

MICRORESISTIVITY LOG

COMPANY SHAKESPEARE OIL CO., INC.

WELL ELLIS #1-6

FIELD WILDCAT

PROVINCE/COUNTY SCOTT

COUNTRY/STATE U.S.A. / KANSAS

LOCATION 960' FSL & 565' FWL

SEC 6 TWP 16S RGE 32W Other Services

Latitude 38.6882684 MAI/MFE

Longitude -100.9053200

API Number 15-171-21233

Permanent Datum GL, Elevation 2983 feet

Log Measured From KB, 8.00 feet above Permanent Datum

Drilling Measured From KB

Date 24-SEP-2018

Run Number ONE

Service Order 18089-224935717

Depth Driller 4730.00 feet

Depth Logger 4728.00 feet

First Reading 4693.00 feet

Last Reading 3800.00 feet

Casing Driller 264.00 feet

Casing Logger 263.00 feet

Bit Size 7.875 inches

Hole Fluid Type CHEMICAL

Density / Viscosity 9.40 lb/USg 59.00 sec/qt

PH / Fluid Loss 8.00 11.20 ml/30Min

Sample Source FLOWLINE

Rm @ Measured Temp 0.67 @ 91.0 ohm-m

Rmf @ Measured Temp 0.54 @ 91.0 ohm-m

Rmc @ Measured Temp 0.80 @ 91.0 ohm-m

Source Rmf / Rmc CALC CALC

Rm @ BHT 0.54 @114.0 ohm-m

Time Since Circulation 4 HOURS

Max Recorded Temp 114.00 deg F

Equipment / Base 13379 ELRENO

Recorded By HAYDEN LEJEUNE

Witnessed By STEVE DAVIS

Elevations:
KB 2991.00
DF 2989.00
GL 2983.00

BOREHOLE RECORD

Last Edited: 24-SEP-2018 03:11

Bit Size
inchesDepth From
feetDepth To
feet

7.875

264.00

4750.00

CASING RECORD

Type

Size
inchesDepth From
feetShoe Depth
feetWeight
pounds/ft

SURFACE

8.625

0.00

264.00

24.00

REMARKS

- LOGGING SOFTWARE: 18.03.8633

- TOOLSTRING: MCB, SHA, MCG, MMR, MDN, MPD, SKJ, MFE, MAI RAN IN COMBINATION.

- HARDWARE USED:

MAI: TWO 0.5 INCH STANDOFFS.

MFE: ONE 0.5 INCH STANDOFF.

MDN: DUAL BOWSPRING

MPD: 8 INCH PROFILE PLATE.

2.71 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY.

- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.

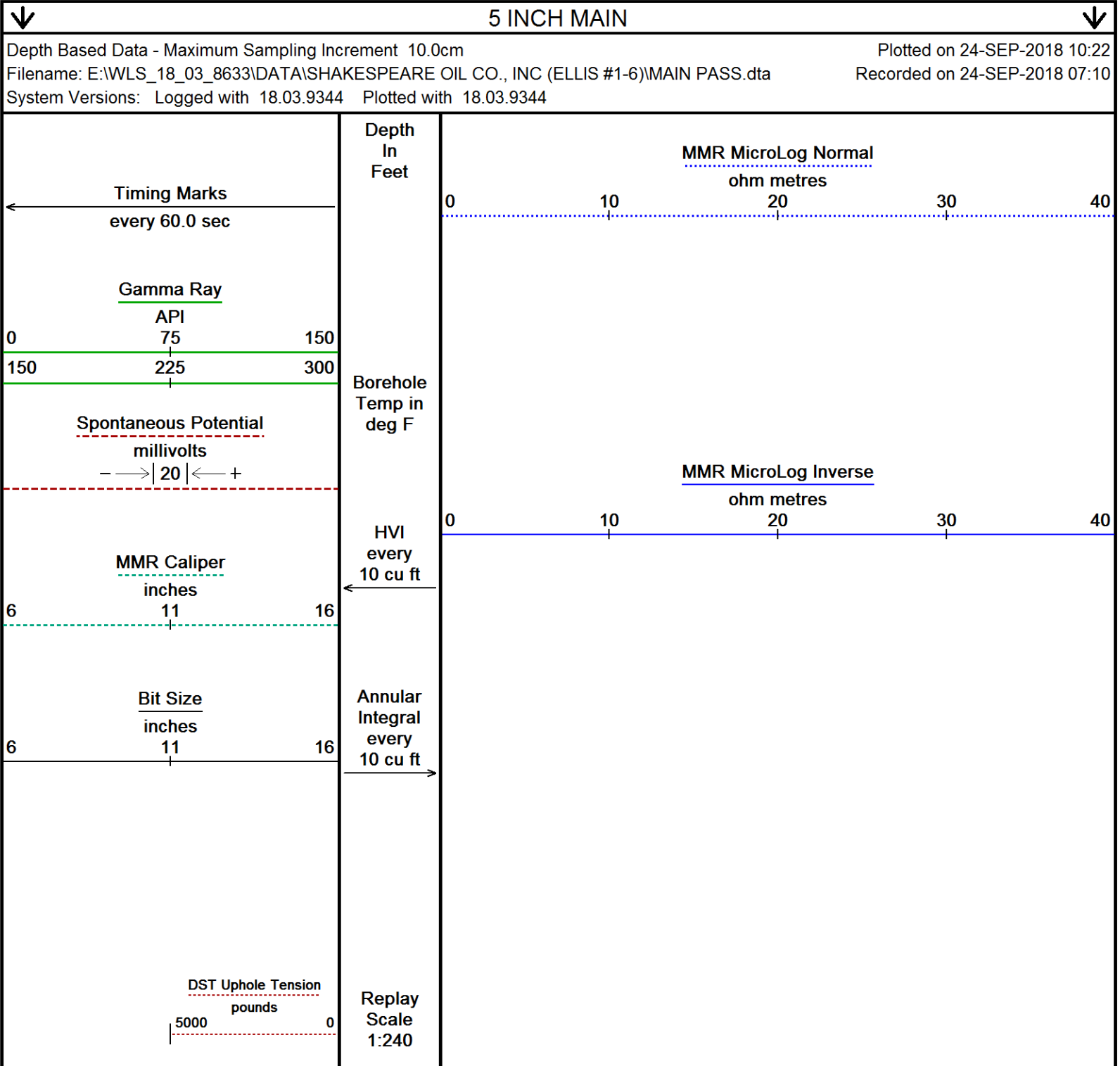
NEUTRON / DENSITY / MICROLOG = TD - 3800'

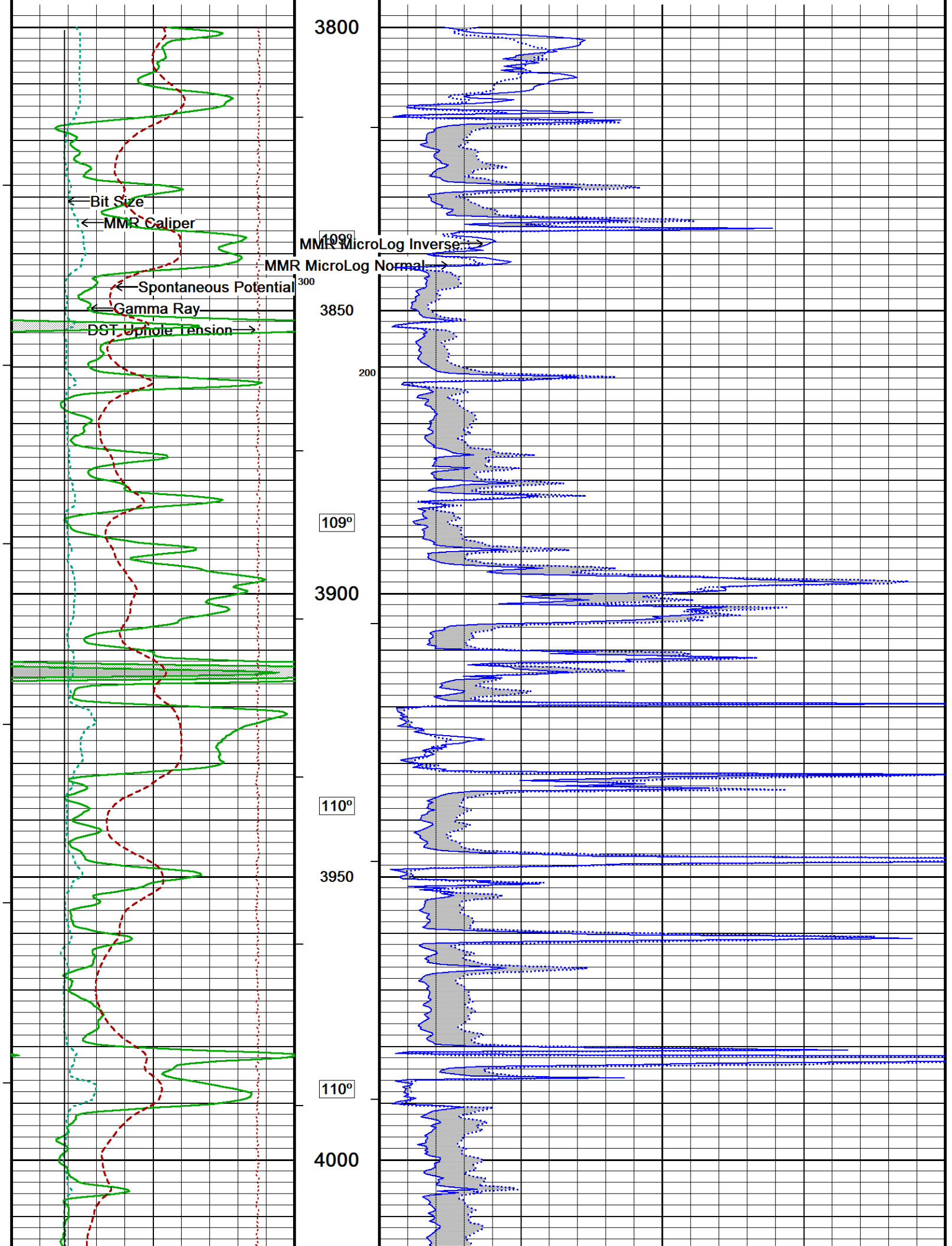
GAMMA / INDUCTION / CALIPER = TD - CASING SHOE

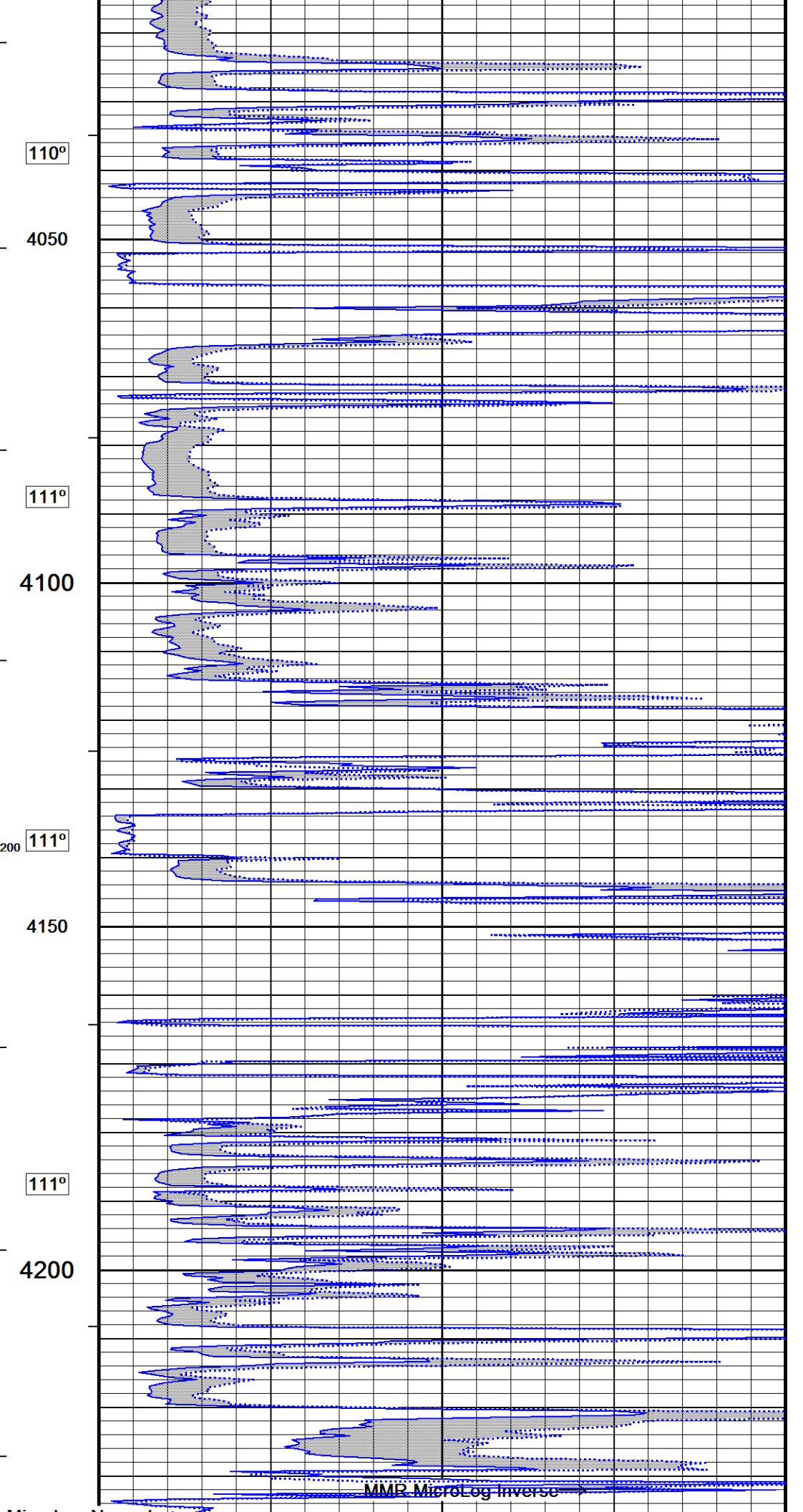
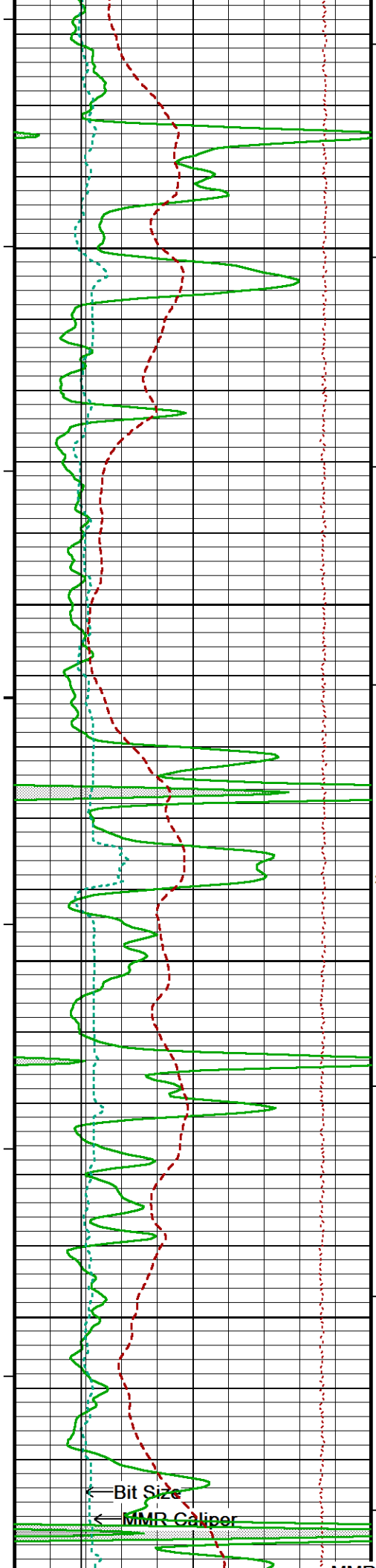
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING = 1960 CU.FT.

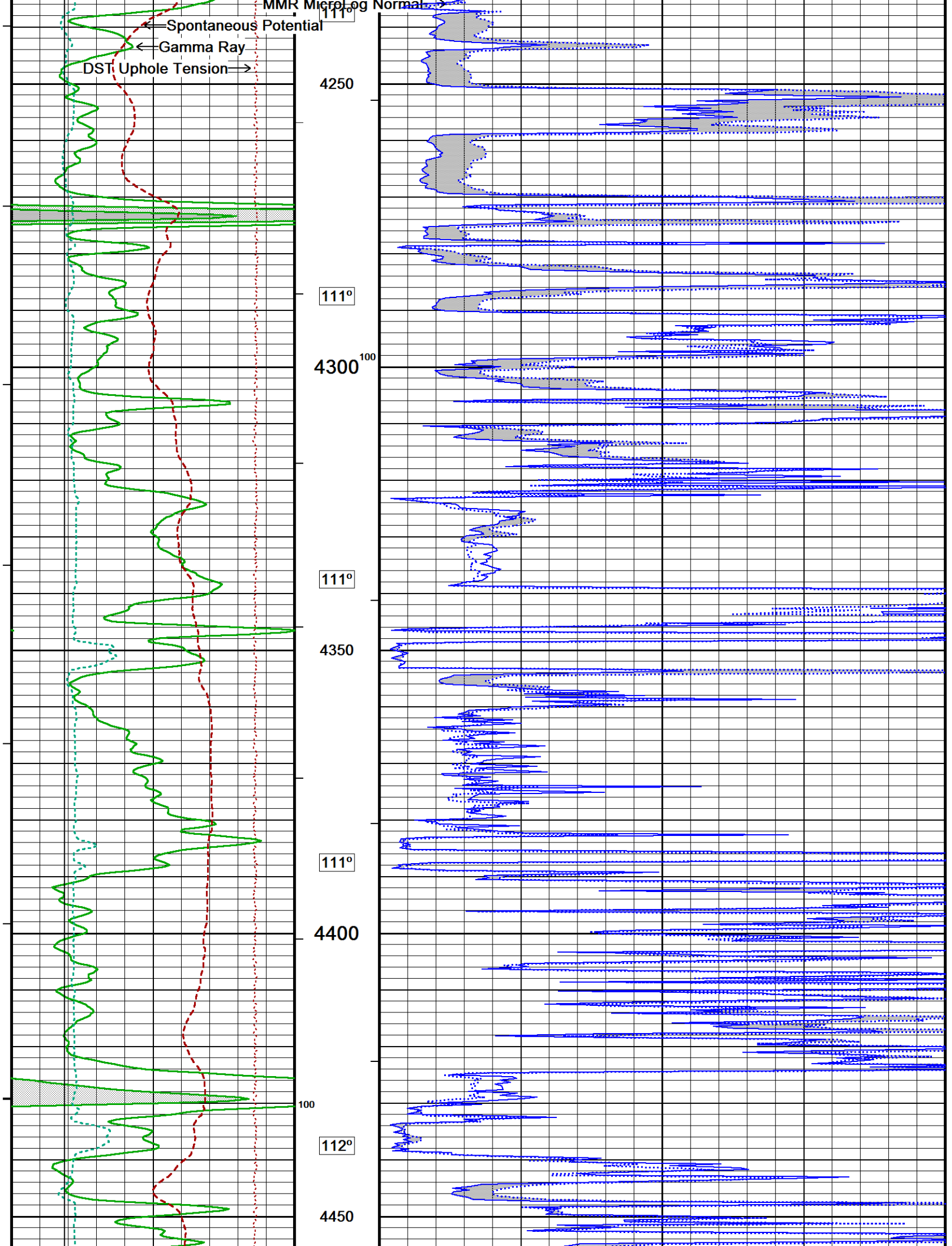
- ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING = 1470 CU.FT.

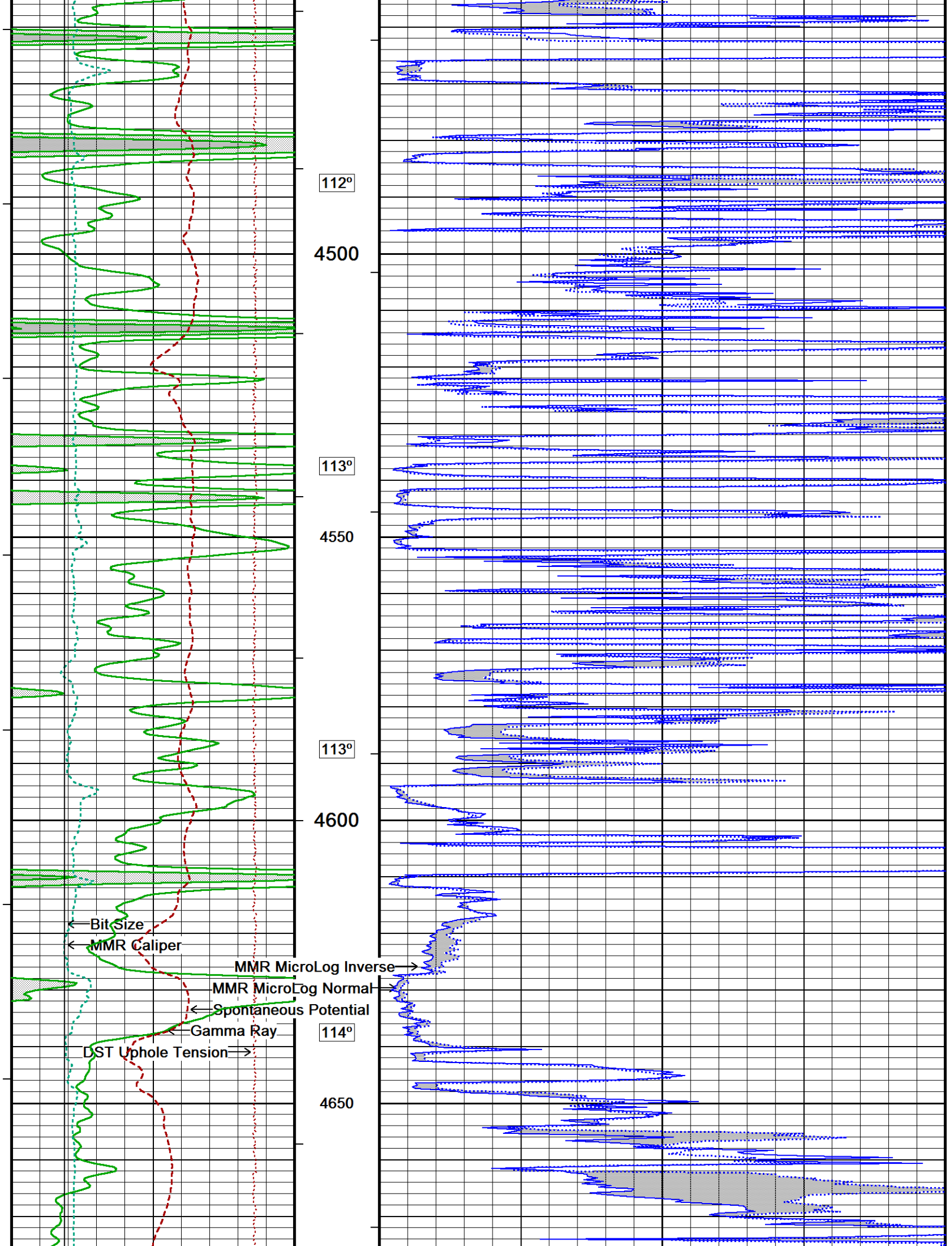
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will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

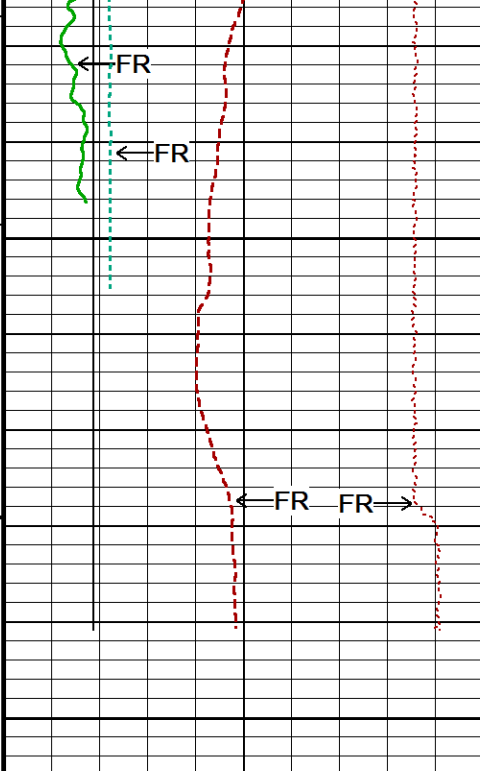












114°

4700

0 0

TD

4750

Depth
In
Feet

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Spontaneous Potential
millivolts
- - - - - 20 - - - - - +

MMR Caliper
inches
6 11 16

Bit Size
inches
6 11 16

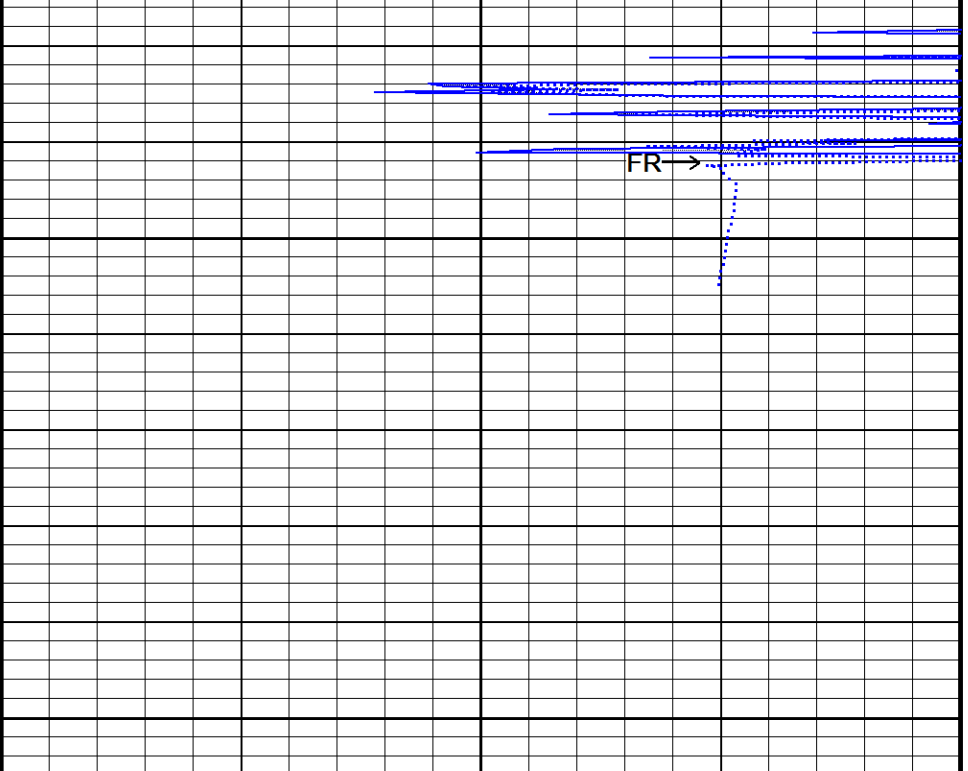
Borehole
Temp in
deg F

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240



MMR MicroLog Normal
ohm metres

0 10 20 30 40

MMR MicroLog Inverse
ohm metres

0 10 20 30 40

↑

5 INCH MAIN

↑

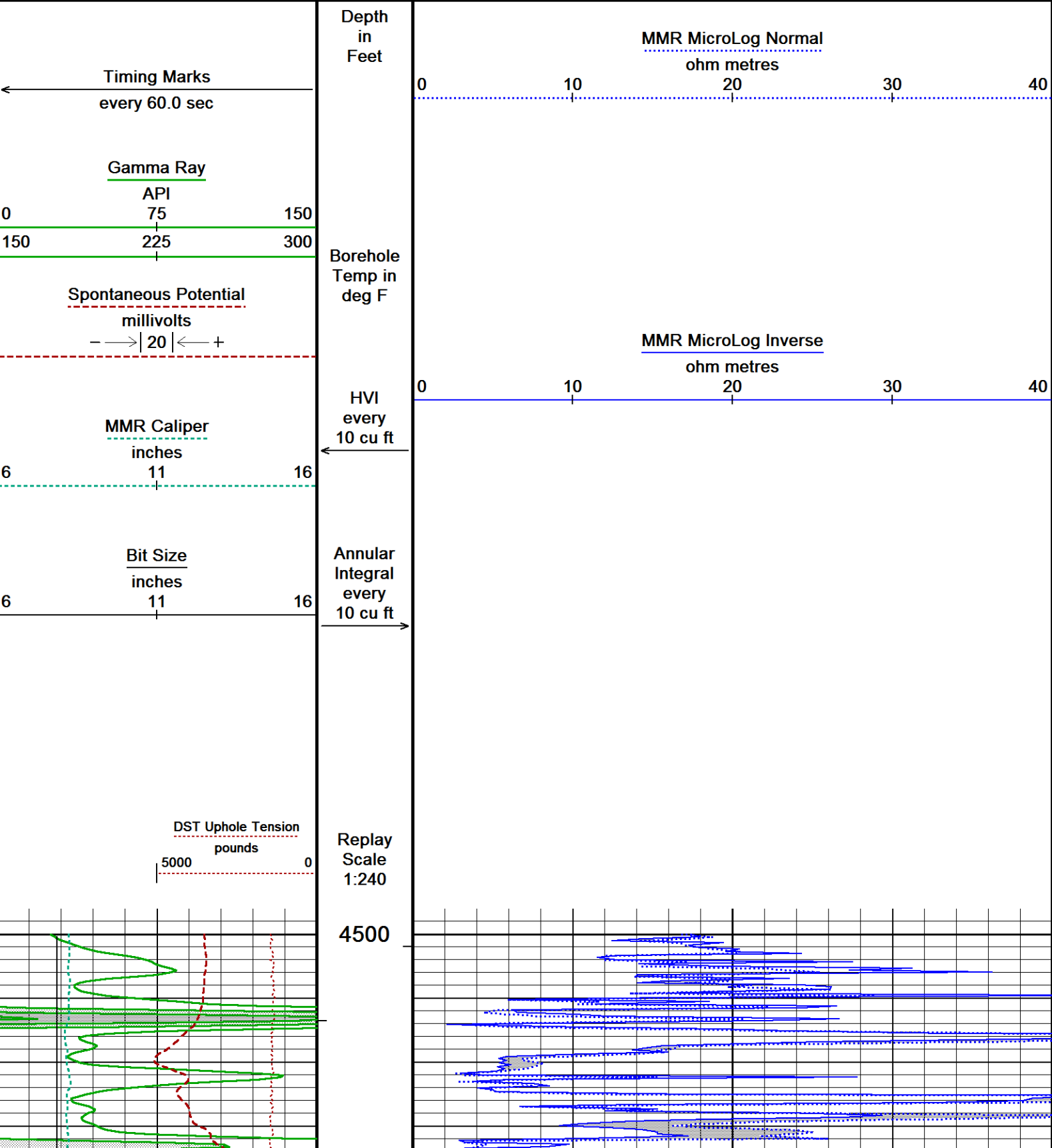
↓

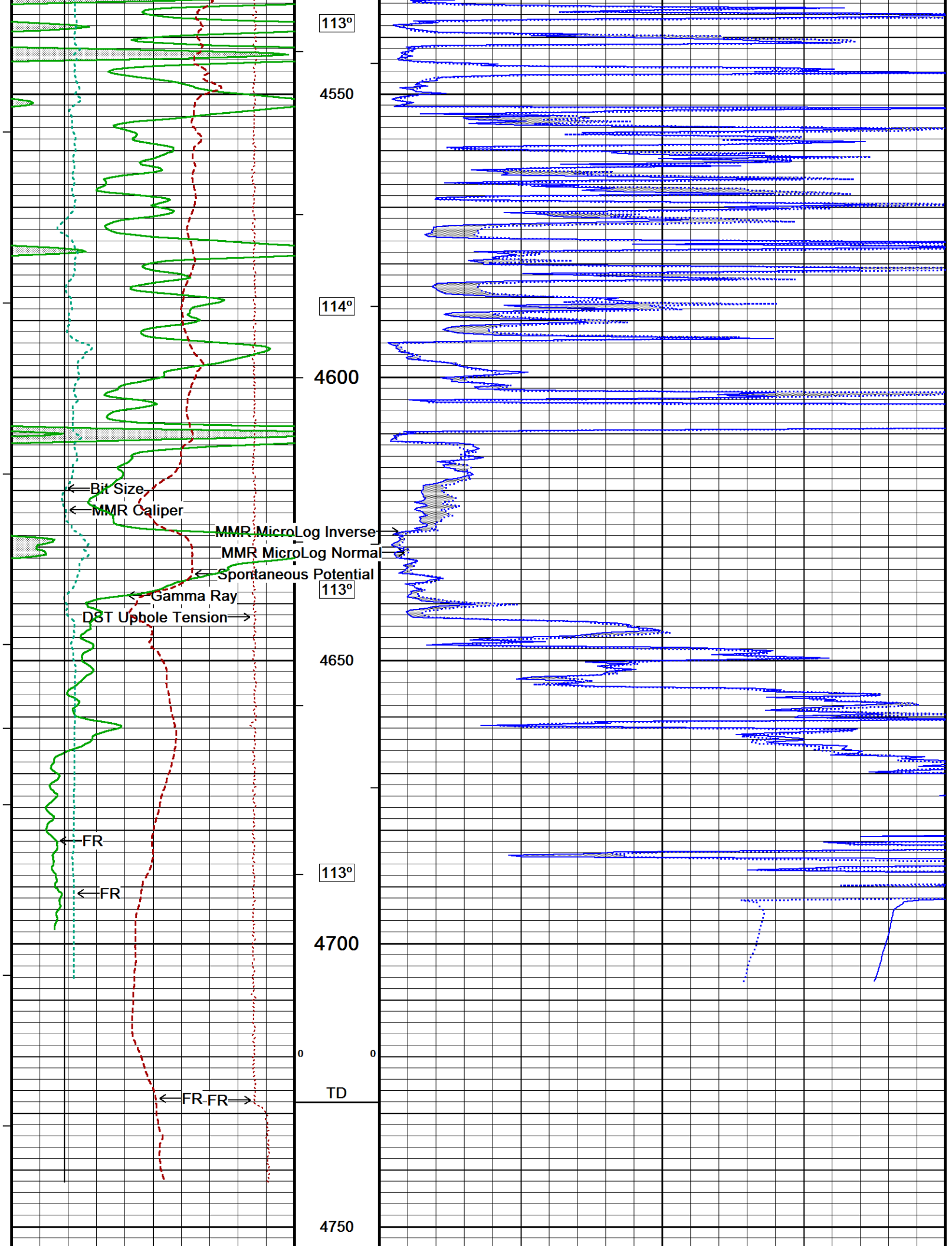
REPEAT SECTION

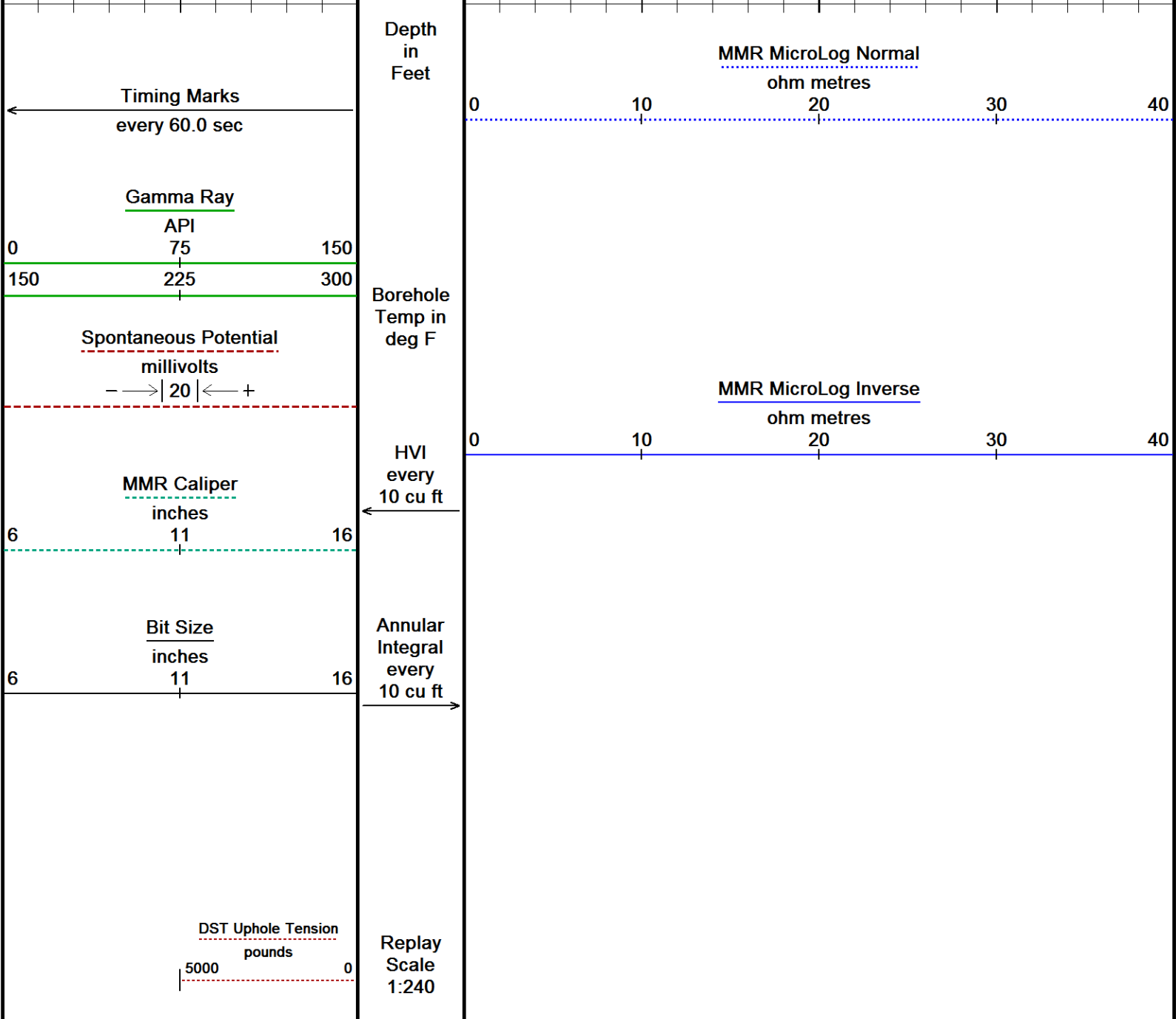
↓

Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: E:\WLS_18_03_8633\DATA\SHAKESPEARE OIL CO., INC (ELLIS #1-6)\REPEAT PASS.dta
System Versions: Logged with 18.03.9344 Plotted with 18.03.9344

Plotted on 24-SEP-2018 10:22
Recorded on 24-SEP-2018 06:50







Depth Based Data - Maximum Sampling Increment 10.0cm		Plotted on 24-SEP-2018 10:22
Filename: E:\WLS_18_03_8633\DATA\SHAKESPEARE OIL CO., INC (ELLIS #1-6)\REPEAT PASS.dta		Recorded on 24-SEP-2018 06:50
System Versions: Logged with 18.03.9344 Plotted with 18.03.9344		

↑	REPEAT SECTION	↑
---	----------------	---

BEFORE SURVEY CALIBRATION		
E:\WLS_18_03_8633\DATA\SHAKESPEARE OIL CO., INC (ELLIS #1-6)\MAIN PASS.dta		
General Constants All 000		Last Edited on 24-SEP-2018,06:22
General Parameters		
Mud Resistivity	0.670	ohm-metres
Mud Resistivity Temperature	91.000	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	4.500	inches
Caliper for Differential Caliper	Density Caliper	

Rwa Parameters	
Porosity used	Crossplot Porosity
Resistivity used	Array Ind. Two Res Rt
RWA Constant A	0.620
RWA Constant M	2.150
SW/APOR Tool Source	0.000

High Resolution Temperature Calibration MCG-D.K 424

Field Calibration on 19-SEP-2018,09:20

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	212.00	212.00

High Resolution Temperature Constants MCG-D.K 424

Last Edited on 01-SEP-2018,11:30

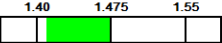
Pre-filter Length 11

Gamma Calibration MCG-D.K 424

Field Calibration on 24-SEP-2018,03:05

	Measured	Calibrated (API)
Background	63	45
Calibrator (Gross)	1840	1306
Calibrator (Net)	1777	1261

Gamma Calibration Tolerances MCG-D.K 424

Ratio 1.409  Counts/API

The bar chart shows three segments: a green segment from 1.40 to 1.475, a yellow segment from 1.475 to 1.55, and a red segment from 1.55 to 1.60. The current ratio of 1.409 is in the green segment.

Gamma Constants MCG-D.K 424

Last Edited on 24-SEP-2018,03:04

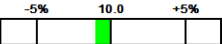
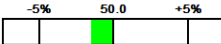
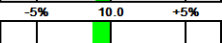
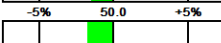
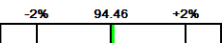
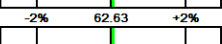
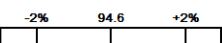
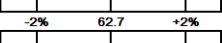
Gamma Calibrator Number	046	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.13	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

Micro Normal and Micro Inverse Calibration MMR-A 11

Base Calibration on 30-AUG-2018 14:26
Field Check on 24-SEP-2018,03:05

	Resistor 1 (ohm)	Resistor 2 (ohm)
	10.0	50.0
Base Calibration		
	Measured	Calibrated (ohm-m)
Micro Normal	9.9 49.2	5.1 25.6
Micro Inverse	9.9 49.1	3.4 16.9
Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	94.6	94.6
Micro Inverse	62.7	62.7

Micro Normal & Micro Inverse Calibration Tolerance MMR-A 11

Micro Normal Res. 1	9.9		ohm	Micro Normal Res. 2	49.2		ohm
Micro Inverse Res. 1	9.9		ohm	Micro Inverse Res. 2	49.1		ohm
Micro Normal Base Check	94.6		ohm-m				
Micro Inverse Base Check	62.7		ohm-m				
Micro Normal Field Check	94.6		ohm-m				
Micro Inverse Field Check	62.7		ohm-m				

The bar charts show tolerance ranges: -5% to +5% for resistors, and -2% to +2% for base and field checks. The current values are within the tolerance ranges.

Micro Normal and Micro Inverse Constants MMR-A 11

Last Edited on 21-JUN-2018,17:25

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

Base Calibration

Reading No

Measured

Calibrator Size (in)

1	15495	5.98
2	18780	7.99
3	22130	9.86
4	26093	11.88
5	0	0.00
6	N/A	N/A

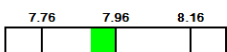
Field Calibration

Measured Caliper (in)

Actual Caliper (in)

7.89 7.96

Caliper Calibration Tolerances MMR-A 11

Short Arm Field Cal. 7.89  in

Caliper Calibration MPD-C.A 271

Base Calibration on 01-SEP-2018 21:29
Field Calibration on 21-SEP-2018 11:38

Base Calibration

Reading No

Measured

Calibrator Size (in)

1	14576	4.00
2	24544	5.98
3	34624	7.99
4	44144	9.86
5	54767	11.88
6	N/A	N/A

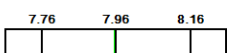
Field Calibration

Measured Caliper (in)

Actual Caliper (in)

7.96 7.96

Caliper Calibration Tolerances MPD-C.A 271

Short Arm Field Cal. 7.96  in

DOWNHOLE EQUIPMENT

E:\WLS_18_03_8633\DATA\SHAKESPEARE OIL CO., INC (ELLIS #1-6)\MAIN PASS.dta

11B Tension Cablehead

MCB-A 1 LG: 2.18 ft WT: 19.8 lb OD: 2.244 in

Compact Swivel Head Adaptor

SHA-J.B 596 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

Compact Comms Gamma

MCG-D.K 424 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity

MMR-A 11 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron

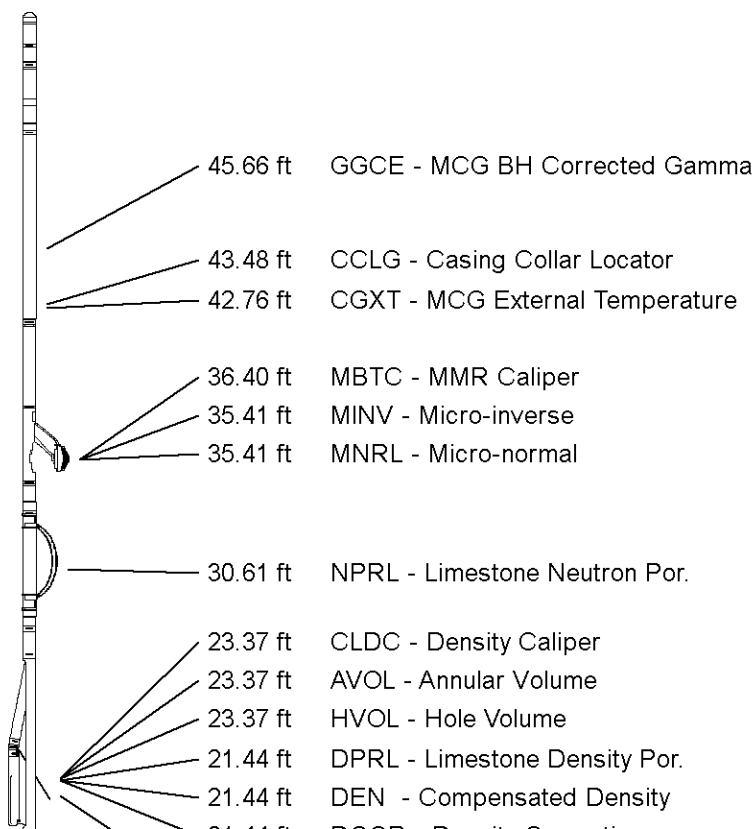
MDN-B.J 391 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper

MPD-C.A 271 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Knuckle Joint

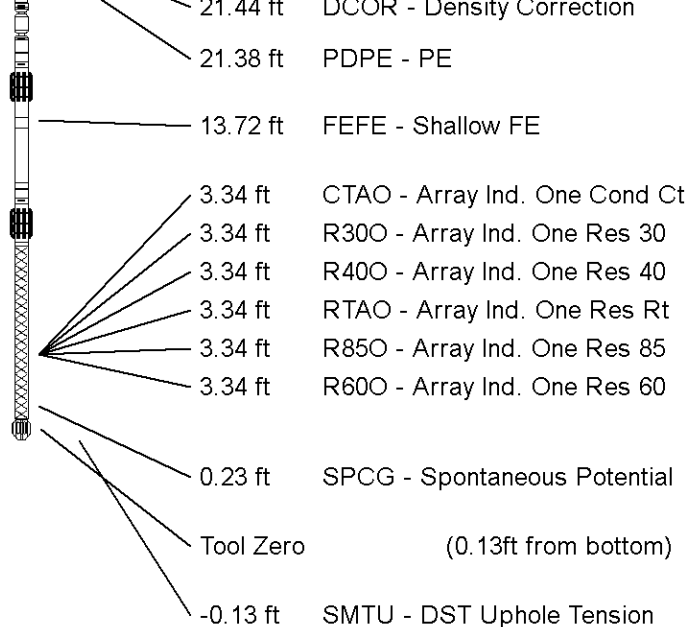
SKJ-E.B 455 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in



Compact Focussed Electric
MFE-B.J 359 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Induction
MAI-B.J 375 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 55.43 ft Weight: 449.7 lb



All measurements relative to tool zero.

COMPANY	SHAKESPEARE OIL CO., INC.
WELL	ELLIS #1-6
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2991	feet	First Reading	4693.00	feet
Elevation Drill Floor	2989	feet	Depth Driller	4730.00	feet
Elevation Ground Level	2983	feet	Depth Logger	4728.00	feet

MICRORESISTIVITY LOG