



**Weatherford**<sup>®</sup>

**MICRORESISTIVITY LOG**

COMPANY	SHAKESPEARE OIL. CO., INC.		
WELL	CAMPBELL 4-17		
FIELD	WILDCAT		
PROVINCE/COUNTY	LOGAN		
COUNTRY/STATE	U.S.A. / KANSAS		
LOCATION	850' FSL & 2000' FEL		
PERMIT NUMBER	SE NW SW SE		
SEC 17	TWP 13S	RGE 32W	Other Services
Latitude			MA/IMFE
Longitude			MSS
API Number	15-109-21293		
Permanent Datum GL, Elevation	3033 feet		
Log Measured From	KB		
Drilling Measured From	KB @ 10 FEET		
Date	11-JUN-2014		
Run Number	ONE		
Service Order	5872-89695834		
Depth Driller	4720.00	feet	
Depth Logger	4716.00	feet	
First Reading	4670.00	feet	
Last Reading	3800.00	feet	
Casing Driller	268.00	feet	
Casing Logger	264.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.30 lb/USg	65.00 CP	
PH / Fluid Loss	10.50	8.80 ml/30Min	
Sample Source	MUDDPIT		
Rm @ Measured Temp	0.64 @ 93.0	ohm-m	
Rmf @ Measured Temp	0.51 @ 93.0	ohm-m	
Rmc @ Measured Temp	0.77 @ 93.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.52 @ 113.0	ohm-m	
Time Since Circulation	5 HOURS		
Max Recorded Temp	113.00	deg F	
Equipment / Base	13244	LIB	
Recorded By	D. COLE		
Witnessed By	T. PRIEST		
JOB #	LB14-178		

Elevations:	feet
KB	3043.00
DF	3041.00
GL	3033.00

**BOREHOLE RECORD** Last Edited: 11-JUN-2014 14:01

Bit Size inches	Depth From feet	Depth To feet
7.875	268.00	4720.00

**CASING RECORD**

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
CASING	8.625	0.00	268.00	24.00

**REMARKS**

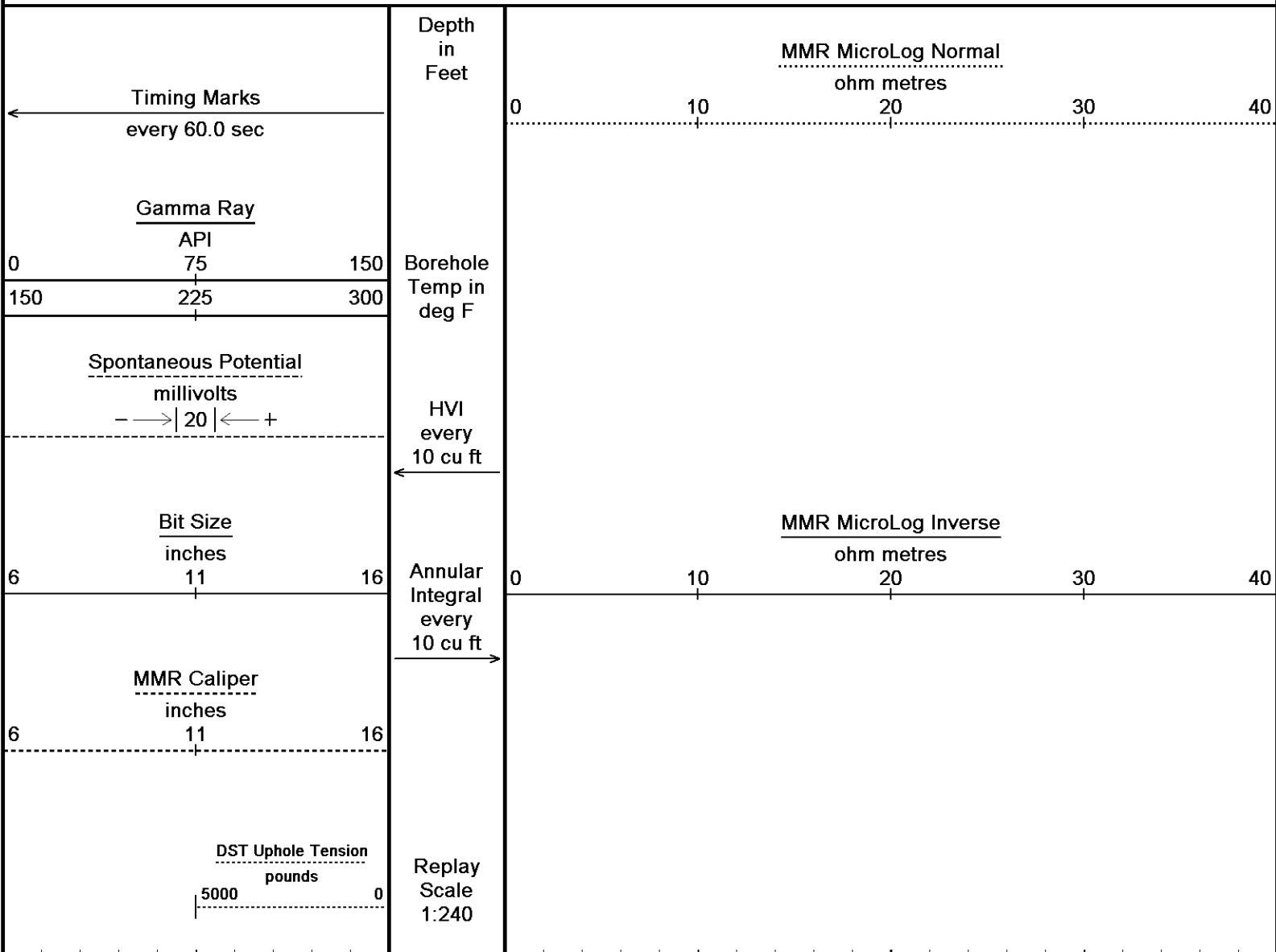
- SOFTWARE ISSUE: WLS 13.08.2113
- TOOLSTRING: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION
- HARDWARE:
  - MDN: DUAL BOWSPRING ECCENTRALIZER
  - MFE: 1 X 0.5 INCH STANDOFF
  - MSS: 2 X 0.5 INCH STANDOFF
  - MAI: 2 X 0.5 INCH STANDOFF
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY
- 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 3800 FEET: 370 CU.FT.

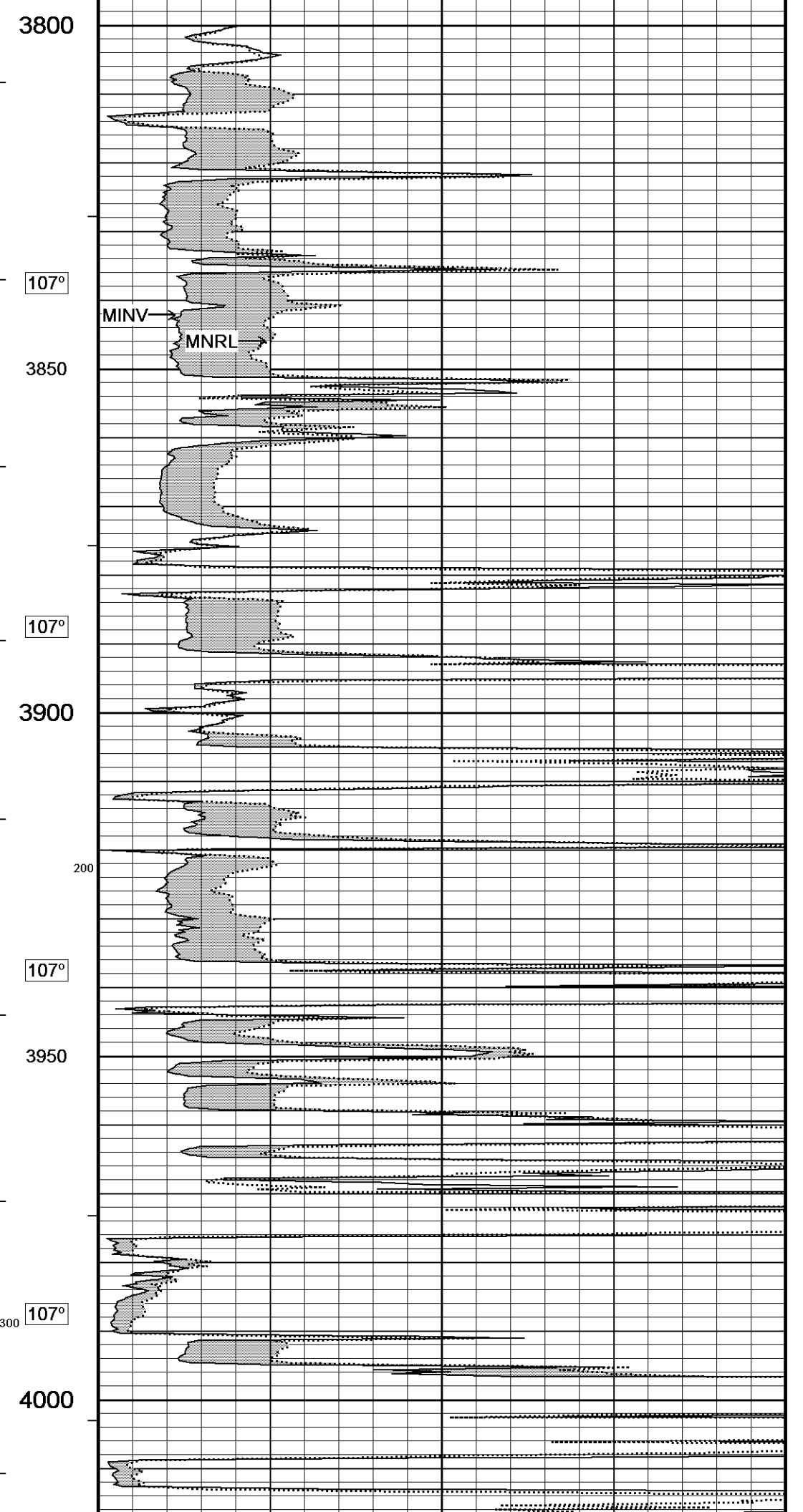
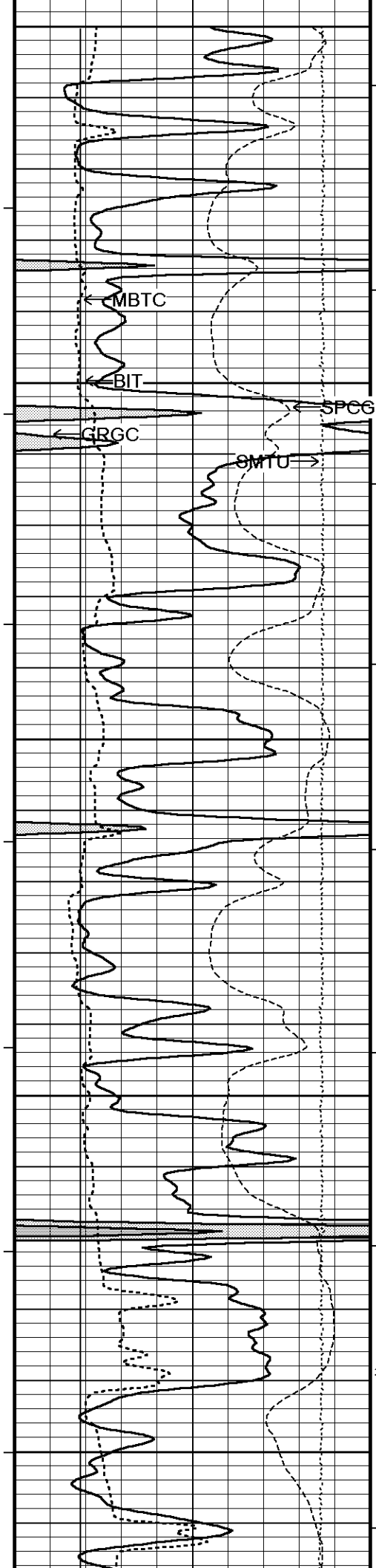
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3800 FEET: 220 CU.FT.
- RIG: HD DRILLING
- ENGINEER: D. COLE
- OPERATOR: K. RINEHART AND D. ALVARADO
- CHLORIDES: 3500

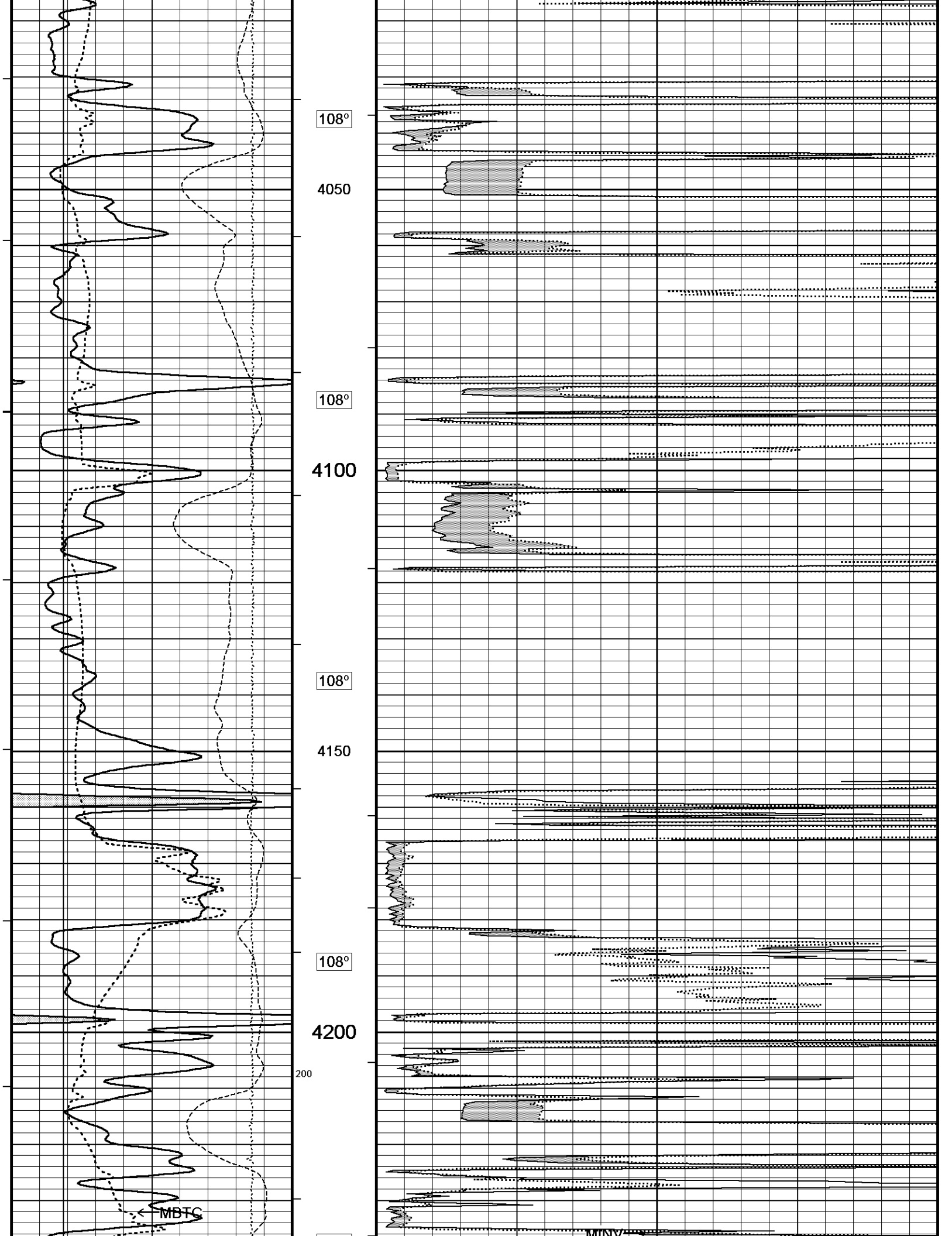
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will 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.

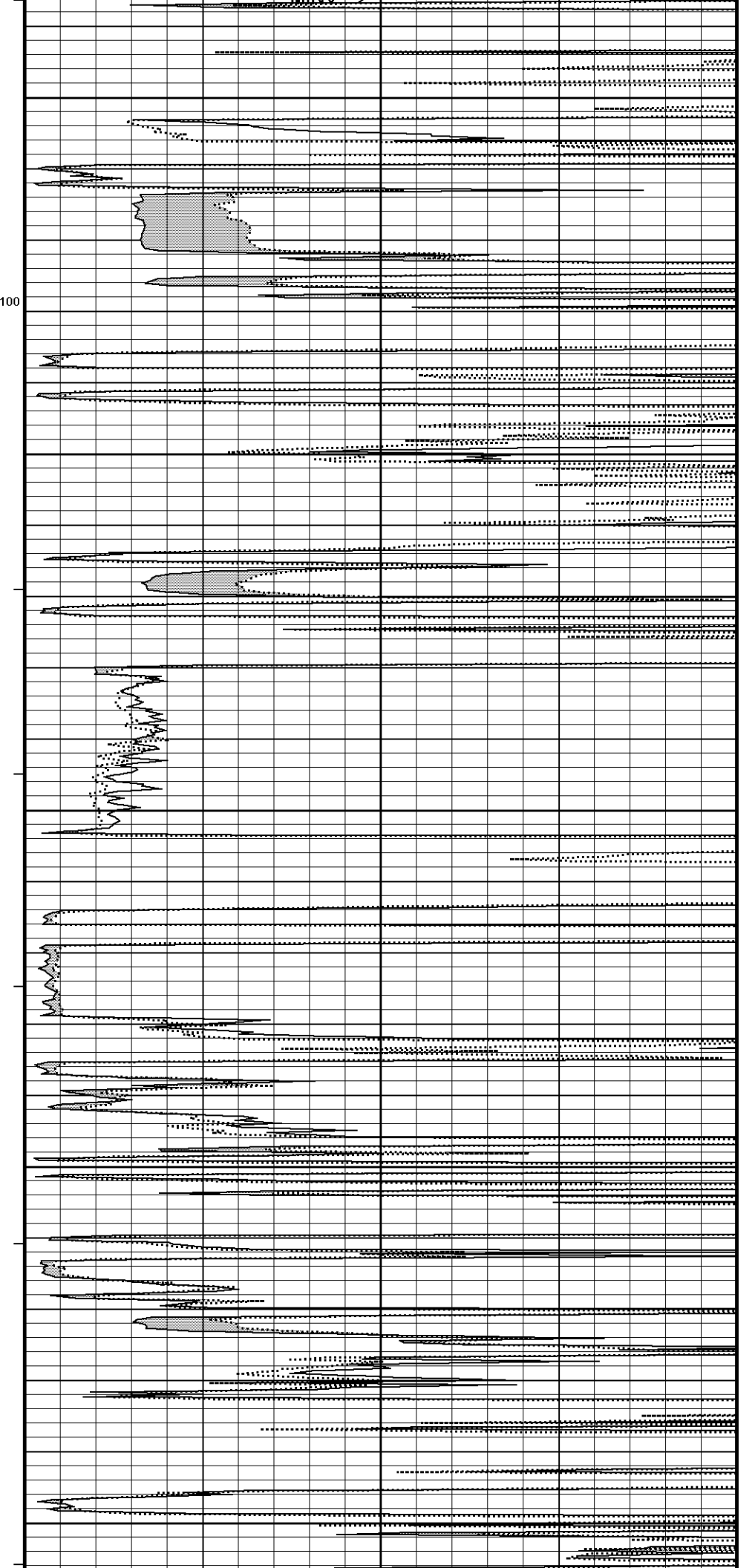
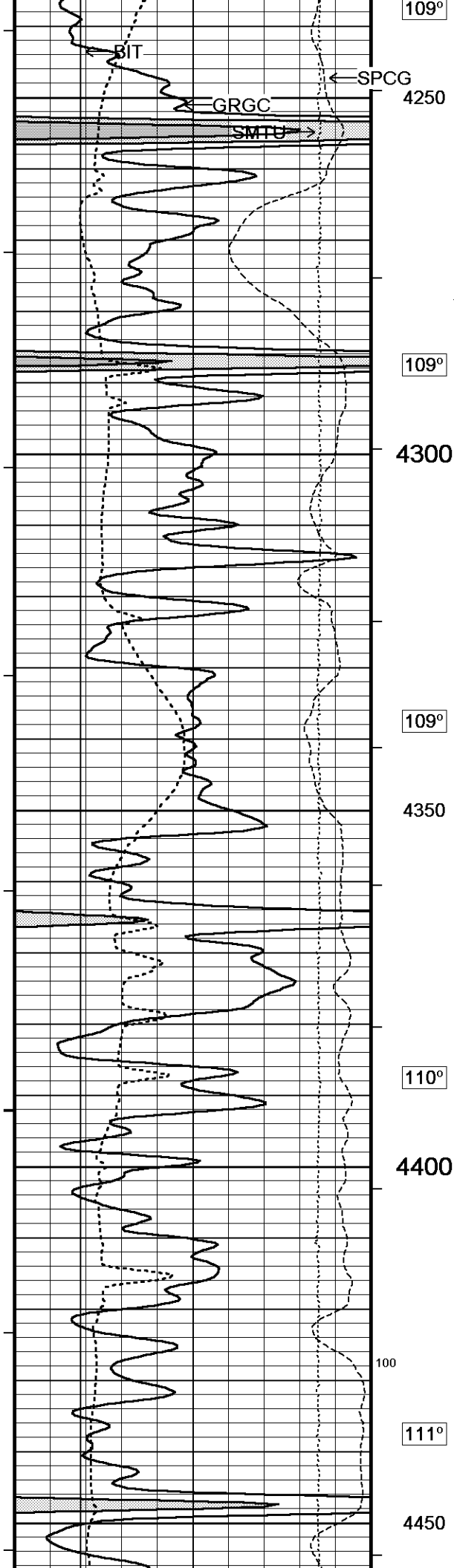
**5 INCH MAIN**

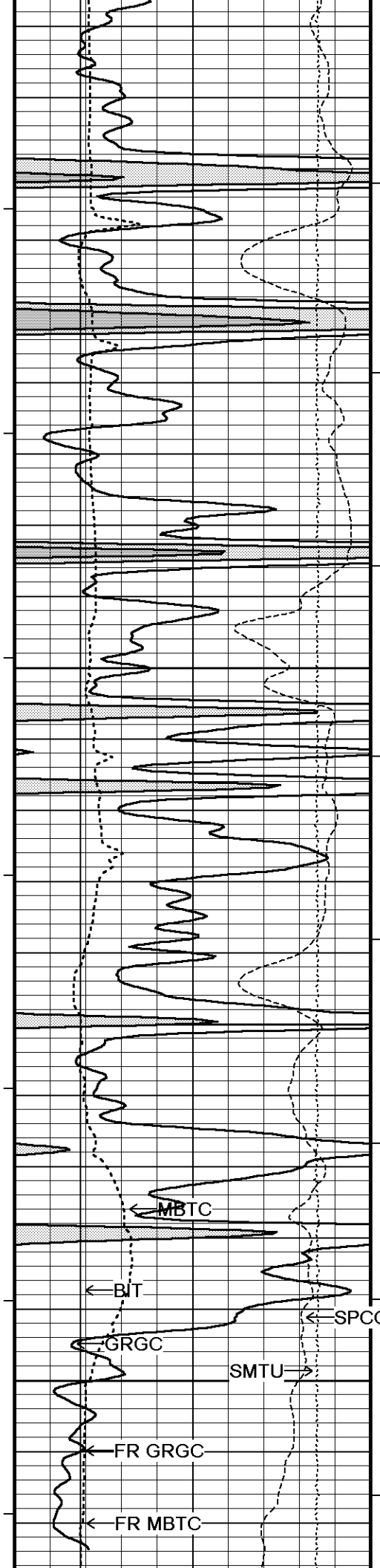
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 11-JUN-2014 19:41  
 Filename: C:\Minimus 13.08.2113\Logs\SHAKESPEA...\SHAKESPEARE CAMPBELL 4-17 DETAIL1.dta  
 System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113











111°

4500

112°

4550

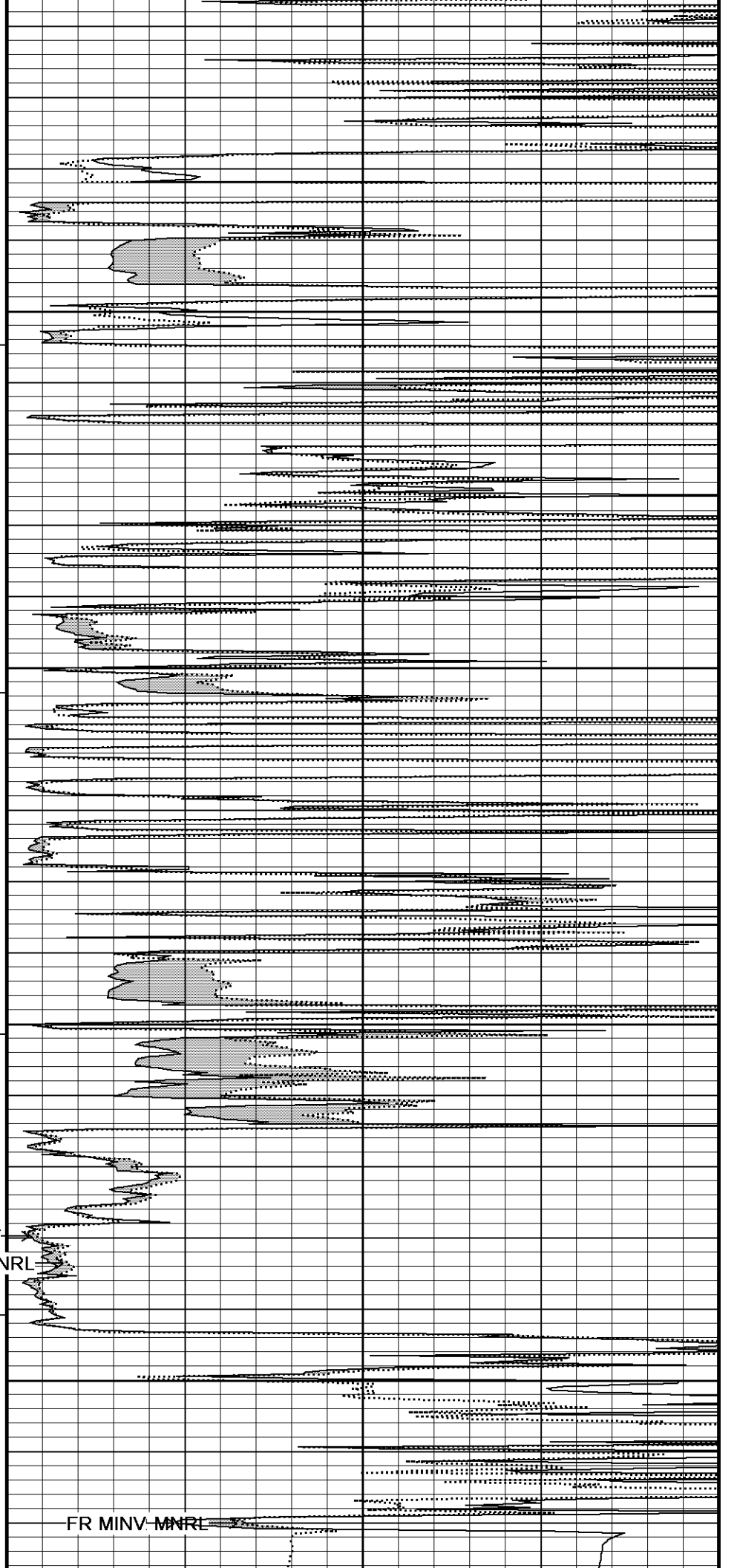
112°

4600

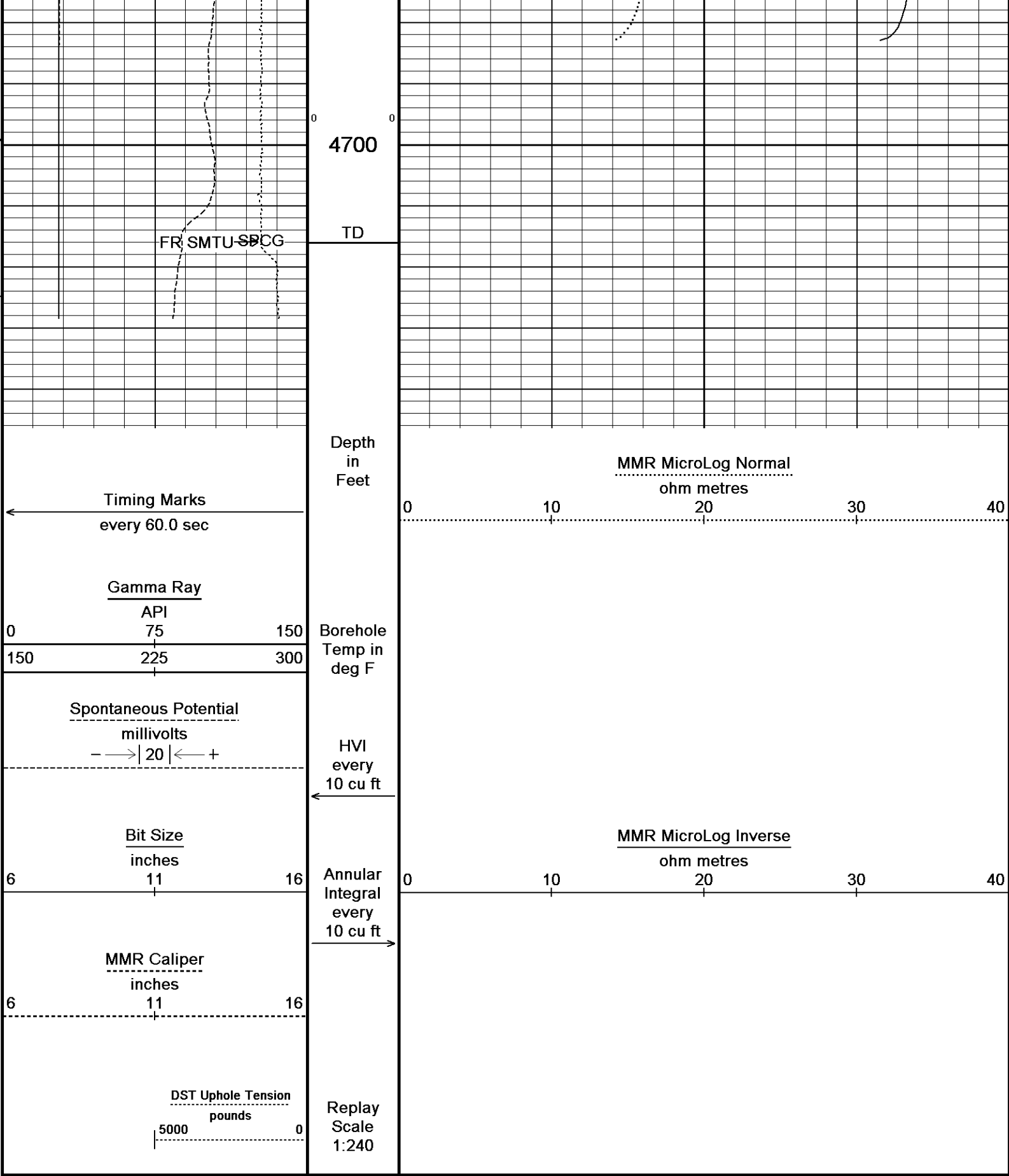
113°

4650

MINV  
MNRL



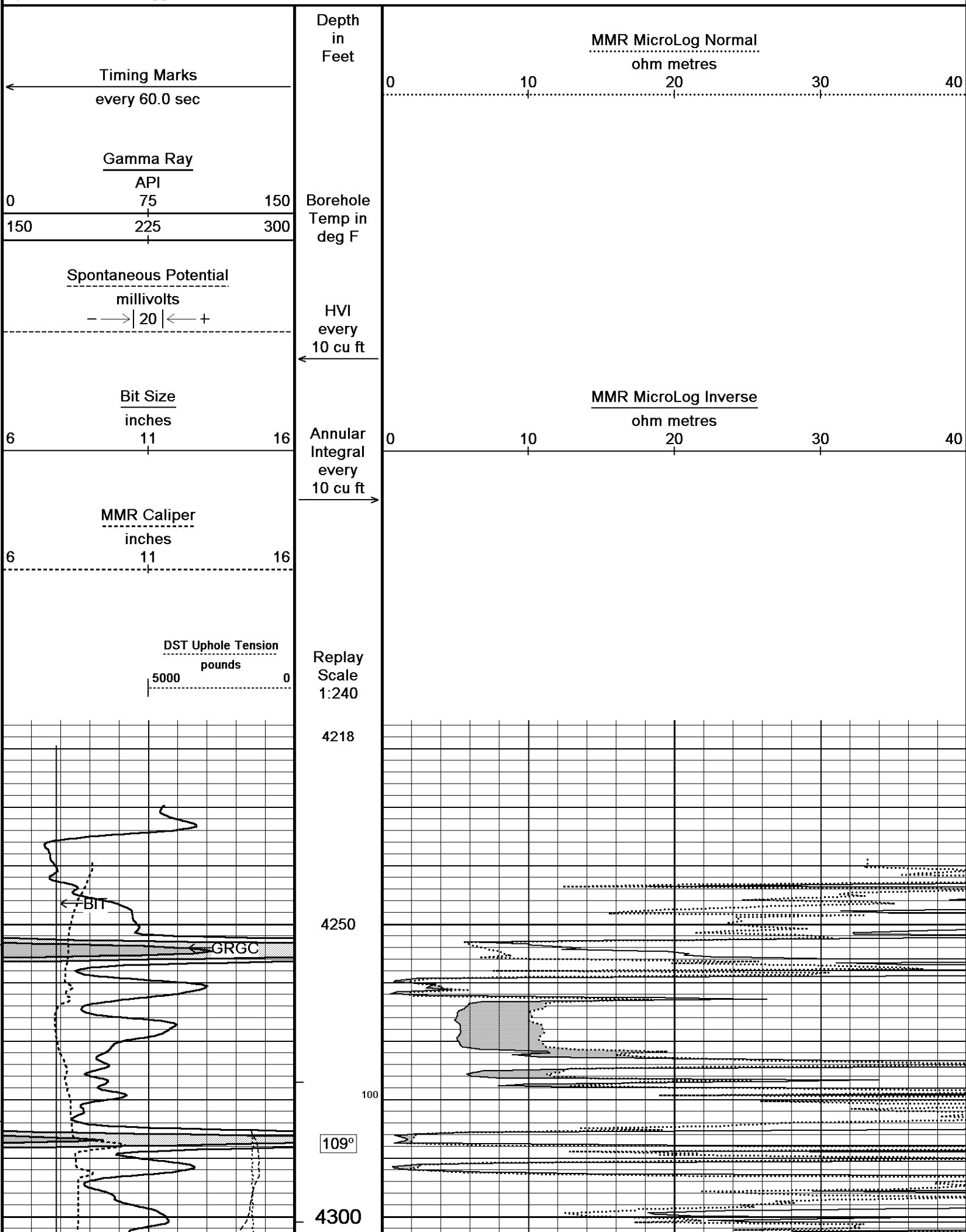
FR MINV-MNRL

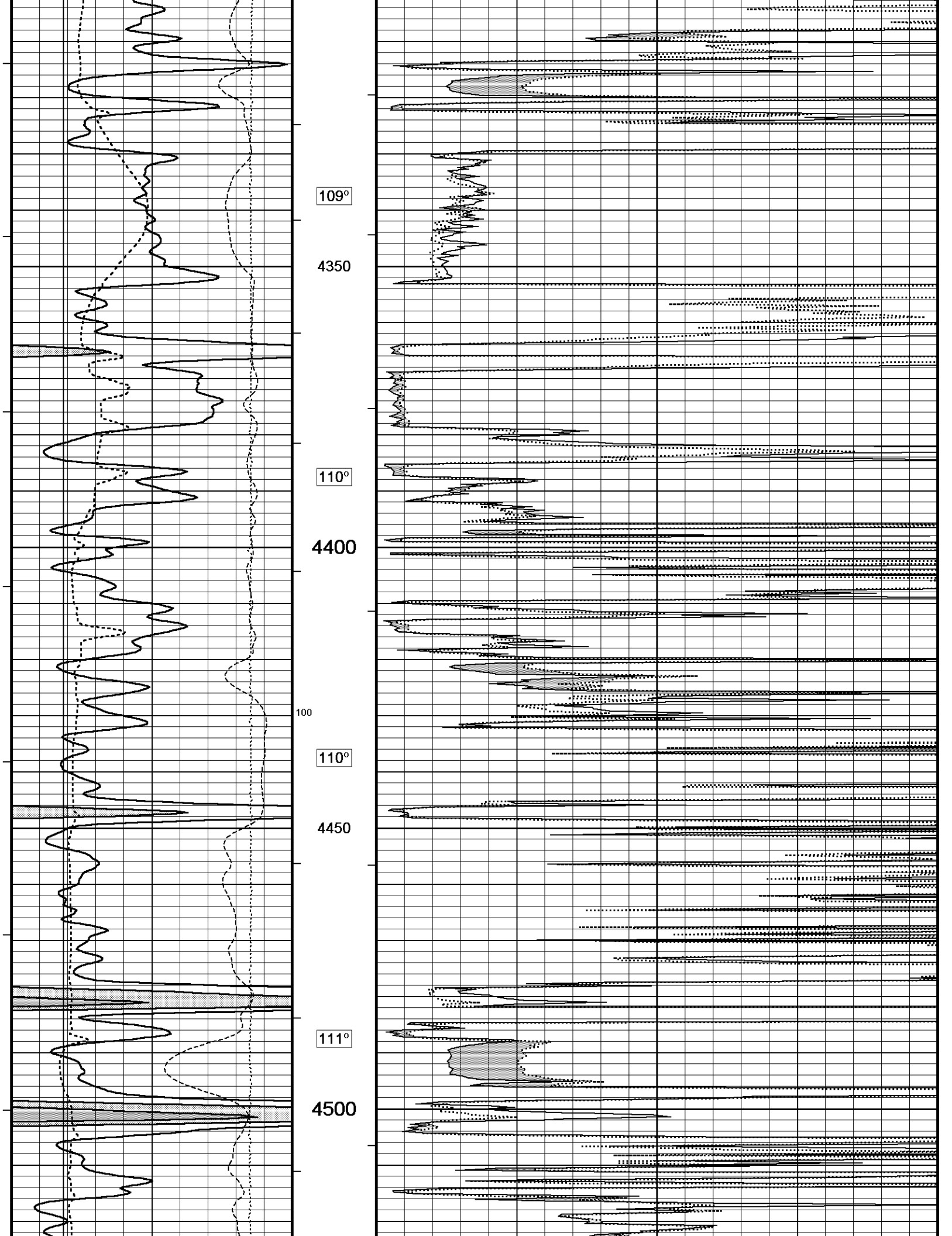


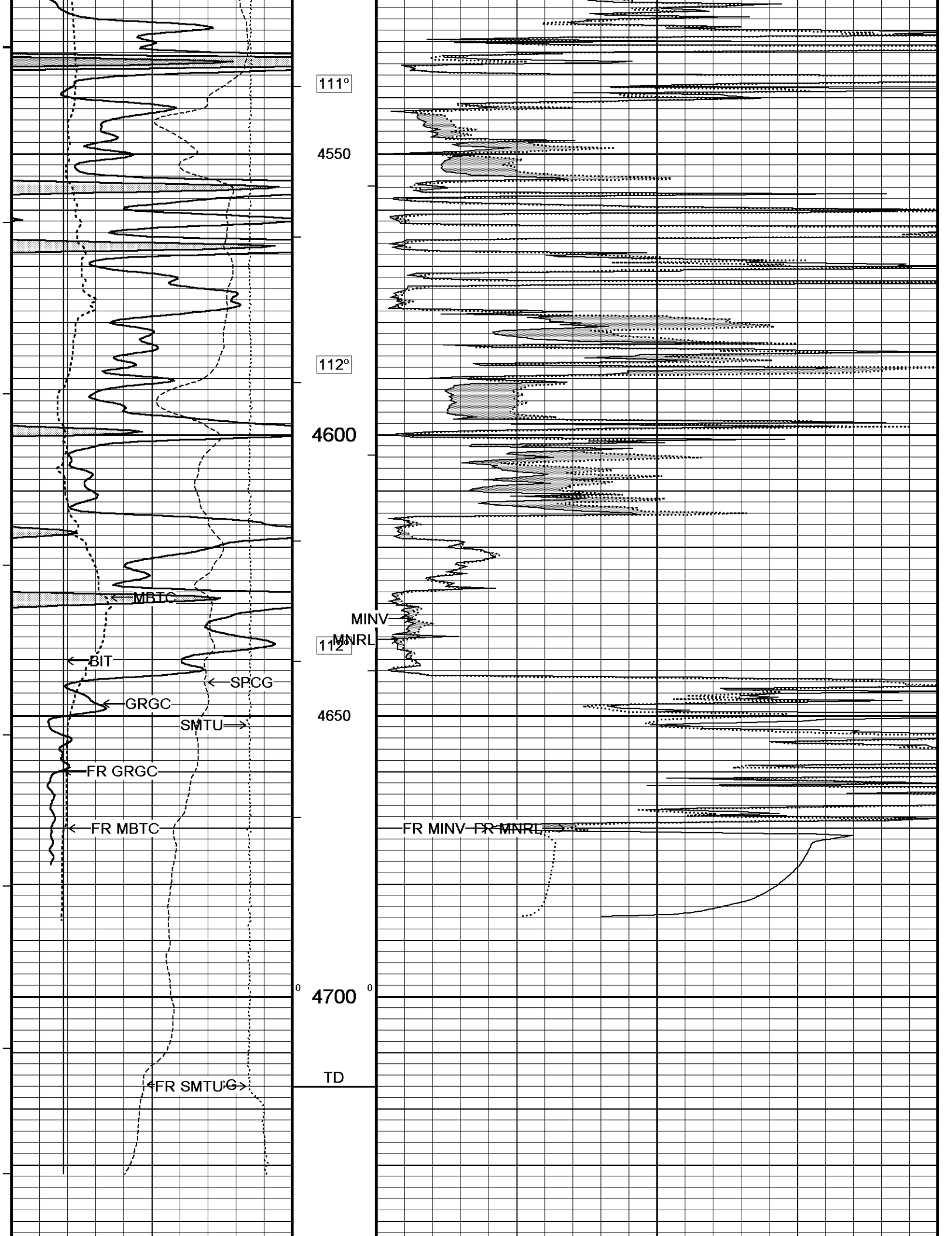
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 11-JUN-2014 19:41  
 Filename: C:\Minimus 13.08.2113\Logs\SHAKESPEA...\SHAKESPEARE CAMPBELL 4-17 DETAIL1.dta  
 System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113

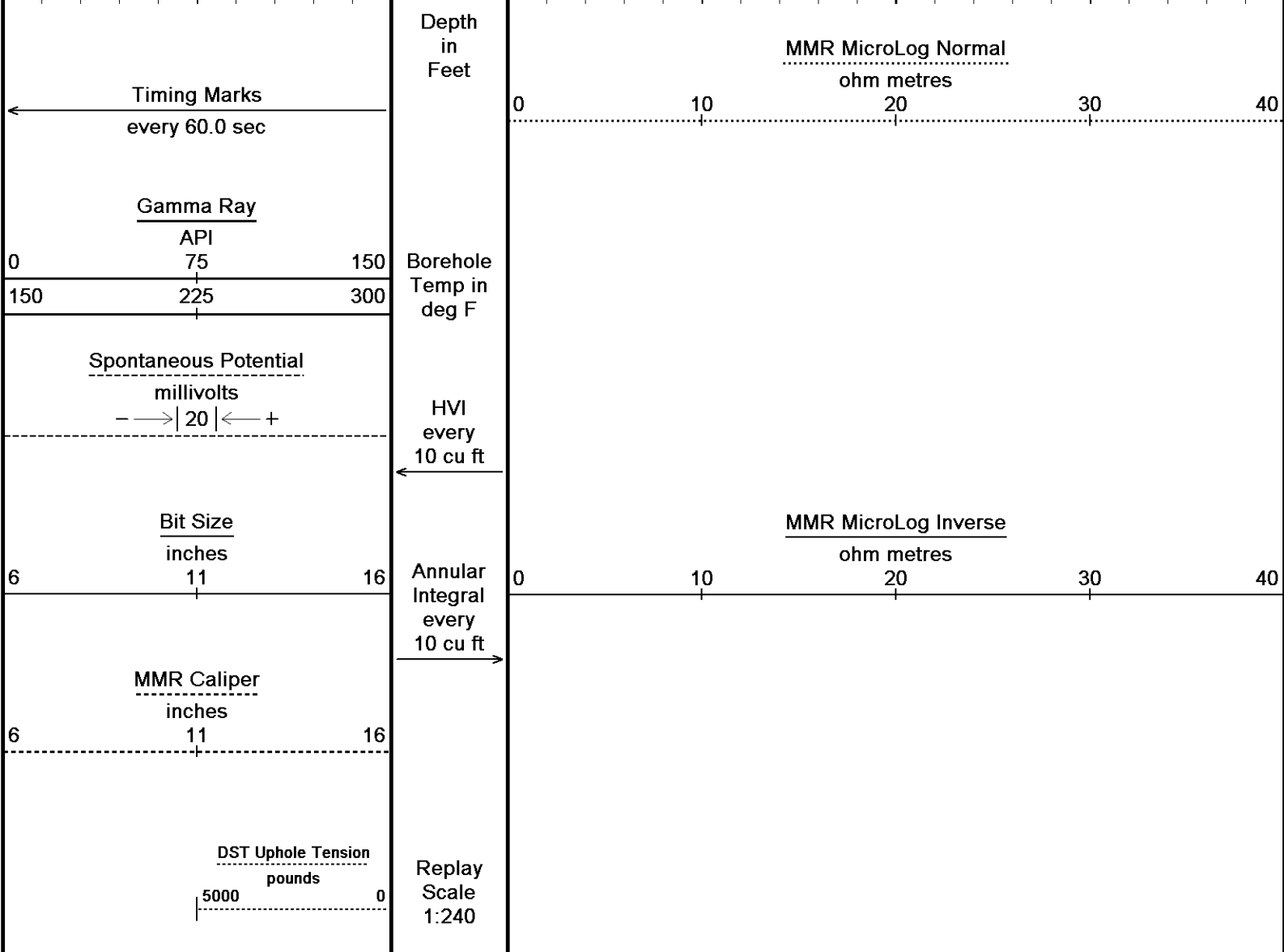
↑ **5 INCH MAIN** ↑

↓ **REPEAT SECTION** ↓









Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 11-JUN-2014 19:41  
 Filename: C:\Minimus 13.08.2113\Log\SHAKESPEARE CAMPBELL 4-17 REPEAT.dta Recorded on 11-JUN-2014 18:11  
 System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113

↑ REPEAT SECTION ↑

**BEFORE SURVEY CALIBRATION**

C:\Minimus 13.08.2113\Log\SHAKESPEARE CAMPBELL 4-17\SHAKESPEARE CAMPBELL 4-17 REPEAT.dta

General Constants All 000

Last Edited on 11-JUN-2014,17:41

**General Parameters**

Mud Resistivity 0.640 ohm-metres  
 Mud Resistivity Temperature 93.000 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 MMR Caliper

**Rwa Parameters**

Porosity used Crossplot Porosity  
 Resistivity used Array Ind. One Res Rt  
 RWA Constant A 0.610  
 RWA Constant M 2.150  
 SW/APOR Tool Source 0.000

High Resolution Temperature Calibration MCG-C 208

Field Calibration on 23-JAN-2014,17:11

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

High Resolution Temperature Constants MCG-C 208

Last Edited on 23-JAN-2014,17:11

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

Gamma Calibration MCG-C 208

Field Calibration on 04-JUN-2014 10:53

	Measured	Calibrated (API)
Background	68	46
Calibrator (Gross)	1134	771
Calibrator (Net)	1067	725

Gamma Constants MCG-C 208

Last Edited on 10-JUN-2014,13:26

Gamma Calibrator Number	GRC038	
Mud Density	1.11	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

Caliper Calibration MMR-C.A 248

Base Calibration on 10-MAY-2014 09:28

Field Calibration on 04-JUN-2014 10:29

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	13446	5.98
2	16585	7.97
3	19782	9.86
4	23693	11.92
5	0	0.00
6	N/A	N/A

Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	8.02	7.97

Micro Normal and Micro Inverse Calibration MMR-C.A 248

Base Calibration on 10-MAY-2014 09:40

Field Check on 04-JUN-2014 10:27

Base Calibration					
Channel	Resistor 1	Measured		Calibrated (ohm-m)	
		Resistor 2	Resistor 1	Resistor 2	
Micro Normal	10.1	49.8	5.1	25.6	
Micro Inverse	9.9	49.5	3.4	16.9	

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	93.6	93.6
Micro Inverse	62.2	62.2

Micro Normal and Micro Inverse Constants MMR-C.A 248

Last Edited on 23-JAN-2014,17:04

Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159
Micro Normal K Factor	0.5110
Micro Inverse K Factor	0.3380
Standoff Offset	0.0000 inches

Caliper Calibration MPD-D.A 480

Base Calibration on 08-MAY-2014 14:36

Field Calibration on 04-JUN-2014 10:32

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	17491	3.99
2	27463	5.98
3	37484	7.97
4	47415	9.86
5	58518	11.92
6	N/A	N/A

## DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Logs\SHAKESPEARE CAMPBELL 4-17\SHAKESPEARE CAMPBELL 4-17 REPEAT.dta

Compact Comms Gamma  
MCG-C 208 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity  
MMR-C.A 248 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron  
MDN-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

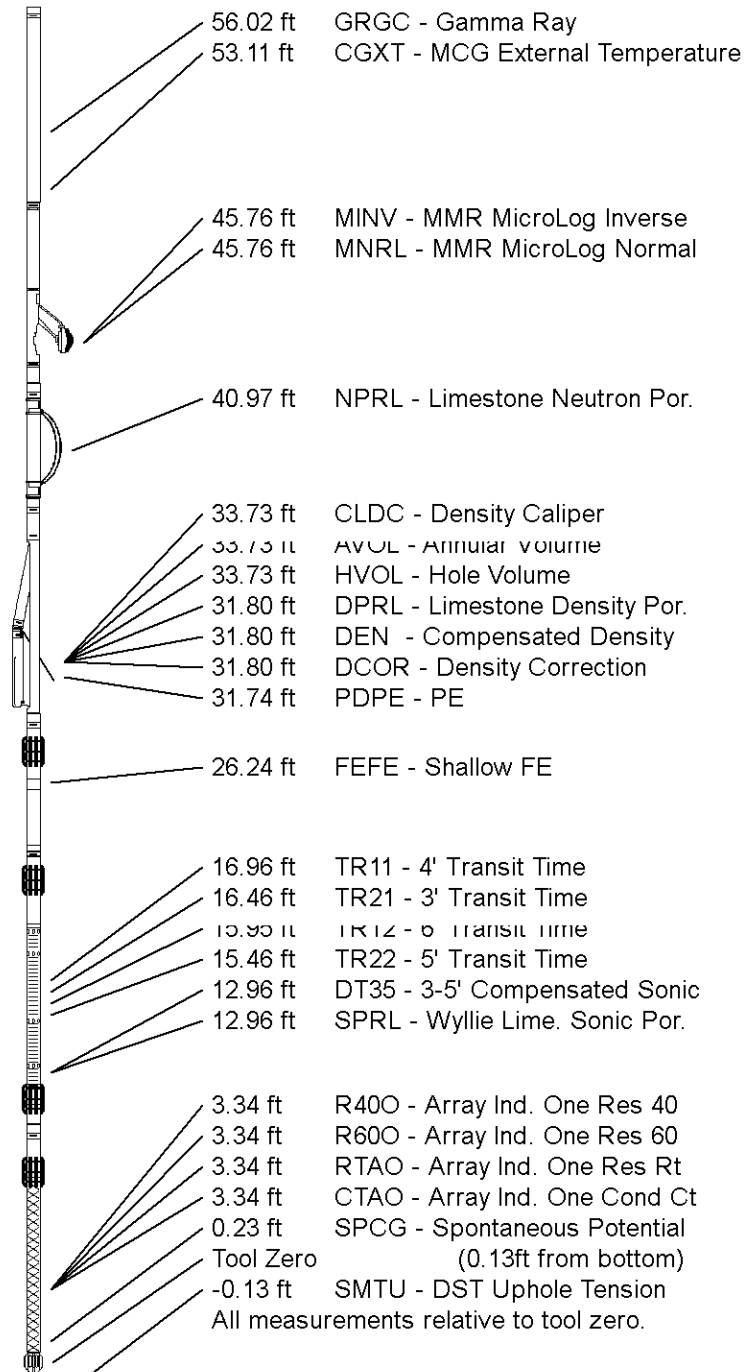
Compact Density/Caliper  
MPD-D.A 480 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric  
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic  
MSS-A.A 73 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction  
MAI-A.A 5 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 61.30 ft Weight: 456.4 lb



COMPANY	SHAKESPEARE OIL. CO., INC.
WELL	CAMPBELL 4-17
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3043.00	feet	First Reading	4670.00	feet
Elevation Drill Floor	3041.00	feet	Depth Driller	4720.00	feet
Elevation Ground Level	3033.00	feet	Depth Logger	4716.00	feet



**Weatherford**<sup>®</sup>

MICRORESISTIVITY LOG