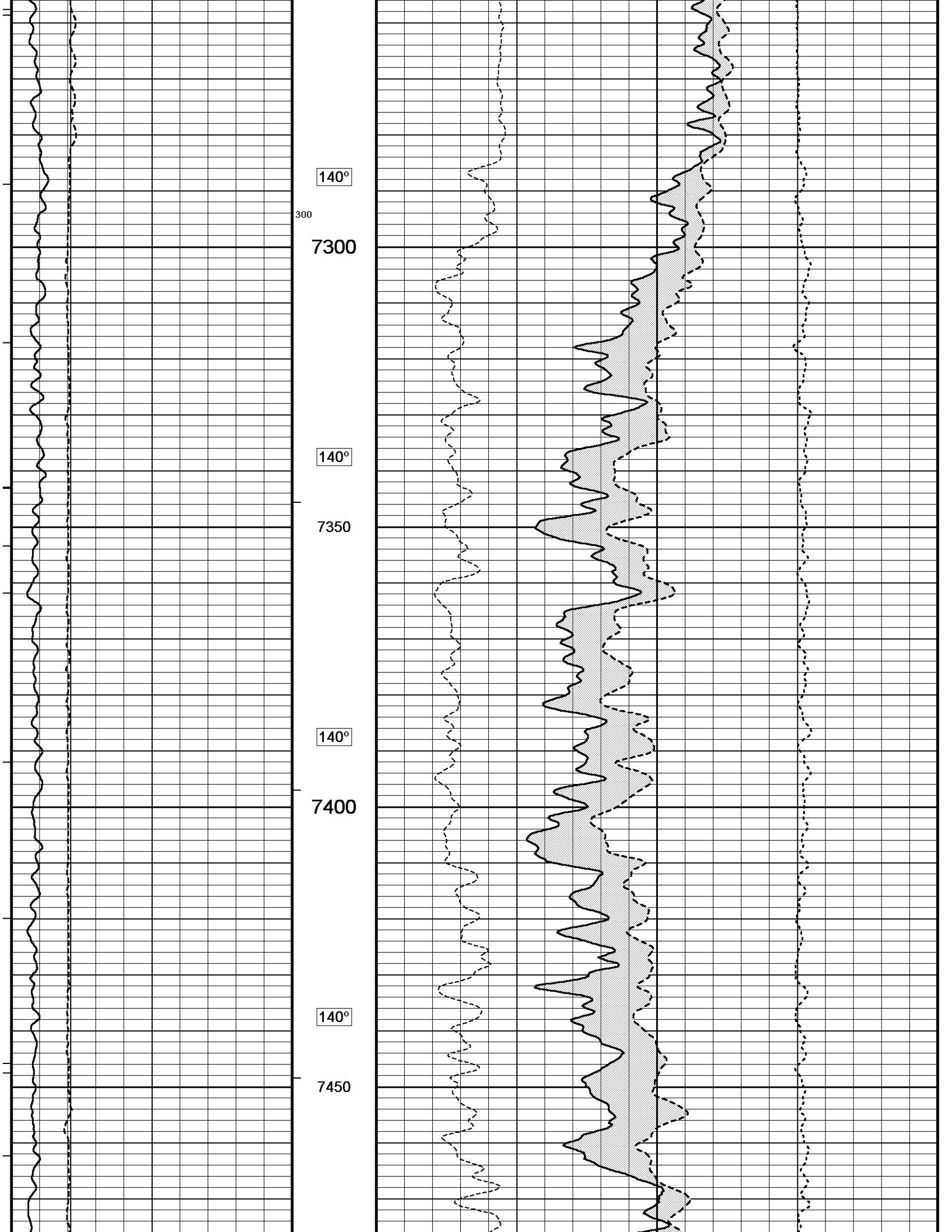
BIT
GRGM
CLDC
PDPE
DPRL
DCOR
NPRL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140°
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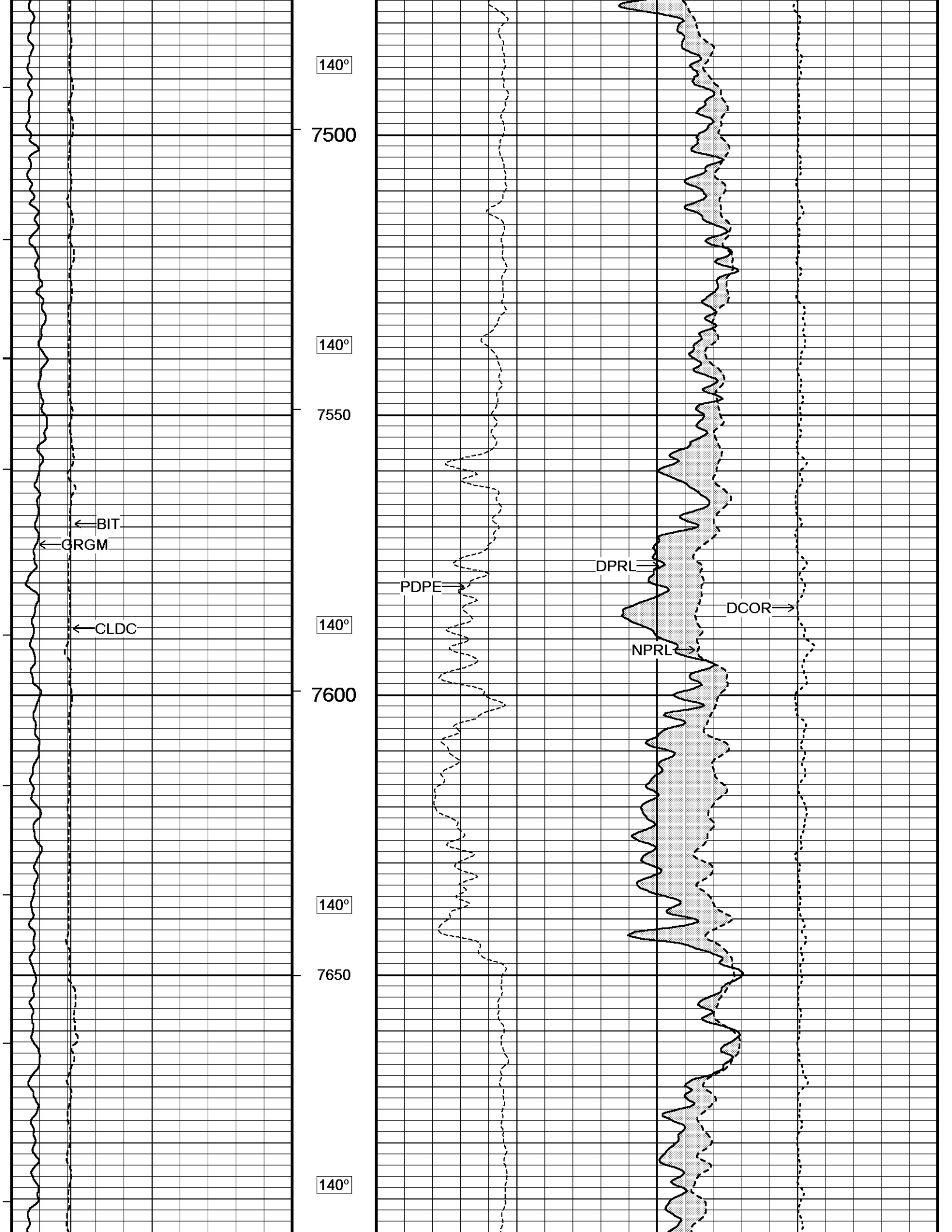
140°
7400
140°
7450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BIT
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DPRL
DCOR
NPRL
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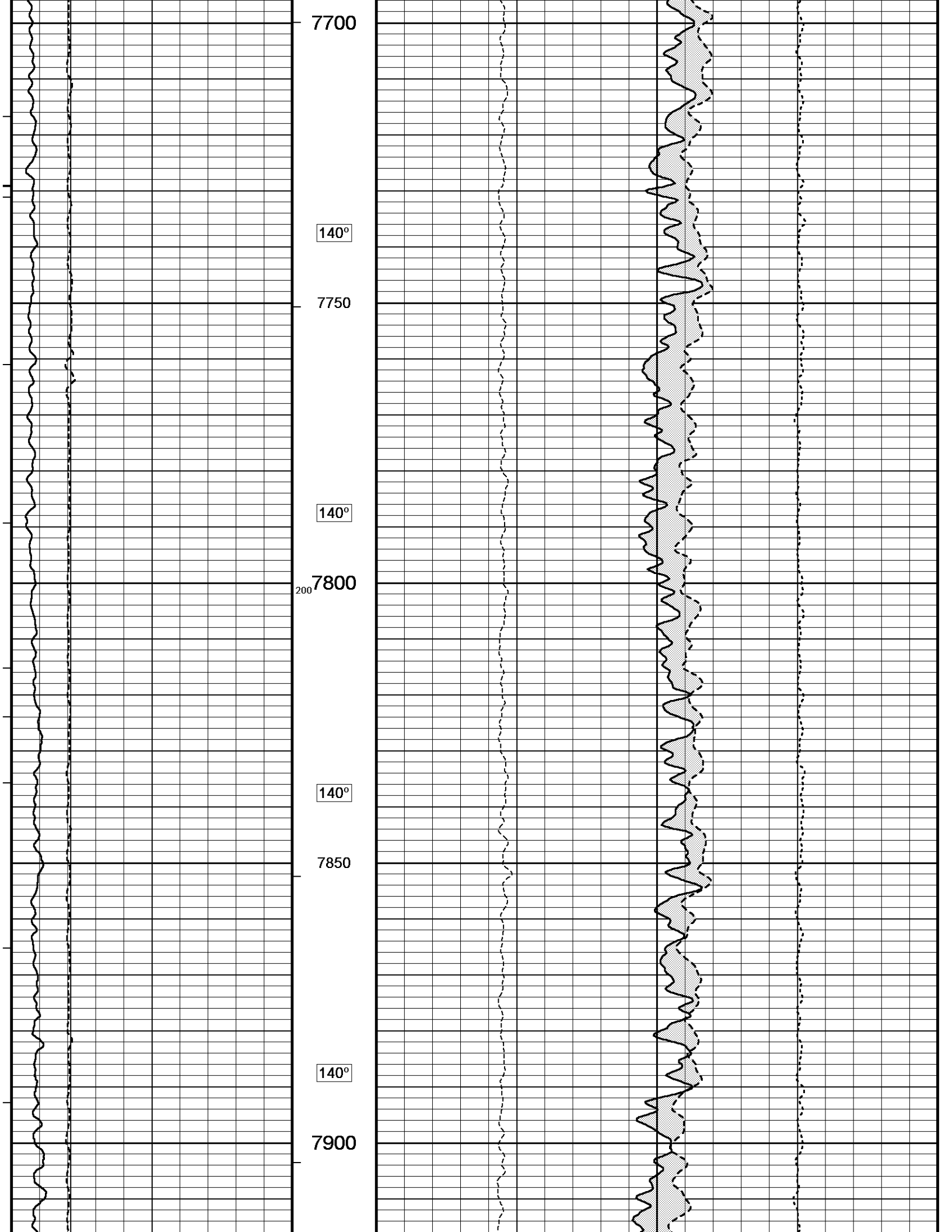
140°
7650
140°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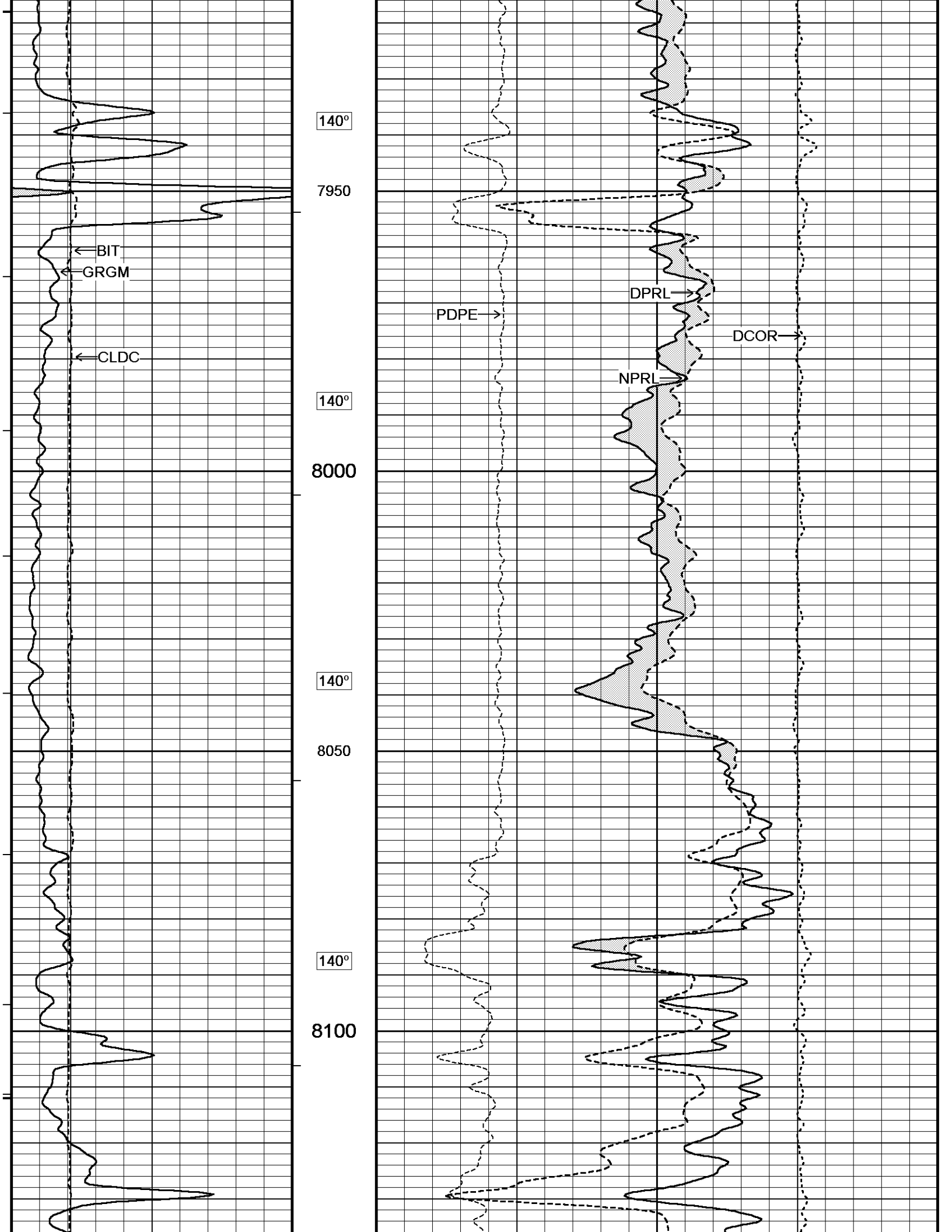
7750
140°
200
7800
140°
7850
140°
7900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BIT
GRGM
CLDC
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DPRL
DCOR
NPRL
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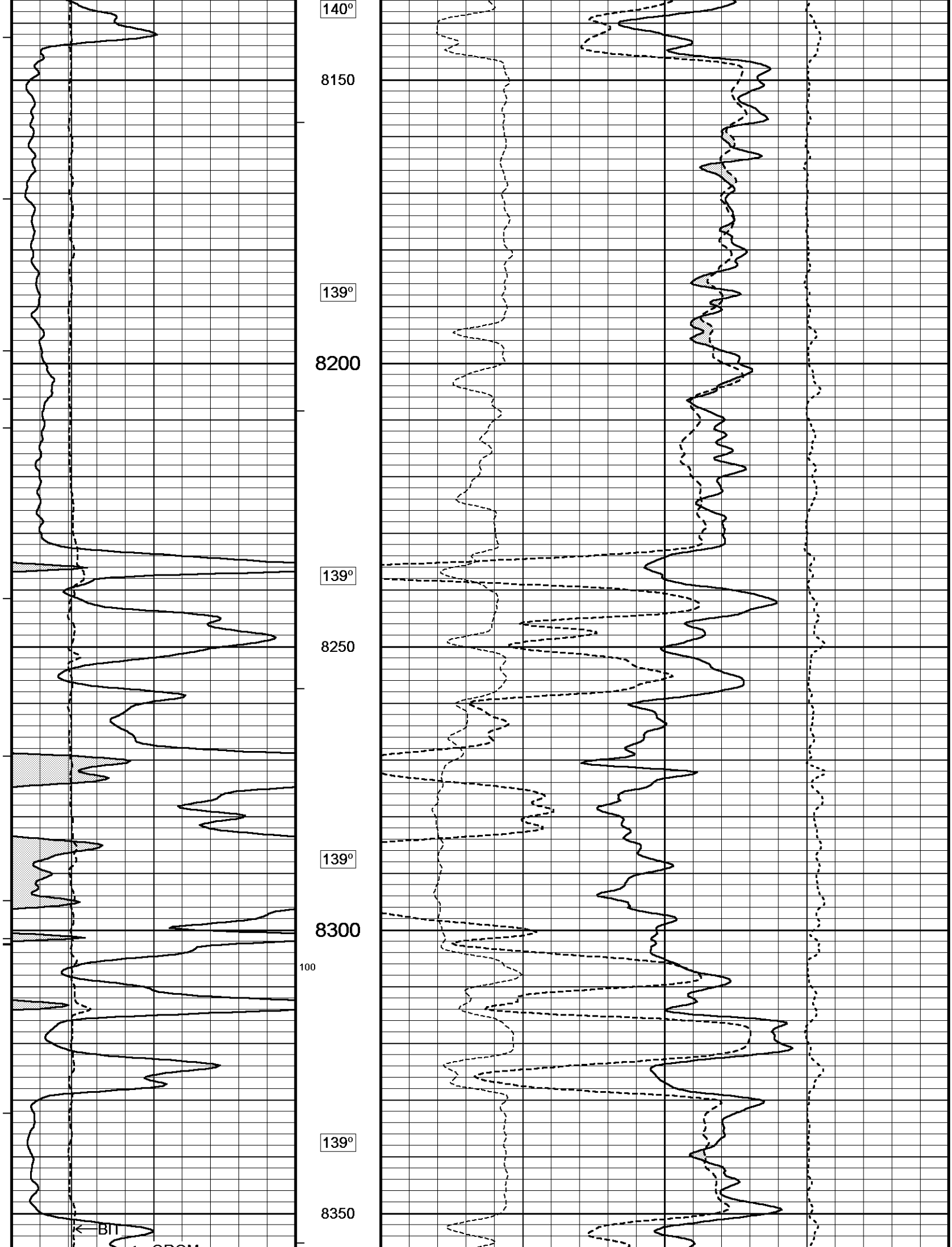
8000
140°
8050
140°
8100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8200
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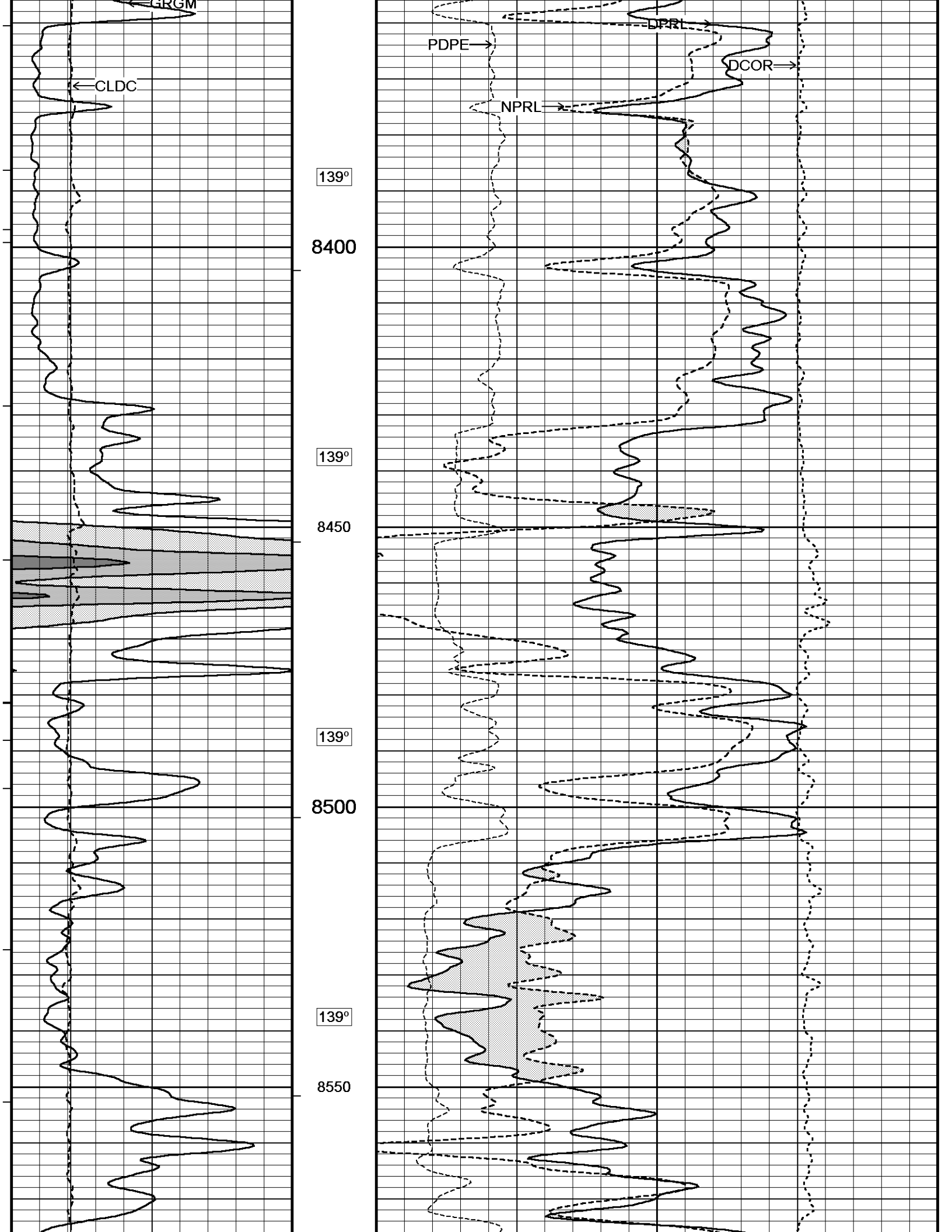
139°
8300
100
139°
8350
BIT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PDPE
DPRL
DCOR
NPRL
139°
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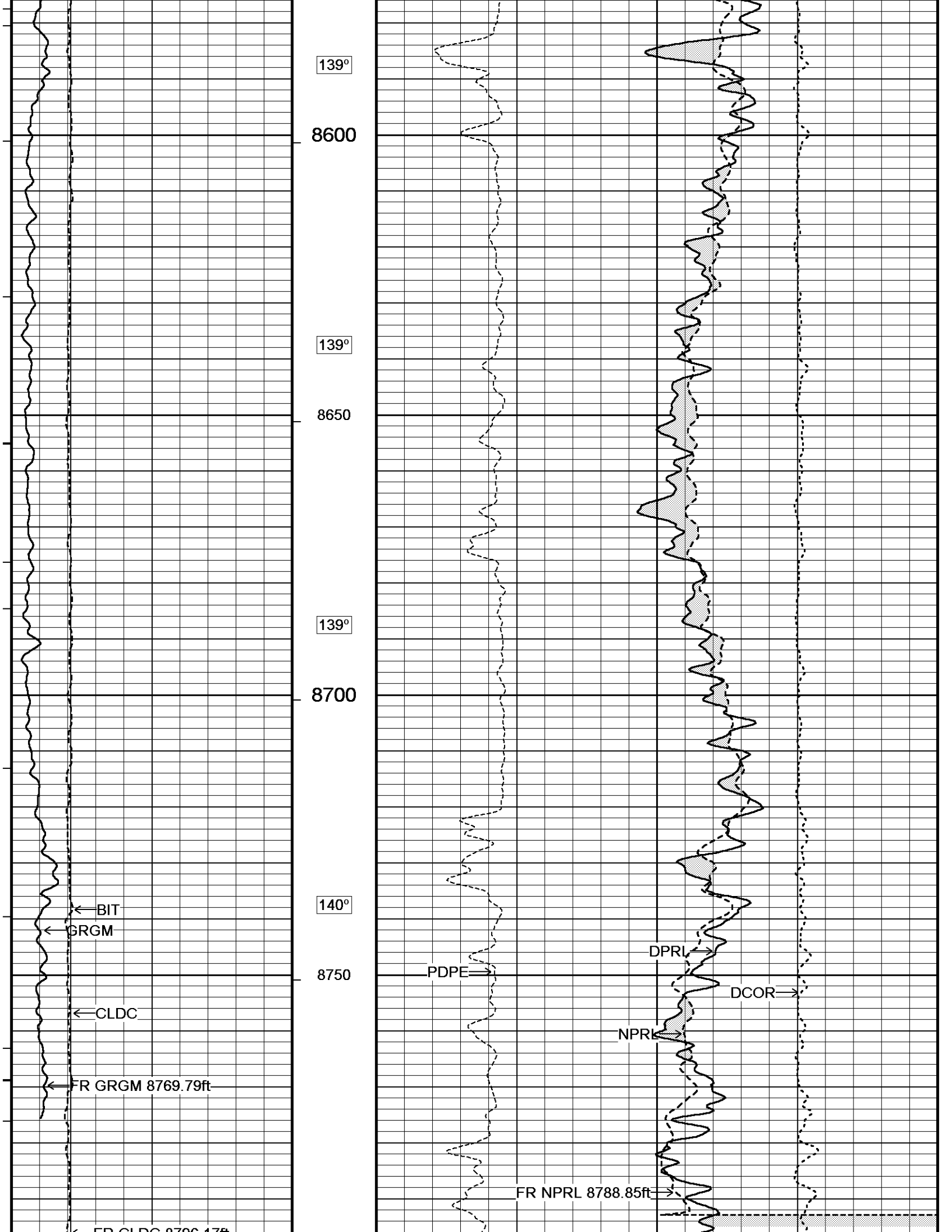
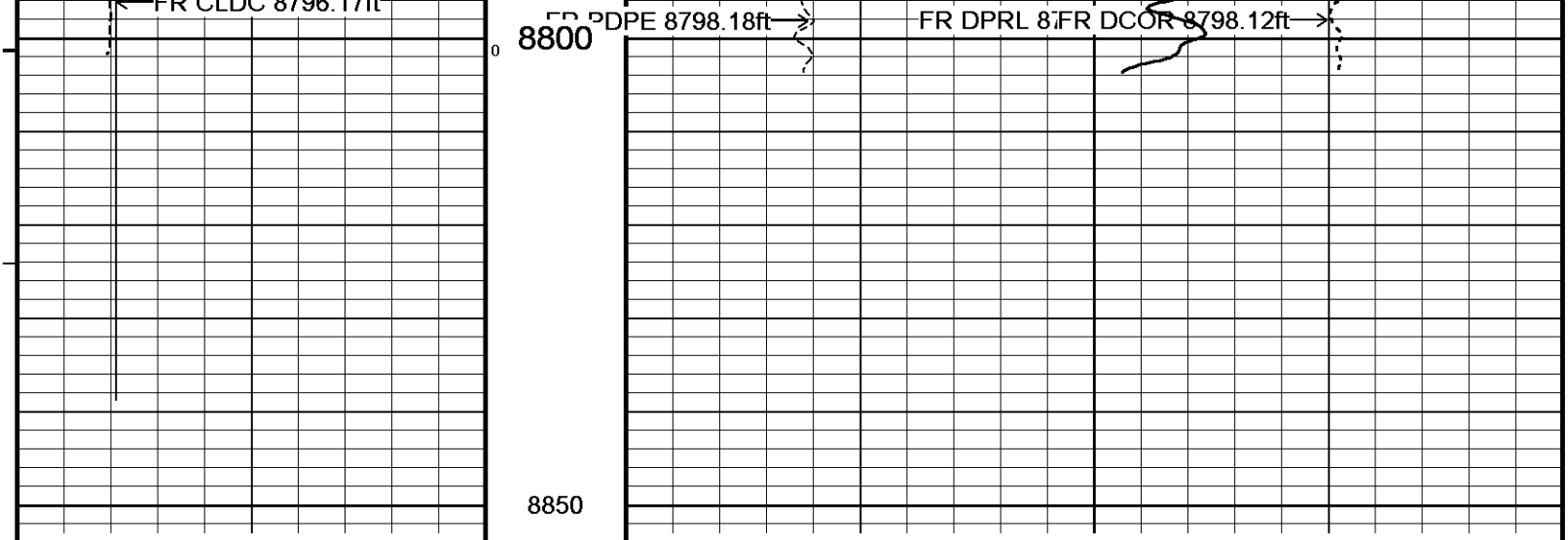
139°
8450
139°
8500
139°
8550


139°
8600
139°
8650
139°
8700
140°
8750
BIT
GRGM
CLDC
FR GRGM 8769.79ft
PDPE
DPRL
DCOR
NPRL
FR NPRL 8788.85ft

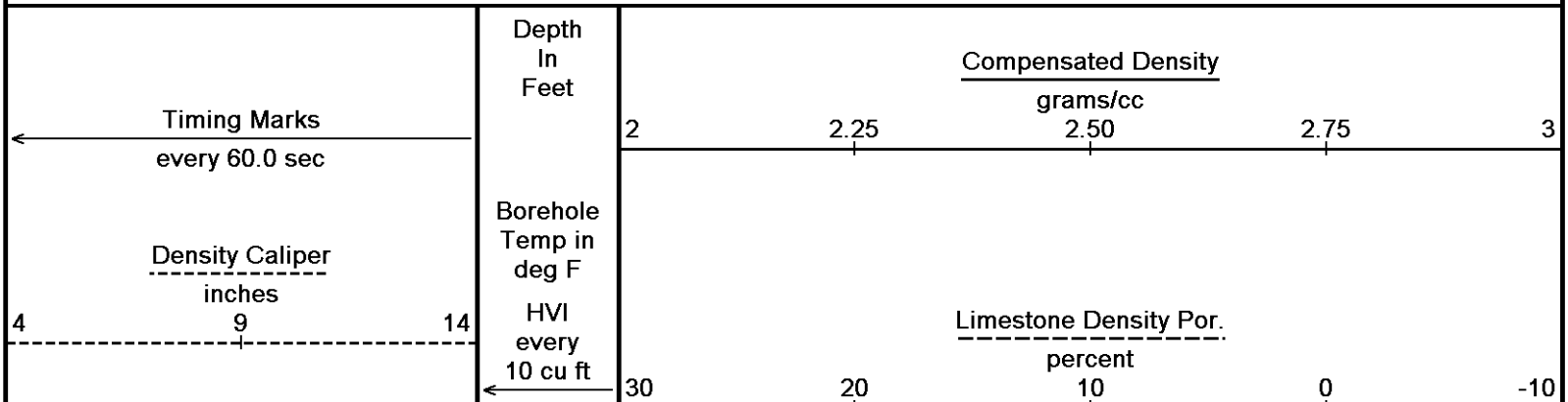


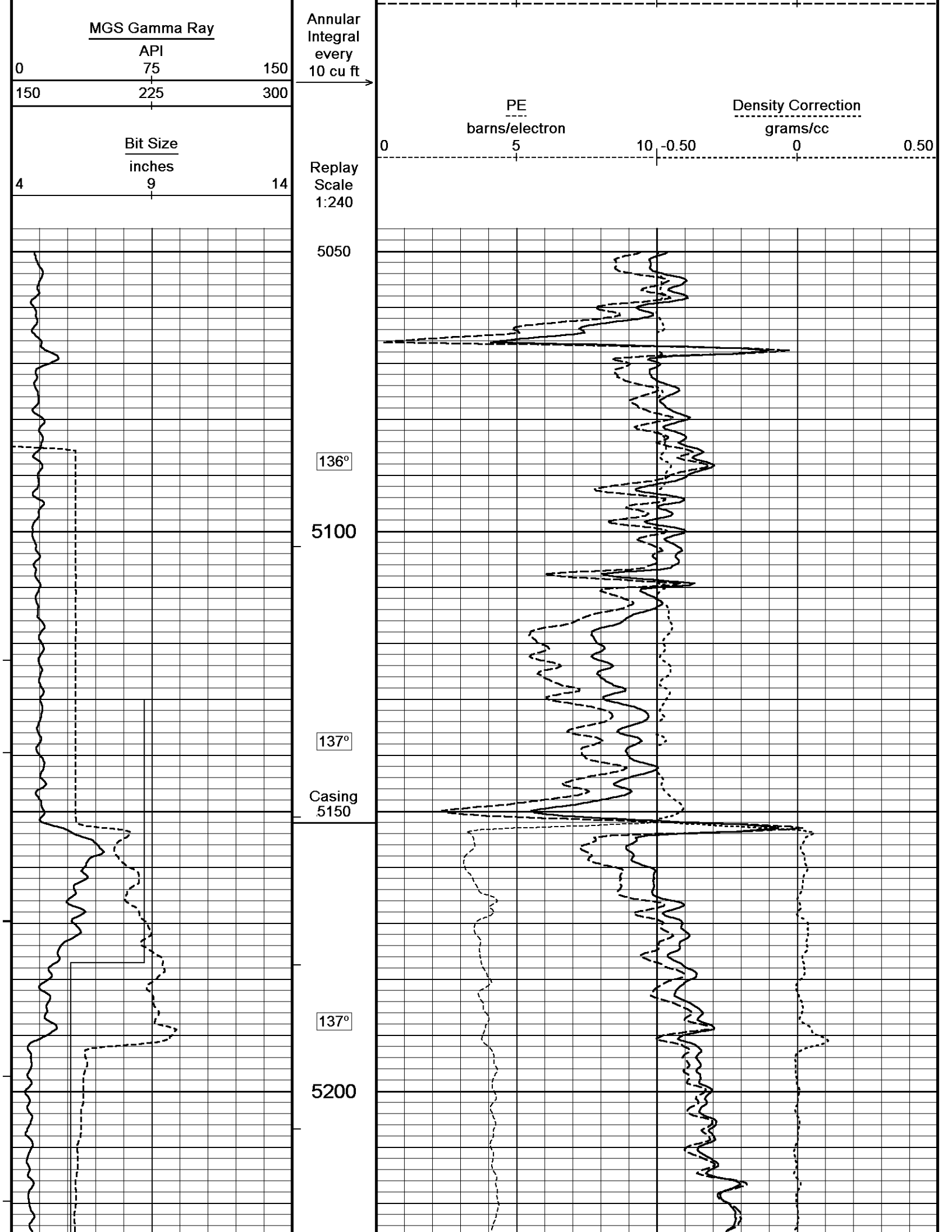
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 08-JUL-2013 09:22
Filename: C:\13_06_9804\DATA\15077219380100 Jefferson 3306 1-27H\27166RTAP.dta
Recorded on 08-JUL-2013 07:59
System Versions: Processed with 13.06.9804 Plotted with 13.06.9804

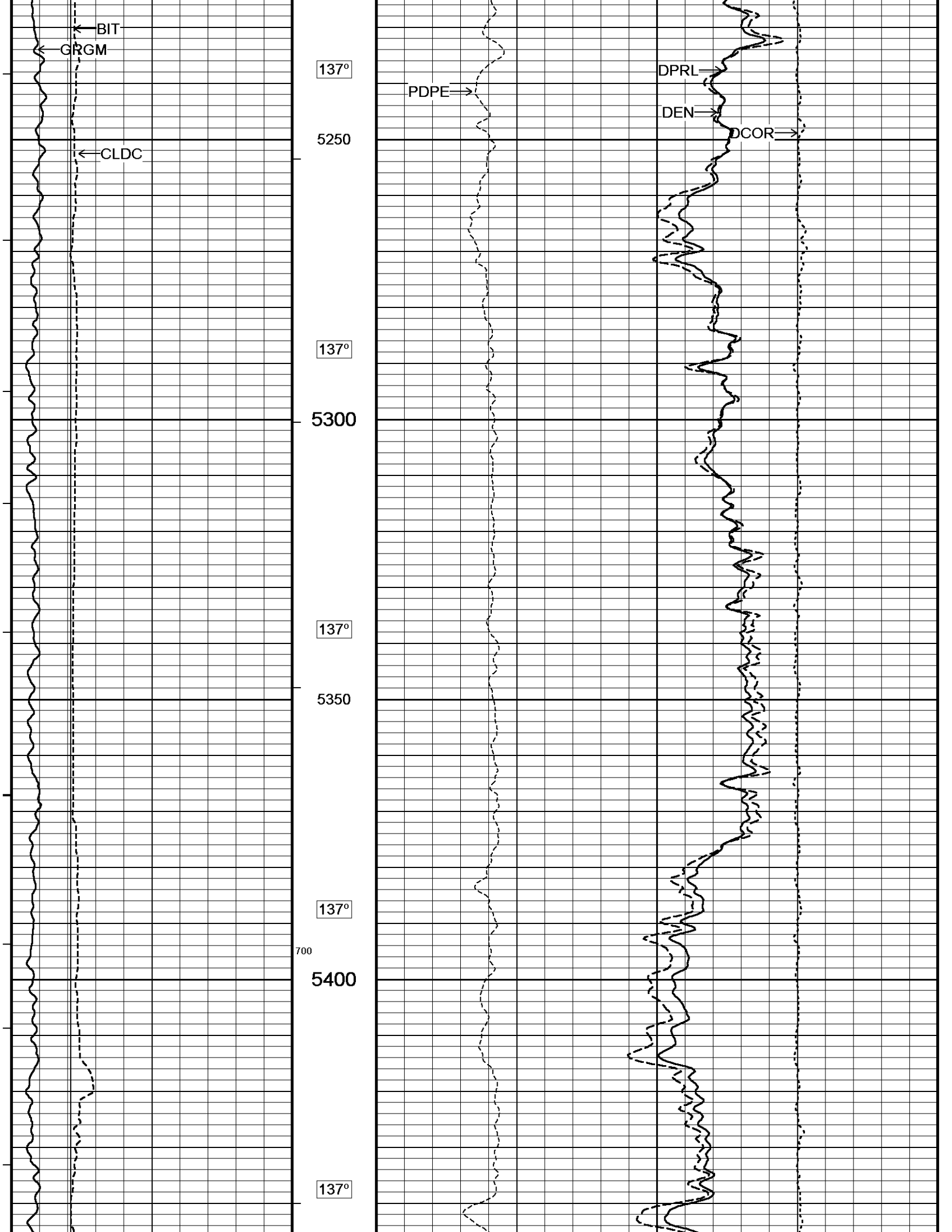
5 INCH MAIN LOG

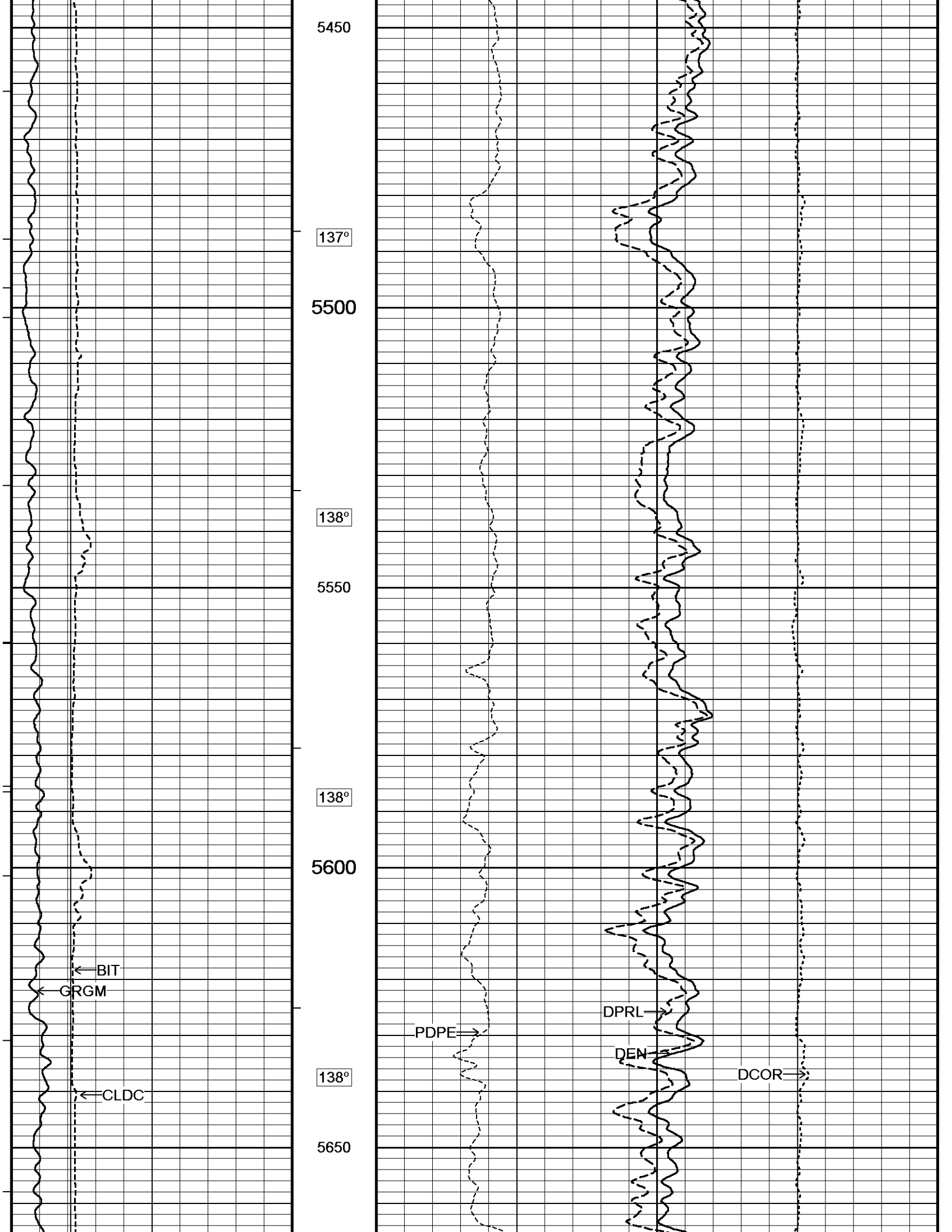
5 INCH BULK DENSITY

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 08-JUL-2013 09:22
Filename: C:\13_06_9804\DATA\15077219380100 Jefferson 3306 1-27H\27166RTAP.dta
Recorded on 08-JUL-2013 07:59
System Versions: Processed with 13.06.9804 Plotted with 13.06.9804




MGS Gamma Ray
API
0
75
150
150
225
300
Bit Size
inches
4
9
14
Annular Integral every 10 cu ft
Replay Scale 1:240
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.50
0
0.50
5050
136°
5100
137°
Casing
5150
137°
5200


BIT
GRGM
CLDC
137°
5250
137°
5300
137°
5350
137°
700
5400
137°
PDPE
DPRL
DEN
DCOR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137°
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BIT
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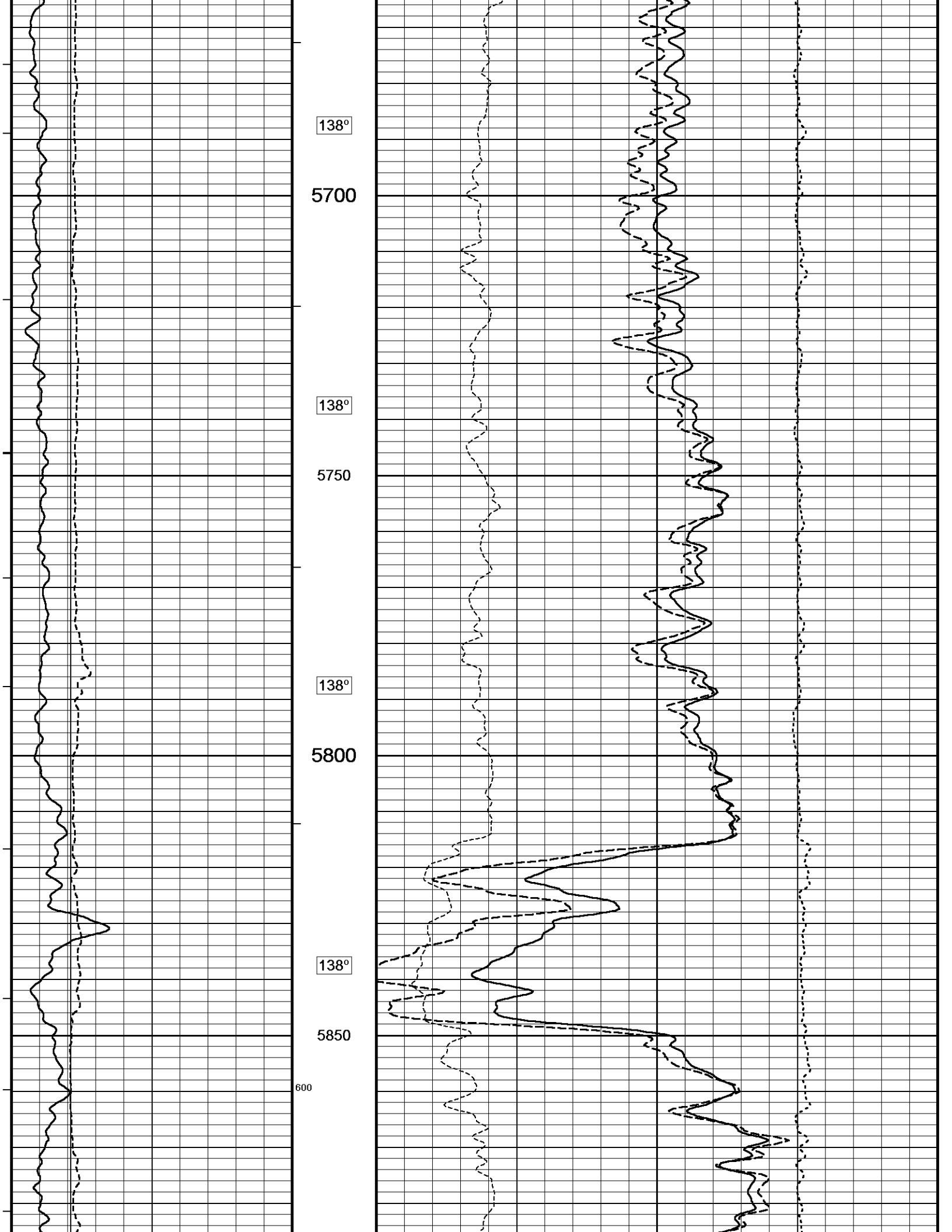
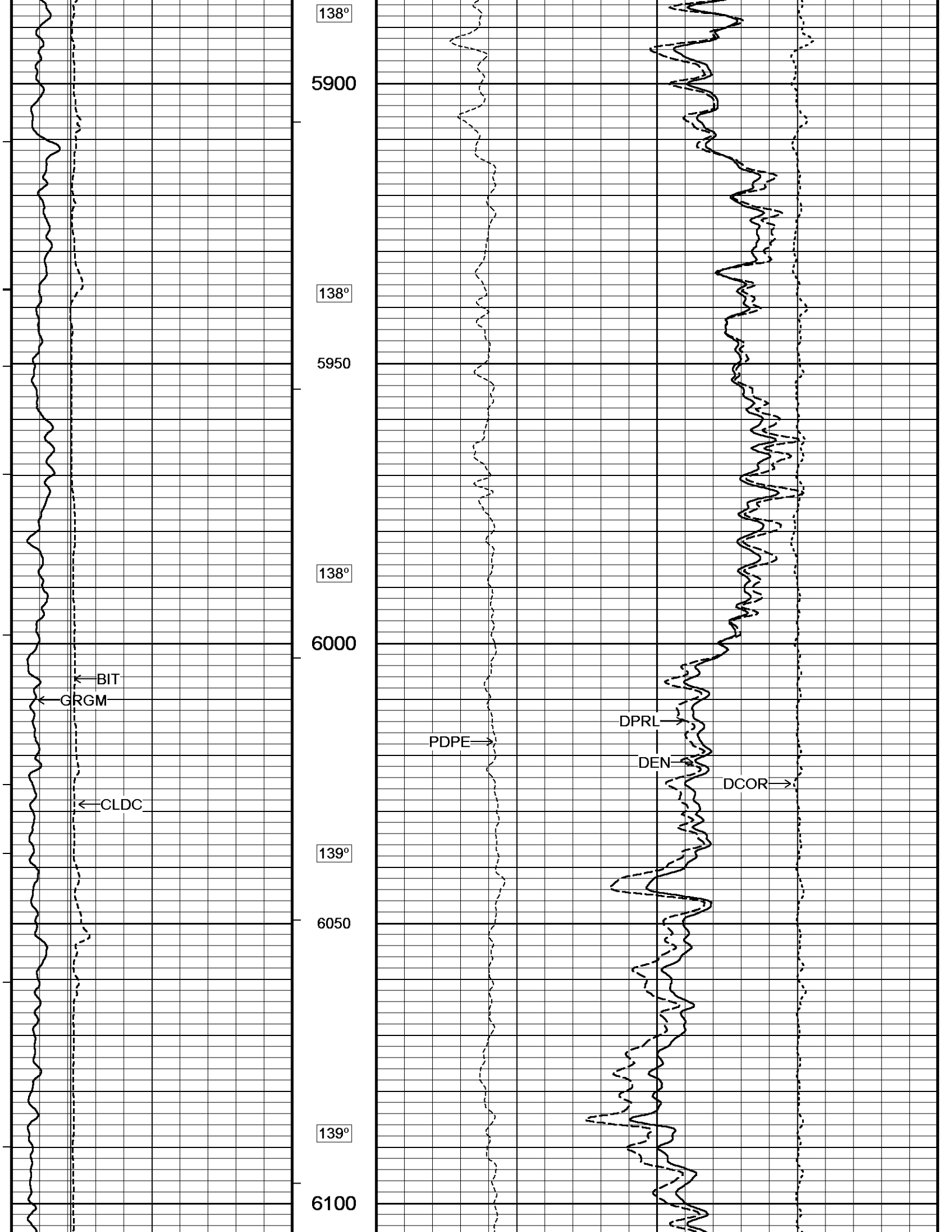

138°
5700
138°
5750
138°
5800
138°
5850
600


138°
5900
138°
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6000
BIT
GRGM
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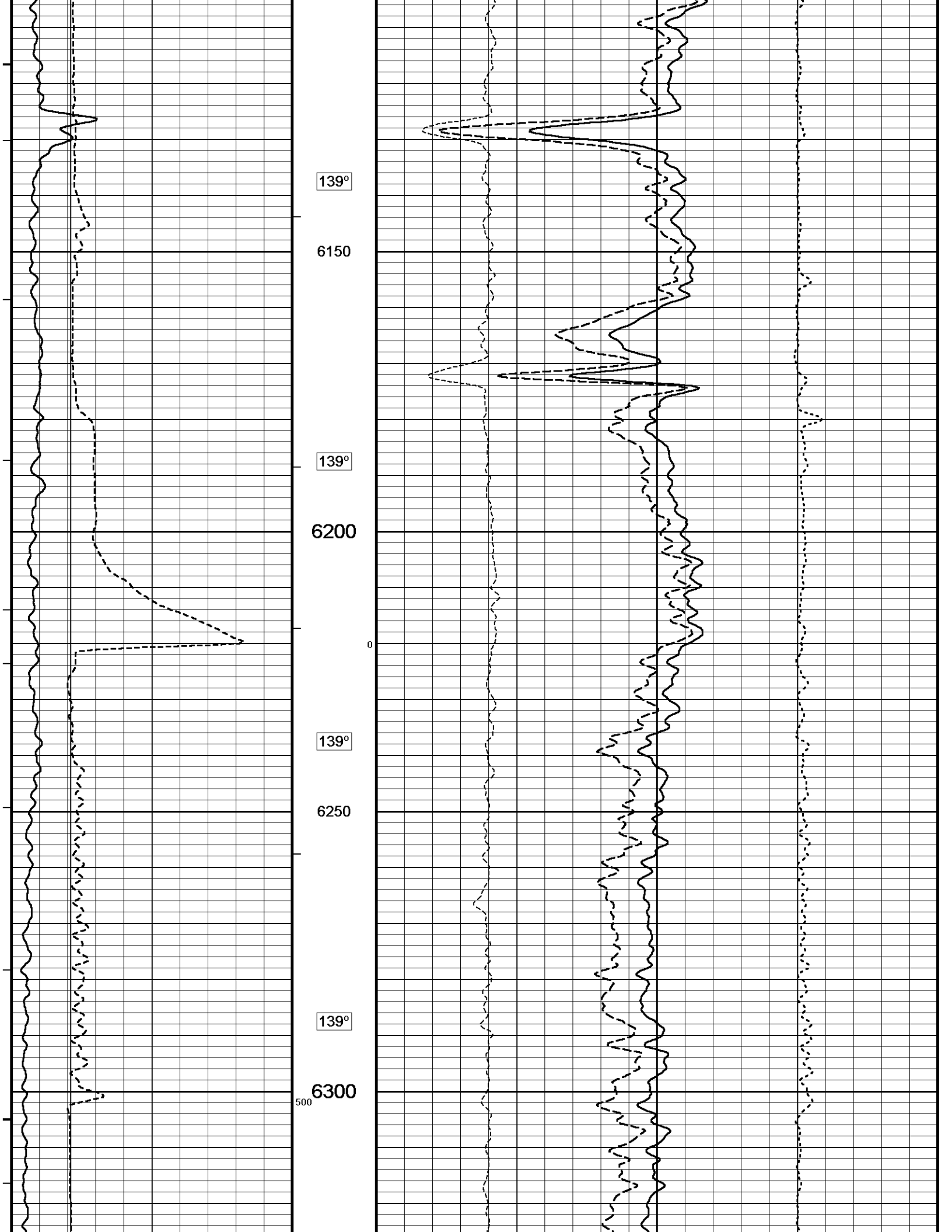
6100
PDPE
DPRL
DEN
DCOR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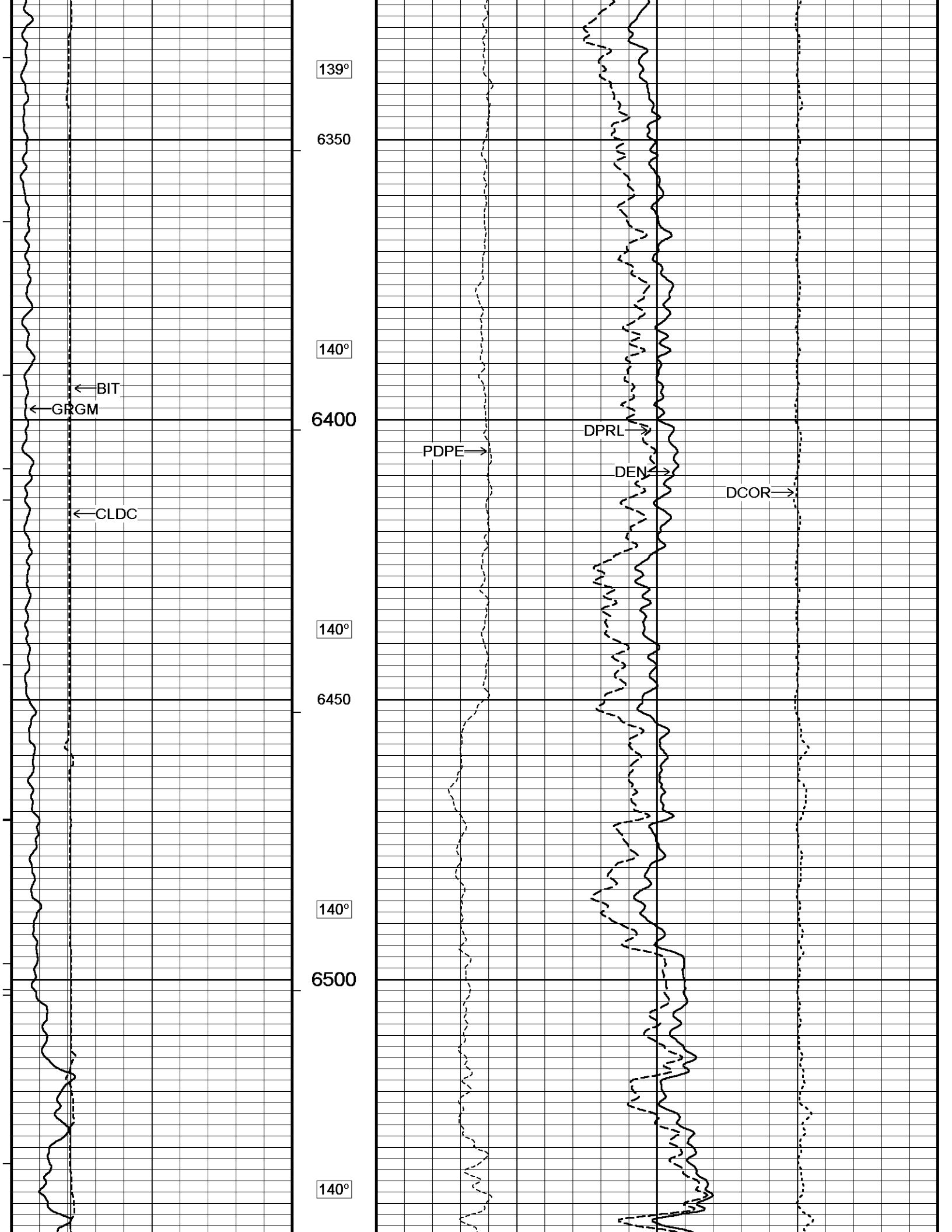
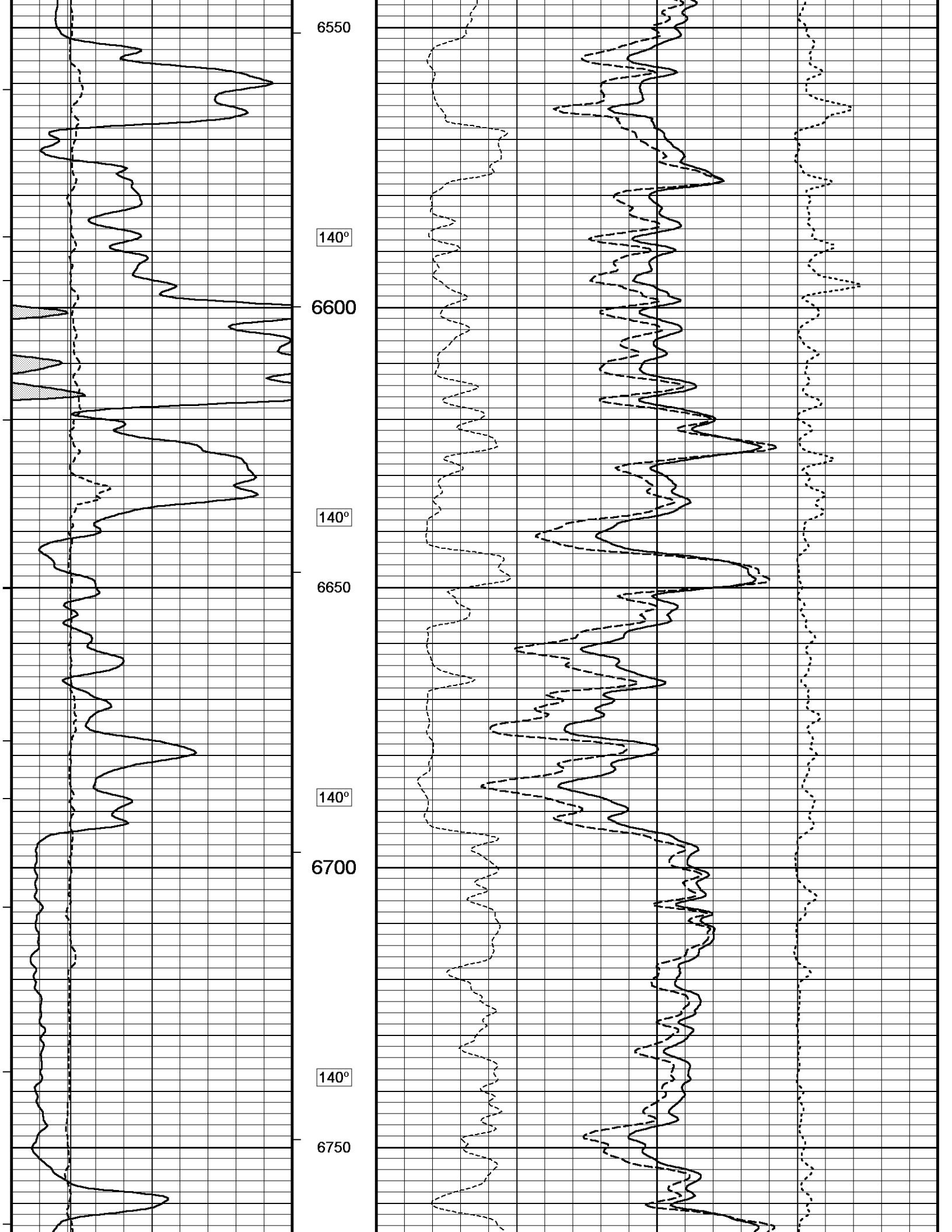
6150
139°
6200
0
139°
6250
139°
6300
500


139°
6350
140°
BIT
GRGM
6400
DPRL
PDPE
DEN
DCOR
CLDC
140°
6450
140°
6500
140°


6550
140°
6600
140°
6650
140°
6700
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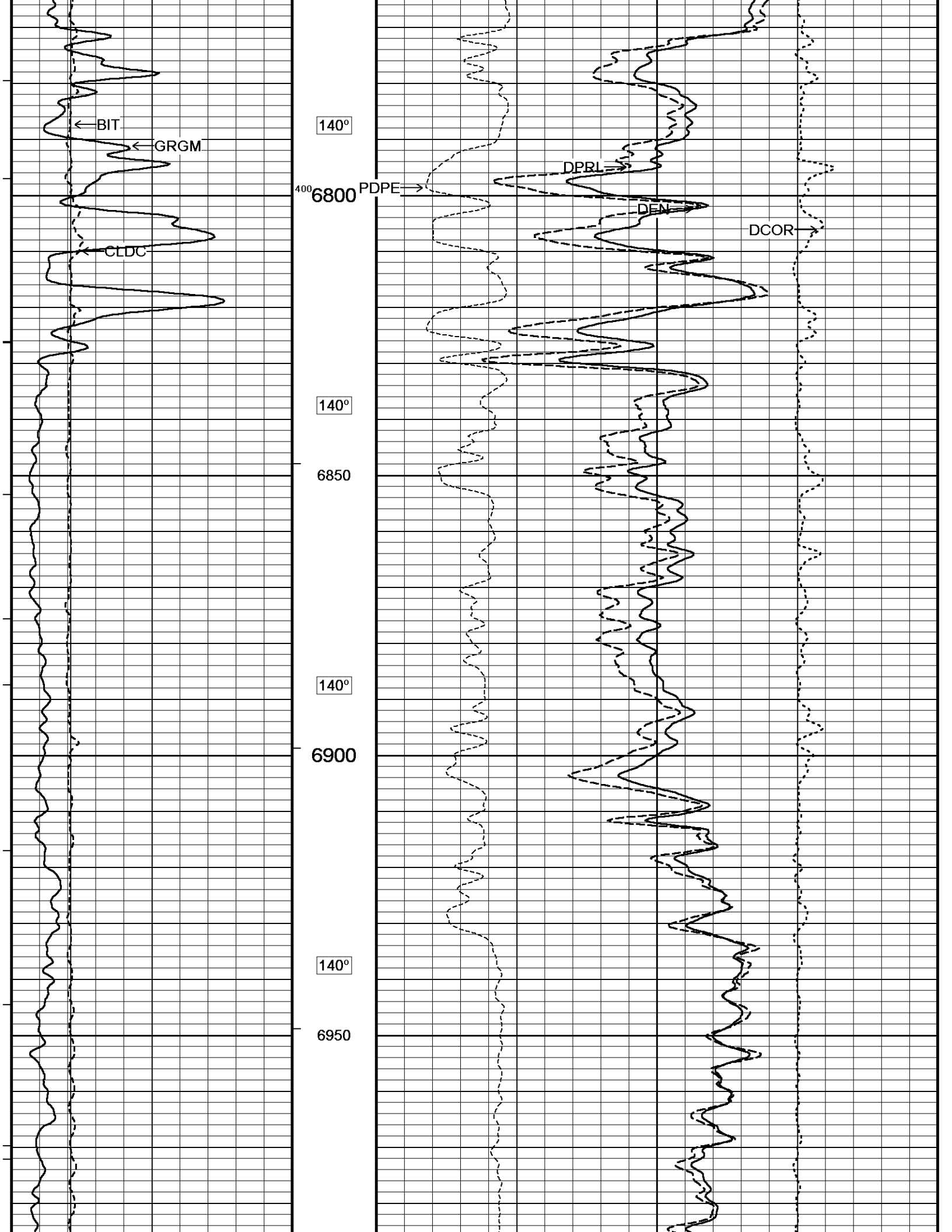
6750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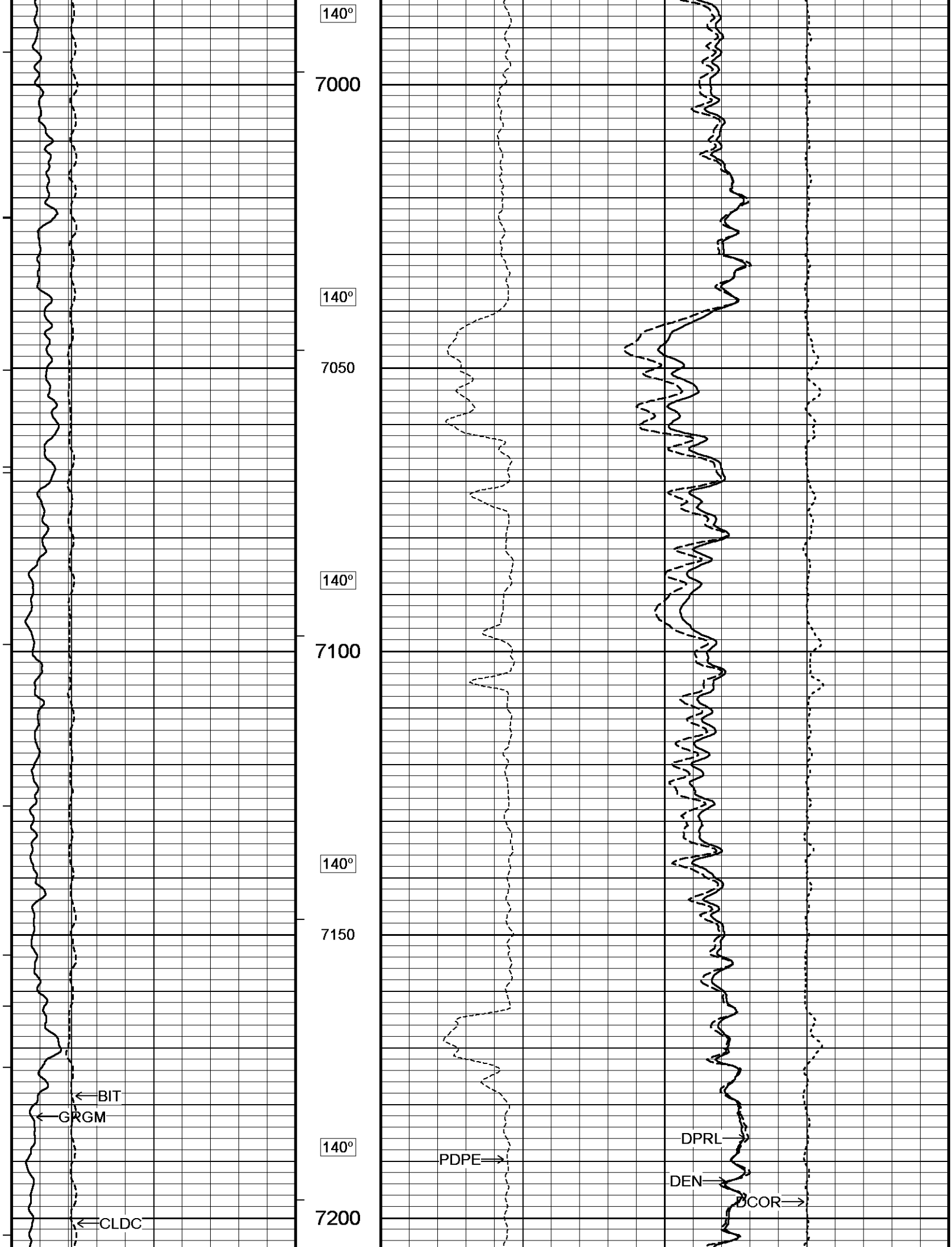
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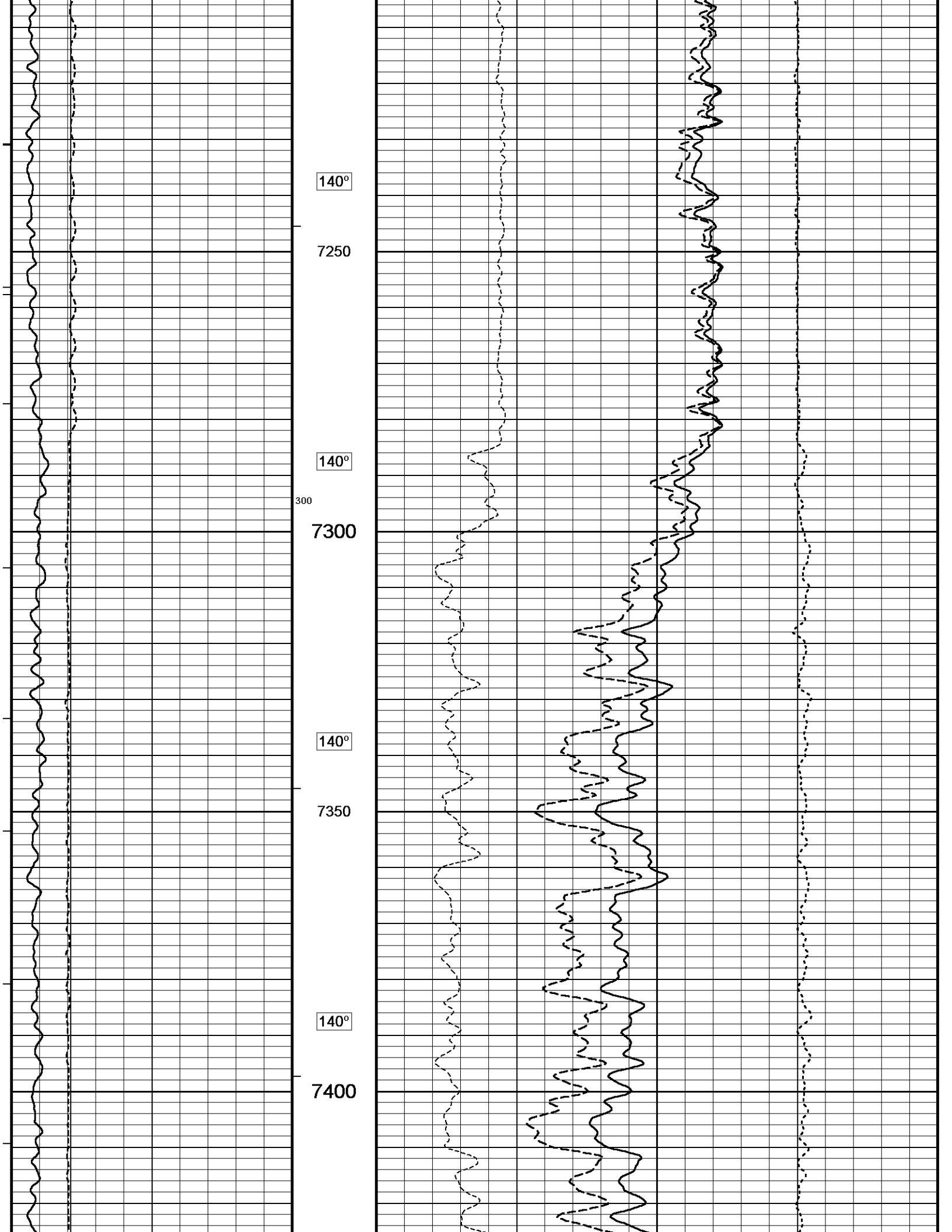
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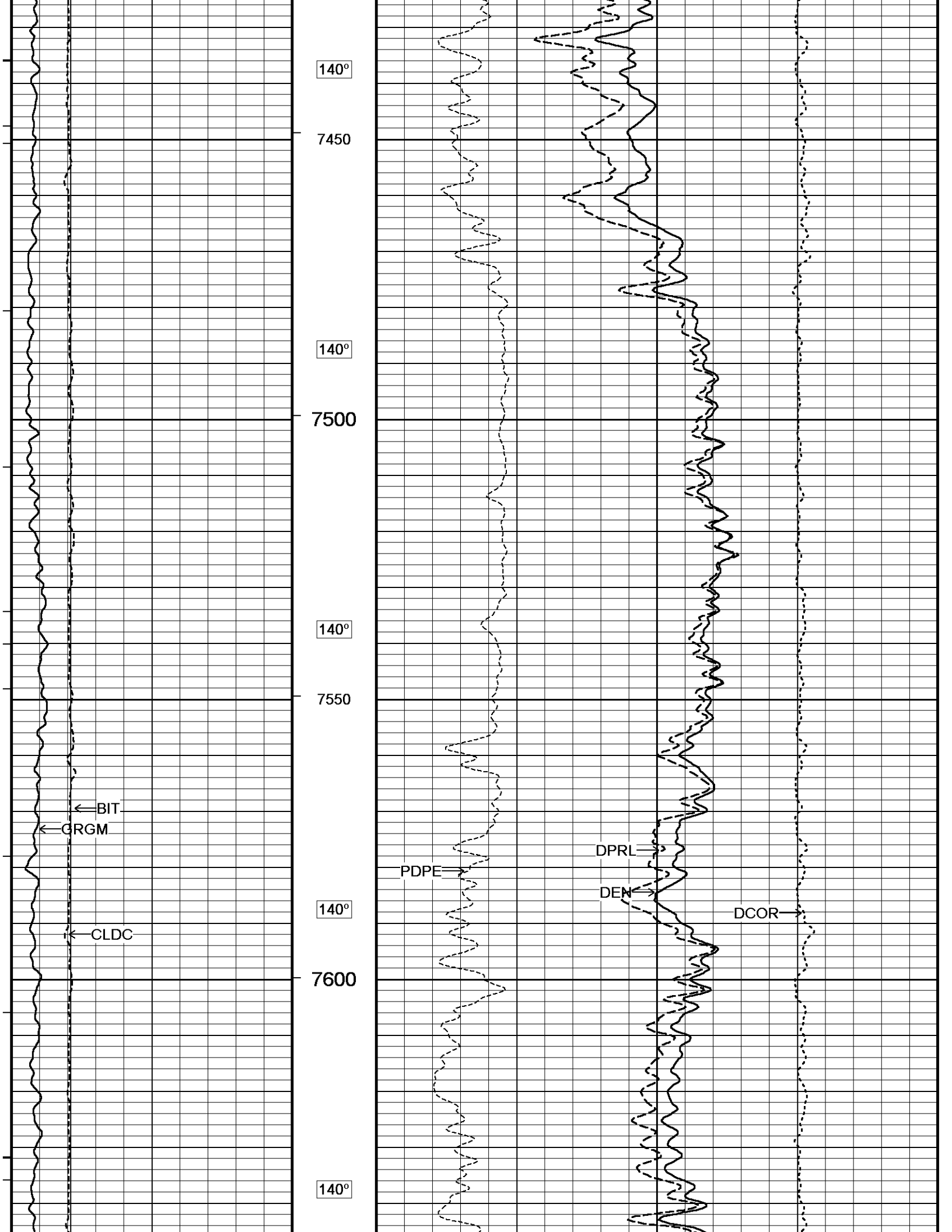
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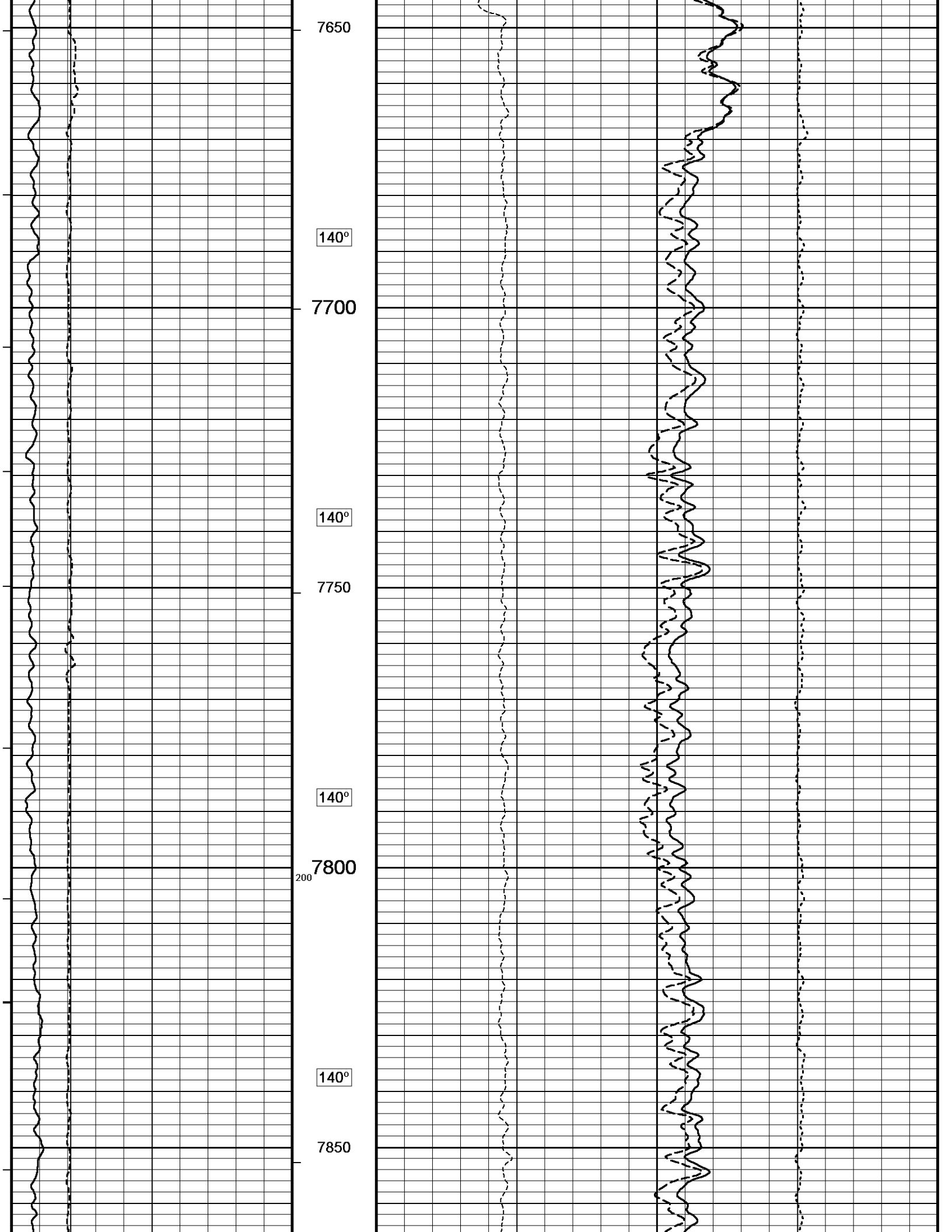
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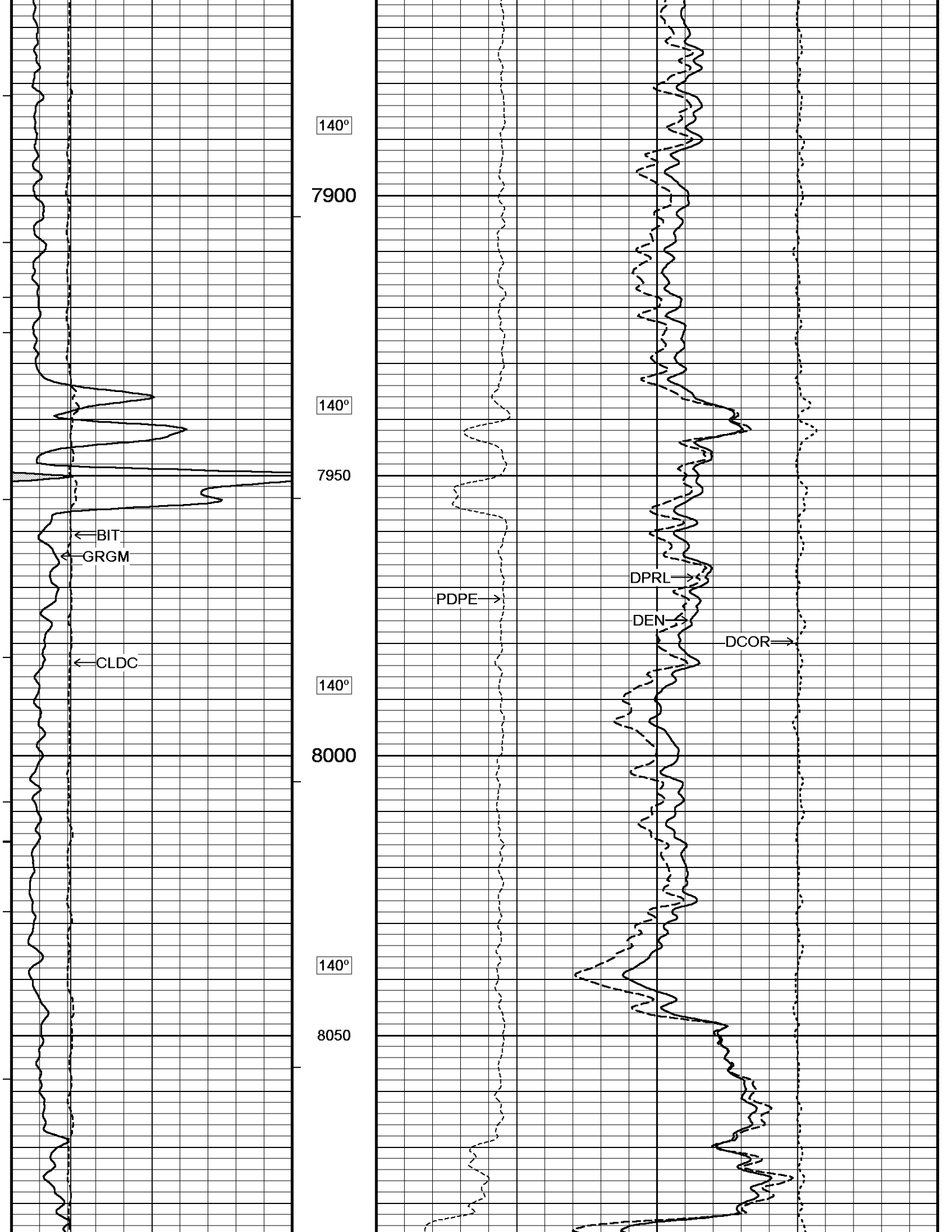
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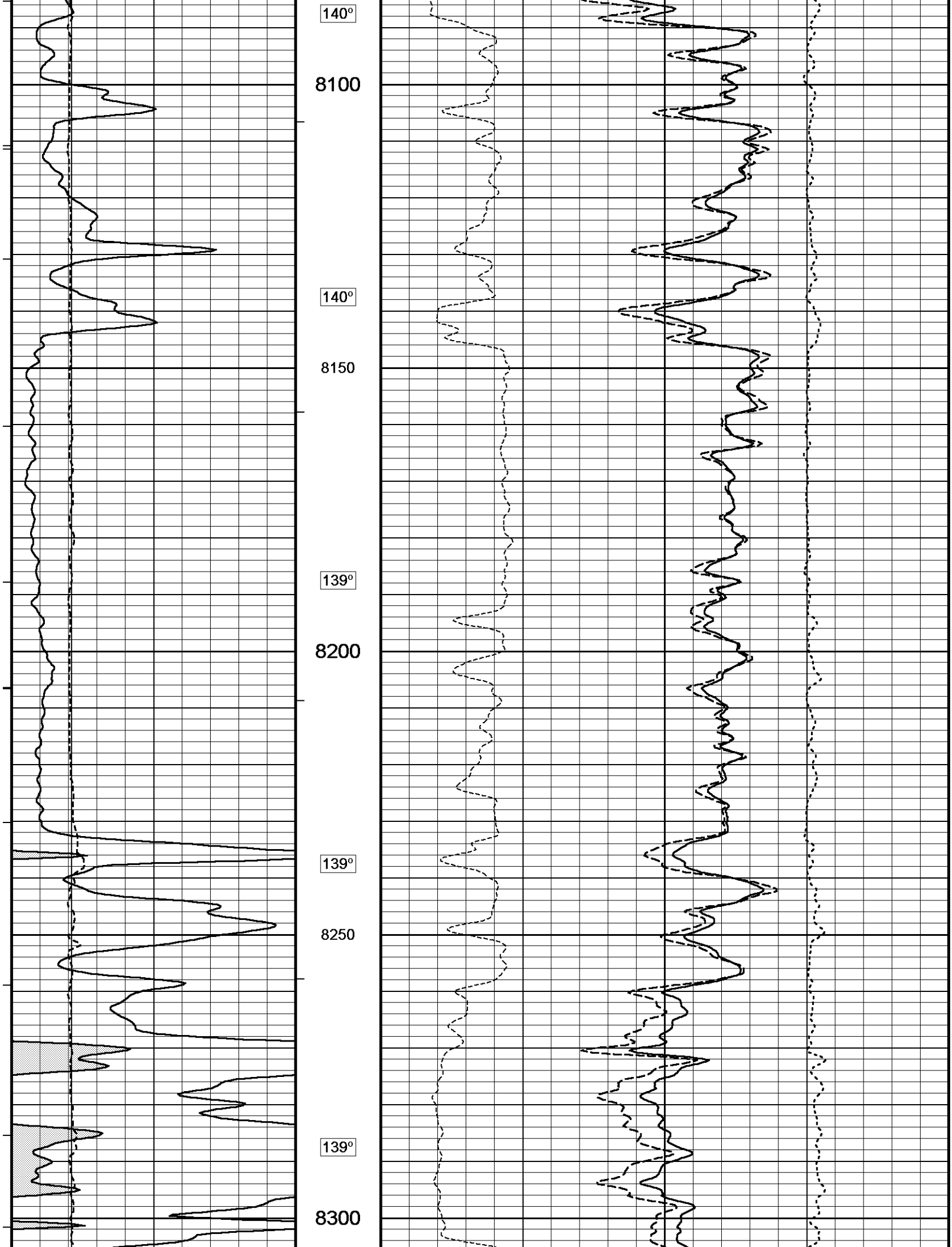
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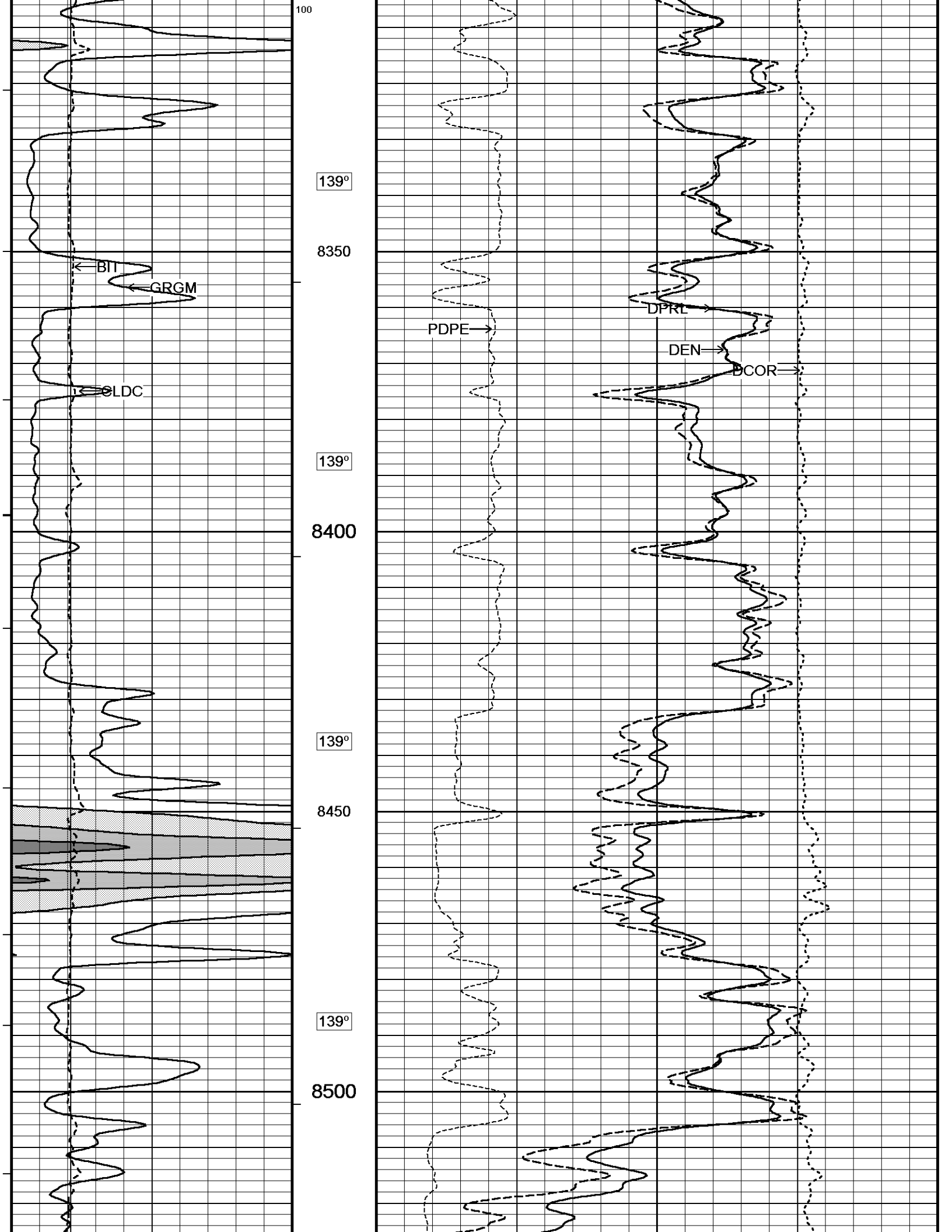
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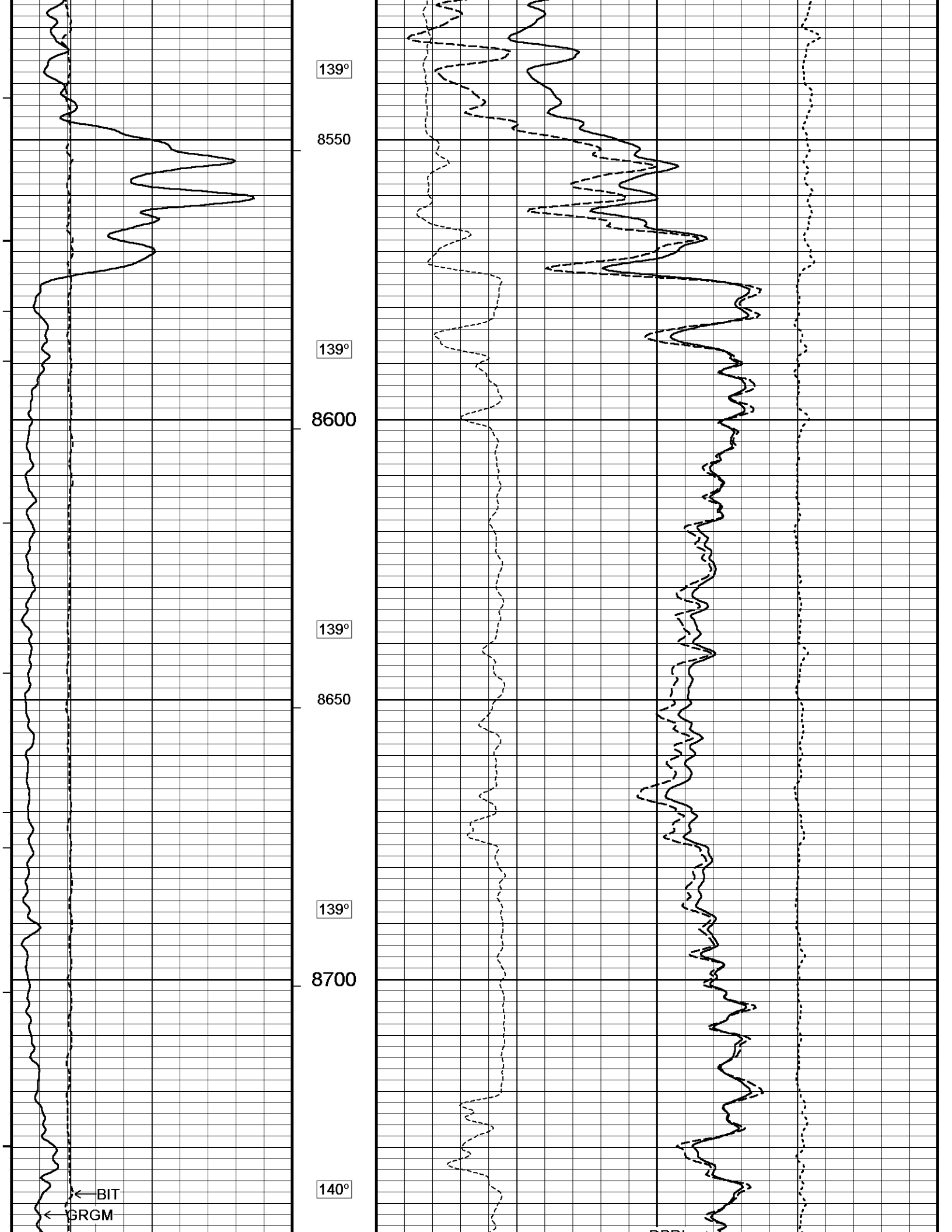
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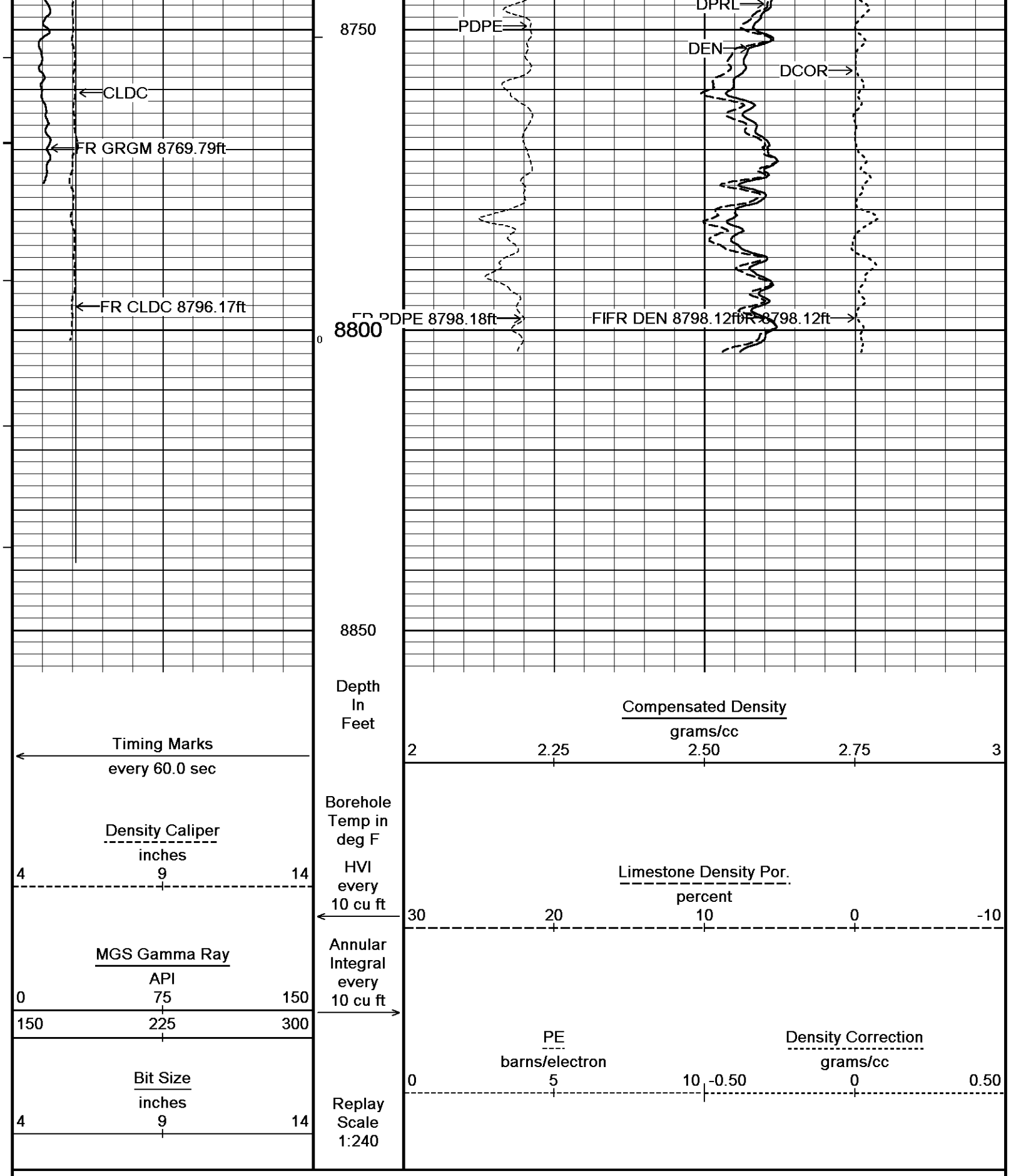


Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\13_06_9804\DATA\15077219380100 Jefferson 3306 1-27H\27166RTAP.dta
System Versions: Processed with 13.06.9804 Plotted with 13.06.9804

Plotted on 08-JUL-2013 09:22
Recorded on 08-JUL-2013 07:59

5 INCH BULK DENSITY

BEFORE SURVEY CALIBRATION

General Constants All 000

Last Edited on 08-JUL-2013,08:12

General Parameters		
Mud Resistivity	1.600	ohm-metres
Mud Resistivity Temperature	99.000	degrees F
Water Level	0.000	feet
Borehole Fluid 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	9.625	inches
Caliper for Differential Caliper	None	
Rwa Parameters		
Porosity used	Limestone Density Por.	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0

Field Calibration on 06-MAY-2013,07:48

Reading No	Measured	Calibrated (lbs)
1	12115.60	0.00
2	13815.60	500.00

Strain Gauge Constants MMS-E.B 165

Last Edited on 02-JUL-2013,21:35

Atmospheric Pressure	14.70	psi
Serial Number	262778	
Calibration Date	28-Dec-2010	
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	-0.111	-0.111	-0.108	-0.107	-0.109	-0.109	-0.117	-0.117
3000.0	5.068	5.069	5.072	5.072	5.070	5.071	5.061	5.063
6000.0	10.256	10.260	10.261	10.264	10.260	10.263	10.250	10.254
9000.0	15.454	15.459	15.460	15.464	15.459	15.463	15.449	15.455
12000.0	20.663	20.666	20.669	20.672	20.669	20.673	20.661	20.665
15000.0	25.884		25.891		25.893		25.885	

High Resolution Temperature Calibration MGS-C.J 135

Field Calibration on 07-JUL-2013,11:24

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

High Resolution Temperature Constants MGS-C.J 135

Last Edited on 07-JUL-2013,11:24

Pre-filter Length	11

SP Calibration MGS-C.J 135

Field Calibration on 07-JUL-2013,11:24

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

Gamma Calibration MGS-C.J 135

Field Calibration on 07-JUL-2013 11:29

	Measured	Calibrated (API)
Background	41	28
Calibrator (Gross)	1321	885
Calibrator (Net)	1280	857

Gamma Constants MGS-C.J 135

Last Edited on 07-JUL-2013,18:21

Gamma Calibrator Number	GRCG073

Gamma Calibrator Number	GRCG073	
Mud Density	1.08	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

Neutron Calibration MDN-B.J 422

Base Calibration on 24-JUN-2013 09:10
Field Check on 07-JUL-2013 11:34

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3092	95	3714	110
Ratio	32.513		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2272	3403
Ratio	0.668	

Field Check

	Calibrated (cps)	
	2331	3424
Ratio	0.680	

Neutron Constants MDN-B.J 422

Last Edited on 07-JUL-2013,18:20

Neutron Source Id	HN553	
Neutron Jig Number	N639	
Epithermal Neutron	No	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.08	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	68.00	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	

FE Calibration MFE-C.A 396

Base Calibration on 24-JUN-2013 12:12
Field Check on 07-JUL-2013 11:15

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.4	126.8
Base Check		281.2
Field Check		281.2

FE Constants MFE-C.A 396

Last Edited on 07-JUL-2013,11:14

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Caliper Source for FE correction	Density Caliper	
Caliper Value for FE correction	N/A	inches
Rm Source for FE correction	Temperature Corr	
Temp. for Rm Corr.	MGS External Temperature	
Stand-off	0.5	inches

Induction Calibration MAI-B.J 389

Base Calibration on 02-AUG-2010,08:19
Field Check on 07-JUL-2013 11:14

Base Calibration

Test Loop Calibration

	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	16.7	465.5	9.3	966.2
2	6.4	384.0	7.6	821.4

3	3.1	258.9	5.2	566.0
4	1.8	133.7	2.6	279.2

Array Temperature 25.6 Deg F

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High
1			14.4	3893.4
2			29.1	3504.5
3			29.0	3045.8
4			19.4	2060.8
Deep			18.9	2010.9
Medium			41.8	3999.0
Shallow			41.7	5145.6

Array Temperature 88.8 Deg F

Induction Constants MAI-B.J 389

Last Edited on 08-JUL-2013,08:12

Induction Model	RtAP-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	

High Resolution Temperature Calibration MAI-B.J 389

Field Calibration on 02-JUL-2013,21:04

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

High Resolution Temperature Constants MAI-B.J 389

Last Edited on 02-JUL-2013,21:04

Pre-filter Length 11

Caliper Calibration MPD-D.A 472

Base Calibration on 02-JUL-2013 21:22
Field Calibration on 07-JUL-2013 11:19

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	17696	4.00

2	26105	5.97
3	34452	7.96
4	42555	9.86
5	51802	11.88
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.95	5.97

Photo Density Calibration MPD-D.A 472

Base Calibration on 24-JUN-2013 10:54
Field Check on 07-JUL-2013 11:24

Density Calibration

Base Calibration	Measured Near	Measured Far	Calibrated (sdu) Near	Calibrated (sdu) Far
Reference 1	60620	31102	59494	30754
Reference 2	25855	2890	26398	2598
Field Check at Base	1184.5	1459.9		
Field Check	1189.2	1452.5		

PE Calibration

Base Calibration	WS	Measured WH	Ratio	Calibrated Ratio
Background	233	1056		
Reference 1	27171	60412	0.454	0.367
Reference 2	8129	25709	0.320	0.270
Field Check at Base	232.8	1056.2		
Field Check	231.6	1061.1		

Density Constants MPD-D.A 472

Last Edited on 08-JUL-2013,08:12

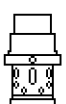
Density Source Id	P74840B	
Nylon Calibrator Number	DNCE766	
Aluminium Calibrator Number	DHCG856	
Density Shoe Profile	4 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.08	gm/cc
Mud Density Z/A Multiplier	1.11	
Mud Filtrate Density	1.00	gm/cc
Dry 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
0.00	

DOWNHOLE EQUIPMENT

C:\13_06_9804\DATA\15077219380100 Jefferson 3306 1-27H\27166RTAP.dta

Shuttle Running Tool 3.5"



SRT-A.A 79 LG: 6.62 ft WT: 37.5 lb OD: 2.52 in

MBS-F.A 200v Compact Battery Sub
MBS-F.A 131 LG: 10.61 ft WT: 70.5 lb OD: 2.24 in

Compact Memory Sub E.B
MMS-E.B 165 LG: 5.20 ft WT: 37.5 lb OD: 2.24 in

Compact Tool Isolator sub.
MTI-B.A 76 LG: 1.54 ft WT: 13.2 lb OD: 2.24 in

Compact Short Gamma
MGS-C.J 135 LG: 3.41 ft WT: 24.3 lb OD: 2.24 in

61.76 ft GRGM - MGS Gamma Ray

59.77 ft GSXT - MGS External Temperature

Compact Collar Locator
MCL-B.J 69 LG: 3.17 ft WT: 26.5 lb OD: 2.24 in

57.75 ft GCSL - MCL C. Collar Locator

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 455 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SHA-H Compact Swivel Head Adaptor
SHA-H 185 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

MIS-D.B Compact Inline Bowspring sub
MIS-D.B 603 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

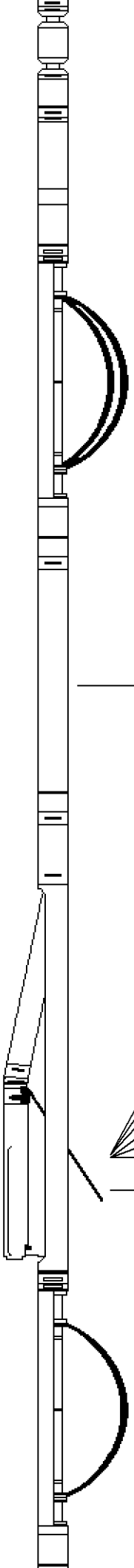
Compact Neutron
MDN-B.J 422 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

42.89 ft NPRL - Limestone Neutron Por.

Compact Density/Caliper
MPD-D.A 472 LG: 9.59 ft WT: 90.4 lb OD: 2.24 in

35.65 ft CLDC - Density Caliper
35.65 ft HVOL - Hole Volume
35.65 ft AVOL - Annular Volume
33.72 ft DCOR - Density Correction
33.72 ft DEN - Compensated Density
33.72 ft DPRL - Limestone Density Por.
33.65 ft PDPE - PE

MIS-D.B Compact Inline Bowspring sub
MIS-D.B 733 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

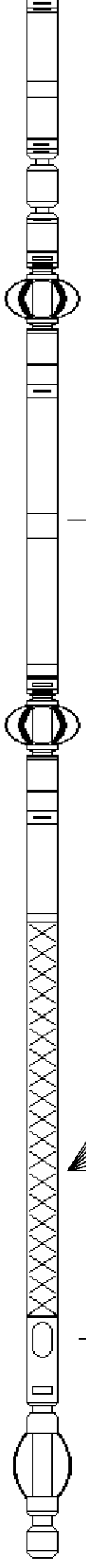


SHA-J.B Compact Swivel Head Adaptor
SHA-J.B 594 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 472 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

MIS-E.B Compact Inline Standoff sub
MIS-E.B 575 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Focussed Electric
MFE-C.A 396 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in



16.05 ft FEFE - Shallow FE

MIS-E.B Compact Inline Standoff sub
MIS-E.B 564 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Induction
MAI-B.J 389 LG: 12.52 ft WT: 48.5 lb OD: 2.24 in

3.34 ft CTAO - Array Ind. One Cond Ct
3.34 ft R20O - Array Ind. One Res 20
3.34 ft R30O - Array Ind. One Res 30
3.34 ft R40O - Array Ind. One Res 40
3.34 ft R60O - Array Ind. One Res 60
3.34 ft R85O - Array Ind. One Res 85
3.34 ft RTAO - Array Ind. One Res Rt

Tool Zero (1.84ft from bottom)

Total Length: 88.36 ft Weight: 637.1 lb

All measurements relative to tool zero.

COMPANY	SANDRIDGE ENERGY
WELL	JEFFERSON 3306 1-27H
FIELD	STOHRVILLE
PROVINCE/COUNTY	HARPER
COUNTRY/STATE	USA \ KANSAS

Elevation Kelly Bushing	1310.00	feet	First Reading	8796.00	feet
Elevation Drill Floor	1310.00	feet	Depth Driller	8865.00	feet
Elevation Ground Level	1288.00	feet	Depth Logger	8865.00	feet

Weatherford®

CML MESSENGER SHUTTLE
COMPACT PHOTO DENSITY
COMPENSATED NEUTRON LOG