



Weatherford[®]

**COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG**

COMPANY **M & M EXPLORATION, INC.**
WELL **Z-BAR 8-1**
FIELD **AETNA SE**
PROVINCE/COUNTY **BARBER**
COUNTRY/STATE **U.S.A. / KANSAS**
LOCATION **500' FNL & 600' FEL NE/4**

SEC **8** TWP **34S** RGE **14W** Other Services
MAI/MFE
API Number **15-007-23999**
Permit Number

Permanent Datum G.L., Elevation 1658 feet
Log Measured From **KB**
Drilling Measured From **K.B. @ 10 FEET**

Date **13-APR-2013** Elevations: **KB 1668.00**
DF 1666.00
GL 1658.00

| | | |
|------------------------|--------------|--------------|
| Run Number | ONE | |
| Service Order | 3539885 | |
| Depth Driller | 5200.00 | feet |
| Depth Logger | 5198.00 | feet |
| First Reading | 5178.00 | feet |
| Last Reading | 3800.00 | feet |
| Casing Driller | 312.00 | feet |
| Casing Logger | 311.00 | inches |
| Bit Size | 7.875 | |
| Hole Fluid Type | CHEMICAL | lb/USg |
| Density / Viscosity | 9.00 lb/USg | 45.00 CP |
| PH / Fluid Loss | 9.80 | 9.80 |
| Sample Source | FLOWLINE | |
| Rm @ Measured Temp | 0.67 @ 82.0 | ohm-m |
| Rmf @ Measured Temp | 0.54 @ 82.0 | ohm-m |
| Rmc @ Measured Temp | 0.80 @ 82.0 | ohm-m |
| Source Rmf / Rmc | CALC | CALC |
| Rm @ BHT | 0.47 @ 118.0 | ohm-m |
| Time Since Circulation | 3 HOURS | |
| Max Recorded Temp | 118.00 | deg F |
| Equipment / Base | 13057 | LIB |
| Recorded By | J. LAPPOINT | |
| Witnessed By | BILL BUSCH | W. STAMBAUGH |
| JOB# | LB13-098 | |

BOREHOLE RECORD Last Edited: 13-APR-2013 06:05

| Bit Size inches | Depth From feet | Depth To feet |
|--------------------|--------------------|------------------|
| 7.875 | 311.00 | 5198.00 |

CASING RECORD

| Type | Size inches | Depth From feet | Shoe Depth feet | Weight pounds/ft |
|---------|----------------|--------------------|--------------------|---------------------|
| SURFACE | 13.375 | 0.00 | 311.00 | 48.00 |

REMARKS

Tools Ran: MCG, MML, MDN, MPD, MFE, MAI ran in combination.
 Hardware Used: MDN Dual bowspring used. MPD 8 inch profile plate used. MAI and MFE 0.5 Inch standoffs used.
 2.71 g/cc Limestone Density Matrix used to calculate porosity.
 All intervals logged and scaled per customer's request.
 Tight pulls, washouts and borehole rugosity will affect data quality.
 Total hole volume from TD to Surface Casing= 1958 cu. ft.
 Annular volume with 5.5 inch production casing from TD to 3800 ft.= 229 cu. ft.
 Service order: #3539885
 Rig: Hardt Drilling Rig #1
 Engineer: W. Stambaugh, J. LaPoint
 Operator(s): R. Venegas

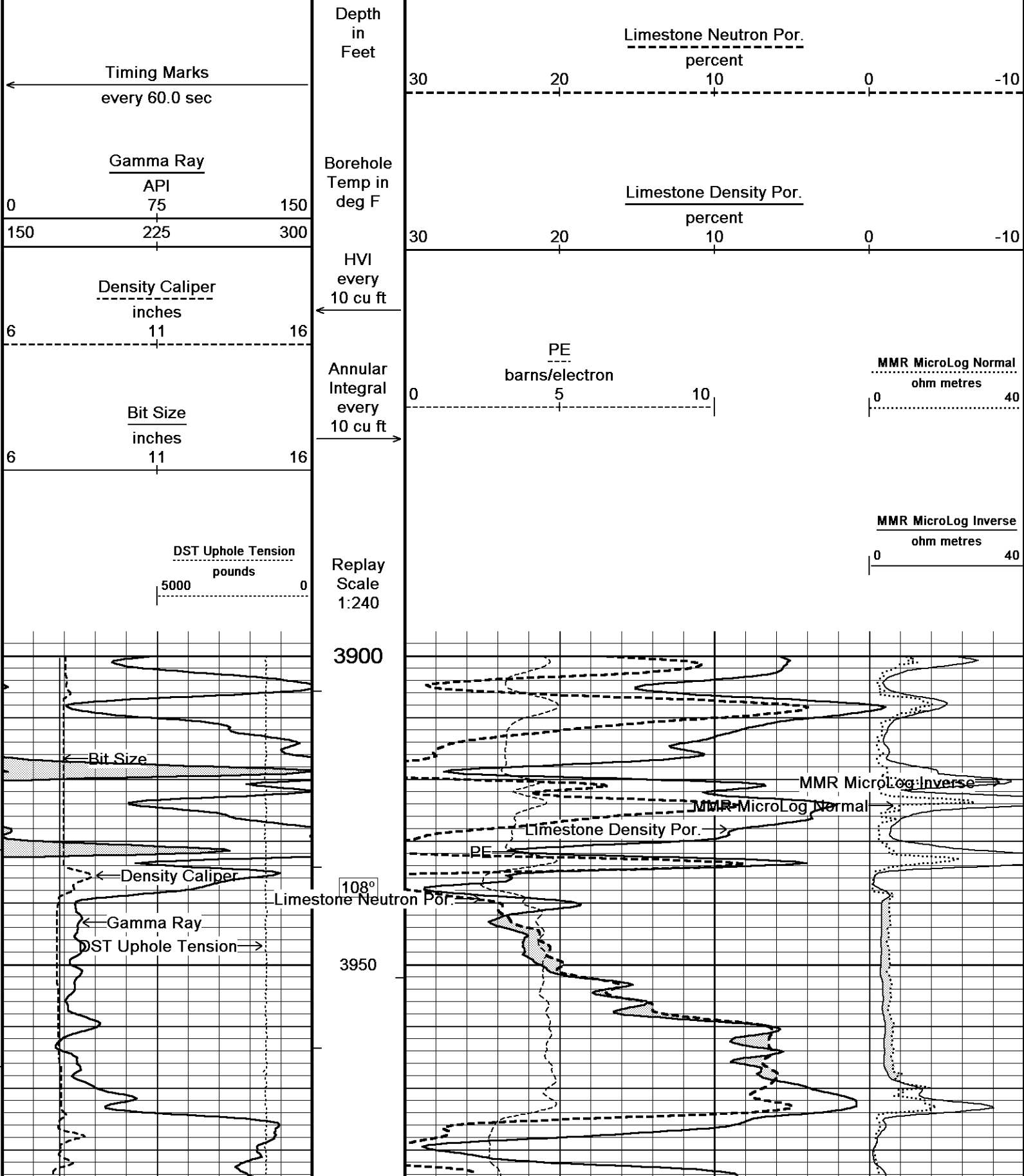
****Software issue changed fluid loss to match Ph fluid loss should be 9.8 ml/30min.****

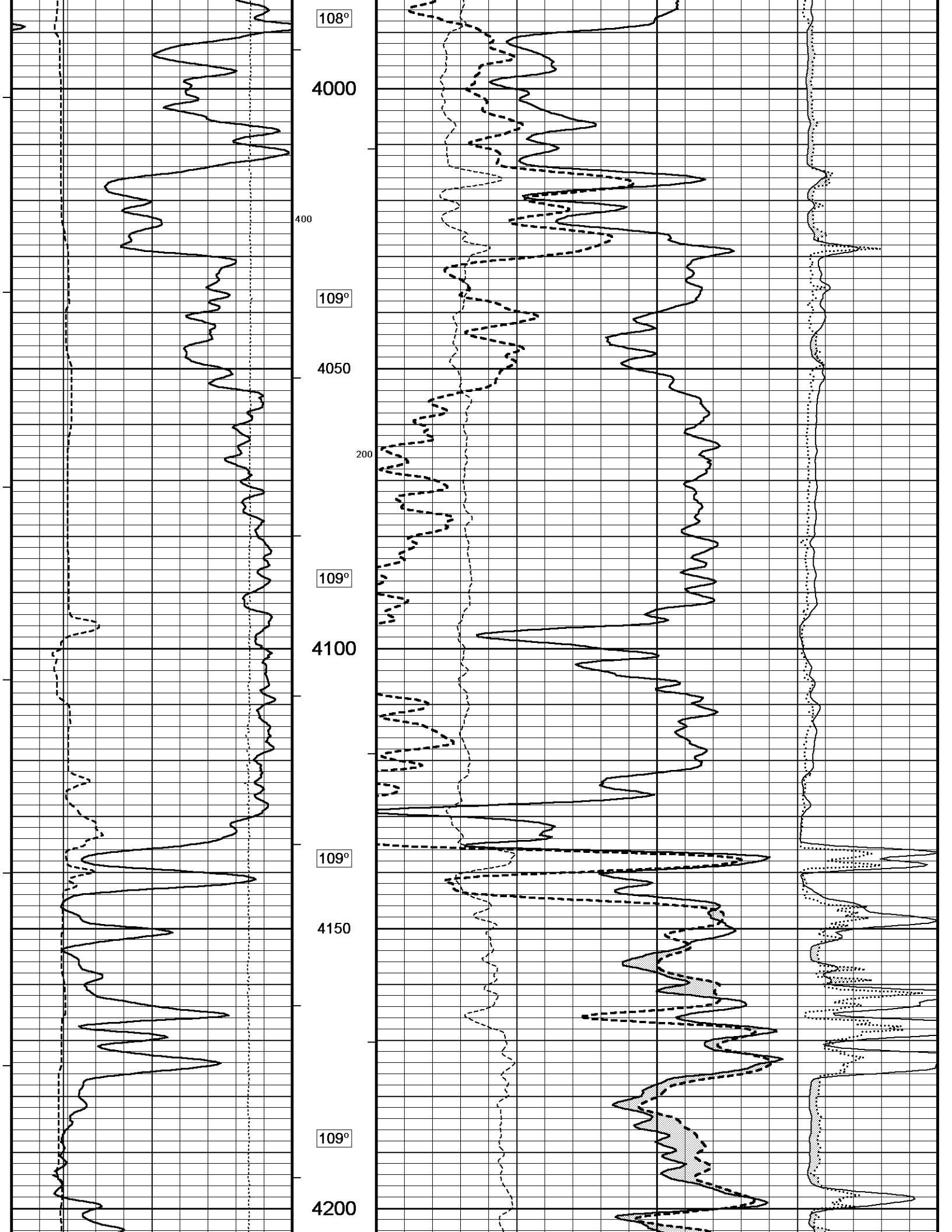
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for

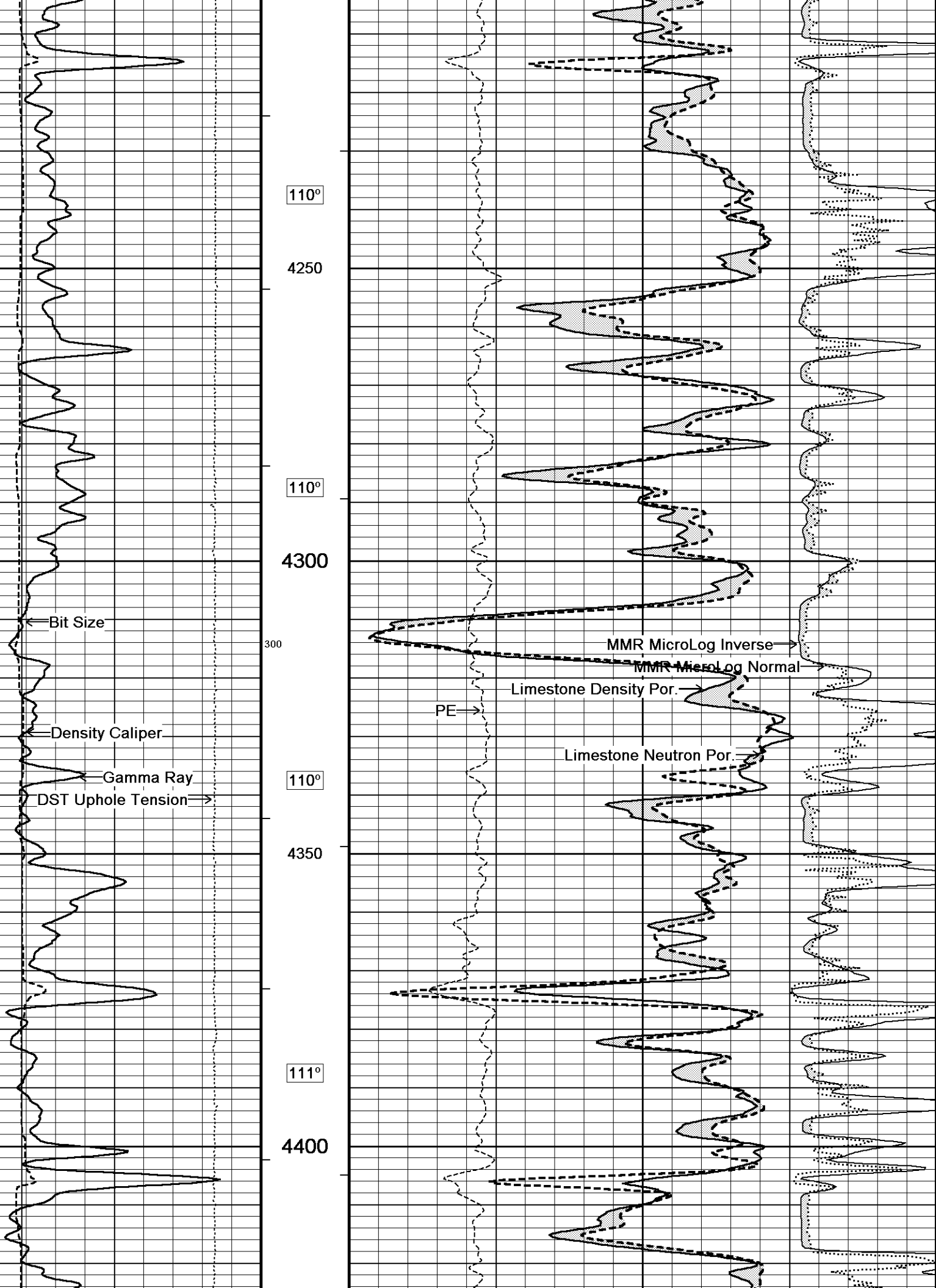
any loss, costs, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions in our price schedule.

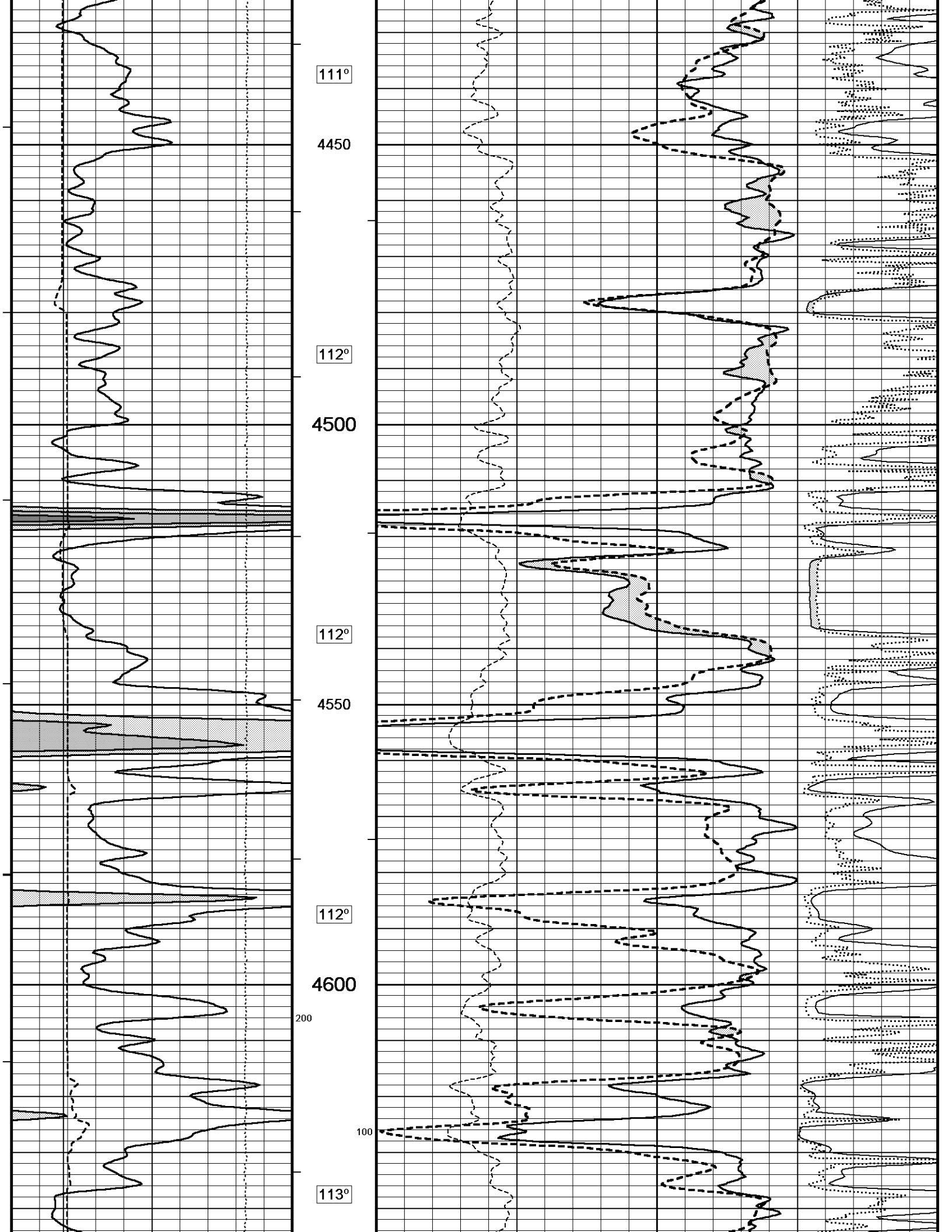
5 INCH MAIN

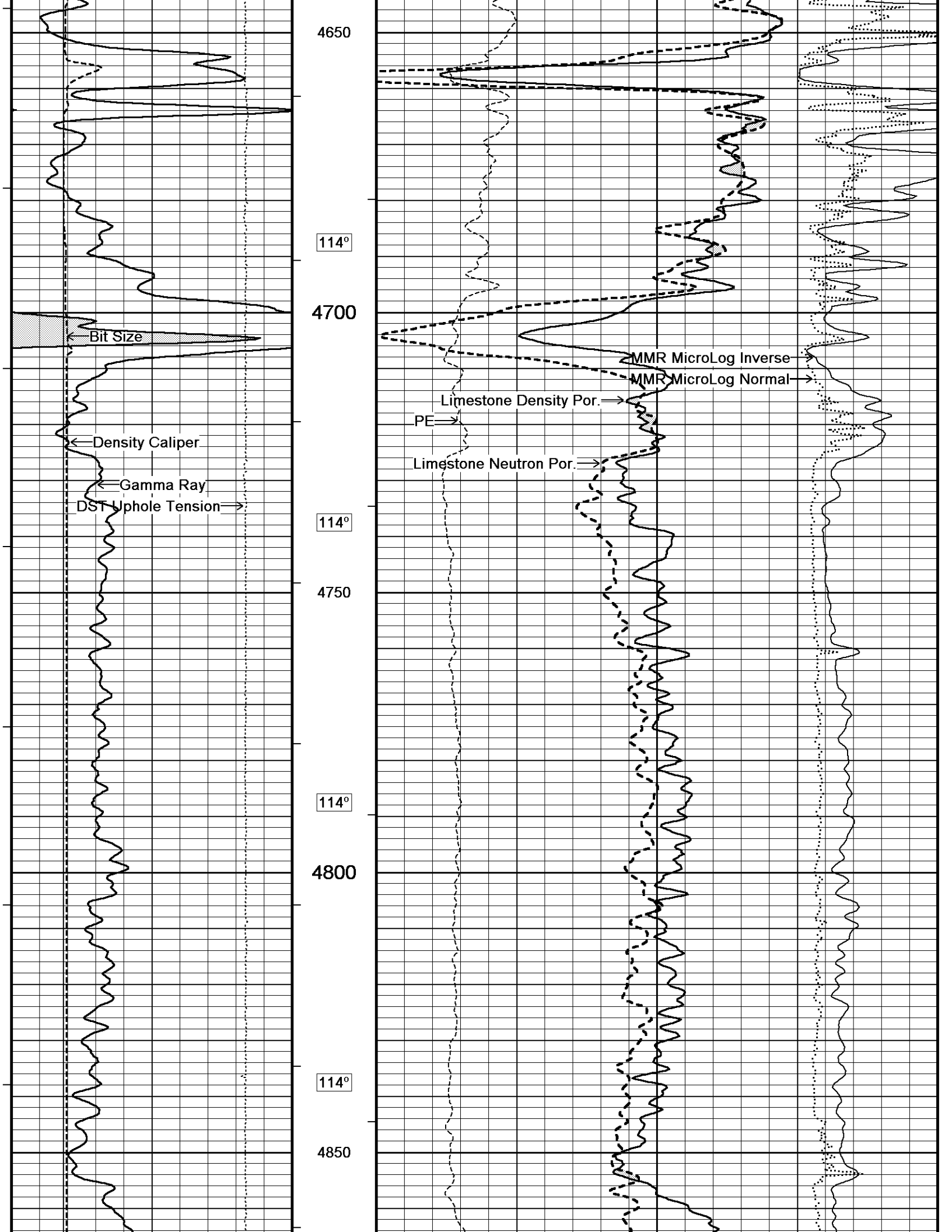
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 System Versions: Logged with 13.04.8492 Plotted with 13.04.8492

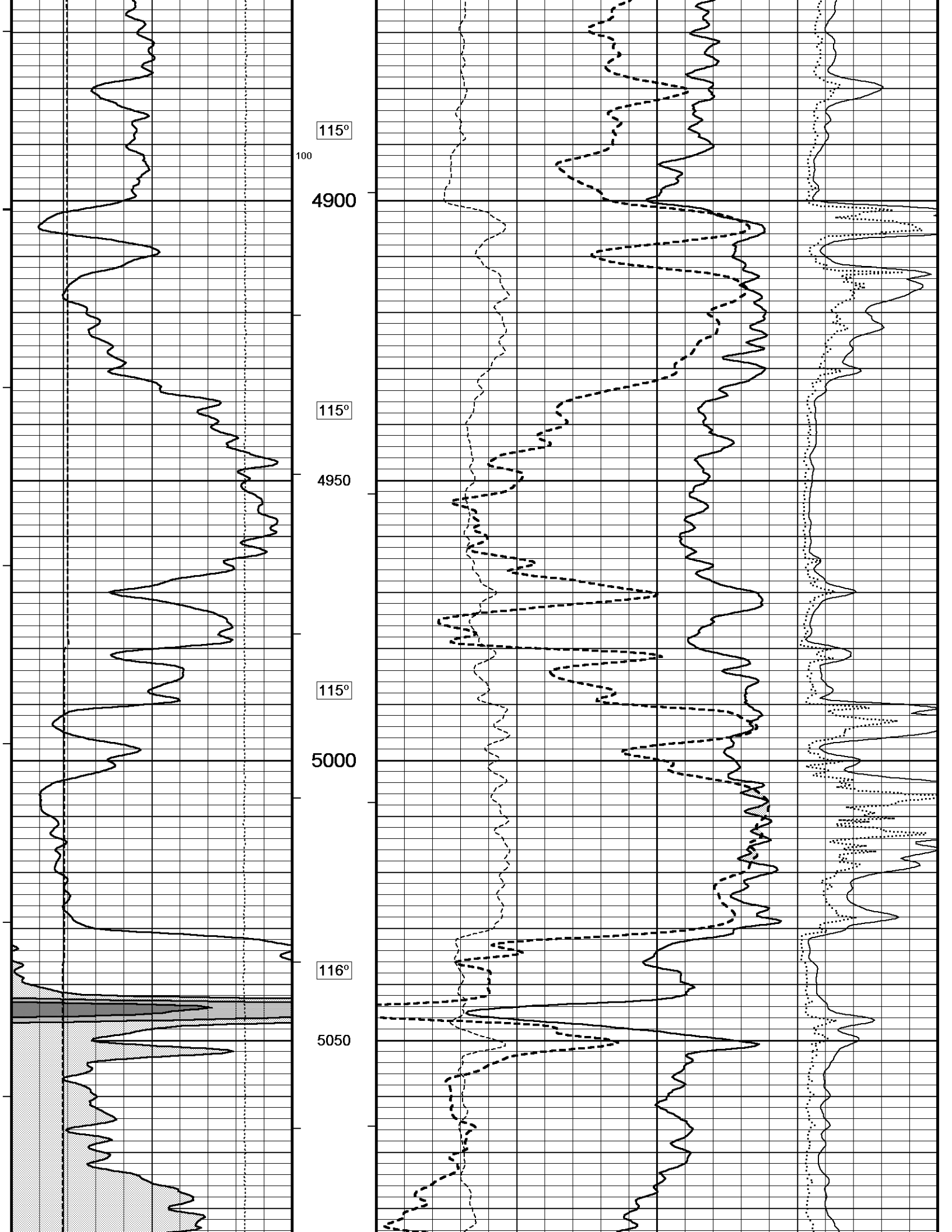


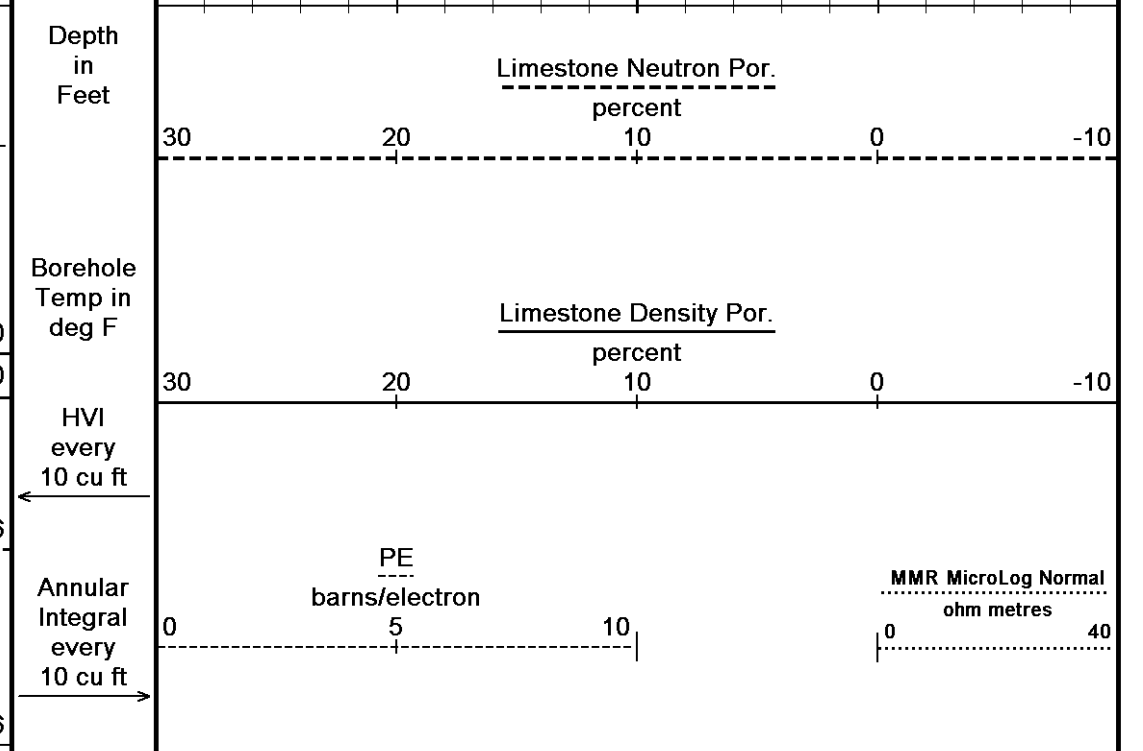
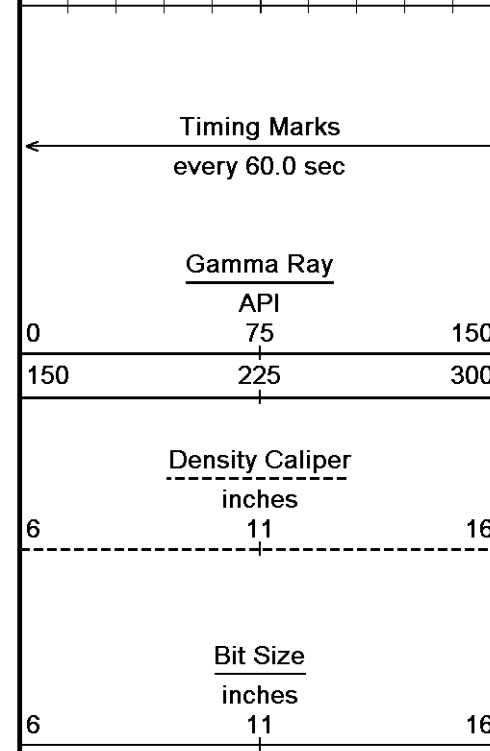
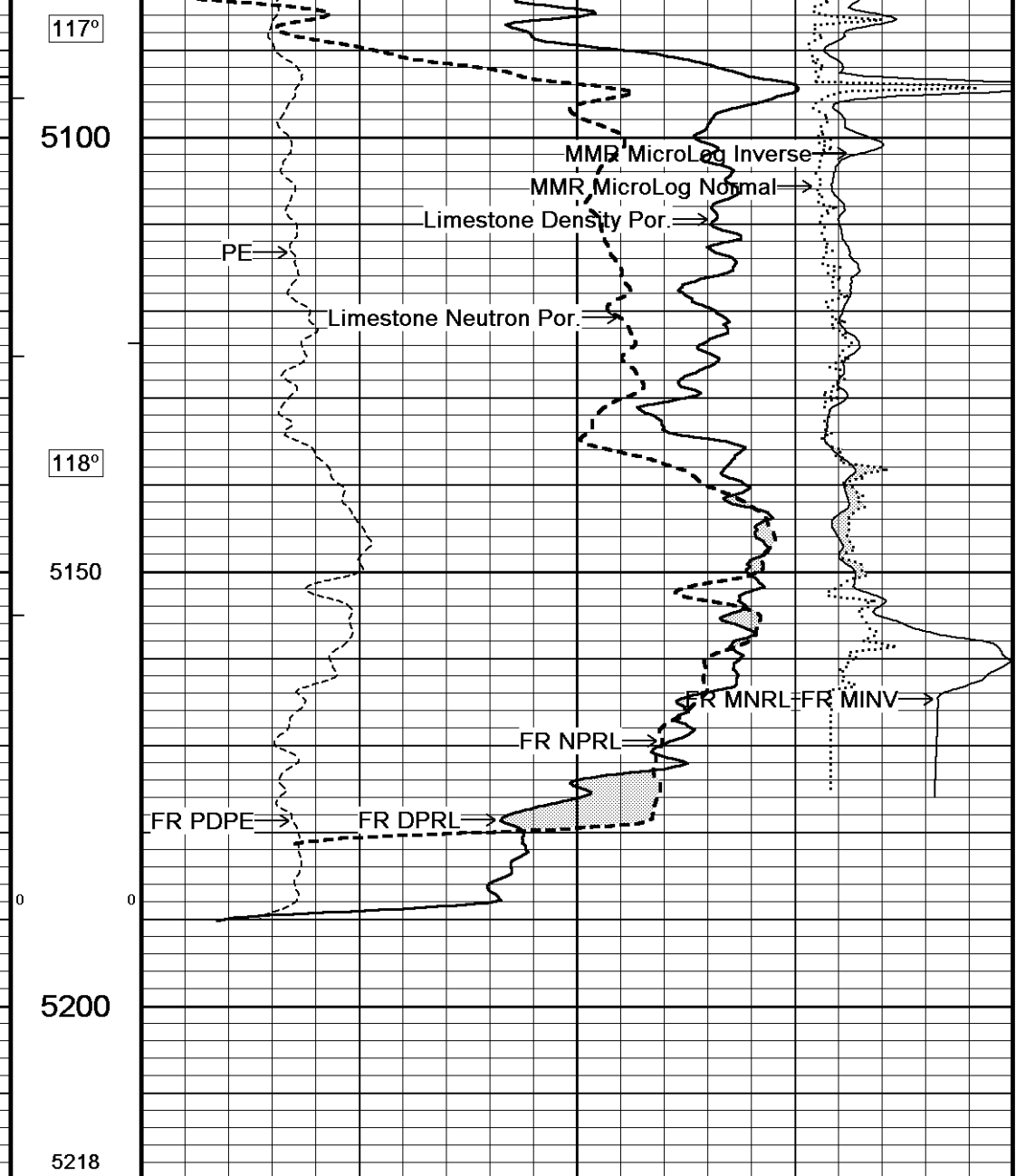
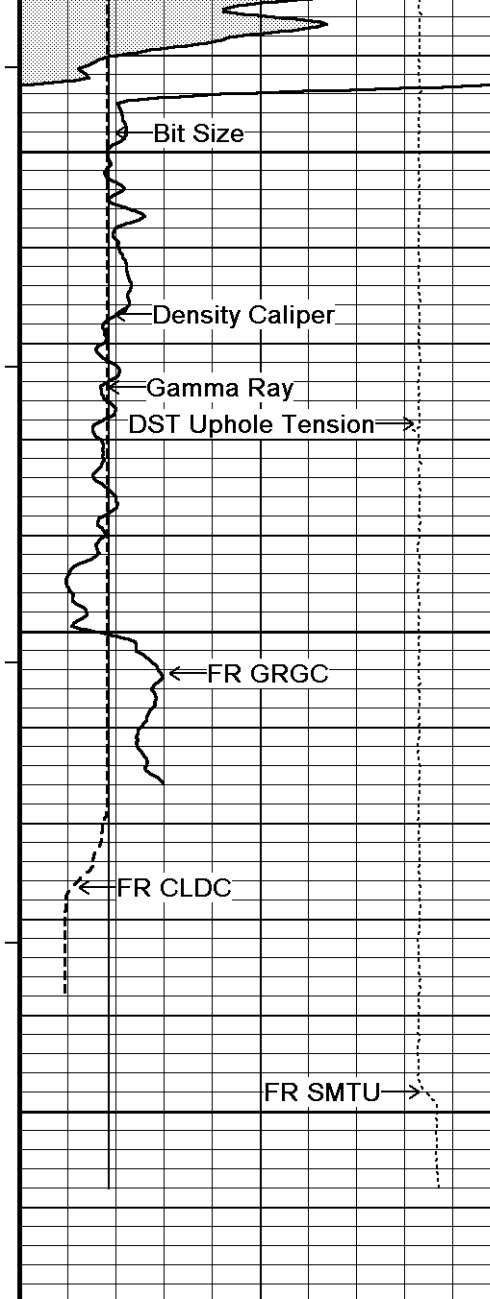


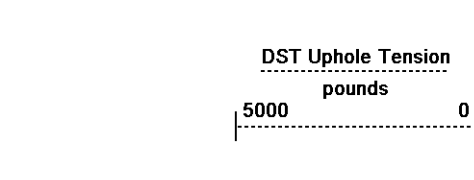




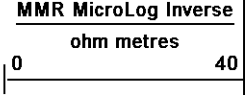








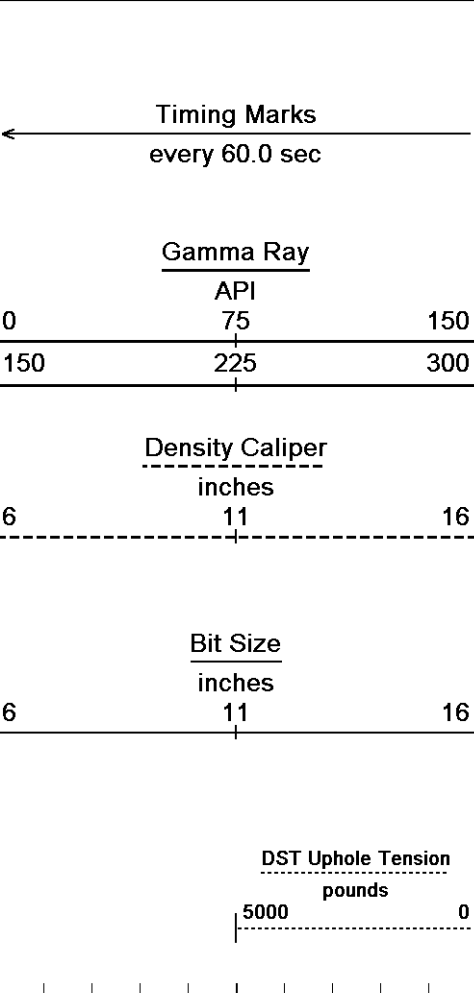
Replay
Scale
1:240



Depth Based Data - Maximum Sampling Increment 10.0cm
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5 INCH MAIN

REPEAT SECTION
 Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 13-APR-2013 08:29
 Filename: C:\Minimus 13.04.8492\Data\M & M Exploration Z-Bar...M & M Exploration Z-Bar 8-1_001.dta
 Recorded on 13-APR-2013 05:45
 System Versions: Logged with 13.04.8492 Plotted with 13.04.8492



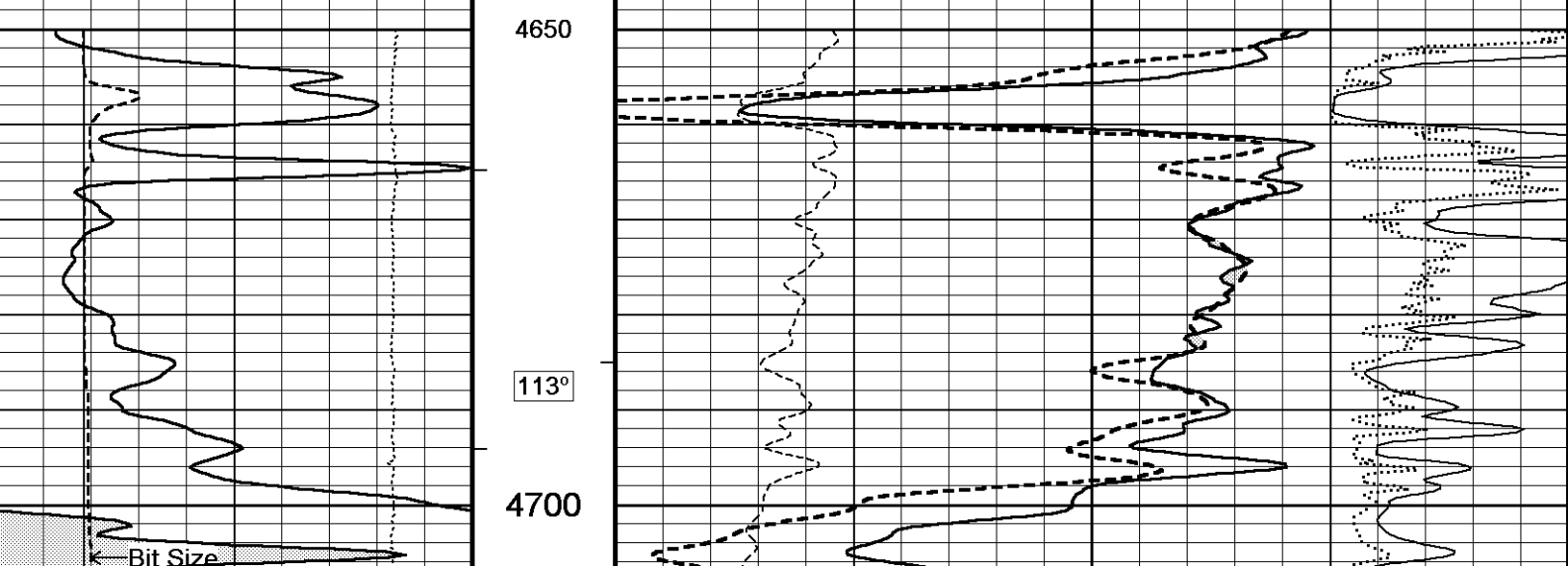
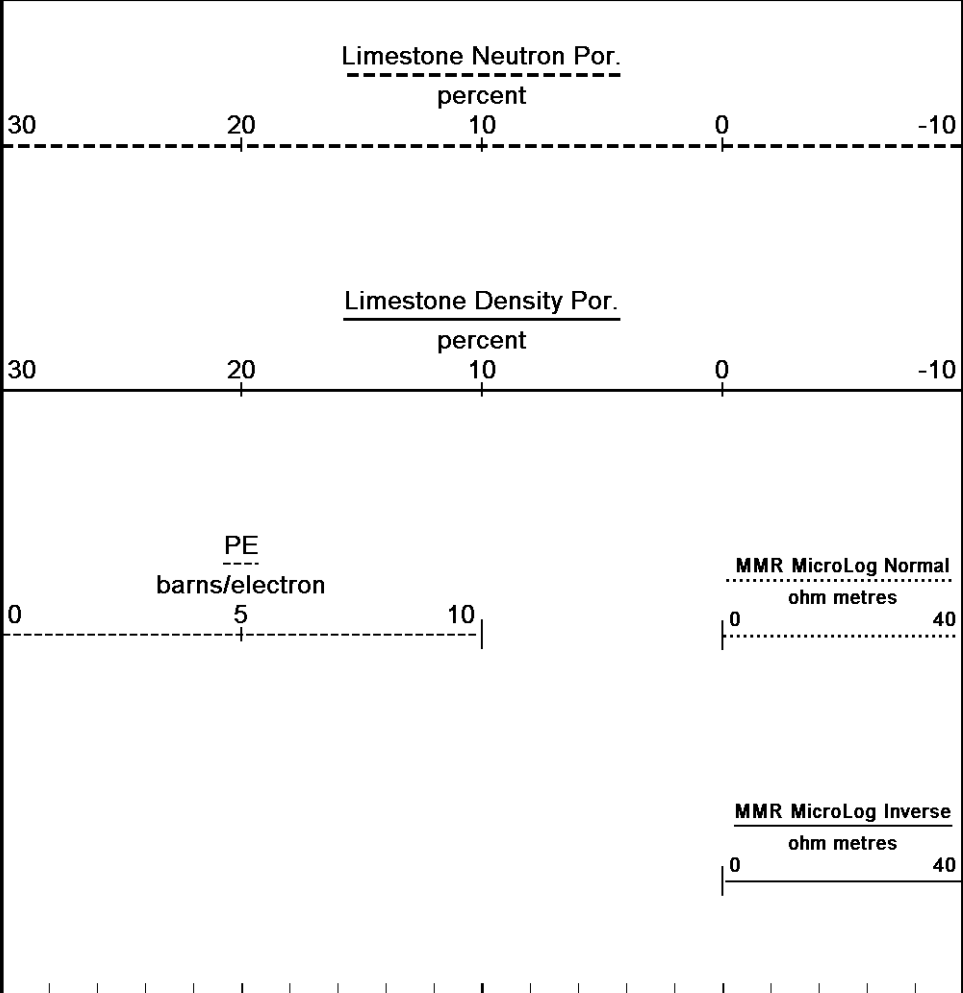
Depth
in
Feet

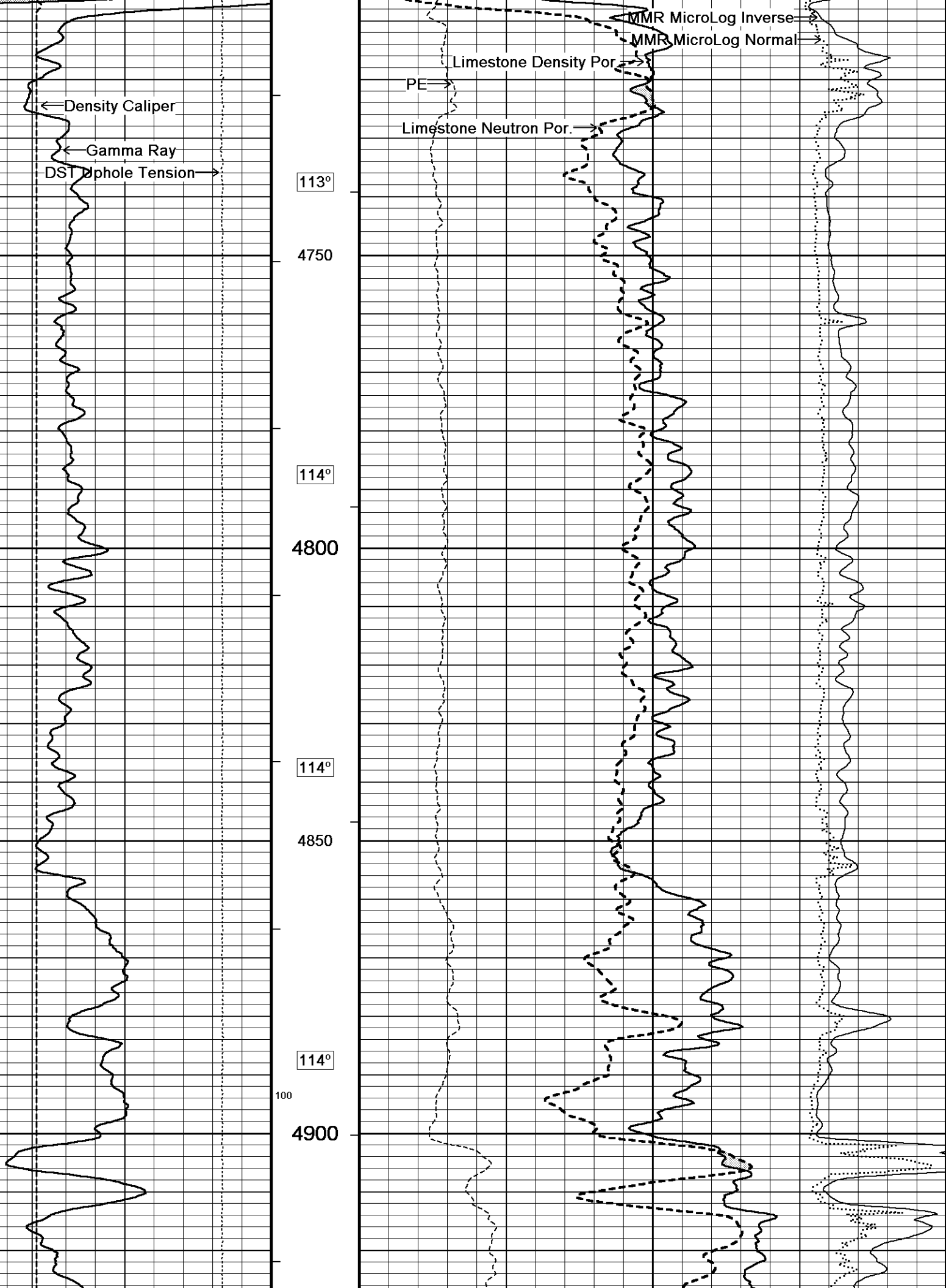
Borehole
Temp in
deg F

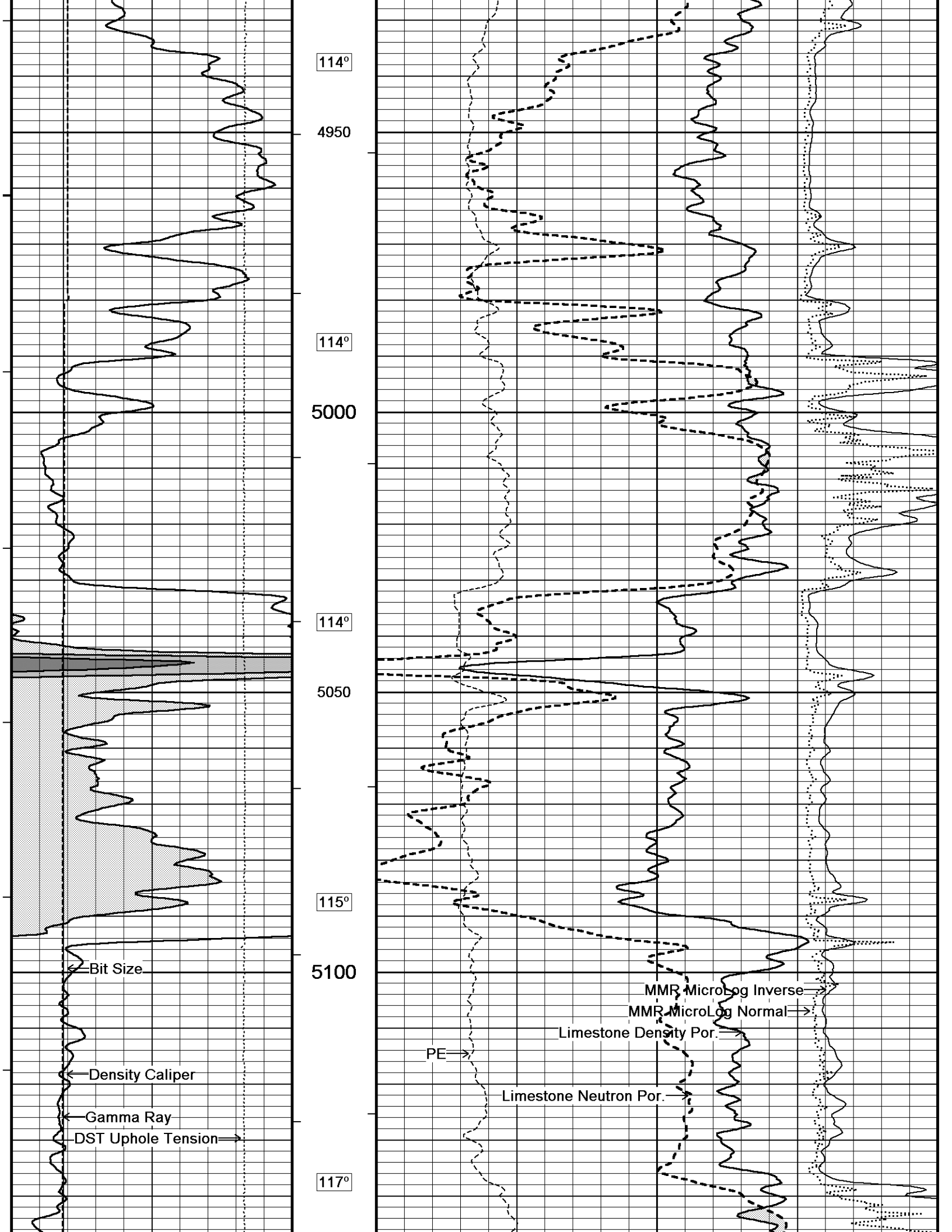
HVI
every
10 cu ft

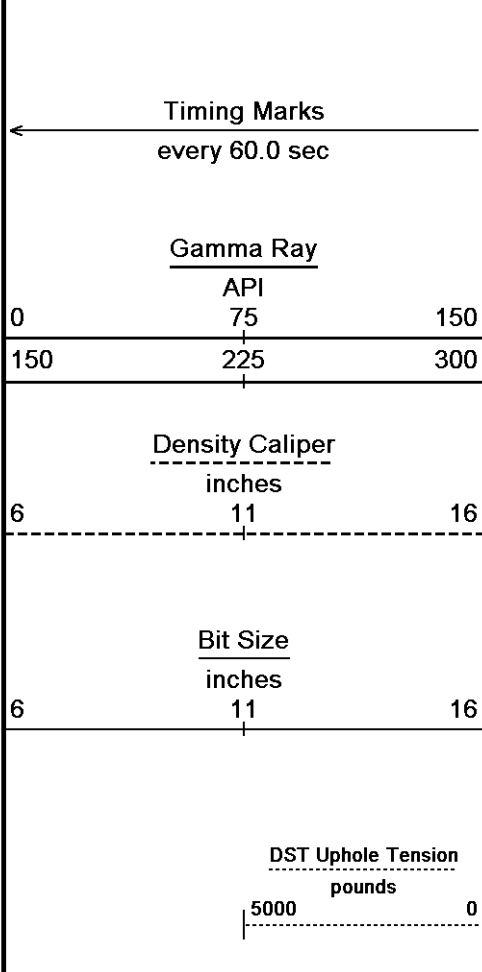
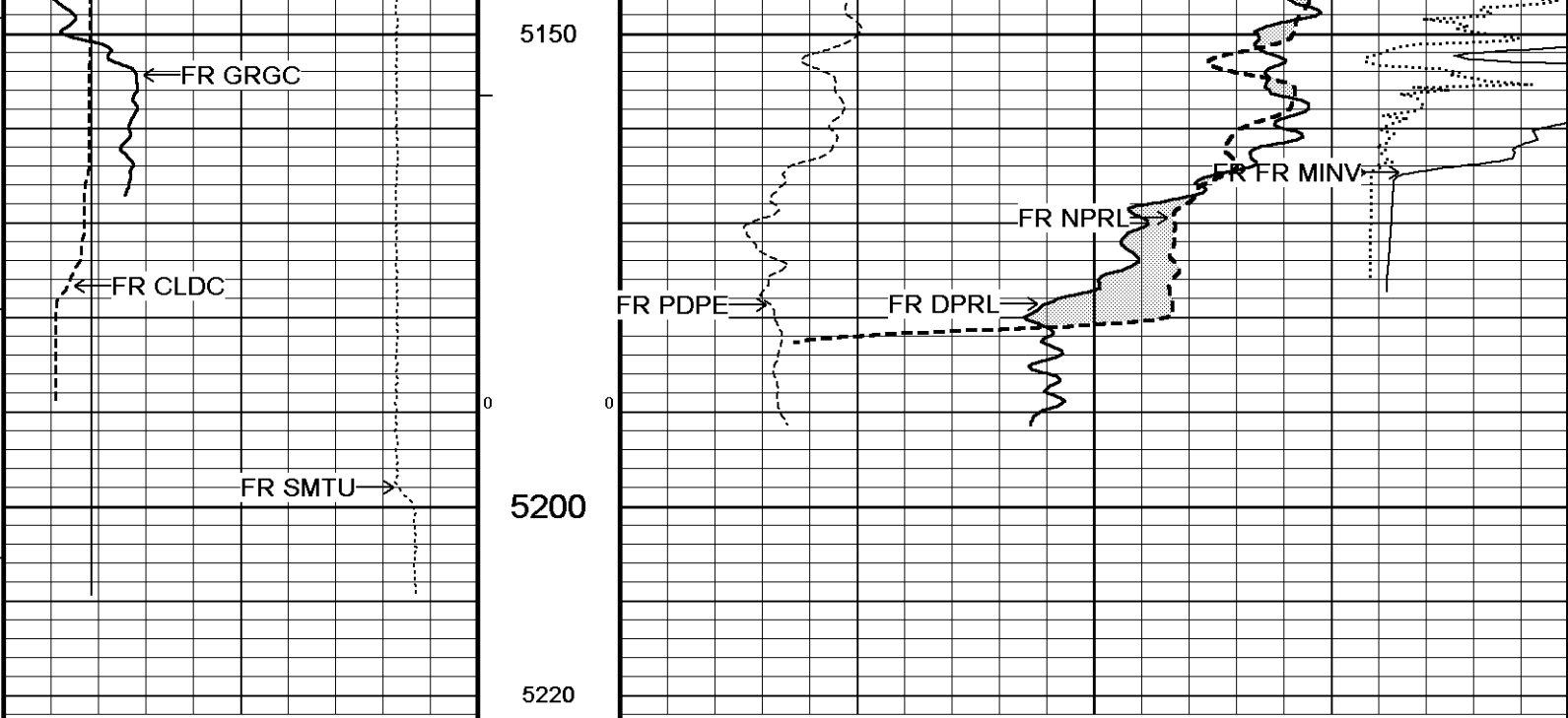
Annular
Integral
every
10 cu ft

Replay
Scale
1:240

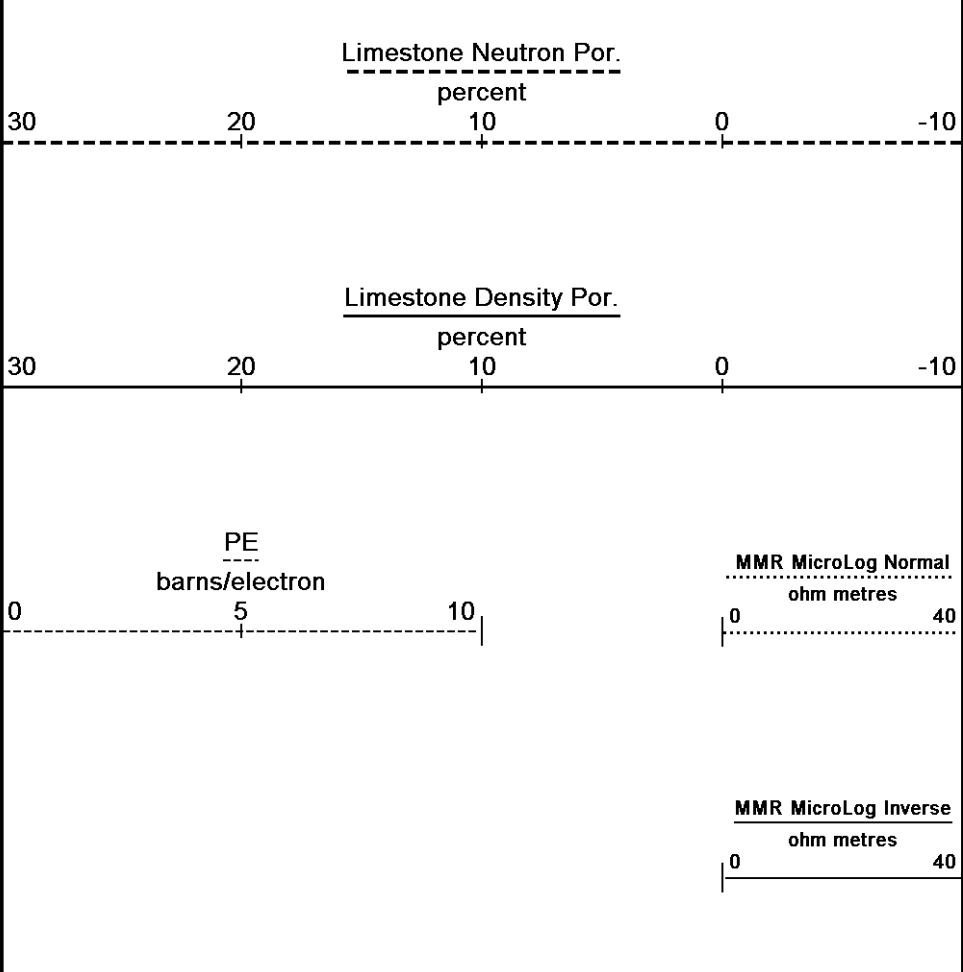








5150
0
5200
5220
Depth in Feet
Borehole Temp in deg F
HVI every 10 cu ft
Annular Integral every 10 cu ft
Replay Scale 1:240



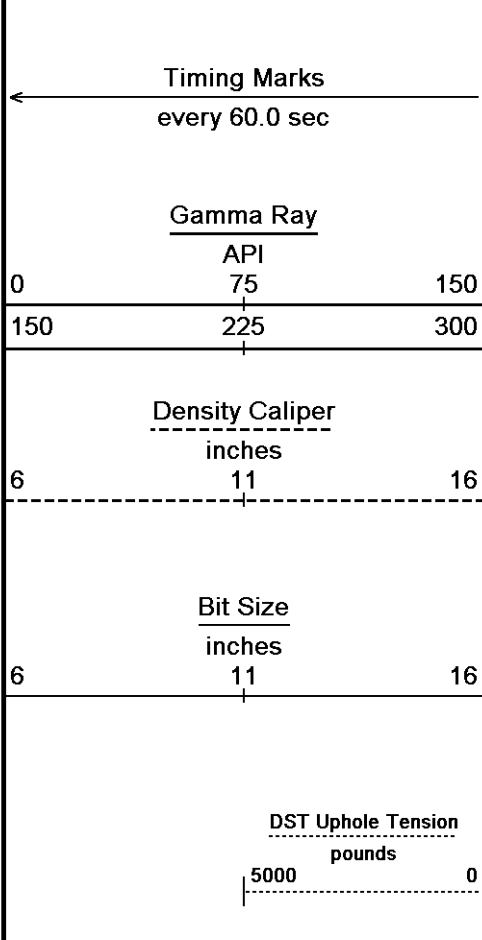
Depth Based Data - Maximum Sampling Increment 10.0cm
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 System Versions: Logged with 13.04.8492 Plotted with 13.04.8492
 Plotted on 13-APR-2013 08:29
 Recorded on 13-APR-2013 05:45

↑ REPEAT SECTION ↑

↓ 5 INCH MAIN ↓

Depth Based Data - Maximum Sampling Increment 10.0cm
 Filename: C:\Minimus 13.04.8492\Data\M & M Exploration Z-Bar...M & M Exploration Z-Bar 8-1_002.dta
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 Plotted on 13-APR-2013 08:29
 Recorded on 13-APR-2013 06:17

Depth



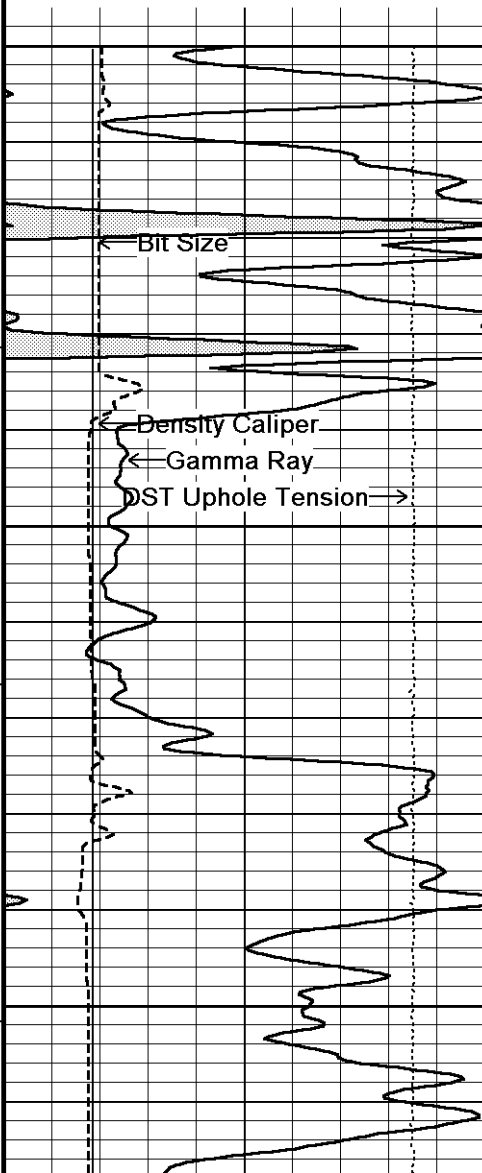
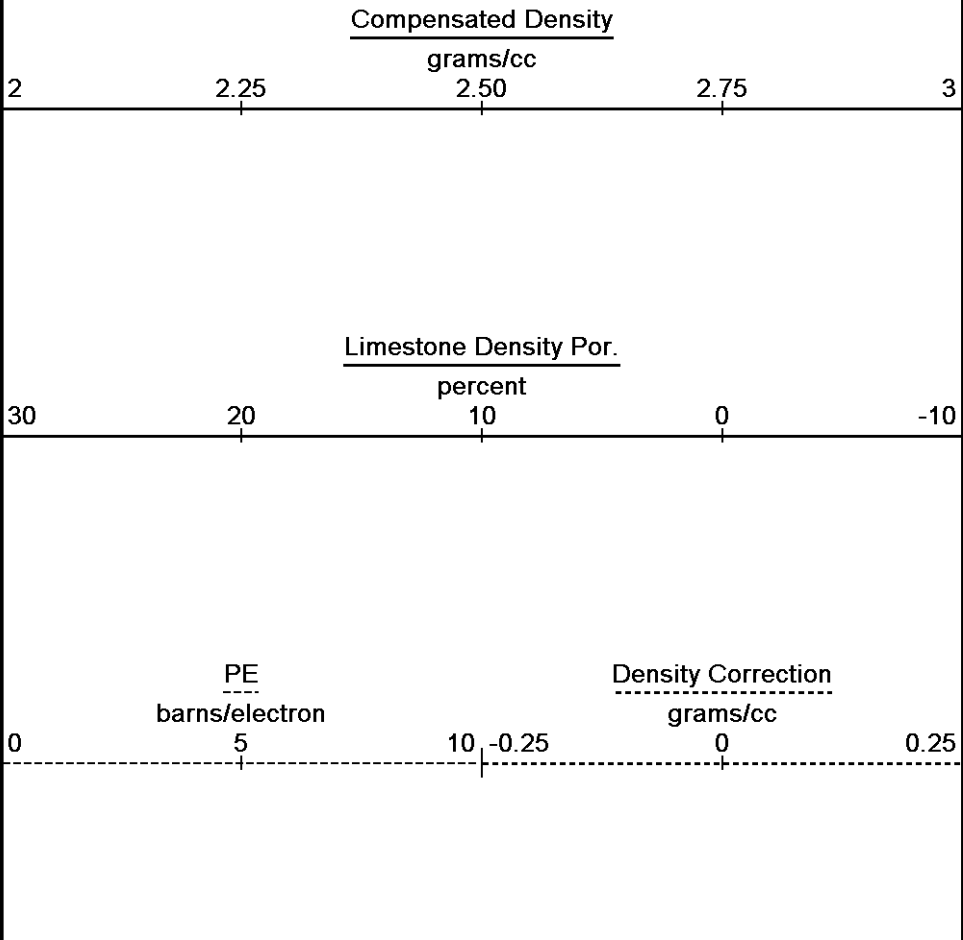
in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240



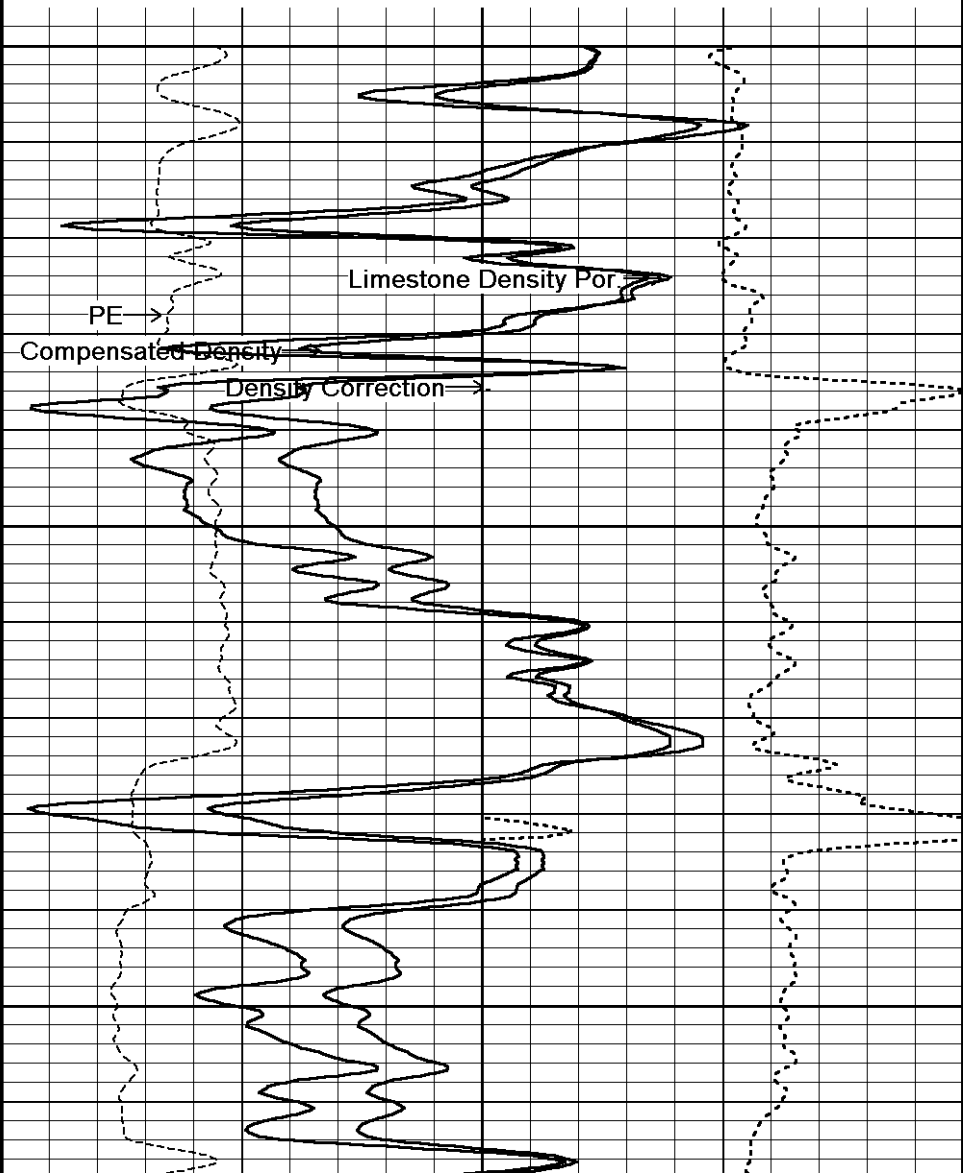
3900

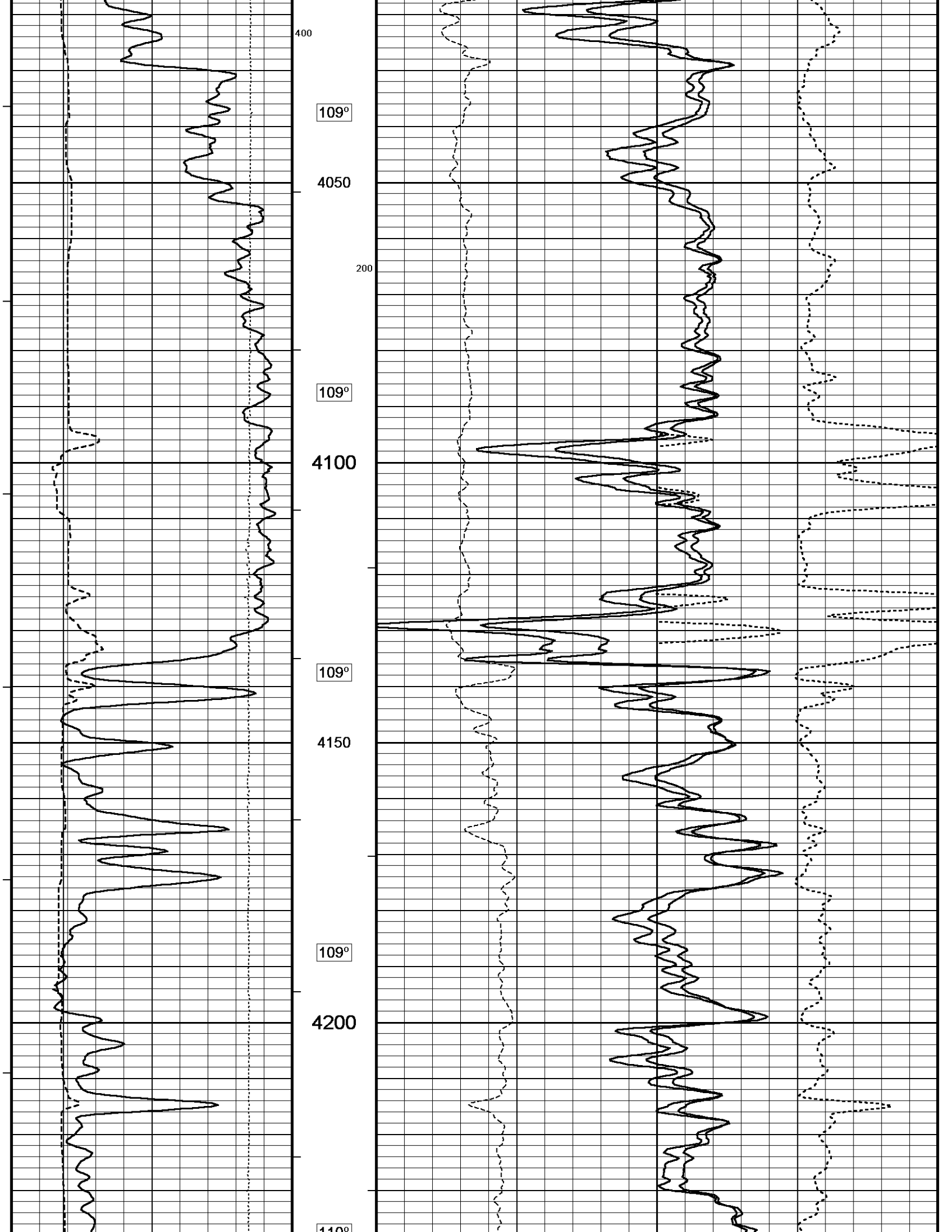
108°

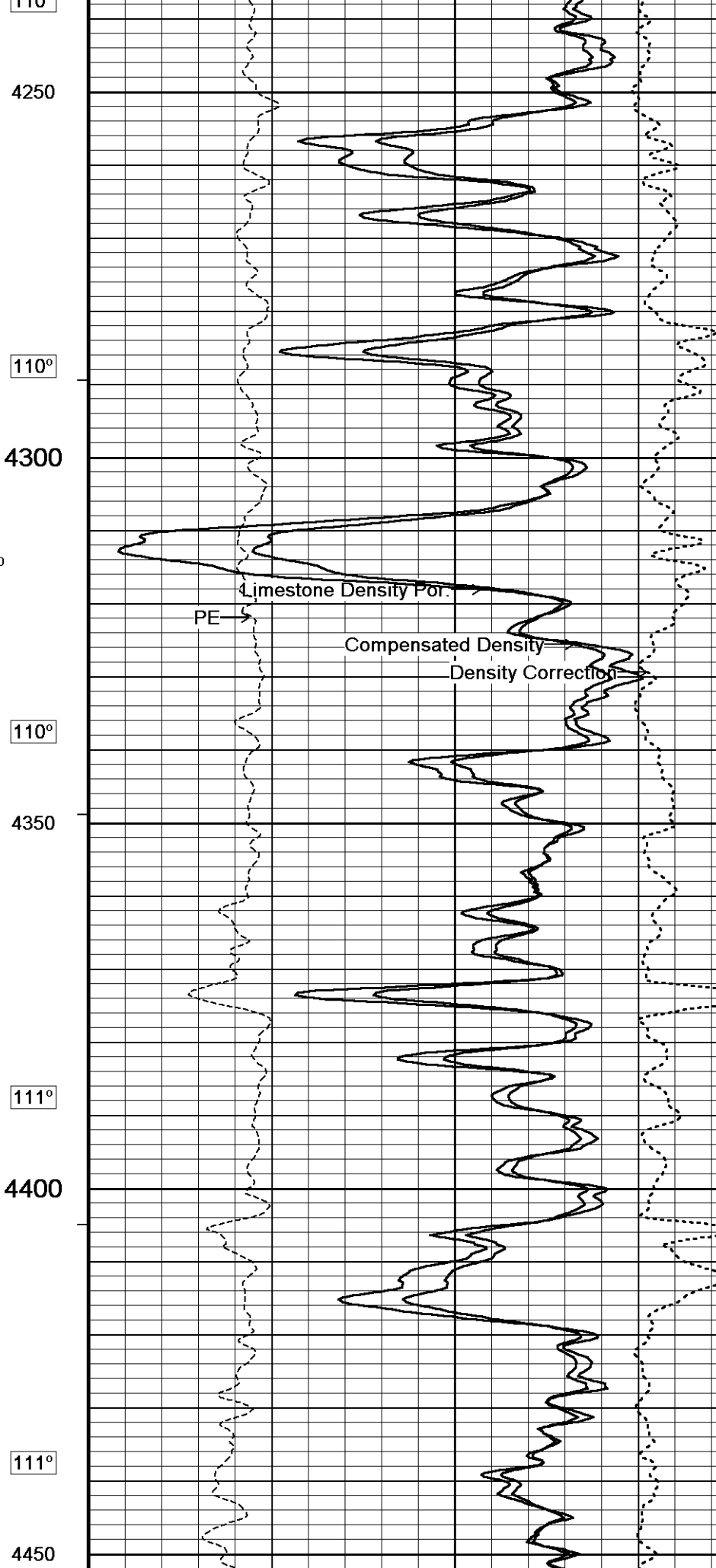
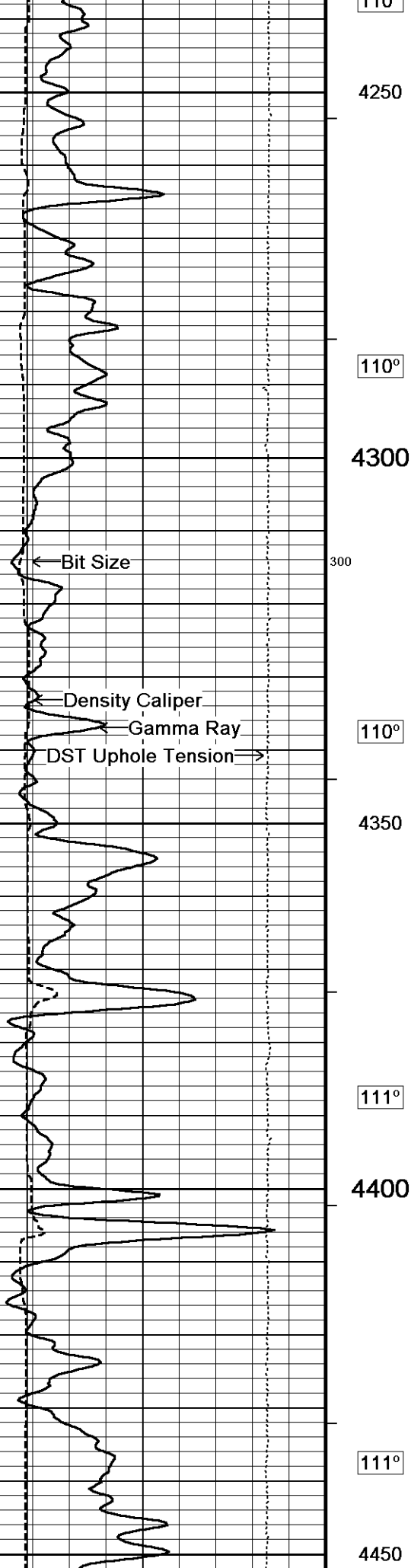
3950

108°

4000







110

4250

110°

4300

300

Limestone Density Por.

PE

Compensated Density

Density Correction

110°

4350

111°

4400

111°

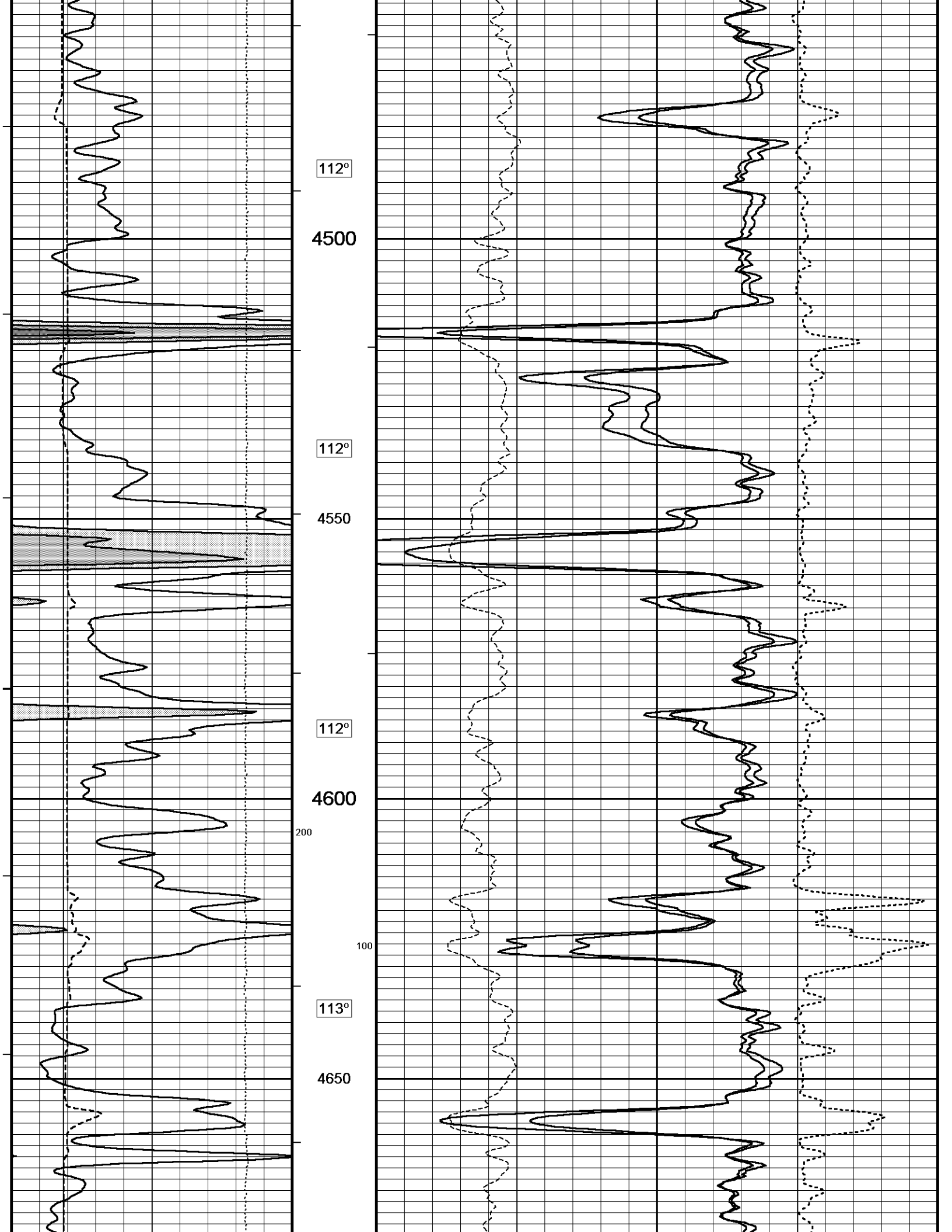
4450

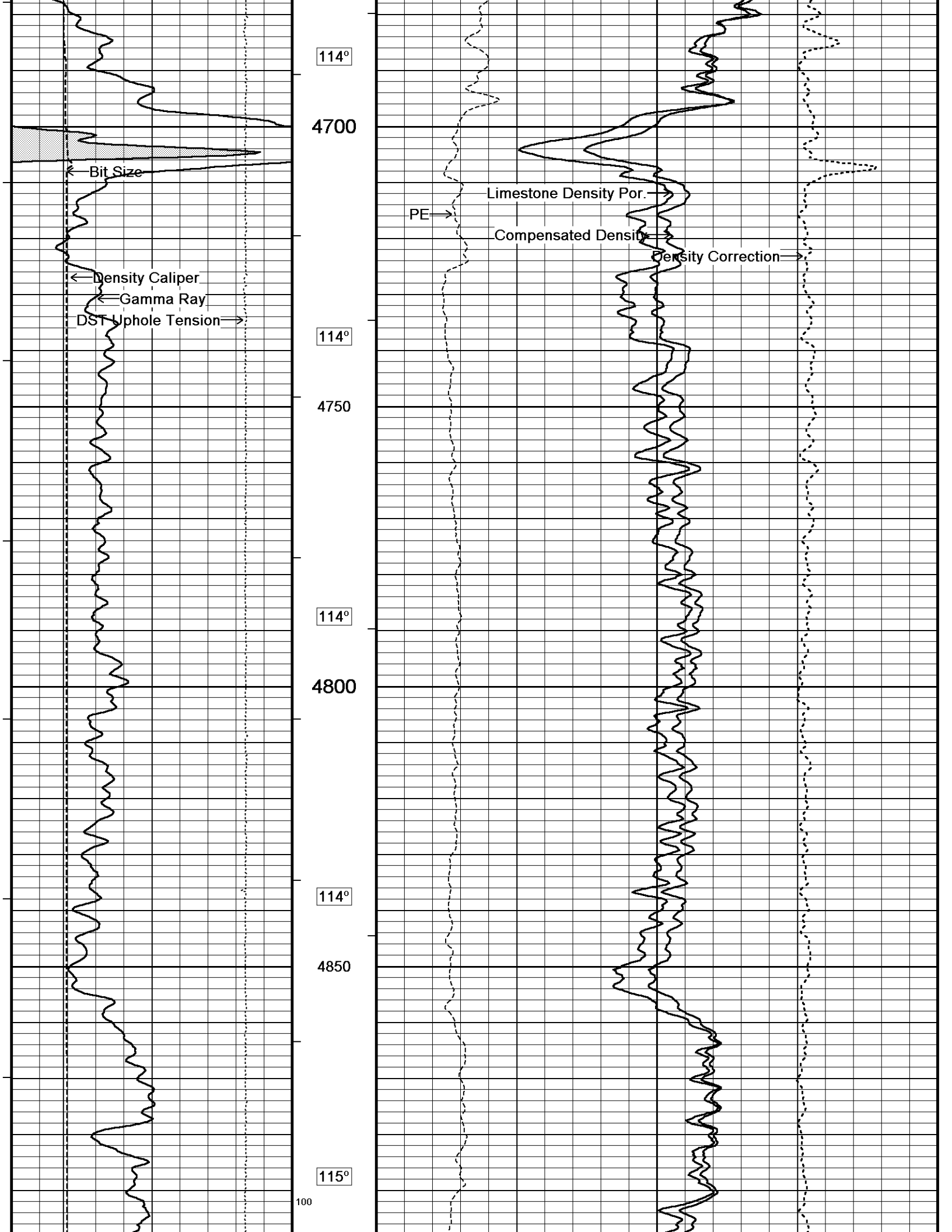
Bit Size

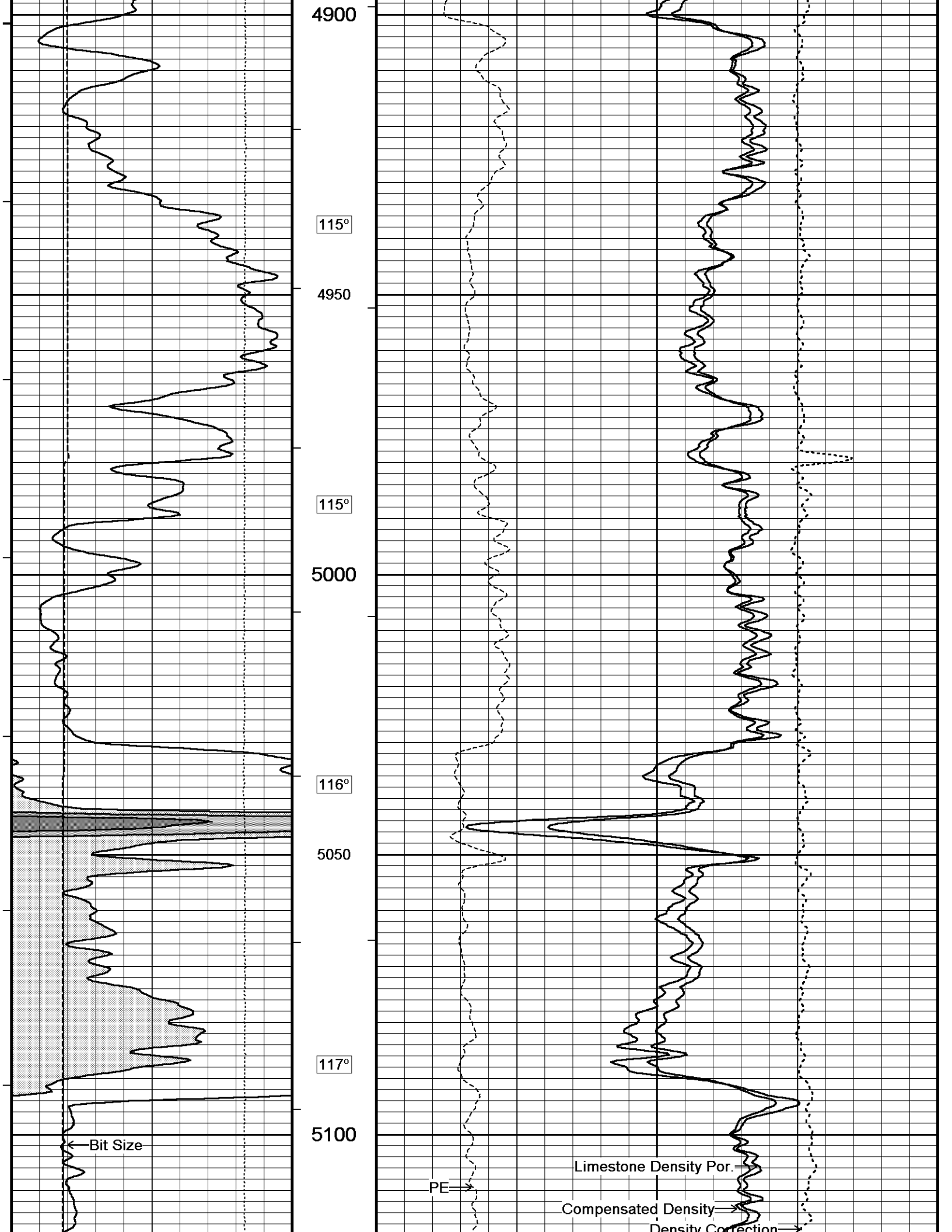
Density Caliper

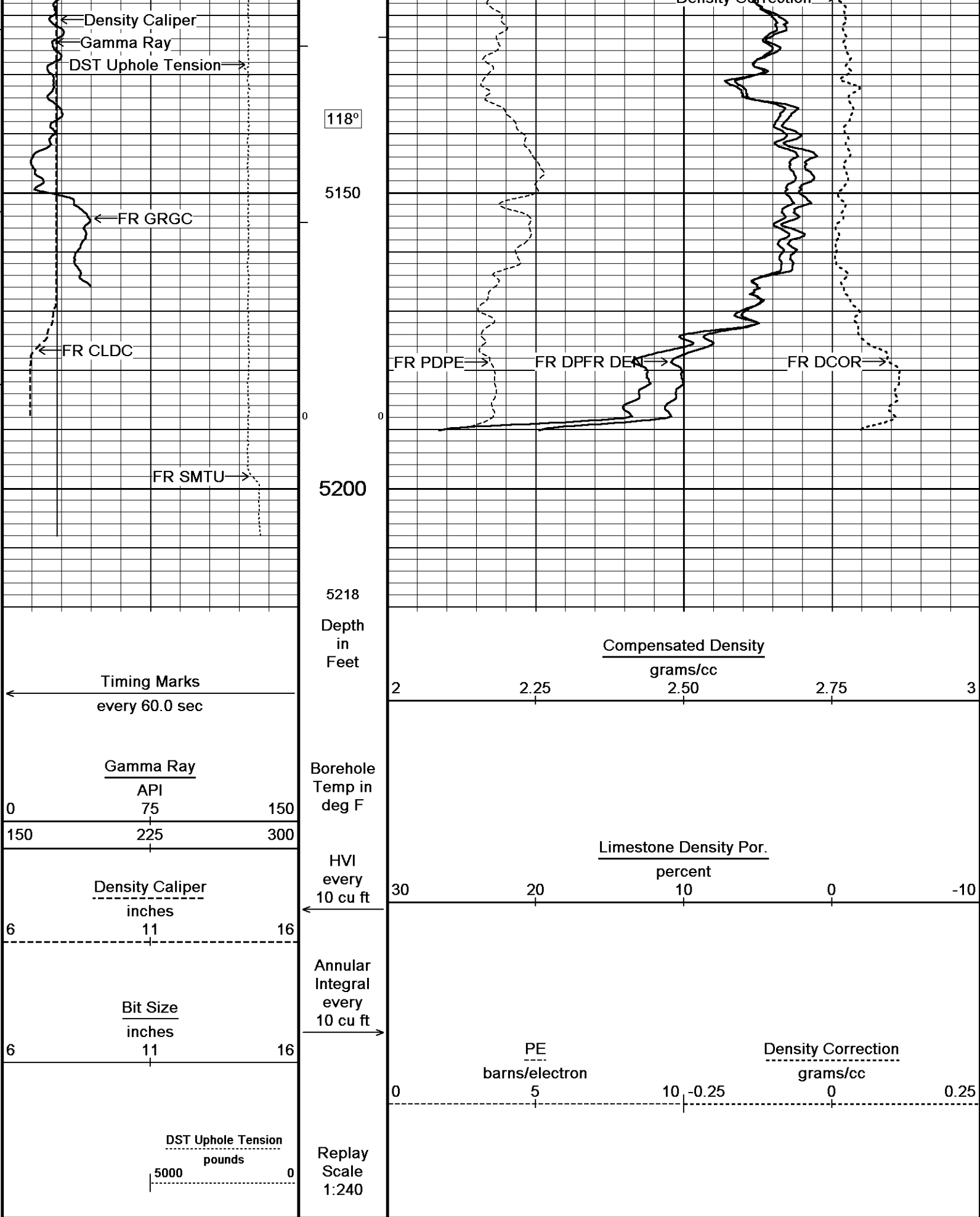
Gamma Ray

DST Uphole Tension









5 INCH MAIN

REPEAT SECTION

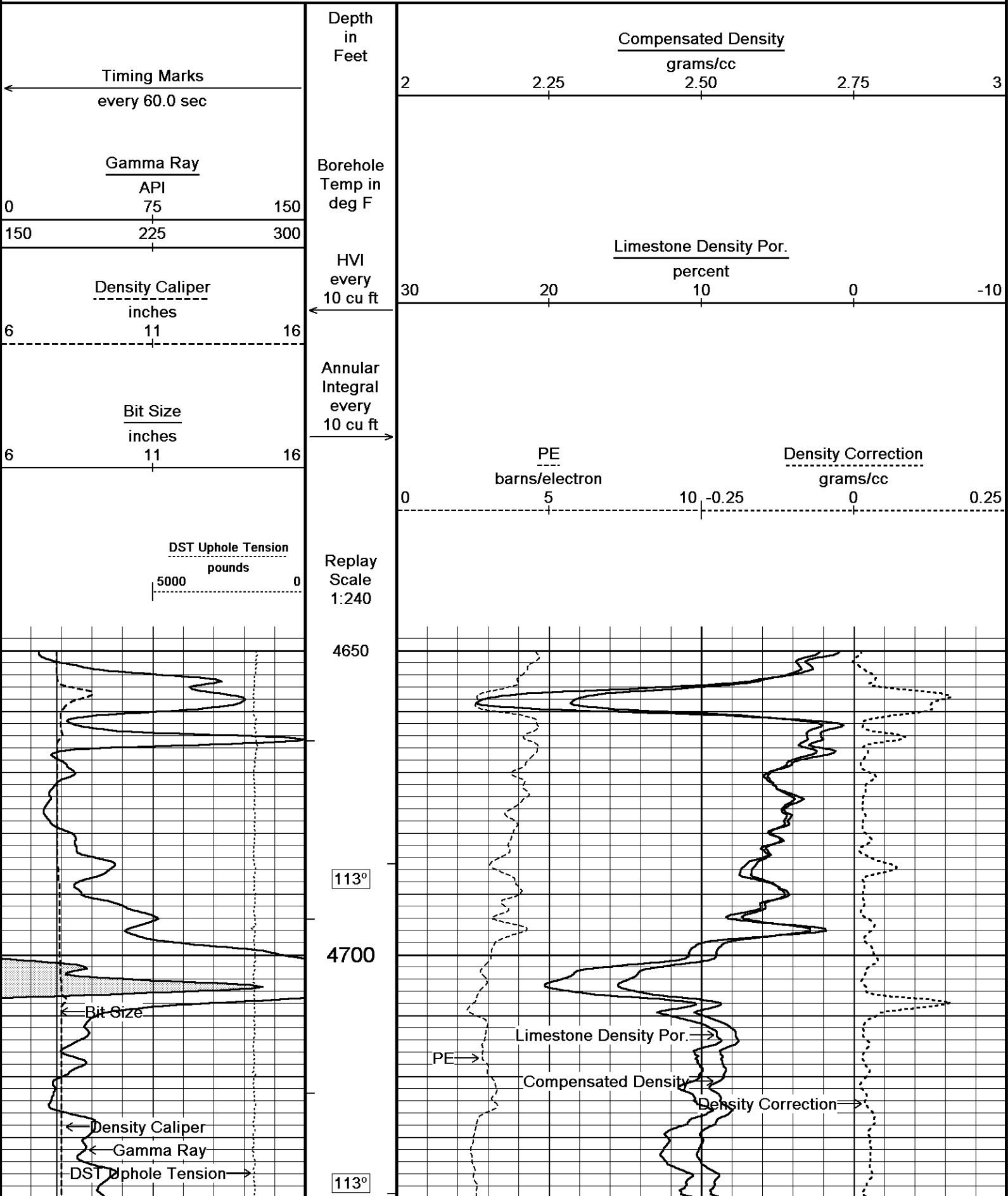
Depth Based Data - Maximum Sampling Increment 10.0cm

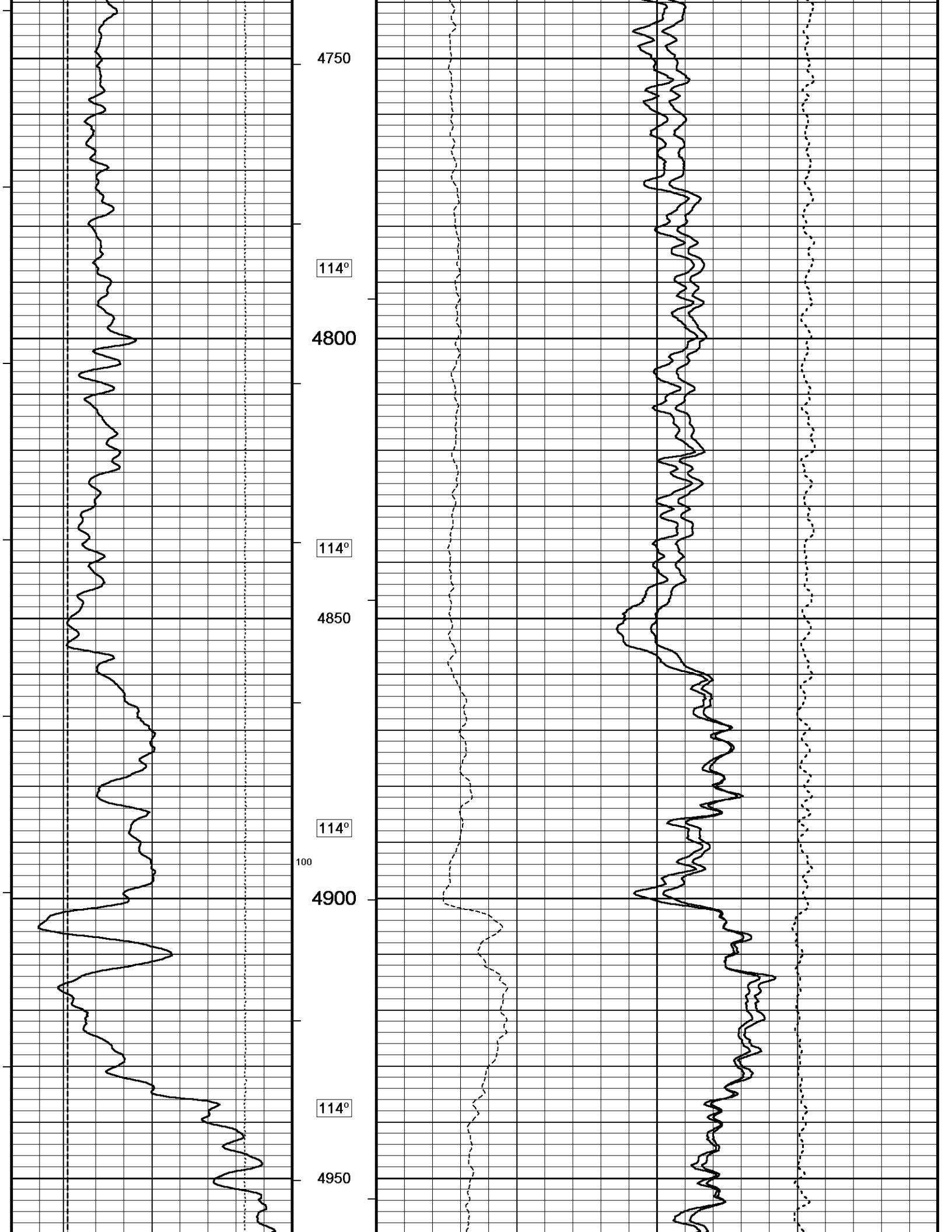
Plotted on 13-APR-2013 08:29

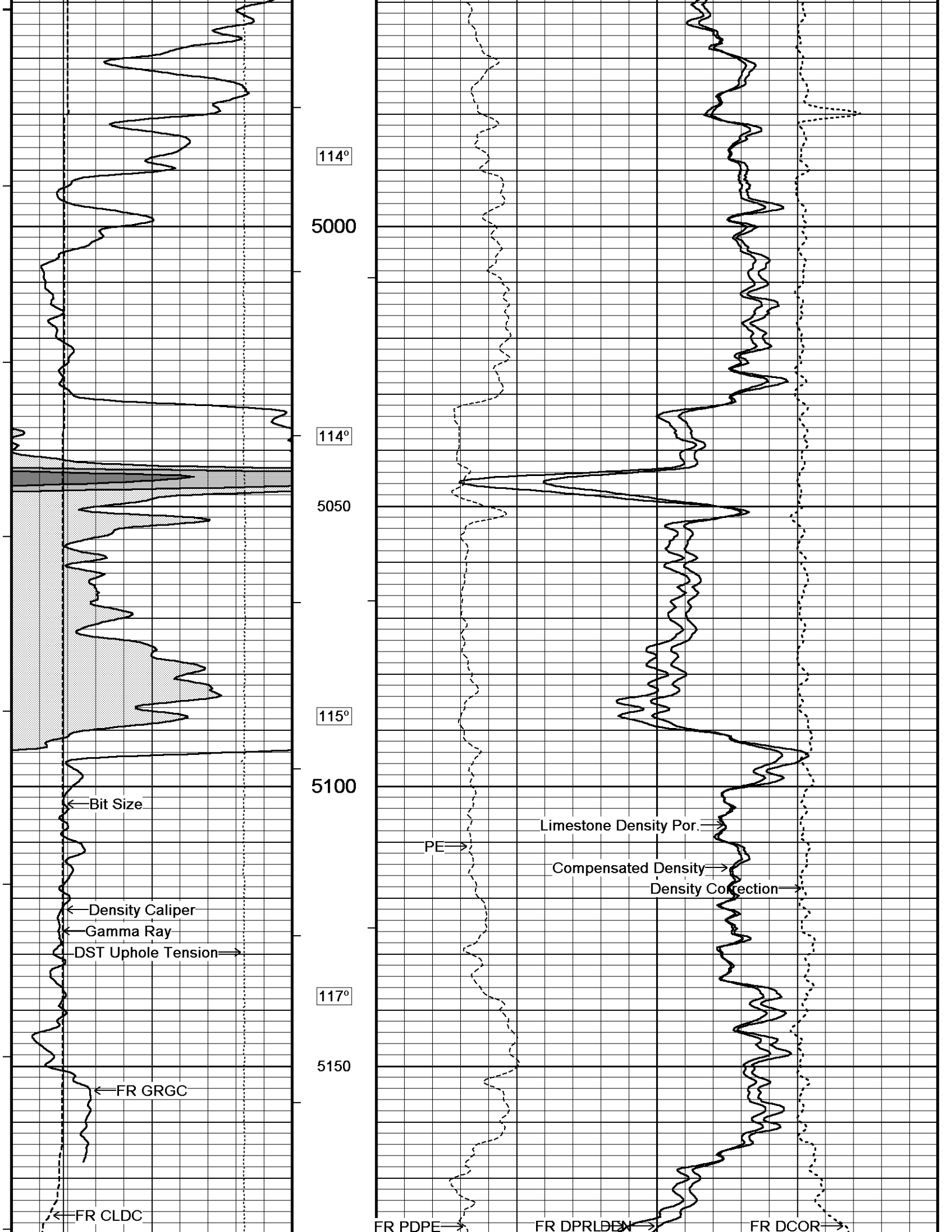
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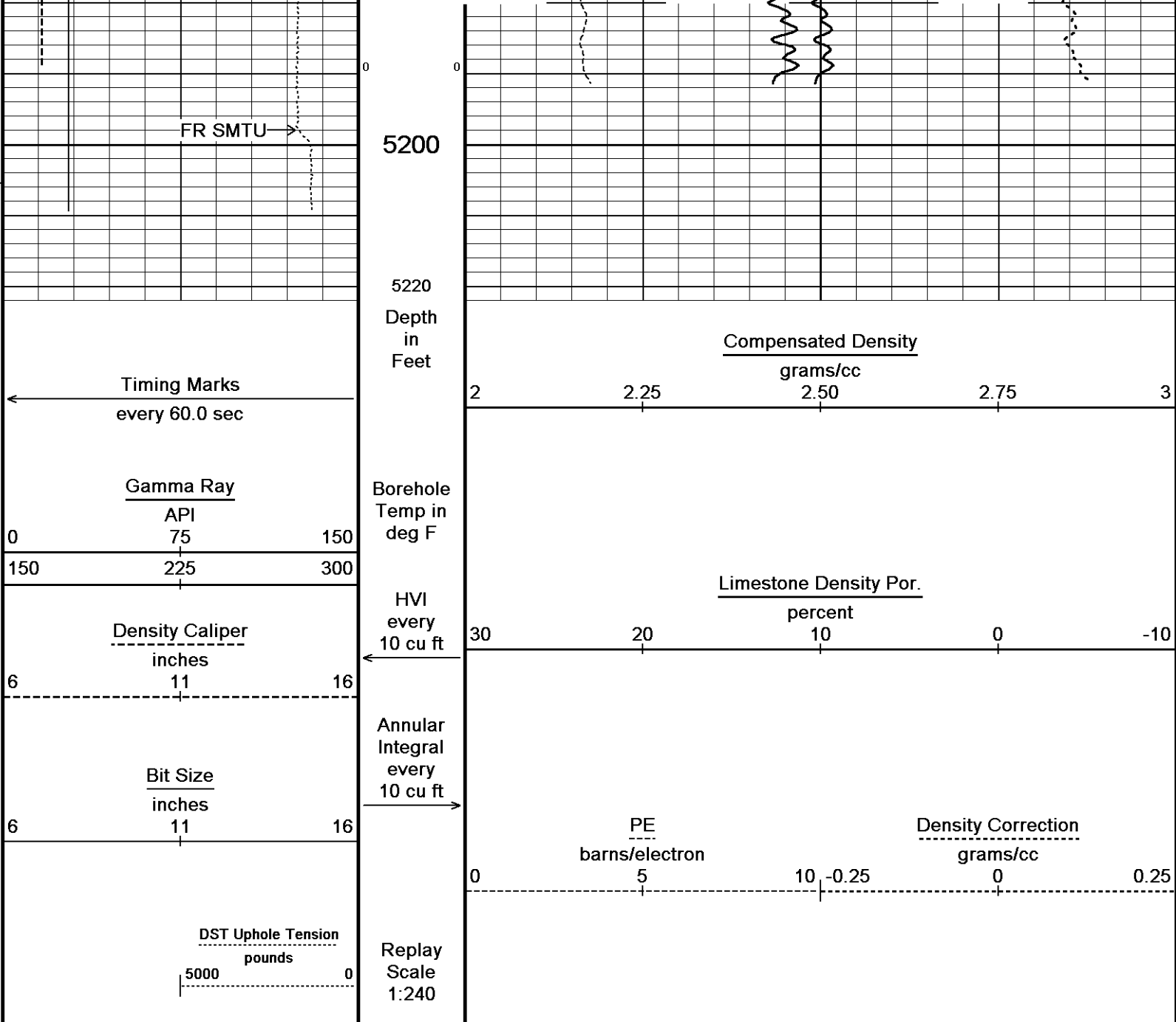
Recorded on 13-APR-2013 05:45

System Versions: Logged with 13.04.8492 Plotted with 13.04.8492









Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 13-APR-2013 08:29
 Filename: C:\Minimus 13.04.8492\Data\M & M Exploration Z-Bar...M & M Exploration Z-Bar 8-1_001.dta Recorded on 13-APR-2013 05:45
 System Versions: Logged with 13.04.8492 Plotted with 13.04.8492

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION
 C:\Minimus 13.04.8492\Data\M & M Exploration Z-Bar 8-1\M & M Exploration Z-Bar 8-1_002 spooled section.dta

General Constants All 000 Last Edited on 13-APR-2013,02:29

General Parameters
 Mud Resistivity 0.670 ohm-metres
 Mud Resistivity Temperature 82.000 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 Density Caliper

| | |
|------------------|-----------------------|
| Rwa Parameters | |
| Porosity used | Base Density Porosity |
| Resistivity used | Array Ind. Six Res Rt |
| RWA Constant A | 1.000 |
| RWA Constant M | 2.000 |

| | | | |
|-------------------------------------|----------|------------------|--|
| Down-hole Tension Calibration SMS 0 | | | Field Calibration on 13-APR-2013 05:06 |
| Reading No | Measured | Calibrated (lbs) | |
| 1 | 14798.56 | 0.00 | |
| 2 | 15473.05 | 383.60 | |

| | | | |
|----------------------------|----------|------------------|--|
| Gamma Calibration MCG-B 34 | | | Field Calibration on 10-APR-2013 10:25 |
| | Measured | Calibrated (API) | |
| Background | 60 | 40 | |
| Calibrator (Gross) | 1154 | 765 | |
| Calibrator (Net) | 1095 | 725 | |

| | | | |
|-------------------------------|-----------------|-------|----------------------------------|
| Gamma Constants MCG-B 34 | | | Last Edited on 13-APR-2013,02:06 |
| Gamma Calibrator Number | GR38 | | |
| Mud Density | 1.08 | gm/cc | |
| Caliper Source for Processing | Density Caliper | | |
| Tool Position | Eccentred | | |
| Concentration of KCl | 0.00 | kppm | |

| | | | |
|-------------------------|----------|-----------------|--|
| SP Calibration MCG-B 34 | | | Field Calibration on 29-MAR-2013,12:58 |
| | Measured | Calibrated (mV) | |
| Reference 1 | 101.0 | 100.0 | |
| Reference 2 | -99.0 | -100.0 | |

| | | | |
|--|----------|-------------------|--|
| High Resolution Temperature Calibration MCG-B 34 | | | Field Calibration on 29-MAR-2013,12:58 |
| | Measured | Calibrated(Deg F) | |
| Lower | 50.00 | 50.00 | |
| Upper | 75.00 | 75.00 | |

| | | | |
|--|----|--|----------------------------------|
| High Resolution Temperature Constants MCG-B 34 | | | Last Edited on 29-MAR-2013,12:58 |
| Pre-filter Length | 11 | | |

| | | | | |
|--------------------------------------|--------------------|-------|---------------------------------------|----------------------------------|
| Micro Laterolog Calibration MMR-A 11 | | | Base Calibration on 31-DEC-1999 00:00 | Field Check on 31-DEC-1999 00:00 |
| Base Calibration | | | | |
| | Measured | | Calibrated (ohm-m) | |
| | Ref 1 | Ref 2 | Ref 1 | Ref 2 |
| | 0.0 | 0.0 | 0.0 | 0.0 |
| | Base Check (ohm-m) | | Field Check (ohm-m) | |
| | 0.0 | | 0.0 | |

| | | | |
|--|--------------------------|-----------|----------------|
| Micro Laterolog Constants MMR-A 11 | | | Last Edited on |
| Pad Type | 6 in Solid Nylon B23059 | | |
| Micro Laterolog K Factor | 0.0128 | | |
| Standoff Offset | 0.0000 | inches | |
| Mudcake Thickness Correction Constants | | | |
| Mud Cake Source | Constant Value | | |
| Mud Cake Thickness | 0.4000 | inches | |
| Mud Cake Thickness Caliper | | | |
| Mud Cake Resistivity | 0.1500 | ohm-m | |
| Mud Cake Resistivity Temp. | 20.00 | Degrees C | |
| Mud Cake Resistivity Source | Constant Value | | |
| Temp. Source Rmc Correc. | MCG External Temperature | | |

| | | | | |
|---|------------|------------|---------------------------------------|----------------------------------|
| Micro Normal and Micro Inverse Calibration MMR-A 11 | | | Base Calibration on 08-MAR-2013 17:36 | Field Check on 10-APR-2013 10:27 |
| Base Calibration | | | | |
| | Measured | | Calibrated (ohm-m) | |
| Channel | Resistor 1 | Resistor 2 | Resistor 1 | Resistor 2 |

| | | | | |
|---------------|------|------|-----|------|
| Micro Normal | 12.4 | 60.0 | 5.0 | 25.0 |
| Micro Inverse | 15.5 | 77.5 | 5.0 | 25.0 |

| | | |
|---------------|--------------------|---------------------|
| Channel | Base Check (ohm-m) | Field Check (ohm-m) |
| Micro Normal | 76.3 | 76.3 |
| Micro Inverse | 58.7 | 58.7 |

Micro Normal and Micro Inverse Constants MMR-A 11

Last Edited on 05-NOV-2012,13:54

Pad Type 8-12 in Soft Rubber Inflatable 006-9011-159
 Micro Normal K Factor 1.0000
 Micro Inverse K Factor 1.0000
 Standoff Offset 0.0000 inches

Caliper Calibration MMR-A 11

Base Calibration on 08-APR-2013 09:09
 Field Calibration on 10-APR-2013 10:30

| | | |
|------------------|----------|----------------------|
| Base Calibration | | |
| Reading No | Measured | Calibrator Size (in) |
| 1 | 13932 | 5.98 |
| 2 | 17063 | 7.97 |
| 3 | 20236 | 9.86 |
| 4 | 24170 | 11.92 |
| 5 | 0 | 0.00 |
| 6 | N/A | N/A |

| | | |
|-------------------|-----------------------|---------------------|
| Field Calibration | Measured Caliper (in) | Actual Caliper (in) |
| | 5.93 | 5.98 |

Neutron Calibration MDN-A.B 65

Base Calibration on 13-MAR-2013 16:17
 Field Check on 10-APR-2013 10:41

| | | | | |
|------------------|------|----------|------|------------------|
| Base Calibration | | | | |
| | | Measured | | Calibrated (cps) |
| | Near | Far | Near | Far |
| | 2980 | 92 | 3714 | 110 |
| Ratio | | 32.499 | | 33.764 |

| | | |
|--------------------------|--|------------------|
| Field Calibrator at Base | | Calibrated (cps) |
| | | 1736 2464 |
| Ratio | | 0.705 |

| | | |
|-------------|--|------------------|
| Field Check | | Calibrated (cps) |
| | | 1736 2470 |
| Ratio | | 0.680 |

Neutron Constants MDN-A.B 65

Last Edited on 13-APR-2013,02:06

| | | |
|---------------------------------|-----------------|-----------|
| Neutron Source Id | PN-521 | |
| 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 | None | |
| Temperature | N/A | 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 16-JAN-2013 10:20
 Field Check on 10-APR-2013 10:50

| | | |
|------------------|----------|--------------------|
| Base Calibration | | |
| | Measured | Calibrated (ohm-m) |
| Reference 1 | 0.0 | 0.0 |
| Reference 2 | 964.3 | 126.8 |

Base Check 281.2

Field Check 281.3

FE Constants MFE-B.J 352

Last Edited on 13-APR-2013,02:04

| | | |
|----------------------------------|--------------------------|--------|
| 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 45

Field Calibration on 13-DEC-2012,10:54

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

High Resolution Temperature Constants MAI-A.A 45

Last Edited on 10-APR-2013,10:31

Pre-filter Length 11

Induction Calibration MAI-A.A 45

Base Calibration on 26-JUL-2012,09:22

Field Check on 10-APR-2013 10:52

Base Calibration

Test Loop Calibration

| Channel | Measured | | Calibrated (mmho/m) | |
|---------|----------|-------|---------------------|-------|
| | Low | High | Low | High |
| 1 | 14.4 | 472.6 | 9.3 | 966.2 |
| 2 | 5.7 | 374.0 | 7.6 | 821.4 |
| 3 | 3.4 | 261.2 | 5.2 | 566.0 |
| 4 | 2.5 | 133.9 | 2.6 | 279.2 |

Array Temperature 78.4 Deg F

| Channel | Base Check (mmho/m) | | Field Check (mmho/m) | |
|---------|---------------------|------|----------------------|--------|
| | Low | High | Low | High |
| 1 | | | 18.4 | 3850.4 |
| 2 | | | 31.7 | 3628.8 |
| 3 | | | 28.7 | 3049.3 |
| 4 | | | 18.3 | 2079.1 |
| Deep | | | 16.1 | 1911.4 |
| Medium | | | 42.5 | 4060.4 |
| Shallow | | | 49.5 | 5481.9 |

Array Temperature 60.4 Deg F

Induction Constants MAI-A.A 45

Last Edited on 13-APR-2013,02:04

| | | |
|-----------------------------------|--------------------------|------------|
| 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 31

Base Calibration on 28-MAR-2013 13:43
Field Calibration on 08-APR-2013 08:48

| | | |
|-------------------|-----------------------|----------------------|
| Base Calibration | | |
| Reading No | Measured | Calibrator Size (in) |
| 1 | 16832 | 3.99 |
| 2 | 24690 | 5.98 |
| 3 | 33328 | 7.97 |
| 4 | 41600 | 9.86 |
| 5 | 50976 | 11.92 |
| 6 | N/A | N/A |
| | | |
| Field Calibration | | |
| | Measured Caliper (in) | Actual Caliper (in) |
| | 6.00 | 5.98 |

Photo Density Calibration MPD-B 31

Base Calibration on 13-MAR-2013 15:17
Field Check on 10-APR-2013 10:49

| | | | | | |
|---------------------|-------|----------|-------|------------------|--|
| Density Calibration | | | | | |
| Base Calibration | | Measured | | Calibrated (sdu) | |
| | Near | Far | Near | Far | |
| Reference 1 | 46119 | 23502 | 59556 | 30836 | |
| Reference 2 | 19149 | 1933 | 24941 | 2541 | |
| | | | | | |
| Field Check at Base | | 681.1 | 838.4 | | |
| | | | | | |
| Field Check | | 679.5 | 834.9 | | |
| | | | | | |
| PE Calibration | | | | | |
| Base Calibration | | Measured | | Calibrated | |
| | WS | WH | Ratio | Ratio | |
| Background | 125 | 604 | | | |
| Reference 1 | 19219 | 46004 | 0.421 | 0.371 | |
| Reference 2 | 5674 | 19062 | 0.301 | 0.272 | |
| | | | | | |
| Field Check at Base | | 125.1 | 603.7 | | |
| | | | | | |
| Field Check | | 124.6 | 603.1 | | |

Density Constants MPD-B 31

Last Edited on 13-APR-2013,02:05

| | | |
|-------------------------------|-----------------|-------|
| Density Source Id | 254 | |
| 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 | 1.08 | 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 | 0.00 | |

DOWNHOLE EQUIPMENT

C:\Minimus 13.04.8492\Data\M & M Exploration Z-Bar 8-1\M & M Exploration Z-Bar 8-1_002 spooled section.dta

Compact Comms Gamma
MCG-B 34 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-Resistivity
MMR-A 11 LG: 8.59 ft WT: 81.6 lb OD: 4.88 in

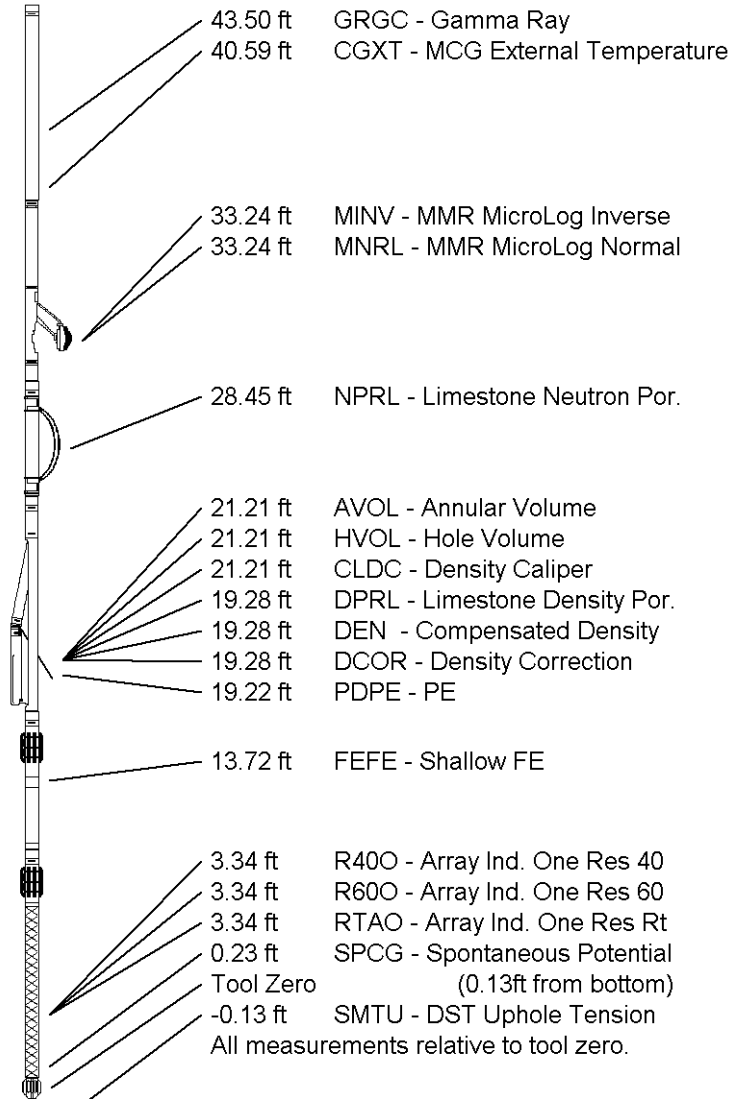
Compact Neutron
MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 31 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 45 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 48.78 ft Weight: 383.6 lb



| | |
|-----------------|-------------------------|
| COMPANY | M & M EXPLORATION, INC. |
| WELL | Z-BAR 8-1 |
| FIELD | AETNA SE |
| PROVINCE/COUNTY | BARBER |
| COUNTRY/STATE | U.S.A. / KANSAS |

| | | | | | |
|-------------------------|---------|------|---------------|---------|------|
| Elevation Kelly Bushing | 1668.00 | feet | First Reading | 5178.00 | feet |
| Elevation Drill Floor | 1666.00 | feet | Depth Driller | 5200.00 | feet |
| Elevation Ground Level | 1658.00 | feet | Depth Logger | 5198.00 | feet |



Weatherford[®]

COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG