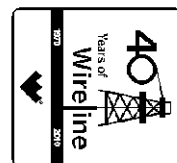




Weatherford[®]

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

COMPANY **M & M EXPLORATION, INC.**
WELL **Z-BAR #9-14**
FIELD **AETNA GAS AREA**
PROVINCE/COUNTY **BARBER**
COUNTRY/STATE **U.S.A. / KANSAS**
LOCATION **660' FSL & 1980' FWL**



SEC **TWP** **RGE** Other Services
9 **34S** **14W** **MDN/MPD**
API Number **15-007-23700** **MML**
Permit Number

Permanent Datum G.L., Elevation 1549 feet
Log Measured From K.B. @ 12 FEET above Permanent Datum
Drilling Measured From K.B.

Elevations: feet
KB 1561.00
DF 1559.00
GL 1549.00

Date	07-JUL-2011	
Run Number	ONE	
Depth Driller	4900.00	feet
Depth Logger	4897.00	feet
First Reading	4894.00	feet
Last Reading	896.00	feet
Casing Driller	900.00	feet
Casing Logger	896.00	feet
Bit Size	7.875	inches
Hole Fluid Type	CHEMICAL	
Density / Viscosity	9.00 lb/USg	55.00 CP
PH / Fluid Loss	9.00	10.40 ml/30Min
Sample Source	FLOWLINE	
Rm @ Measured Temp	0.56 @ 92.0	ohm-m
Rmf @ Measured Temp	0.45 @ 92.0	ohm-m
Rmc @ Measured Temp	0.67 @ 92.0	ohm-m
Source Rmf / Rmc	CALC	CALC
Rm @ BHT	0.43 @ 121.0	ohm-m
Time Since Circulation	4 HOURS	
Max Recorded Temp	121.00	deg F
Equipment Name	COMPACT	
Equipment / Base	13057	LIB
Recorded By	R. HOFFMAN	
Witnessed By	BETH BROCK	
S.O. # / JOB #	3531102	LB11-156

BOREHOLE RECORD

Last Edited: 07-JUL-2011 11:39

Bit Size inches	Depth From feet	Depth To feet
7.875	896.00	4897.00

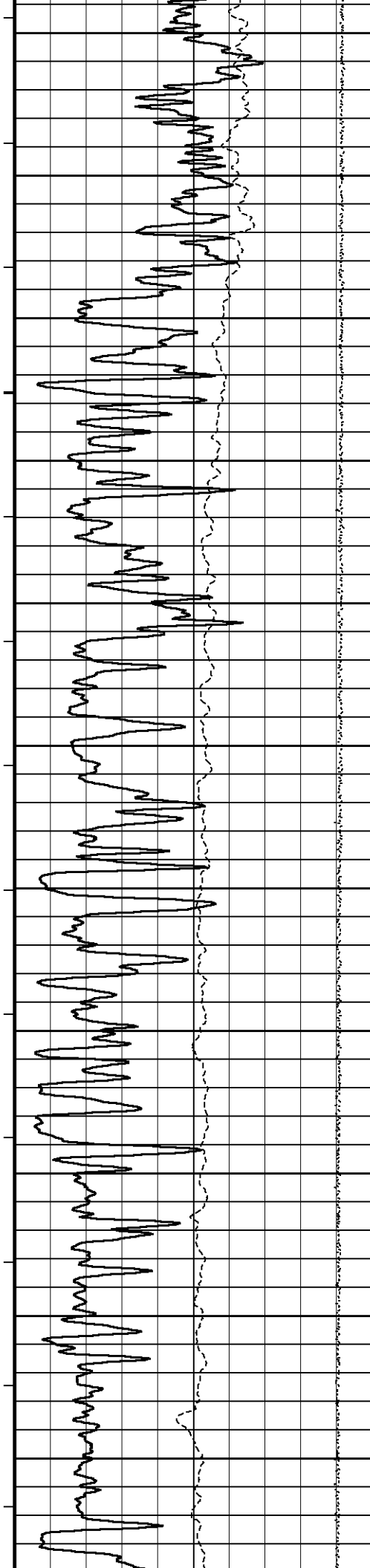
CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	896.00	24.00

REMARKS

Tools Ran: MCG, MML, MDN, MPD, SKJ, MFE, MAI.
Hardware Used: MDN Dual Eccentralizer used. MPD 8 inch profile plate used. MFE MSS and MAI 0.5 inch standoffs used.
2.71 g/cc Limestone Density Matrix used to calculate porosity.
All intervals logged and scaled per customer's request.
Annular volume with 4.5 inch production casing=258 cu. ft.
Service order #3531102
Rig: Southwind Rig #70
Engineer: R. Hoffman
Operator(s): B. Reeves

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.



1200

104°

1300

105°

1400

105°

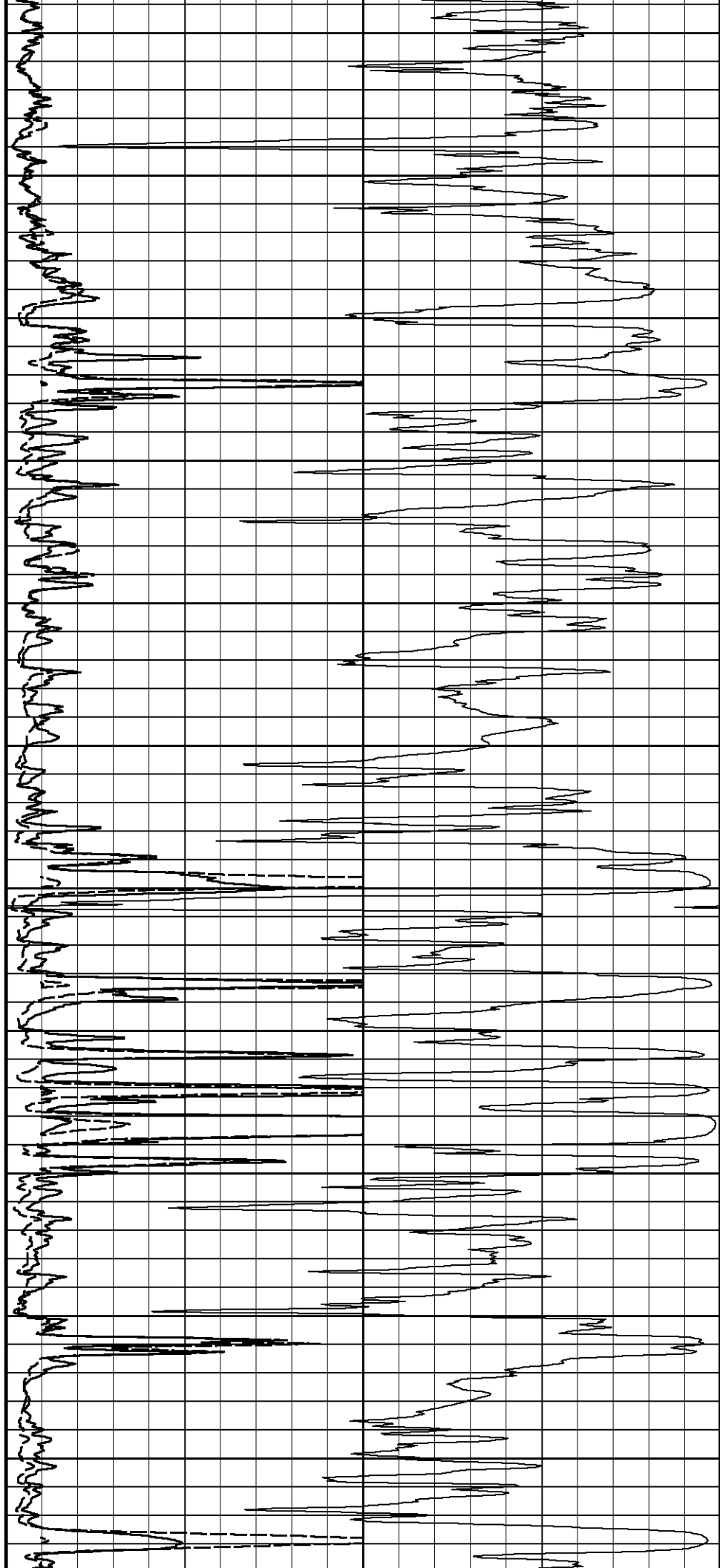
1500

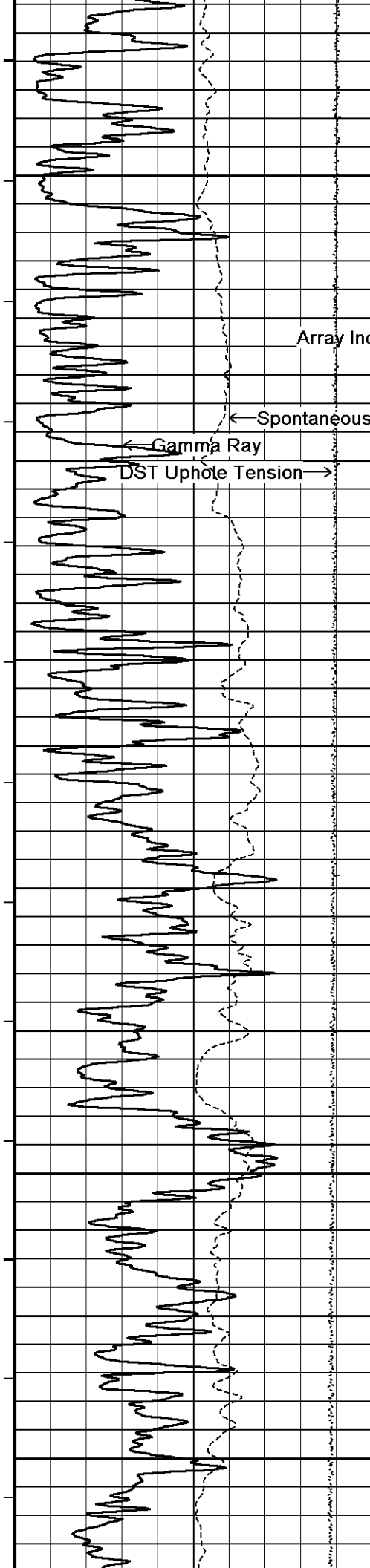
106°

1600

106°

1700





104°

1800

Array Ind. One Res Rt

104°

← Spontaneous Potential

← Gamma Ray

DST Uphole Tension →

1900

105°

2000

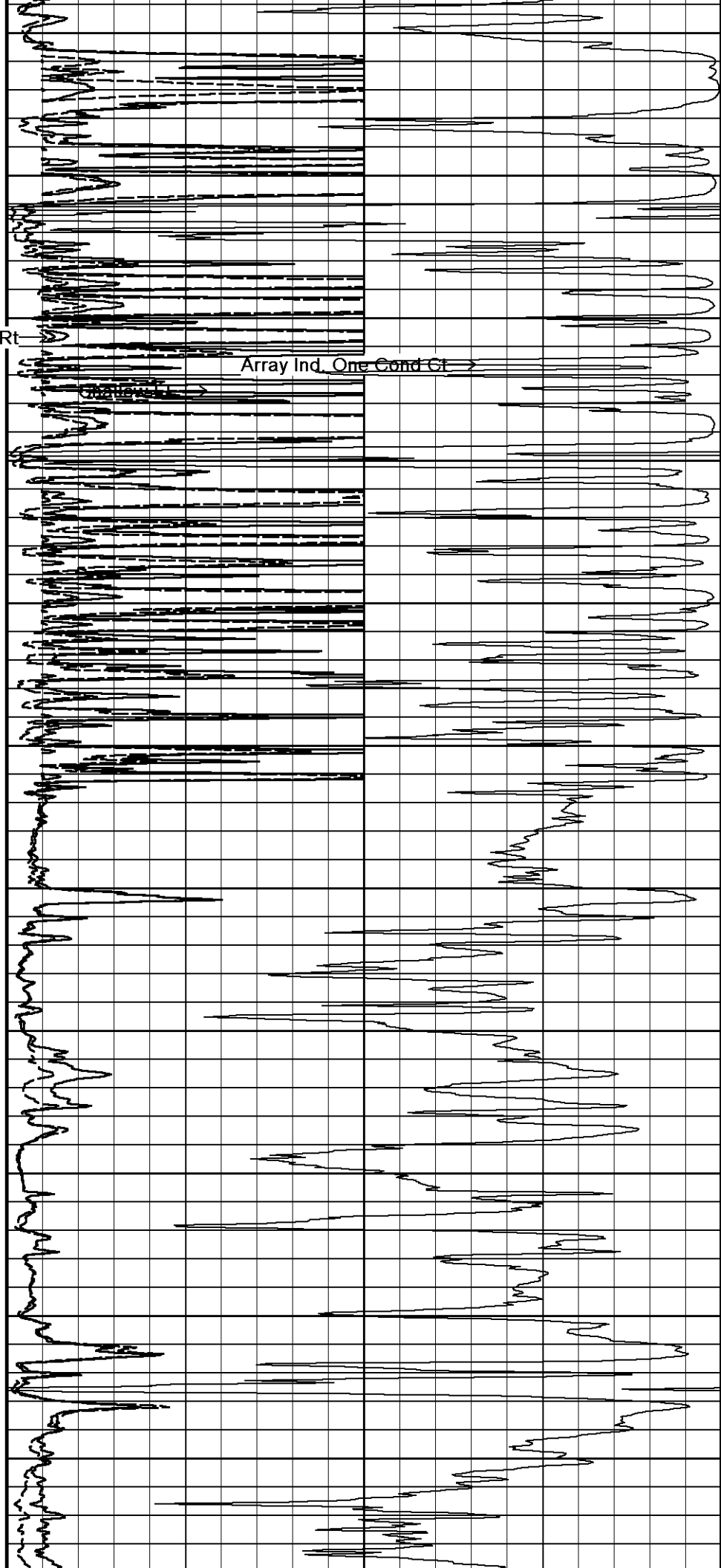
106°

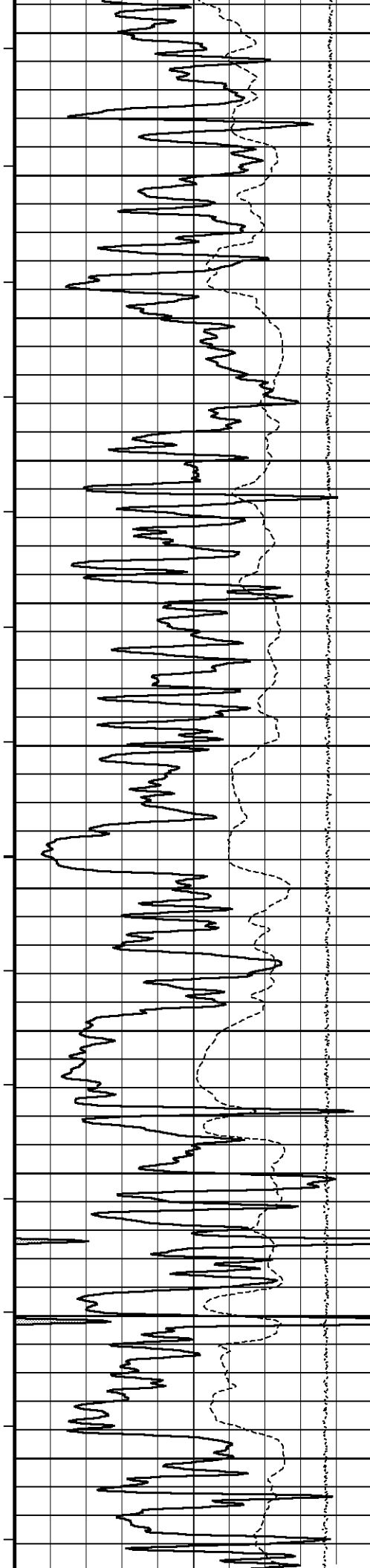
2100

106°

2200

107°





2300

108°

2400

107°

2500

108°

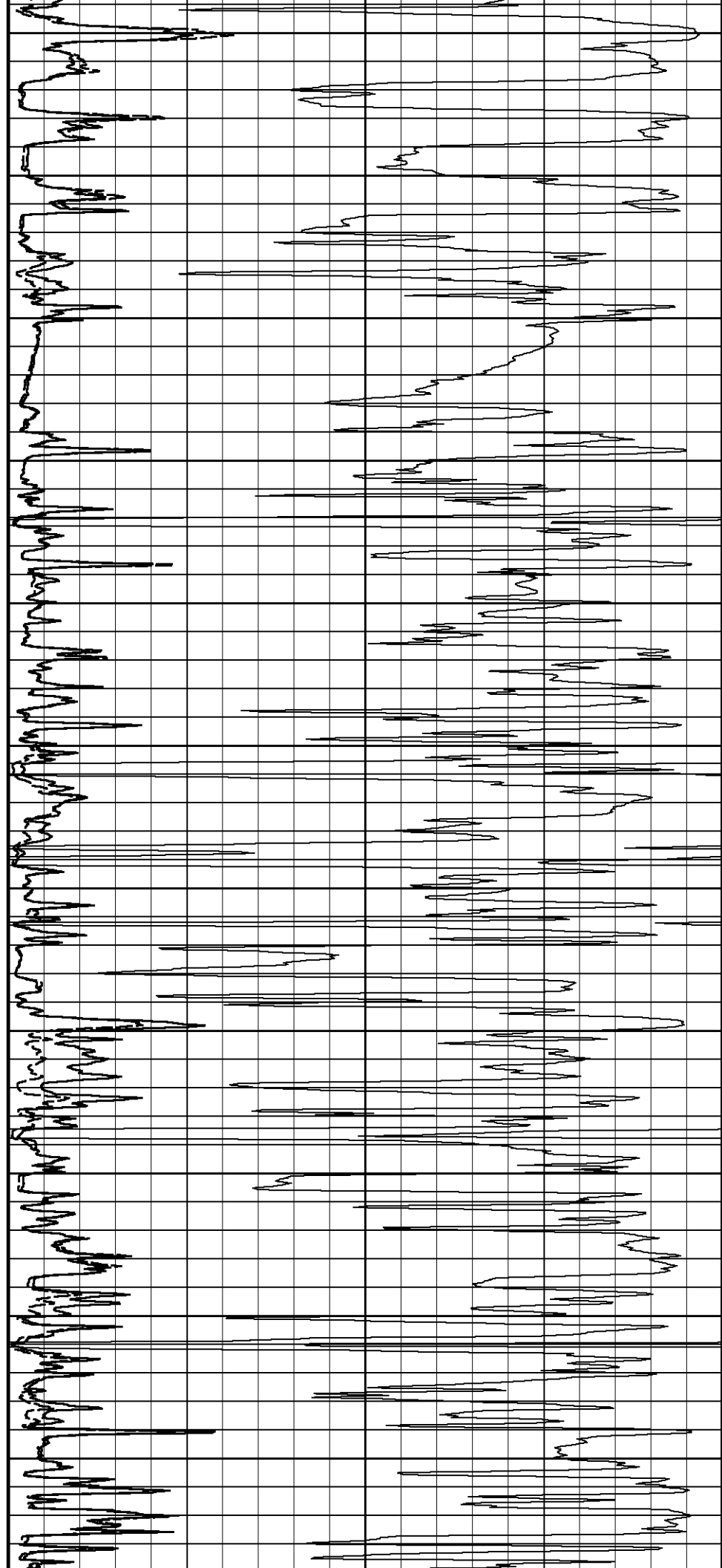
2600

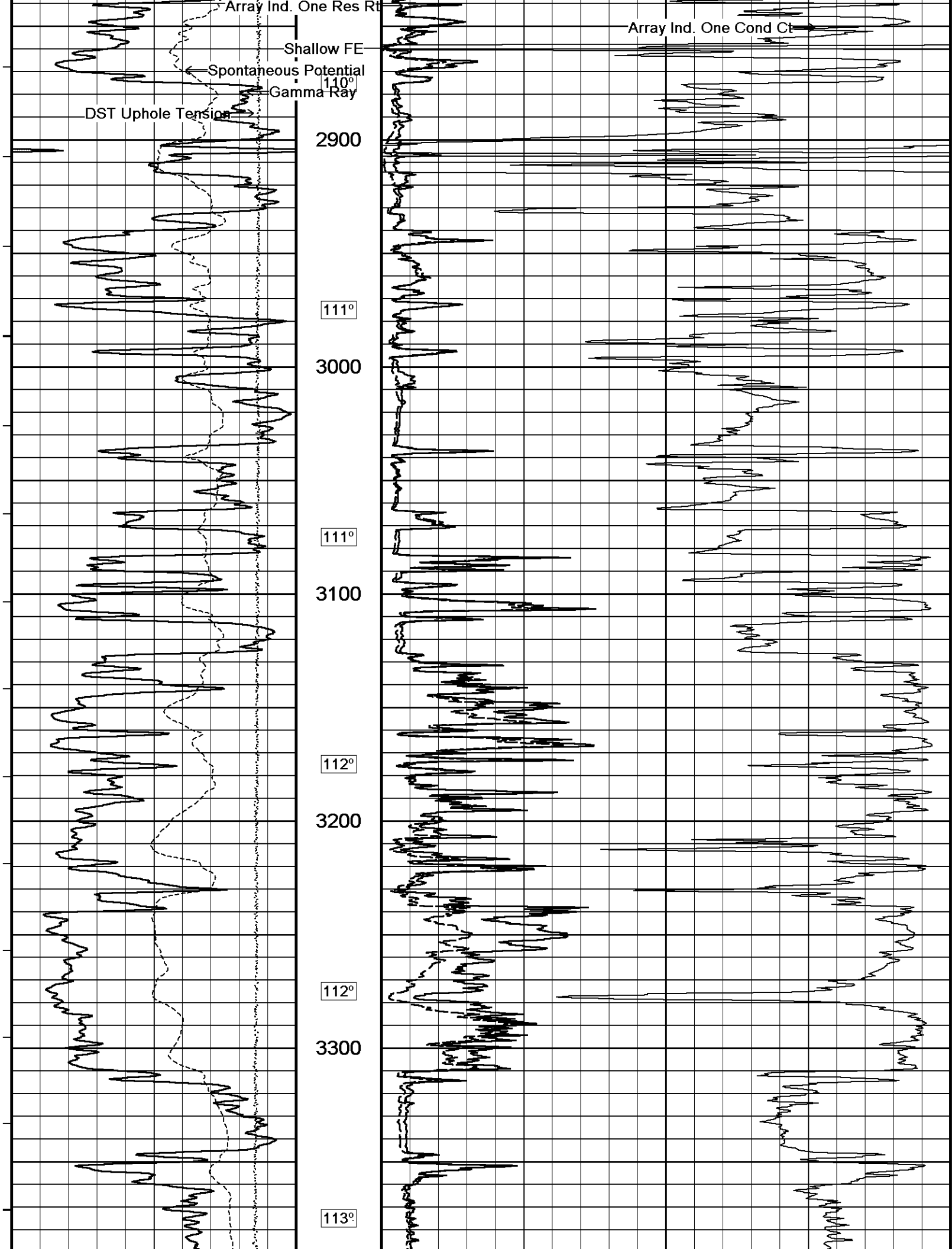
109°

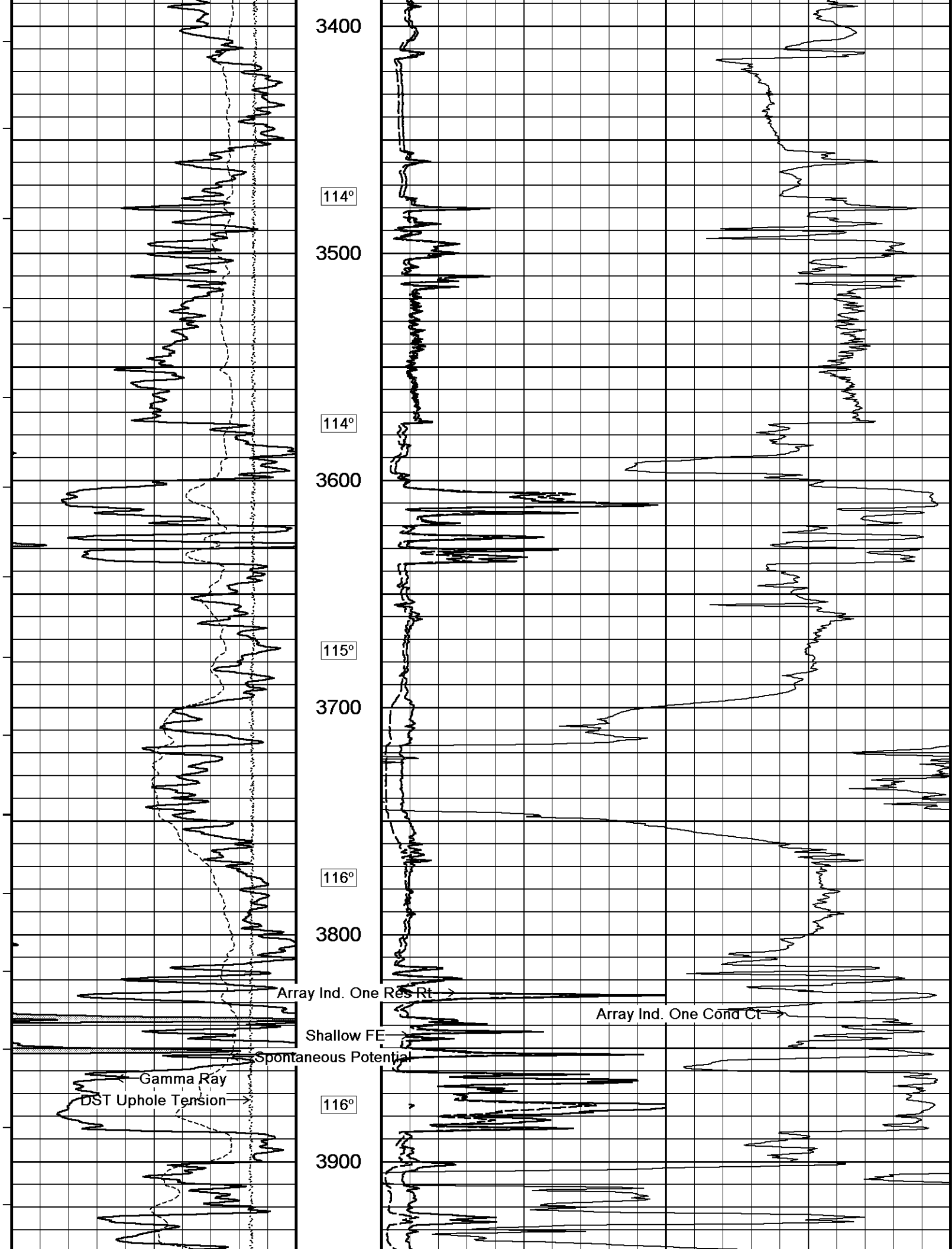
2700

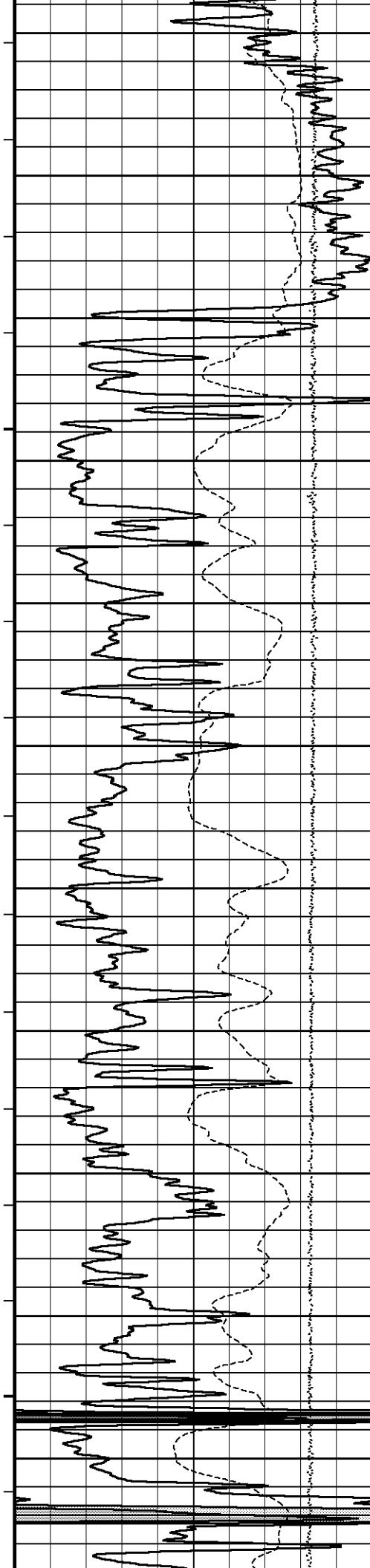
109°

2800









117°

4000

118°

4100

118°

4200

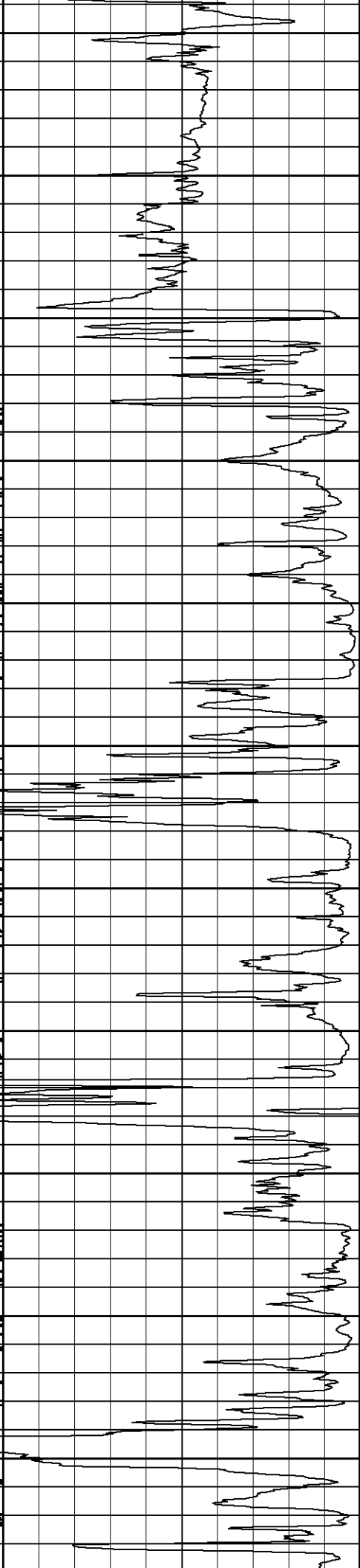
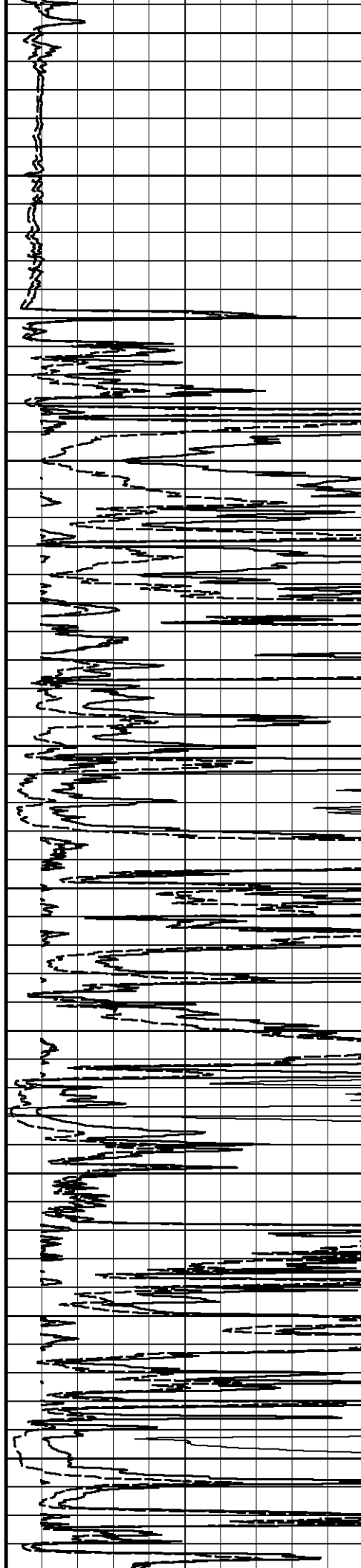
118°

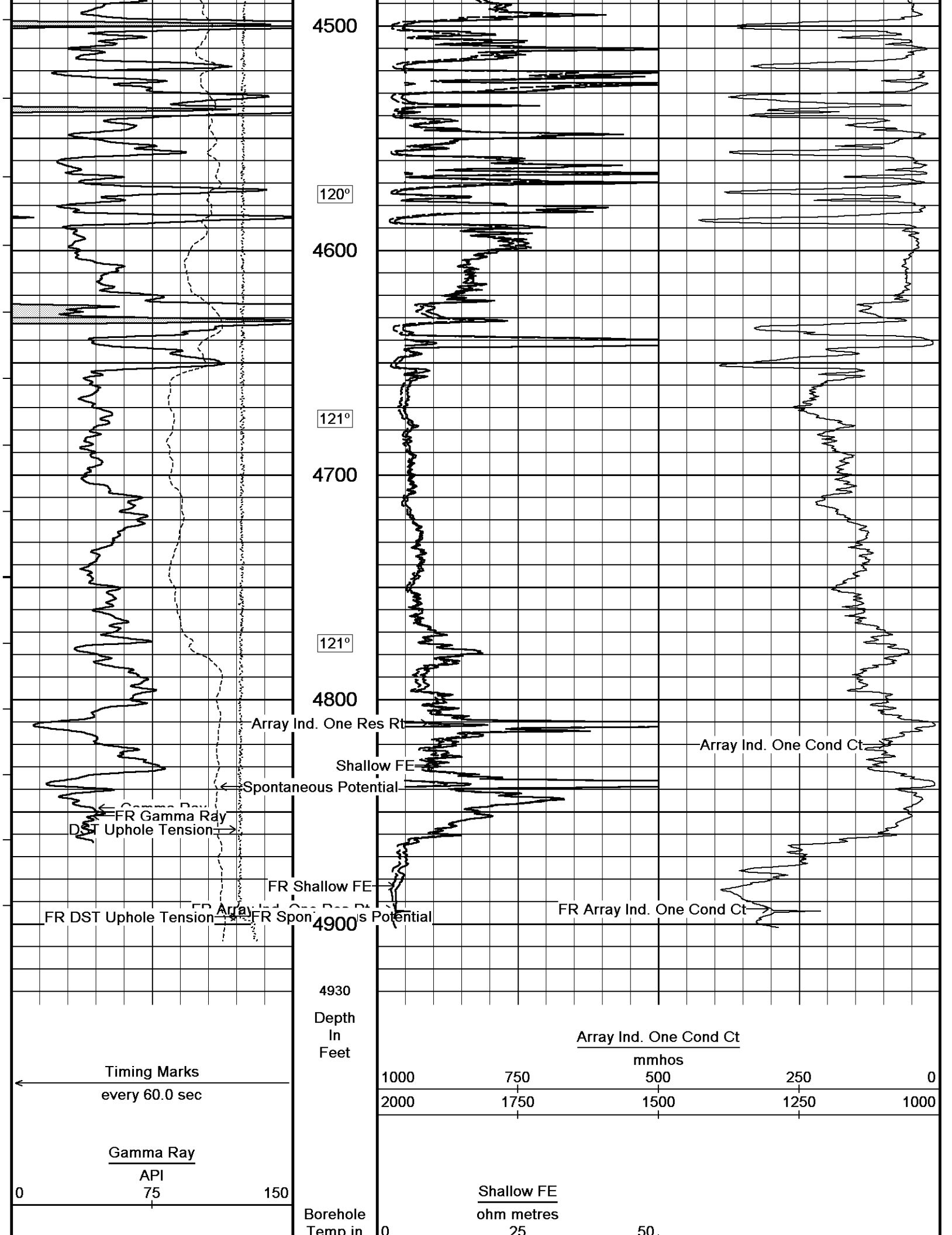
4300

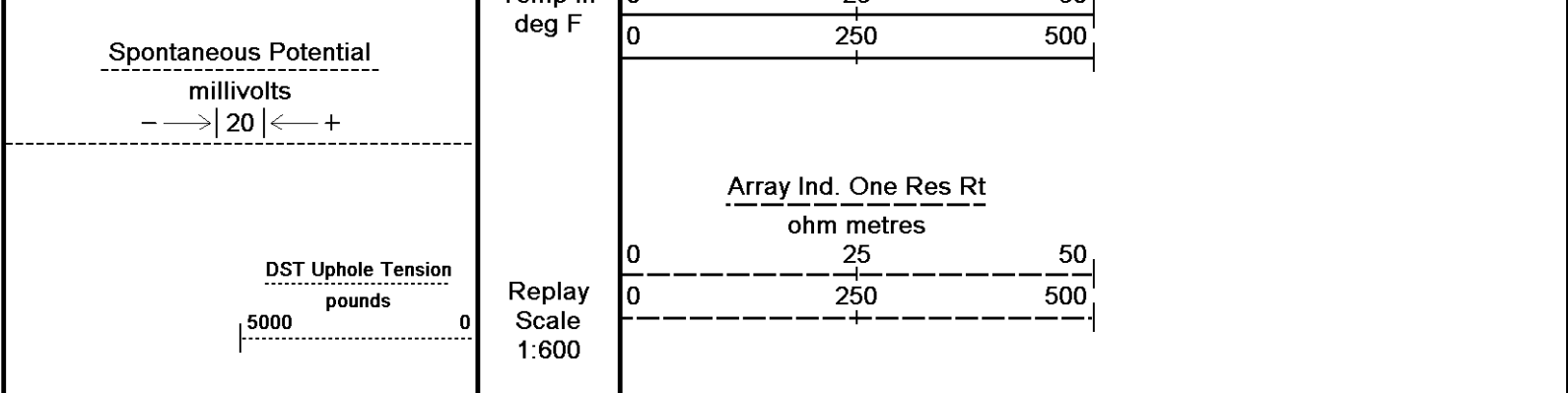
119°

4400

120°







Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 11.02.3186\Data\M&M Z-Bar #9-14\M&M Z-Bar #9-14_002.dta
System Versions: Logged with 11.02.3186 Plotted with 11.02.3186

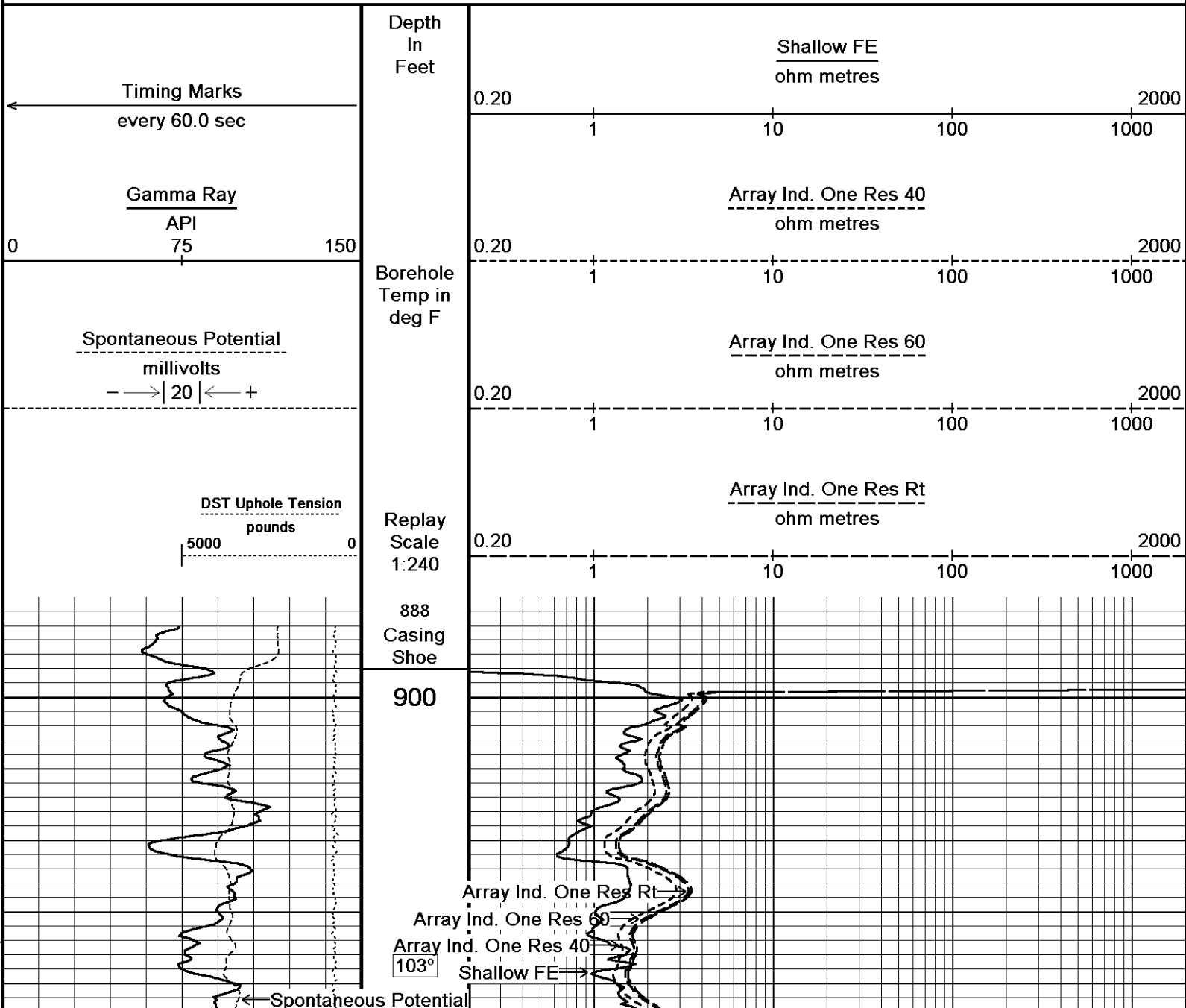
Plotted on 07-JUL-2011 11:48
Recorded on 07-JUL-2011 09:49

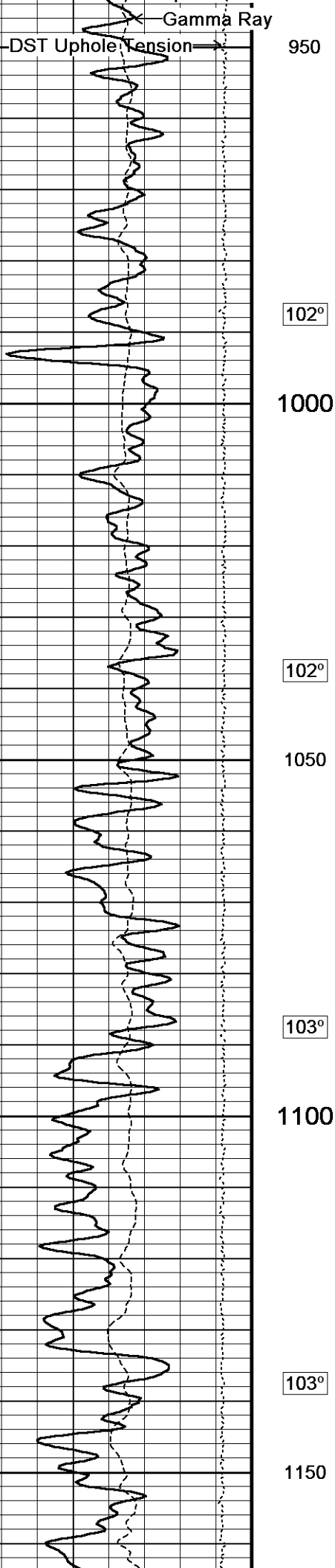
↑ 2 INCH MAIN PASS ↑

↓ 5 INCH MAIN PASS ↓

Depth Based Data - Maximum Sampling Increment 10.0cm
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System Versions: Logged with 11.02.3186 Plotted with 11.02.3186

Plotted on 07-JUL-2011 11:48
Recorded on 07-JUL-2011 09:49





102°

1000

102°

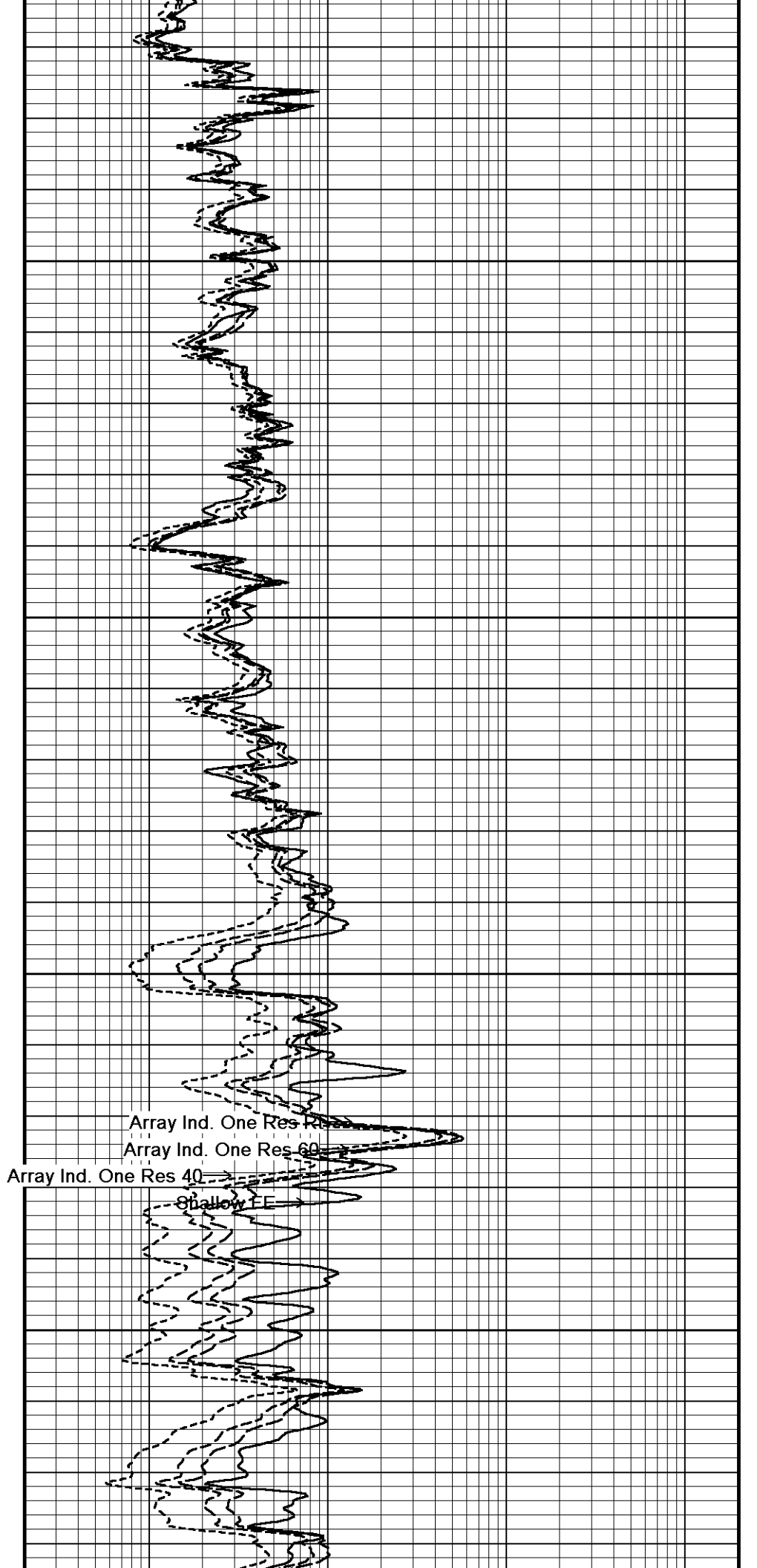
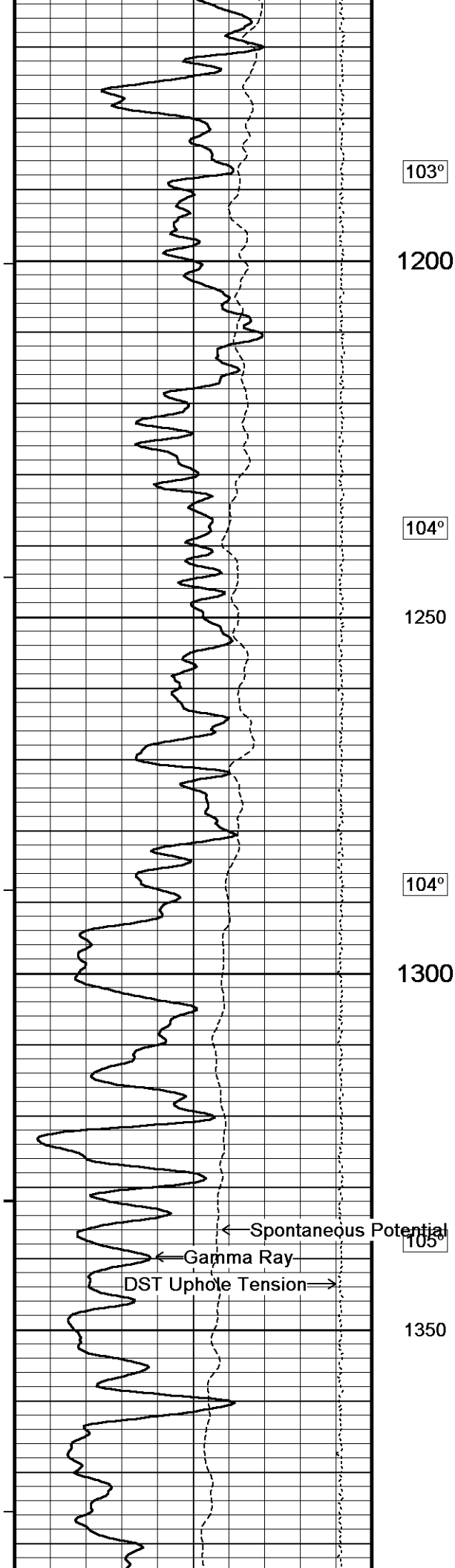
1050

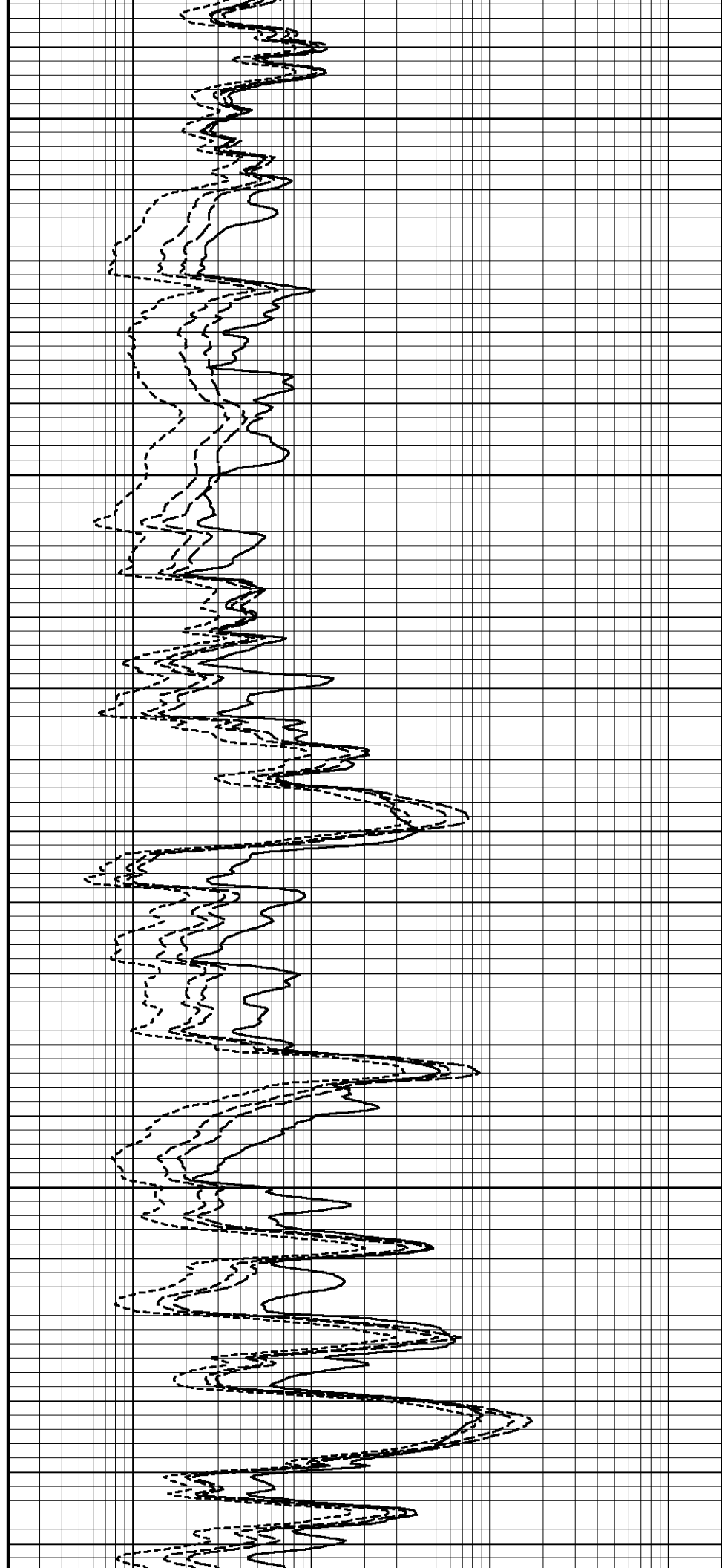
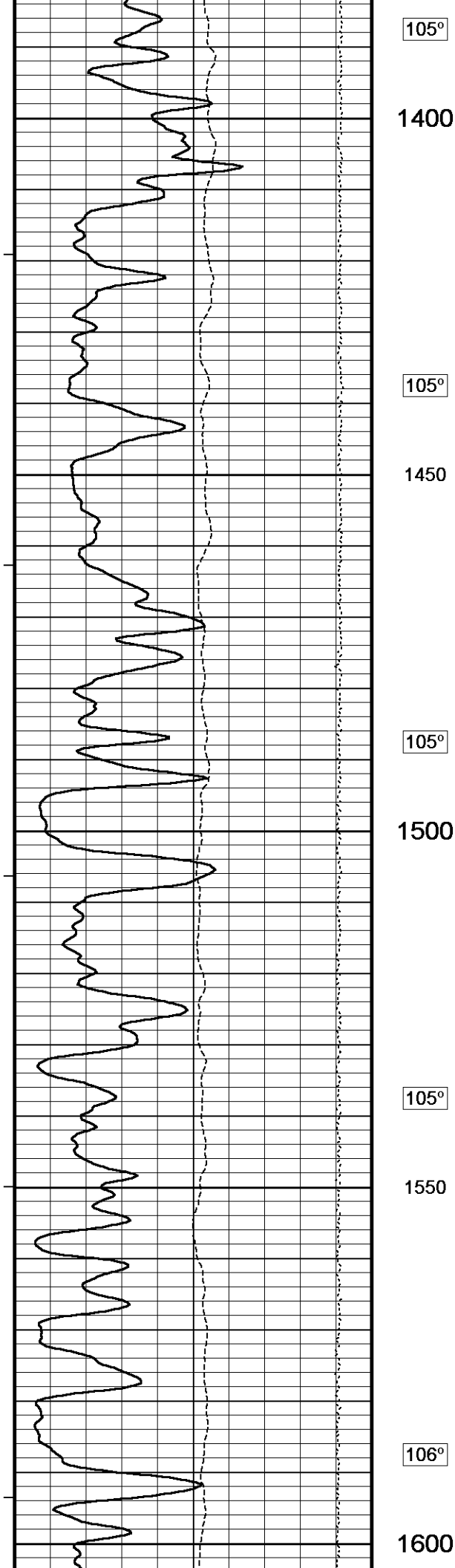
103°

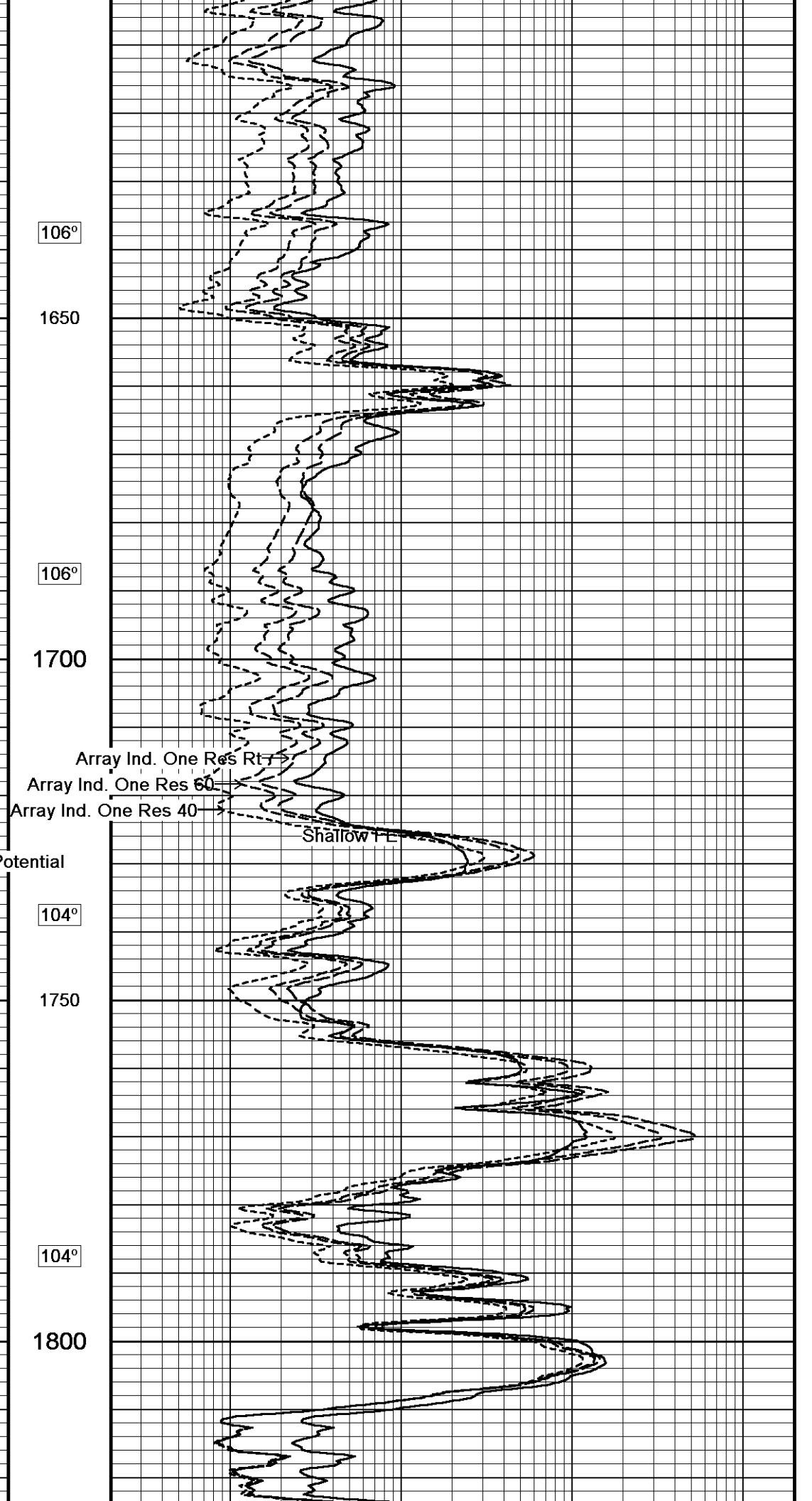
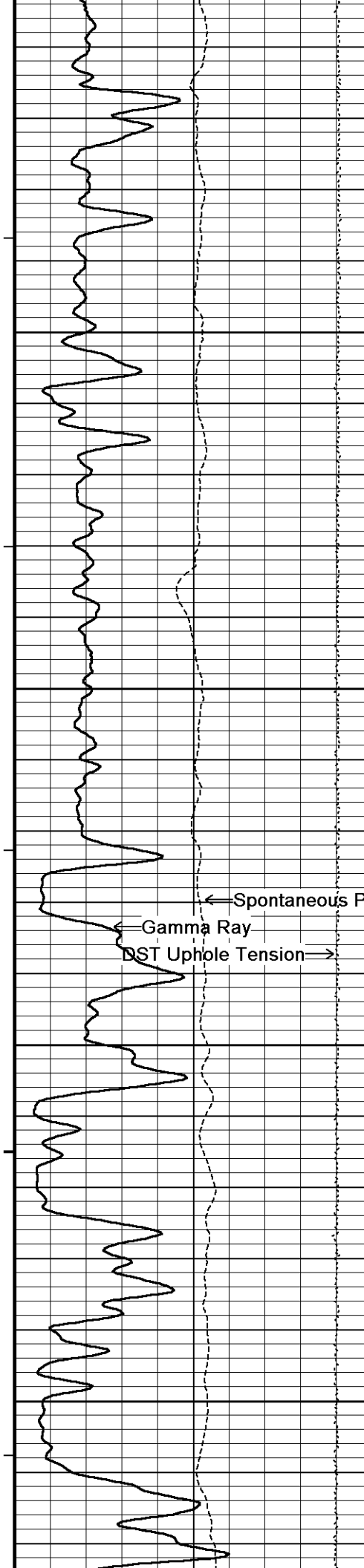
1100

103°

1150







106°

1650

106°

1700

Array Ind. One Res Rt

Array Ind. One Res 60

Array Ind. One Res 40

Shallow F-L

← Spontaneous Potential

← Gamma Ray

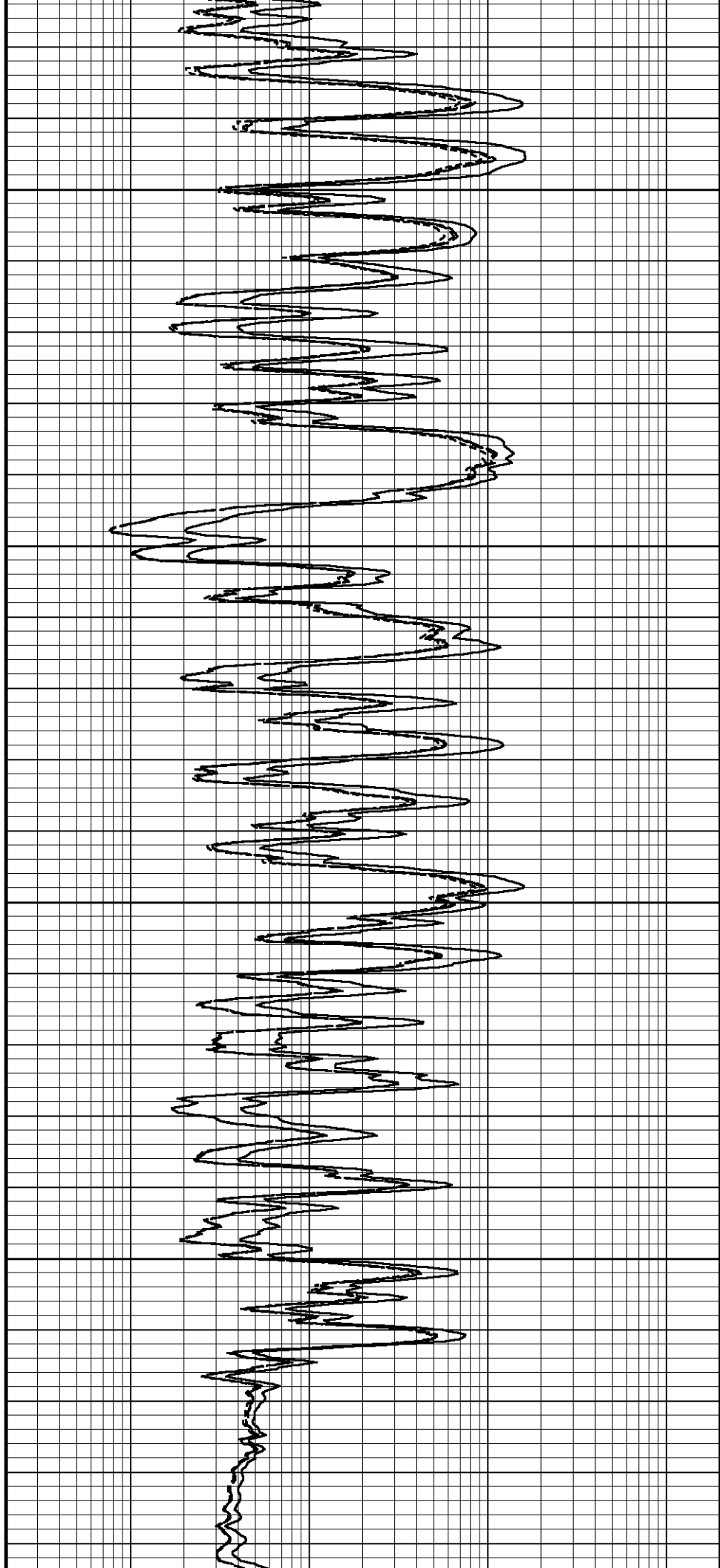
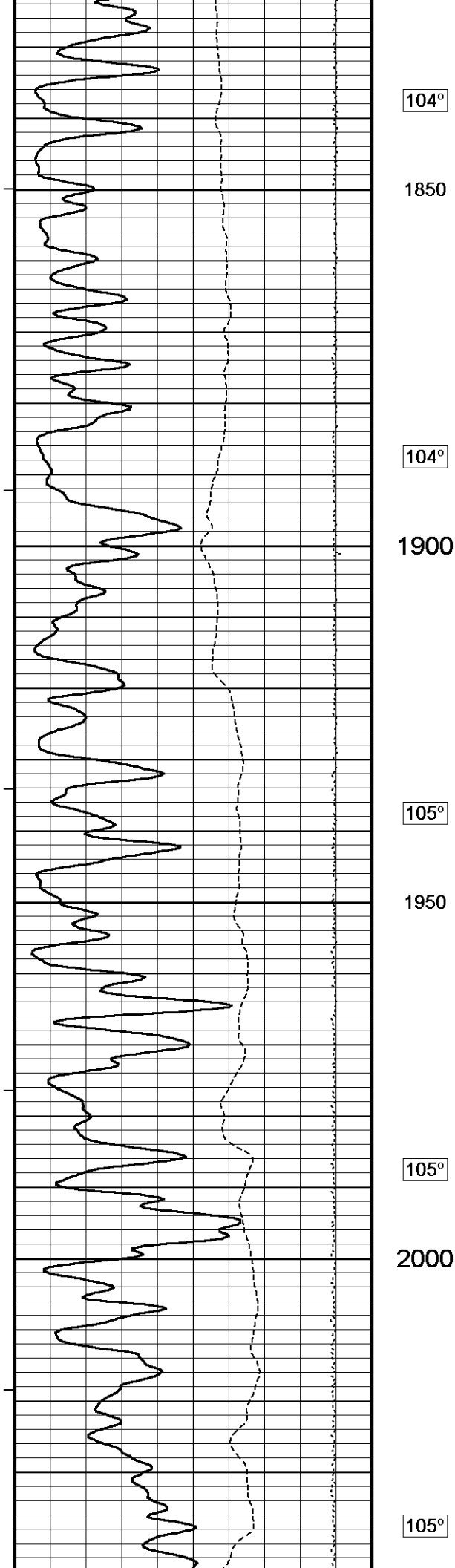
DST Uphole Tension →

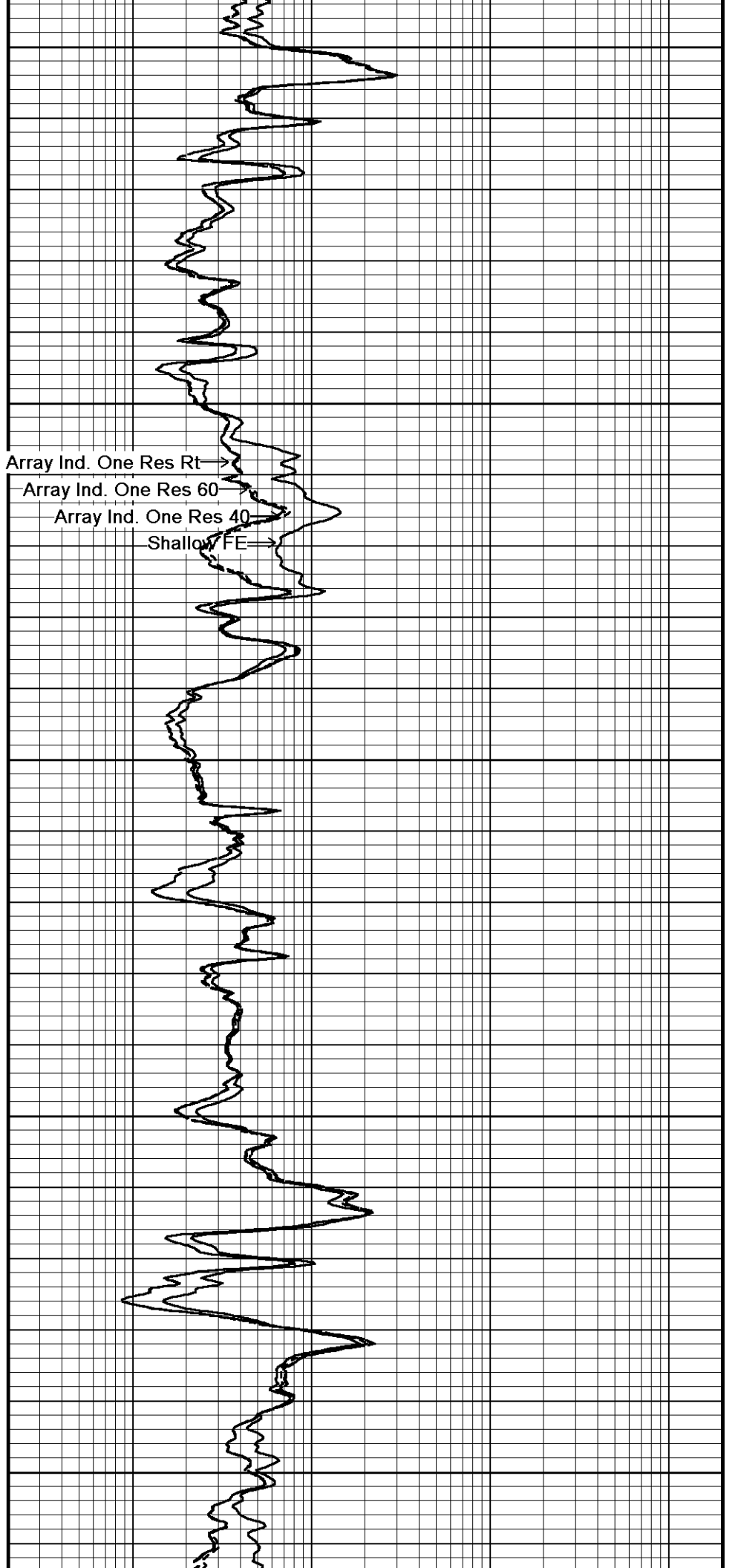
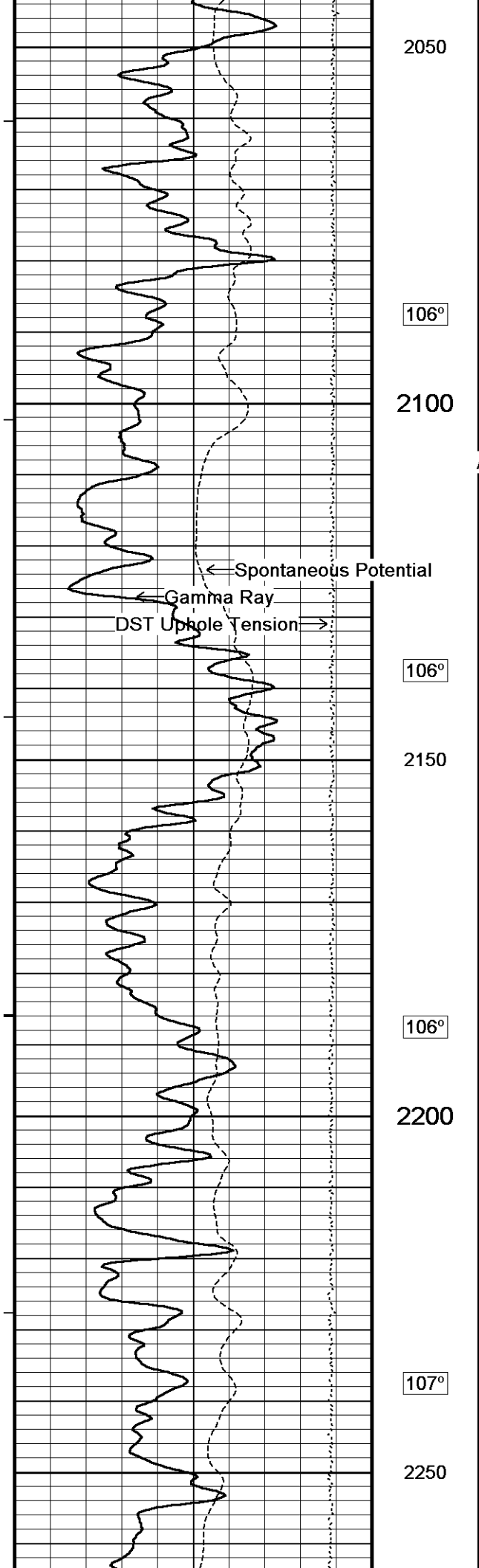
104°

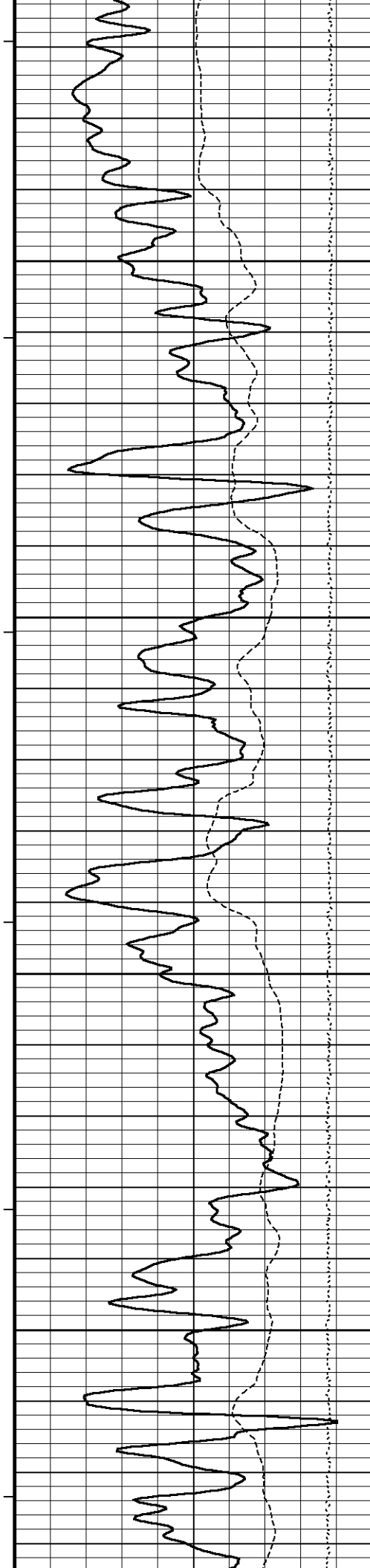
1750

104°

1800







107°

2300

107°

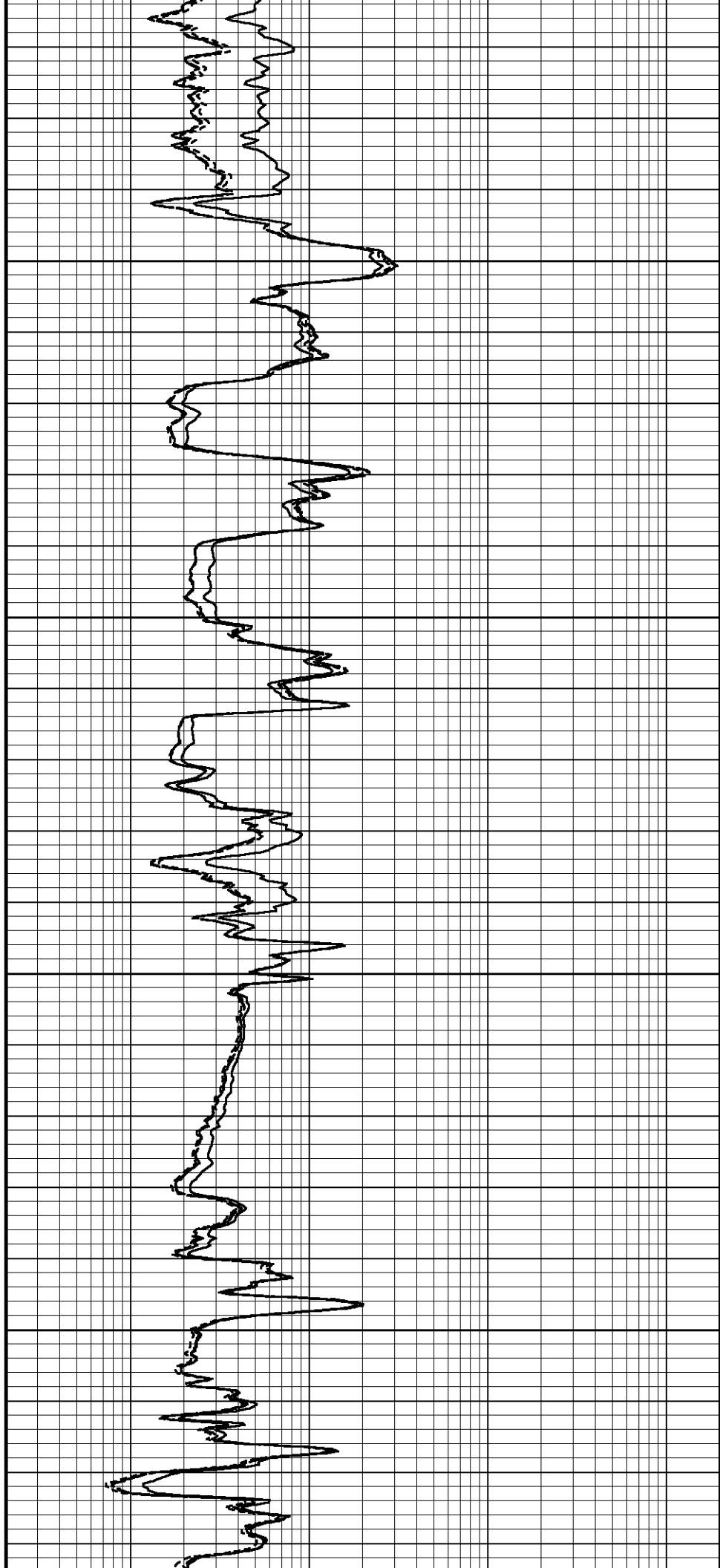
2350

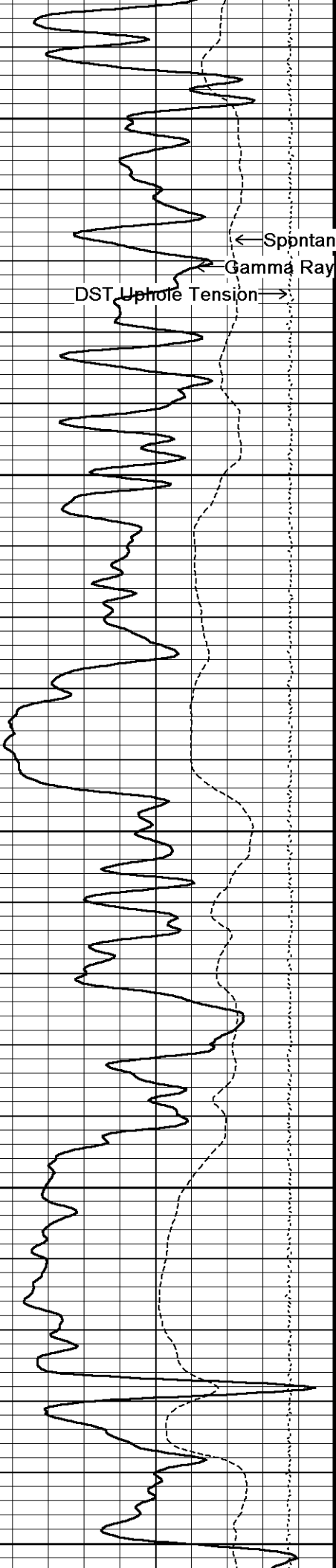
108°

2400

108°

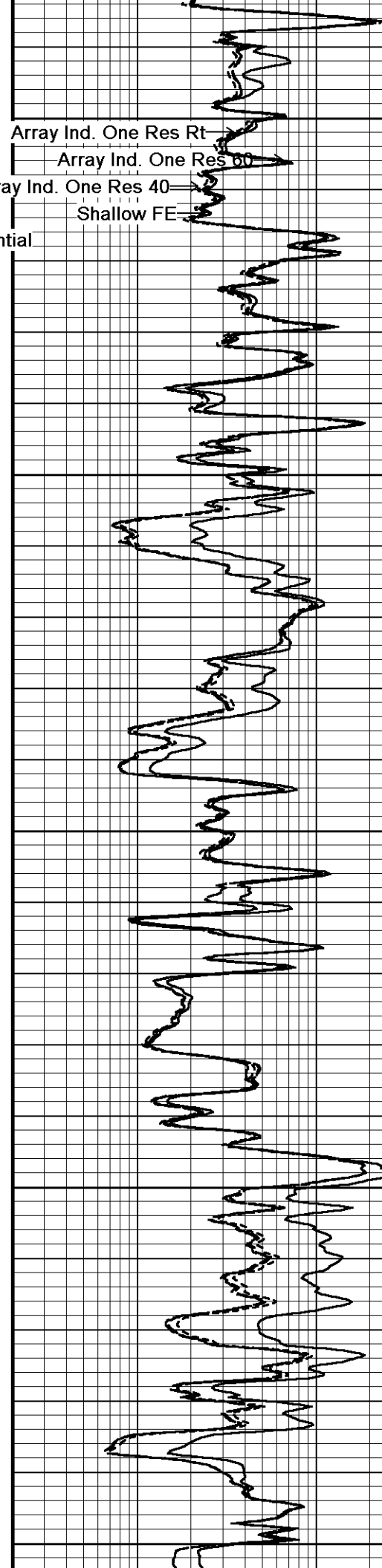
2450





108°

2500



Array Ind. One Res Rt

Array Ind. One Res 60

Array Ind. One Res 40

Shallow FE

← Spontaneous Potential

← Gamma Ray

DST Uphole Tension →

108°

2550

108°

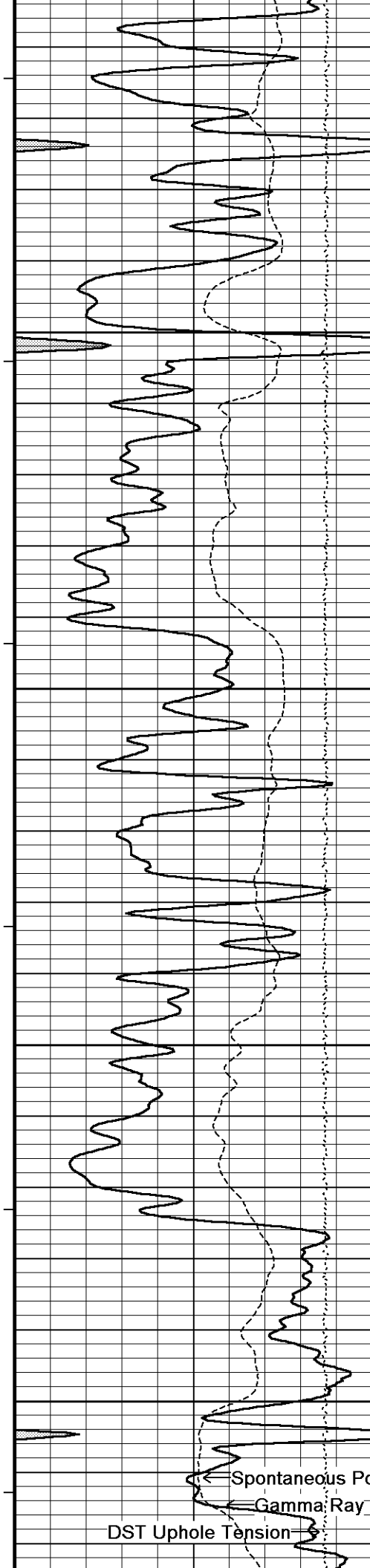
2600

109°

2650

109°

2700



109°

2750

110°

2800

110°

2850

110°

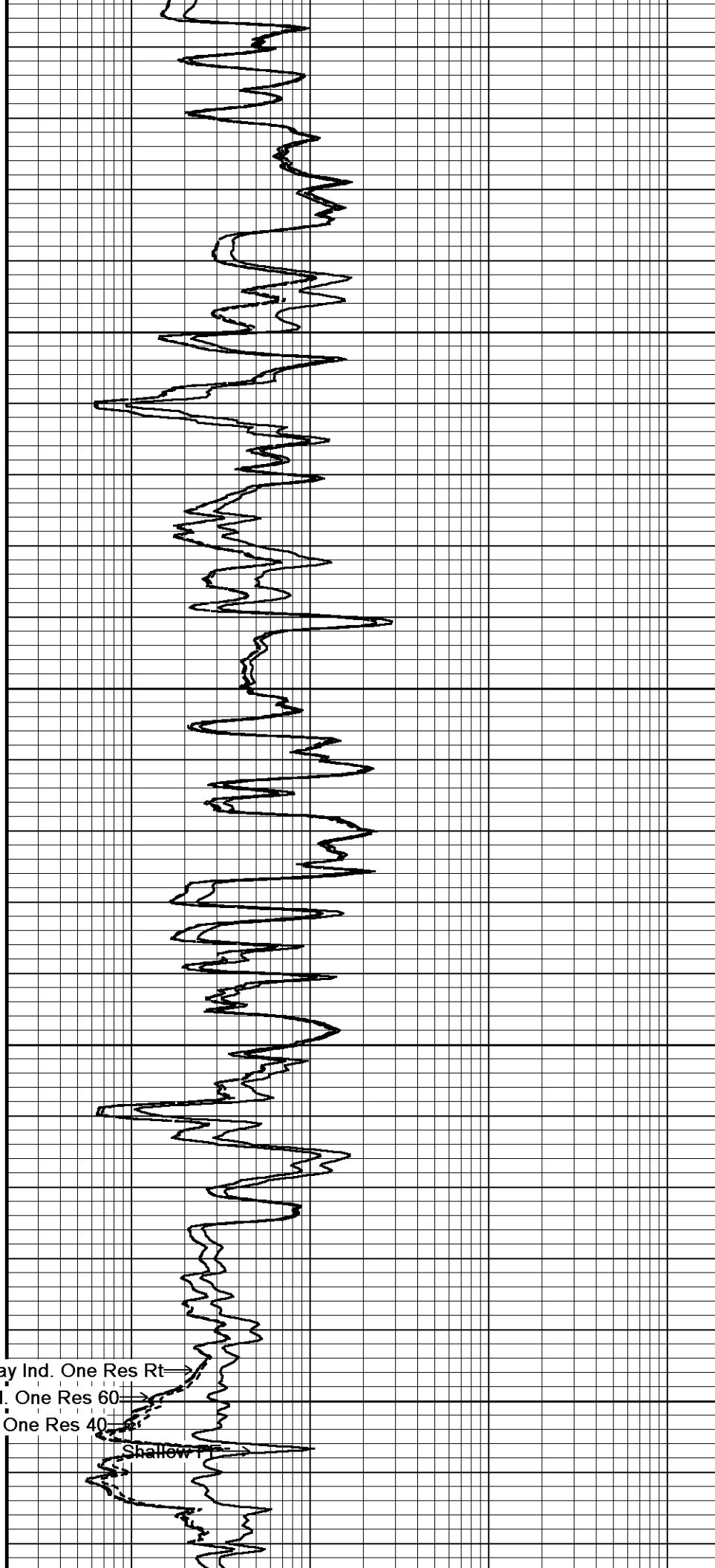
Array Ind. One Res Rt
2900nd. One Res 60
Array Ind. One Res 40

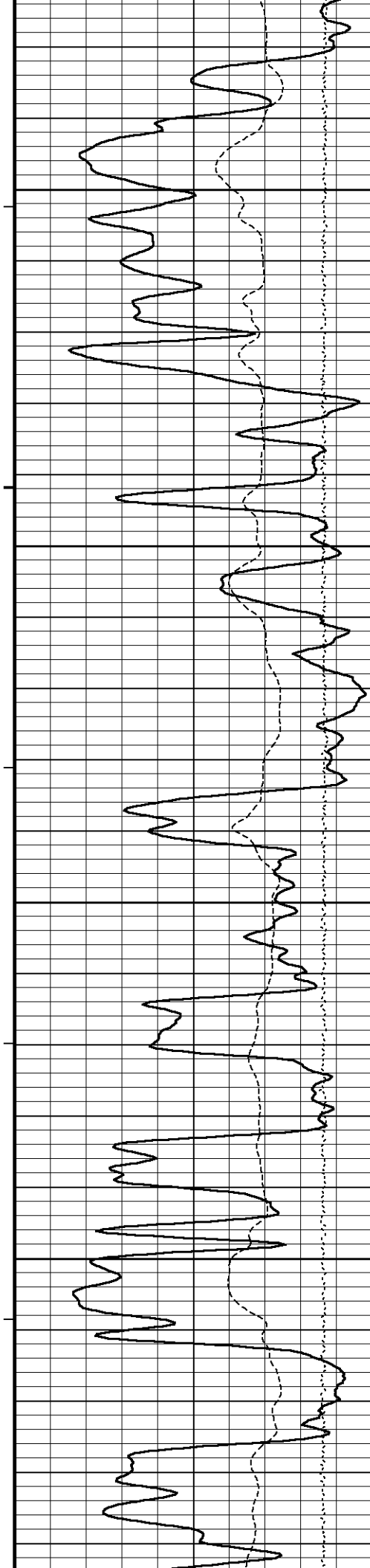
Shallow

Spontaneous Potential

Gamma Ray

DST Uphole Tension





110°

2950

111°

3000

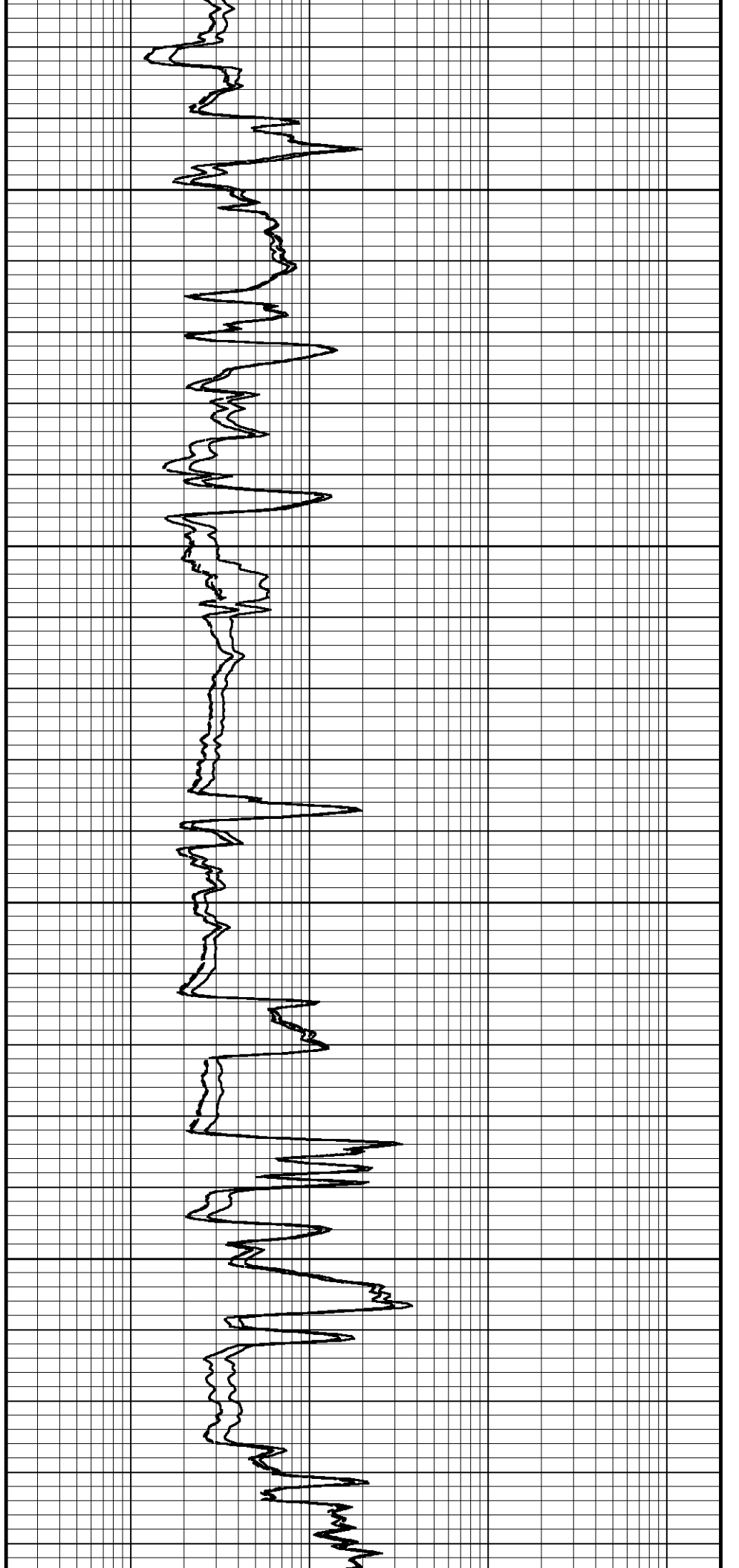
111°

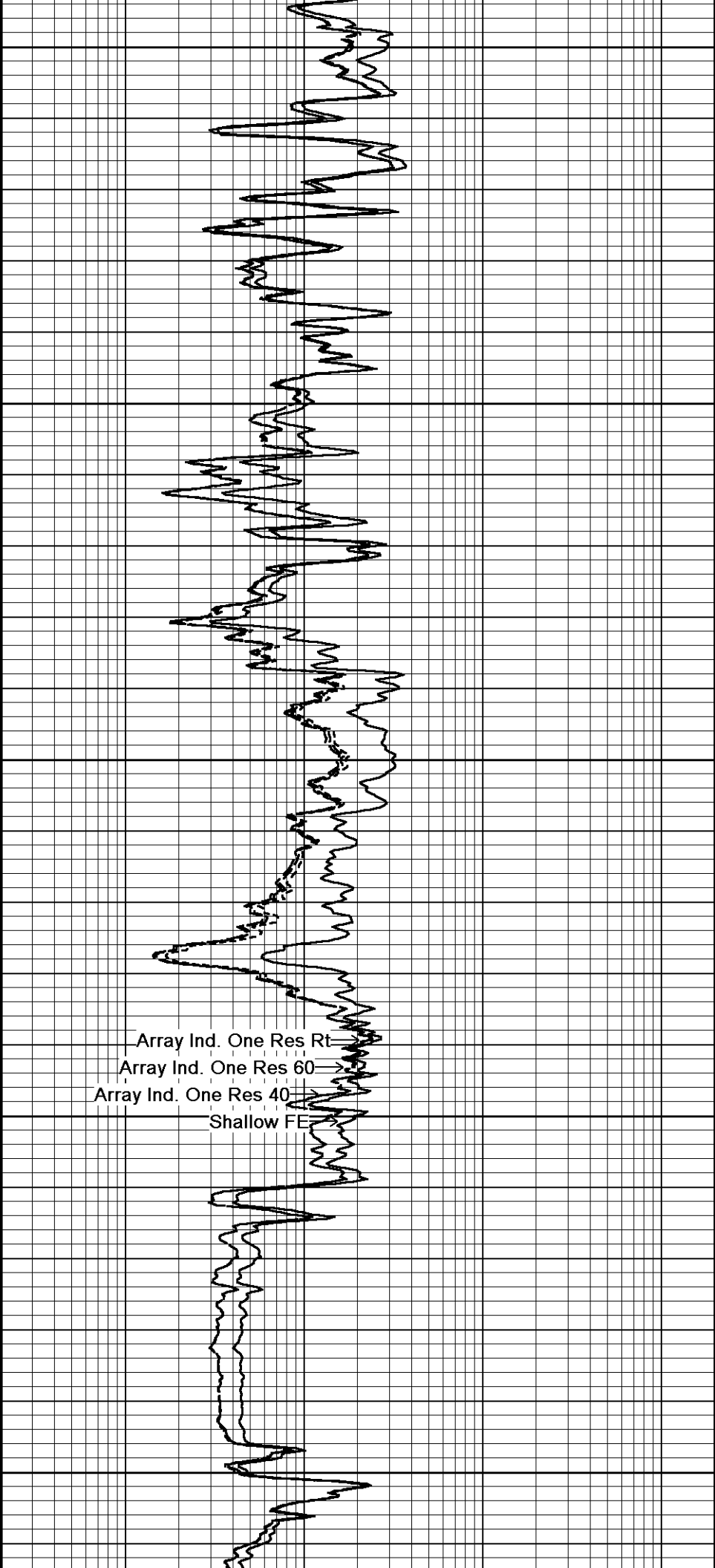
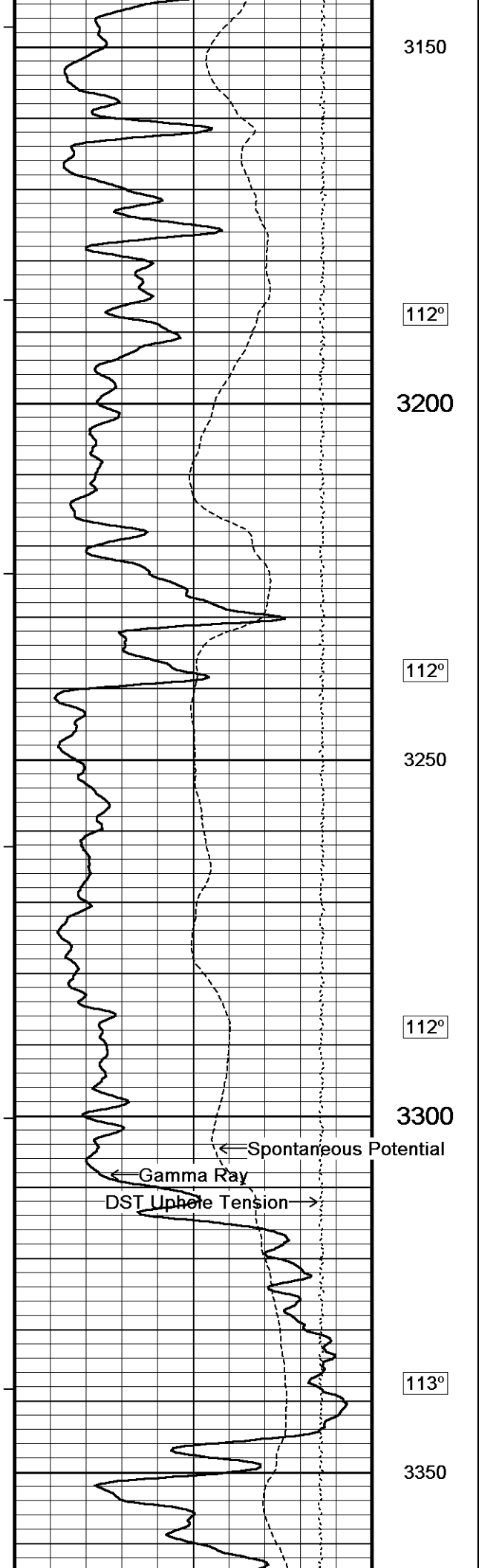
3050

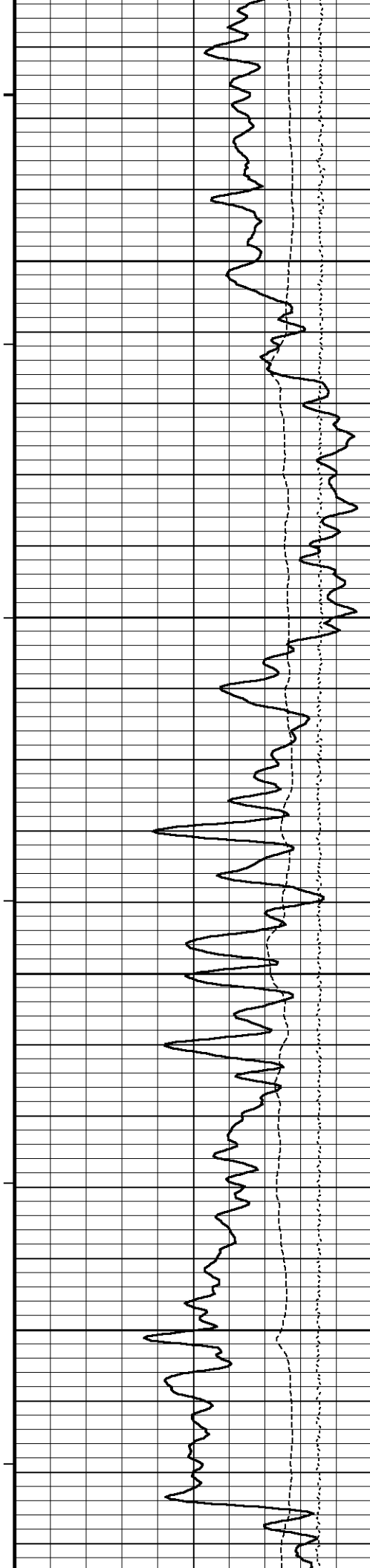
111°

3100

112°







113°

3400

114°

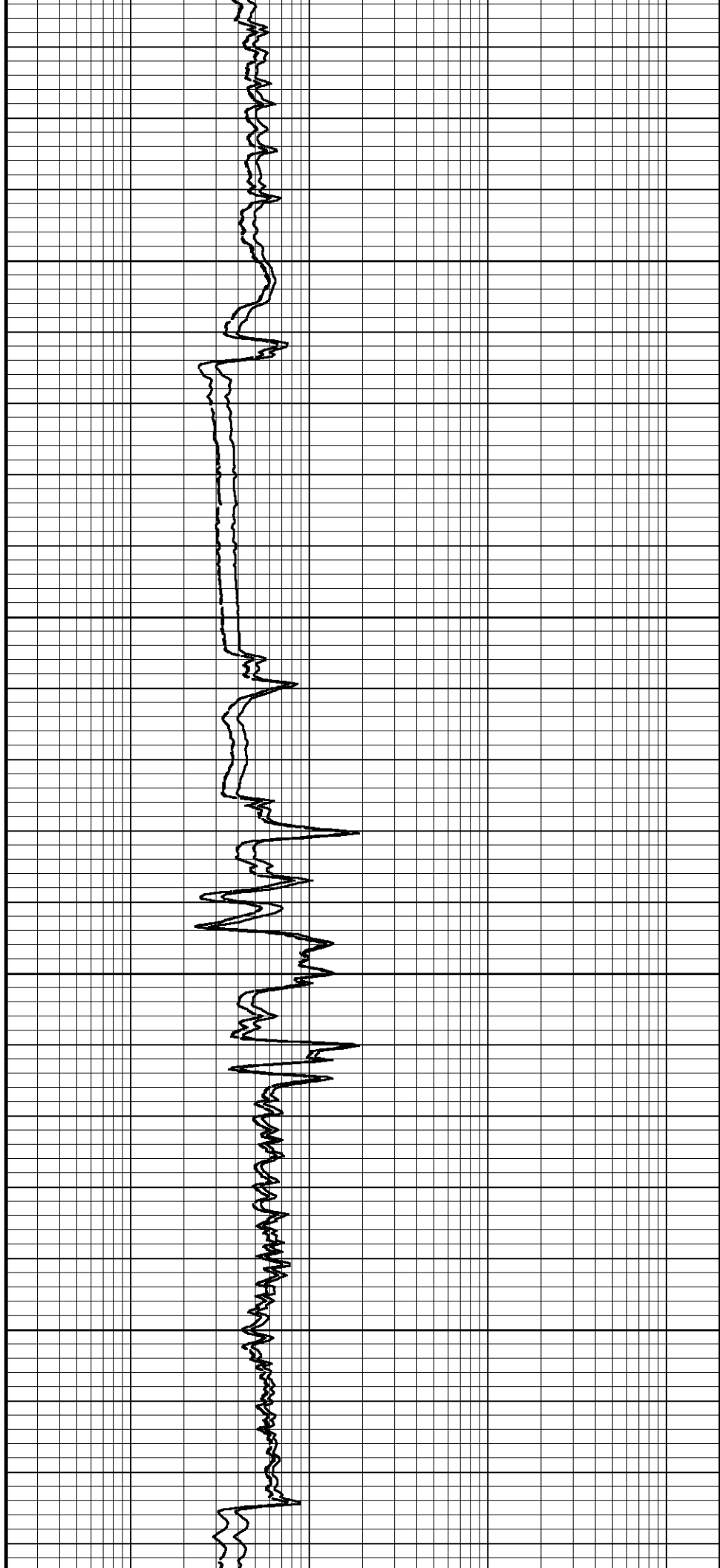
3450

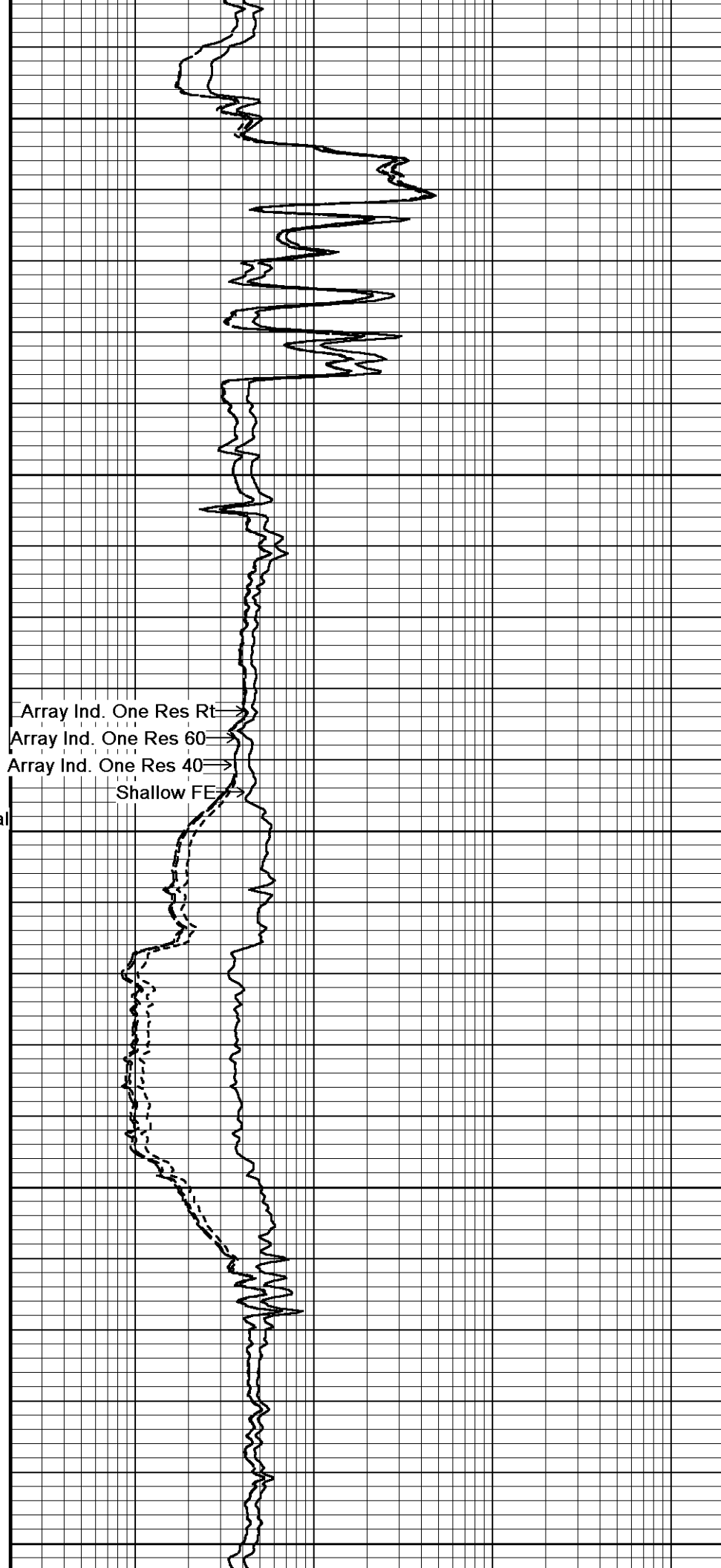
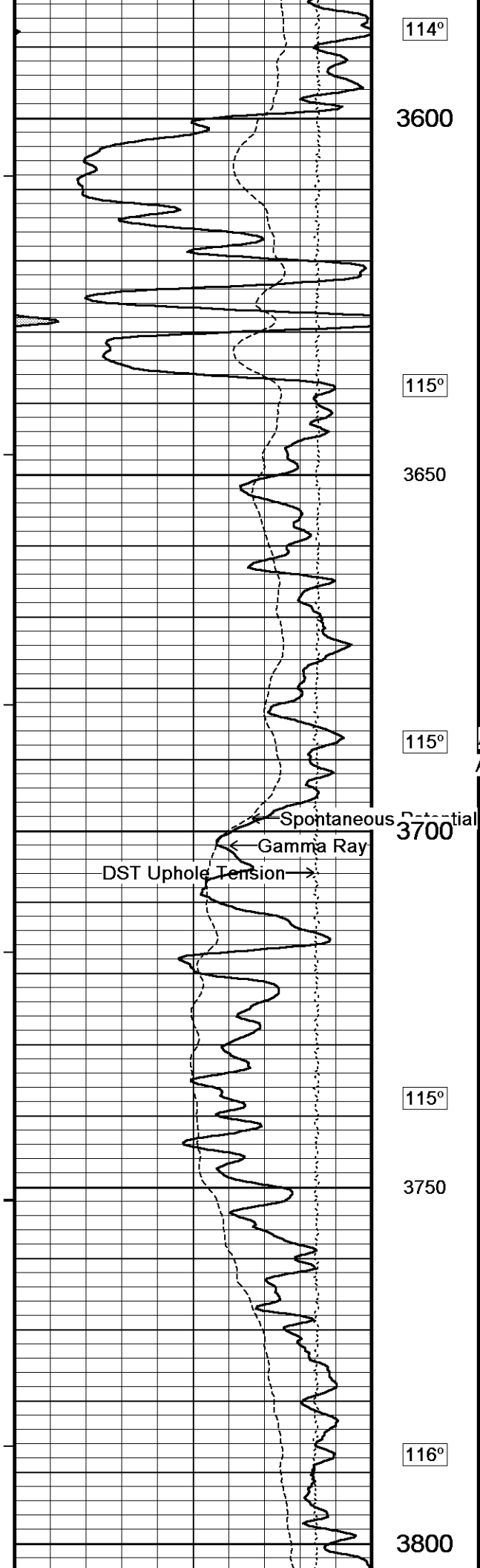
114°

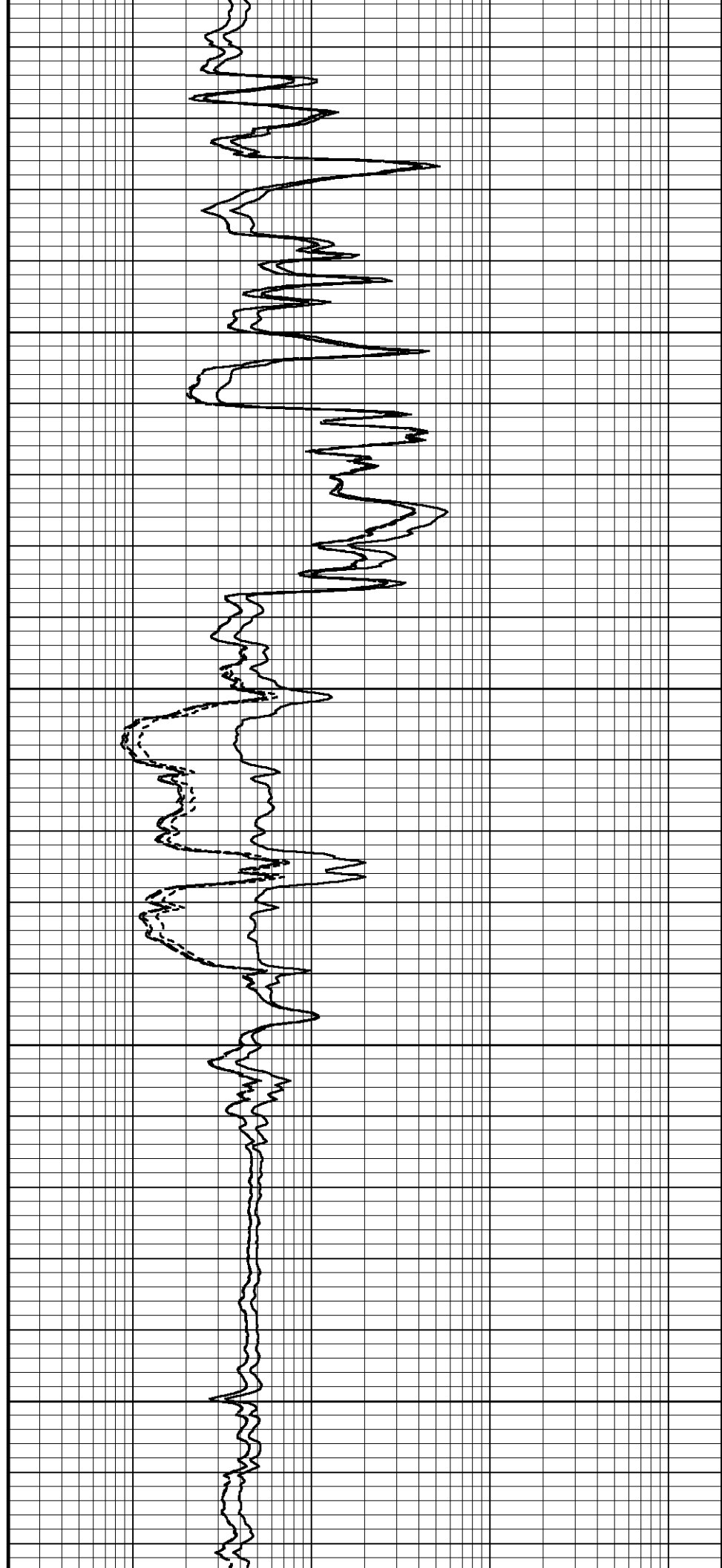
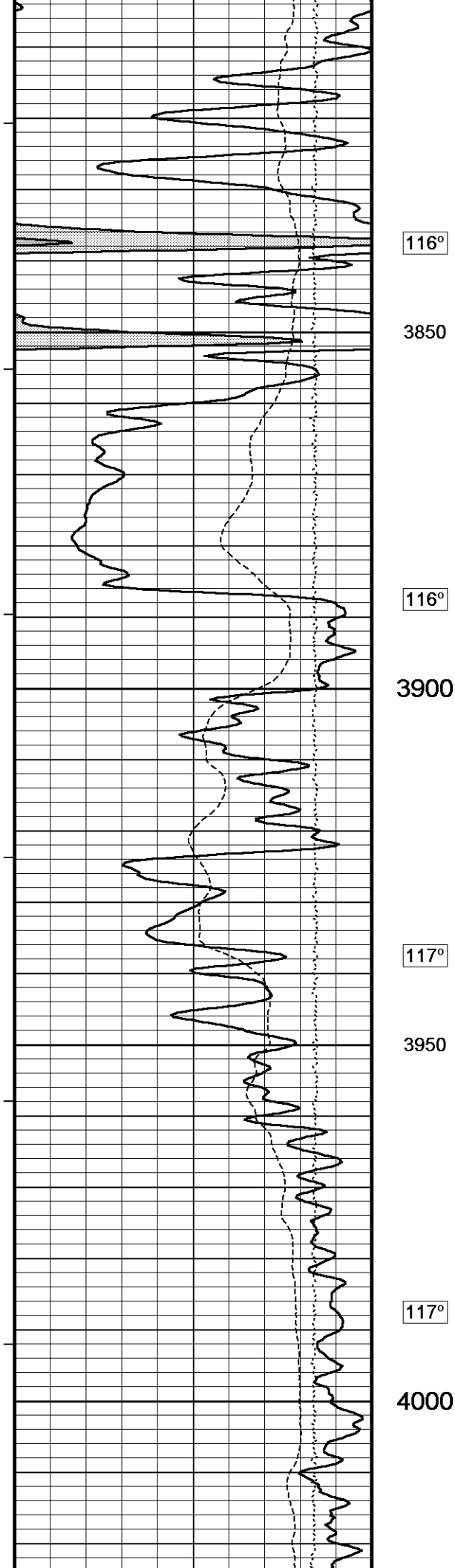
3500

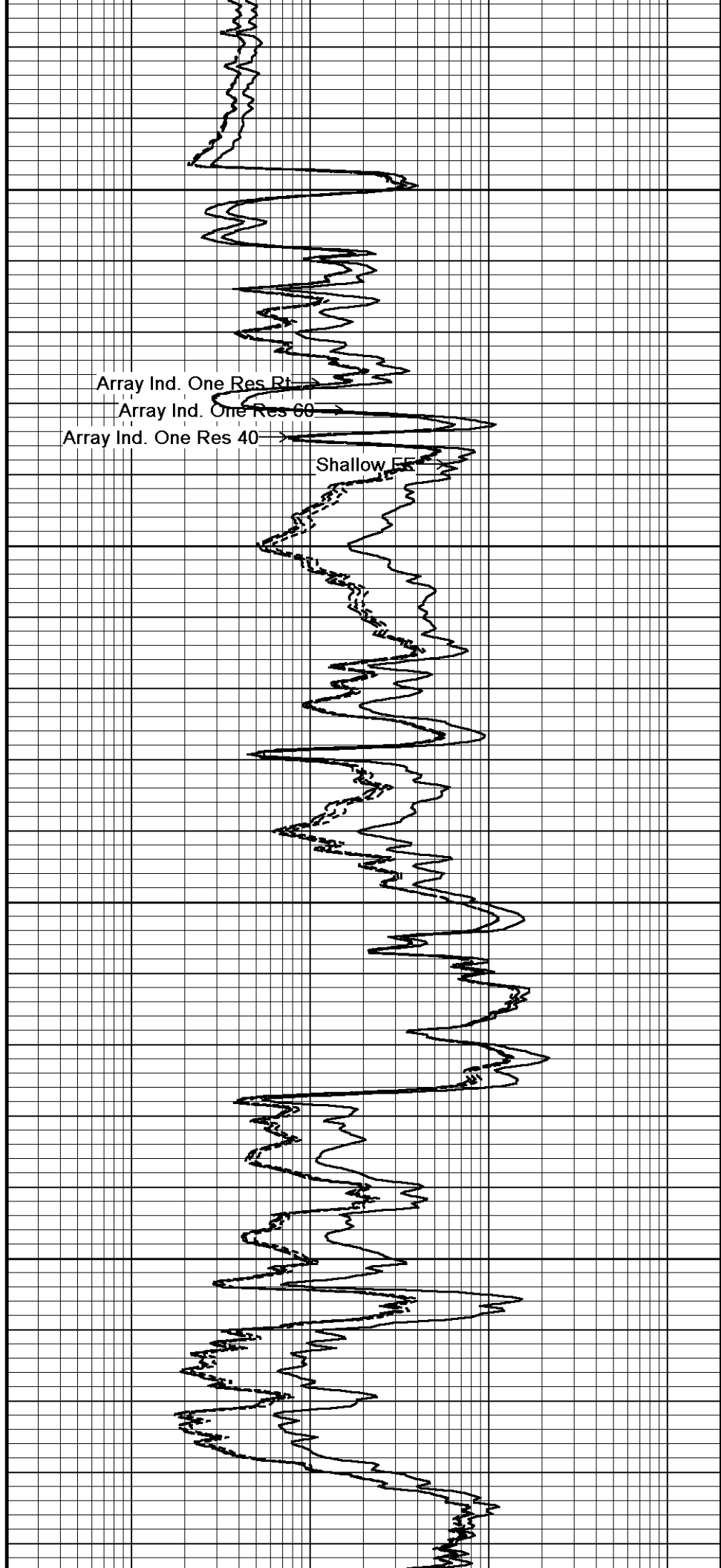
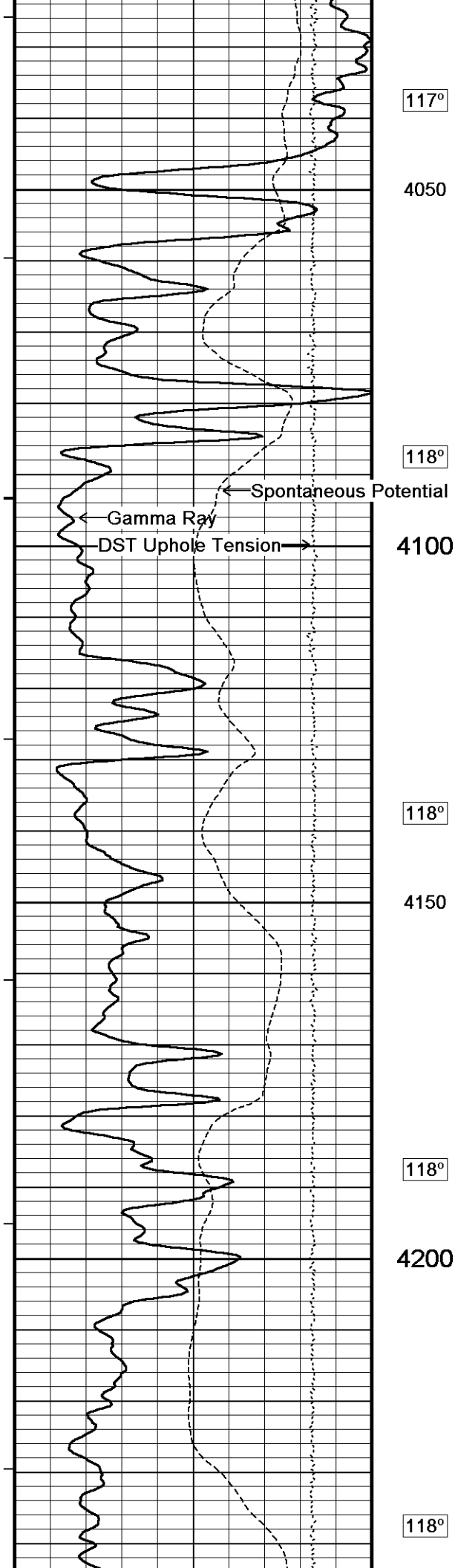
114°

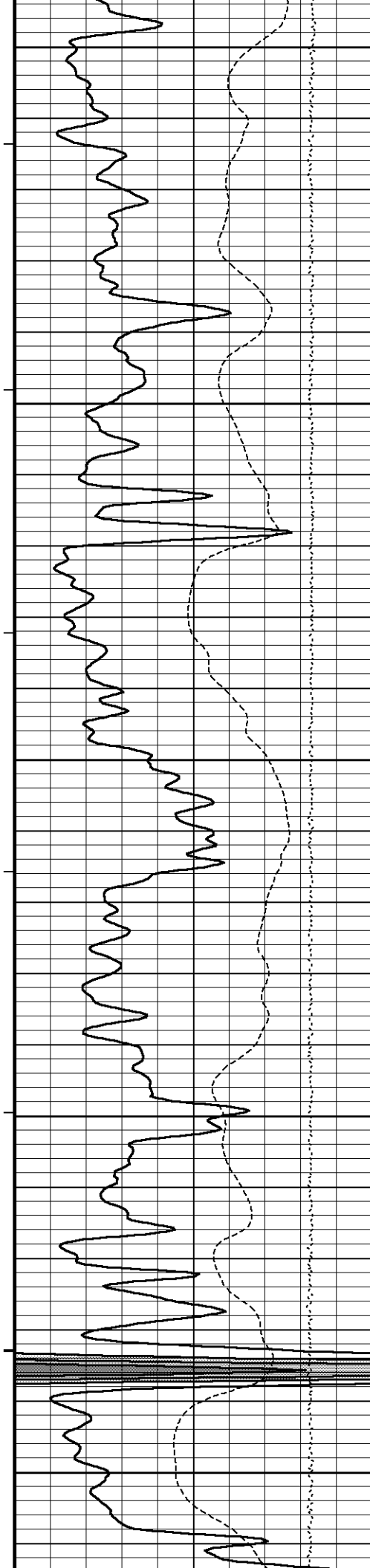
3550











4250

119°

4300

119°

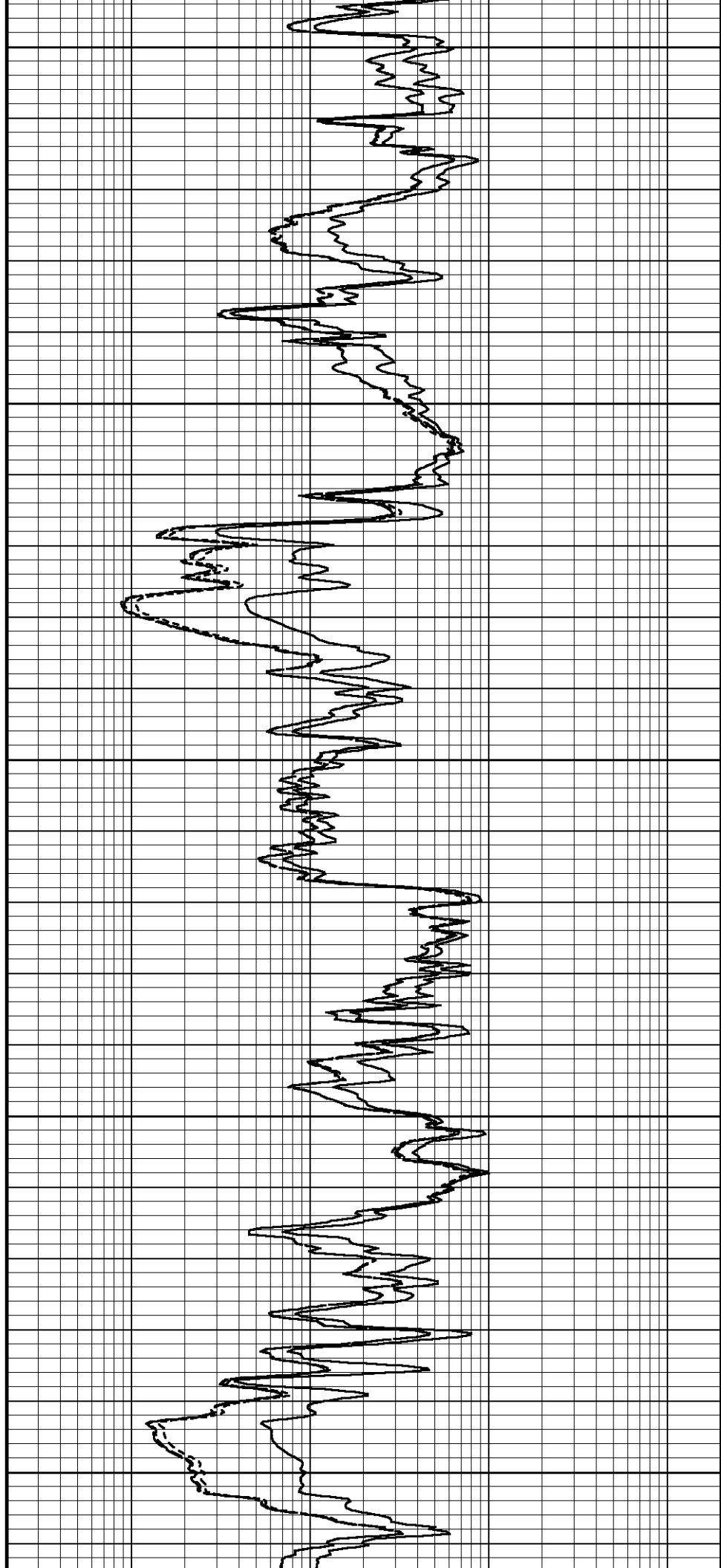
4350

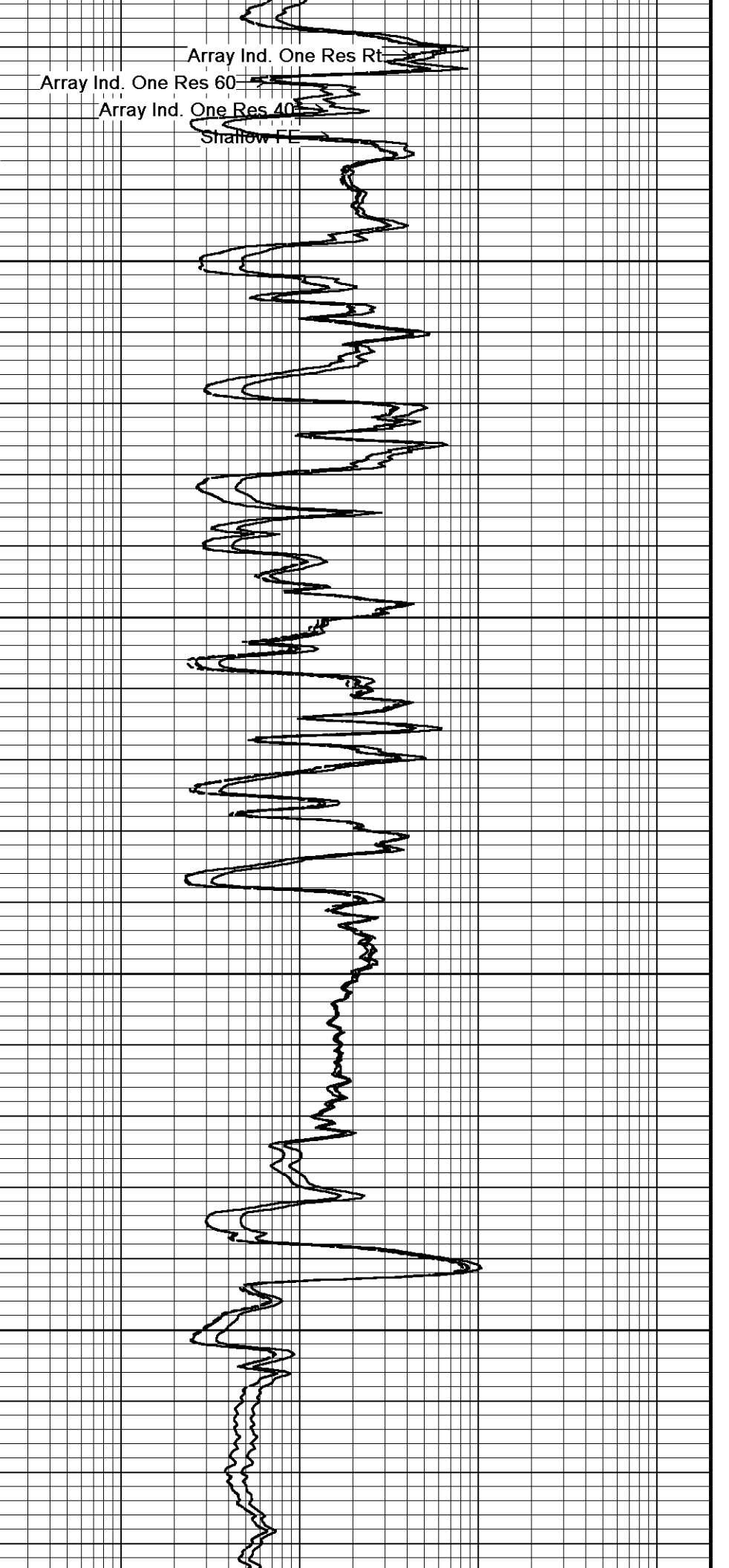
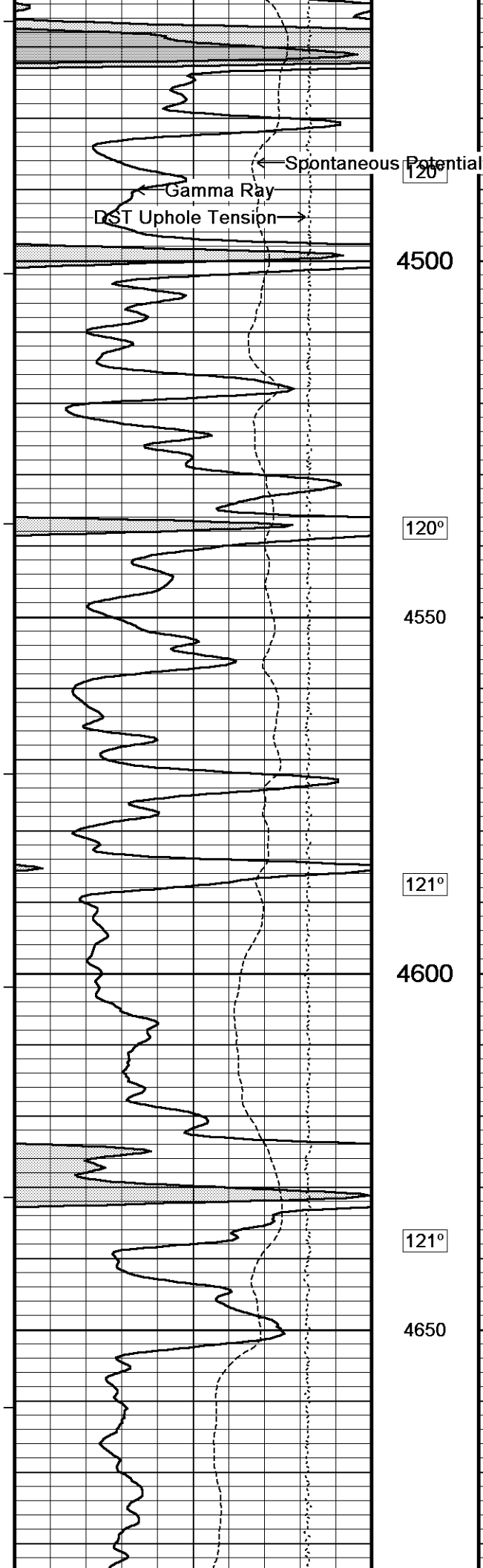
119°

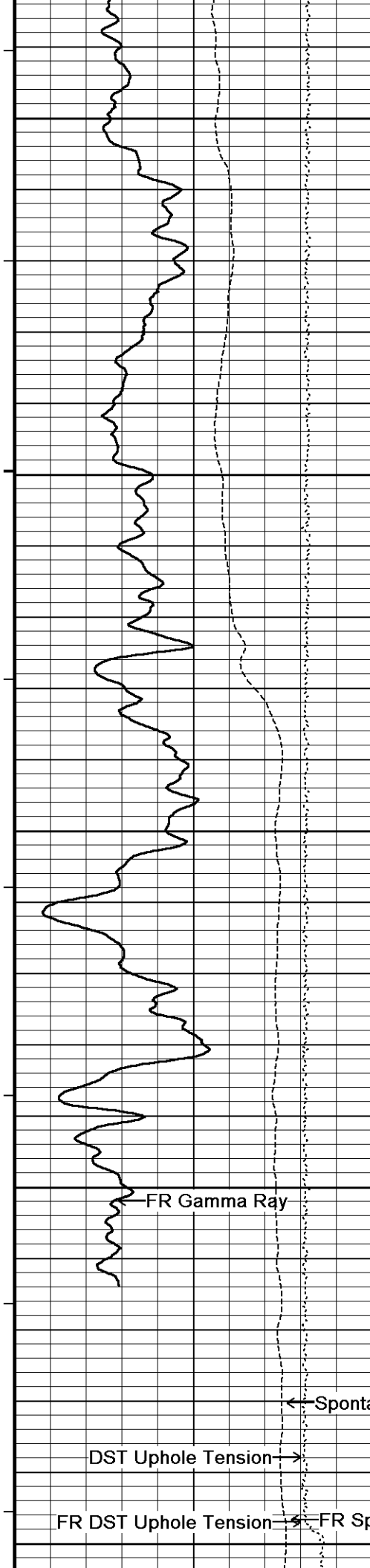
4400

119°

4450







121°

4700

121°

4750

121°

4800

121°

4850

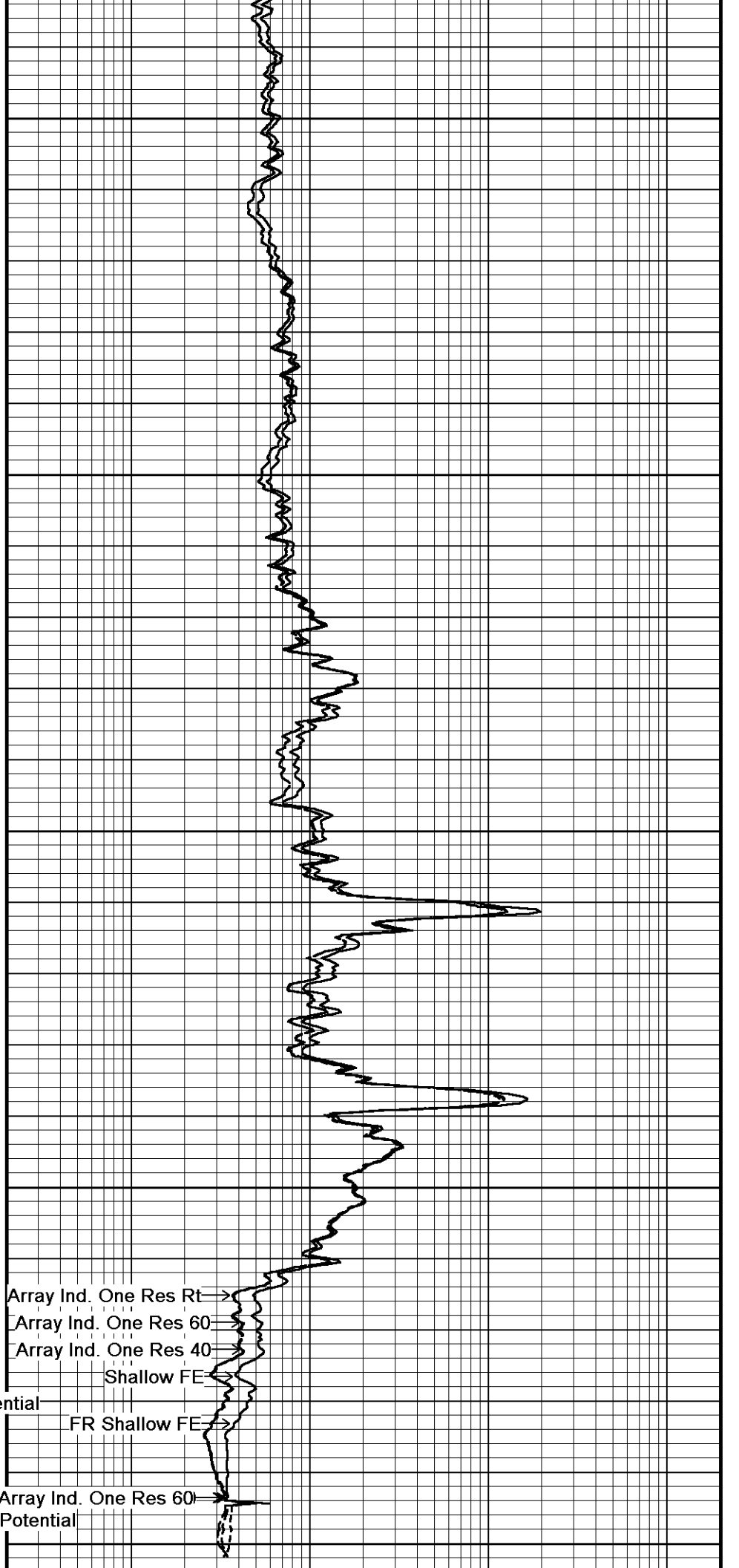
FR Gamma Ray

← Spontaneous Potential

DST Uphole Tension →

FR DST Uphole Tension ← FR Spontaneous Potential

4900



Array Ind. One Res Rt →

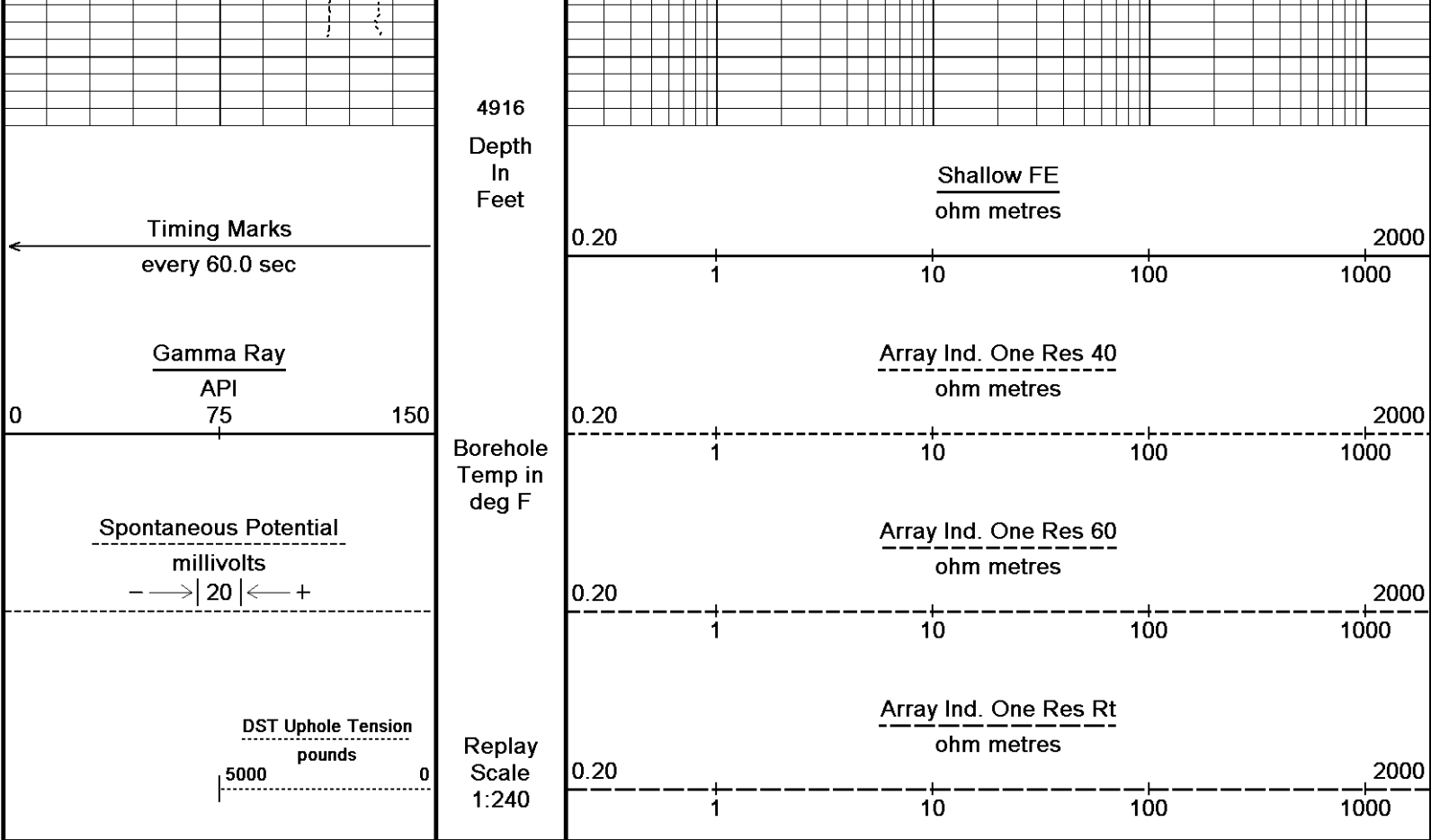
Array Ind. One Res 60 →

Array Ind. One Res 40 →

Shallow FE →

FR Shallow FE →

FR Array Ind. One Res 60 →

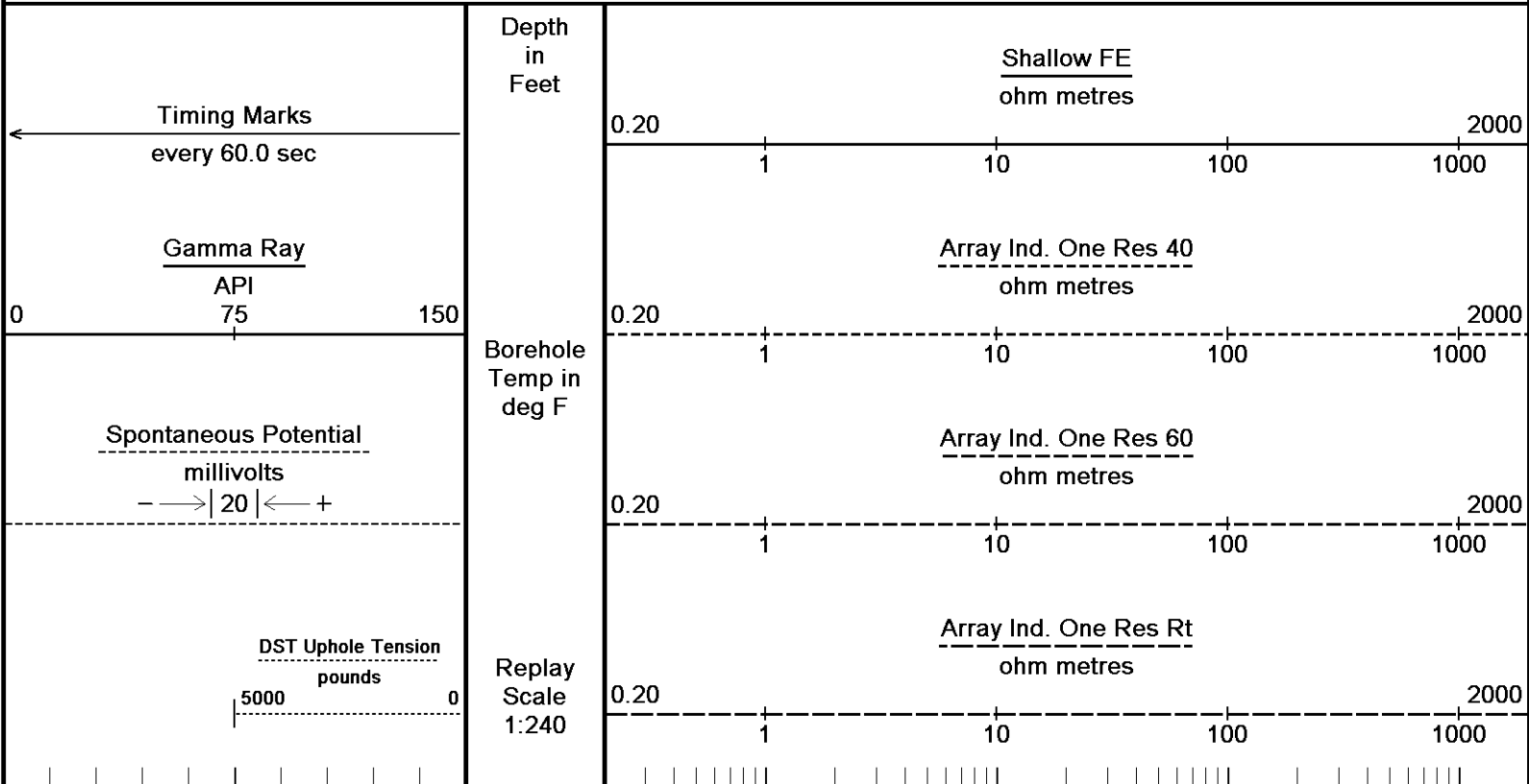


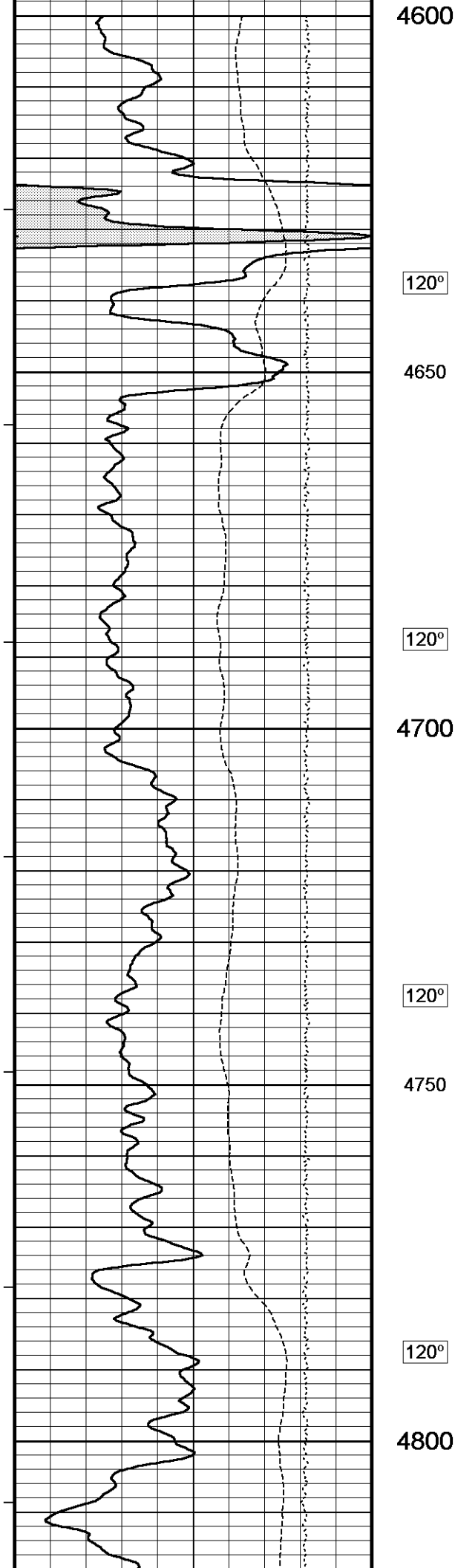
Depth Based Data - Maximum Sampling Increment 10.0cm	Plotted on 07-JUL-2011 11:48
Filename: C:\Minimus 11.02.3186\Data\M&M Z-Bar #9-14\M&M Z-Bar #9-14_002.dta	Recorded on 07-JUL-2011 09:49
System Versions: Logged with 11.02.3186 Plotted with 11.02.3186	

↑	5 INCH MAIN PASS	↑
---	------------------	---

↓	5 INCH REPEAT PASS	↓
---	--------------------	---

Depth Based Data - Maximum Sampling Increment 10.0cm	Plotted on 07-JUL-2011 11:48
Filename: C:\Minimus 11.02.3186\Data\M&M Z-Bar #9-14\M&M Z-Bar #9-14_001.dta	Recorded on 07-JUL-2011 09:29
System Versions: Logged with 11.02.3186 Plotted with 11.02.3186	





4600

120°

4650

120°

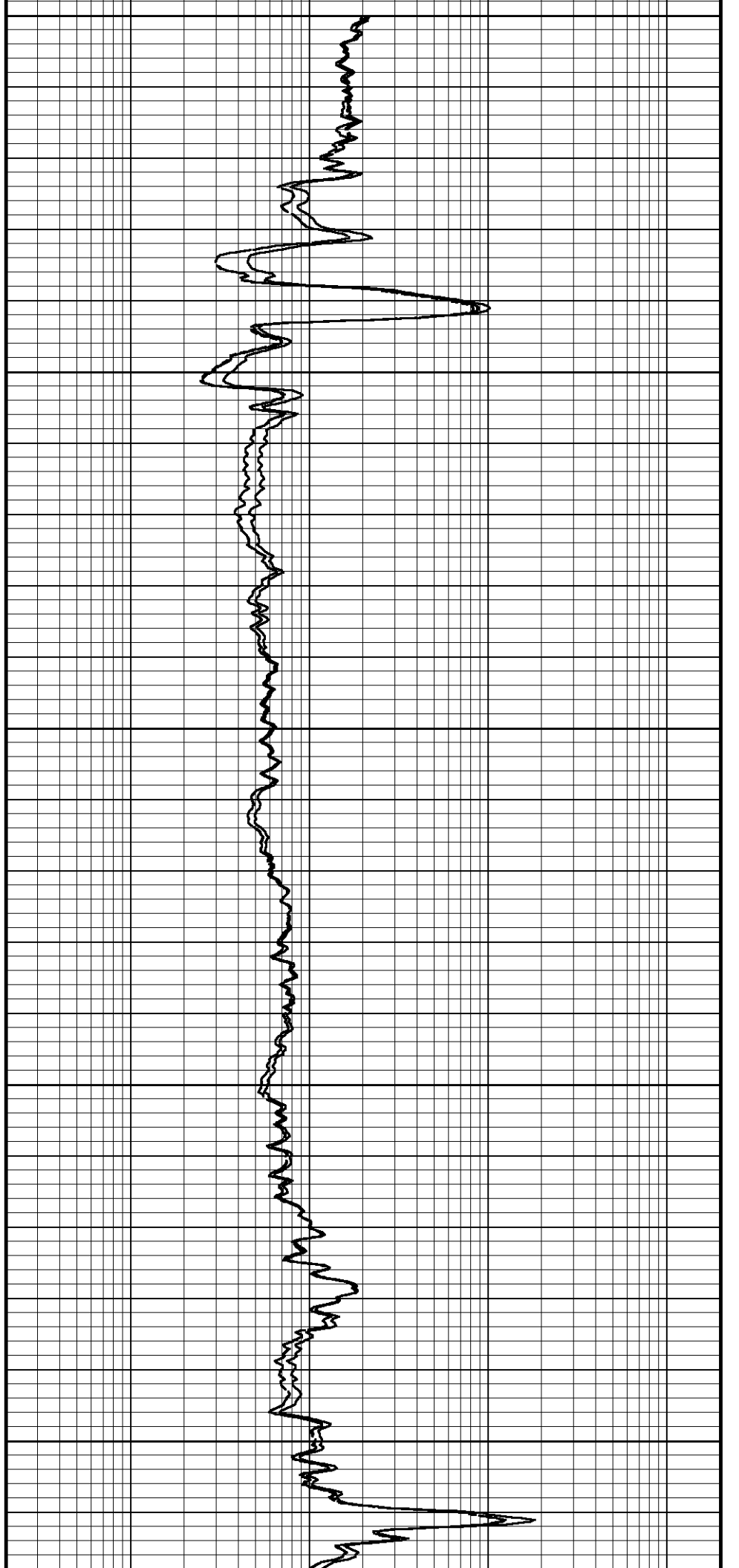
4700

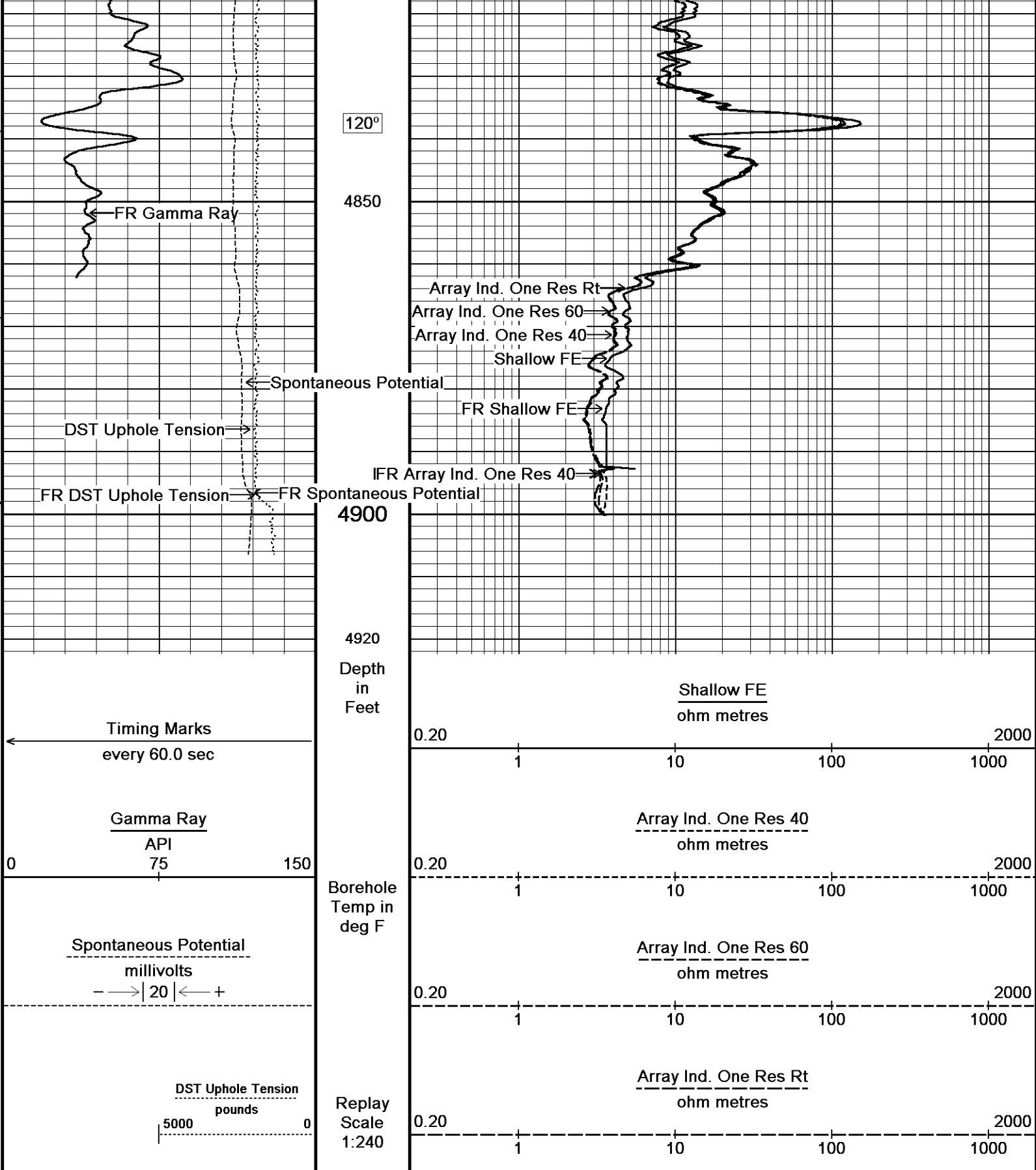
120°

4750

120°

4800





Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 11.02.3186\Data\M&M Z-Bar #9-14\M&M Z-Bar #9-14_001.dta
System Versions: Logged with 11.02.3186 Plotted with 11.02.3186

Plotted on 07-JUL-2011 11:48
Recorded on 07-JUL-2011 09:29

↑ 5 INCH REPEAT PASS ↑

BEFORE SURVEY CALIBRATION
C:\Minimus 11.02.3186\Data\M&M Z-Bar #9-14\M&M Z-Bar #9-14_002.dta

General Parameters

Mud Resistivity	0.560	ohm-metres
Mud Resistivity Temperature	92.000	degrees F
Water Level	0.000	feet
Density/Neutron 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	Base Density Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

Down-hole Tension Calibration SMS 0

Field Calibration on 05-JUN-2011 04:37

Reading No	Measured	Calibrated (lbs)
1	13499.89	0.00
2	14983.70	496.00

High Resolution Temperature Calibration MCG-B 34

Field Calibration on 05-MAR-2011,23:56

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

High Resolution Temperature Constants MCG-B 34

Last Edited on

Pre-filter Length	11
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SP Calibration MCG-B 34

Field Calibration on 20-APR-2011 14:53

	Measured	Calibrated (mV)
Reference 1	106.7	100.0
Reference 2	-95.0	-100.0

Gamma Calibration MCG-B 34

Field Calibration on 07-JUL-2011 02:24

	Measured	Calibrated (API)
Background	66	45
Calibrator (Gross)	1116	770
Calibrator (Net)	1050	725

Gamma Constants MCG-B 34

Last Edited on 07-JUL-2011,06:30

Gamma Calibrator Number	grc38	
Mud Density	1.08	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

Micro Normal and Micro Inverse Calibration MML-A 4

Base Calibration on 16-MAY-2011 09:23

Field Check on 07-JUL-2011 02:10

Base Calibration

		Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2	
Micro Normal	12.1	60.1	2.6	12.8	
Micro Inverse	15.6	78.3	1.7	8.4	

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	32.2	32.2
Micro Inverse	16.3	16.3

Micro Normal and Micro Inverse Constants MML-A 4

Last Edited on 07-JUL-2011,06:31

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 MML-A 4		Base Calibration on 16-MAY-2011 09:38 Field Calibration on 07-JUL-2011 02:11
Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	14953	5.98
2	18280	7.97
3	21656	9.86
4	25588	11.92
5	0	0.00
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	6.04	5.98

Neutron Calibration MDN-A.B 65		Base Calibration on 02-JUL-2011 23:27 Field Check on 07-JUL-2011 02:18
Base Calibration		
	Measured	Calibrated (cps)
	Near Far	Near Far
	3269 103	3714 110
Ratio	31.795	33.764
Field Calibrator at Base		
		Calibrated (cps)
		1562 2227
Ratio		0.701
Field Check		
		Calibrated (cps)
		1579 2250
Ratio		0.702

Neutron Constants MDN-A.B 65		Last Edited on 07-JUL-2011,06:30
Neutron Source Id	757	
Neutron Jig Number	5824NE	
Epithermal Neutron	No	
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	MCG External Temperature	
Temperature	N/A	degrees F
Mud Salinity	0.00	kppm
Formation Fluid Salinity Source	Constant Value	
Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-A.A 55		Base Calibration on 21-JUN-2011 10:19 Field Check on 07-JUL-2011 02:02
Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	953.6	126.8
Base Check		
		281.3
Field Check		
		281.3

FE Constants MFE-A.A 55		Last Edited on 07-JUL-2011,06:31
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	

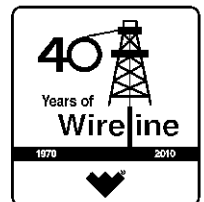
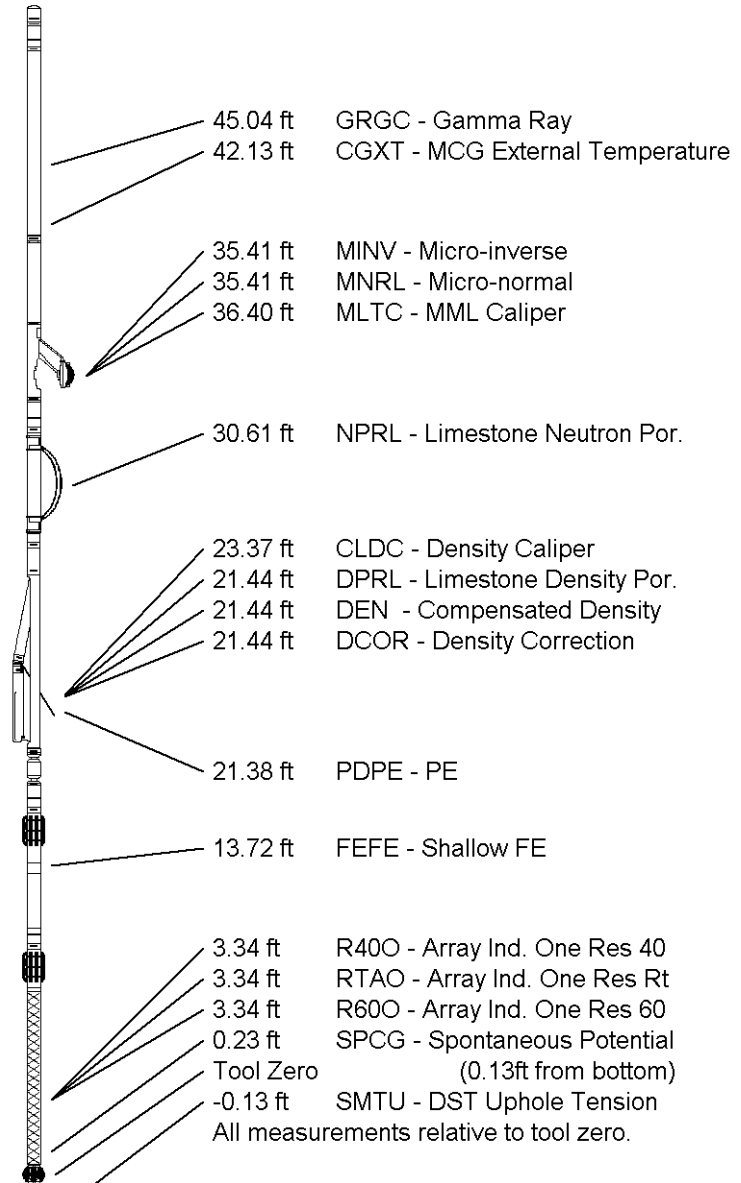
Temp. for Rm Corr.	MCG External Temperature	0.5	inches	
Stand-off				
High Resolution Temperature Calibration MAI-A.A 45			Field Calibration on 13-AUG-2010,13:31	
	Measured	Calibrated(Deg F)		
Lower	50.00	50.00		
Upper	100.00	100.00		
High Resolution Temperature Constants MAI-A.A 45			Last Edited on	
Pre-filter Length	11			
Induction Calibration MAI-A.A 45			Base Calibration on 13-AUG-2010,13:32 Field Check on 07-JUL-2011 02:00	
Base Calibration				
Test Loop Calibration		Measured	Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	14.5	473.5	9.3	966.2
2	5.2	373.4	7.6	821.4
3	2.8	260.6	5.2	566.0
4	1.6	132.2	2.6	279.2
Array Temperature	86.2	Deg F		
Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	19.7	3845.9
2	0.0	0.0	33.0	3631.9
3	0.0	0.0	30.0	3050.5
4	0.0	0.0	20.4	2094.0
Deep	0.0	0.0	18.0	1920.7
Medium	0.0	0.0	43.2	4051.1
Shallow	0.0	0.0	50.2	5475.8
Array Temperature	0.0		88.4	Deg F
Induction Constants MAI-A.A 45			Last Edited on 07-JUL-2011,01:50	
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		0.50	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		
Porosity of Water for Apor	0.25			

Caliper Calibration MPD-B 65		Base Calibration on 01-JUL-2011 18:46 Field Calibration on 07-JUL-2011 02:03	
Base Calibration			
Reading No	Measured	Calibrator Size (in)	
1	13710	3.99	
2	22224	5.98	
3	30784	7.97	
4	39184	9.86	
5	48352	11.92	
6	N/A	N/A	
Field Calibration			
	Measured Caliper (in)	Actual Caliper (in)	
	5.97	5.98	

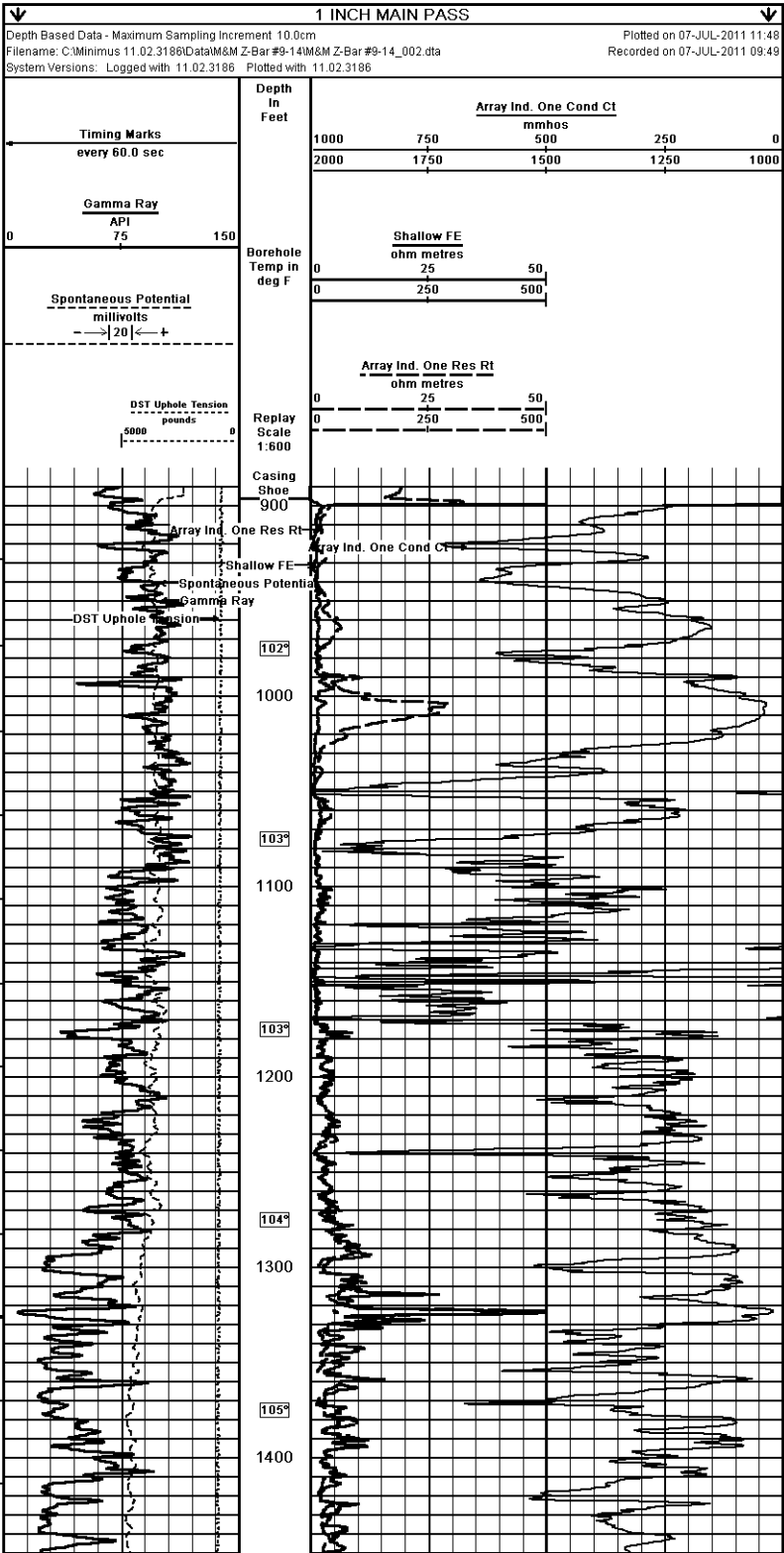
Photo Density Calibration MPD-B 65				Base Calibration on 02-JUL-2011 22:55	
Density Calibration				Field Check on 07-JUL-2011 02:09	
Base Calibration		Measured		Calibrated (sdu)	
		Near	Far	Near	Far
Reference 1		50829	24574	59556	30836
Reference 2		20710	2286	24941	2541
Field Check at Base					
		1245.3	1199.3		
Field Check					
		1245.0	1197.7		
PE Calibration					
Base Calibration		Measured		Calibrated	
	WS	WH	Ratio	Ratio	
Background	226	1107			
Reference 1	19076	50633	0.381	0.371	
Reference 2	5565	20564	0.274	0.272	
Field Check at Base					
	225.7	1107.0			
Field Check					
	226.6	1109.6			

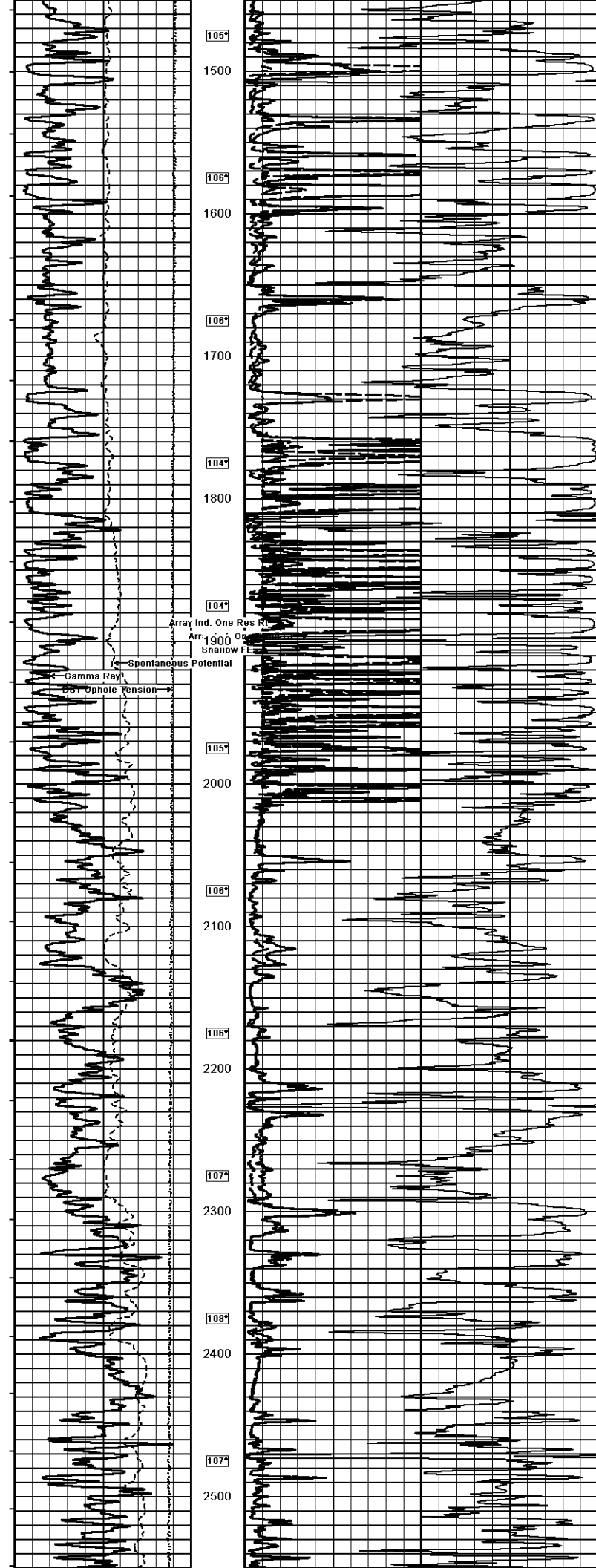
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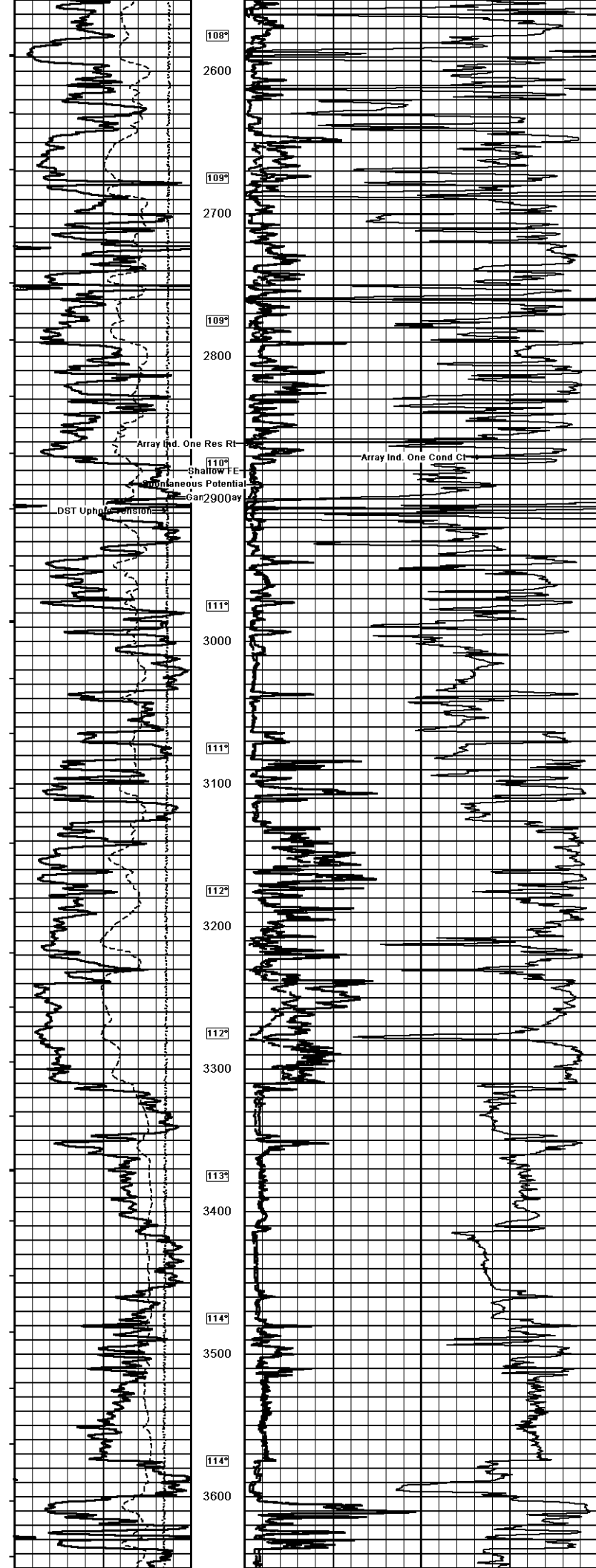
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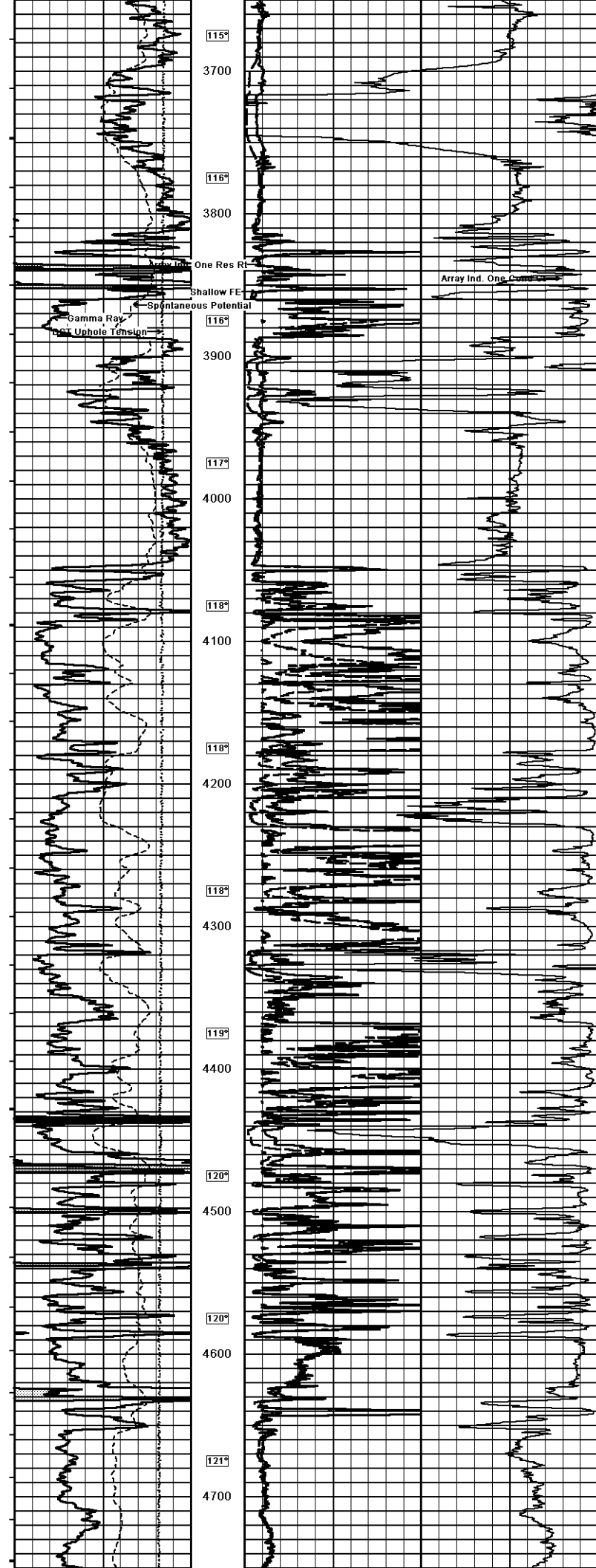


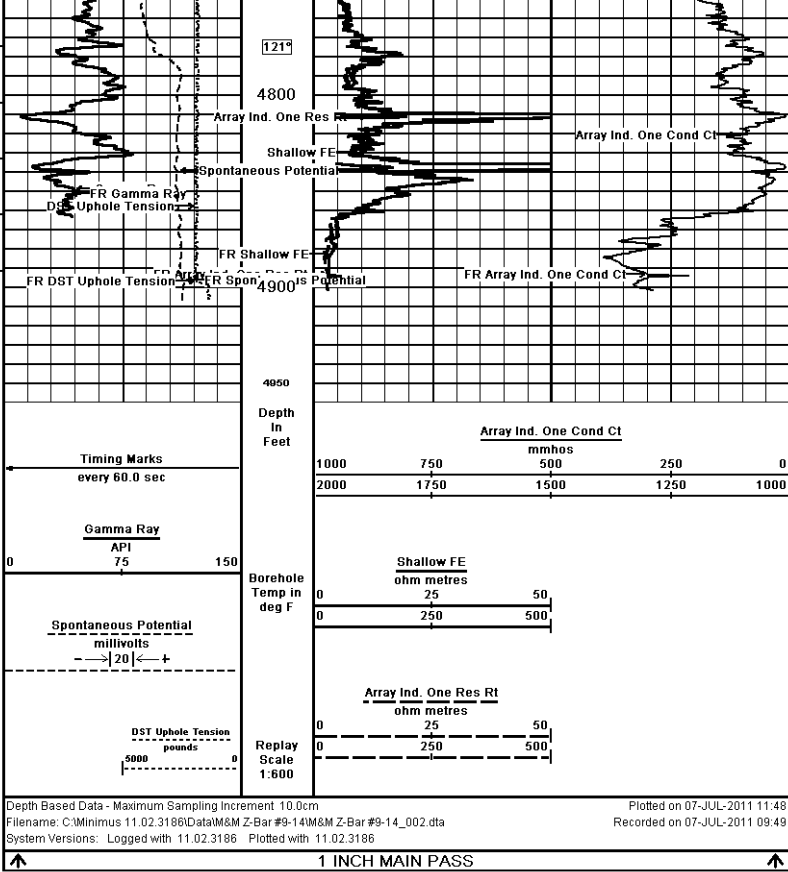
Weatherford		ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG	
M & M EXPLORATION, INC. Z-BAR #9-14 AETNA GAS AREA BARBER U.S.A. / KANSAS 6601 FSL & 19801 FWL		40 ft Wireline	
TYPE	3AS	FE	Other Services
FE	14W	MML	NOUWPD
DATE	15-07-2010	TIME	
Well Datum: O.L. Elevation: 1549 feet Measured From: K.B. @ 12 FEET above Permanent Datum Measured From: K.B.			
07-JUL-2011		Borehole: KB CP OL	
Number	ONE	Feet	
Miller	4900.00	Feet	
2000	4897.00	Feet	
4000	4894.00	Feet	
6000	8986.00	Feet	
8000	9000.00	Feet	
9000	8986.00	Feet	
9000	7.875	Inches	
ID Type	CHEMICAL	55.00	CP
Viscosity	9.00	lb/100	
Flow Rate	9.00	10.40	m3/min
Source	FLUOWLINE	0.56 @ 92.0	0.00-m
Measured Temp	0.45 @ 92.0	0.00-m	
HT	0.67 @ 92.0	0.00-m	
HT	0.43 @ 21.0	0.00-m	
HT	4.1000	deg F	
HT	121.00	deg F	
HT	COMPACT	LIB	
HT	R. HOFFMAN		
HT	BETH BROCK		
HT	3531102		
HT	LB11-156		











COMPANY	M & M EXPLORATION, INC.				
WELL	Z-BAR #9-14				
FIELD	AETNA GAS AREA				
PROVINCE/COUNTY	BARBER				
COUNTRY/STATE	U.S.A. / KANSAS				
Elevation Kelly Bushing	1561.00	feet	First Reading	4894.00	feet
Elevation Drill Floor	1559.00	feet	Depth Driller	4900.00	feet
Elevation Ground Level	1549.00	feet	Depth Logger	4897.00	feet
			ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG		
					