



Weatherford

**CML MESSENGER SHUTTLE
COMPACT PHOTO DENSITY
COMPENSATED NEUTRON LOG**

COMPANY	SANDRIDGE ENERGY		
WELL	TOEWS 2629 2-21H		
FIELD	MONGER		
PROVINCE/COUNTY	GRAY		
COUNTRY/STATE	USA / KANSAS		
LOCATION	N2 NW NW NW 220' FNL & 330' FWL		
SEC	TWP 21	RGE 29w	Other Services MAI
API Number	15-069-20416		
Permit Number			
Permanent Datum GL, Elevation	feet		Elevations: KB 2765.00 DF 2765.00 GL 2748.00
Log Measured From	KB		
Drilling Measured From	KB @ 17' AGL		
Date	23-DEC-2012		
Run Number	ONE		
Service Order	3538732		
Depth Driller	9360.00		feet
Depth Logger	9360.00		feet
First Reading	9301.00		feet
Last Reading	3980.00		feet
Casing Driller	5572.00		feet
Casing Logger	5568.00		feet
Bit Size	6.125		inches
Hole Fluid Type	WBM		
Density / Viscosity	9.20 lb/USg	32.00 CP	
PH / Fluid Loss	11.10	4.40 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	0.75 @ 70.0	ohm-m	
Rmf @ Measured Temp	0.60 @ 70.0	ohm-m	
Rmc @ Measured Temp	0.90 @ 70.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.43 @127.0	ohm-m	
Time Since Circulation	16 HOURS		
Max Recorded Temp	127.00	deg F	
Equipment / Base	18006	OKC	
Recorded By	GUTHMUELLER		
Witnessed By	W SCOTT		
AFE# DC12574			

BOREHOLE RECORD			Last Edited: 23-DEC-2012 17:33
Bit Size inches	Depth From feet	Depth To feet	
12.250	0.00	1553.00	
8.750	1553.00	5572.00	
6.125	5572.00	9360.00	

CASING RECORD				
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURF	9.625	0.00	1553.00	36.00
INTER	7.000	0.00	5572.00	26.00

REMARKS
LOGGED WITH WLS VER 13.04.8492 SOFTWARE
TOOLS RAN: SRT-070; MBS-112;MMSE-167; MTI-067; MGS-135; MCL-060; SKJ-042; SHA-454; MISD-310; MDN-388; MPD-435;MISD-15; SHA-033; SKJ-041; MISE-578; MFE-359; MISB-029; MAI-158
WELL LOGGED USING MESSENGER METHOD OF DEPLOYMENT, AND MEMORY LOGGING SYSTEM
LOGS RESET TO PIPE STRAP AND COMPARED TO MWD LOGS PROVIDED BY CUSTOMER
HARDWARE: MAI:0.5" MISE STANDOFF ABOVE ISA STANDOFF BELOW MFE: 0.5" MISE STANDOFFS ABOVE AND BELOW MPD: 4"PROFILE PLATE, MIS-A SINGLE SPRING DECENTRALIZER BELOW MDN: MISD DOUBLE SPRING DECENTRALIZER RAN ABOVE
2.31 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY

2.77 g/cc DENSITY MATRIX USED TO CALCULATE POROSITY
ALL INTERVALS LOGGED AND SCALED PER CUSTOMER REQUEST

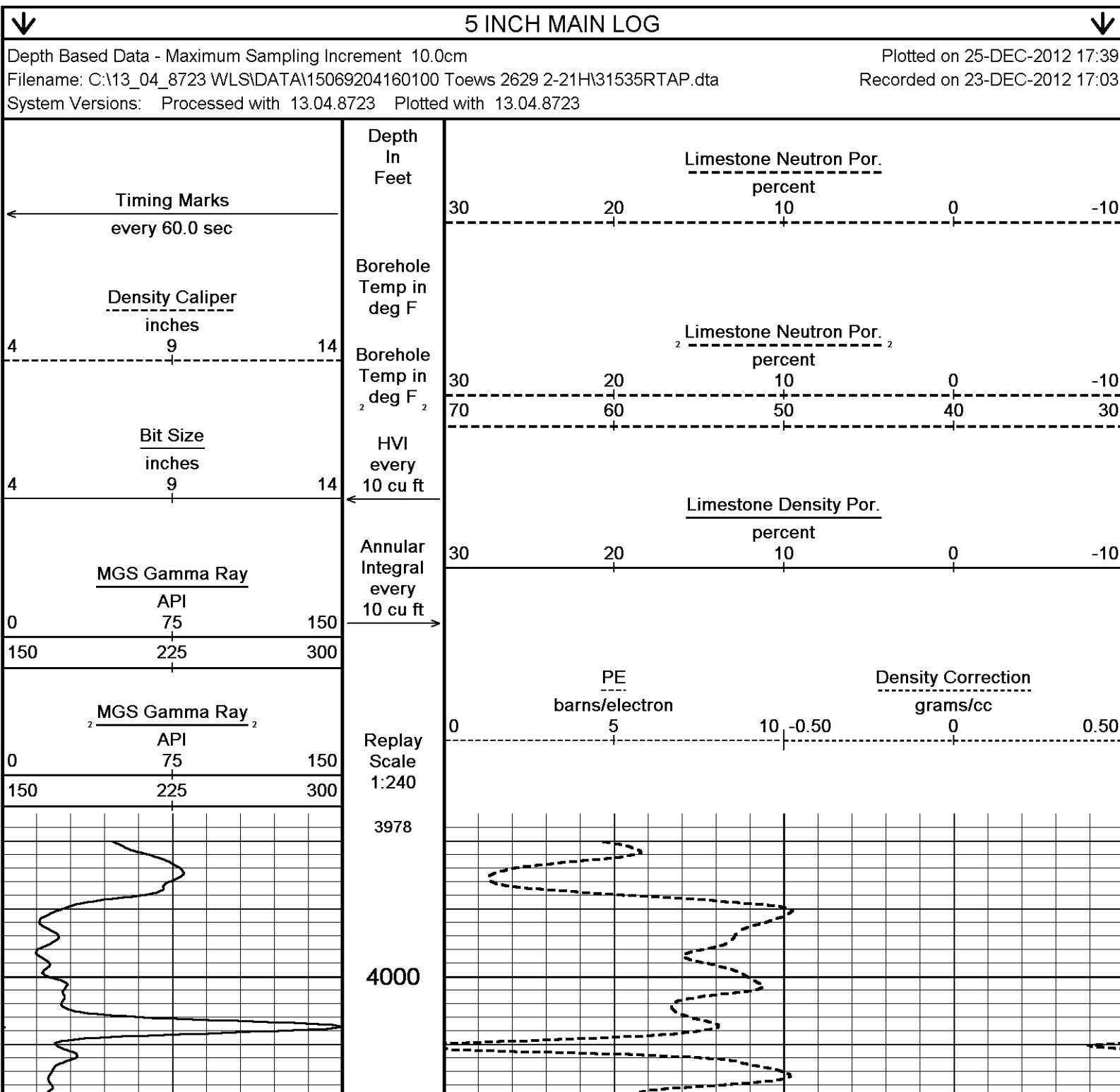
DRILL PIPE DEPTH DURING DEPLOYMENT - 9252
LOGGING TOOL DEPTH AFTER DEPLOYMENT: 9335

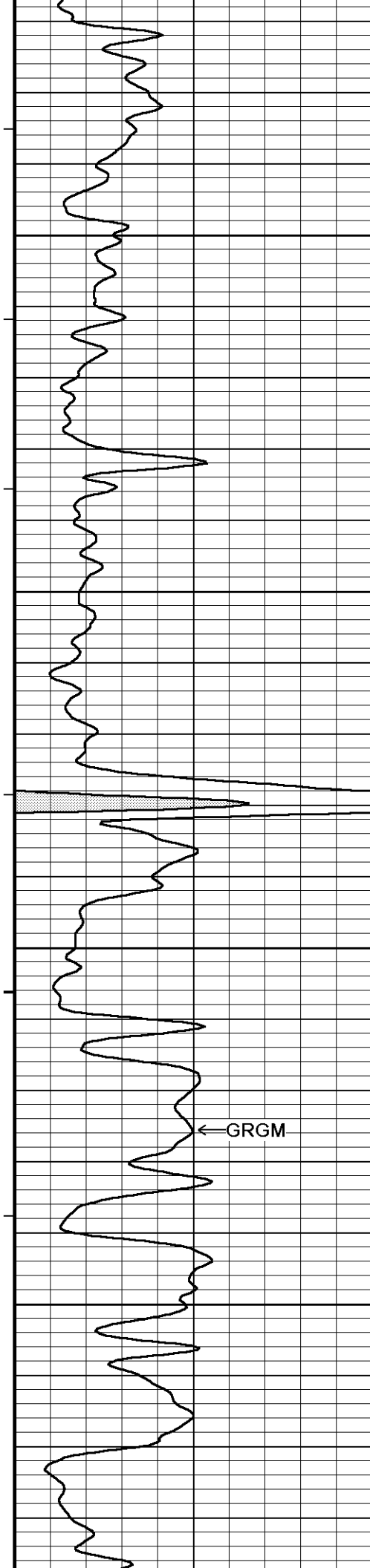
4.5" CASING USED TO CALCULATE AHV

SERVICE ORDER # 3538732
RIG: LARIAT #20

OPERATORS: R CASPARIAN; K CHAFFIN

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions in our price schedule.





113°

4050

113°

4100

114°

4150

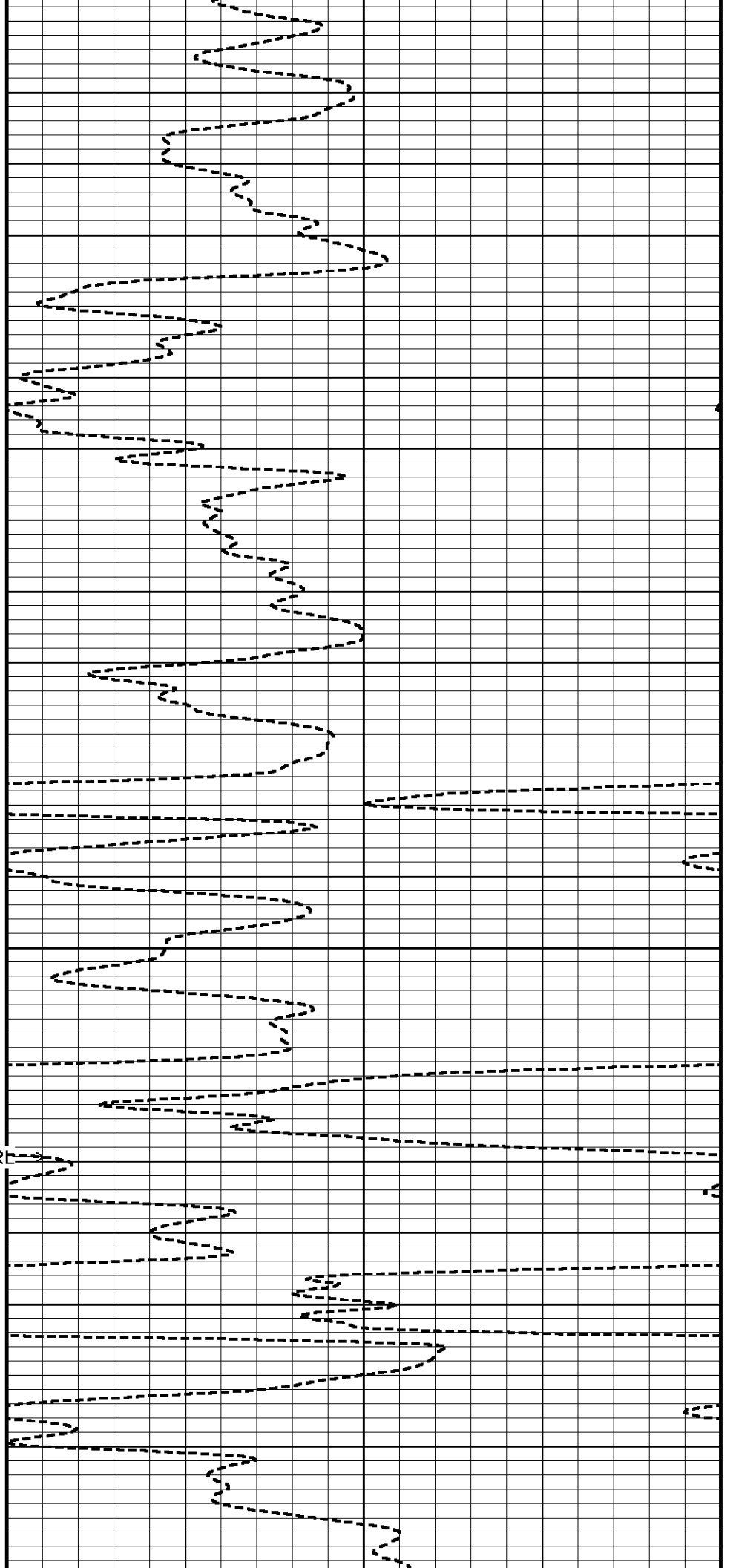
← GRGM

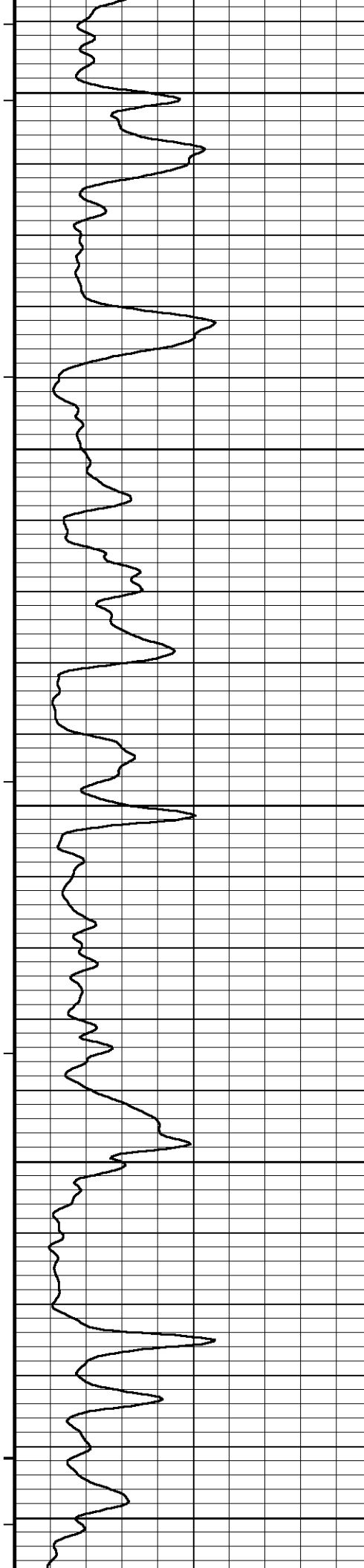
NPR →

114°

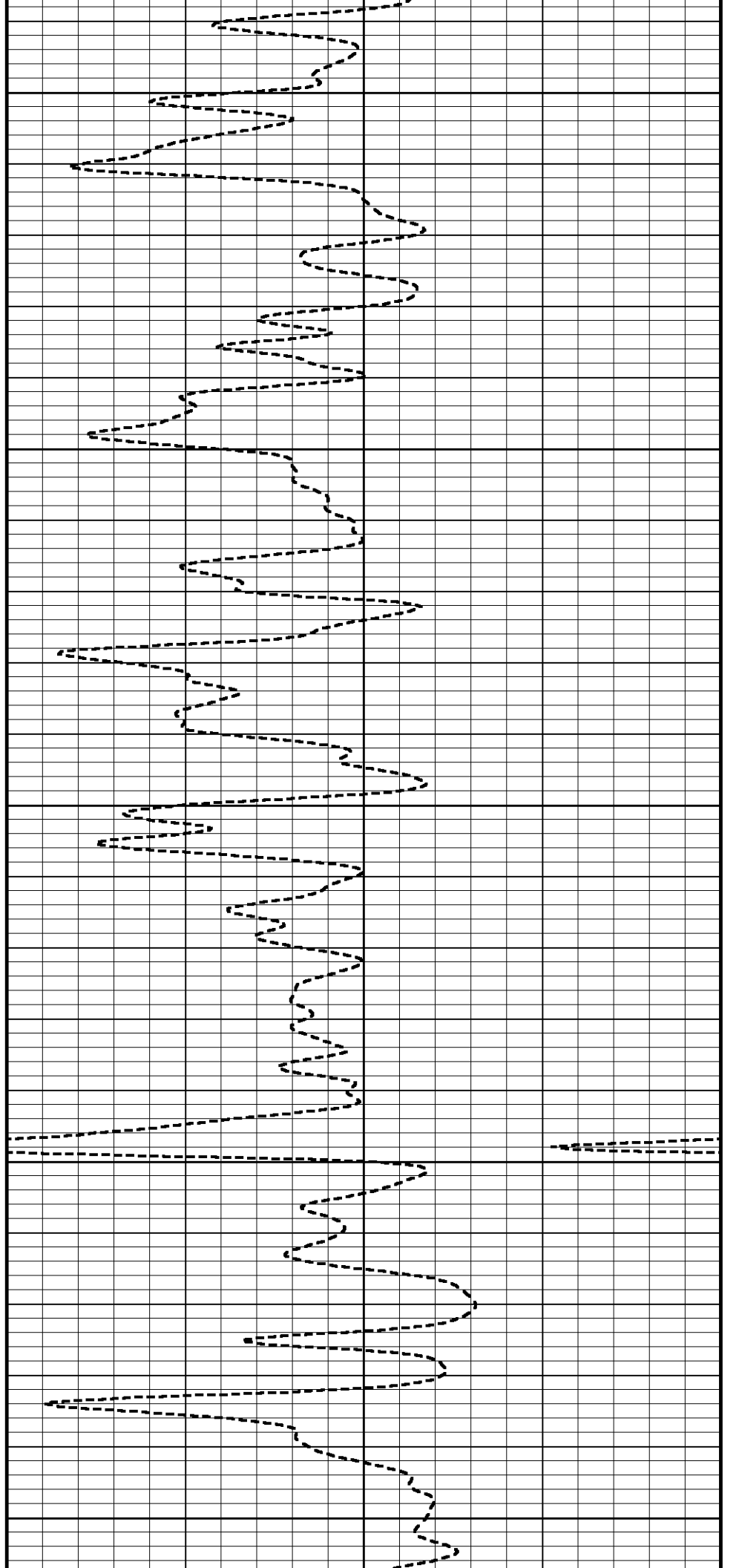
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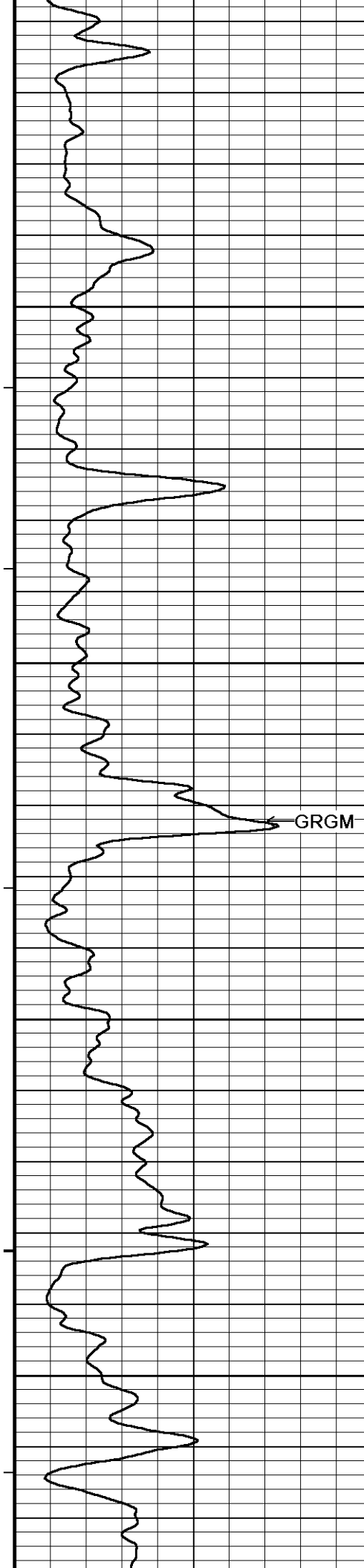
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115°
4250
115°
4300
116°
4350
116°
4400
116°
4450





117°

4500

117°

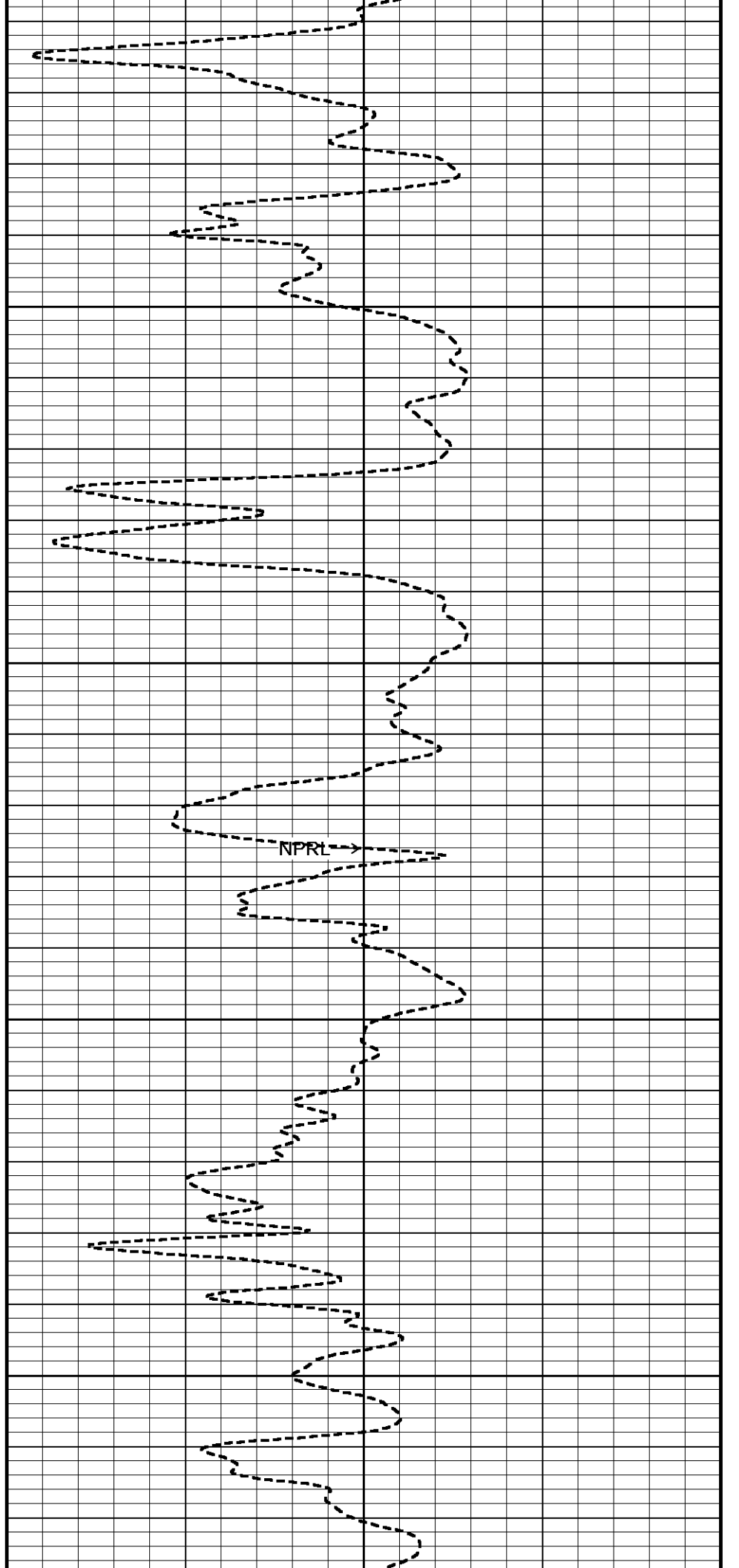
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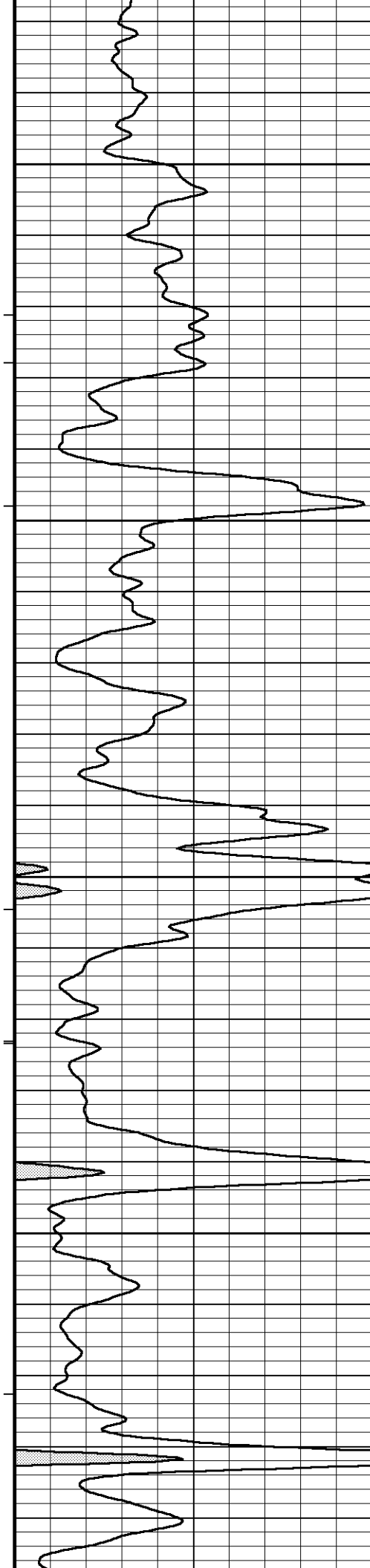
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4600

118°

4650





118°

4700

118°

4750

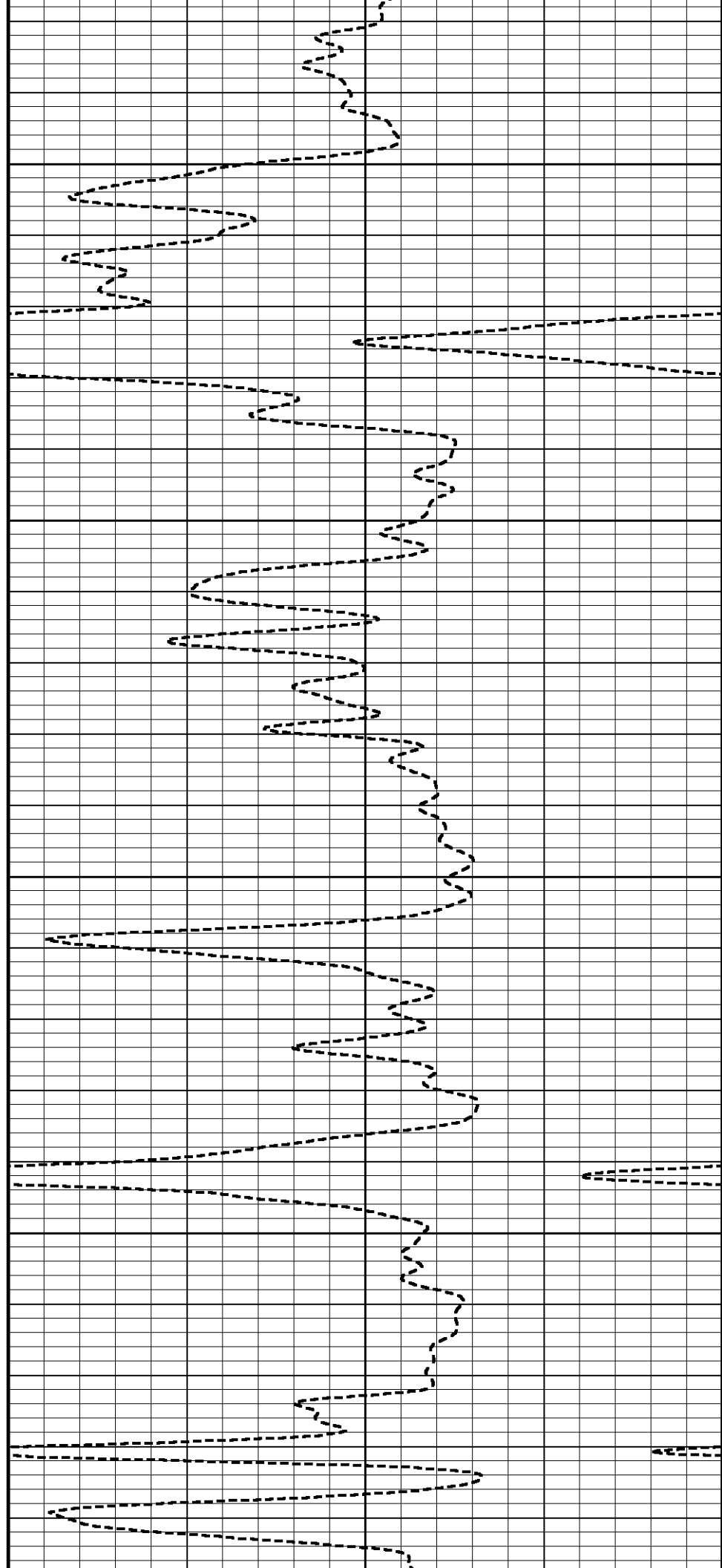
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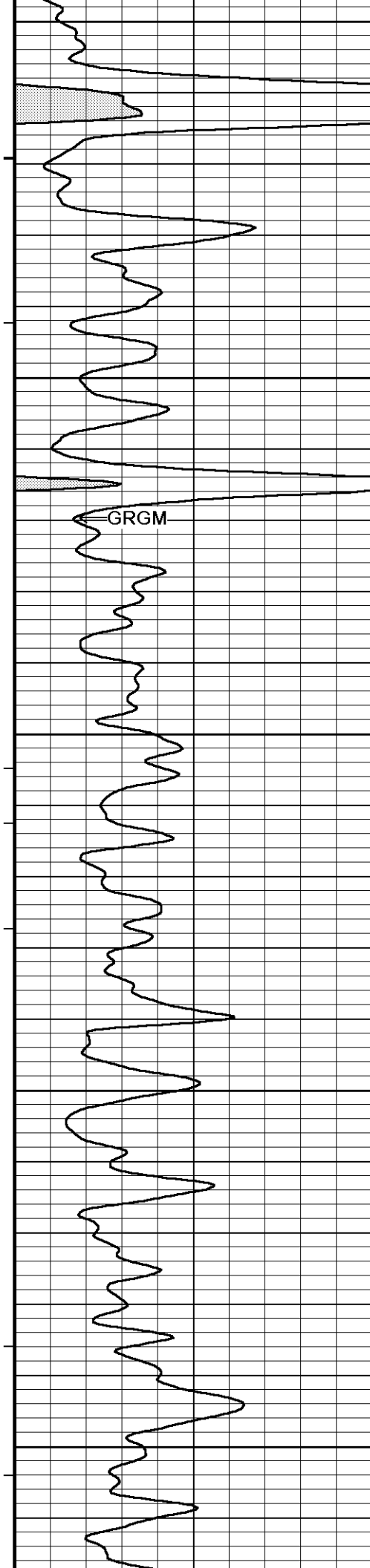
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119°

4850

120°





4900

120°

4950

120°

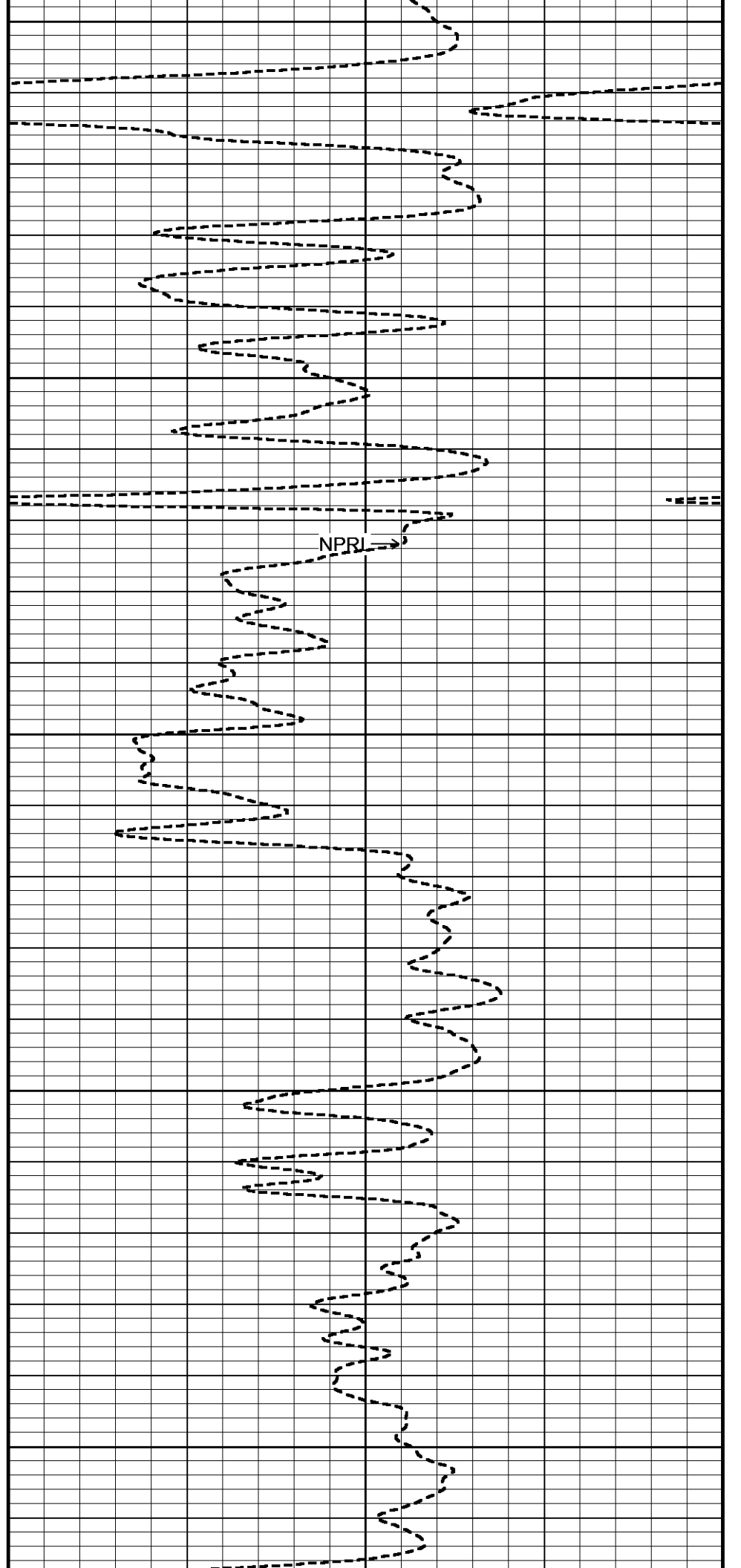
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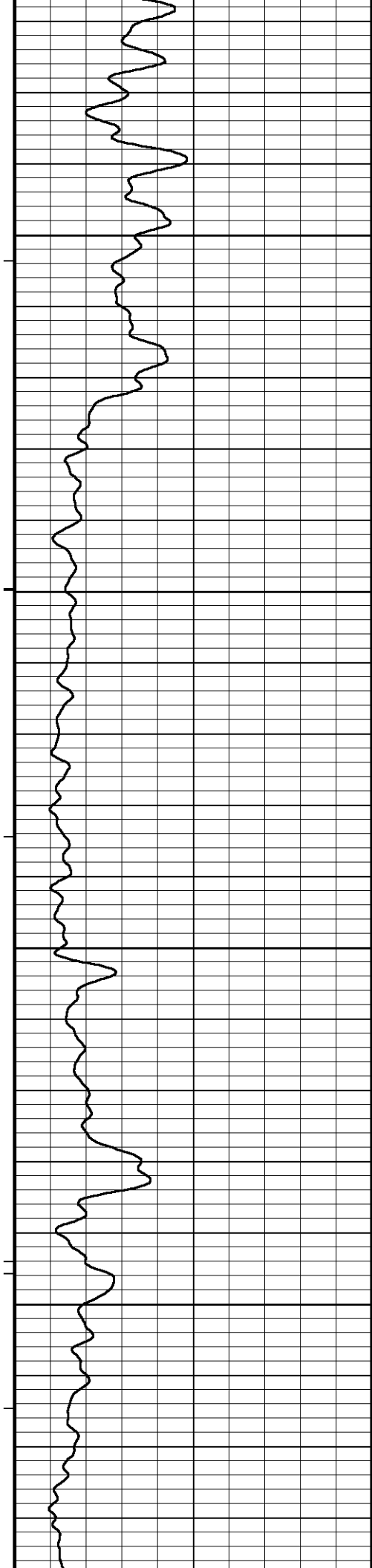
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5050

121°

5100





122°

5150

122°

5200

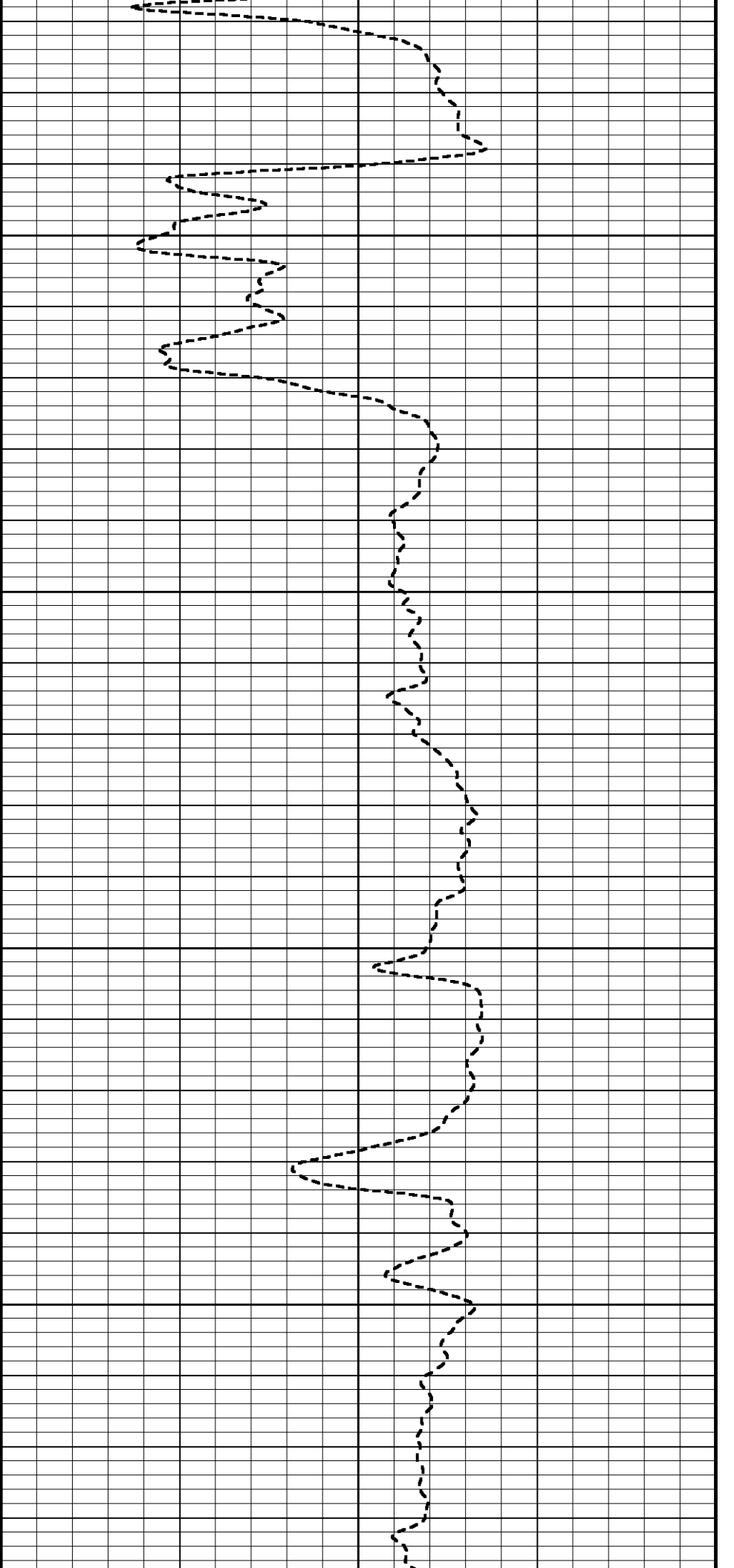
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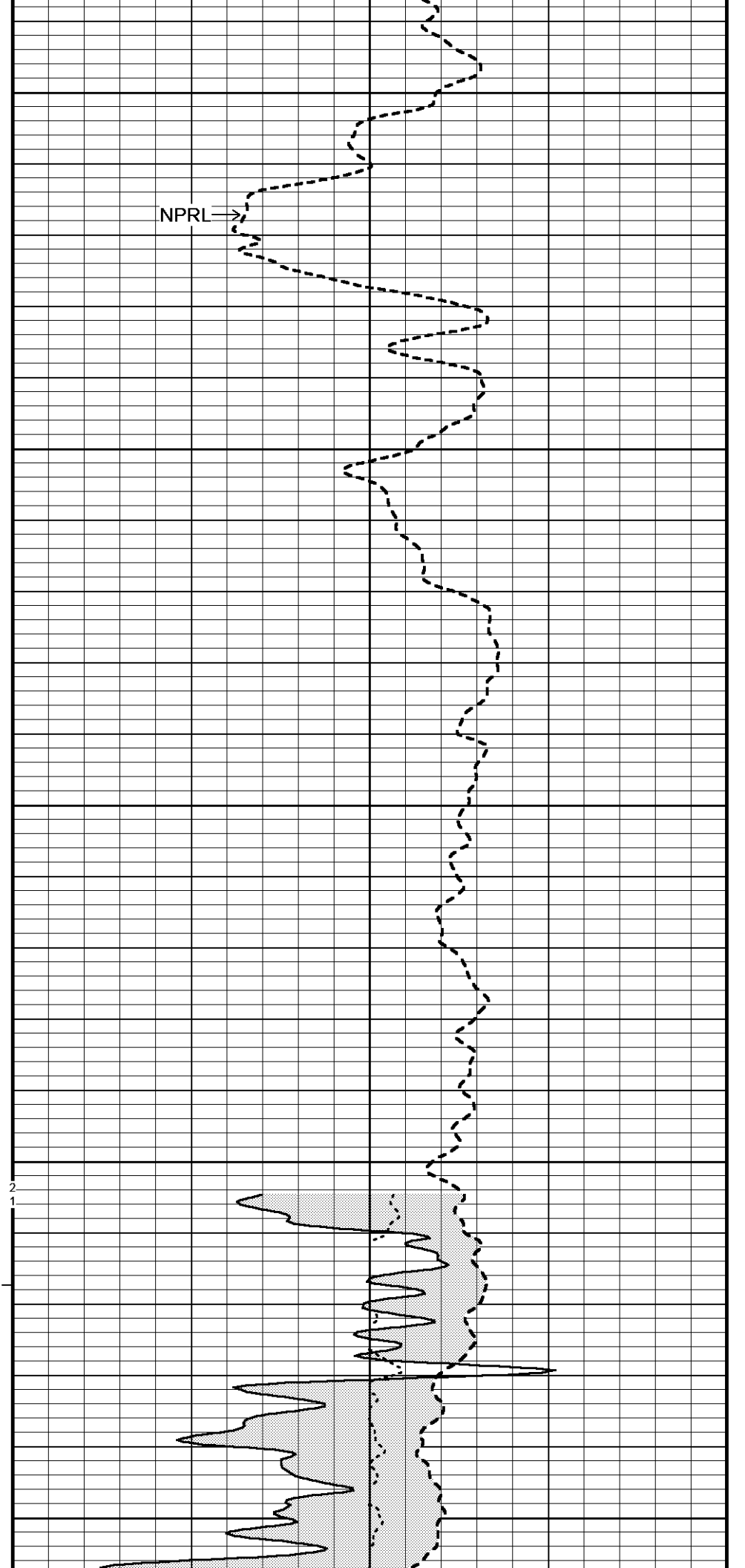
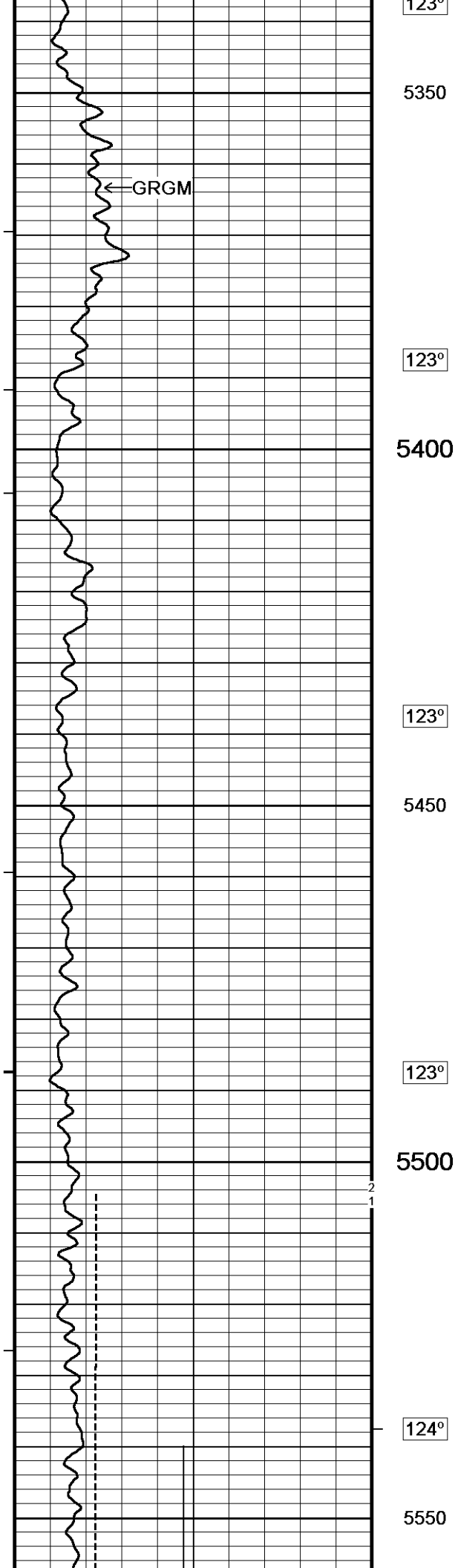
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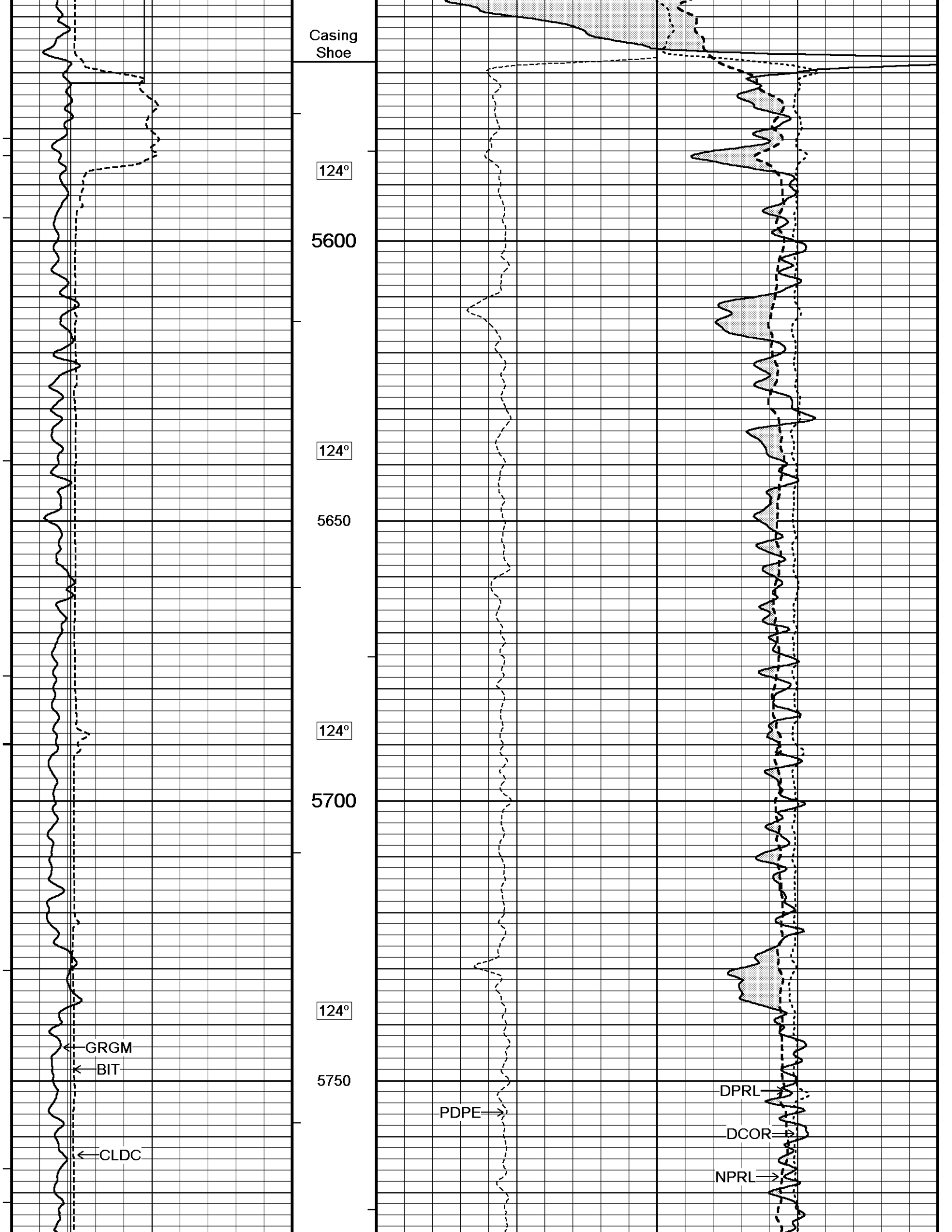
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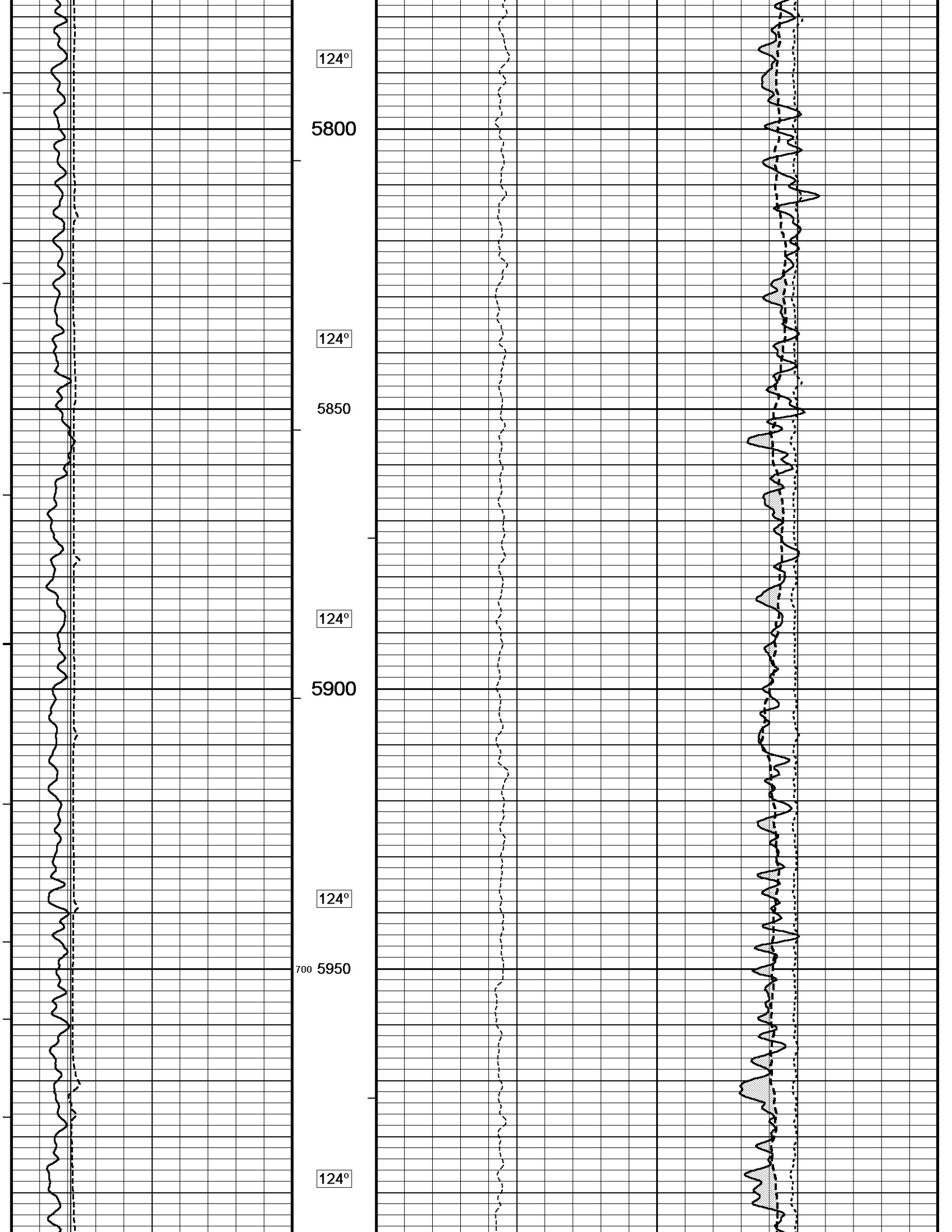
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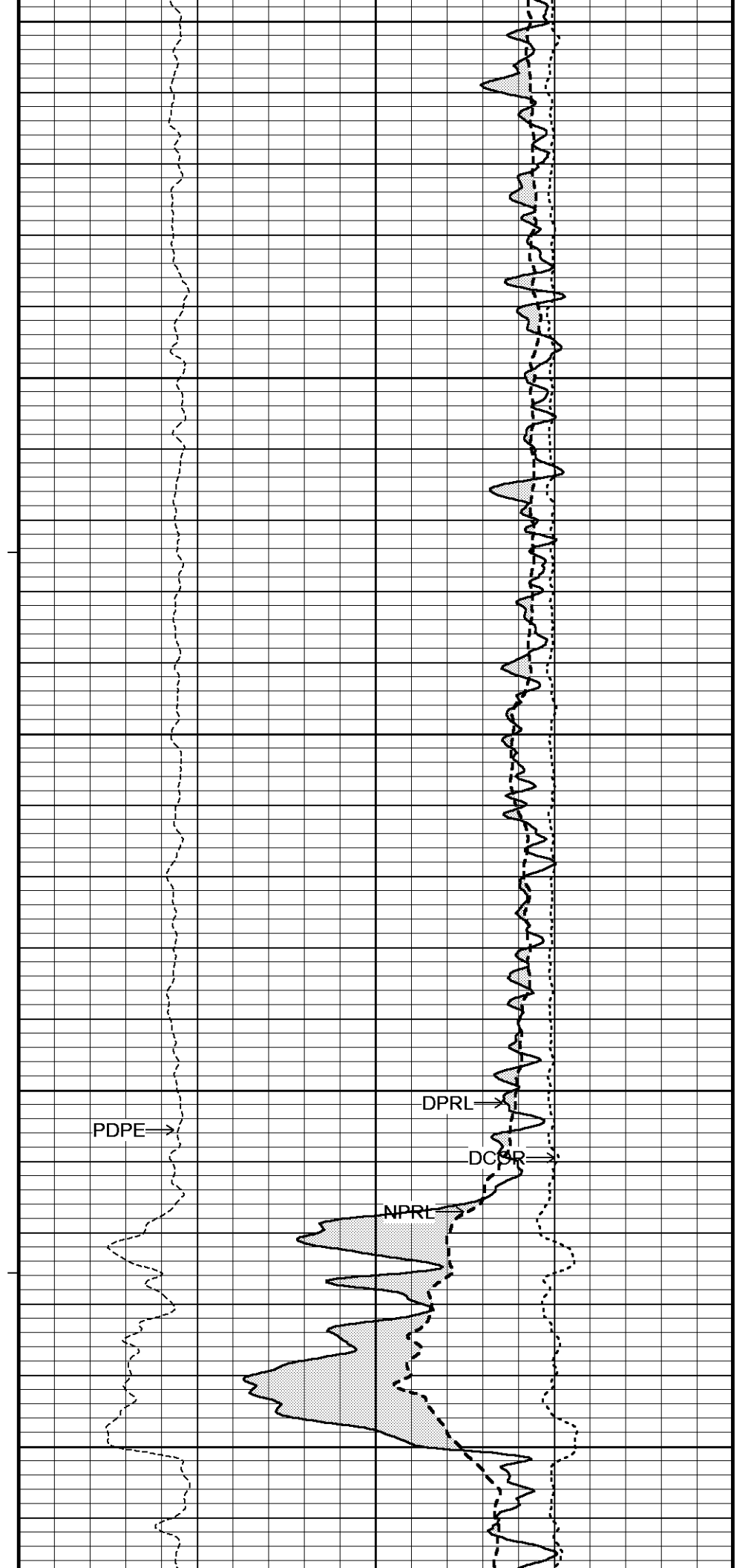
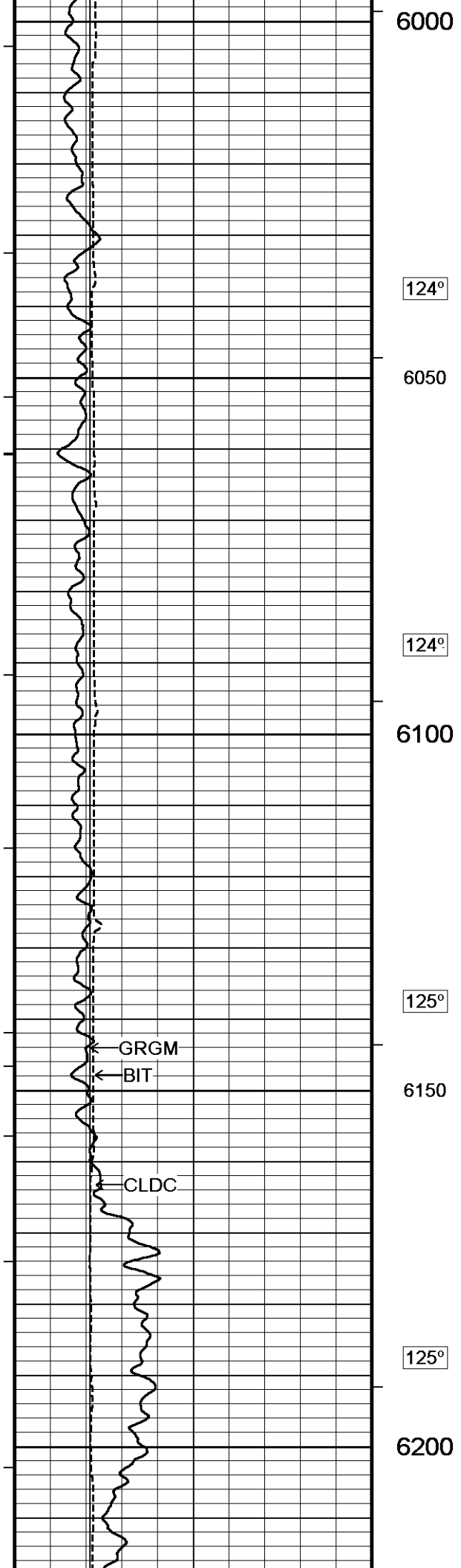
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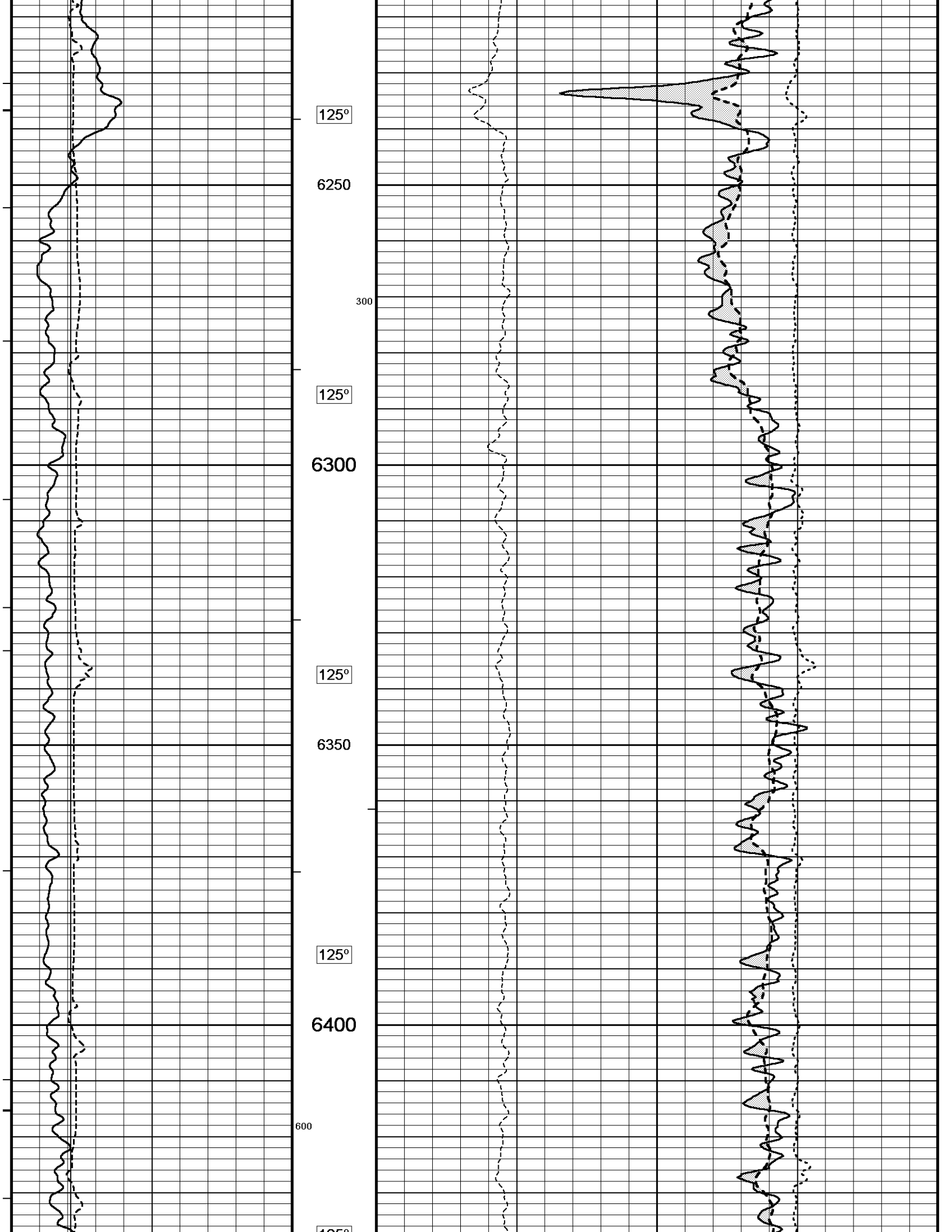


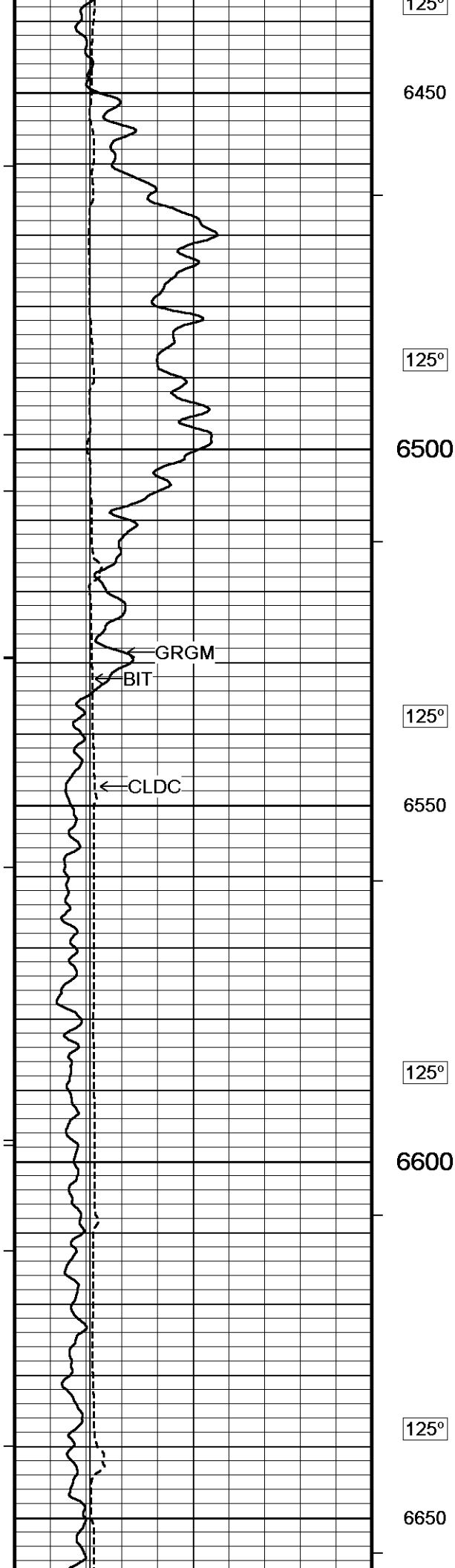




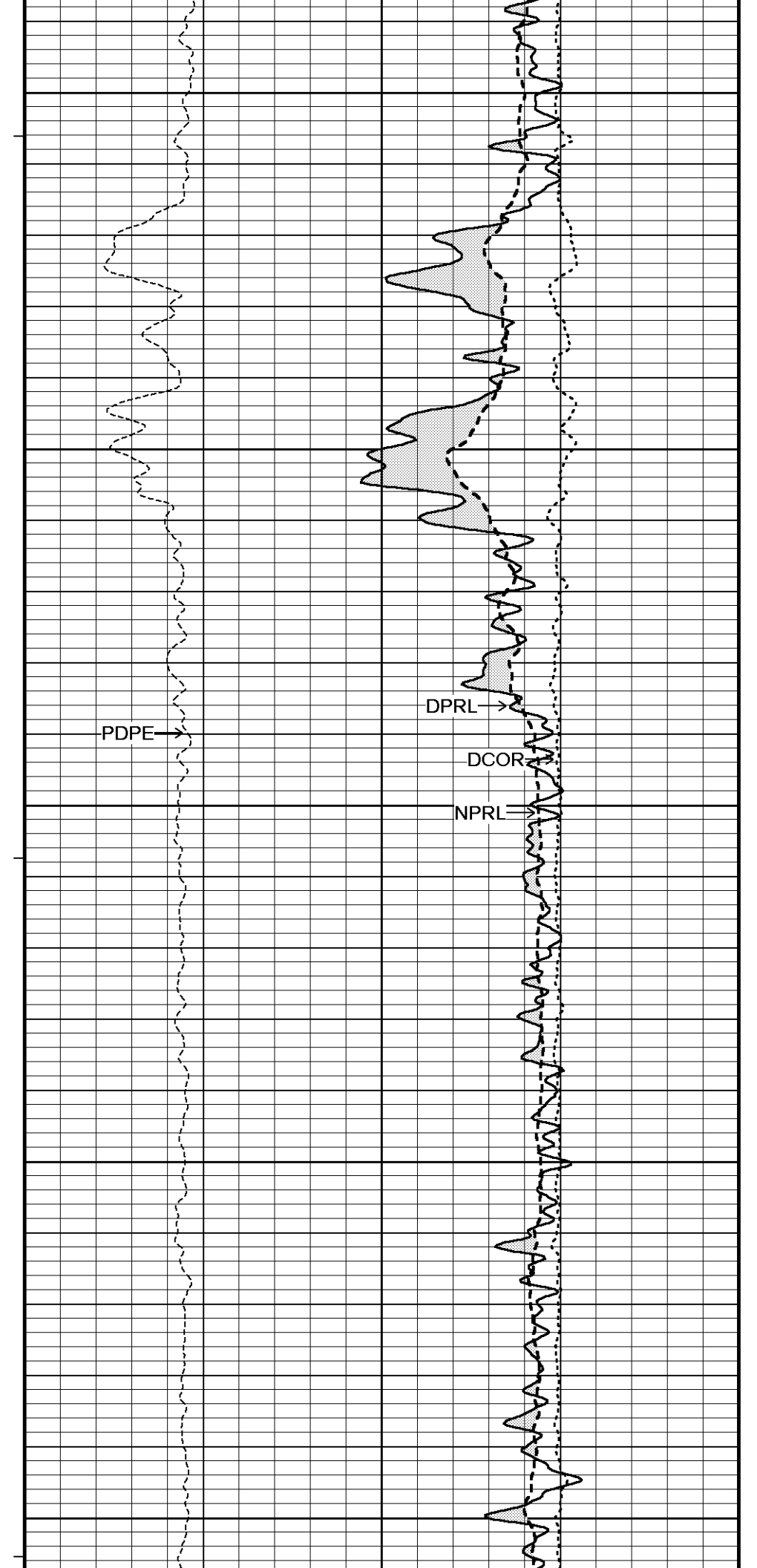








125°
6450
125°
6500
125°
6550
125°
6600
125°
6650

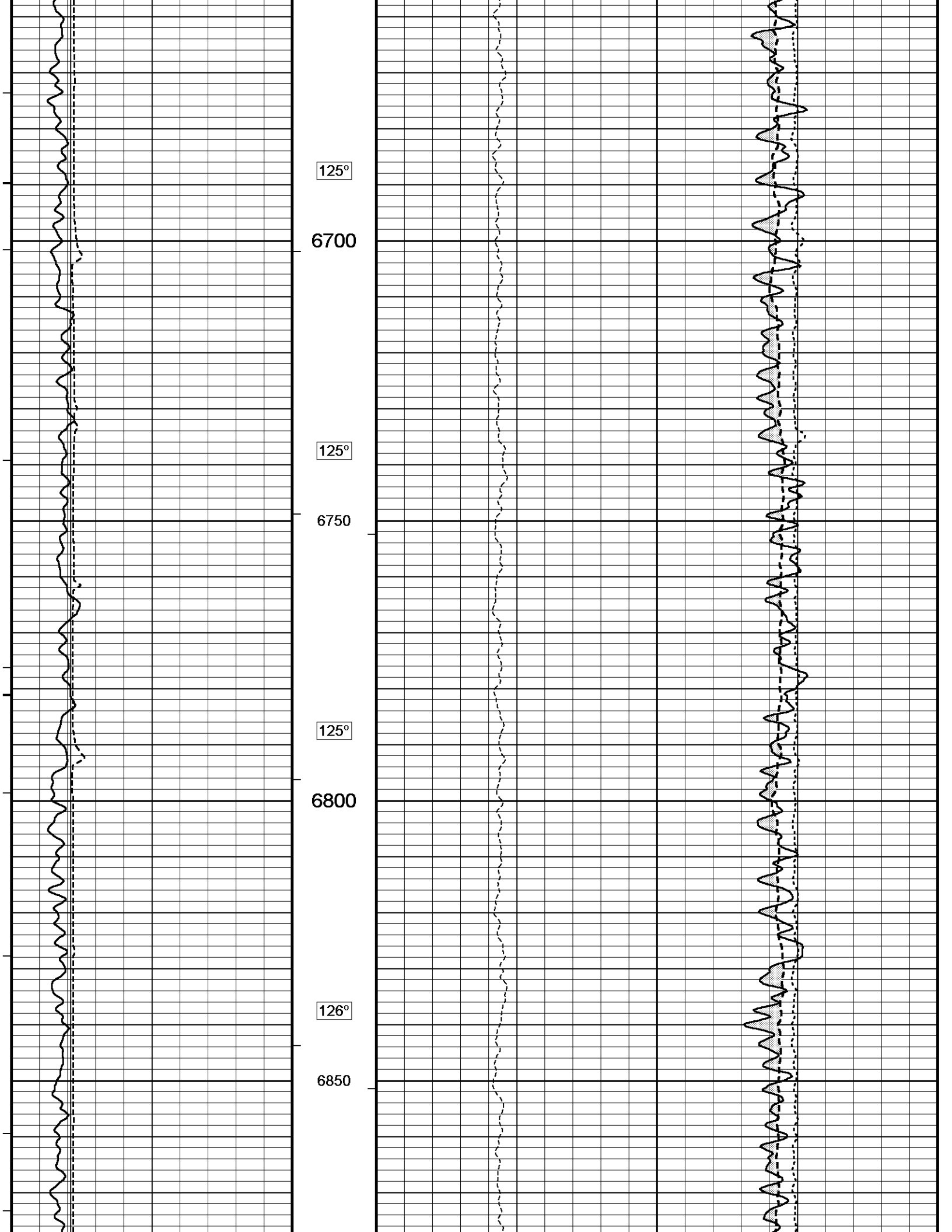


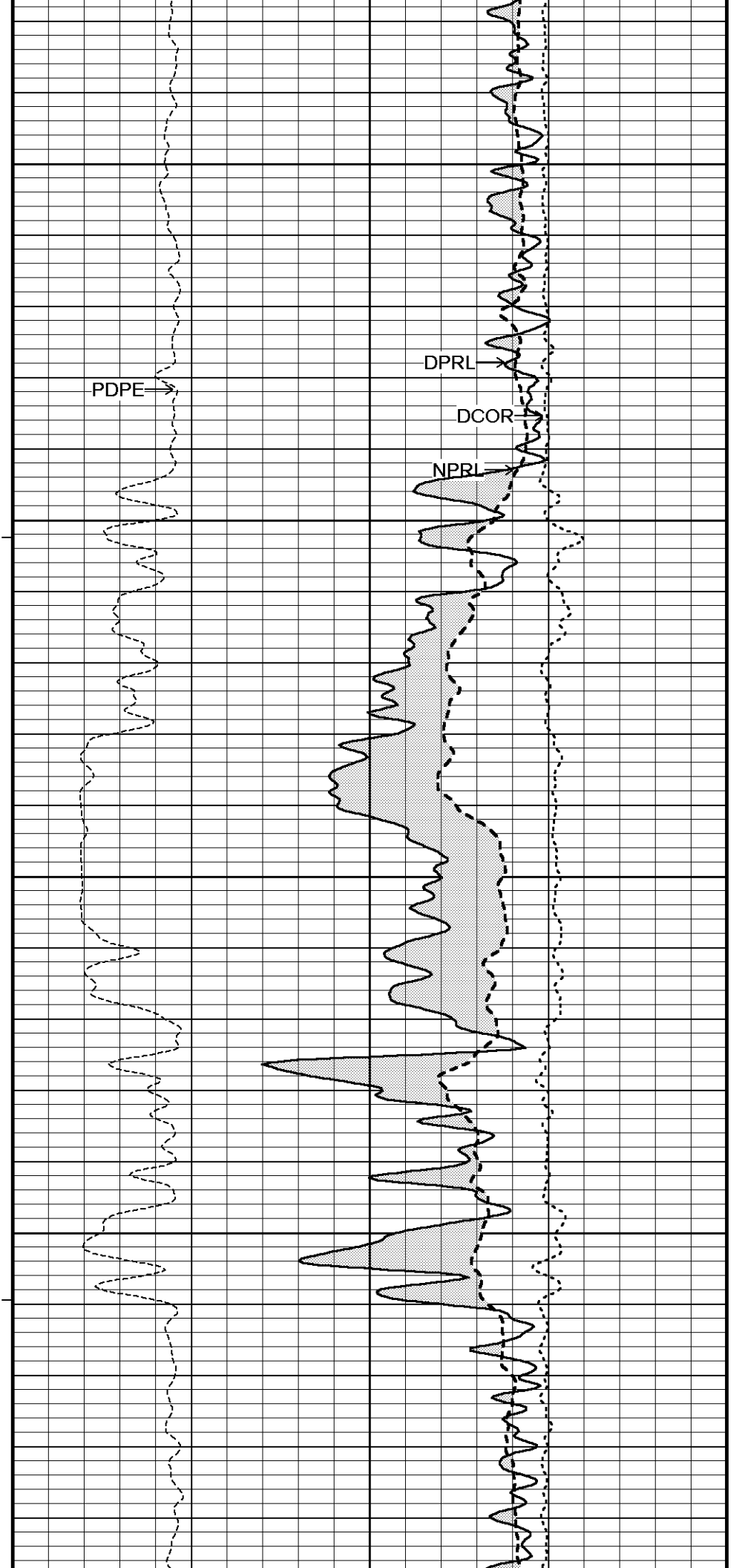
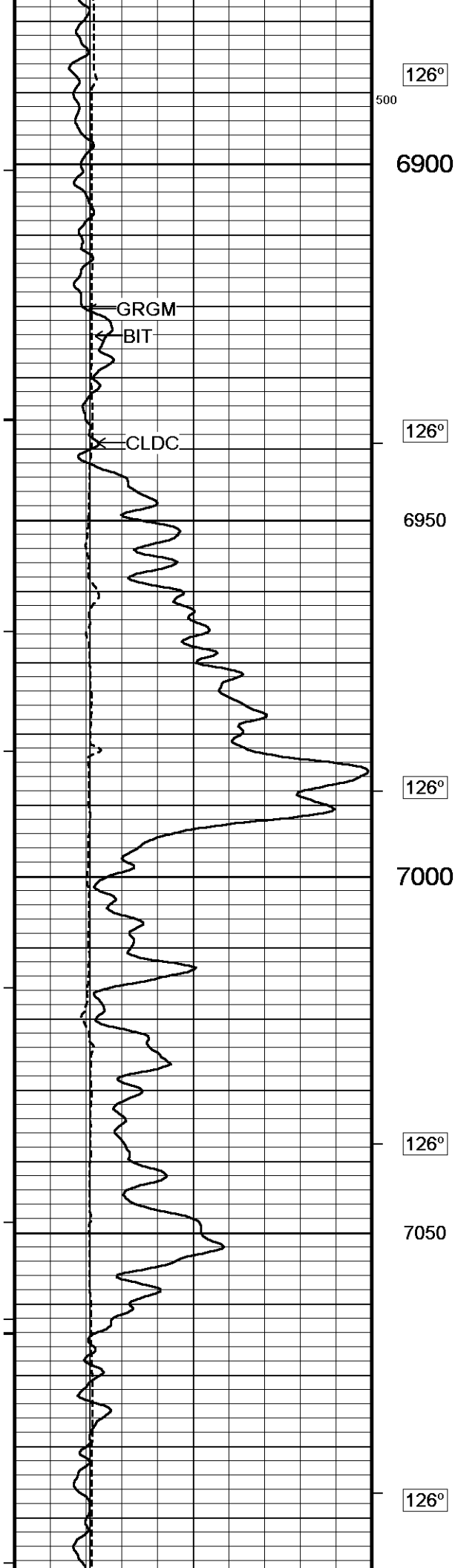
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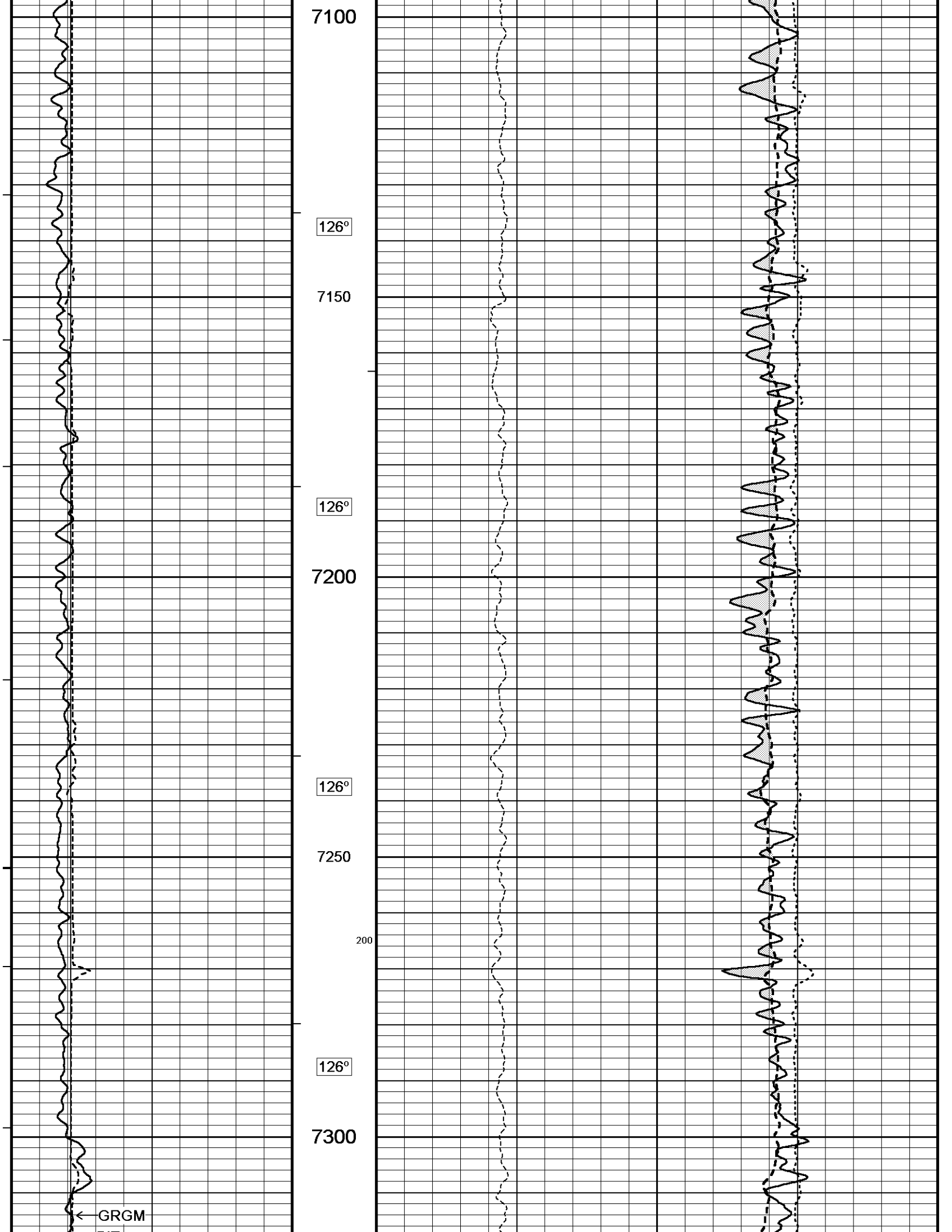
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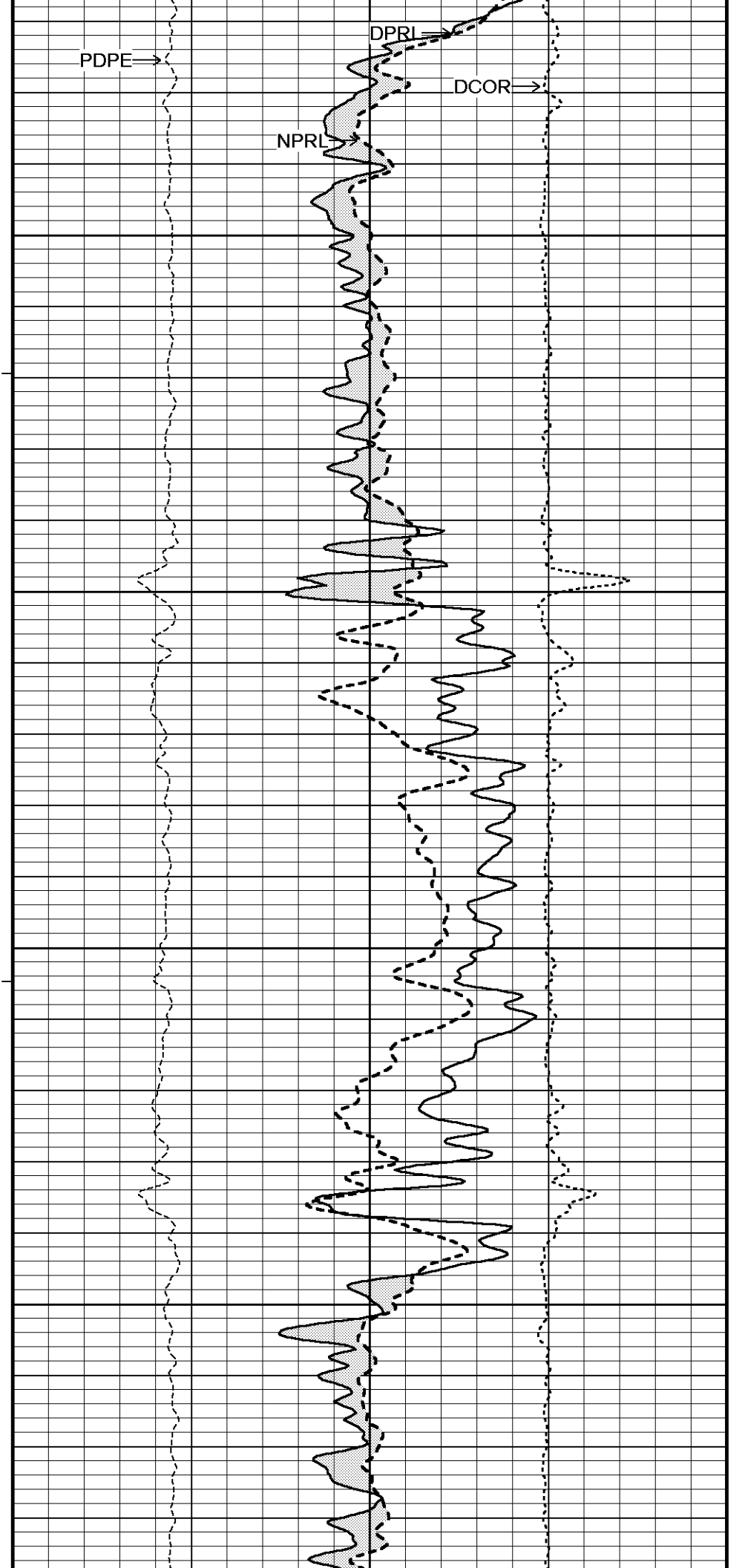
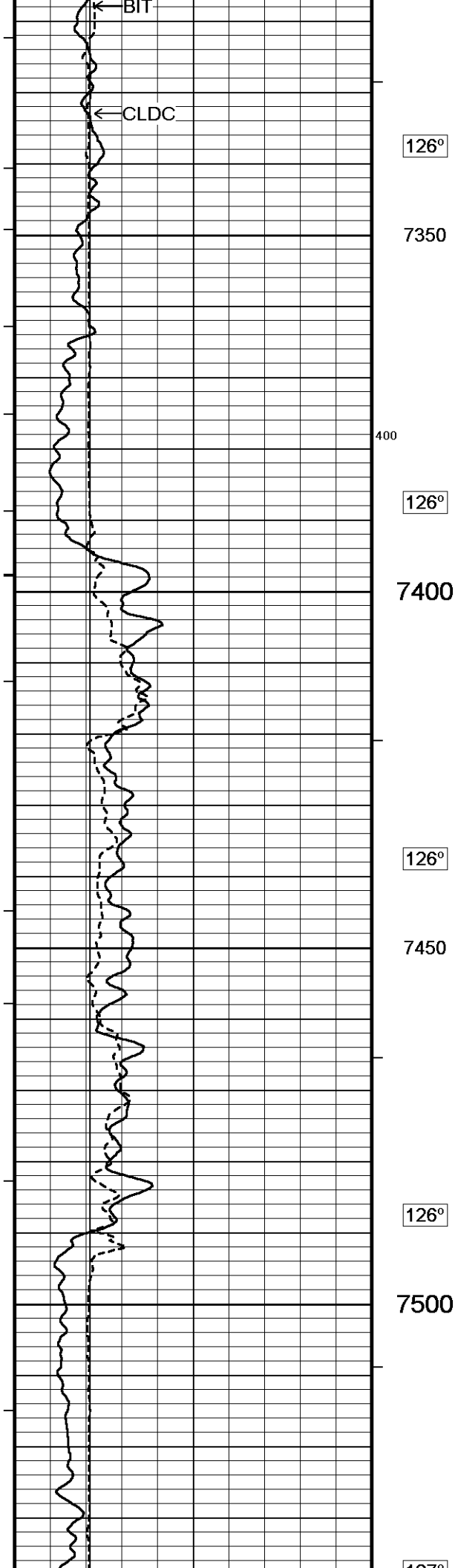
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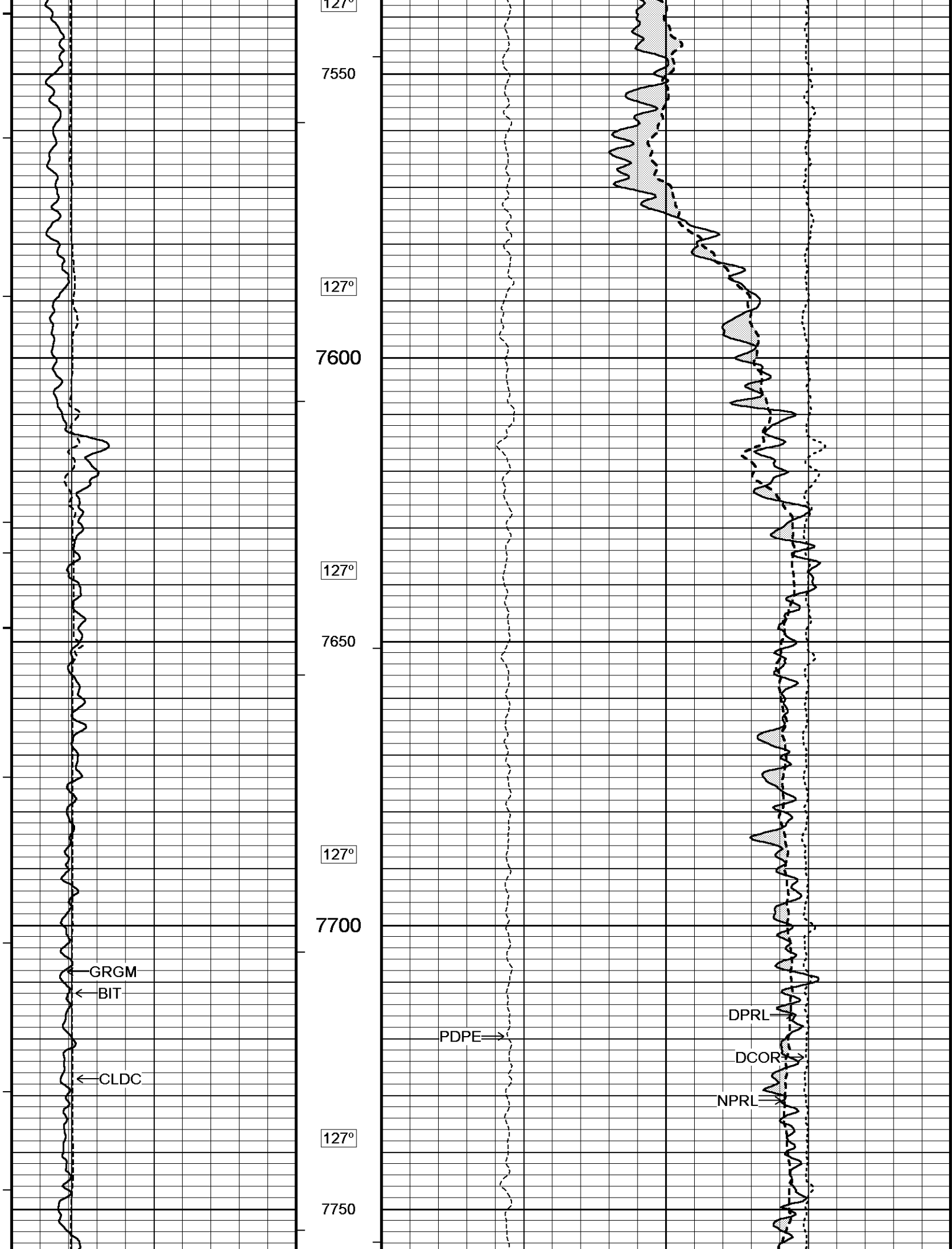
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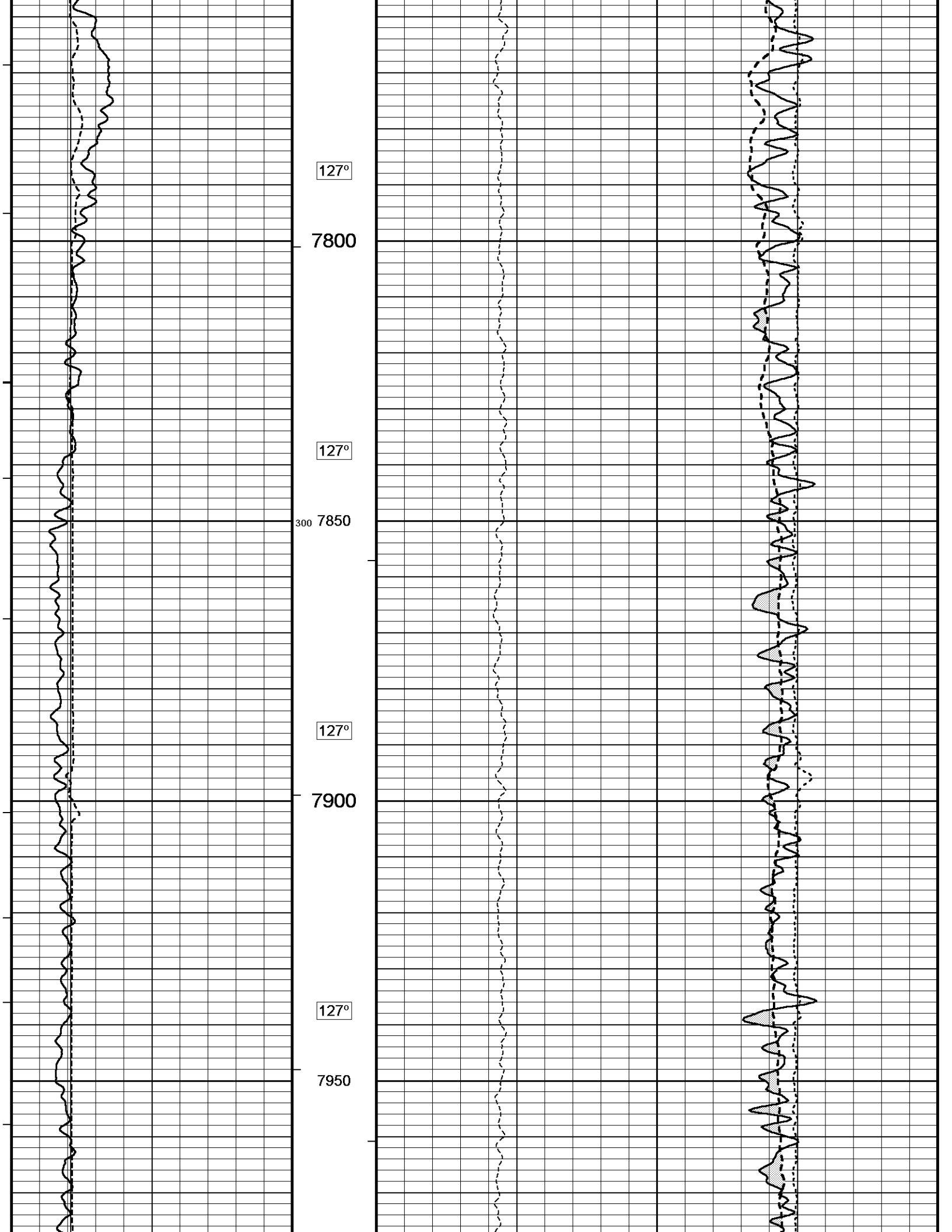


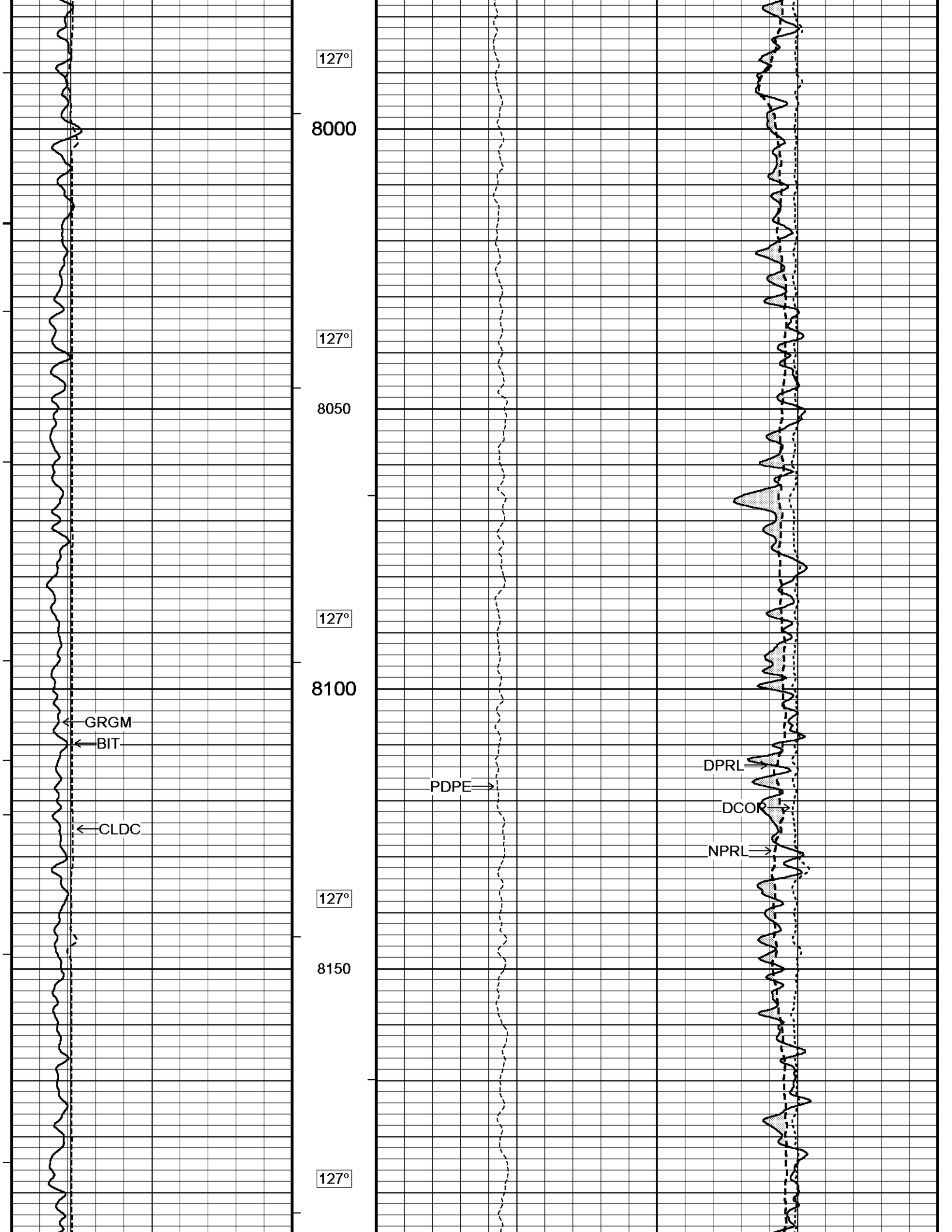


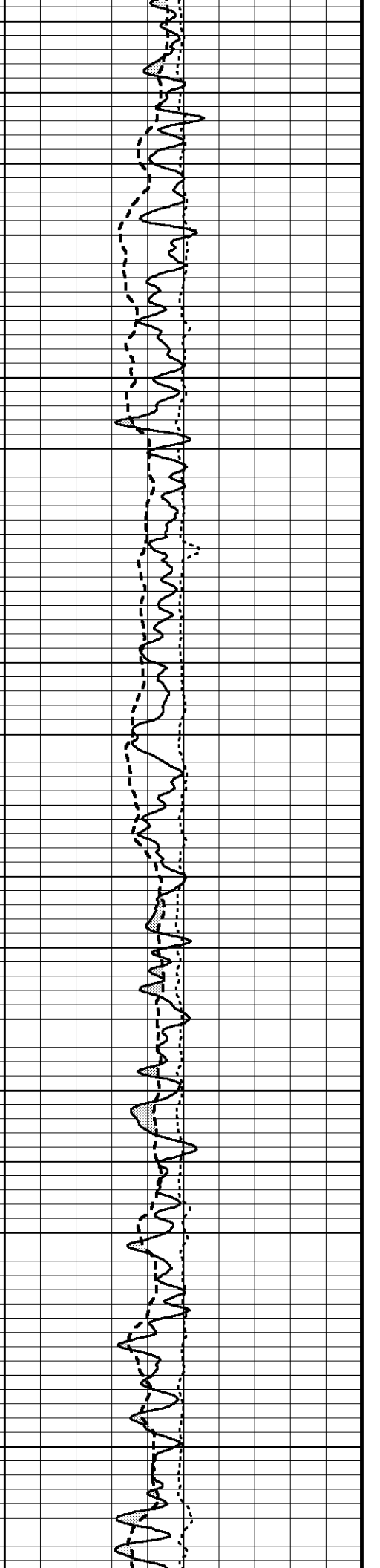
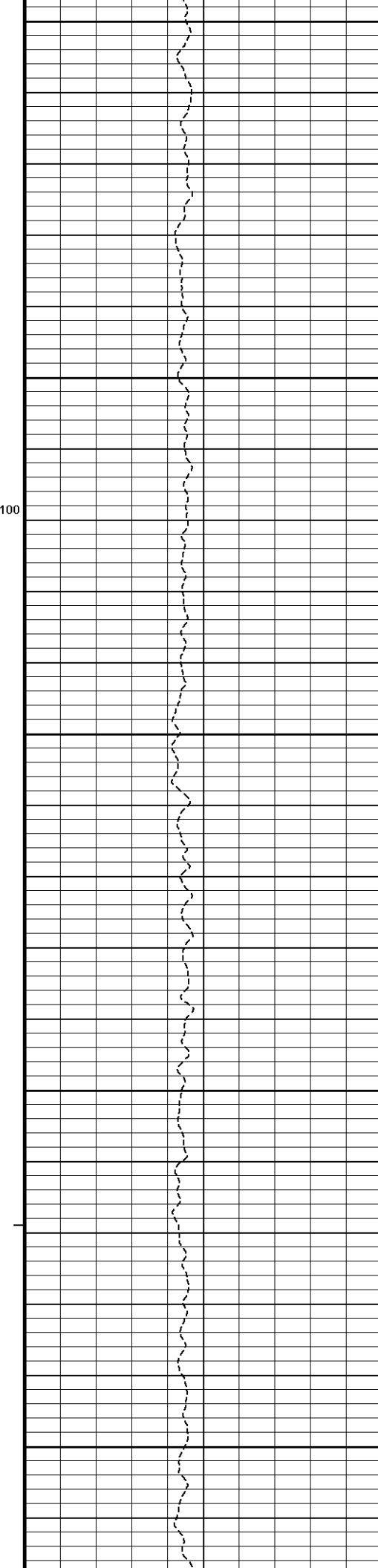
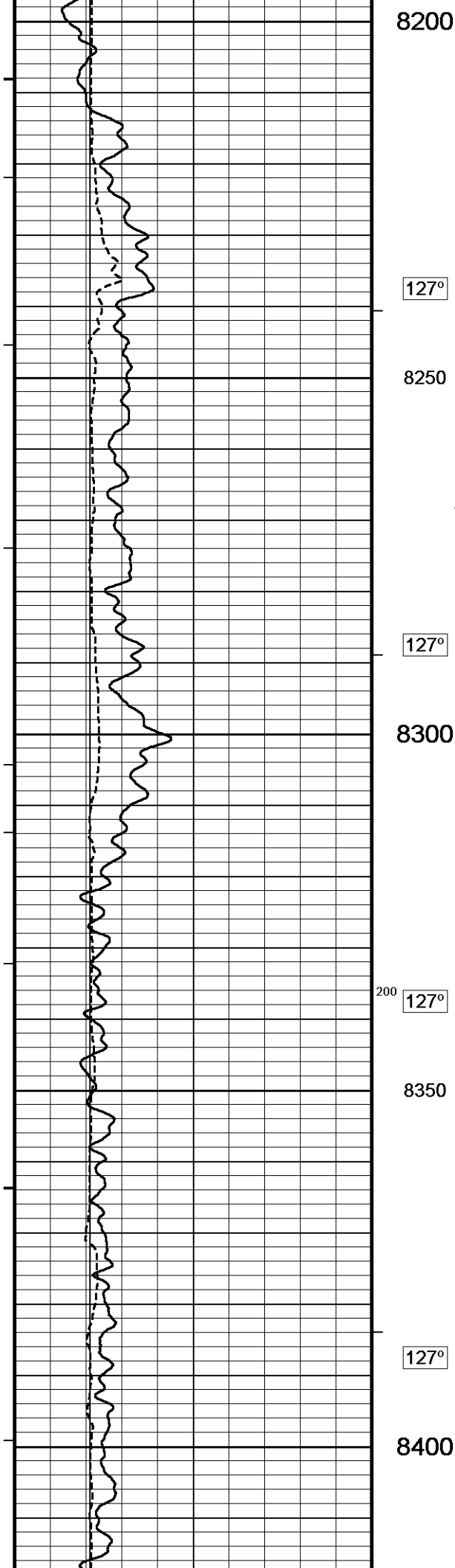


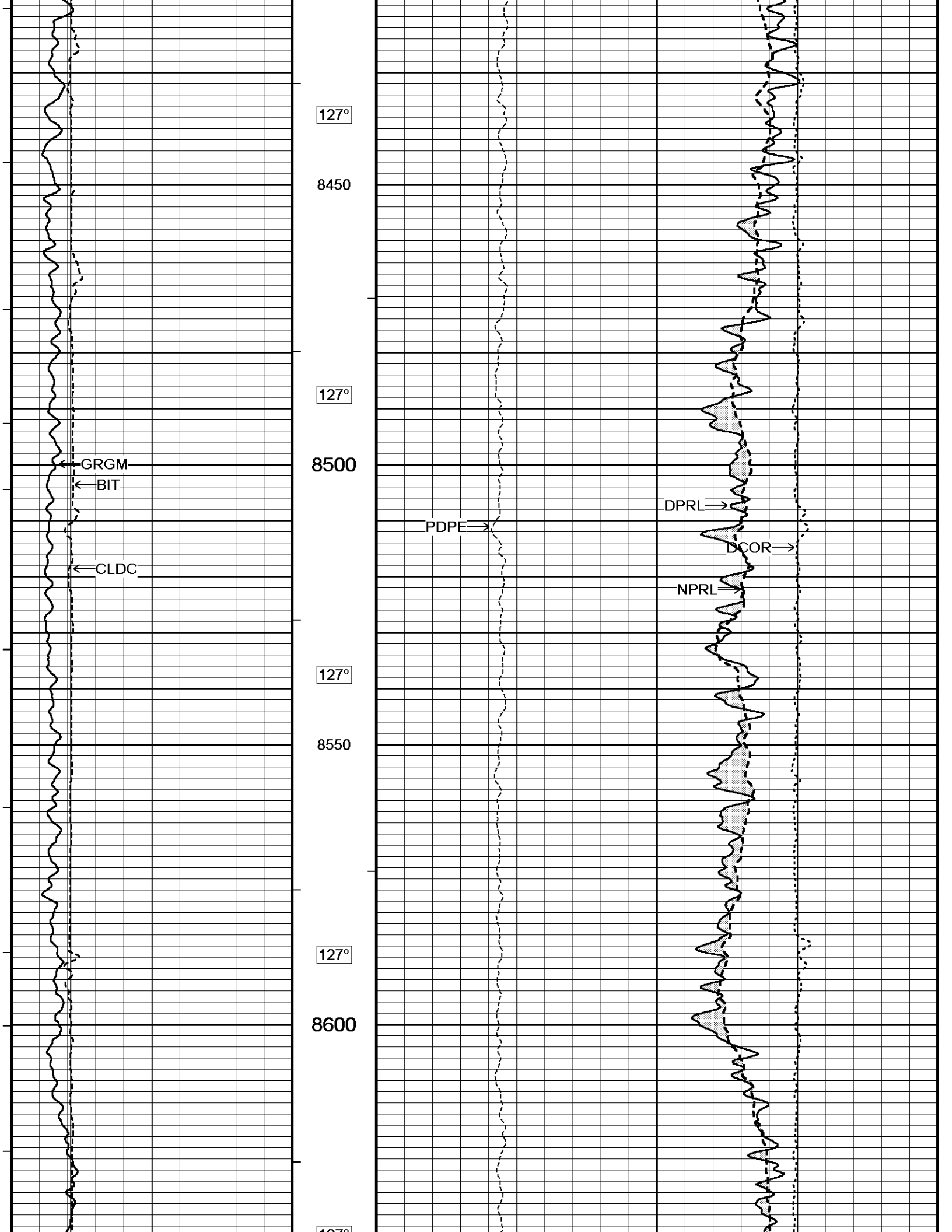


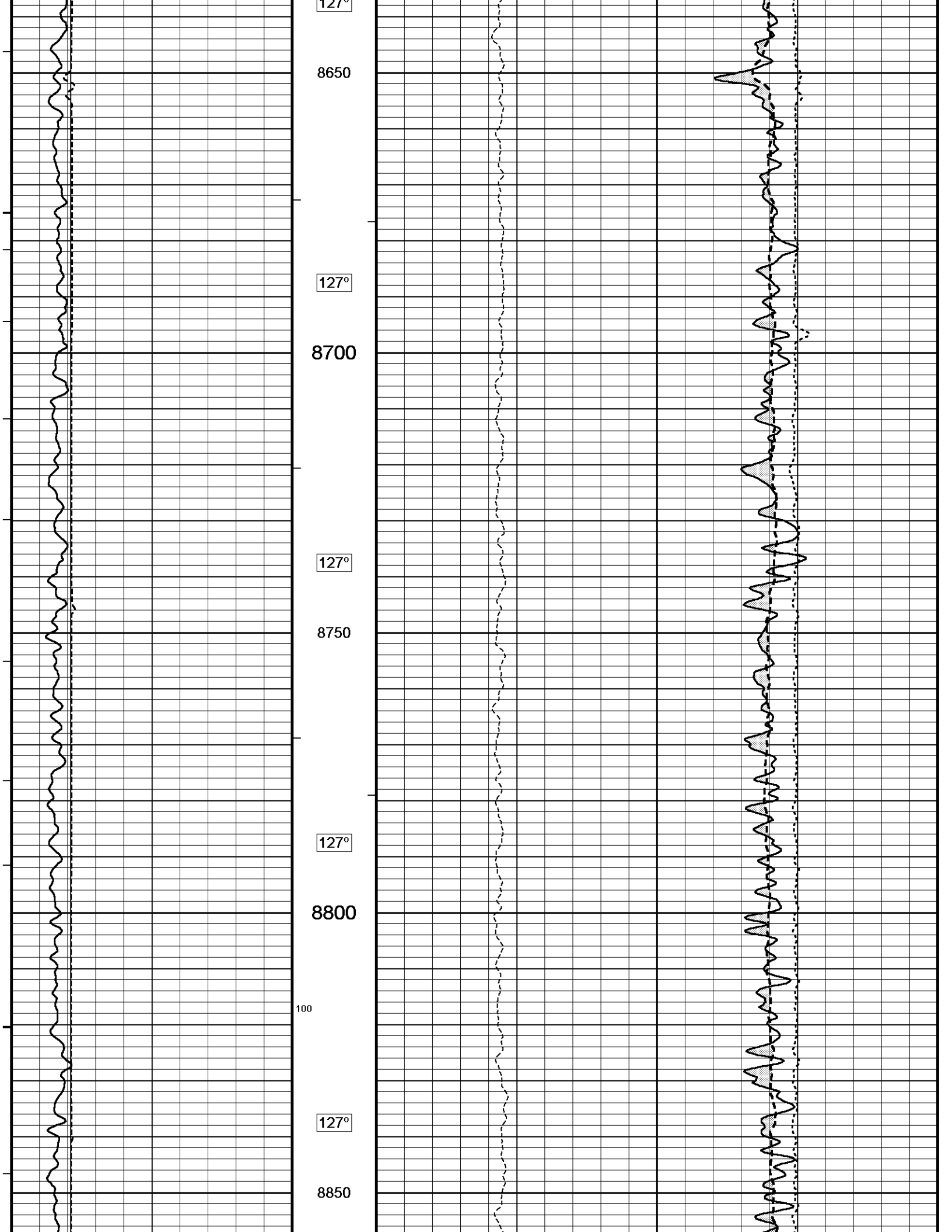


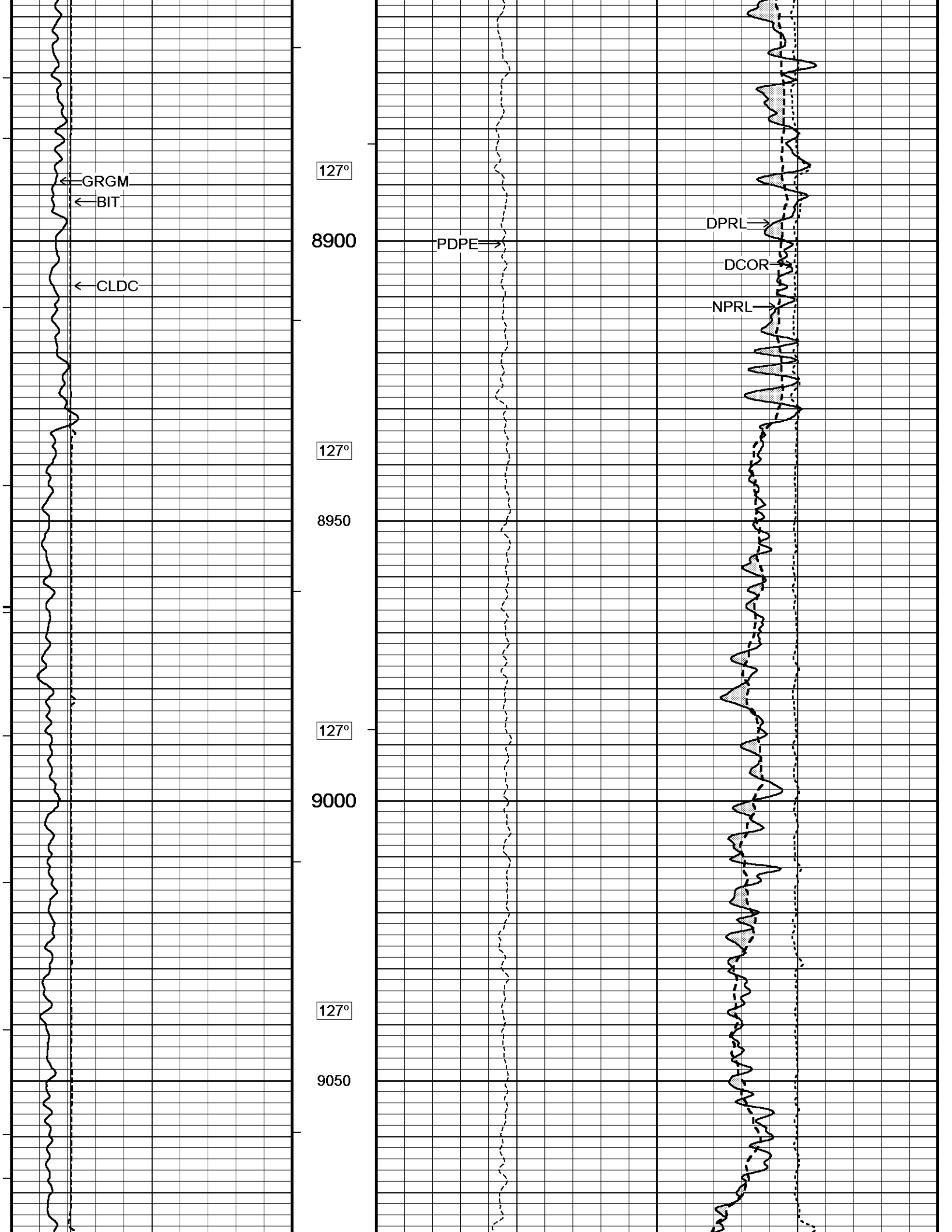


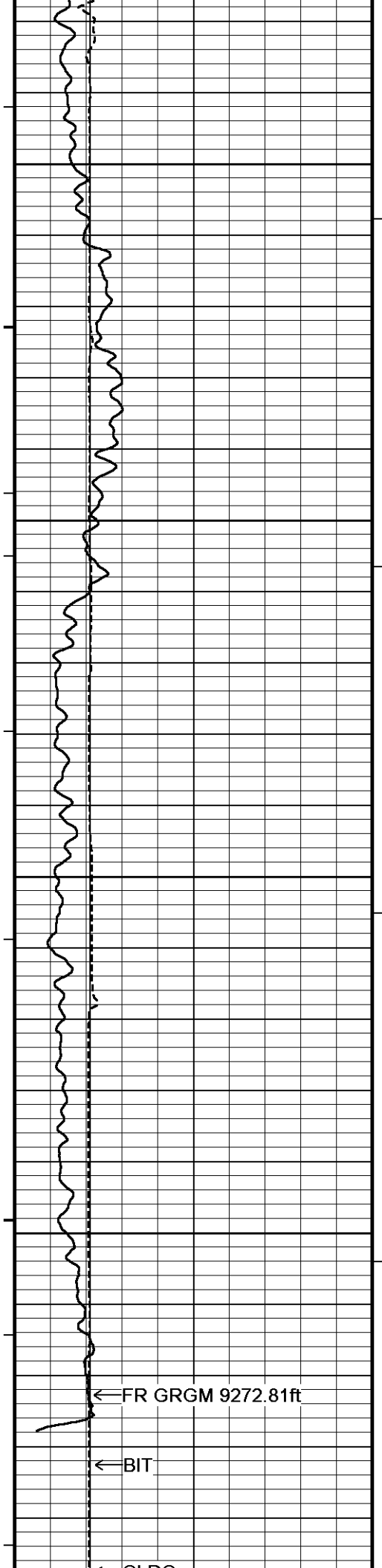




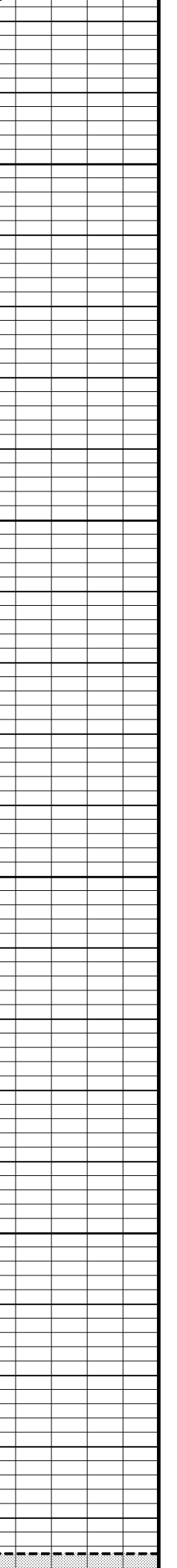
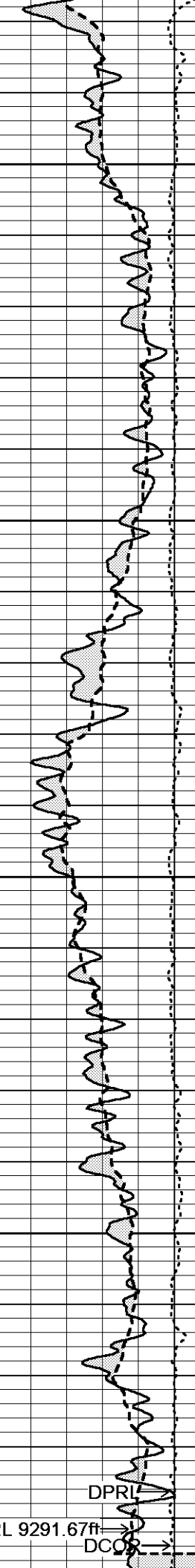
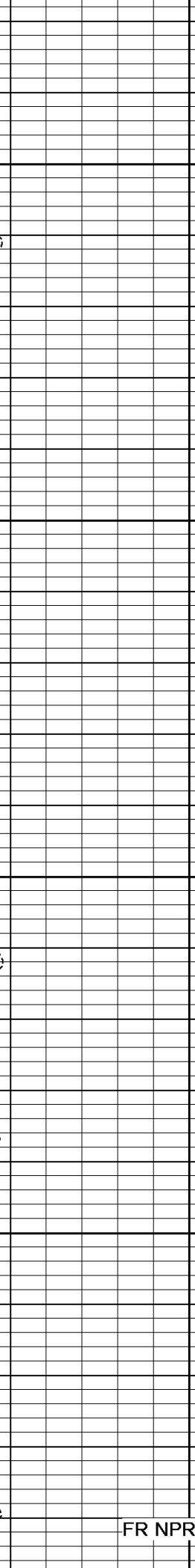
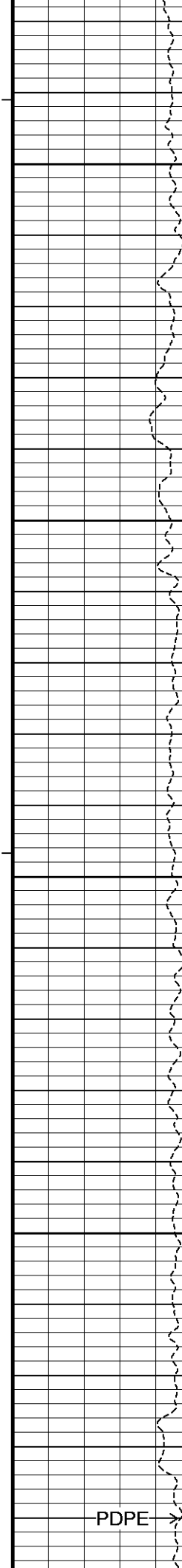








127°
9100
127°
9150
127°
9200
128°
9250



← FR GRGM 9272.81ft

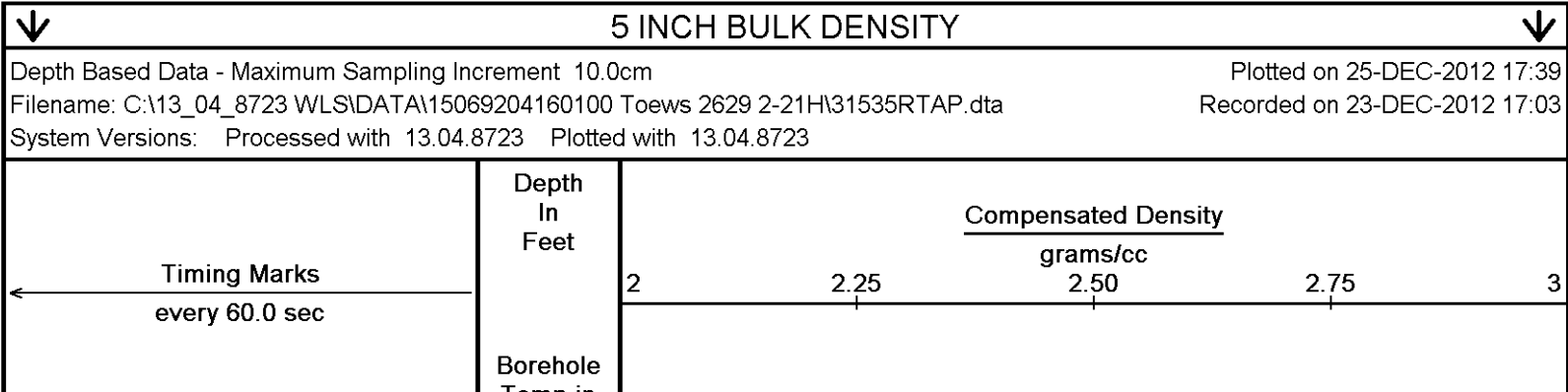
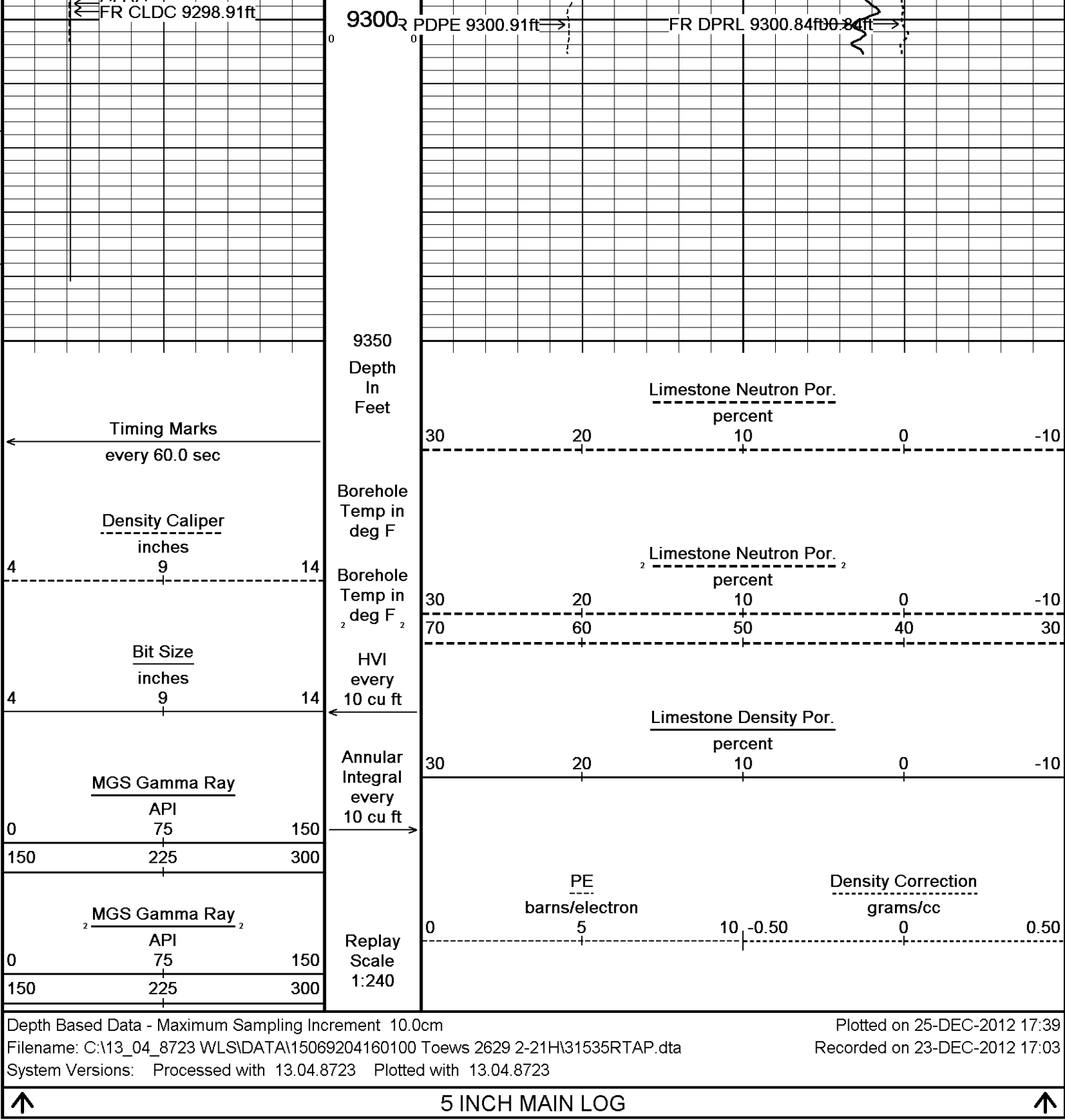
← BIT

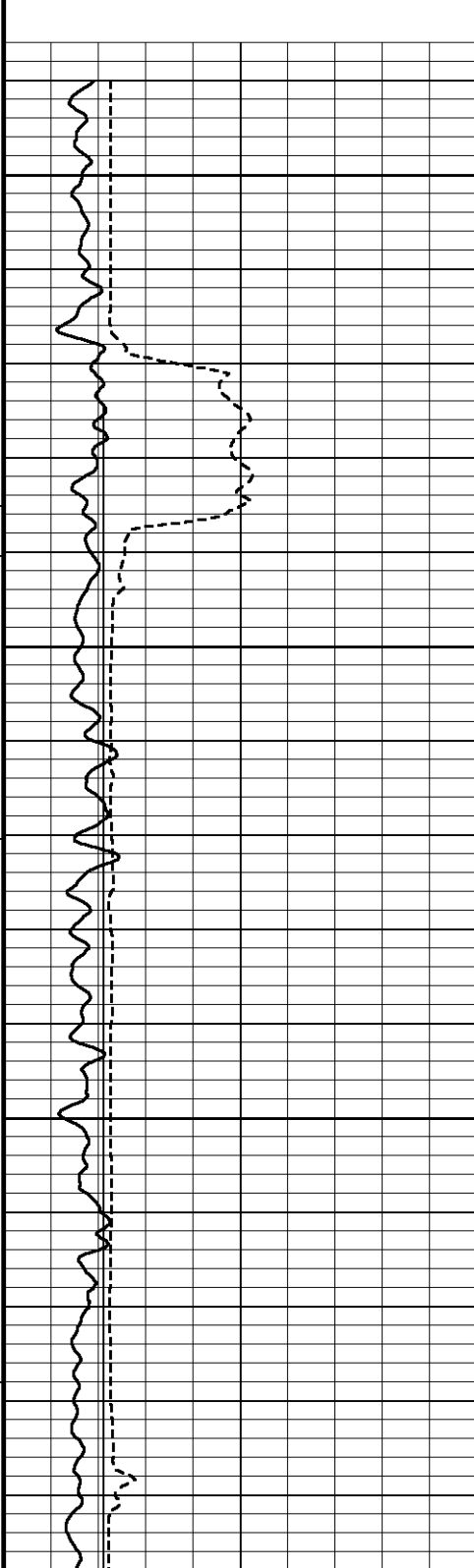
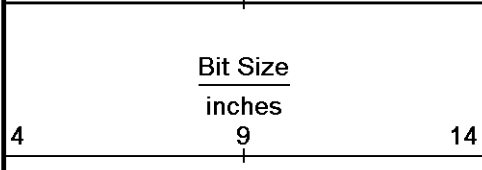
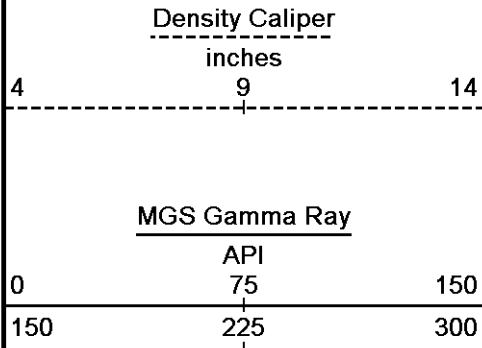
PDPE →

FR NPRL 9291.67ft →

DPRI

DCO →



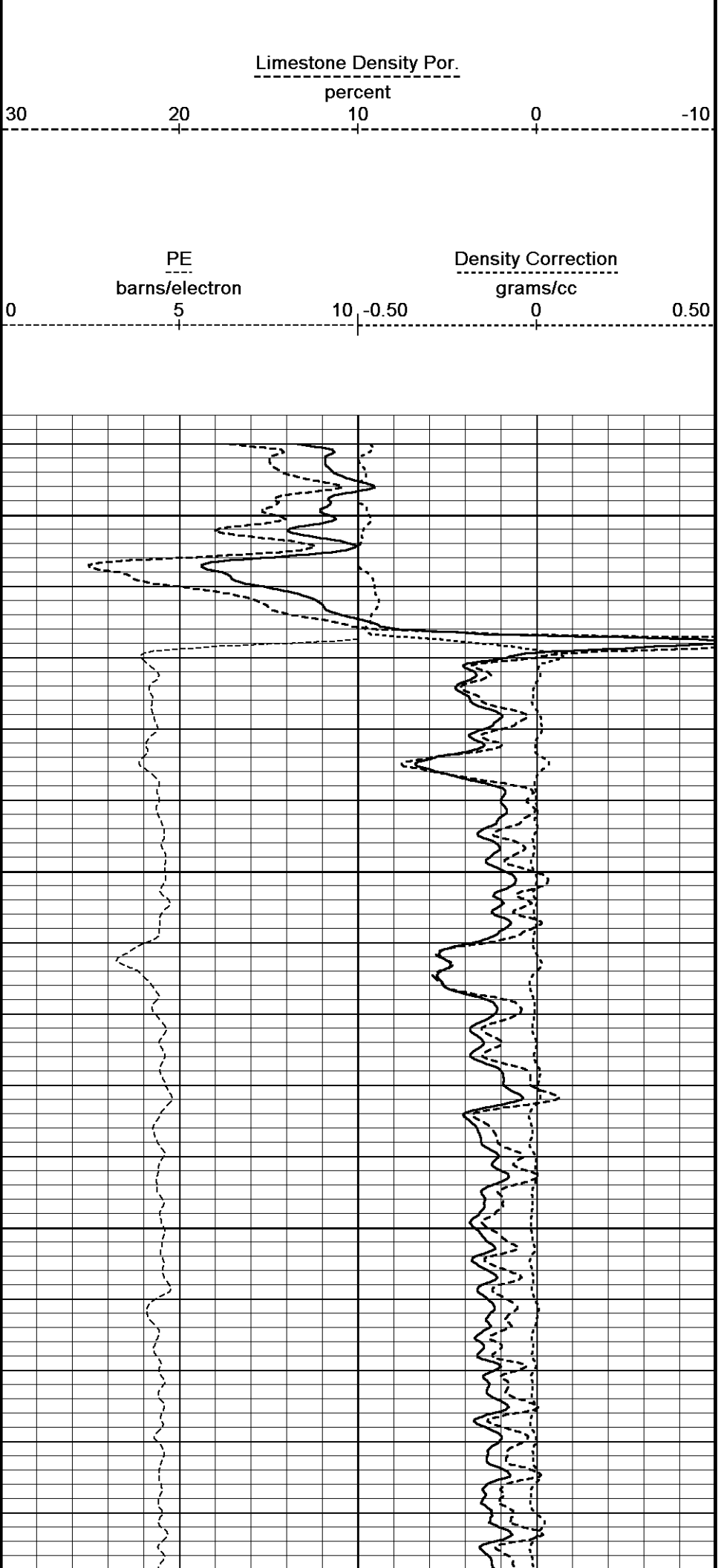


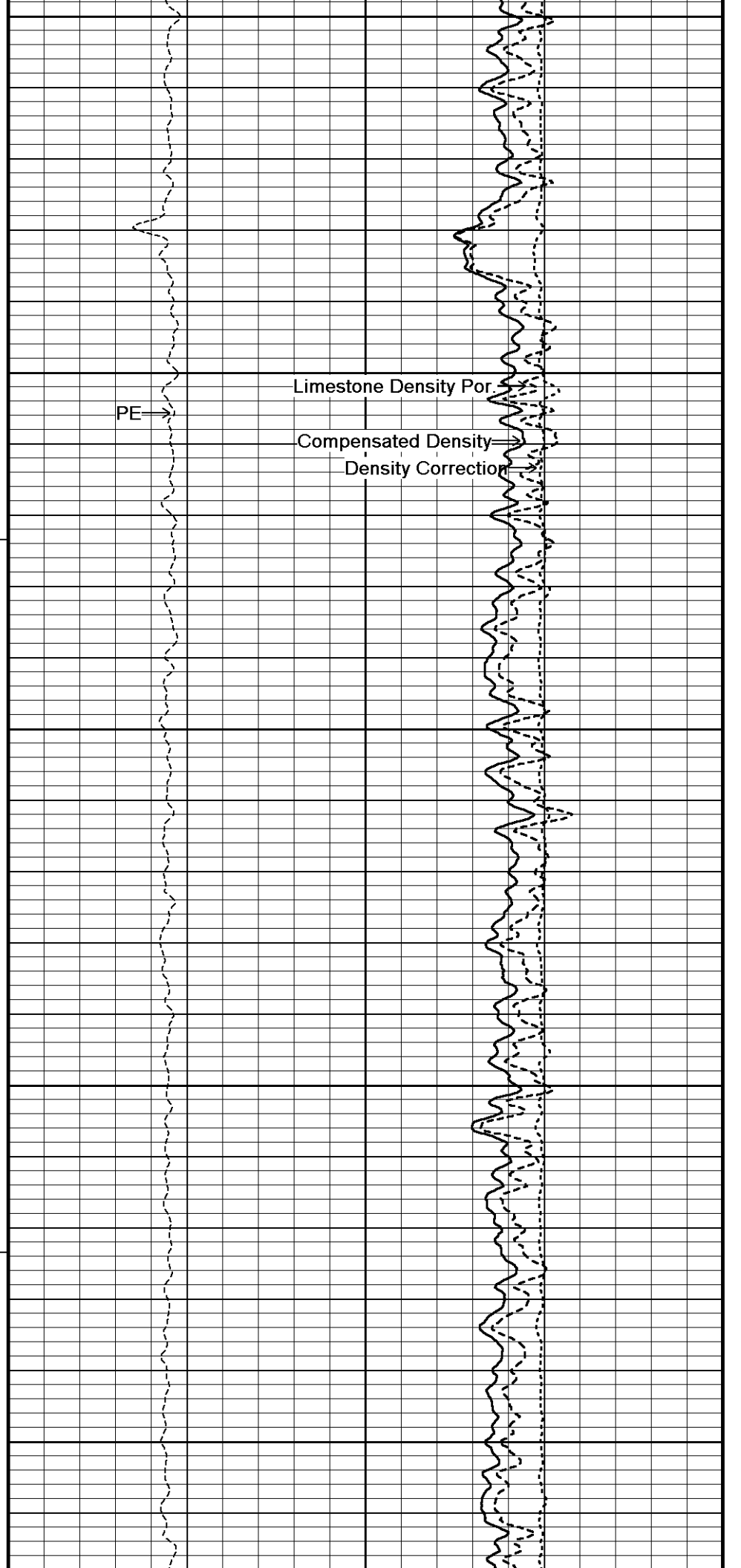
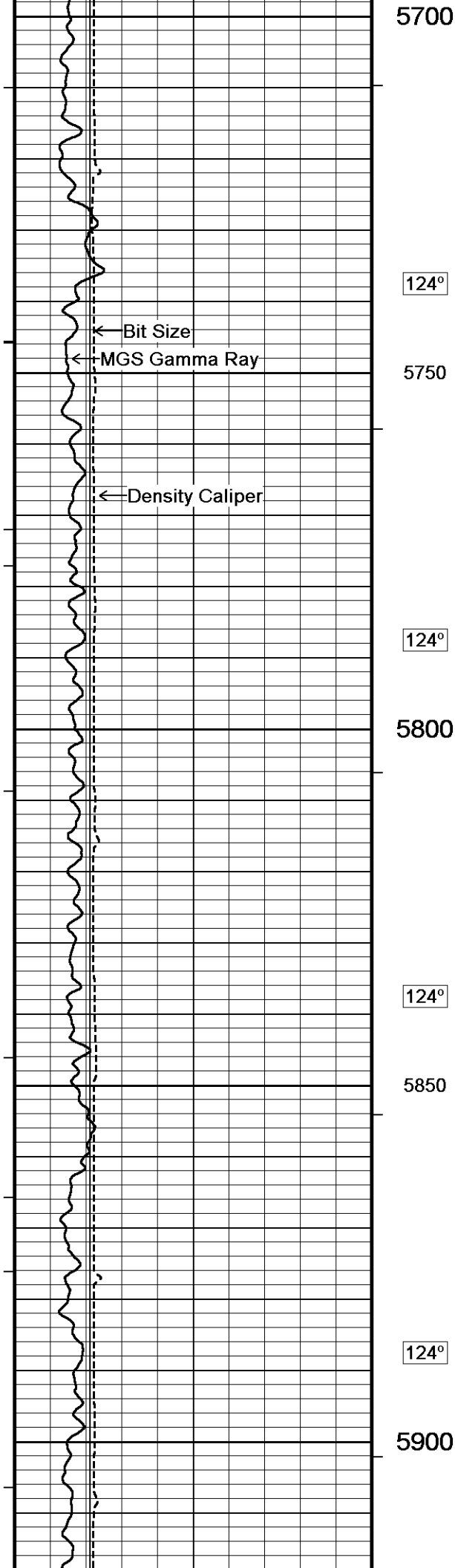
Temp in
deg F

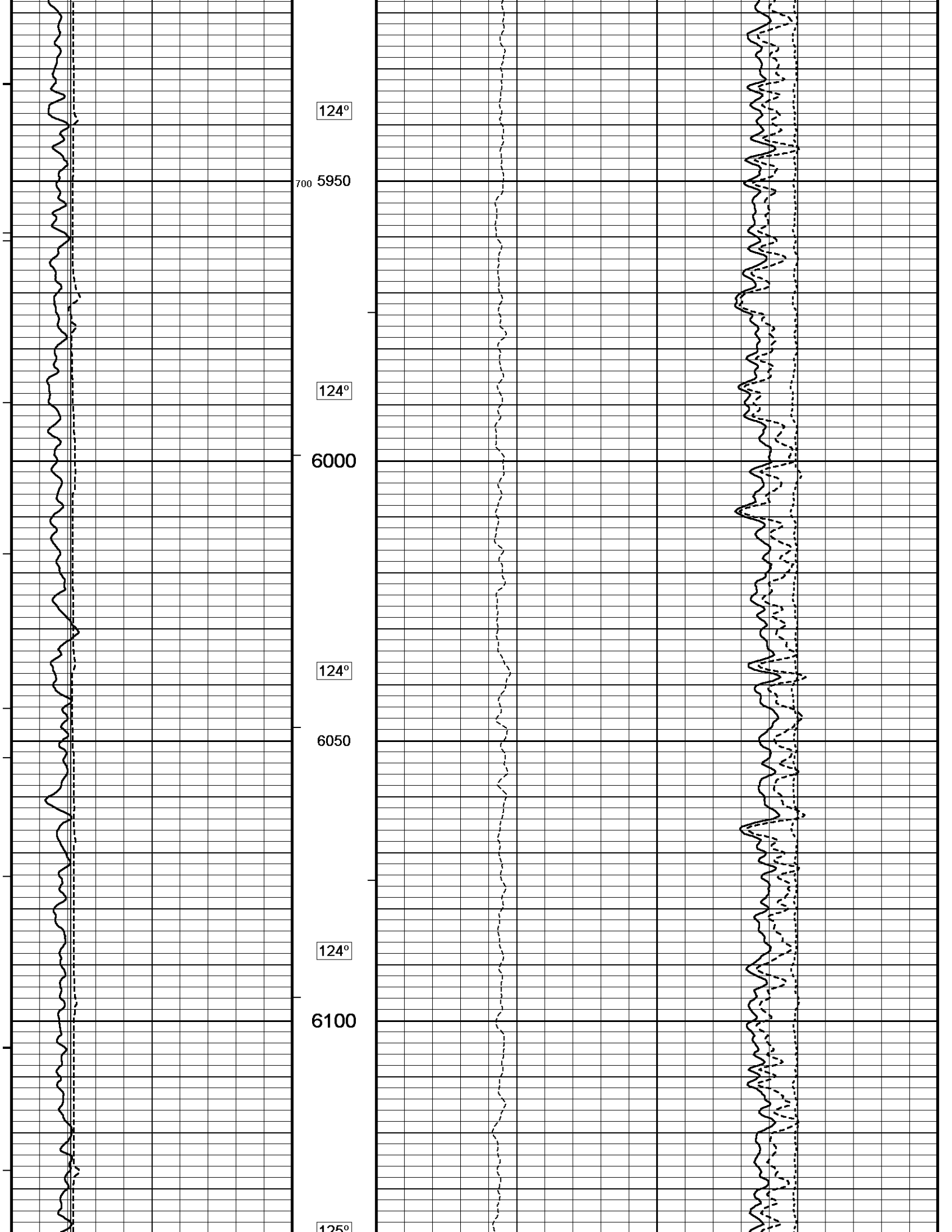
HVI
every
10 cu ft

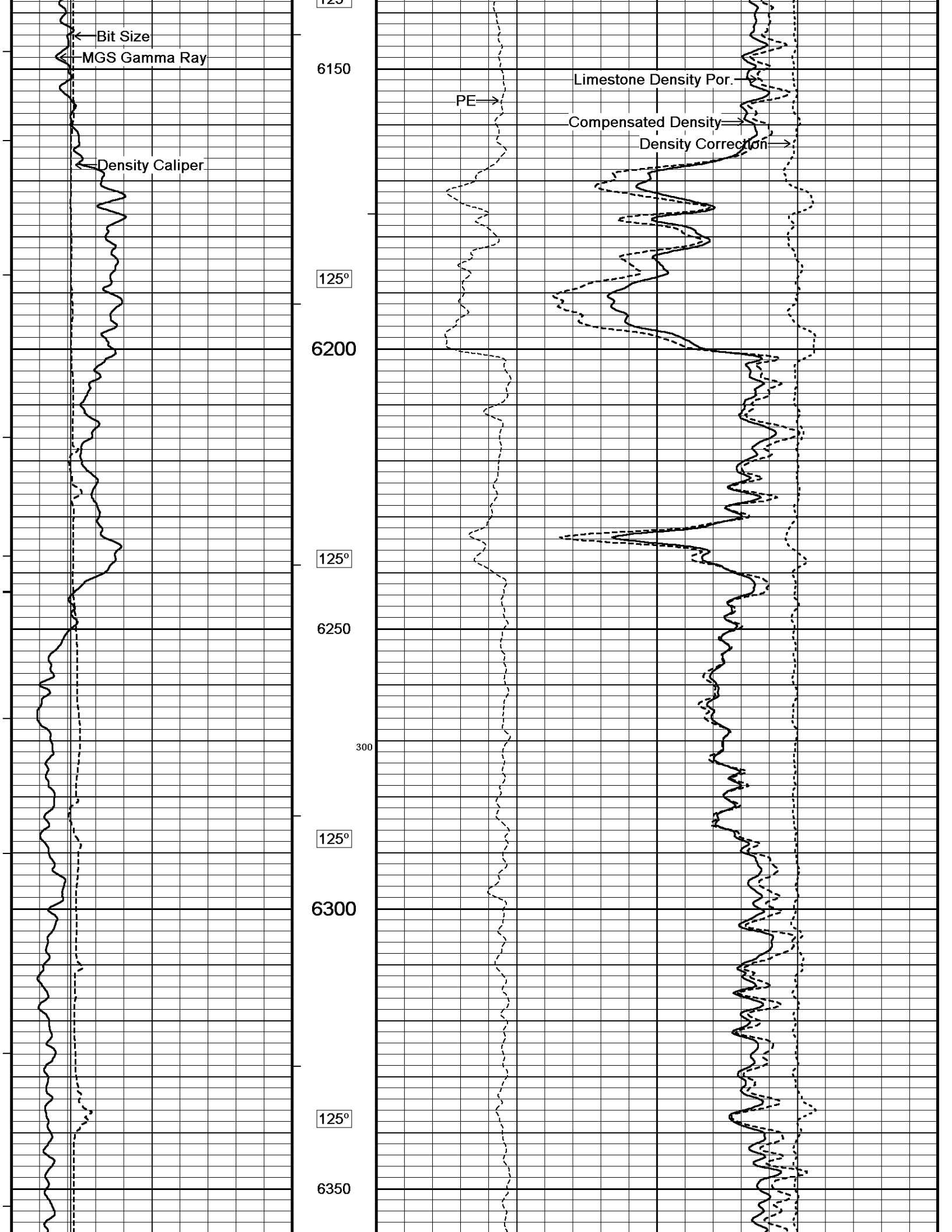
Annular
Integral
every
10 cu ft

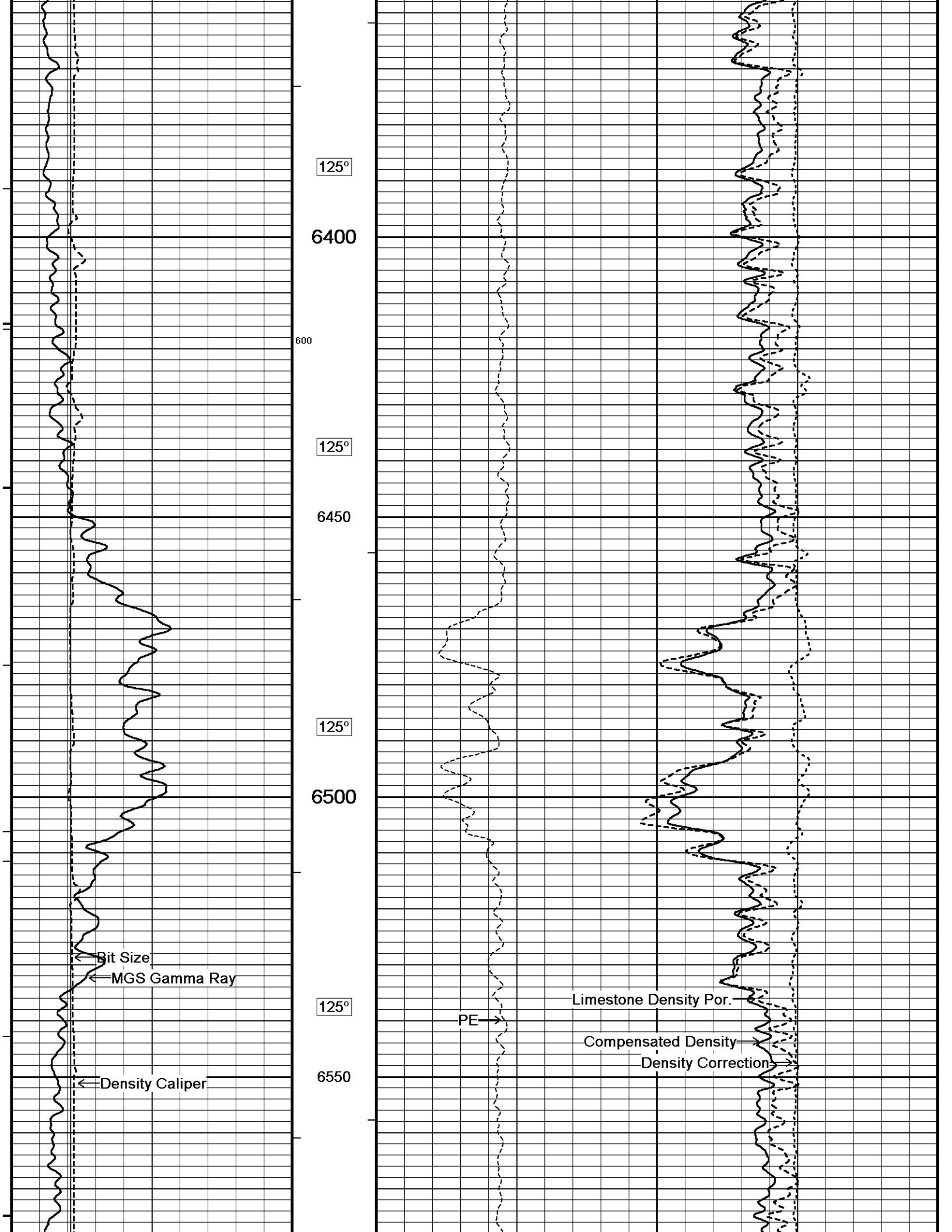
Replay
Scale
1:240

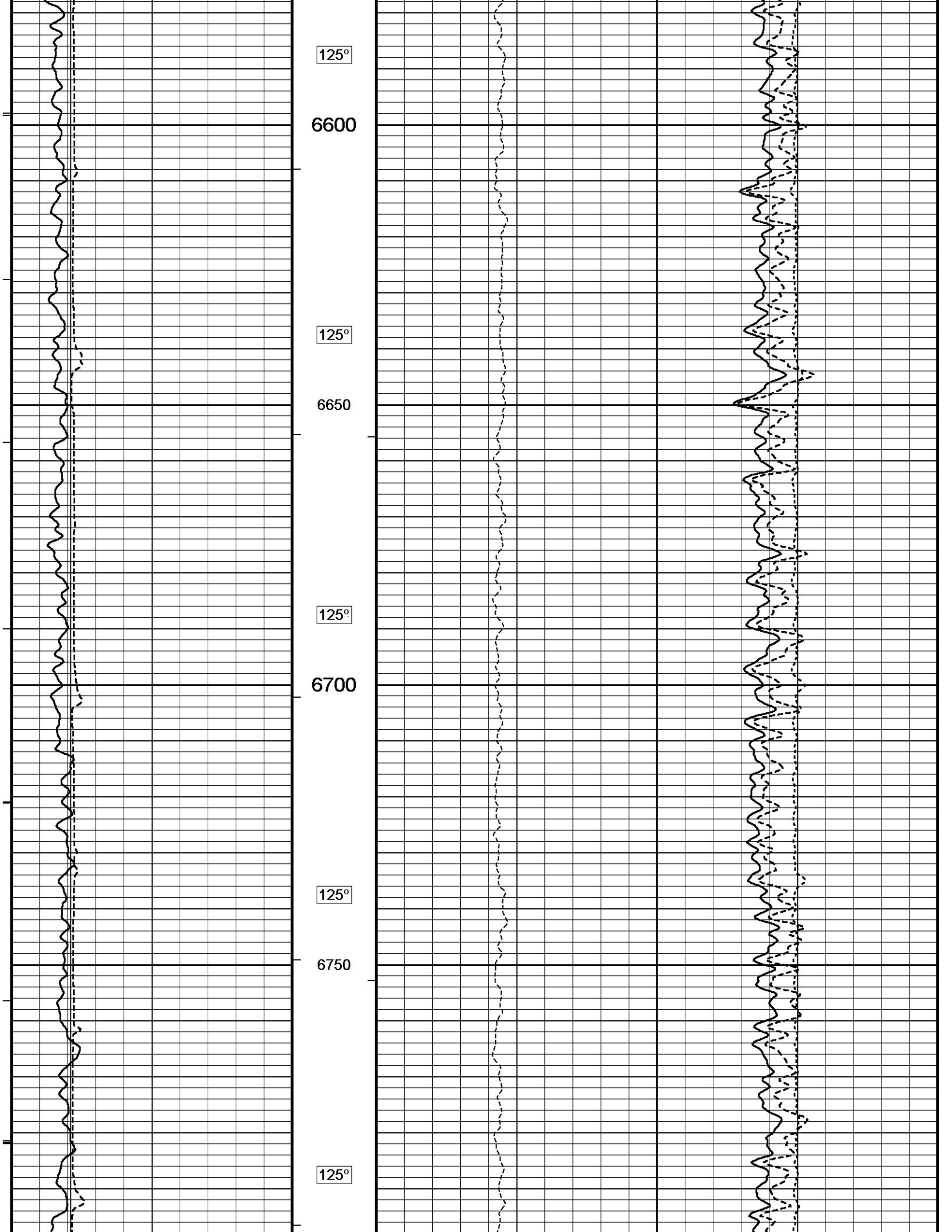


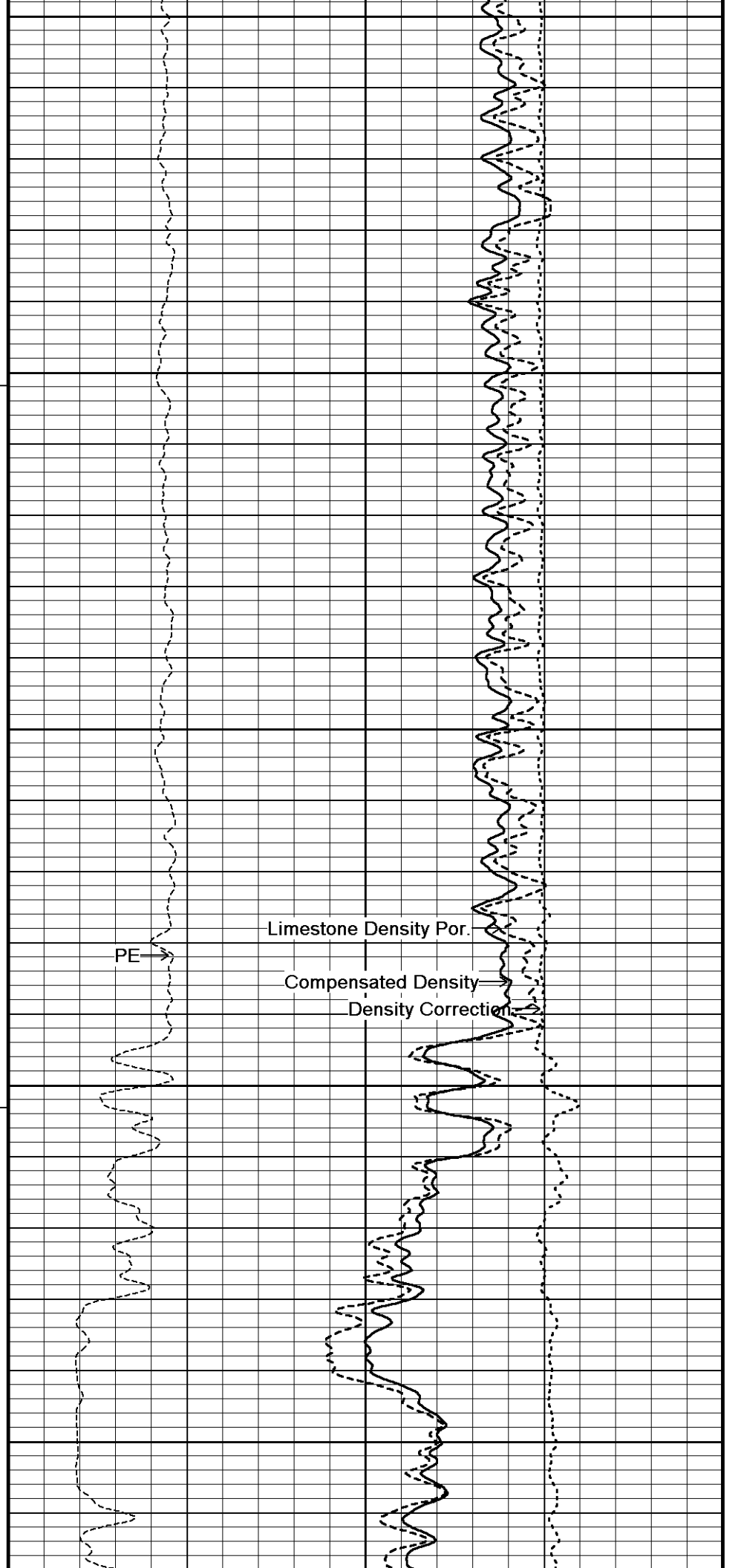
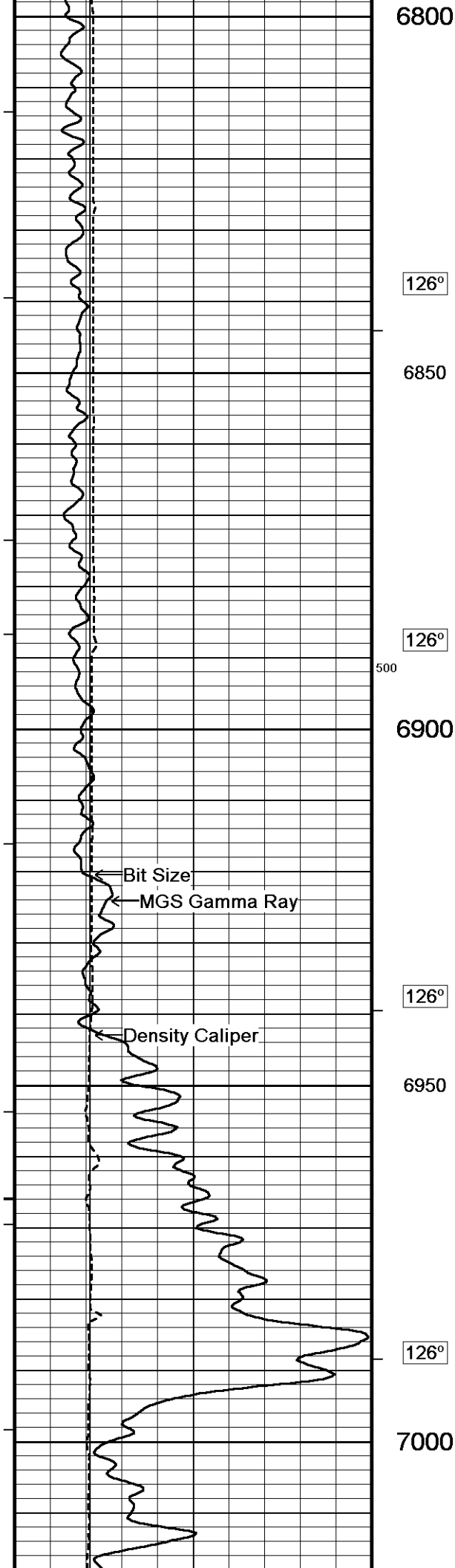


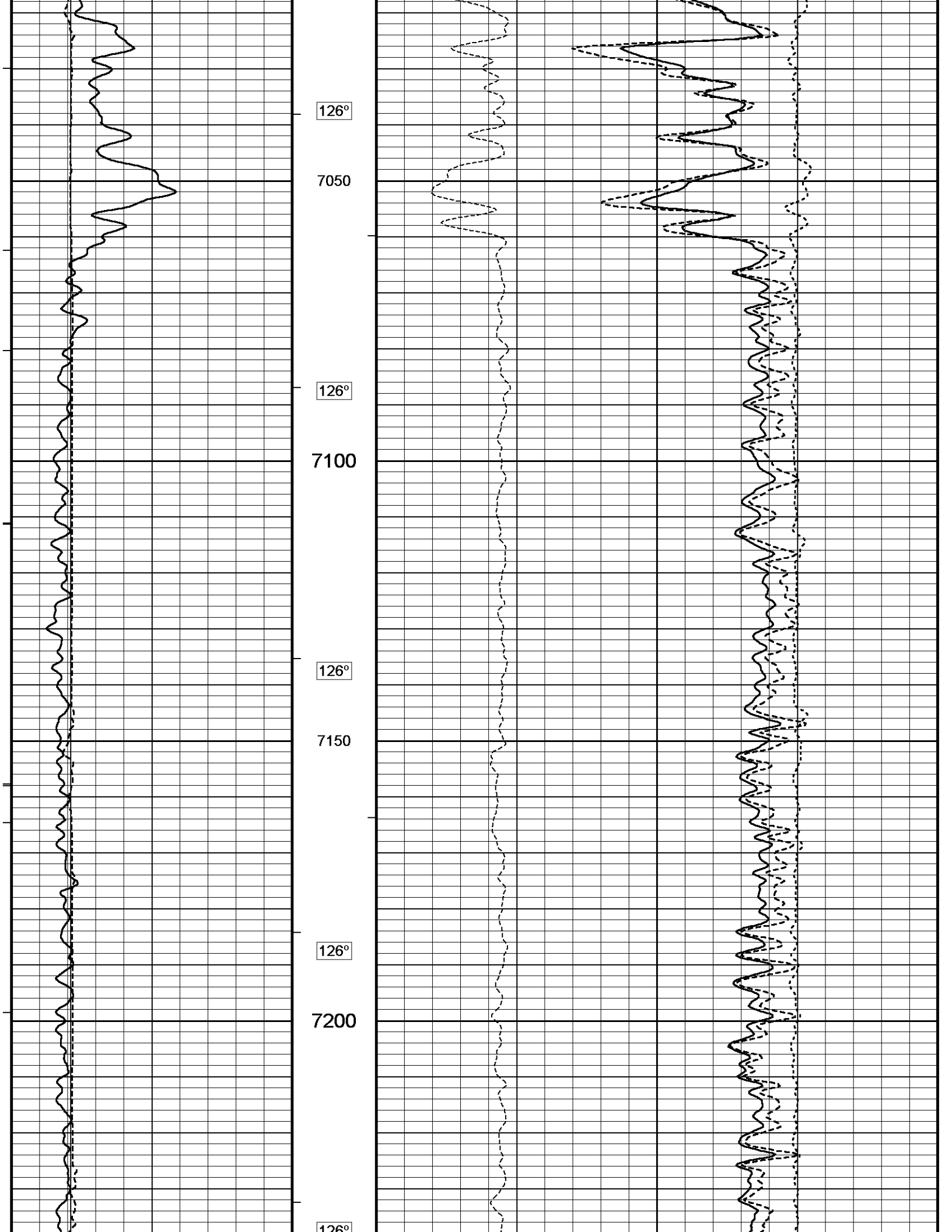


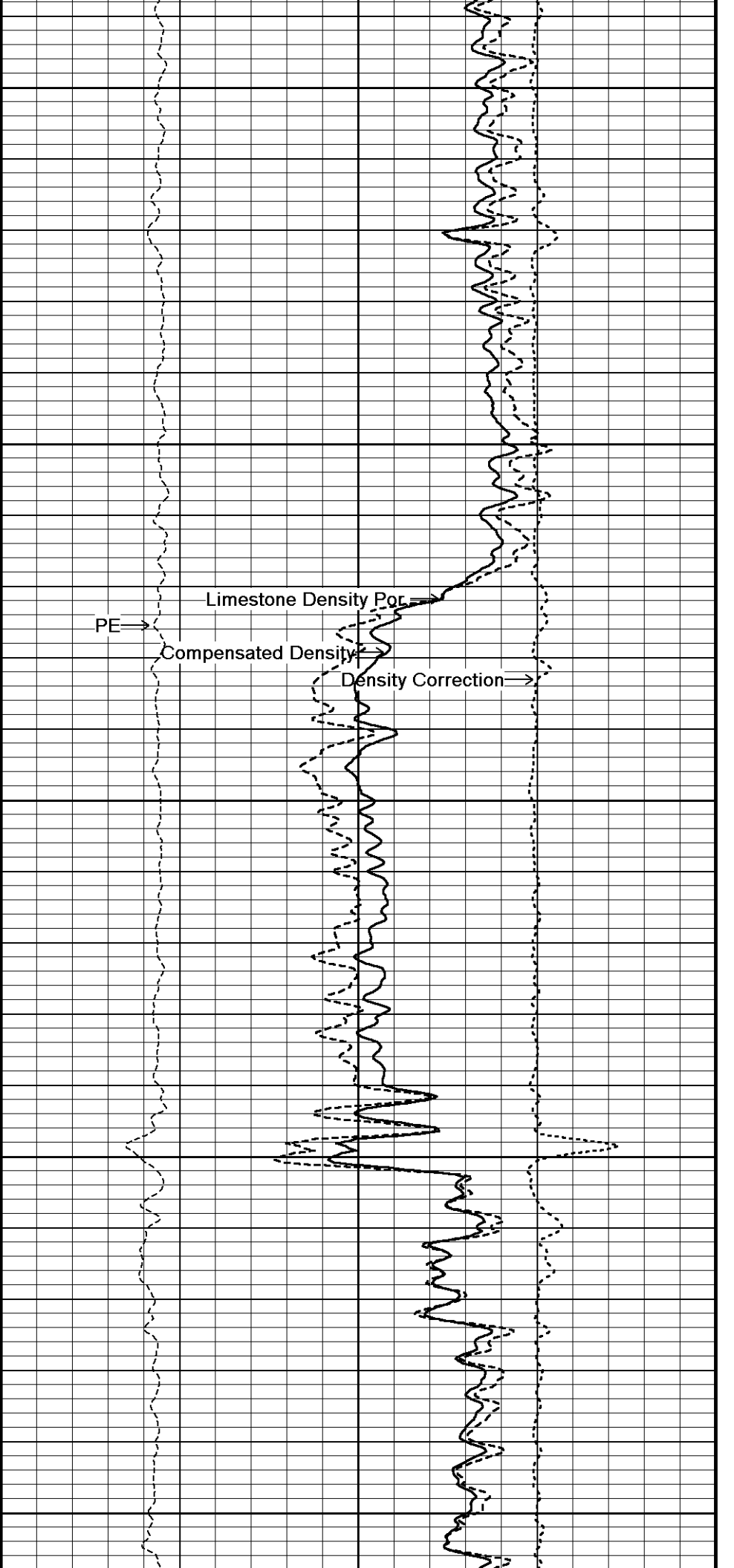
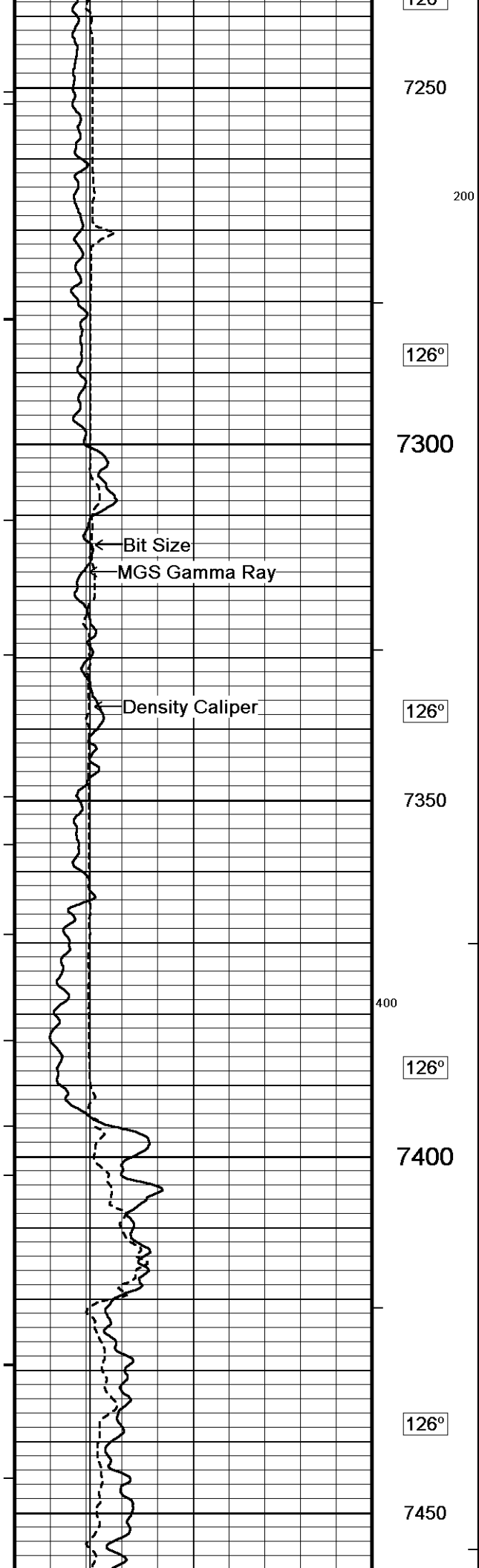


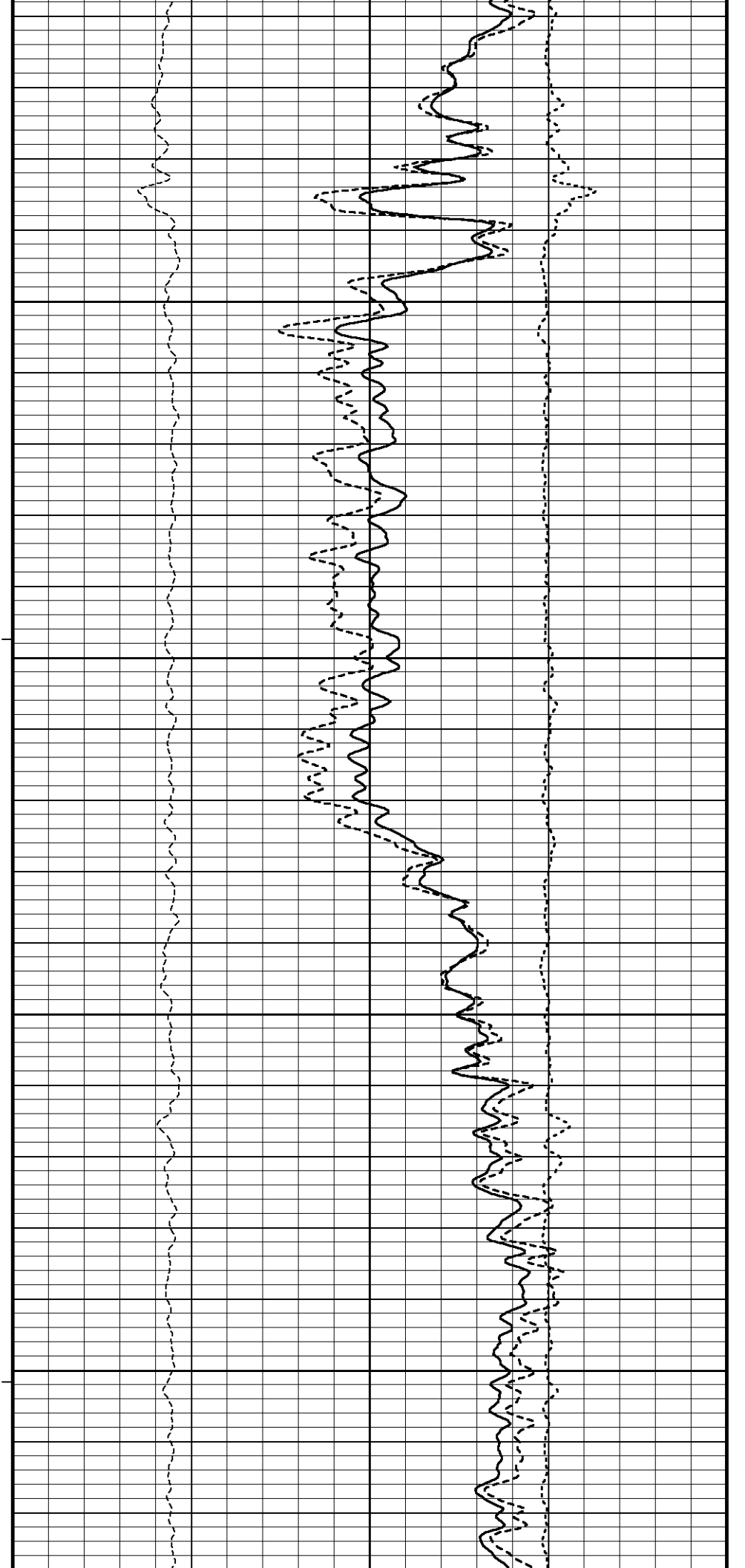
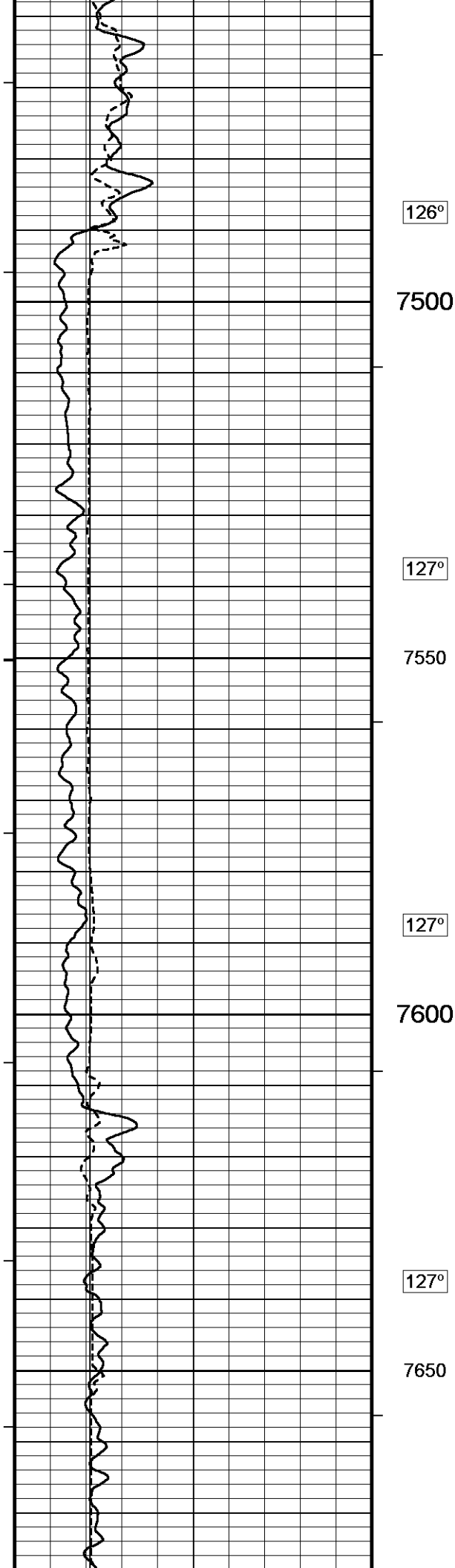


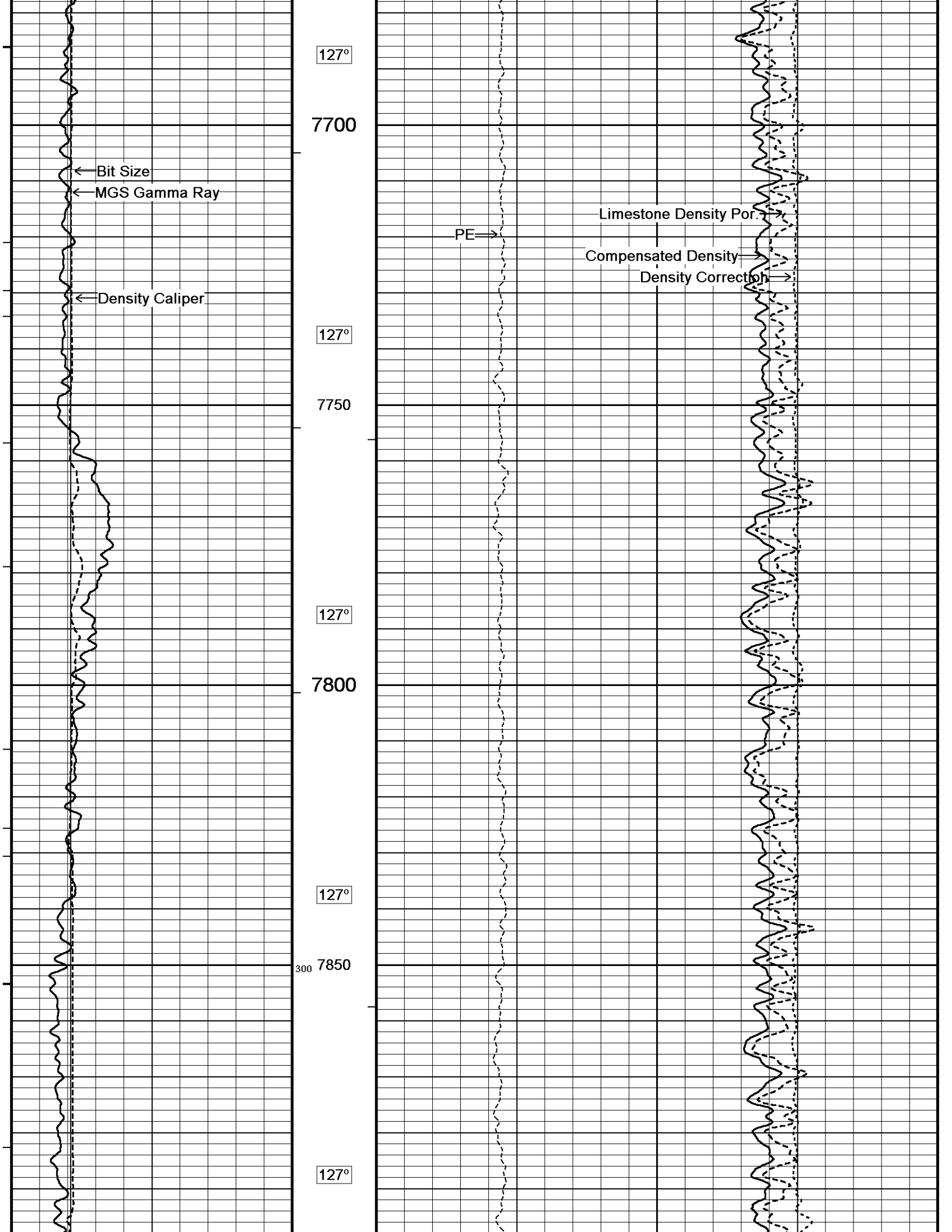


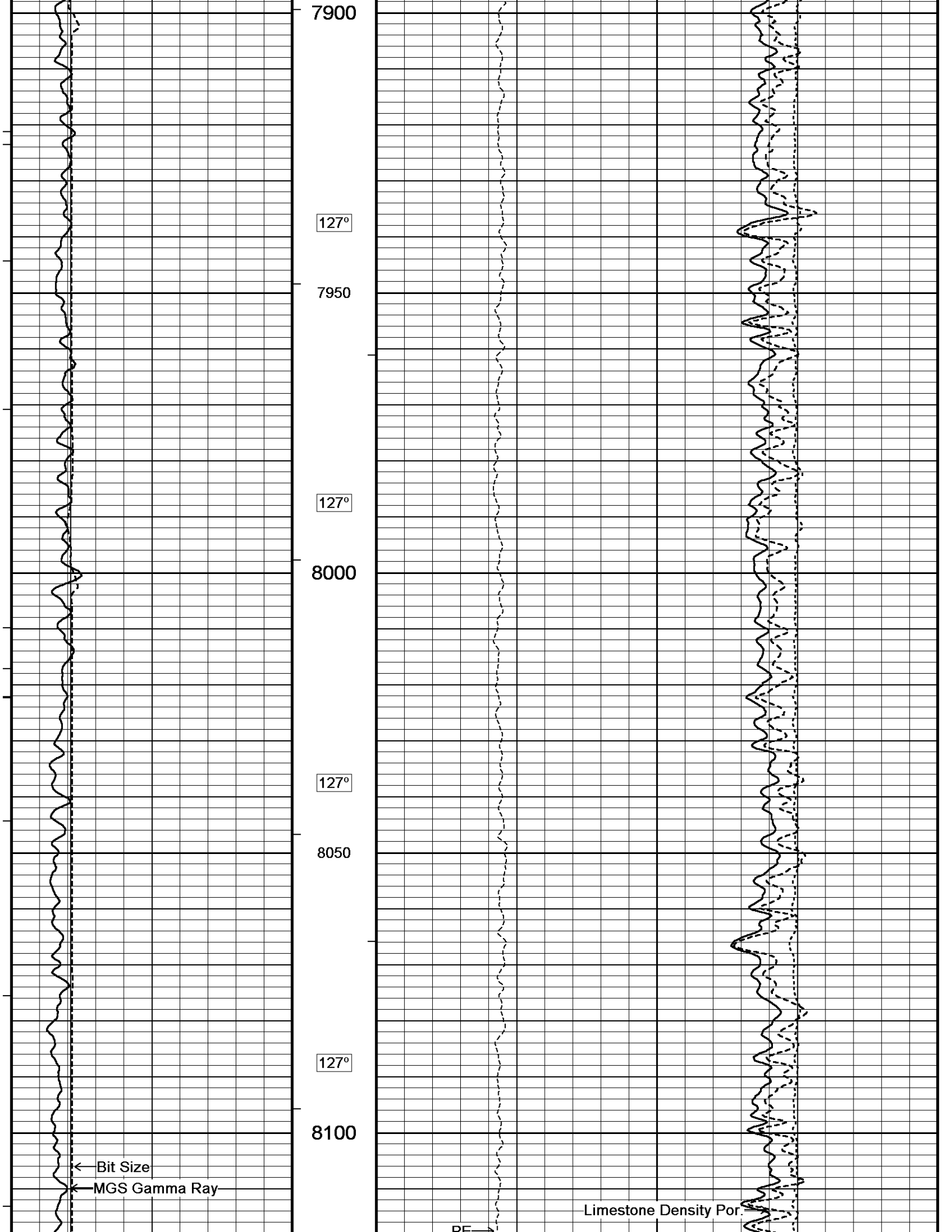


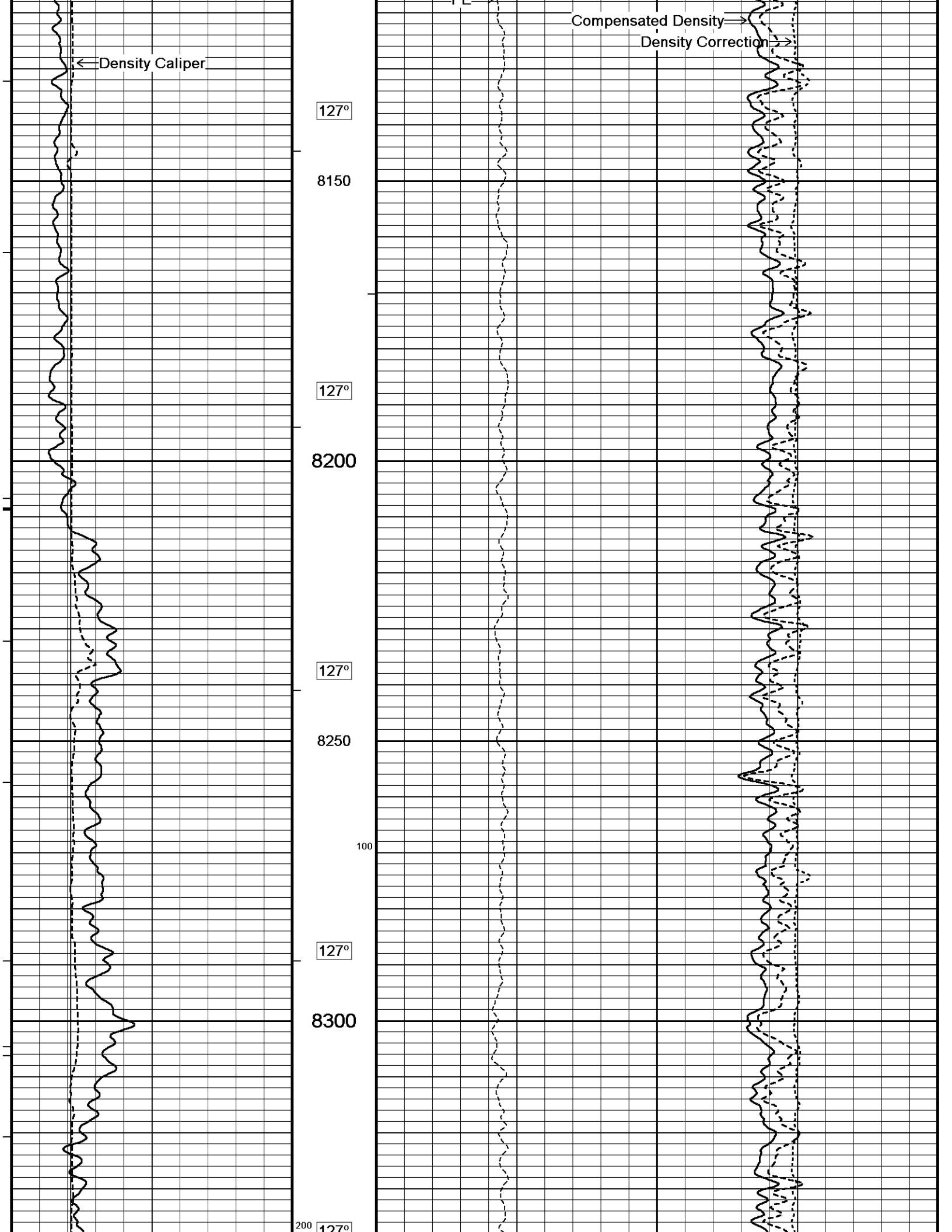


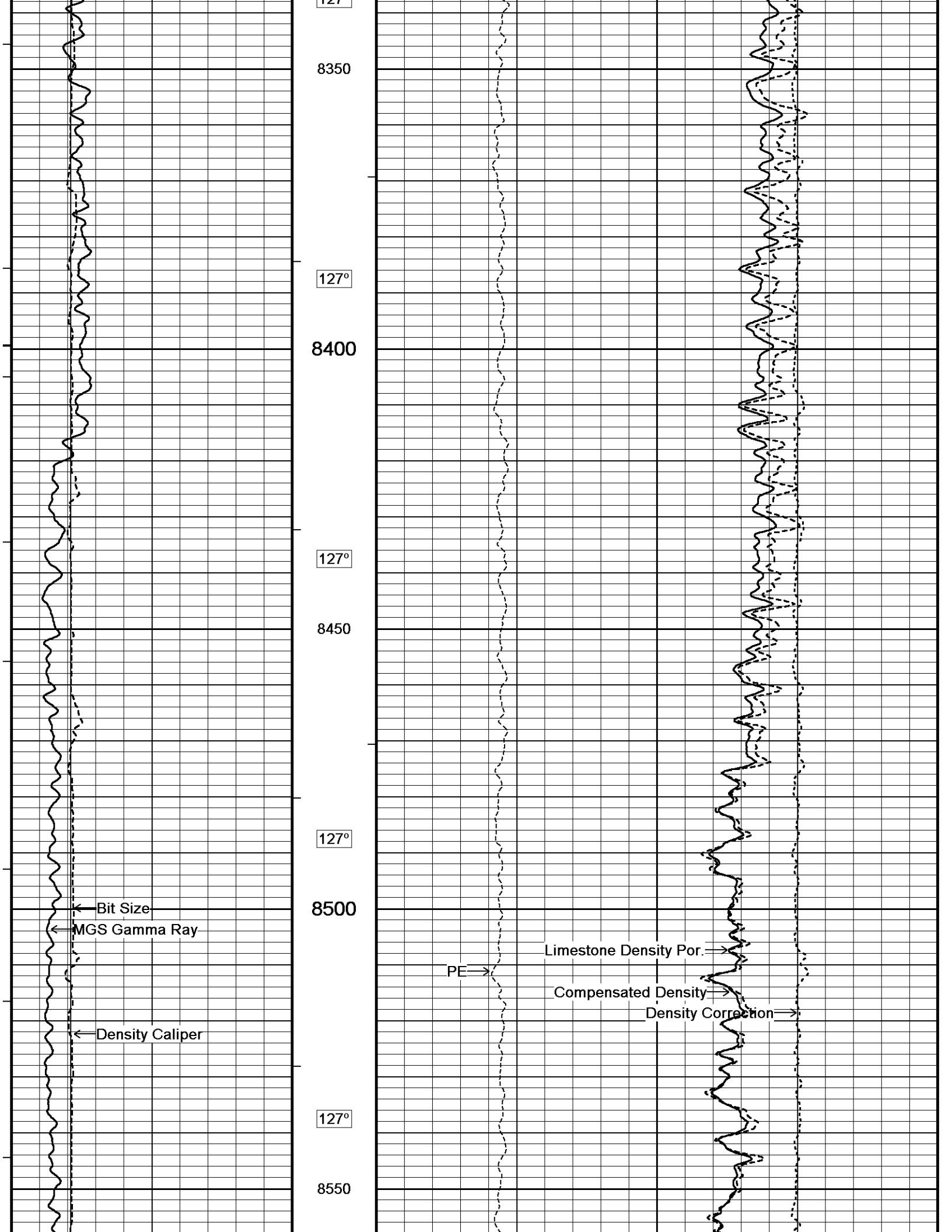


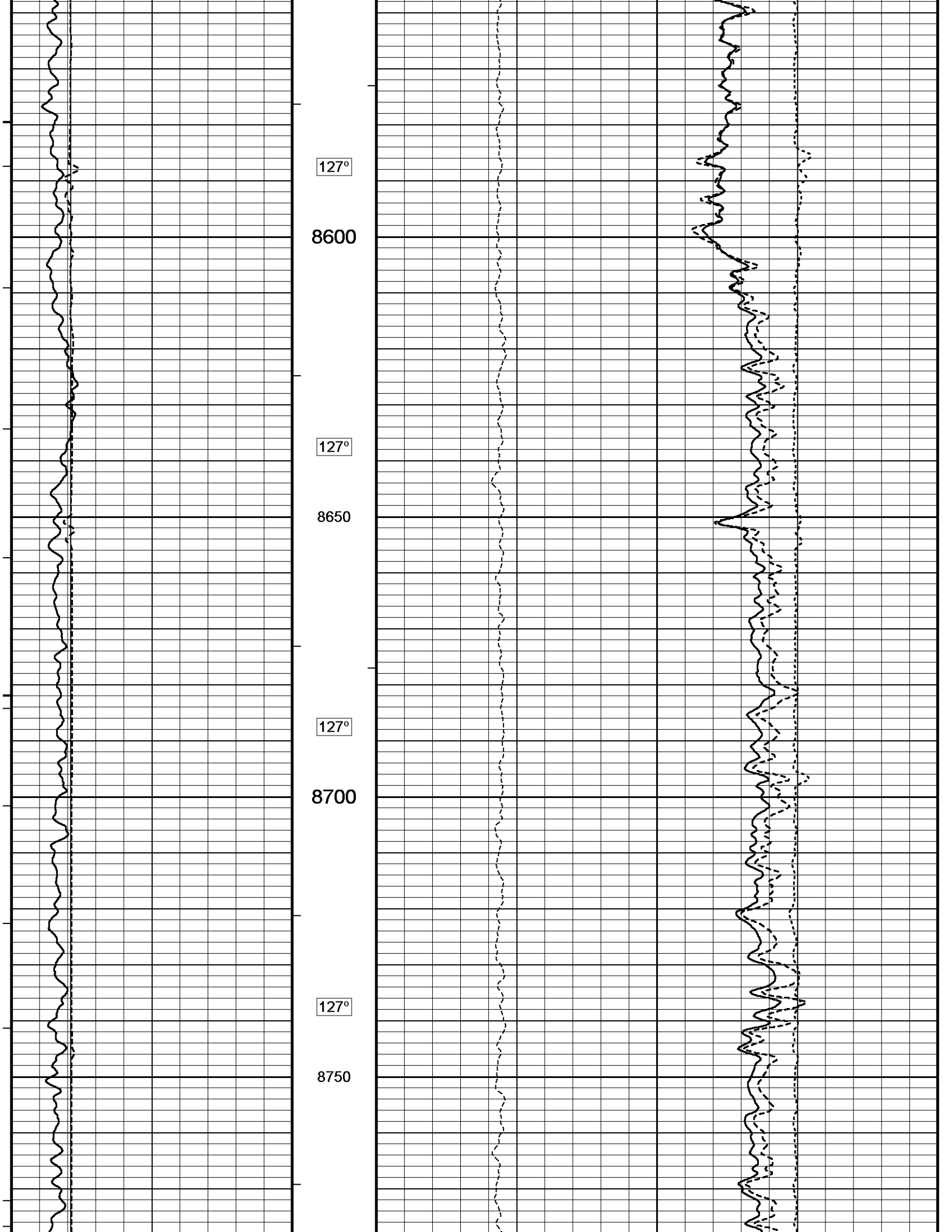


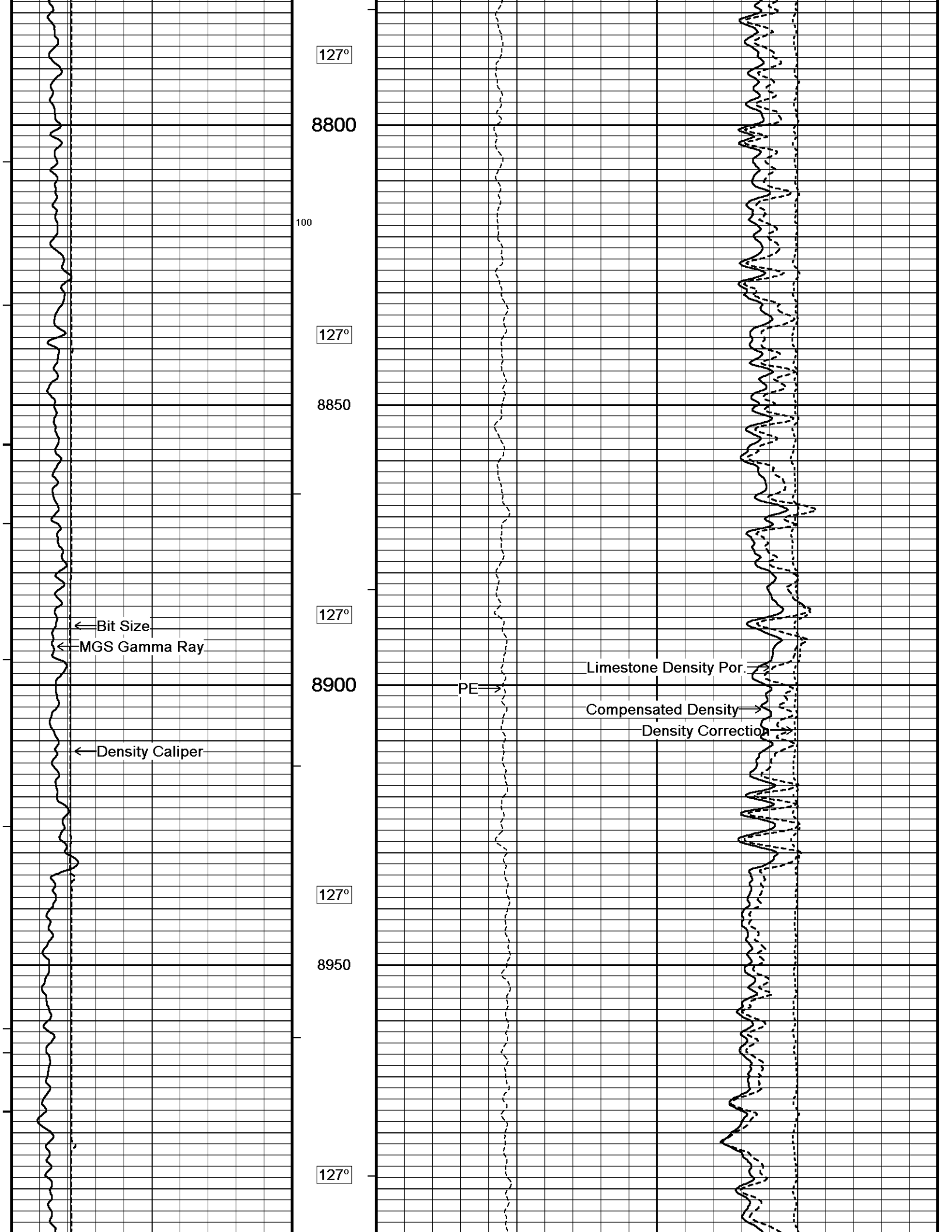


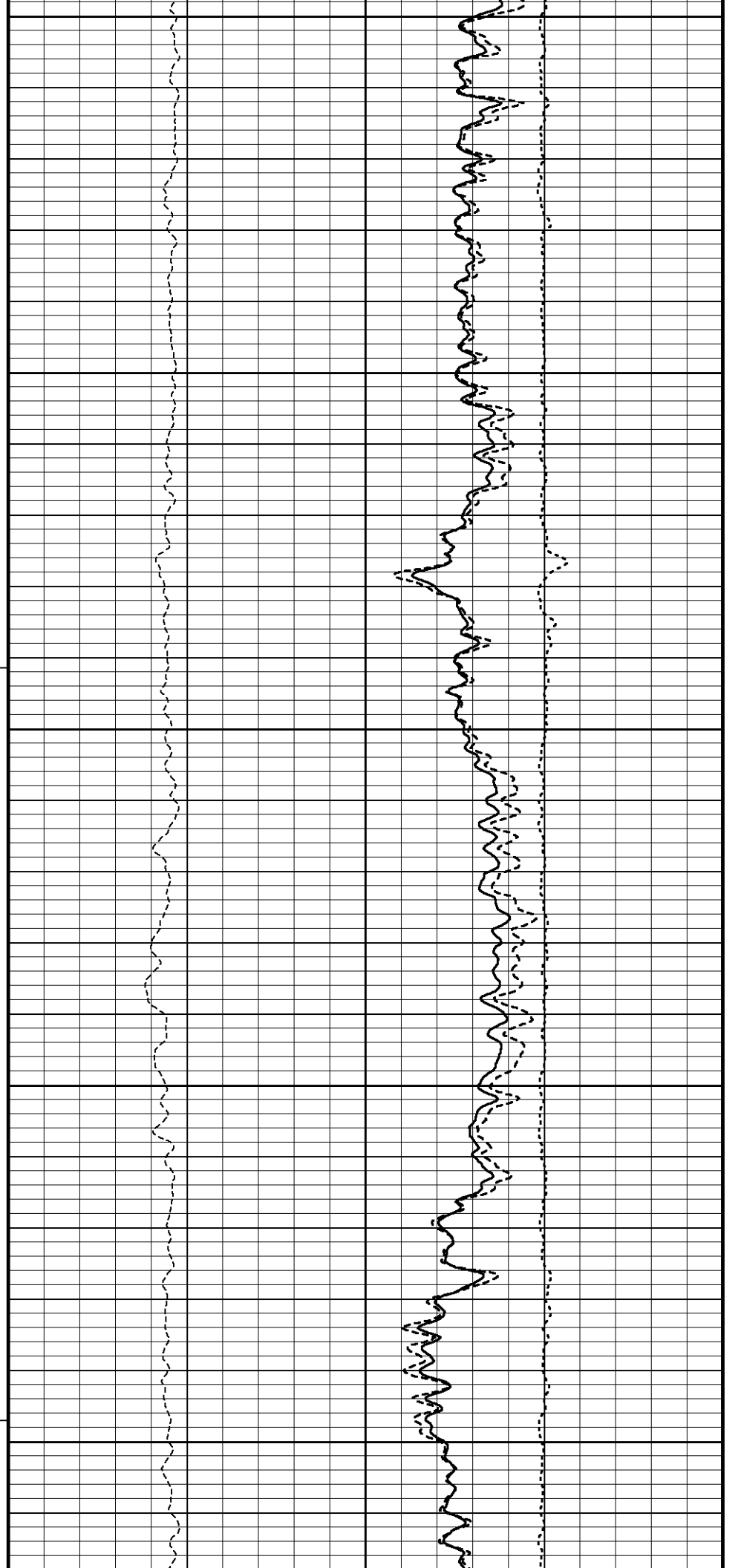
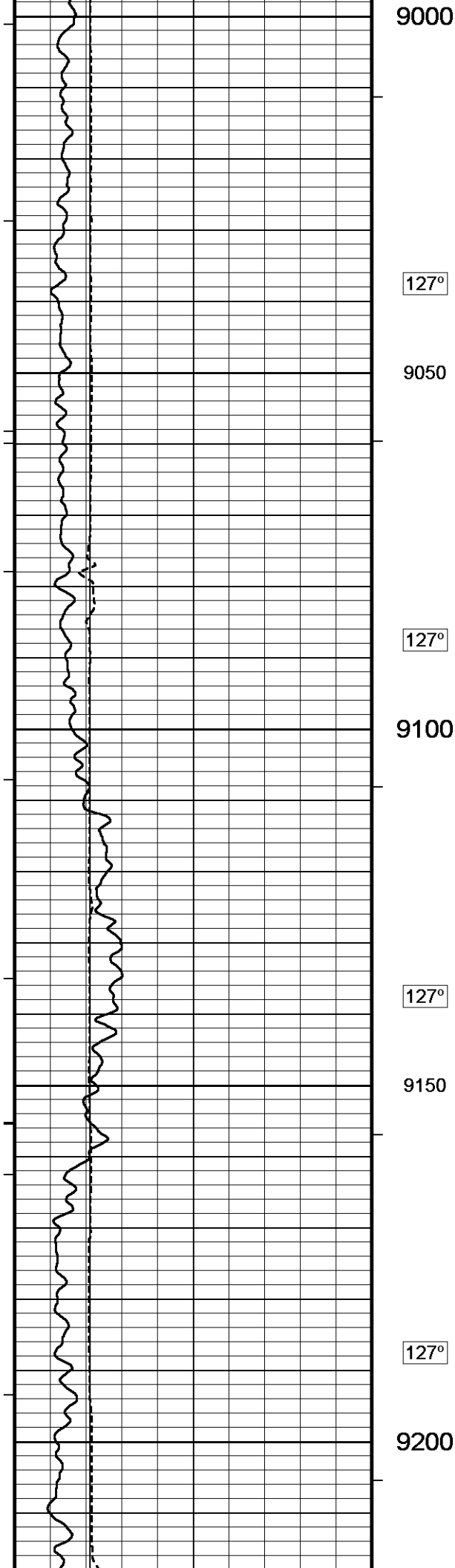


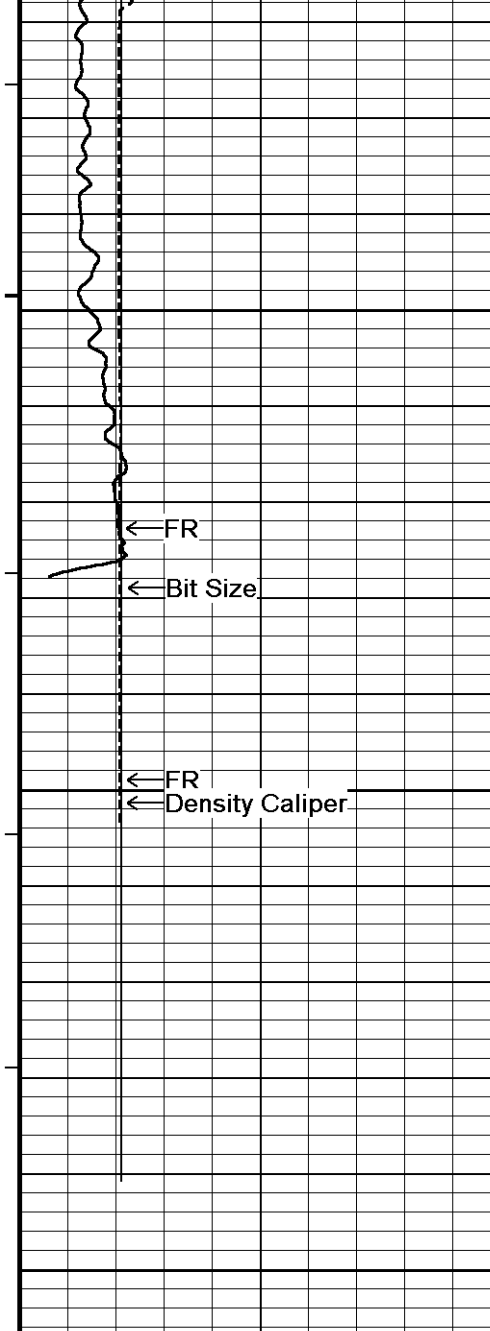












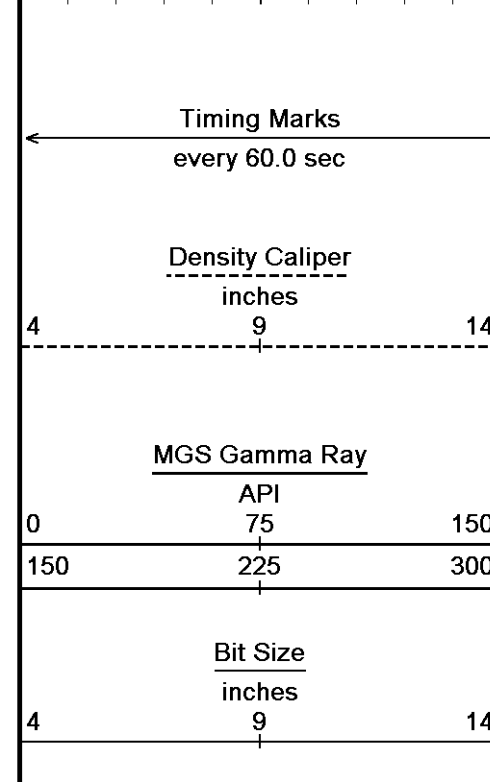
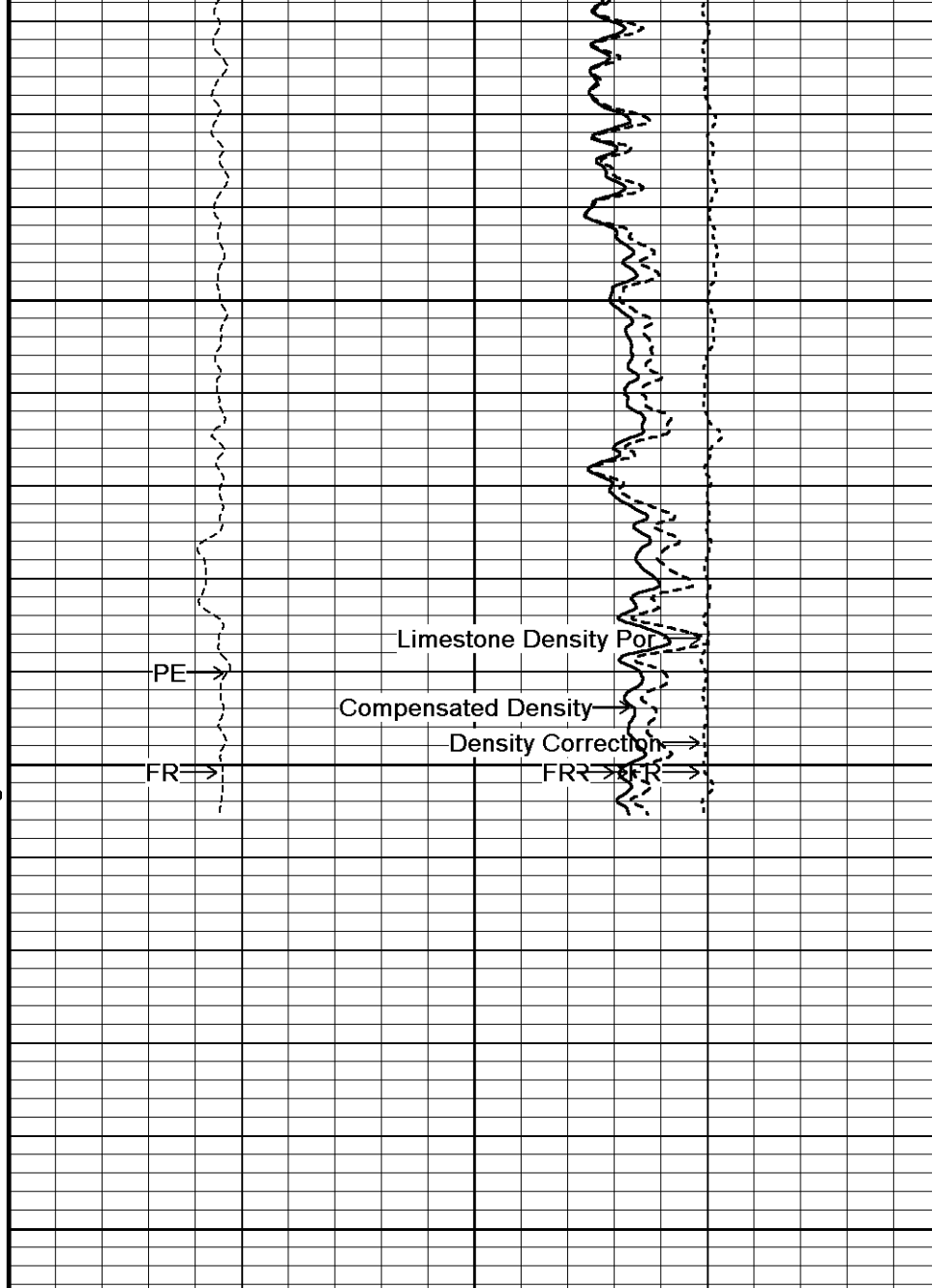
128°

9250

9300

9350

Depth
In
Feet

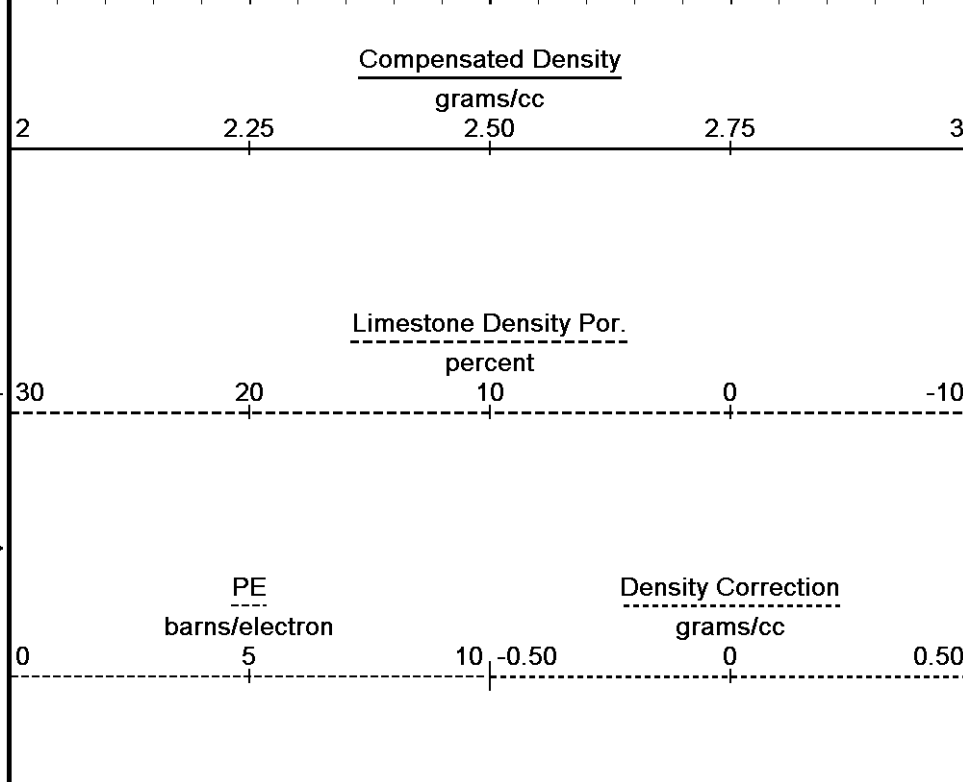


Borehole
Temp in
deg F

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

Replay
Scale
1:240



Plotted on 25-DEC-2012 17:39

Recorded on 23-DEC-2012 17:03

C:\13_04_8723 WLS\DATA\15069204160100 Toews 2629 2-21H\31535RTAP.dta

Field Calibration on 24-FEB-2009 00:00

Porosity used	Limestone Density Por.
Resistivity used	Array Ind. One Res Rt
RWA Constant A	0.610
RWA Constant M	2.150

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

Last Edited on 20-DEC-2012,14:02

Temperature	75.0		150.0		250.0		350.0 degrees F	
Pressure psia	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.
0.0	0.038	0.038	0.049	0.049	0.063	0.063	0.077	0.078
3000.0	5.218	5.220	5.230	5.232	5.244	5.246	5.257	5.259
6000.0	10.409	10.412	10.422	10.425	10.436	10.440	10.447	10.452
9000.0	15.610	15.615	15.623	15.628	15.638	15.643	15.650	15.656
12000.0	20.823	20.826	20.837	20.841	20.853	20.857	20.866	20.869
15000.0	26.048		26.064		26.081		26.093	

Field Calibration on 20-DEC-2012,13:54

Field Calibration on 22-DEC-2012 15:59

	Measured	Calibrated (API)
Background	48	35
Calibrator (Gross)	1810	1296

Calibrator (Net)	1762	1261	
Gamma Constants MGS-C.J 138			Last Edited on 23-DEC-2012,06:16
Gamma Calibrator Number	blue		
Mud Density	1.10	gm/cc	
Caliper Source for Processing	Density Caliper		
Tool Position	Eccentred		
Concentration of KCl	0.00	kppm	

High Resolution Temperature Calibration MGS-C.J 138			Field Calibration on 20-DEC-2012,13:54
	Measured	Calibrated(Deg F)	
Lower	0.00	0.00	
Upper	0.00	0.00	

High Resolution Temperature Constants MGS-C.J 138			Last Edited on 20-DEC-2012,13:54
Pre-filter Length	11		

Neutron Calibration MDN-B.J 388			Base Calibration on 04-DEC-2012 13:04 Field Check on 22-DEC-2012 16:04
Base Calibration			
	Measured	Calibrated (cps)	
	Near Far	Near Far	
	2996 90	3714 110	
Ratio	33.133	33.764	
Field Calibrator at Base			
		Calibrated (cps)	
		1256 1840	
Ratio		0.682	
Field Check			
		Calibrated (cps)	
Ratio		0.674	

Neutron Constants MDN-B.J 388			Last Edited on 23-DEC-2012,17:13
Neutron Source Id	p31112b		
Neutron Jig Number	blue		
Epithermal Neutron	No		
Caliper Source for Processing	Density Caliper		
Stand-off	0.00	inches	
Mud Density	1.10	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	MGS External Temperature		
Temperature	N/A	degrees F	
Mud Salinity	10.00	kppm	
Salinity Correction	Not Applied		
Formation Fluid Salinity Source	None		
Formation Fluid Salinity	N/A	kppm	
Barite Mud Correction	Not Applied		

FE Calibration MFE-B.J 359			Base Calibration on 19-DEC-2012 15:21 Field Check on 22-DEC-2012 15:46
Base Calibration			
	Measured	Calibrated (ohm-m)	
Reference 1	0.0	0.0	
Reference 2	966.8	126.8	
Base Check		279.0	
Field Check		279.0	

FE Constants MFE-B.J 359			Last Edited on 22-DEC-2012,15:45
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-A.A 158

Base Calibration on 19-DEC-2012 14:59

Field Check on 22-DEC-2012 15:45

Base Calibration

Test Loop Calibration

Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	17.2	475.3	9.3	966.2
2	6.1	381.2	7.6	821.4
3	3.8	265.2	5.2	566.0
4	2.7	132.2	2.6	279.2

Array Temperature 22.3 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			12.2	3815.7
2			30.2	3532.0
3			27.5	2983.2
4			18.2	2098.6
Deep			15.1	1945.1
Medium			41.5	3889.8
Shallow			47.5	5238.0

Array Temperature 57.4 Deg F

Induction Constants MAI-A.A 158

Last Edited on 23-DEC-2012,17:12

Induction Model

Caliper for Borehole Corr.	RtAP-WBM	
Hole Size for Borehole Correction	Density Caliper	
Tool Centred	N/A	inches
Stand-off Type	No	
Stand-off	Fins	
Stand-off	0.50	inches
Number of Fins on Stand-off	0.0000	
Stand-off Fin Angle	60.00	degrees
Stand-off Fin Width	0.0000	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-A.A 158

Field Calibration on 20-DEC-2012,13:35

Measured	Calibrated(Deg F)
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[illegible]

0.00
0.00

0.00

DOWNHOLE EQUIPMENT

C:\13_04_8723 WLS\DATA\15069204160100 Toews 2629 2-21H\31535RTAP.dta

Shuttle Running Tool 3.5")
SRT-A.A 70 LG: 6.62 ft WT: 37.5 lb OD: 2.52 in

MBS-F.A 200v Compact Battery Sub
MBS-F.A 112 LG: 10.61 ft WT: 70.5 lb OD: 2.24 in

Compact Memory Sub E.B
MMS-E.B 167 LG: 5.20 ft WT: 37.5 lb OD: 2.24 in

Compact Tool Isolator sub.
MTI-B.A 67 LG: 1.54 ft WT: 13.2 lb OD: 2.24 in

Compact Short Gamma
MGS-C.J 138 LG: 3.41 ft WT: 24.3 lb OD: 2.24 in



62.19 ft GRGM - MGS Gamma Ray

60.21 ft GSXT - MGS External Temperature

Compact Collar Locator
MCL-B.J 60 LG: 3.17 ft WT: 26.5 lb OD: 2.24 in

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 42 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

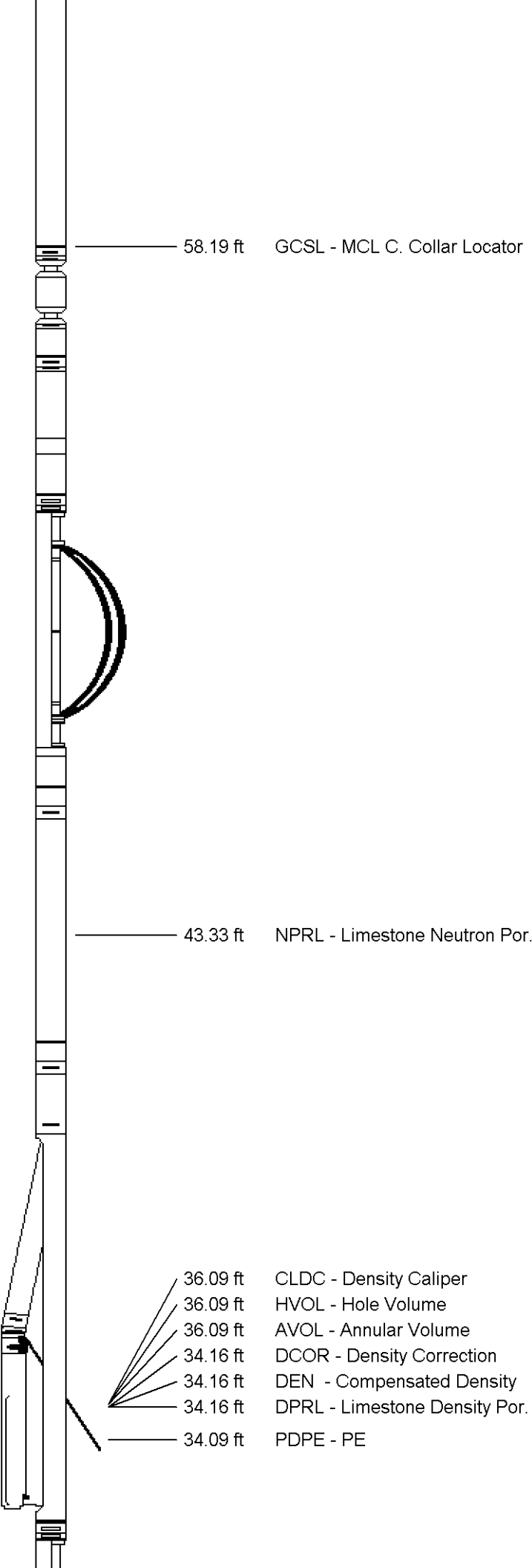
SHA-J.A Compact Swivel Head Adaptor
SHA-J.A 454 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

MIS-D.A Compact Inline Bowspring sub
MIS-D.A 310 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

Compact Neutron
MDN-B.J 388 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-C.J 435 LG: 9.59 ft WT: 90.4 lb OD: 2.24 in

MIS-A.A Compact Inline Bowspring sub



MIS-A.A Compact Inline Bowspring sub
MIS-A.A 15 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SHA-F Compact Swivel Head Adaptor
SHA-F 33 LG: 2.74 ft WT: 26.5 lb OD: 2.24 in

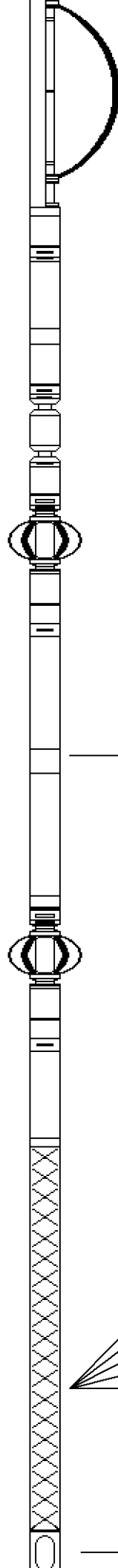
SKJ-D.A Compact Knuckle Joint
SKJ-D.A 41 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

MIS-E.B Compact Inline Standoff sub
MIS-E.B 578 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Focussed Electric
MFE-B.J 359 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

MIS-B Compact Inline Standoff sub
MIS-B 29 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Induction
MAI-A.A 158 LG: 12.52 ft WT: 48.5 lb OD: 2.24 in

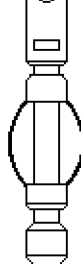


15.86 ft FEFE - Shallow FE

3.34 ft CTAO - Array Ind. One Cond Ct
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: 88.80 ft Weight: 641.5 lb All measurements relative to tool zero.

COMPANY		SANDRIDGE ENERGY			
WELL		TOEWS 2629 2-21H			
FIELD		MONGER			
PROVINCE/COUNTY		GRAY			
COUNTRY/STATE		USA / KANSAS			
Elevation Kelly Bushing	2765.00	feet	First Reading	9301.00	feet
Elevation Drill Floor	2765.00	feet	Depth Driller	9360.00	feet
Elevation Ground Level	2748.00	feet	Depth Logger	9360.00	feet
		CML MESSENGER SHUTTLE			
		COMPACT PHOTO DENSITY			
		COMPENSATED NEUTRON LOG			