



# Weatherford

## COMPACT PHOTO DENSITY COMPENSATED NEUTRON MICRORESISTIVITY LOG

COMPANY GRAND MESA OPERATING COMPANY

WELL E & E # 1-34

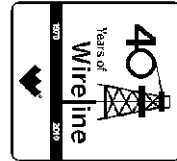
FIELD WILDCAT

PROVINCE/COUNTY LOGAN

COUNTRY/STATE U.S.A. / KANSAS

LOCATION 351' FSL & 739' FEL

NE SW SE SE



SEC 34 TWP 13S RGE 32W Other Services MAI/MFE

API Number 15-109-21027

Permit Number

Permanent Datum G.L., Elevation 2874 feet

Log Measured From KB

Drilling Measured From K.B. @ 5 FEET

Date 12-AUG-2011

Run Number ONE

Depth Driller 4650.00 feet

Depth Logger 4651.00 feet

First Reading 4628.00 feet

Last Reading 3850.00 feet

Casing Driller 222.00 feet

Casing Logger 219.00 feet

Bit Size 7.875 inches

Hole Fluid Type CHEMICAL

Density / Viscosity 9.10 lb/USg 56.00 CP

PH / Fluid Loss 10.50 8.00 ml/30Min

Sample Source FLOWLINE

Rm @ Measured Temp 1.05 @ 97.0 ohm-m

Rmf @ Measured Temp 0.84 @ 97.0 ohm-m

Rmc @ Measured Temp 1.26 @ 97.0 ohm-m

Source Rmf / Rmc CALC CALC

Rm @ BHT 0.86 @ 119.0 ohm-m

Time Since Circulation 4 HOURS

Max Recorded Temp 119.00 deg F

Equipment Name COMPACT

Equipment / Base 13025 LIB

Recorded By A. GIAMBALVO

Witnessed By KENT MATSON

S.O. / JOB # 3529203

W. STAMBAUGH

LB11-196

Elevations: KB 2879.00 DF 2877.00 GL 2874.00

### BOREHOLE RECORD

Last Edited: 12-AUG-2011 17:59

| Bit Size<br>inches | Depth From<br>feet | Depth To<br>feet |
|--------------------|--------------------|------------------|
| 7.875              | 219.00             | 4651.00          |

### CASING RECORD

| Type    | Size<br>inches | Depth From<br>feet | Shoe Depth<br>feet | Weight<br>pounds/ft |
|---------|----------------|--------------------|--------------------|---------------------|
| SURFACE | 8.625          | 0.00               | 219.00             | 24.00               |

### REMARKS

Tools Used: MPD, MCG, MDN, MML, MFE, MAI.  
 Hardware: MPD: 8 inch profile plate used. MDN: Dual Bowspring used.  
 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.  
 Annular volume with 5.5 inch production casing = 192 cu. ft.  
 Service order #3529203  
 Rig: Murtin # 24  
 Engineer: A. Giambalvo, W. Stambaugh  
 Operator(s): K. Rinehart

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.

# 5 INCH MAIN

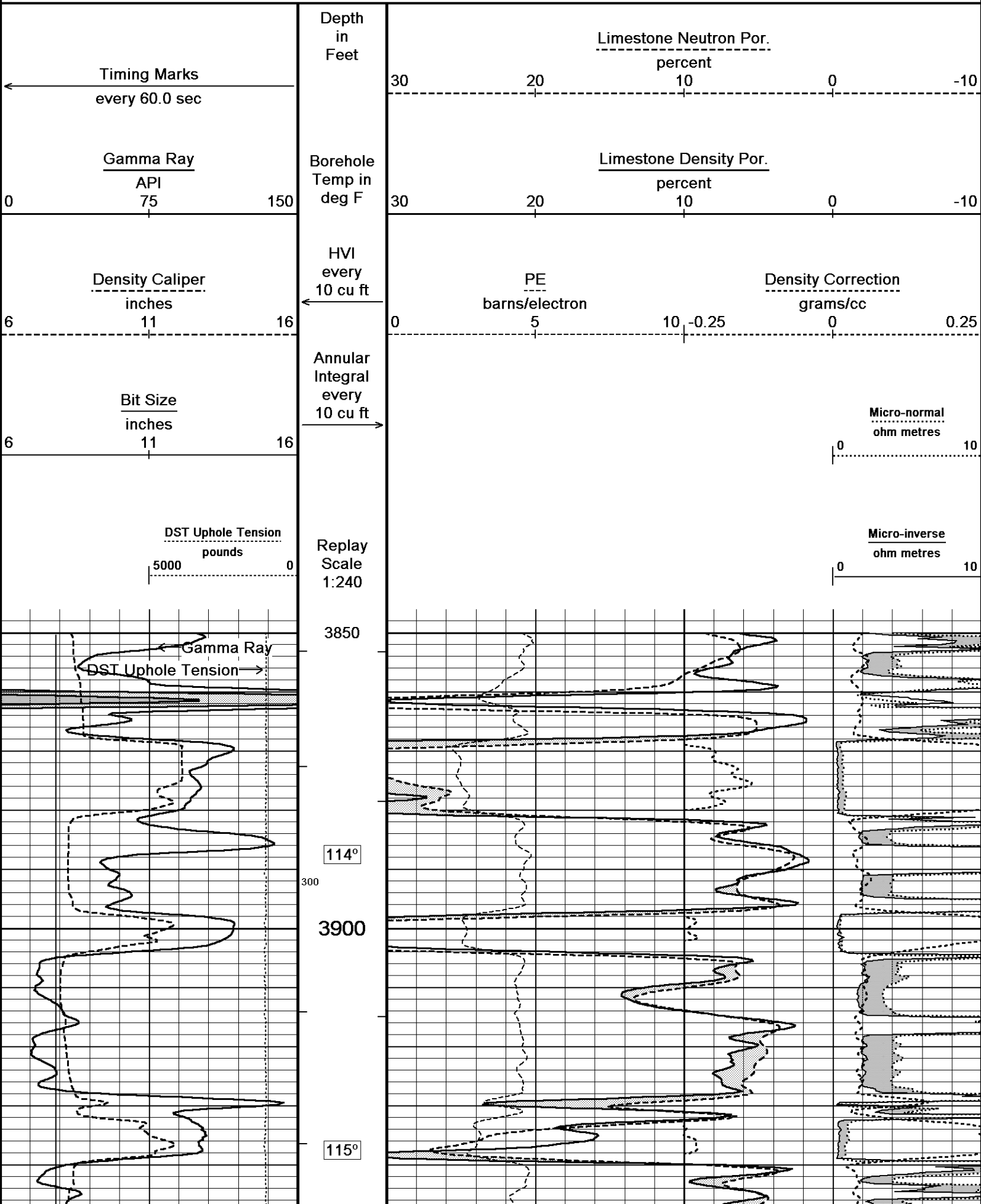
Depth Based Data - Maximum Sampling Increment 10.0cm

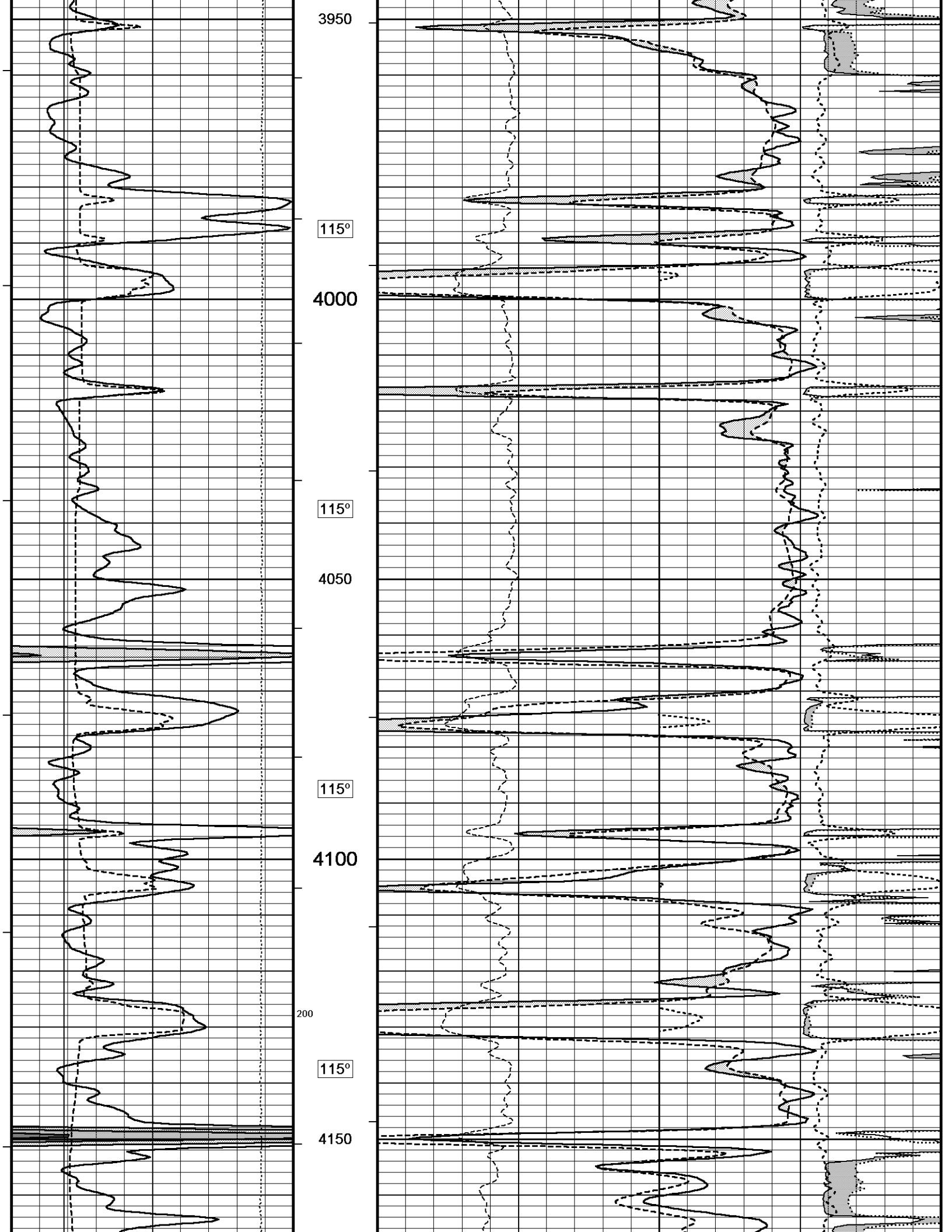
Plotted on 31-AUG-2011 09:37

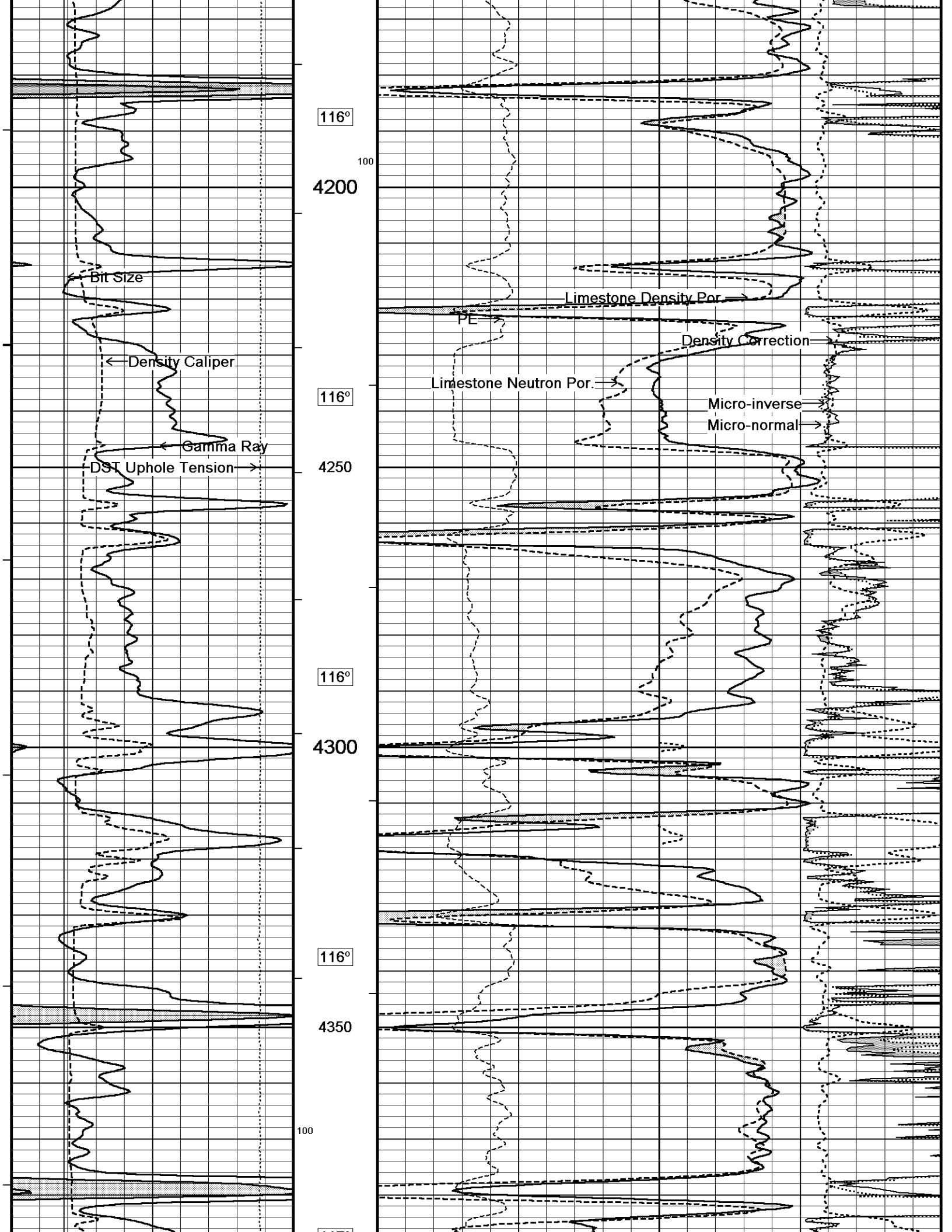
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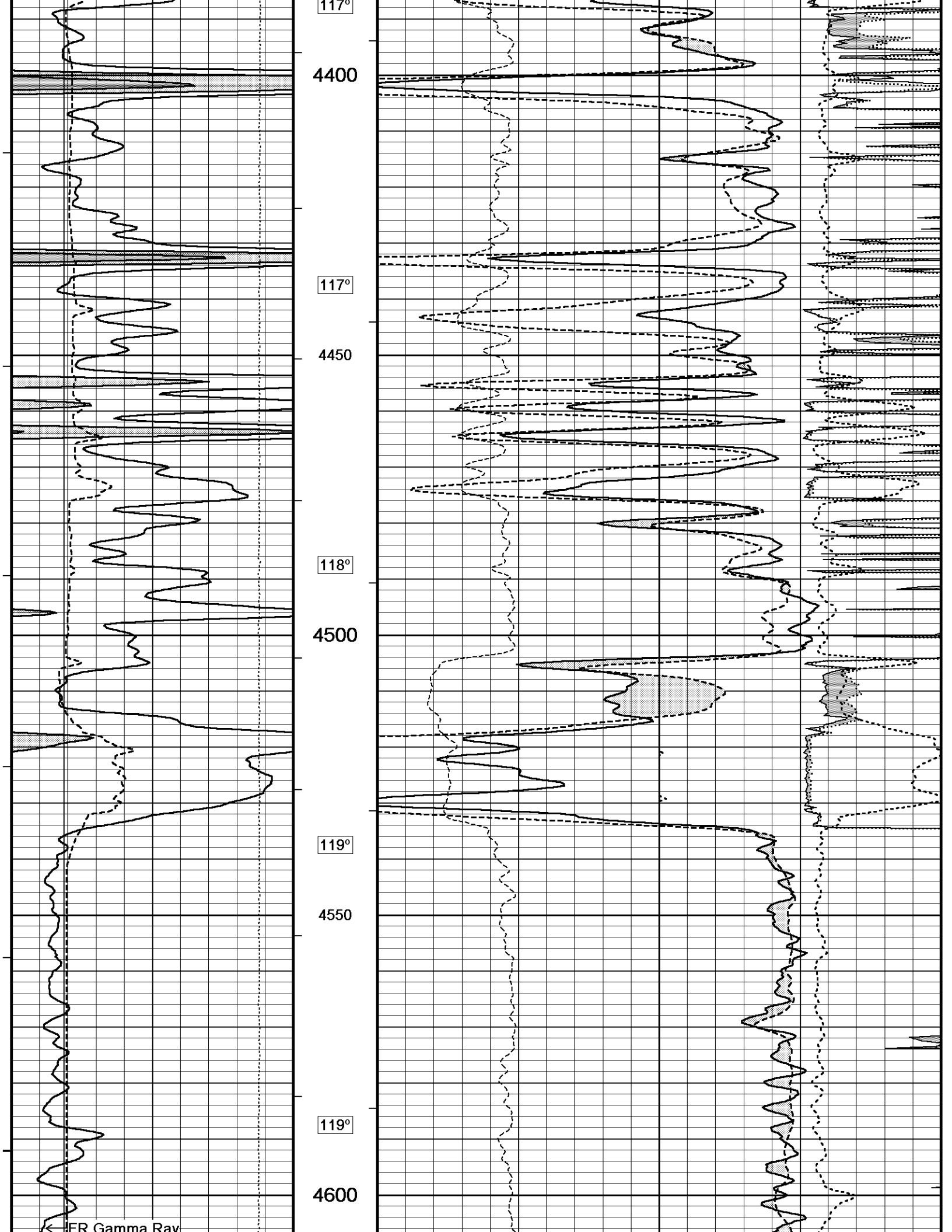
Recorded on 12-AUG-2011 18:06

System Versions: Logged with 11.03.4044 Plotted with 12.01.3513









117°

4400

117°

4450

118°

4500

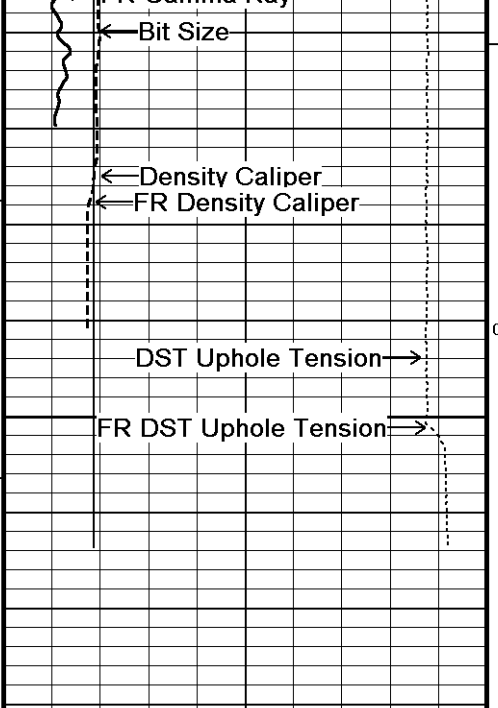
119°

4550

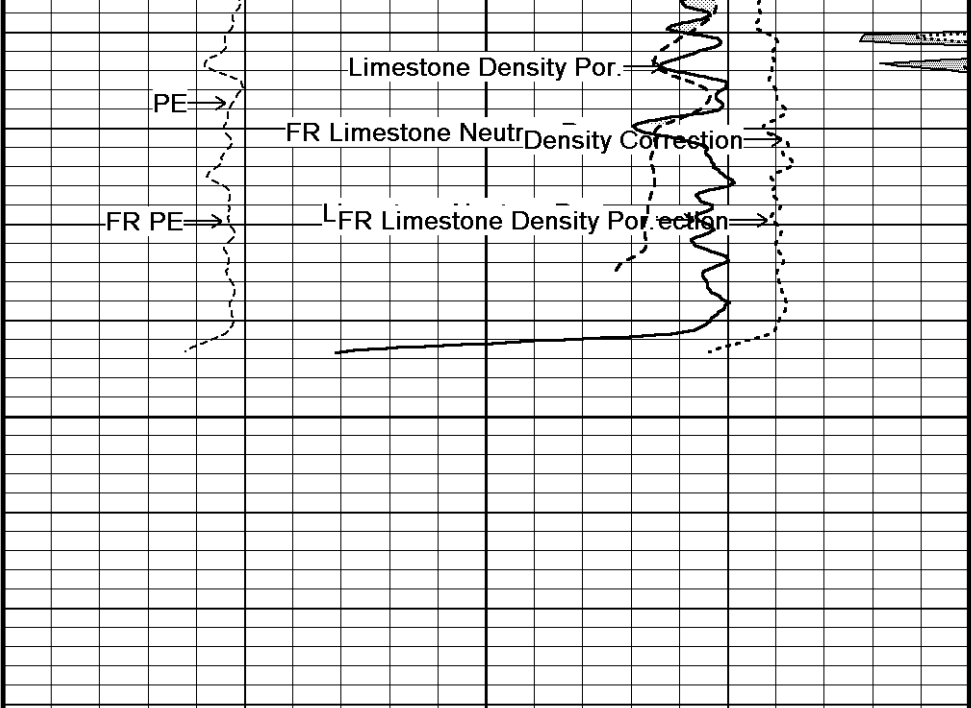
119°

4600

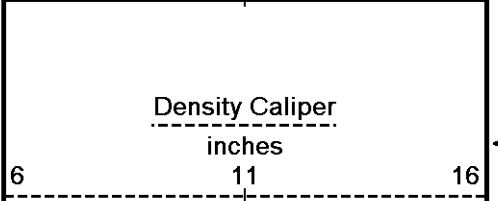
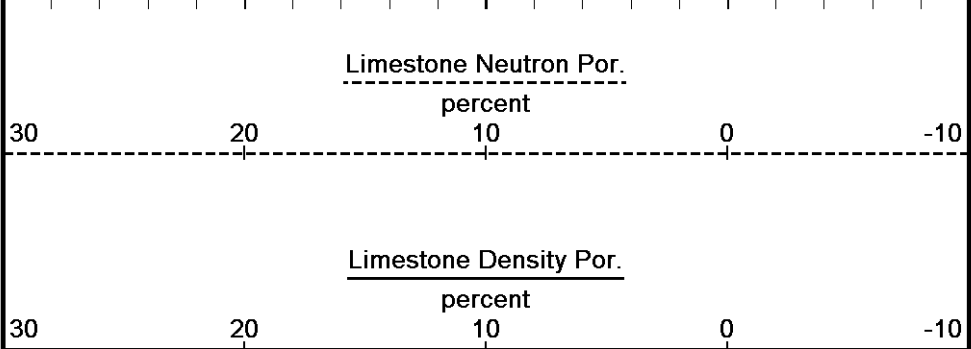
← FER Gamma Ray



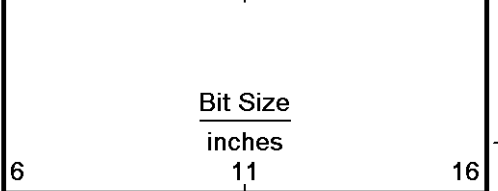
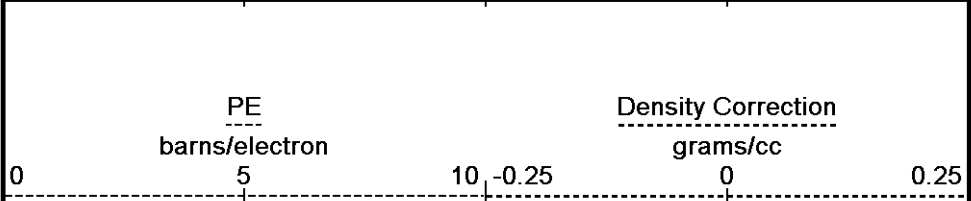
0  
4650



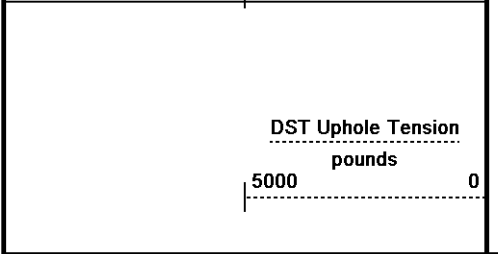
4678  
Depth in Feet  
Borehole Temp in deg F



HVI every 10 cu ft



Annular Integral every 10 cu ft



Replay Scale 1:240



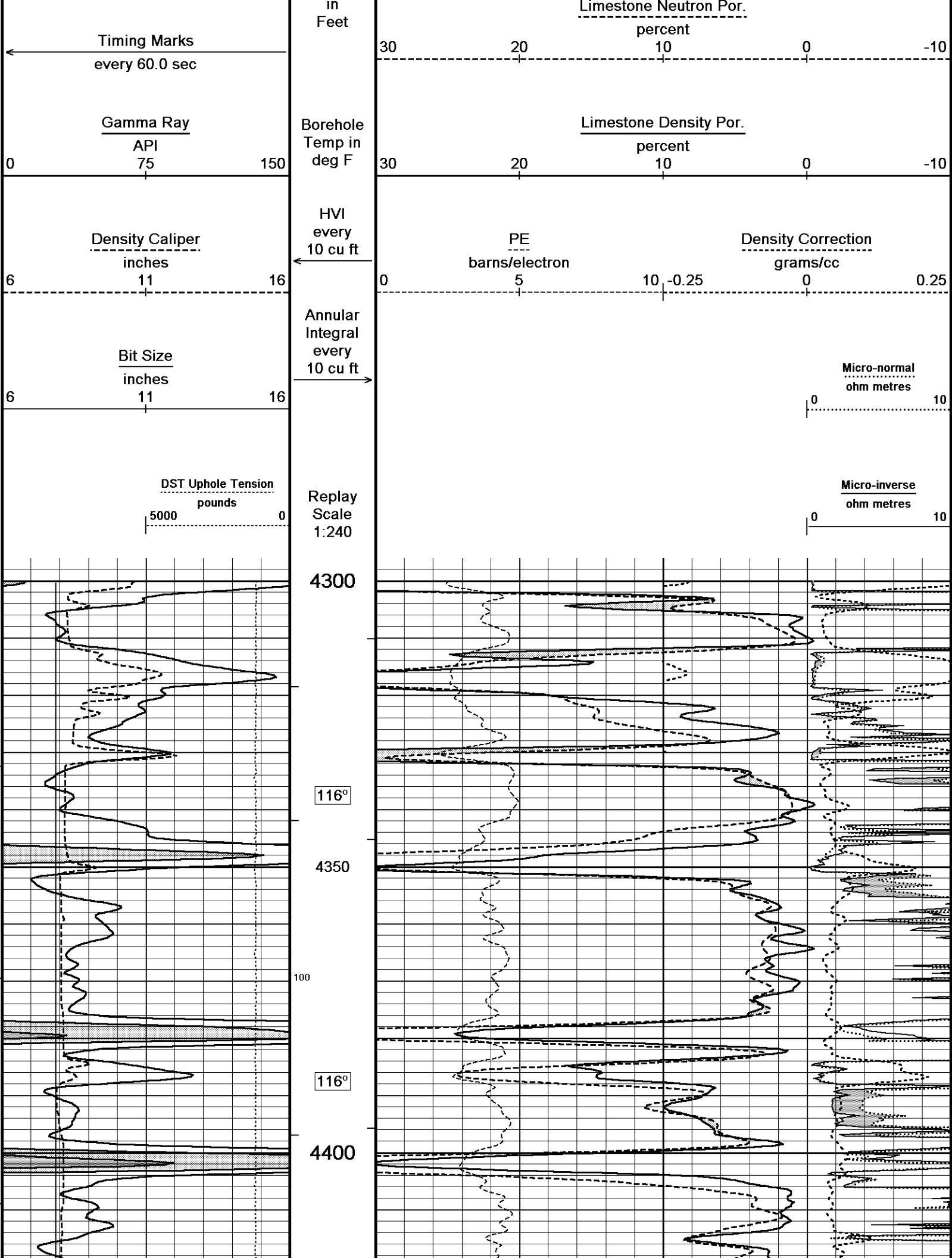
Depth Based Data - Maximum Sampling Increment 10.0cm  
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 Recorded on 12-AUG-2011 18:06  
 System Versions: Logged with 11.03.4044 Plotted with 12.01.3513

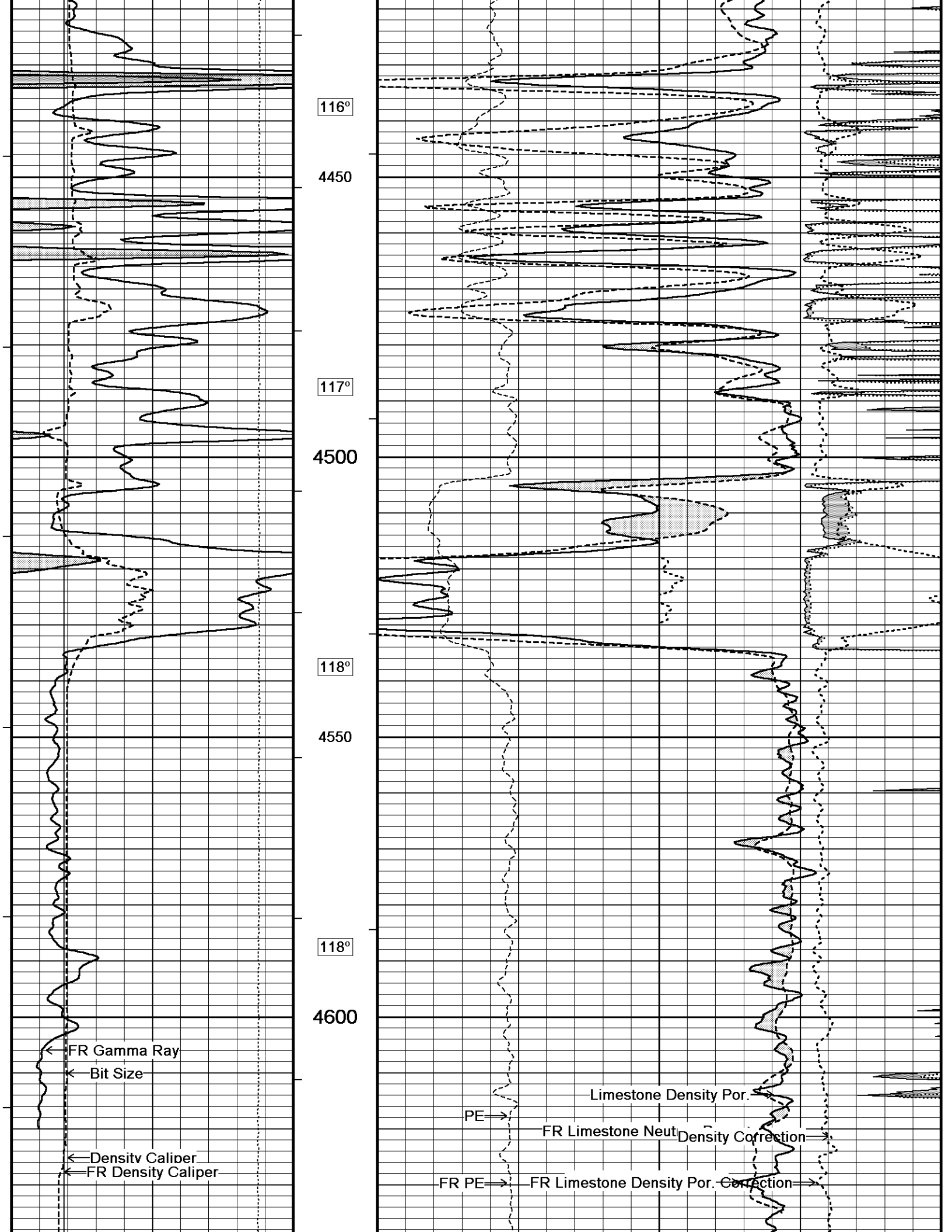
↑ 5 INCH MAIN ↑

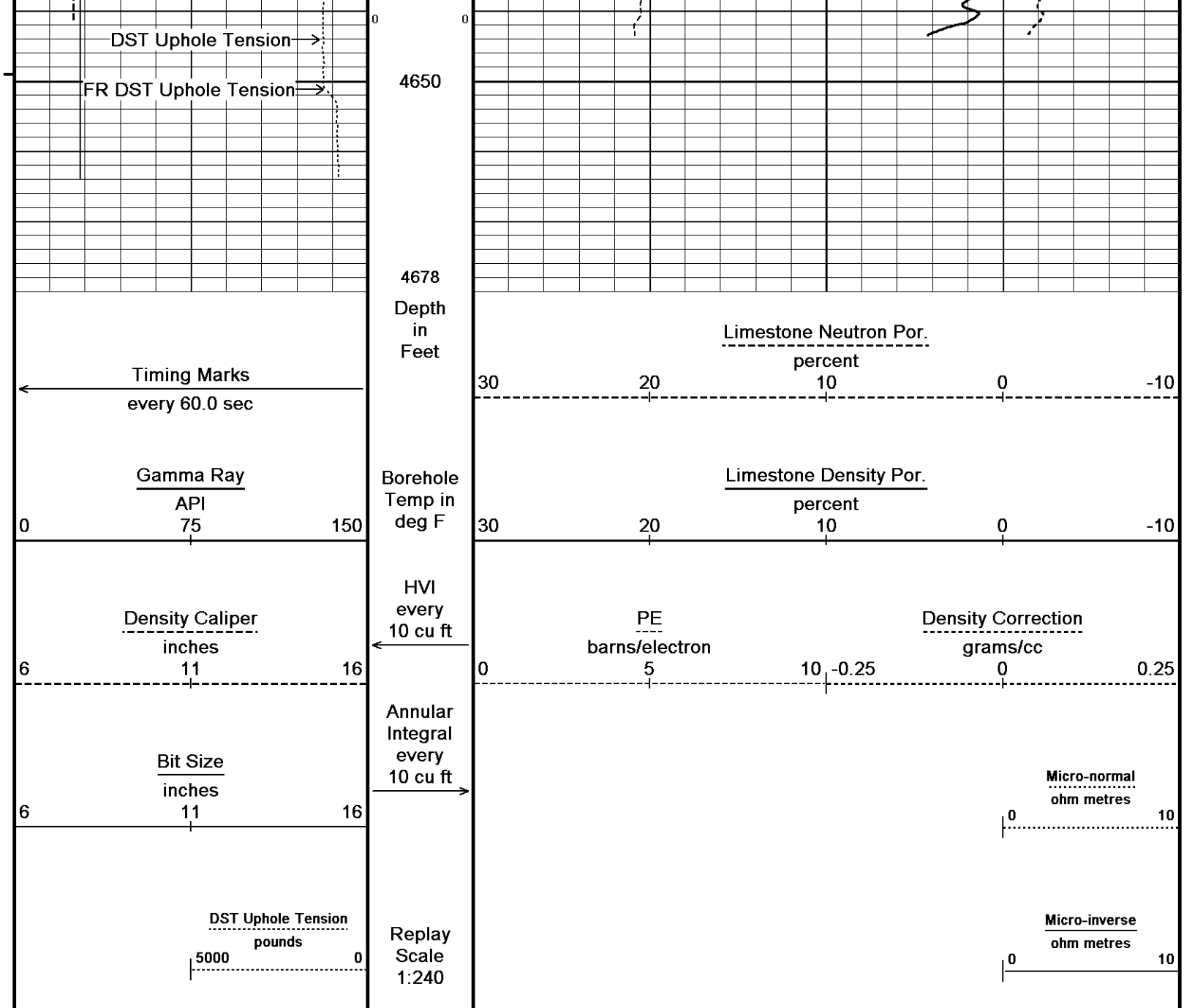
↓ REPEAT SECTION ↓

Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 31-AUG-2011 09:37  
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 Recorded on 12-AUG-2011 17:41  
 System Versions: Logged with 11.03.4044 Plotted with 12.01.3513

|  |       |  |
|--|-------|--|
|  | Depth |  |
|--|-------|--|





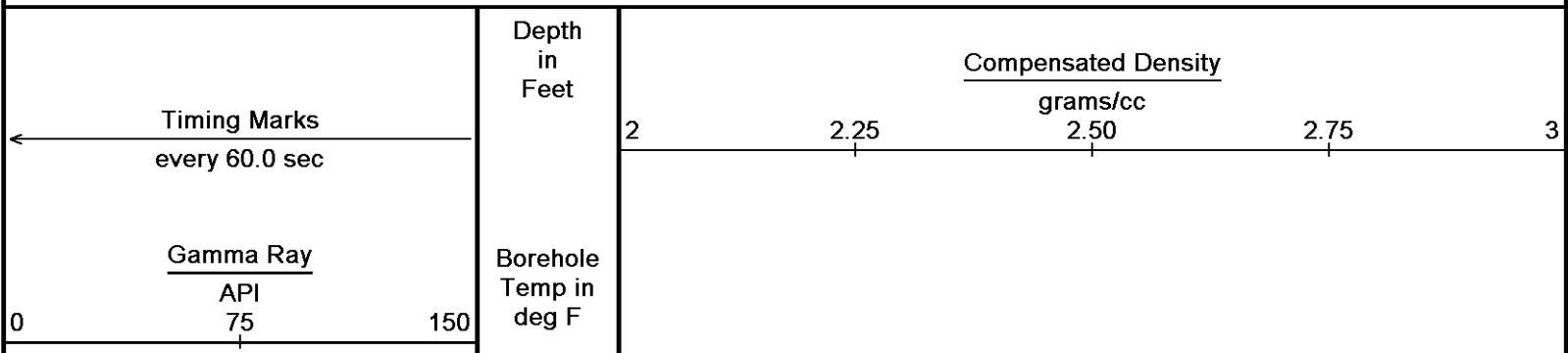


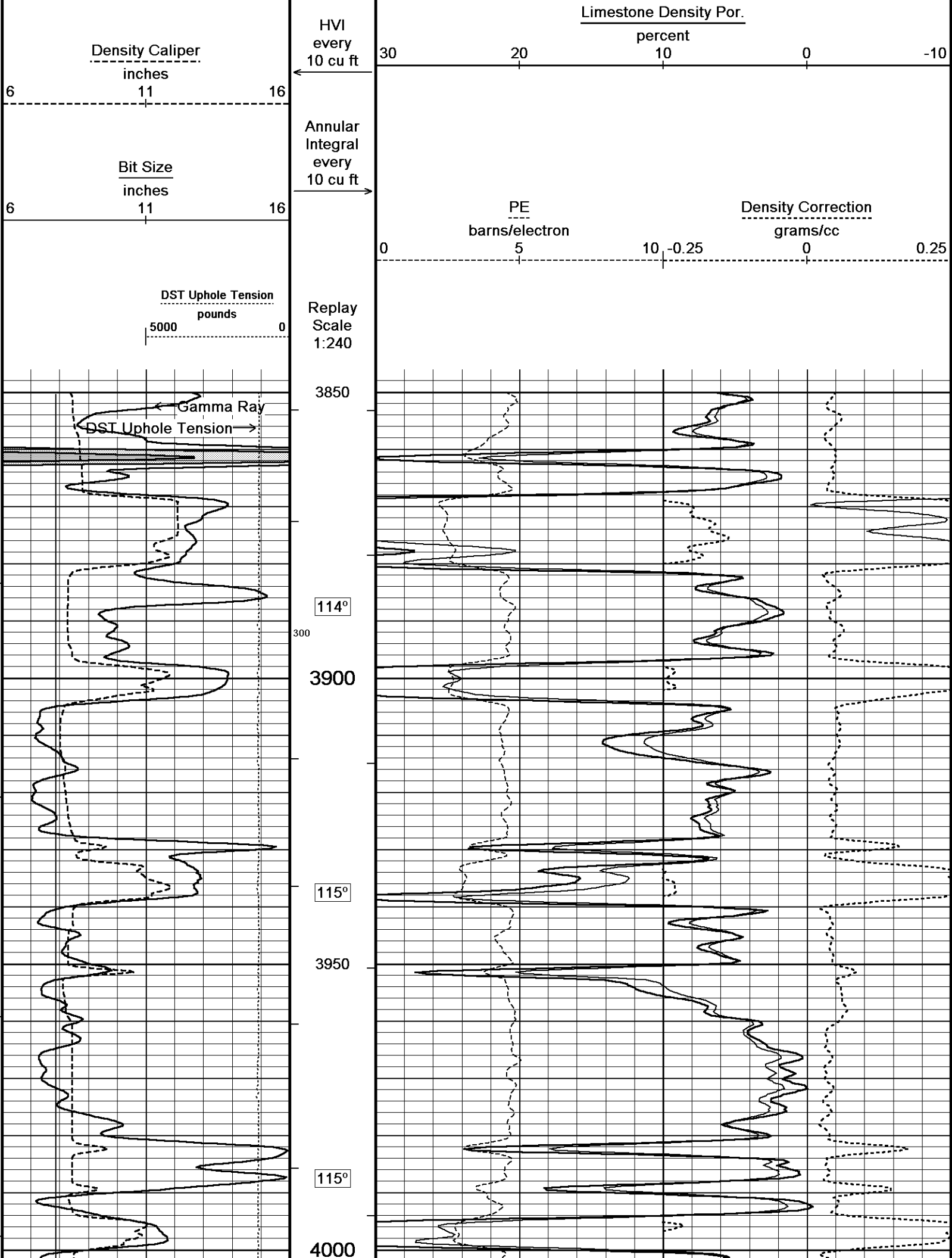
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 System Versions: Logged with 11.03.4044 Plotted with 12.01.3513

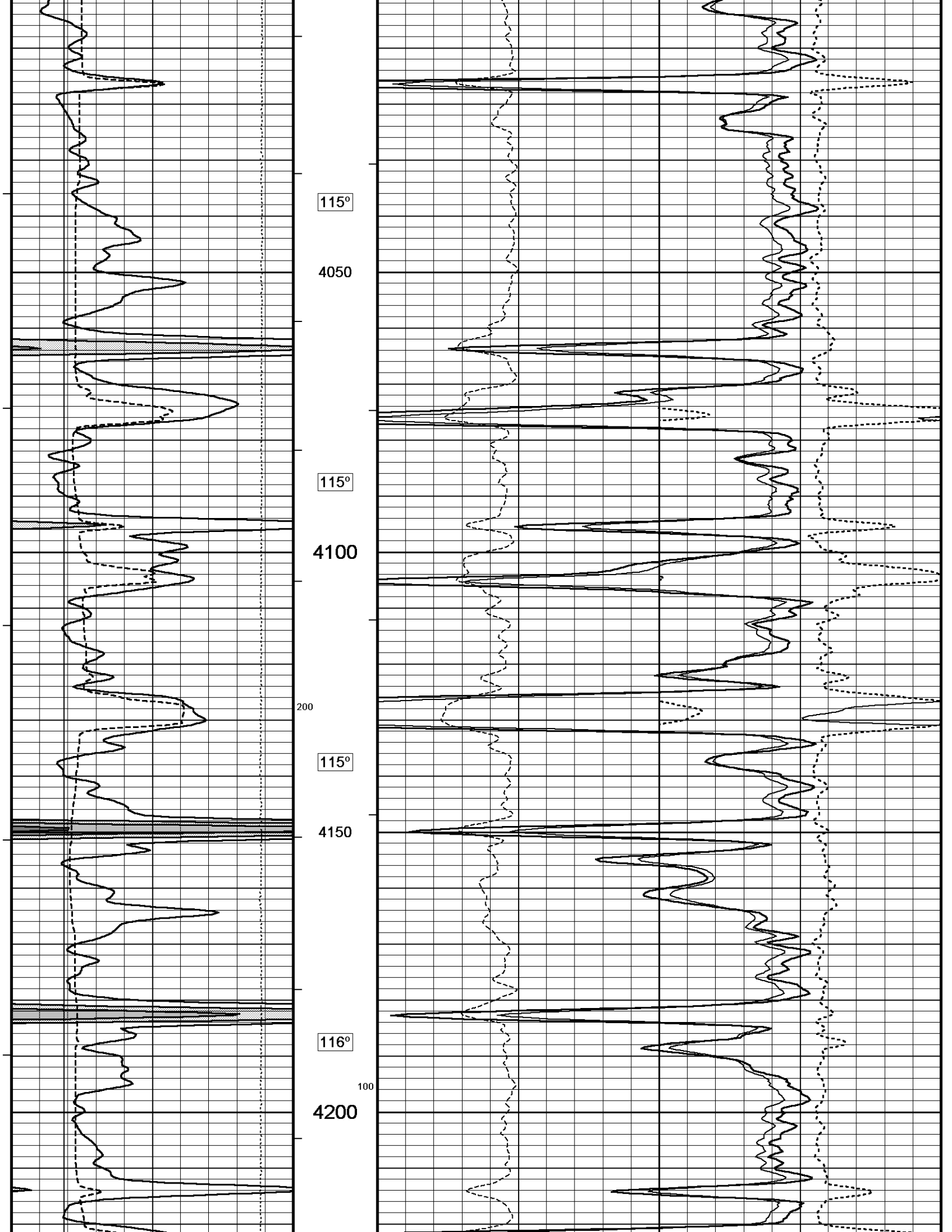
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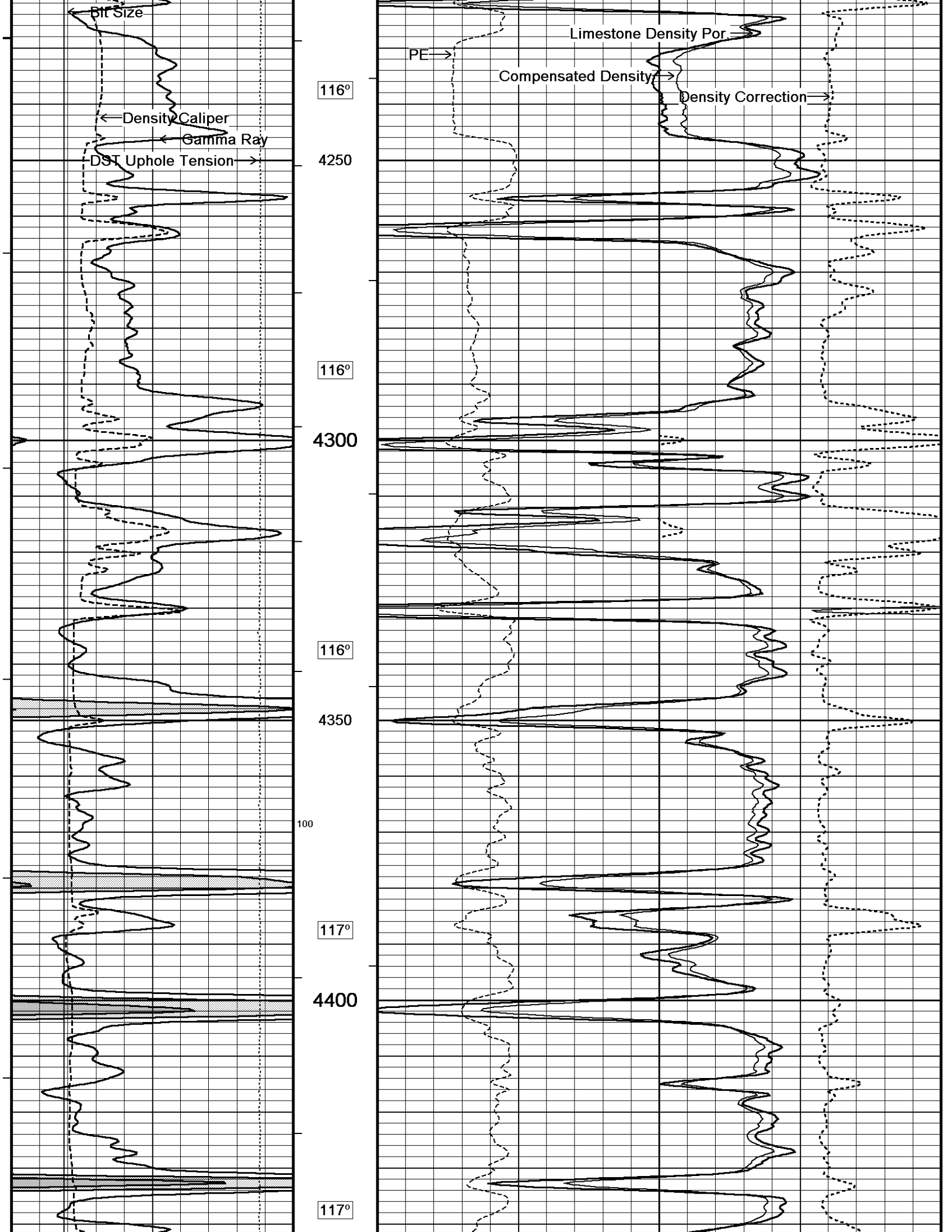
↓ 5 INCH MAIN ↓

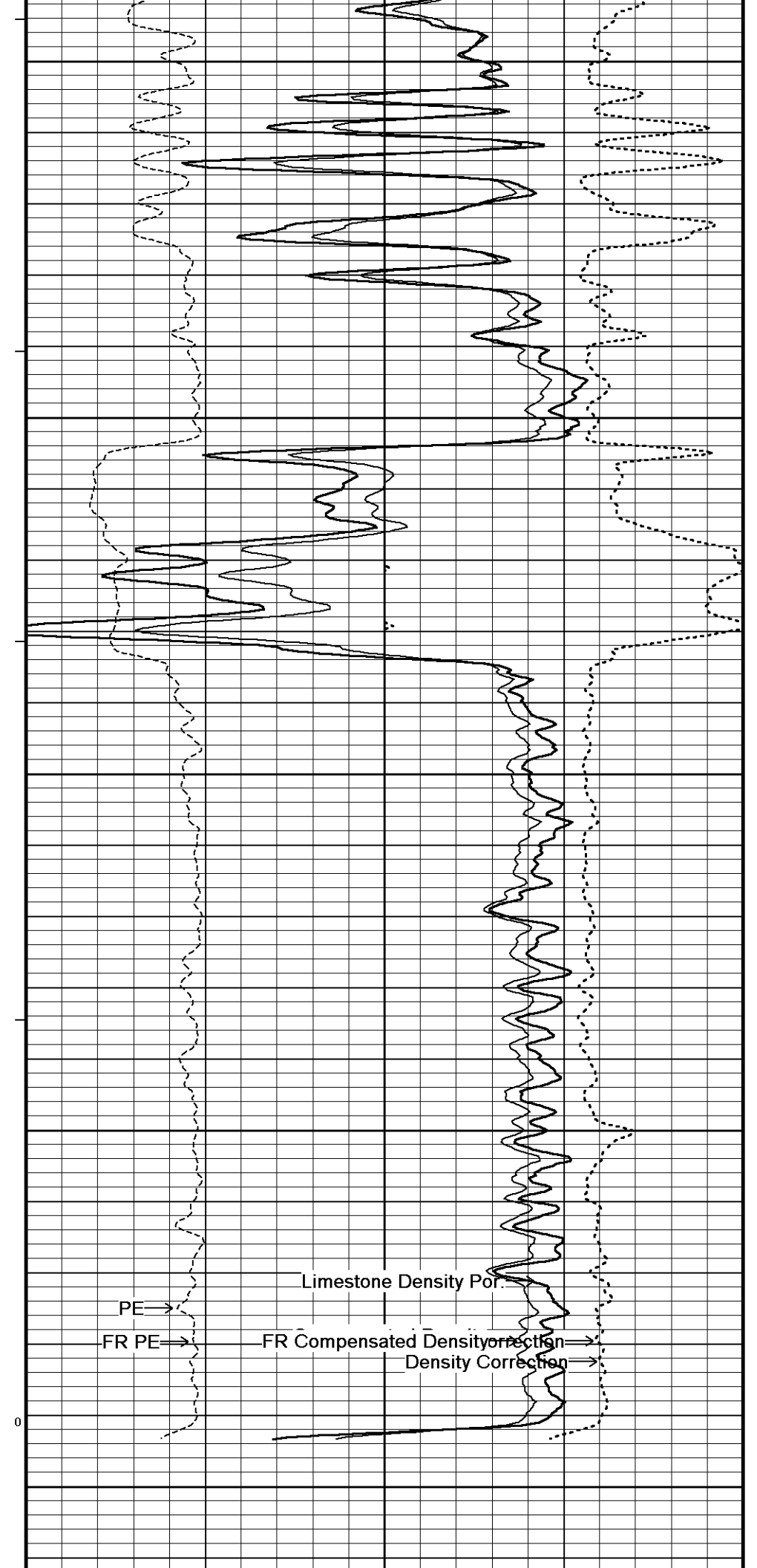
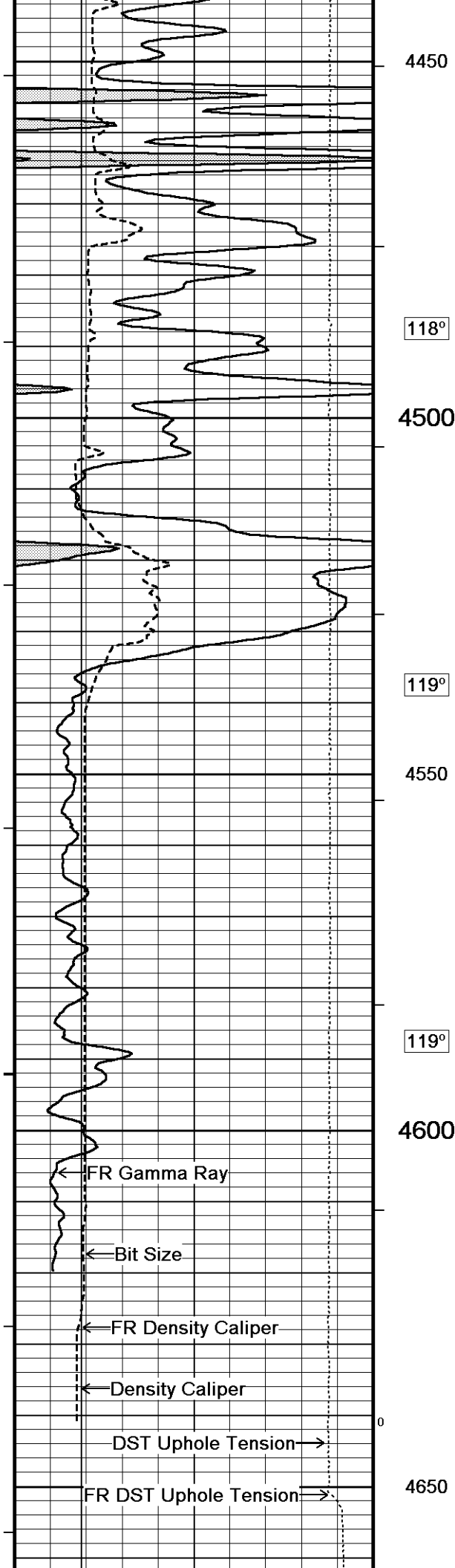
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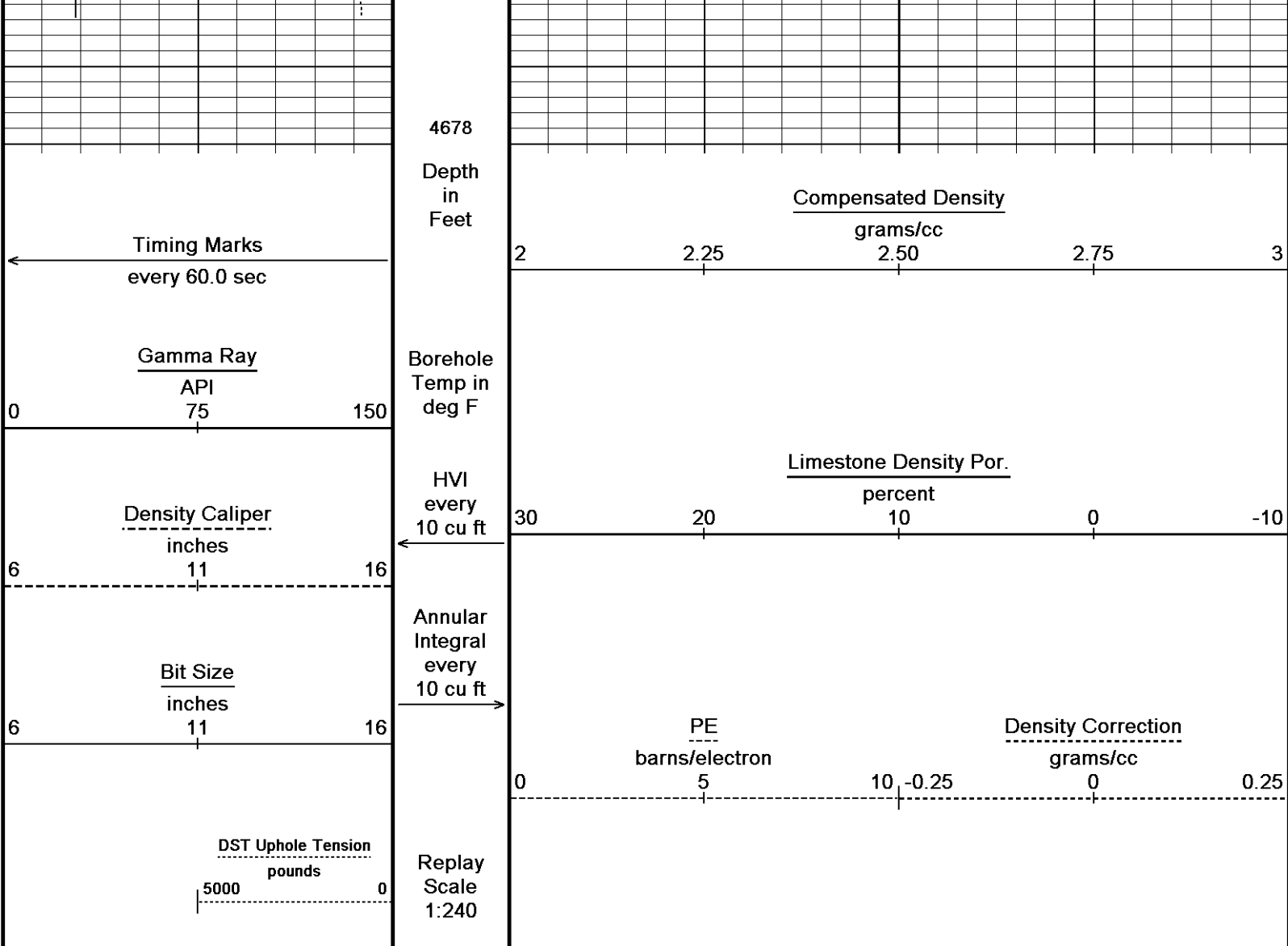










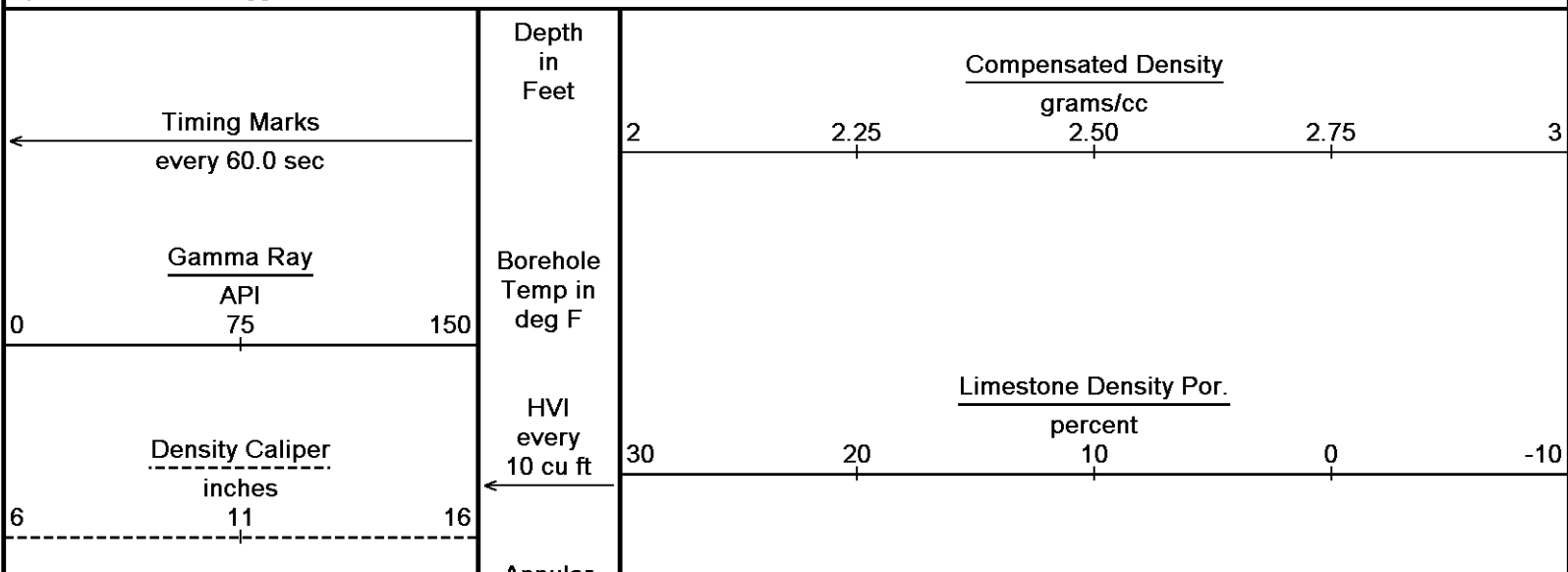


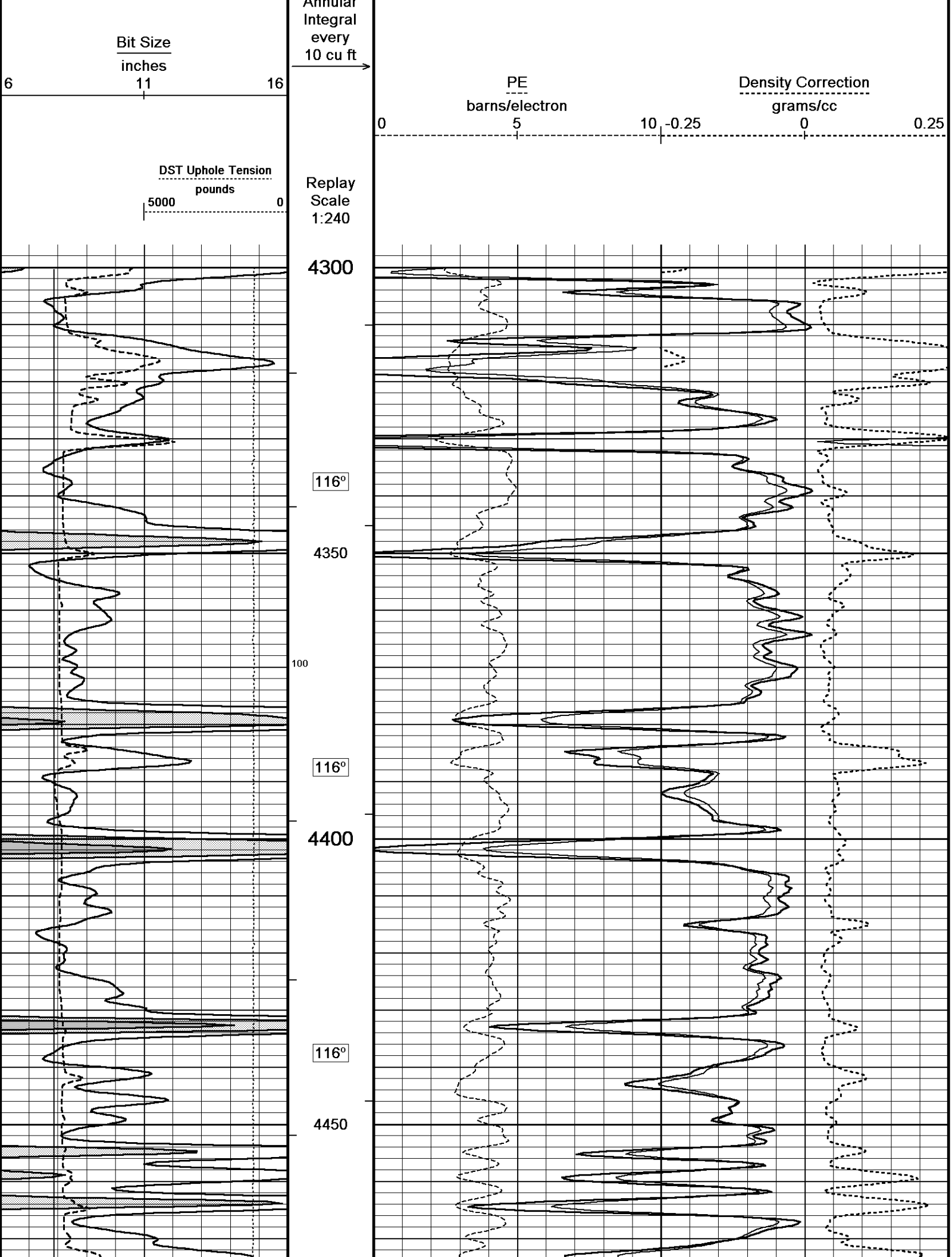
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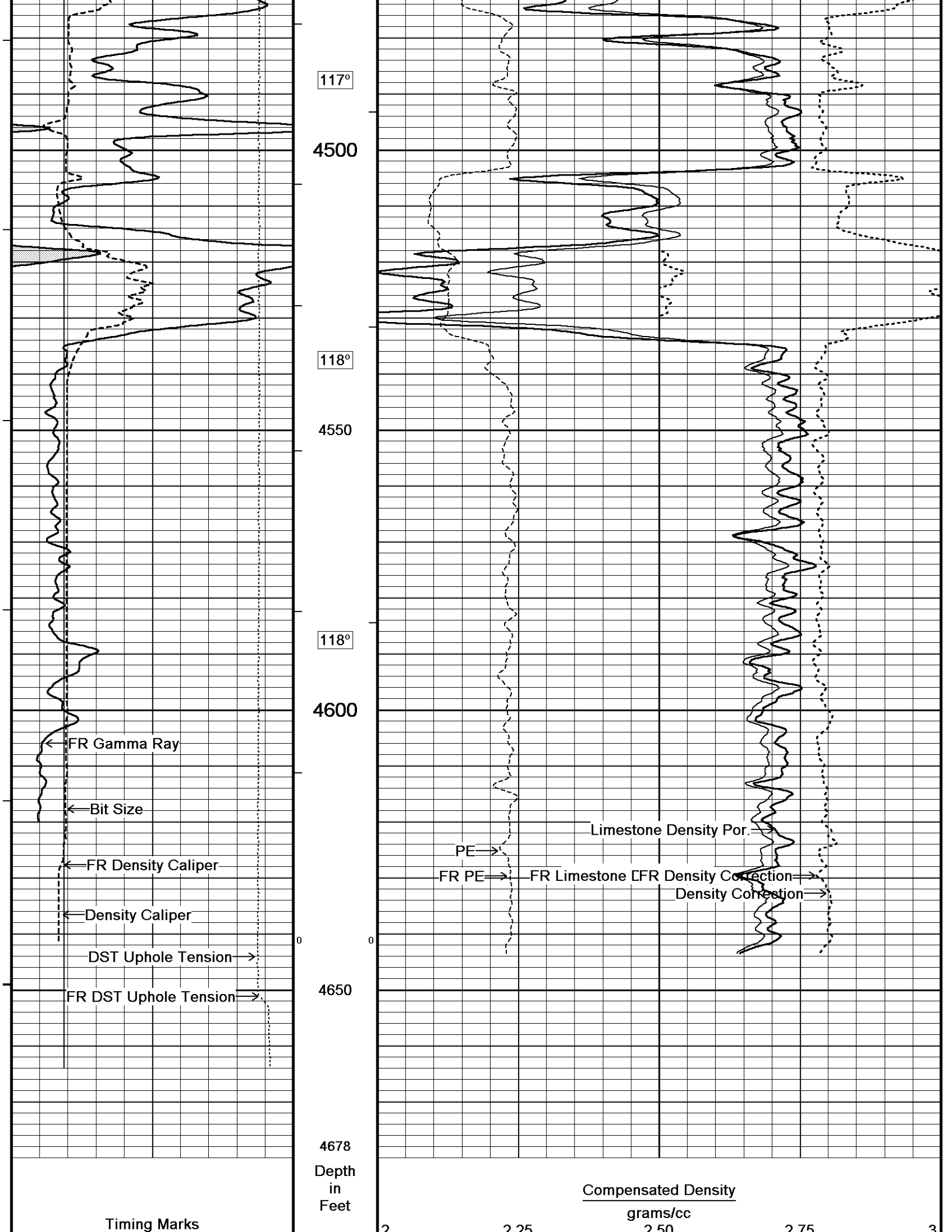
↑ **5 INCH MAIN** ↑

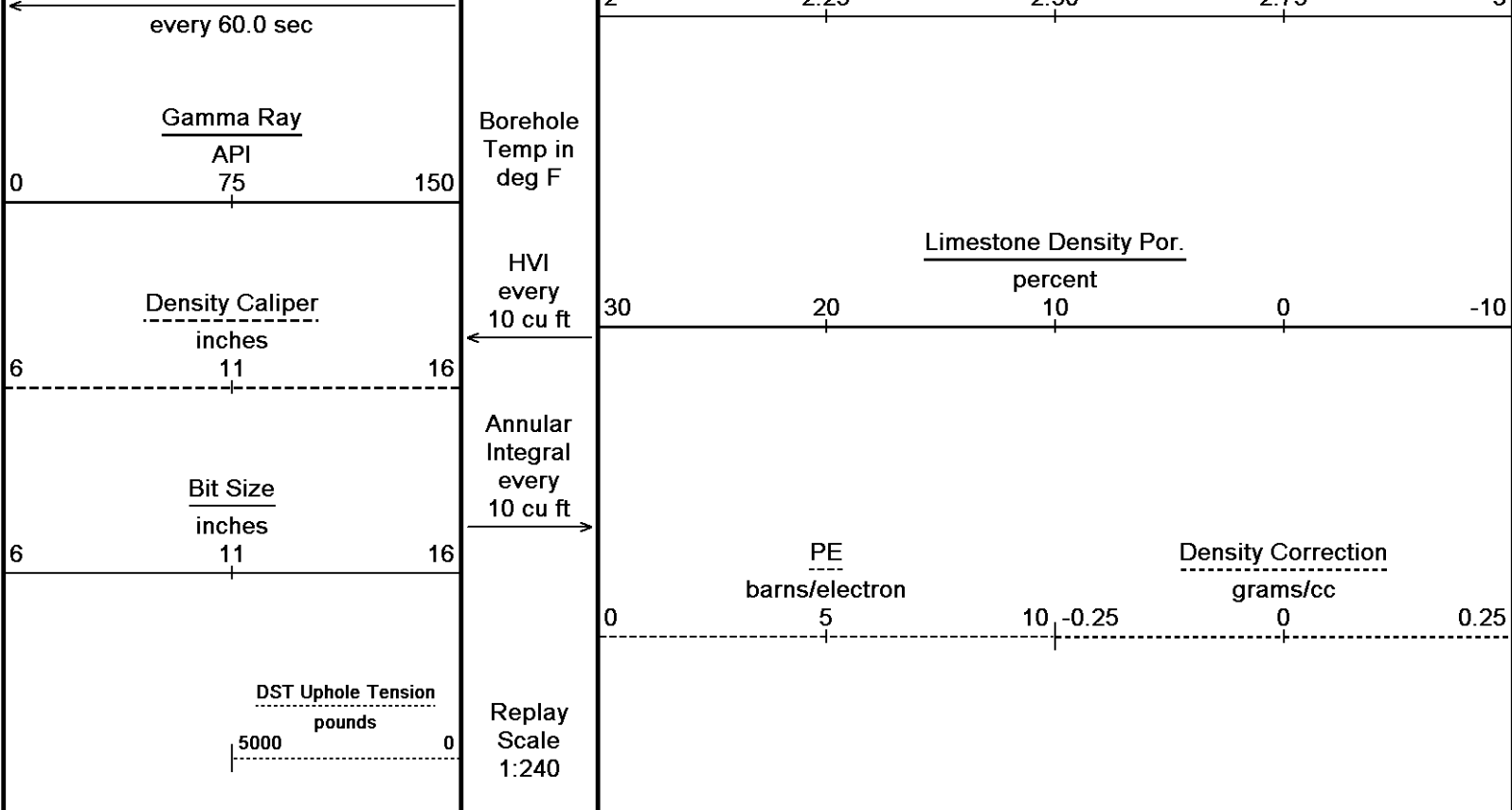
↓ **REPEAT SECTION** ↓

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 31-AUG-2011 09:37  
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 System Versions: Logged with 11.03.4044 Plotted with 12.01.3513









Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 31-AUG-2011 09:37  
 Filename: C:\DOCUME~1\sysadmin\LOCALS~1\Temp\Weatherfor...\Grand Mesa E & E # 1-34\_002.dta  
 Recorded on 12-AUG-2011 17:41  
 System Versions: Logged with 11.03.4044 Plotted with 12.01.3513

↑ REPEAT SECTION ↑

**BEFORE SURVEY CALIBRATION**  
 C:\DOCUME~1\sysadmin\LOCALS~1\Temp\Weatherford PreView\0\Grand Mesa E & E # 1-34\_003.dta

General Constants All 000 Last Edited on 12-AUG-2011 17:06

|  |                       |            |
|--|-----------------------|------------|
| <b>General Parameters</b>                                      |                       |            |
| Mud Resistivity  | 1.050                 | ohm-metres |
| Mud Resistivity Temperature                                    | 97.000                | degrees F  |
| Water Level  | 0.000                 | feet       |
| Density/Neutron 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  | Base Density Porosity |            |
| Resistivity used   | Array Ind. One Res Rt |            |
| RWA Constant A   | 0.610                 |            |
| RWA Constant M   | 2.150                 |            |

Down-hole Tension Calibration All 000 Field Calibration on 30-JUN-2010 01:00

| Reading No | Measured | Calibrated (lbs) |
|------------|----------|------------------|
| 1          | 14112.01 | 10.00            |
| 2          | 15164.79 | 427.00           |

Down-hole Tension Calibration SMS 0 Field Calibration on 30-JUN-2010 01:00

| Reading No | Measured | Calibrated (lbs) |
|------------|----------|------------------|
| 1          | 14112.01 | 10.00            |
| 2          | 15164.79 | 427.00           |

High Resolution Temperature Calibration MCG-C 139

Field Calibration on 02-AUG-2011 18:13

|       | Measured | Calibrated(Deg F) |
|-------|----------|-------------------|
| Lower | 50.00    | 50.00             |
| Upper | 75.00    | 75.00             |

High Resolution Temperature Constants MCG-C 139

Last Edited on

Pre-filter Length 11

SP Calibration MCG-C 139

Field Calibration on 02-AUG-2011 18:12

|             | Measured | Calibrated (mV) |
|-------------|----------|-----------------|
| Reference 1 | 103.5    | 100.0           |
| Reference 2 | -96.9    | -100.0          |

Gamma Calibration MCG-C 139

Field Calibration on 11-AUG-2011 16:09

|                    | Measured | Calibrated (API) |
|--------------------|----------|------------------|
| Background         | 73       | 50               |
| Calibrator (Gross) | 1130     | 775              |
| Calibrator (Net)   | 1057     | 725              |

Gamma Constants MCG-C 139

Last Edited on 12-AUG-2011 17:03

|                               |                 |       |
|-------------------------------|-----------------|-------|
| Gamma Calibrator Number       | grc38           |       |
| Mud Density                   | 1.10            | gm/cc |
| Caliper Source for Processing | Density Caliper |       |
| Tool Position                 | Eccentred       |       |
| Concentration of KCl          | 0.00            | kppm  |

Micro Normal and Micro Inverse Calibration MML-A 16

Base Calibration on 02-AUG-2011 16:55

Field Check on 11-AUG-2011 15:49

Base Calibration

| Channel       | Resistor 1 | Resistor 2 | Measured   |            | Calibrated (ohm-m) |            |
|---------------|------------|------------|------------|------------|--------------------|------------|
|               |            |            | Resistor 1 | Resistor 2 | Resistor 1         | Resistor 2 |
| Micro Normal  | 12.2       | 60.2       | 2.6        | 12.8       |                    |            |
| Micro Inverse | 15.6       | 78.4       | 1.7        | 8.4        |                    |            |

| Channel       | Base Check (ohm-m) | Field Check (ohm-m) |
|---------------|--------------------|---------------------|
| Micro Normal  | 32.1               | 32.1                |
| Micro Inverse | 16.3               | 16.3                |

Micro Normal and Micro Inverse Constants MML-A 16

Last Edited on 12-AUG-2011 17:04

|                        |   |        |        |
|------------------------|---|--------|--------|
| 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        |   | N/A    | inches |

Caliper Calibration MML-A 16

Base Calibration on 02-AUG-2011 17:07

Field Calibration on 11-AUG-2011 15:48

Base Calibration

| Reading No | Measured | Calibrator Size (in) |
|------------|----------|----------------------|
| 1          | 14087    | 5.98                 |
| 2          | 17465    | 7.97                 |
| 3          | 20778    | 9.86                 |
| 4          | 24732    | 11.92                |
| 5          | 0        | 0.00                 |
| 6          | N/A      | N/A                  |

Field Calibration

| Measured Caliper (in) | Actual Caliper (in) |
|-----------------------|---------------------|
| 6.05                  | 5.98                |

Neutron Calibration MDN-A.B 66

Base Calibration on 02-AUG-2011 19:16

Field Check on 11-AUG-2011 16:02

Base Calibration

| Ratio | Measured |     | Calibrated (cps) |     |
|-------|----------|-----|------------------|-----|
|       | Near     | Far | Near             | Far |
|       | 3250     | 102 | 3714             | 110 |
|       | 31.962   |     | 33.764           |     |

Field Calibrator at Base

Calibrated (cps)

Field Calibrator at Base

Calibrated (cps)  
1591      2269  
Ratio      0.701

Field Check

Calibrated (cps)  
1571      2283  
Ratio      0.688

Neutron Constants MDN-A.B 66

Last Edited on 12-AUG-2011 17:05

Neutron Source Id      P58125B  
Neutron Jig Number      5824NE  
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      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  
Formation Fluid Salinity Source      Constant Value  
Formation Fluid Salinity      0.00      kppm  
Barite Mud Correction      Not Applied

FE Calibration MFE-A.A 52

Base Calibration on 02-AUG-2011 16:38  
Field Check on 11-AUG-2011 15:47

Base Calibration

|             | Measured | Calibrated (ohm-m) |
|-------------|----------|--------------------|
| Reference 1 | 0.0      | 0.0                |
| Reference 2 | 964.4    | 126.8              |
| Base Check  |          | 280.0              |
| Field Check |          | 280.1              |

FE Constants MFE-A.A 52

Last Edited on 12-AUG-2011 17:05

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 167

Field Calibration on 02-AUG-2011 18:25

|       | Measured | Calibrated(Deg F) |
|-------|----------|-------------------|
| Lower | 1.00     | 33.80             |
| Upper | 11.00    | 51.80             |

High Resolution Temperature Constants MAI-A.A 167

Last Edited on

Pre-filter Length      11

Induction Calibration MAI-A.A 167

Base Calibration on 11-MAR-2011 09:58  
Field Check on 11-AUG-2011 15:45

Base Calibration

| Test Loop Calibration Channel | Measured            |       | Calibrated (mmho/m)  |        |
|-------------------------------|---------------------|-------|----------------------|--------|
|                               | Low                 | High  | Low                  | High   |
| 1                             | 17.3                | 474.2 | 9.3                  | 966.2  |
| 2                             | 6.3                 | 388.4 | 7.6                  | 821.4  |
| 3                             | 3.3                 | 259.4 | 5.2                  | 566.0  |
| 4                             | 1.9                 | 133.0 | 2.6                  | 279.2  |
| Array Temperature             | 76.8                |       | Deg F                |        |
| Channel                       | Base Check (mmho/m) |       | Field Check (mmho/m) |        |
|                               | Low                 | High  | Low                  | High   |
| 1                             | 0.0                 | 0.0   | 13.8                 | 3837.3 |

|                   |     |     |      |        |
|-------------------|-----|-----|------|--------|
| 1                 | 0.0 | 0.0 | 19.8 | 3037.3 |
| 2                 | 0.0 | 0.0 | 29.7 | 3474.6 |
| 3                 | 0.0 | 0.0 | 29.1 | 3050.7 |
| 4                 | 0.0 | 0.0 | 19.7 | 2079.9 |
| Deep              | 0.0 | 0.0 | 18.6 | 2047.2 |
| Medium            | 0.0 | 0.0 | 42.2 | 3988.3 |
| Shallow           | 0.0 | 0.0 | 43.2 | 5051.1 |
| Array Temperature |     | 0.0 | 85.4 | Deg F  |

Induction Constants MAI-A.A 167

Last Edited on 12-AUG-2011 17:05

|  |        |                          |             |
|--|--------|--------------------------|-------------|
| 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                      |        | 8.0000                   |             |
| Stand-off Fin Angle                              |        | 45.00                    | 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 35

Base Calibration on 02-AUG-2011 17:17  
Field Calibration on 11-AUG-2011 15:51

|                   |                       |                      |
|-------------------|-----------------------|----------------------|
| Base Calibration  |                       |                      |
| Reading No        | Measured              | Calibrator Size (in) |
| 1                 | 19303                 | 3.99                 |
| 2                 | 29535                 | 5.98                 |
| 3                 | 39888                 | 7.97                 |
| 4                 | 49472                 | 9.86                 |
| 5                 | 60384                 | 11.92                |
| 6                 | N/A                   | N/A                  |
| Field Calibration |                       |                      |
|                   | Measured Caliper (in) | Actual Caliper (in)  |
|                   | 5.98                  | 5.98                 |

Photo Density Calibration MPD-B 35

Base Calibration on 02-AUG-2011 18:00  
Field Check on 11-AUG-2011 15:56

|                     |          |       |                  |       |
|---------------------|----------|-------|------------------|-------|
| Density Calibration |          |       |                  |       |
| Base Calibration    |          |       |                  |       |
|                     | Measured |       | Calibrated (sdu) |       |
|                     | Near     | Far   | Near             | Far   |
| Reference 1         | 56174    | 27139 | 59556            | 30836 |
| Reference 2         | 22984    | 2574  | 24941            | 2541  |

Field Check at Base  
1165.2 1387.5

Field Check  
1163.6 1388.5

PE Calibration

| Base Calibration | WS    | Measured WH | Ratio | Calibrated Ratio |
|------------------|-------|-------------|-------|------------------|
| Background       | 207   | 1028        |       |                  |
| Reference 1      | 20811 | 55977       | 0.375 | 0.371            |
| Reference 2      | 6055  | 22836       | 0.268 | 0.272            |

Field Check at Base  
207.3 1028.3

Field Check  
208.9 1028.0

Density Constants MPD-B 35

Last Edited on 12-AUG-2011 17:05

|                               |                 |       |
|-------------------------------|-----------------|-------|
| 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                   | 1.10            | 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                          | 0.00            |       |

DOWNHOLE EQUIPMENT

C:\DOCUME~1\sysadmin\LOCALS~1\Temp\Weatherford PreView\0\Grand Mesa E & E # 1-34\_003.dta

Compact Comms Gamma  
MCG-C 139 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

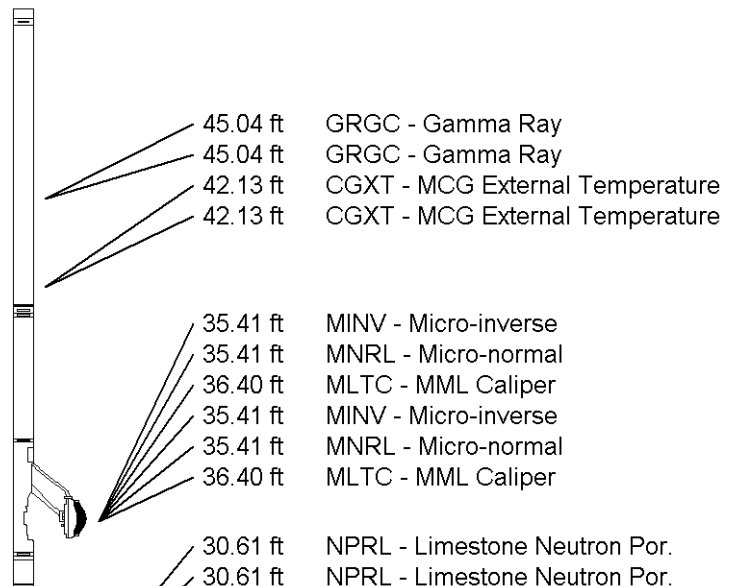
Compact Comms Gamma  
MCG-C 139 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log  
MML-A 16 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Micro-log  
MML-A 16 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Neutron  
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Neutron  
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in



Compact Density/Caliper  
MPD-B 35 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Density/Caliper  
MPD-B 35 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

SKJ-D.A Compact Knuckle Joint  
SKJ-D.A 36 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SKJ-D.A Compact Knuckle Joint  
SKJ-D.A 36 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

Compact Focussed Electric  
MFE-A.A 52 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

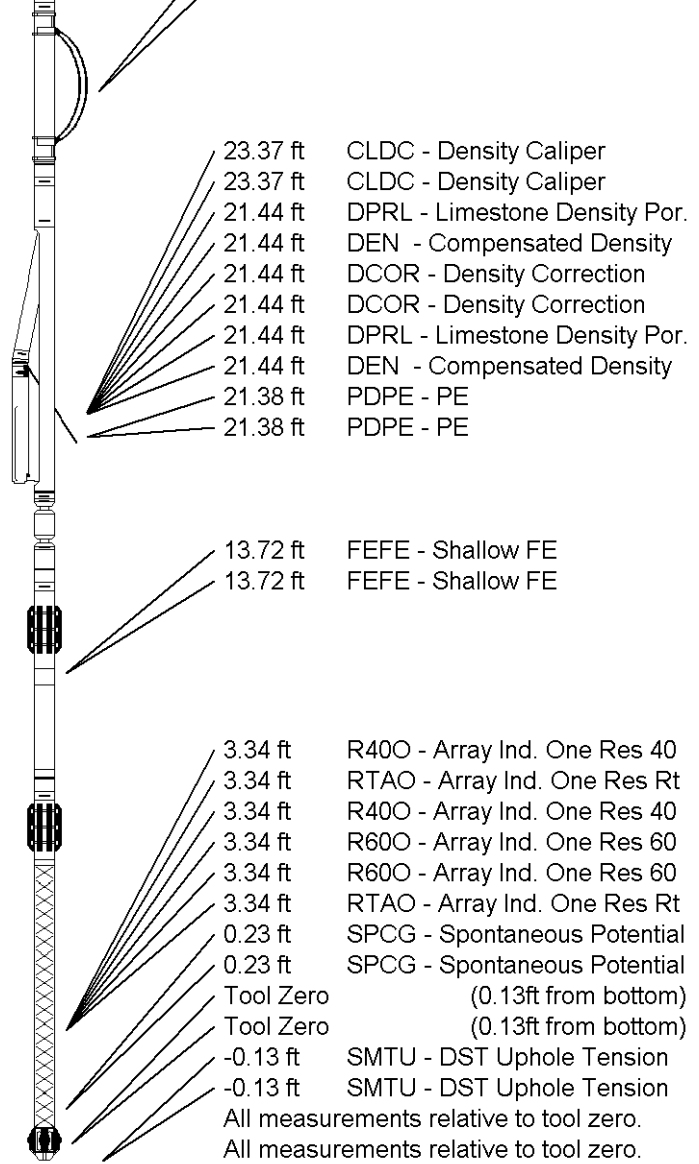
Compact Focussed Electric  
MFE-A.A 52 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction  
MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in


Compact Induction  
MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 50.32 ft Weight: 407.9 lb

Total Length: 50.32 ft Weight: 407.9 lb



|                         |                              |      |               |         |      |
|-------------------------|------------------------------|------|---------------|---------|------|
| <b>COMPANY</b>          | GRAND MESA OPERATING COMPANY |      |               |         |      |
| <b>WELL</b>             | E & E # 1-34                 |      |               |         |      |
| <b>FIELD</b>            | WILDCAT                      |      |               |         |      |
| <b>PROVINCE/COUNTY</b>  | LOGAN                        |      |               |         |      |
| <b>COUNTRY/STATE</b>    | U.S.A. / KANSAS              |      |               |         |      |
| Elevation Kelly Bushing | 2879.00                      | feet | First Reading | 4628.00 | feet |
| Elevation Drill Floor   | 2877.00                      | feet | Depth Driller | 4650.00 | feet |
| Elevation Ground Level  | 2874.00                      | feet | Depth Logger  | 4651.00 | feet |



**COMPACT PHOTO DENSITY  
COMPENSATED NEUTRON  
MICRORESISTIVITY LOG**

