



Weatherford

**ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**

COMPANY	O'BRIEN ENERGY RESOURCES CORP.			
WELL	SHINOGL 3-20			
FIELD	SINGLEY			
PROVINCE/COUNTY	MEADE			
COUNTRY/STATE	U.S.A. / KANSAS			
LOCATION	N2 S2 SW SE 335' FSL & 1980' FEL			
SEC 20	TWP 33	RGE 29	Other Services	
Latitude	37.126944	MPD/MDN		MML
Longitude	-100.525277			
API Number	15-119-21433			
Permanent Datum GL, Elevation 2667 feet				Elevations: feet
Log Measured From KB, 12.00 feet above Permanent Datum				KB 2679.00
Drilling Measured From KB				DF 2677.00
				GL 2667.00
Date	26-MAR-2019			
Run Number	ONE			
Service Order	17937-240753906			
Depth Driller	6384.00			
Depth Logger	6398.00			
First Reading	6395.00			
Last Reading	1528.00			
Casing Driller	1538.00			
Casing Logger	1528.00			
Bit Size	7.875			
Hole Fluid Type	WATER-BASED			
Density / Viscosity	9.00 lb/USg			
PH / Fluid Loss	10.50			
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.78 @ 92.0			
Rmf @ Measured Temp	0.62 @ 92.0			
Rmc @ Measured Temp	0.94 @ 92.0			
Source Rmf / Rmc	CALC			
Rm @ BHT	0.57 @ 128.0			
Time Since Circulation	4 HOURS			
Max Recorded Temp	128.00			
Equipment / Base	13244			
Recorded By	MATT MCGLOTHLIN			
Witnessed By	PETER DEBENHAM			

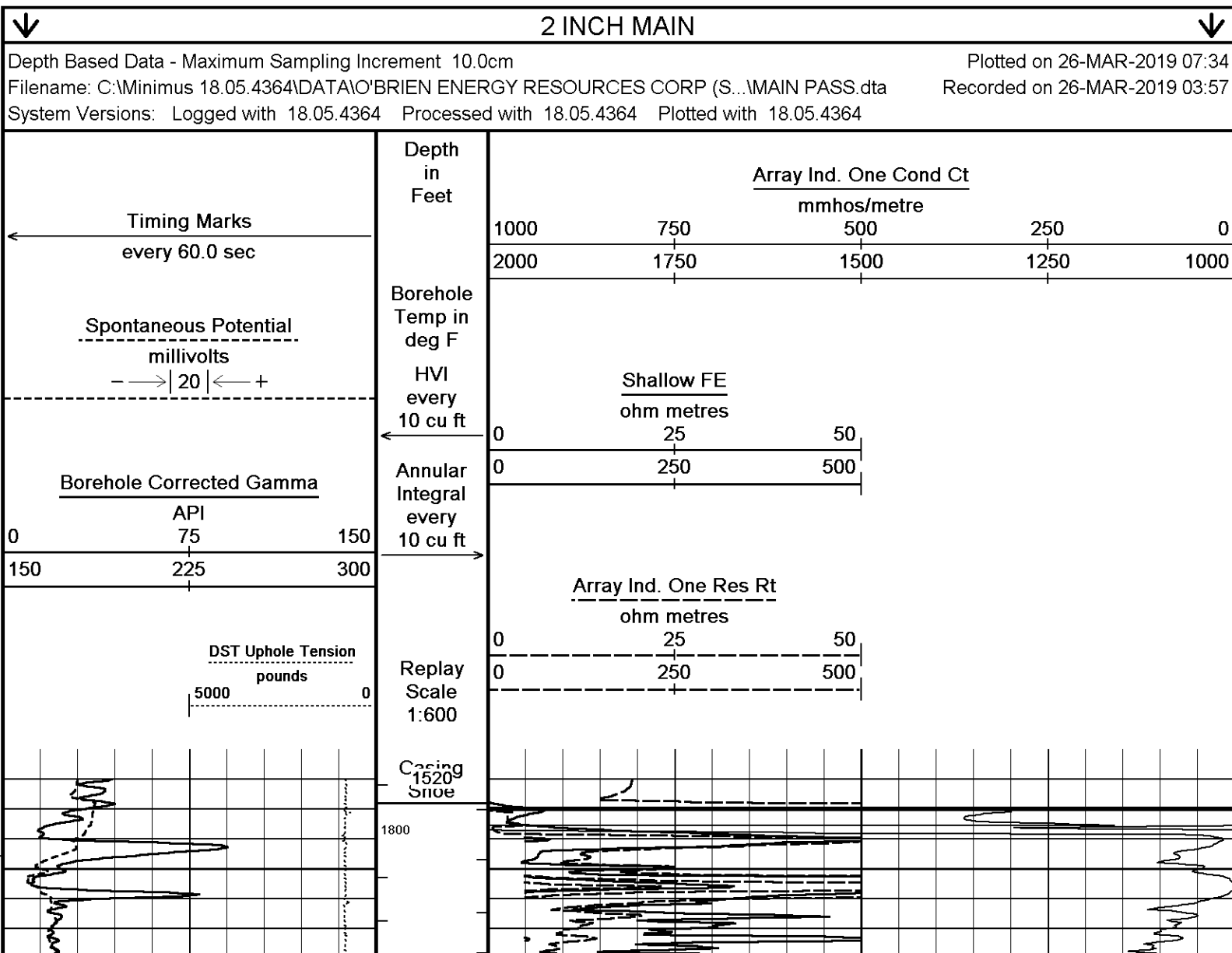
BOREHOLE RECORD					Last Edited: 26-MAR-2019 04:50
Bit Size inches		Depth From feet		Depth To feet	
7.875		1538.00		6384.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
SURFACE	8.625	0.00	1538.00	24.00	

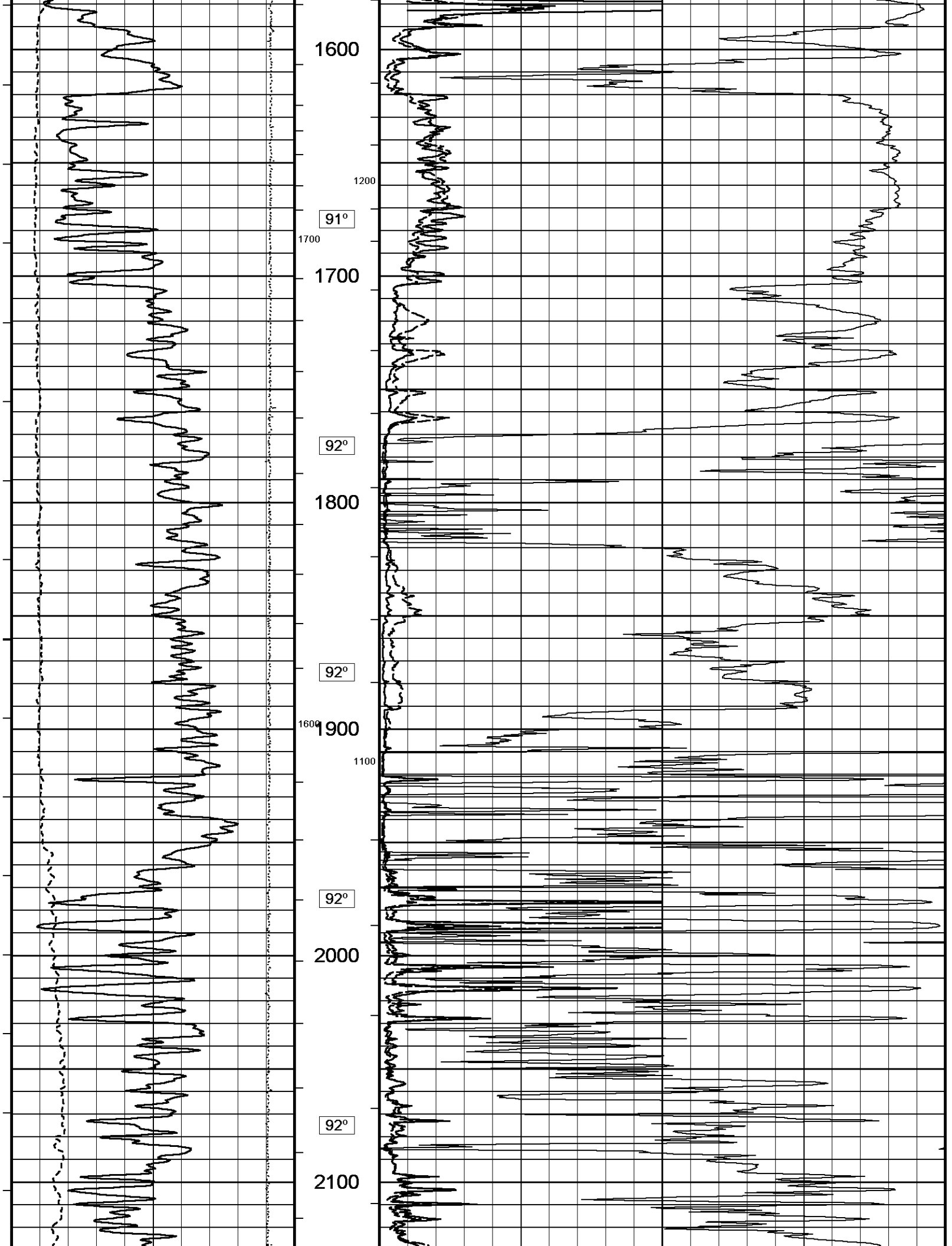
REMARKS
WLS SOFTWARE VERSION: 18.05.4364.
- TOOLSTRING: SHA, MCG, MML, MDN, MPD, SKJ, MFE, MAI, LOGGED IN COMBANATION.
- HARDWARE USED: MAI: TWO 0.5 INCH STANDOFFS. MFE: ONE 0.5 INCH STANOFF. MPD: 8 INCH PROFILE PLATE. MDN: DUAL BOWSPRING FOR DECENTRALIZATION.
- DENSITY MATRICES USED TO CALCULAT POROSITY: LIMESTONE: 2.71 G/CC. SANDSTONE: 2.65 G/CC. DOLOMITE: 2.87 G/CC.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST. HIGH RESOLUTION: TD - 5700 FT. REPEAT PASS: TD - 5700 ET

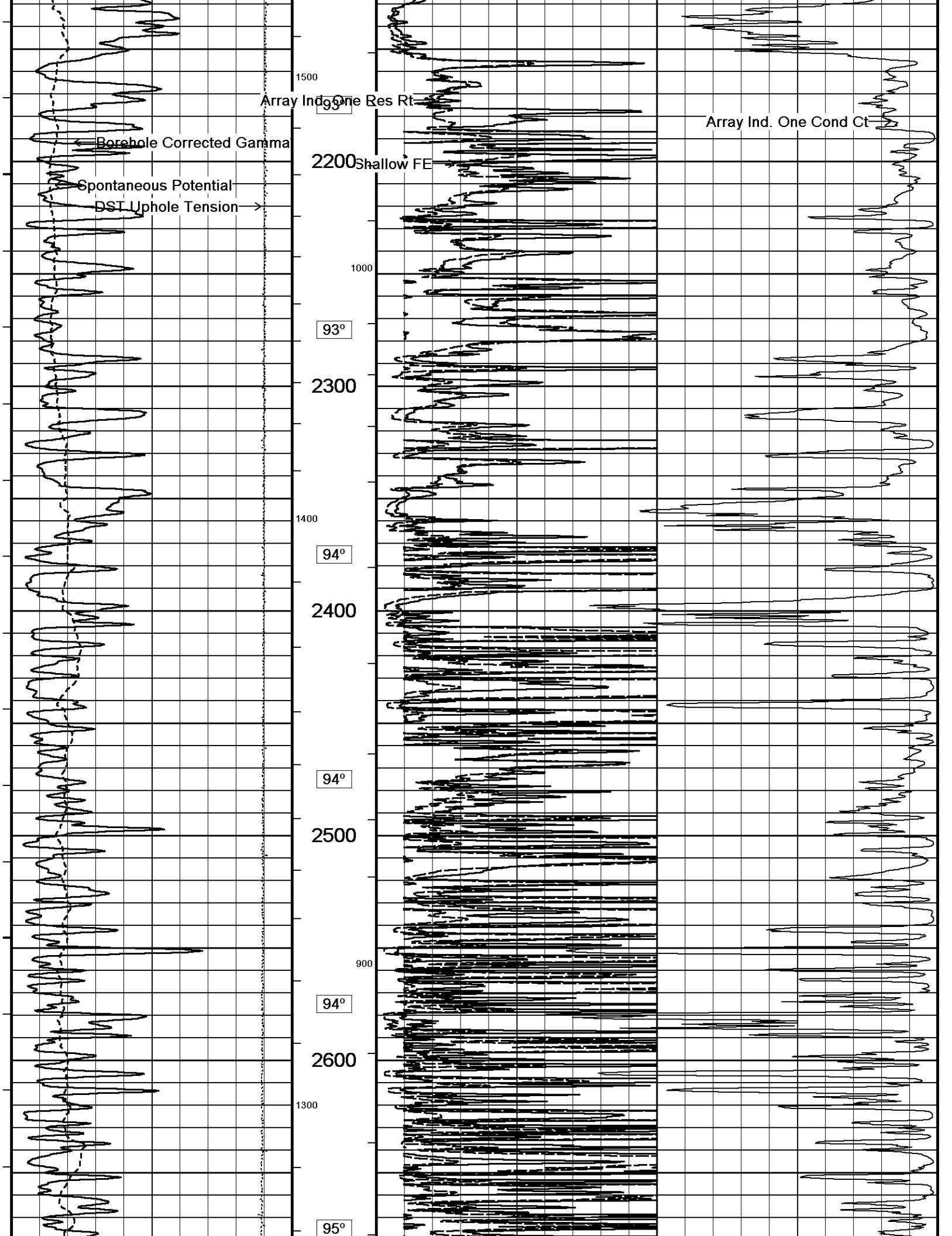
DENSITY / NEUTRON / MICROLOG: TD - 4000 FT.
GAMMA / INDUCTION / CALIPER = TD - SURFACE CASING.

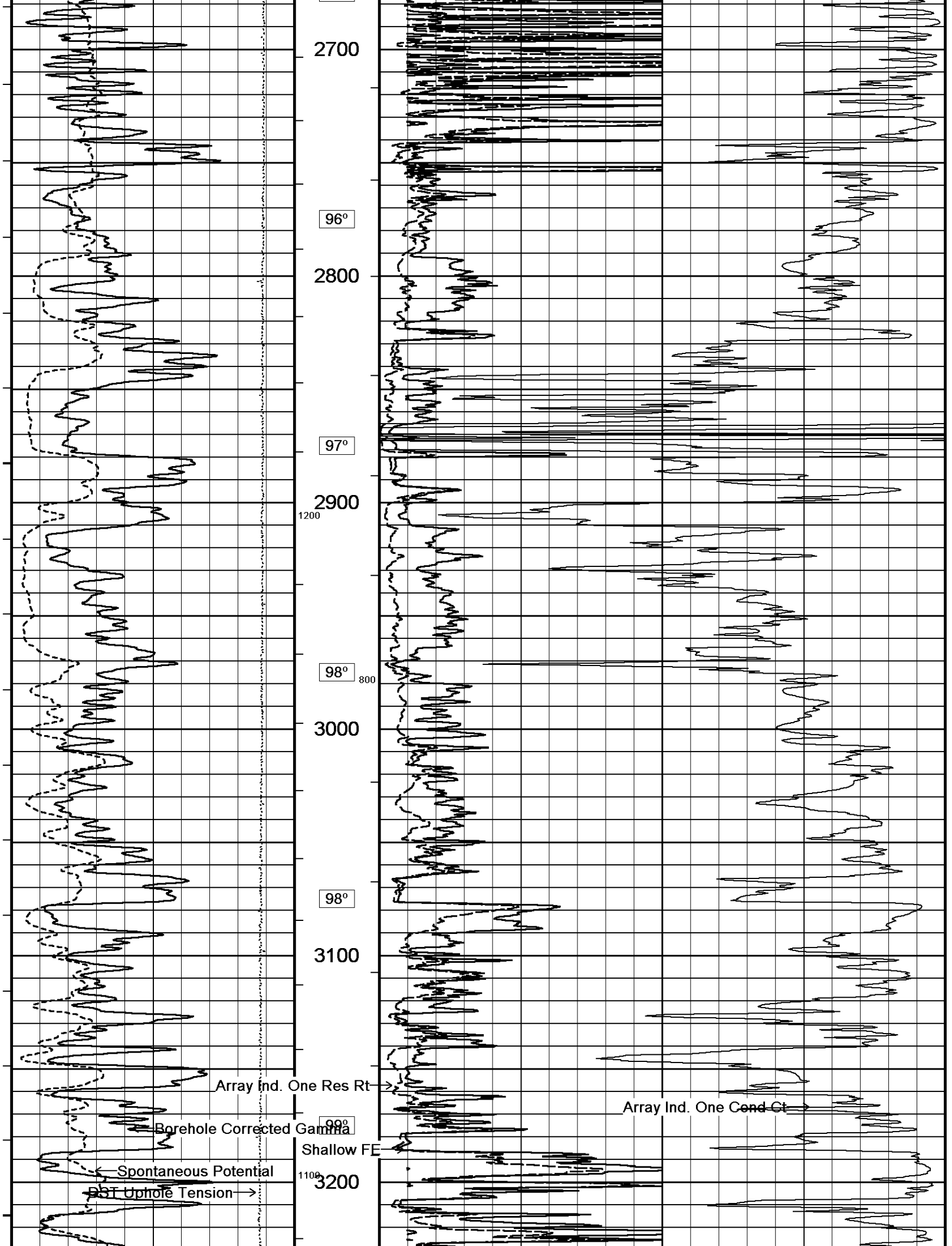
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING = 1800 CU.FT.
- ANNULAR HOLE VOLUME WITH 4.5 INCH FUTURE CASING FROM TD TO SURFACE CASING = 1270 CU.FT.
- CREW:
 - B. TOVAR
 - B. COPELAND
- MUD PROPERTIES:
 - CHLORIDES: 4000 MG/L.
 - LCM: 8#/BBL.

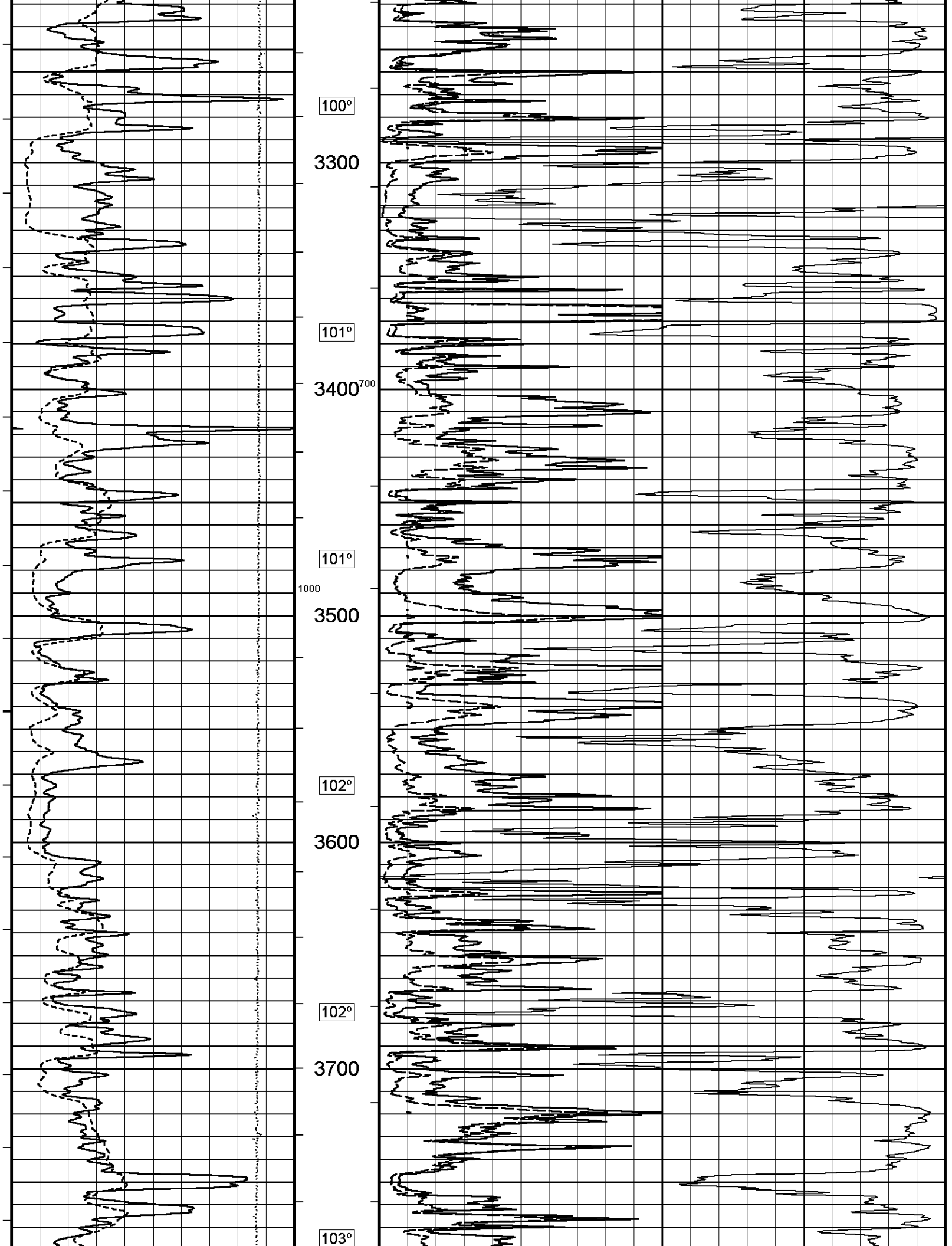
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.

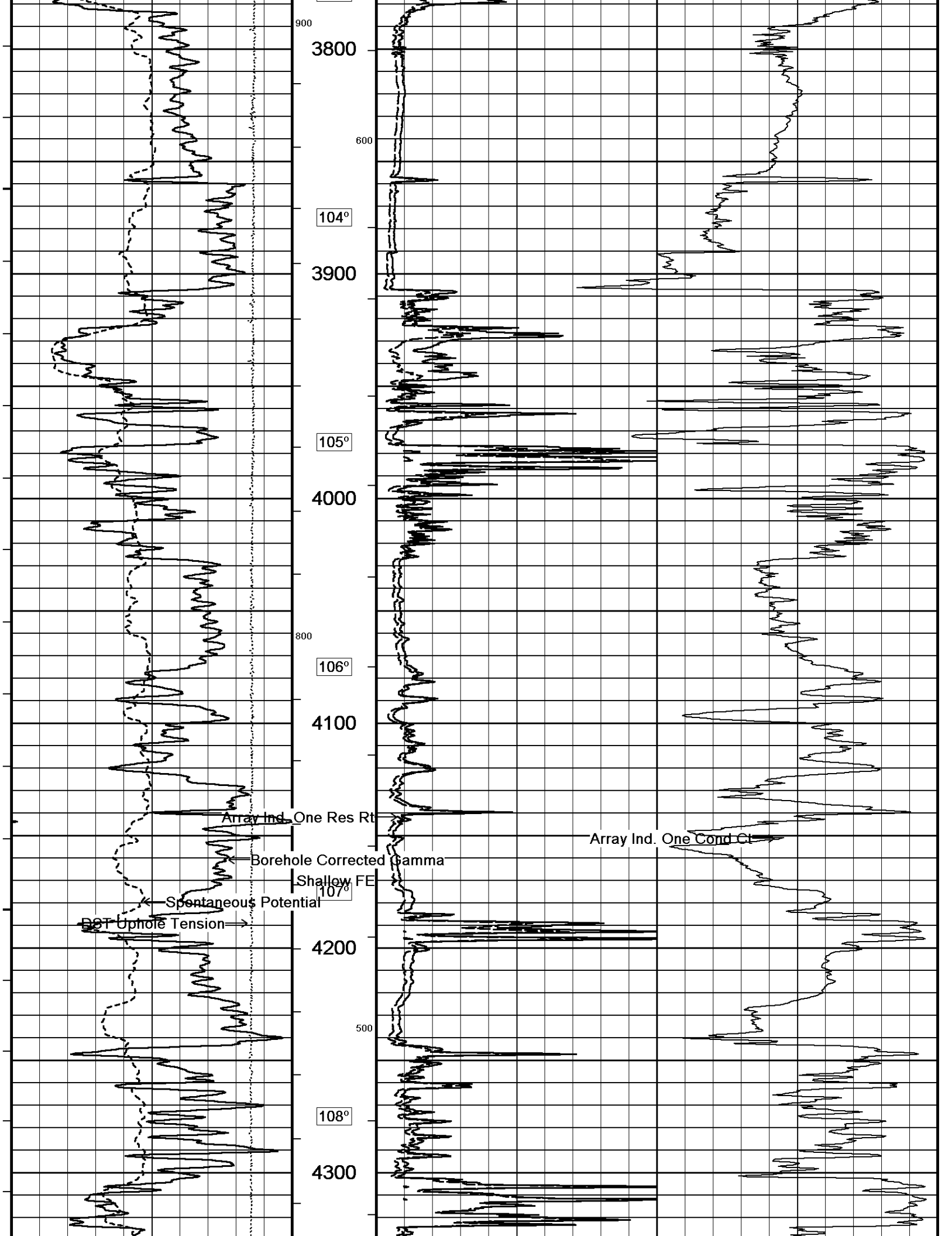


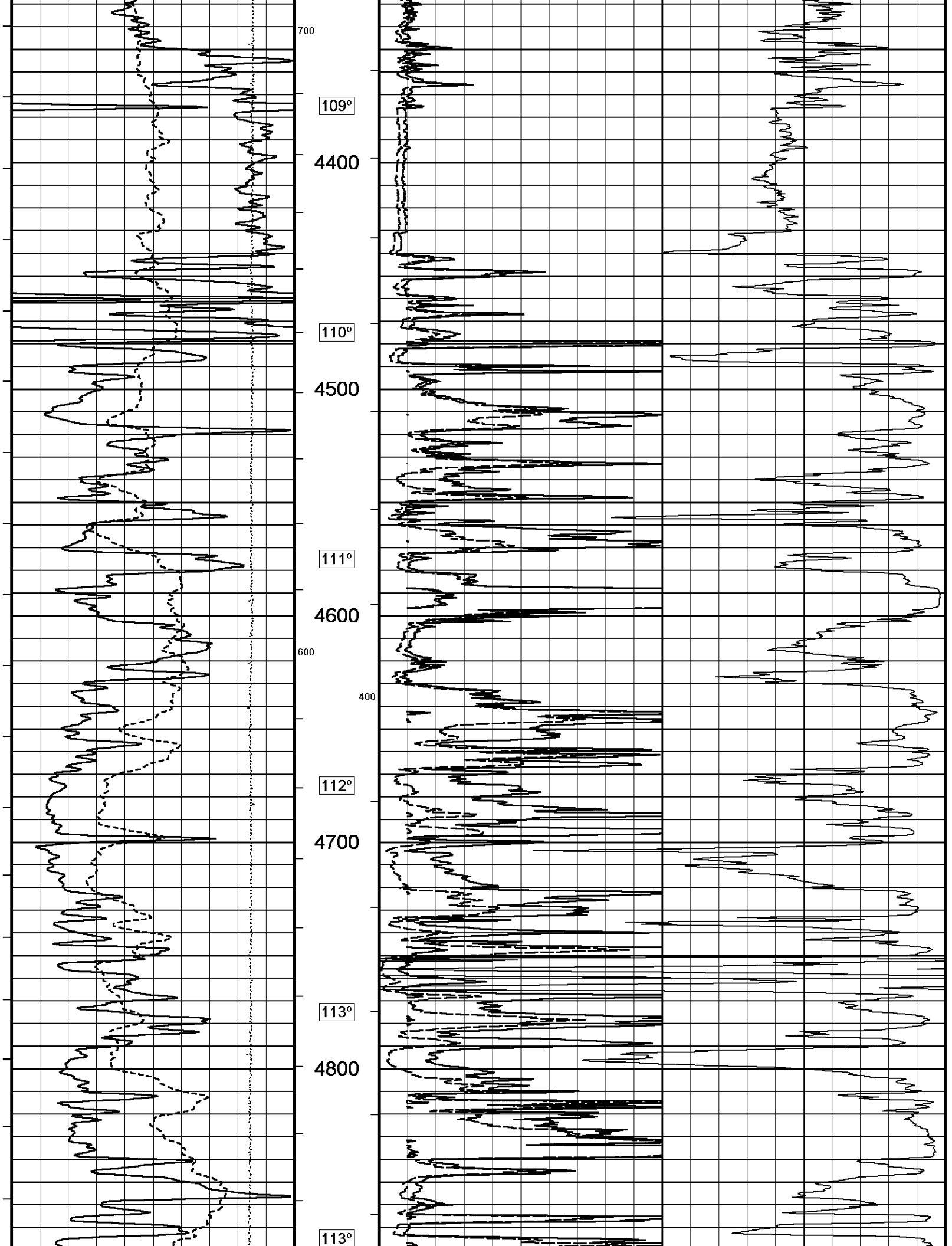


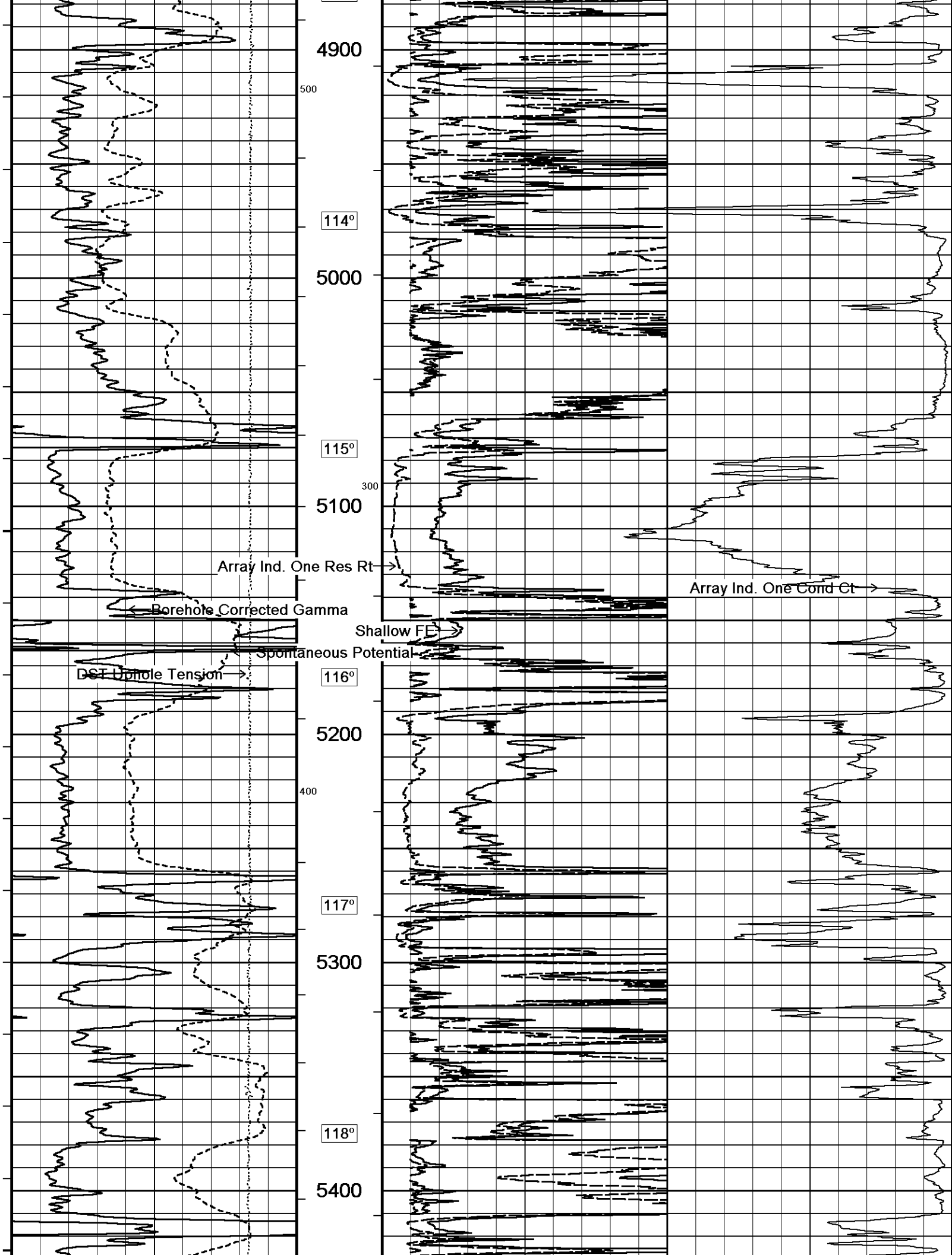


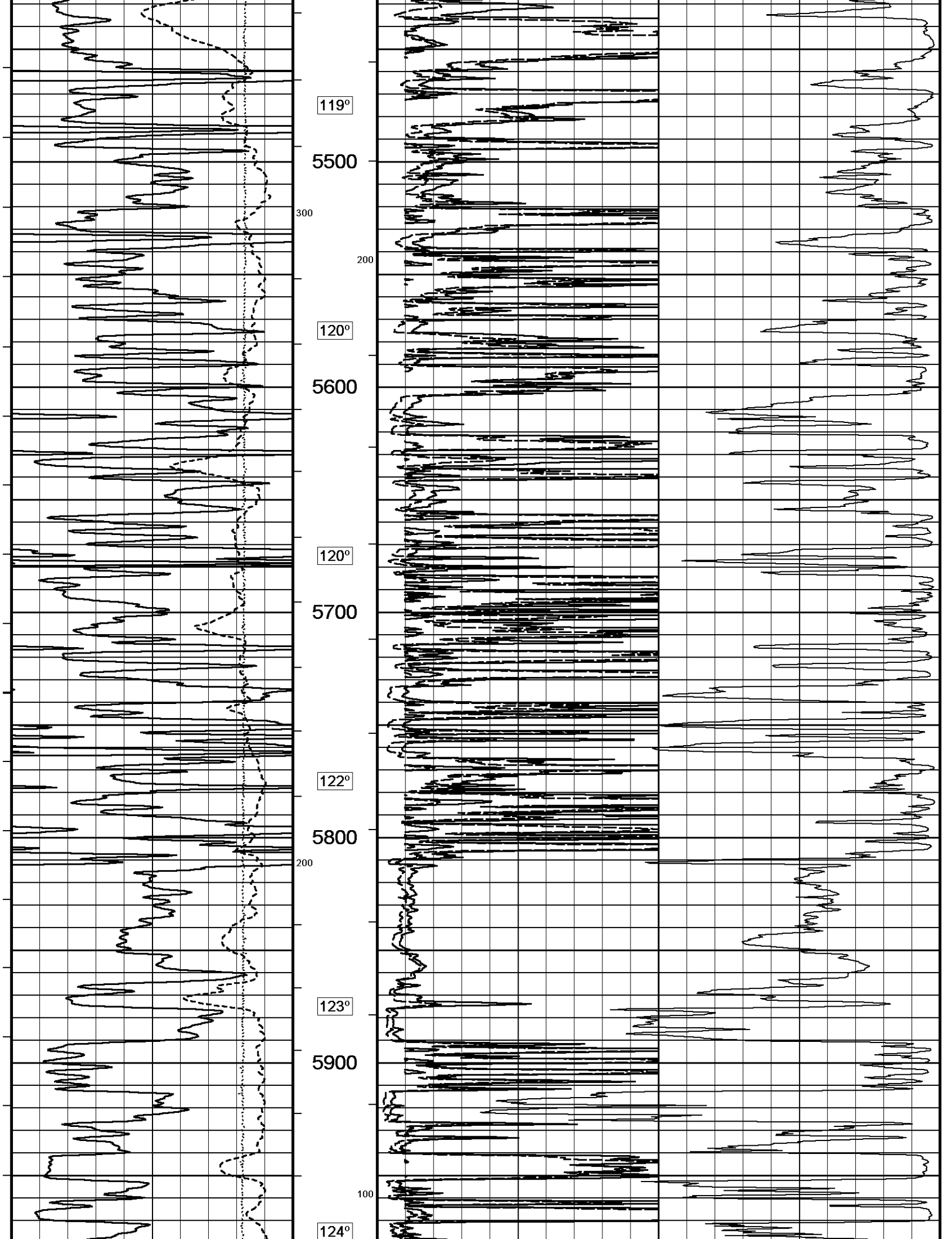


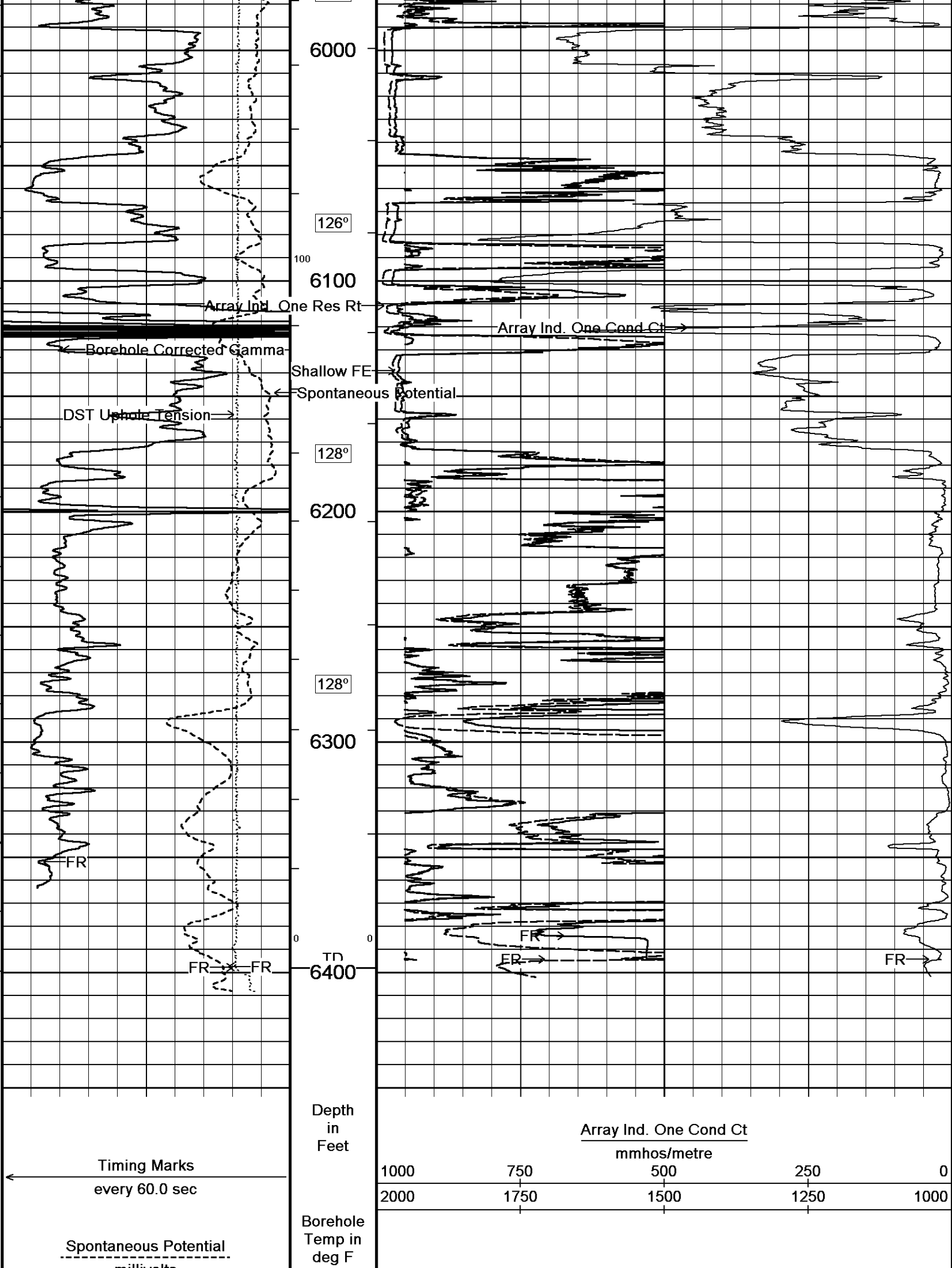


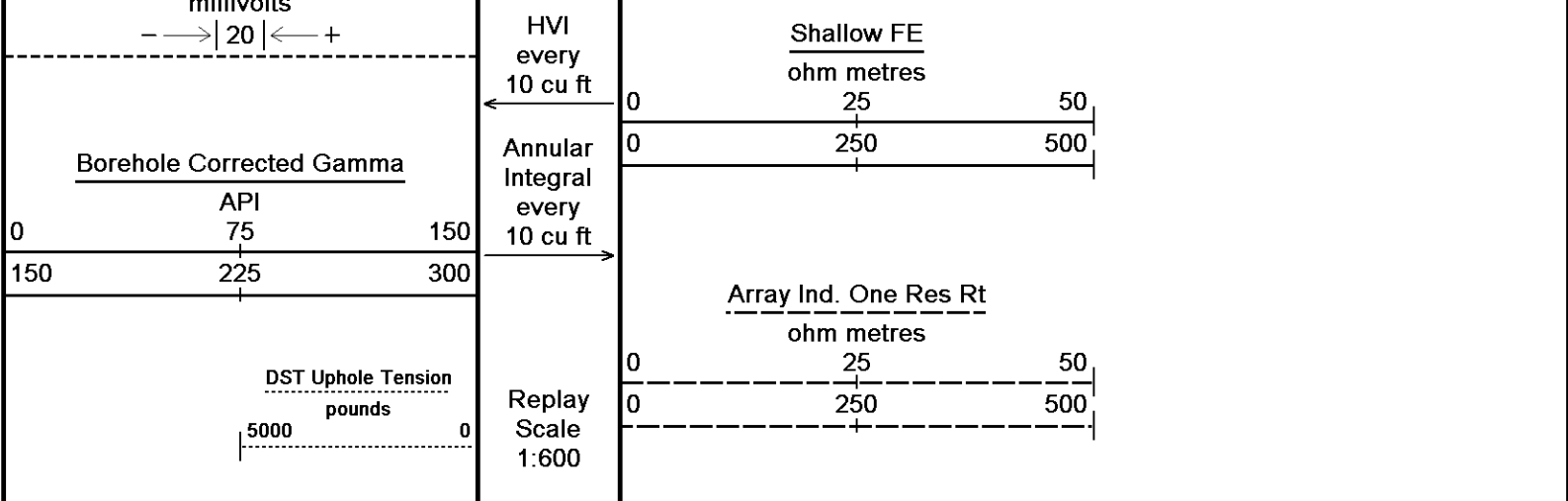












Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 26-MAR-2019 07:34

Filename: C:\Minimus 18.05.4364\DATA\O'BRIEN ENERGY RESOURCES CORP (S...MAIN PASS.dta

Recorded on 26-MAR-2019 03:57

System Versions: Logged with 18.05.4364 Processed with 18.05.4364 Plotted with 18.05.4364

↑

2 INCH MAIN

↑

↓

5 INCH MAIN

↓

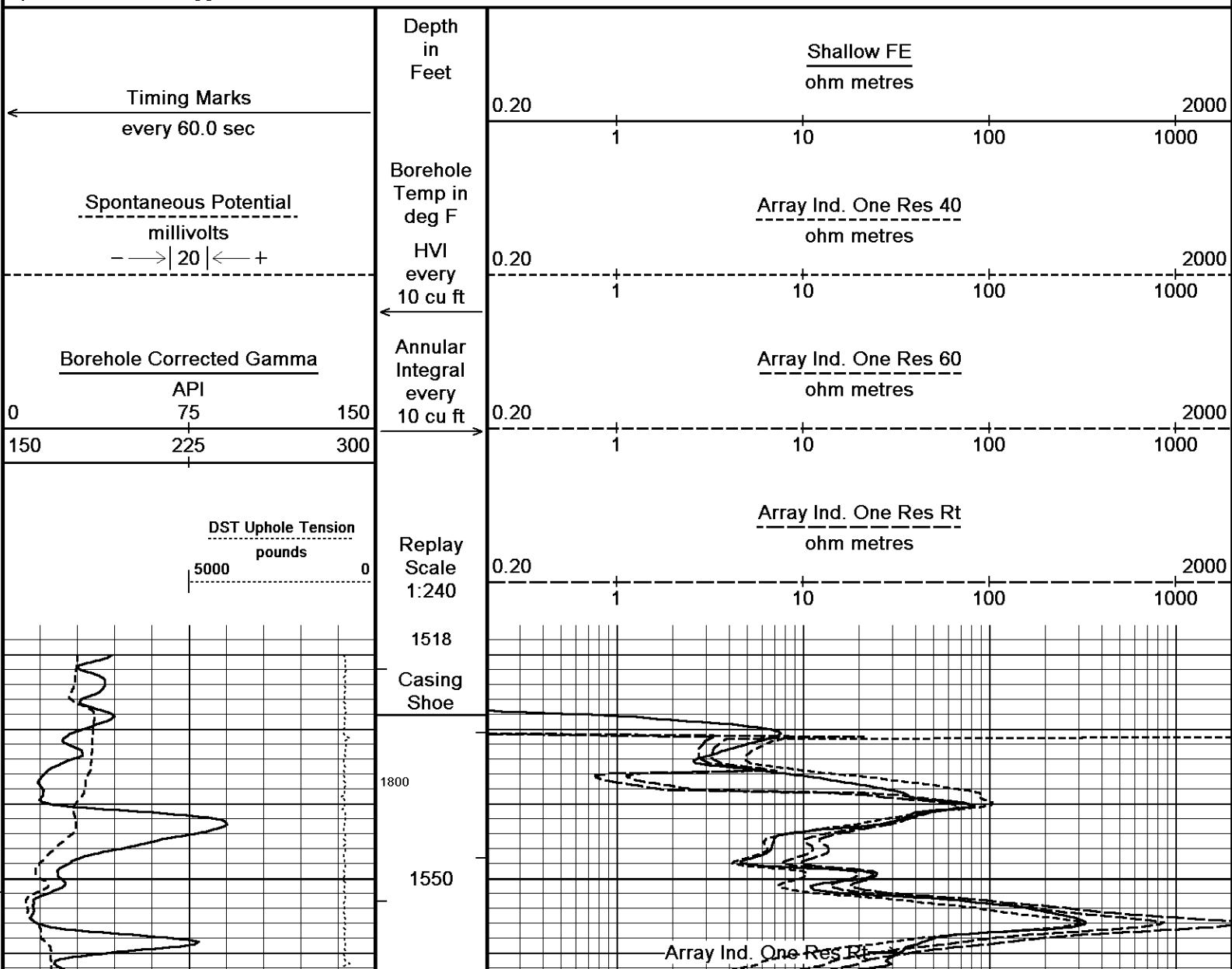
Depth Based Data - Maximum Sampling Increment 10.0cm

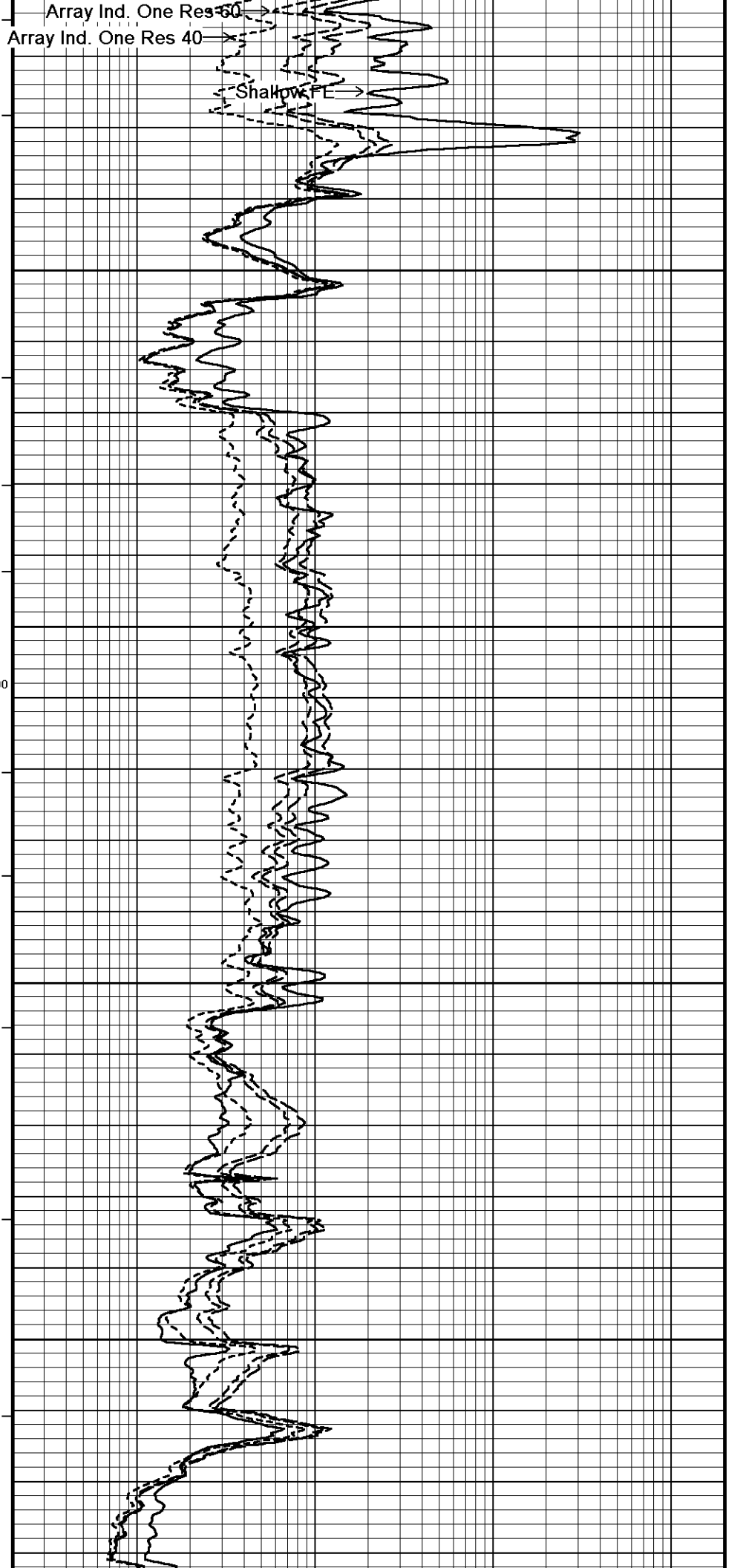
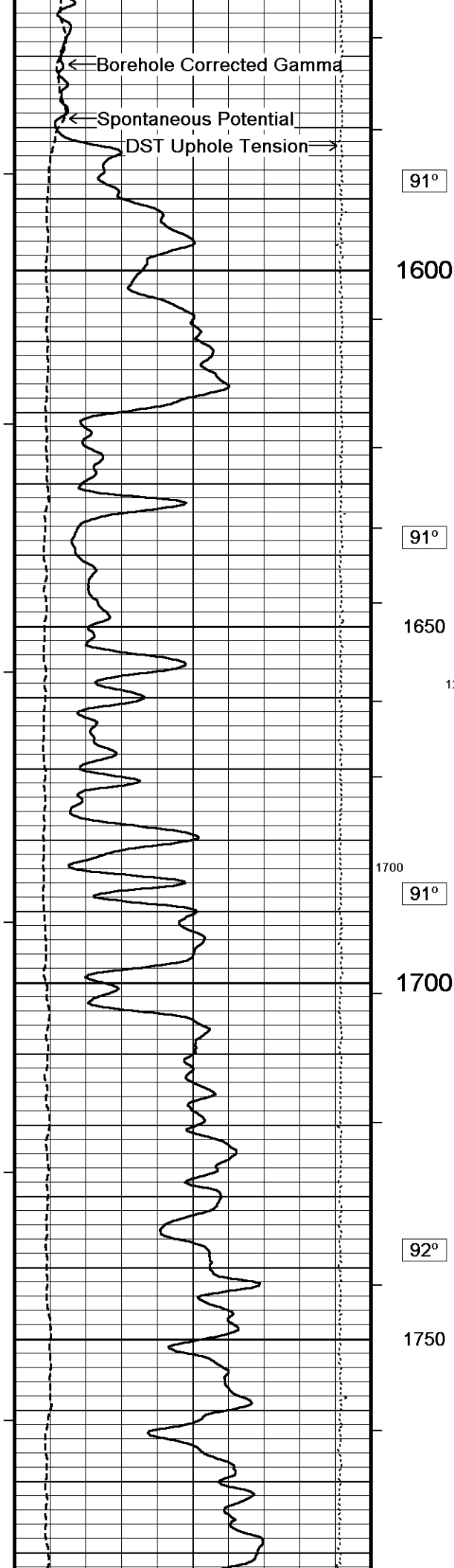
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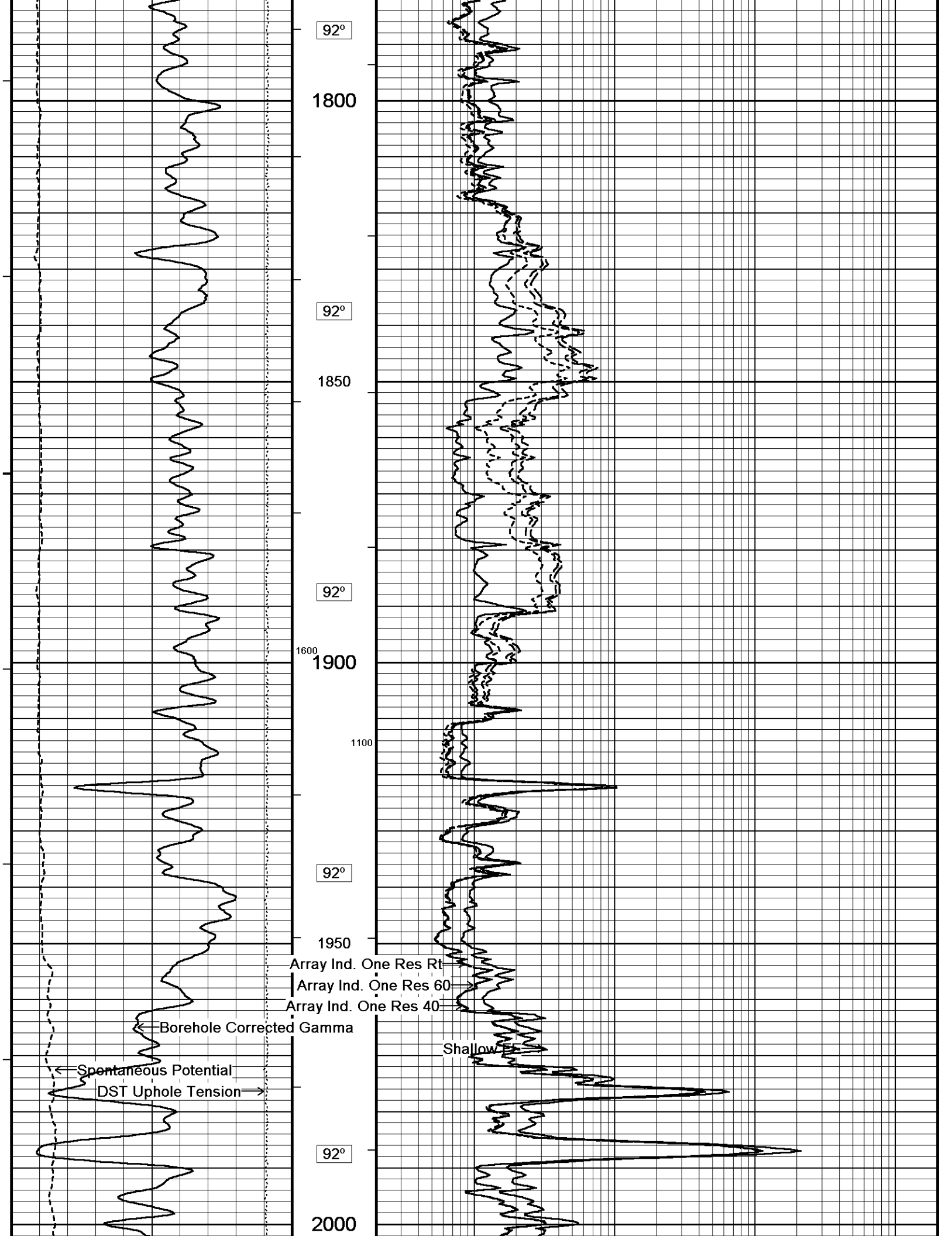
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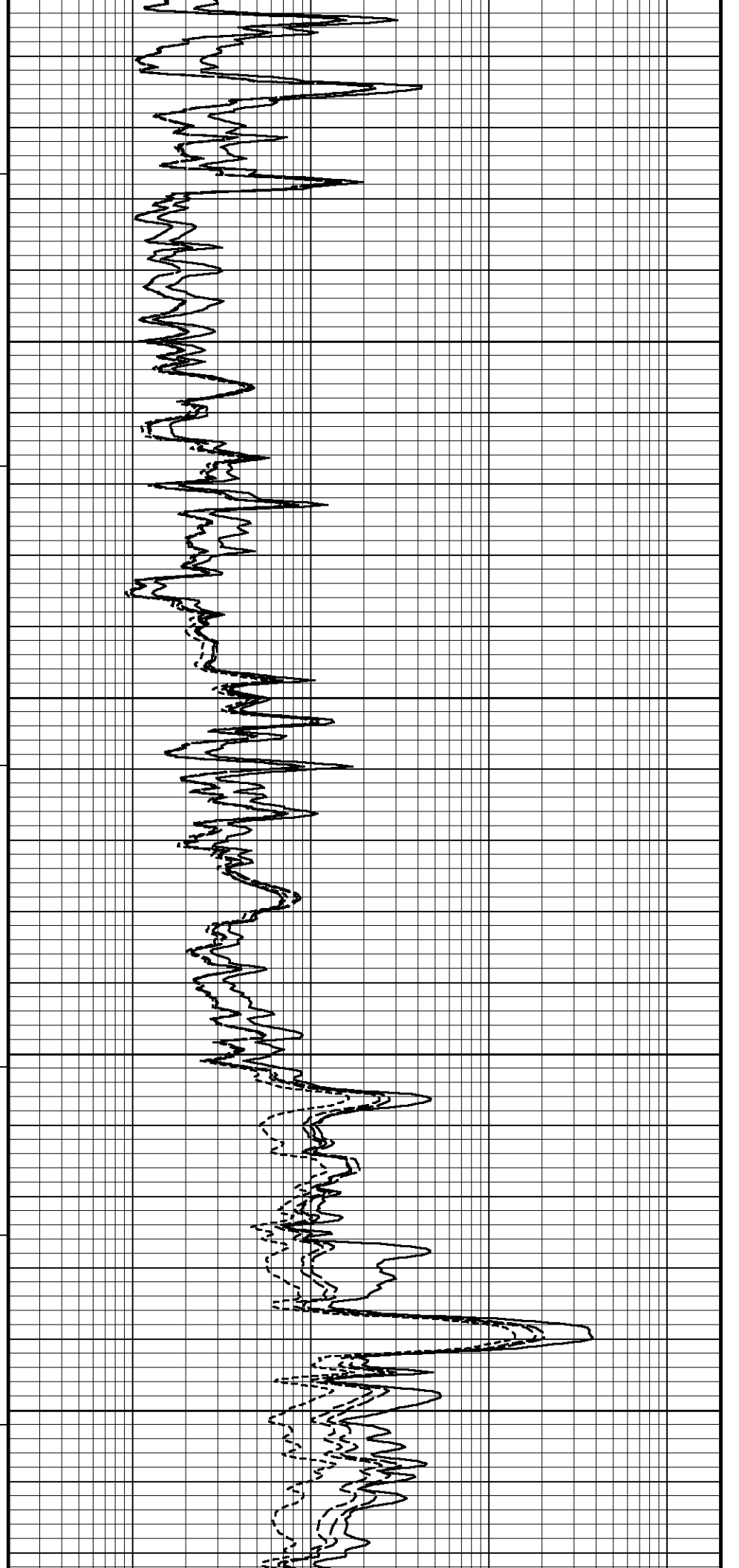
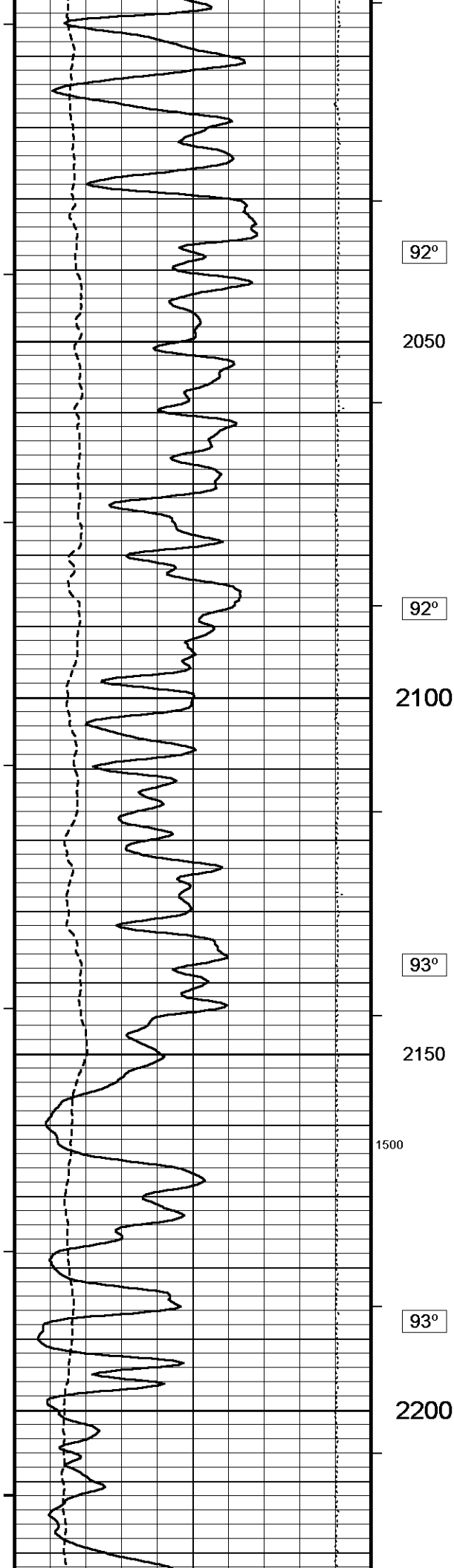
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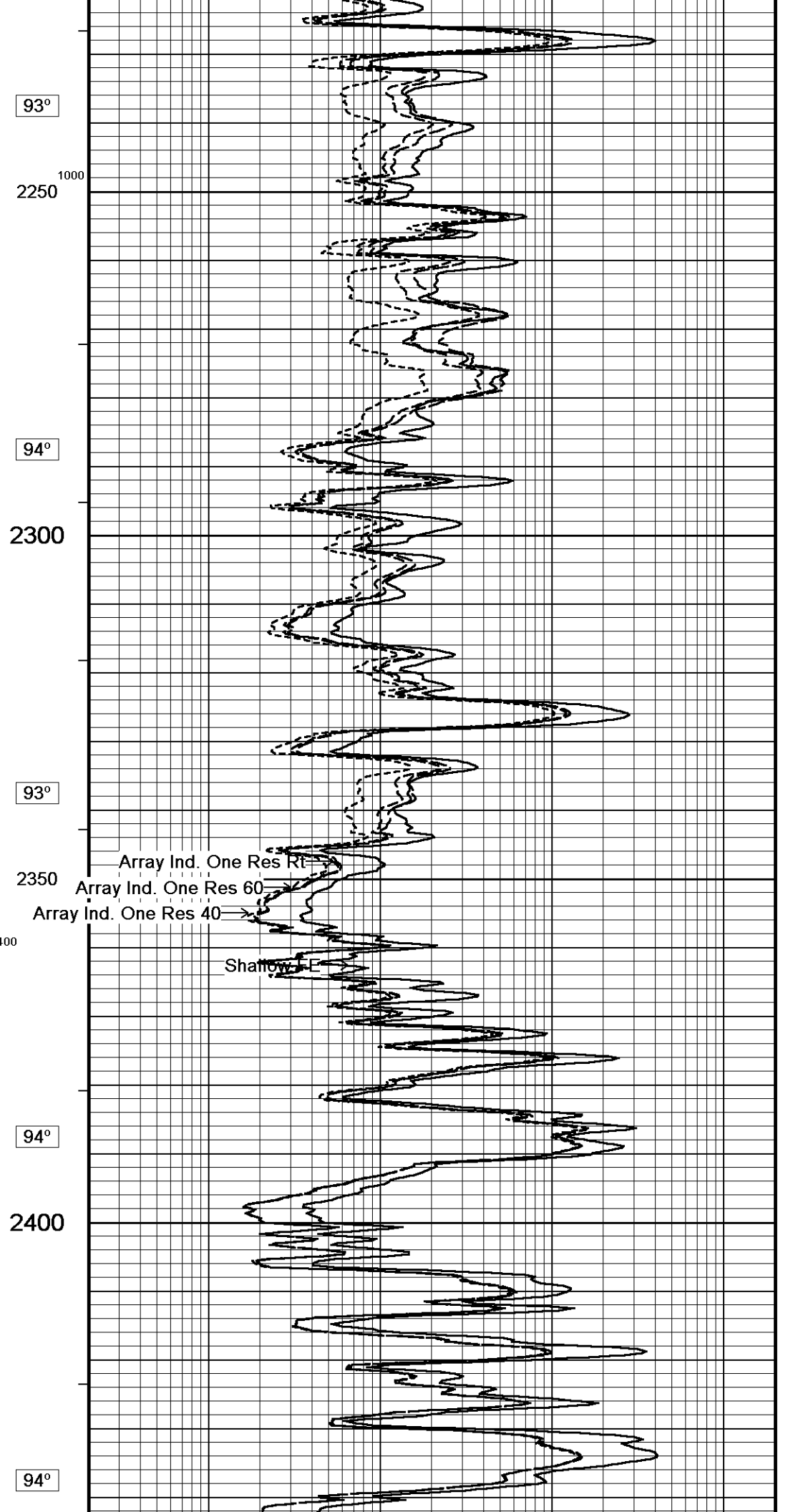
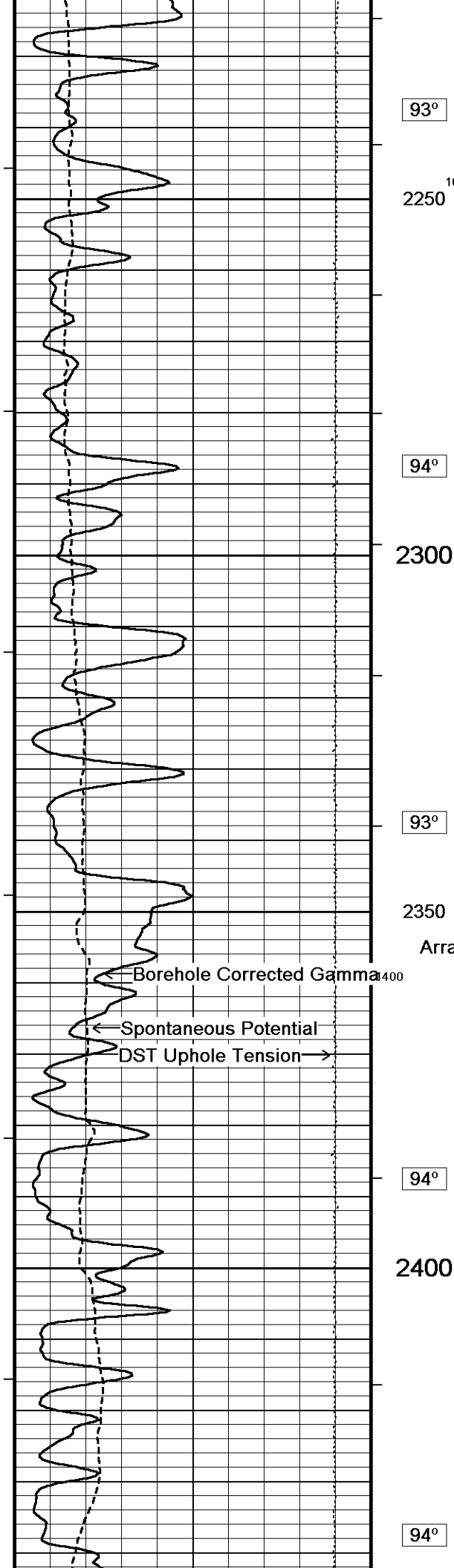
System Versions: Logged with 18.05.4364 Processed with 18.05.4364 Plotted with 18.05.4364

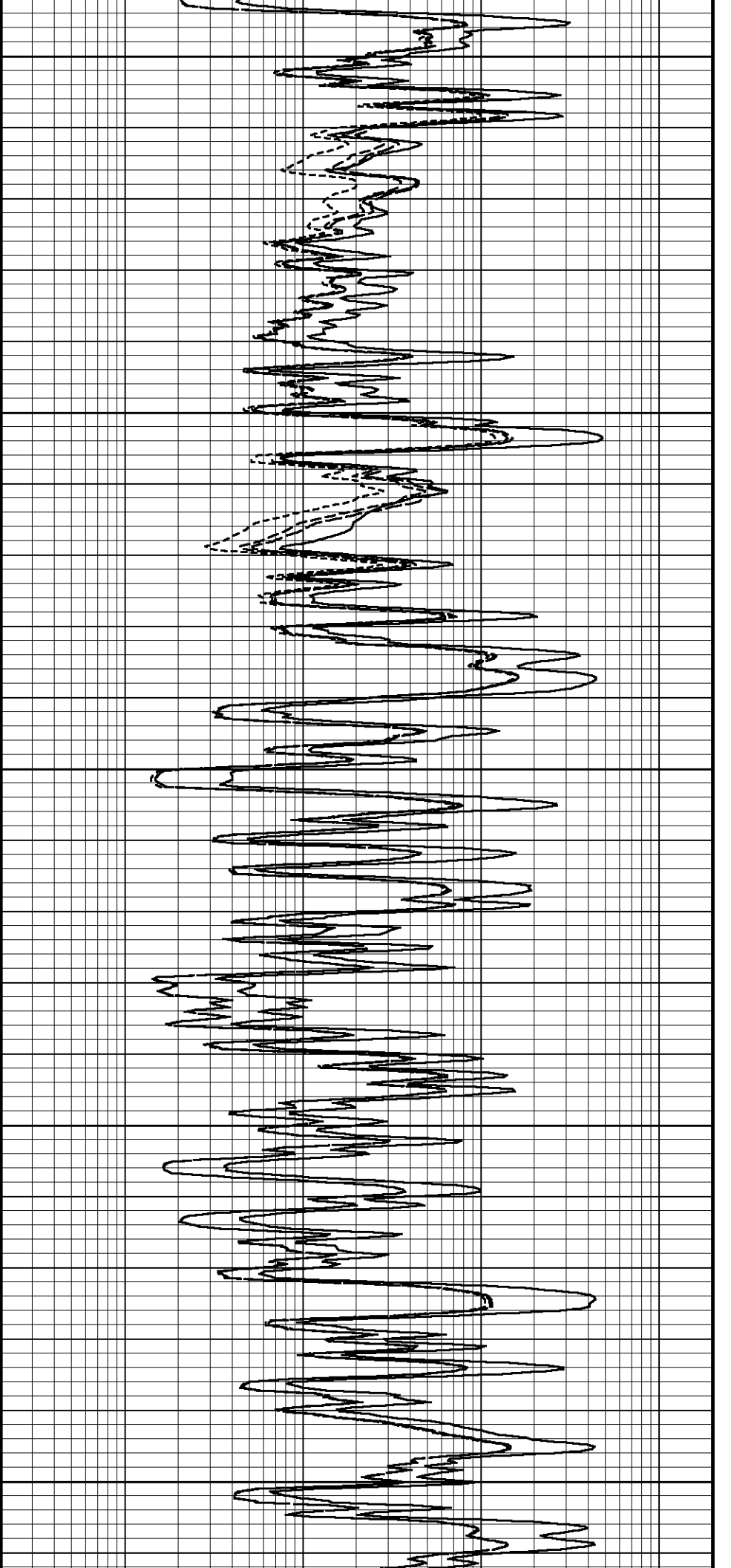
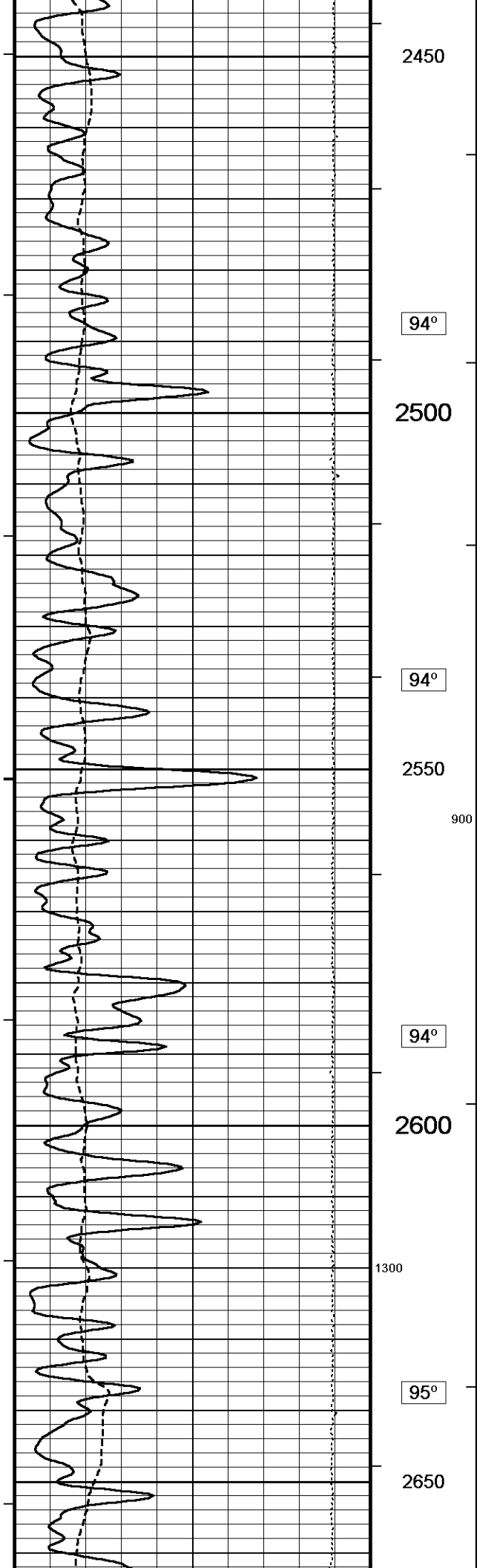


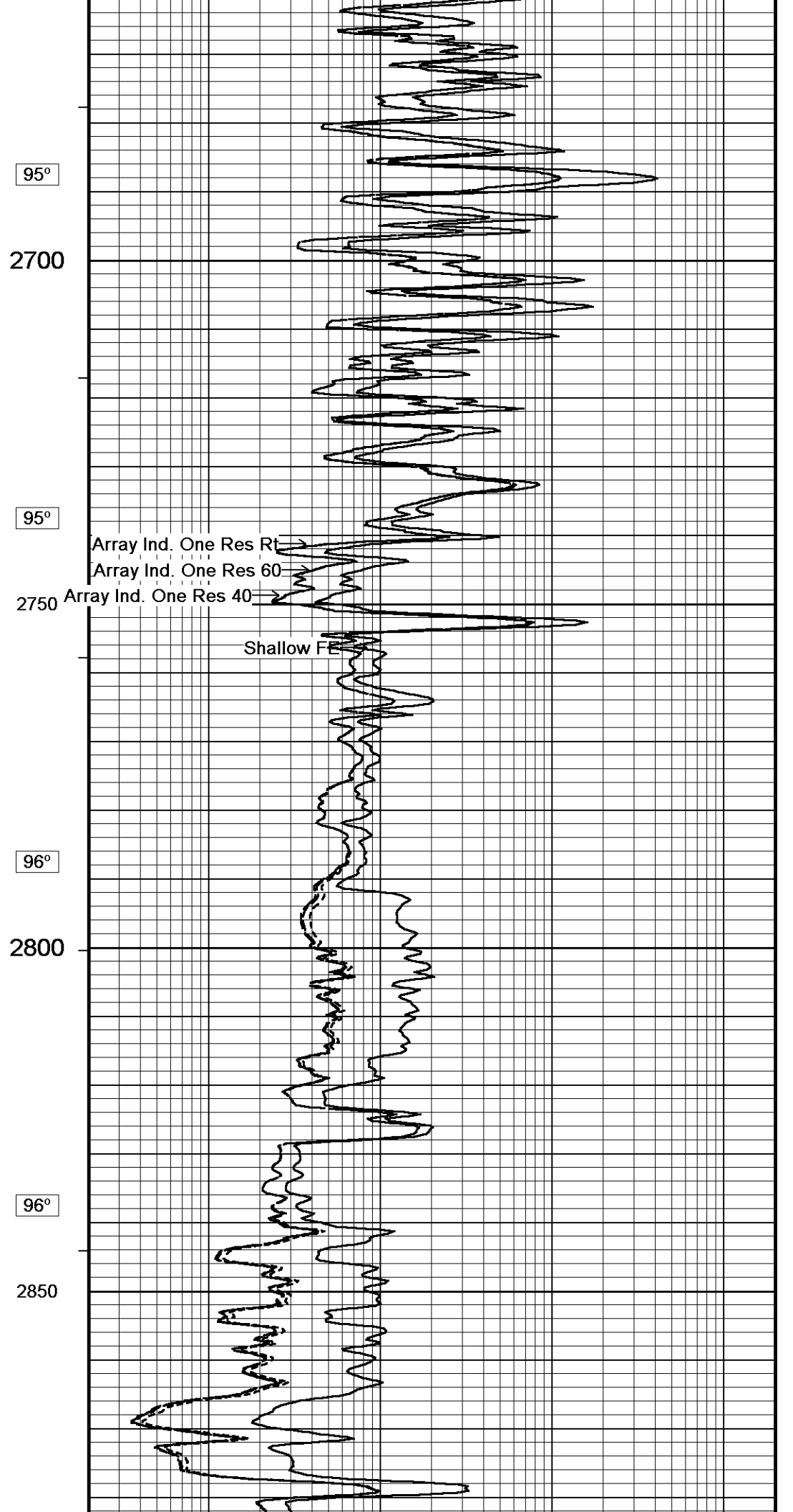
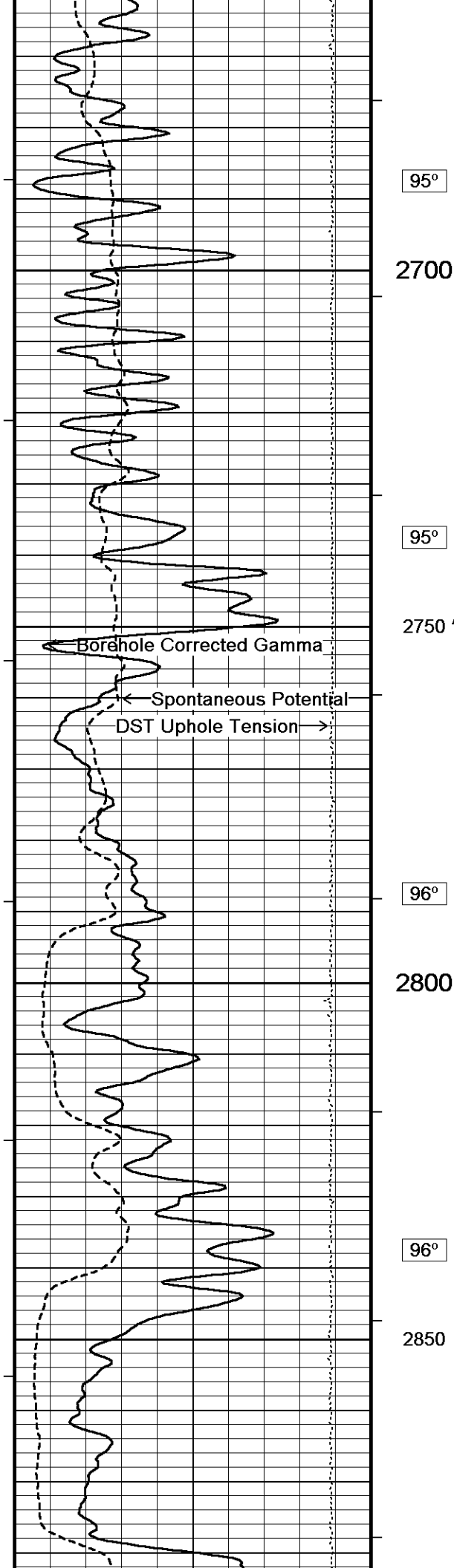


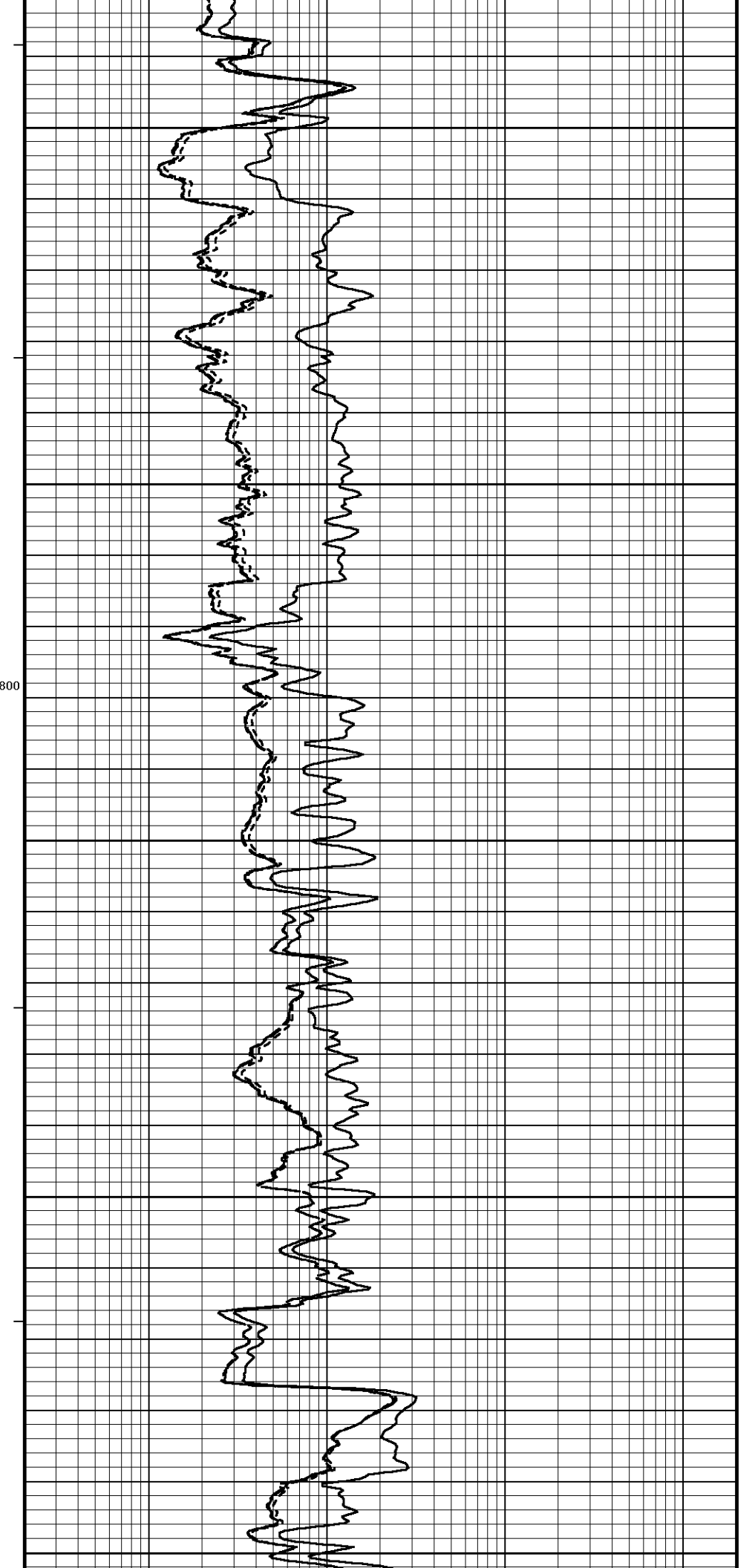
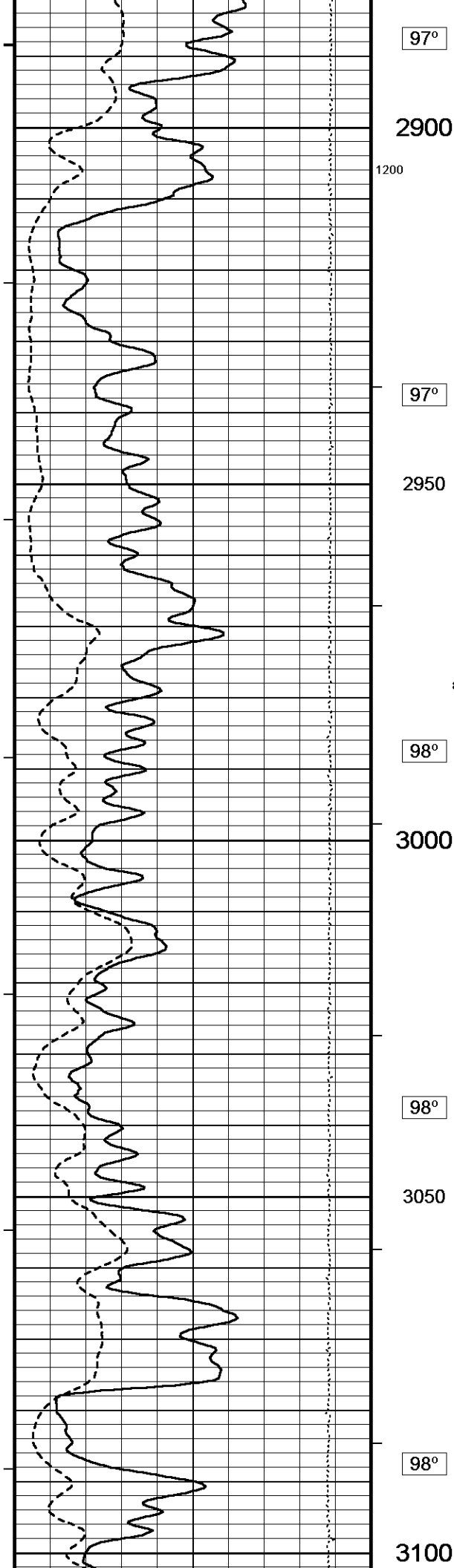


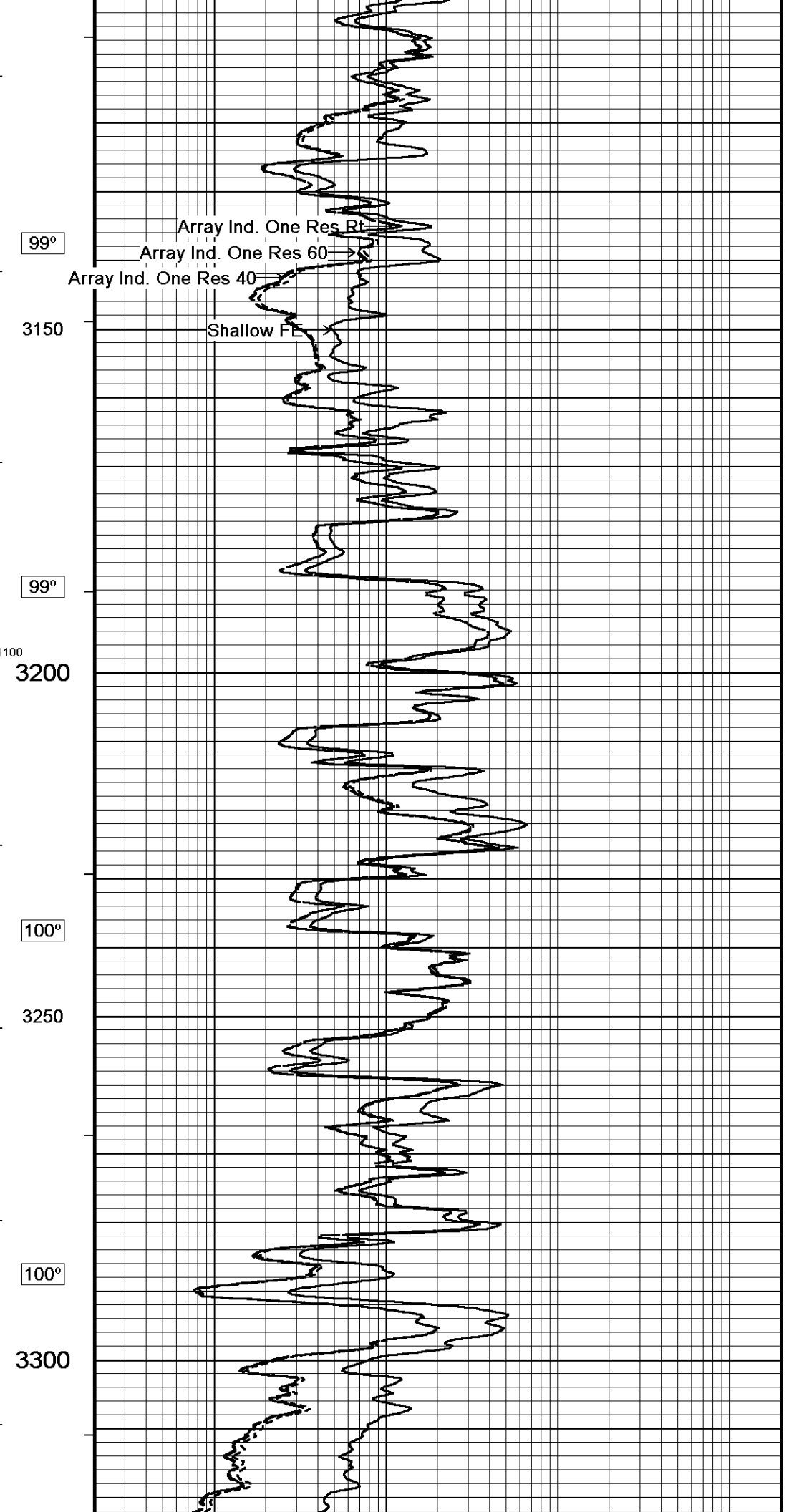
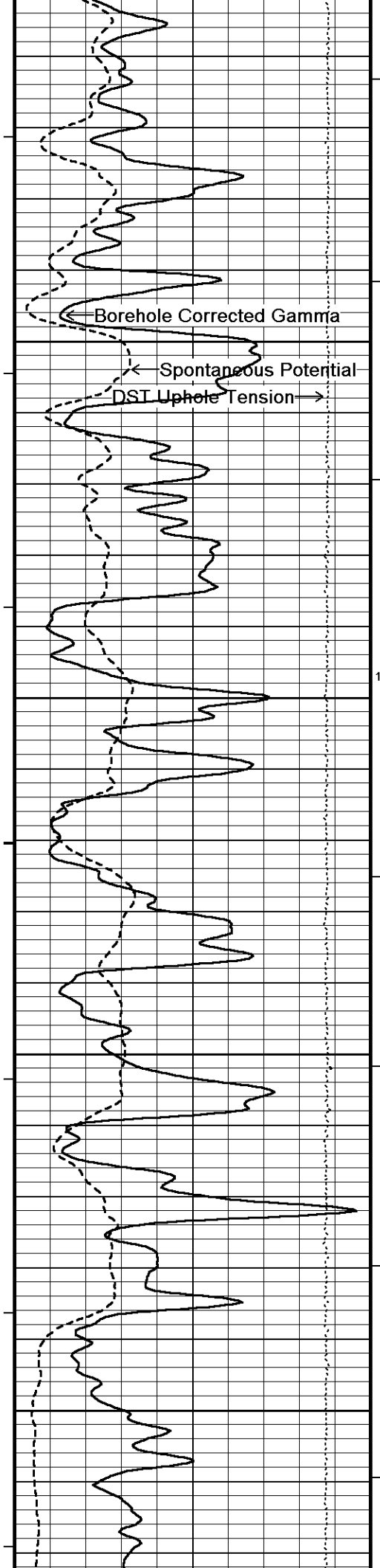


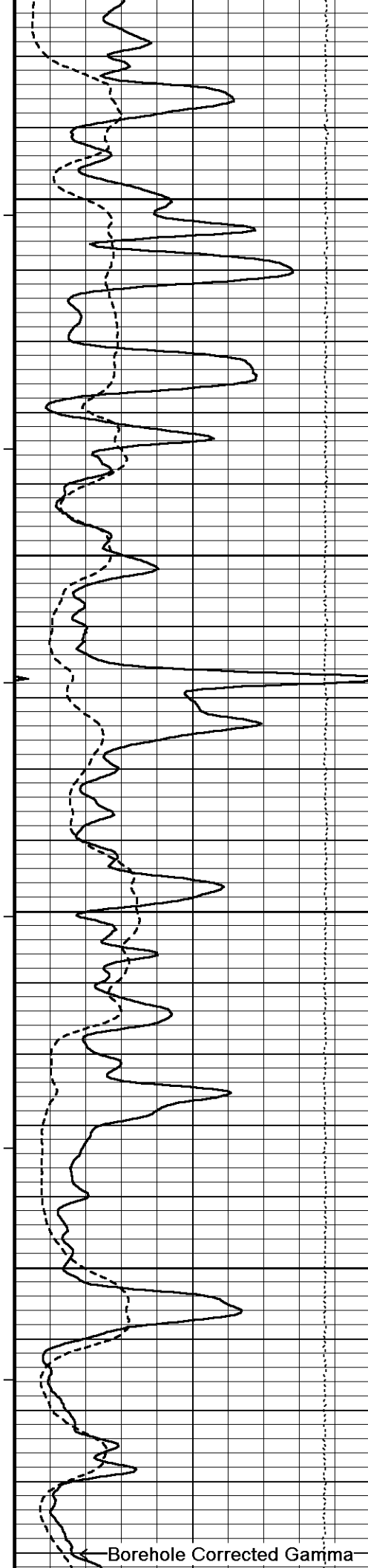




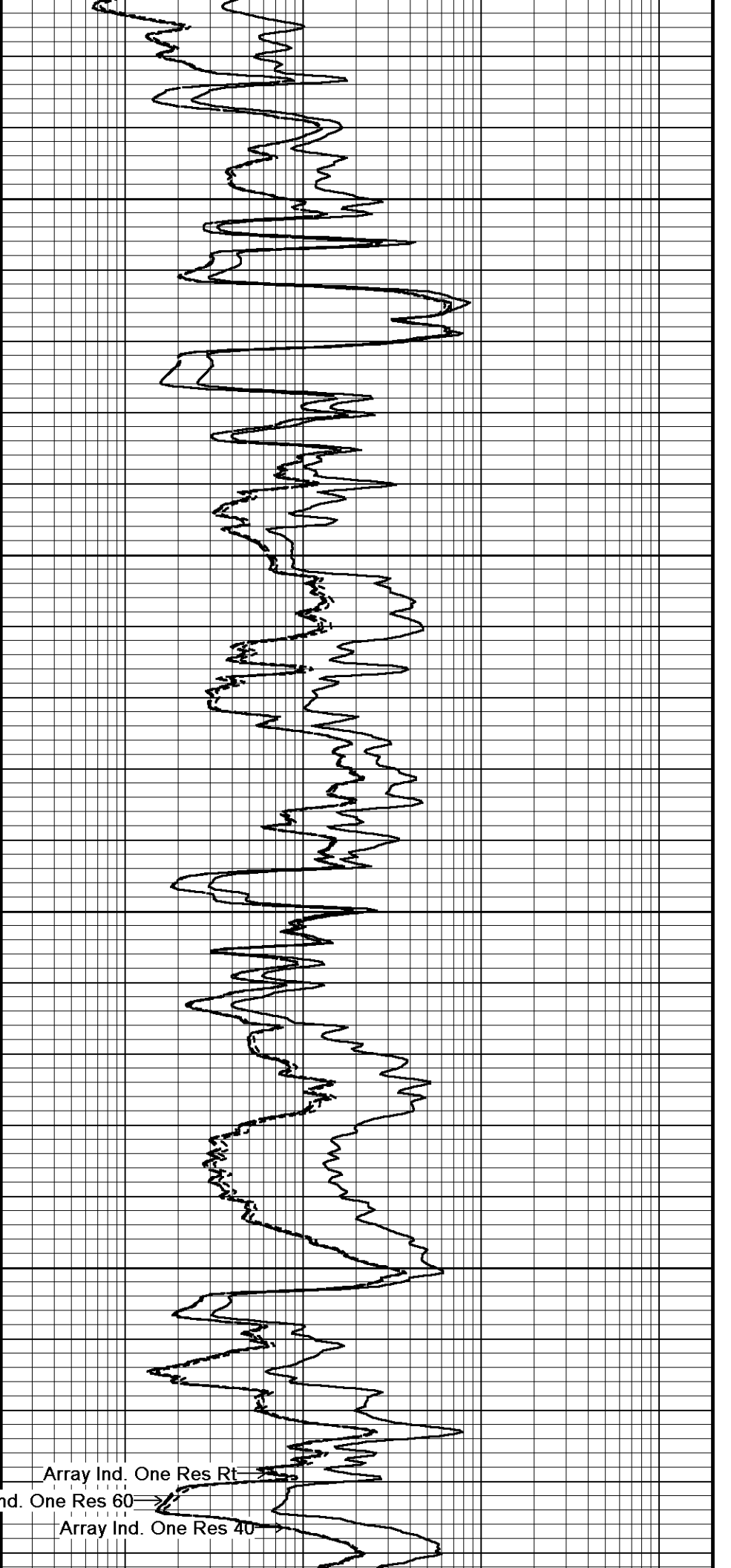




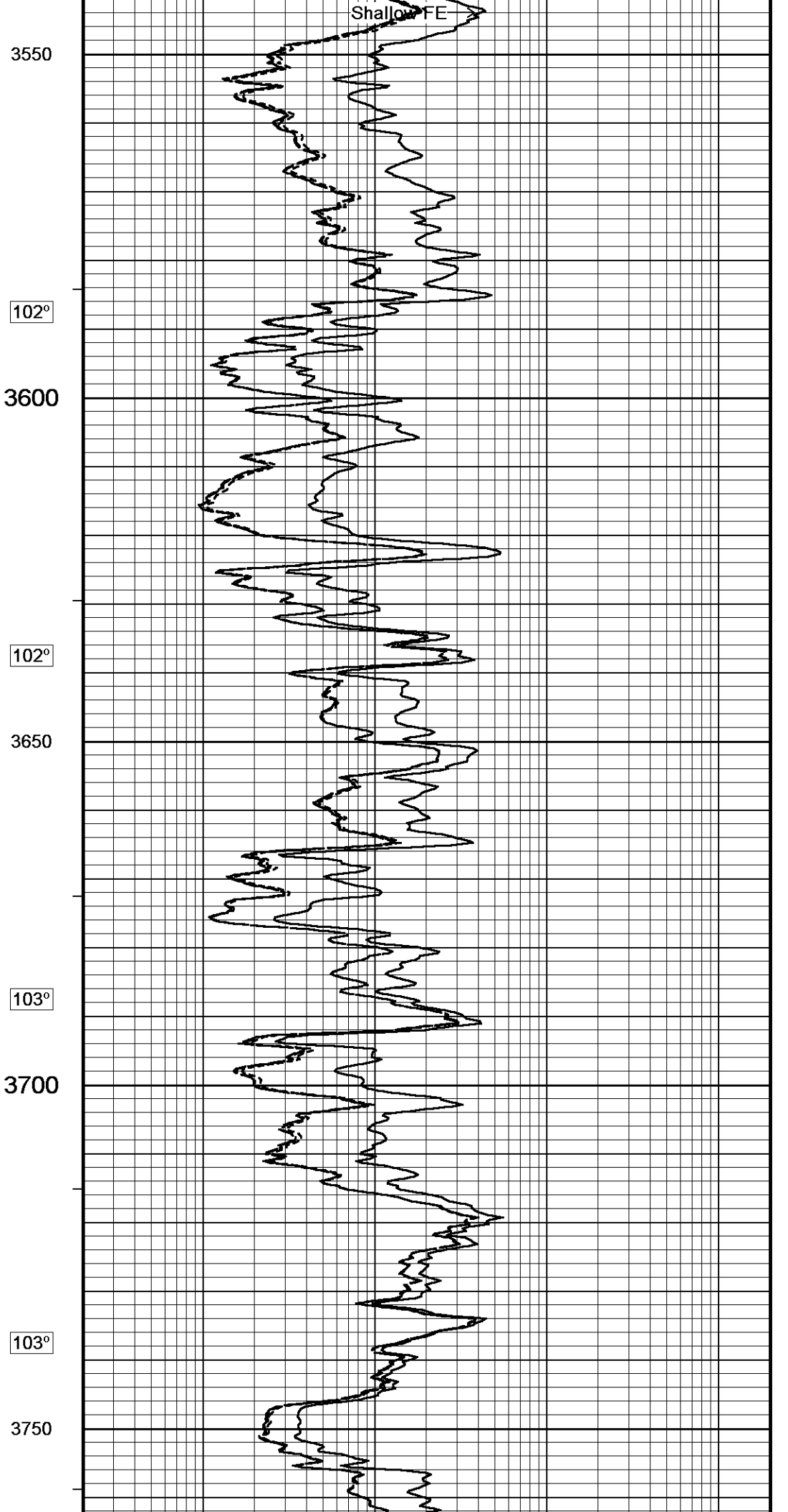
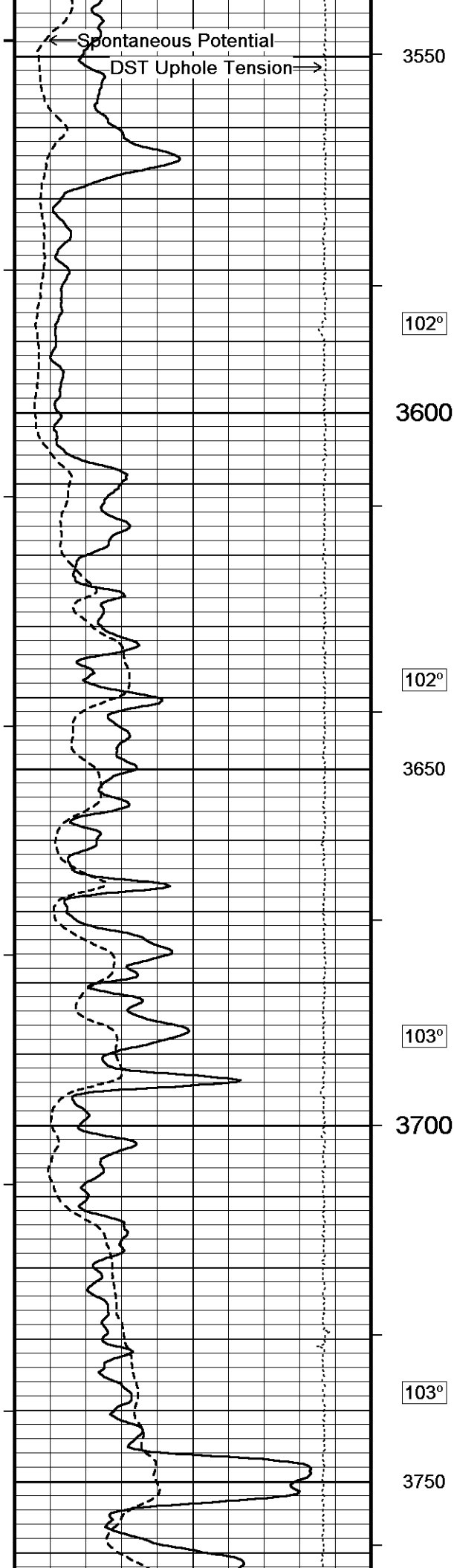


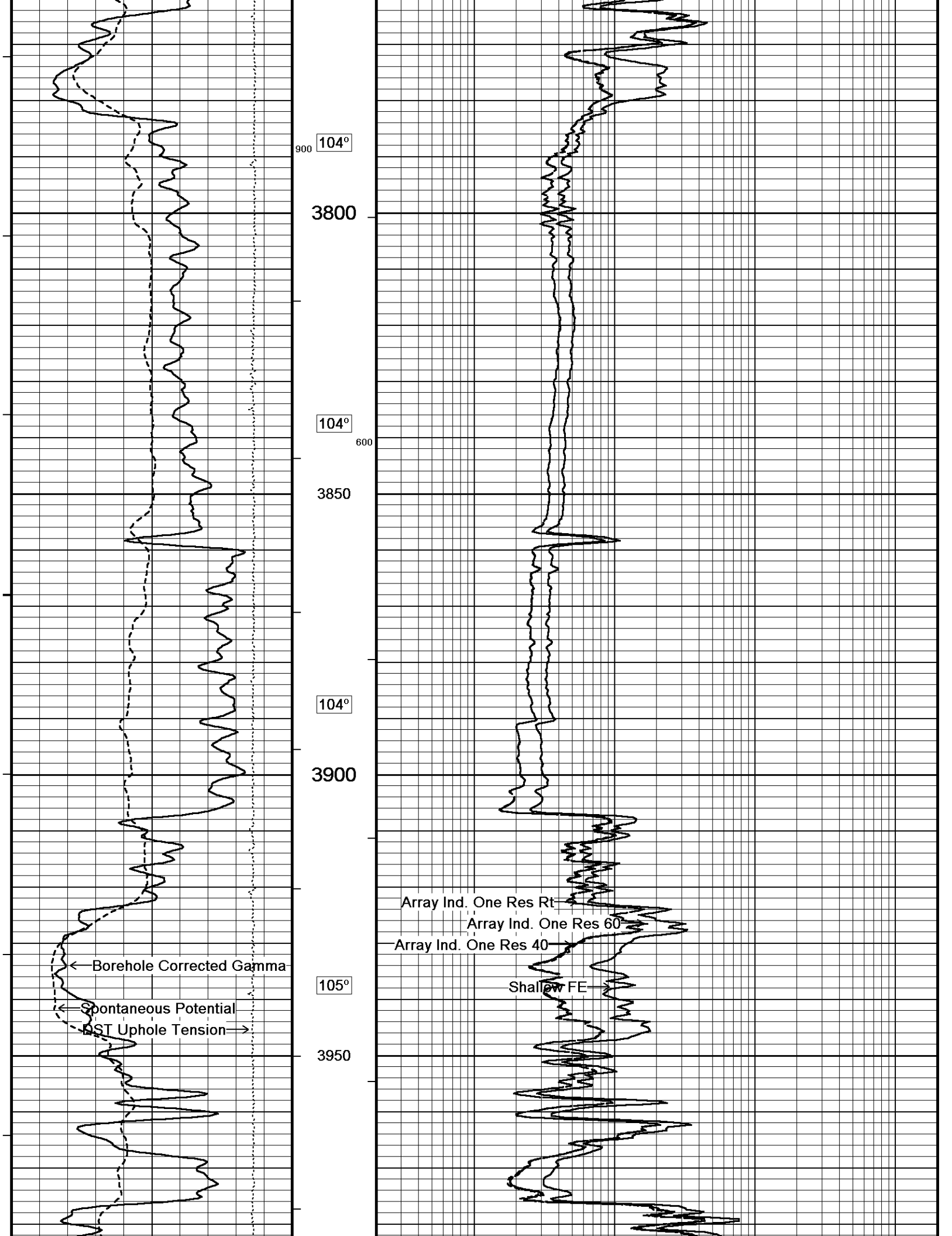


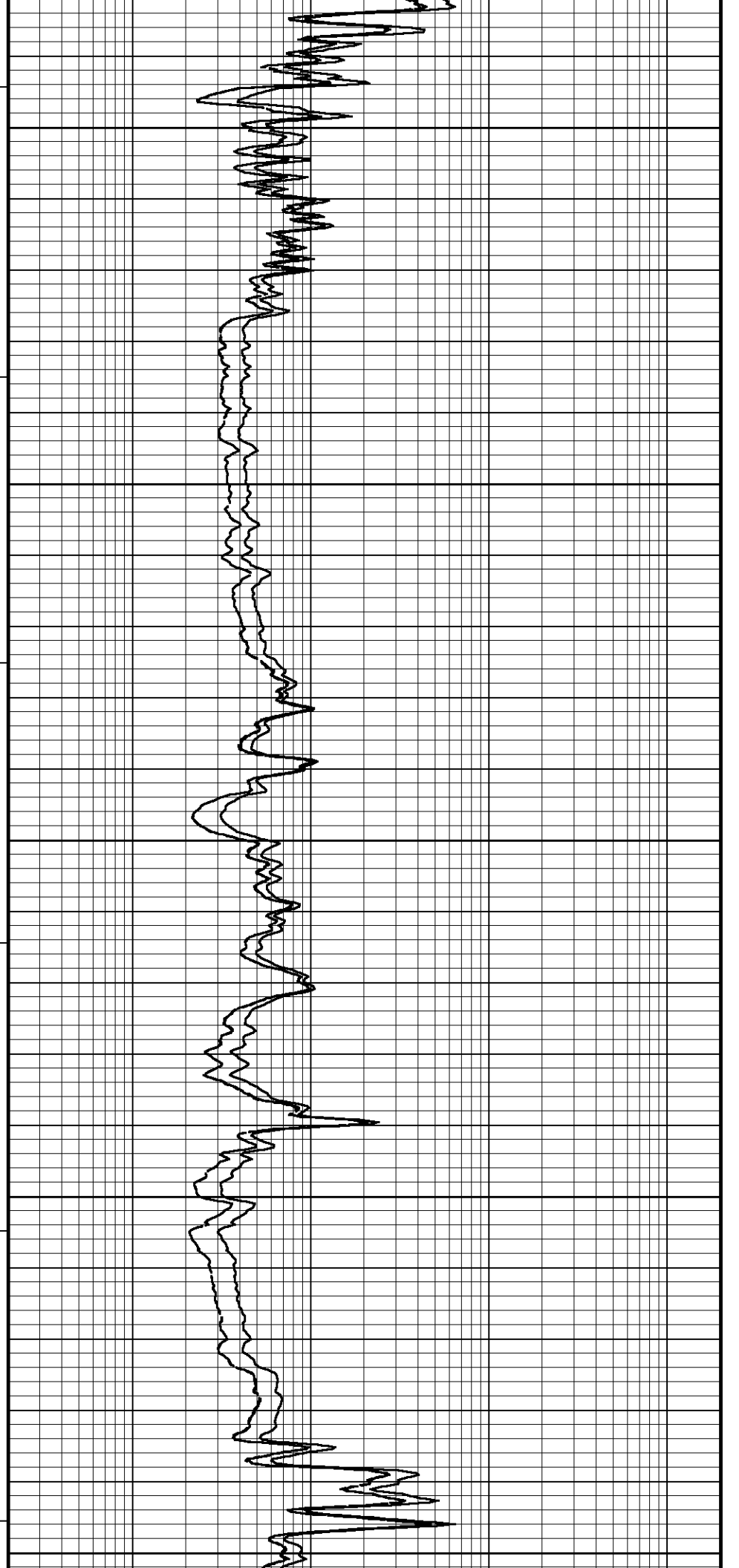
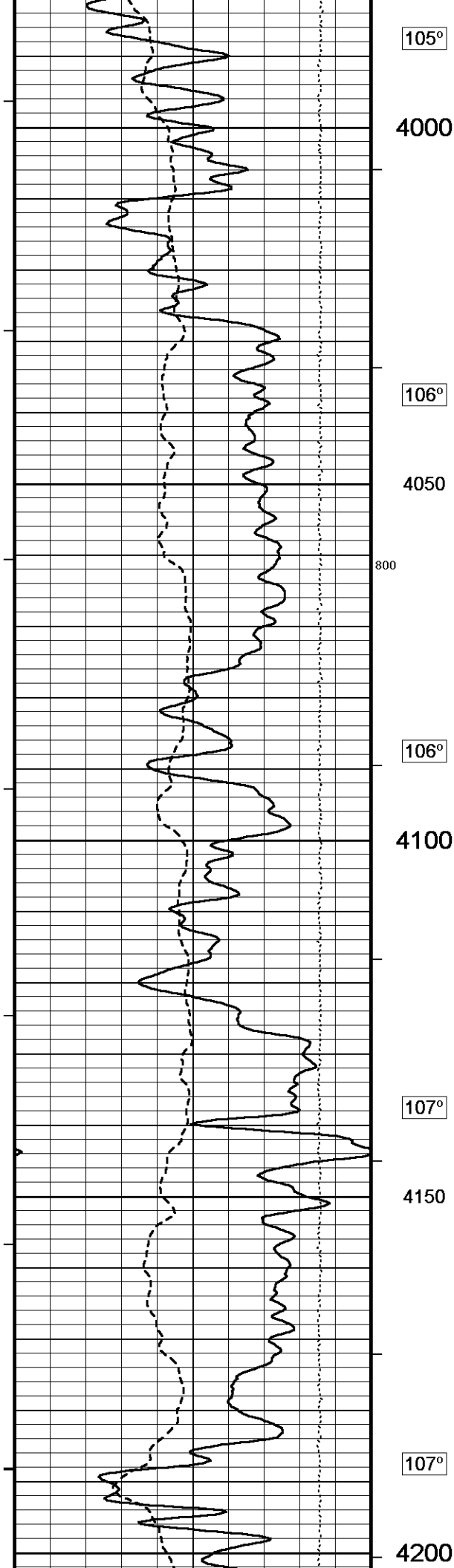
100°
3350
101°
3400
101°
3450
1000 101°
3500
101°

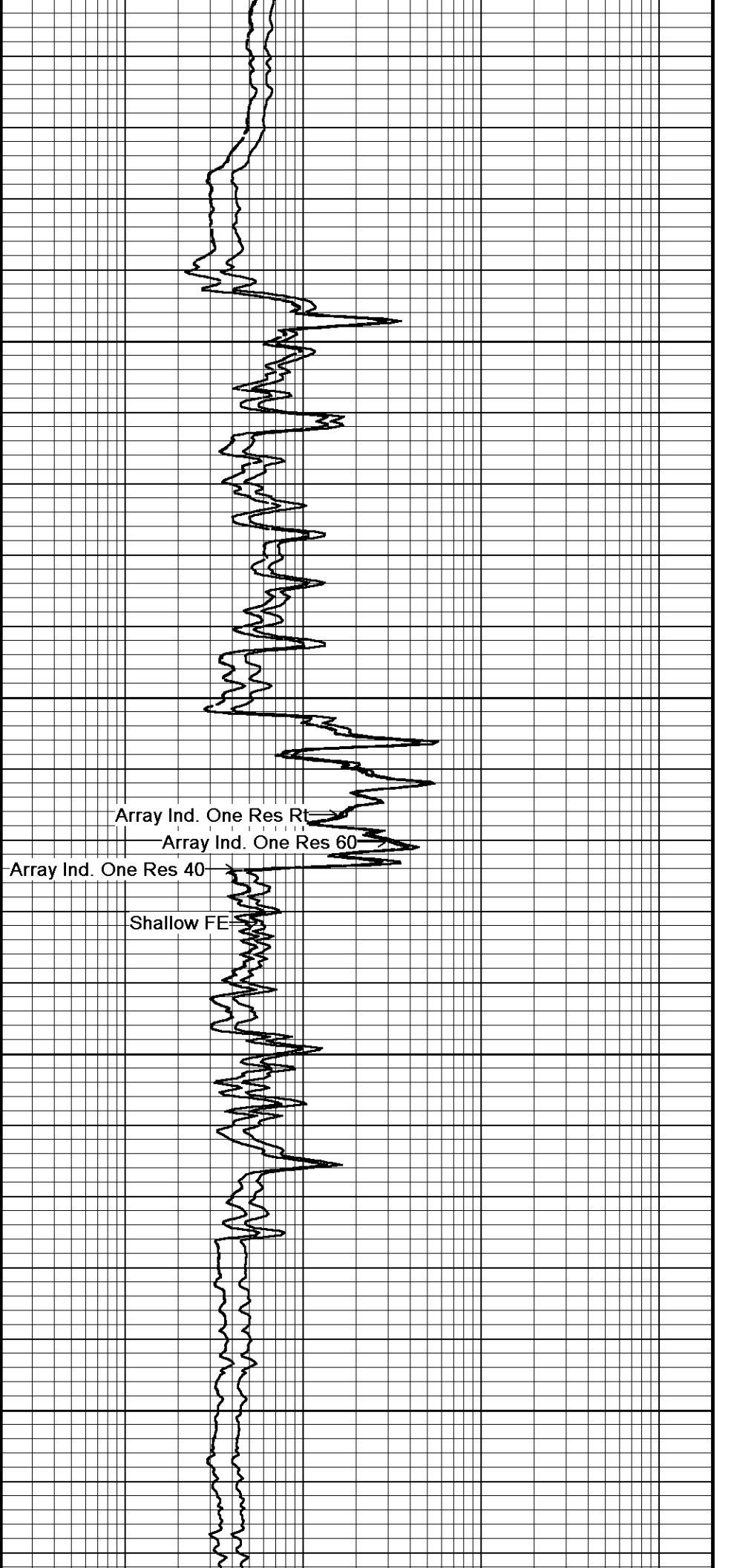
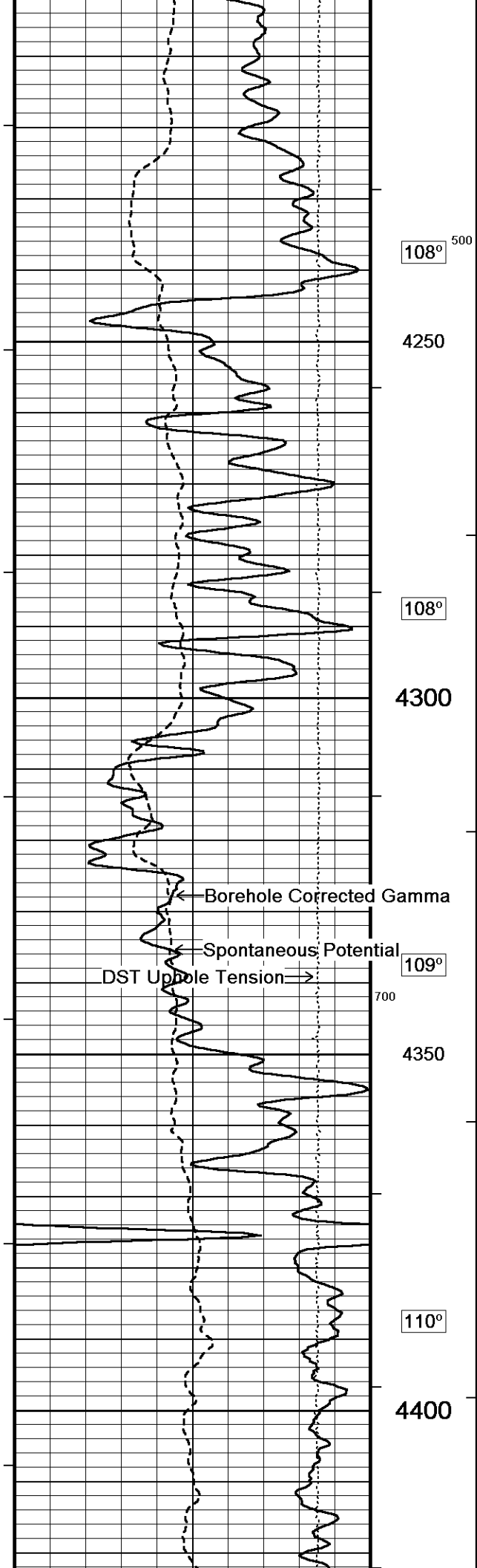


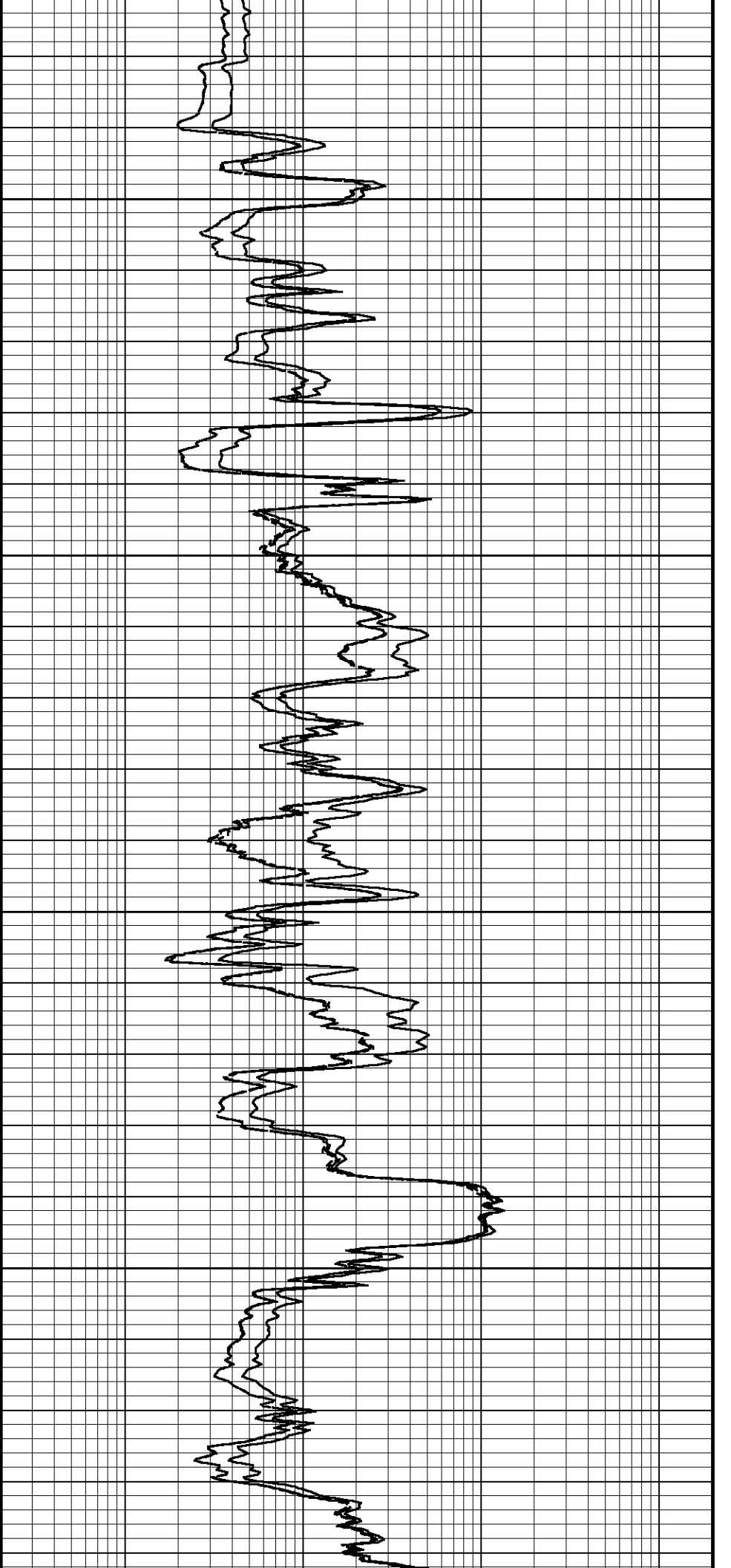
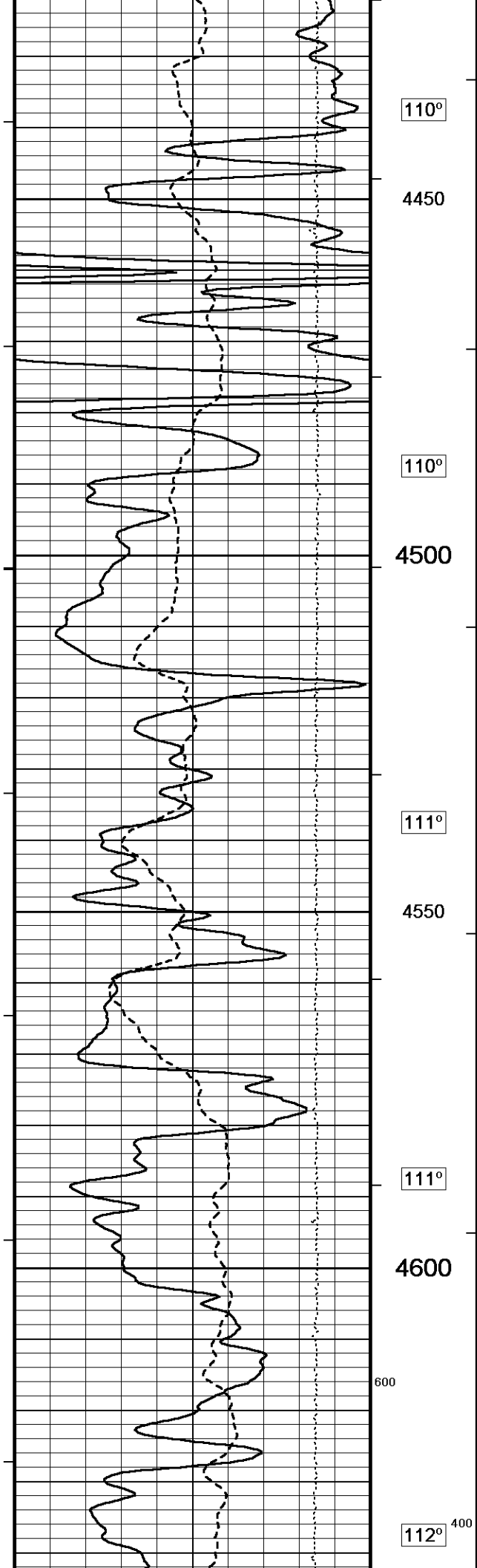
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40

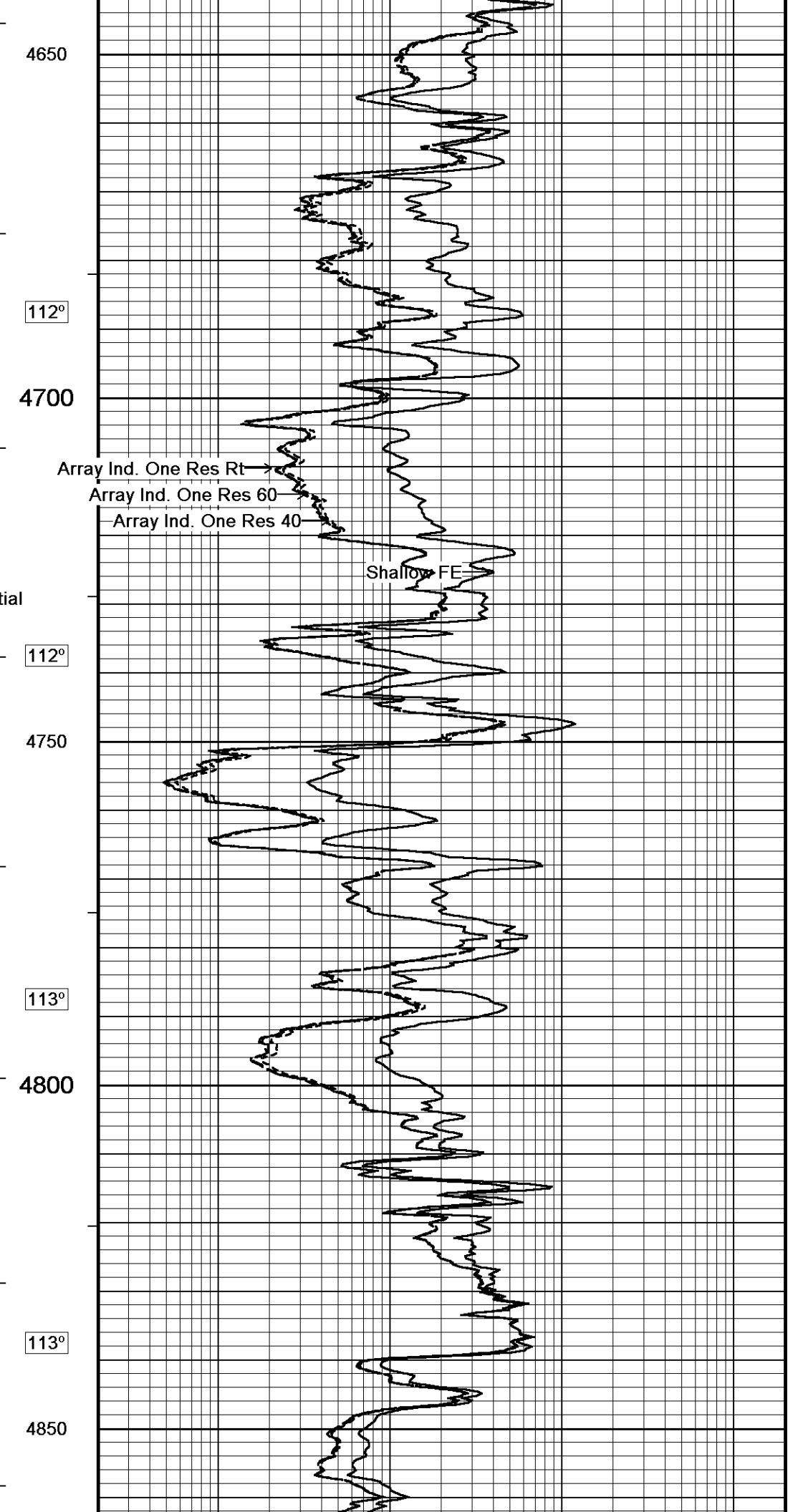
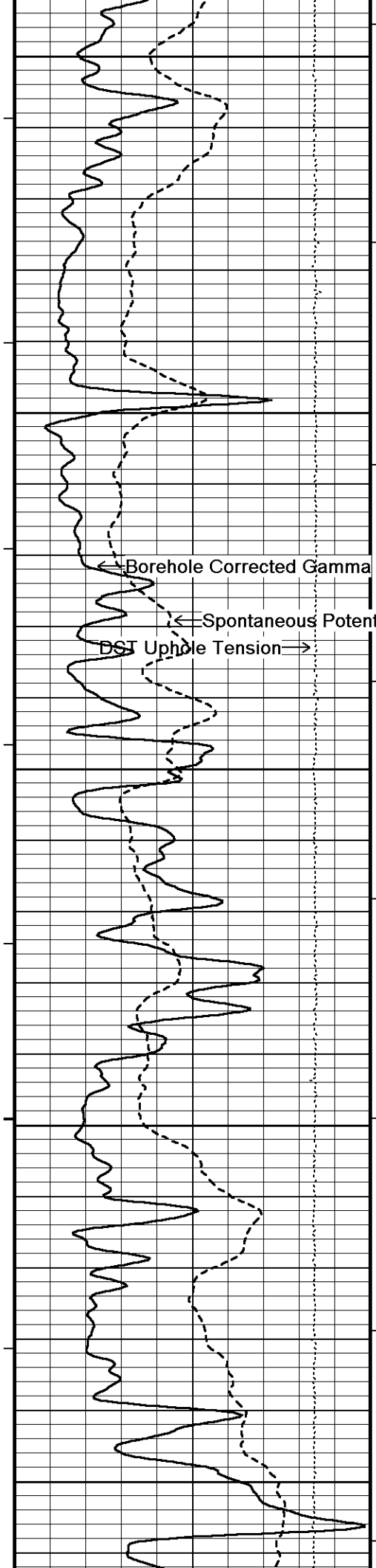


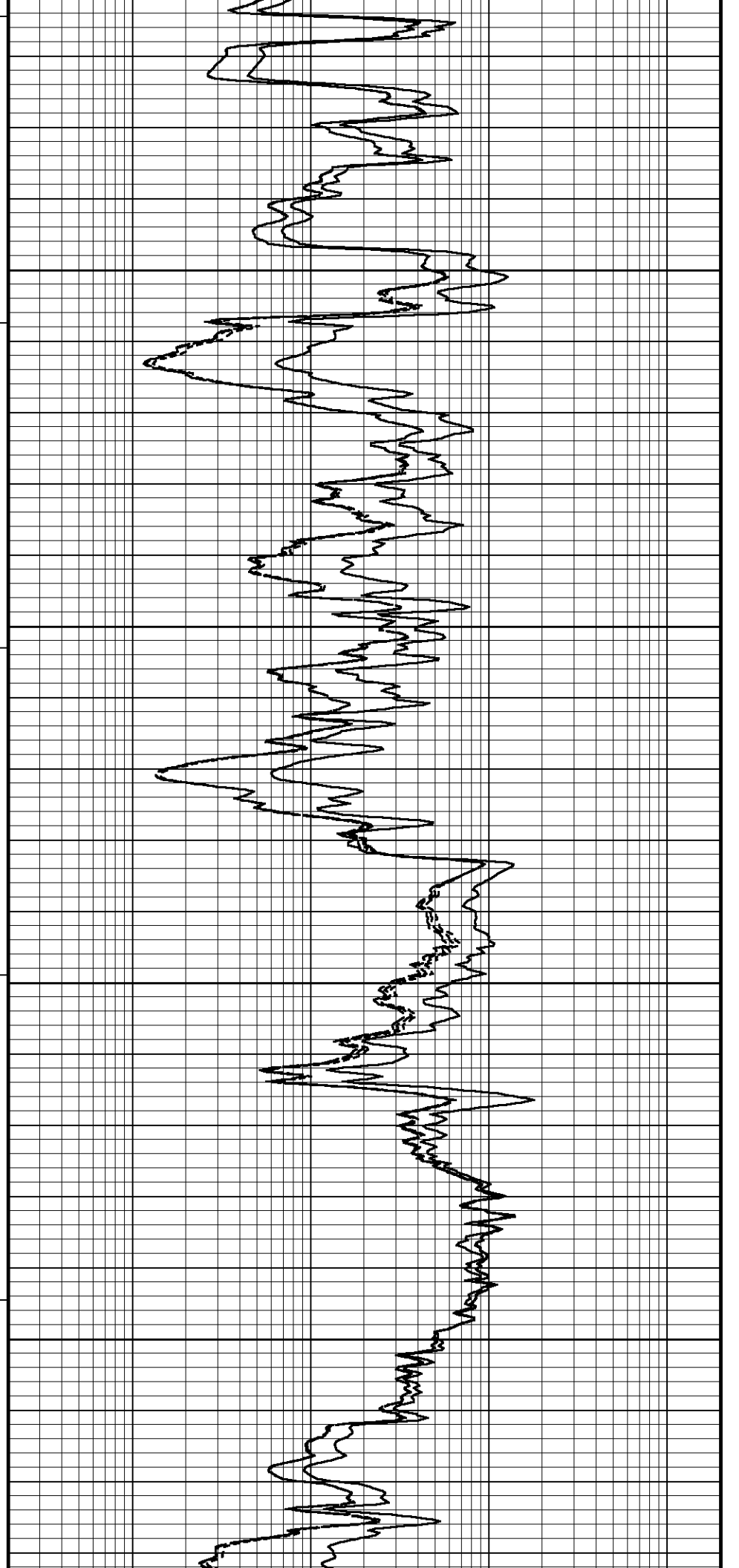
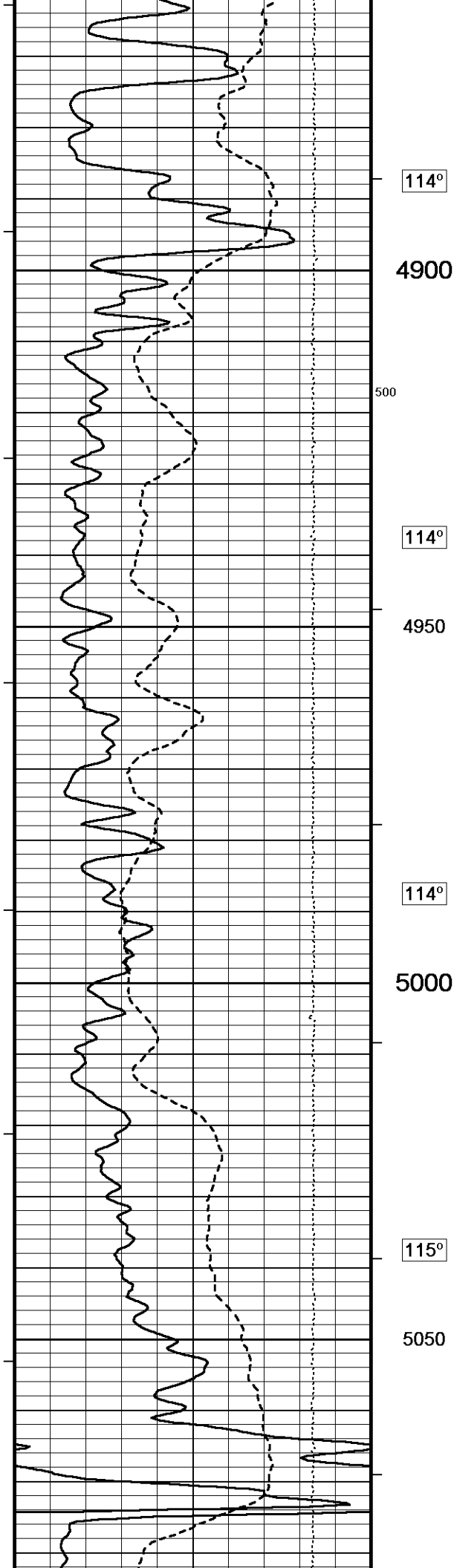


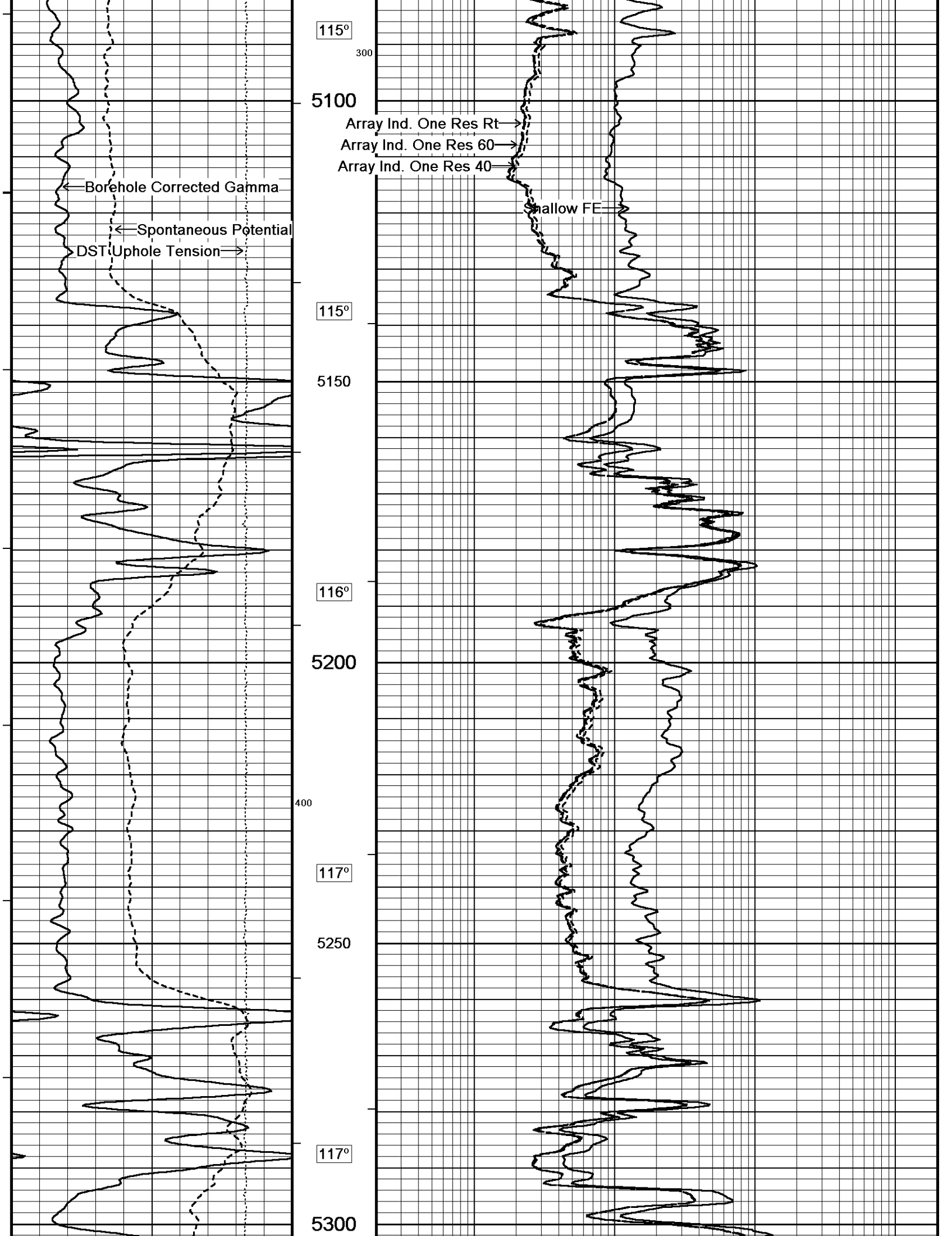


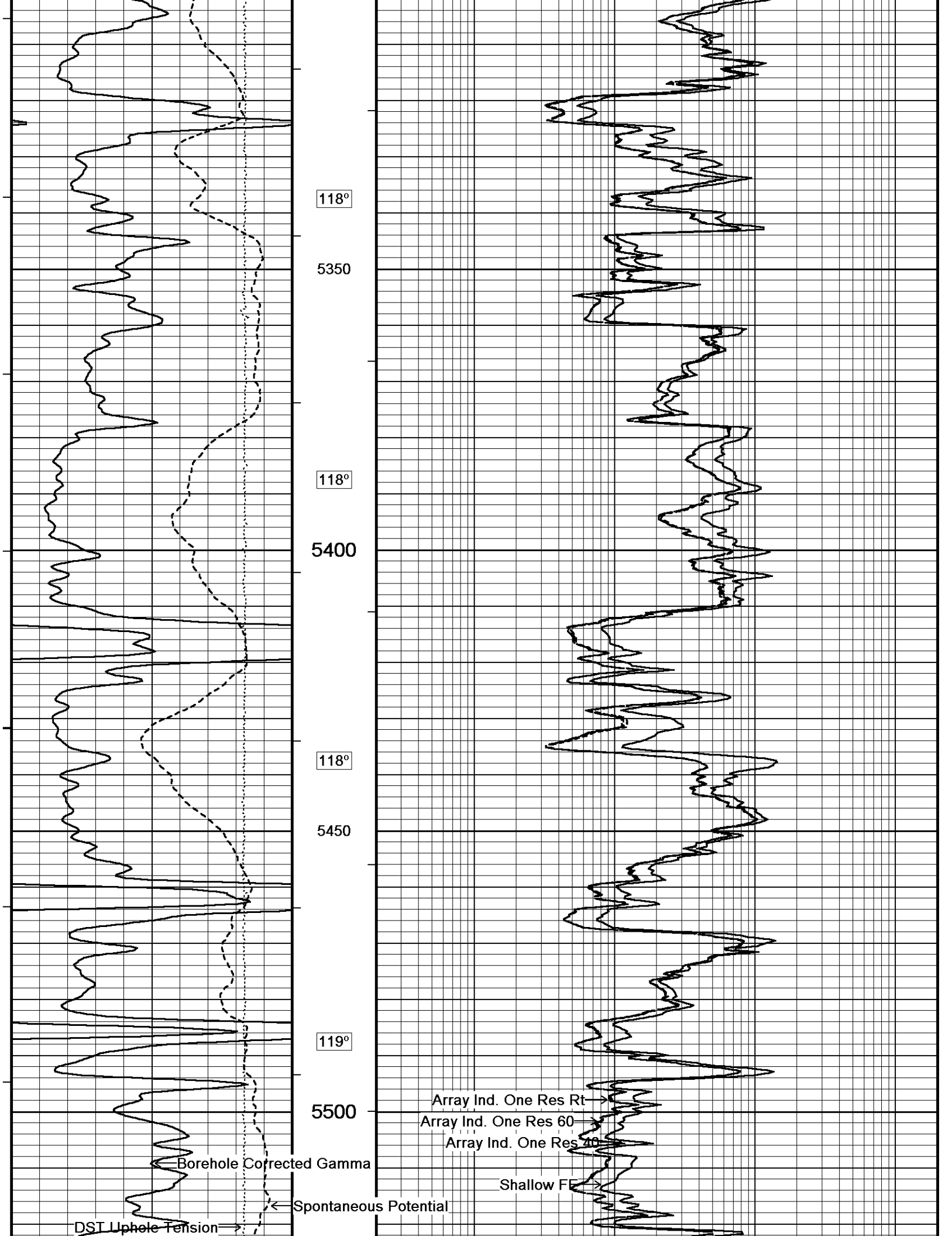












118°

5350

118°

5400

118°

5450

119°

5500

Array Ind. One Res Rt

Array Ind. One Res 60

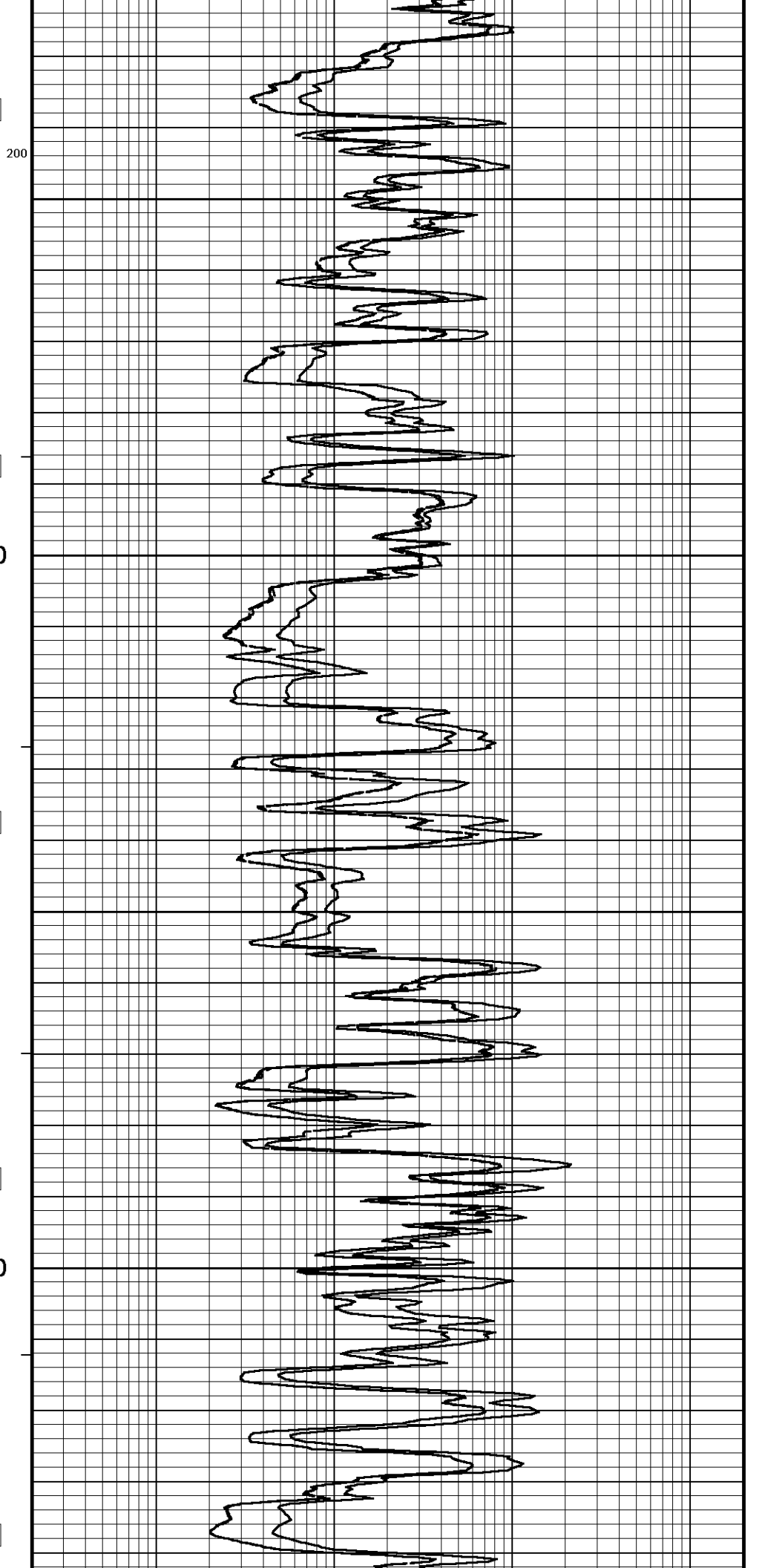
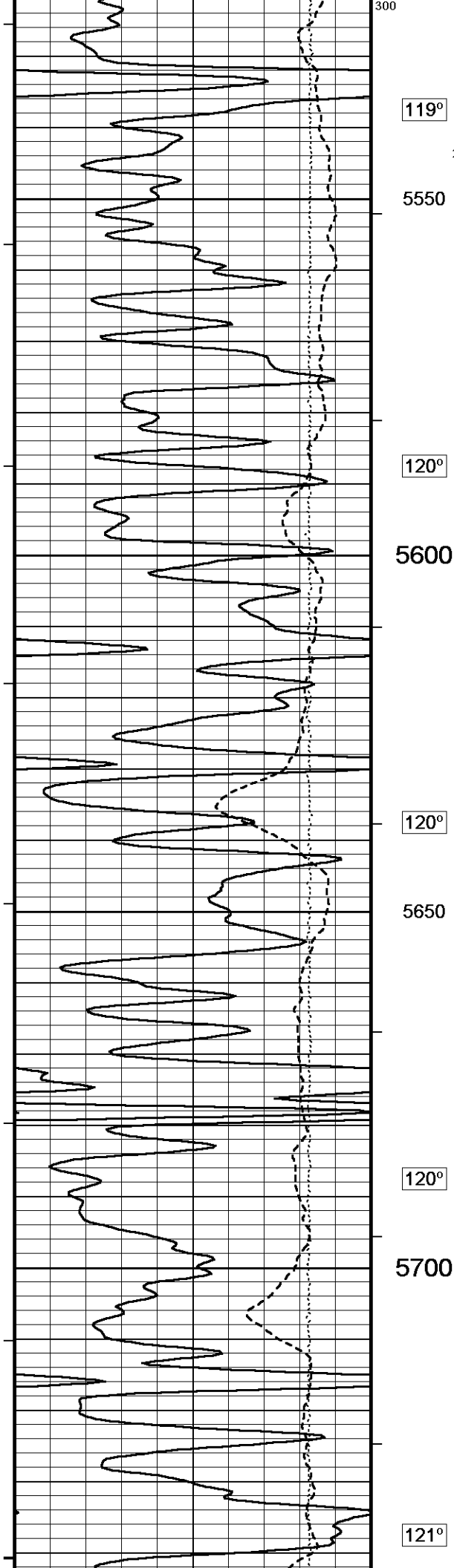
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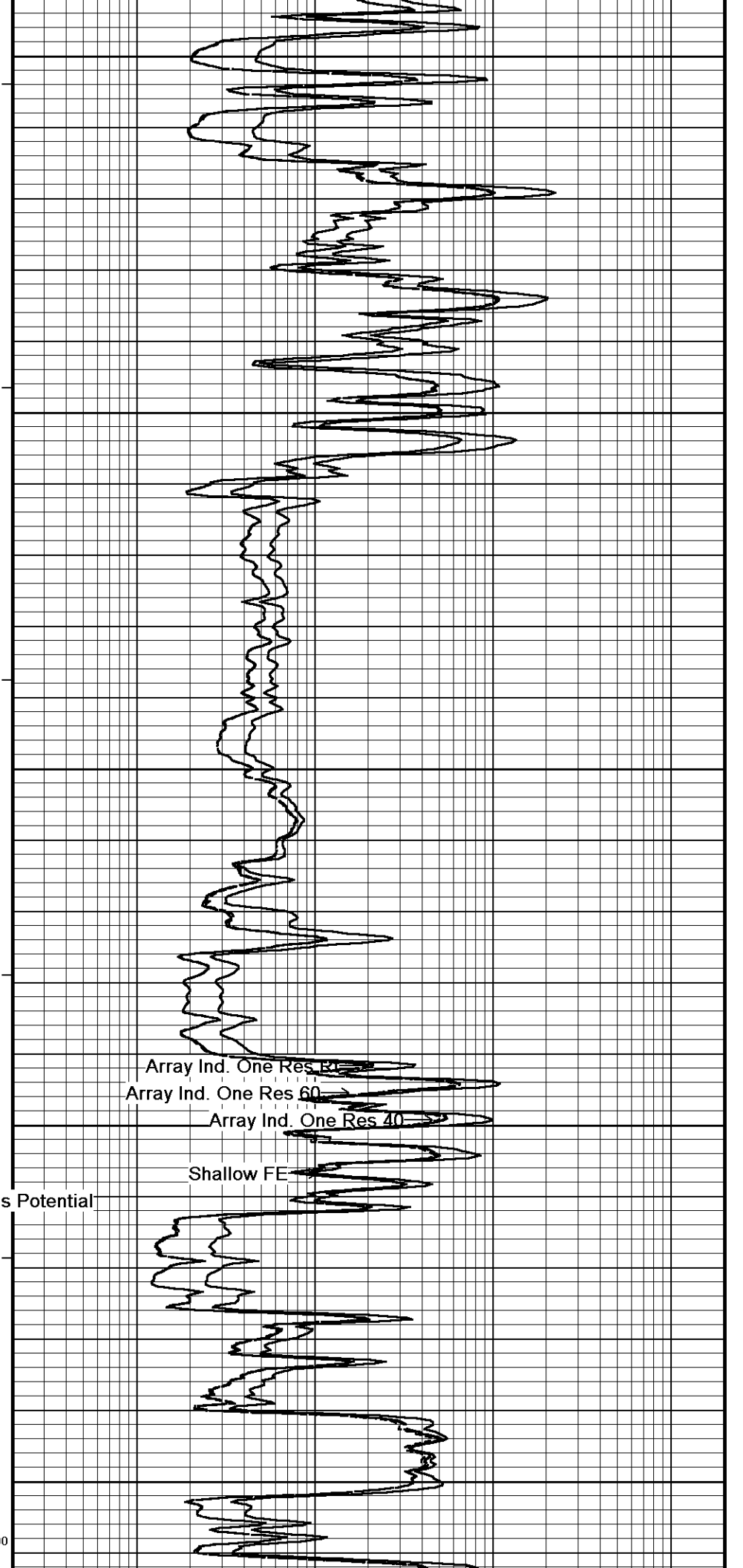
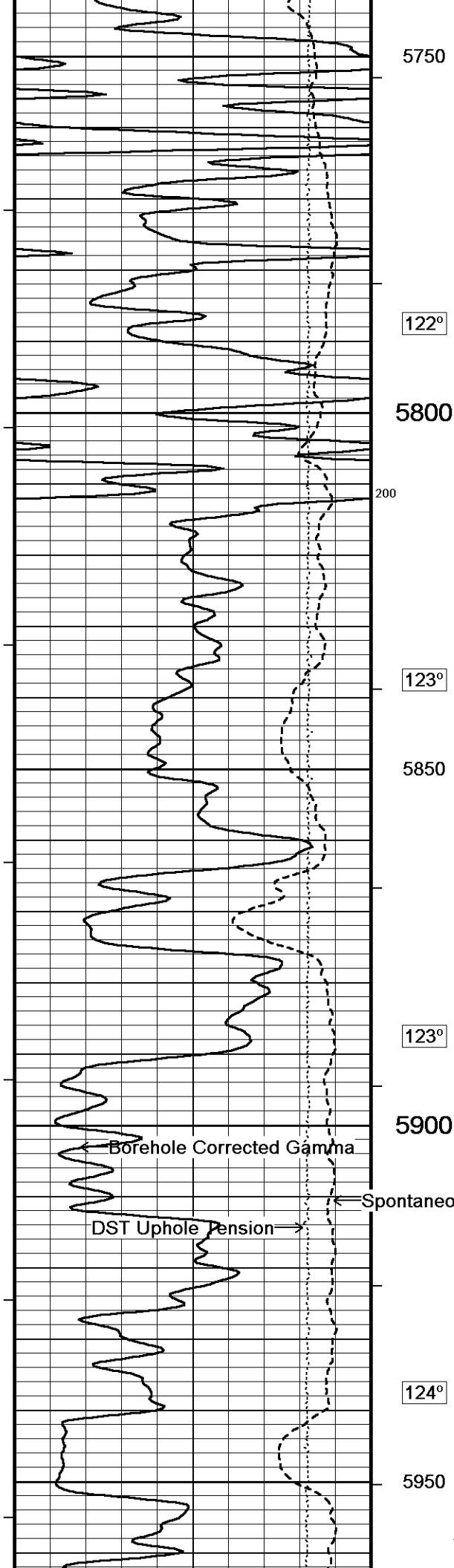
Shallow FE

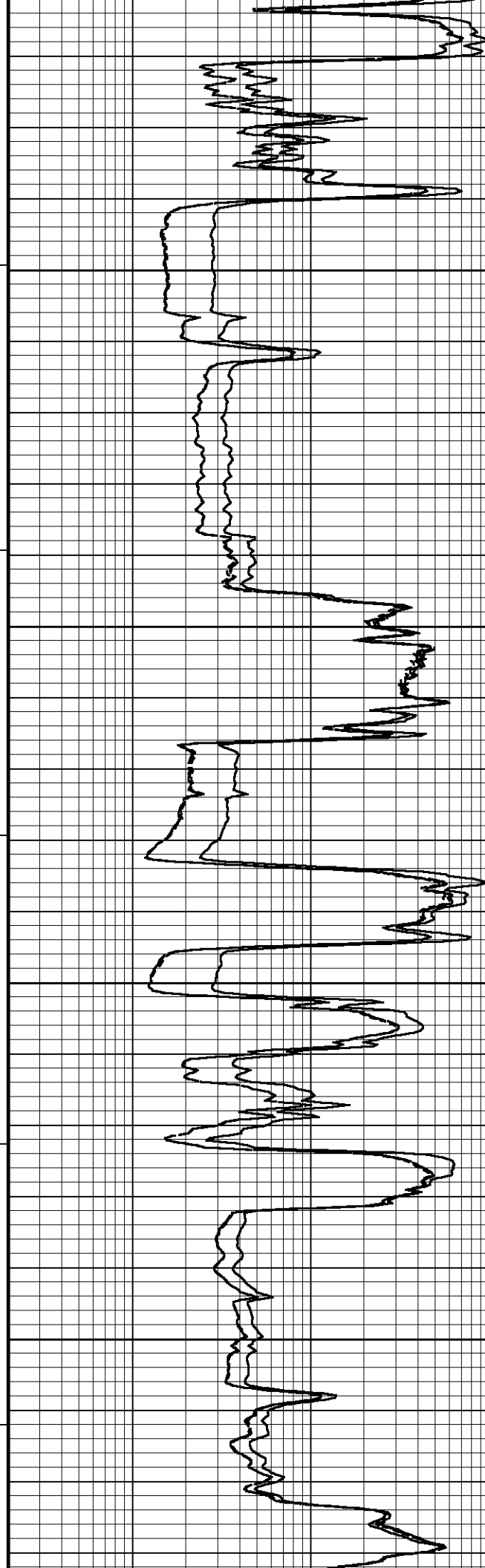
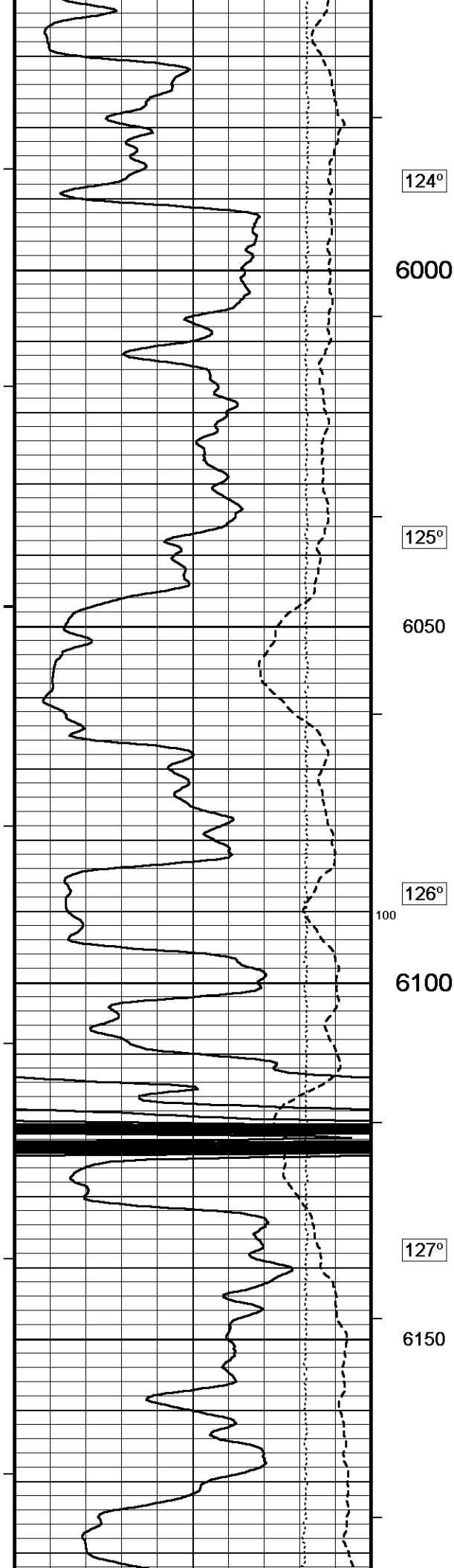
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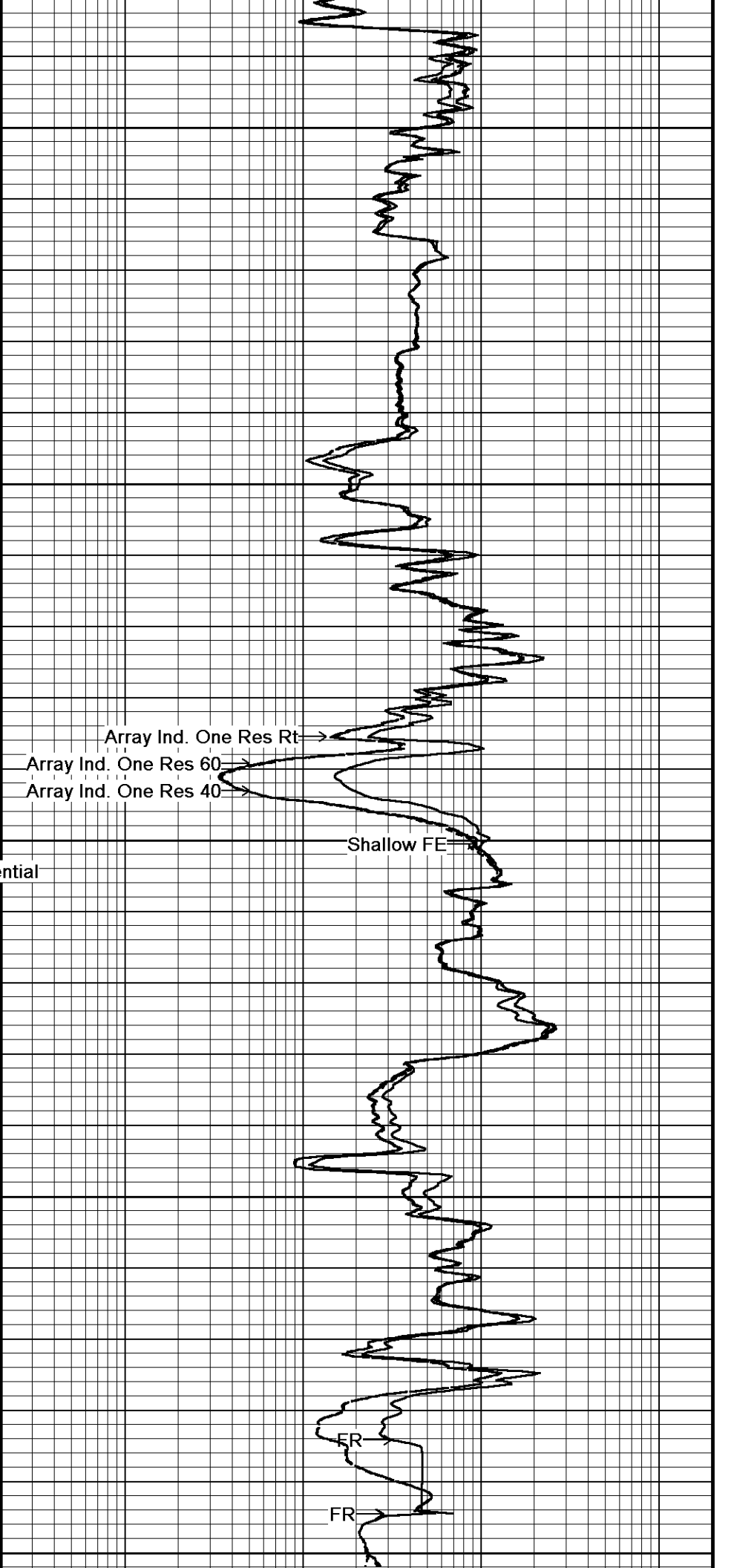
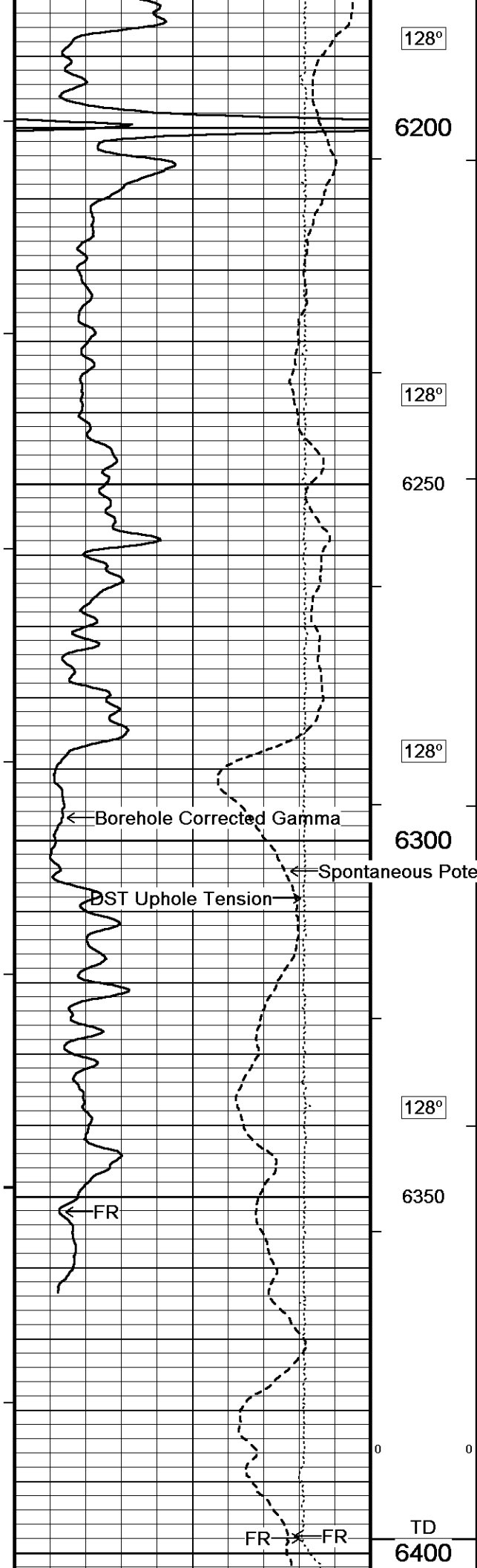
Spontaneous Potential

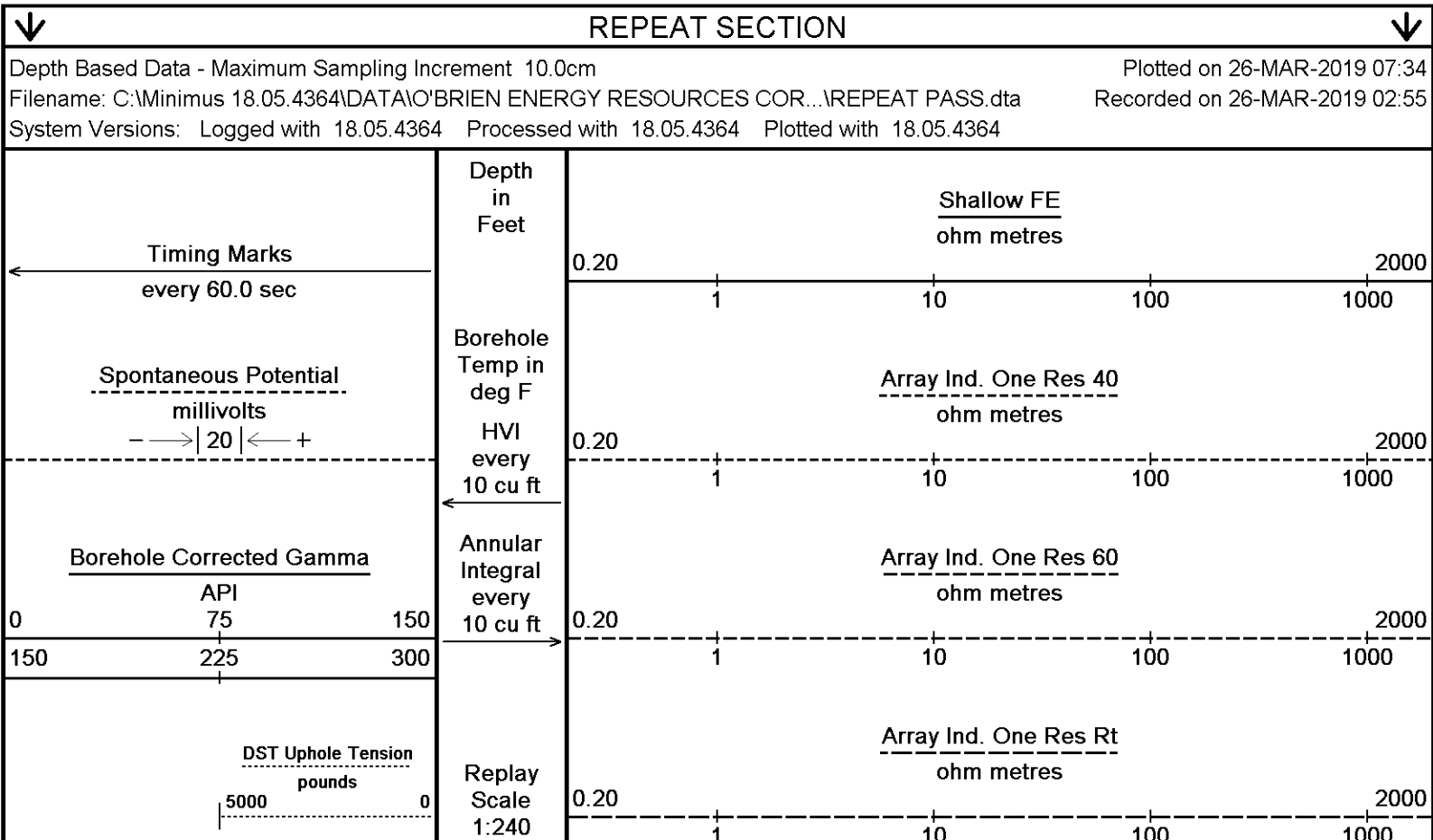
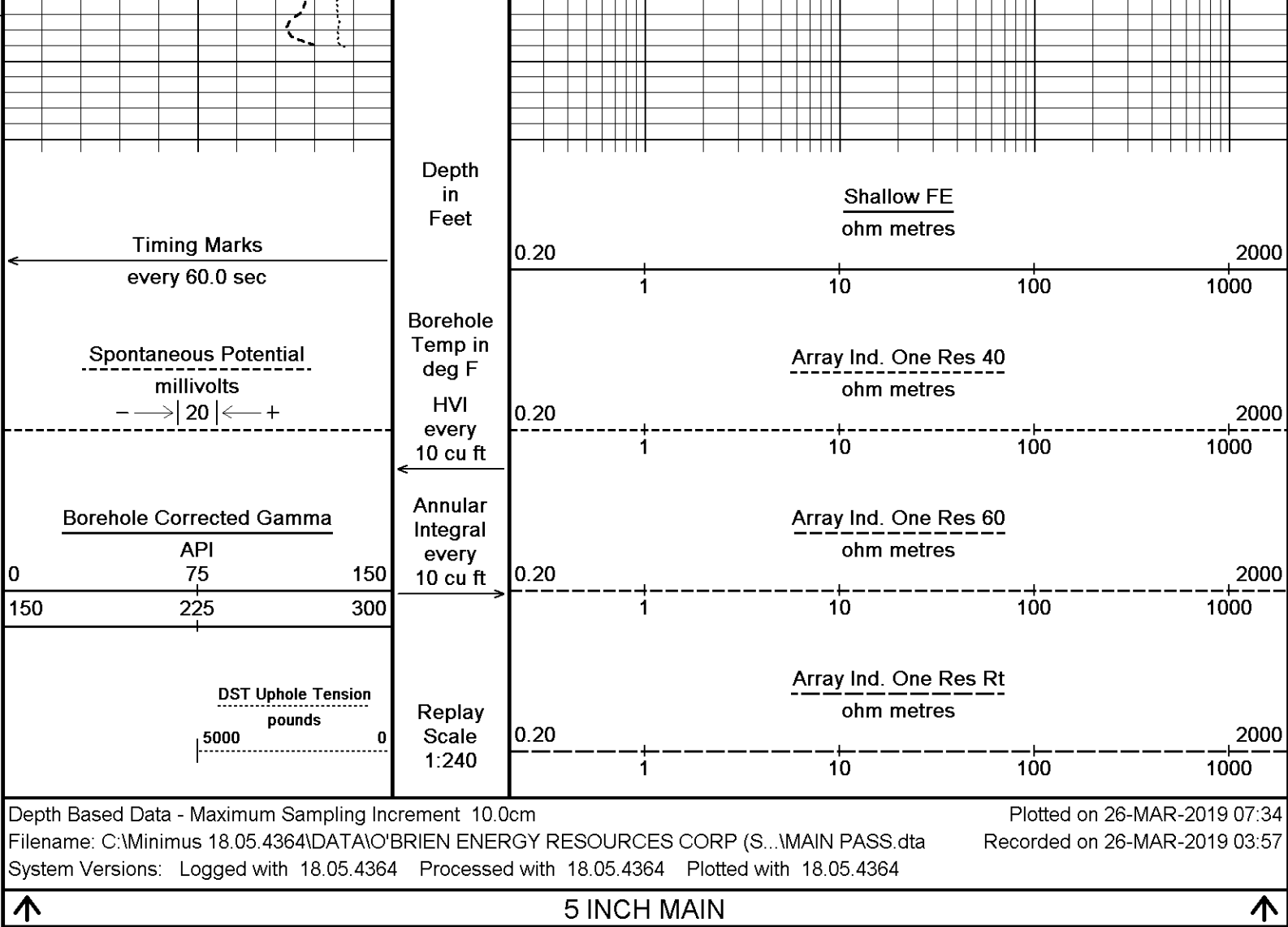
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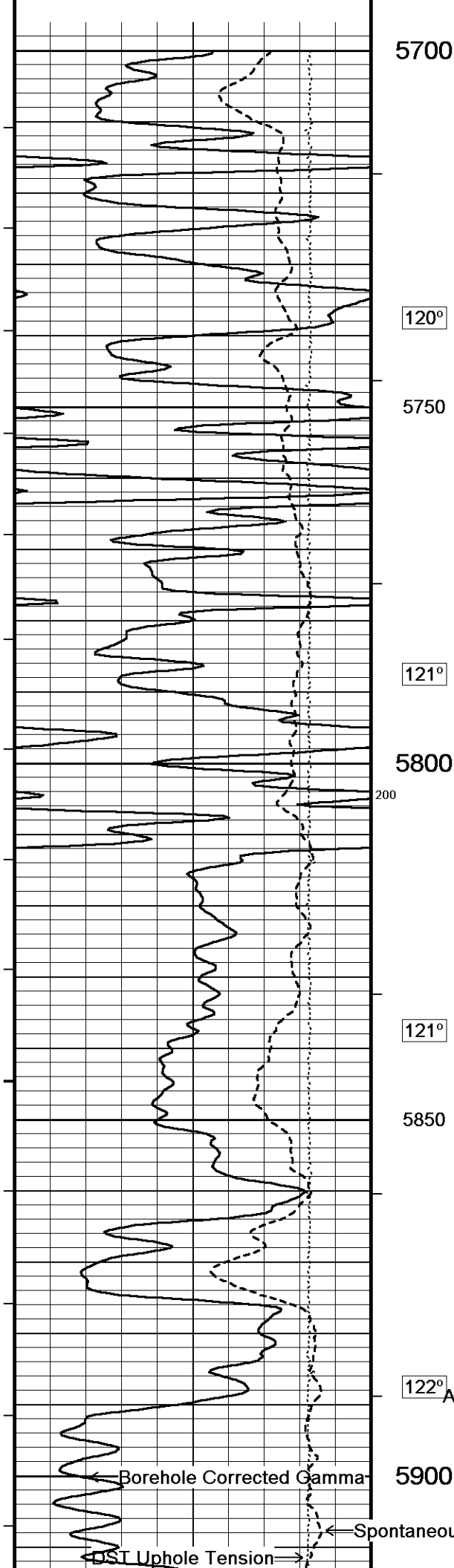










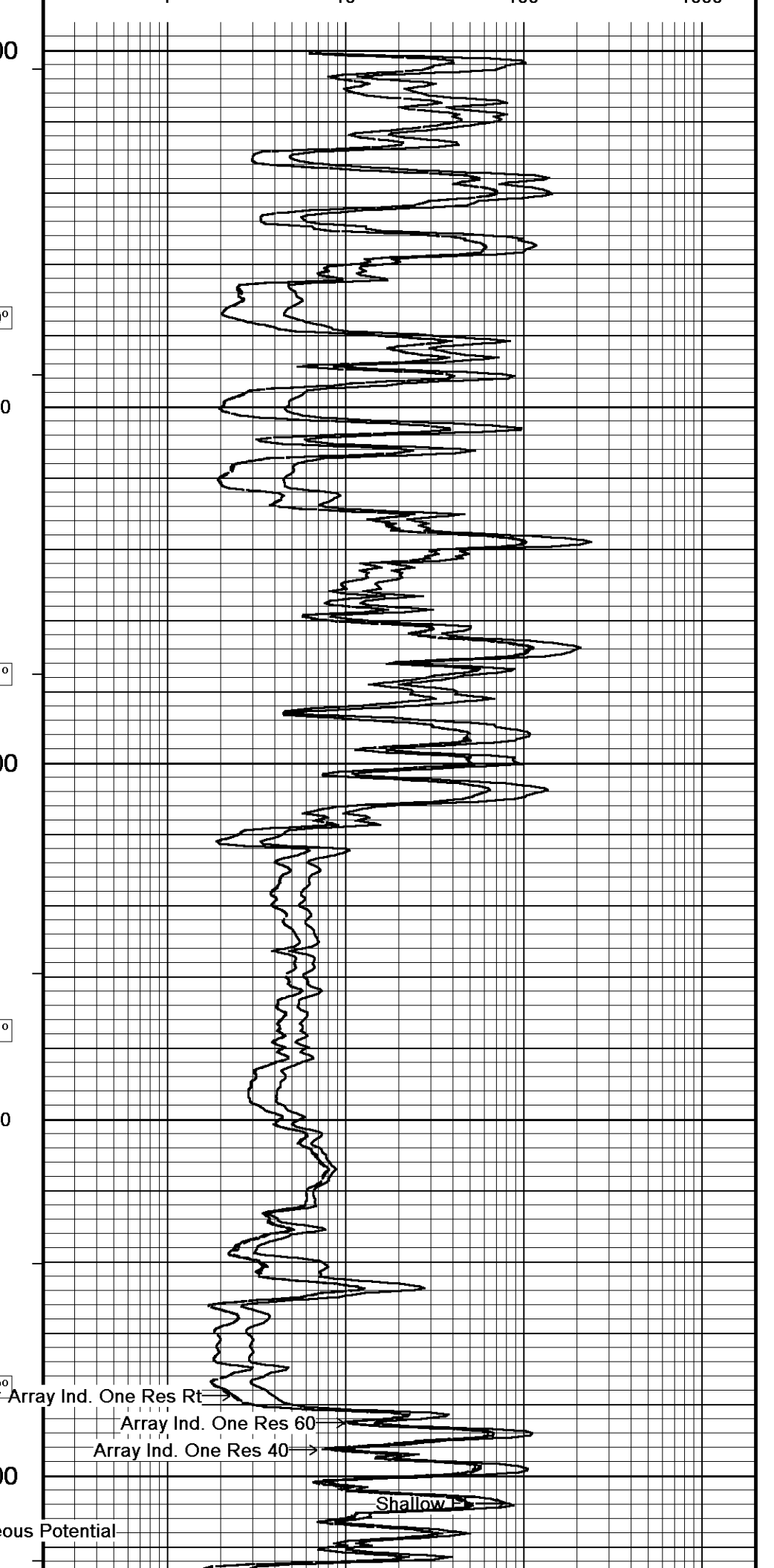


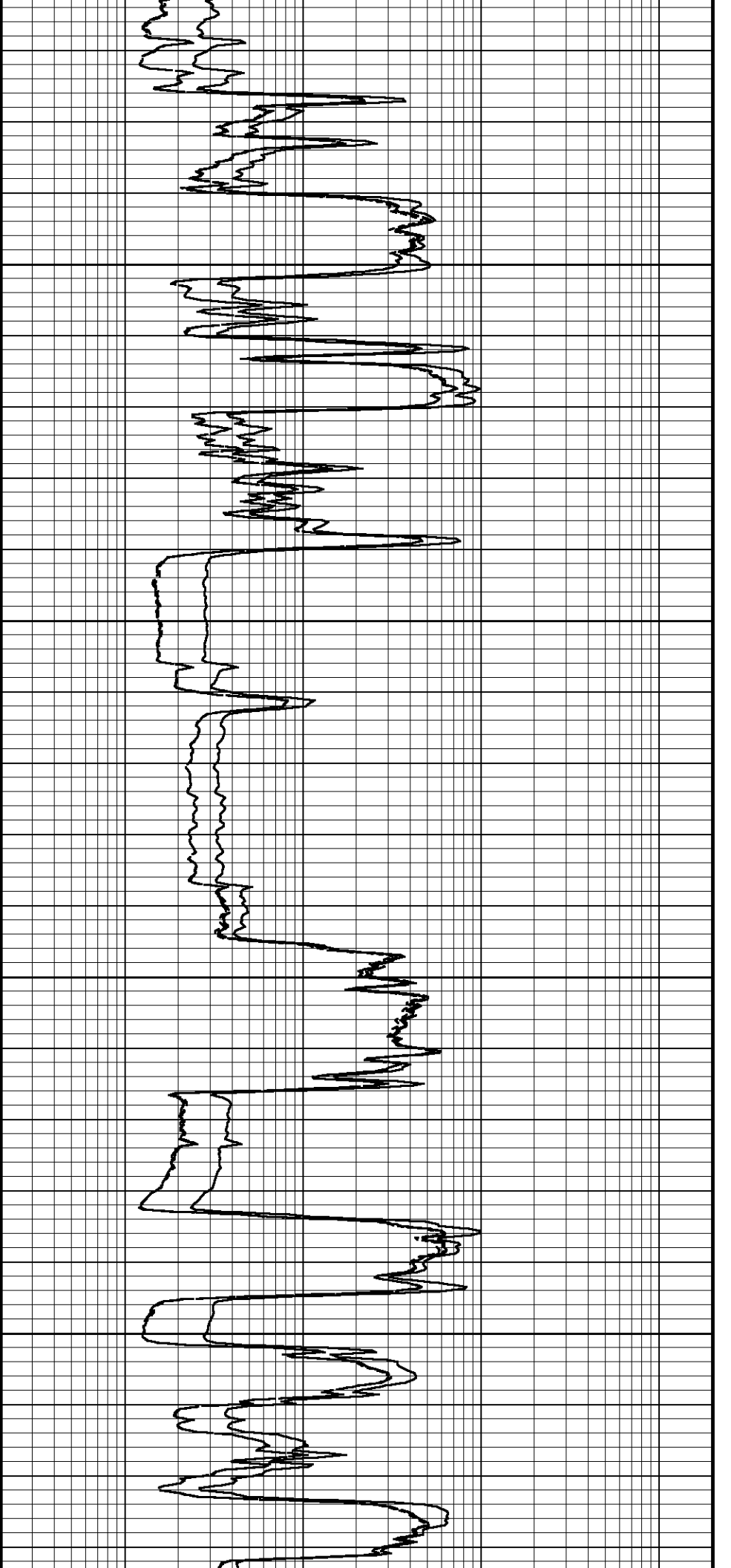
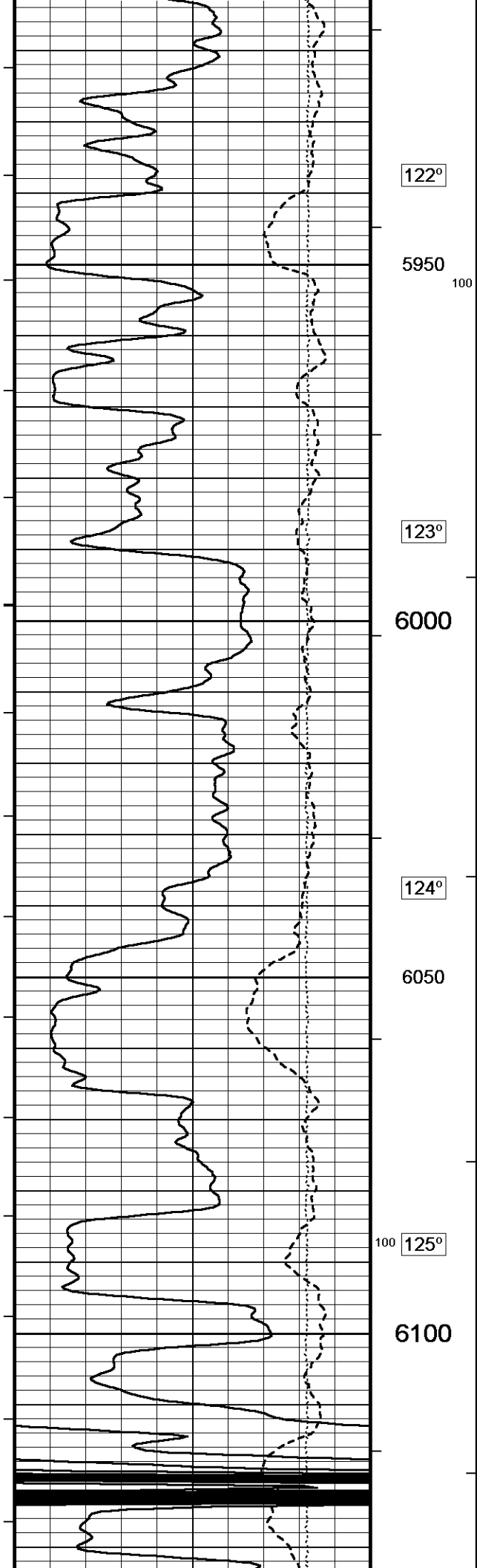
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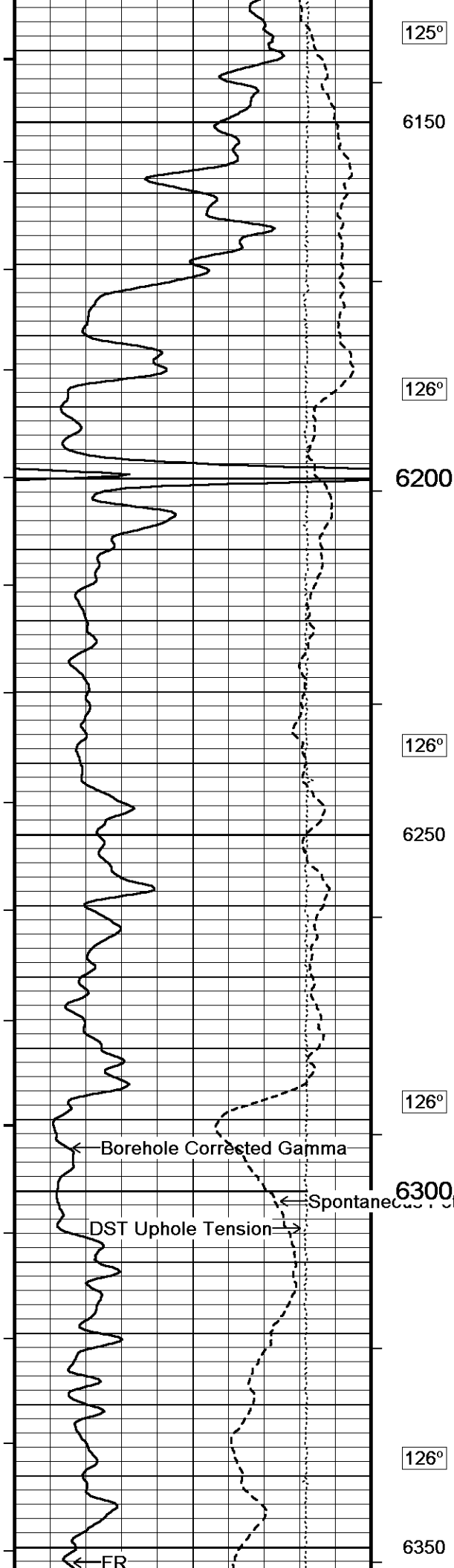
121°

121°

122°







125°

6150

126°

6200

126°

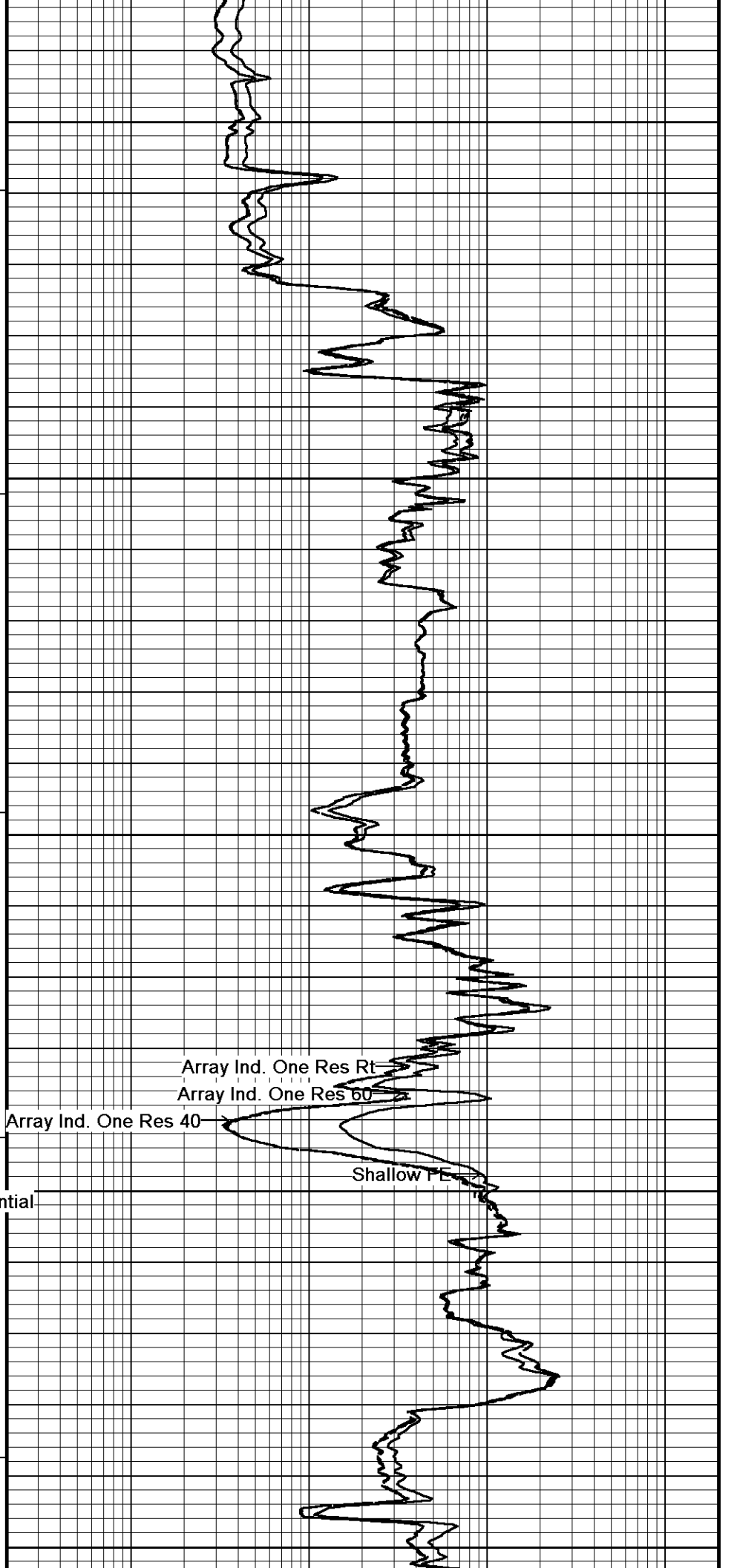
6250

126°

6300

126°

6350

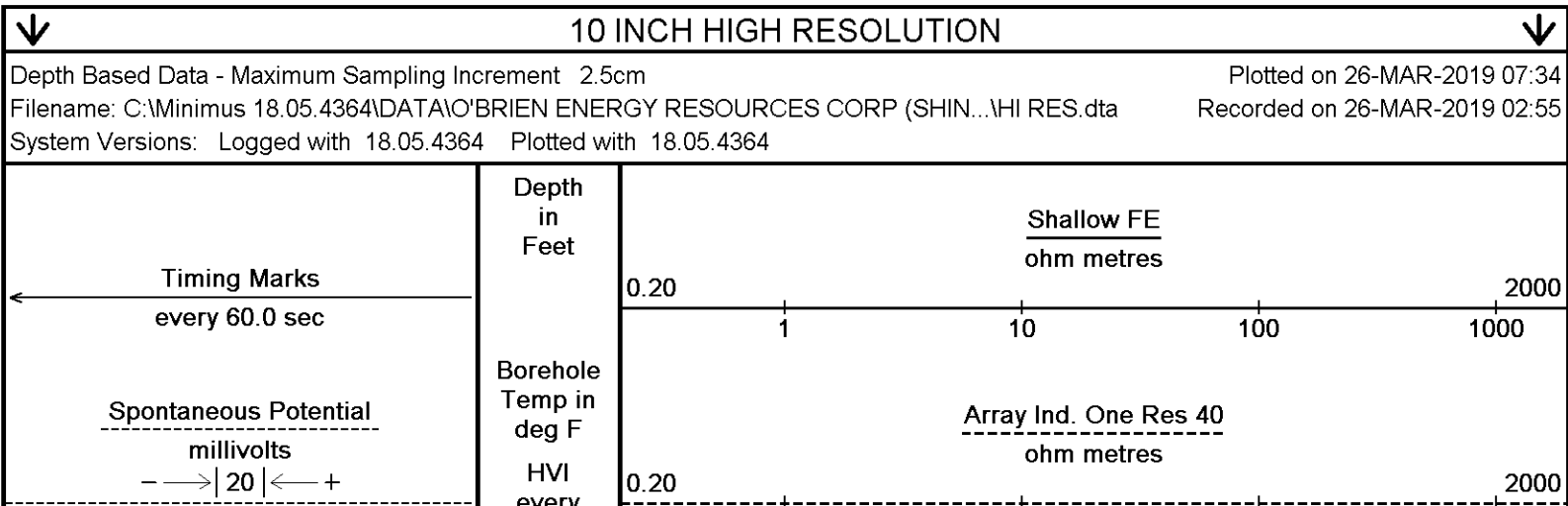
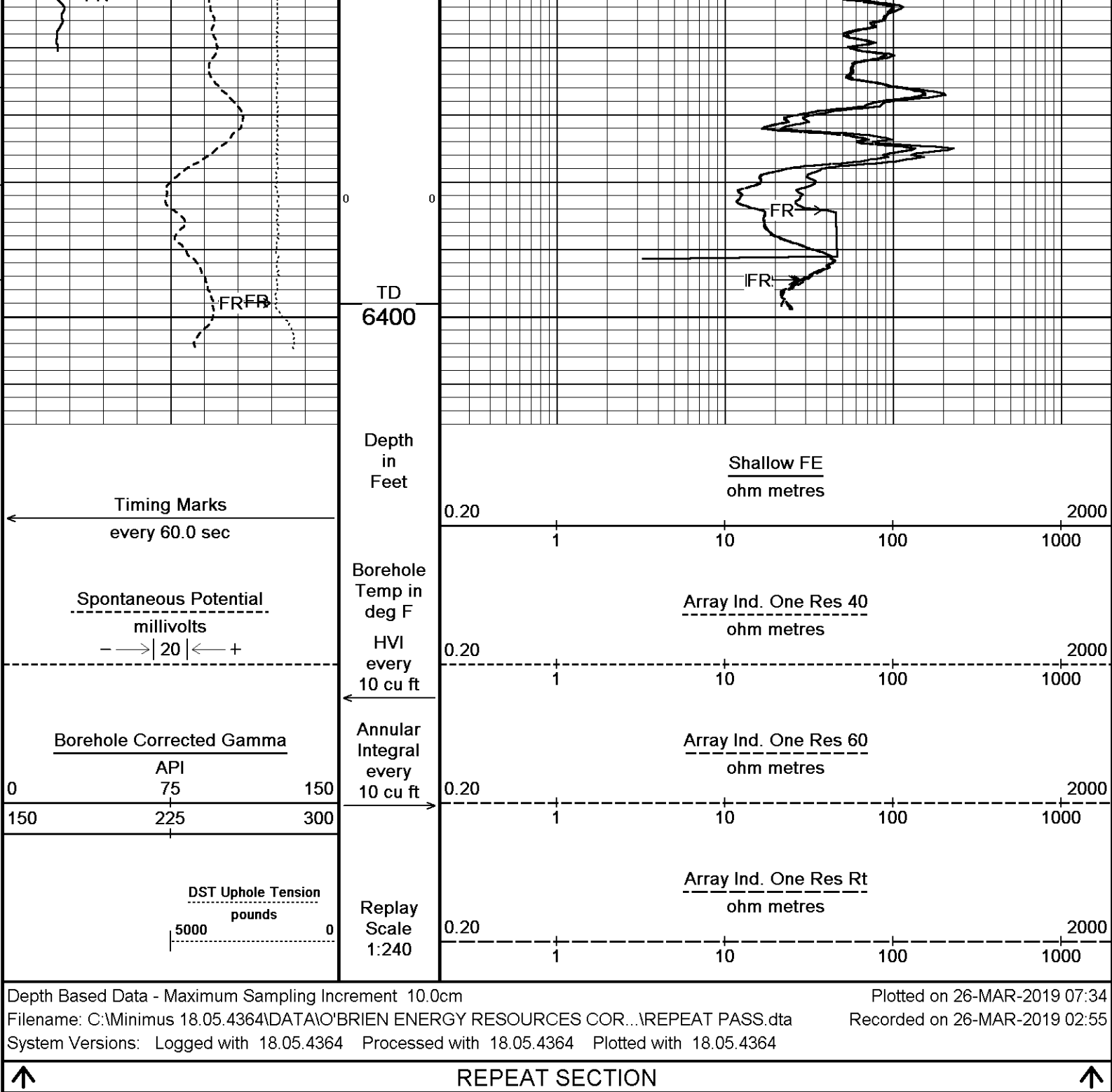


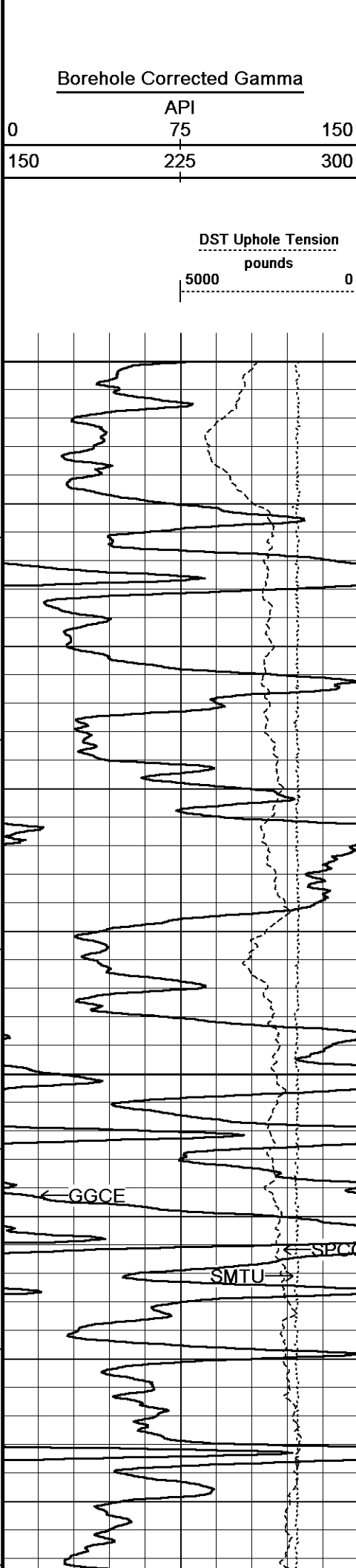
Array Ind. One Res Rt

Array Ind. One Res 60

Array Ind. One Res 40

Shallow PE





every 10 cu ft

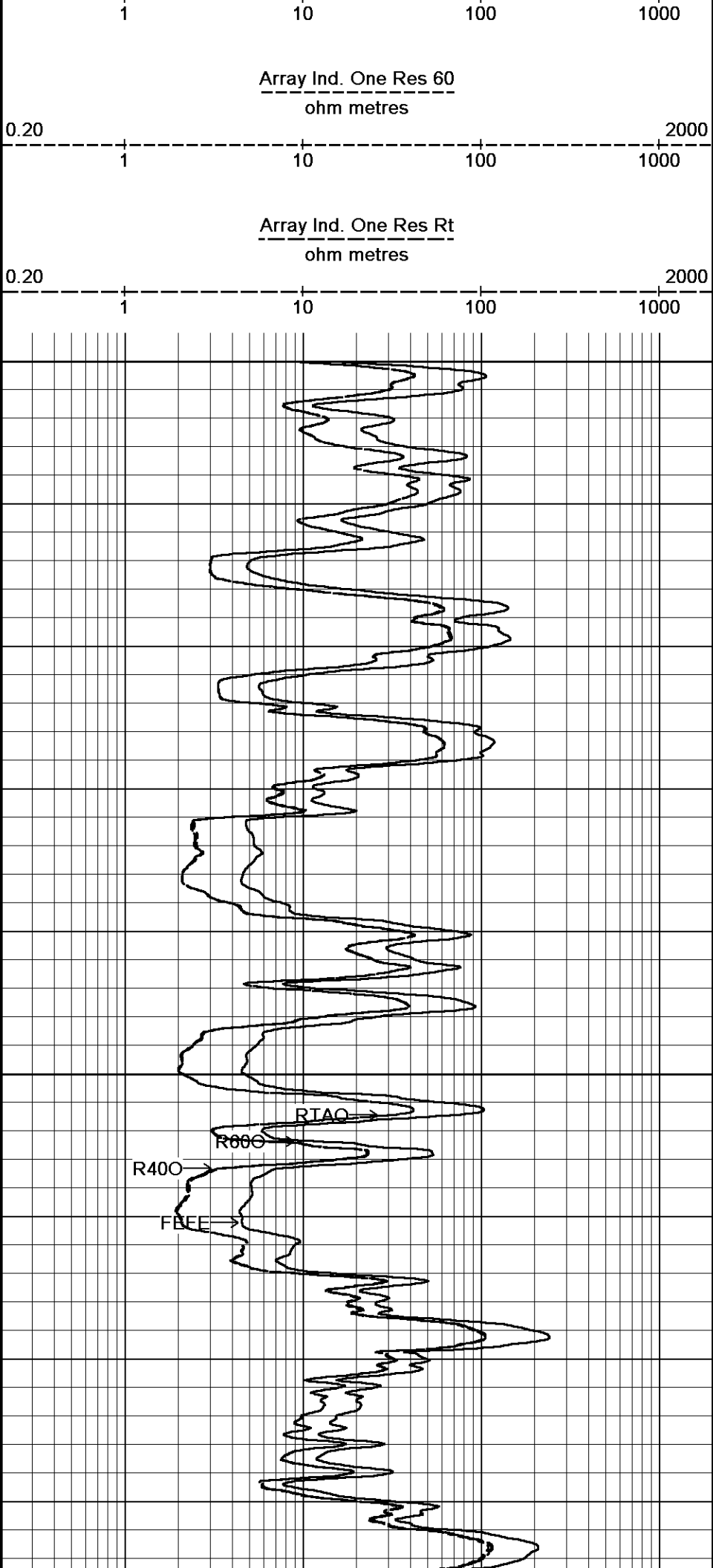
Annular Integral every 10 cu ft

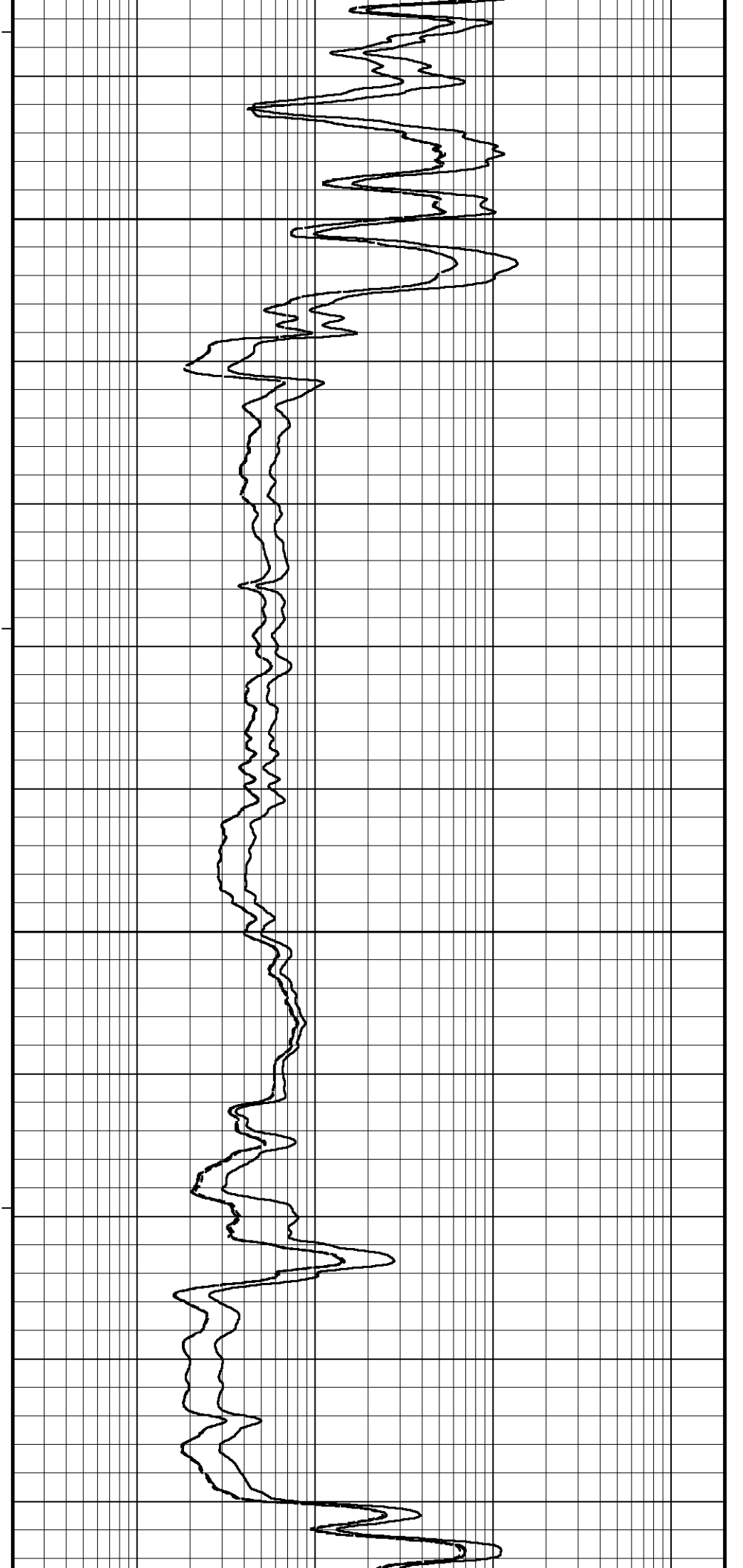
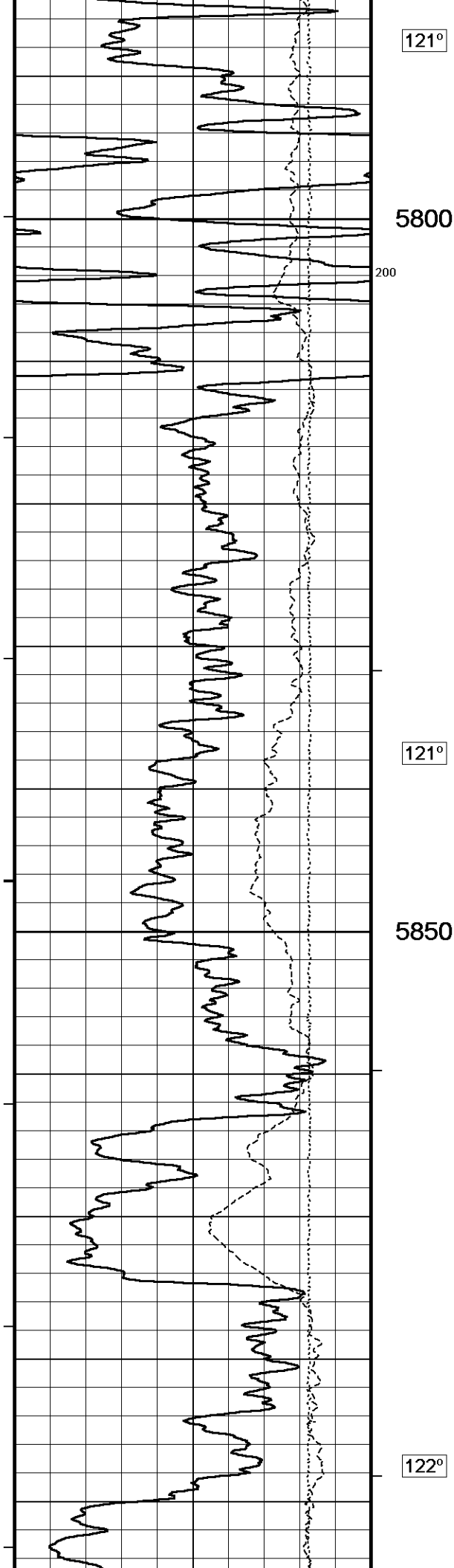
Replay Scale 1:120

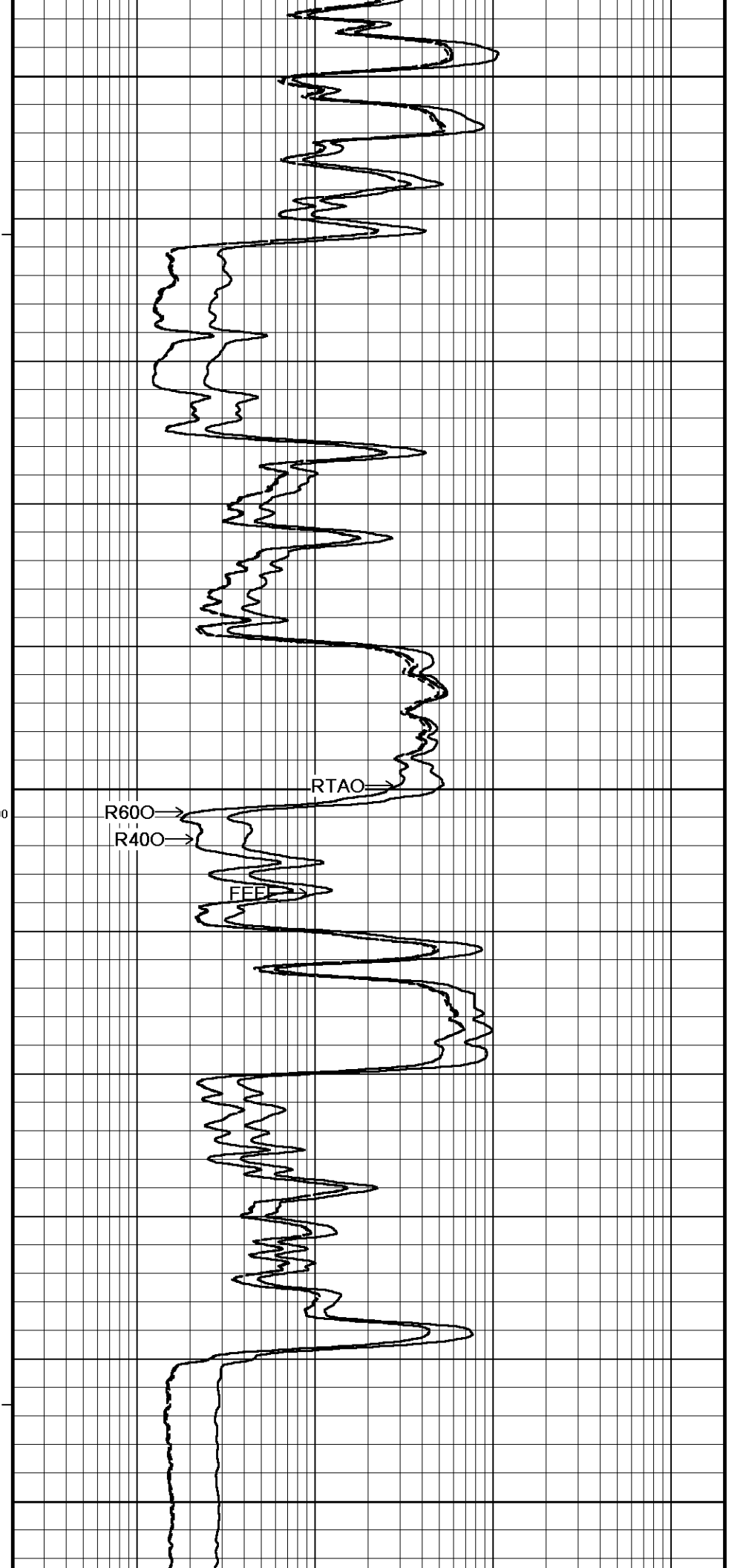
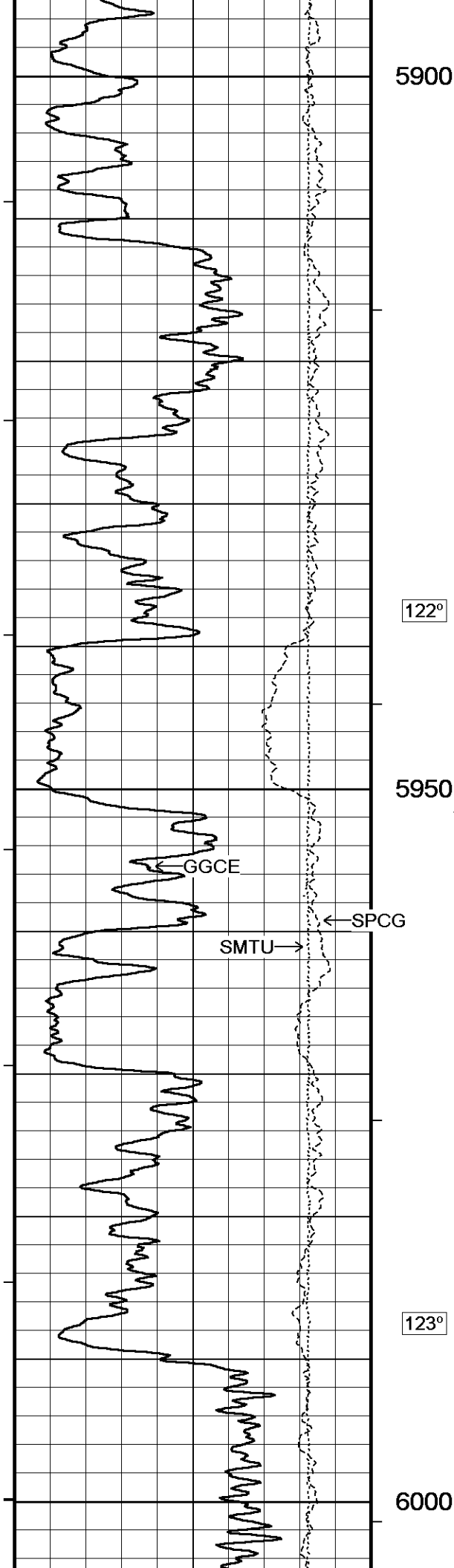
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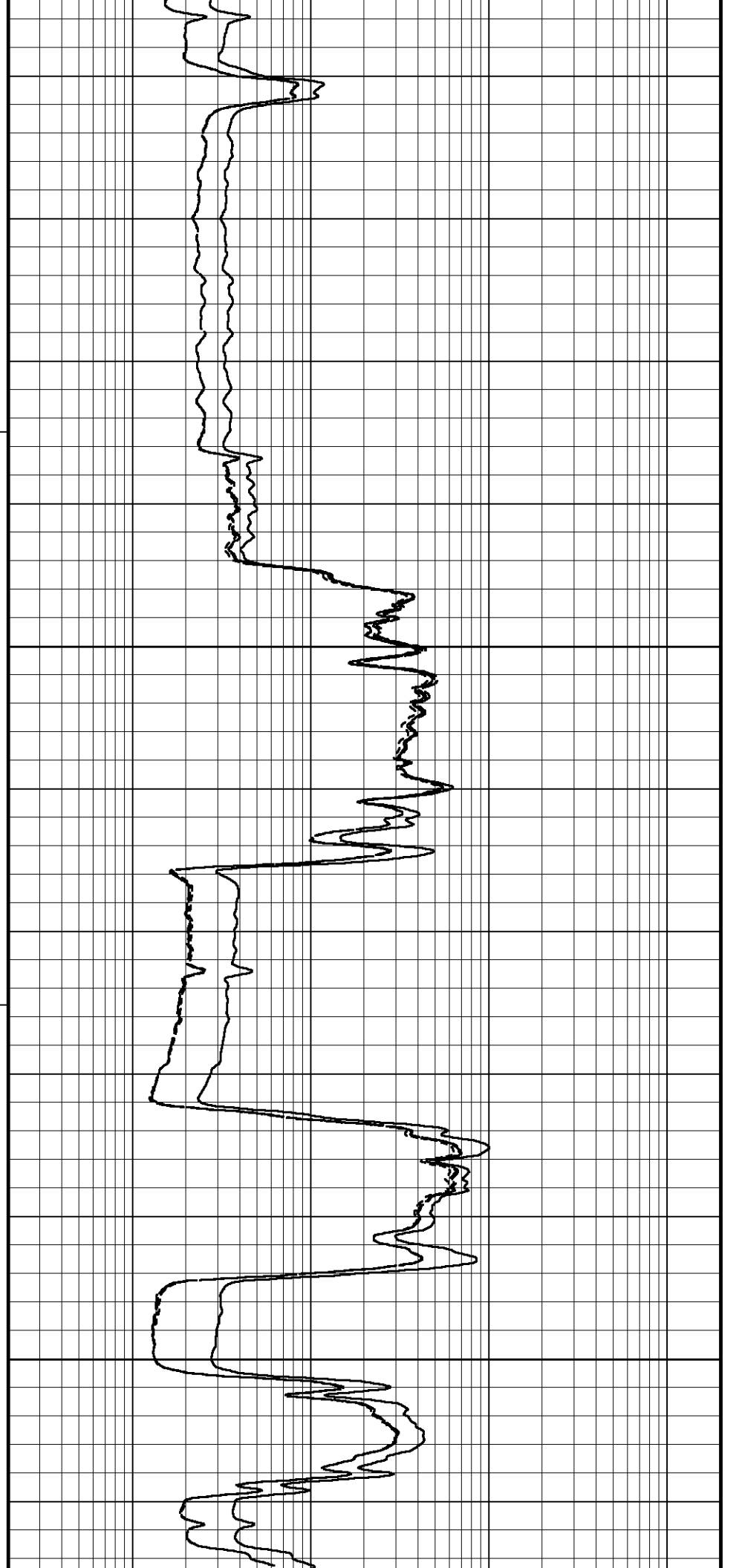
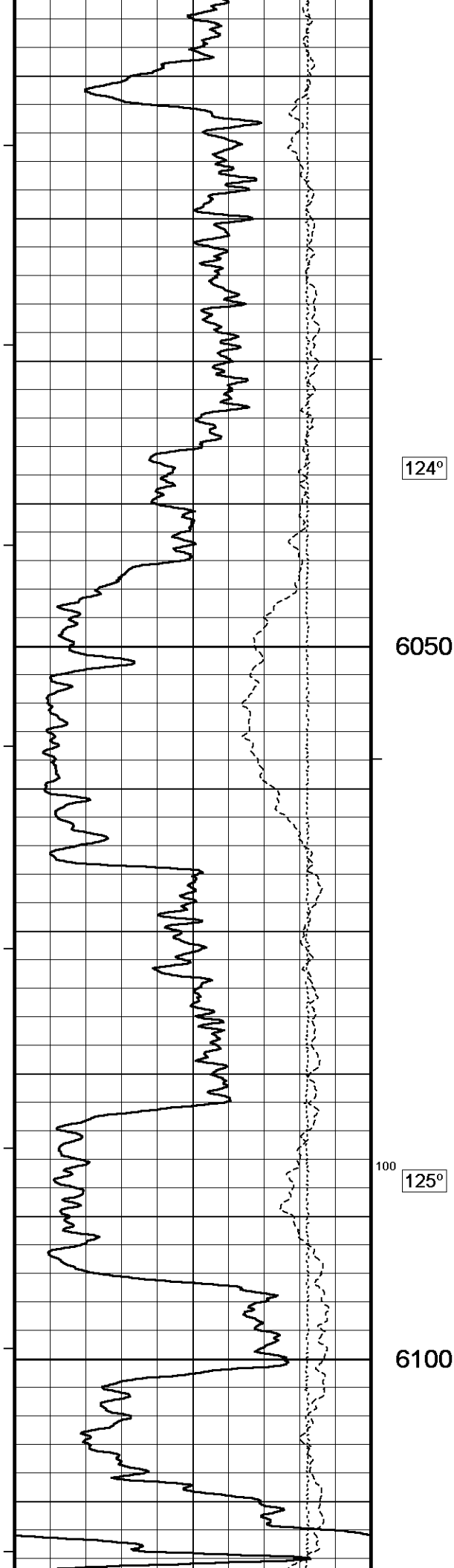
120°

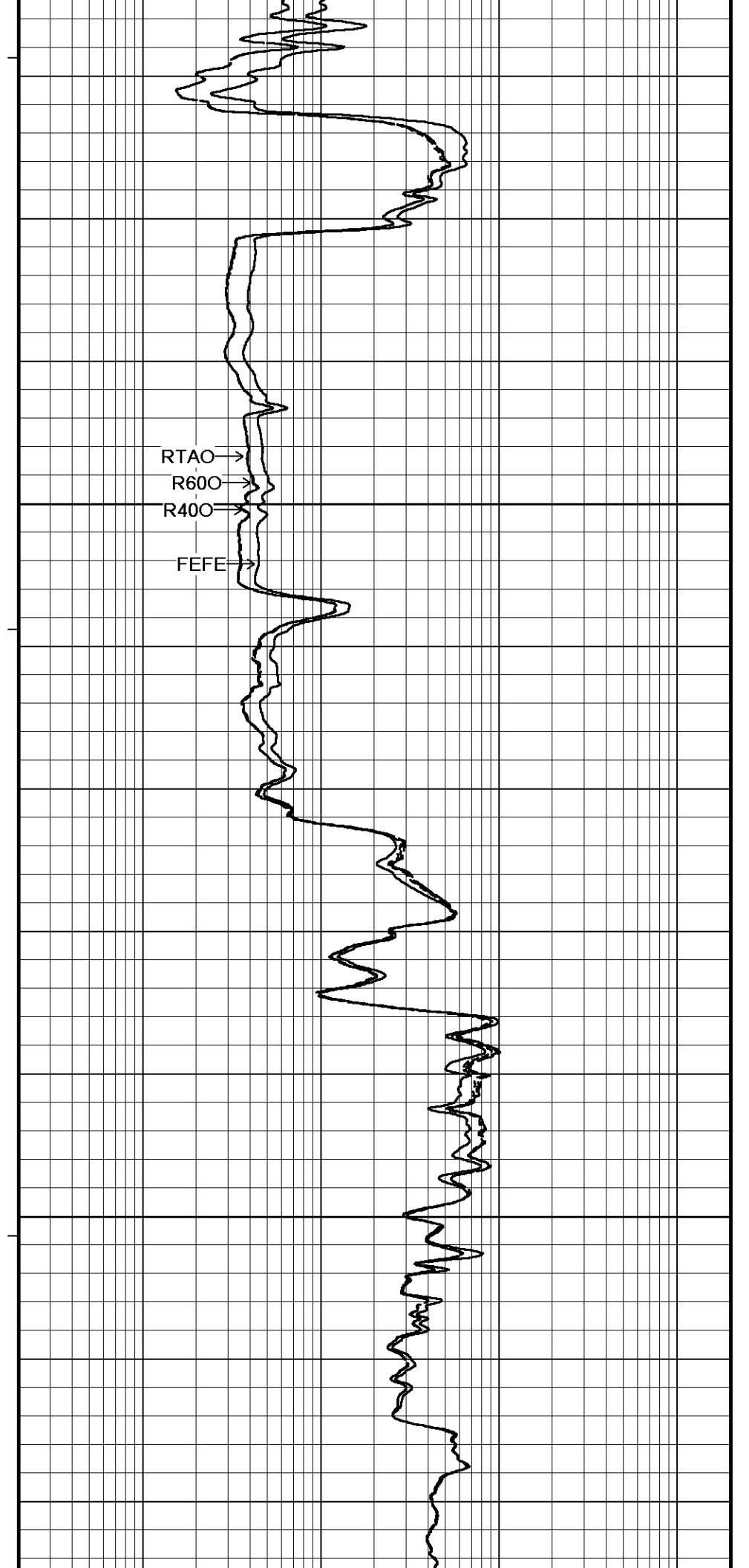
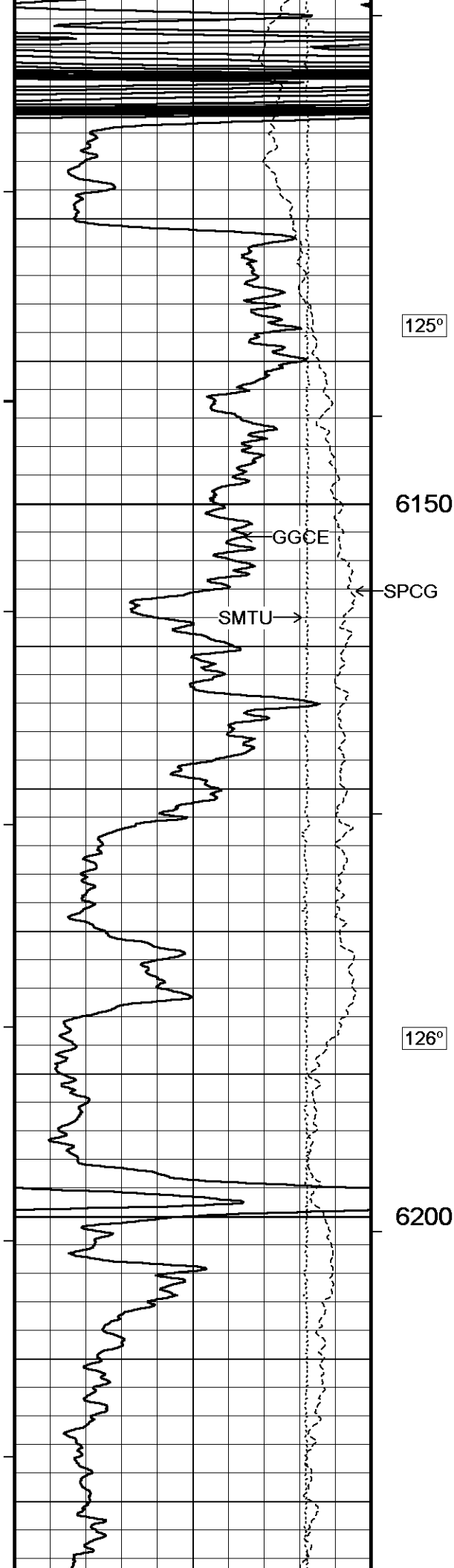
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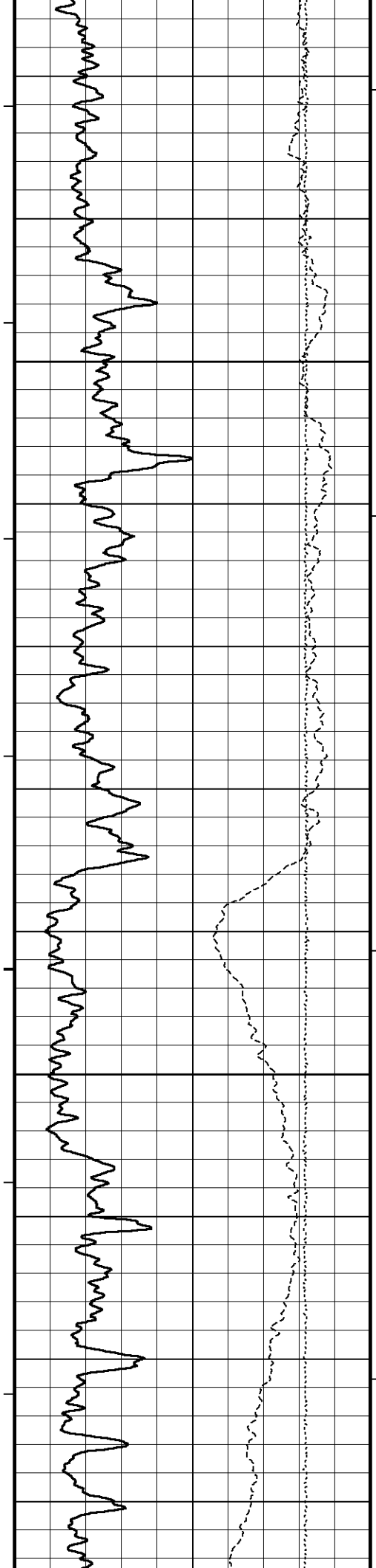










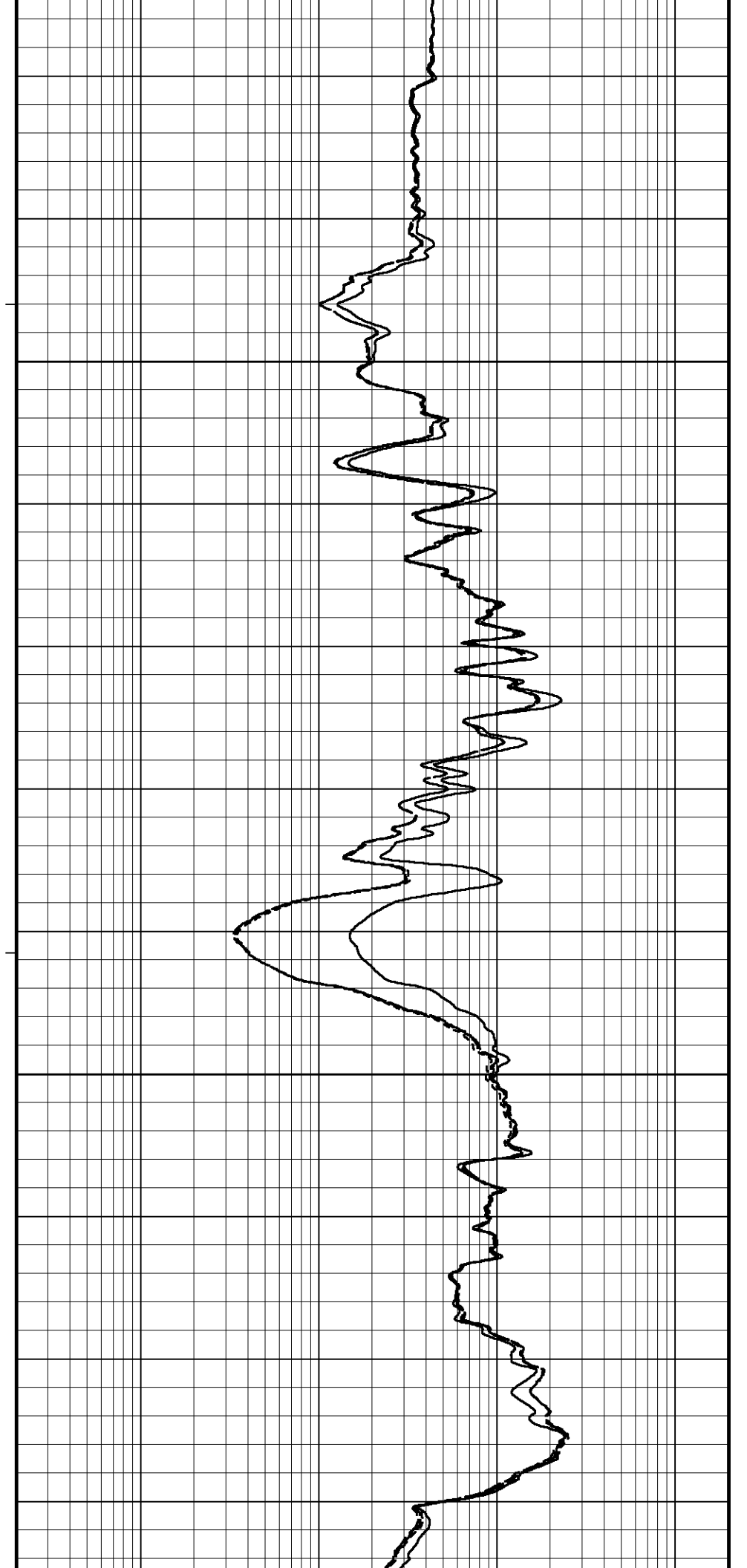


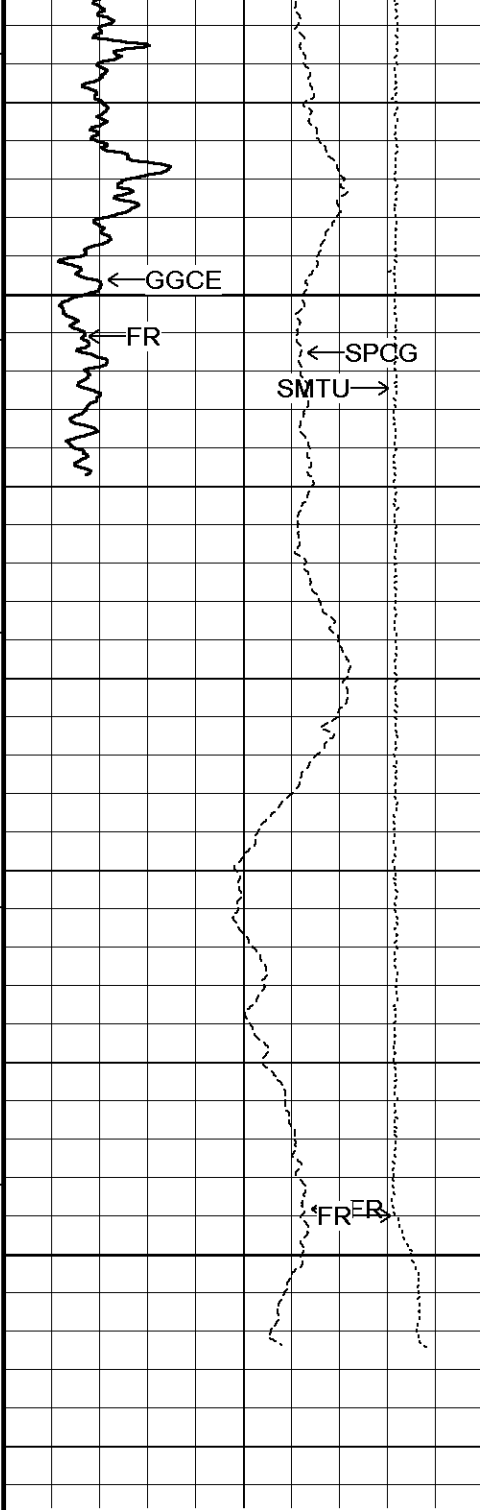
126°

6250

126°

6300





126°

6350

0 0

TD

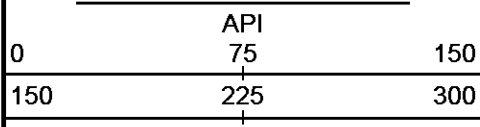
6400

Depth
in
Feet

Timing Marks
every 60.0 sec

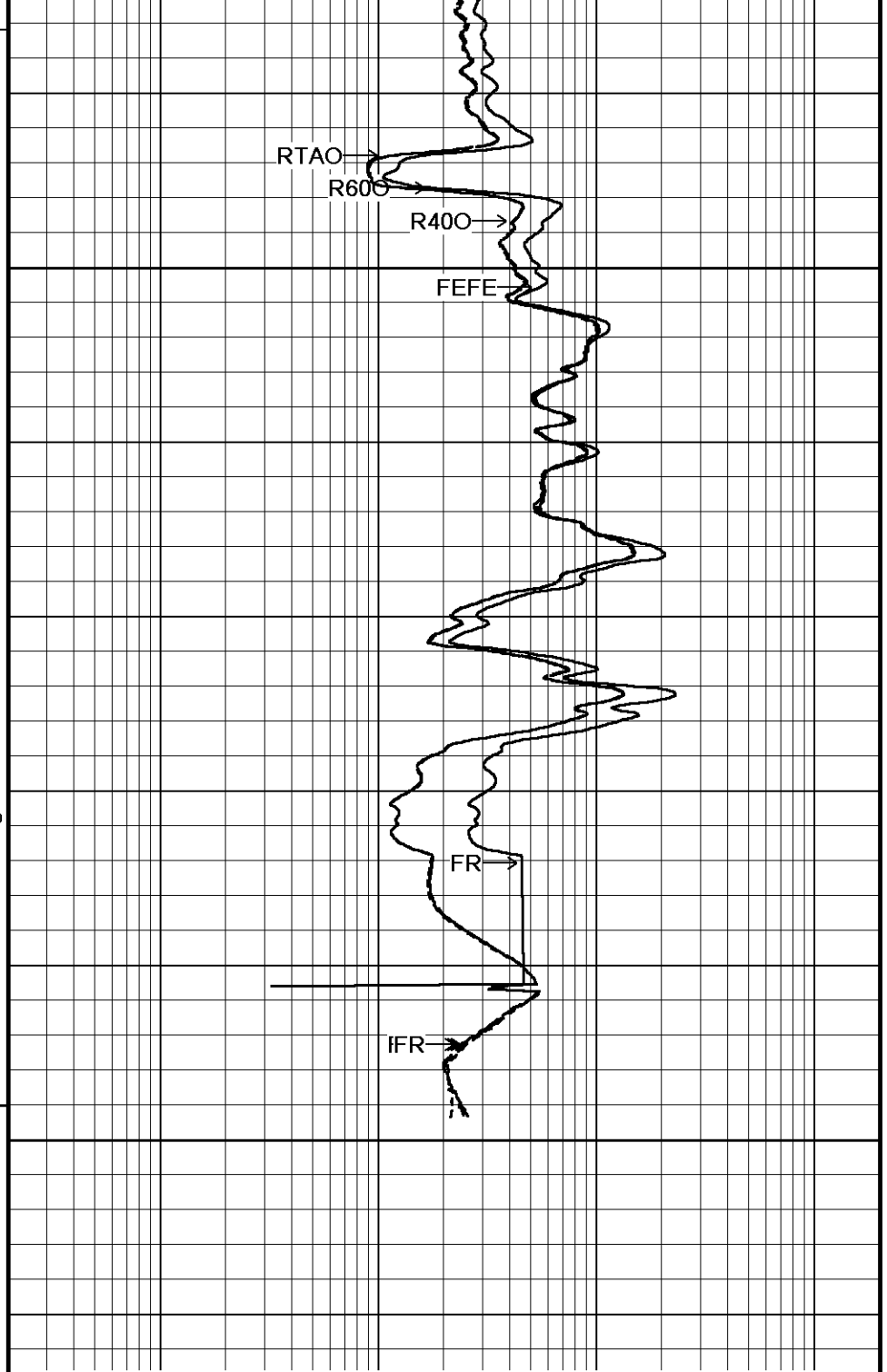
Spontaneous Potential
millivolts
- - - - -> | 20 | < - - - - - +

Borehole Corrected Gamma

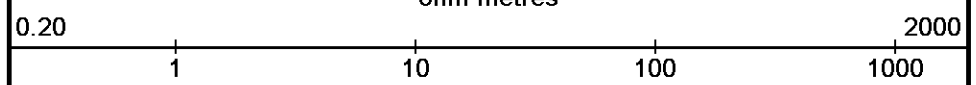


Borehole
Temp in
deg F
HVI
every
10 cu ft

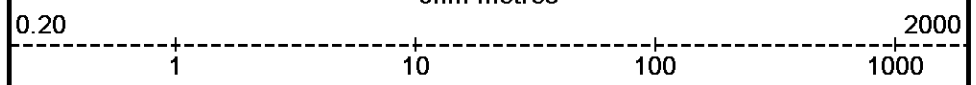
Annular
Integral
every
10 cu ft



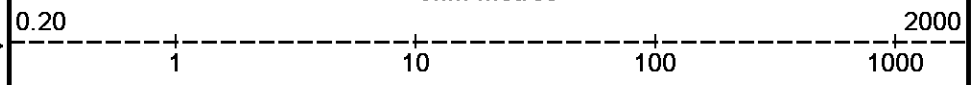
Shallow FE
ohm metres



Array Ind. One Res 40
ohm metres



Array Ind. One Res 60
ohm metres



DST Uphole Tension
pounds
5000 0

Replay
Scale
1:120

Array Ind. One Res Rt
ohm metres

0.20

1

10

100

1000

2000

Depth Based Data - Maximum Sampling Increment 2.5cm

Plotted on 26-MAR-2019 07:34

Filename: C:\Minimus 18.05.4364\DATA\O'BRIEN ENERGY RESOURCES CORP (SHIN...)\HI RES.dta

Recorded on 26-MAR-2019 02:55

System Versions: Logged with 18.05.4364 Plotted with 18.05.4364



10 INCH HIGH RESOLUTION



BEFORE SURVEY CALIBRATION

C:\Minimus 18.05.4364\DATA\O'BRIEN ENERGY RESOURCES CORP (SHINOGL 3-20)\MAIN PASS.dta

General Constants All 000

Last Edited on 26-MAR-2019,02:38

General Parameters

Mud Resistivity	0.780	ohm-metres
Mud Resistivity Temperature	92.000	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	4.500	inches
Caliper for Differential Caliper	Density Caliper	

Rwa Parameters

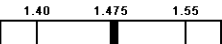
Porosity used	Crossplot Porosity
Resistivity used	Array Ind. One Res Rt
RWA Constant A	0.620
RWA Constant M	2.150
SW/APOR Tool Source	0.000

Gamma Calibration MCG-C 210

Field Calibration on 25-MAR-2019 16:17

	Measured	Calibrated (API)
Background	72	49
Calibrator (Gross)	748	505
Calibrator (Net)	676	456

Gamma Calibration Tolerances MCG-C 210

Ratio 1.483  Counts/API

Gamma Constants MCG-C 210

Last Edited on 26-MAR-2019,00:32

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.08	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-C 210

Field Calibration on 25-MAR-2019,16:17

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	200.00	200.00

High Resolution Temperature Constants MCG-C 210

Last Edited on 22-MAR-2019,14:36

Pre-filter Length 11

FE Calibration MFE-B.J 352

Base Calibration on 13-MAR-2019 13:31

Field Check on 25-MAR-2019 15:56

	Resistor 1 (ohm)	Resistor 2 (ohm)
	0.0	1000.0
Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	960.2	126.8
Base Check		281.8
Field Check		282.5

FE Calibration Tolerances MFE-B.J 352

Reference 2	960.2	-3% 960.0 +3%	ohm
Base Check	281.8	-2% 277.0 +2%	ohm-m
Field Check	282.5	-2% 281.8 +2%	ohm-m

FE Constants MFE-B.J 352

Last Edited on 25-MAR-2019,16:38

Running Mode	No Sleeve
MFE K Factor	0.1268
Borehole Correction Constants	
Sonde Position	0.5 inches
Hole Size Source	Density Caliper
Hole Size Constant Value	N/A inches
Rm Source	Global Value: Temperature Corrected
Temp. for Rm Corr.	MCG External Temperature

Induction Calibration MAI-A.A 111

Factory Loop Calibration 17-MAR-2019 17:11
Field Check on 25-MAR-2019 15:54

Factory Loop Calibration

High Conductivity Reference Resistor	3.3 ohm
Low Conductivity Reference Resistor	333.3 ohm

Array	Measured Signal (unitless)		Reference Conductivity (mmho/m)		Calibration	
	Low	High	Low	High	Gain	Offset
1 (near)	17.6	473.6	9.3	966.2	2.099	-27.8
2	6.4	385.9	7.6	821.4	2.144	-6.1
3	3.2	264.0	5.2	566.0	2.150	-1.6
4 (far)	2.1	135.5	2.6	279.2	2.074	-1.8
Array Temperature	23.0		Deg F			

Tool Checks

Array	Factory Reference (mmho/m)		Before Survey (mmho/m)		
	Low	High	Low	High	
1 (near)	8.9	3838.6	9.0	3838.2	
2	27.2	3497.1	27.2	3496.8	
3	26.9	2994.8	26.9	2994.5	
4 (far)	17.6	2040.6	17.6	2040.1	
Array Temperature	70.6		63.0		Deg F

Induction Check Tolerances MAI-A.A 111

Low Array 1	9.0	7.4 8.9 10.4	mmho/m	High Array 1	3838.2	-0.5% 3838.6 +0.5%	mmho/m
Low Array 2	27.2	25.7 27.2 28.7	mmho/m	High Array 2	3496.8	-0.5% 3497.1 +0.5%	mmho/m
Low Array 3	26.9	25.3 26.8 28.3	mmho/m	High Array 3	2994.5	-0.5% 2994.8 +0.5%	mmho/m
Low Array 4	17.6	16.1 17.6 19.1	mmho/m	High Array 4	2040.1	-0.5% 2040.6 +0.5%	mmho/m

Induction Constants MAI-A.A 111

Last Edited on 26-MAR-2019,02:38

Induction Model	RtAP-WBM
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Borehole Correction Constants

Tool Centred	No
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Hole Size Source	Density Caliper		
Hole Size Constant Value	N/A	inches	
Stand-off Type	Pineapple		
Stand-off	0.49	inches	
Number of Fins on Stand-off	5.0000		
Stand-off Fin Angle	72.00	degrees	
Stand-off Fin Width	1.3878	inches	
Rm Source	Global Value: Temperature Corrected		
Temp. for Rm Corr.	MCG External Temperature		
Borehole Correction Method	Default		
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	
Symmetrised Receiver Gains			
Receiver 1	1.00		
Receiver 2	1.00		
Receiver 3	1.00		
Receiver 4	1.00		
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-C.A 216

Base Calibration on 21-MAR-2019 10:44
Field Calibration on 25-MAR-2019 16:32

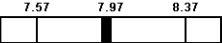
Base Calibration

Reading No	Measured	Calibrator Size (in)
1	16416	3.99
2	24992	5.98
3	33618	7.97
4	41920	9.86
5	51021	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.91	7.97

Caliper Calibration Tolerances MPD-C.A 216

Long Arm Field Cal. 7.91  in

DOWNHOLE EQUIPMENT

C:\Minimus 18.05.4364\DATA\O'BRIEN ENERGY RESOURCES CORP (SHINOGLE 3-20)\MAIN PASS.dta

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



Compact Swivel Head Adaptor
SHA-J.B 722 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

Compact Comms Gamma
MCG-C 210 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity
MMR-A 33 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron
MDN-B.A 295 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

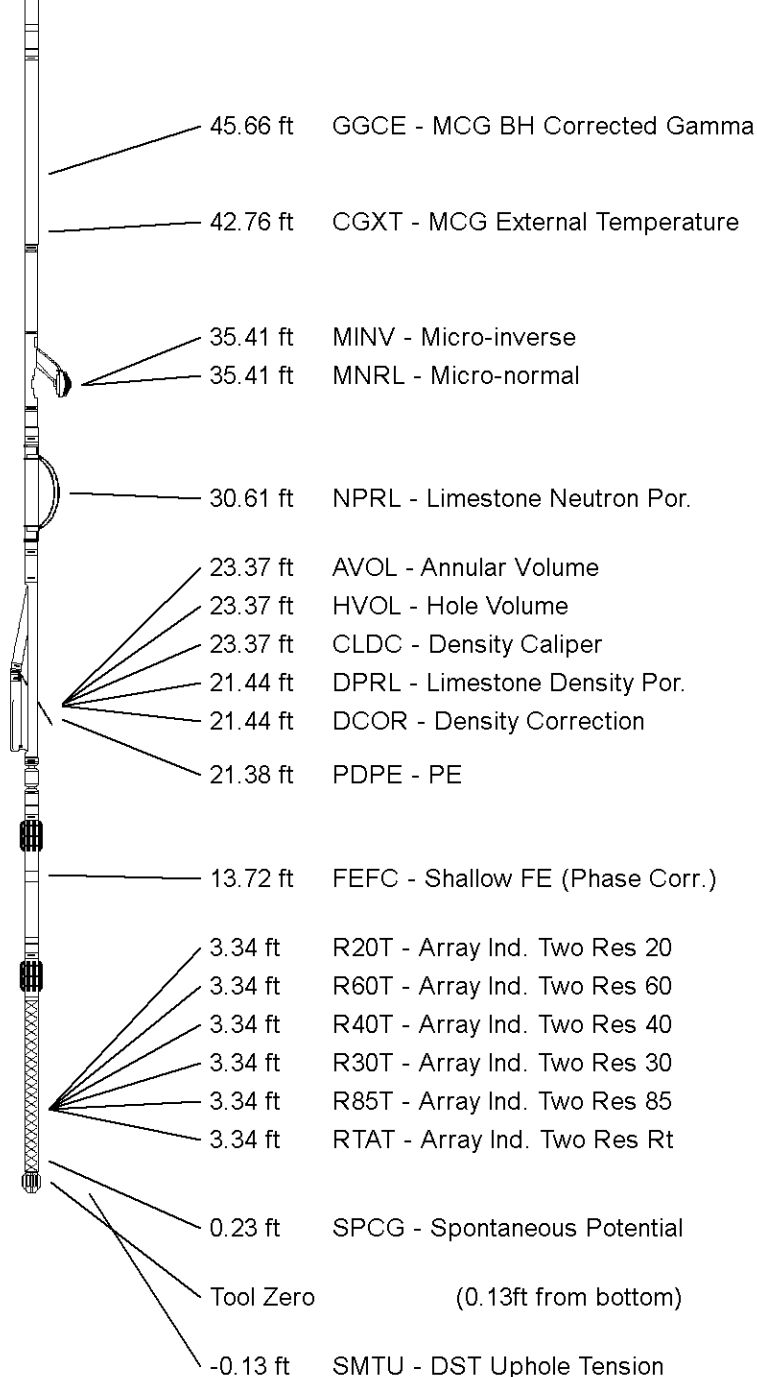
Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.913 in

Compact Knuckle Joint
SKJ-E.B 733 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Induction
MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.240 in

Total Length: 55.64 ft Weight: 454.2 lb



All measurements relative to tool zero.

COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	SHINOGL 3-20
FIELD	SINGLEY
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS

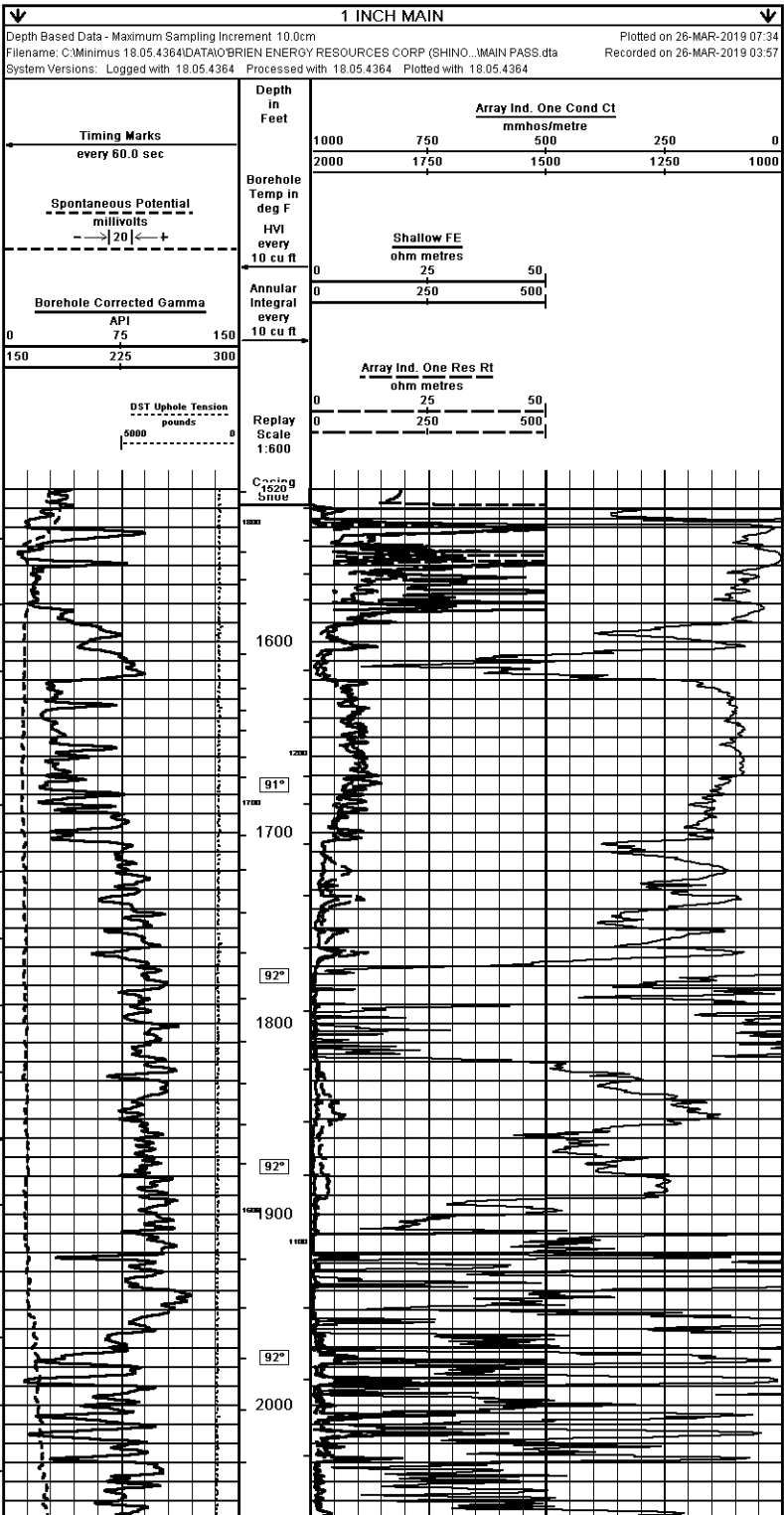
Elevation Kelly Bushing	2679	feet	First Reading	6395.00	feet
Elevation Drill Floor	2677	feet	Depth Driller	6384.00	feet
Elevation Ground Level	2667	feet	Depth Logger	6398.00	feet

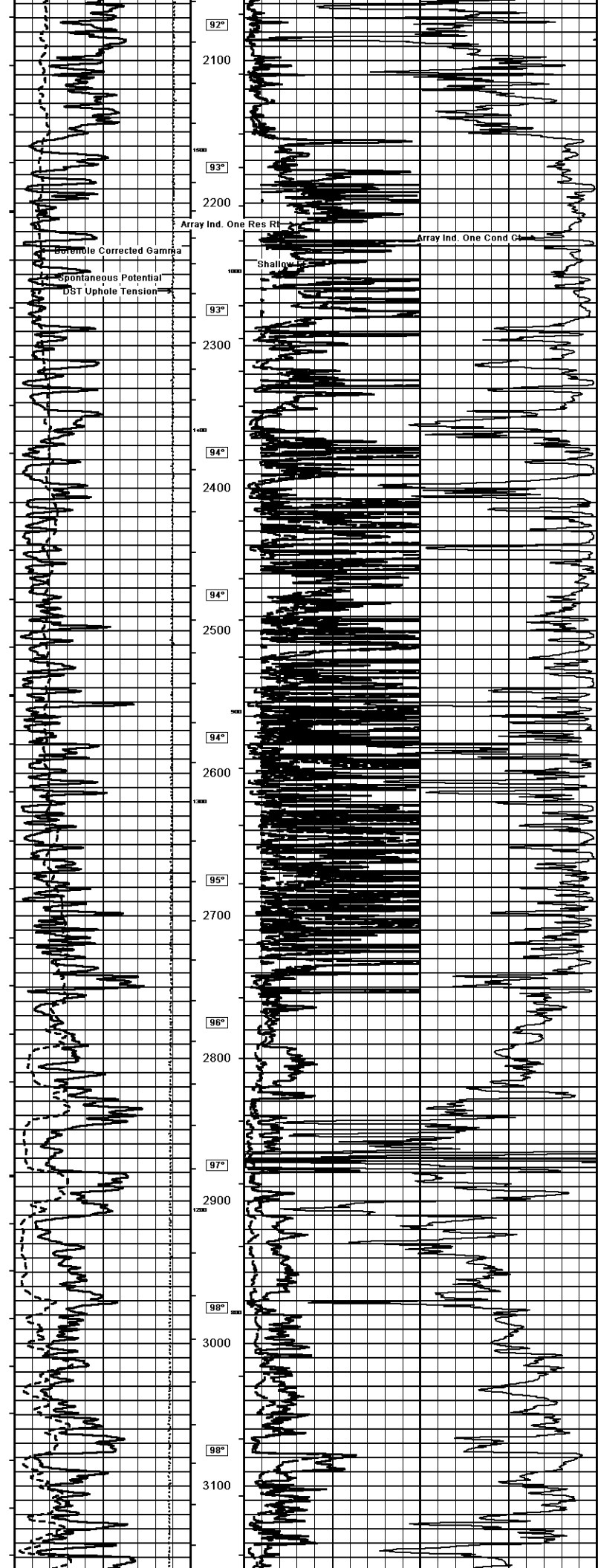


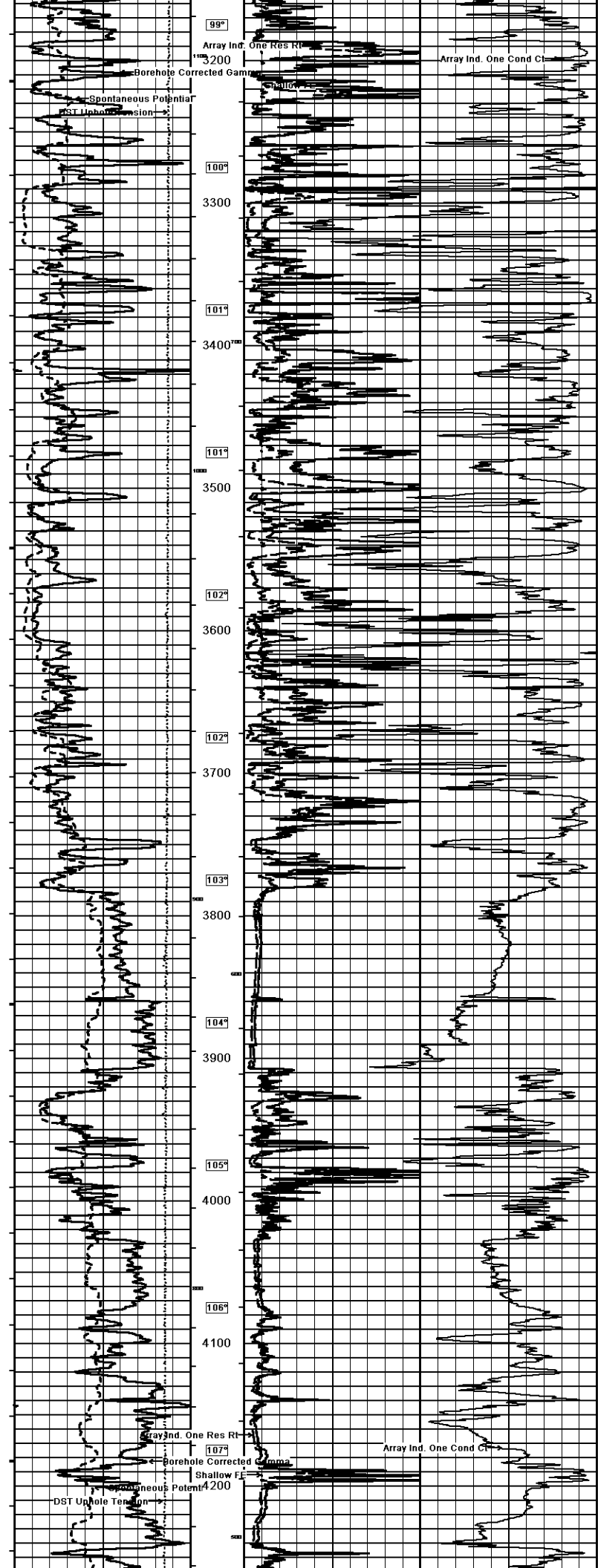
Weatherford®

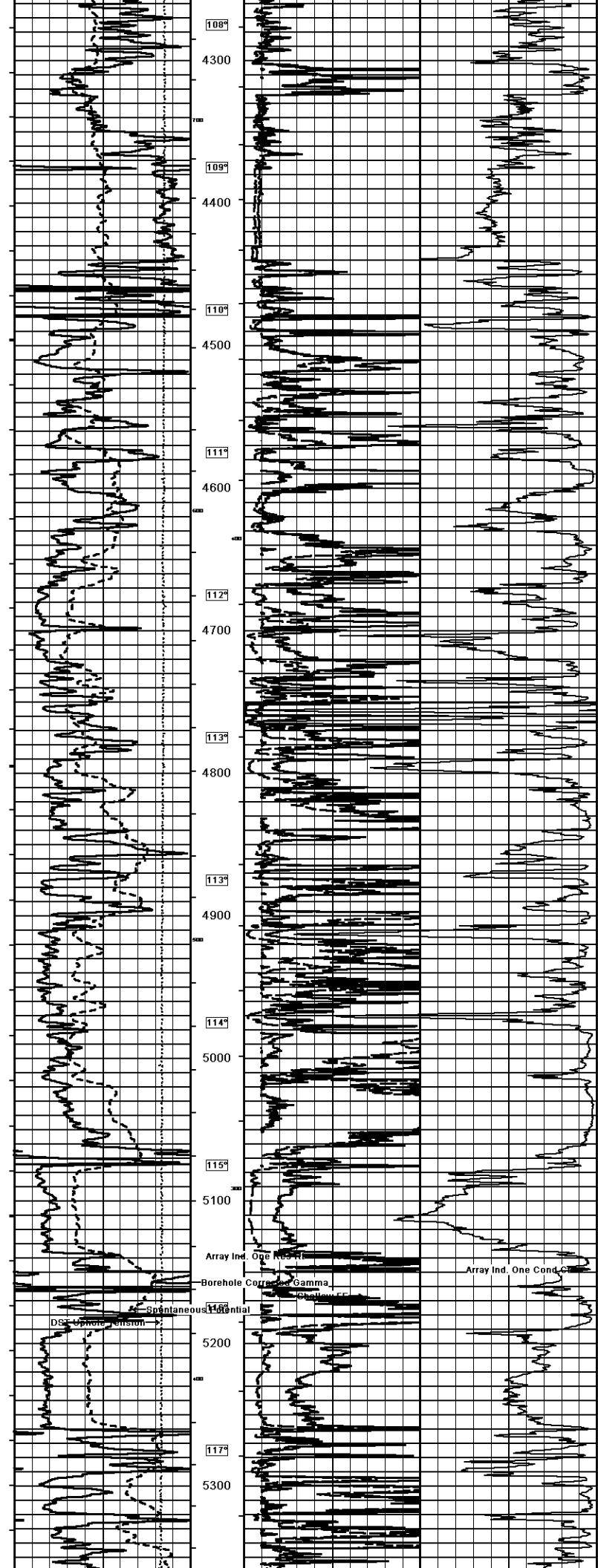
ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

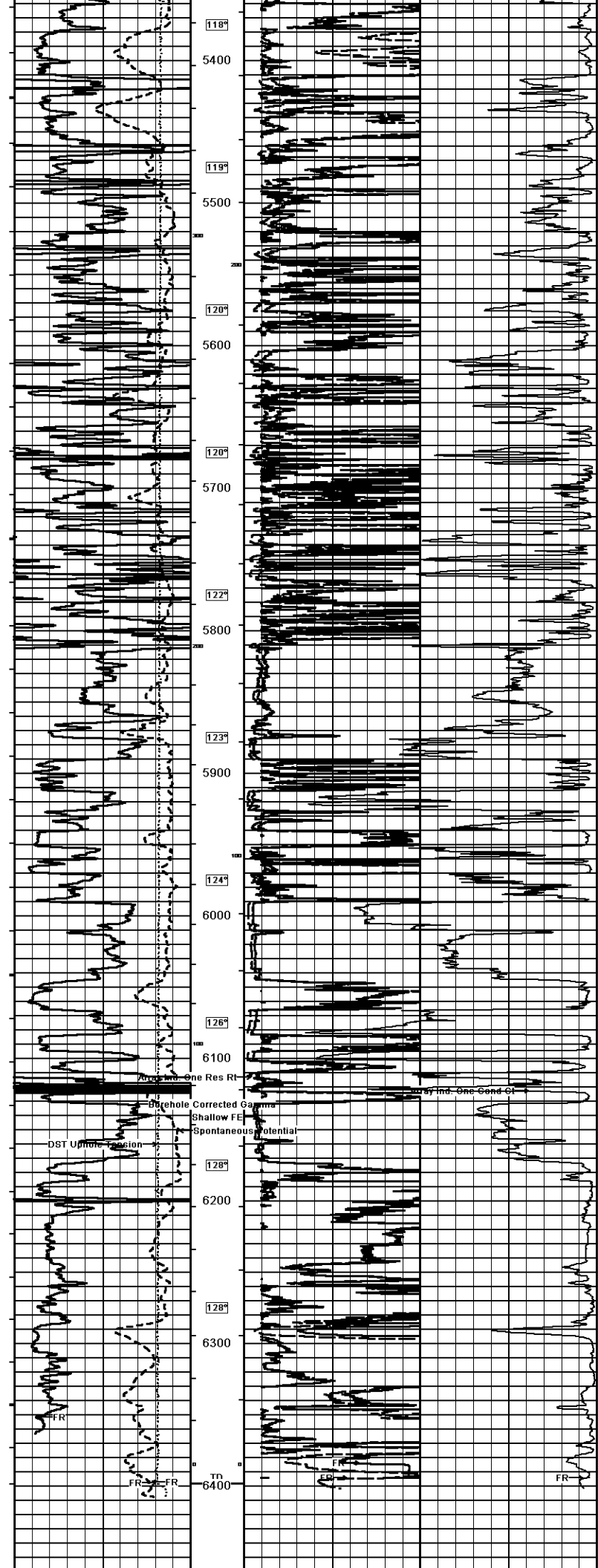
Weatherford		ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG	
COMPANY O'BRIEN ENERGY RESOURCES CORP.		WELL SHINOGLIE 3-20	
FIELD SINGLELEY		PROVINCE/COUNTY MEADE	
COUNTRY/STATE U S A / KANSAS		LOCATION N2 S2 SW SE 33S FSL & 1980' FEL	
SEC 20	TWP 33	R10E 29	Other Services
Latitude 37.126844	Longitude -100.525271	Drilling Measured From RB 15-119-2-1433	MMML
Permanent Datum GL Elevation 2607 feet	Log Measured From RB 12.00 feet above Permanent Datum	Drilling Measured From RB	End of Log 2679.00 2677.00 2667.00
Date 26-MAR-2019		Run Number ONE	
Service Order 17937-24075306		Depth Driller 6384.00	
Depth Logger 6384.00		First Reading 6385.00	
Last Reading 1528.00		Casing Driller 1528.00	
Casing Logger 1528.00		Bit Size 7.875	
Hole Fluid Type WATER-BASED		Density/Viscosity 9.00 lb/lb 6.00 m/cu ft	
Sample Source FLOWLINE		Rm @ Measured Temp 0.78 @ 92.0 ohm-m	
Rm @ Measured Temp 0.92 @ 92.0 ohm-m		Rm @ Measured Temp 0.94 @ 92.0 ohm-m	
Source Rmt/Rmc CALC		Rm @ BHT 0.57 @ 28.0 ohm-m	
Time Since Circulation 4 HOURS		Max Recorded Temp 128.00 deg F	
Equipment Base MATTINGLOT/HJLN		Recorded By PETER OEBENHAM	
Witnessed By			

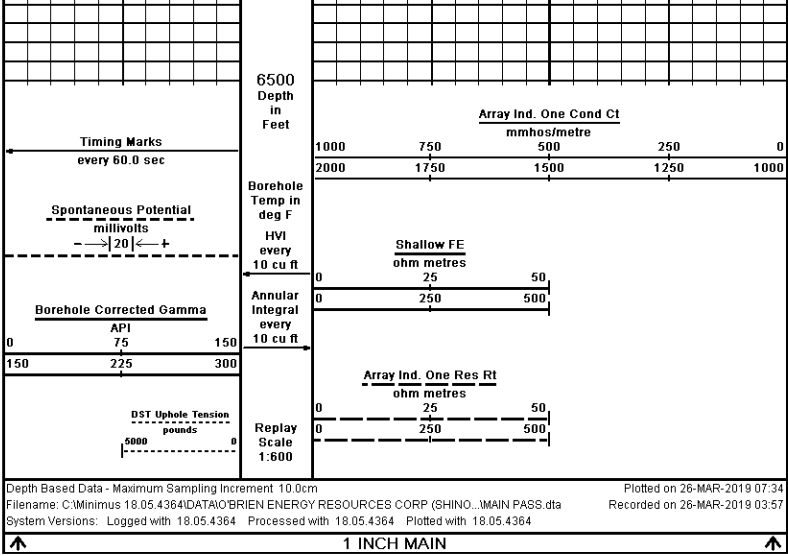












COMPANY		O'BRIEN ENERGY RESOURCES CORP.			
WELL		SHINOGL 3-20			
FIELD		SINGLEY			
PROVINCE/COUNTY		MEADE			
COUNTRY/STATE		U.S.A. / KANSAS			
Elevation Kelly Bushing	2679	feet	First Reading	6395.00	feet
Elevation Drill Floor	2677	feet	Depth Driller	6384.00	feet
Elevation Ground Level	2667	feet	Depth Logger	6398.00	feet
		ARRAY INDUCTION			
		SHALLOW FOCUSED			
		ELECTRIC LOG			