



Weatherford

MICRORESISTIVITY LOG

COMPANY		McCOY PETROLEUM CORPORATION			
WELL		PATTERSON-O'BRADE 'A' 3-17			
FIELD		MERTILLA SOUTHEAST			
PROVINCE/COUNTY		MEADE			
COUNTRY/STATE		U.S.A. / KANSAS			
LOCATION		990' FNL & 1650' FWL			
SEC 17	TWP 30S	RGE 30W	Other Services		MPD/MDN
Latitude		MAI/MFE			
Longitude					
API Number		15-119-21378			
Permanent Datum GL, Elevation 2814 feet					
Log Measured From KB					
Drilling Measured From KB @ 11 feet					Elevations: KB 2825.00 DF 2823.00 GL 2814.00
Date	10-NOV-2014				
Run Number	ONE				
Service Order	7577-102837829				
Depth Driller	5700.00		feet		
Depth Logger	5702.00		feet		
First Reading	5669.00		feet		
Last Reading	4000.00		feet		
Casing Driller	1857.00		feet		
Casing Logger	1858.00		feet		
Bit Size	7.875		inches		
Hole Fluid Type	CHEMICAL				
Density / Viscosity	9.25	lb/USg	48.00	CP	
PH / Fluid Loss	9.50		8.00	ml/30Min	
Sample Source	MUD PIT				
Rm @ Measured Temp	1.97 @ 75.0		ohm-m		
Rmf @ Measured Temp	1.58 @ 75.0		ohm-m		
Rmc @ Measured Temp	2.36 @ 75.0		ohm-m		
Source Rmf / Rmc	CALC		CALC		
Rm @ BHT	1.24 @122.0		ohm-m		
Time Since Circulation	3.5 HOURS				
Max Recorded Temp	122.00		deg F		
Equipment / Base	13244		LIB		
Recorded By	JEFFREY RANDLE				
Witnessed By	ZACH WIELE				
JOB #	LB14-352				

BOREHOLE RECORD				Last Edited: 10-NOV-2014 19:58
Bit Size inches		Depth From feet		Depth To feet
7.875		1857.00		5700.00
CASING RECORD				
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1857.00	24.00

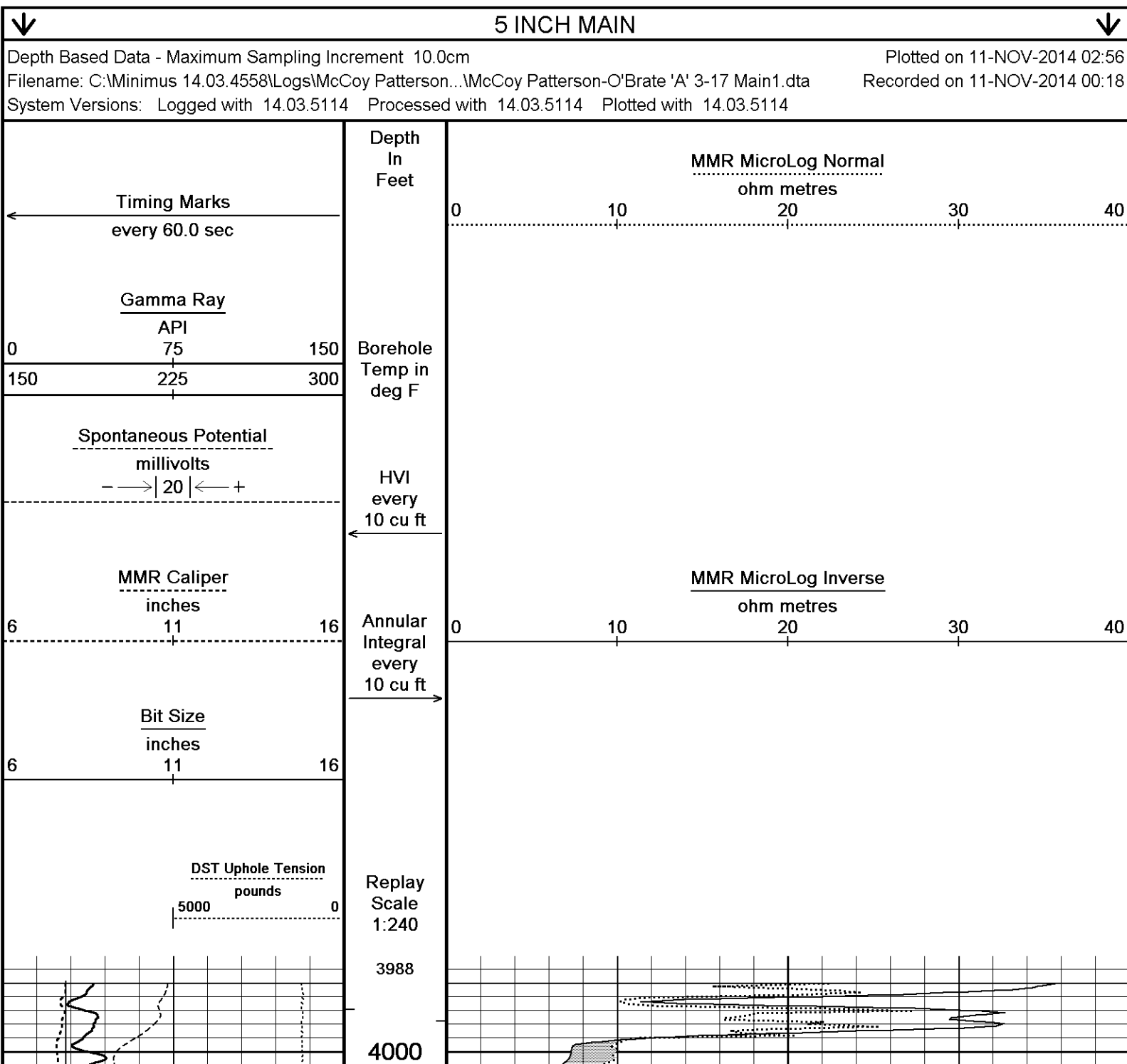
REMARKS
- SOFTWARE ISSUE: WLS 14.03.5114.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION. - HARDWARE: DUAL BOWSPRING USED ON MDN. 0.5 INCH STANDOFF USED ON MFE. 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 1337 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 4000 FEET: 279 CU.FT.
- RIG: STERLING #2

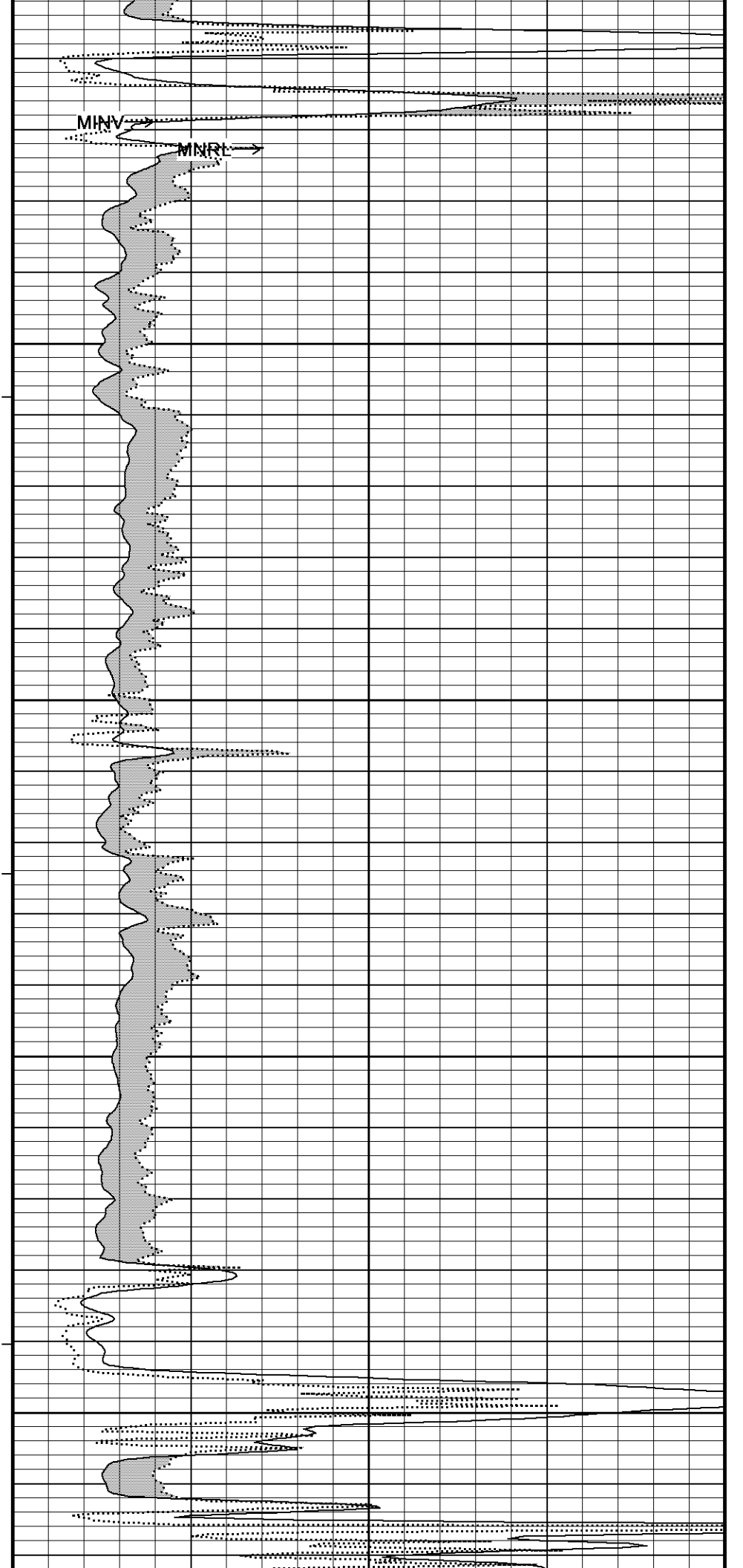
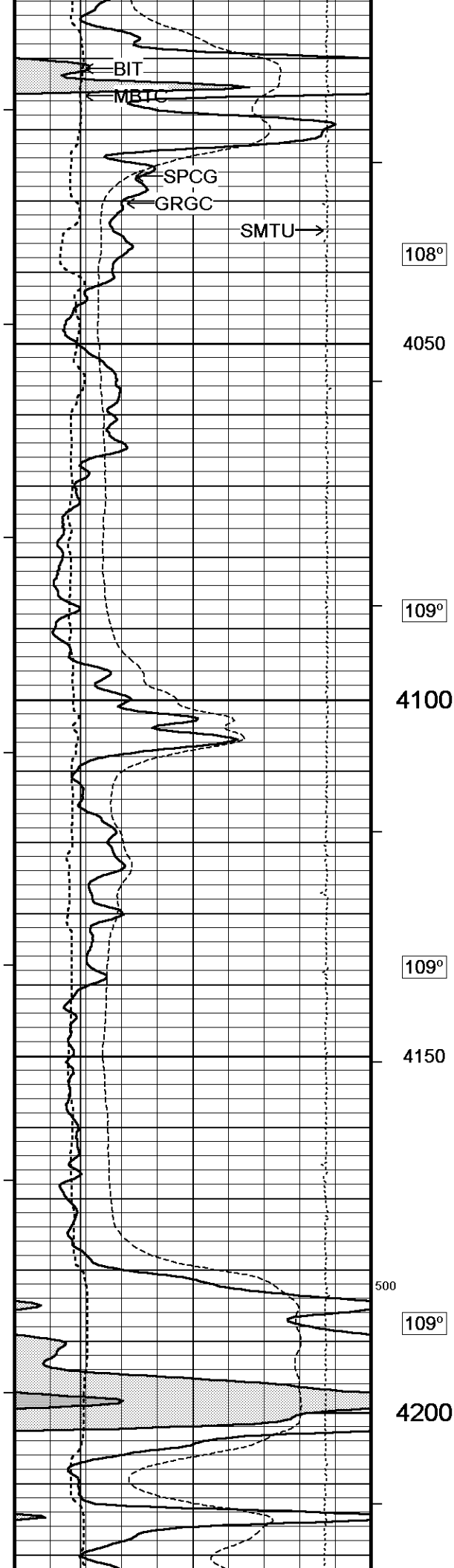
CRIS: OPERATOR #2:

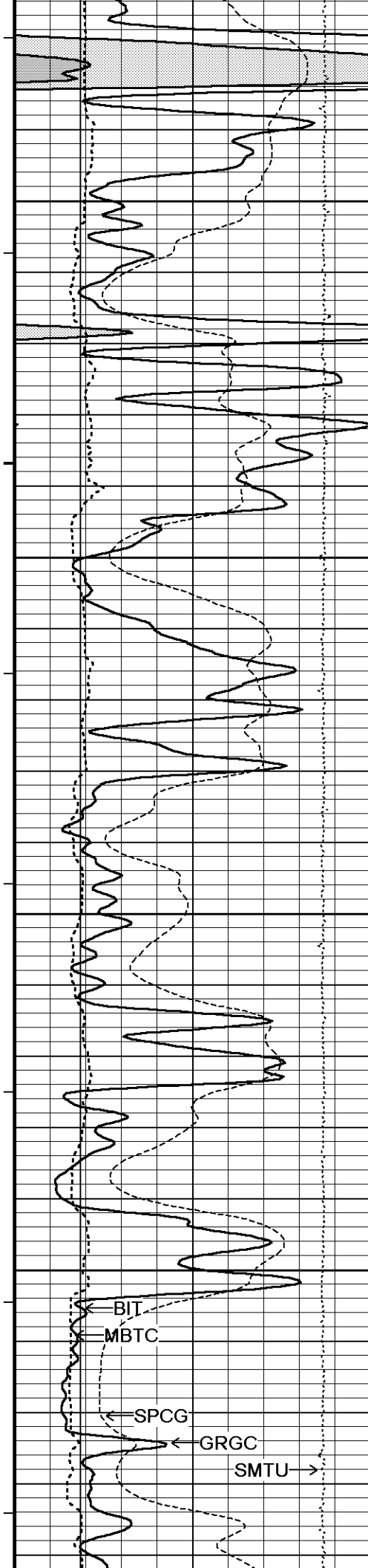
- ENGINEER: J. RANDLE.

- OPERATOR: J. LaPOINT.

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.







110°

4250

110°

4300

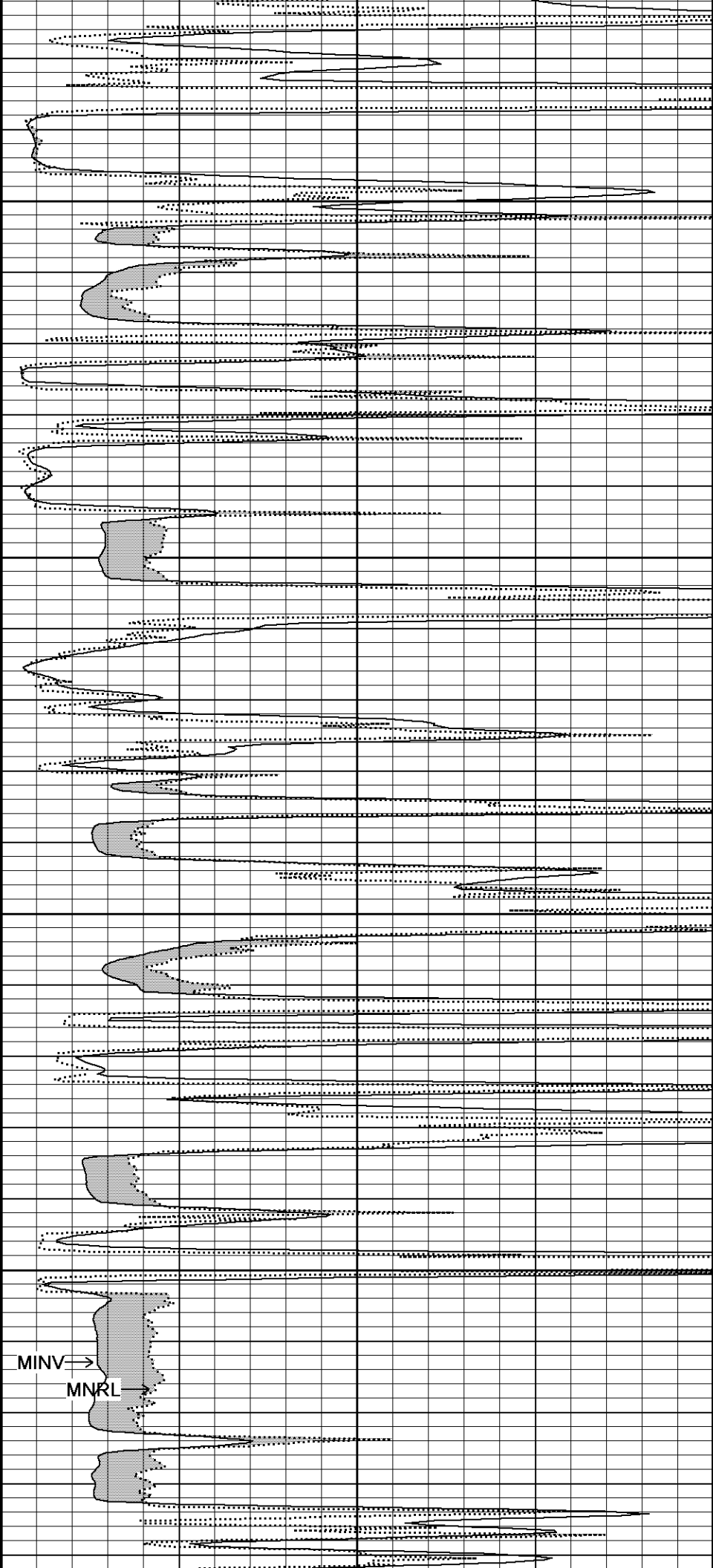
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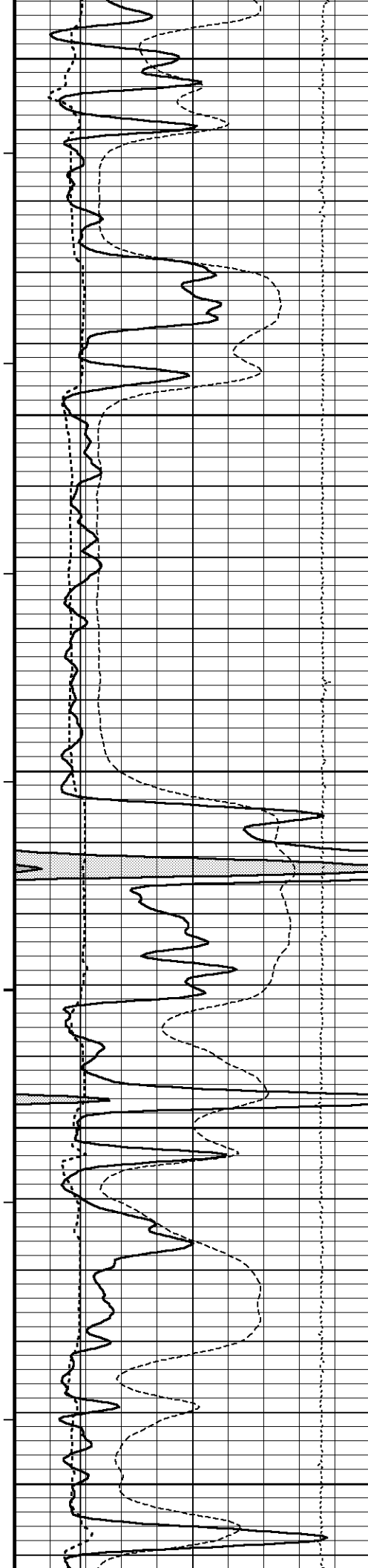
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111°

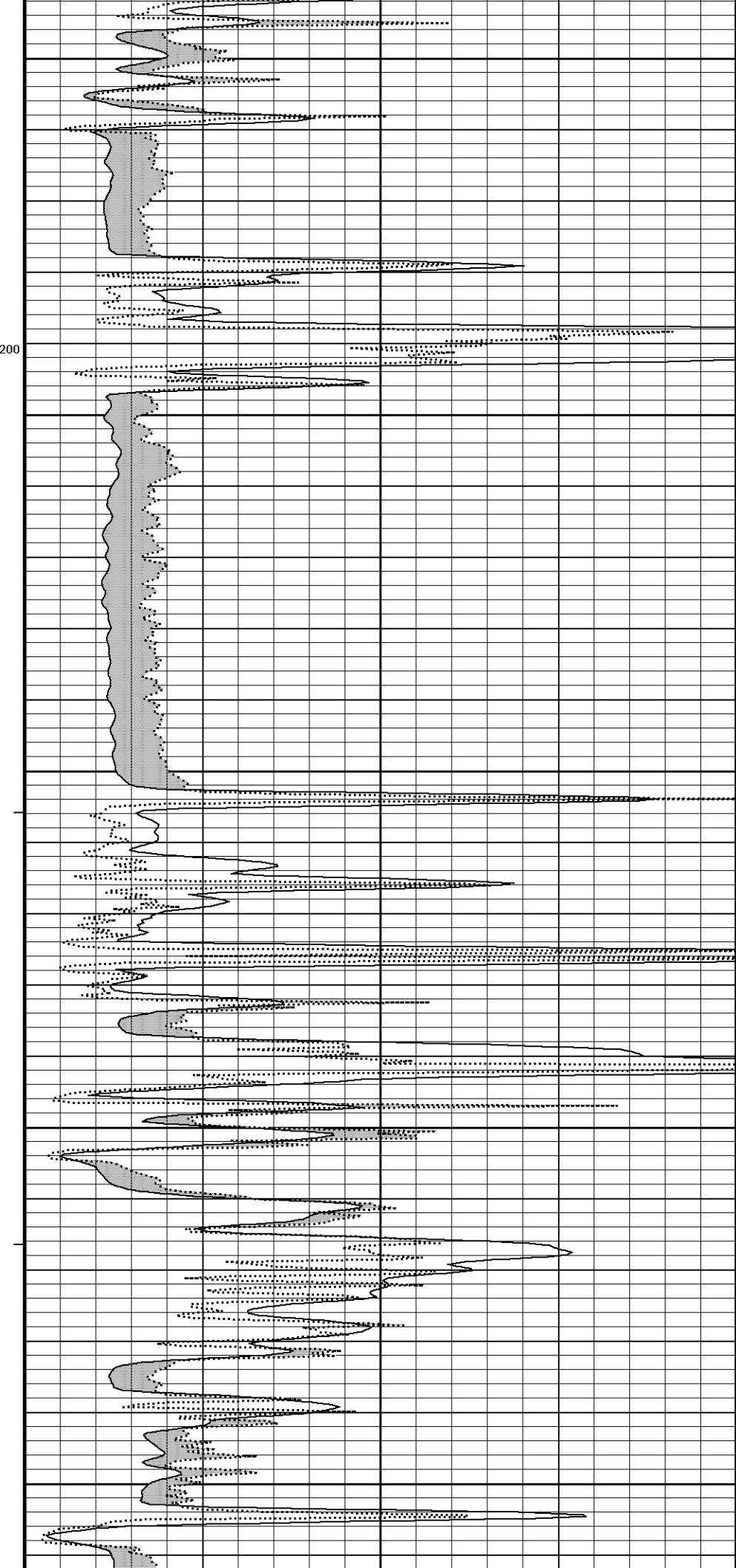
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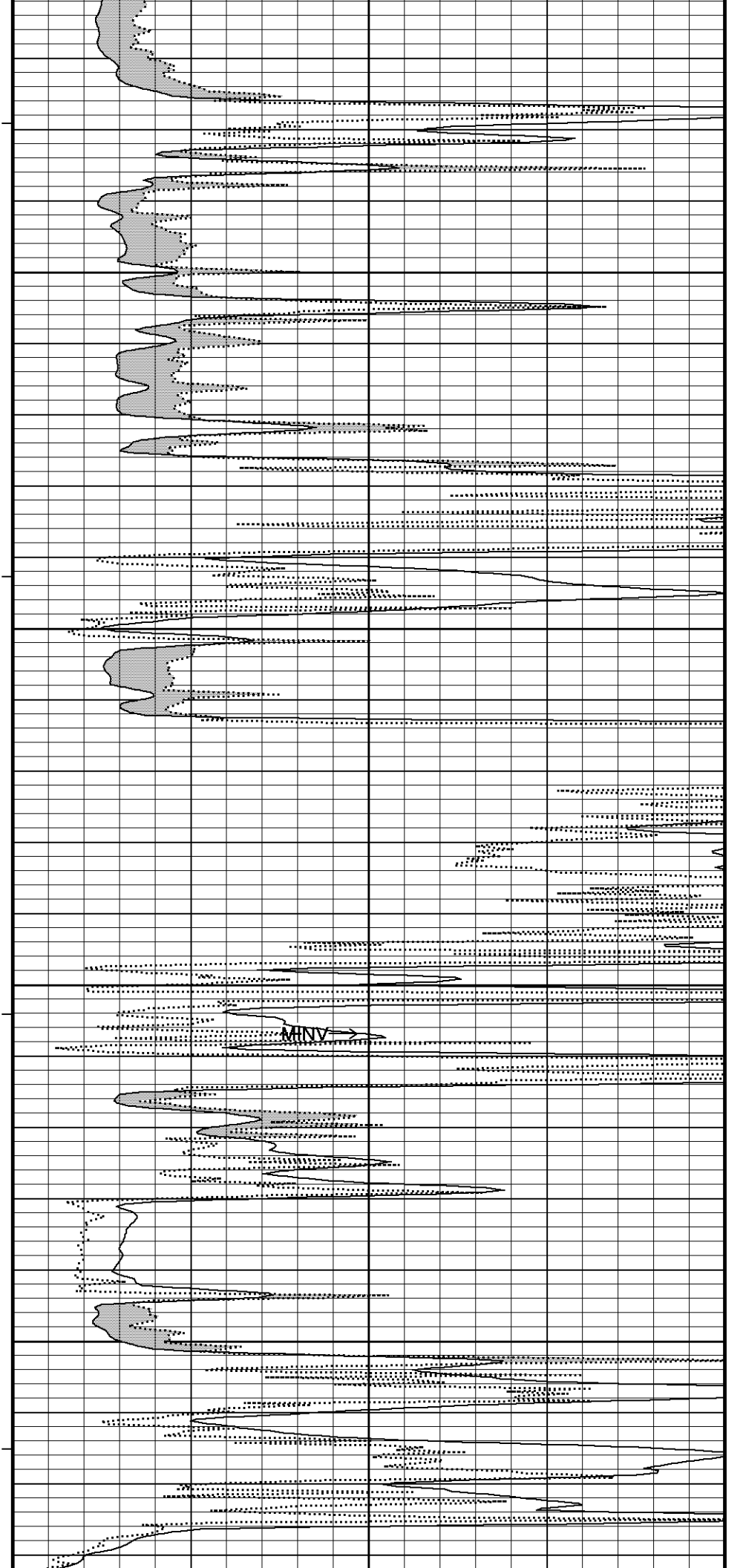
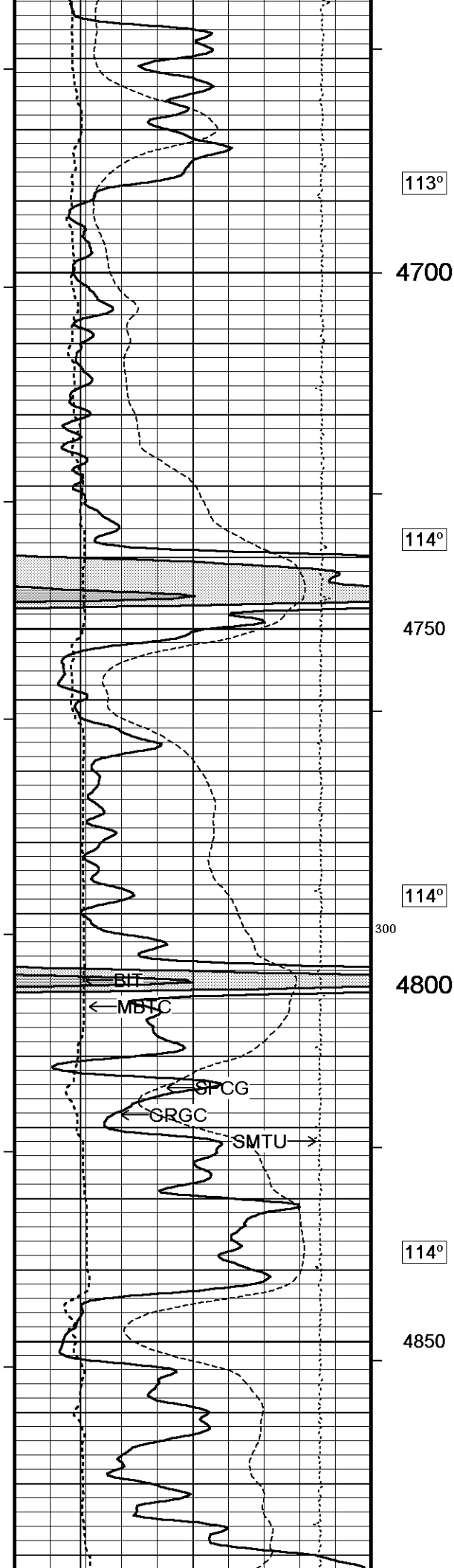
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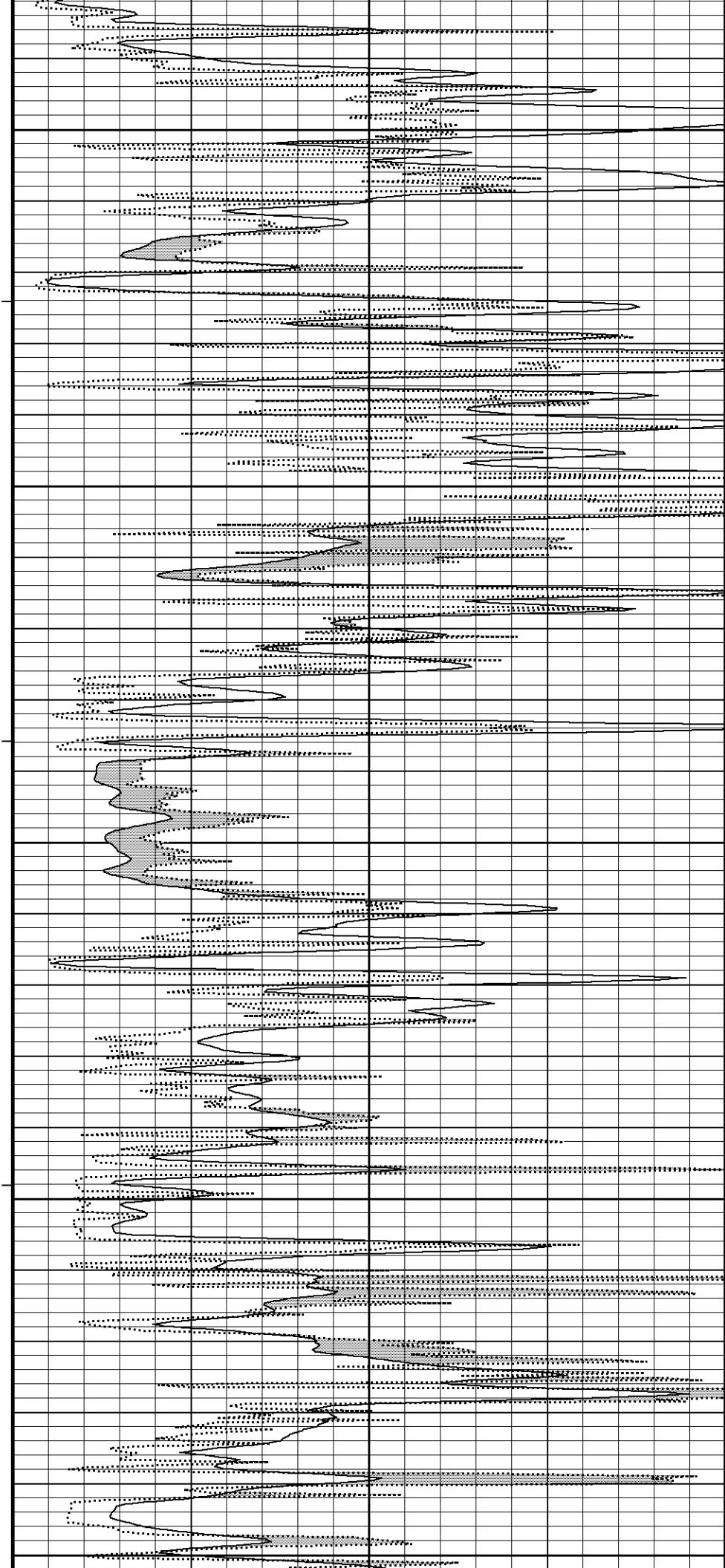
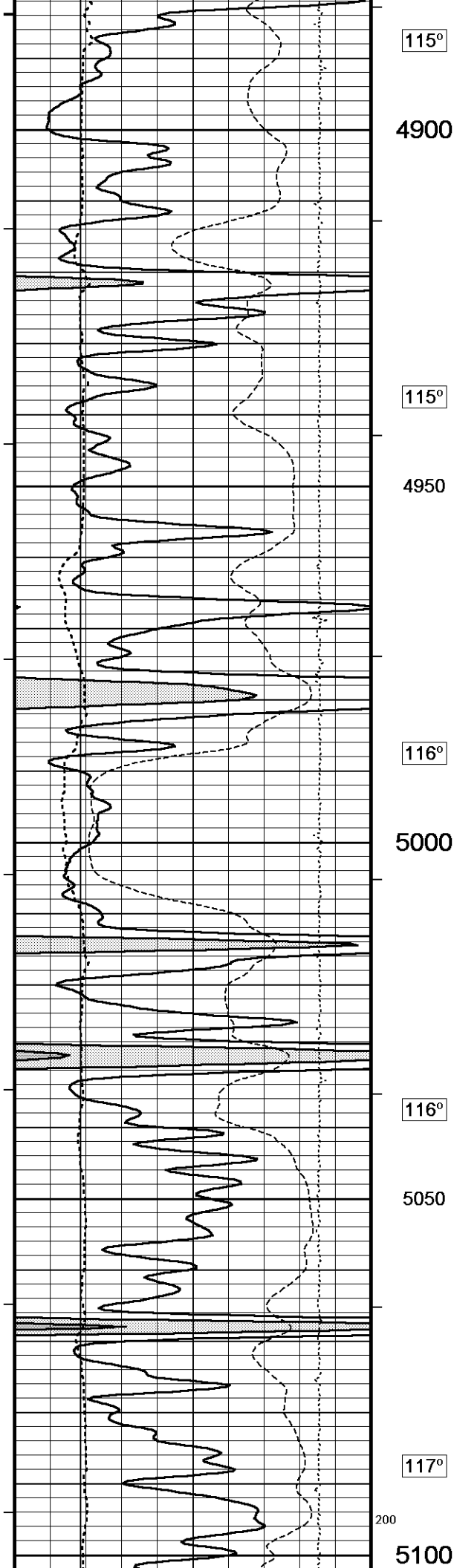


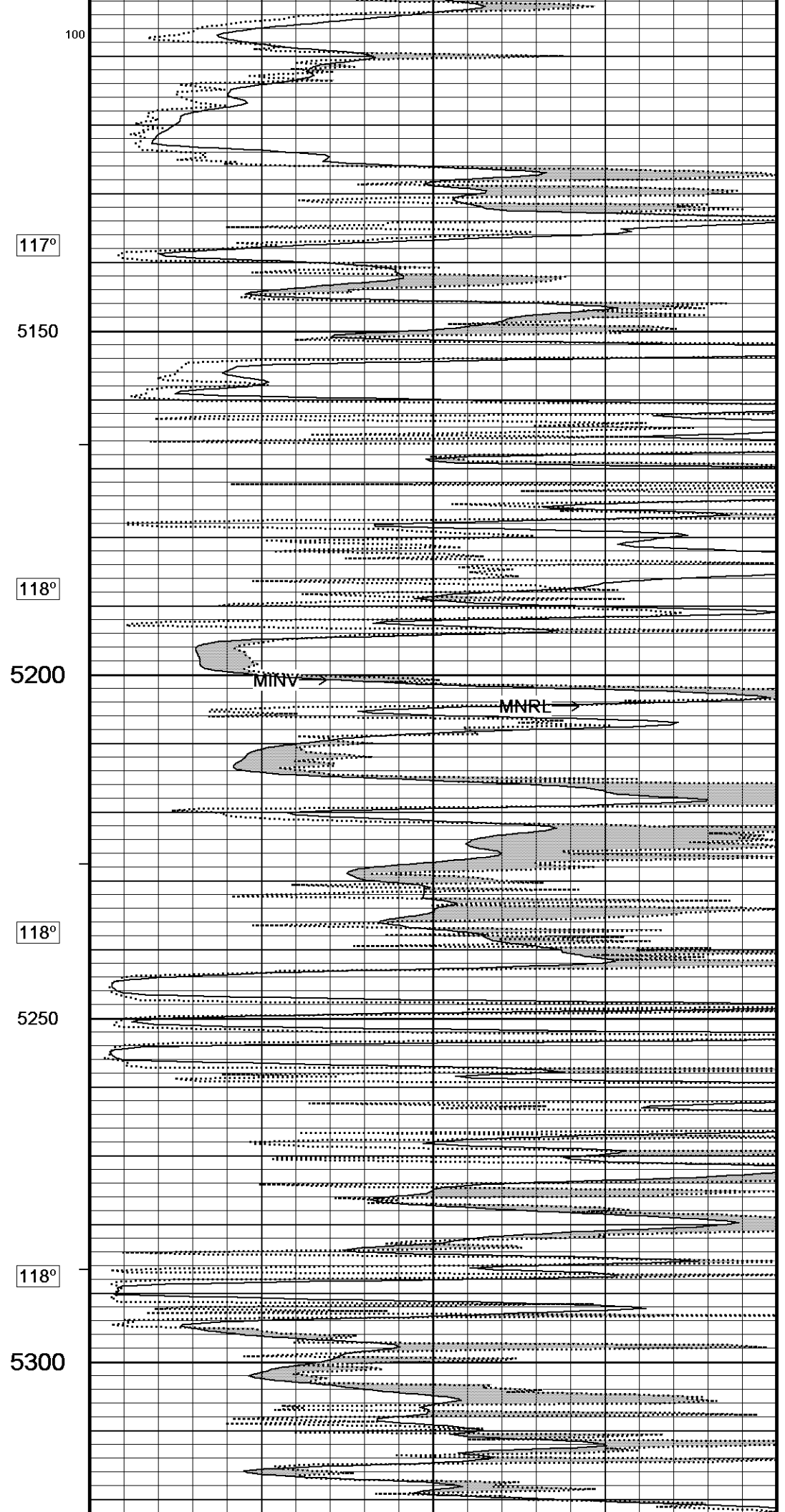
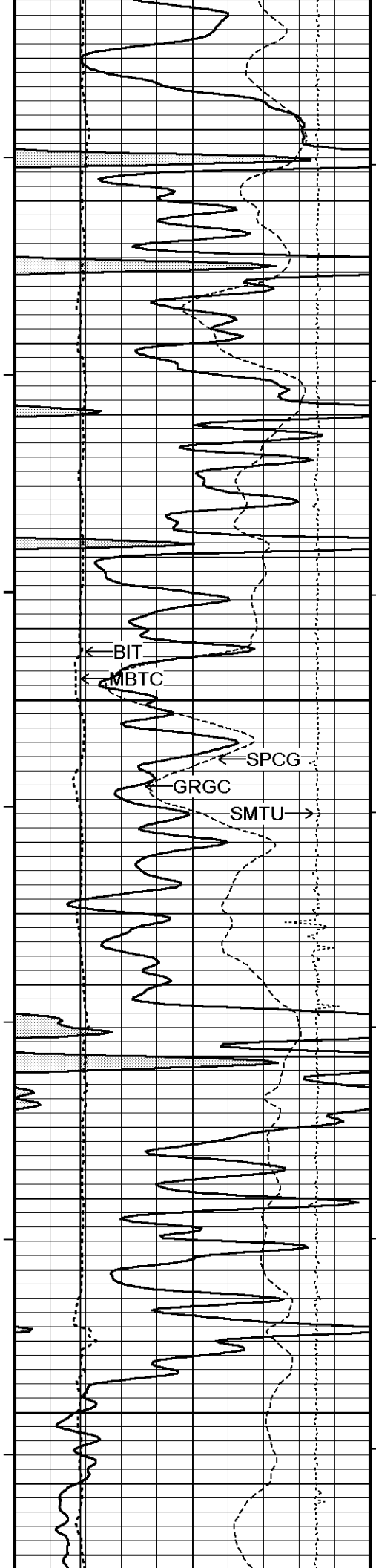


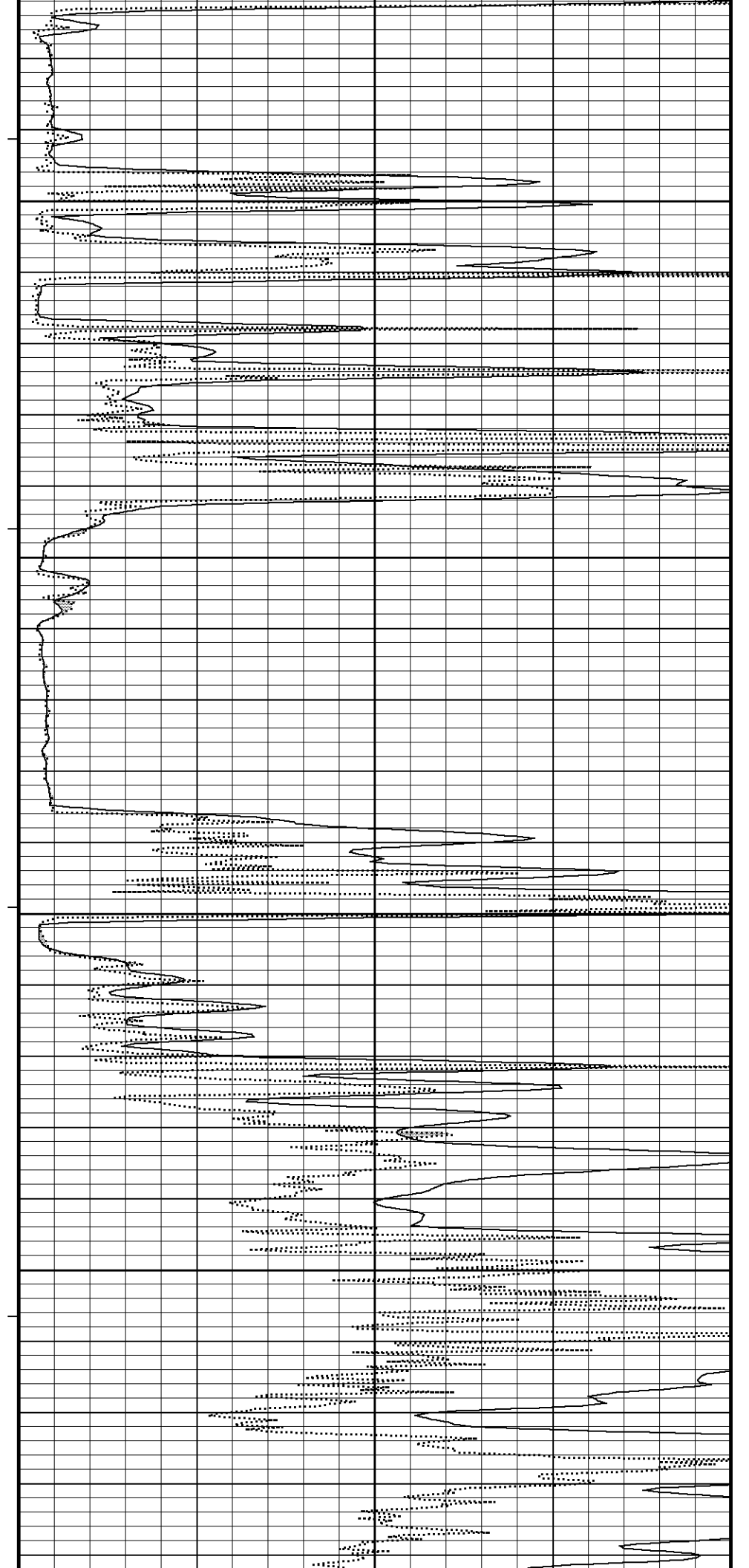
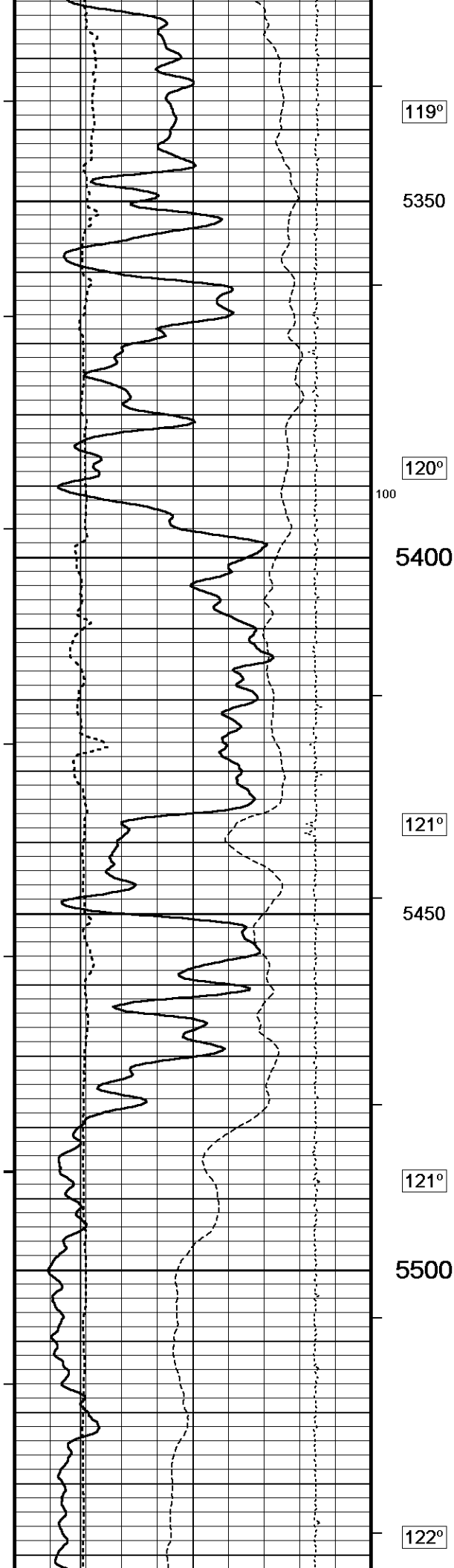
4450
400
111°
200
4500
112°
4550
112°
4600
113°
4650

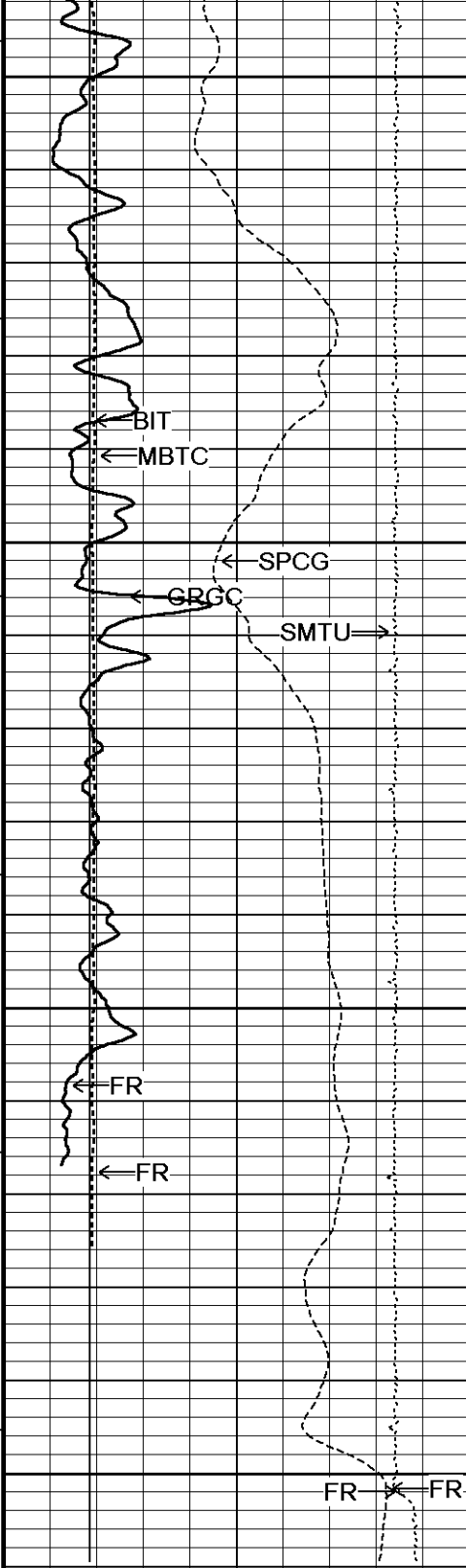












5550

122°

5600

122°

5650

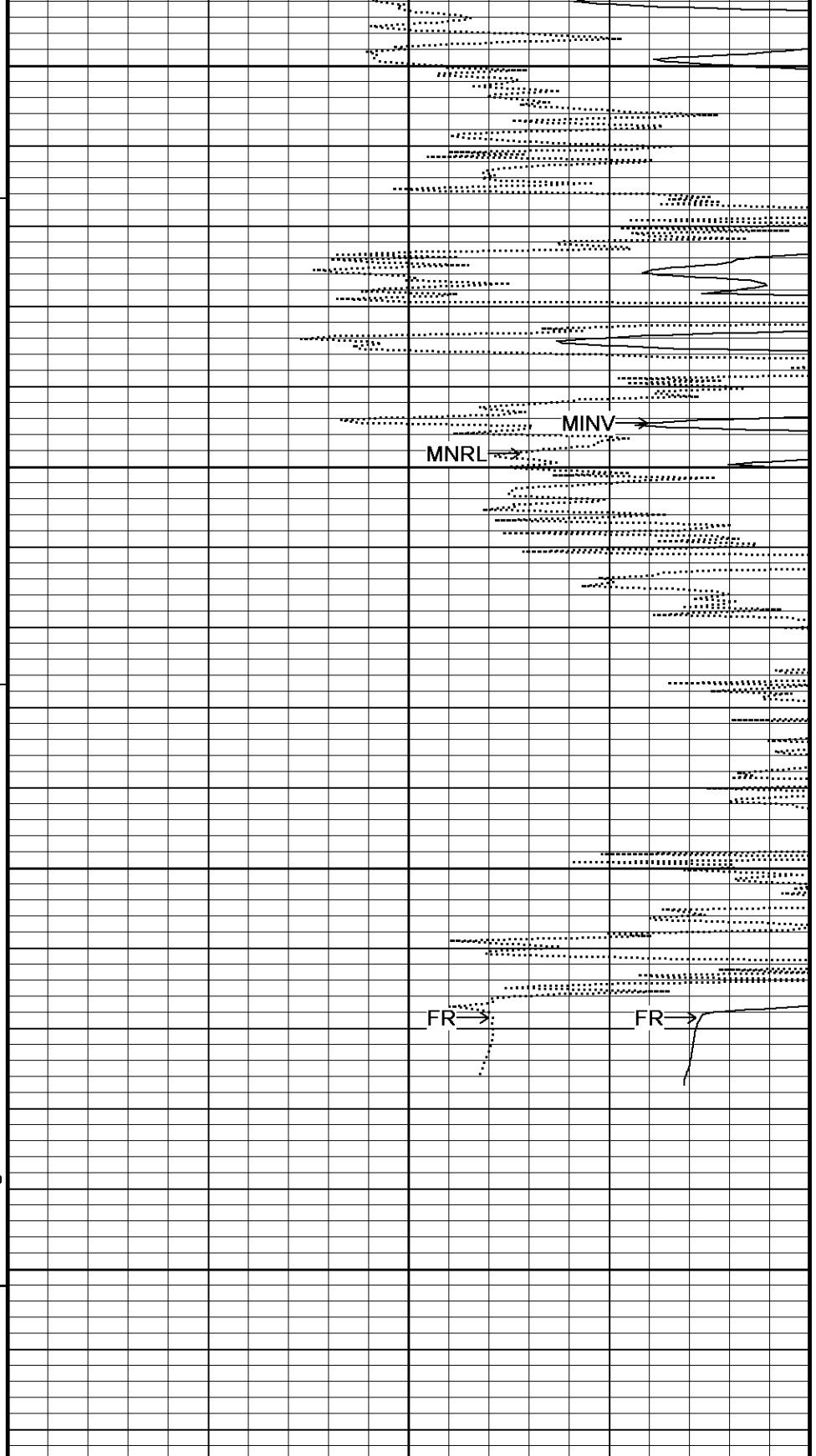
5700

Depth
In
Feet

Timing Marks
every 60.0 sec

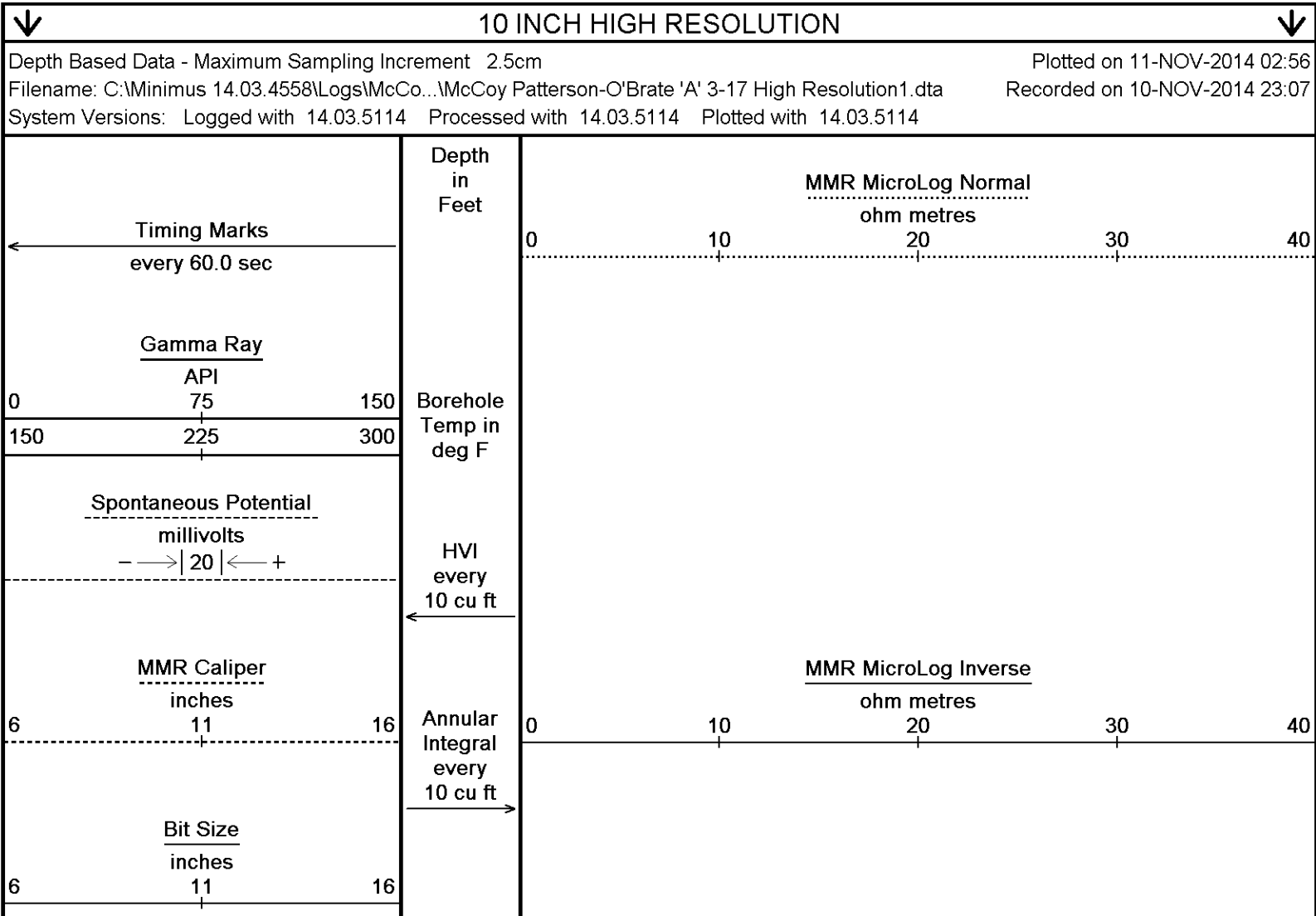
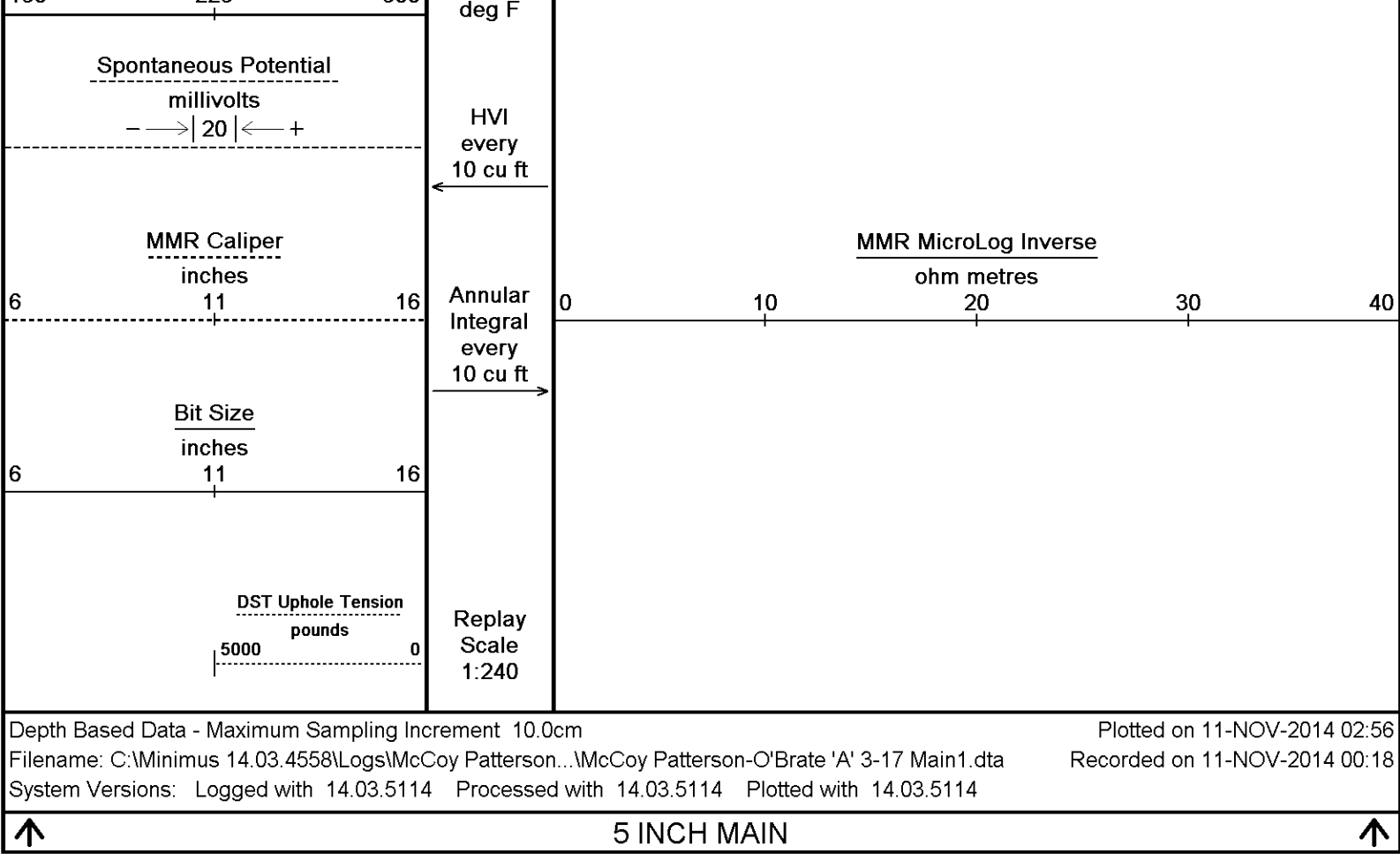
Gamma Ray
API
0 75 150
150 225 300

Borehole
Temp in



0 10 20 30 40

MMR MicroLog Normal
ohm metres



DST Uphole Tension
pounds
5000 0

Replay
Scale
1:120

5192

5200

117°

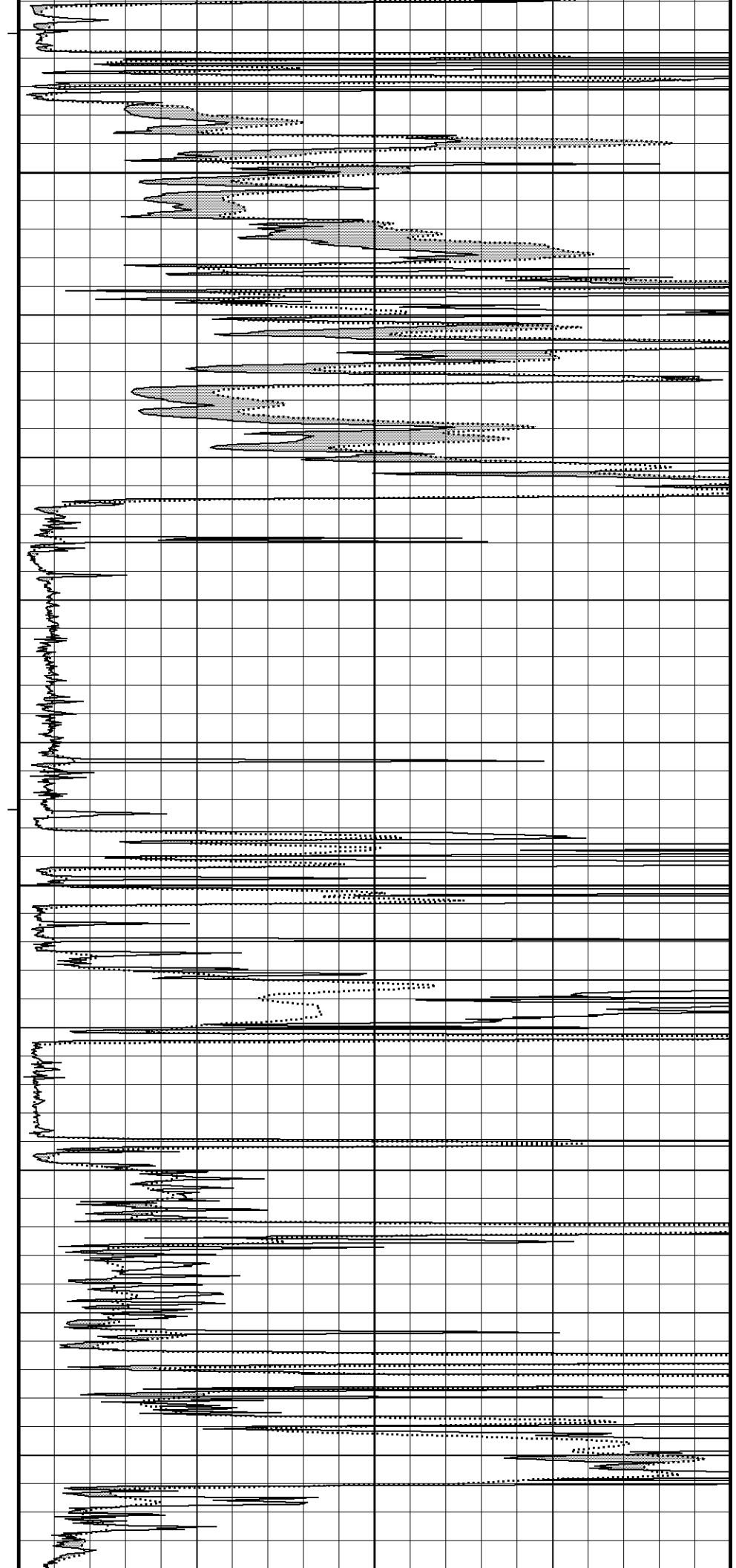
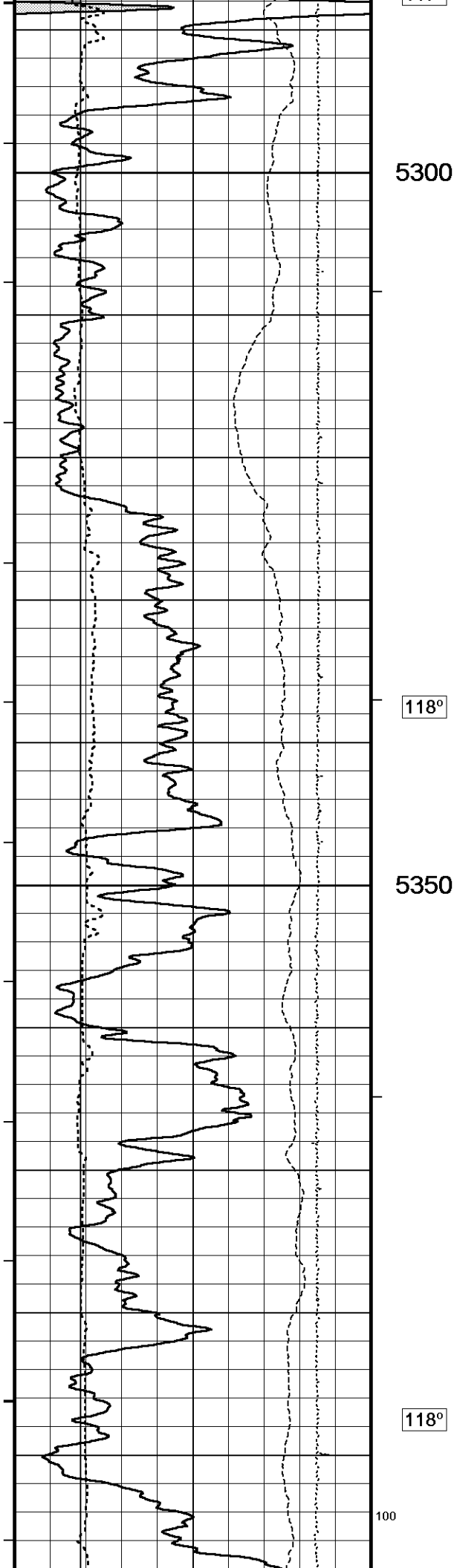
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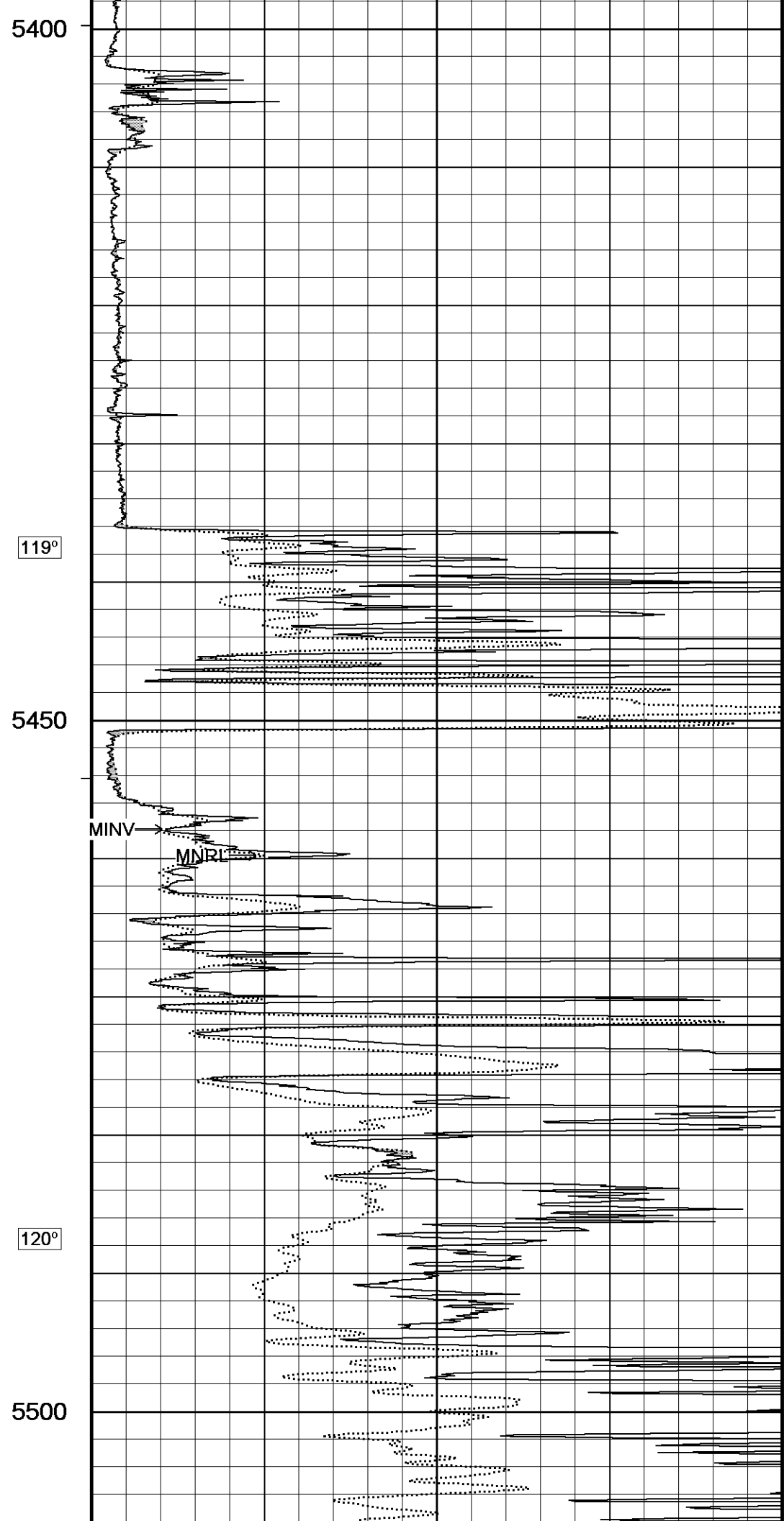
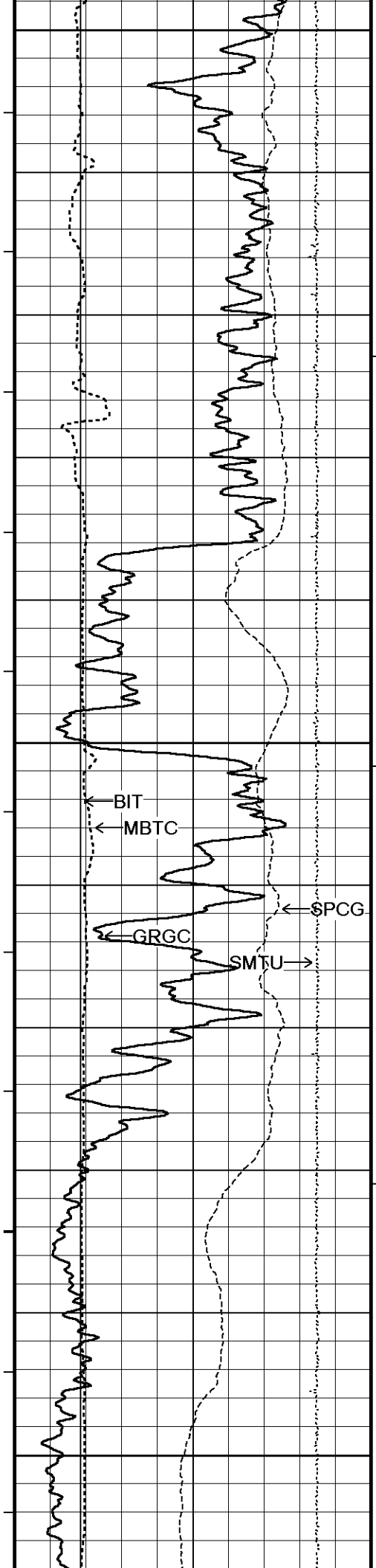
BIT
← MBTC

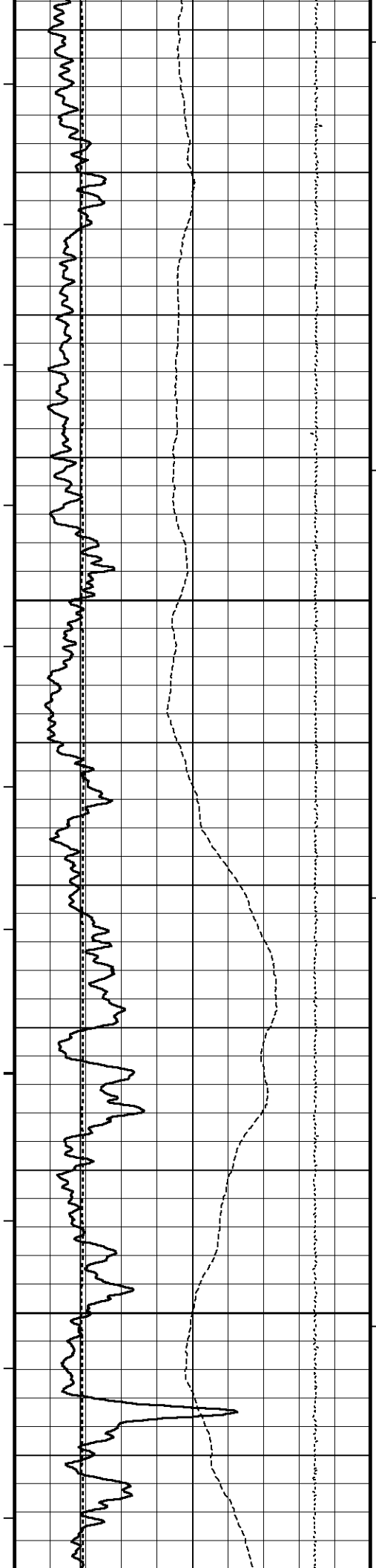
← SPCG
SMTU →
← GRGC

117°

MINRL





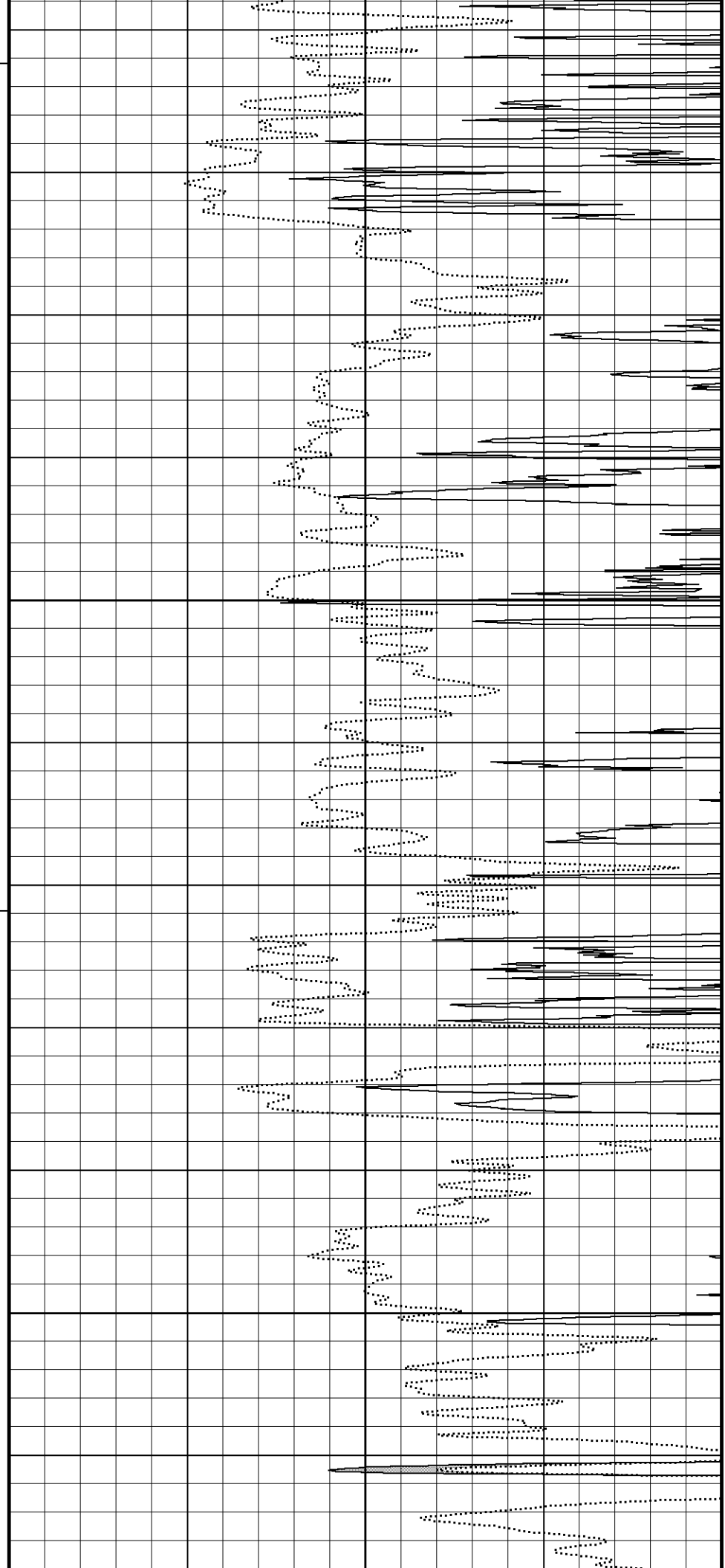


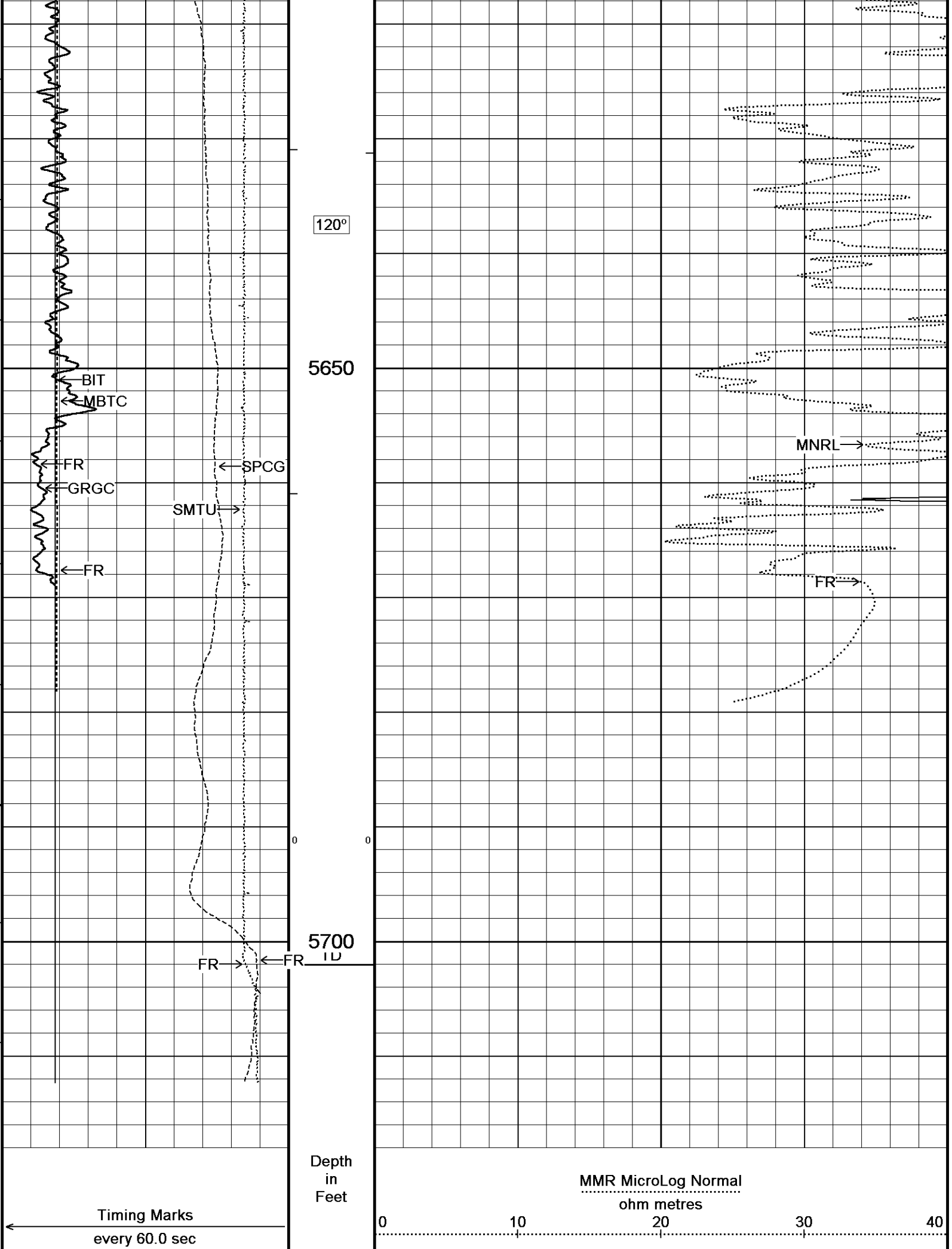
120°

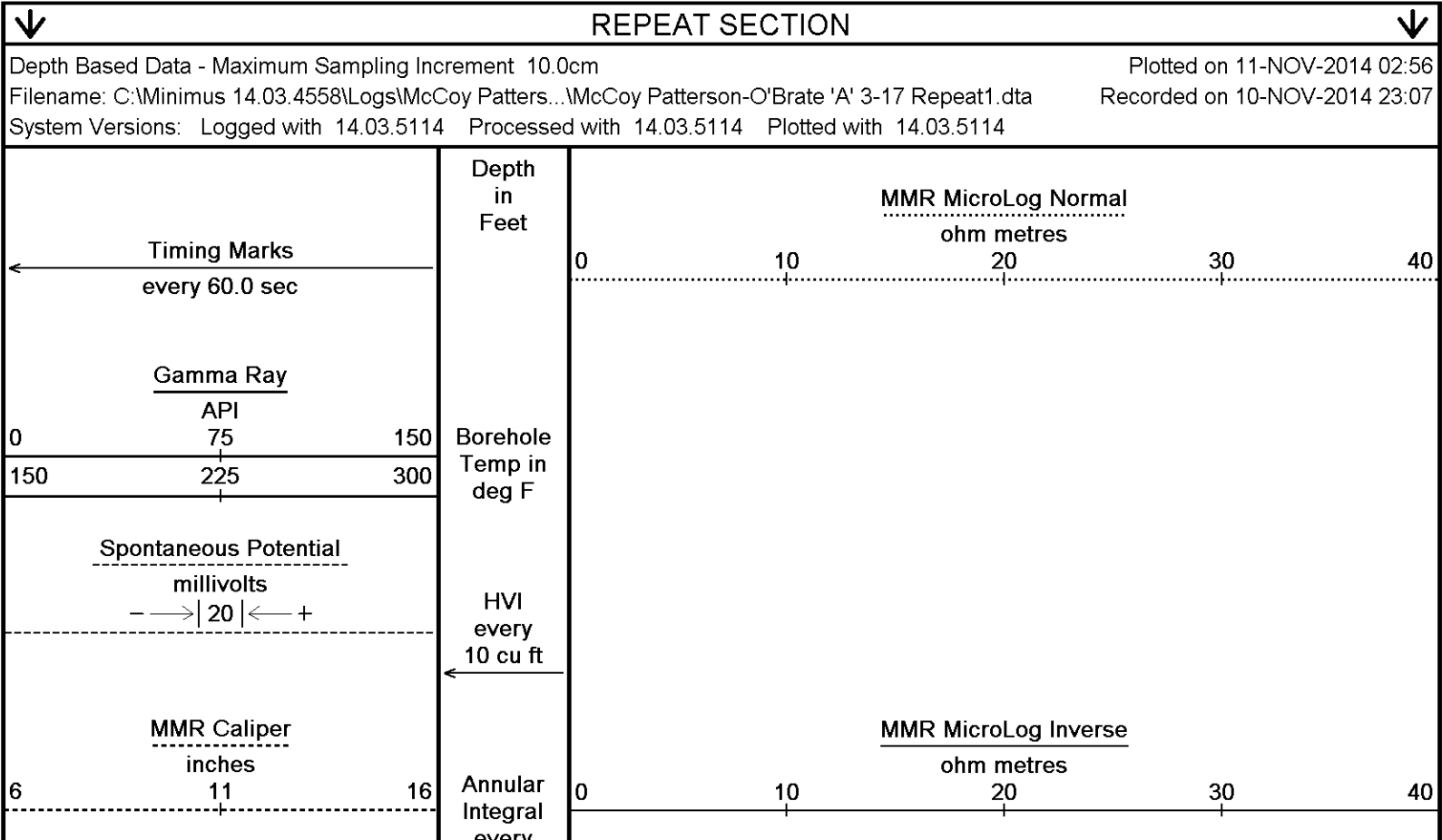
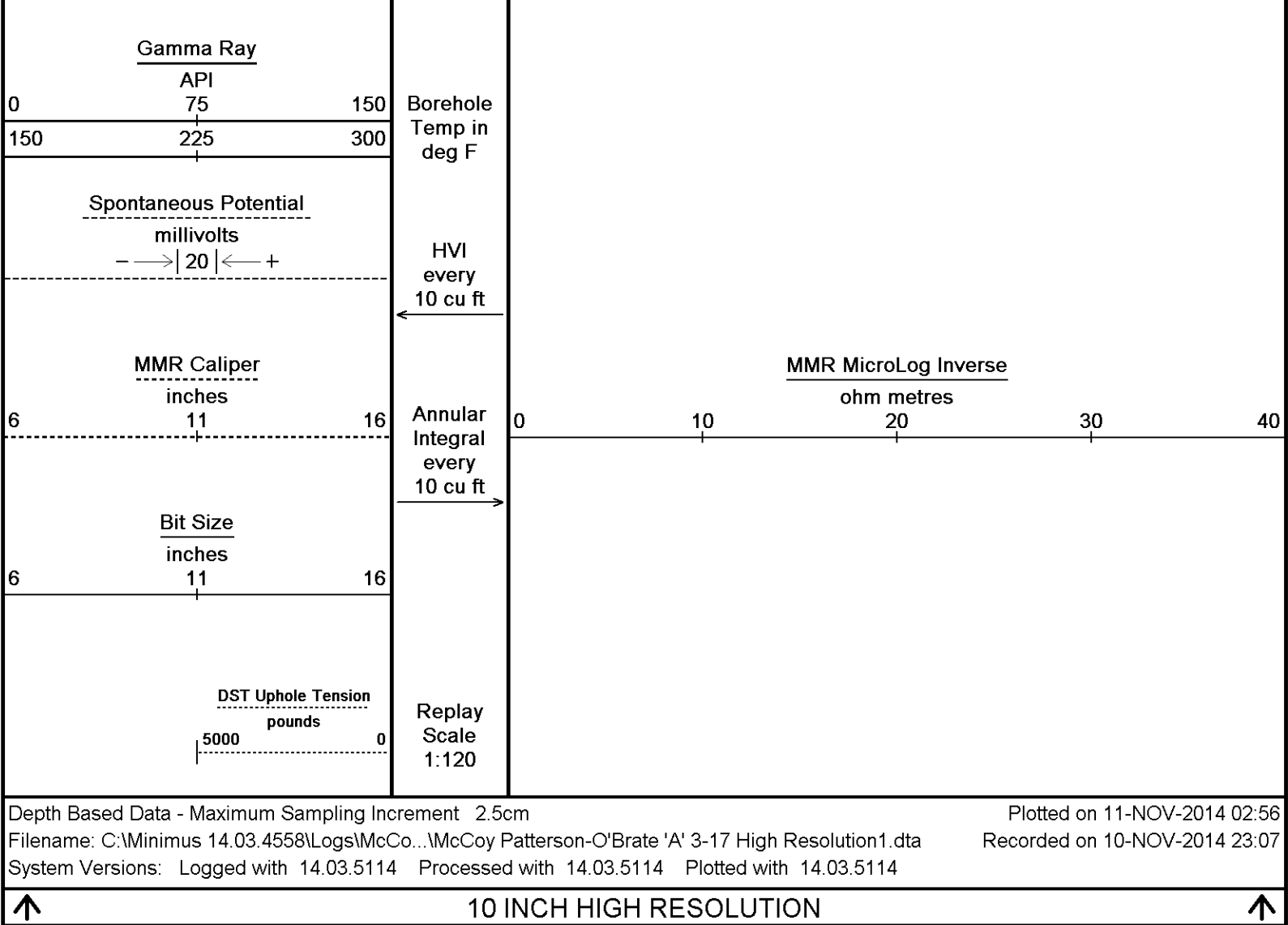
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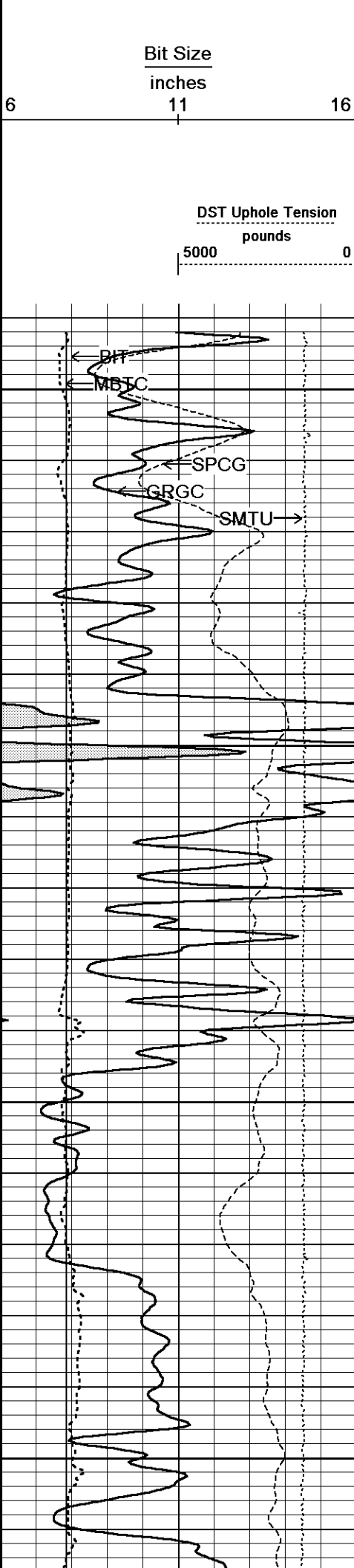
120°

5600









every
10 cu ft

Replay
Scale
1:240

5190

5200

117°

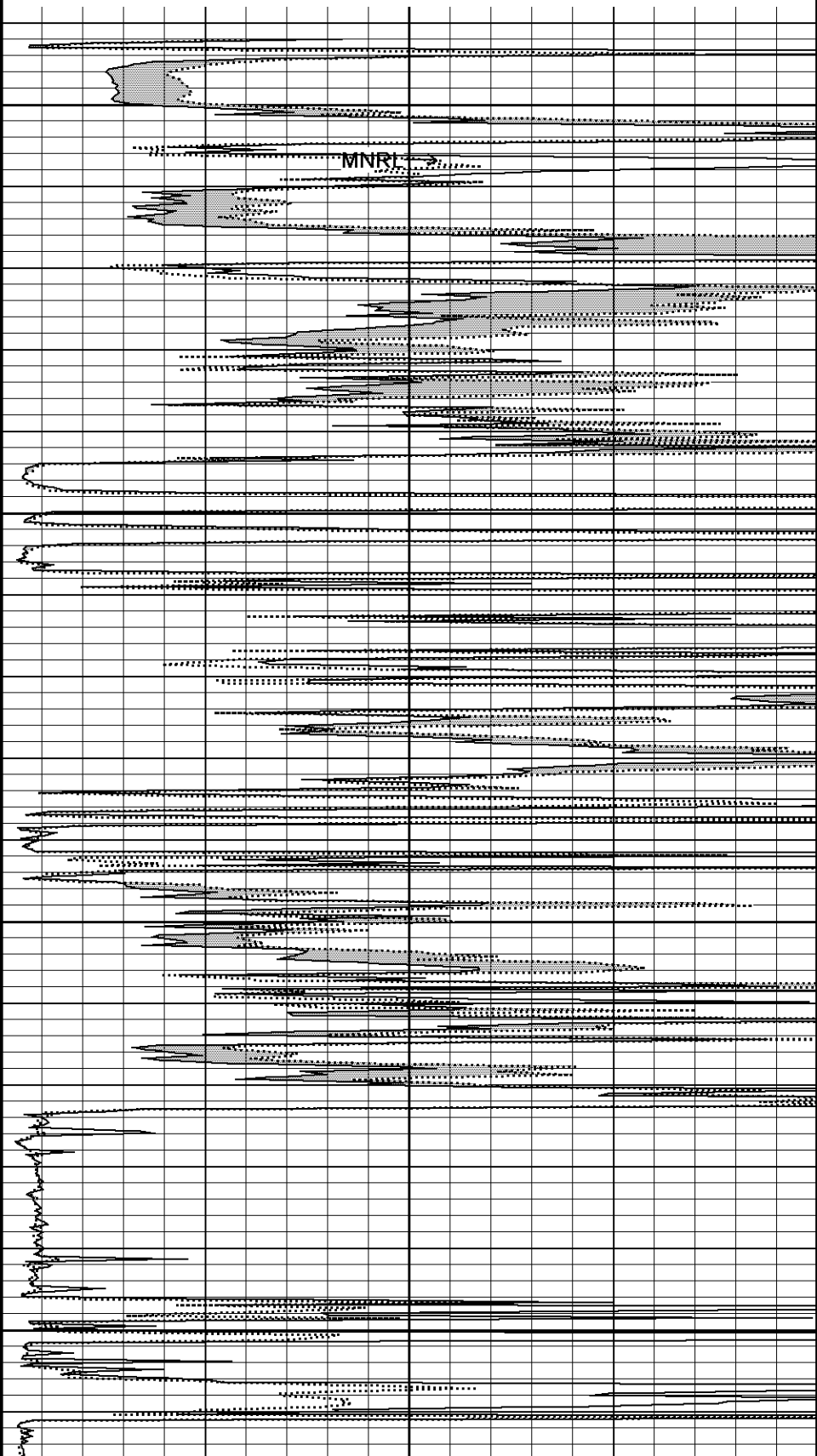
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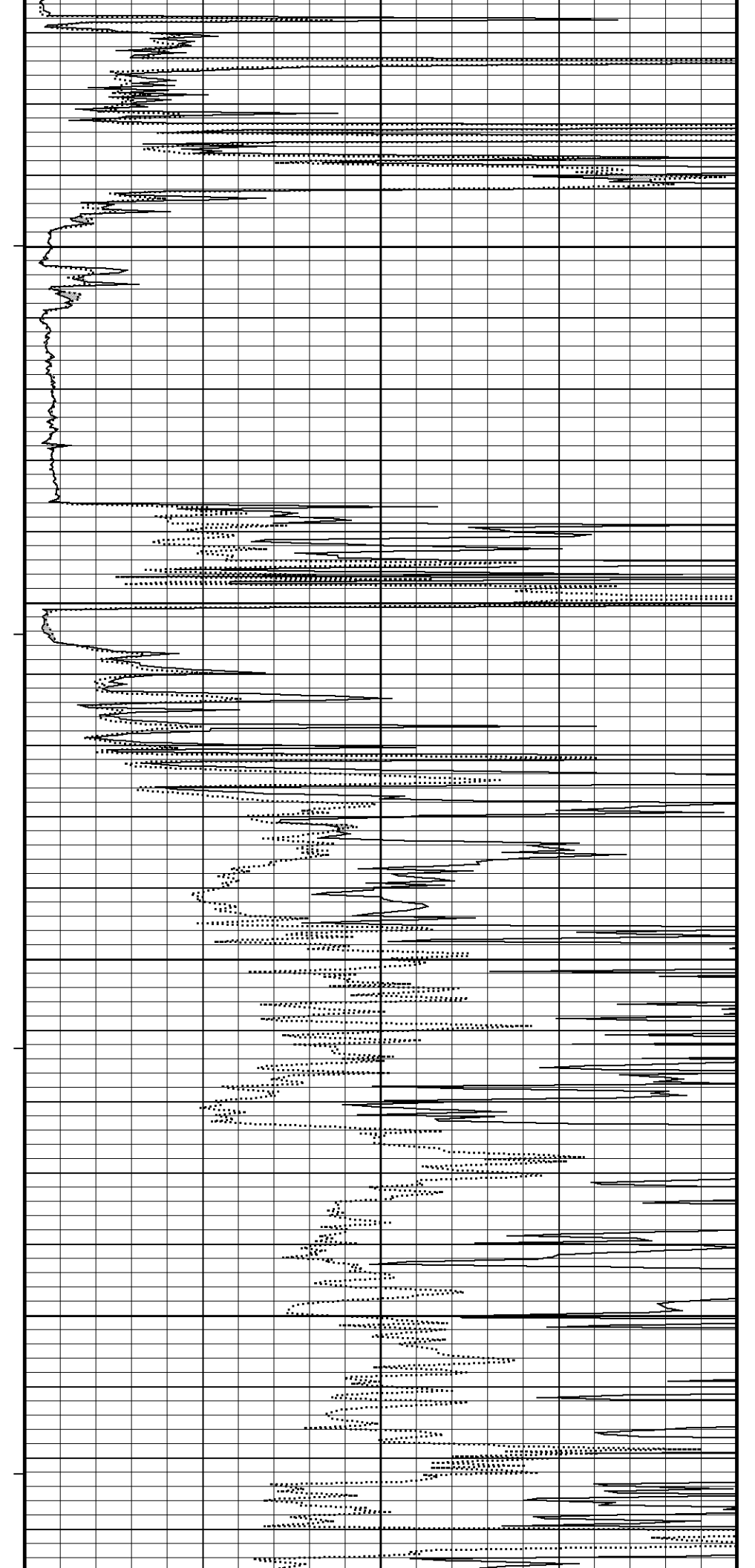
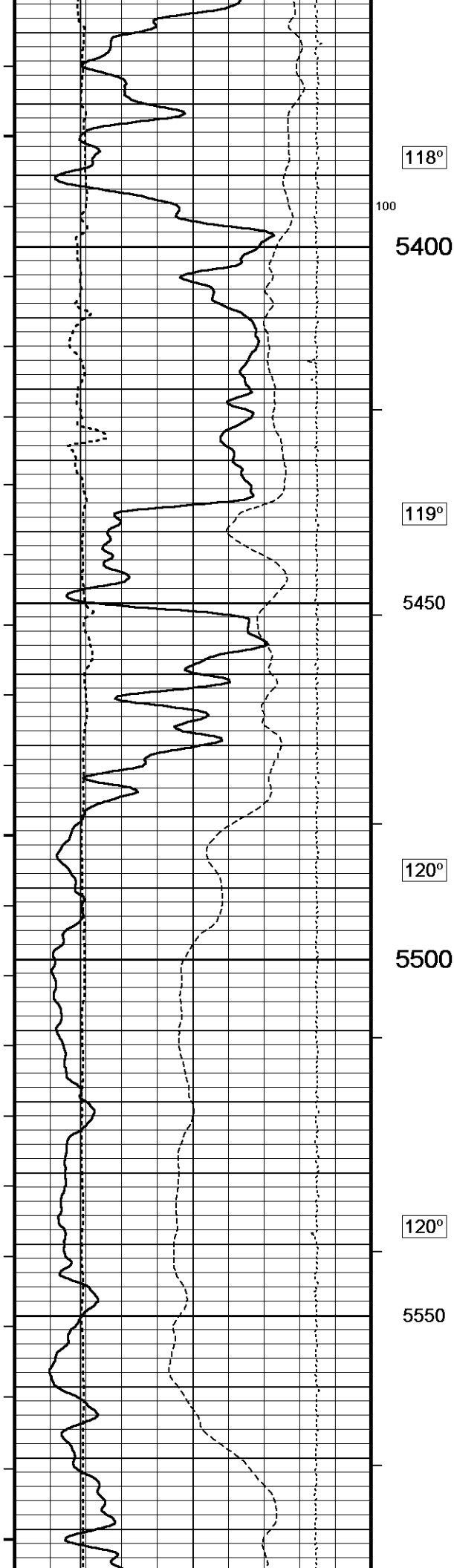
117°

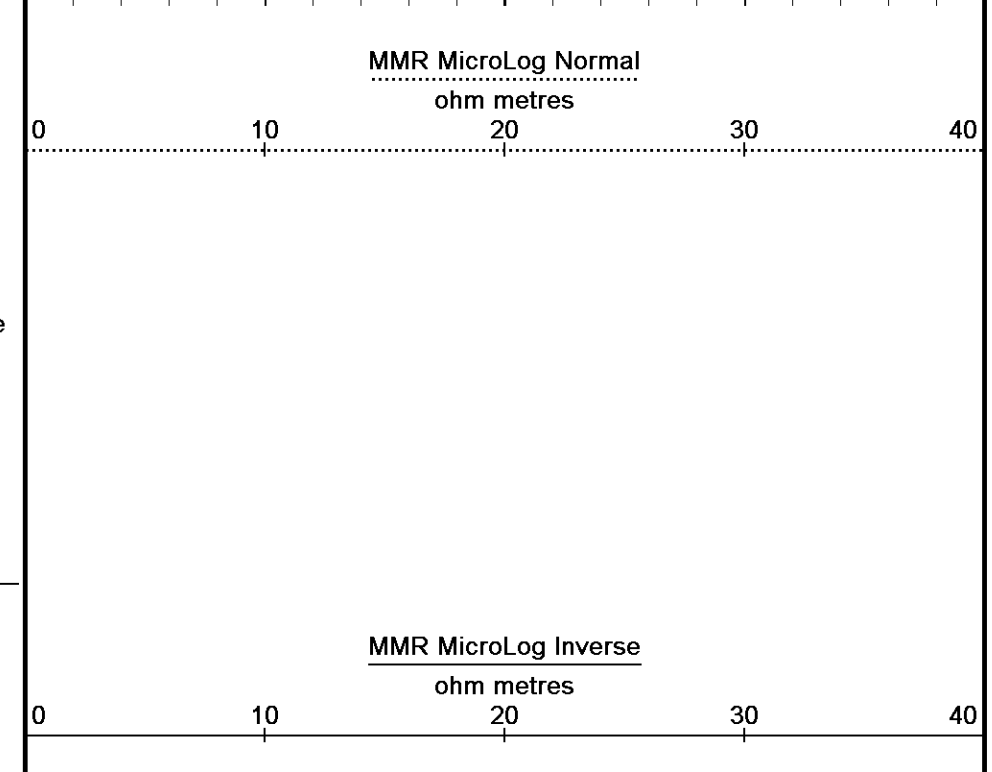
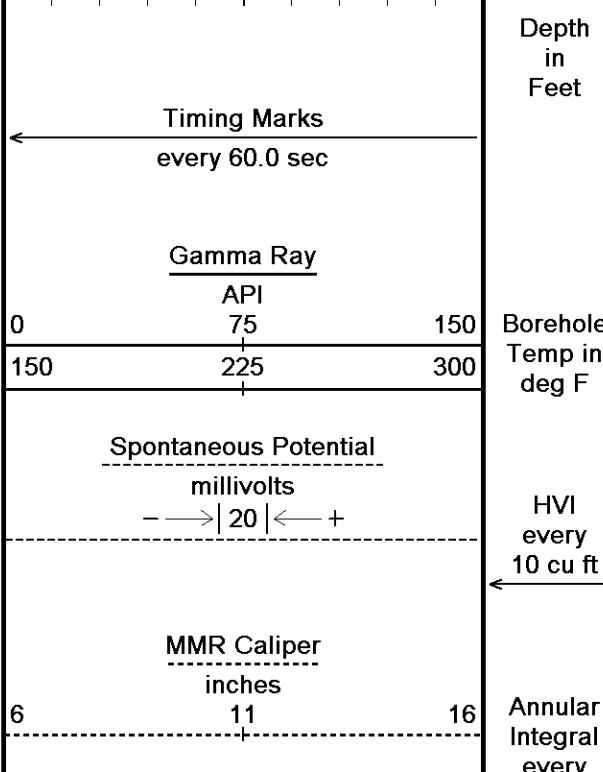
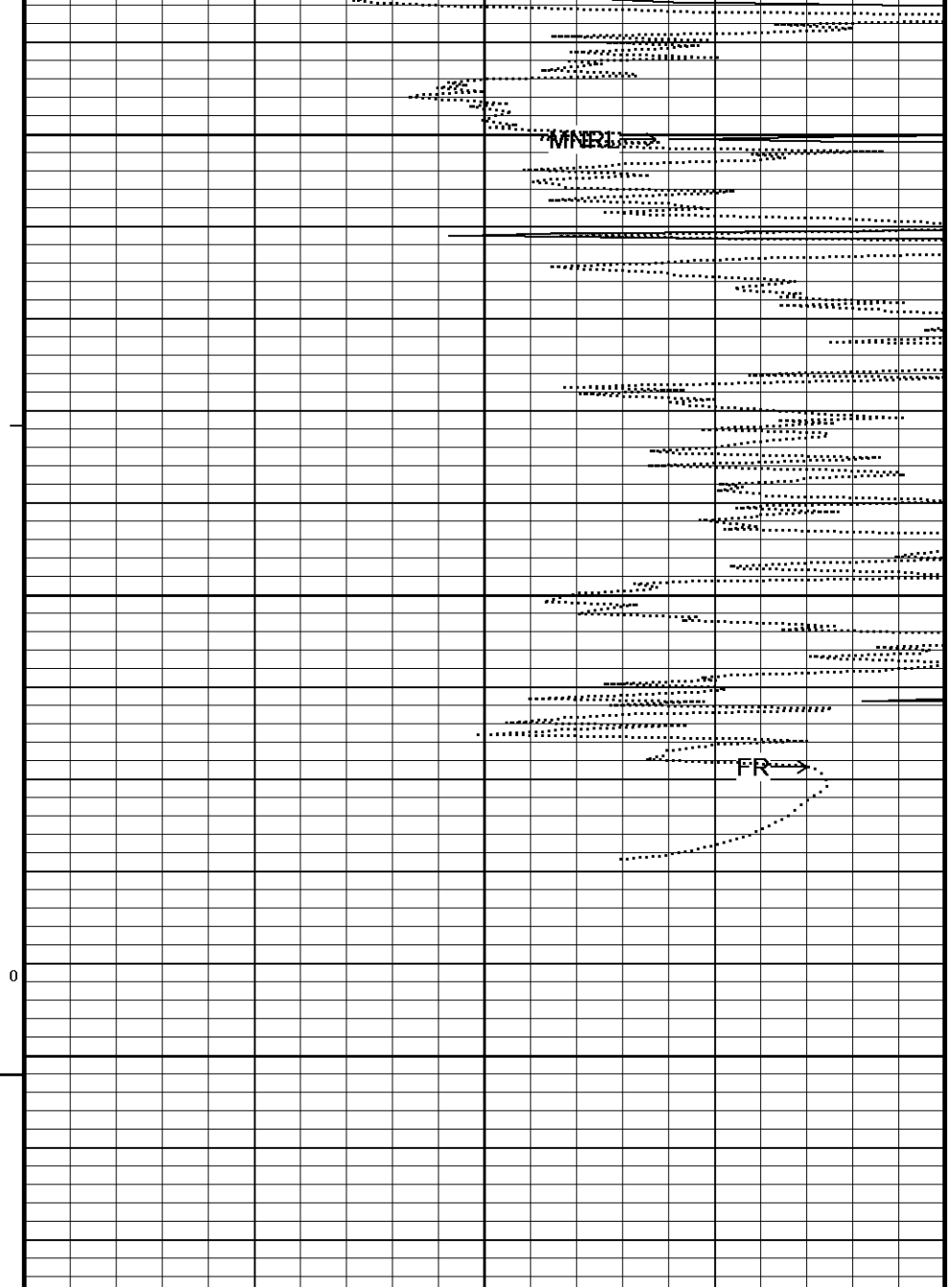
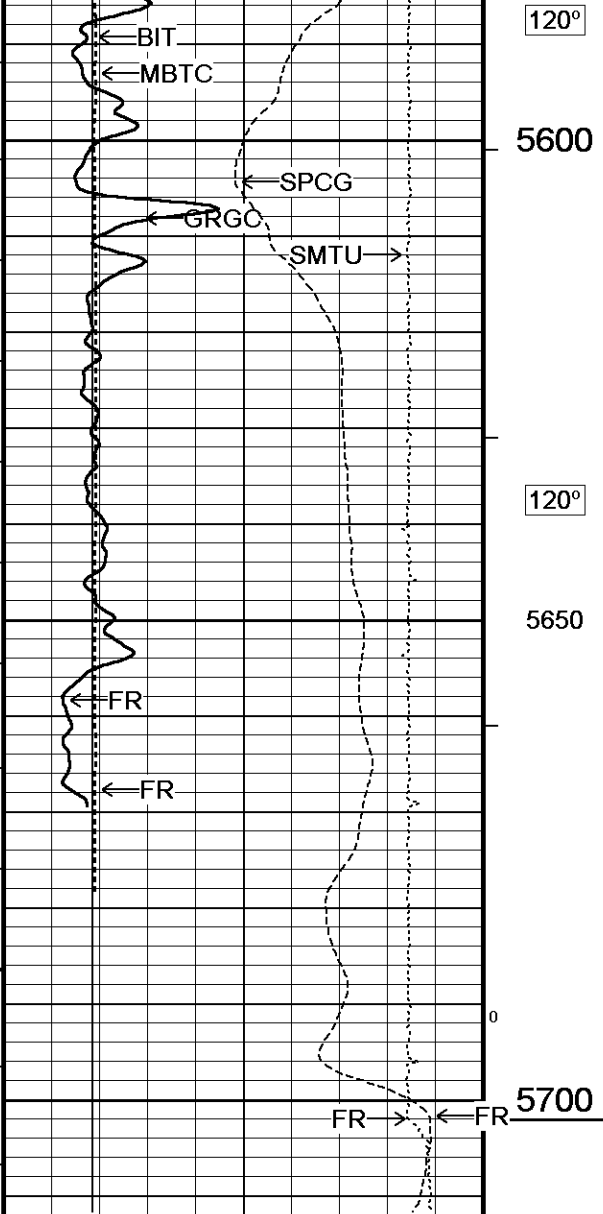
5300

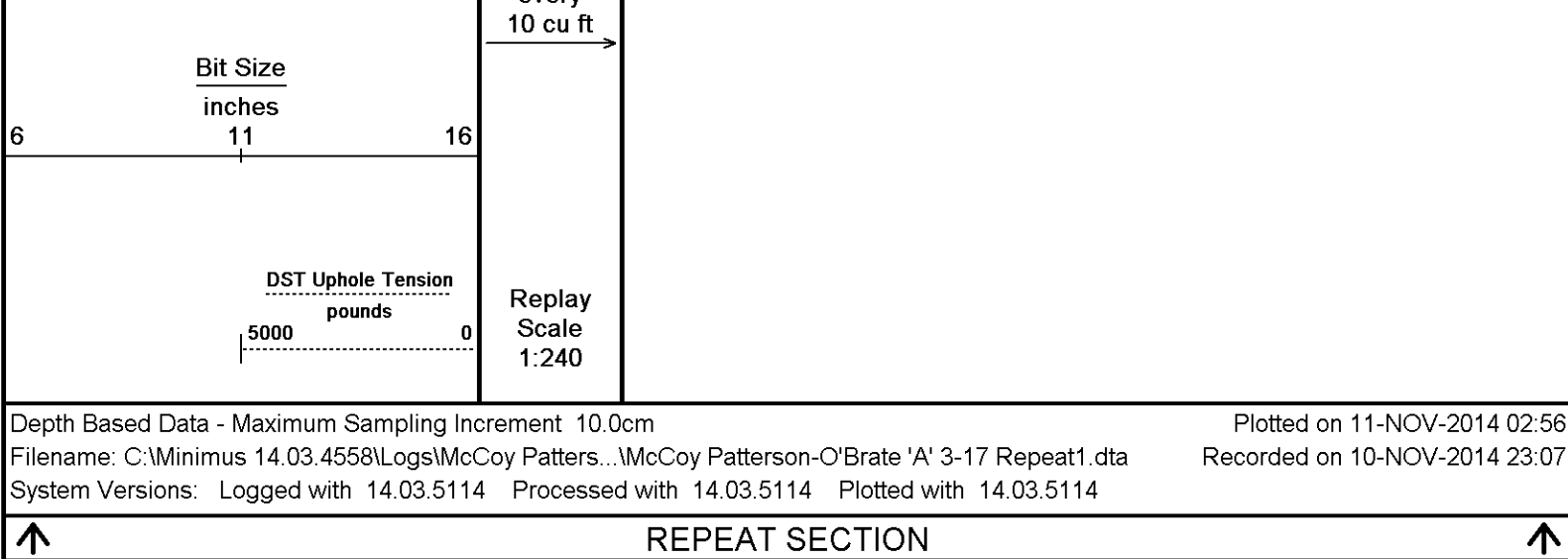
118°

5350









BEFORE SURVEY CALIBRATION

C:\Minimus 14.03.4558\Logs\McCoy Patterson-O'Brate 'A' 3-17\McCoy Patterson-O'Brate 'A' 3-17 Repeat1.dta

General Constants All 000			Last Edited on 10-NOV-2014,20:39
General Parameters			
Mud Resistivity	1.970	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. Four Res Rt		
RWA Constant A	0.610		
RWA Constant M	2.150		
SW/APOR Tool Source	0.000		

Down-hole Tension Calibration SMS 0		Field Calibration on 10-NOV-2014 22:07	
Reading No	Measured	Calibrated (lbs)	
1	15342.73	0.00	
2	15915.40	407.90	

Gamma Calibration MCG-C 208		Field Calibration on 10-NOV-2014 09:47	
	Measured	Calibrated (API)	
Background	72	49	
Calibrator (Gross)	1130	774	
Calibrator (Net)	1057	725	

Gamma Calibration Tolerances MCG-C 208		
Ratio	1.459	1.40 1.475 1.55 Counts/API

Gamma Constants MCG-C 208			Last Edited on 10-NOV-2014,20:39		
Gamma Calibrator Number	GRC038				
GRC-M Calibrator Jig in Use?	NO				
Inactive Background Jig in Use?	NO				
Mud Density	1.11	gm/cc			
Caliper Source for Processing	Density Caliper				
Tool Position	Eccentred				
Concentration of KCl		knpm			

Concentration of KCl	Chloride	ppm
K Mud Type	0.00	%
K Mud Concentration		
SP Calibration MCG-C 208		Field Calibration on 10-NOV-2014 11:01
	Measured	Calibrated (mV)
Reference 1	99.9	99.2
Reference 2	-98.0	-99.0
High Resolution Temperature Calibration MCG-C 208		Field Calibration on 23-SEP-2014,19:44
	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	100.00
High Resolution Temperature Constants MCG-C 208		Last Edited on 23-SEP-2014,19:44
Pre-filter Length	11	
Caliper Calibration MMR-C.A 248		Base Calibration on 23-OCT-2014 09:52 Field Calibration on 10-NOV-2014 09:36
Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	13737	5.96
2	17108	7.98
3	20397	9.85
4	24360	11.92
5	0	0.00
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	7.94	7.97
Caliper Calibration Tolerances MMR-C.A 248		
Short Arm Field Cal.	7.77 7.97 8.17 7.94 in	
Micro Normal and Micro Inverse Calibration MMR-C.A 248		Base Calibration on 23-OCT-2014 10:02 Field Check on 02-NOV-2014 00:33
Base Calibration		
Channel	Resistor 1	Resistor 2
Micro Normal	10.2	49.9
Micro Inverse	9.9	49.5
	Measured	Calibrated (ohm-m)
Channel	Resistor 1	Resistor 2
Micro Normal	5.1	25.6
Micro Inverse	3.4	16.9
Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	93.5	93.5
Micro Inverse	62.2	62.2
Micro Normal & Micro Inverse Calibration Tolerance MMR-C.A 248		
Micro Normal Res. 1	10.2	ohm
Micro Inverse Res. 1	9.9	ohm
Micro Normal Res. 2	49.9	ohm
Micro Inverse Res. 2	49.5	ohm
Micro Normal Base Check	93.5	ohm-m
Micro Inverse Base Check	62.2	ohm-m
Micro Normal Field Check	93.5	ohm-m
Micro Inverse Field Check	62.2	ohm-m
Micro Normal and Micro Inverse Constants MMR-C.A 248		Last Edited on 19-SEP-2014,16:14
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
Micro-Resistivity Caliper Constants MMR-C.A 248		Last Edited on

Micro Laterolog Calibration MMR-C.A 248

Base Calibration on 31-DEC-1999 00:00

Field Check on 31-DEC-1999 00:00

Base Calibration

	Measured		Calibrated (ohm-m)	
	Ref 1	Ref 2	Ref 1	Ref 2
	0.0	0.0	0.0	0.0
Base Check (ohm-m)			Field Check (ohm-m)	
		0.0		0.0

Micro Laterolog Constants MMR-C.A 248

Last Edited on 23-SEP-2014,18:59

Pad Type 6 in Solid Nylon B23059
 Micro Laterolog K Factor 0.0128
 Standoff Offset 0.0000 inches

Mudcake Thickness Correction Constants

Mud Cake Source Constant Value
 Mud Cake Thickness 0.4000 inches
 Mud Cake Thickness Caliper N/A
 Mud Cake Resistivity 0.1500 ohm-m
 Mud Cake Resistivity Temp. 68.00 Deg F
 Mud Cake Resistivity Source Constant Value
 Temp. Source Rmc Correc. N/A

Neutron Calibration MDN-A.B 163

Base Calibration on 22-OCT-2014 17:32

Field Check on 10-NOV-2014 09:51

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3042	93	3714	110
Ratio	32.627		33.764	

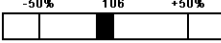
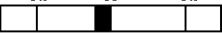
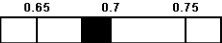
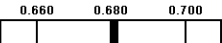
Field Calibrator at Base

	Calibrated (cps)
	1687 2482
Ratio	0.680

Field Check

	Calibrated (cps)
	1673 2453
Ratio	0.682

Neutron Calibration Tolerances MDN-A.B 163

Near Reading	3042		cps	Far Reading	93		cps
Ratio	32.627						
Base Check	0.680						
Field Check	0.682						

Neutron Constants MDN-A.B 163

Last Edited on 10-NOV-2014,20:02

Neutron Source Id P58125B
 Neutron Jig Number 5824NE
 Air Hole Processing Legacy
 Caliper Source for Processing Density Caliper
 Stand-off 0.00 inches
 Mud Density 1.00 gm/cc
 Limestone Sigma 7.10 cu
 Sandstone Sigma 4.26 cu
 Dolomite Sigma 4.70 cu
 Formation Pressure Source None
 Formation Pressure N/A kpsi
 Temperature Source Constant Value
 Temperature 68.00 degrees F
 Mud Salinity 0.00 kppm
 Salinity Correction Not Applied
 Formation Fluid Salinity Source None
 Formation Fluid Salinity N/A kppm

Formation Fluid Salinity N/A kppm
Barite Mud Correction Not Applied

FE Calibration MFE-A.A 55			Base Calibration on 23-OCT-2014 09:18	
			Field Check on 10-NOV-2014 09:27	
Base Calibration				
	Measured	Calibrated (ohm-m)		
Reference 1	0.0	0.0		
Reference 2	950.6	126.8		
Base Check			282.0	
Field Check			281.8	

FE Calibration Tolerances MFE-A.A 55				
Reference 2	950.6		ohm	
Base Check	282.0		ohm-m	
Field Check	281.8		ohm-m	

FE Constants MFE-A.A 55			Last Edited on 10-NOV-2014,20:01	
Running Mode		No Sleeve		
MFE K Factor		0.1268		
Caliper Source for FE correction		Density Caliper		
Caliper Value for FE correction		N/A inches		
Rm Source for FE correction		Temperature Corr		
Temp. for Rm Corr.		MCG External Temperature		
Stand-off		0.5 inches		

Induction Calibration MAI-A.A 5				Base Calibration on 22-OCT-2014,13:28	
				Field Check on 10-NOV-2014 09:26	
Base Calibration					
Test Loop Calibration		Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High	
1	16.3	470.8	9.3	966.2	
2	5.6	376.1	7.6	821.4	
3	2.6	266.1	5.2	566.0	
4	1.6	130.0	2.6	279.2	
Array Temperature		71.1	Deg F		
Test Loop Calibration Verified					
Channel	Base Check (mmho/m)		Field Check (mmho/m)		
	Low	High	Low	High	
1			14.6	3862.9	
2			31.6	3591.6	
3			29.7	2972.4	
4			20.7	2127.0	
Deep			18.4	1913.0	
Medium			42.9	3862.6	
Shallow			46.9	5373.6	
Array Temperature			66.3	Deg F	

Induction Calibration Tolerances MAI-A.A 5									
Low Conductivity 1	16.3		mmho/m	High Conductivity 1	470.8		mmho/m		
Low Conductivity 2	5.6		mmho/m	High Conductivity 2	376.1		mmho/m		
Low Conductivity 3	2.6		mmho/m	High Conductivity 3	266.1		mmho/m		
Low Conductivity 4	1.6		mmho/m	High Conductivity 4	130.0		mmho/m		
Background Vx 1	0.0		mmho/m	Phase Check Loop 1	0.0		%		
Background Vx 2	0.0		mmho/m	Phase Check Loop 2	0.0		%		
Background Vx 3	0.0		mmho/m	Phase Check Loop 3	0.0		%		
Background Vx 4	0.0		mmho/m	Phase Check Loop 4	0.0		%		

Induction Model	RtAP-WBM		
Caliper for Borehole Corr.	Density Caliper		
Hole Size for Borehole Correction	N/A	inches	
Tool Centred	No		
Stand-off Type	Fins		
Stand-off	0.00	inches	
Number of Fins on Stand-off	8.0000		
Stand-off Fin Angle	45.00	degrees	
Stand-off Fin Width	0.0000	inches	
Borehole Corr. Rm Source	Temperature Corr		
Temp. for Rm Corr.	MCG External Temperature		
Squasher Start	0.0020	mhos/metre	
Squasher Offset	N/A	mhos/metre	

Borehole Normalisation

DRM1	0.0000	DRC1	0.0000
DRM2	0.0000	DRC2	0.0000
MRM1	0.0000	MRC1	0.0000
MRM2	0.0000	MRC2	0.0000
SRM1	0.0000	SRC1	0.0000
SRM2	0.0000	SRC2	0.0000

Calibration Site Corrections

Channel 1	0.00	mmhos/metre
Channel 2	0.00	mmhos/metre
Channel 3	0.00	mmhos/metre
Channel 4	0.00	mmhos/metre

Apparent Porosity and Water Saturation Constants

Archie Constant (A)	1.00	
Cementation Exponent (M)	2.00	
Saturation Exponent (N)	2.00	
Saturation of Water for Apor	100.00	percent
Resistivity of Water for Apor and Sw	0.05	ohm-m
Resistivity of Mud Filtrate for Sw	0.00	ohm-m
Source for Rt	0.00	
Source for Rxo	0.00	

High Resolution Temperature Calibration MAI-A.A 5

Field Calibration on 01-NOV-2014,01:00

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	100.00

High Resolution Temperature Constants MAI-A.A 5

Last Edited on 01-NOV-2014,01:00

Pre-filter Length	11
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Photo Density Calibration MPD-D.A 481

Base Calibration on 22-OCT-2014 15:53

Field Check on 10-NOV-2014 09:33

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1210	1421		
Reference 1	55376	26233	59556	30836
Reference 2	22300	2596	24941	2541

Field Check at Base

1210.3 1420.8

Field Check

1211.2 1417.9

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	227	1078		
Reference 1	23980	55175	0.439	0.371
Reference 2	6780	22159	0.311	0.272

Field Check at Base

226.9

1078.0

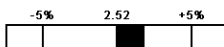
Field Check

230.6

1082.6

Photo Density Calibration Tolerances MPD-D.A 481

Near Density Ratio 2.57

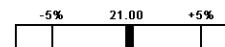


PE Calibration 0.120

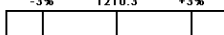


Far Density Ratio

21.11

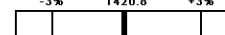


Near Den. Field Check 1211.2

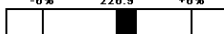


Far Den. Field Check

1417.9

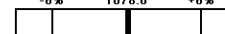


PE WS Field Check 230.6



PE WH Field Check

1082.6



Density Constants MPD-D.A 481

Last Edited on 10-NOV-2014,20:38

Density Source Id P50557B
 Nylon Calibrator Number DNCE695
 Aluminium Calibrator Number DACD698
 Density Shoe Profile 8 inch
 Caliper Source for Processing Density Caliper
 PE Correction to Density Not Applied
 Mud Density 1.11 gm/cc
 Mud Density Z/A Multiplier 1.11
 Mud Filtrate Density 1.00 gm/cc
 Dry Hole Mud Filtrate Density 1.00 gm/cc
 DNCT 0.00 gm/cc
 CRCT 0.00 gm/cc
 Density Z/A Correction Hybrid

Matrix density (gm/cc)	Depth (m)
2.71	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

Caliper Calibration MPD-D.A 481

 Base Calibration on 22-OCT-2014 15:01
 Field Calibration on 10-NOV-2014 09:28

Base Calibration

Reading No

Measured

Calibrator Size (in)

1

17509

3.99

2

27597

5.98

3

37616

7.97

4

47437

9.86

5

58570

11.92

6

N/A

N/A

Field Calibration

Measured Caliper (in)

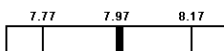
7.98

Actual Caliper (in)

7.97

Caliper Calibration Tolerances MPD-D.A 481

Short Arm Field Cal. 7.98



DOWNHOLE EQUIPMENT

C:\Minimus 14.03.4558\Logs\McCoy Patterson-O'Brate 'A' 3-17\McCoy Patterson-O'Brate 'A' 3-17 Repeat1.dta

CBH-C, Cablehead, 11 pin
 CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma



Compact Gamma Ray
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

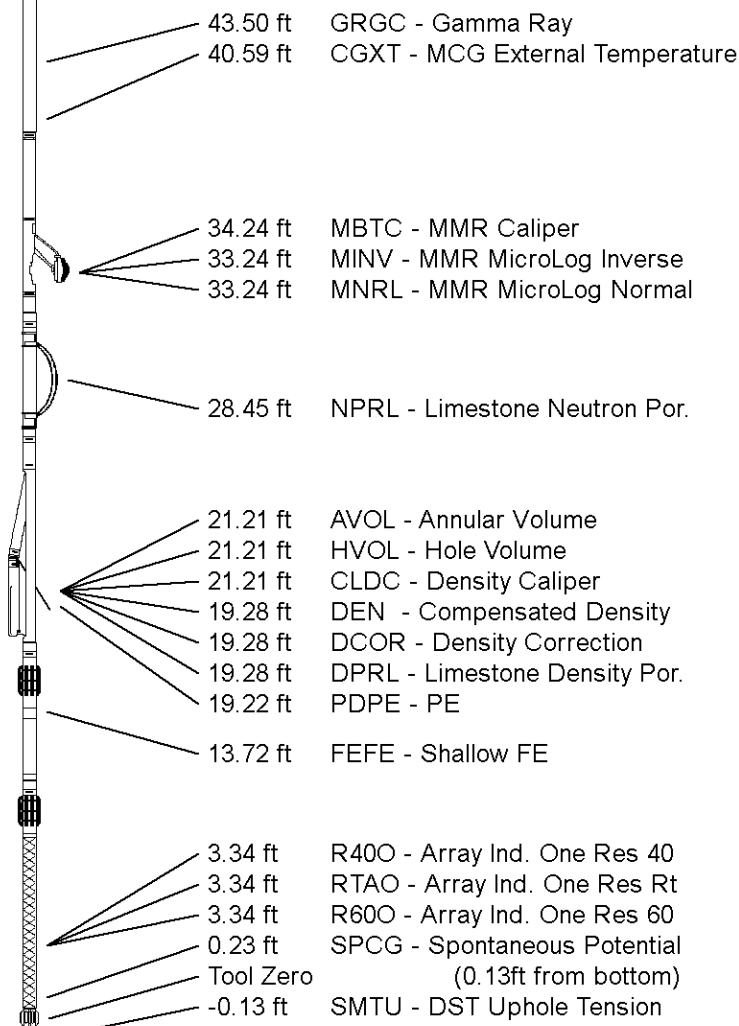
Compact Neutron
MDN-A.B 163 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-D.A 481 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 Induction
MAI-A.A 5 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 51.18 ft Weight: 407.9 lb



COMPANY	McCOY PETROLEUM CORPORATION
WELL	PATTERSON-O'BRATE 'A' 3-17
FIELD	MERTILLA SOUTHEAST
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2825.00	feet	First Reading	5669.00	feet
Elevation Drill Floor	2823.00	feet	Depth Driller	5700.00	feet
Elevation Ground Level	2814.00	feet	Depth Logger	5702.00	feet



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