# HALLIBURTON

# SPECTRAL DENSITY DUAL SPACED NEUTRON MICROLOG

COMPANY **PHOENIX PETROCORP INC.**

WELL **BERRYMAN RU 14-4**

FIELD **RICHFIELD**

COUNTY **MORTON** STATE **KANSAS**

COMPANY PHOENIX PETROCORP INC.
WELL BERRYMAN RU 14-4
FIELD RICHFIELD
COUNTY MORTON
STATE KANSAS

API No. 15-129-21933
Location
2310' FSL & 1320' FEL

Other Services:
ACRT
SDL-DSN-ML

| | | | |
|---|---|---|---|
| Permanent Datum | GL | Elev. 3443.0 ft | Elev.: K.B. 3454.0 ft |
| Log measured from | KB | , 11.0 ft above perm. Datum | D.F. 3453.0 ft |
| Drilling measured from | KB | | G.L. 3443.0 ft |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date | | 31-May-11 | | | | | |
| Run No. | | 1 | | | | | |
| Depth - Driller | | 5175.00 ft | | | | | |
| Depth - Logger | | 5175.0 ft | | | | | |
| Bottom - Logged Interval | | 5165 | | | | | |
| Top - Logged Interval | | 1563 | | | | | |
| Casing - Driller | | 8.625 in @ 1560.0 ft | | @ | | @ | |
| Casing - Logger | | 1563.0 ft | | | | | |
| Bit Size | | 7.875 in | | @ | | @ | |
| Type Fluid in Hole | | WBM | | | | | |
| Density | Viscosity | 9.1 ppg | 65.00 s/qt | | | | |
| PH | Fluid Loss | 5.40 pH | 5.4 cptm | | | | |
| Source of Sample | | FLOWLINE | | | | | |
| Rm @ Meas. Temperature | | 1.650 ohmm @ 83.00 degF | | @ | | @ | |
| Rmf @ Meas. Temperature | | 1.37 ohmm @ 80.00 degF | | @ | | @ | |
| Rmc @ Meas. Temperature | | 1.830 ohmm @ 80.00 degF | | @ | | @ | |
| Source Rmf | Rmc | MEAS | MEAS | | | | |
| Rm @ BHT | | 1.05 ohmm @ 134.0 degF | | @ | | @ | |
| Time Since Circulation | | 10.0 hr | | | | | |
| Time on Bottom | | 31-May-11 10:54 | | | | | |
| Max. Rec. Temperature | | 134.0 degF @ 5175.0 ft | | @ | | @ | |
| Equipment | Location | 10975786 | LIBERAL | | | | |
| Recorded By | | WHITLOCK | | | | | |
| Witnessed By | | CHARLIE WILLIAMS | | JIM BERGMAN | | | |

Fold here

Service Ticket No.: 8213414 API Serial No.: 15-129-21933 PGM Version: WL INSITE R3.2.1 (Build 7)

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE

RESISTIVITY SCALE CHANGES

| | Sample No. | Type Log | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|---|---|
| Date | | | | | |
| Depth-Driller | | | | | |
| Type Fluid in Hole | | | | | |
| Density | Viscosity | | | | |
| Ph | Fluid Loss | | | | |
| Source of Sample | | | | | |
| Rm @ Meas. Temp | @ | | | | |
| Rmf @ Meas. Temp. | @ | | | | |
| Rmc @ Meas. Temp. | @ | | | | |
| Source Rmf | Rmc | | | | |
| Rm @ BHT | @ | | | | |
| Rmf @ BHT | @ | | | | |
| Rmc @ BHT | @ | | | | |

RESISTIVITY EQUIPMENT DATA

| | Run No. | Tool Type & No. | Pad Type | Tool Pos. | Other |
|---|---|---|---|---|---|
| | @ | | | | |
| | @ | | | | |
| | @ | | | | |
| | @ | | | | |
| | @ | | | | |
| | @ | | | | |

EQUIPMENT DATA

| | GAMMA | | ACOUSTIC | | DENSITY | | NEUTRON | |
|---|---|---|---|---|---|---|---|---|
| | Run No. | | Run No. | | Run No. | | Run No. | |
| Serial No. | | | Serial No. | | Serial No. | | Serial No. | |
| Model No. | | | Model No. | | Model No. | | Model No. | |
| Diameter | | | No. of Cent. | | Diameter | | Diameter | |
| Detector Model No. | | | Spacing | | Log Type | | Log Type | |
| Type | | | LSA [Y/N] | | Source Type | | Source Type | |
| Length | | | FWDA [Y/N] | | Serial No. | | Serial No. | |
| Distance to Source | | | | | Strength | | Strength | |

LOGGING DATA

GENERAL GAMMA ACOUSTIC DENSITY NEUTRON

| GENERAL | | | | GAMMA | | ACOUSTIC | | | DENSITY | | | NEUTRON | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Run | Depth | | Speed | Scale | | Scale | | Matrix | Scale | | Matrix | Scale | | Matrix |
| No. | From | To | ft/min | L | R | L | R | | L | R | | L | R | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

DIRECTIONAL INFORMATION

| Maximum Deviation @ | KOP @ |
|---|---|

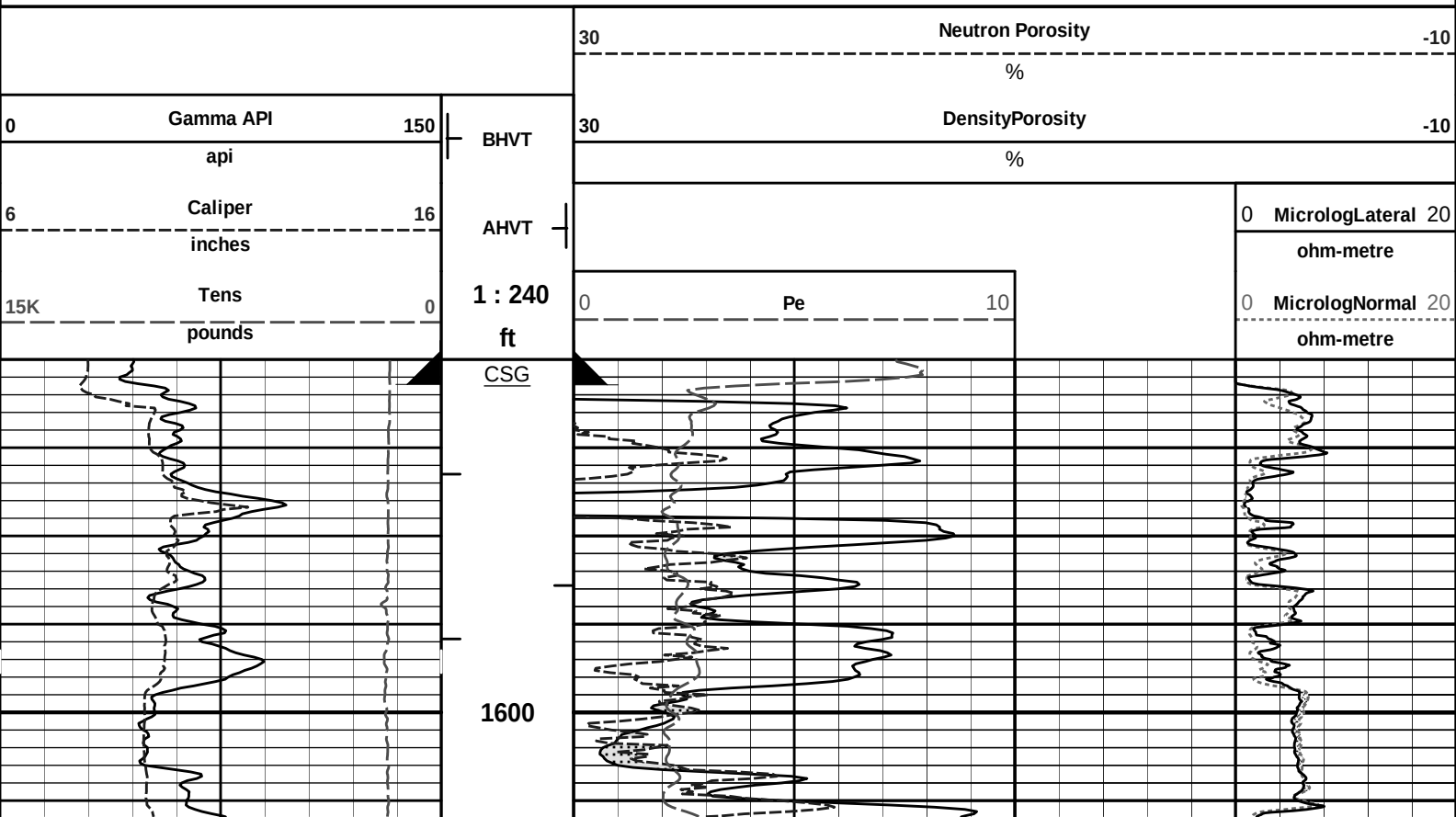
Remarks: 5 1/2'' CASING USED FOR ANNULAR HOLE VOLUME

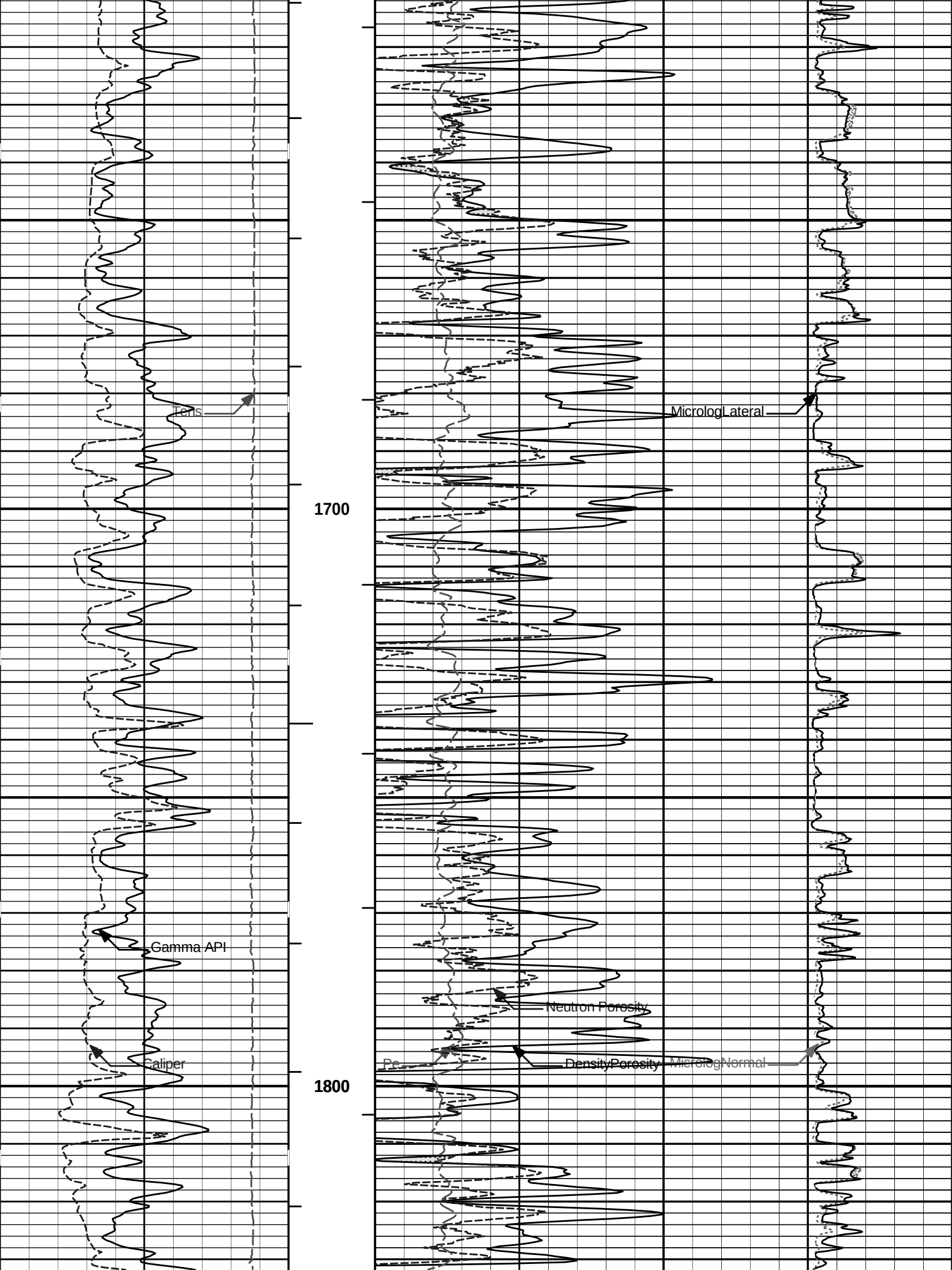


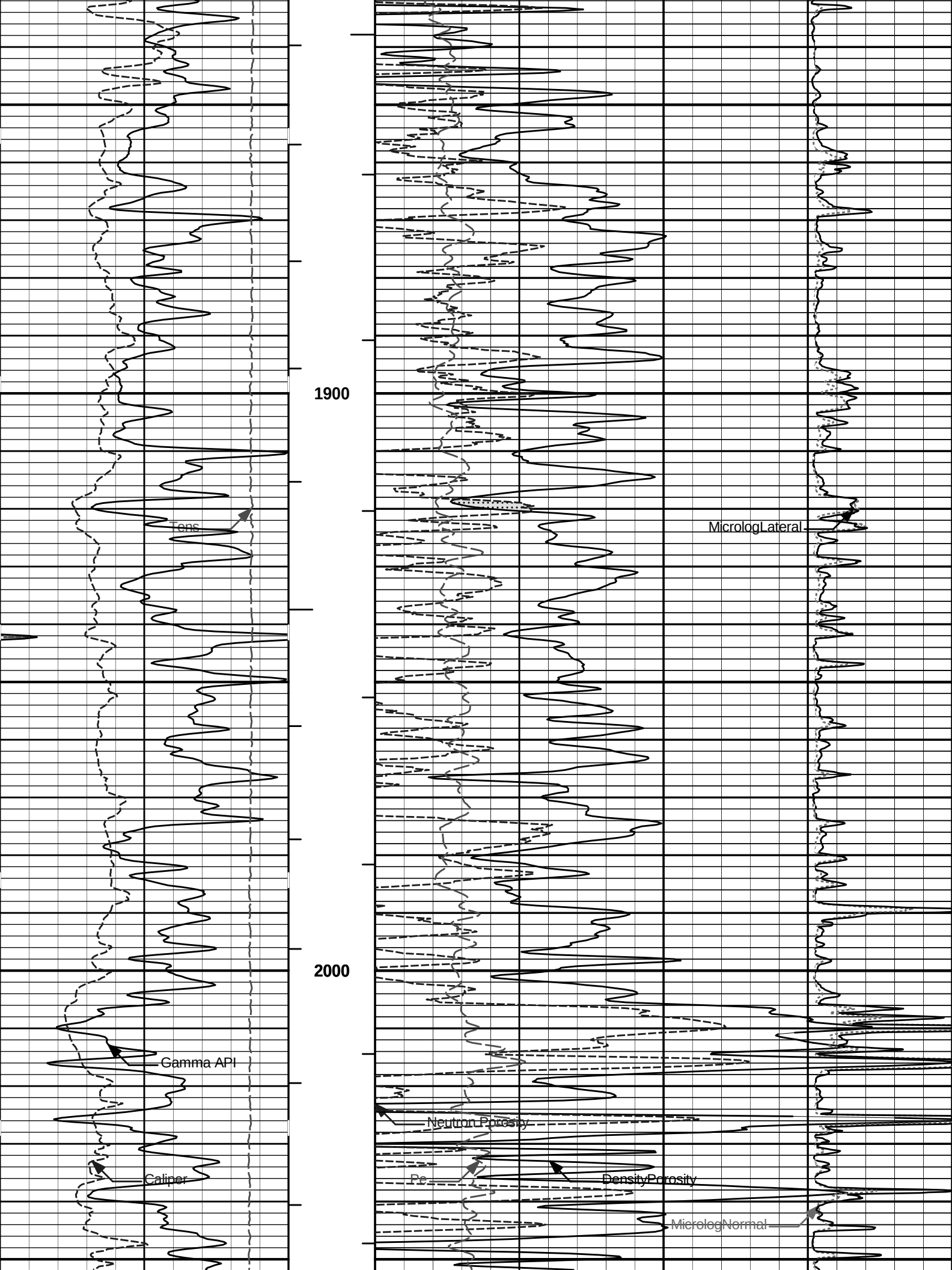
HALLIBURTON

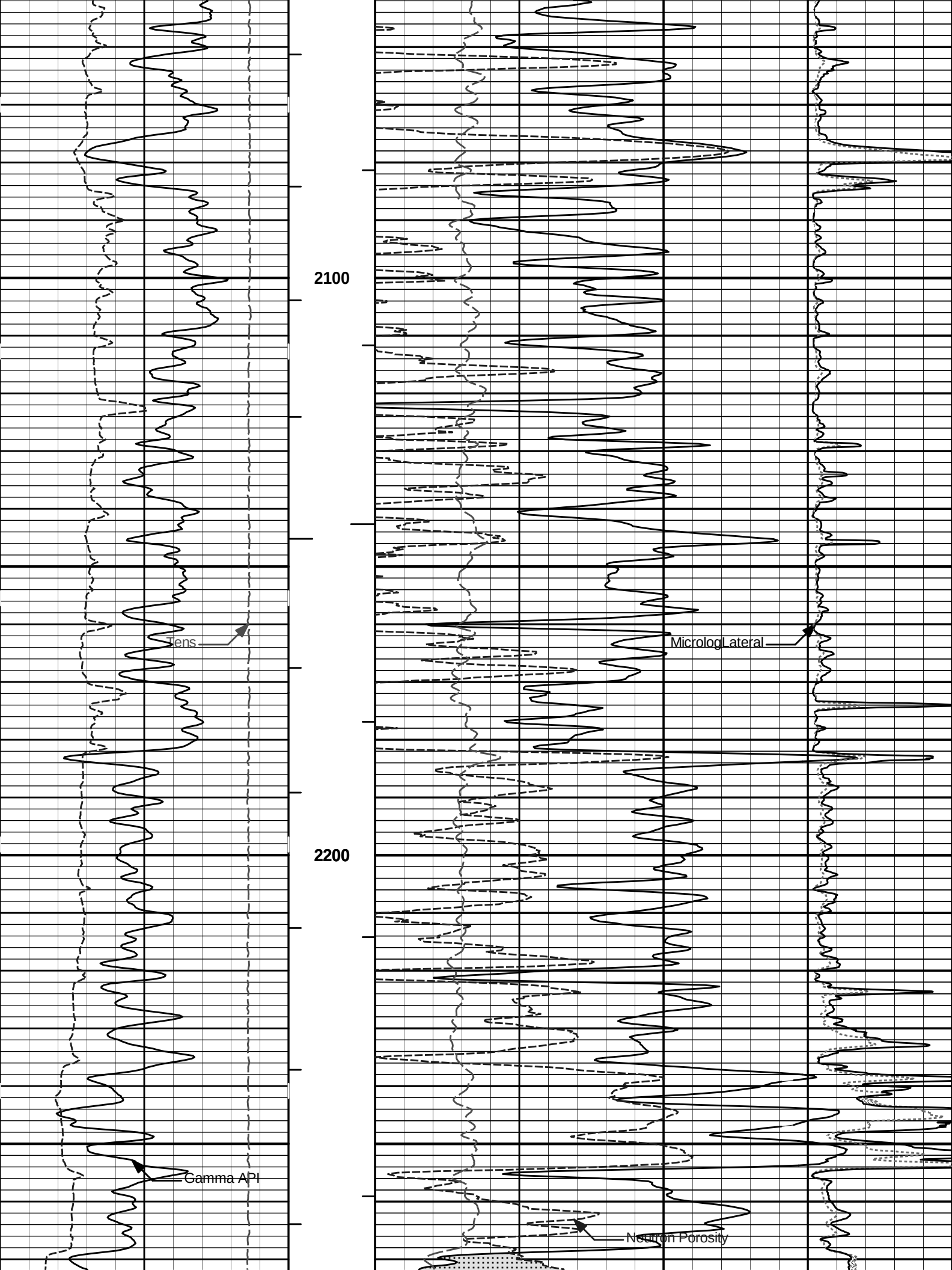
**Plot Time: 31-May-11 13:28:00**
**Plot Range: 1560 ft to 5179.67 ft**
**Data: PHOENIX_BERRYMN\Well Based\DAQ-0001-003**
**Plot File: \\SDL-DSN\PoroML_5_main_IQ**

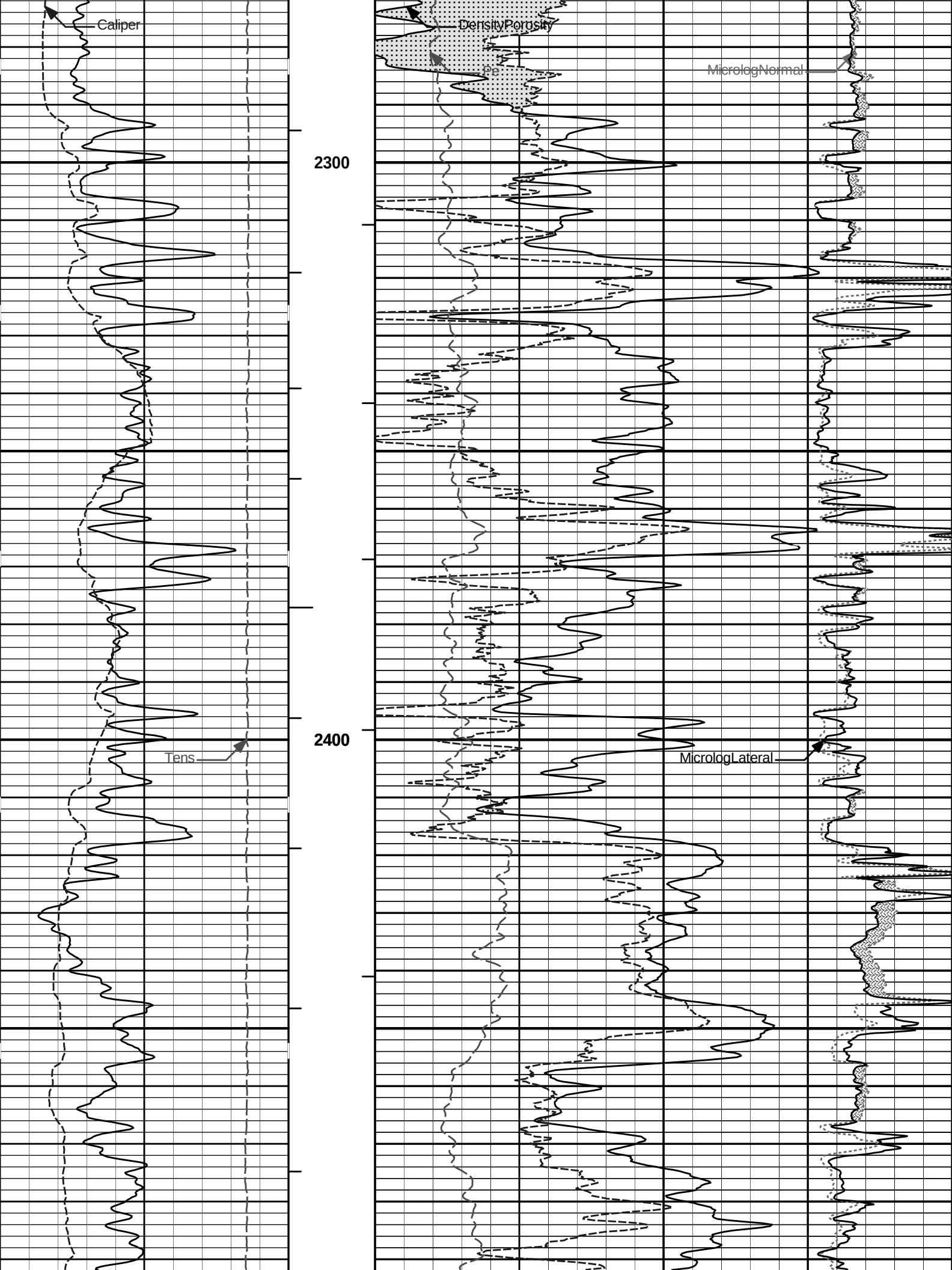
# 5 INCH MAIN LOG

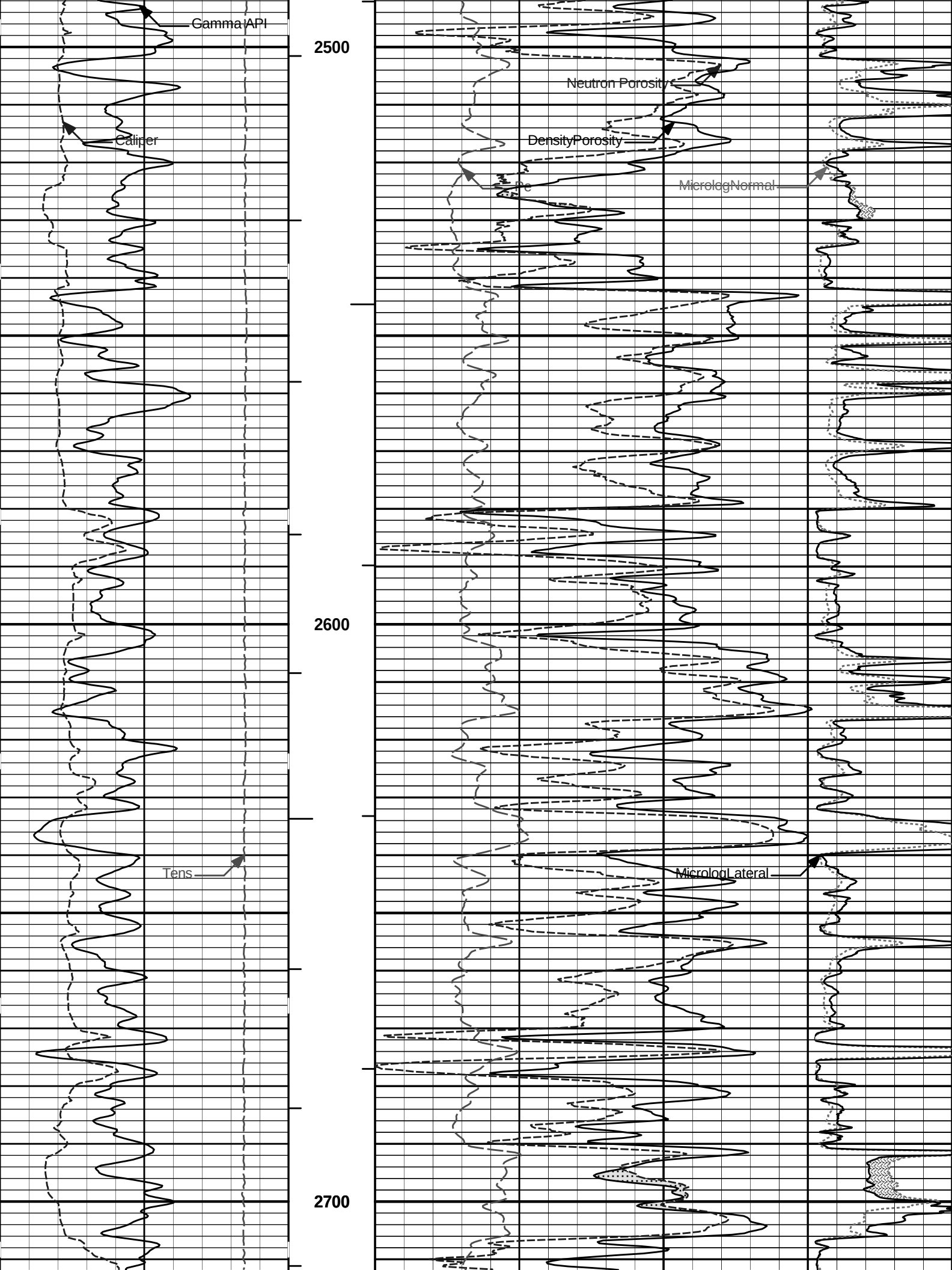



Tens
MicrologLateral
1700
Gamma API
Neutron Porosity
Caliper
Pe
DensityPorosity
MicrologNormal
1800


1900
2000
Tens
MicrologLateral
Gamma API
Caliper
Neutron Porosity
Pe
DensityPorosity
MicrologNormal


2100
2200
Tens
MicrologLateral
Gamma API
Neutron Porosity


Caliper
DensityPorosity
Pe
MicrologNormal
2300
2400
Tens
MicrologLateral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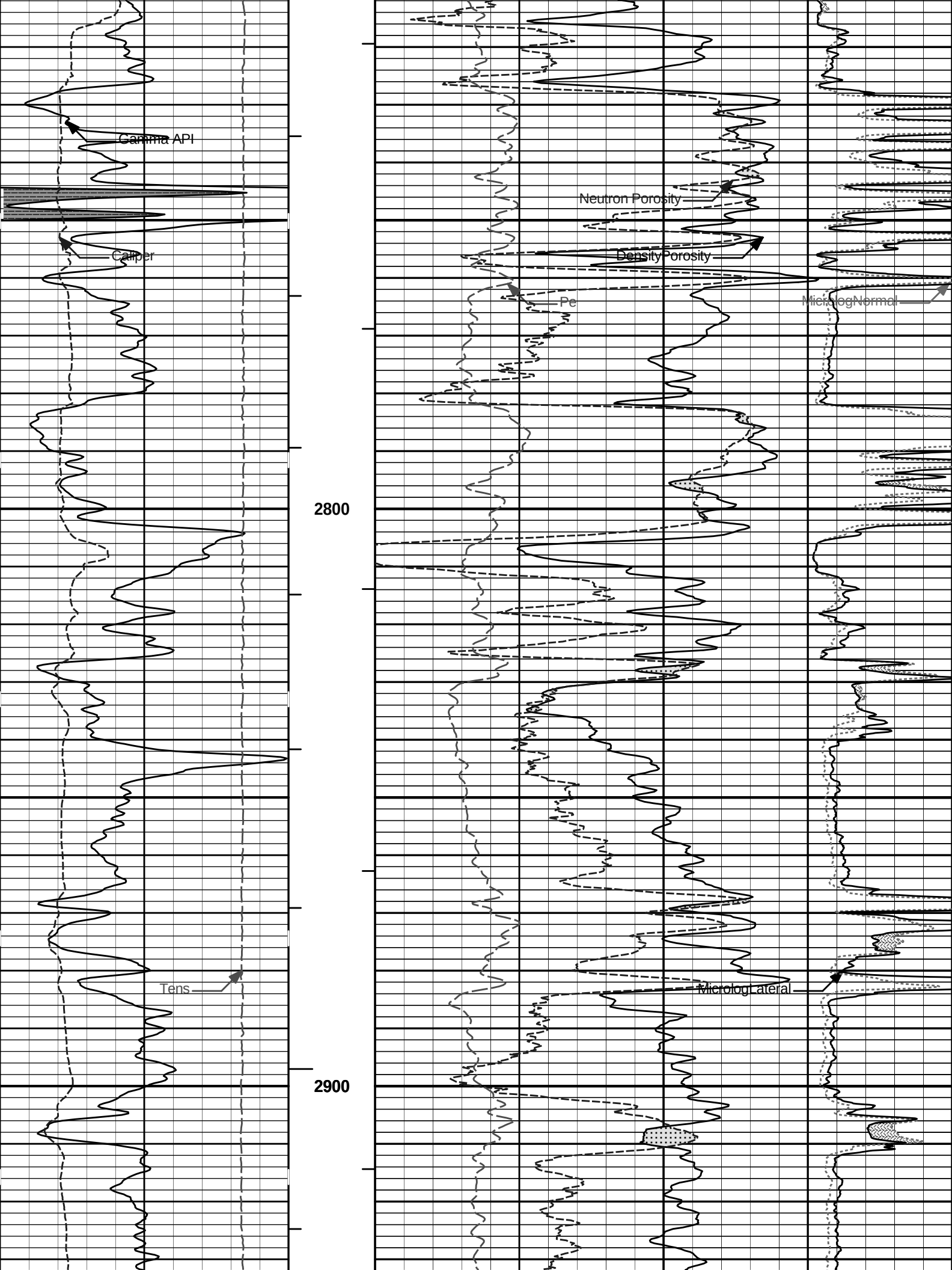
Caliper
Tens
2500
2600
2700
Neutron Porosity
DensityPorosity
Pe
MicrologNormal
MicrologLateral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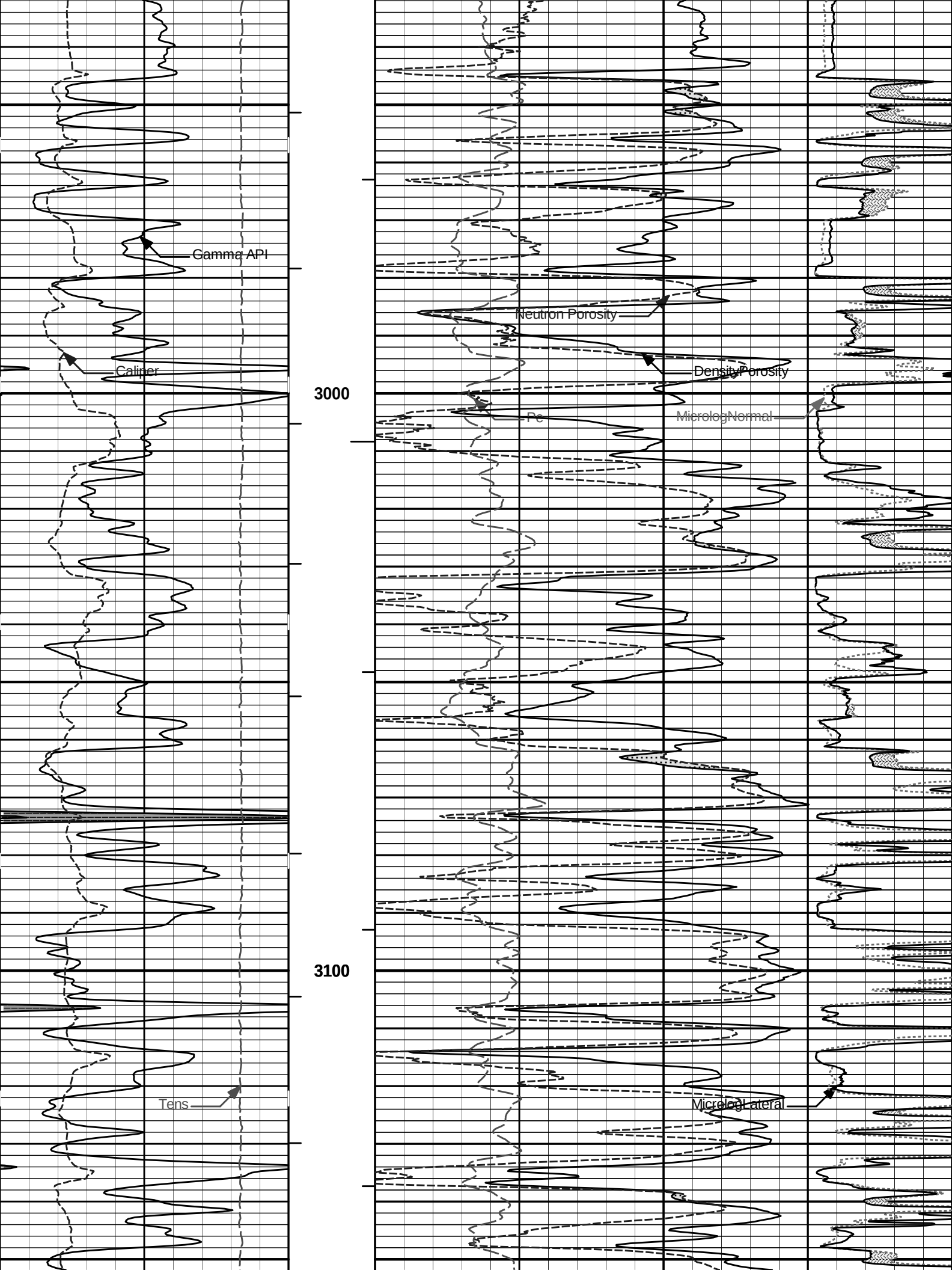
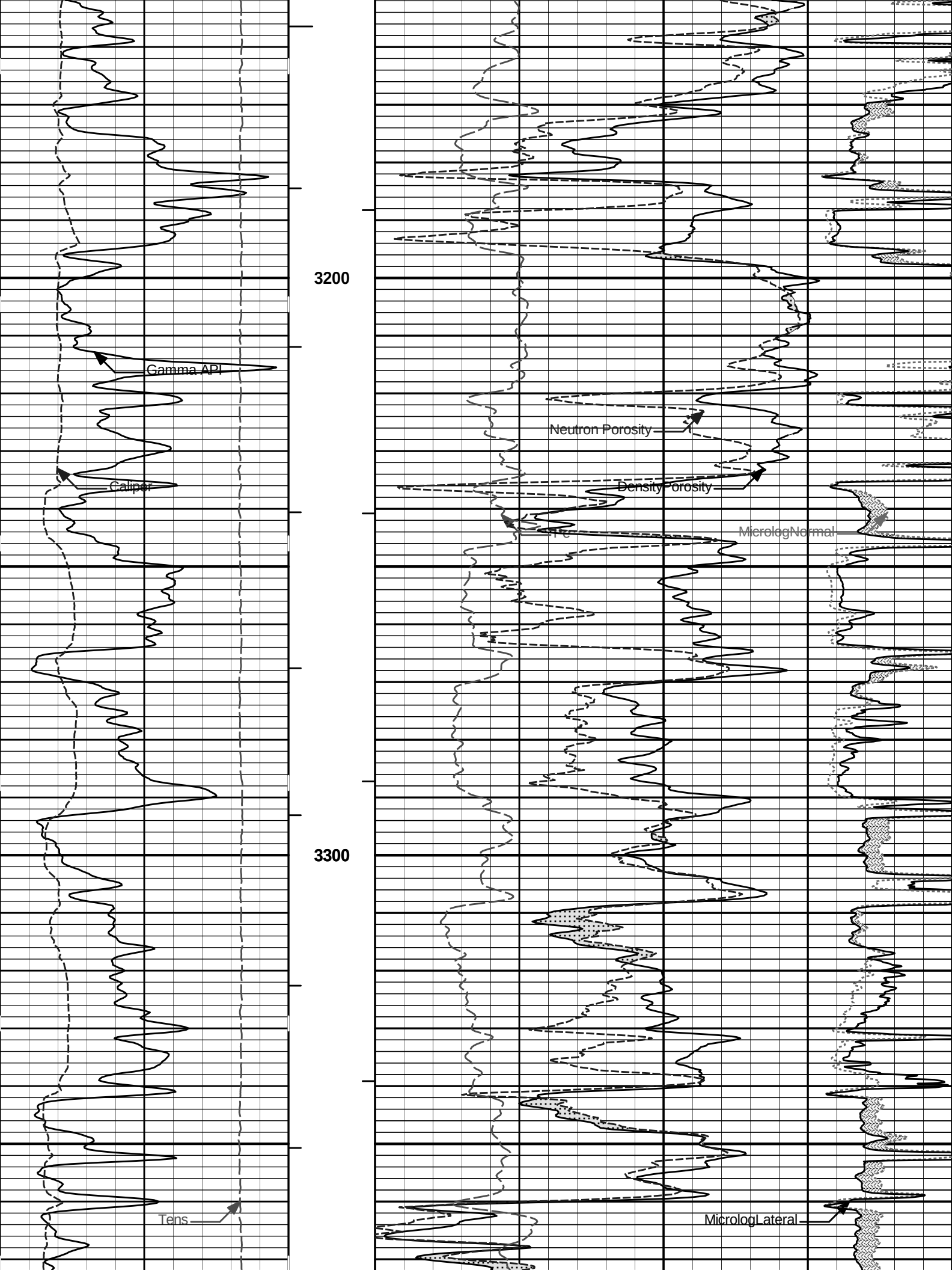
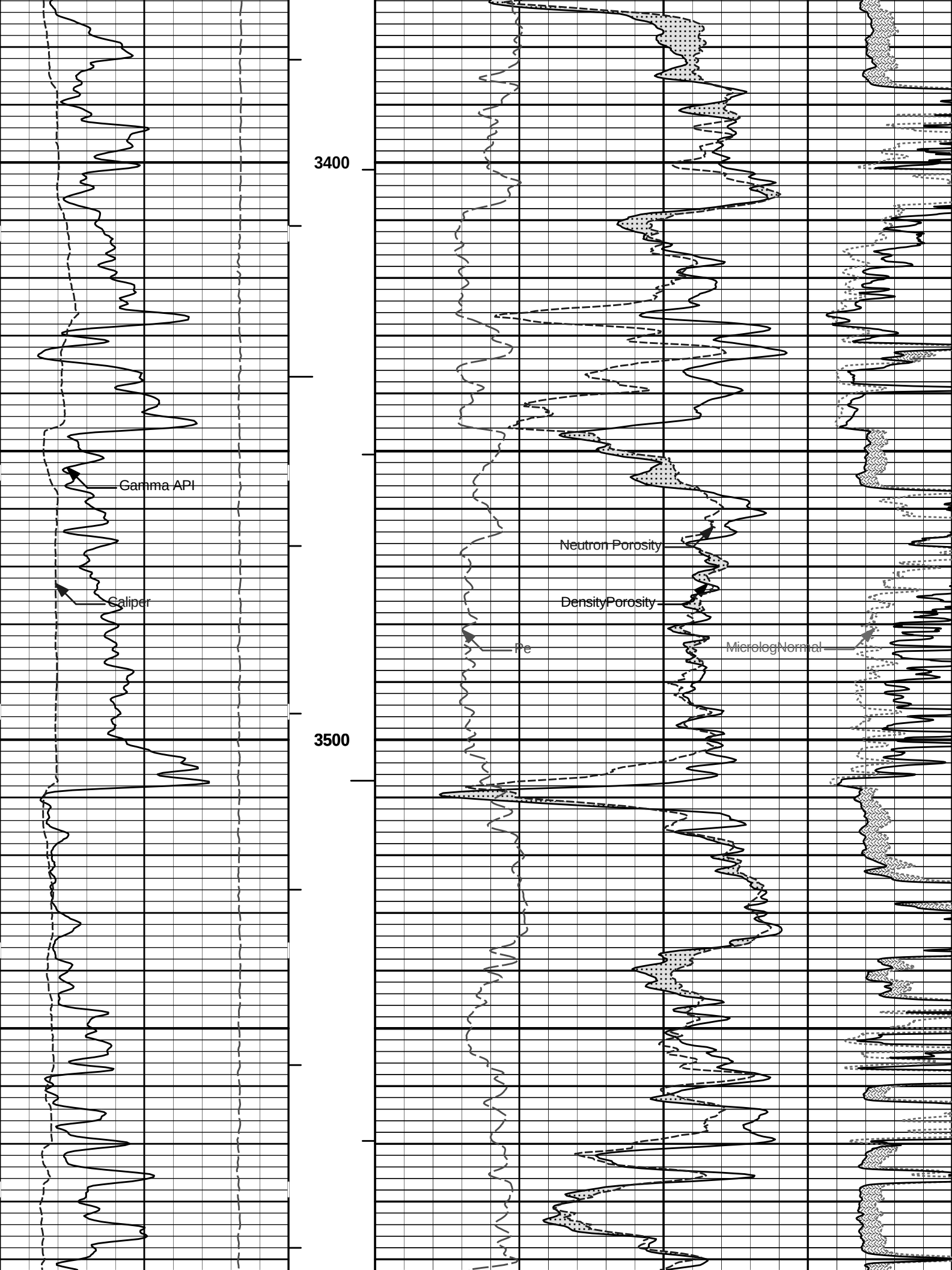
Caliper
Tens
Neutron Porosity
Density Porosity
Pe
MicrologNormal
MicrologLateral
2800
2900


Gamma API
Caliper
Tens
Neutron Porosity
Density Porosity
Pe
MicrologNormal
MicrologLateral
3000
3100


3200
3300
Gamma API
Caliper
Tens
Neutron Porosity
Density Porosity
MicrologNormal
MicrologLateral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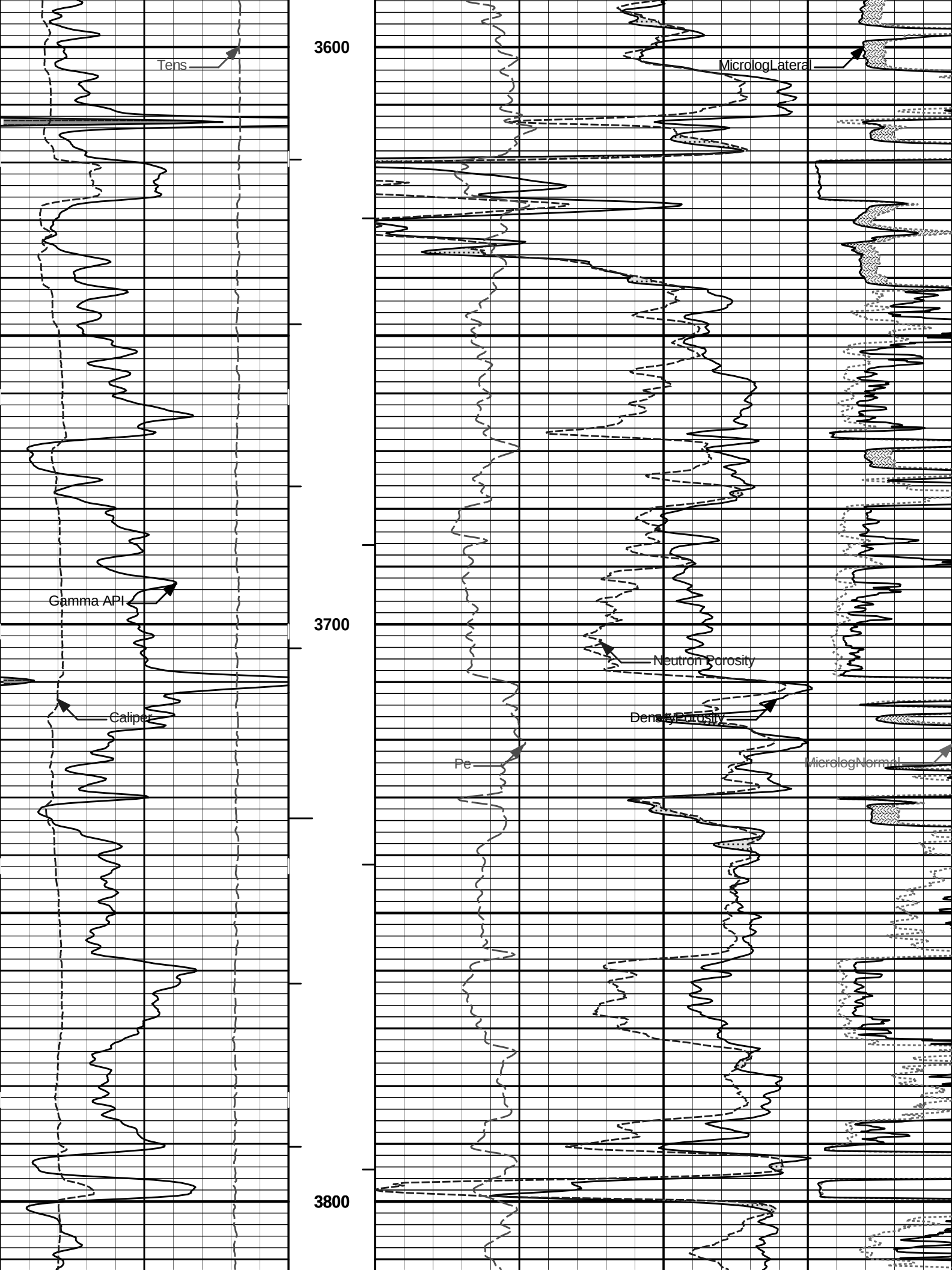
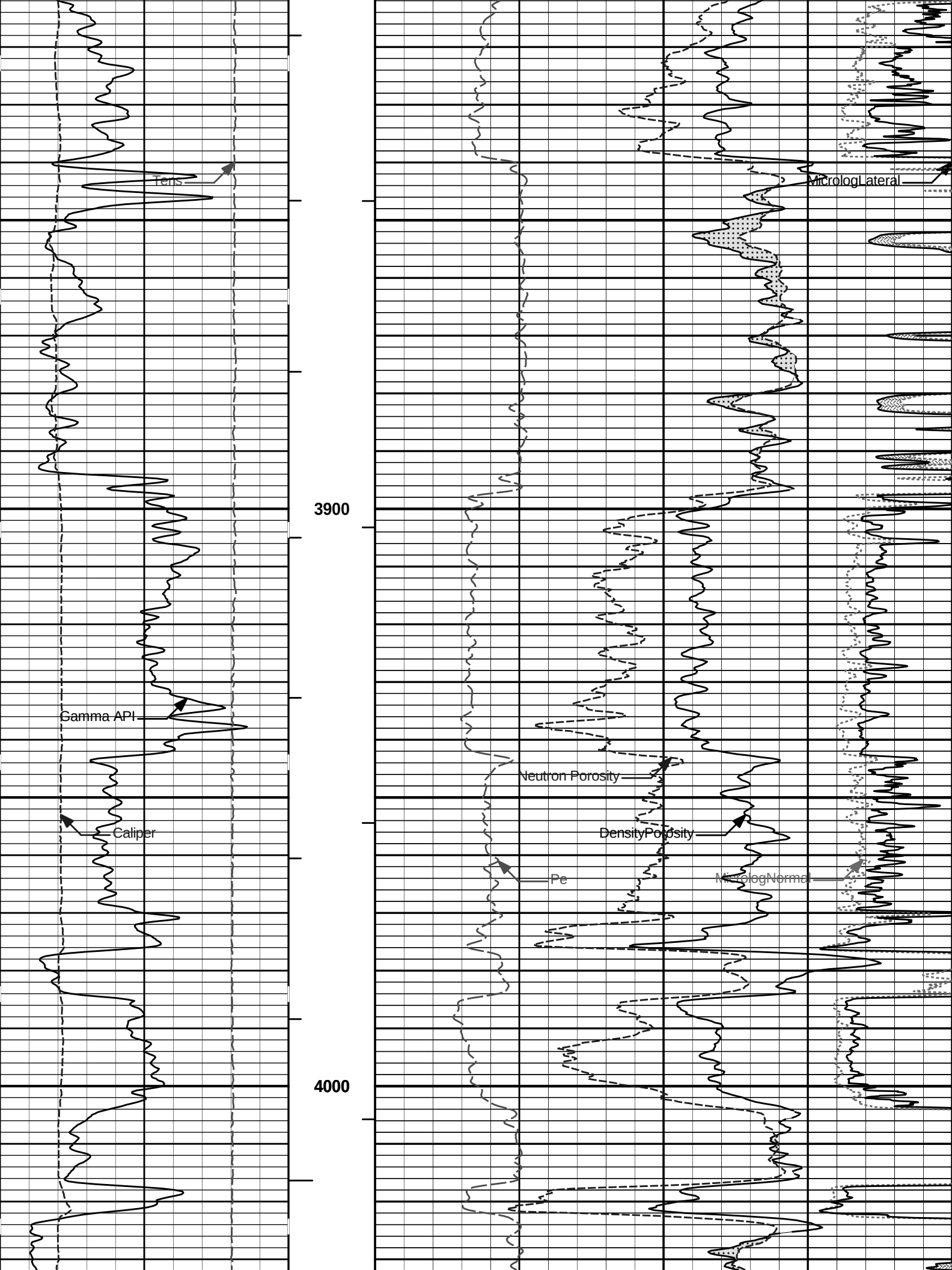
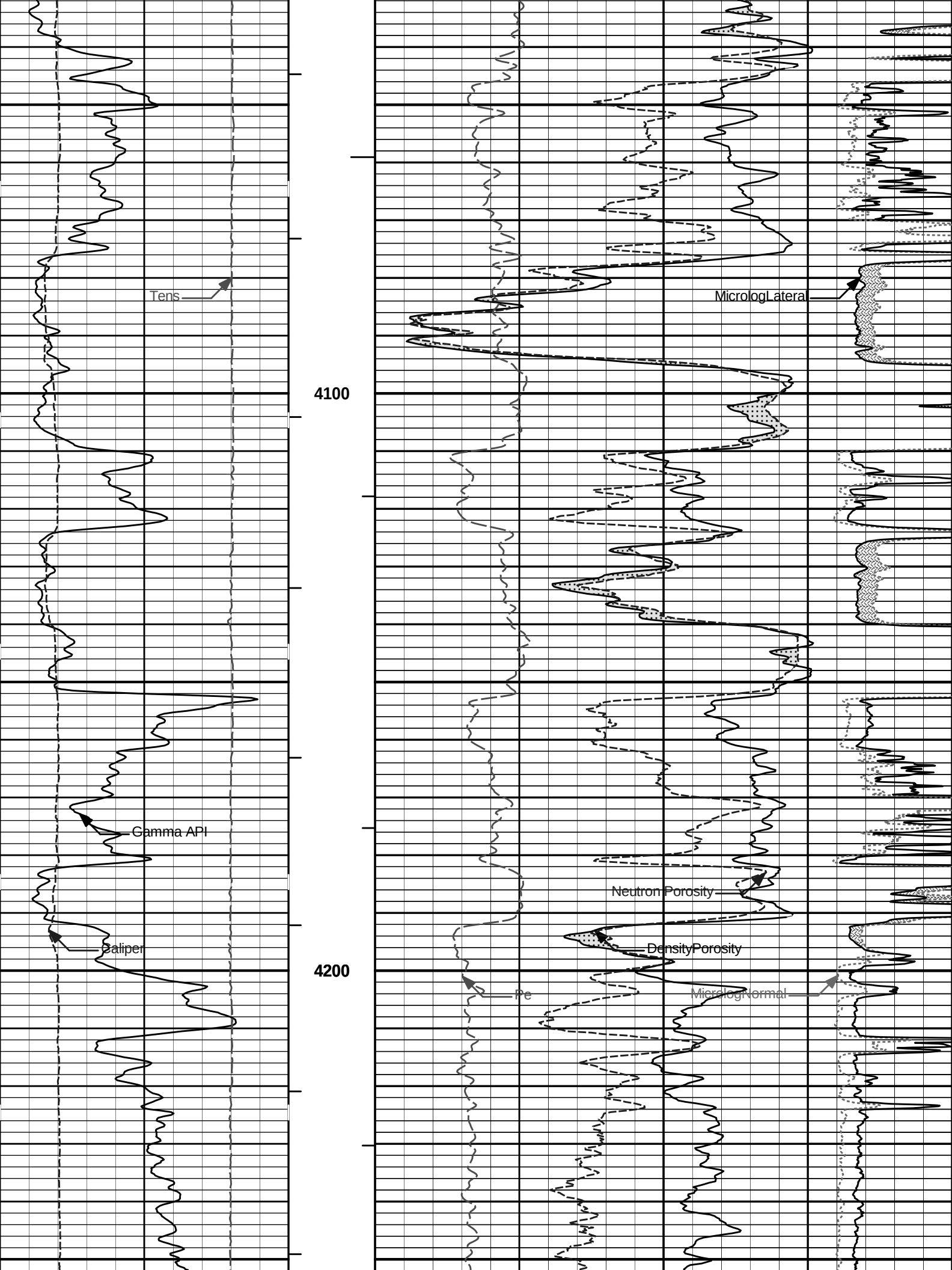
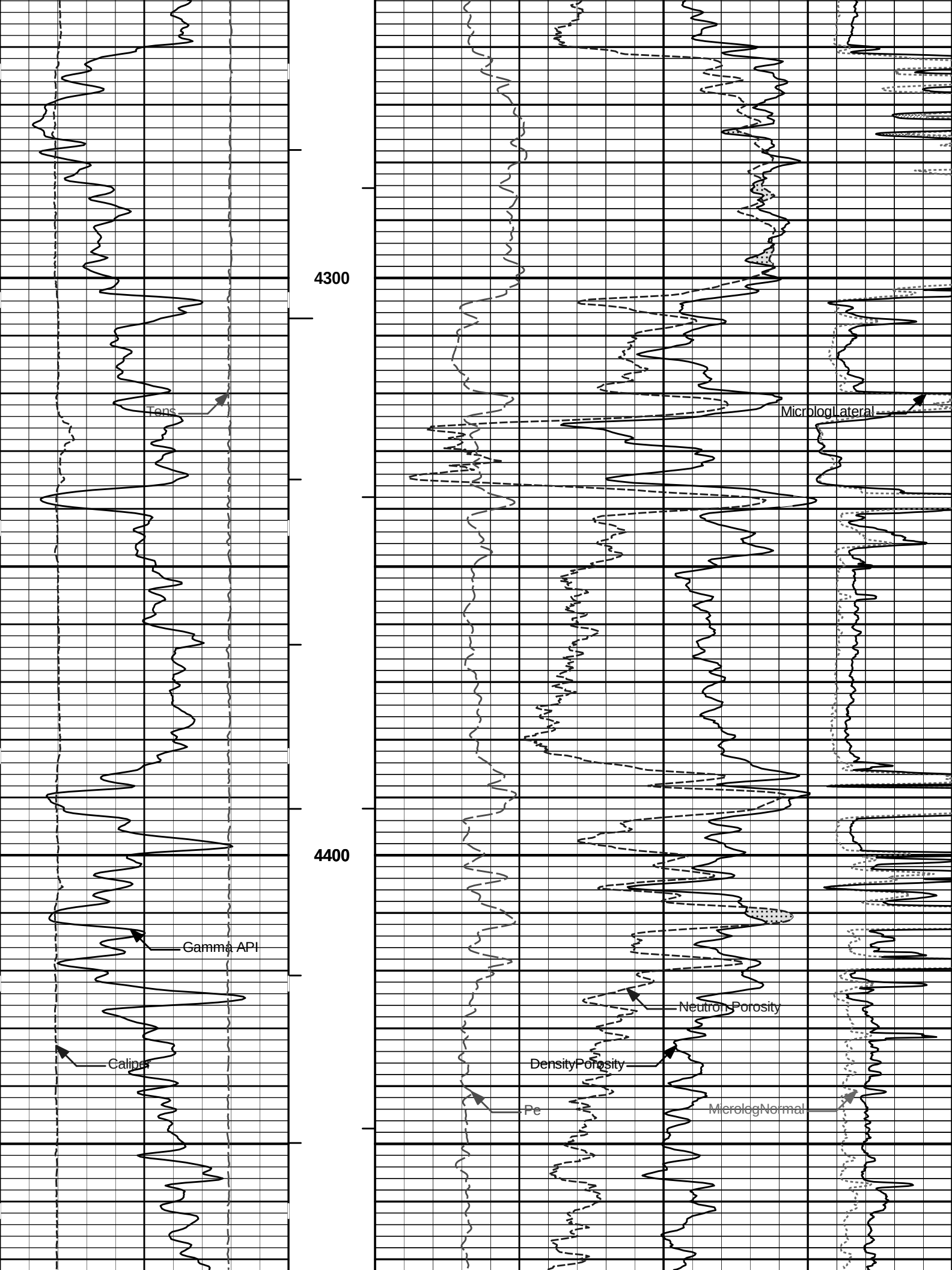
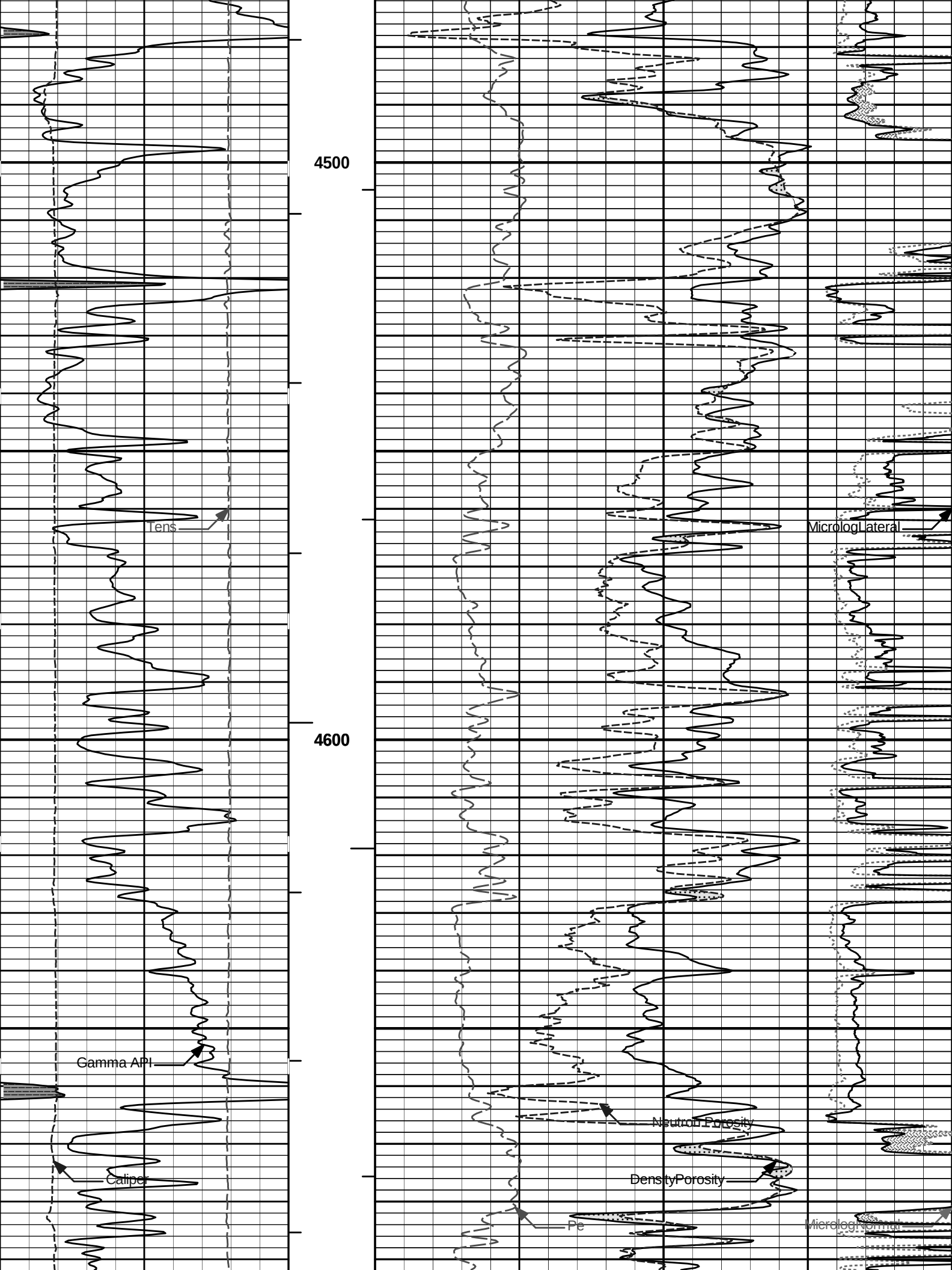
3500
Gamma API
Caliper
Neutron Porosity
DensityPorosity
Pe
MicrologNormal

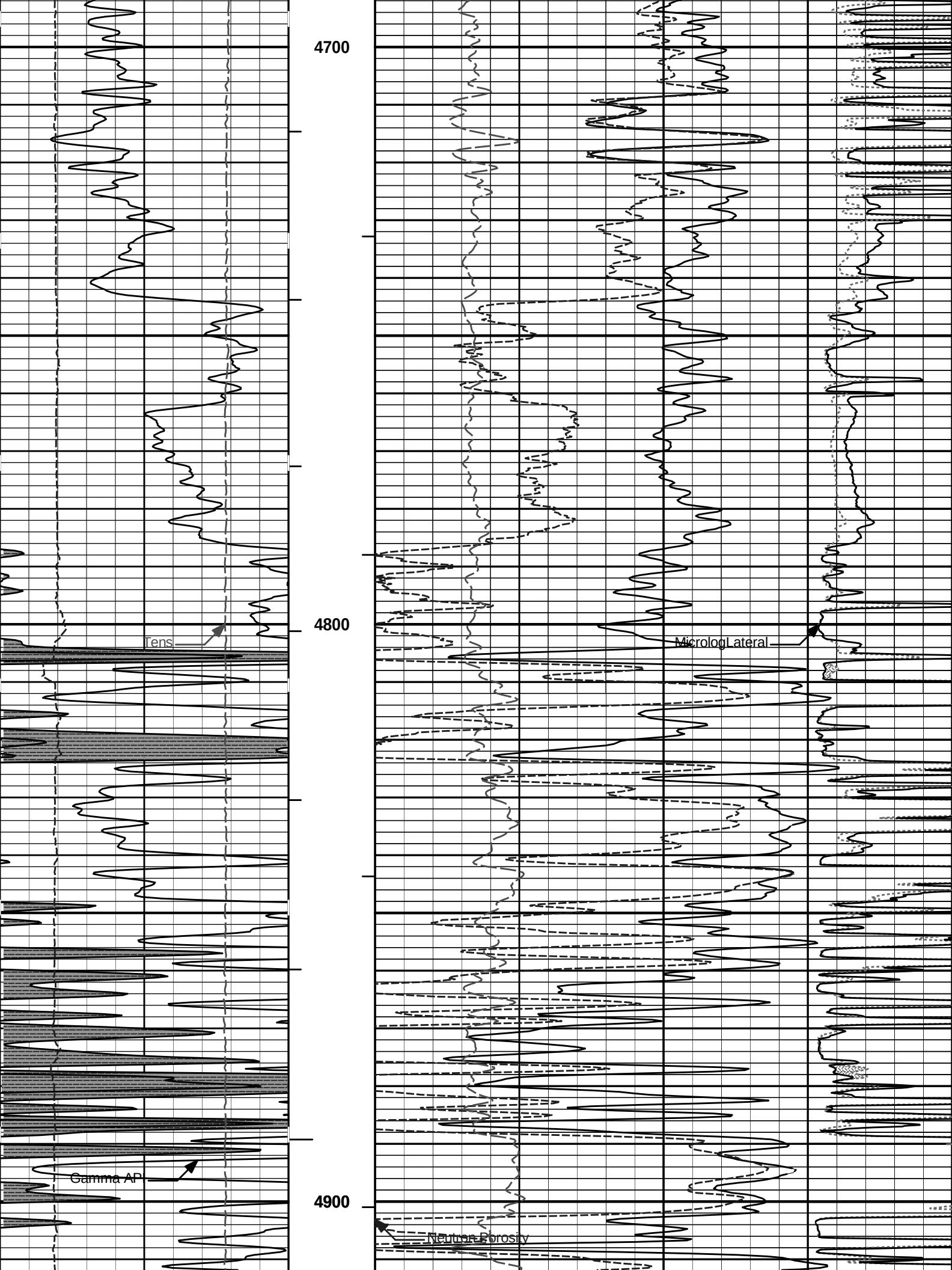

Tens
3600
MicrologLateral
Gamma API
3700
Neutron Porosity
Caliper
Density Porosity
Pe
MicrologNormal
3800

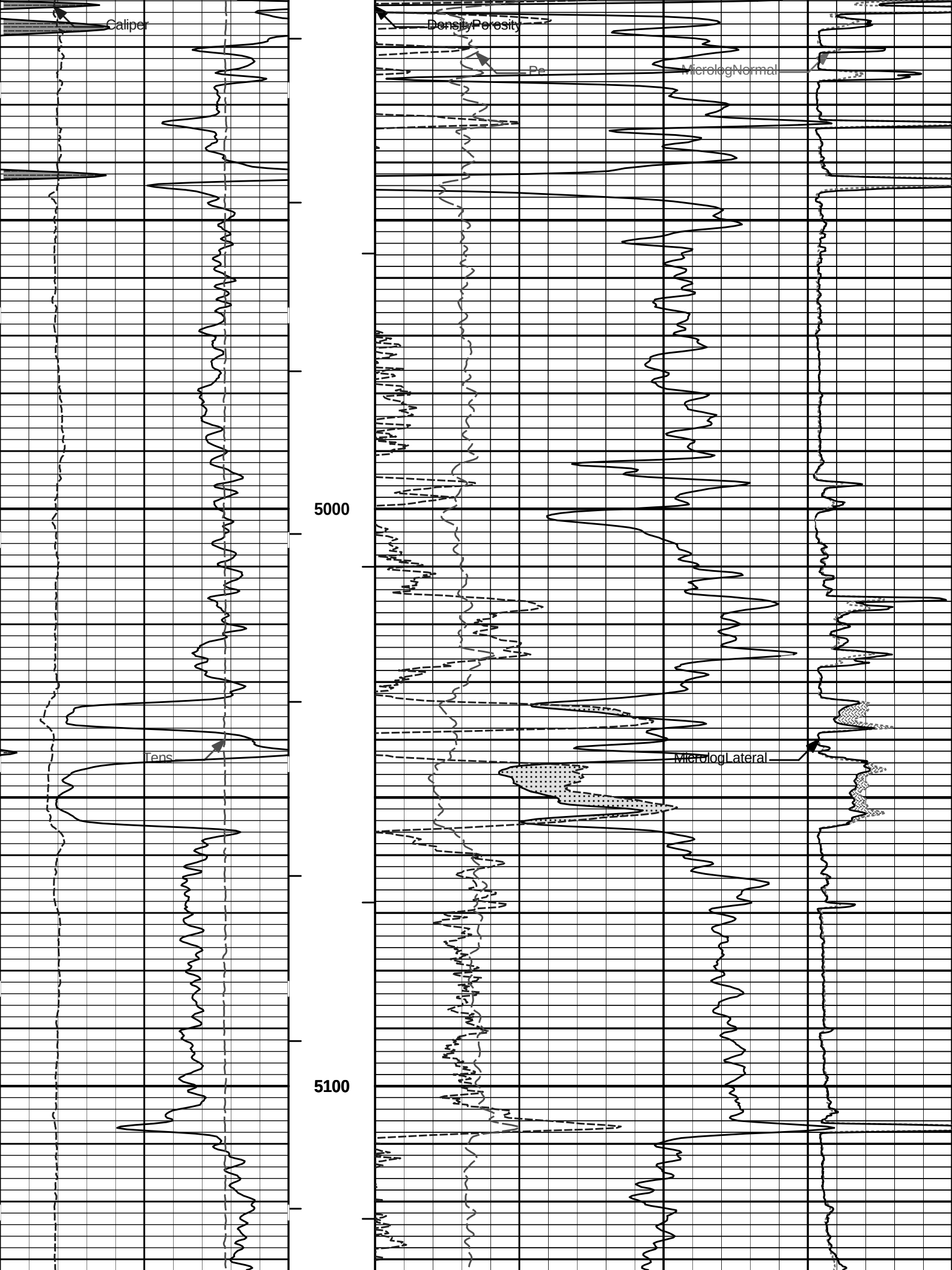

Tens
Gamma API
Caliper
3900
4000
MicrologLateral
Neutron Porosity
DensityPorosity
Pe
MicrologNormal

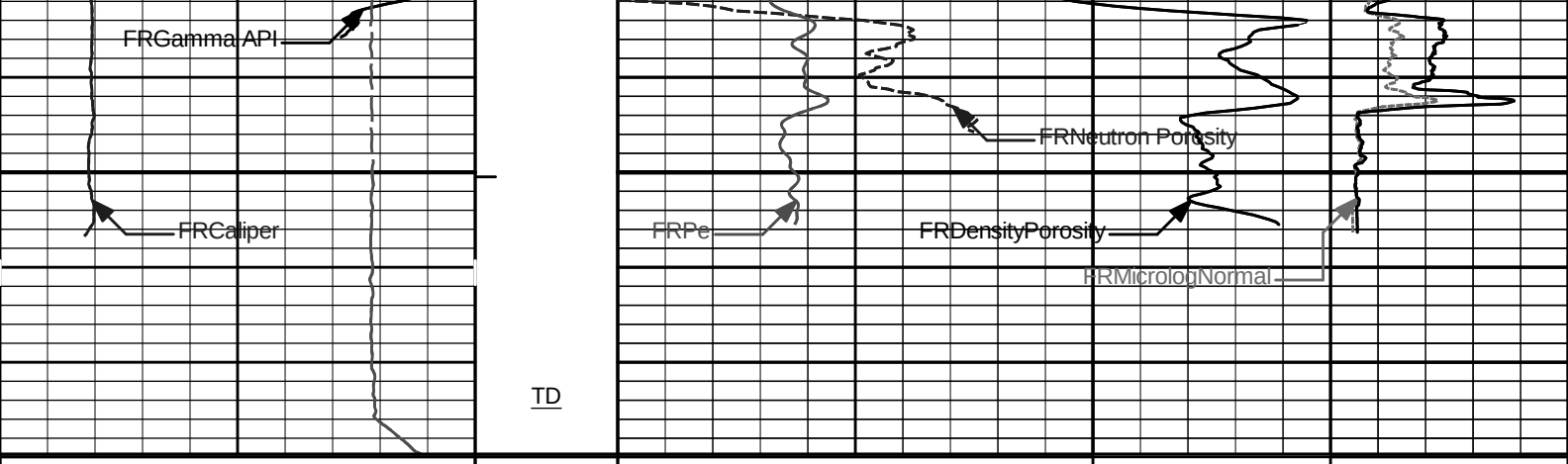

Tens
MicrologLateral
4100
Gamma API
Neutron Porosity
Caliper
DensityPorosity
4200
Pe
MicrologNormal


4300
4400
Tens
MicrologLateral
Gamma API
Caliper
NeutronPorosity
DensityPorosity
Pe
MicrologNormal


4500
4600
Tens
Gamma API
Caliper
MicrologLateral
Neutron Porosity
DensityPorosity
Pe
MicrologNormal


4700
4800
4900
Tens
MicrologLateral
Gamma API
Neutron Porosity


Caliper
DensityPorosity
Pe
MicrologNormal
Tens
MicrologLateral
5000
5100




| | | |
|---|---|---|
| 15K Tens 0<br>pounds | 1 : 240<br>ft | 0 Pe 10 |
| 6 Caliper 16<br>inches | AHVT | 0 MicrologNormal 20<br>ohm-metre<br>0 MicrologLateral 20<br>ohm-metre |
| 0 Gamma API 150<br>api | BHVT | 30 DensityPorosity -10<br>%<br>30 Neutron Porosity -10<br>% |

HALLIBURTON

Plot Time: 31-May-11 13:28:33
Plot Range: 1560 ft to 5179.67 ft
Data: PHOENIX_BERRYMN\Well Based\DAQ-0001-003\
Plot File: \\SDL-DSN\PoroML_5_main_IQ

# 5 INCH MAIN LOG

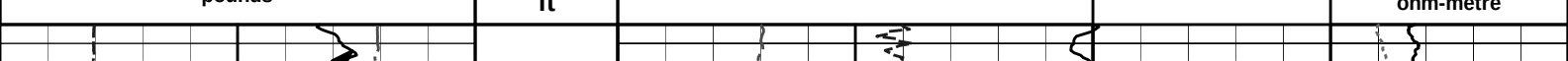
HALLIBURTON

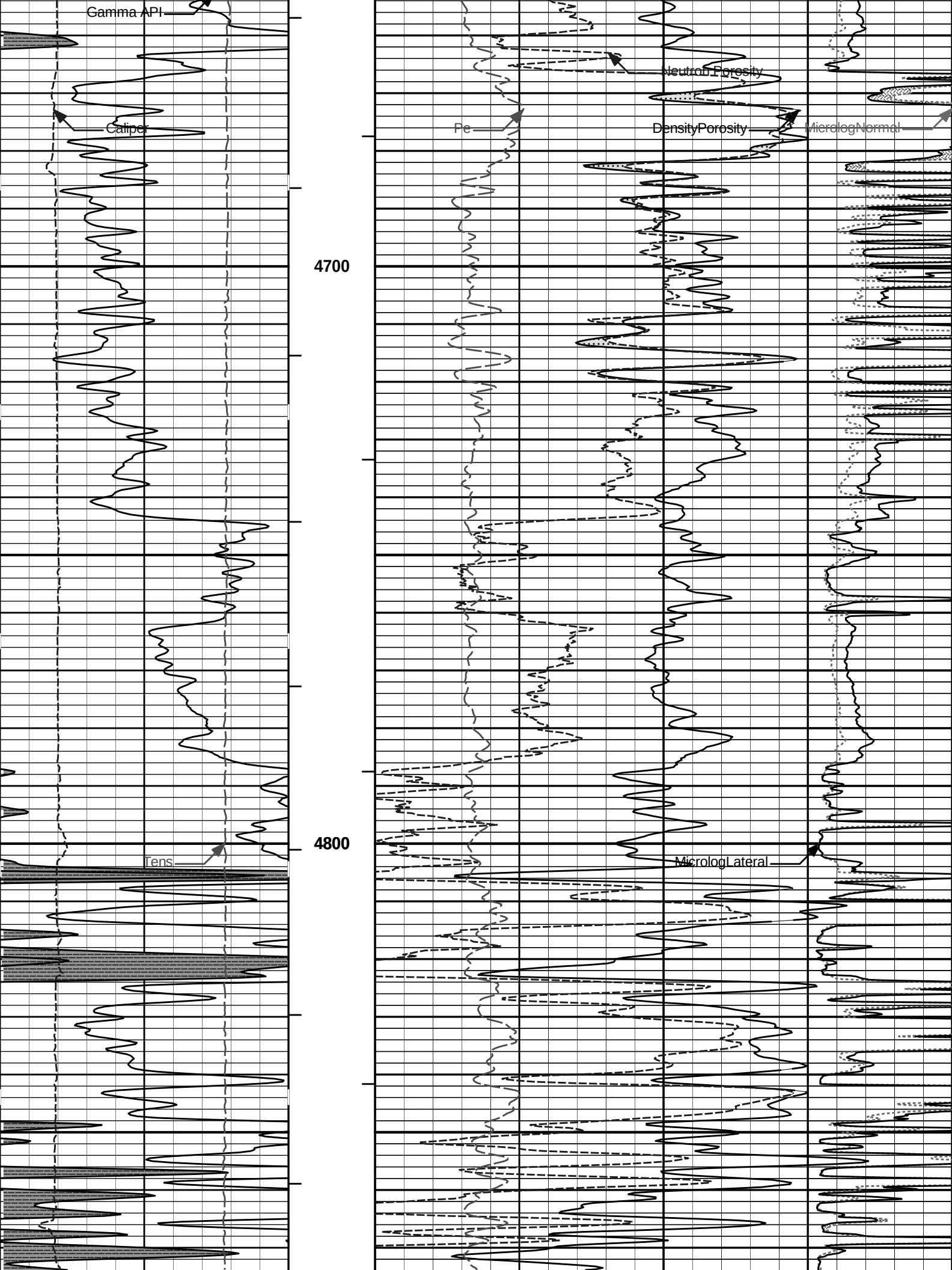
Plot Time: 31-May-11 13:28:34
Plot Range: 4650 ft to 5180.17 ft
Data: PHOENIX_BERRYMN\Well Based\DAQ-0001-002\
Plot File: \\SDL-DSN\PoroML_5_main_IQ

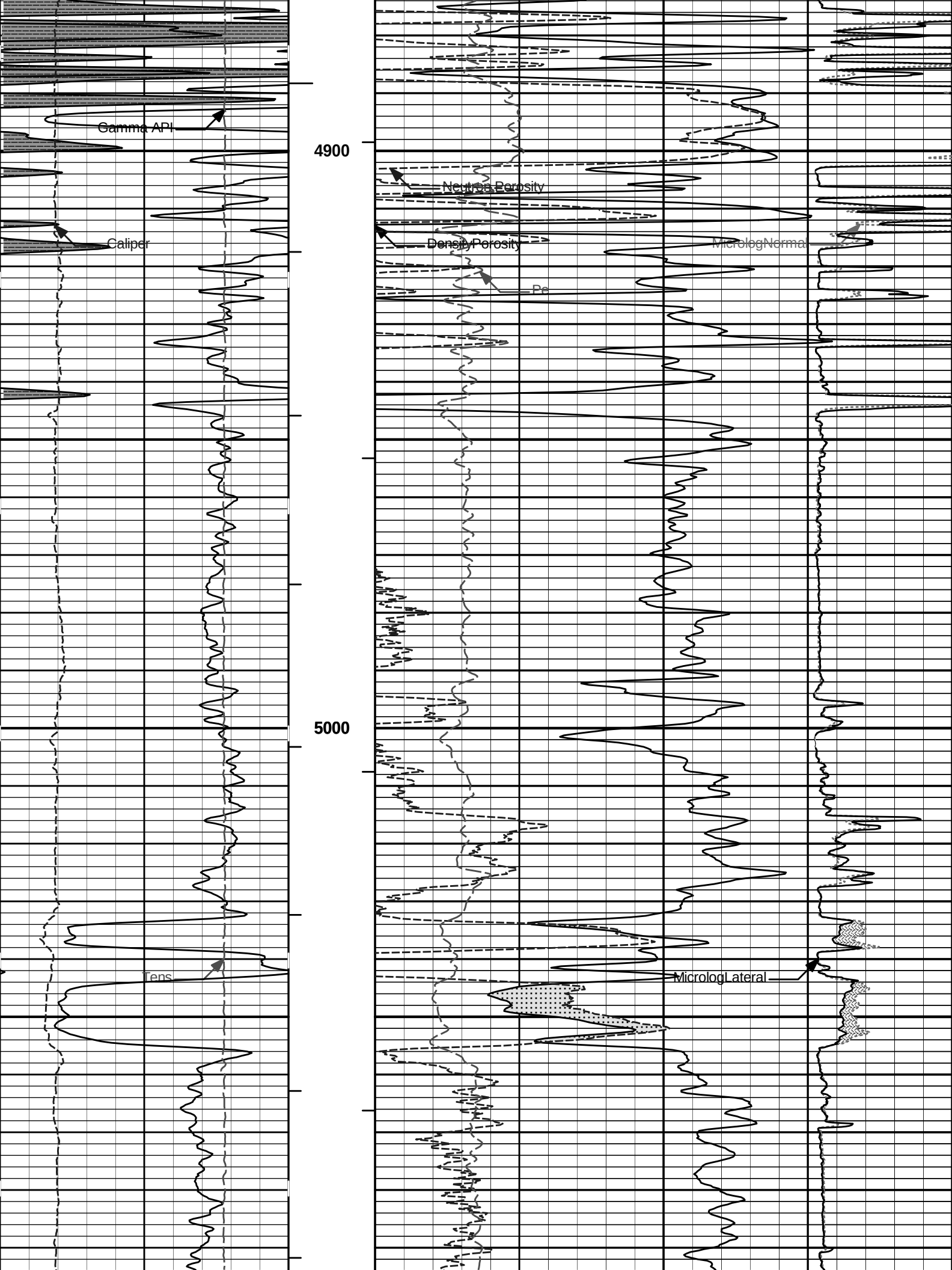
# REPEAT SECTION

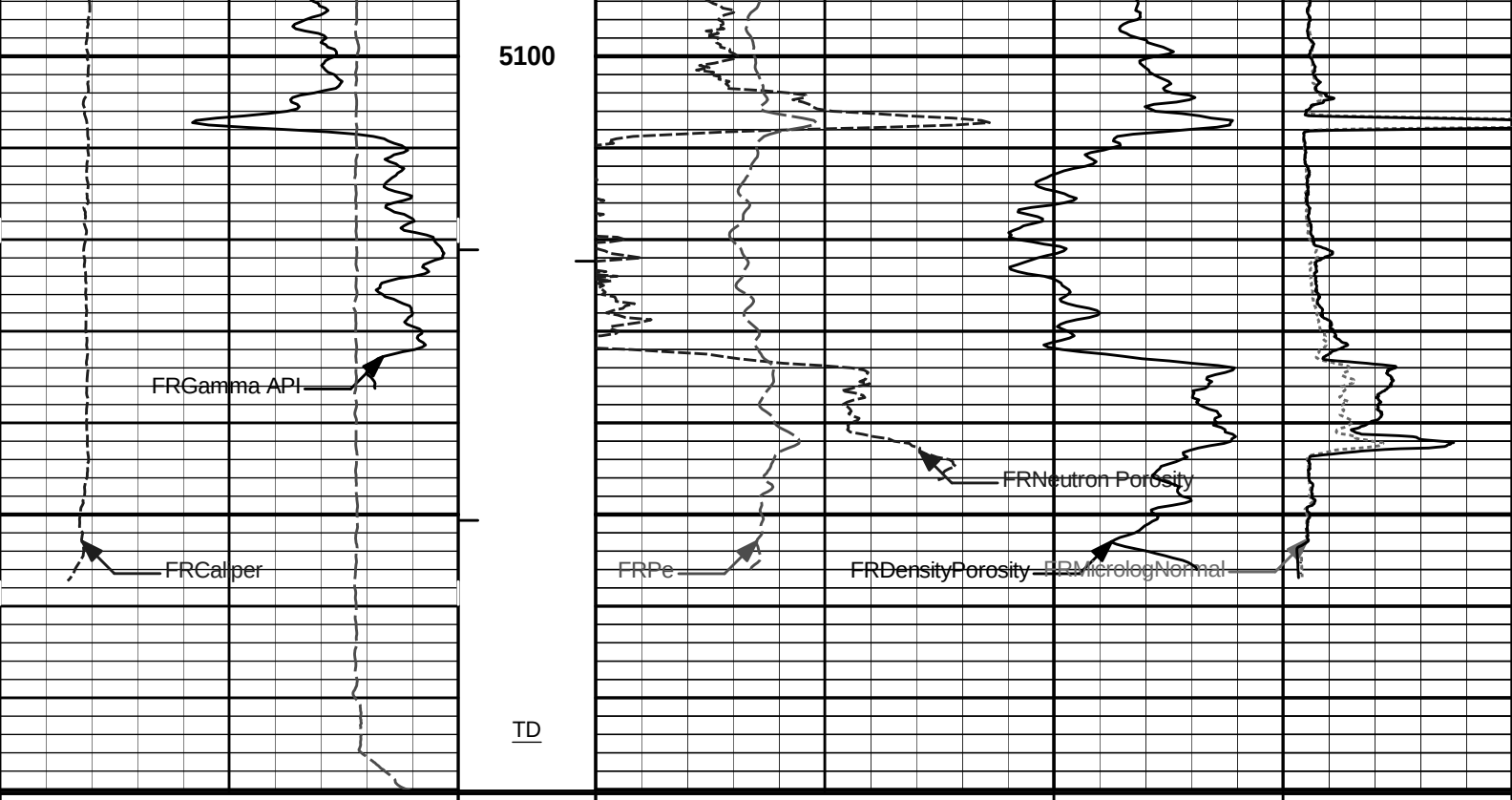
REPEAT SECTION

| | | |
|---|---|---|
| | | 30 Neutron Porosity -10<br>%<br>30 DensityPorosity -10<br>% |
| 0 Gamma API 150<br>api | BHVT | |
| 6 Caliper 16<br>inches | AHVT | 0 MicrologLateral 20<br>ohm-metre |
| 15K Tens 0<br>pounds | 1 : 240<br>ft | 0 Pe 10<br>0 MicrologNormal 20<br>ohm-metre |




Gamma API
Caliper
Tens
Pe
NeutronPorosity
DensityPorosity
MicrologNormal
MicrologLateral
4700
4800


Gamma API
Caliper
Tens
4900
5000
Neutron Porosity
Density Porosity
Pe
MicrologNormal
MicrologLateral




| | | |
|---|---|---|
| 15K Tens 0 pounds | 1 : 240 ft | 0 Pe 10 |
| 6 Caliper 16 inches | AHVT | 0 MicrologNormal 20 ohm-metre |
| 0 Gamma API 150 api | BHVT | 0 MicrologLateral 20 ohm-metre |
| | | 30 DensityPorosity -10 % |
| | | 30 Neutron Porosity -10 % |

HALLIBURTON

Plot Time: 31-May-11 13:28:42
Plot Range: 4650 ft to 5180.17 ft
Data: PHOENIX_BERRYMN\Well Based\DAQ-0001-002\
Plot File: \\SDL-DSN\PoroML_5_main_IQ

# REPEAT SECTION

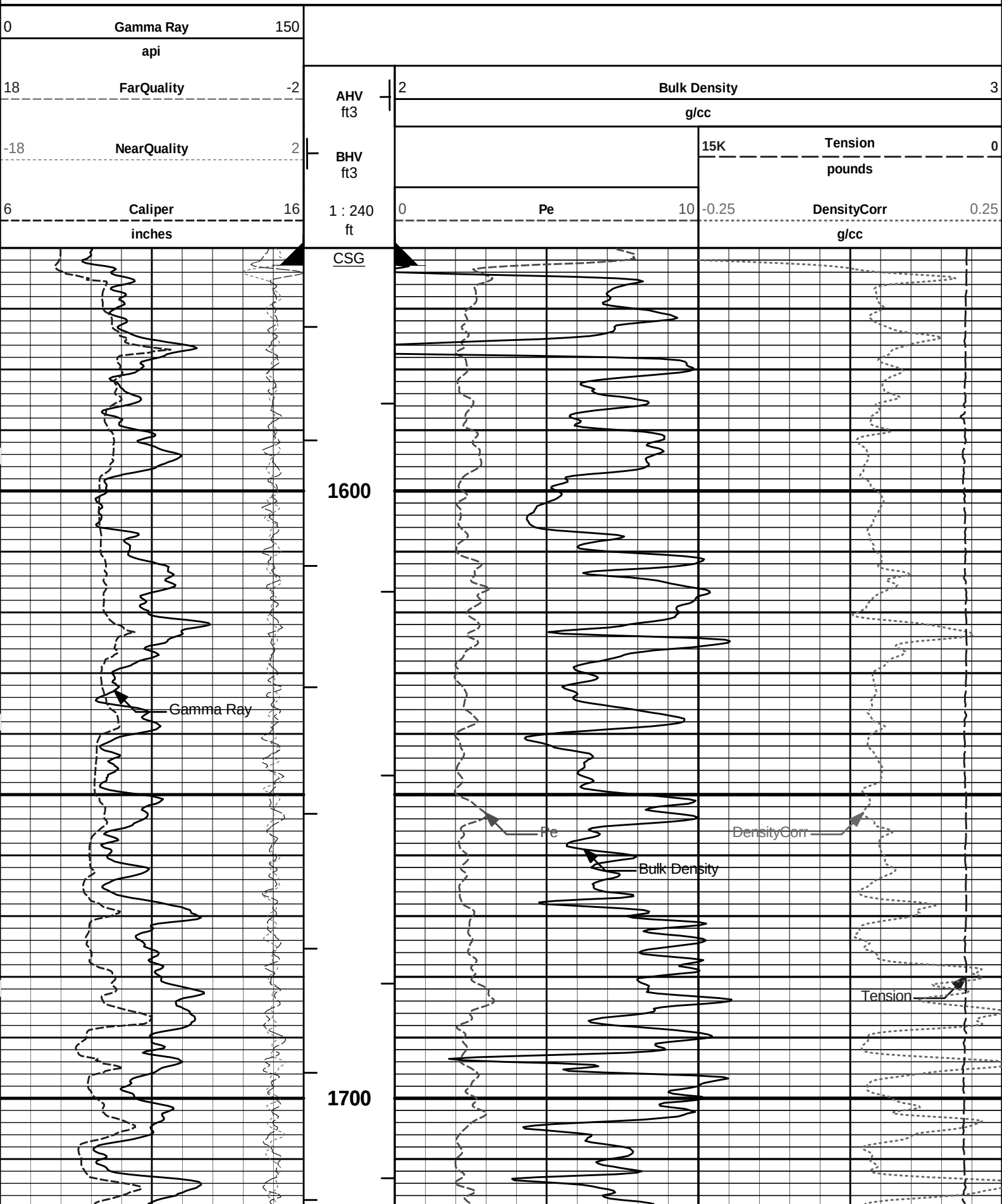
REPEAT SECTION

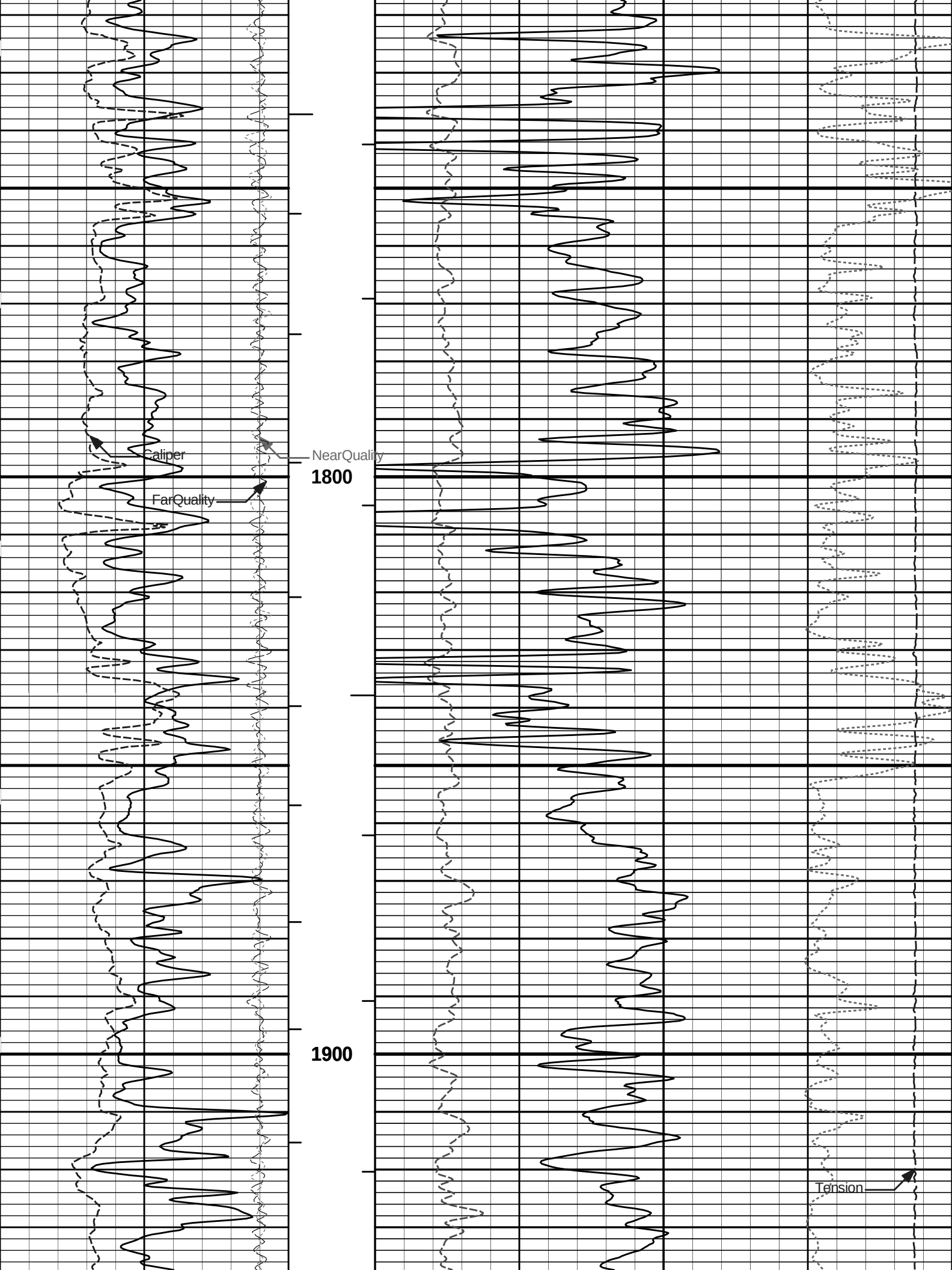
HALLIBURTON

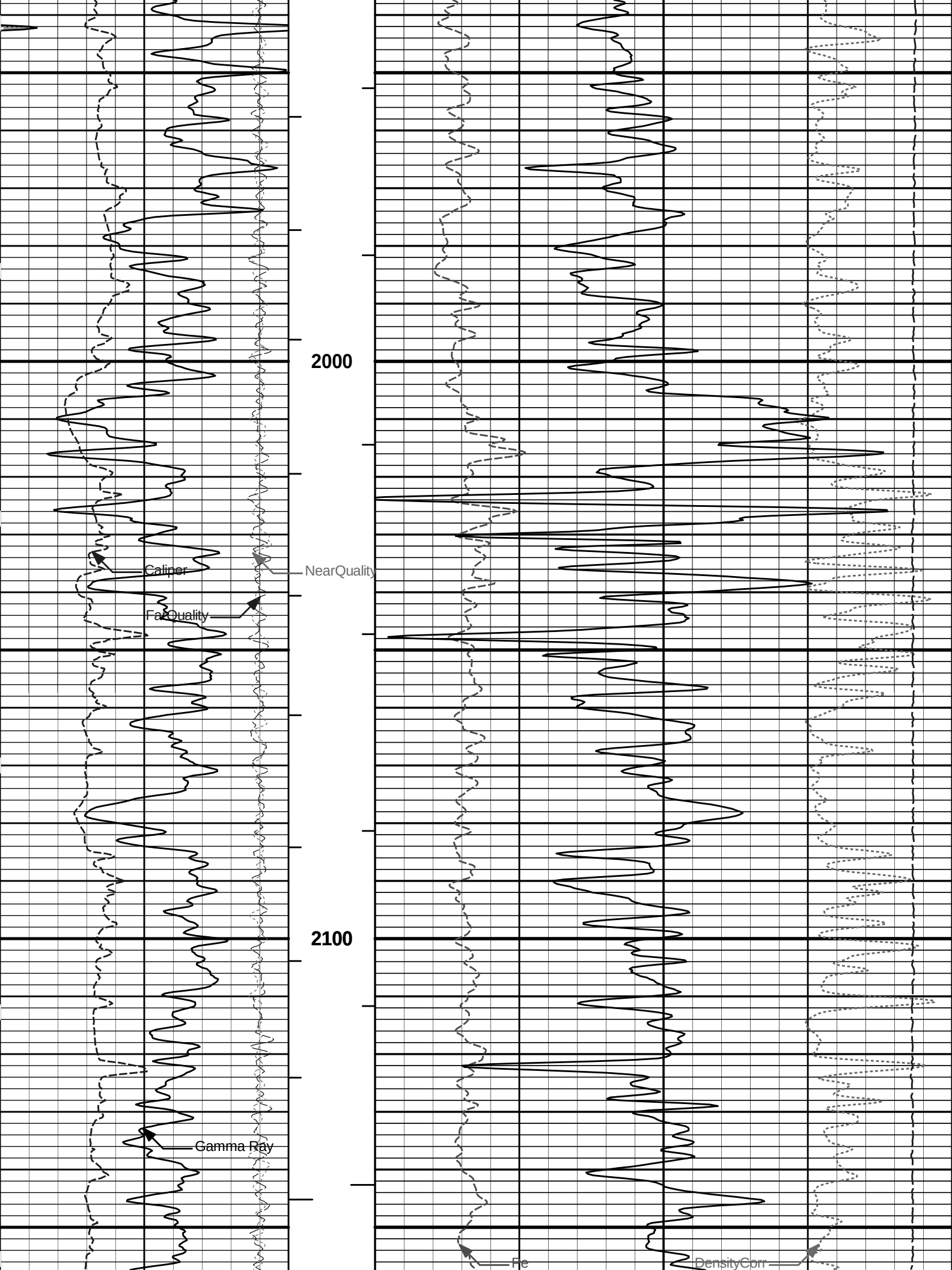
Plot Time: 31-May-11 13:28:43
Plot Range: 1560 ft to 5179.67 ft
Data: PHOENIX_BERRYMN\Well Based\DAQ-0001-003\
Plot File: \\-LOCAL-\PHOENIX_BERRYMN\0001 GTET-DSN-SDL-ACRT\SDL-DSN\BULKD_5_MAIN_IQ

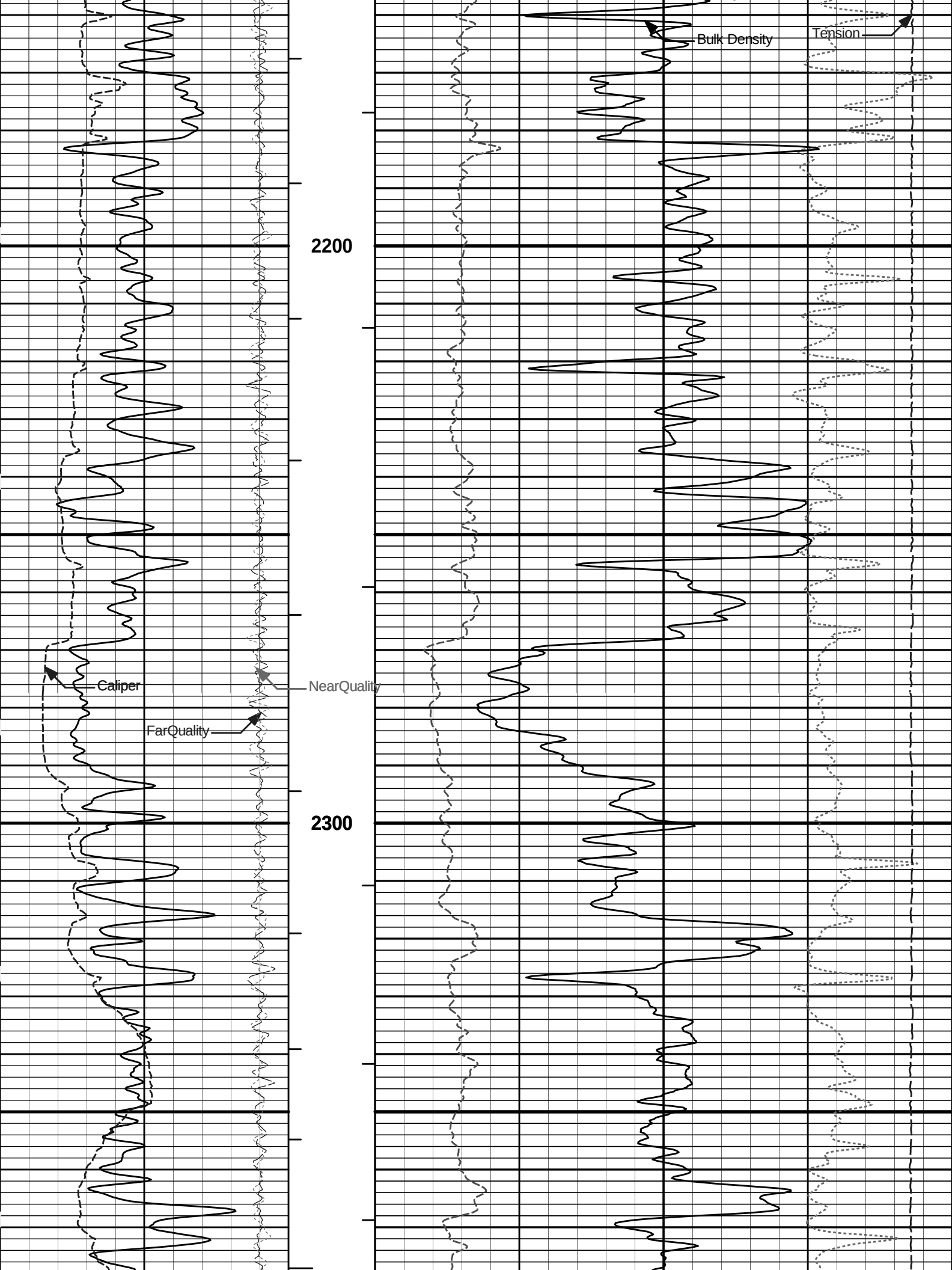
# 5 INCH MAIN LOG

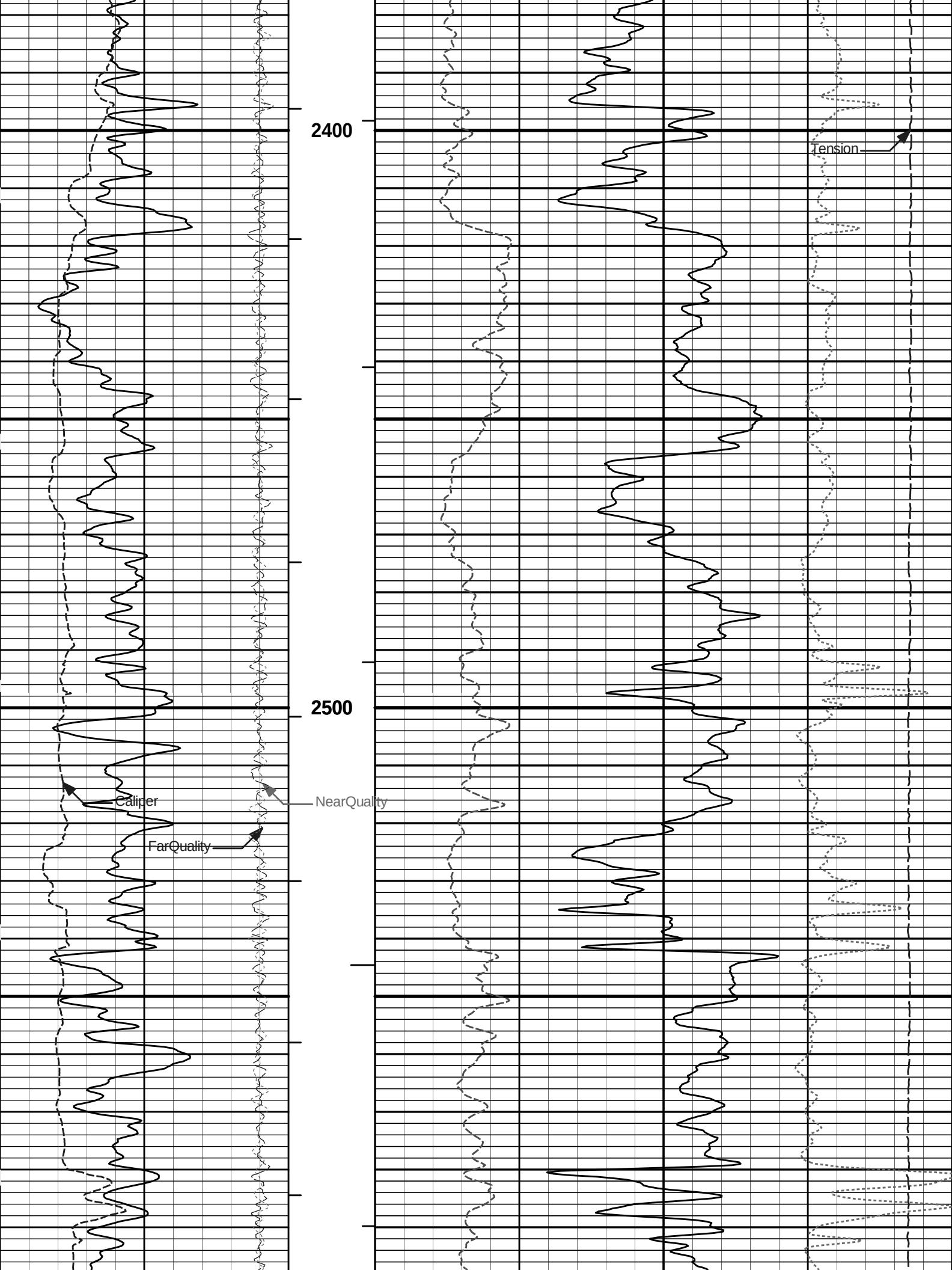
# MAIN SECTION 5" PER 100'

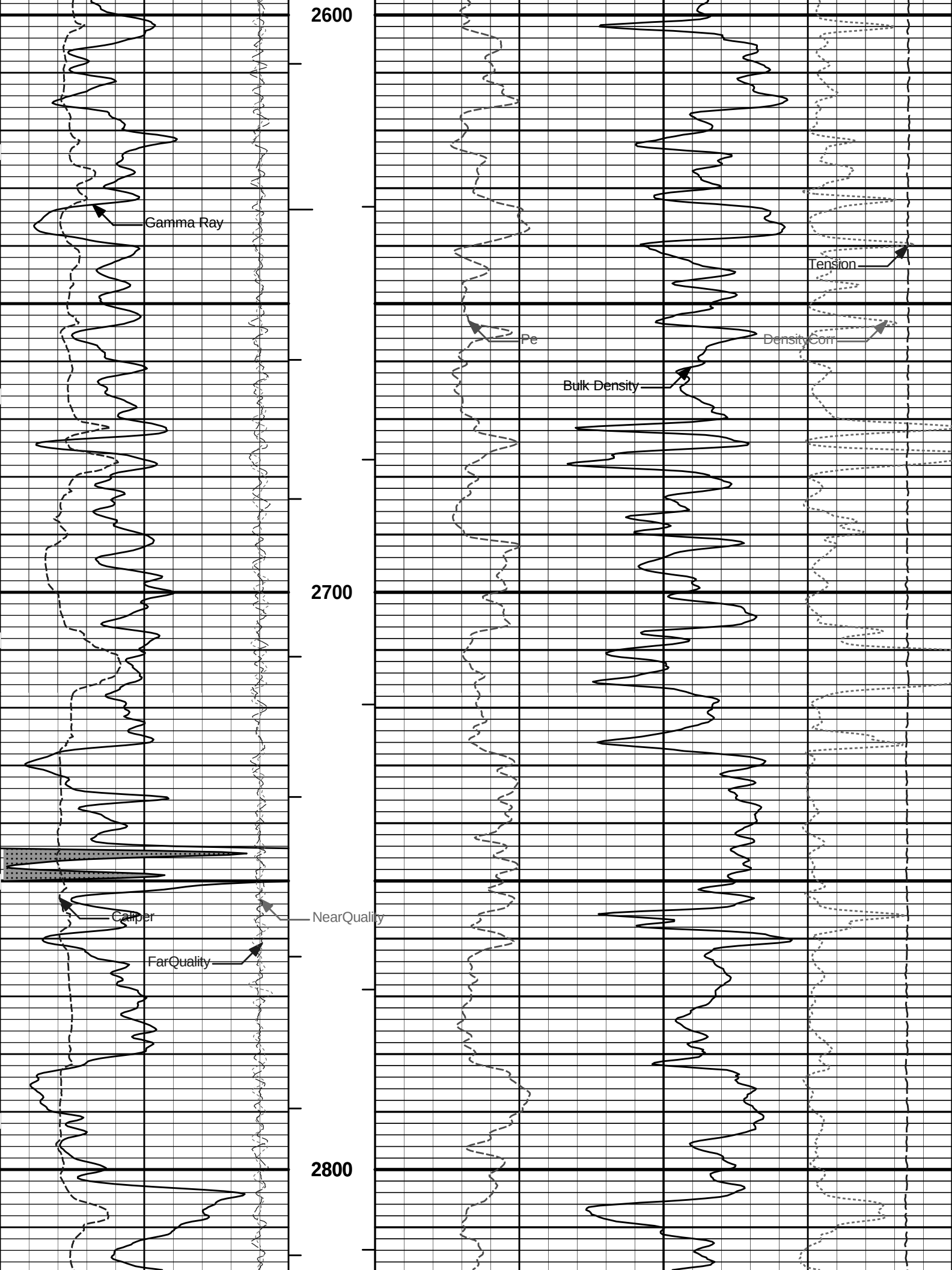



Caliper
NearQuality
1800
FarQuality
1900
Tension


2000
2100
Caliper
NearQuality
FarQuality
Gamma Ray
Pe
DensityCorr


Bulk Density
Tension
2200
Caliper
NearQuality
FarQuality
2300


2400
2500
Tension
Caliper
NearQuality
FarQuality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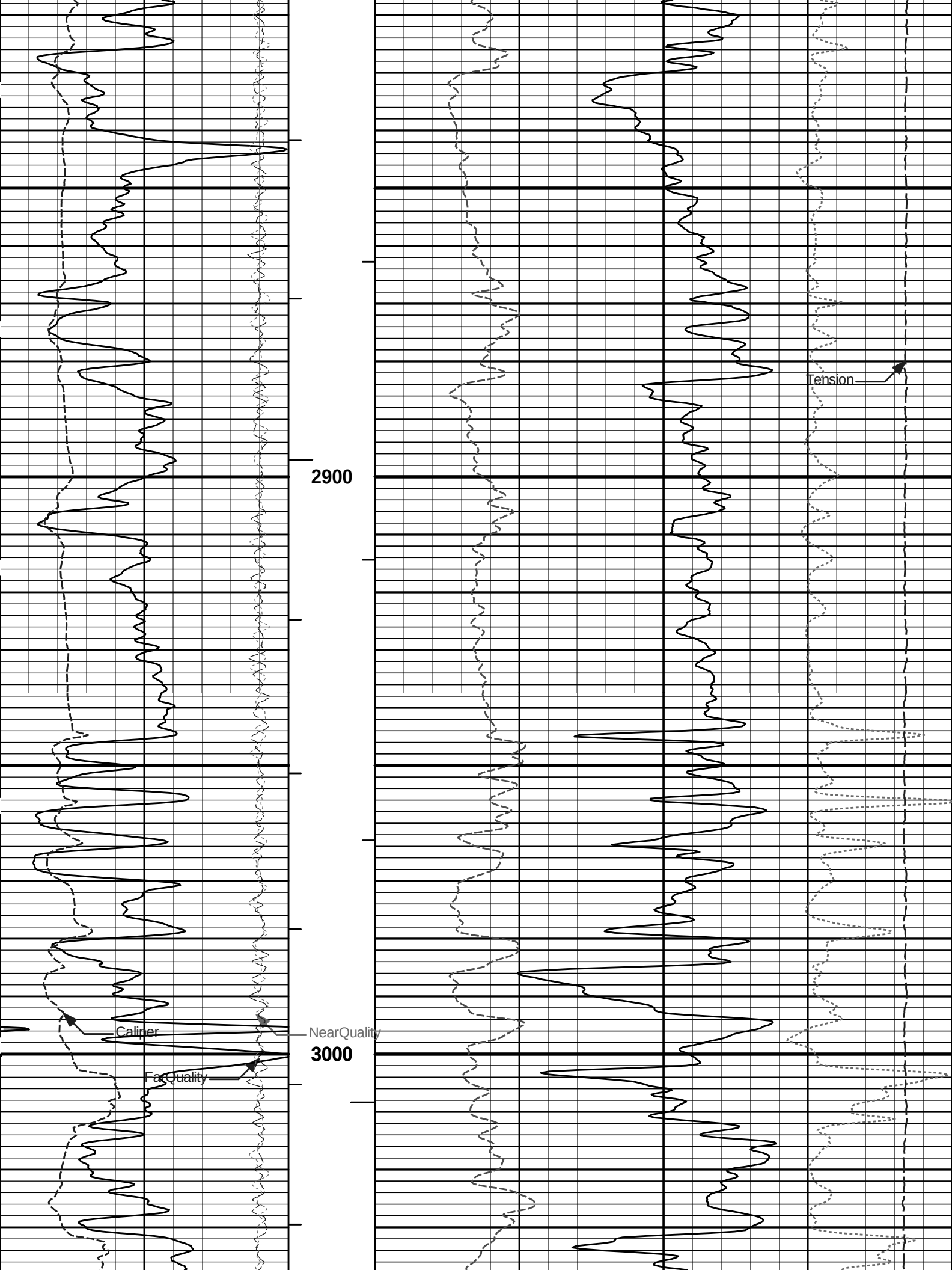
2700
2800
Gamma Ray
Tension
Pe
DensityCorr
Bulk Density
Caliper
NearQuality
FarQuality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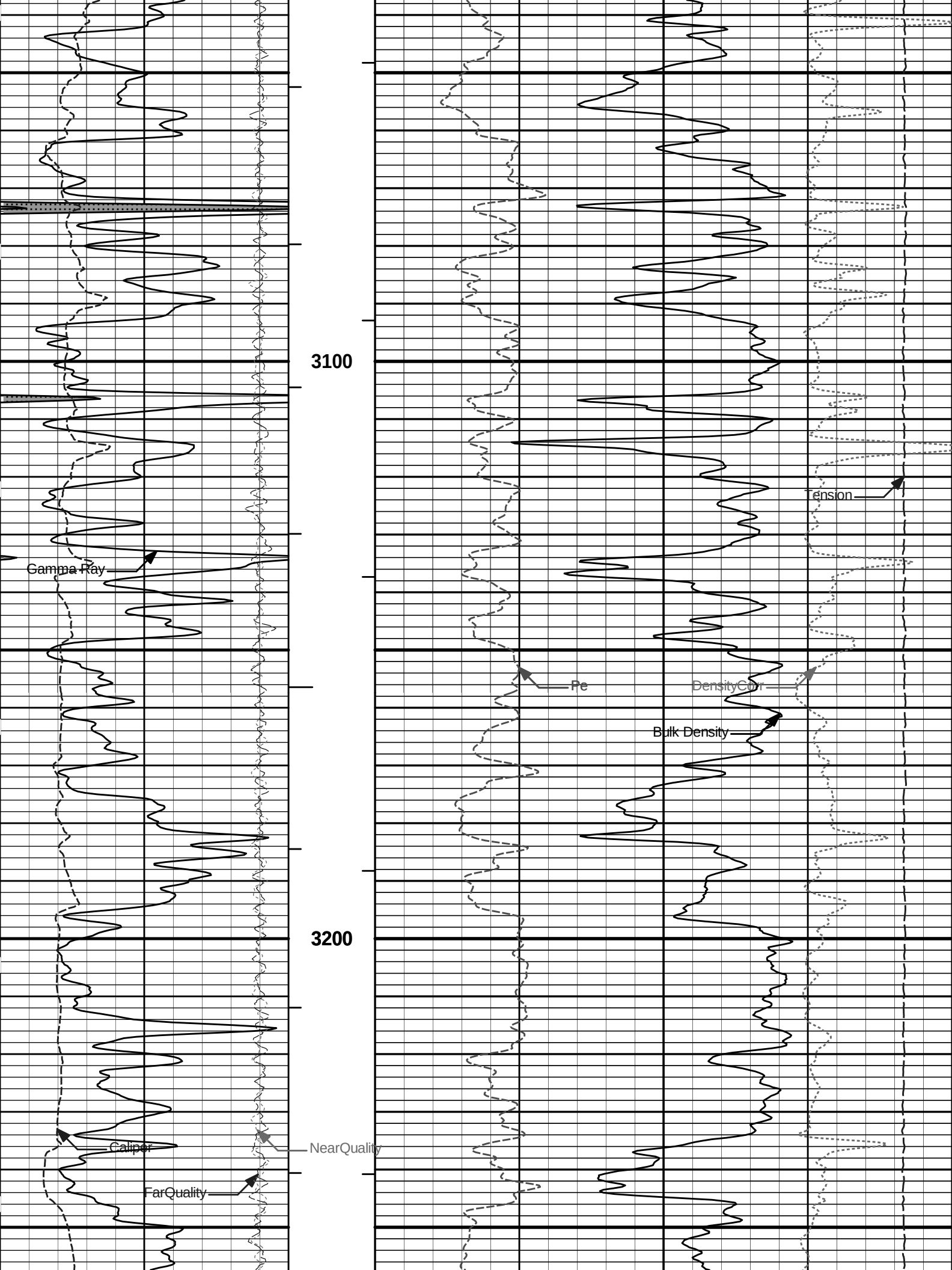
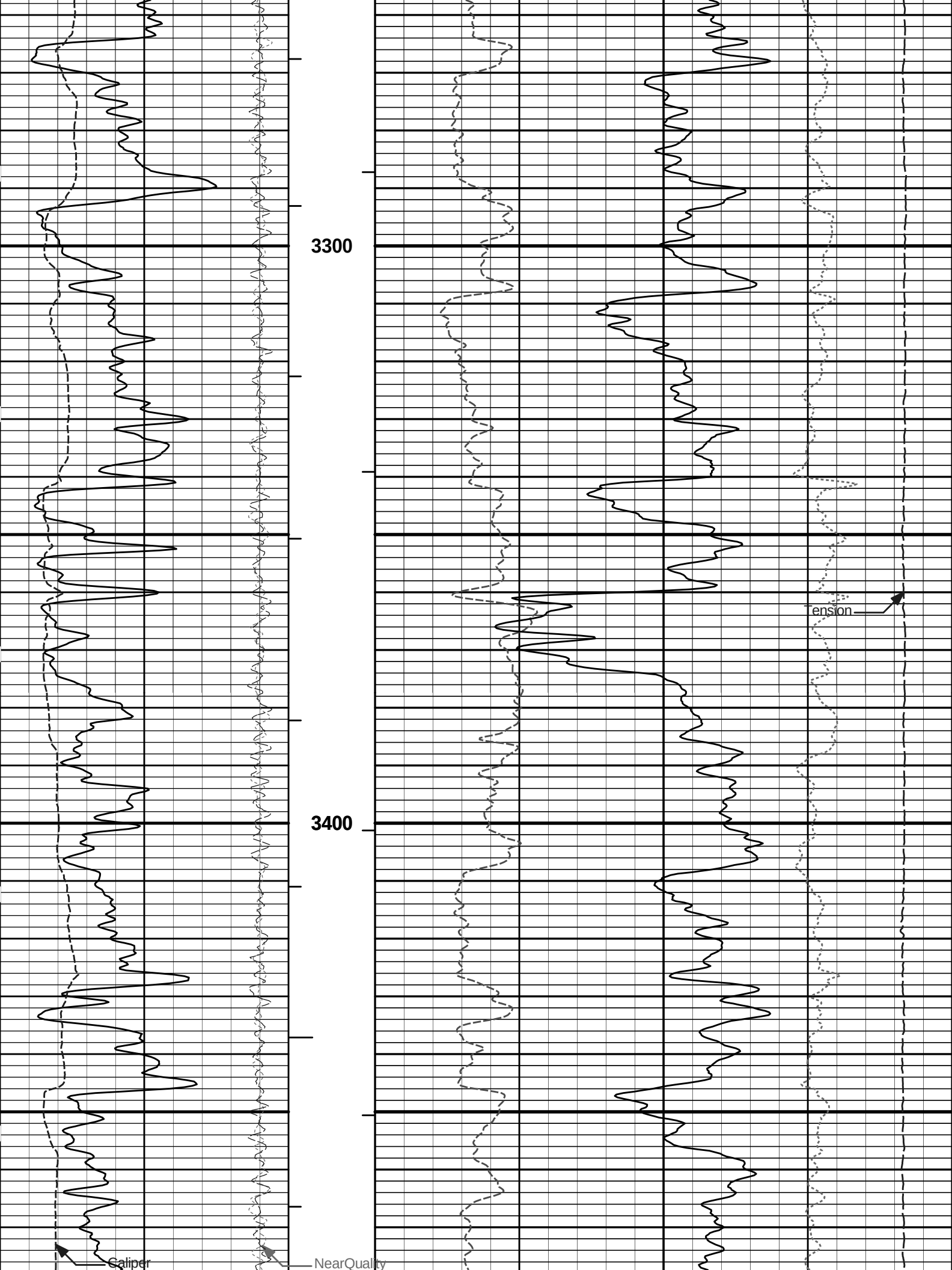
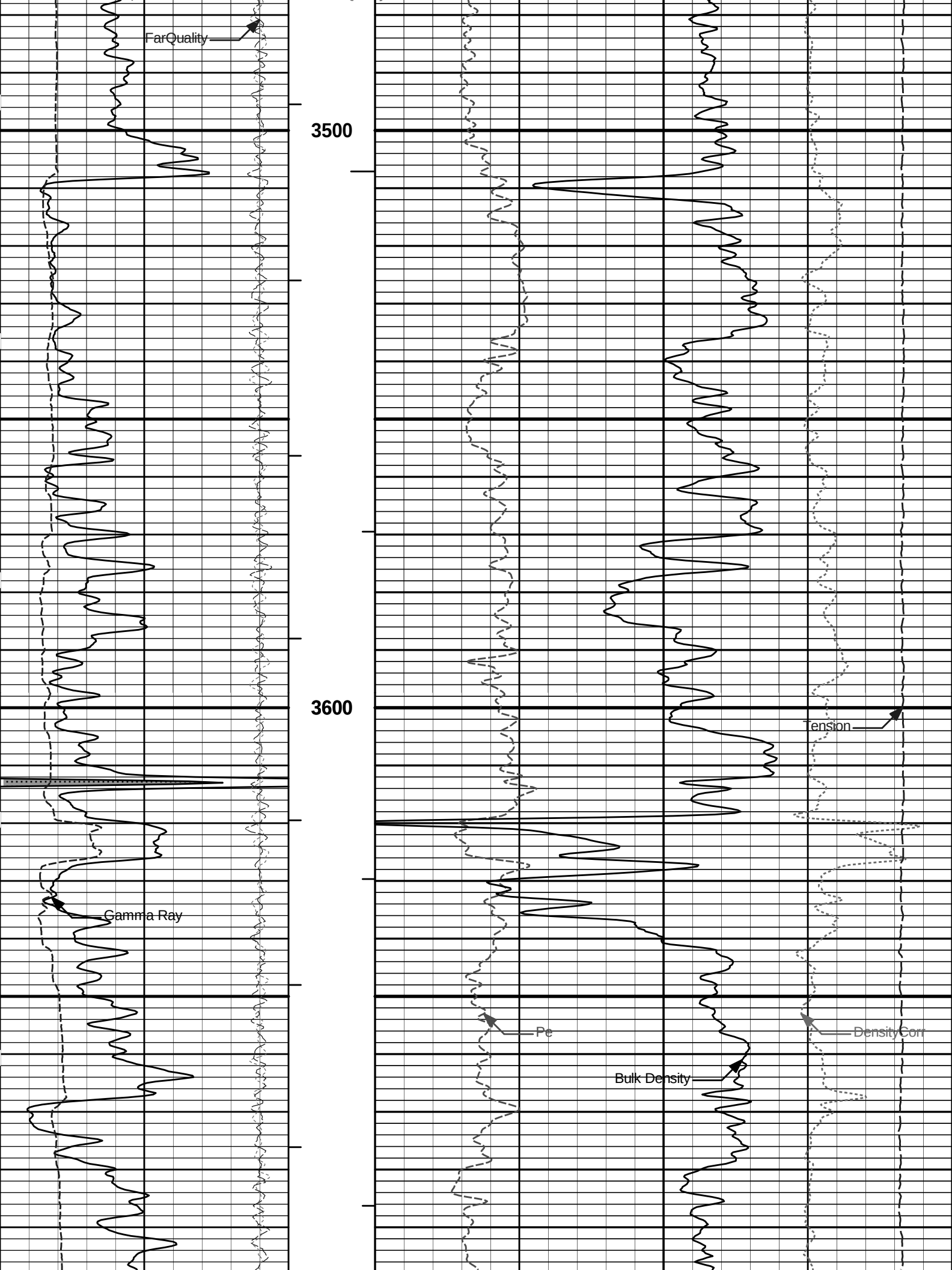
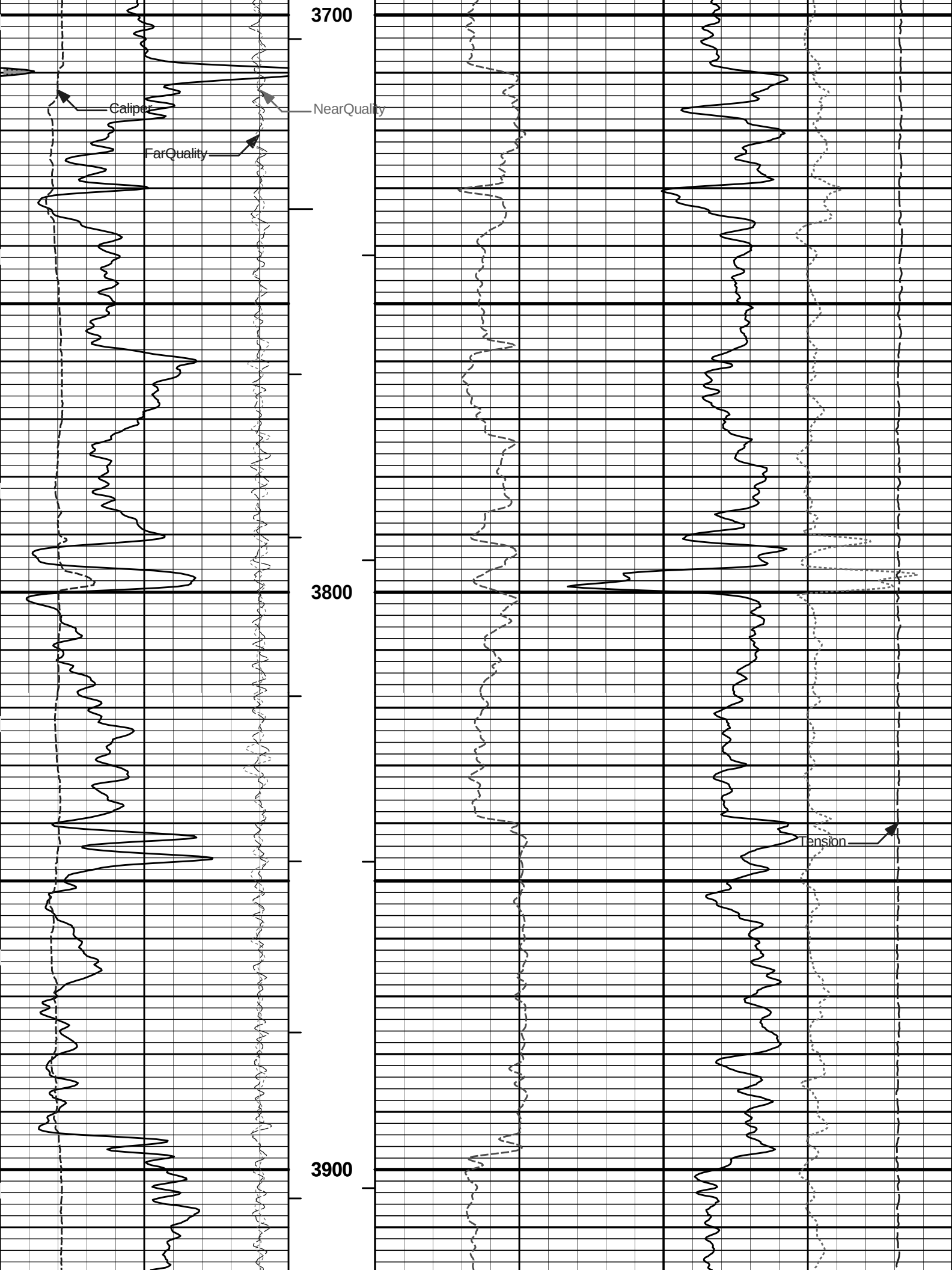
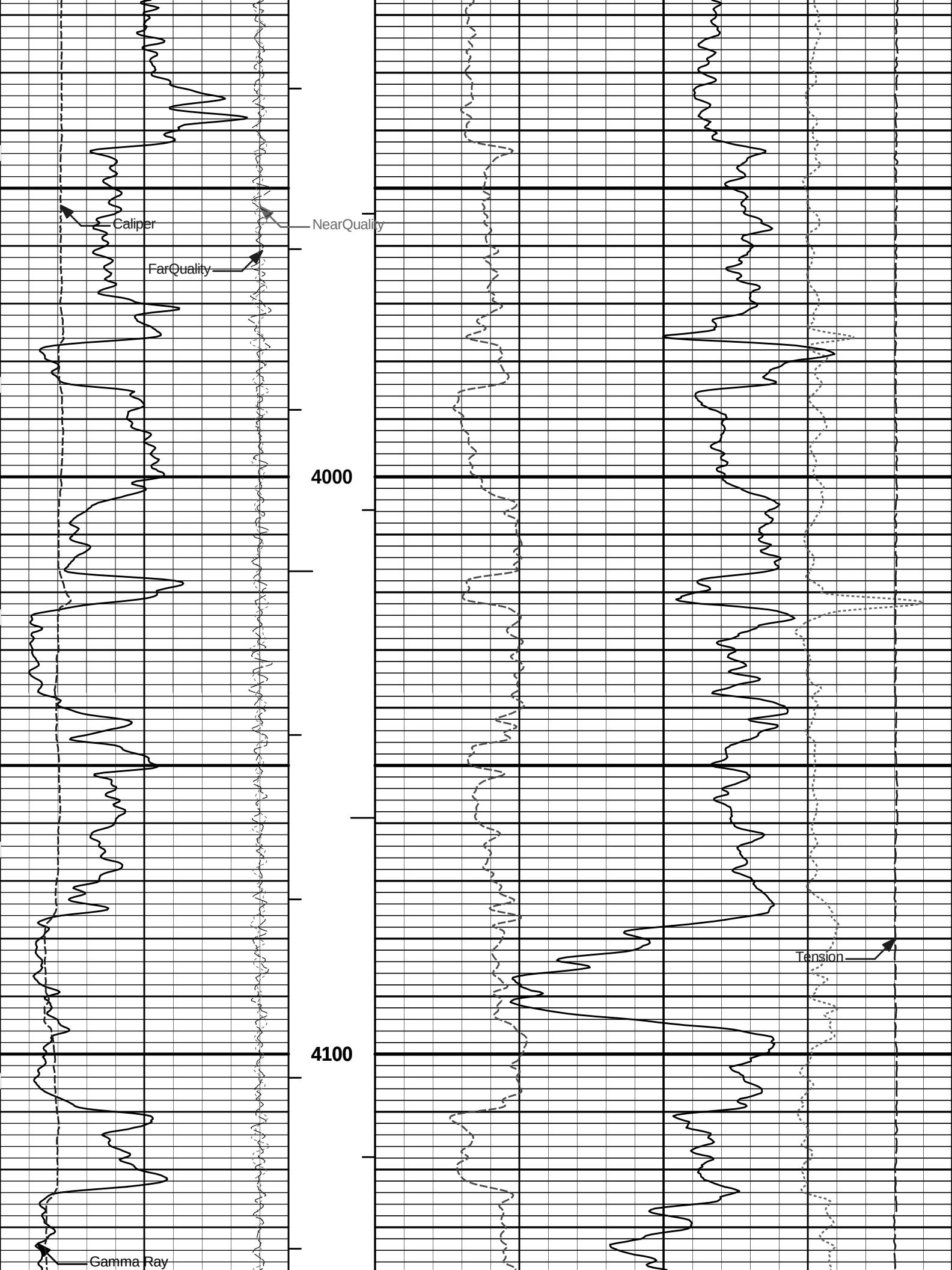
Caliper
NearQuality
3000
FarQuality

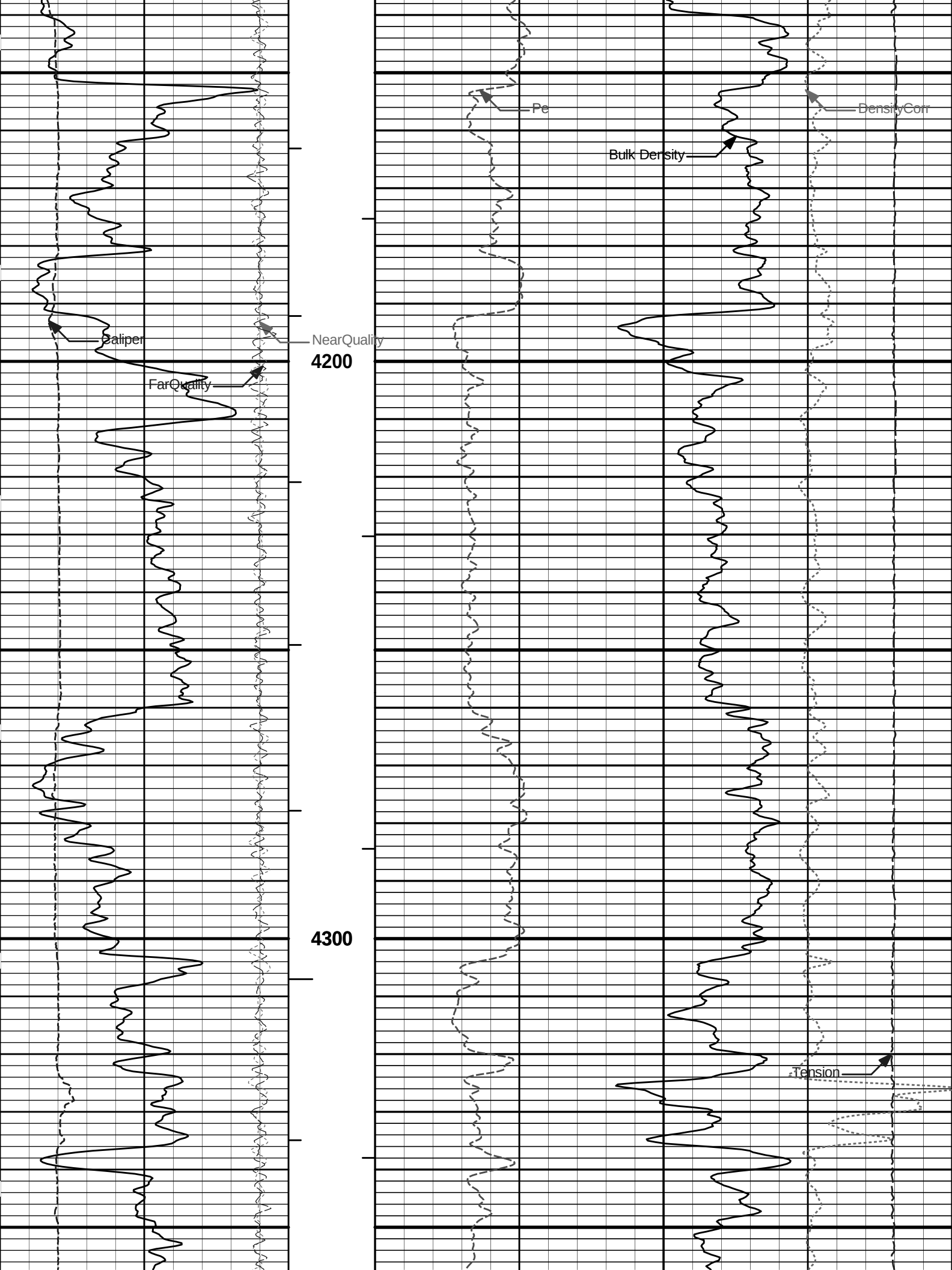

3100
3200
Gamma Ray
Caliper
FarQuality
NearQuality
Pe
DensityCorr
Bulk Density
Tension

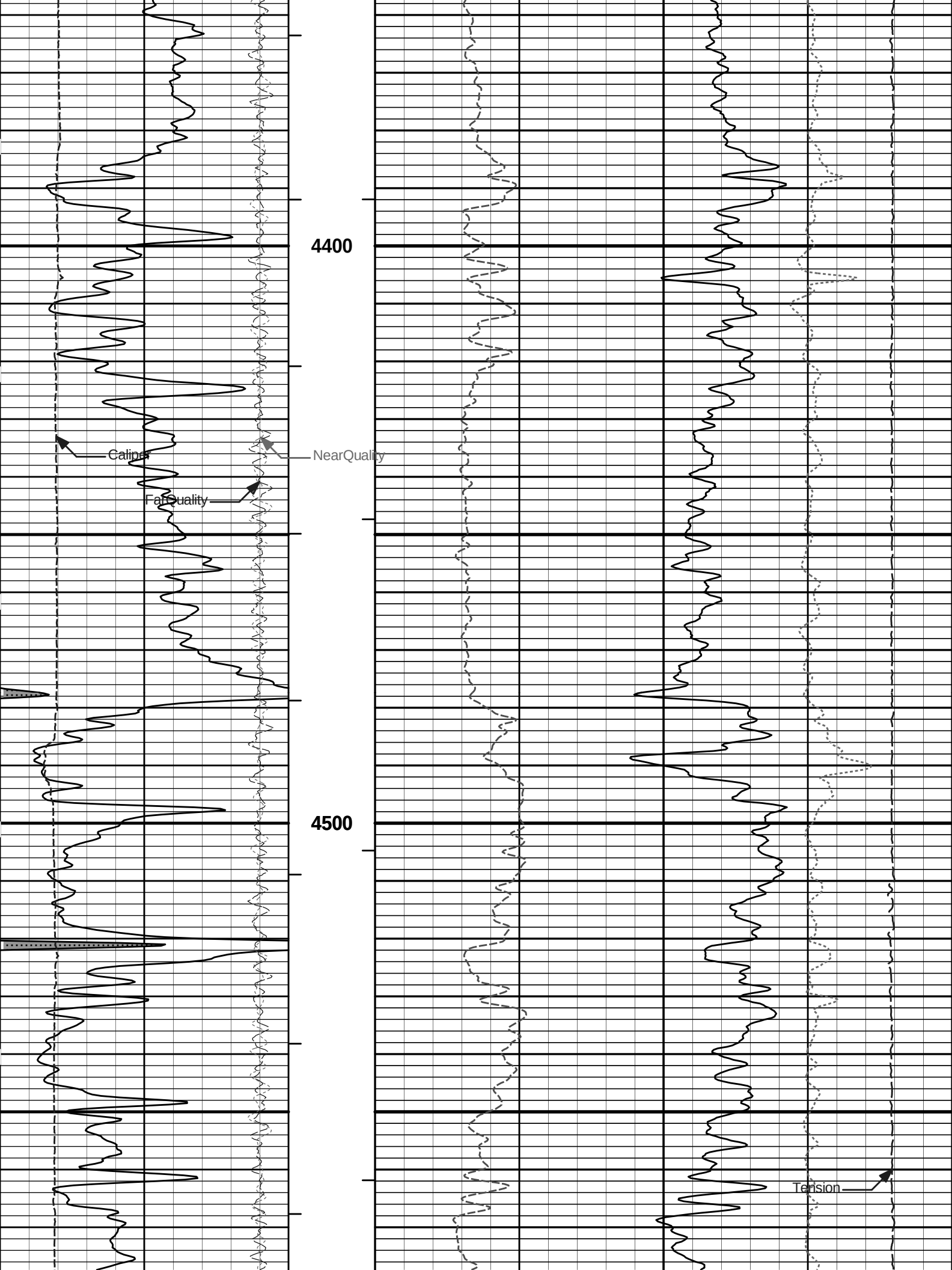

3300
3400
Tension
Caliper
NearQuality

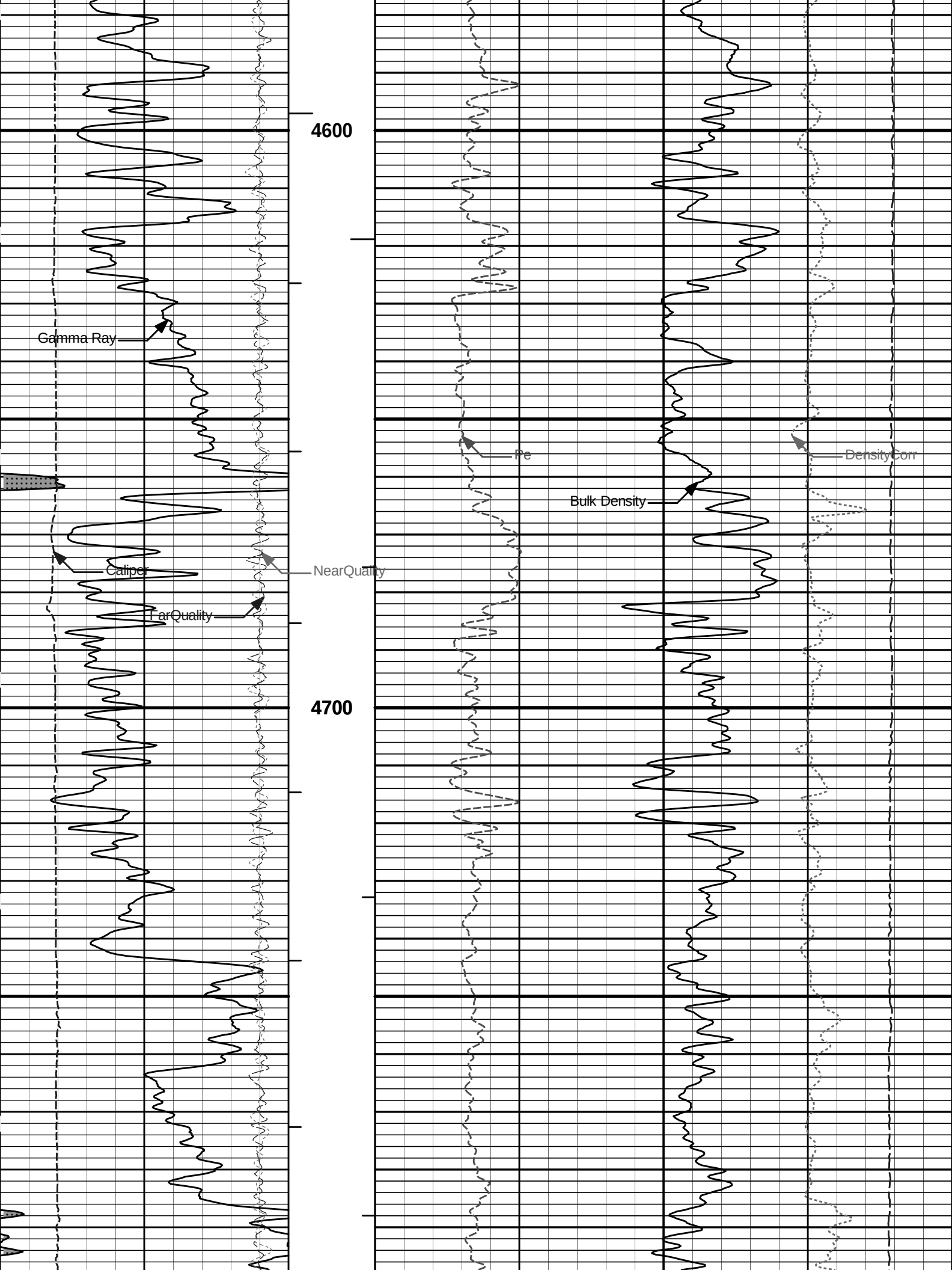

FarQuality
3500
3600
Tension
Gamma Ray
Pe
DensityCorr
Bulk Density

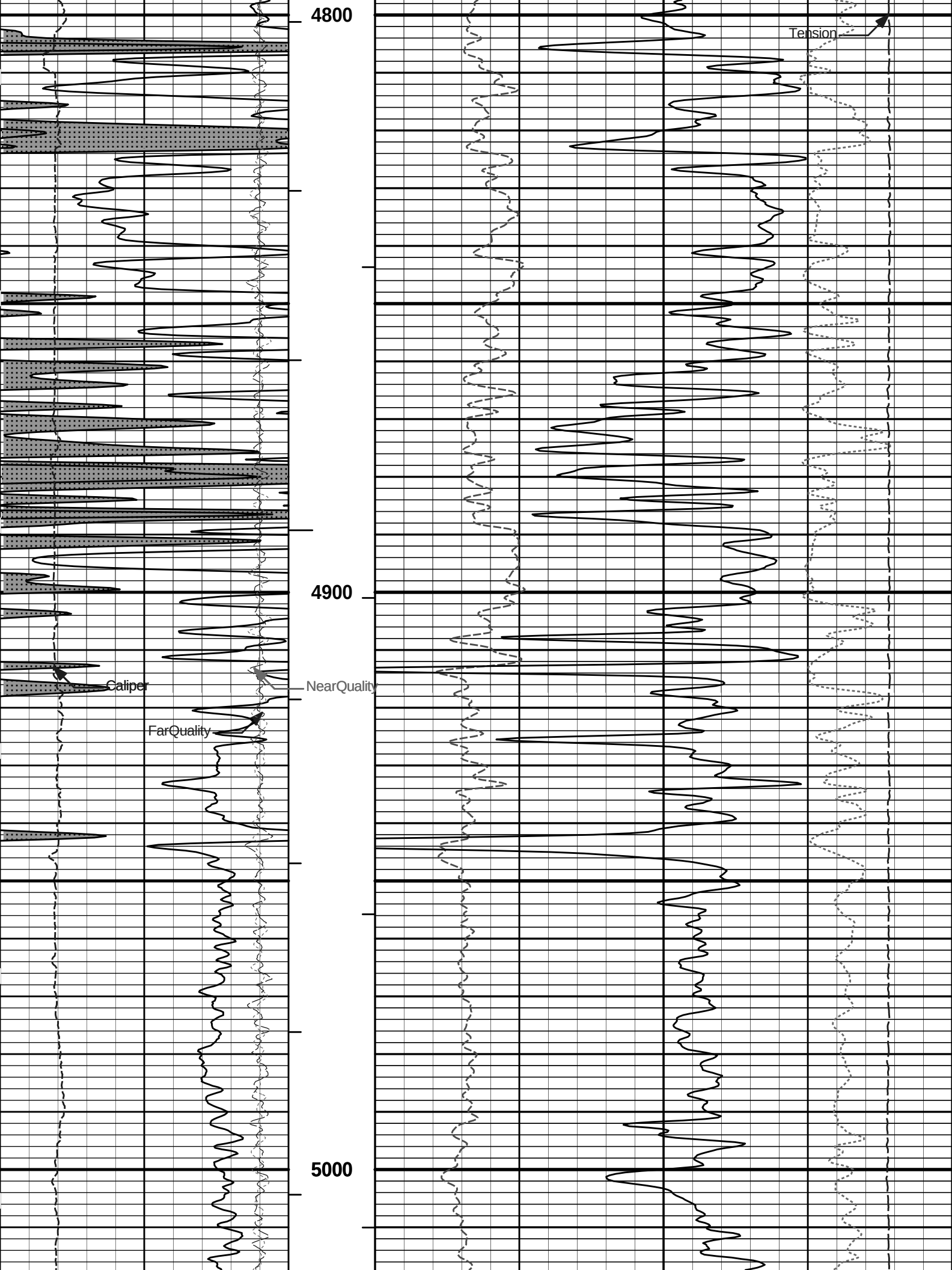

3700
3800
3900
Caliper
NearQuality
FarQuality
Tension

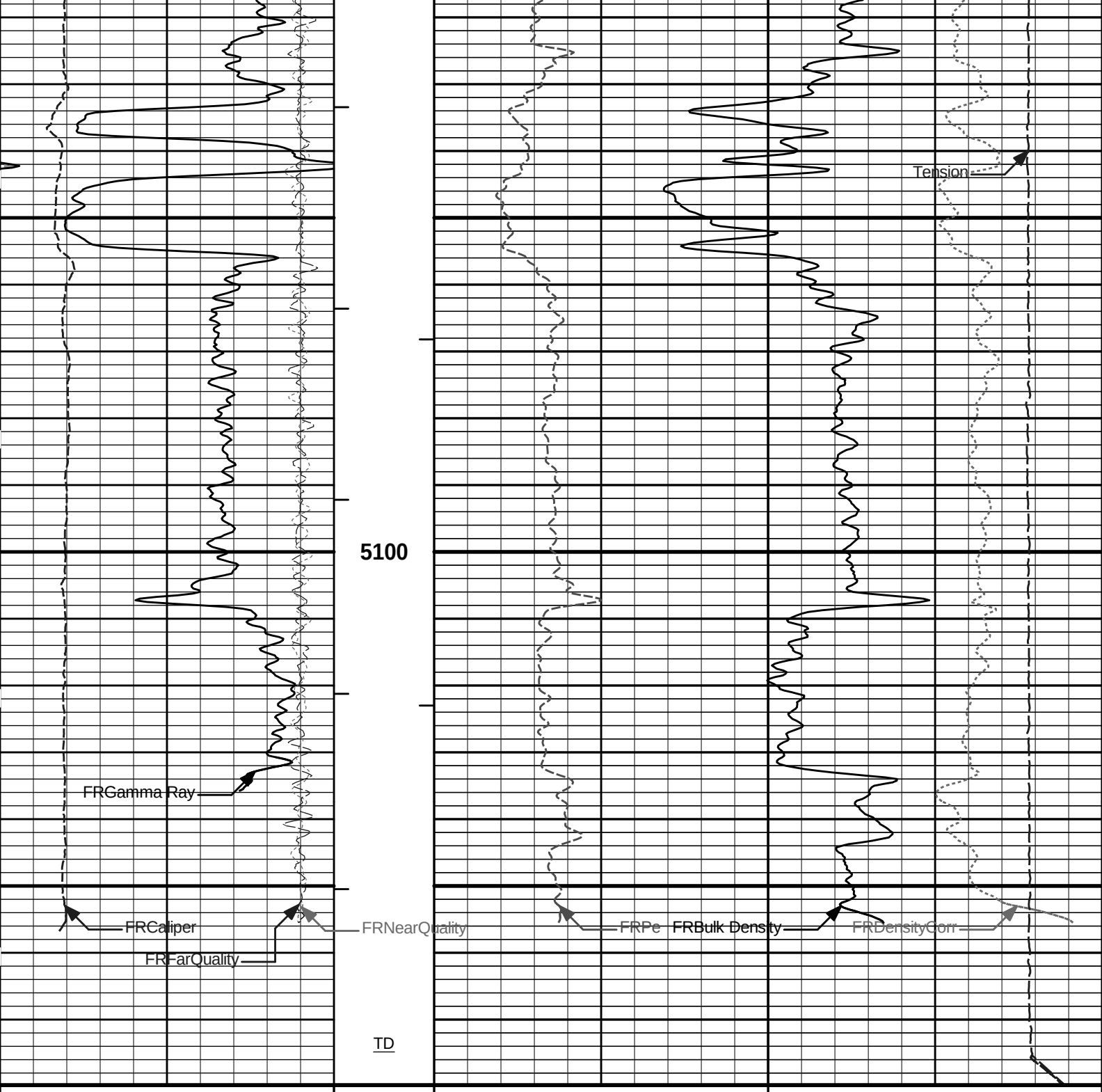

Caliper
NearQuality
FarQuality
4000
Tension
4100
Gamma Ray


Pe
DensityCorr
Bulk Density
Caliper
NearQuality
4200
FarQuality
4300
Tension


4400
4500
Caliper
NearQuality
FarQuality
Tension


4600
4700
Gamma Ray
Caliper
NearQuality
FarQuality
Pe
Bulk Density
DensityCorr


4800
4900
5000
Tension
Caliper
NearQuality
FarQuality




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6 | Caliper | 16 | 1 : 240 ft | 0 | Pe | 10 | -0.25 DensityCorr 0.25 |
| | inches | | | | | | g/cc |
| -18 | NearQuality | 2 | BHV ft3 | | | | 15K Tension 0 |
| | | | | | | | pounds |
| 18 | FarQuality | -2 | AHV ft3 | 2 | Bulk Density | 3 | |
| | | | | | g/cc | | |
| 0 | Gamma Ray | 150 | | | | | |
| | api | | | | | | |

HALLIBURTON

**Plot Time: 31-May-11 13:28:49**
**Plot Range: 1560 ft to 5179.67 ft**
**Data: PHOENIX_BERRYMN\Well Based\DAQ-0001-003**
**Plot File: \\-LOCAL-\PHOENIX_BERRYMN\0001 GTET-DSN-SDL-ACRT\SDL-DSN\BULKD_5_MAIN_IQ**

# 5 INCH MAIN LOG

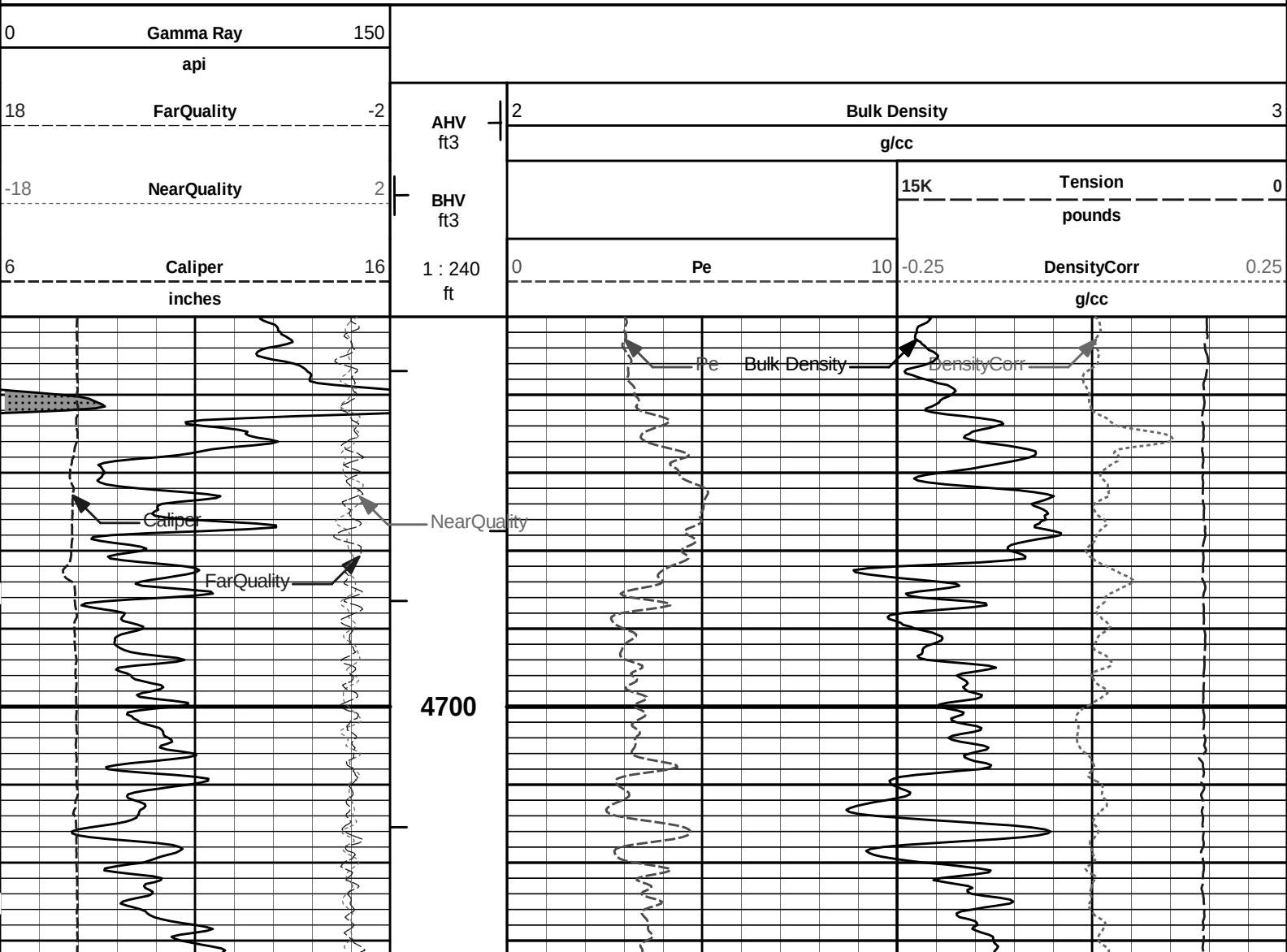
## MAIN SECTION 5" PER 100'

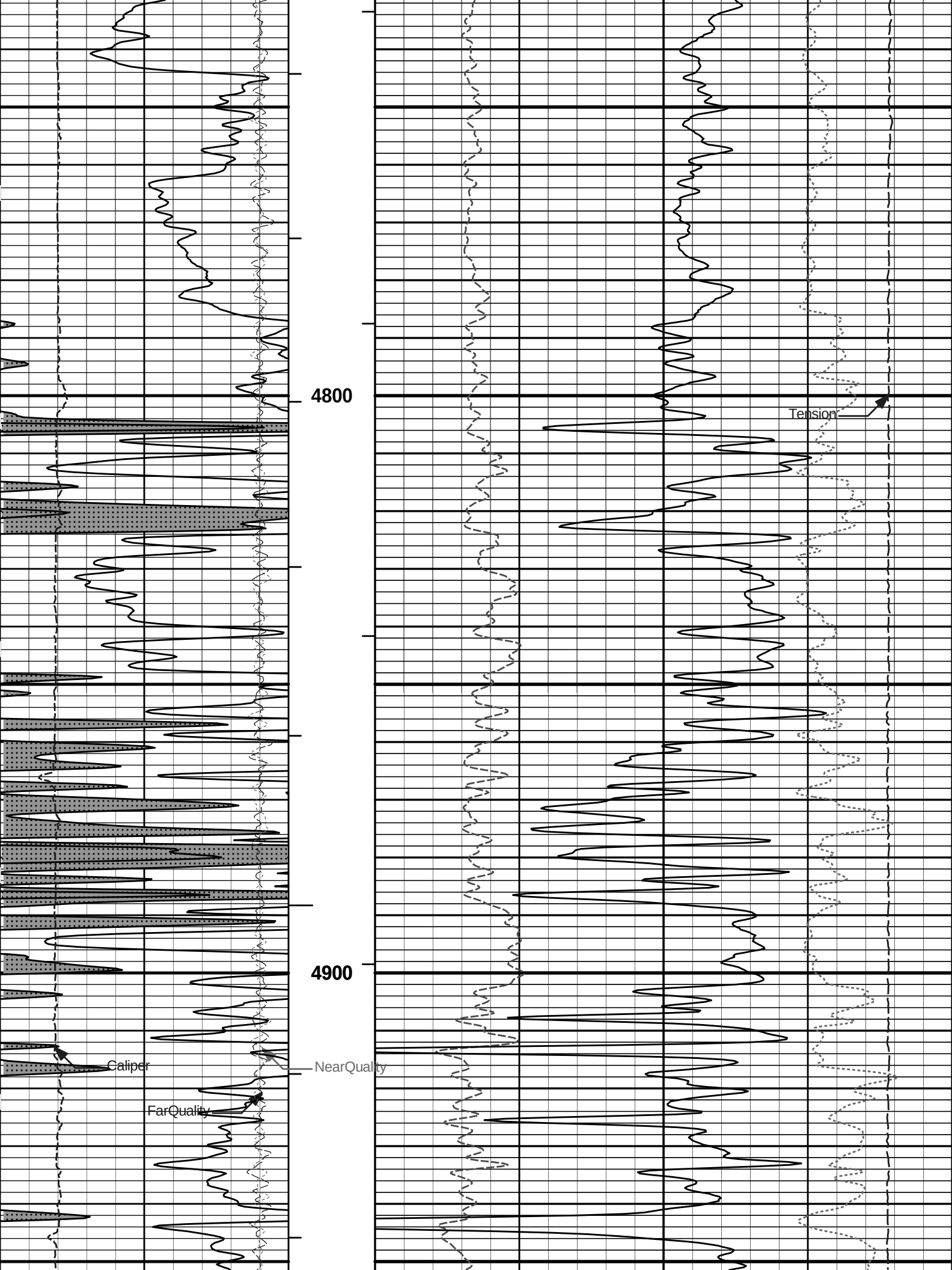
HALLIBURTON

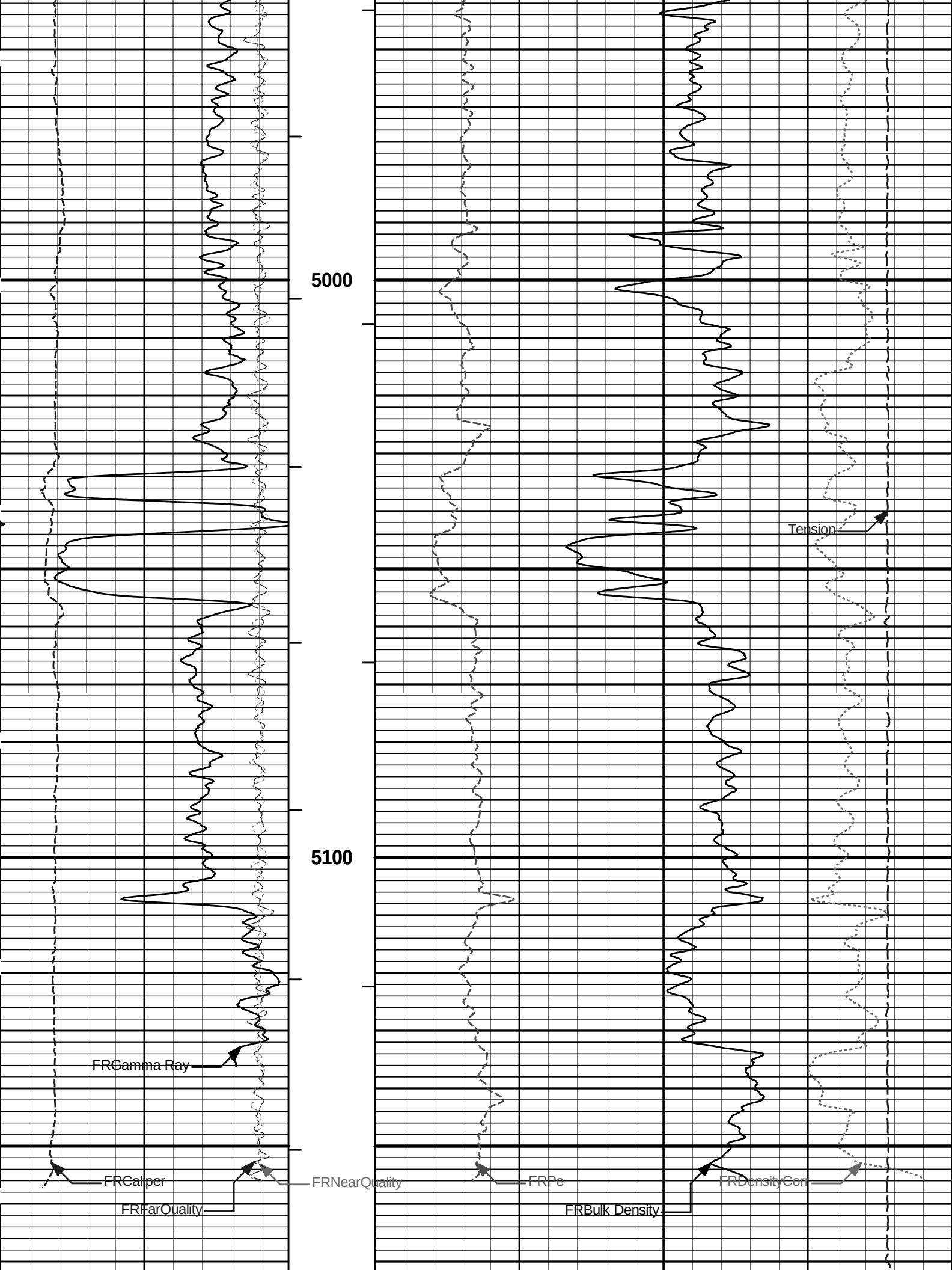
Plot Time: 31-May-11 13:28:49
Plot Range: 4650 ft to 5180.17 ft
Data: PHOENIX_BERRYMN\Well Based\DAQ-0001-002\
Plot File: \\-LOCAL-\PHOENIX_BERRYMN\0001 GTET-DSN-SDL-ACRT\SDL-DSN\BULKD_5_MAIN_IQ

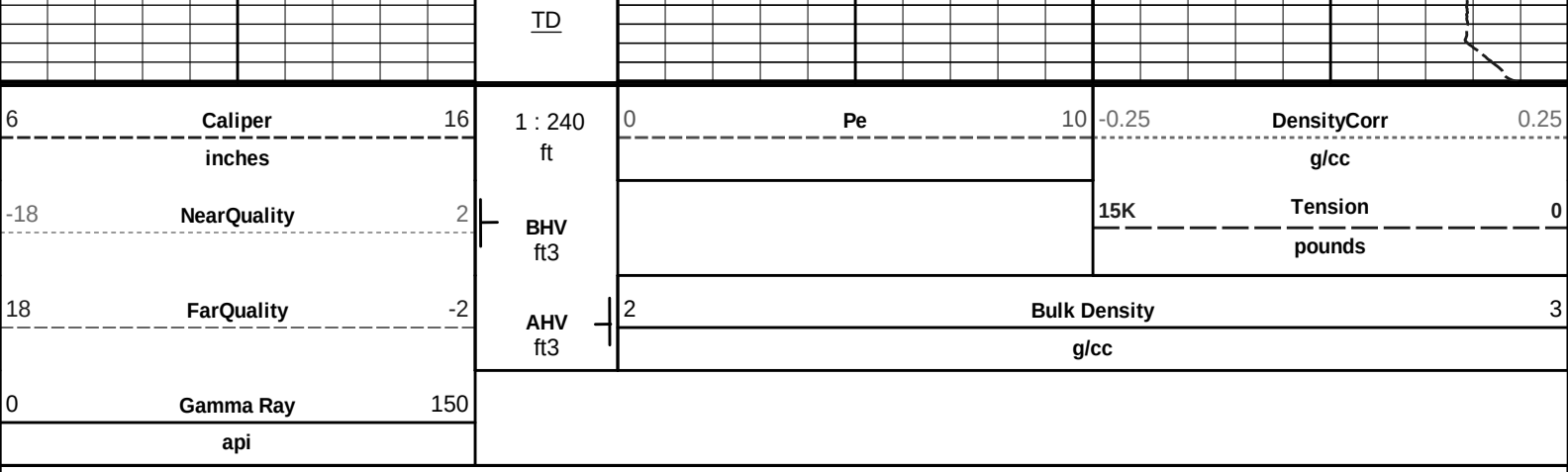
## REPEAT SECTION

## REPEAT SECTION




4800
4900
Tension
Caliper
NearQuality
FarQuality


5000
5100
Tension
FRGamma Ray
FRCaliper
FRFarQuality
FRNearQuality
FRPe
FRBulk Density
FRDensityCorr




HALLIBURTON

**Plot Time: 31-May-11 13:28:51**
**Plot Range: 4650 ft to 5180.17 ft**
**Data: PHOENIX_BERRYMN\Well Based\DAQ-0001-002**
**Plot File: \\-LOCAL-\PHOENIX_BERRYMN\0001 GTET-DSN-SDL-ACRT\SDL-DSN\BULKD_5_MAIN_IQ**

# REPEAT SECTION

# REPEAT SECTION

HALLIBURTON

# CALIBRATION REPORT

## SURFACE TENSION SHOP CALIBRATION

| | | | |
|---|---|---|---|
| **Tool Name:** | **Depth Panel - PROT01** | **Reference Calibration Date:** | **13-Jan-08 19:31:38** |
| **Engineer:** | **WHITLOCK** | **Calibration Date:** | **26-Mar-09 09:42:21** |
| **Software Version:** | **WL INSITE R2.4 (Build 1)** | **Calibration Version:** | **1** |

### SURFACE TENSION LOAD CELL

| Measurement | Load Cell Value | Measurement | Calibrated | Units |
|---|---|---|---|---|
| Low | 9877.87 | 32908.03 | 0.00 | lbs |
| High | 16448.28 | 55771.74 | 7800.00 | lbs |

## DOWNHOLE TENSION SHOP CALIBRATION

| | | | |
|---|---|---|---|
| **Tool Name:** | **CH_HOS - CH_HOS_I** | **Reference Calibration Date:** | **15-Mar-11 22:16:32** |
| **Engineer:** | **WHITLOCK** | **Calibration Date:** | **09-May-11 17:24:29** |
| **Software Version:** | **WL INSITE R3.2.1 (Build 7)** | **Calibration Version:** | **1** |

### DOWNHOLE LOAD CELL

| Measurement | Tool Value | Measurement | Calibrated | Units |
|---|---|---|---|---|
| Low | 3396.05 | -16.78 | 0.00 | lbs |
| High | 12608.03 | 1068.42 | 1050.00 | lbs |

## NATURAL GAMMA RAY TOOL SHOP CALIBRATION

| | | | |
|---|---|---|---|
| **Tool Name:** | **GTET - 10971172** | **Reference Calibration Date:** | **22-Apr-11 13:31:12** |
| **Engineer:** | **WHITLOCK** | **Calibration Date:** | **13-May-11 11:12:07** |

| | | | |
|---|---|---|---|
| **Software Version:** | **WL INSITE R3.2.1 (Build 7)** | **Calibration Version:** | **1** |

Calibrator Source S/N: TB-79

Calibrator API Reference:222.00 api

Equivalent Calibrator API Reference:225.9 api

| Measurement | Measured | Calibrated | Units |
|---|---|---|---|
| Background | 29.2 | 29.1 | api |
| Background + Calibrator | 256.0 | 255.0 | api |
| Calibrator | 225.8 | 225.9 | api |

## NATURAL GAMMA RAY TOOL FIELD CALIBRATION

| | | | |
|---|---|---|---|
| **Tool Name:** | **GTET - 10971172** | **Reference Calibration Date:** | **13-May-11 11:12:07** |
| **Engineer:** | **WHITLOCK** | **Calibration Date:** | **13-May-11 11:15:13** |
| **Software Version:** | **WL INSITE R3.2.1 (Build 7)** | **Calibration Version:** | **1** |

Calibrator Source S/N: TB-79

Calibrator API Reference:222.00 api

Equivalent Calibrator API Reference:225.9 api

| Field Verification | Shop | Field | Units |
|---|---|---|---|
| Background | 29.1 | 29.5 | api |
| Background + Calibrator | 255.0 | 253.2 | api |
| Calibrator | 225.9 | 223.7 | api |

| Shop | Field | Difference | Tolerance |
|---|---|---|---|
| 225.9 | 223.7 | 2.2 | +/- 9.00 |

## ACCELEROMETER SHOP CALIBRATION

| | | | |
|---|---|---|---|
| **Tool Name:** | **GTET - 10971172** | **Reference Calibration Date:** | **01-Jan-70 00:00:00** |
| **Engineer:** | **WHITLOCK** | **Calibration Date:** | **20-Oct-08 14:40:55** |
| **Software Version:** | **WL INSITE R2.2 (Build 2)** | **Calibration Version:** | **1** |

| Horizontal-1 Telemetry | Horizontal-2 Telemetry | Vertical Telemetry | Units |
|---|---|---|---|
| -85.64 | -67.18 | -16422.00 | cnts |

| Coefficient | Coefficient Value | Tolerance |
|---|---|---|
| Gain | -0.000061 | 0.0010 - -0.0010 |
| Offset | -0.005 | ----- |
| Noise | 0.0000 | 0.0000 |

| Orientation | Measured | Calibrated |
|---|---|---|
| Horizontal | -76.41 | 0.00 |
| Vertical | -16422.00 | 1.00 |

## DUAL SPACED NEUTRON SHOP CALIBRATION

| | | | |
|---|---|---|---|
| **Tool Name:** | **DSNT - 10951378** | **Reference Calibration Date:** | **14-Apr-11 12:15:56** |
| **Engineer:** | **WHITLOCK** | **Calibration Date:** | **13-May-11 12:51:07** |
| **Software Version:** | **WL INSITE R3.2.1 (Build 7)** | **Calibration Version:** | **1** |

Logging Source S/N: DSN-373

Tank Serial Number: FTSM H2O TANK

Reference value assigned to Tank: 56.100

Snow Block S/N: 10975786

Calibration Tank Water Temperature: 74 degF

Min. Tool Housing Outside Diameter: 3.625 in

| CALIBRATION CONSTANTS |
|---|

**CALIBRATION CONSTANTS**

| Measurement | Prev. Value | New Value | Control Limit On New Value |
|---|---|---|---|
| Gain: | 1.009 | 1.014 | 0.900 - 1.100 |

**WATER TANK SUMMARY (Horizontal Water Tank)**

| Measurement | Current Reading (Previous Coef.) | Calibrated (New Coef.) | Change | Control Limit On Change |
|---|---|---|---|---|
| Porosity (decp): | 0.2343 | 0.2358 | 0.0015 | +/- 0.0020 |
| Calibrated Ratio: | 10.51 | 10.56 | 0.049 | +/- 0.050 |

**VERIFIER**

| Measurement | Value | Control Limit |
|---|---|---|
| Snow-Block Porosity (decp): | 0.0774 | 0.02000 - 0.09000 |

**PASS/FAIL SUMMARY**

| | |
|---|---|
| Background Check: | Passed |
| Gain-Range Check: | Passed |
| Snow-Block Check: | Passed |

## DUAL SPACED NEUTRON FIELD CALIBRATION

**Tool Name:** DSNT - 10951378 **Reference Calibration Date:** 13-May-11 12:51:07

**Engineer:** WHITLOCK **Calibration Date:** 13-May-11 12:52:54

**Software Version:** WL INSITE R3.2.1 (Build 7) **Calibration Version:** 1

Logging Source S/N: DSN-373

Snow Block S/N: 10975786

**NEUTRON FIELD-CHECK SUMMARY**

| | Shop | Field | Difference | Control Limit On Change |
|---|---|---|---|---|
| Snow-Block Porosity (decp): | 0.0774 | 0.0774 | -0.0000 | +/- 0.0150 |

**PASS/FAIL SUMMARY**

| | |
|---|---|
| Block Change Check: | Passed |
| Snow Block Stat Check: | Passed |
| Temperature Check: | Passed |

## SPECTRAL DENSITY SHOP CALIBRATION

**Tool Name:** SDLT - I378_M477_P870 **Reference Calibration Date:** 14-Apr-11 11:44:47

**Engineer:** WHITLOCK **Calibration Date:** 13-May-11 10:52:25

**Software Version:** WL INSITE R3.2.1 (Build 7) **Calibration Version:** 1

Logging Source S/N: 20784B

Aluminum Block S/N: FTSM AL BLOCK Density: 2.581g/cc Pe: 3.170

Magnesium Block S/N: FTSM MAG BLOCK Density: 1.687g/cc Pe: 2.594

**DENSITY CALIBRATION SUMMARY**

| Measurement | Previous Value | New Value | Control Limit |
|---|---|---|---|
| Near Bar Gain | 1.0050 | 1.0205 | 0.90 - 1.10 |
| Near Dens Gain | 1.0034 | 1.0212 | 0.90 - 1.10 |
| Near Peak Gain | 1.0112 | 1.0213 | 0.90 - 1.10 |
| Near Lith Gain | 1.0234 | 1.0308 | 0.90 - 1.10 |
| Far Bar Gain | 1.0089 | 1.0097 | 0.90 - 1.10 |
| Far Dens Gain | 1.0001 | 1.0010 | 0.90 - 1.10 |
| Far Peak Gain | 0.9987 | 1.0002 | 0.90 - 1.10 |

| | | | |
|---|---|---|---|
| Far Lith Gain | 0.9782 | 0.9820 | 0.90 - 1.10 |
| Near Bar Offset | 0.1245 | -0.0176 | NONE |
| Near Dens Offset | 0.1198 | -0.0359 | NONE |
| Near Peak Offset | 0.0426 | -0.0412 | NONE |
| Near Lith Offset | -0.0861 | -0.1494 | NONE |
| Far Bar Offset | 0.0231 | 0.0176 | NONE |
| Far Dens Offset | 0.0875 | 0.0795 | NONE |
| Far Peak Offset | 0.0748 | 0.0642 | NONE |
| Far Lith Offset | 0.2061 | 0.1781 | NONE |
| Near Bar Background | 917.62 | 917.54 | 700 - 1450 |
| Near Dens Background | 299.23 | 300.24 | 230 - 480 |
| Near Peak Background | 131.16 | 131.13 | 100 - 210 |
| Near Lith Background | 162.20 | 162.12 | 125 - 260 |
| Far Bar Background | 549.43 | 550.05 | 450 - 900 |
| Far Dens Background | 213.49 | 215.29 | 175 - 345 |
| Far Peak Background | 84.89 | 84.18 | 70 - 140 |
| Far Lith Background | 88.22 | 88.01 | 75 - 145 |

**CALIBRATION BLOCK SUMMARY**

| Measurement | Current Reading (Previous Coef) | Calibrated (New Coef) | Change | Control Limit On Change |
|---|---|---|---|---|
| MAGNESIUM | | | | |
| Density (g/cc) | 1.686 | 1.687 | 0.001 | +/- 0.015 |
| Pe | 2.550 | 2.558 | 0.008 | +/- 0.150 |
| ALUMINUM | | | | |
| Density (g/cc) | 2.582 | 2.581 | -0.001 | +/- 0.01500 |
| Pe | 3.128 | 3.131 | 0.003 | +/- 0.150 |

**TOOL SUMMARY**

| Measurement | Near Detector | | Far Detector | |
|---|---|---|---|---|
| | Value | Control Limits | Value | Control Limits |
| QUALITY | | | | |
| Background | -0.0013 | +/- 0.0110 | -0.0019 | +/- 0.0140 |
| Magnesium Block | -0.0000 | +/- 0.0110 | 0.0008 | +/- 0.0140 |
| Aluminum Block | 0.0001 | +/- 0.0110 | 0.0006 | +/- 0.0140 |
| Resolution | 9.23 | 6.00 - 11.50 | 8.52 | 6.00 - 11.50 |
| Internal Verifier(B+D+P+L) | 1511 | 1200 - 2700 | 938 | 800 - 1700 |

| PASS/FAIL SUMMARY | |
|---|---|
| Background Quality Check: | Passed |
| Background Range Check: | Passed |
| Background Resolution Check: | Passed |
| Background Verification Check: | Passed |
| Magnesium Quality Check: | Passed |
| Aluminum Quality Check: | Passed |
| Gains Check: | Passed |
| Changes in Calibration Blocks: | Passed |

## SPECTRAL DENSITY FIELD CHECK

**Tool Name:** SDLT - I378_M477_P870 **Reference Calibration Date:** 13-May-11 10:52:25

**Engineer:** WHITLOCK **Calibration Date:** 13-May-11 11:03:26

**Engineer:** WHITLOCK **Calibration Date:** 13-May-11 11:03:26

**Software Version:** WL INSITE R3.2.1 (Build 7) **Calibration Version:** 1

Pad Temperature: 79.1 degF

| DENSITY FIELD CALIBRATION SUMMARY | | | | |
|---|---|---|---|---|
| Measurement | Shop | Field | Change | Control Limit +/- |
| Near (B+D+P+L) cps | 1511.032 | 1514.376 | 3.344 | 15.660 |
| Far (B+D+P+L) cps | 937.529 | 940.796 | 3.267 | 16.547 |
| Near Resolution | 9.23 | 9.12 | -0.110 | 0.50 |
| Far Resolution | 8.52 | 8.47 | -0.050 | 1.00 |

| PASS/FAIL SUMMARY | |
|---|---|
| Bkg Quality Check: | Passed |
| Bkg Resolution Check: | Passed |
| Bkg Verification Check: | Passed |

## MICRO LOG SHOP CALIBRATION

**Tool Name:** SDLT - I378_M477_P870 **Reference Calibration Date:** 22-Apr-11 13:32:38

**Engineer:** WHITLOCK **Calibration Date:** 03-May-11 11:32:17

**Software Version:** WL INSITE R3.2.1 (Build 7) **Calibration Version:** 1

| CALIBRATION COEFFICIENT SUMMARY | | | | | |
|---|---|---|---|---|---|
| Measurement | Micro Log Normal | | Micro Log Lateral | | |
| | Measured | Calibrated | Measured | Calibrated | Units |
| Tool Zero | -0.18 | -0.15 | -0.00 | 0.00 | ohmm |
| Calibration Point #1 | -0.04 | 0.00 | -0.01 | 0.00 | ohmm |
| Calibration Point #2 | 19.33 | 20.00 | 19.98 | 20.00 | ohmm |
| Internal Reference | 19.20 | 19.86 | 19.99 | 20.00 | ohmm |

| Measurement | Micro Log Normal Tool Value | Micro Log Lateral Tool Value | Units |
|---|---|---|---|
| Tool Zero | 0.18 | 0.01 | V |
| Calibration Point #1 | 38.48 | -0.52 | V |
| Calibration Point #2 | 5298.30 | 6866.00 | V |
| Internal Reference | 5262.31 | 6866.98 | V |

## MICRO LOG FIELD CHECK

**Tool Name:** SDLT - I378_M477_P870 **Reference Calibration Date:** 03-May-11 11:32:17

**Engineer:** WHITLOCK **Calibration Date:** 03-May-11 11:33:13

**Software Version:** WL INSITE R3.2.1 (Build 7) **Calibration Version:** 1

| Measurement | Micro Log Normal | | Micro Log Lateral | | |
|---|---|---|---|---|---|
| | Shop | Field | Shop | Field | Units |
| Tool Zero | -0.15 | -0.14 | 0.00 | 0.00 | ohmm |
| Internal Reference | 19.86 | 19.86 | 20.00 | 20.00 | ohmm |

| Summary | | | | |
|---|---|---|---|---|
| Signal | Shop | Field | Difference | Tolerence |
| Microlog Normal | 19.86 | 19.86 | 0.00 | +/- 0.80 |
| Microlog Lateral | 20.00 | 20.00 | 0.00 | +/- 0.80 |

## DENSITY CALIPER SHOP CALIBRATION

**Tool Name:** SDLT - I378_M477_P870 **Reference Calibration Date:** 01-Jan-70 00:00:00

**Engineer:** WHITLOCK **Calibration Date:** 25-Feb-11 10:15:12

**Software Version:** WL INSITE R3.2.1 (Build 7) **Calibration Version:** 1

| CALIBRATION COEFFICIENTS | | | |
|---|---|---|---|
| Measurement | Previous Value | New Value | Control Limit On New Value |
| Pad Offset | -1186.01 | -1186.01 | -7000.00 - -1000.00 |
| Pad Gain | 0.0003757 | 0.0003757 | 0.000200 - 0.000600 |
| Arm Offset | -1165.63 | -1165.63 | -5000.00 - 3000.00 |
| Arm Gain | 0.0004320 | 0.0004320 | 0.000300 - 0.000700 |
| Arm Power | 0.000000704 | 0.000000704 | -0.000010 - 0.000010 |

The ring diameter is computed from: DIAMETER = PAD EXTENSION + ARM EXTENSION + TOOL DIAMETER

Tool Diameter: 4.50 in

| CALIBRATION RINGS | | | | |
|---|---|---|---|---|
| Measurement | Current Reading (Previous Coeff.) | Calibrated (New Coeff.) | Change | Control Limit On New Value |
| PAD EXTENSION: | | | | |
| Small Ring (in) | 2.00 | 2.00 | 0.00 | +/- 0.20 |
| Medium Ring (in) | 3.75 | 3.75 | 0.00 | +/- 0.20 |
| RING DIAMETER: | | | | |
| Small Ring (in) | 6.50 | 6.50 | 0.00 | +/- 0.20 |
| Medium Ring (in) | 8.25 | 8.25 | 0.00 | +/- 0.20 |
| Large Ring (in) | 15.00 | 15.00 | 0.00 | +/- 0.20 |

| PASS/FAIL SUMMARY | |
|---|---|
| Calibration-Coefficients Range Check: | Passed |
| Ring-Measurement Check: | Passed |

| PASS/FAIL SUMMARY | |
|---|---|
| Calibration-Coefficients Range Check: | Passed |

## SDLT CALIPER FIELD CALIBRATION

**Tool Name:** SDLT - I378_M477_P870 **Reference Calibration Date:** 25-Feb-11 10:15:12

**Engineer:** WHITLOCK **Calibration Date:** 25-Feb-11 10:16:46

**Software Version:** WL INSITE R3.2.1 (Build 7) **Calibration Version:** 1

| MEASURED CALIPER VALUES | | | | |
|---|---|---|---|---|
| Measurement | Shop | Field | Change | Control Limit On New Value |
| Pad Extension | 3.75 | 3.76 | 0.01 | +/- 0.10 |
| Ring Diameter | 8.25 | 8.25 | 0.00 | +/- 0.15 |

| PASS/FAIL SUMMARY | |
|---|---|
| Pad Extension Check: | Passed |
| Diameter Check: | Passed |

## ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

**Tool Name:** ACRt - I816_S708 **Reference Calibration Date:** 21-Mar-11 07:29:13

**Engineer:** WHITLOCK **Calibration Date:** 24-May-11 10:13:21

**Software Version:** WL INSITE R3.2.1 (Build 7) **Calibration Version:** 1

| TYPICAL GAIN RANGE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Subarray | R12KHz | | | R36KHz | | | R72KHz | | |
| | Lower | (mmho/m) | Upper | Lower | (mmho/m) | Upper | Lower | (mmho/m) | Upper |
| A1 (80") | 0.95 | 1.0377 | 1.05 | 0.95 | 1.0167 | 1.05 | 0.95 | 1.0084 | 1.05 |
| A2 (50") | 0.95 | 1.0436 | 1.05 | 0.95 | 1.0218 | 1.05 | 0.95 | 1.0107 | 1.05 |
| A3 (29") | 0.95 | 1.0477 | 1.05 | 0.95 | 1.0264 | 1.05 | 0.95 | 1.0158 | 1.05 |
| A4 (17") | 0.95 | 1.0259 | 1.05 | 0.95 | 1.0036 | 1.05 | 0.95 | 0.9984 | 1.05 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| A5 (10") | N/A | N/A | N/A | 0.95 | 0.9938 | 1.05 | 0.95 | 0.9865 | 1.05 |
| A6 (6") | N/A | N/A | N/A | 0.95 | 0.9923 | 1.05 | 0.95 | 0.9861 | 1.05 |

**TYPICAL SONDE OFFSET RANGE**

| Subarray | R12KHz | | | R36KHz | | | R72KHz | | |
|---|---|---|---|---|---|---|---|---|---|
| | Lower | (mmho/m) | Upper | Lower | (mmho/m) | Upper | Lower | (mmho/m) | Upper |
| A1 (80") | -5 | 1.540 | 2 | -6 | -4.354 | -2 | -8 | -5.886 | -2 |
| A2 (50") | -7 | 0.756 | -1 | -6 | -4.115 | -2 | -7 | -5.229 | -2 |
| A3 (29") | -27 | -11.449 | -9 | -9 | -3.850 | -3 | -7 | -4.599 | -1 |
| A4 (17") | -180 | -106.437 | -60 | -45 | -32.865 | -15 | -39 | -25.638 | -13 |
| A5 (10") | N/A | N/A | N/A | -150 | -102.566 | -50 | -80 | -48.266 | -10 |
| A6 (6") | N/A | N/A | N/A | 175 | 326.990 | 525 | 90 | 165.506 | 270 |

**TRANSMITTER CURRENT GAIN**

| Signal | Lower | R | Upper |
|---|---|---|---|
| 12K | 0.6 | 0.8460 | 1.3 |
| 36K | 1.0 | 1.1689 | 2.0 |
| 72K | 1.0 | 1.3226 | 2.0 |

**R-MUD VERIFICATION**

| Signal | Lower (ohm-m) | Measured (ohm-m) | Upper (ohm-m) |
|---|---|---|---|
| Mud Cell | 0.95 | 1.003 | 1.05 |

## CALIBRATION SUMMARY

| Sensor | Shop | Field | Post | Difference | Tolerance | Units |
|---|---|---|---|---|---|---|
| **Depth Panel-PROT01** | | | | | | |
| Tension Zero | 0.00 | ---------- | ---------- | 0.00 | ---------- | lbs |
| Tension Cal | 7800.00 | ---------- | ---------- | 0.00 | ---------- | lbs |
| **CH_HOS-CH_HOS_I** | | | | | | |
| DH Tension Zero | 0.00 | ---------- | ---------- | 0.00 | ---------- | lbs |
| DH Tension Cal | 1050.00 | ---------- | ---------- | 0.00 | ---------- | lbs |
| **GTET-10971172** | | | | | | |
| Gamma Ray Calibrator | 225.9 | 223.7 | ---------- | 2.2 | +/- 9.00 | api |
| **DSNT-10951378** | | | | | | |
| Snow-Block Porosity | 0.0774 | 0.0774 | ---------- | 0.0000 | +/- 0.0150 | decp |
| **SDLT-I378_M477_P870** | | | | | | |
| Near(B+D+P+L) | 1511.032 | 1514.376 | ---------- | -3.344 | +/-15.660 | cps |
| Far(B+D+P+L) | 937.529 | 940.796 | ---------- | -3.267 | +/-16.547 | cps |
| MicroLog Normal | 19.86 | 19.86 | ---------- | 0.00 | +/-0.80 | ohmm |
| MicroLog Lateral | 20.00 | 20.00 | ---------- | 0.00 | +/-0.80 | ohmm |
| Pad Extension | 3.75 | 3.76 | ---------- | -0.01 | +/-0.10 | in |
| Ring Diameter | 8.25 | 8.25 | ---------- | 0.000 | +/-0.15 | in |
| **ACRt-I816_S708** | | | | | | |
| Mud Cell | 1.003 | ---------- | ---------- | 0.000 | ---------- | ohm-m |

**Data: PHOENIX_BERRYMN\0001 GTET-DSN-SDL-ACRT\001 31-May-11 10:59 Dn @476.8f** **Date: 31-May-11 11:00:25**

HALLIBURTON

## PARAMETERS REPORT

| Depth (ft) | Tool Name | Mnemonic | Description | Value | Units |
|---|---|---|---|---|---|
| TOP | | | | | |
| | SHARED | BS | Bit Size | 7.875 | in |
| | SHARED | UBS | Use Bit Size instead of Caliper for all applications. | No | |

| | | | | |
|---|---|---|---|---|
| SHARED | MDBS | Mud Base | Water | |
| SHARED | MDWT | Borehole Fluid Weight | 9.100 | ppg |
| SHARED | WAGT | Weighting Agent | Barite | |
| SHARED | BSAL | Borehole salinity | 0.00 | ppm |
| SHARED | FSAL | Formation Salinity NaCl | 0.00 | ppm |
| SHARED | KPCT | Percent K in Mud by Weight? | 0.00 | % |
| SHARED | RMUD | Mud Resistivity | 2.000 | ohmm |
| SHARED | TRM | Temperature of Mud | 75.0 | degF |
| SHARED | CSD | Logging Interval is Cased? | No | |
| SHARED | ICOD | AHV Casing OD | 4.500 | in |
| SHARED | ST | Surface Temperature | 75.0 | degF |
| SHARED | TD | Total Well Depth | 5175.00 | ft |
| SHARED | BHT | Bottom Hole Temperature | 140.0 | degF |
| SHARED | SVTM | Navigation and Survey Master Tool | NONE | |
| SHARED | AZTM | High Res Z Accelerometer Master Tool | GTET | |
| SHARED | TEMM | Temperature Master Tool | NONE | |
| SHARED | BHSM | Borehole Size Master Tool | NONE | |
| GTET | GROK | Process Gamma Ray? | Yes | |
| GTET | GRSO | Gamma Tool Standoff | 0.000 | in |
| GTET | GEOK | Process Gamma Ray EVR? | No | |
| GTET | TPOS | Tool Position | Centered | |
| DSNT | DNOK | Process DSN? | Yes | |
| DSNT | DEOK | Process DSN EVR? | No | |
| DSNT | NLIT | Neutron Lithology | Limestone | |
| DSNT | DNSO | DSN Standoff - 0.25 in (6.35 mm) Recommended | 0.200 | in |
| DSNT | DNTP | Temperature Correction Type | None | |
| DSNT | DPRS | DSN Pressure Correction Type | None | |
| DSNT | SHCO | View More Correction Options | No | |
| DSNT | UTVD | Use TVD for Gradient Corrections? | No | |
| DSNT | LHWT | Logging Horizontal Water Tank? | No | |
| SDLT | DNOK | Process Density? | Yes | |
| SDLT | DNOK | Process Density EVR? | No | |
| SDLT | CB | Logging Calibration Blocks? | No | |
| SDLT | SPVT | SDLT Pad Temperature Valid? | Yes | |
| SDLT | DTWN | Disable temperature warning | No | |
| SDLT | DMA | Formation Density Matrix | 2.710 | g/cc |
| SDLT | DFL | Formation Density Fluid | 1.000 | g/cc |
| SDLT | CLOK | Process Caliper Outputs? | Yes | |
| SDLT | MLOK | Process MicroLog Outputs? | Yes | |
| ACRt | RTOK | Process ACRt? | Yes | |
| ACRt | MNSO | Minimum Tool Standoff | 1.50 | in |
| ACRt | TCS1 | Temperature Correction Source | FP Lwr & FP Upr | |
| ACRt | TPOS | Tool Position | Free Hanging | |
| ACRt | RMOP | Rmud Source | Mud Cell | |
| ACRt | RMIN | Minimum Resistivity for MAP | 0.20 | ohmm |
| ACRt | RMIN | Maximum Resistivity for MAP | 200.00 | ohmm |
| ACRt | THQY | Threshold Quality | 0.50 | |

BOTTOM

**Data: PHOENIX_BERRYMN\0001 GTET-DSN-SDL-ACRT\001 31-May-11 10:59 Dn @476.8f** **Date: 31-May-11 11:01:09**

HALLIBURTON

# TOOL STRING DIAGRAM REPORT

| | | | | | | Accumulated |
|---|---|---|---|---|---|---|

| Description | Overbody Description | O.D. | Diagram | Sensors @ Delays | Length | Accumulated Length |
|---|---|---|---|---|---|---|
| | | | | | | 52.10 ft |
| CH_HOS_I<br>37.50 lbs | | Ø 2.750 in | | Temperature @ 50.85 ft | 3.25 ft | |
| | | | | | | 48.85 ft |
| GTET-10971172<br>165.00 lbs | | Ø 3.625 in | | | 8.52 ft | |
| | | | | GammaRay @ 42.79 ft | | |
| | | | | | | 40.33 ft |
| | DSN Decentralizer-10958654<br>6.60 lbs | Ø 3.625 in* | | | | |
| DSNT-10951378<br>174.00 lbs | | Ø 3.625 in | | | 9.69 ft | |
| | | | | DSN Far @ 33.39 ft | | |
| | | | | DSN Near @ 32.64 ft | | |
| | | | | | | 30.64 ft |
| SDLT-I378_M477_P870<br>360.00 lbs | | Ø 4.500 in | | | 10.81 ft | |
| | | Ø 4.750 in | | SDL Microlog @ 22.83 ft<br>SDL Caliper @ 22.65 ft<br>SDL @ 22.64 ft | | |
| | | | | | | 19.83 ft |
| | | | | Mud Resistivity @ 13.44 ft | | |
| ACRt-I816_S708<br>250.00 lbs | | Ø 3.625 in | | ACRt @ 9.46 ft | 19.25 ft | |
| | SP Ring-1<br>0.00 lbs | Ø 3.625 in* | | SP @ 1.86 ft | | |
| | | | | | | 0.58 ft |
| Cabbage Head-01<br>10.00 lbs | | Ø 3.625 in<br>Ø 6.000 in | | | 0.58 ft | |

0.00 ft

| Mnemonic | Tool Name | Serial Number | Weight (lbs) | Length (ft) | | Accumulated Length (ft) | Max.Log. Speed (fpm) |
|---|---|---|---|---|---|---|---|
| CH_HOS | Hostile Cable Head with Load Cell | CH_HOS_I | 37.50 | 3.25 | | 48.85 | 300.00 |
| GTET | Gamma Telemetry Tool | 10971172 | 165.00 | 8.52 | | 40.33 | 60.00 |
| DSNT | Dual Spaced Neutron | 10951378 | 174.00 | 9.69 | | 30.64 | 60.00 |
| DCNT | DSN Decentralizer | 10958654 | 6.60 | 5.13 | * | 33.97 | 300.00 |
| SDLT | Spectral Density Tool | I378_M477_P870 | 360.00 | 10.81 | | 19.83 | 60.00 |
| ACRt | Array Compensated True Resistivity | I816_S708 | 250.00 | 19.25 | | 0.58 | 300.00 |
| SP | SP Ring | 1 | 0.00 | 0.25 | * | 1.86 | 300.00 |
| CBHD | Cabbage Head | 01 | 10.00 | 0.58 | | 0.00 | 300.00 |
| **Total** | | | **1,003.10** | **52.10** | | | |

* Not included in Total Length and Length Accumulation.

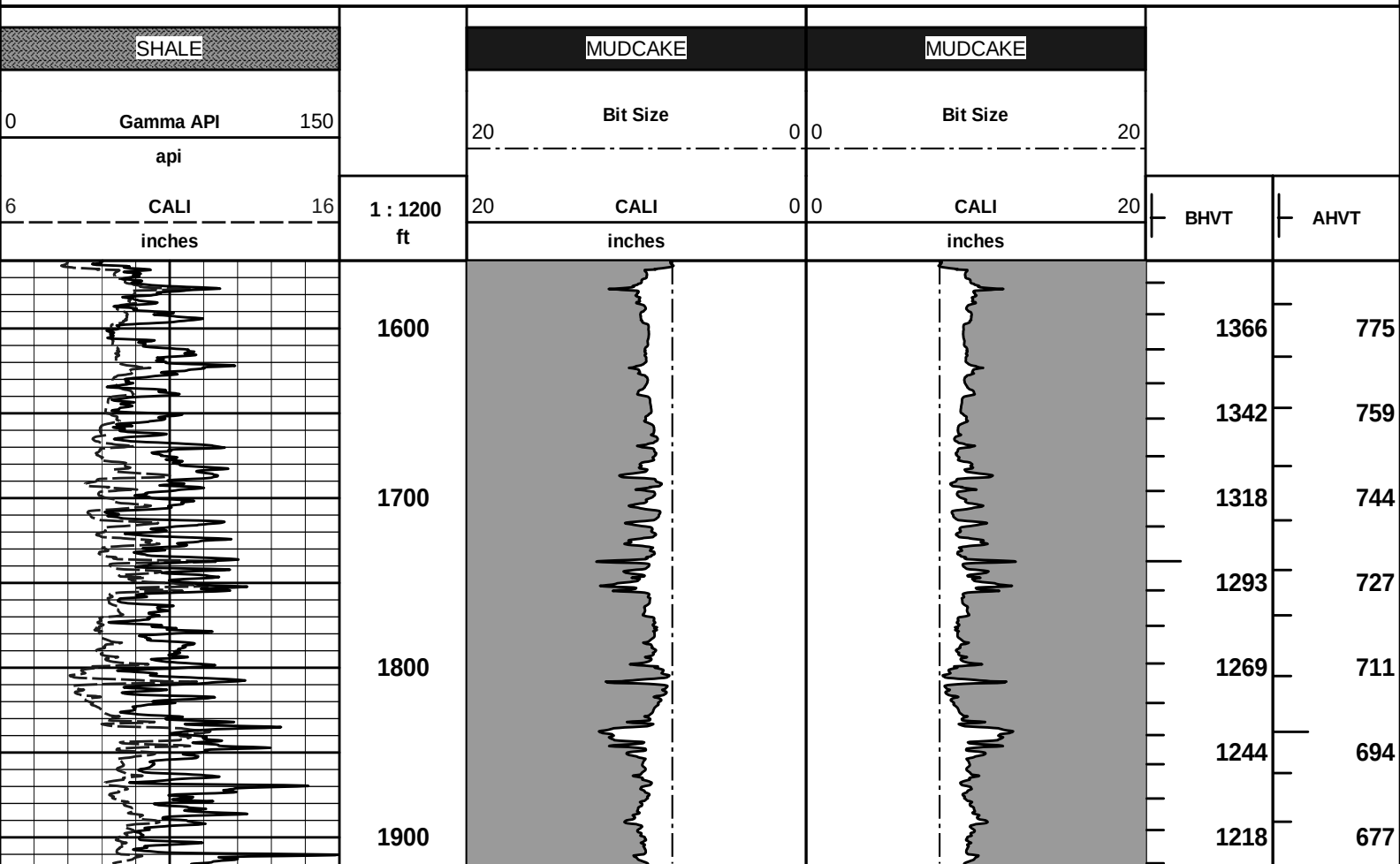
**Data: PHOENIX_BERRYMN\0001 GTET-DSN-SDL-ACRT\001 31-May-11 10:59 Dn @476.8f** **Date: 31-May-11 11:01:40**

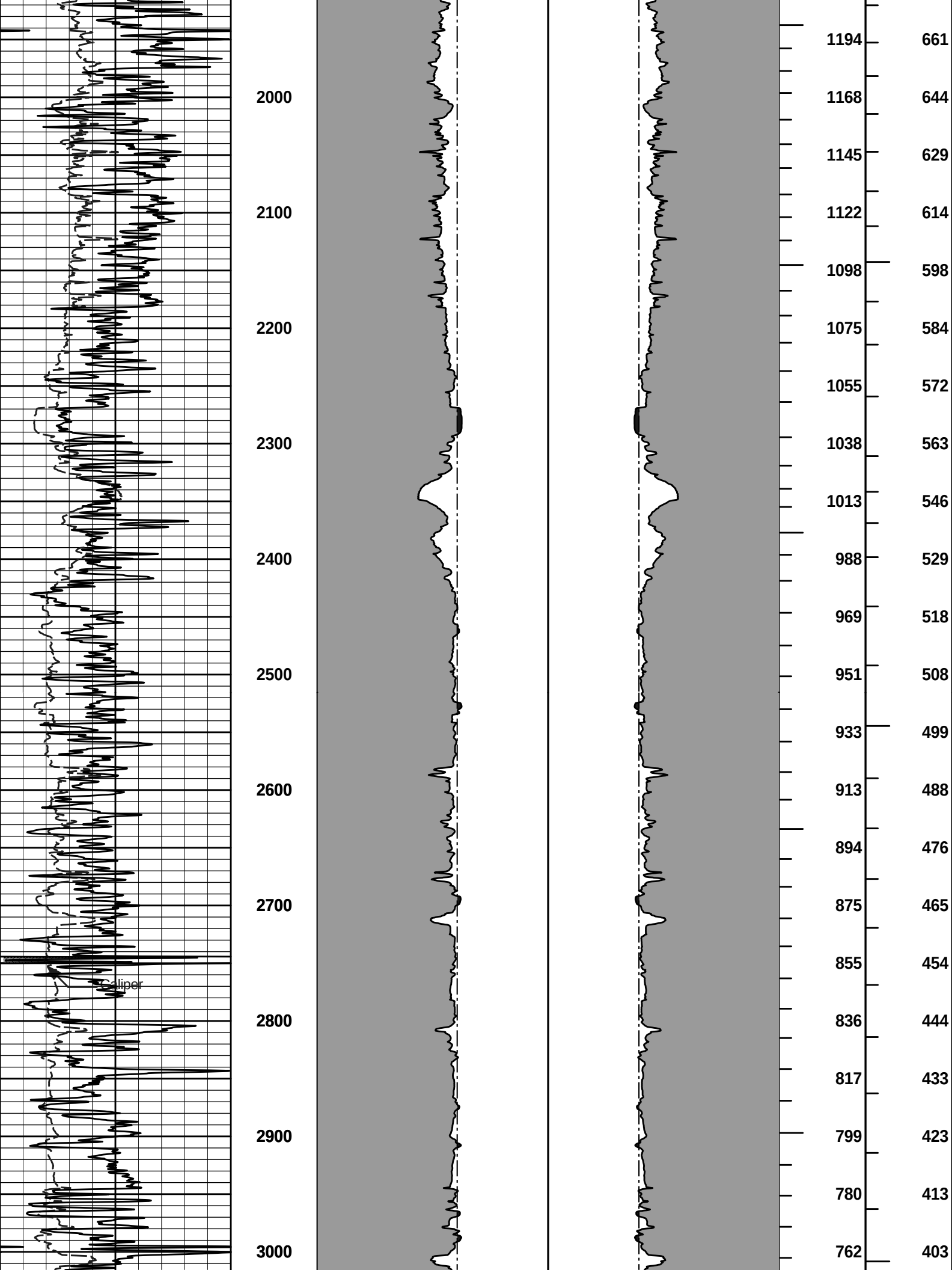
HALLIBURTON

**Plot Time: 31-May-11 13:28:51**
**Plot Range: 1560 ft to 5179.67 ft**
**Data: PHOENIX_BERRYMN\Well Based\DAQ-0001-003**
**Plot File: \\-LOCAL-\PHOENIX_BERRYMN\0001 GTET-DSN-SDL-ACRT\SDL-DSN\AHV Plot_INSITE_IQ**

# ANNULAR HOLE VOLUME PLOT

## AHV PLOT CALCULATED FOR 5.5" CASING

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2800
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3000
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1075
1055
1038
1013
988
969
951
933
913
894
875
855
836
817
799
780
762
661
644
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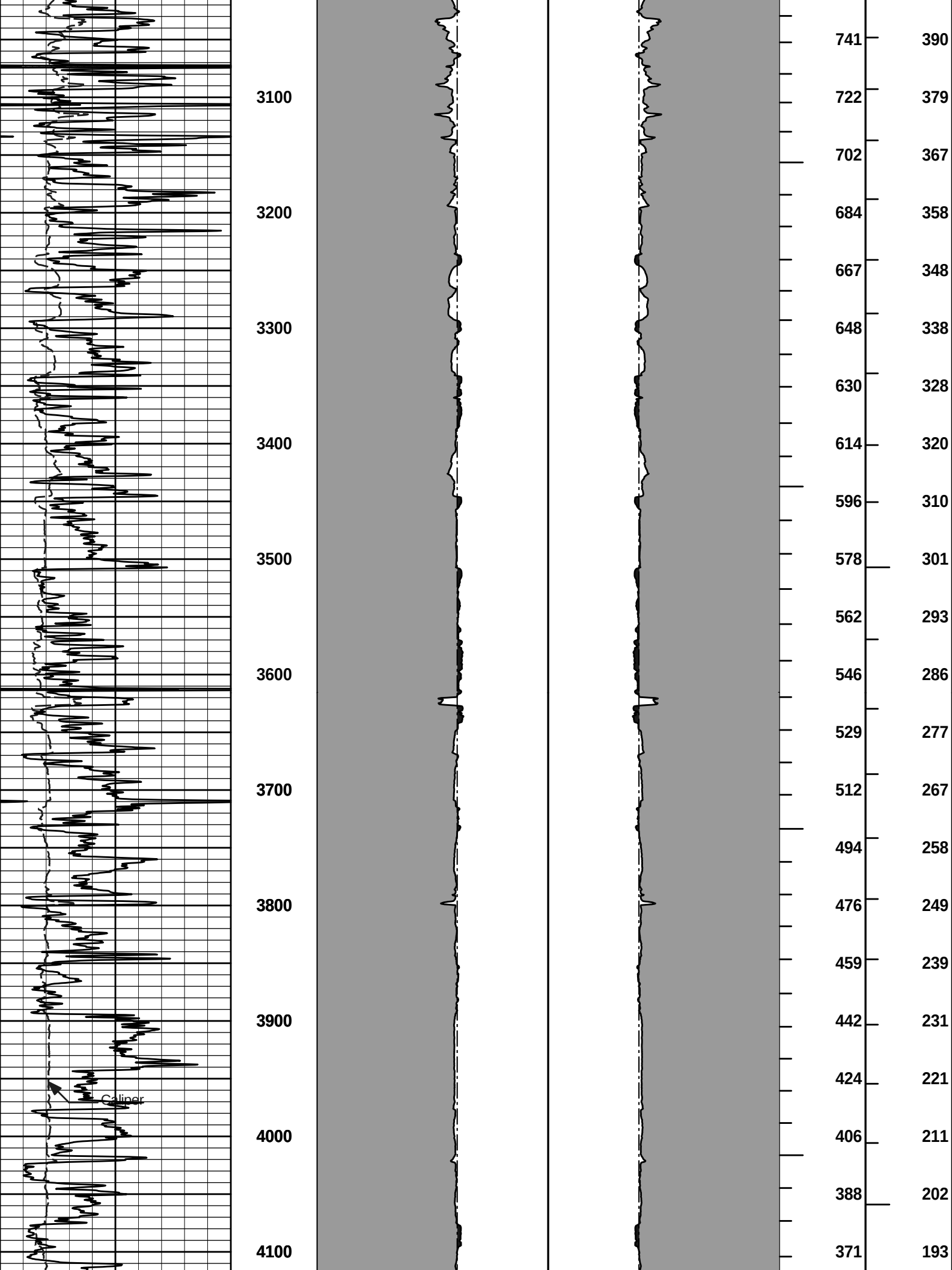
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3800
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4000
4100
Caliper
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722
702
684
667
648
630
614
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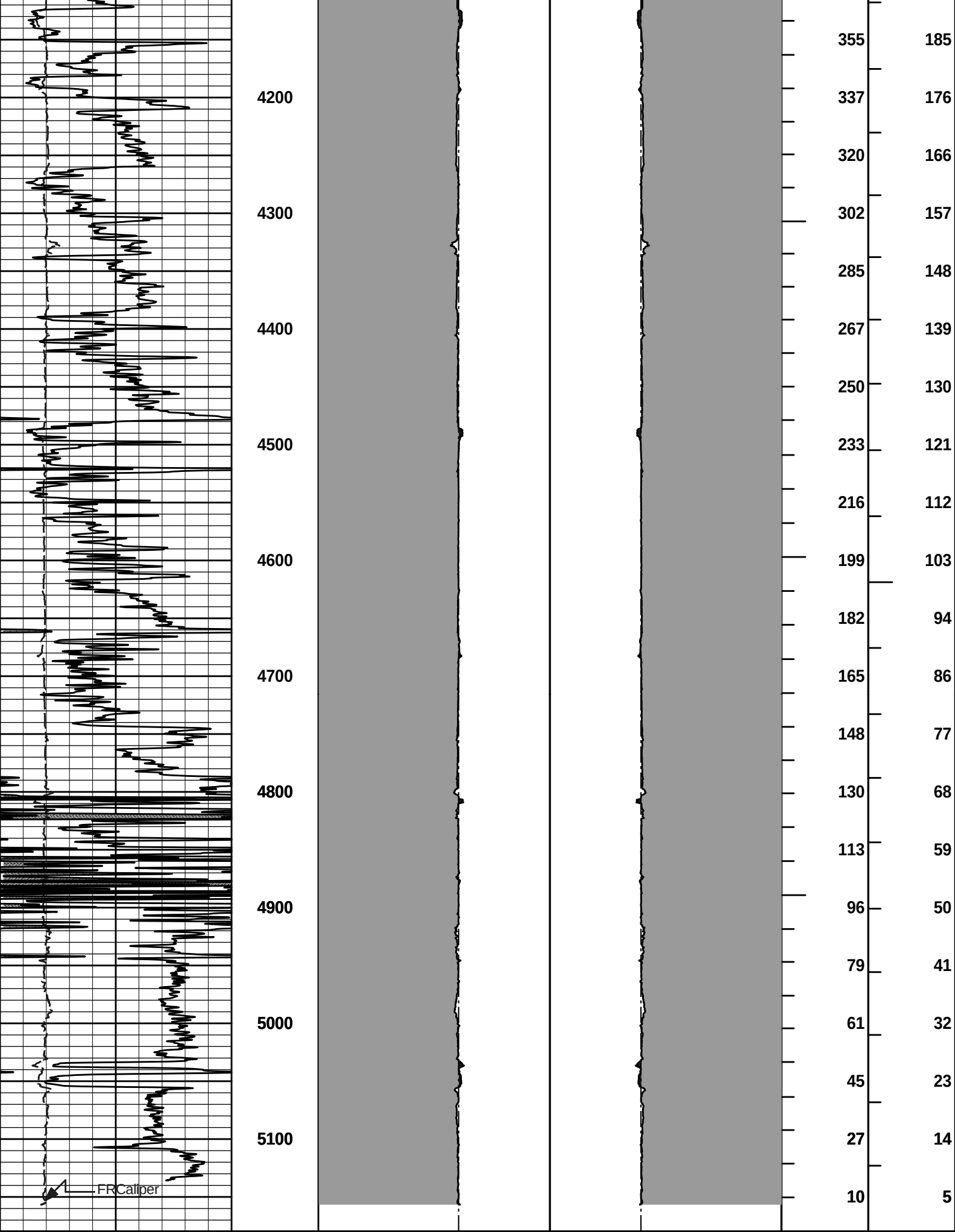
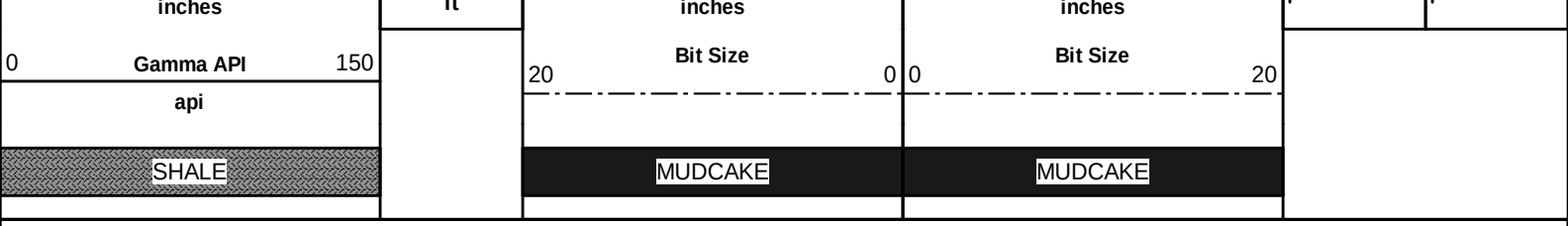



| 6 CALI 16 | 1 : 1200 ft | 20 CALI 0 | 0 CALI 20 | BHVT | AHVT |
|---|---|---|---|---|---|




HALLIBURTON

**Plot Time: 31-May-11 13:28:55**
**Plot Range: 1560 ft to 5179.67 ft**
**Data: PHOENIX_BERRYMN\Well Based\DAQ-0001-003**
**Plot File: \\-LOCAL-\PHOENIX_BERRYMN\0001 GTET-DSN-SDL-ACRT\SDL-DSN\AHV Plot_INSITE_IQ**

# ANNULAR HOLE VOLUME PLOT

## AHV PLOT CALCULATED FOR 5.5" CASING