



Weatherford

**ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**

COMPANY **SHAKESPEARE OIL CO., INC.**

WELL **RUDOLPH 1-23**

FIELD **WILDCAT**

PROVINCE/COUNTY **SCOTT**

COUNTRY/STATE **U.S.A. / KANSAS**

LOCATION **1300' FNL & 1050' FWL**

PERMIT NUMBER **SE SE NW NW**

SEC 23 TWP 17S RGE 33W Other Services MML

Latitude 38.565719897 MPD/MDN

Longitude -100.940172130

API Number 15-171-21114

Permanent Datum GL, Elevation 3016 feet

Log Measured From KB

Drilling Measured From KB @ 10 FEET

Elevations:
KB 3026.00
DF 3024.00
GL 3016.00

Date 10-DEC-2014

Run Number ONE

Service Order 7036-105380343

Depth Driller 4770.00 feet

Depth Logger 4775.00 feet

First Reading 4771.04 feet

Last Reading 265.00 feet

Casing Driller 267.00 feet

Casing Logger 265.00 feet

Bit Size 7.875 inches

Hole Fluid Type CHEMICAL

Density / Viscosity 9.20 lb/USg 58.00 CP

PH / Fluid Loss 10.50 6.40 ml/30Min

Sample Source MUDPIT

Rm @ Measured Temp 0.598 @ 75.0 ohm-m

Rmf @ Measured Temp 0.479 @ 75.0 ohm-m

Rmc @ Measured Temp 0.718 @ 75.0 ohm-m

Source Rmf / Rmc CALC CALC

Rm @ BHT 0.386 @ 119.0 ohm-m

Time Since Circulation 4.5 HOURS

Max Recorded Temp 119.00 deg F

Equipment / Base 13096 LIB

Recorded By DEREK CARTER

Witnessed By TIM PRIEST

Job # LB14-377

BOREHOLE RECORD

Last Edited: 10-DEC-2014 03:16

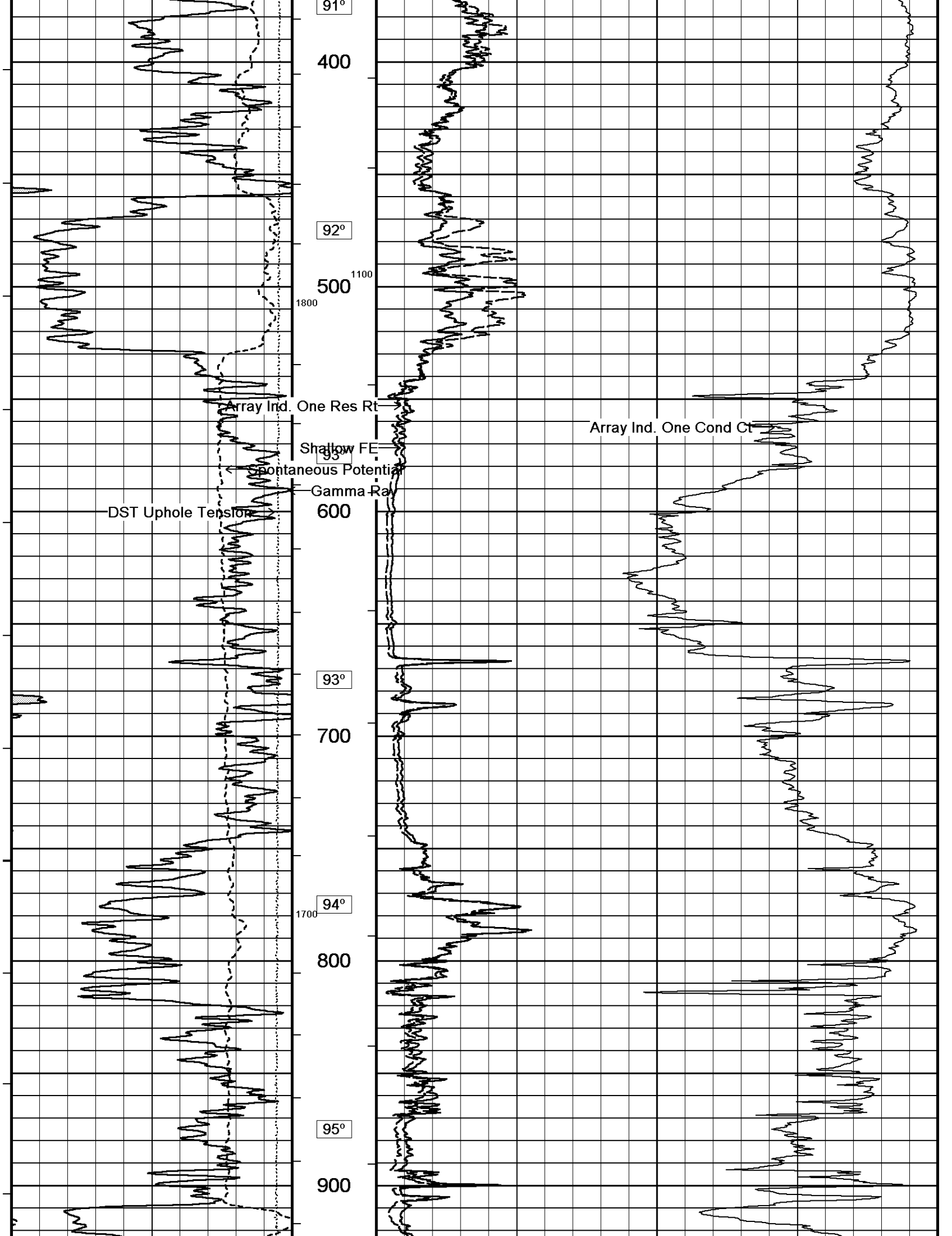
Bit Size inches	Depth From feet	Depth To feet
7.875	267.00	4770.00

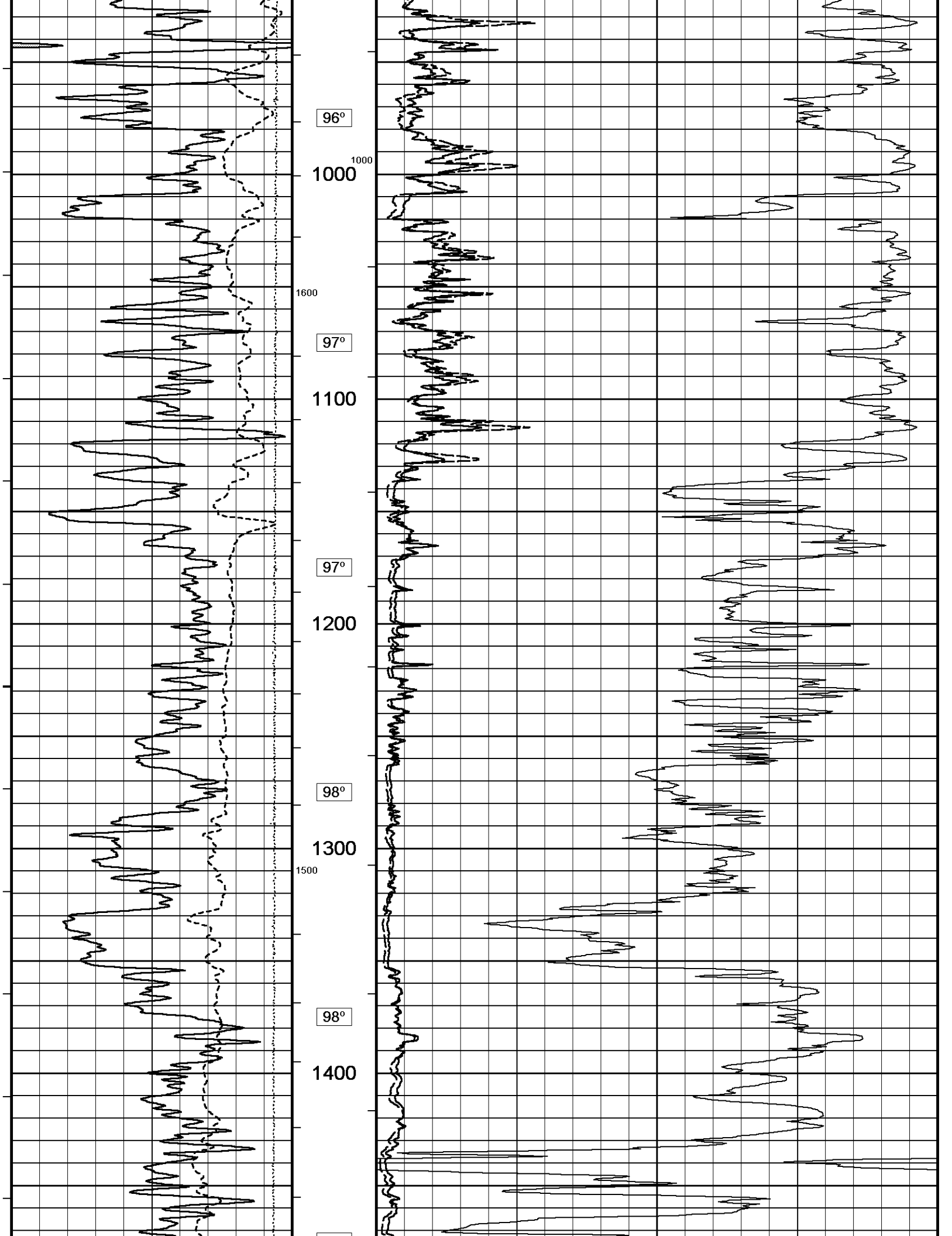
CASING RECORD

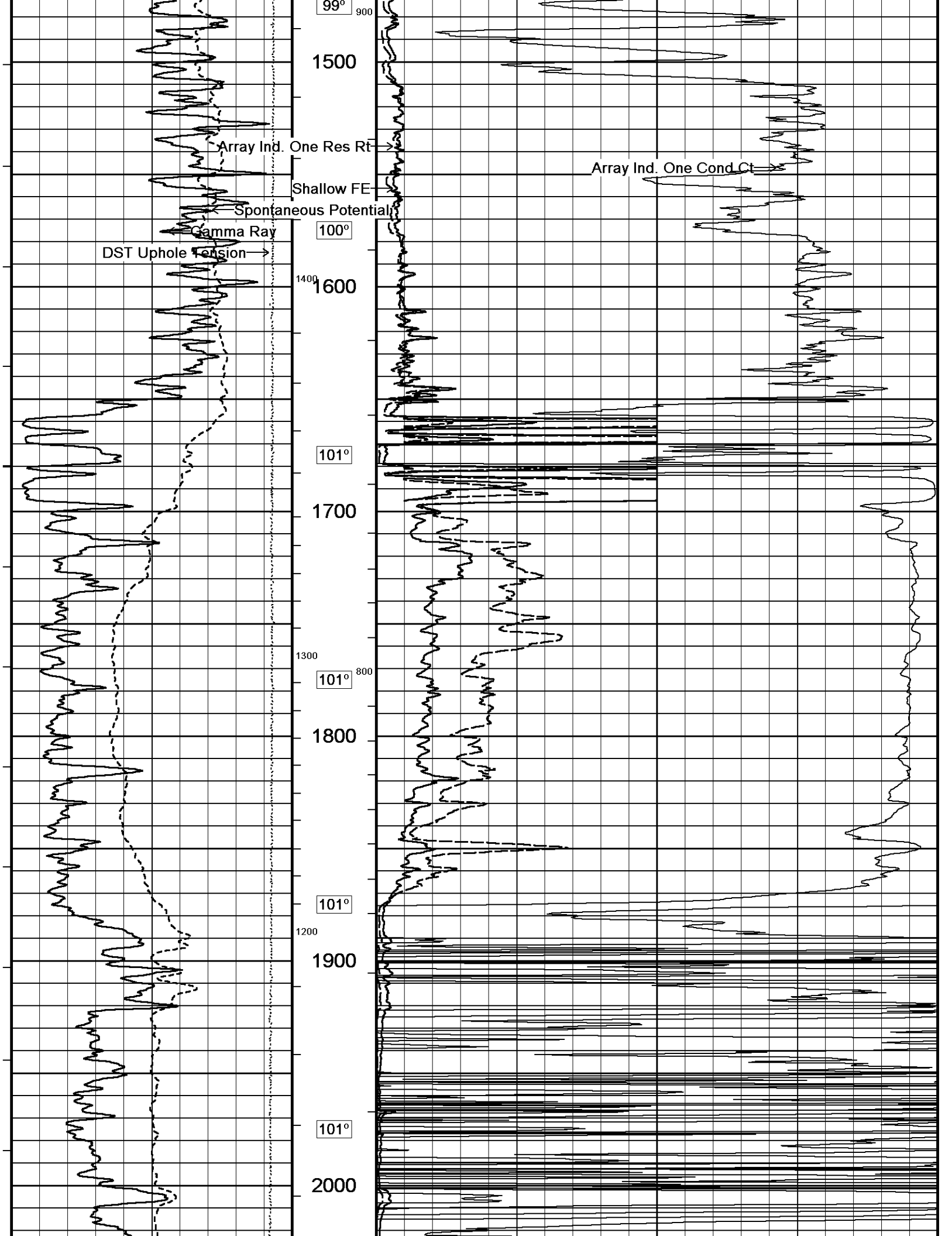
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	267.00	24.00

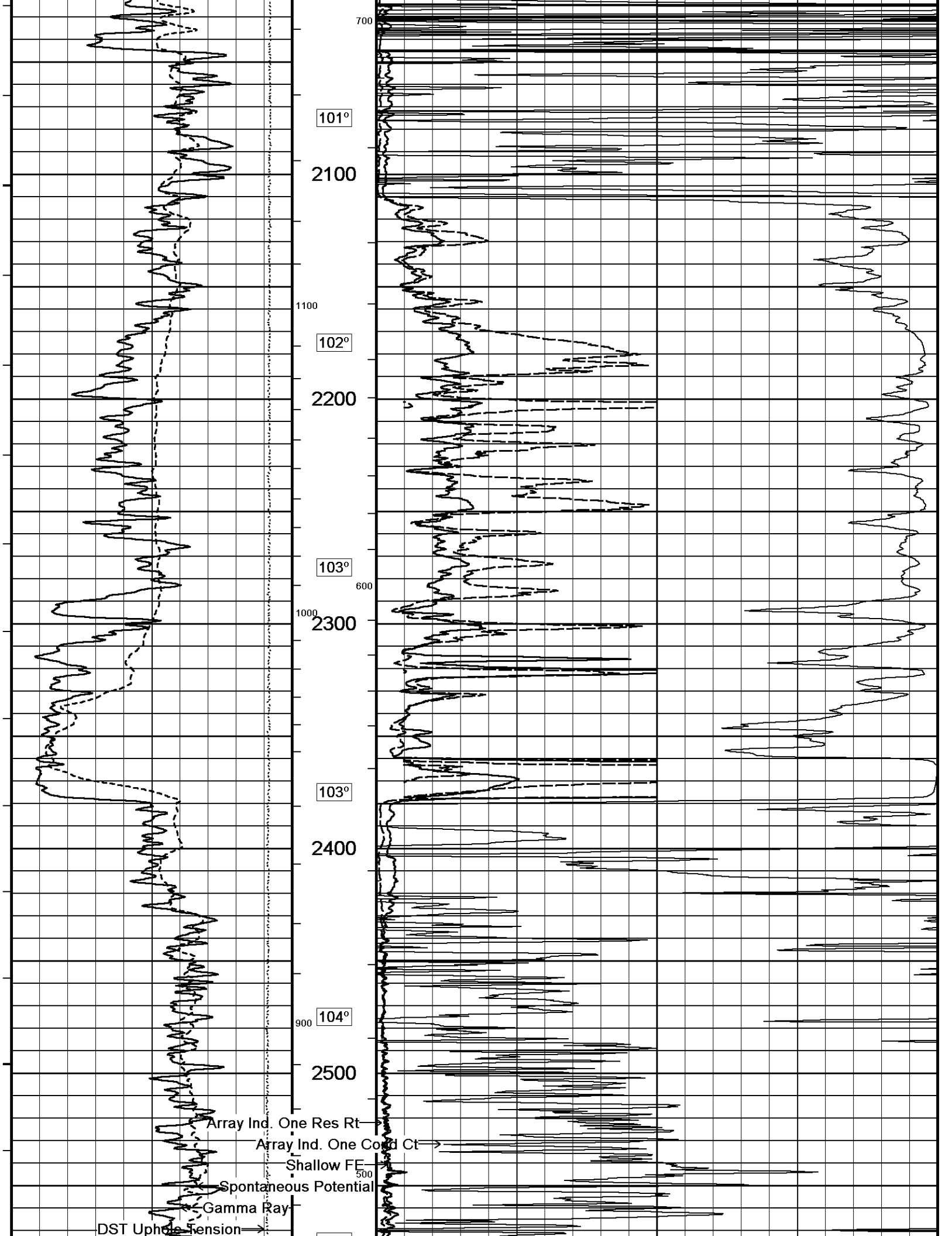
REMARKS

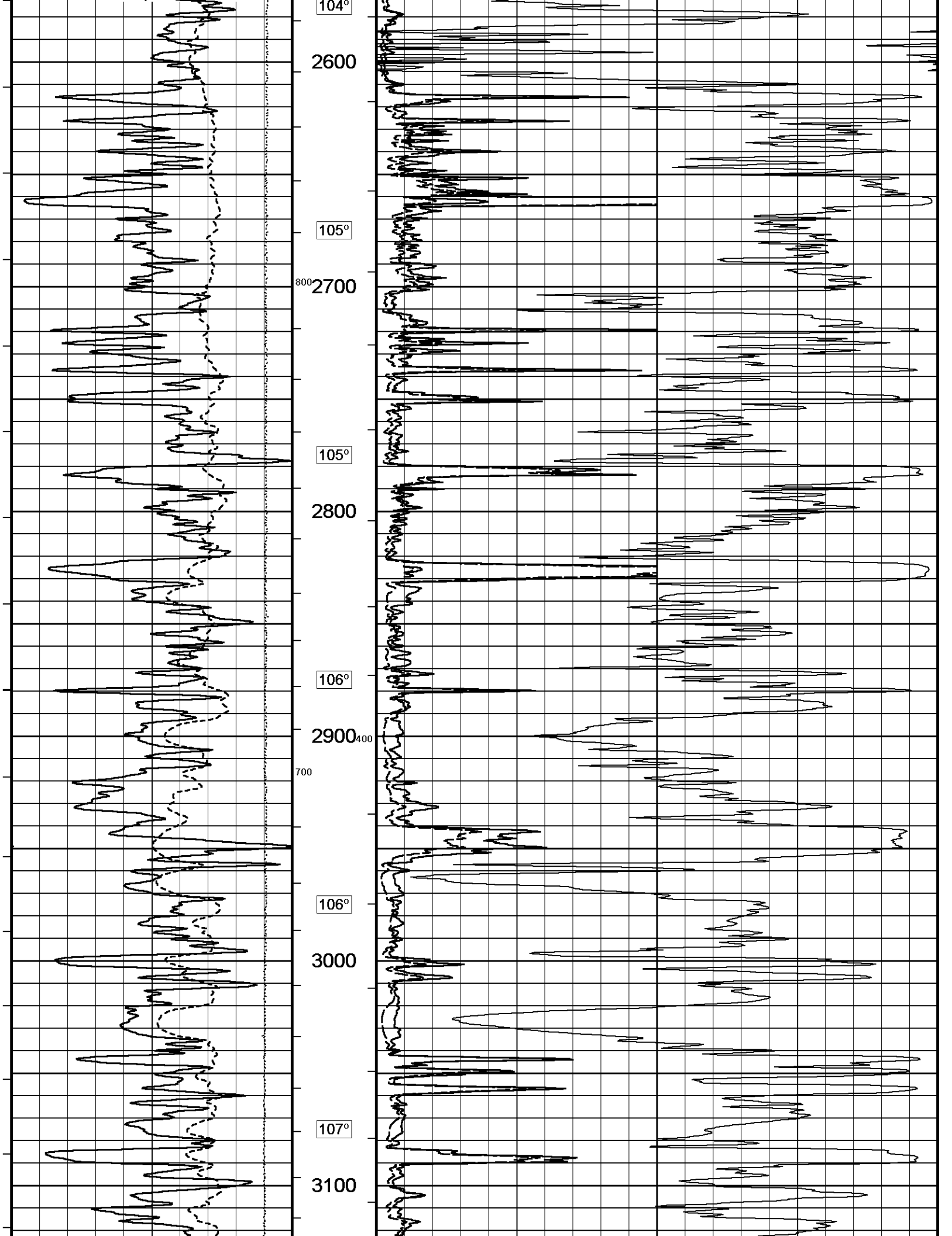
- SOFTWARE ISSUE: WLS 14.05.5280
- TOOLSTRING: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION
- HARDWARE:
MDN: DUAL BOWSPRING ECCENTRALIZER
MFE: 1 X 0.5 INCH STANDOFF
MAI: 2 X 0.5 INCH STANDOFF
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST
- TOTAL HOLE VOLUME FROM TD TO 3800 FT.: 320 CU.FT.
- ANNUJ AR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3800 FT.: 160 CU.FT.

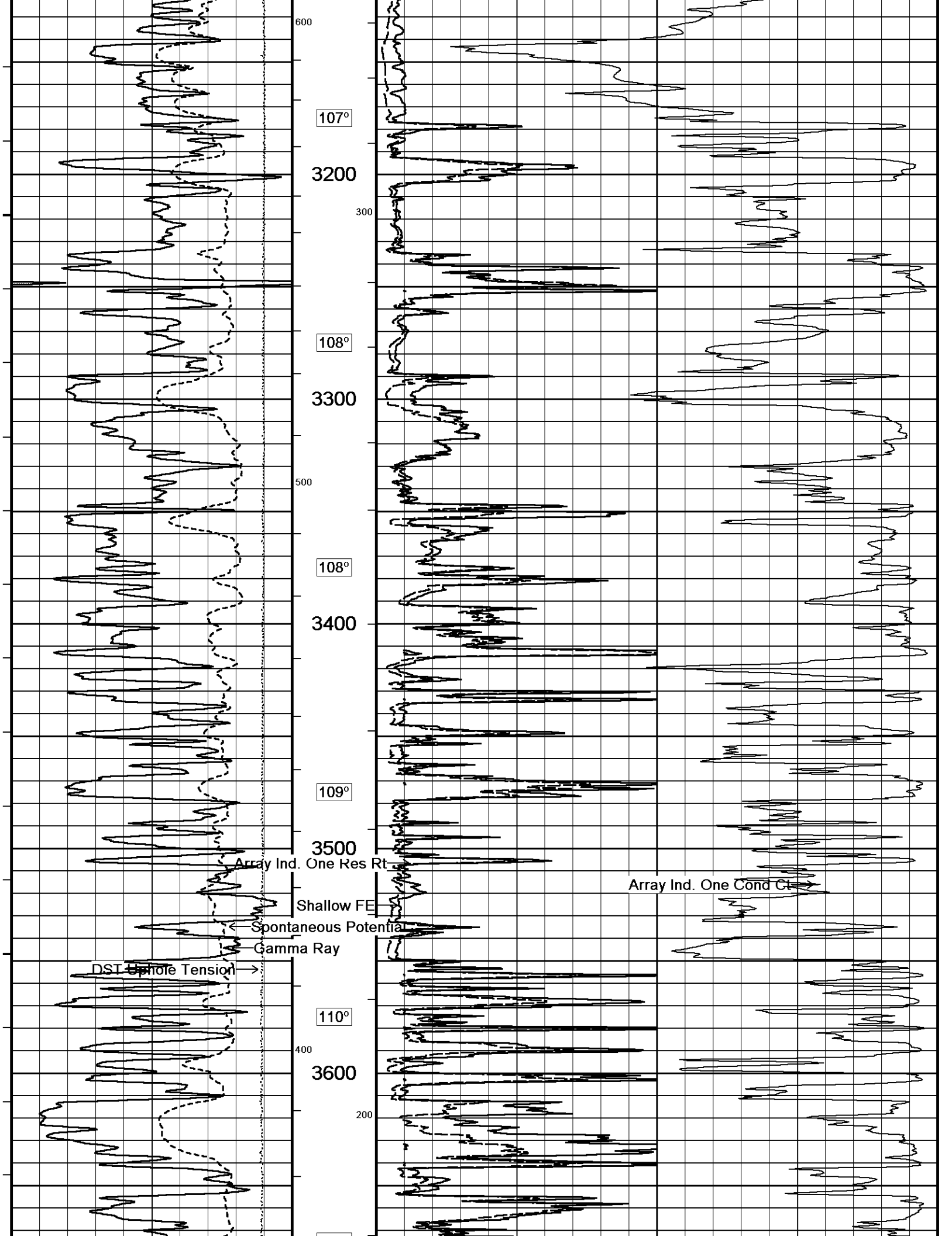


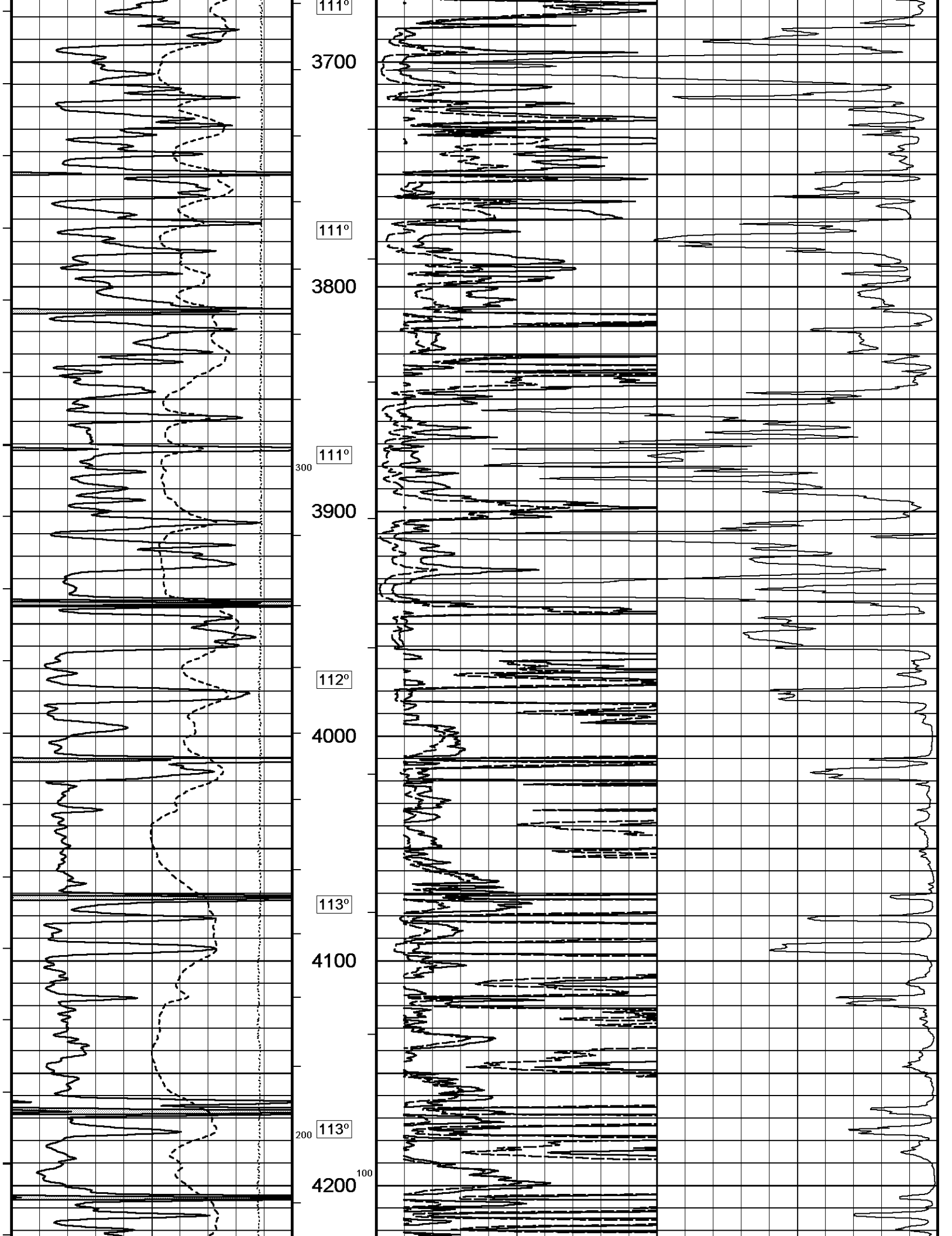


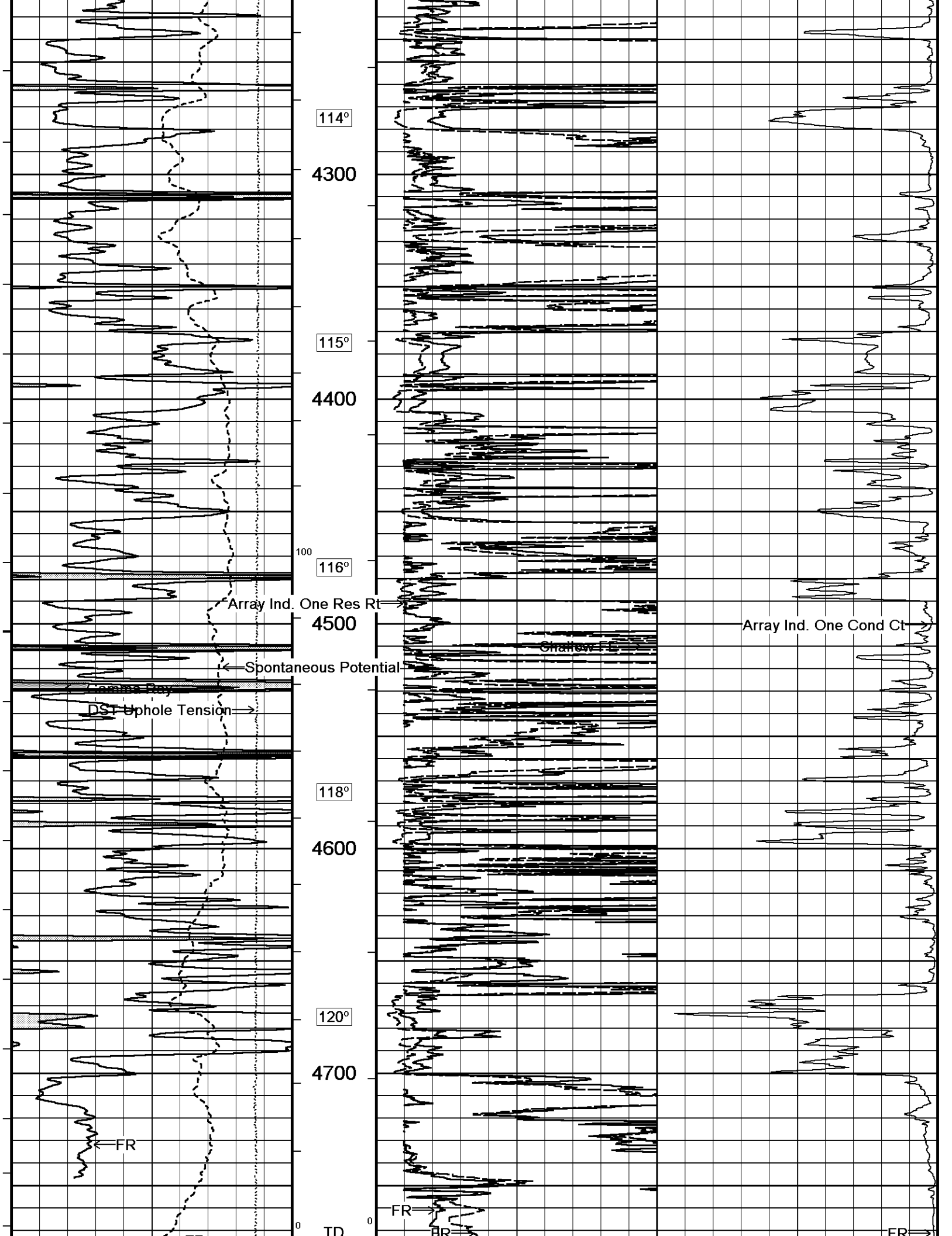


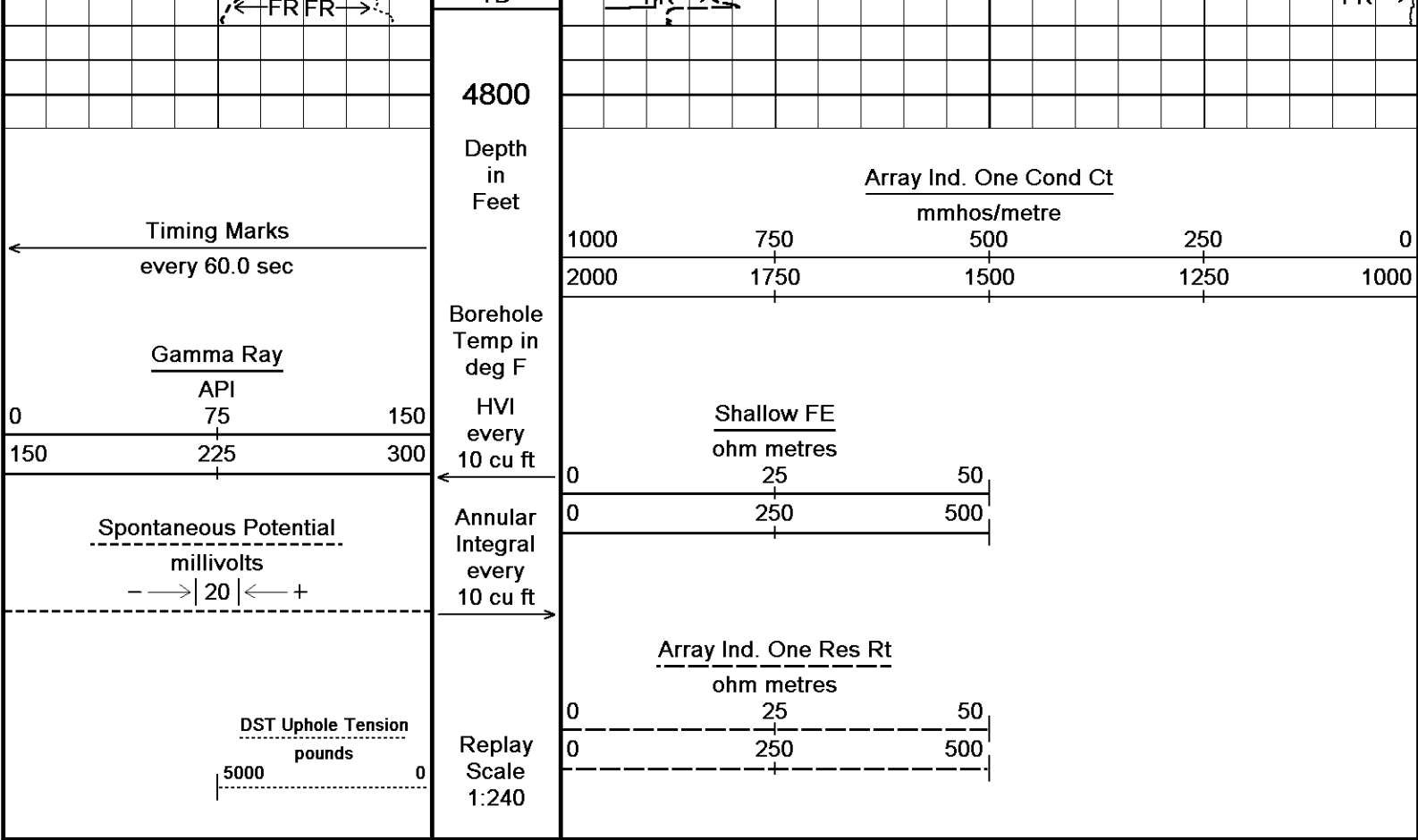










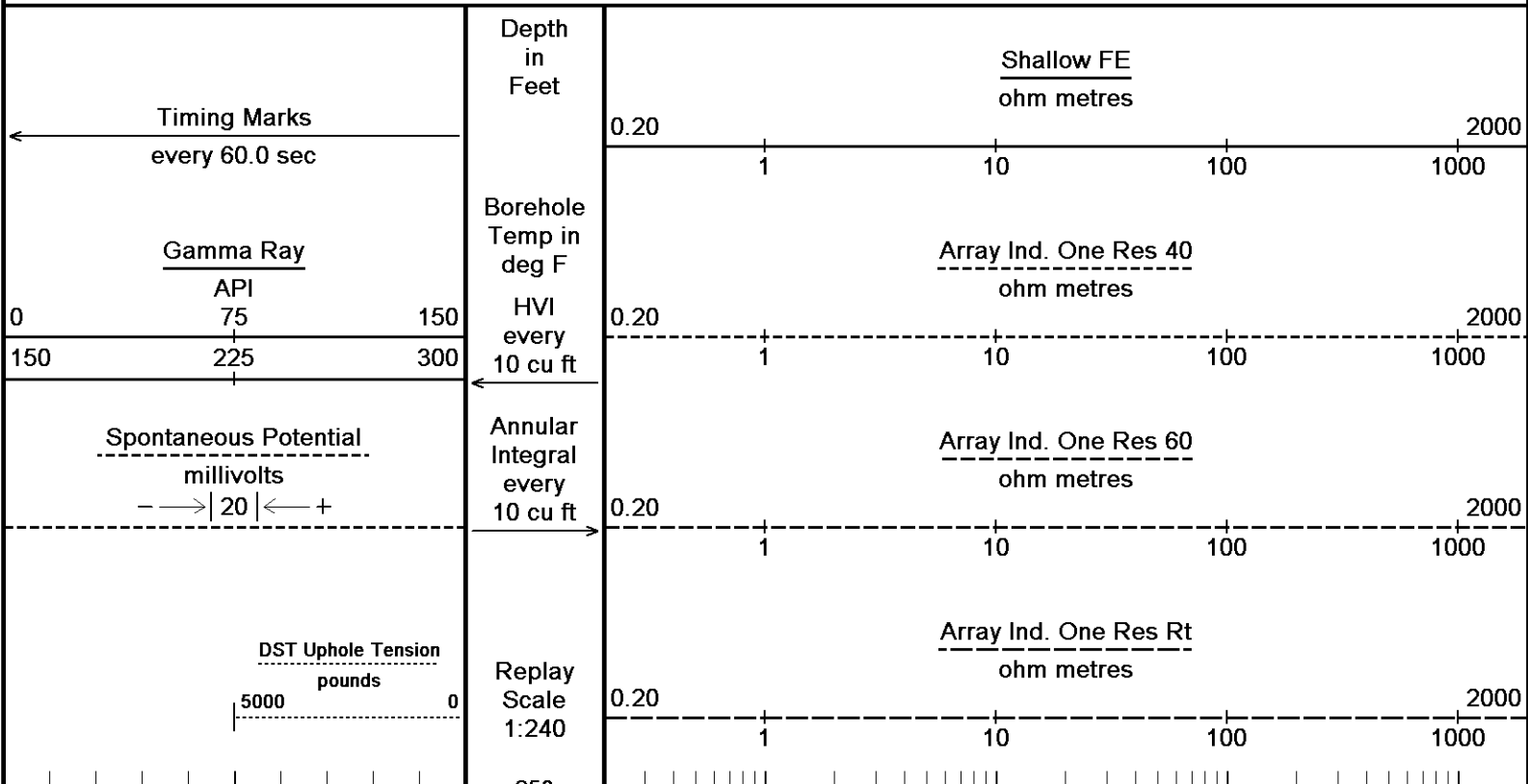


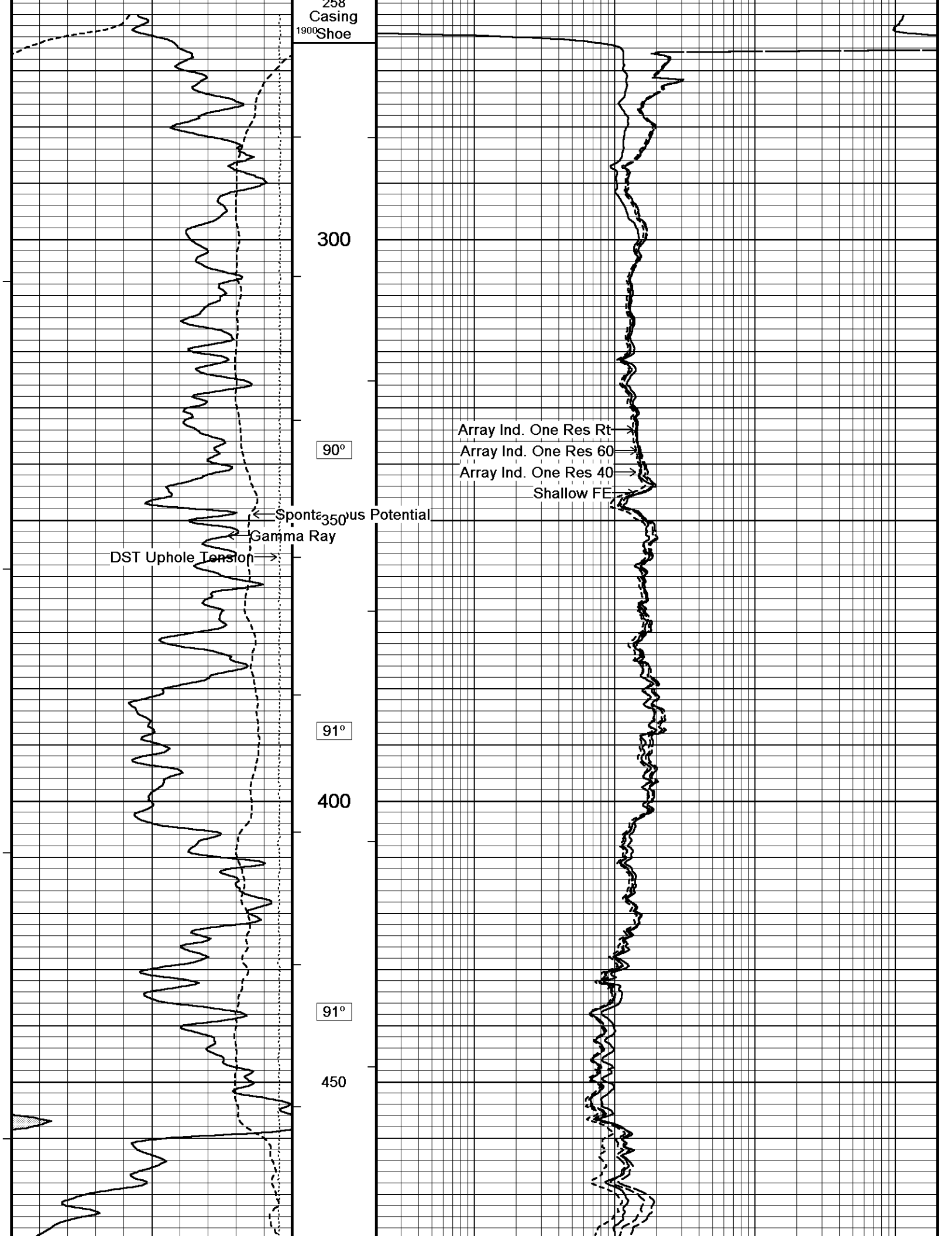
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 Filename: C:\Minimus 14.05\Log Data\Shakespeare Rudolph 1-23\Shakespeare Rudolph 1-23 Main.dta Recorded on 10-DEC-2014 08:02
 System Versions: Logged with 14.05.5280 Plotted with 14.05.5280

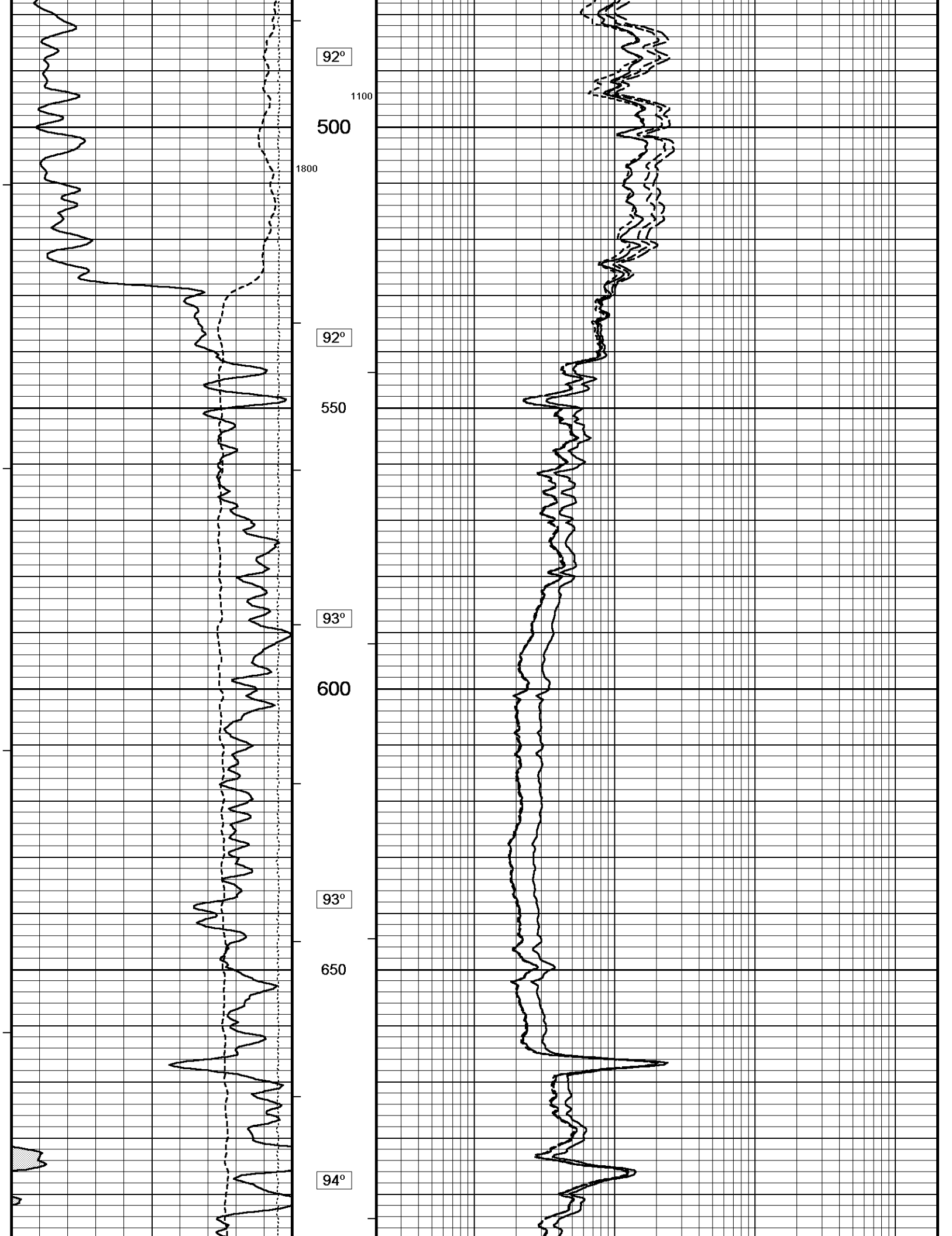
↑ 2 INCH MAIN ↑

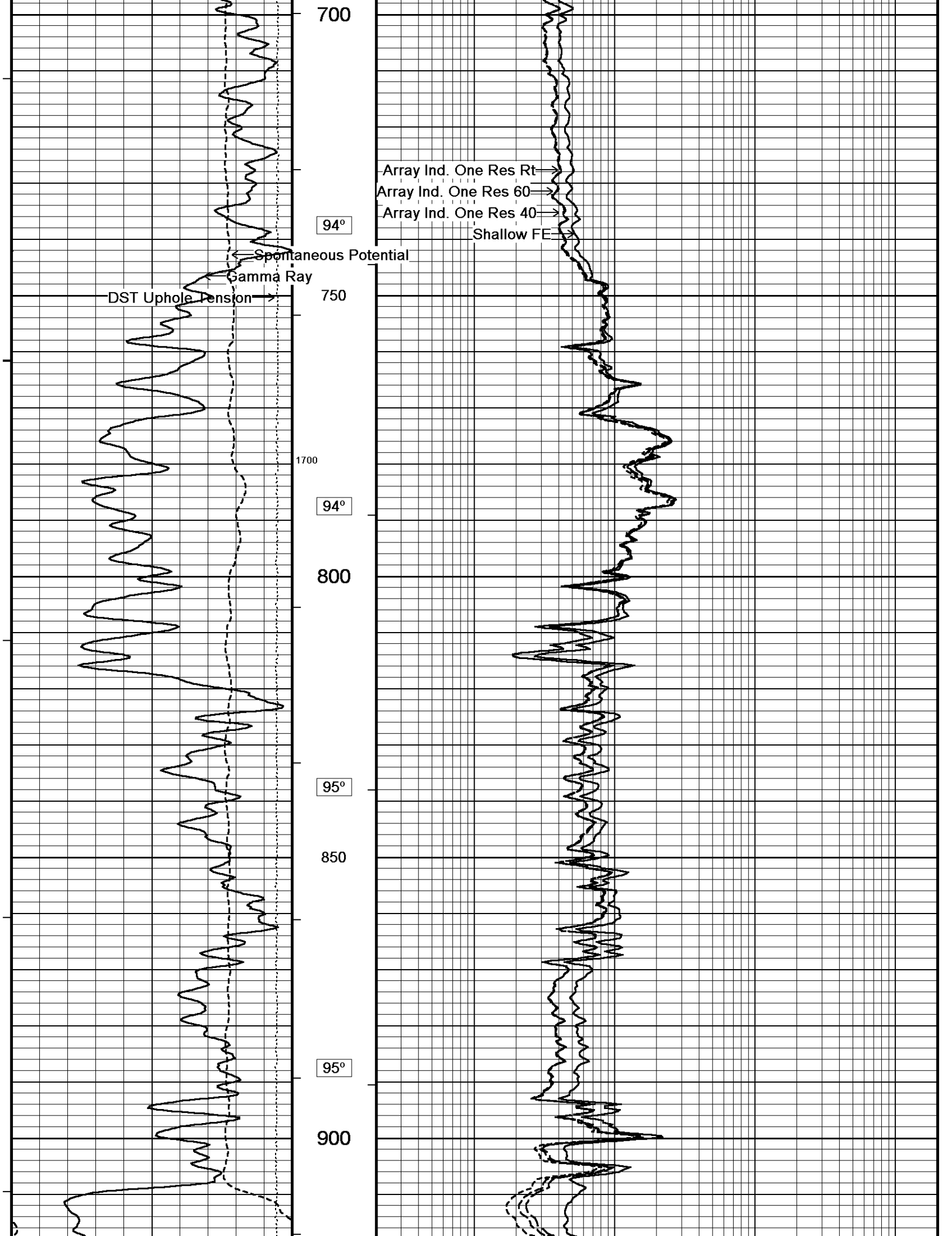
↓ 5 INCH MAIN ↓

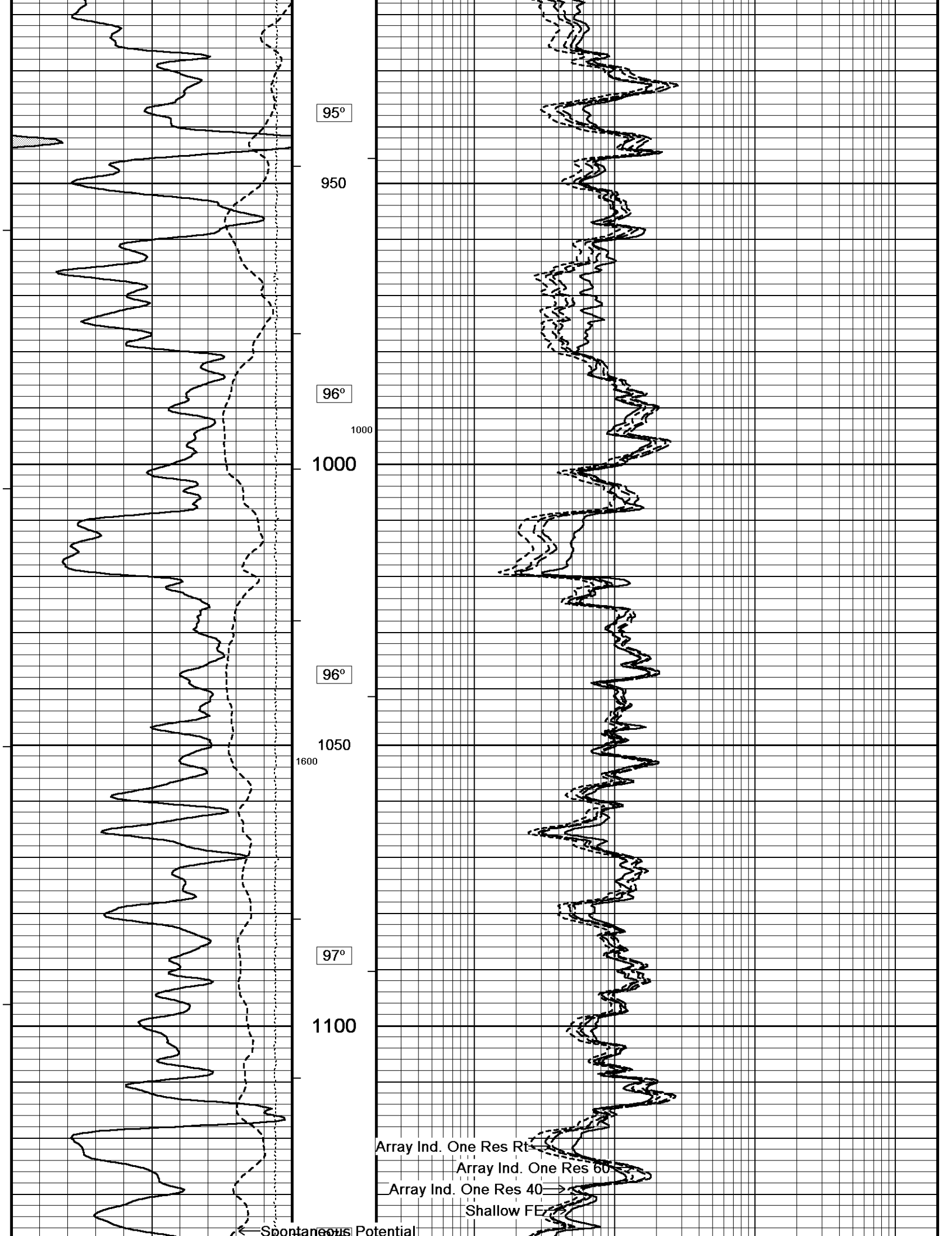
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 10-DEC-2014 10:23
 Filename: C:\Minimus 14.05\Log Data\Shakespeare Rudolph 1-23\Shakespeare Rudolph 1-23 Main.dta Recorded on 10-DEC-2014 08:02
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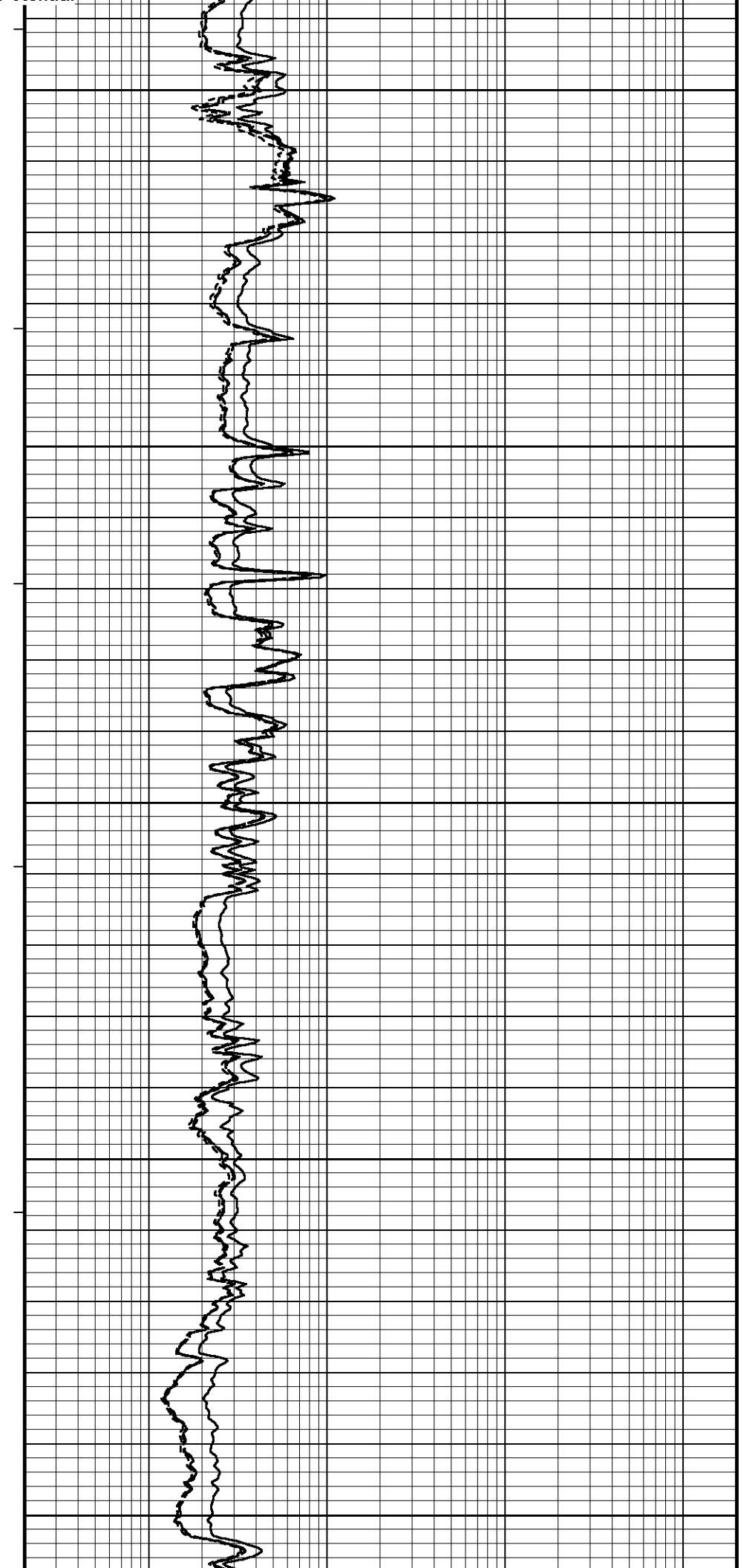
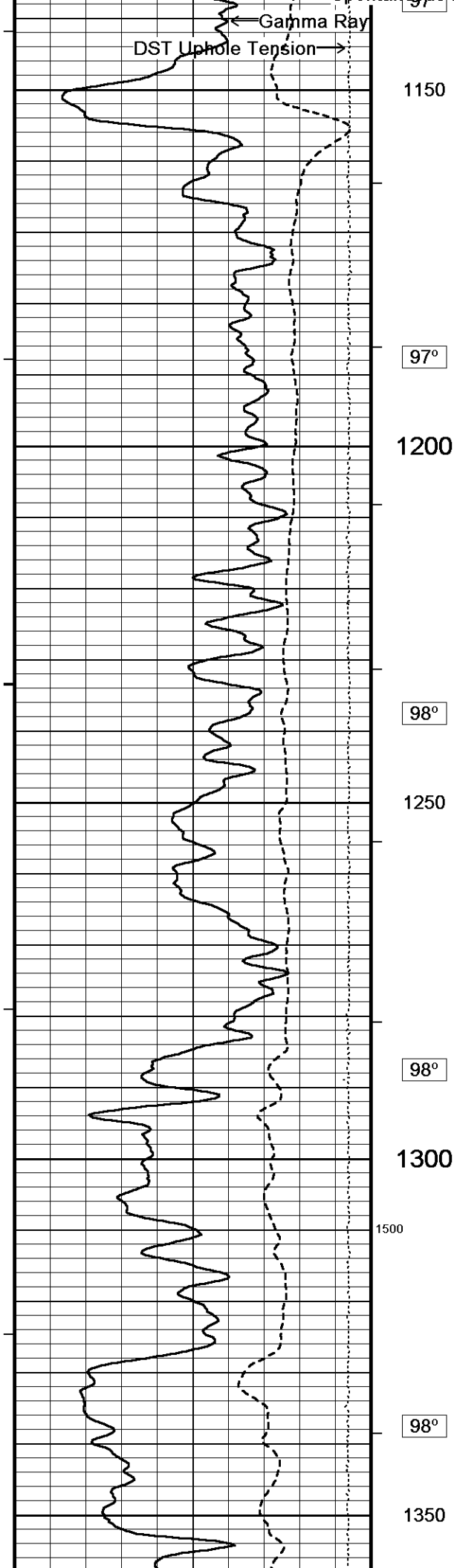


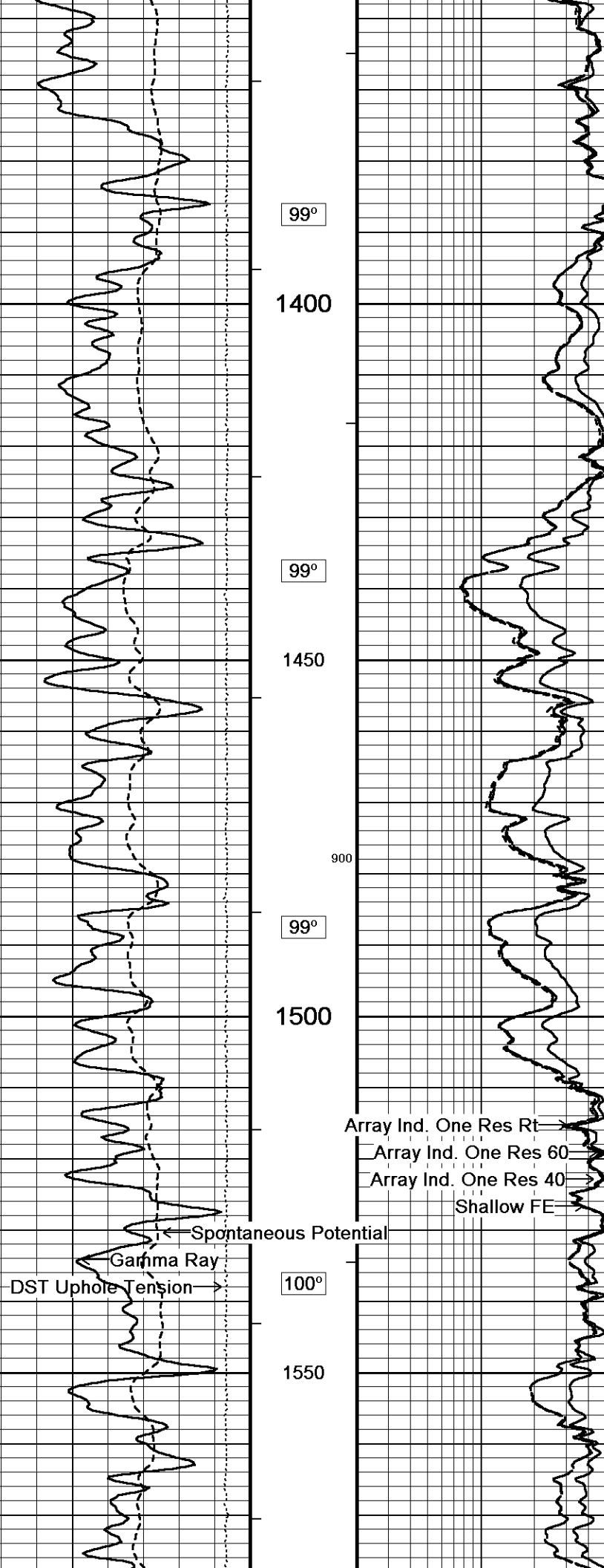


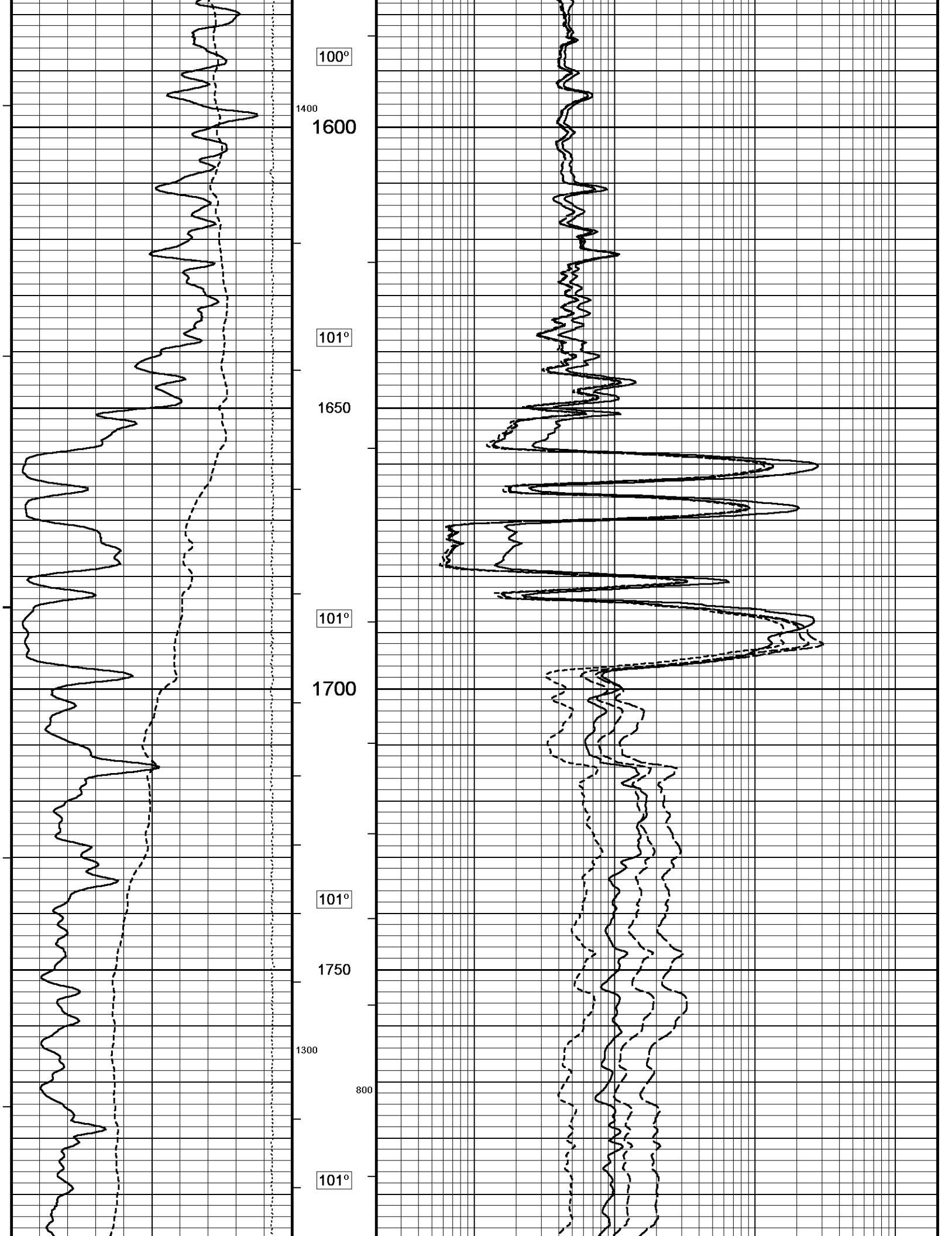


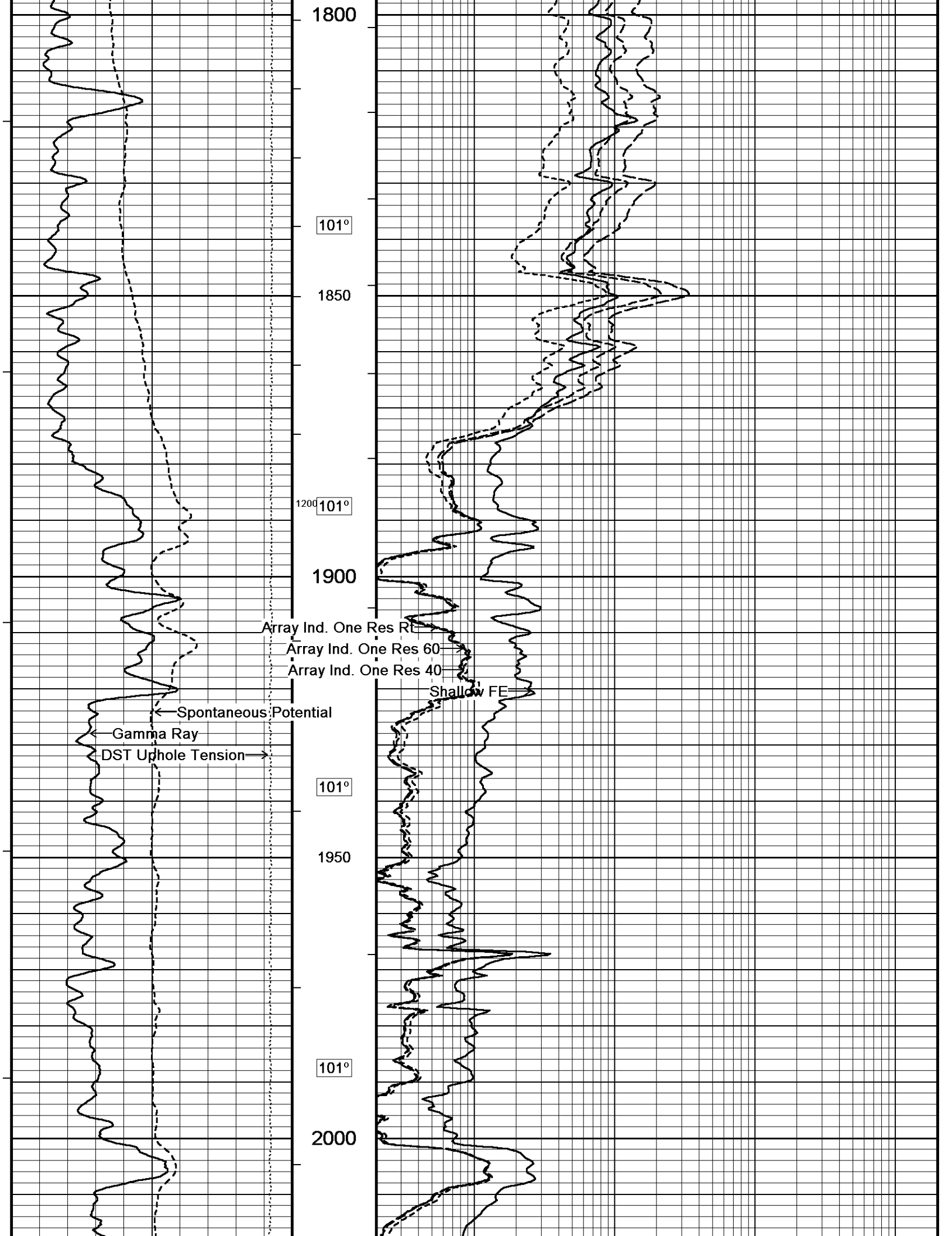


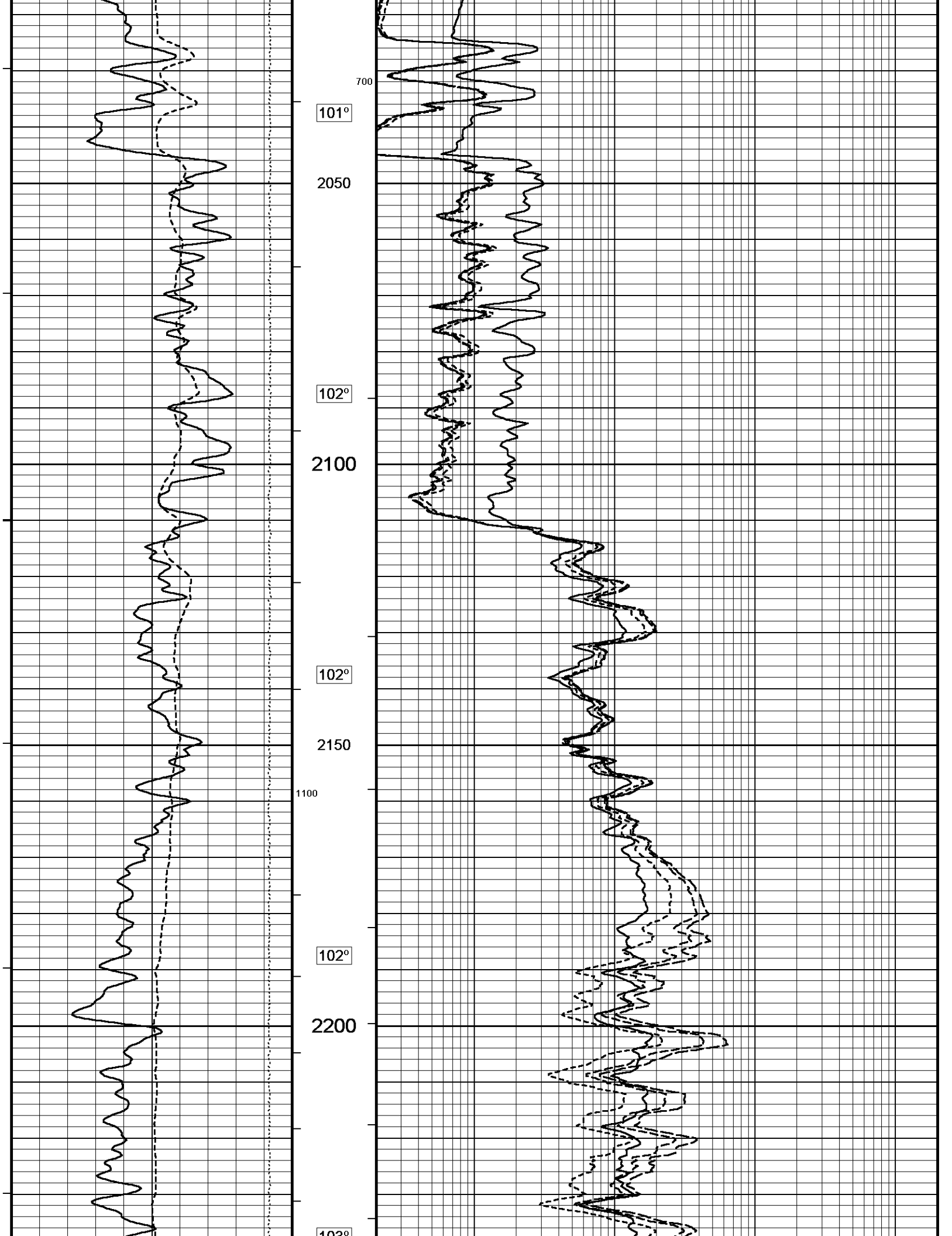


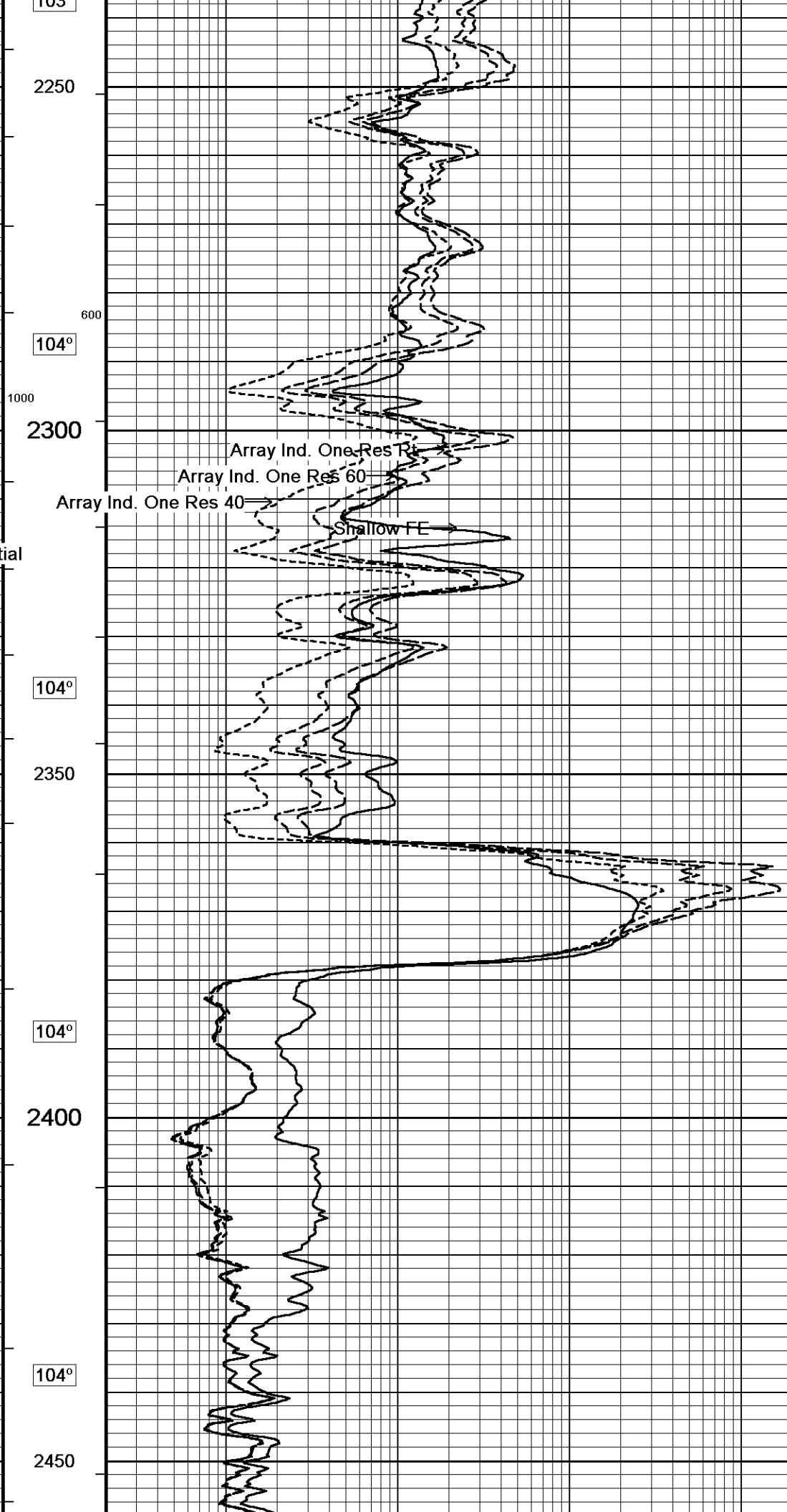
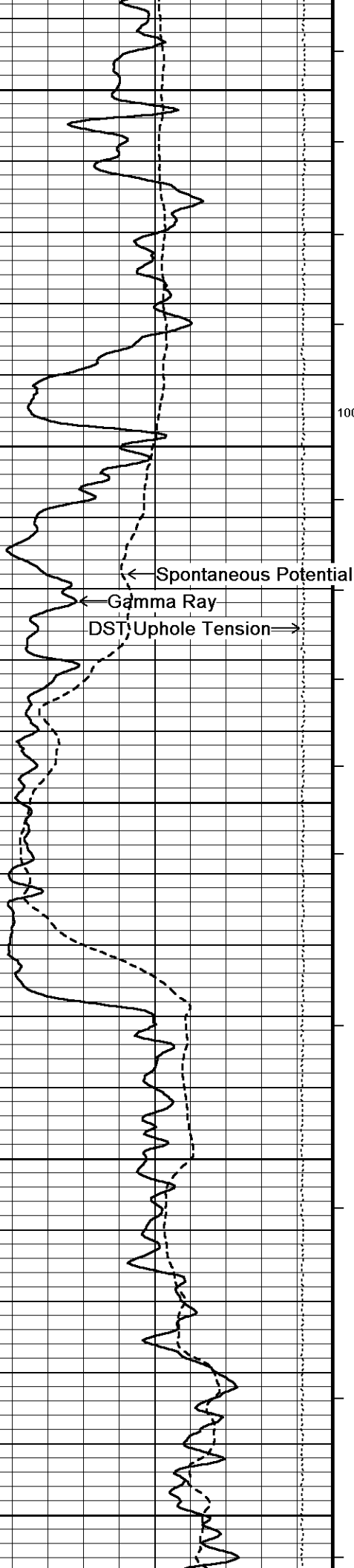












105

2250

600

104°

1000

2300

Array Ind. One Res R

Array Ind. One Res 60

Array Ind. One Res 40

Shallow FE

Spontaneous Potential

Gamma Ray

DST/Uphole Tension

104°

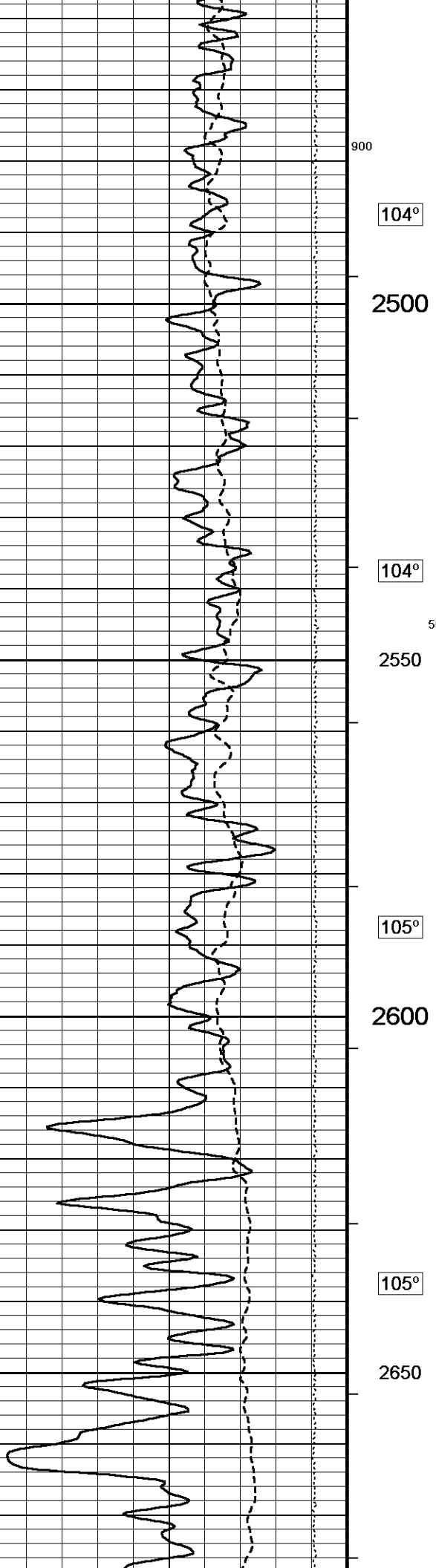
2350

104°

2400

104°

2450



104°

2500

104°

2550

105°

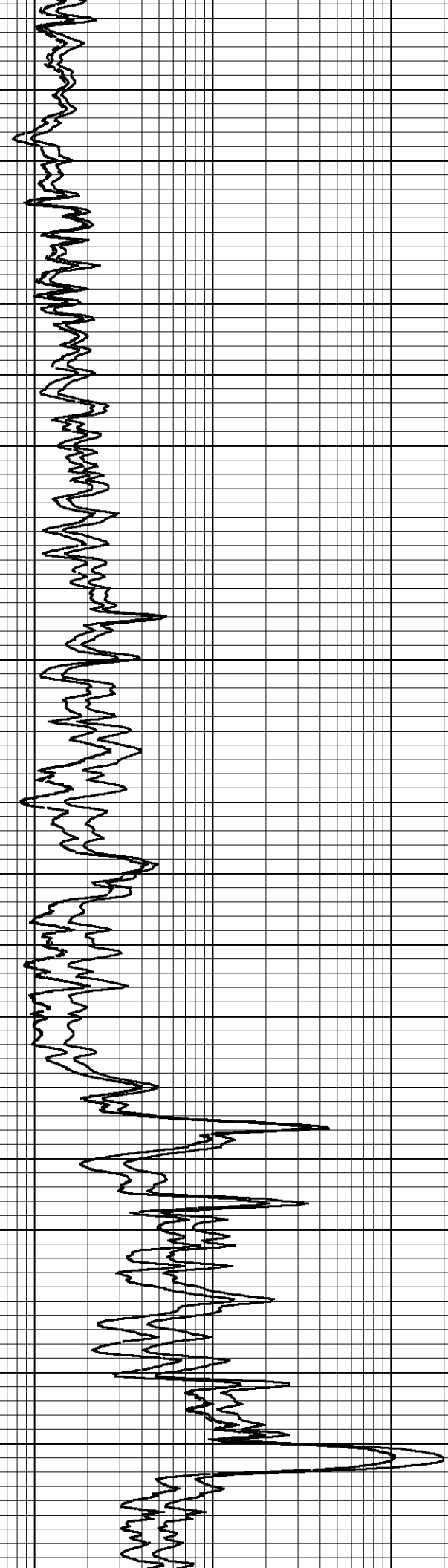
2600

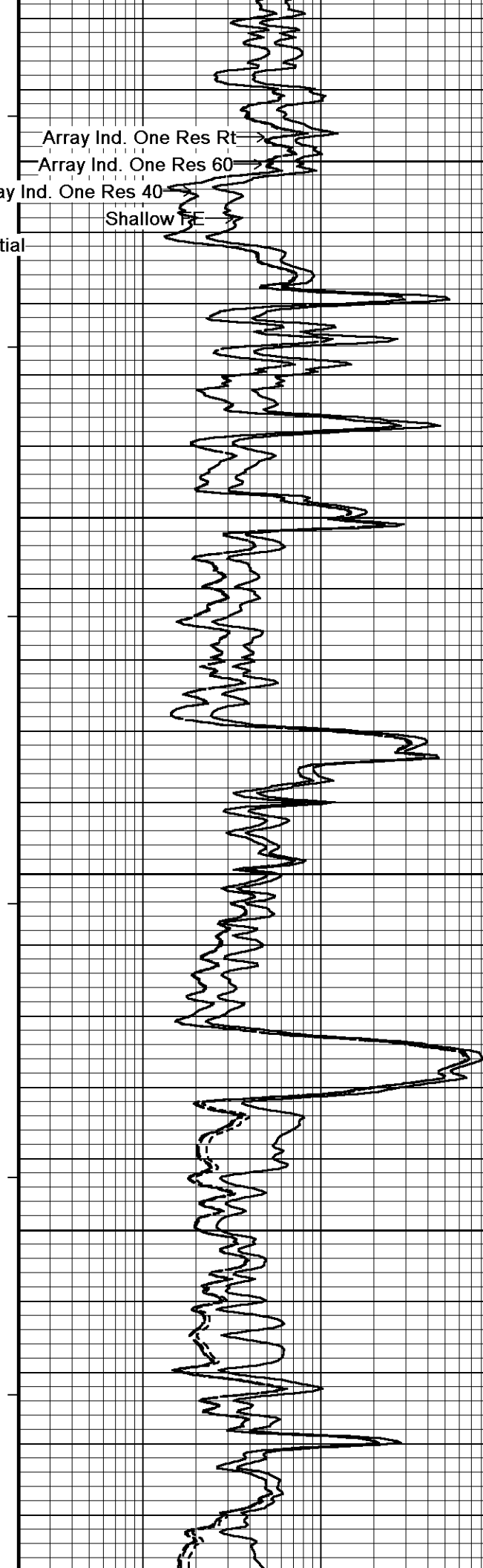
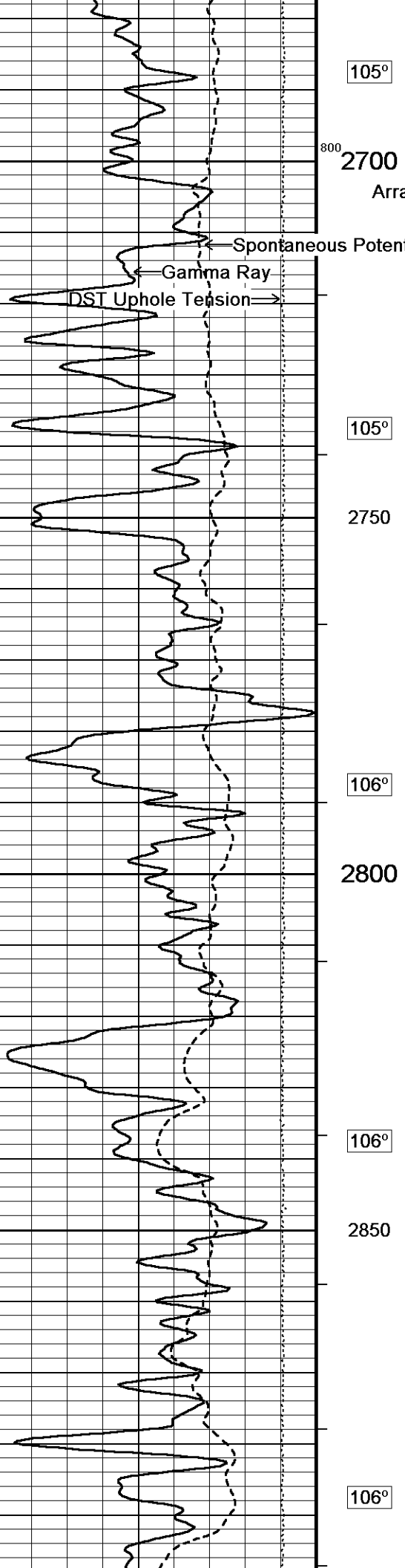
105°

2650

500

900





105°

800
2700

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

← Spontaneous Potential

← Gamma Ray

DST Uphole Tension →

105°

2750

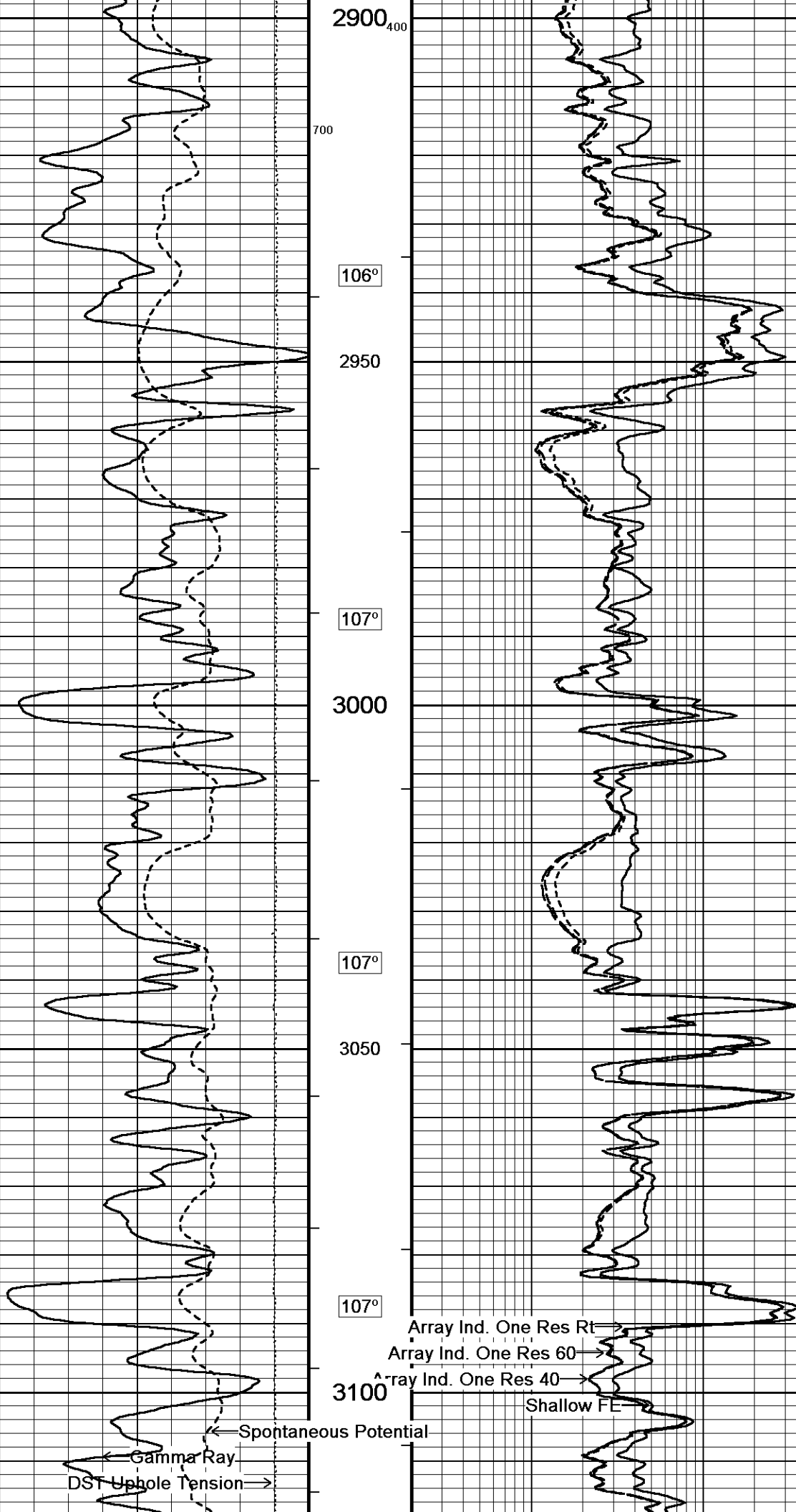
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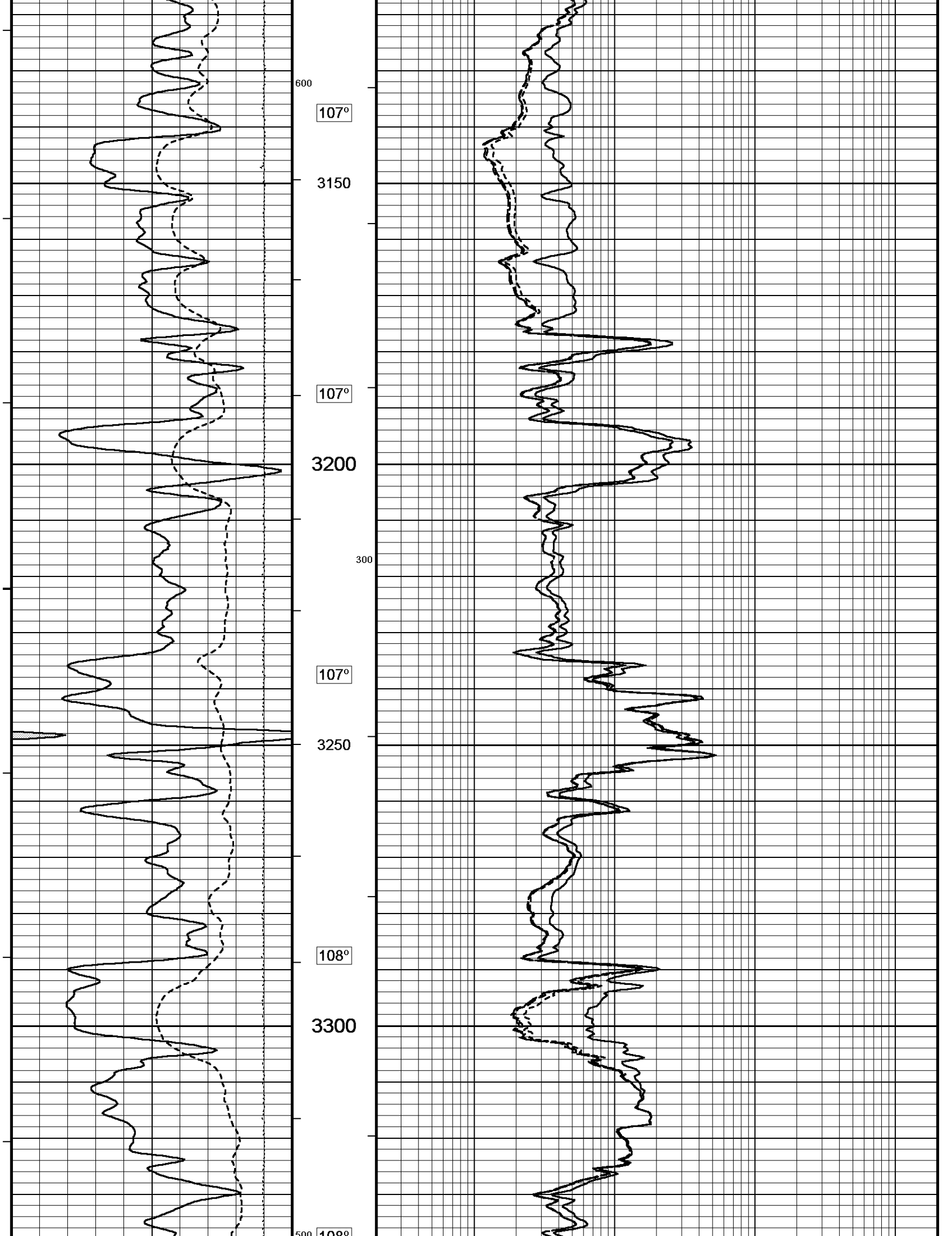
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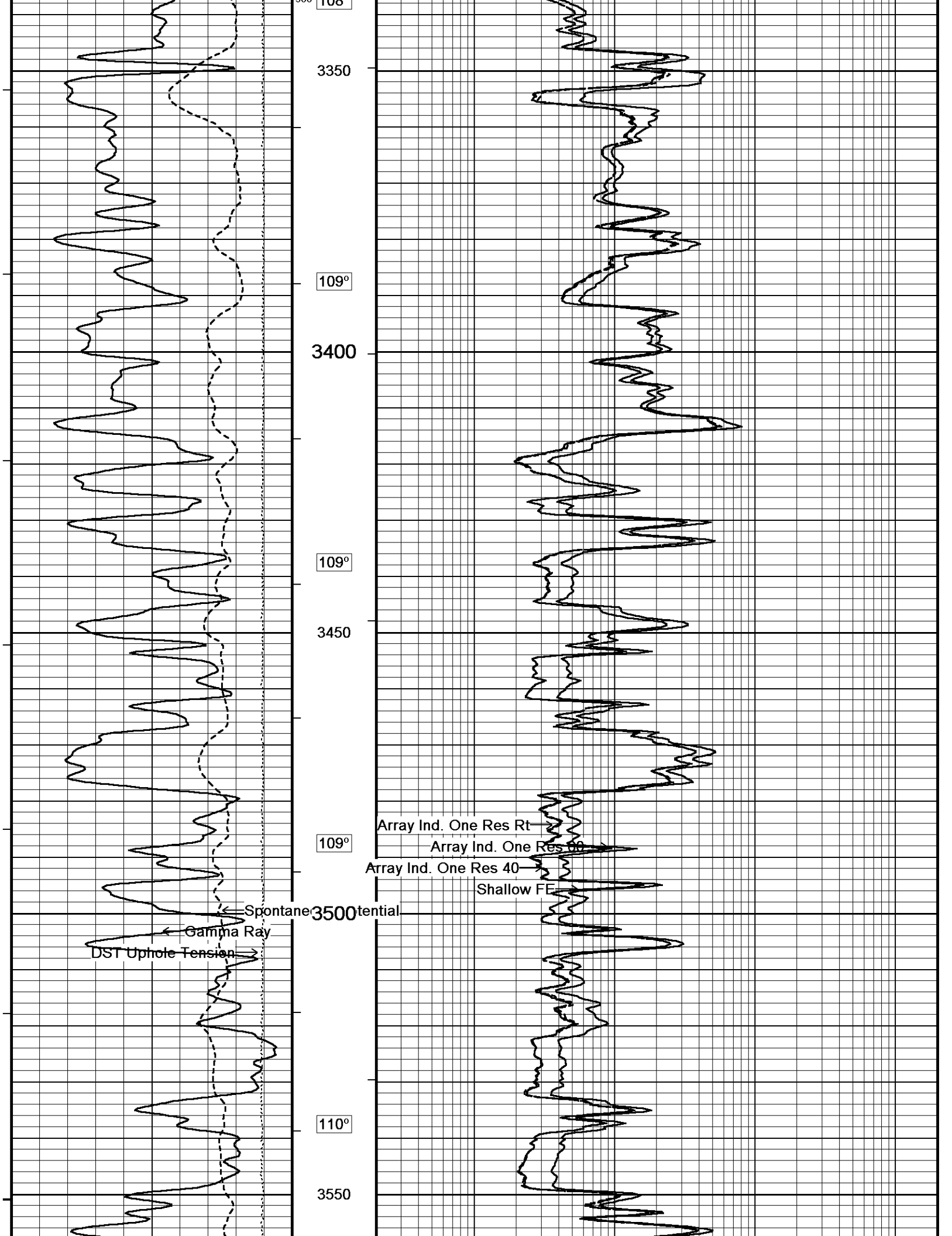
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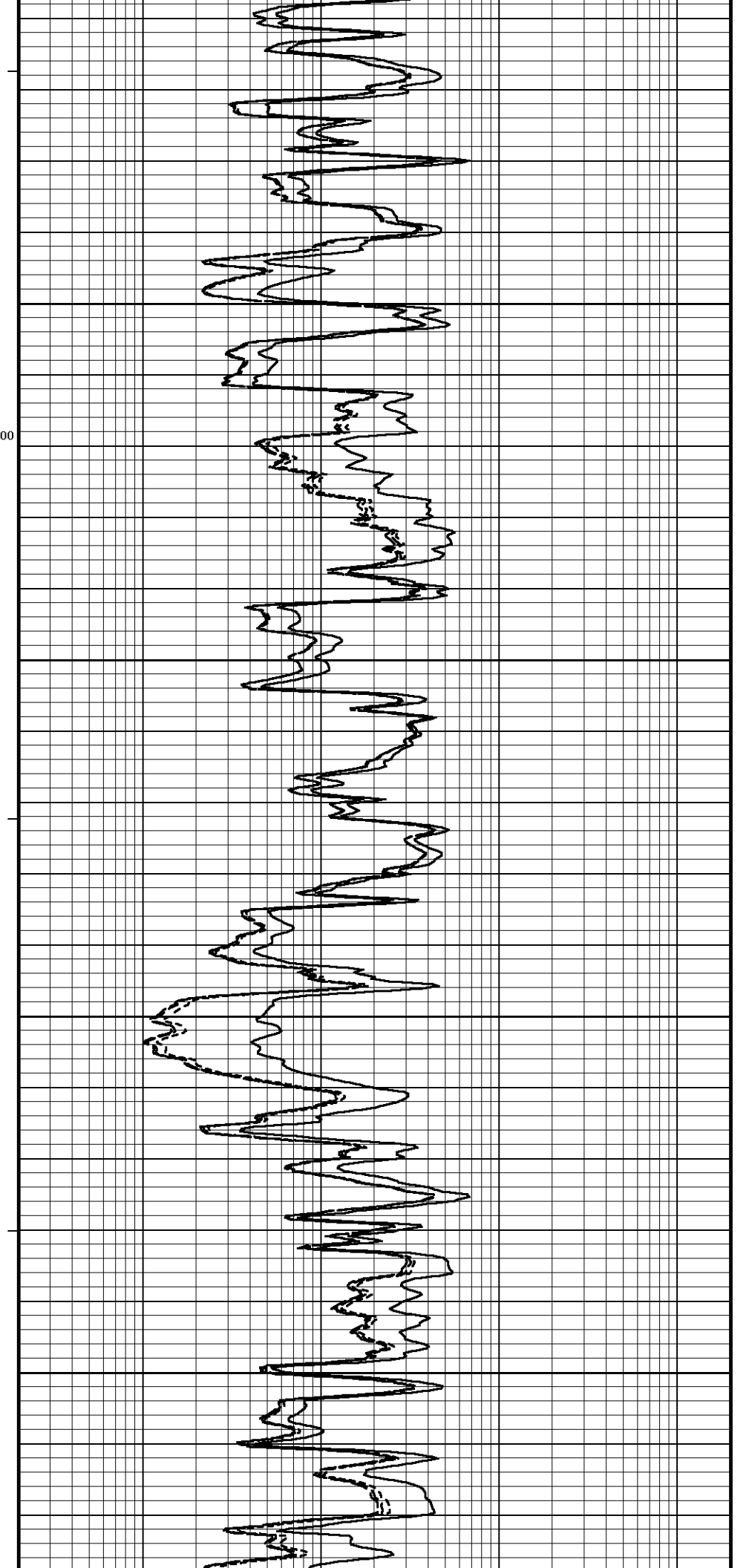
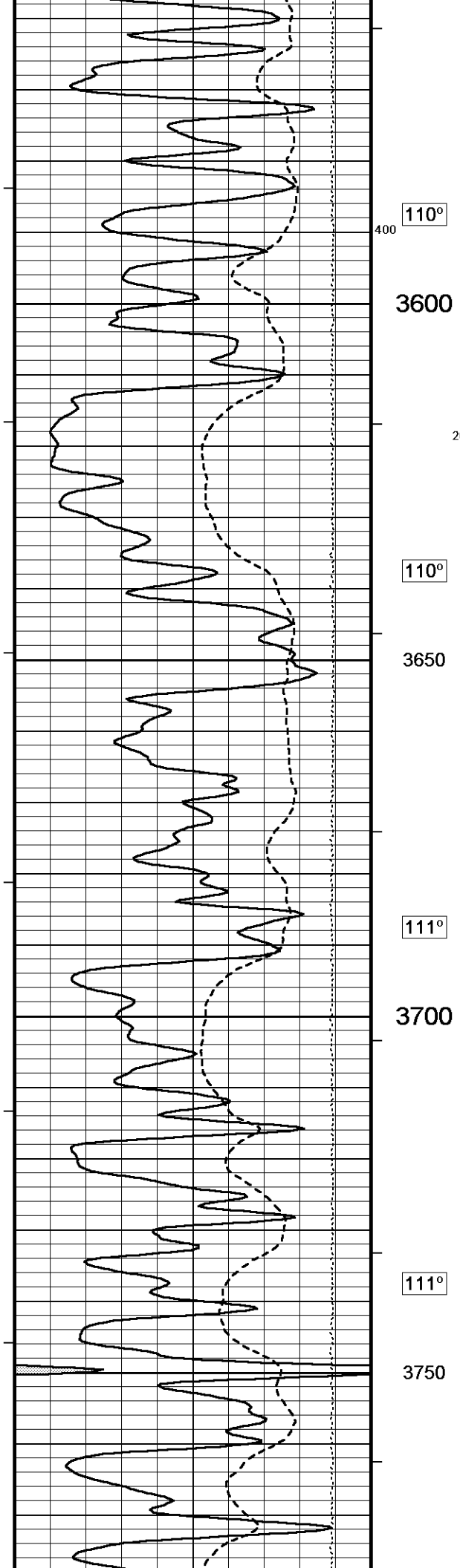
2850

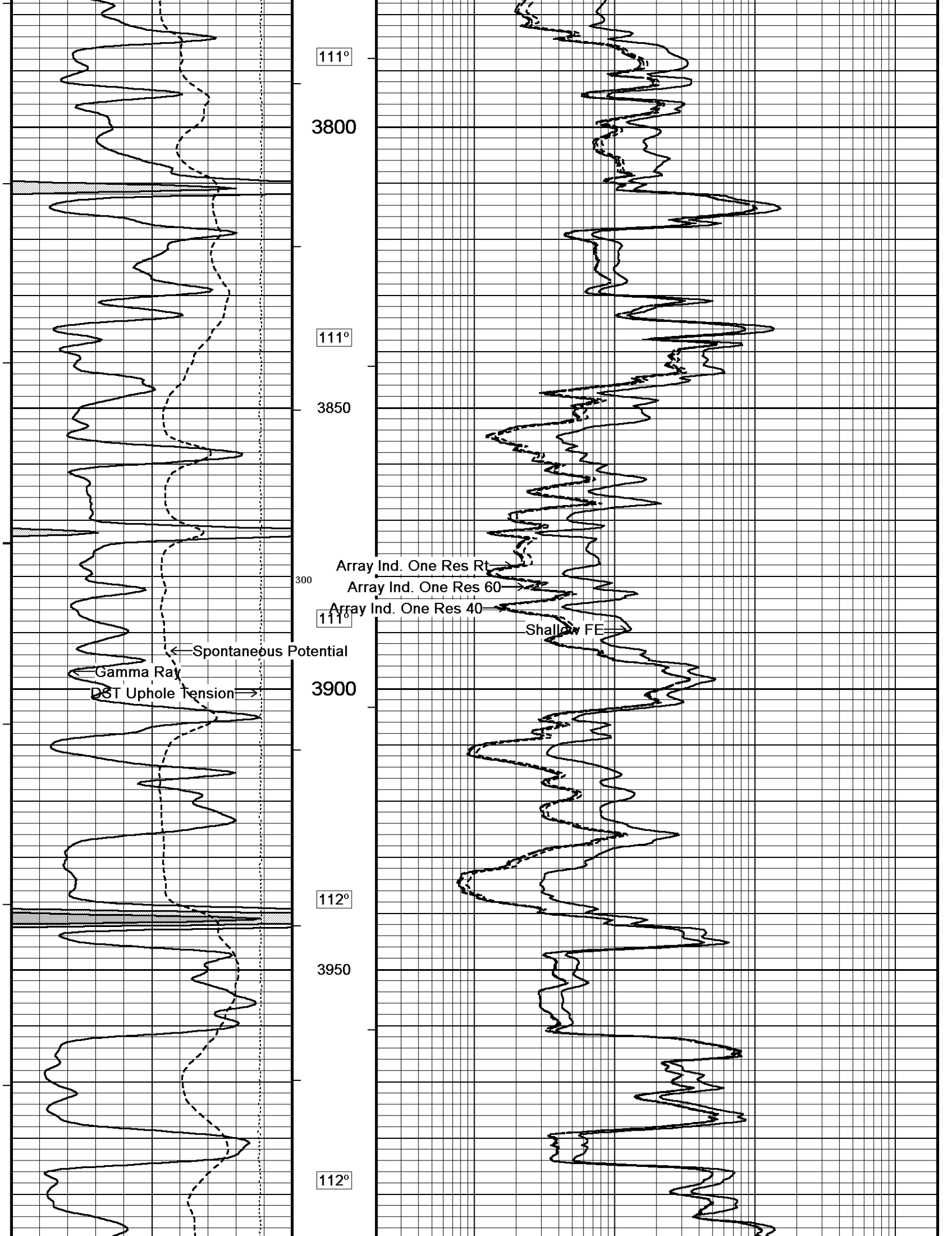
106°

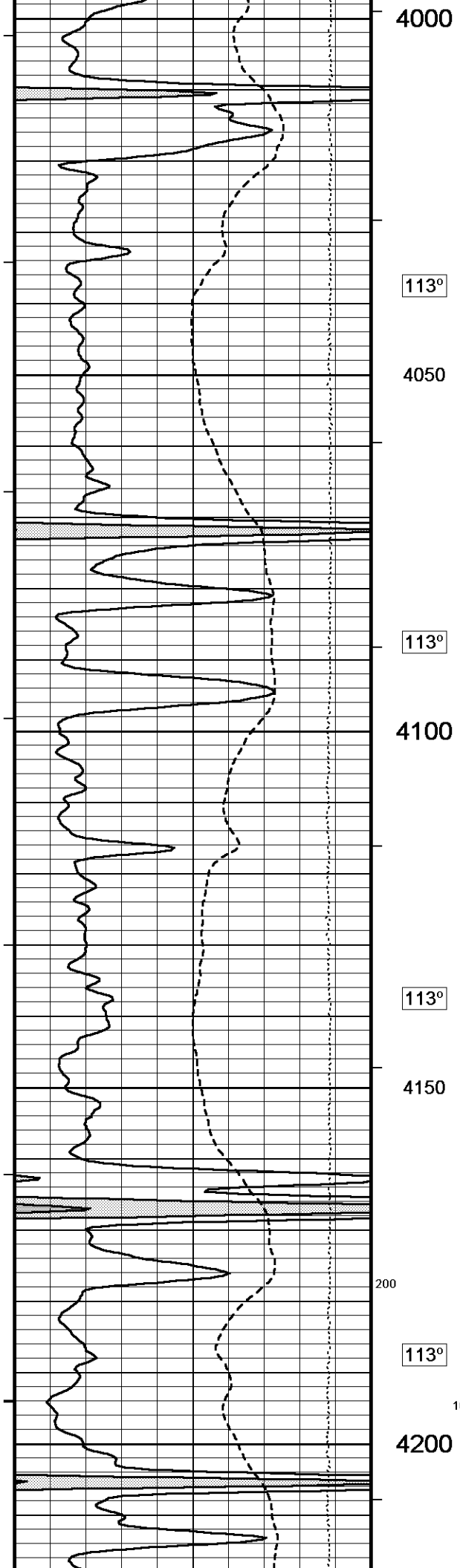




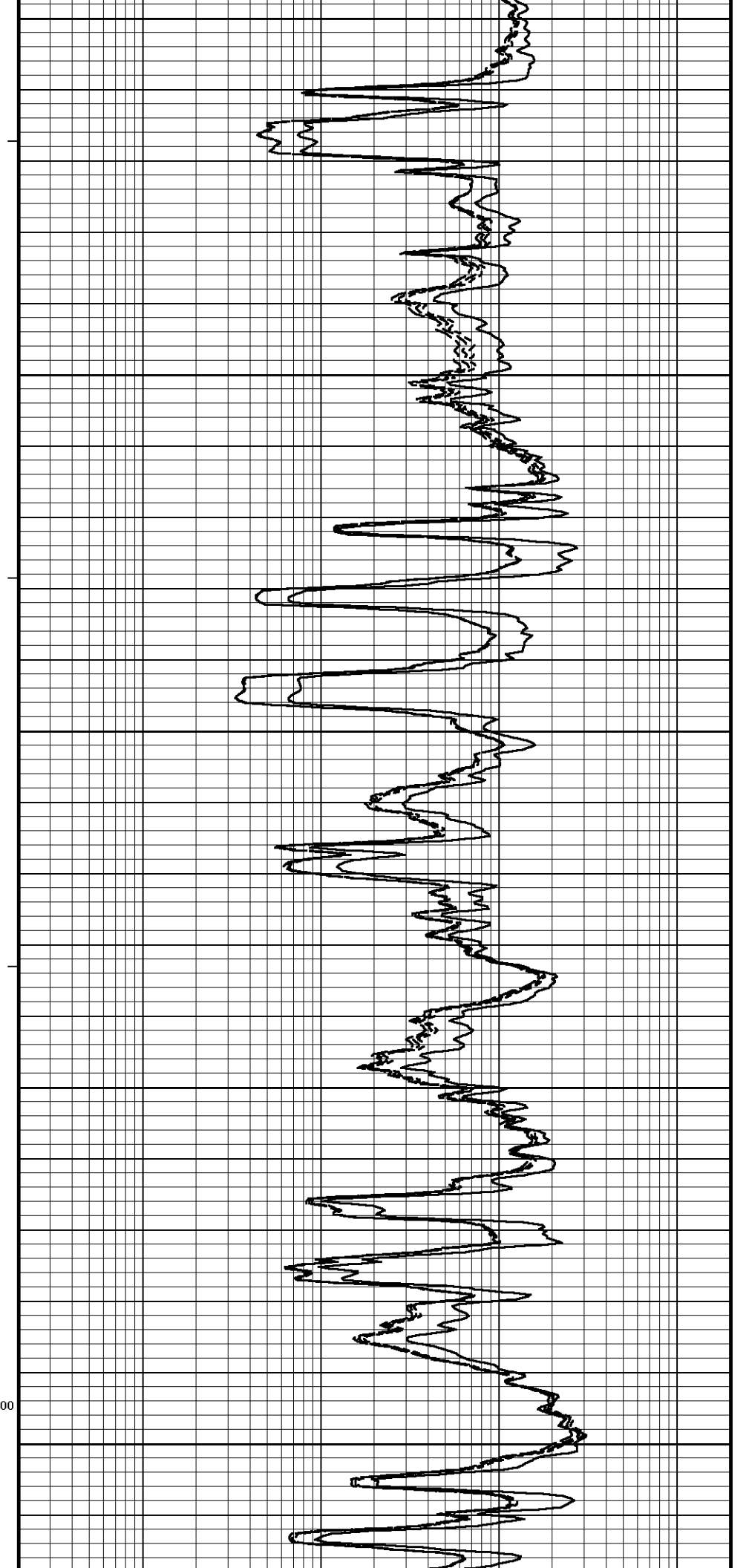


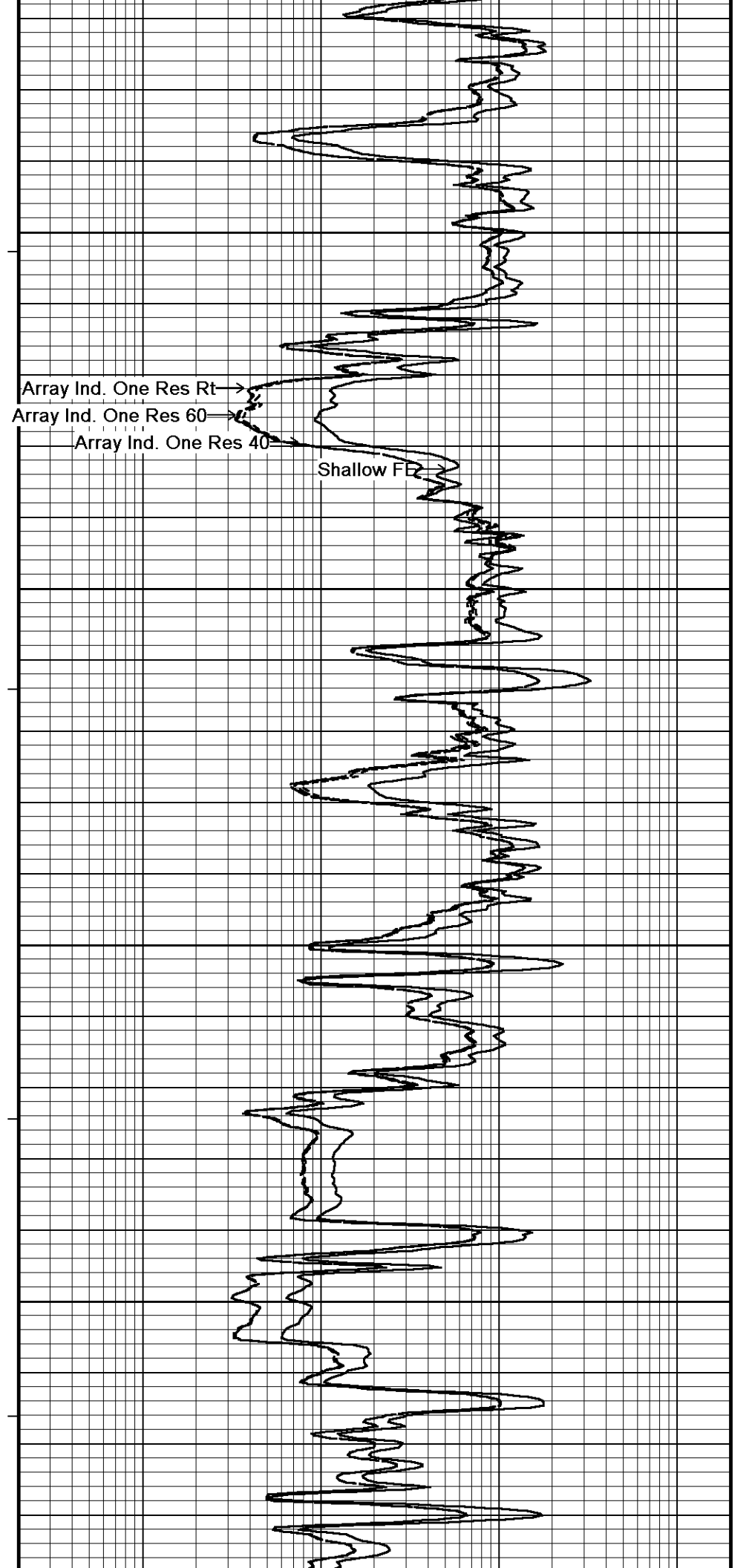
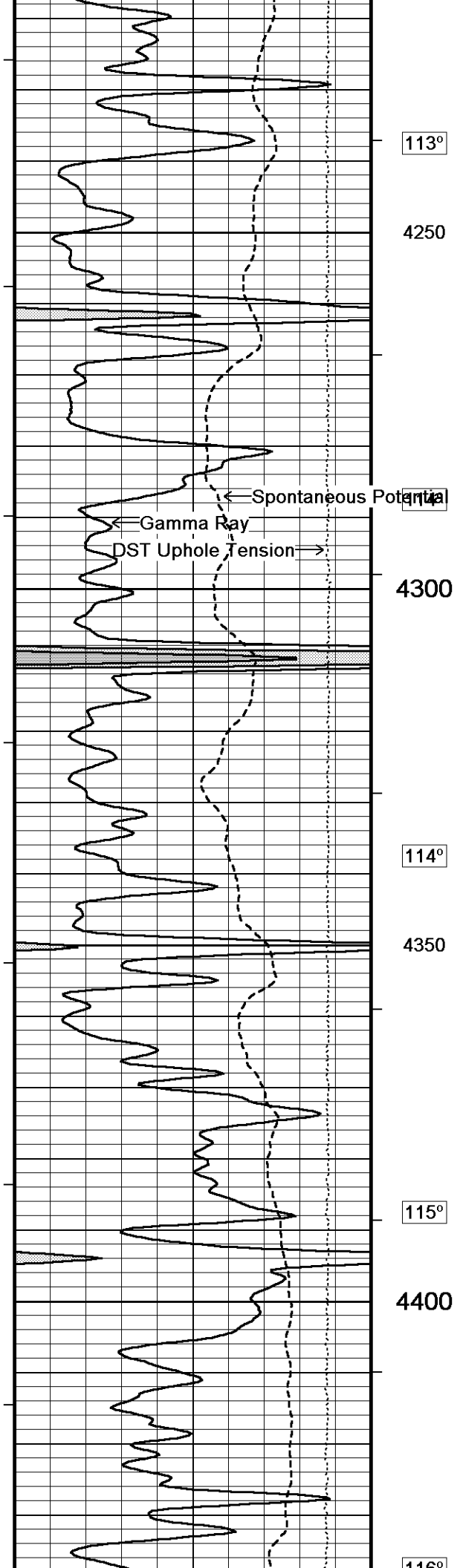


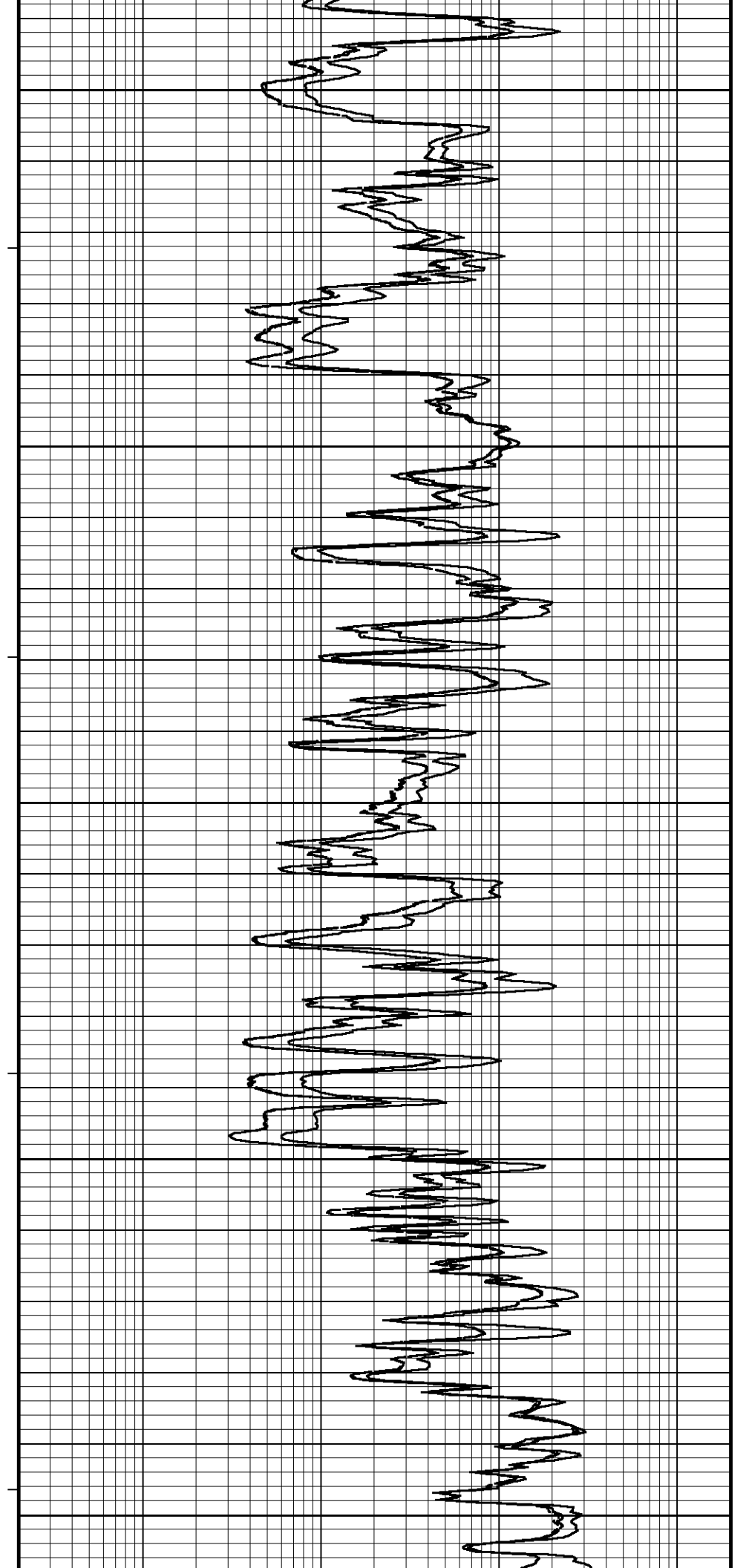
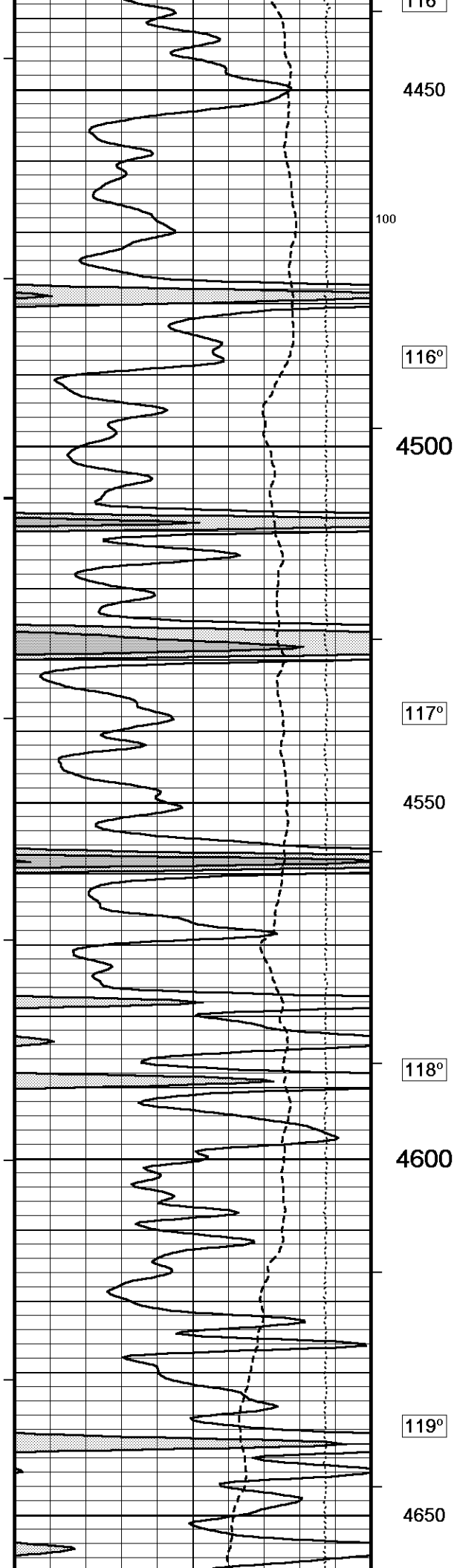


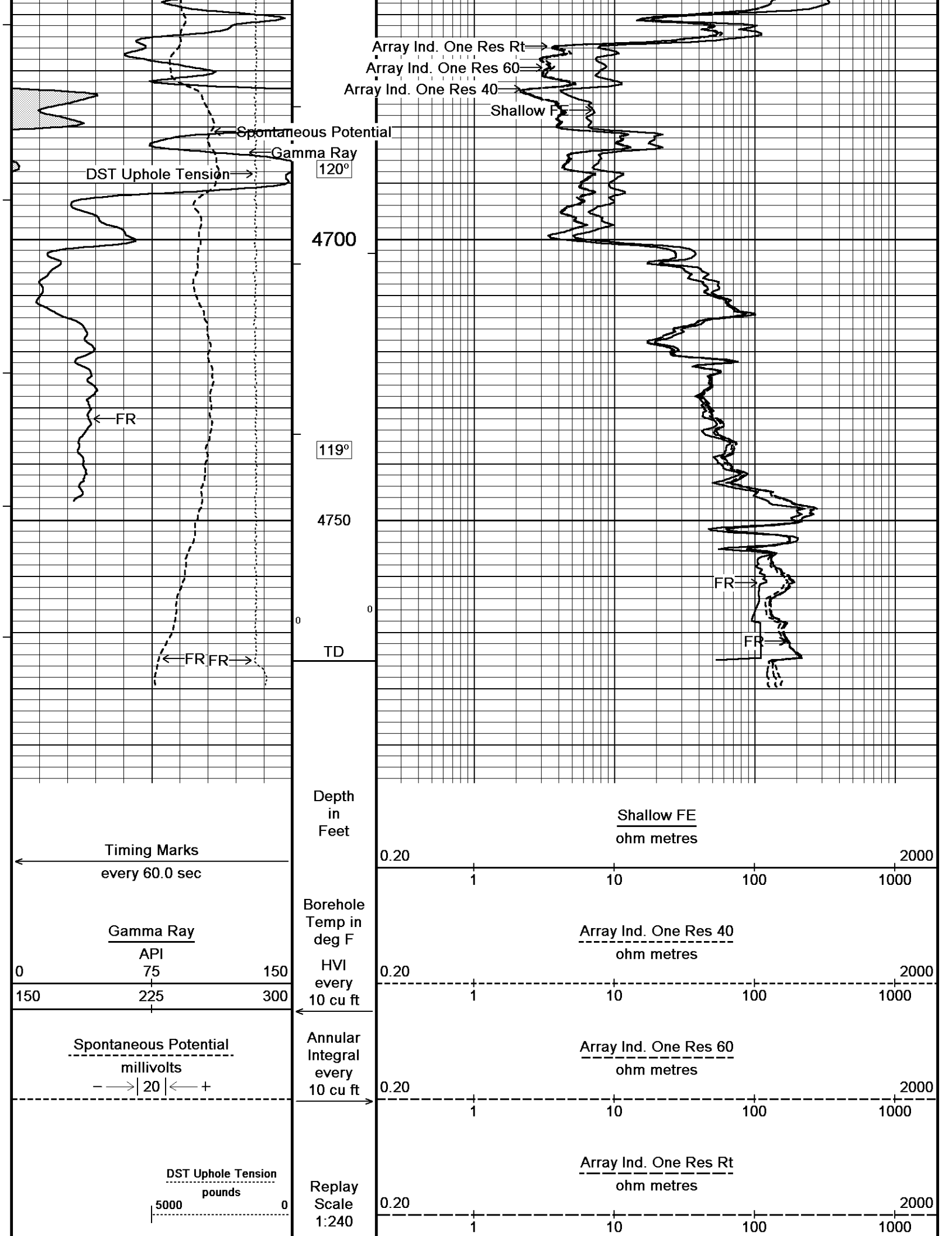


4000
113°
4050
113°
4100
113°
4150
200
113°
100
4200







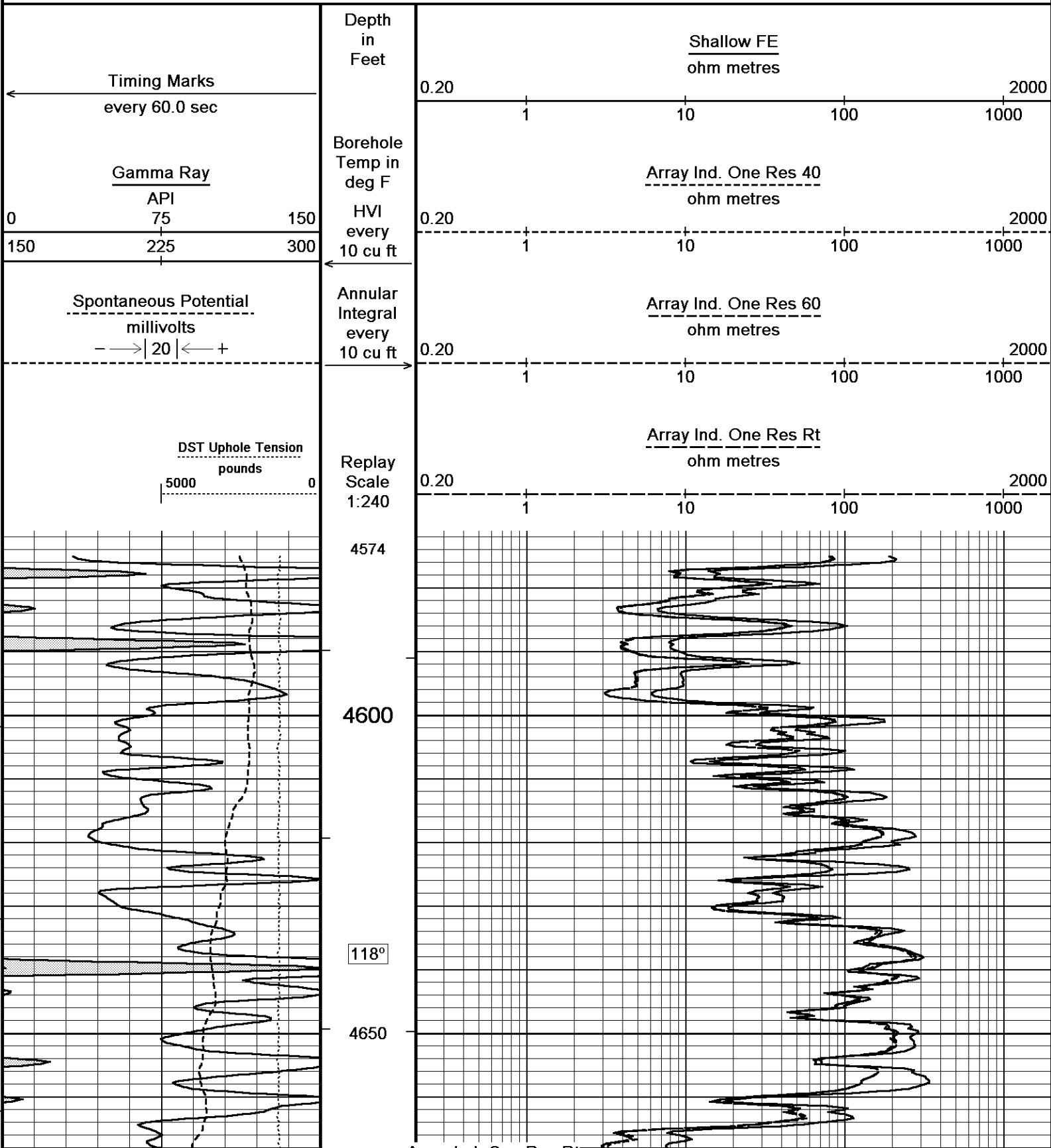


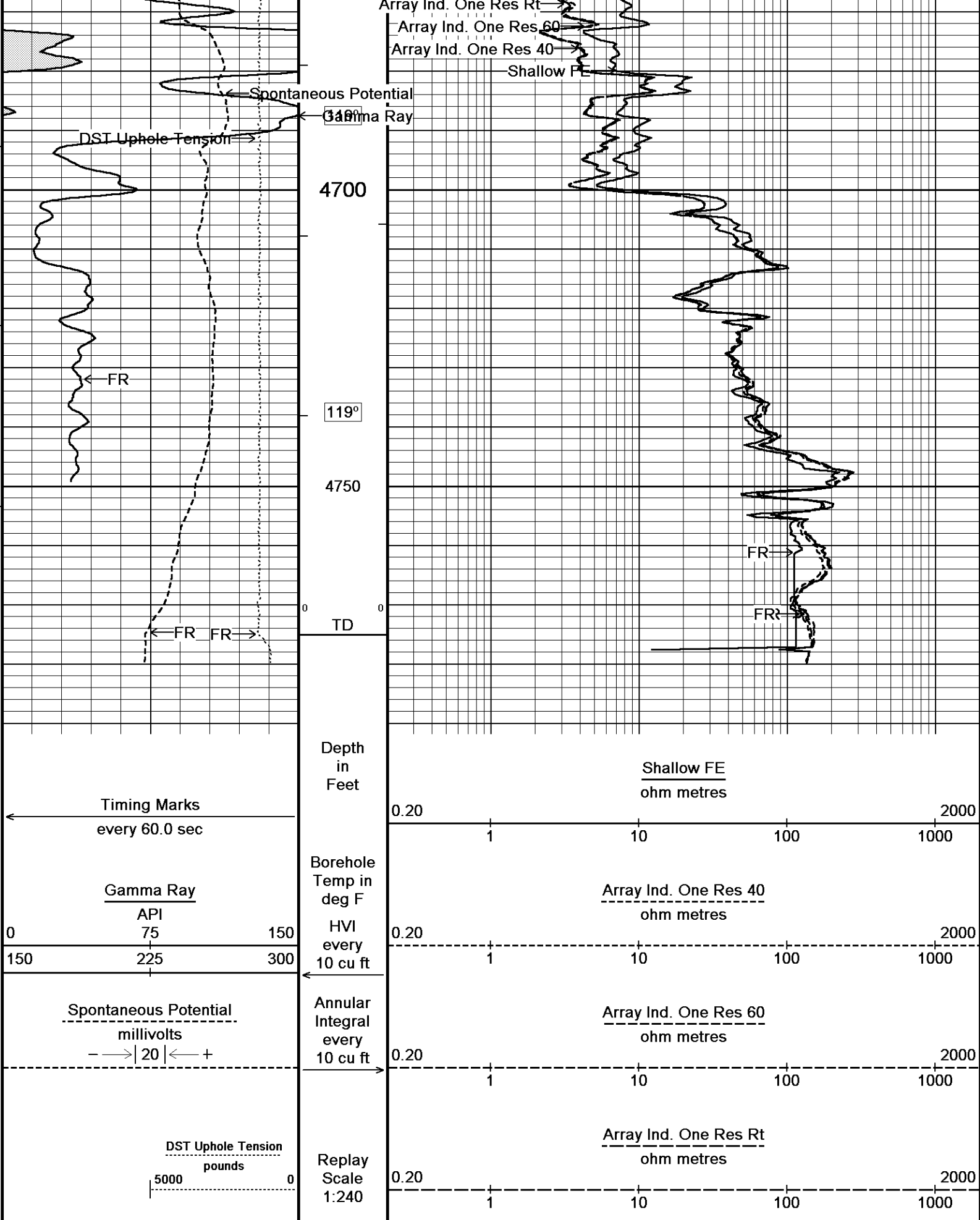


5 INCH MAIN



REPEAT SECTION





BEFORE SURVEY CALIBRATION

C:\Minimus 14.05\Log Data\Shakespeare Rudolph 1-23\Shakespeare Rudolph 1-23.dta

General Constants All 000

Last Edited on 10-DEC-2014,07:05

General Parameters

Mud Resistivity 0.598 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. One Res Rt
 RWA Constant A 0.610
 RWA Constant M 2.150
 SW/APOR Tool Source 0.000

Down-hole Tension Calibration SMS 0

Field Calibration on 10-DEC-2014 06:54

Reading No	Measured	Calibrated (lbs)
1	14625.10	0.00
2	15498.90	393.00

High Resolution Temperature Calibration MCG-B 39

Field Calibration on 24-NOV-2014,12:05

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

High Resolution Temperature Constants MCG-B 39

Last Edited on 28-AUG-2014,01:02

Pre-filter Length 11

SP Calibration MCG-B 39

Field Calibration on 24-NOV-2014,12:05

	Measured	Calibrated (mV)
Reference 1	102.6	99.9
Reference 2	-97.9	-100.0

Gamma Calibration MCG-B 39

Field Calibration on 09-DEC-2014 16:20

	Measured	Calibrated (API)
Background	78	53
Calibrator (Gross)	1146	778
Calibrator (Net)	1069	725

Gamma Calibration Tolerances MCG-B 39

Ratio 1.474

1.40	1.475	1.55
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 Counts/API

Gamma Constants MCG-B 39

Last Edited on 10-DEC-2014,03:21

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 %

Base Calibration

Channel	Measured		Calibrated (ohm-m)	
	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	10.0	49.9	5.1	25.6
Micro Inverse	10.0	49.9	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	77.4	77.4
Micro Inverse	51.3	51.3

Micro Normal & Micro Inverse Calibration Tolerance MML-A 3

Micro Normal Res. 1	10.0		ohm	Micro Normal Res. 2	49.9		ohm
Micro Inverse Res. 1	10.0		ohm	Micro Inverse Res. 2	49.9		ohm
Micro Normal Base Check	77.4		ohm-m				
Micro Inverse Base Check	51.3		ohm-m				
Micro Normal Field Check	77.4		ohm-m				
Micro Inverse Field Check	51.3		ohm-m				

Micro Normal and Micro Inverse Constants MML-A 3

Last Edited on 09-DEC-2014,16:38

Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159		
Micro Normal K Factor	0.5110		
Micro Inverse K Factor	0.3380		
Standoff Offset	N/A	inches	

Caliper Calibration MML-A 3

Base Calibration on 01-DEC-2014 10:40
Field Calibration on 09-DEC-2014 16:38

Base Calibration	Reading No	Measured	Calibrator Size (in)
	1	15291	5.98
	2	18492	7.97
	3	21784	9.86
	4	25739	11.92
	5	0	0.00
	6	N/A	N/A

Field Calibration	Measured Caliper (in)	Actual Caliper (in)
	7.96	7.97

Caliper Calibration Tolerances MML-A 3

Short Arm Field Cal.	7.96		in
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Neutron Calibration MDN-A.B 152

Base Calibration on 09-DEC-2014 15:34
Field Check on 09-DEC-2014 15:59

Base Calibration	Measured		Calibrated (cps)	
	Near	Far	Near	Far
Ratio	2888	88	3714	110
	32.811		33.764	

Field Calibrator at Base	Calibrated (cps)
Ratio	1761 2584
	0.681

Field Check	Calibrated (cps)
Ratio	1761 2586
	0.681

Neutron Calibration Tolerances MDN-A.B 152

Near Reading	2888		cps	Far Reading	88		cps
Ratio	32.811						

Ratio	32.811	
Base Check	0.681	
Field Check	0.681	

Neutron Constants MDN-A.B 152

Last Edited on 10-DEC-2014,03:21

Neutron Source Id	P0204NN	
Neutron Jig Number	5824NE	
Air Hole Processing	Legacy	
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	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	N/A	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-B.J 353

Base Calibration on 01-DEC-2014 10:12
Field Check on 09-DEC-2014 16:35

Base Calibration	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	975.8	126.8
Base Check		277.9
Field Check		277.8

FE Calibration Tolerances MFE-B.J 353

Reference 2	975.8		ohm
Base Check	277.9		ohm-m
Field Check	277.8		ohm-m

FE Constants MFE-B.J 353

Last Edited on 10-DEC-2014,03:20

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 Corrected	
Temp. for Rm Corr.	MCG External Temperature	
Stand-off	0.5	inches

High Resolution Temperature Calibration MAI-A.A 111

Field Calibration on 24-NOV-2014,10:23

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

High Resolution Temperature Constants MAI-A.A 111

Last Edited on 26-JUN-2014,15:06

Pre-filter Length	11
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Induction Calibration MAI-A.A 111

Base Calibration on 05-AUG-2014,09:34
Field Check on 09-DEC-2014 16:33

Base Calibration	Measured		Calibrated (mmho/m)	
Test Loop Calibration 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

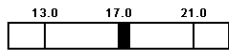
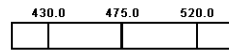

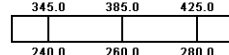
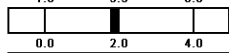
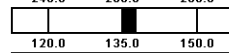
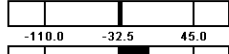
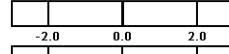
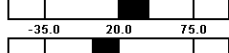
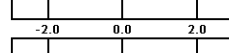
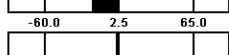
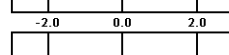
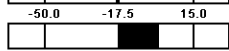
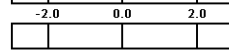

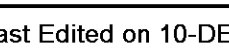
Array Temperature 23.0 Deg F

Test Loop Calibration Verified

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	11.9	3872.3
2	0.0	0.0	29.7	3527.5
3	0.0	0.0	29.0	3020.8
4	0.0	0.0	19.1	2058.0
Deep			17.7	1961.6
Medium			43.1	3975.9
Shallow			44.3	5232.1

Array Temperature 0.0 61.6 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 10-DEC-2014,03:19

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 Global Value: Temperature Corrected			
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 Water for Apol and Sw	0.00	ohm-m
Source for Rt	0.00	
Source for Rxo	0.00	

Caliper Calibration MPD-C.A 216

Base Calibration on 09-DEC-2014 13:29
Field Calibration on 09-DEC-2014 13:33

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	19120	3.99
2	29184	5.98
3	39328	7.97
4	49072	9.86
5	60273	11.92
6	N/A	N/A

Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	7.97	7.97

Caliper Calibration Tolerances MPD-C.A 216

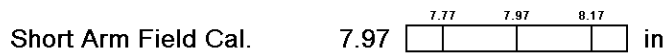


Photo Density Calibration MPD-C.A 216

Base Calibration on 09-DEC-2014 13:48
Field Check on 09-DEC-2014 13:54

Density Calibration				
Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1092	1289		
Reference 1	58913	30669	59556	30836
Reference 2	24800	2733	24941	2541

Field Check at Base		
	1091.9	1288.6

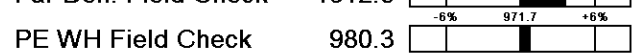
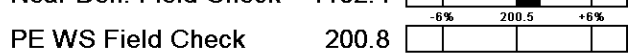
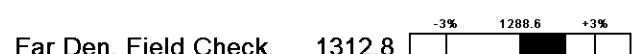
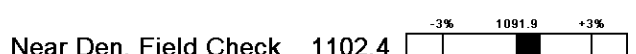
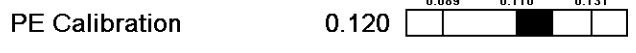
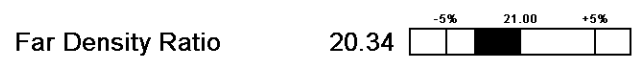
Field Check		
	1102.4	1312.8

PE Calibration				
Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	200	972		
Reference 1	24229	58725	0.416	0.371
Reference 2	6999	24668	0.287	0.272

Field Check at Base		
	200.5	971.7

Field Check		
	200.8	980.3

Photo Density Calibration Tolerances MPD-C.A 216



Density Constants MPD-C.A 216

Last Edited on 10-DEC-2014,03:21

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 14.05\Log Data\Shakespeare Rudolph 1-23\Shakespeare Rudolph 1-23.dta

3/8" Triple Cone Cable Head (MCB C A)
 MCB-C.A 233 LG: 1.58 ft WT: 15.4 lb OD: 2.240 in

Compact Comms Gamma
 MCG-B 39 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

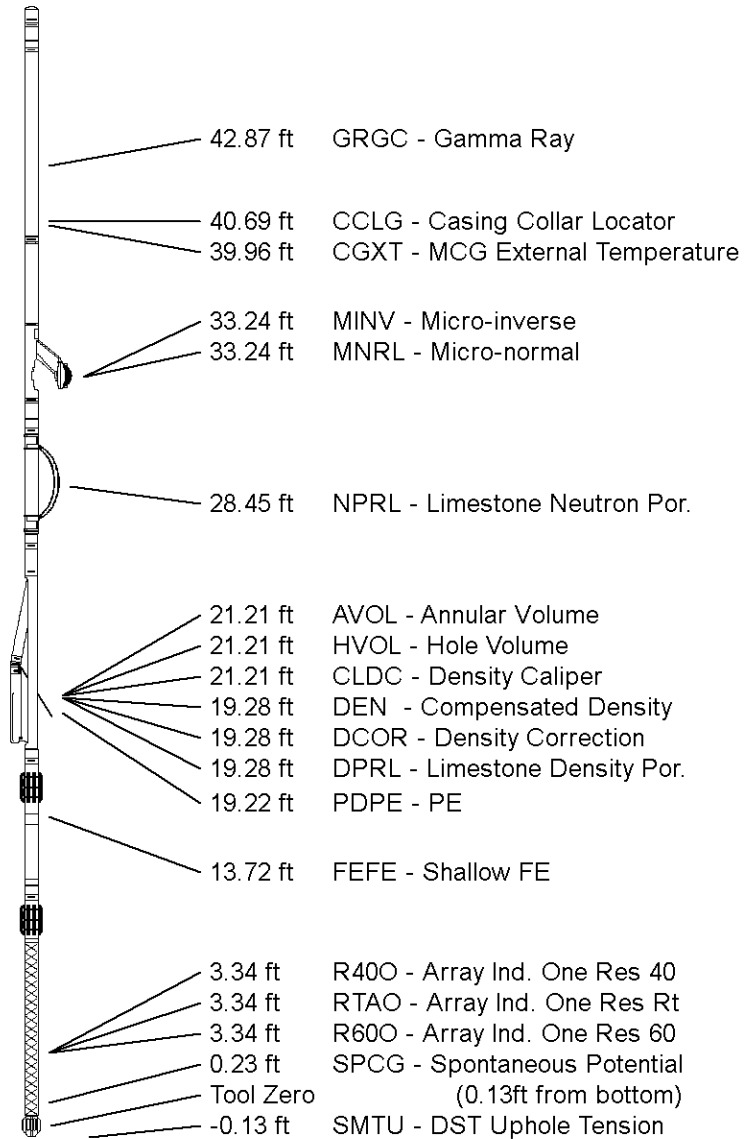
Compact Neutron
 MDN-A.B 152 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
 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 Induction
 MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 49.73 ft Weight: 399.0 lb



COMPANY	SHAKESPEARE OIL CO., INC.
WELL	RUDOLPH 1-23
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing 3026.00 feet
 Elevation Drill Floor 3024.00 feet
 Elevation Ground Level 3016.00 feet

First Reading 4771.04 feet
 Depth Driller 4770.00 feet
 Depth Logger 4775.00 feet

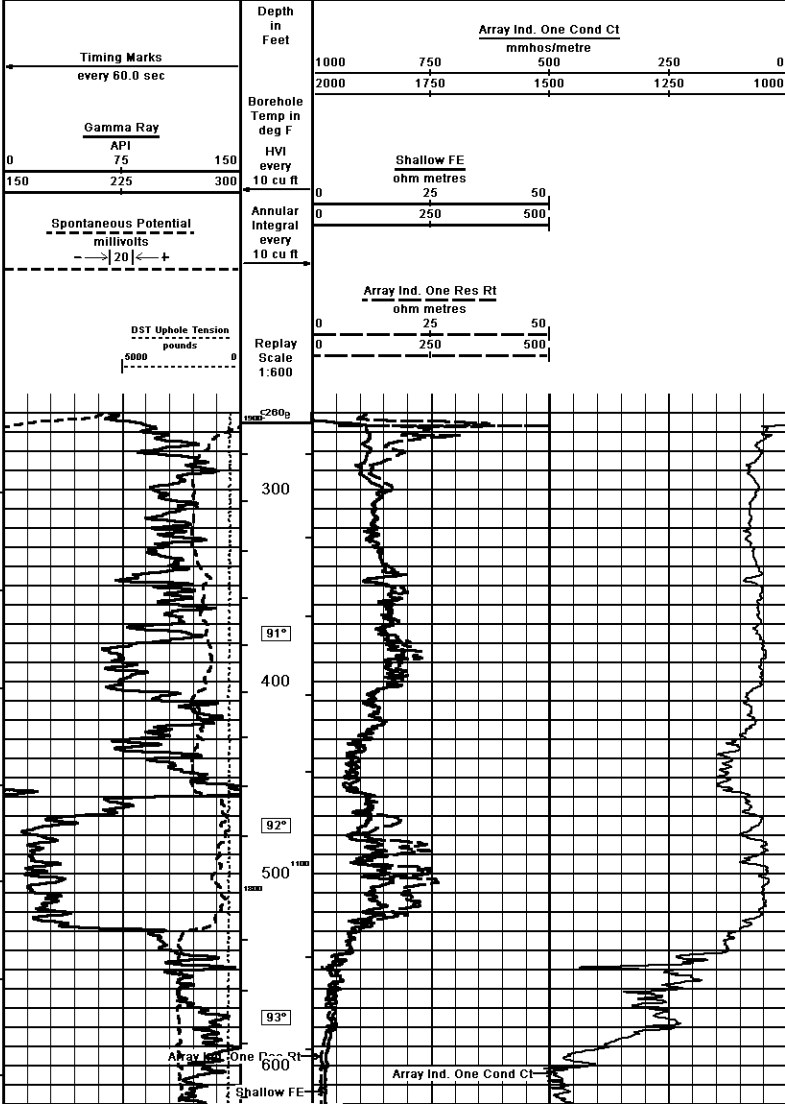


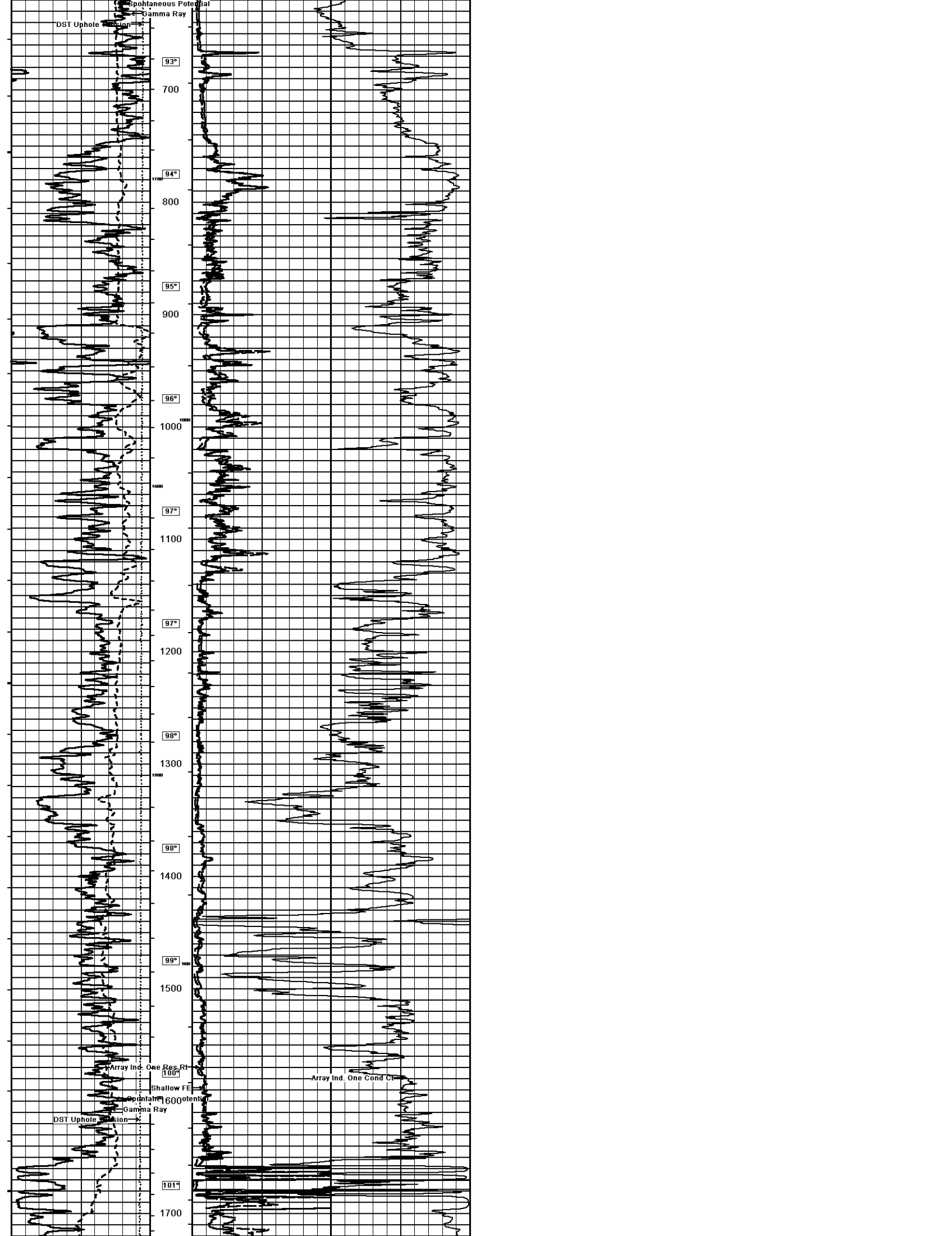
Weatherford[®]

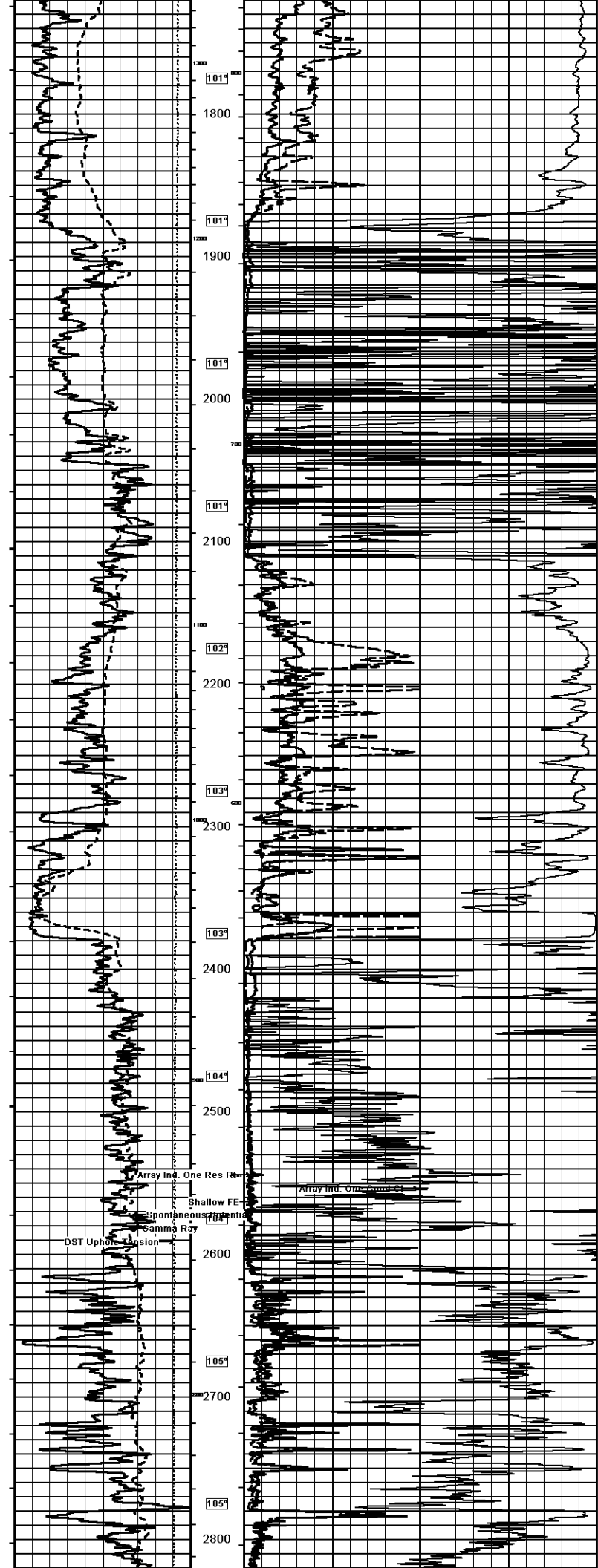
**ARRAY INDUCTION
 SHALLOW FOCUSED
 ELECTRIC LOG**

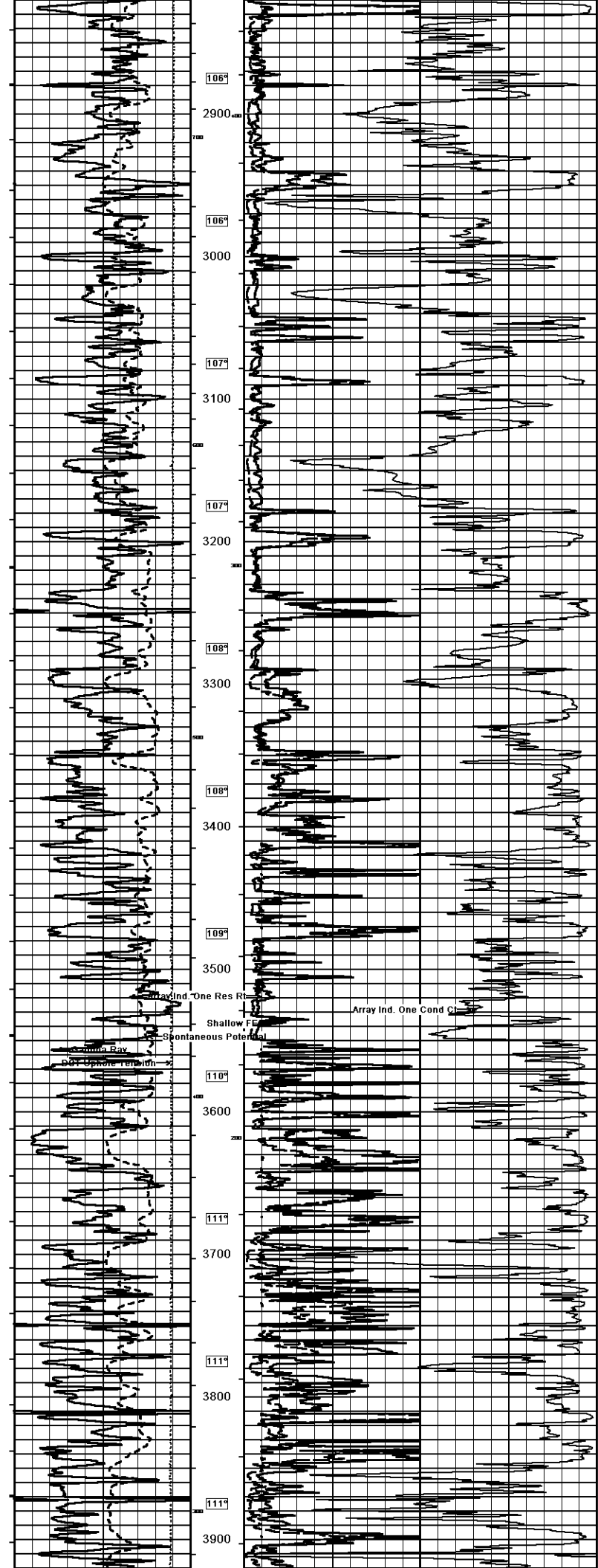
Weatherford		ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG	
COMPANY	SHAKESPEARE OIL CO., INC.		
WELL	RUDOLPH 1-23		
FIELD	WILDCAI		
PROVINCE/COUNTY	SCOTT		
COUNTRY/STATE	U.S.A. / KANSAS		
LOCATION	1300' FNL & 1050' FWL		
PERMIT NUMBER	SE SE NW NW		
SEC. 23 TYPE	TTS (REG. 33W) Open Services		
Latitude	38.88719897 W/DMD/DN		
Longitude	-100.94012130		
Spot Number	15-171-27114		
Permanant Datum G.L. Elevation	3016 feet		
Log Measured From	KB @ 10 FEET		
Drilling Measured From	KB @ 10 FEET		
Date	10-DEC-2014		
Run Number	ONE		
Service Order	7038-10530343		
Depth Driller	4770.00	feet	
Depth Logger	4775.00	feet	
First Reading	4771.04	feet	
Last Reading	3255.00	feet	
Casing Driller	287.00	feet	
Casing Logger	285.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	CHEMICAL		
Density/Viscosity	9.20 lb/59	58.00 CP	
PH/Fluid Loss	10.50	6.40 m/30Min	
Sample Source	MUDPT		
Rm @ Measured Temp	0.598 @ 75.0	ohm-m	
Rmt @ Measured Temp	0.479 @ 75.0	ohm-m	
Rm @ Measured Temp	0.718 @ 75.0	ohm-m	
Source Rm/Temp	CALC	CALC	
Rm @ BHT	0.386 @ 111.0	ohm-m	
Time Since Circulation	4.5 HOURS	499 F	
Max Recorded Temp	119.00	LB	
Equipment Base	13008	LB	
Recorded by	DEBBE CARTER		
Witnessed by	TIM PRIEST		
DOB #			

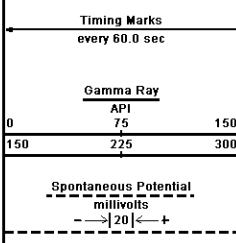
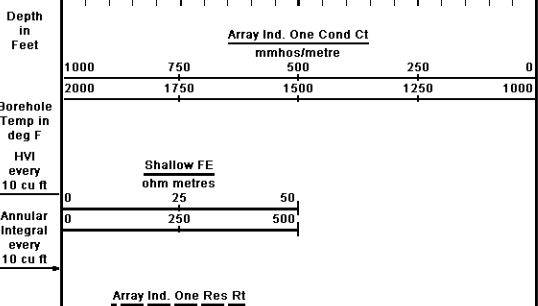
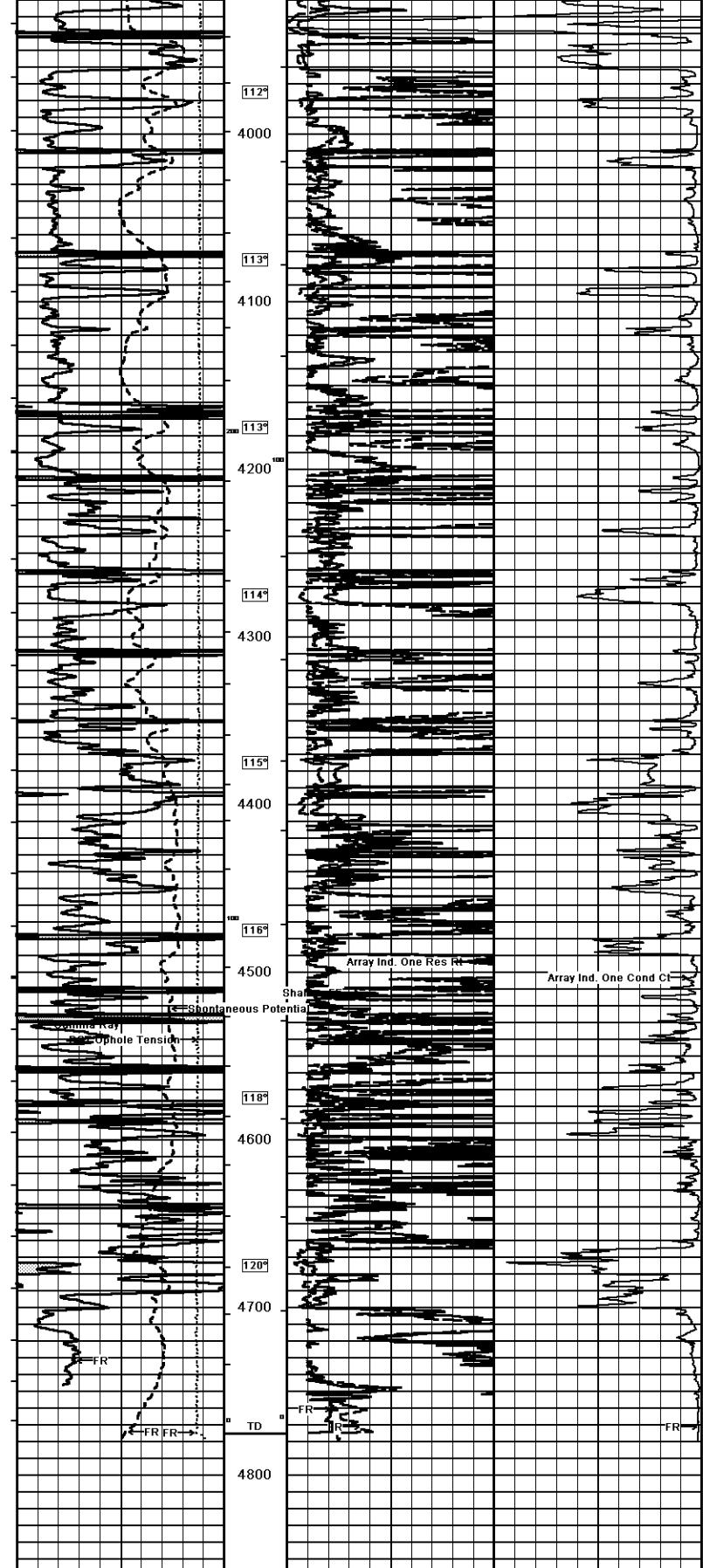
1 INCH MAIN
 Depth Based Data - Maximum Sampling Increment 10.0cm
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 System Versions: Logged with 14.05.5280 Plotted with 14.05.5280

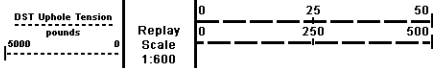













Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 10-DEC-2014 10:23
 Filename: C:\Minimus 14.05\Log Data\Shakespeare Rudolph 1-23\Shakespeare Rudolph 1-23 Main.dta
 Recorded on 10-DEC-2014 08:02
 System Versions: Logged with 14.05.5280 Plotted with 14.05.5280

↑ 1 INCH MAIN ↑

COMPANY	SHAKESPEARE OIL CO., INC.		
WELL	RUDOLPH 1-23		
FIELD	WILDCAT		
PROVINCE/COUNTY	SCOTT		
COUNTRY/STATE	U.S.A. / KANSAS		

Elevation Kelly Bushing	3026.00	feet	First Reading	4771.04	feet
Elevation Drill Floor	3024.00	feet	Depth Driller	4770.00	feet
Elevation Ground Level	3016.00	feet	Depth Logger	4775.00	feet

 ARRAY INDUCTION
 SHALLOW FOCUSED
 ELECTRIC LOG