



Weatherford

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

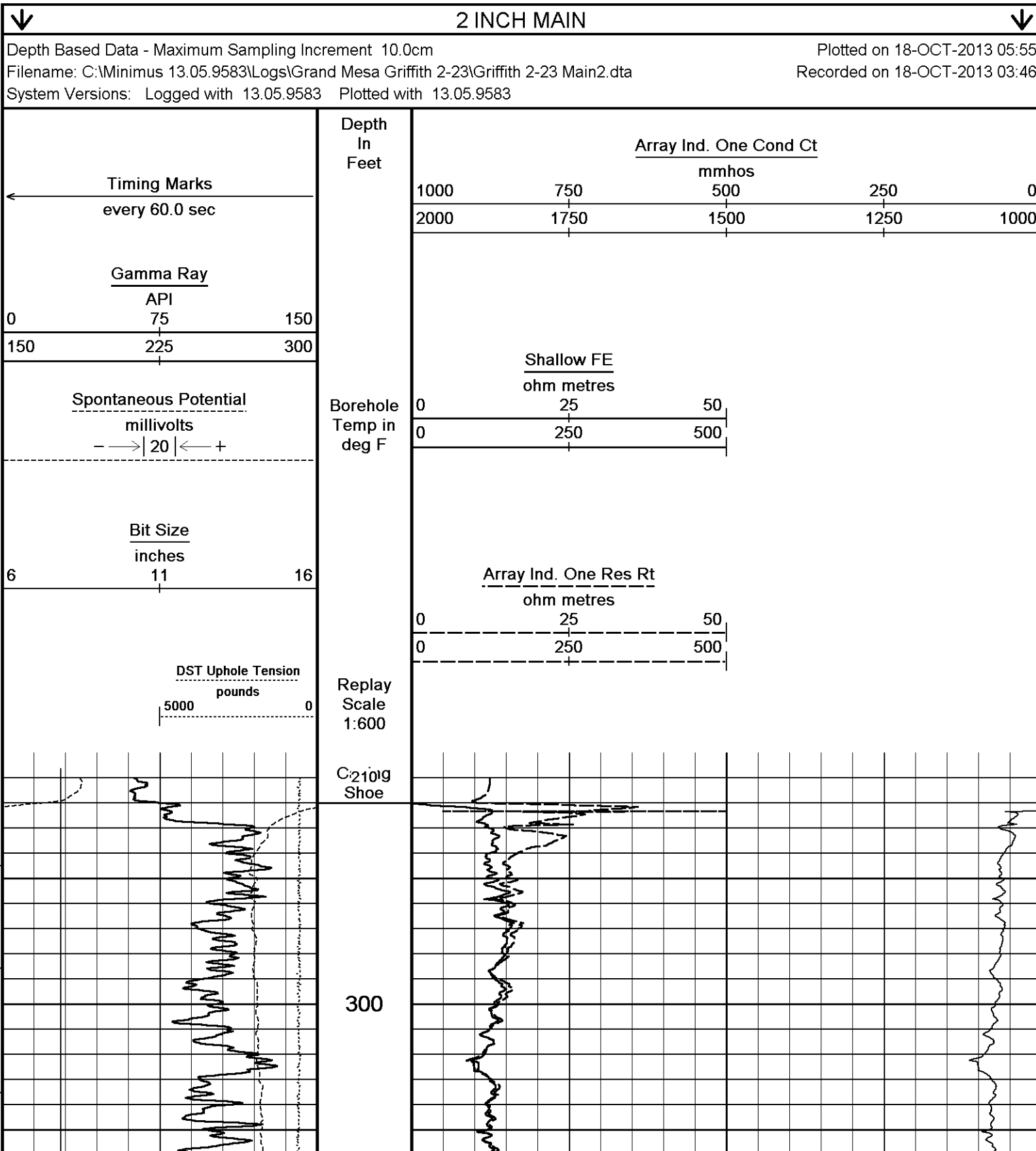
COMPANY				GRAND MESA OPERATING COMPANY			
WELL				GRIFFITH 2-23			
FIELD				WILDCAT			
PROVINCE/COUNTY				SCOTT			
COUNTRY/STATE				U.S.A. / KANSAS			
LOCATION				1429' FSL & 775' FEL SE SW NE SE			
SEC	TWP	RGE	Other Services				
23	16S	33W	MPD/MDN				
API Number		15-171-20988		MML			
Permit Number							
Permanent Datum GL, Elevation 2968 feet							
Log Measured From KB							
Drilling Measured From KB @ 9 FEET							
Date	18-OCT-2013						
Run Number	ONE						
Service Order	3541125						
Depth Driller	4810.00			feet			
Depth Logger	4814.00			feet			
First Reading	4811.00			feet			
Last Reading	220.00			feet			
Casing Driller	221.00			feet			
Casing Logger	220.00			feet			
Bit Size	7.875			inches			
Hole Fluid Type	CHEM						
Density / Viscosity	9.20 lb/USg		67.00 CP				
PH / Fluid Loss	10.00		7.20 ml/30Min				
Sample Source	PIT						
Rm @ Measured Temp	1.0 @ 58.0		ohm-m				
Rmf @ Measured Temp	0.80 @ 58.0		ohm-m				
Rmc @ Measured Temp	1.20 @ 58.0		ohm-m				
Source Rmf / Rmc	CALC	CALC					
Rm @ BHT	0.49 @ 117.0		ohm-m				
Time Since Circulation	4 HRS						
Max Recorded Temp	117.00		deg F				
Equipment / Base	13057		KANSAS				
Recorded By	D. COLE						
Witnessed By	K. MATSON						
IOB#	LB 13-294						

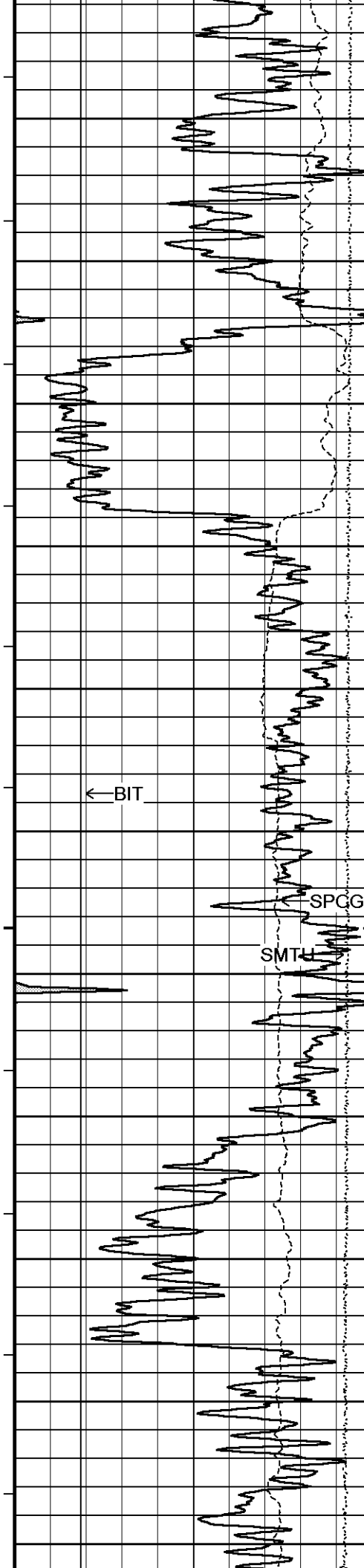
BOREHOLE RECORD					Last Edited: 18-OCT-2013 03:03
Bit Size inches		Depth From feet		Depth To feet	
7.875		220.00		4814.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet		Weight pounds/ft
SURFACE	8.625	0.00	220.00		24.00

REMARKS
- SOFTWARE ISSUE: 13.05.9583
- MCG, MML, MDN, MPD, MFE AND MAI RAN IN COMBINATION
- HARDWARE: DUAL BOWSPRING USED ON MDN 0.5 INCH STANDOFF USED ON MFE AND MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL EFFECT DATA QUALITY
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMRES REQUEST
- TOTAL HOLE VOLUME FROM TD TO 3800: 375 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING TD TO 3800: 210 CU.FT.
-RIG: DUKE DRILLING RIG #10

- ENGINEER: D. COLE
- OPERATOR: J. LAPOINT AND C. RAMIREZ

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions in our price schedule.





91°

400

91°

500

92°

600

← BIT

RTAO

FEFE

93°

GRGC

SPCG

SMT

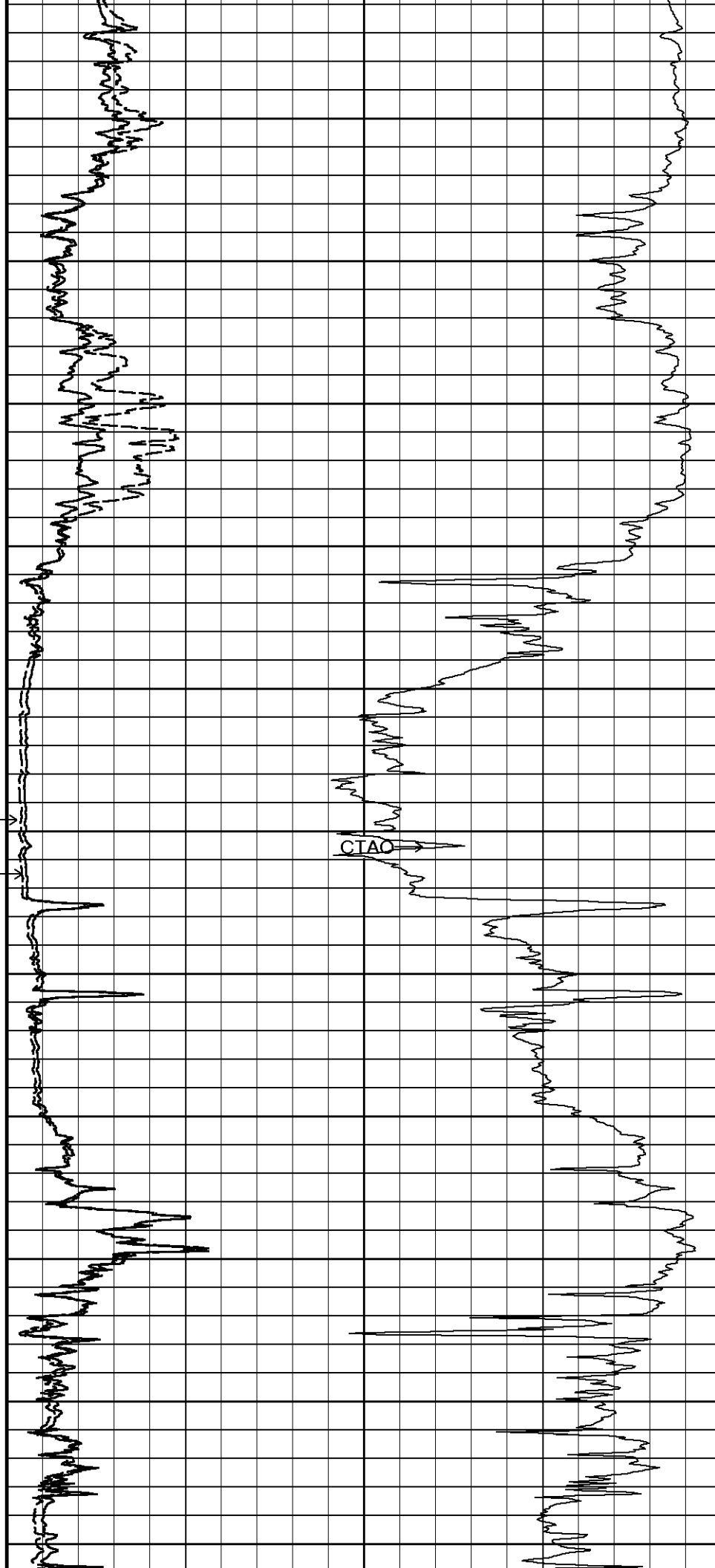
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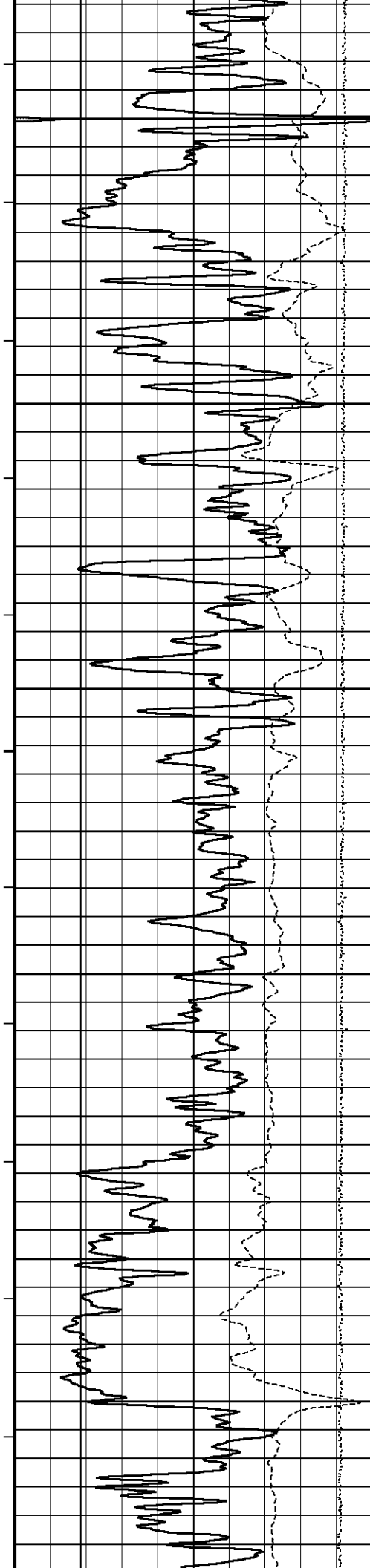
94°

800

94°

900





94°

1000

96°

1100

96°

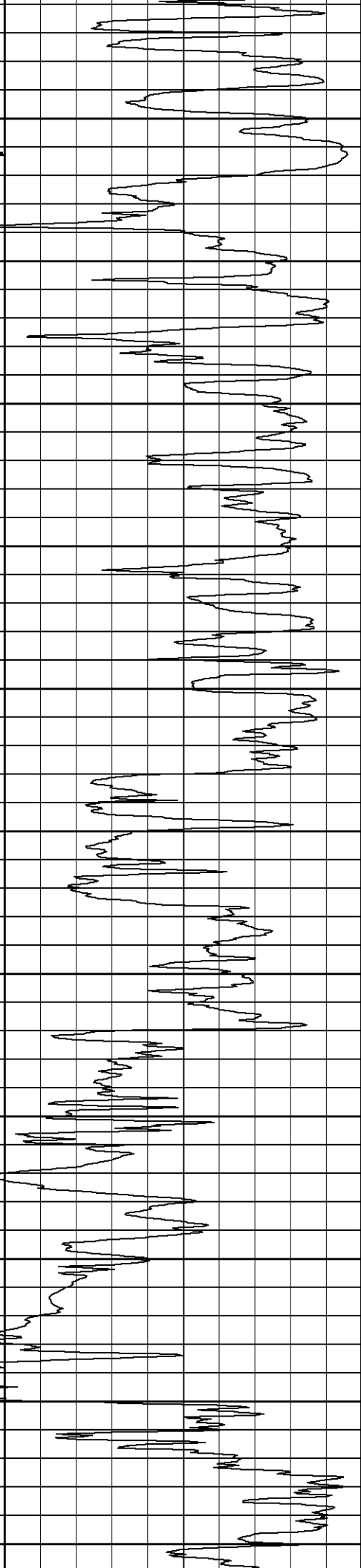
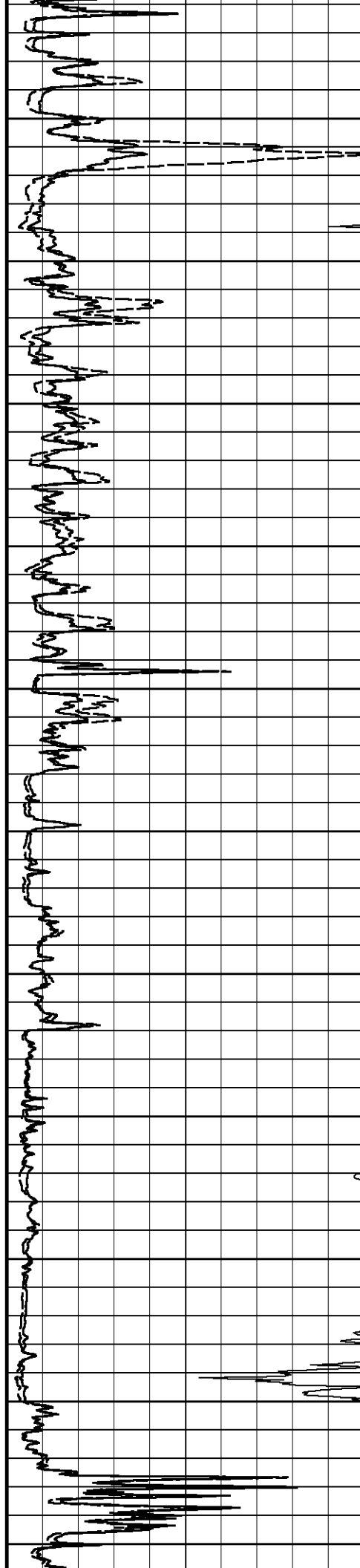
1200

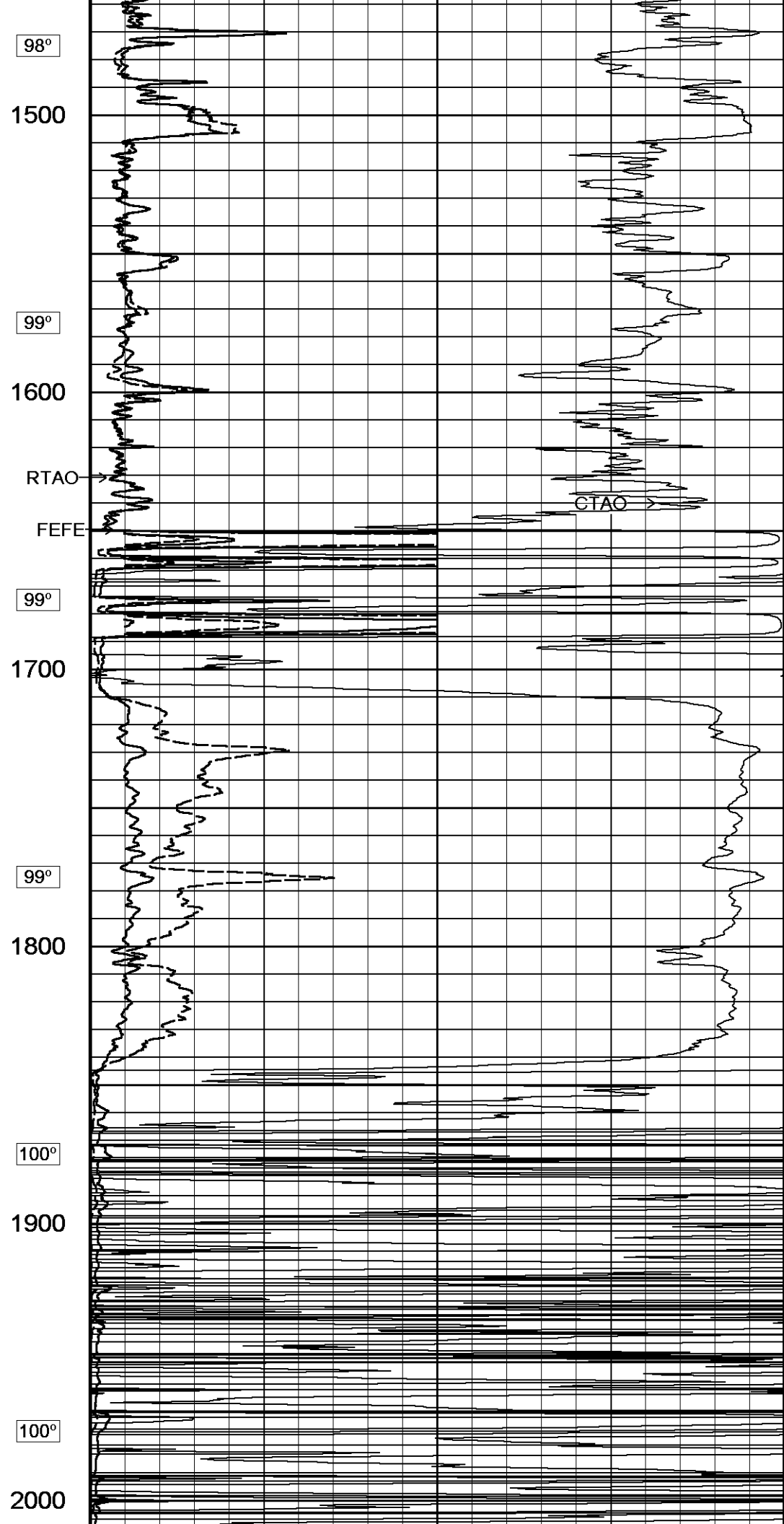
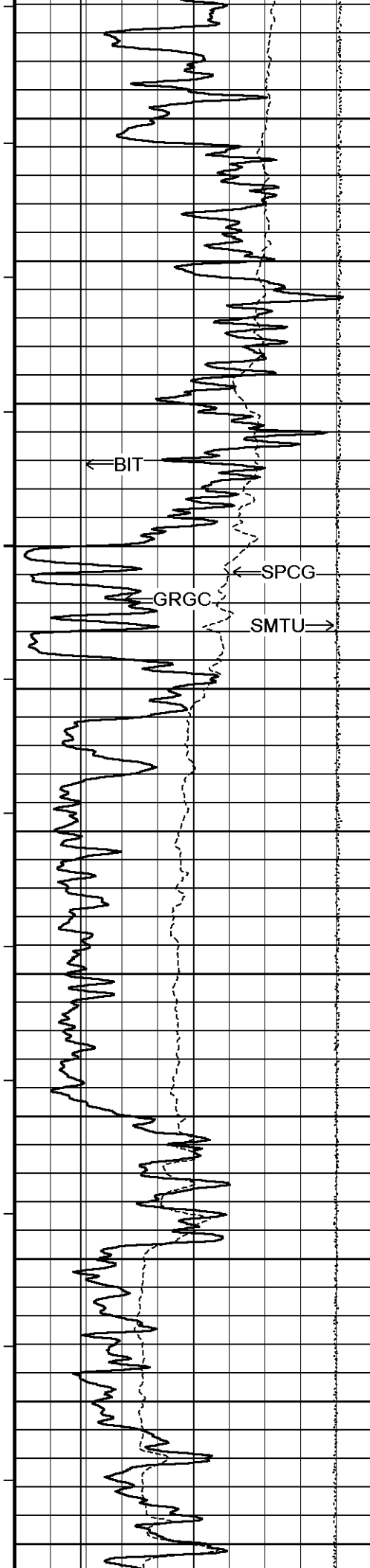
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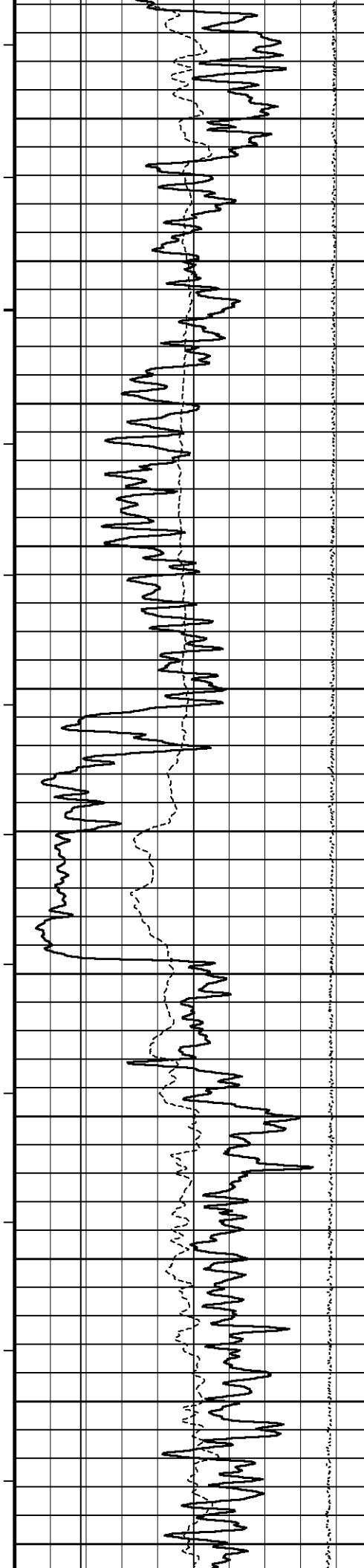
1300

97°

1400







100°

2100

100°

2200

101°

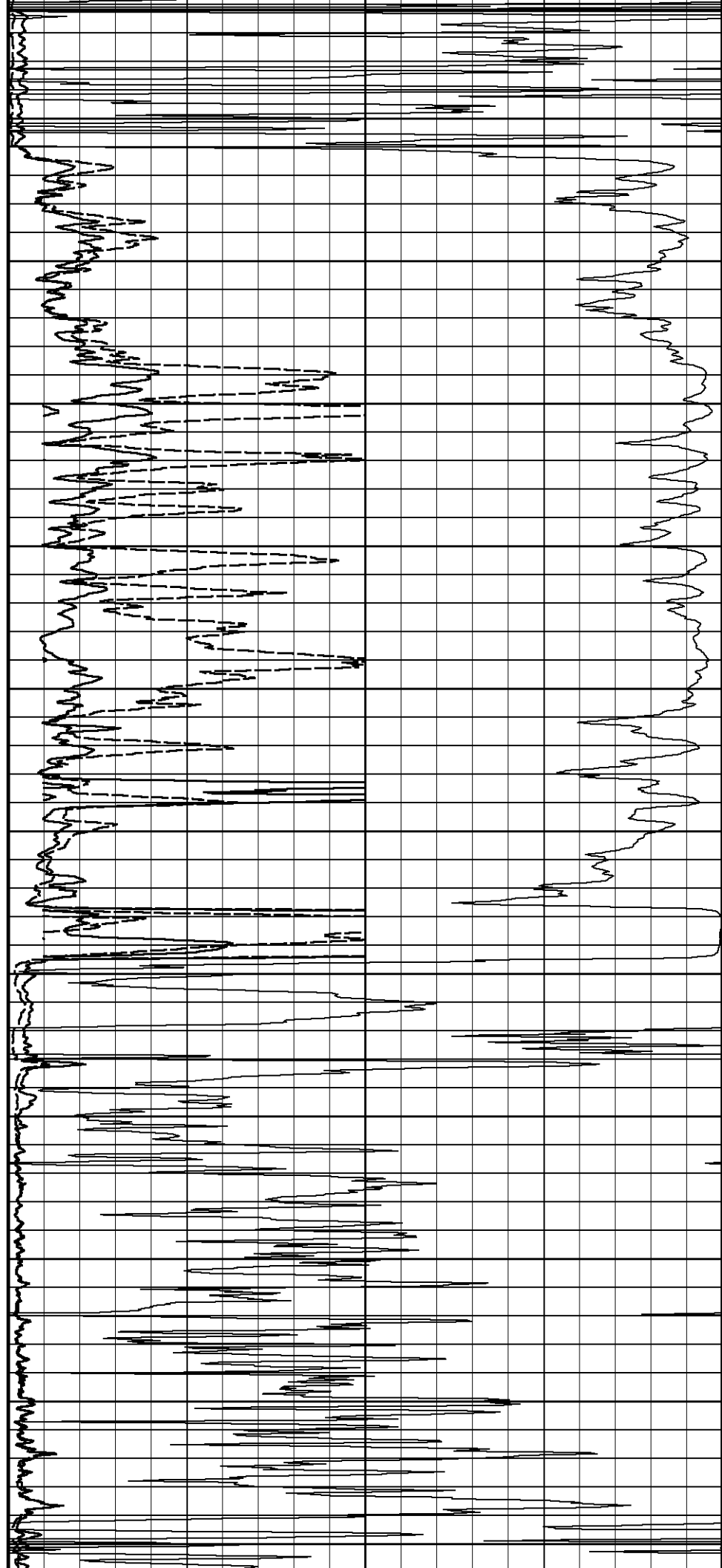
2300

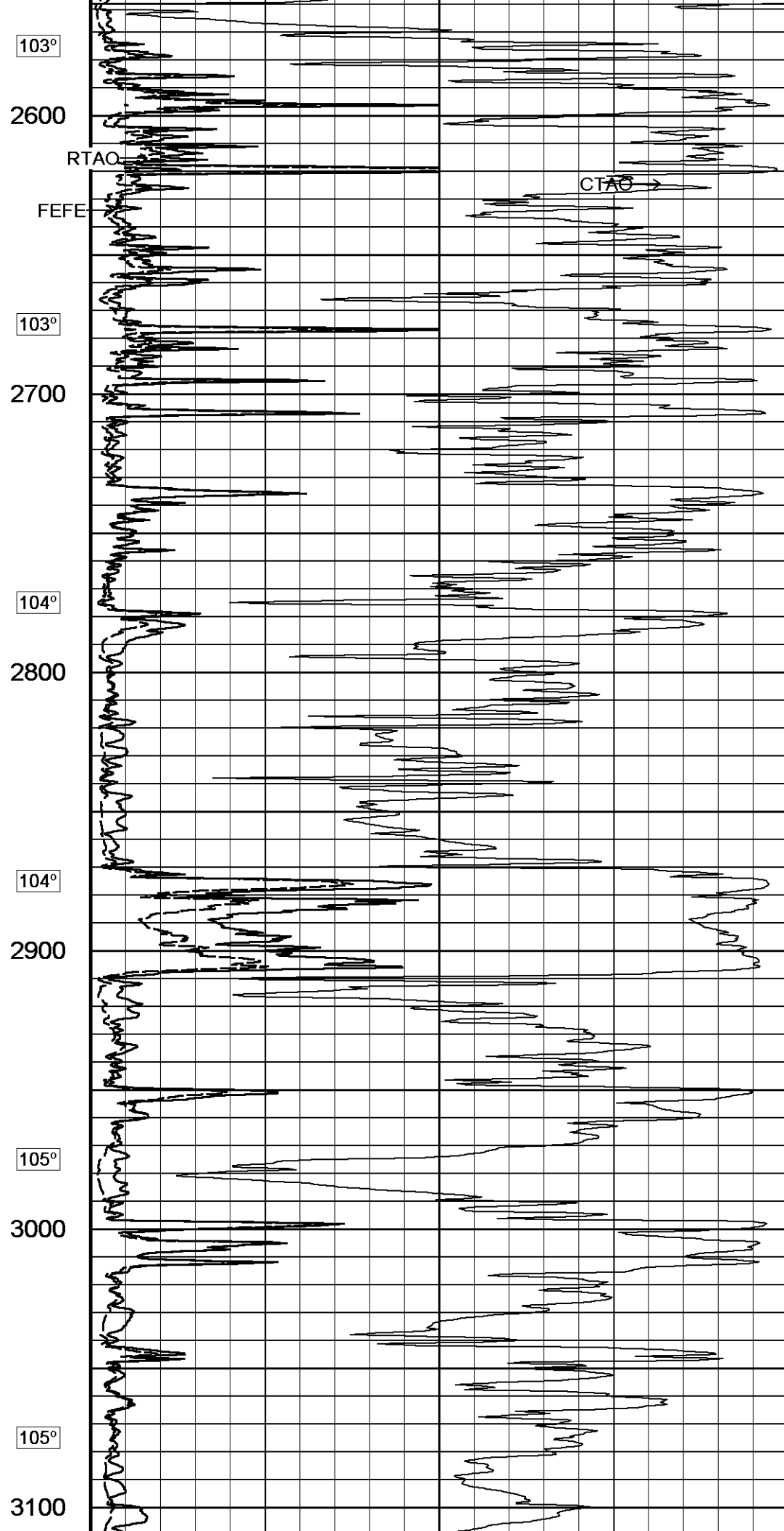
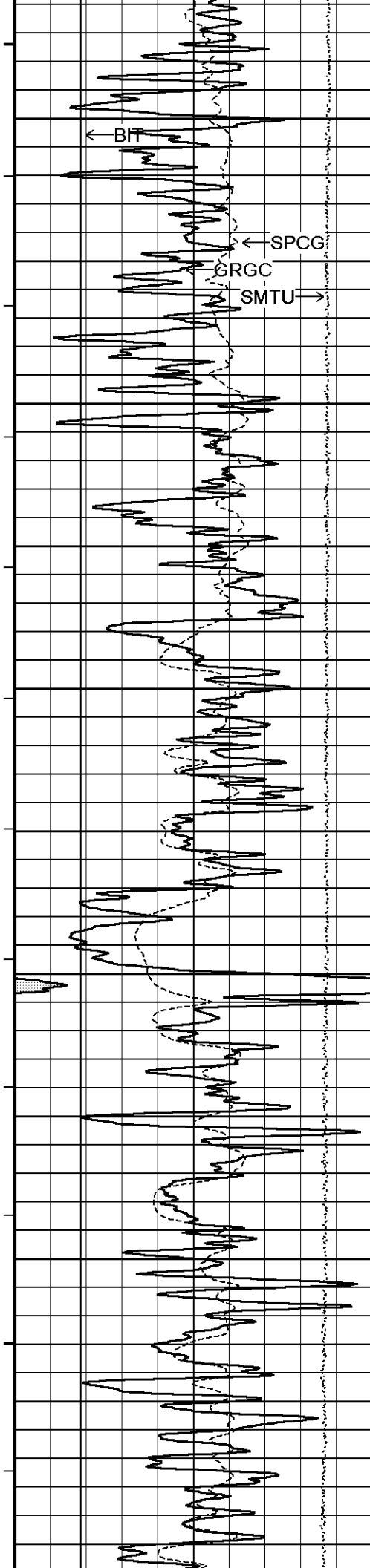
102°

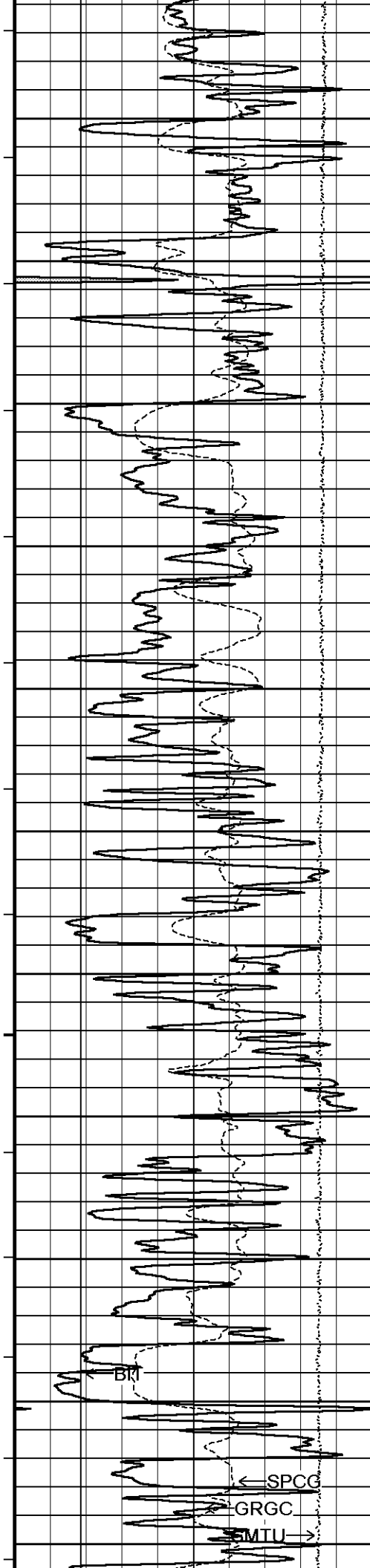
2400

102°

2500







106°

3200

106°

3300

107°

3400

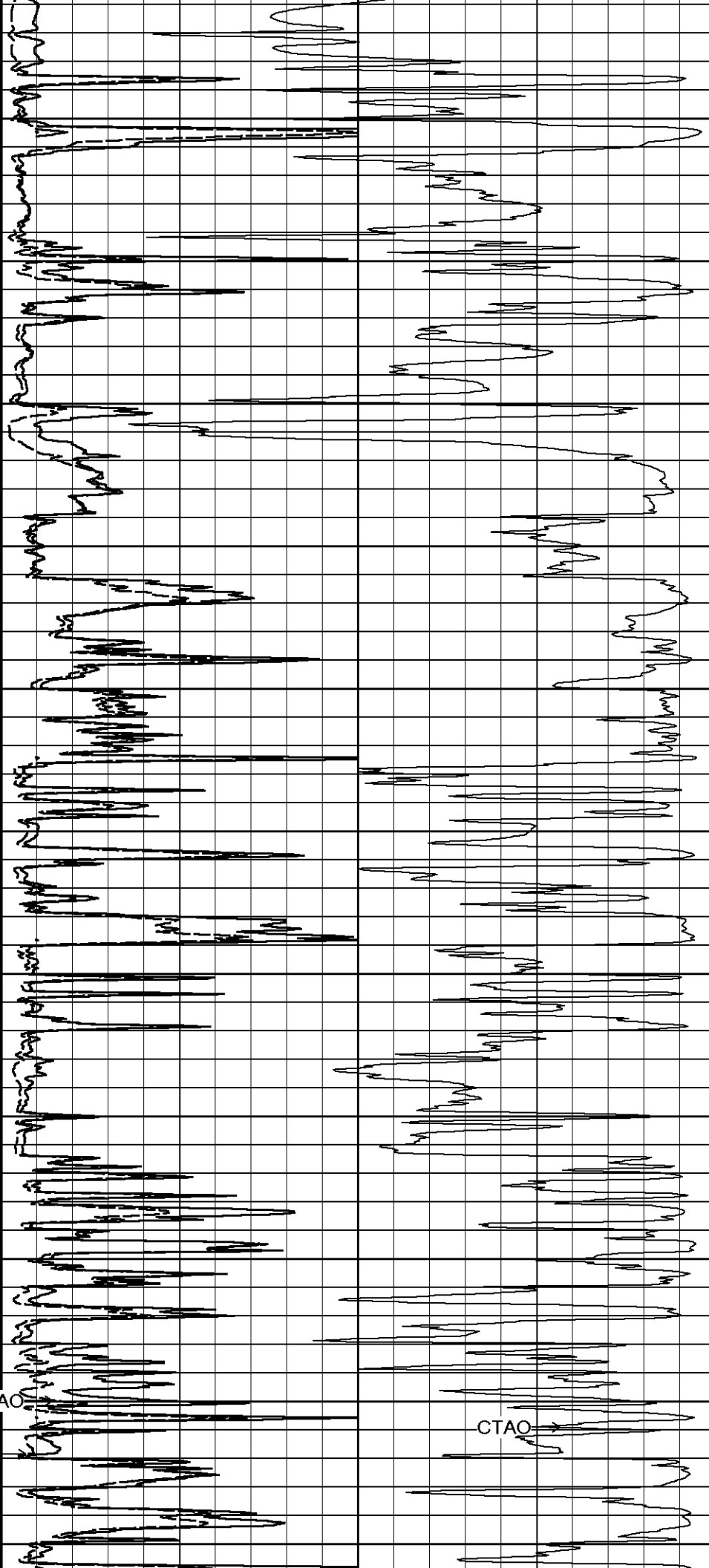
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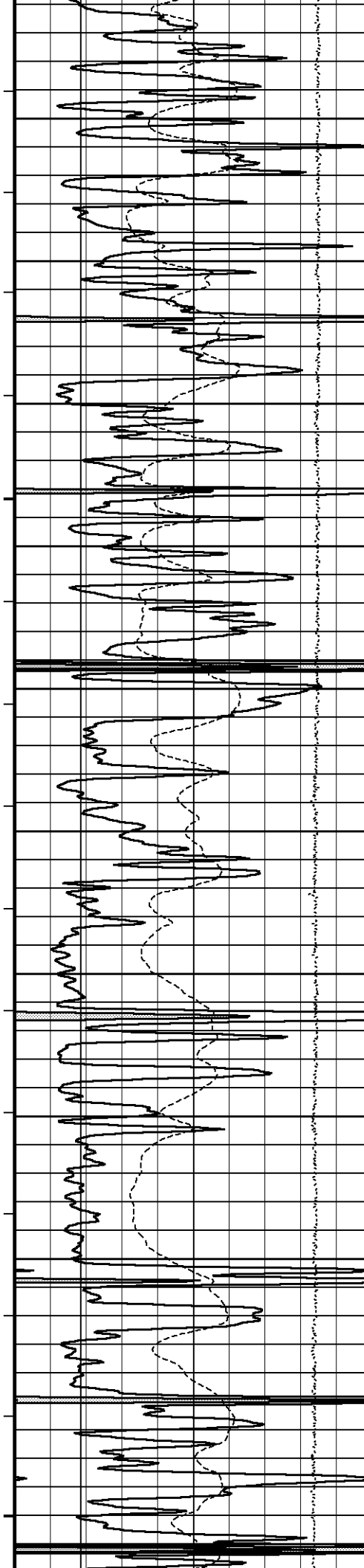
3500

108°

3600

FEFE





109°

3700

110°

3800

110°

3900

111°

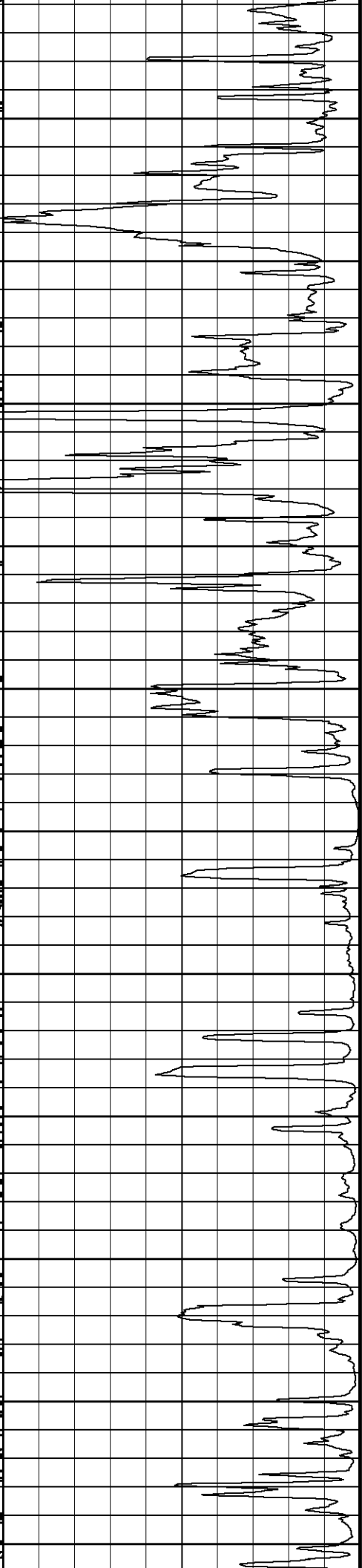
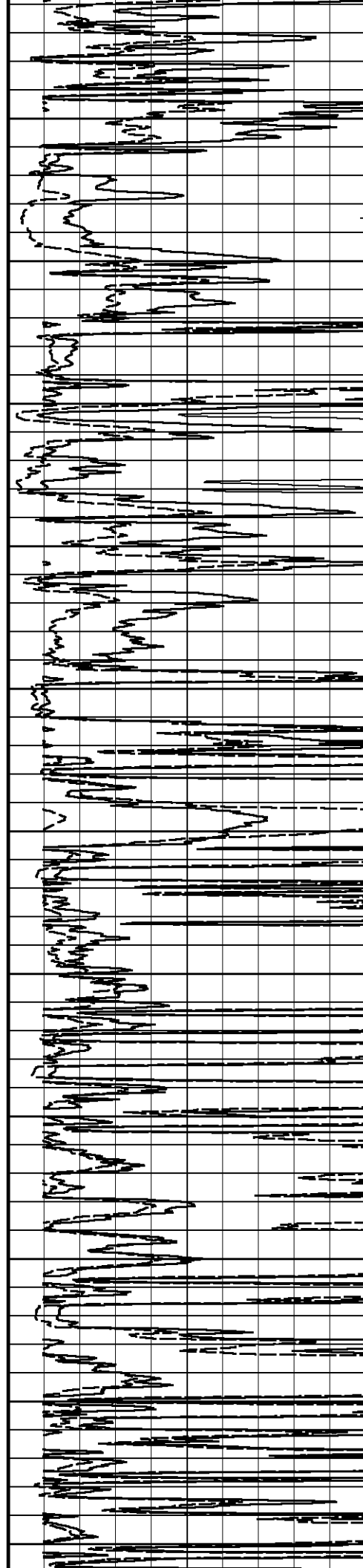
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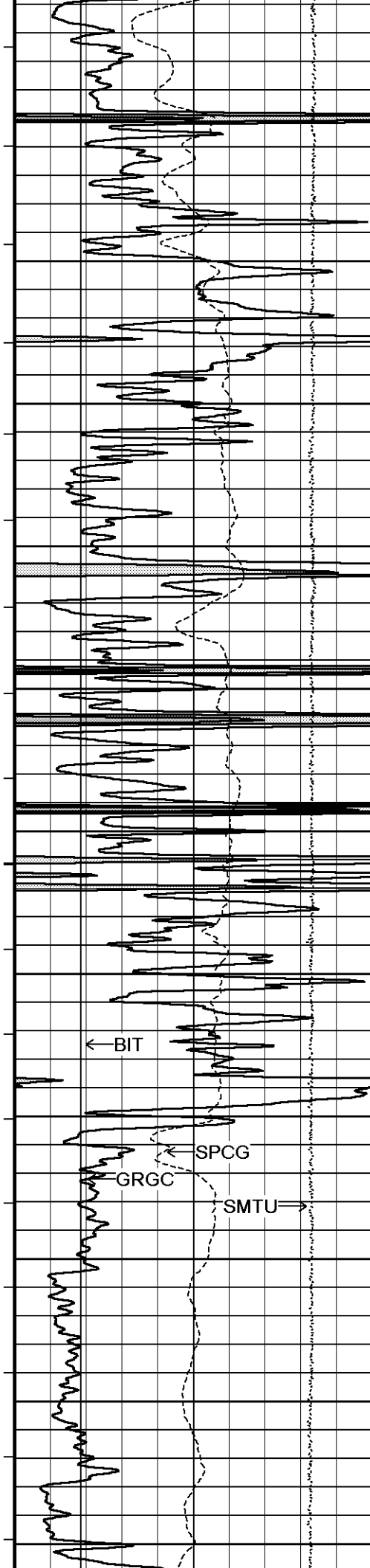
111°

4100

112°

4200





112°

4300

114°

4400

115°

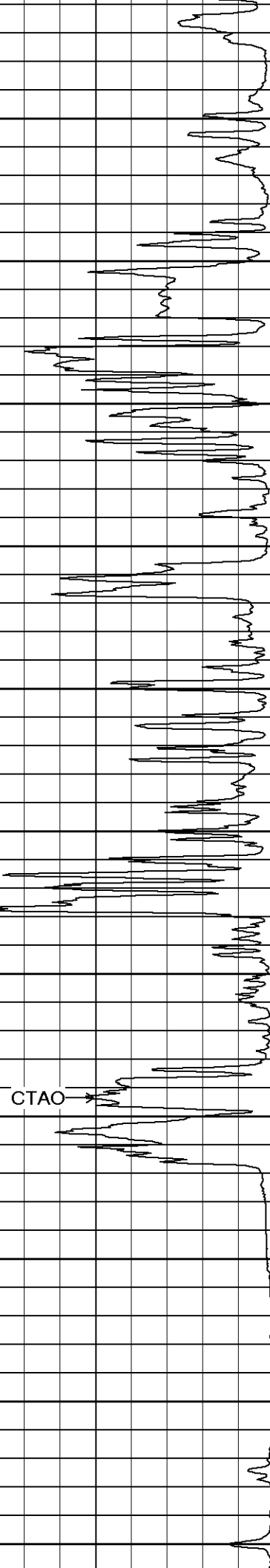
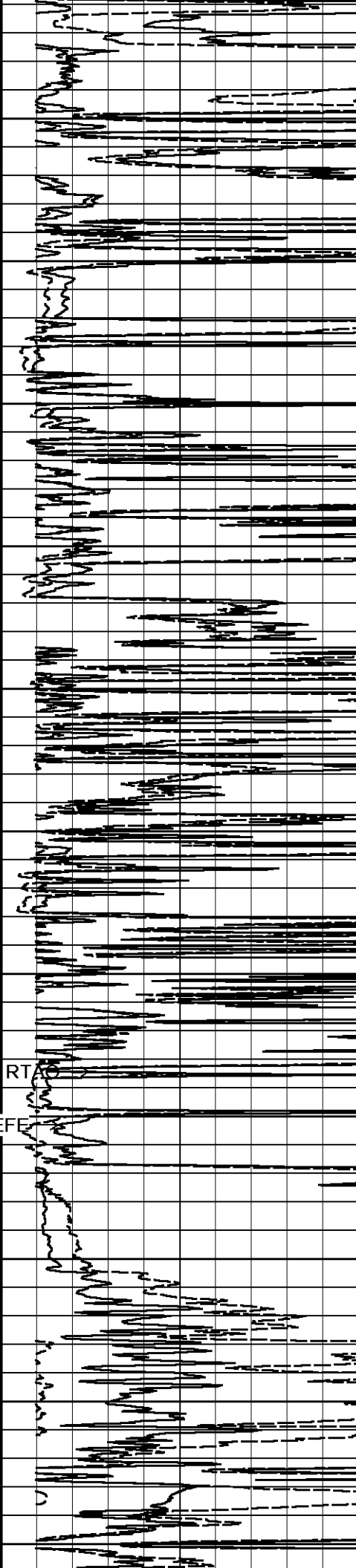
4500

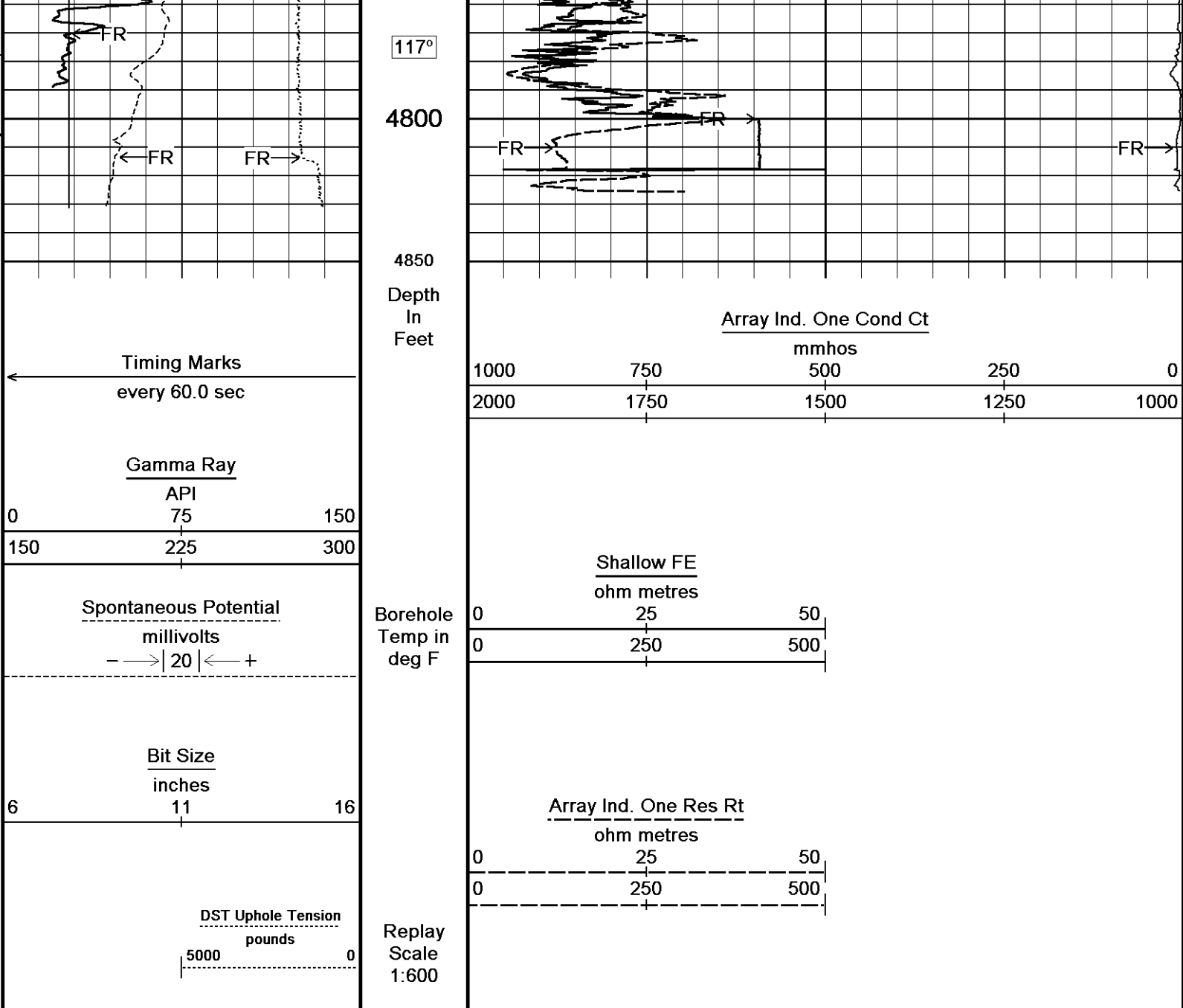
116°

4600

118°

4700



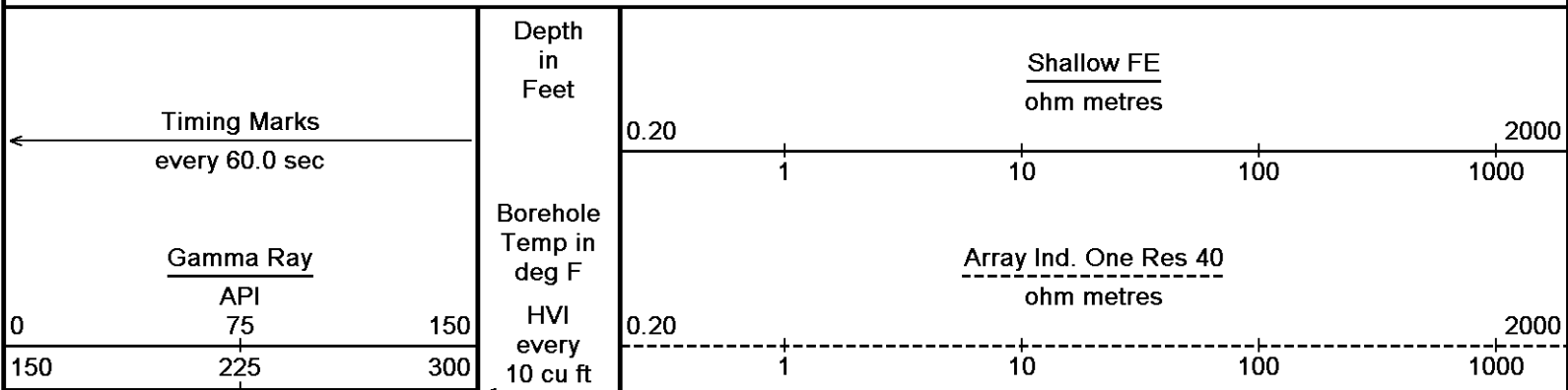


Depth Based Data - Maximum Sampling Increment 10.0cm	Plotted on 18-OCT-2013 05:55
Filename: C:\Minimus 13.05.9583\Logs\Grand Mesa Griffith 2-23\Griffith 2-23 Main2.dta	Recorded on 18-OCT-2013 03:46
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583	

↑	2 INCH MAIN	↑
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↓	5 INCH MAIN	↓
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Depth Based Data - Maximum Sampling Increment 10.0cm	Plotted on 18-OCT-2013 05:55
Filename: C:\Minimus 13.05.9583\Logs\Grand Mesa Griffith 2-23\Griffith 2-23 Main2.dta	Recorded on 18-OCT-2013 03:46
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583	



Spontaneous Potential

millivolts

- -> | 20 | <- +

Annular
Integral
every
10 cu ft

Array Ind. One Res 60

ohm metres

0.20

2000

1

10

100

1000

DST Uphole Tension

pounds

5000

0

Replay
Scale
1:240

Array Ind. One Res Rt

ohm metres

0.20

2000

1

10

100

1000

3800

110°

3850 200

110°

3900

110°

3950

SPCG

GRGC

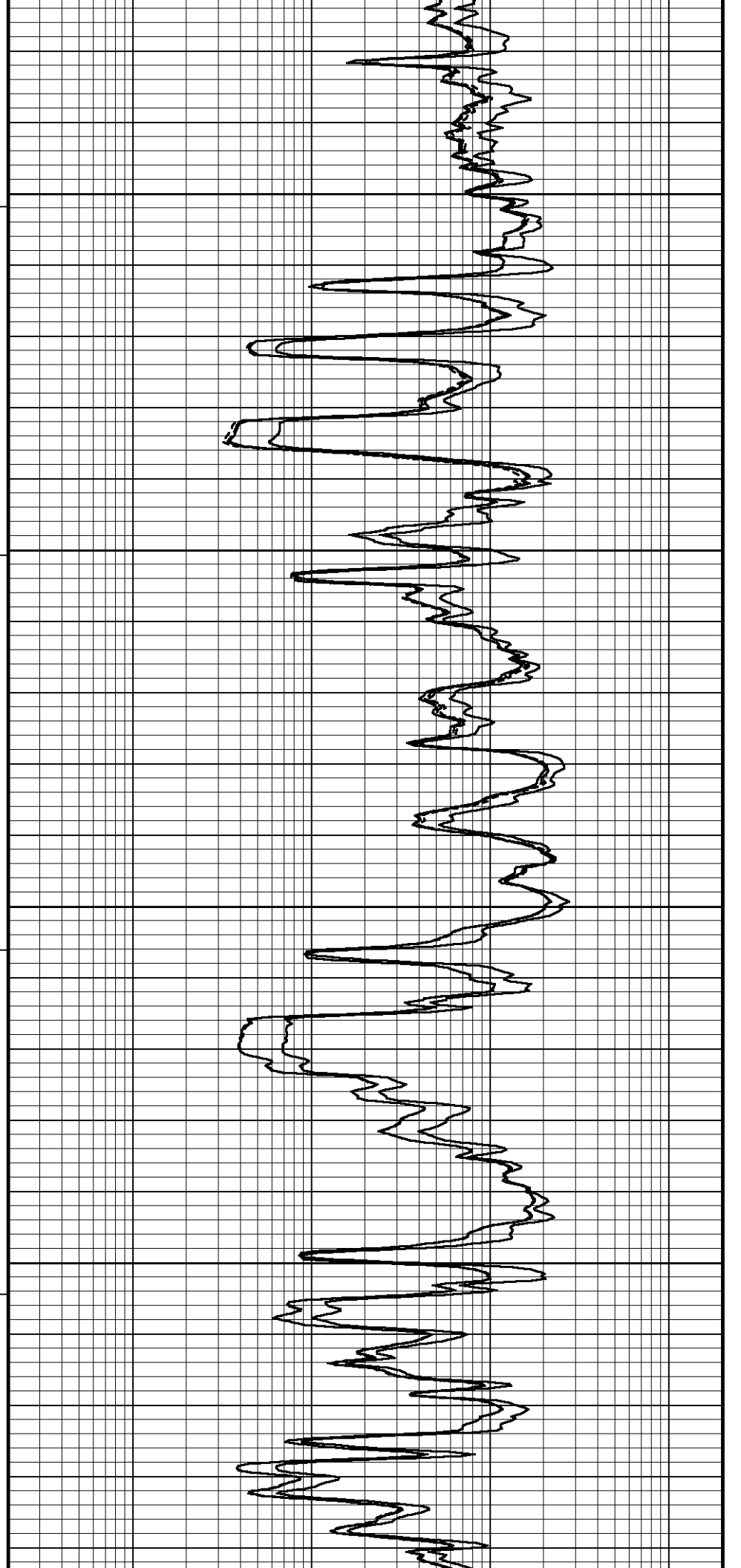
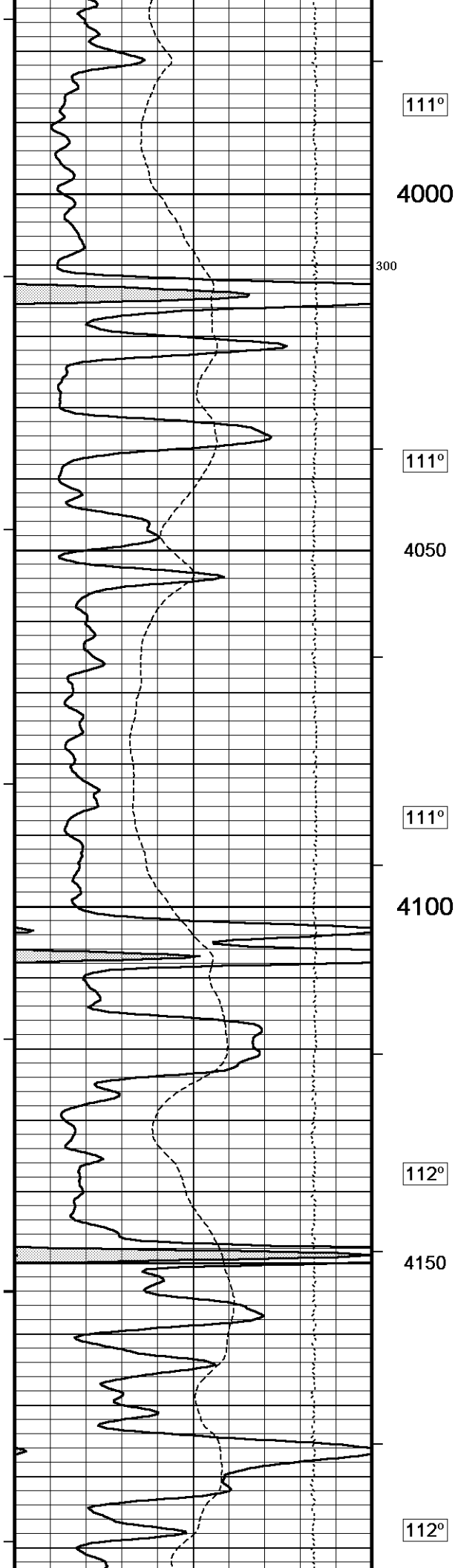
SMU

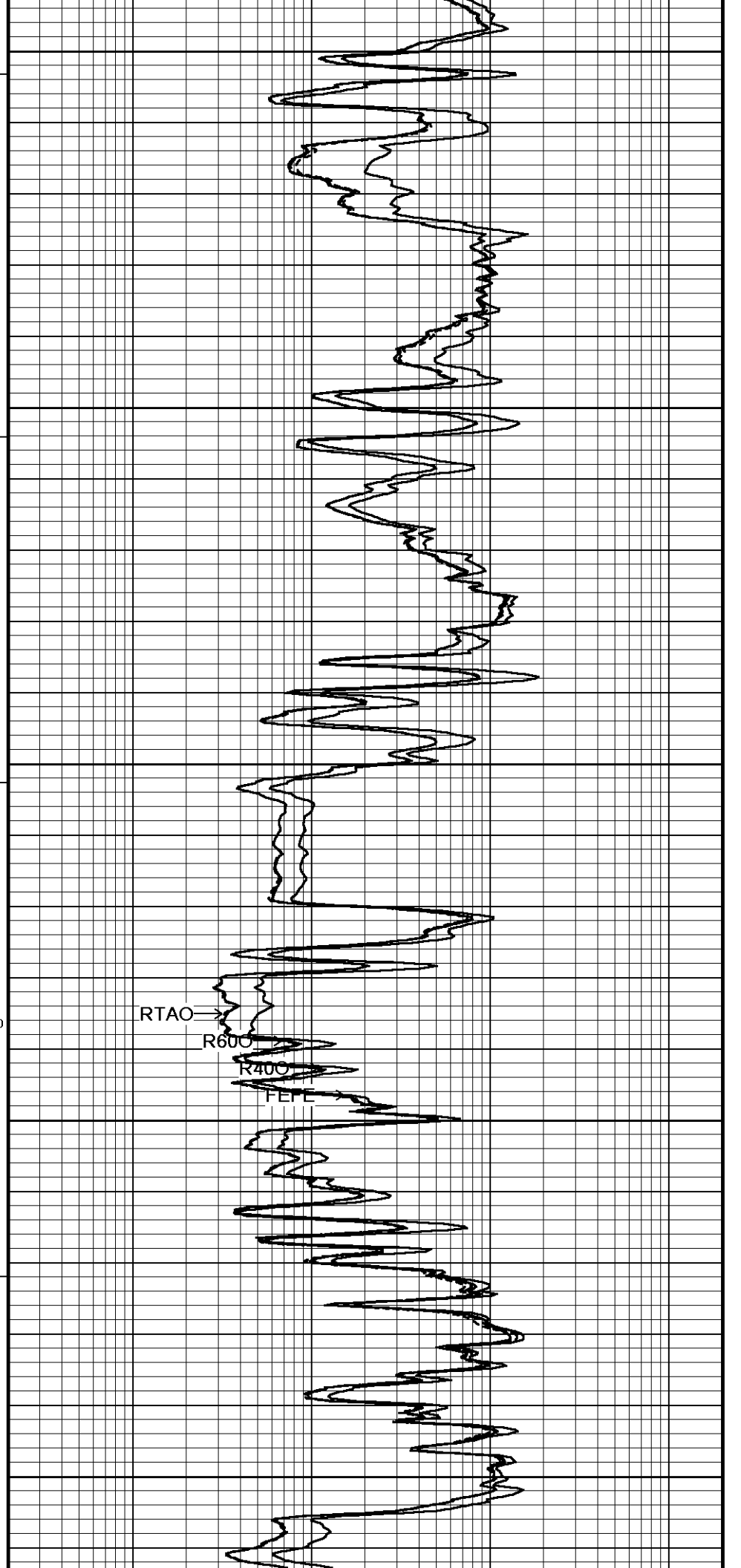
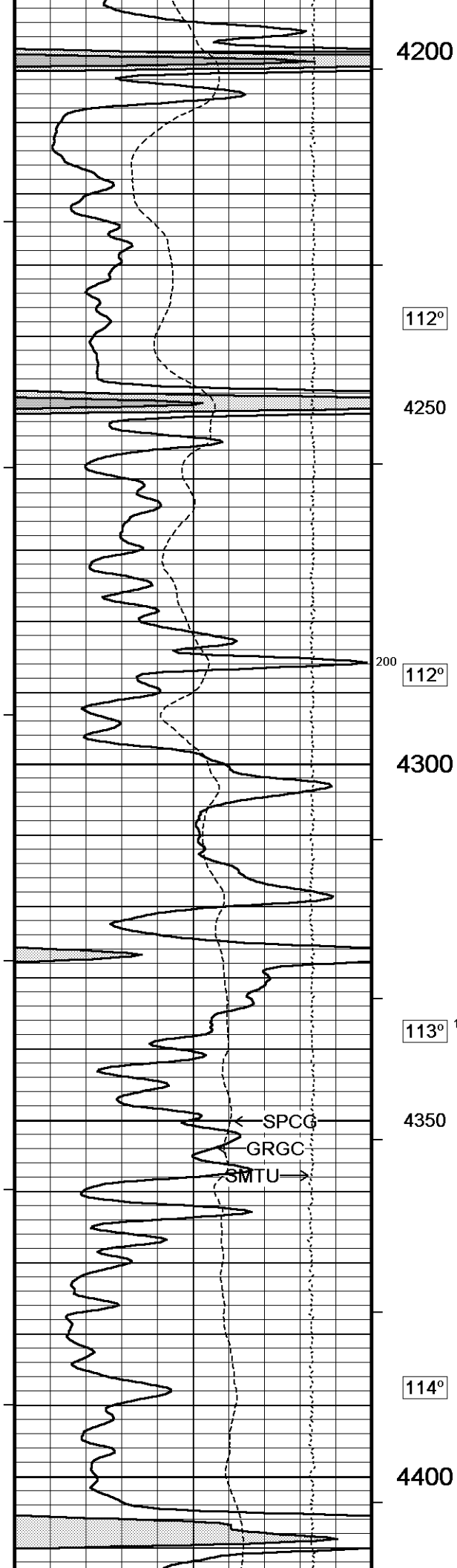
RTAG

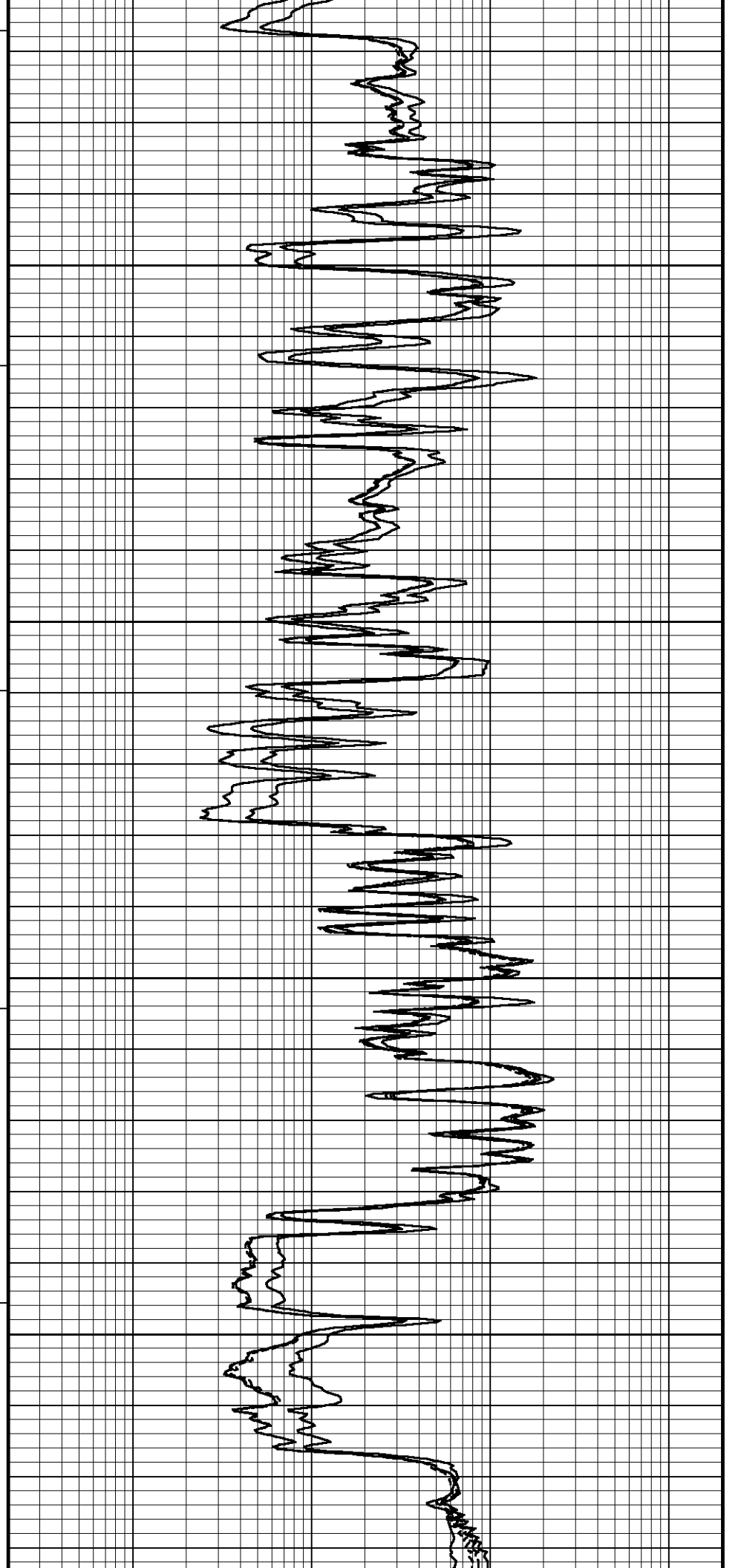
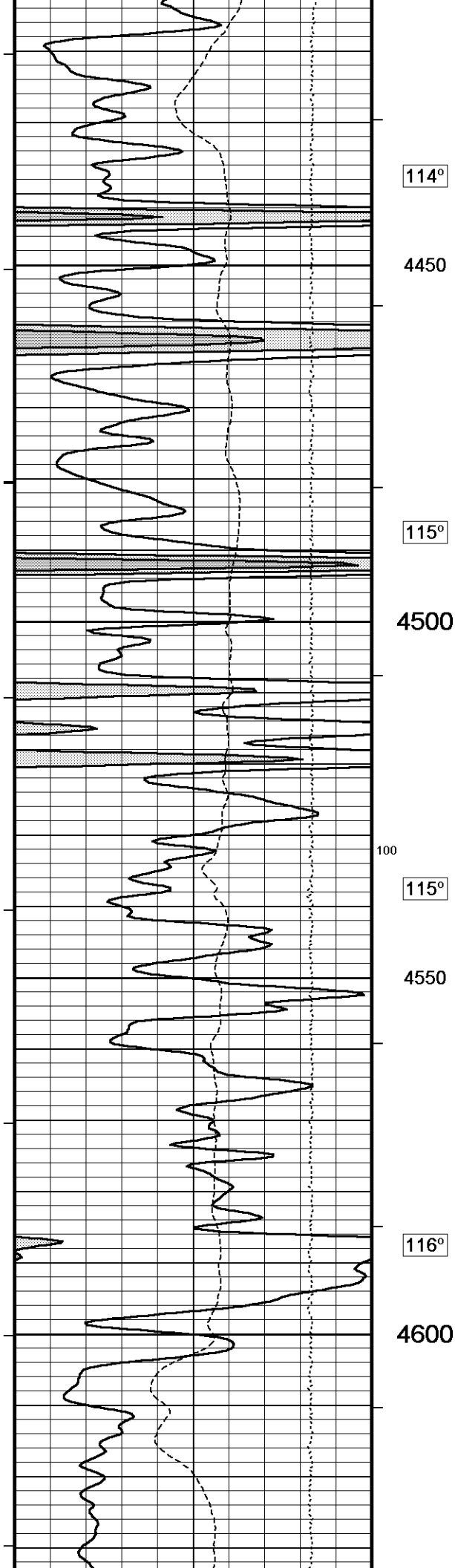
R600

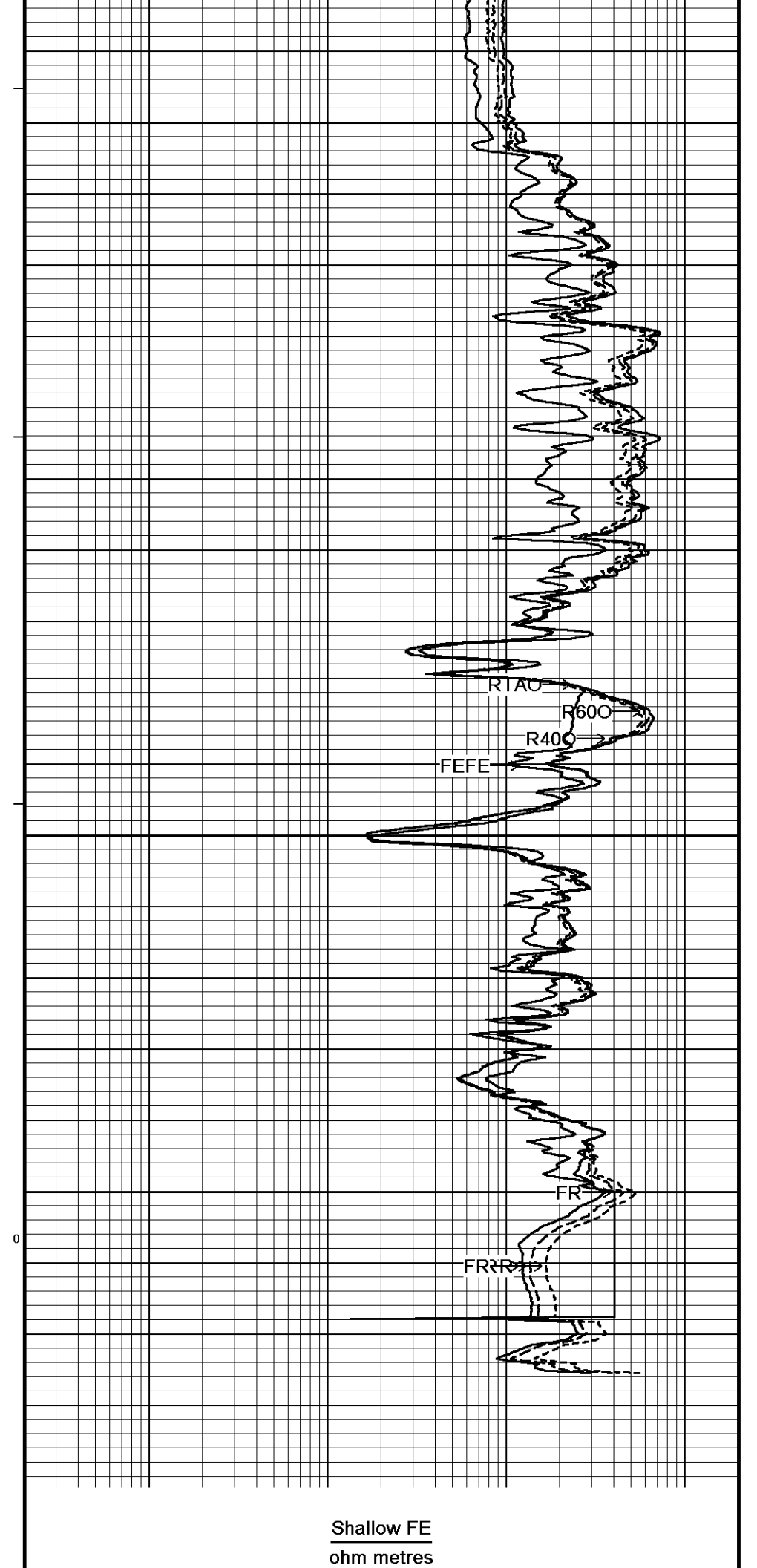
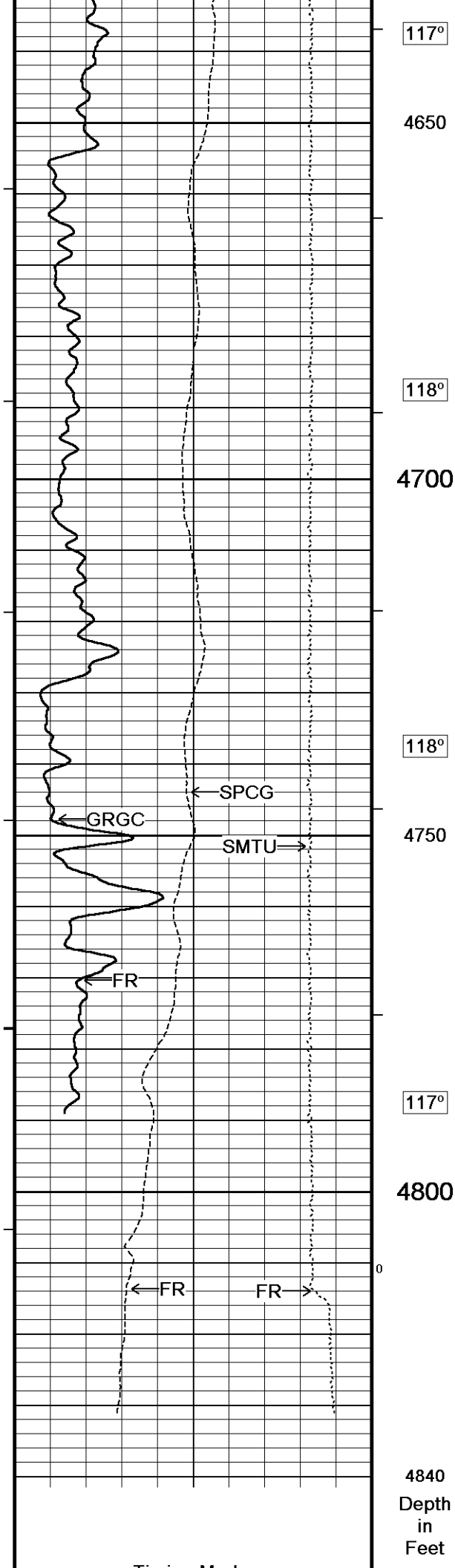
R400

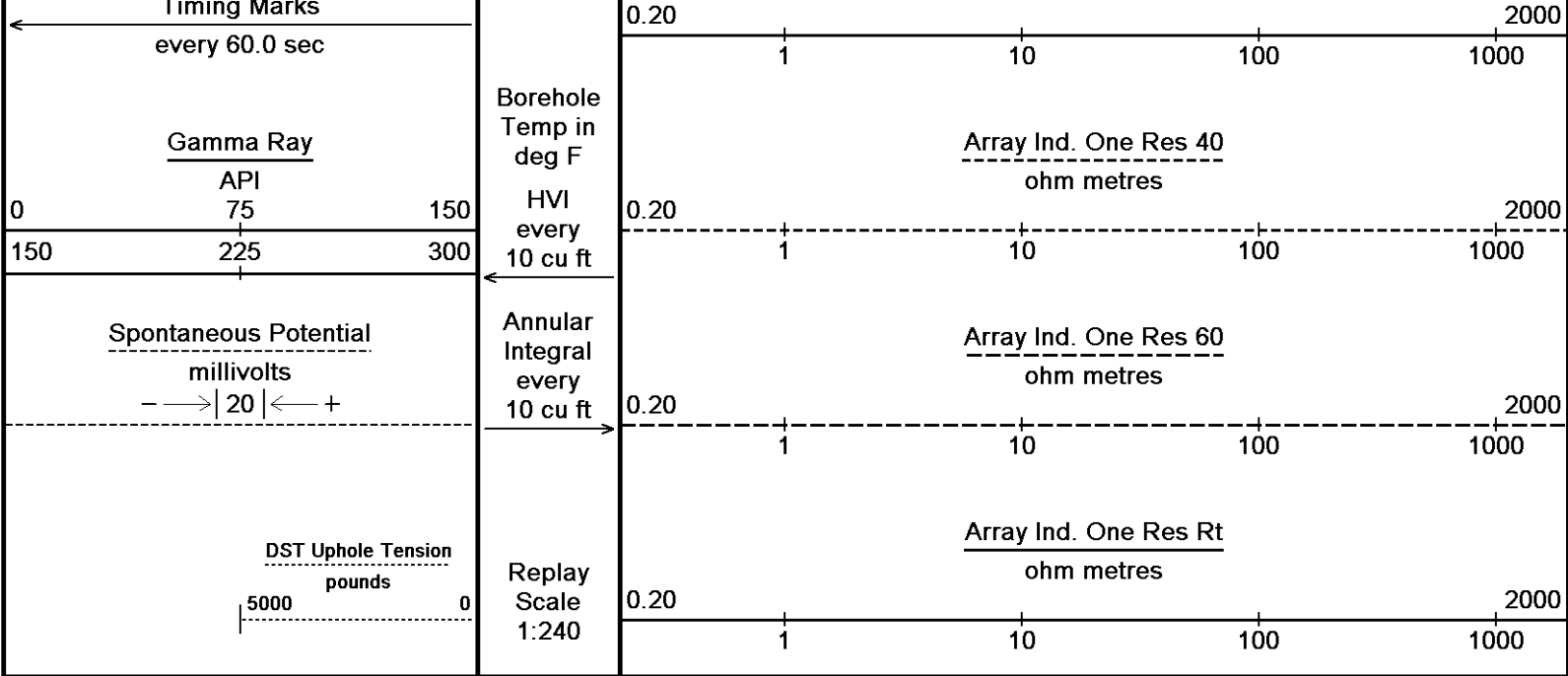
FEFE











Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 18-OCT-2013 05:55

Filename: C:\Minimus 13.05.9583\Logs\Grand Mesa Griffith 2-23\Griffith 2-23 Main2.dta

Recorded on 18-OCT-2013 03:46

System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

↑ 5 INCH MAIN ↑

↓ REPEAT SECTION ↓

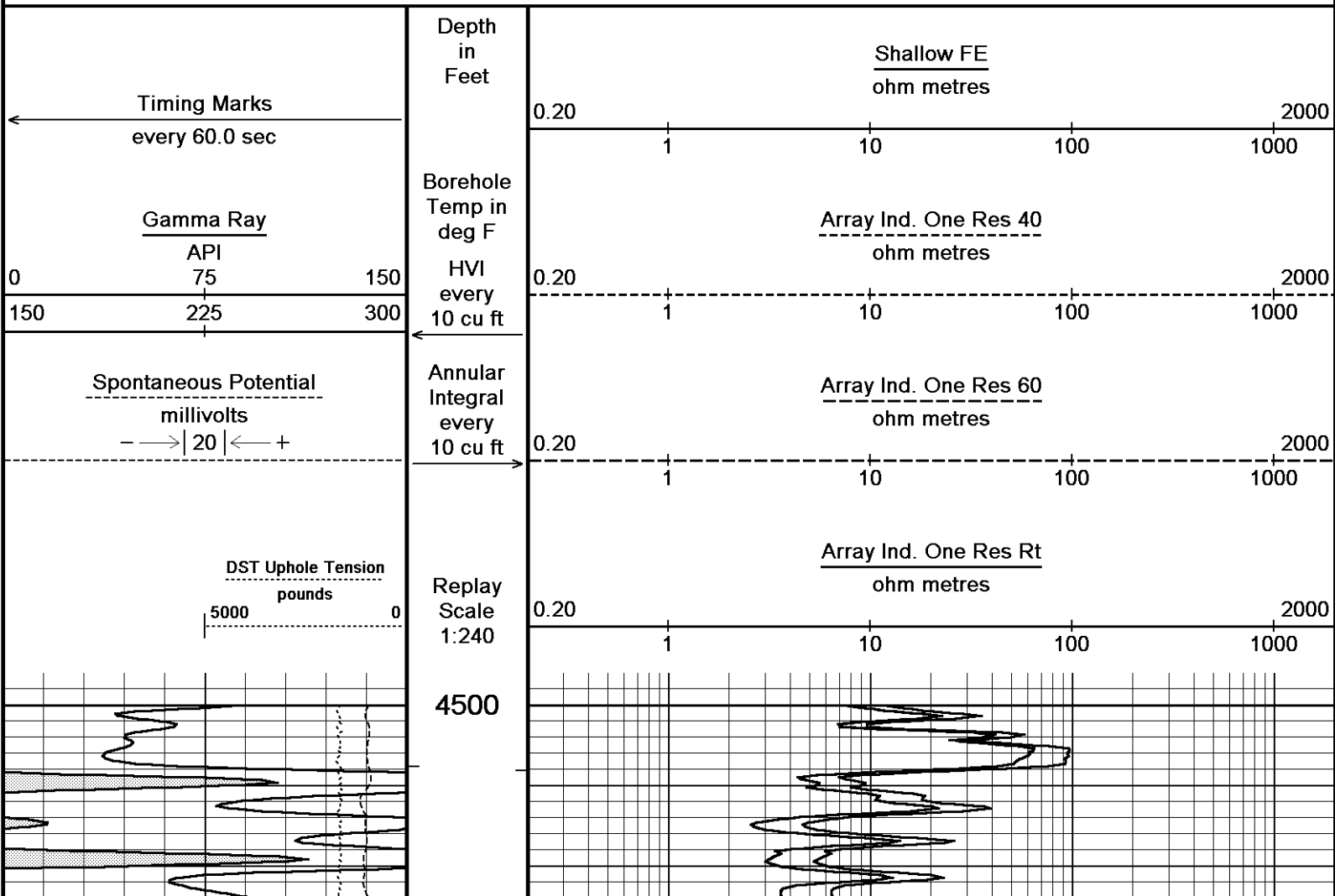
Depth Based Data - Maximum Sampling Increment 10.0cm

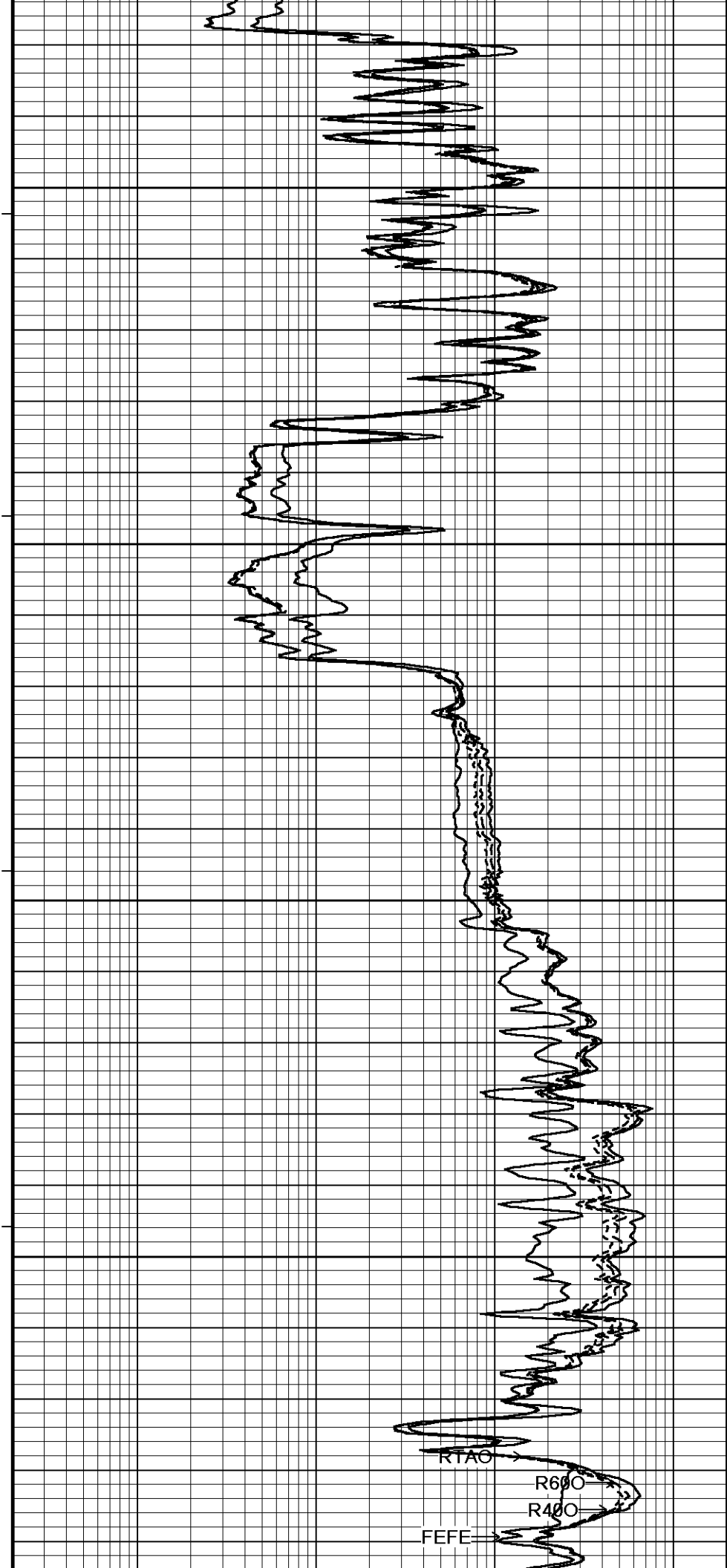
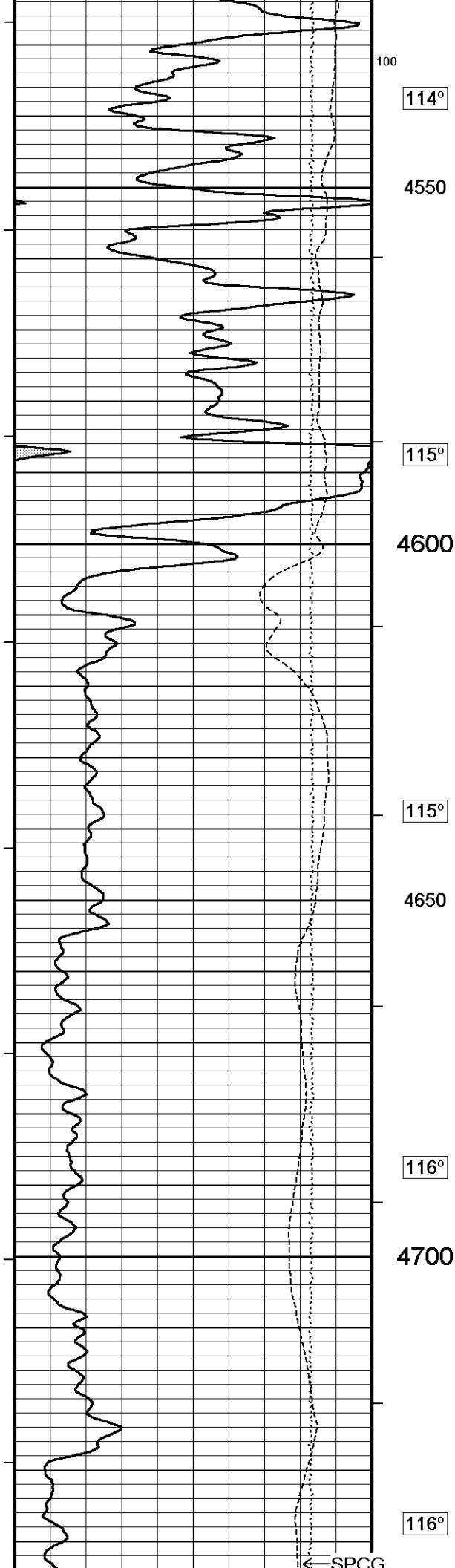
Plotted on 18-OCT-2013 05:55

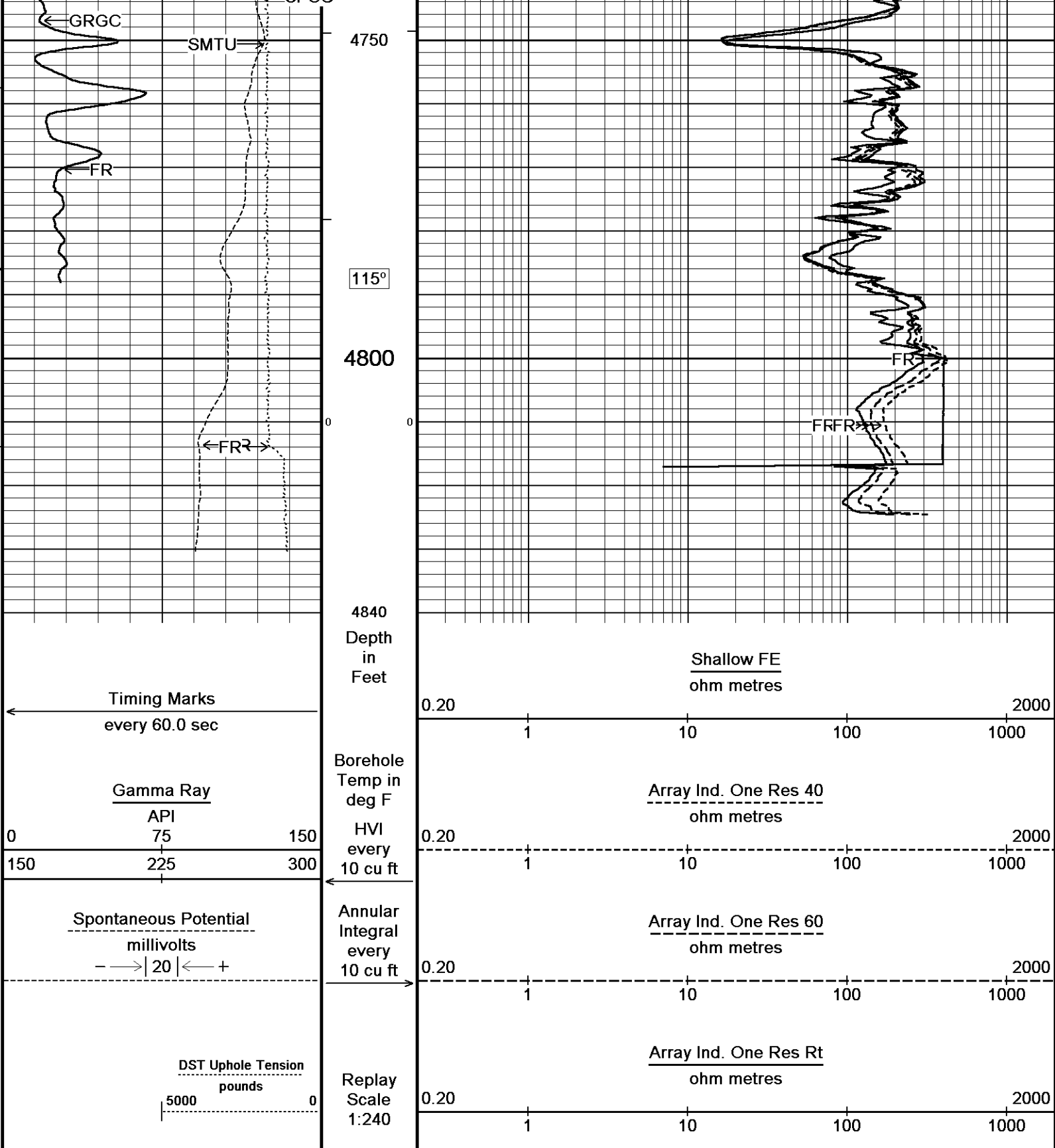
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Recorded on 18-OCT-2013 02:26

System Versions: Logged with 13.05.9583 Processed with 13.05.9583 Plotted with 13.05.9583







Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 13.05.9583\Logs\Grand Mesa Griffith 2-23\Copy of Griffith 2-23 Repeat2.dta
System Versions: Logged with 13.05.9583 Processed with 13.05.9583 Plotted with 13.05.9583
Plotted on 18-OCT-2013 05:55
Recorded on 18-OCT-2013 02:26

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION
C:\Minimus 13.05.9583\Logs\Grand Mesa Griffith 2-23\Copy of Griffith 2-23 Repeat2.dta
General Constants All 000
Last Edited on 18-OCT-2013,01:48

General Parameters			
Mud Resistivity	1.000	ohm-metres	
Mud Resistivity Temperature	58.000	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	Deep Induction		
RWA Constant A	0.610		
RWA Constant M	2.150		
SW/APOR Tool Source	0.000		
High Resolution Temperature Calibration MCG-D.K 442			
	Measured	Calibrated(Deg F)	Field Calibration on 09-AUG-2013,09:35
Lower	50.00	50.00	
Upper	75.00	75.00	
High Resolution Temperature Constants MCG-D.K 442			
Pre-filter Length	11		Last Edited on 09-AUG-2013,09:35
Gamma Calibration MCG-D.K 442			
	Measured	Calibrated (API)	Field Calibration on 16-OCT-2013 07:50
Background	72	49	
Calibrator (Gross)	1147	774	
Calibrator (Net)	1075	725	
Gamma Constants MCG-D.K 442			
			Last Edited on 18-OCT-2013,00:46
Gamma Calibrator Number	GRC38		
Mud Density	1.10	gm/cc	
Caliper Source for Processing	Density Caliper		
Tool Position	Eccentred		
Concentration of KCl		kppm	
K Mud Type	Chloride		
K Mud Concentration	0.00	%	
FE Calibration MFE-B.J 352			
			Base Calibration on 11-OCT-2013 11:23
			Field Check on 16-OCT-2013 07:34
Base Calibration			
	Measured	Calibrated (ohm-m)	
Reference 1	0.0	0.0	
Reference 2	965.0	126.8	
Base Check		281.1	
Field Check		281.2	
FE Constants MFE-B.J 352			
			Last Edited on 18-OCT-2013,03:32
Running Mode	No Sleeve		
MFE K Factor	0.1268		
Caliper Source for FE correction	Bit Size		
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 45			
			Base Calibration on 21-MAY-2013,16:47
			Field Check on 16-OCT-2013 07:33
Base Calibration			
Test Loop Calibration			
Channel	Measured	Calibrated (mmho/m)	
	Low	Low	High
1	14.4	472.6	266.2

1	14.4	472.6	9.3	966.2
2	5.7	374.0	7.6	821.4
3	3.4	261.2	5.2	566.0
4	2.5	133.9	2.6	279.2

Array Temperature 0.0 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			18.7	3850.5
2			31.8	3628.7
3			28.7	3049.0
4			18.4	2078.9
Deep			16.1	1911.1
Medium			42.6	4060.0
Shallow			49.7	5481.8

Array Temperature 64.0 Deg F

Induction Constants MAI-A.A 45

Last Edited on 18-OCT-2013,03:31

Induction Model		RtAP-WBM	
Caliper for Borehole Corr.		Bit Size	
Hole Size for Borehole Correction		N/A	inches
Tool Centred		No	
Stand-off Type		Fins	
Stand-off		0.50	inches
Number of Fins on Stand-off		8.0000	
Stand-off Fin Angle		45.00	degrees
Stand-off Fin Width		0.5000	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	

Caliper Calibration MPD-B 31

Base Calibration on 11-OCT-2013 13:50
Field Calibration on 16-OCT-2013 07:40

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	18160	3.99
2	27038	5.98
3	35584	7.97
4	43976	9.86
5	53328	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in) Actual Caliper (in)

Weatherford

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

GRAND MESA OPERATING COMPANY

GRIFFITH 2-23

WILDCAT

SCOTT

U.S.A. / KANSAS

1429' FSL & 775' FEL

SE SW NE SE

TYPE	RF	Other Services
16S	33W	INFORMATION
15-171-20880		MML

Instant Datum Q.L. Elevation 2968 feet

measured from KB

18-OCT-2013

ONE

3541725

4810.00 feet

4811.00 feet

4811.00 feet

221.00 feet

221.00 feet

221.00 feet

7.8/5 inches

CHEM

9.20 1bu/sg 67.00 CP

10.00 7.20 ml/30min

PT

1.0 @ 58.0 0.80 @ 58.0

1.20 @ 58.0 0.49 @ 17.0

CALC

4 HRS

117.00 deg F

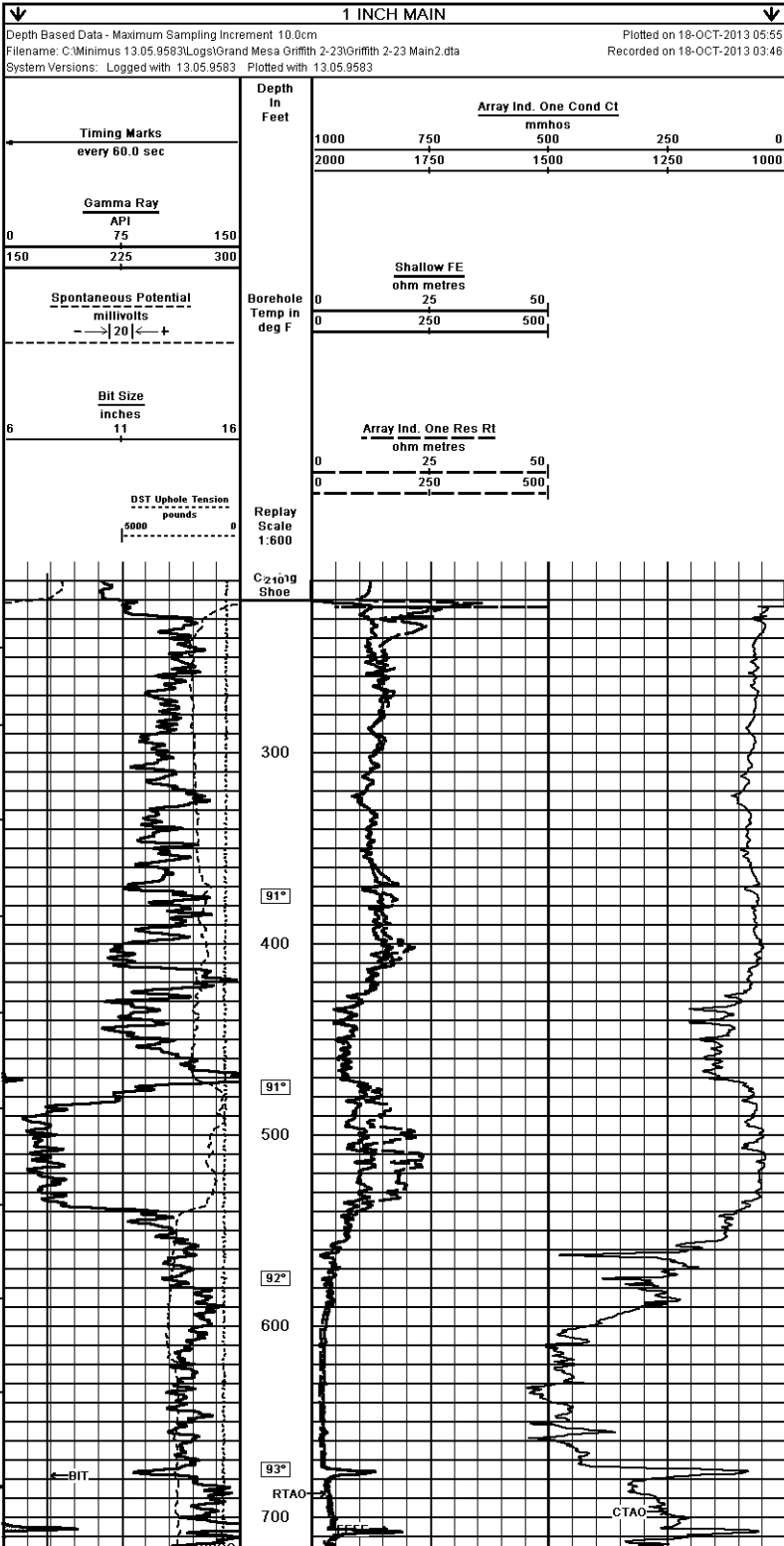
13057 KANSAS

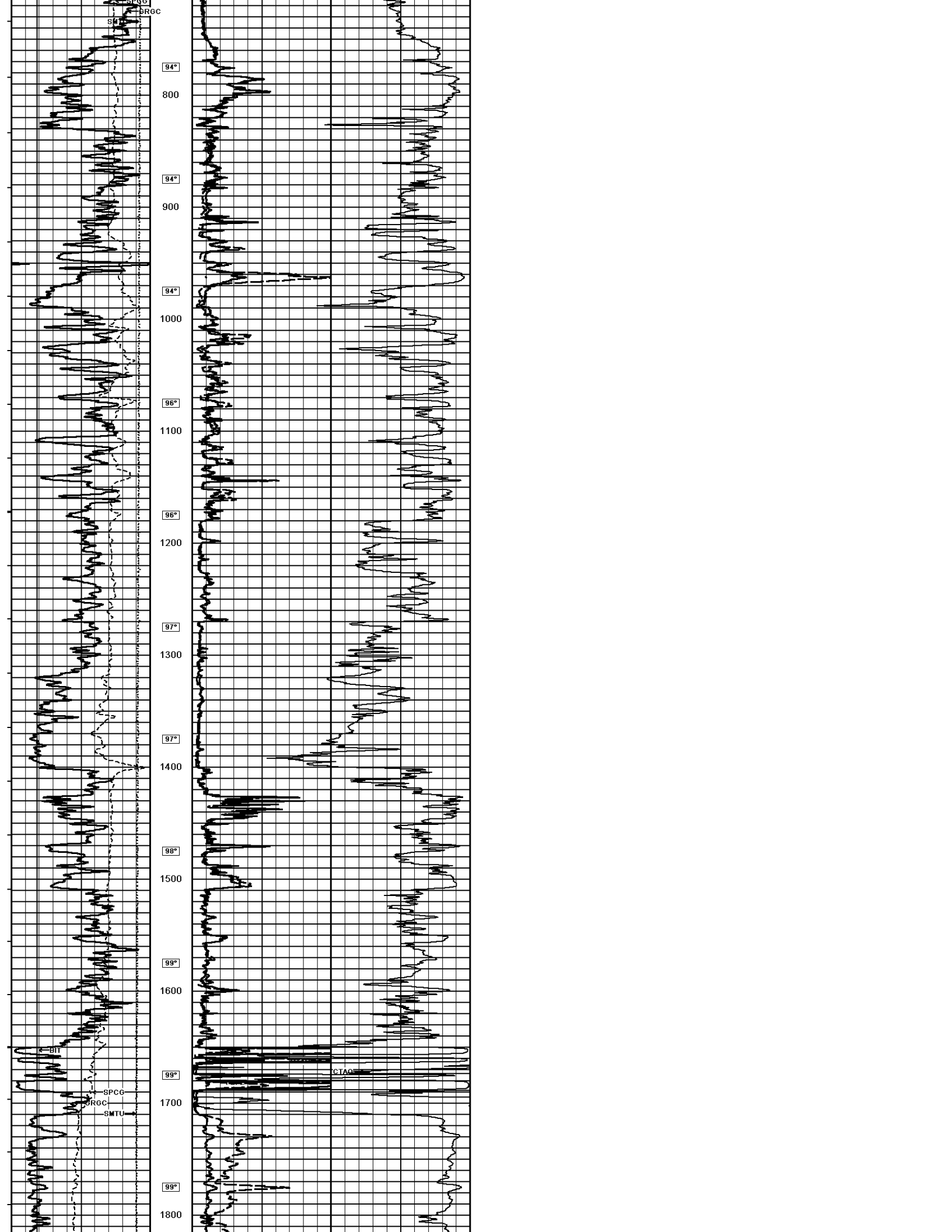
D. COLE

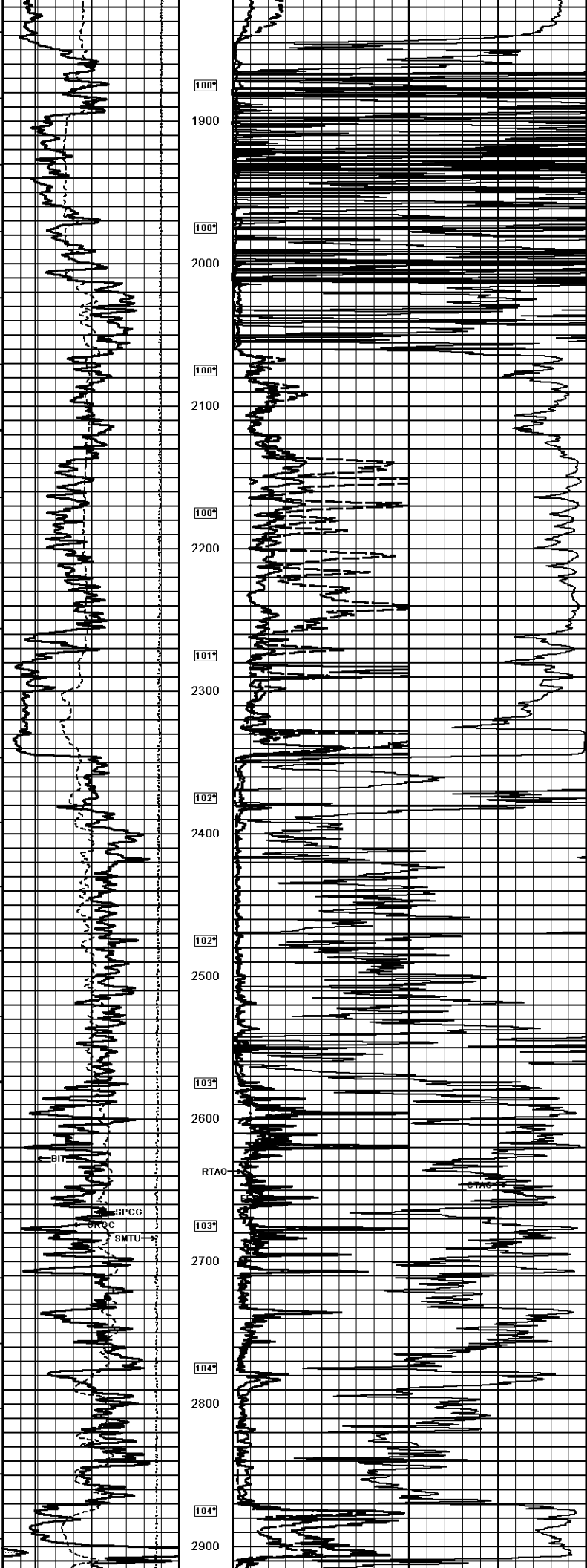
K. WATSON

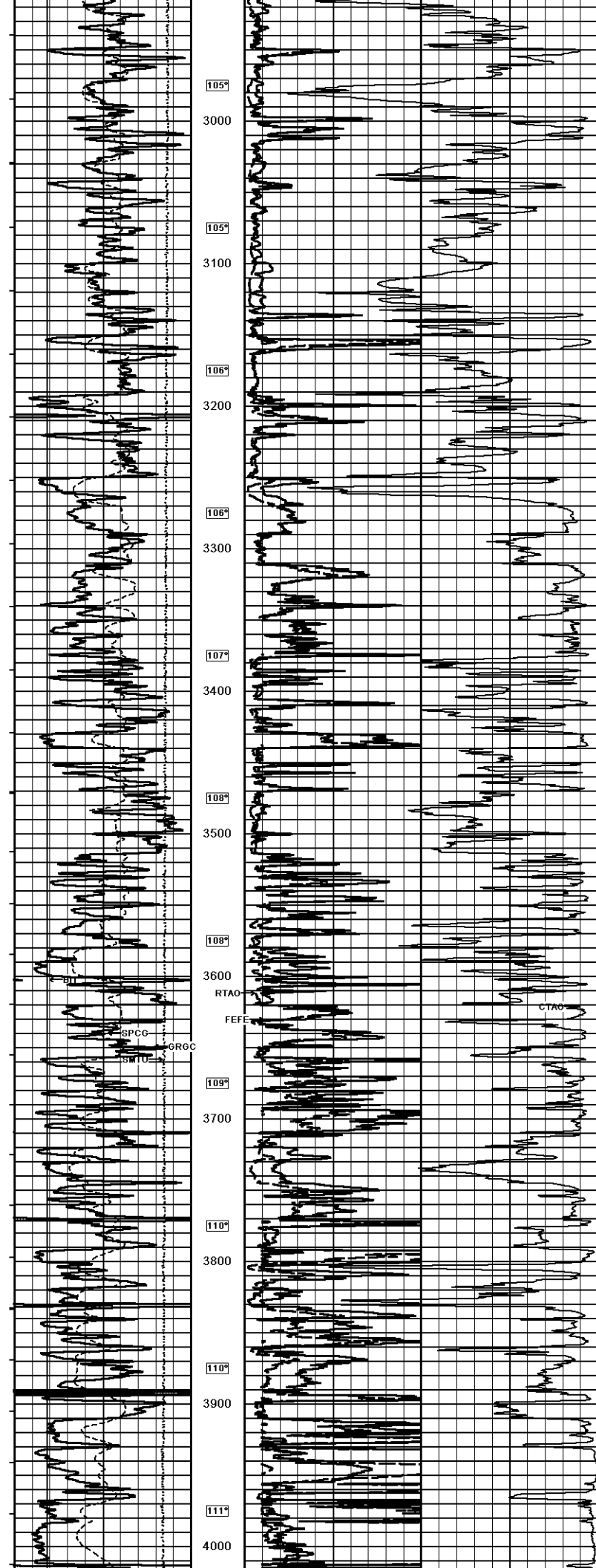
13-294

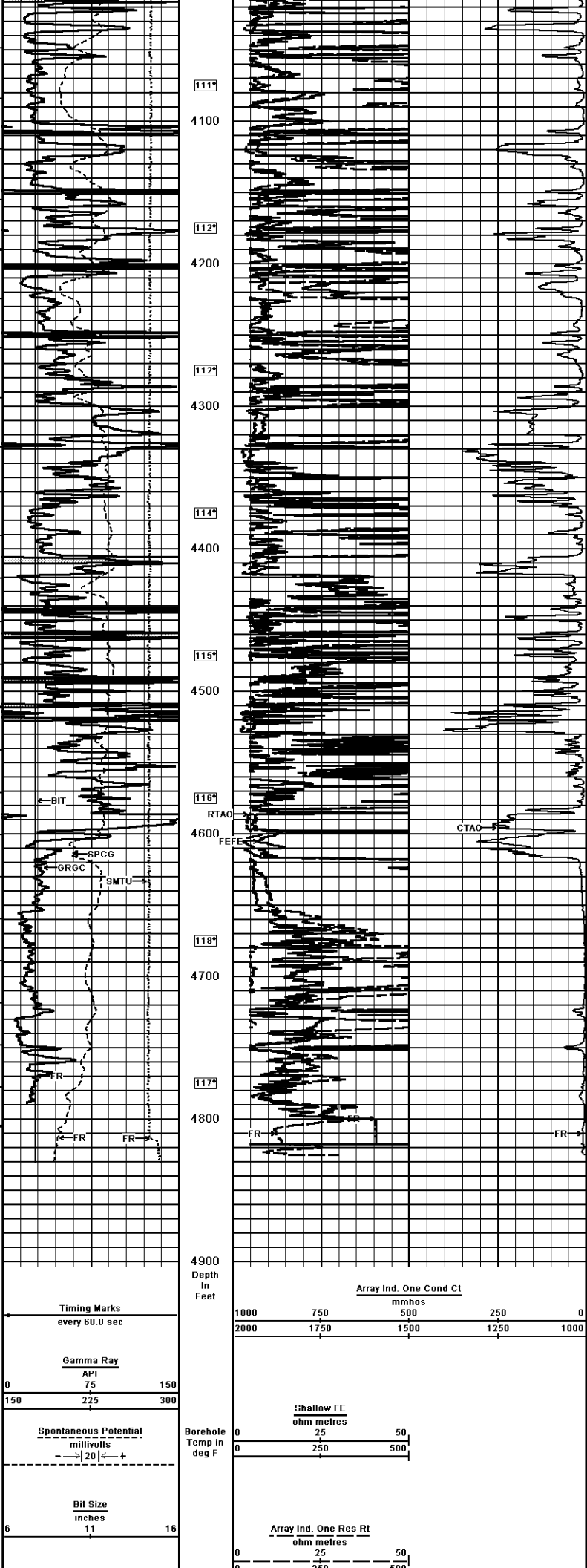
Elevation:	feet
KB	2978.00
16S	2977.00
16S	2985.00

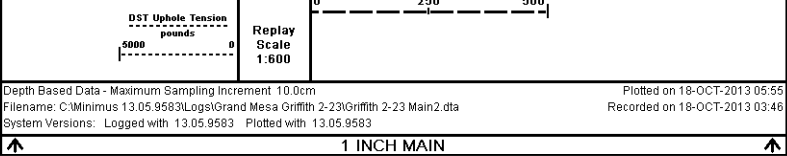












COMPANY	GRAND MESA OPERATING COMPANY				
WELL	GRIFFITH 2-23				
FIELD	WILDCAT				
PROVINCE/COUNTY	SCOTT				
COUNTRY/STATE	U.S.A. / KANSAS				

Elevation Kelly Bushing	2978.00	feet	First Reading	4811.00	feet
Elevation Drill Floor	2977.00	feet	Depth Driller	4810.00	feet
Elevation Ground Level	2968.00	feet	Depth Logger	4814.00	feet



ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG