



**Weatherford**

**MICRORESISTIVITY LOG**

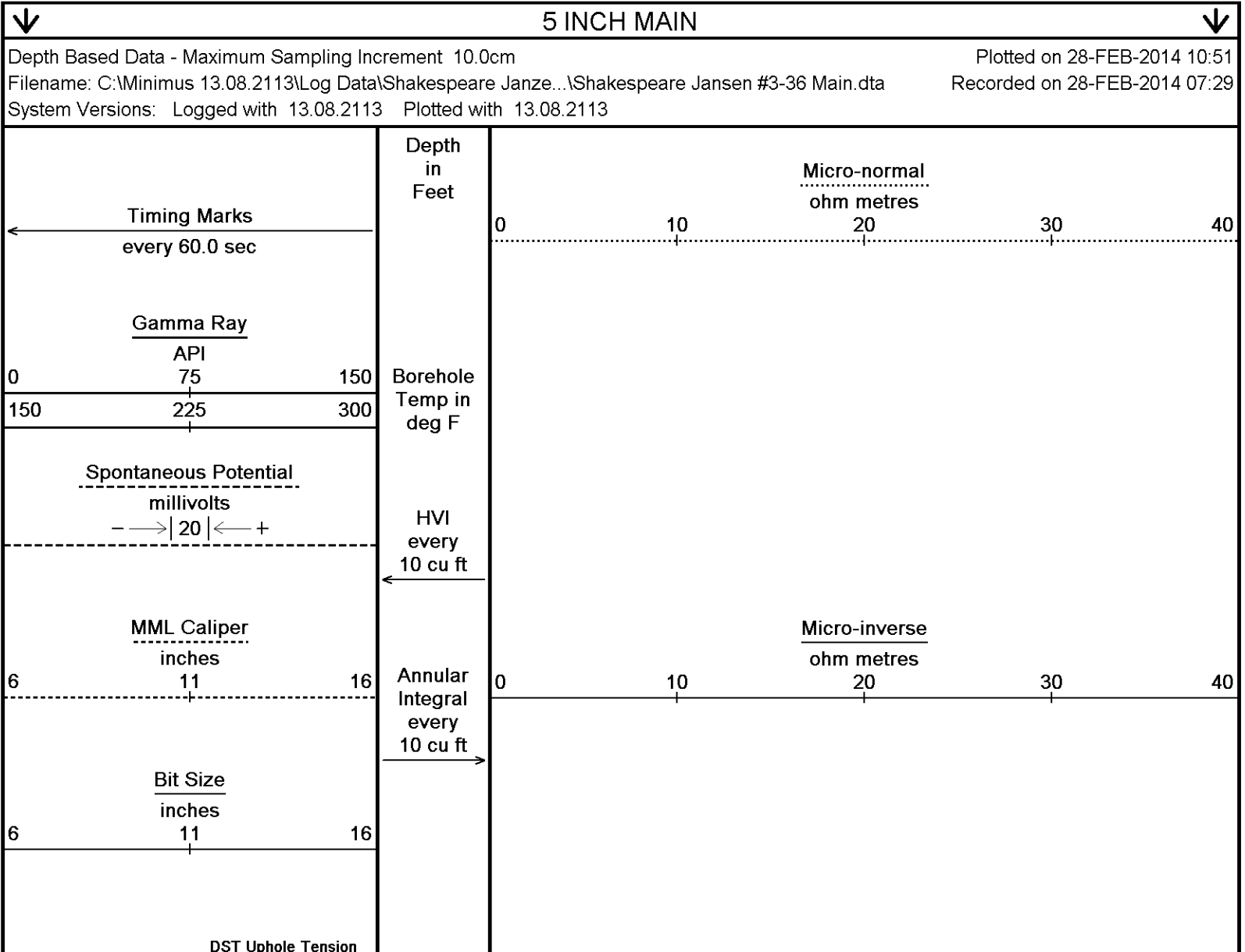
|                                         |                          |         |                |  |             |  |  |
|-----------------------------------------|--------------------------|---------|----------------|--|-------------|--|--|
| COMPANY                                 | SHAKESPEARE OIL CO., INC |         |                |  |             |  |  |
| WELL                                    | JANZEN #3-36             |         |                |  |             |  |  |
| FIELD                                   | CAPSTONE EAST            |         |                |  |             |  |  |
| PROVINCE/COUNTY                         | SCOTT                    |         |                |  |             |  |  |
| COUNTRY/STATE                           | U.S.A / KANSAS           |         |                |  |             |  |  |
| LOCATION                                | 915' FSL & 1880' FWL     |         |                |  |             |  |  |
| SEC 36                                  | TWP 16S                  | RGE 34W | Other Services |  | MPD/MDN     |  |  |
| Latitude                                | 38.615082                |         | MAI/MFE        |  |             |  |  |
| Longitude                               | 101.029757               |         |                |  |             |  |  |
| API Number                              | 15-171-21026             |         |                |  |             |  |  |
| Permanent Datum Gl, Elevation 3102 feet |                          |         |                |  | Elevations: |  |  |
| Log Measured From KB                    |                          |         |                |  | KB 3114.00  |  |  |
| Drilling Measured From KB @ 12 FEET     |                          |         |                |  | DF 3112.00  |  |  |
|                                         |                          |         |                |  | GL 3102.00  |  |  |
| Date                                    | 28-FEB-2014              |         |                |  |             |  |  |
| Run Number                              | ONE                      |         |                |  |             |  |  |
| Service Order                           | 7036-80773435            |         |                |  |             |  |  |
| Depth Driller                           | 4880.00                  |         |                |  | feet        |  |  |
| Depth Logger                            | 4874.00                  |         |                |  | feet        |  |  |
| First Reading                           | 4840.76                  |         |                |  | feet        |  |  |
| Last Reading                            | 3874.00                  |         |                |  | feet        |  |  |
| Casing Driller                          | 264.00                   |         |                |  | feet        |  |  |
| Casing Logger                           | 265.00                   |         |                |  | feet        |  |  |
| Bit Size                                | 7.875                    |         |                |  | inches      |  |  |
| Hole Fluid Type                         | CHEMICAL                 |         |                |  |             |  |  |
| Density / Viscosity                     | 9.10 lb/USg              |         | 48.00 CP       |  |             |  |  |
| PH / Fluid Loss                         | 10.00                    |         | 8.80 ml/30Min  |  |             |  |  |
| Sample Source                           | MUDPIT                   |         |                |  |             |  |  |
| Rm @ Measured Temp                      | 0.38 @ 75.0              |         |                |  | ohm-m       |  |  |
| Rmf @ Measured Temp                     | 0.31 @ 75.0              |         |                |  | ohm-m       |  |  |
| Rmc @ Measured Temp                     | 0.46 @ 75.0              |         |                |  | ohm-m       |  |  |
| Source Rmf / Rmc                        | CALC                     |         | CALC           |  |             |  |  |
| Rm @ BHT                                | 0.26 @111.0              |         |                |  | ohm-m       |  |  |
| Time Since Circulation                  | 4 HOURS                  |         |                |  |             |  |  |
| Max Recorded Temp                       | 112.00                   |         |                |  | deg F       |  |  |
| Equipment / Base                        | 13096                    |         | LIB            |  |             |  |  |
| Recorded By                             | DEREK CARTER             |         |                |  | BEN WELDIN  |  |  |
| Witnessed By                            | MARK HERNDON             |         |                |  |             |  |  |
| JOB #                                   | LB14-057                 |         |                |  |             |  |  |

| BOREHOLE RECORD    |                |                    |                    |                     | Last Edited: 28-FEB-2014 10:34 |
|--------------------|----------------|--------------------|--------------------|---------------------|--------------------------------|
| Bit Size<br>inches |                | Depth From<br>feet |                    | Depth To<br>feet    |                                |
| 7.875              |                | 264.00             |                    | 4880.00             |                                |
| CASING RECORD      |                |                    |                    |                     |                                |
| Type               | Size<br>inches | Depth From<br>feet | Shoe Depth<br>feet | Weight<br>pounds/ft |                                |
| SURFACE            | 8.625          | 0.00               | 264.00             | 24.00               |                                |

| REMARKS                                                                                                      |
|--------------------------------------------------------------------------------------------------------------|
| - SOFTWARE ISSUE: WLS 13.08.2113                                                                             |
| - TOOL STRING: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION                                               |
| - HARDWARE:<br>MDN: DUAL BOWSPRING ECCENTRALIZER<br>MFE: 1 X 0.5 INCH STANDOFF<br>MAI: 2 X 0.5 INCH STANDOFF |
| - 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY                                              |
| - BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY                                      |
| - ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST                                                     |
| - TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 2020 CU. FT.                                                  |
| - ANNUILLAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO 3874 FT : 180 CU. FT.                                |

- SERVICE ORDER # 7036-80773435  
 - RIG: SOUTHWIND #70  
 - ENGINEER: DEREK CARTER  
 - JUNIOR FIELD ENGINEER: BEN WELDIN  
 - OPERATORS: KEN RINEHART  
 - WELL SITE GEOLOGIST AND DRILLER STATED THAT THEY WERE HAVING PROBLEMS WITH THEIR GEOLOGRAPH AND THAT THE LOGGERS TD OF 4874 FT. WAS ACCEPTABLE; DRILLERS TD WAS 4880 FT.

In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.



pounds  
5000 0

Replay  
Scale  
1:240

3872

3900

103°

3950

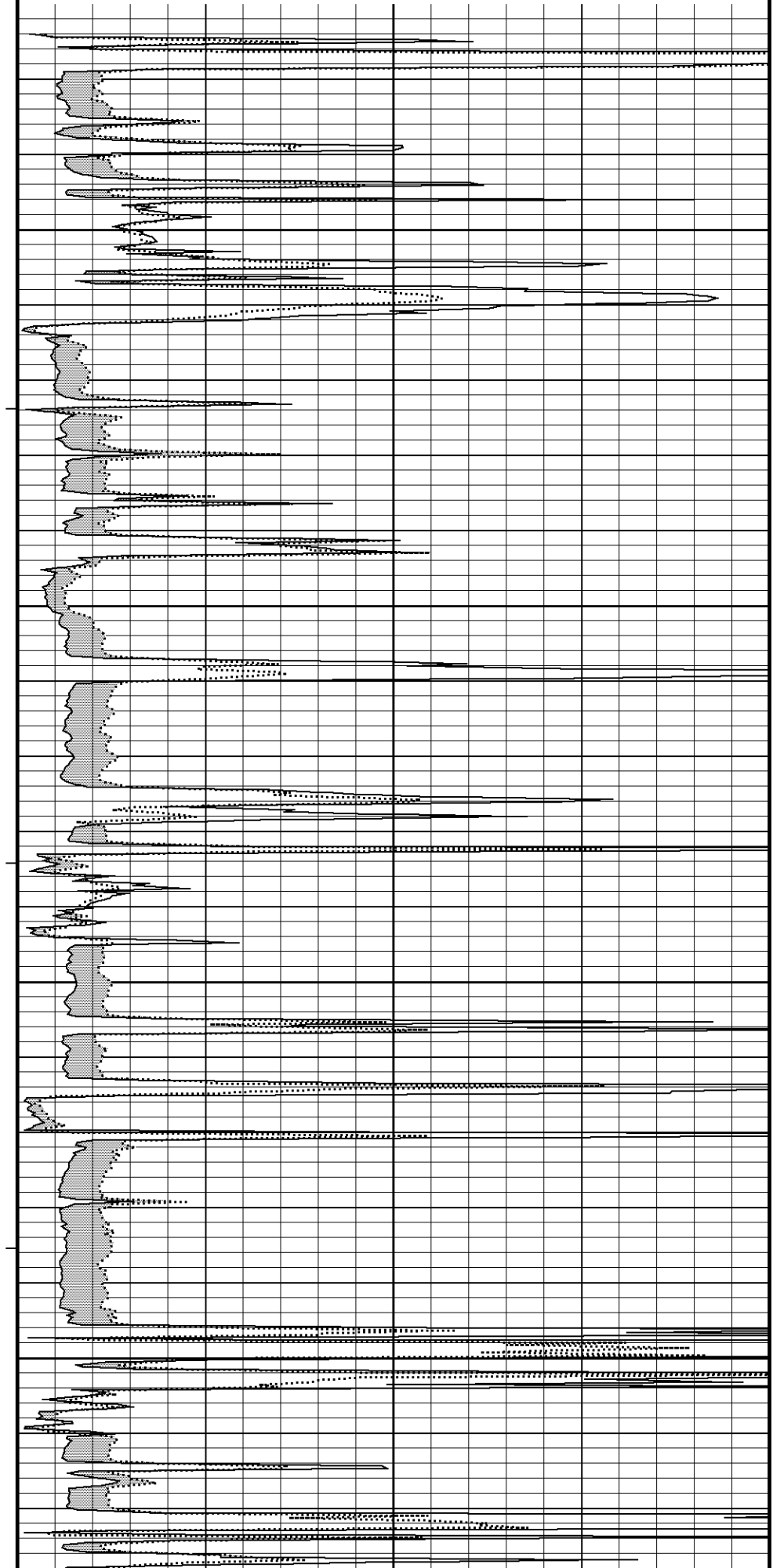
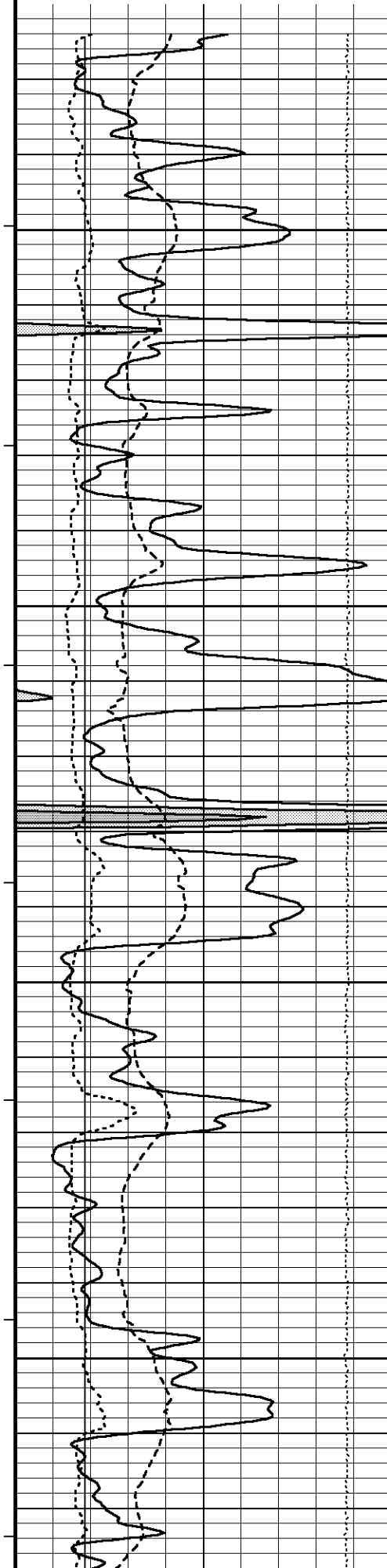
103°

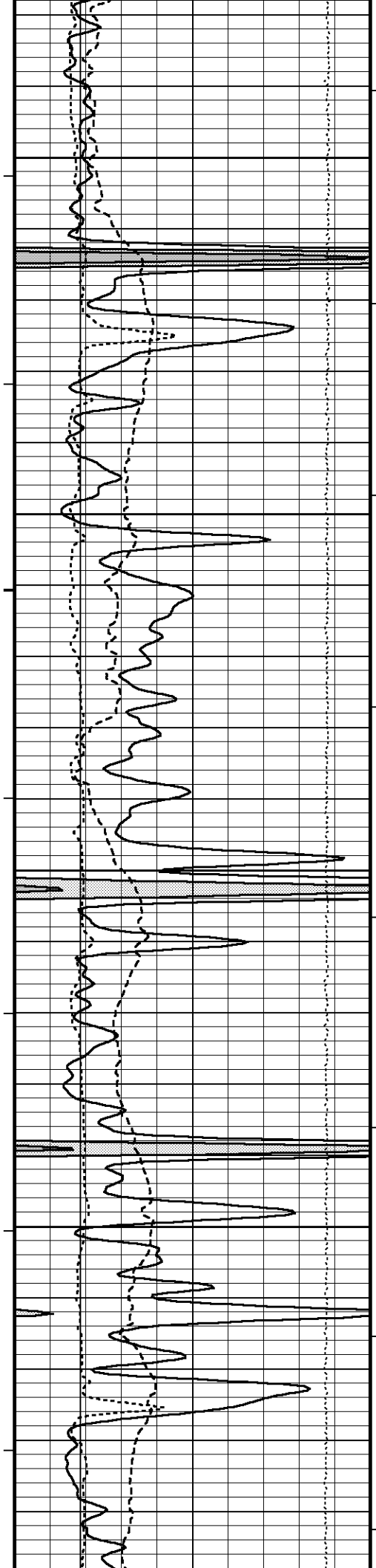
4000

300

104°

4050





104°

4100

104°

4150

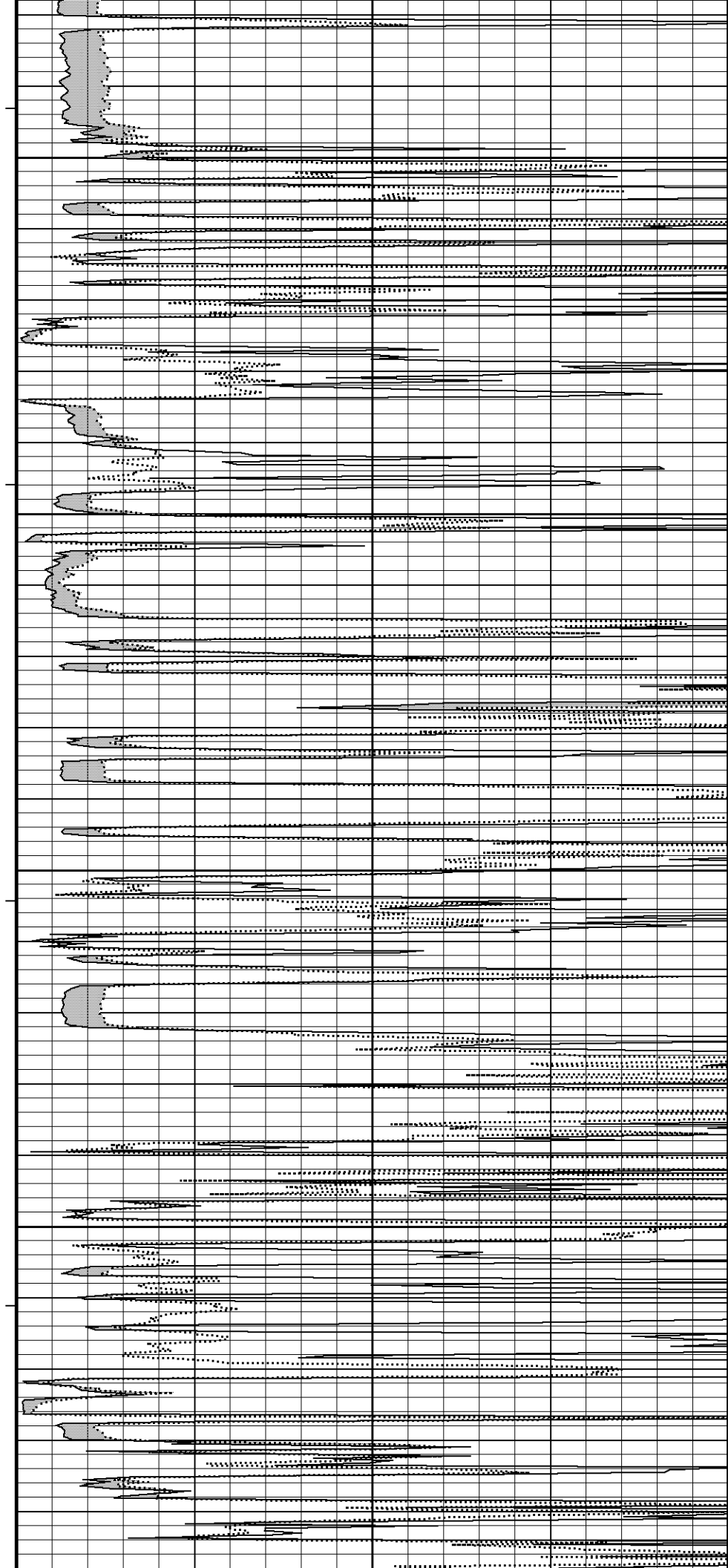
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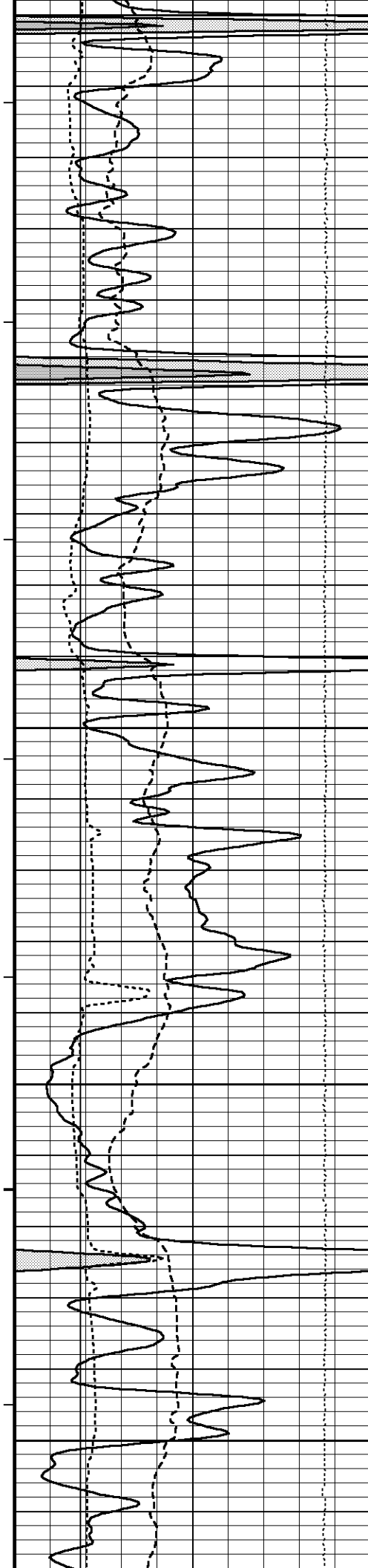
4200

105°

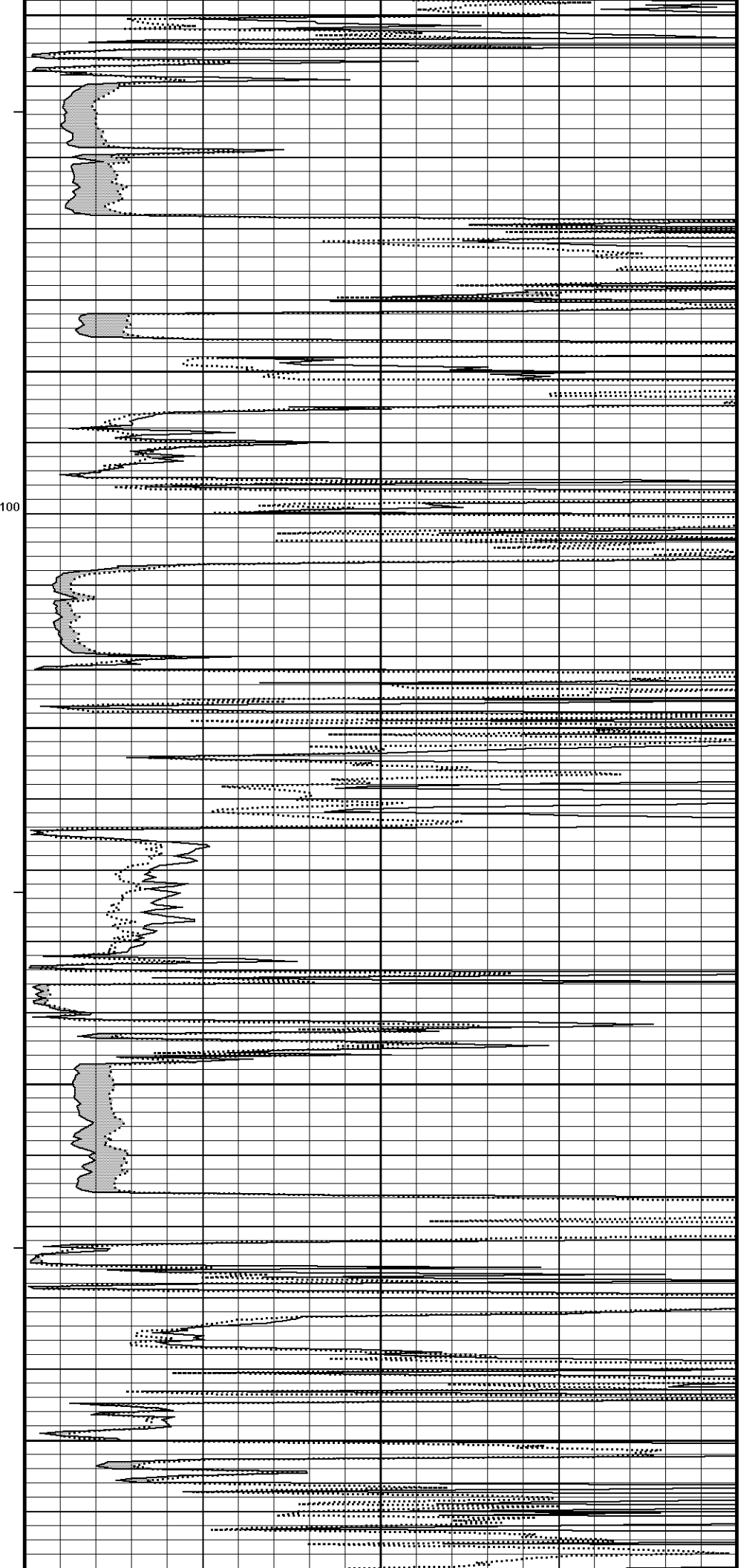
4250

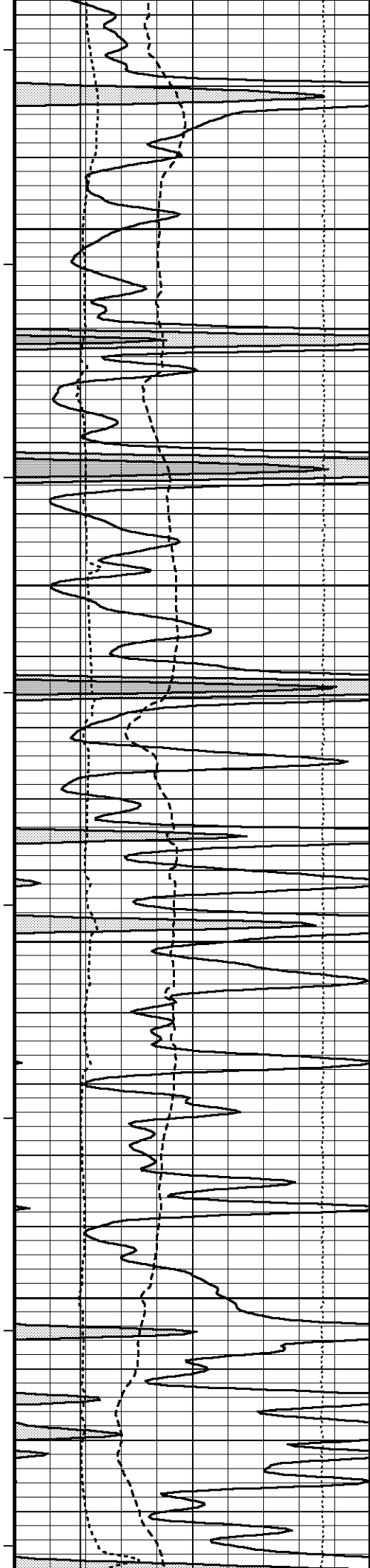
105°





4300  
200  
105°  
4350  
100  
106°  
4400  
107°  
4450  
108°  
4500





108°

4550

109°

100 4600

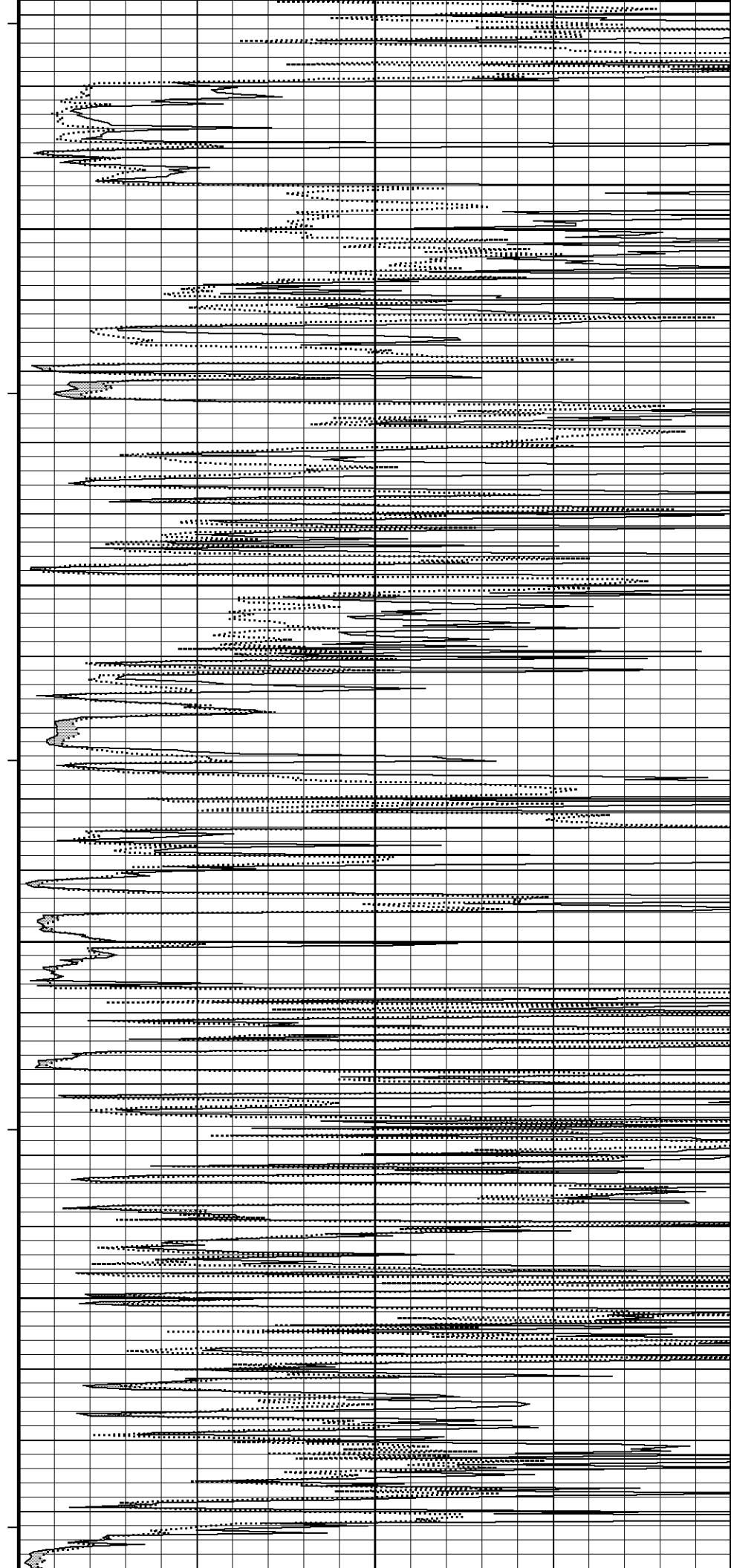
110°

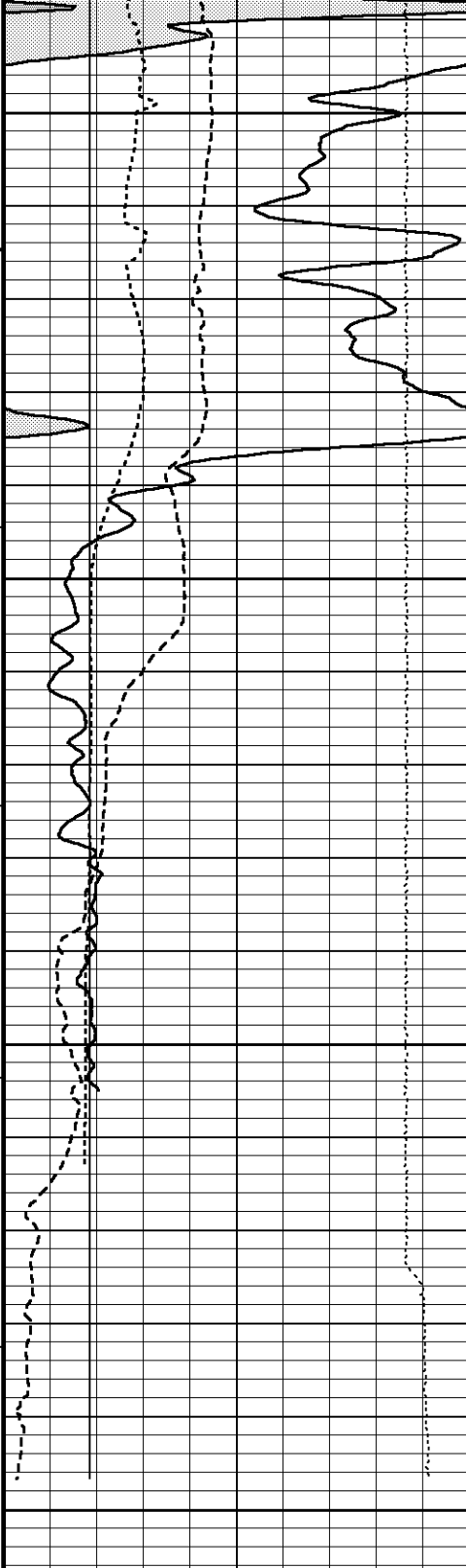
4650

111°

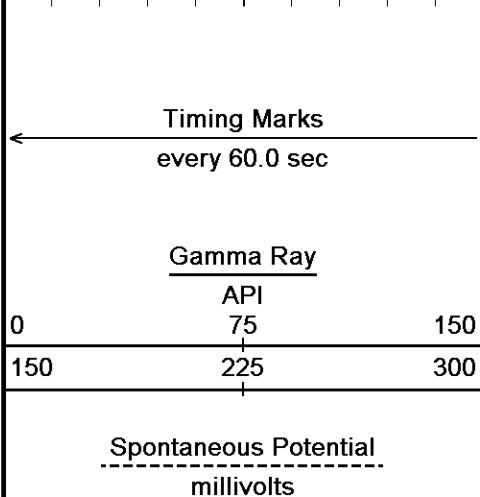
4700

111°



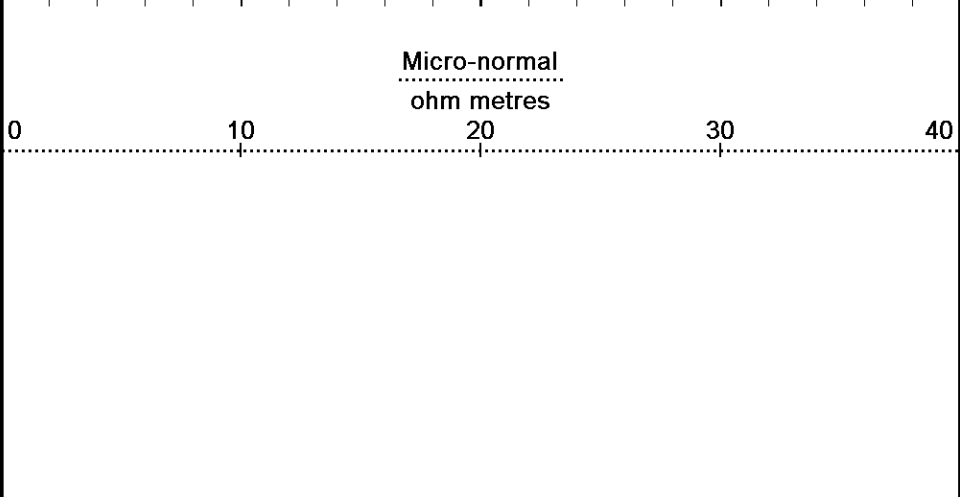
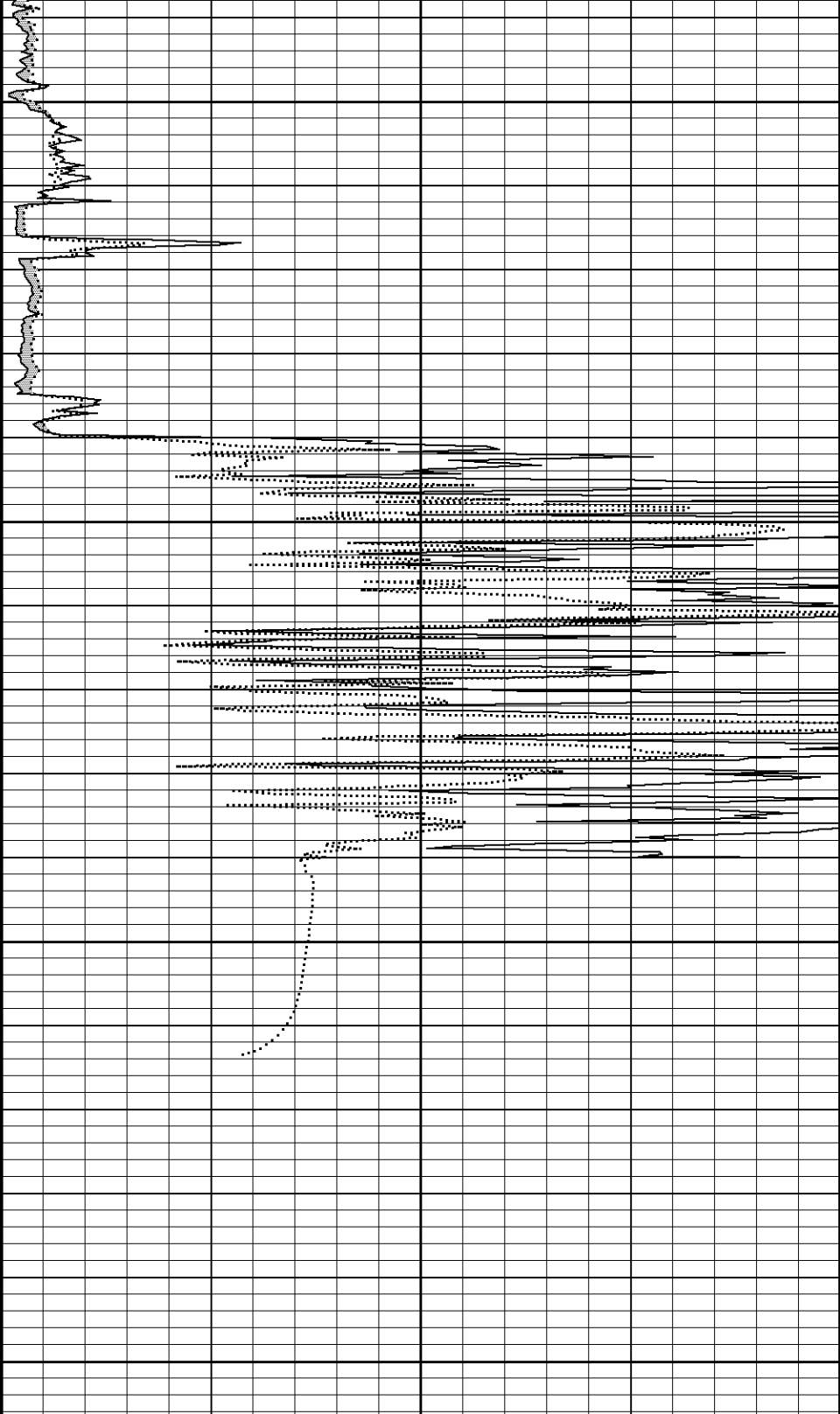


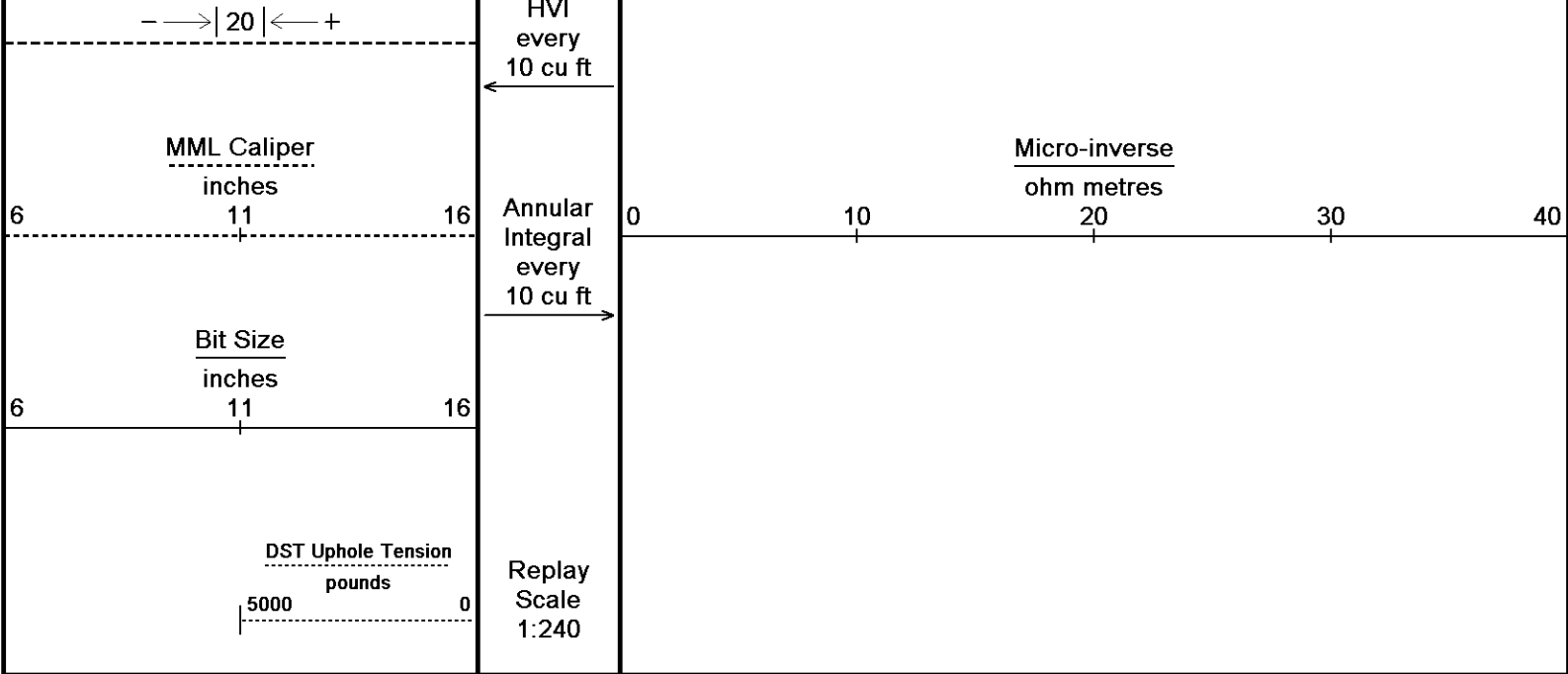
4750  
112°  
4800  
111°  
4850  
0  
4900



Depth  
in  
Feet

Borehole  
Temp in  
deg F





Depth Based Data - Maximum Sampling Increment 10.0cmPlotted on 28-FEB-2014 10:51

Filename: C:\Minimus 13.08.2113\Log Data\Shakespeare Janze...\Shakespeare Jansen #3-36 Main.dtaRecorded on 28-FEB-2014 07:29

System Versions: Logged with 13.08.2113Plotted with 13.08.2113

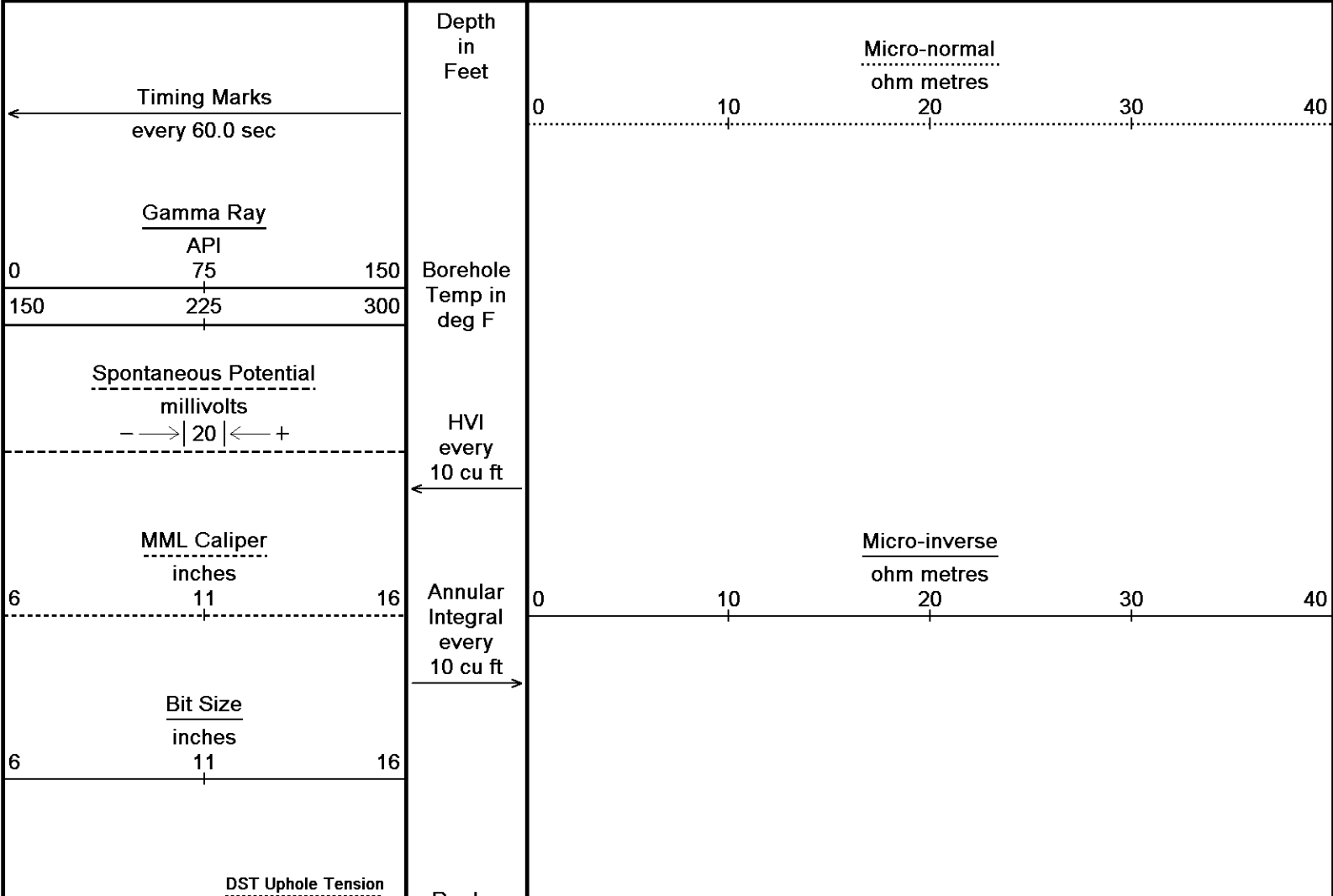
↑5 INCH MAIN↑

↓REPEAT SECTION↓

Depth Based Data - Maximum Sampling Increment 10.0cmPlotted on 28-FEB-2014 10:51

Filename: C:\Minimus 13.08.2113\Log Data\Shakespeare Janze...\Shakespeare Jansen #3-36 Repeat.dtaRecorded on 28-FEB-2014 06:42

System Versions: Logged with 13.08.2113Plotted with 13.08.2113



5000 pounds 0

Replay  
Scale  
1:240

4372

4400

106°

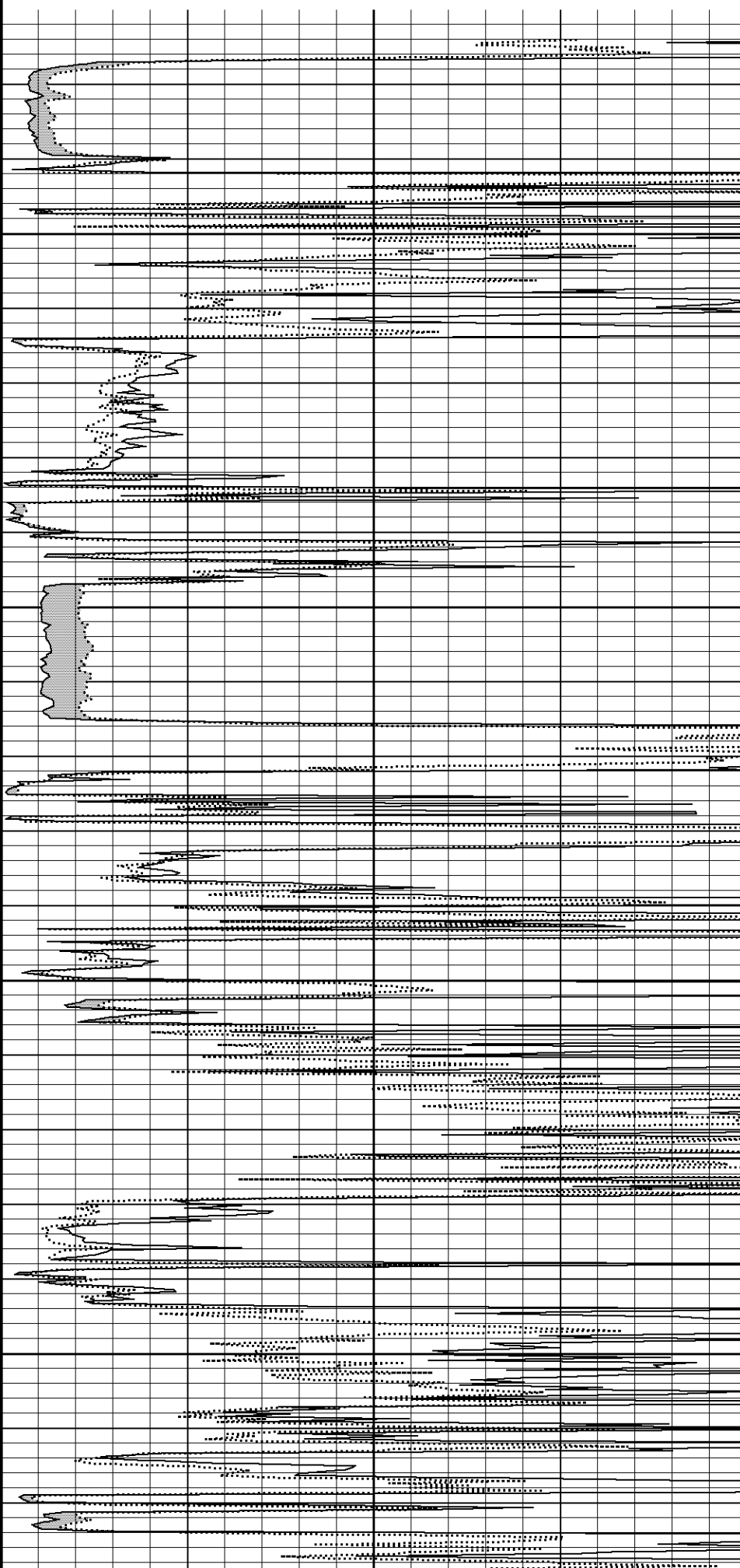
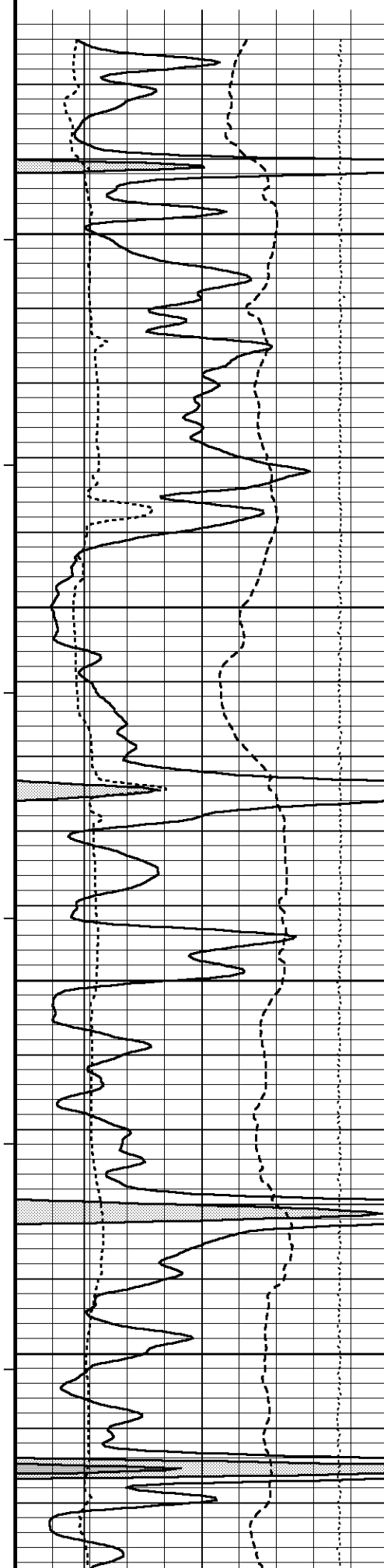
4450

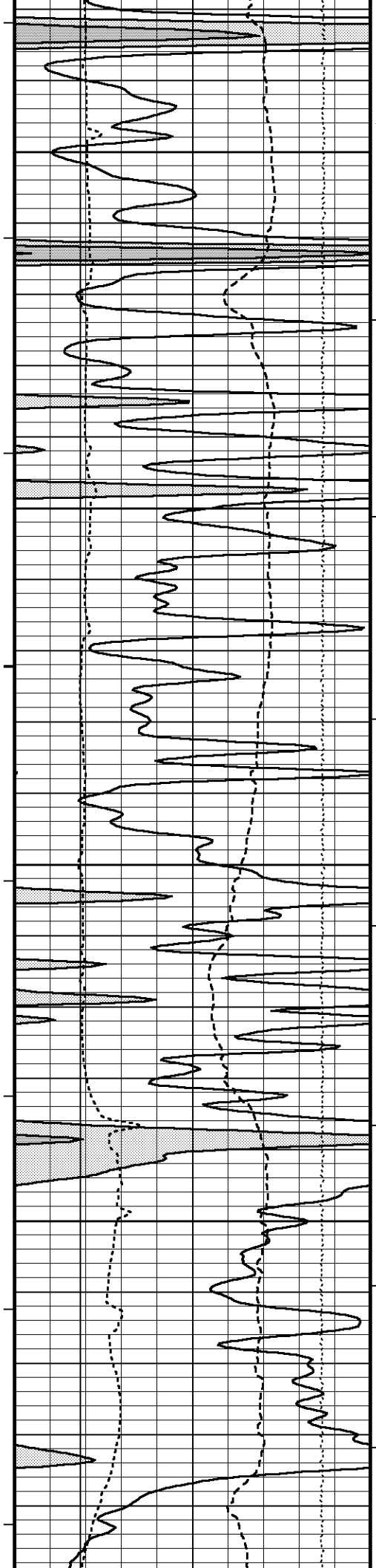
107°

4500

107°

4550





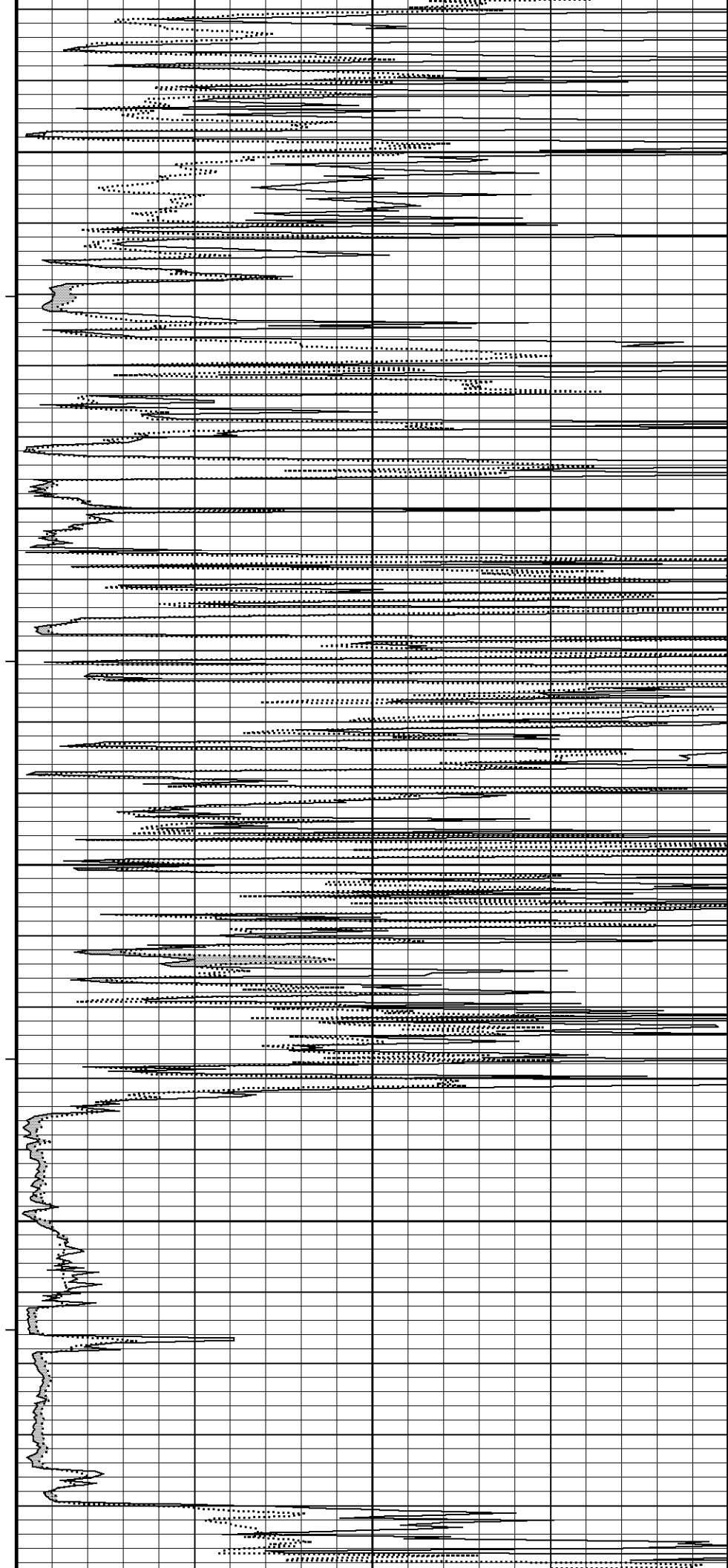
108°  
100  
4600

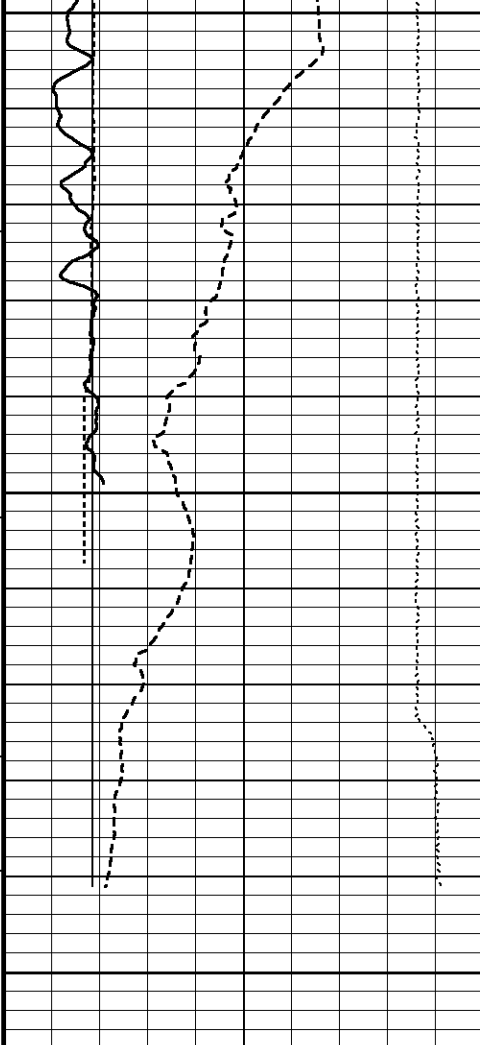
109°  
4650

110°  
4700

110°  
4750

110°





4800

109°

4850

0

4900

Depth  
in  
Feet

Timing Marks  
every 60.0 sec

Gamma Ray  
API  
0 75 150  
150 225 300

Borehole  
Temp in  
deg F

Spontaneous Potential  
millivolts  
- - - - -> | 20 | < - - - - - +

HVI  
every  
10 cu ft

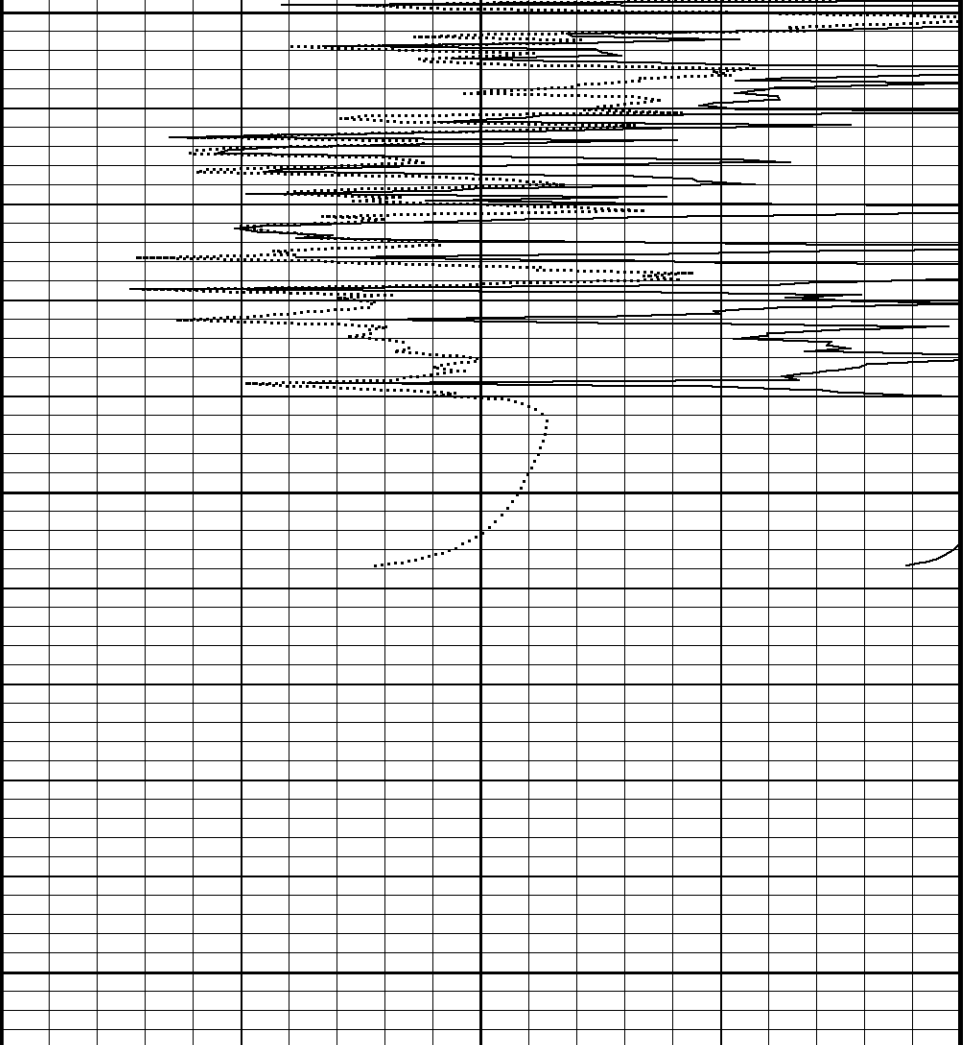
MML Caliper  
inches  
6 11 16

Annular  
Integral  
every  
10 cu ft

Bit Size  
inches  
6 11 16

DST Uphole Tension

Donkey



Micro-normal  
ohm metres

0 10 20 30 40

Micro-inverse  
ohm metres

0 10 20 30 40

Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 28-FEB-2014 10:51  
 Filename: C:\Minimus 13.08.2113\Log Data\Shakespeare Janzen #3-36 Repeat.dta  
 Recorded on 28-FEB-2014 06:42  
 System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

↑ REPEAT SECTION ↑

## BEFORE SURVEY CALIBRATION

C:\Minimus 13.08.2113\Log Data\Shakespeare Janzen #3-36\Shakespeare Jansen #3-36 Main.dta

### General Constants All 000

Last Edited on 28-FEB-2014,05:53

#### General Parameters

|                             |          |            |
|-----------------------------|----------|------------|
| Mud Resistivity             | 0.381    | ohm-metres |
| Mud Resistivity Temperature | 75.000   | 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 | None            |        |

#### Rwa Parameters

|                     |                       |
|---------------------|-----------------------|
| Porosity used       | Crossplot Porosity    |
| Resistivity used    | Array Ind. One Res Rt |
| RWA Constant A      | 1.000                 |
| RWA Constant M      | 2.000                 |
| SW/APOR Tool Source | 0.000                 |

### Gamma Calibration MCG-D.K 442

Field Calibration on 28-FEB-2014 00:52

|                    | Measured | Calibrated (API) |
|--------------------|----------|------------------|
| Background         | 68       | 45               |
| Calibrator (Gross) | 1157     | 770              |
| Calibrator (Net)   | 1089     | 725              |

### Gamma Constants MCG-D.K 442

Last Edited on 28-FEB-2014,04:18

|                               |                 |       |
|-------------------------------|-----------------|-------|
| Gamma Calibrator Number       | GRC038          |       |
| Mud Density                   | 1.09            | gm/cc |
| Caliper Source for Processing | Density Caliper |       |
| Tool Position                 | Eccentred       |       |
| Concentration of KCl          |                 | kppm  |
| K Mud Type                    | Chloride        |       |
| K Mud Concentration           | 0.00            | %     |

### High Resolution Temperature Constants MCG-D.K 442

Last Edited on

|                   |    |
|-------------------|----|
| Pre-filter Length | 11 |
|-------------------|----|

### Caliper Calibration MML-A 3

Base Calibration on 22-FEB-2014 12:08  
 Field Calibration on 28-FEB-2014 00:30

#### Base Calibration

| Reading No | Measured | Calibrator Size (in) |
|------------|----------|----------------------|
| 1          | 14697    | 5.98                 |
| 2          | 17926    | 7.97                 |
| 3          | 21145    | 9.86                 |
| 4          | 25044    | 11.92                |
| 5          | 0        | 0.00                 |
| 6          | N/A      | N/A                  |

#### Field Calibration

|                       |                     |
|-----------------------|---------------------|
| Measured Caliper (in) | Actual Caliper (in) |
| 7.95                  | 7.97                |

## Base Calibration

| Channel       | Measured           |            | Calibrated (ohm-m)  |            |
|---------------|--------------------|------------|---------------------|------------|
|               | Resistor 1         | Resistor 2 | Resistor 1          | Resistor 2 |
| Micro Normal  | 10.0               | 50.0       | 5.1                 | 25.6       |
| Micro Inverse | 10.0               | 49.9       | 3.4                 | 16.9       |
|               |                    |            |                     |            |
| Channel       | Base Check (ohm-m) |            | Field Check (ohm-m) |            |
|               |                    |            |                     |            |
| Micro Normal  | 77.3               |            | 77.3                |            |
| Micro Inverse | 51.2               |            | 51.2                |            |

## Micro Normal and Micro Inverse Constants MML-A 3

Last Edited on 28-FEB-2014,04:22

|                        |                                             |        |  |
|------------------------|---------------------------------------------|--------|--|
| Pad Type               | 8-12 in Soft Rubber Inflatable 006-9011-159 |        |  |
| Micro Normal K Factor  | 0.5110                                      |        |  |
| Micro Inverse K Factor | 0.3380                                      |        |  |
| Standoff Offset        | N/A                                         | inches |  |

## Caliper Calibration MPD-C.A 216

Base Calibration on 22-FEB-2014,15:53

Field Calibration on 28-FEB-2014 00:33

| Base Calibration  |                       |                      |
|-------------------|-----------------------|----------------------|
| Reading No        | Measured              | Calibrator Size (in) |
| 1                 | 16592                 | 3.99                 |
| 2                 | 26576                 | 5.98                 |
| 3                 | 36592                 | 7.97                 |
| 4                 | 46339                 | 9.86                 |
| 5                 | 57568                 | 11.92                |
| 6                 | N/A                   | N/A                  |
|                   |                       |                      |
| Field Calibration |                       |                      |
|                   | Measured Caliper (in) | Actual Caliper (in)  |
|                   | 7.94                  | 7.97                 |

## DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Log Data\Shakespeare Janzen #3-36\Shakespeare Jansen #3-36 Main.dta

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

MCB-C.A 5 LG: 1.58 ft WT: 15.4 lb OD: 2.244 in

Compact Comms Gamma

MCG-D.K 442 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-log

MML-A 3 LG: 7.97 ft WT: 81.6 lb OD: 2.240 in

Compact Neutron

MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper

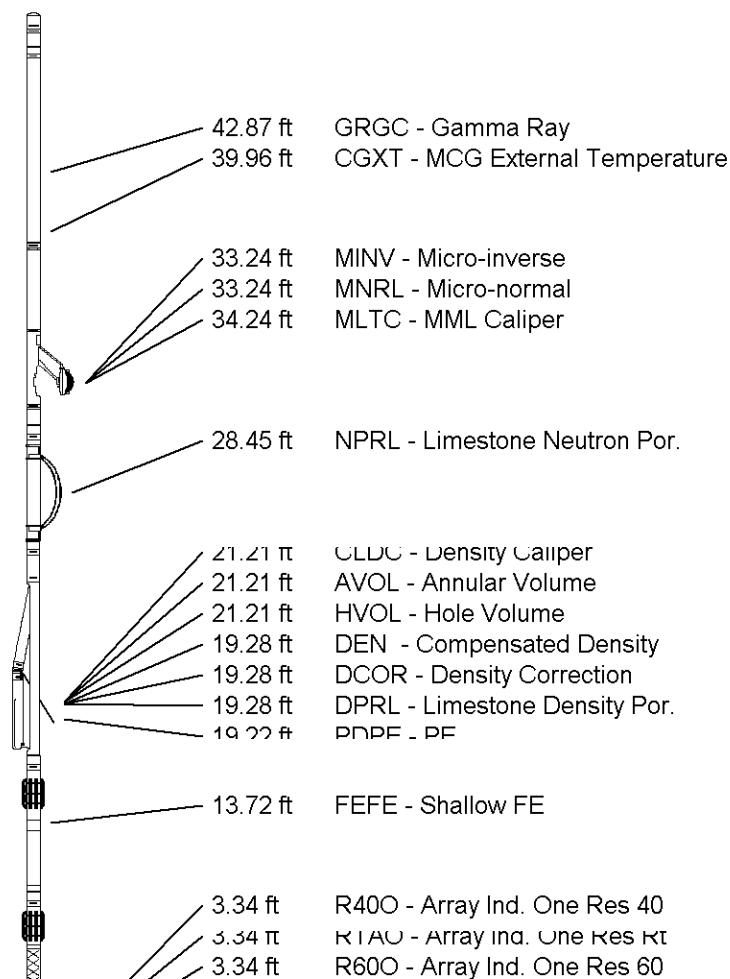
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric

MFE-A.A 135 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Induction

MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in



Total Length: 49.73 ft Weight: 399.0 lb



0.23 ft SPCG - Spontaneous Potential  
Tool Zero (0.13ft from bottom)  
-0.13 ft SMTU - DST Uphole Tension  
All measurements relative to tool zero.

|                 |                          |
|-----------------|--------------------------|
| COMPANY         | SHAKESPEARE OIL CO., INC |
| WELL            | JANZEN #3-36             |
| FIELD           | CAPSTONE EAST            |
| PROVINCE/COUNTY | SCOTT                    |
| COUNTRY/STATE   | U.S.A / KANSAS           |

|                         |         |      |               |         |      |
|-------------------------|---------|------|---------------|---------|------|
| Elevation Kelly Bushing | 3114.00 | feet | First Reading | 4840.76 | feet |
| Elevation Drill Floor   | 3112.00 | feet | Depth Driller | 4880.00 | feet |
| Elevation Ground Level  | 3102.00 | feet | Depth Logger  | 4874.00 | feet |



**Weatherford®**

MICRORESISTIVITY LOG