# CALIPER LOG

| | |
|---|---|
| COMPANY | SHAKESPEARE OIL CO., INC. |
| WELL | EDWARDS #1-21 |
| FIELD | PENCE WEST |
| PROVINCE/COUNTY | SCOTT |
| COUNTRY/STATE | U.S.A. / KANSAS |
| LOCATION | 1428' FSL & 481' FEL |

| | | | |
|---|---|---|---|
| SEC 21 | TWP 16S | RGE 34W | Other Services |
| Latitude | | | |
| Longitude | | | |
| API Number | 15-171-21174 | | |

| | | | |
|---|---|---|---|
| Permanent Datum GL, Elevation 3132 feet | | Elevations: | feet |
| Log Measured From KB | | KB | 3140.00 |
| Drilling Measured From KB @ 8 FEET | | DF | 3138.00 |
| | | GL | 3132.00 |

| | | | | |
|---|---|---|---|---|
| Date | 05-AUG-2016 | | | |
| Run Number | ONE | | | |
| Service Order | 4558-157610049 | | | |
| Depth Driller | 4915.00 | feet | | |
| Depth Logger | 4911.00 | feet | | |
| First Reading | 4879.00 | feet | | |
| Last Reading | 266.00 | feet | | |
| Casing Driller | 264.00 | feet | | |
| Casing Logger | 266.00 | feet | | |
| Bit Size | 7.875 | inches | | |
| Hole Fluid Type | CHEMICAL | | | |
| Density / Viscosity | 9.50 lb/USg | 59.00 CP | | |
| PH / Fluid Loss | 10.50 | 8.00 ml/30Min | | |
| Sample Source | FLOWLINE | | | |
| Rm @ Measured Temp | 0.62 @ 75.0 | ohm-m | | |
| Rmf @ Measured Temp | 0.50 @ 75.0 | ohm-m | | |
| Rmc @ Measured Temp | 0.74 @ 75.0 | ohm-m | | |
| Source Rmf / Rmc | CALC | CALC | | |
| Rm @ BHT | 0.40 @116.0 | ohm-m | | |
| Time Since Circulation | 5 HOURS | | | |
| Max Recorded Temp | 116.00 | deg F | | |
| Equipment / Base | 13096 | OKC | | |
| Recorded By | ADAM SILL | | | |
| Witnessed By | TIM PRIEST | | | |

## BOREHOLE RECORD

Last Edited: 05-AUG-2016 17:49

| Bit Size inches | Depth From feet | Depth To feet |
|---|---|---|
| 7.875 | 264.00 | 4915.00 |

## CASING RECORD

| Type | Size inches | Depth From feet | Shoe Depth feet | Weight pounds/ft |
|---|---|---|---|---|
| SURFACE | 8.625 | 0.00 | 264.00 | 24.00 |

## REMARKS

- SOFTWARE ISSUE: WLS 15.03.5939.

- 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: 2496 CU.FT.

- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3800 FEET: 288 CU.FT.

- RIG: DUKE #2.

- ENGINEER: A. SILL.

- OPERATOR: J. LaPOINT.



## 5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 05-AUG-2016 23:31

Filename: C:\Minimus 15.03.5939\Logs\Shakespeare Edwards ...\Shakespeare Edwards #1-21_003.dta — Recorded on 05-AUG-2016 20:49

System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

Timing Marks every 60.0 sec

Gamma Ray API 0 75 150 / 150 225 300

Density Caliper inches 6 11 16

Bit Size inches 6 11 16

DST Uphole Tension pounds 5000 0

Depth In Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

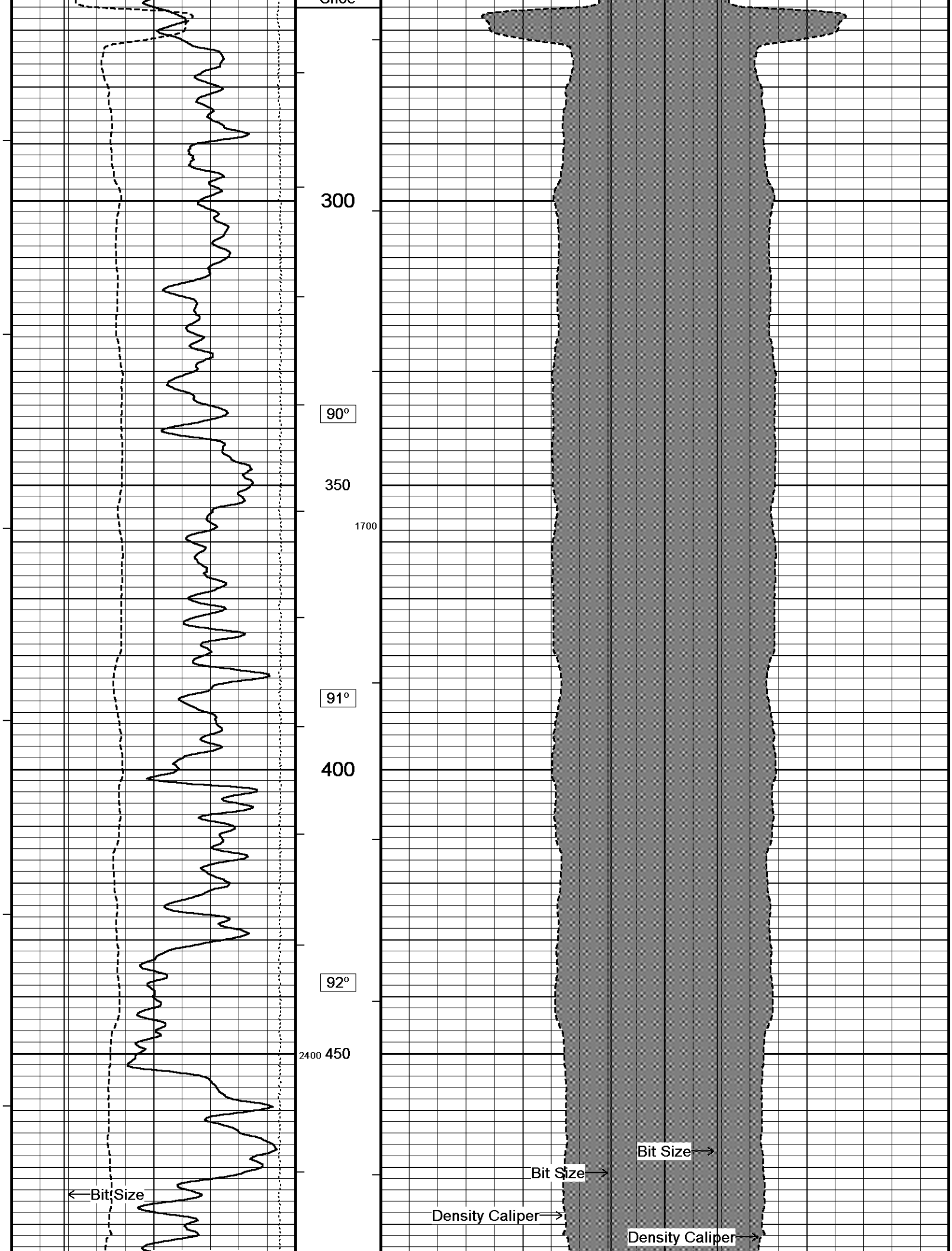
254

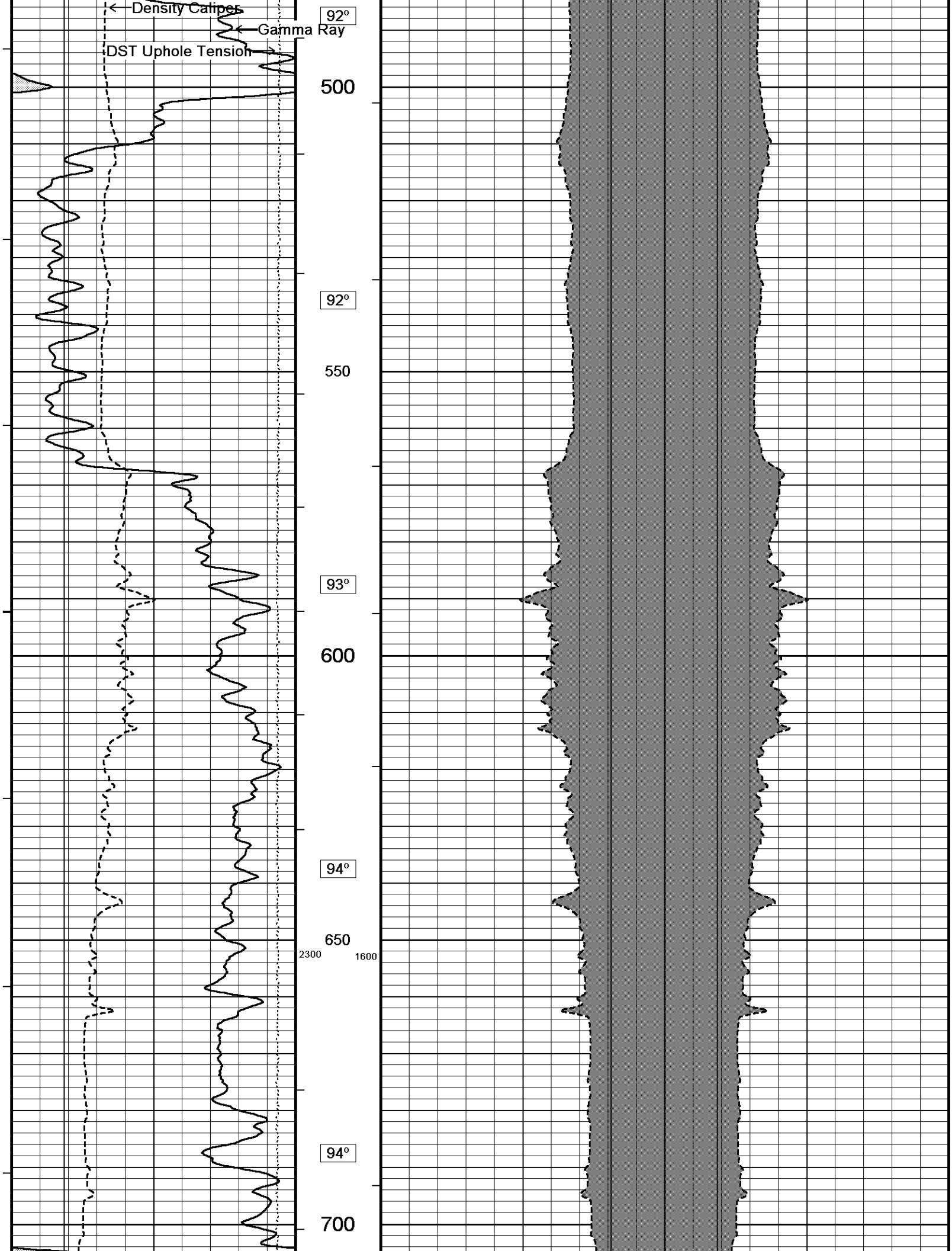
2500

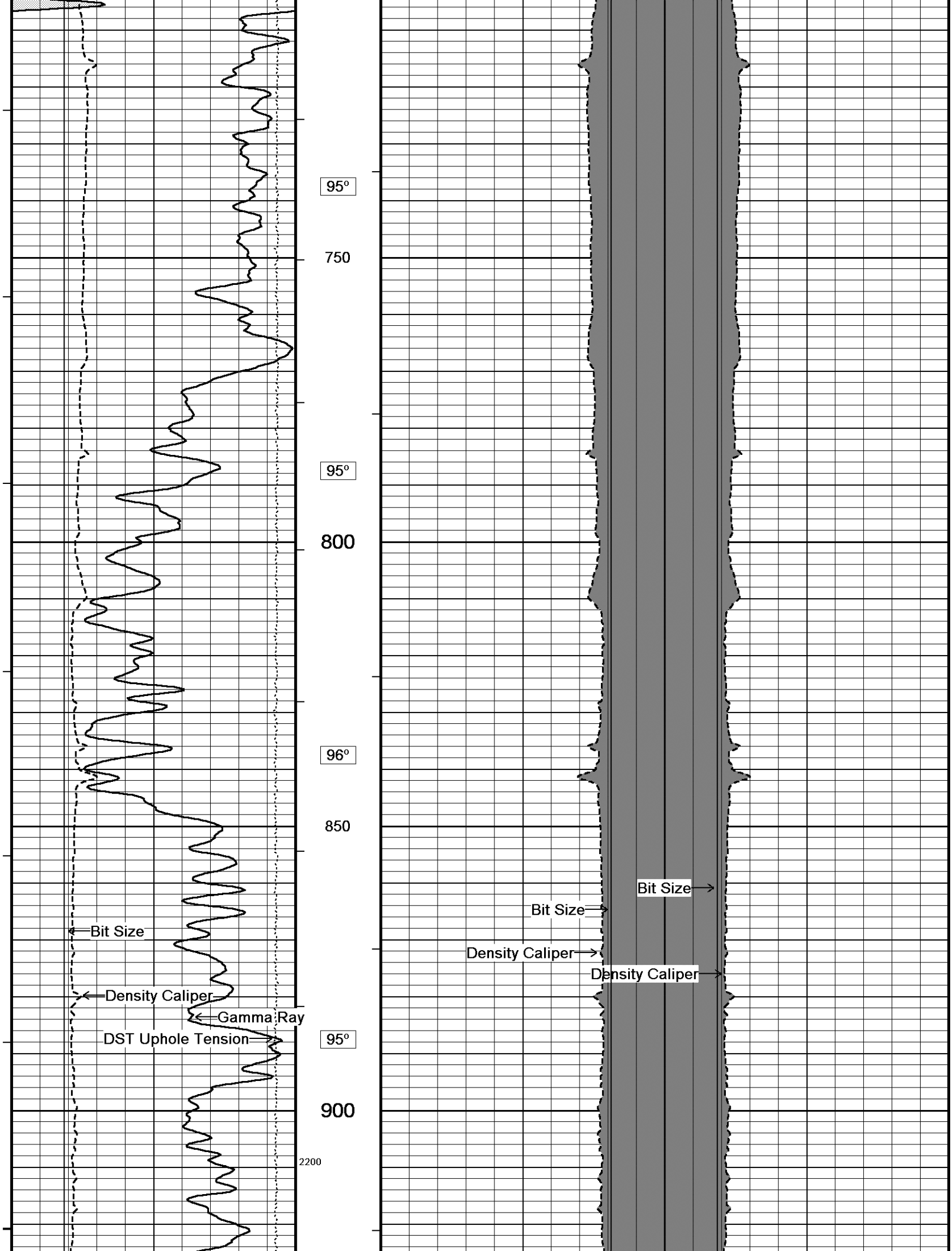
Casing Shoe

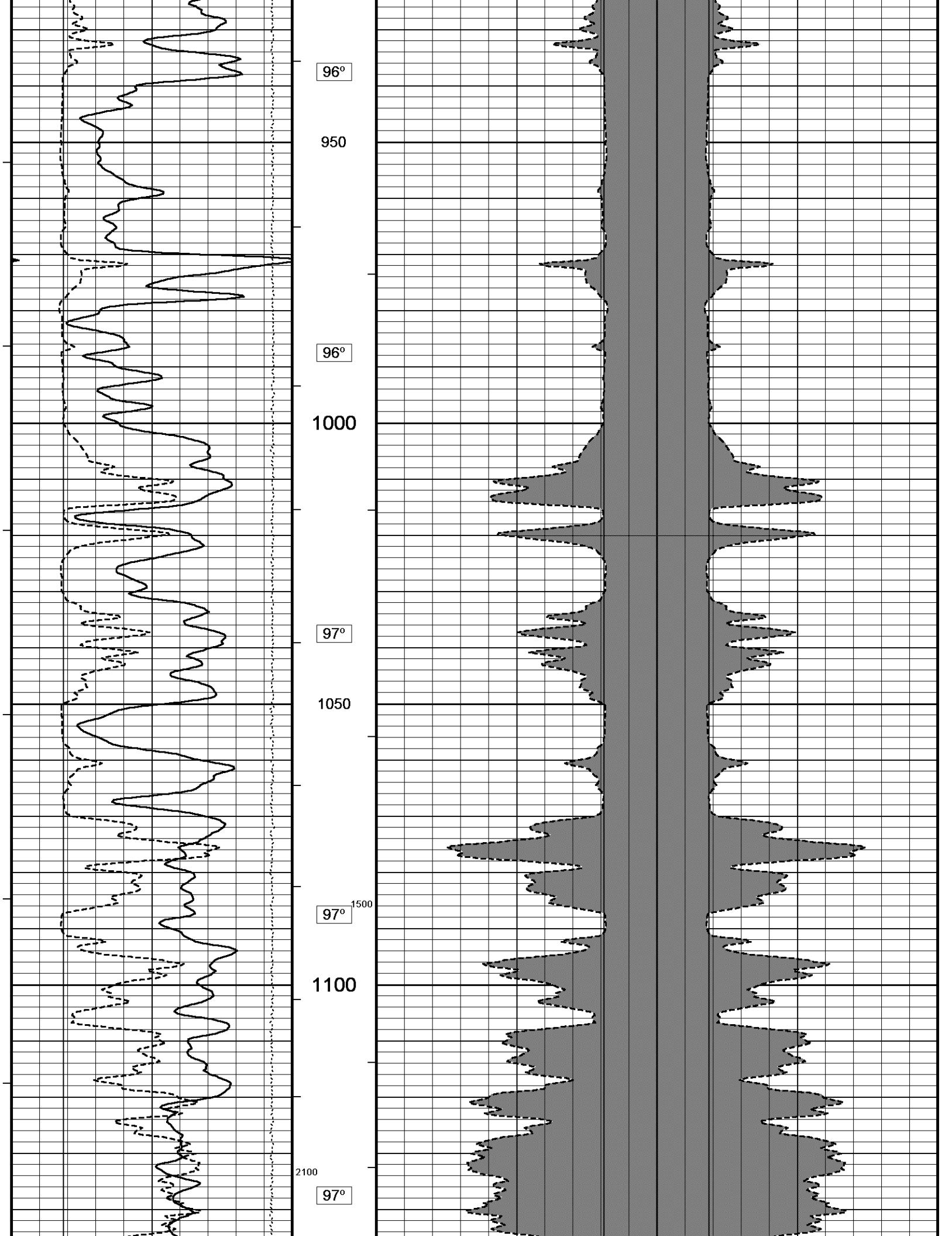
Density Caliper inches 16 11 6 / 6 11 16

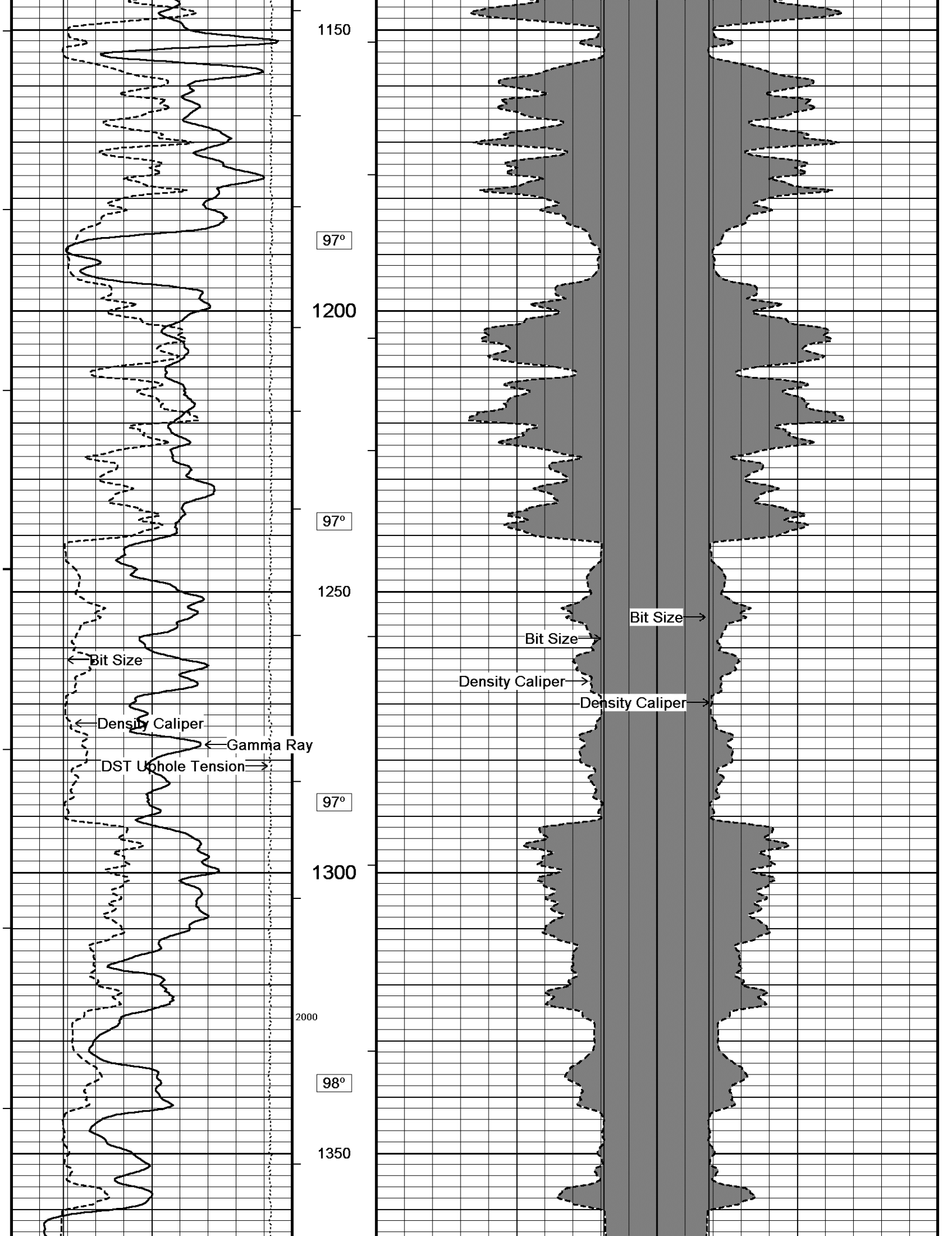
Bit Size inches 16 11 6 / 6 11 16

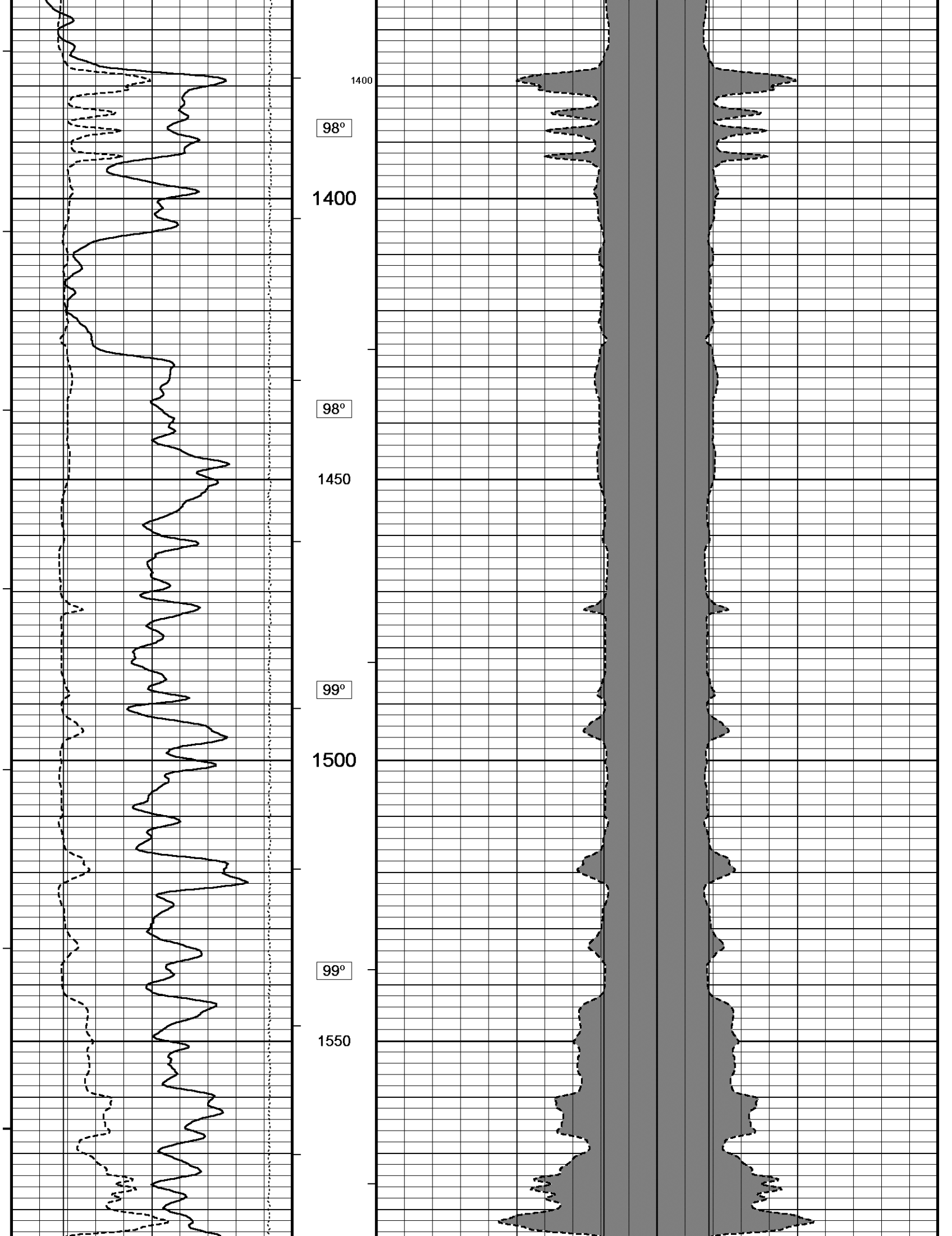

300
90°
350
1700
91°
400
92°
2400
450
←Bit Size
Bit Size→
Bit Size→
Density Caliper→
Density Caliper→

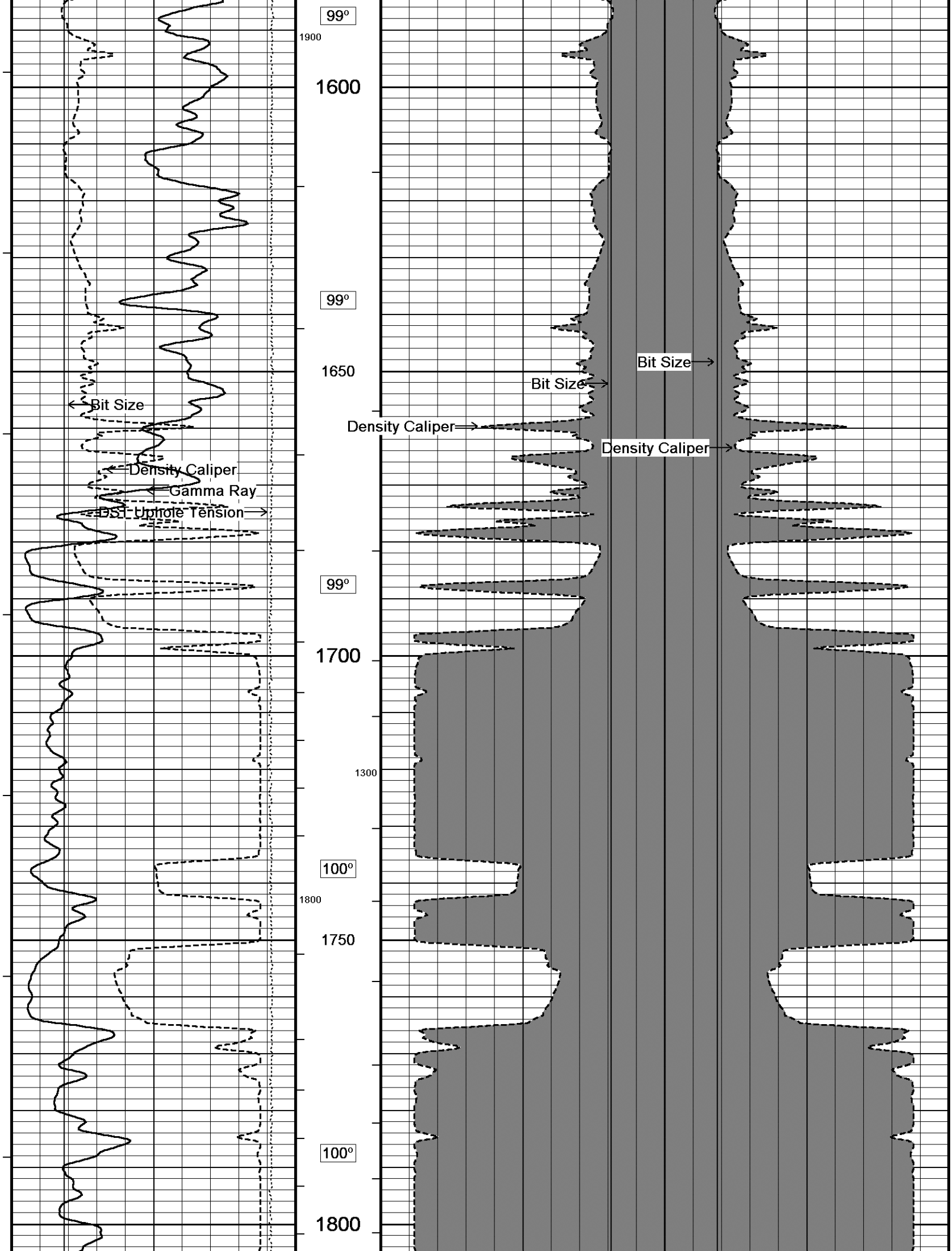

Density Caliper
Gamma Ray
DST Uphole Tension
92°
500
92°
550
93°
600
94°
650
2300
1600
94°
700

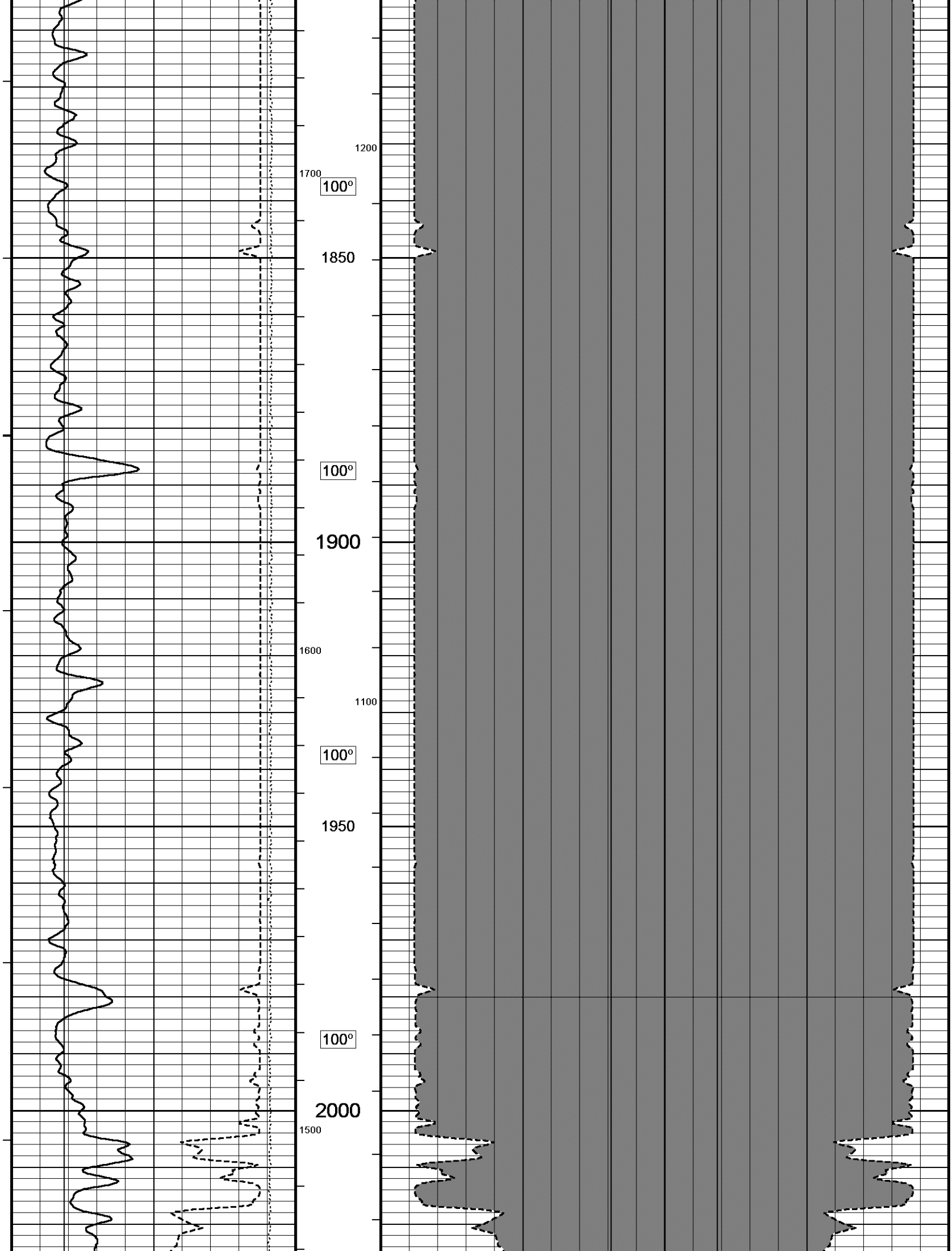

95°
750
95°
800
96°
850
95°
900
2200
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Bit Size
Bit Size
Density Caliper
Density Caliper


96°
950
96°
1000
97°
1050
97°
1500
1100
2100
97°


1150
97°
1200
97°
1250
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
97°
1300
2000
98°
1350
Bit Size
Bit Size
Density Caliper
Density Caliper


1400
98°
1400
98°
1450
99°
1500
99°
1550


99°
1900
1600
99°
1650
Bit Size
Bit Size
Density Caliper
Density Caliper
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
99°
1700
1300
100°
1800
1750
100°
1800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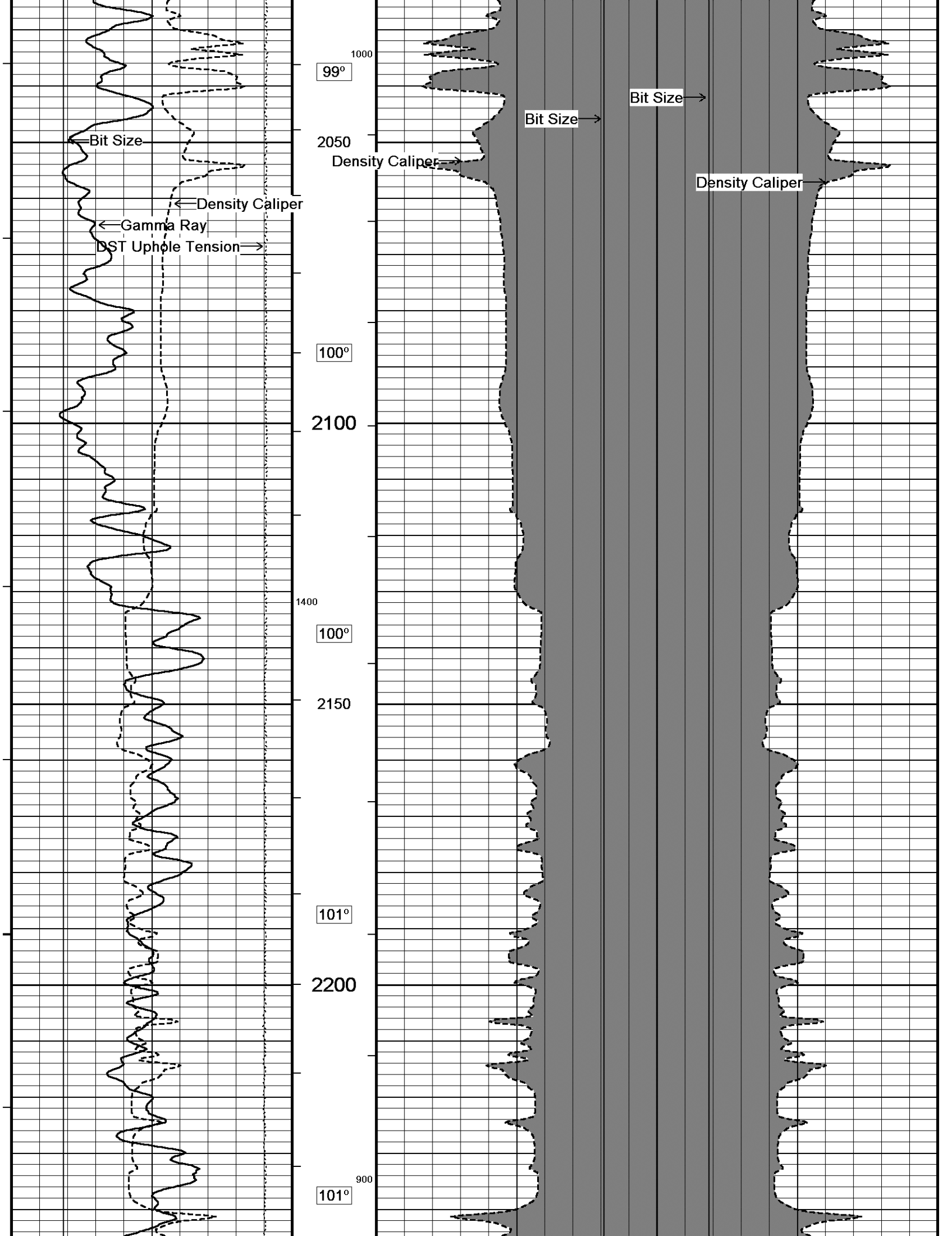
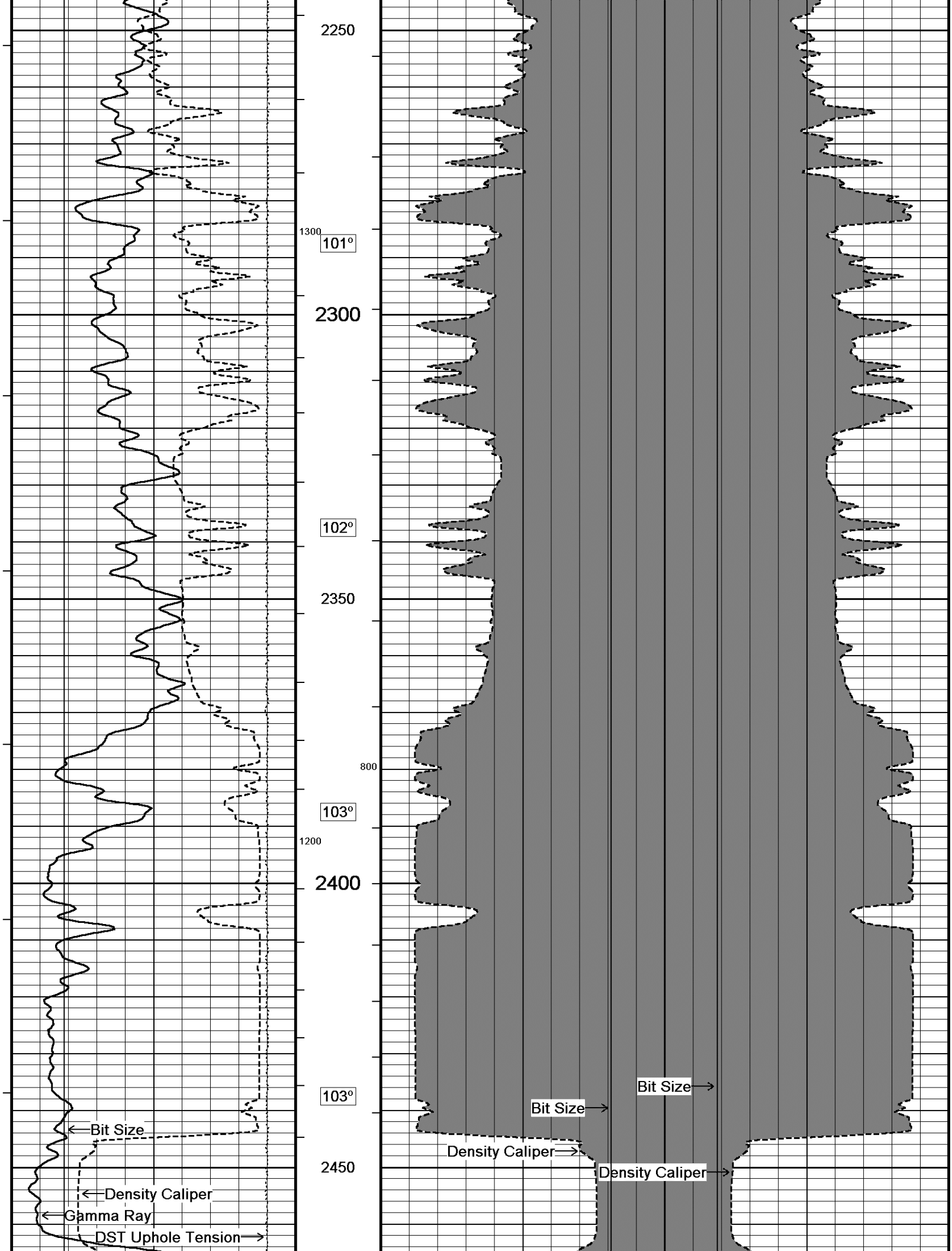
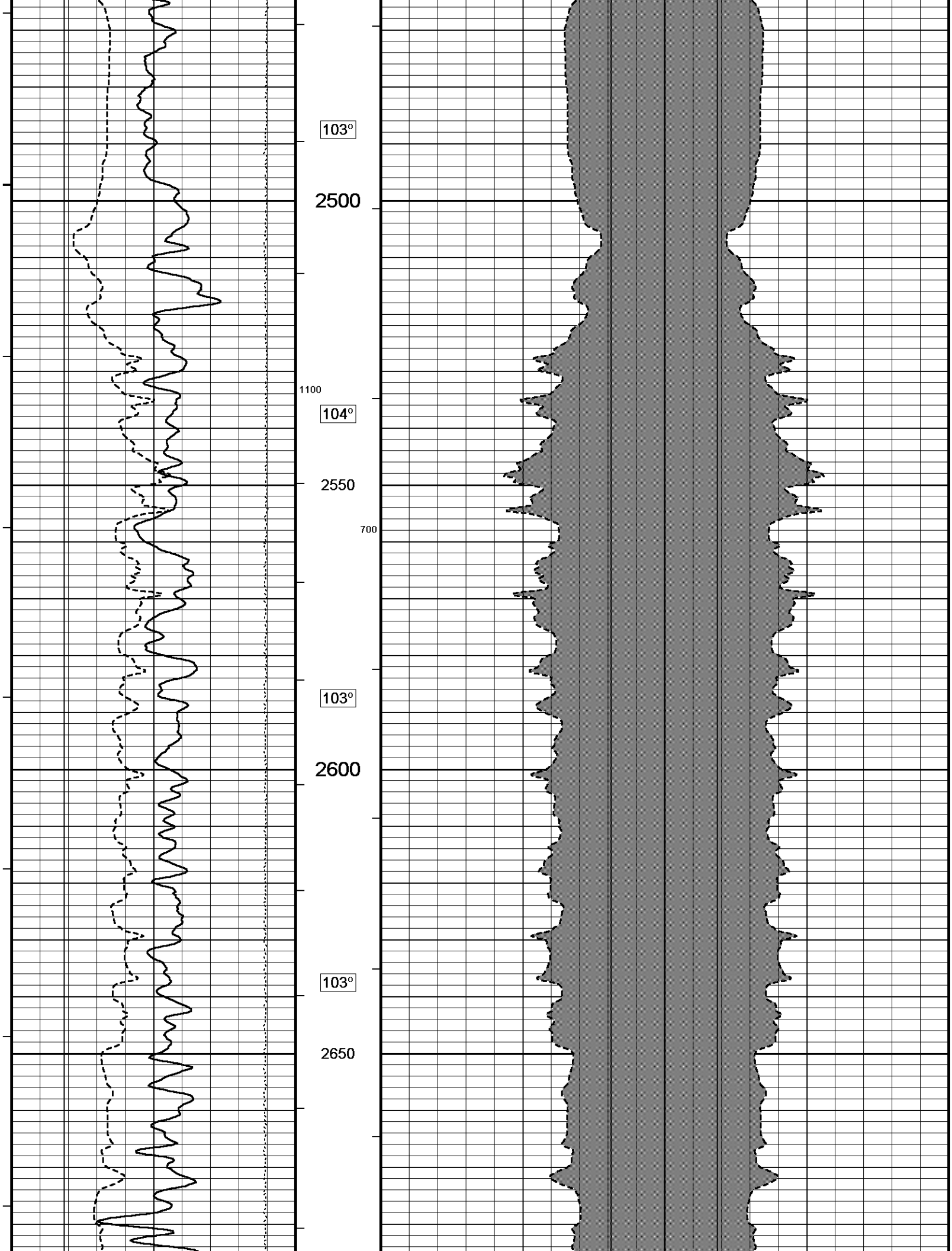
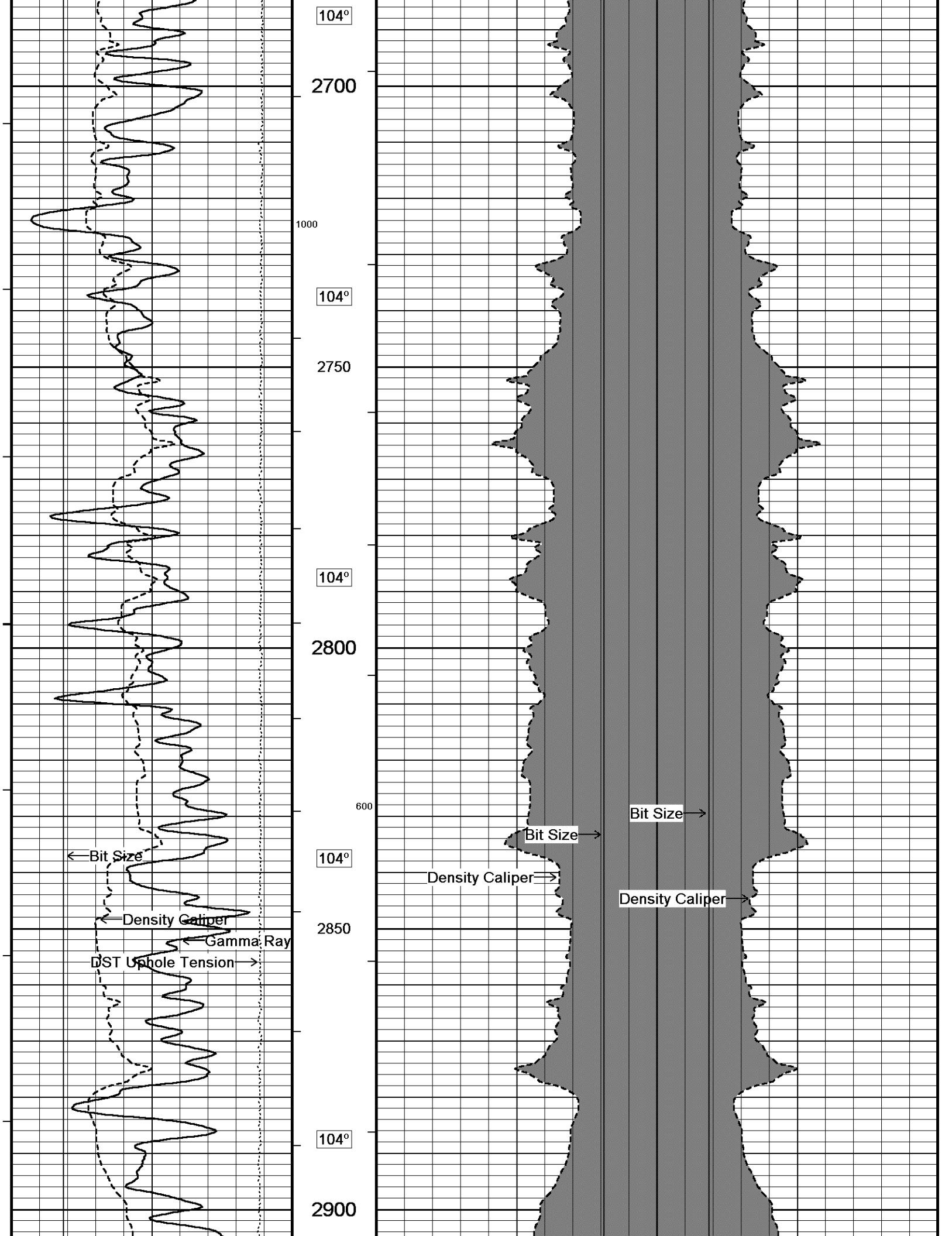
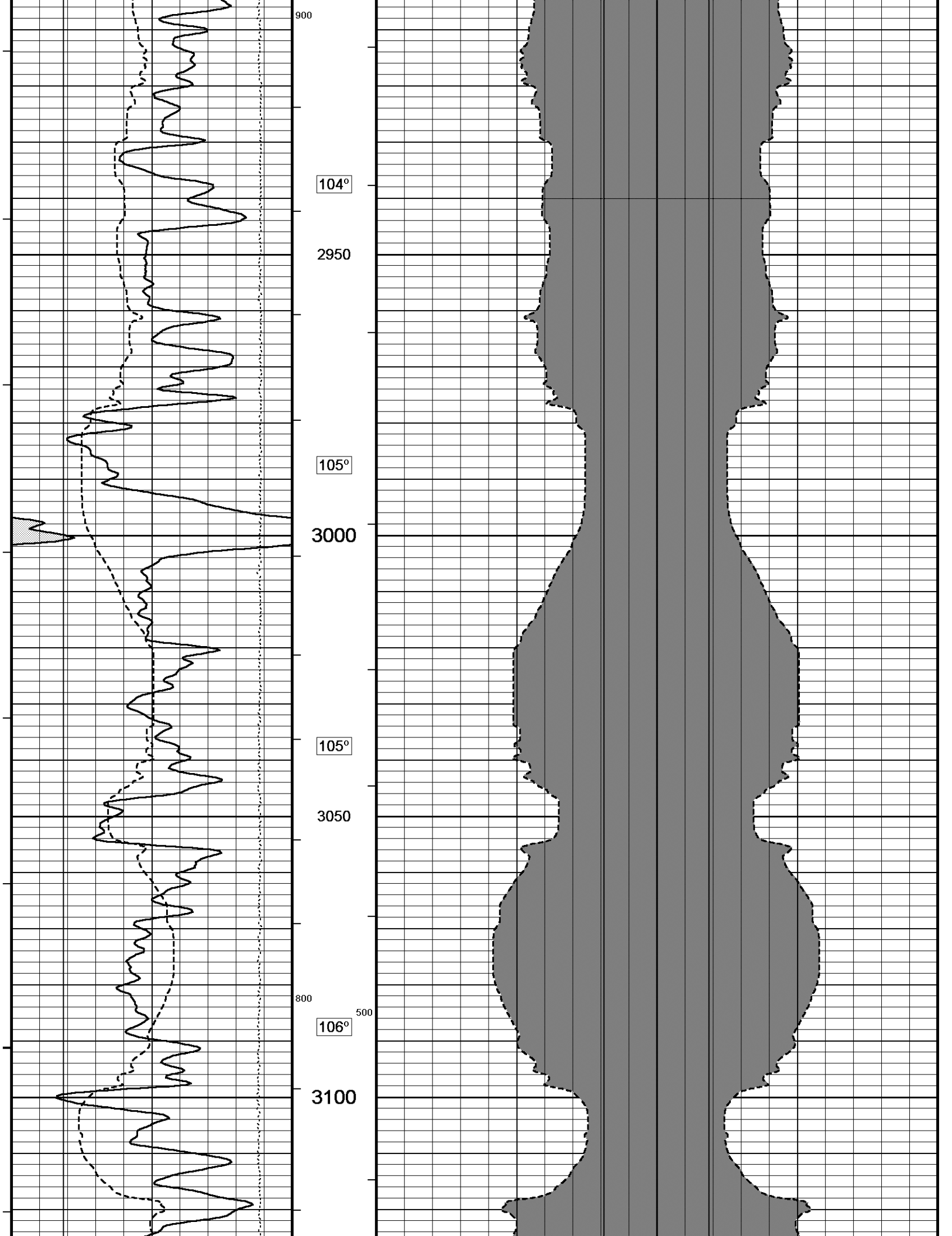
100°
1850
100°
1900
1600
100°
1950
100°
2000
1500
1200
1100

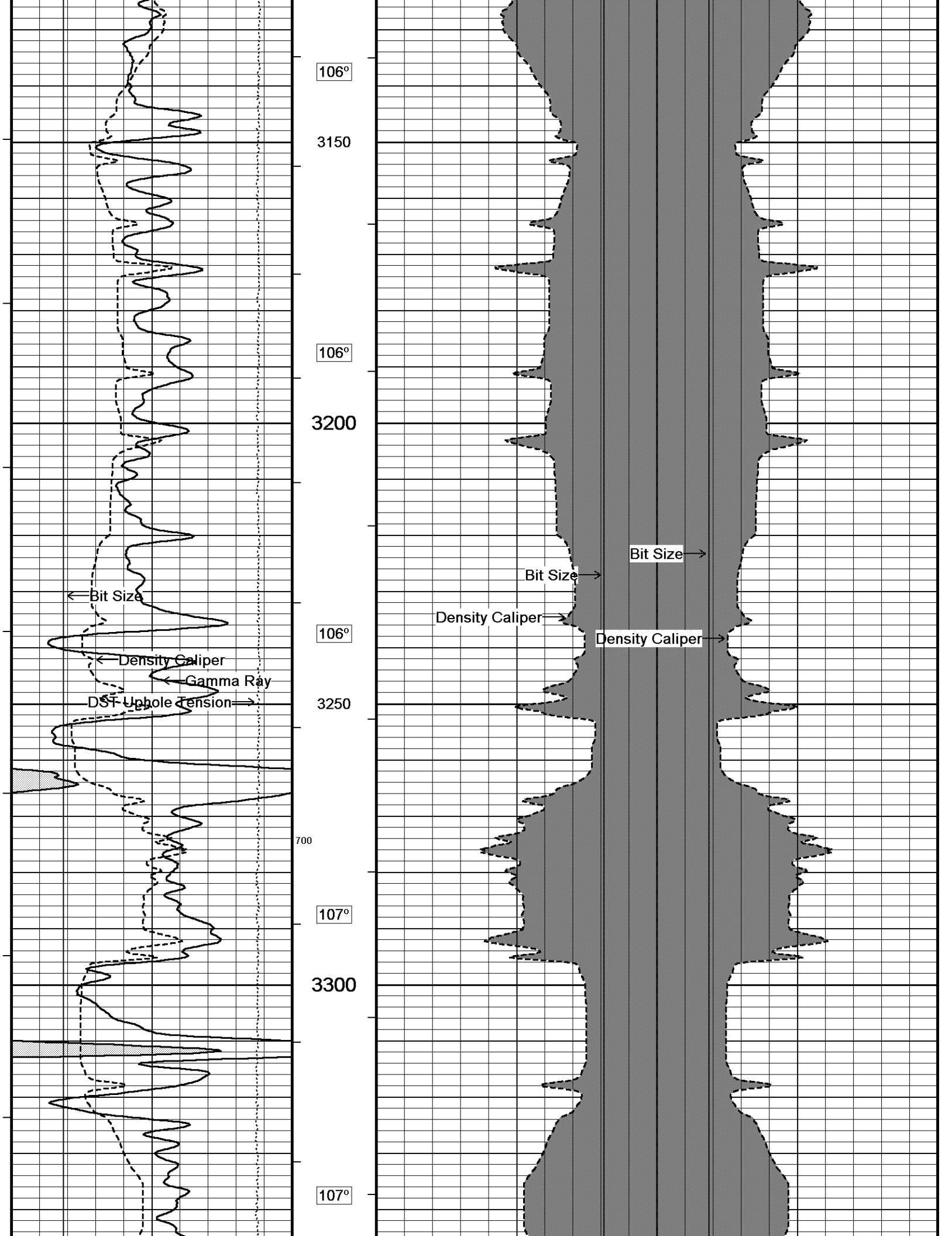

Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Bit Size
Density Caliper
Bit Size
Density Caliper
1000
99°
2050
100°
2100
1400
100°
2150
101°
2200
900
101°

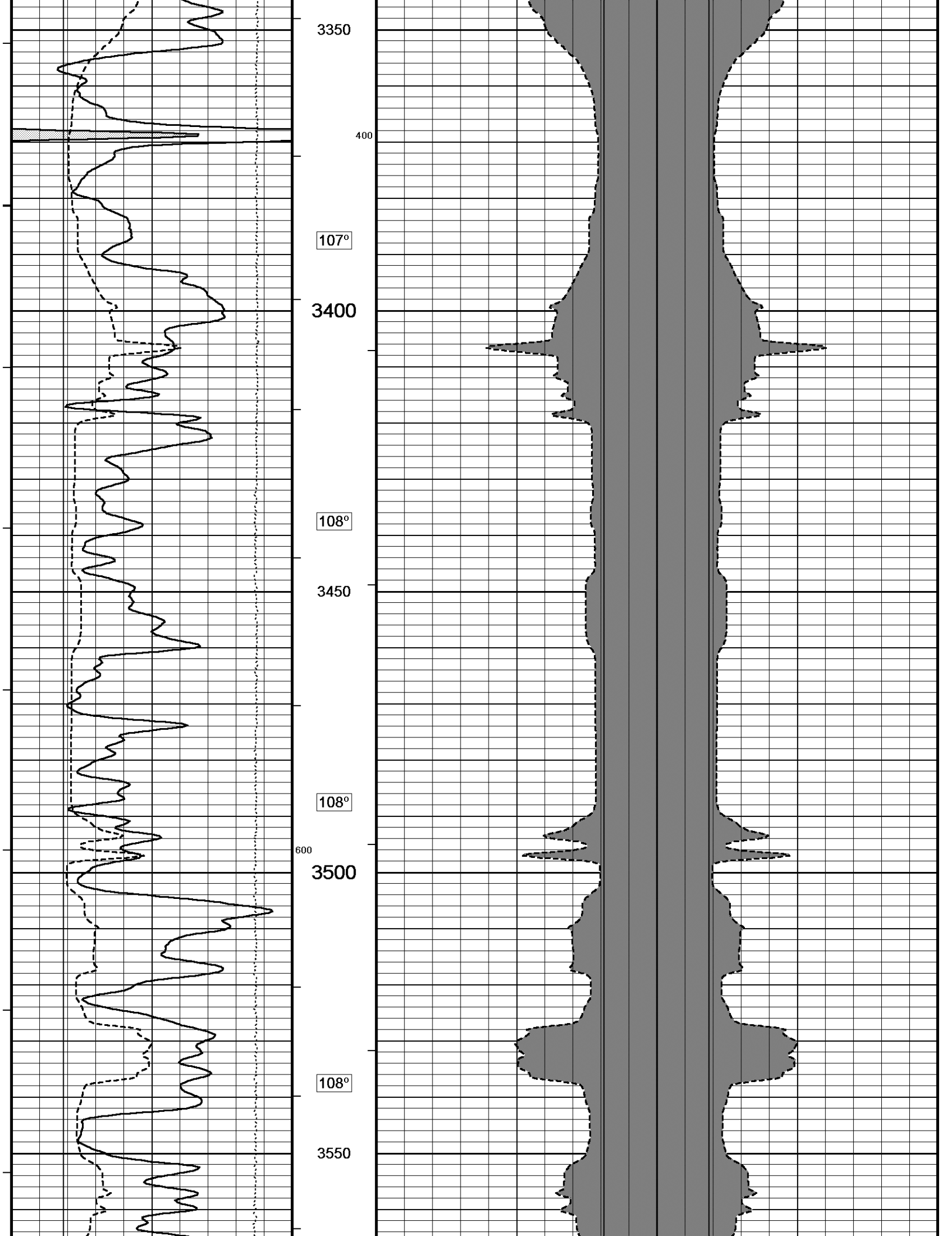

2250
1300
101°
2300
102°
2350
800
103°
1200
2400
103°
2450
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Bit Size
Bit Size
Density Caliper
Density Caliper

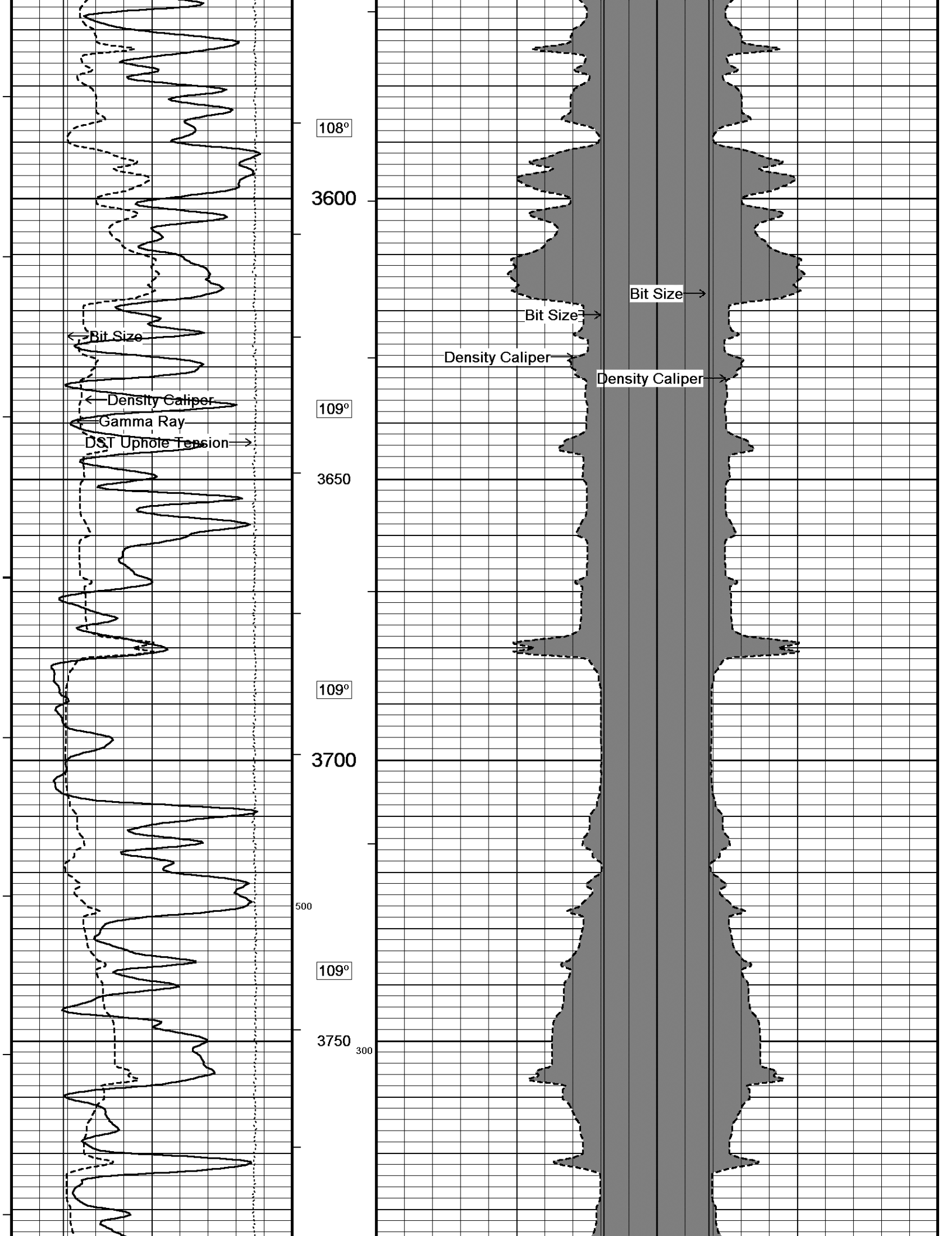

103°
2500
1100
104°
2550
700
103°
2600
103°
2650

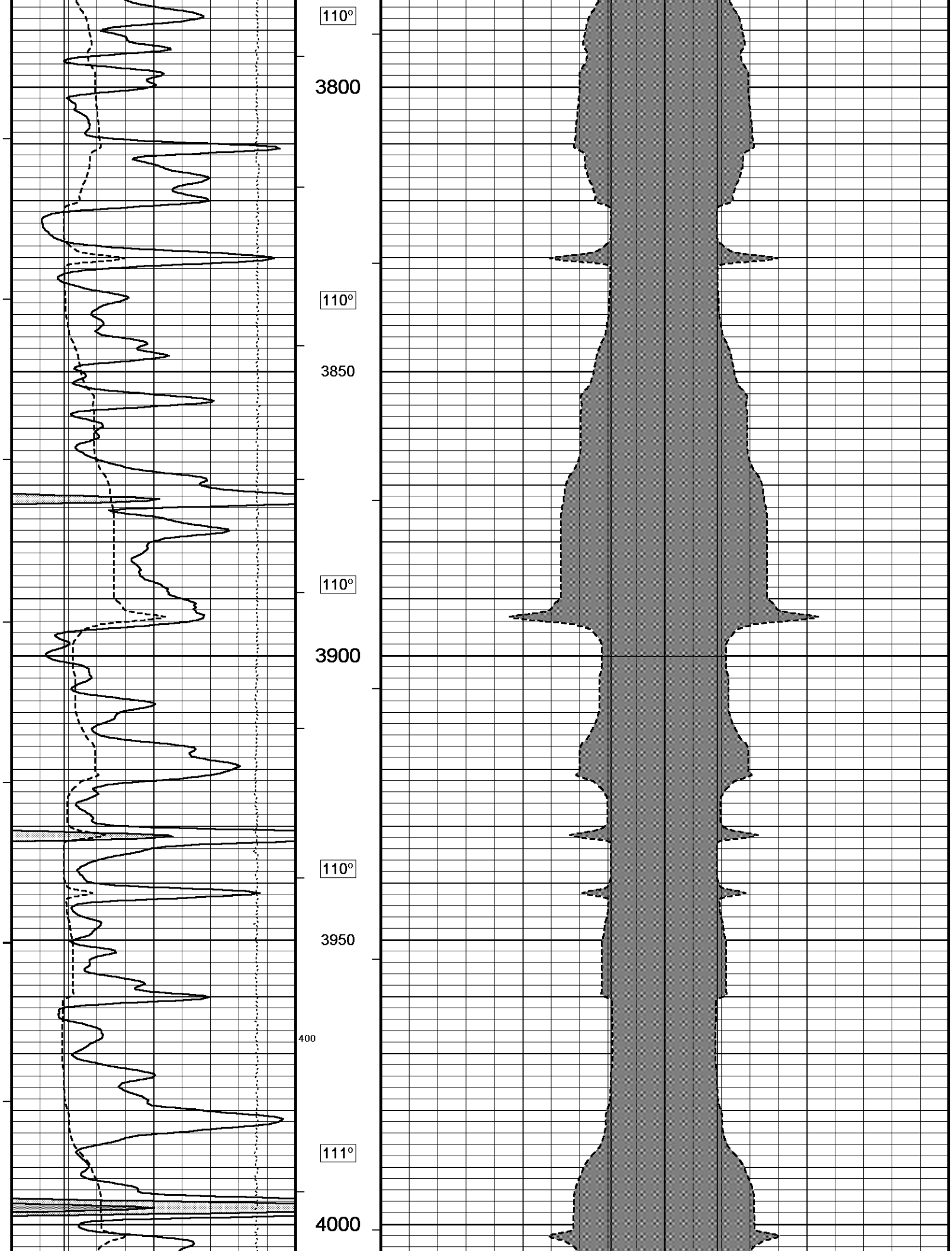

104°
2700
1000
104°
2750
104°
2800
600
104°
2850
104°
2900
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Bit Size
Bit Size
Density Caliper
Density Caliper

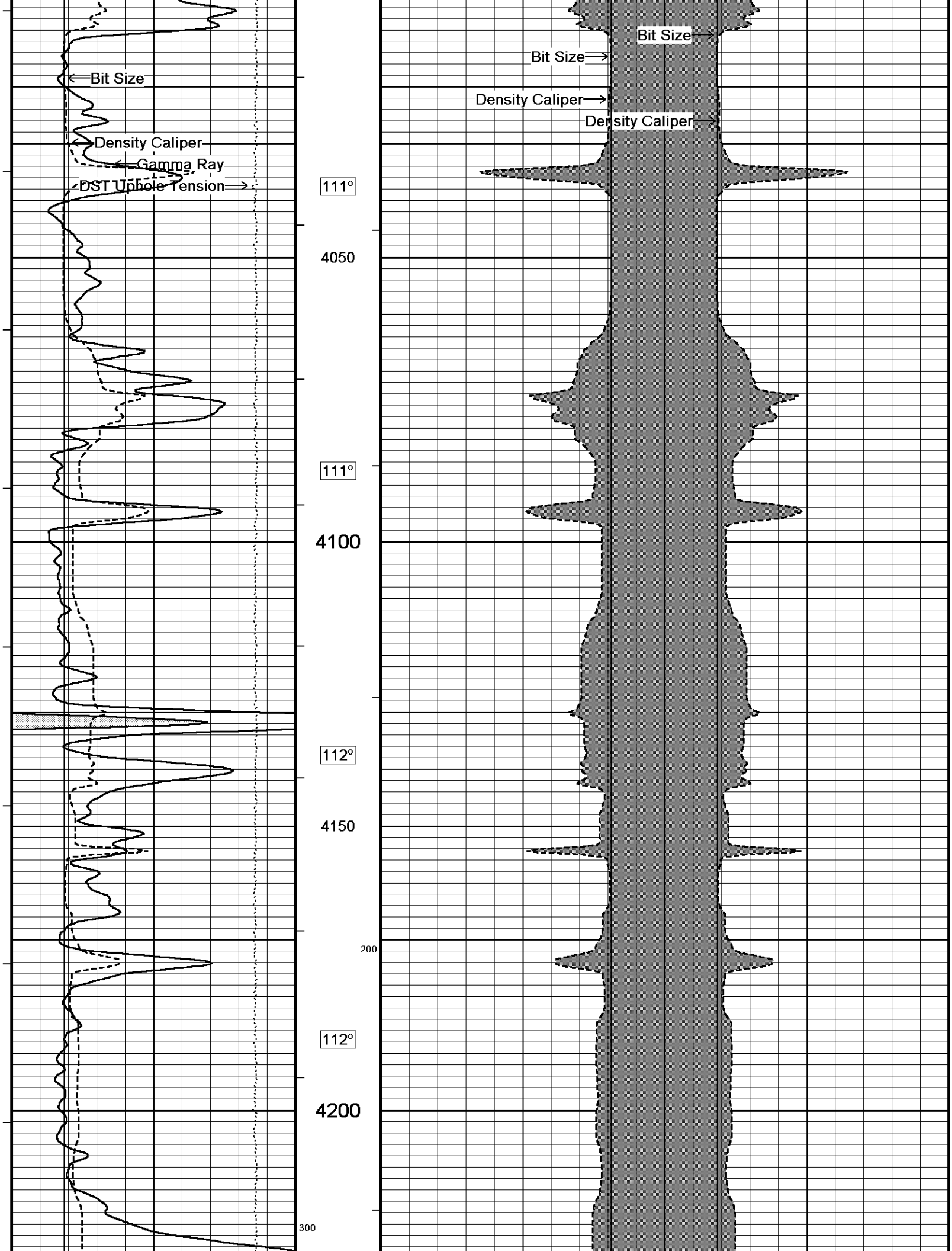

900
104°
2950
105°
3000
105°
3050
800
106°
500
3100

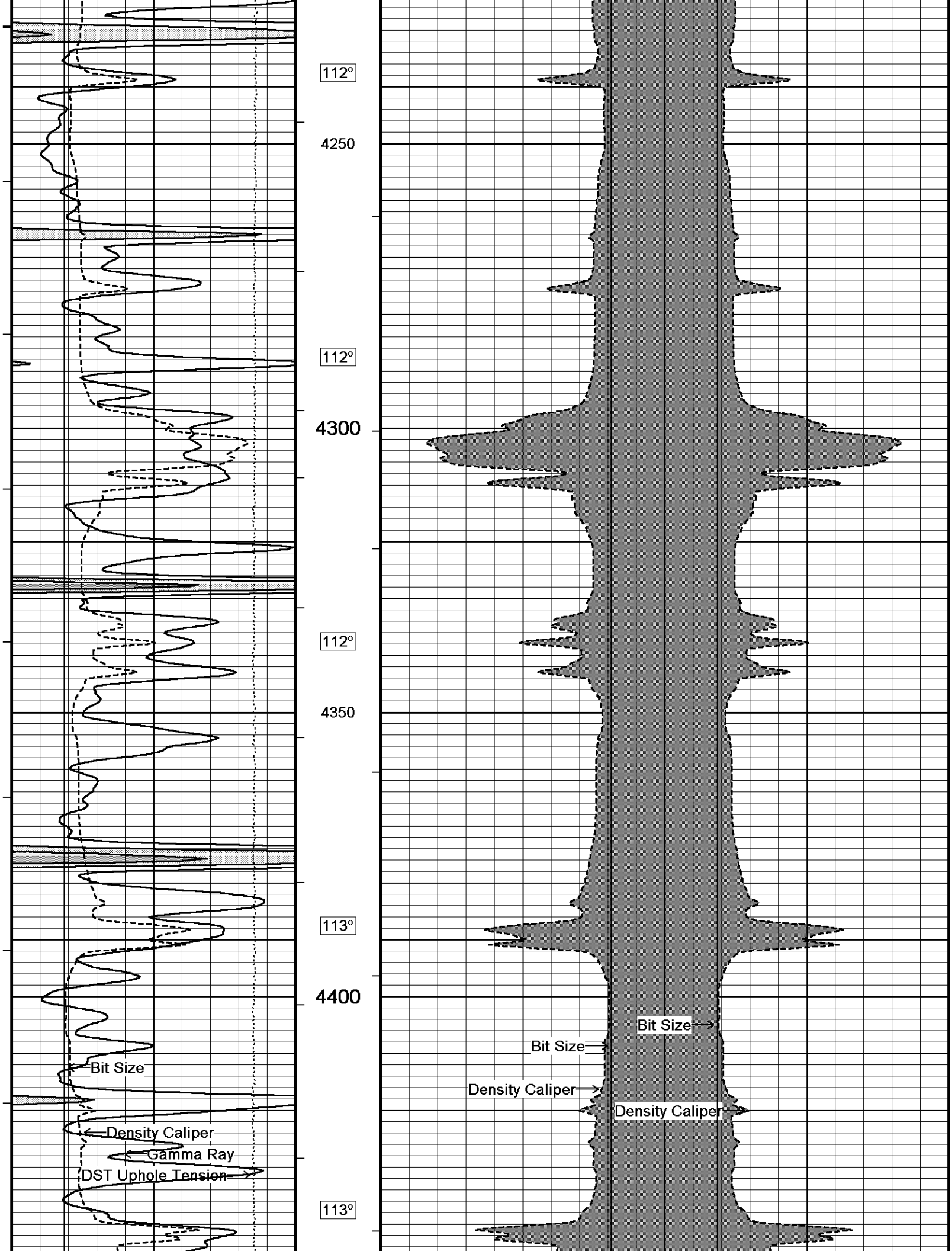

106°
3150
106°
3200
106°
3250
700
107°
3300
107°
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Bit Size
Bit Size
Density Caliper
Density Caliper

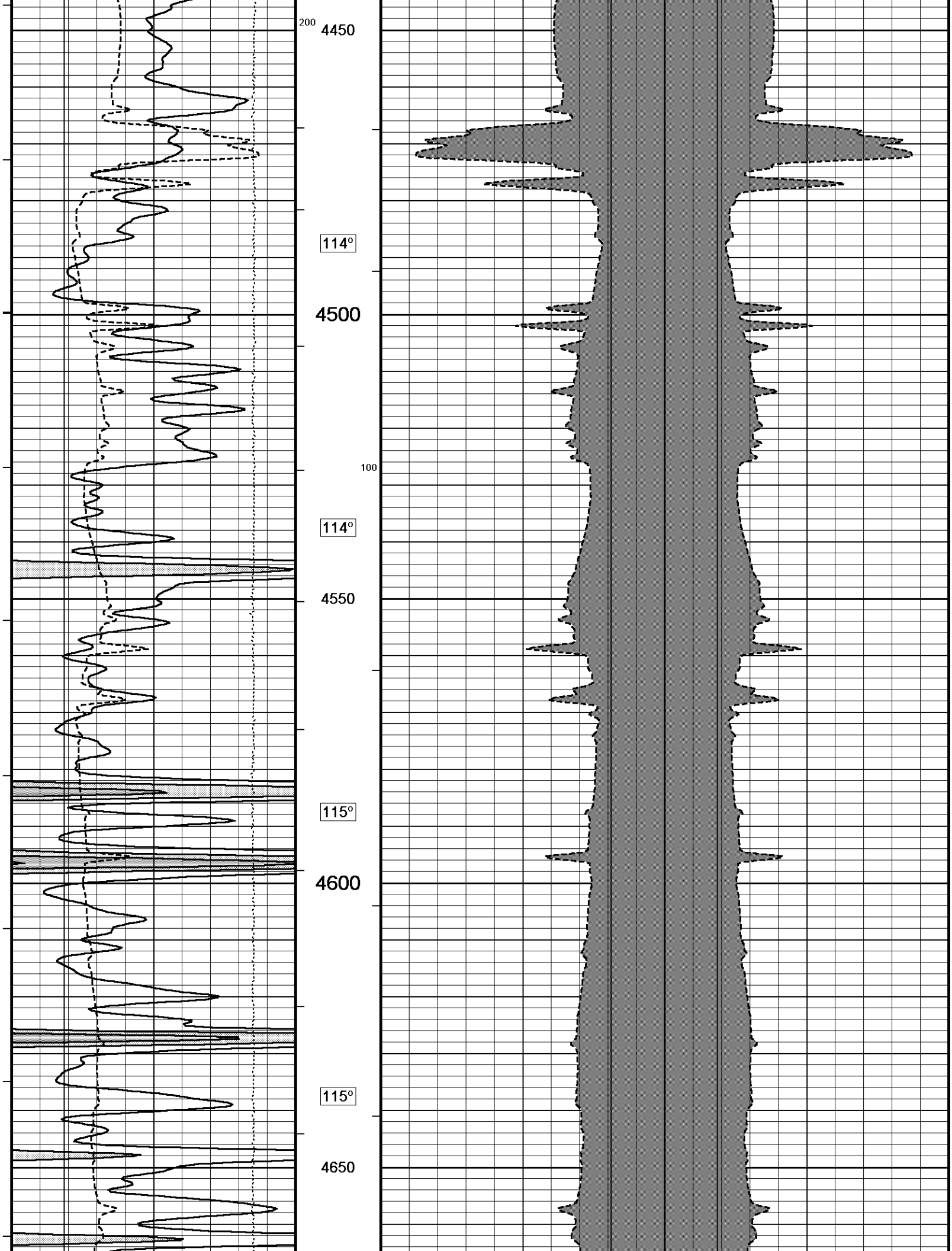

3350
400
107°
3400
108°
3450
108°
600
3500
108°
3550

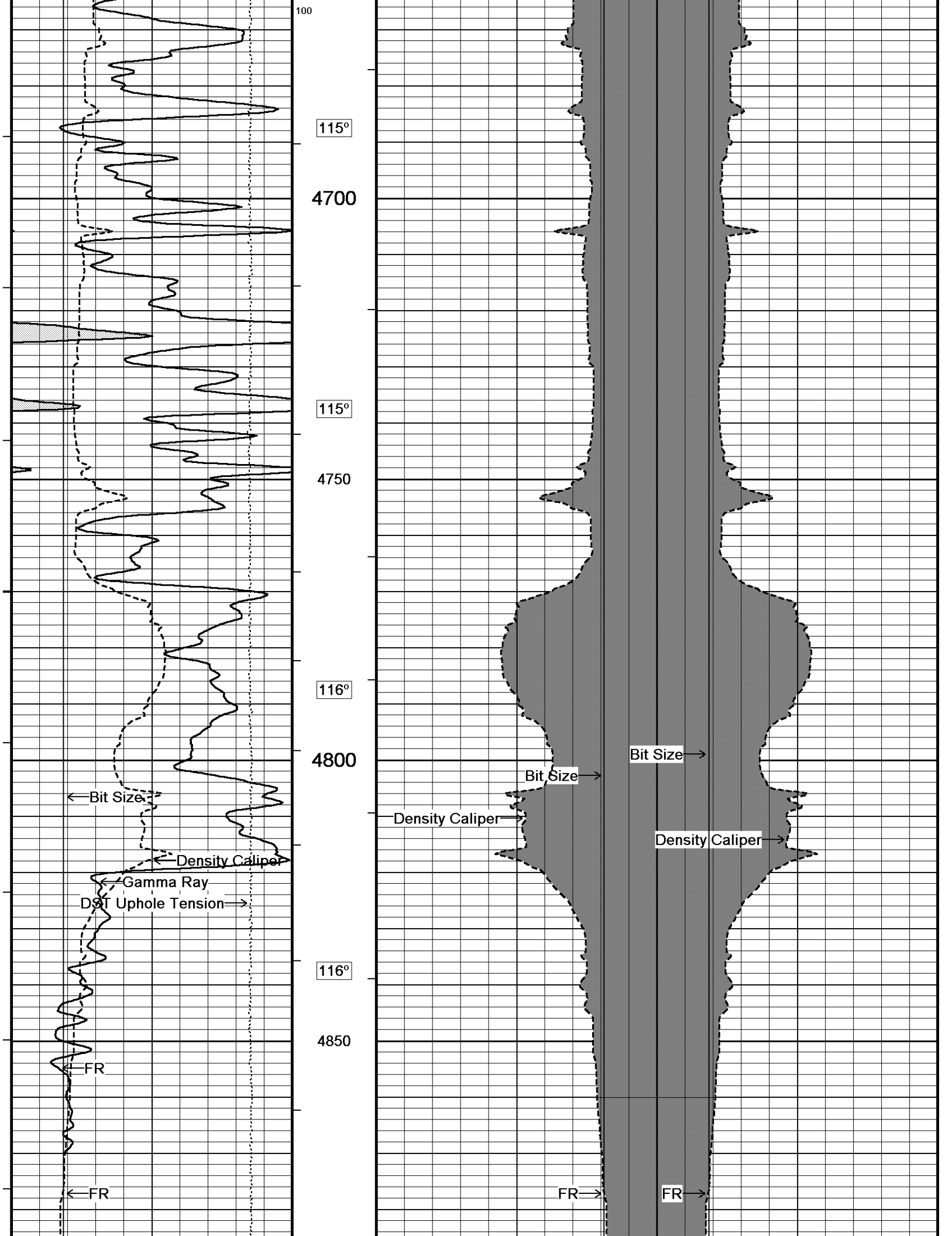

108°
3600
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
109°
3650
109°
3700
500
109°
3750
300
Bit Size
Bit Size
Density Caliper
Density Caliper

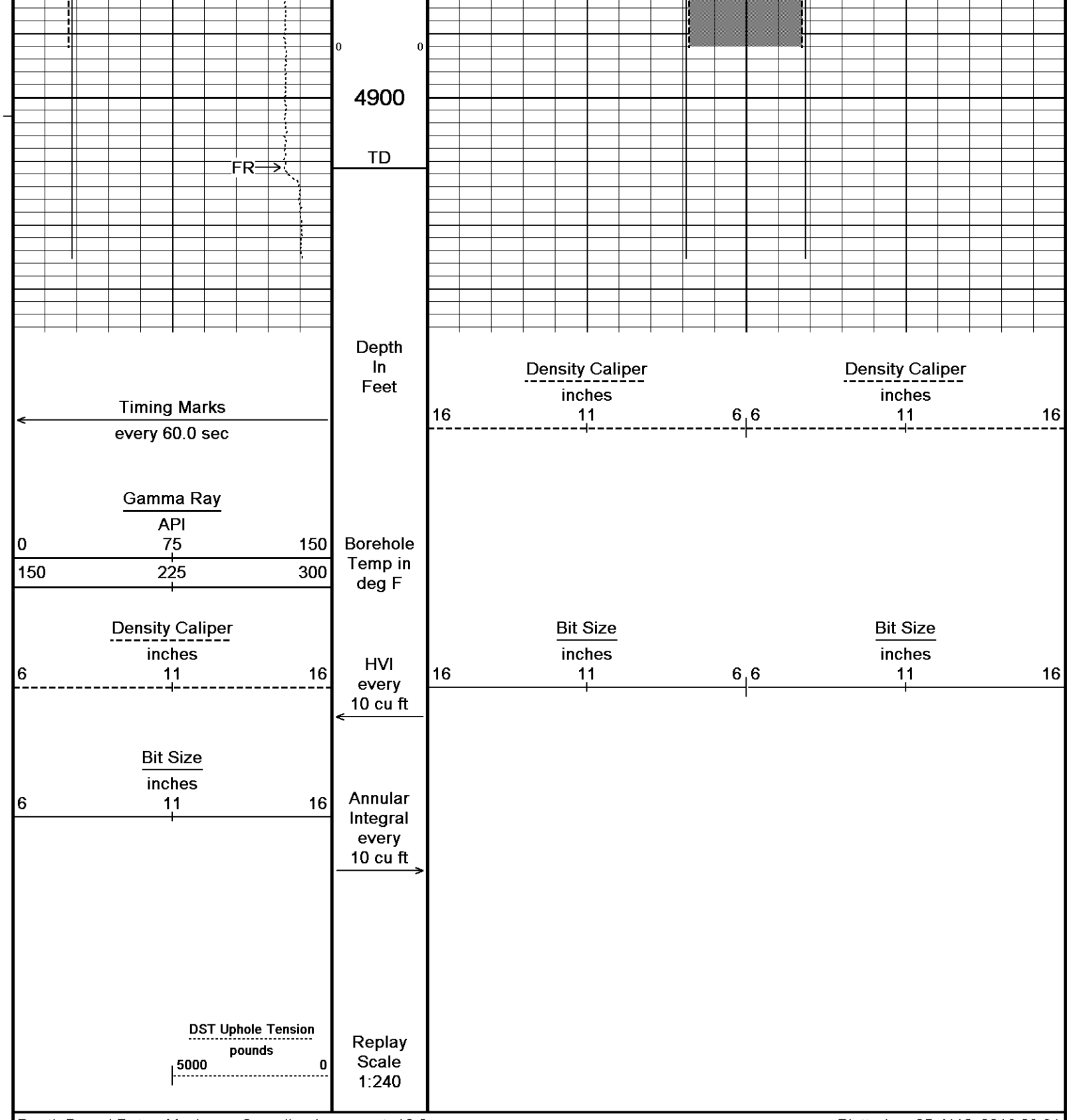

110°
3800
110°
3850
110°
3900
110°
3950
400
111°
4000


Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
111°
4050
111°
4100
112°
4150
200
112°
4200
300
Bit Size
Bit Size
Density Caliper
Density Caliper


112°
4250
112°
4300
112°
4350
113°
4400
113°
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Bit Size
Bit Size
Density Caliper
Density Caliper


200
4450
114°
4500
100
114°
4550
115°
4600
115°
4650


100
115°
4700
115°
4750
116°
4800
116°
4850
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
FR
FR
Bit Size
Bit Size
Density Caliper
Density Caliper
FR
FR




Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 05-AUG-2016 23:31
Filename: C:\Minimus 15.03.5939\Logs\Shakespeare Edwards ...\Shakespeare Edwards #1-21_003.dta
Recorded on 05-AUG-2016 20:49
System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

5 INCH MAIN

## BEFORE SURVEY CALIBRATION

C:\Minimus 15.03.5939\Logs\Shakespeare Edwards #1-21\Shakespeare Edwards #1-21_002.dta

General Constants All 000
Last Edited on 05-AUG-2016,19:47

General Parameters

| | | |
|---|---|---|
| Mud Resistivity | 0.620 | ohm-metres |

| | | |
|---|---|---|
| Mud Resistivity Temperature | 75.000 | 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 | 5.500 | 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 | |
| SW/APOR Tool Source | 0.000 | |

## Down-hole Tension Calibration SMS 0

Field Calibration on 24-JUL-2016 15:20

| Reading No | Measured | Calibrated (lbs) |
|---|---|---|
| 1 | 15235.81 | 0.00 |
| 2 | 16026.61 | 481.00 |

## Gamma Calibration MCG-C 123

Field Calibration on 04-AUG-2016 08:11

| | Measured | Calibrated (API) |
|---|---|---|
| Background | 71 | 49 |
| Calibrator (Gross) | 731 | 505 |
| Calibrator (Net) | 660 | 456 |

## Gamma Calibration Tolerances MCG-C 123

Ratio 1.448 (1.40 | 1.475 | 1.55) Counts/API

## Gamma Constants MCG-C 123

Last Edited on 05-AUG-2016,17:51

| | | |
|---|---|---|
| Gamma Calibrator Number | MCGGRCC141 | |
| GRC-M Calibrator Jig in Use? | NO | |
| Inactive Background Jig in Use? | NO | |
| Mud Density | 1.14 | gm/cc |
| Caliper Source for Processing | Density Caliper | |
| Tool Position | Eccentred | |
| Potassium Equivalence | Chloride | |
| K Mud Concentration | 0.00 | % |

## High Resolution Temperature Calibration MCG-C 123

Field Calibration on 31-OCT-2015,17:05

| | Measured | Calibrated(Deg F) |
|---|---|---|
| Lower | 50.00 | 50.00 |
| Upper | 100.00 | 100.00 |

## High Resolution Temperature Constants MCG-C 123

Last Edited on 22-SEP-2015,11:43

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

## SP Calibration MCG-C 123

Field Calibration on 14-JUL-2016 12:06

| | Measured | Calibrated (mV) |
|---|---|---|
| Reference 1 | 101.2 | 100.6 |
| Reference 2 | -99.1 | -99.9 |

## Micro Normal and Micro Inverse Calibration MMR-C.A 247

Base Calibration on 22-MAY-2016 16:59
Field Check on 04-AUG-2016 07:56

Base Calibration

| | Measured | | Calibrated (ohm-m) | |
|---|---|---|---|---|
| Channel | Resistor 1 | Resistor 2 | Resistor 1 | Resistor 2 |
| Micro Normal | 10.2 | 49.9 | 5.1 | 25.6 |
| Micro Inverse | 10.0 | 49.5 | 3.4 | 16.9 |

| Channel | Base Check (ohm-m) | Field Check (ohm-m) |
|---|---|---|
| Micro Normal | 93.6 | 93.6 |
| Micro Inverse | 62.2 | 62.2 |

## Micro Normal & Micro Inverse Calibration Tolerance MMR-C.A 247

| | | | | | | |
|---|---|---|---|---|---|---|
| Micro Normal Res. 1 | 10.2 | ohm | Micro Normal Res. 2 | 49.9 | ohm |
| Micro Inverse Res. 1 | 10.0 | ohm | Micro Inverse Res. 2 | 49.5 | ohm |
| Micro Normal Base Check | 93.6 | ohm-m | | | |
| Micro Inverse Base Check | 62.2 | ohm-m | | | |
| Micro Normal Field Check | 93.6 | ohm-m | | | |
| Micro Inverse Field Check | 62.2 | ohm-m | | | |

## Micro Normal and Micro Inverse Constants MMR-C.A 247

Last Edited on 26-JUN-2016,15:44

| | | |
|---|---|---|
| Pad Type | 8-12 in Soft Rubber Inflatable 006-9011-159 | |
| Micro Normal K Factor | 0.5110 | |
| Micro Inverse K Factor | 0.3380 | |
| Standoff Offset | 0.0000 | inches |

## Caliper Calibration MMR-C.A 247

Base Calibration on 22-MAY-2016 16:40
Field Calibration on 04-AUG-2016 07:55

Base Calibration

| Reading No | Measured | Calibrator Size (in) |
|---|---|---|
| 1 | 14762 | 5.98 |
| 2 | 18067 | 7.97 |
| 3 | 21325 | 9.86 |
| 4 | 25277 | 11.92 |
| 5 | 0 | 0.00 |
| 6 | N/A | N/A |

Field Calibration

| Measured Caliper (in) | Actual Caliper (in) |
|---|---|
| 7.95 | 7.97 |

## Caliper Calibration Tolerances MMR-C.A 247

| | | |
|---|---|---|
| Short Arm Field Cal. | 7.95 | in |

## Micro-Resistivity Caliper Constants MMR-C.A 247

Last Edited on

Sonde Configuration Resistivity Mode

## Neutron Calibration MDN-A.B 66

Base Calibration on 22-MAY-2016,18:15
Field Check on 04-AUG-2016 08:21

Base Calibration

| | Measured | | Calibrated (cps) | |
|---|---|---|---|---|
| | Near | Far | Near | Far |
| | 3116 | 97 | 3714 | 110 |
| Ratio | 32.277 | | 33.764 | |

Field Calibrator at Base

| | Calibrated (cps) | |
|---|---|---|
| | 2061 | 3028 |
| Ratio | 0.681 | |

Field Check

| | Calibrated (cps) | |
|---|---|---|
| | 2178 | 3118 |
| Ratio | 0.698 | |

## Neutron Calibration Tolerances MDN-A.B 66

| | | |
|---|---|---|
| Ratio | 32.277 | |
| Base Check | 0.681 | |
| Field Check | 0.698 | |

## Neutron Constants MDN-A.B 66

Last Edited on 05-AUG-2016,17:51

| | |
|---|---|
| Neutron Source Id | P0204NN |

| | | |
|---|---|---|
| Neutron Jig Number | NJ5736 | |
| Air Hole Processing | Legacy | |
| Caliper Source for Processing | Density Caliper | |
| Stand-off | 0.00 | inches |
| Mud Density | 1.00 | 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-B.J 352

Base Calibration on 22-MAY-2016 16:12
Field Check on 04-AUG-2016 07:46

Base Calibration

| | Measured | Calibrated (ohm-m) |
|---|---|---|
| Reference 1 | 0.0 | 0.0 |
| Reference 2 | 972.3 | 126.8 |
| Base Check | | 278.7 |
| Field Check | | 278.8 |

## FE Calibration Tolerances MFE-B.J 352

| | | | | | |
|---|---|---|---|---|---|
| Reference 2 | 972.3 | -3% | 980.0 | +3% | ohm |
| Base Check | 278.7 | -2% | 277.0 | +2% | ohm-m |
| Field Check | 278.8 | -2% | 278.7 | +2% | ohm-m |

## FE Constants MFE-B.J 352

Last Edited on 05-AUG-2016,17:50

| | | |
|---|---|---|
| Running Mode | No Sleeve | |
| MFE K Factor | 0.1268 | |
| Borehole Correction Constants | | |
| Sonde Position | 0.5 | inches |
| Hole Size Source | Density Caliper | |
| Hole Size Constant Value | N/A | inches |
| Rm Source | Global Value: Temperature Corrected | |
| Temp. for Rm Corr. | MCG External Temperature | |

## Sonic Constants MSS-A.A 55

Last Edited on 05-AUG-2016,17:50

| | | |
|---|---|---|
| Maximum Boundary Contrast | 100.00 | micro-sec/ft |
| Fluid Transit Time | 189.00 | micro-sec/ft |
| Limestone Transit Time | 47.50 | micro-sec/ft |
| Sandstone Transit Time | 55.50 | micro-sec/ft |
| Dolomite Transit Time | 43.50 | micro-sec/ft |
| Sonic used for Porosities | 3-5' Compensated Sonic | |
| Correction for Sonde Skew | Applied | |
| Cycle Stretch Algorithm | Applied | |
| MN3FT | N/A | micro-sec |
| MX3FT | N/A | micro-sec |
| Hunt-Raymer Constant | 83.13 | micro-sec/ft |
| Sonde Mode | Compensated | |
| Hole Type | Open Hole | |

Sonde Parameters

| | Measured | Calibrated |
|---|---|---|
| Offset | N/A | 0.0000 |
| Free Pipe | N/A | N/A |

Peak Amplitude Source N/A

| Waveform | Start Time (micro-sec) | Width (micro-sec) | Pre Gain | Start Gain | Discriminator (mV) |
|---|---|---|---|---|---|
| 3' | N/A | N/A | N/A | N/A | N/A |
| 4' | N/A | N/A | N/A | N/A | N/A |
| 5' | N/A | N/A | N/A | N/A | N/A |
| 6' | N/A | N/A | N/A | N/A | N/A |

Processed Fixed Gate Parameters

Waveform Used For Processing N/A

| Start Time (micro-sec) | End Time (micro-sec) | Discriminator (mV) | N/A |
|---|---|---|---|
| N/A | N/A | N/A | |
| N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A |

Full Waveform Parameters

| | | |
|---|---|---|
| Use 3' Waveform to derive TR | N/A | |
| Use 4' Waveform to derive TR | N/A | |
| Use 5' Waveform to derive TR | N/A | |
| Use 6' Waveform to derive TR | N/A | |
| 3' Waveform Discriminator Level | N/A | mV |
| 4' Waveform Discriminator Level | N/A | mV |
| 5' Waveform Discriminator Level | N/A | mV |
| 6' Waveform Discriminator Level | N/A | mV |
| 3' Waveform Filter | N/A | |
| 4' Waveform Filter | N/A | |
| 5' Waveform Filter | N/A | |
| 6' Waveform Filter | N/A | |
| Semblance Level | N/A | |
| Semblance Window Width | N/A | micro-sec |
| Sonic 1 Despiker | N/A | N/A |
| Sonic 2 Despiker | N/A | N/A |

## Induction Calibration MAI-A.A 111

Base Calibration on 05-AUG-2014,09:34
Field Check on 04-AUG-2016 07:45

Base Calibration

| Test Loop Calibration Channel | Measured Low | Measured High | Calibrated (mmho/m) Low | Calibrated (mmho/m) High |
|---|---|---|---|---|
| 1 | 17.6 | 473.6 | 9.3 | 966.2 |
| 2 | 6.4 | 385.9 | 7.6 | 821.4 |
| 3 | 3.2 | 264.0 | 5.2 | 566.0 |
| 4 | 2.1 | 135.5 | 2.6 | 279.2 |

Array Temperature 23.0 Deg F

Test Loop Calibration Verified 22-MAY-2016,17:59

| Channel | Base Check (mmho/m) Low | Base Check (mmho/m) High | Field Check (mmho/m) Low | Field Check (mmho/m) High |
|---|---|---|---|---|
| 1 | 12.1 | 3873.0 | 10.5 | 3867.1 |
| 2 | 29.8 | 3528.1 | 27.6 | 3522.2 |
| 3 | 29.1 | 3021.3 | 27.1 | 3016.2 |
| 4 | 19.1 | 2058.5 | 17.8 | 2054.6 |
| Deep | 17.7 | 1962.1 | 16.5 | 1958.5 |
| Medium | 43.1 | 3976.4 | 40.4 | 3970.0 |
| Shallow | 44.4 | 5232.7 | 41.2 | 5224.4 |
| Array Temperature | | 65.8 | | 83.0 Deg F |

## Induction Calibration Tolerances MAI-A.A 111

| | | | | | |
|---|---|---|---|---|---|
| Low Conductivity 1 | 17.6 | 13.0 17.0 21.0 | mmho/m | High Conductivity 1 | 473.6 | 430.0 475.0 520.0 | mmho/m |
| Low Conductivity 2 | 6.4 | 4.5 6.0 7.5 | mmho/m | High Conductivity 2 | 385.9 | 345.0 385.0 425.0 | mmho/m |
| Low Conductivity 3 | 3.2 | 1.0 3.5 6.0 | mmho/m | High Conductivity 3 | 264.0 | 240.0 260.0 280.0 | mmho/m |
| Low Conductivity 4 | 2.1 | 0.0 2.0 4.0 | mmho/m | High Conductivity 4 | 135.5 | 120.0 135.0 150.0 | mmho/m |
| | | -110.0 -32.5 45.0 | | | | -2.0 0.0 2.0 | |

| | | | | | |
|---|---|---|---|---|---|
| Background Vx 1 | 0.0 | -35.0 20.0 75.0 | mmho/m | Phase Check Loop 1 | 0.0 -2.0 0.0 2.0 % |
| Background Vx 2 | 0.0 | -60.0 2.5 65.0 | mmho/m | Phase Check Loop 2 | 0.0 -2.0 0.0 2.0 % |
| Background Vx 3 | 0.0 | -50.0 -17.5 15.0 | mmho/m | Phase Check Loop 3 | 0.0 -2.0 0.0 2.0 % |
| Background Vx 4 | 0.0 | | mmho/m | Phase Check Loop 4 | 0.0 -2.0 0.0 2.0 % |

## Induction Constants MAI-A.A 111

Last Edited on 05-AUG-2016,17:50

| | | |
|---|---|---|
| Induction Model | RtAP-WBM | |
| **Borehole Correction Constants** | | |
| Tool Centred | No | |
| Hole Size Source | Density Caliper | |
| Hole Size Constant Value | N/A | inches |
| Stand-off Type | Fins | |
| Stand-off | 0.50 | inches |
| Number of Fins on Stand-off | 8.0000 | |
| Stand-off Fin Angle | 45.00 | degrees |
| Stand-off Fin Width | 0.5000 | inches |
| Rm Source | Global Value: Temperature Corrected | |
| 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 |
| **Symmetrised Receiver Gains** | | |
| Receiver 1 | 1.00 | |
| Receiver 2 | 1.00 | |
| Receiver 3 | 1.00 | |
| Receiver 4 | 1.00 | |
| **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 111

Field Calibration on 24-NOV-2014,10:23

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

## High Resolution Temperature Constants MAI-A.A 111

Last Edited on 26-JUN-2014,15:06

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

## Photo Density Calibration MPD-B 104

Base Calibration on 22-MAY-2016 17:45
Field Check on 04-AUG-2016 07:53

**Density Calibration**

| Base Calibration | Measured Near | Measured Far | Calibrated (sdu) Near | Calibrated (sdu) Far |
|---|---|---|---|---|
| Background | 1148 | 1338 | | |

| | | | | |
|---|---|---|---|---|
| Reference 1 | 49789 | 23977 | 59556 | 30836 |
| Reference 2 | 20127 | 2423 | 24941 | 2541 |

Field Check at Base

| | |
|---|---|
| 1148.2 | 1337.6 |

Field Check

| | |
|---|---|
| 1145.5 | 1333.5 |

PE Calibration

Base Calibration

| | WS | WH | Ratio | Calibrated Ratio |
|---|---|---|---|---|
| Background | 211 | 1025 | | |
| Reference 1 | 20854 | 49612 | 0.425 | 0.371 |
| Reference 2 | 5819 | 19993 | 0.296 | 0.272 |

Field Check at Base

| | |
|---|---|
| 211.2 | 1025.1 |

Field Check

| | |
|---|---|
| 211.0 | 1024.0 |

## Photo Density Calibration Tolerances MPD-B 104

| | | | | | |
|---|---|---|---|---|---|
| Near Density Ratio | 2.56 | -5% 2.52 +5% | Far Density Ratio | 20.85 | -5% 21.00 +5% |
| PE Calibration | 0.121 | 0.089 0.110 0.131 | | | |
| Near Den. Field Check | 1145.5 | -3% 1148.2 +3% | Far Den. Field Check | 1333.5 | -3% 1337.6 +3% |
| PE WS Field Check | 211.0 | -6% 211.2 +6% | PE WH Field Check | 1024.0 | -6% 1025.1 +6% |

## Density Constants MPD-B 104

Last Edited on 05-AUG-2016,17:50

| | | |
|---|---|---|
| Density Source Id | P50557B | |
| Nylon Calibrator Number | DNCE695 | |
| Aluminium Calibrator Number | DACD698 | |
| Density Shoe Profile | 8 inch | |
| Caliper Source for Processing | Density Caliper | |
| PE Correction to Density | Not Applied | |
| Mud Density | 1.14 | gm/cc |
| Mud Density Z/A Multiplier | 1.11 | |
| Mud Filtrate Density | 1.00 | gm/cc |
| Dry Hole Mud Filtrate Density | 1.00 | gm/cc |
| DNCT | 0.00 | gm/cc |
| CRCT | 0.00 | gm/cc |
| Density Z/A Correction | Hybrid | |

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

## Caliper Calibration MPD-B 104

Base Calibration on 22-MAY-2016 17:26
Field Calibration on 04-AUG-2016 07:48

Base Calibration

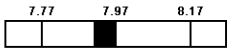
| Reading No | Measured | Calibrator Size (in) |
|---|---|---|
| 1 | 13598 | 3.99 |
| 2 | 22432 | 5.98 |
| 3 | 31029 | 7.97 |
| 4 | 39246 | 9.86 |
| 5 | 48339 | 11.92 |
| 6 | N/A | N/A |

Field Calibration

| Measured Caliper (in) | Actual Caliper (in) |
|---|---|
| 7.91 | 7.97 |

Caliper Calibration Tolerances MPD-B 104

Short Arm Field Cal. 7.91 in




# DOWNHOLE EQUIPMENT

C:\Minimus 15.03.5939\Logs\Shakespeare Edwards #1-21\Shakespeare Edwards #1-21_002.dta

Cablehead, 11 pin
CBH-CA 176 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma
MCG-C 123 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity
MMR-C.A 247 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-B 104 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

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

Compact Sonic
MSS-A.A 55 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction
MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 63.70 ft Weight: 480.6 lb

| | |
|---|---|
| 56.02 ft | GRGC - MCG Gamma Ray |
| 53.11 ft | CGXT - MCG External Temperature |
| 46.76 ft | MBTC - MMR Caliper |
| 45.76 ft | MINV - MMR MicroLog Inverse |
| 45.76 ft | MNRL - MMR MicroLog Normal |
| 40.97 ft | NPRL - Limestone Neutron Por. |
| 33.73 ft | AVOL - Annular Volume |
| 33.73 ft | HVOL - Hole Volume |
| 33.73 ft | CLDC - Density Caliper |
| 31.80 ft | DPRL - Limestone Density Por. |
| 31.80 ft | DEN - Compensated Density |
| 31.80 ft | DCOR - Density Correction |
| 31.74 ft | PDPE - PE |
| 26.24 ft | FEFE - Shallow FE |
| 16.96 ft | TR11 - 4' Transit Time |
| 16.46 ft | TR21 - 3' Transit Time |
| 15.95 ft | TR12 - 6' Transit Time |
| 15.46 ft | TR22 - 5' Transit Time |
| 12.96 ft | SPRL - Wyllie Lime. Sonic Por. |
| 12.96 ft | DT35 - 3-5' Compensated Sonic |
| 3.34 ft | R40O - Array Ind. One Res 40 |
| 3.34 ft | R60O - Array Ind. One Res 60 |
| 3.34 ft | CTAO - Array Ind. One Cond Ct |
| 3.34 ft | RTAO - Array Ind. One Res Rt |
| 0.23 ft | SPCG - Spontaneous Potential |
| Tool Zero | (0.13ft from bottom) |
| -0.13 ft | SMTU - DST Uphole Tension |

All measurements relative to tool zero.

| | |
|---|---|
| COMPANY | SHAKESPEARE OIL CO., INC. |
| WELL | EDWARDS #1-21 |
| FIELD | PENCE WEST |
| PROVINCE/COUNTY | SCOTT |
| COUNTRY/STATE | U.S.A. / KANSAS |

| | | | | | |
|---|---|---|---|---|---|
| Elevation Kelly Bushing | 3140.00 | feet | First Reading | 4879.00 | feet |
| Elevation Drill Floor | 3138.00 | feet | Depth Driller | 4915.00 | feet |
| Elevation Ground Level | 3132.00 | feet | Depth Logger | 4911.00 | feet |

Weatherford®

# CALIPER LOG