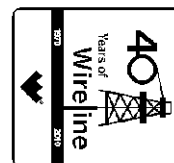




Weatherford

ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

COMPANY **M&M EXPLORATION, INC**
WELL **Z BAR 16-4 SWD**
FIELD **AETNA NE**
PROVINCE/COUNTY **BARBER**
COUNTRY/STATE **U.S.A. / KANSAS**
LOCATION **400' FNL & 530' FWL**
NW/4



SEC	TWP	RGE	Other Services	
16	34S	14W	MPD/MDN	
API Number	15-007-23843	MML		
Permit Number				
Permanent Datum G.L., Elevation 1559 feet				
Log Measured From KB				Elevations: KB 1571.00
Drilling Measured From K.B.				DF 1569.00
				GL 1559.00
Date	06-MAY-2012			
Run Number	ONE			
Depth Driller	5330.00	feet		
Depth Logger	5327.00	feet		
First Reading	5324.00	feet		
Last Reading	917.00	feet		
Casing Driller	916.00	feet		
Casing Logger	917.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	8.80 lb/USg	48.00 CP		
PH / Fluid Loss	9.00	10.80 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	1.02 @ 73.0	ohm-m		
Rmf @ Measured Temp	0.82 @ 73.0	ohm-m		
Rmc @ Measured Temp	1.22 @ 73.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.61 @125.0	ohm-m		
Time Since Circulation	4 HOURS			
Max Recorded Temp	125.00	deg F		
Equipment Name	COMPACT			
Equipment / Base	13096	LIB		
Recorded By	F. MARTINS			
Witnessed By	B. BROCK			
S.O. / JOB #	3534534			LB12-114

BOREHOLE RECORD

Last Edited: 06-MAY-2012 14:02

Bit Size inches	Depth From feet	Depth To feet
7.875	917.00	5327.00

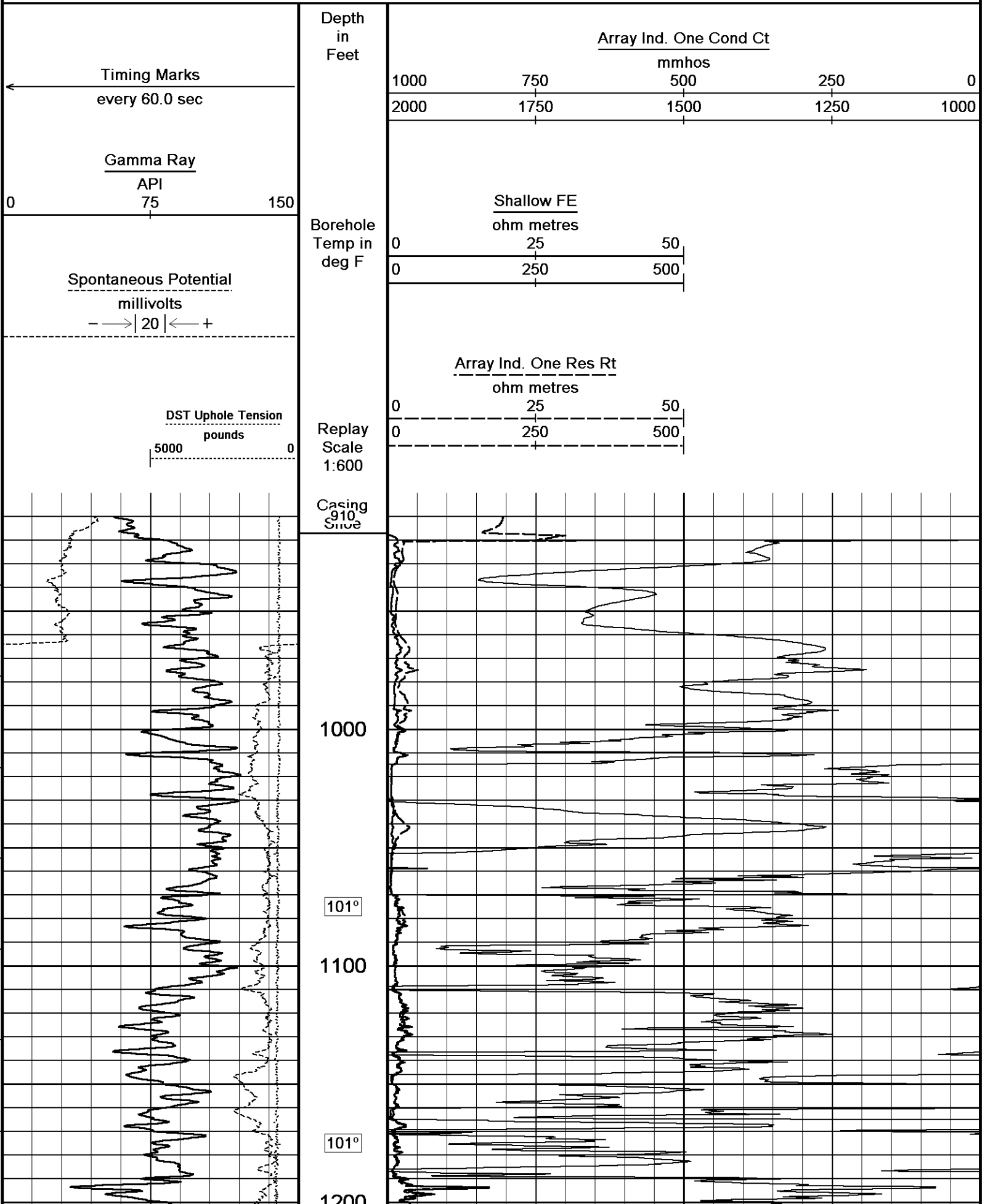
CASING RECORD

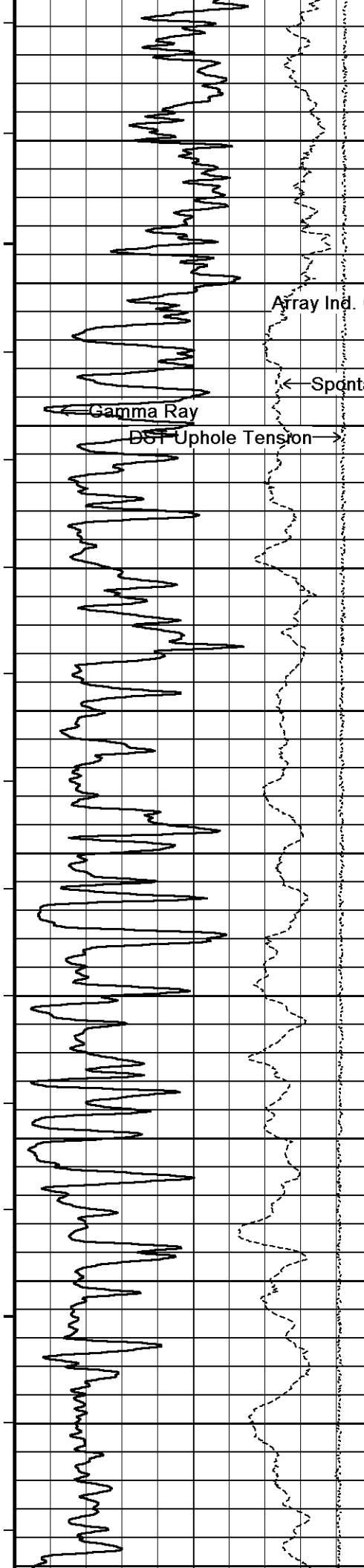
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	917.00	24.00

REMARKS

Tools Used: MPD, MCG, MDN, MFE, MAI, MML.
Hardware: MPD: 8 inch profile plate used. MAI and MFE: 0.5 Inch standoffs used. MDN: Dual Bowspring used.
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.
Annular volume with 5.5 inch production casing = 280 cu. ft
Service Order #3534534
Rig: Southwind # 70
Engineer: F.Martins
Operator(s): K. Rinehart

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
102°
1300
102°
1400
102°
1500
103°
1600
103°
1700

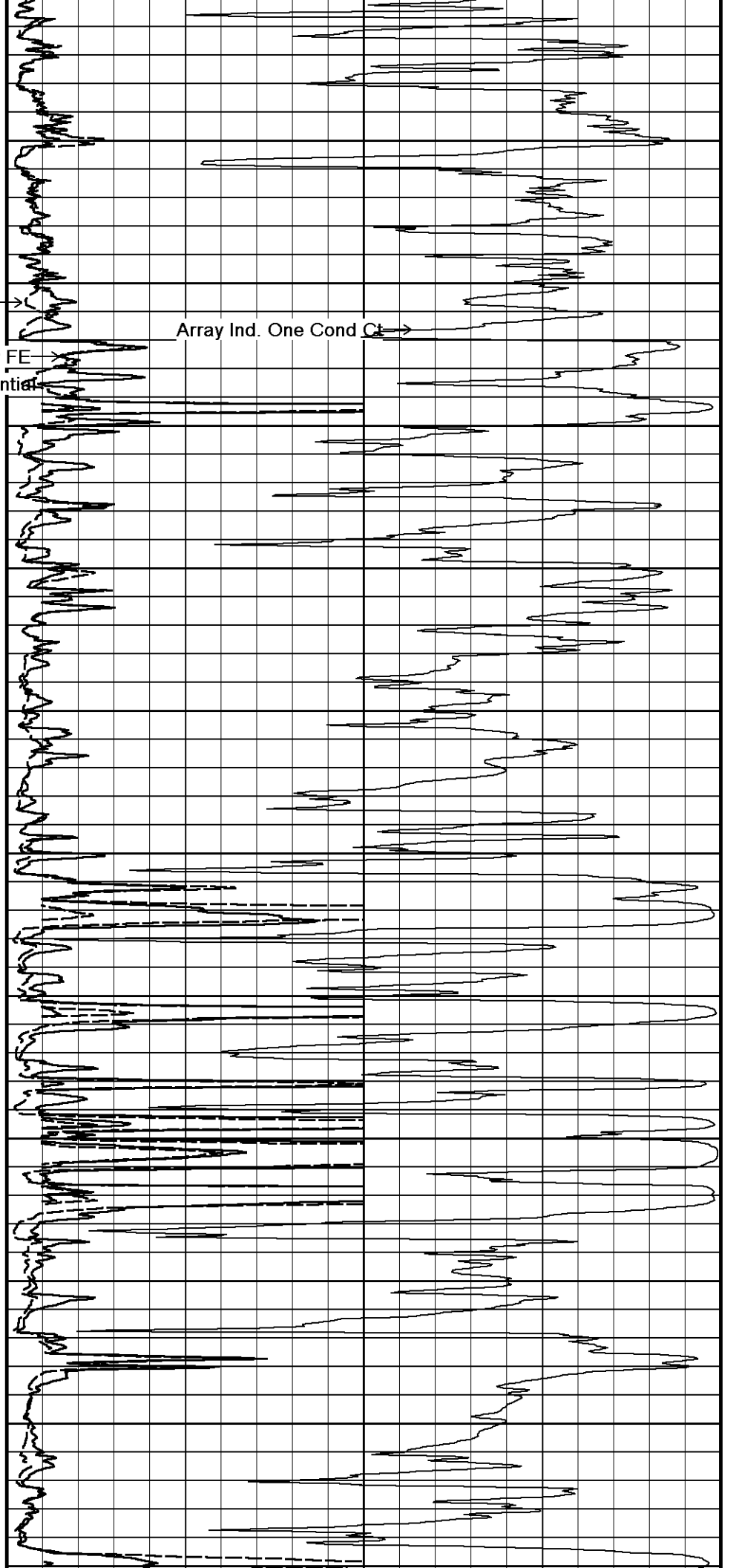
Array Ind. One Res Rt

Shallow FE

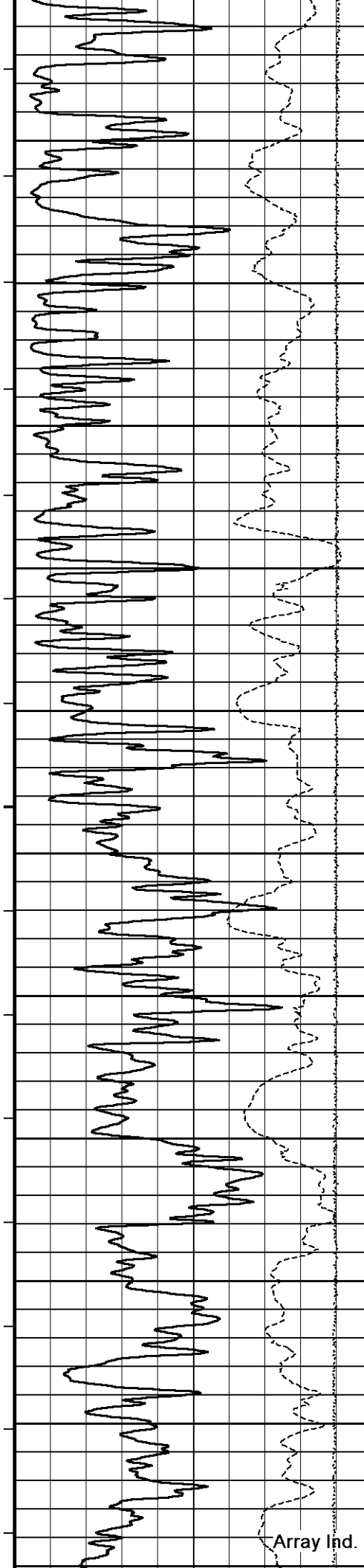
Spontaneous Potential

Gamma Ray

DST Uphole Tension



Array Ind. One Cond Ct



Array Ind. One Res Rt

102°

1800

102°

1900

103°

2000

104°

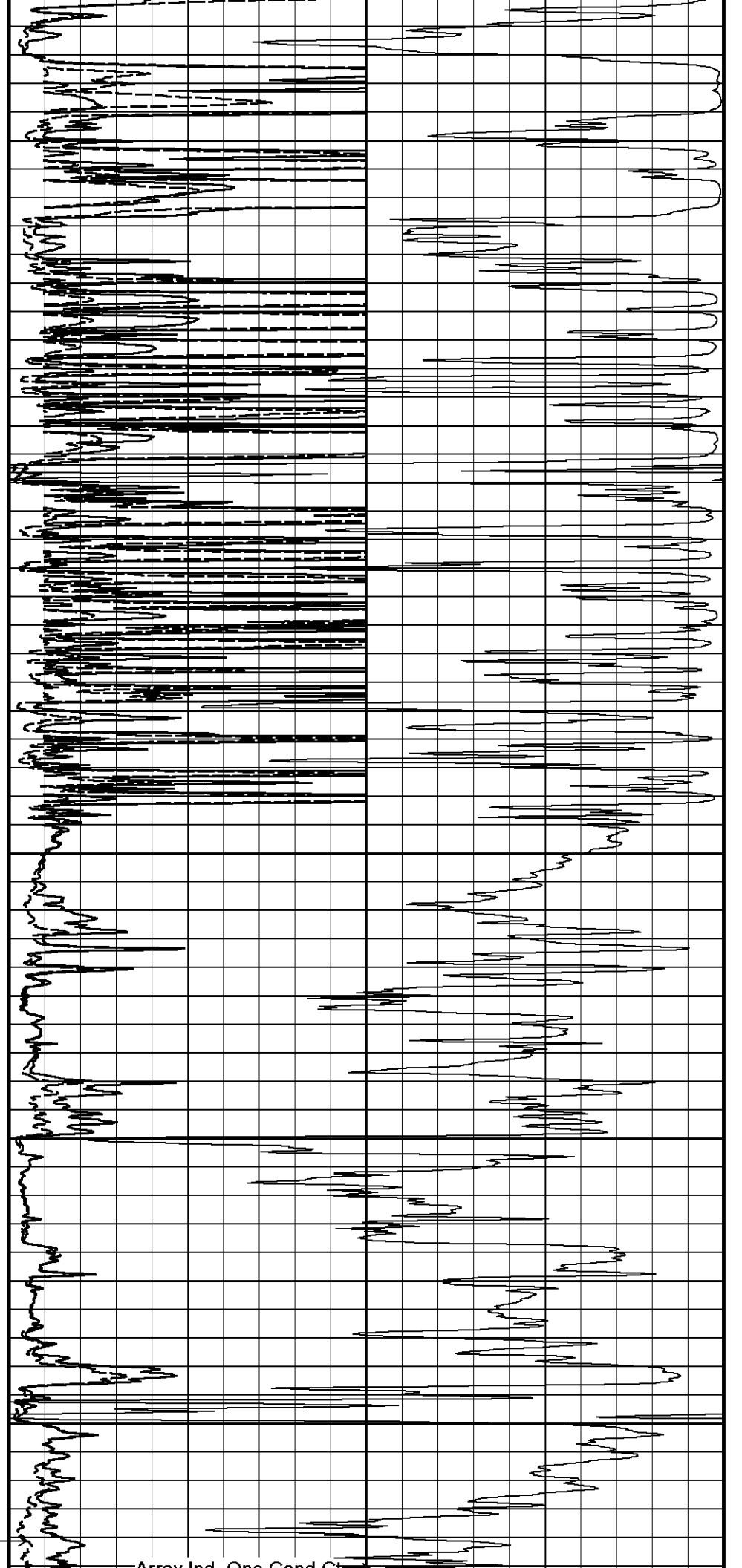
2100

105°

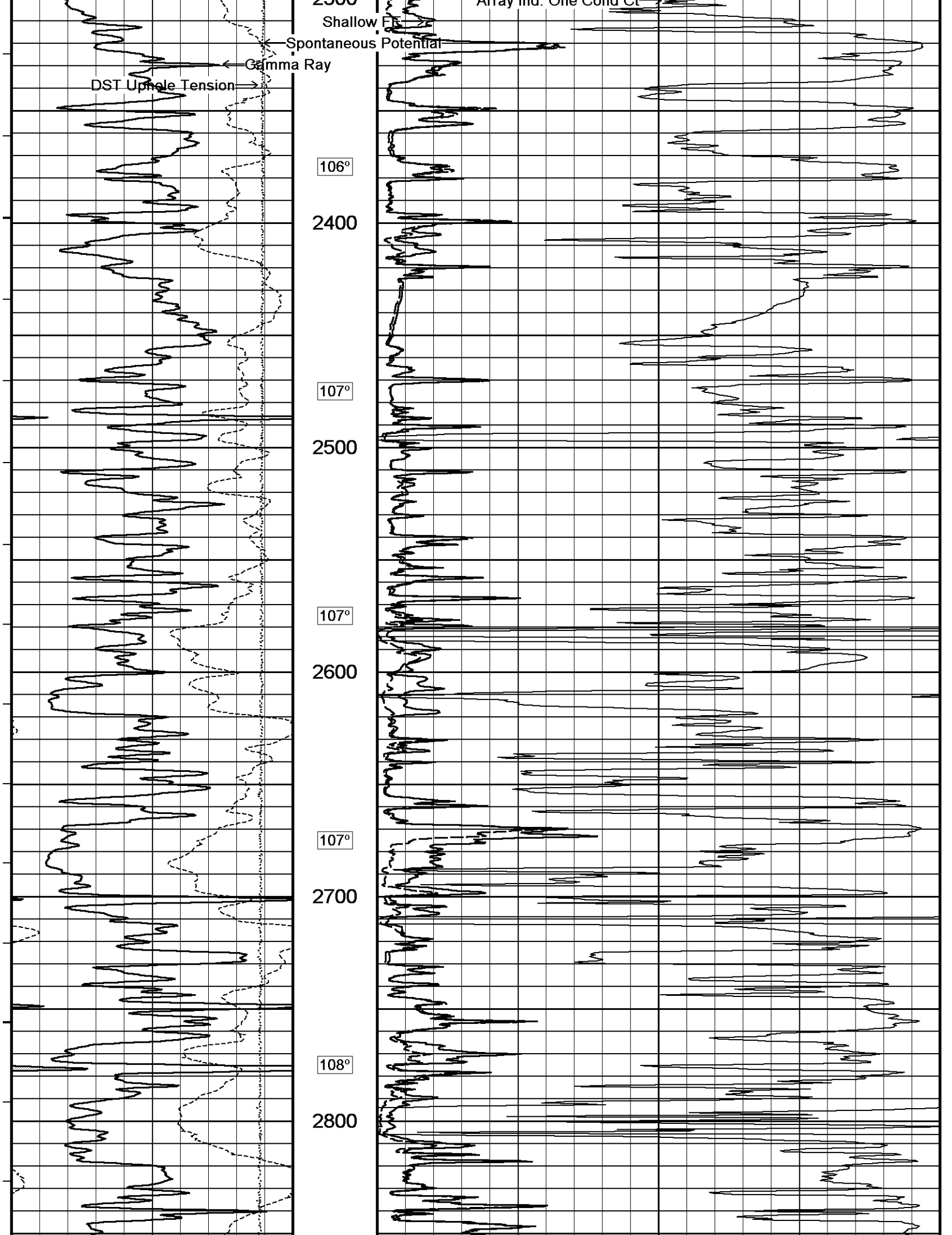
2200

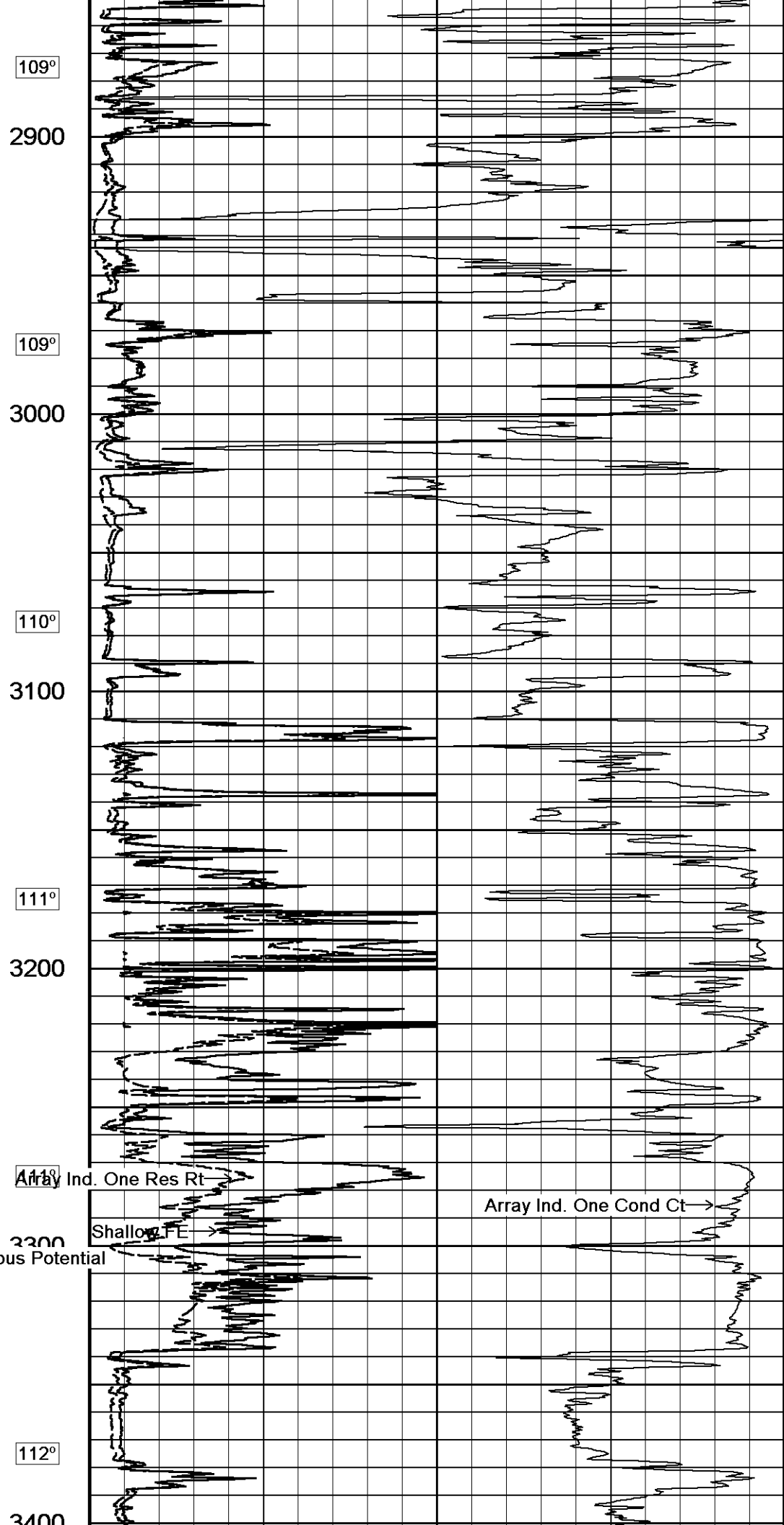
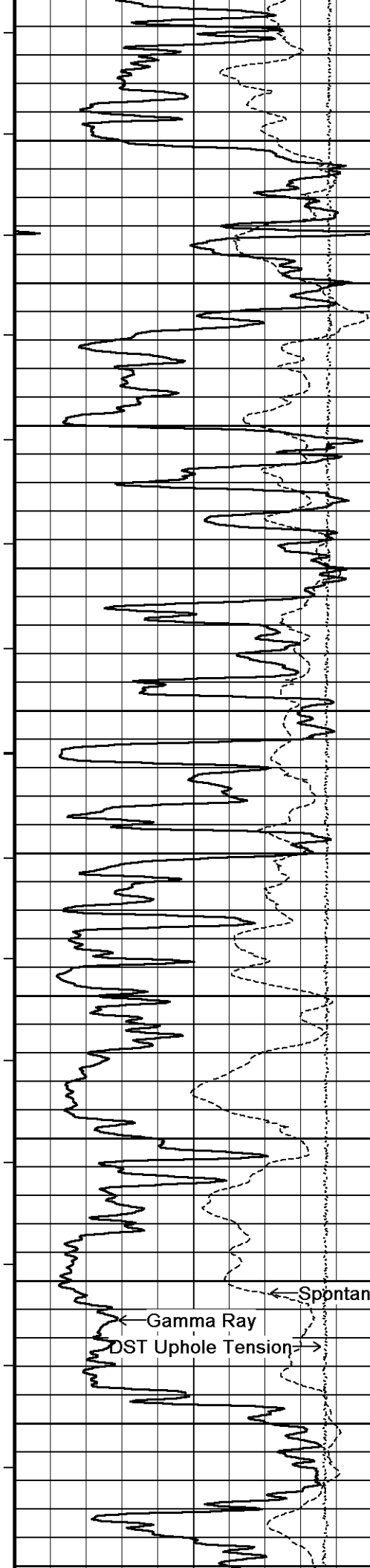
105°

2300



Array Ind. One Cond Ct





109°

2900

109°

3000

110°

3100

111°

3200

111°

3300

112°

3400

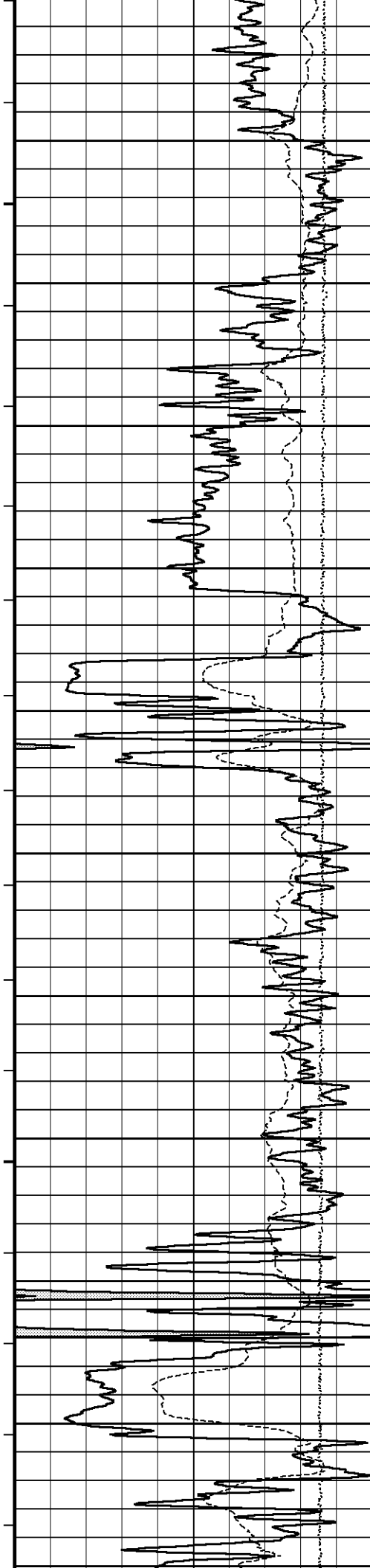
Array Ind. One Res Rt

Shallow FE

Array Ind. One Cond Ct

Spontaneous Potential

Gamma Ray
DST Uphole Tension



112°

3500

113°

3600

113°

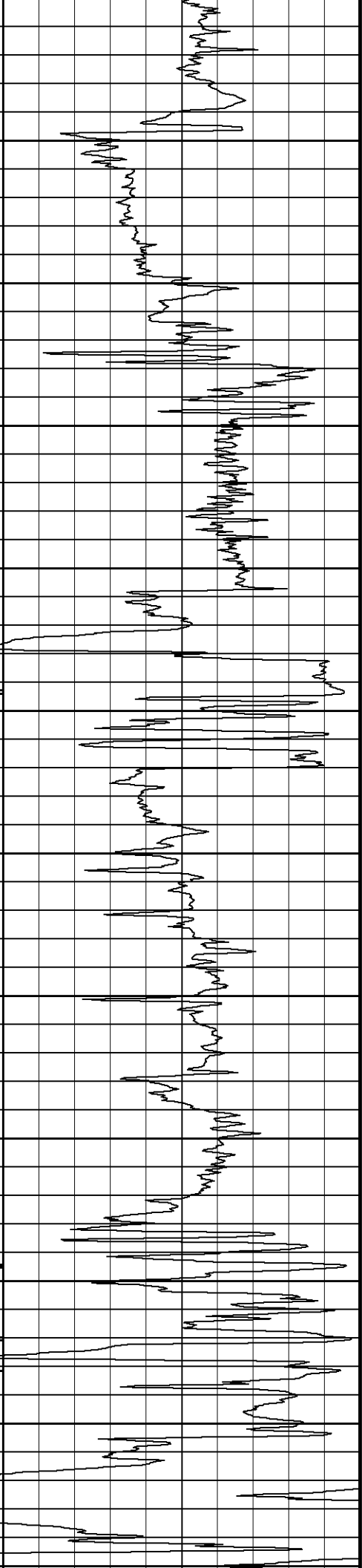
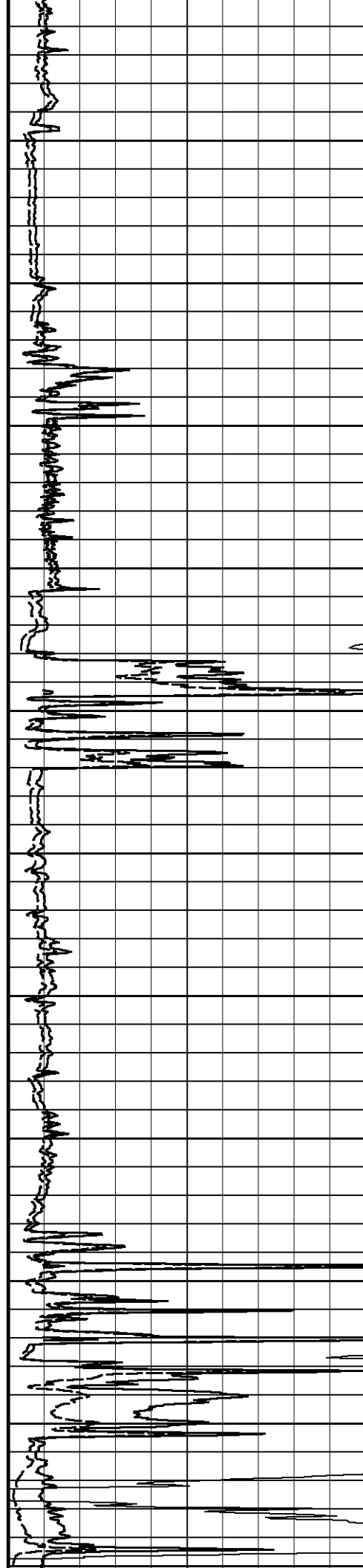
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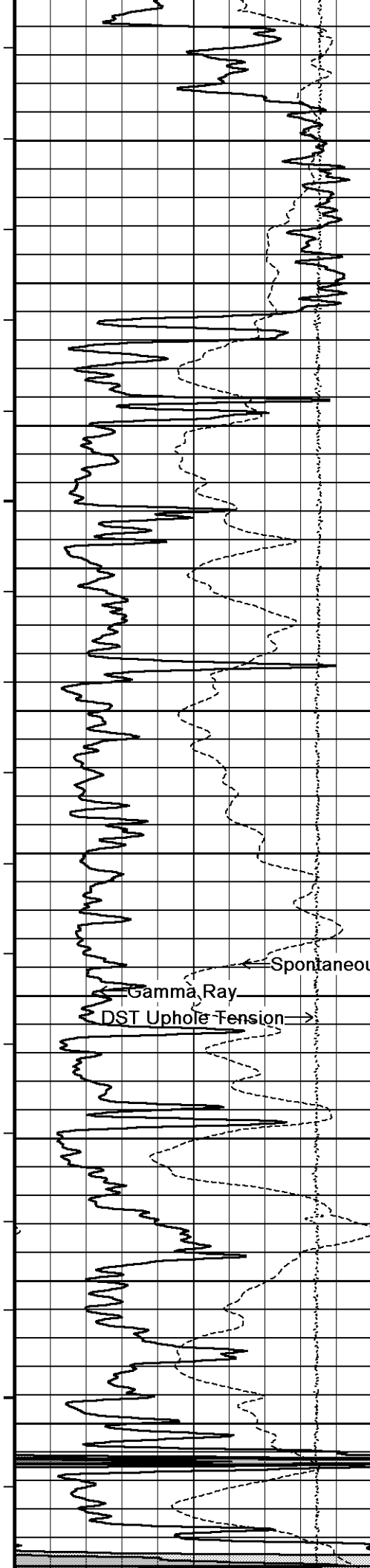
114°

3800

115°

3900





116°

4000

116°

4100

117°

4200

117°

4300

118°

4400

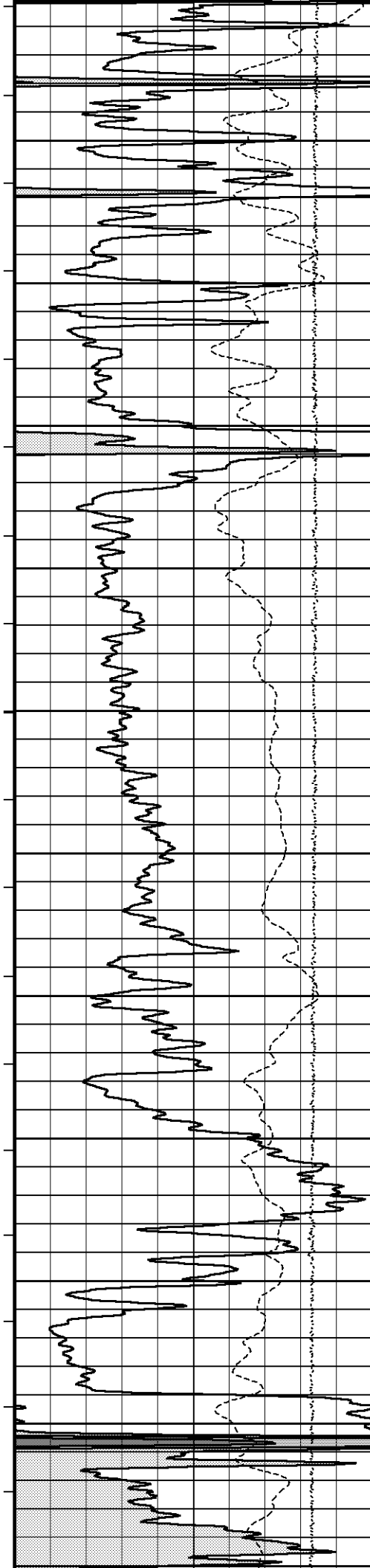
118°

4500

Shallow F

Array Ind. One Res Rt

Array Ind. One Cond Ct



4550

119°

4600

119°

4700

120°

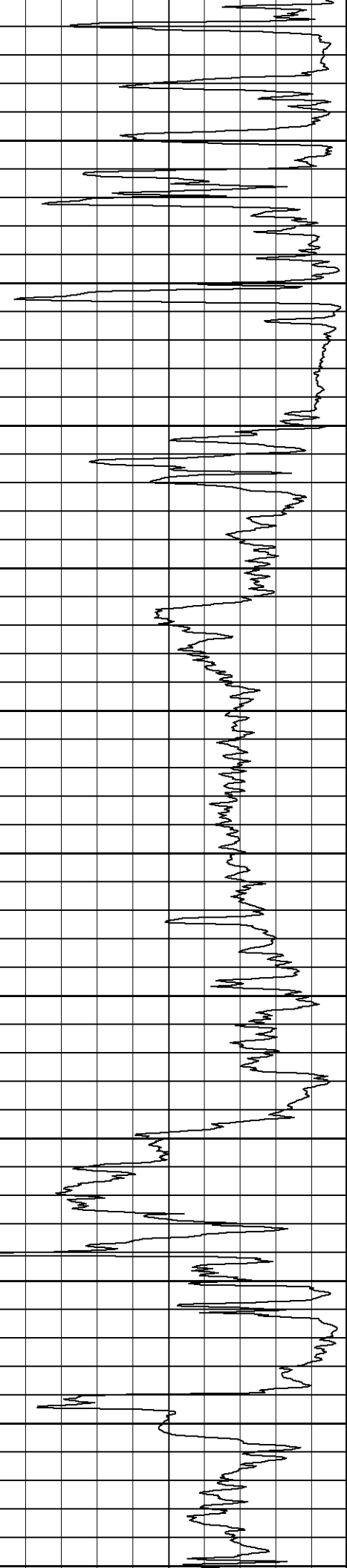
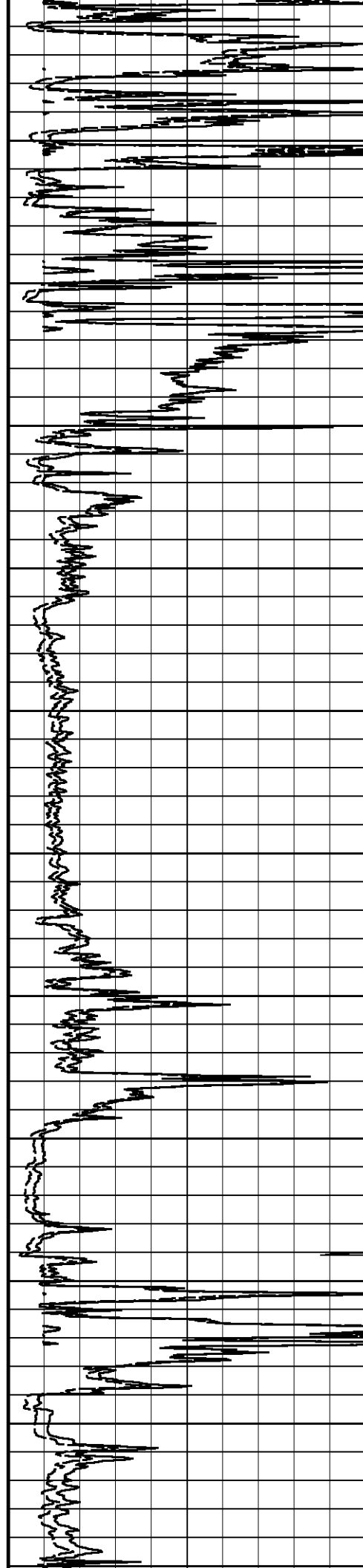
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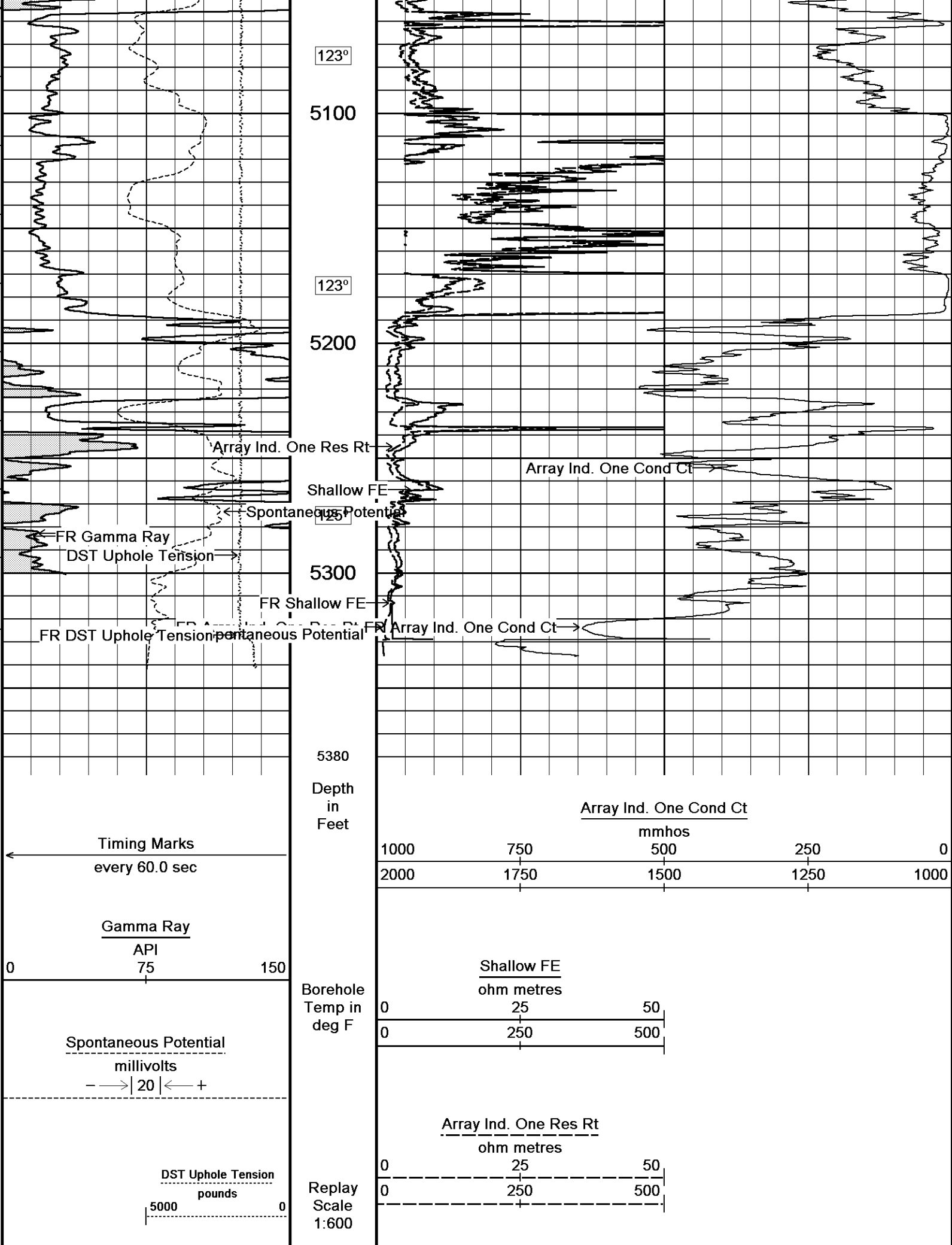
121°

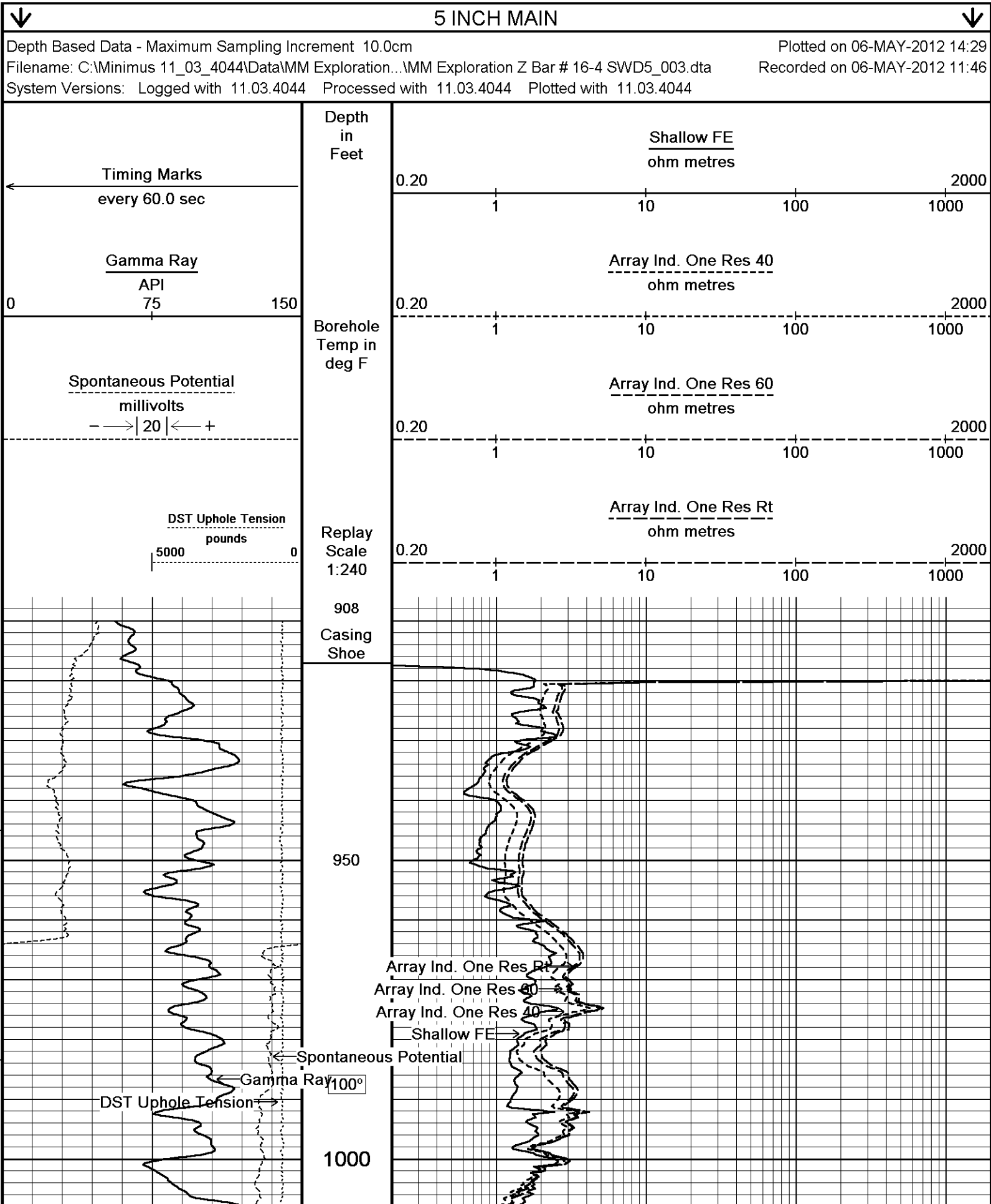
4900

122°

5000









101°

1050

101°

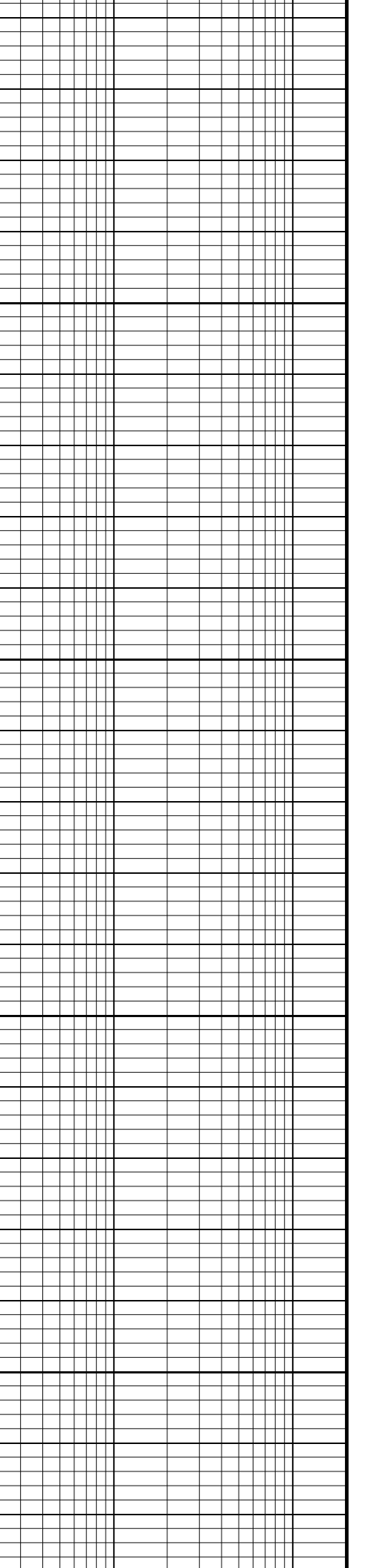
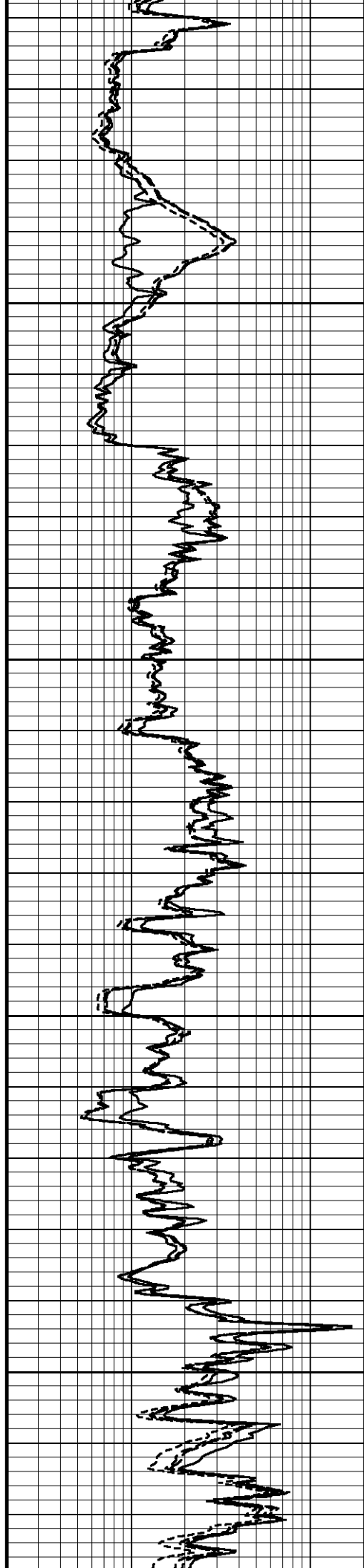
1100

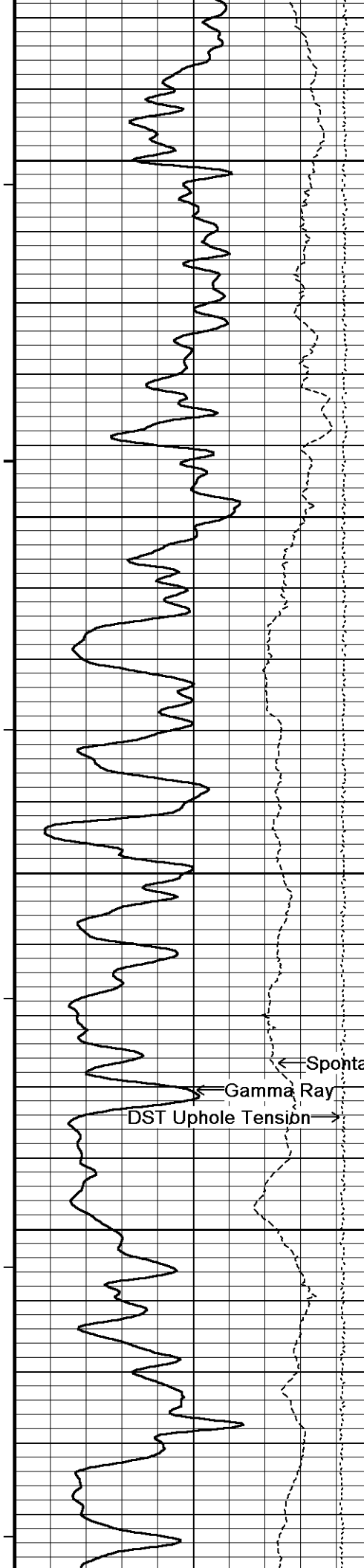
101°

1150

101°

1200





102°

1250

102°

1300

102°

1350

102°

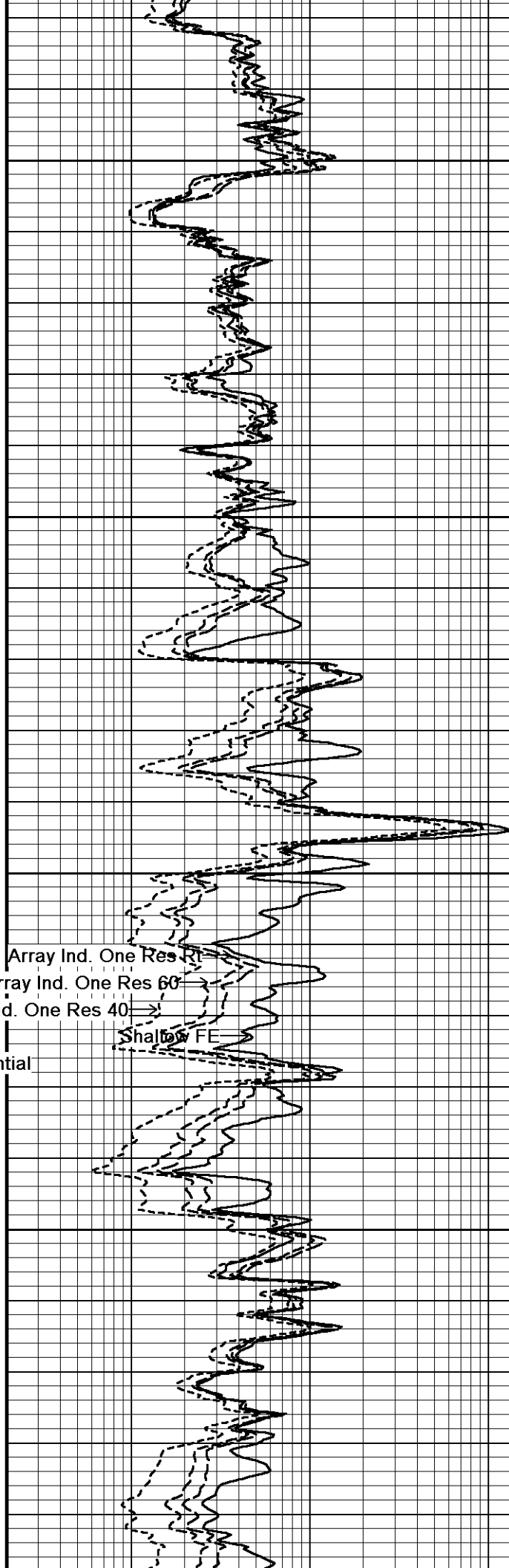
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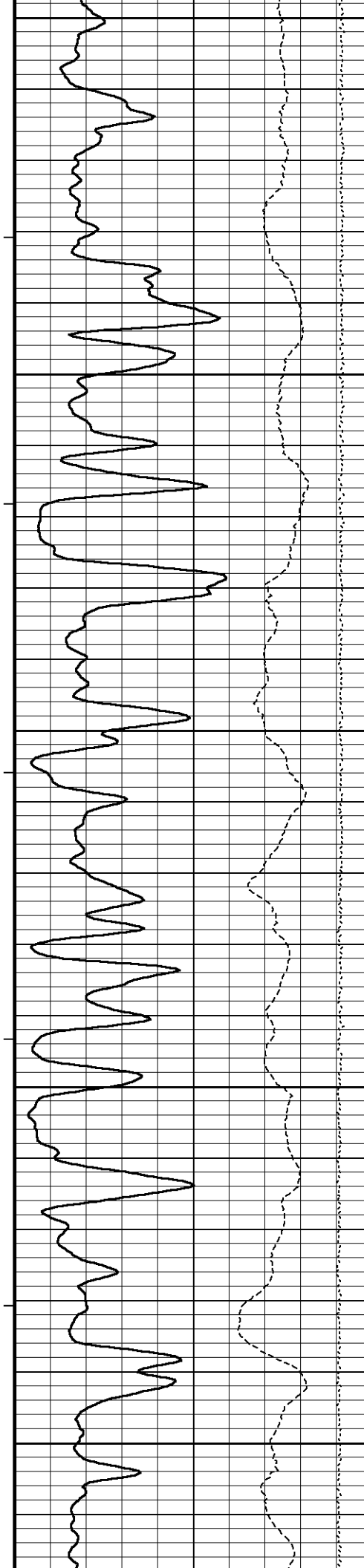
102°

← Gamma Ray
DST Uphole Tension →

← Spontaneous Potential

Array Ind. One Res 10
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE





1450

102°

1500

103°

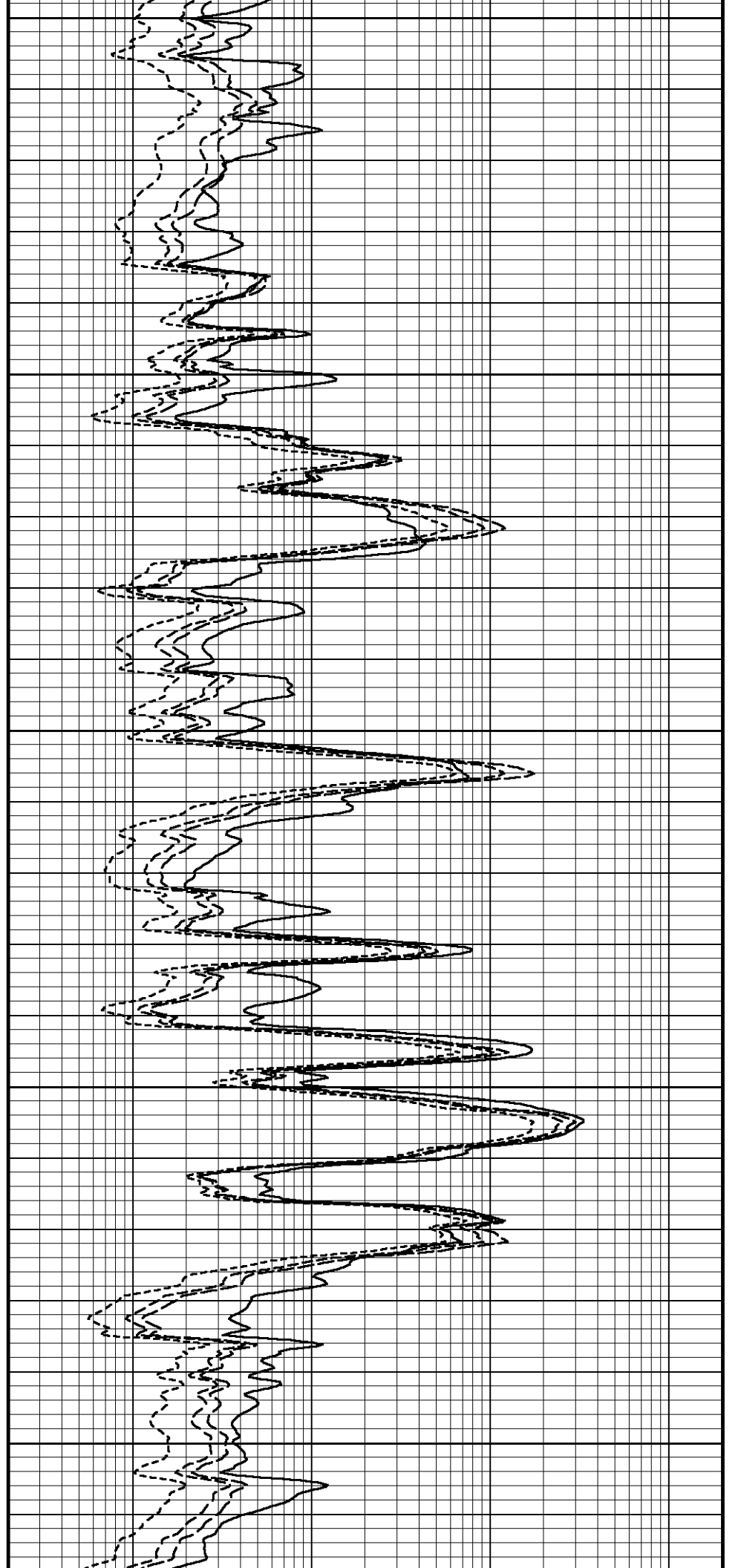
1550

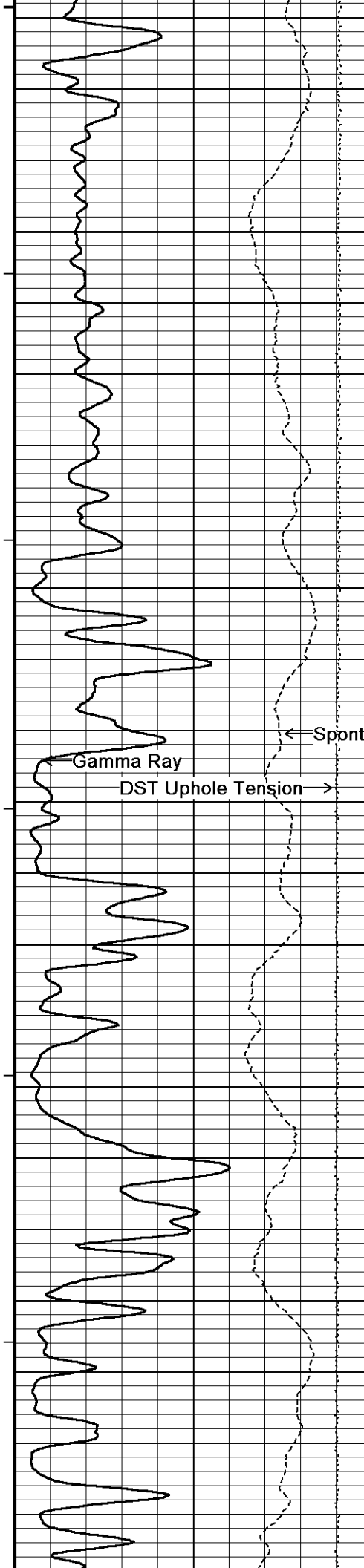
103°

1600

103°

1650





103°

1700

103°

1750

102°

1800

102°

1850

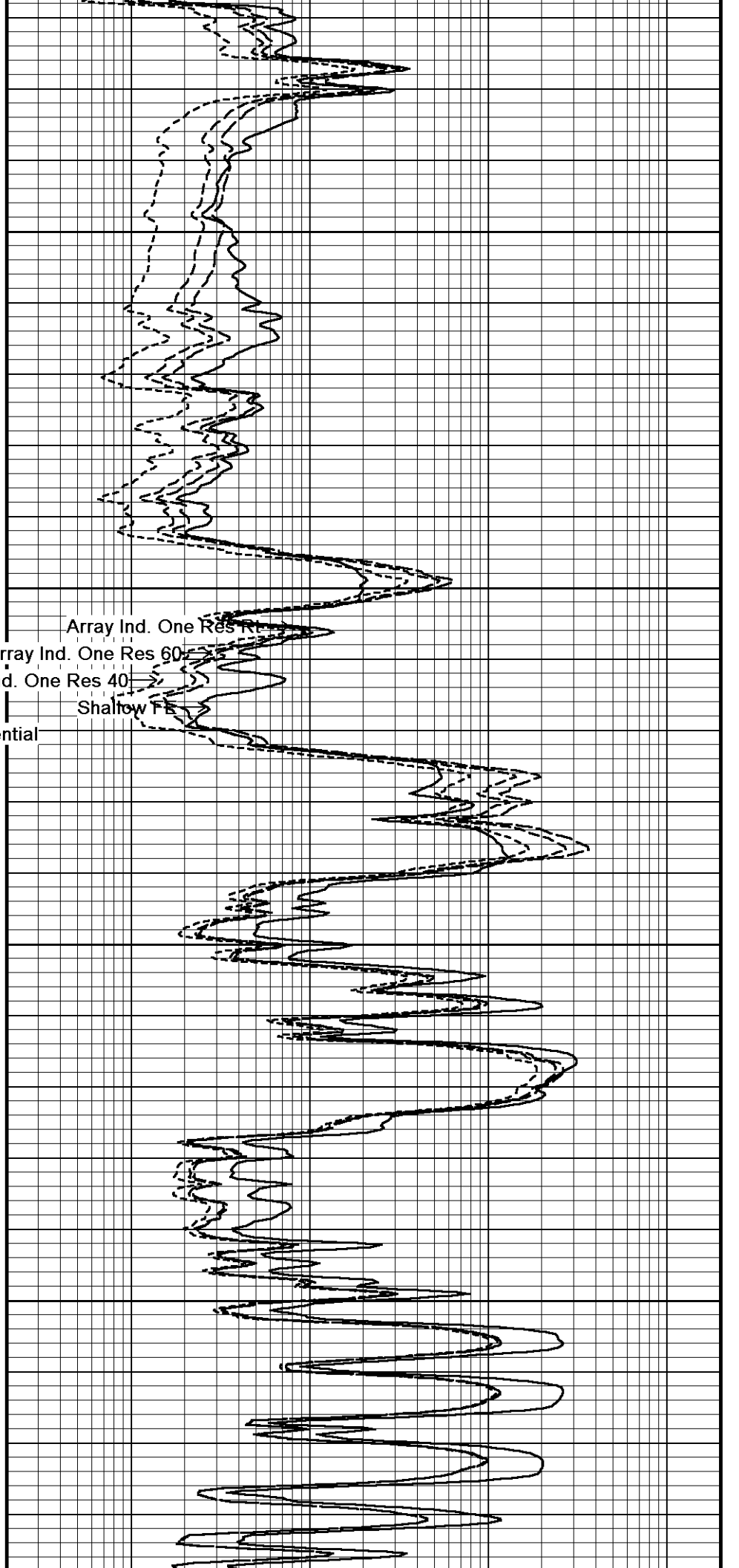
102°

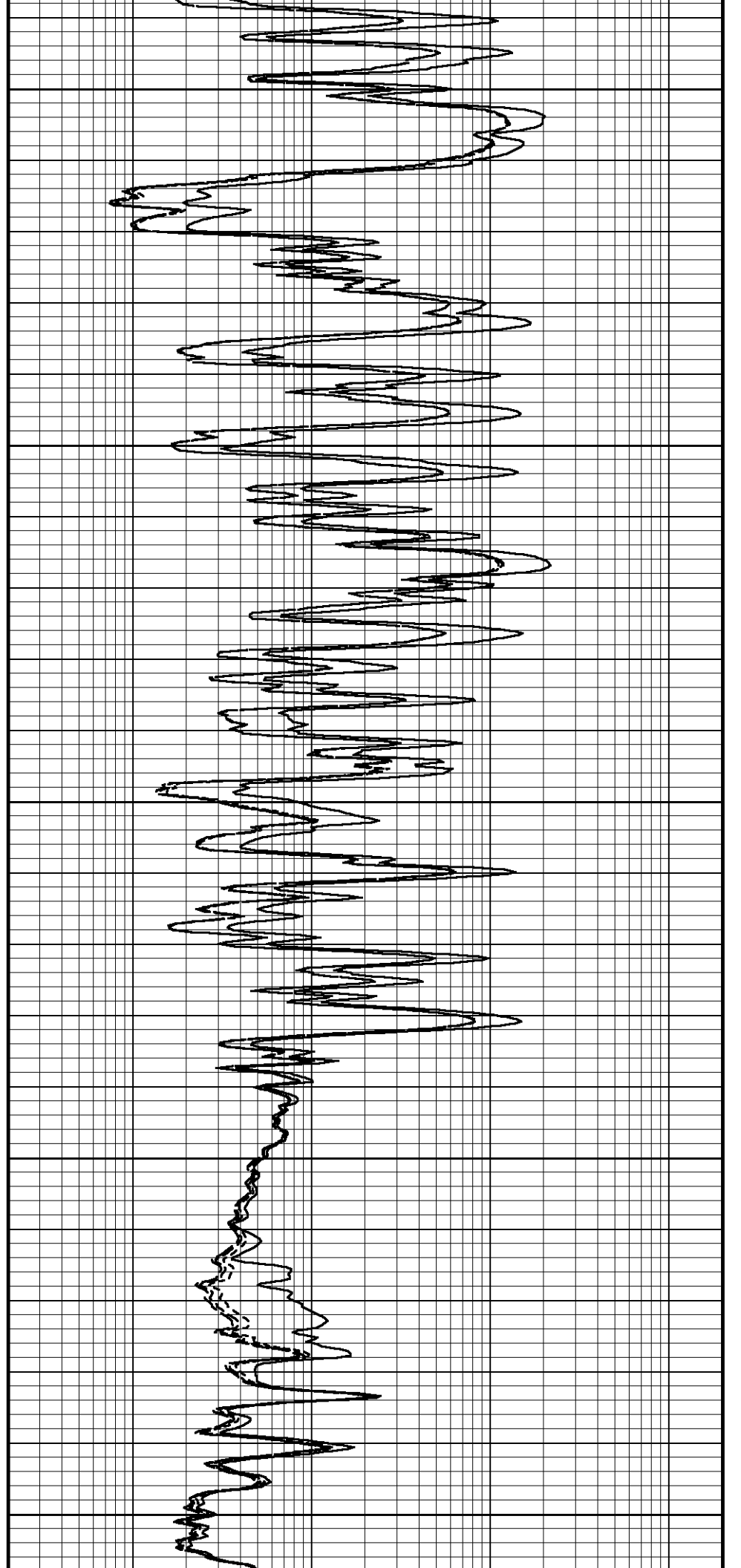
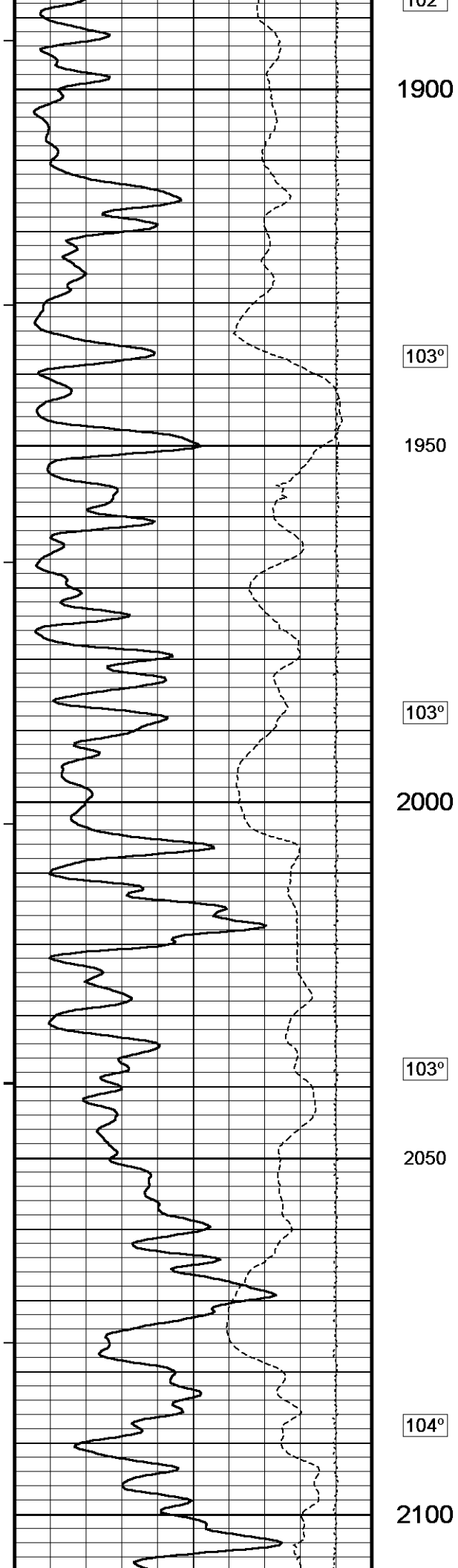
← Spontaneous Potential

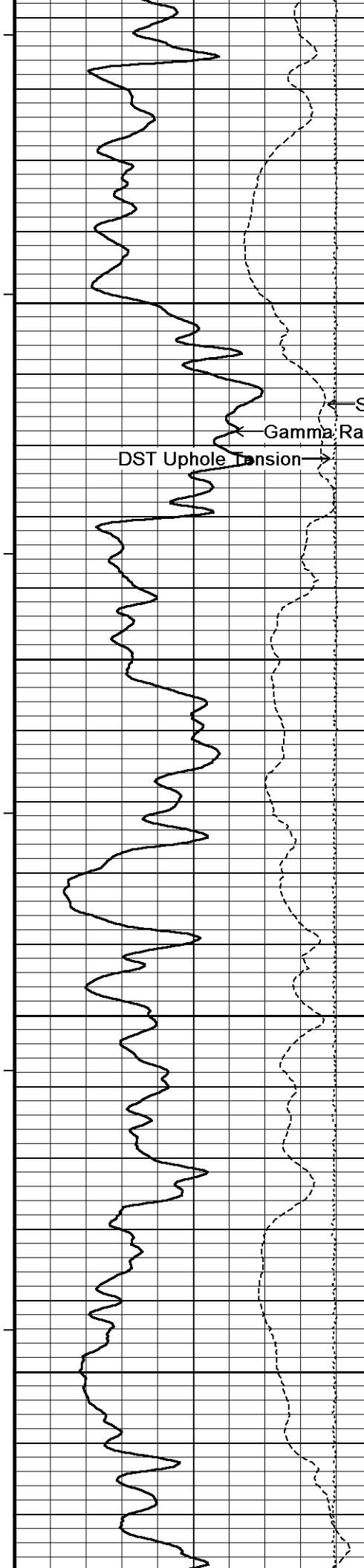
Gamma Ray

DST Uphole Tension →

Array Ind. One Res 10
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE







105°

2150
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE

Spontaneous Potential

Gamma Ray

DST Uphole Tension

105°

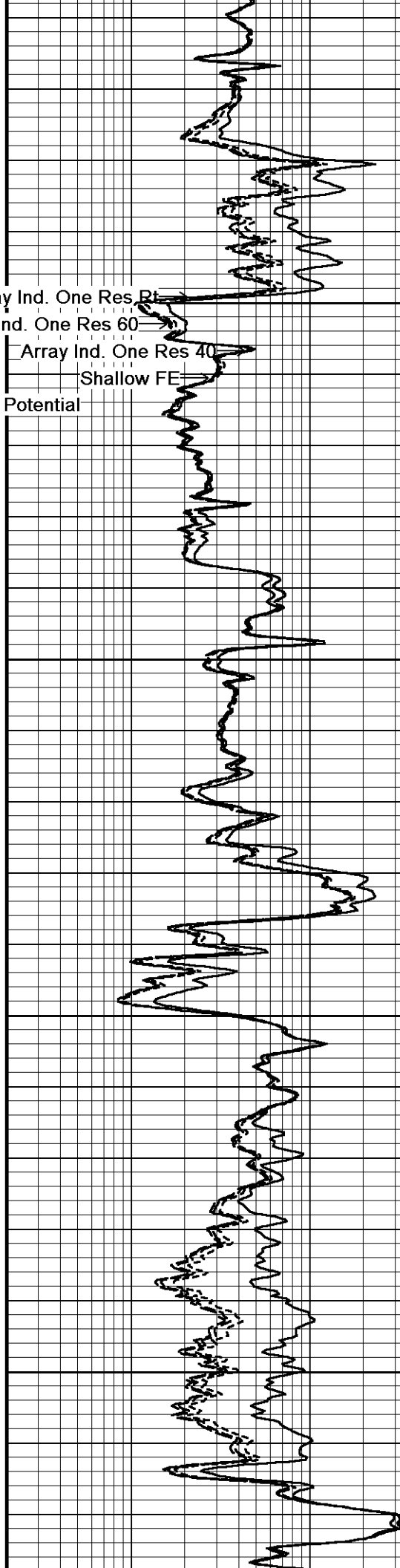
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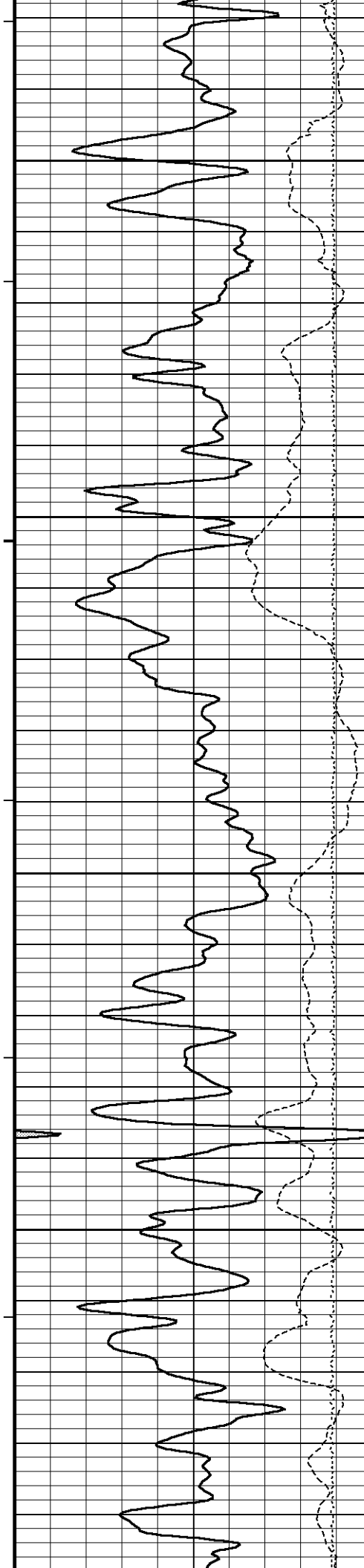
105°

2250

105°

2300





106°

2350

106°

2400

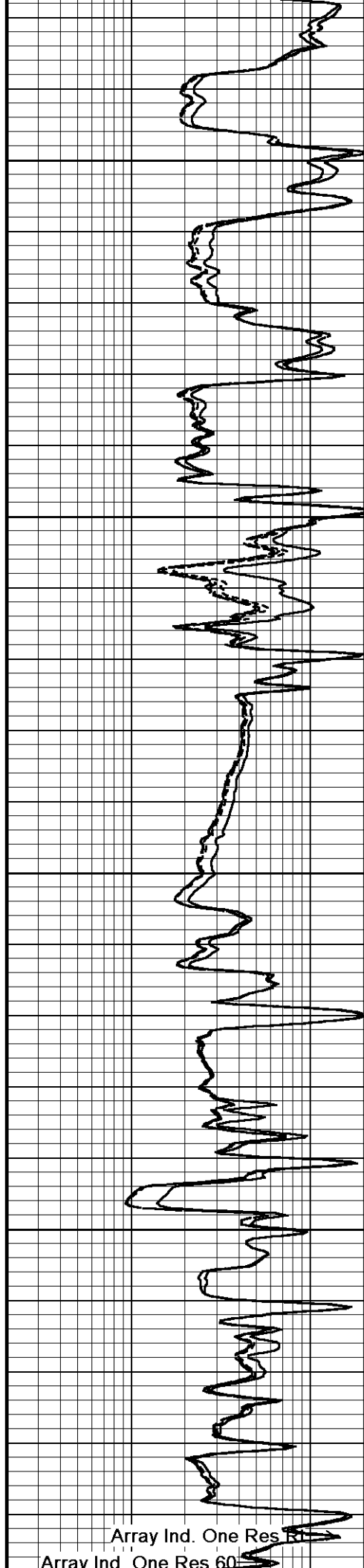
107°

2450

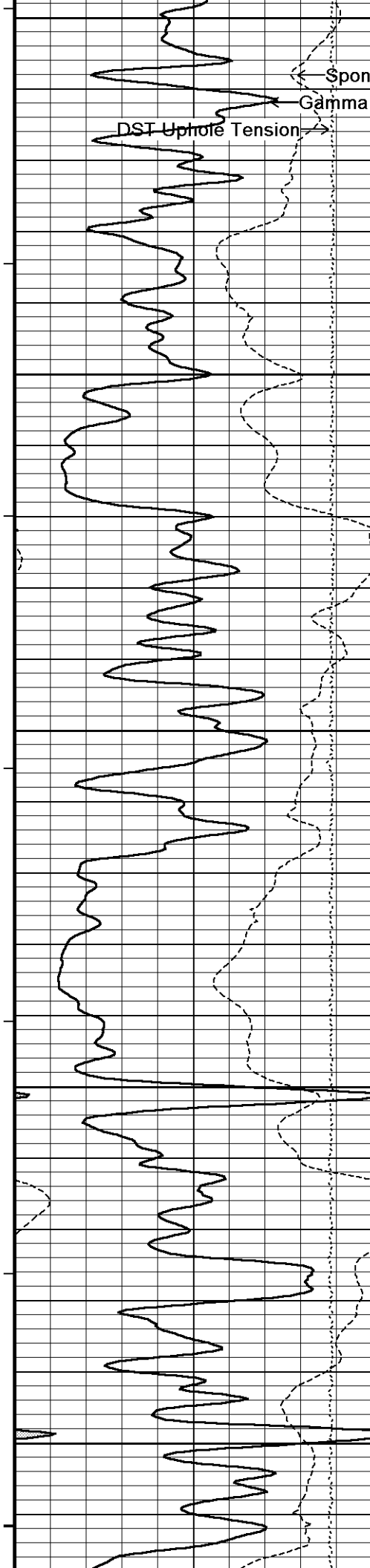
107°

2500

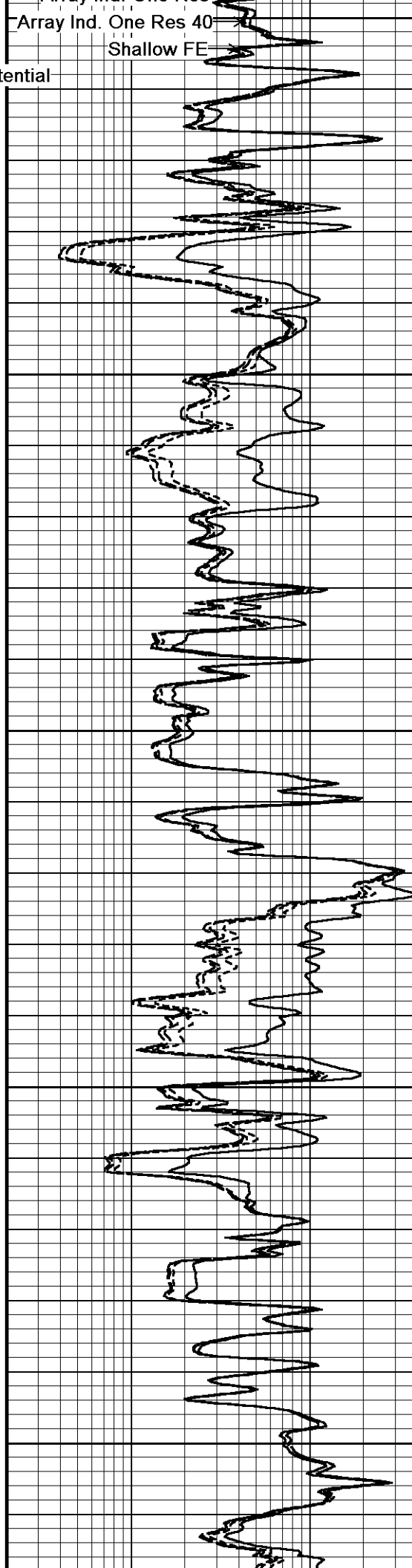
107°

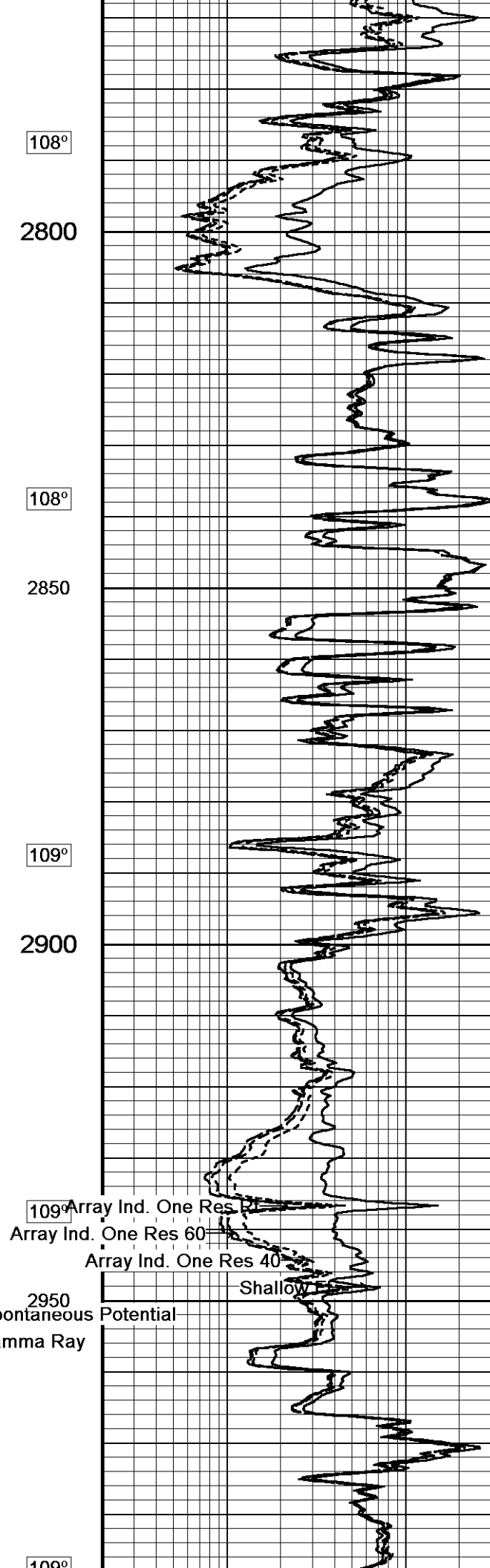
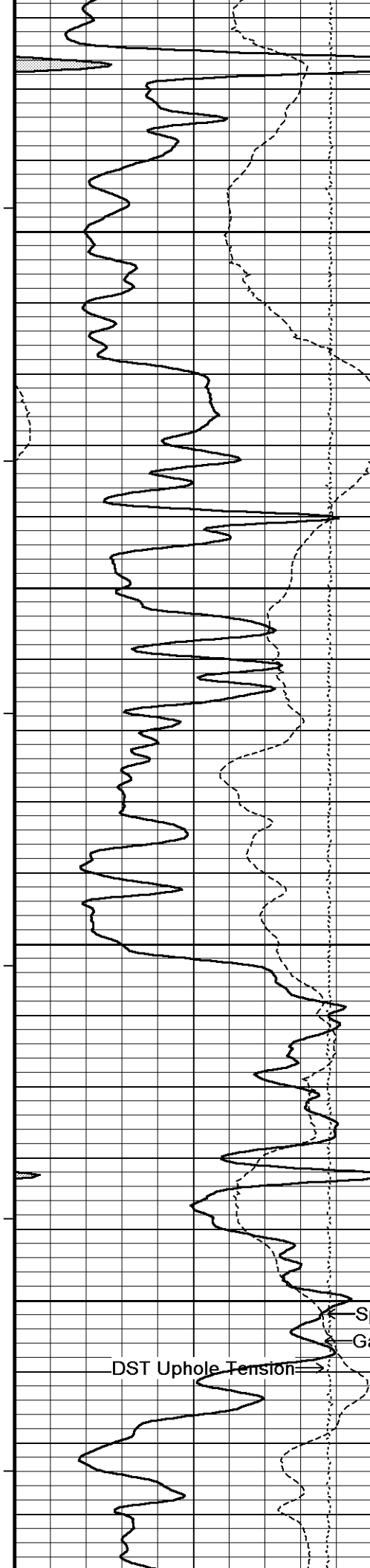


Array Ind. One Res 60
Array Ind. One Res 60



2550
107°
2600
107°
2650
108°
2700
108°
2750





108°

2800

108°

2850

109°

2900

109°

Array Ind. One Res 31

Array Ind. One Res 60

Array Ind. One Res 40

Shallow

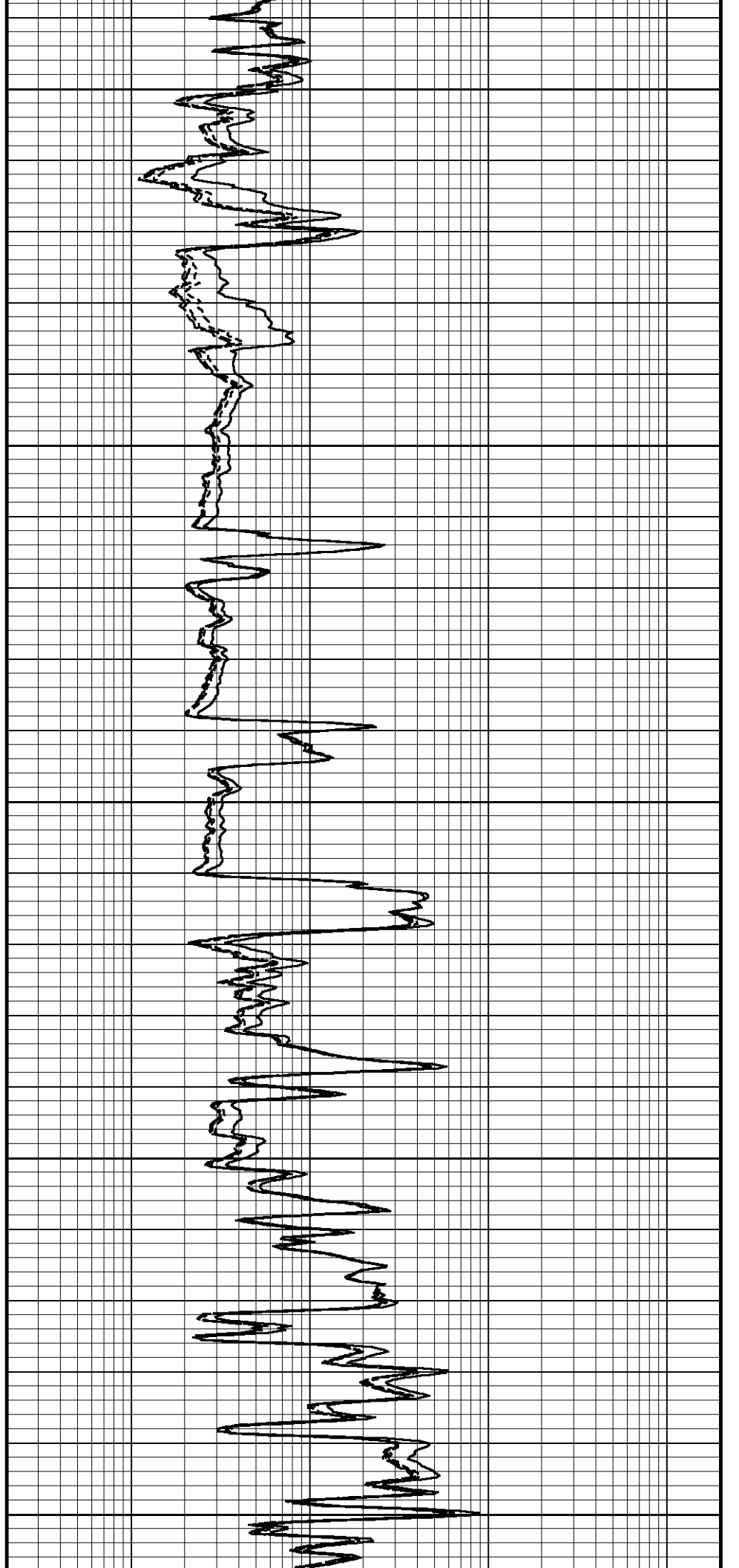
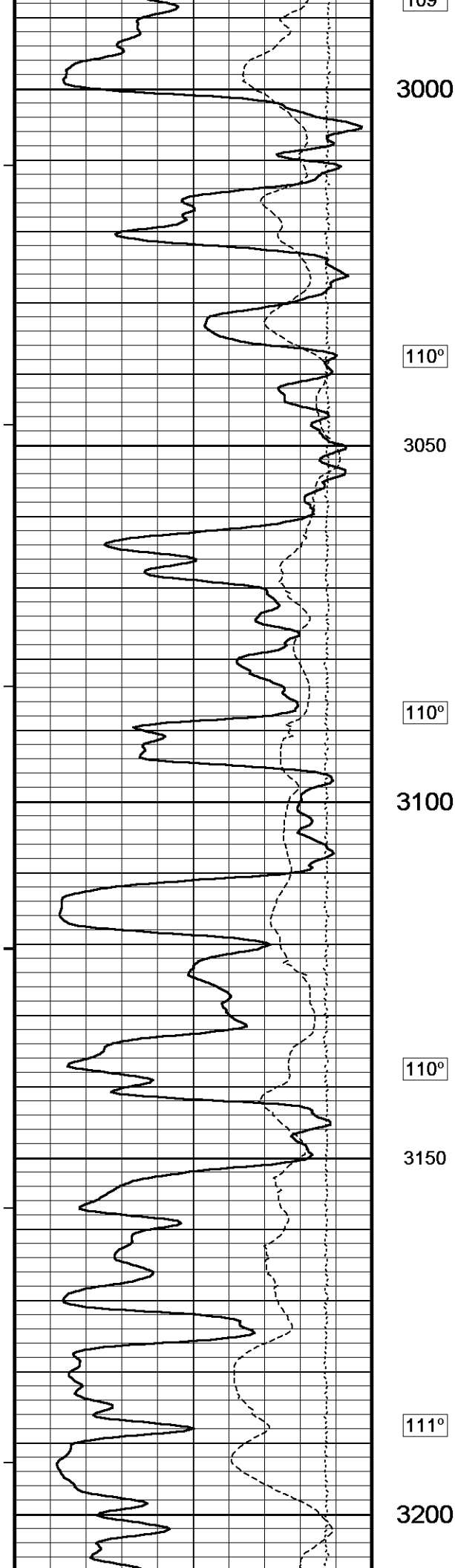
2950

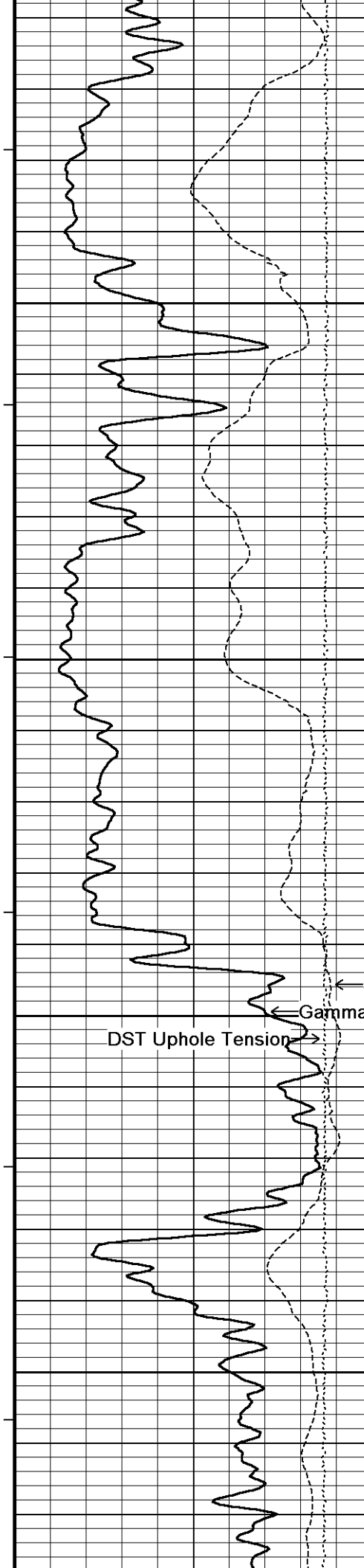
Spontaneous Potential

Gamma Ray

DST Uphole Tension

109°





111°

3250

111°

3300

111°

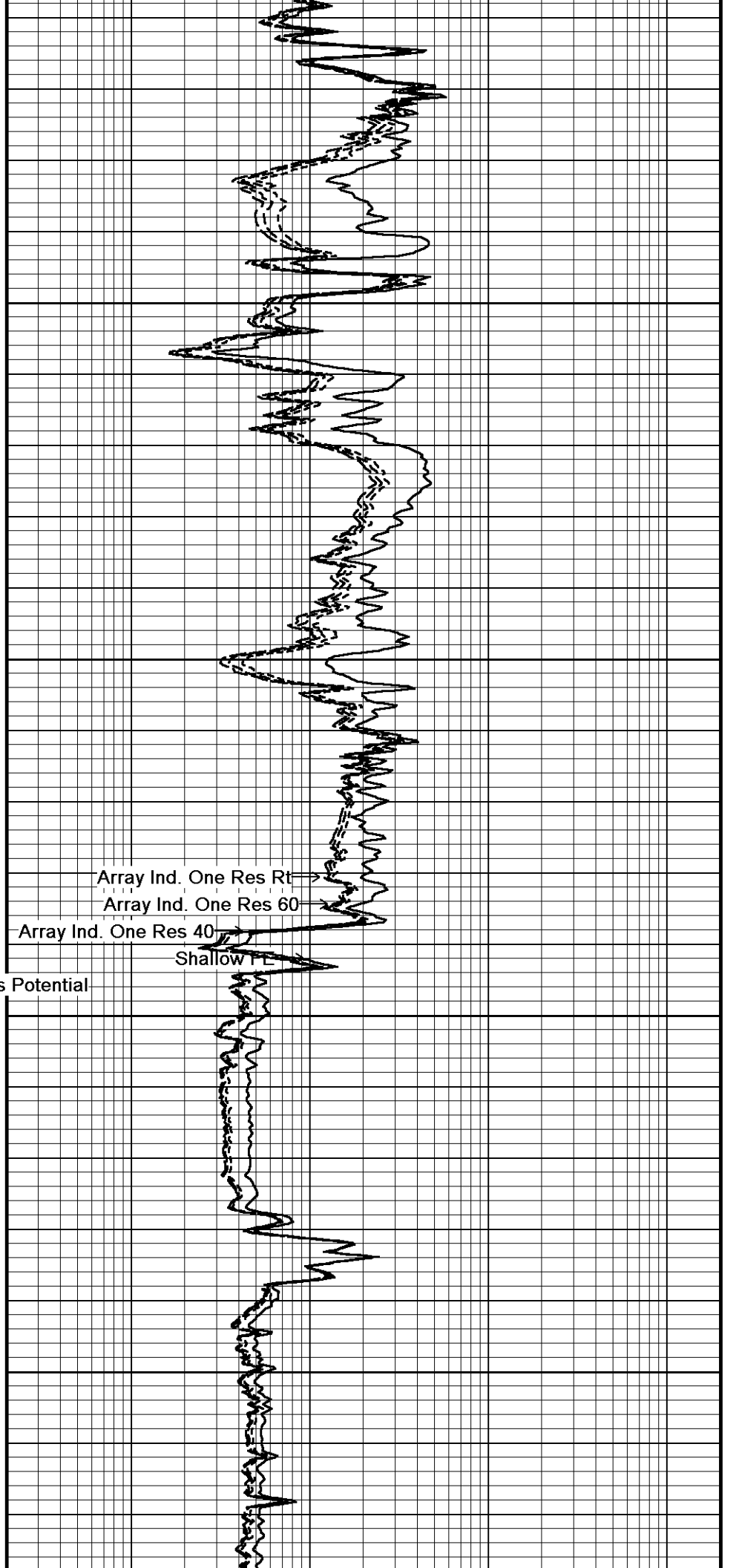
← Spontaneous Potential

← Gamma Ray

DST Uphole Tension →

112°

3400

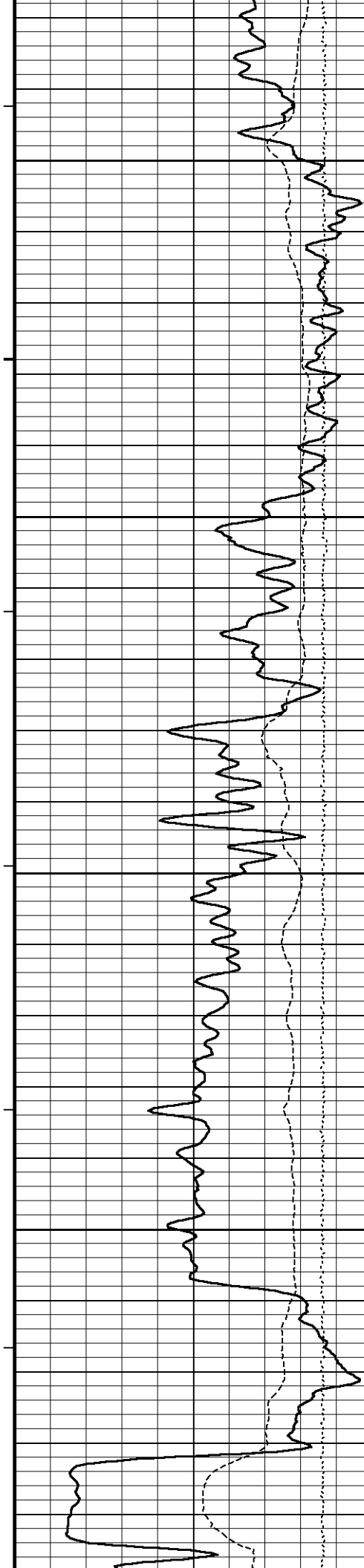


Array Ind. One Res Rt →

Array Ind. One Res 60 →

Array Ind. One Res 40 →

Shallow F.E. →



112°

3450

112°

3500

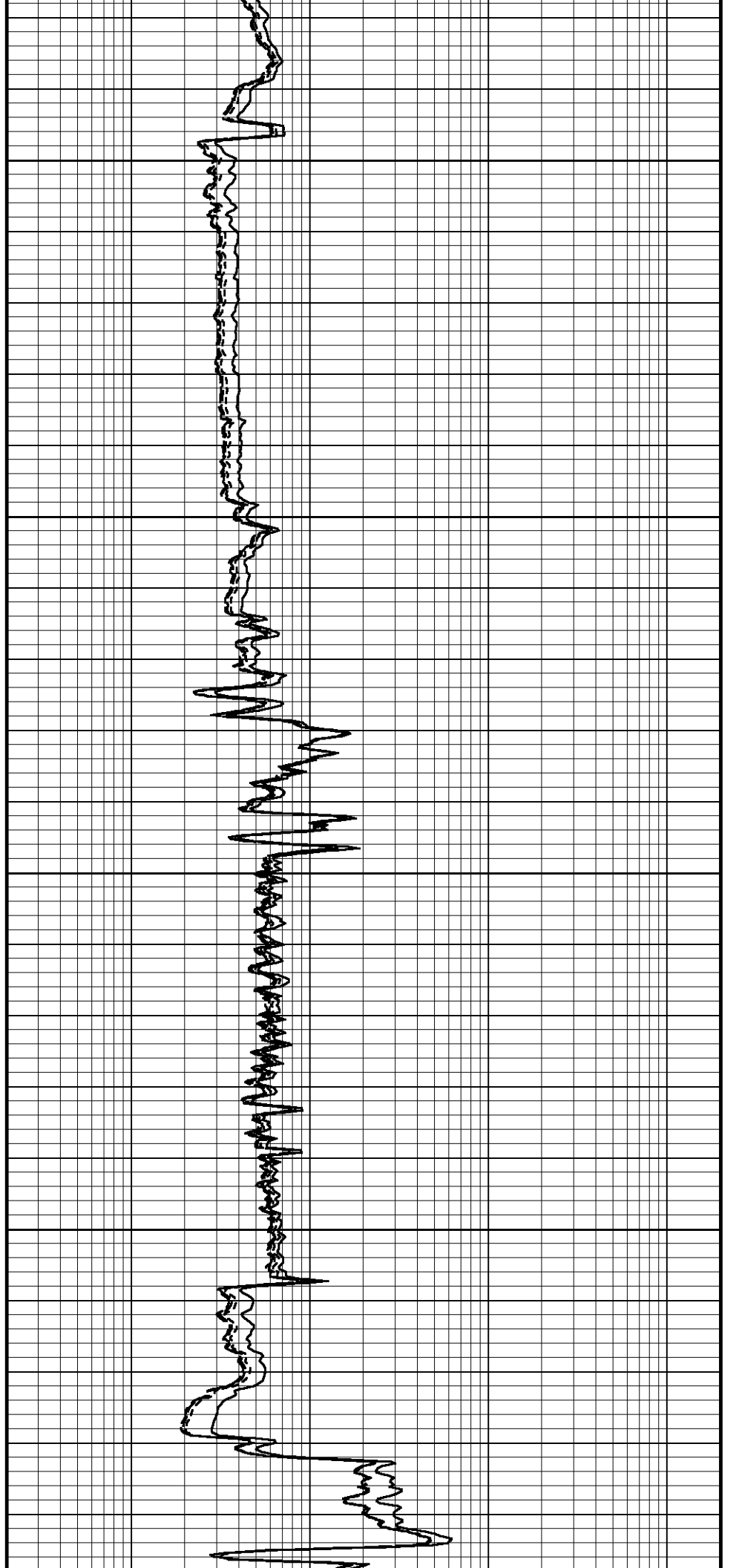
113°

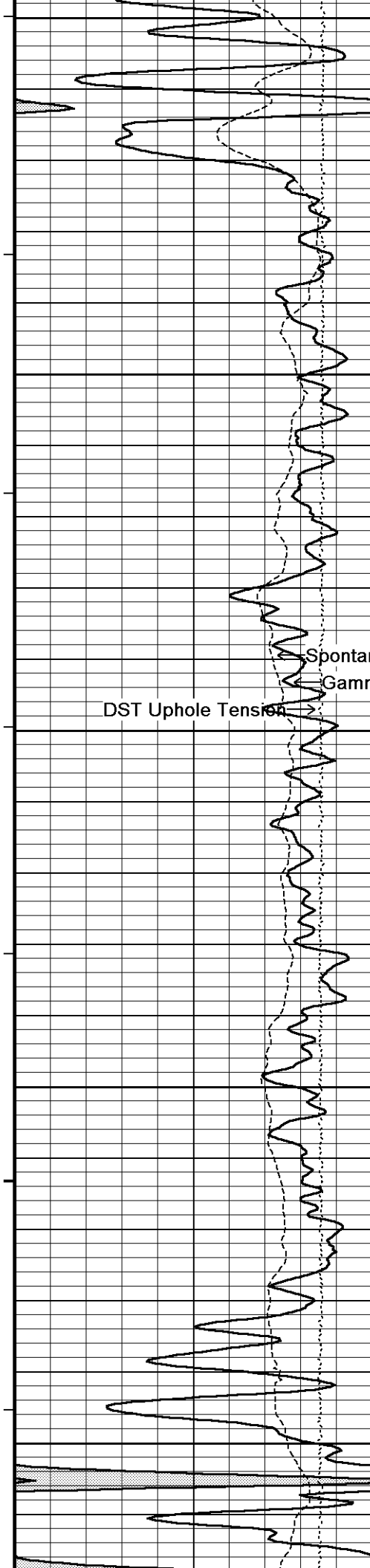
3550

113°

3600

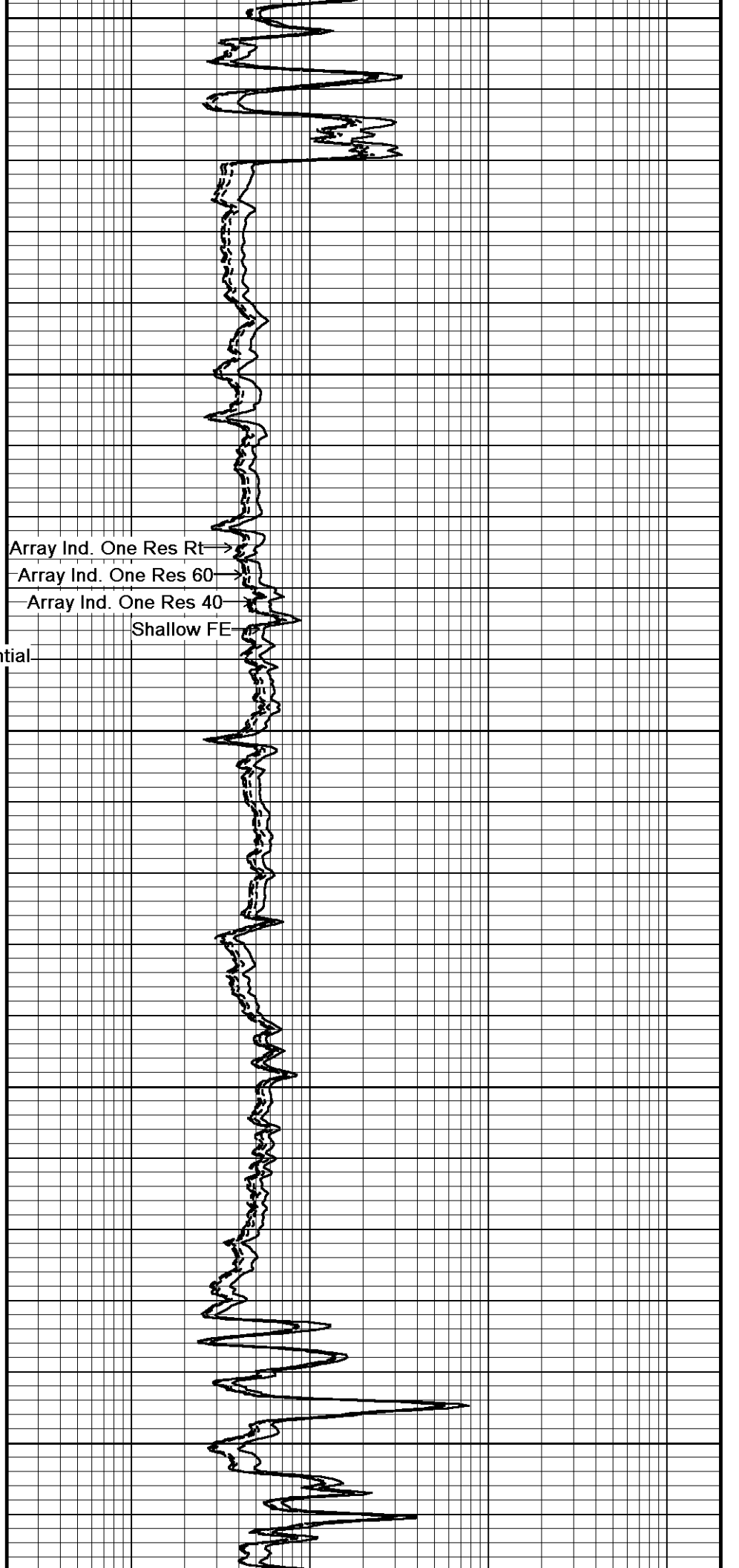
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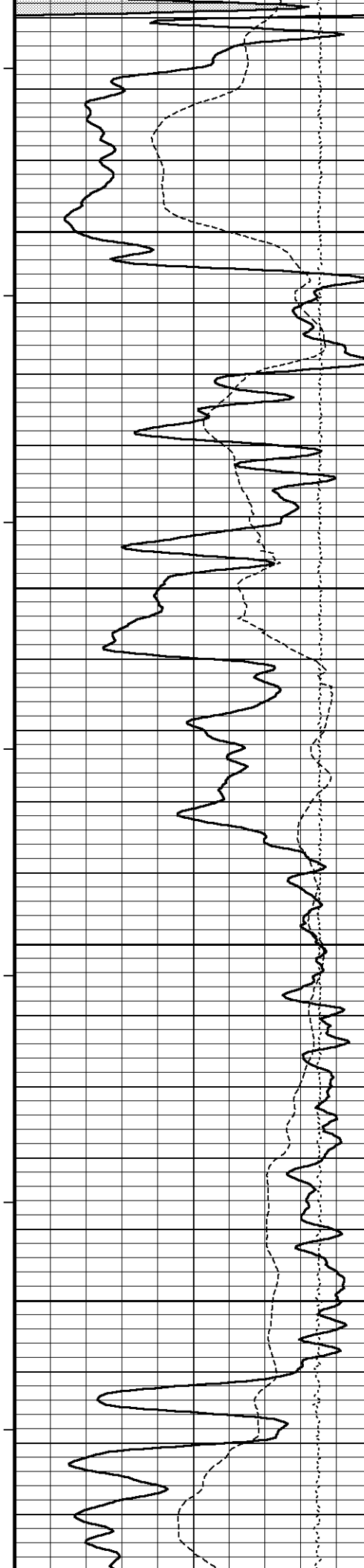




3650
113°
3700
114°
3750
114°
3800
115°
3850

Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE





115°

3900

115°

3950

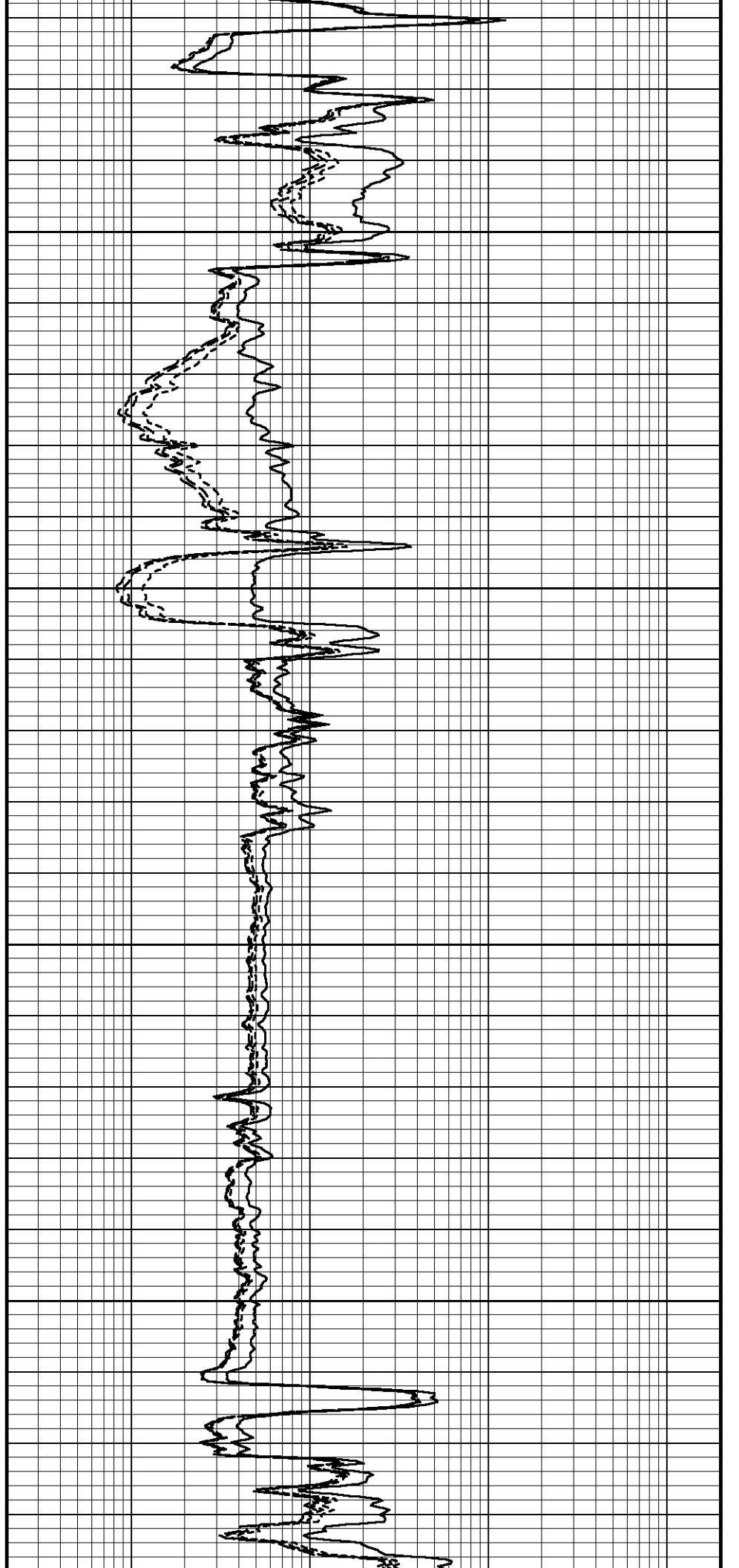
116°

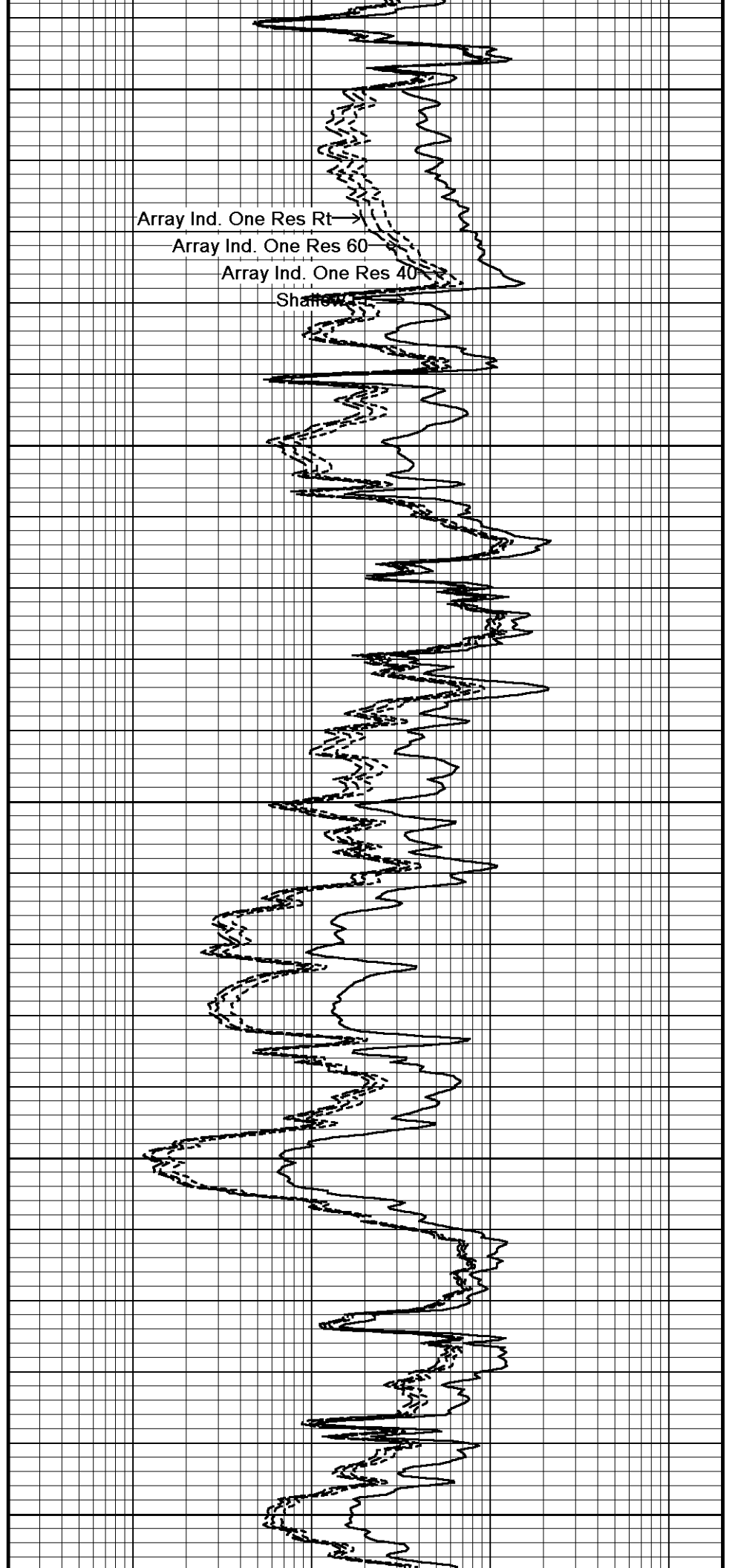
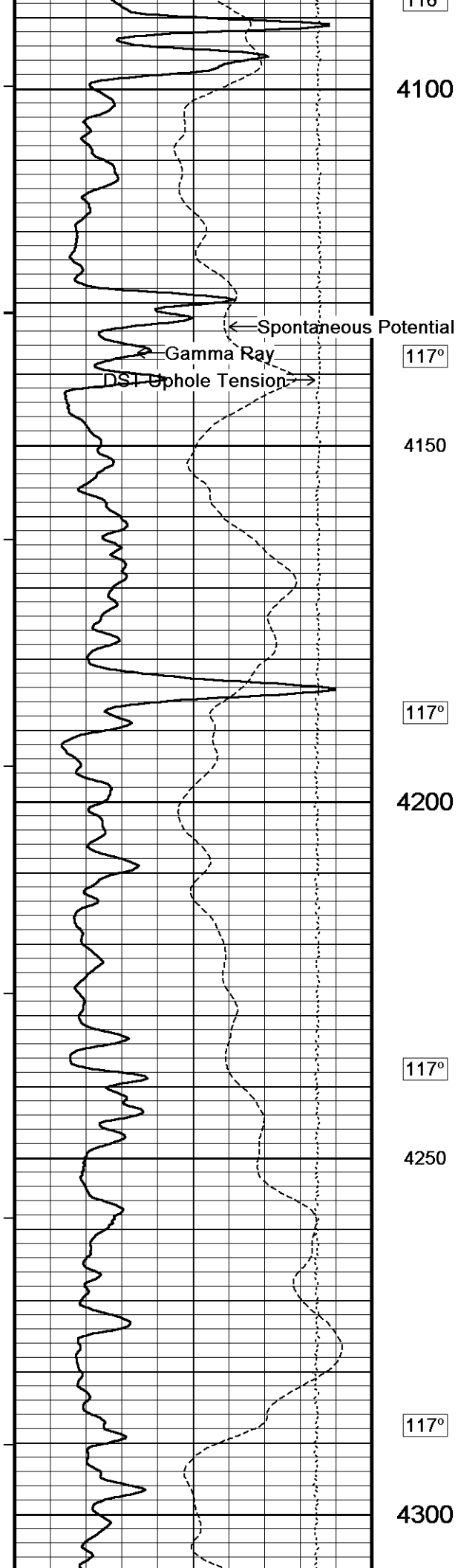
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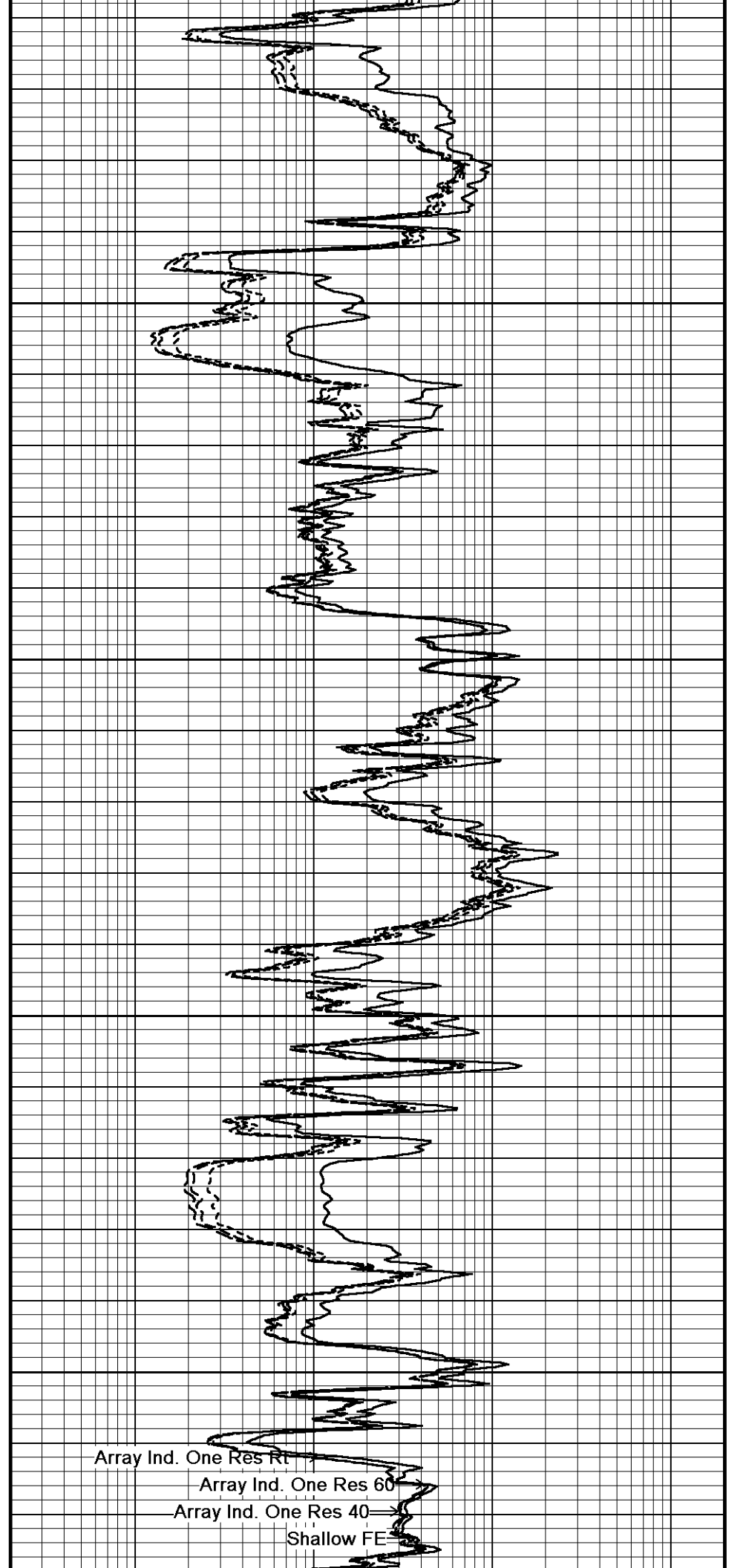
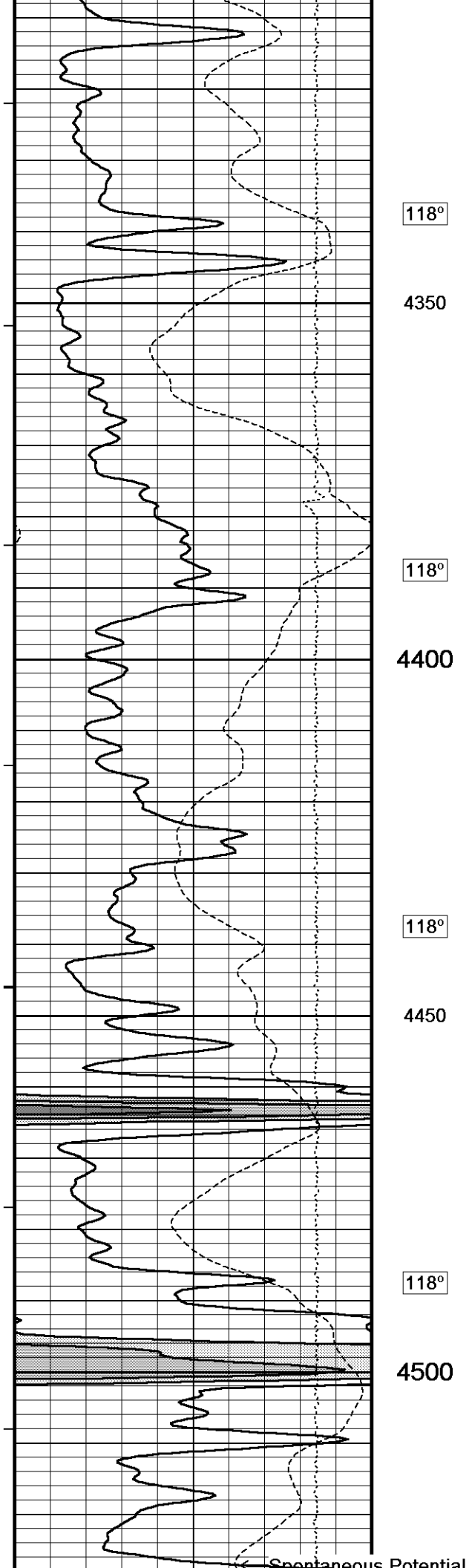
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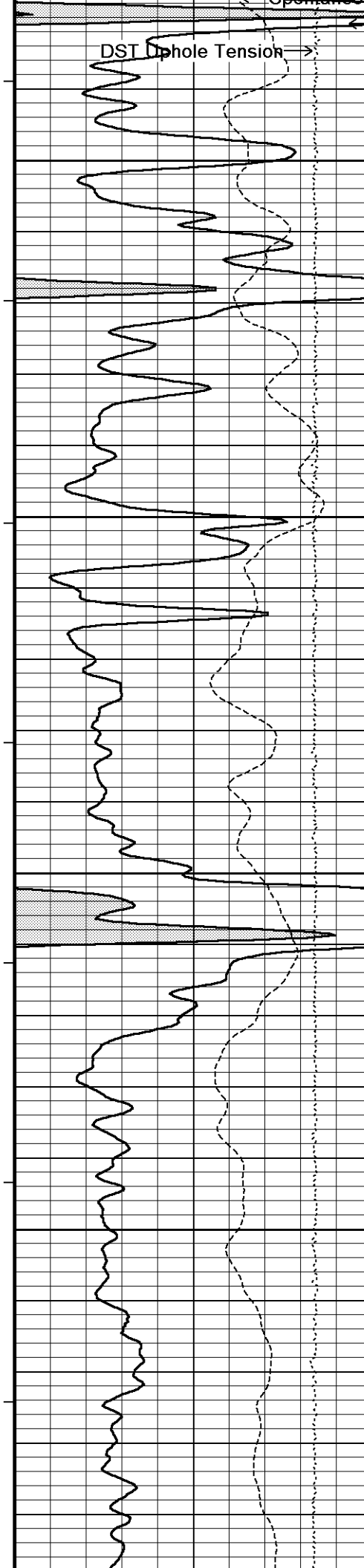
4050

116°









Gamma Ray

118°

4550

119°

4600

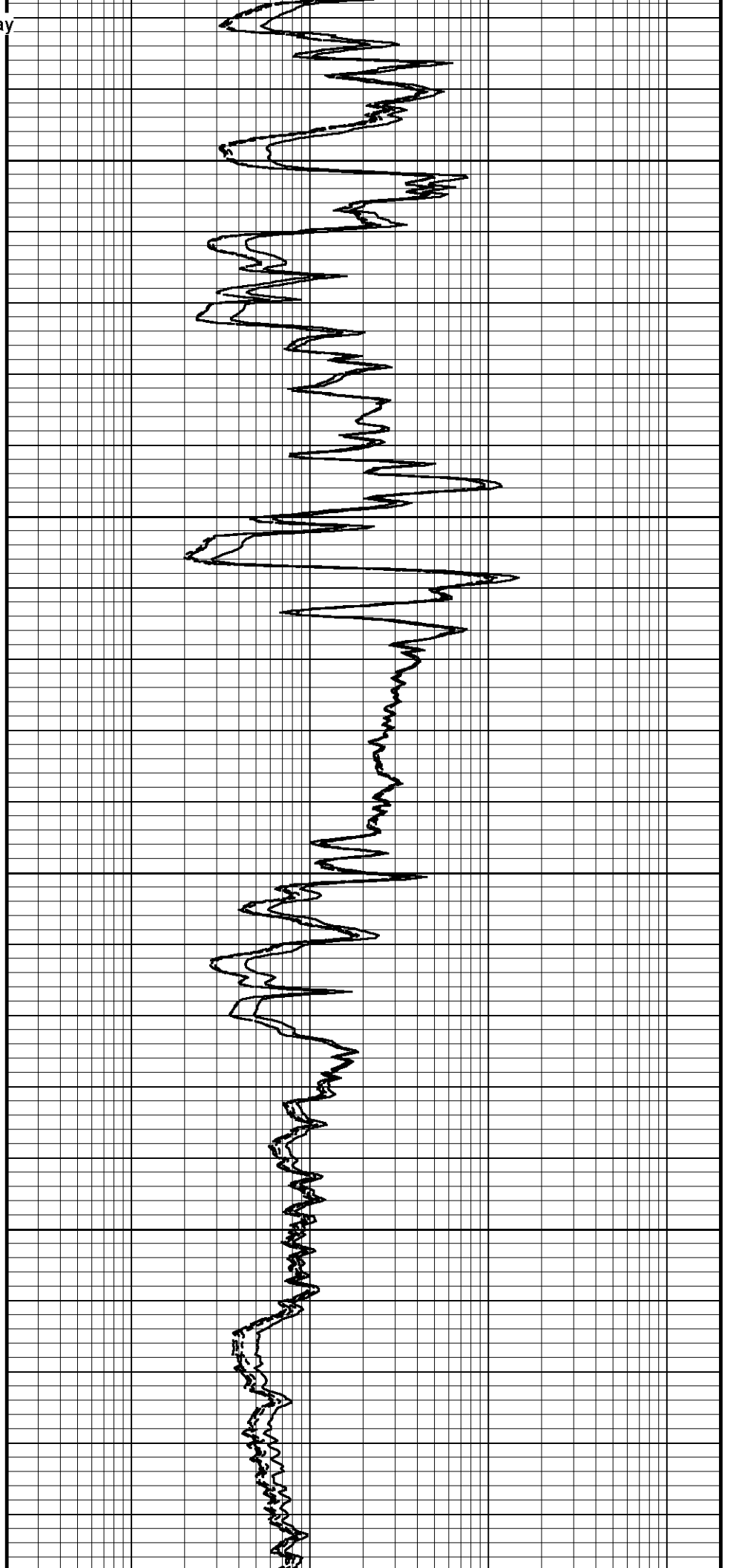
119°

4650

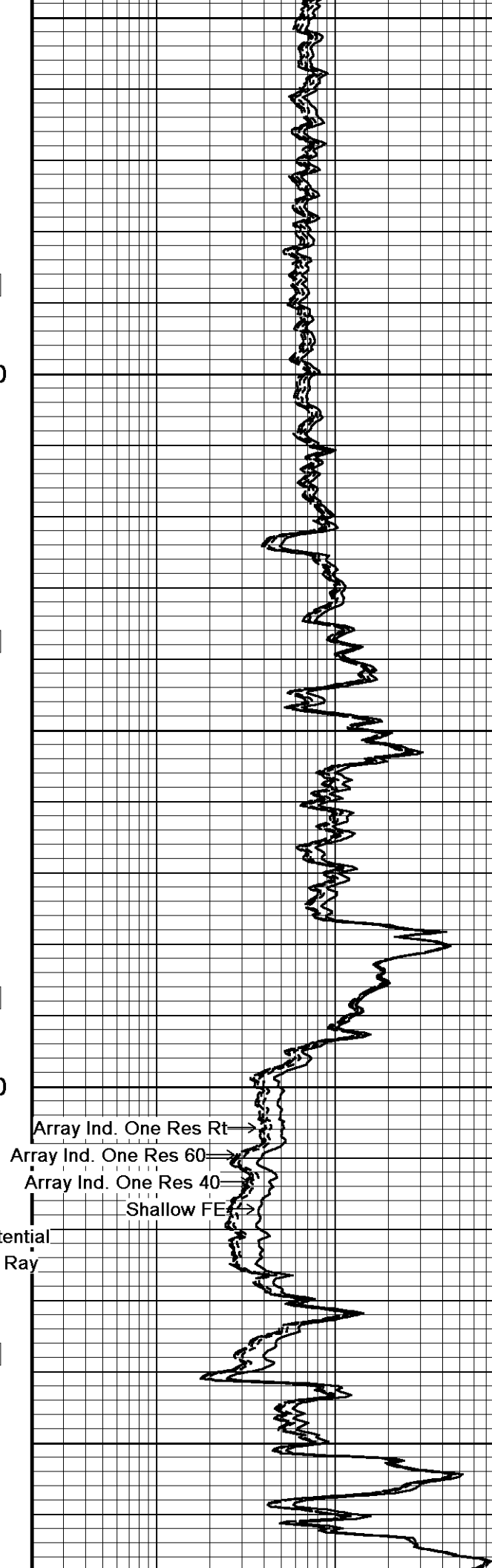
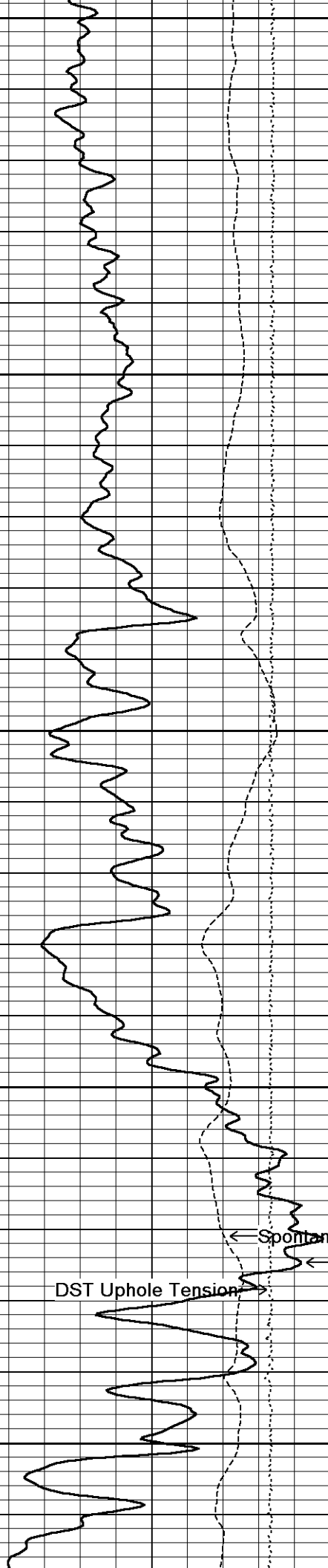
119°

4700

119°

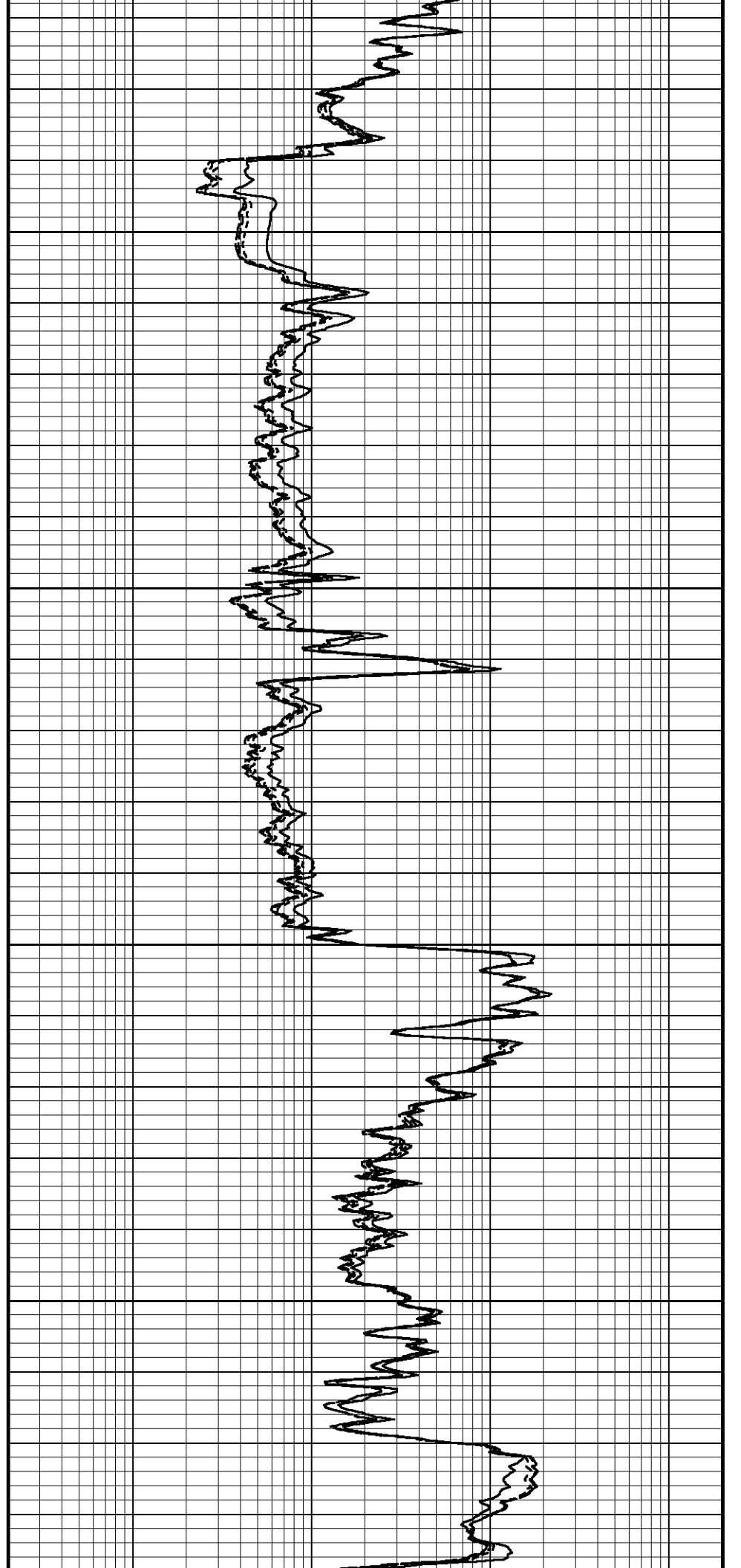
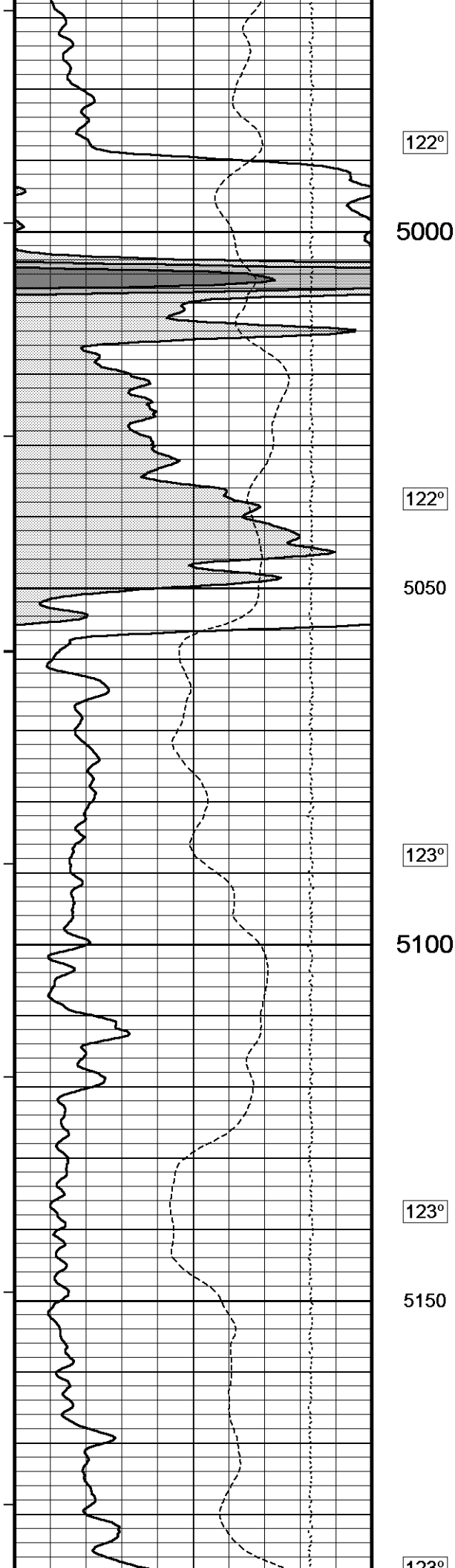


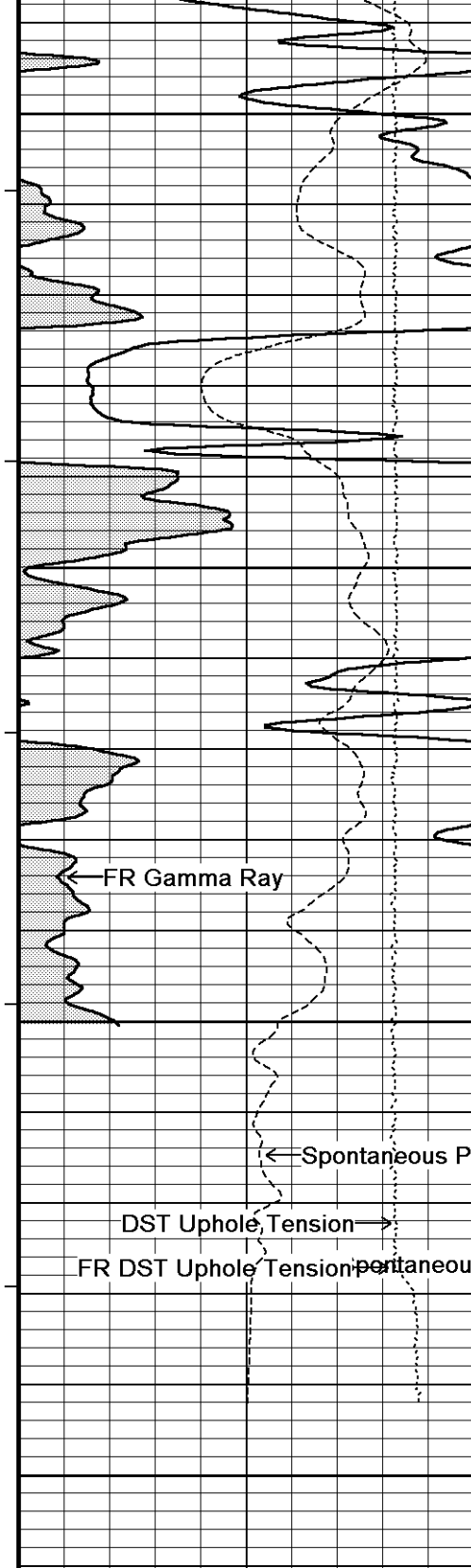
4750
120°
4800
120°
4850
121°
4900
122°
4950



DST Uphole Tension
Spontaneous Potential
Gamma Ray

Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FEA





123°
5200

124°
5250

125°
5300

FR Gamma Ray

Spontaneous Potential

DST Uphole Tension

FR DST Uphole Tension

FR Array Ind. One Res Rt

FR Spontaneous Potential

5350

5358

Depth
in
Feet

Timing Marks
every 60.0 sec

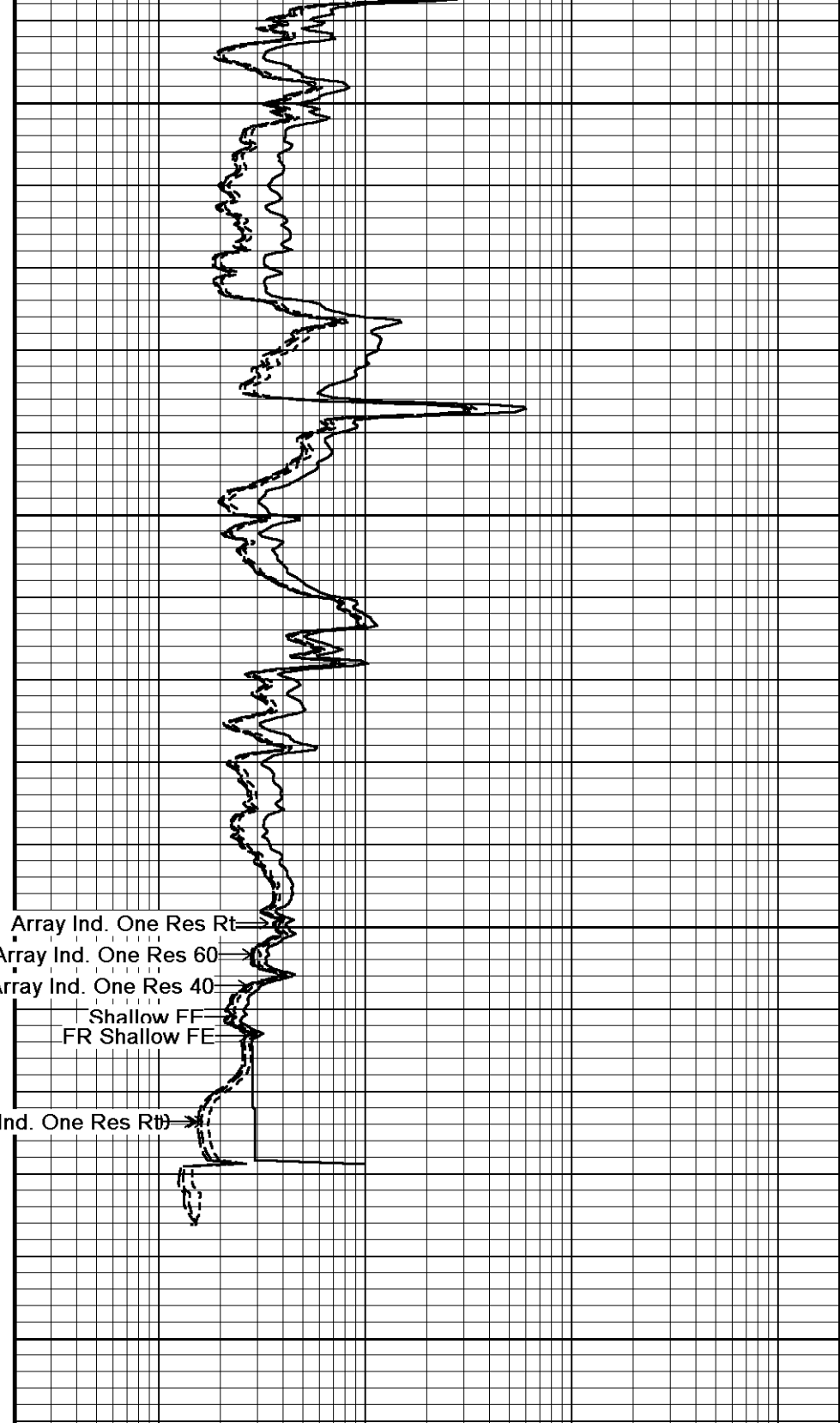
Gamma Ray

API
75

0 150

Borehole
Temp in
deg F

Spontaneous Potential



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 Rt

FR Spontaneous Potential

5350

5358

Depth
in
Feet

Shallow FE
ohm metres

0.20

1

10

100

1000

2000

Array Ind. One Res 40

ohm metres

0.20

1

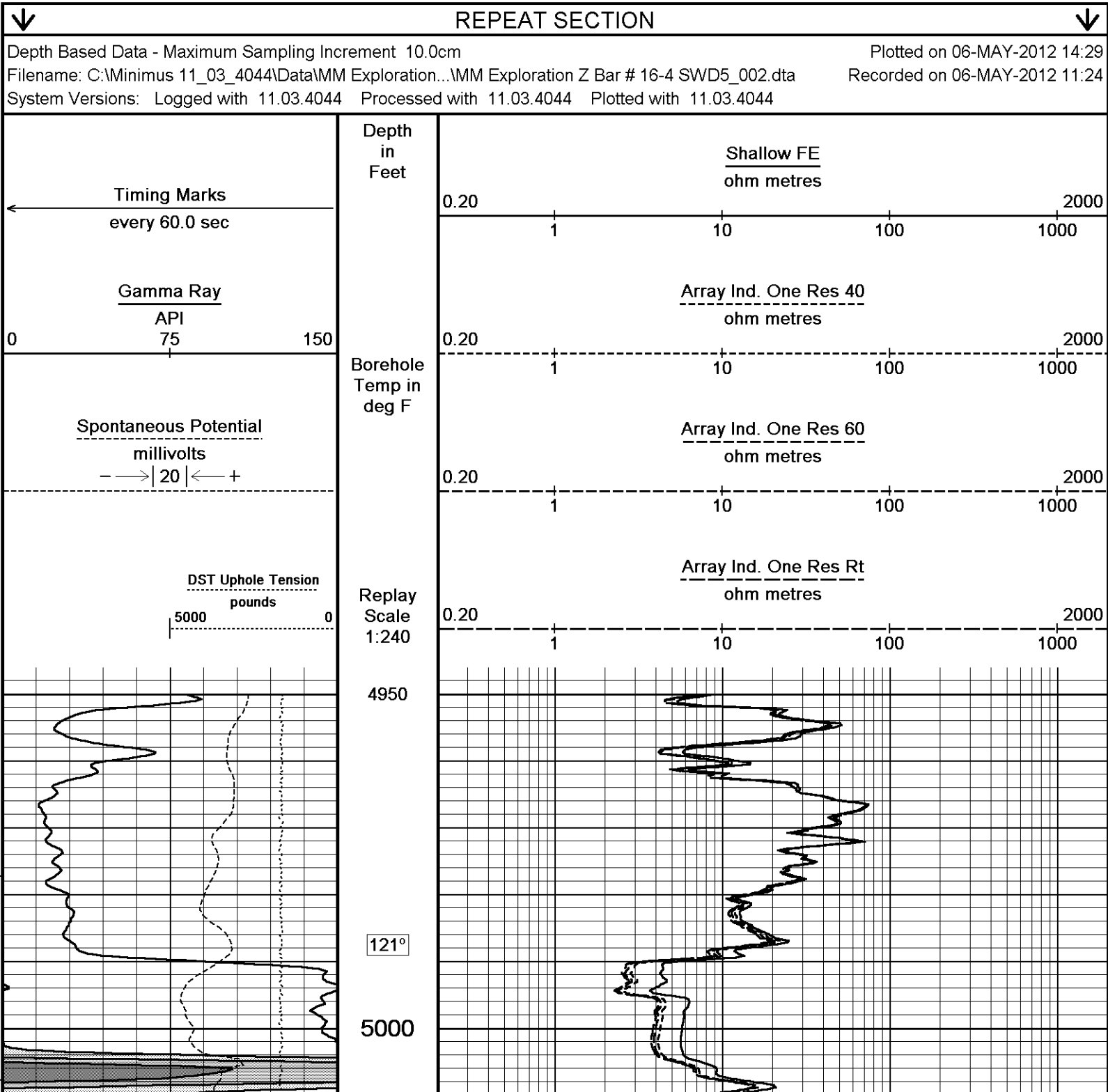
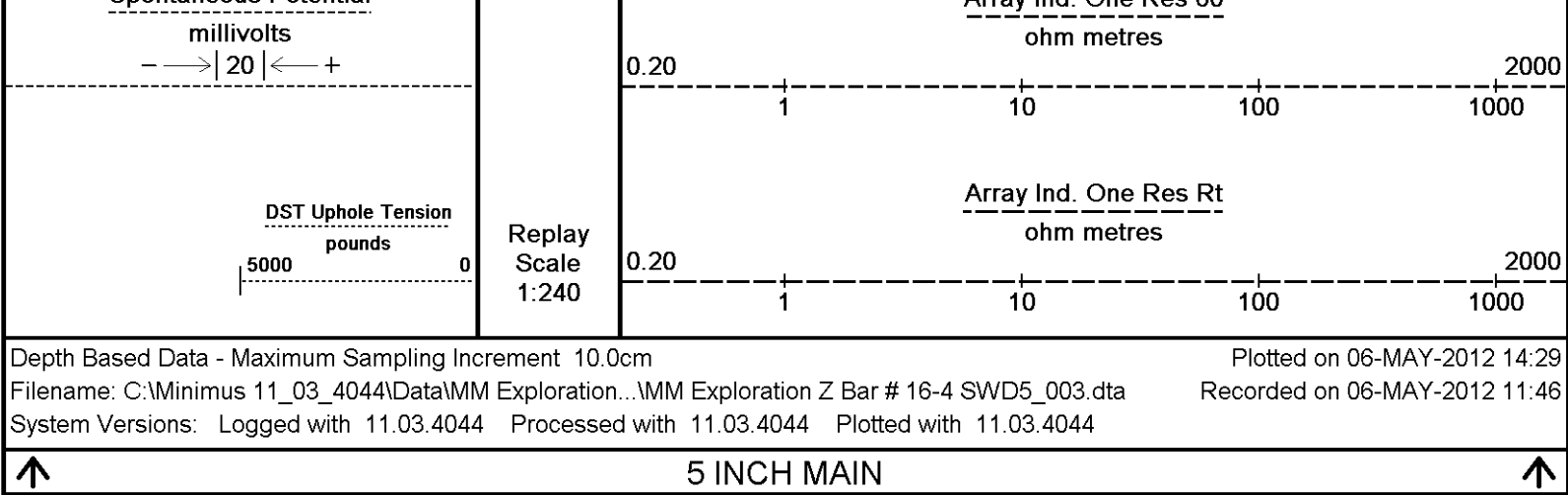
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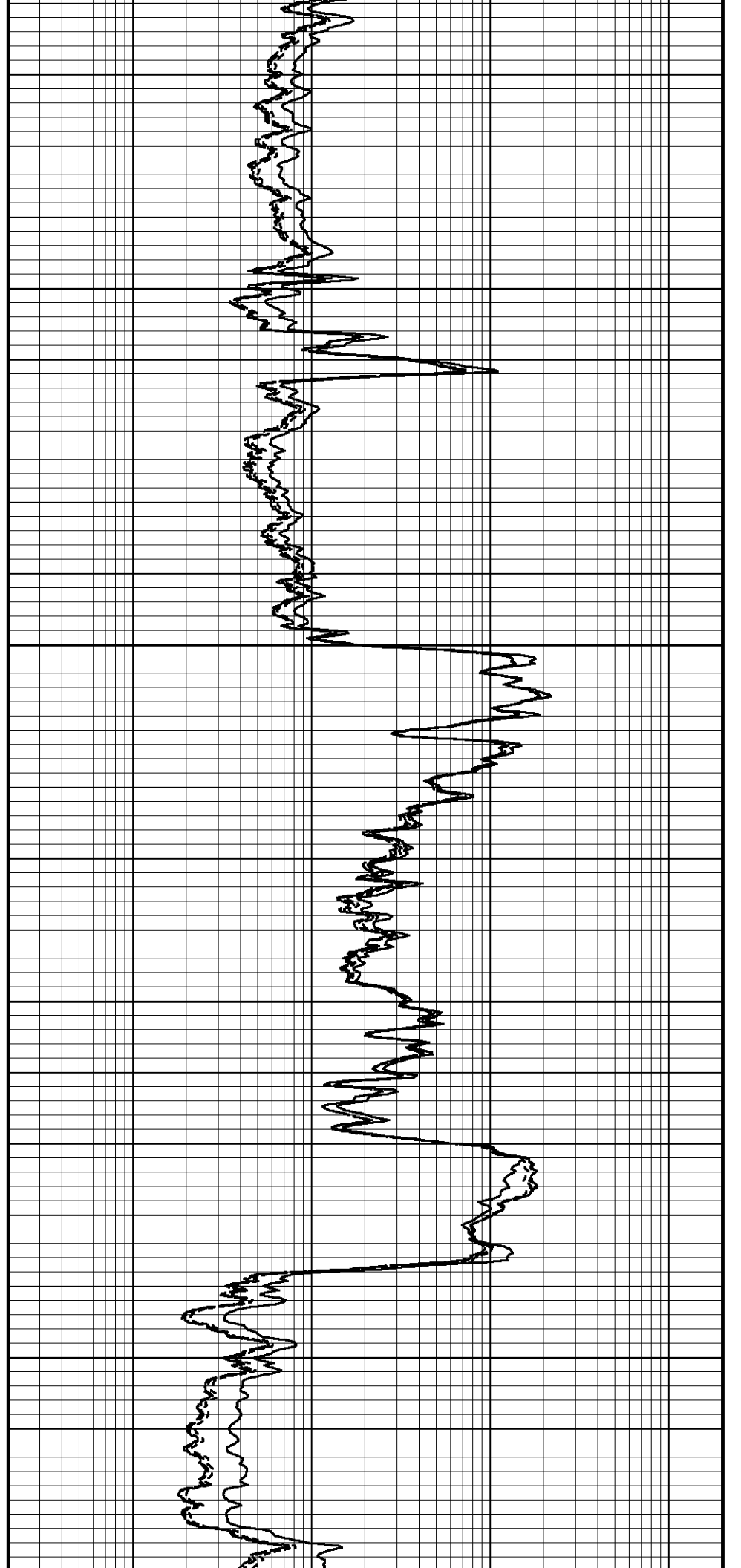
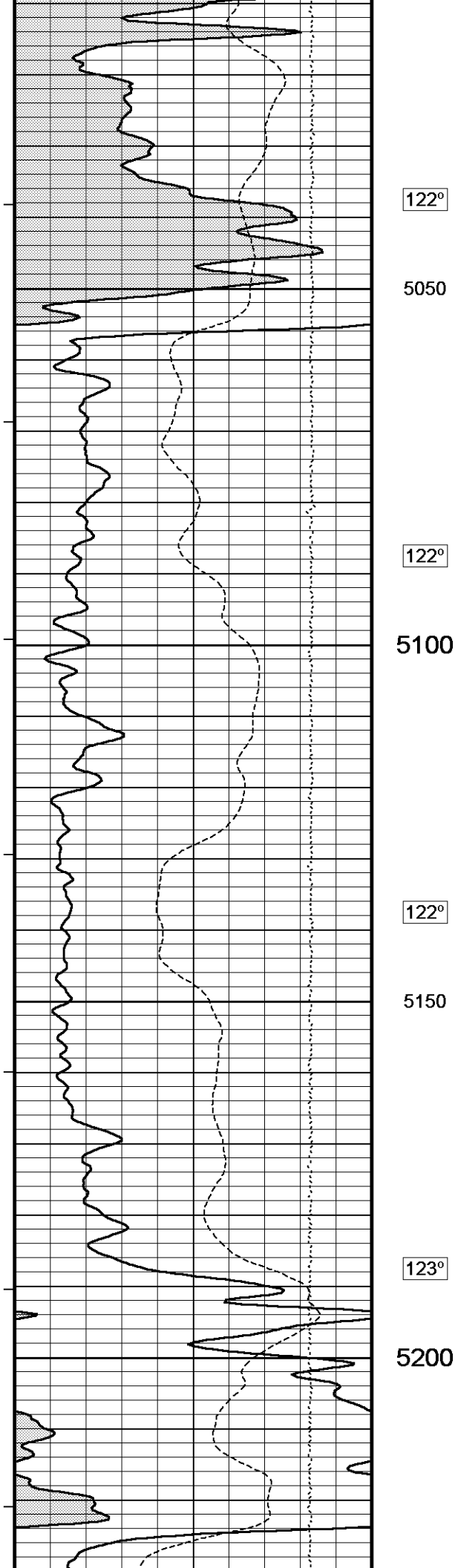
100

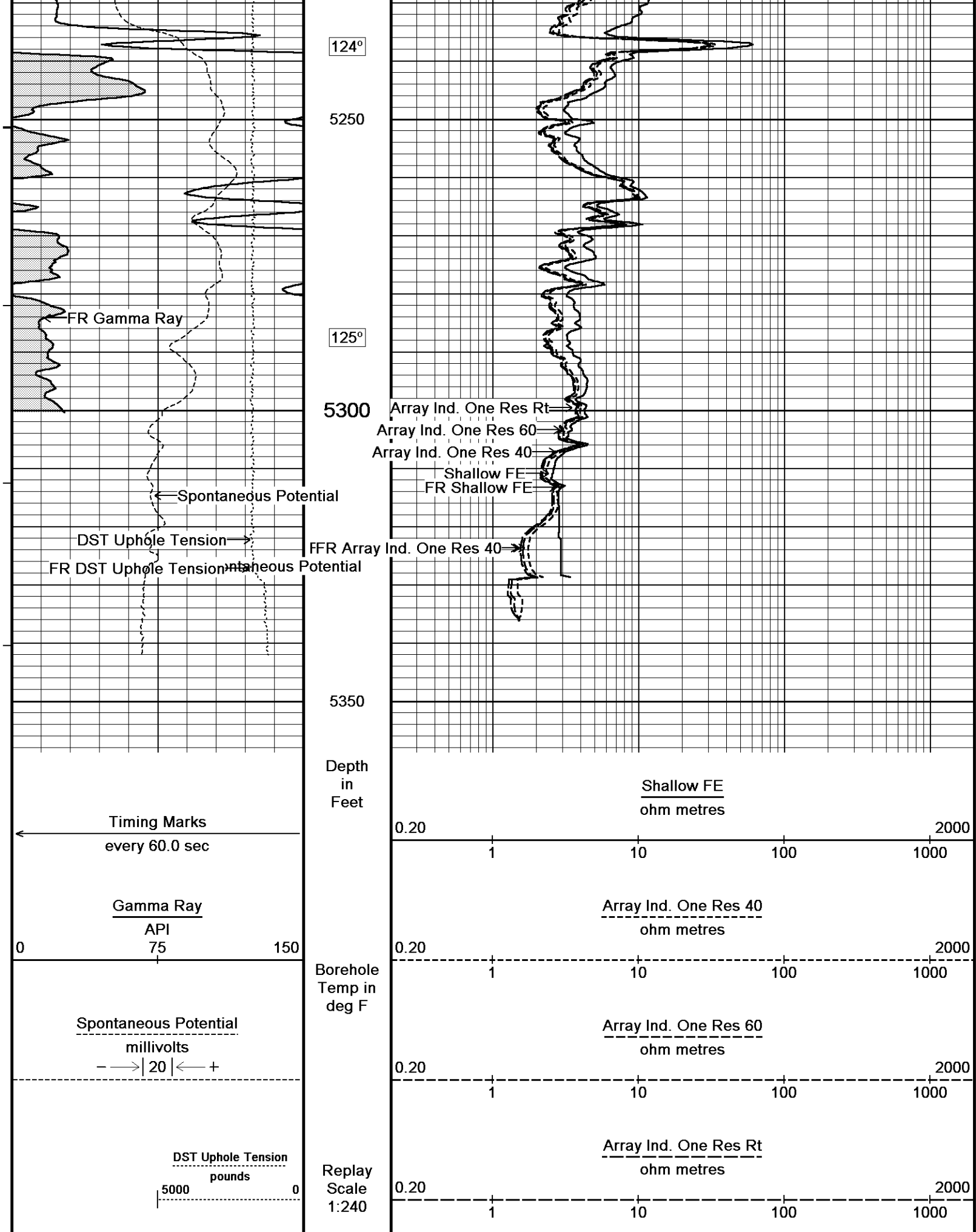
1000

2000

Array Ind. One Res 60









REPEAT SECTION



BEFORE SURVEY CALIBRATION

C:\Minimus 11_03_4044\Data\MM Exploration Z Bar # 16-4 SWD\MM Exploration Z Bar # 16-4 SWD5_003.dta

General Constants All 000

Last Edited on 0C4060A13004,

General Parameters

Mud Resistivity	1.020	ohm-metres
Mud Resistivity Temperature	73.000	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	5.500	inches
Caliper for Differential Caliper	None	

Rwa Parameters

Porosity used	Limestone Density Por.
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 23-FEB-2012 23:25

Reading No	Measured	Calibrated (lbs)
1	13693.36	0.00
2	14387.39	407.90

Gamma Calibration MCG-B 39

Field Calibration on 0C4060532000

	Measured	Calibrated (API)
Background	45	30
Calibrator (Gross)	726	486
Calibrator (Net)	681	456

Gamma Constants MCG-B 39

Last Edited on 0C4060A13004,

Gamma Calibrator Number	GRC141	
Mud Density	1.05	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

SP Calibration MCG-B 39

Field Calibration on 0C30B0F0100C

	Measured	Calibrated (mV)
Reference 1	101.0	100.0
Reference 2	-99.7	-100.0

High Resolution Temperature Calibration MCG-B 39

Field Calibration on 0C317000C008,

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-B 39

Last Edited on

Pre-filter Length 11

Caliper Calibration MML-A 4

Base Calibration on 0C3170021008,
Field Calibration on 0C4060524000

Base Calibration Reading No	Measured	Calibrator Size (in)
1	15017	5.98
2	18447	7.97
3	21786	9.86
4	25801	11.92

4	2380.1	11.92
5	0	0.00
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	6.08	5.98
Micro Normal and Micro Inverse Calibration MML-A 4		Base Calibration on 0C3170023008, Field Check on 0C4060525000
Base Calibration		
Channel	Resistor 1	Measured Resistor 2
Micro Normal	12.2	60.2
Micro Inverse	15.7	78.3
		Calibrated (ohm-m)
		Resistor 1
		Resistor 2
		5.0
		25.0
		5.0
		25.0
Channel	Base Check (ohm-m)	
Micro Normal	62.9	
Micro Inverse	48.3	
	Field Check (ohm-m)	
	62.9	
	48.3	
Micro Normal and Micro Inverse Constants MML-A 4		Last Edited on 0C4060A13004,
Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159	
Micro Normal K Factor	1.0000	
Micro Inverse K Factor	1.0000	
Standoff Offset	N/A inches	
Neutron Calibration MDN-B.J 387		Base Calibration on 0C31C0938008 Field Check on 0C4060537000
Base Calibration		
	Near	Measured Far
	2956	91
Ratio	32.635	
	Near	Calibrated (cps) Far
	3714	110
	33.764	
Field Calibrator at Base	Calibrated (cps)	
	2214	3169
Ratio	0.699	
Field Check	Calibrated (cps)	
	2202	3182
Ratio	0.692	
Neutron Constants MDN-B.J 387		Last Edited on 06-MAY-2012,10:54
Neutron Source Id	P0204NN	
Neutron Jig Number	NEDC117	
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	Constant Value	
Formation Pressure	0.00	kpsi
Temperature Source	Constant Value	
Temperature	68.00	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-B.J 352		Base Calibration on 0C31B0831004 Field Check on 0C4060523000
Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.7	126.8
Base Check	281.5	
Field Check	281.5	

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 178

Base Calibration on 0C31B0B06000,
Field Check on 0C4060521000

Base Calibration

Test Loop Calibration

Measured

Calibrated (mmho/m)

Channel	Low	High	Low	High
1	17.6	484.7	9.3	966.2
2	6.2	391.4	7.6	821.4
3	4.0	264.5	5.2	566.0
4	2.3	135.1	2.6	279.2

Array Temperature	77.0	Deg F
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Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	12.3	3762.6
2	0.0	0.0	29.6	3466.9
3	0.0	0.0	27.3	3014.1
4	0.0	0.0	18.8	2064.7
Deep	0.0	0.0	15.9	1995.3
Medium	0.0	0.0	40.3	3955.3
Shallow	0.0	0.0	45.3	5081.7

Array Temperature	0.0	72.7	Deg F
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Induction Constants MAI-A.A 178

Last Edited on 0C4060A08004,

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	Constant Value	
Temp. for Rm Corr.	N/A	
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

Resistivity of Mud Filtrate for SW	0.00	0mm-in
Source for Rt	0.00	
Source for Rxo	0.00	
High Resolution Temperature Calibration MAI-A.A 178		
	Measured	Calibrated(Deg F)
Lower	32.00	32.00
Upper	68.00	68.00
High Resolution Temperature Constants MAI-A.A 178		
Pre-filter Length	11	
Photo Density Calibration MPD-B 35		
Density Calibration		Base Calibration on 0C31C0B00008
Base Calibration		Field Check on 0C406052B000
	Measured	Calibrated (sdu)
	Near	Far
Reference 1	62298	31871
Reference 2	26887	2863
Field Check at Base	1142.9	1359.1
Field Check	1145.7	1361.2
PE Calibration		
Base Calibration		Calibrated
	WS	Ratio
Background	204	1008
Reference 1	23049	62096
Reference 2	7079	26739
Field Check at Base	204.4	1008.1
Field Check	206.4	1011.8
Density Constants MPD-B 35		
Density Source Id		18235B
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	1.05	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 (ft)
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-B 35		
Base Calibration		Base Calibration on 0C31C0A2C008
Reading No		Field Calibration on 0C4060527000
	Measured	Calibrator Size (in)
1	20688	3.99
2	30944	5.98
3	41212	7.97

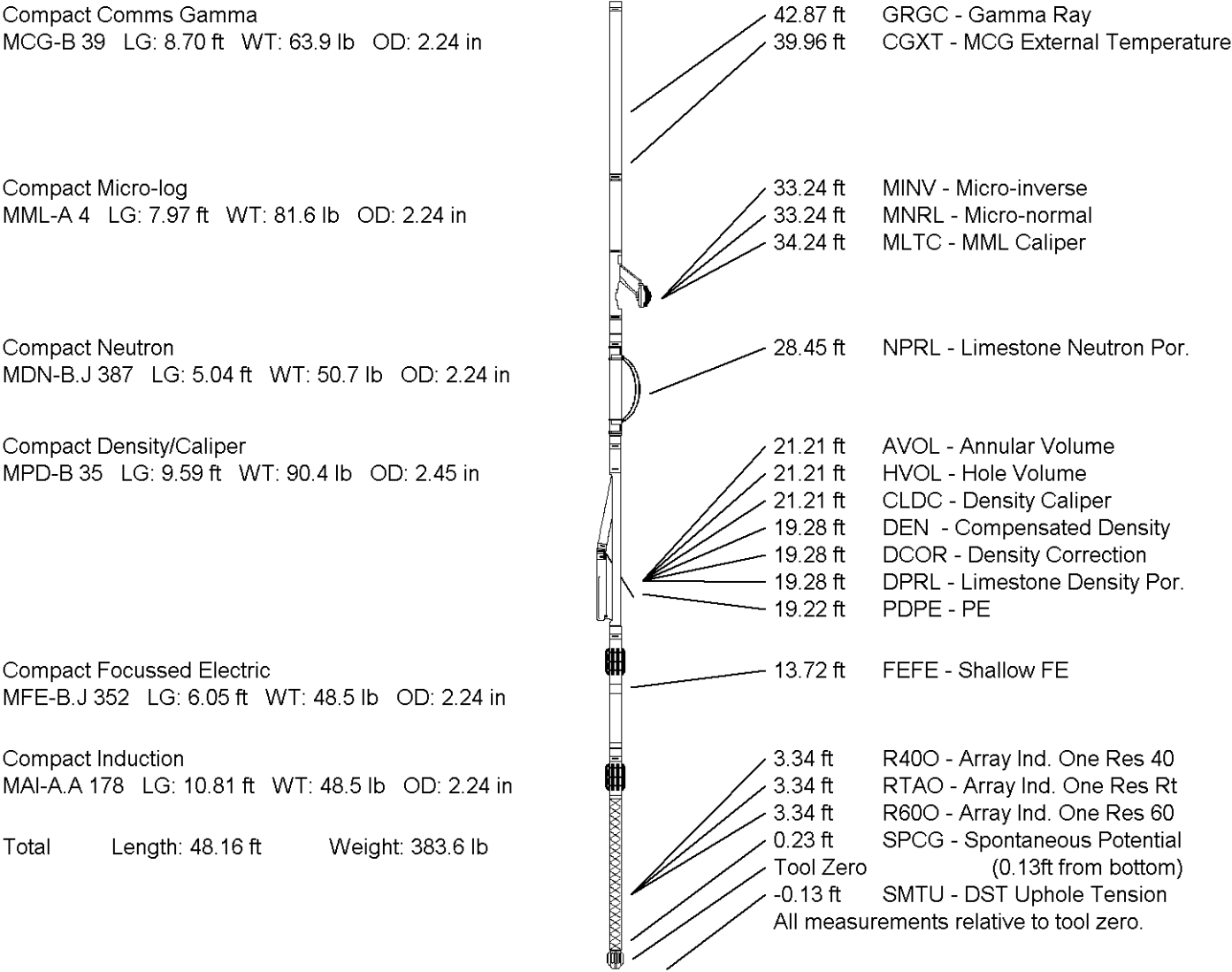
3	41312	7.97
4	50976	9.86
5	61184	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.99	5.98

DOWNHOLE EQUIPMENT

C:\Minimus 11_03_4044\Data\MM Exploration Z Bar # 16-4 SWD\MM Exploration Z Bar # 16-4 SWD5_003.dta



COMPANY	M&M EXPLORATION, INC
WELL	Z BAR 16-4 SWD
FIELD	AETNA NE
PROVINCE/COUNTY	BARBER
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	1571.00	feet	First Reading	5324.00	feet
Elevation Drill Floor	1569.00	feet	Depth Driller	5330.00	feet
Elevation Ground Level	1559.00	feet	Depth Logger	5327.00	feet

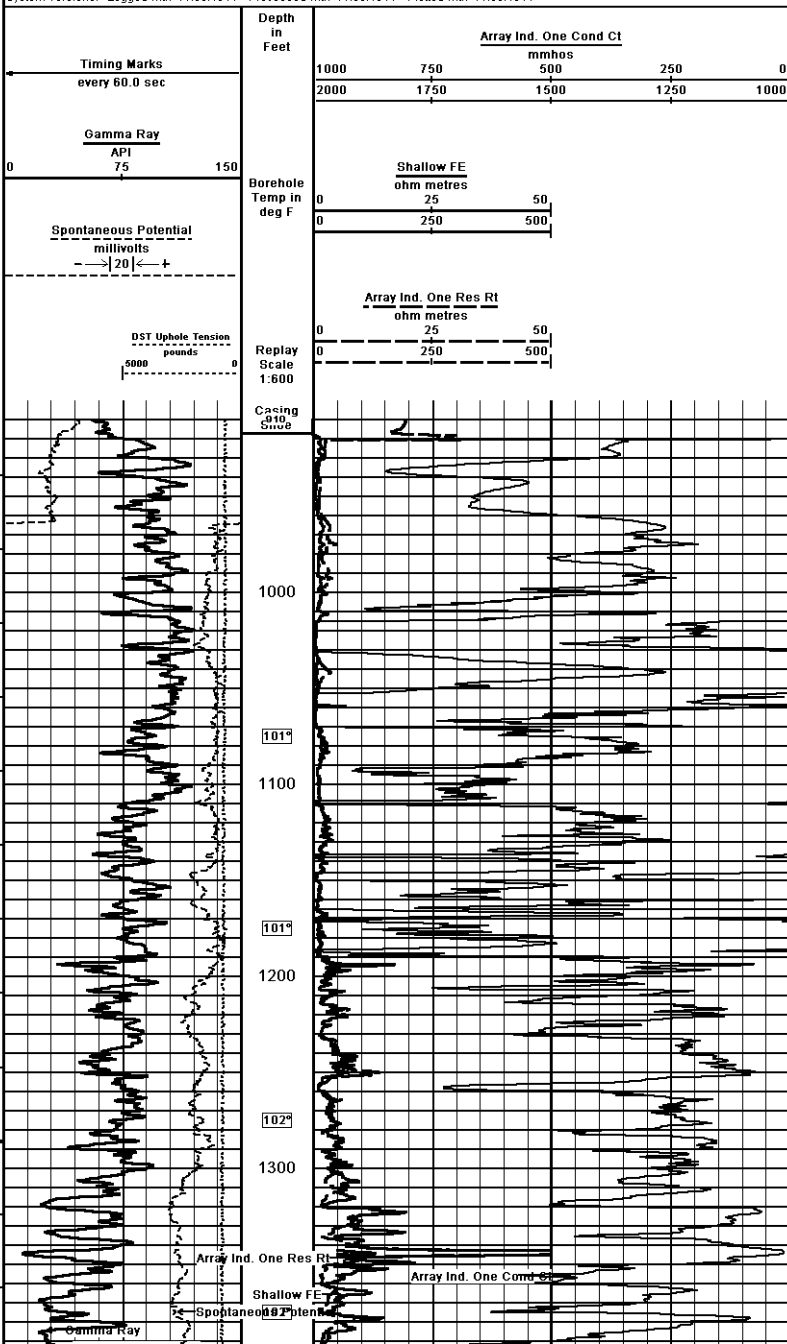


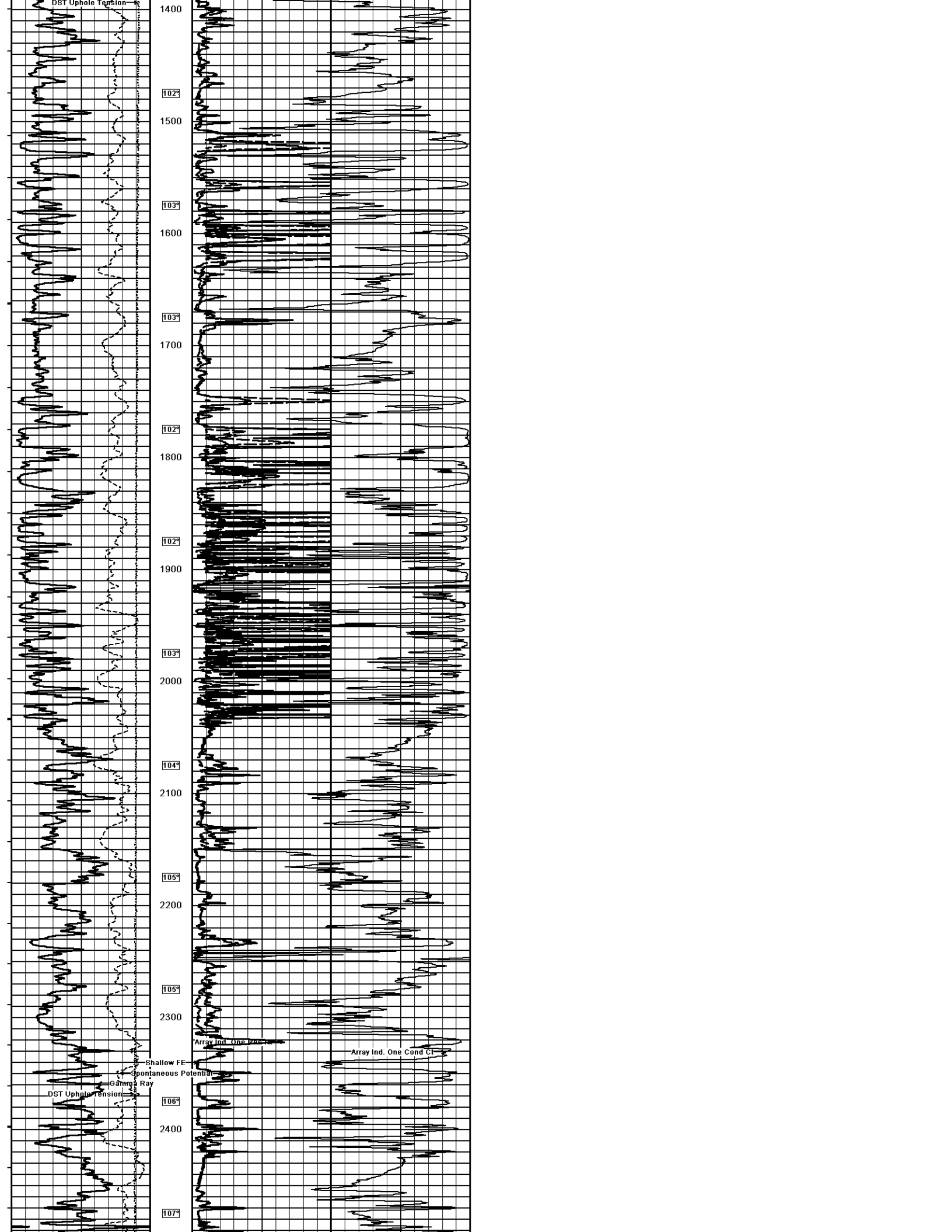
ARRAY INDUCTION
SHALLOW FOCUSED

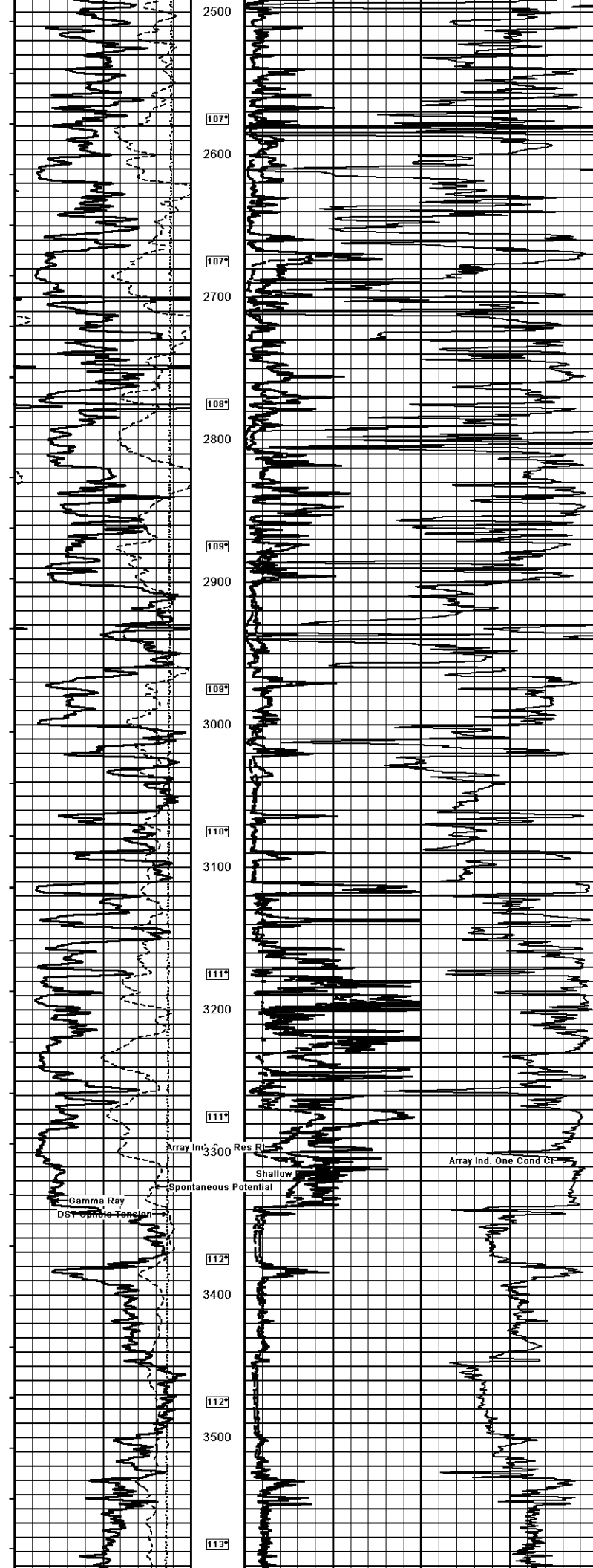


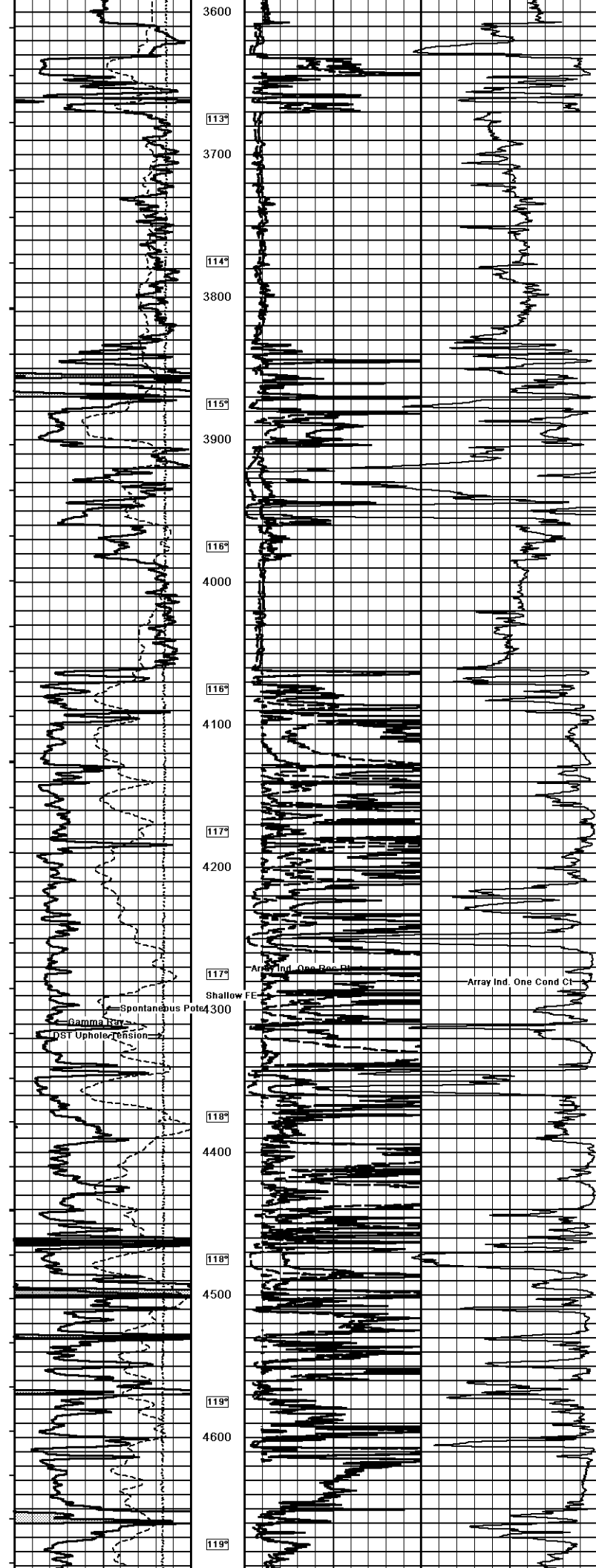
ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOGCOMPANY M&M EXPLORATION, INC.
WELL Z BAR 16-4 SWD
FIELD AETNA NE
PROVINCE/COUNTY BARBER
COUNTRY/STATE U.S.A. / KANSAS
LOCATION 400' FNL & 530' FWL
NW/4SEC 10 TWP 34S R2E Other Services
10 34S 14W MPT/MDN
APL Number 15-007-23943
Permit Number
Permanet Datum G.L. Elevation 1559 feet
Log Measured From KB
Drilling Measured From KBDate 06-MAY-2012
Run Number ONE
Depth Driller 5330.00 feet
Depth Logger 5327.00 feet
First Reading 5324.00 feet
Last Reading 917.00 feet
Casing Driller 916.00 feet
Casing Logger 917.00 feet
Bit Size 7.875 inches
Flow Fluid Type CHEMICAL
Density/Viscosity 8.80 lb/USG 48.00 CP
PH/Fluid Loss 9.00 FLOWLINE 10.80 m/20min
Sample Source
Rm @ Measured Temp 1.02 @ 73.0 ohm-m
Rmr @ Measured Temp 0.82 @ 73.0 ohm-m
Rmc @ Measured Temp 1.22 @ 73.0 ohm-m
Source Rmr/Rmc CALC
Rm @ BHT 0.61 @ 125.0 ohm-m
Time Since Circulation 4 HOURS
Max Recorded Temp 125.00 deg F
Equipment Name COMPACT
Equipment Base 13086
Recorded By F. MARTINS
Witnessed By B. BROCK
S.O. 13086 3534524Revisions:
157.00
1569.00
1559.00
G.L.

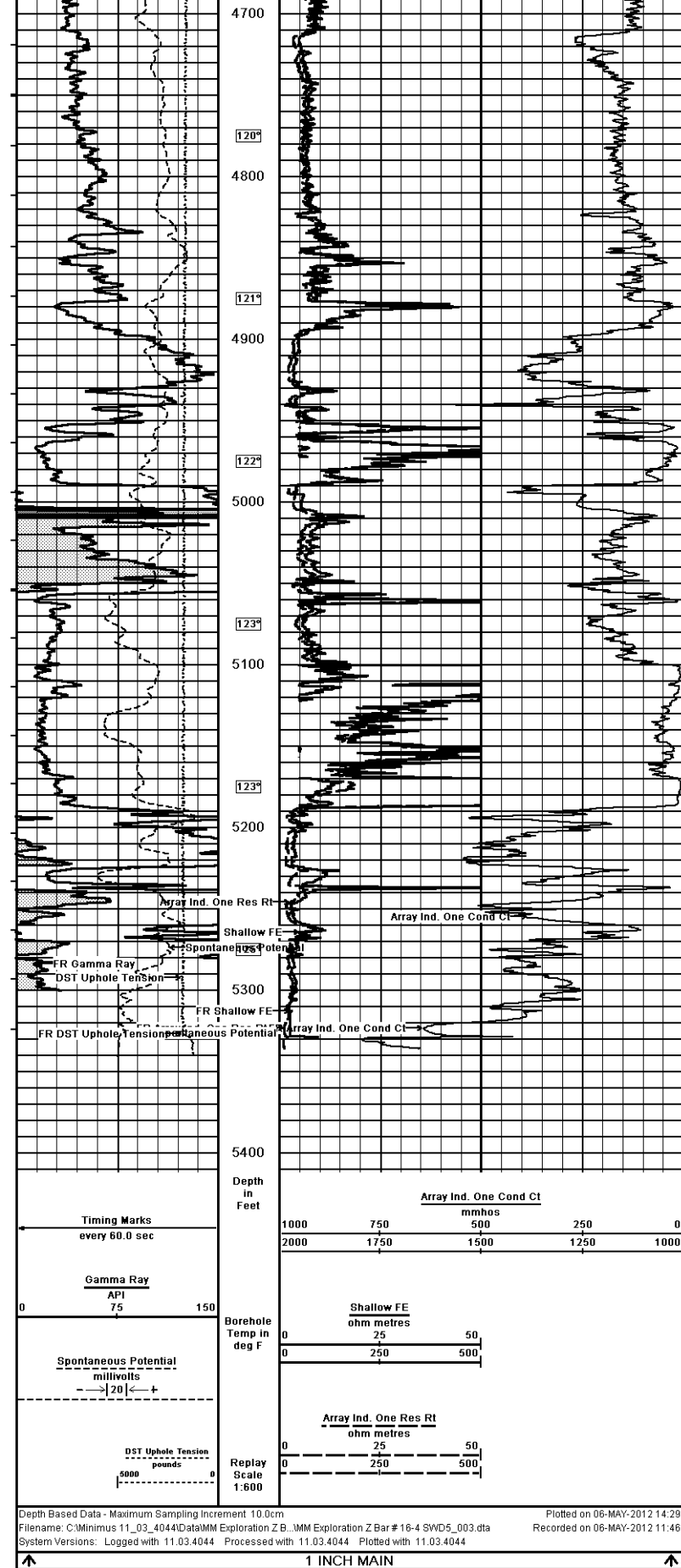
Run Number	ONE
Depth Driller	5330.00 feet
Depth Logger	5327.00 feet
First Reading	5324.00 feet
Last Reading	917.00 feet
Casing Driller	916.00 feet
Casing Logger	917.00 feet
Bit Size	7.875 inches
Flow Fluid Type	CHEMICAL
Density/Viscosity	8.80 lb/USG 48.00 CP
PH/Fluid Loss	9.00 FLOWLINE 10.80 m/20min
Sample Source	
Rm @ Measured Temp	1.02 @ 73.0 ohm-m
Rmr @ Measured Temp	0.82 @ 73.0 ohm-m
Rmc @ Measured Temp	1.22 @ 73.0 ohm-m
Source Rmr/Rmc	CALC
Rm @ BHT	0.61 @ 125.0 ohm-m
Time Since Circulation	4 HOURS
Max Recorded Temp	125.00 deg F
Equipment Name	COMPACT
Equipment Base	13086
Recorded By	F. MARTINS
Witnessed By	B. BROCK
S.O. 13086 #	3534524

1 INCH MAIN
Depth Based Data - Maximum Sampling Increment: 10.0cm
Plotted on 06-MAY-2012 14:29
Filename: C:\Minimus 11_03_4044Data\MM Exploration Z Bar # 16-4 SWD5_003.dta
Recorded on 06-MAY-2012 11:46
System Versions: Logged with 11.03.4044 Processed with 11.03.4044 Plotted with 11.03.4044









COMPANY	M&M EXPLORATION, INC				
WELL	Z BAR 16-4 SWD				
FIELD	AETNA NE				
PROVINCE/COUNTY	BARBER				
COUNTRY/STATE	U.S.A. / KANSAS				
Elevation Kelly Bushing	1571.00	feet	First Reading	5324.00	feet
Elevation Drill Floor	1569.00	feet	Depth Driller	5330.00	feet
Elevation Ground Level	1559.00	feet	Depth Logger	5327.00	feet

ARRAY INDUCTION
SHALLOW FOCUSED



