



Weatherford[®]

**ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**

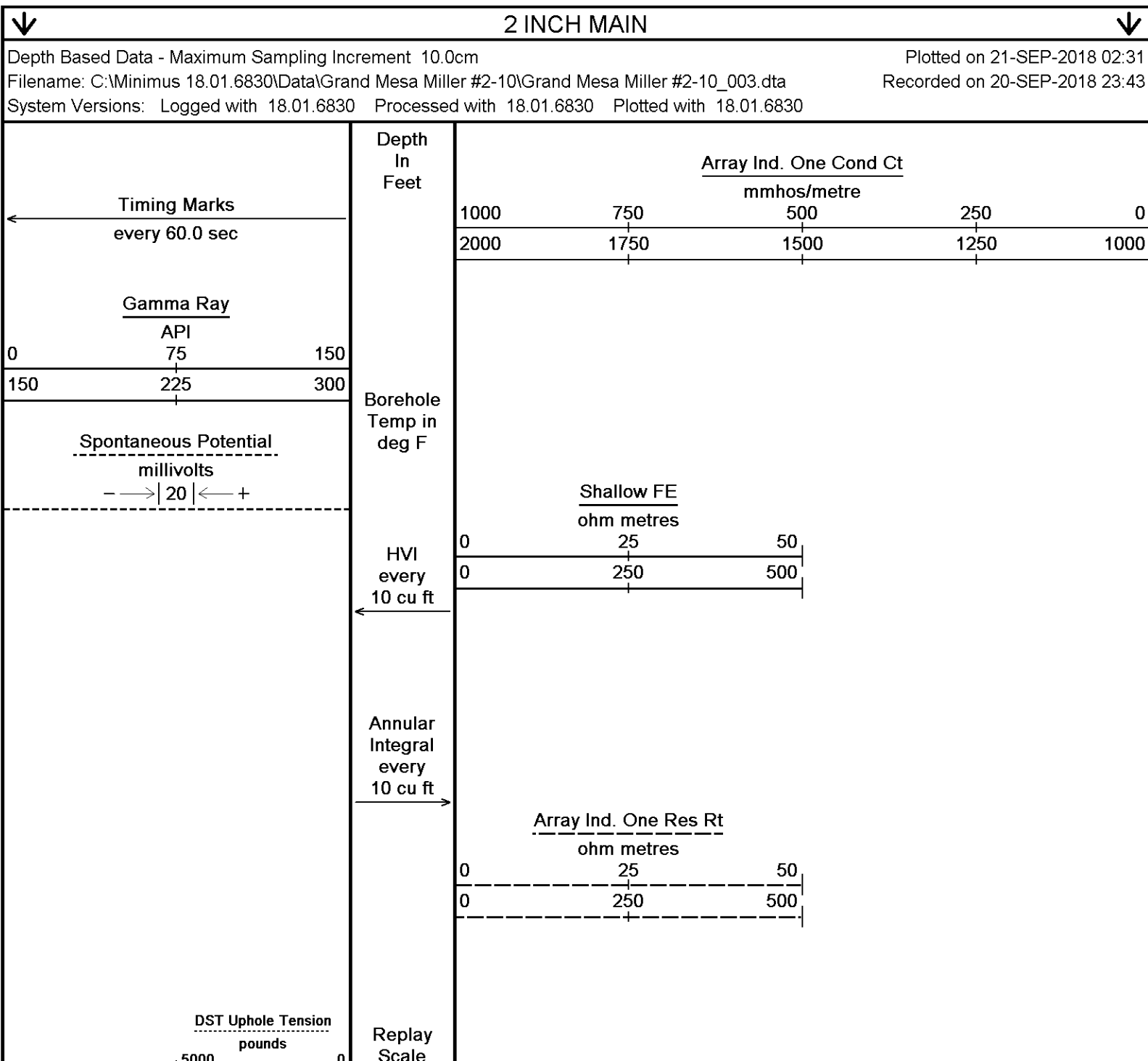
COMPANY				GRAND MESA OPERATING COMPANY			
WELL				MILLER #2-10			
FIELD				ZENITH-PEACE CREEK			
PROVINCE/COUNTY				RENO			
COUNTRY/STATE				U.S.A. / KANSAS			
LOCATION				1950' FSL & 1273' FWL			
SEC 10	TWP 23S	RGE 10W	Other Services		MML		
Latitude		MPD/MDN					
Longitude		MSS					
API Number		15-155-21759					
Permanent Datum GL, Elevation 1765 feet						Elevations: feet	
Log Measured From KB, 5.00 feet above Permanent Datum						KB 1770.00	
Drilling Measured From KB						DF 1765.00	
						GL	
Date	20-SEP-2018						
Run Number	ONE						
Service Order	4558-224651393						
Depth Driller	3860.00			feet			
Depth Logger	3856.00			feet			
First Reading	3853.00			feet			
Last Reading	169.00			feet			
Casing Driller	168.00			feet			
Casing Logger	169.00			feet			
Bit Size	7.875			inches			
Hole Fluid Type	CHEMICAL						
Density / Viscosity	9.25 lb/USg		48.00 CP				
PH / Fluid Loss	9.00		12.40 ml/30Min				
Sample Source	FLOWLINE						
Rm @ Measured Temp	0.43 @ 75.0			ohm-m			
Rmf @ Measured Temp	0.34 @ 75.0			ohm-m			
Rmc @ Measured Temp	0.52 @ 75.0			ohm-m			
Source Rmf / Rmc	CALC	CALC					
Rm @ BHT	0.30 @107.0		ohm-m				
Time Since Circulation	4 HOURS						
Max Recorded Temp	107.00		deg F				
Equipment / Base	13096	LIB					
Recorded By	ADAM SILL						
Witnessed By	STEVE CARL						

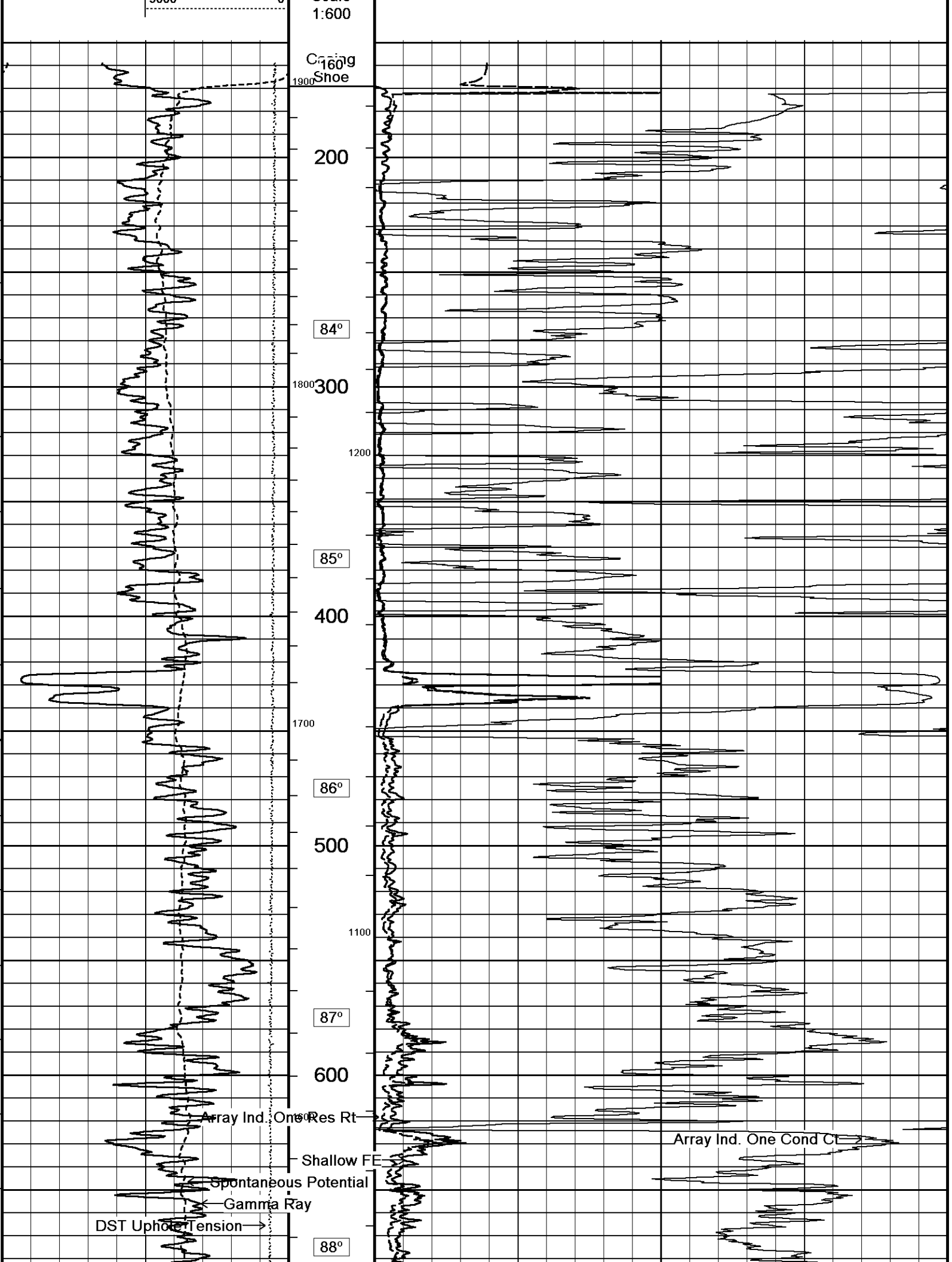
BOREHOLE RECORD					Last Edited: 20-SEP-2018 20:35
Bit Size inches		Depth From feet		Depth To feet	
7.875		168.00		3860.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
SURFACE	8.625	0.00	168.00	24.00	

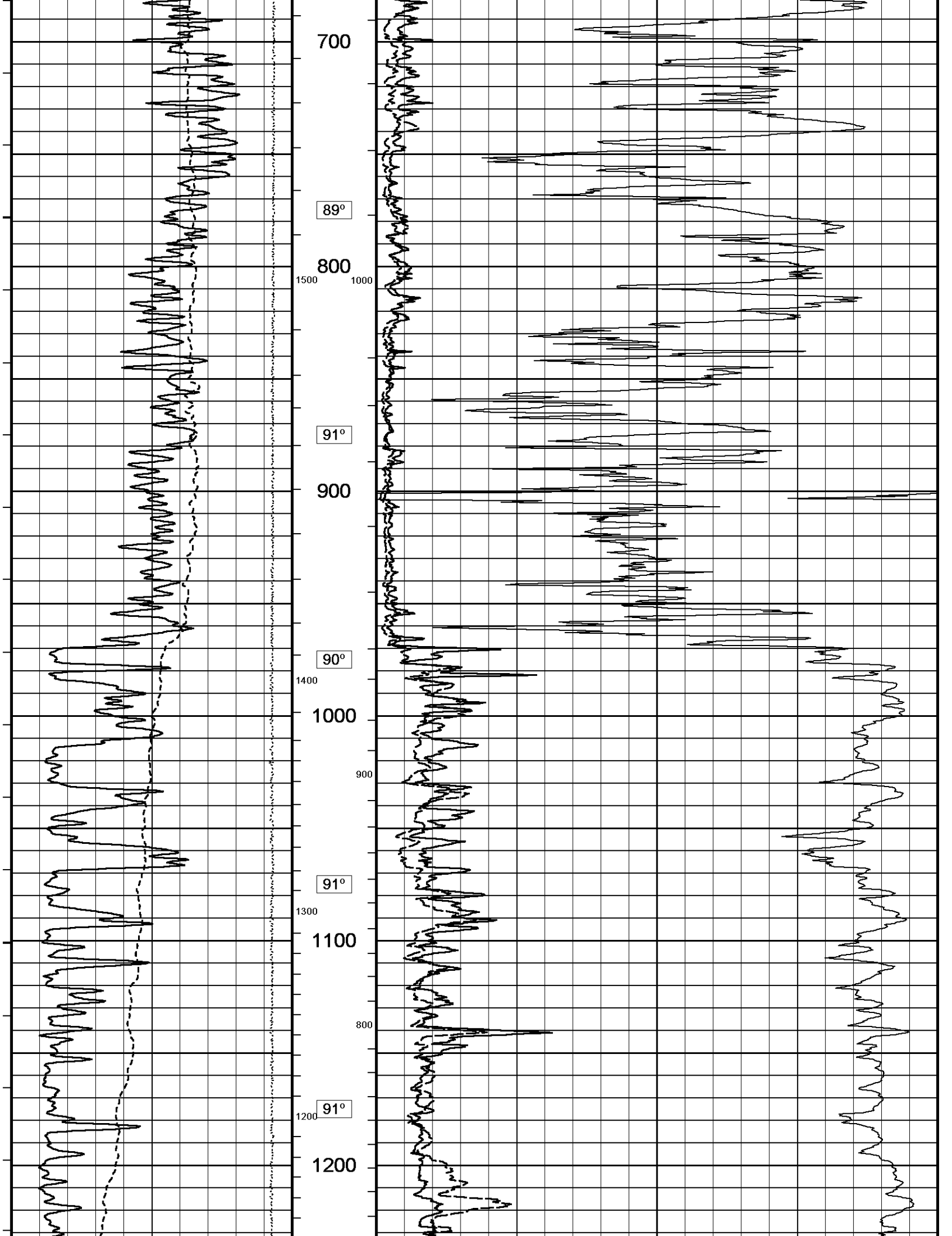
REMARKS
- SOFTWARE ISSUE: WLS 18.01.6830.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION. - HARDWARE: DUAL BOWSPRING USED ON MDN. 0.5 INCH STANDOFF USED ON MFE. TWO 0.5 INCH STANDOFFS USED ON MSS. 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 1899 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING: 1293 CU.FT.

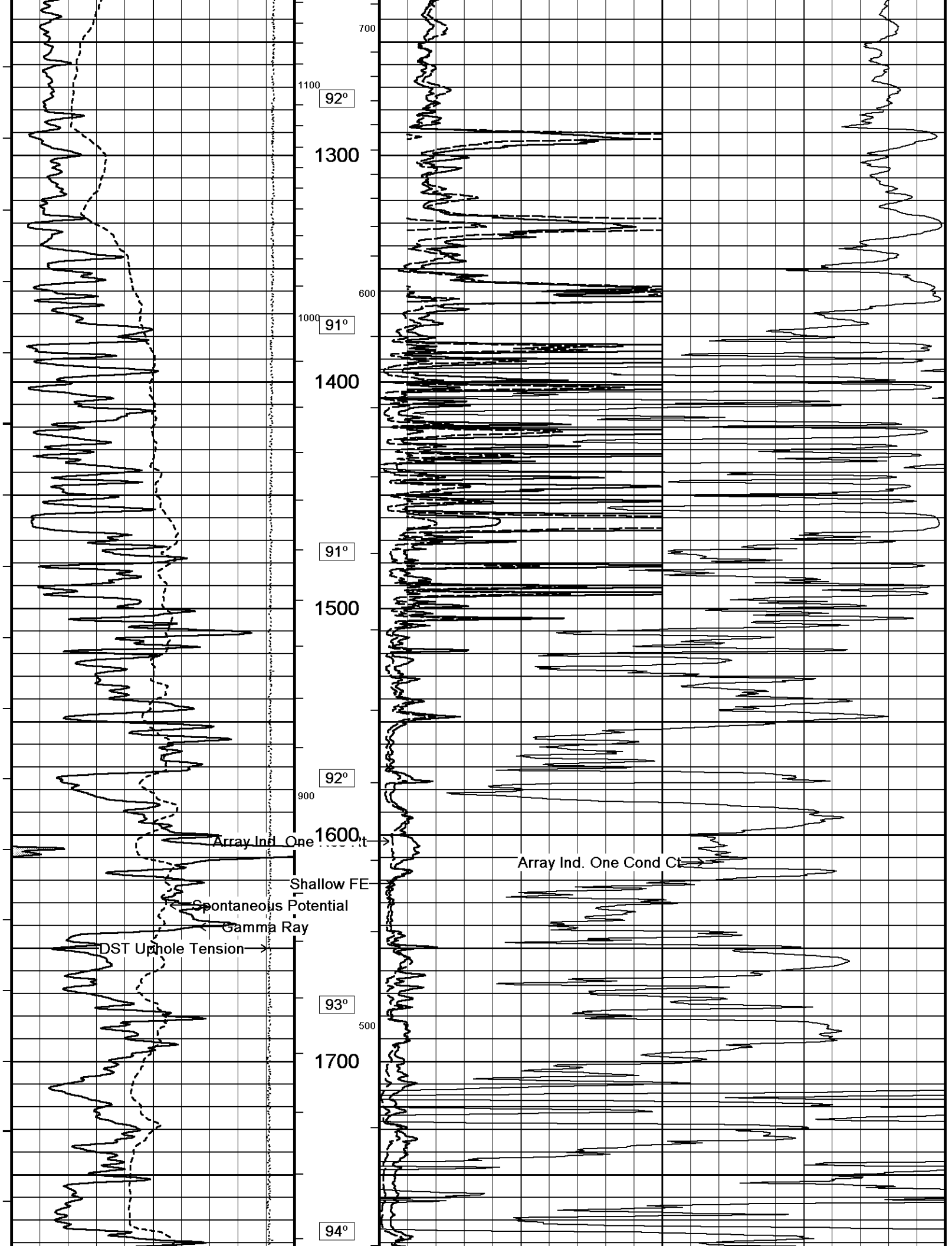
- OPERATOR: B. TOVAR.

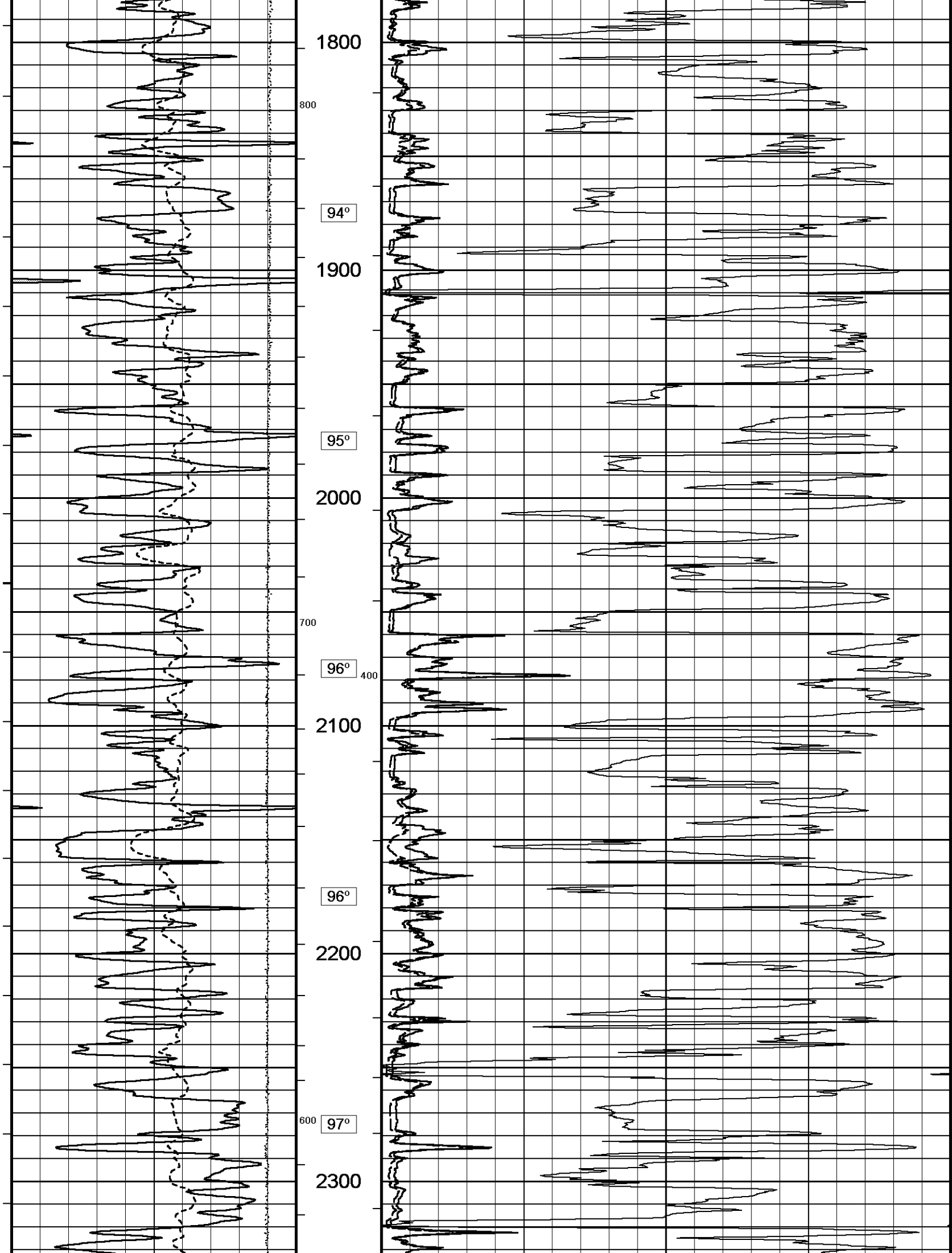
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will 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.

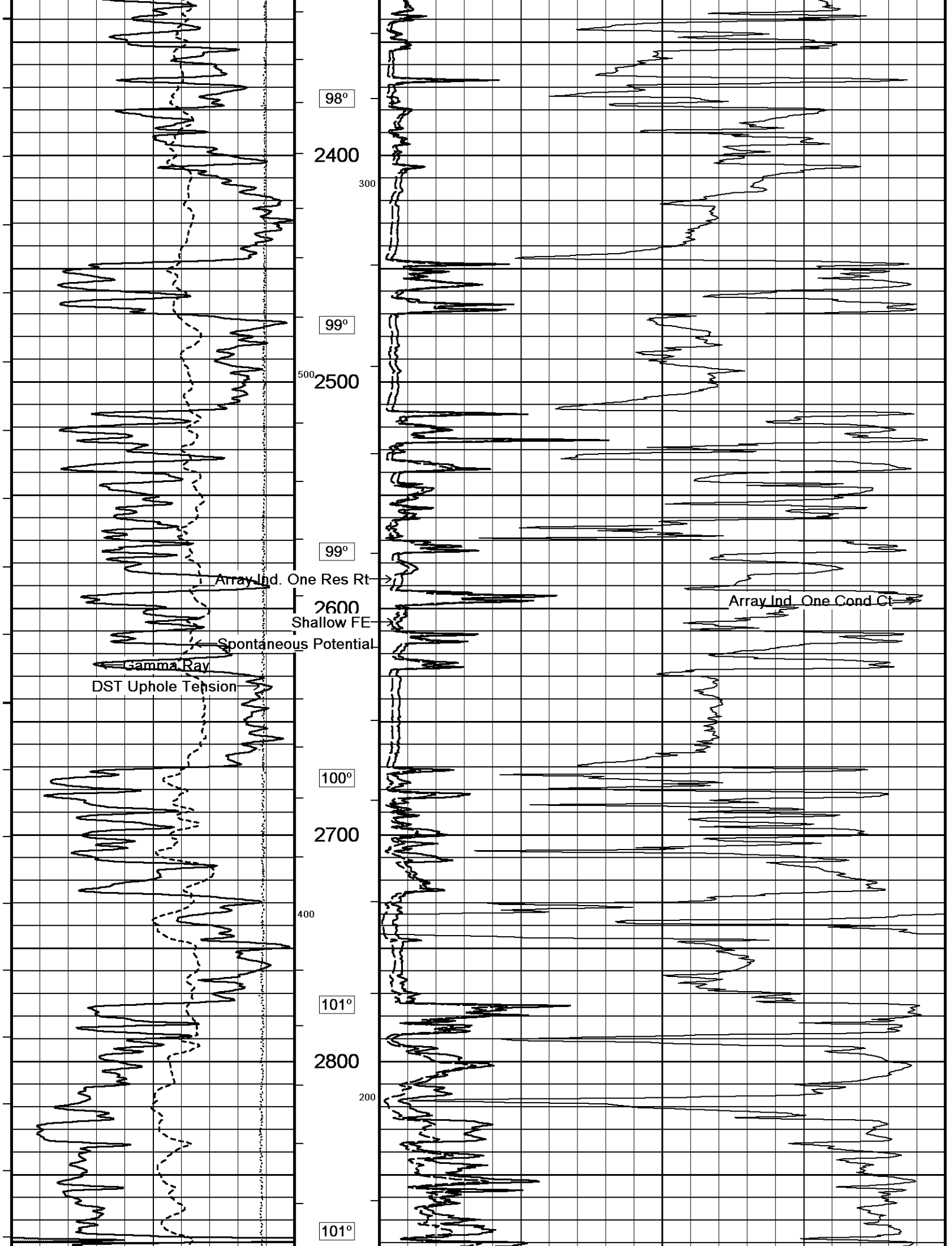


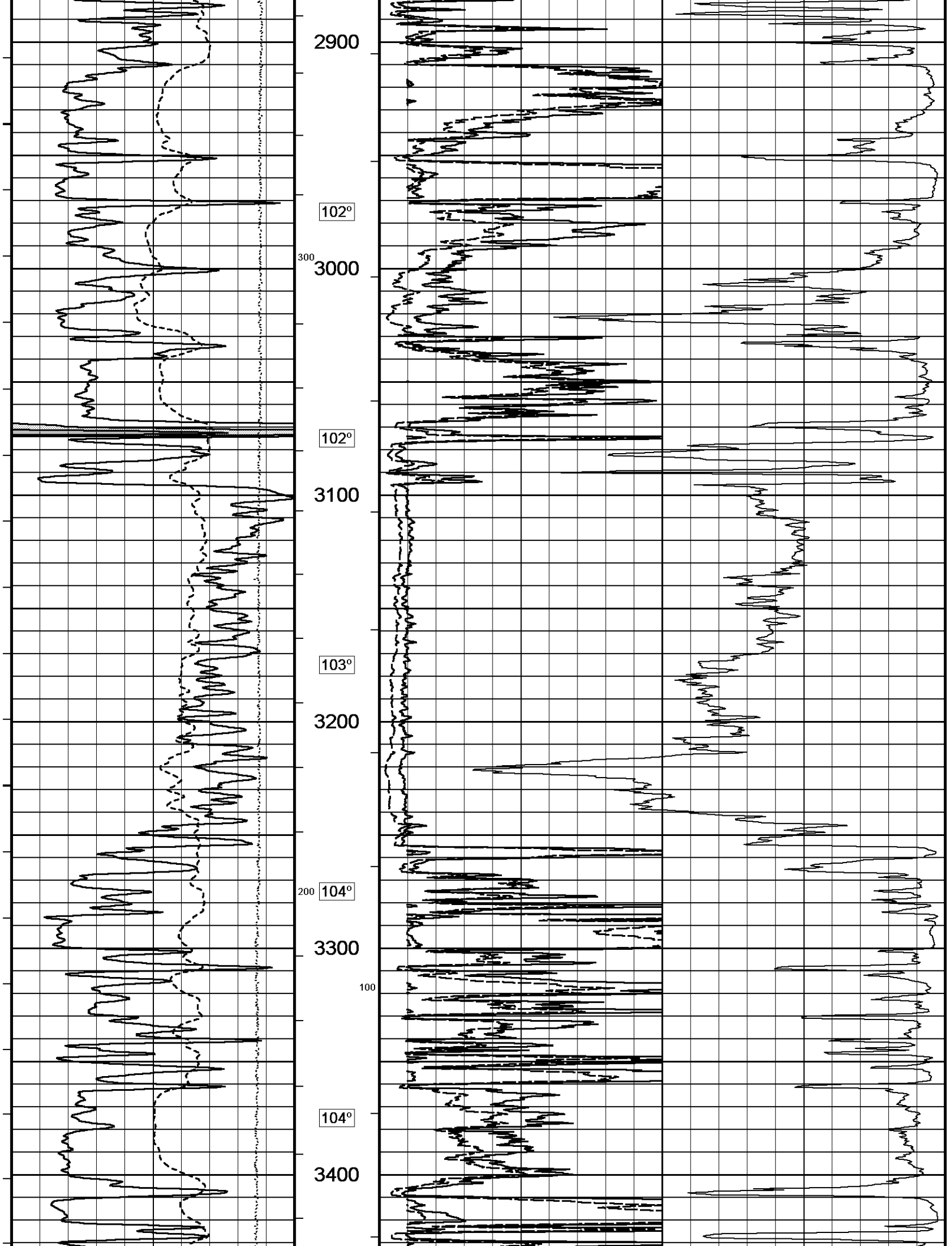


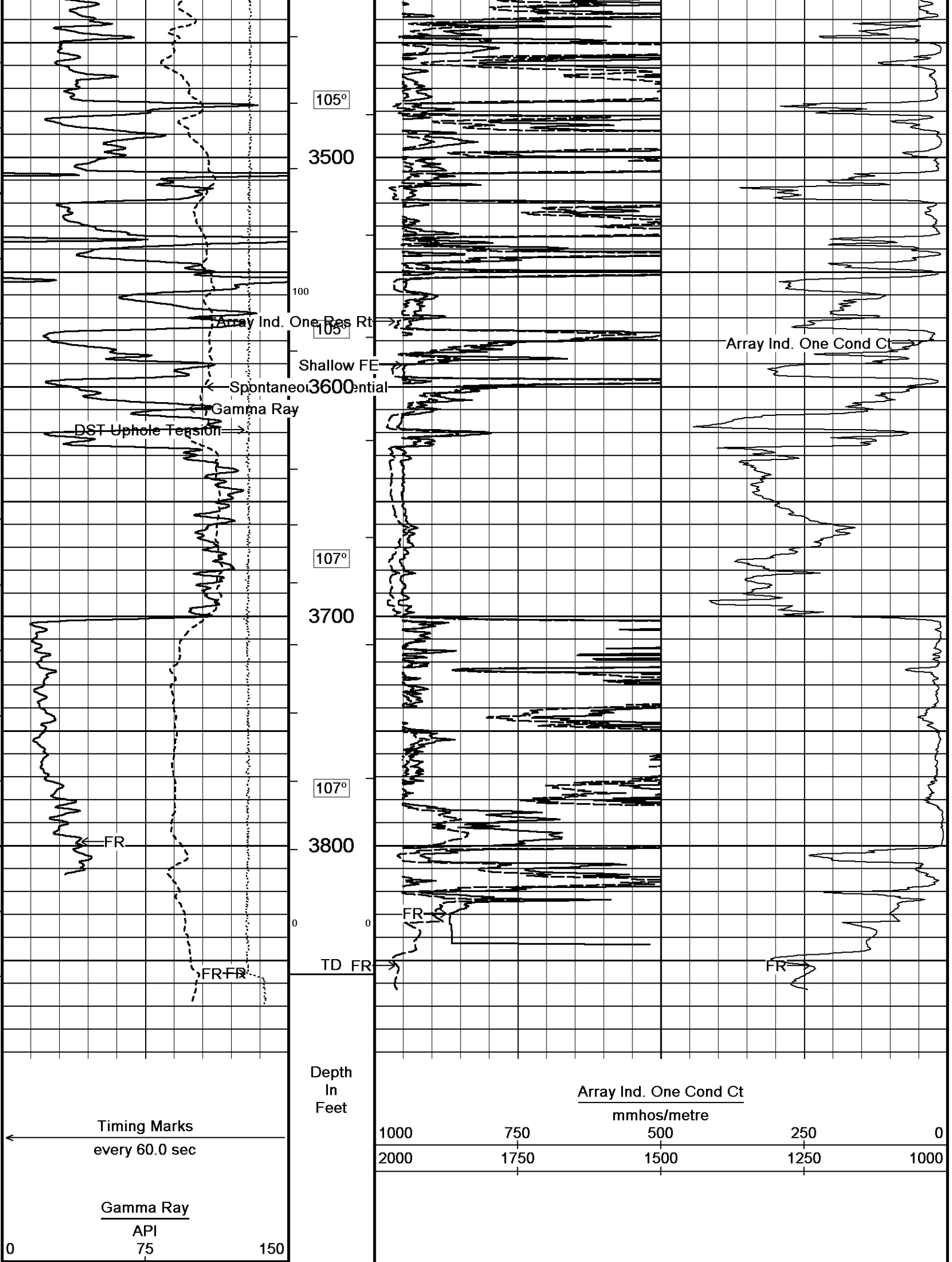


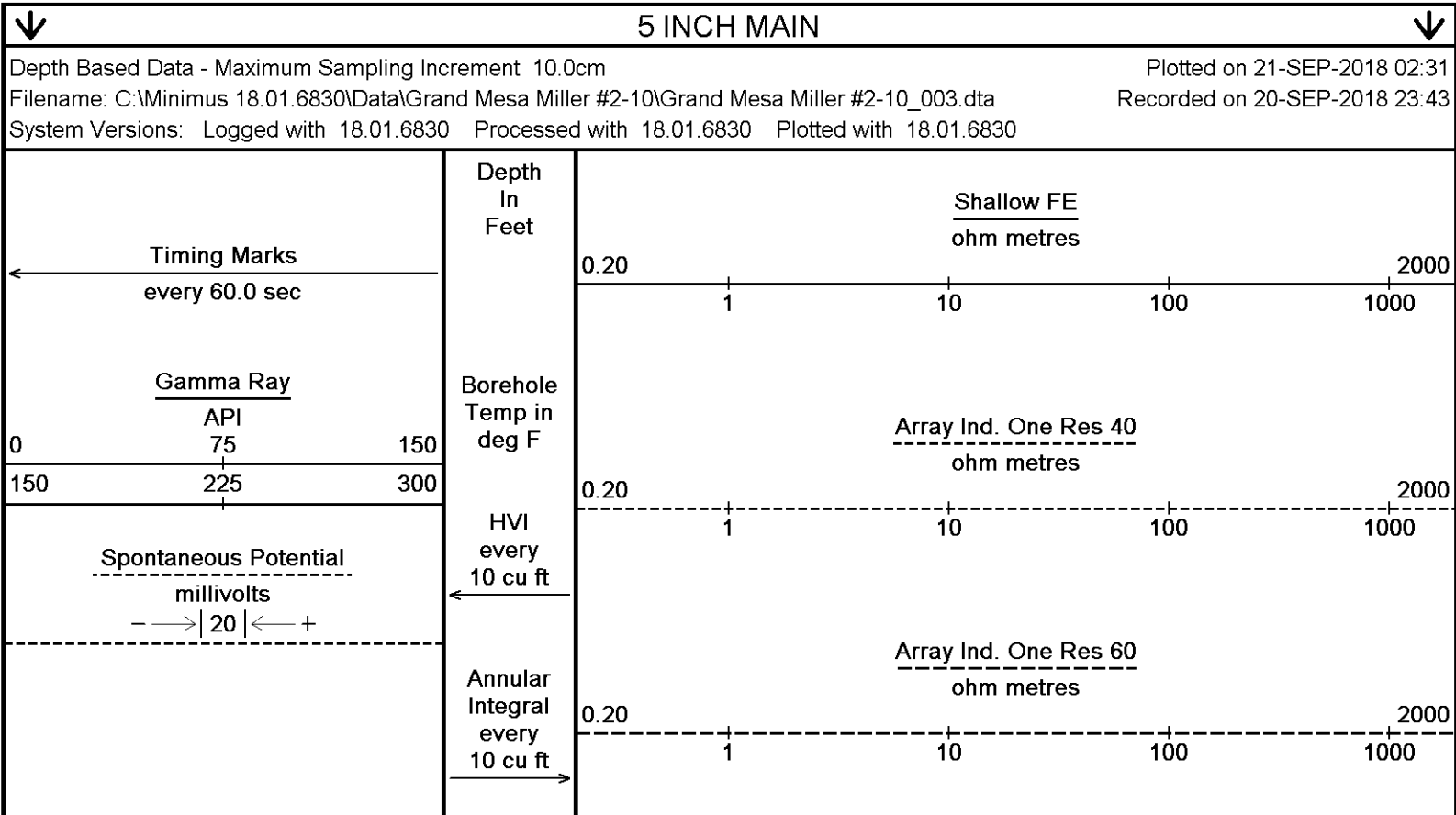
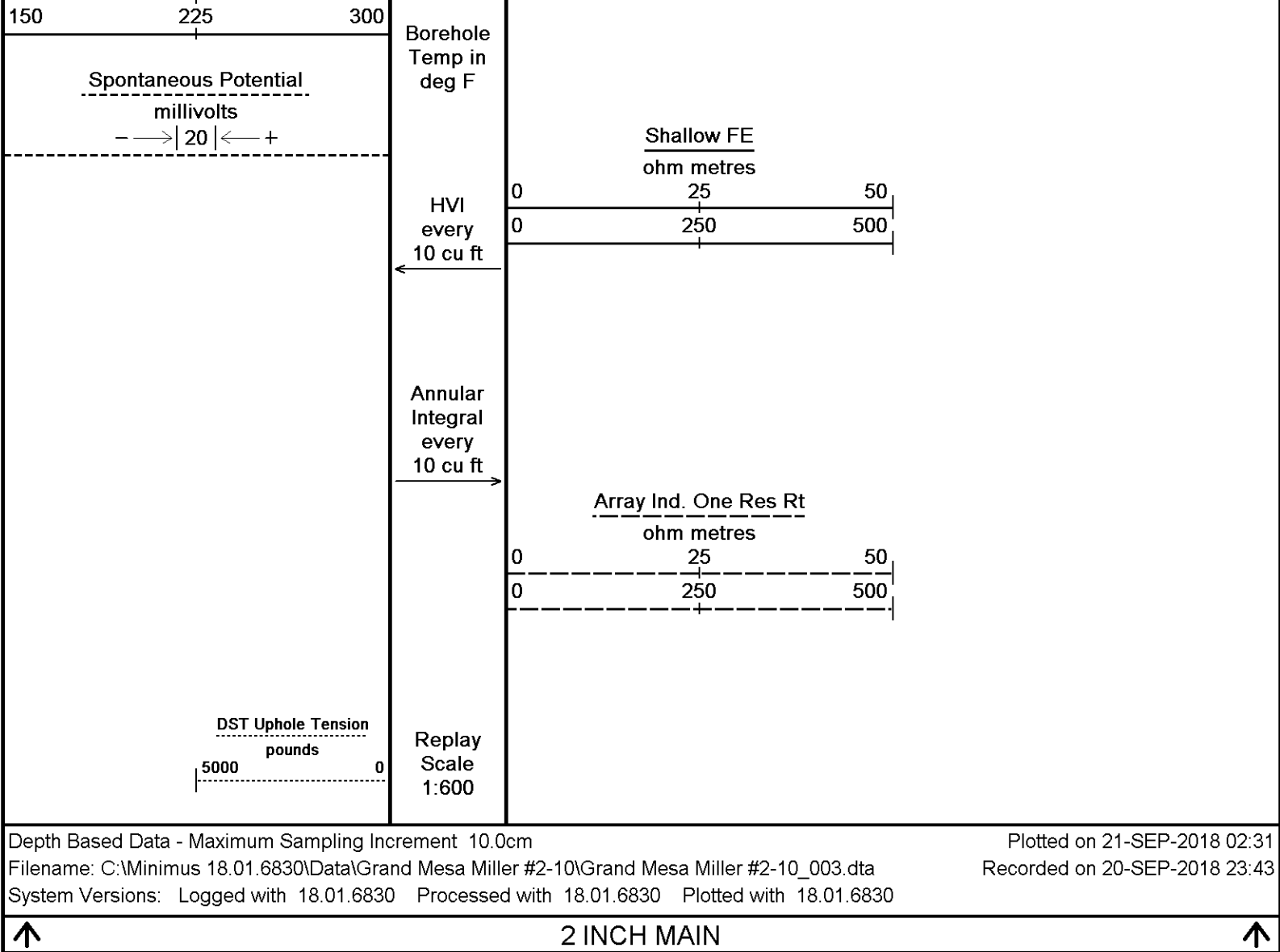


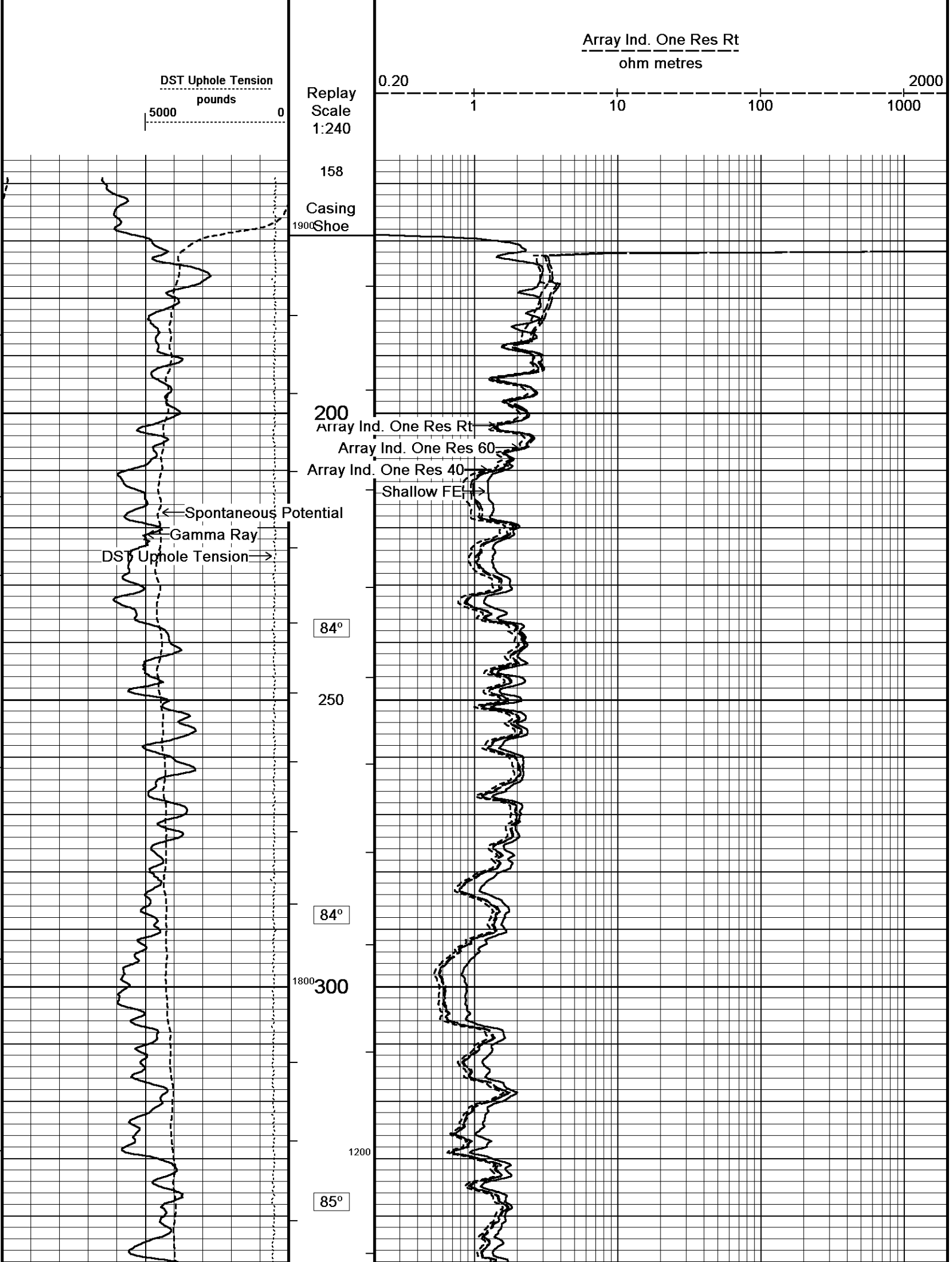


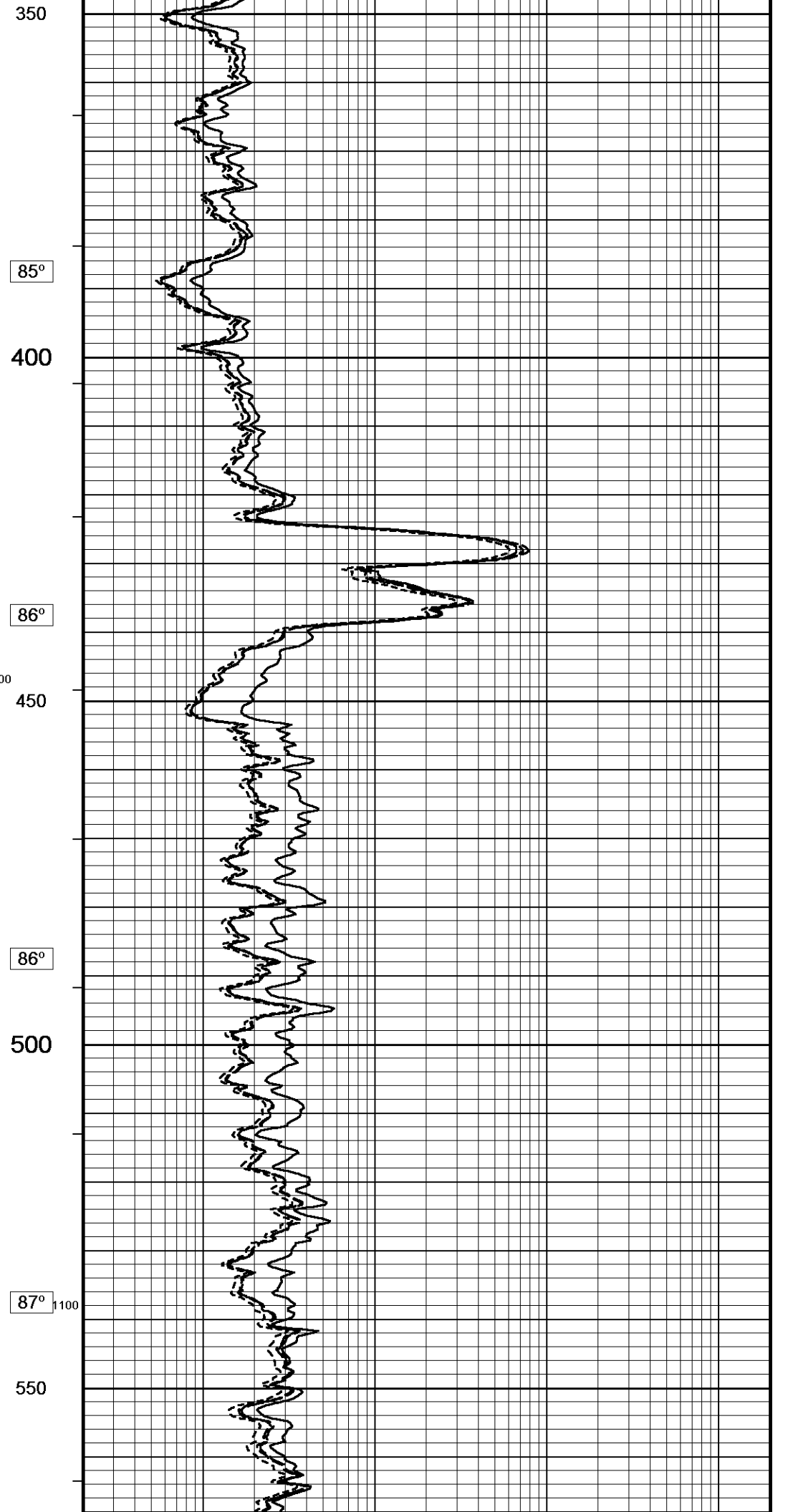
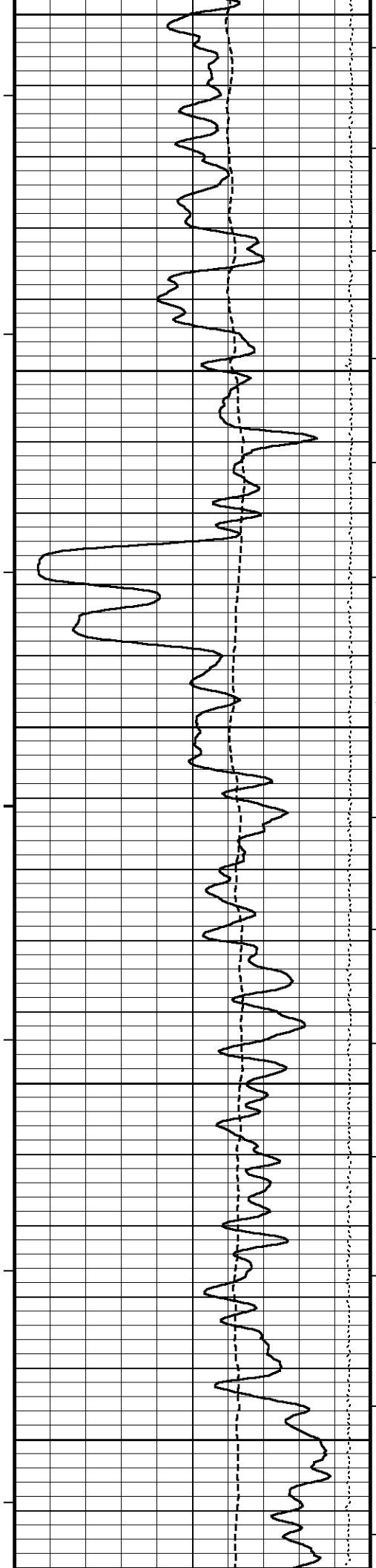


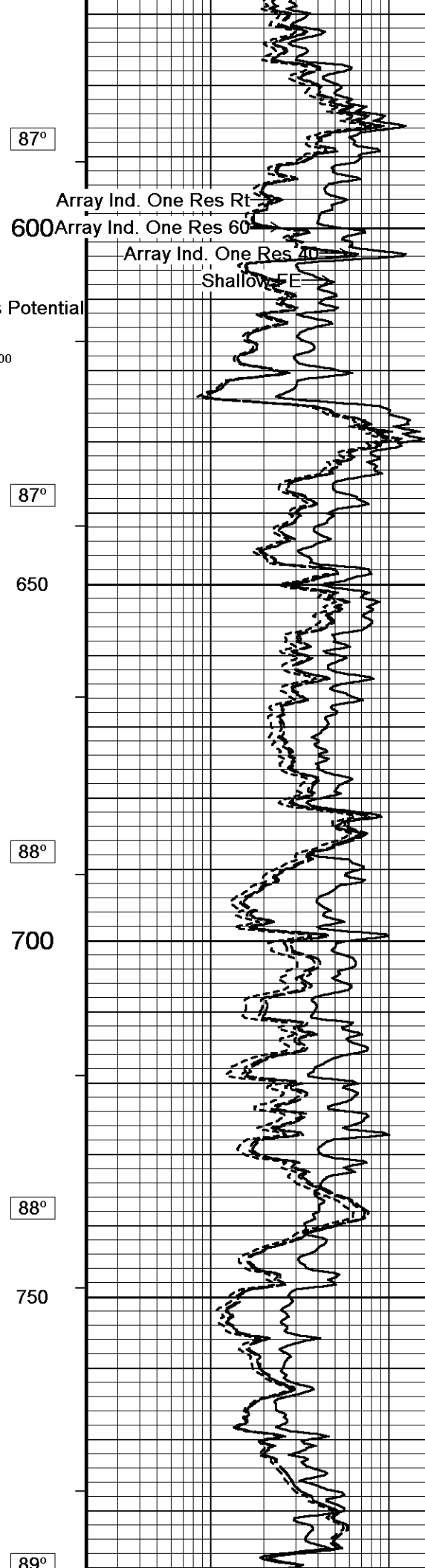
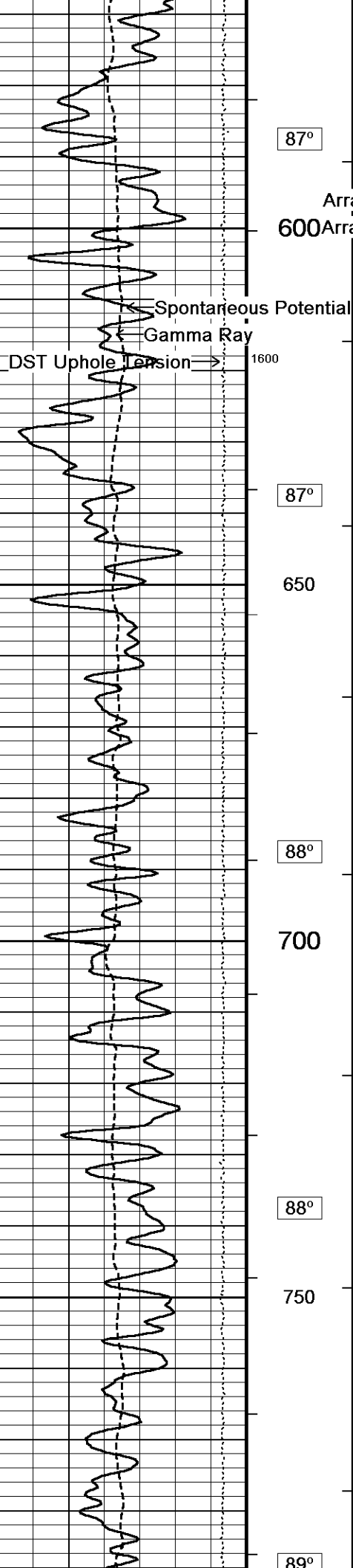


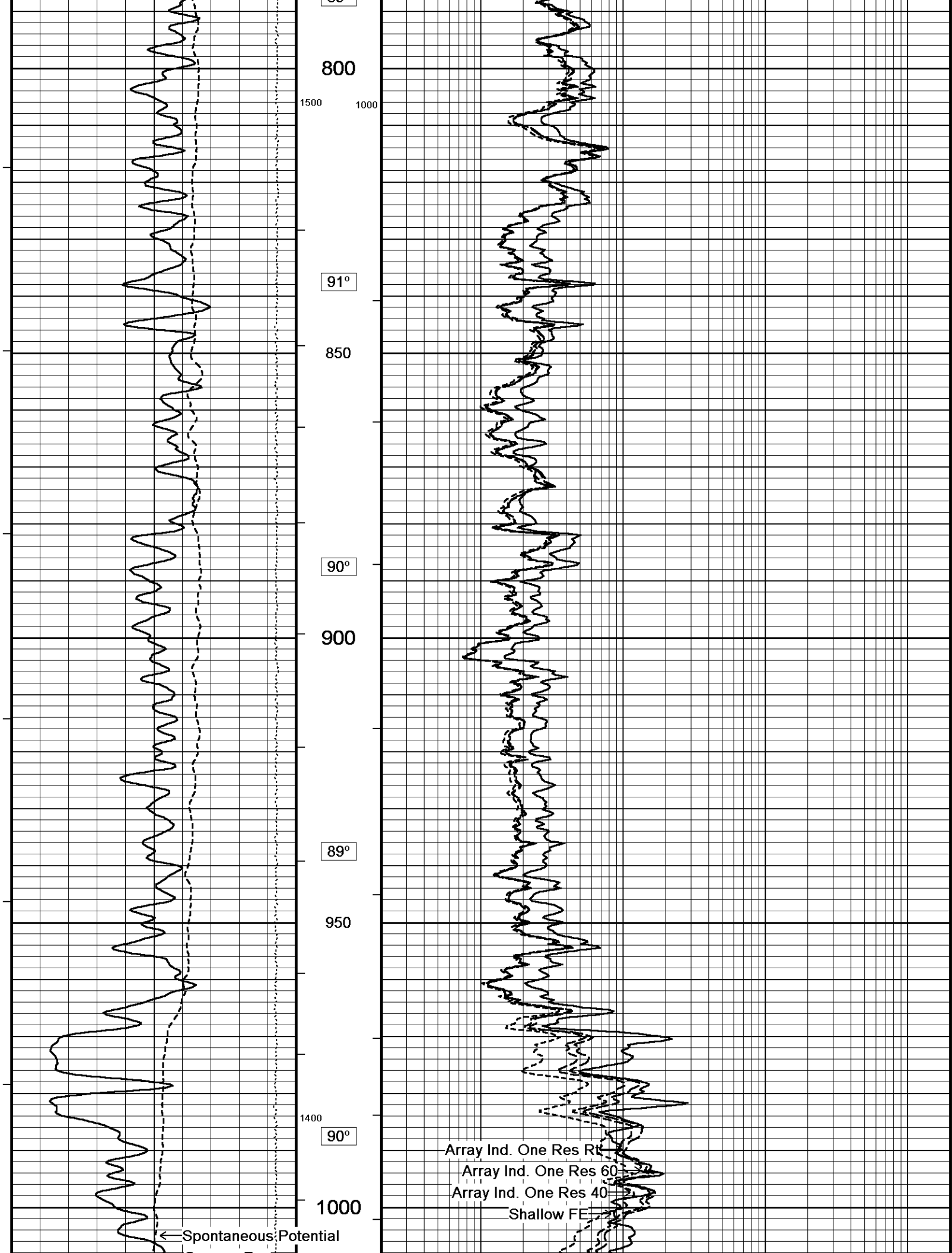


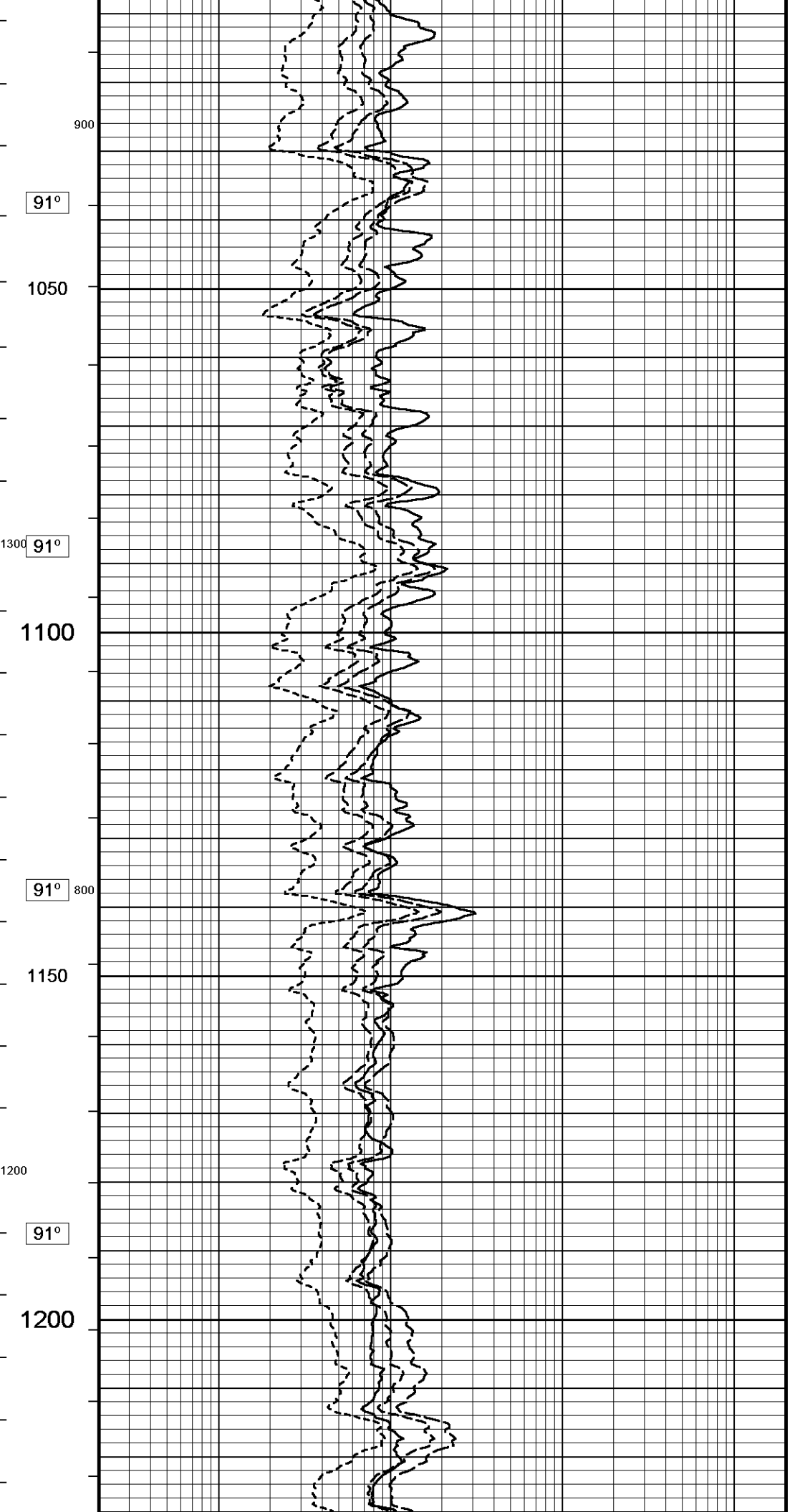
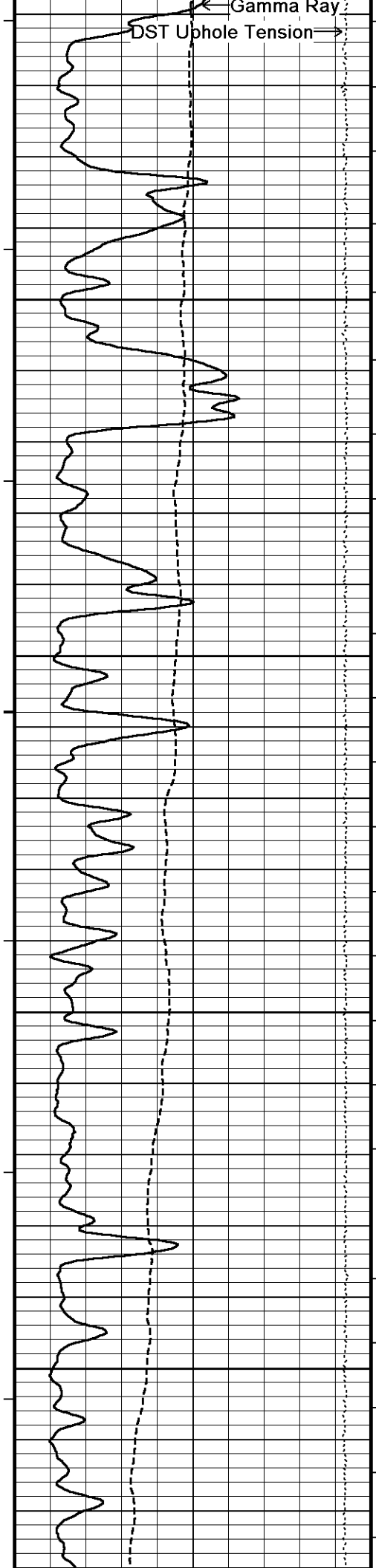


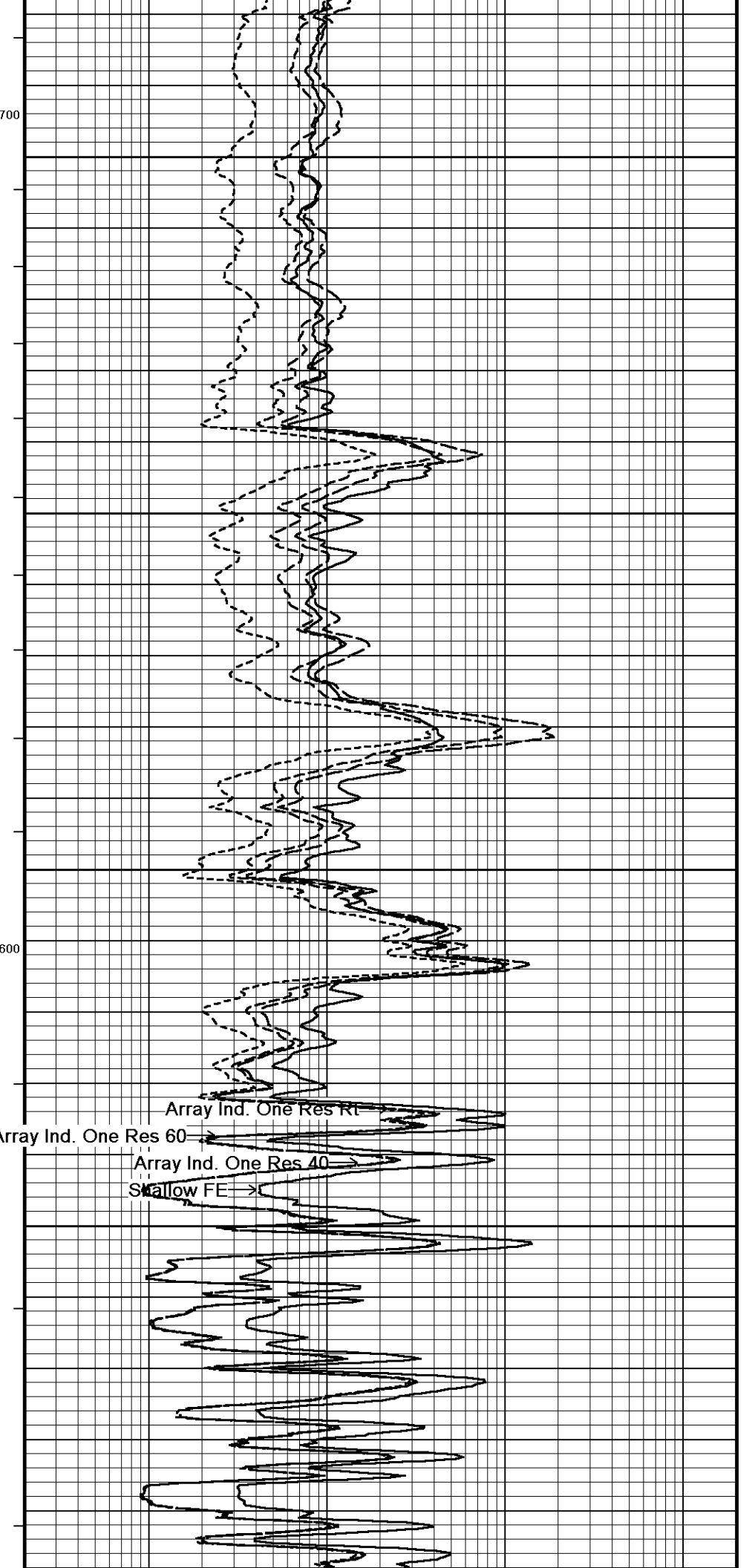
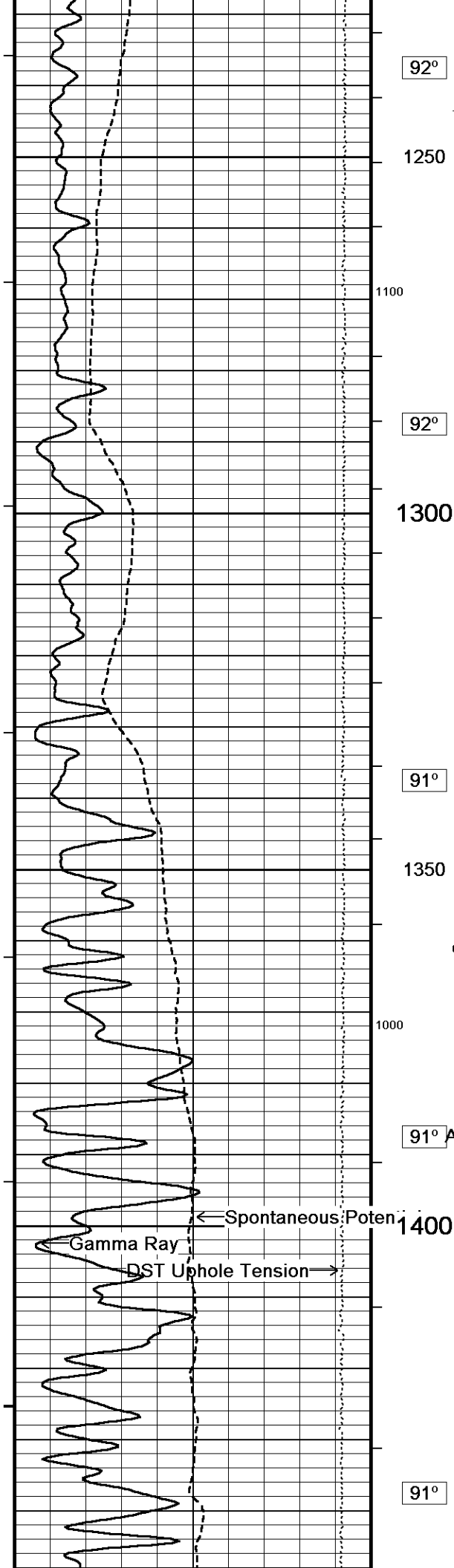


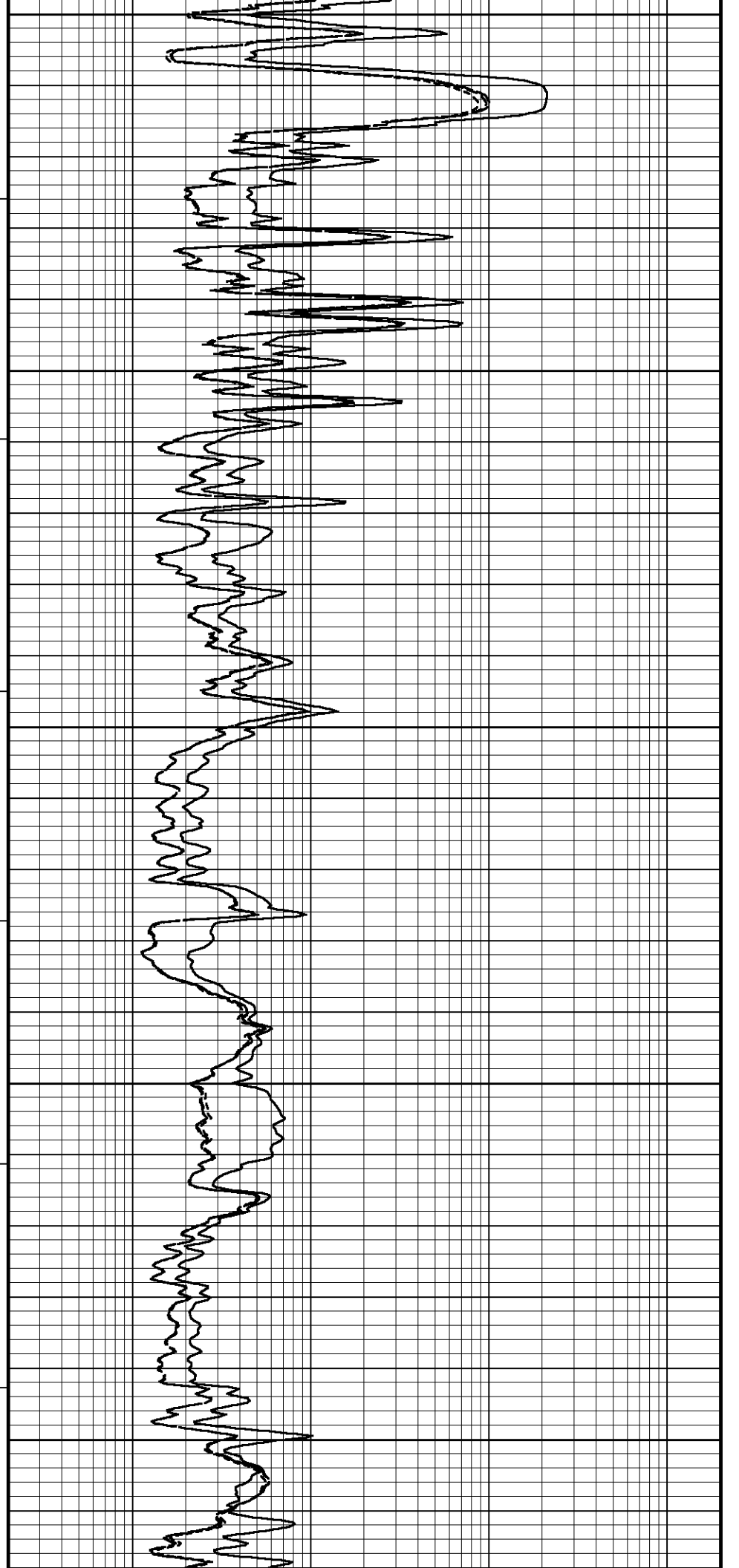
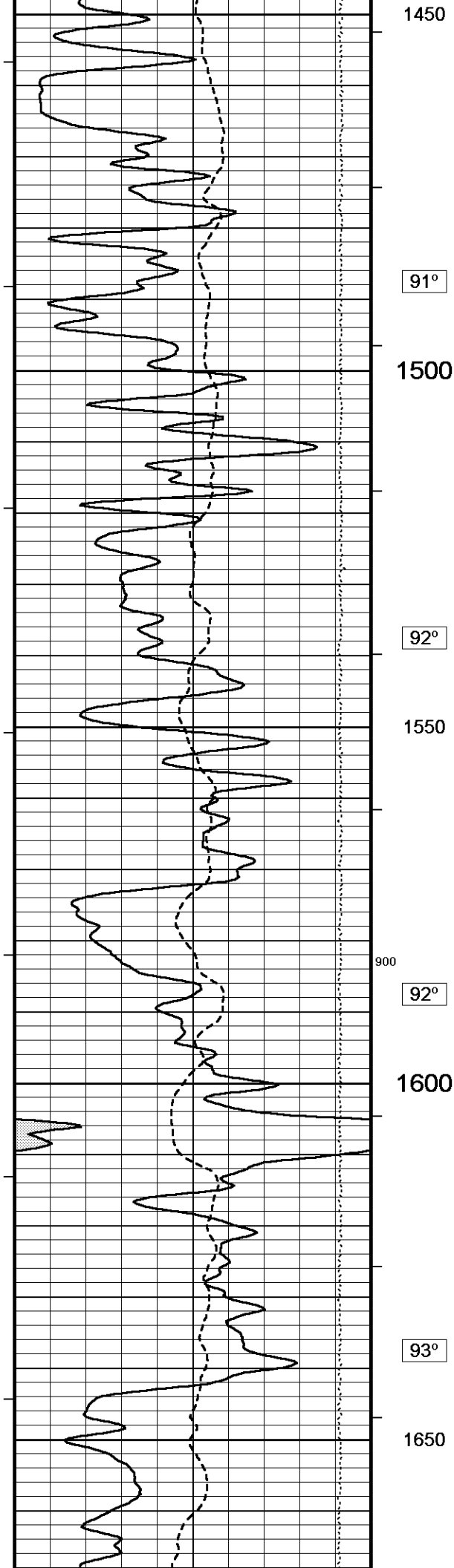


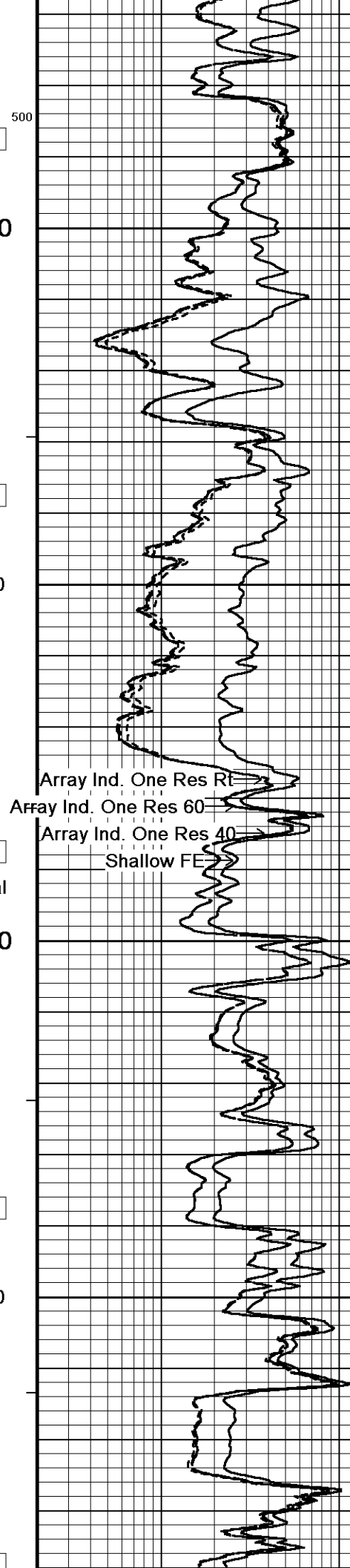
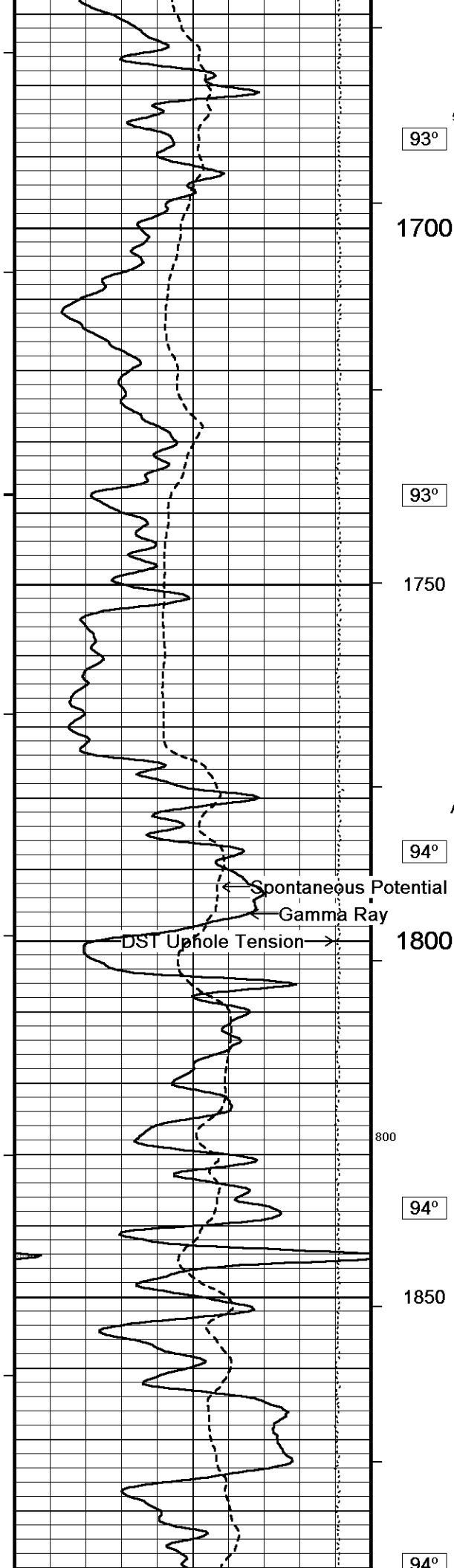


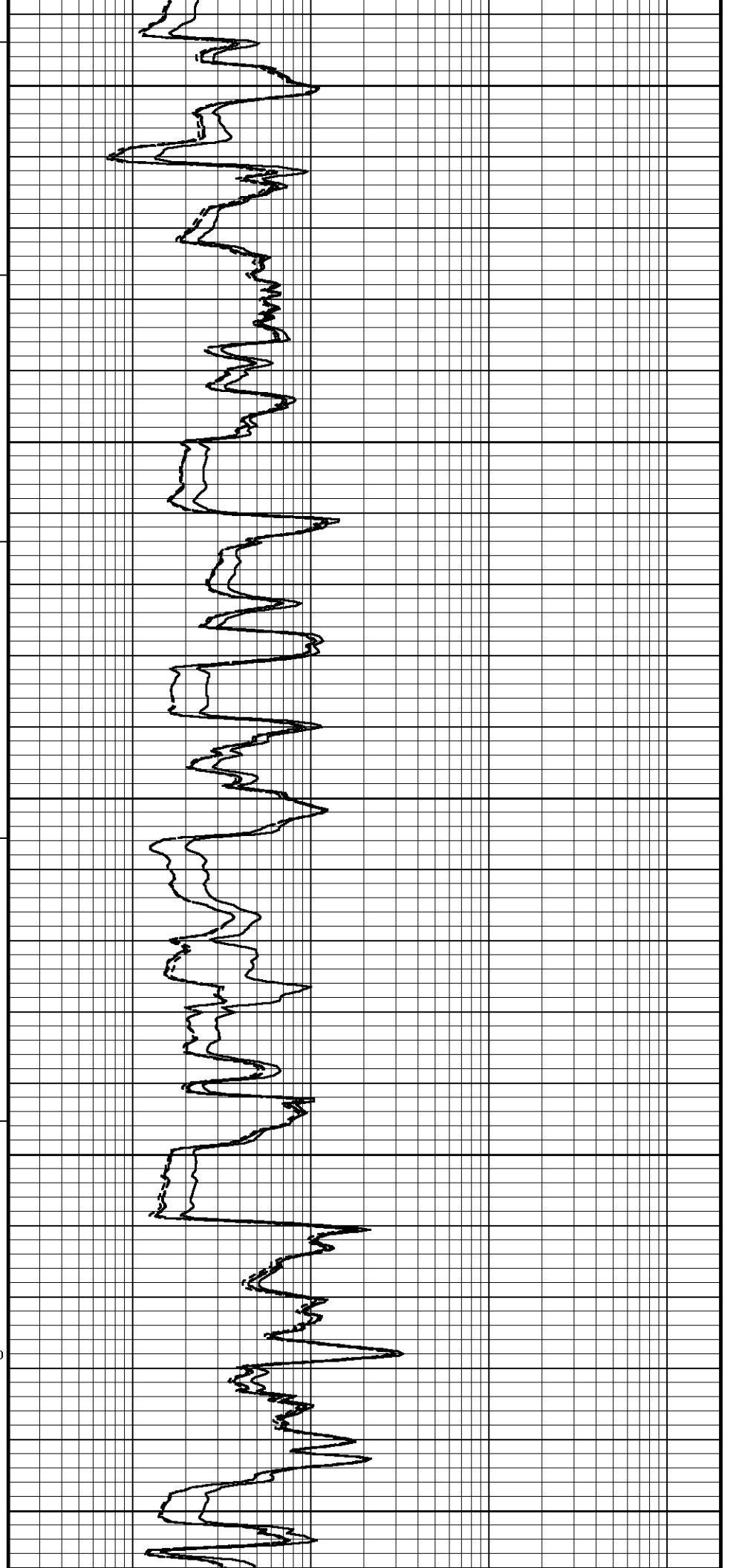
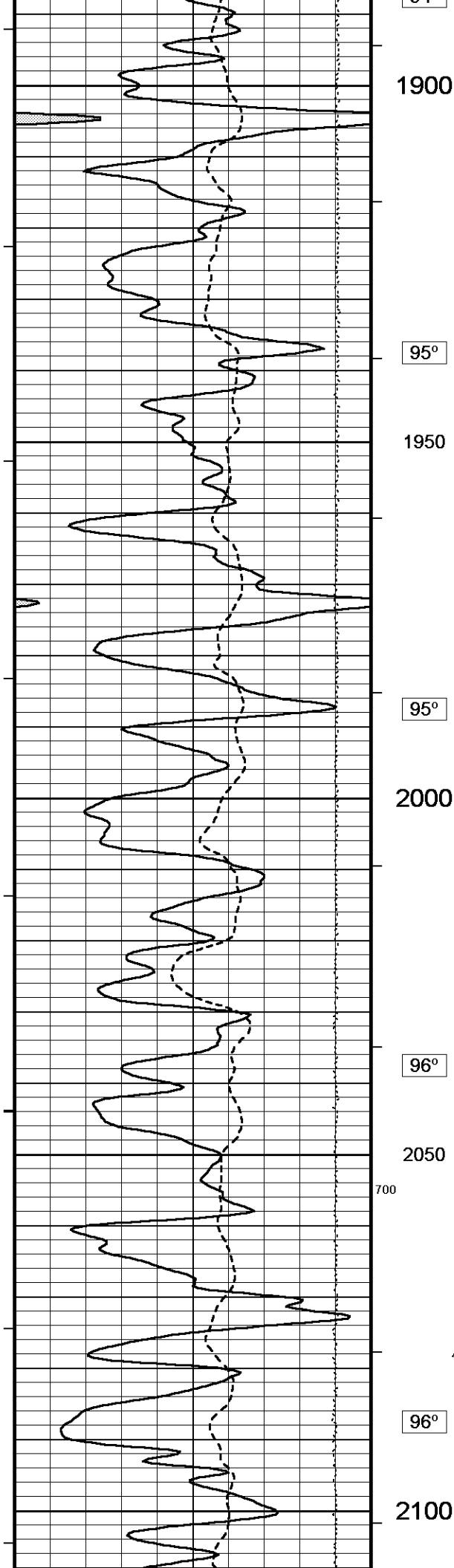


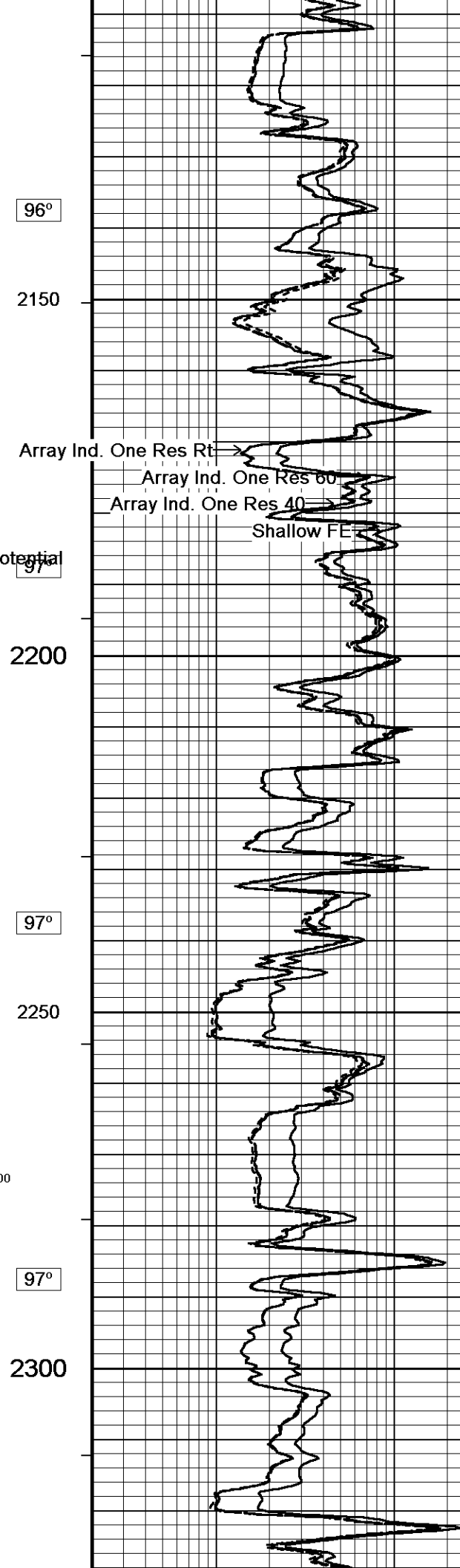
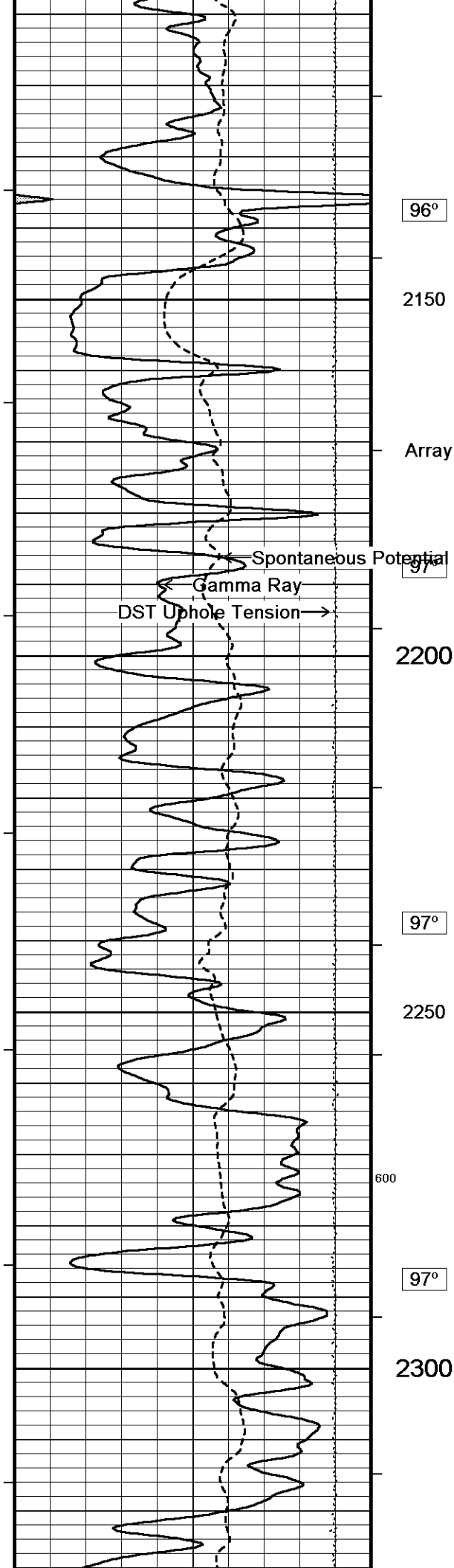


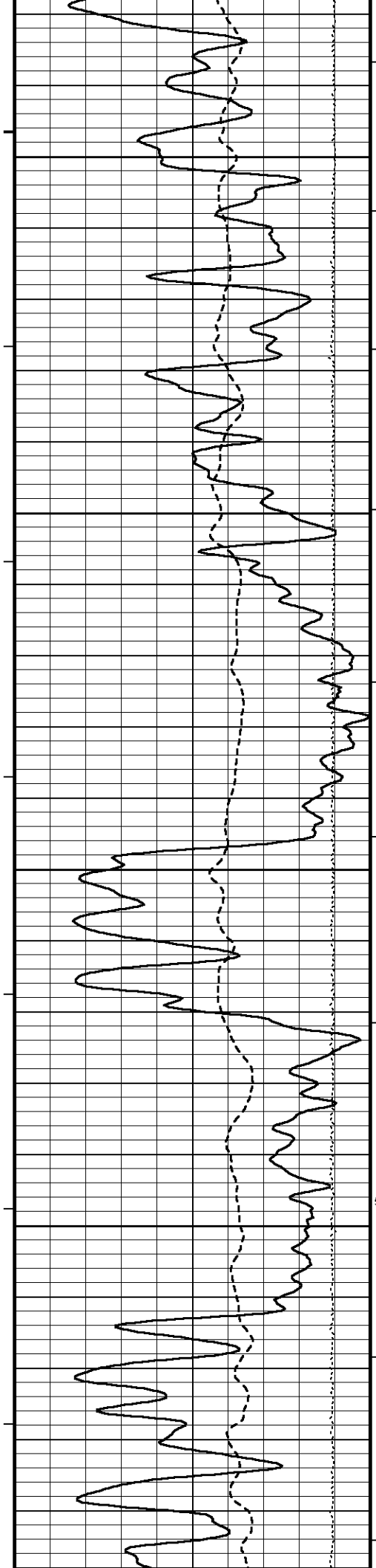












98°

2350

98°

2400

300

98°

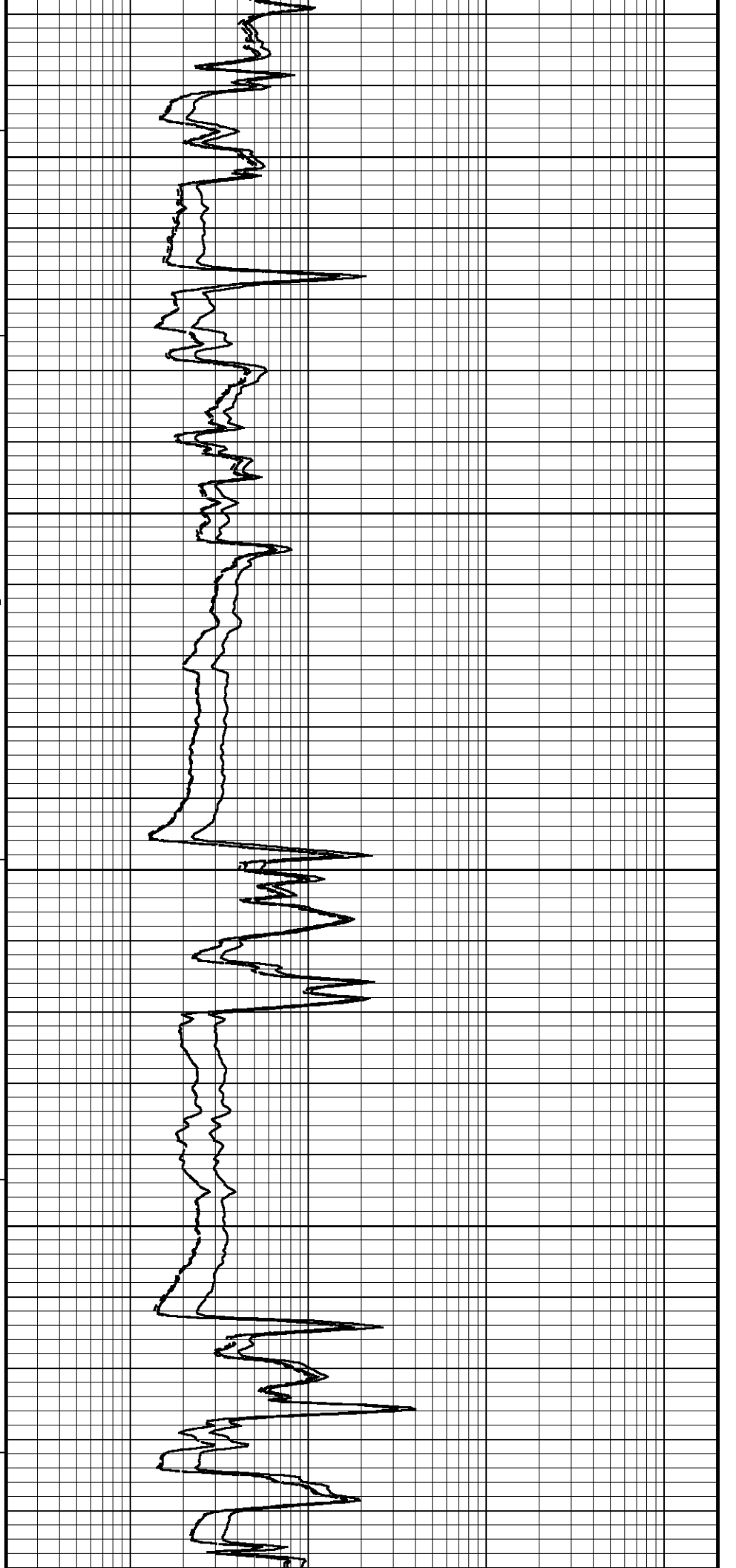
2450

99°

500

2500

99°



2550

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

Spontaneous Potential

Gamma Ray

DST Uphole Tension

99°

2600

100°

2650

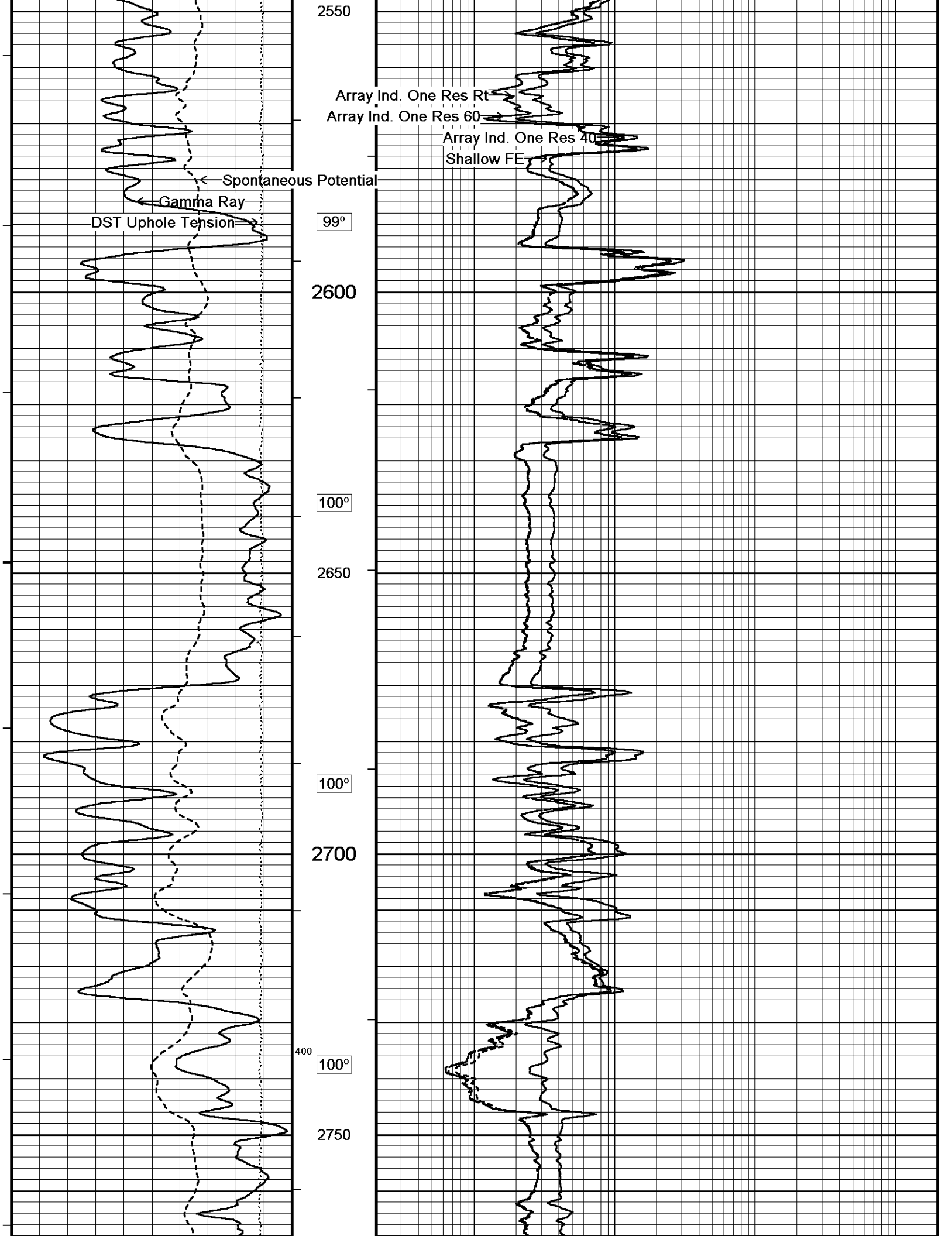
100°

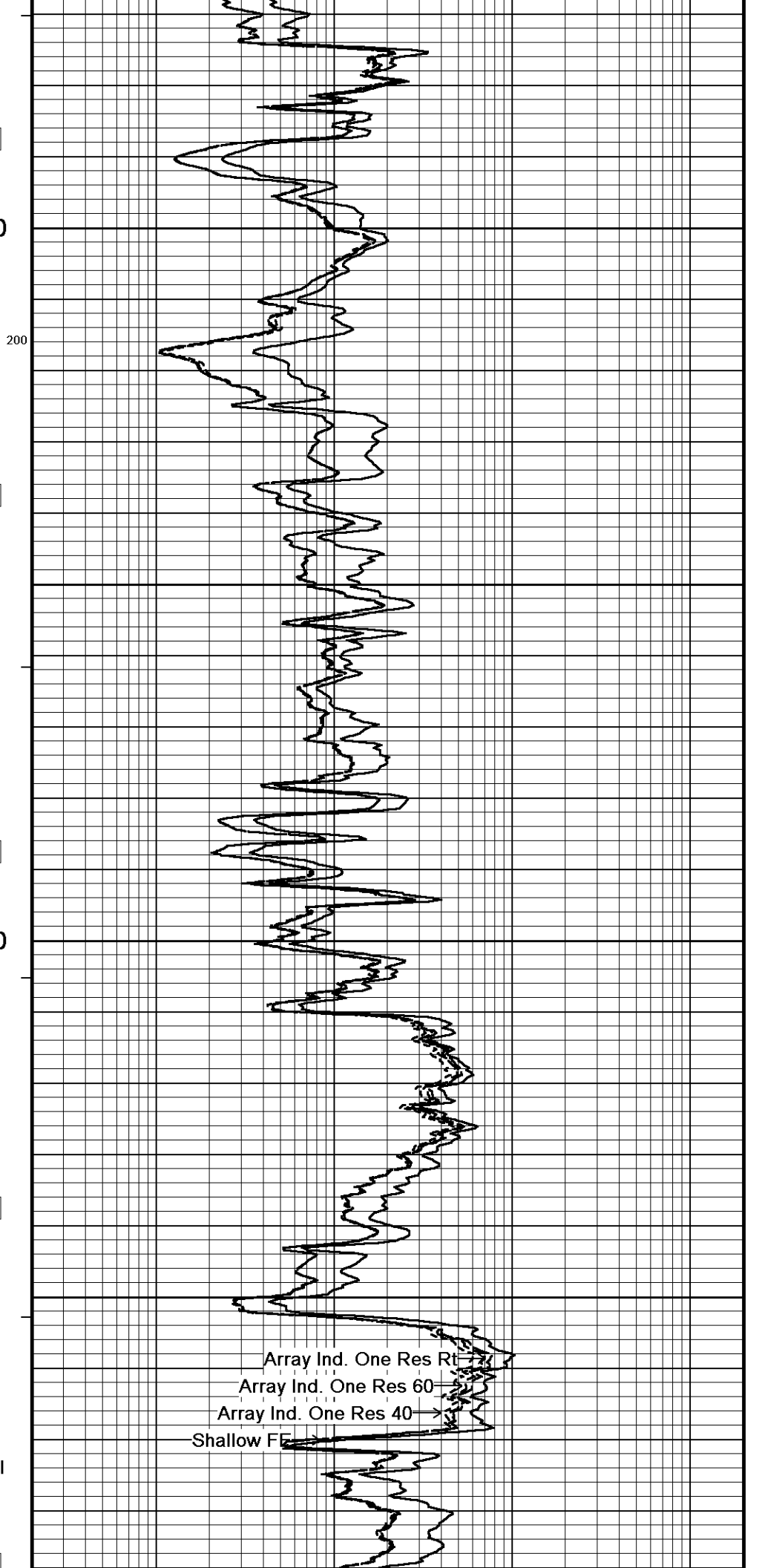
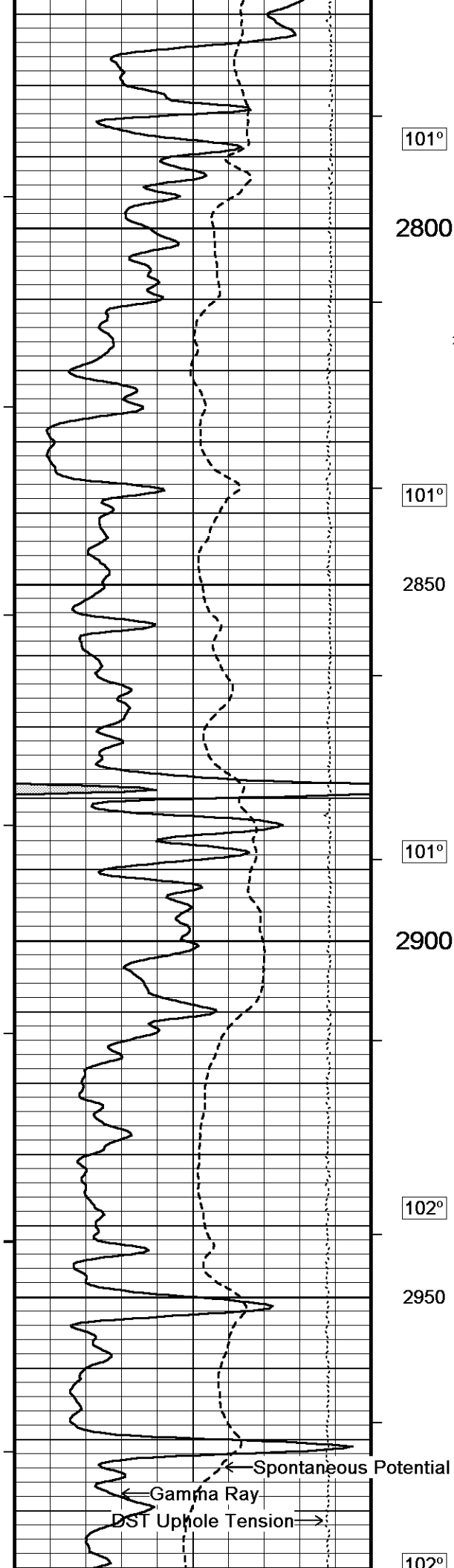
2700

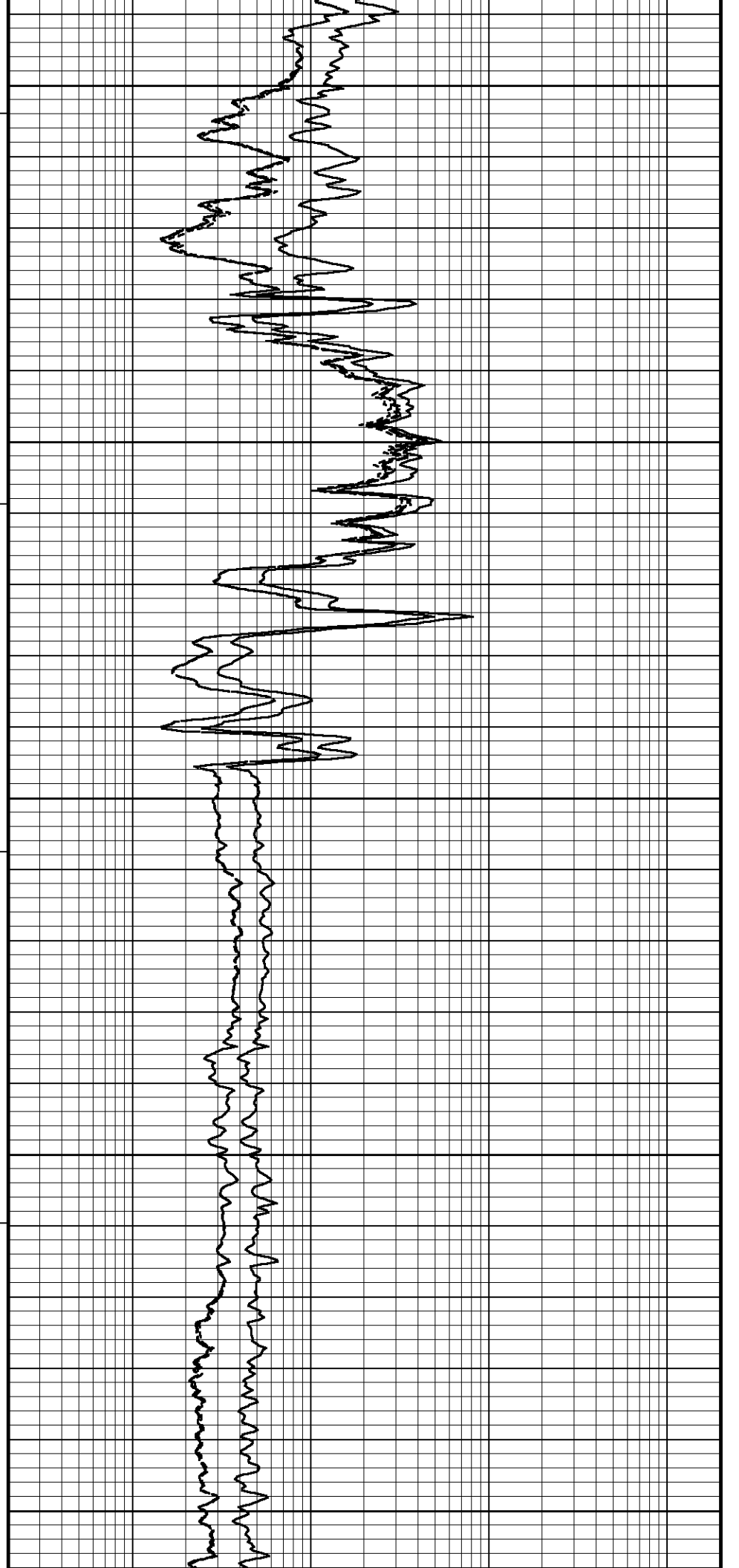
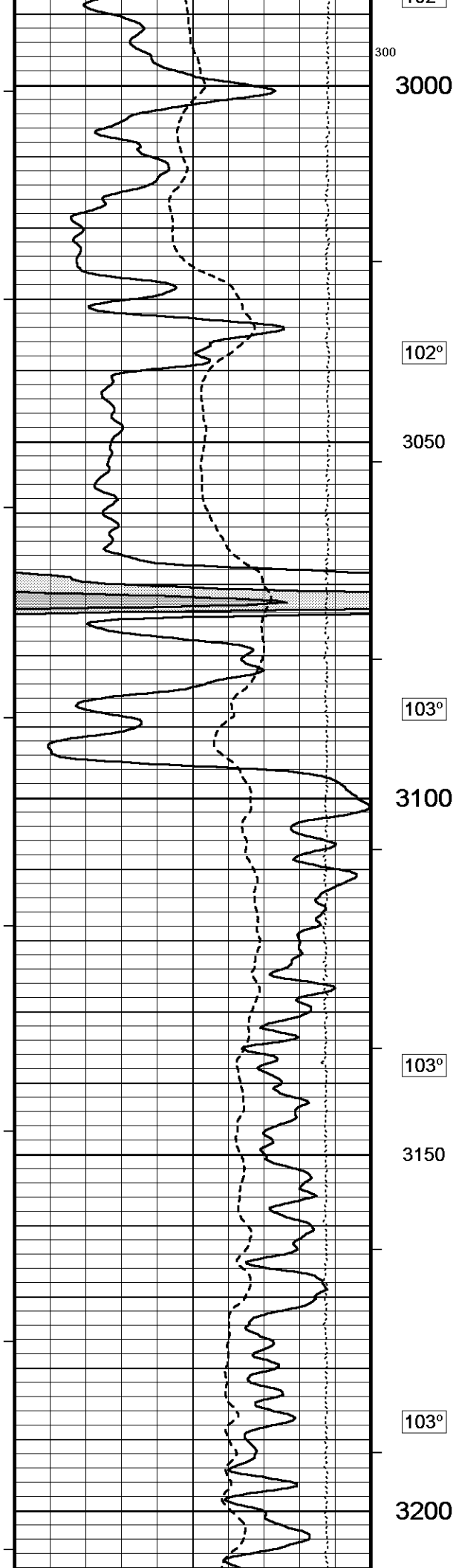
400

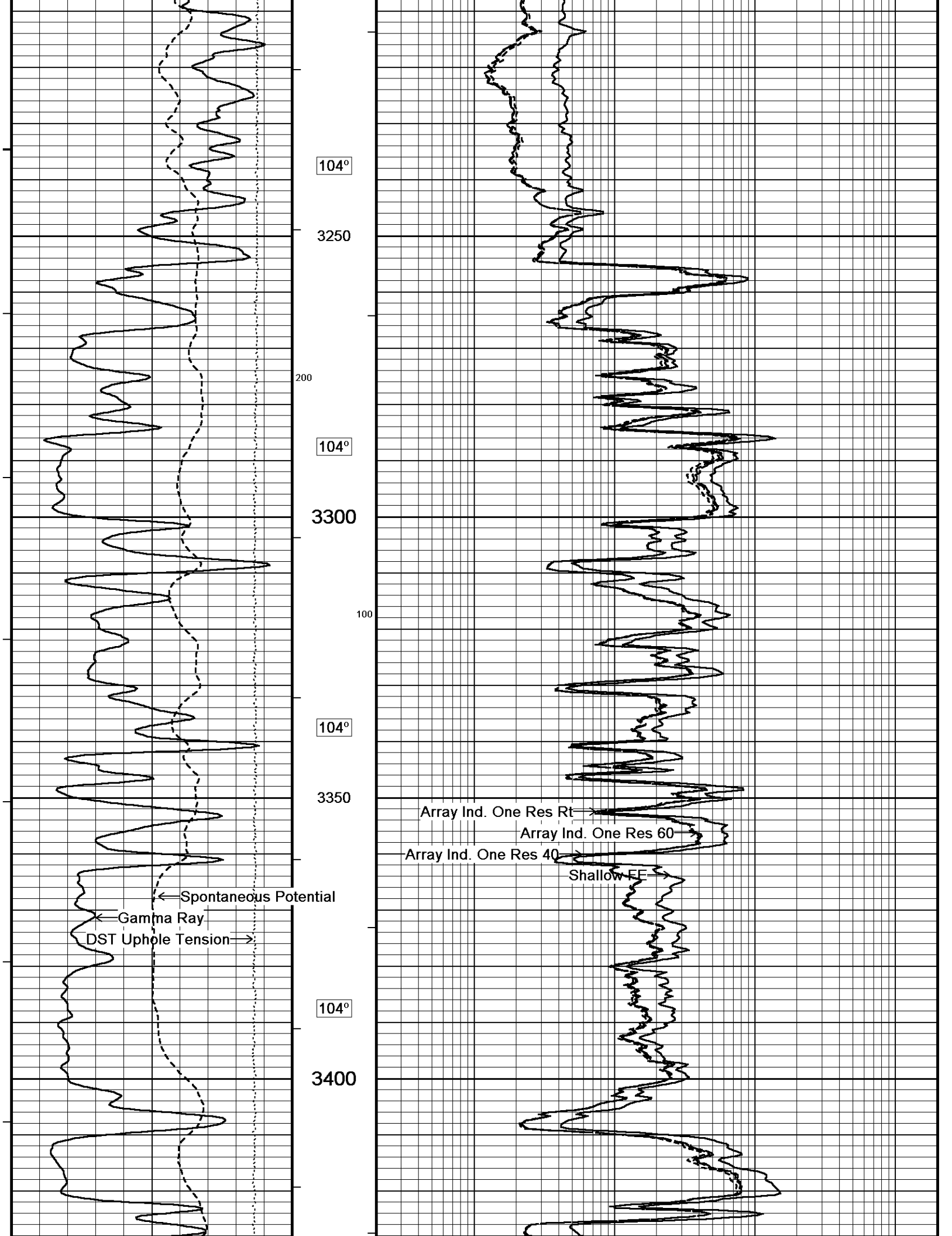
100°

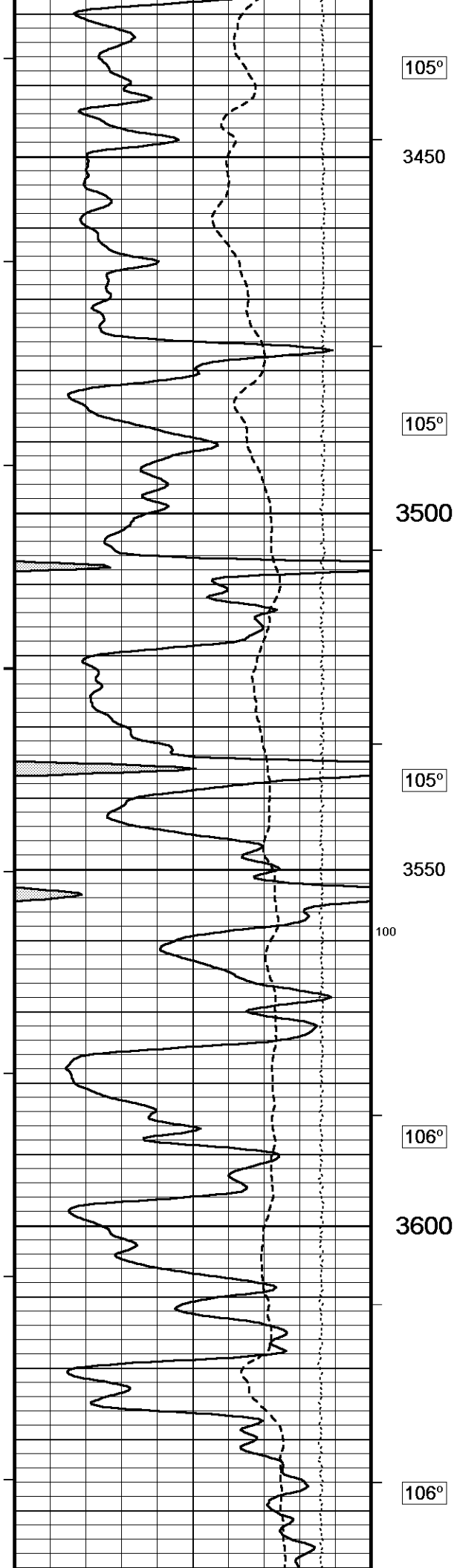
2750











105°

3450

105°

3500

105°

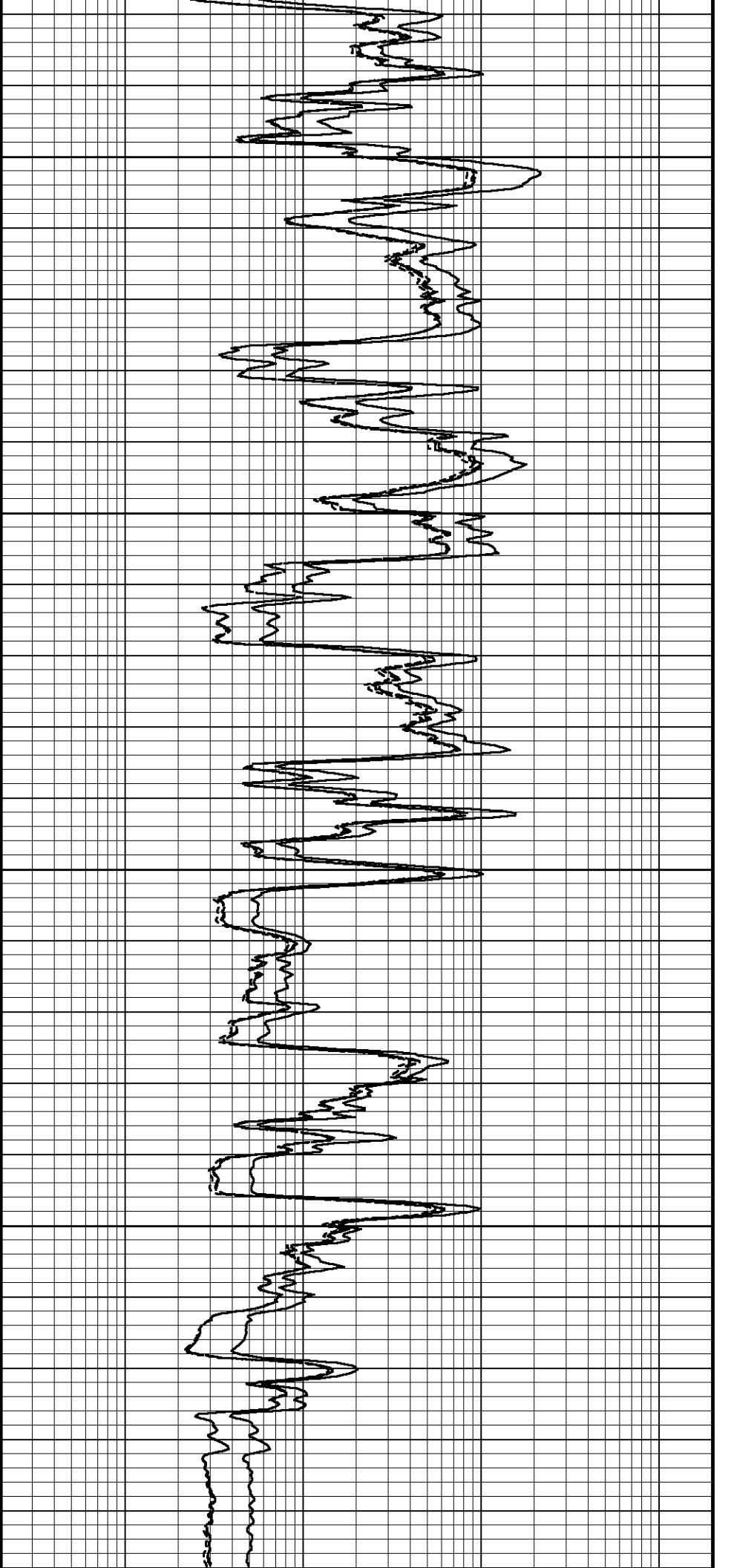
3550

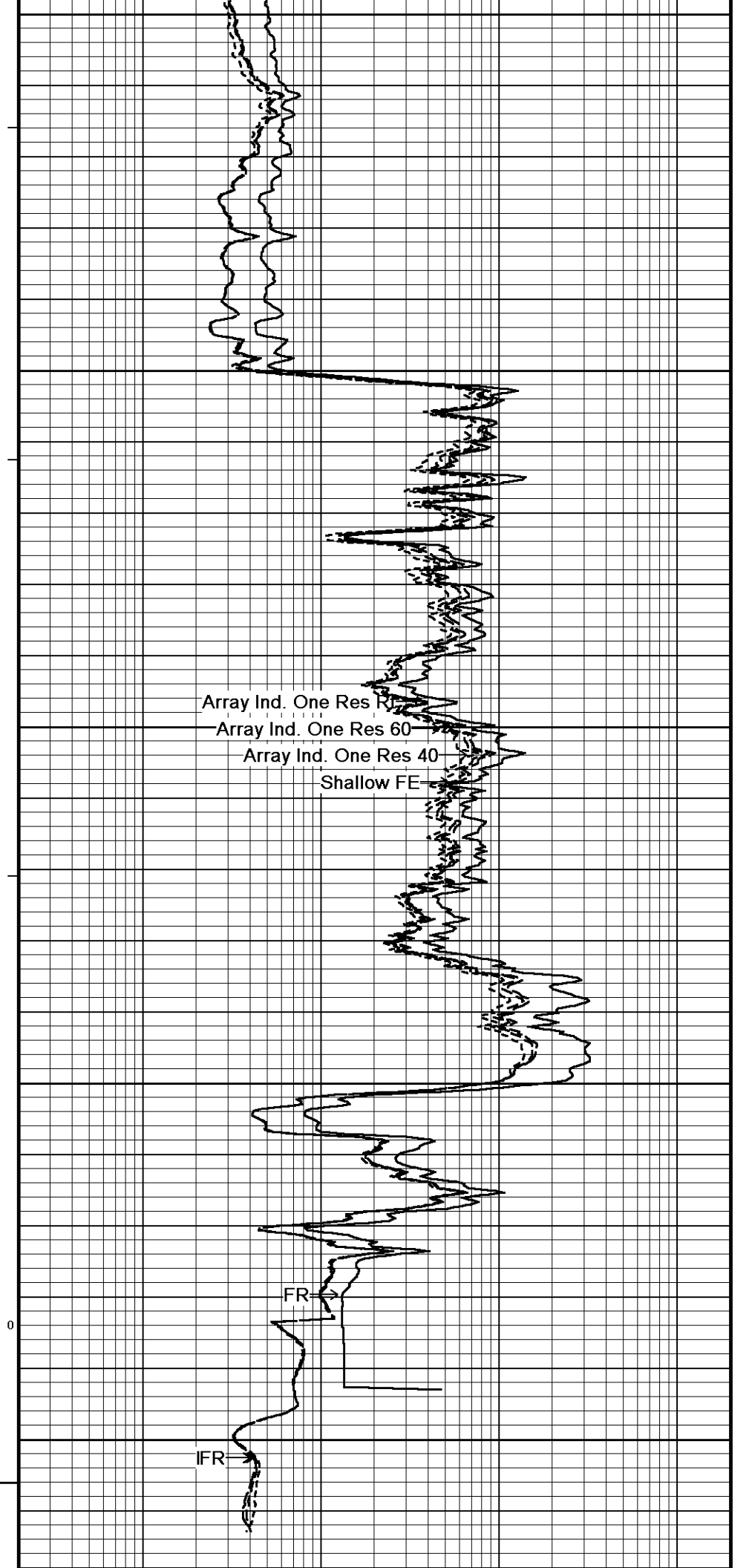
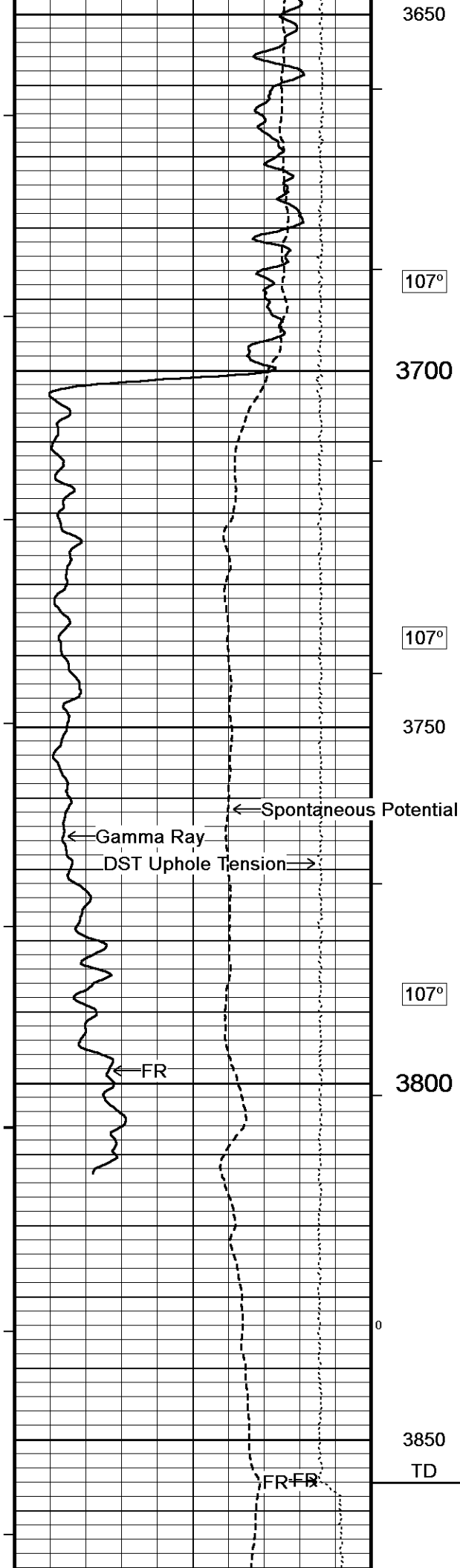
100

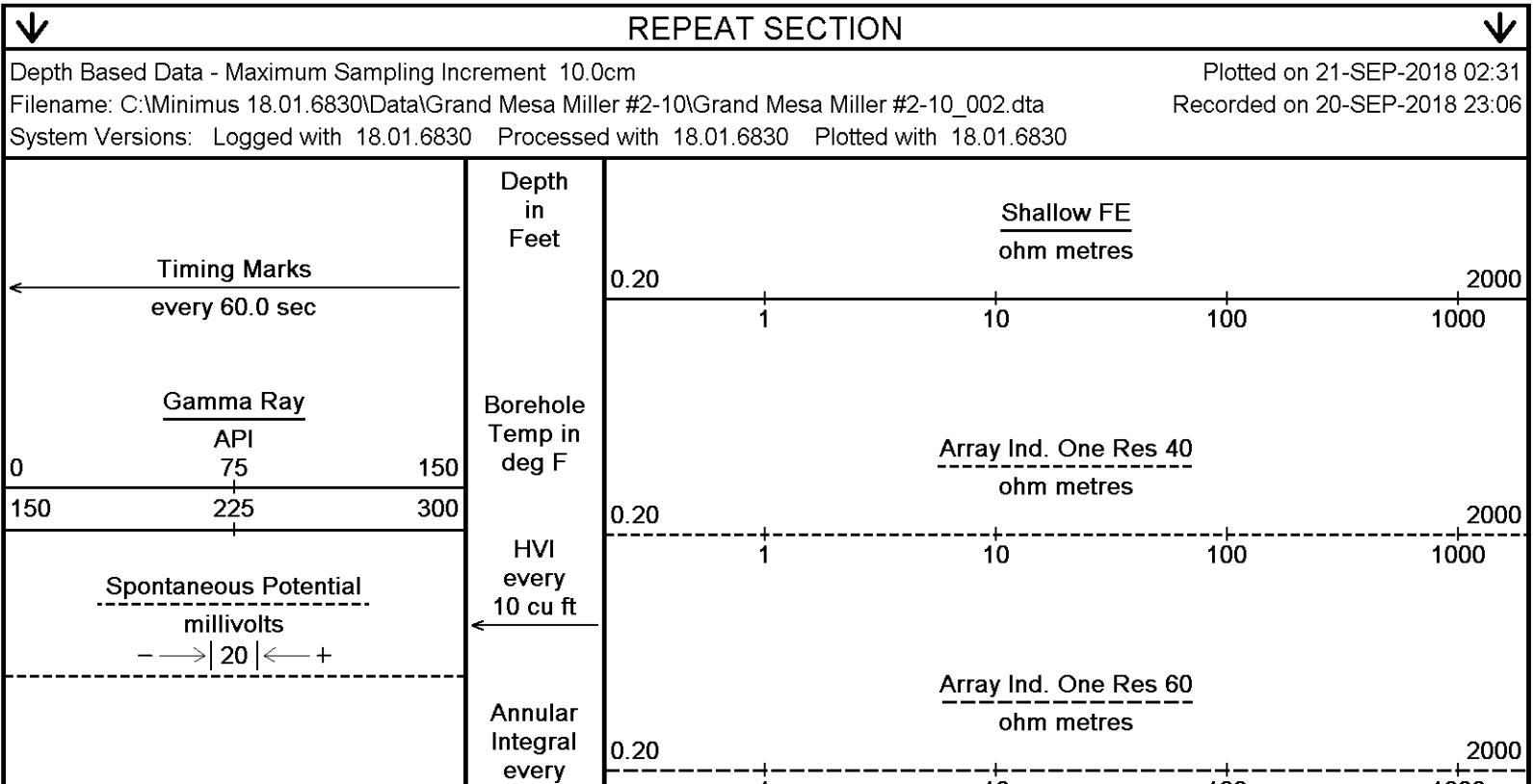
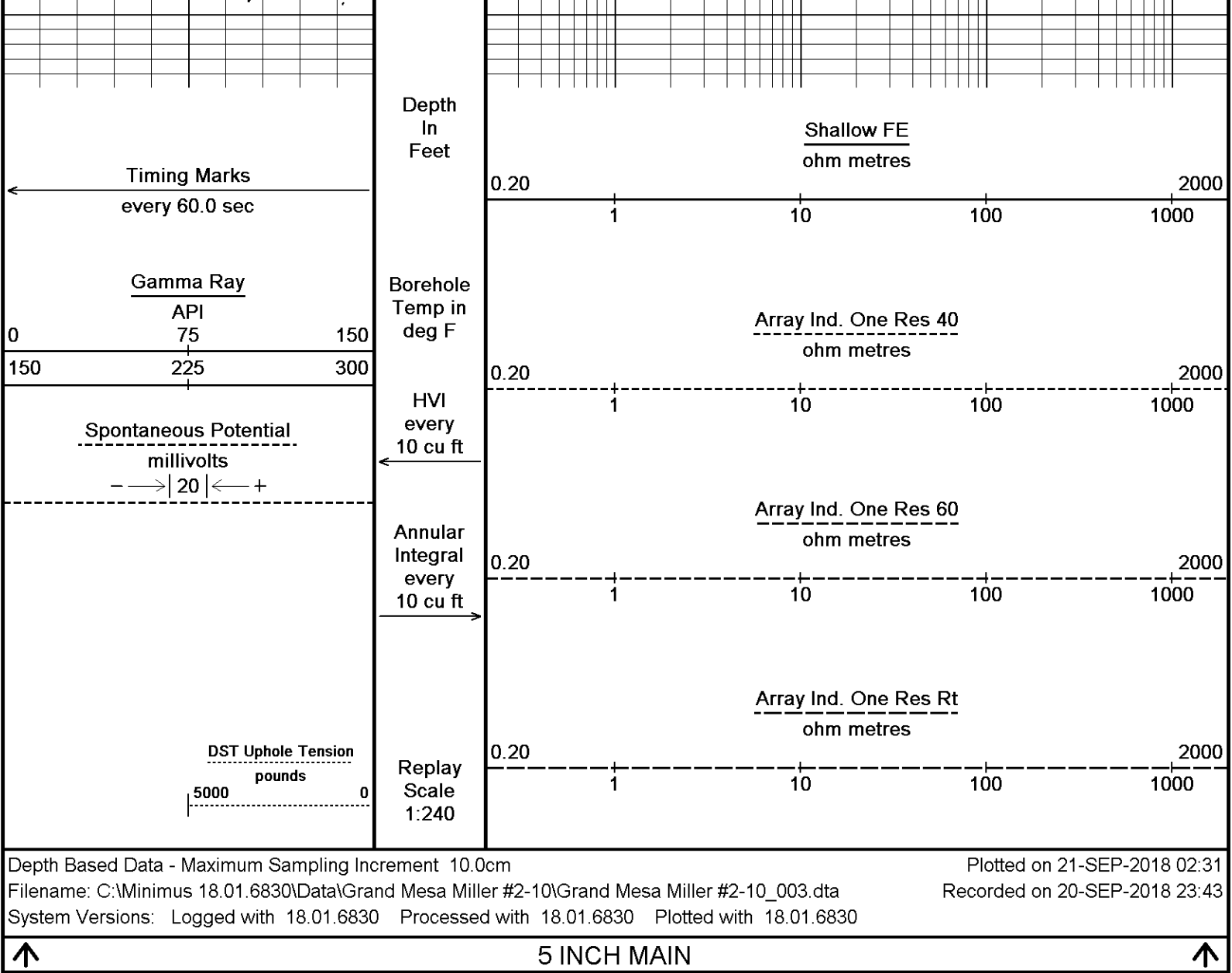
106°

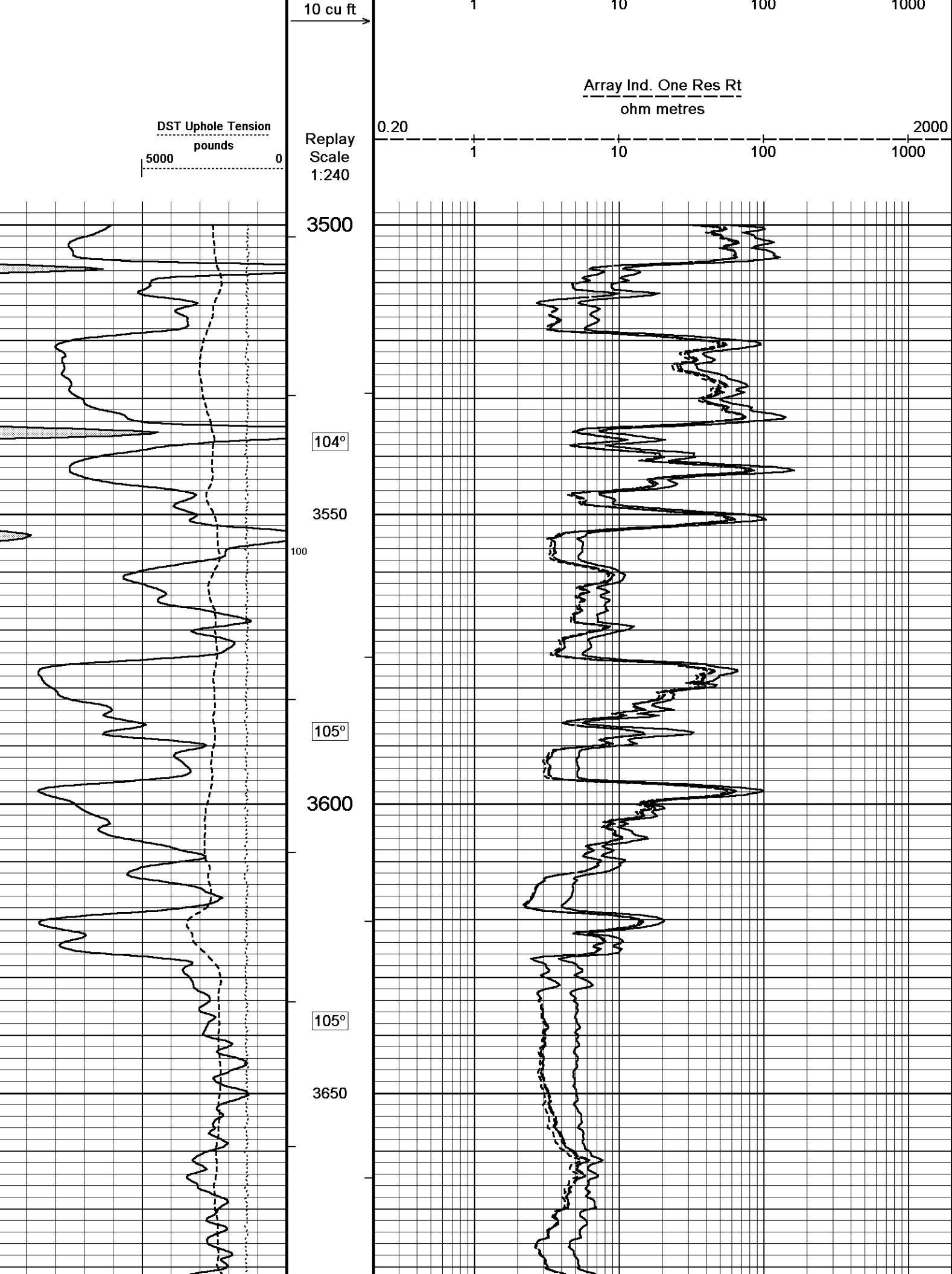
3600

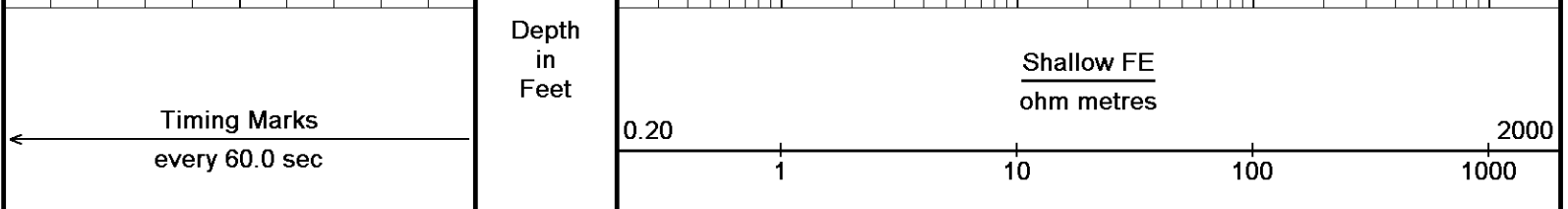
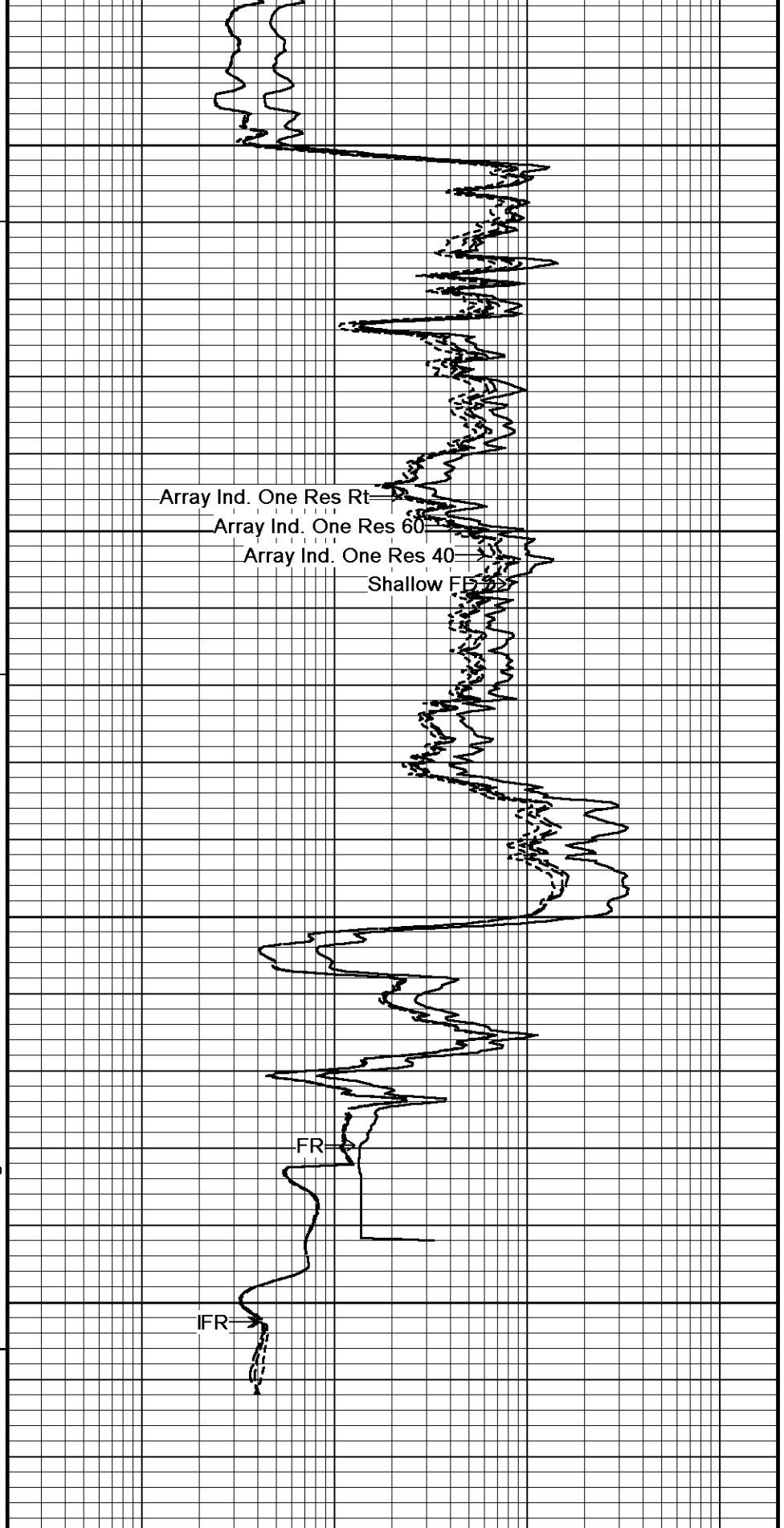
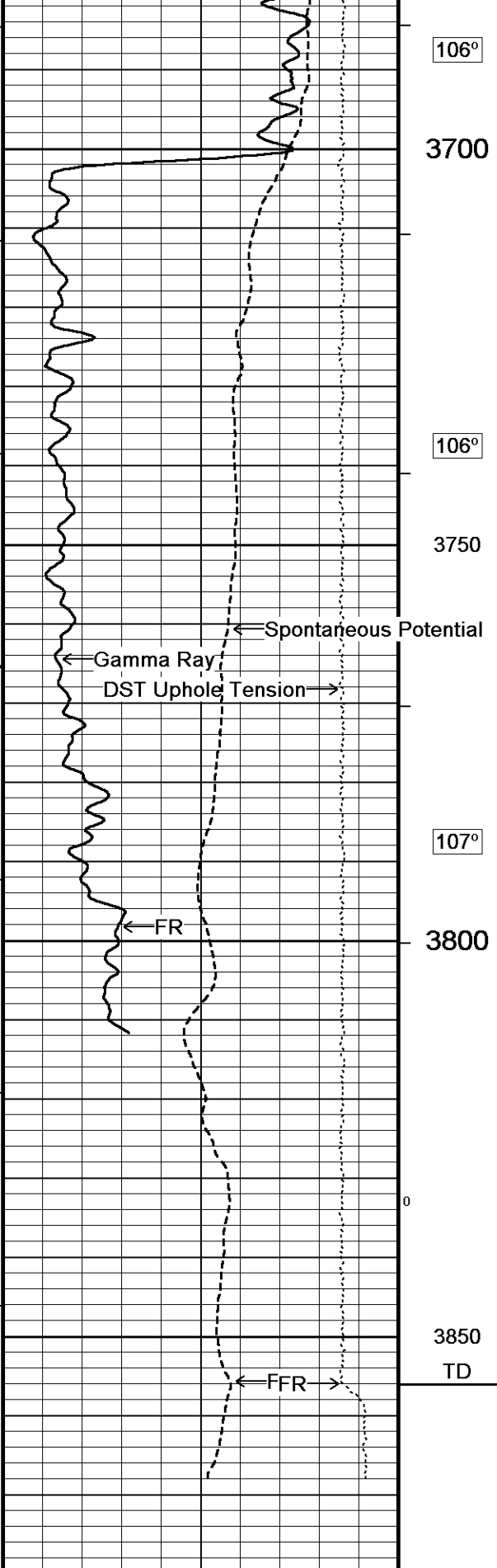
106°

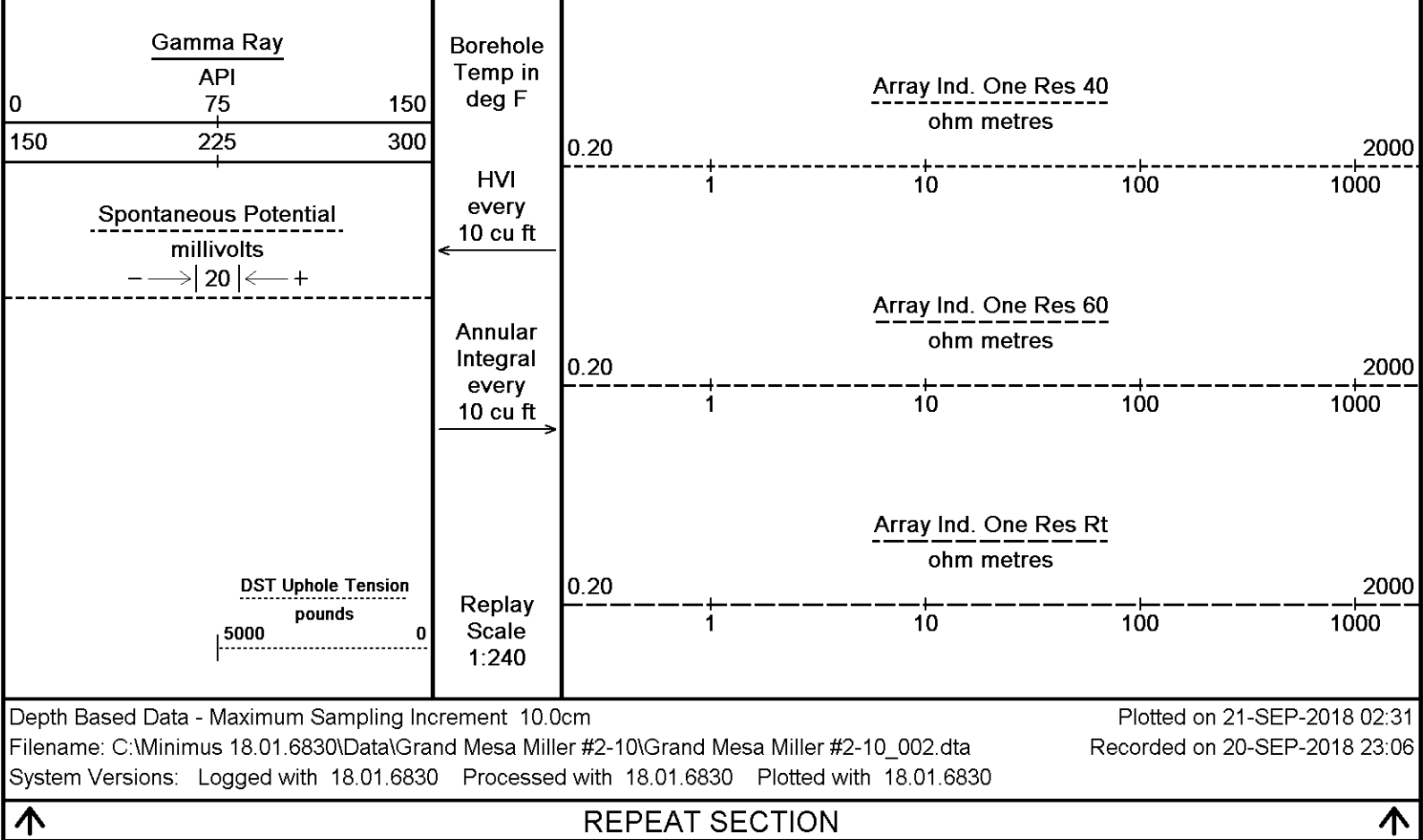












BEFORE SURVEY CALIBRATION			C:\Minimus 18.01.6830\Data\Grand Mesa Miller #2-10\Grand Mesa Miller #2-10_002.dta		
General Constants All 000			Last Edited on 20-SEP-2018,22:43		
General Parameters					
Mud Resistivity	0.430	ohm-metres			
Mud Resistivity Temperature	75.000	degrees F			
Water Level	0.000	feet			
Borehole Fluid Processing	Wet Hole				
Hole/Annular Volume and Differential Caliper Parameters					
HVOL Method	Single Caliper				
HVOL Caliper 1	Density Caliper				
HVOL Caliper 2	N/A				
Annular Volume Diameter	5.500	inches			
Caliper for Differential Caliper	Density Caliper				
Rwa Parameters					
Porosity used	Crossplot Porosity				
Resistivity used	Array Ind. Two Res Rt				
RWA Constant A	0.620				
RWA Constant M	2.150				
SW/APOR Tool Source	0.000				
Gamma Calibration MCG-D.A 246			Field Calibration on 20-SEP-2018,10:55		
	Measured	Calibrated (API)			
Background	107	74			
Calibrator (Gross)	770	530			
Calibrator (Net)	663	456			
Gamma Calibration Tolerances MCG-D.A 246					
Ratio	1.454	1.401.4751.55	Counts/API		
Gamma Constants MCG-D.A 246			Last Edited on 20-SEP-2018,21:39		

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.11	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-D.A 246			Field Calibration on 01-AUG-2018,13:29
	Measured	Calibrated(Deg F)	
Lower	50.00	50.00	
Upper	212.00	212.00	

High Resolution Temperature Constants MCG-D.A 246		Last Edited on 07-JUN-2018,10:42
Pre-filter Length	11	

FE Calibration MFE-A.A 135		Base Calibration on 02-SEP-2018,10:12
		Field Check on 20-SEP-2018,10:42
	Resistor 1 (ohm)	Resistor 2 (ohm)
	0.0	1000.0
Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	962.9	126.8
Base Check		281.0
Field Check		281.0

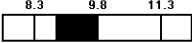
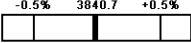
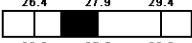
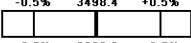
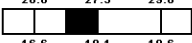
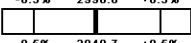
FE Calibration Tolerances MFE-A.A 135	
Reference 2	962.9 ohm
Base Check	281.0 ohm-m
Field Check	281.0 ohm-m

FE Constants MFE-A.A 135		Last Edited on 20-SEP-2018,10:42
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 10-SEP-2018,05:14
		Field Check on 20-SEP-2018,10:42
Factory Loop Calibration		
High Conductivity Reference Resistor	3.3 ohm	
Low Conductivity Reference Resistor	333.3 ohm	
	Measured Signal (unitless)	Reference Conductivity (mmho/m)
Array	Low High	Low High
1 (near)	17.6 473.6	9.3 966.2
2	6.4 385.9	7.6 821.4
3	3.2 264.0	5.2 566.0
4 (far)	2.1 135.5	2.6 279.2
Array Temperature	23.0	Deg F
Tool Checks		
	Factory Reference (mmho/m)	Before Survey (mmho/m)
Array	Low High	Low High
1 (near)	9.8 3840.7	8.8 3839.2

2	27.9	3498.4	27.0	3497.5
3	27.5	2996.0	26.7	2994.9
4 (far)	18.1	2040.7	17.6	2040.3
Array Temperature		87.9	85.9	Deg F

Induction Check Tolerances MAI-A.A 111

Low Array 1	8.8		mmho/m	High Array 1	3839.2		mmho/m
Low Array 2	27.0		mmho/m	High Array 2	3497.5		mmho/m
Low Array 3	26.7		mmho/m	High Array 3	2994.9		mmho/m
Low Array 4	17.6		mmho/m	High Array 4	2040.3		mmho/m

Induction Constants MAI-A.A 111

Last Edited on 20-SEP-2018,10:42

Induction Model		RtAP-WBM	
Borehole Correction Constants			
Tool Centred		No	
Hole Size Source		Density Caliper	
Hole Size Constant Value		N/A	inches
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
Rm Source	Global Value: Temperature Corrected		
Temp. for Rm Corr.	Borehole Temp. Unfilt.		
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 02-SEP-2018,10:42
Field Calibration on 20-SEP-2018,10:42

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	14688	3.99
2	23495	5.98
3	32176	7.97

4	40480	9.86
5	49713	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.08	8.10

Caliper Calibration Tolerances MPD-C.A 216

Long Arm Field Cal. 8.08

DOWNHOLE EQUIPMENT

C:\Minimus 18.01.6830\Data\Grand Mesa Miller #2-10\Grand Mesa Miller #2-10_002.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 595 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

Compact Comms Gamma
MCG-D.A 246 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-log
MML-A 7 LG: 7.97 ft WT: 81.6 lb OD: 2.244 in

Compact Neutron
MDN-B.A 292 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

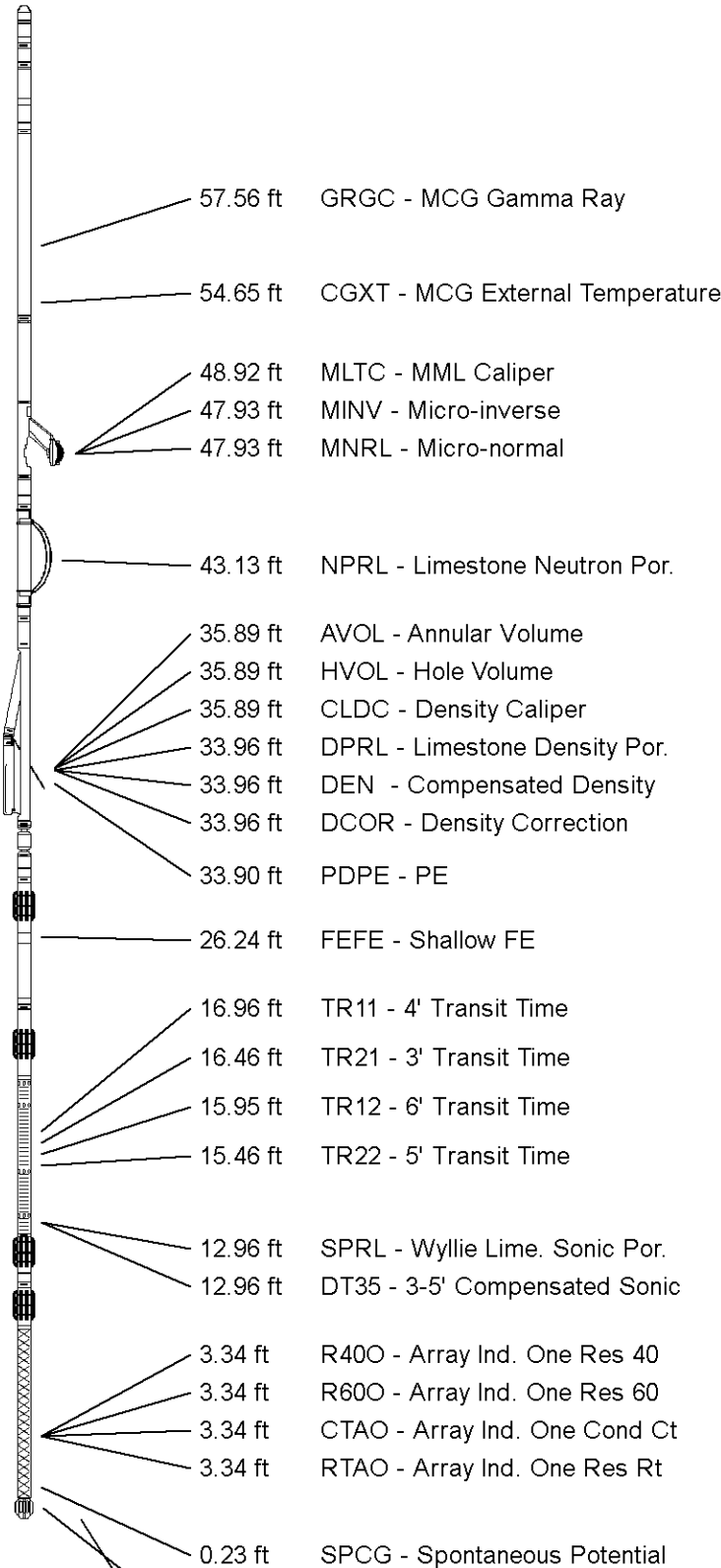
Compact Knuckle Joint
SKJ-D.A 167 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

Compact Focussed Electric
MFE-A.A 135 LG: 6.05 ft WT: 48.5 lb OD: 2.240 in

Compact Sonic
MSS-C.K 319 LG: 12.52 ft WT: 72.8 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: 67.54 ft Weight: 526.9 lb



Tool Zero (0.13ft from bottom)

-0.13 ft SMTU - DST Uphole Tension

All measurements relative to tool zero.

COMPANY GRAND MESA OPERATING COMPANY
WELL MILLER #2-10
FIELD ZENITH-PEACE CREEK
PROVINCE/COUNTY RENO
COUNTRY/STATE U.S.A. / KANSAS

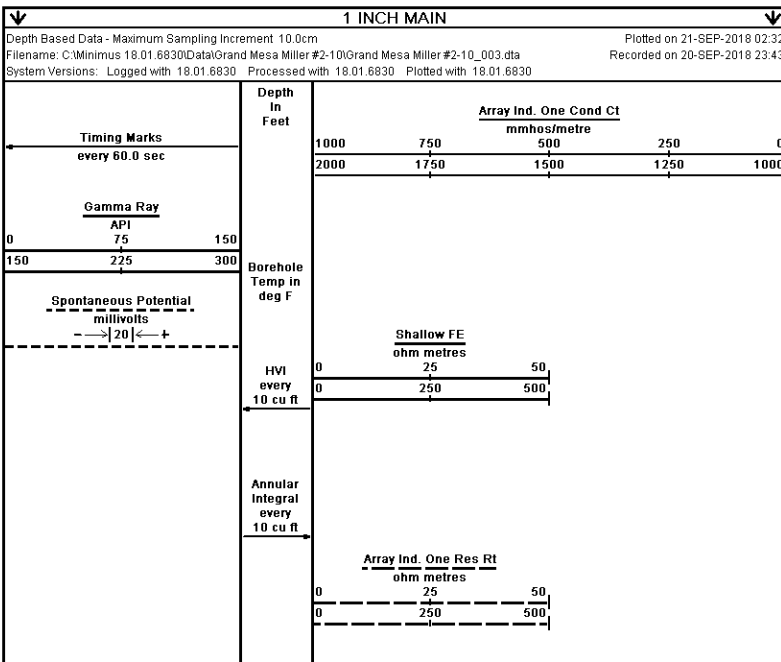
Elevation Kelly Bushing	1770	feet	First Reading	3853.00	feet
Elevation Drill Floor	1765	feet	Depth Driller	3860.00	feet
Elevation Ground Level		feet	Depth Logger	3856.00	feet



ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

Weatherford®

Weatherford		ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG	
COMPANY	GRAND MESA OPERATING COMPANY		
WELL	MILLER #2-10		
FIELD	ZENITH-PEACE CREEK		
PROVINCE/COUNTY	RENO		
COUNTRY/STATE	U.S.A. / KANSAS		
LOCATION	1950' ESL & 1273' FWL		
SEC 10	TWP 23S R3E T10N	Other Services	
Latitude	35.15521729	NAD83	MML
Longitude	-115.15521729		
Permanent Datum GL Elevation	1765 feet		
Log Measured From KB	5.00 feet above Permanent Datum		
Drilling Measured From KB			
Date	20-SEP-2018		
Run Number	ONE		
Service Order	4568-22461393		
Depth Driller	3860.00	feet	
Depth Logger	3866.00	feet	
First Reading	3853.00	feet	
Last Reading	169.00	feet	
Casing Driller	169.00	feet	
Casing Logger	169.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	CHEMICAL		
Density/Viscosity	9.25 lb/lb gal	148.00 CP	
PT/Fluid Loss	9.00	12.40 ml/30min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	0.43 @ 75.0	ohm-m	
Rm @ Measured Temp	0.34 @ 75.0	ohm-m	
Rm @ Measured Temp	0.52 @ 75.0	ohm-m	
Source Rm1/Rm2	CALC	CALC	
Rm @ BHT	0.30 @ 107.0	ohm-m	
Time Since Circulation	4 HOURS		
Max Recorded Temp	107.00	deg F	
Equipment Base	13096	UB	
Witnessed By	STEVE CARL		



DST Uphole Tension
pounds
5000
0

Replay
Scale
1:600

Casing
Shoe

200

84°

300

85°

400

86°

500

87°

600

88°

700

89°

800

91°

900

90°

1000

91°

1100

91°

1200

Array Ind. One Res Rt

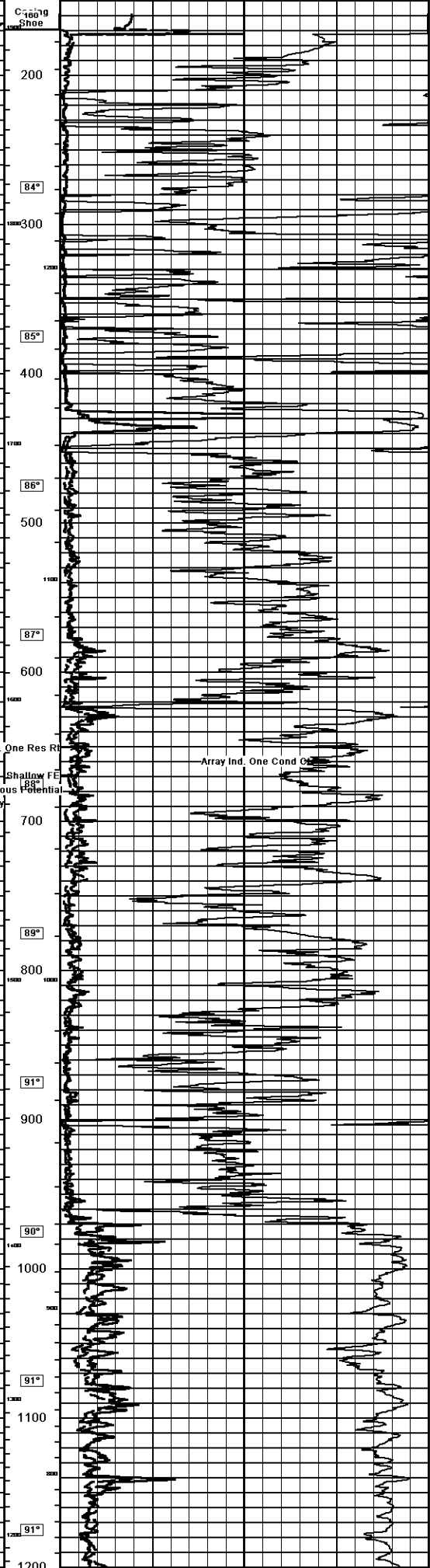
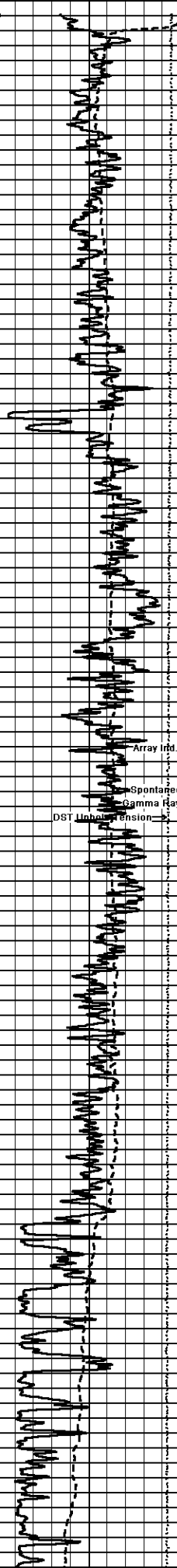
Array Ind. One Cond O

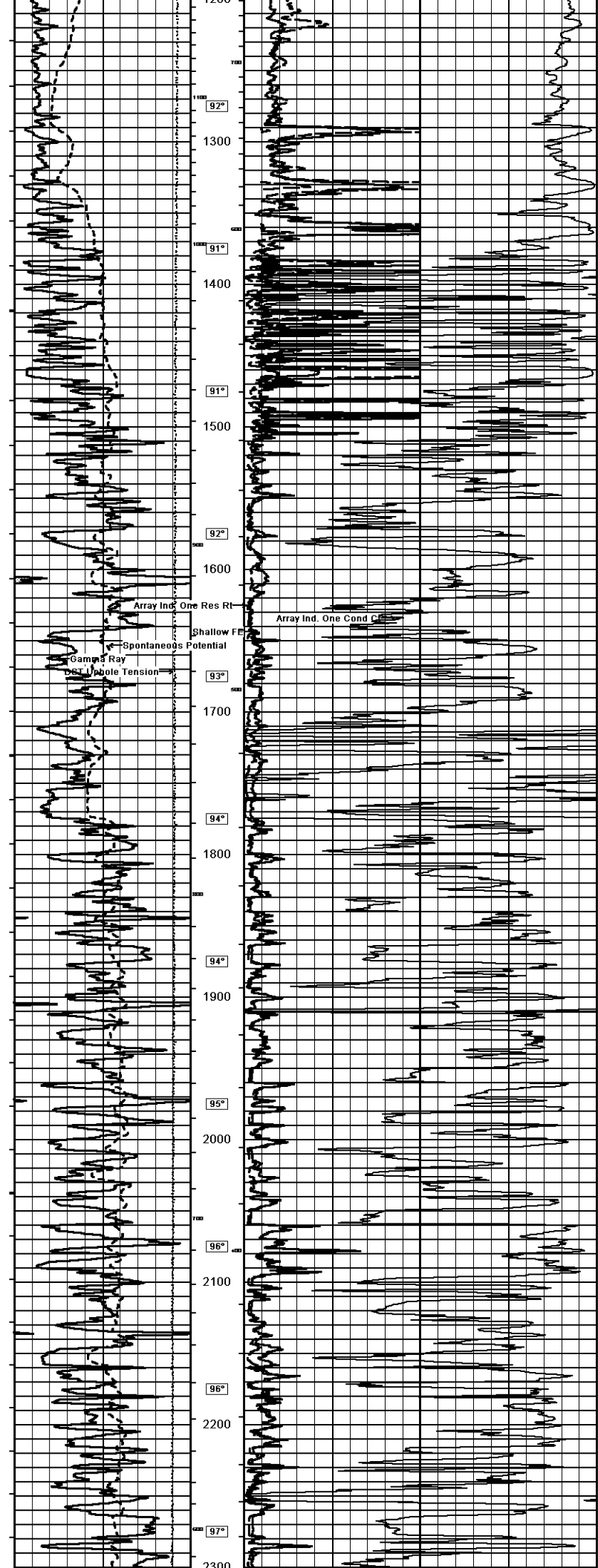
Shallow FE

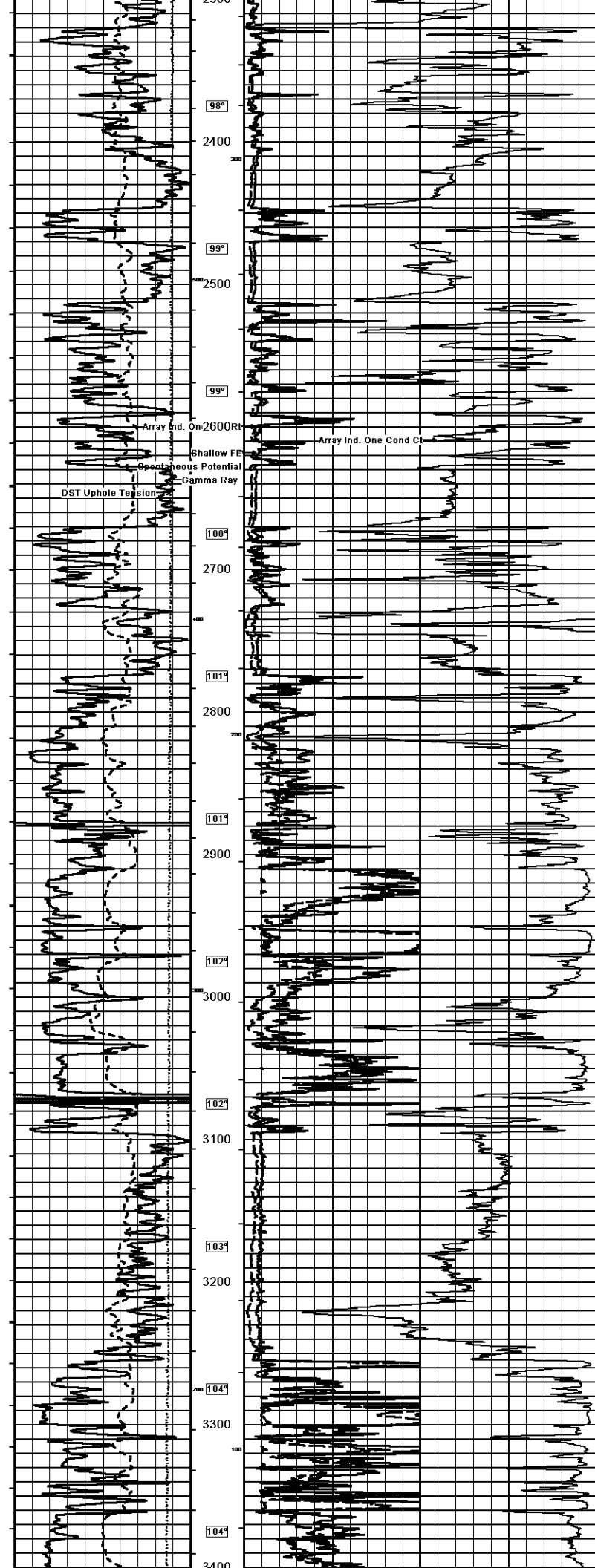
Spontaneous Potential

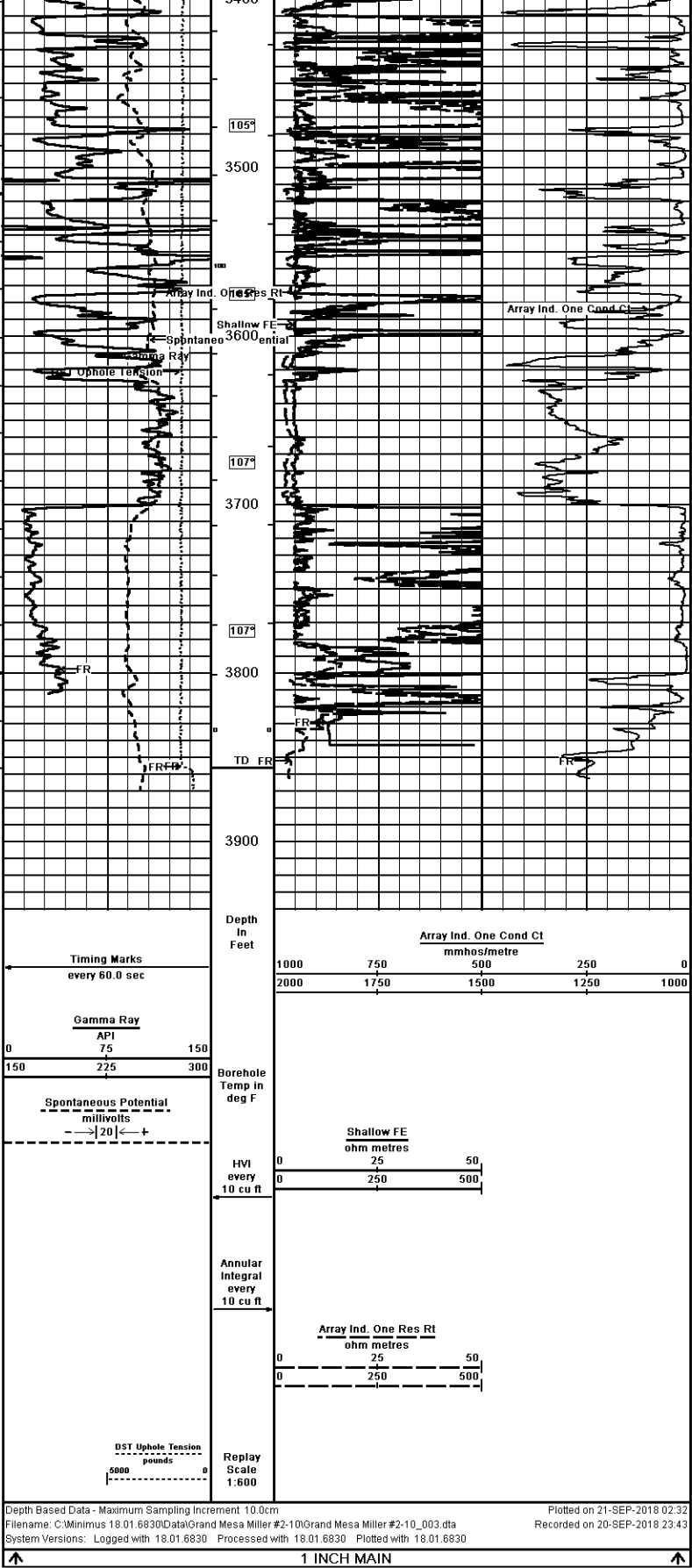
Gamma Ray

DST Uphole Tension









COMPANY	GRAND MESA OPERATING COMPANY			
WELL	MILLER #2-10			
FIELD	ZENITH-PEACE CREEK			
PROVINCE/COUNTY	RENO			
COUNTRY/STATE	U.S.A. / KANSAS			
Elevation Kelly Bushing	1770	feet	First Reading	3853.00 feet
Elevation Drill Floor	1765	feet	Depth Driller	3860.00 feet
Elevation Ground Level		feet	Depth Logger	3856.00 feet
Weatherford ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG				

