



Weatherford[®]

**ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**

COMPANY **GRAND MESA OPERATING**
WELL **BFF #1-35**
FIELD **WILDCAT**
PROVINCE/COUNTY **SCOTT**
COUNTRY/STATE **U.S.A. / KANSAS**
LOCATION **2479' FNL & 2772' FEL
SE SE SE NW**

SEC 35 TWP 16S RGE 33W Other Services MML
API Number 15-171-21013
Permit Number
Permanent Datum GL, Elevation 2970 feet
Log Measured From KB
Drilling Measured From KB AT 9 FEET

Elevations:
KB 2979.00 feet
DF 2977.00
GL 2970.00

Date	15-JAN-2014
Run Number	ONE
Service Order	736-76969324
Depth Driller	4800.00 feet
Depth Logger	4800.00 feet
First Reading	4796.66 feet
Last Reading	219.00 feet
Casing Driller	220.00 feet
Casing Logger	219.00 feet
Bit Size	7.875 inches
Hole Fluid Type	CHEMICAL
Density / Viscosity	9.30 lb/USg 63.00 CP
PH / Fluid Loss	11.00 7.20 ml/30Min
Sample Source	MUDPIT
Rm @ Measured Temp	0.61 @ 75.0 ohm-m
Rmf @ Measured Temp	0.49 @ 75.0 ohm-m
Rmc @ Measured Temp	0.73 @ 75.0 ohm-m
Source Rmf / Rmc	CALC CALC
Rm @ BHT	0.40 @117.0 ohm-m
Time Since Circulation	4 HOURS
Max Recorded Temp	117.00 deg F
Equipment / Base	13096 LIB
Recorded By	DEREK CARTER
Witnessed By	JOHN GOLDSMITH
JOB #	LB14-016

BOREHOLE RECORD

Last Edited: 15-JAN-2014 04:14

Bit Size inches 7.875	Depth From feet 220.00	Depth To feet 4800.00
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CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	220.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.05.9583
- TOOLS: 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 SURFACE CASING: 2010 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO SURFACE CASING: 1250 CU. FT.

- RIG: DUKE DRILLING COMPANY #4

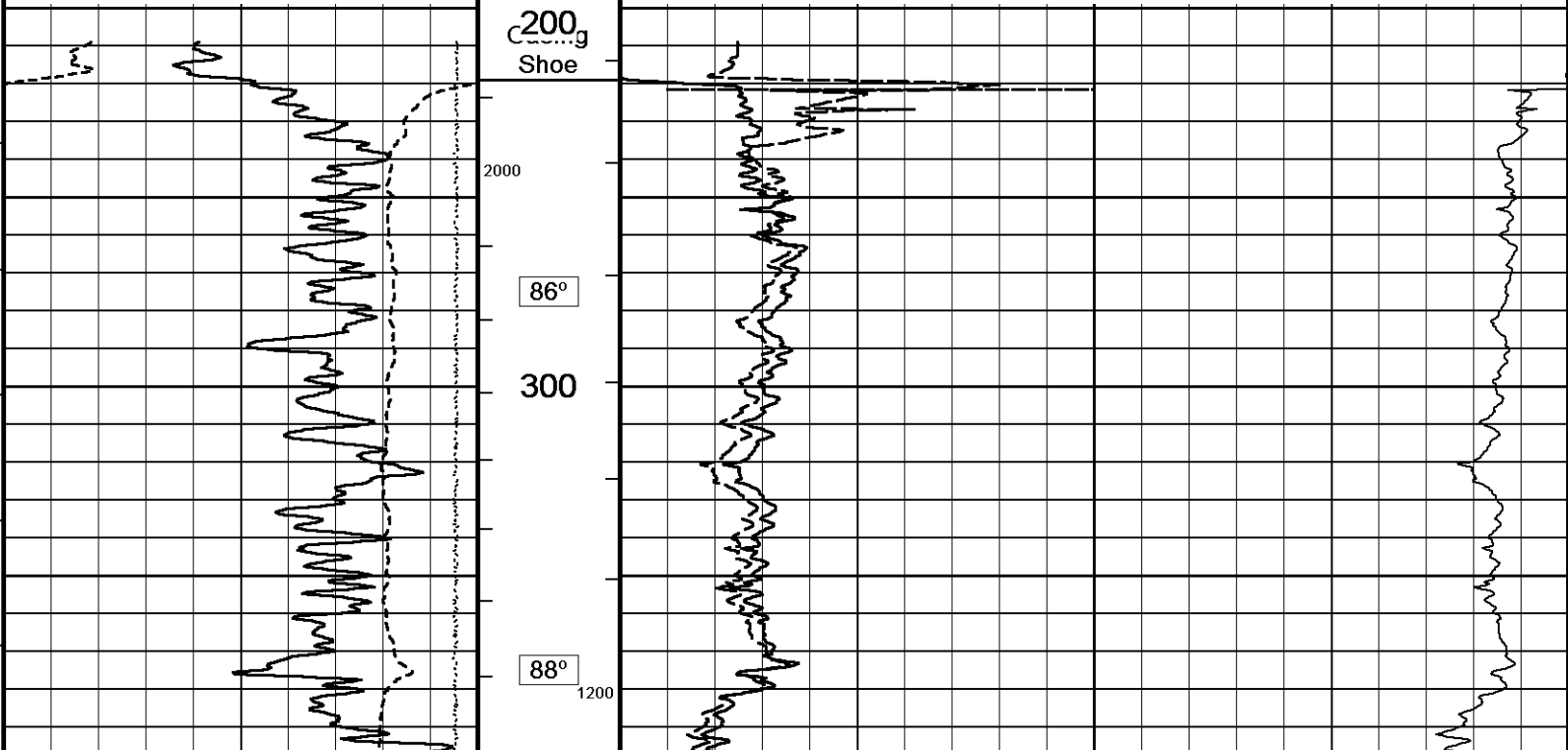
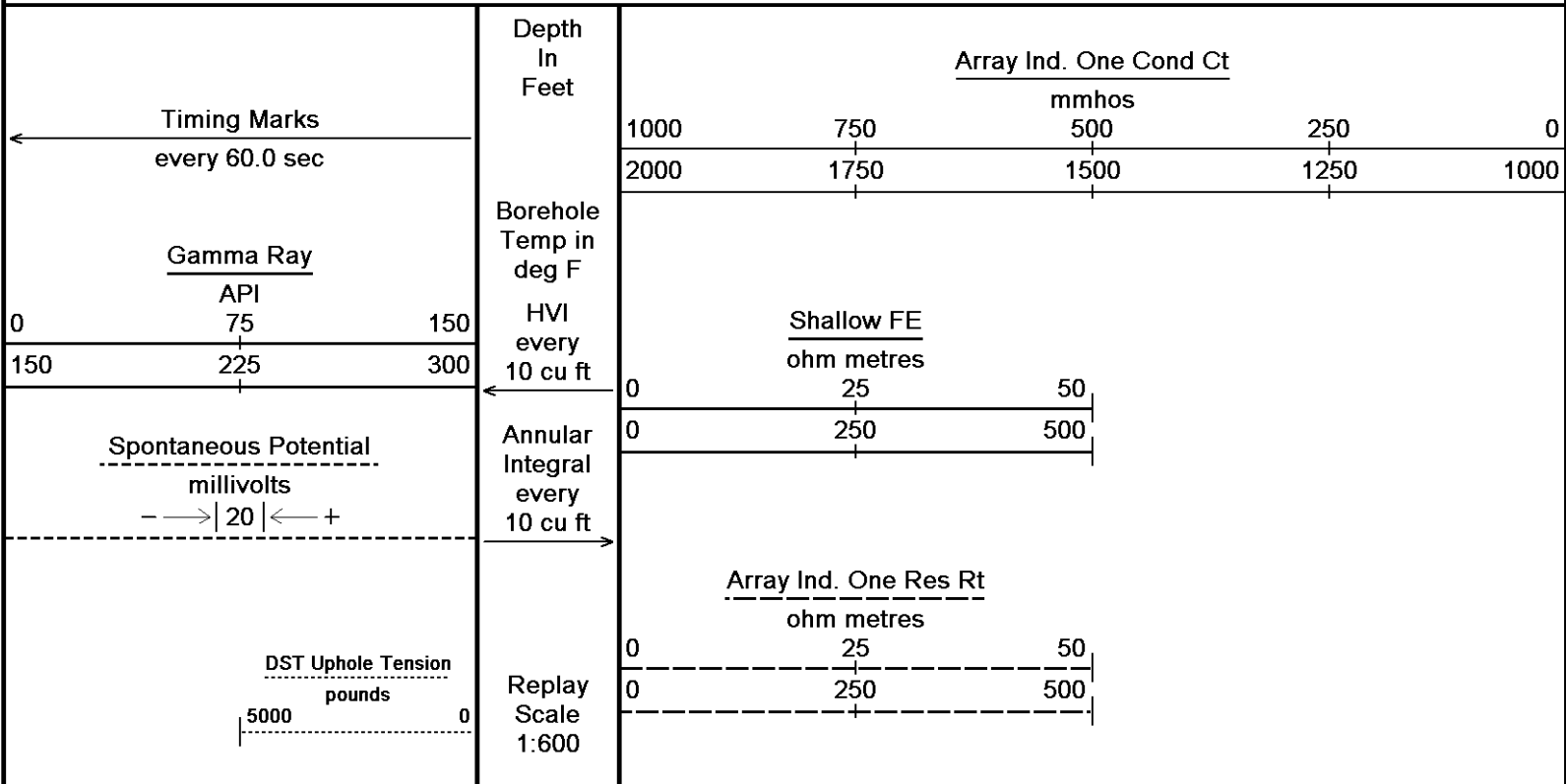
- ENGINEER: DEREK CARTER

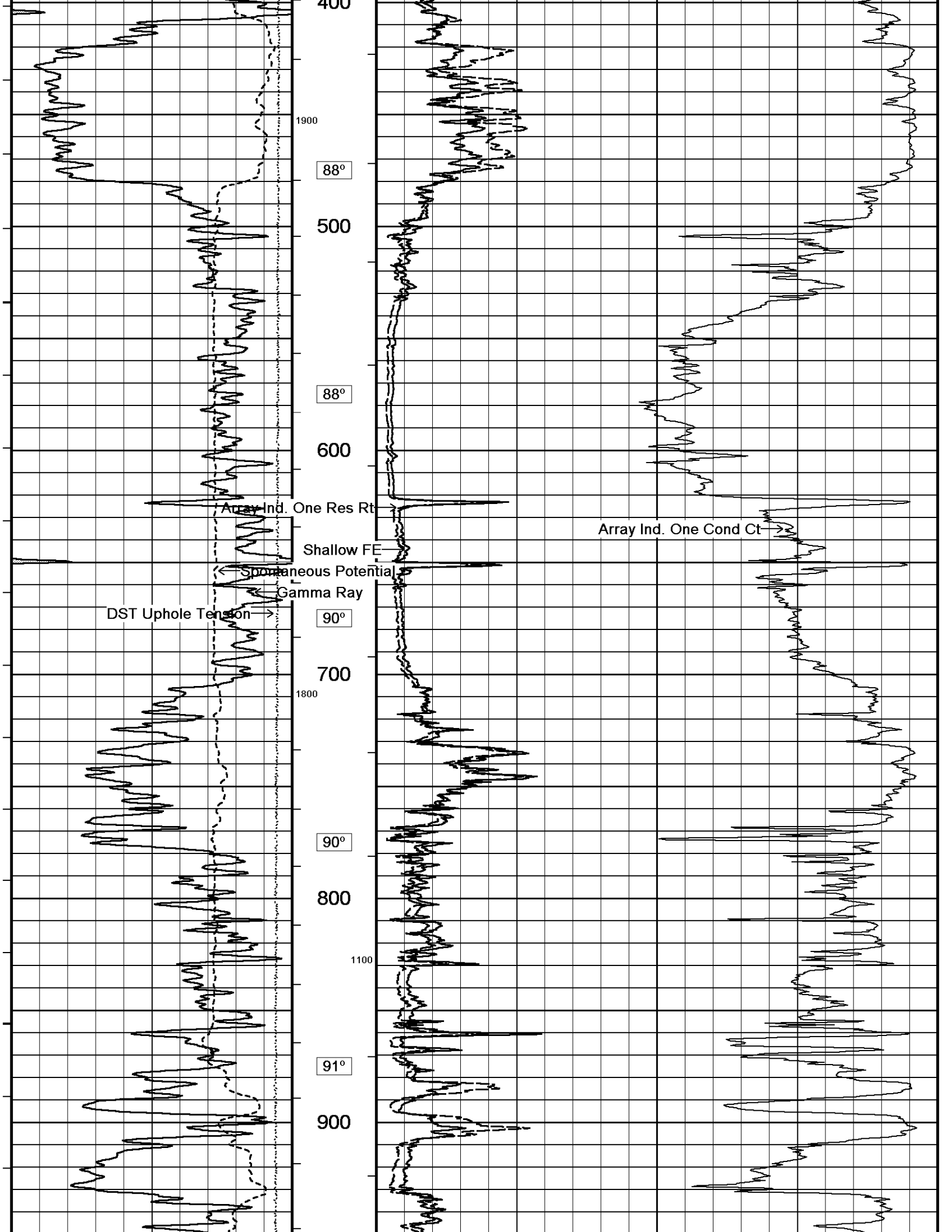
- OPERATORS: KEN RINEHART, TROWDY DICKENS

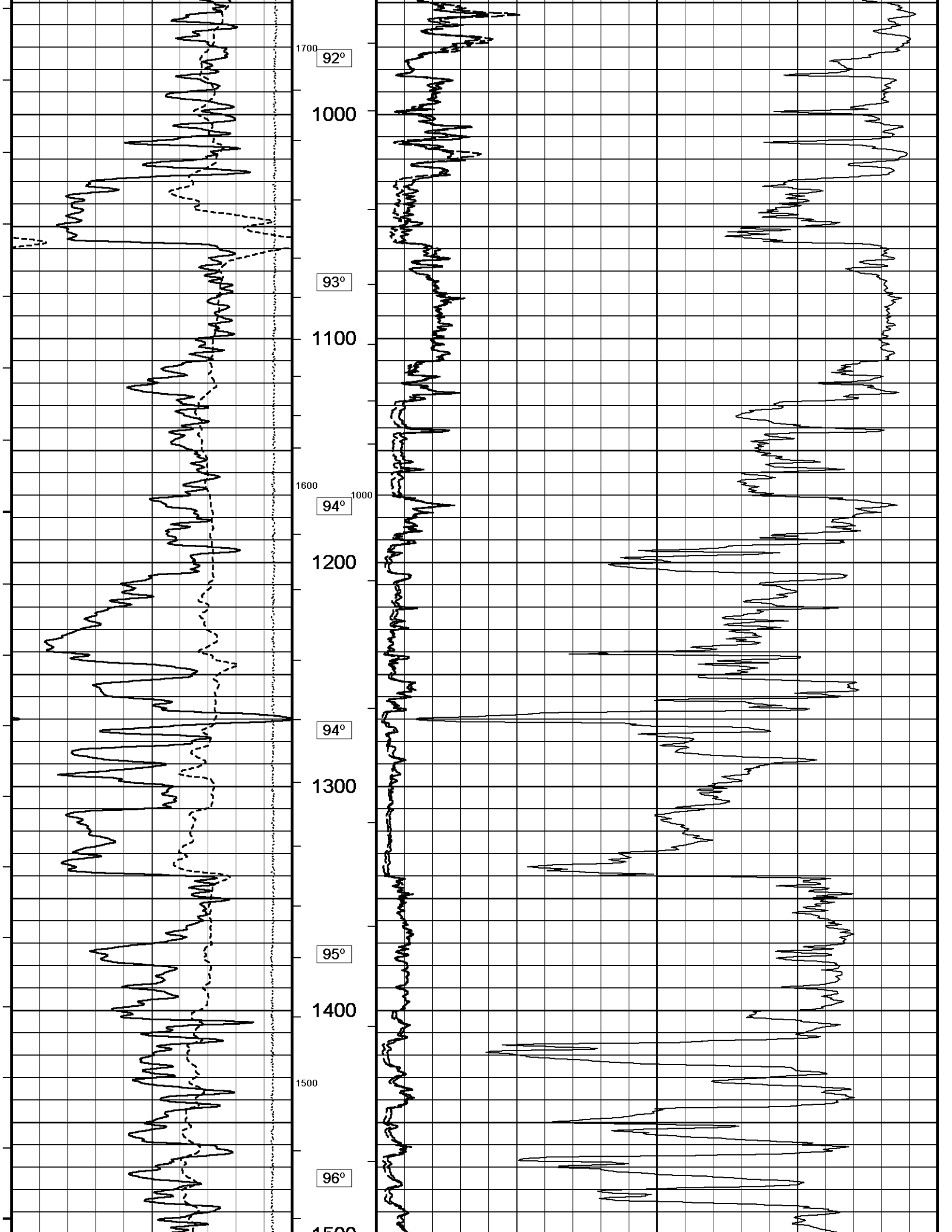
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions in our price schedule.

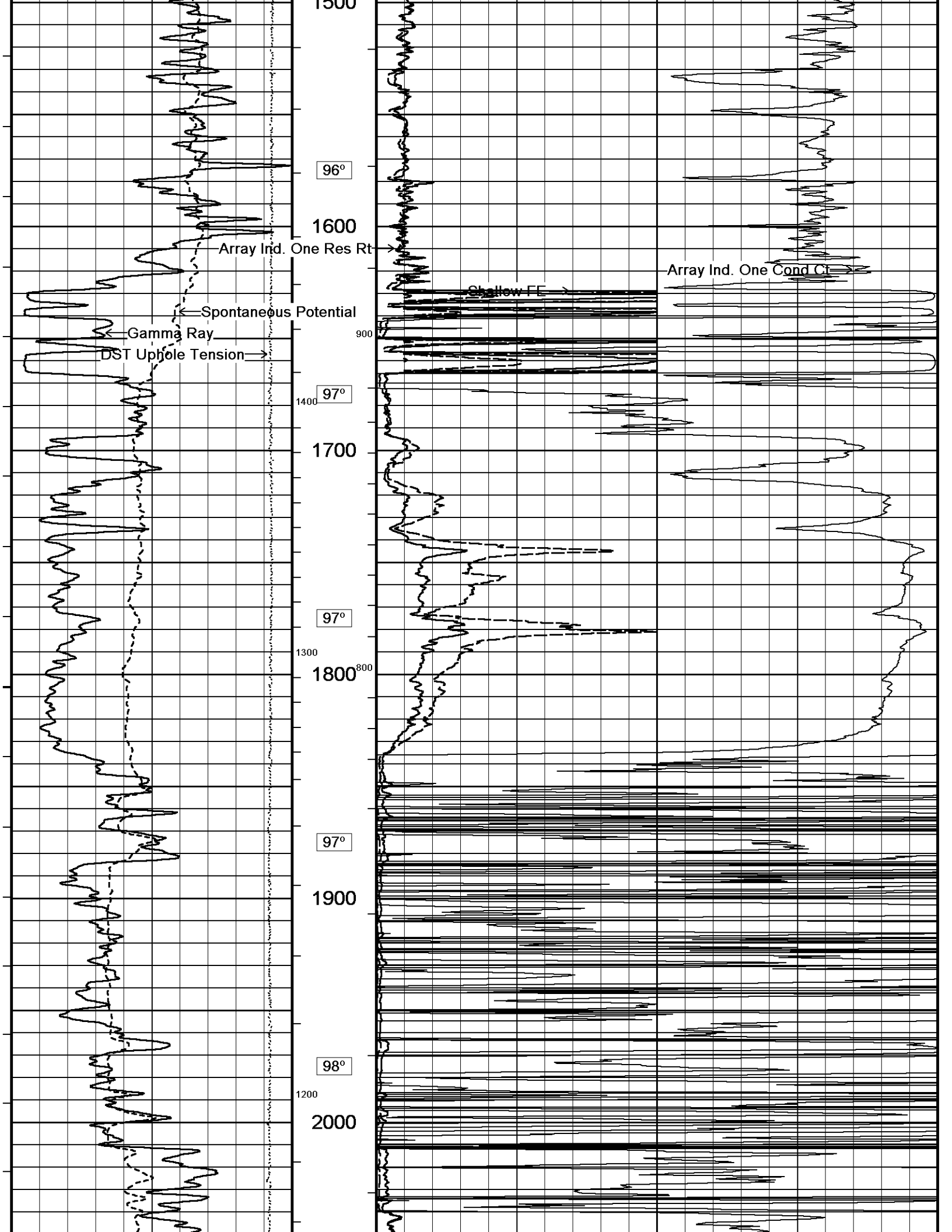
2 INCH MAIN

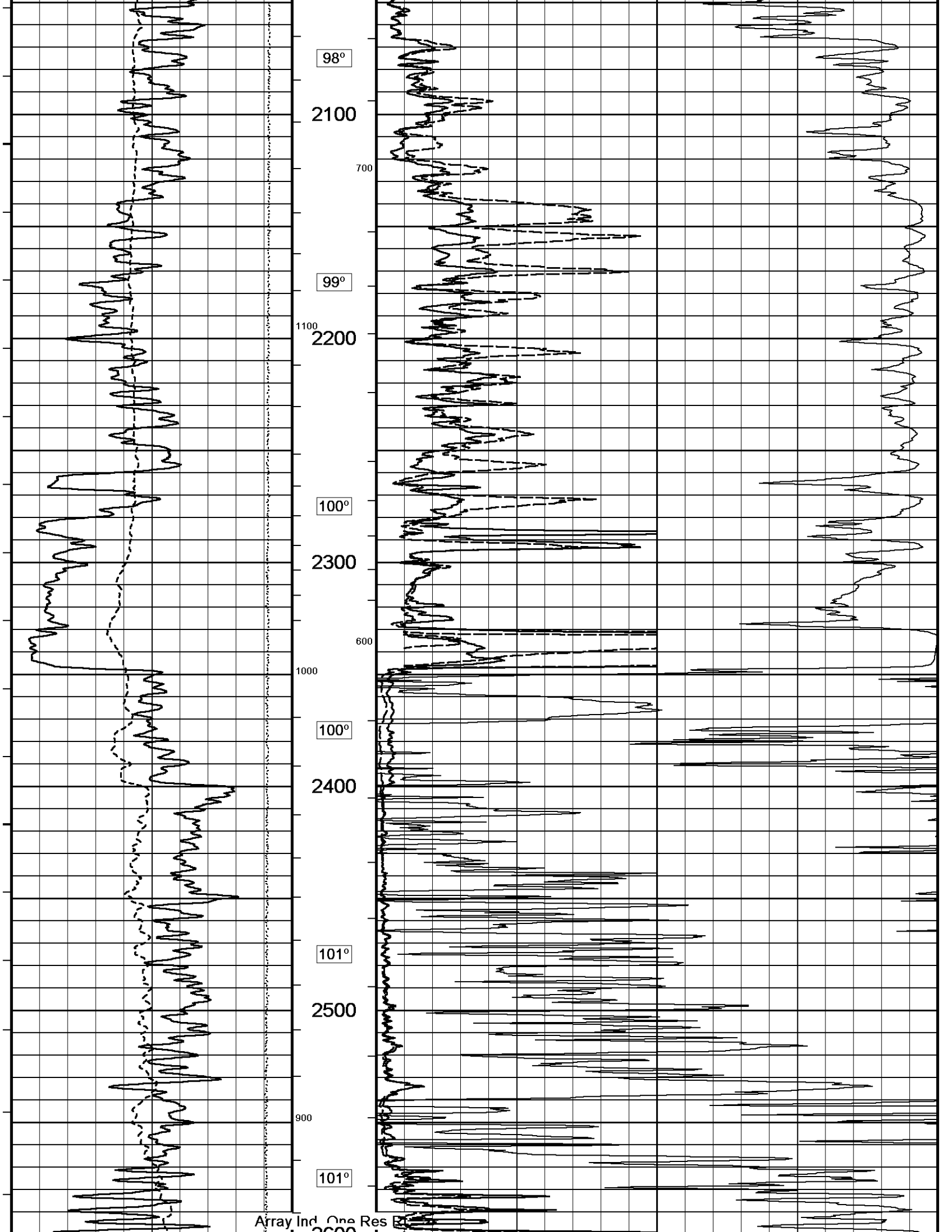
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Filename: C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Main.dta Recorded on 15-JAN-2014 05:07
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

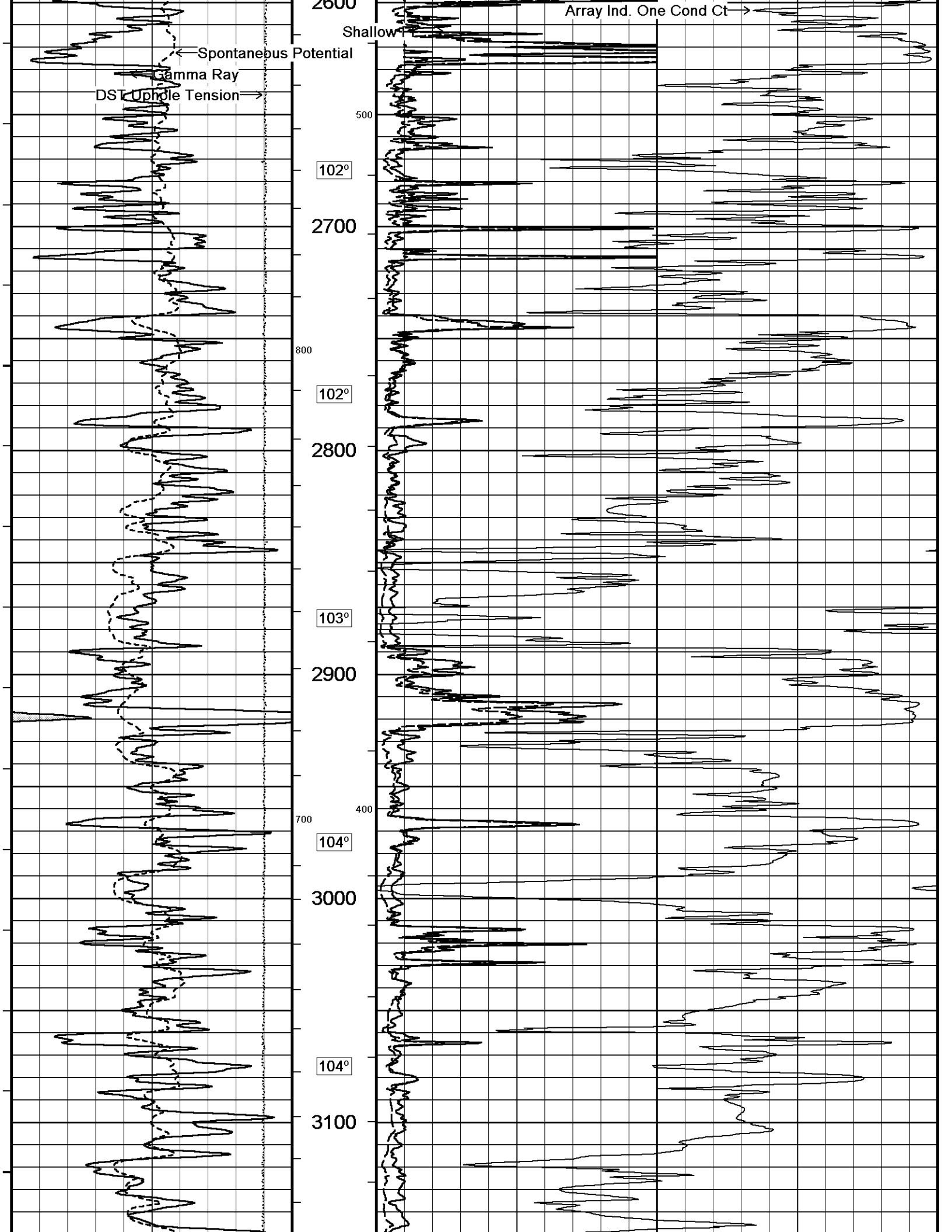


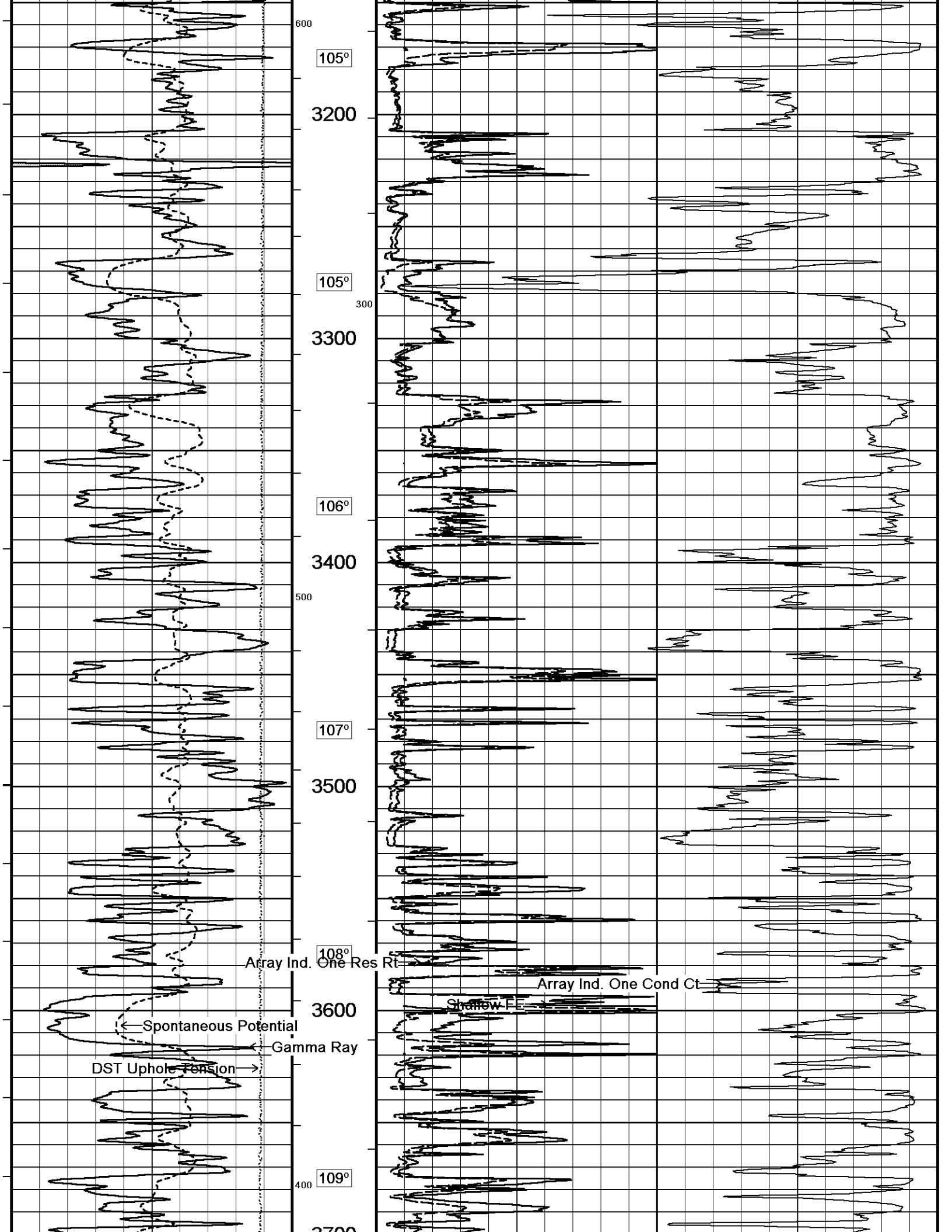


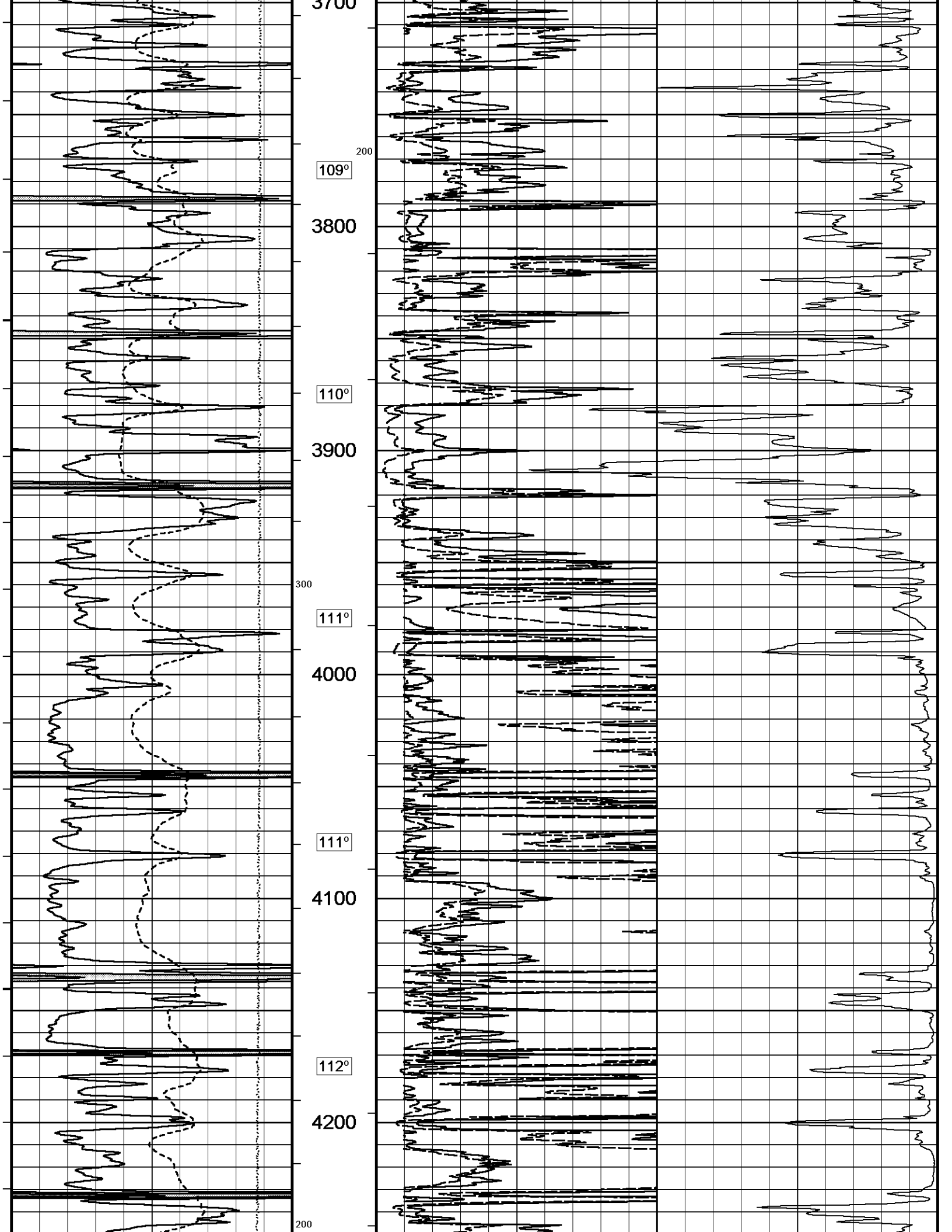


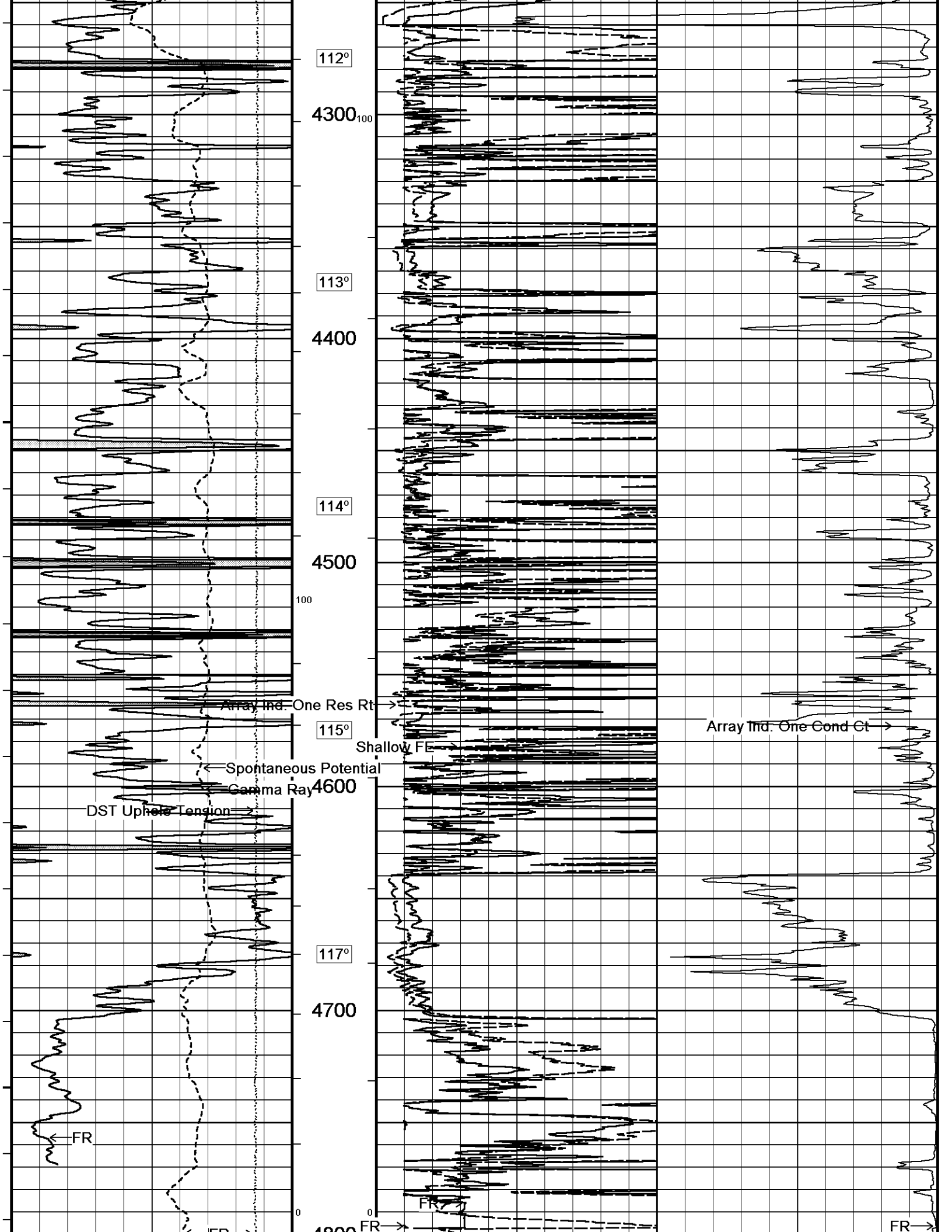


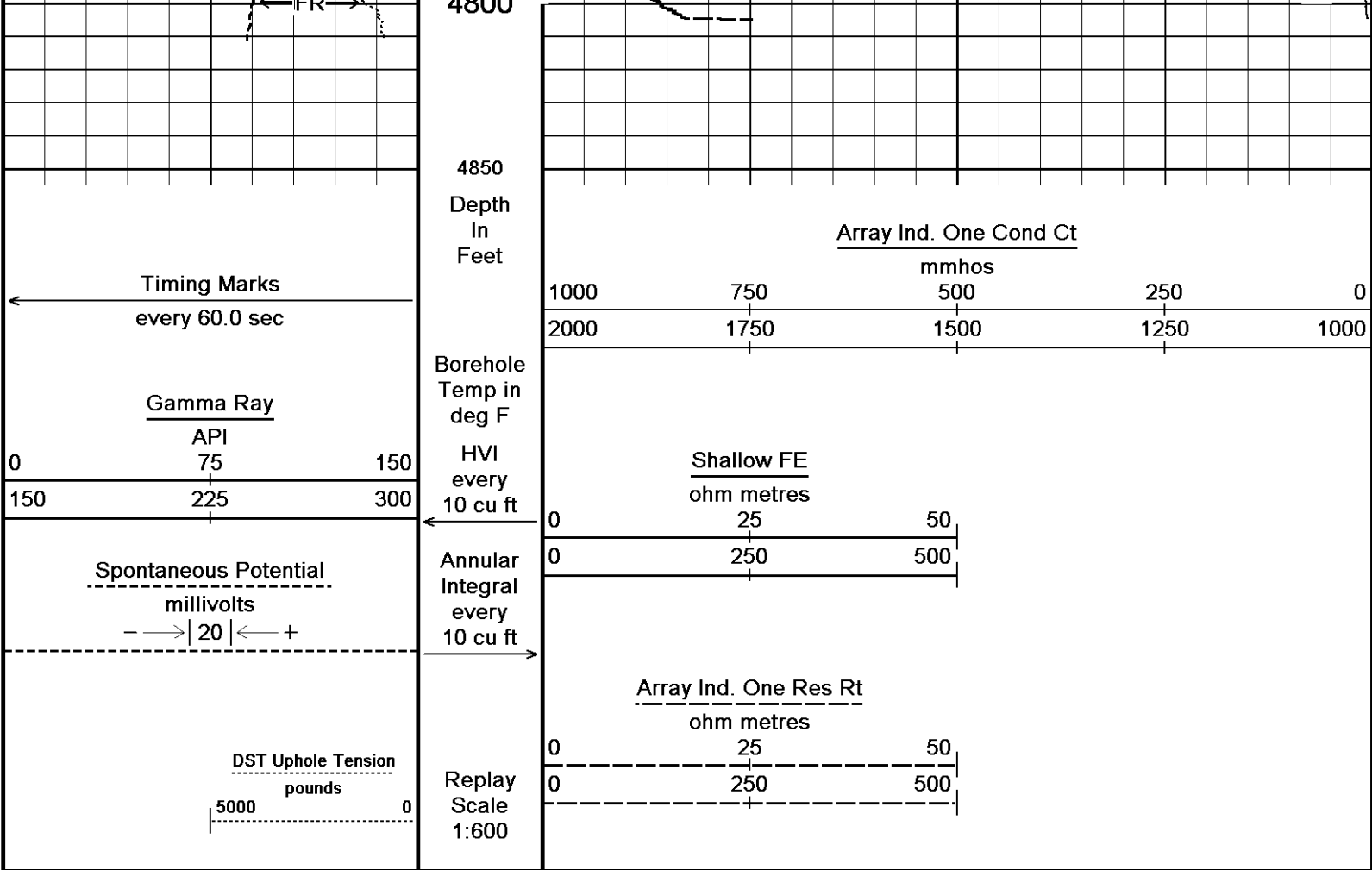










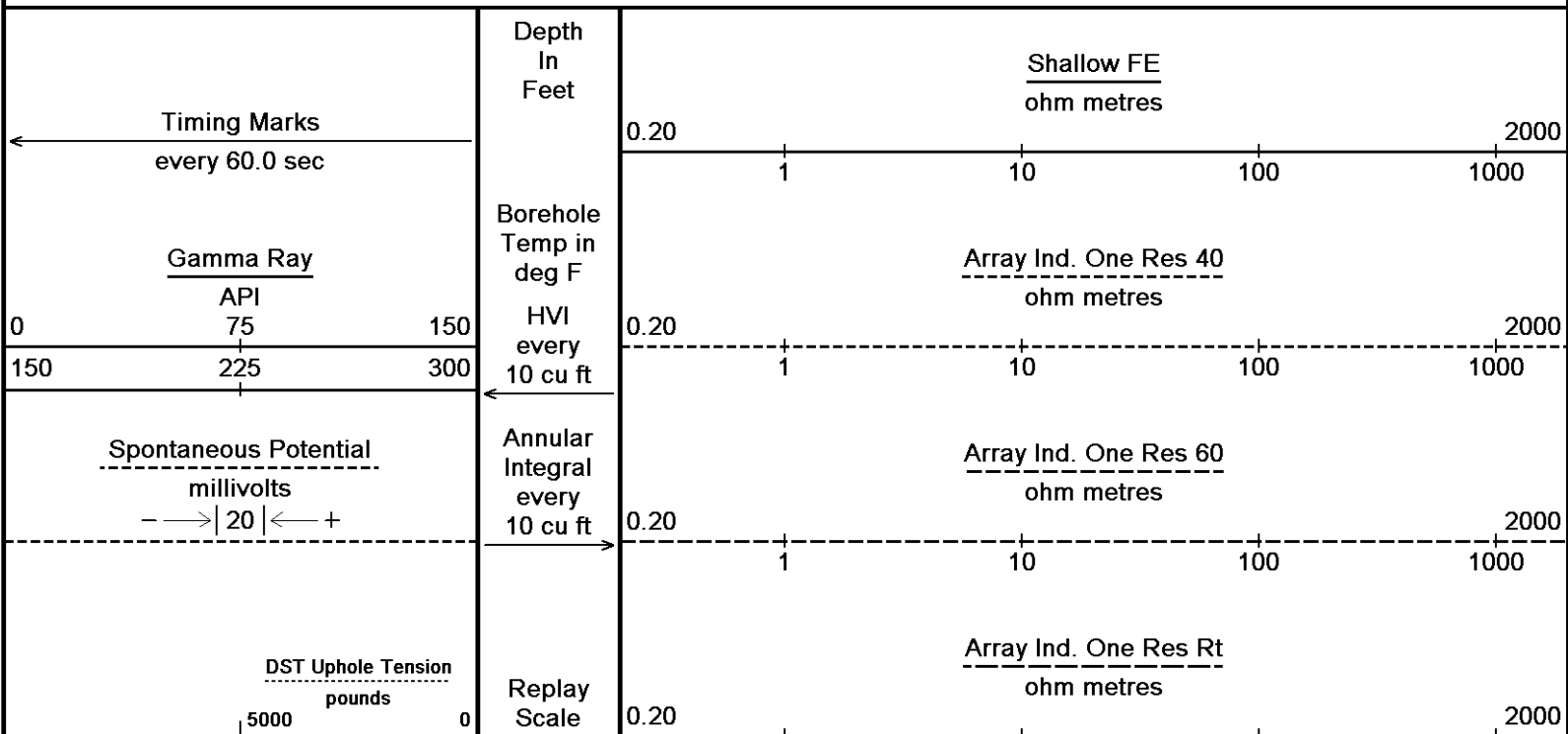


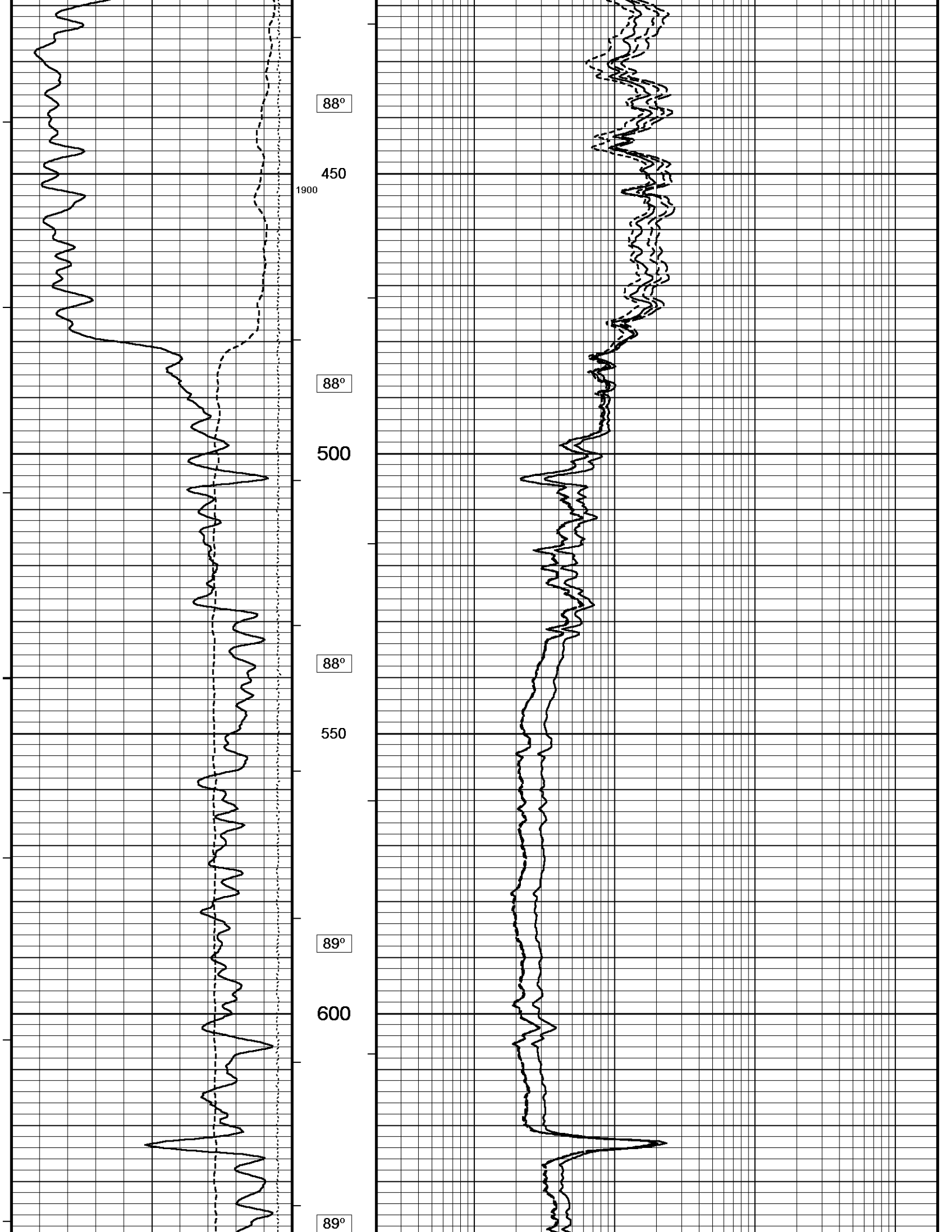
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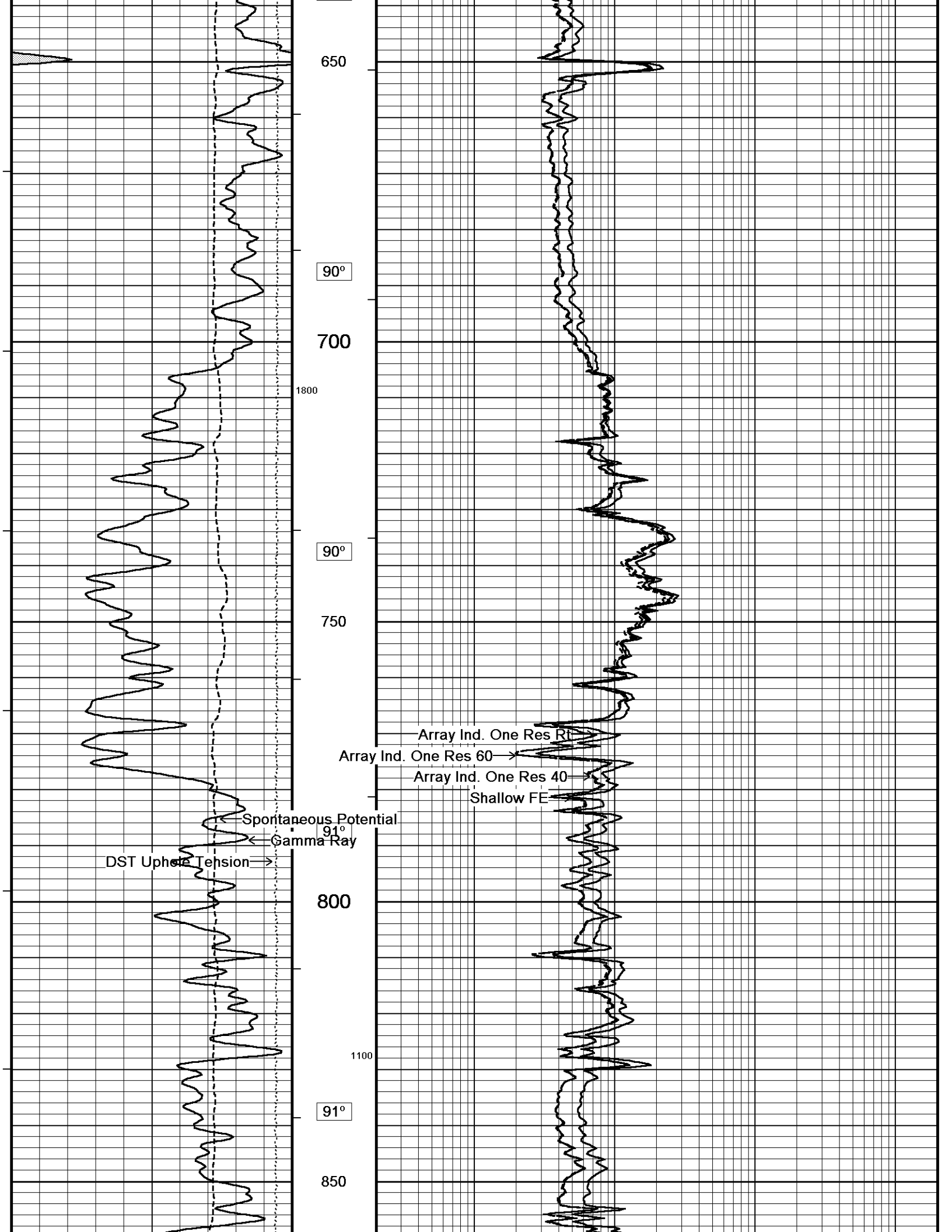
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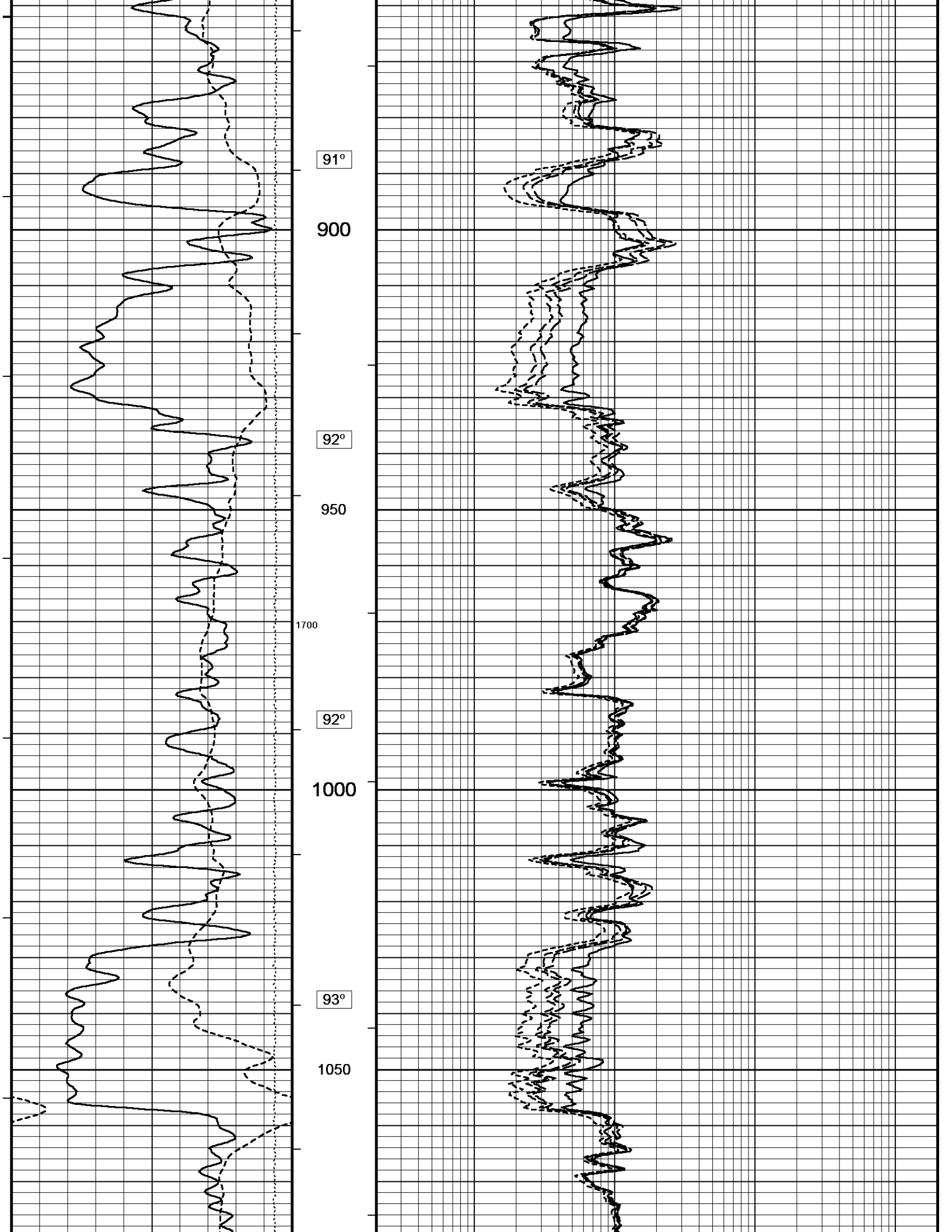
↓ 5 INCH MAIN ↓

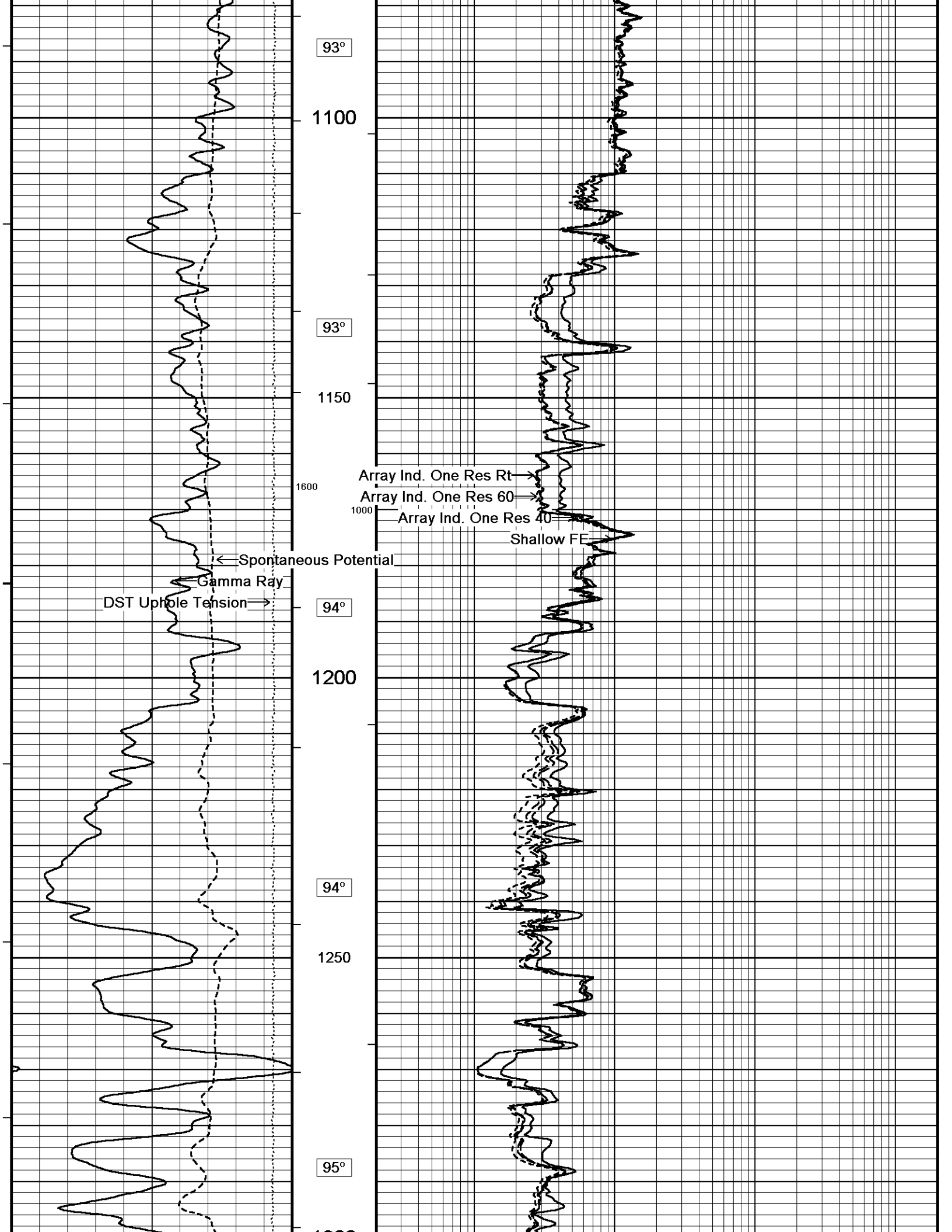
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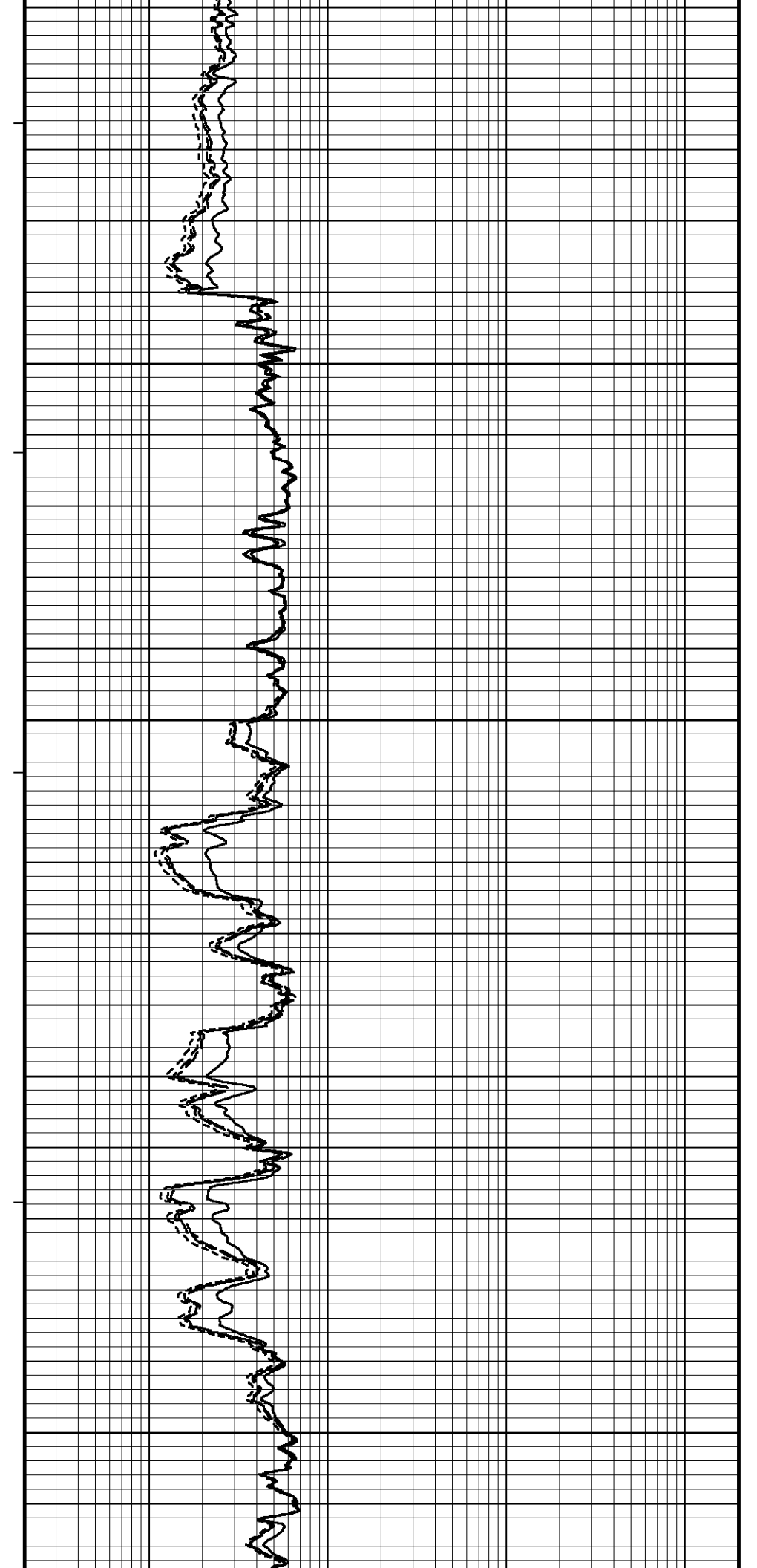
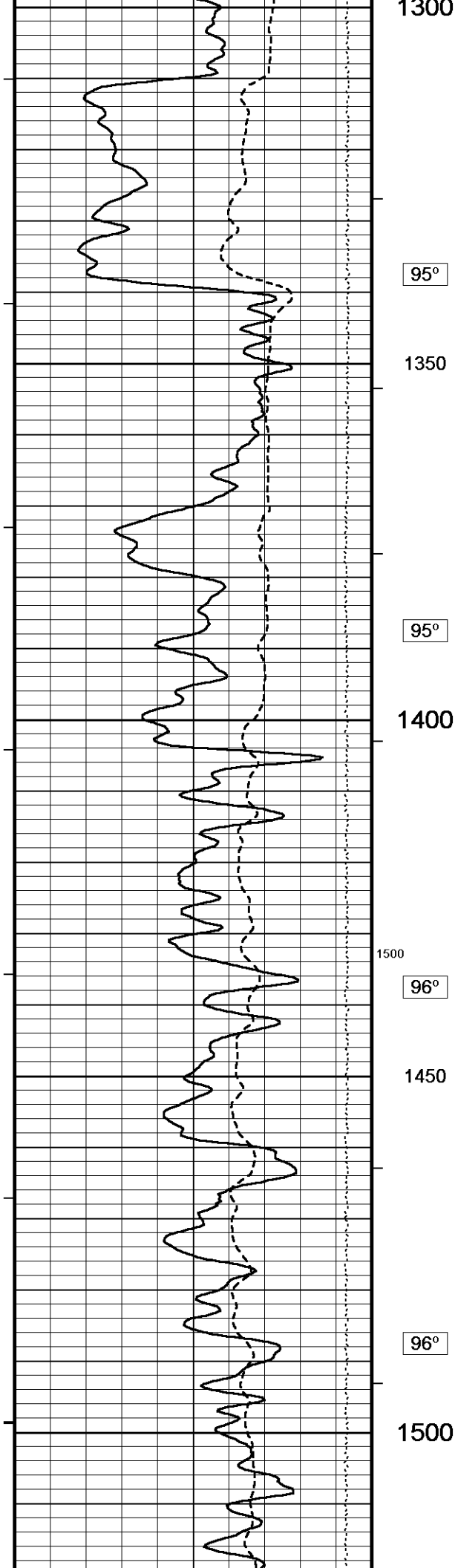


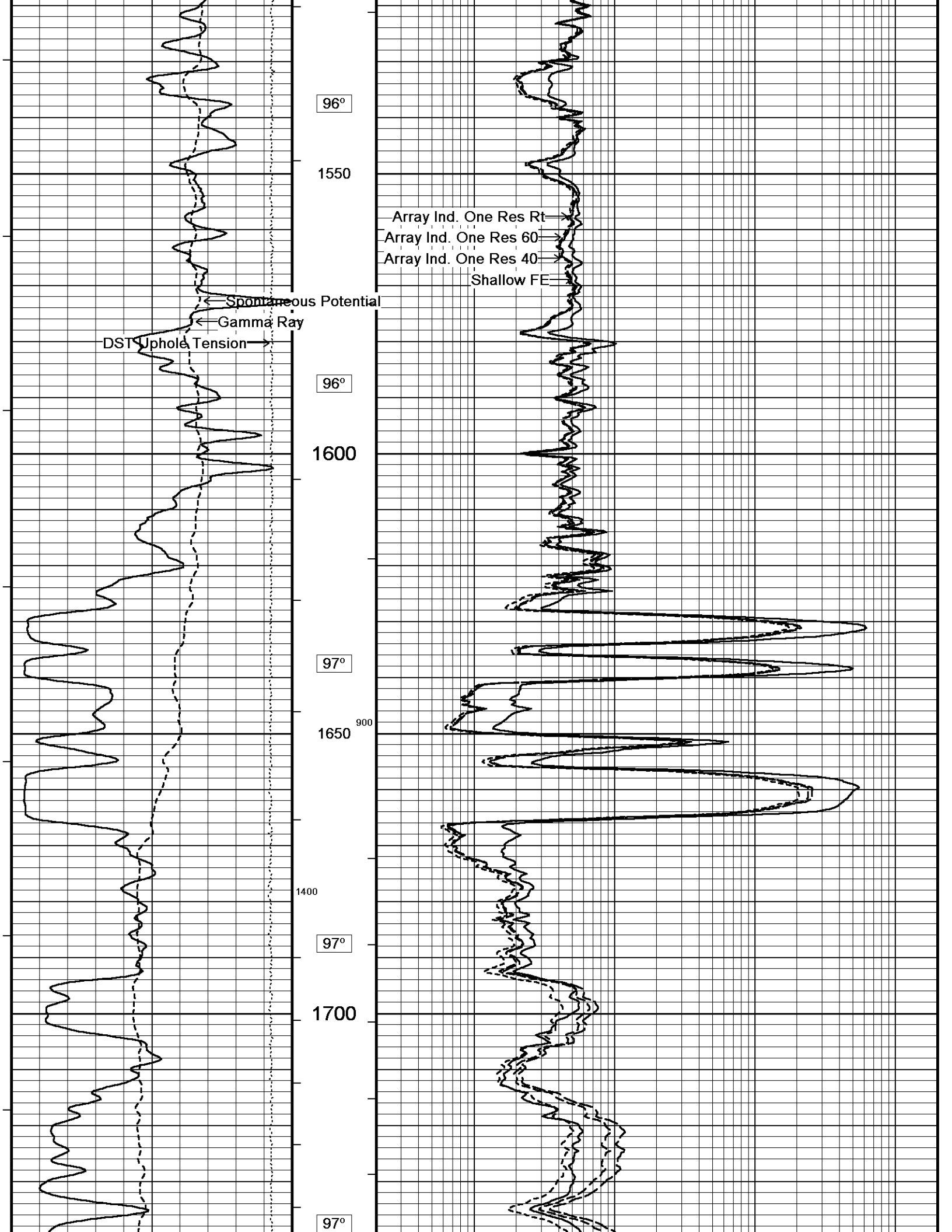


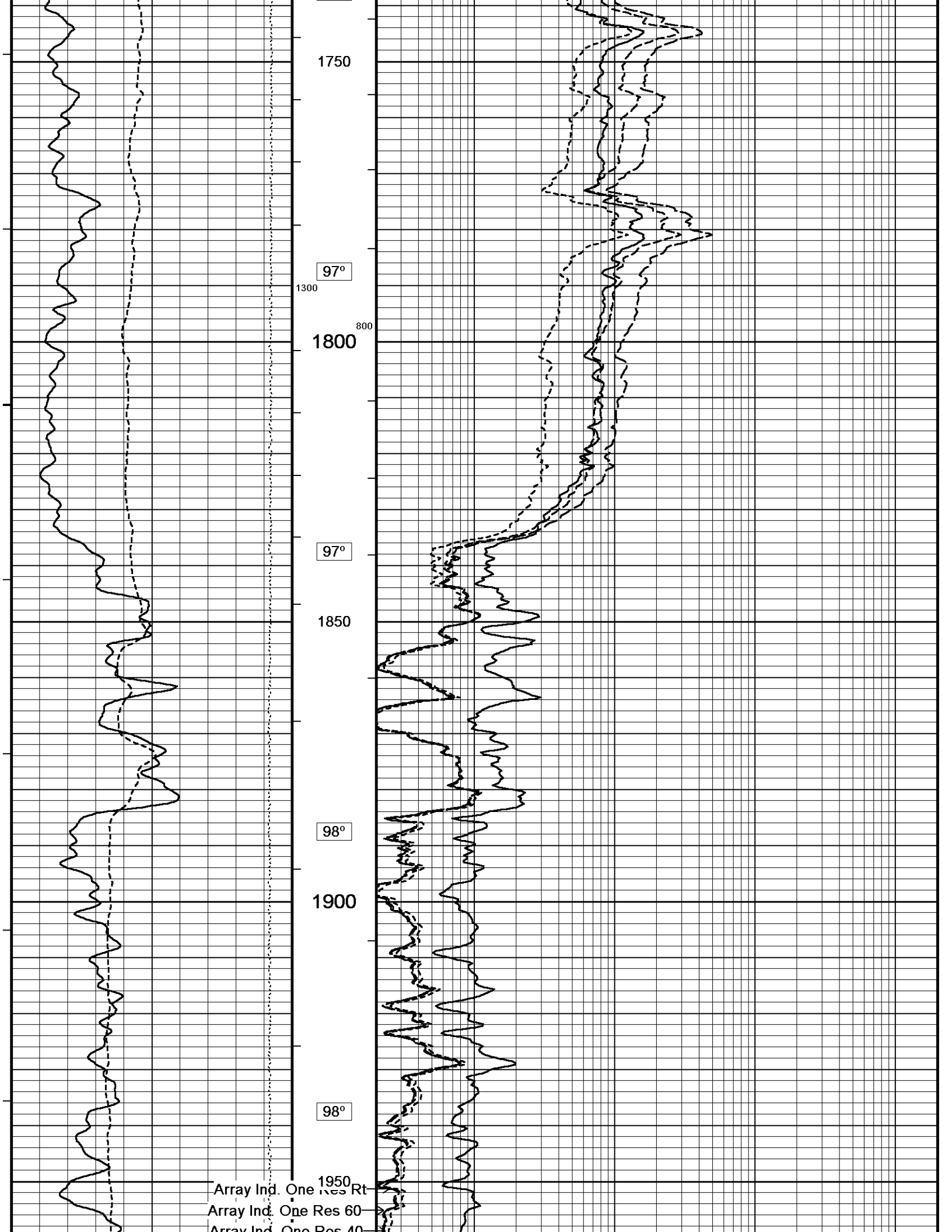












← Spontaneous Potential
Gamma Ray
DST Uphole Tension →

Shallow EE →

1200 98°

2000

98°

2050

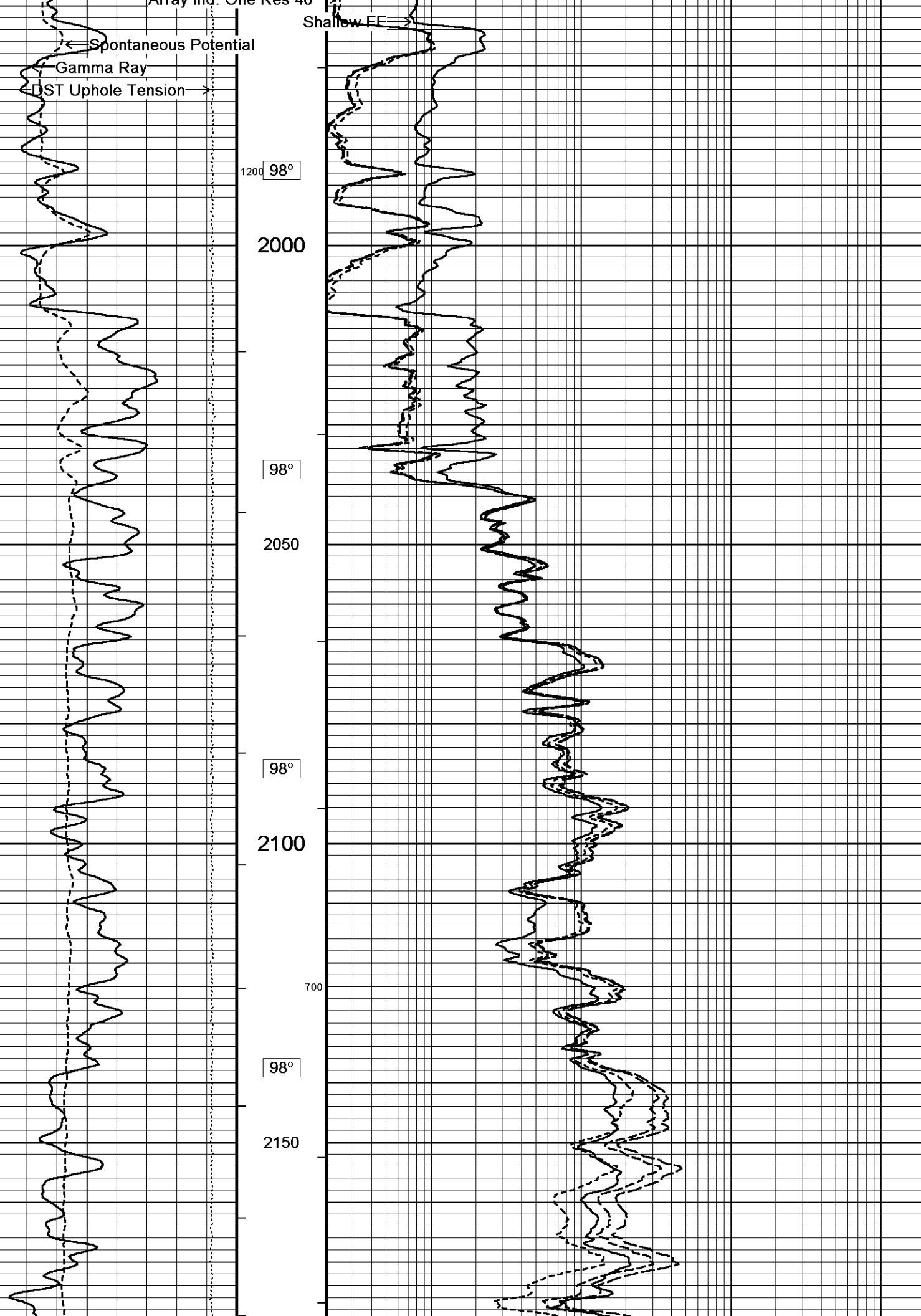
98°

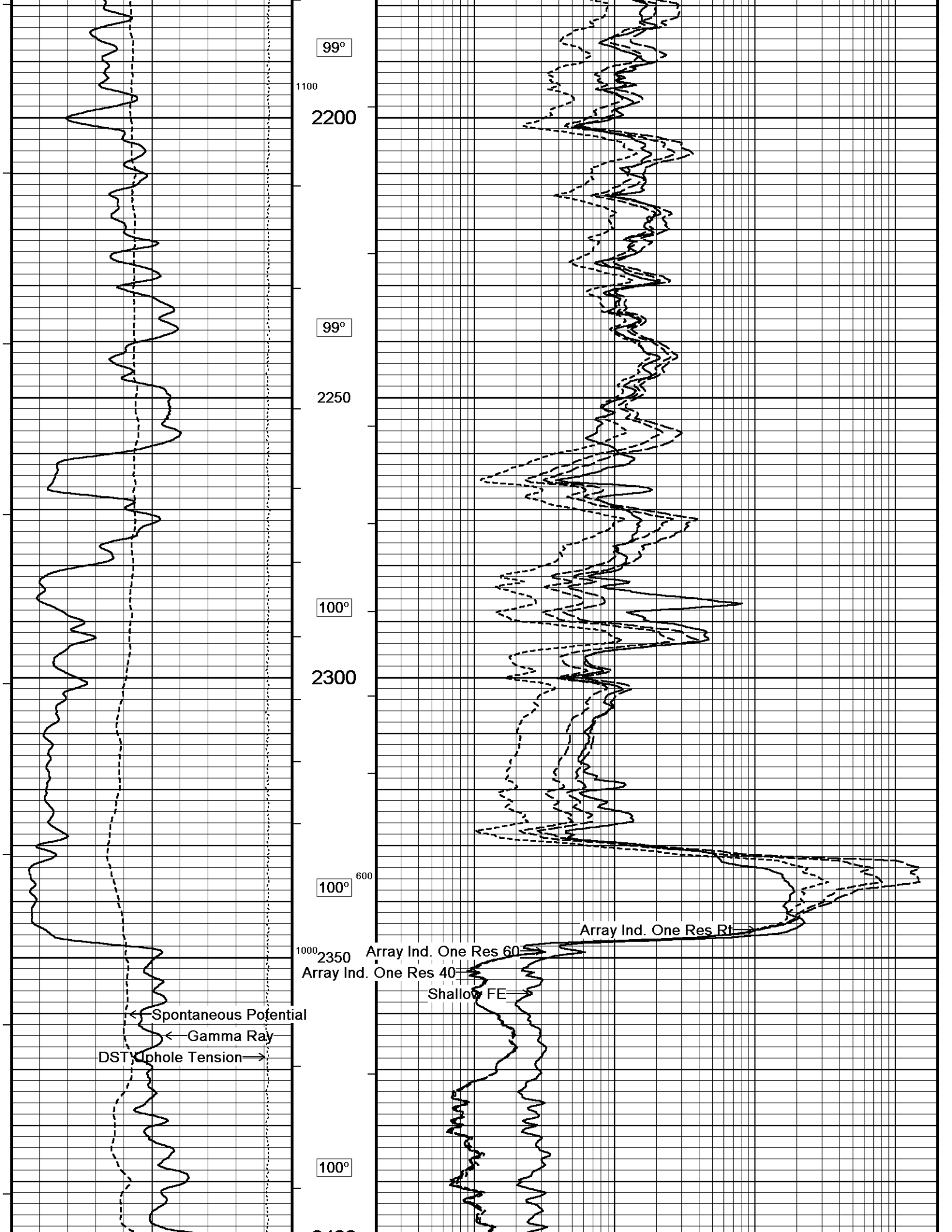
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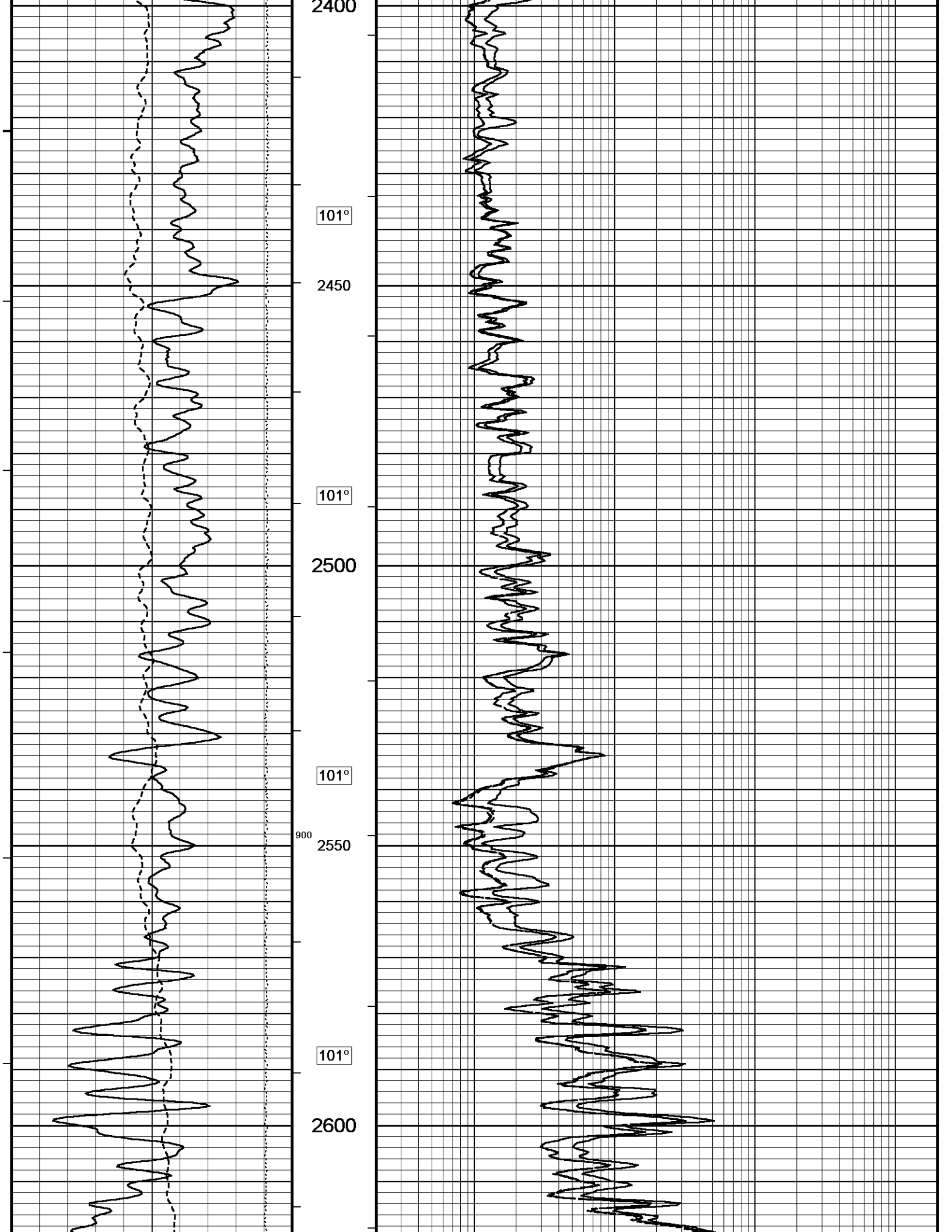
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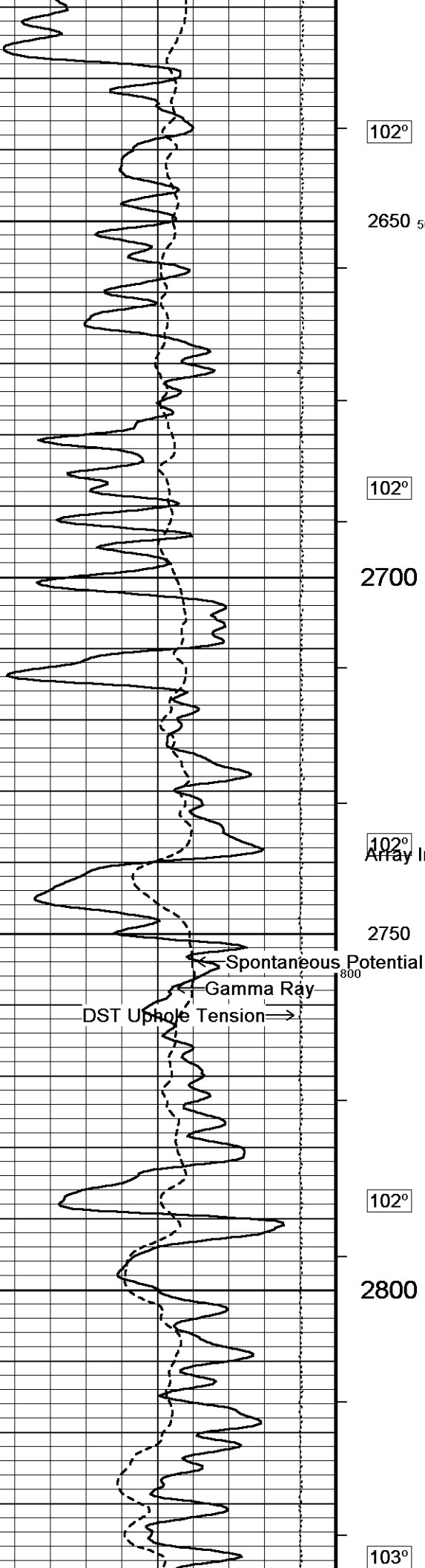
98°

2150









102°

2650 500

102°

2700

102°

2750

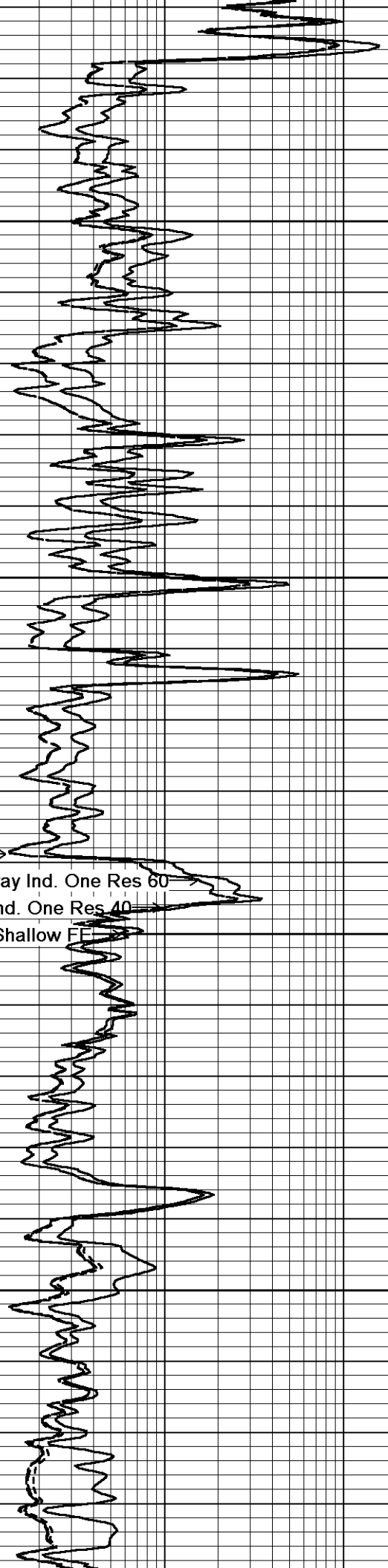
102°

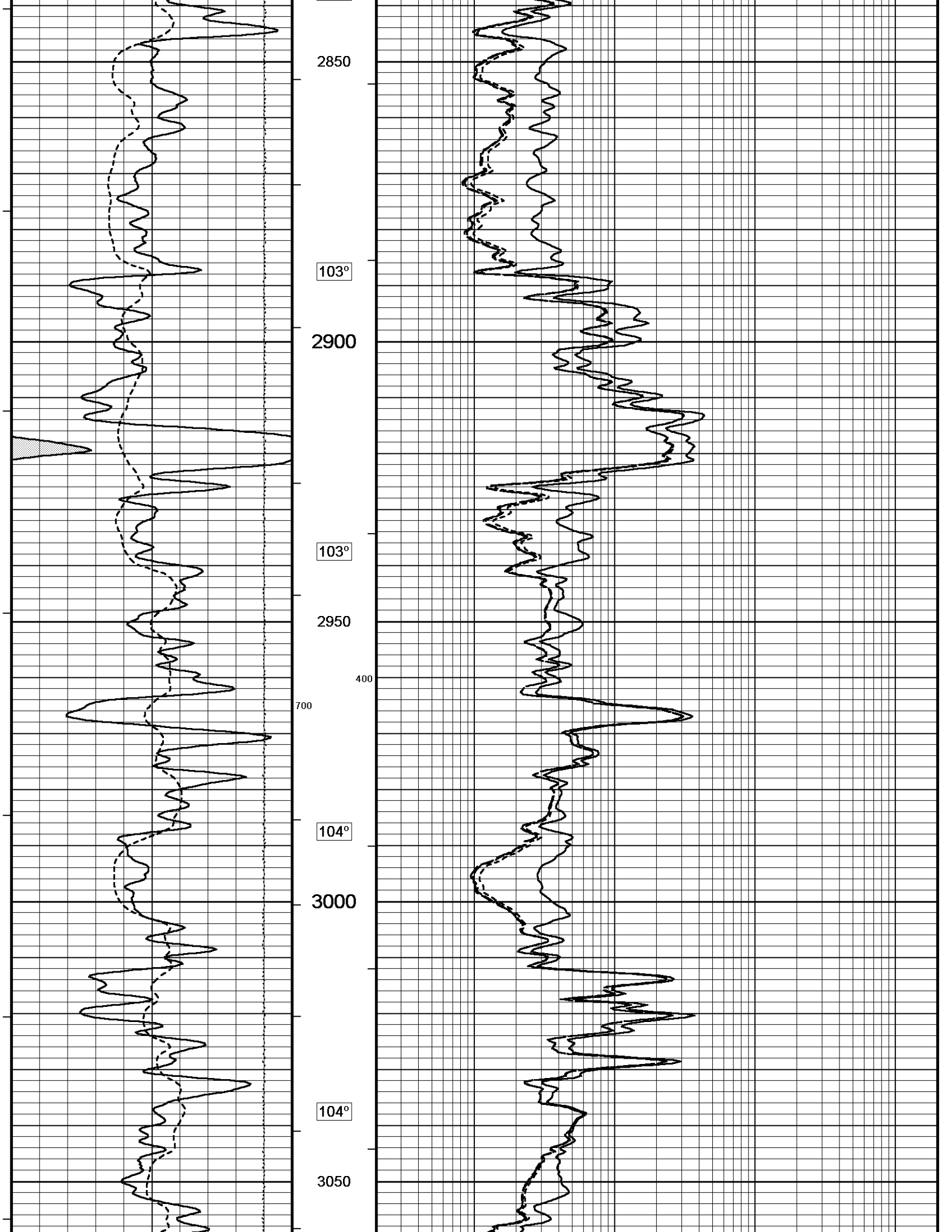
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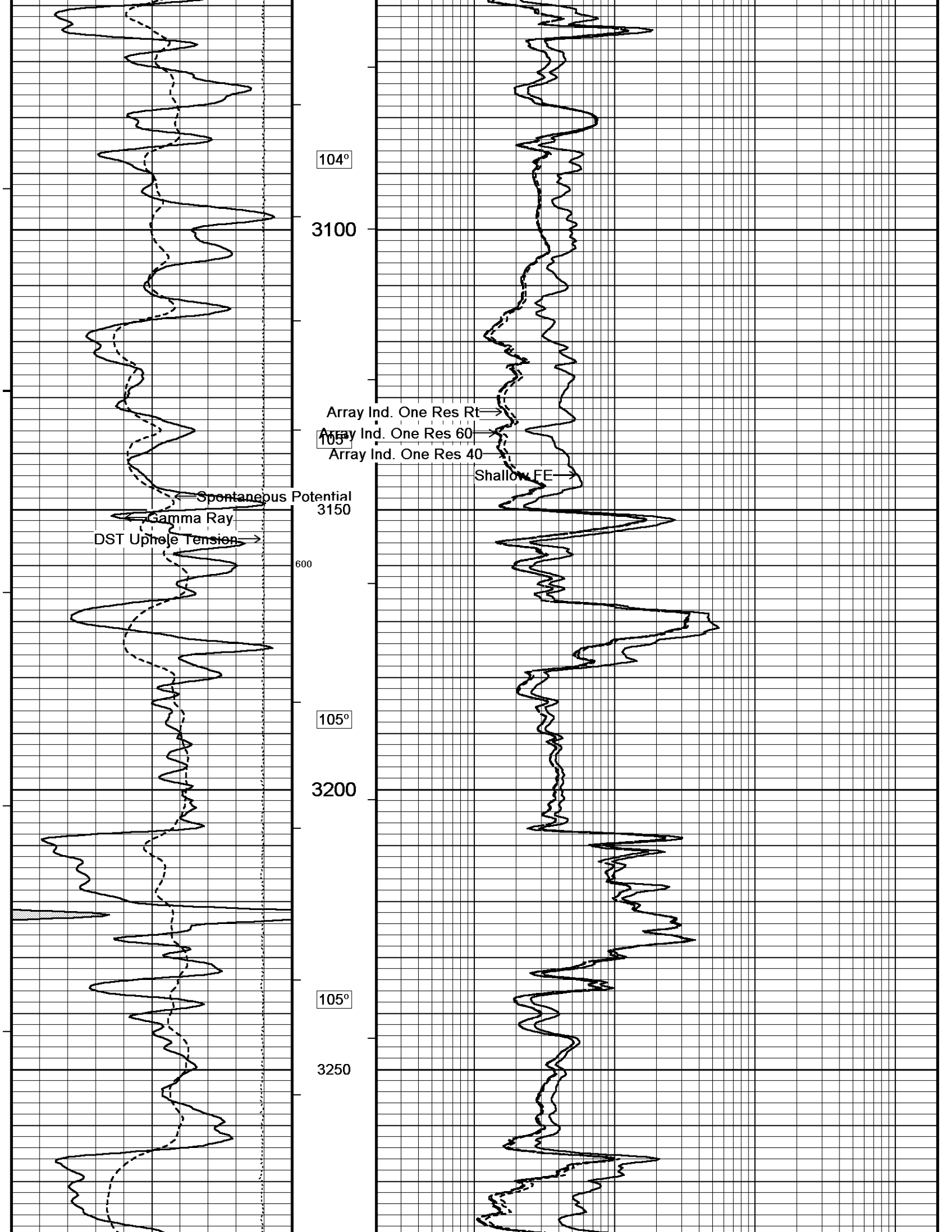
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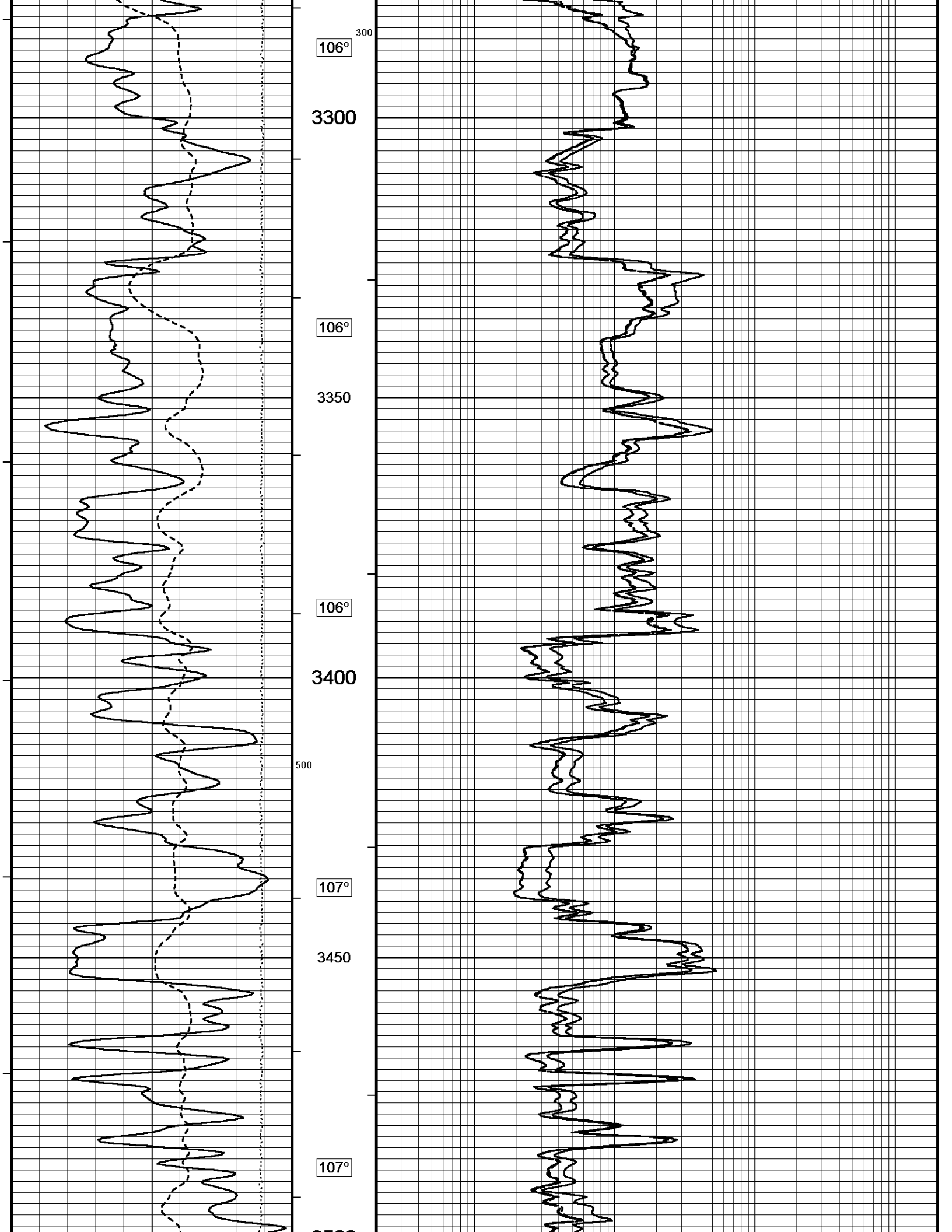
Spontaneous Potential
Gamma Ray
DST Uphole Tension →

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









3500

107°

3550

108°

3600

108°

3650

400

109°

3700

Array Ind. One Res Rt

Array Ind. One Res 60

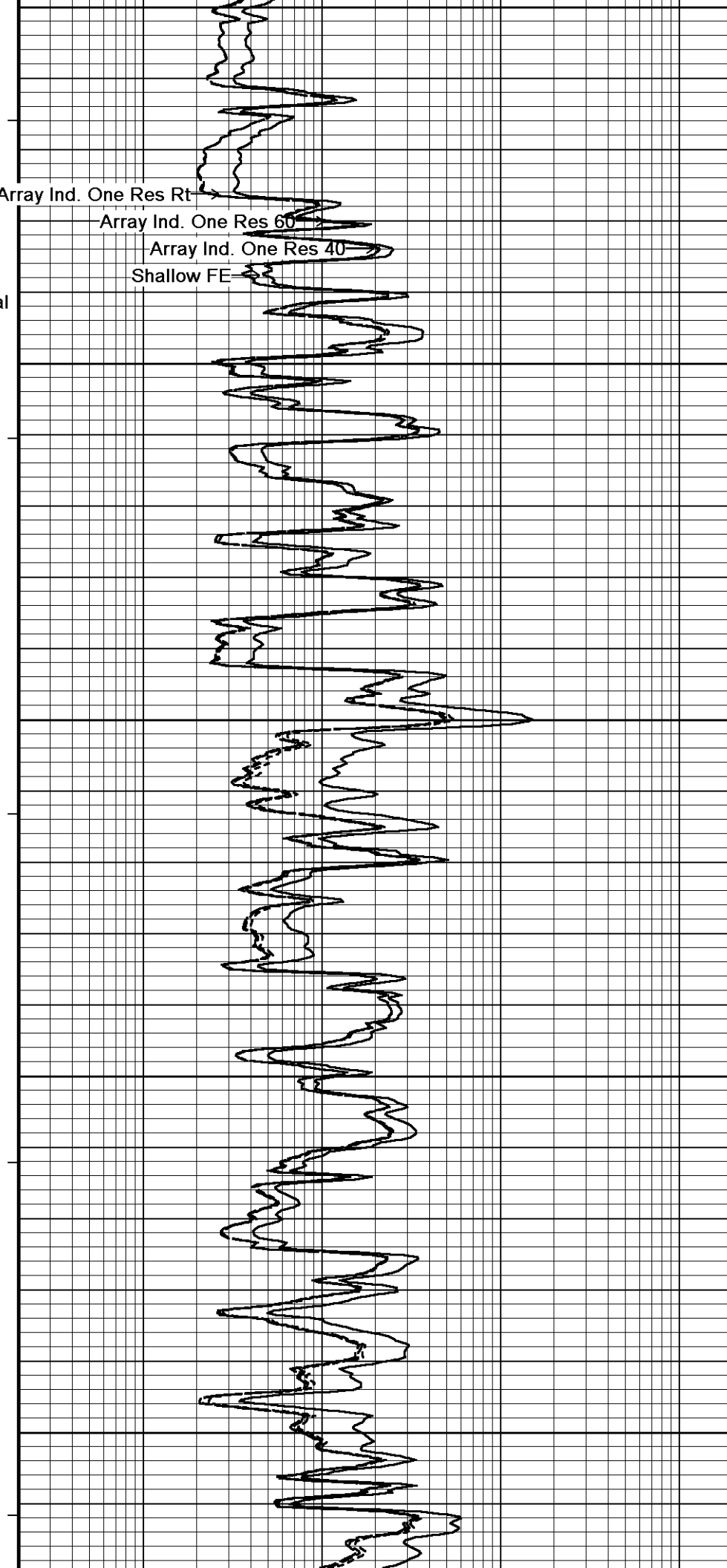
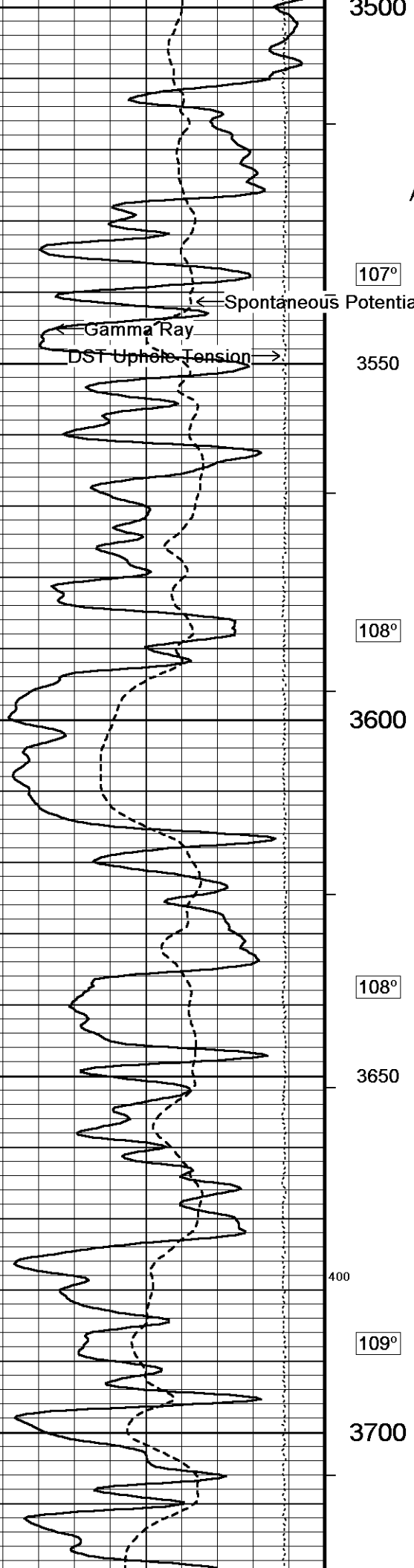
Array Ind. One Res 40

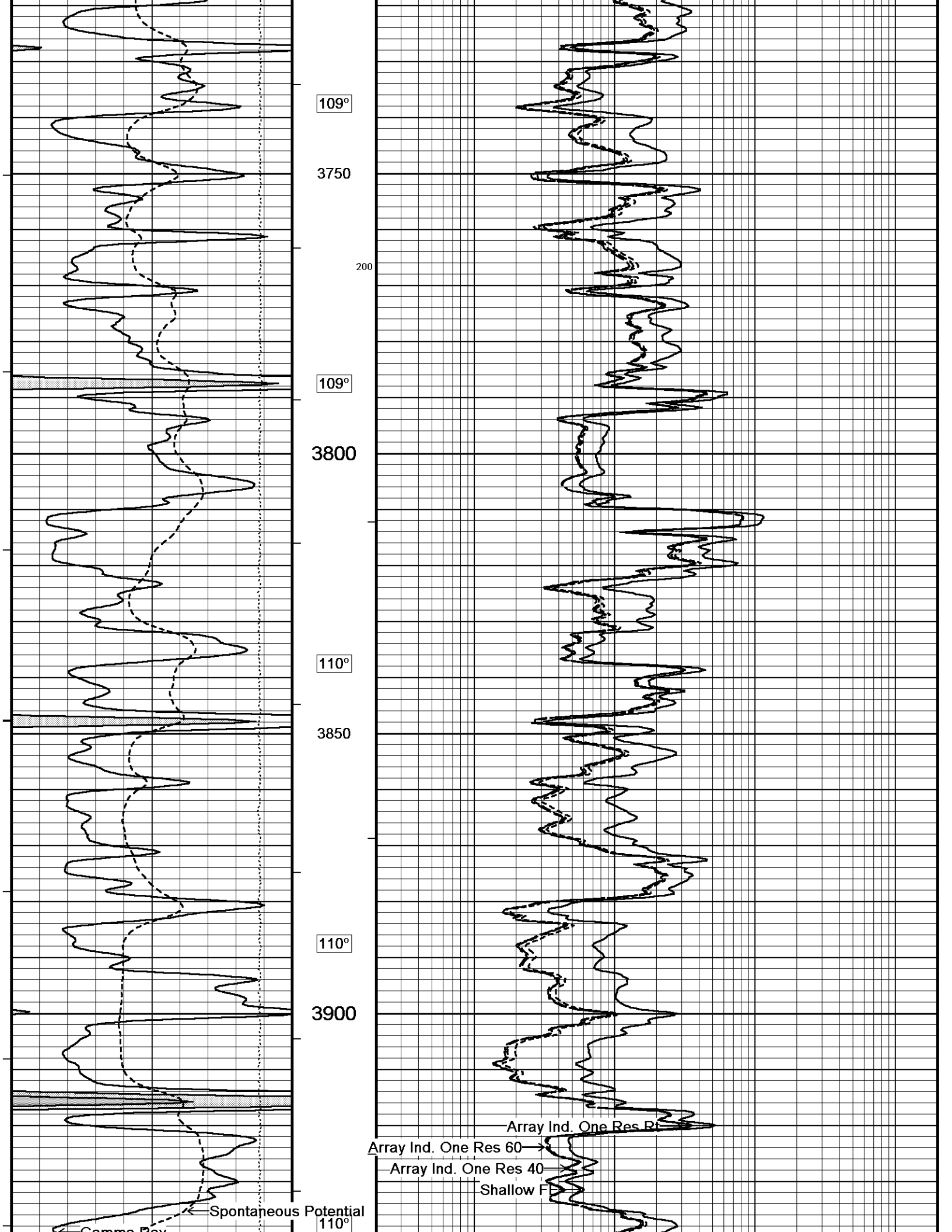
Shallow FE

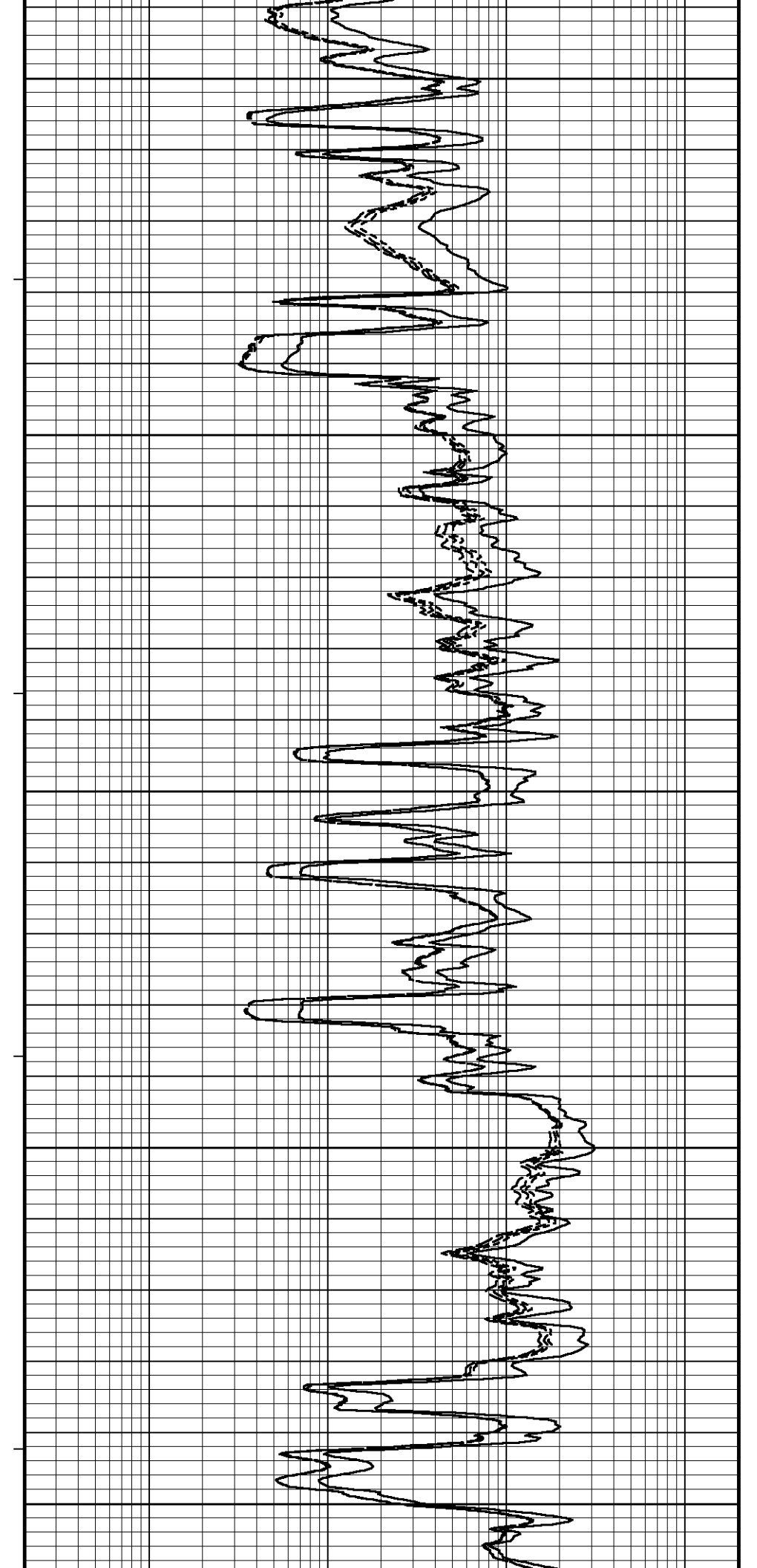
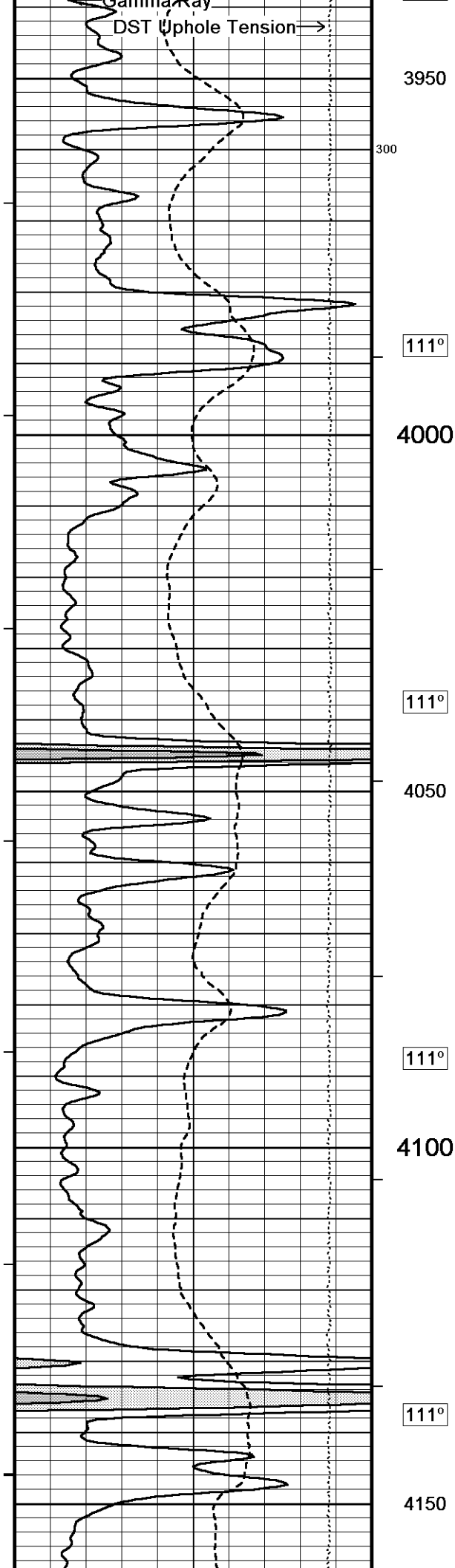
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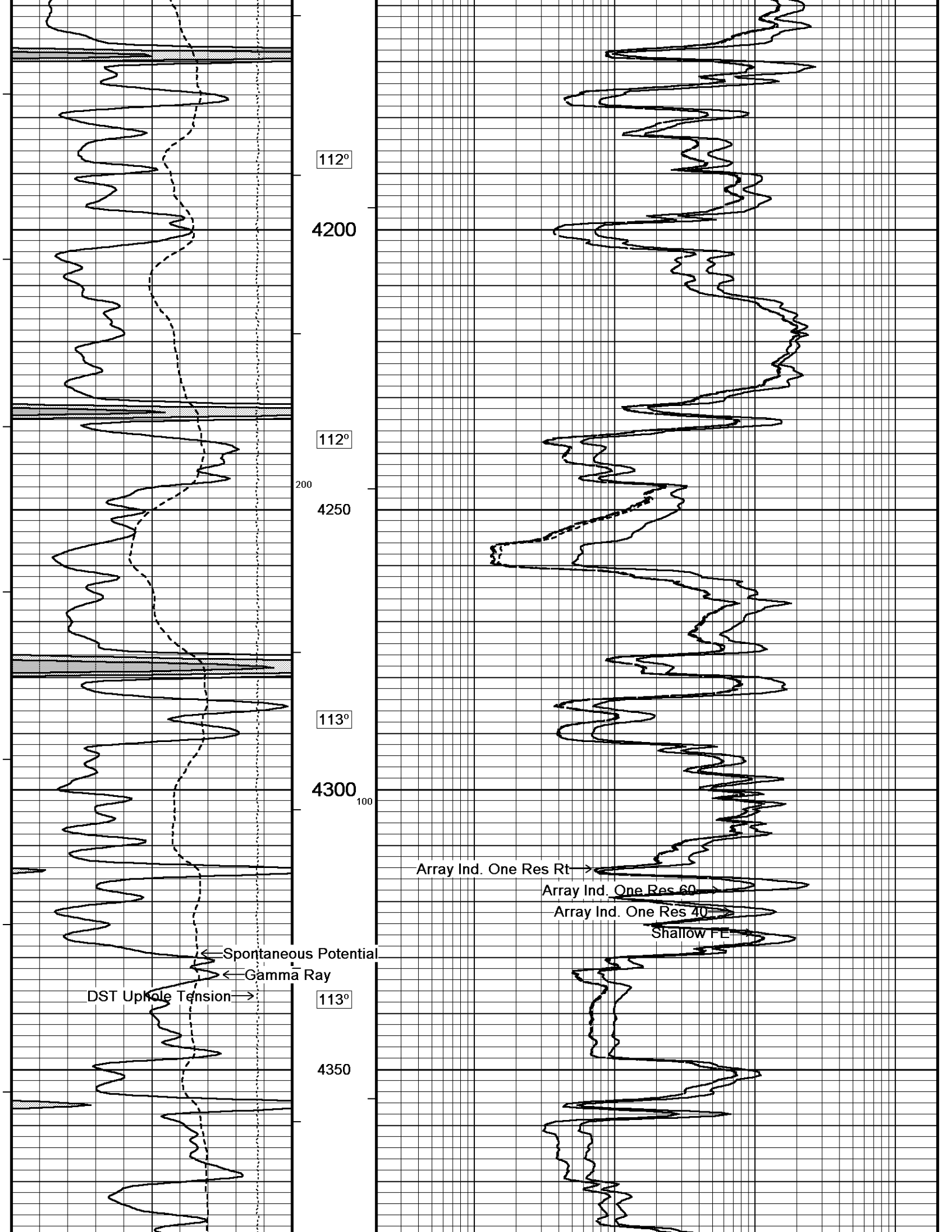
Gamma Ray

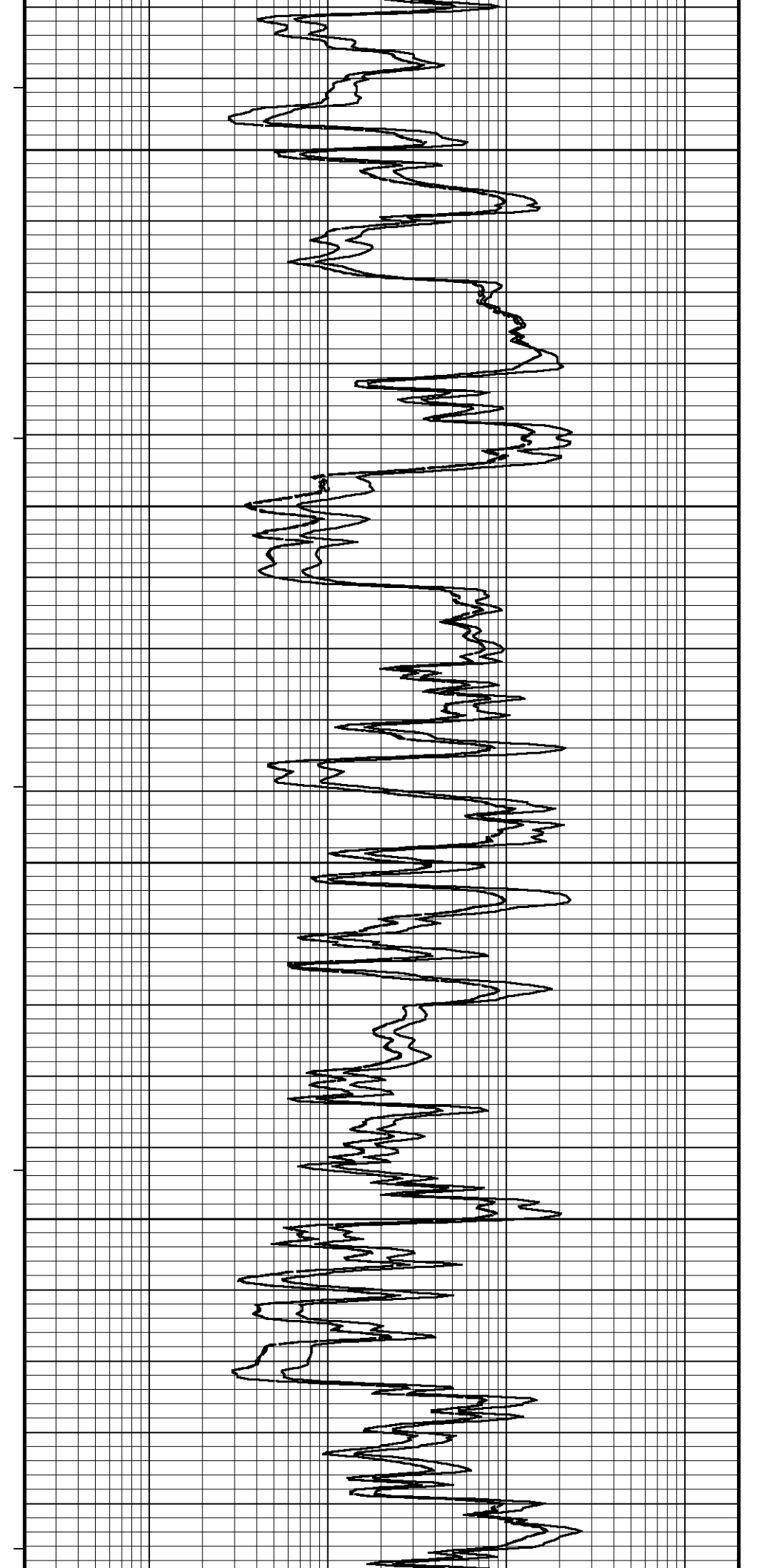
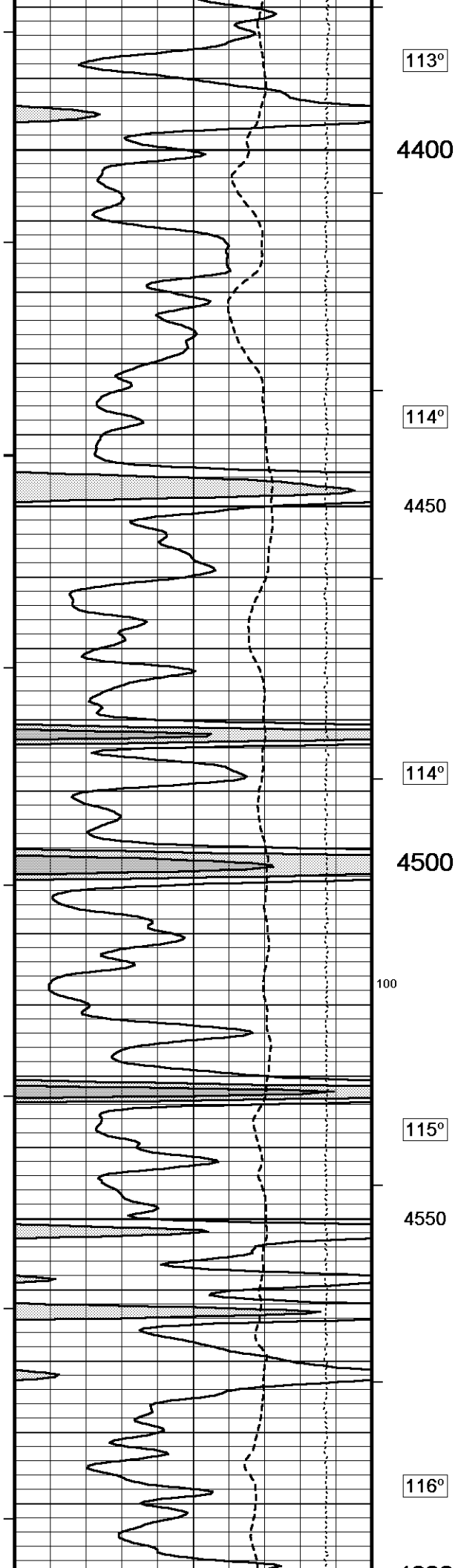
DST Uphole Tension

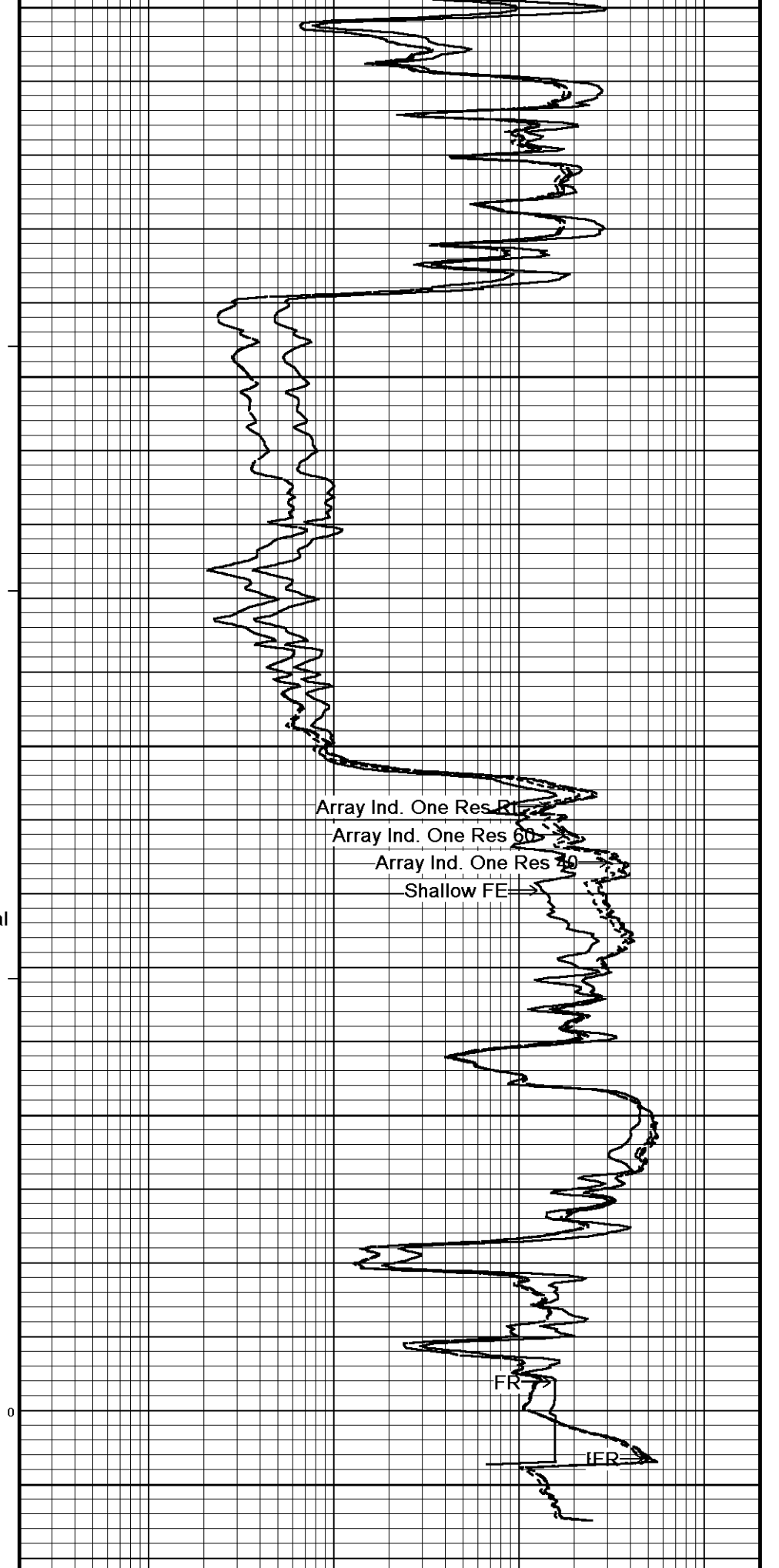
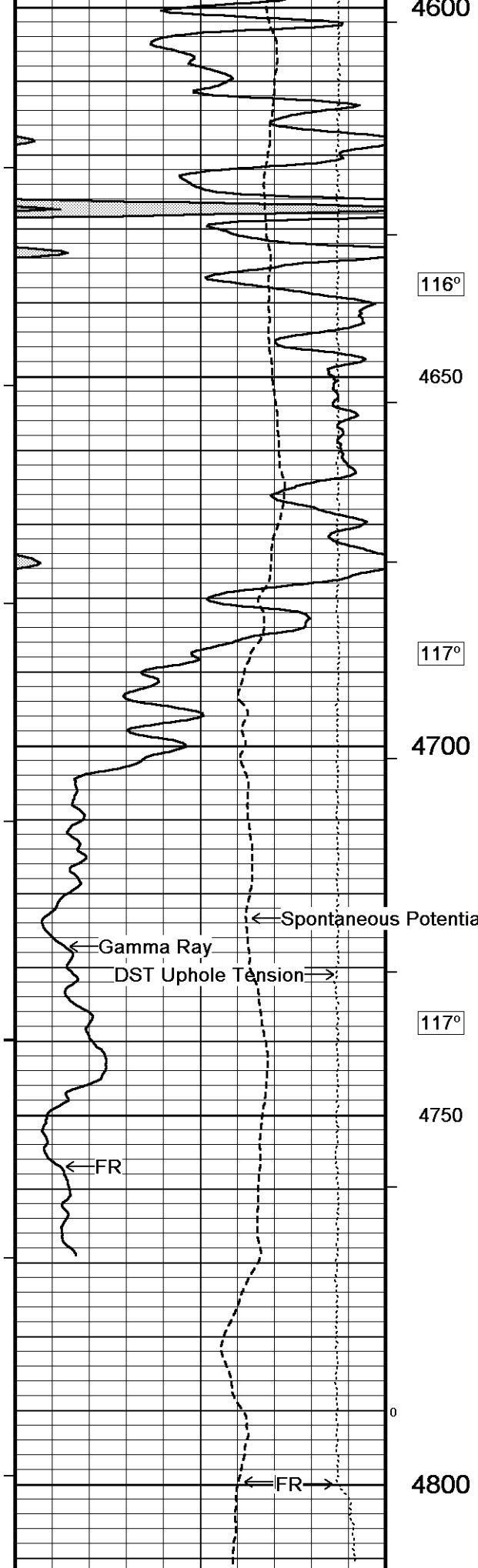


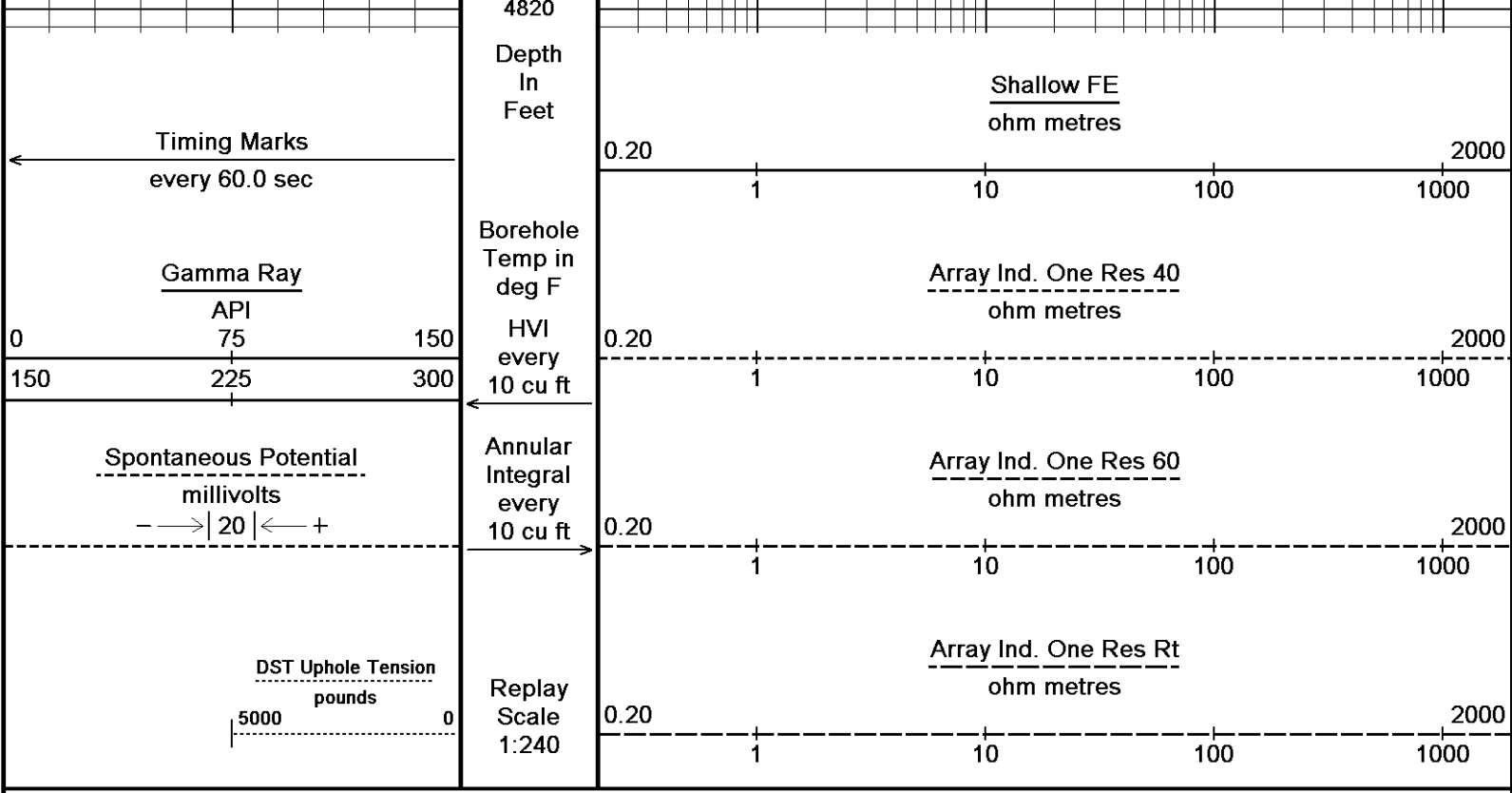










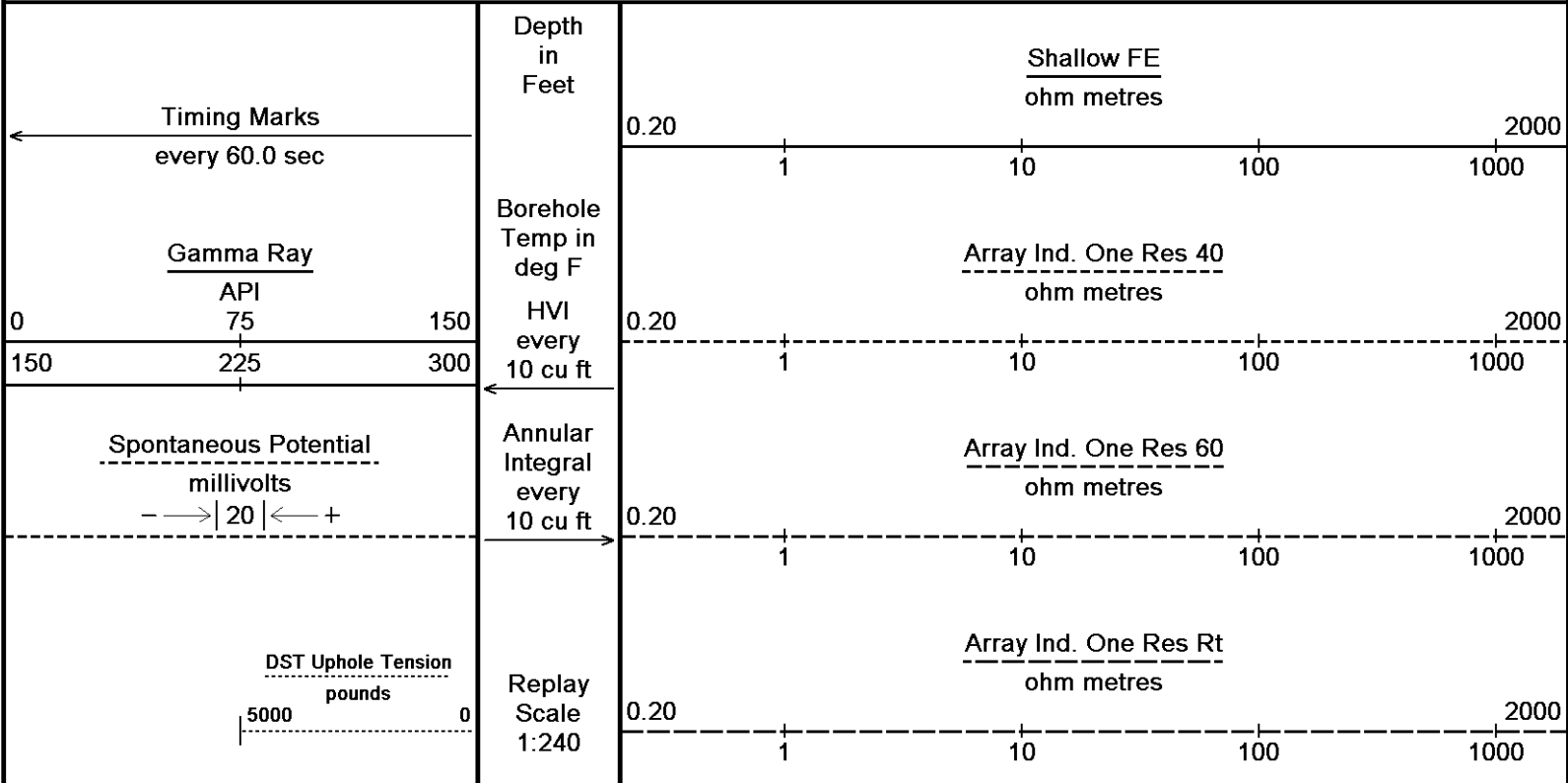


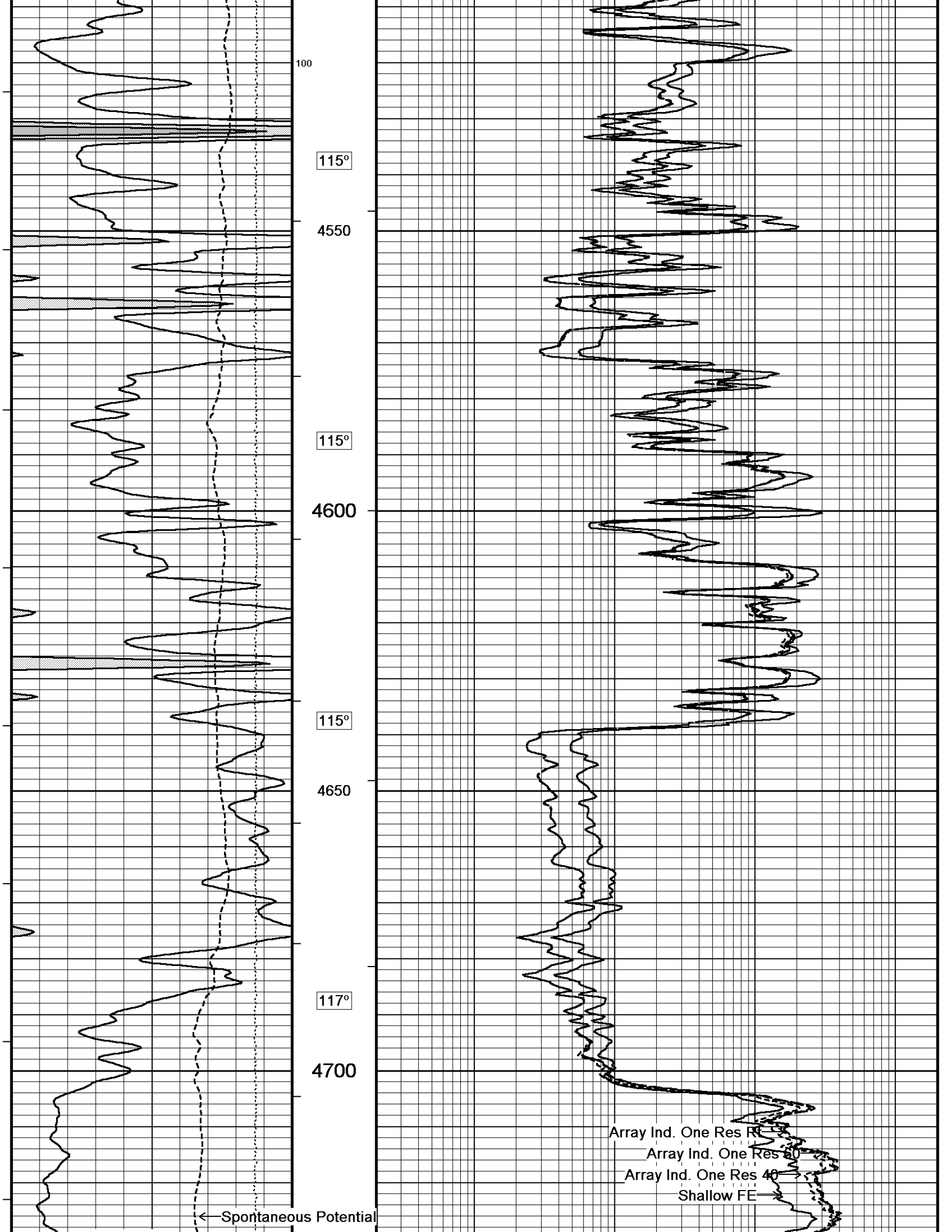
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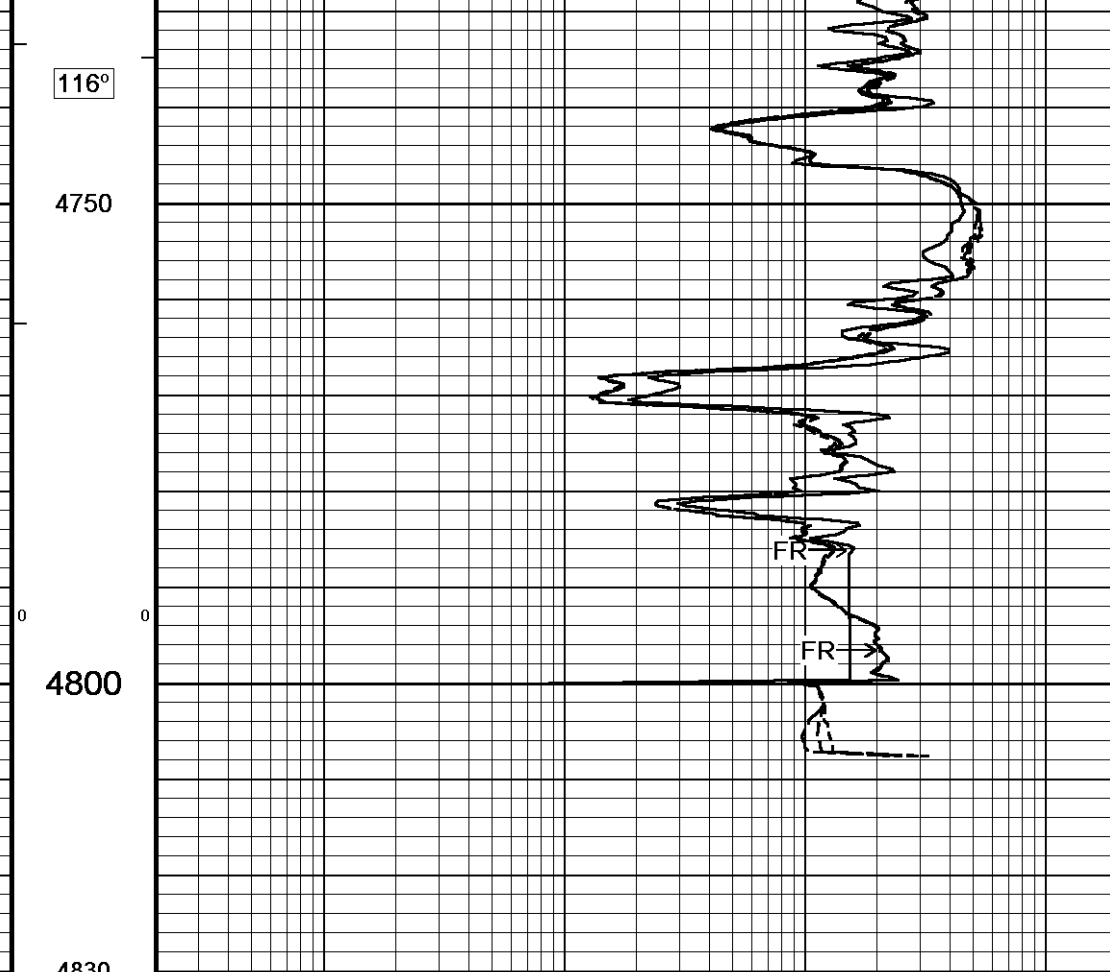
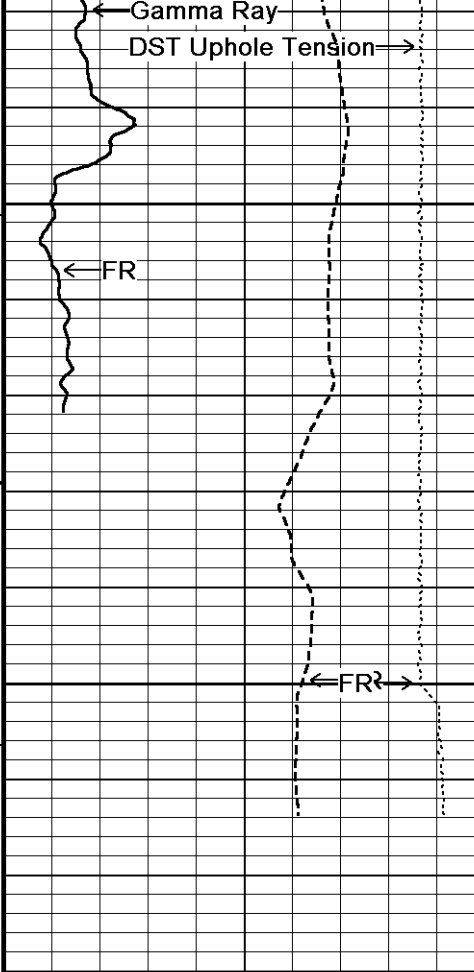
↑ 5 INCH MAIN ↑

↓ REPEAT SECTION ↓

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 15-JAN-2014 08:59
 Filename: C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Repeat.dta Recorded on 15-JAN-2014 04:44
 System Versions: Logged with 13.05.9583 Plotted with 13.05.9583







Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Spontaneous Potential
millivolts
- - - - - | 20 | - - - - - +

DST Uphole Tension
pounds
5000 0

4830
Depth
in
Feet

Borehole
Temp in
deg F
HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

Replay
Scale
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 15-JAN-2014 08:59
 Filename: C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Repeat.dta
 Recorded on 15-JAN-2014 04:44
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↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION
 C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Main.dta

General Constants: All 000
 Last Edited on 15 JAN 2014 02:13

General Parameters

Mud Resistivity	0.880	ohm-metres
Mud Resistivity Temperature	77.800	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	1.000	
RWA Constant M	2.000	
SW/APOR Tool Source	0.000	

Gamma Calibration MCG-D.K 469

Field Calibration on 13-JAN-2014 14:21

	Measured	Calibrated (API)
Background	65	43
Calibrator (Gross)	1158	768
Calibrator (Net)	1093	725

Gamma Constants MCG-D.K 469

Last Edited on 15-JAN-2014,03:13

Gamma Calibrator Number	GRC38	
Mud Density	1.12	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 11-JAN-2014,16:37

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-D.K 469

Last Edited on 11-JAN-2014,16:37

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

Base Calibration on 30-DEC-2013 12:34

Field Check on 13-JAN-2014 14:05

Base Calibration	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	964.4	126.8
Base Check		280.9
Field Check		281.1

FE Constants MFE-B.J 353

Last Edited on 15-JAN-2014,03:12

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 167

Base Calibration on 02-OCT-2013,14:21

Field Check on 13-JAN-2014 14:04

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

Channel	Low	High	Low	High
1	17.3	474.2	9.3	966.2
2	6.3	388.4	7.6	821.4
3	3.3	259.4	5.2	566.0
4	1.9	133.0	2.6	279.2

Array Temperature 76.8 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			12.1	3840.7
2			29.4	3478.8
3			29.0	3054.8
4			19.8	2082.8
Deep			18.5	2050.1
Medium			42.3	3993.6
Shallow			42.7	5056.8

Array Temperature 57.9 Deg F

Induction Constants MAI-A.A 167

Last Edited on 15-JAN-2014,03:12

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 30-DEC-2013 16:06

Field Calibration on 13-JAN-2014 14:07

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	16063	3.99
2	26074	5.98
3	36080	7.97
4	45856	9.86
5	57120	11.92
6	N/A	N/A

DOWNHOLE EQUIPMENT

C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Main.dta

3/8" Triple Cone Cable Head (MCB C A)
MCB-C.A 5 LG: 1.58 ft WT: 15.4 lb OD: 2.24 in

Compact Comms Gamma
MCG-D.K 469 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 3 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

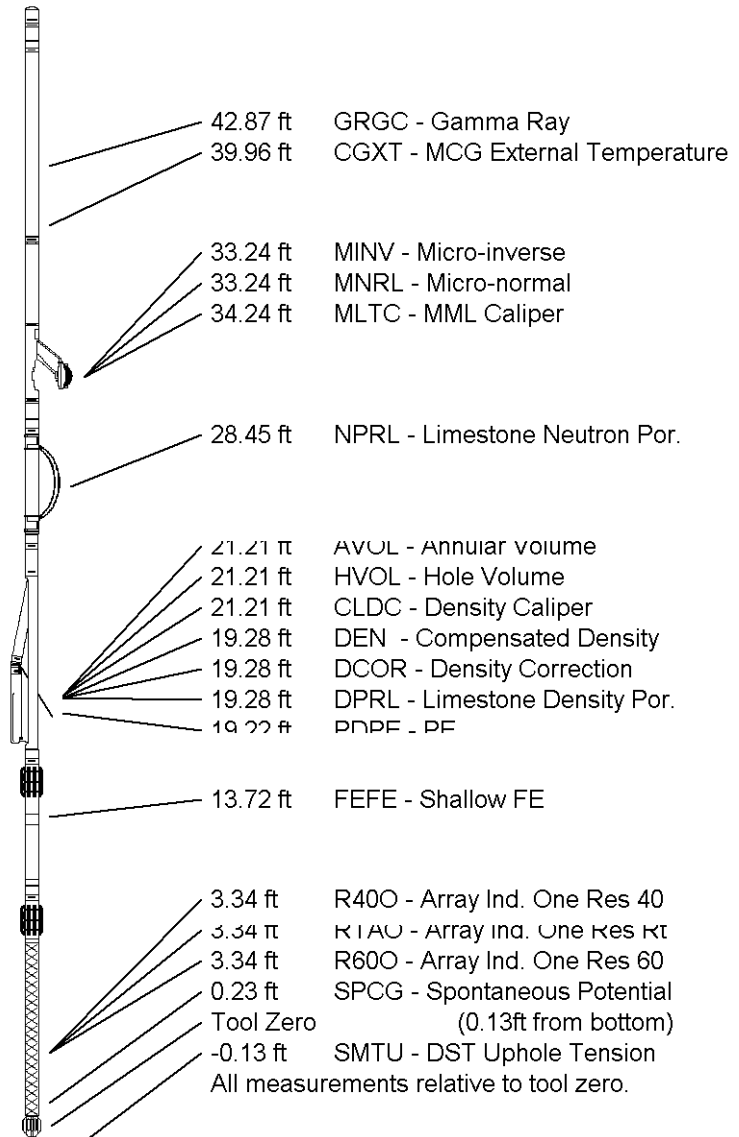
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focused Electric
MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 49.73 ft Weight: 399.0 lb



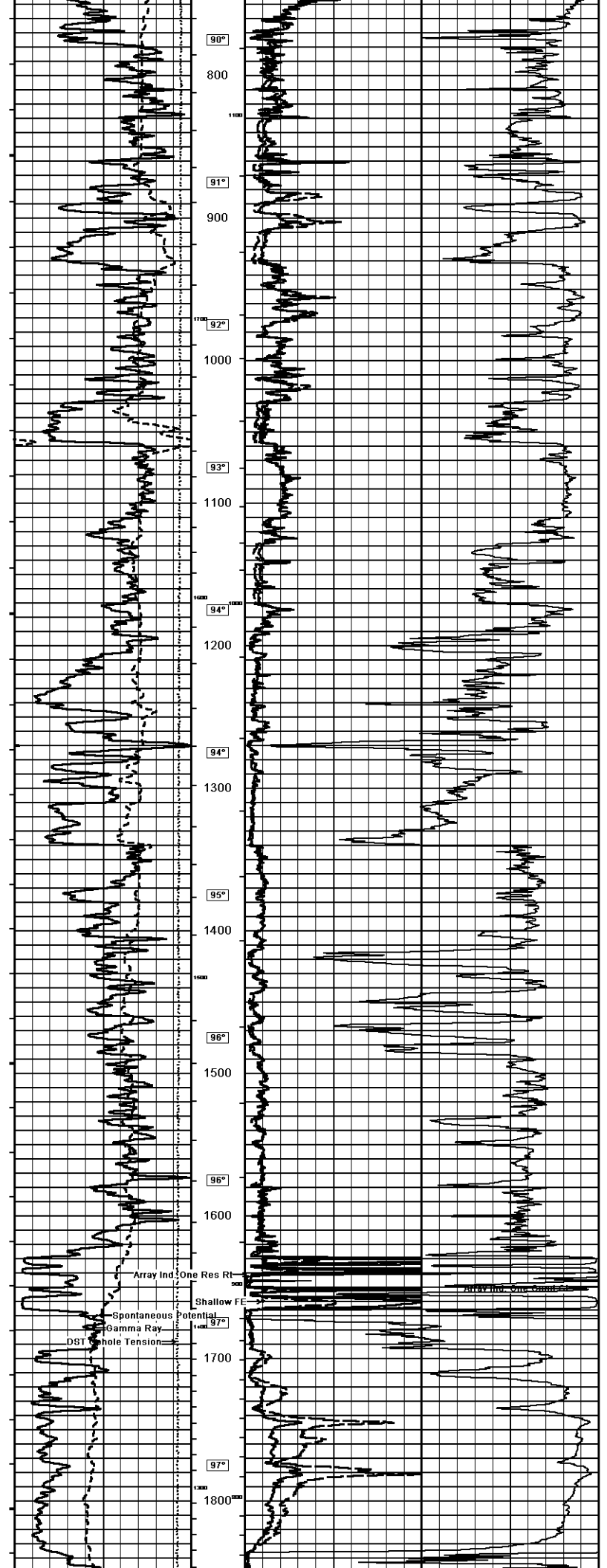
COMPANY	GRAND MESA OPERATING
WELL	BFF #1-35
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS

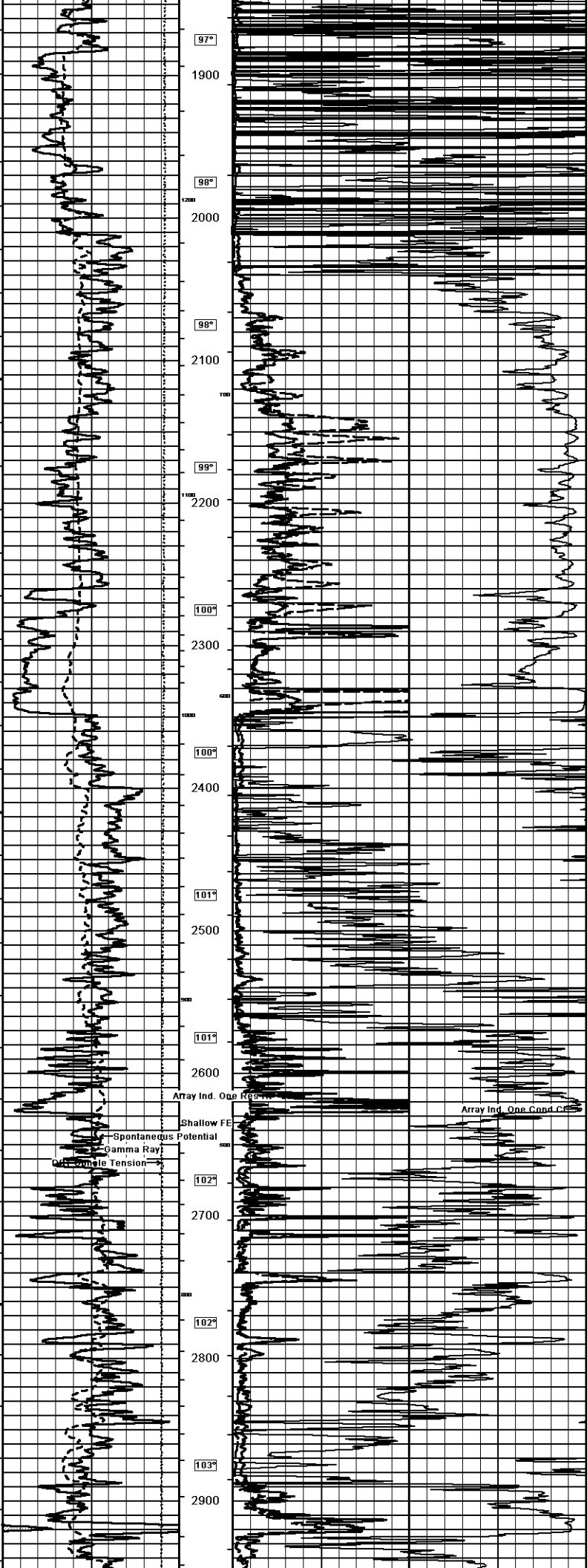
Elevation Kelly Bushing	2979.00	feet	First Reading	4796.66	feet
Elevation Drill Floor	2977.00	feet	Depth Driller	4800.00	feet
Elevation Ground Level	2970.00	feet	Depth Logger	4800.00	feet

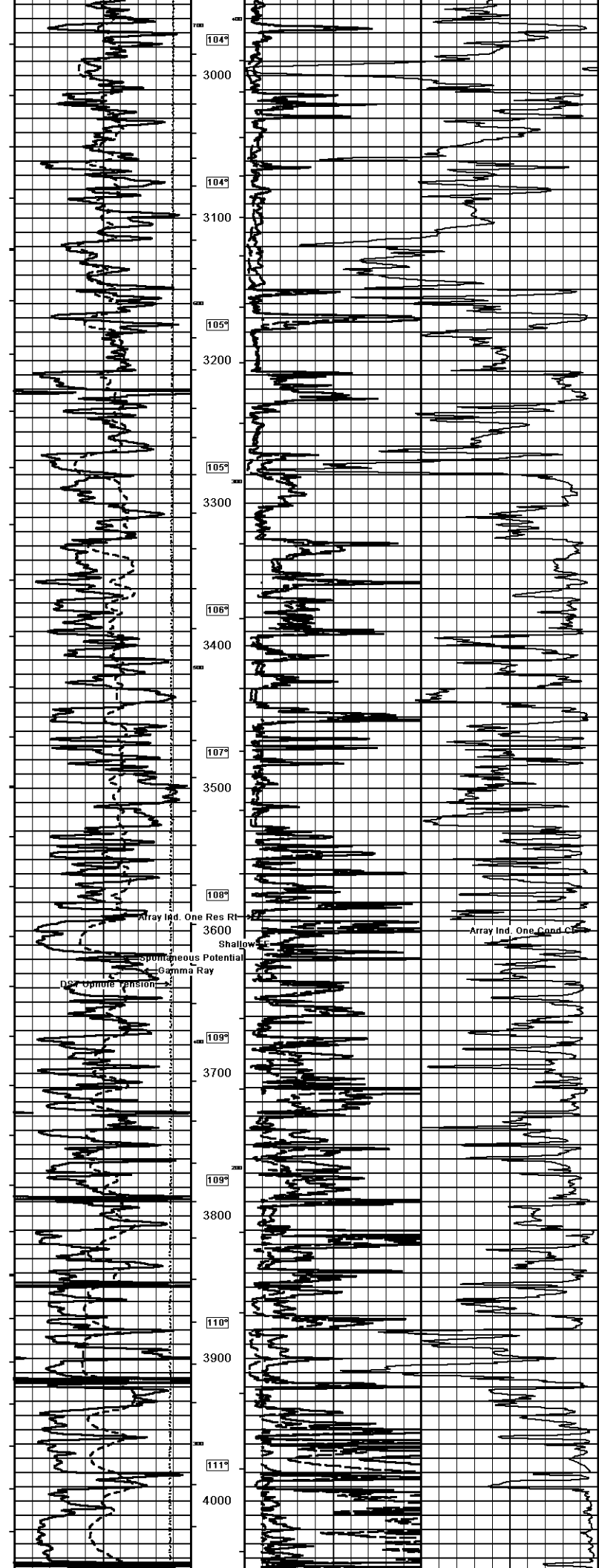


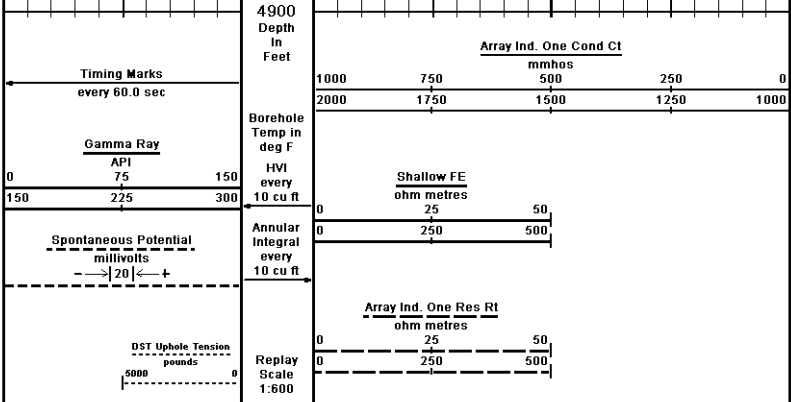
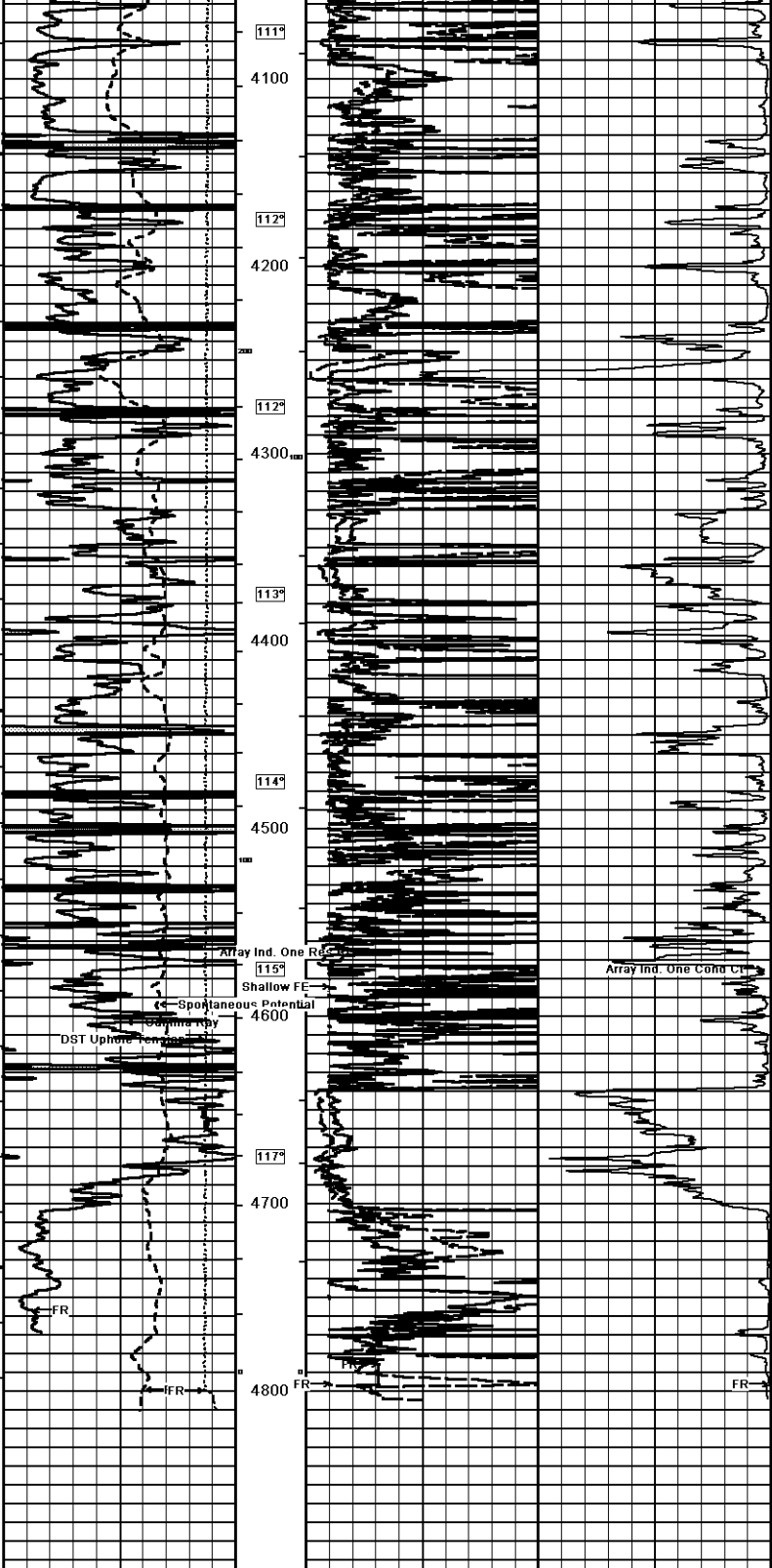
Weatherford®

**ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**










Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 15-JAN-2014 08:59
 Filename: C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Main.dta
 Recorded on 15-JAN-2014 05:07
 System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

COMPANY	GRAND MESA OPERATING				
WELL	BFF #1-35				
FIELD	WILDCAT				
PROVINCE/COUNTY	SCOTT				
COUNTRY/STATE	U.S.A. / KANSAS				
Elevation Kelly Bushing	2979.00	feet	First Reading	4796.66	feet
Elevation Drill Floor	2977.00	feet	Depth Driller	4800.00	feet
Elevation Ground Level	2970.00	feet	Depth Logger	4800.00	feet
		ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG			