



Weatherford

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

COMPANY	SHAKESPEARE OIL CO., INC.		
WELL	BAHM 2-21		
FIELD	WILDCAT		
PROVINCE/COUNTY	SCOTT		
COUNTRY/STATE	U.S.A. / KANSAS		
LOCATION	335' FNL & 2120' FEL		
PERMIT NUMBER	SE NW NW NE		
SEC 21	TWP 16S	RGE 34W	Other Services
Latitude	38.655160581		
Longitude	-101.080919172		
API Number	15-171-21101		
Permanent Datum GL, Elevation	3135 feet		
Log Measured From KB			
Drilling Measured From KB @ 10 FEET			
Date	02-NOV-2014		Elevations: KB 3145.00 DF 3143.00 GL 3135.00
Run Number	ONE		
Service Order	7036-102129390		
Depth Driller	4890.00	feet	
Depth Logger	4890.00	feet	
First Reading	4886.66	feet	
Last Reading	266.00	feet	
Casing Driller	267.00	feet	
Casing Logger	266.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	WBM		
Density / Viscosity	9.20 lb/USg	53.00 CP	
PH / Fluid Loss	10.00	8.90 ml/30Min	
Sample Source	MUDPIT		
Rm @ Measured Temp	0.425 @ 75.0	ohm-m	
Rmf @ Measured Temp	0.34 @ 75.0	ohm-m	
Rmc @ Measured Temp	0.51 @ 75.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.297 @ 110.0	ohm-m	
Time Since Circulation	4 HOURS		
Max Recorded Temp	111.00	deg F	
Equipment / Base	13096	LIB	
Recorded By	DEREK CARTER		
Witnessed By	TIM PRIEST		
IOB #	LB14-343		

BOREHOLE RECORD					Last Edited: 02-NOV-2014 12:41
Bit Size inches		Depth From feet		Depth To feet	
7.875		267.00		4890.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
SURFACE	8.625	0.00	267.00	24.00	

REMARKS
- SOFTWARE ISSUE: WLS 14.03.4558
- TOOL STRING: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION
- HARDWARE: MDN: DUAL BOWSPRING ECCENTRALIZER MFE: 1 X 0.5 INCH STANDOFF MSS: 2 X 0.5 INCH STANDOFF MAI: 2 X 0.5 INCH STANDOFF
- 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 3800 FT.: 360 CU. FT.

- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO 3800 FT.: 280 CU. FT.

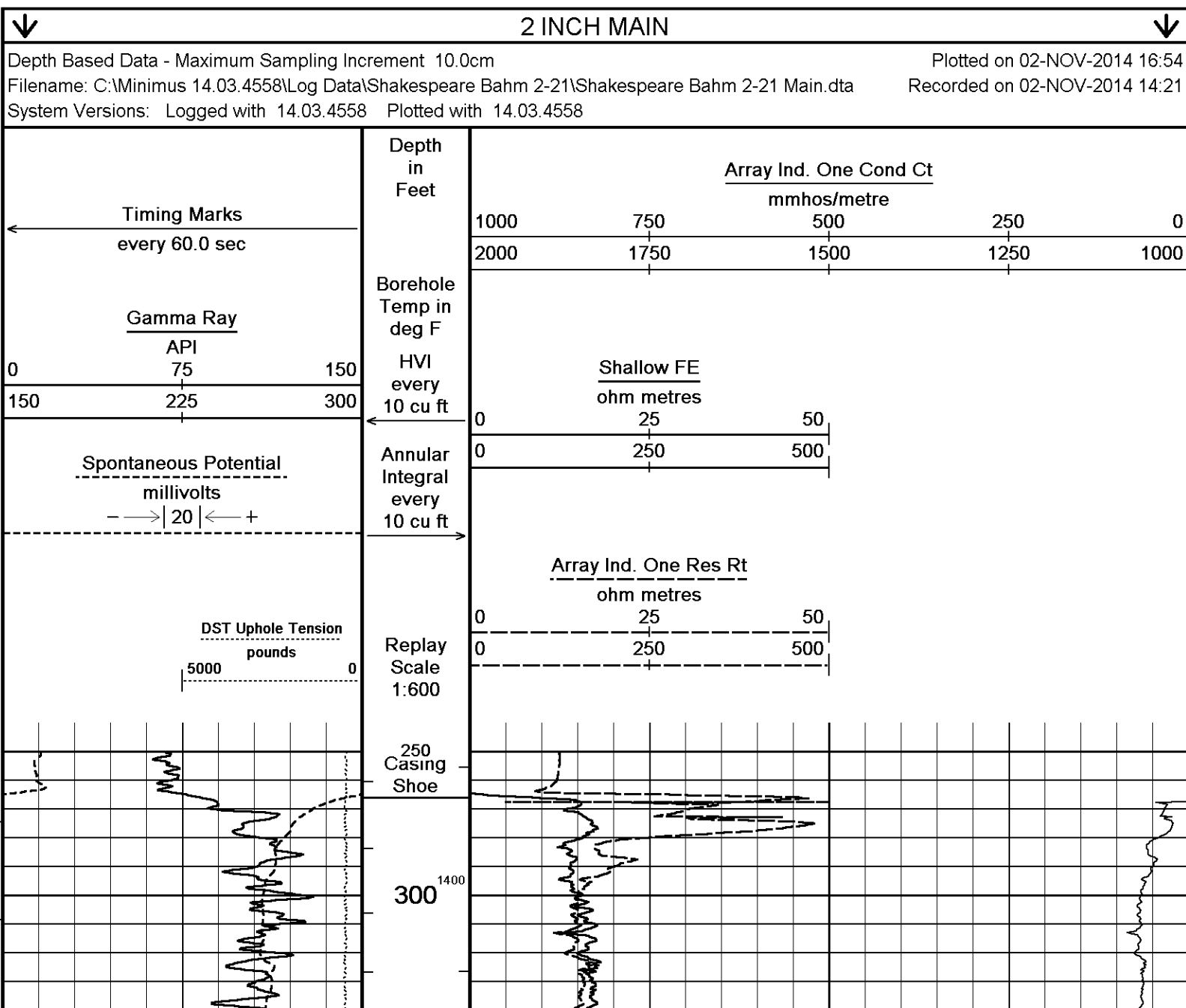
- SERVICE ORDER # 7036-102129390

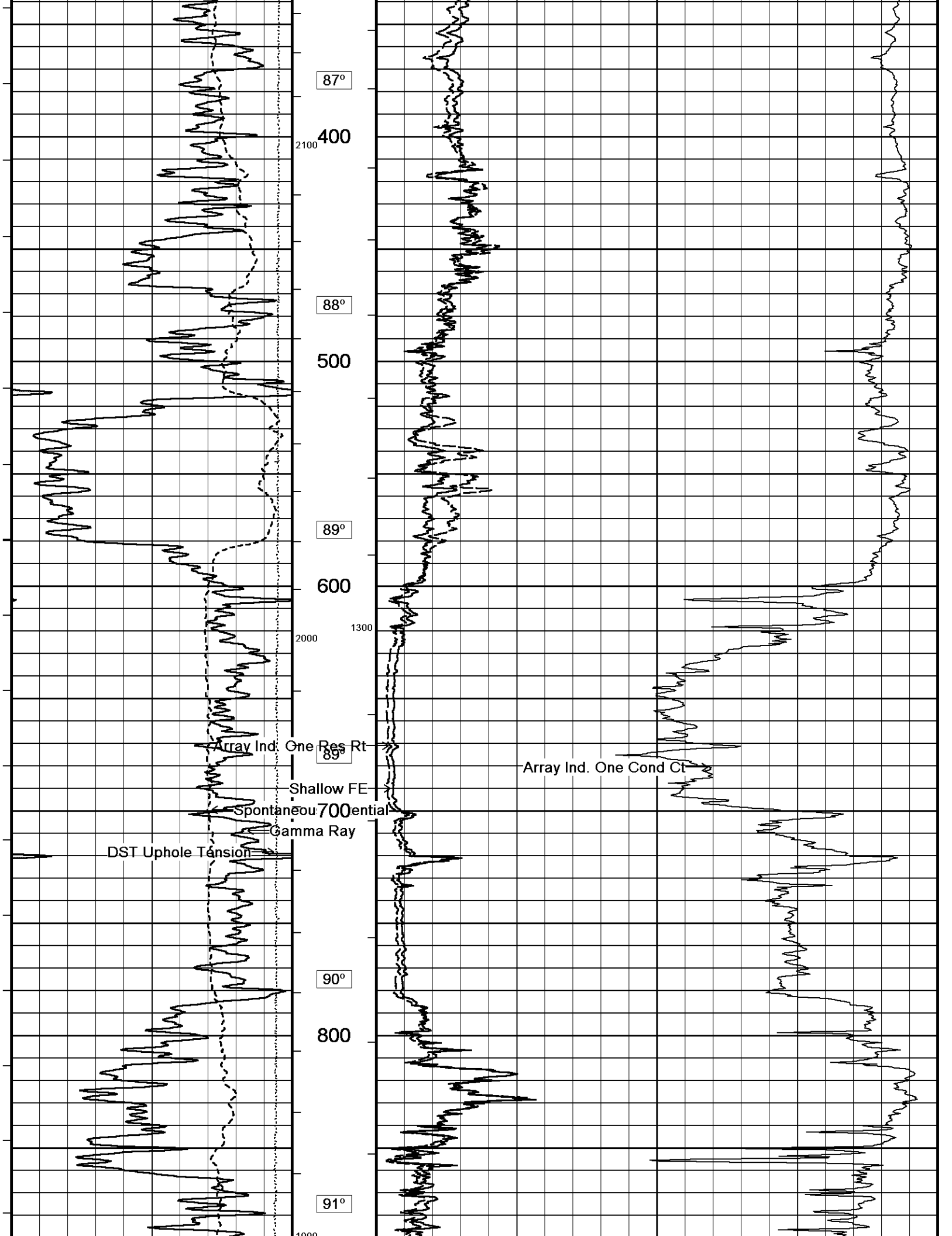
- RIG: H.D. DRILLING #2

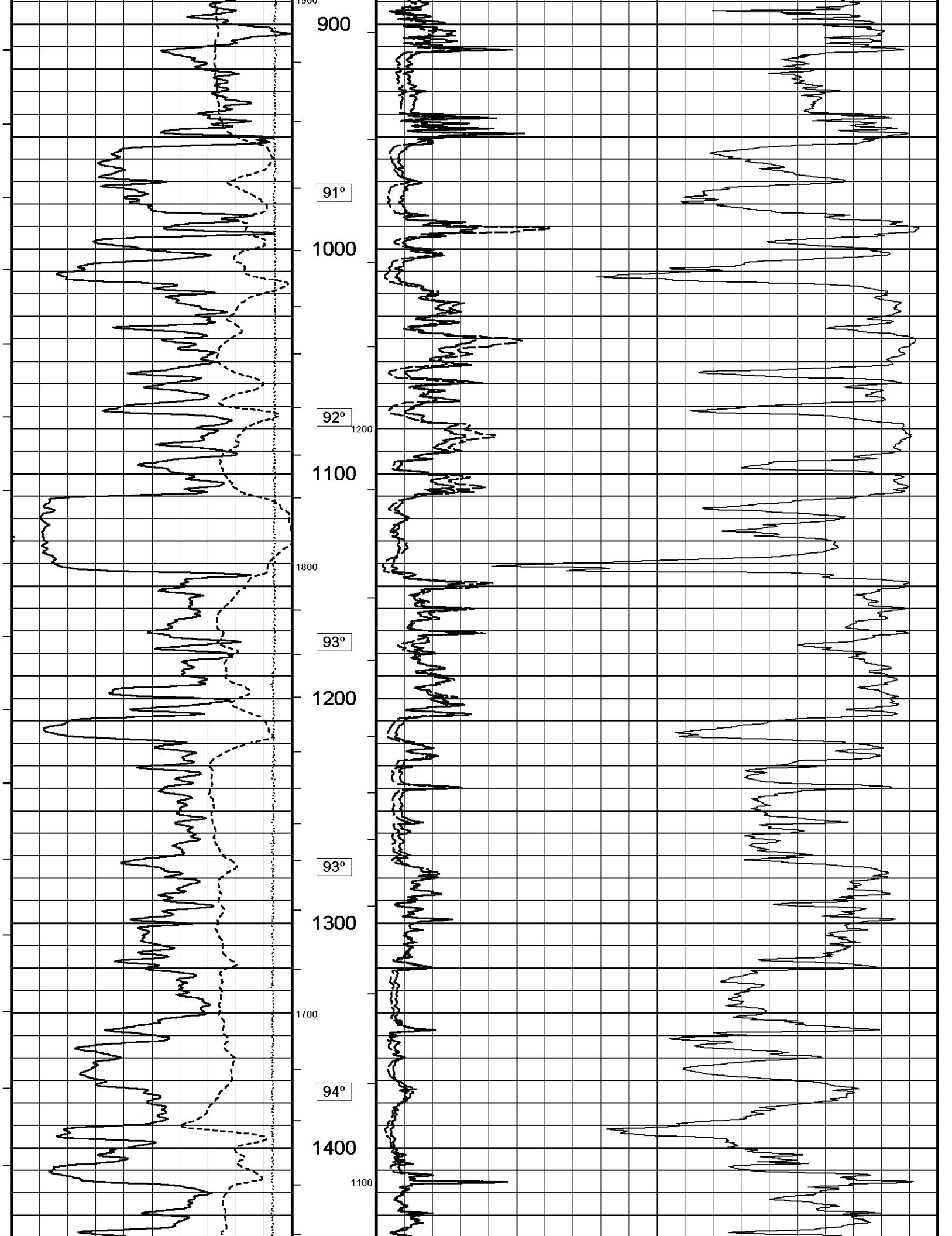
- ENGINEER: DEREK CARTER

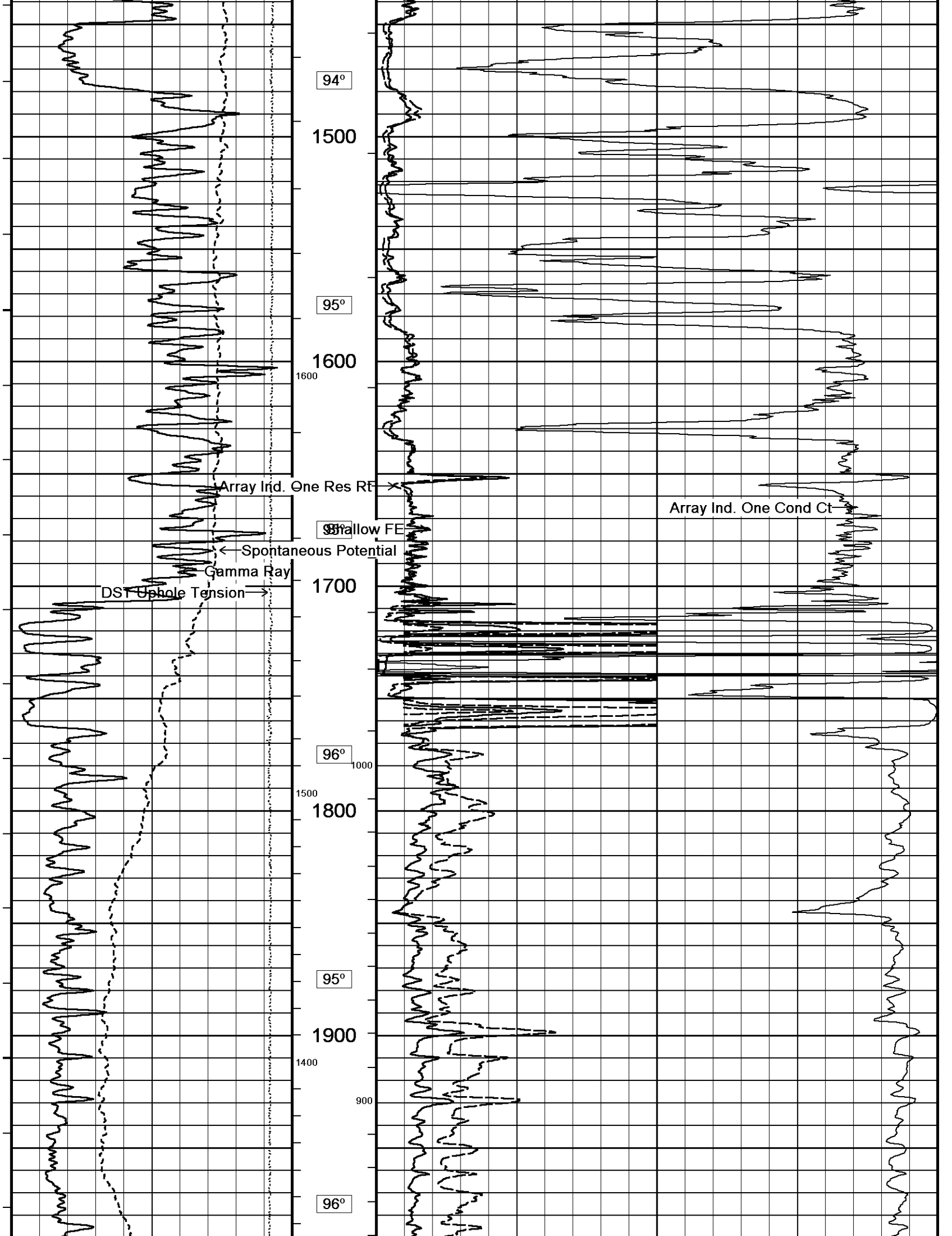
- OPERATORS: CARLOS RAMIREZ

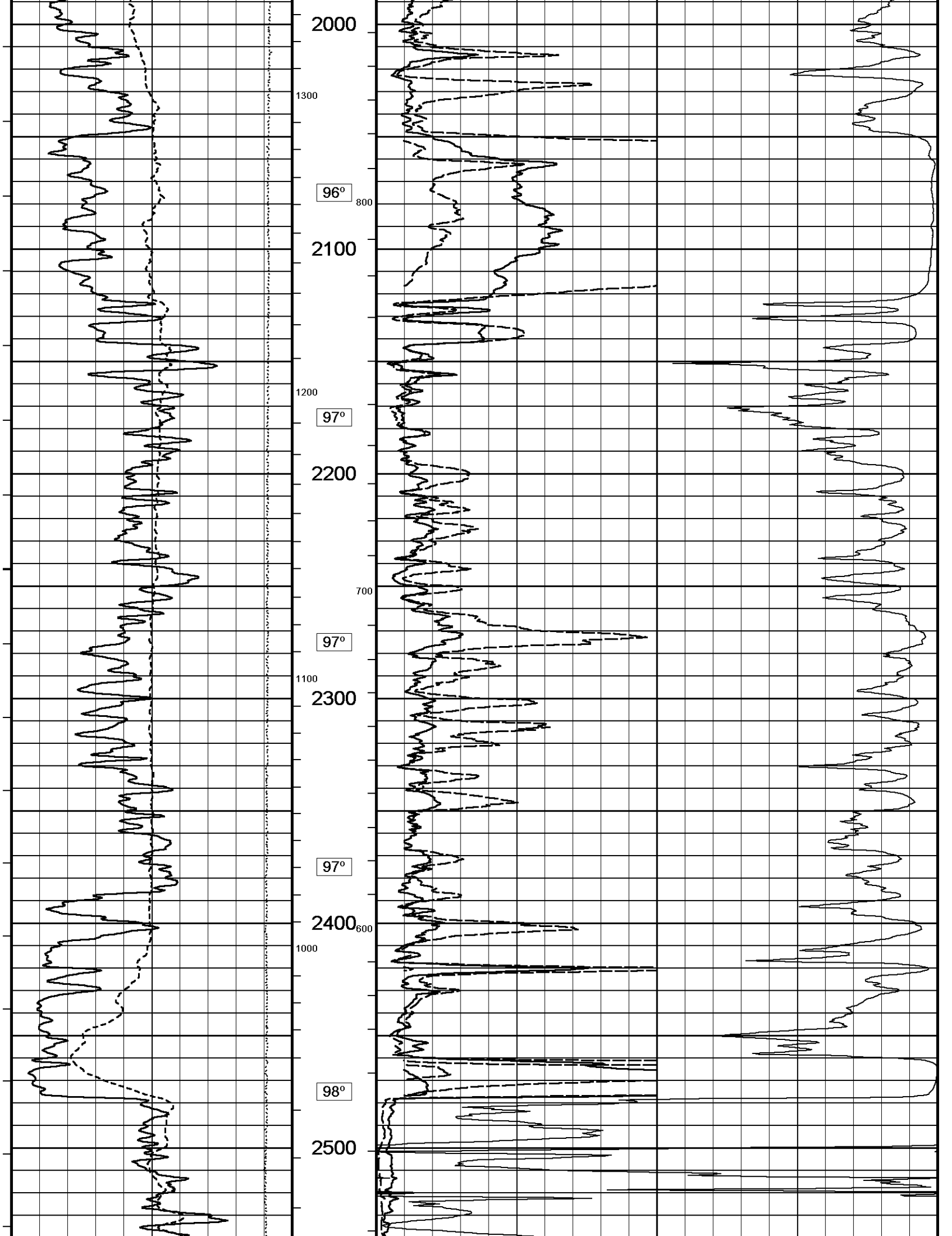
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will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

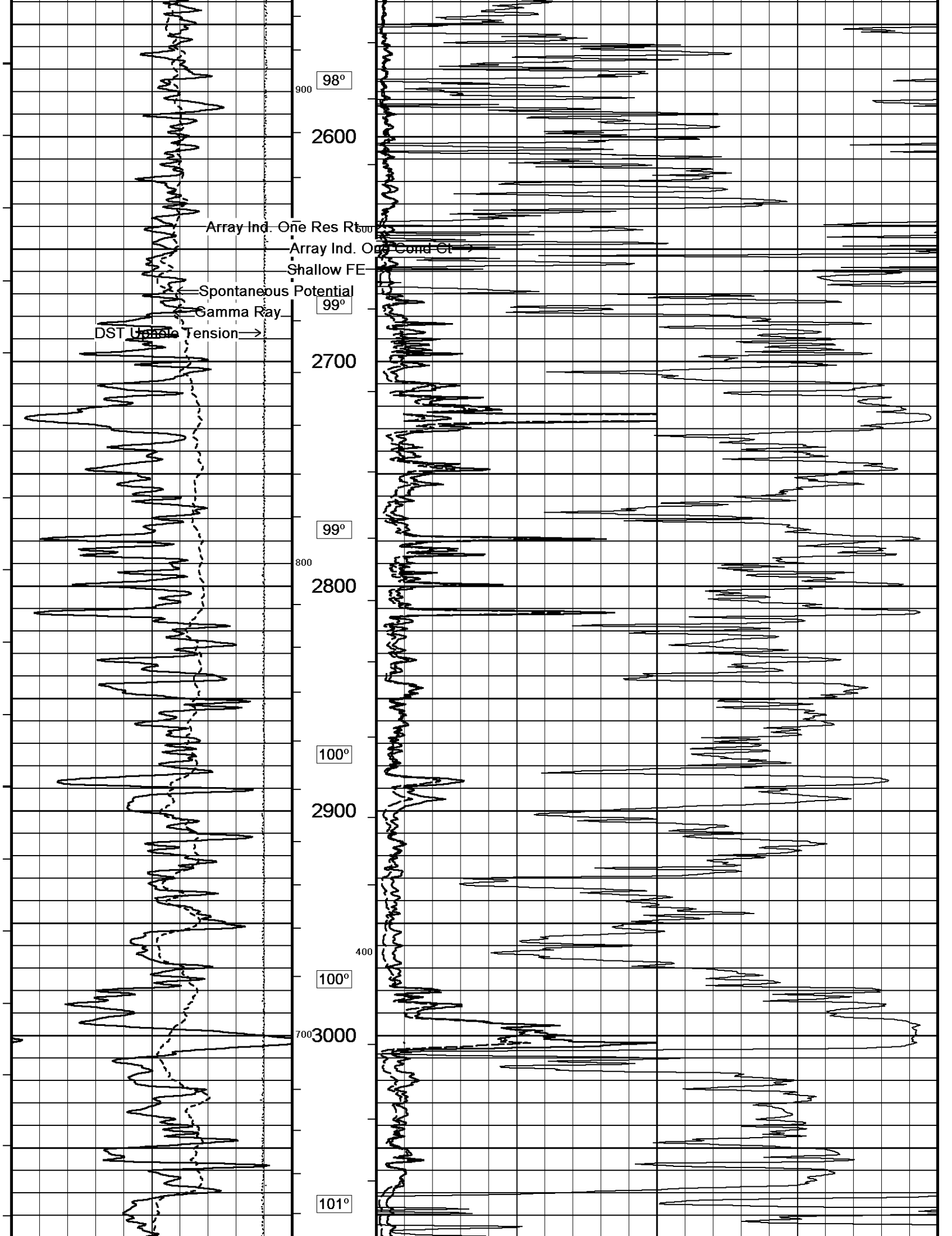


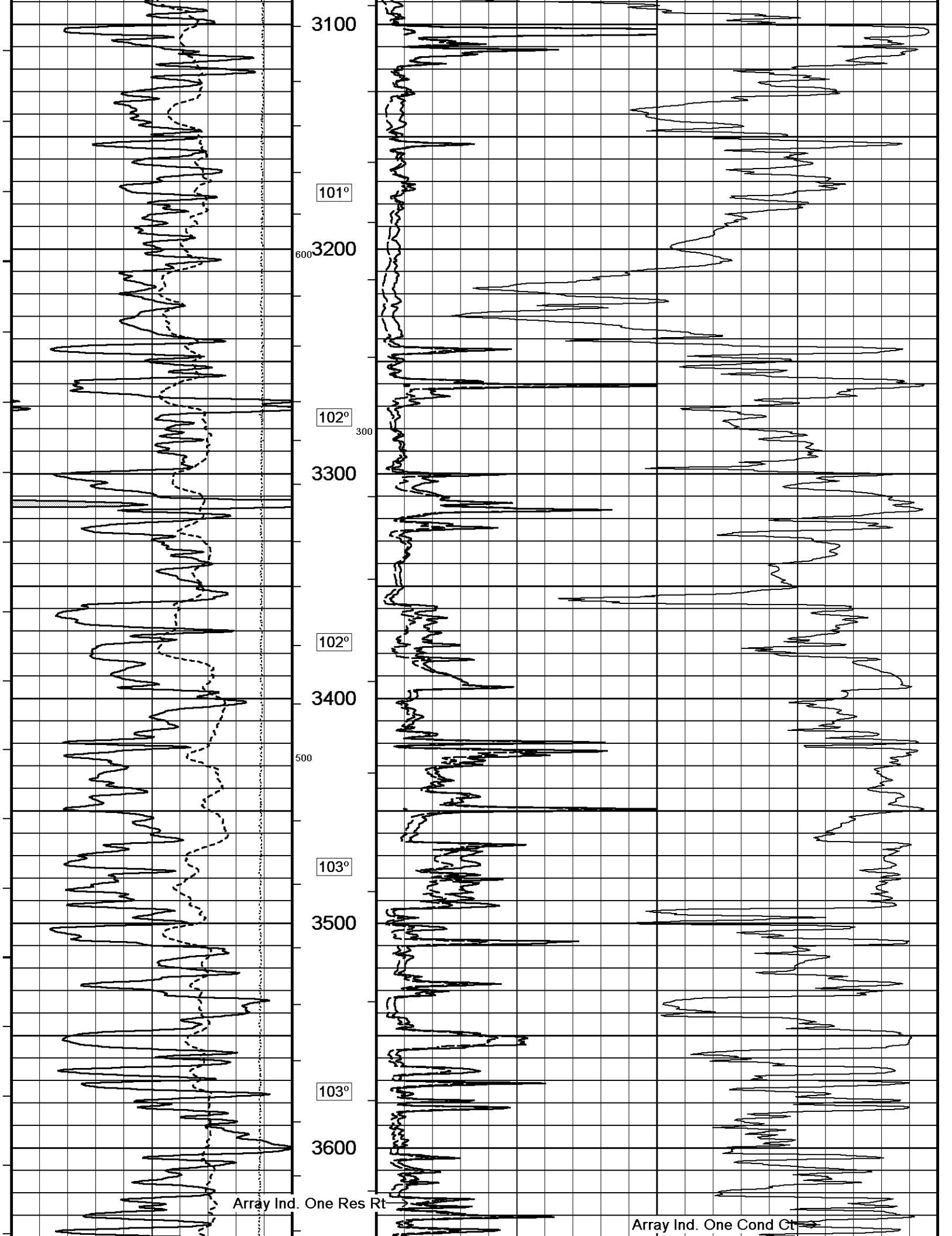


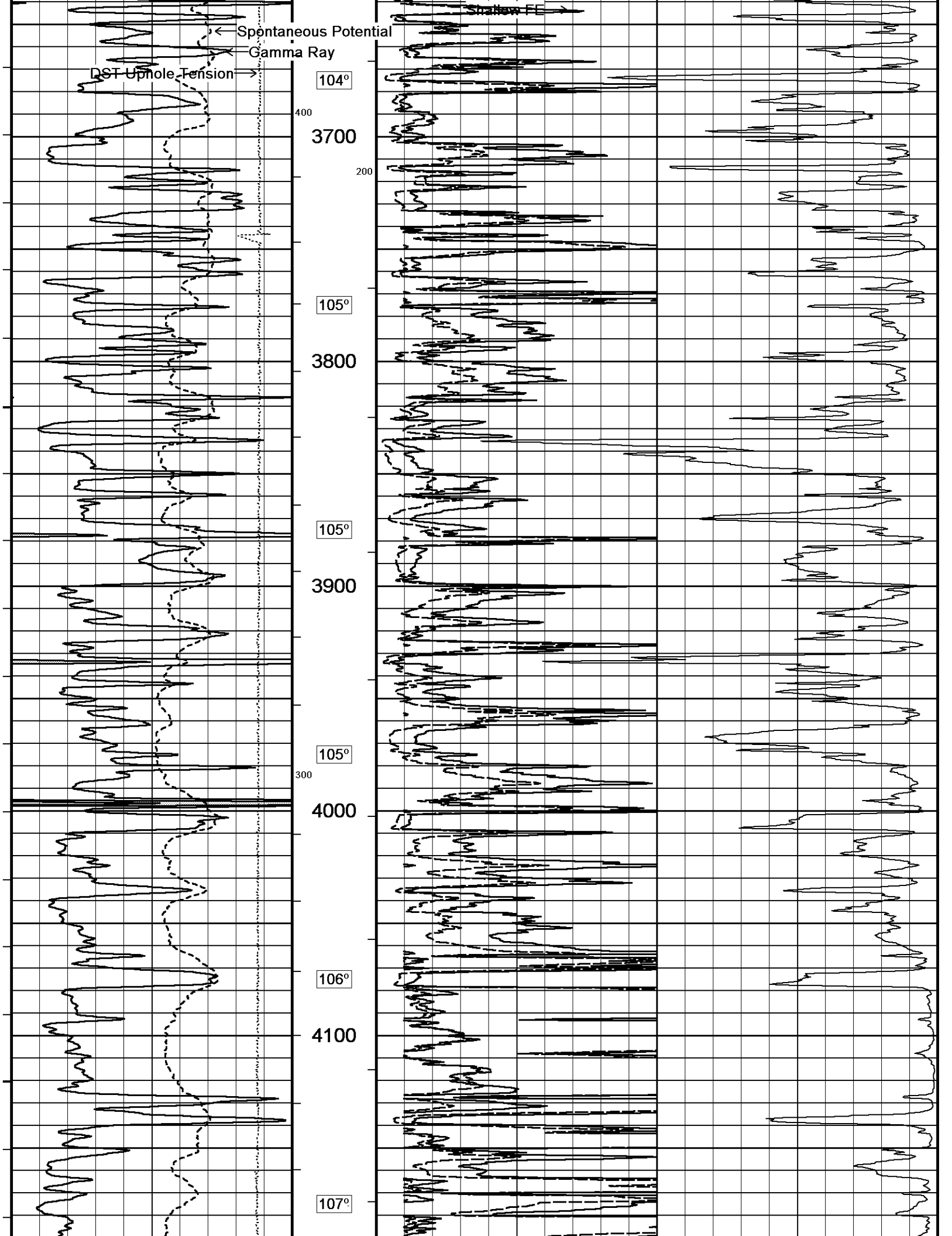


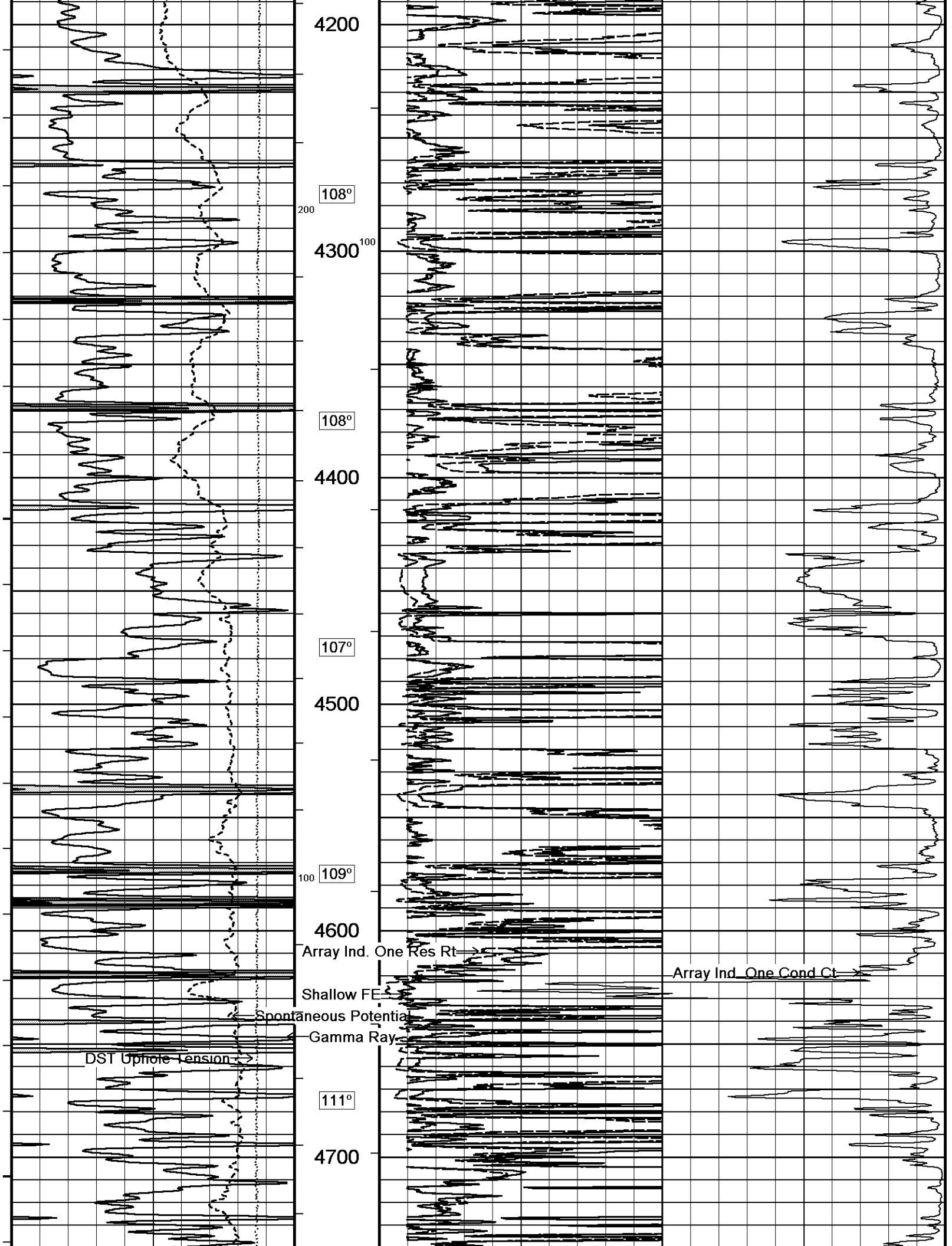


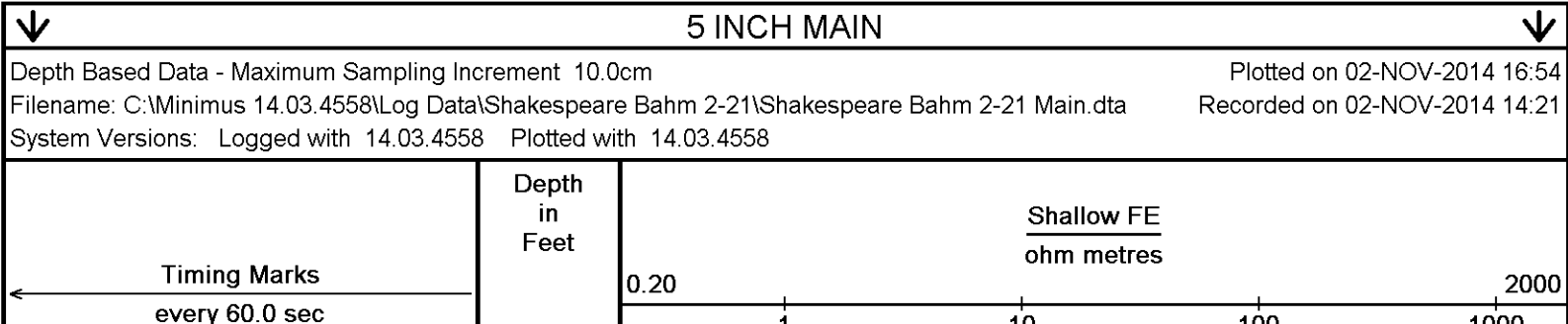
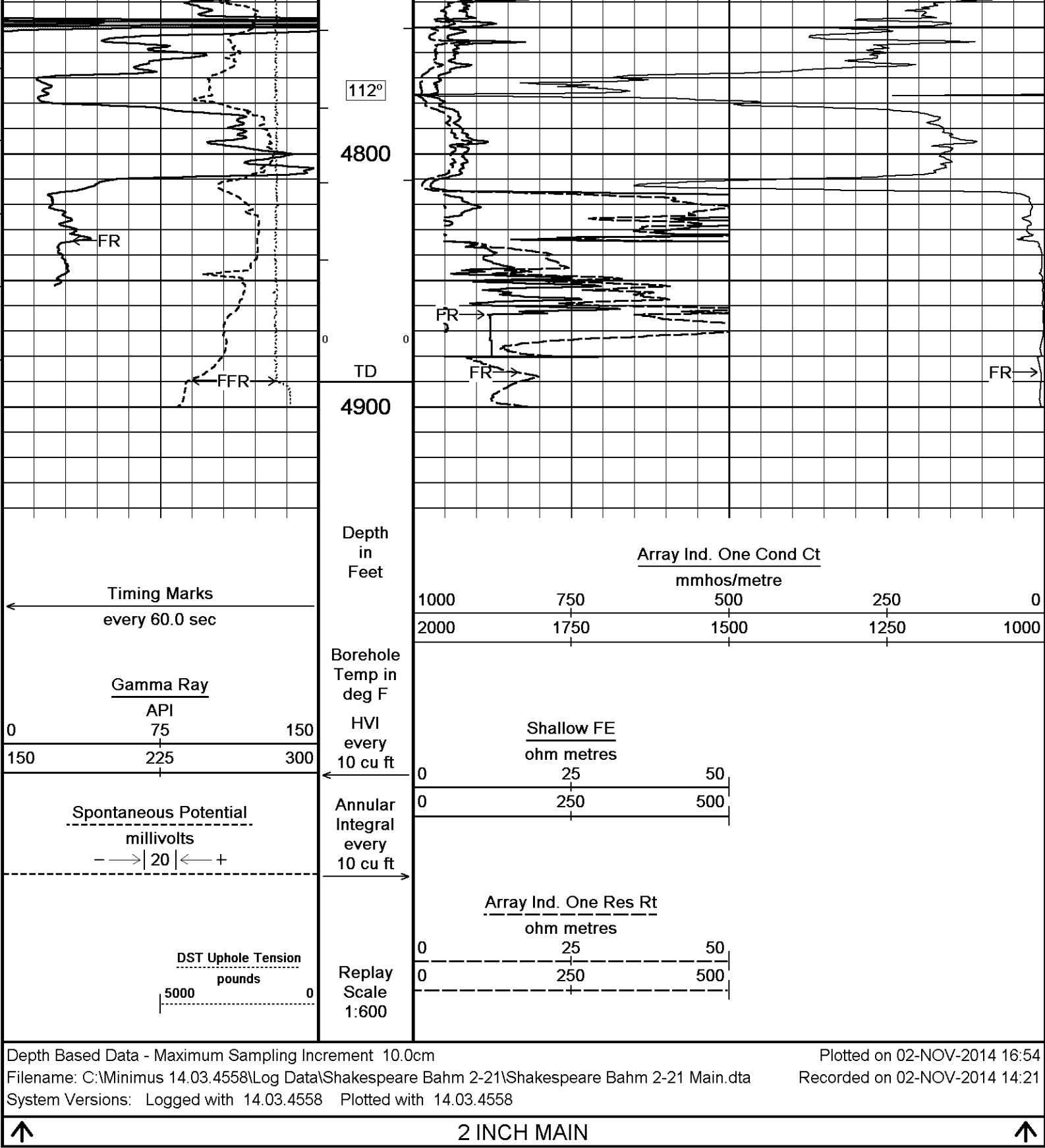


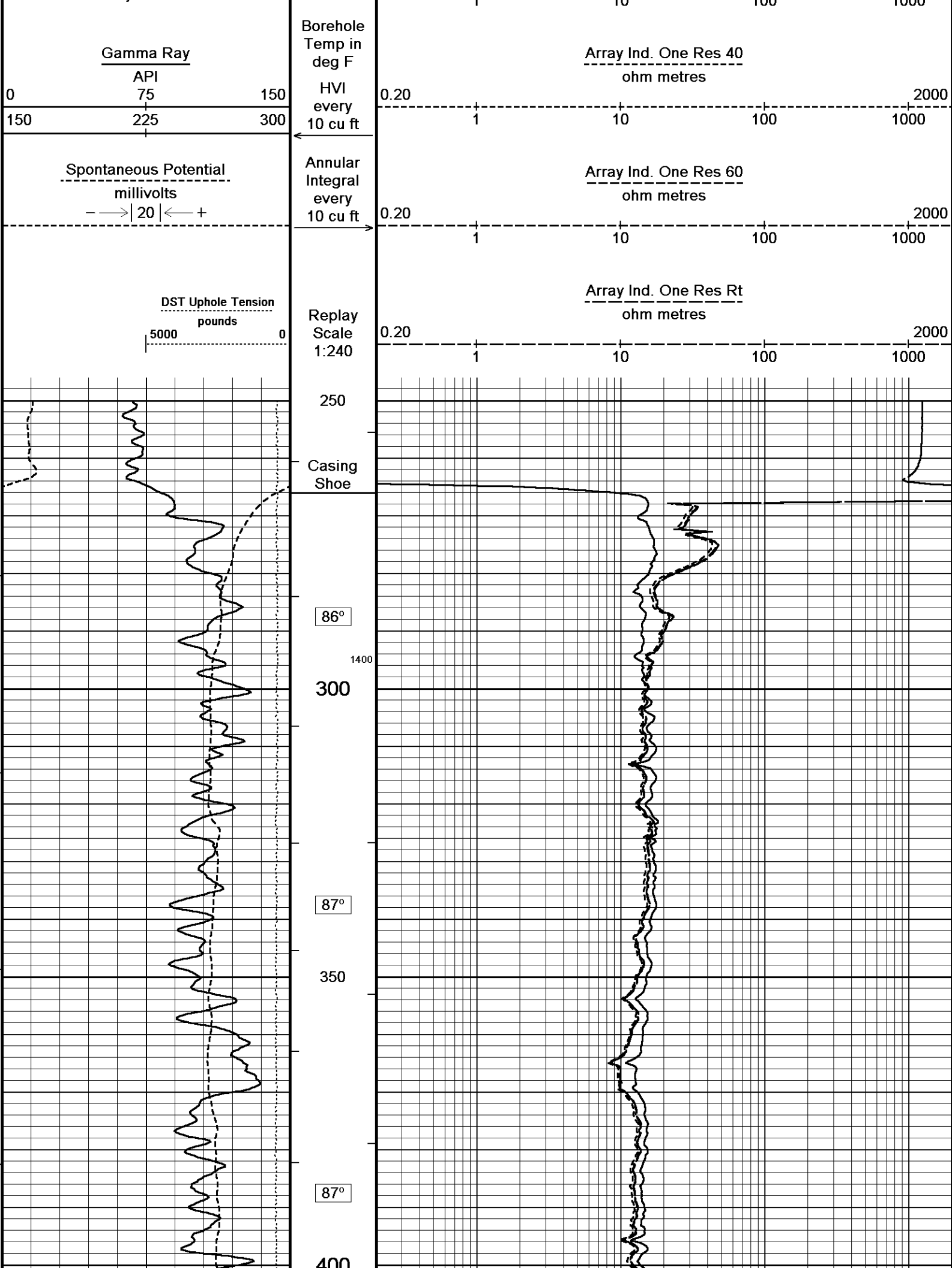


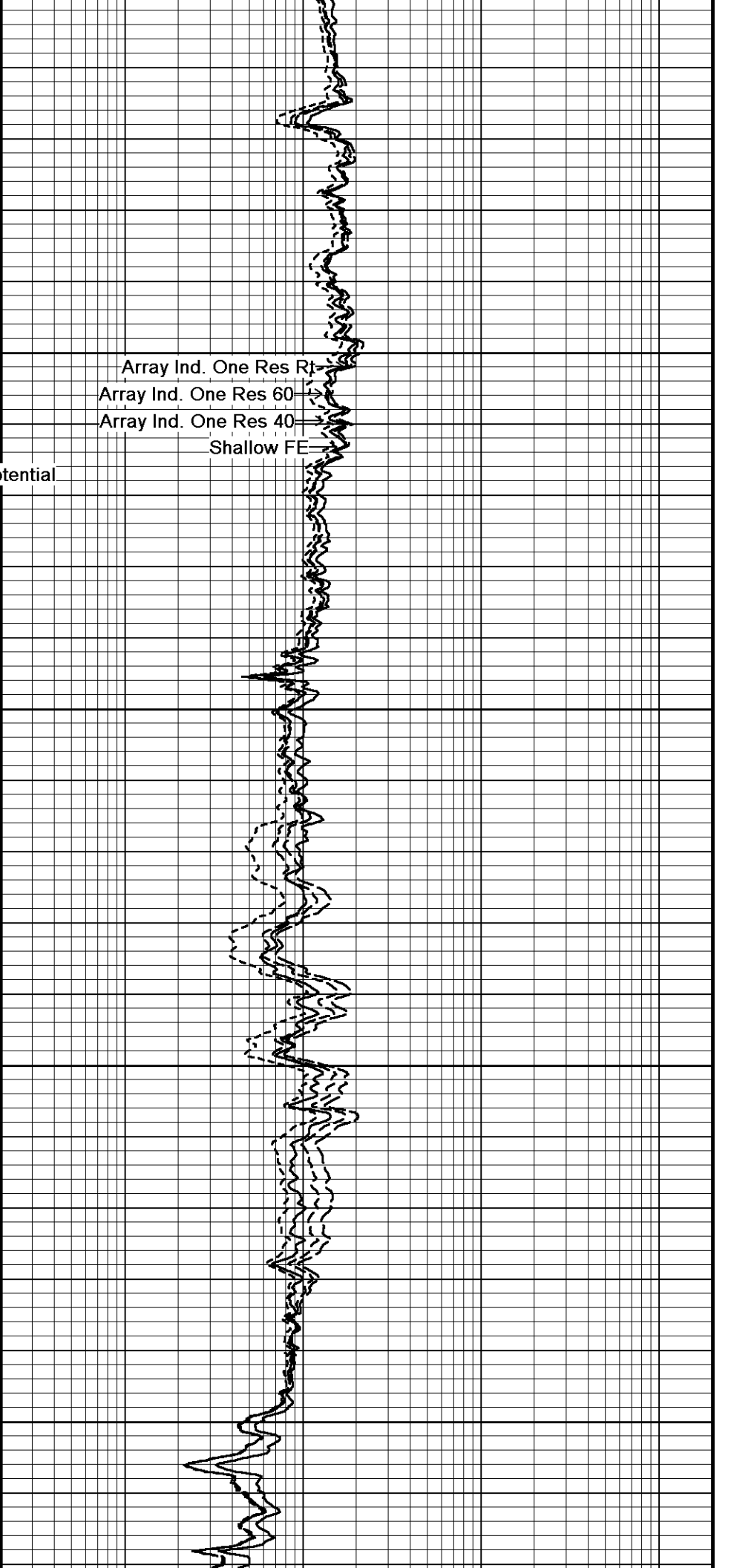
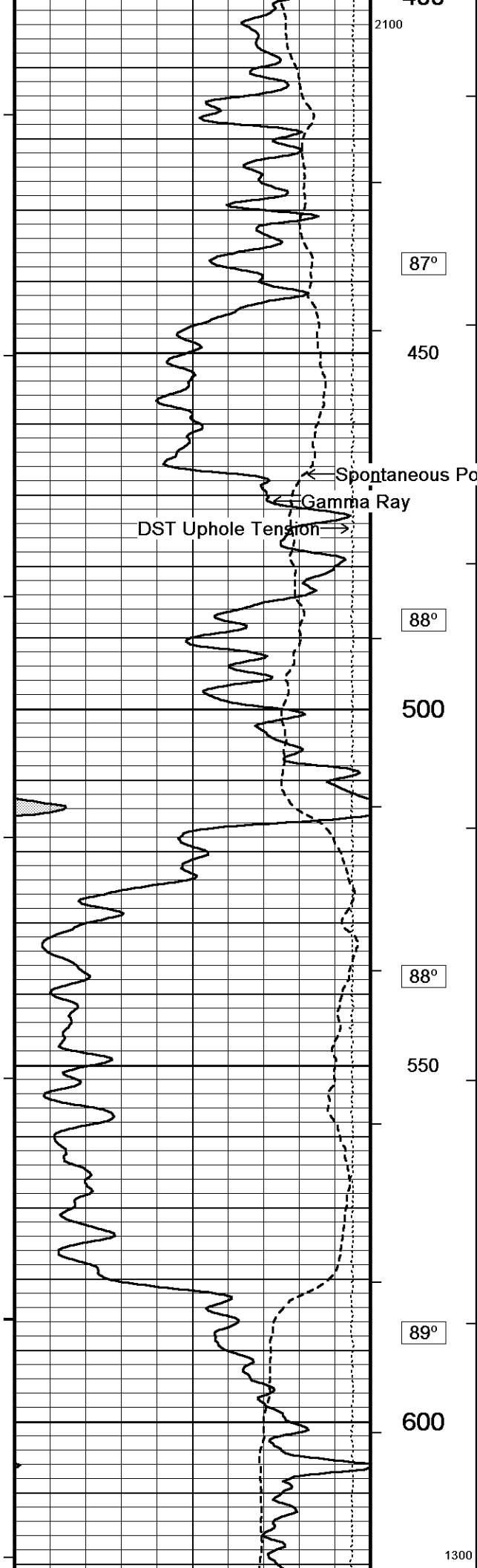


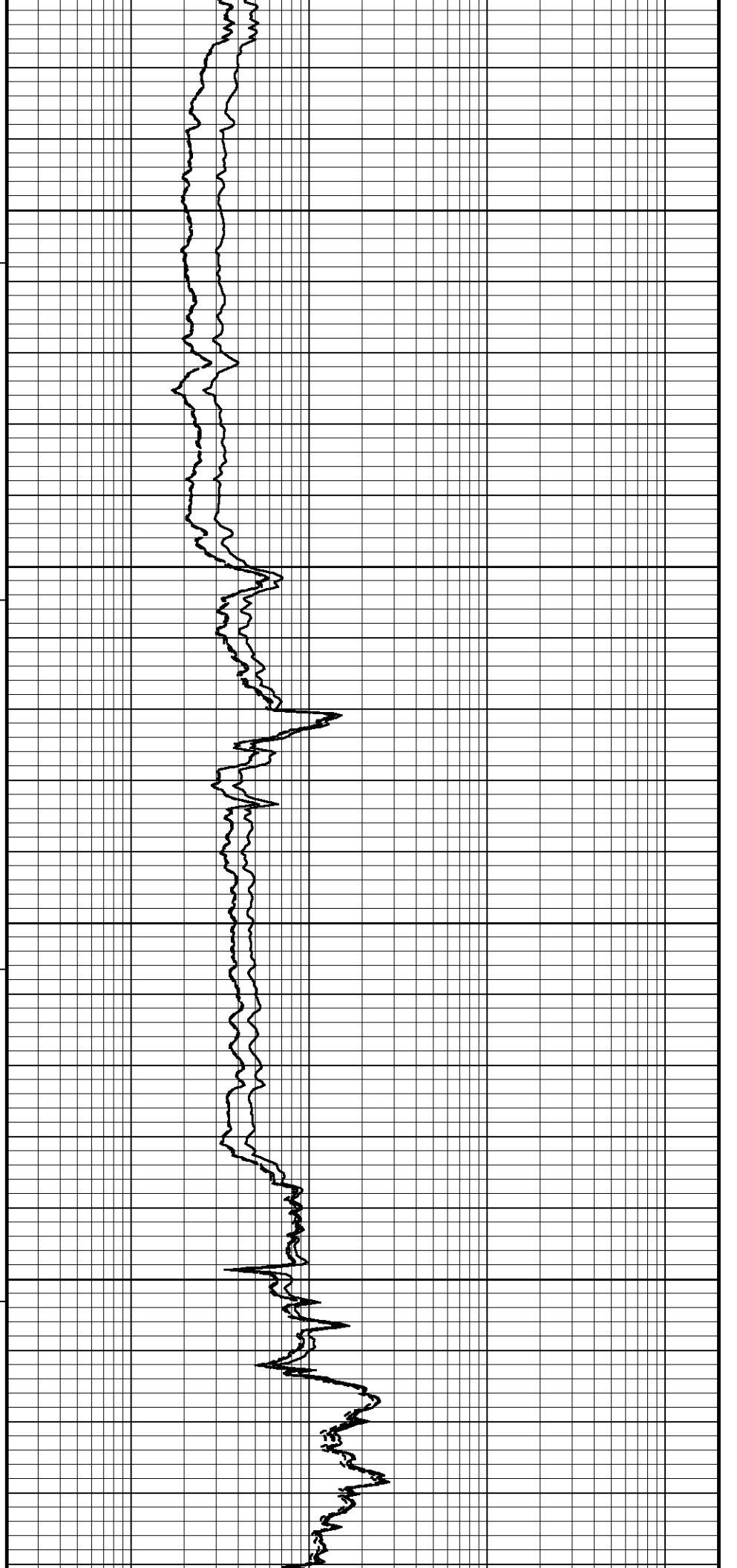
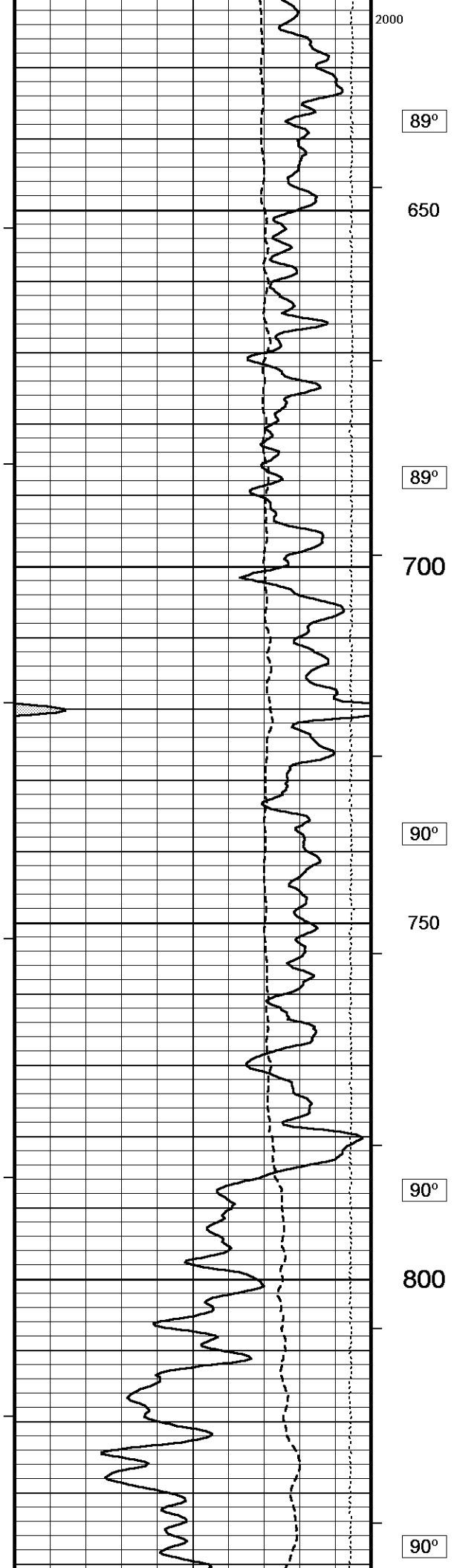


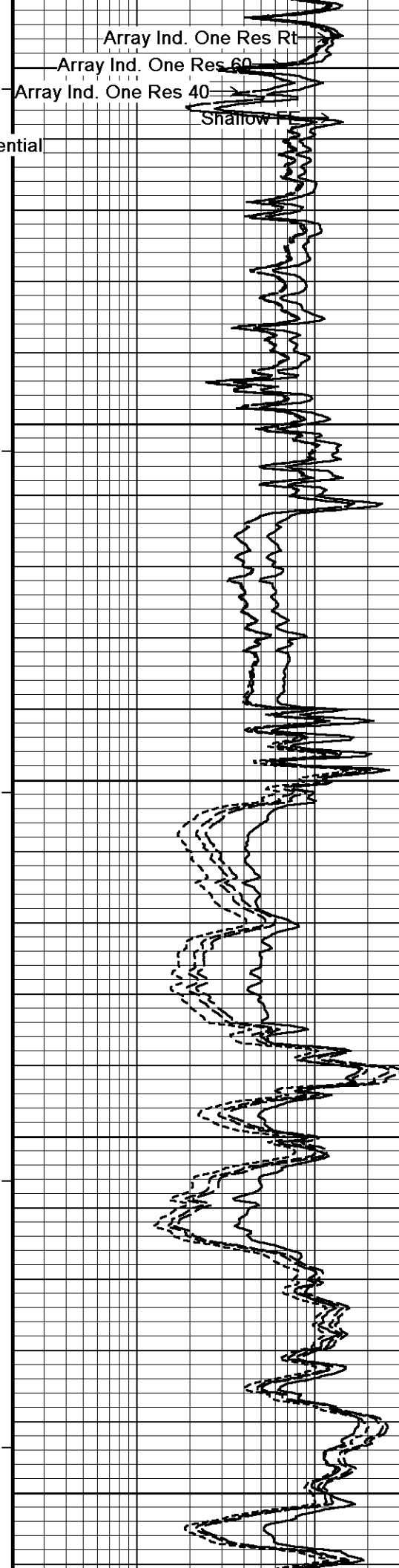
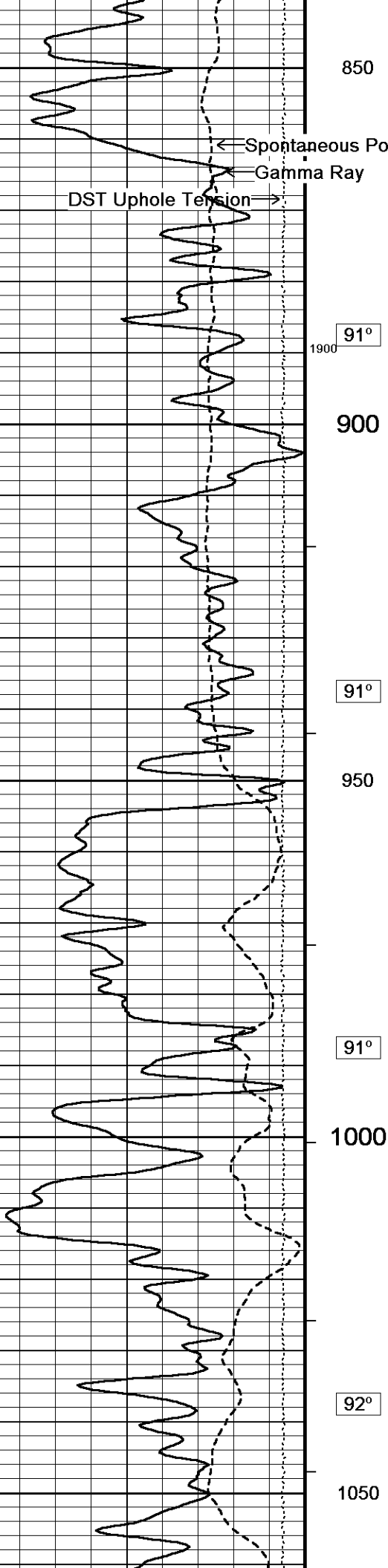


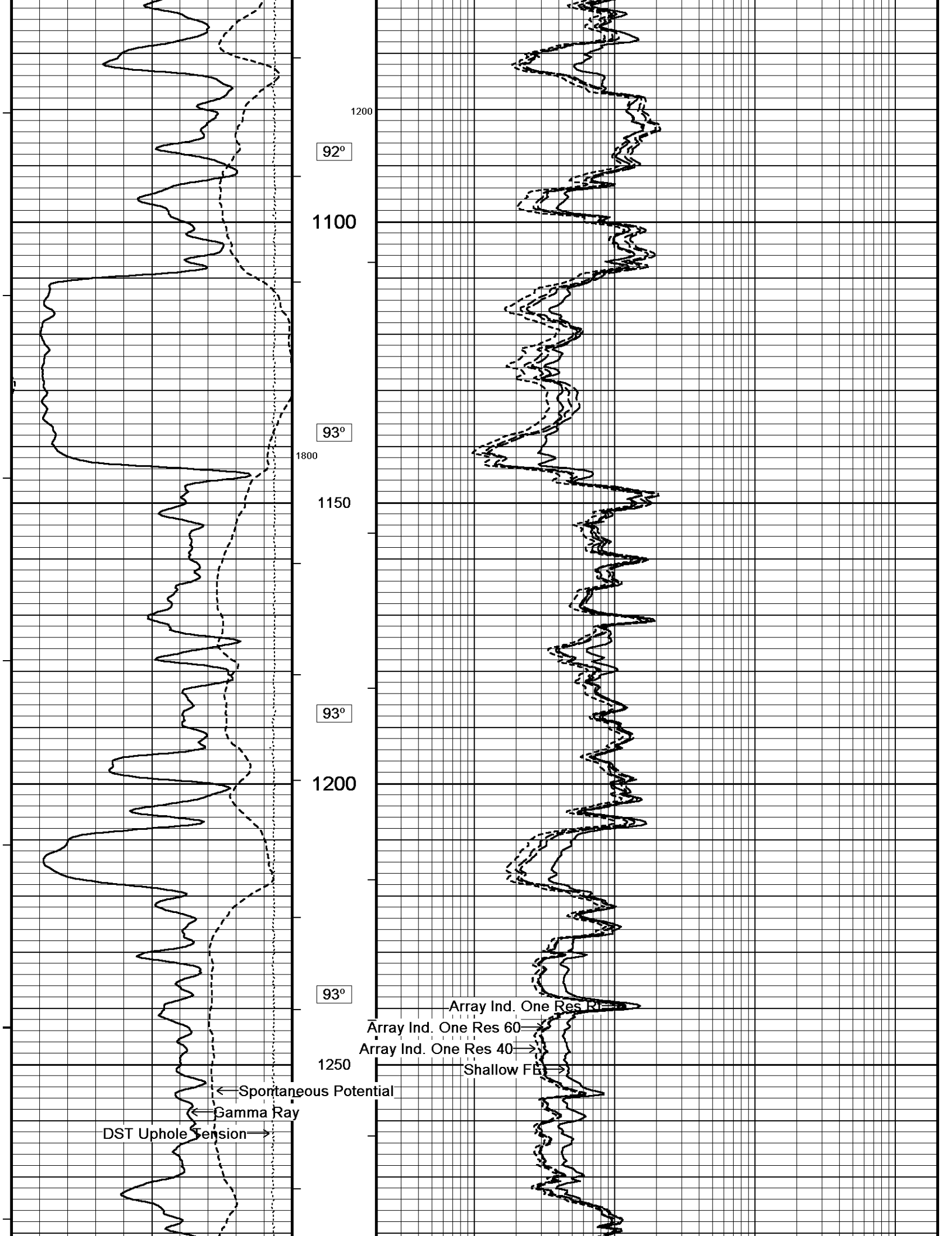


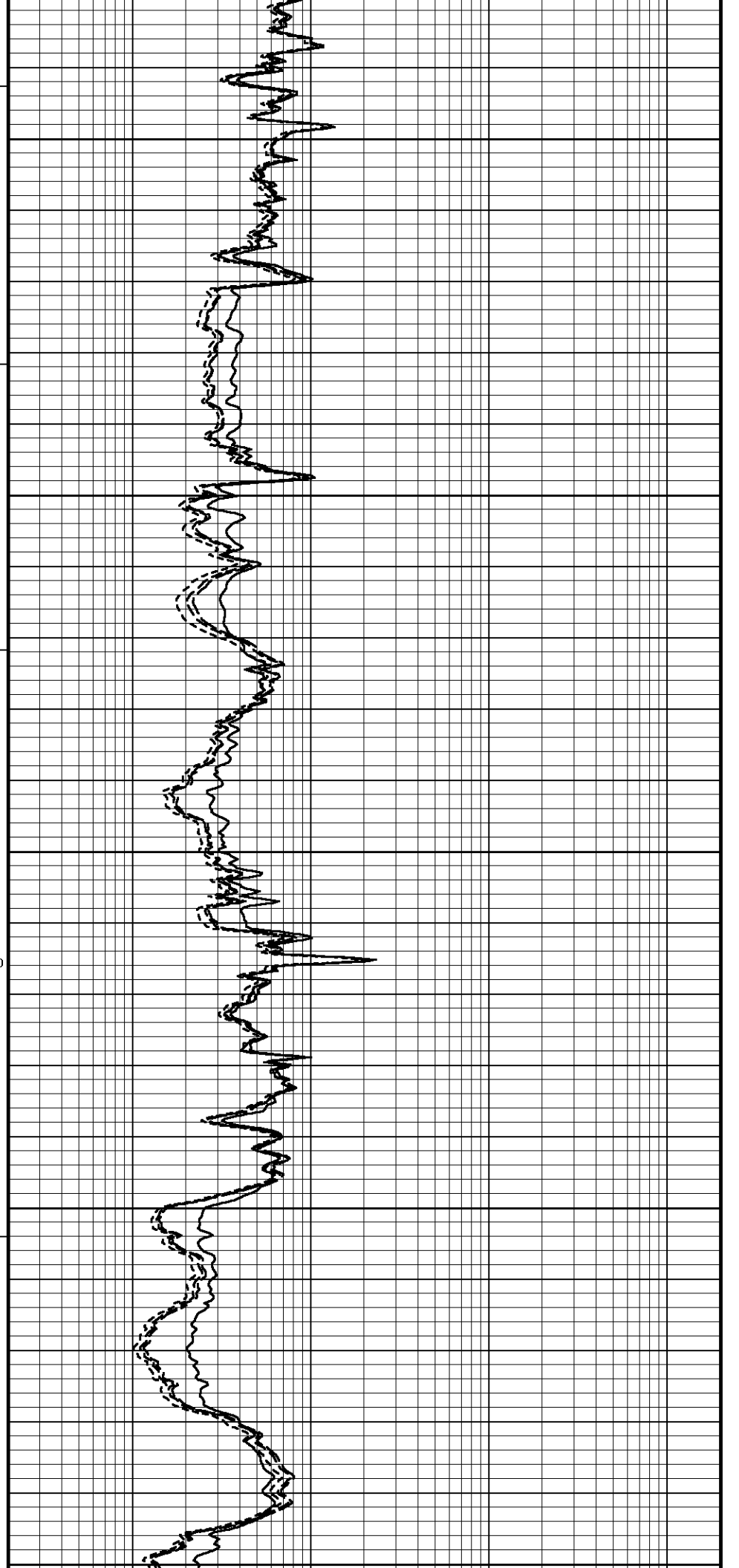
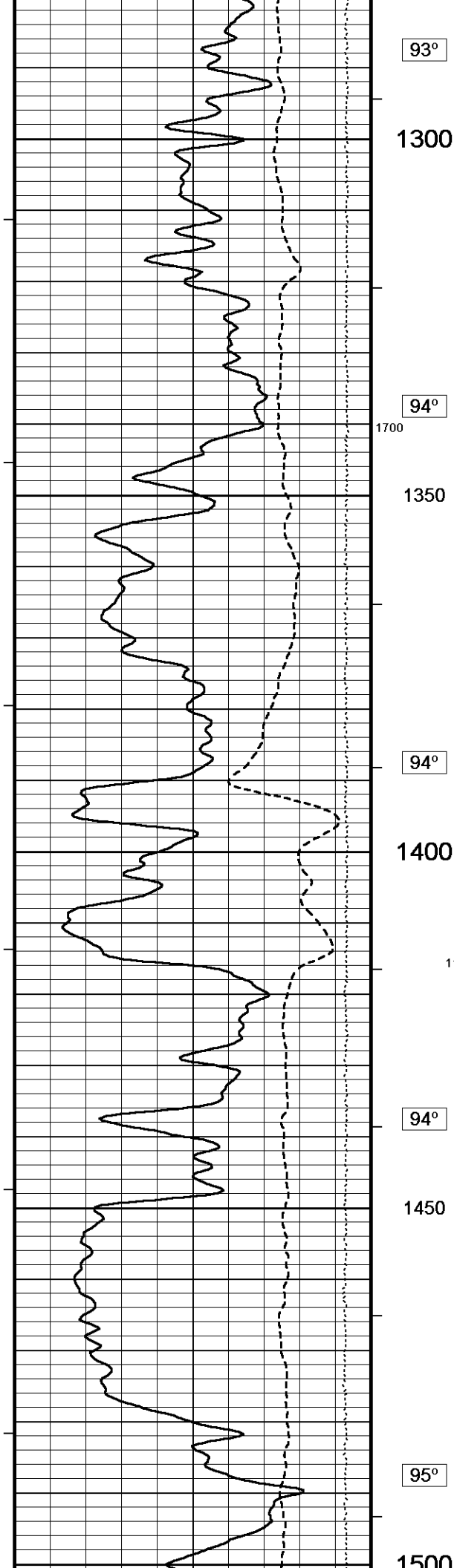


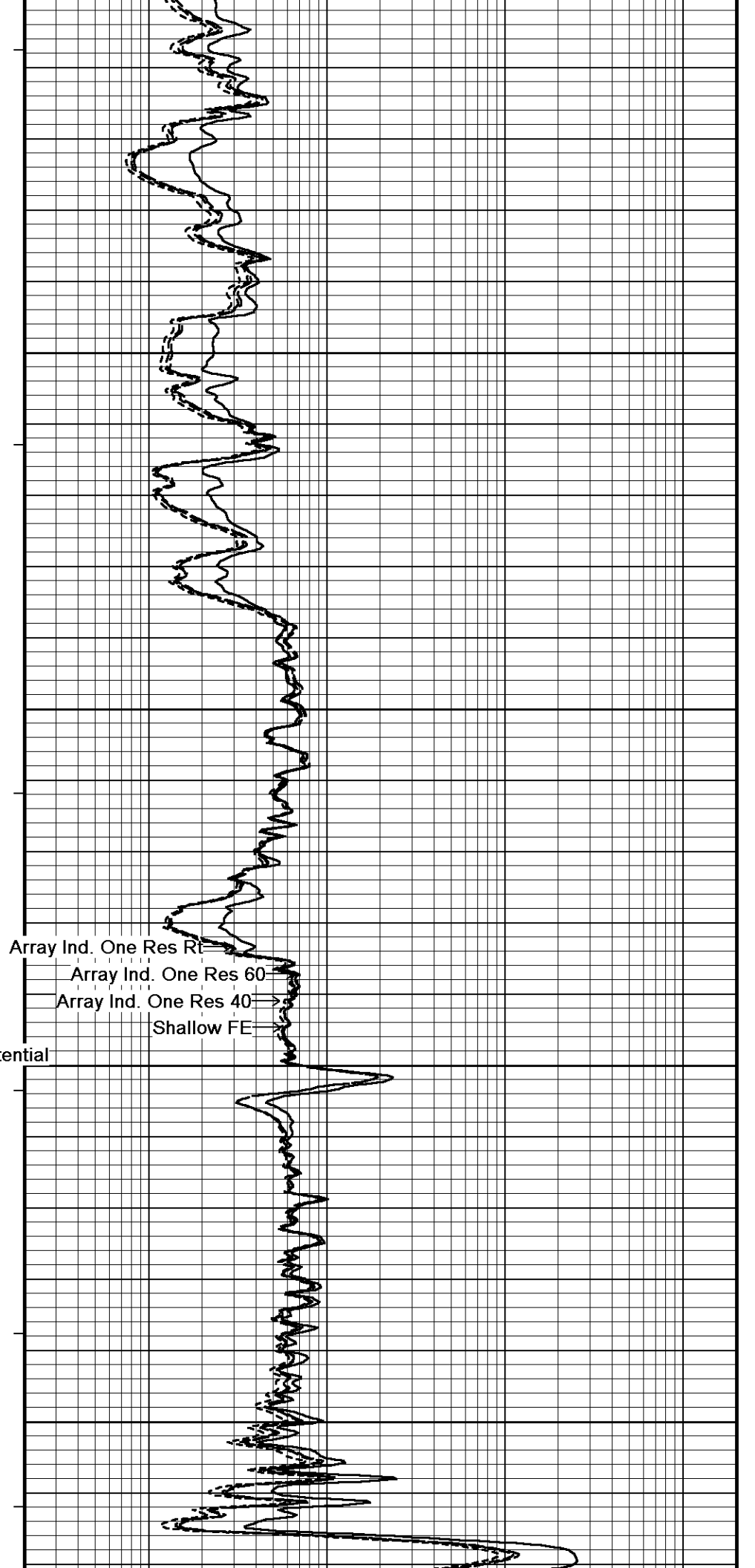
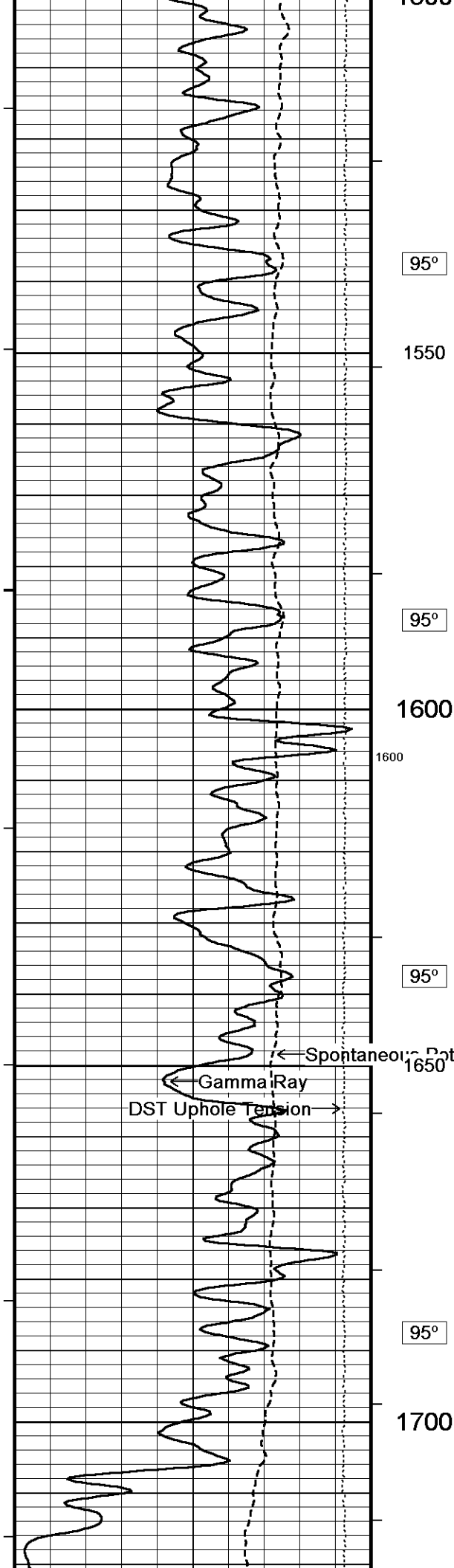


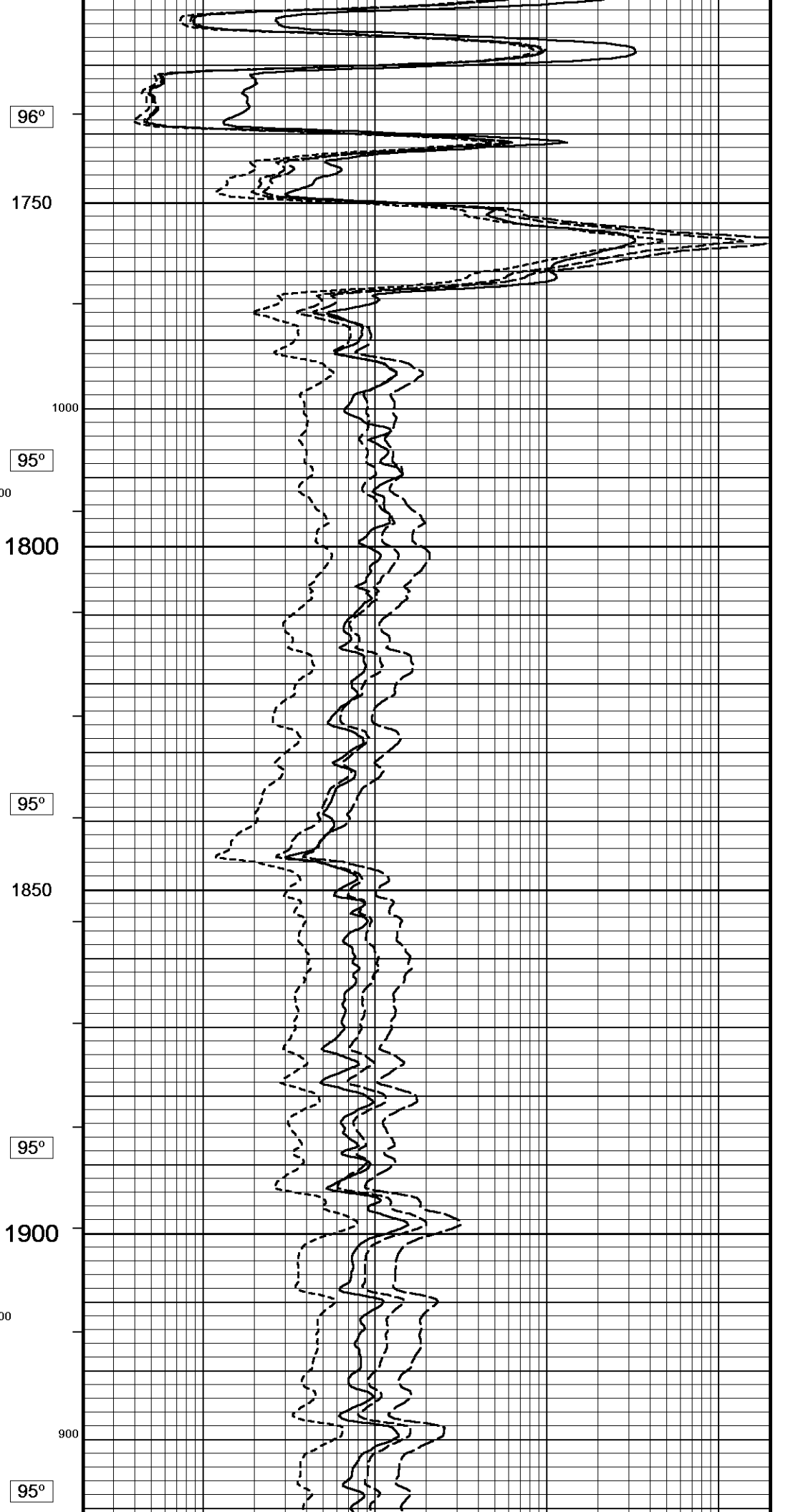
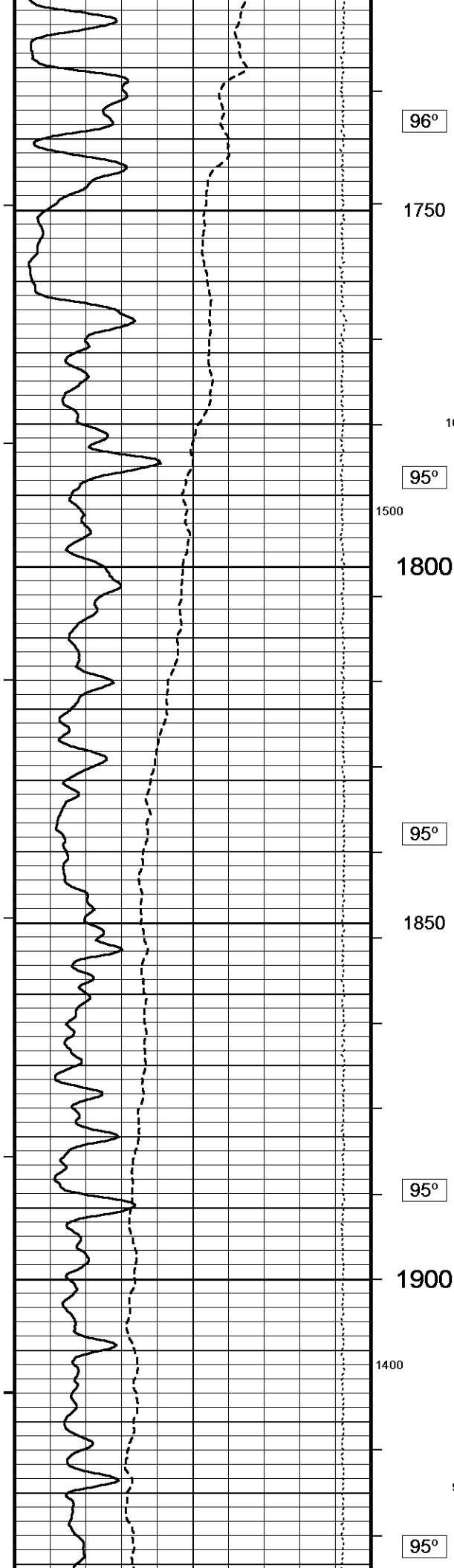


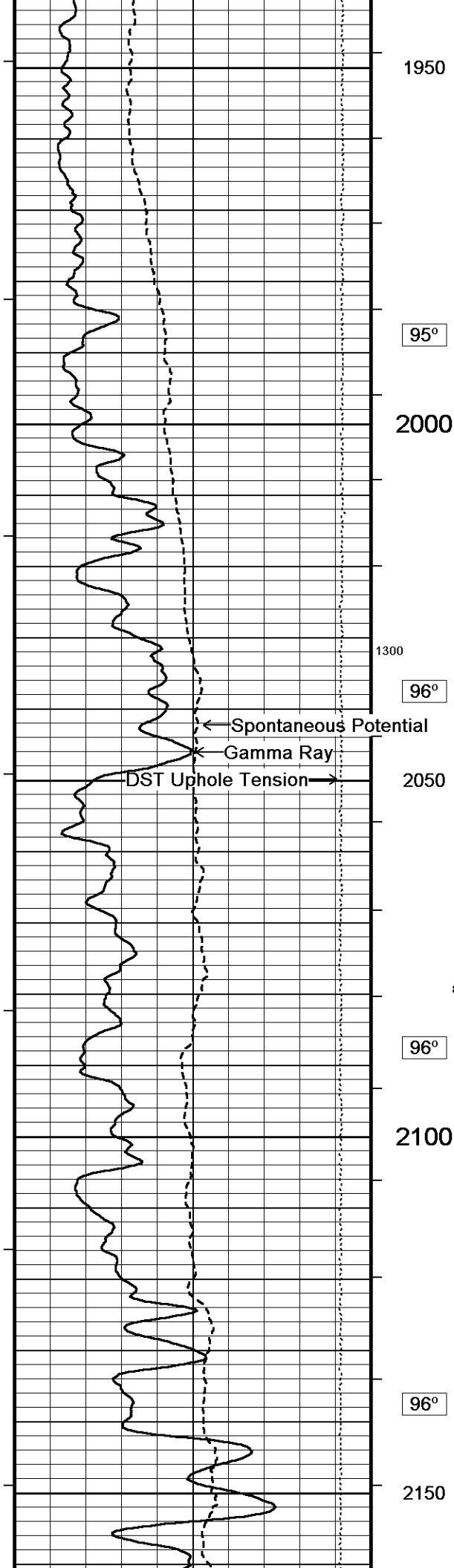












1950

95°

2000

1300

96°

2050

800

96°

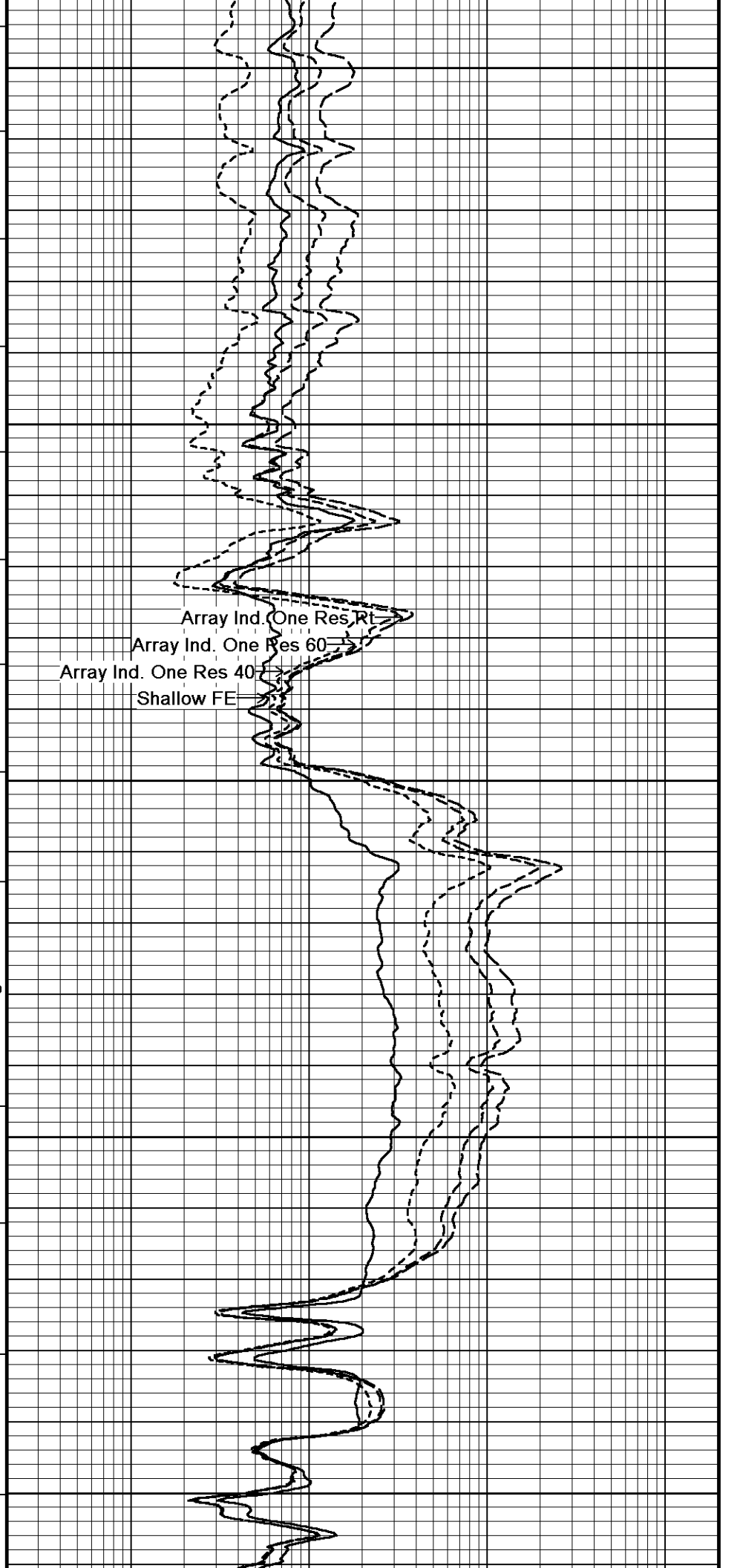
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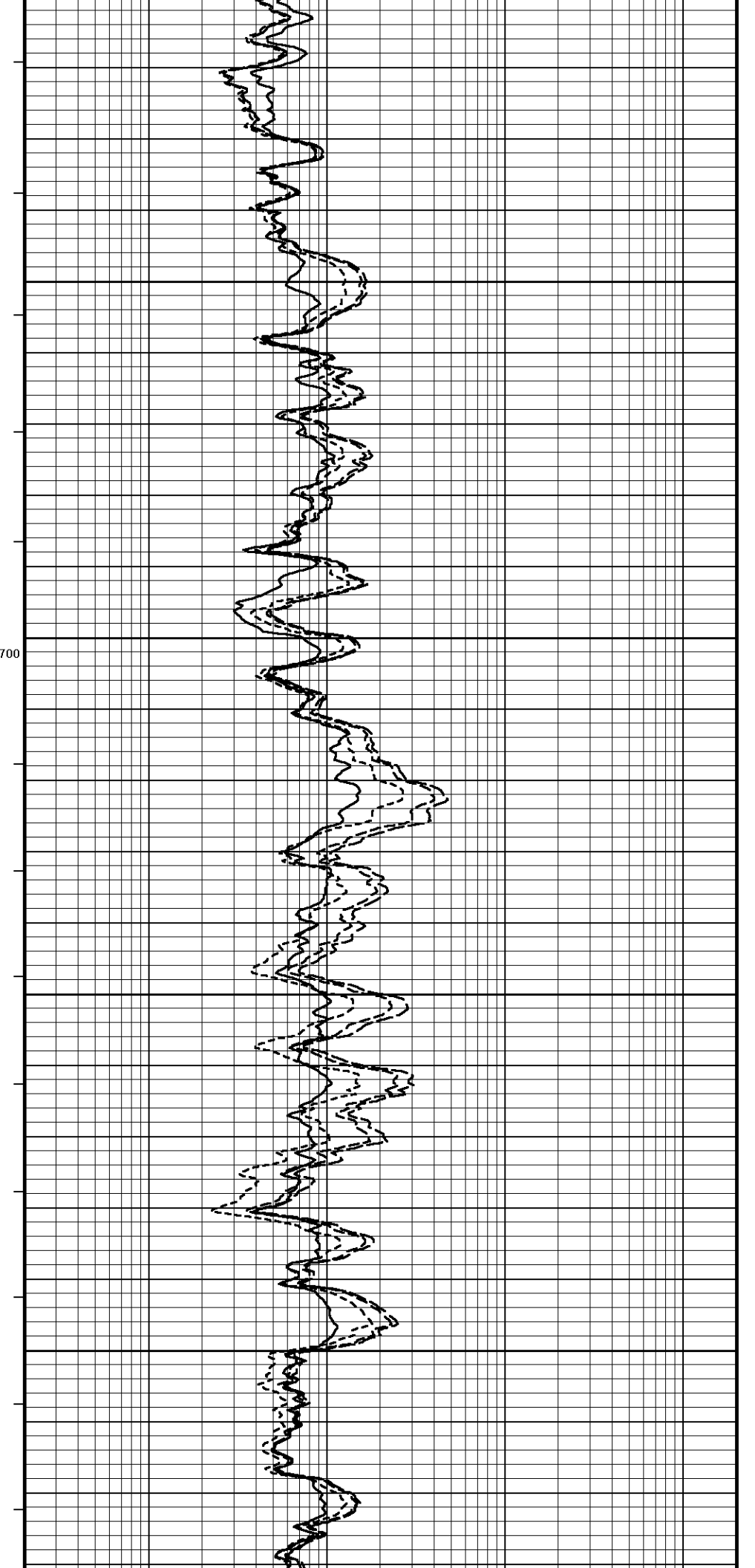
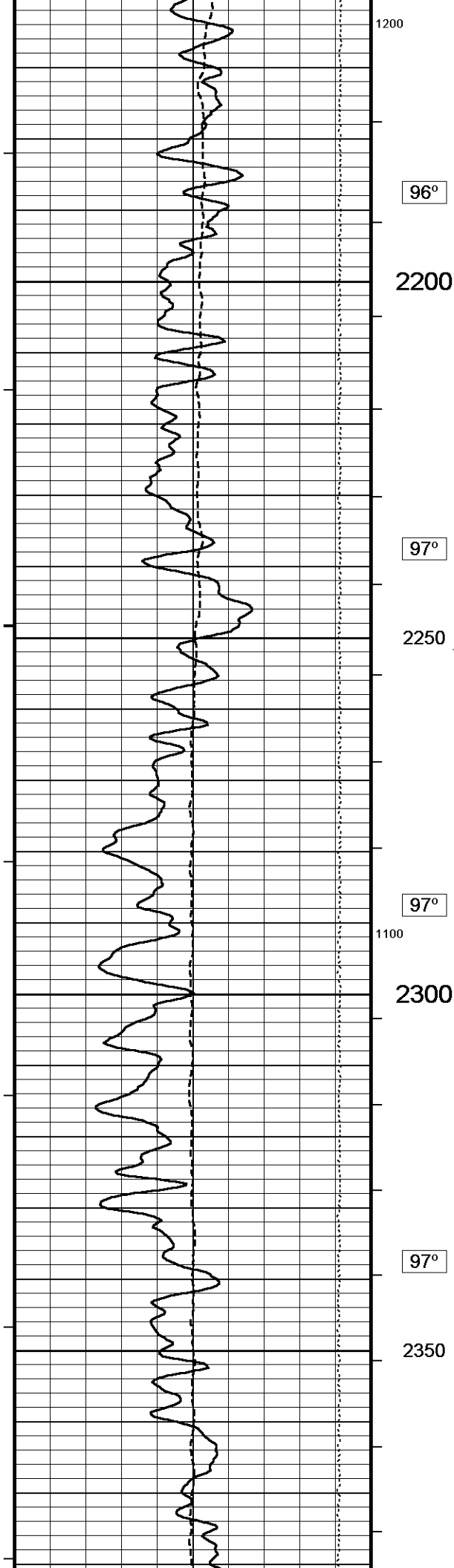
96°

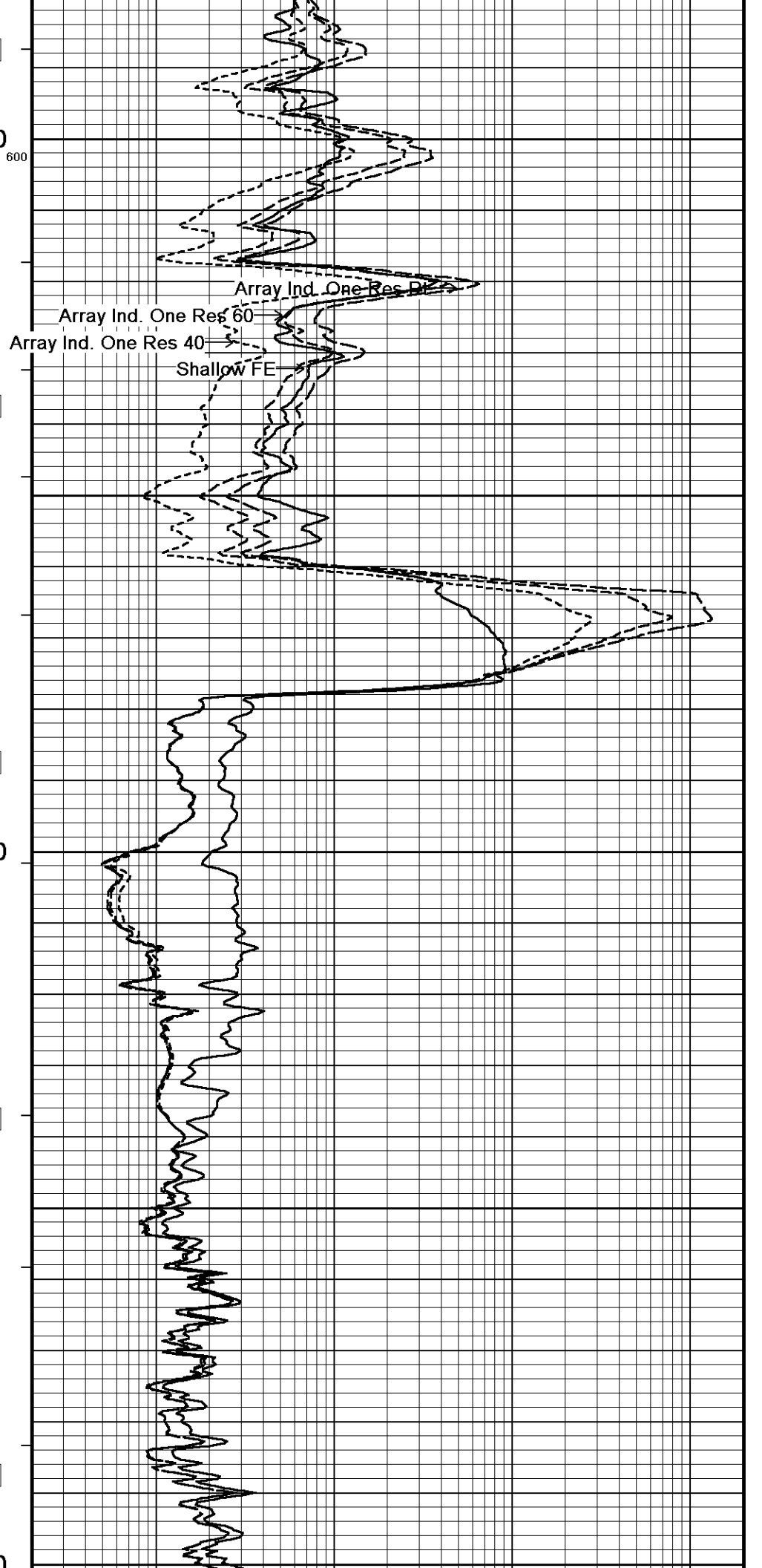
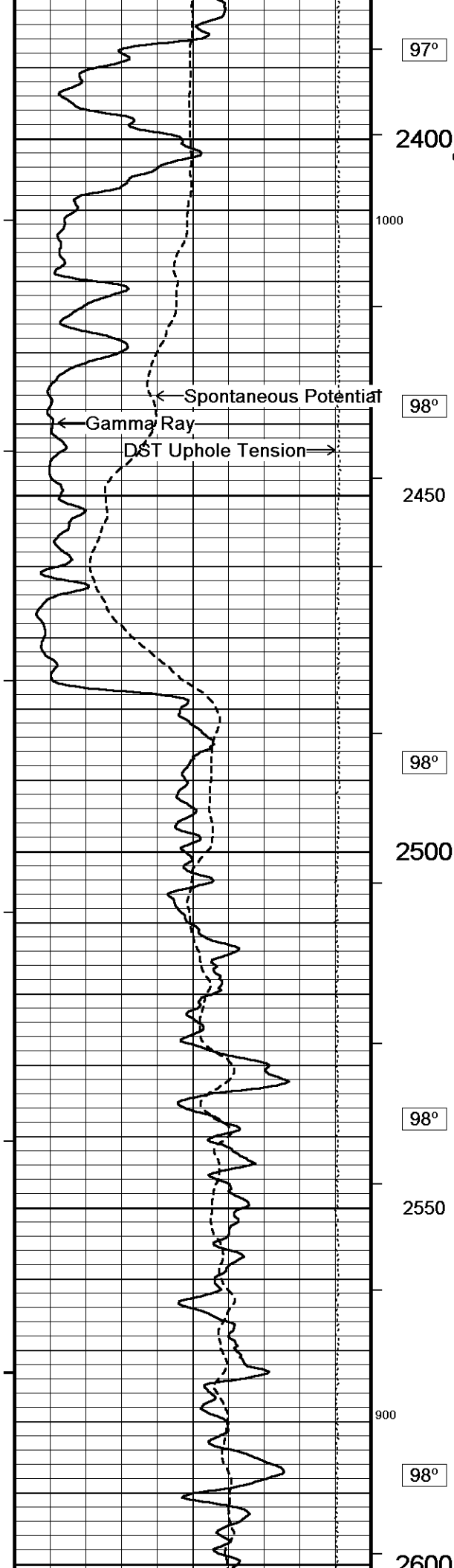
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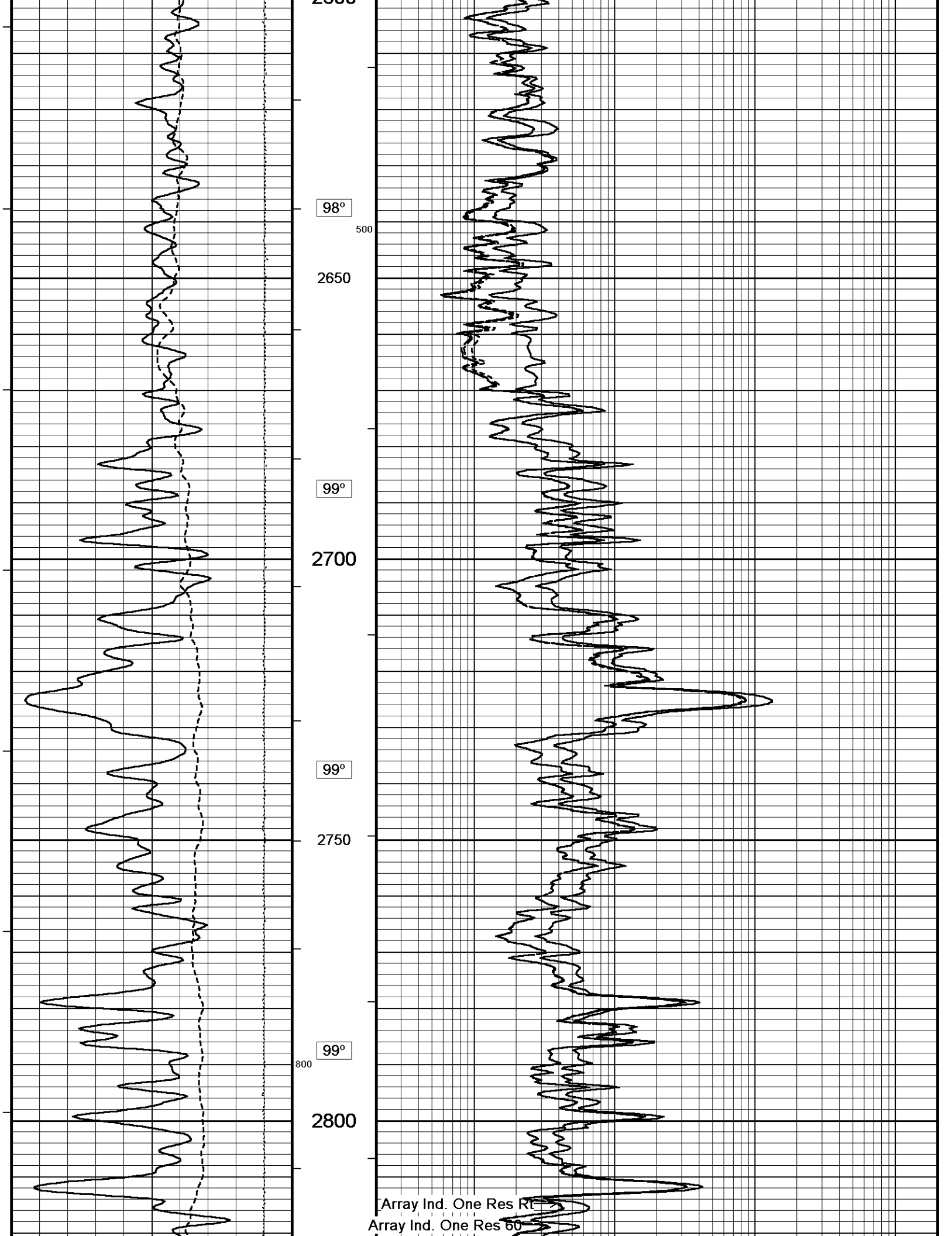
← Spontaneous Potential
← Gamma Ray
DST Uphole Tension →

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





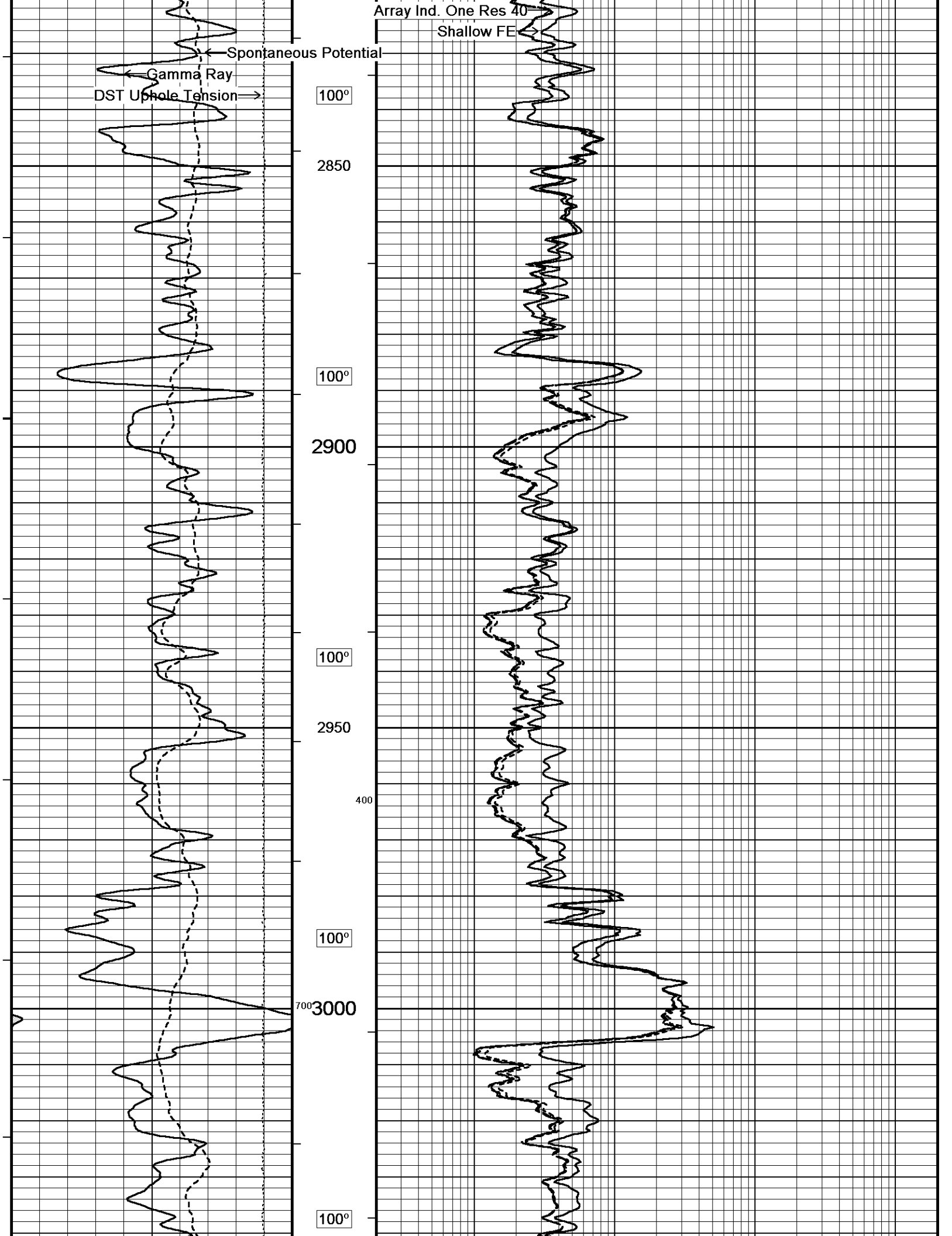


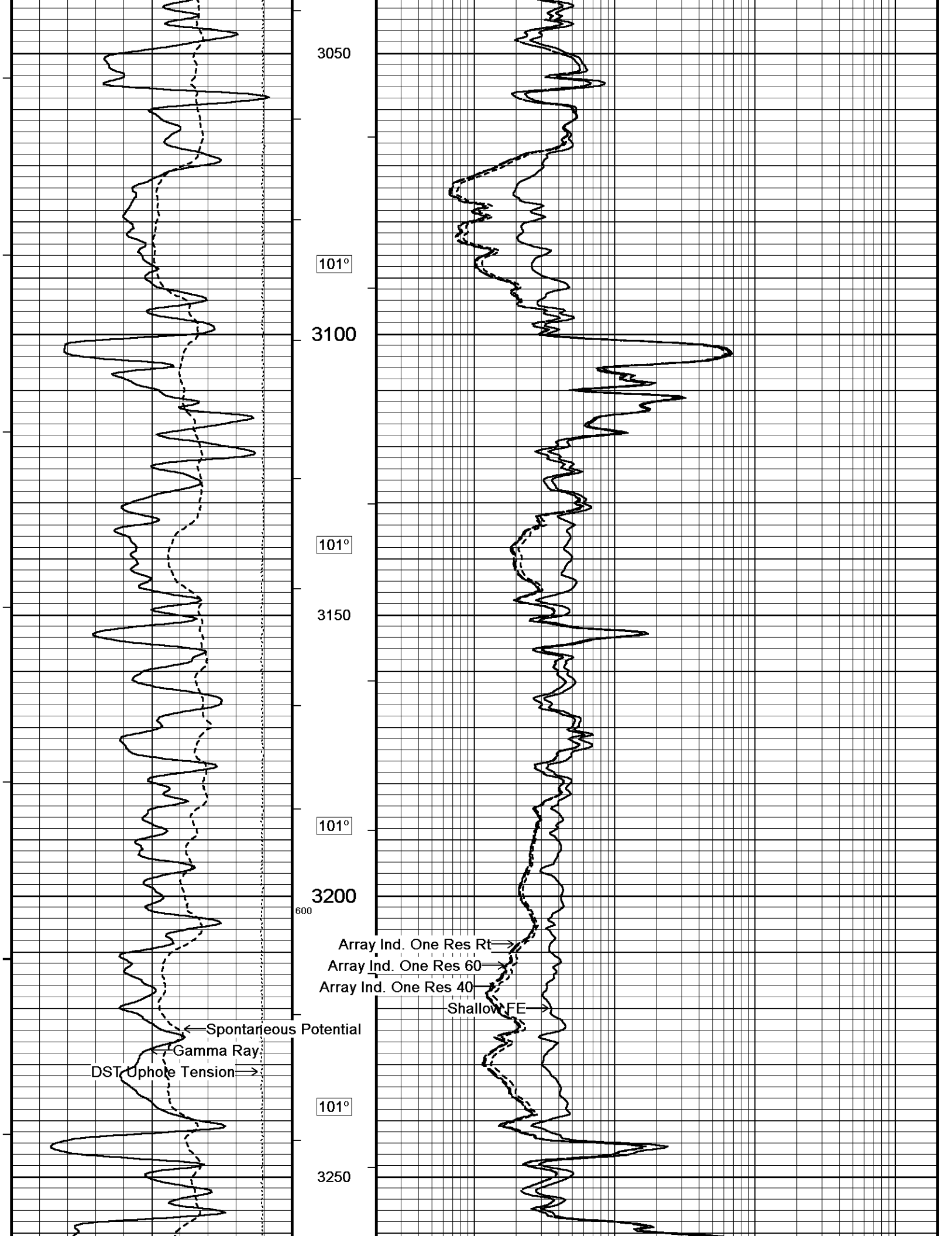


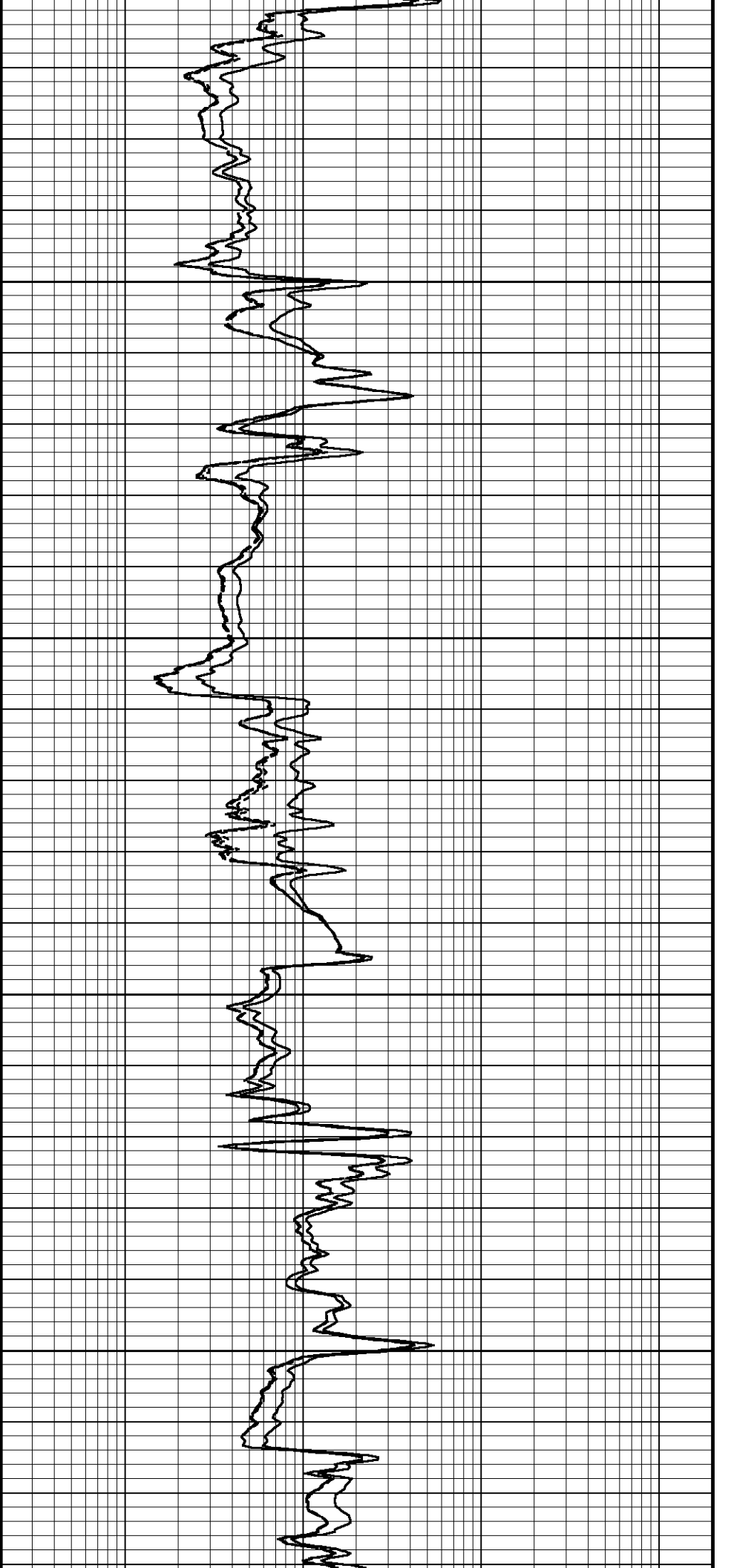
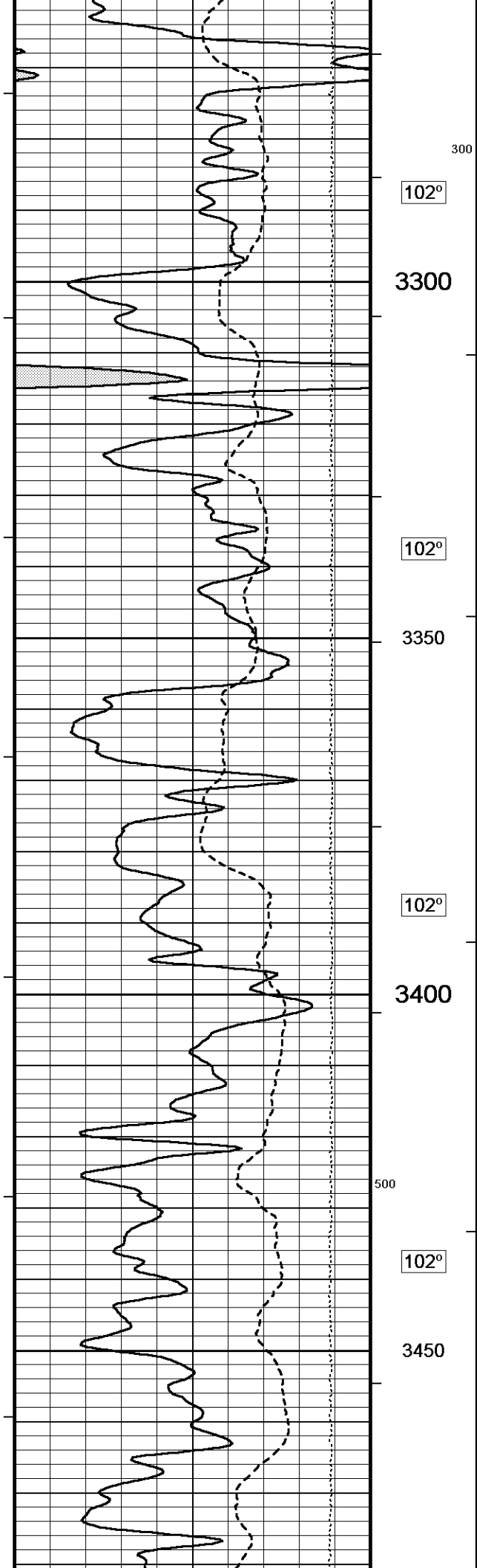
Spontaneous Potential
Gamma Ray
DST Uphole Tension

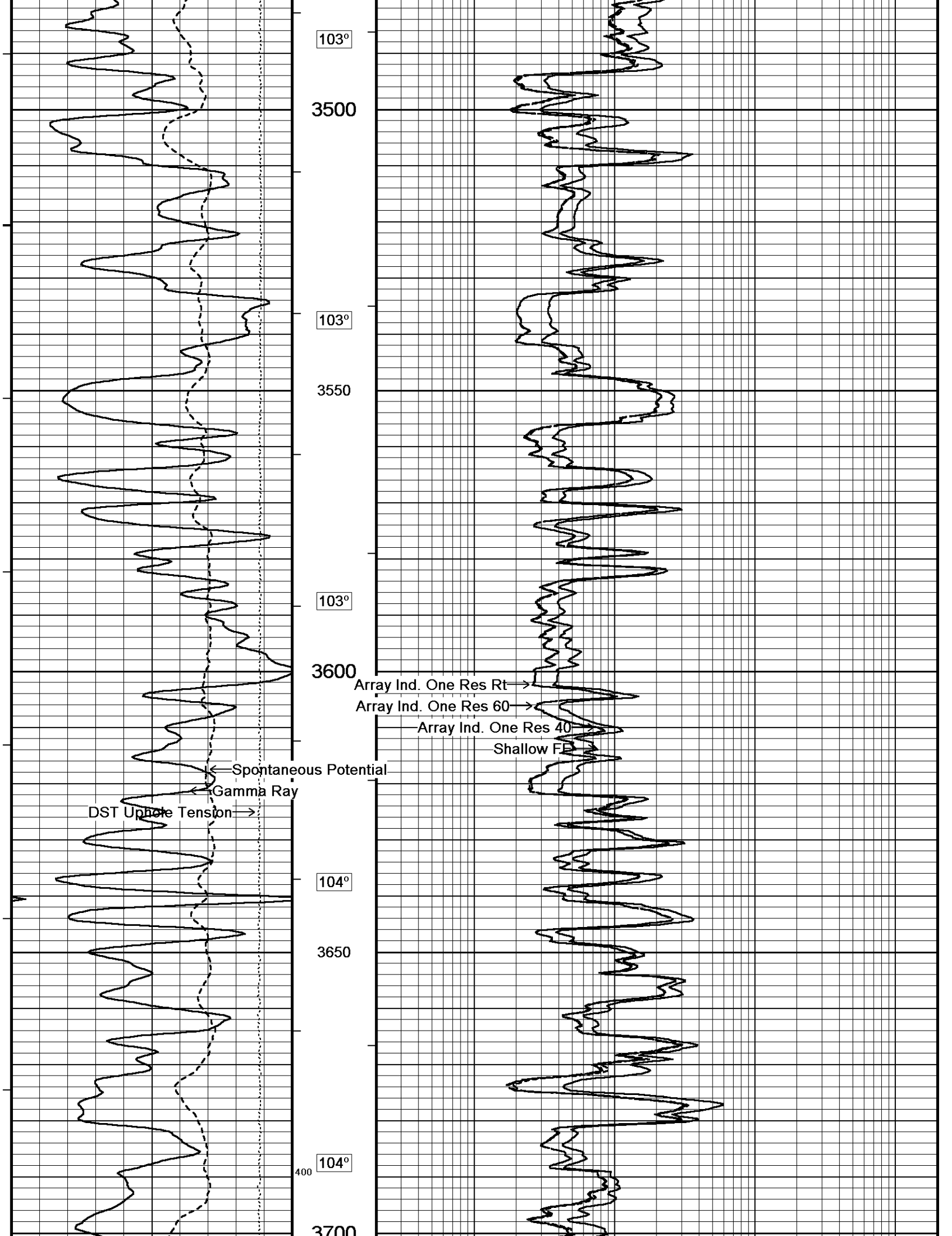
100°
2850
100°
2900
100°
2950
400
100°
3000
100°

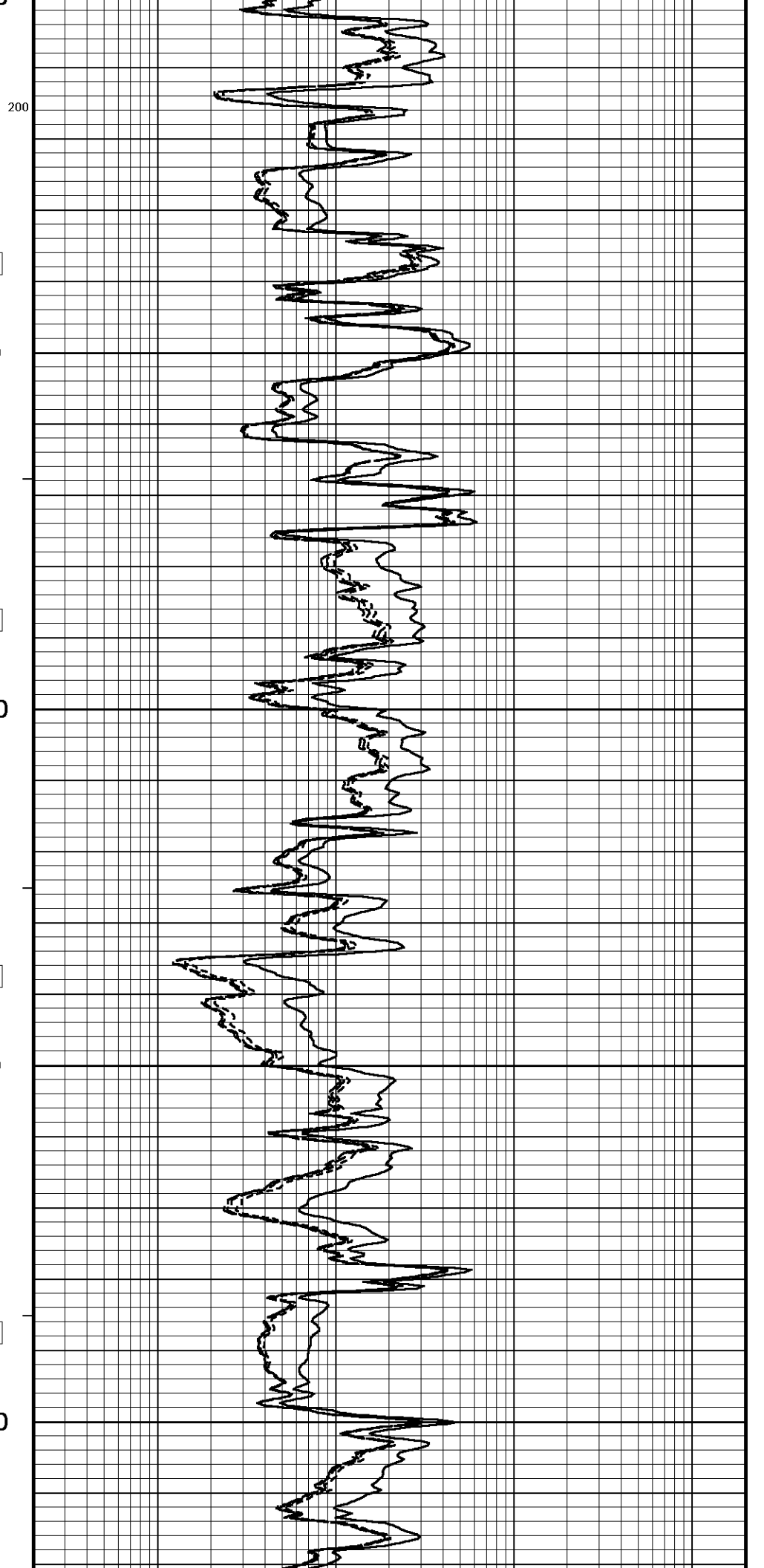
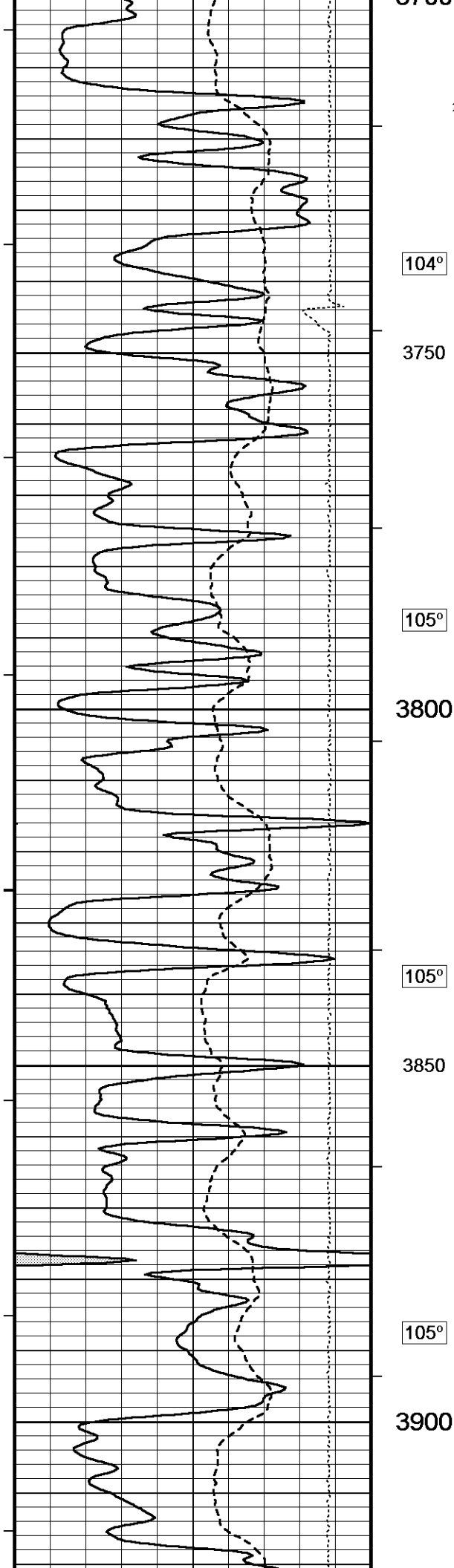
Array Ind. One Res 40
Shallow FE

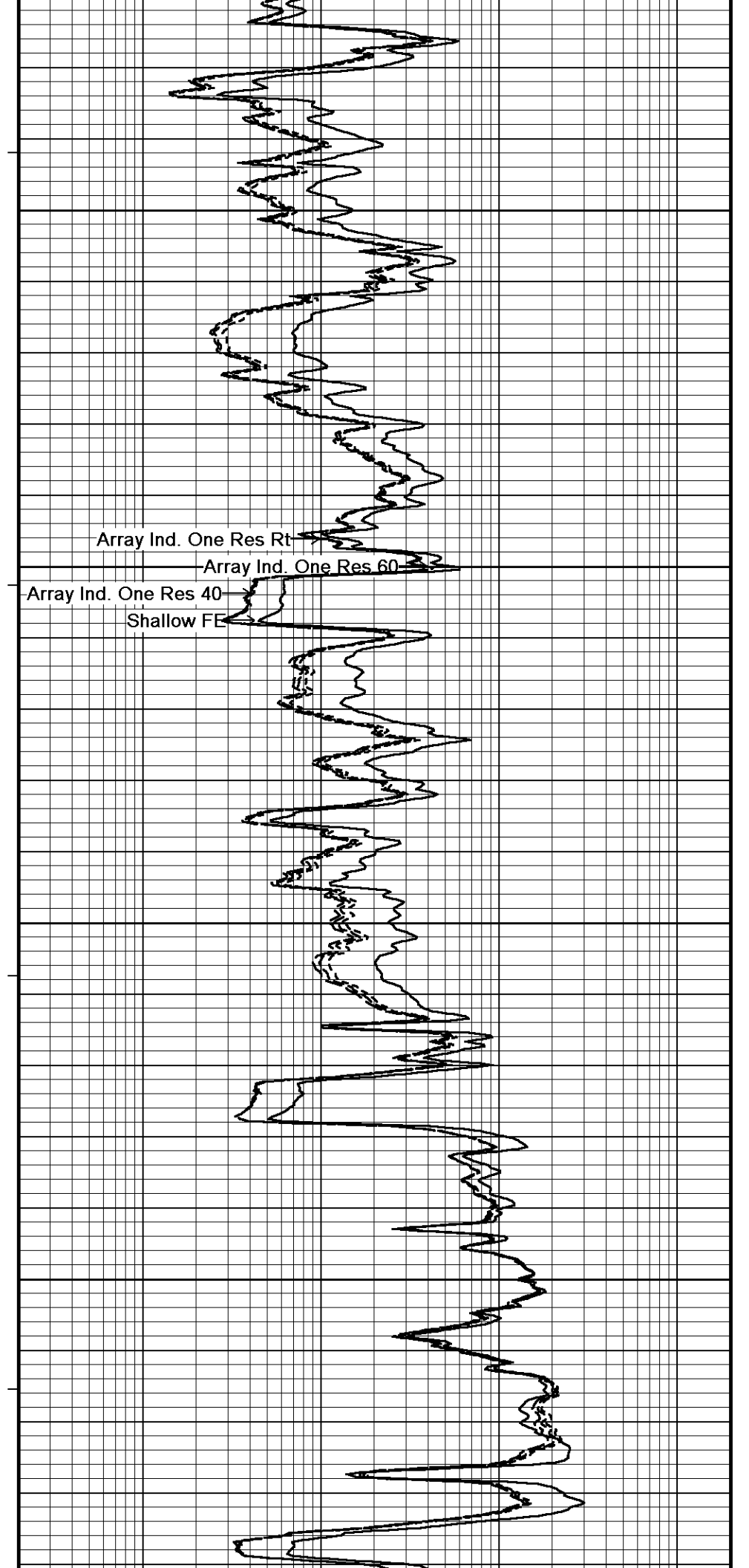
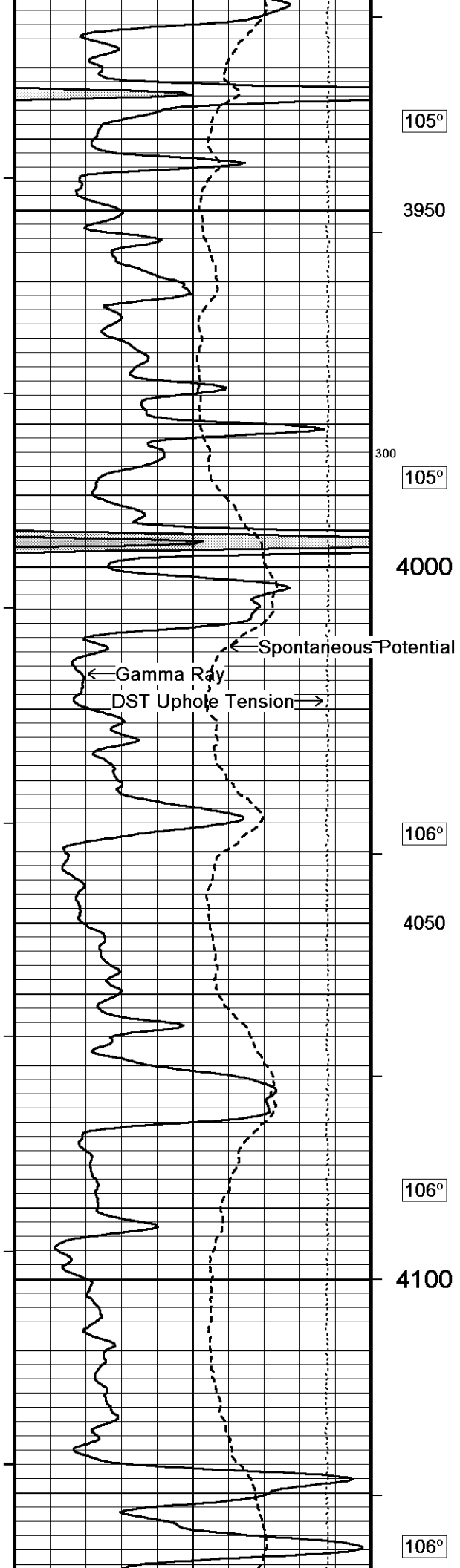


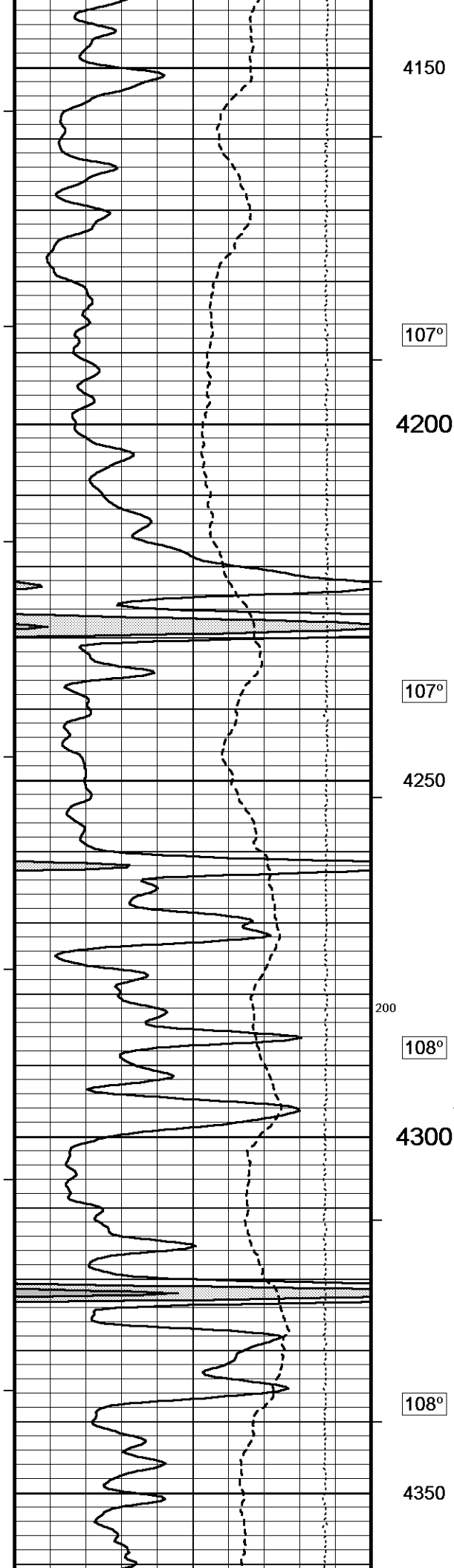












4150

107°

4200

107°

4250

200

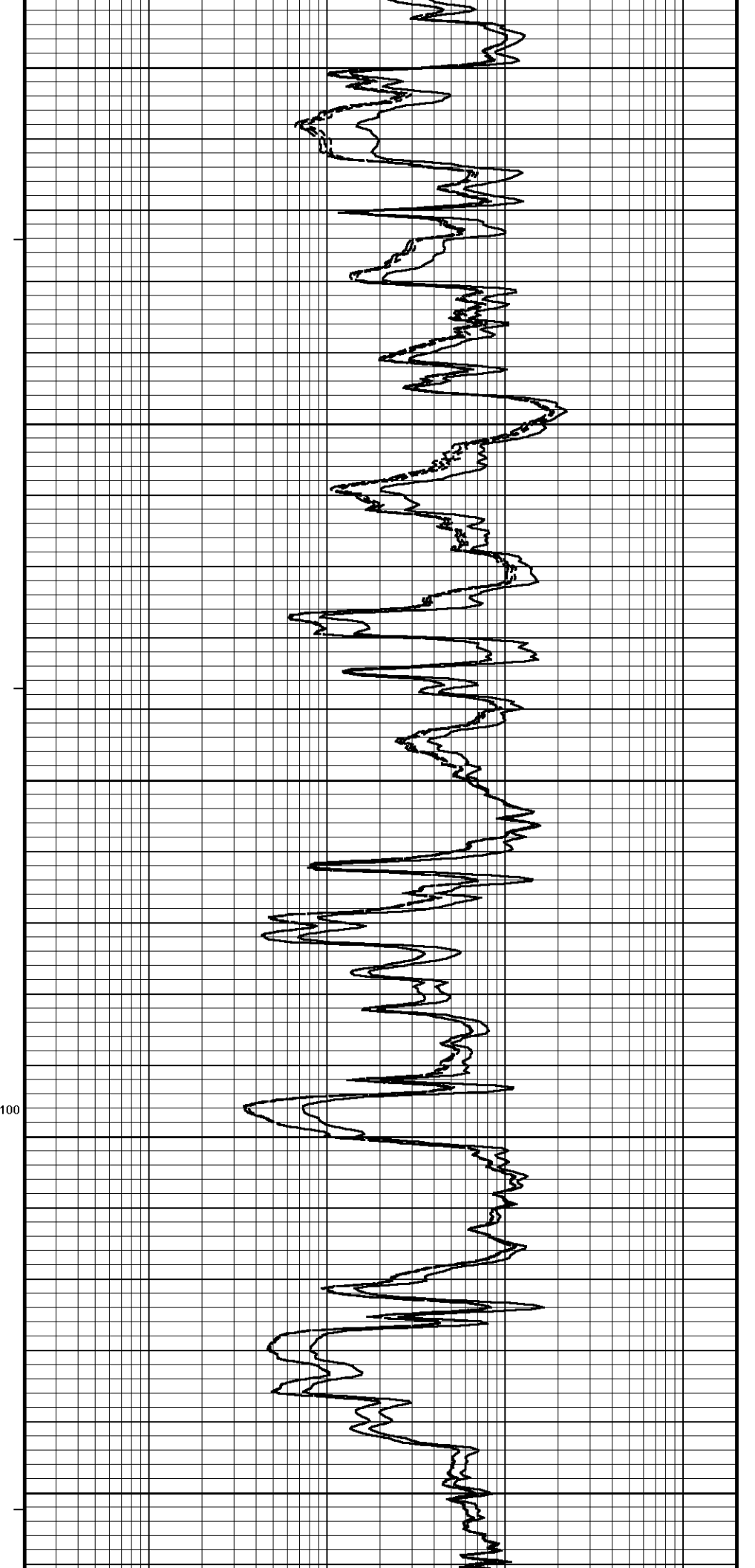
108°

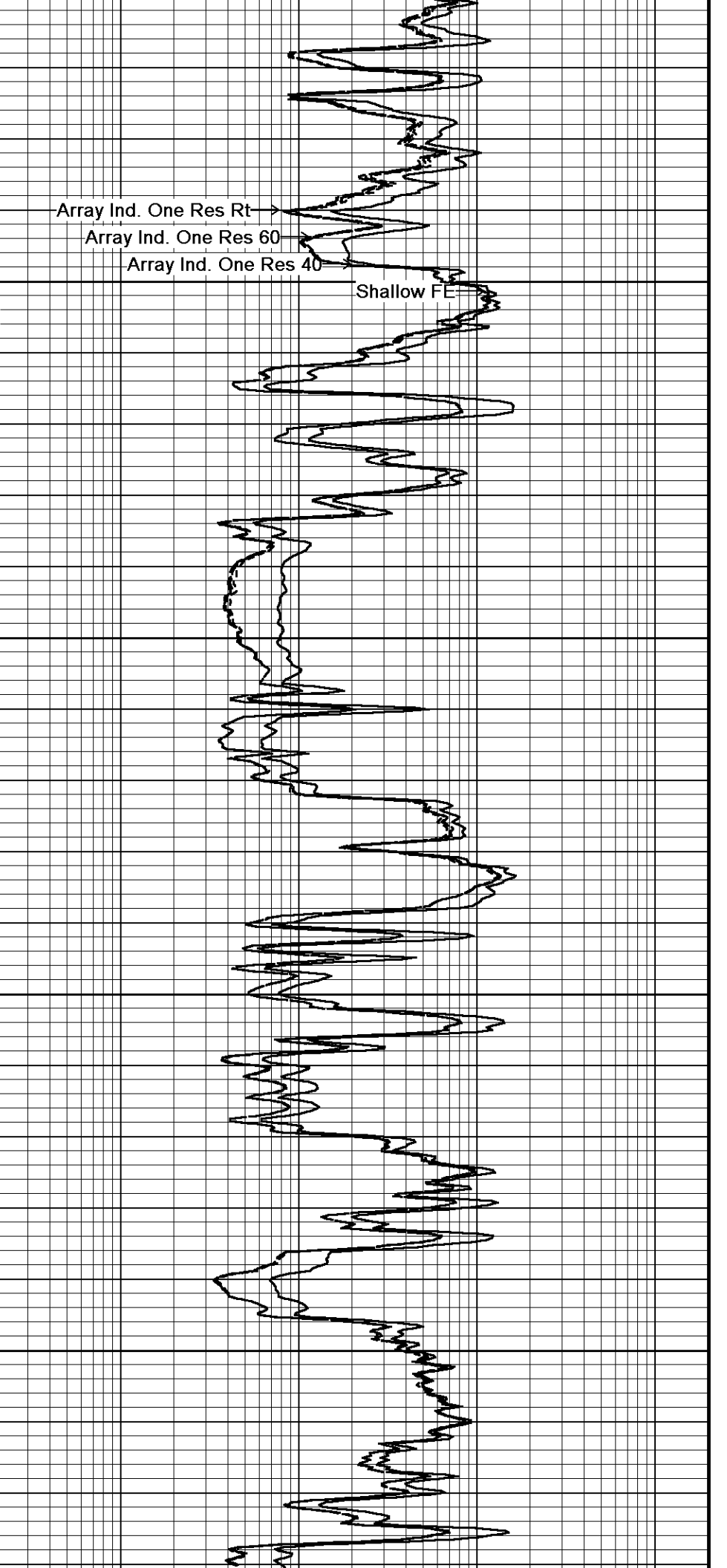
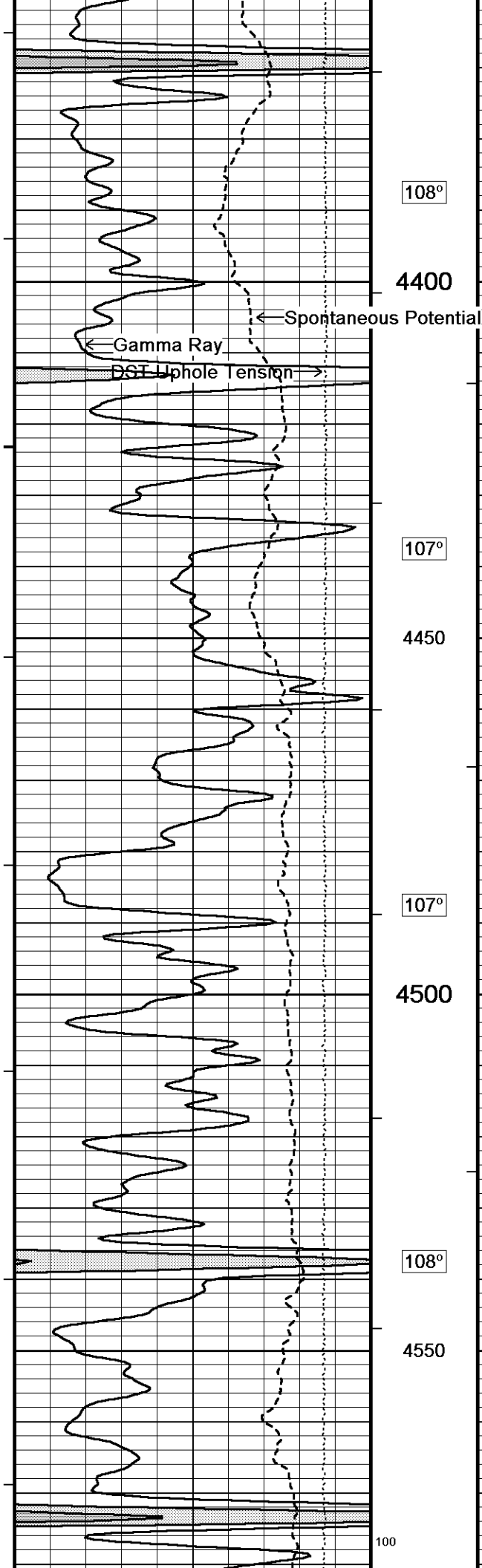
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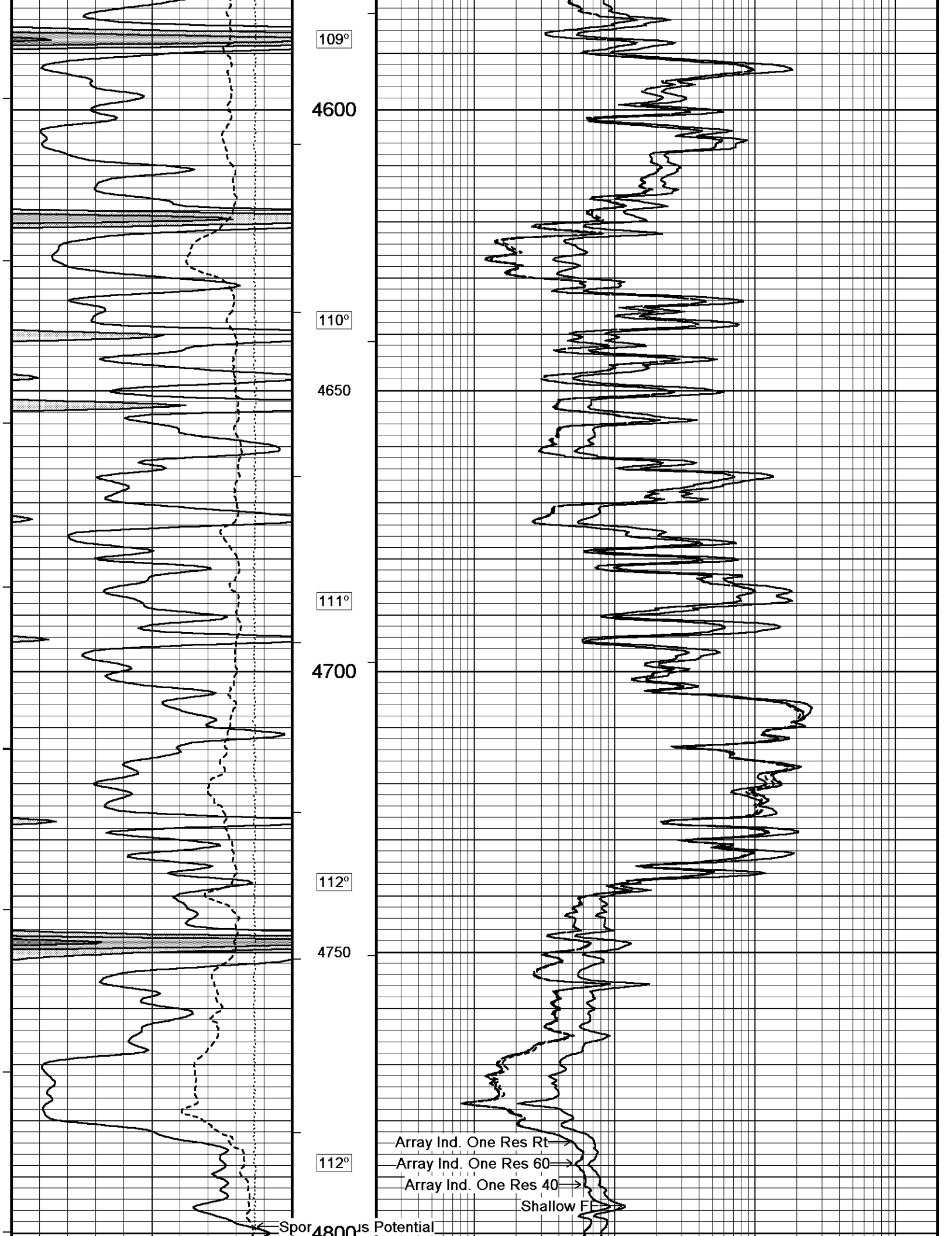
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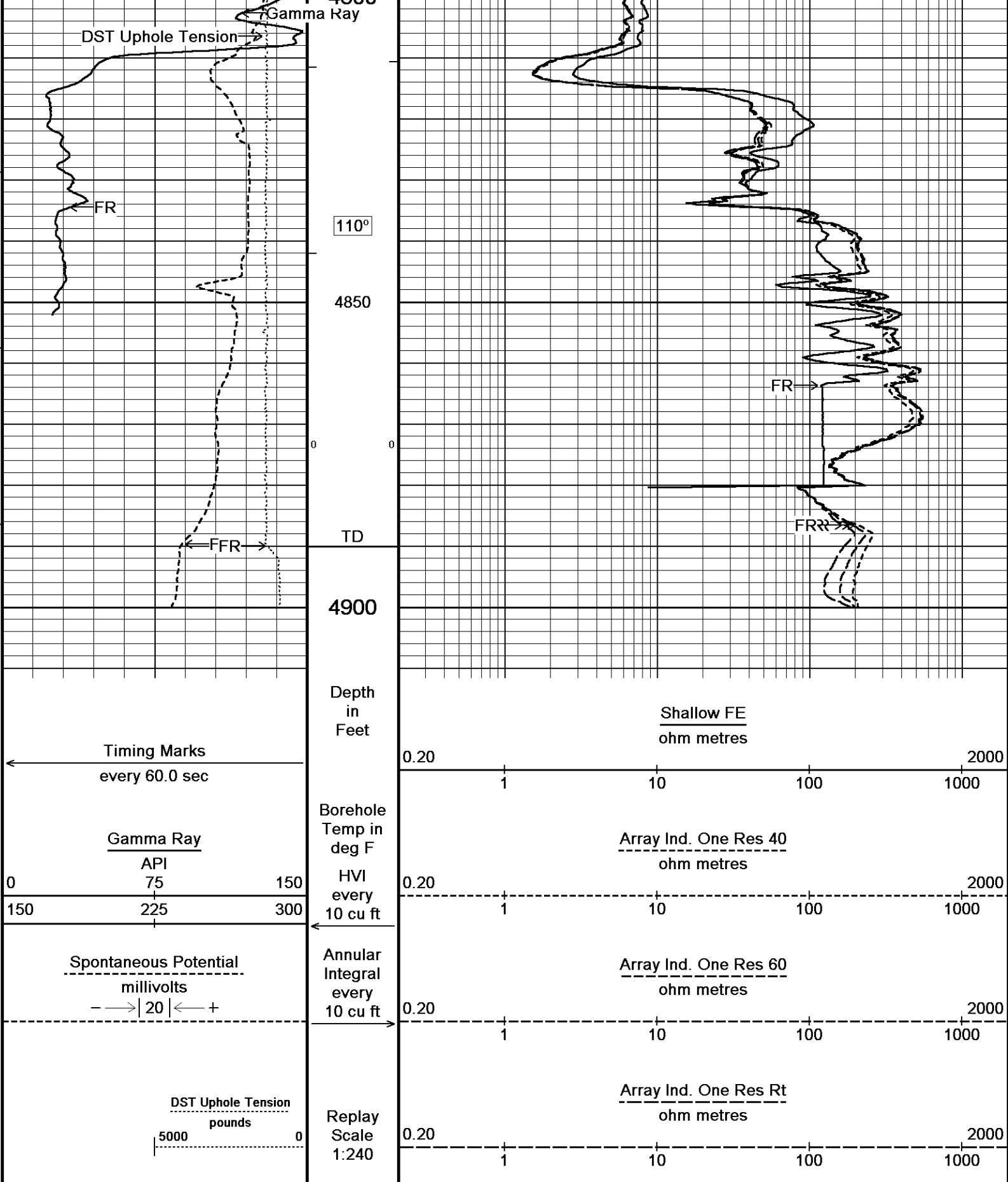
108°

4350





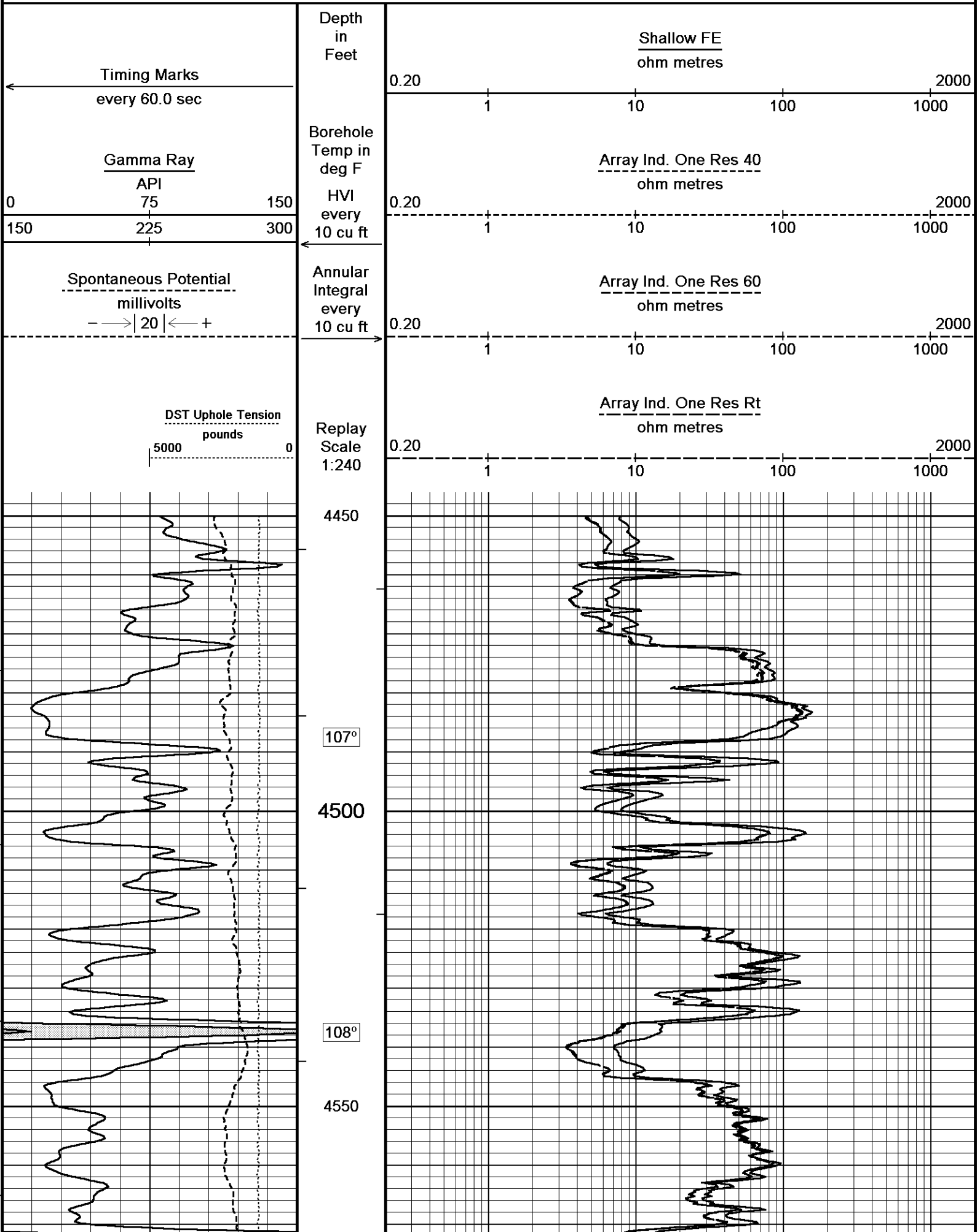


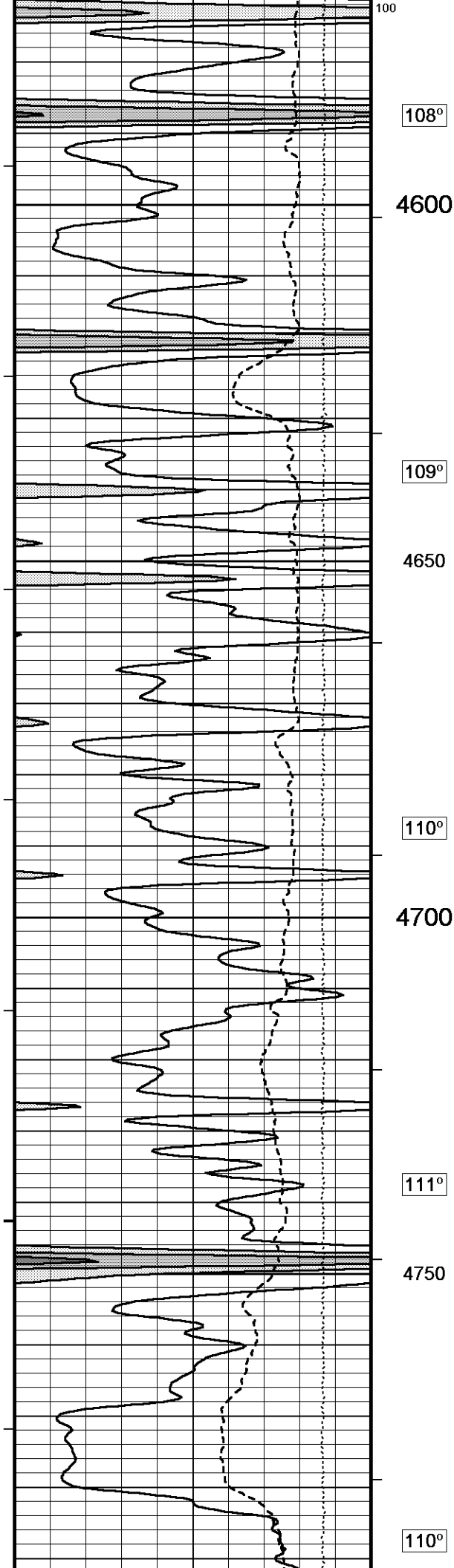


Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 02-NOV-2014 16:54
Filename: C:\Minimus 14.03.4558\Log Data\Shakespeare Bahm 2-21\Shakespeare Bahm 2-21 Main.dta
Recorded on 02-NOV-2014 14:21
System Versions: Logged with 14.03.4558 Plotted with 14.03.4558

5 INCH MAIN

REPEAT SECTION





108°

4600

109°

4650

110°

4700

111°

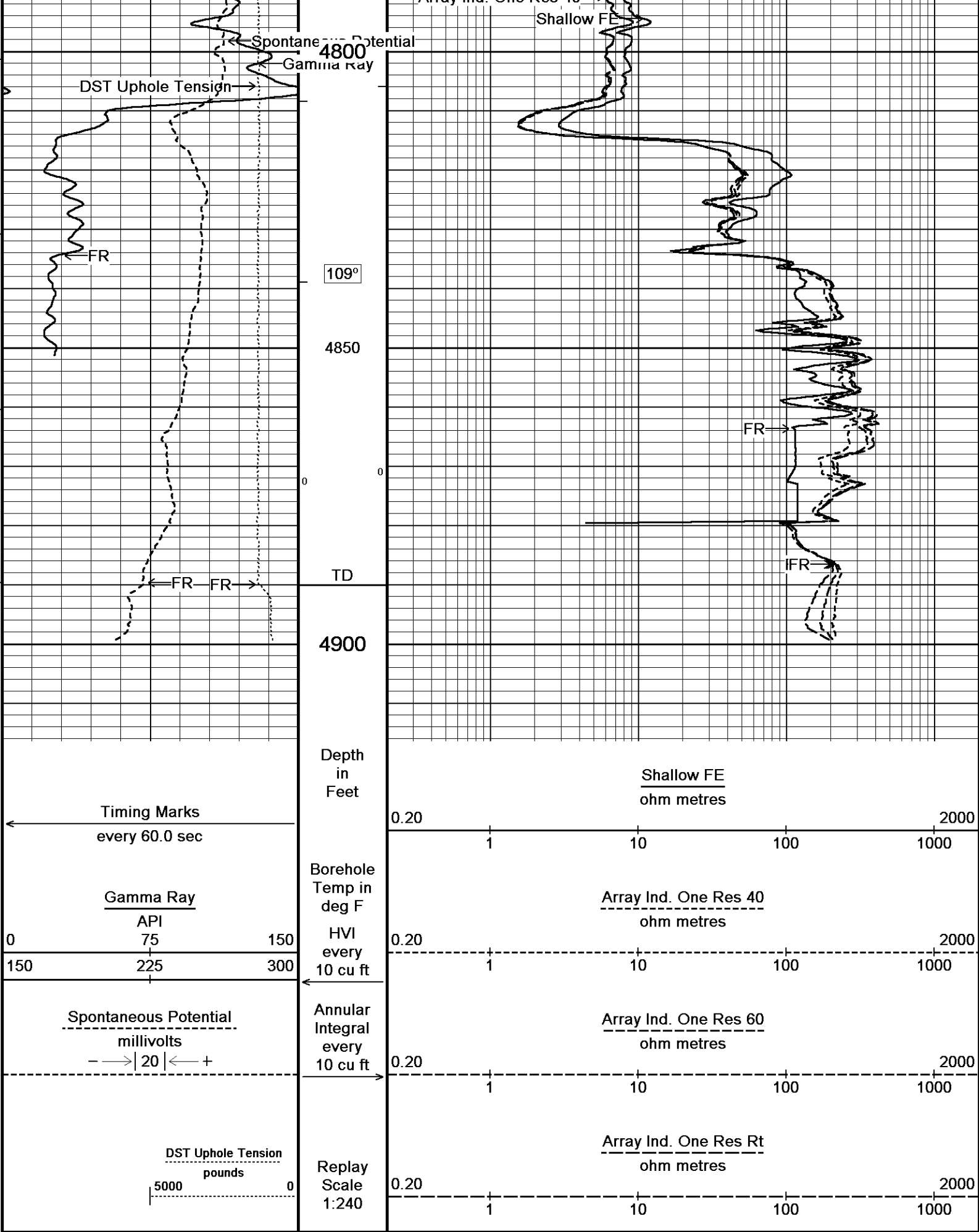
4750

110°

Array Ind. One Res Rt

Array Ind. One Res 60

Array Ind. One Res 40





BEFORE SURVEY CALIBRATION

C:\Minimus 14.03.4558\Log Data\Shakespeare Bahm 2-21\Shakespeare Bahm 2-21 Main.dta

General Constants All 000

Last Edited on 02-NOV-2014,13:30

General Parameters

Mud Resistivity	0.425	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	None	

Rwa Parameters

Porosity used	Crossplot Porosity
Resistivity used	Array Ind. One Res Rt
RWA Constant A	0.610
RWA Constant M	2.150
SW/APOR Tool Source	0.000

Gamma Calibration MCG-D.K 469

Field Calibration on 28-OCT-2014 13:39

	Measured	Calibrated (API)
Background	68	45
Calibrator (Gross)	1149	770
Calibrator (Net)	1082	725

Gamma Calibration Tolerances MCG-D.K 469

Ratio	1.492		Counts/API
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Gamma Constants MCG-D.K 469

Last Edited on 02-NOV-2014,12:42

Gamma Calibrator Number	GRC038	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.10	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-D.K 469

Field Calibration on 12-MAY-2014,02:16

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-D.K 469

Last Edited on 13-JUL-2014,14:53

Pre-filter Length	11
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FE Calibration MFE-B.J 353

Base Calibration on 24-OCT-2014 15:33

Field Check on 02-NOV-2014 09:35

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	964.2	126.8
Base Check		281.0
Field Check		281.1

FE Calibration Tolerances MFE-B.J 353

Reference 2	964.2		ohm
Base Check	281.0		ohm-m
Field Check	281.1		ohm-m

FE Constants MFE-B.J 353

Last Edited on 02-NOV-2014,09:34

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 111

Base Calibration on 05-AUG-2014,09:34

Field Check on 02-NOV-2014 09:34

Base Calibration				
Test Loop Calibration		Measured		Calibrated (mmho/m)
Channel	Low	High	Low	High
1	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	2.1	135.5	2.6	279.2
Array Temperature	23.0		Deg F	

Test Loop Calibration Verified

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	12.1	3871.3
2	0.0	0.0	29.8	3526.4
3	0.0	0.0	29.1	3019.8
4	0.0	0.0	19.1	2057.2
Deep			17.7	1960.8
Medium			43.1	3974.8
Shallow			44.4	5230.7
Array Temperature	0.0		66.3	Deg F

Induction Calibration Tolerances MAI-A.A 111

Low Conductivity 1	17.6		mmho/m	High Conductivity 1	473.6		mmho/m
Low Conductivity 2	6.4		mmho/m	High Conductivity 2	385.9		mmho/m
Low Conductivity 3	3.2		mmho/m	High Conductivity 3	264.0		mmho/m
Low Conductivity 4	2.1		mmho/m	High Conductivity 4	135.5		mmho/m
Background Vx 1	0.0		mmho/m	Phase Check Loop 1	0.0		%
Background Vx 2	0.0		mmho/m	Phase Check Loop 2	0.0		%
Background Vx 3	0.0		mmho/m	Phase Check Loop 3	0.0		%
Background Vx 4	0.0		mmho/m	Phase Check Loop 4	0.0		%

Induction Constants MAI-A.A 111

Last Edited on 02-NOV-2014,09:32

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	

Caliper Calibration MPD-C.A 216

Base Calibration on 24-OCT-2014 11:23

Field Calibration on 02-NOV-2014 09:42

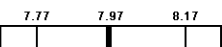
Base Calibration

Reading No	Measured	Calibrator Size (in)
1	18960	3.99
2	28807	5.98
3	38852	7.97
4	48518	9.86
5	59792	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.95	7.97

Caliper Calibration Tolerances MPD-C.A 216

Short Arm Field Cal. 7.95  in

DOWNHOLE EQUIPMENT

C:\Minimus 14.03.4558\Log Data\Shakespeare Bahm 2-21\Shakespeare Bahm 2-21 Main.dta

3/8" Triple Cone Cable Head (MCB C A)

MCB-C.A 234 LG: 1.58 ft WT: 15.4 lb OD: 2.240 in

Compact Comms Gamma

MCG-D.K 469 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

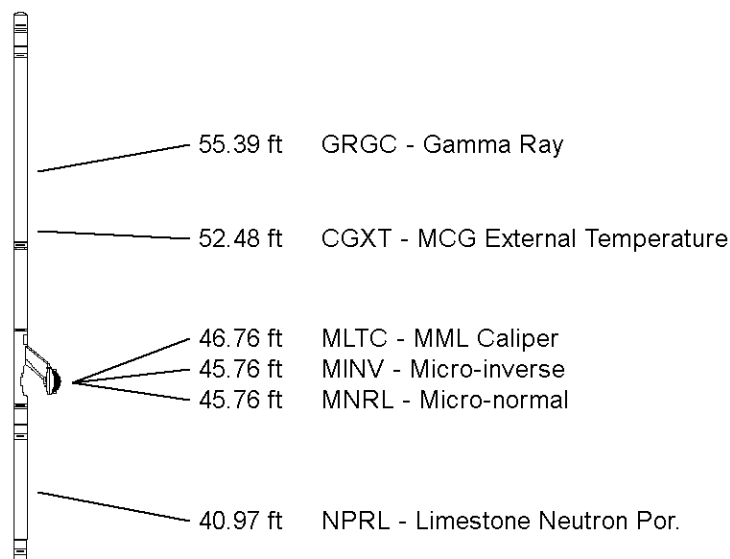
Compact Micro-log

MML-A 3 LG: 7.97 ft WT: 81.6 lb OD: 2.240 in

Compact Neutron

MDN-A.B 152 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper



Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric

MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

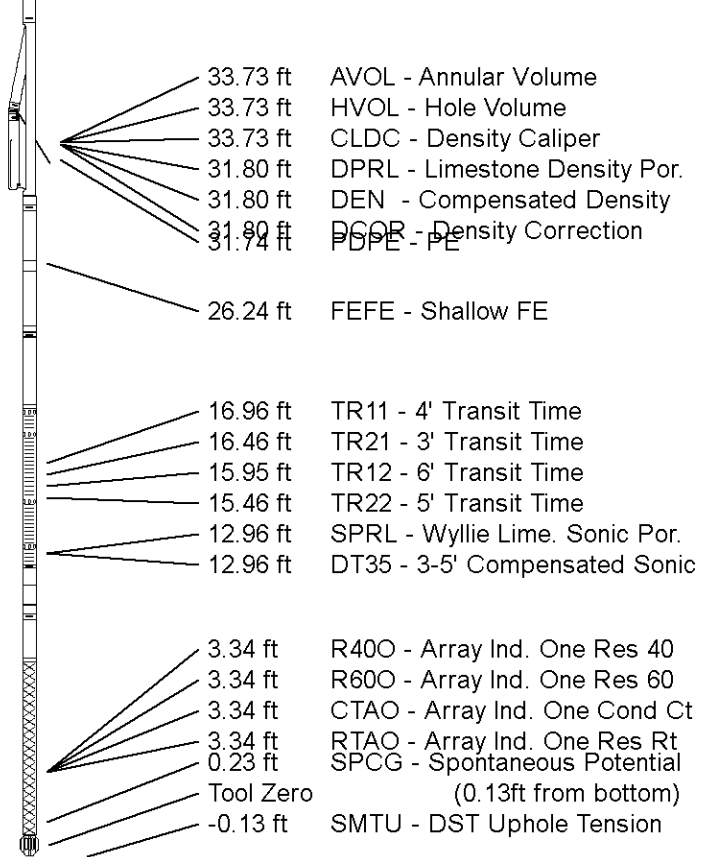
Compact Sonic

MSS-A.A 126 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: 2.244 in

Total Length: 62.25 ft Weight: 471.8 lb



COMPANY SHAKESPEARE OIL CO., INC.
WELL BAHM 2-21
FIELD WILDCAT
PROVINCE/COUNTY SCOTT
COUNTRY/STATE U.S.A. / KANSAS

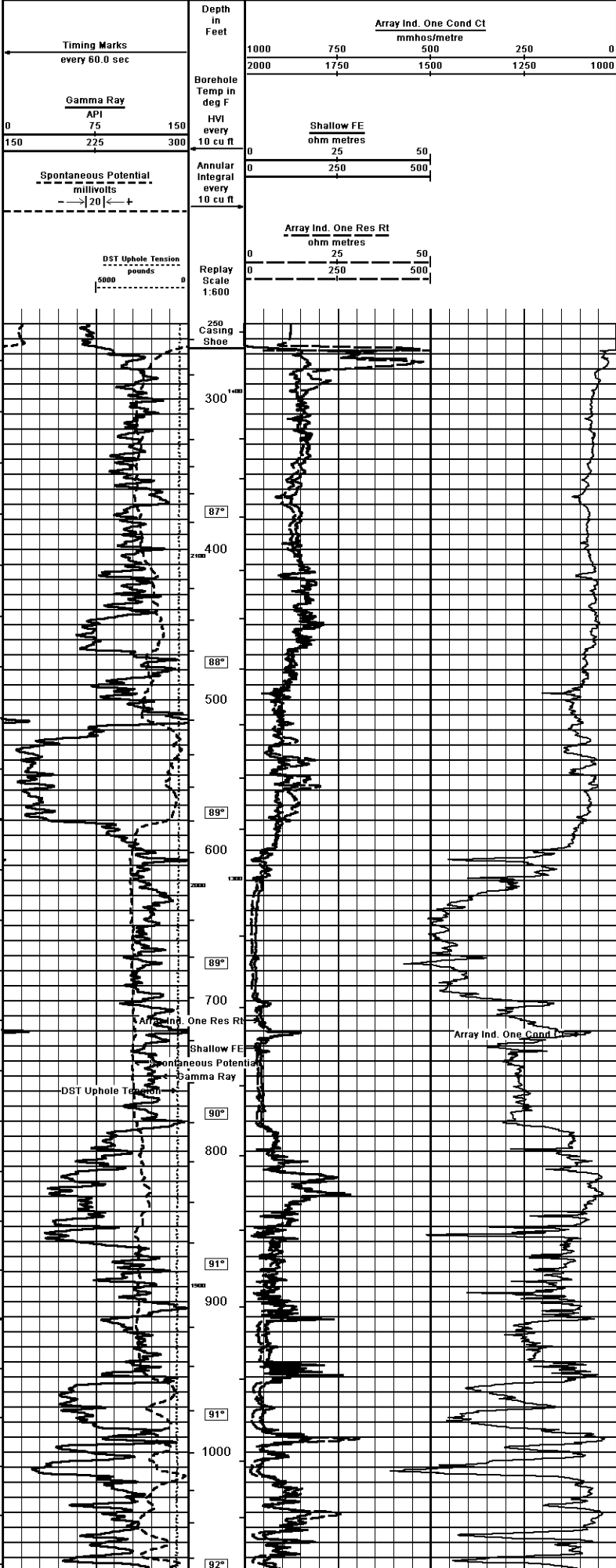
Elevation Kelly Bushing	3145.00	feet	First Reading	4886.66	feet
Elevation Drill Floor	3143.00	feet	Depth Driller	4890.00	feet
Elevation Ground Level	3135.00	feet	Depth Logger	4890.00	feet

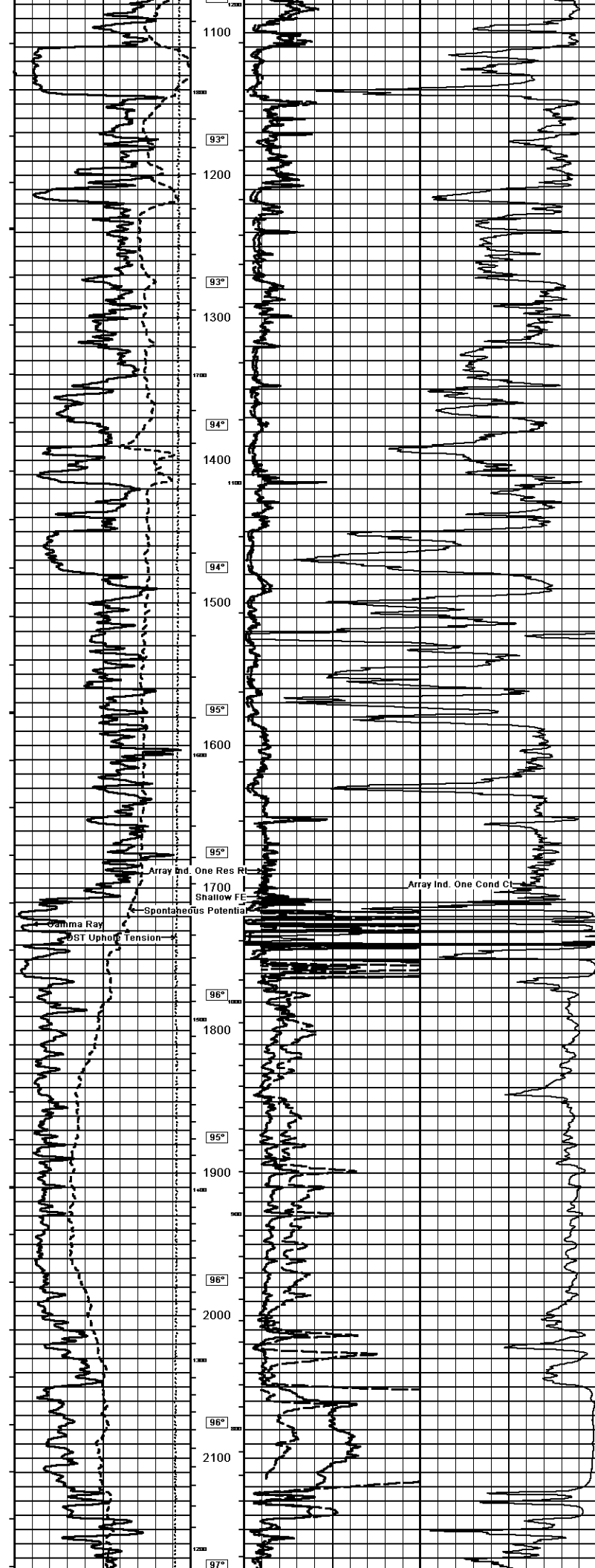


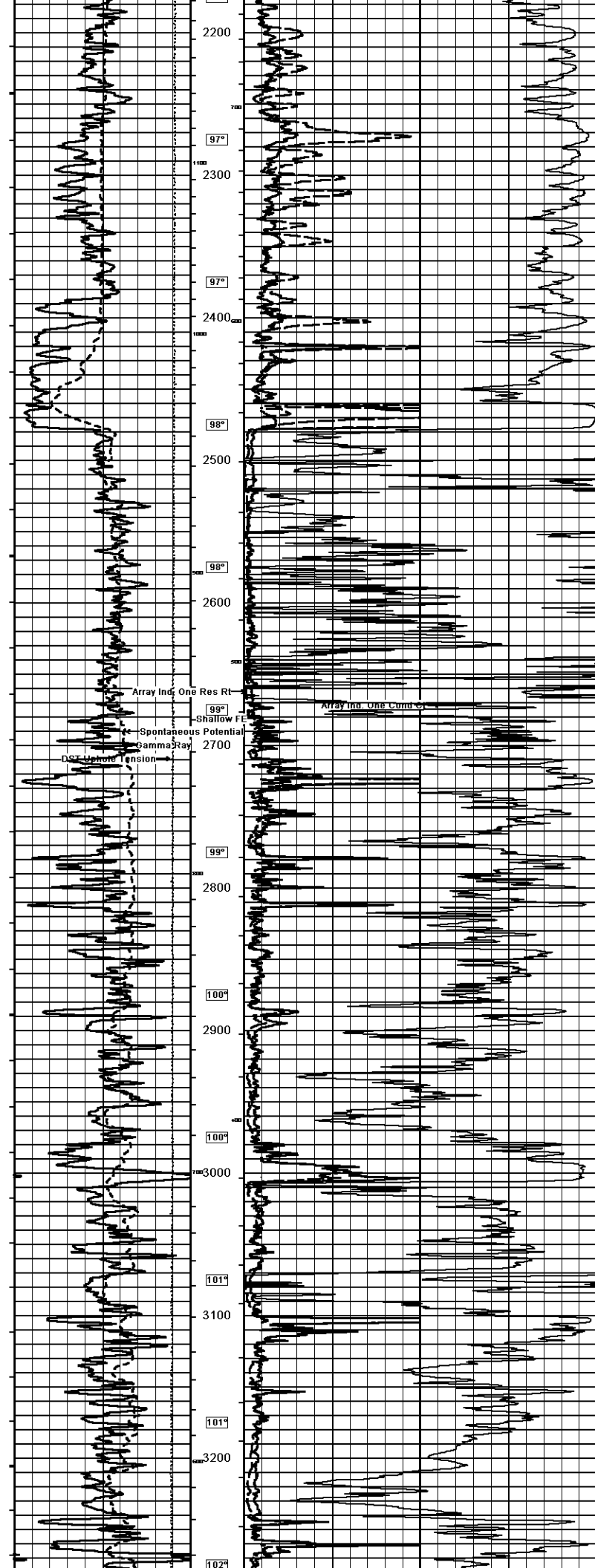
ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

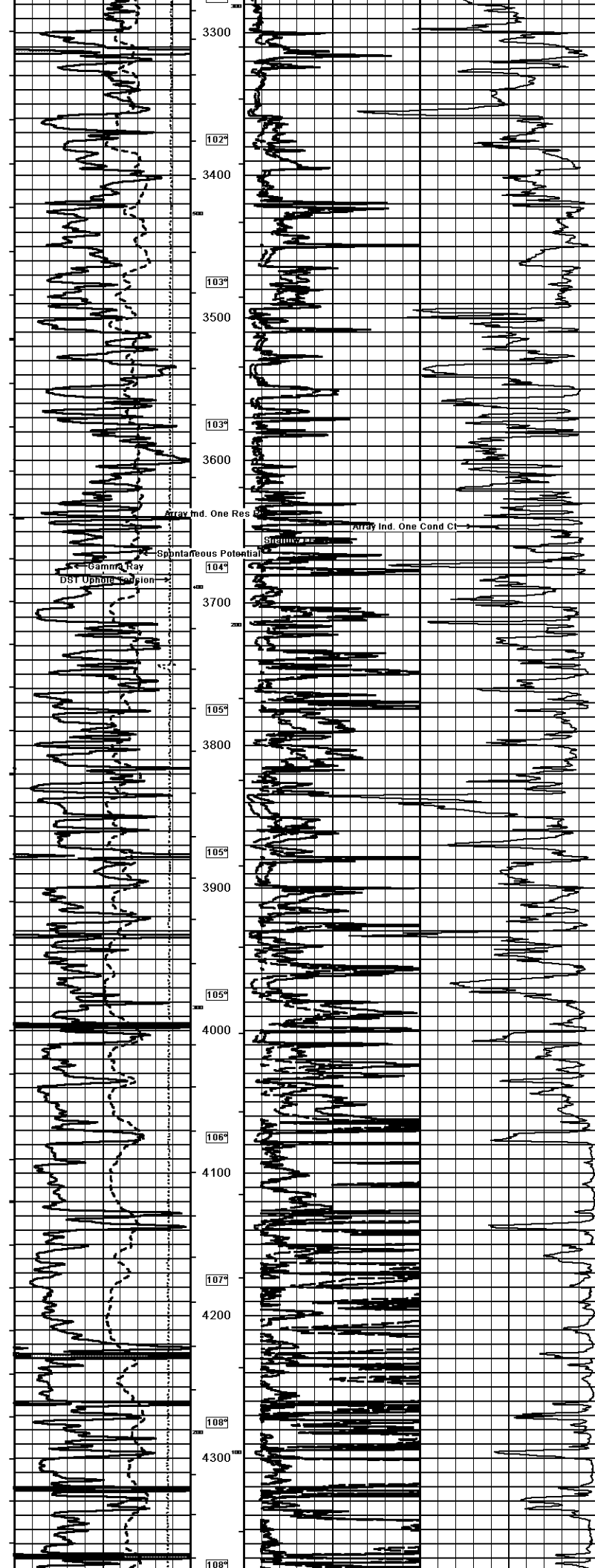
Weatherford®

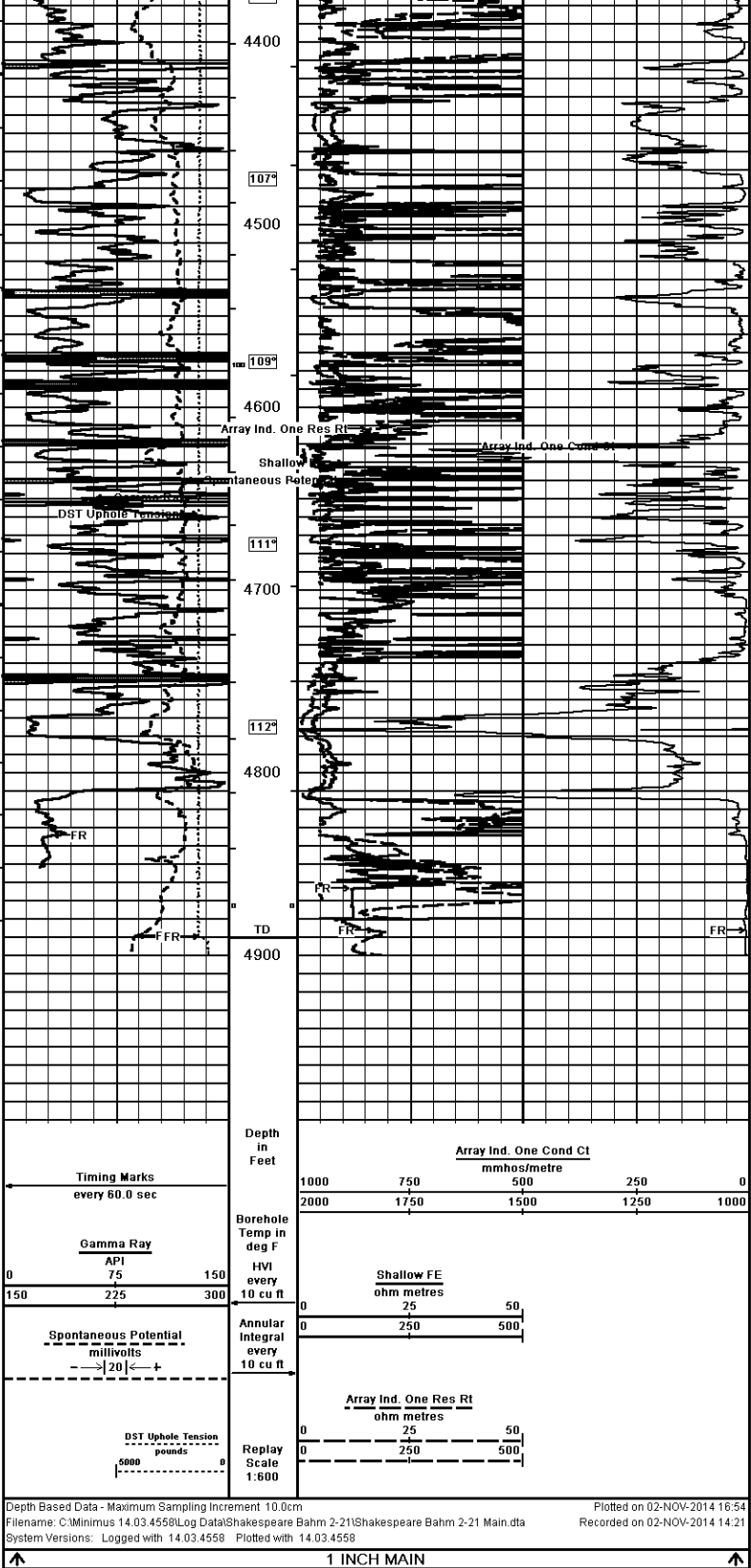
Weatherford		ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG	
COMPANY	SHAKESPEARE OIL CO., INC.	WELL	BAHM 2-21
FIELD	WILDCAT	PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS	LOCATION	335° FNL & 2120° FEL
PERMIT NUMBER	SE NW NW NE	SEC. 21	T1S R3E 34W
Latitude	38.65105681	Longitude	-101.00691912
Perm Number	15-171-21101	Permanent Datum G.L. Elevation	3135 feet
Log Measured From	KB @ 10 FEET	Drilling Measured From	KB @ 10 FEET
Date	02-NOV-2014	Run Number	ONE
Service Order	7036-102129300	Depth Driller	4890.00 feet
Depth Logger	4890.00 feet	First Reading	4886.66 feet
Tool Reading	268.00 feet	Casing Driller	267.00 feet
Casing Logger	266.00 feet	Bit Size	7.875 inches
Hole Fluid Type	WBM	Density/Viscosity	9.20 lb/USg 53.00 cP
PH/Fluid Loss	10.00	ml/30min	8.90
Sample Source	MUDPT	Run @ Measured Temp	0.425 @ 75.0 ohm-m
Run @ Measured Temp	0.34 @ 75.0 ohm-m	Run @ Measured Temp	0.51 @ 75.0 ohm-m
Source Rmt/Rmc	CALC	Run @ BHT	0.297 @ 110.0 ohm-m
Time Since Circulation	4 HOURS	Max Recorded Temp	111.00 deg F
Equipment Base	13008	Recorded By	DEREK CARTER
Witnessed by	TIM PREST	Log #	LE14-343











COMPANY		SHAKESPEARE OIL CO., INC.	
WELL		BAHM 2-21	
FIELD		WILDCAT	
PROVINCE/COUNTY		SCOTT	
COUNTRY/STATE		U.S.A. / KANSAS	
Elevation Kelly Bushing	3145.00 feet	First Reading	4886.66 feet
Elevation Drill Floor	3143.00 feet	Depth Driller	4890.00 feet
Elevation Ground Level	3135.00 feet	Depth Logger	4890.00 feet
 ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG			

