



**Weatherford**

**CALIPER LOG**

COMPANY

MURFIN DRILLING COMPANY, INC.

WELL

RED POLL #8-21

FIELD

WILDCAT

PROVINCE/COUNTY LINCOLN

COUNTRY/STATE U.S.A. / COLORADO

LOCATION 1900' FNL & 605' FEL

SEC 21 TWP 10S RGE 56W Other Services

Latitude

Longitude

API Number 05-073-06754

Permanent Datum GL, Elevation 5489 feet

Log Measured From KB, 13.00 feet above Permanent Datum

Drilling Measured From KB

Date 09-DEC-2018

Run Number ONE

Service Order 4558-231541832

Depth Driller 8400.00 feet

Depth Logger 8402.00 feet

First Reading 8368.00 feet

Last Reading 432.00 feet

Casing Driller 432.00 feet

Casing Logger 432.00 feet

Bit Size 7.875 inches

Hole Fluid Type CHEMICAL

Density / Viscosity 9.40 lb/USg 68.00 CP

PH / Fluid Loss 9.00 8.00 ml/30Min

Sample Source FLOWLINE

Rm @ Measured Temp 1.15 @ 75.0 ohm-m

Rmf @ Measured Temp 0.92 @ 75.0 ohm-m

Rmc @ Measured Temp 1.38 @ 75.0 ohm-m

Source Rmf / Rmc CALC CALC

Rm @ BHT 0.47 @182.0 ohm-m

Time Since Circulation 5 HOURS

Max Recorded Temp 182.00 deg F

Equipment / Base 13096 LIB

Recorded By ADAM SILL

Witnessed By GREGG SMITH

Elevations:  
KB 5502.00 feet  
DF 5500.00  
GL 5489.00

**BOREHOLE RECORD**

Last Edited: 09-DEC-2018 04:36

| Bit Size<br>inches | Depth From<br>feet | Depth To<br>feet |
|--------------------|--------------------|------------------|
| 7.875              | 432.00             | 8400.00          |

**CASING RECORD**

| Type    | Size<br>inches | Depth From<br>feet | Shoe Depth<br>feet | Weight<br>pounds/ft |
|---------|----------------|--------------------|--------------------|---------------------|
| SURFACE | 8.625          | 0.00               | 432.00             | 24.00               |

**REMARKS**

- SOFTWARE ISSUE: WLS 18.03.9344.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING USED ON MDN.
  - 0.5 INCH STANDOFF USED ON MFE.
  - TWO 0.5 INCH STANDOFFS USED ON MSS.
  - 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 3751 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 4200 FEET: 732 CU.FT.

- RIG: MURFIN #25.

- ENGINEER: A. SILL.

- OPERATOR: B. TOVAR, B. COPELAND.

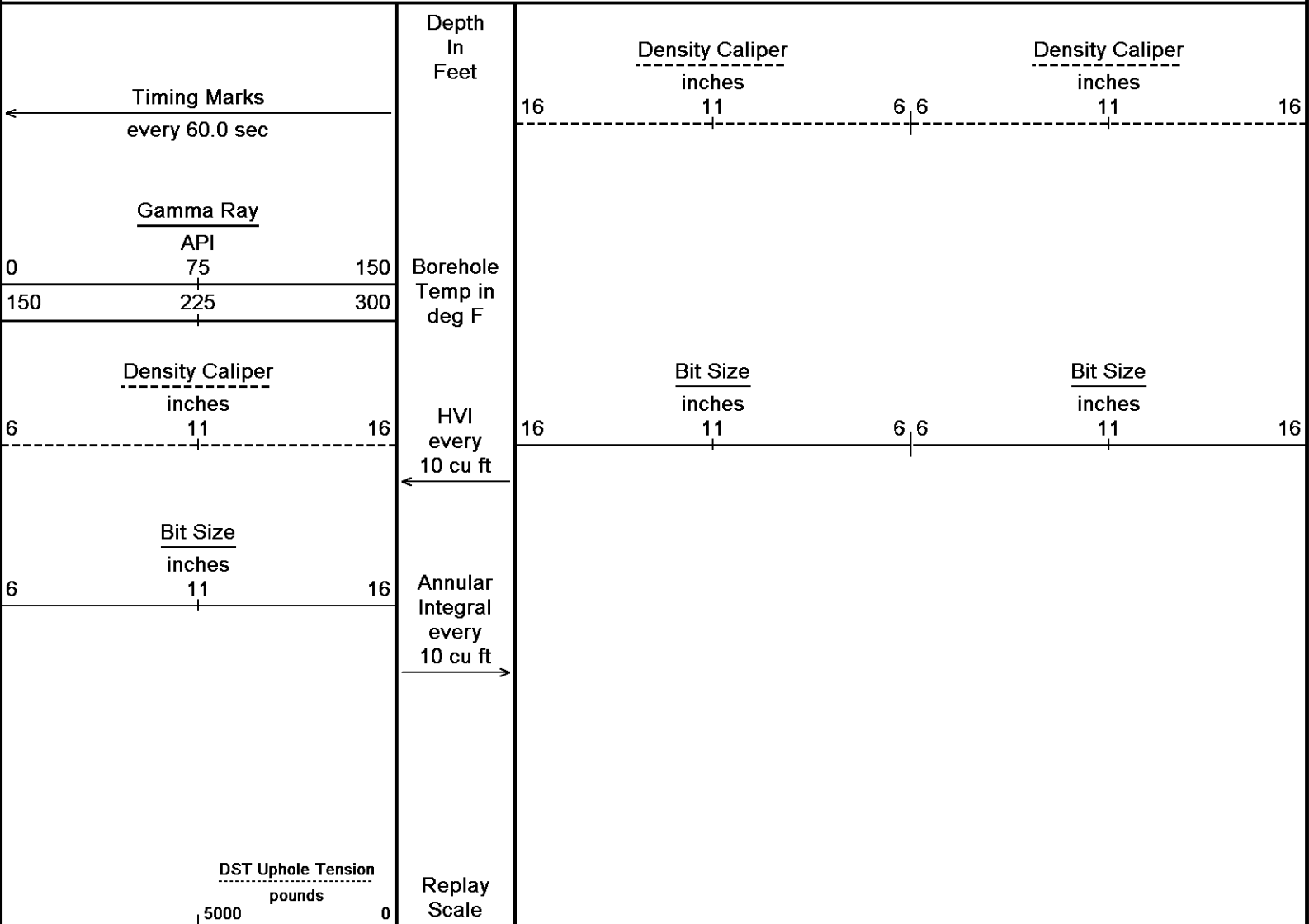
\*\*\*\* CALIPERS WERE CLOSED BETWEEN 5750 FEET AND 5920 FEET AS PER CUSTOMER'S REQUEST, DUE TO HOLE CONDITIONS THROUGH THAT INTERVAL. TOOL READINGS MAY NOT BE ACCURATE THROUGH THIS INTERVAL. \*\*\*\*

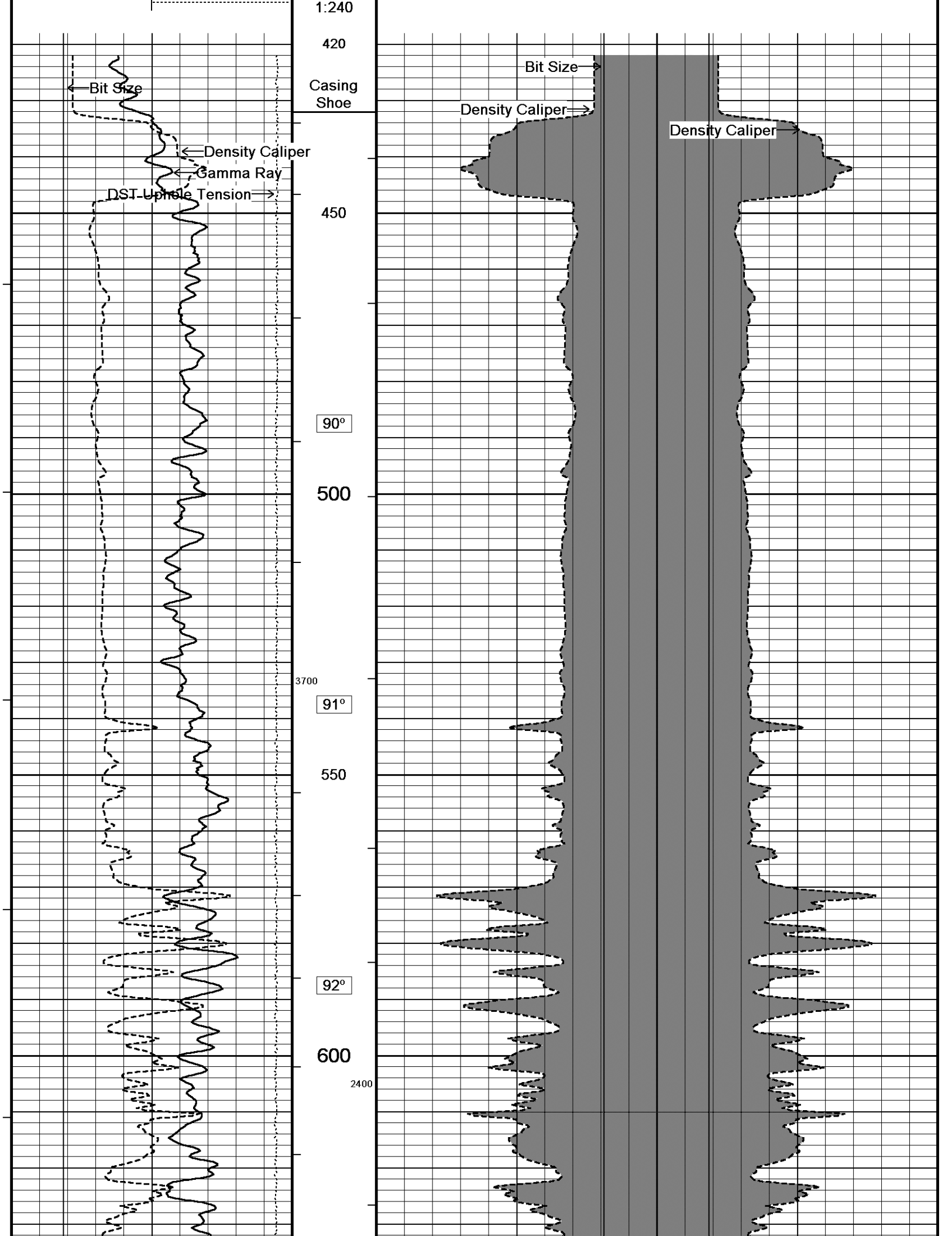
\*\*\*\* SP IS A LITTLE ERRATIC IN PLACES DUE TO AN UNKNOWN CAUSE. CHECKED SP PLACEMENT AND CHECKED FOR SOMETHING THAT MAY BE CAUSING STRAY VOLTAGE AND COULD NOT FIND A CAUSE. \*\*\*\*

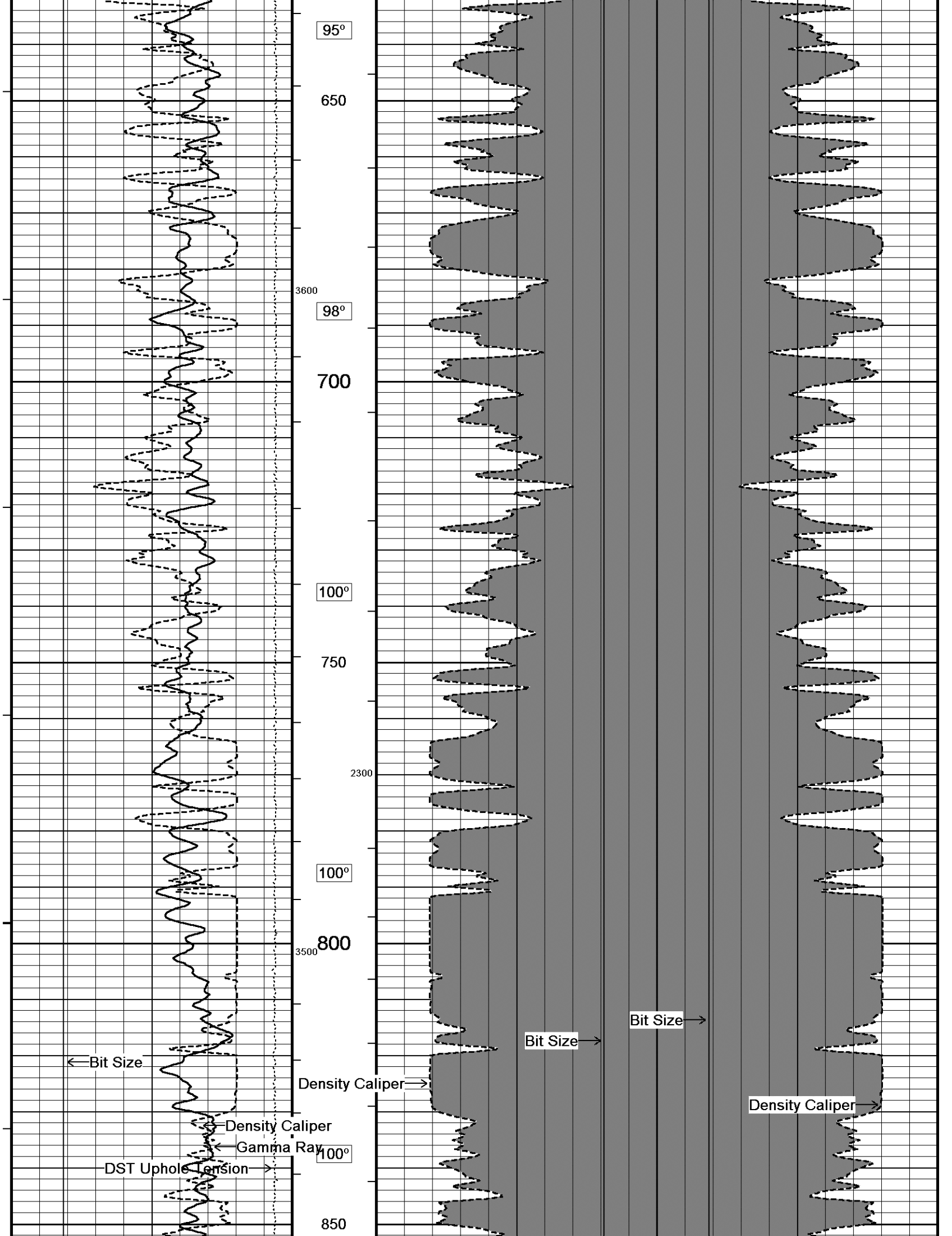
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.

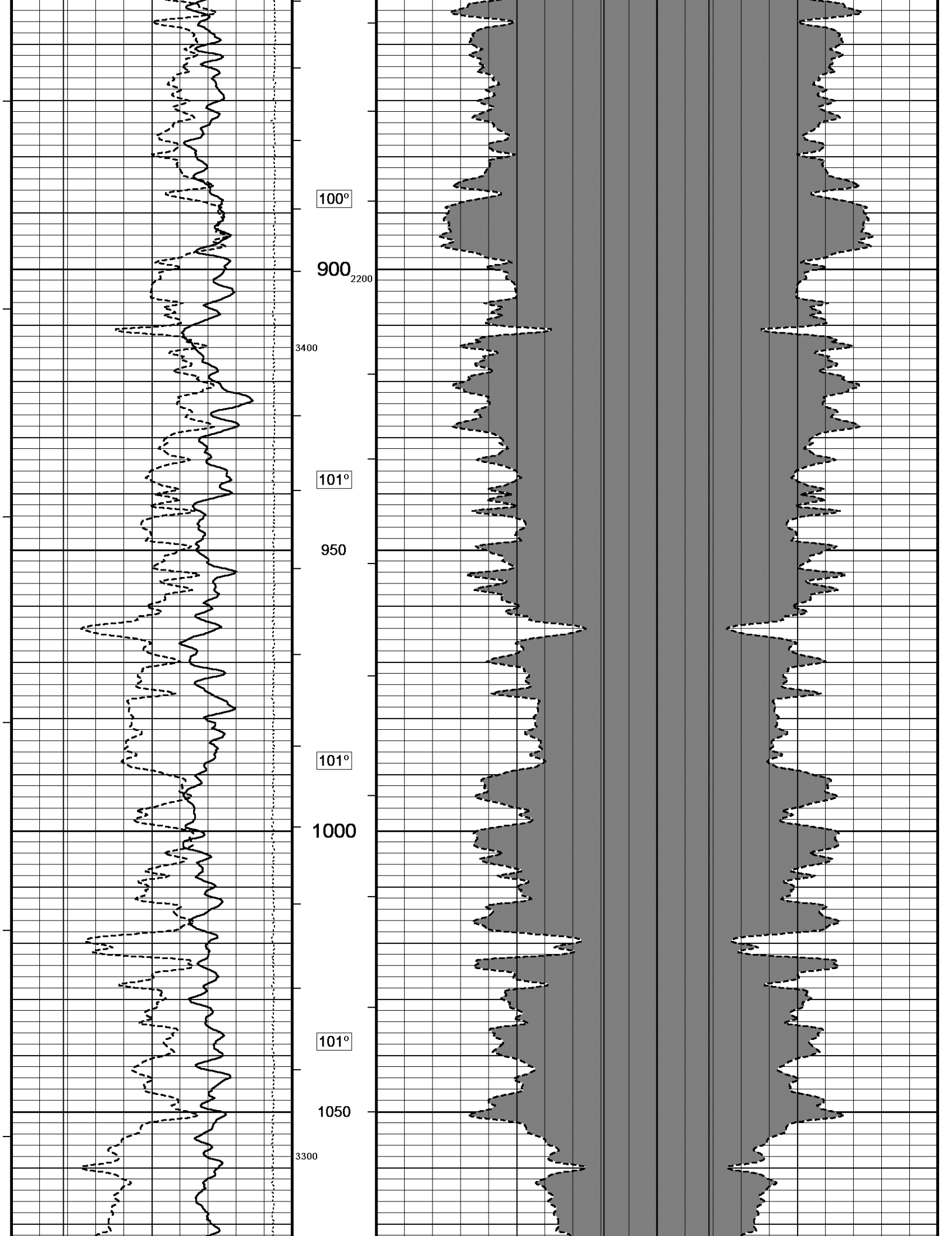
5 INCH MAIN

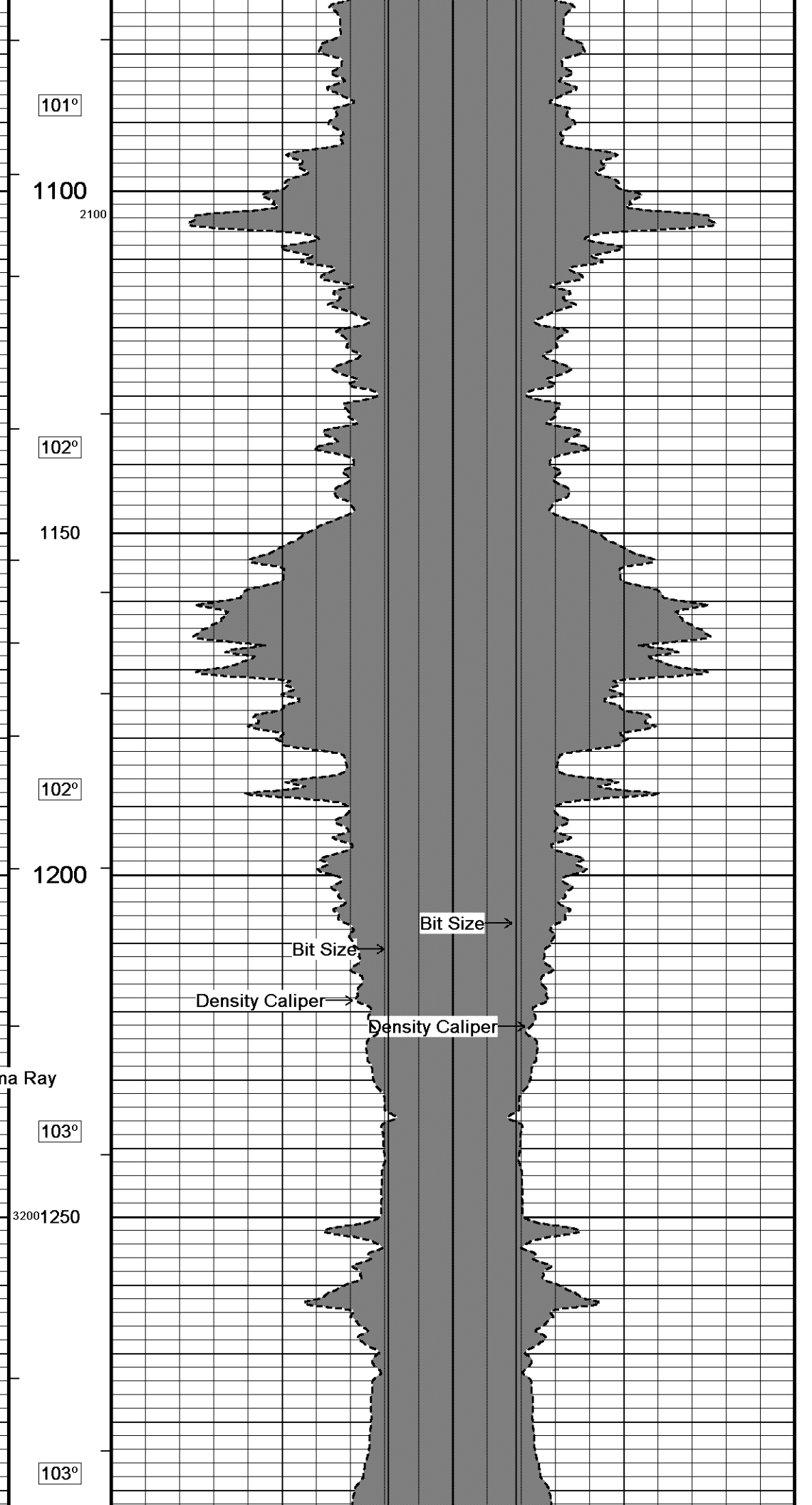
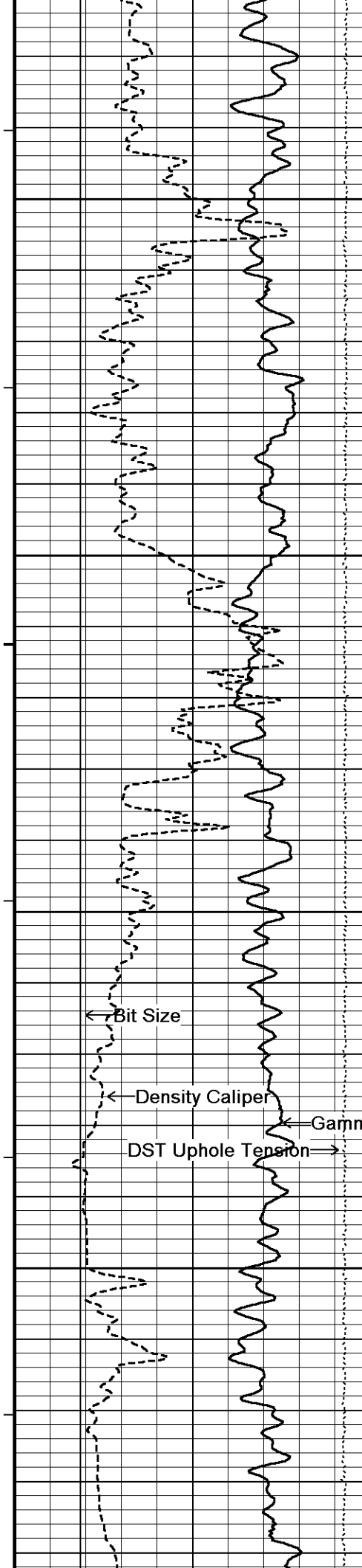
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 09-DEC-2018 13:04  
Filename: C:\Minimus 18.03.9344\Data\Murfin Red Poll #8-21\Murfin Red Poll #8-21\_003.dta Recorded on 09-DEC-2018 07:52  
System Versions: Logged with 18.03.9344 Plotted with 18.03.9344

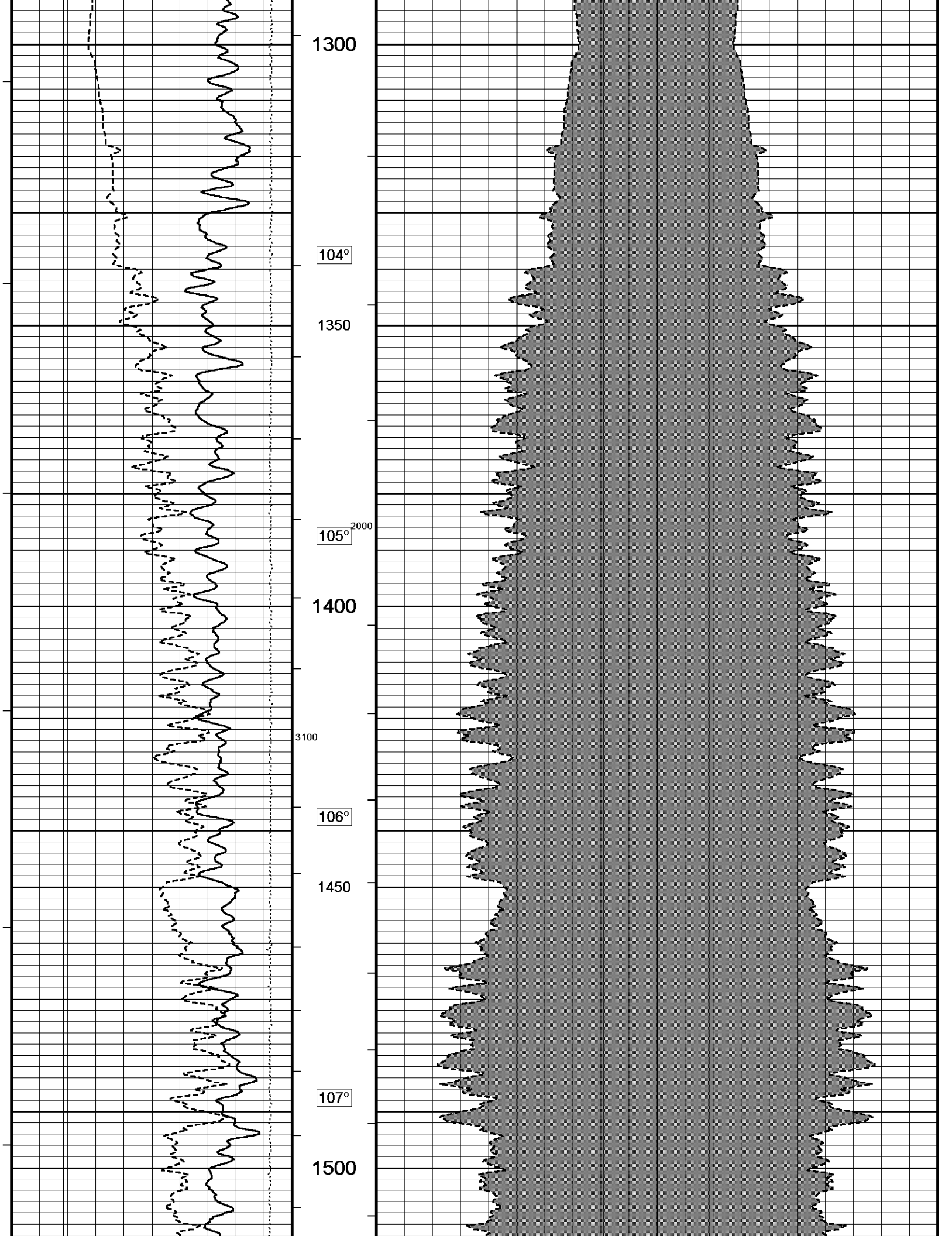


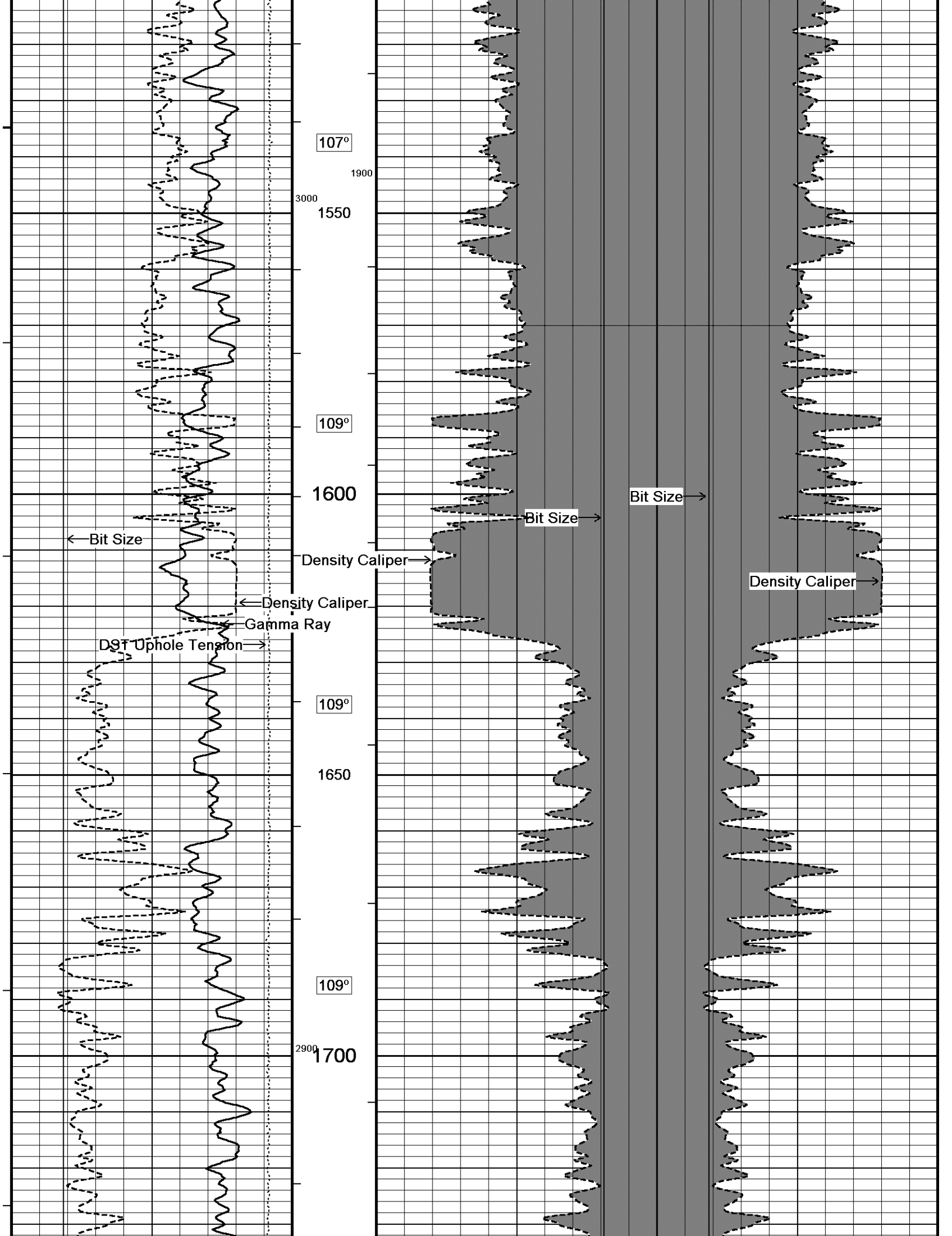


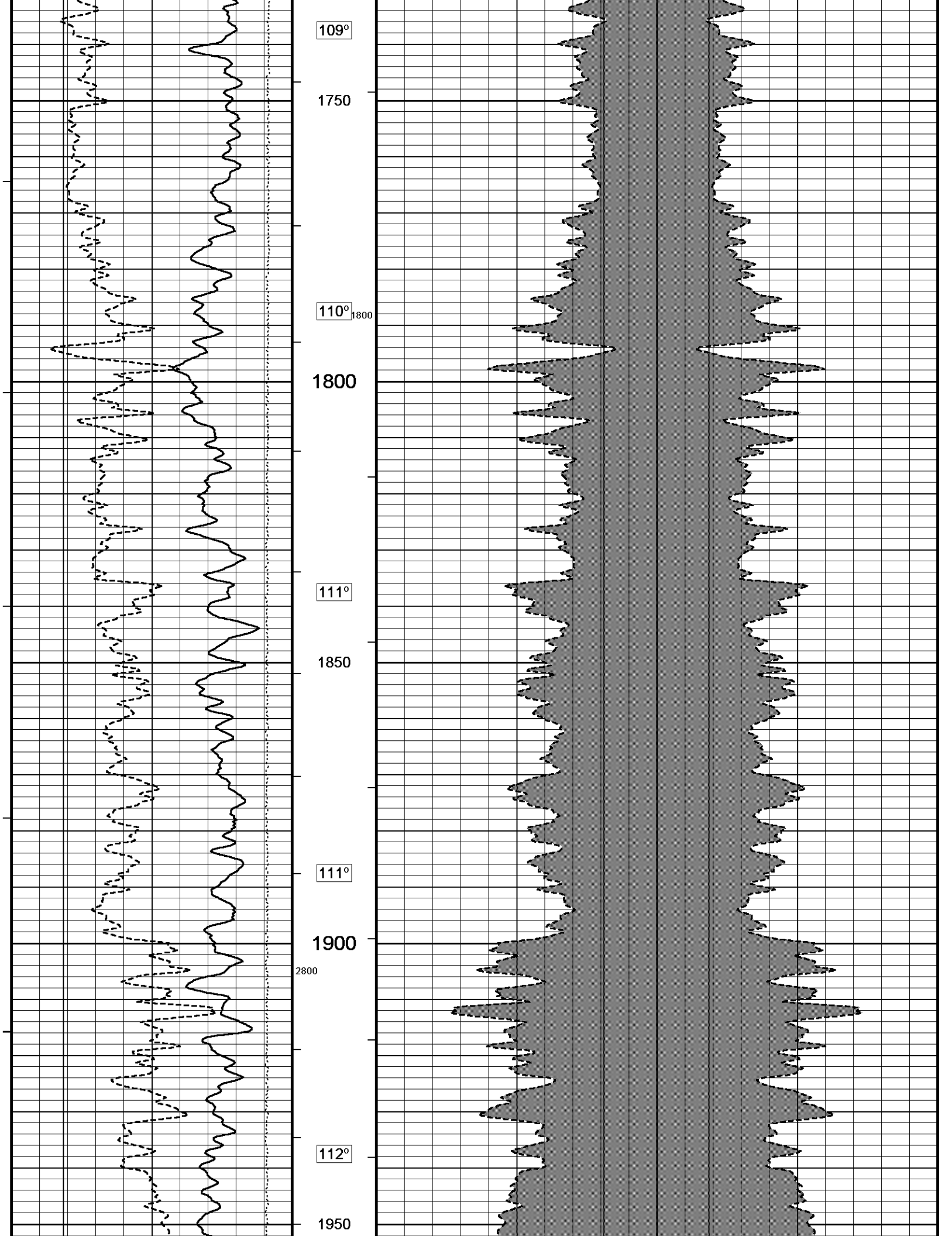


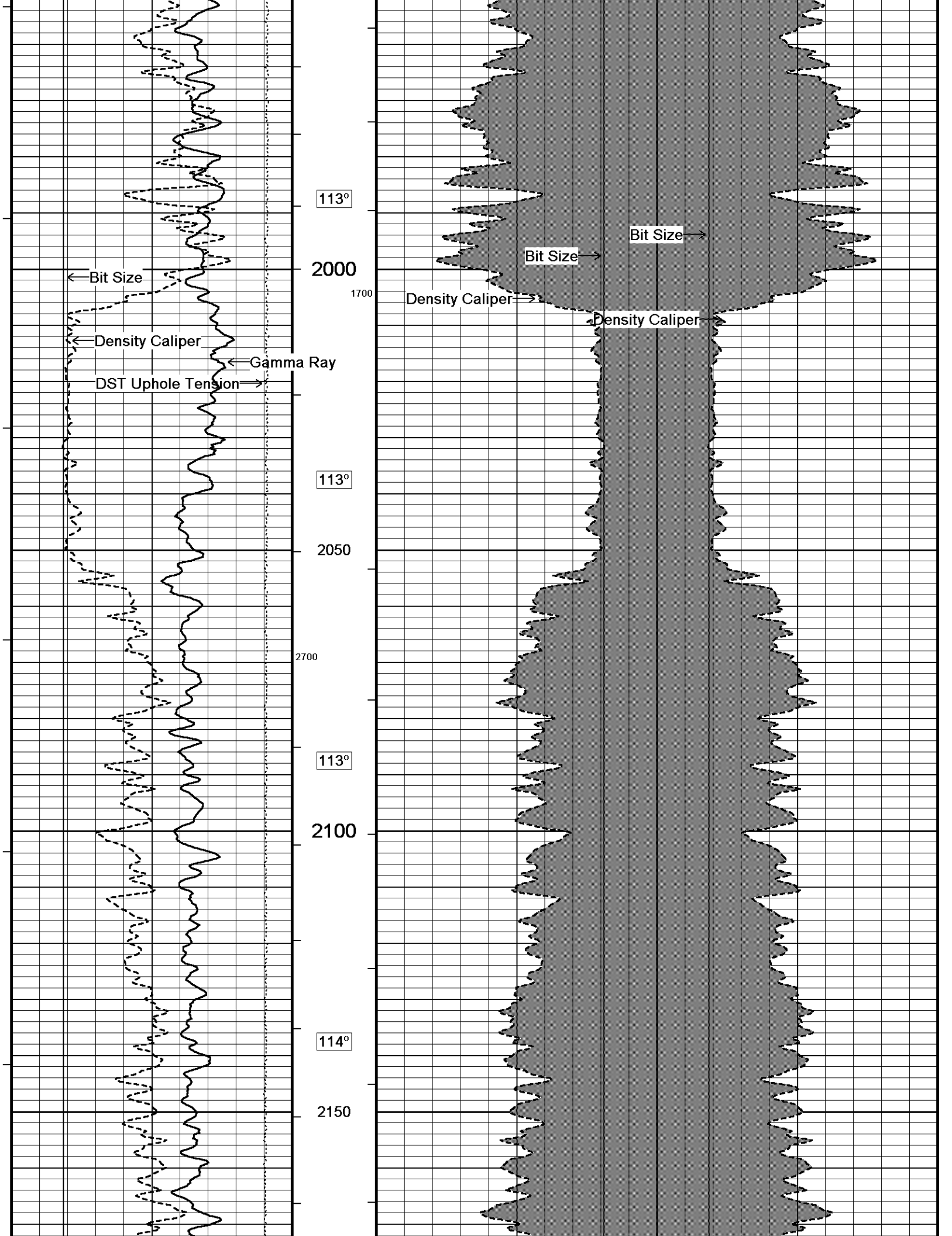


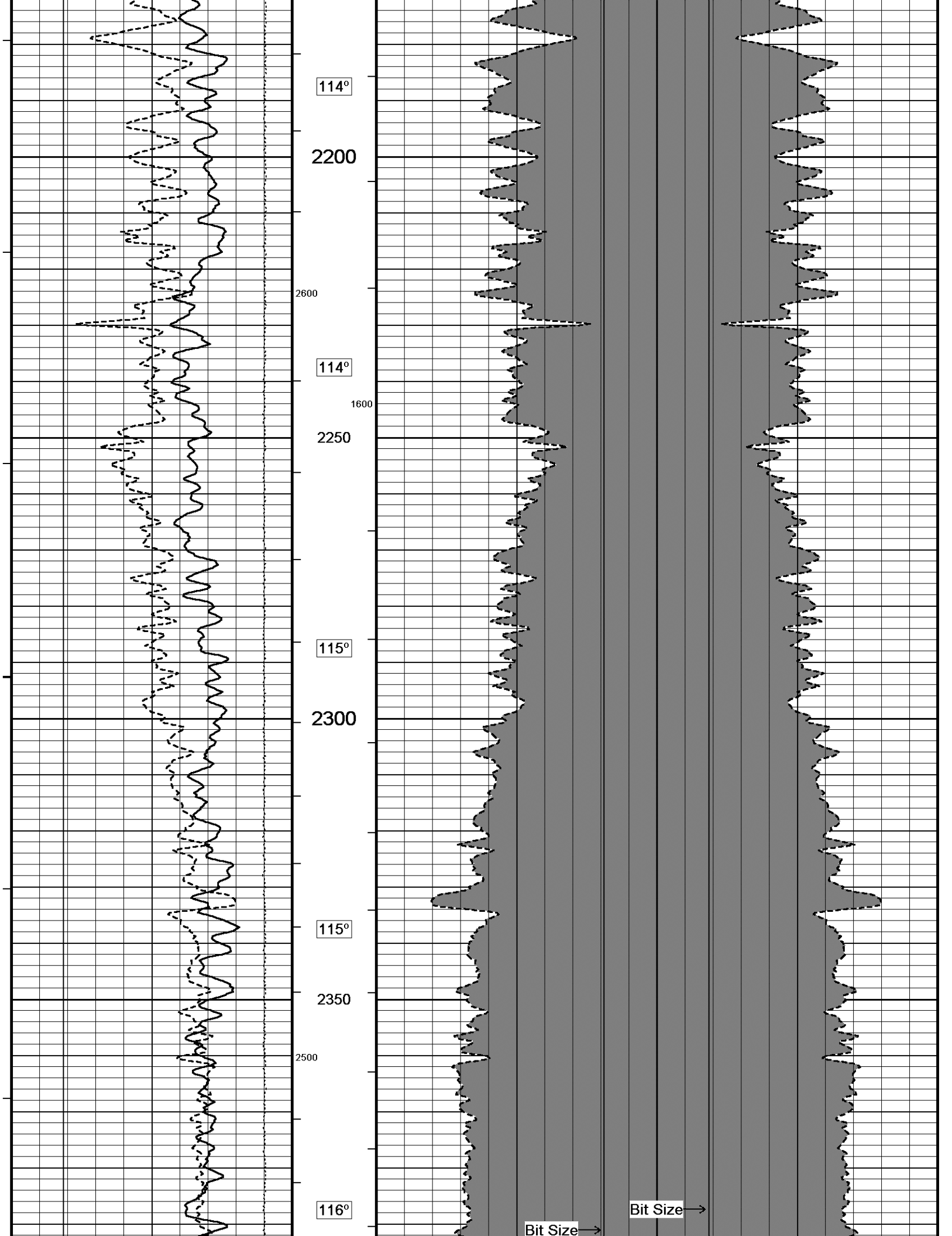












← Bit Size

2400 Density Caliper →

Density Caliper

Density Caliper

← Gamma Ray

DST Uphole Tension →

117°

2450

117°

2400

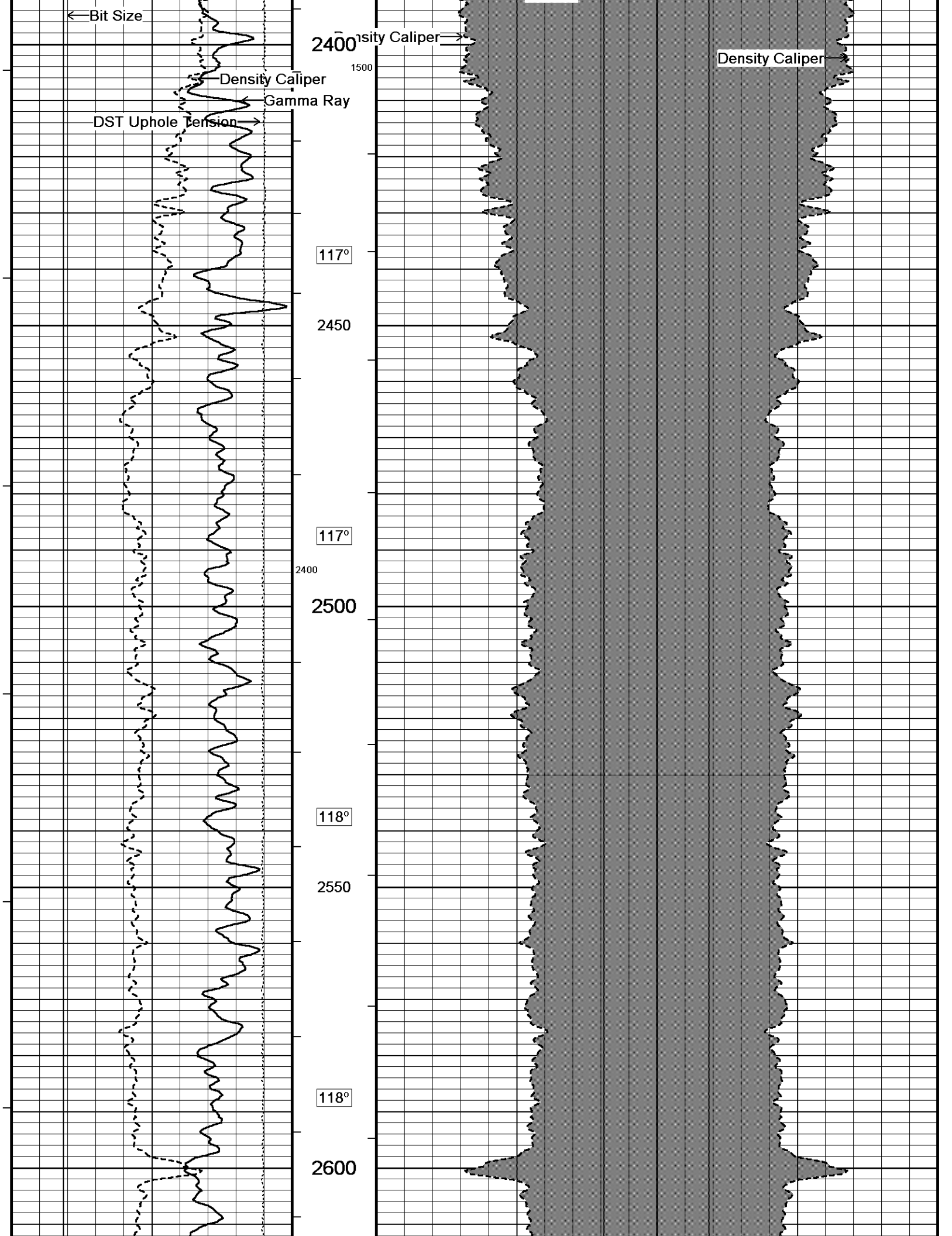
2500

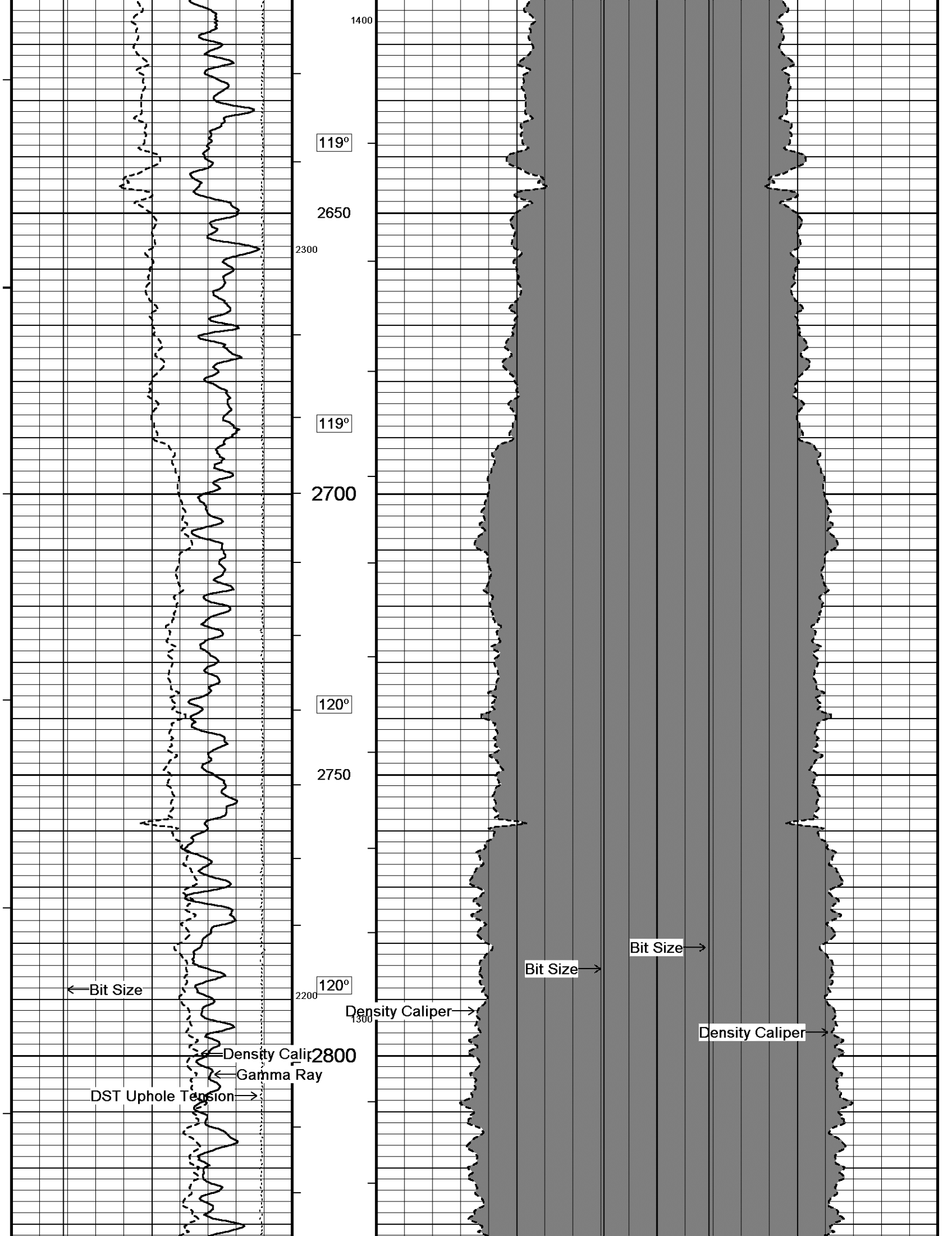
118°

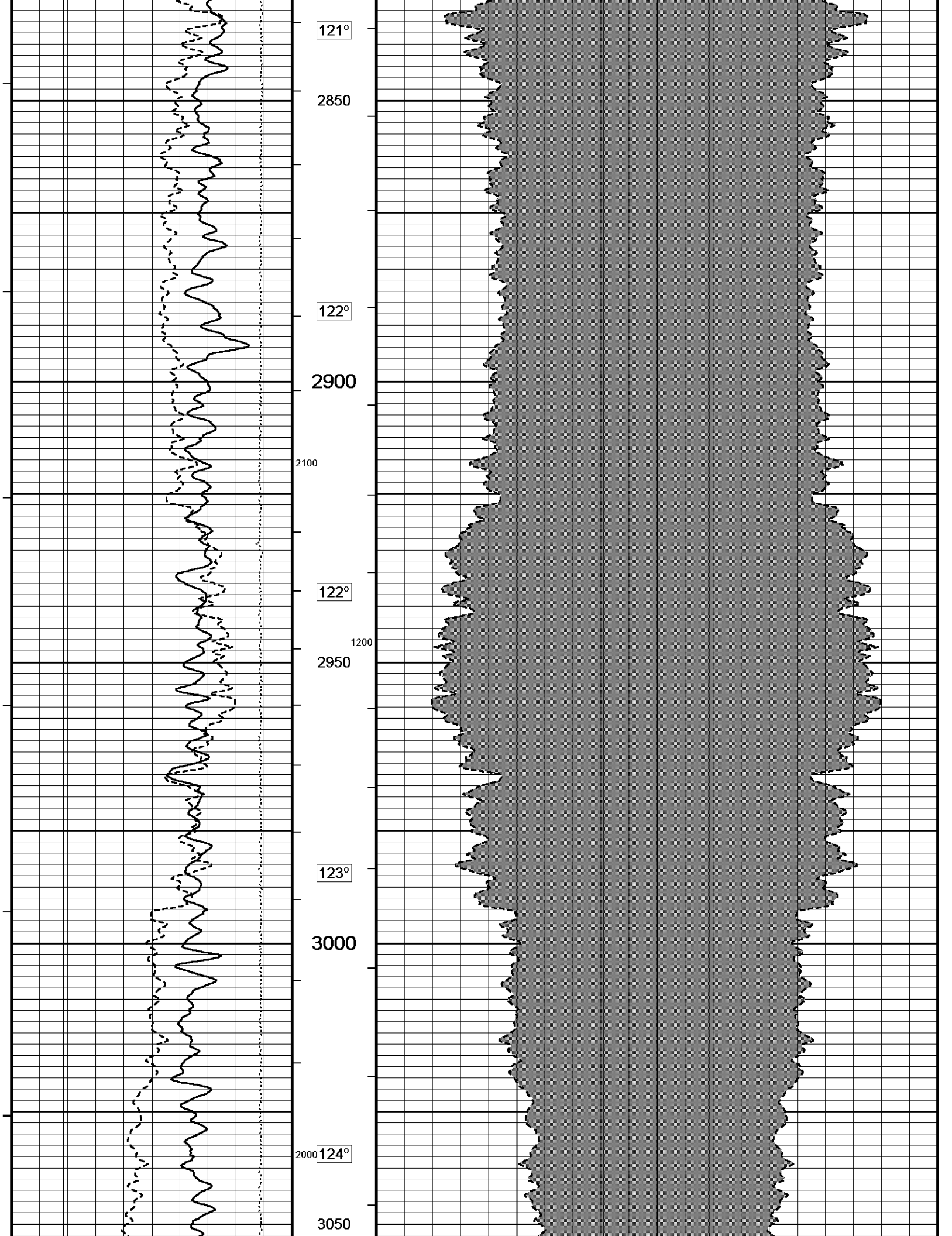
2550

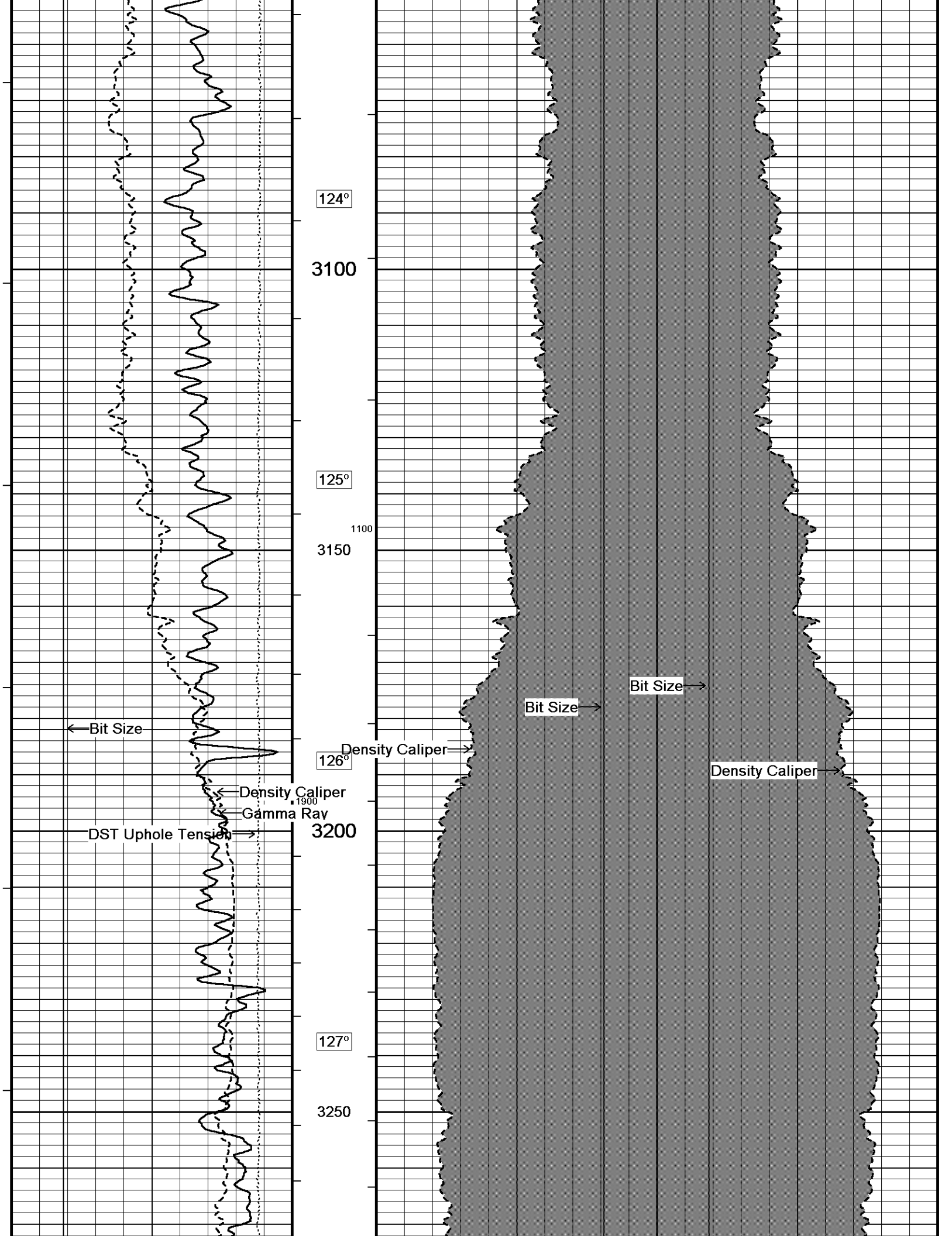
118°

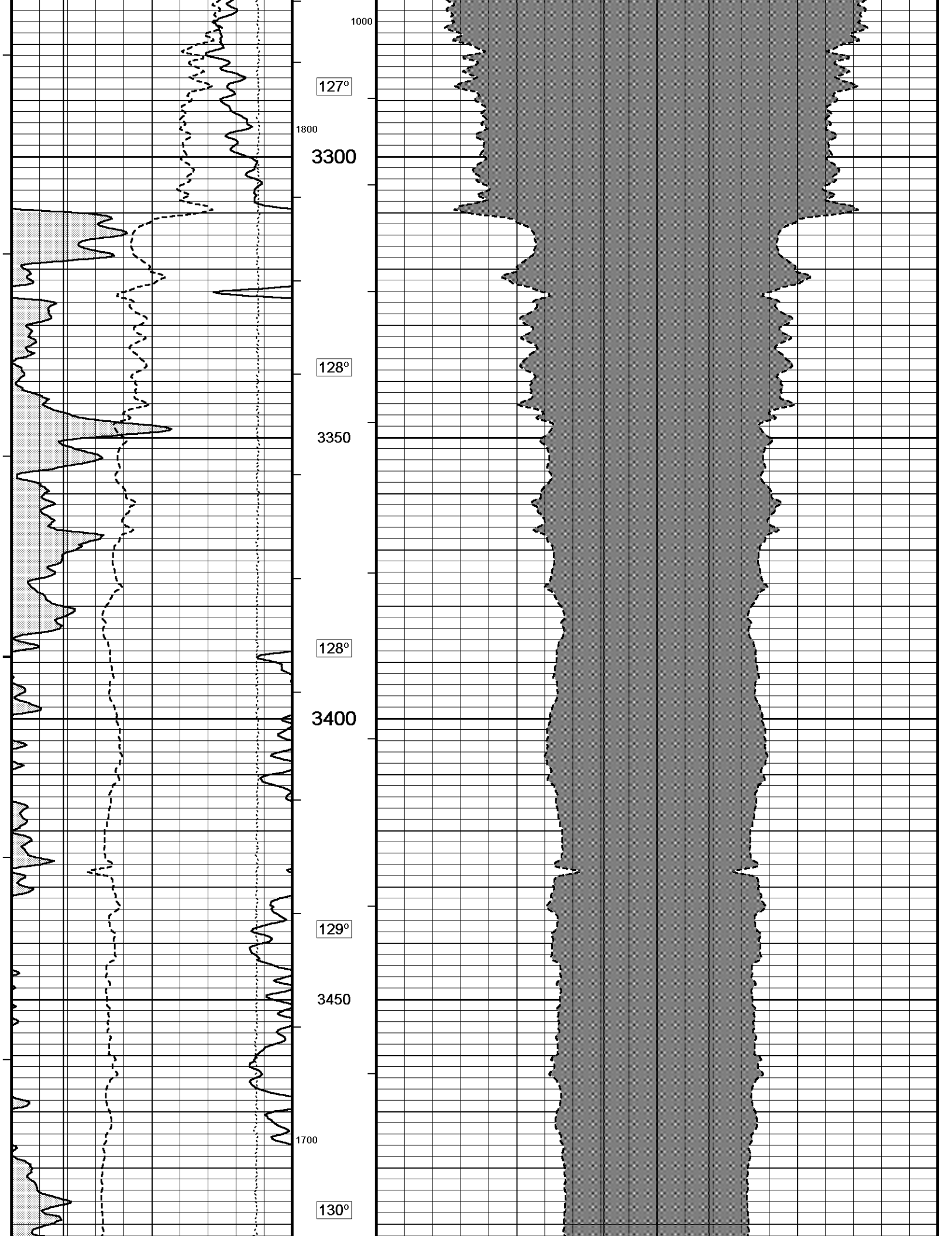
2600

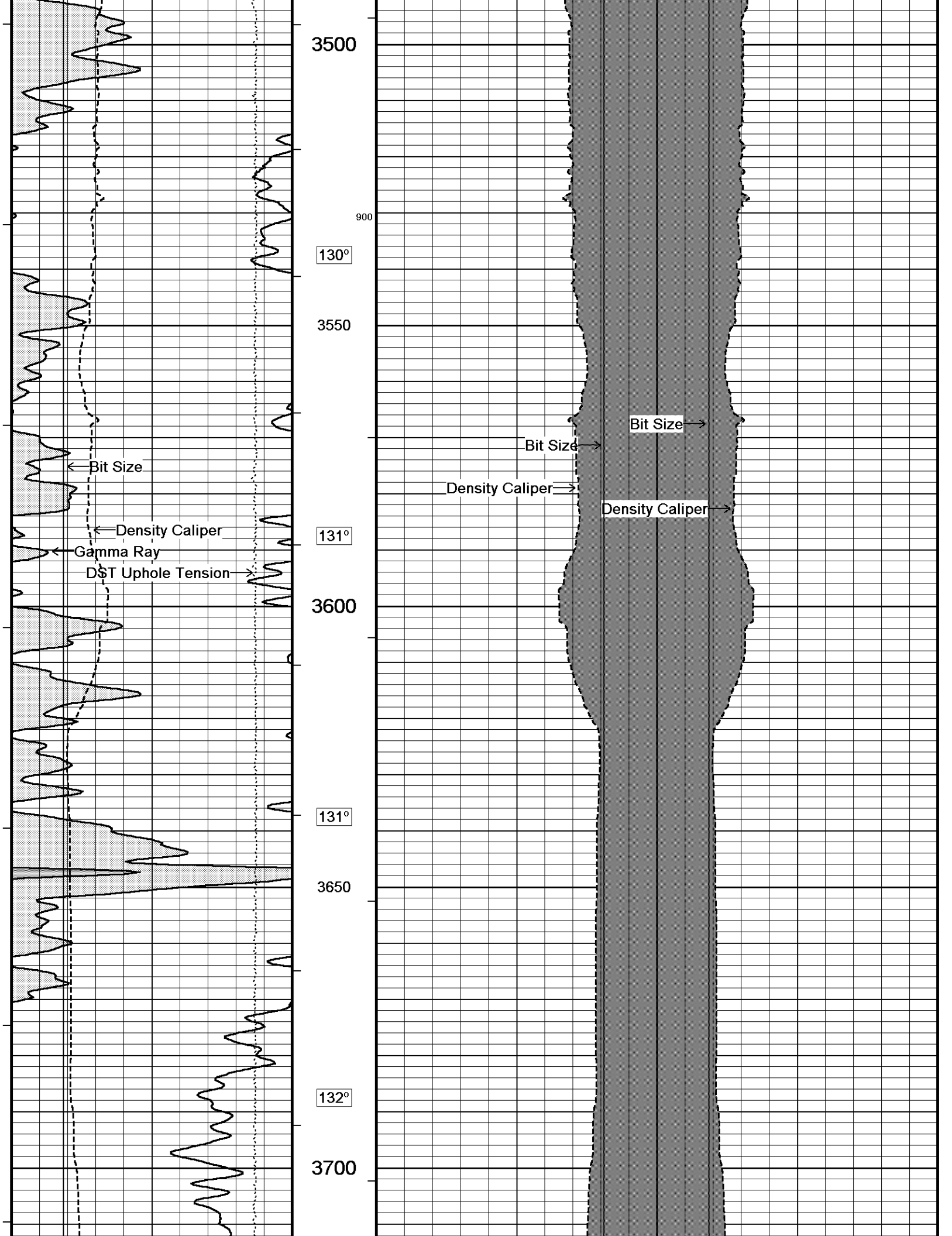


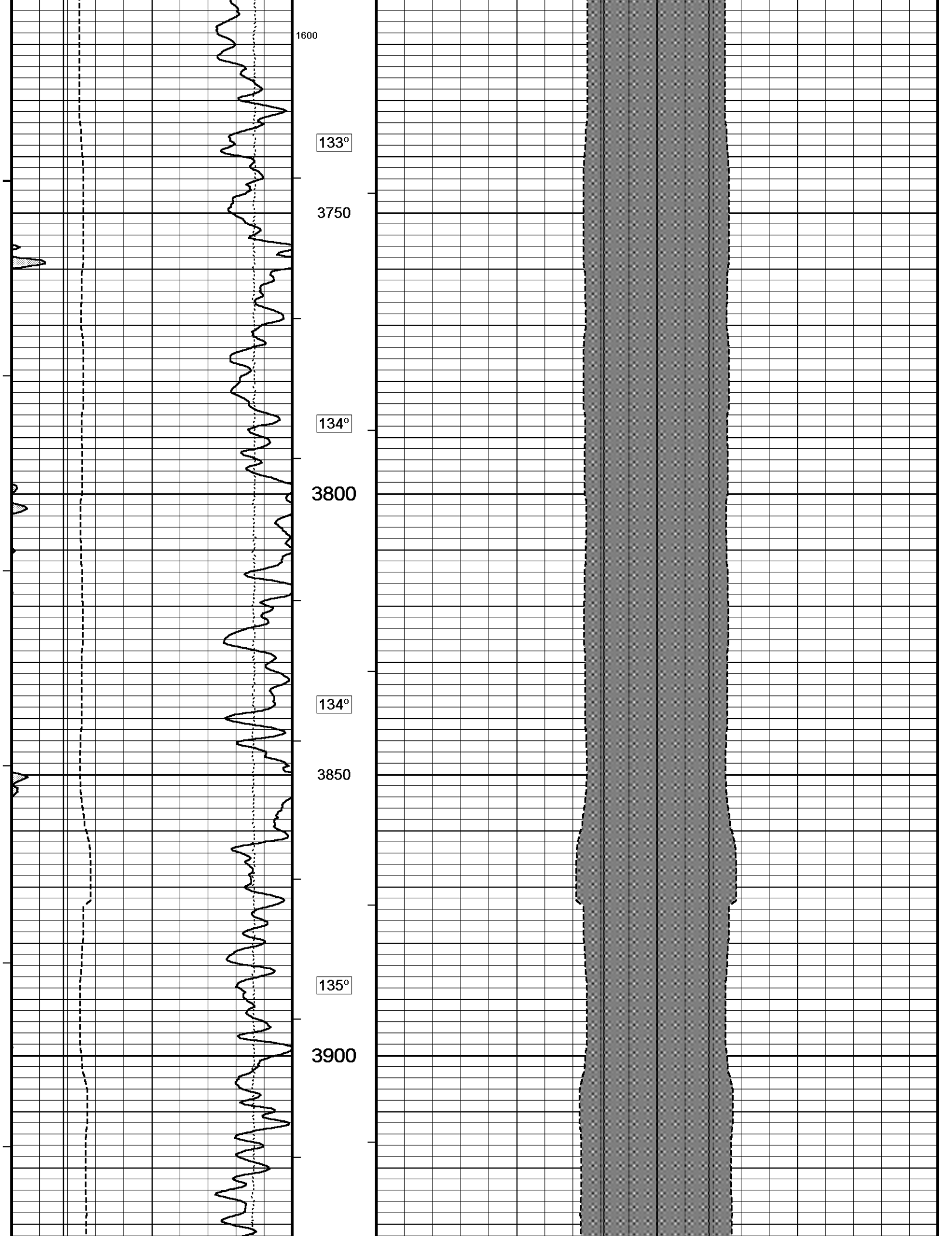


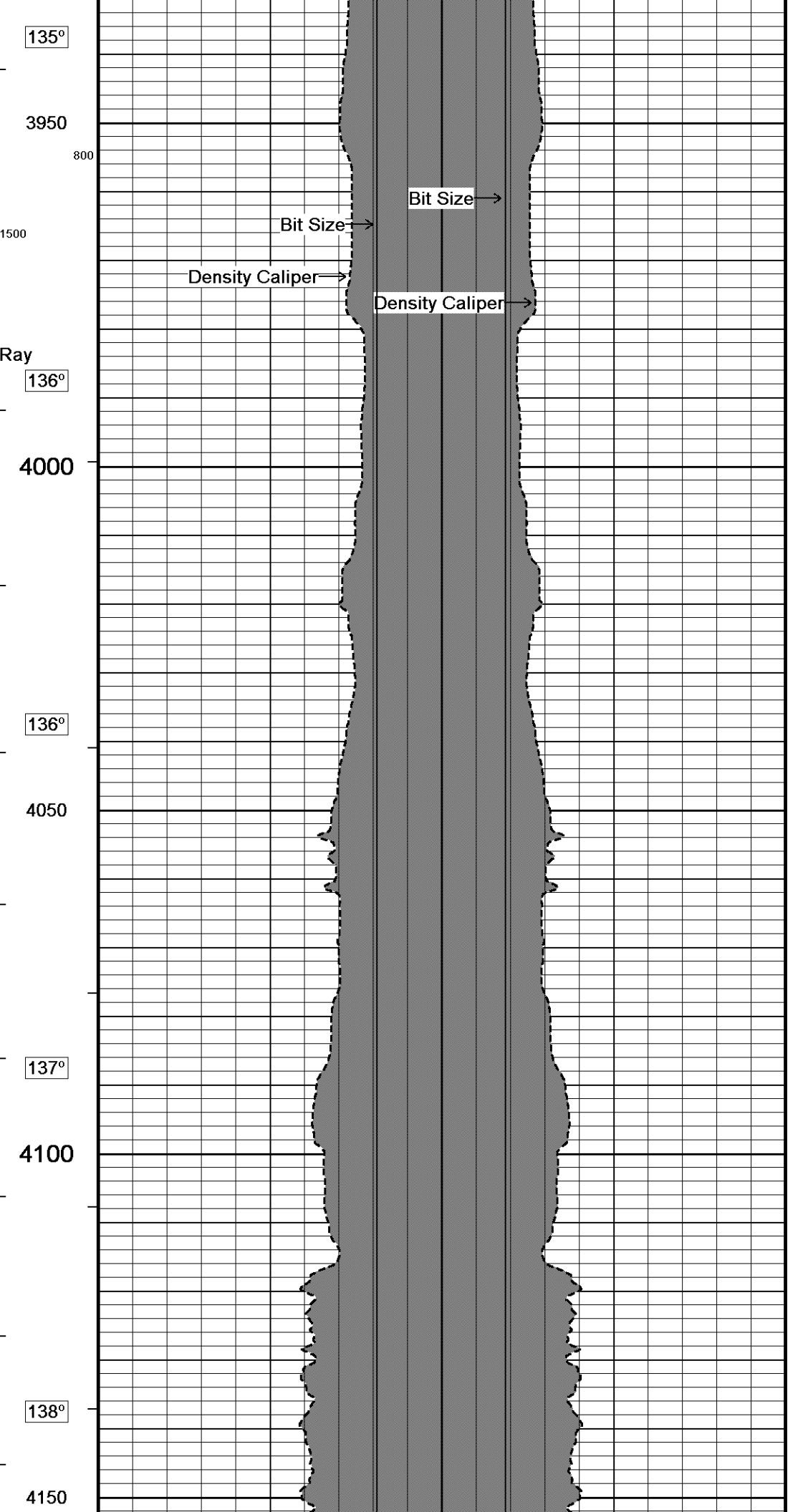
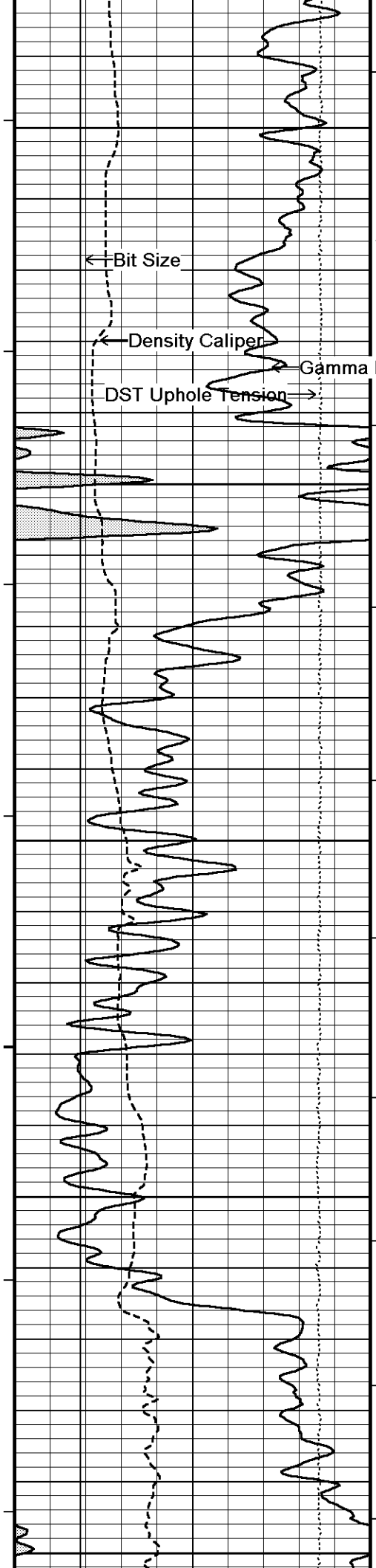


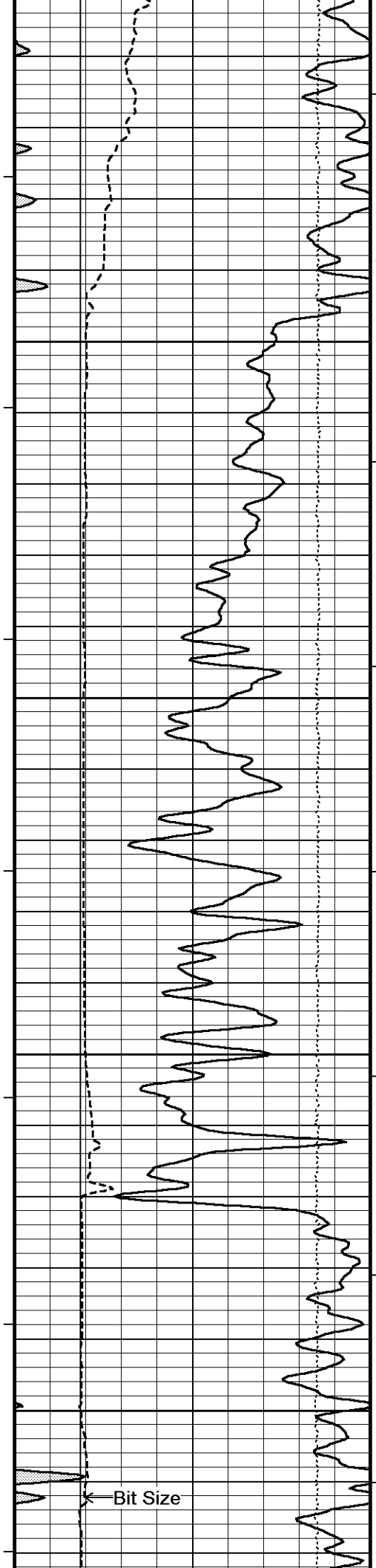












1400 138°

4200

139°

4250

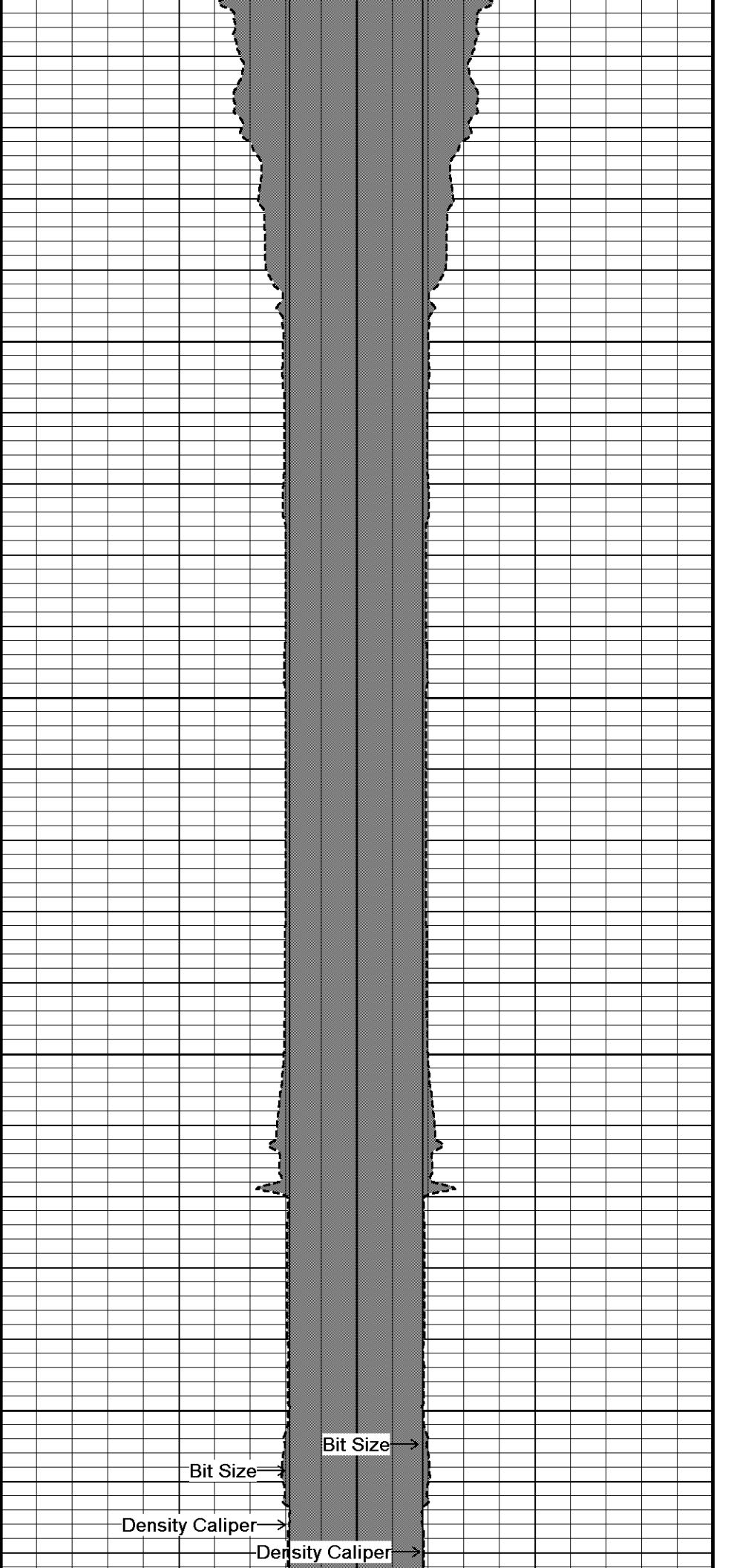
139°

4300

140°

4350

Bit Size

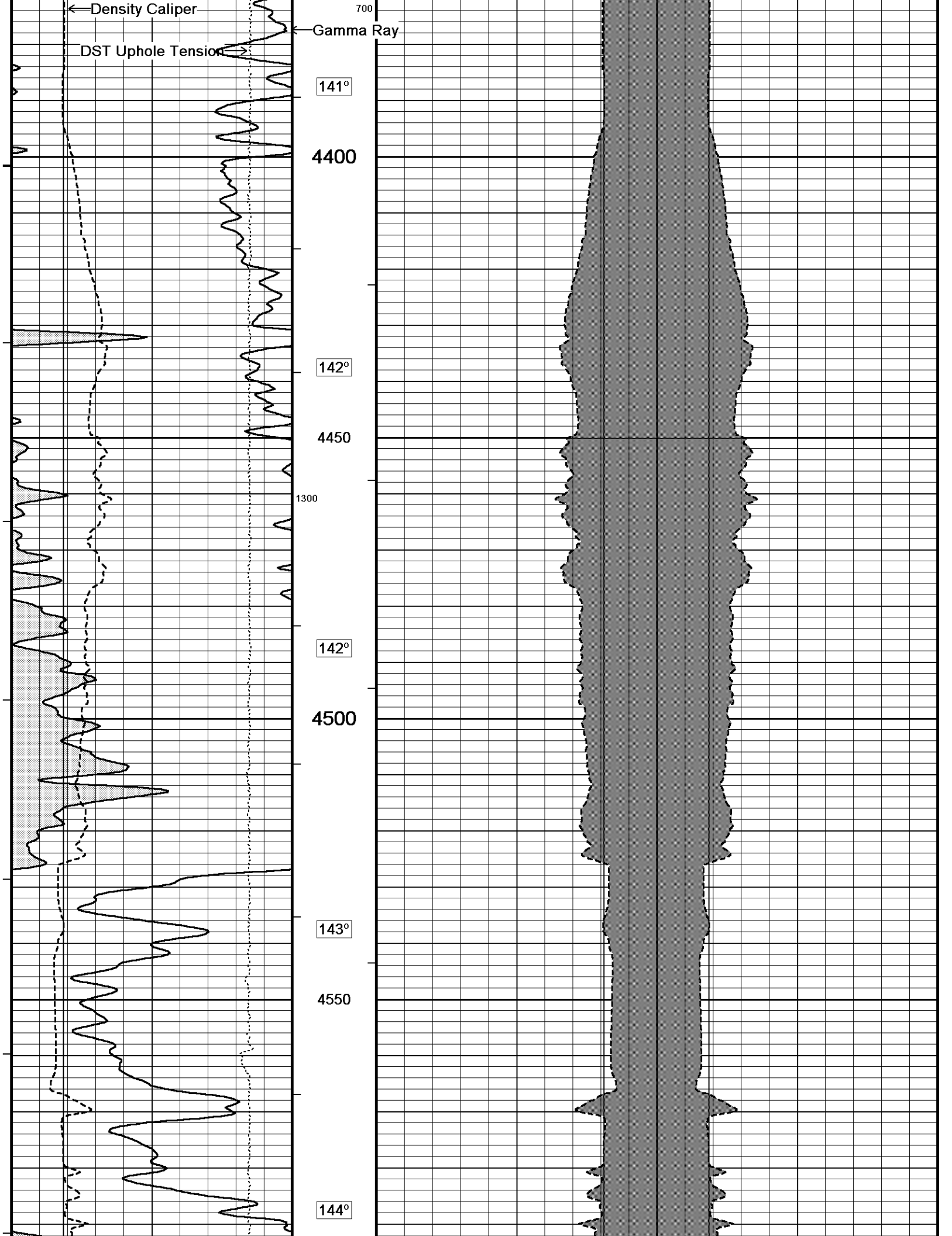


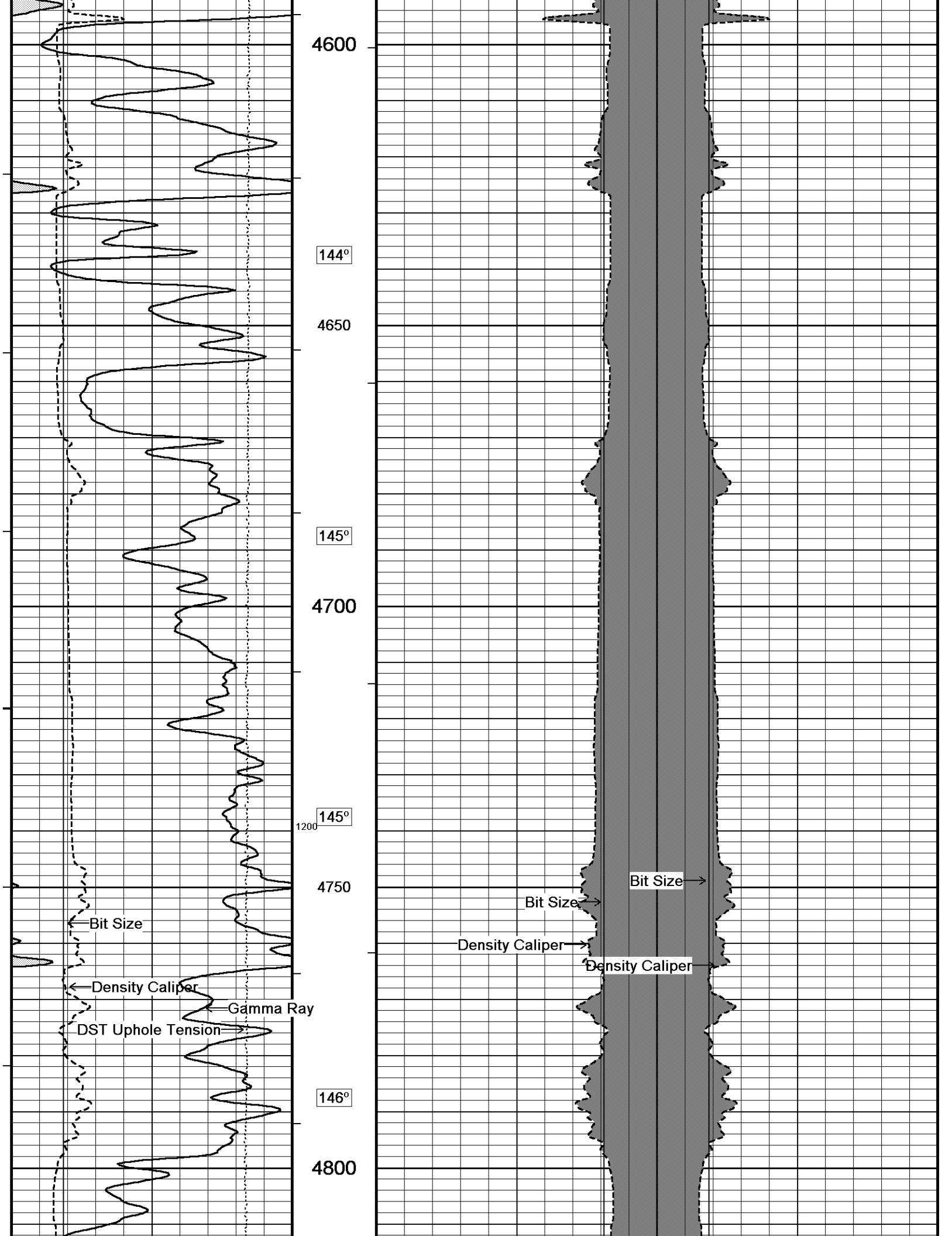
Bit Size

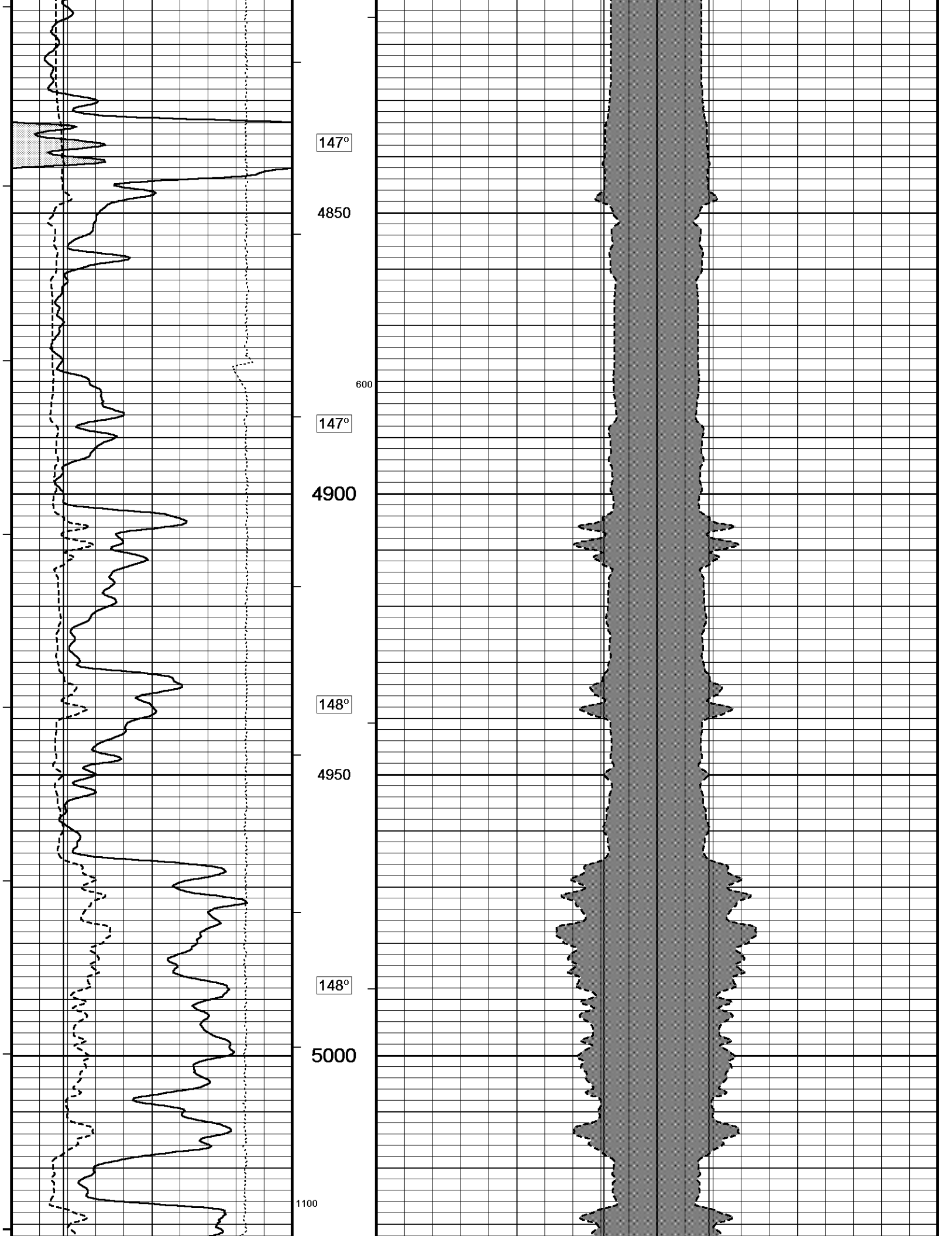
Bit Size

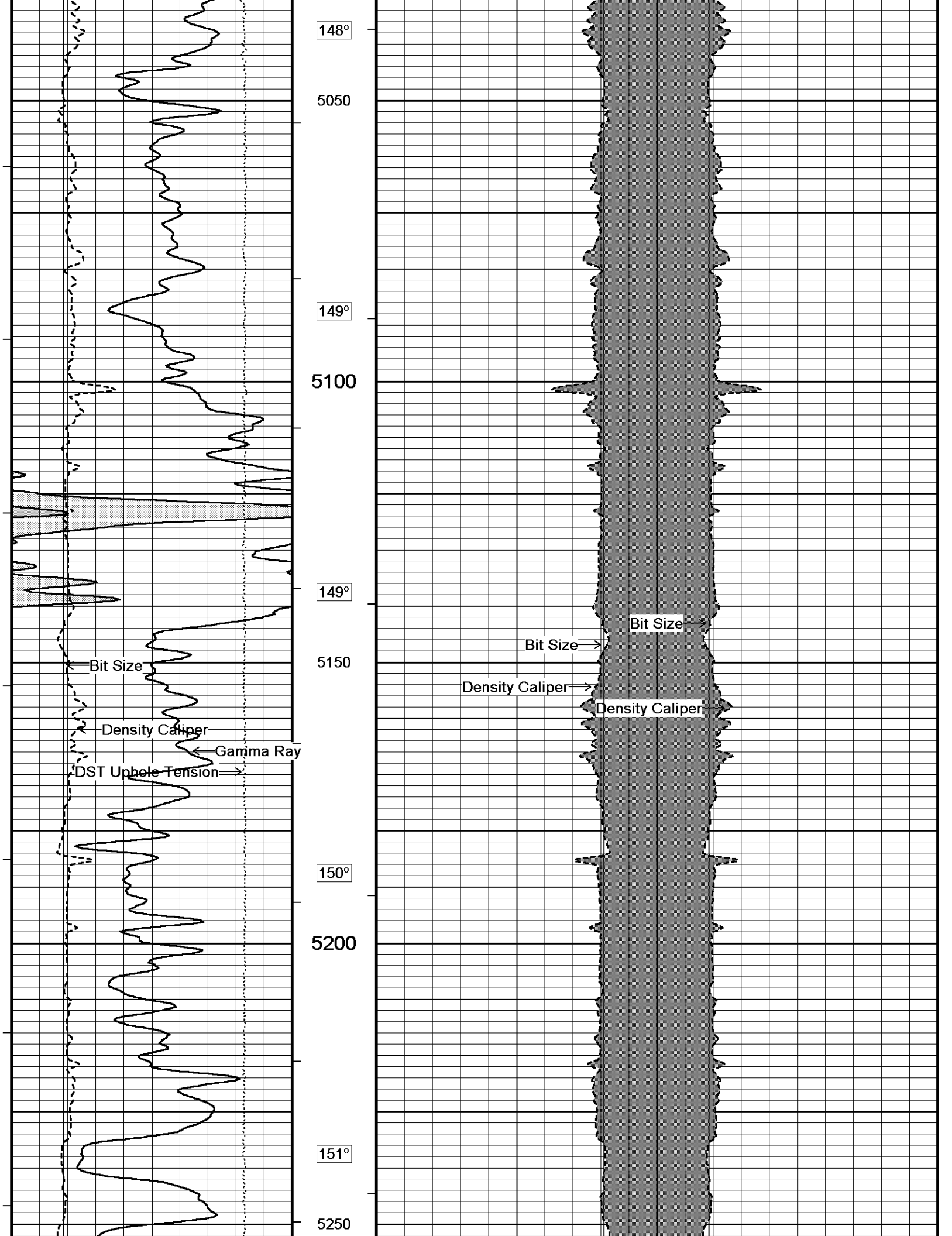
Density Caliper

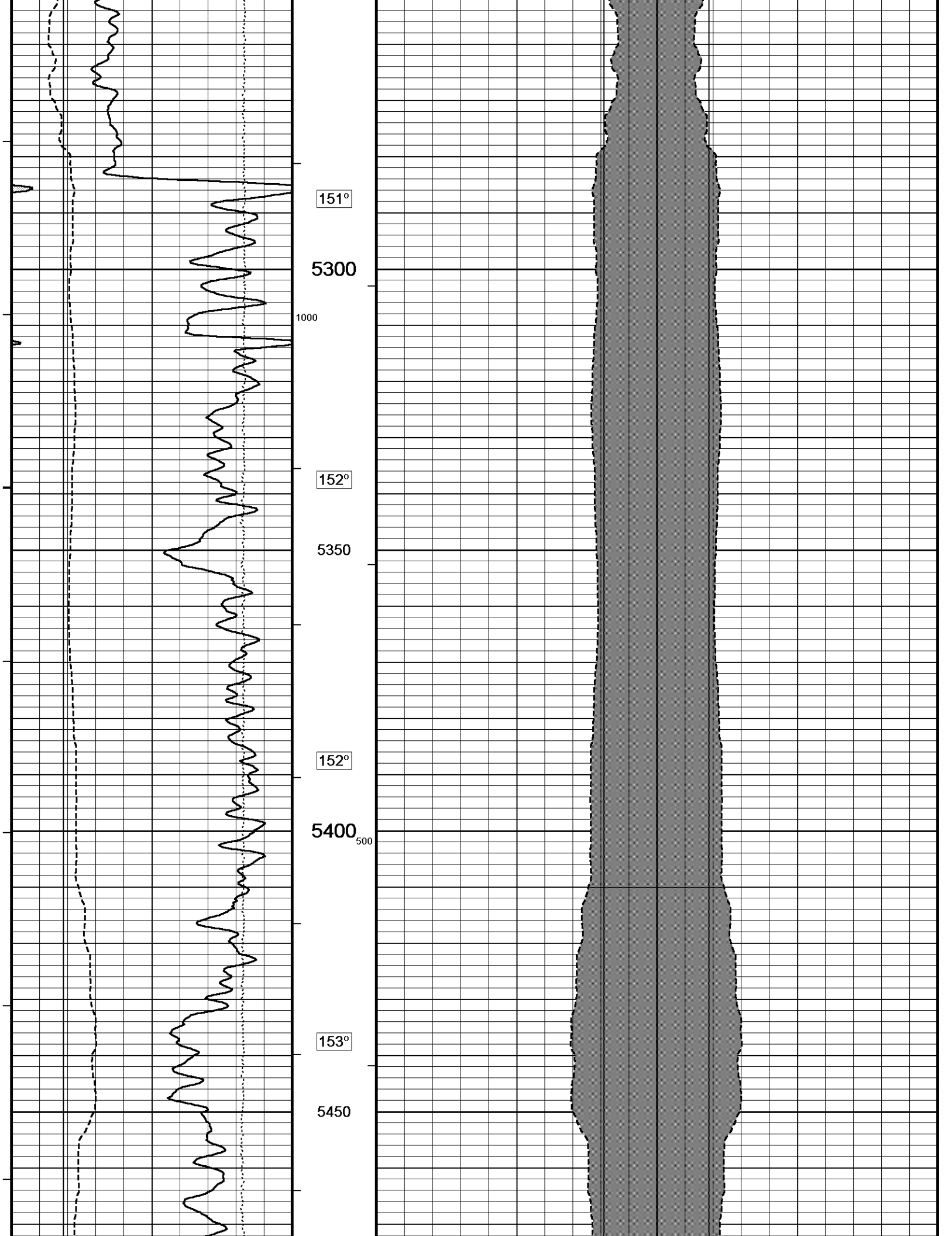
Density Caliper

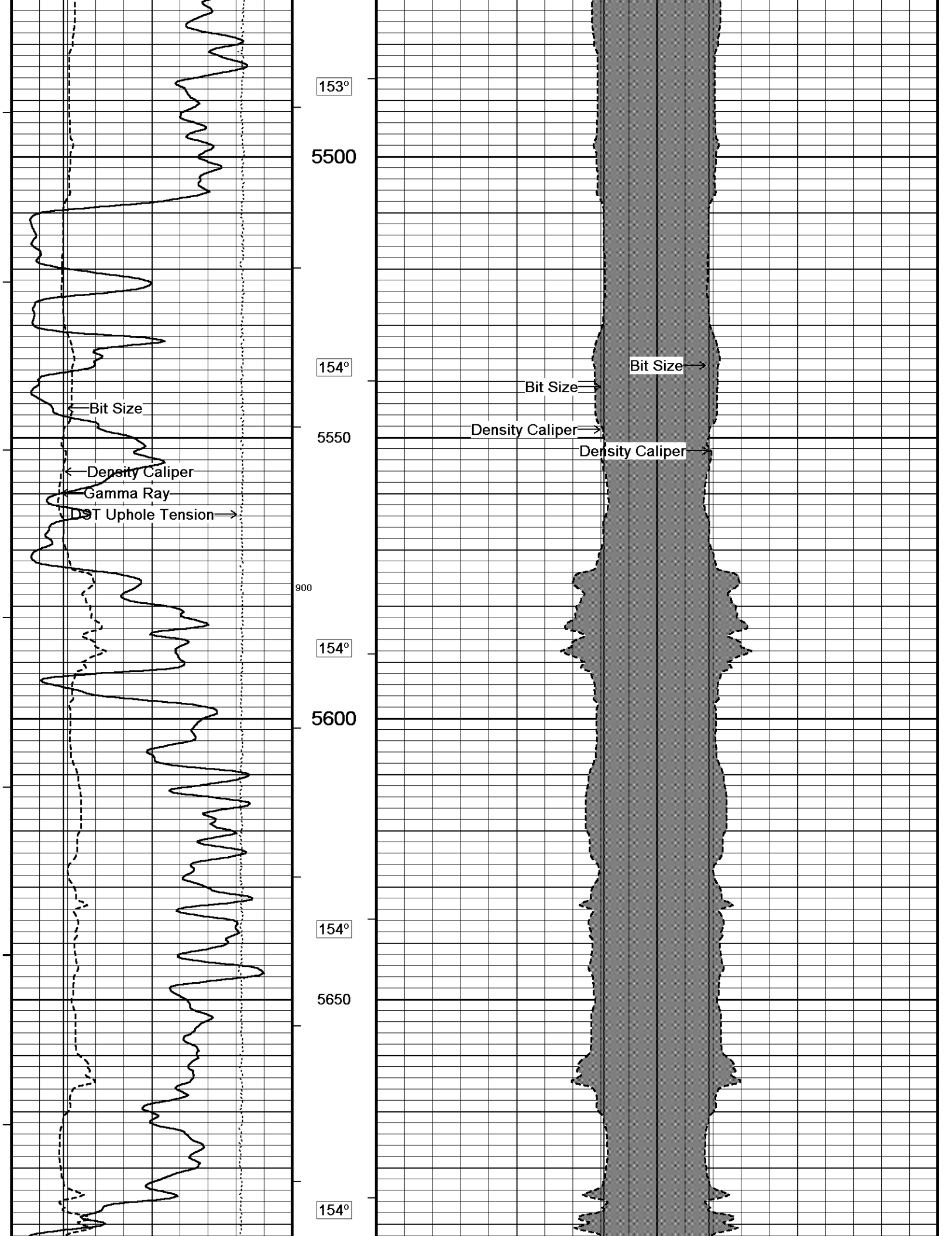


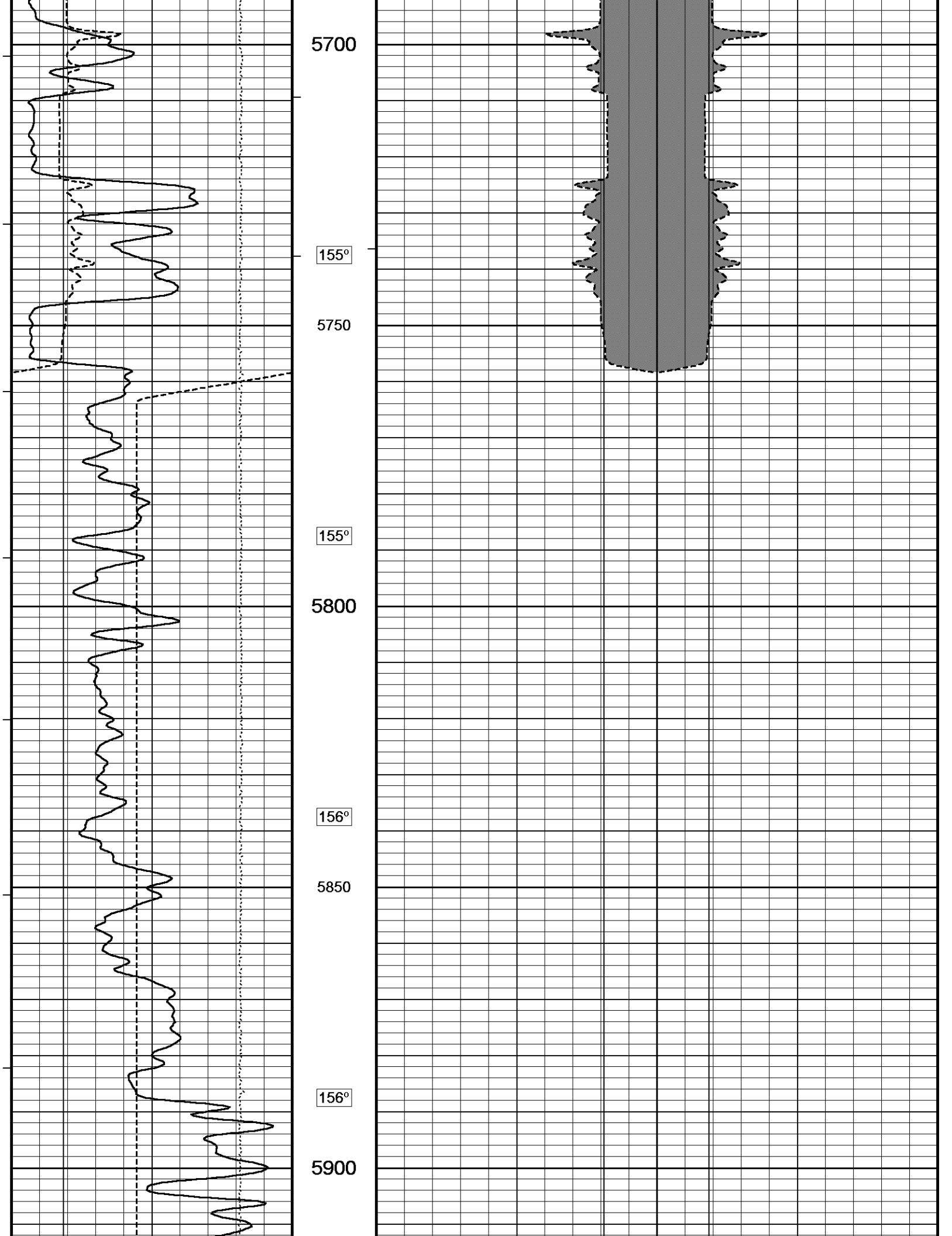


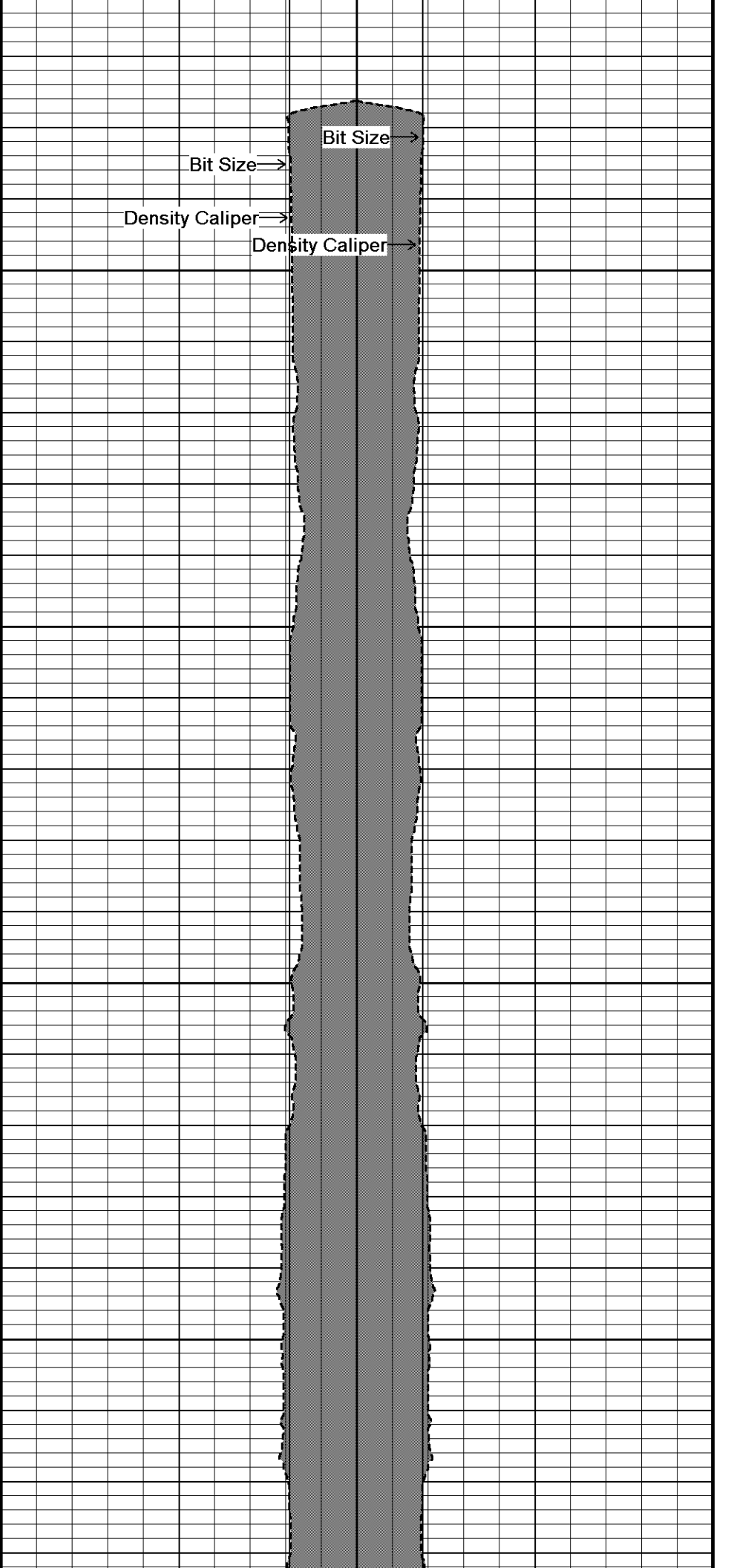
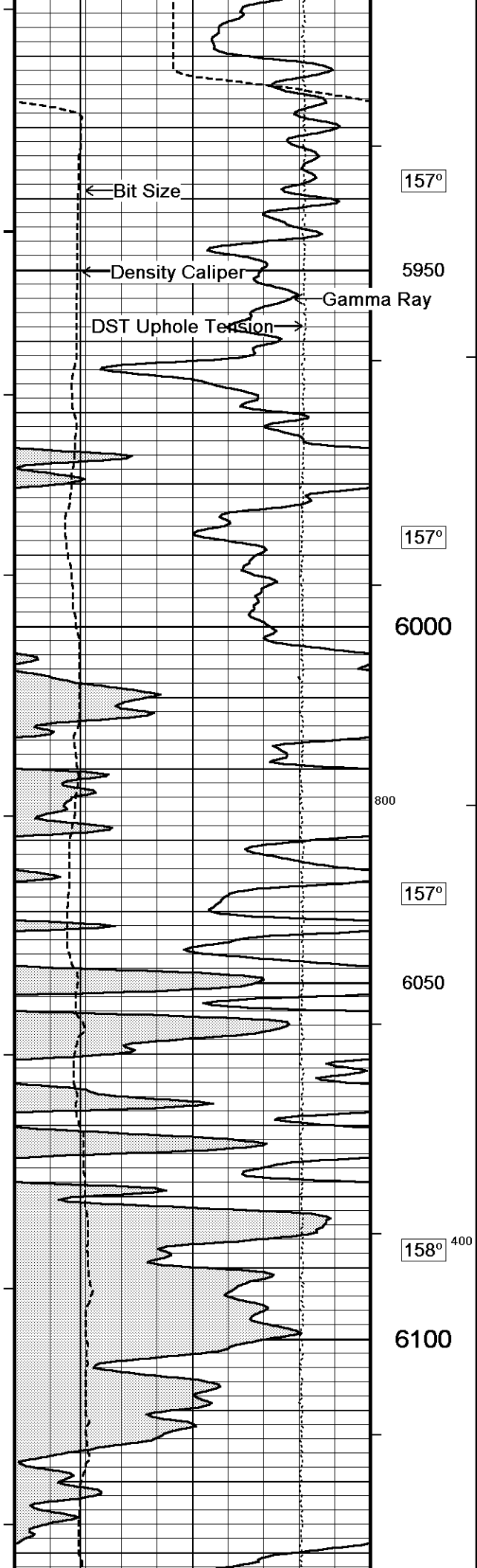


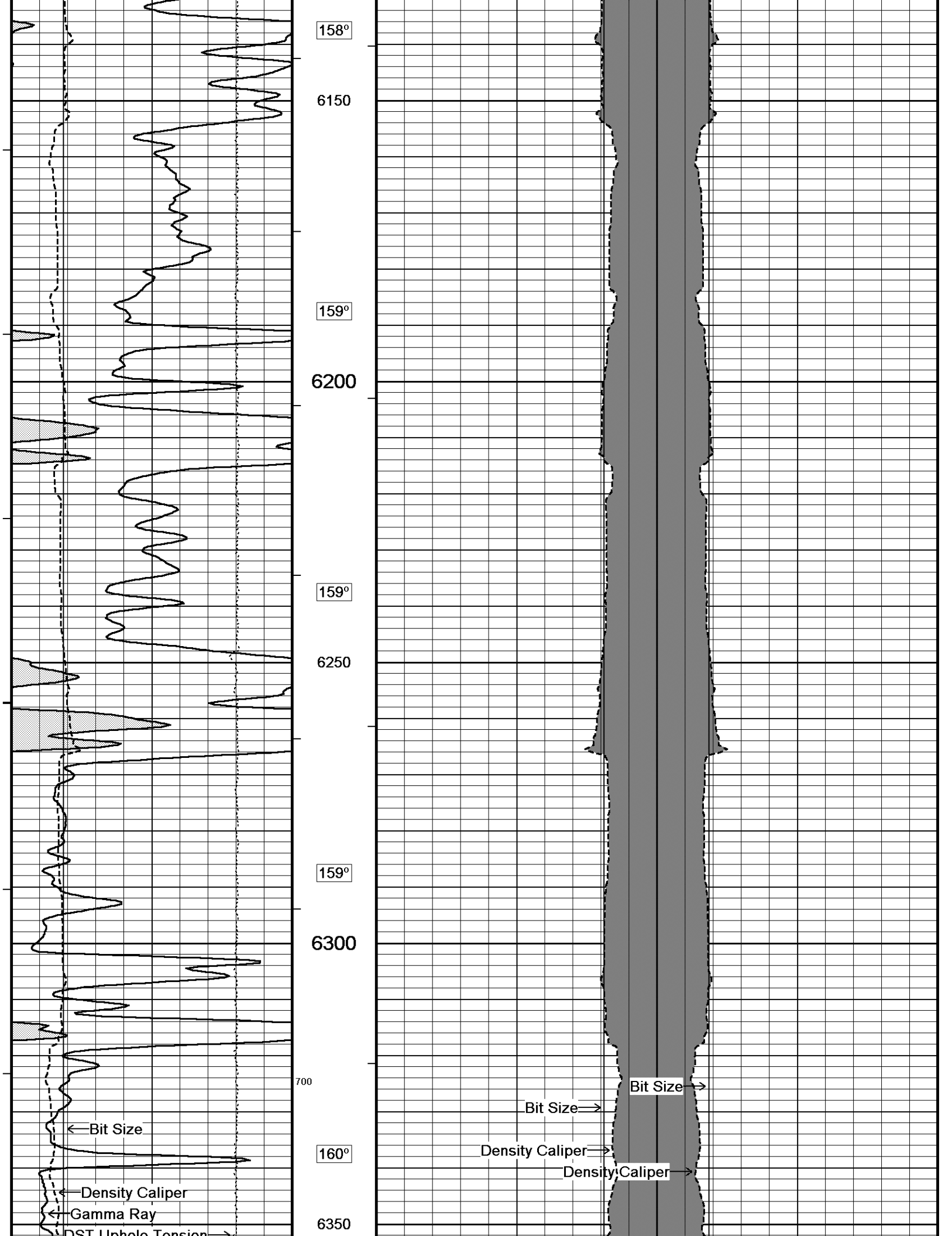












158°

6150

159°

6200

159°

6250

159°

6300

700

160°

6350

Bit Size →

Bit Size →

Density Caliper →

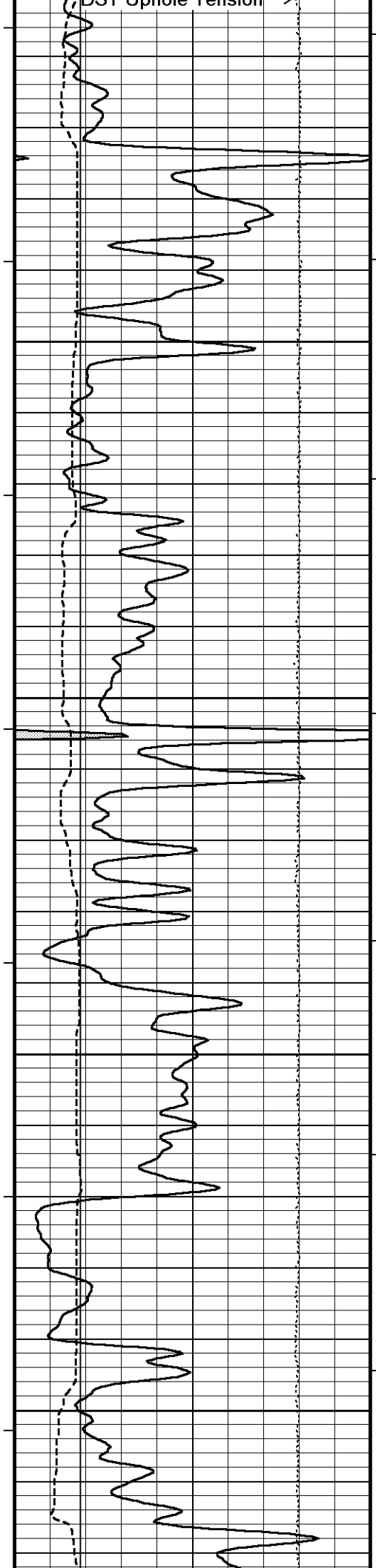
Density Caliper →

← Bit Size

← Density Caliper

← Gamma Ray

← DST Up-hole Tension →



161°

6400

161°

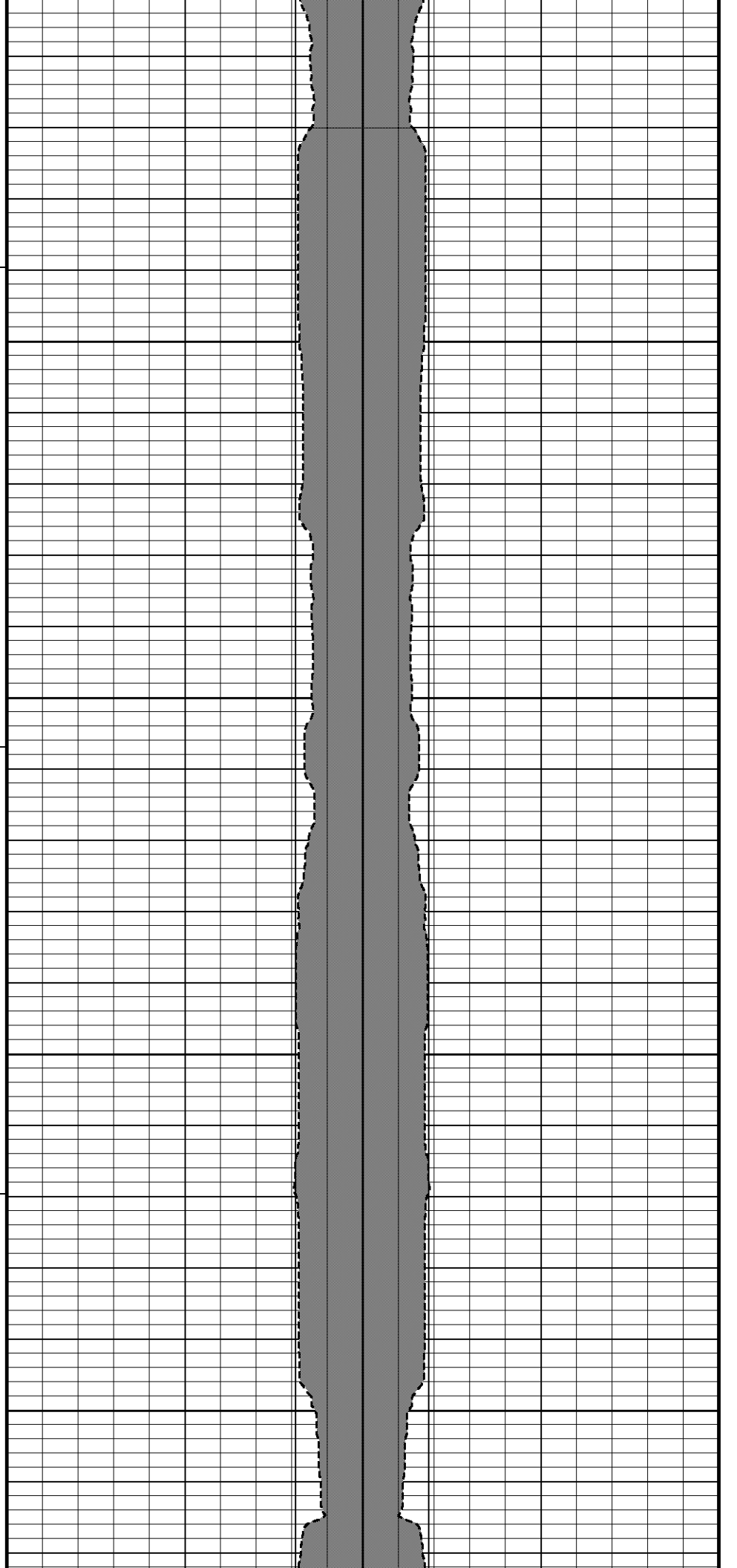
6450

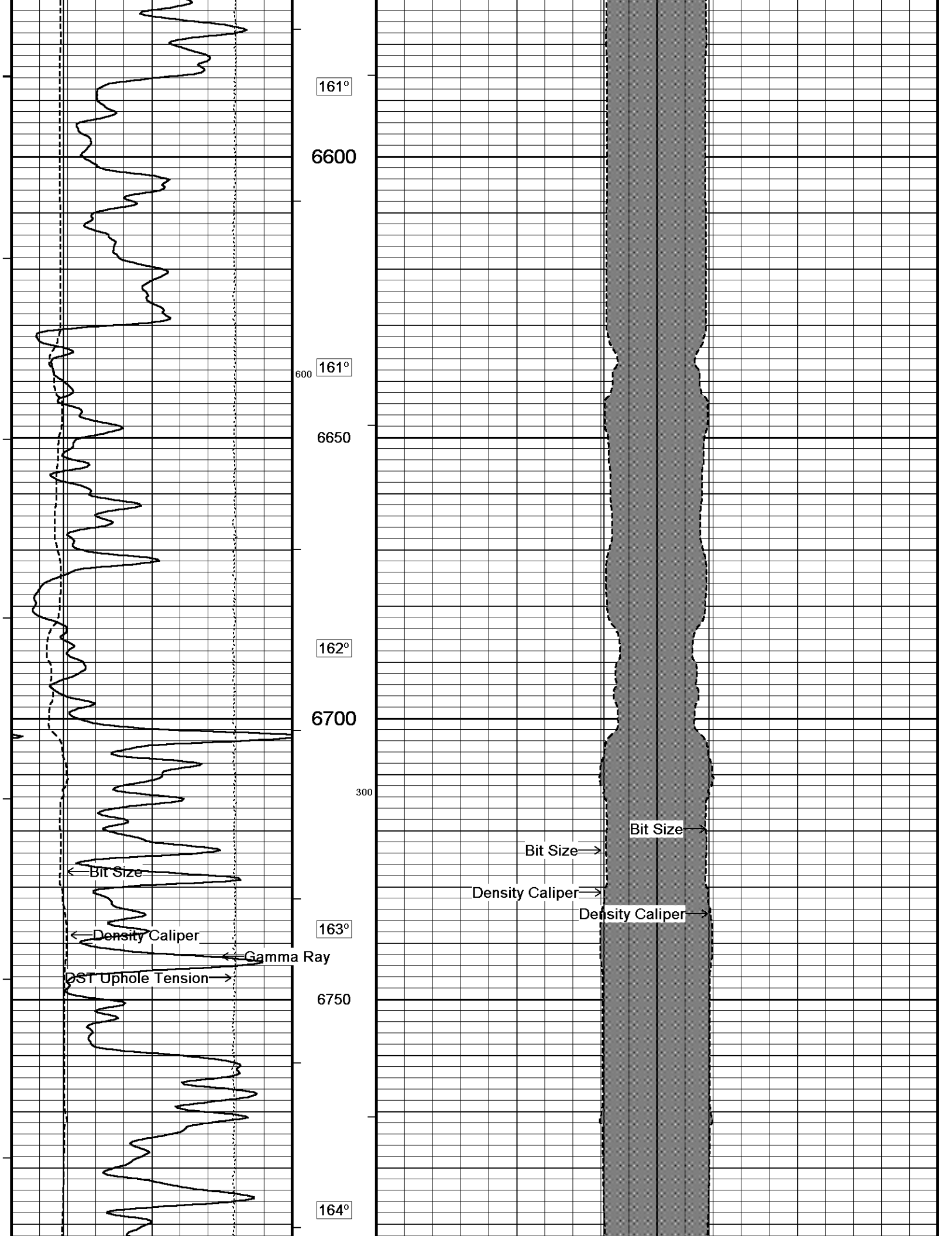
161°

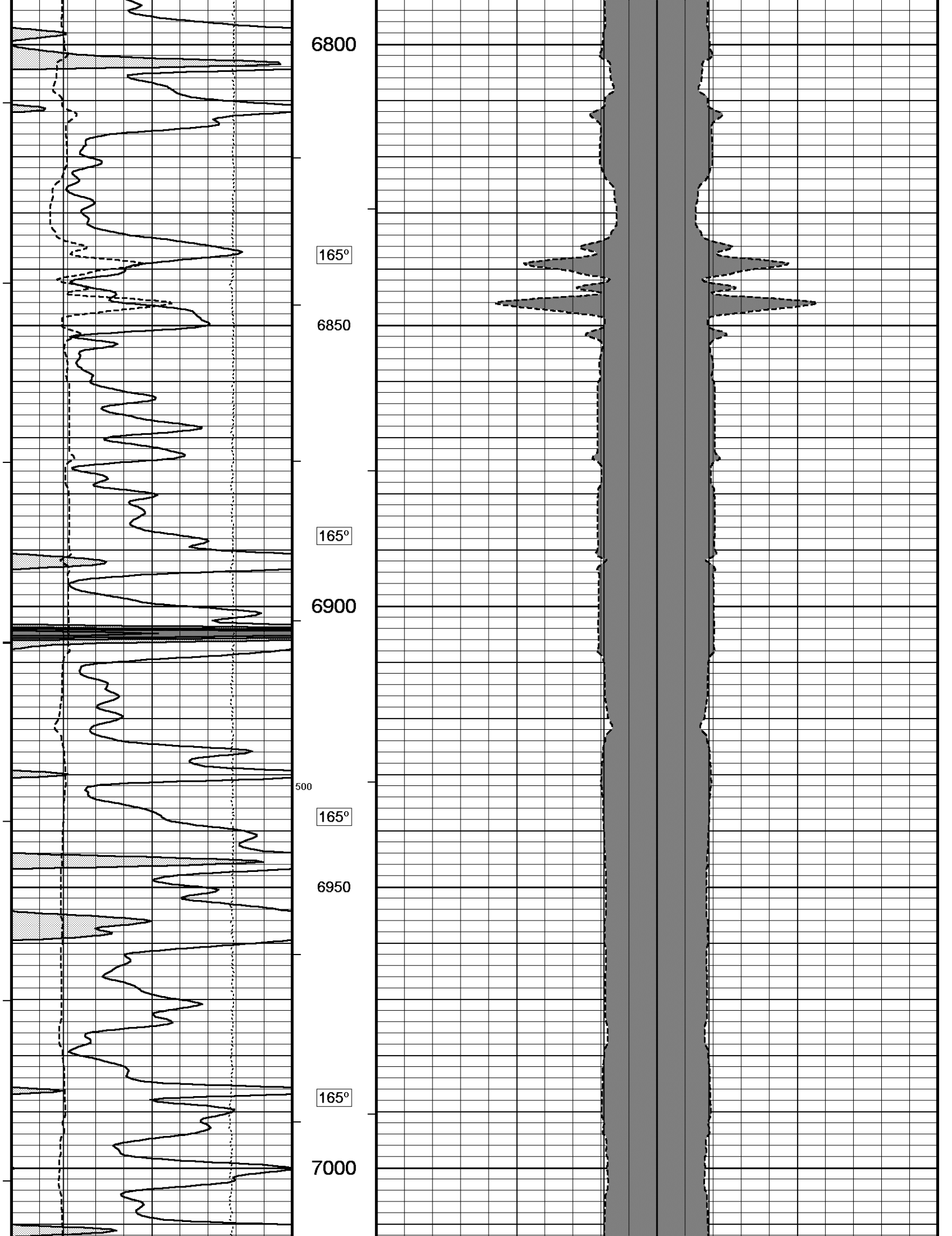
6500

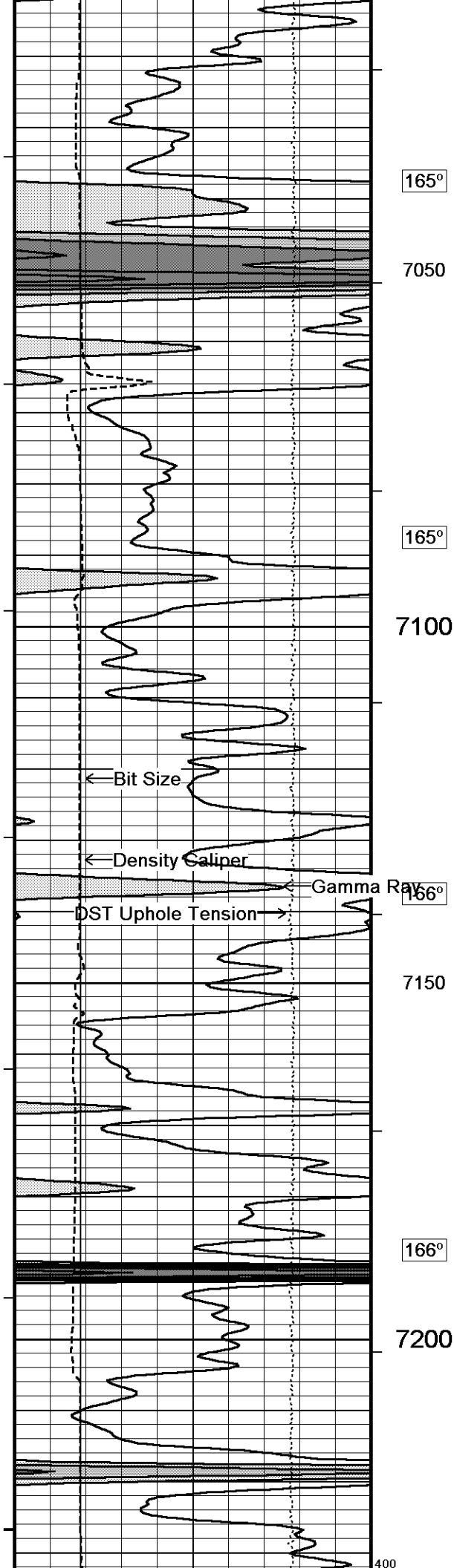
161°

6550









165°

7050

165°

7100

← Bit Size

← Density Caliper

← Gamma Ray

→ DST Uphole Tension

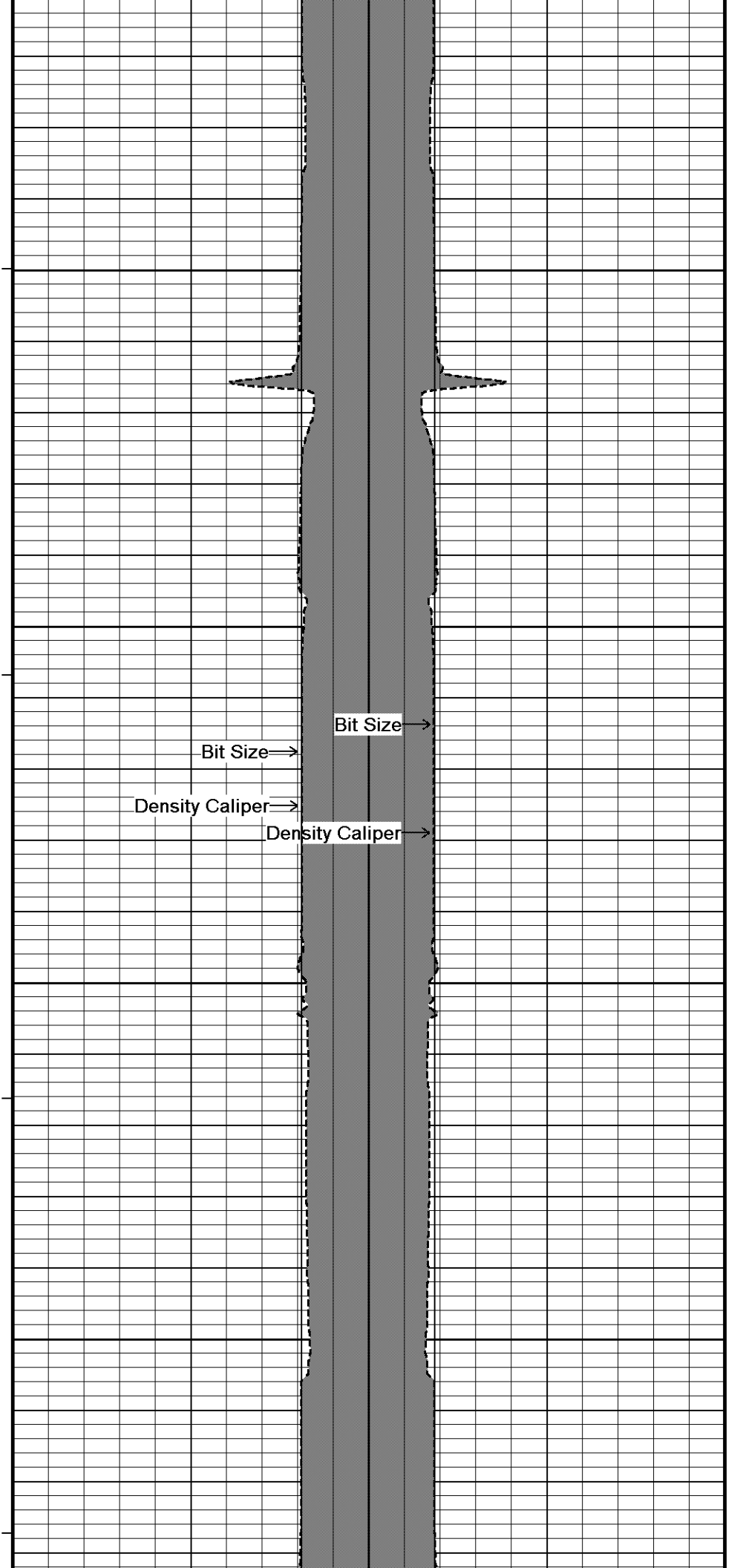
166°

7150

166°

7200

400

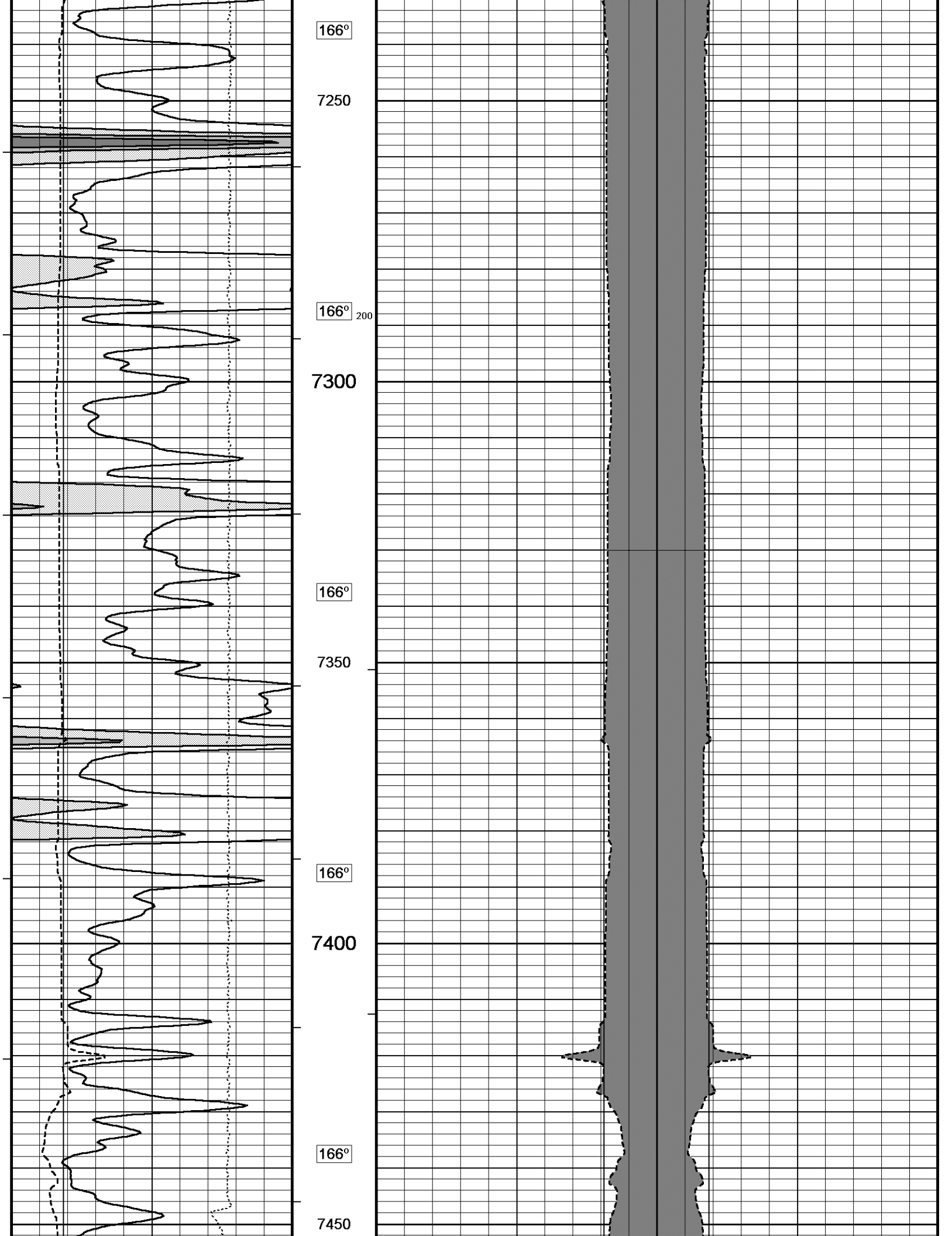


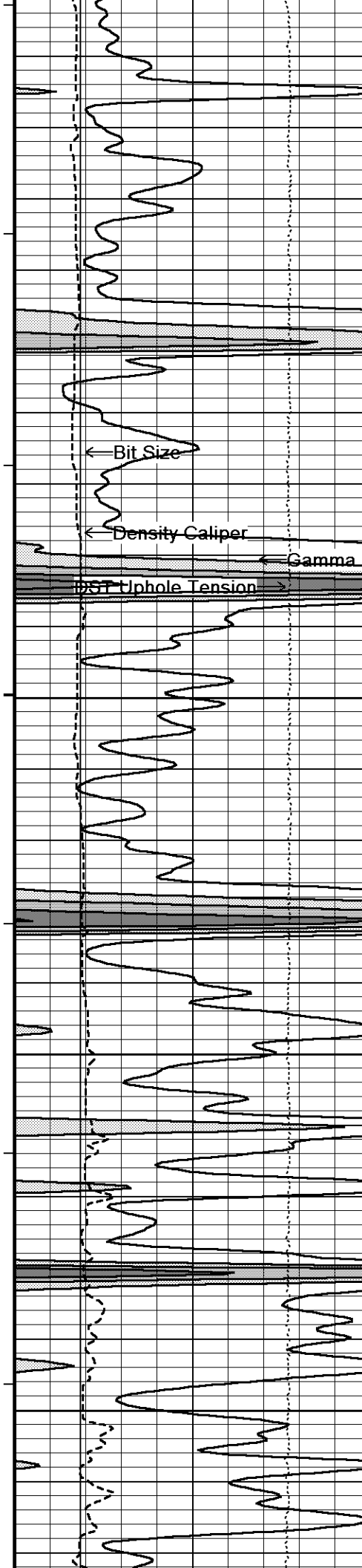
Bit Size →

Bit Size →

Density Caliper →

Density Caliper →





167°

7500

← Bit Size

← Density Caliper

← Gamma Ray

← BHT Uphole Tension

300 168°

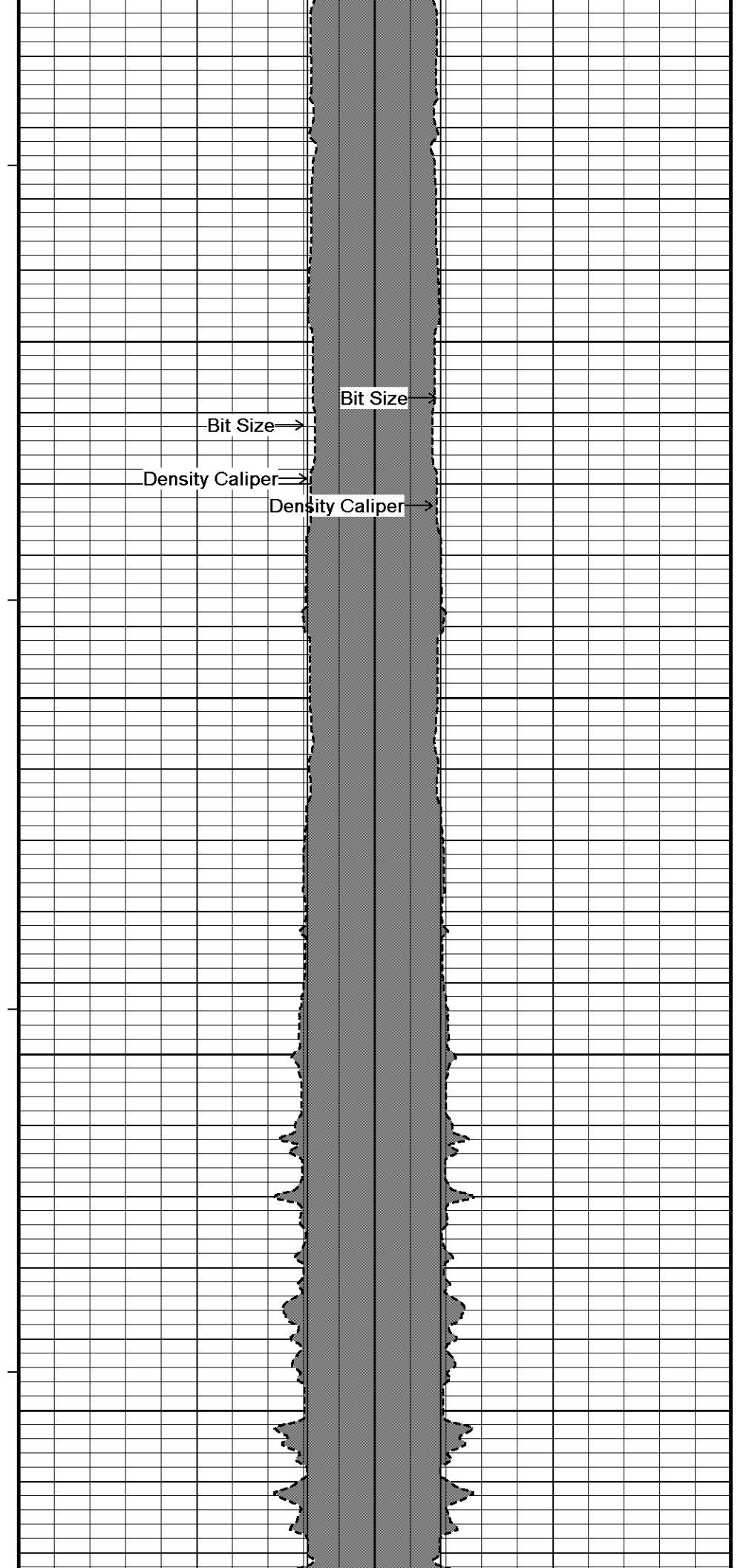
7550

168°

7600

169°

7650

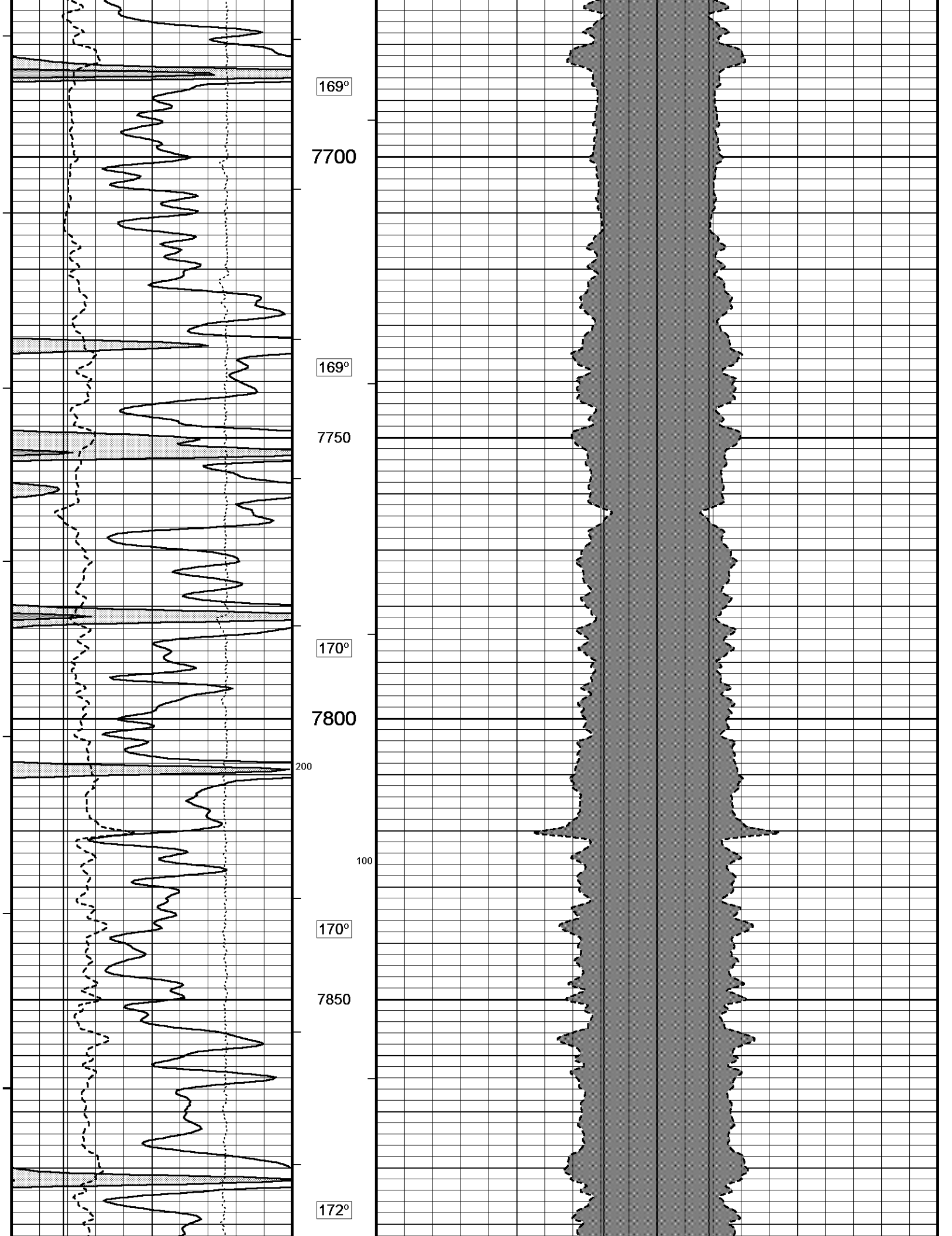


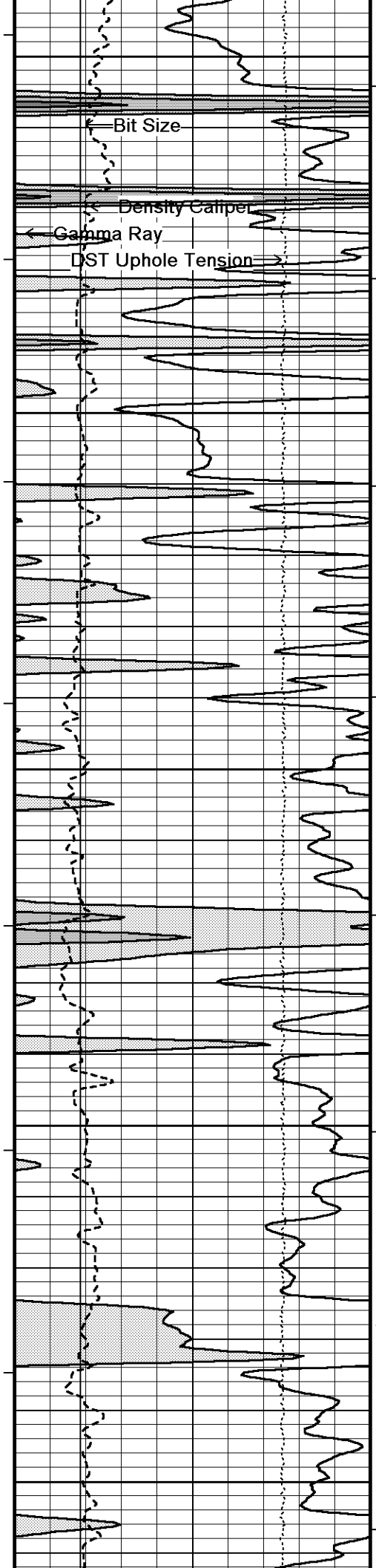
Bit Size →

Bit Size →

Density Caliper →

Density Caliper →





7900

Bit Size →

Bit Size →

Density Caliper →

Density Caliper →

← Bit Size

← Density Caliper

← Gamma Ray

← DST Uphole Tension

173°

7950

173°

8000

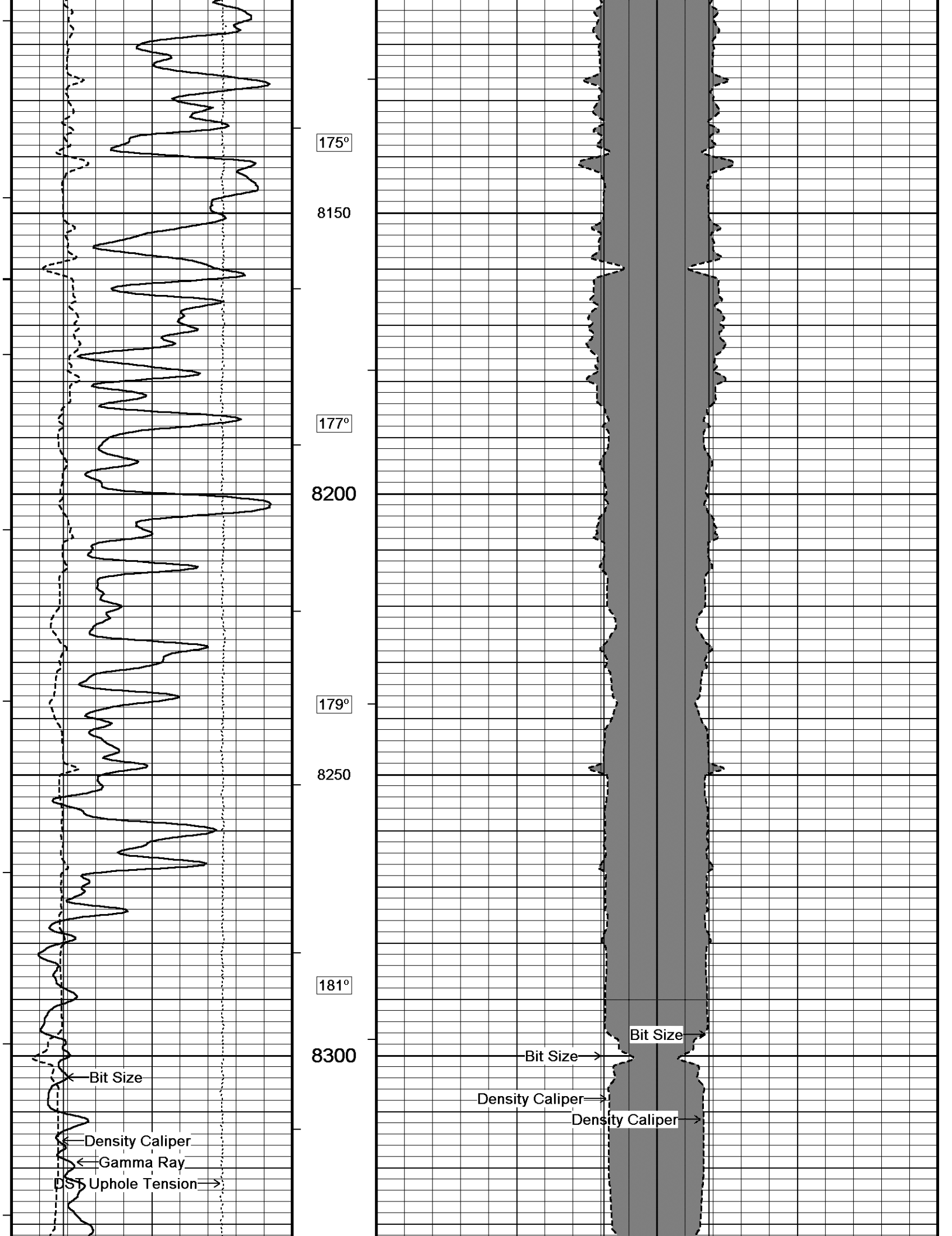
174°

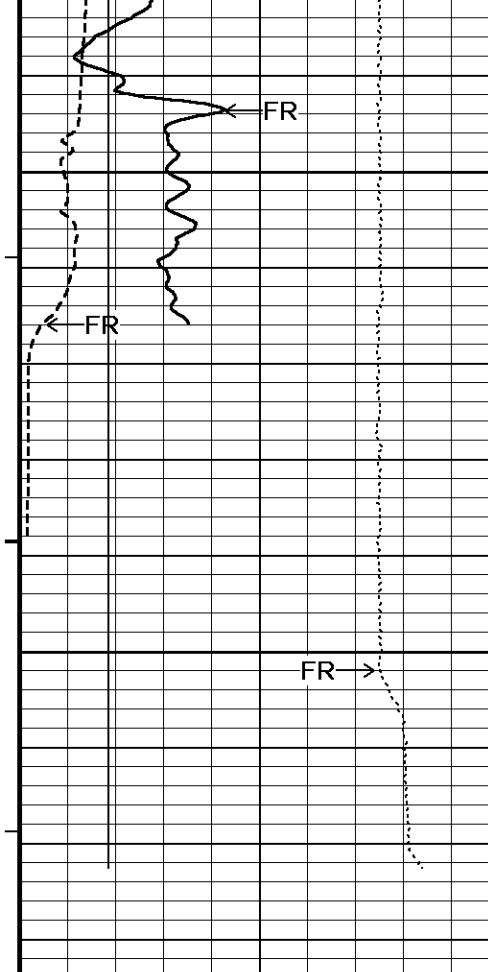
8050

100

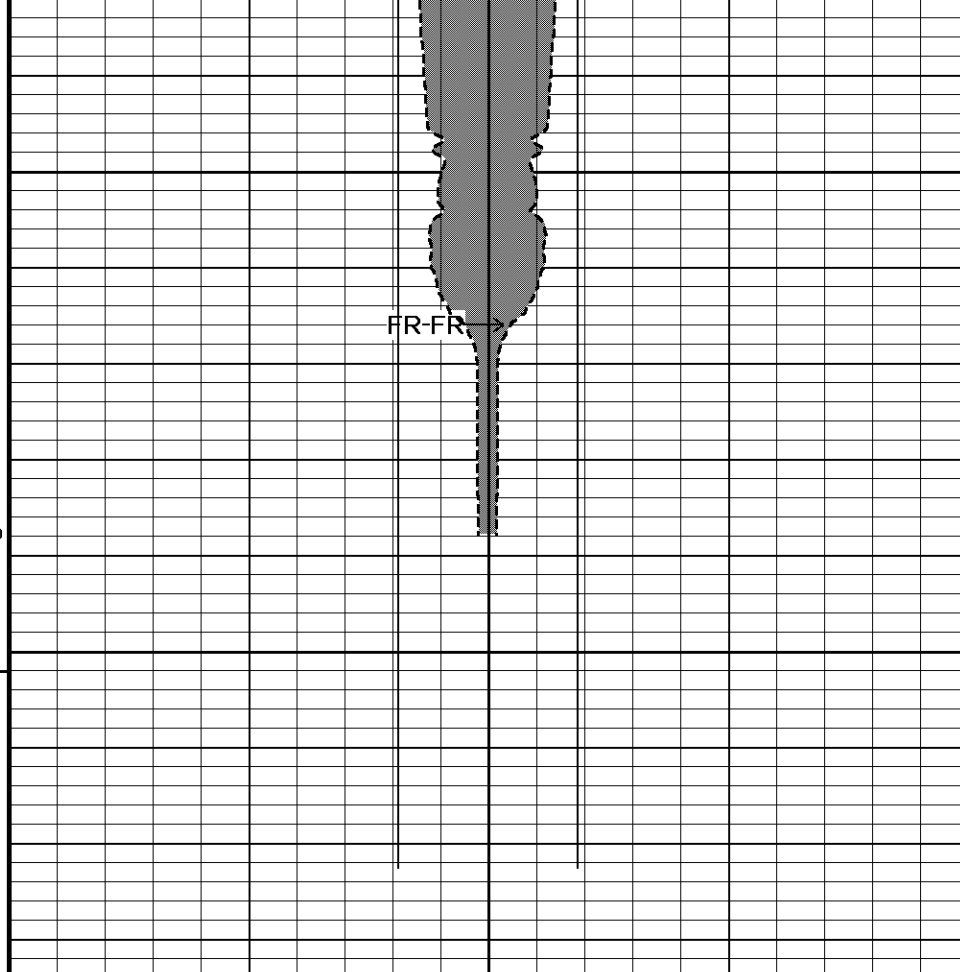
175°

8100





182°  
8350  
0 0  
8400

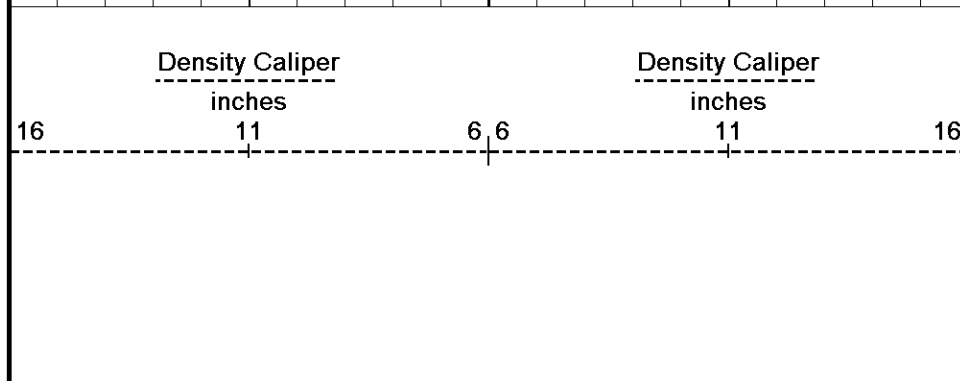


Timing Marks  
every 60.0 sec

Gamma Ray  
API  
0 75 150  
150 225 300

Depth  
In  
Feet

Borehole  
Temp in  
deg F

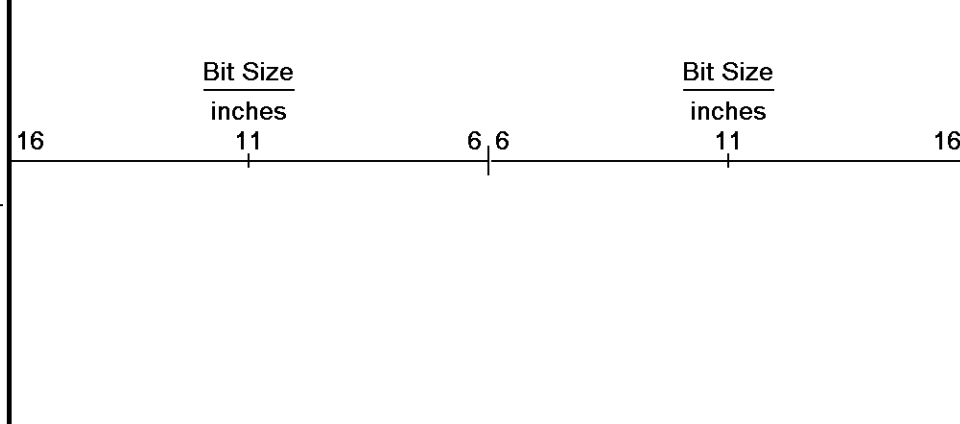


Density Caliper  
inches  
6 11 16

Bit Size  
inches  
6 11 16

HVI  
every  
10 cu ft

Annular  
Integral  
every  
10 cu ft



DST Uphole Tension  
pounds  
5000 0

Replay  
Scale  
1:240

↑ **5 INCH MAIN** ↑

**BEFORE SURVEY CALIBRATION**

C:\Minimus 18.03.9344\Data\Murfin Red Poll #8-21\Murfin Red Poll #8-21\_002.dta

**General Constants All 000** Last Edited on 09-DEC-2018,06:28

|  |                       |            |
|--|-----------------------|------------|
| <b>General Parameters</b>                                      |                       |            |
| Mud Resistivity  | 1.150                 | ohm-metres |
| Mud Resistivity Temperature                                    | 75.000                | degrees F  |
| Water Level  | 0.000                 | feet       |
| Borehole Fluid Processing                                      | Wet Hole              |            |
| <b>Hole/Annular Volume and Differential Caliper Parameters</b> |                       |            |
| HVOL Method  | Single Caliper        |            |
| HVOL Caliper 1   | Density Caliper       |            |
| HVOL Caliper 2   | N/A                   |            |
| Annular Volume Diameter  | 5.500                 | inches     |
| Caliper for Differential Caliper                               | Density Caliper       |            |
| <b>Rwa Parameters</b>  |                       |            |
| Porosity used  | Crossplot Porosity    |            |
| Resistivity used   | Array Ind. Two Res Rt |            |
| RWA Constant A   | 0.620                 |            |
| RWA Constant M   | 2.150                 |            |
| SW/APOR Tool Source  | 0.000                 |            |

**High Resolution Temperature Calibration MCG-D.K 443** Field Calibration on 12-OCT-2018,05:20

|       | Measured | Calibrated(Deg F) |
|-------|----------|-------------------|
| Lower | 50.00    | 50.00             |
| Upper | 212.00   | 212.00            |

**High Resolution Temperature Constants MCG-D.K 443** Last Edited on 12-OCT-2018,05:20

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

**Gamma Calibration MCG-D.K 443** Field Calibration on 07-DEC-2018,13:43

|                    | Measured | Calibrated (API) |
|--------------------|----------|------------------|
| Background         | 106      | 74               |
| Calibrator (Gross) | 758      | 530              |
| Calibrator (Net)   | 652      | 456              |

**Gamma Calibration Tolerances MCG-D.K 443**

|       |       |   |            |
|-------|-------|---|------------|
| Ratio | 1.430 |  | Counts/API |
|-------|-------|---|------------|

**Gamma Constants MCG-D.K 443** Last Edited on 08-DEC-2018,00:26

|                                 |                 |       |
|---------------------------------|-----------------|-------|
| Gamma Calibrator Number         | MCGGRCC141      |       |
| GRC-M Calibrator Jig in Use?    | NO              |       |
| Inactive Background Jig in Use? | NO              |       |
| Mud Density                     | 1.13            | gm/cc |
| Caliper Source for Processing   | Density Caliper |       |
| Tool Position                   | Eccentred       |       |
| Potassium Equivalence           | Chloride        |       |
| K Mud Concentration             | 0.00            | %     |

**Caliper Calibration MPD-C.A 216** Base Calibration on 04-DEC-2018 12:24  
Field Calibration on 07-DEC-2018 12:57

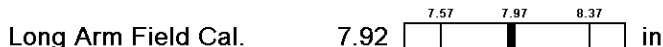
| Base Calibration Reading No | Measured | Calibrator Size (in) |
|-----------------------------|----------|----------------------|
| 1                           | 15599    | 3.99                 |
| 2                           | 24289    | 5.98                 |
| 3                           | 32989    | 7.97                 |

|   |       |       |
|---|-------|-------|
| 4 | 41250 | 9.86  |
| 5 | 50464 | 11.92 |
| 6 | N/A   | N/A   |

Field Calibration

| Measured Caliper (in) | Actual Caliper (in) |
|-----------------------|---------------------|
| 7.92                  | 7.97                |

Caliper Calibration Tolerances MPD-C.A 216



DOWNHOLE EQUIPMENT

C:\Minimus 18.03.9344\Data\Murfin Red Poll #8-21\Murfin Red Poll #8-21\_002.dta

Cablehead, 11 pin  
CBH-CB 264 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Swivel Head Adaptor  
SHA-J.B 595 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

Compact Comms Gamma  
MCG-D.K 443 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity  
MMR-B.A 91 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron  
MDN-B.A 292 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper  
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.913 in

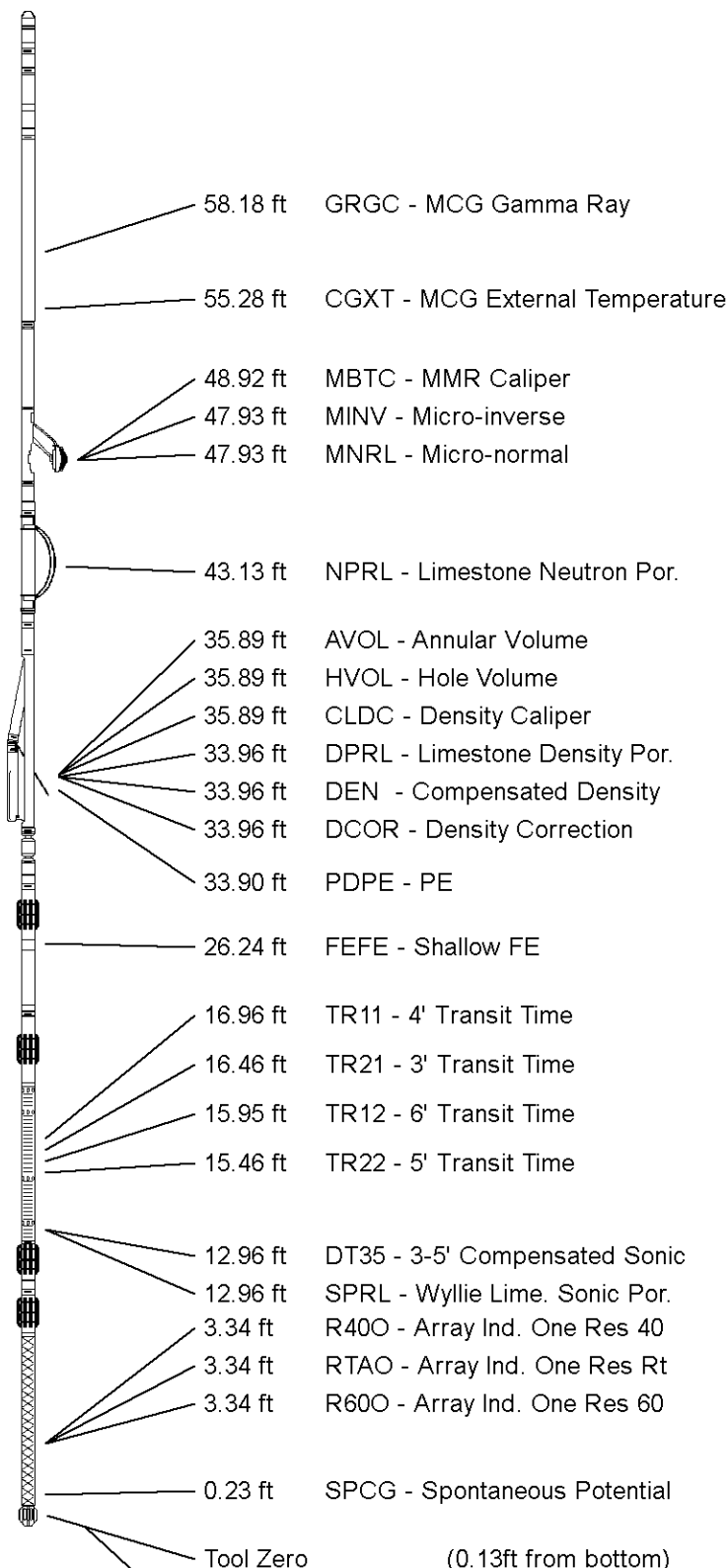
Compact Knuckle Joint  
SKJ-D.A 167 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

Compact Focused Electric  
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic  
MSS-C.K 319 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction  
MAI-B.J 390 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 68.16 ft Weight: 526.9 lb



-0.13 ft SMTU - DST Uphole Tension

All measurements relative to tool zero.

|                 |                               |
|-----------------|-------------------------------|
| COMPANY         | MURFIN DRILLING COMPANY, INC. |
| WELL            | RED POLL #8-21                |
| FIELD           | WILDCAT                       |
| PROVINCE/COUNTY | LINCOLN                       |
| COUNTRY/STATE   | U.S.A. / COLORADO             |

|                         |      |      |               |         |      |
|-------------------------|------|------|---------------|---------|------|
| Elevation Kelly Bushing | 5502 | feet | First Reading | 8368.00 | feet |
| Elevation Drill Floor   | 5500 | feet | Depth Driller | 8400.00 | feet |
| Elevation Ground Level  | 5489 | feet | Depth Logger  | 8402.00 | feet |



CALIPER LOG

**Weatherford**<sup>®</sup>