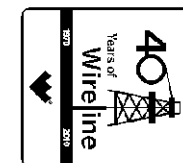




# Weatherford

## HOLE VOLUME CALIPER LOG



COMPANY	LARAMIE ENERGY II		
WELL	HAWXHURST 17-05B		
FIELD	BUZZARD CREEK		
PROVINCE/COUNTY	MESA		
COUNTRY/STATE	U.S.A. / COLORADO		
LOCATION	SHL: 1279' FNL & 386' FWL BHL: 1832' FNL & 653' FWL		
SEC	TWP 17 9S	RGE 94W	Other Services MAL-MFE MPD-MDN
API Number	05-077-10159-00		
Permit Number			
Permanent Datum GL, Elevation 6786 feet			Elevations: KB 6807.00 DF 6806.00 GL 6786.00
Log Measured From KB			
Drilling Measured From KB @ 21 FEET			
Date	6-NOV-2011		
Run Number	ONE		
Depth Driller	7180.00 feet		
Depth Logger	7194.00 feet		
First Reading	7171.00 feet		
Last Reading	1541.00 feet		
Casing Driller	1544.00 feet		
Casing Logger	1541.00 feet		
Bit Size	8.750 inches		
Hole Fluid Type	GEL/POLY		
Density / Viscosity	9.70 lb/USg 59.00 CP		
PH / Fluid Loss	9.60 5.60 ml/30Min		
Sample Source	FLOWLINE		
Rm @ Measured Temp	1.37 @ 91.0 ohm-m		
Rmf @ Measured Temp	1.10 @ 91.0 ohm-m		
Rmc @ Measured Temp	1.64 @ 91.0 ohm-m		
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.65 @ 196.0 ohm-m		
Time Since Circulation	4 HOURS		
Max Recorded Temp	196.00 deg F		
Equipment Name	COMPACT		
Equipment / Base	13045 GD JCT		
Recorded By	A. VAN BRUNT		
Witnessed By	C. CLAUSSEN		
Service Order	#3524916		

BOREHOLE RECORD					Last Edited: 06-NOV-2011 08:35
Bit Size inches		Depth From feet		Depth To feet	
8.750		1544.00		7180.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
SURFACE	9.625	0.00	1544.00	32.00	

REMARKS
SOFTWARE VERSION: 12.02.4401.
TOOLS RUN: MAI, MFE, SKJ, MPD, MDN, MCG, AND SHA RAN IN COMBINATION.
HARDWARE: MPD: 8 INCH DENSITY SKID PLATE RAN. MDN: DUAL BOWSPRING RAN. MFE: 0.5 INCH STANDOFF RAN. MAI: 0.5 INCH STANDOFF RAN.
TOTAL HOLE VOLUME FROM TD TO SURFACE CASING = 2535 CU. FT.
ANNULAR VOLUME WITH 7.0 INCH PRODUCTION CASING FROM TD TO SURFACE CASING = 1030 CU. FT.
2.68 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY.
ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
WELL DEVIATION MAXIMUM 10 DEGREES

WELL DEVIATION MEASUREMENTS DECKLED.

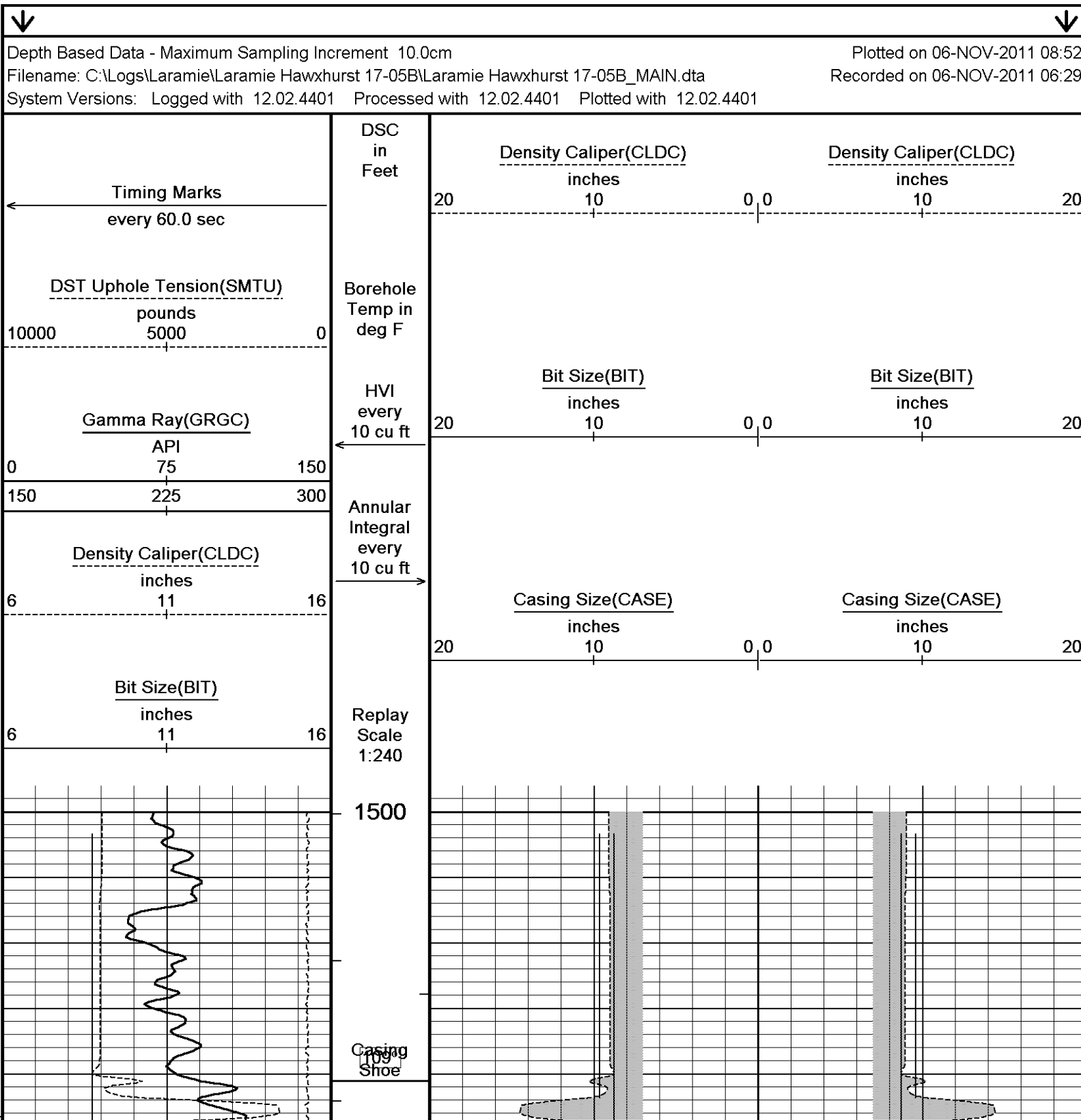
TIGHT PULLS, BOREHOLE SIZE, EXCESS MUD CAKE AND RUGOSITY WILL AFFECT REPEATABILITY AND DATA QUALITY.

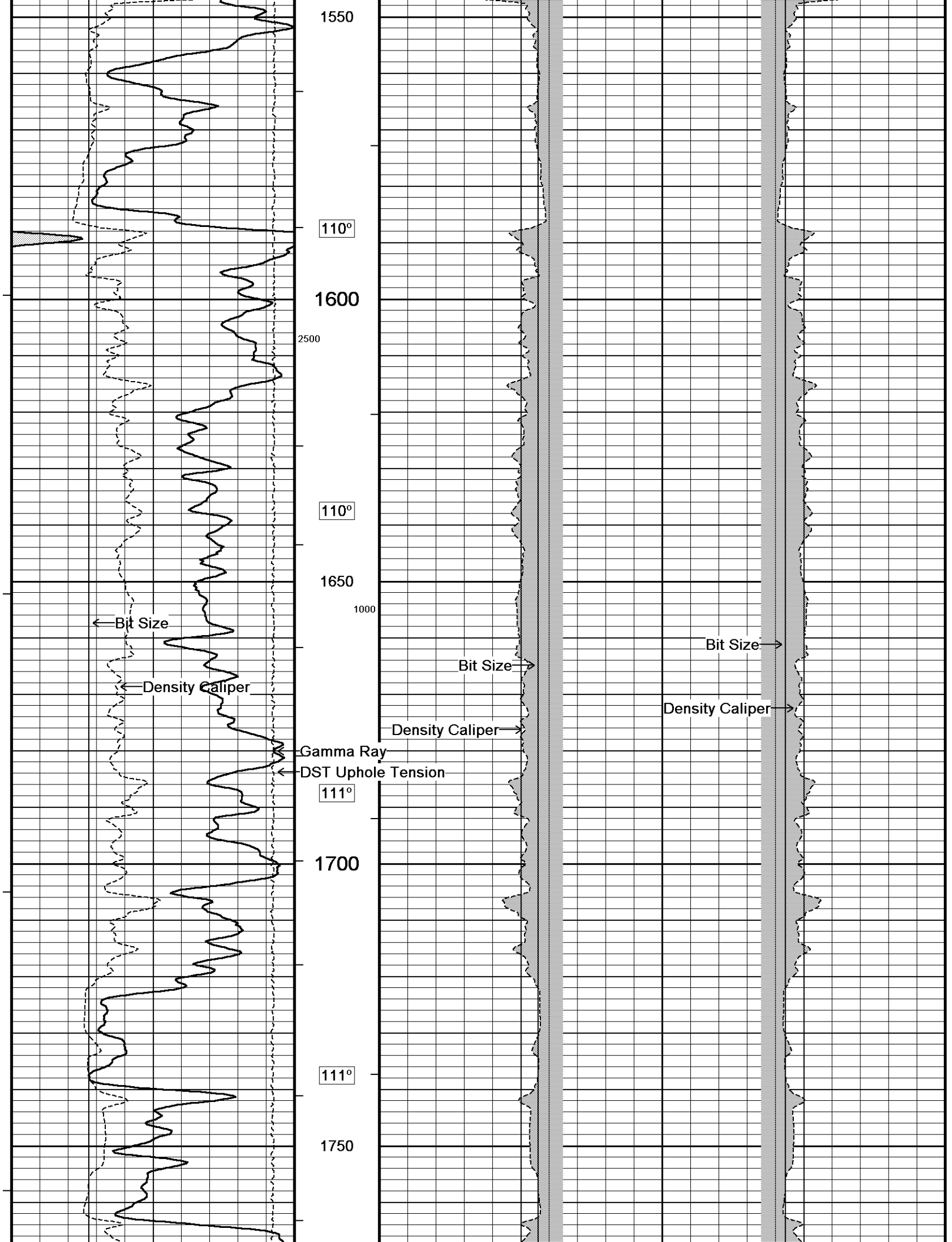
OPERATORS: B. FRISBIE, A. ALLRED.

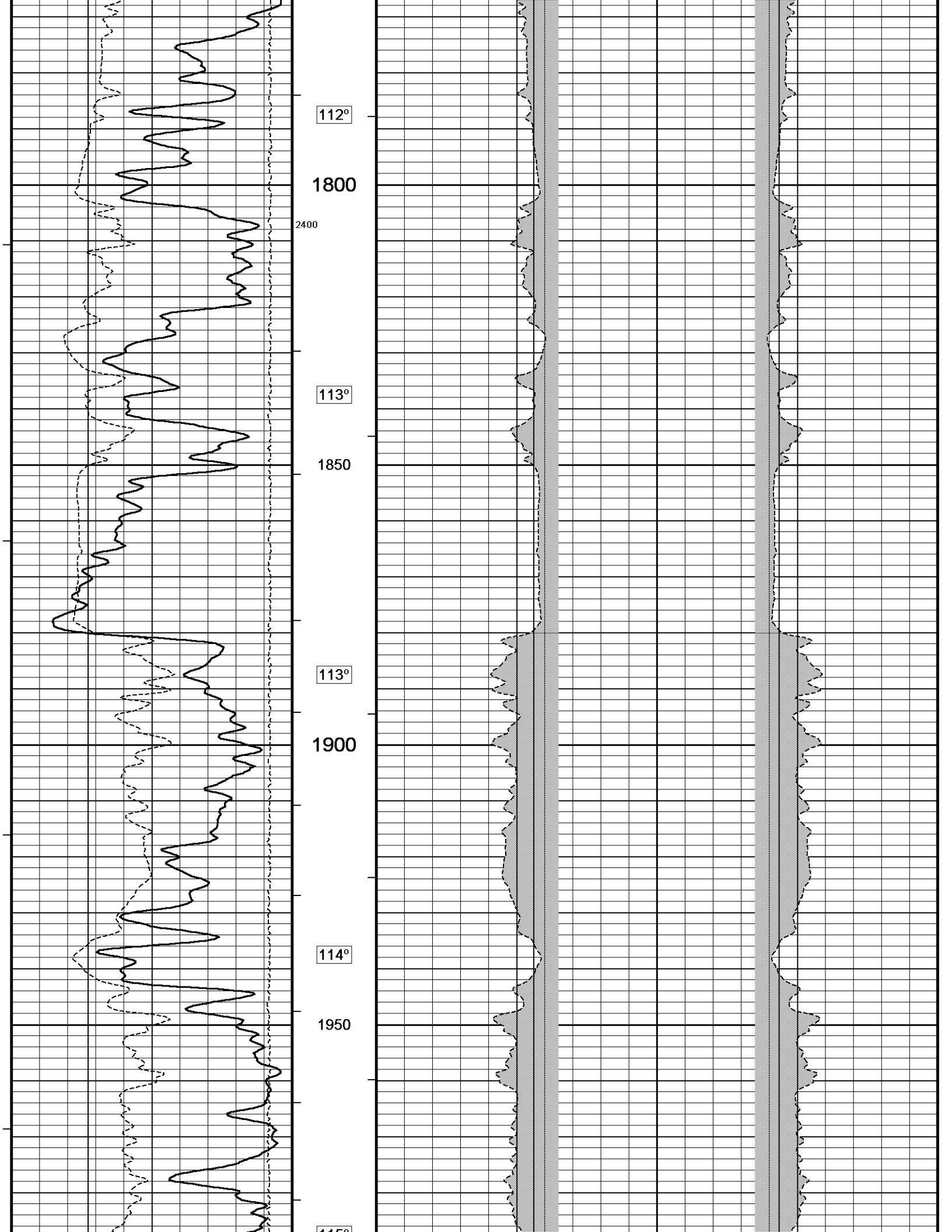
SERVICE ORDER: #3524916.

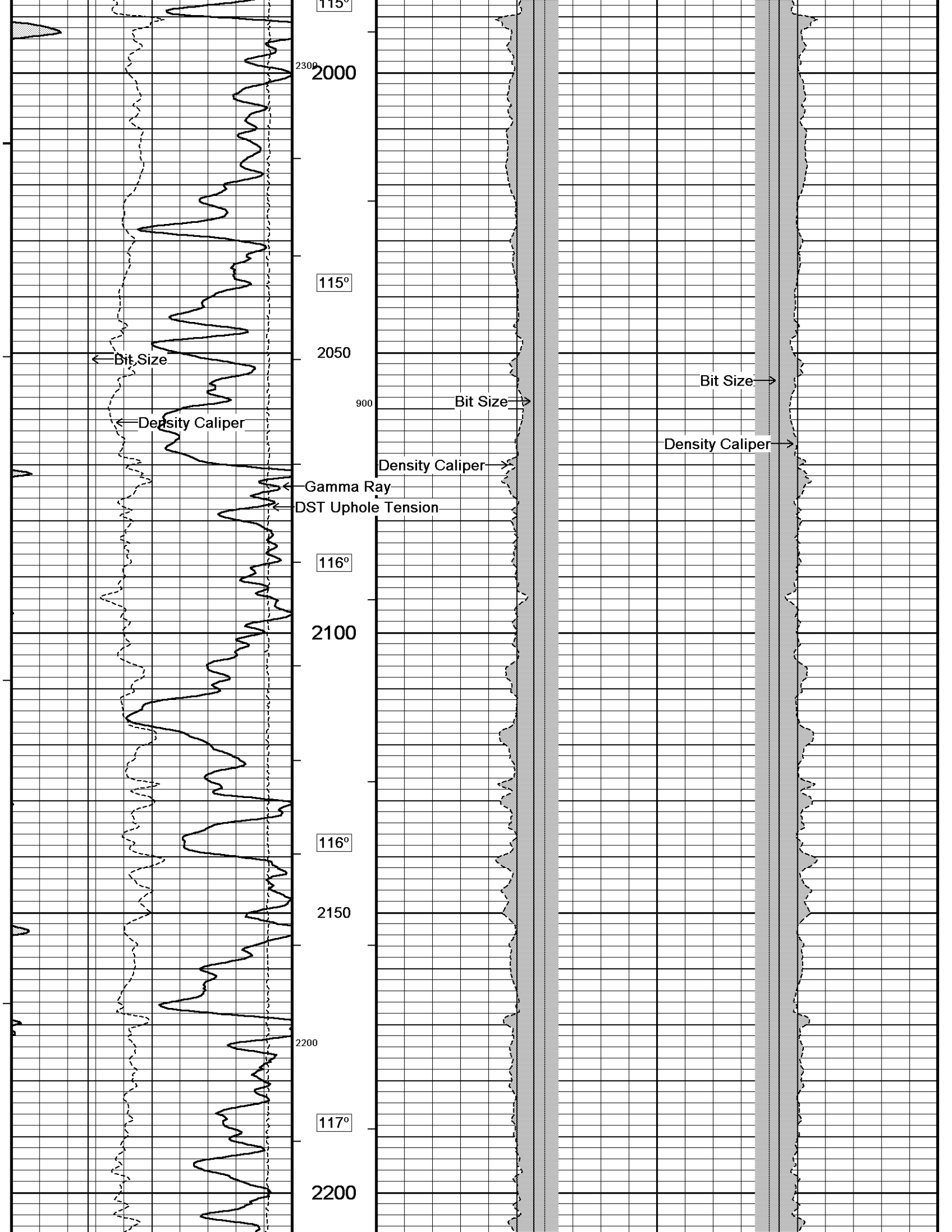
RIG: PRECISION #706.

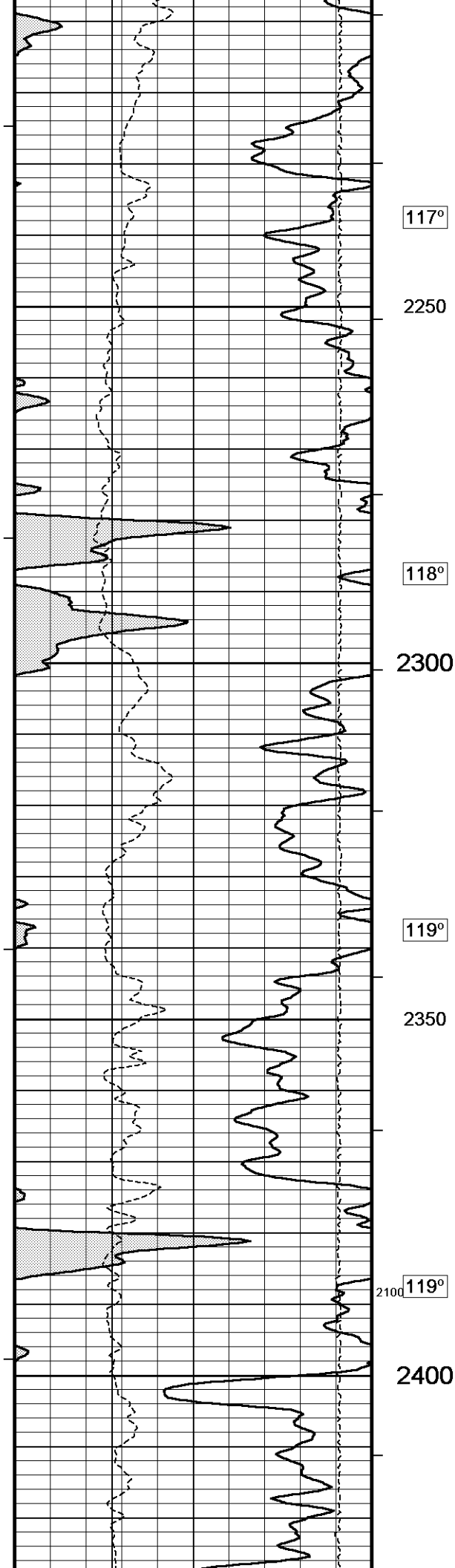
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, 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.











117°

2250

118°

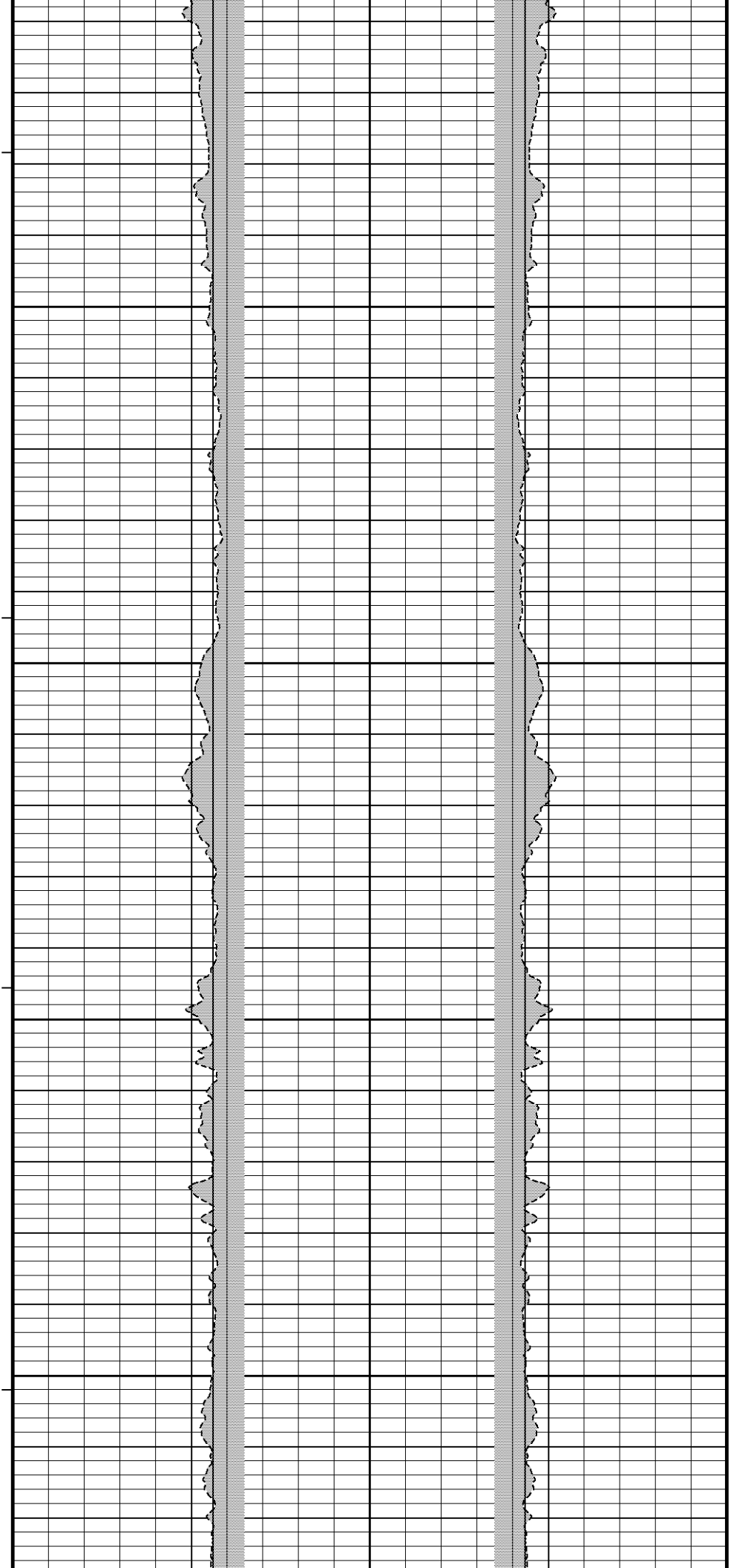
2300

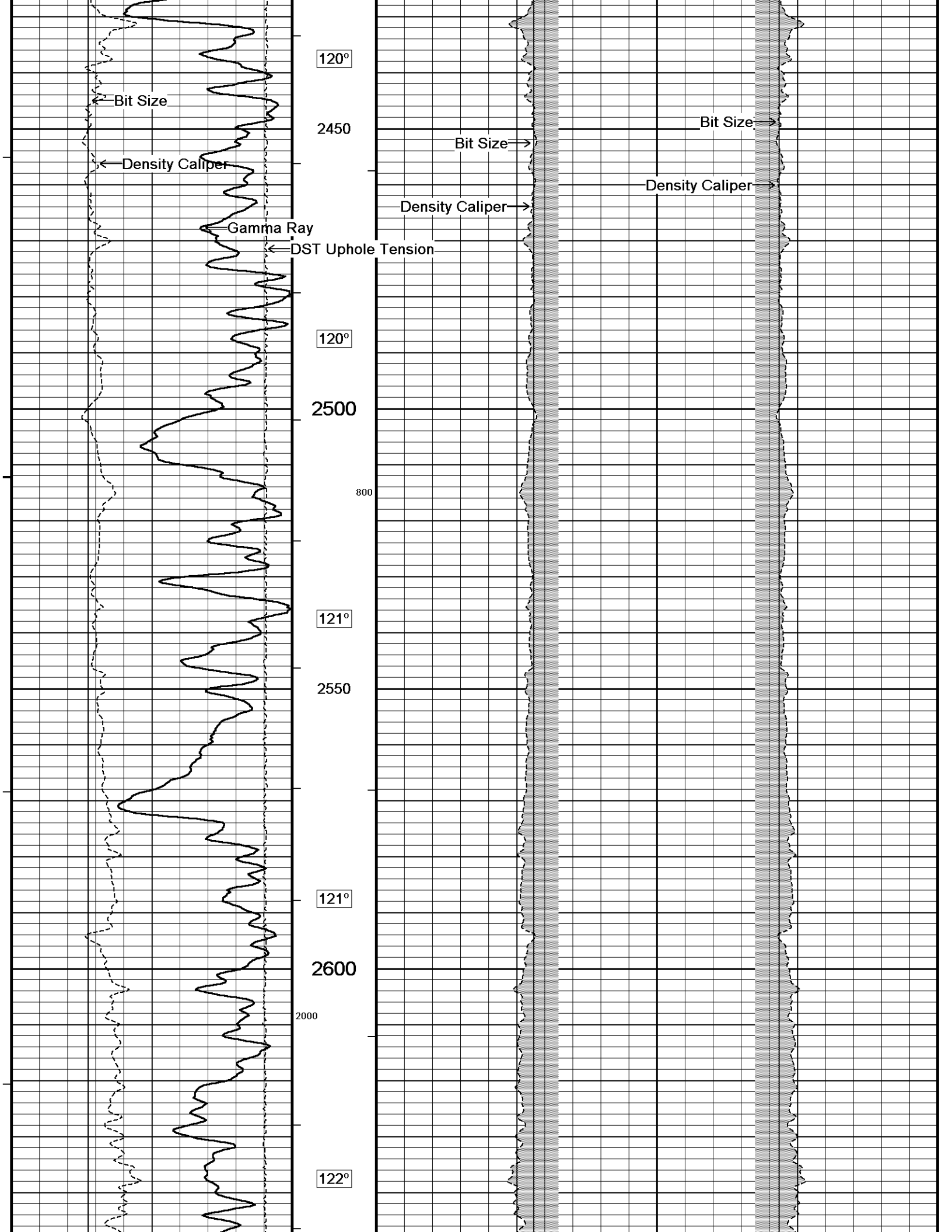
119°

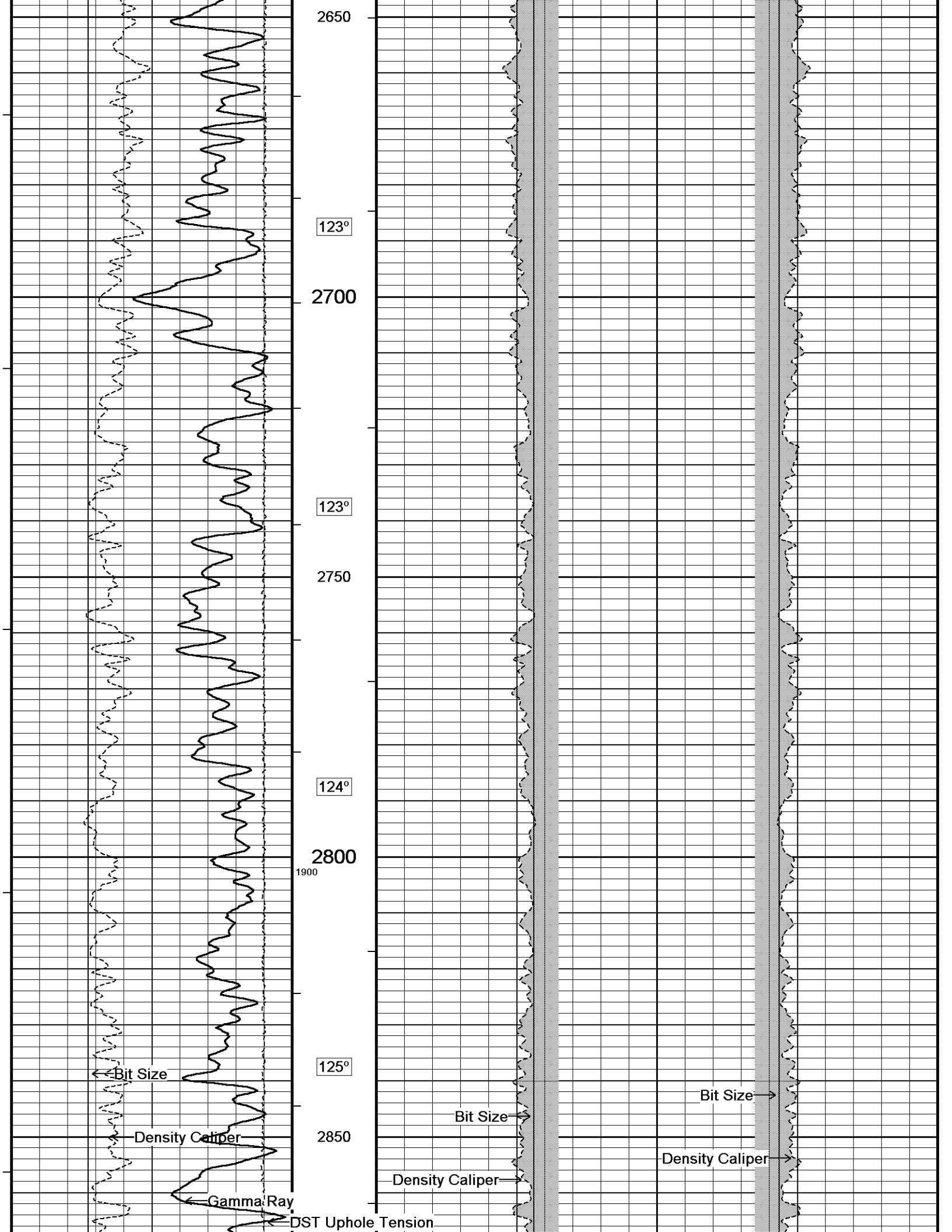
2350

2100 119°

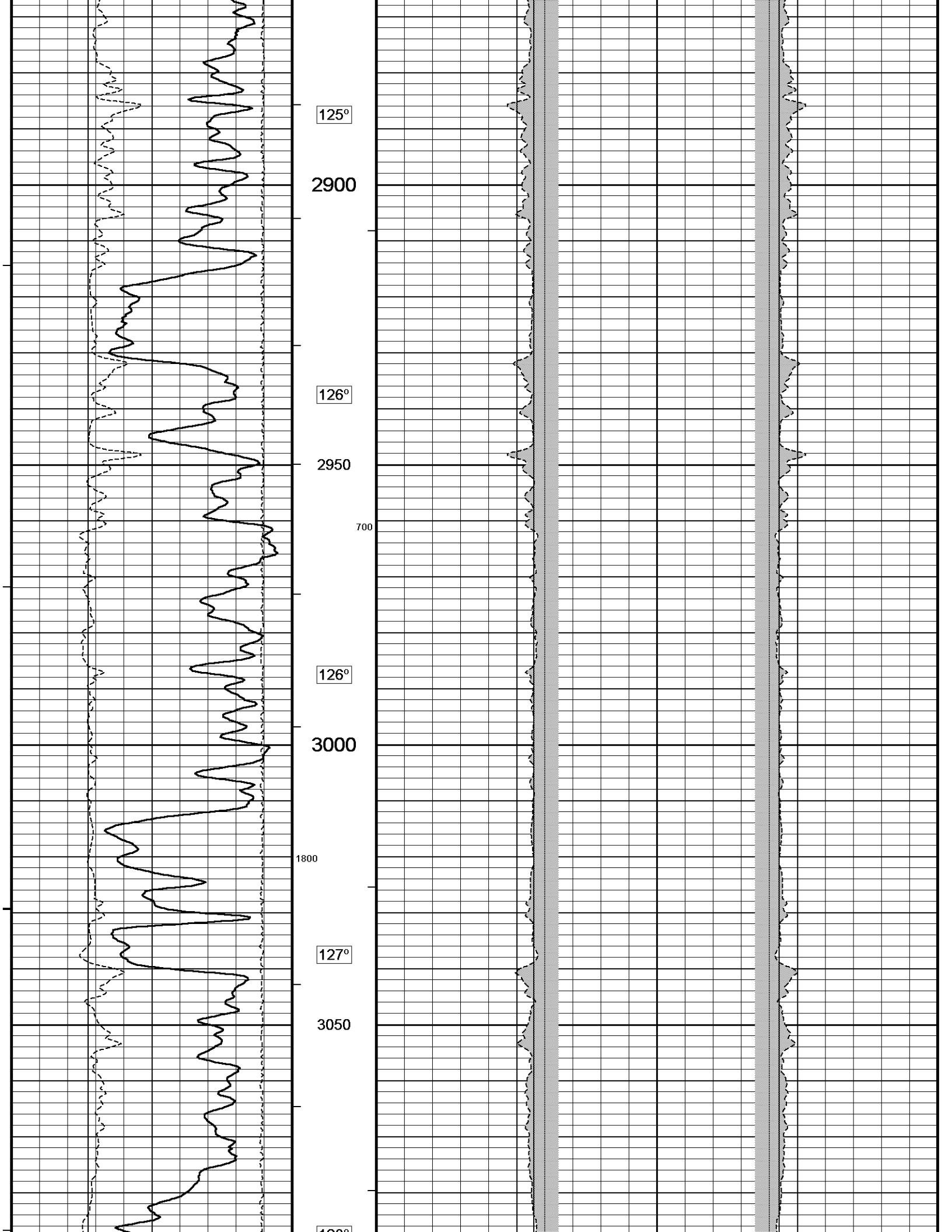
2400

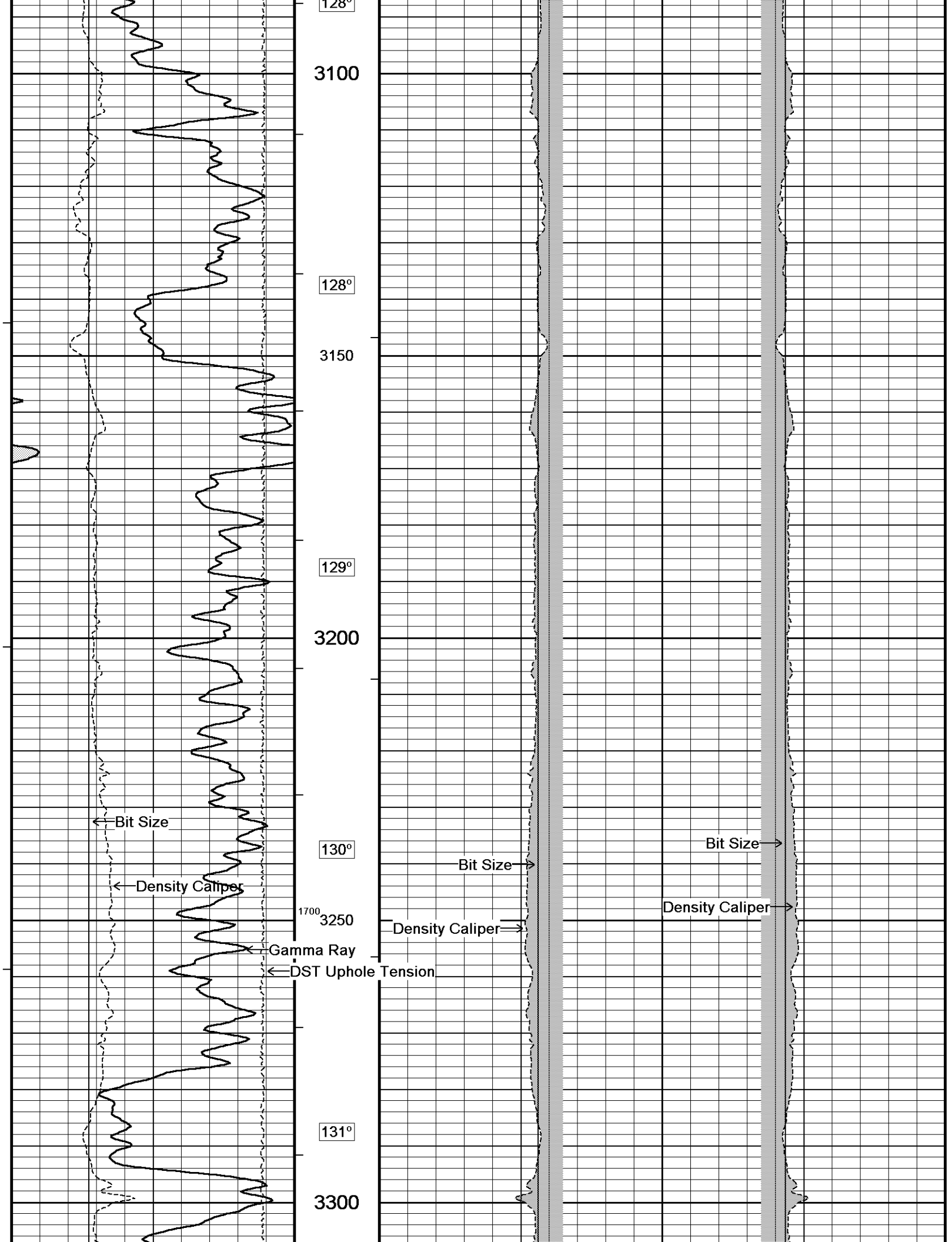


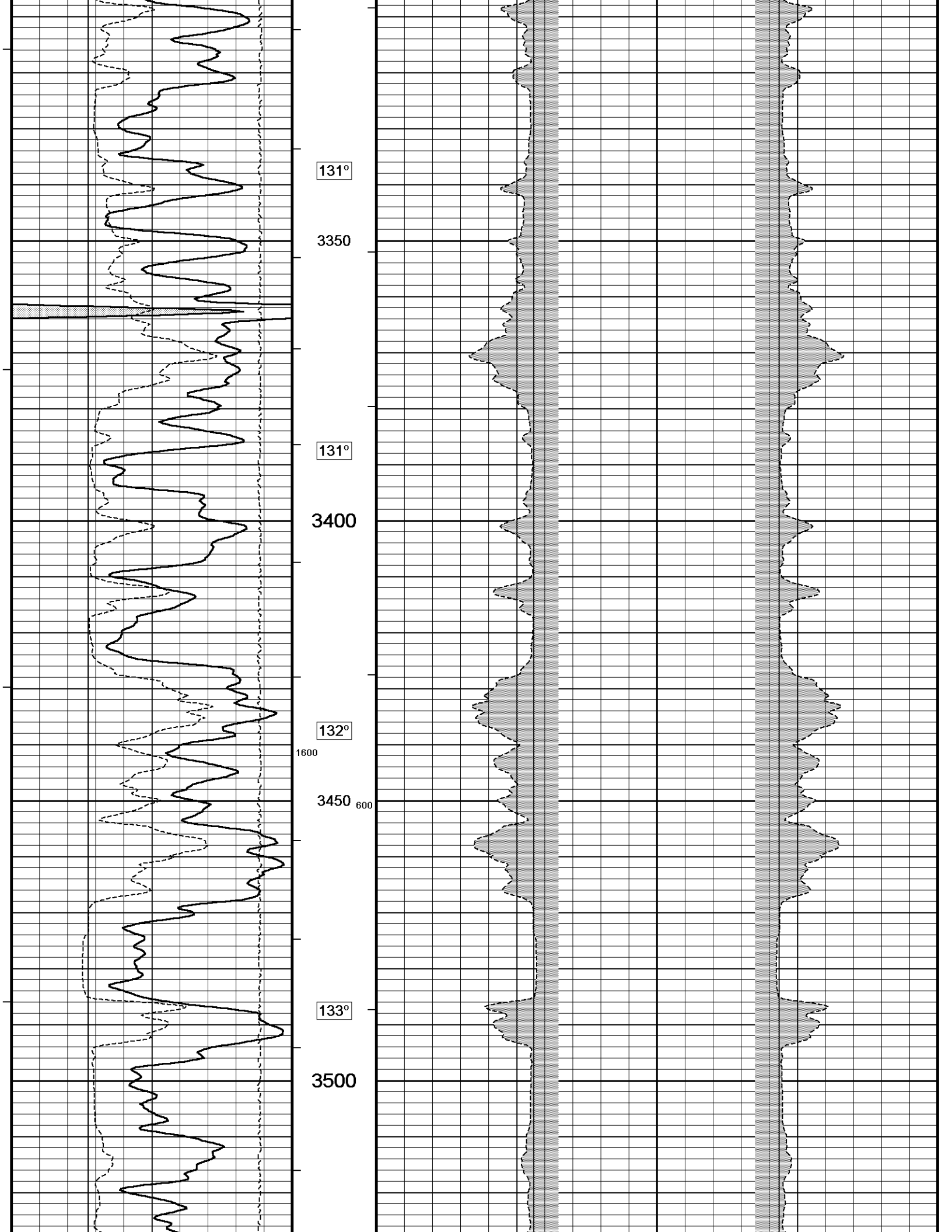


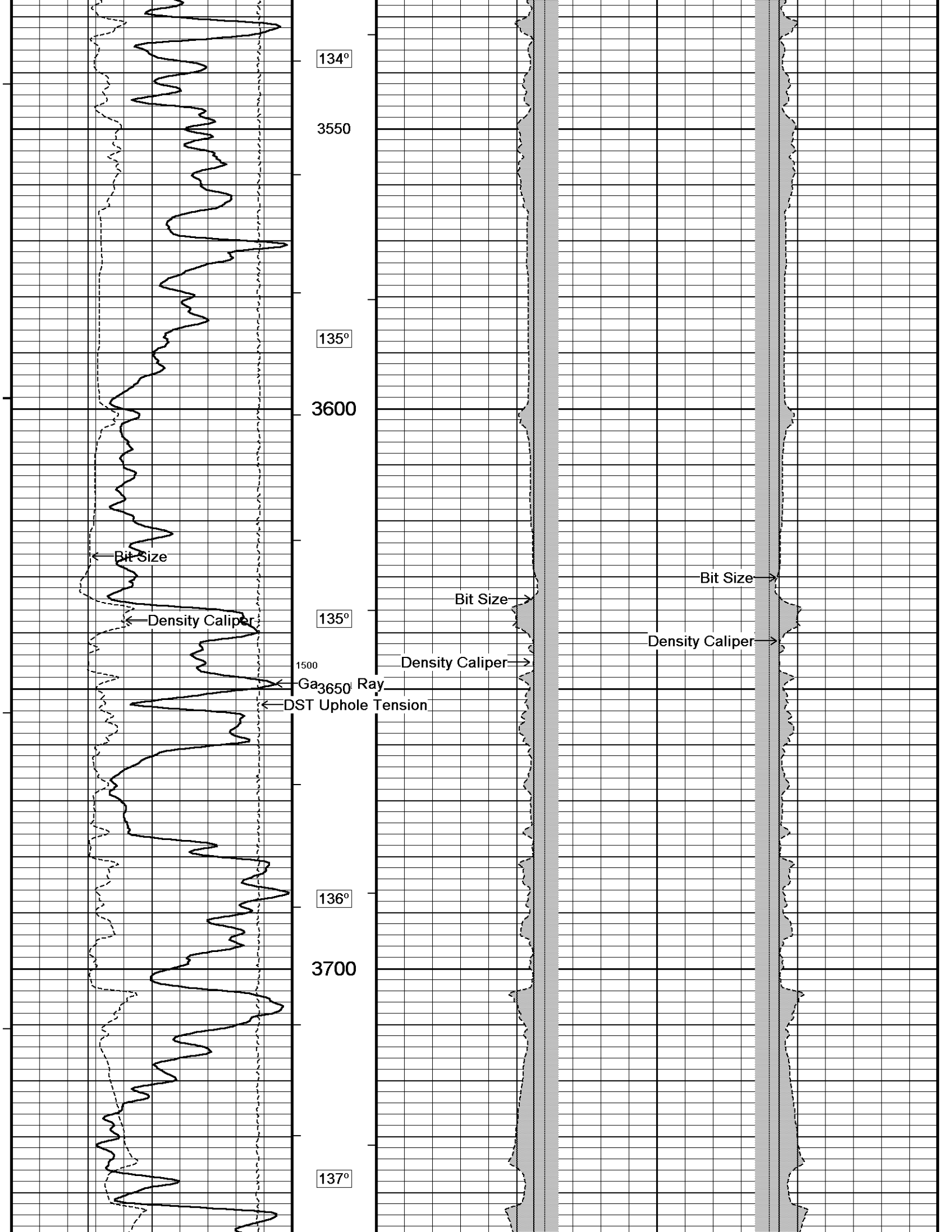


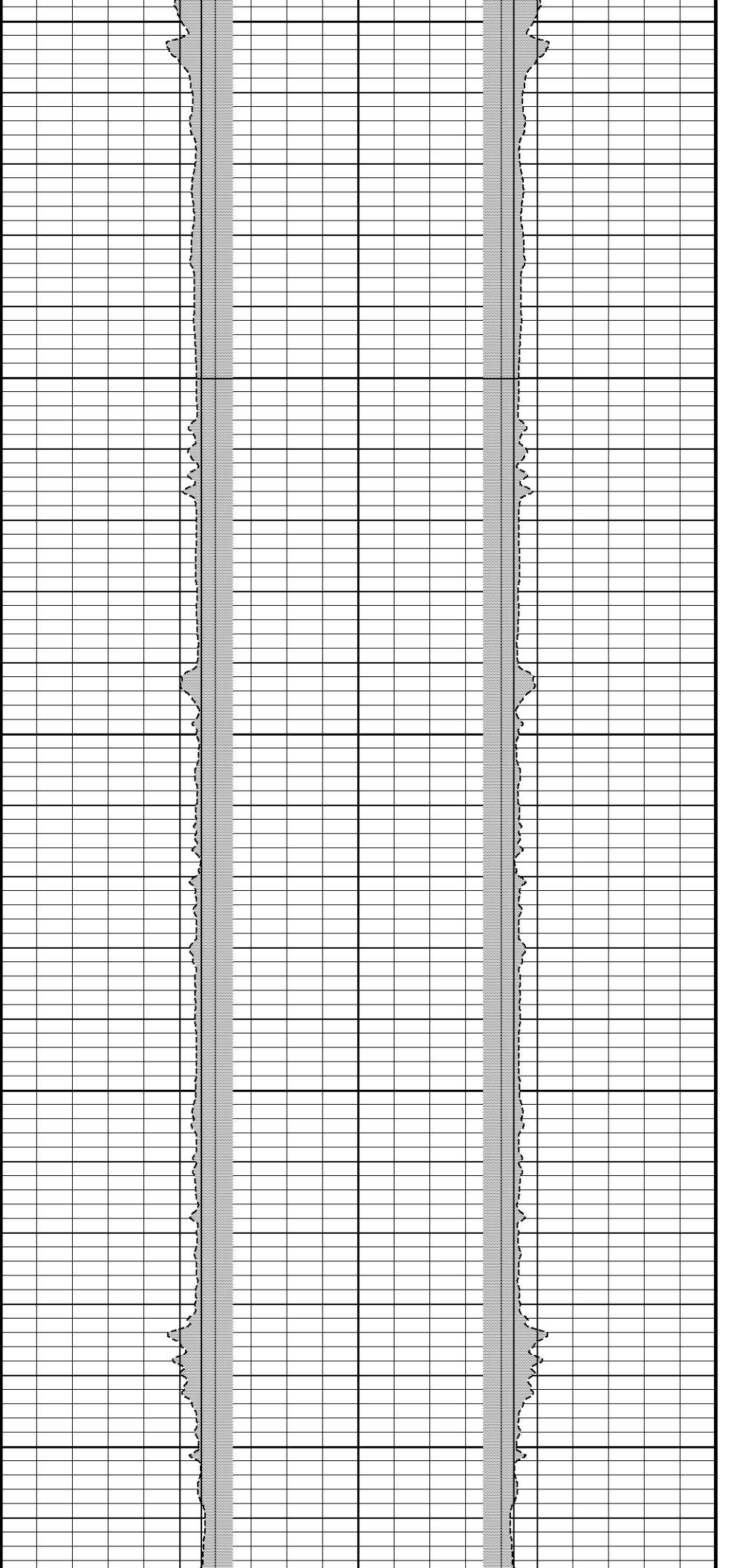
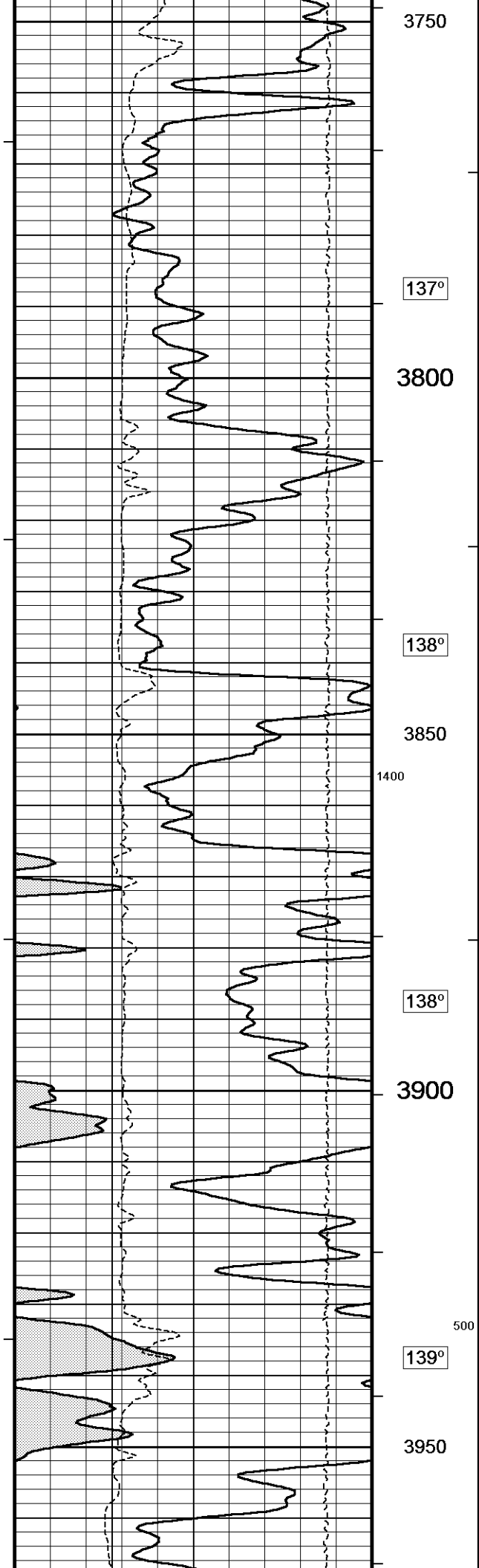


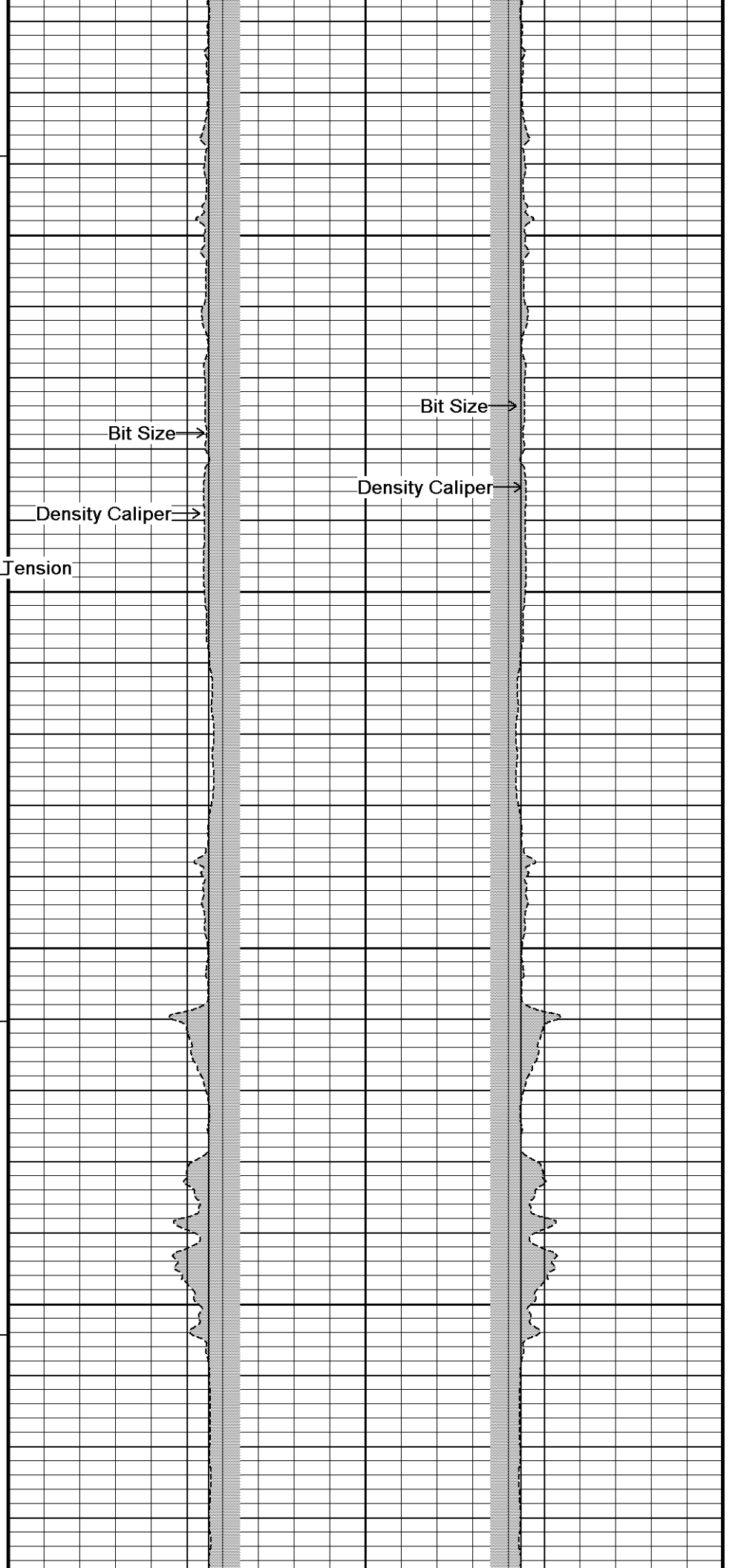
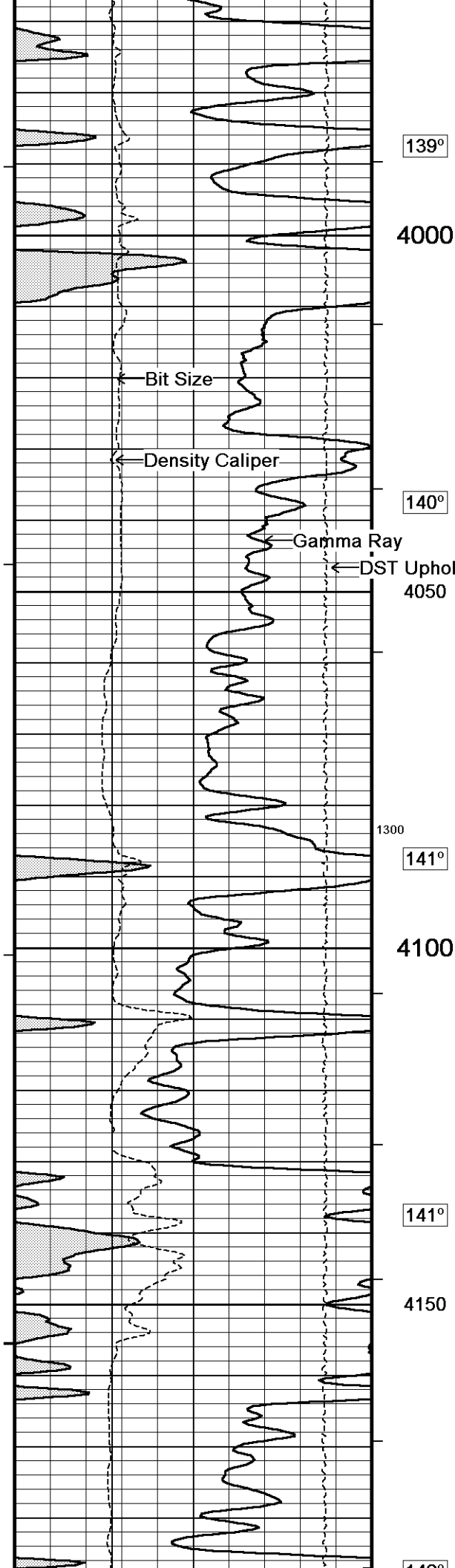


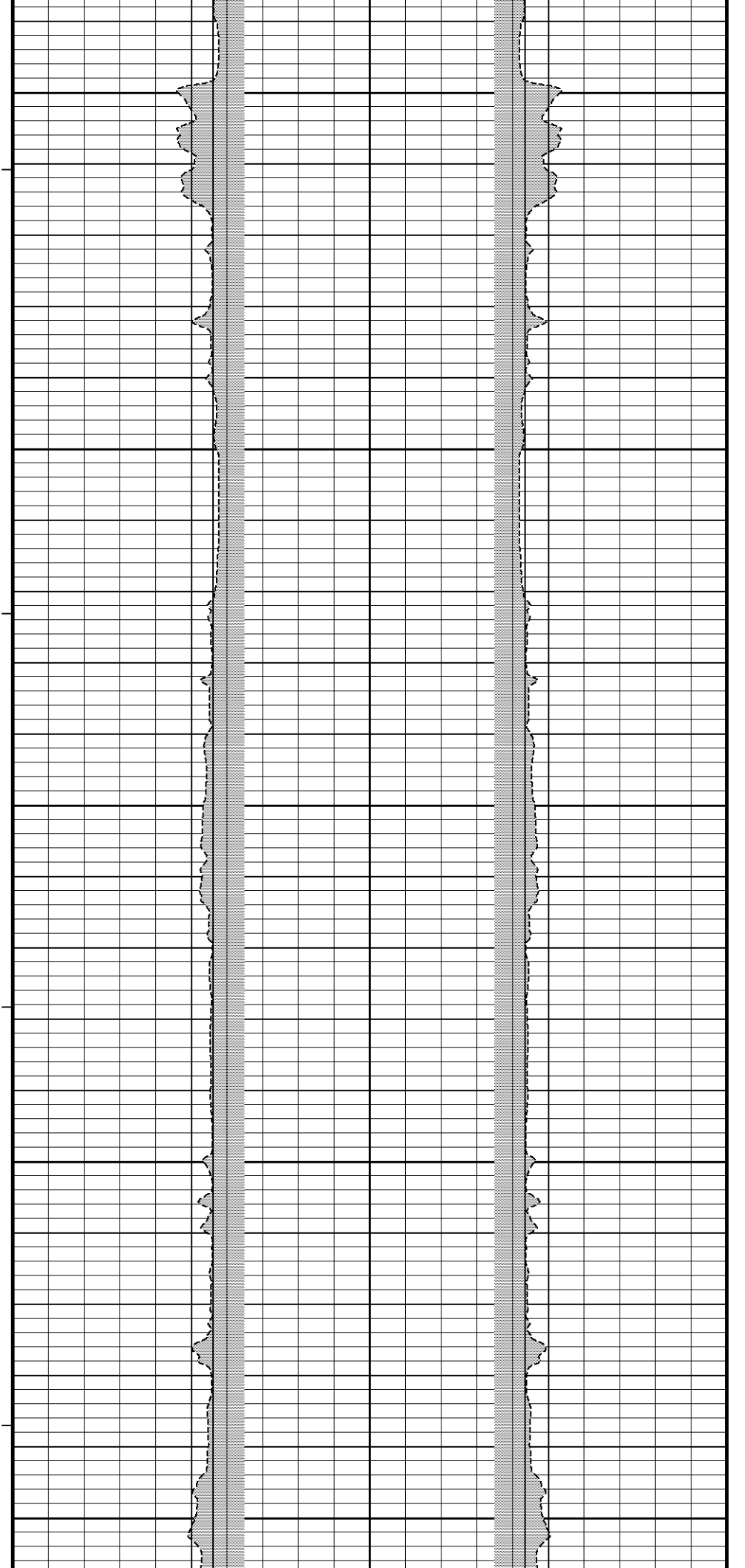
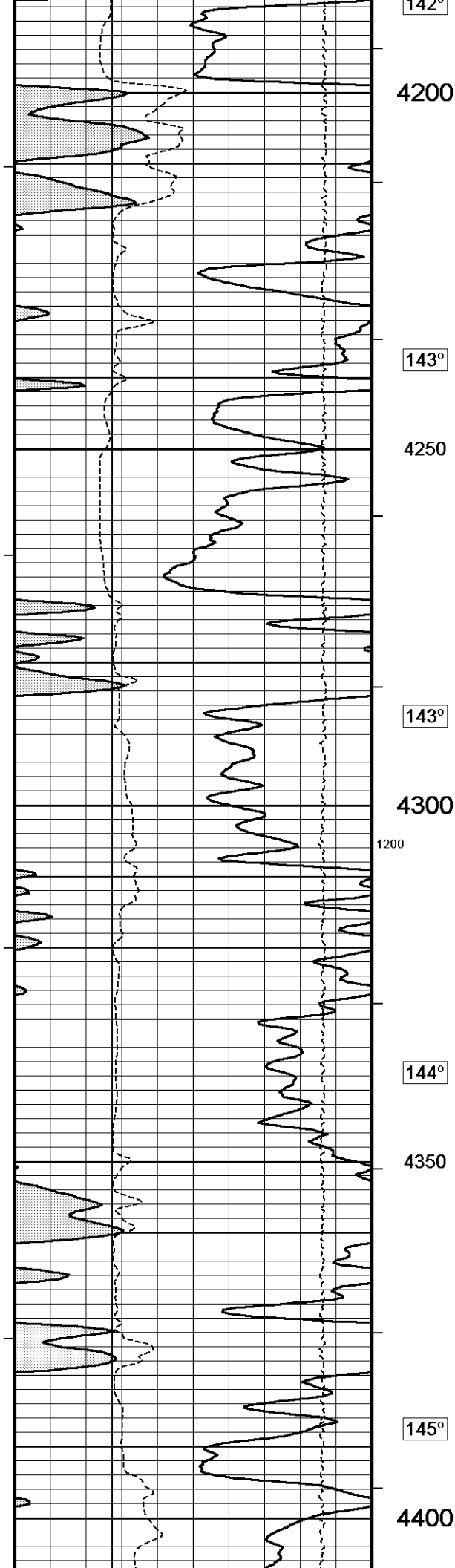


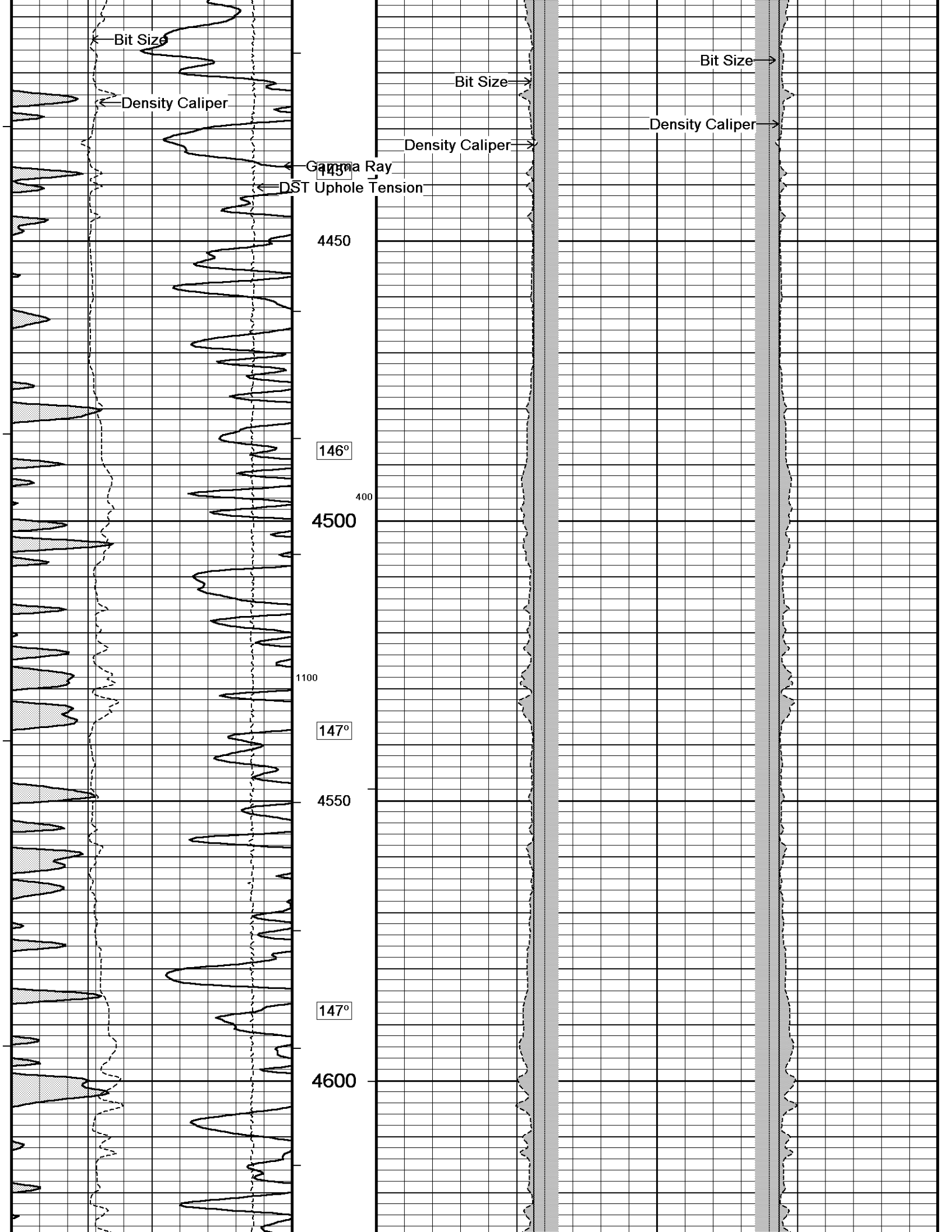




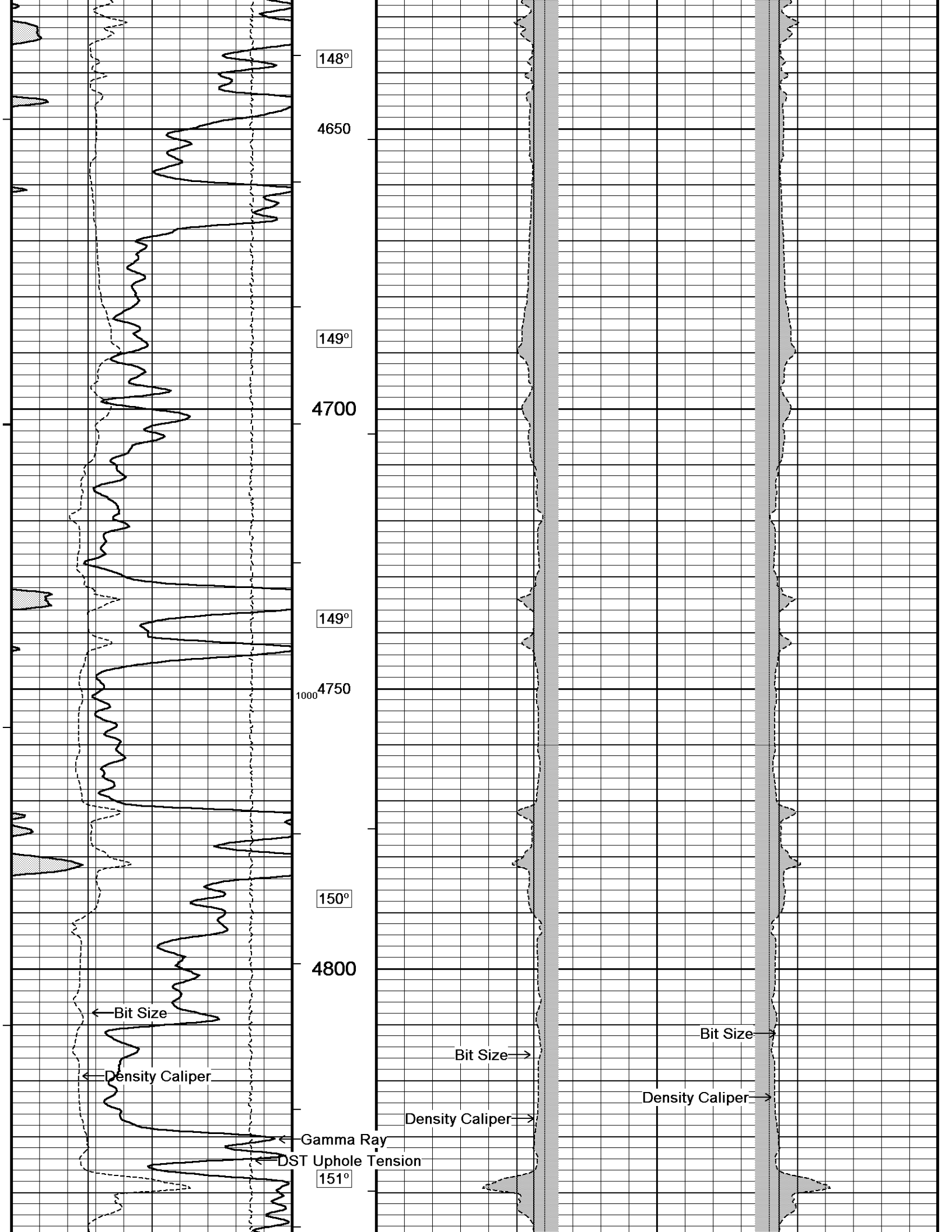


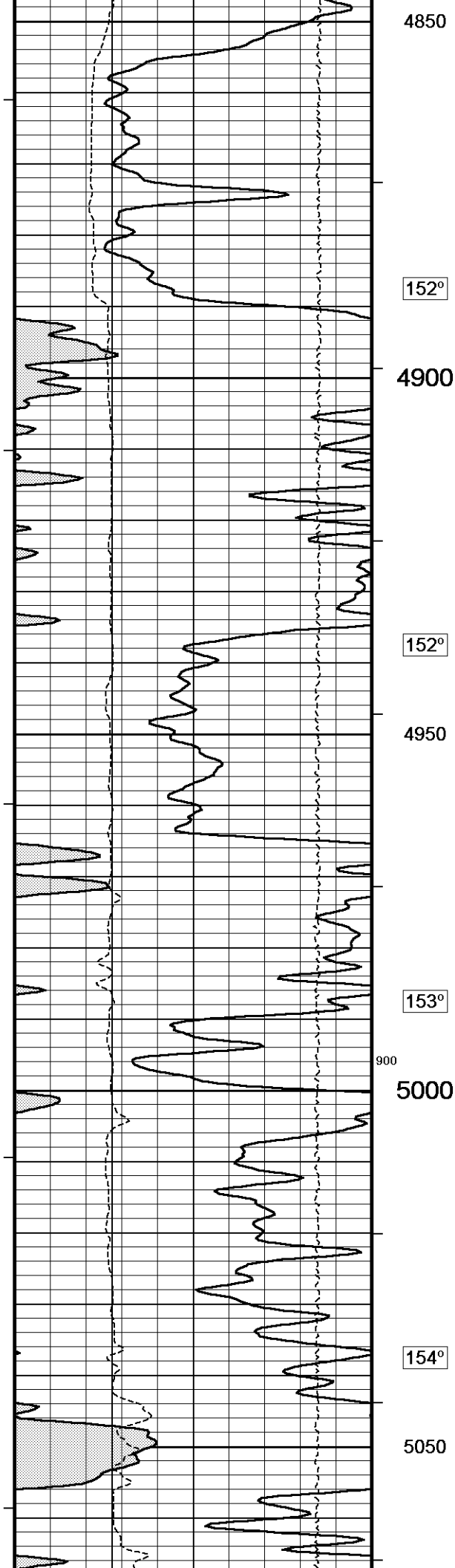












4850

152°

4900

152°

4950

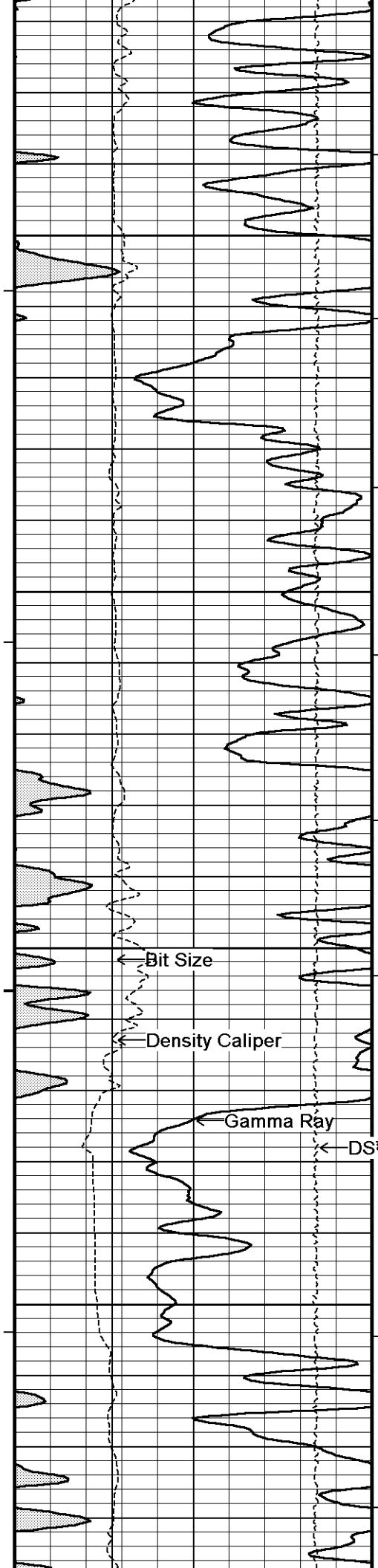
153°

900

5000

154°

5050



154°

5100

300

155°

5150

156°

5200

Bit Size

Density Caliper

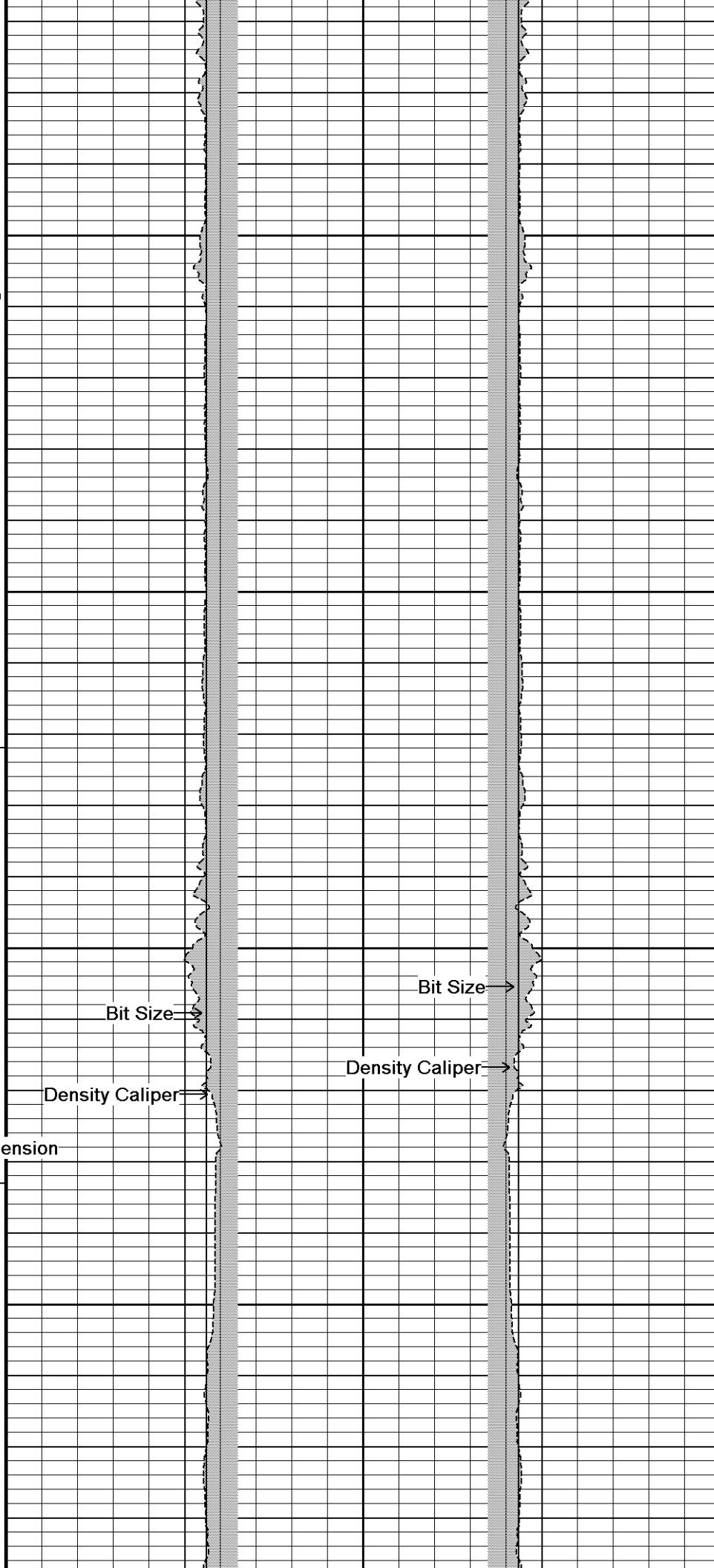
Gamma Ray

DSP Uphole Tension

156°

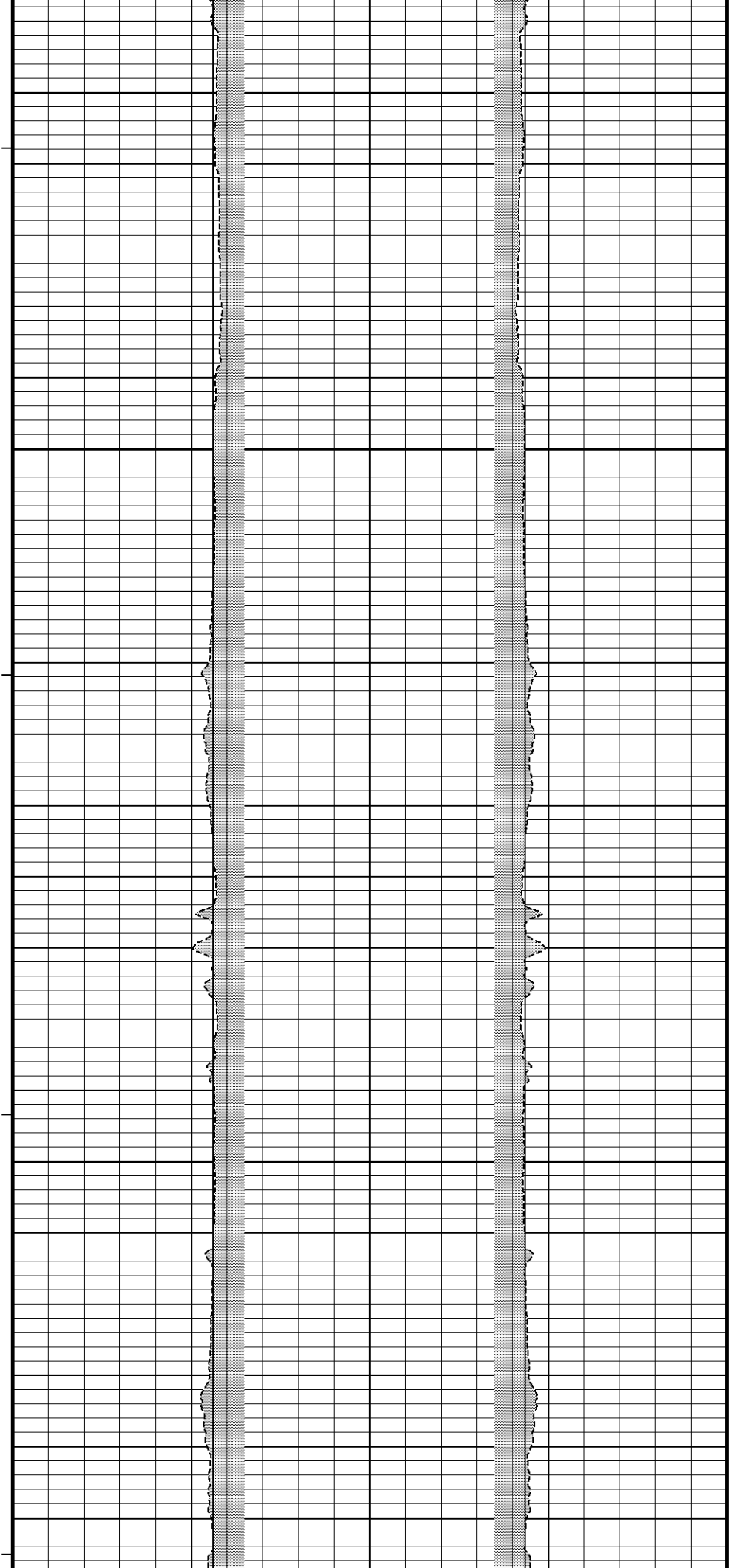
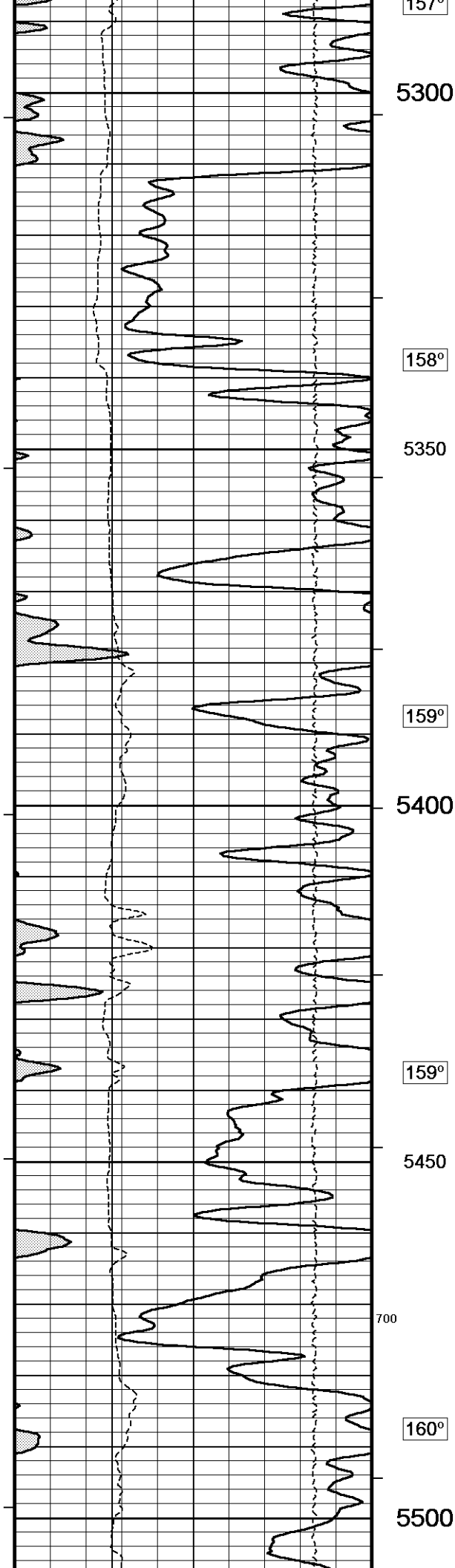
5250

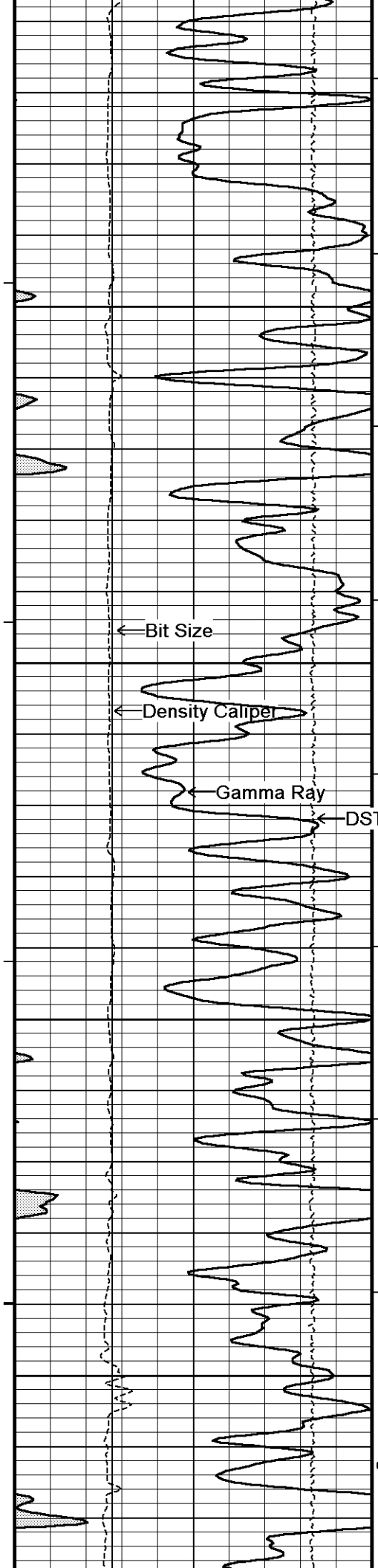
157°



Bit Size

Density Caliper





161°

5550

161°

5600

162°

5650

163°

5700

600

← Bit Size

← Density Caliper

← Gamma Ray

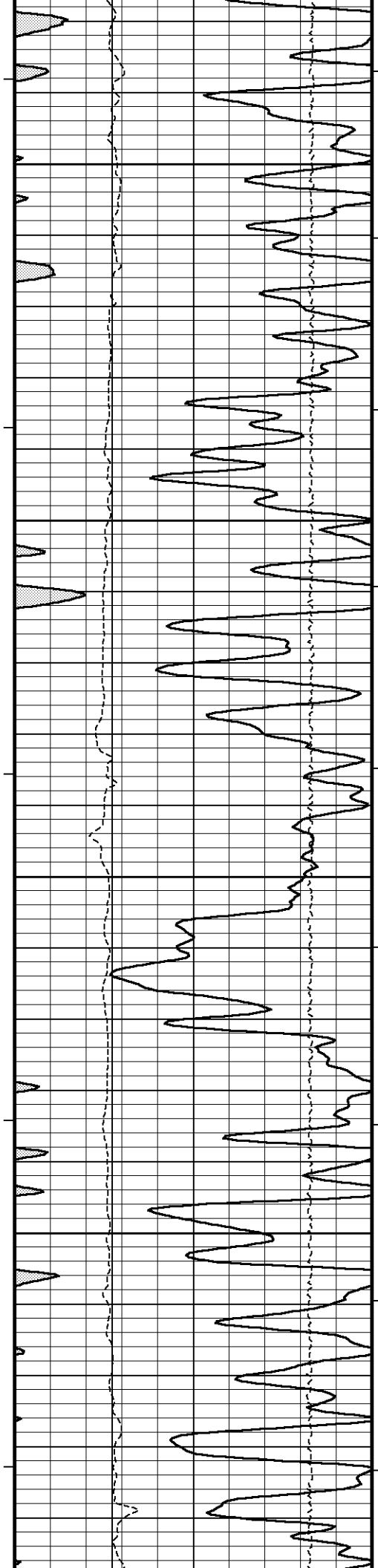
← DST Uphole Tension

Bit Size →

Density Caliper →

Bit Size →

Density Caliper →



163°

5750

200

164°

5800

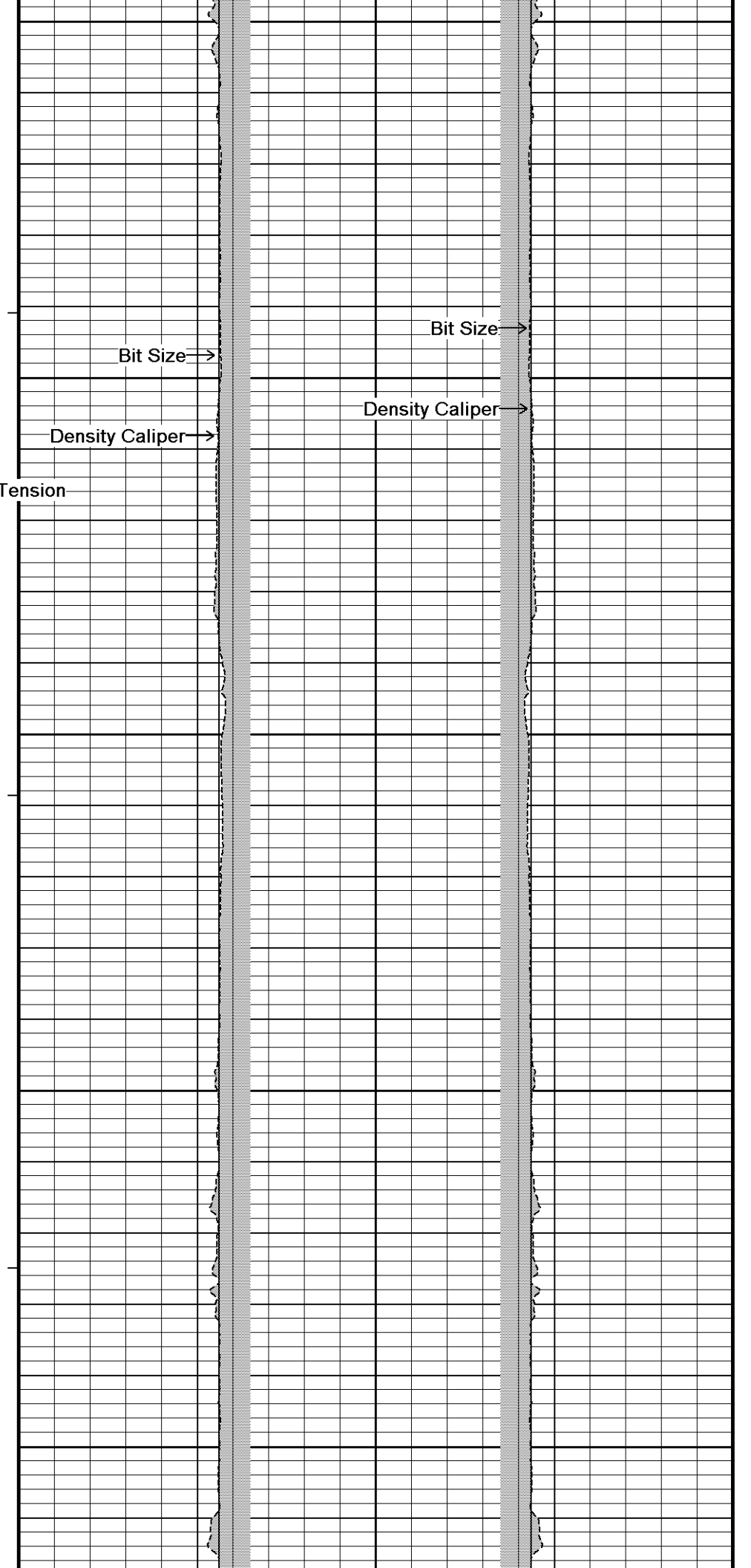
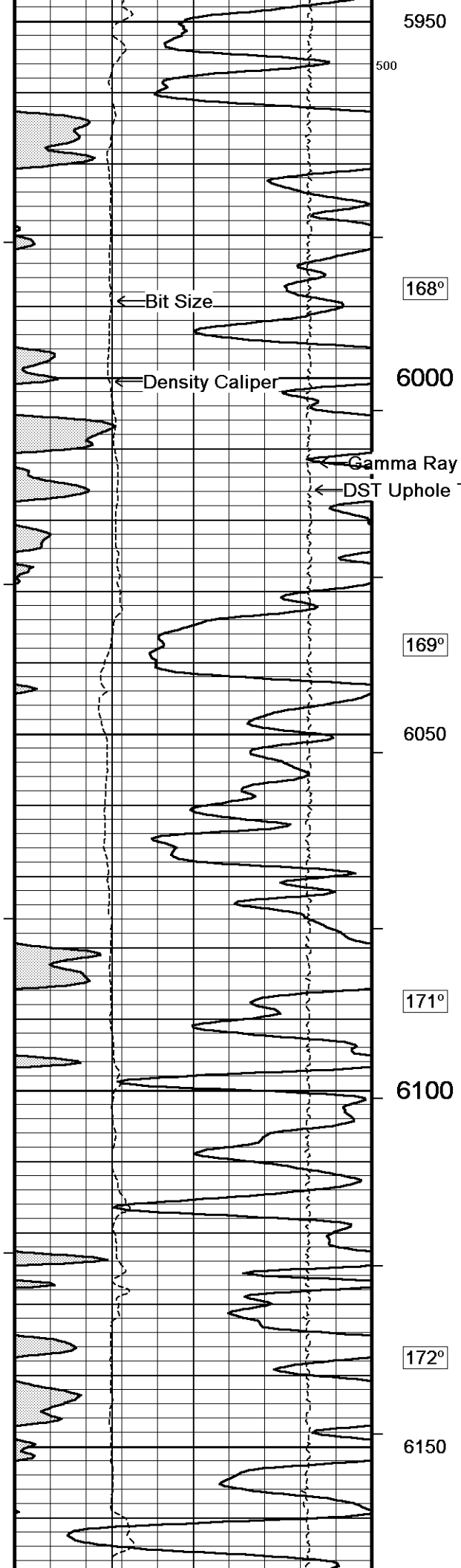
165°

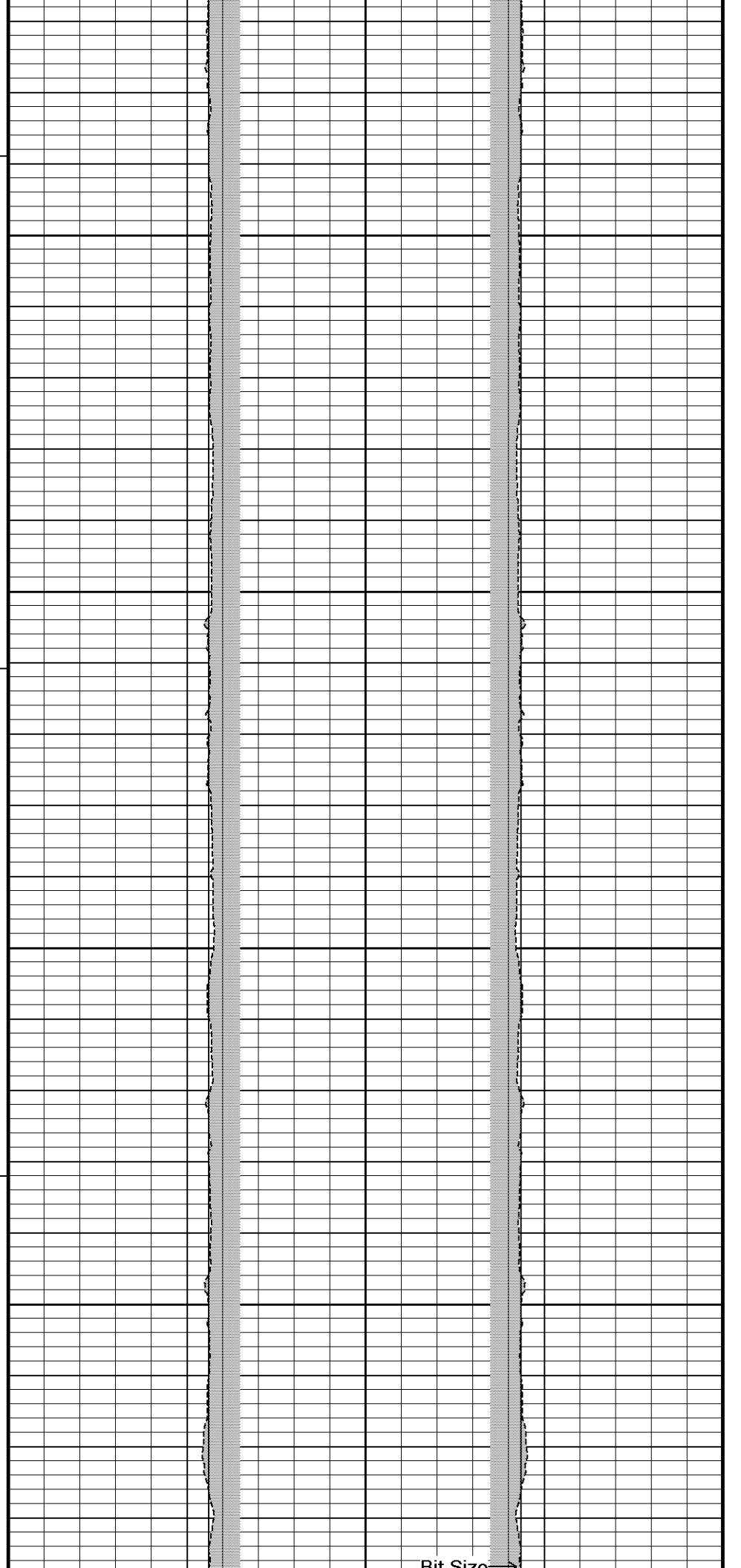
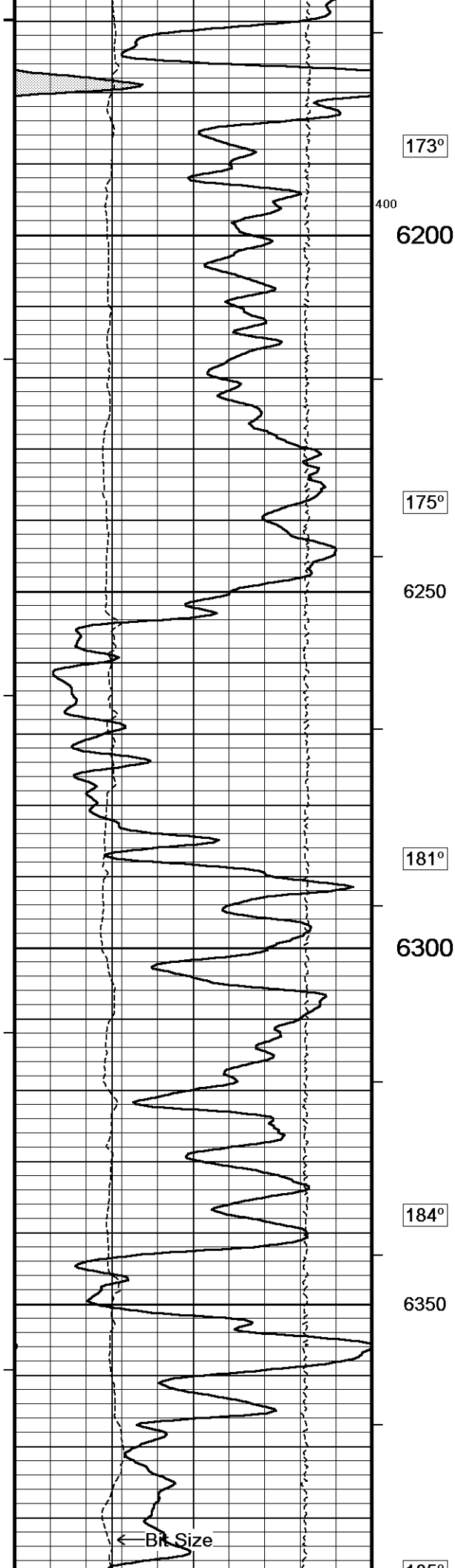
5850

166°

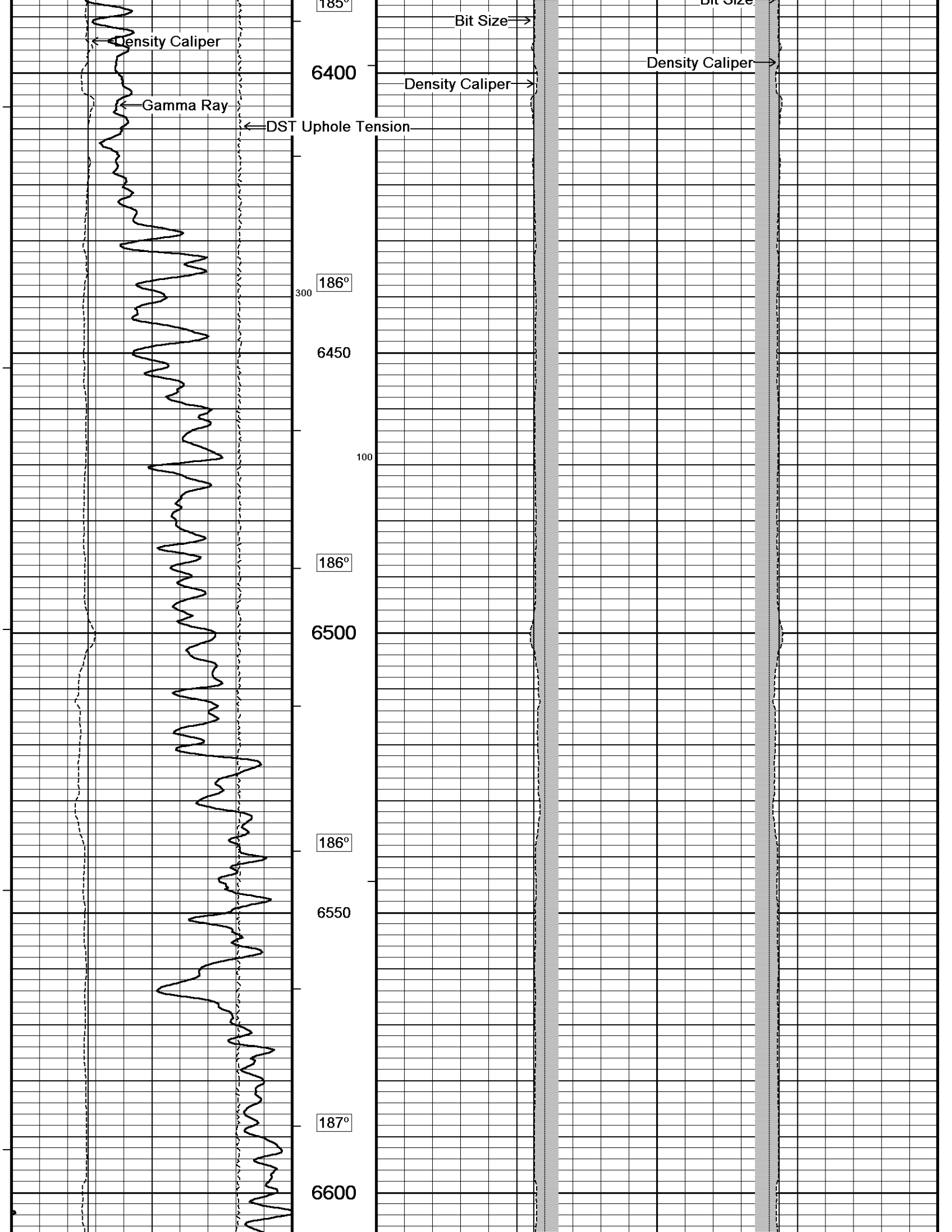
5900

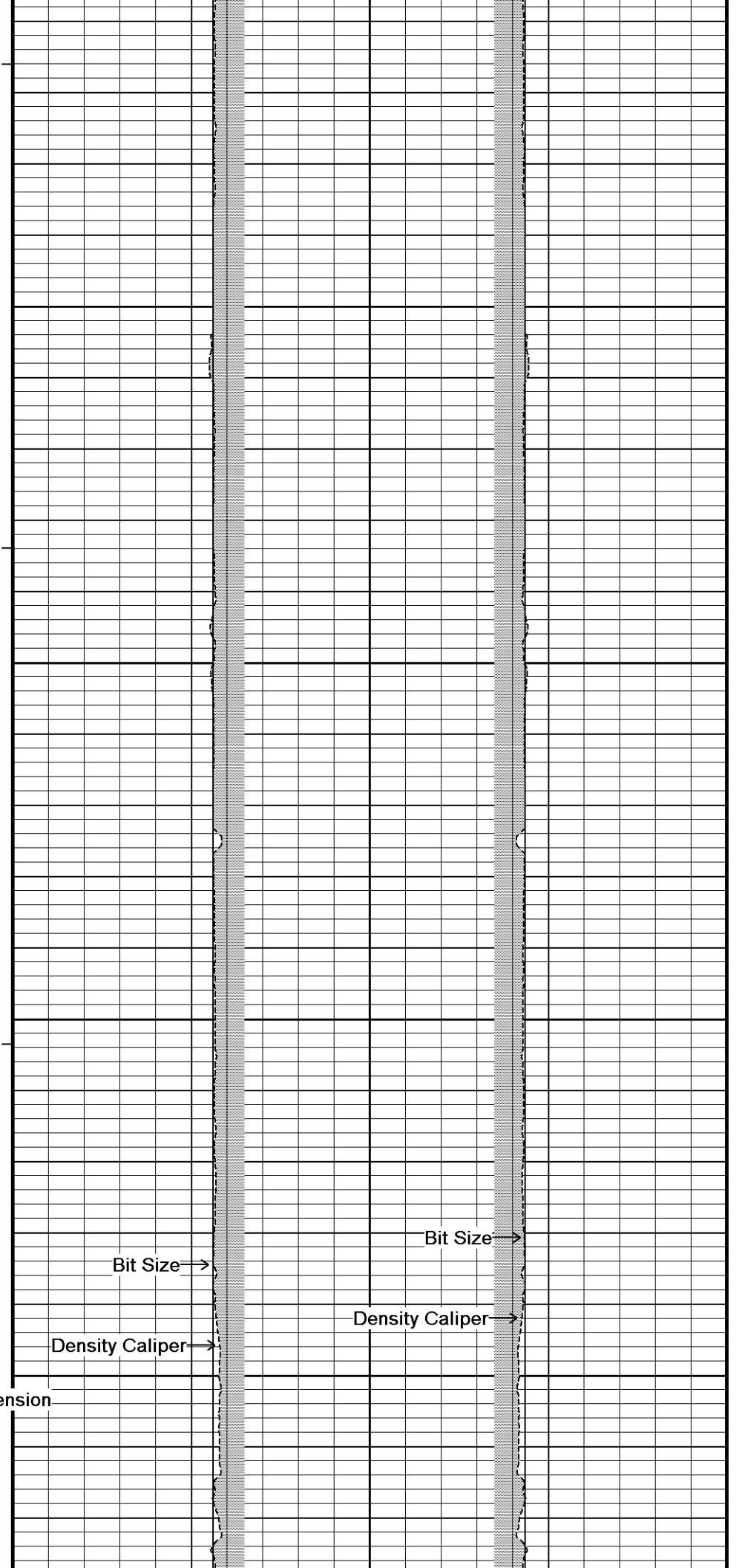
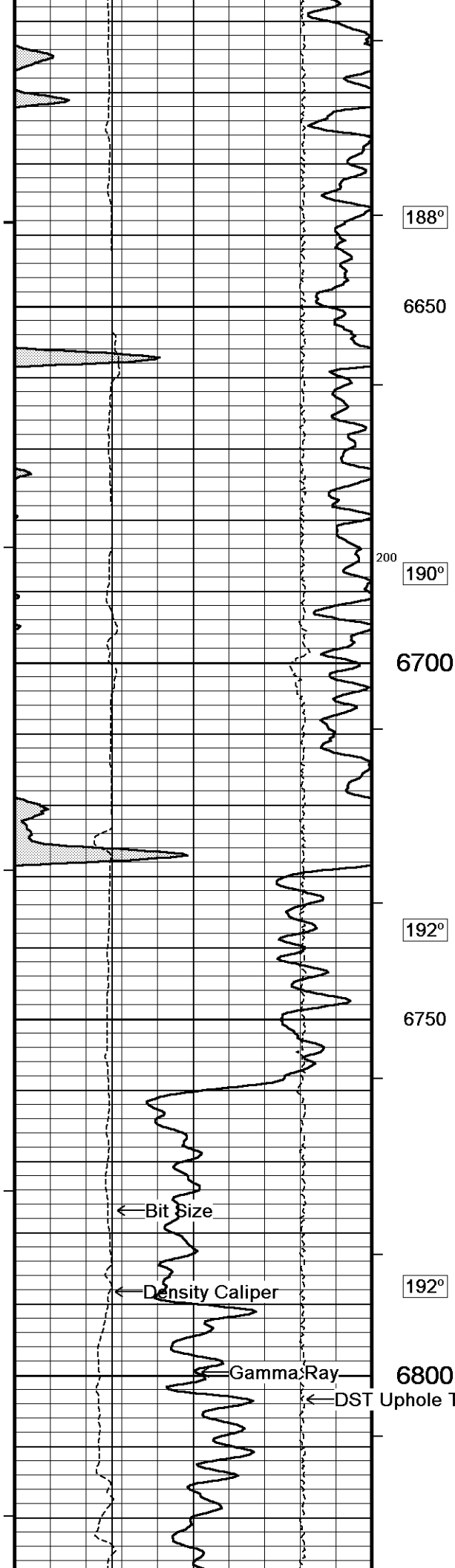
167°

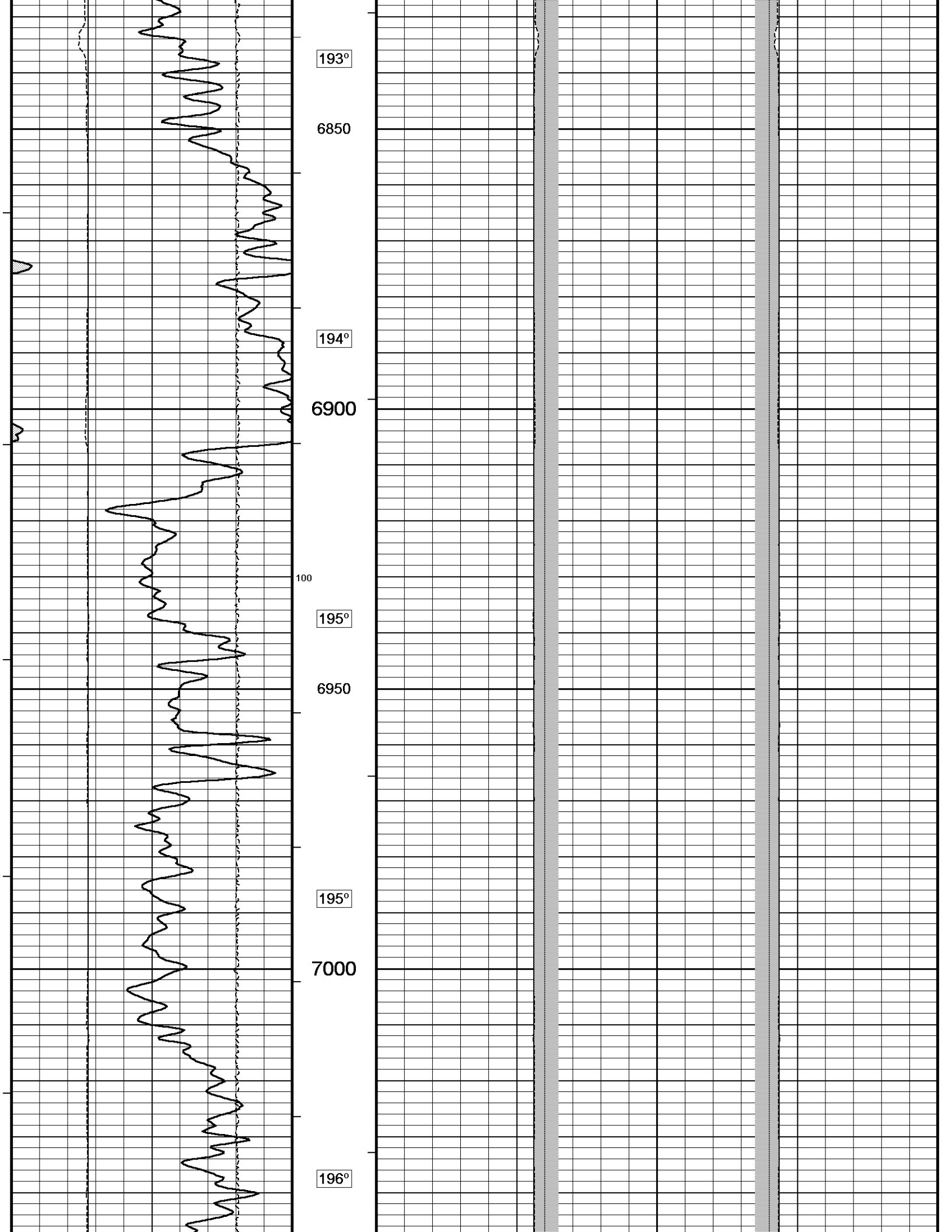


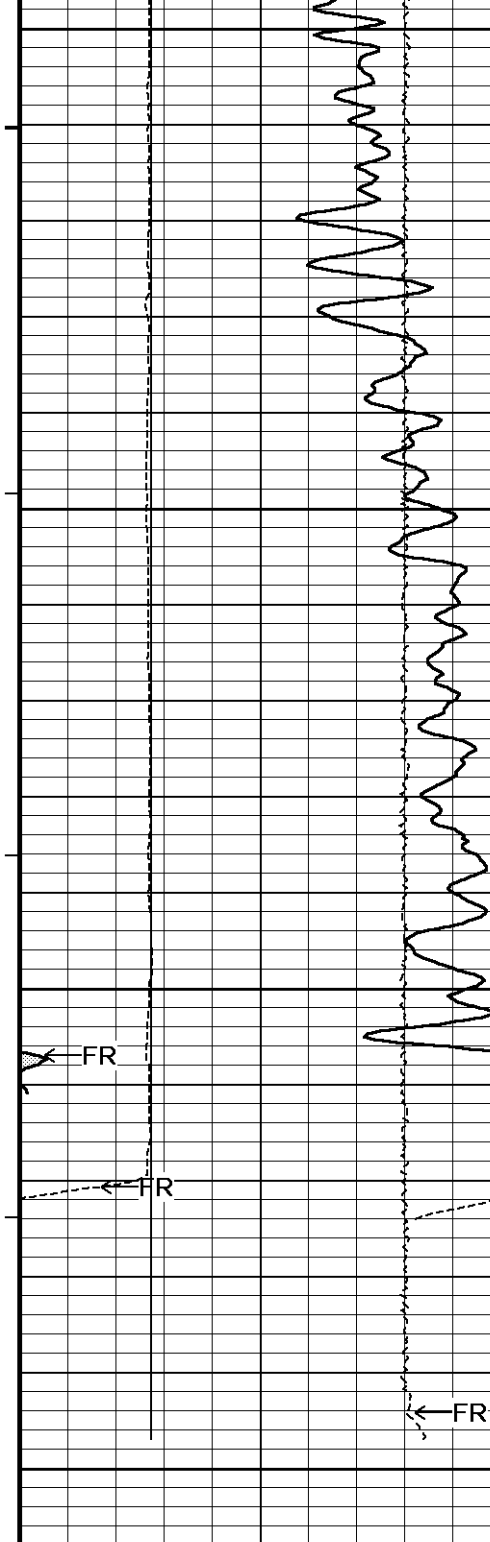




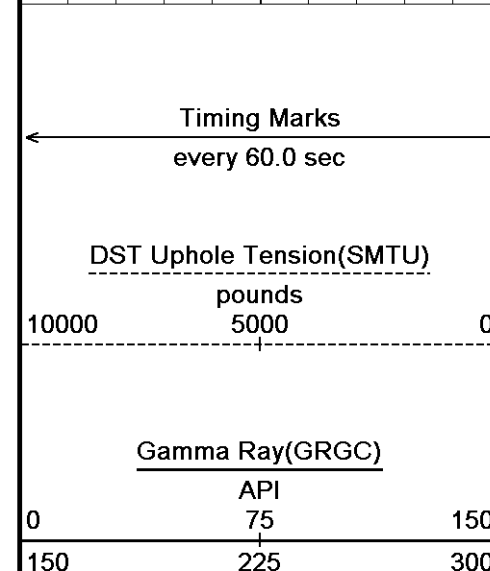




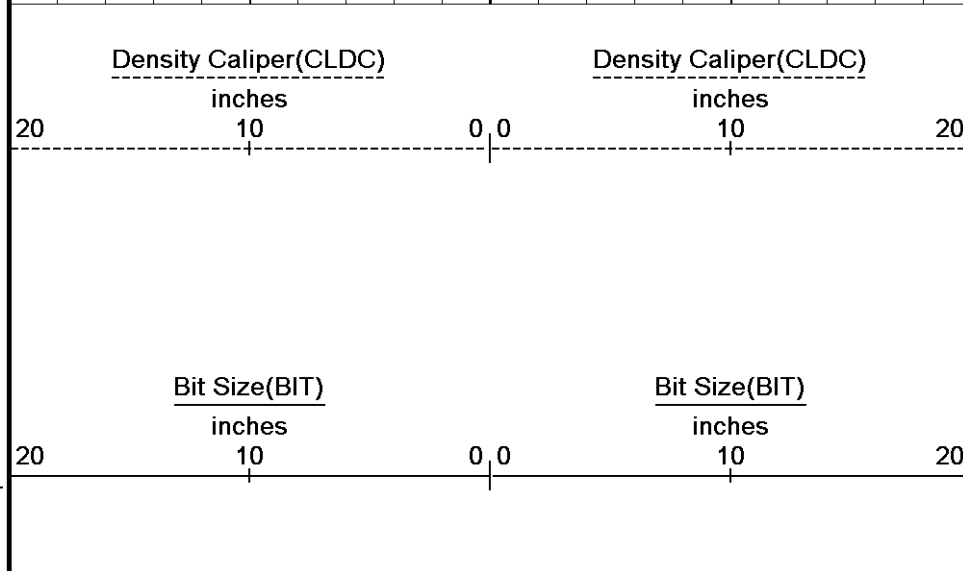
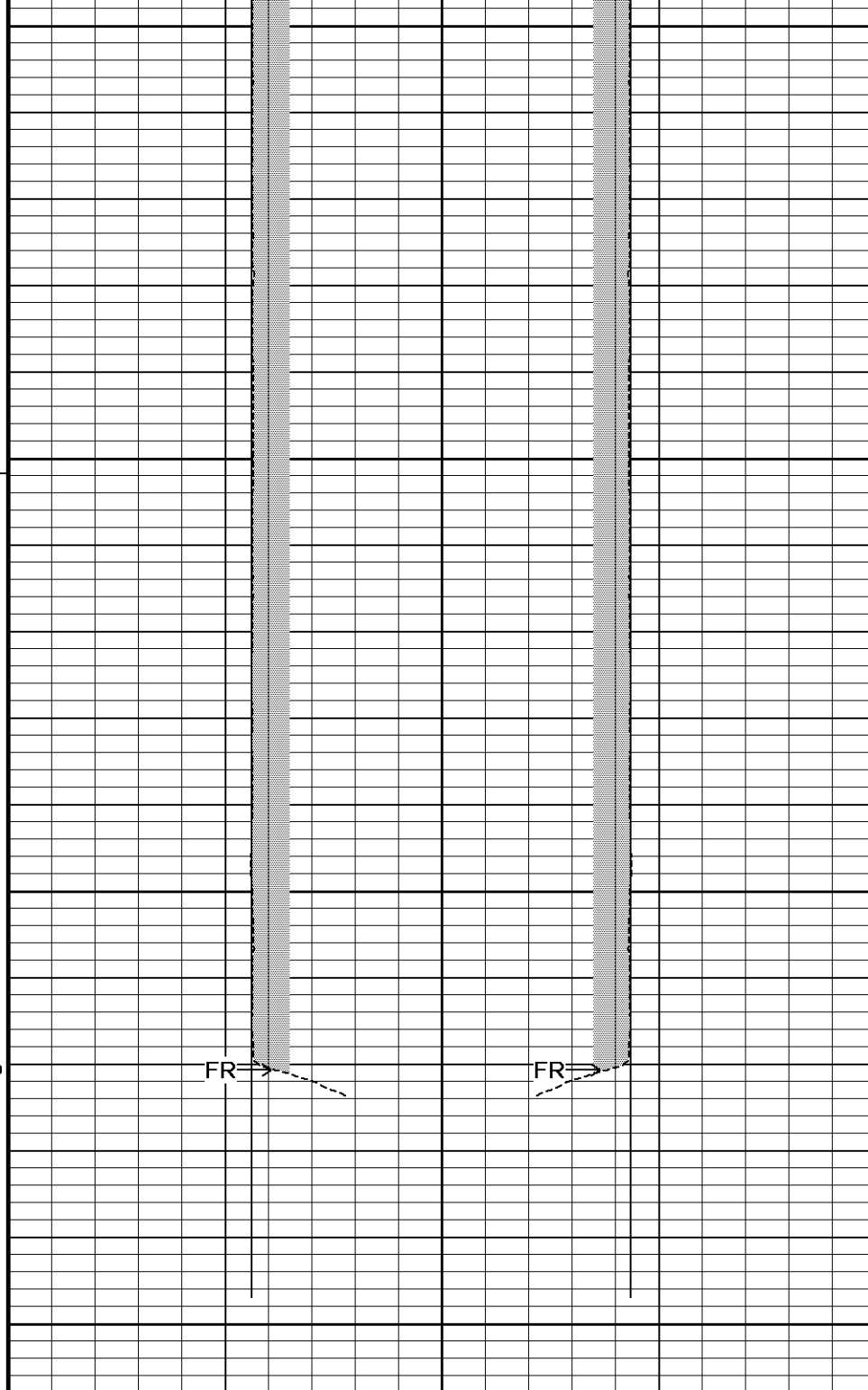




7050  
196°  
7100  
196°  
7150  
0  
7200



DSC  
in  
Feet  
  
Borehole  
Temp in  
deg F  
  
HVI  
every  
10 cu ft



<u>Density Caliper(CLDC)</u> inches 6                      11                      16	Annular Integral every 10 cu ft →	<u>Casing Size(CASE)</u> inches 20                      10                      0 0                      10                      20
<u>Bit Size(BIT)</u> inches 6                      11                      16	Replay Scale 1:240	

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 06-NOV-2011 08:52

Filename: C:\Logs\Laramie\Laramie Hawxhurst 17-05B\Laramie Hawxhurst 17-05B\_MAIN.dta
Recorded on 06-NOV-2011 06:29

System Versions: Logged with 12.02.4401
Processed with 12.02.4401
Plotted with 12.02.4401

↑
↑

BEFORE SURVEY CALIBRATION

C:\Logs\Laramie\Laramie Hawxhurst 17-05B\Laramie Hawxhurst 17-05B\_MAIN.dta

General Constants All 000
Last Edited on 06-NOV-2011 05:31

General Parameters		
Mud Resistivity	1.370	ohm-metres
Mud Resistivity Temperature	91.000	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	7.000	inches
Caliper for Differential Caliper	None	
Rwa Parameters		
Porosity used	Base Density 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 06-NOV-2011 05:03

Reading No	Measured	Calibrated (lbs)
1	15421.76	0.00
2	17032.58	360.00

High Resolution Temperature Calibration MCG-D.A 342
Field Calibration on 29-OCT-2011 19:26

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	75.00	75.00

High Resolution Temperature Constants MCG-D.A 342
Last Edited on

Pre-filter Length	11
-------------------	----

SP Calibration MCG-D.A 342
Field Calibration on 29-OCT-2011 19:26

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

Gamma Calibration MCG-D.A 342
Field Calibration on 06-NOV-2011 04:51

	Measured	Calibrated (API)
Background	104	72
Calibrator (Gross)	869	599

## Gamma Constants MCG-D.A 342

Last Edited on 28-OCT-2011 01:46

Gamma Calibrator Number	GRC-174	
Mud Density	1.00	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

## Neutron Calibration MDN-B.A 306

Base Calibration on 05-OCT-2011 14:34

Field Check on 06-NOV-2011 04:53

## Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2907	90	3714	110
Ratio	32.245		33.764	

## Field Calibrator at Base

	Calibrated (cps)	
	2329	3388
Ratio	0.687	

## Field Check

	Calibrated (cps)	
	2334	3437
Ratio	0.679	

## Neutron Constants MDN-B.A 306

Last Edited on 06-NOV-2011 04:55

Neutron Source Id	P44384B	
Neutron Jig Number	6584	
Epithermal Neutron	No	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	7.00	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	None	
Formation Pressure	N/A	kpsi
Temperature Source	None	
Temperature	N/A	degrees F
Mud Salinity	0.00	kppm
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	N/A	kppm
Barite Mud Correction	Not Applied	
Salinity Correction	Not Applied	

## FE Calibration MFE-B.A 179

Base Calibration on 05-OCT-2011 16:03

Field Check on 06-NOV-2011 05:22

## Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	11.5	1.3
Reference 2	963.8	126.8

Base Check	280.4
------------	-------

Field Check	280.5
-------------	-------

## FE Constants MFE-B.A 179

Last Edited on 06-NOV-2011 05:22

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.	MCG External Temperature	
Stand-off	0.5	inches

## High Resolution Temperature Calibration MAI-A.A 191

Field Calibration on 29-OCT-2011 19:28

	Measured	Calibrated (Deg F)
Lower	10.00	10.00
Upper	75.00	75.00

Pre-filter Length 11

## Induction Calibration MAI-A.A 191

Base Calibration on 31-AUG-2011 09:58

Field Check on 06-NOV-2011 05:23

## Base Calibration

## Test Loop Calibration

## Measured

## Calibrated (mmho/m)

Channel	Low	High	Low	High
1	15.8	467.8	9.3	966.2
2	6.2	382.6	7.6	821.4
3	3.9	257.9	5.2	566.0
4	2.1	136.5	2.6	279.2

Array Temperature 88.9 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	13.9	3864.4
2	0.0	0.0	28.8	3513.9
3	0.0	0.0	26.8	3063.9
4	0.0	0.0	18.0	2020.5
Deep	0.0	0.0	15.9	1982.5
Medium	0.0	0.0	39.2	4080.1
Shallow	0.0	0.0	43.7	5207.3

Array Temperature 0.0 58.6 Deg F

## Induction Constants MAI-A.A 191

Last Edited on 06-NOV-2011 05:23

## 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.

MCG 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	

## Caliper Calibration MPD-B 167

Base Calibration on 29-OCT-2011 11:57

Field Calibration on 06-NOV-2011 05:21

## Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15024	4.00
2	23536	5.96
3	31456	7.98
4	39664	9.86
5	48928	11.88
6	N/A	N/A

#### Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.96	7.98

#### Photo Density Calibration MPD-B 167

Base Calibration on 29-OCT-2011 11:46

Field Check on 06-NOV-2011 05:01

#### Density Calibration

##### Base Calibration

	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	50886	18093	53237	19445
Reference 2	23683	2986	25135	2545

##### Field Check at Base

1233.0 1721.6

##### Field Check

1232.9 1719.4

#### PE Calibration

##### Base Calibration

	WS	Measured WH	Ratio	Calibrated Ratio
Background	225	1111		
Reference 1	17104	50709	0.340	0.320
Reference 2	6561	23545	0.282	0.274

##### Field Check at Base

225.4 1111.1

##### Field Check

224.4 1102.6

#### Density Constants MPD-B 167

Last Edited on 06-NOV-2011 05:21

Density Source Id	P44263B
Nylon Calibrator Number	532
Aluminium Calibrator Number	532
Density Shoe Profile	8 inch
Caliper Source for Processing	Density Caliper
PE Correction to Density	Not Applied
Mud Density	1.16 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)
2.68	
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:\Logs\Laramie\Laramie Hawxhurst 17-05B\Laramie Hawxhurst 17-05B\_MAIN.dta



MCB-C.A 95 LG: 1.58 ft WT: 15.4 lb OD: 2.24 in

SHA-J.A Compact Swivel Head Adaptor

SHA-J.A 314 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

Compact Comms Gamma

MCG-D.A 342 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Neutron

MDN-B.A 306 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper

MPD-B 167 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

SKJ-D.A Compact Knuckle Joint

SKJ-D.A 88 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

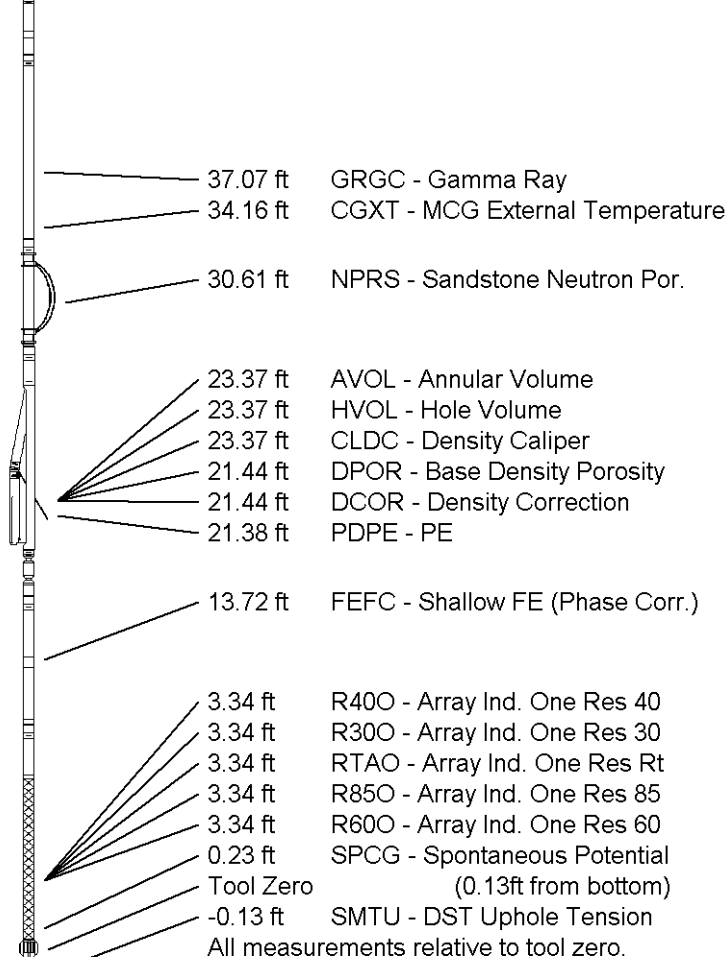
Compact Focussed Electric

MFE-B.A 179 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction

MAI-A.A 191 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 46.23 ft Weight: 363.8 lb



COMPANY LARAMIE ENERGY II  
WELL HAWXHURST 17-05B  
FIELD BUZZARD CREEK  
PROVINCE/COUNTY MESA  
COUNTRY/STATE U.S.A. / COLORADO

Elevation Kelly Bushing	6807.00	feet	First Reading	7171.00	feet
Elevation Drill Floor	6806.00	feet	Depth Driller	7180.00	feet
Elevation Ground Level	6786.00	feet	Depth Logger	7194.00	feet



**Weatherford®**

HOLE VOLUME  
CALIPER LOG

