# HALLIBURTON

# SPECTRAL DENSITY DUAL SPACED NEUTRON LOG

COMPANY **OXY USA INC.**

WELL **GARDEN CITY H-11**

FIELD **GARDEN CITY**

COUNTY **FINNEY** STATE **KANSAS**

COMPANY OXY USA INC.
WELL GARDEN CITY H-11
FIELD GARDEN CITY
COUNTY FINNEY
STATE KANSAS

API No. 15055221910000

Location 620' FSL & 342' FWL
NE SW SW SW

Sect. 23 Twp. 23S Rge. 34W

Other Services:
MICROLOG
ACRT
BSAT

| | | | |
|---|---|---|---|
| Permanent Datum | GL | Elev. 2941.0 ft | Elev.: K.B. 2952.0 ft |
| Log measured from | KB | , 11.0 ft above perm. Datum | D.F. 2951.0 ft |
| Drilling measured from | KB | | G.L. 2941.0 ft |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date | | 11-Jan-13 | | | | | |
| Run No. | | ONE | | | | | |
| Depth - Driller | | 5090.00 ft | | | | | |
| Depth - Logger | | 5024.0 ft | | | | | |
| Bottom - Logged Interval | | 4980.0 ft | | | | | |
| Top - Logged Interval | | 3700.0 ft | | | | | |
| Casing - Driller | | 8.625 in | @ 1800.0 ft | @ | | @ | |
| Casing - Logger | | 1799.0 ft | | | | | |
| Bit Size | | 7.875 in | | @ | | @ | |
| Type Fluid in Hole | | WATER BASED MUD | | | | | |
| Density | Viscosity | 9.4 ppg | 32.00 s/qt | | | | |
| PH | Fluid Loss | 10.40 pH | 15.6 cptm | | | | |
| Source of Sample | | MUD PIT | | | | | |
| Rm @ Meas. Temperature | | 0.470 ohmm | @ 75.00 degF | @ | | @ | |
| Rmf @ Meas. Temperature | | 0.39 ohmm | @ 75.00 degF | @ | | @ | |
| Rmc @ Meas. Temperature | | 0.790 ohmm | @ 75.00 degF | @ | | @ | |
| Source Rmf | Rmc | MEASURED | MEASURED | | | | |
| Rm @ BHT | | 0.29 ohmm | @ 125.0 degF | @ | | @ | |
| Time Since Circulation | | 8.0 hr | | | | | |
| Time on Bottom | | 11-Jan-13 14:22 | | | | | |
| Max. Rec. Temperature | | 125.0 degF | @ 5024.0 ft | @ | | @ | |
| Equipment | Location | 10546696 | LIBERAL | | | | |
| Recorded By | | J. BOLLOM | | | | | |
| Witnessed By | | M. BONNER | | | | | |

Fold here

Service Ticket No.: 900131775 API Serial No.: 15055221910000 PGM Version: WL INSITE R3.6.0 (Build 3)

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. | ONE | Run No. | | Run No. | ONE | Run No. | ONE |
| Serial No. | 11048627 | Serial No. | | Serial No. | 10865884 | Serial No. | 11055304 |
| Model No. | GTET | Model No. | | Model No. | SDLT-I | Model No. | DSNT-I |
| Diameter | 3.625" | No. of Cent. | | Diameter | 4.5" | Diameter | 3.625" |
| Detector Model No. | GTET | Spacing | | Log Type | GAM-GAM | Log Type | NEU-NEU |
| Type | SCINT | | | Source Type | CS137 | Source Type | AM241BE |
| Length | 8' | LSA [Y/N] | | Serial No. | 5168GW | Serial No. | DSN-424 |
| Distance to Source | 10' | FWDA [Y/N ] | | Strength | 1.5 CI | Strength | 15 CI |

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 | |
| ONE | 5024 | 3700 | REC | 0 | 150 | | | | 30 | -10 | 2.71 | 30 | -10 | LIME |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

DIRECTIONAL INFORMATION

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

Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 5.5-INCH CASING

CHLORIDES REPORTED AT 16,000 MG/L

GTET-DSNT-SDLT-BSAT-ACRT RUN IN COMBINATION

TODAY'S CREW: B. TERRELL & F. VILLA

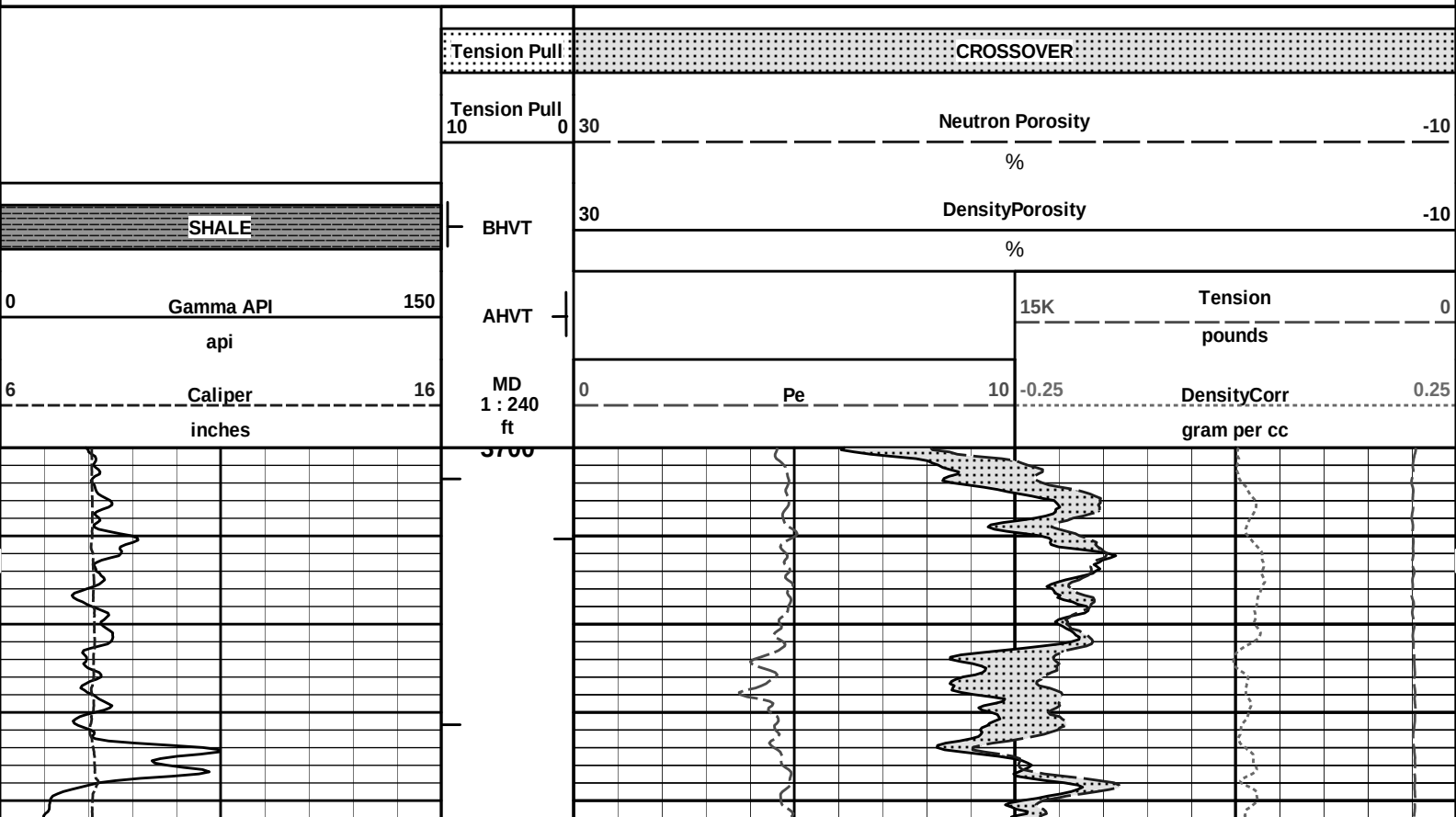
THANK YOU FOR CHOOSING HALLIBURTON ENERGY SOURCES LIBERAL, KS. 620-624-8123

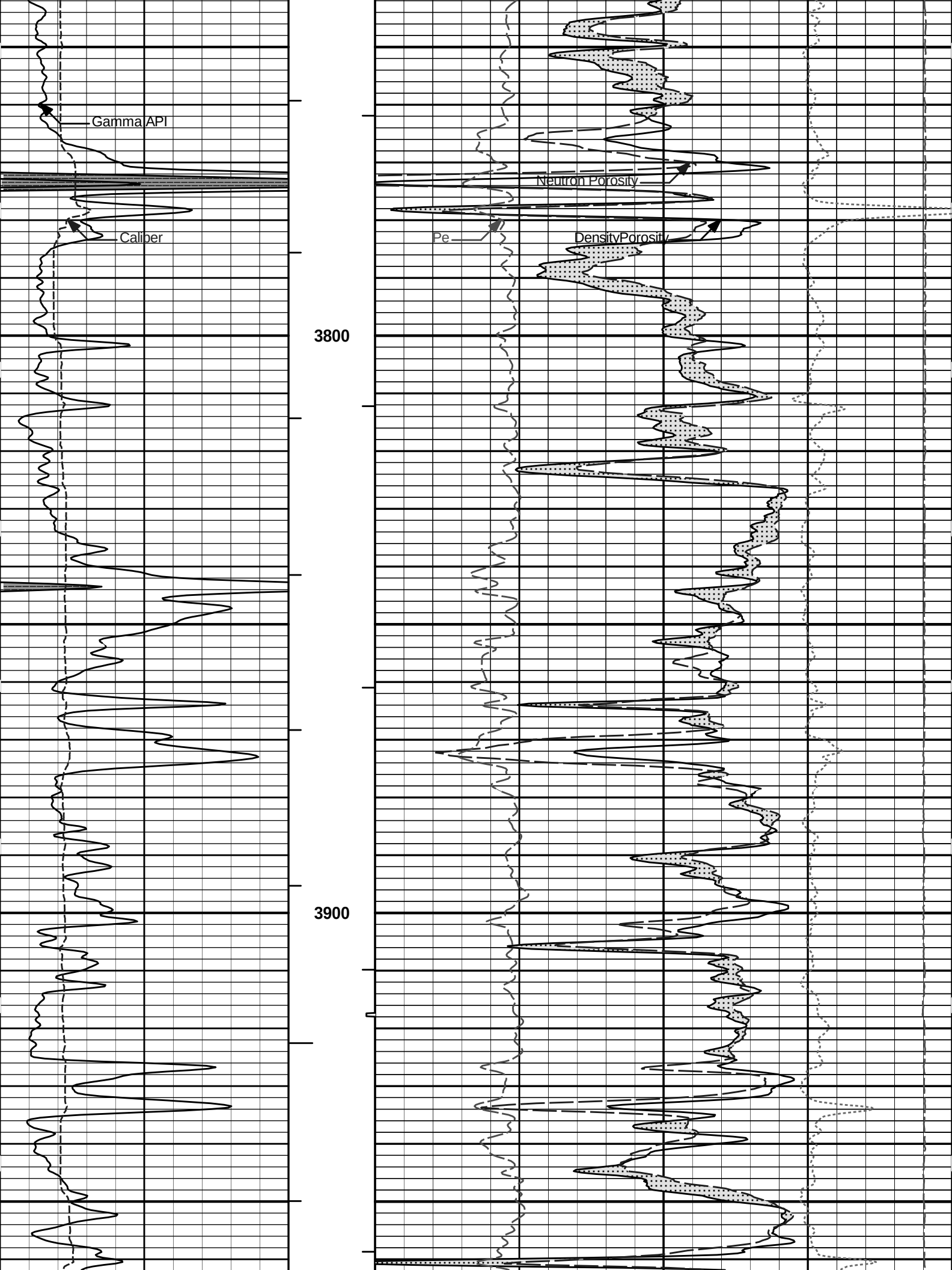


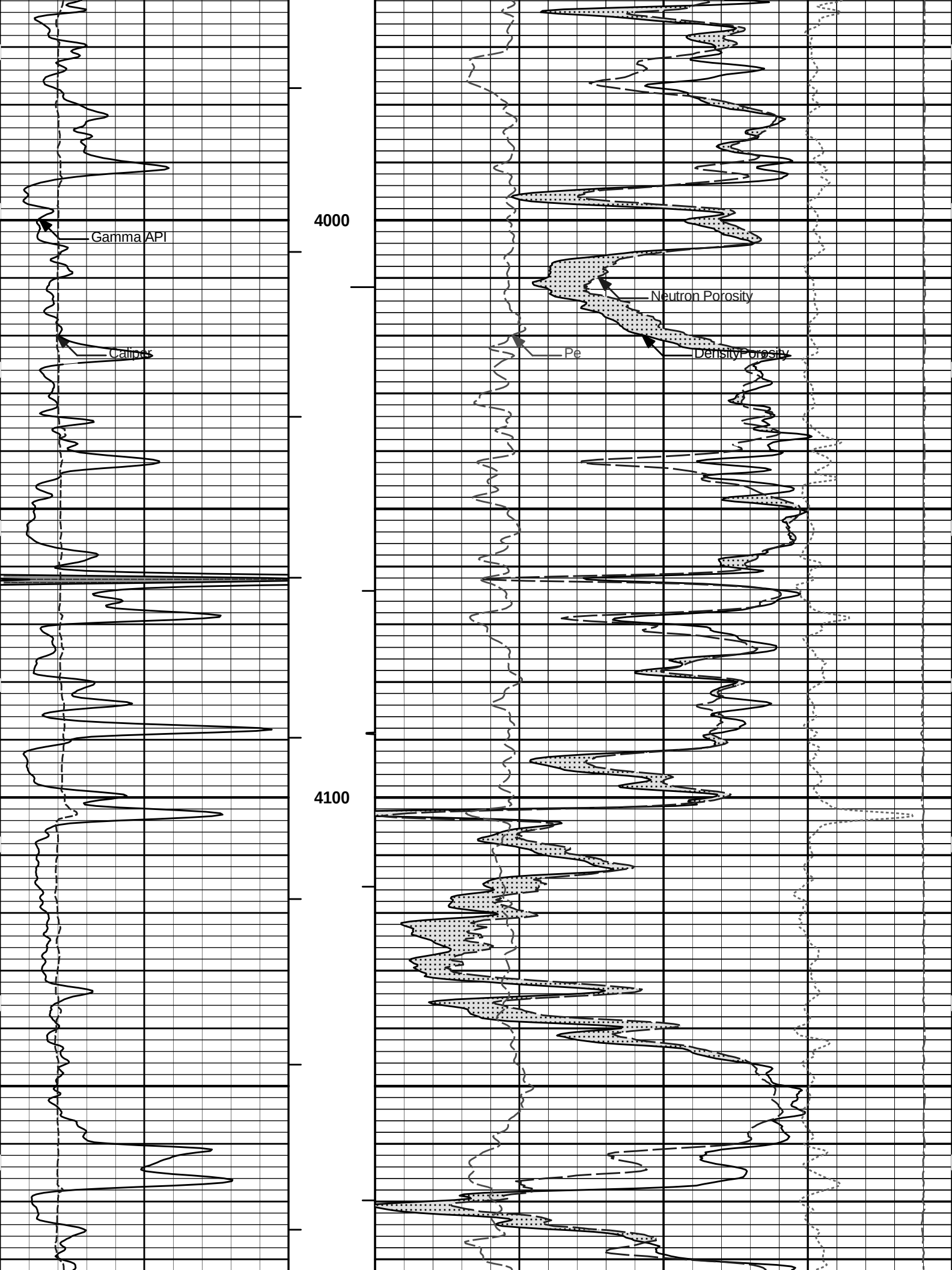
HALLIBURTON

**Plot Time: 11-Jan-13 16:32:11**
**Plot Range: 3700 ft to 5028.83 ft**
**Data: GARDEN_CITY_H11\Well Based\DETAIL**
**Plot File: \\PORO\Poro_IQ_5_MAIN_LIB**

# 5 INCH MAIN LOG




Gamma API
Caliber
Neutron Porosity
Pe
DensityPorosity
3800
3900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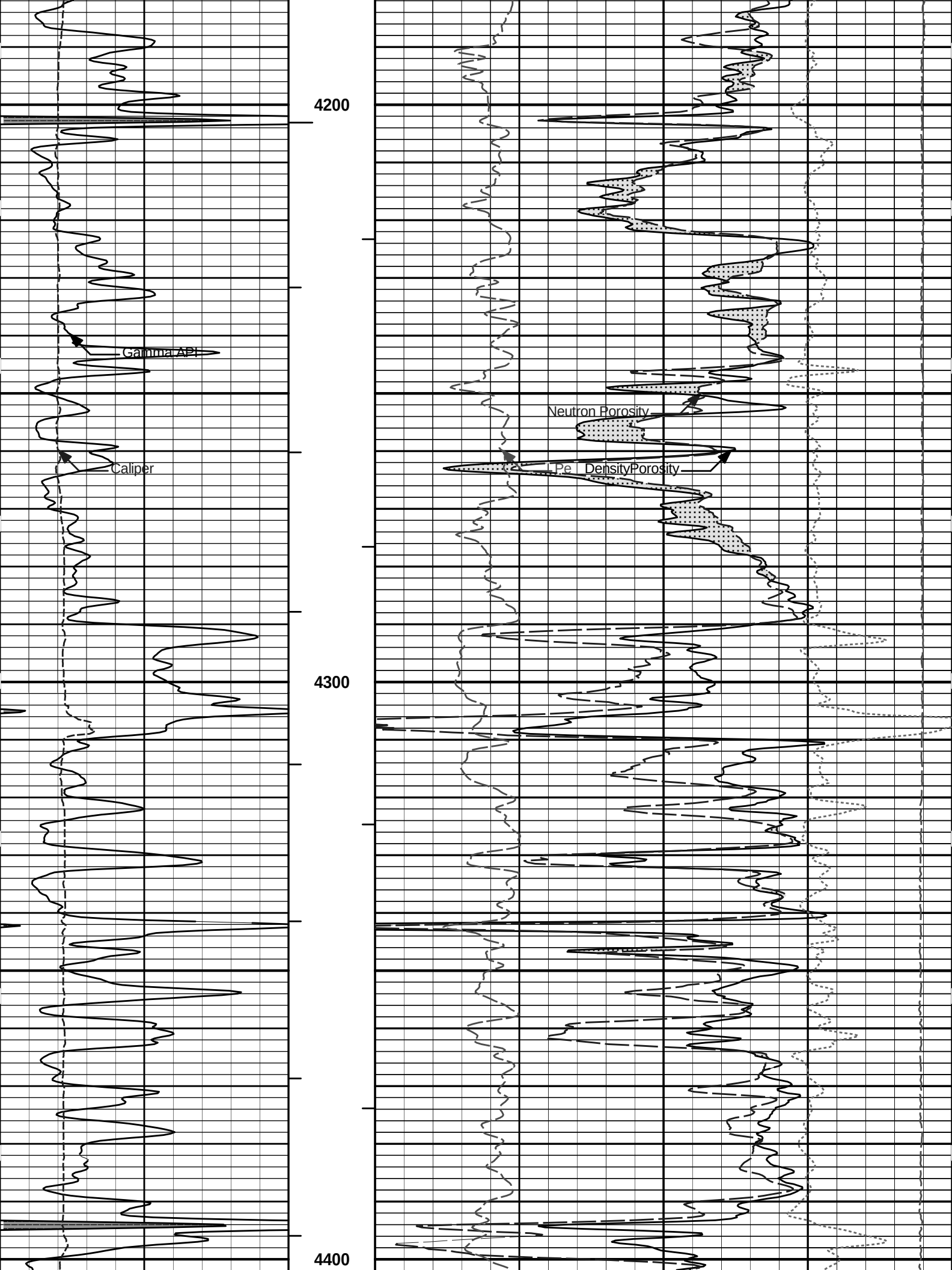
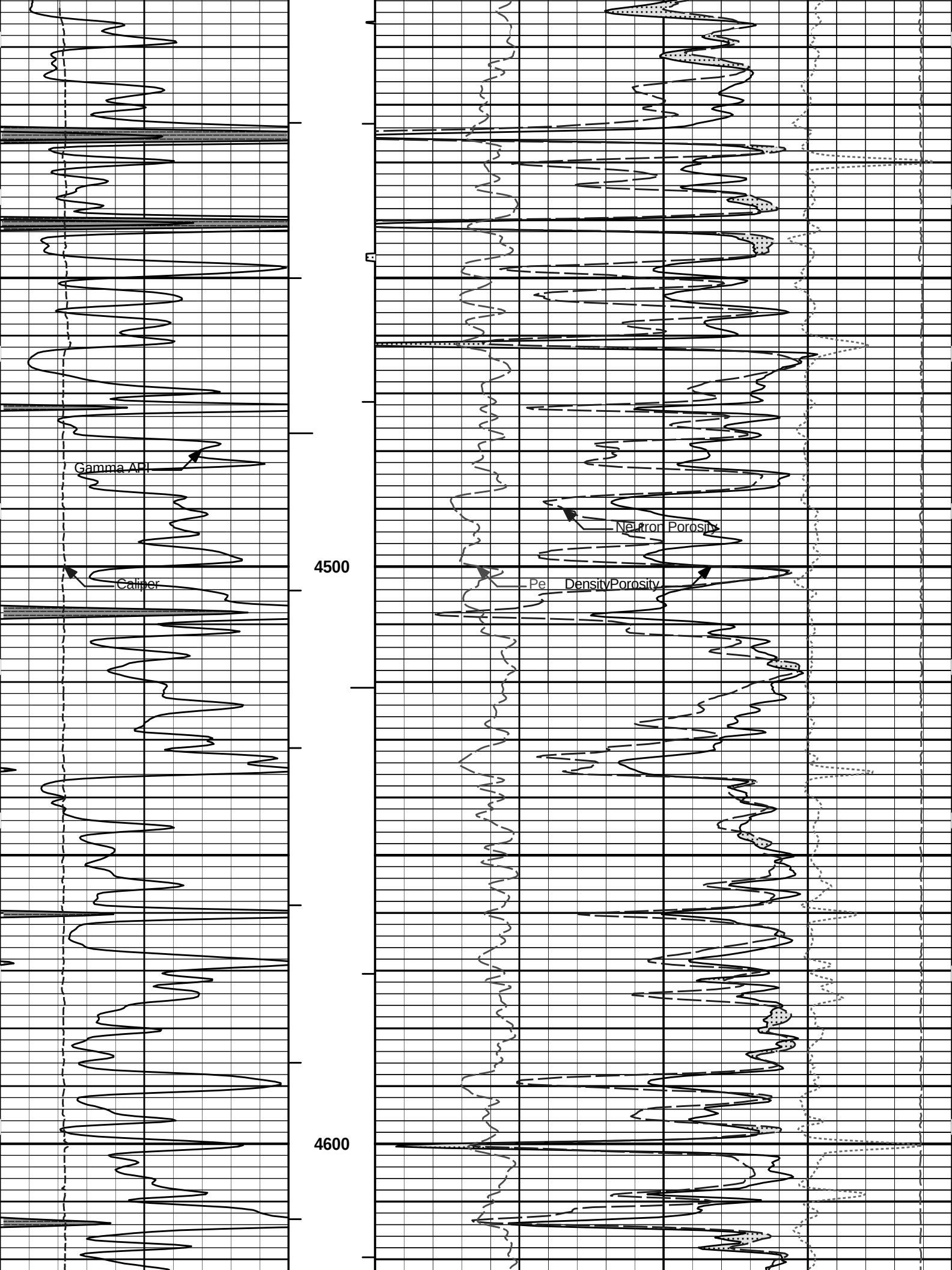
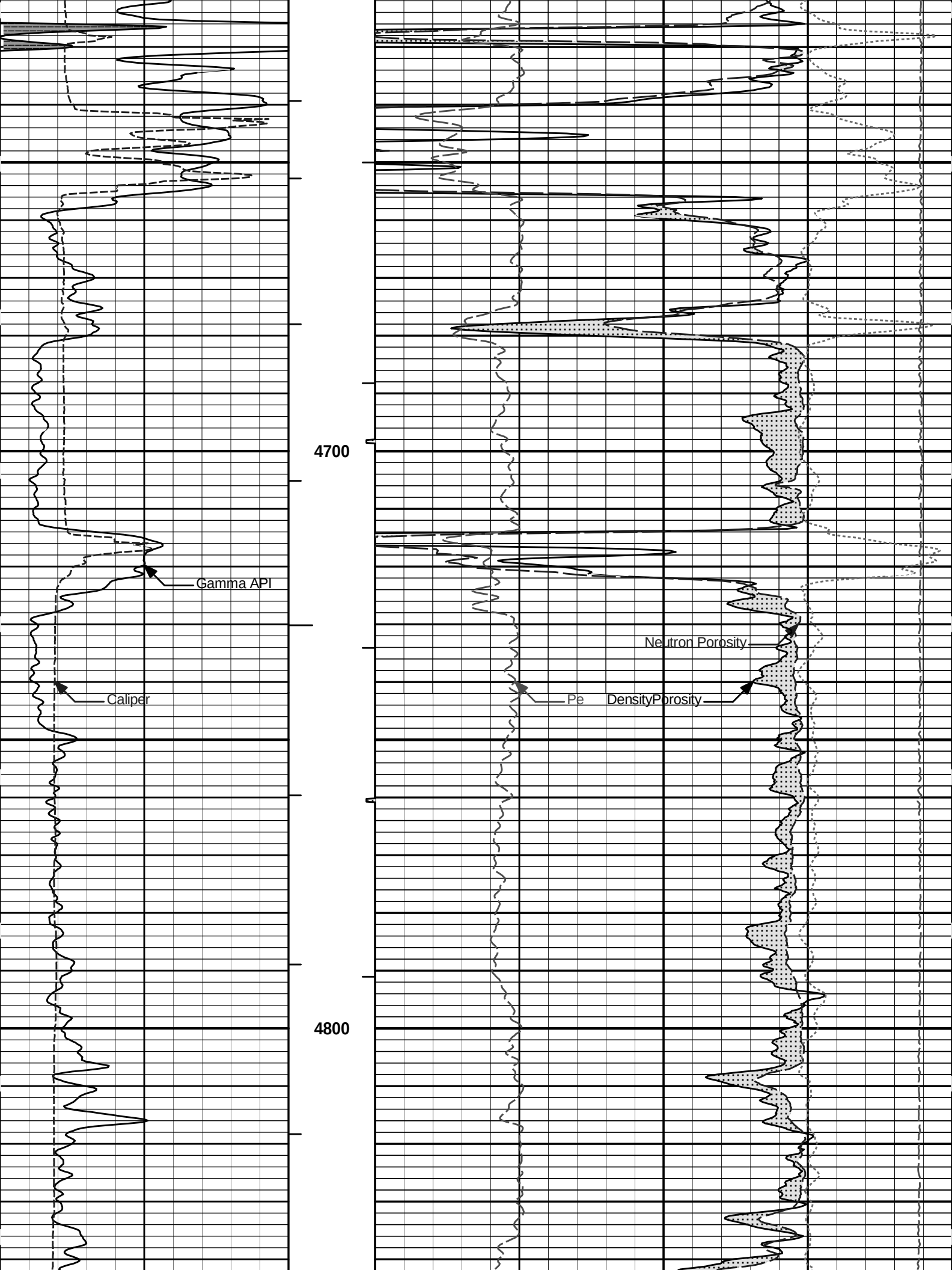
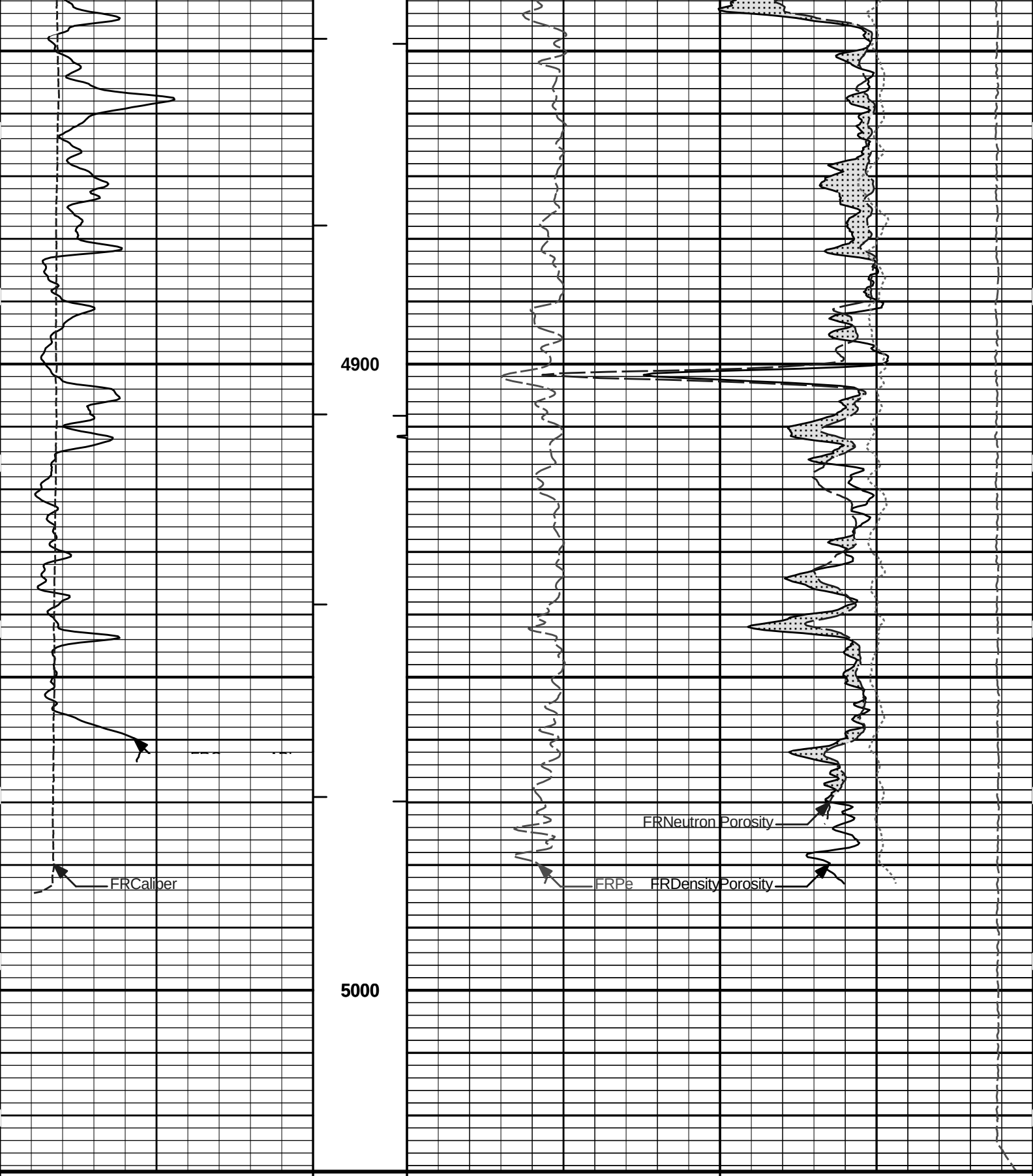
Caliper
4000
Neutron Porosity
Pe
DensityPorosity
4100


4200
4300
4400
Gamma API
Caliper
Neutron Porosity
Pe
DensityPorosity


Gamma API
Caliper
Neutron Porosity
Pe
DensityPorosity
4500
4600


4700
4800
Gamma API
Caliper
Neutron Porosity
Pe
DensityPorosity




| | | |
|---|---|---|
| 6 Caliper 16<br>inches | MD<br>1 : 240<br>ft | 0 Pe 10 \| -0.25 DensityCorr 0.25<br>gram per cc |
| 0 Gamma API 150<br>api | AHVT | 15K Tension 0<br>pounds |
| SHALE | BHVT | 30 DensityPorosity -10<br>% |
| | Tension Pull | Neutron Porosity |

10 0 | 30 Neutron Porosity -10

%

Tension Pull | CROSSOVER

HALLIBURTON

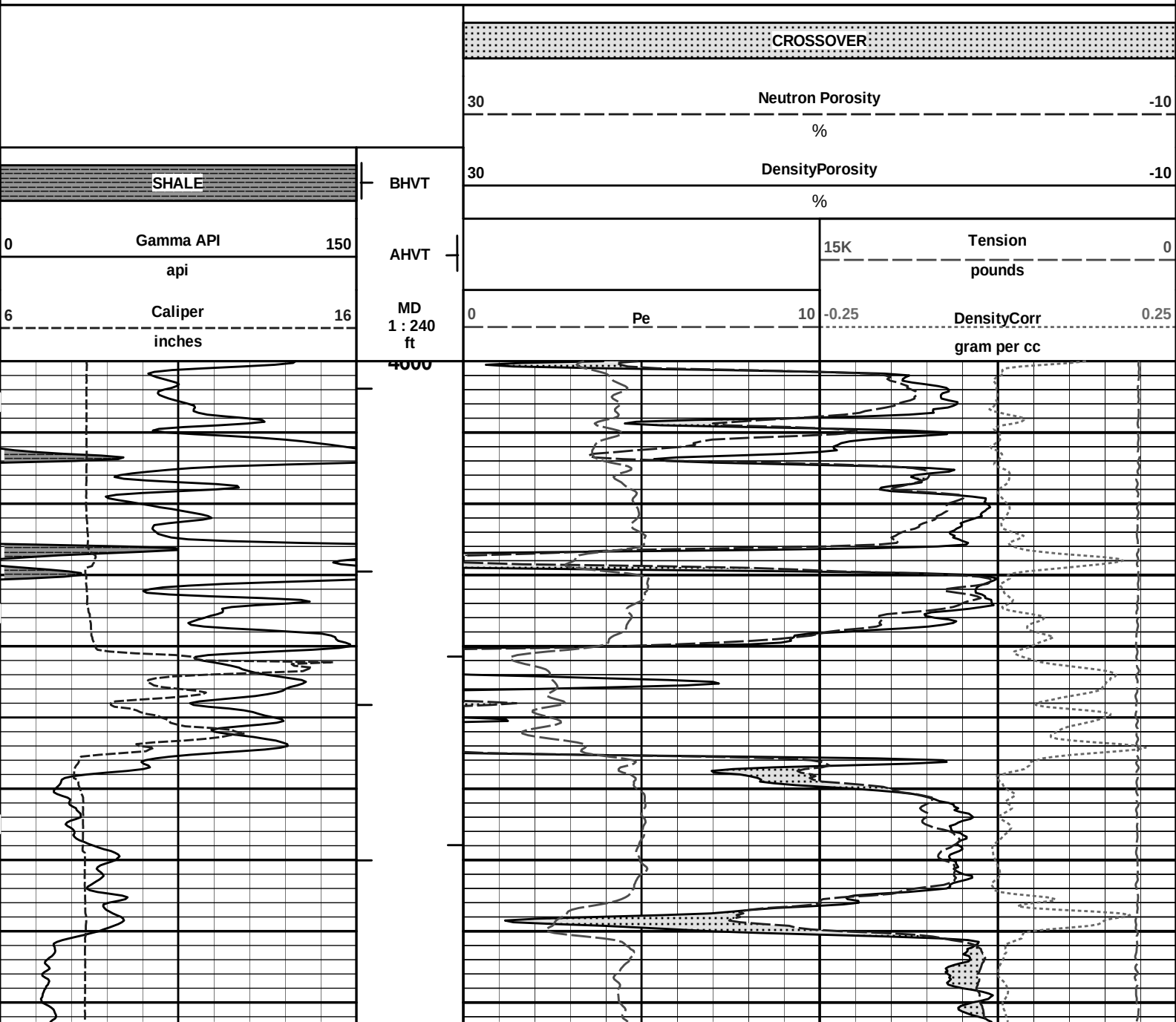
Plot Time: 11-Jan-13 16:32:14
Plot Range: 3700 ft to 5028.83 ft
Data: GARDEN_CITY_H11\Well Based\DETAIL\
Plot File: \\PORO\Poro_IQ_5_MAIN_LIB

# 5 INCH MAIN LOG

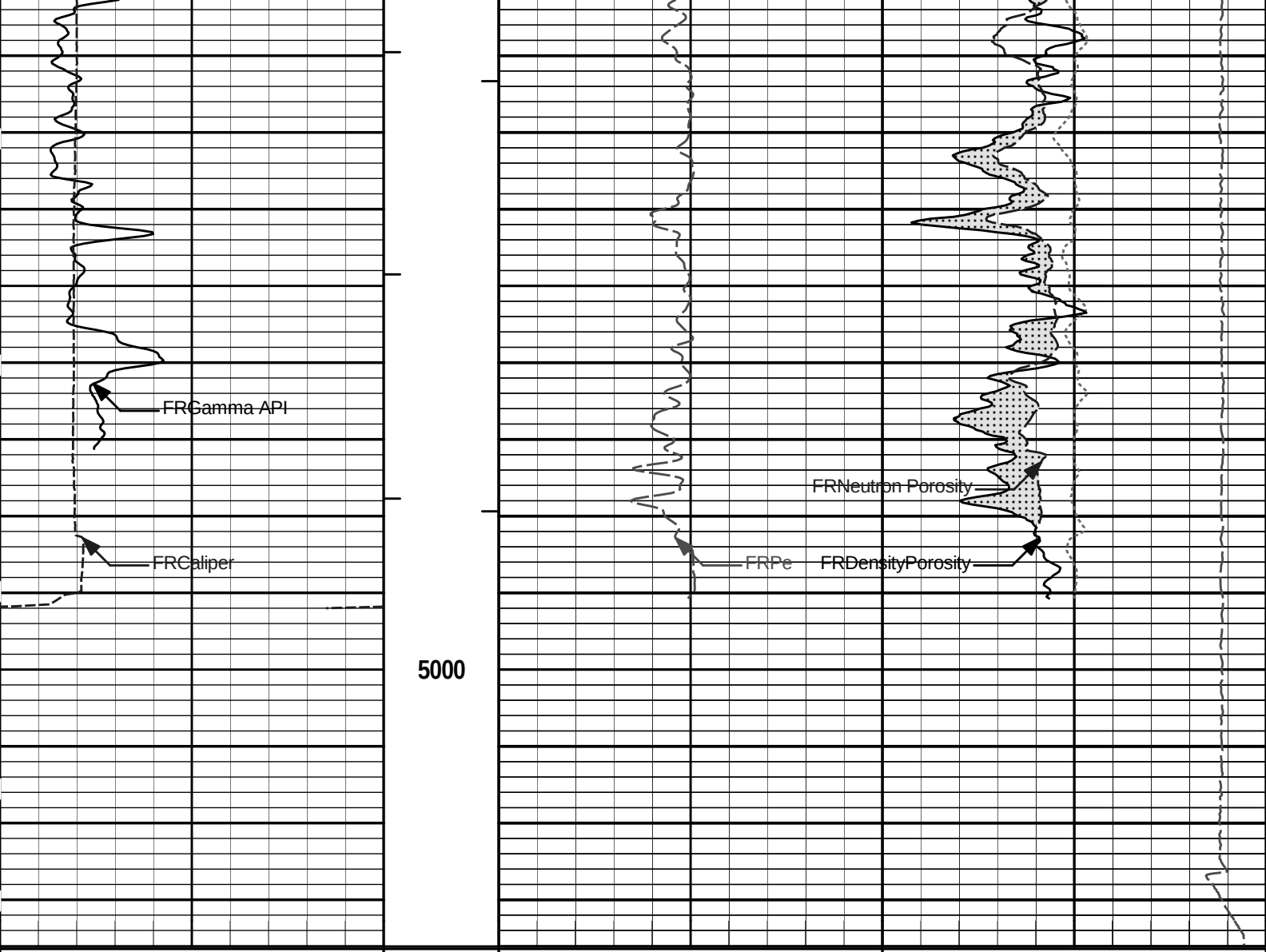
HALLIBURTON

Plot Time: 11-Jan-13 16:32:15
Plot Range: 4600 ft to 5036.08 ft
Data: GARDEN_CITY_H11\Well Based\REPEAT\
Plot File: \\PORO\Poro_IQ_5_REP_LIB

# REPEAT SECTION




4700
Gamma API
Caliper
Neutron Porosity
Pe
DensityPorosity
4800
4900




| | | |
|---|---|---|
| 6 Caliper 16<br>inches | MD<br>1 : 240<br>ft | 0 Pe 10 \| -0.25 DensityCorr 0.25<br>gram per cc |
| 0 Gamma API 150<br>api | AHVT | 15K Tension 0<br>pounds |
| SHALE | BHVT | 30 DensityPorosity -10<br>% |
| | | 30 Neutron Porosity -10<br>% |
| | | CROSSOVER |

HALLIBURTON

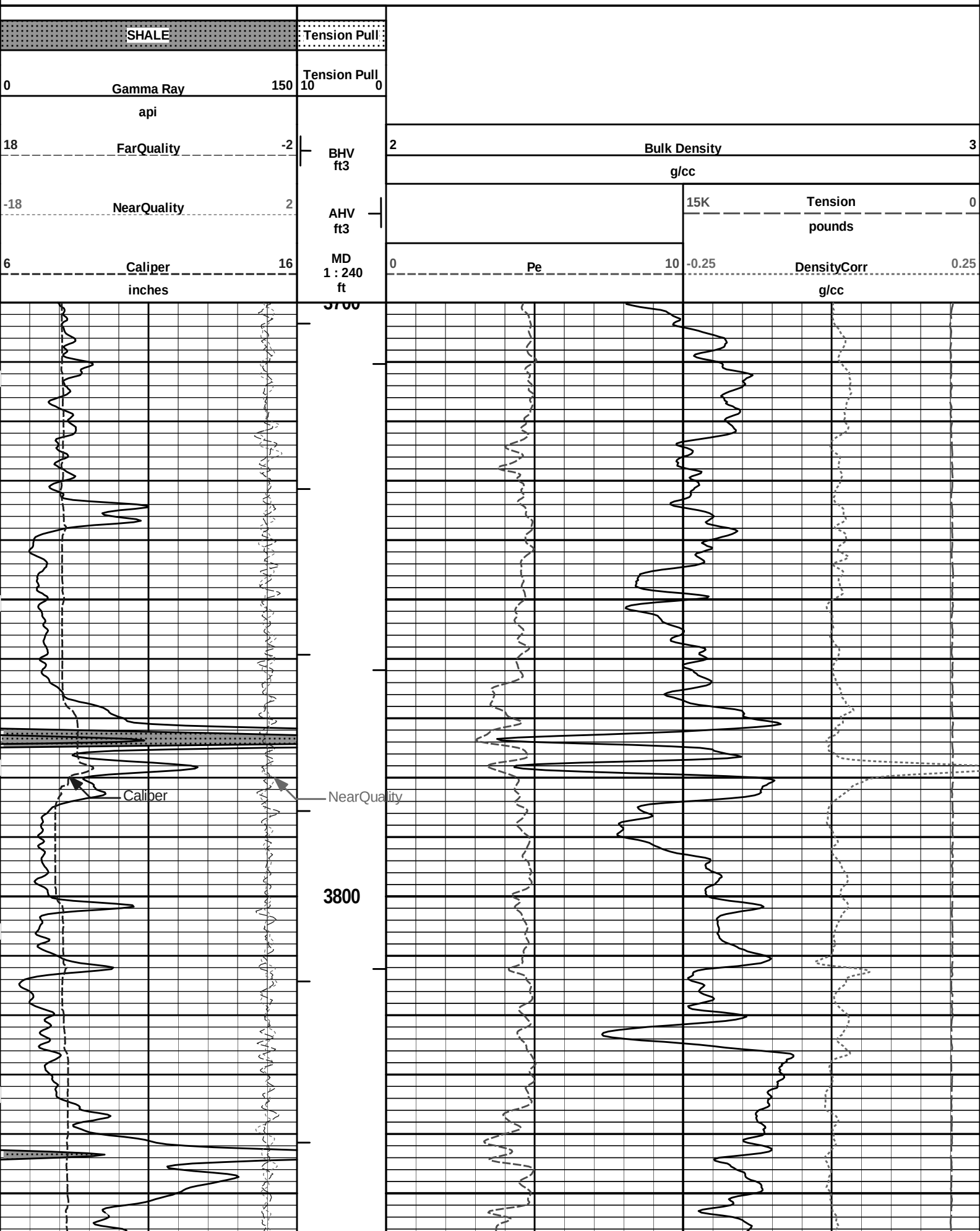
Plot Time: 11-Jan-13 16:32:16
Plot Range: 4600 ft to 5036.08 ft
Data: GARDEN_CITY_H11\Well Based\REPEAT\
Plot File: \\PORO\Poro_IQ_5_REP_LIB

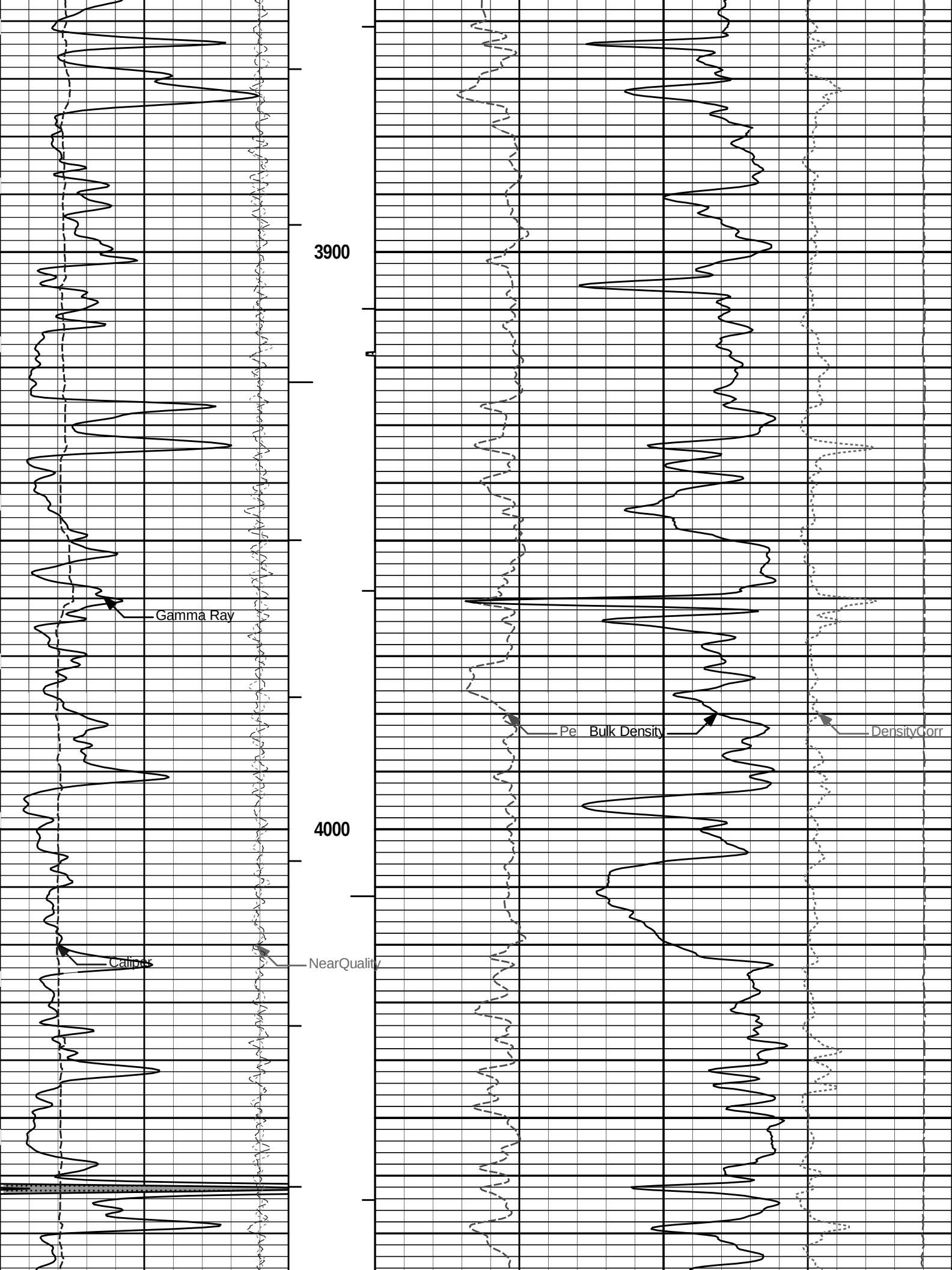
# REPEAT SECTION

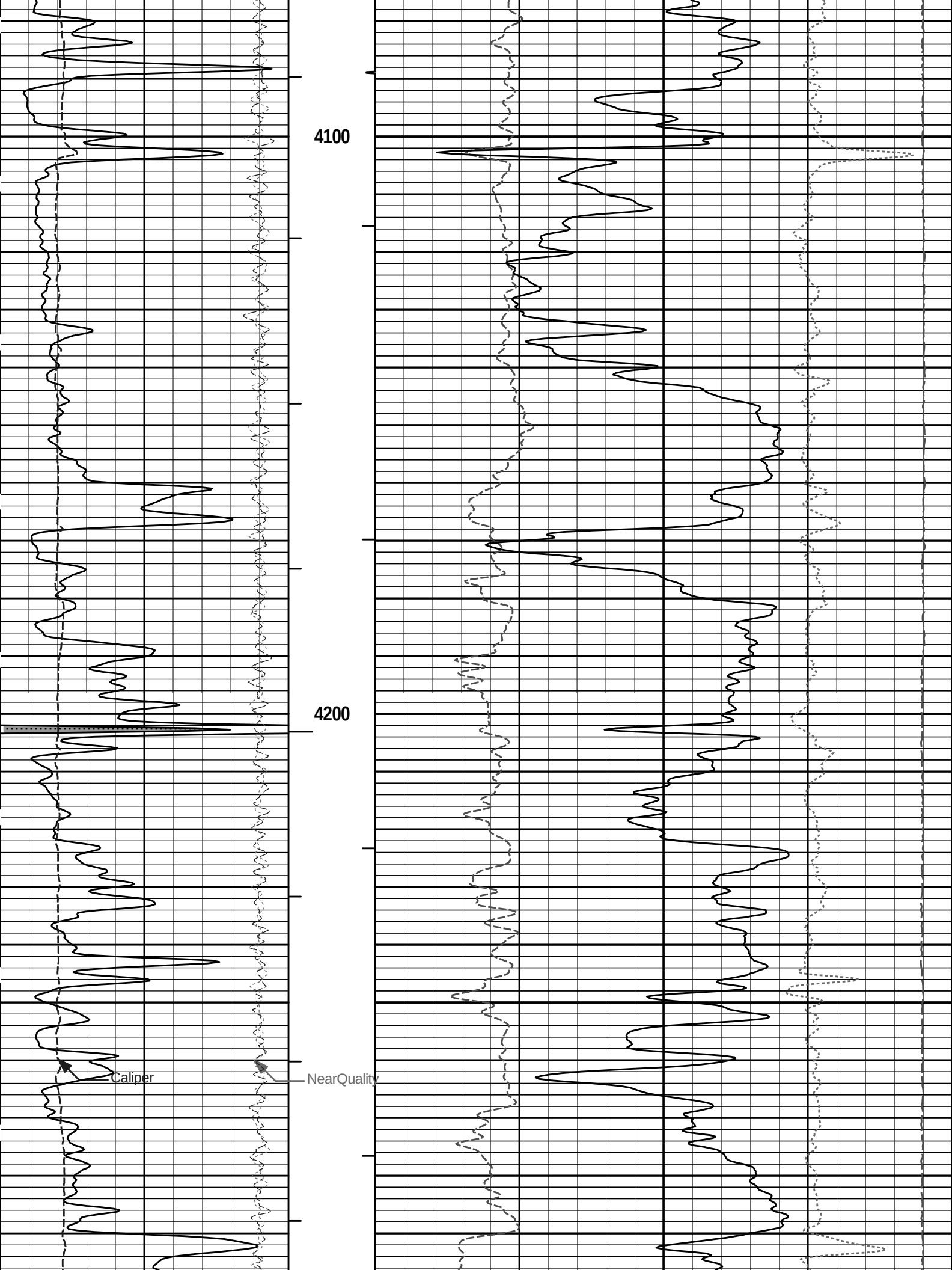
HALLIBURTON

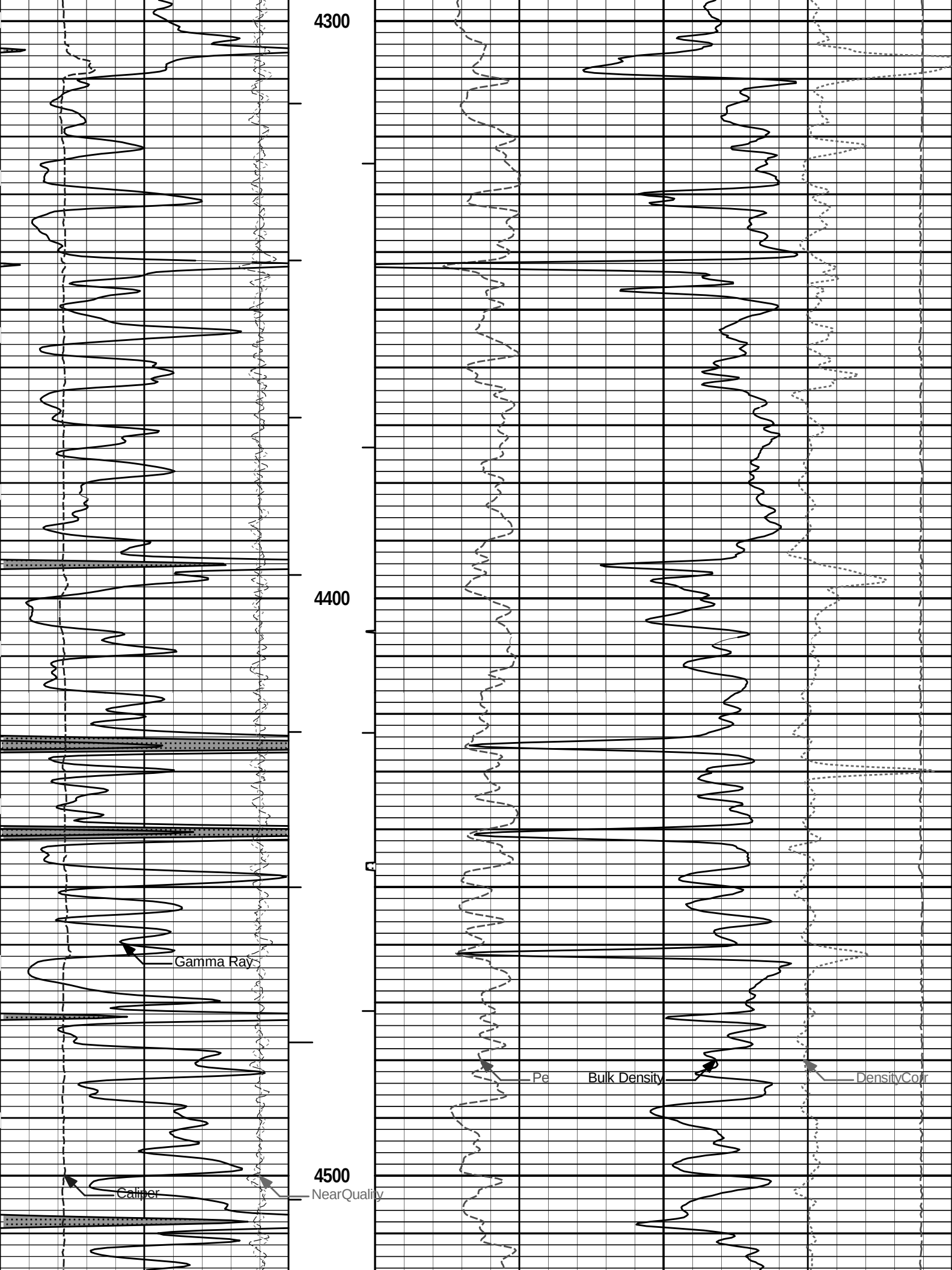
Plot Time: 11-Jan-13 16:32:16
Plot Range: 3700 ft to 5028.83 ft
Data: GARDEN_CITY_H11\Well Based\DETAIL\
Plot File: \\-LOCAL-\GARDEN_CITY_H11\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CH\PORO\BULKD_5_MAIN_LIB

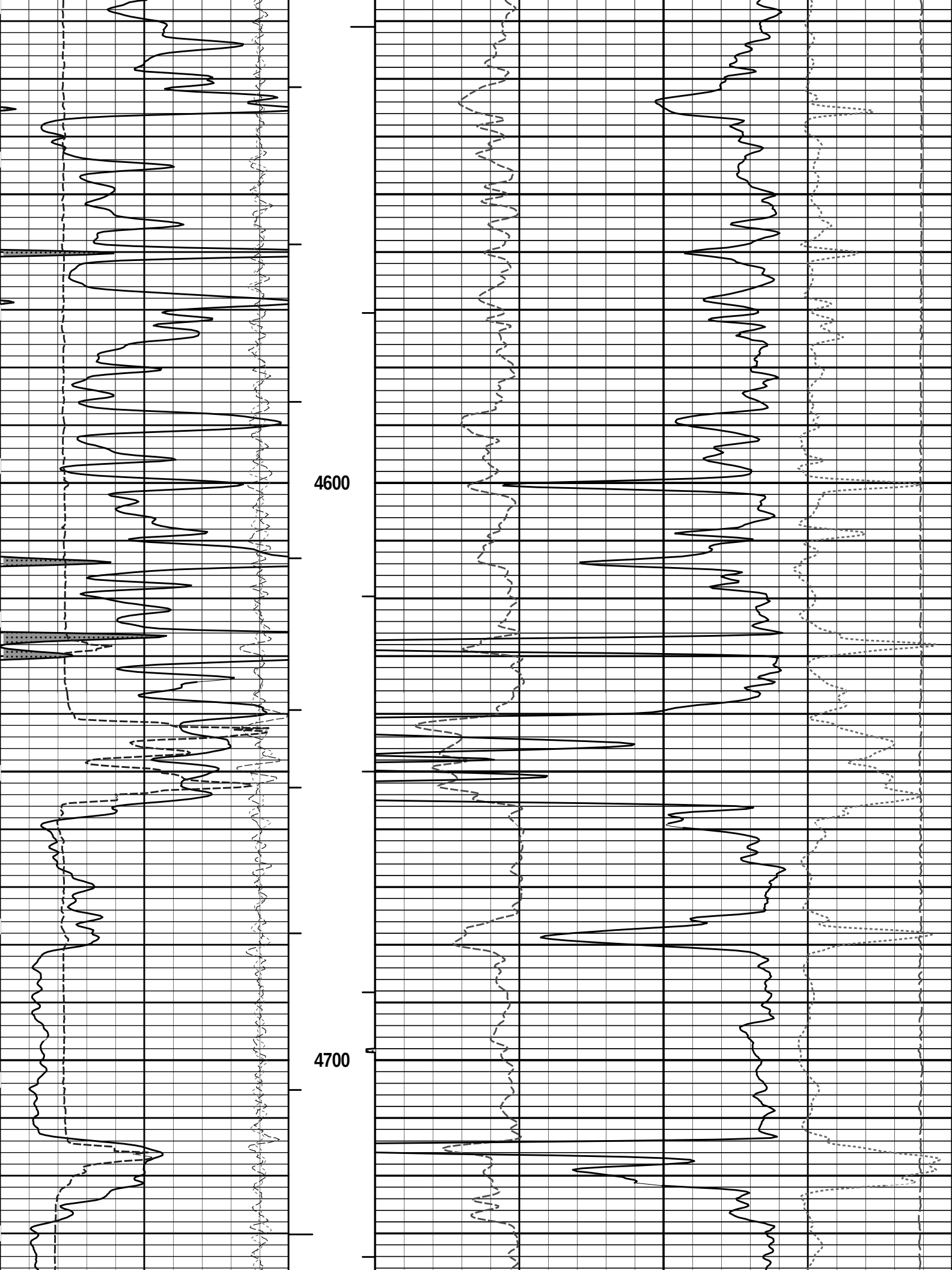
# 5 INCH MAIN LOG

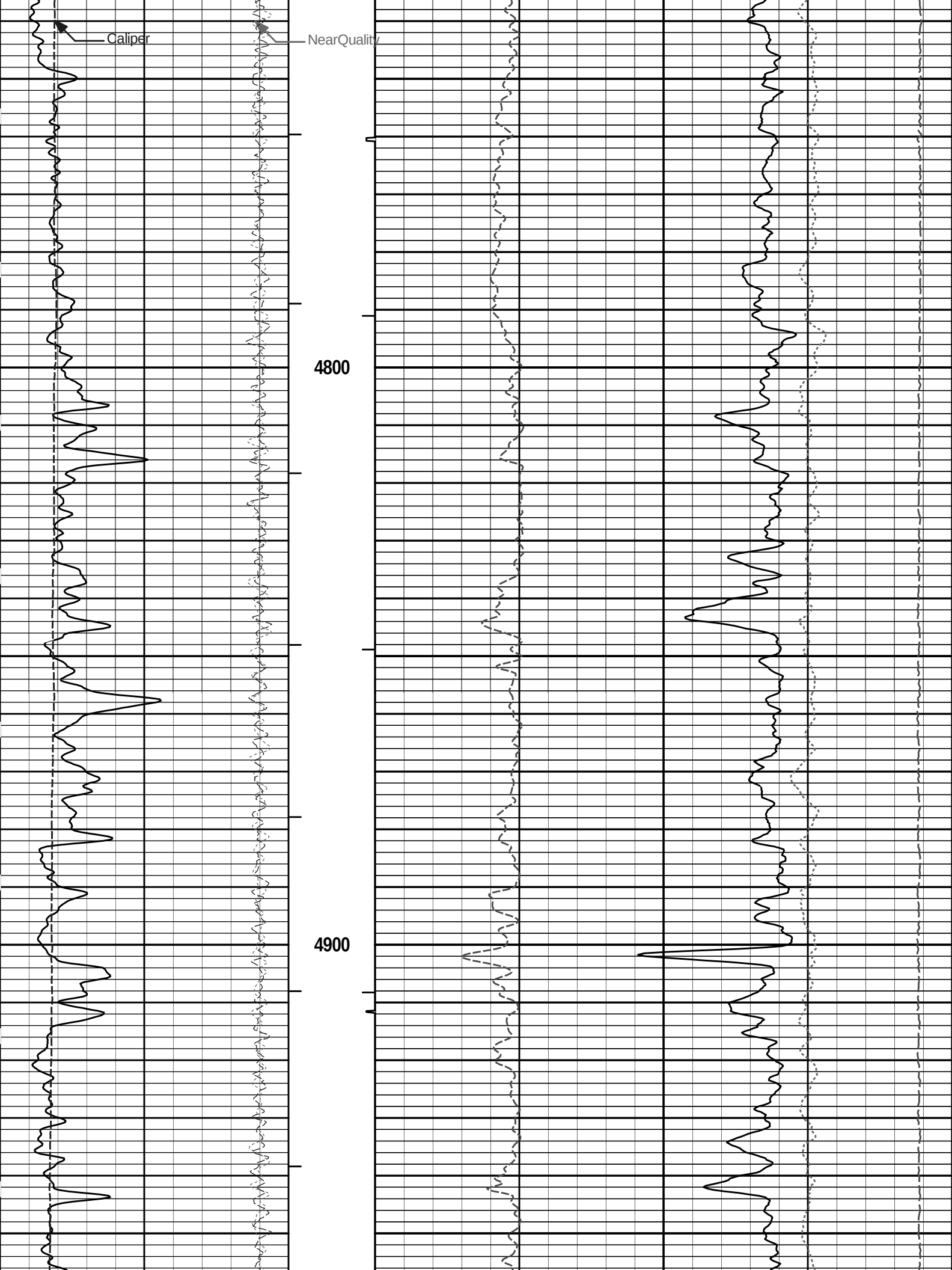


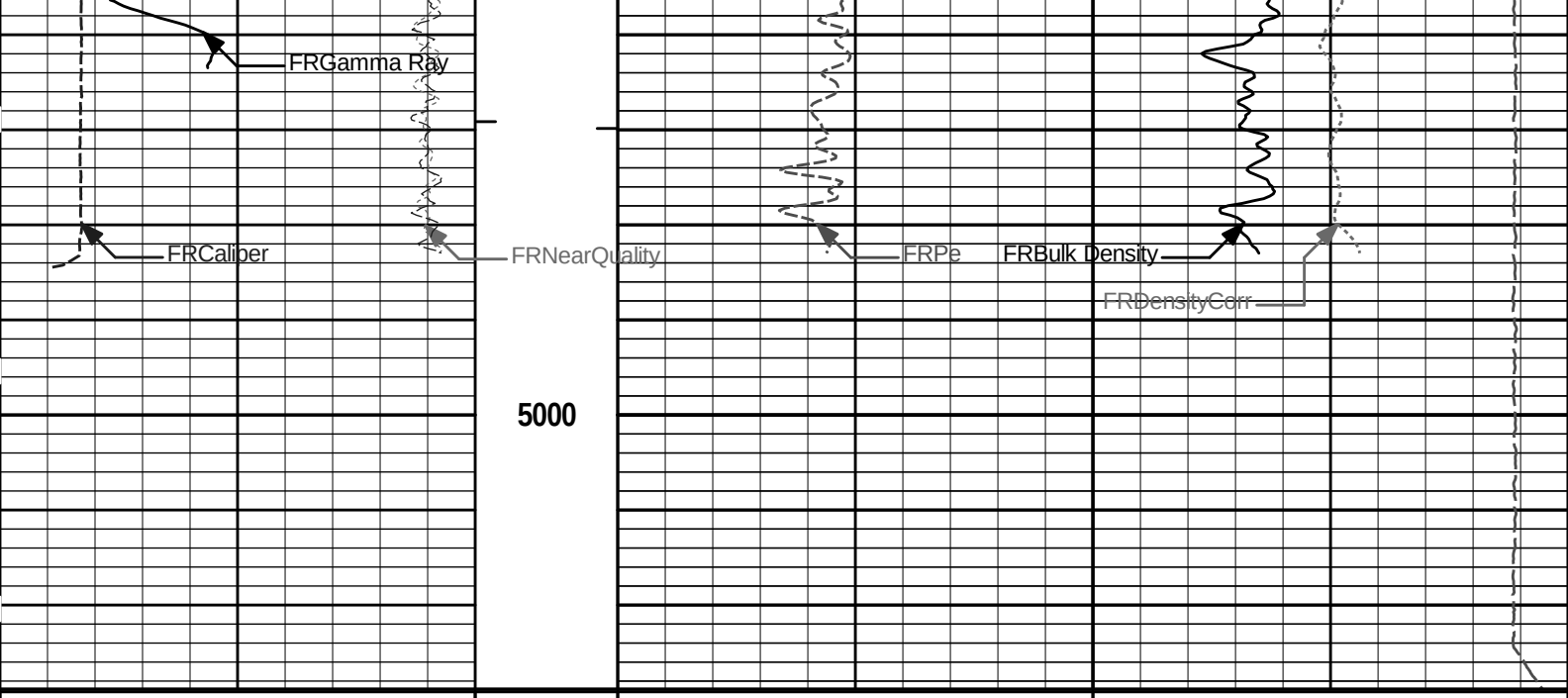

3900
4000
Gamma Ray
Caliper
NearQuality
Pe
Bulk Density
DensityCorr


4100
4200
Caliper
NearQuality


4300
4400
4500
Gamma Ray
Caliper
NearQuality
Pe
Bulk Density
DensityCorr


4600
4700


Caliper
NearQuality
4800
4900




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

HALLIBURTON

Plot Time: 11-Jan-13 16:32:18
Plot Range: 3700 ft to 5028.83 ft
Data: GARDEN_CITY_H11\Well Based\DETAIL\
Plot File: \\-LOCAL-\GARDEN_CITY_H11\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CH\PORO\BULKD_5_MAIN_LIB

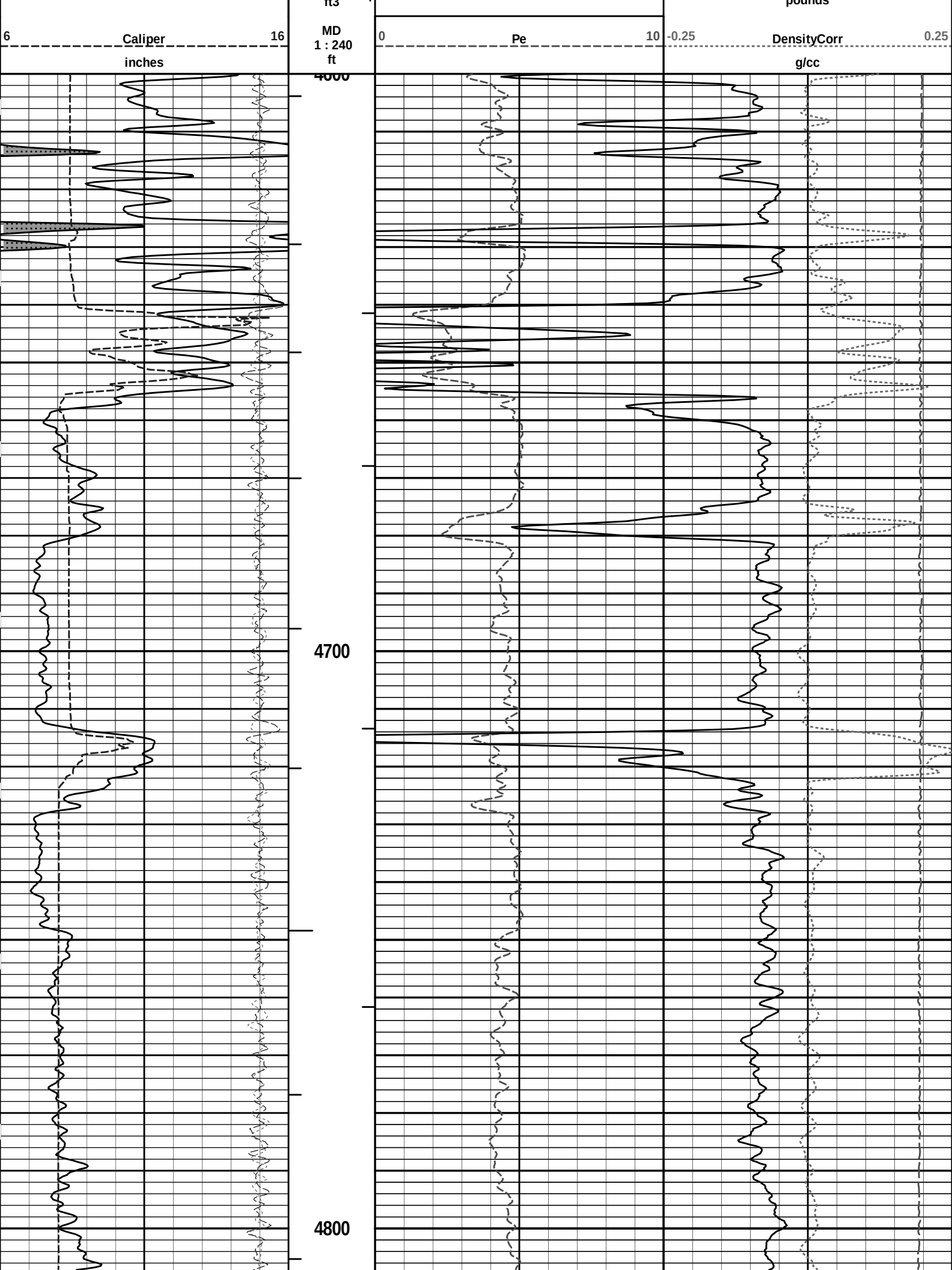
# 5 INCH MAIN LOG

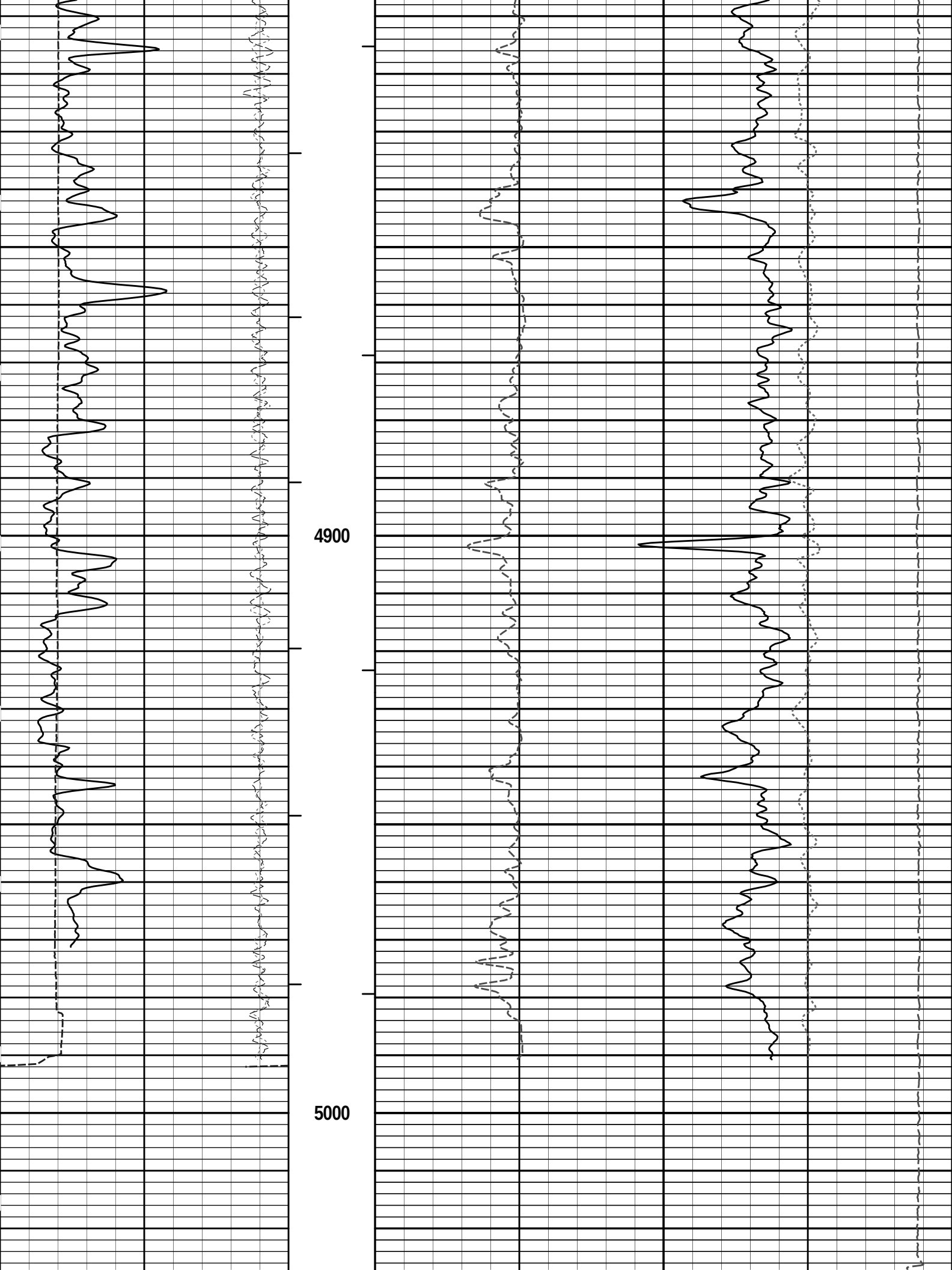
HALLIBURTON

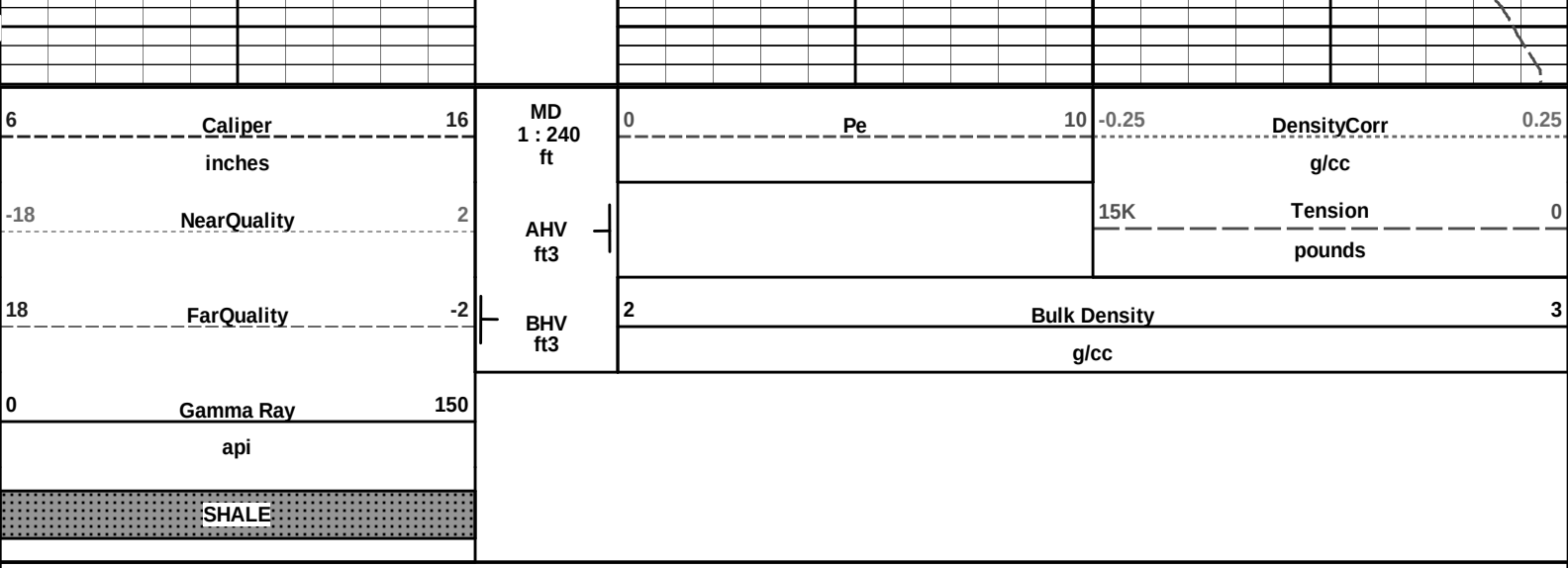
Plot Time: 11-Jan-13 16:32:19
Plot Range: 4600 ft to 5036.08 ft
Data: GARDEN_CITY_H11\Well Based\REPEAT\
Plot File: \\-LOCAL-\GARDEN_CITY_H11\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CH\PORO\BULKD_5_REP_LIB

# REPEAT SECTION

| | | |
|---|---|---|
| SHALE | | |
| 0 Gamma Ray 150<br>api | | |
| 18 FarQuality -2 | BHV<br>ft3 | 2 Bulk Density 3<br>g/cc |
| -18 NearQuality 2 | AHV<br>ft3 | 15K Tension 0<br>pounds |


ft3
6
Caliper
16
inches
MD
1 : 240
ft
0
Pe
10
pounds
-0.25
DensityCorr
0.25
g/cc
4700
4800


4900
5000




HALLIBURTON

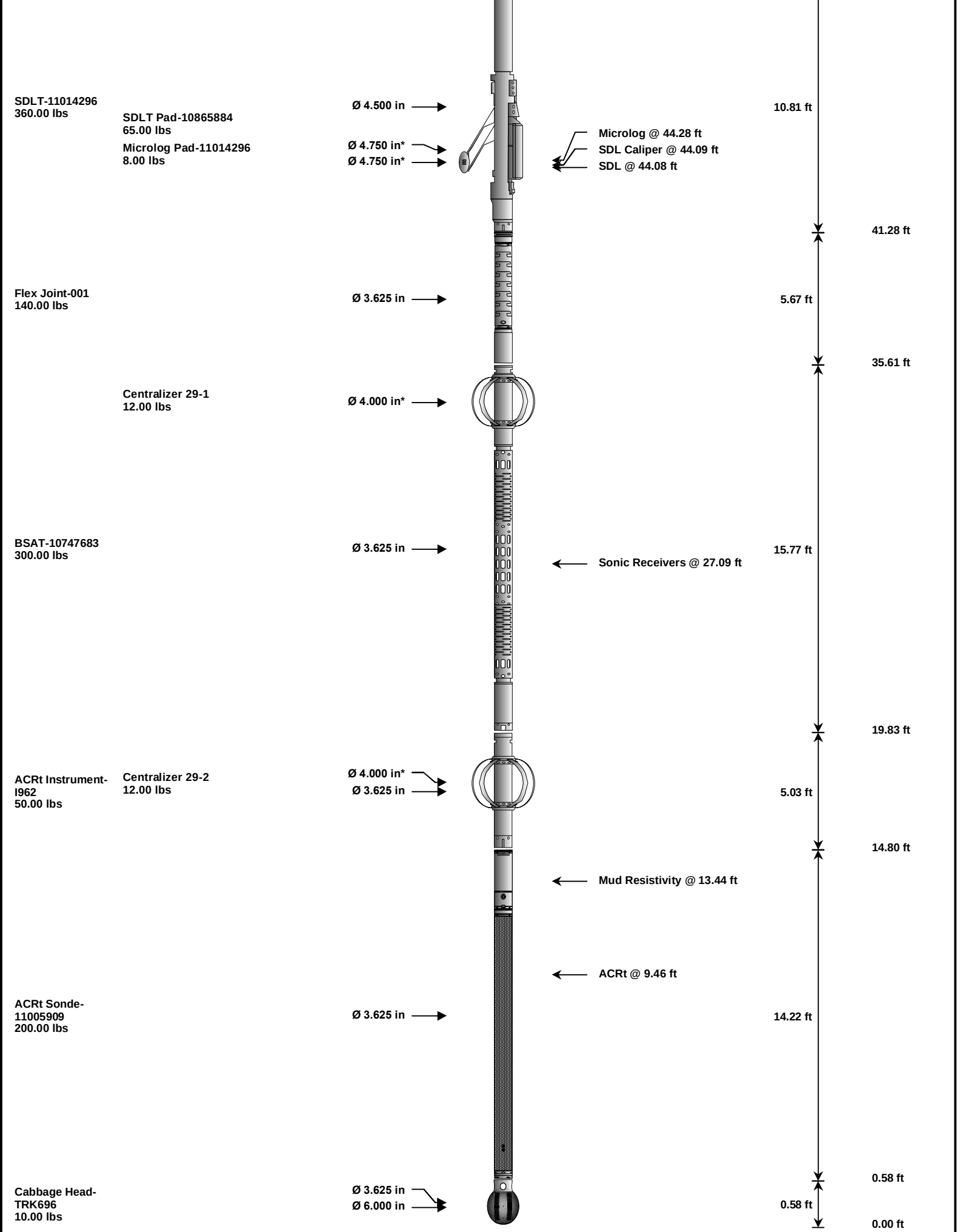
Plot Time: 11-Jan-13 16:32:20
Plot Range: 4600 ft to 5036.08 ft
Data: GARDEN_CITY_H11\Well Based\REPEAT\
Plot File: \\-LOCAL-\GARDEN_CITY_H11\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CH\PORO\BULKD_5_REP_LIB

# REPEAT SECTION

HALLIBURTON

## TOOL STRING DIAGRAM REPORT

| Description | Overbody Description | O.D. | Diagram | Sensors @ Delays | Length | Accumulated Length |
|---|---|---|---|---|---|---|
| | | | | | | 77.06 ft |
| CH_HOS-CH_696<br>37.50 lbs | | Ø 2.750 in | | Temperature @ 76.03 ft | 3.03 ft | |
| | | | | | | 74.03 ft |
| SP Sub-11441455<br>60.00 lbs | | Ø 3.625 in | | SP @ 72.26 ft | 3.74 ft | |
| | | | | | | 70.30 ft |
| GTET-11048627<br>165.00 lbs | | Ø 3.625 in | | | 8.52 ft | |
| | | | | GammaRay @ 64.23 ft | | |
| | | | | | | 61.78 ft |
| | DSN Decentralizer-<br>11019643<br>6.60 lbs | Ø 5.000 in* | | | | |
| DSNT-11055304<br>174.00 lbs | | Ø 3.625 in | | | 9.69 ft | |
| | | | | DSN Far @ 54.84 ft<br>DSN Near @ 54.09 ft | | |
| | | | | | | 52.09 ft |




| Mnemonic | Tool Name | Serial Number | Weight (lbs) | Length (ft) | Accumulated Length (ft) | Max.Log. Speed (fpm) |
|---|---|---|---|---|---|---|
| SDLT | SDLT-11014296 | 11014296 | 360.00 | 10.81 | 10.81 | 3600 |
| SDLT Pad | SDLT Pad-10865884 | 10865884 | 65.00 | | | |
| Microlog Pad | Microlog Pad-11014296 | 11014296 | 8.00 | | | |
| Flex Joint | Flex Joint-001 | 001 | 140.00 | 5.67 | 41.28 | |
| Centralizer 29-1 | Centralizer 29-1 | 29-1 | 12.00 | | | |
| BSAT | BSAT-10747683 | 10747683 | 300.00 | 15.77 | 35.61 | |
| Centralizer 29-2 | Centralizer 29-2 | 29-2 | 12.00 | | | |
| ACRt Instrument | ACRt Instrument-I962 | I962 | 50.00 | 5.03 | 19.83 | |
| ACRt Sonde | ACRt Sonde-11005909 | 11005909 | 200.00 | 14.22 | 14.80 | |
| Cabbage Head | Cabbage Head-TRK696 | TRK696 | 10.00 | 0.58 | 0.58 | |

| | | Number | (lbs) | (ft) | | (ft) | (fpm) |
|---|---|---|---|---|---|---|---|
| CH_HOS | Hostile Cable Head with Load Cell | CH_696 | 37.50 | 3.03 | | 74.03 | 300.00 |
| SP | SP Sub | 11441455 | 60.00 | 3.74 | | 70.30 | 300.00 |
| GTET | Gamma Telemetry Tool | 11048627 | 165.00 | 8.52 | | 61.78 | 60.00 |
| DSNT | Dual Spaced Neutron | 11055304 | 174.00 | 9.69 | | 52.09 | 60.00 |
| DCNT | DSN Decentralizer | 11019643 | 6.60 | 5.13 | * | 55.42 | 300.00 |
| SDLT | Spectral Density Tool | 11014296 | 360.00 | 10.81 | | 41.28 | 60.00 |
| MICP | Microlog Pad | 11014296 | 8.00 | 1.00 | * | 43.78 | 60.00 |
| SDLP | Density Insite Pad | 10865884 | 65.00 | 2.55 | * | 43.49 | 60.00 |
| FLEX | Flex Joint | 001 | 140.00 | 5.67 | | 35.61 | 300.00 |
| BSAT | Borehole Sonic Array Tool | 10747683 | 300.00 | 15.77 | | 19.83 | 60.00 |
| OBCEN | Centralizer - 29 in.Overbody | 1 | 12.00 | 2.42 | * | 32.77 | 300.00 |
| ACRt | Array Compensated True Resistivity Instrument Section | I962 | 50.00 | 5.03 | | 14.80 | 300.00 |
| OBCEN | Centralizer - 29 in.Overbody | 2 | 12.00 | 2.42 | * | 16.39 | 300.00 |
| ACRt | Array Compensated True Resistivity Sonde Section | 11005909 | 200.00 | 14.22 | | 0.58 | 300.00 |
| CBHD | Cabbage Head | TRK696 | 10.00 | 0.58 | | 0.00 | 300.00 |
| **Total** | | | **1,600.10** | **77.06** | | | |

* Not included in Total Length and Length Accumulation.

**Data: GARDEN_CITY_H11\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CH\IDLE** **Date: 11-Jan-13 12:44:48**

HALLIBURTON

# CALIBRATION REPORT

## NATURAL GAMMA RAY TOOL SHOP CALIBRATION

**Tool Name:** GTET - 11048627 **Reference Calibration Date:** 15-Oct-12 10:58:20

**Engineer:** S. INGERSOLL **Calibration Date:** 20-Dec-12 17:00:35

**Software Version:** WL INSITE R3.6.0 (Build 3) **Calibration Version:** 1

Calibrator Source S/N: TB146

Calibrator API Reference:265.00 api

Equivalent Calibrator API Reference:269.6 api

| Measurement | Measured | Calibrated | Units |
|---|---|---|---|
| Background | 51.6 | 51.2 | api |
| Background + Calibrator | 323.1 | 320.9 | api |
| Calibrator | 271.5 | 269.6 | api |

## NATURAL GAMMA RAY TOOL FIELD CALIBRATION

**Tool Name:** GTET - 11048627 **Reference Calibration Date:** 20-Dec-12 17:00:35

**Engineer:** J. BOLLOM **Calibration Date:** 10-Jan-13 16:22:40

**Software Version:** WL INSITE R3.6.0 (Build 3) **Calibration Version:** 1

Calibrator Source S/N: TB146

Calibrator API Reference:265.00 api

Equivalent Calibrator API Reference:269.6 api

| Field Verification | Shop | Field | Units |
|---|---|---|---|
| Background | 51.2 | 54.3 | api |
| Background + Calibrator | 320.9 | 326.3 | api |
| Calibrator | 269.6 | 272.0 | api |

| Shop | Field | Difference | Tolerance |
|---|---|---|---|
| 269.6 | 272.0 | -2.4 | +/- 9.00 |

## DUAL SPACED NEUTRON SHOP CALIBRATION

**Tool Name:** DSNT - 11055304 **Reference Calibration Date:** 02-Nov-12 10:41:48

**Engineer:** S. INGERSOLL **Calibration Date:** 19-Dec-12 16:48:47

| | | | |
|---|---|---|---|
| **Software Version:** | **WL INSITE R3.6.0 (Build 3)** | **Calibration Version:** | **1** |

Logging Source S/N: 696
Tank Serial Number: LIBERAL_NEUTRON
Reference value assigned to Tank: 51.680
Snow Block S/N: 696
Calibration Tank Water Temperature: 68 degF
Min. Tool Housing Outside Diameter: 3.620 in

**CALIBRATION CONSTANTS**

| Measurement | Prev. Value | New Value | Control Limit On New Value |
|---|---|---|---|
| Gain: | 0.989 | 0.986 | 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): | 0.2116 | 0.2107 | 0.0010 | +/- 0.0020 |
| Calibrated Ratio: | 9.75 | 9.72 | 0.033 | +/- 0.050 |

**VERIFIER**

| Measurement | Value | Control Limit |
|---|---|---|
| Snow-Block Porosity (decp): | 0.0742 | 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 - 11055304** | **Reference Calibration Date:** | **19-Dec-12 16:48:47** |
| **Engineer:** | **J. BOLLOM** | **Calibration Date:** | **10-Jan-13 16:24:49** |
| **Software Version:** | **WL INSITE R3.6.0 (Build 3)** | **Calibration Version:** | **1** |

Logging Source S/N: 696
Snow Block S/N: 696

**NEUTRON FIELD-CHECK SUMMARY**

| | Shop | Field | Difference | Control Limit On Change |
|---|---|---|---|---|
| Snow-Block Porosity (decp): | 0.0742 | 0.0687 | -0.0055 | +/- 0.0150 |

**PASS/FAIL SUMMARY**

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

## DENSITY CALIPER SHOP CALIBRATION

| | | | |
|---|---|---|---|
| **Tool Name:** | **SDLT - 11014296** | **Reference Calibration Date:** | **04-Jan-13 11:03:24** |
| **Engineer:** | **T. HYDE** | **Calibration Date:** | **04-Jan-13 11:11:28** |
| **Software Version:** | **WL INSITE R3.6.0 (Build 3)** | **Calibration Version:** | **1** |
| **Host Tool Name:** | **DSNT - 11055304** | | |

**CALIBRATION COEFFICIENTS**

| Measurement | Previous Value | New Value | Control Limit On New Value |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Pad Offset | -3834.31 | -4128.48 | -7000.00 - -1000.00 |
| Pad Gain | 0.0003661 | 0.0003869 | 0.000200 - 0.000600 |
| Arm Offset | -1610.38 | -2062.96 | -5000.00 - 3000.00 |
| Arm Gain | 0.0003825 | 0.0004679 | 0.000300 - 0.000700 |
| Arm Power | 0.000005415 | -0.000002075 | -0.000010000 - 0.000010000 |

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) | 3.66 | 3.75 | 0.09 | +/- 0.20 |
| RING DIAMETER: | | | | |
| Small Ring (in) | 6.47 | 6.50 | 0.03 | +/- 0.20 |
| Medium Ring (in) | 8.05 | 8.25 | 0.20 | +/- 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 |

## SPECTRAL DENSITY SHOP CALIBRATION

| | | | |
|---|---|---|---|
| **Tool Name:** | **SDLT Pad - 10865884** | **Reference Calibration Date:** | **04-Jan-13 10:09:46** |
| **Engineer:** | **T. HYDE** | **Calibration Date:** | **04-Jan-13 10:30:13** |
| **Software Version:** | **WL INSITE R3.6.0 (Build 3)** | **Calibration Version:** | **1** |

Logging Source S/N: 5168GW

Aluminum Block S/N: LIBERAL Density: 2.598g/cc Pe: 3.170

Magnesium Block S/N: LIBERAL Density: 1.684g/cc Pe: 2.598

| DENSITY CALIBRATION SUMMARY | | | |
|---|---|---|---|
| **Measurement** | **Previous Value** | **New Value** | **Control Limit** |
| Near Bar Gain | 1.0641 | 1.0591 | 0.90 - 1.10 |
| Near Dens Gain | 1.0212 | 1.0204 | 0.90 - 1.10 |
| Near Peak Gain | 1.0332 | 1.0236 | 0.90 - 1.10 |
| Near Lith Gain | 0.9975 | 0.9918 | 0.90 - 1.10 |
| Far Bar Gain | 1.0151 | 1.0142 | 0.90 - 1.10 |
| Far Dens Gain | 1.0024 | 1.0021 | 0.90 - 1.10 |
| Far Peak Gain | 0.9962 | 0.9953 | 0.90 - 1.10 |
| Far Lith Gain | 0.9756 | 0.9734 | 0.90 - 1.10 |
| Near Bar Offset | -0.3890 | -0.3434 | NONE |
| Near Dens Offset | -0.0254 | -0.0183 | NONE |
| Near Peak Offset | -0.1443 | -0.0641 | NONE |
| Near Lith Offset | 0.1155 | 0.1634 | NONE |
| Far Bar Offset | 0.0001 | 0.0078 | NONE |
| Far Dens Offset | 0.0890 | 0.0906 | NONE |
| Far Peak Offset | 0.1156 | 0.1244 | NONE |
| Far Lith Offset | 0.2380 | 0.2556 | NONE |
| Near Bar Background | 833.52 | 831.89 | 700 - 1450 |
| Near Dens Background | 277.09 | 276.96 | 230 - 480 |

| | | | |
|---|---|---|---|
| Near Peak Background | 120.94 | 118.93 | 100 - 210 |
| Near Lith Background | 147.46 | 146.93 | 125 - 260 |
| Far Bar Background | 515.98 | 515.51 | 450 - 900 |
| Far Dens Background | 199.55 | 202.64 | 175 - 345 |
| Far Peak Background | 78.68 | 78.62 | 70 - 140 |
| Far Lith Background | 82.91 | 81.88 | 75 - 145 |

**CALIBRATION BLOCK SUMMARY**

| Measurement | Current Reading (Previous Coef) | Calibrated (New Coef) | Change | Control Limit On Change |
|---|---|---|---|---|
| MAGNESIUM | | | | |
| Density (g/cc) | 1.684 | 1.684 | -0.000 | +/- 0.015 |
| Pe | 2.554 | 2.555 | 0.001 | +/- 0.150 |
| ALUMINUM | | | | |
| Density (g/cc) | 2.598 | 2.598 | 0.000 | +/- 0.01500 |
| Pe | 3.127 | 3.124 | -0.003 | +/- 0.150 |

**TOOL SUMMARY**

| Measurement | Near Detector | | Far Detector | |
|---|---|---|---|---|
| | Value | Control Limits | Value | Control Limits |
| QUALITY | | | | |
| Background | 0.0009 | +/- 0.0110 | -0.0003 | +/- 0.0140 |
| Magnesium Block | 0.0010 | +/- 0.0110 | -0.0010 | +/- 0.0140 |
| Aluminum Block | -0.0004 | +/- 0.0110 | 0.0001 | +/- 0.0140 |
| Resolution | 9.28 | 6.00 - 11.50 | 8.98 | 6.00 - 11.50 |
| Internal Verifier(B+D+P+L) | 1375 | 1200 - 2700 | 879 | 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 Pad - 10865884 **Reference Calibration Date:** 04-Jan-13 10:30:13

**Engineer:** J. BOLLOM **Calibration Date:** 10-Jan-13 16:18:56

**Software Version:** WL INSITE R3.6.0 (Build 3) **Calibration Version:** 1

Pad Temperature: 68.2 degF

**DENSITY FIELD CALIBRATION SUMMARY**

| Measurement | Shop | Field | Change | Control Limit +/- |
|---|---|---|---|---|
| Near (B+D+P+L) cps | 1374.714 | 1376.613 | 1.899 | 14.983 |
| Far (B+D+P+L) cps | 878.664 | 879.884 | 1.220 | 16.179 |
| Near Resolution | 9.28 | 9.10 | -0.180 | 0.50 |
| Far Resolution | 8.98 | 9.07 | 0.090 | 1.00 |

**PASS/FAIL SUMMARY**

| | |
|---|---|
| Bkg Quality Check: | Passed |

| | |
|---|---|
| Bkg Resolution Check: | Passed |
| Bkg Verification Check: | Passed |

## SDLT CALIPER FIELD CALIBRATION

| | | | |
|---|---|---|---|
| **Tool Name:** | **SDLT - 11014296** | **Reference Calibration Date:** | **04-Jan-13 11:11:28** |
| **Engineer:** | **J. BOLLOM** | **Calibration Date:** | **10-Jan-13 16:27:58** |
| **Software Version:** | **WL INSITE R3.6.0 (Build 3)** | **Calibration Version:** | **1** |

### MEASURED CALIPER VALUES

| Measurement | Shop | Field | Change | Control Limit On New Value |
|---|---|---|---|---|
| Pad Extension | 3.75 | 3.66 | -0.09 | +/- 0.10 |
| Ring Diameter | 8.25 | 8.18 | -0.07 | +/- 0.15 |

### PASS/FAIL SUMMARY

| | |
|---|---|
| Pad Extension Check: | Passed |
| Diameter Check: | Passed |

## CALIBRATION SUMMARY

| Sensor | Shop | Field | Post | Difference | Tolerance | Units |
|---|---|---|---|---|---|---|
| **GTET-11048627** | | | | | | |
| Gamma Ray Calibrator | 269.6 | 272.0 | ---------- | -2.4 | +/- 9.00 | api |
| **DSNT-11055304** | | | | | | |
| Snow-Block Porosity | 0.0742 | 0.0687 | ---------- | 0.0055 | +/- 0.0150 | decp |
| **SDLT-11014296** | | | | | | |
| Pad Extension | 3.75 | 3.66 | ---------- | 0.09 | +/-0.10 | in |
| Ring Diameter | 8.25 | 8.18 | ---------- | 0.07 | +/-0.15 | in |
| **SDLT Pad-10865884** | | | | | | |
| Near(B+D+P+L) | 1374.714 | 1376.613 | ---------- | -1.899 | +/-14.983 | cps |
| Far(B+D+P+L) | 878.664 | 879.884 | ---------- | -1.220 | +/-16.179 | cps |

**Data: GARDEN_CITY_H11\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CH\IDLE** **Date: 11-Jan-13 12:46:20**

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## 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 | 9.300 | ppg |
| | SHARED | WAGT | Weighting Agent | Natural | |
| | 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 | 5.500 | in |
| | SHARED | ST | Surface Temperature | 75.0 | degF |
| | SHARED | TD | Total Well Depth | 5090.00 | ft |
| | SHARED | BHT | Bottom Hole Temperature | 200.0 | 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 | |
| Rwa / CrossPlot | XPOK | Process Crossplot? | Yes | |
| Rwa / CrossPlot | FCHO | Select Source of F | Automatic | |
| Rwa / CrossPlot | AFAC | Archie A factor | 0.6200 | |
| Rwa / CrossPlot | MFAC | Archie M factor | 2.1500 | |
| Rwa / CrossPlot | RMFR | Rmf Reference | 0.10 | ohmm |
| Rwa / CrossPlot | TMFR | Rmf Ref Temp | 75.00 | degF |
| Rwa / CrossPlot | RWA | Resistivity of Formation Water | 0.05 | ohmm |
| Rwa / CrossPlot | ADP | Use Air Porosity to calculate CrossplotPhi | No | |
| 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 for Gamma Ray Tools. | Eccentered | |
| 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 | 0.250 | 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 | CLOK | Process Caliper Outputs? | Yes | |
| SDLT Pad | DNOK | Process Density? | Yes | |
| SDLT Pad | DNOK | Process Density EVR? | No | |
| SDLT Pad | CB | Logging Calibration Blocks? | No | |
| SDLT Pad | SPVT | SDLT Pad Temperature Valid? | Yes | |
| SDLT Pad | DTWN | Disable temperature warning | No | |
| SDLT Pad | DMA | Formation Density Matrix | 2.710 | g/cc |
| SDLT Pad | DFL | Formation Density Fluid | 1.000 | g/cc |
| Microlog Pad | MLOK | Process MicroLog Outputs? | Yes | |
| BSAT | MBOK | Compute BCAS Results? | Yes | |
| BSAT | FLLO | Frequency Filter Low Pass Value? | 5000 | Hz |
| BSAT | FLHI | Frequency Filter High Pass Value? | 27000 | Hz |
| BSAT | DTFL | Delta -T Fluid | 189.00 | uspf |
| BSAT | DTMT | Delta -T Matrix Type | User define | |
| BSAT | DTMA | Delta -T Matrix | 47.60 | uspf |
| BSAT | DTSH | Delta -T Shale | 100.00 | uspf |
| BSAT | SPEQ | Acoustic Porosity Equation | Wylie | |
| ACRt Sonde | RTOK | Process ACRt? | Yes | |
| ACRt Sonde | MNSO | Minimum Tool Standoff | 1.50 | in |
| ACRt Sonde | TCS1 | Temperature Correction Source | FP Lwr & FP Upr | |
| ACRt Sonde | TPOS | Tool Position | Free Hanging | |
| ACRt Sonde | RMOP | Rmud Source | Mud Cell | |
| ACRt Sonde | RMIN | Minimum Resistivity for MAP | 0.20 | ohmm |
| ACRt Sonde | RMIN | Maximum Resistivity for MAP | 200.00 | ohmm |
| ACRt Sonde | THQY | Threshold Quality | 0.50 | |
| ACRt Sonde | MRFX | Fixed mud resistivity | 2000 | ohmm |

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# INPUTS, DELAYS AND FILTERS TABLE

| Mnemonic | Input Description | Delay (ft) | Filter Type | Filter Length (ft) |
|---|---|---|---|---|
| | **Depth Panel** | | | |
| TENS | Tension | 0.00 | NO | |
| | **CH_HOS** | | | |
| DHTN | DownholeTension | 0.00 | BLK | 0.000 |
| | **SP Sub** | | | |
| PLTC | Plot Control Mask | 72.25 | NO | |
| SP | Spontaneous Potential | 72.25 | BLK | 1.250 |
| SPR | Raw Spontaneous Potential | 72.25 | NO | |
| SPO | Spontaneous Potential Offset | 72.25 | NO | |
| | **GTET** | | | |
| TPUL | Tension Pull | 64.23 | NO | |
| GR | Natural Gamma Ray API | 64.23 | TRI | 1.750 |
| GRU | Unfiltered Natural Gamma Ray API | 64.23 | NO | |
| EGR | Natural Gamma Ray API with Enhanced Vertical Resolution | 64.23 | W | 1.416 , 0.750 |
| ACCZ | Accelerometer Z | 0.00 | BLK | 0.083 |
| DEVI | Inclination | 0.00 | NO | |
| | **DSNT** | | | |
| TPUL | Tension Pull | 53.99 | NO | |
| RNDS | Near Detector Telemetry Counts | 54.09 | BLK | 1.417 |
| RFDS | Far Detector Telemetry Counts | 54.84 | TRI | 0.583 |
| DNTT | DSN Tool Temperature | 54.09 | NO | |
| DSNS | DSN Tool Status | 53.99 | NO | |
| ERND | Near Detector Telemetry Counts EVR | 54.09 | BLK | 0.000 |
| ERFD | Far Detector Telemetry Counts EVR | 54.84 | BLK | 0.000 |
| ENTM | DSN Tool Temperature EVR | 54.09 | NO | |
| | **SDLT** | | | |
| TPUL | Tension Pull | 44.09 | NO | |
| PCAL | Pad Caliper | 44.09 | TRI | 0.250 |
| ACAL | Arm Caliper | 44.09 | TRI | 0.250 |
| | **BSAT** | | | |
| TPUL | Tension Pull | 27.09 | NO | |
| STAT | Status | 27.09 | NO | |
| DLYT | Delay Time | 27.09 | NO | |
| SI | Sample Interval | 27.09 | NO | |
| TXRX | Raw Telemetry 10 Receivers | 27.09 | NO | |
| FRMC | Tool Frame Count | 27.09 | NO | |
| GMOD | Gain processing mode | 19.83 | NO | |
| | **ACRt Sonde** | | | |
| TPUL | Tension Pull | 2.97 | NO | |

| | | | | |
|---|---|---|---|---|
| F1R1 | ACRT 12KHz - 80in R value | 9.22 | BLK | 0.000 |
| F1X1 | ACRT 12KHz - 80in X value | 9.22 | BLK | 0.000 |
| F1R2 | ACRT 12KHz - 50in R value | 6.72 | BLK | 0.000 |
| F1X2 | ACRT 12KHz - 50in X value | 6.72 | BLK | 0.000 |
| F1R3 | ACRT 12KHz - 29in R value | 5.22 | BLK | 0.000 |
| F1X3 | ACRT 12KHz - 29in X value | 5.22 | BLK | 0.000 |
| F1R4 | ACRT 12KHz - 17in R value | 4.22 | BLK | 0.000 |
| F1X4 | ACRT 12KHz - 17in X value | 4.22 | BLK | 0.000 |
| F1R5 | ACRT 12KHz - 10in R value | 3.72 | BLK | 0.000 |
| F1X5 | ACRT 12KHz - 10in X value | 3.72 | BLK | 0.000 |
| F1R6 | ACRT 12KHz - 6in R value | 3.47 | BLK | 0.000 |
| F1X6 | ACRT 12KHz - 6in X value | 3.47 | BLK | 0.000 |
| F2R1 | ACRT 36KHz - 80in R value | 9.22 | BLK | 0.000 |
| F2X1 | ACRT 36KHz - 80in X value | 9.22 | BLK | 0.000 |
| F2R2 | ACRT 36KHz - 50in R value | 6.72 | BLK | 0.000 |
| F2X2 | ACRT 36KHz - 50in X value | 6.72 | BLK | 0.000 |
| F2R3 | ACRT 36KHz - 29in R value | 5.22 | BLK | 0.000 |
| F2X3 | ACRT 36KHz - 29in X value | 5.22 | BLK | 0.000 |
| F2R4 | ACRT 36KHz - 17in R value | 4.22 | BLK | 0.000 |
| F2X4 | ACRT 36KHz - 17in X value | 4.22 | BLK | 0.000 |
| F2R5 | ACRT 36KHz - 10in R value | 3.72 | BLK | 0.000 |
| F2X5 | ACRT 36KHz - 10in X value | 3.72 | BLK | 0.000 |
| F2R6 | ACRT 36KHz - 6in R value | 3.47 | BLK | 0.000 |
| F2X6 | ACRT 36KHz - 6in X value | 3.47 | BLK | 0.000 |
| F3R1 | ACRT 72KHz - 80in R value | 9.22 | BLK | 0.000 |
| F3X1 | ACRT 72KHz - 80in X value | 9.22 | BLK | 0.000 |
| F3R2 | ACRT 72KHz - 50in R value | 6.72 | BLK | 0.000 |
| F3X2 | ACRT 72KHz - 50in X value | 6.72 | BLK | 0.000 |
| F3R3 | ACRT 72KHz - 29in R value | 5.22 | BLK | 0.000 |
| F3X3 | ACRT 72KHz - 29in X value | 5.22 | BLK | 0.000 |
| F3R4 | ACRT 72KHz - 17in R value | 4.22 | BLK | 0.000 |
| F3X4 | ACRT 72KHz - 17in X value | 4.22 | BLK | 0.000 |
| F3R5 | ACRT 72KHz - 10in R value | 3.72 | BLK | 0.000 |
| F3X5 | ACRT 72KHz - 10in X value | 3.72 | BLK | 0.000 |
| F3R6 | ACRT 72KHz - 6in R value | 3.47 | BLK | 0.000 |
| F3X6 | ACRT 72KHz - 6in X value | 3.47 | BLK | 0.000 |
| RMUD | Mud Resistivity | 12.76 | BLK | 0.000 |
| F1RT | Transmitter Reference 12 KHz Real Signal | 2.97 | BLK | 0.000 |
| F1XT | Transmitter Reference 12 KHz Imaginary Signal | 2.97 | BLK | 0.000 |
| F2RT | Transmitter Reference 36 KHz Real Signal | 2.97 | BLK | 0.000 |
| F2XT | Transmitter Reference 36 KHz Imaginary Signal | 2.97 | BLK | 0.000 |
| F3RT | Transmitter Reference 72 KHz Real Signal | 2.97 | BLK | 0.000 |
| F3XT | Transmitter Reference 72 KHz Imaginary Signal | 2.97 | BLK | 0.000 |
| TFPU | Upper Feedpipe Temperature Calculated | 2.97 | BLK | 0.000 |
| TFPL | Lower Feedpipe Temperature Calculated | 2.97 | BLK | 0.000 |
| ITMP | Instrument Temperature | 2.97 | BLK | 0.000 |
| TCVA | Temperature Correction Values Loop Off | 2.97 | NO | |
| TIDV | Instrument Temperature Derivative | 2.97 | NO | |
| TUDV | Upper Temperature Derivative | 2.97 | NO | |
| TLDV | Lower Temperature Derivative | 2.97 | NO | |
| TRBD | Receiver Board Temperature | 2.97 | NO | |

| SDLT Pad | | | | |
|---|---|---|---|---|
| TPUL | Tension Pull | 44.08 | NO | |
| NAB | Near Above | 43.90 | BLK | 0.920 |
| NHI | Near Cesium High | 43.90 | BLK | 0.920 |

| | | | | |
|---|---|---|---|---|
| NLO | Near Cesium Low | 43.90 | BLK | 0.920 |
| NVA | Near Valley | 43.90 | BLK | 0.920 |
| NBA | Near Barite | 43.90 | BLK | 0.920 |
| NDE | Near Density | 43.90 | BLK | 0.920 |
| NPK | Near Peak | 43.90 | BLK | 0.920 |
| NLI | Near Lithology | 43.90 | BLK | 0.920 |
| NBAU | Near Barite Unfiltered | 43.90 | BLK | 0.250 |
| NLIU | Near Lithology Unfiltered | 43.90 | BLK | 0.250 |
| FAB | Far Above | 44.26 | BLK | 0.250 |
| FHI | Far Cesium High | 44.26 | BLK | 0.250 |
| FLO | Far Cesium Low | 44.26 | BLK | 0.250 |
| FVA | Far Valley | 44.26 | BLK | 0.250 |
| FBA | Far Barite | 44.26 | BLK | 0.250 |
| FDE | Far Density | 44.26 | BLK | 0.250 |
| FPK | Far Peak | 44.26 | BLK | 0.250 |
| FLI | Far Lithology | 44.26 | BLK | 0.250 |
| PTMP | Pad Temperature | 44.09 | BLK | 0.920 |
| NHV | Near Detector High Voltage | 43.49 | NO | |
| FHV | Far Detector High Voltage | 43.49 | NO | |
| ITMP | Instrument Temperature | 43.49 | NO | |
| DDHV | Detector High Voltage | 43.49 | NO | |

**Microlog Pad**

| | | | | |
|---|---|---|---|---|
| TPUL | Tension Pull | 44.28 | NO | |
| MINV | Microlog Lateral | 44.28 | BLK | 0.750 |
| MNOR | Microlog Normal | 44.28 | BLK | 0.750 |

**Data: GARDEN_CITY_H11\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CH\IDLE** **Date: 11-Jan-13 12:45:17**

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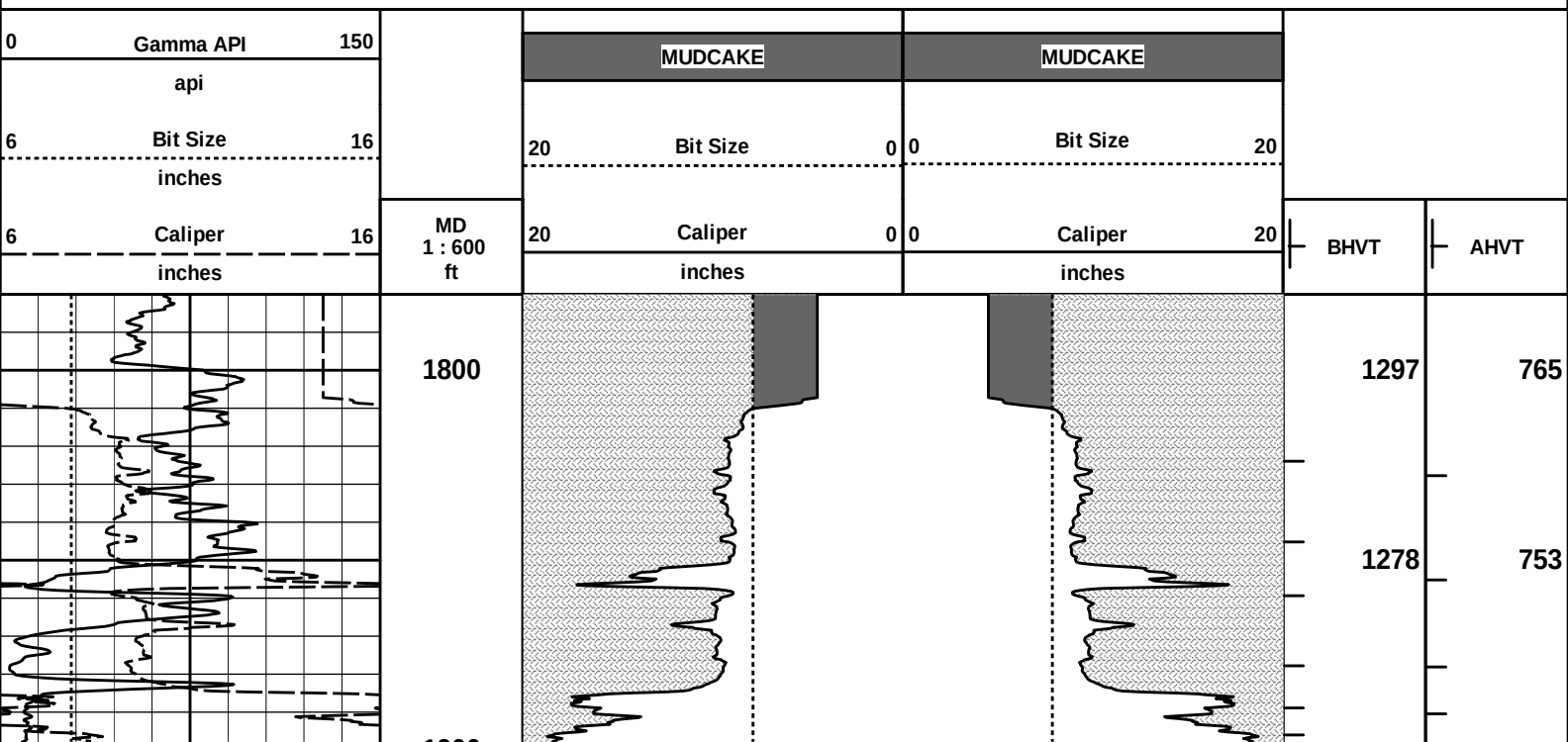
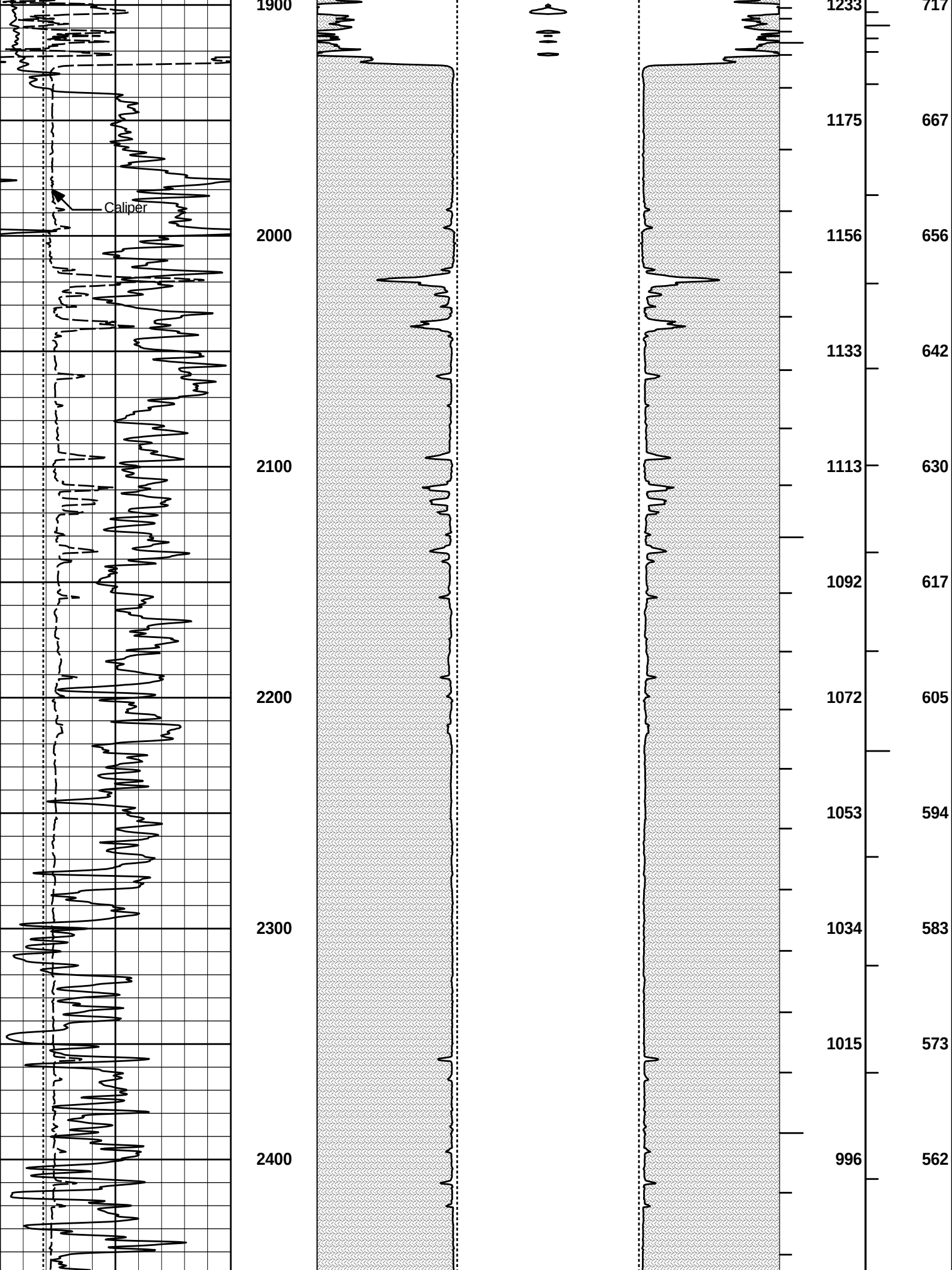
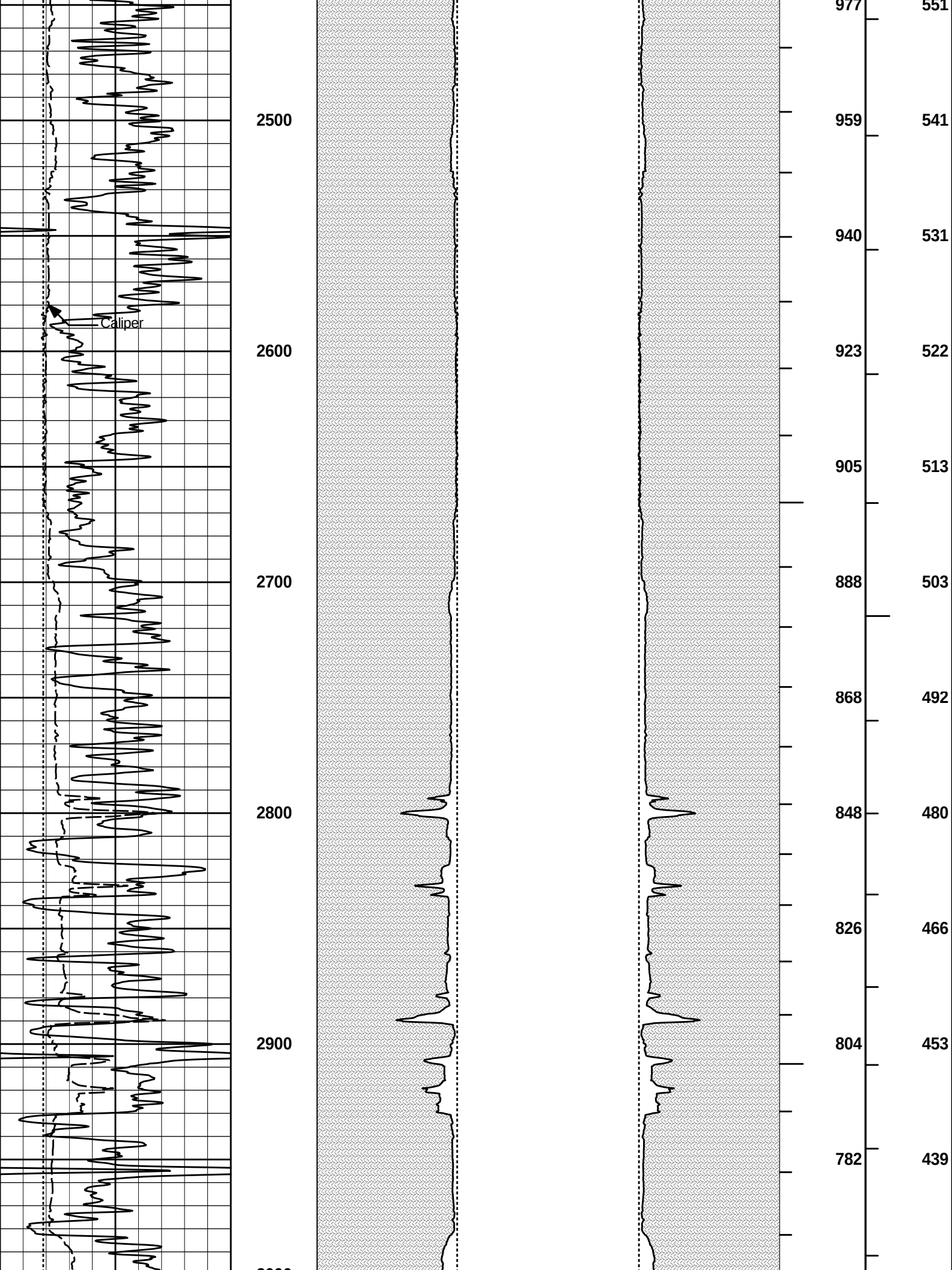
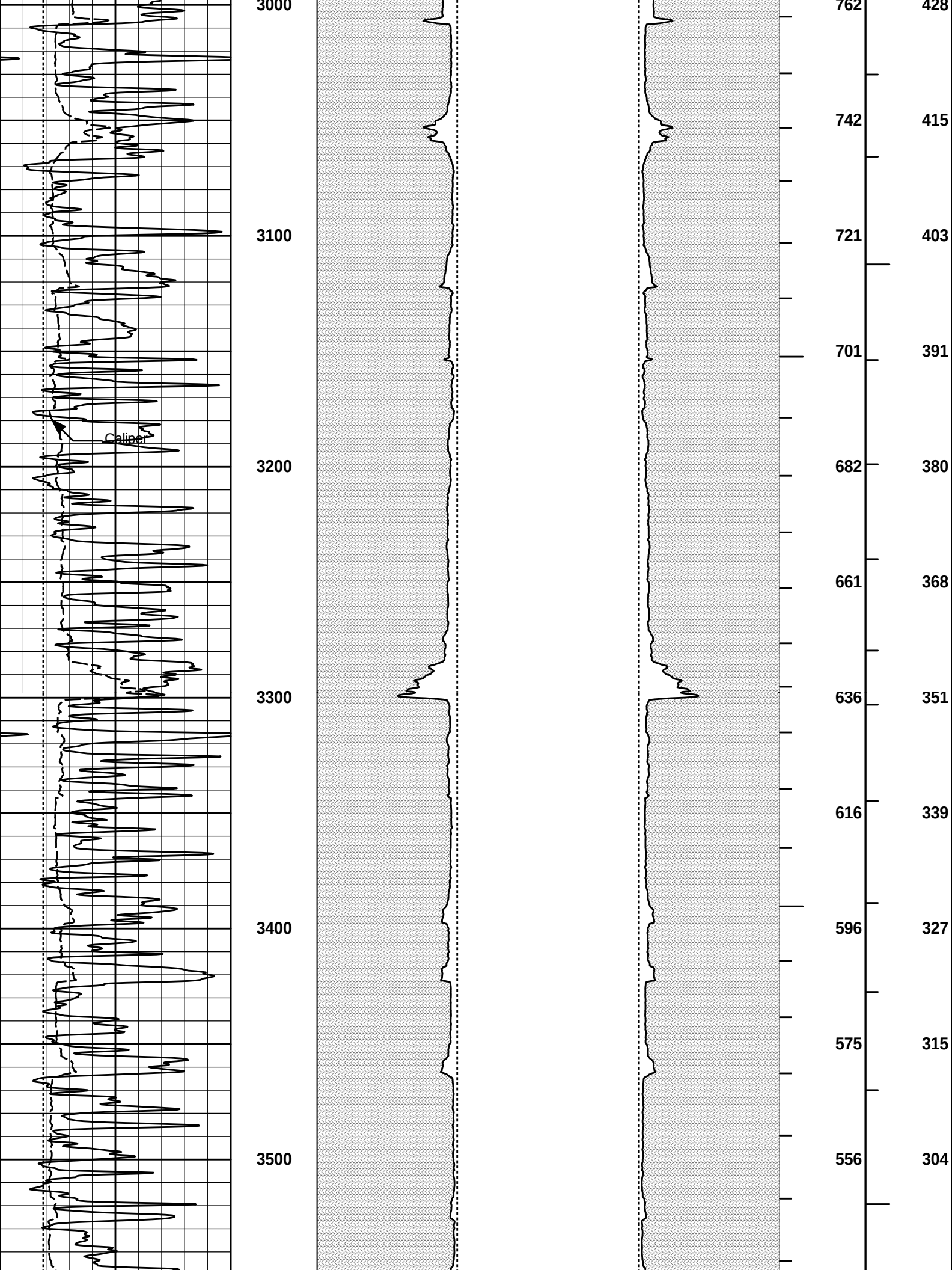
**Plot Time: 11-Jan-13 16:32:21**
**Plot Range: 1780 ft to 5028.83 ft**
**Data: GARDEN_CITY_H11\Well Based\CASING**
**Plot File: \\-LOCAL-\GARDEN_CITY_H11\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CH\PORO\AHV_2_IQ_LIB**

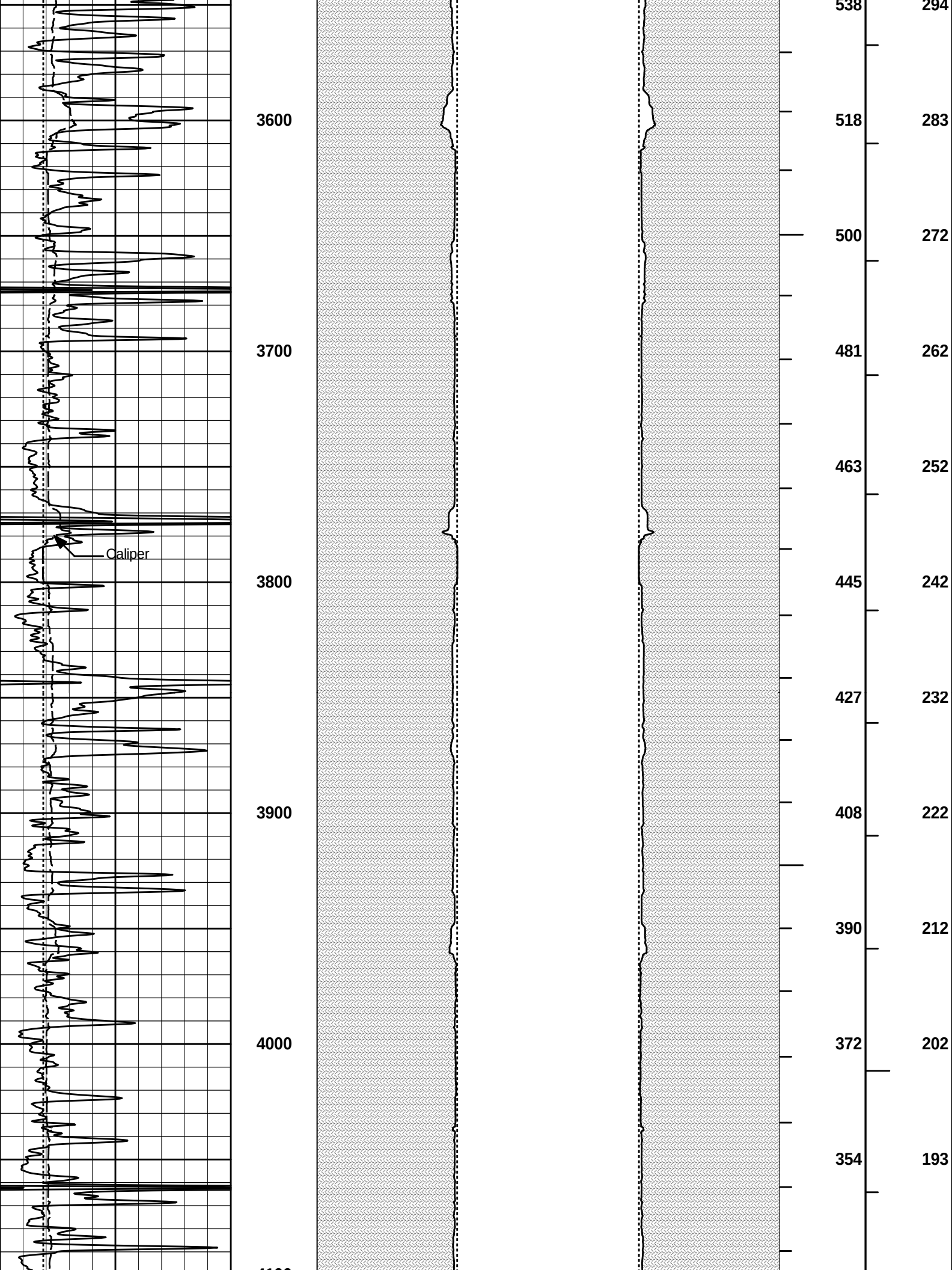
# ANNULAR HOLE VOLUME PLOT

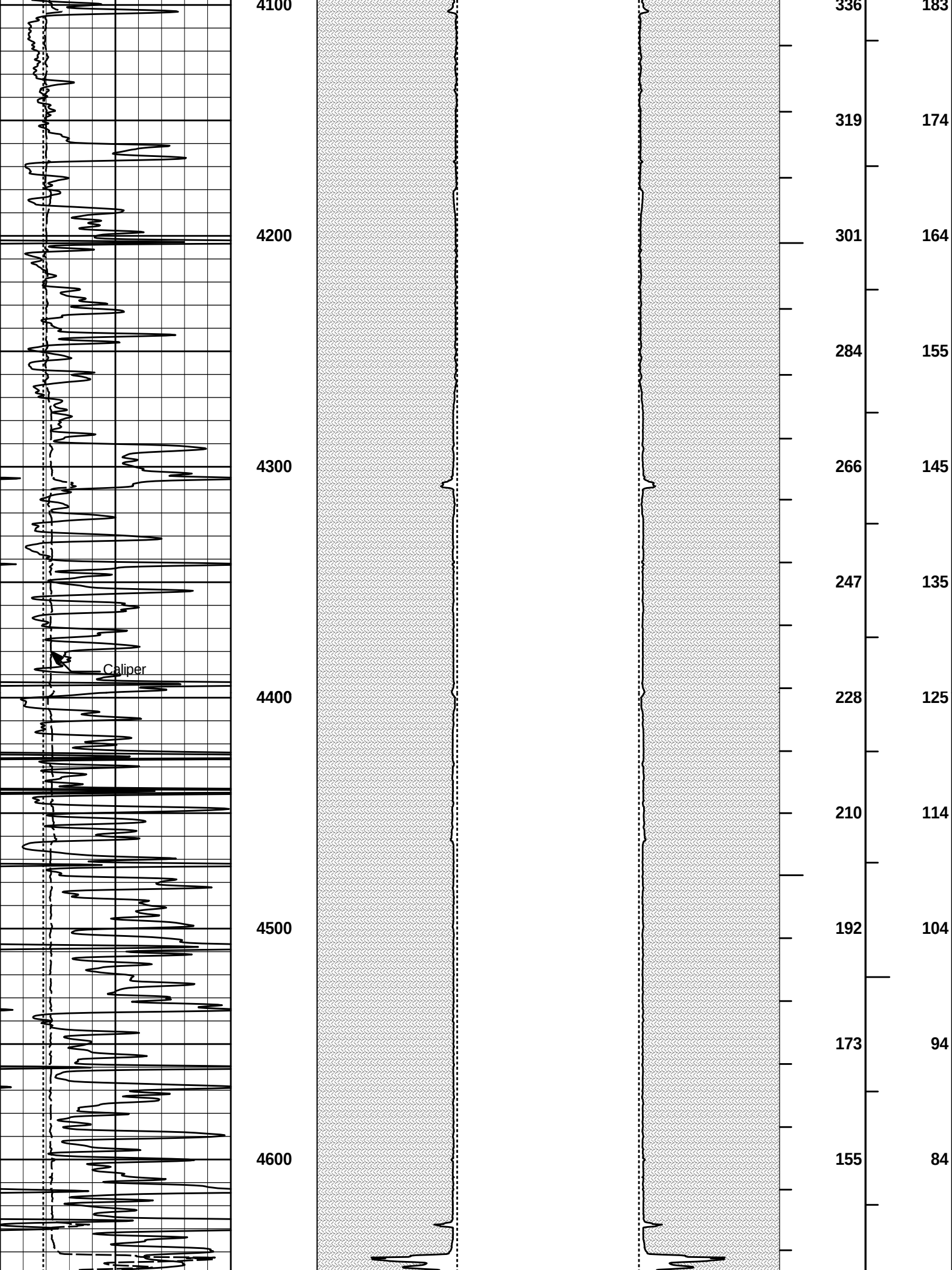


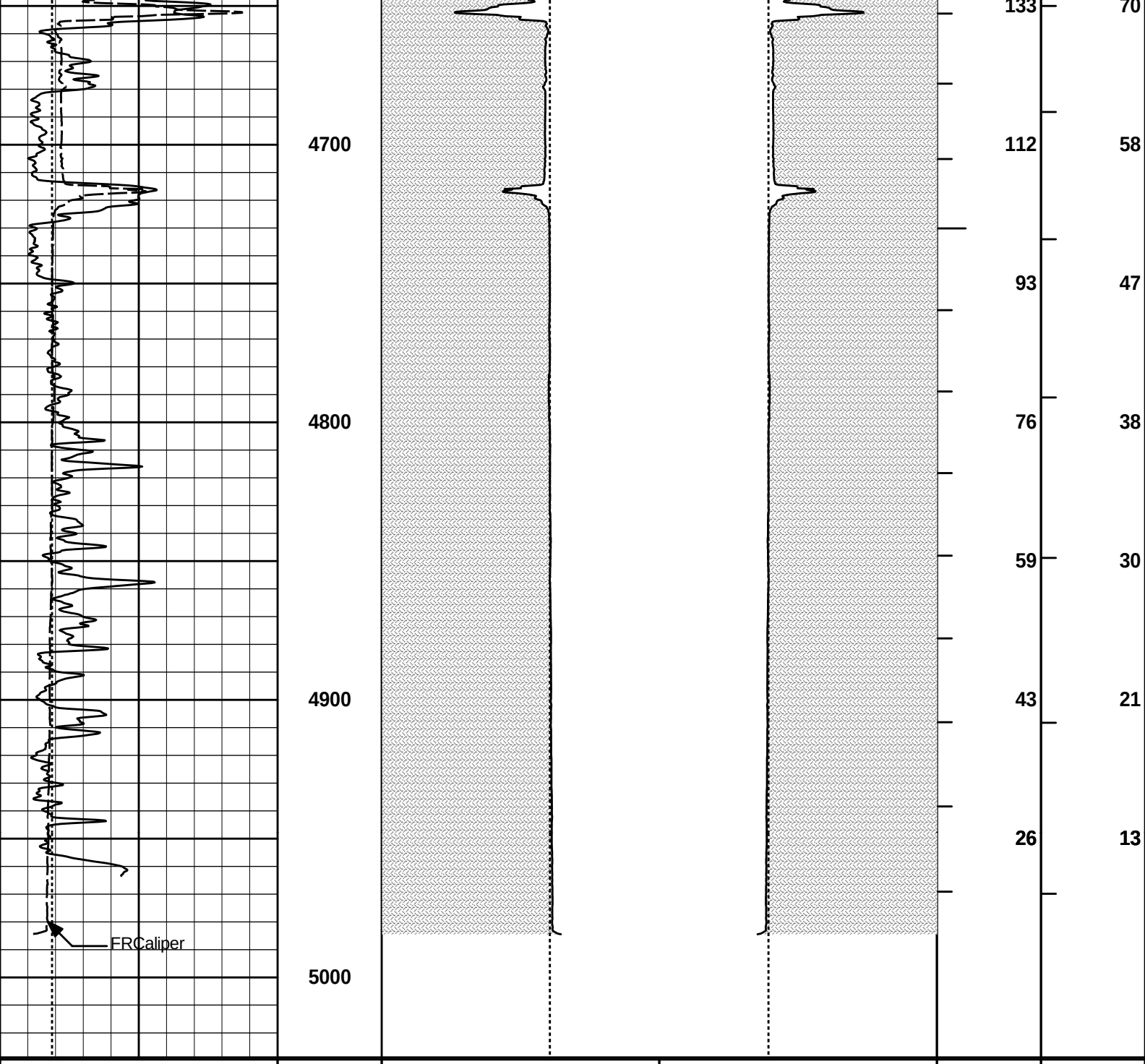

Caliper
1900
2000
2100
2200
2300
2400
1233
1175
1156
1133
1113
1092
1072
1053
1034
1015
996
717
667
656
642
630
617
605
594
583
573
562


Caliper
2500
2600
2700
2800
2900
977
959
940
923
905
888
868
848
826
804
782
551
541
531
522
513
503
492
480
466
453
439


3000
3100
3200
3300
3400
3500
Caliper
762
742
721
701
682
661
636
616
596
575
556
428
415
403
391
380
368
351
339
327
315
304


Caliper
3600
3700
3800
3900
4000
538
294
518
283
500
272
481
262
463
252
445
242
427
232
408
222
390
212
372
202
354
193


4100
4200
4300
4400
4500
4600
Caliper
336
319
301
284
266
247
228
210
192
173
155
183
174
164
155
145
135
125
114
104
94
84




| | | |
|---|---|---|
| 6 Caliper 16 | MD 1 : 600 ft | 20 Caliper 0 |
| inches | | inches |
| 6 Bit Size 16 | | 20 Bit Size 0 |
| inches | | |
| 0 Gamma API 150 | | MUDCAKE |
| api | | |

| | | |
|---|---|---|
| 0 Caliper 20 | BHVT | AHVT |
| inches | | |
| 0 Bit Size 20 | | |
| MUDCAKE | | |

HALLIBURTON

Plot Time: 11-Jan-13 16:32:25
Plot Range: 1780 ft to 5028.83 ft
Data: GARDEN_CITY_H11\Well Based\CASING\
Plot File: \\-LOCAL-\GARDEN_CITY_H11\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CH\PORO\AHV_2_IQ_LIB

# ANNULAR HOLE VOLUME PLOT

| | |
|---|---|
| COMPANY | **OXY USA INC.** |

| | | | |
|---|---|---|---|
| WELL | **GARDEN CITY H-11** | | |
| FIELD | **GARDEN CITY** | | |
| COUNTY | **FINNEY** | STATE | **KANSAS** |

HALLIBURTON

**SPECTRAL DENSITY**
**DUAL SPACED NEUTRON**
**LOG**