# ARRAY INDUCTION
# SHALLOW FOCUSED
# ELECTRIC LOG

Weatherford®

| | |
|---|---|
| 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 |

40 Years of Wireline 1970 2010

| SEC | TWP | RGE | Other Services |
|---|---|---|---|
| 17 | 9S | 94W | MPD-MDN |
| | | | CALIPER |

API Number 05-077-10159-00
Permit Number

Permanent Datum GL, Elevation 6786 feet
Log Measured From KB
Drilling Measured From KB @ 21 FEET

| Elevations: | feet |
|---|---|
| KB | 6807.00 |
| DF | 6806.00 |
| GL | 6786.00 |

| | | | | |
|---|---|---|---|---|
| Date | 6-NOV-2011 | | | |
| Run Number | ONE | | | |
| Depth Driller | 7180.00 | feet | | |
| Depth Logger | 7194.00 | feet | | |
| First Reading | 7191.00 | feet | | |
| Last Reading | 200.00 | 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 MAXIMUM 15 DEGREES.

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

OPERATORS: B. FRISBIE, A. ALLRED.

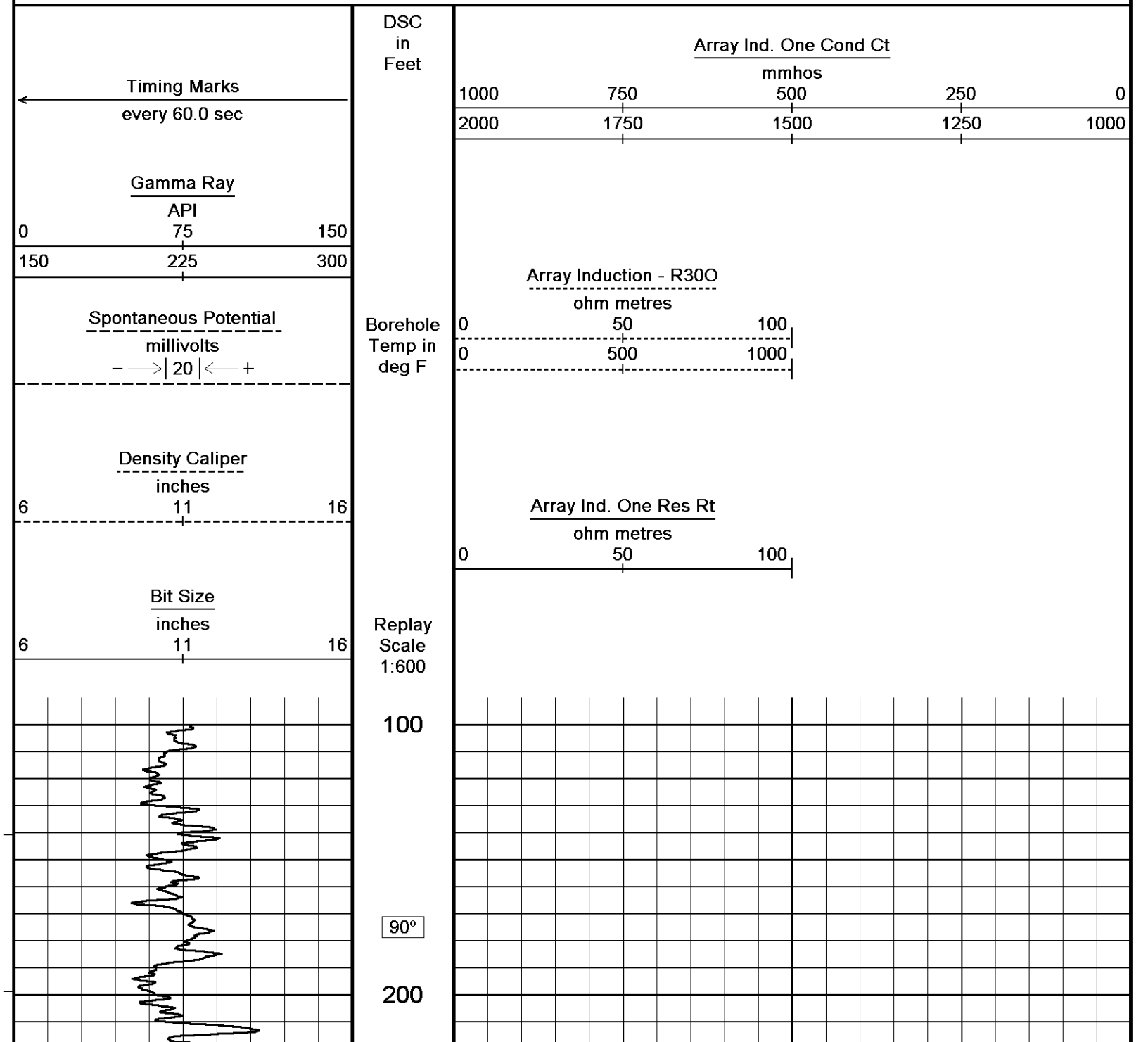
SERVICE ORDER: #3524916.

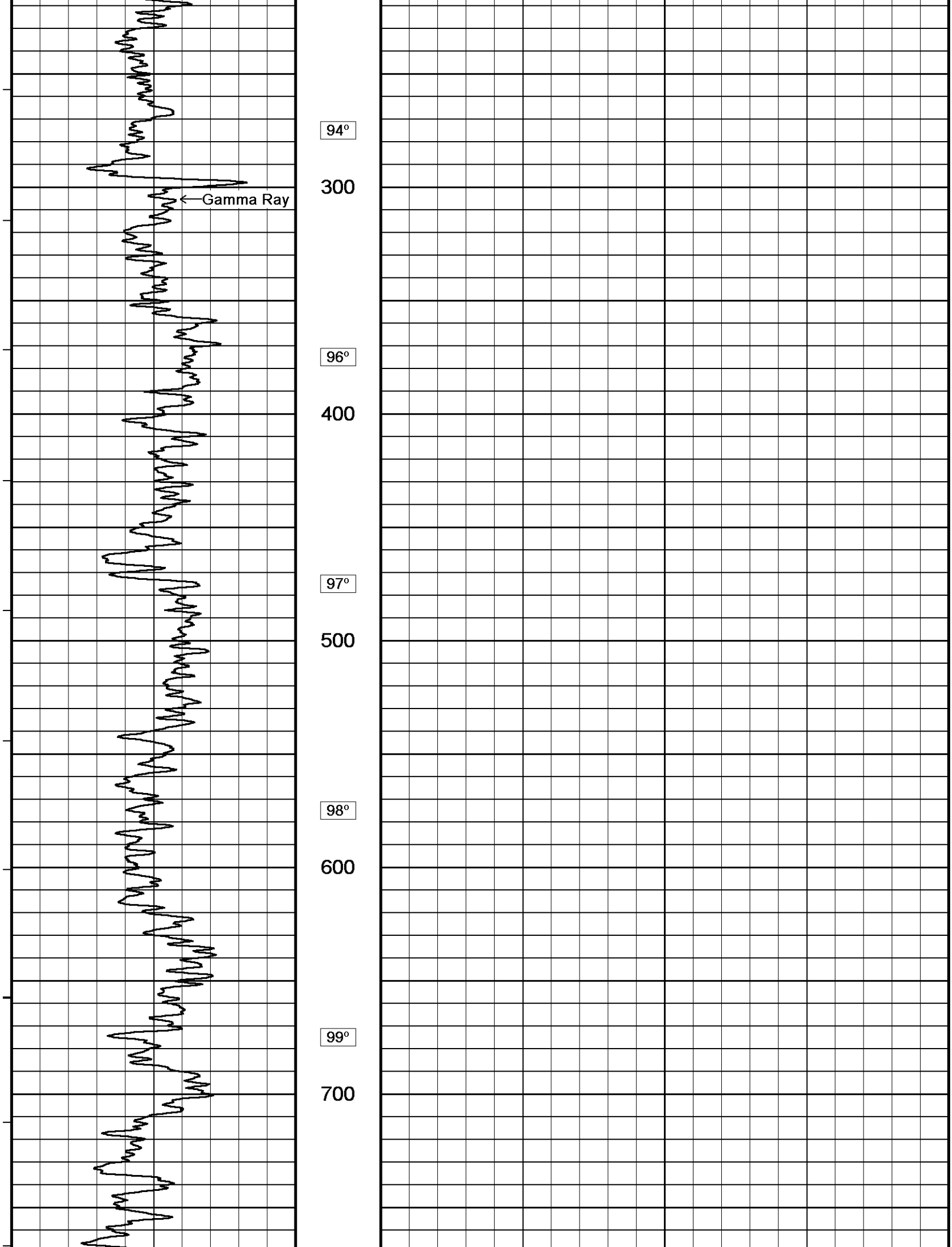
RIG: PRECISION #706.

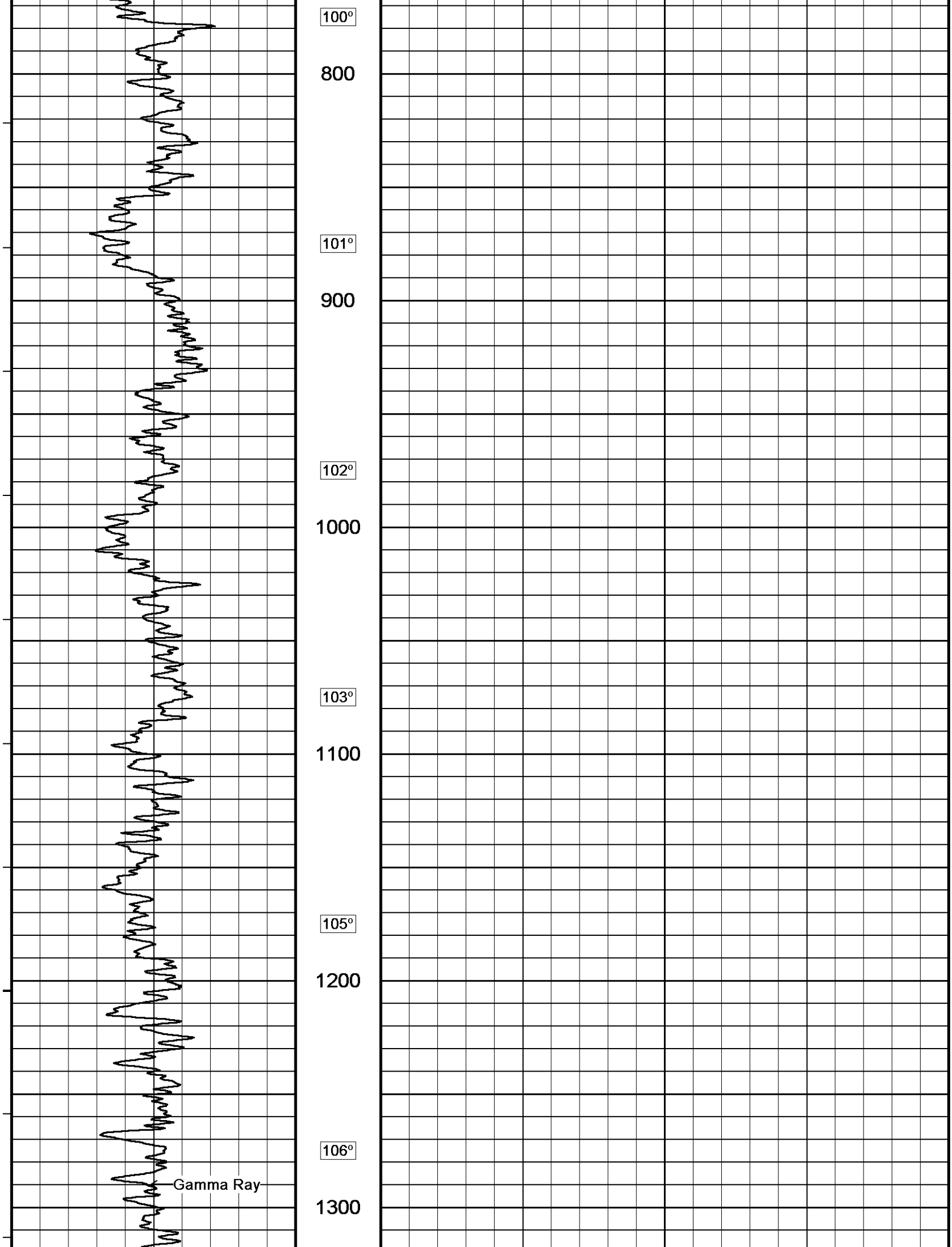


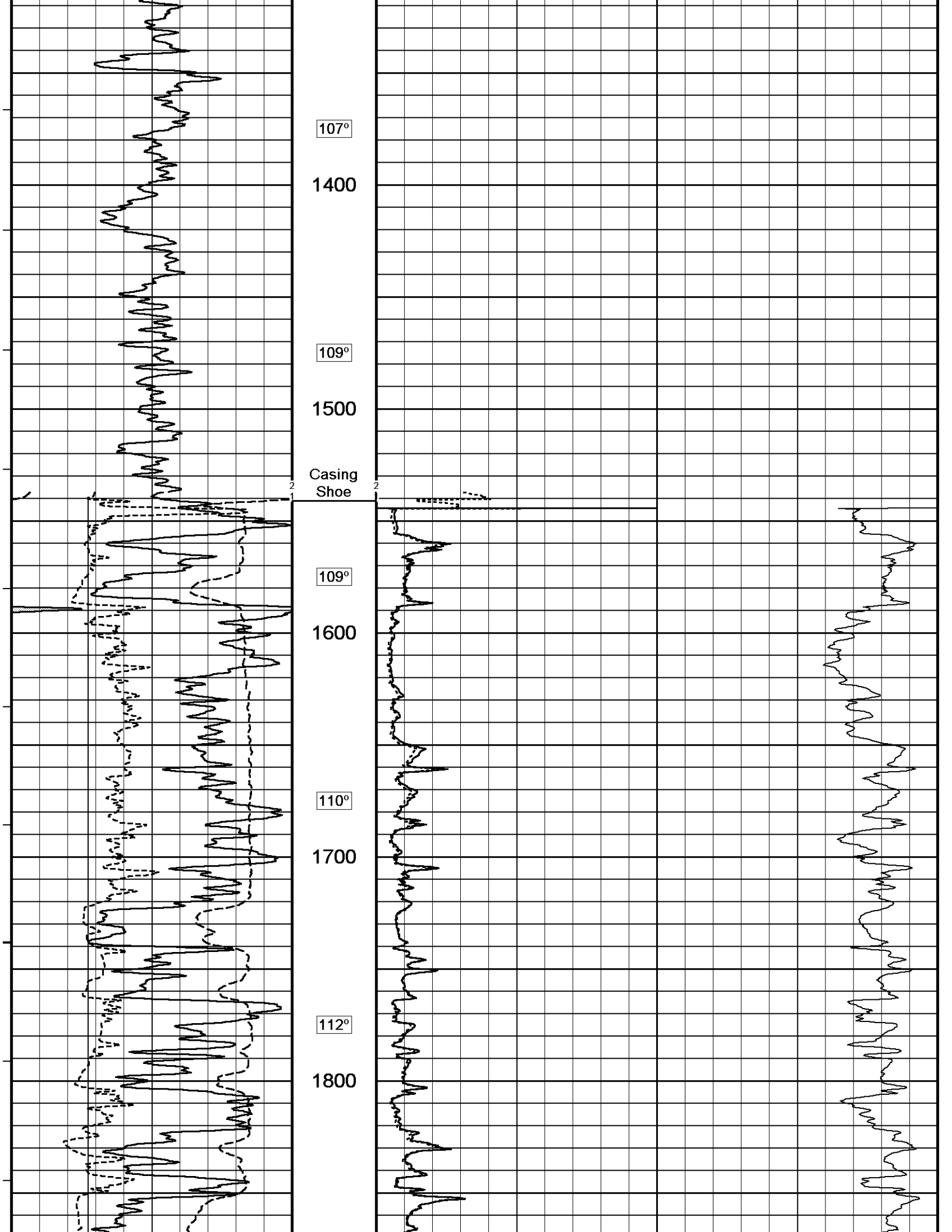
## 2 INCH MAIN LOG

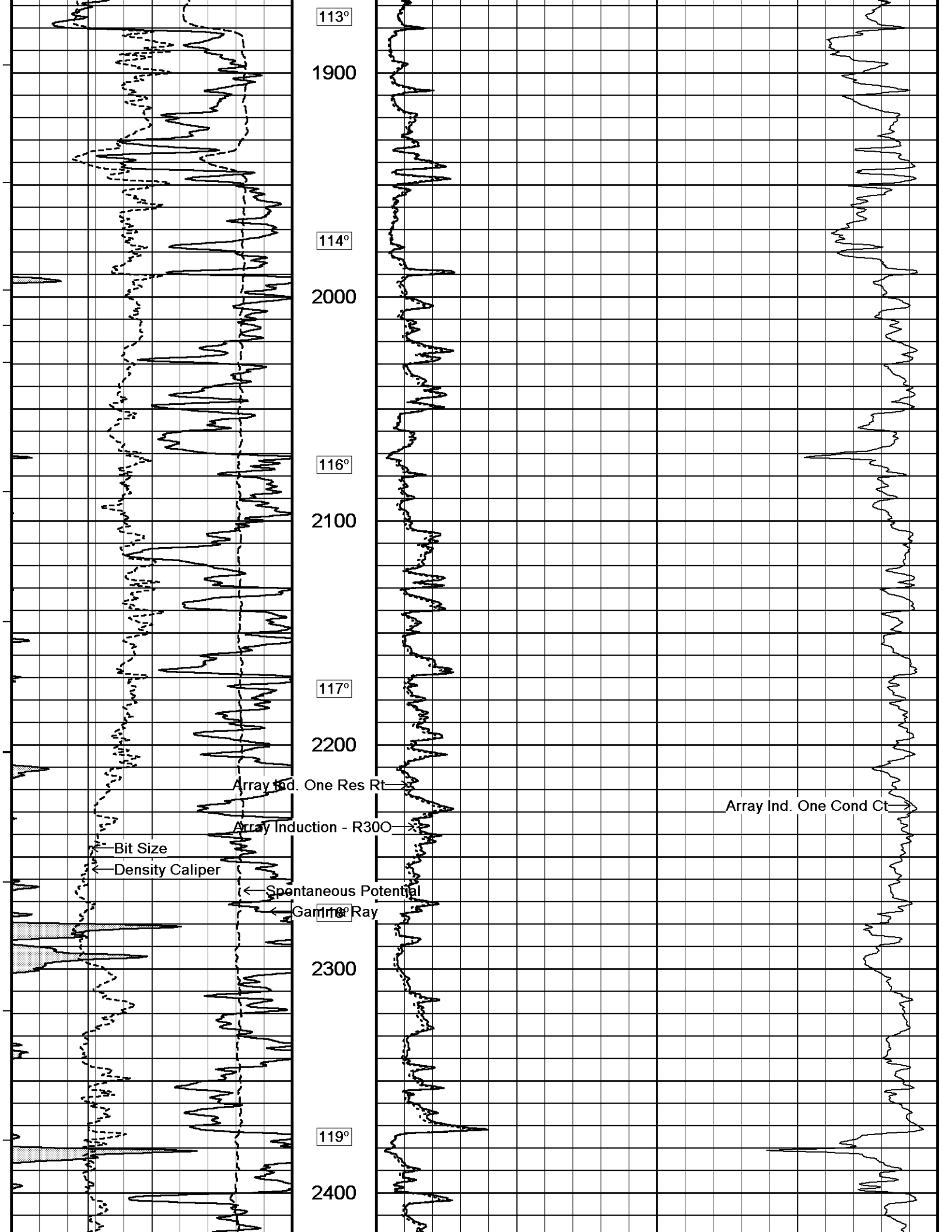
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 06-NOV-2011 08:55
Filename: C:\Logs\Laramie\Laramie Hawxhurst 17-05B\Laramie Hawxhurst 17-05B_MAIN.dta
Recorded on 06-NOV-2011 06:29
System Versions: Logged with 12.02.4401 Processed with 12.02.4401 Plotted with 12.02.4401

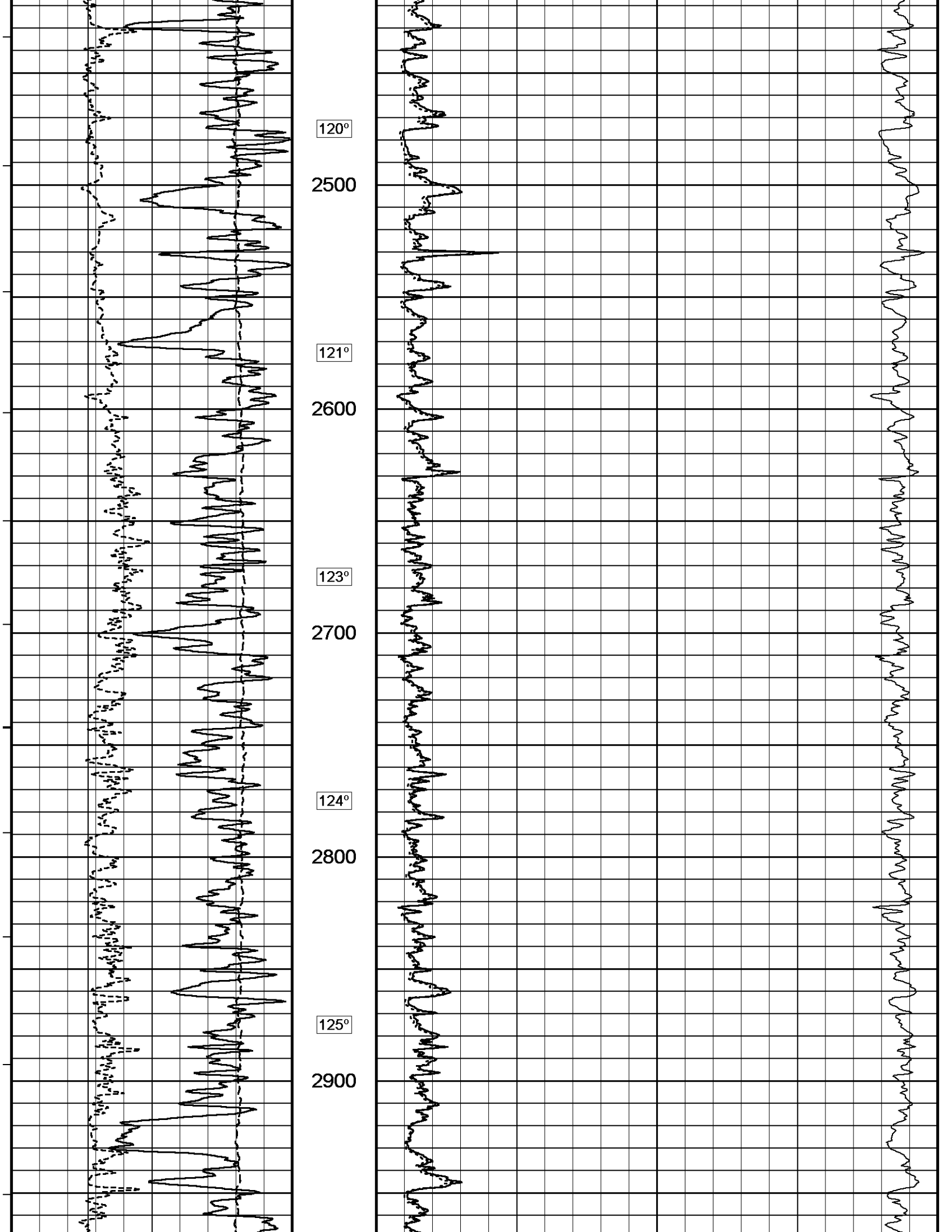


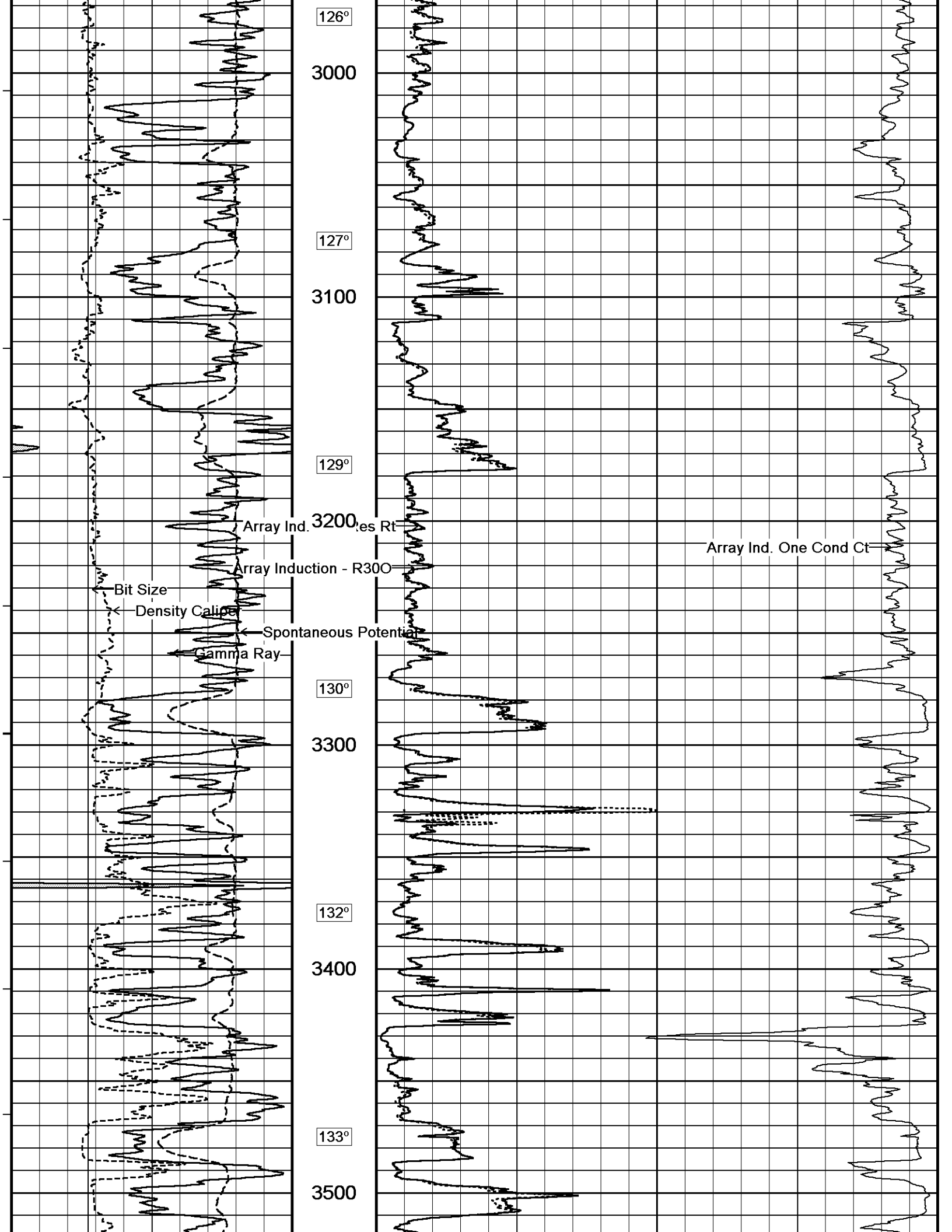

94°
300
Gamma Ray
96°
400
97°
500
98°
600
99°
700

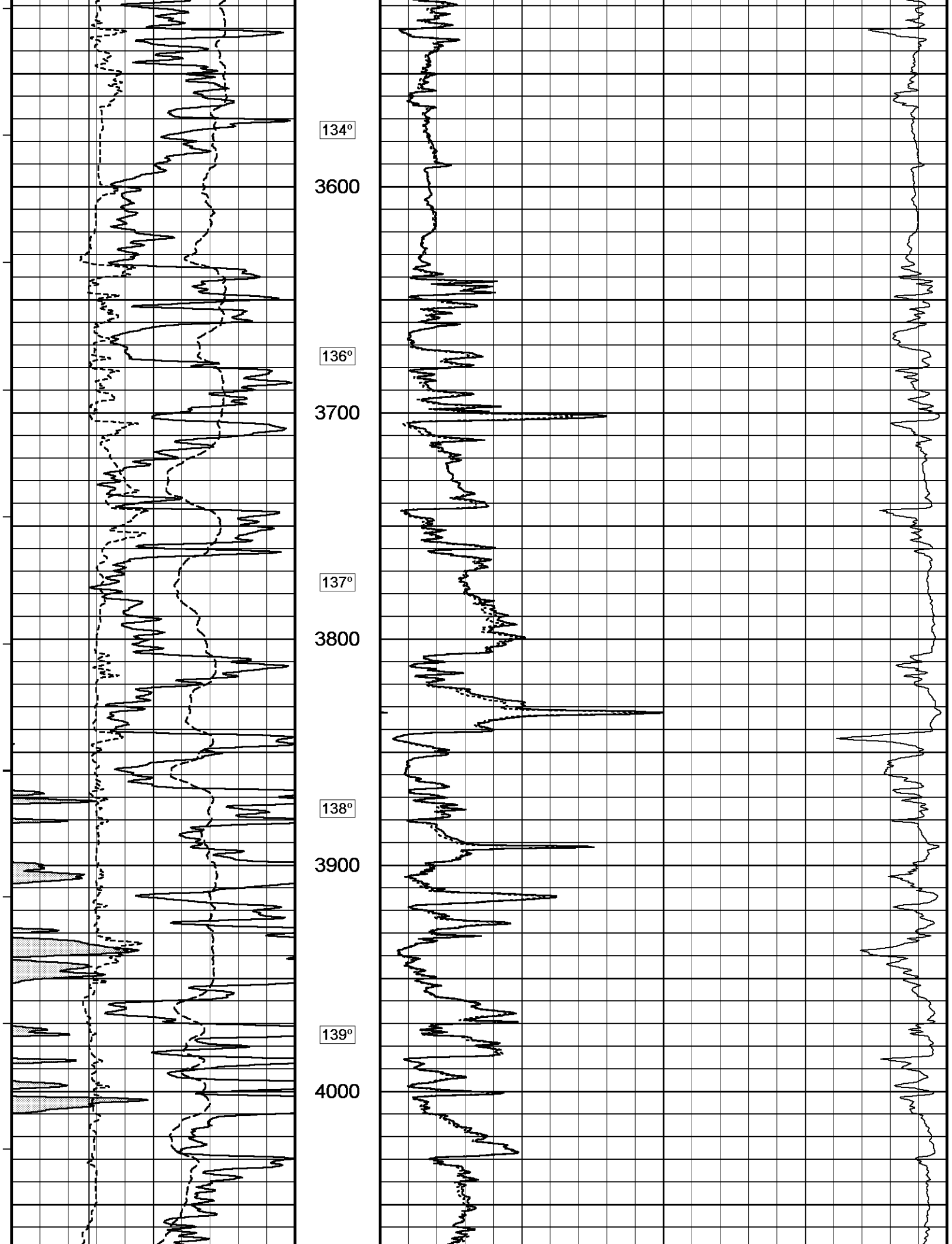

100°
800
101°
900
102°
1000
103°
1100
105°
1200
106°
Gamma Ray
1300

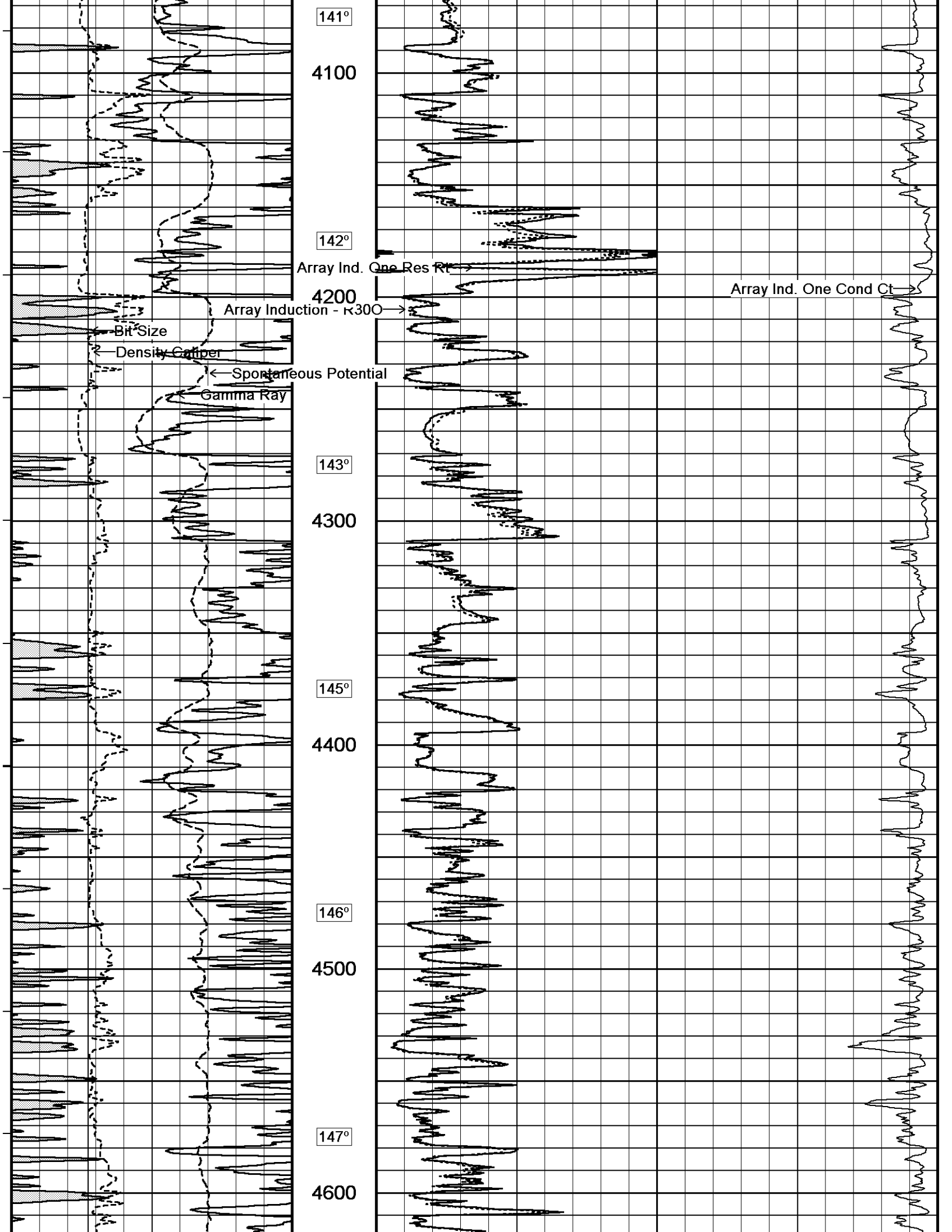

107°
1400
109°
1500
Casing
Shoe
109°
1600
110°
1700
112°
1800

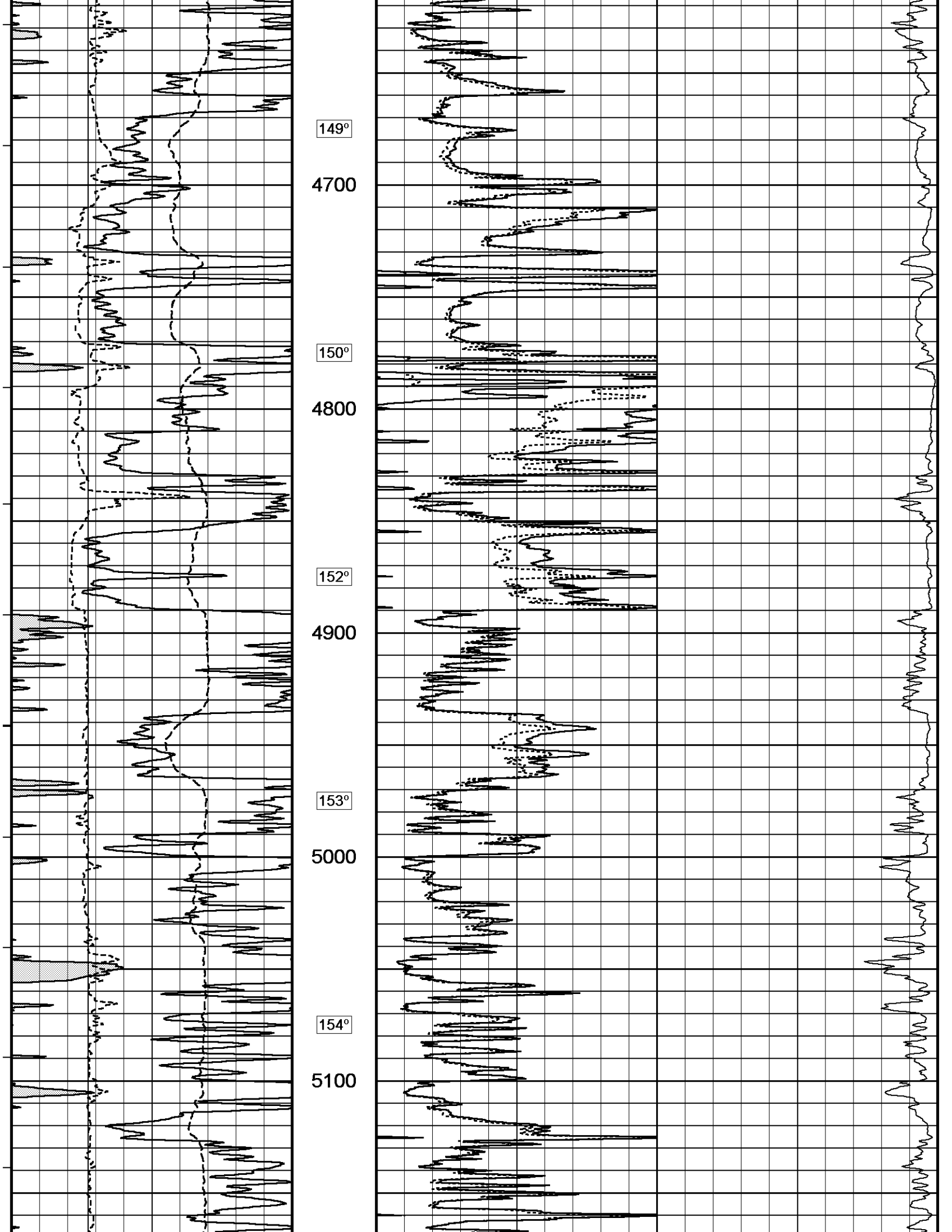

113°
1900
114°
2000
116°
2100
117°
2200
Array Ind. One Res Rt
Array Induction - R30O
Array Ind. One Cond Ct
Bit Size
Density Caliper
Spontaneous Potential
Gamma Ray
2300
119°
2400

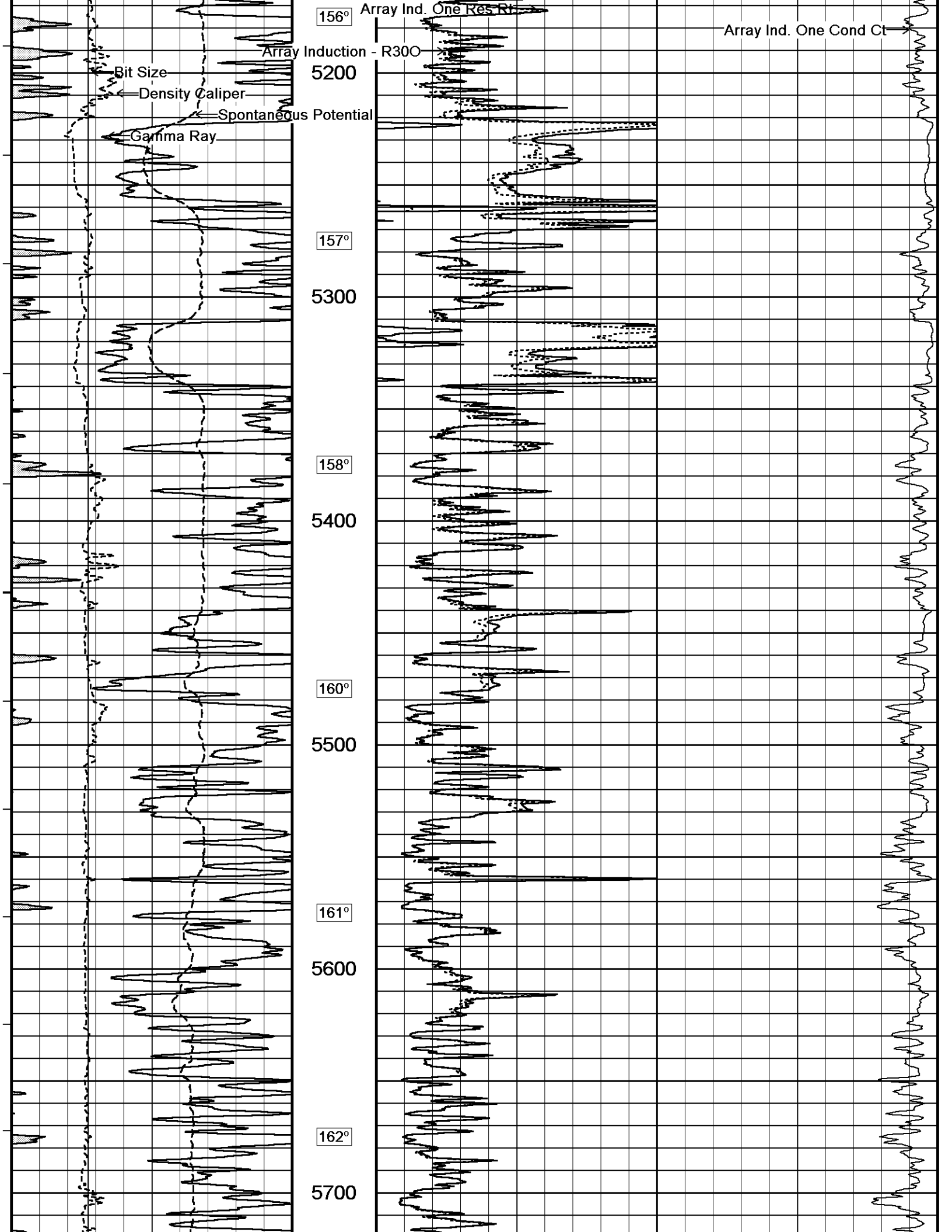

120°
2500
121°
2600
123°
2700
124°
2800
125°
2900

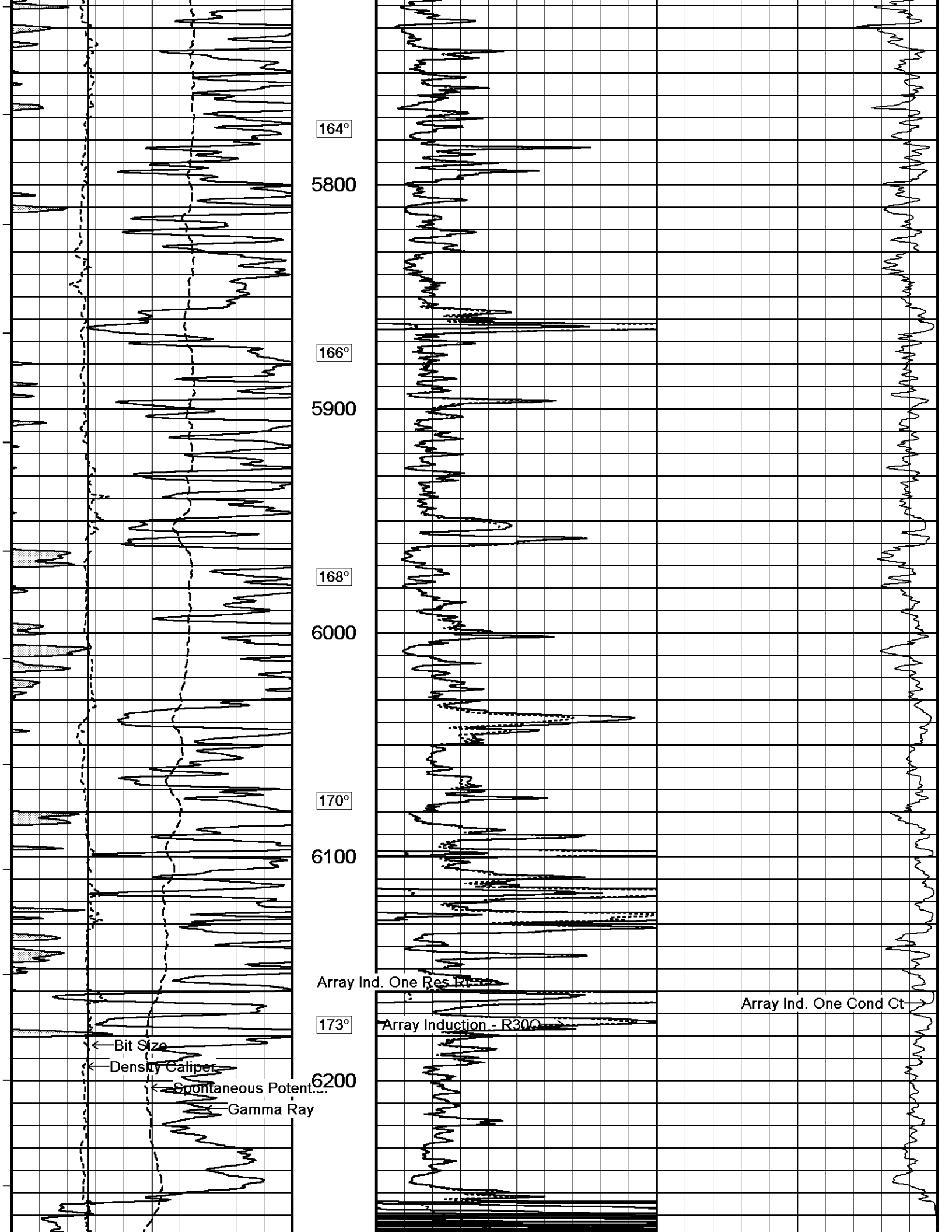

126°
3000
127°
3100
129°
3200
Array Ind.
Array Induction - R30
Bit Size
Density Caliper
Spontaneous Potential
Gamma Ray
130°
3300
132°
3400
133°
3500
Array Ind. One Cond Ct

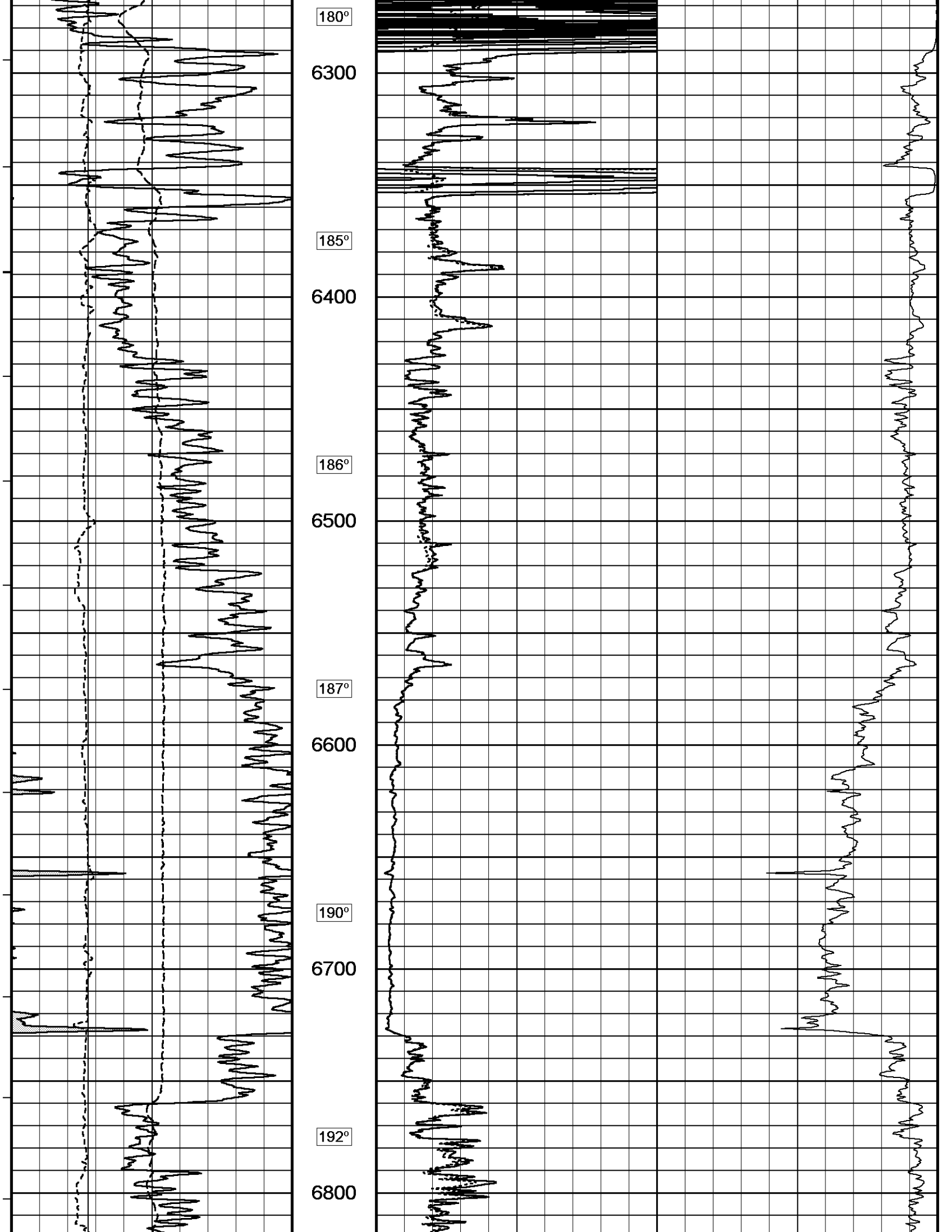

134°
3600
136°
3700
137°
3800
138°
3900
139°
4000

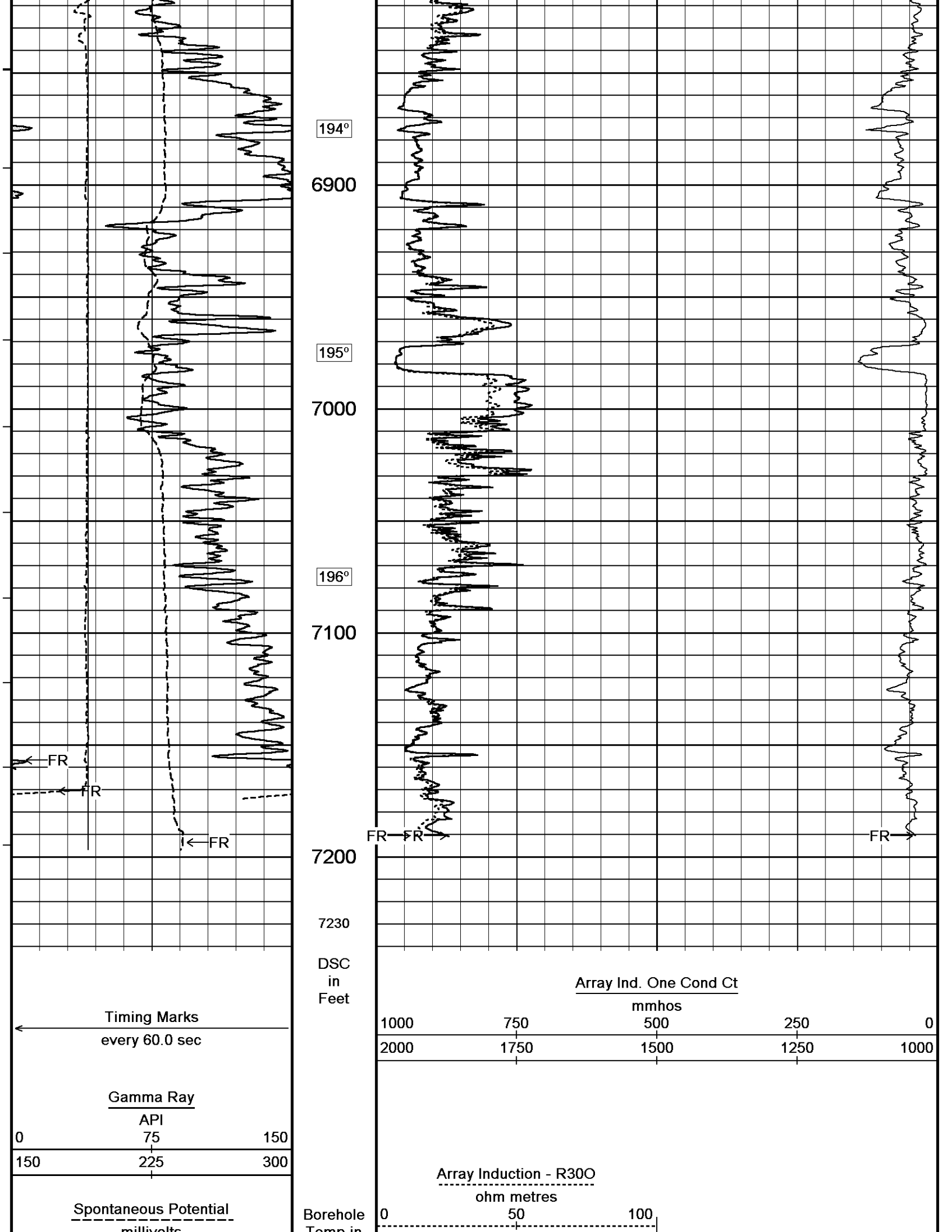

141°
4100
142°
Array Ind. One Res Rt
4200
Array Ind. One Cond Ct
Array Induction - R30
Bit Size
Density Caliper
Spontaneous Potential
Gamma Ray
143°
4300
145°
4400
146°
4500
147°
4600


149°
4700
150°
4800
152°
4900
153°
5000
154°
5100


Array Ind. One Res Rt
Array Ind. One Cond Ct
Array Induction - R30
Bit Size
Density Caliper
Spontaneous Potential
Gamma Ray
156°
5200
157°
5300
158°
5400
160°
5500
161°
5600
162°
5700


164°
5800
166°
5900
168°
6000
170°
6100
173°
6200
Array Ind. One Res Rt
Array Ind. One Cond Ct
Array Induction - R30
Bit Size
Density Caliper
Spontaneous Potent...
Gamma Ray


180°
6300
185°
6400
186°
6500
187°
6600
190°
6700
192°
6800


194°
6900
195°
7000
196°
7100
7200
7230
FR
FR
FR
FR
FR
FR
DSC
in
Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Spontaneous Potential
millivolts
Array Ind. One Cond Ct
mmhos
1000
750
500
250
0
2000
1750
1500
1250
1000
Array Induction - R30
ohm metres
Borehole
0
50
100

millivolts
– → | 20 | ← +

Temp in deg F

0 500 1000

Density Caliper
inches
6 11 16

Array Ind. One Res Rt
ohm metres
0 50 100

Bit Size
inches
6 11 16

Replay Scale 1:600

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## 2 INCH MAIN LOG

## 5 INCH MAIN LOG

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 06-NOV-2011 08:55
Filename: C:\Logs\Laramie\Laramie Hawxhurst 17-05B\Laramie Hawxhurst 17-05B_MAIN.dta
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System Versions: Logged with 12.02.4401 Processed with 12.02.4401 Plotted with 12.02.4401

DSC in Feet

Timing Marks
every 60.0 sec

Shallow FE (Phase Corr.)
ohm metres
0.20 2000
1 10 100 1000

DST Uphole Tension
pounds
10000 5000 0
0 -5000 -10000

Array Induction - R30O
ohm metres
0.20 2000
1 10 100 1000

Gamma Ray
API
0 75 150

Array Induction - R40O
ohm metres
0.20 2000
1 10 100 1000

Borehole Temp in deg F

Spontaneous Potential
millivolts
– → | 20 | ← +

Array Induction - R60O
ohm metres
0.20 2000
1 10 100 1000

Density Caliper
inches
6 11 16

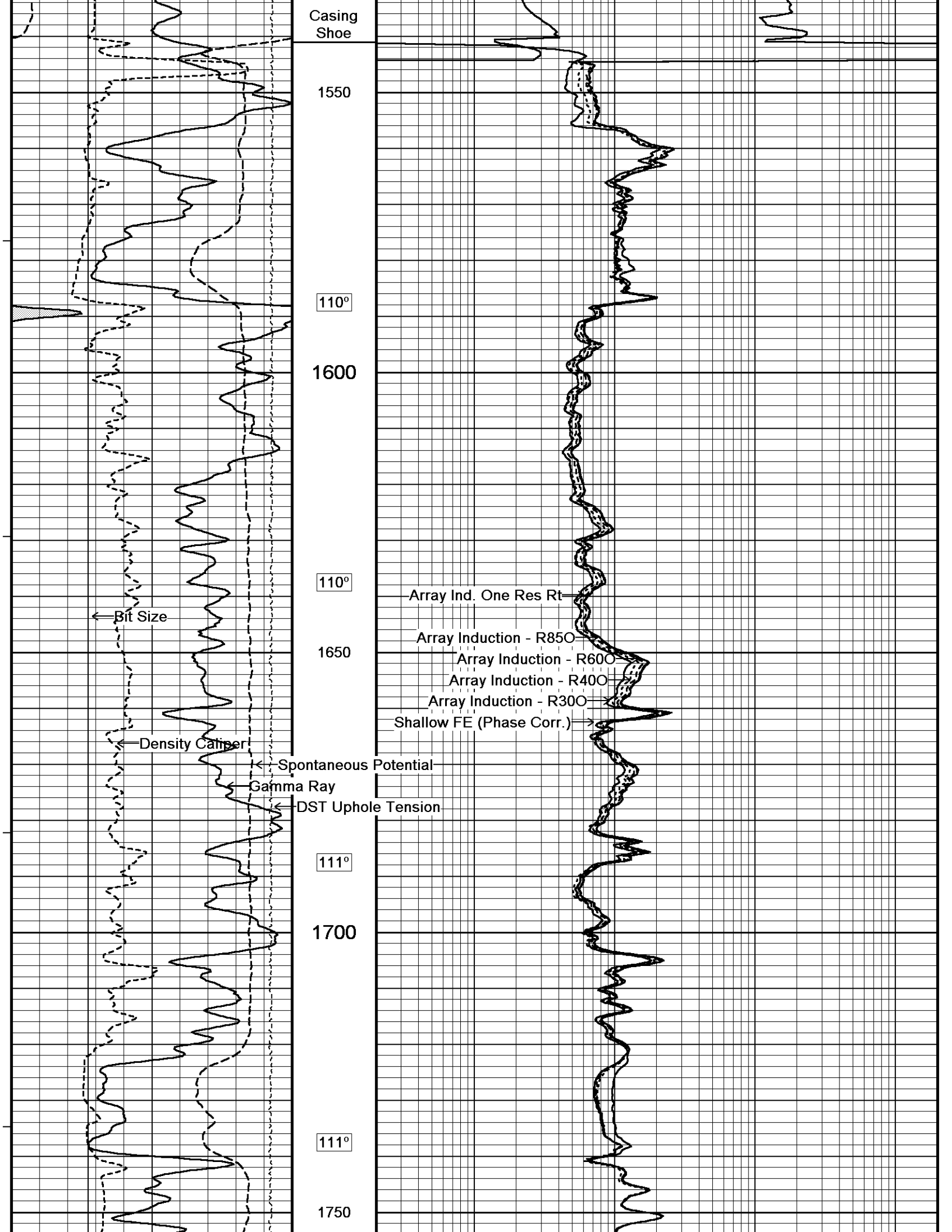
Array Induction - R85O
ohm metres
0.20 2000
1 10 100 1000

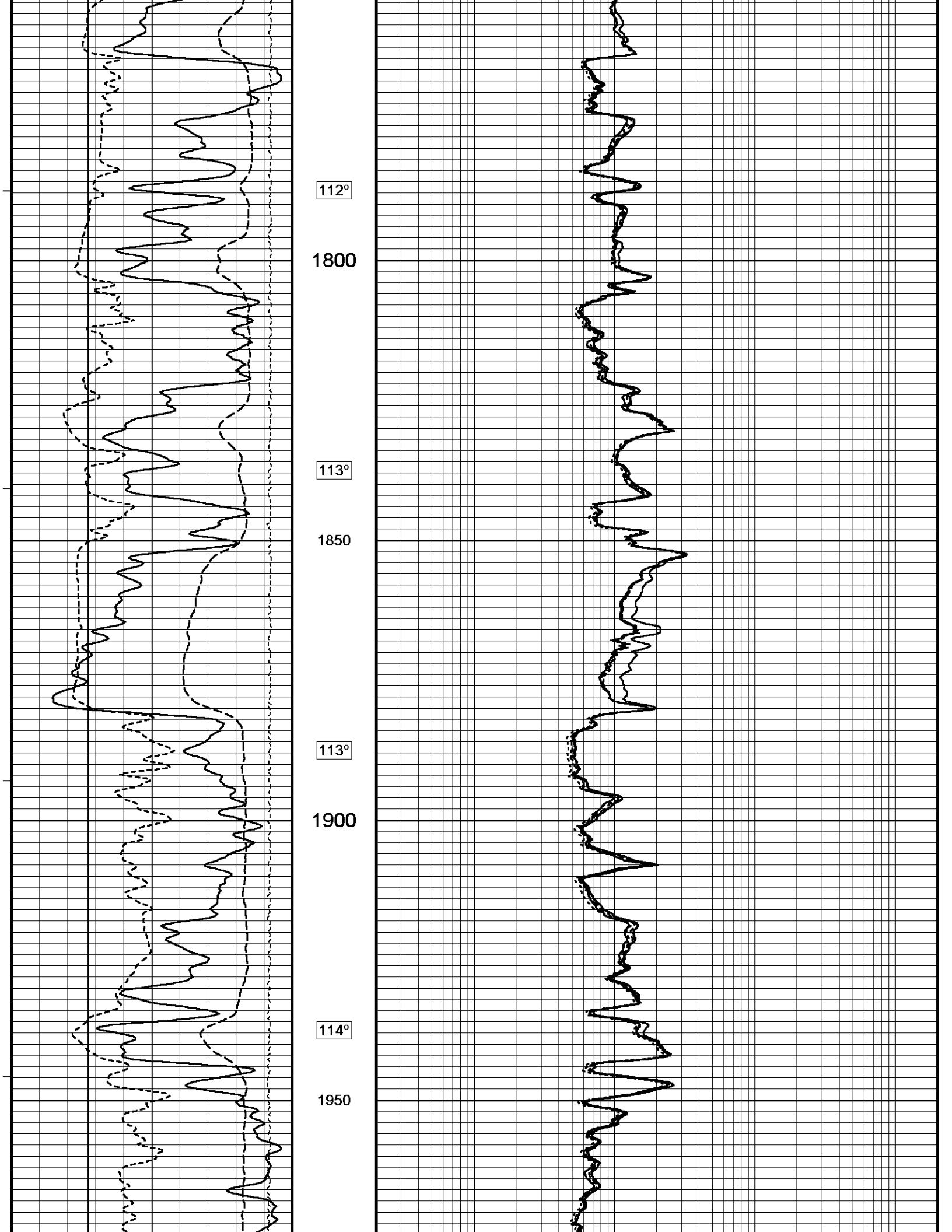
Bit Size
inches
6 11 16

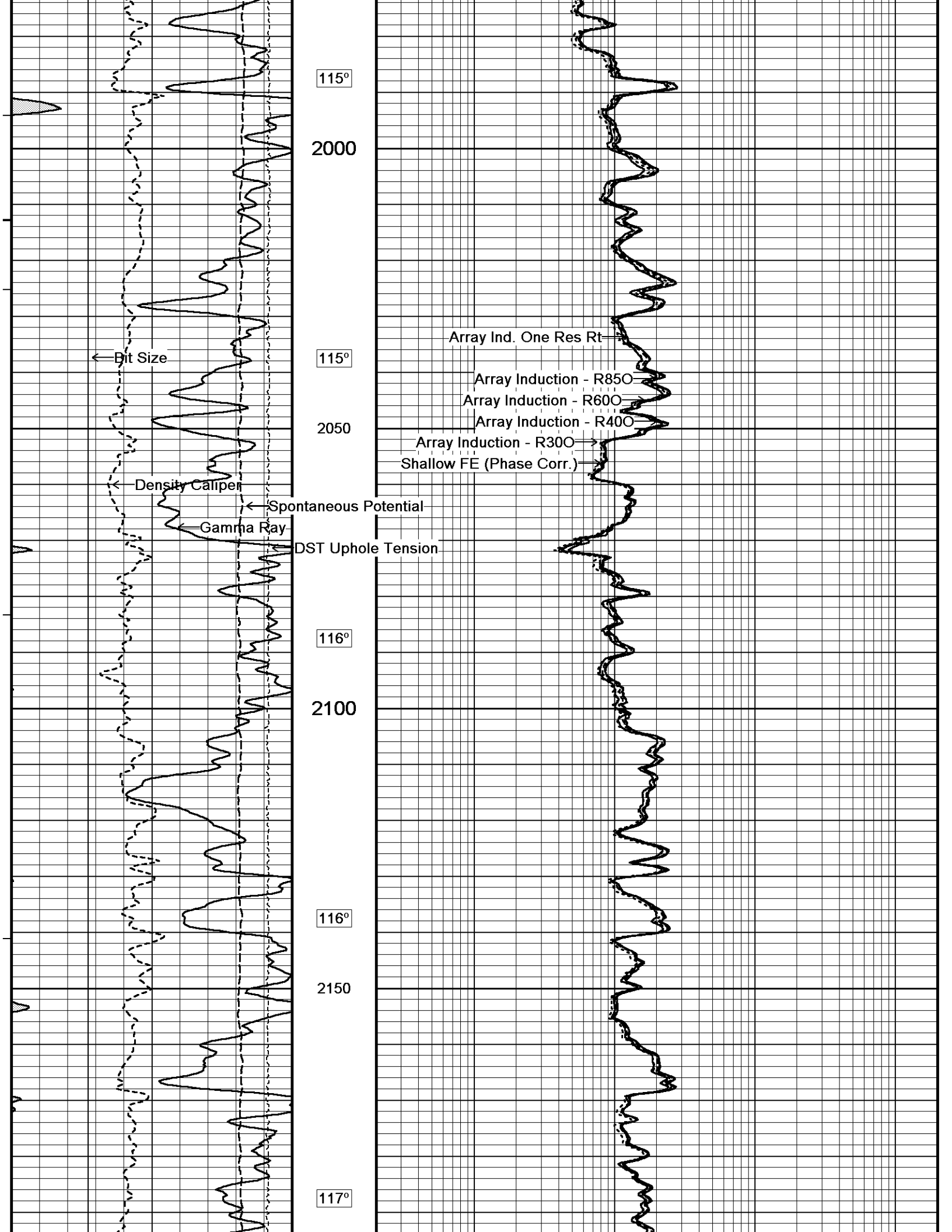
Array Ind. One Res Rt
ohm metres
0.20 2000
1 10 100 1000

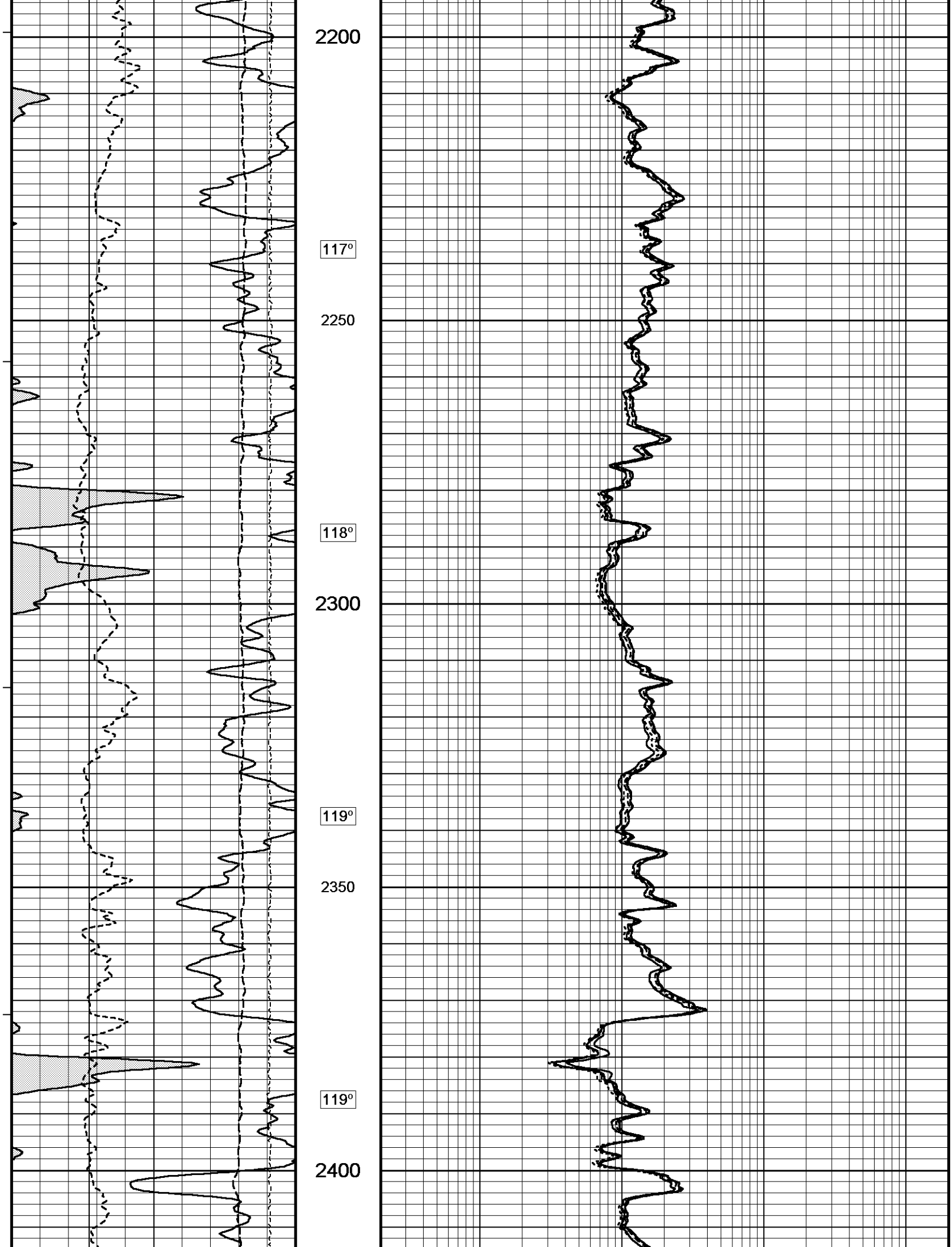
Replay Scale 1:240

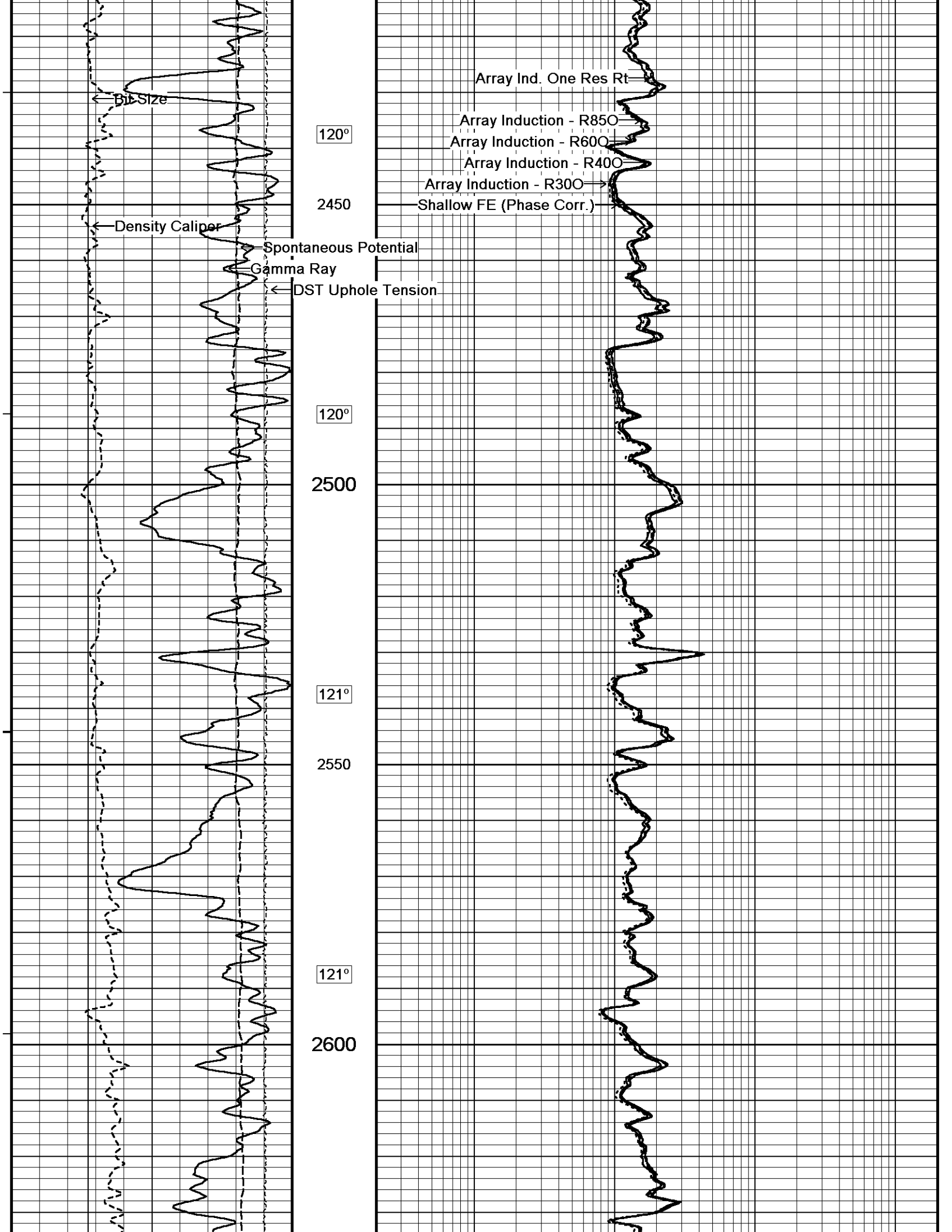
1528

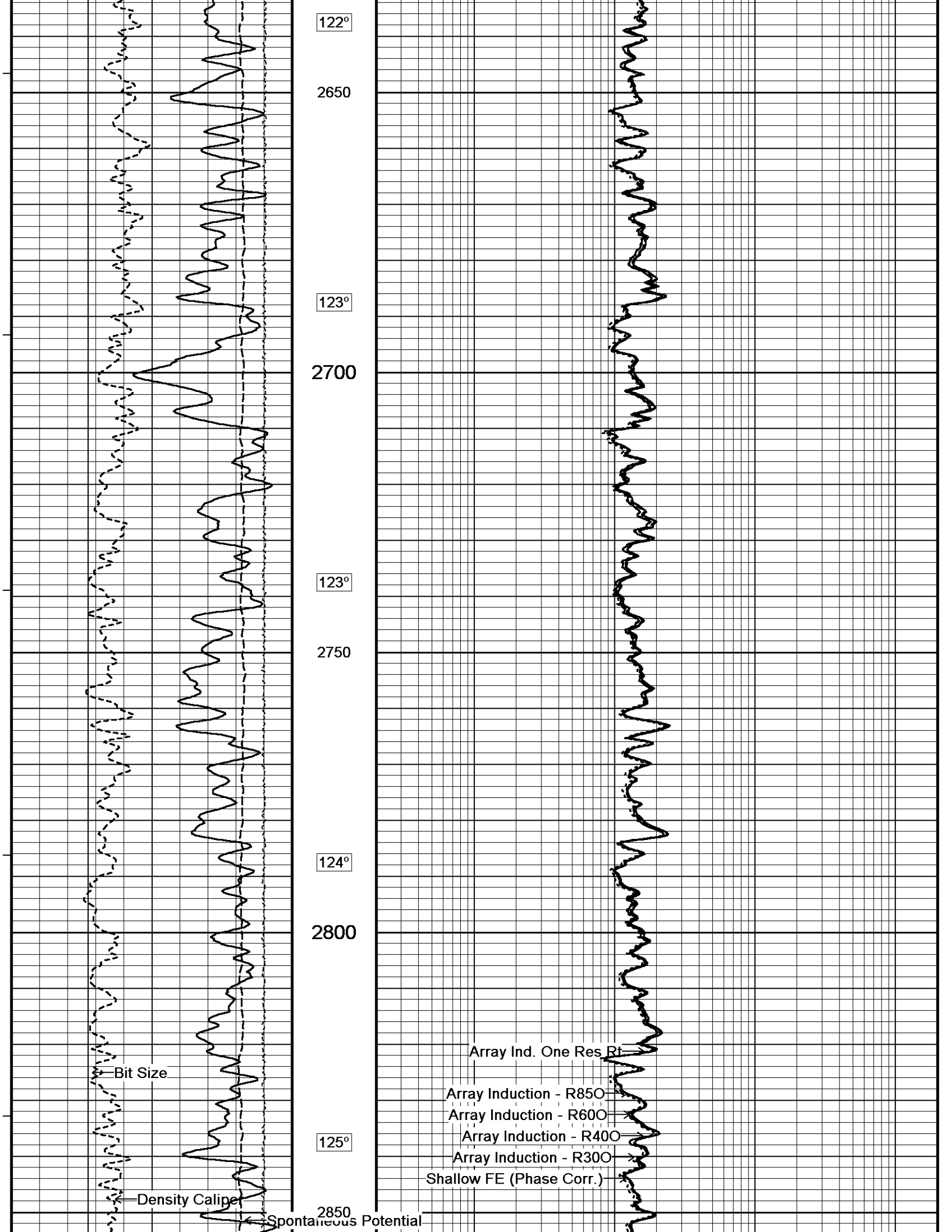

Casing
Shoe
1550
110°
1600
110°
Bit Size
1650
Density Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
111°
1700
111°
1750
Array Ind. One Res Rt
Array Induction - R85O
Array Induction - R60O
Array Induction - R40O
Array Induction - R30O
Shallow FE (Phase Corr.)

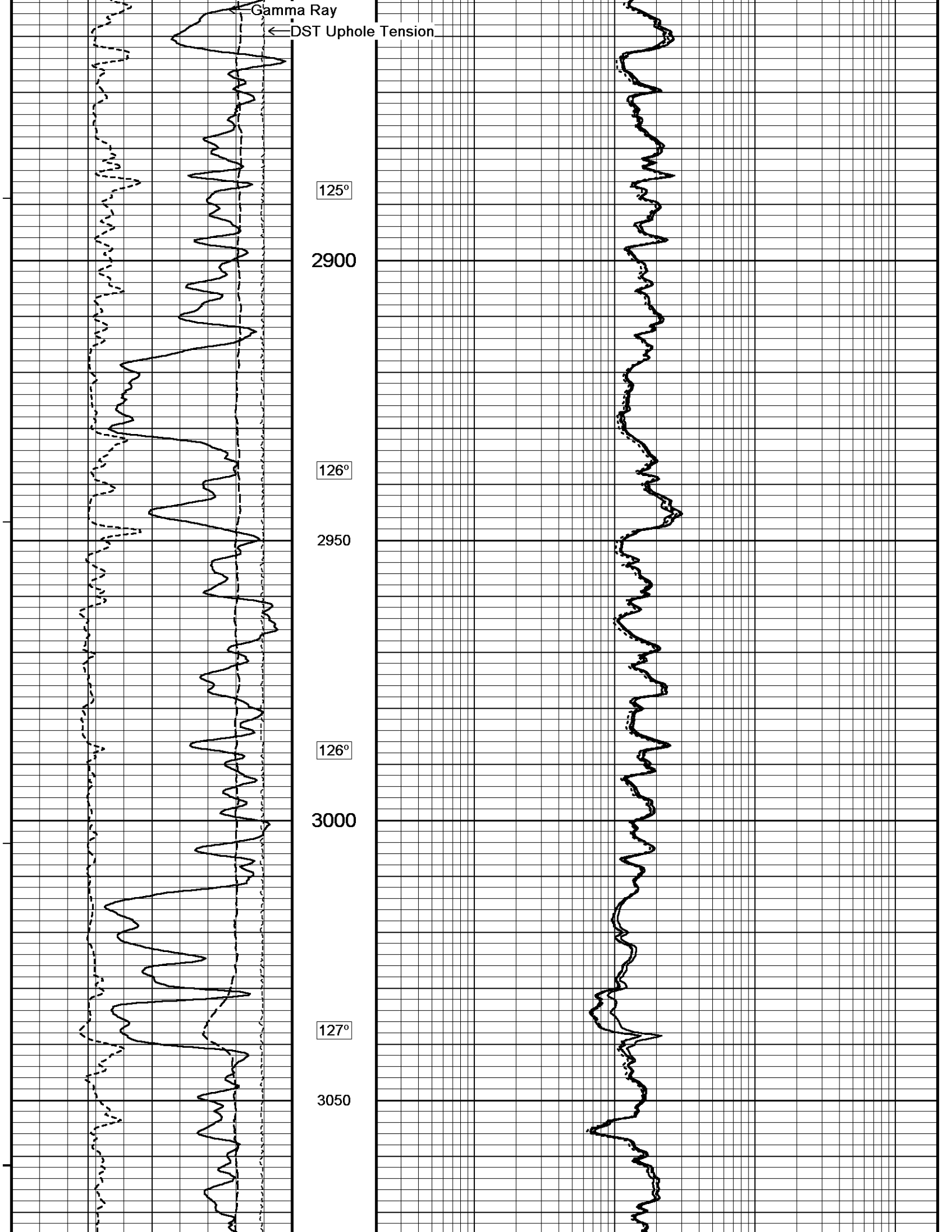

112°
1800
113°
1850
113°
1900
114°
1950

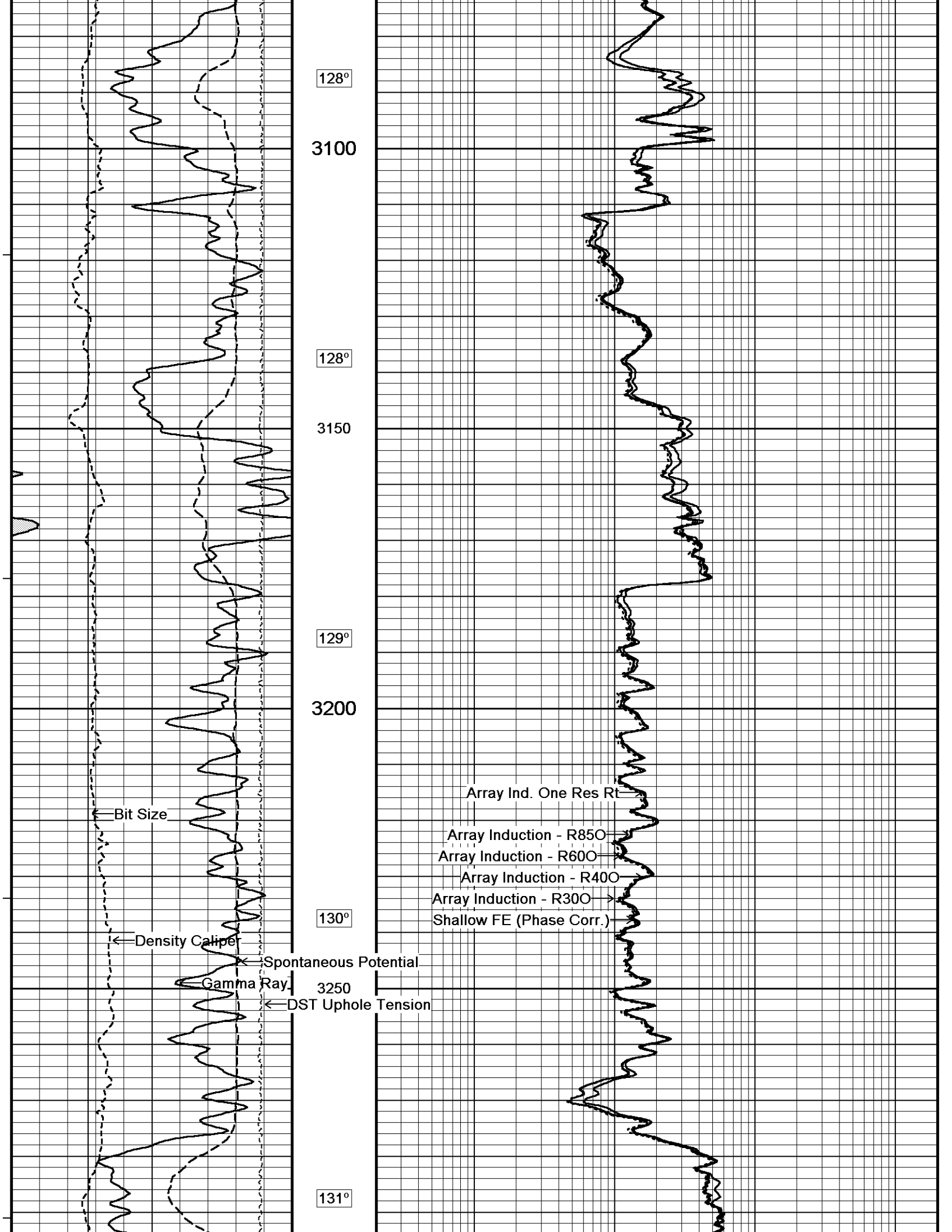

115°
2000
115°
Array Ind. One Res Rt
Bit Size
Array Induction - R85O
Array Induction - R60O
Array Induction - R40O
2050
Array Induction - R30O
Shallow FE (Phase Corr.)
Density Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
116°
2100
116°
2150
117°

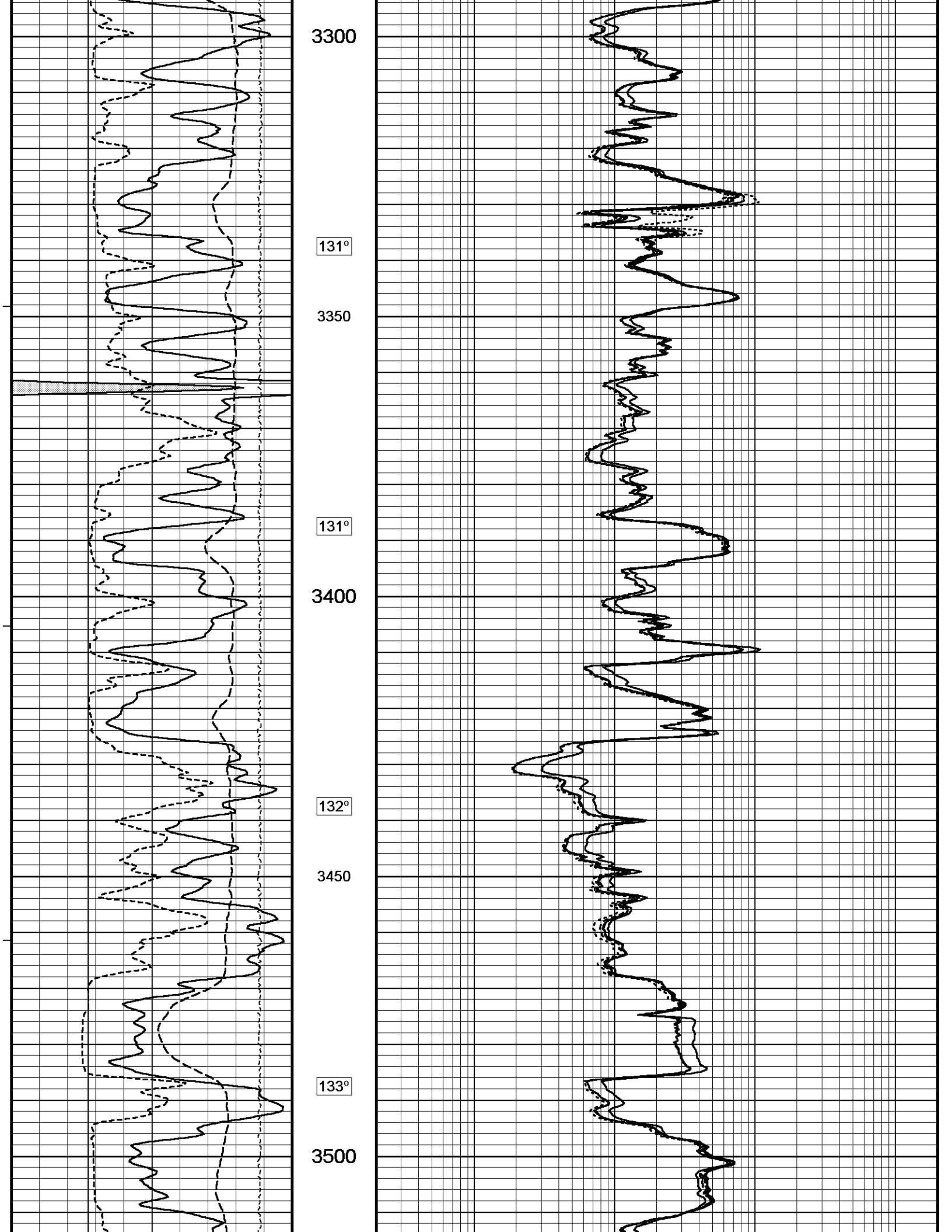

2200
117°
2250
118°
2300
119°
2350
119°
2400

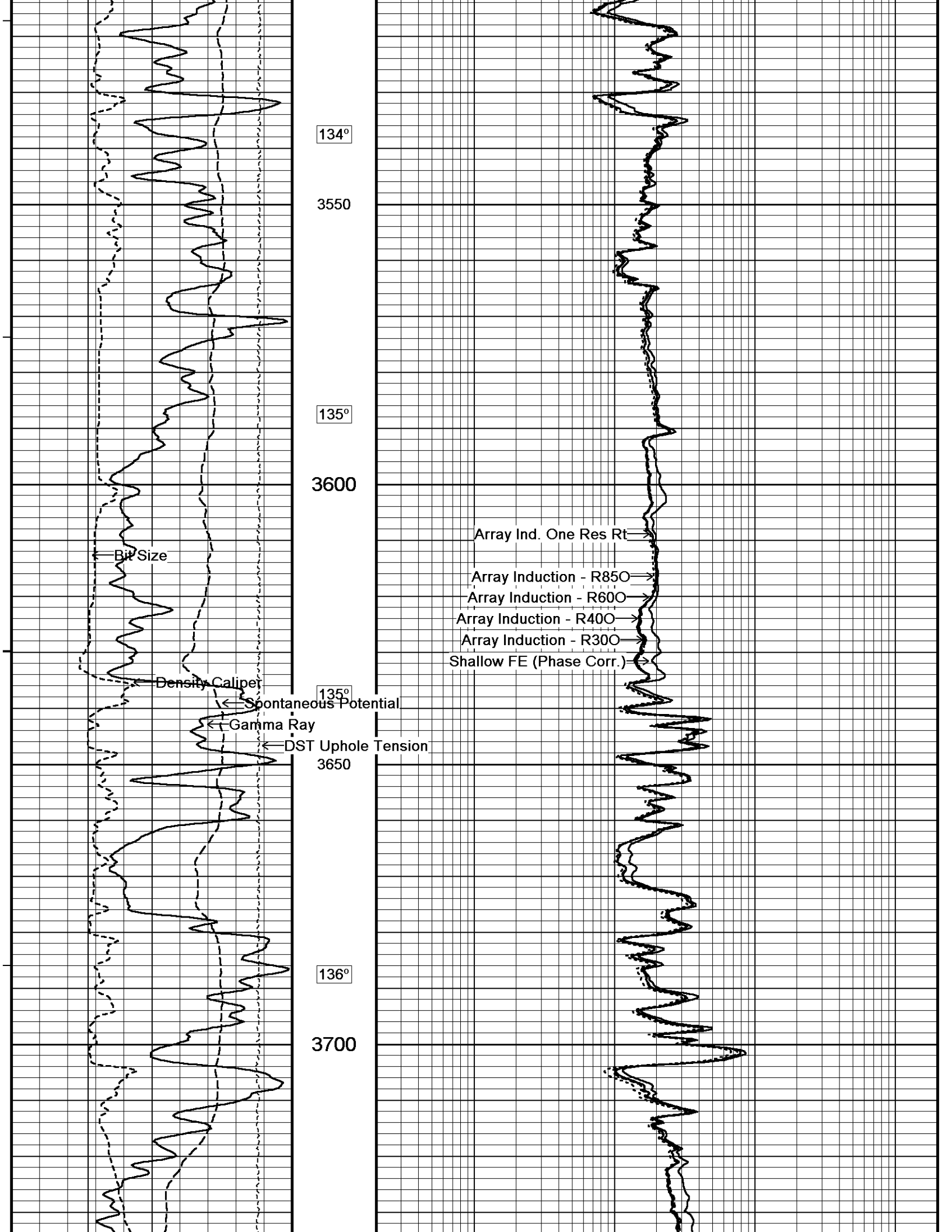

Array Ind. One Res Rt
Bit Size
Array Induction - R85O
120°
Array Induction - R60O
Array Induction - R40O
Array Induction - R30O
2450
Shallow FE (Phase Corr.)
Density Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
120°
2500
121°
2550
121°
2600

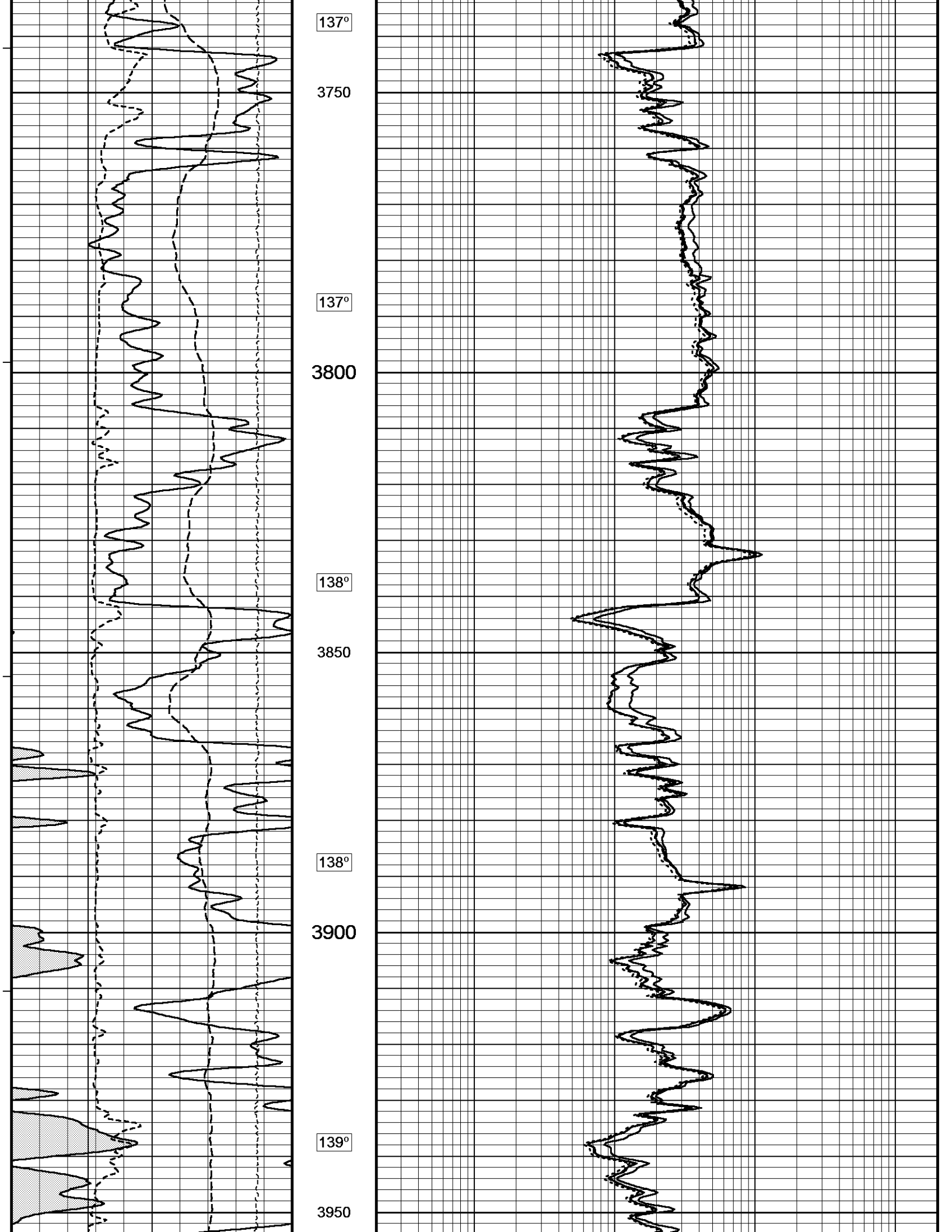

122°
2650
123°
2700
123°
2750
124°
2800
125°
2850
Bit Size
Density Caliper
Spontaneous Potential
Array Ind. One Res Rt
Array Induction - R85O
Array Induction - R60O
Array Induction - R40O
Array Induction - R30O
Shallow FE (Phase Corr.)

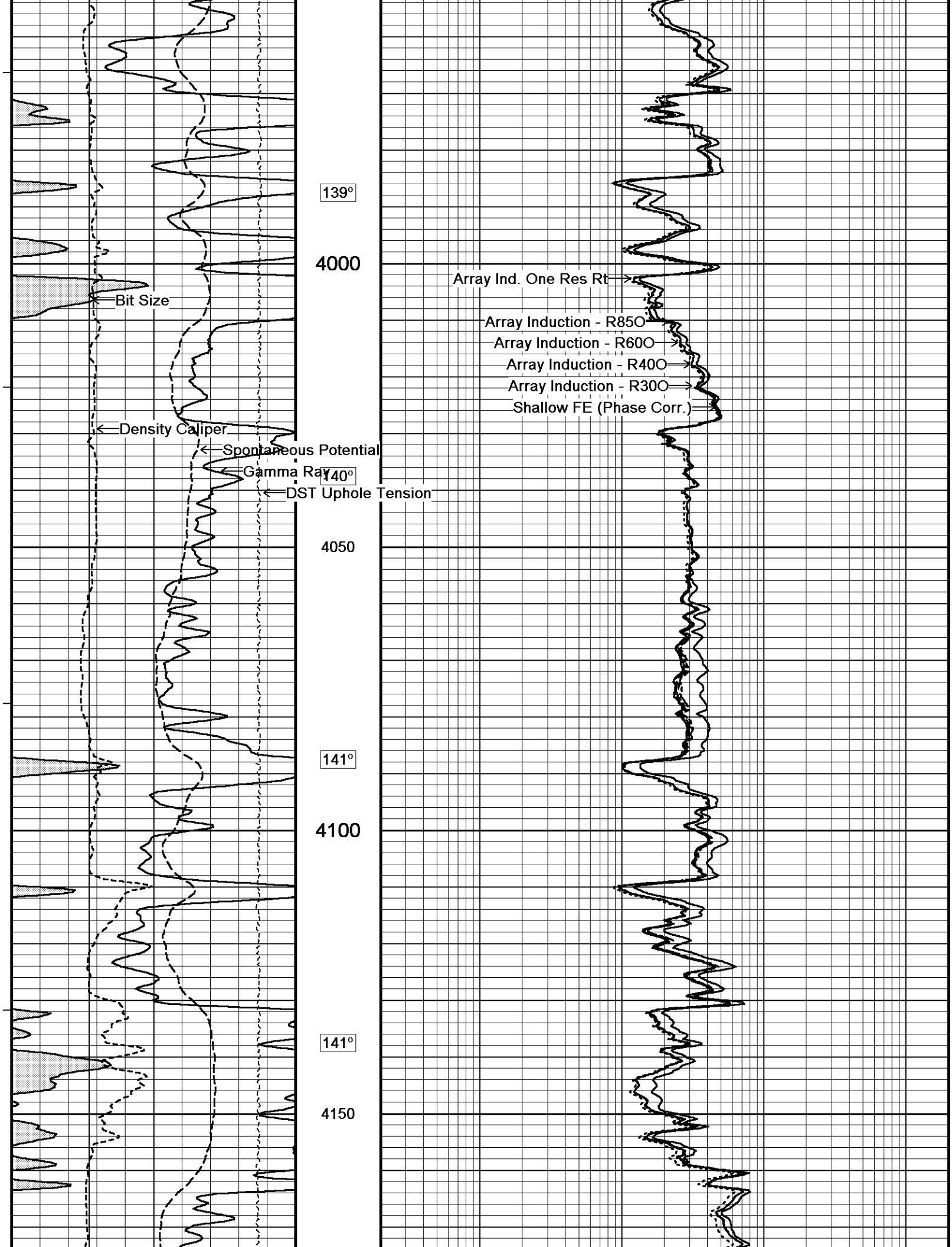

Gamma Ray
DST Uphole Tension
125°
2900
126°
2950
126°
3000
127°
3050

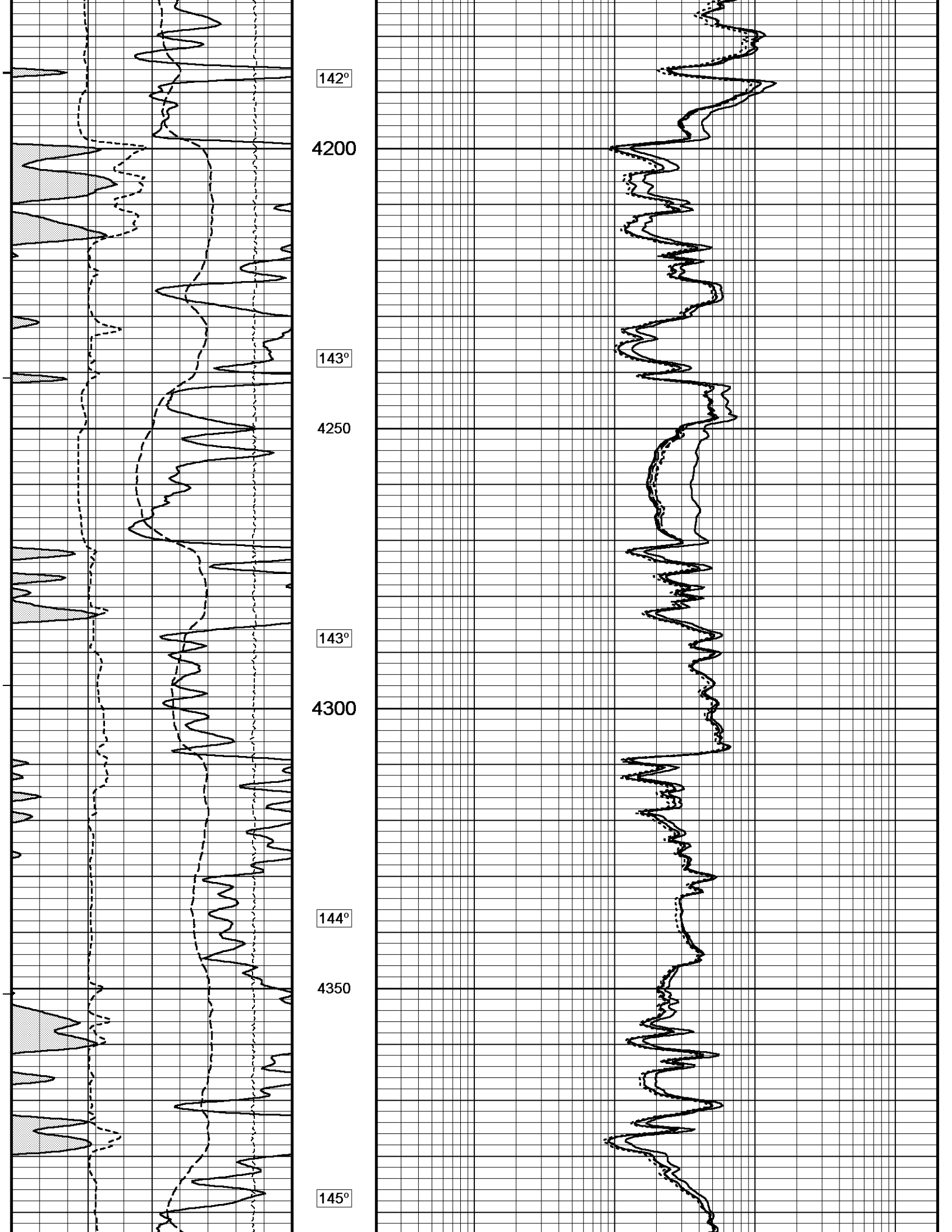

128°
3100
128°
3150
129°
3200
130°
3250
131°
Bit Size
Density Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
Array Ind. One Res Rt
Array Induction - R85O
Array Induction - R60O
Array Induction - R40O
Array Induction - R30O
Shallow FE (Phase Corr.)

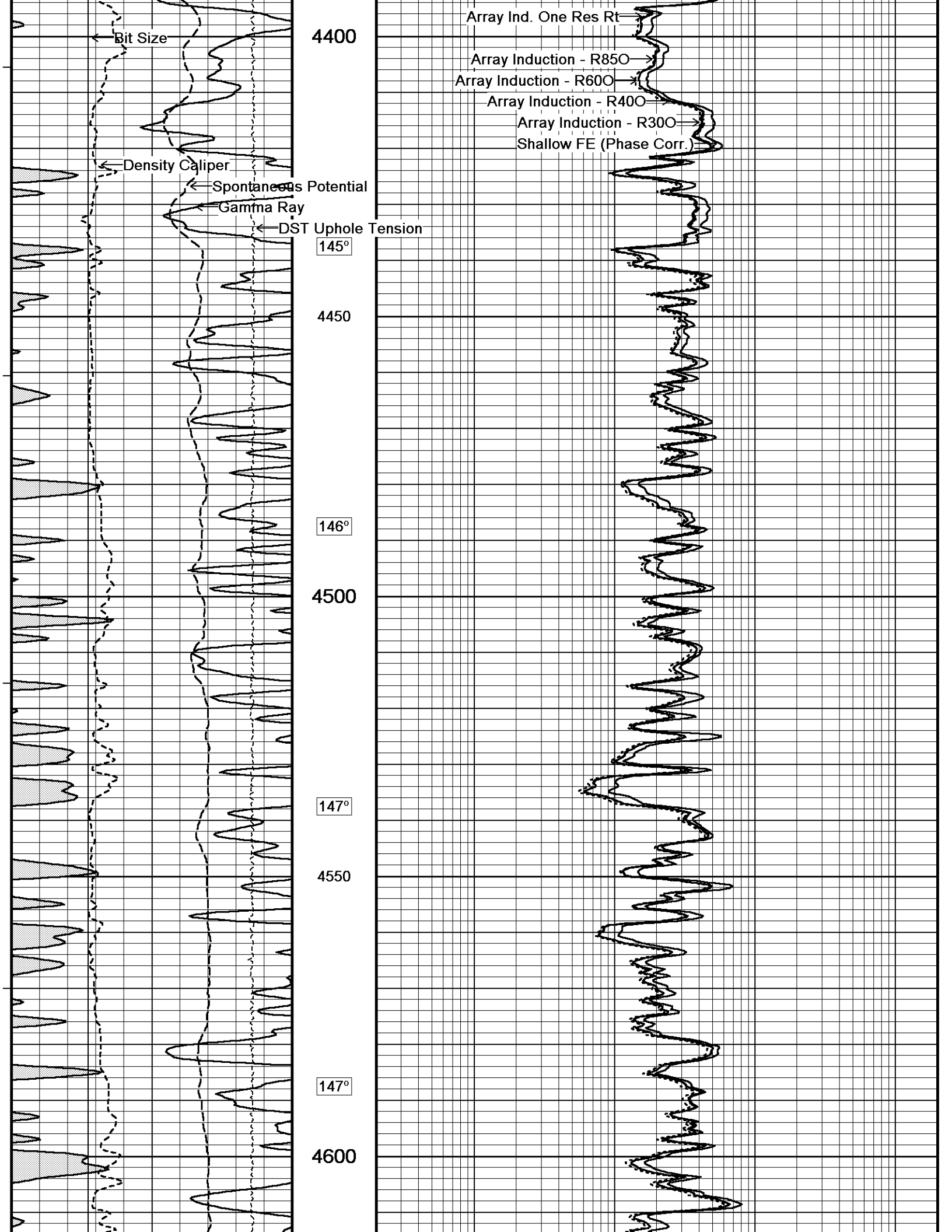

3300
131°
3350
131°
3400
132°
3450
133°
3500

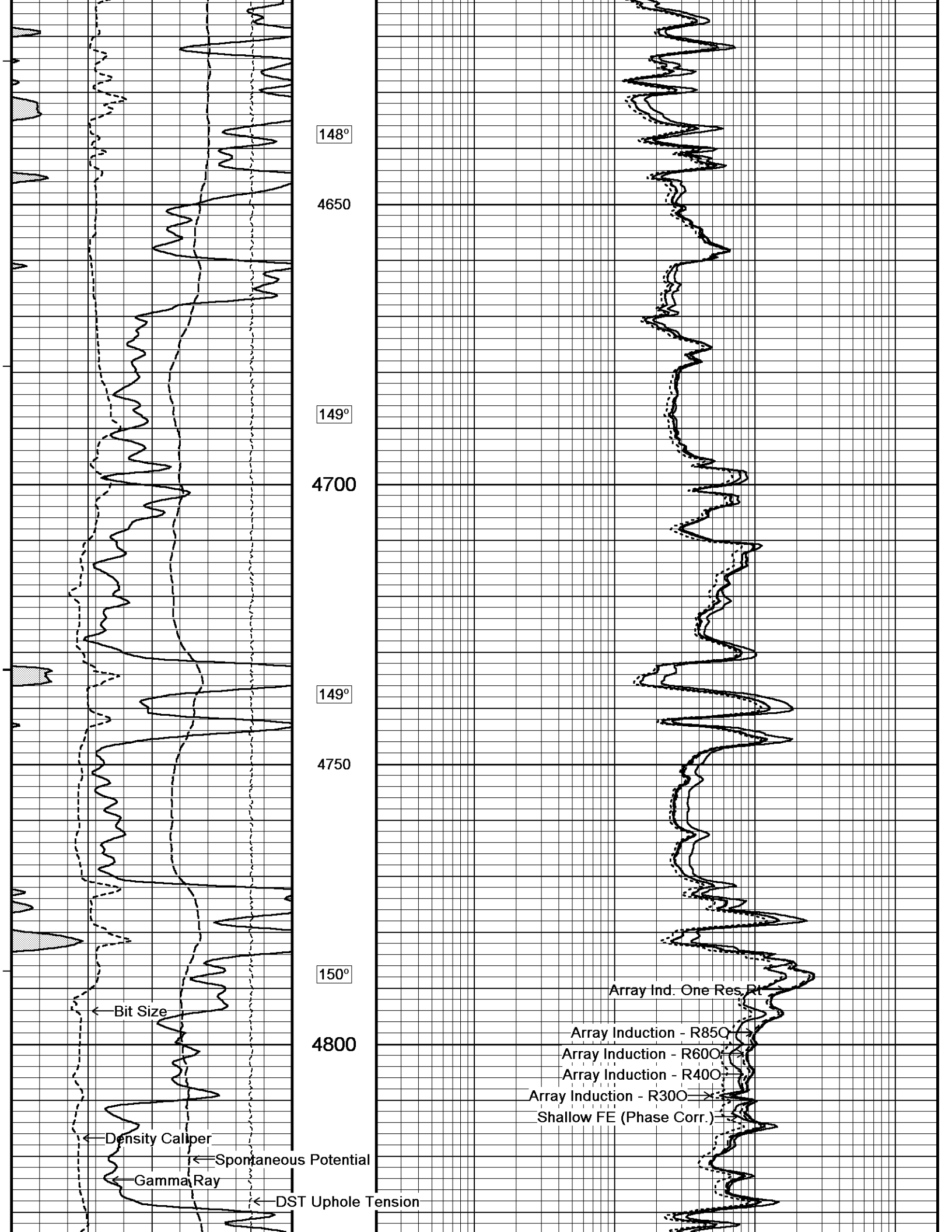

134°
3550
135°
3600
Array Ind. One Res Rt
Bit Size
Array Induction - R85O
Array Induction - R60O
Array Induction - R40O
Array Induction - R30O
Shallow FE (Phase Corr.)
Density Caliper
135°
Spontaneous Potential
Gamma Ray
DST Uphole Tension
3650
136°
3700

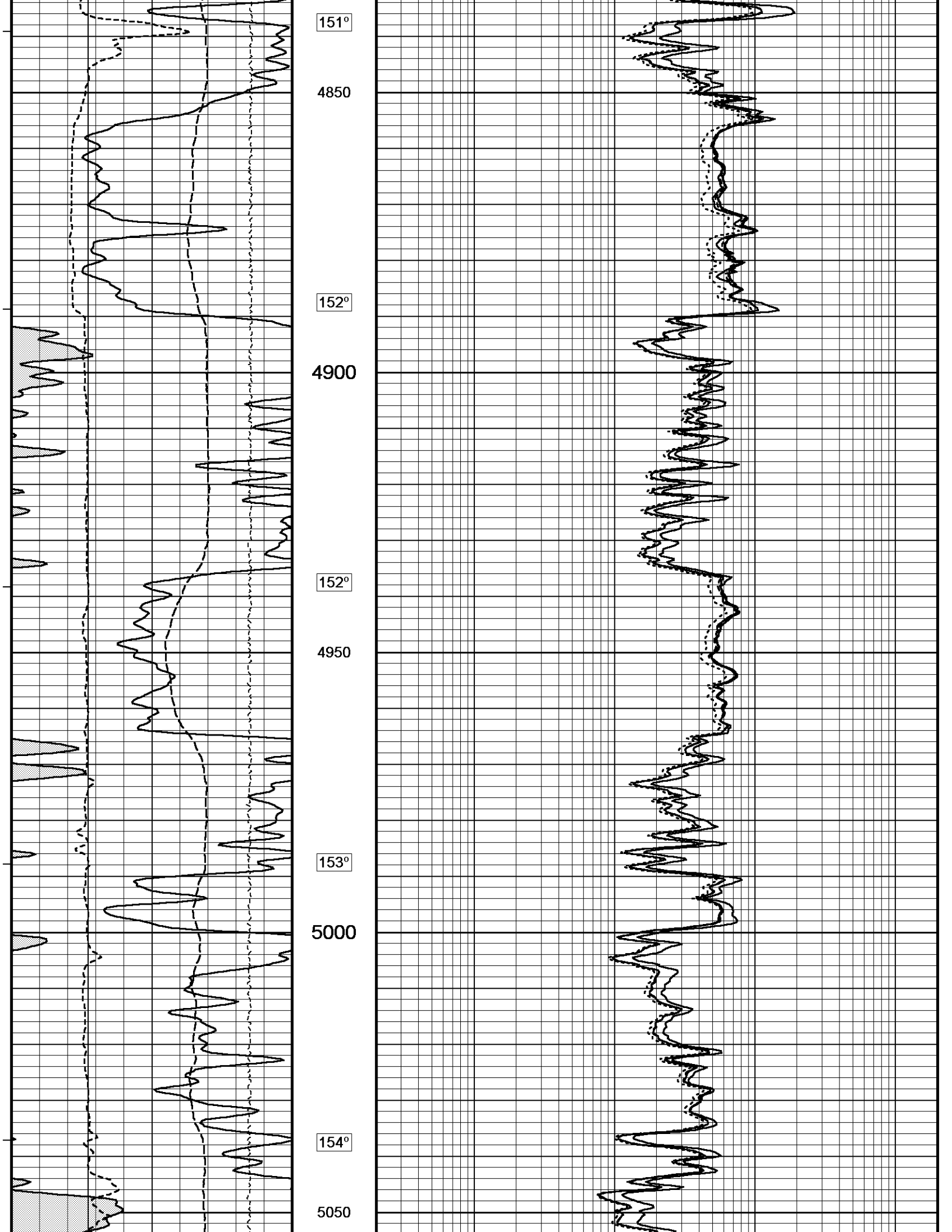

137°
3750
137°
3800
138°
3850
138°
3900
139°
3950

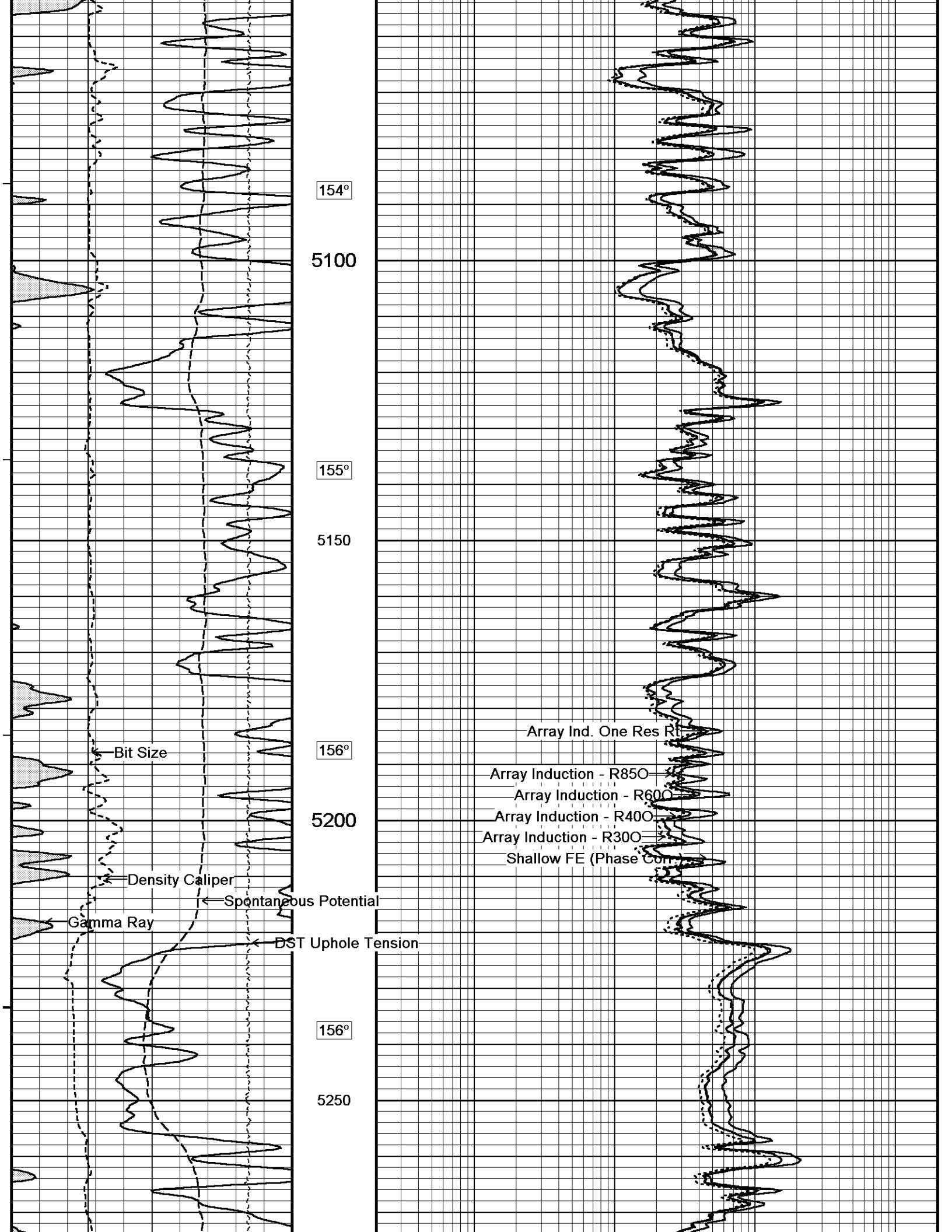

139°
4000
Array Ind. One Res Rt
Bit Size
Array Induction - R85O
Array Induction - R60O
Array Induction - R40O
Array Induction - R30O
Shallow FE (Phase Corr.)
Density Caliper
Spontaneous Potential
Gamma Ray
140°
DST Uphole Tension
4050
141°
4100
141°
4150

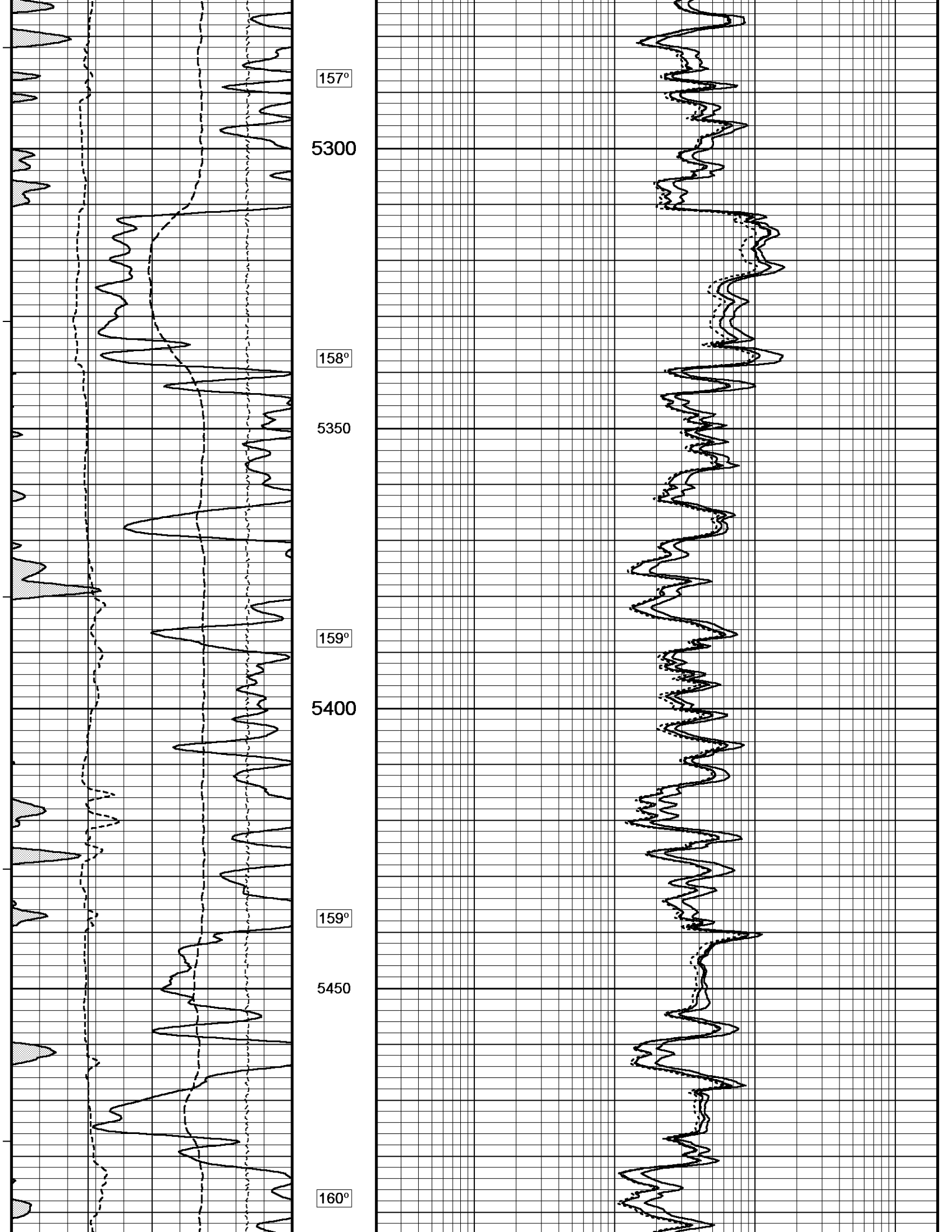

142°
4200
143°
4250
143°
4300
144°
4350
145°

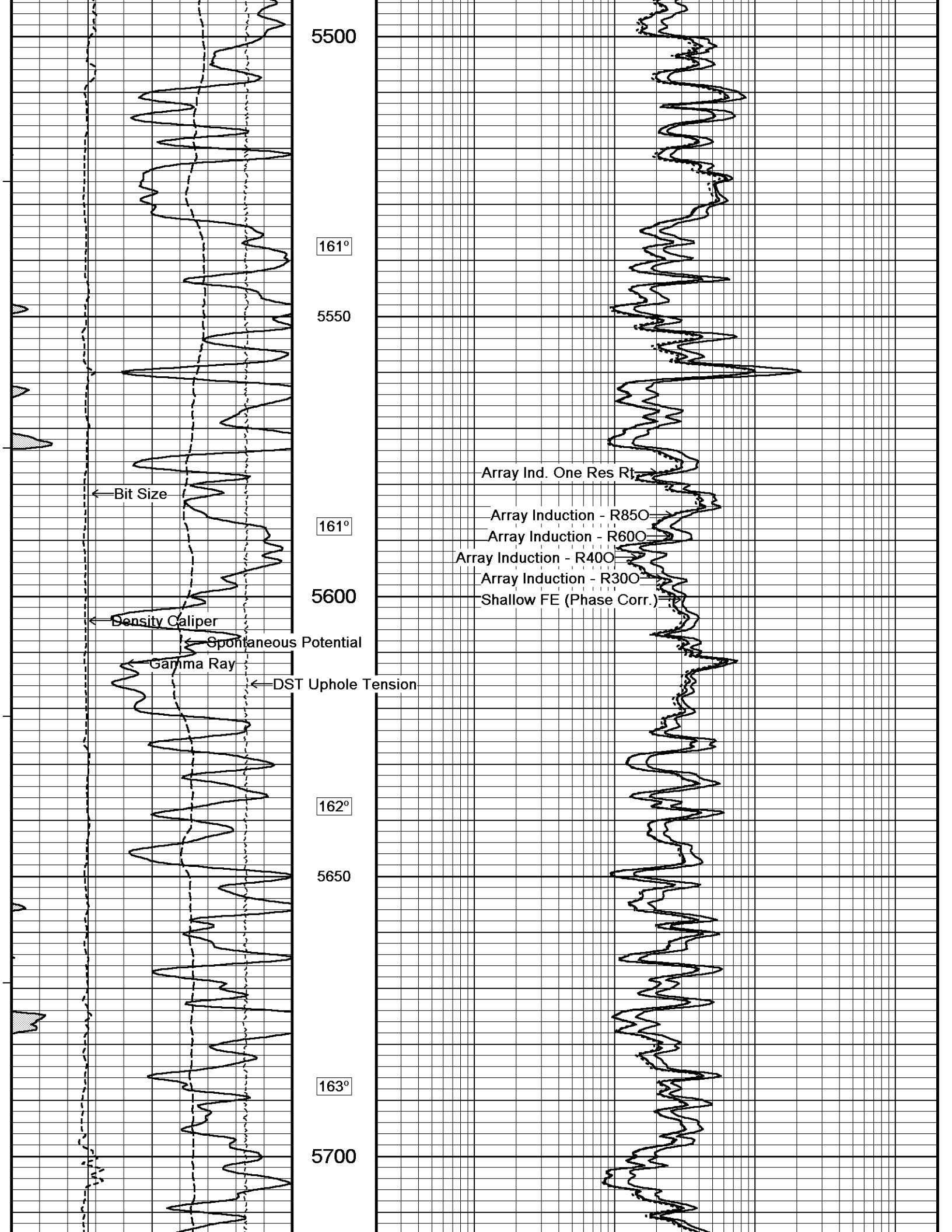

Array Ind. One Res Rt
Array Induction - R85O
Array Induction - R60O
Array Induction - R40O
Array Induction - R30O
Shallow FE (Phase Corr.)
Bit Size
Density Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
4400
145°
4450
146°
4500
147°
4550
147°
4600

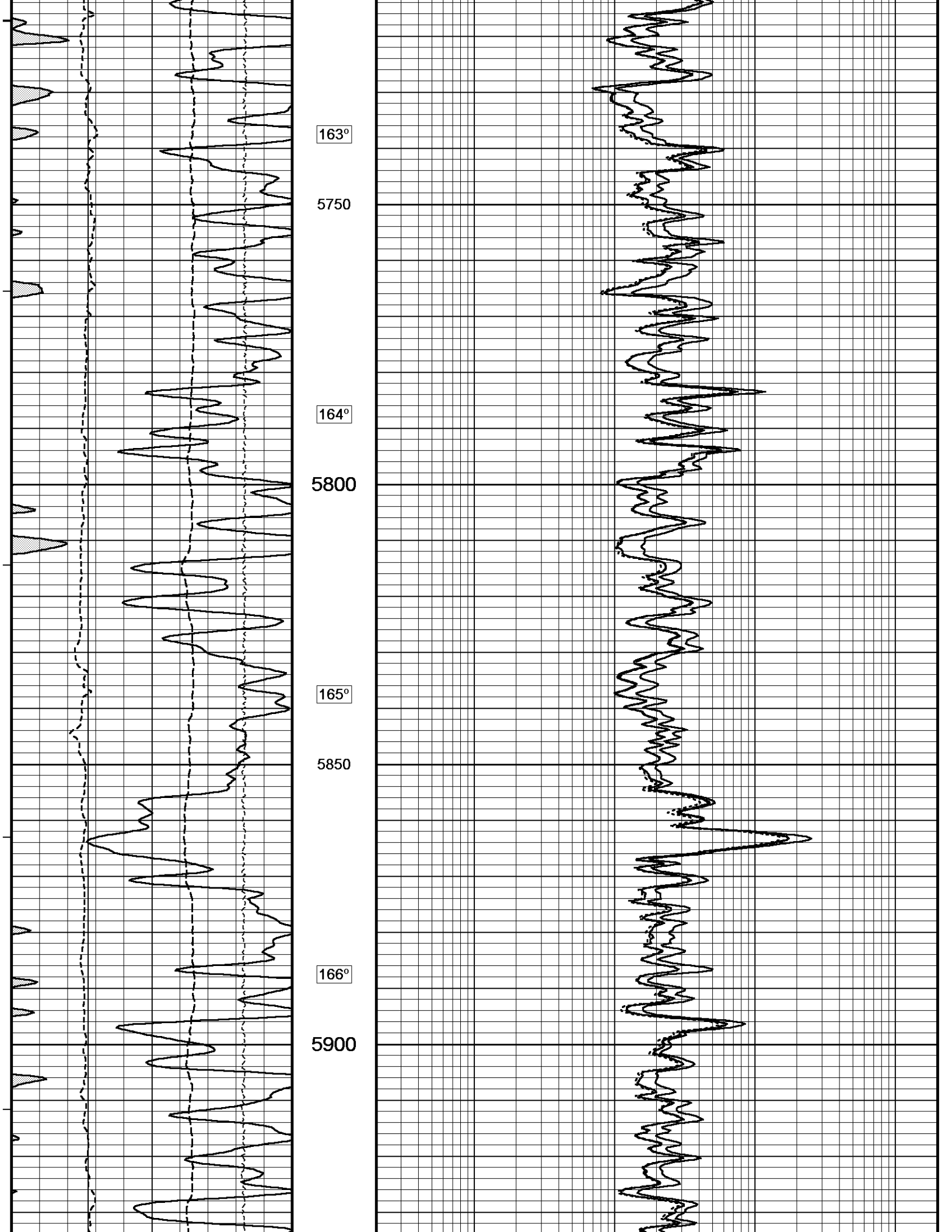

148°
4650
149°
4700
149°
4750
150°
4800
Bit Size
Density Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
Array Ind. One Res. Rt
Array Induction - R85O
Array Induction - R60O
Array Induction - R40O
Array Induction - R30O
Shallow FE (Phase Corr.)

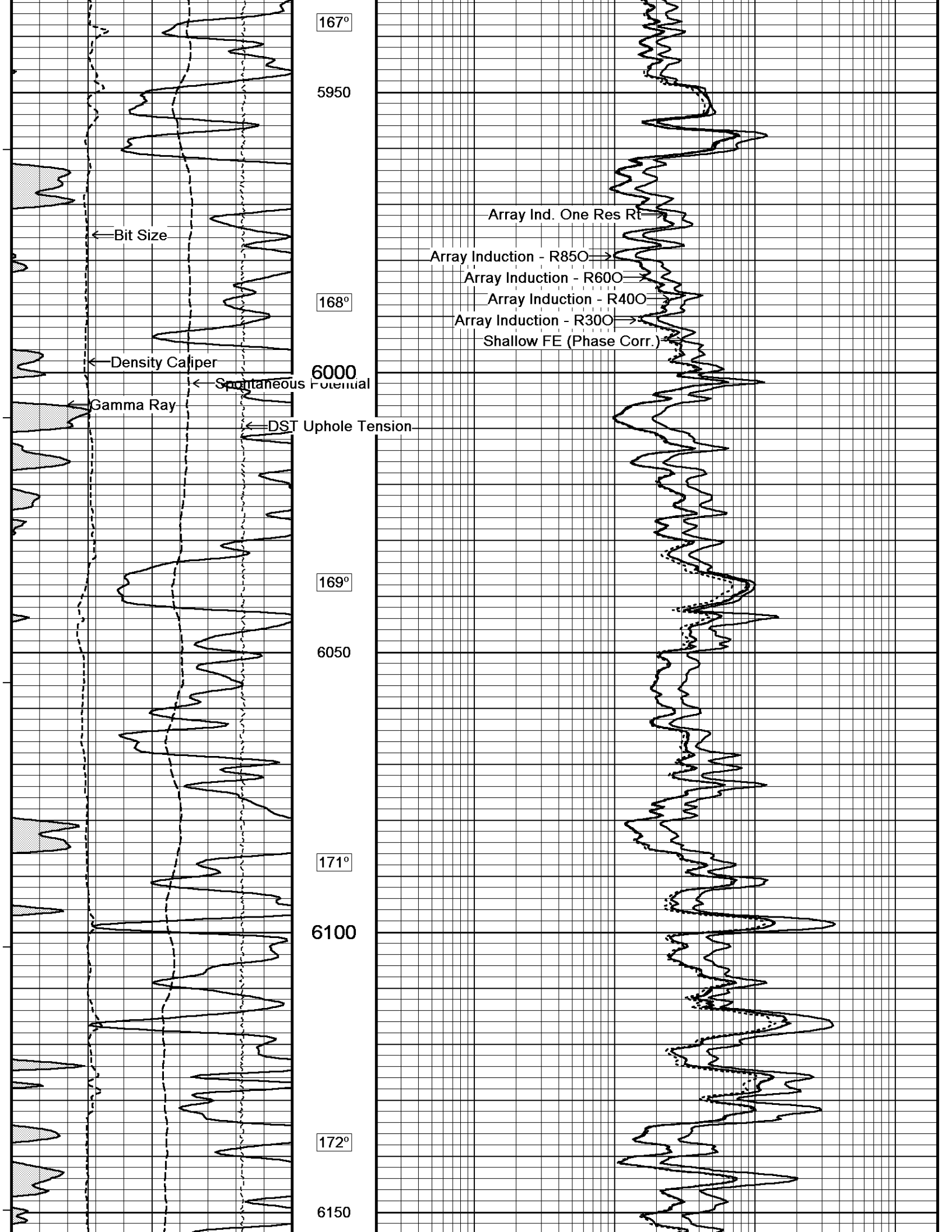

151°
4850
152°
4900
152°
4950
153°
5000
154°
5050

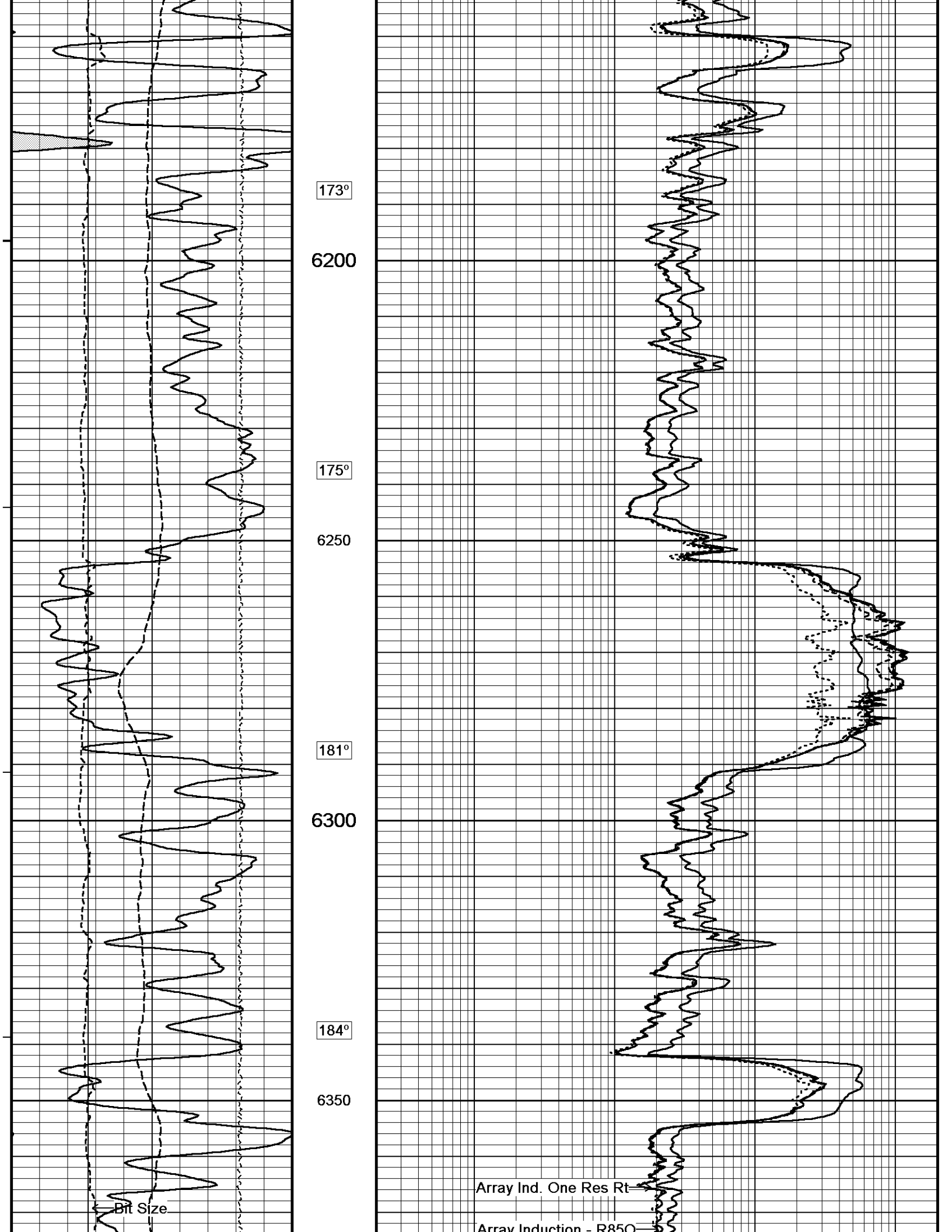

154°
5100
155°
5150
156°
5200
156°
5250
Bit Size
Density Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
Array Ind. One Res Rt
Array Induction - R85O
Array Induction - R60O
Array Induction - R40O
Array Induction - R30O
Shallow FE (Phase Cor.)

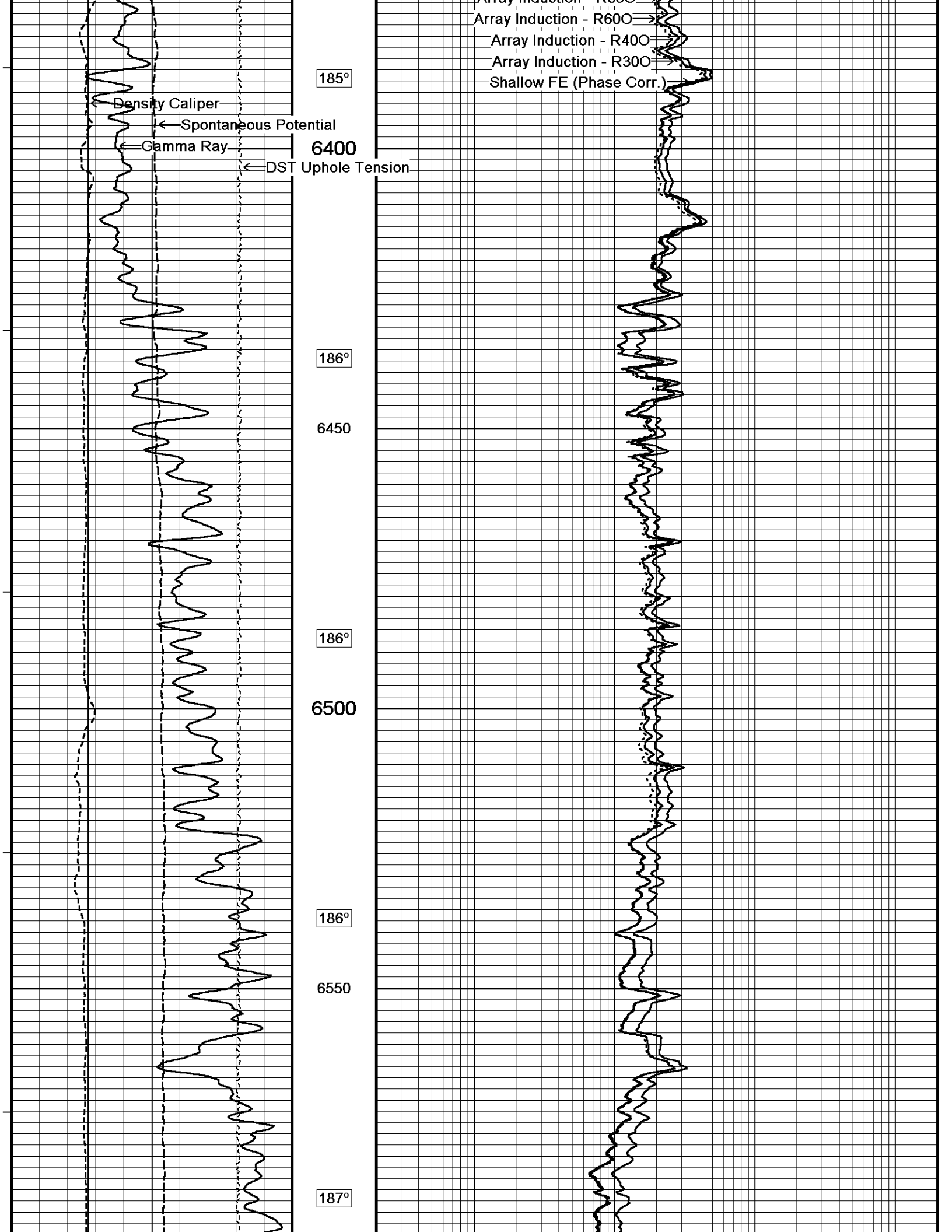

157°
5300
158°
5350
159°
5400
159°
5450
160°

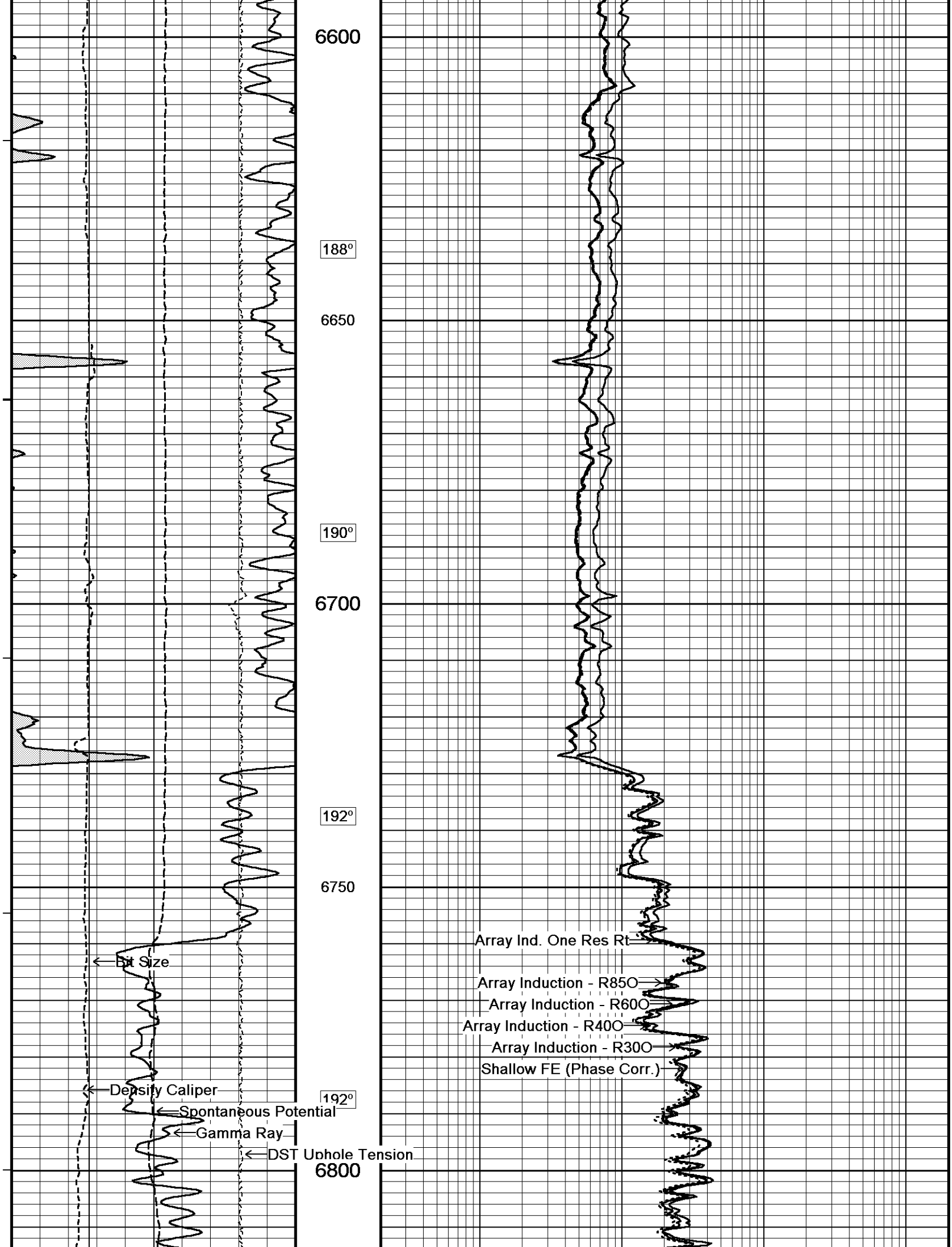

5500
161°
5550
Array Ind. One Res Rt
Bit Size
Array Induction - R85O
161°
Array Induction - R60O
Array Induction - R40O
Array Induction - R30O
5600
Shallow FE (Phase Corr.)
Density Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
162°
5650
163°
5700

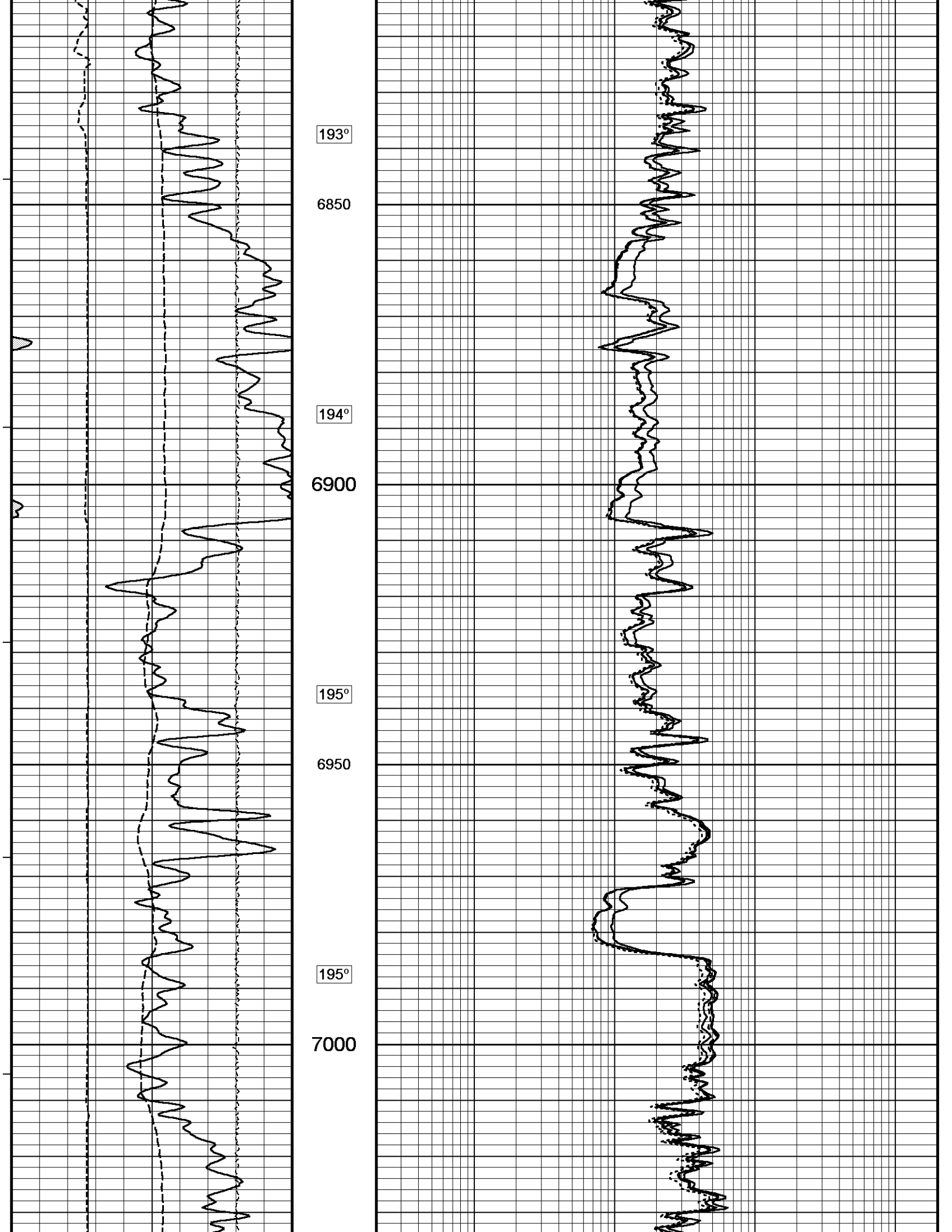

163°
5750
164°
5800
165°
5850
166°
5900

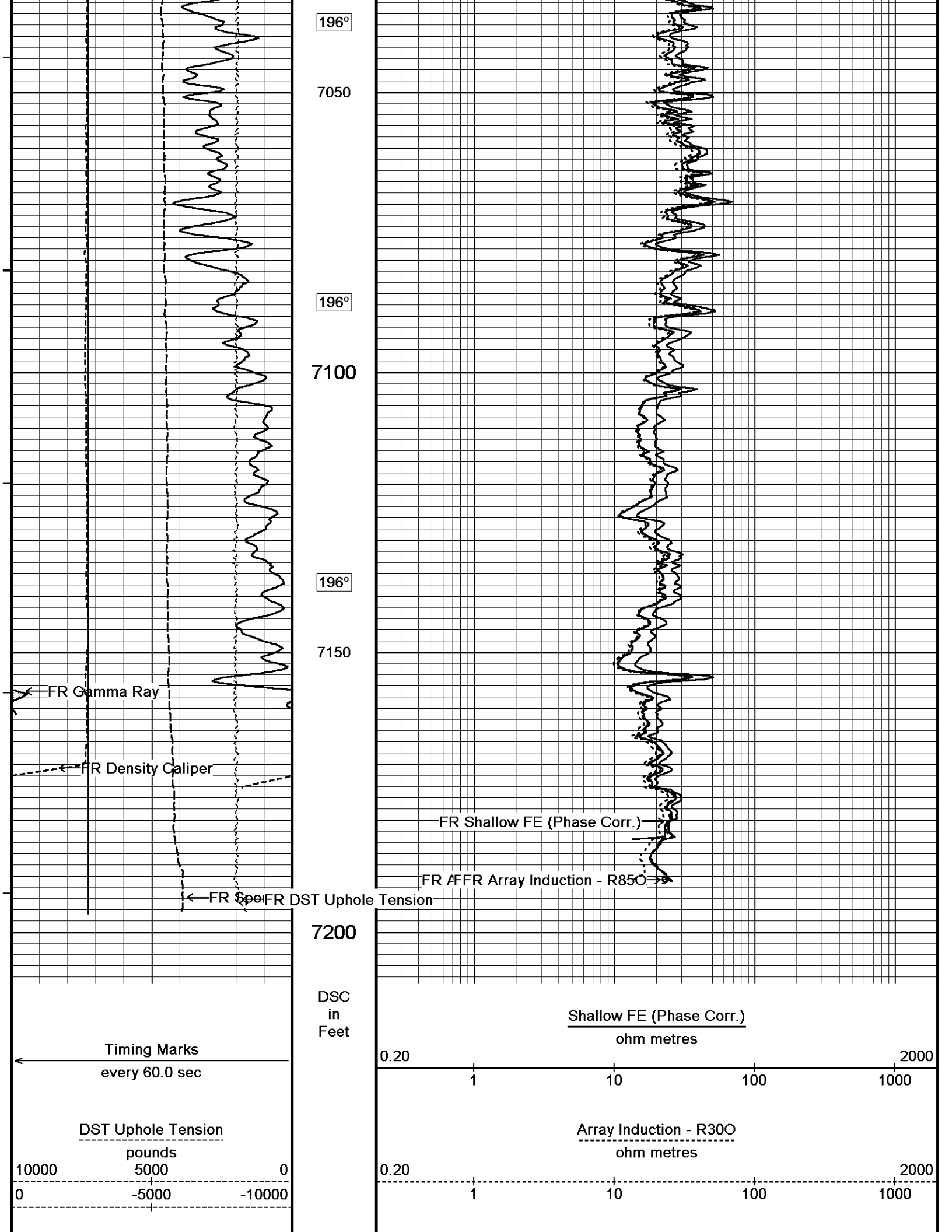

167°
5950
Array Ind. One Res Rt
Bit Size
Array Induction - R85O
Array Induction - R60O
168°
Array Induction - R40O
Array Induction - R30O
Shallow FE (Phase Corr.)
Density Caliper
6000
Spontaneous Potential
Gamma Ray
DST Uphole Tension
169°
6050
171°
6100
172°
6150

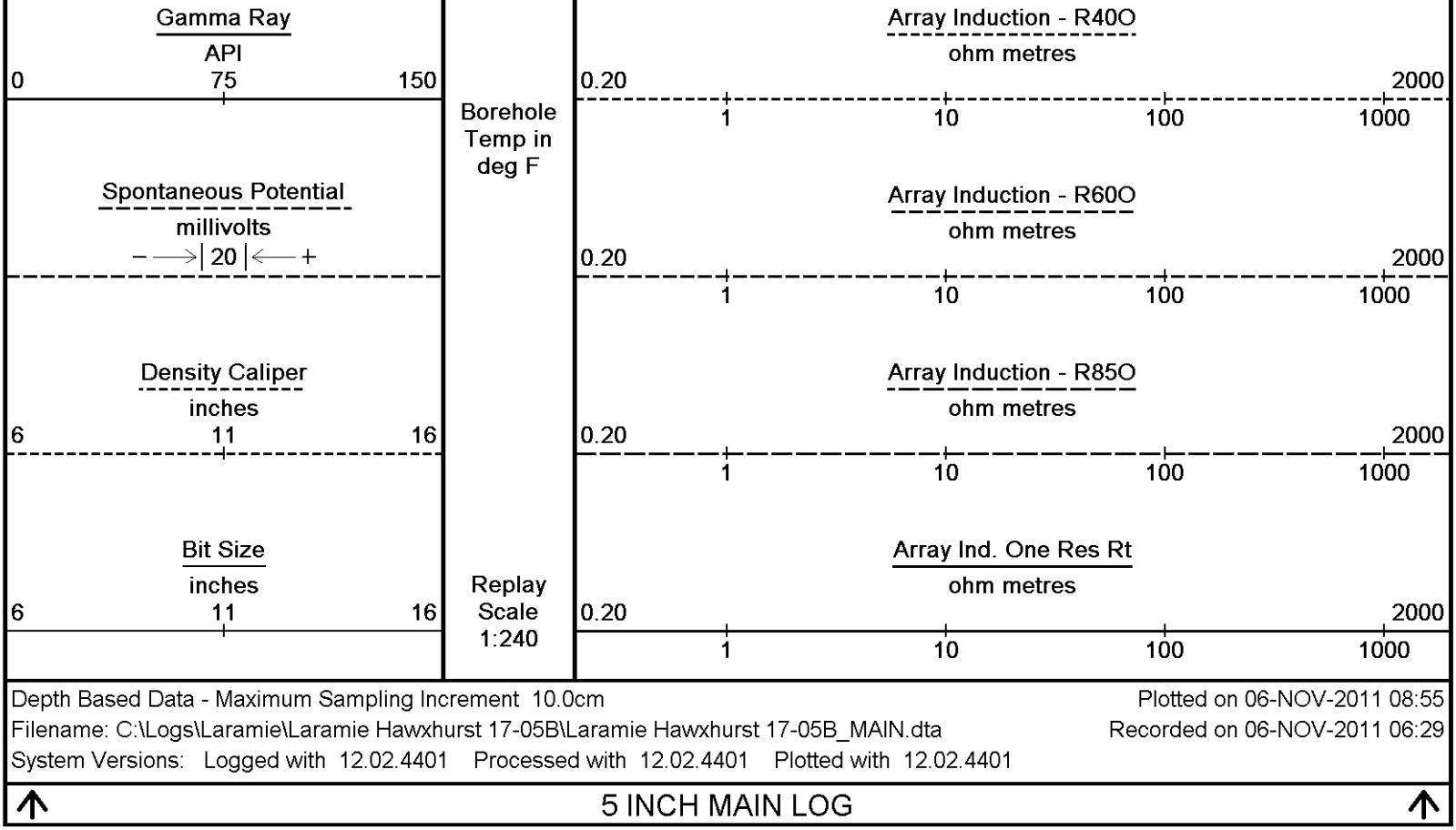

173°
6200
175°
6250
181°
6300
184°
6350
Bit Size
Array Ind. One Res Rt
Array Induction - R85O


Array Induction - R60O
Array Induction - R40O
Array Induction - R30O
Shallow FE (Phase Corr.)
185°
Density Caliper
Spontaneous Potential
Gamma Ray
6400
DST Uphole Tension
186°
6450
186°
6500
186°
6550
187°


6600
188°
6650
190°
6700
192°
6750
Bit Size
Density Caliper
192°
Spontaneous Potential
Gamma Ray
DST Uphole Tension
6800
Array Ind. One Res Rt
Array Induction - R85O
Array Induction - R60O
Array Induction - R40O
Array Induction - R30O
Shallow FE (Phase Corr.)


193°
6850
194°
6900
195°
6950
195°
7000


196°
7050
196°
7100
196°
7150
FR Gamma Ray
FR Density Caliper
FR Shallow FE (Phase Corr.)
FR AFFR Array Induction - R85O
FR Spe
FR DST Uphole Tension
7200
DSC
in
Feet
Timing Marks
every 60.0 sec
DST Uphole Tension
pounds
10000
5000
0
0
-5000
-10000
Shallow FE (Phase Corr.)
ohm metres
0.20
2000
1
10
100
1000
Array Induction - R30O
ohm metres
0.20
2000
1
10
100
1000

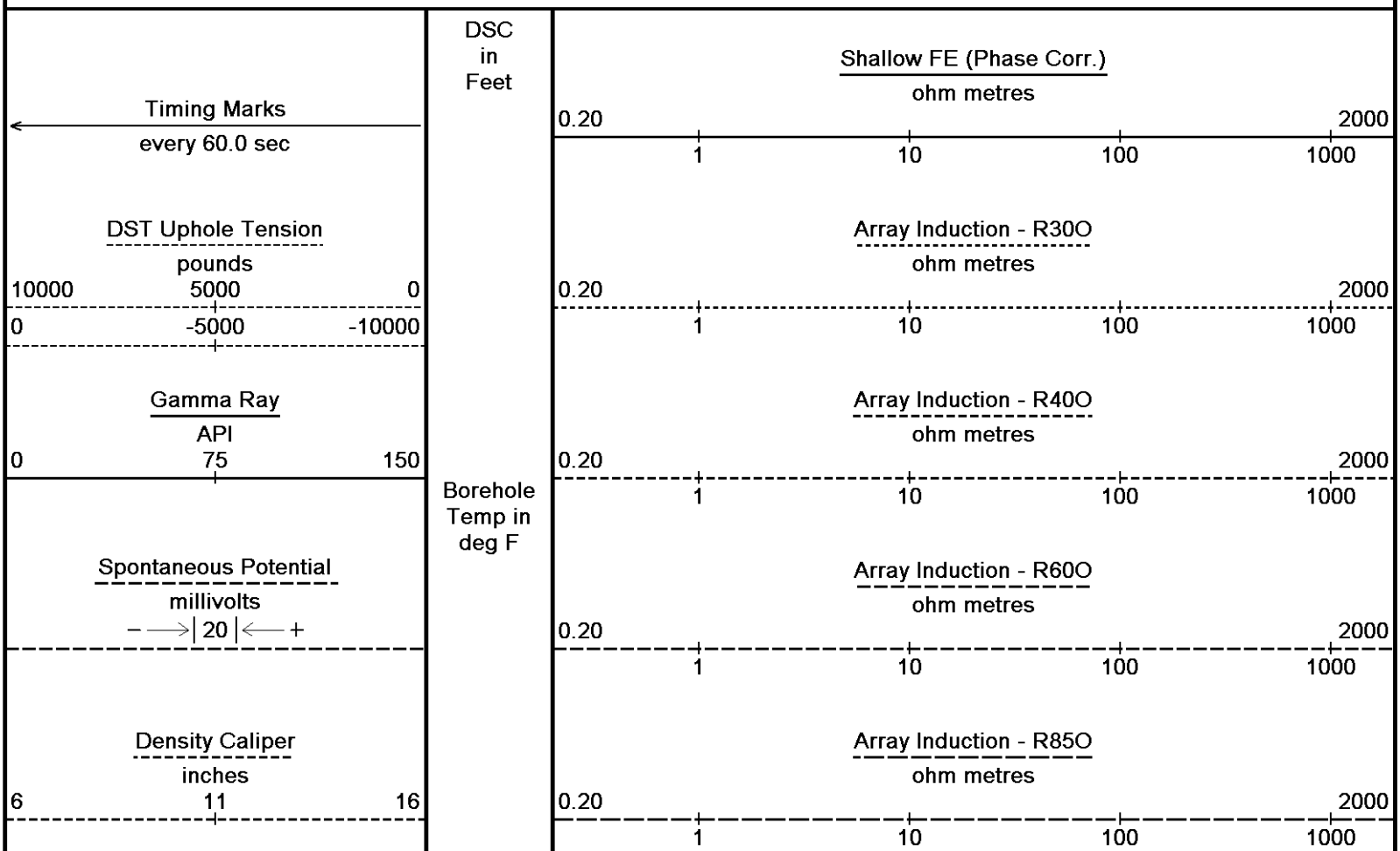


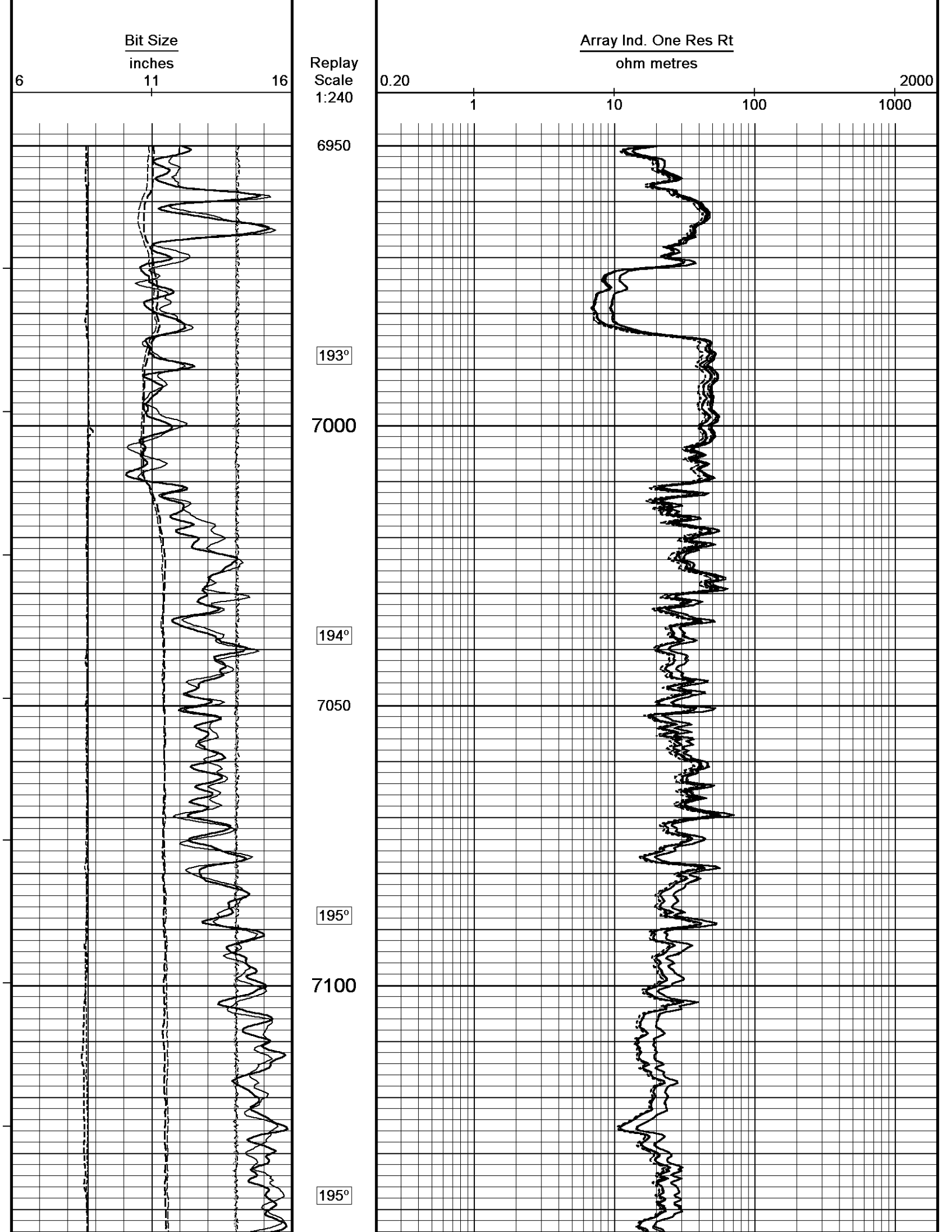

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 06-NOV-2011 08:55
Filename: C:\Logs\Laramie\Laramie Hawxhurst 17-05B\Laramie Hawxhurst 17-05B_MAIN.dta — Recorded on 06-NOV-2011 06:29
System Versions: Logged with 12.02.4401 Processed with 12.02.4401 Plotted with 12.02.4401

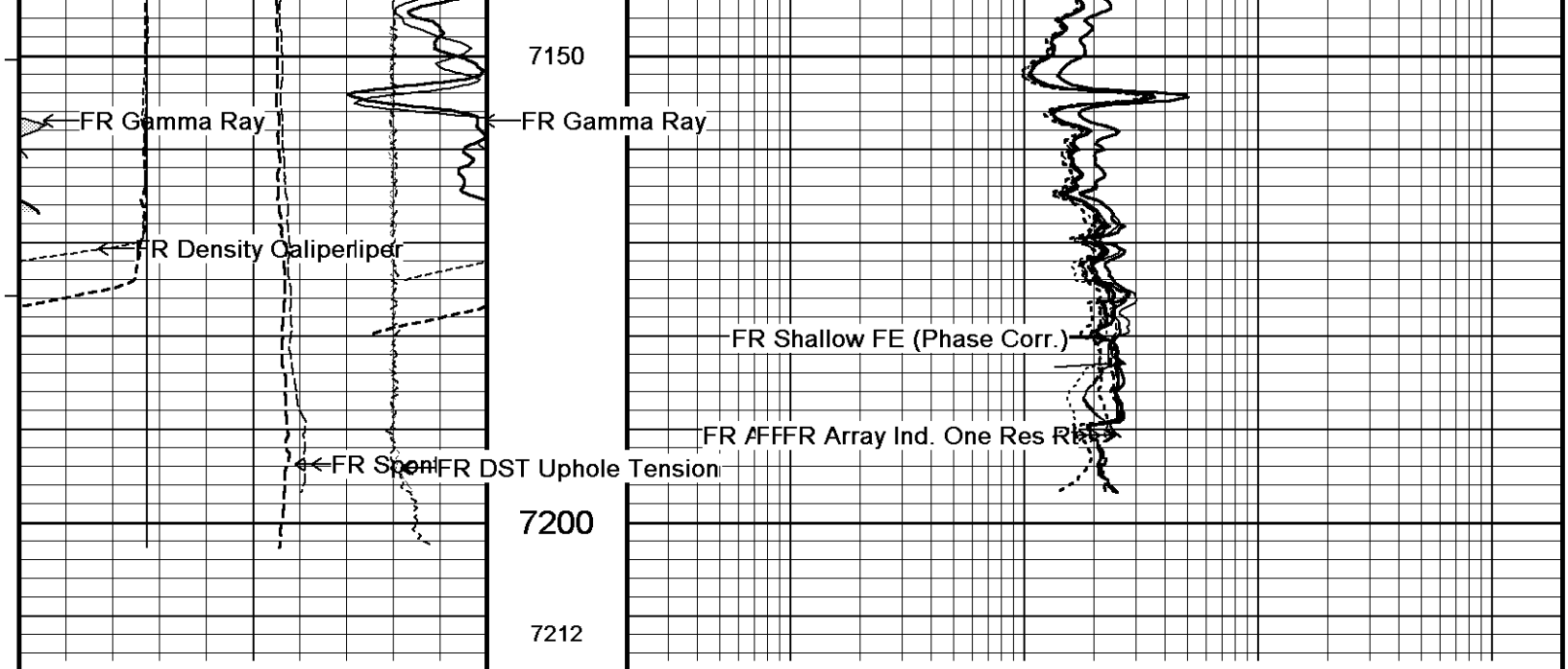
5 INCH MAIN LOG

OVERLAY

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 06-NOV-2011 08:55
Filename: C:\Logs\Laramie\Laramie Hawxhurst 17-05B\Laramie Hawxhurst 17-05B_REPEAT.dta — Recorded on 06-NOV-2011 06:14
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




Bit Size
inches
6
11
16
Replay
Scale
1:240
Array Ind. One Res Rt
ohm metres
0.20
2000
1
10
100
1000
6950
193°
7000
194°
7050
195°
7100
195°




7212

DSC in Feet

Timing Marks
every 60.0 sec

DST Uphole Tension
pounds
10000 5000 0
0 -5000 -10000

Gamma Ray
API
0 75 150

Spontaneous Potential
millivolts
− → | 20 | ← +

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

Borehole Temp in deg F

Replay Scale 1:240

Shallow FE (Phase Corr.)
ohm metres
0.20 1 10 100 2000

Array Induction - R30O
ohm metres
0.20 1 10 100 2000

Array Induction - R40O
ohm metres
0.20 1 10 100 2000

Array Induction - R60O
ohm metres
0.20 1 10 100 2000

Array Induction - R85O
ohm metres
0.20 1 10 100 2000

Array Ind. One Res Rt
ohm metres
0.20 1 10 100 2000

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 06-NOV-2011 08:55
Filename: C:\Logs\Laramie\Laramie Hawxhurst 17-05B\Laramie Hawxhurst 17-05B_REPEAT.dta
Recorded on 06-NOV-2011 06:14
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

OVERLAY

# 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 |
| Calibrator (Net) | 765 | 527 |

## 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 |

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

Last Edited on

| | |
|---|---|
| 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

| Channel | Measured Low | Measured High | Calibrated (mmho/m) Low | Calibrated (mmho/m) 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) Low | Base Check (mmho/m) High | Field Check (mmho/m) Low | Field Check (mmho/m) 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 |

| | | | | |
|---|---|---|---|---|
| 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 | Measured 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 |

## DOWNHOLE EQUIPMENT

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

3/8" Triple Cone Cable Head (MCB C A)
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

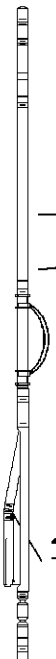
Compact Comms Gamma
MCG-D.A 342 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

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

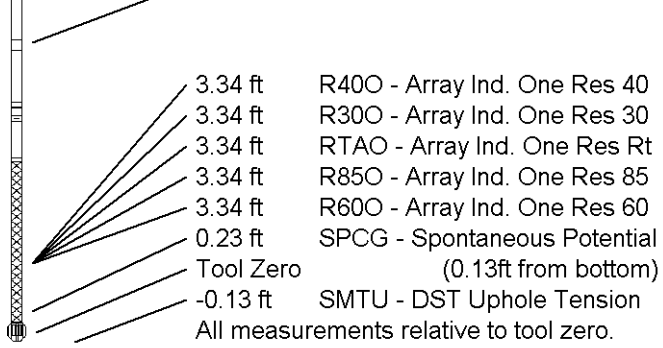


37.07 ft GRGC - Gamma Ray
34.16 ft CGXT - MCG External Temperature
30.61 ft NPRS - Sandstone Neutron Por.
23.37 ft AVOL - Annular Volume
23.37 ft HVOL - Hole Volume
23.37 ft CLDC - Density Caliper
21.44 ft DPOR - Base Density Porosity
21.44 ft DCOR - Density Correction
21.38 ft PDPE - PE
13.72 ft FEFC - Shallow FE (Phase Corr.)

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



All measurements relative to tool zero.

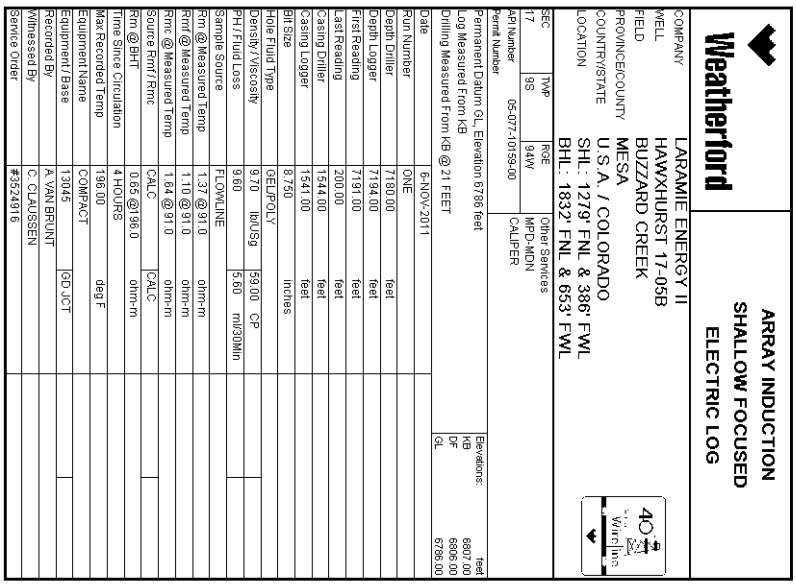
| | |
|---|---|
| COMPANY | LARAMIE ENERGY II |
| WELL | HAWXHURST 17-05B |
| FIELD | BUZZARD CREEK |
| PROVINCE/COUNTY | MESA |
| COUNTRY/STATE | U.S.A. / COLORADO |

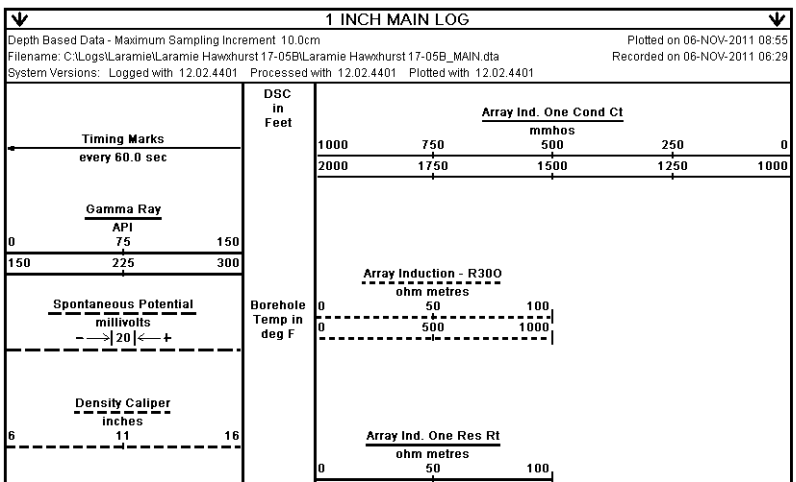
| | | | | | |
|---|---|---|---|---|---|
| Elevation Kelly Bushing | 6807.00 | feet | First Reading | 7191.00 | feet |
| Elevation Drill Floor | 6806.00 | feet | Depth Driller | 7180.00 | feet |
| Elevation Ground Level | 6786.00 | feet | Depth Logger | 7194.00 | feet |

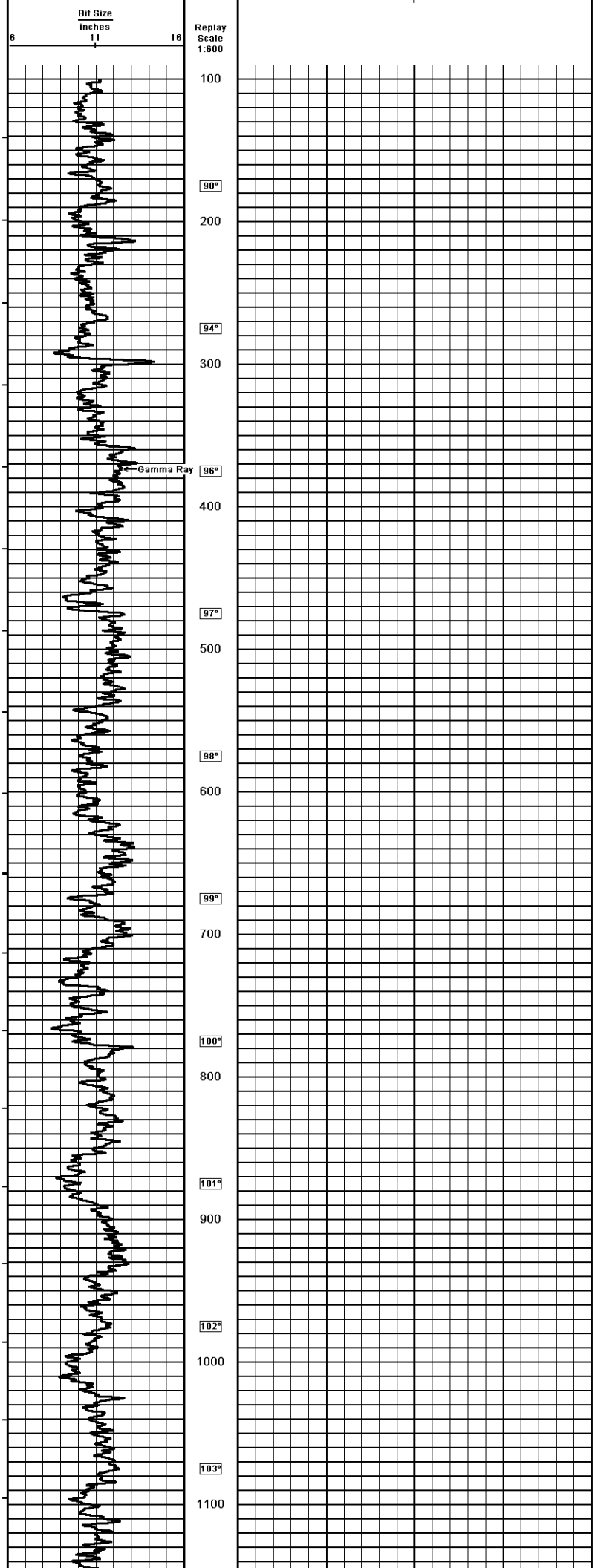
Weatherford®

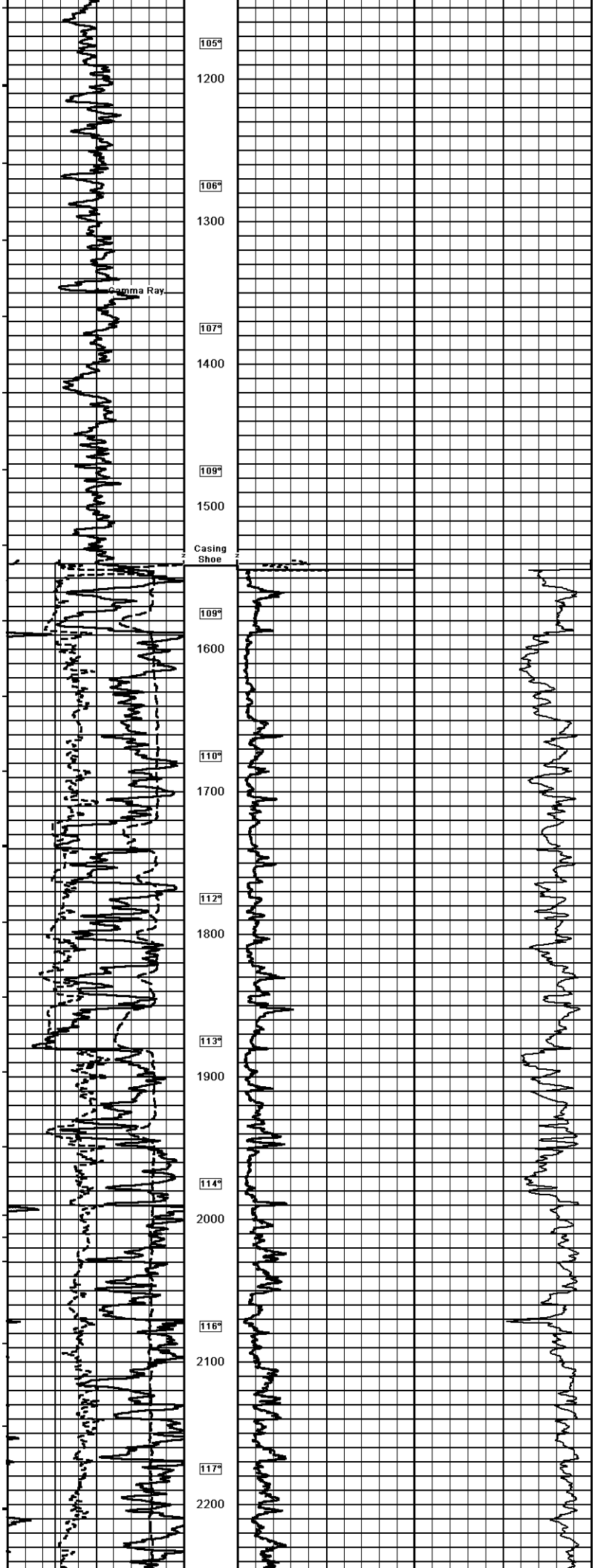
ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

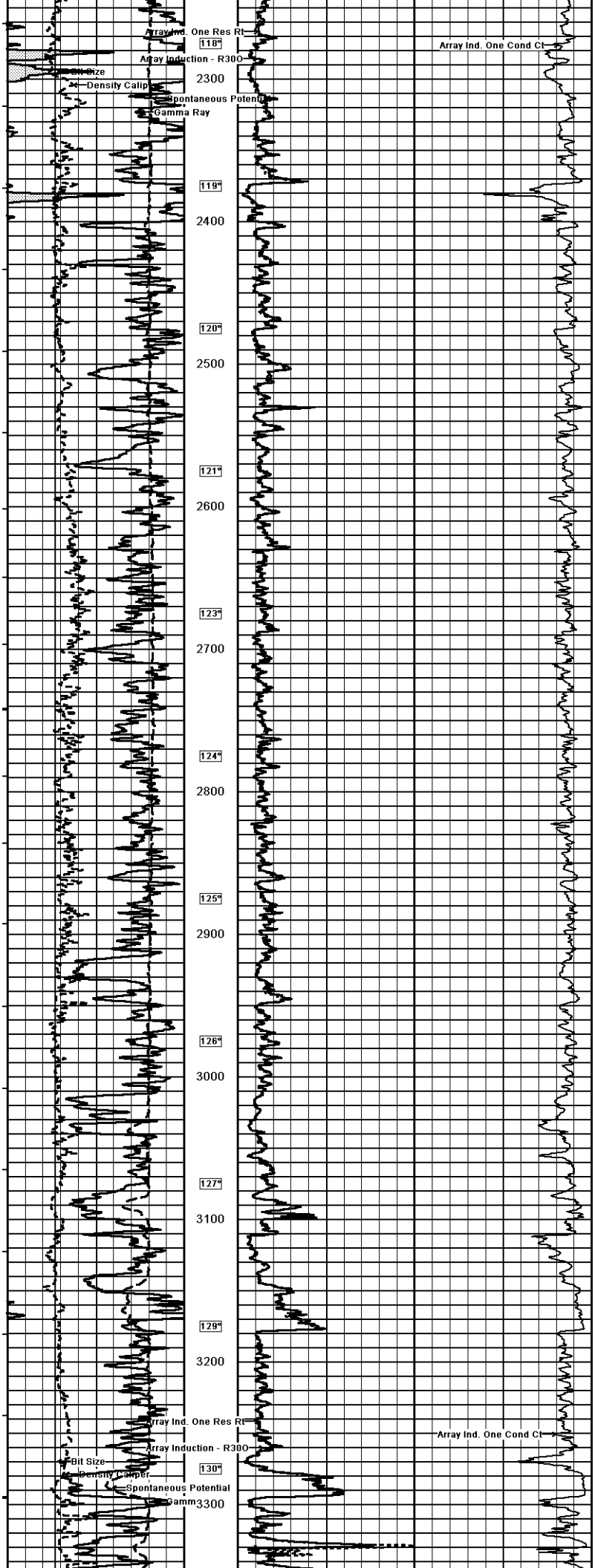
40 Years of Wireline 1970 2010

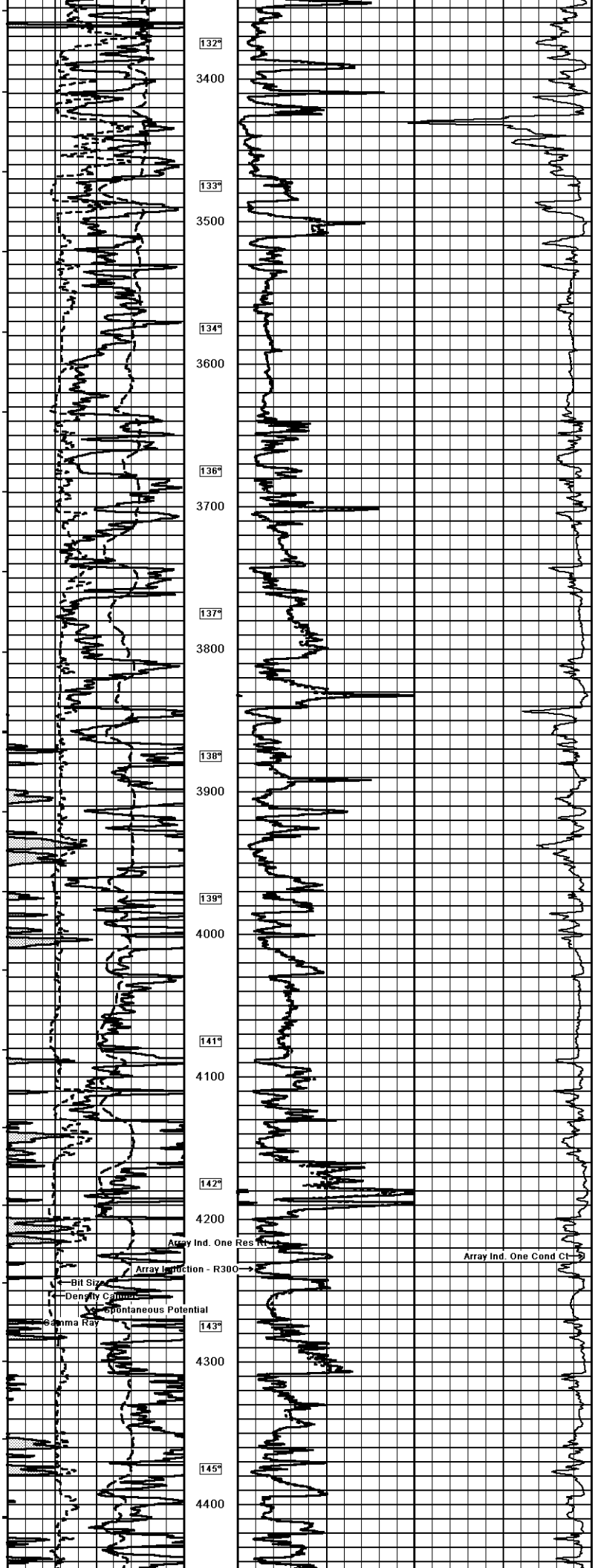


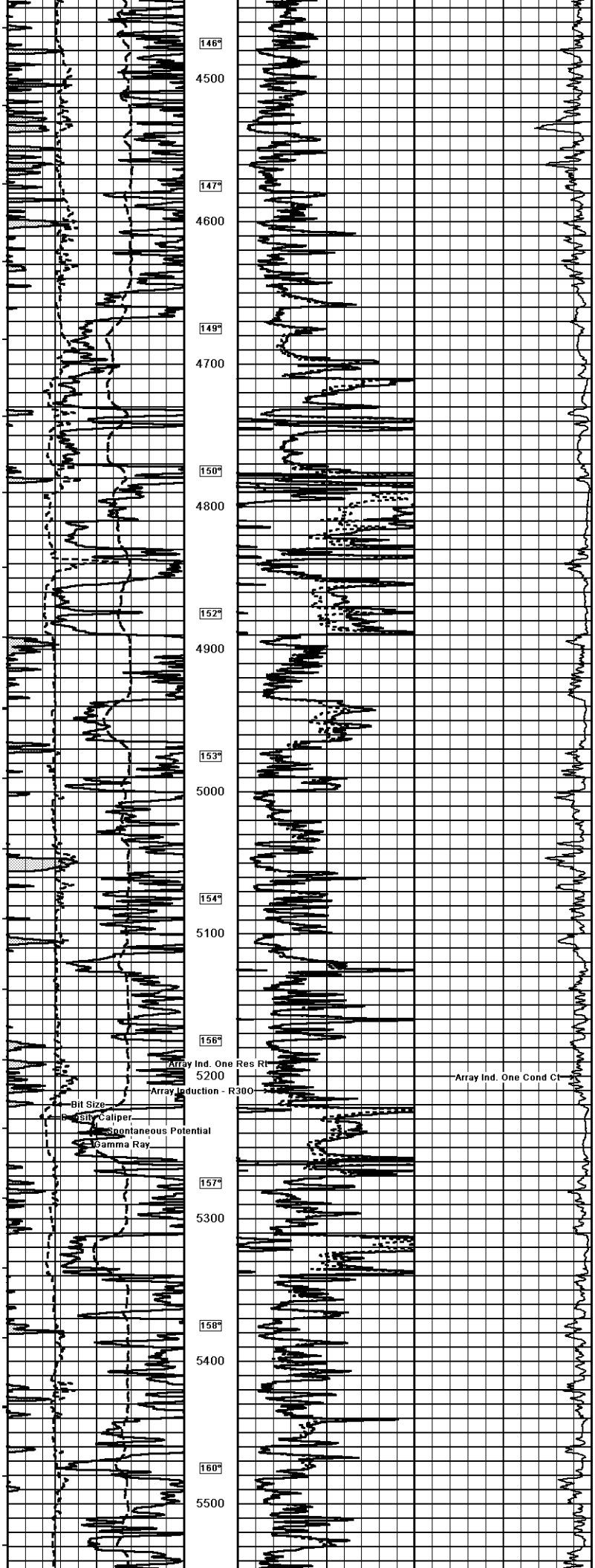



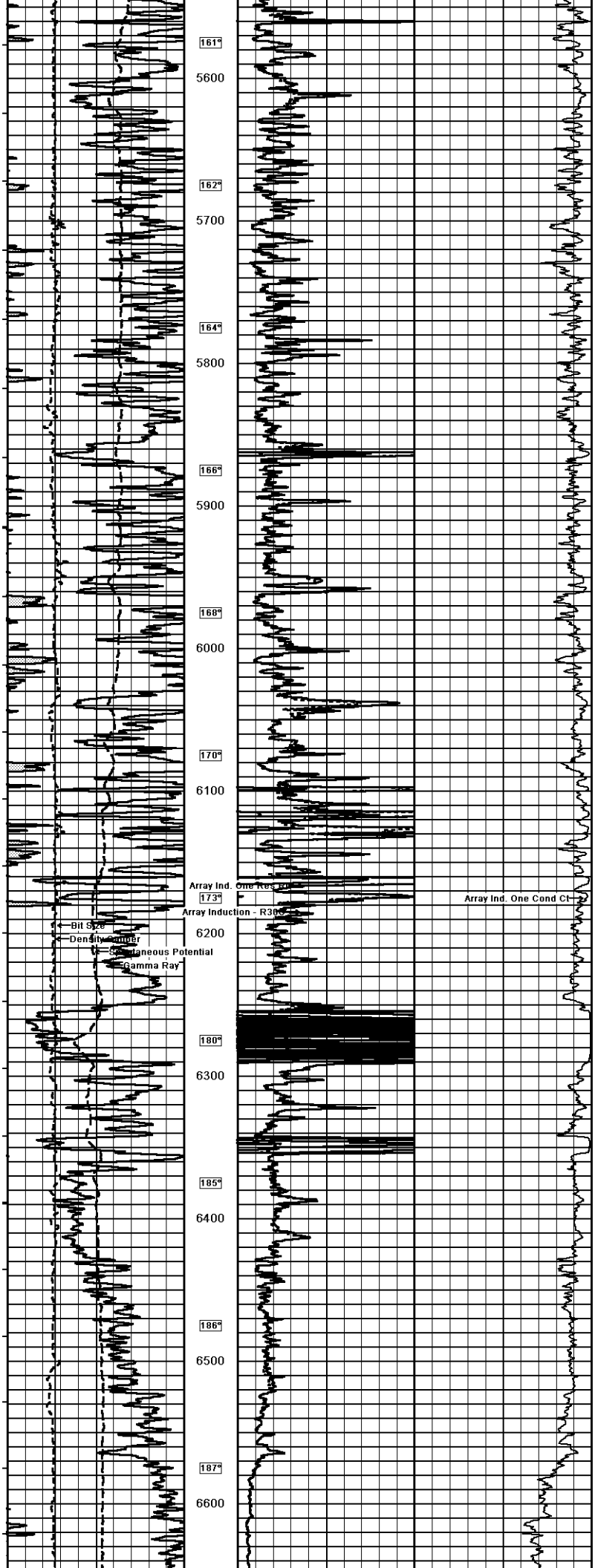

Bit Size
inches
6
11
16
Replay
Scale
1:600
100
90°
200
94°
300
Gamma Ray
96°
400
97°
500
98°
600
99°
700
100°
800
101°
900
102°
1000
103°
1100

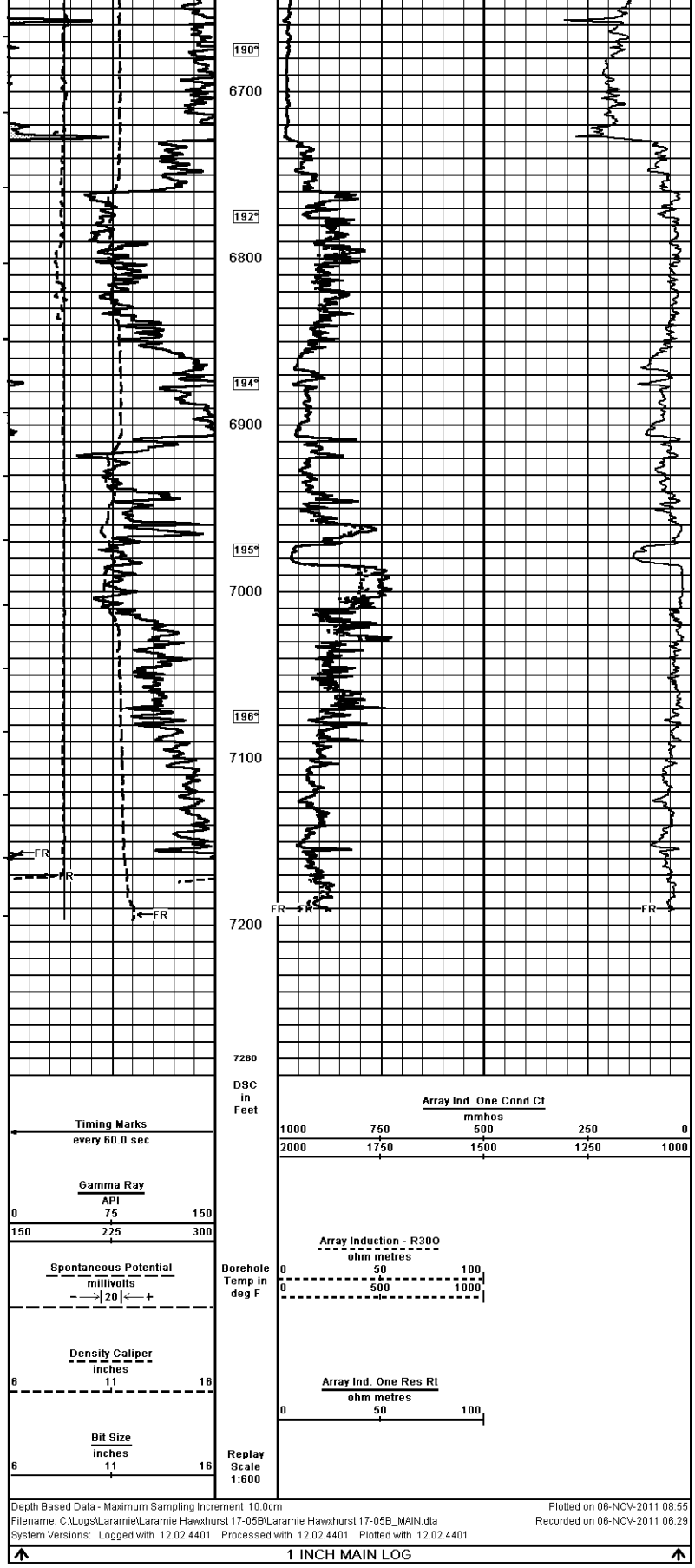

105°
1200
106°
1300
Gamma Ray
107°
1400
109°
1500
Casing Shoe
109°
1600
110°
1700
112°
1800
113°
1900
114°
2000
116°
2100
117°
2200


Array Ind. One Res Rt
Array Induction - R30O
Bit Size
Density Caliper
Spontaneous Potential
Gamma Ray
Array Ind. One Cond Ct
118°
119°
120°
121°
123°
124°
125°
126°
127°
129°
130°
2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300


132°
3400
133°
3500
134°
3600
136°
3700
137°
3800
138°
3900
139°
4000
141°
4100
142°
4200
143°
4300
145°
4400
Array Ind. One Res Rt
Array Induction - R30O
Bit Size
Density Caliper
Spontaneous Potential
Gamma Ray
Array Ind. One Cond Ct


146°
4500
147°
4600
149°
4700
150°
4800
152°
4900
153°
5000
154°
5100
156°
Array Ind. One Res Rt
5200
Array Ind. One Cond Ct
Array Induction - R30O
Bit Size
Density Caliper
Spontaneous Potential
Gamma Ray
157°
5300
158°
5400
160°
5500


161°
5600
162°
5700
164°
5800
166°
5900
168°
6000
170°
6100
173°
Array Induction - R30
Bit Size
Density Caliper
Spontaneous Potential
Gamma Ray
6200
180°
6300
185°
6400
186°
6500
187°
6600
Array Ind. One Cond Ct




Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 06-NOV-2011 08:55
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

1 INCH MAIN LOG

| | |
|---|---|
| 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 | 7191.00 | feet |
| Elevation Drill Floor | 6806.00 | feet | Depth Driller | 7180.00 | feet |
| Elevation Ground Level | 6786.00 | feet | Depth Logger | 7194.00 | feet |

Weatherford

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

40 Years of Wireline