

**Weatherford****ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**

COMPANY

RED OAK ENERGY, INC.

WELL

FS/FRAHM # 1-35

FIELD

WC

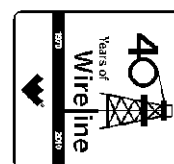
PROVINCE/COUNTY

THOMAS

COUNTRY/STATE

U.S.A. / KANSAS

LOCATION

1980' FSL & 100' FEL**E2 E2 NE SE**

SEC

TWP

RGE

Other Services

35

8S

35W

MPD/MDN

API Number

15-193-20848

MML

Permit Number

Permanent Datum G.L., Elevation 3303 feet

Log Measured From KB

Drilling Measured From K.B.

Elevations:

feet

KB

DF

GL

3308.00
3306.00
3303.00

Date

12-MAY-2012

Run Number

ONE

Depth Driller

4860.00

feet

Depth Logger

4857.00

feet

First Reading

4854.00

feet

Last Reading

331.00

feet

Casing Driller

335.00

feet

Casing Logger

331.00

feet

Bit Size

7.875

inches

Hole Fluid Type

CHEMICAL

Density / Viscosity

9.20

lb/USg

57.00

CP

PH / Fluid Loss

11.00

8.80

ml/30Min

Sample Source

FLOWLINE

Rm @ Measured Temp

0.71 @ 80.0

ohm-m

Rmf @ Measured Temp

0.57 @ 80.0

ohm-m

Rmc @ Measured Temp

0.85 @ 80.0

ohm-m

Source Rmf / Rmc

CALC

CALC

Rm @ BHT

0.47 @ 124.0

ohm-m

Time Since Circulation

5 HOURS

Max Recorded Temp

124.00

deg F

Equipment Name

COMPACT

Equipment / Base

13096

LIB

Recorded By

A. GIAMBALVO

BOREHOLE RECORD

Last Edited: 12-MAY-2012 05:55

Bit Size
inches

7.875

Depth From
feet

335.00

Depth To
feet

4857.00

CASING RECORD

Type

Size
inches

8.625

Depth From
feet

0.00

Shoe Depth
feet

335.00

Weight
pounds/ft

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 = 212 cu. ft

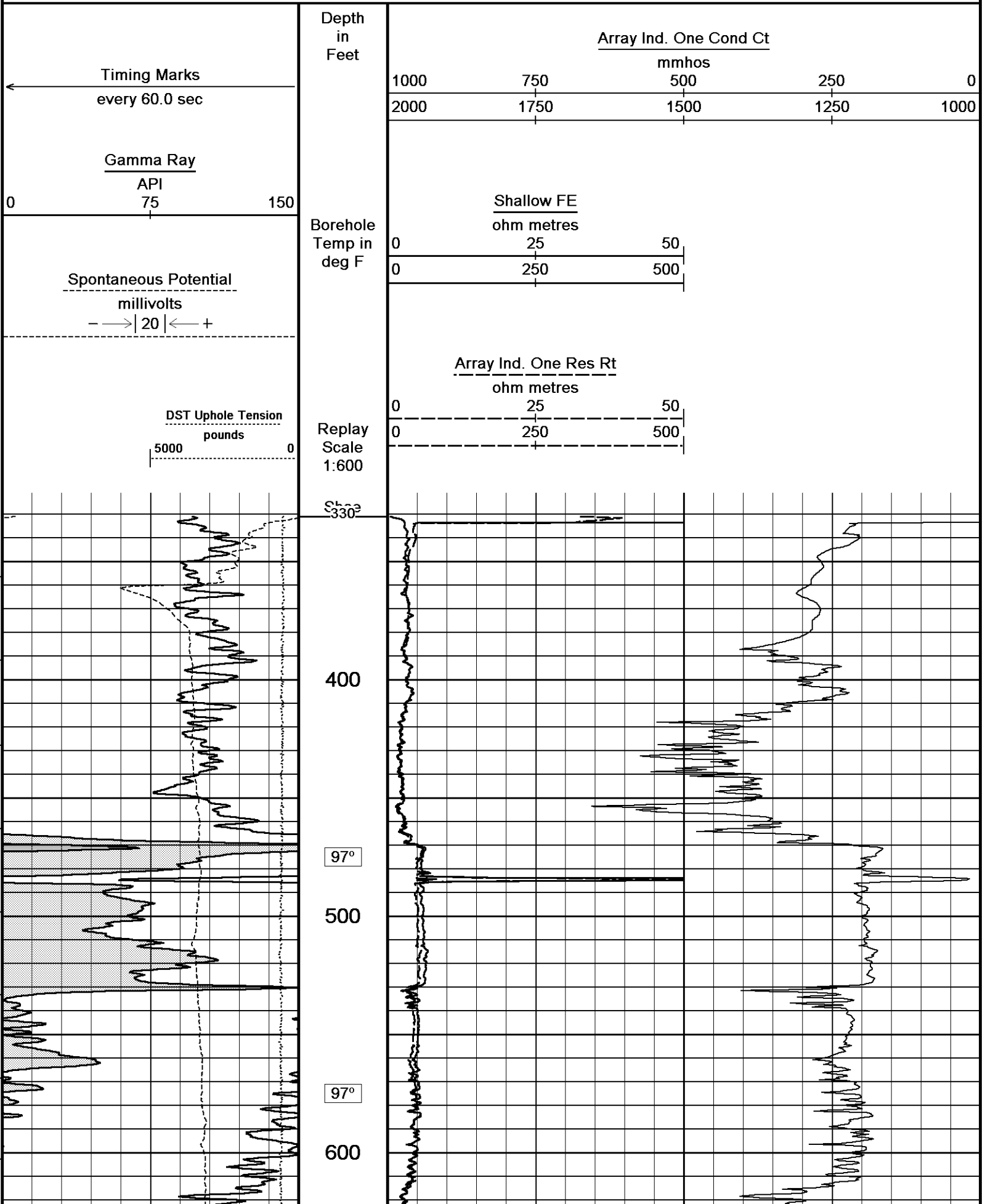
Service order #3534539

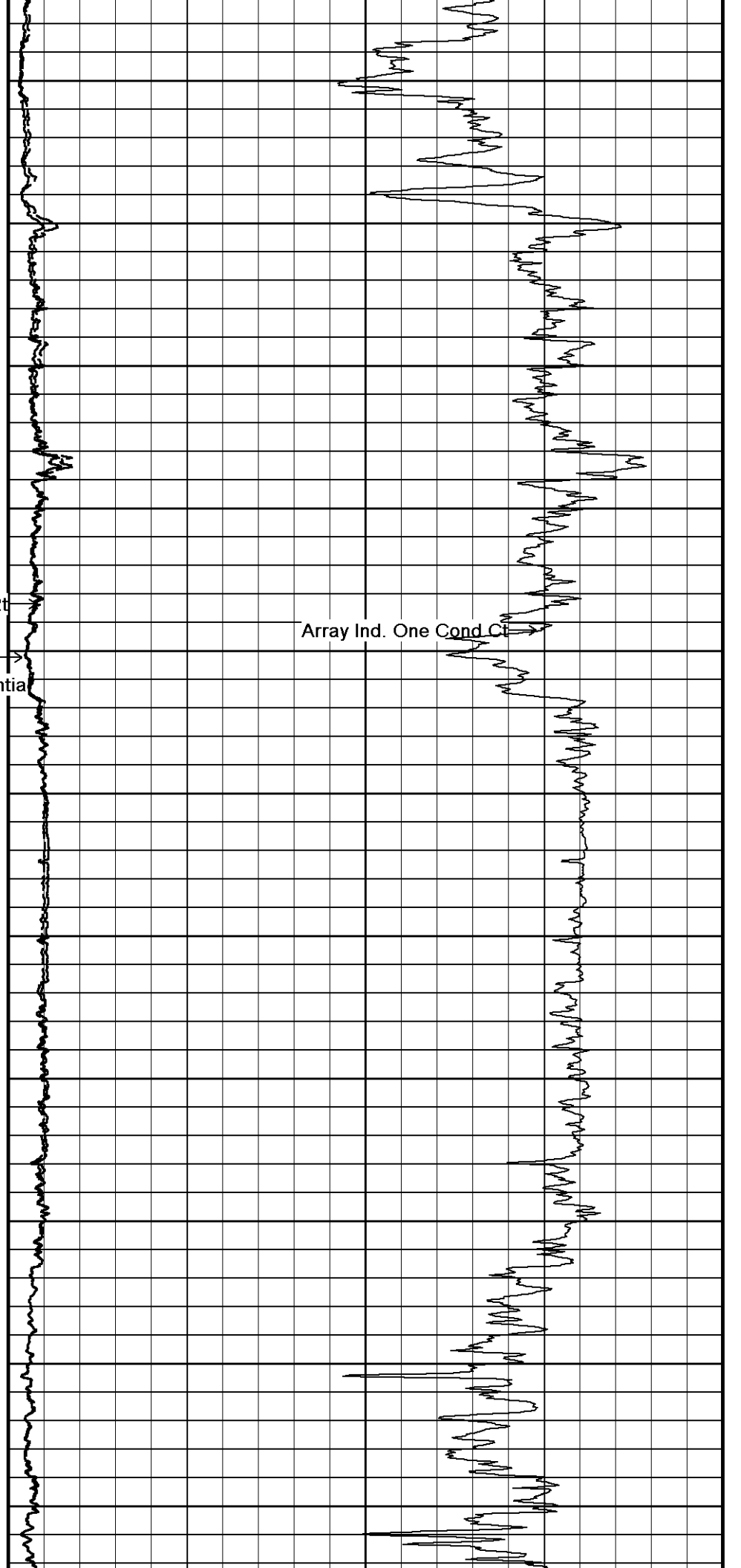
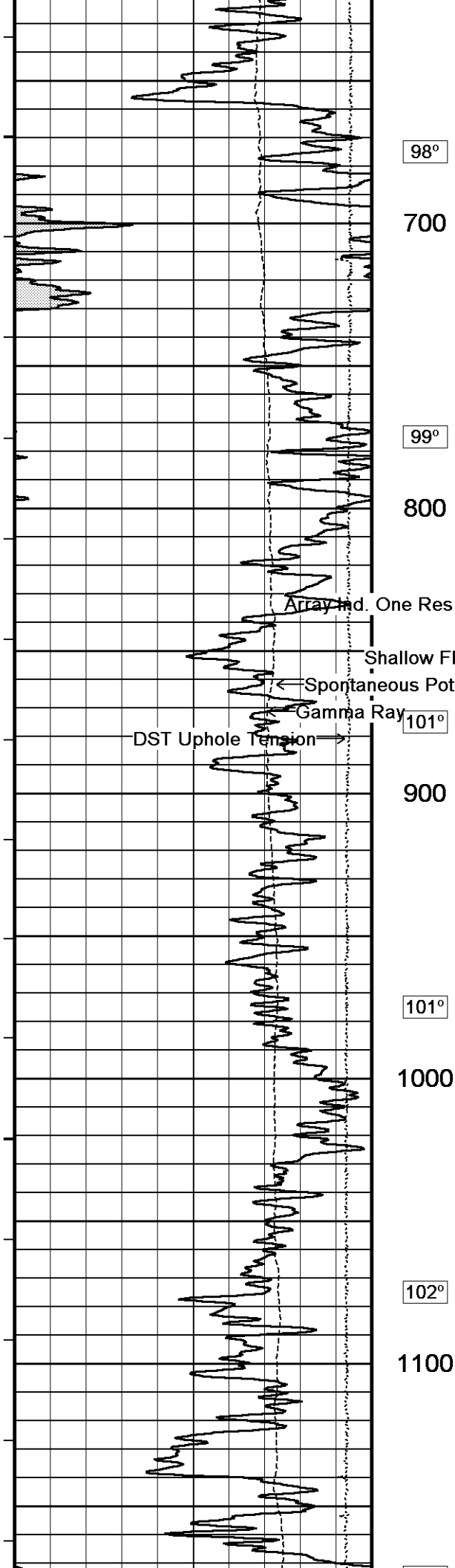
Rig: WW Drilling # 4

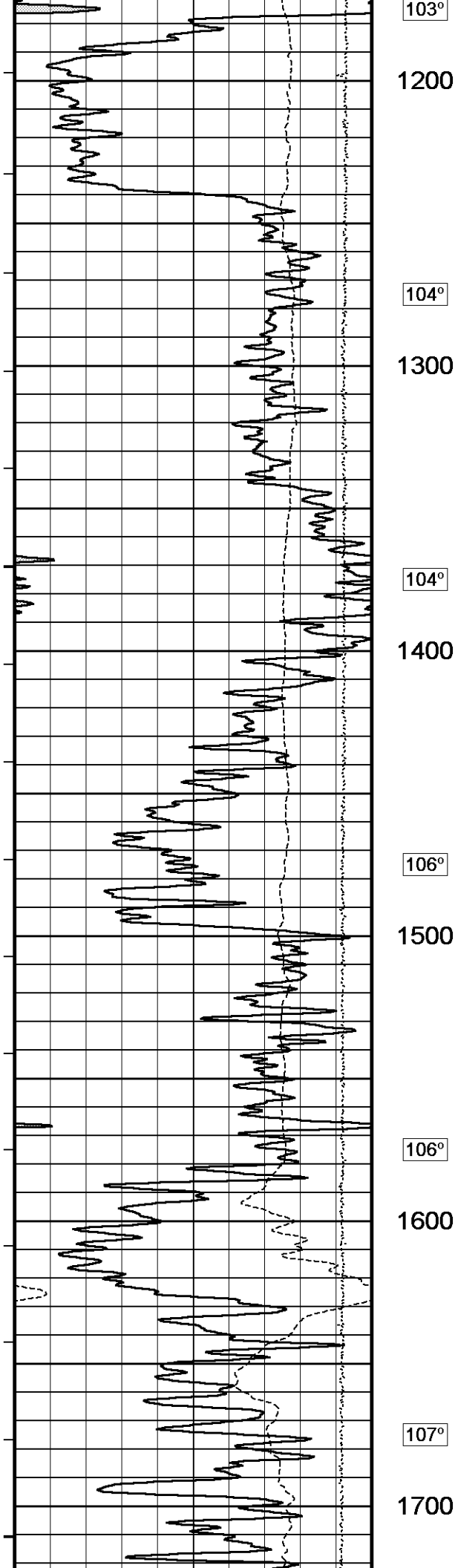
Engineer: A. Giambalvo

Operator(s): M. Stegman

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.







103°

1200

104°

1300

104°

1400

106°

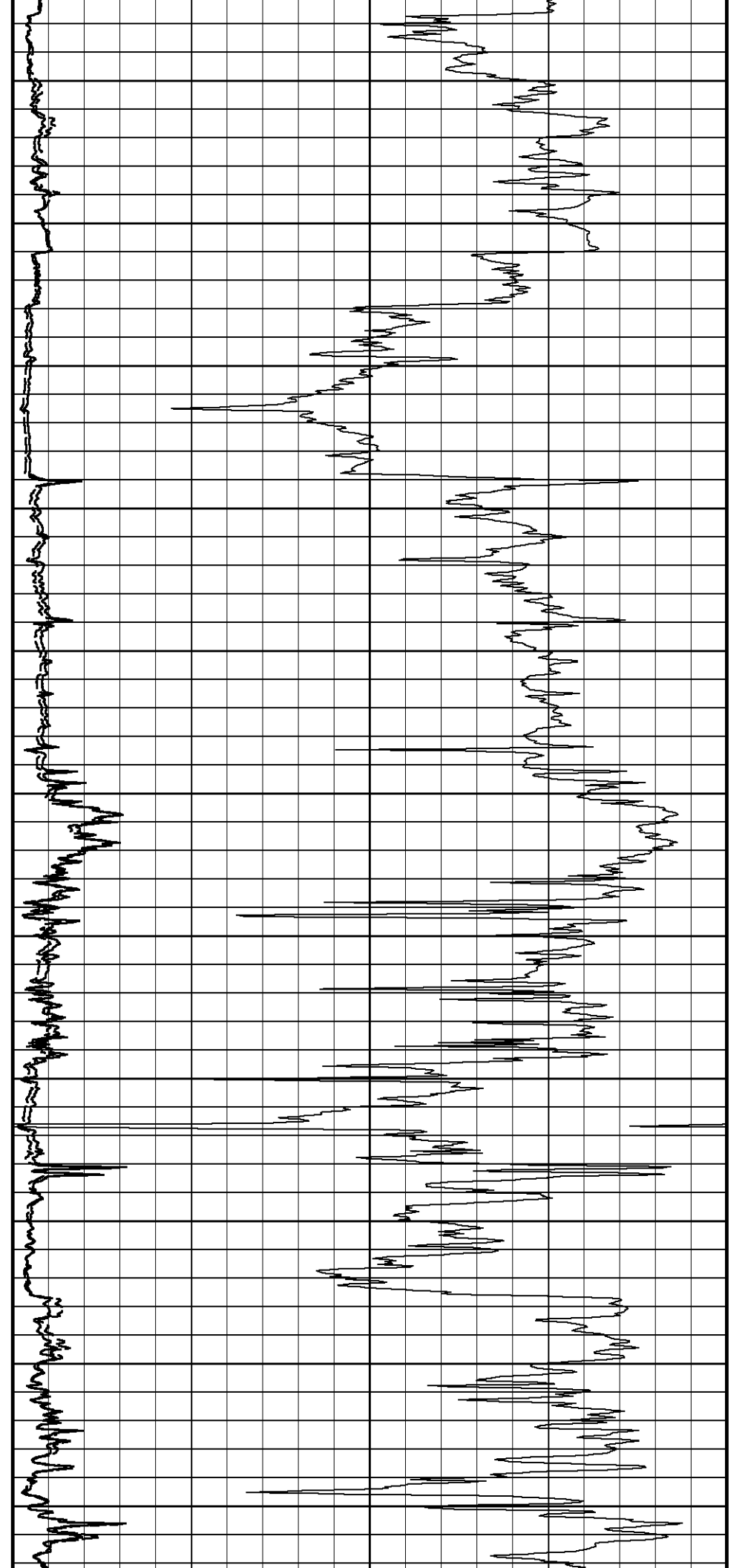
1500

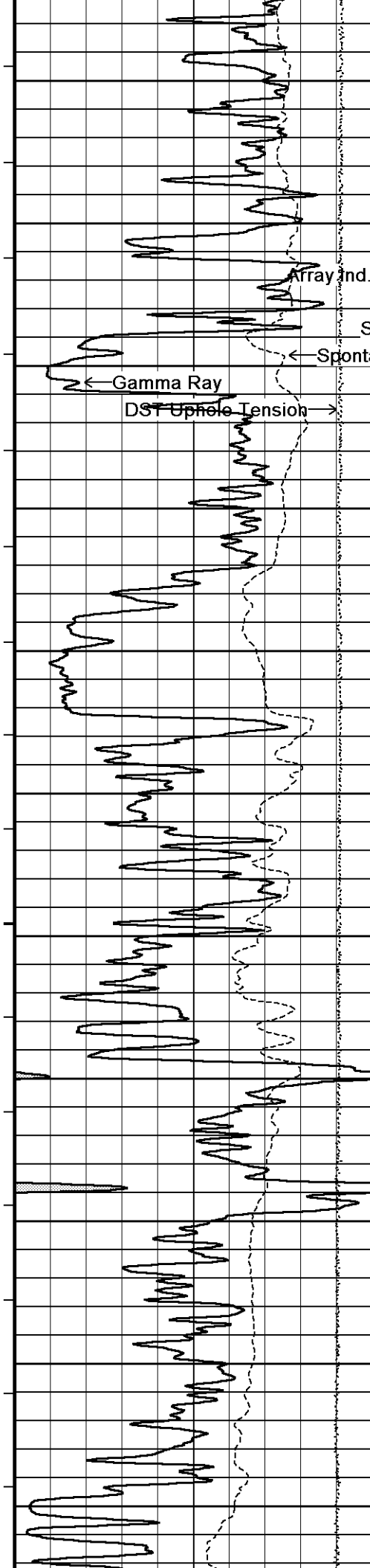
106°

1600

107°

1700





107°

1800

Array Ind. One Res Rt

Shallow FE

← Spontaneous Potential

← Gamma Ray

DST Up-hole Tension →

108°

1900

108°

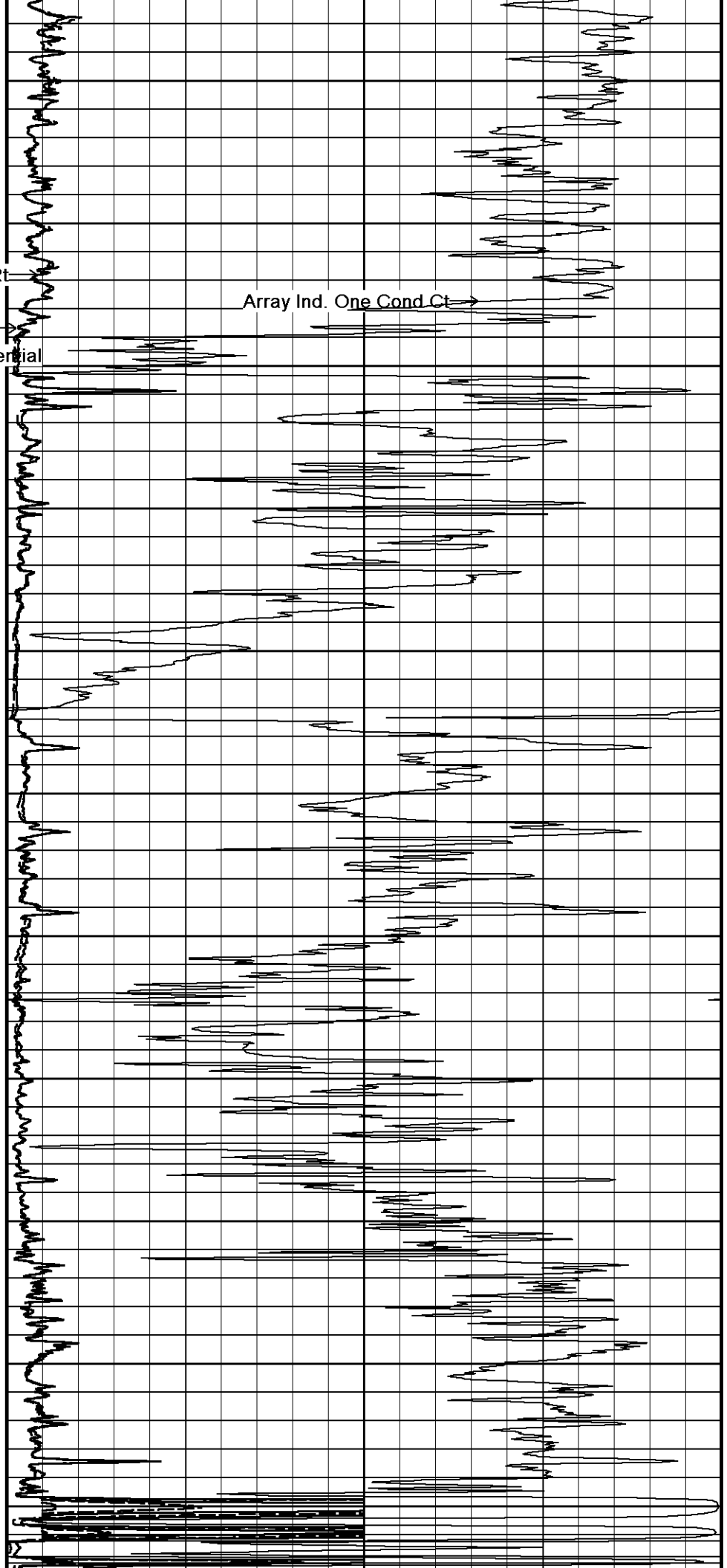
2000

109°

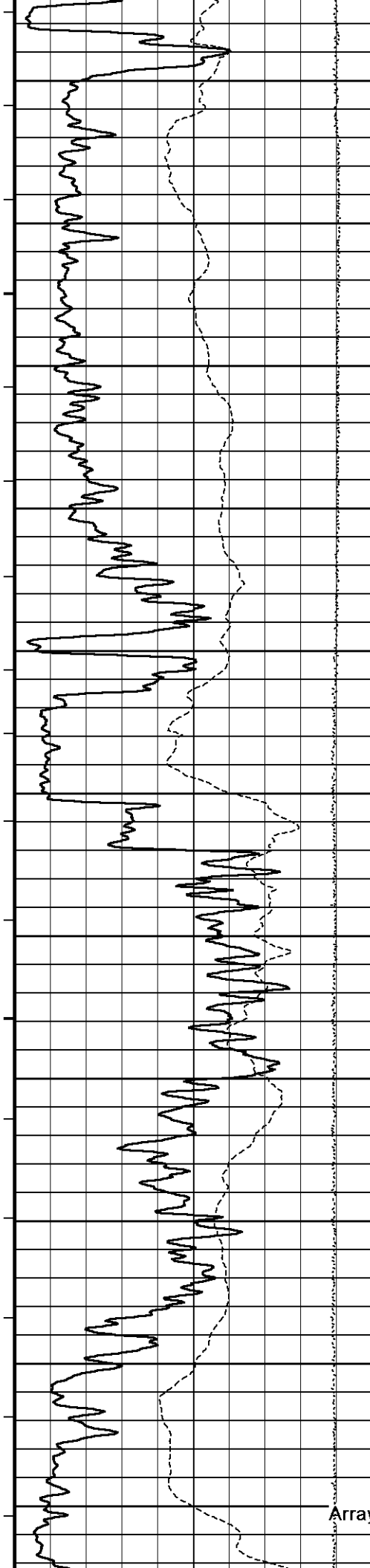
2100

110°

2200



Array Ind. One Cond Ct



110°

2300

110°

2400

110°

2500

111°

2600

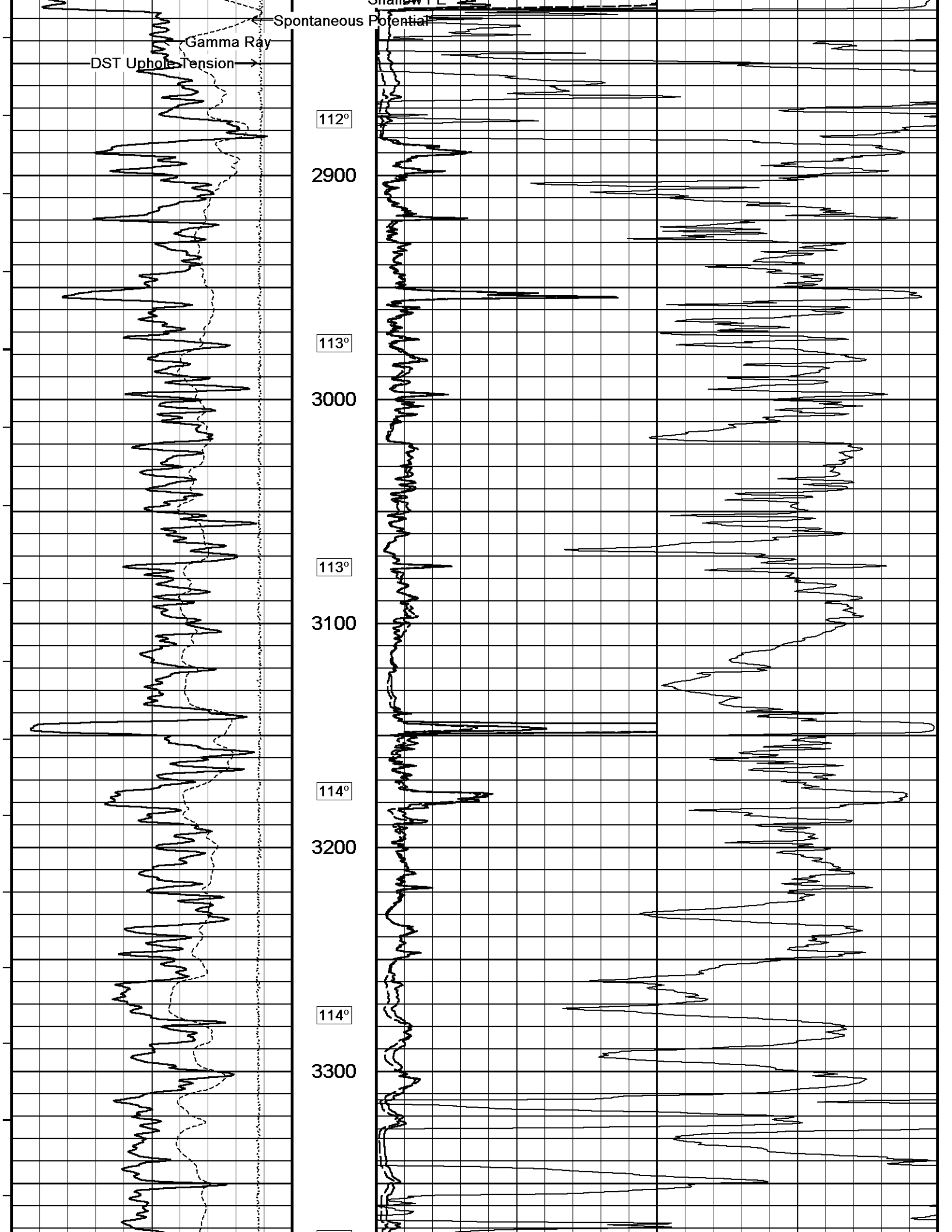
112°

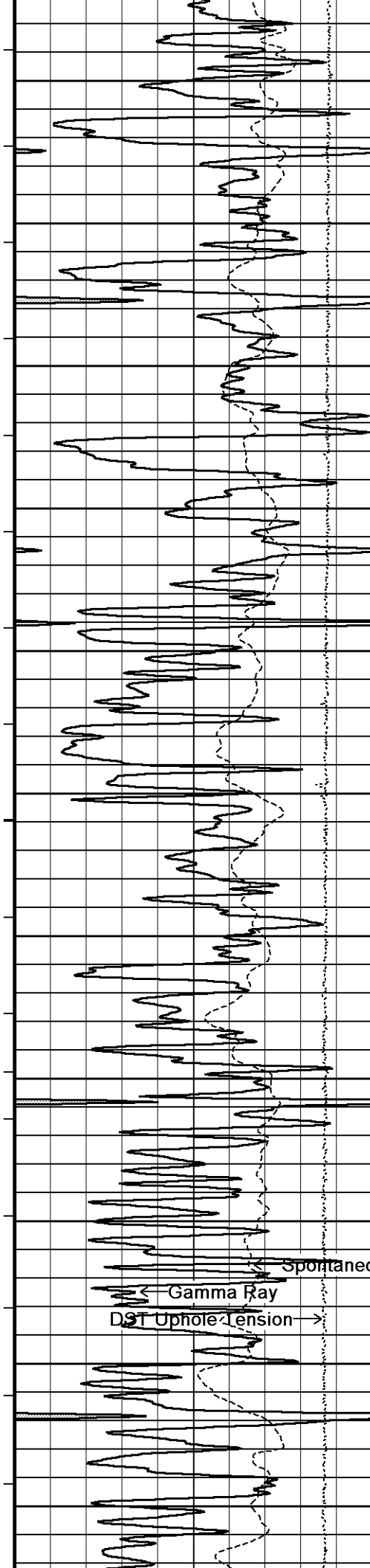
2700

112°

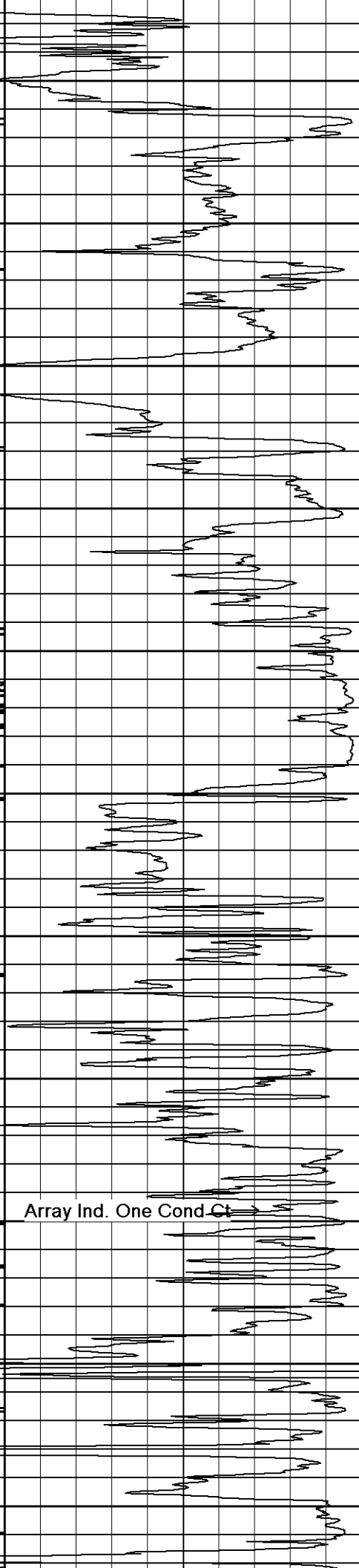
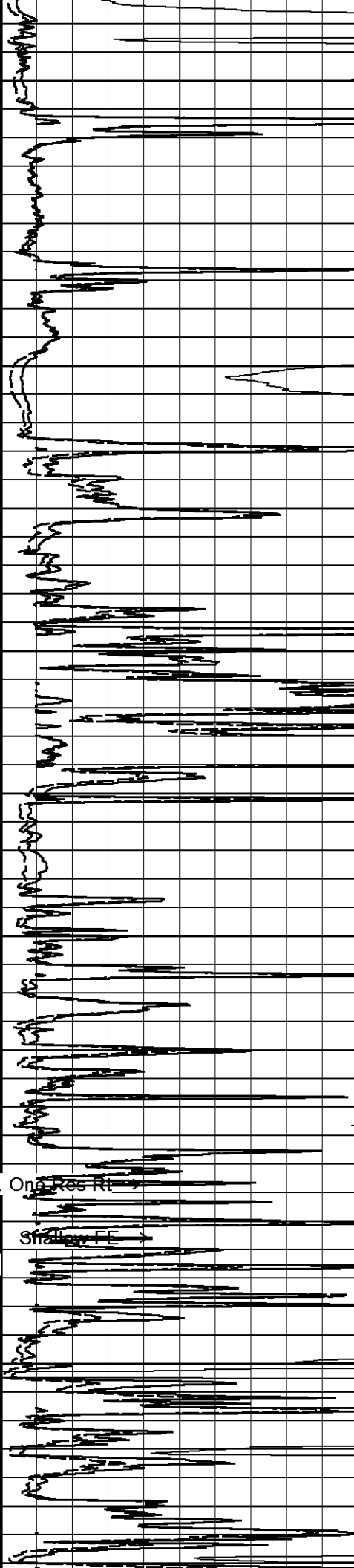
Array Ind. Res R

Array Ind. One Cond Ct →





115°
3400
115°
3500
115°
3600
115°
3700
116°
3800
117°
3900

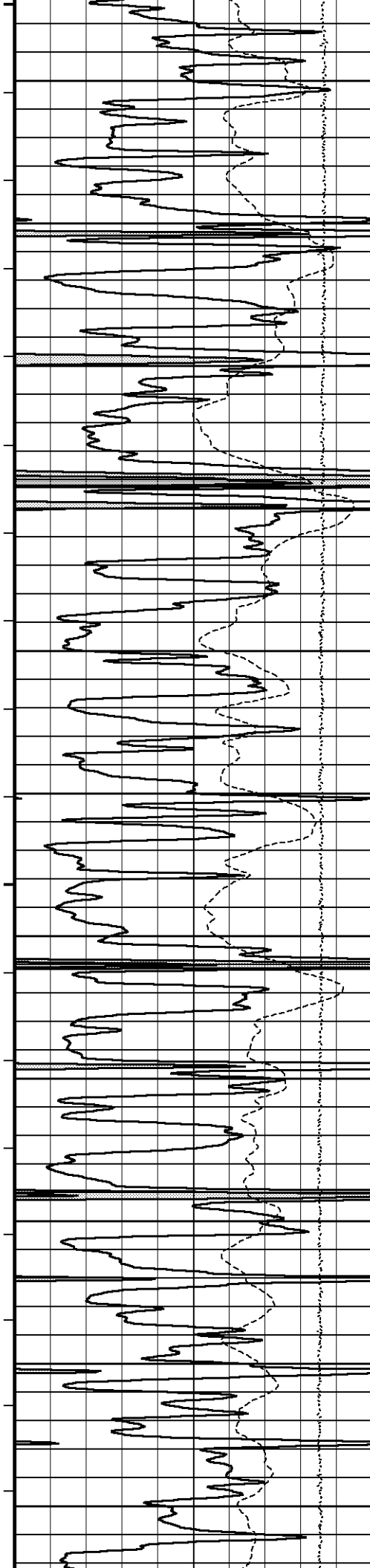


← Gamma Ray
DST Uphole Tension →

Array Ind. One Res Rt →

Array Ind. One Cond Ct →

Shallow FE →



118°

4000

118°

4100

118°

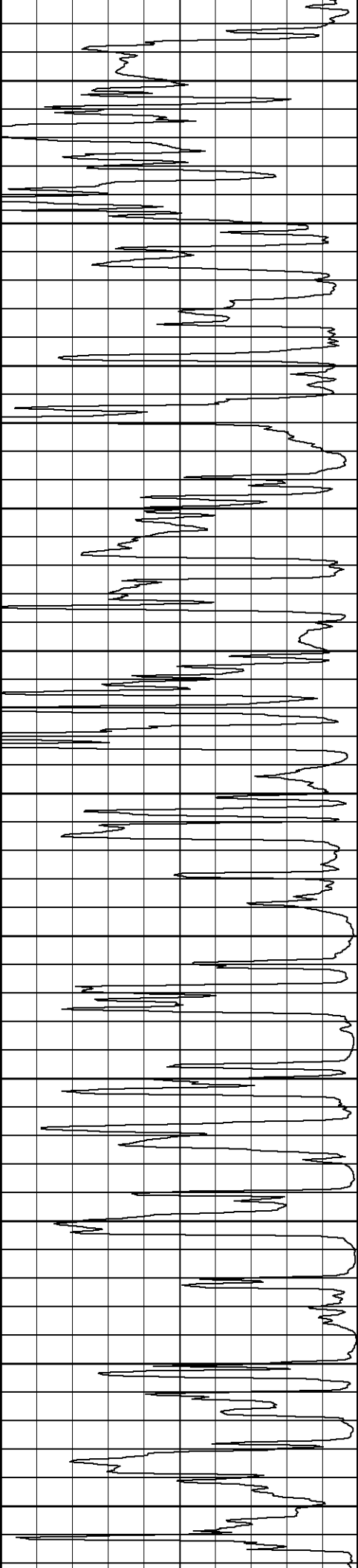
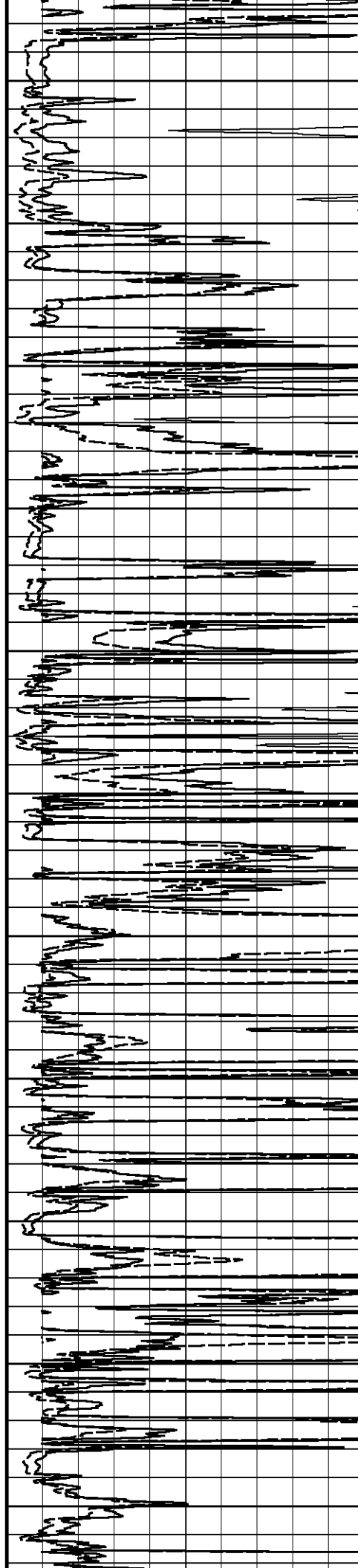
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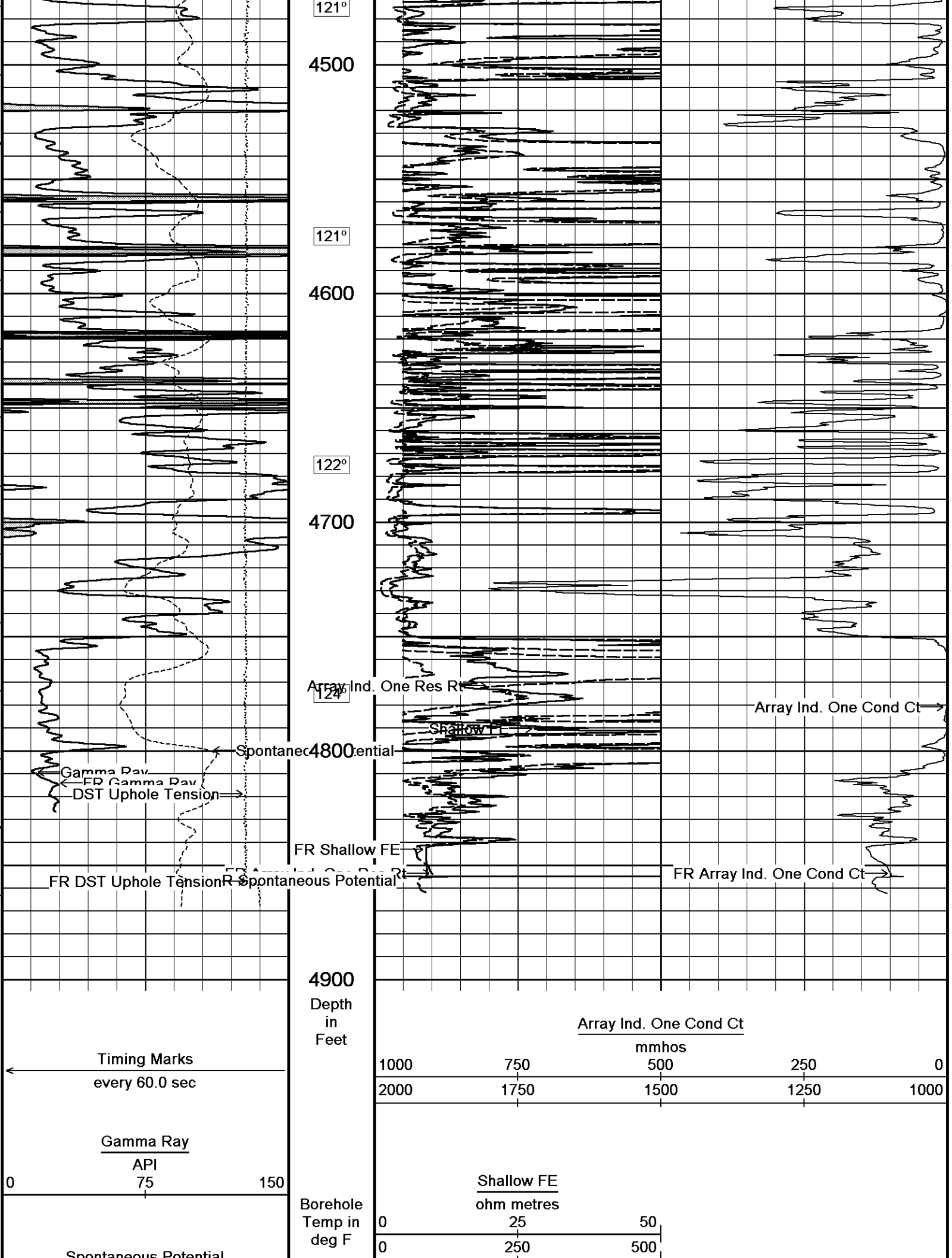
119°

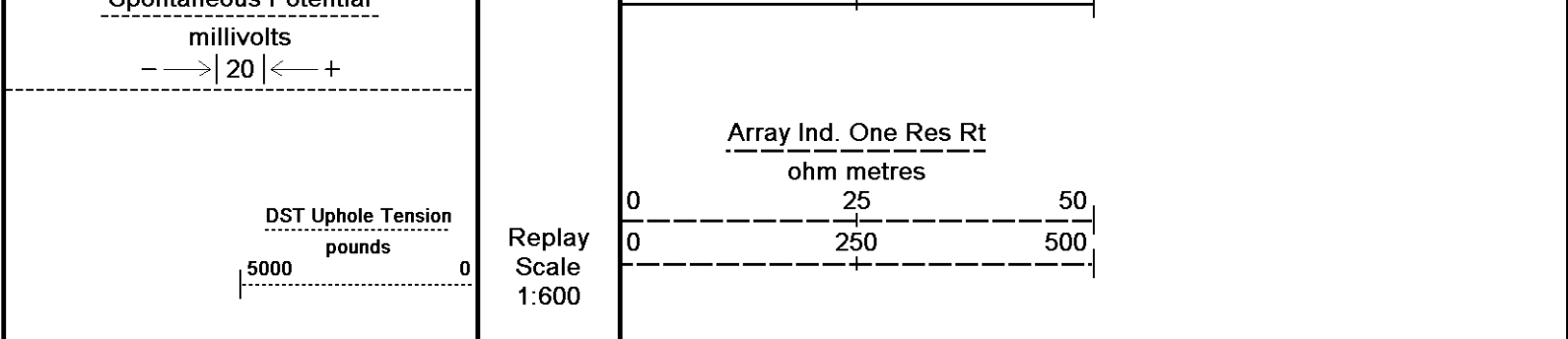
4300

119°

4400





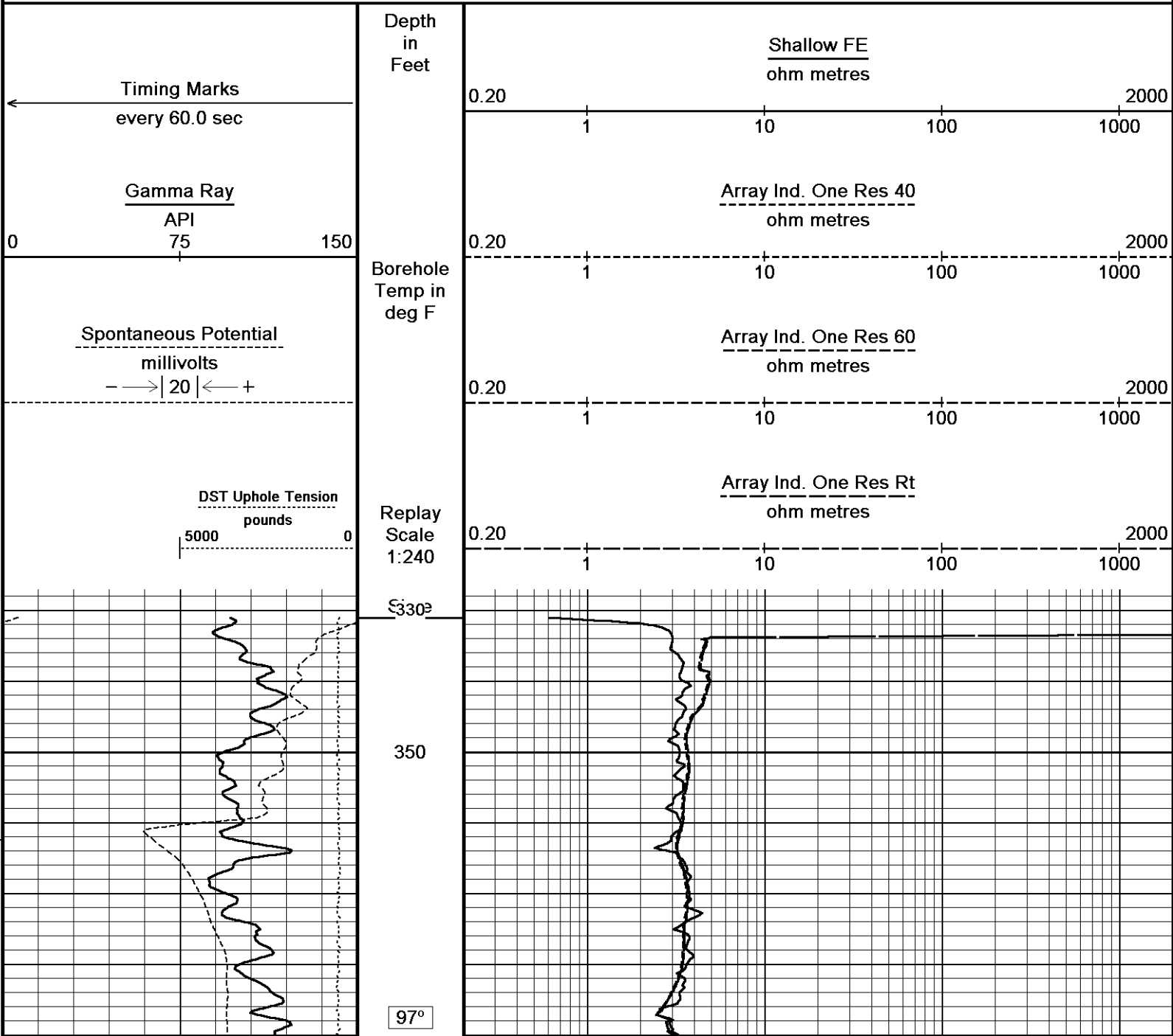


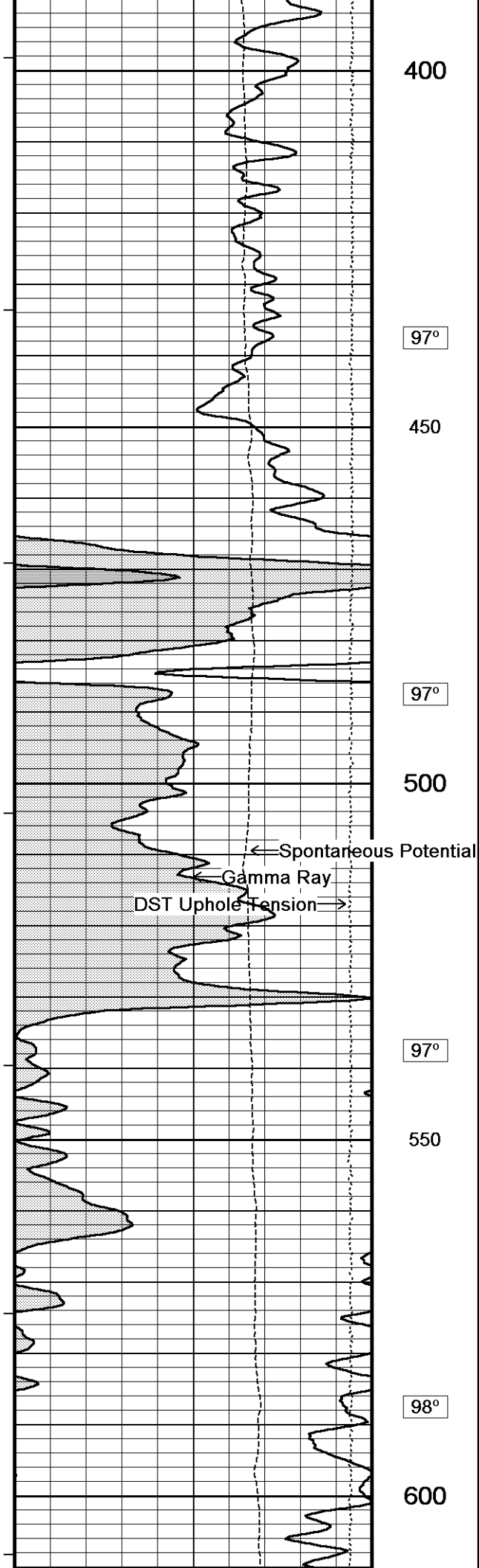
Depth Based Data - Maximum Sampling Increment 10.0cm	Plotted on 12-MAY-2012 08:30
Filename: C:\Minimus 11_03_4044\Data\Red Oak En...\Red Oak Energy, Inc FS-Frahm # 1-35_003.dta	Recorded on 12-MAY-2012 05:59
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044	

↑	2 INCH MAIN	↑
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↓	5 INCH MAIN	↓
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Depth Based Data - Maximum Sampling Increment 10.0cm	Plotted on 12-MAY-2012 08:30
Filename: C:\Minimus 11_03_4044\Data\Red Oak En...\Red Oak Energy, Inc FS-Frahm # 1-35_003.dta	Recorded on 12-MAY-2012 05:59
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044	





400

97°

450

97°

500

97°

550

98°

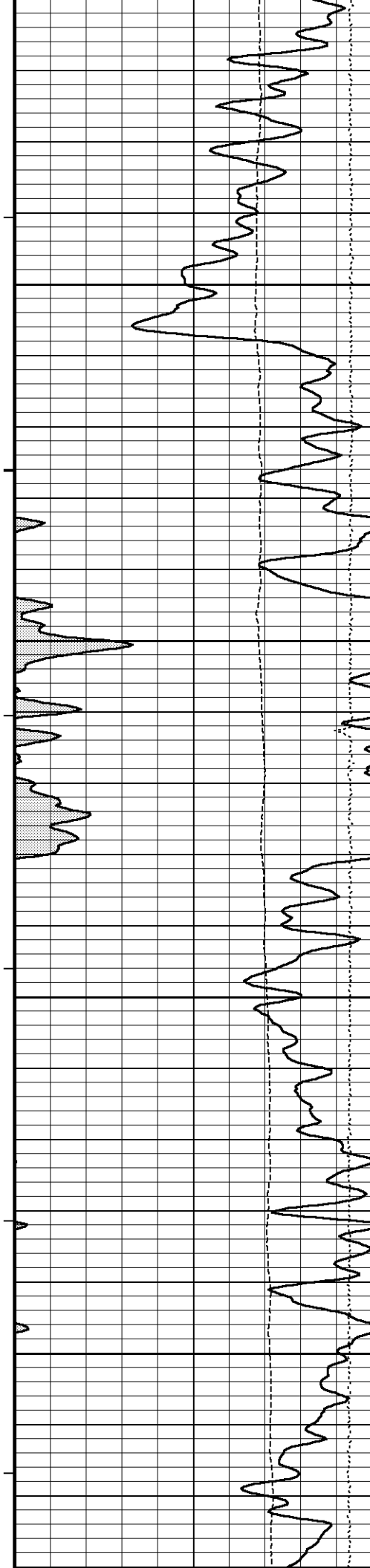
600

Array Ind. One Res Rt

Array Ind. One Res 60

Array Ind. One Res 40

Shallow FE



98°

650

98°

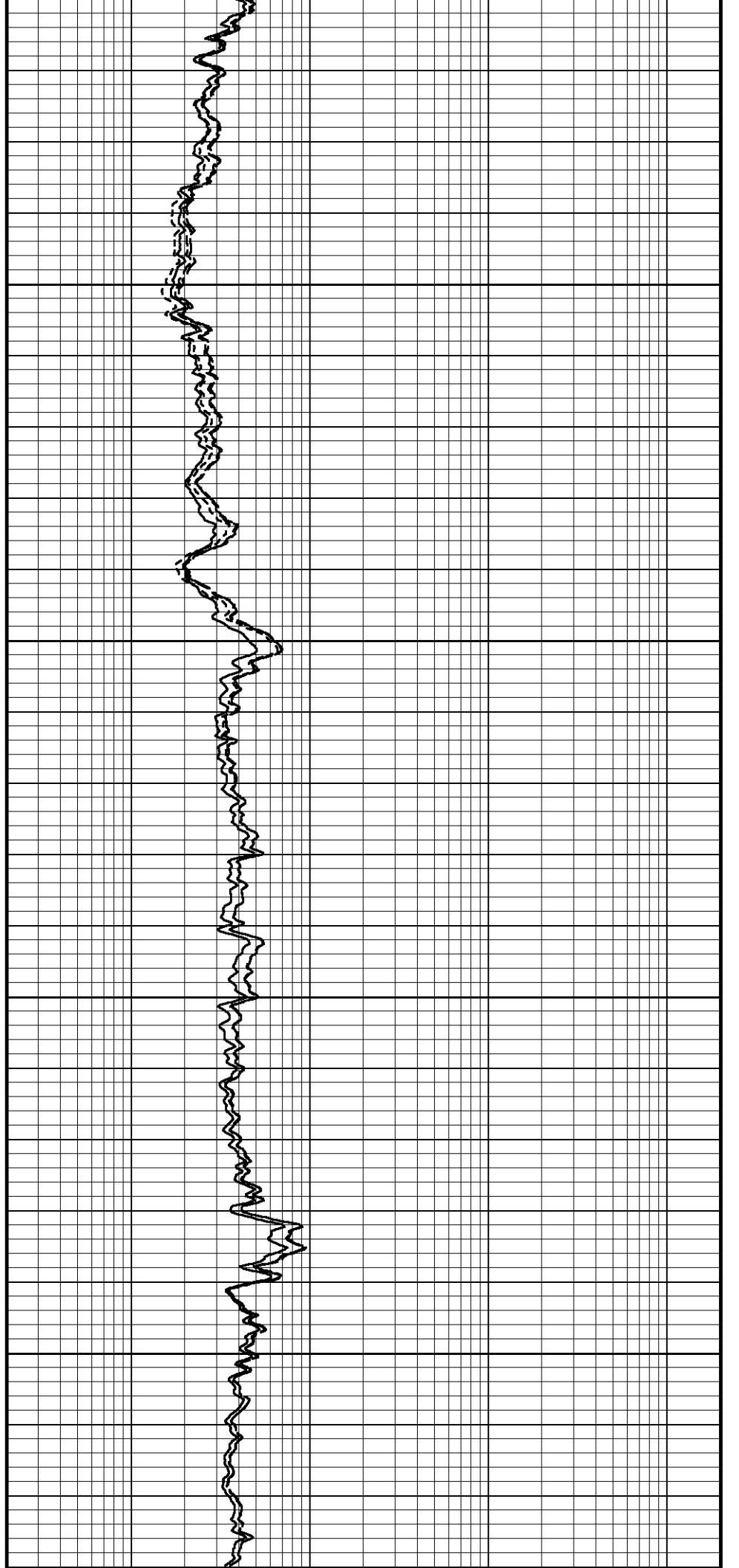
700

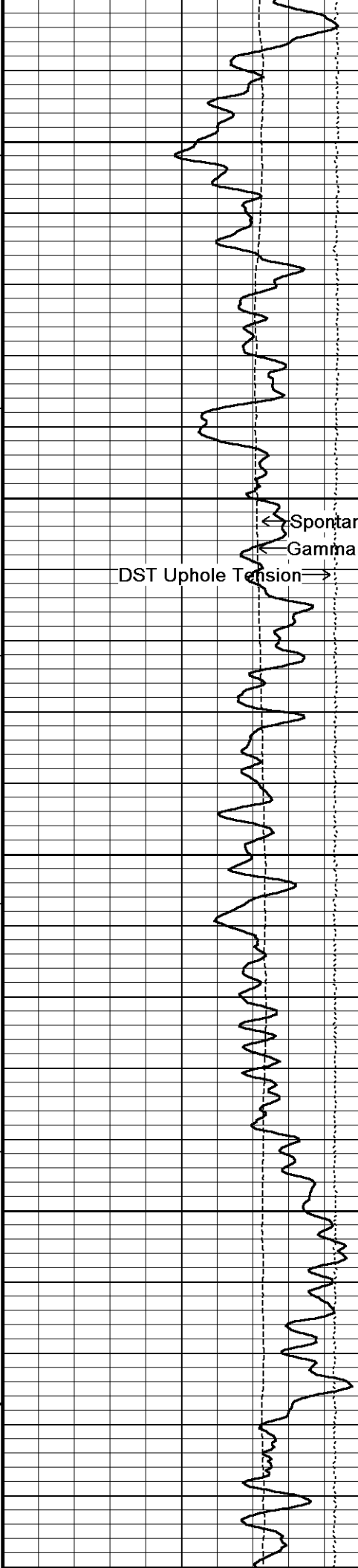
99°

750

100°

800





101°

850

101°

900

101°

950

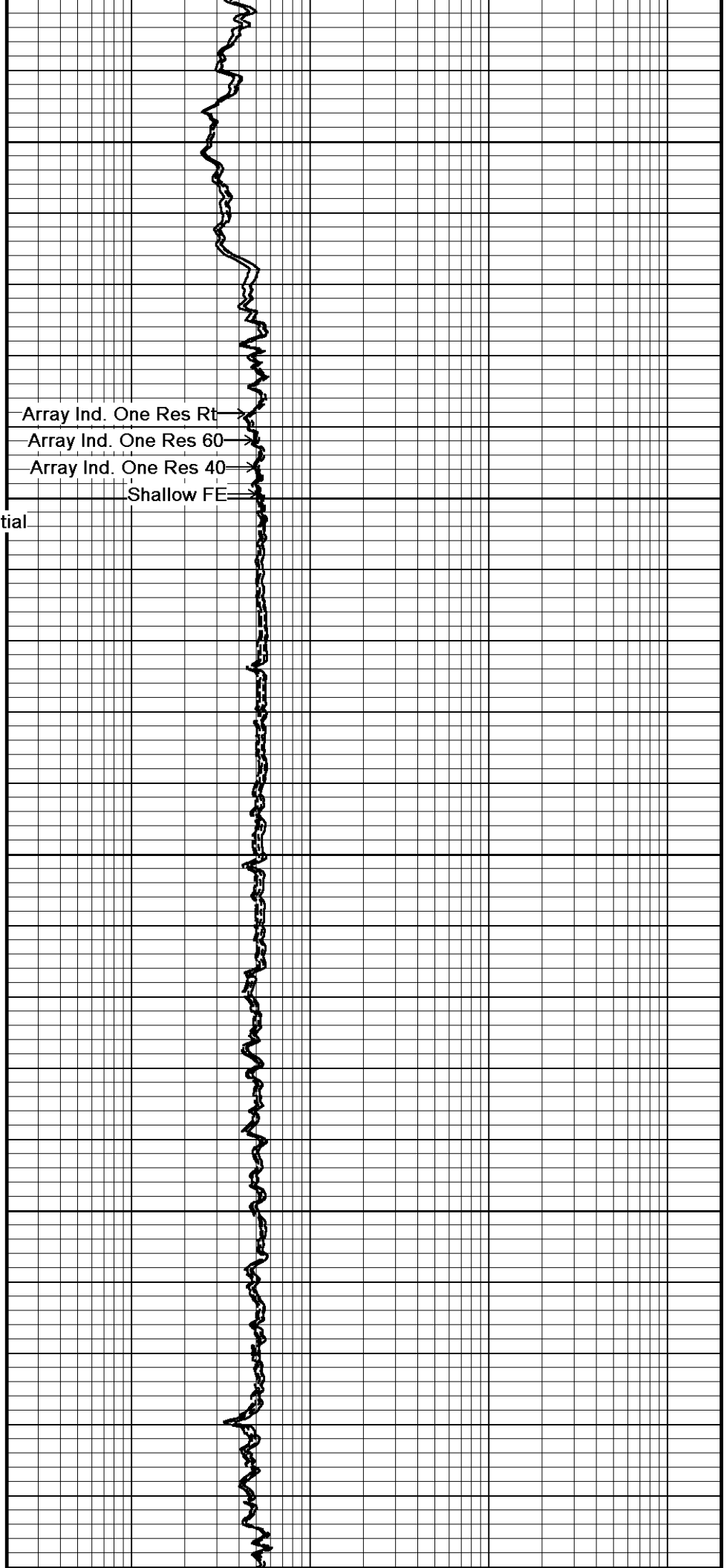
101°

1000

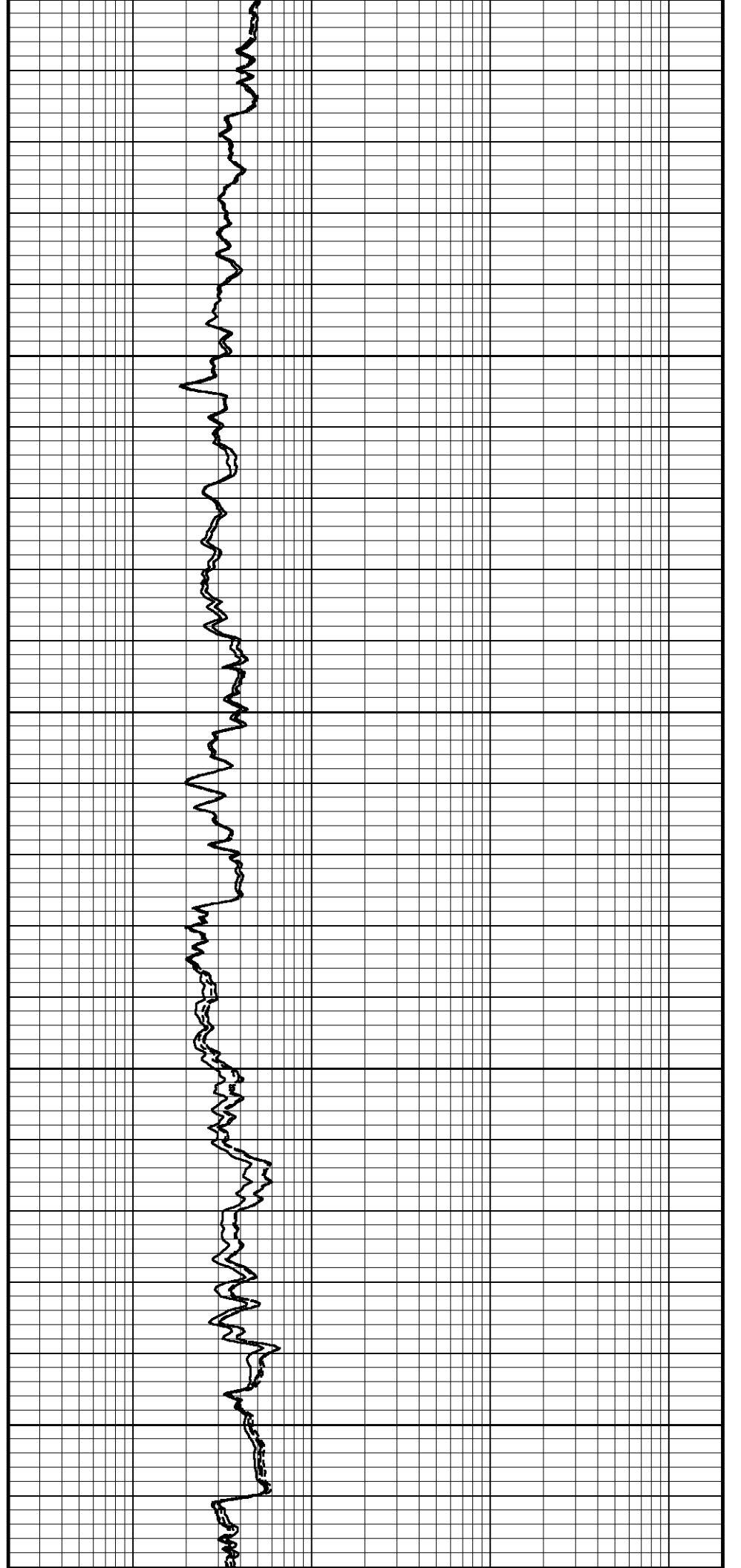
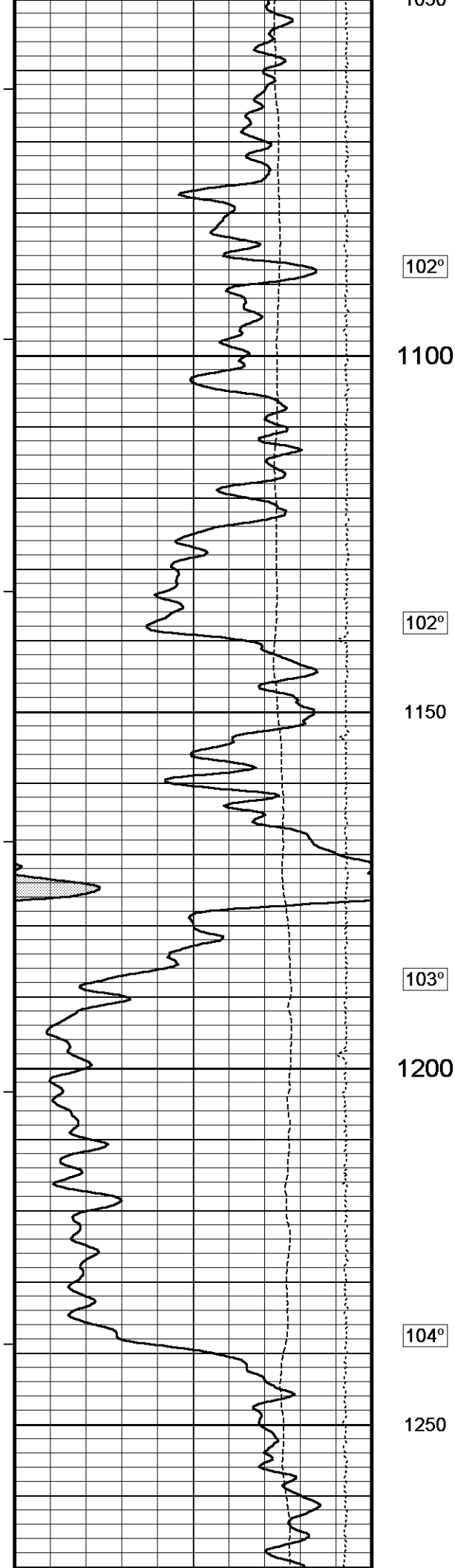
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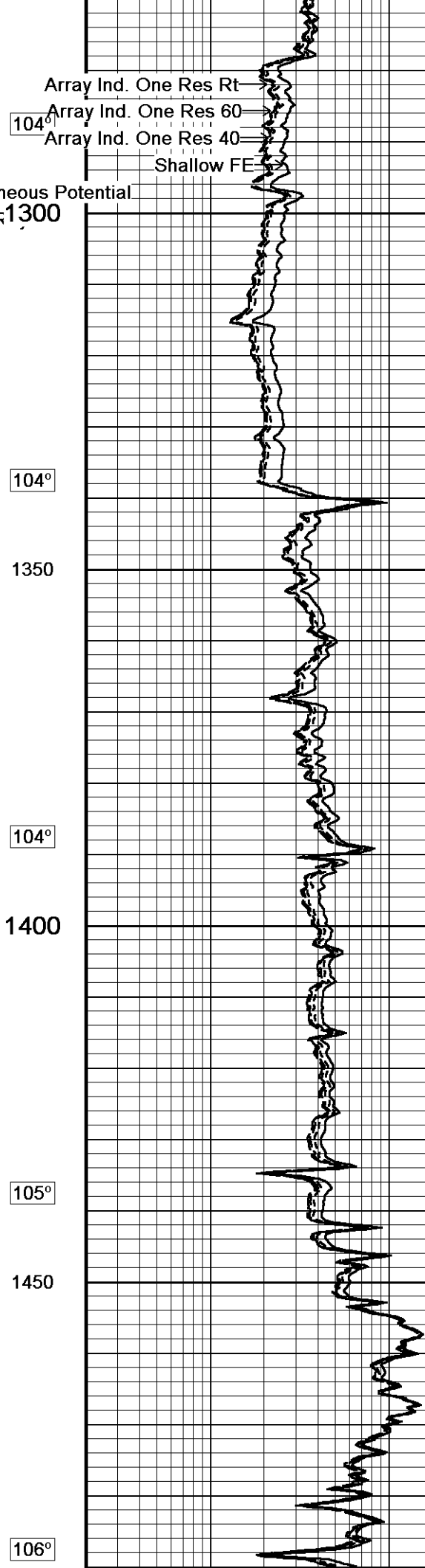
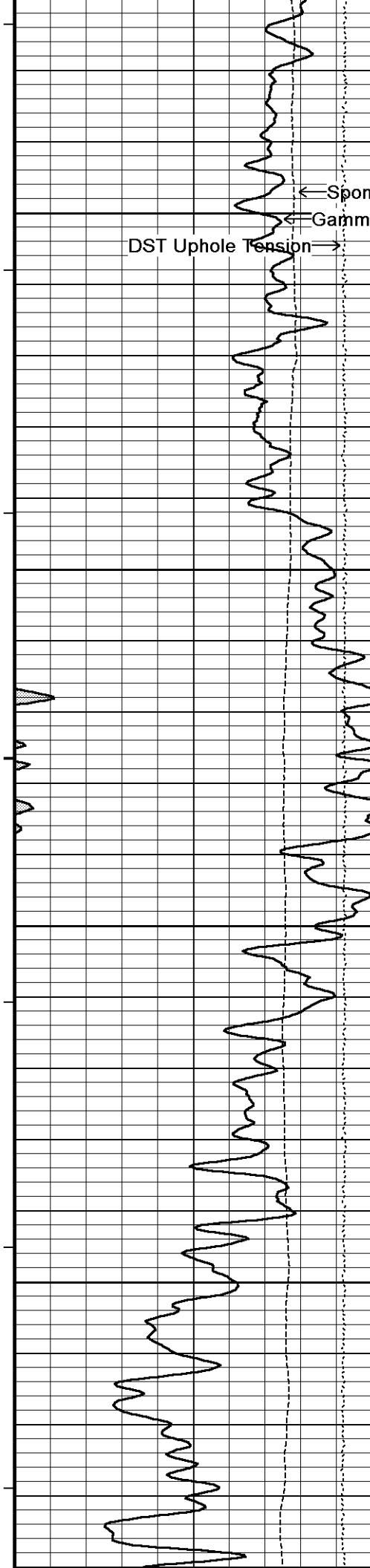
1050

← Spontaneous Potential
← Gamma Ray
DST Uphole Tension →



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





104°

104°

1350

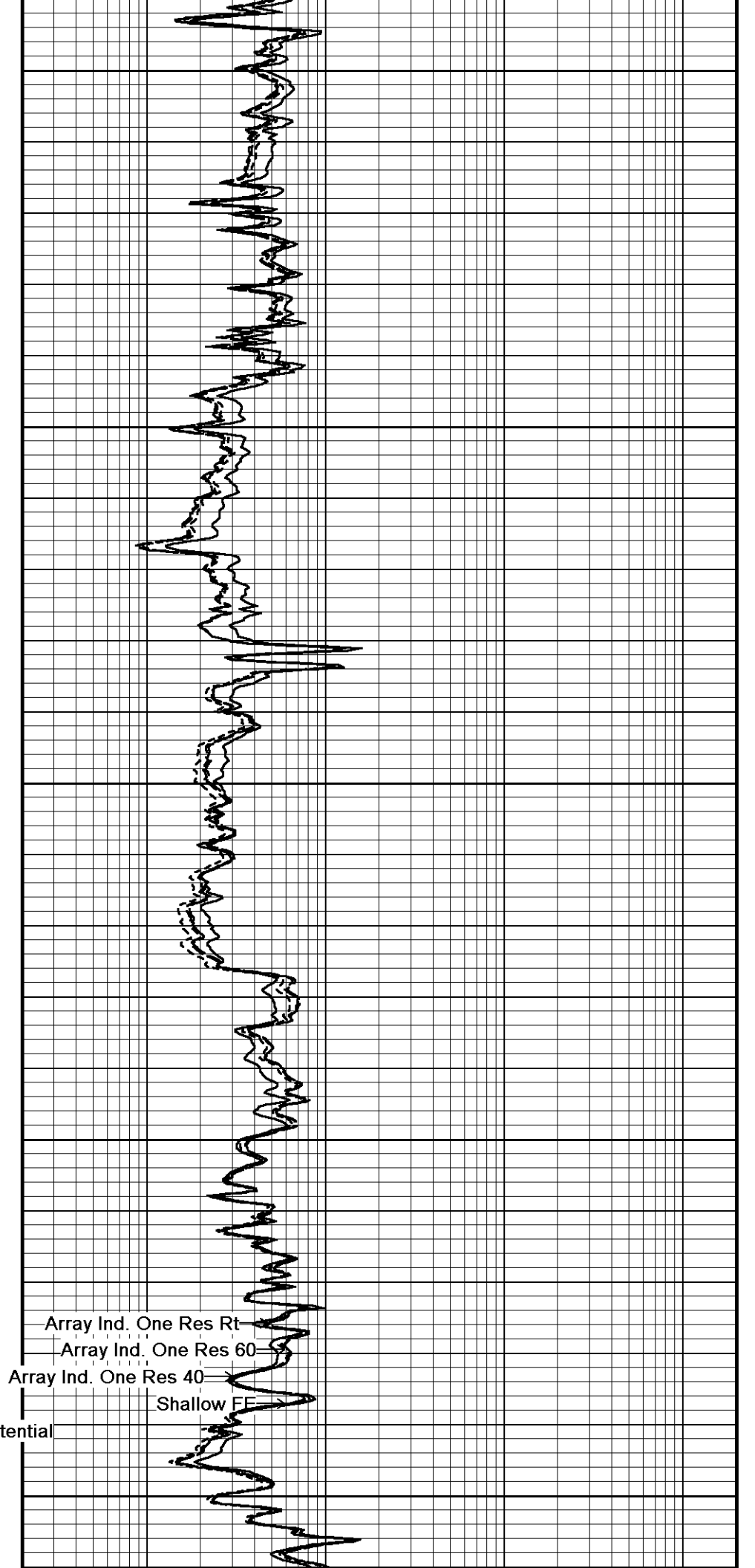
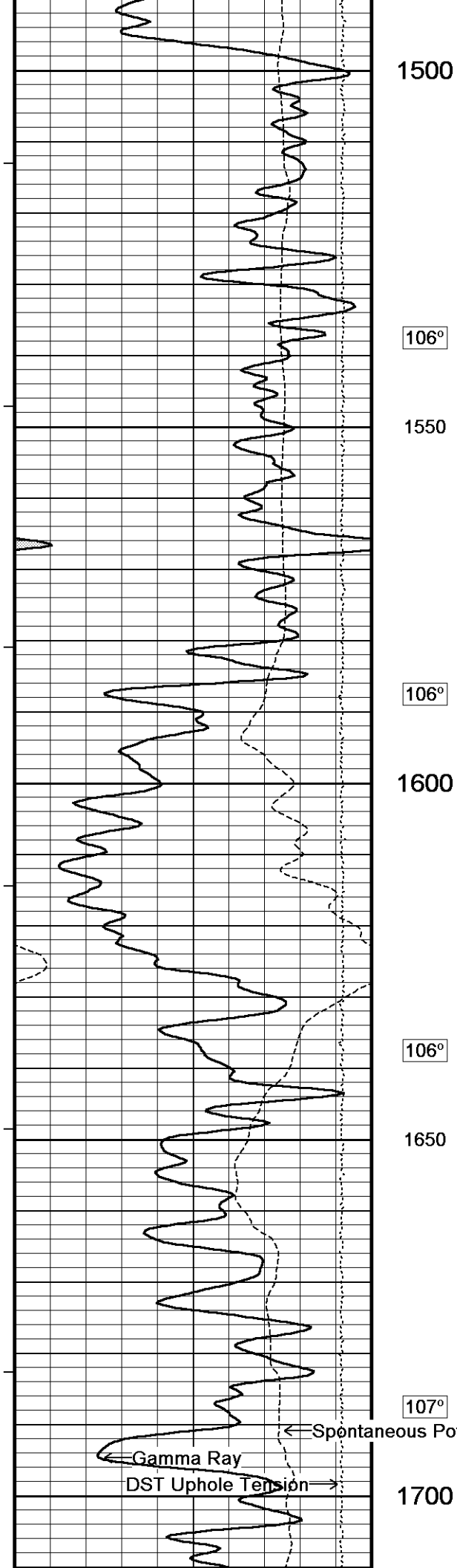
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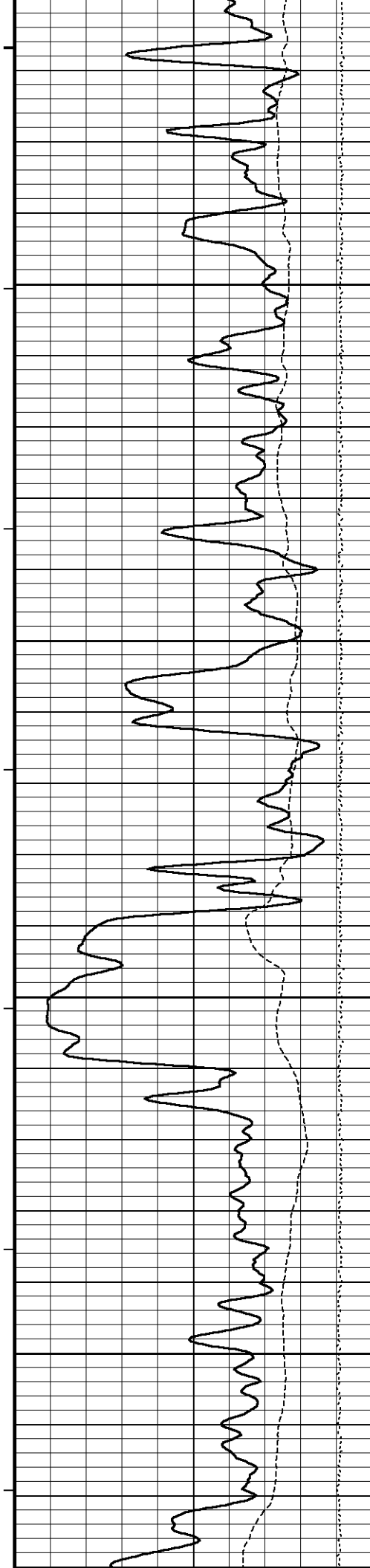
1400

105°

1450

106°





107°

1750

107°

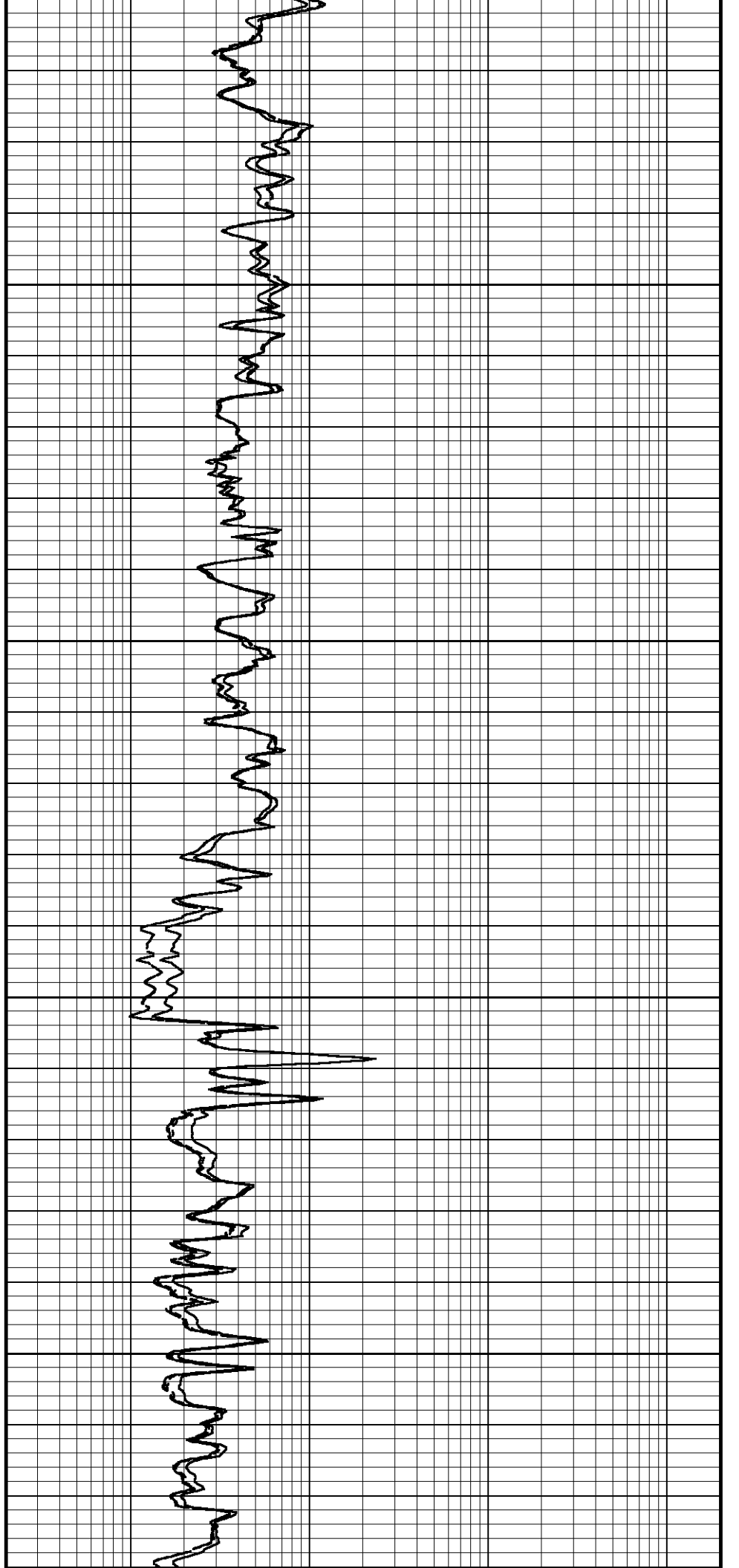
1800

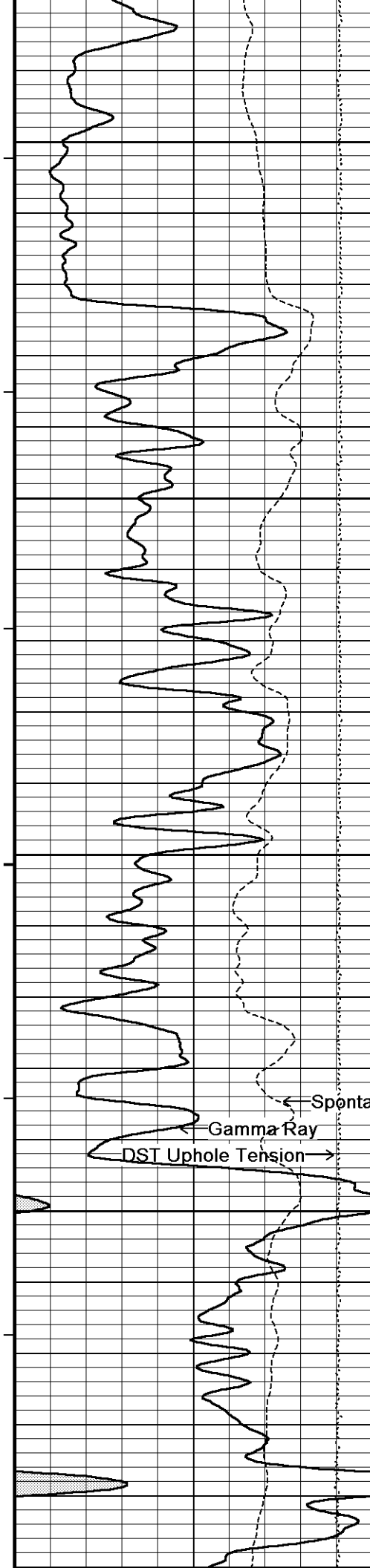
107°

1850

108°

1900





108°

1950

109°

2000

109°

2050

Array Ind. One Res Rt

Array Ind. One Res 60

Array Ind. One Res 40

Shallow FE

← Spontaneous Potential

← Gamma Ray

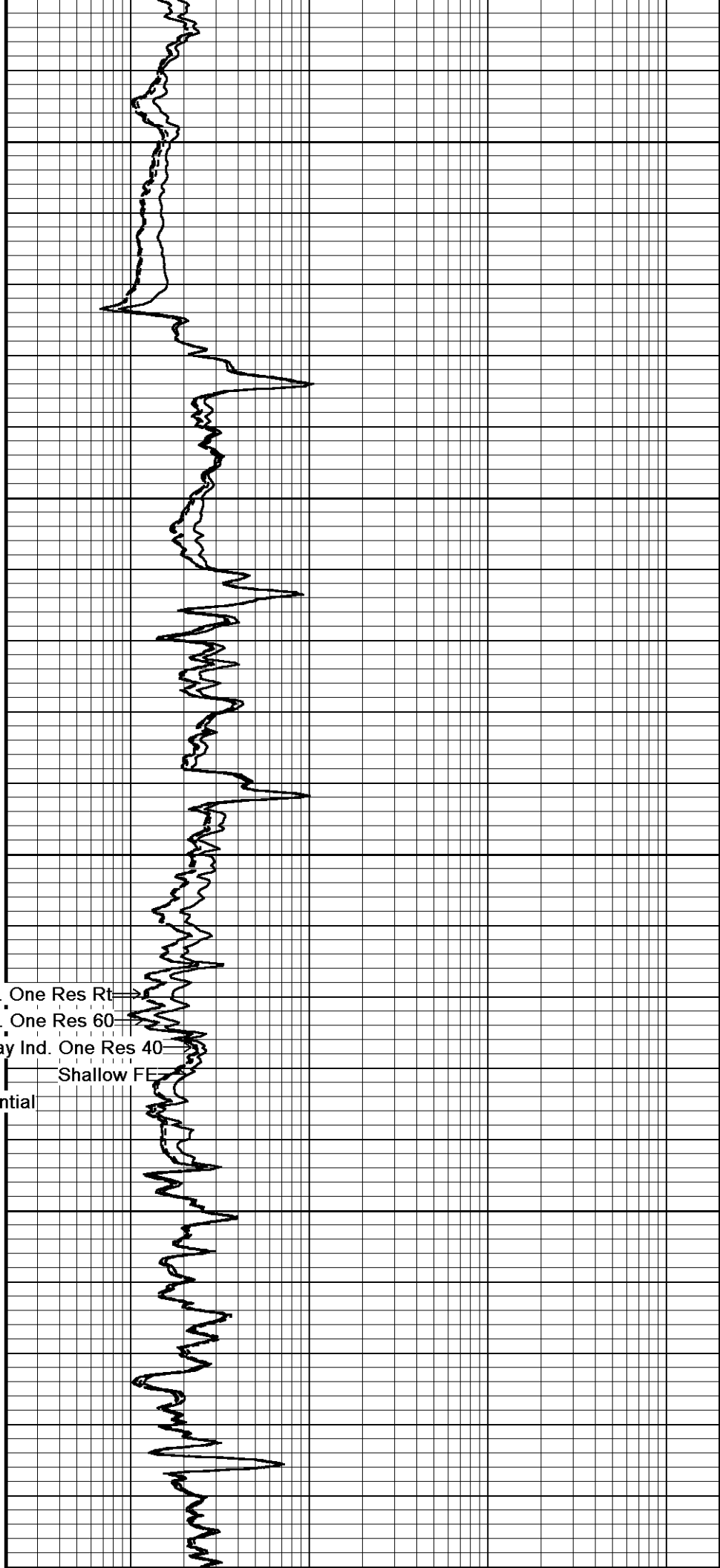
DST Uphole Tension →

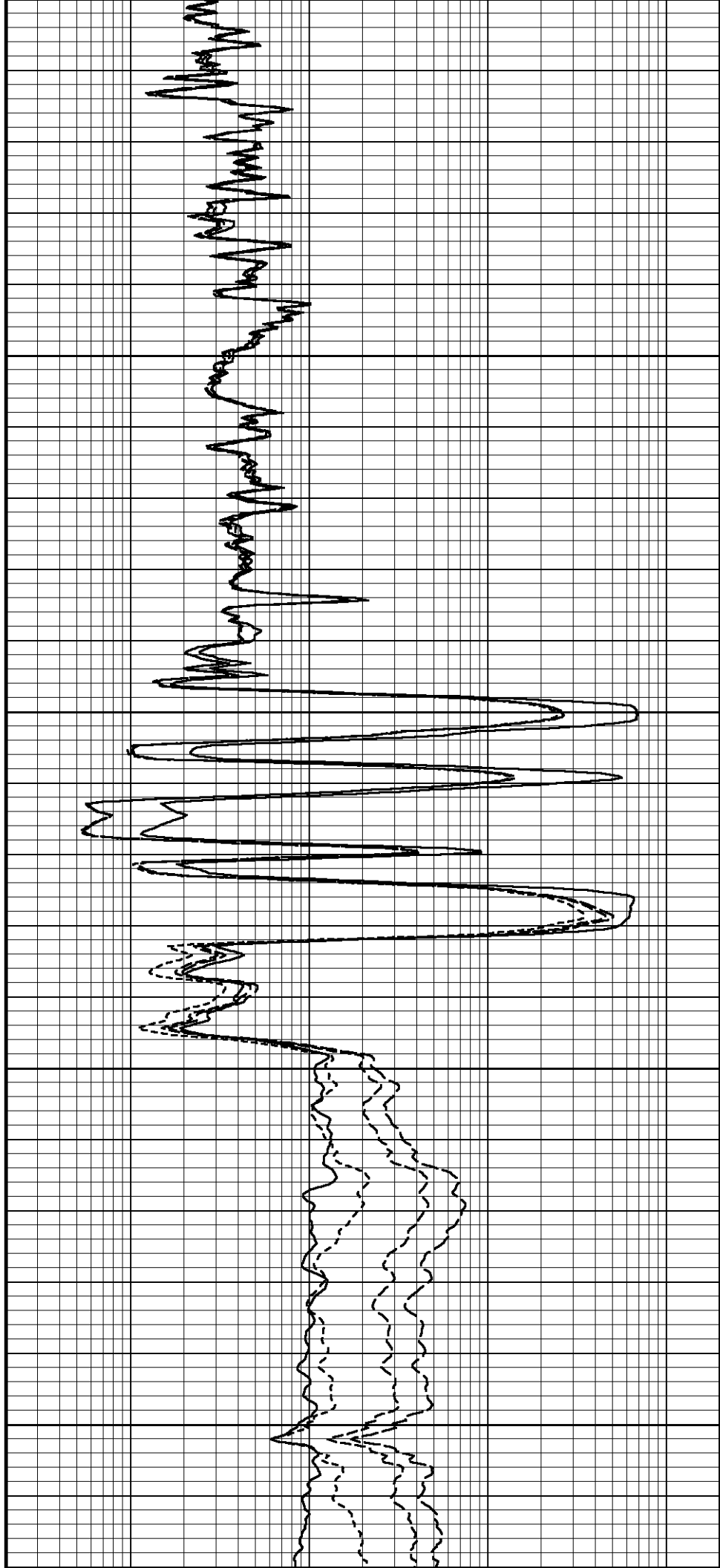
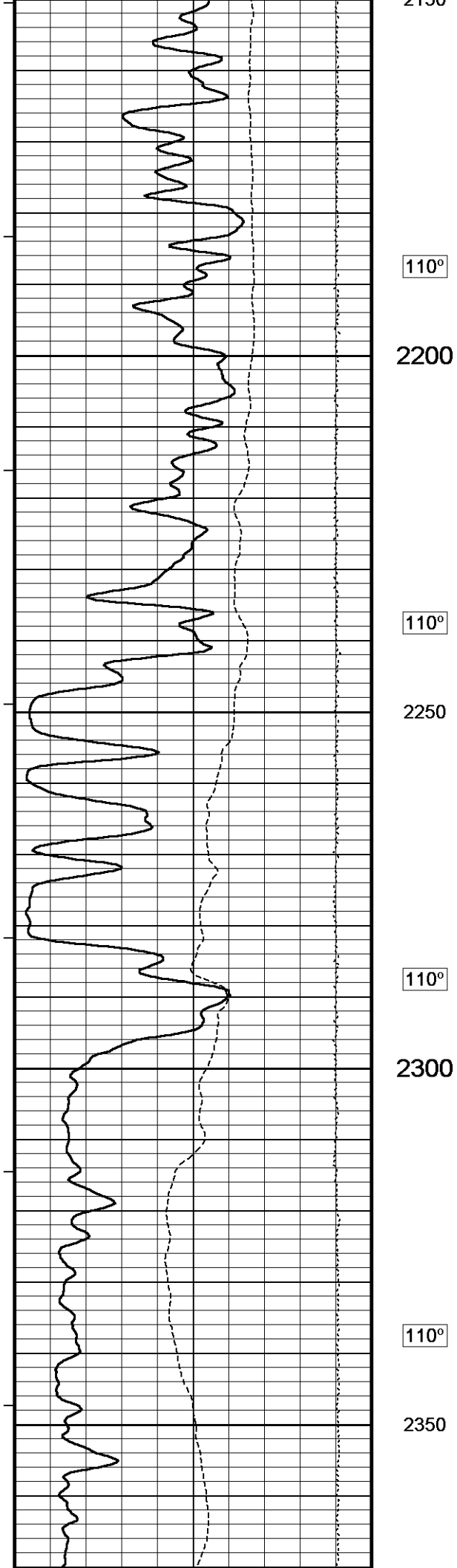
109°

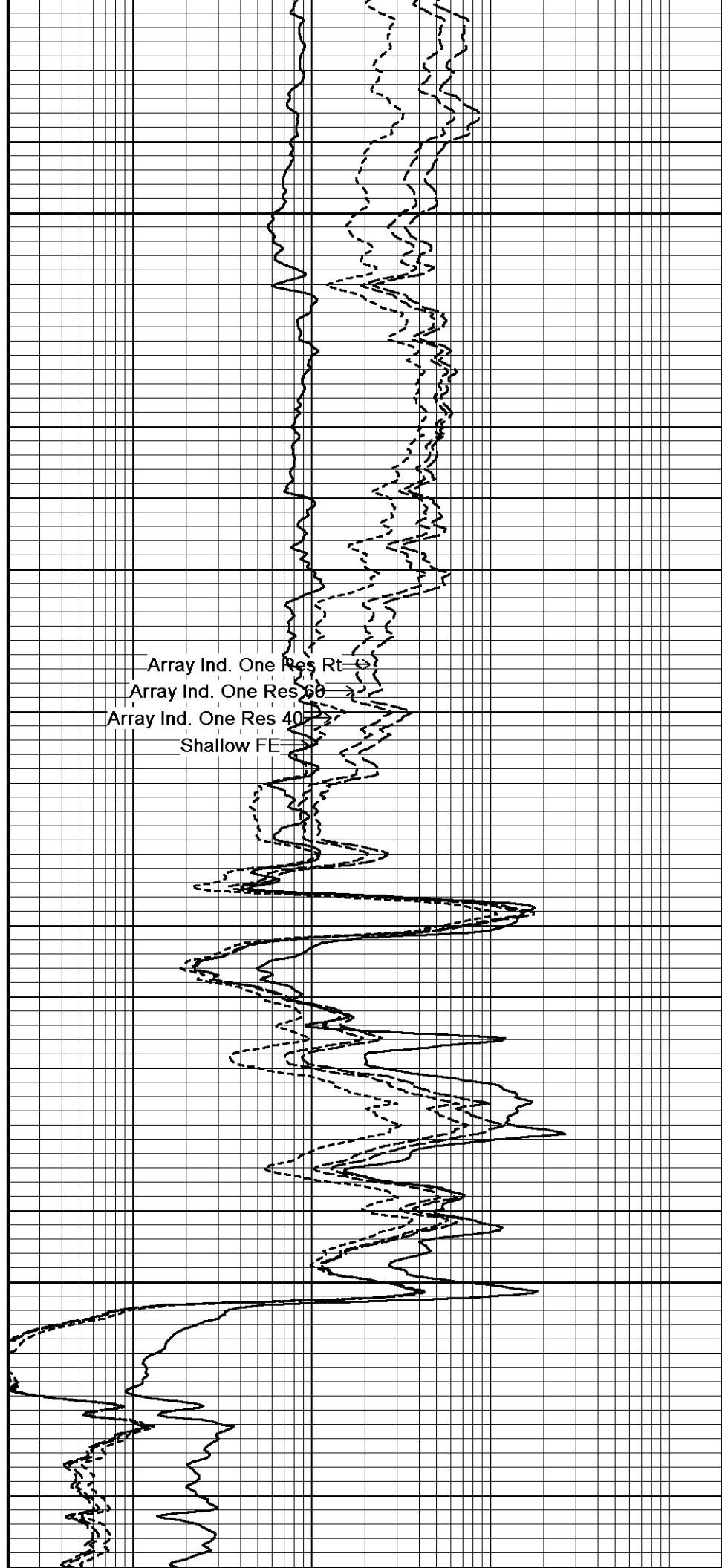
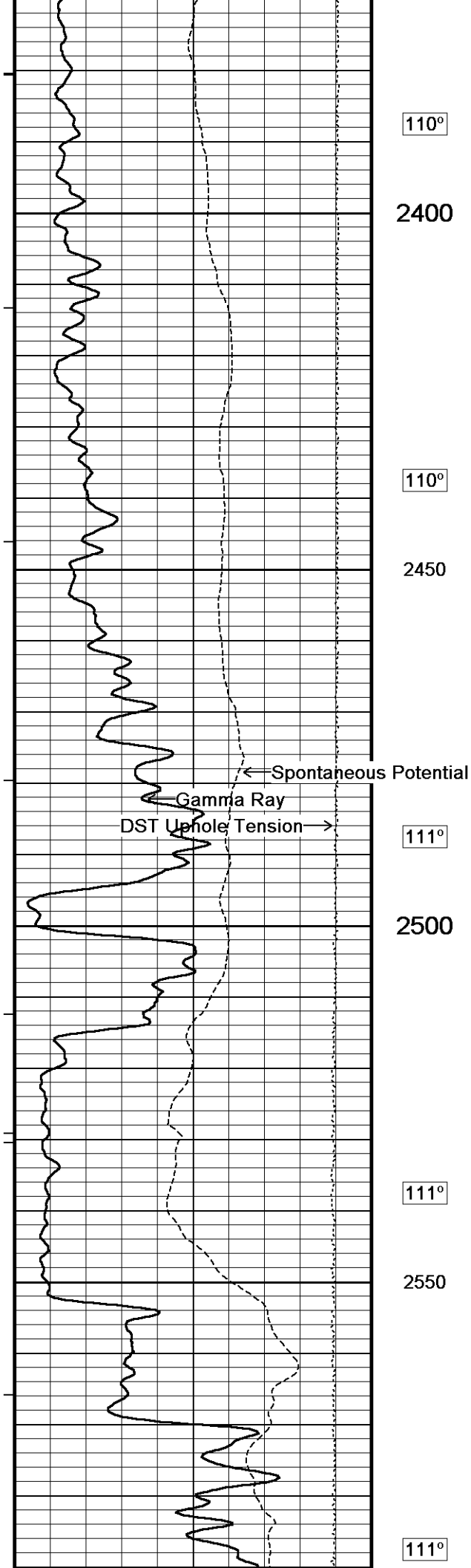
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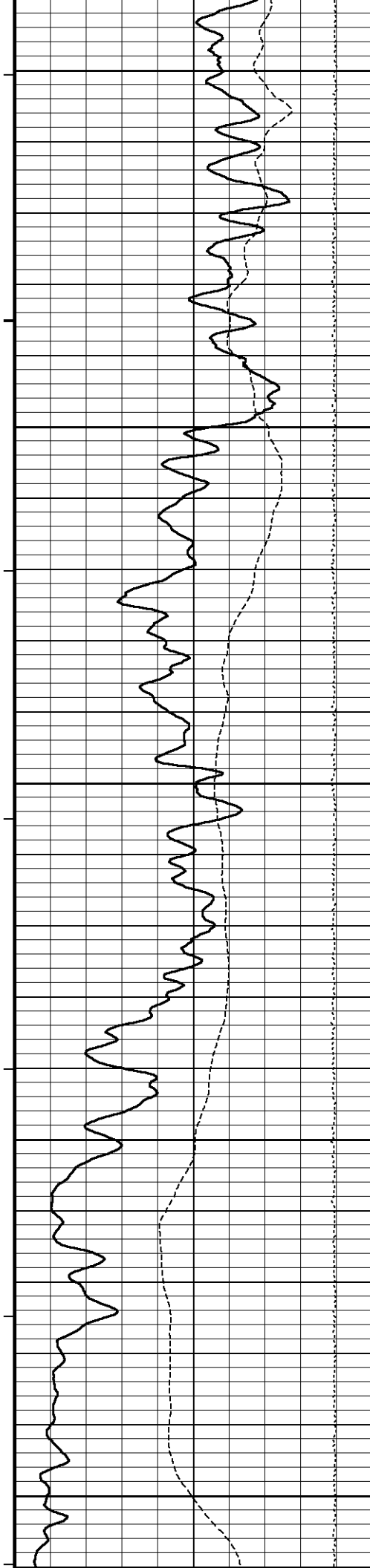
110°

2150









2600

112°

2650

112°

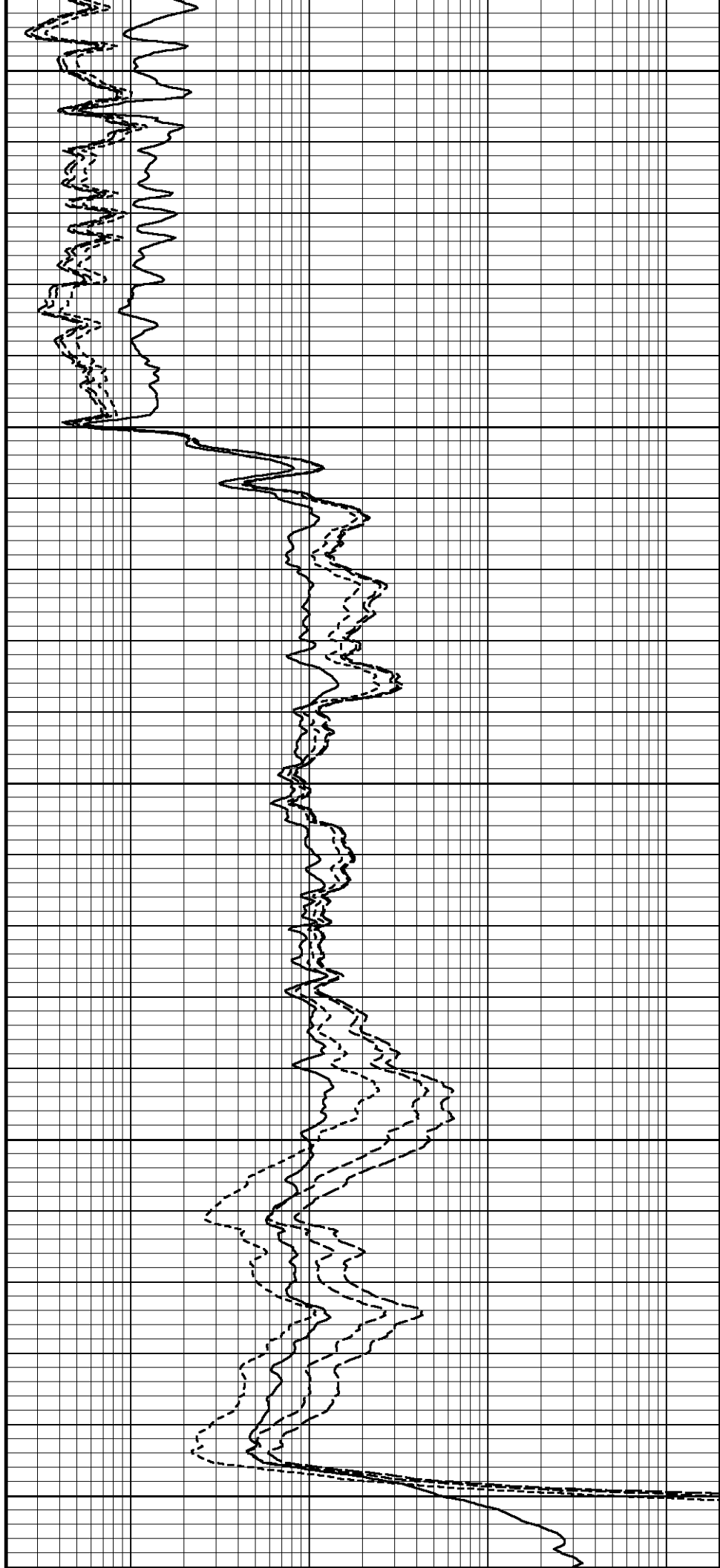
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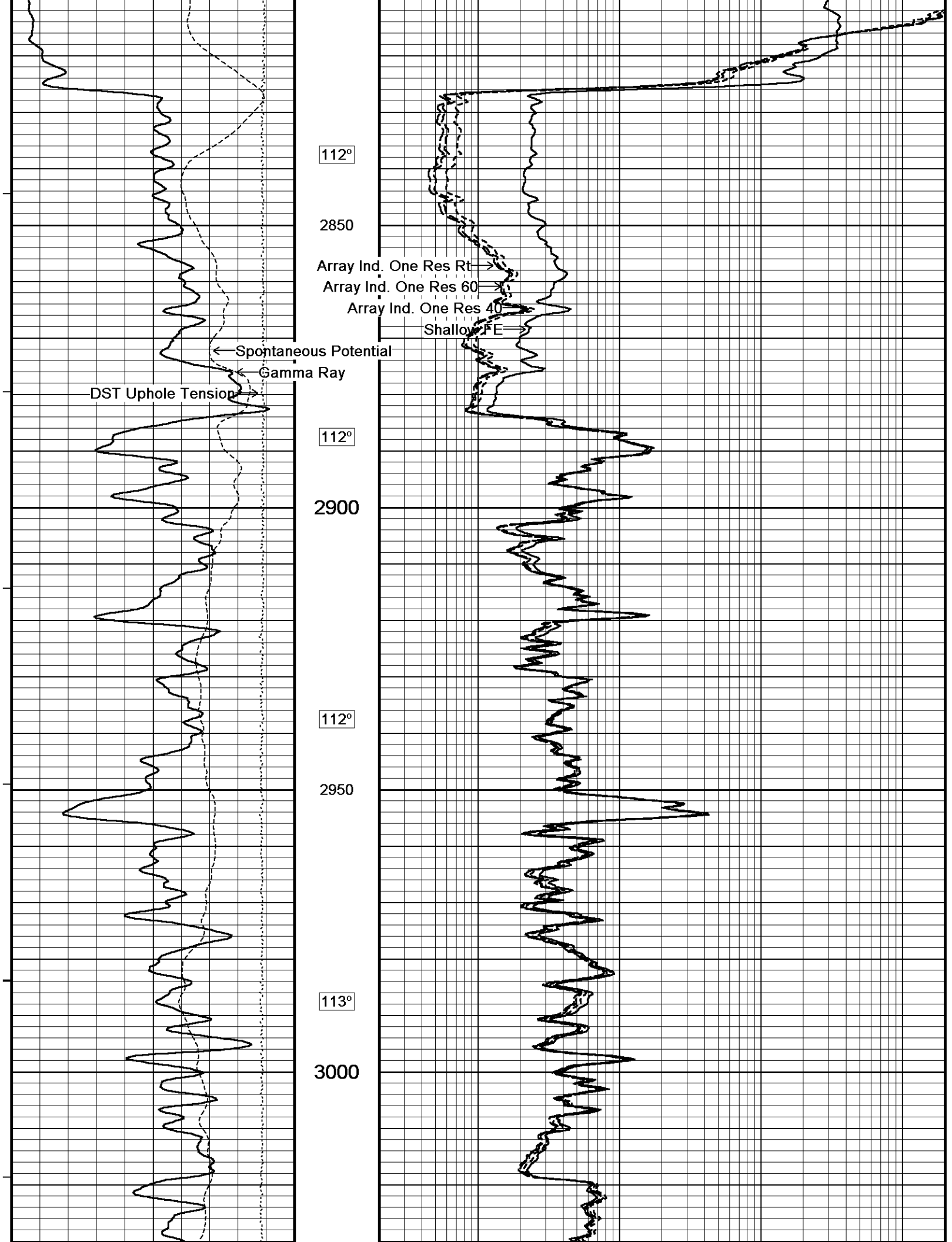
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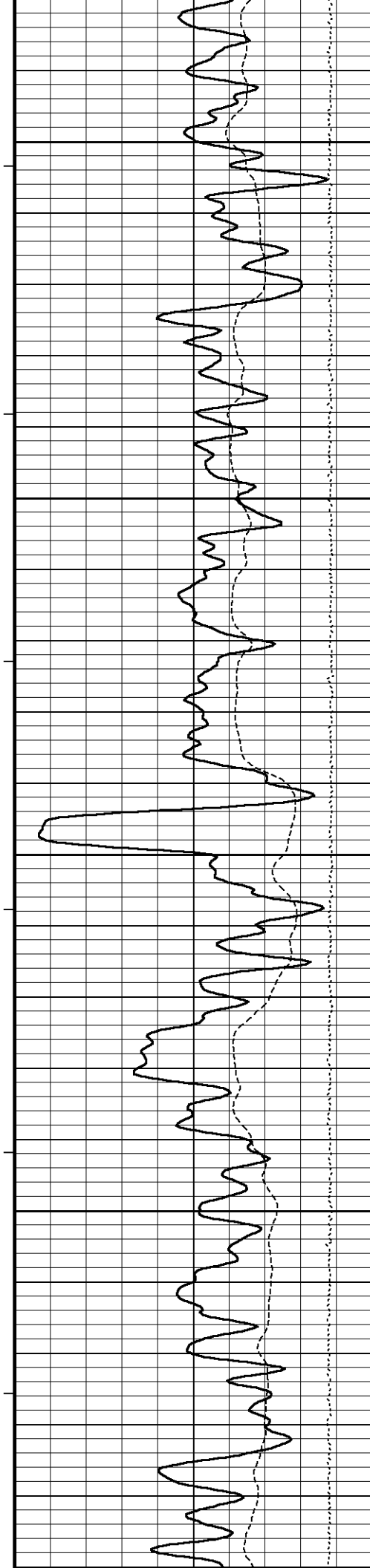
2750

112°

2800







113°

3050

113°

3100

114°

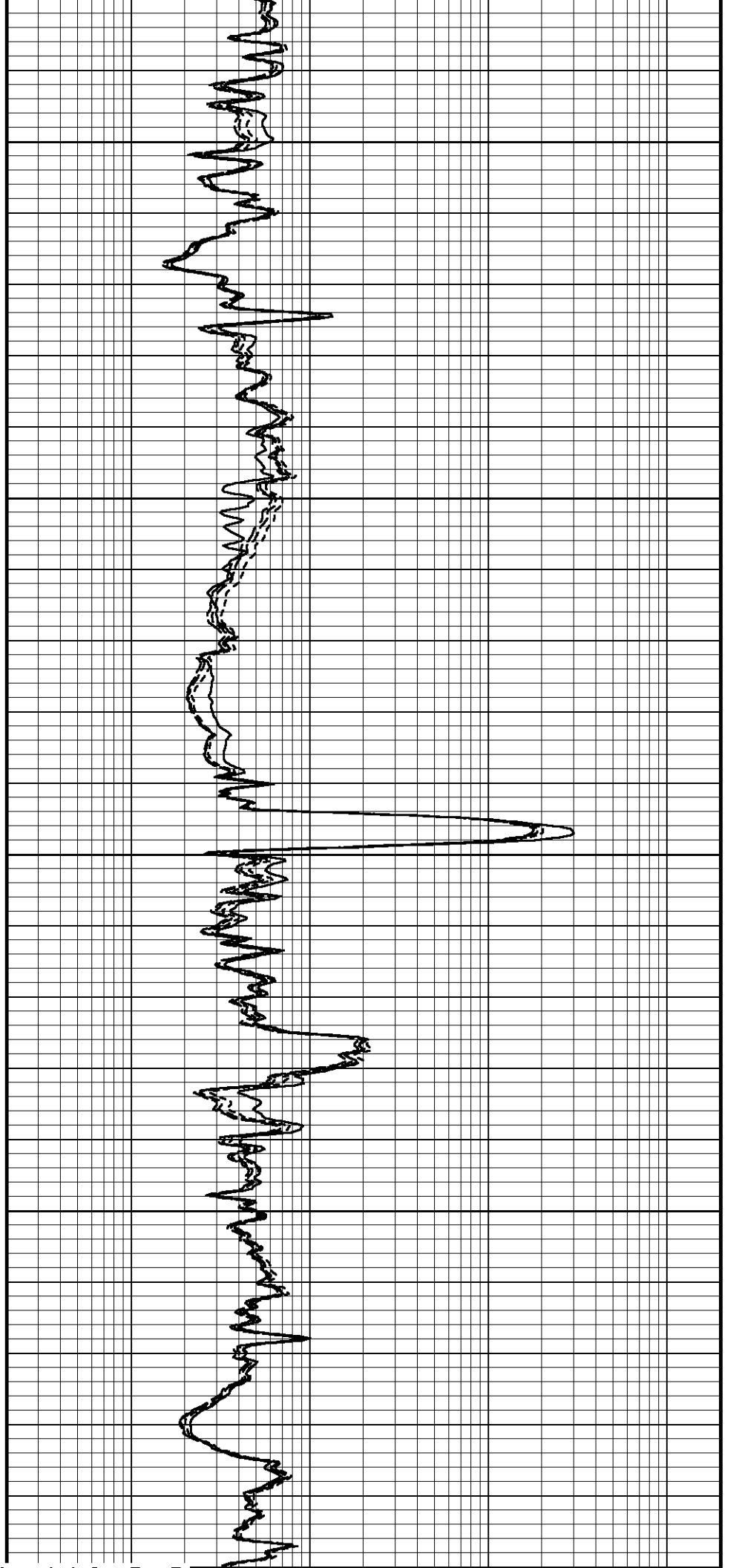
3150

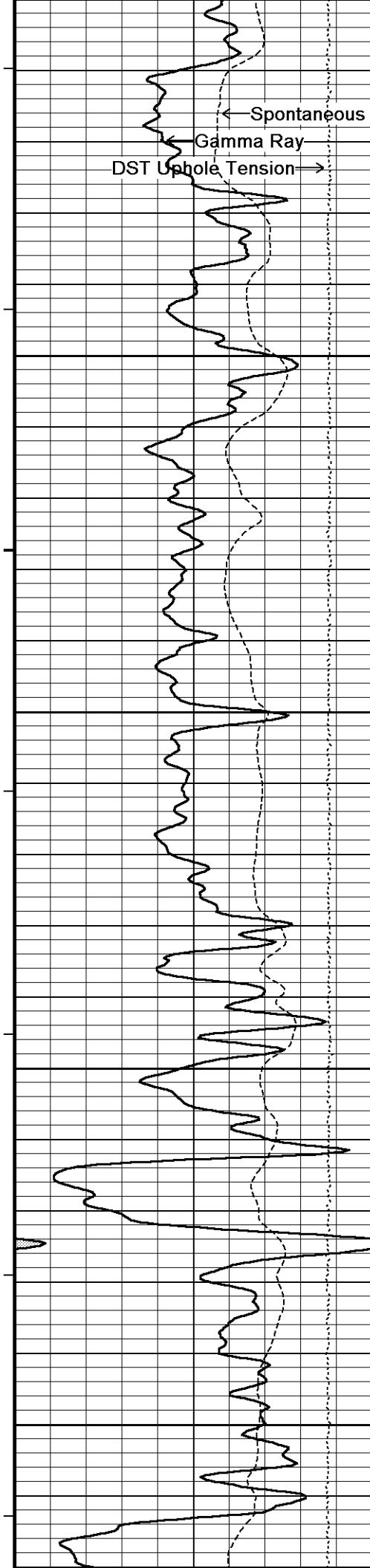
114°

3200

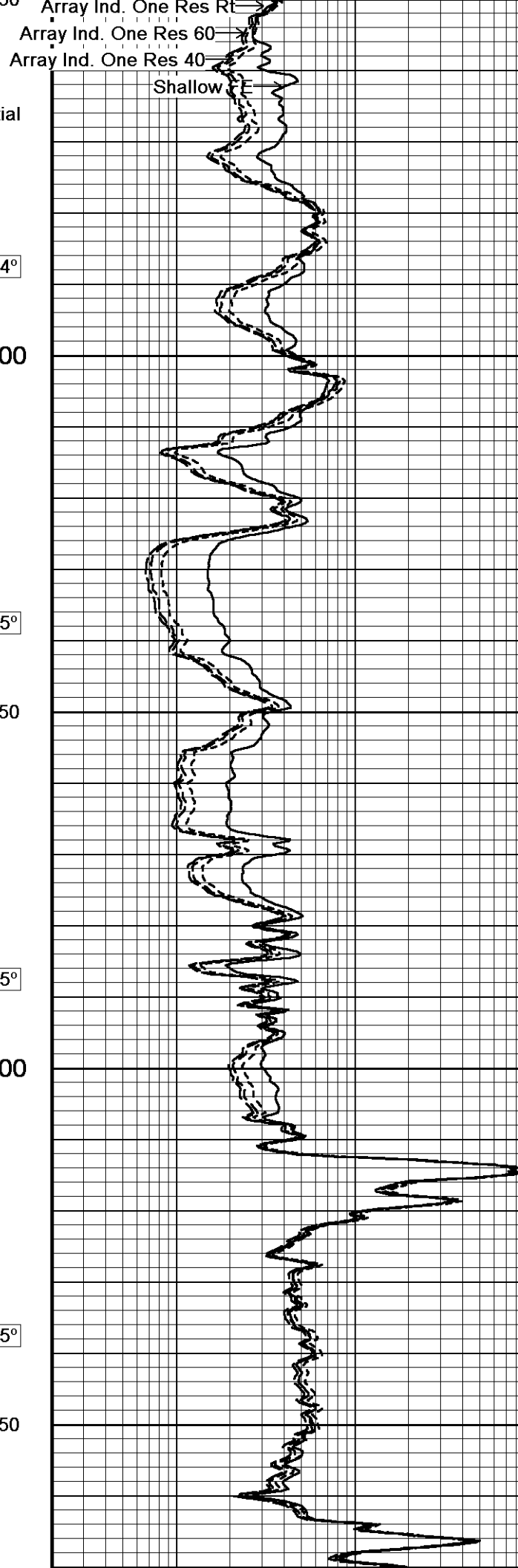
114°

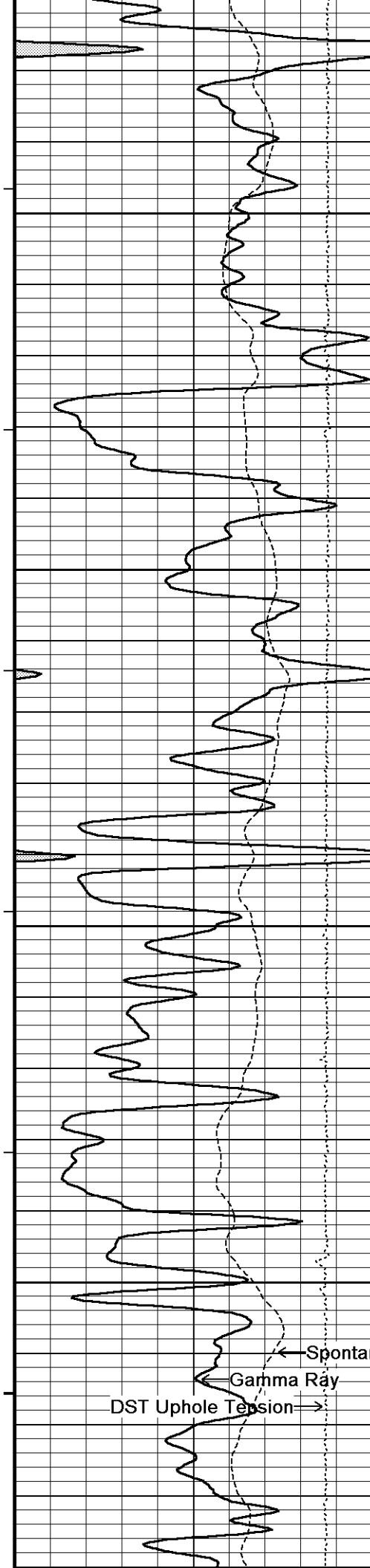
3250





3250
114°
3300
115°
3350
115°
3400
115°
3450





115°

3500

115°

3550

115°

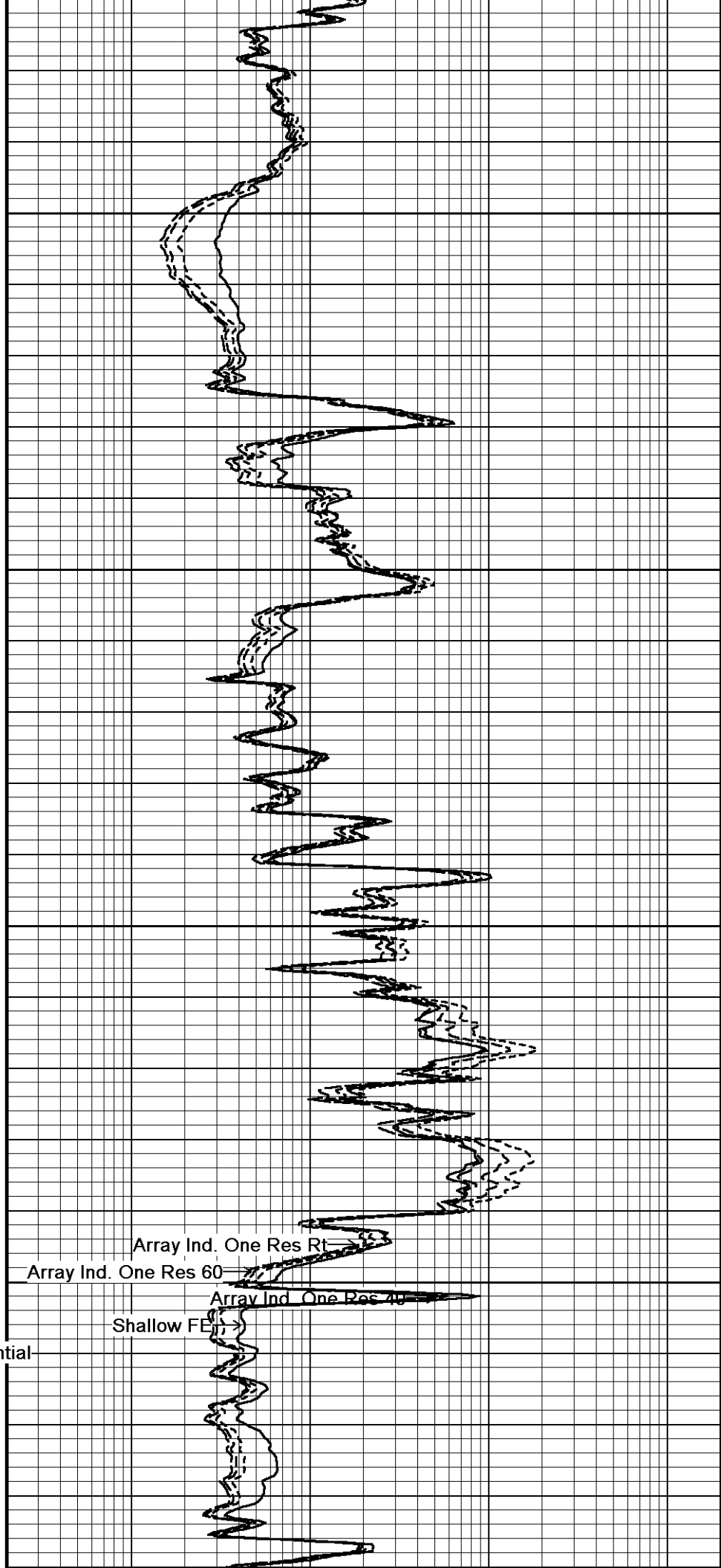
3600

115°

3650

← Spontaneous Potential
Gamma Ray
DST Uphole Tension →

115°

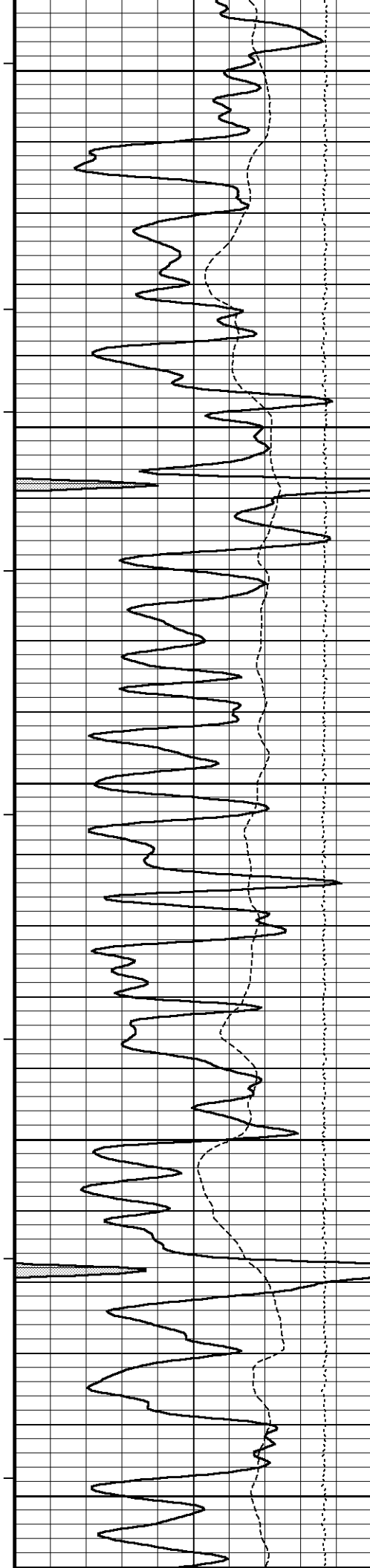


Array Ind. One Res Rt →

Array Ind. One Res 60 →

Array Ind. One Res 40 →

Shallow FEI →



3700

116°

3750

116°

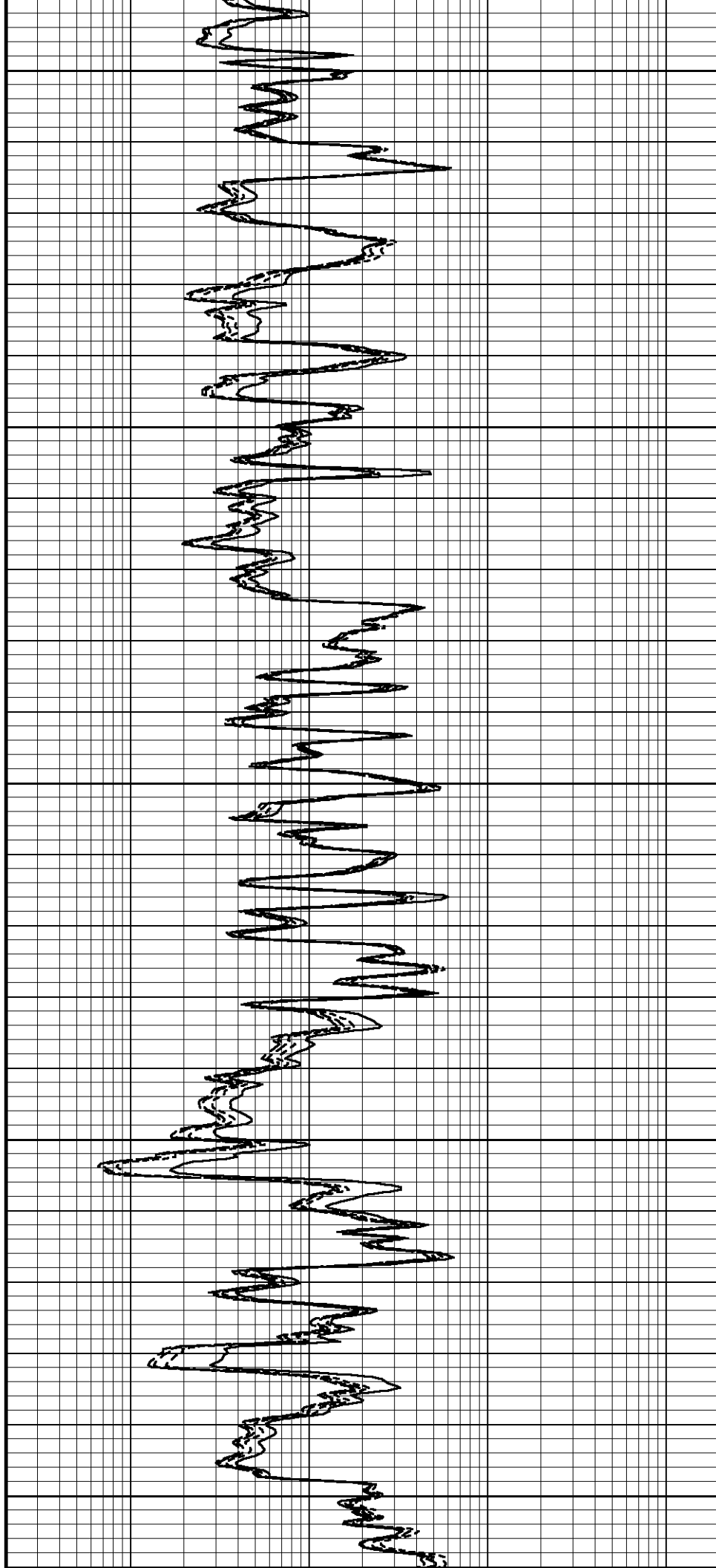
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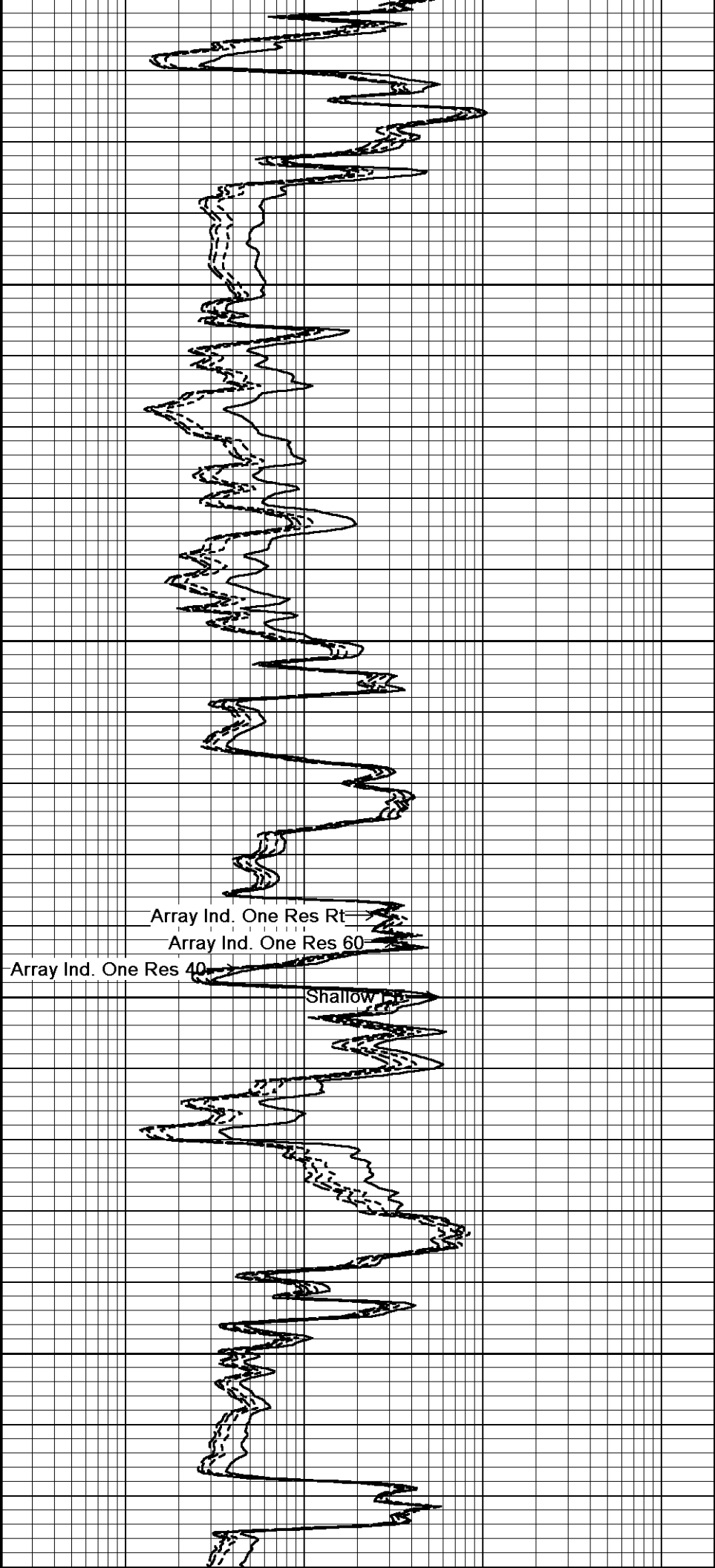
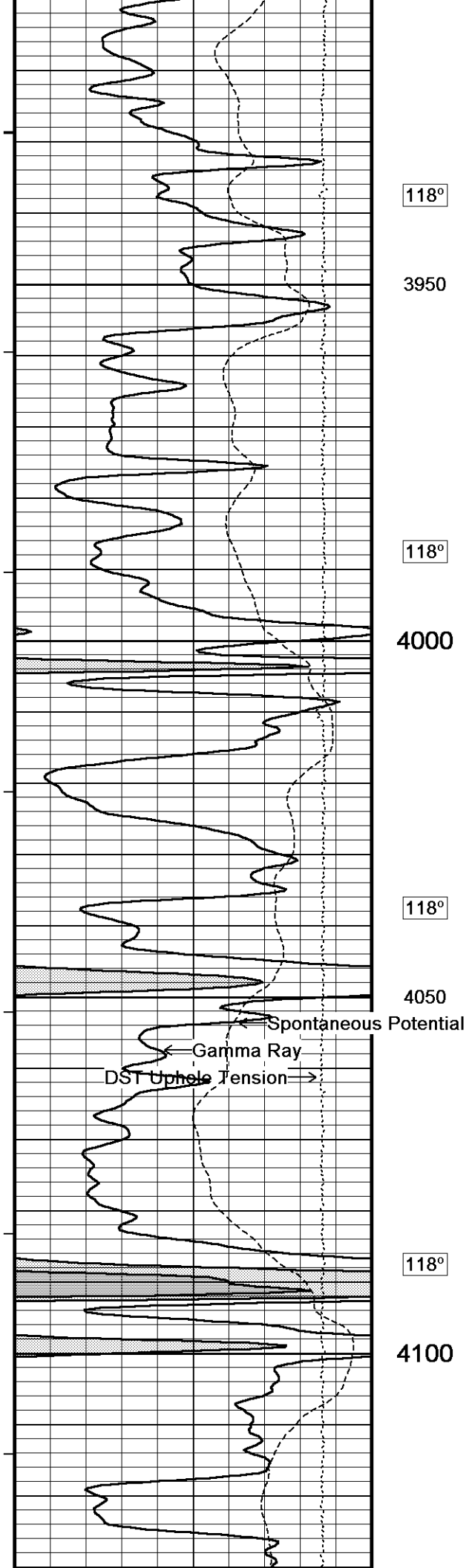
117°

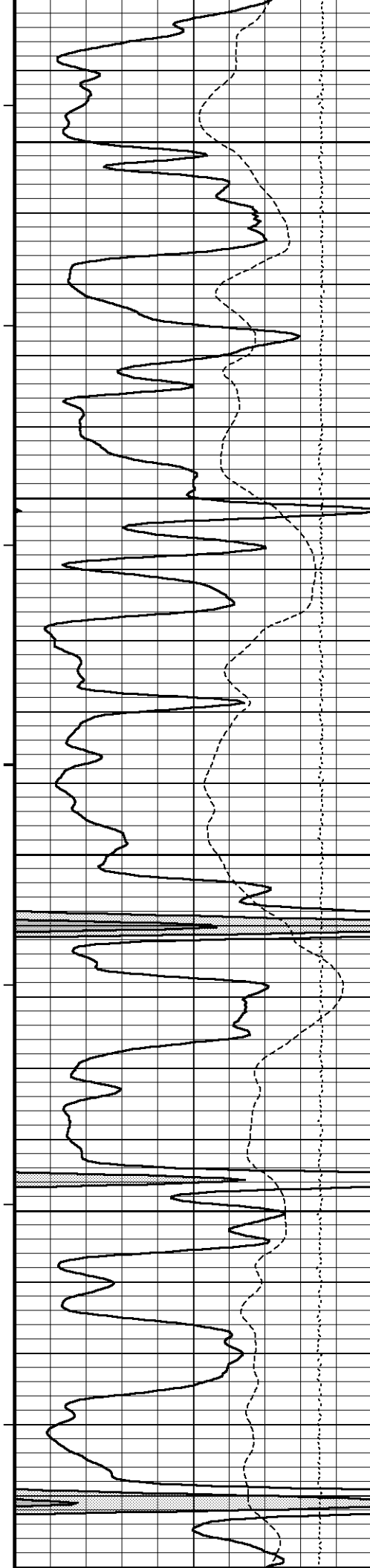
3850

117°

3900







118°

4150

118°

4200

119°

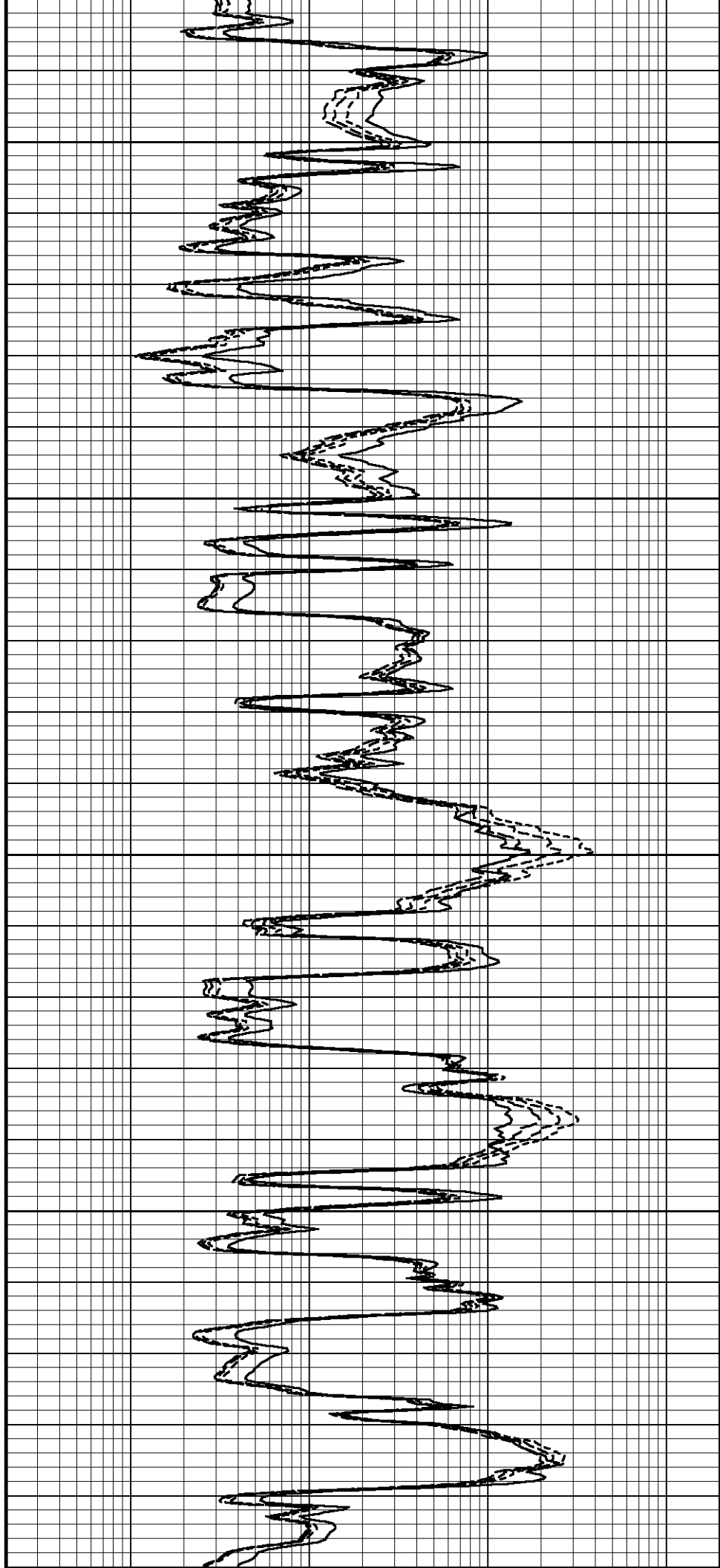
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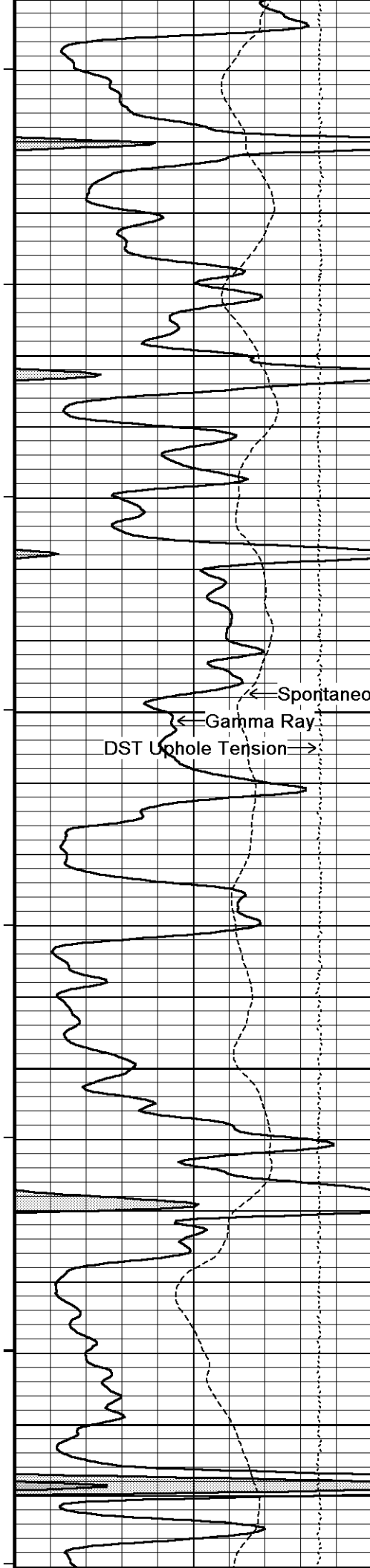
119°

4300

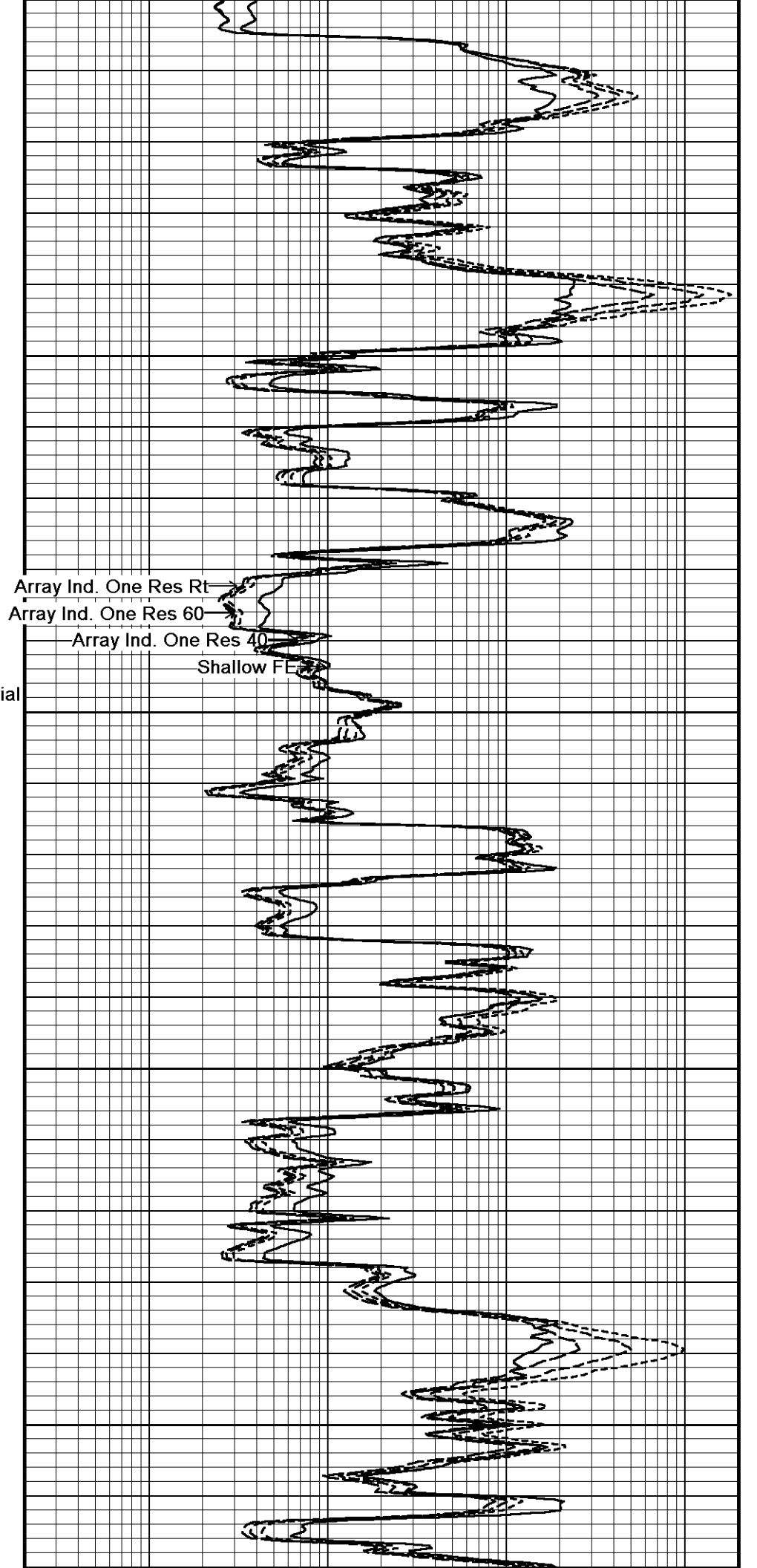
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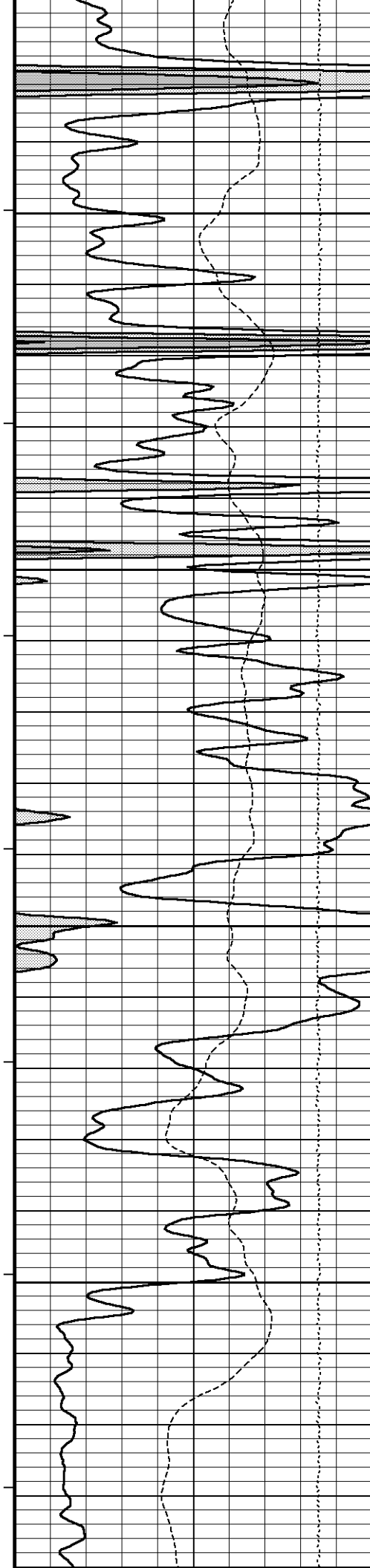
4350





4550
119°
4400
120°
4450
121°
4500
121°
4550





122°

4600

122°

4650

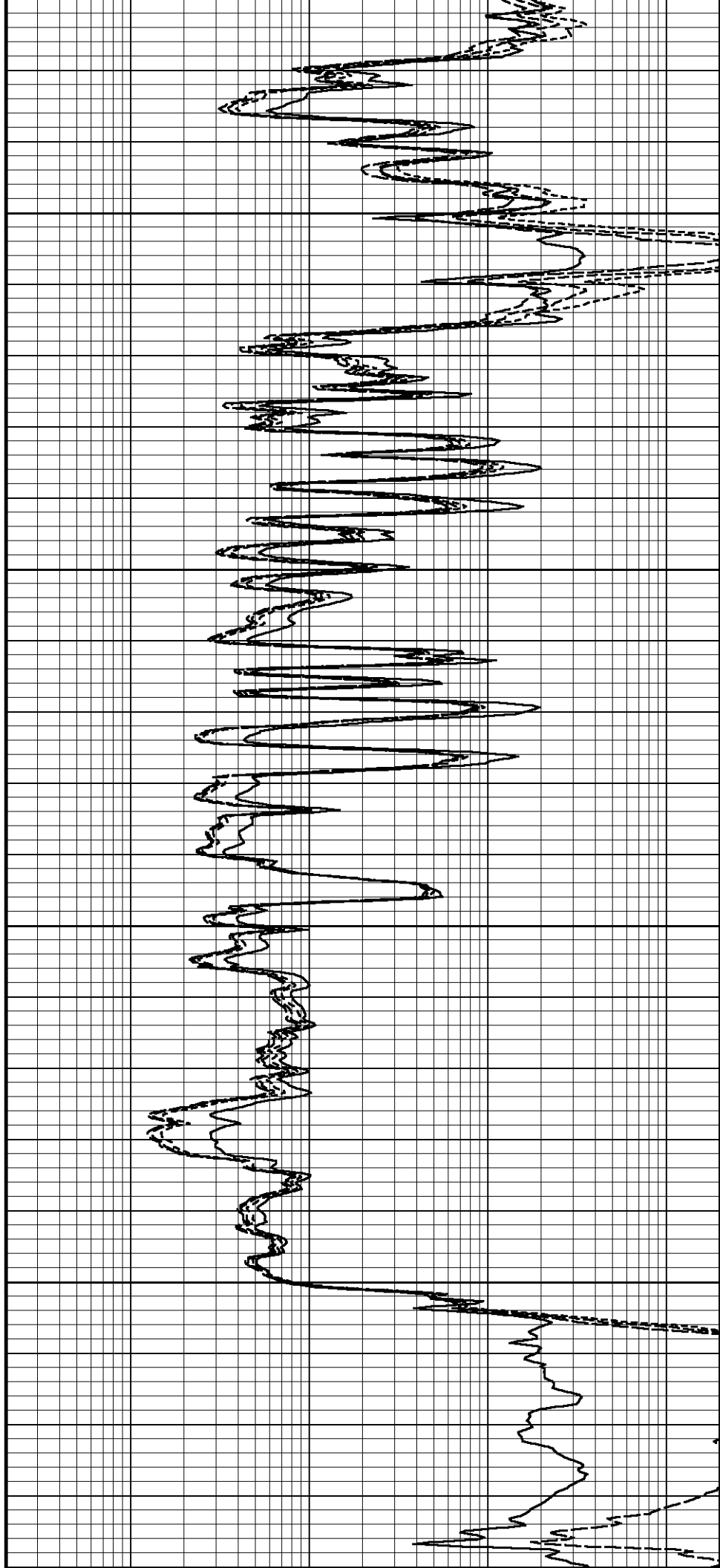
123°

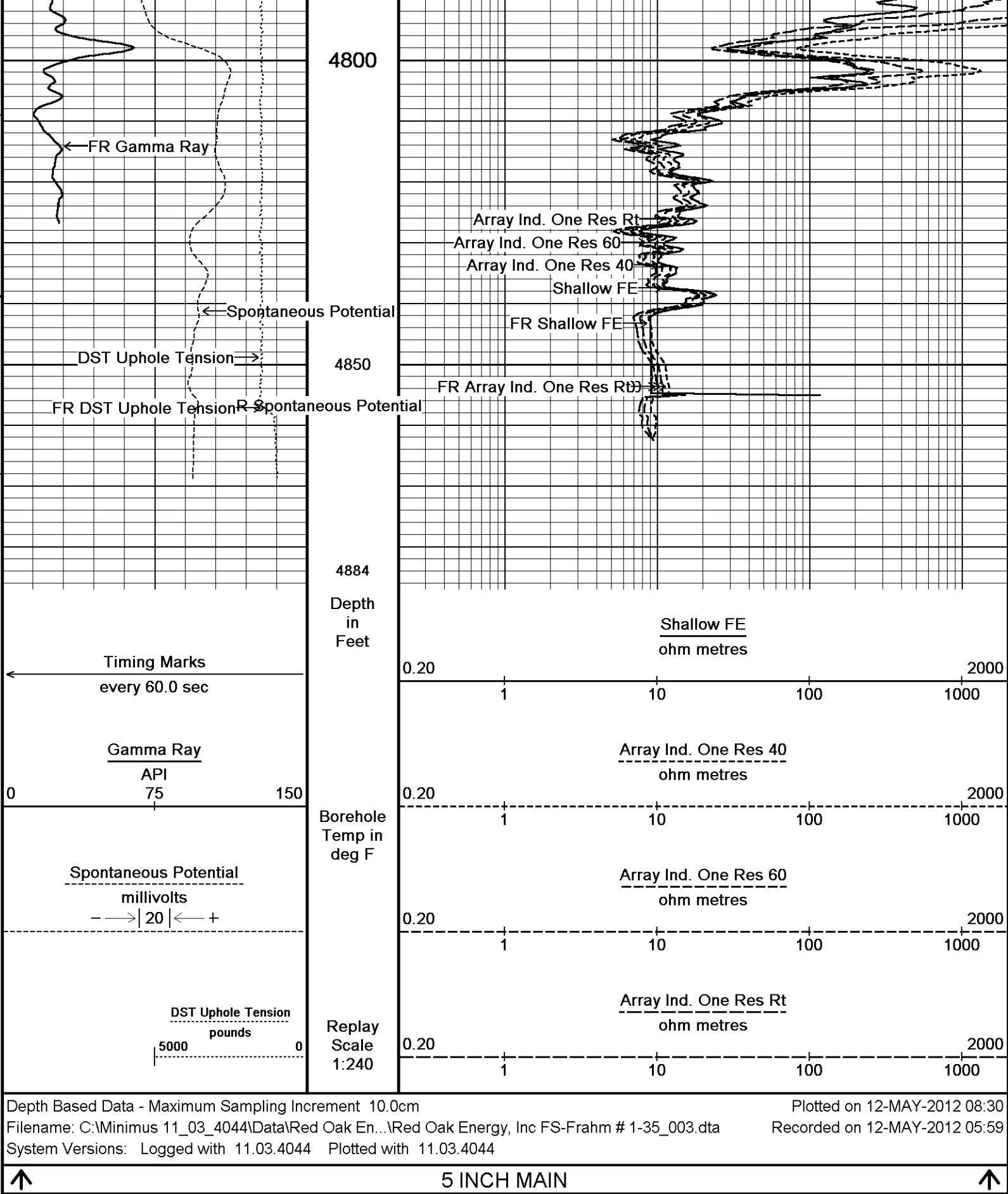
4700

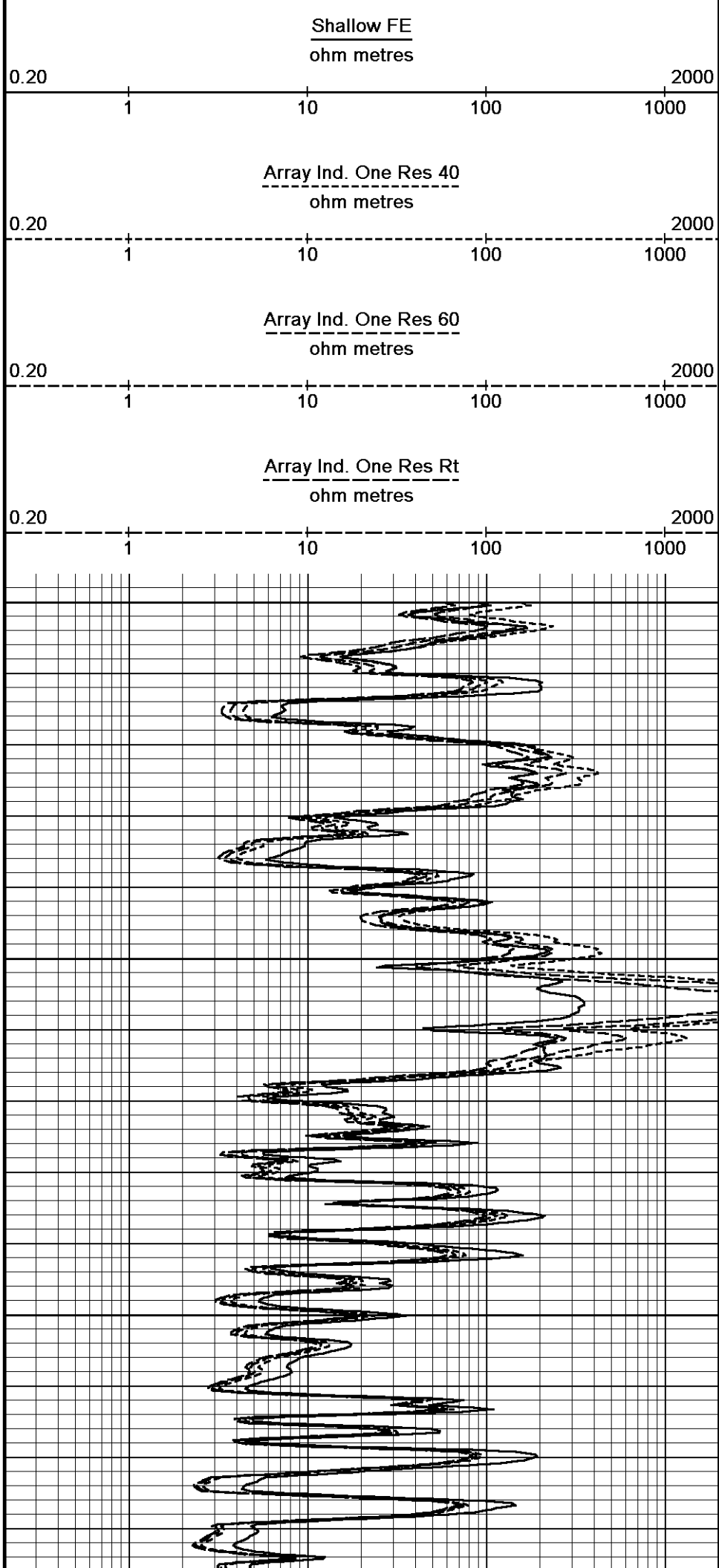
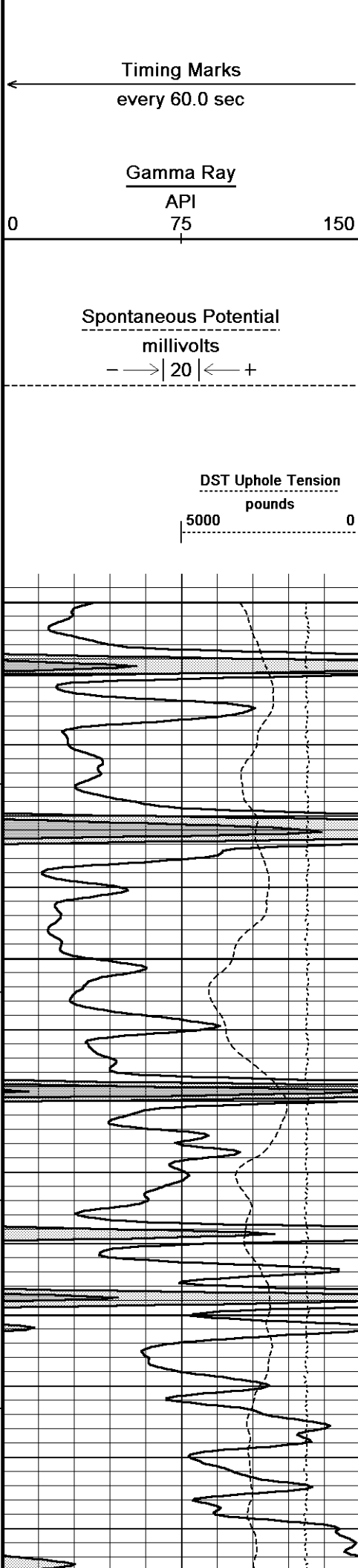
124°

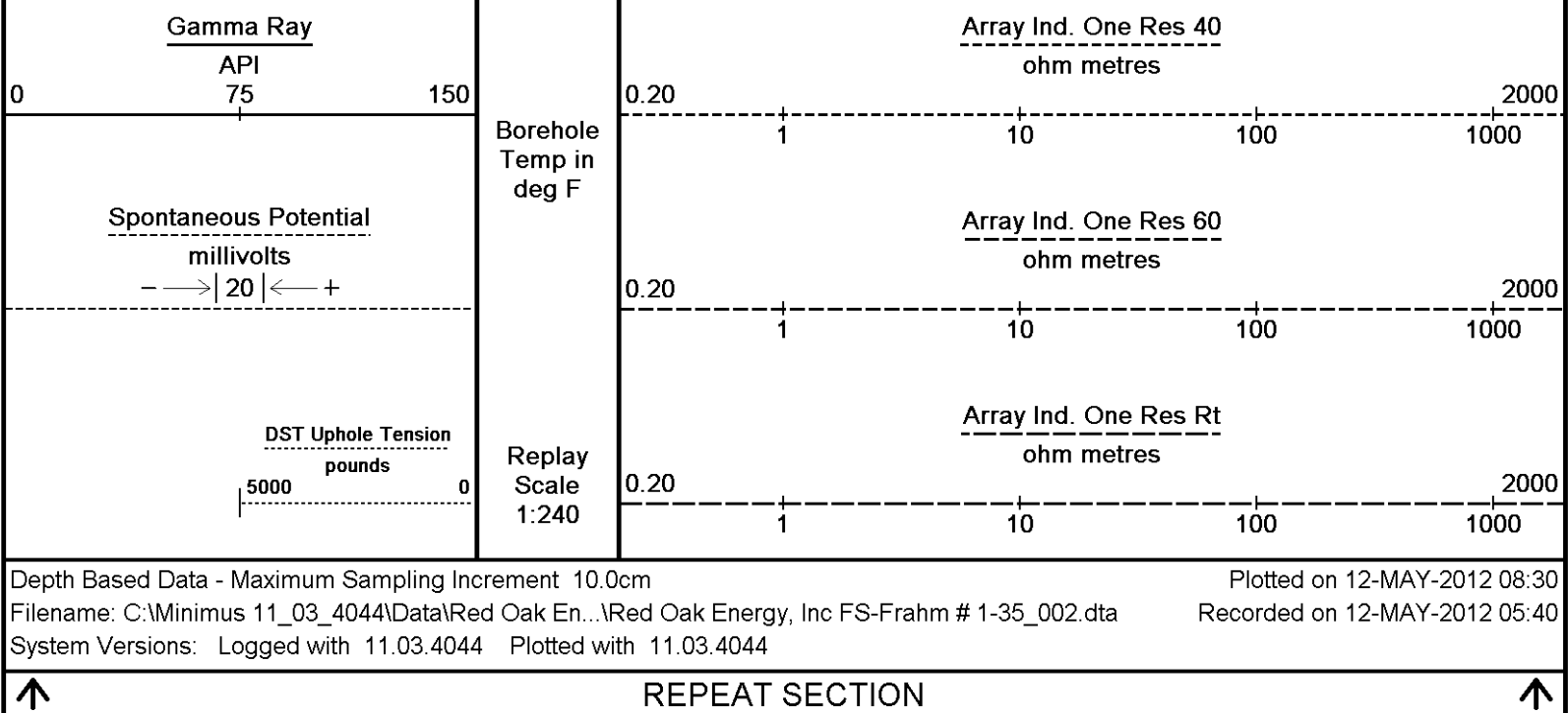
4750

124°









BEFORE SURVEY CALIBRATION			
C:\Minimus 11_03_4044\Data\Red Oak Energy, Inc FS-Frahm # 1-35\Red Oak Energy, Inc FS-Frahm # 1-35_003.dta			
General Constants All 000		Last Edited on 12-MAY-2012,04:18	
General Parameters			
Mud Resistivity	0.710	ohm-metres	
Mud Resistivity Temperature	80.000	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	Density Caliper		
Rwa Parameters			
Porosity used	Limestone Density Por.		
Resistivity used	Array Ind. One Res Rt		
RWA Constant A	1.000		
RWA Constant M	2.000		
Down-hole Tension Calibration SMS 0		Field Calibration on 09-MAY-2012 17:14	
Reading No	Measured	Calibrated (lbs)	
1	12472.43	0.00	
2	13803.95	582.00	
Gamma Calibration MCG-B 39		Field Calibration on 11-MAY-2012 23:07	
	Measured	Calibrated (API)	
Background	65	44	
Calibrator (Gross)	744	500	
Calibrator (Net)	680	456	
Gamma Constants MCG-B 39		Last Edited on 12-MAY-2012,04:19	
Gamma Calibrator Number	GRC141		
Mud Density	1.10	gm/cc	
Caliper Source for Processing	Density Caliper		
Tool Position	Eccentred		
Concentration of KCl	0.00	kppm	

Oil Calibration MCG-B 39			Field Calibration on 02-APR-2012,14:02	
Reference 1	Measured	100.0	Calibrated (mV)	100.0
Reference 2		-100.0		-100.0
High Resolution Temperature Calibration MCG-B 39			Field Calibration on 02-APR-2012,14:03	
	Measured	50.00	Calibrated(Deg F)	50.00
Lower				
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 11-MAY-2012 23:18	
Base Calibration				
Reading No	Measured	Calibrator Size (in)		
1	15017	5.98		
2	18447	7.97		
3	21786	9.86		
4	25801	11.92		
5	0	0.00		
6	N/A	N/A		
Field Calibration				
	Measured Caliper (in)	Actual Caliper (in)		
	6.10	5.98		
Micro Normal and Micro Inverse Calibration MML-A 4			Base Calibration on 0C3170023008, Field Check on 11-MAY-2012 23:17	
Base Calibration				
Channel	Resistor 1	Measured Resistor 2	Calibrated (ohm-m) Resistor 1	Resistor 2
Micro Normal	12.2	60.2	5.0	25.0
Micro Inverse	15.7	78.3	5.0	25.0
Channel	Base Check (ohm-m)		Field Check (ohm-m)	
Micro Normal	62.9		62.9	
Micro Inverse	48.3		48.3	
Micro Normal and Micro Inverse Constants MML-A 4			Last Edited on 10-MAY-2012,23:09	
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 09-MAY-2012,12:48 Field Check on 11-MAY-2012 23:16	
Base Calibration				
	Near	Measured Far	Calibrated (cps) Near	Far
	2956	91	3714	110
Ratio	32.635		33.764	
Field Calibrator at Base			Calibrated (cps)	
			2214	3169
Ratio	0.699			
Field Check			Calibrated (cps)	
			2142	3165
Ratio	0.677			
Neutron Constants MDN-B.J 387			Last Edited on 12-MAY-2012,04:19	
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 11-MAY-2012 23:11	
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	

FE Constants MFE-B.J 352		Last Edited on 12-MAY-2012,04:20	
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 11-MAY-2012 23:09	
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		
Channel	Base Check (mmho/m)		Field Check (mmho/m)		
	Low	High	Low	High	
1	0.0	0.0	12.1	3764.2	
2	0.0	0.0	29.6	3468.3	
3	0.0	0.0	27.1	3014.9	
4	0.0	0.0	18.7	2065.5	
Deep	0.0	0.0	15.8	1995.8	
Medium	0.0	0.0	40.1	3956.2	
Shallow	0.0	0.0	45.4	5083.9	
Array Temperature		0.0	71.5	Deg F	

Induction Constants MAI-A.A 178		Last Edited on 12-MAY-2012,04:20	
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
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 178

Field Calibration on 0C4030110004,

	Measured	Calibrated(Deg F)
Lower	32.00	32.00
Upper	68.00	68.00

High Resolution Temperature Constants MAI-A.A 178

Last Edited on 0C4060522000,

Pre-filter Length	11
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Caliper Calibration MPD-B 35

Base Calibration on 0C31C0A2C008
Field Calibration on 11-MAY-2012 23:32

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	20688	3.99
2	30944	5.98
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)
5.96	5.98

Photo Density Calibration MPD-B 35

Base Calibration on 0C31C0B00008
Field Check on 11-MAY-2012 23:30

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	62298	31871	59556	30836
Reference 2	26887	2863	24941	2541

Field Check at Base

1142.9	1359.1
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Field Check

1146.5	1361.8
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PE Calibration

Base Calibration		Measured		Calibrated
	WS	WH	Ratio	Ratio
Background	204	1008		
Reference 1	23049	62096	0.374	0.371
Reference 2	7079	26739	0.267	0.272

Field Check at Base

204.4 1008.1

Field Check

205.5 1014.8

Density Constants MPD-B 35

Last Edited on 12-MAY-2012,04:20

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	1.10	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	

DOWNHOLE EQUIPMENT

C:\Minimus 11_03_4044\Data\Red Oak Energy, Inc FS-Frahm # 1-35\Red Oak Energy, Inc FS-Frahm # 1-35_003.dta

MCB-A.A 11B Tension Cablehead
 MCB-A.A 161 LG: 2.40 ft WT: 19.8 lb OD: 2.24 in

Compact Comms Gamma
 MCG-B 39 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
 MML-A 4 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

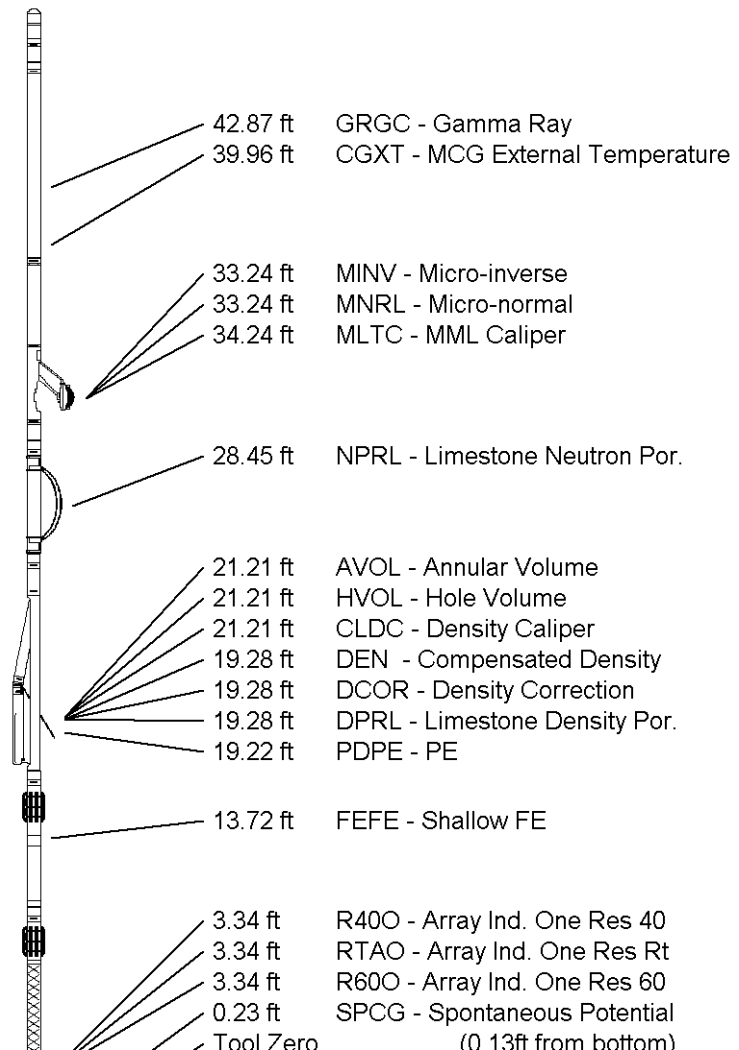
Compact Neutron
 MDN-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
 MPD-B 35 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focussed Electric
 MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
 MAI-A.A 178 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 50.55 ft Weight: 403.4 lb



Elevation Kelly Bushing	3308.00	feet	First Reading	4854.00	feet
Elevation Drill Floor	3306.00	feet	Depth Driller	4860.00	feet
Elevation Ground Level	3303.00	feet	Depth Logger	4857.00	feet



1 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
 Filename: C:\Minimus 11_03_4044\Data\Red Oak Energy, Inc\Red Oak Energy, Inc FS-Frahm # 1-35_003.dta
 System Versions: Logged with 11.03.4044 Plotted with 11.03.4044

Plotted on 12-MAY-2012 08:30
 Recorded on 12-MAY-2012 05:59

Timing Marks
 every 60.0 sec

Gamma Ray
 API
 75 150

Spontaneous Potential
 millivolts
 - -> | 20 | <- +

DST Uphole Tension
 pounds
 5000 0

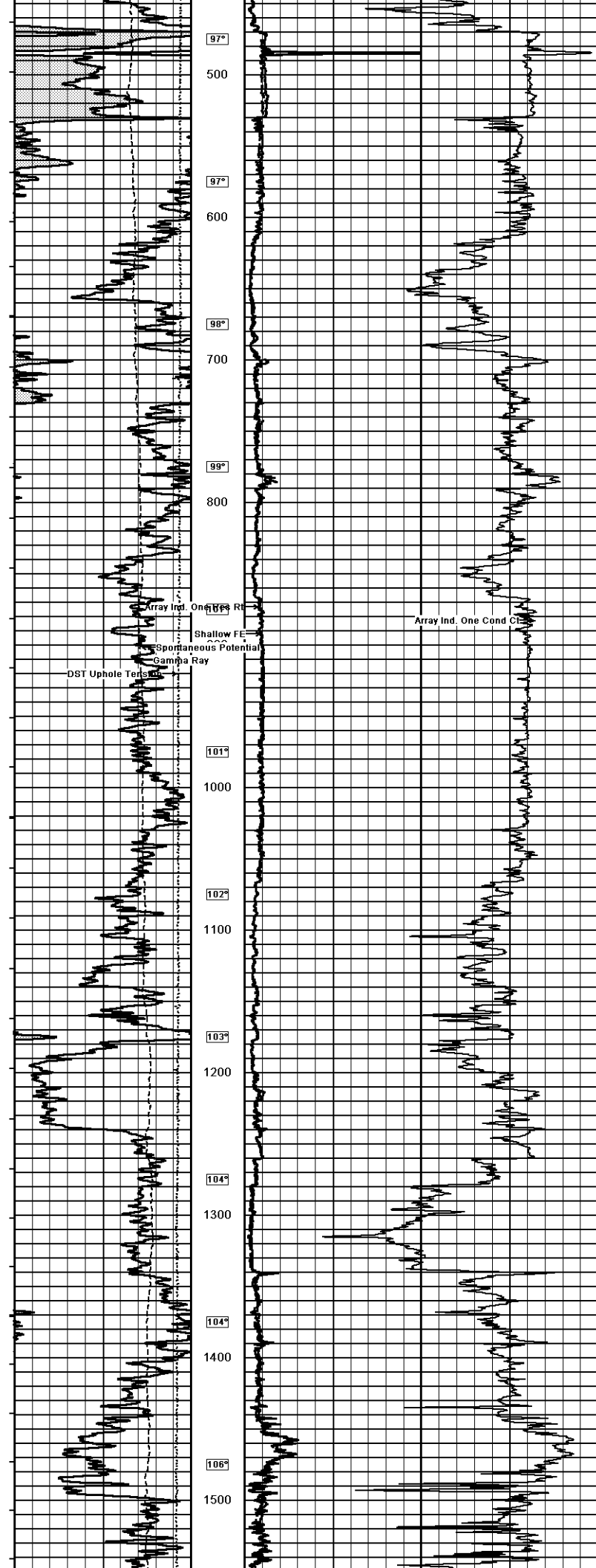
Array Ind. One Cond Ct
 mmhos
 1000 750 500 250 0
 2000 1750 1500 1250 1000

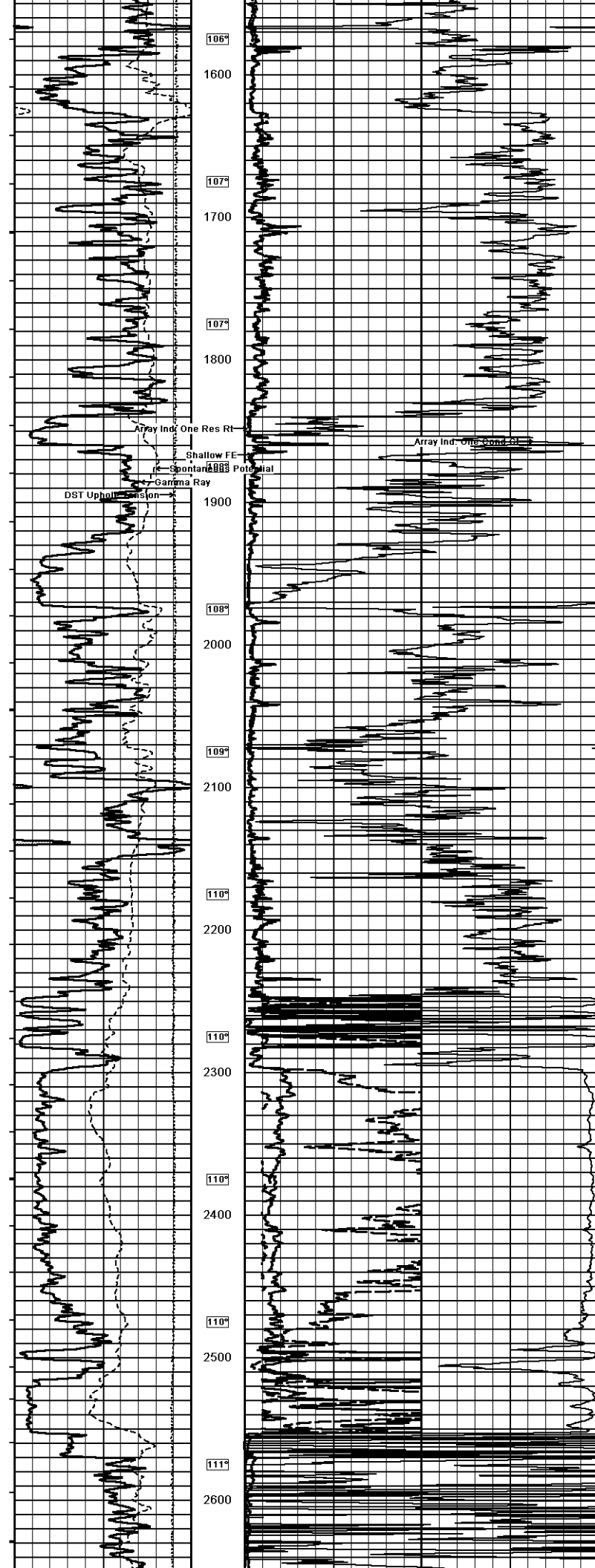
Borehole Temp in deg F
 0 25 50
 0 250 500

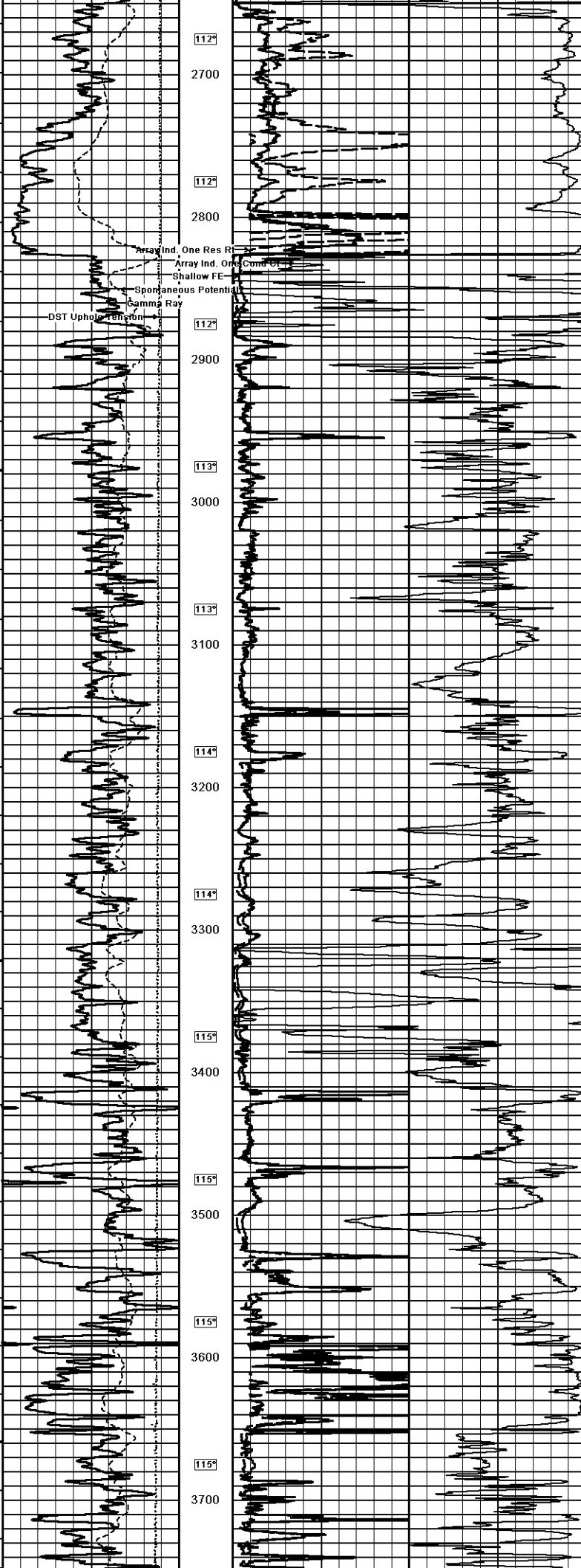
Array Ind. One Res Rt
 ohm metres
 0 25 50
 0 250 500

Replay Scale 1:600

Depth in Feet
 0 350 400







112°

2700

112°

2800

Array Ind., One Res R

Array Ind., One Comp O

Shallow FE

Spontaneous Potential

Gamma Ray

DST Uphole Pressure

112°

2900

113°

3000

113°

3100

114°

3200

114°

3300

115°

3400

115°

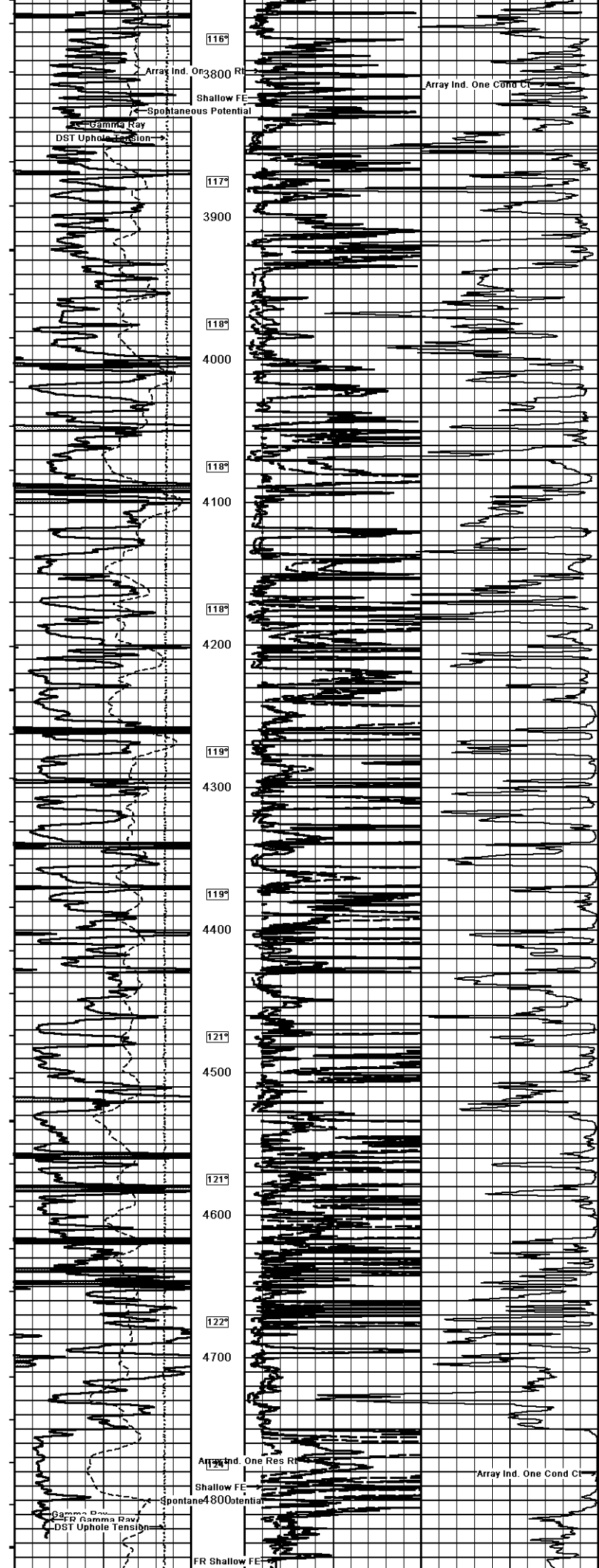
3500

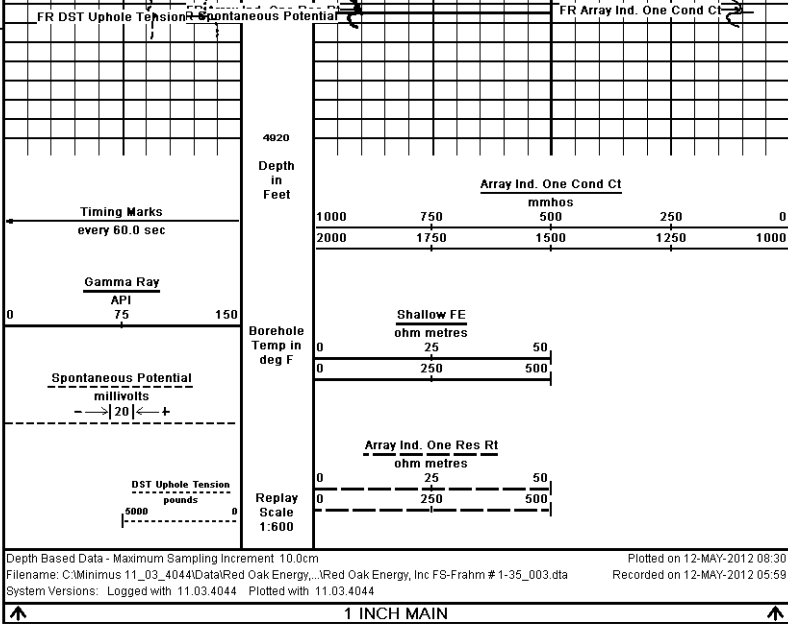
115°

3600

115°

3700





COMPANY		RED OAK ENERGY, INC.	
WELL		FS/FRAHM # 1-35	
FIELD		WC	
PROVINCE/COUNTY		THOMAS	
COUNTRY/STATE		U.S.A. / KANSAS	

Elevation Kelly Bushing	3308.00	feet	First Reading	4854.00	feet
Elevation Drill Floor	3306.00	feet	Depth Driller	4860.00	feet
Elevation Ground Level	3303.00	feet	Depth Logger	4857.00	feet



ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

