Weatherford

ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

COMPANY	O'BRIEN RESOURCES, LLC.
WELL	JECHA 4 #2
FIELD	WILDCAT
PROVINCE/COUNTY	RUSH
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1302' FNL & 2137' FWL

SEC 4	TWP 19S	RGE 17W	Other Services
Latitude			MDN/MPD MML
Longitude			MSS
API Number	15-165-22137		

Permanent Datum GL, Elevation 2070 feet
Log Measured From KB
Drilling Measured From KB @ 13 FEET

Elevations:	feet
KB	2083.00
DF	2081.00
GL	2070.00

Date	04-OCT-2016			
Run Number	ONE			
Service Order	4558-162772378			
Depth Driller	3907.00	feet		
Depth Logger	3908.00	feet		
First Reading	3905.00	feet		
Last Reading	267.00	feet		
Casing Driller	265.00	feet		
Casing Logger	267.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.35 lb/USg		53.00 CP	
PH / Fluid Loss	9.50		13.60 ml/30Min	
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.46 @ 75.0	ohm-m		
Rmf @ Measured Temp	0.37 @ 75.0	ohm-m		
Rmc @ Measured Temp	0.55 @ 75.0	ohm-m		
Source Rmf / Rmc	CALC		CALC	
Rm @ BHT	0.33 @103.0	ohm-m		
Time Since Circulation	4 HOURS			
Max Recorded Temp	103.00	deg F		
Equipment / Base	13096		OKC	
Recorded By	ADAM SILL			
Witnessed By	JIM MUSGROVE			

BOREHOLE RECORD

Last Edited: 04-OCT-2016 13:29

Bit Size inches	Depth From feet	Depth To feet
7.875	265.00	3907.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	265.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 15.03.5939.
- 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: 1742 CU.FT.
- ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO 2300: 466 CU.FT.

- RIG: DUKE #7.

- ENGINEER: A. SILL.

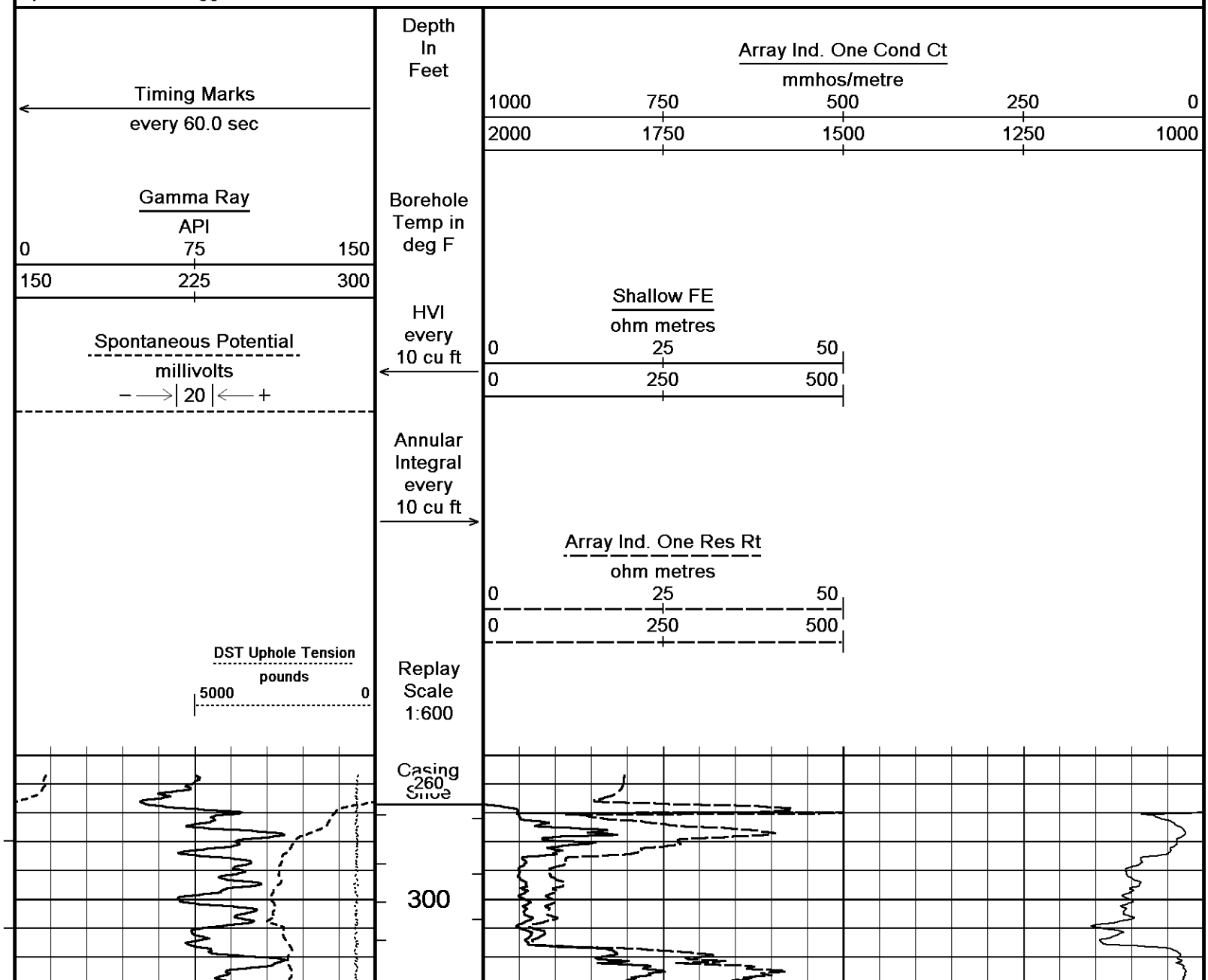
- OPERATOR: B. TOVAR.

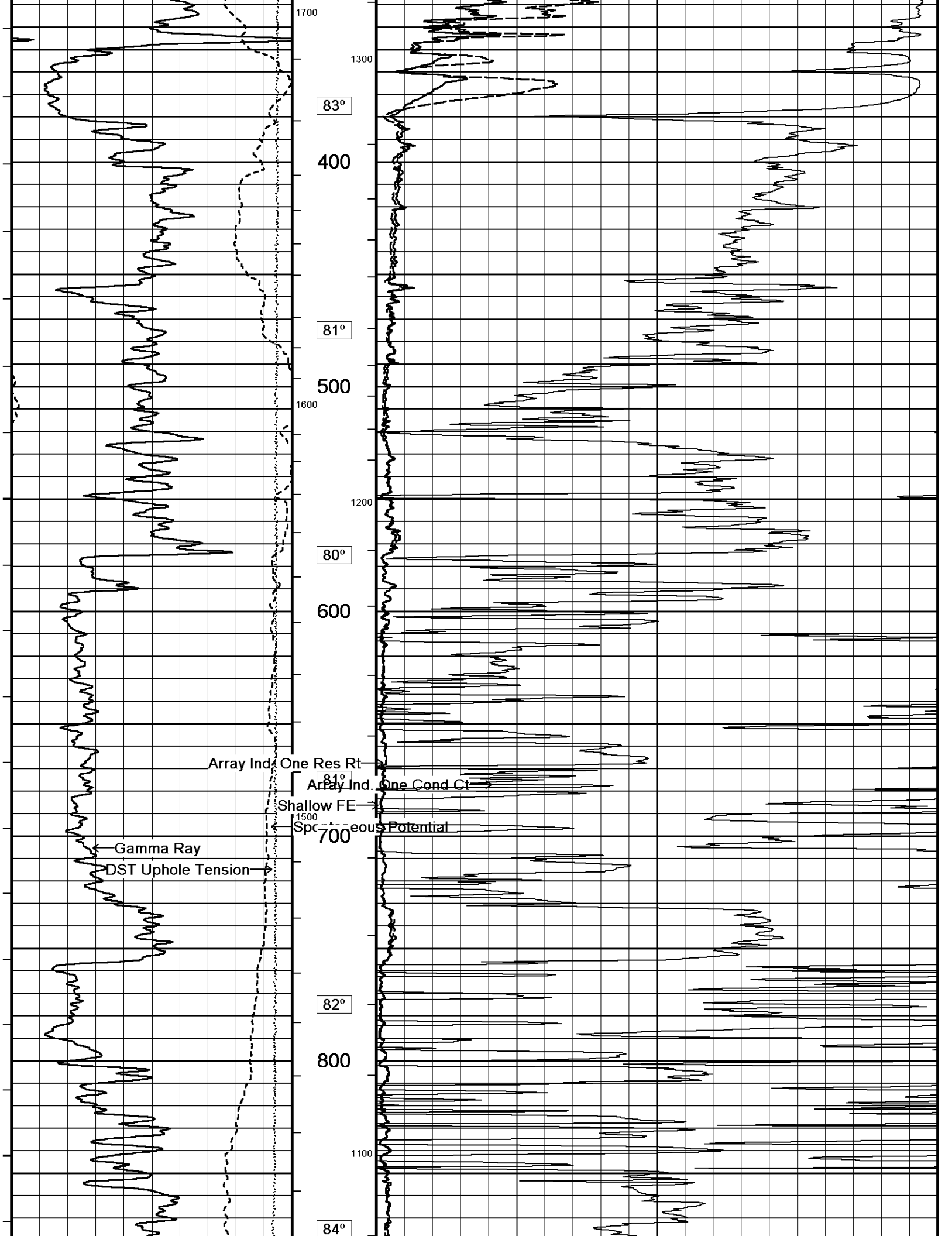
2 INCH MAIN

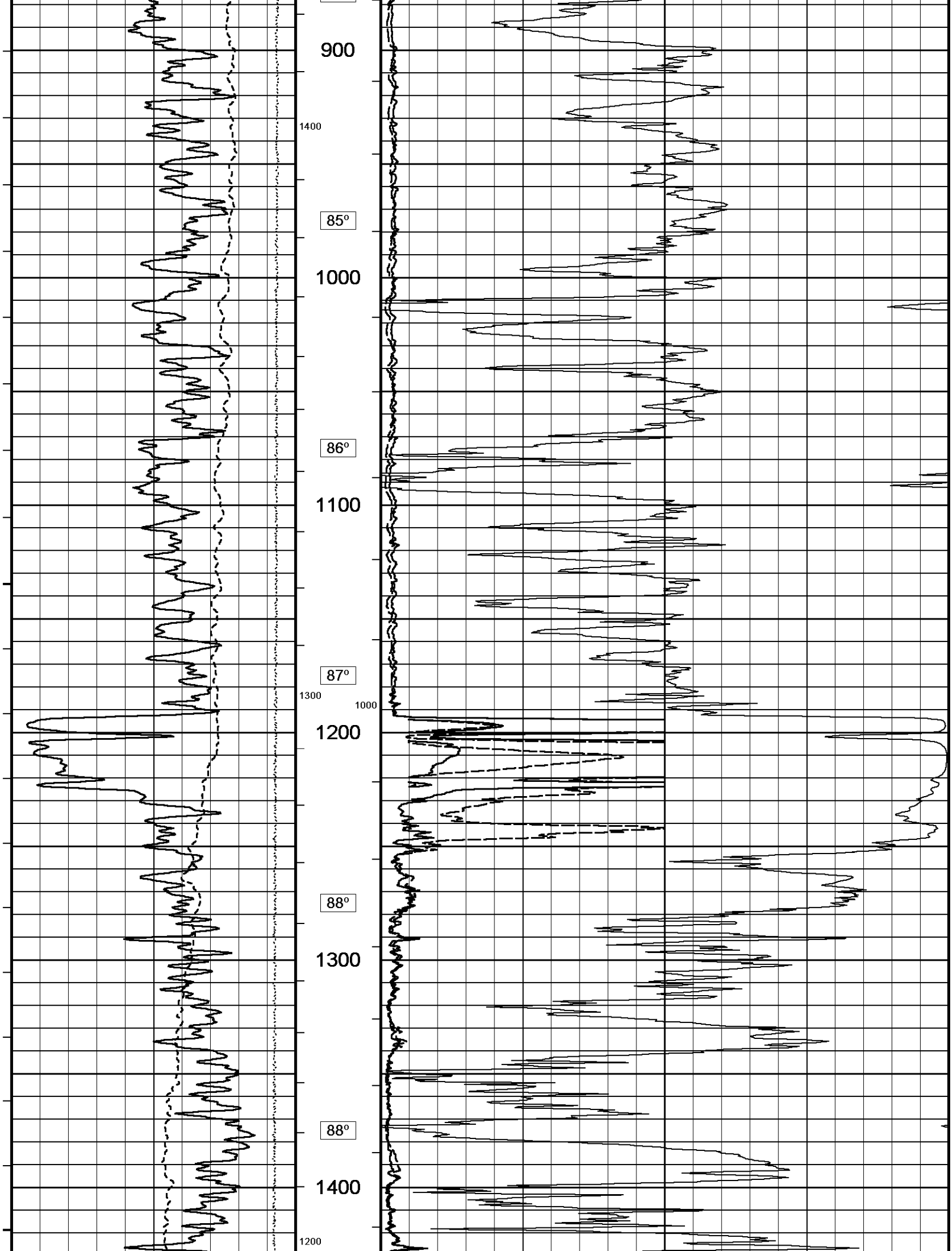
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 04-OCT-2016 18:58

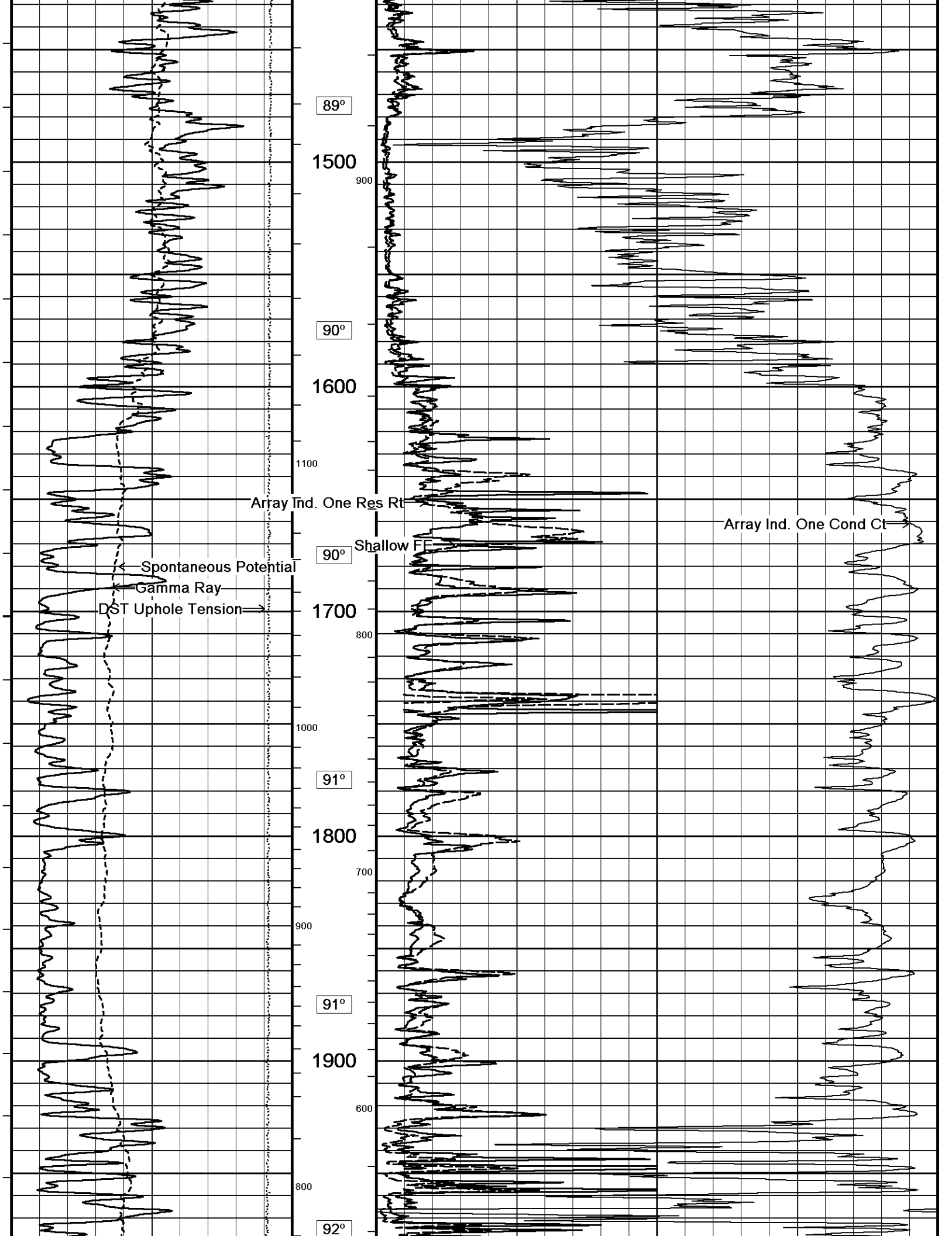
Filename: C:\Minimus 15.03.5939\Logs\O'Brien (LA) Jecha 4 #2\O'Brien (LA) Jecha 4 #2_002.dta — Recorded on 04-OCT-2016 16:29

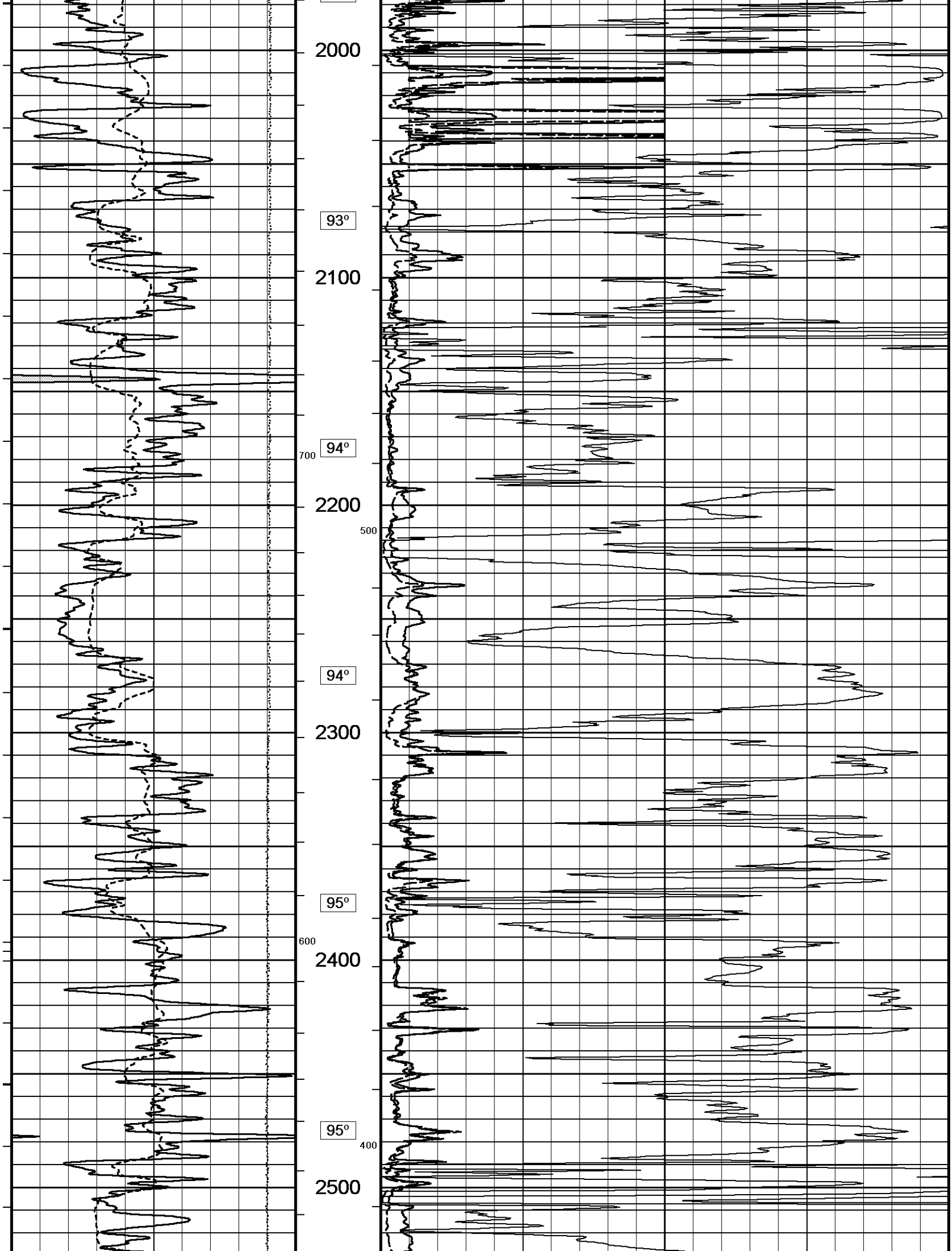
System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

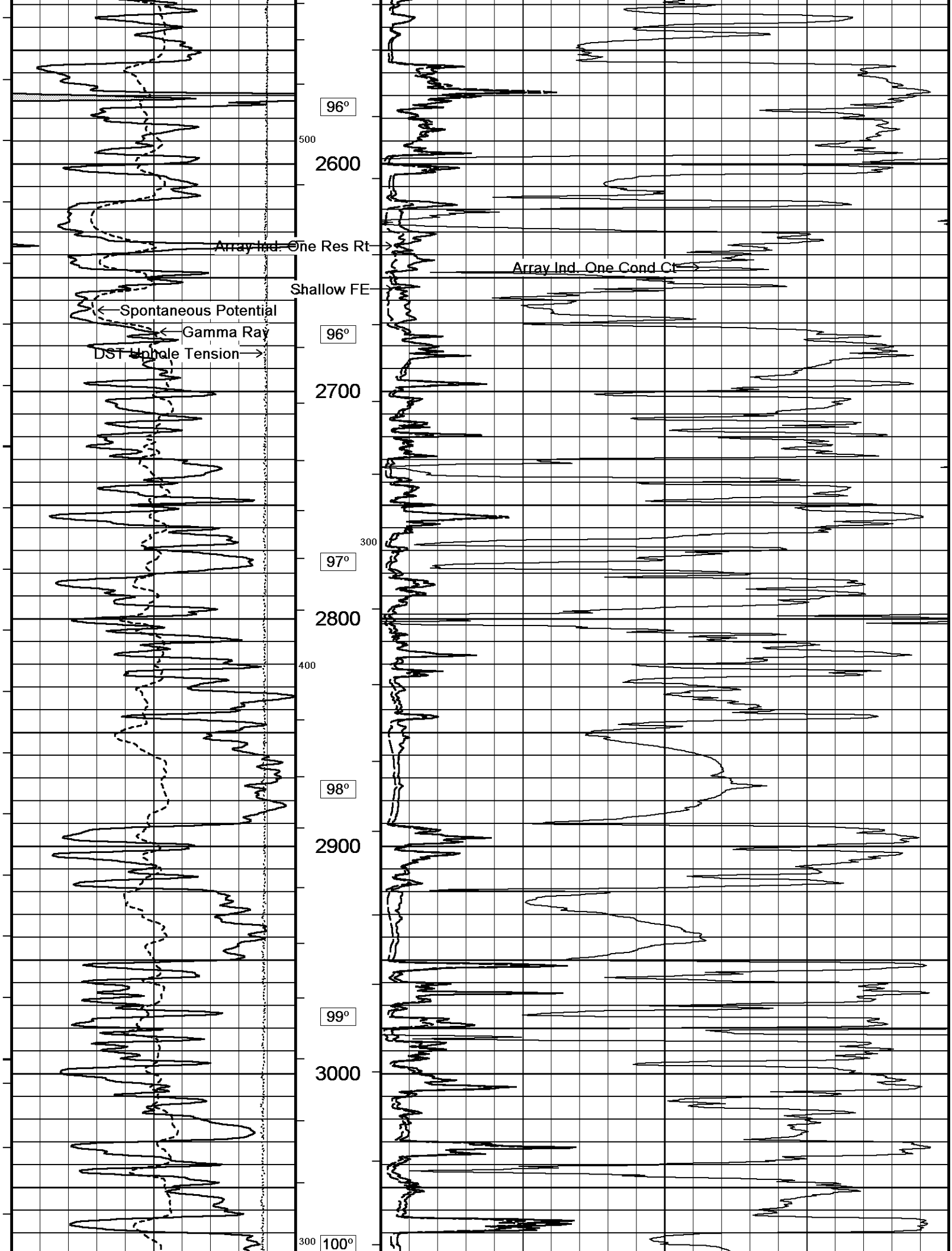


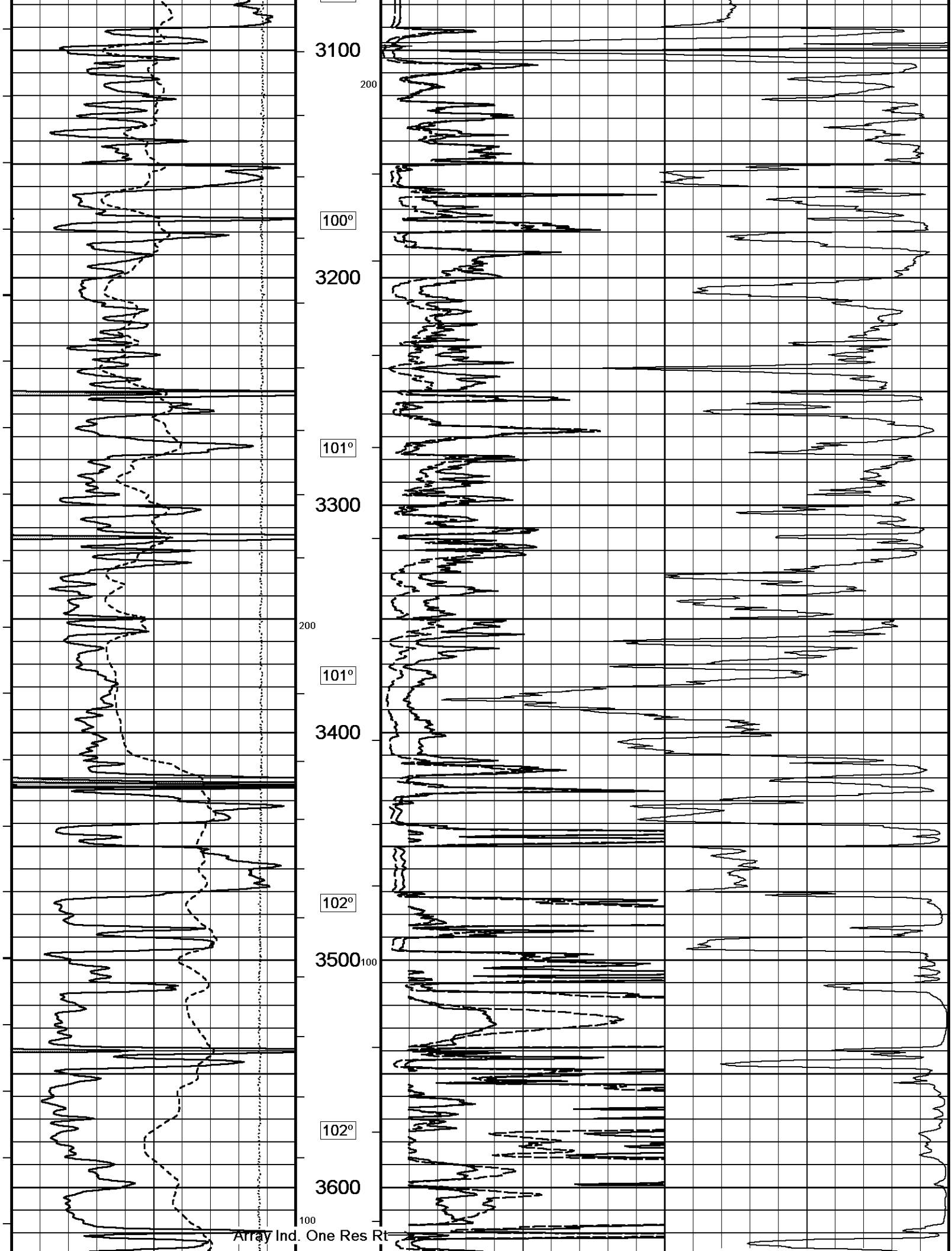

1700
1300
83°
400
81°
500
1600
1200
80°
600
Array Ind. One Res Rt
81°
Array Ind. One Cond Ct
Shallow FE
1500
Spontaneous Potential
700
Gamma Ray
DST Uphole Tension
82°
800
1100
84°

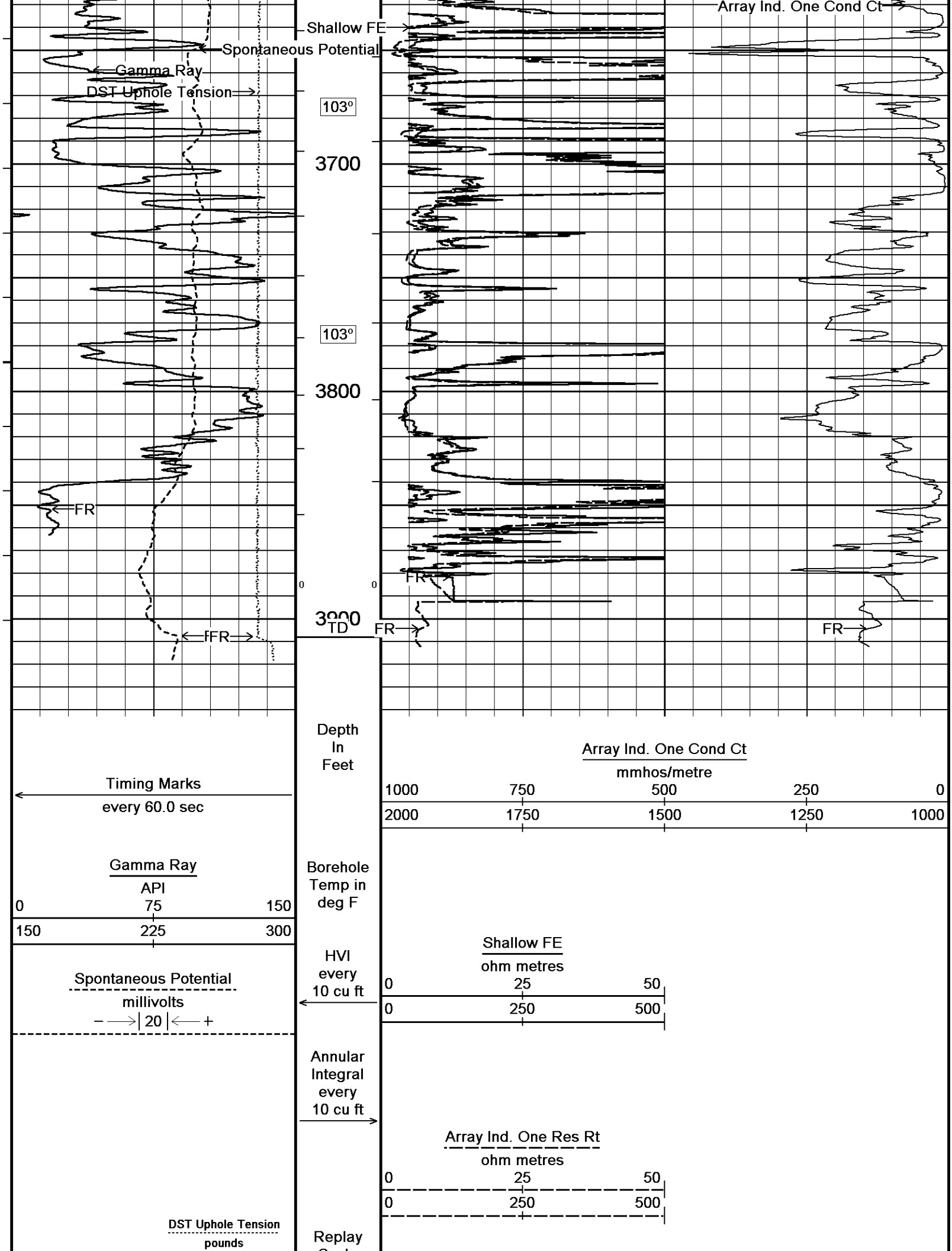

900
1400
85°
1000
86°
1100
87°
1300
1000
1200
88°
1300
88°
1400
1200


89°
1500
900
90°
1600
1100
Array Ind. One Res Rt
Shallow FF
Array Ind. One Cond Ct
90°
Spontaneous Potential
Gamma Ray
DST Uphole Tension
1700
800
1000
91°
1800
700
900
91°
1900
600
800
92°


2000
93°
2100
700
94°
2200
500
94°
2300
95°
600
2400
95°
400
2500


96°
500
2600
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
96°
2700
300
97°
2800
400
98°
2900
99°
3000
300
100°


3100
200
100°
3200
101°
3300
200
101°
3400
102°
3500
100
102°
3600
100
Array Ind. One Res Rt


Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
103°
3700
103°
3800
FR
FFR
TD
FR
FR
FR
Array Ind. One Cond Ct
Depth
In
Feet
Timing Marks
every 60.0 sec
Array Ind. One Cond Ct
mmhos/metre
1000 750 500 250 0
2000 1750 1500 1250 1000
Gamma Ray
API
0 75 150
150 225 300
Borehole
Temp in
deg F
Shallow FE
ohm metres
0 25 50
0 250 500
HVI
every
10 cu ft
Spontaneous Potential
millivolts
– 20 +
Annular
Integral
every
10 cu ft
Array Ind. One Res Rt
ohm metres
0 25 50
0 250 500
DST Uphole Tension
pounds
Replay

5000 0

Scale 1:600

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2 INCH MAIN

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 04-OCT-2016 18:58
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System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

Timing Marks
every 60.0 sec

Depth In Feet

Shallow FE
ohm metres
0.20 1 10 100 1000 2000

Gamma Ray
API
0 75 150
150 225 300

Borehole Temp in deg F

Array Ind. One Res 40
ohm metres
0.20 1 10 100 1000 2000

Spontaneous Potential
millivolts
− → | 20 | ← +

HVI every 10 cu ft

Array Ind. One Res 60
ohm metres
0.20 1 10 100 1000 2000

Annular Integral every 10 cu ft

Array Ind. One Res Rt
ohm metres
0.20 1 10 100 1000 2000

DST Uphole Tension
pounds
5000 0

Replay Scale 1:240

256

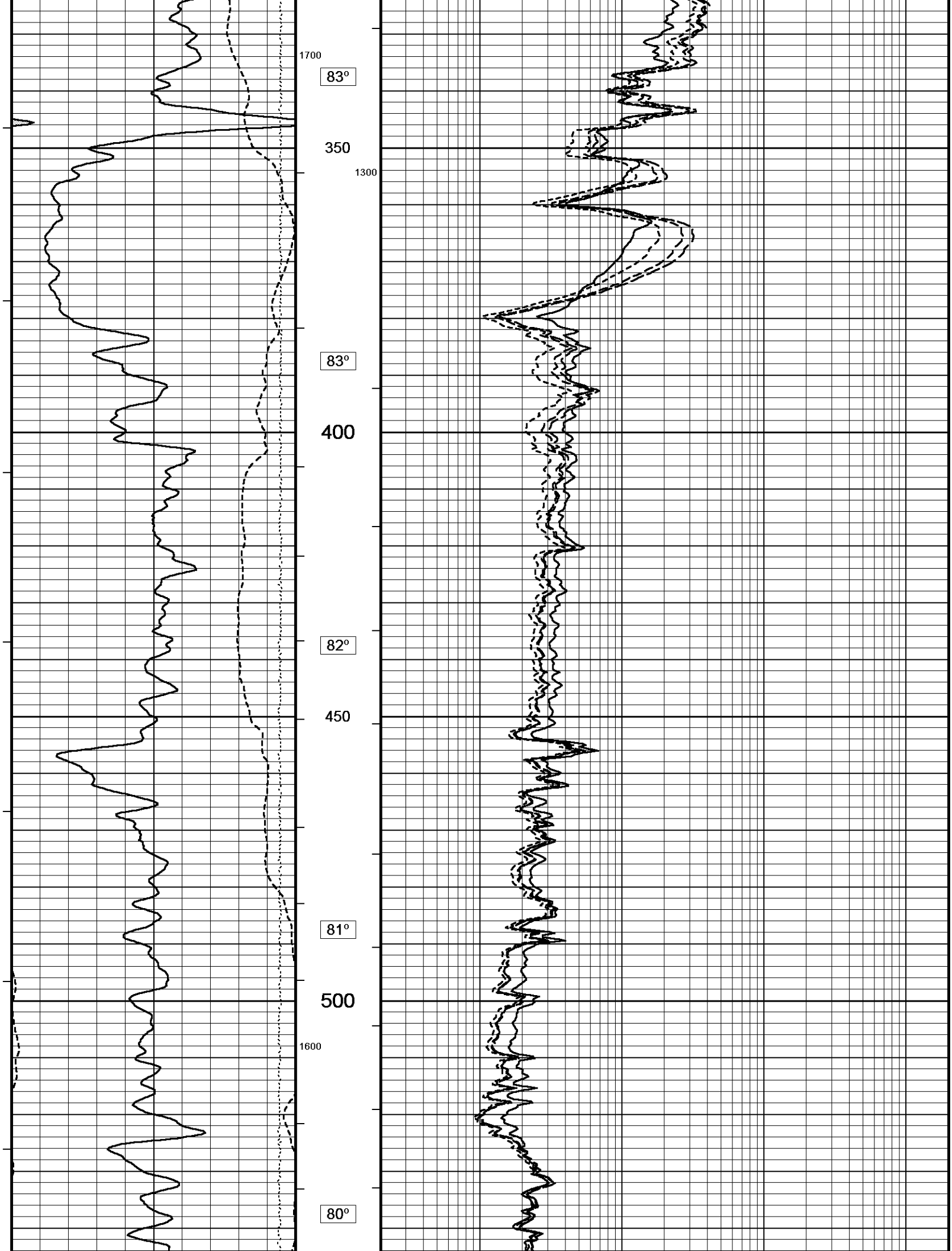
Casing Shoe

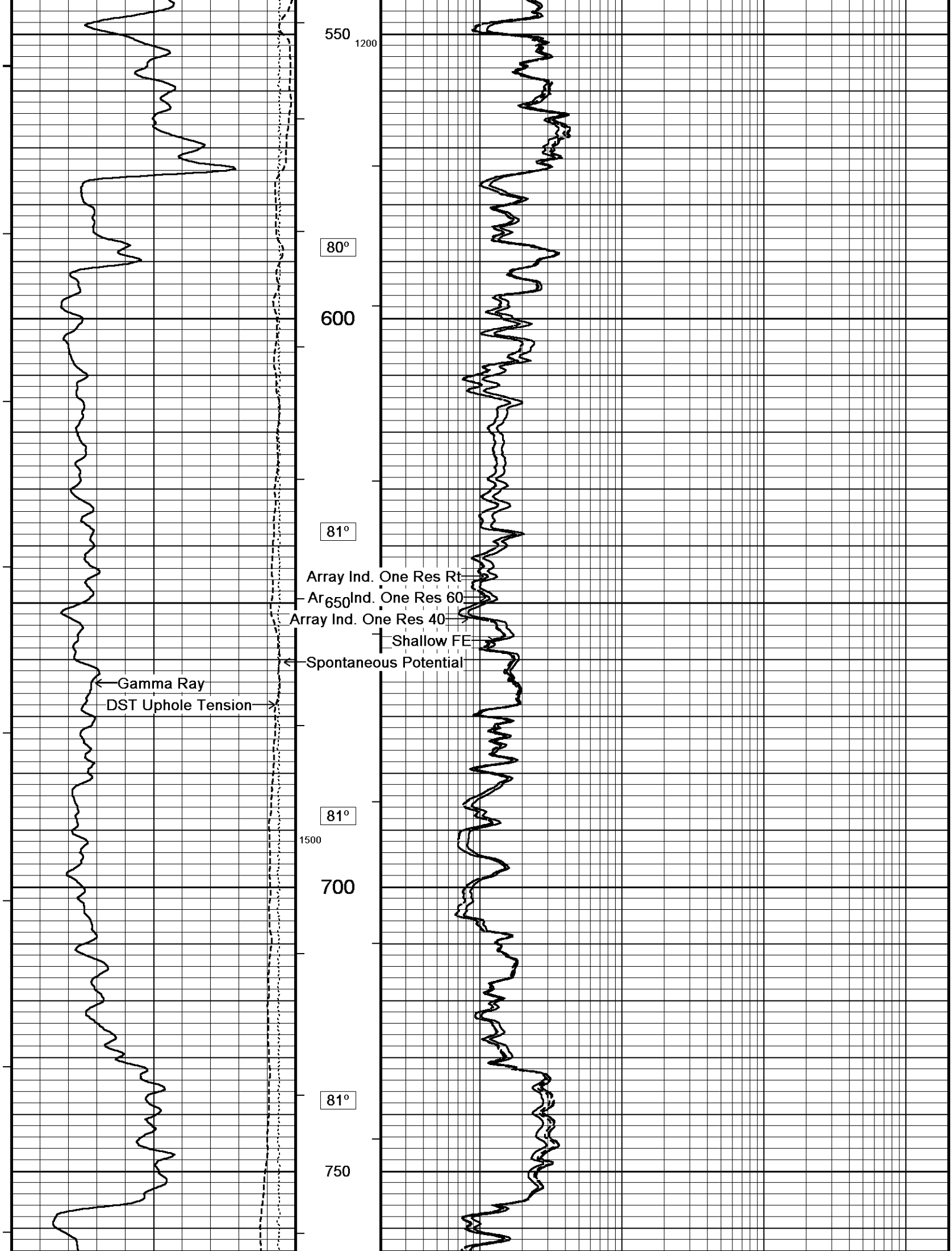
Spontaneous Potential

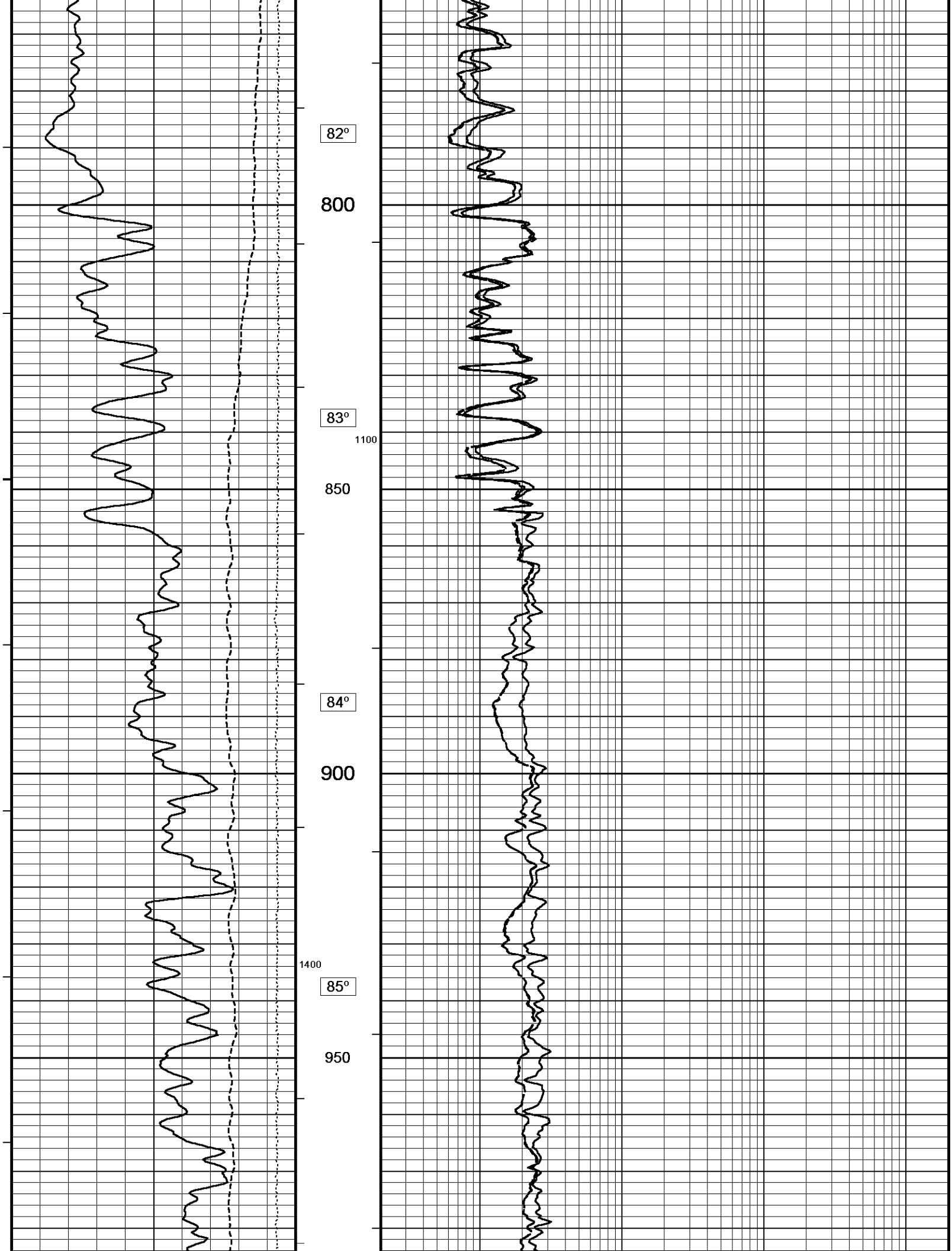
Gamma Ray

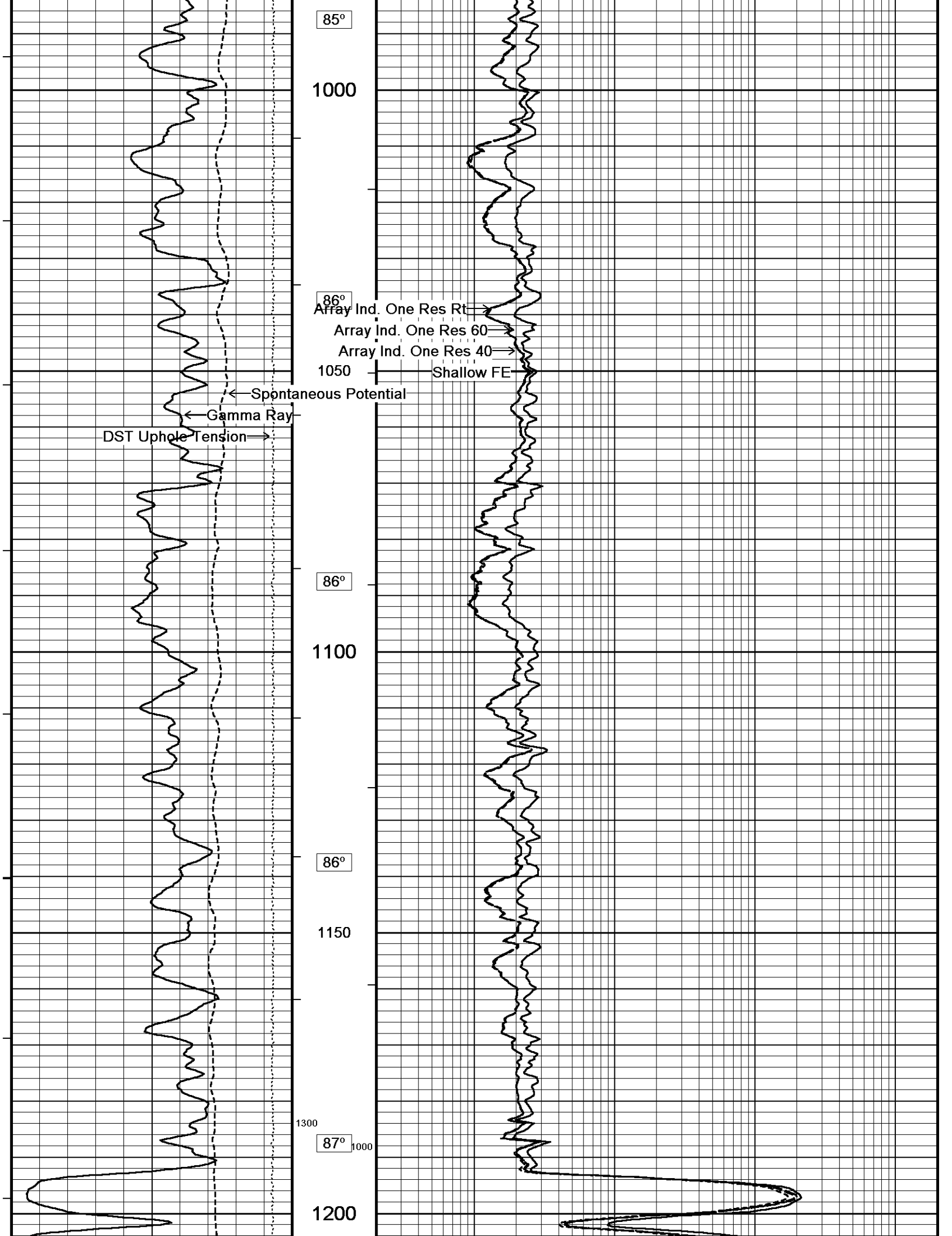
DST Uphole Tension

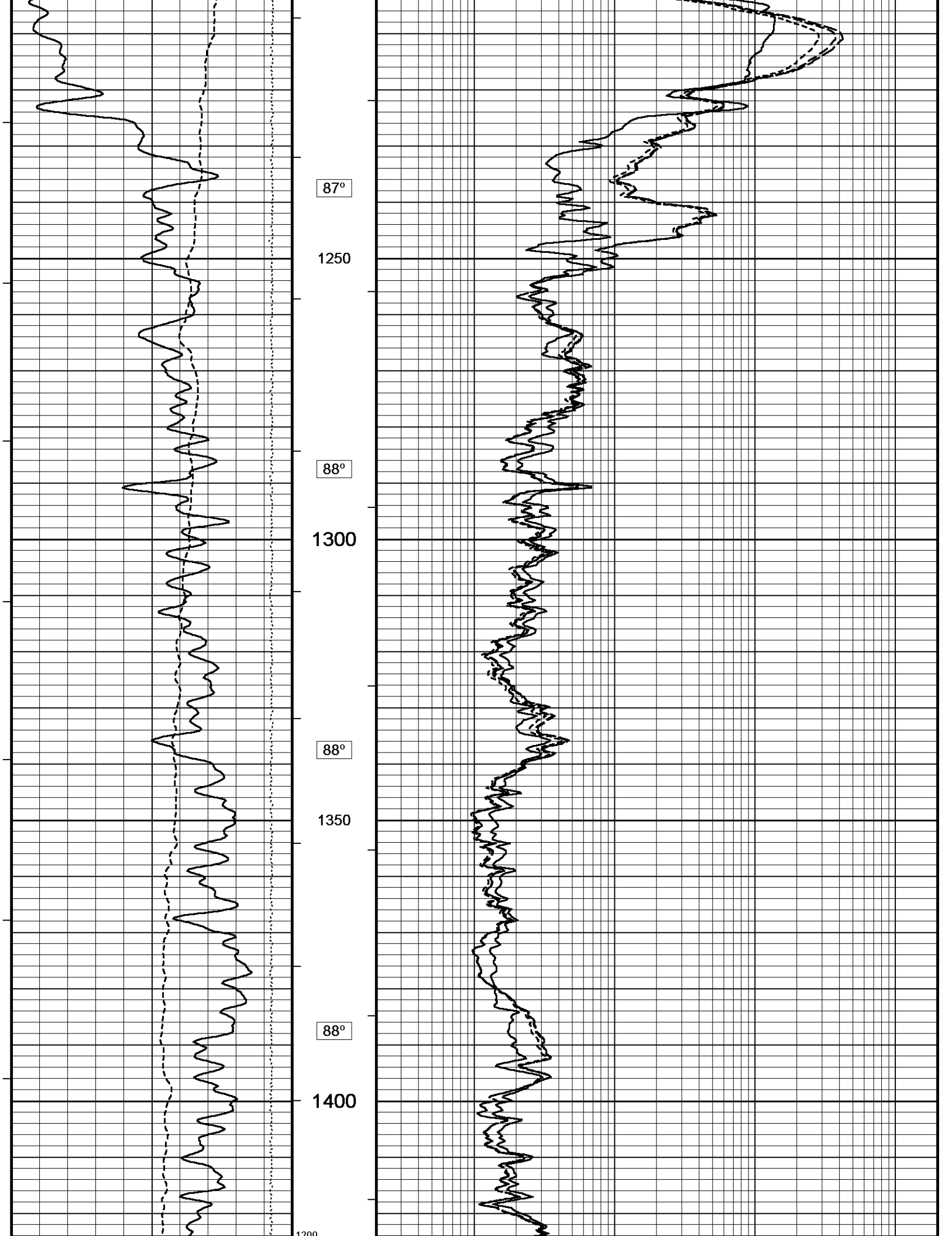
300

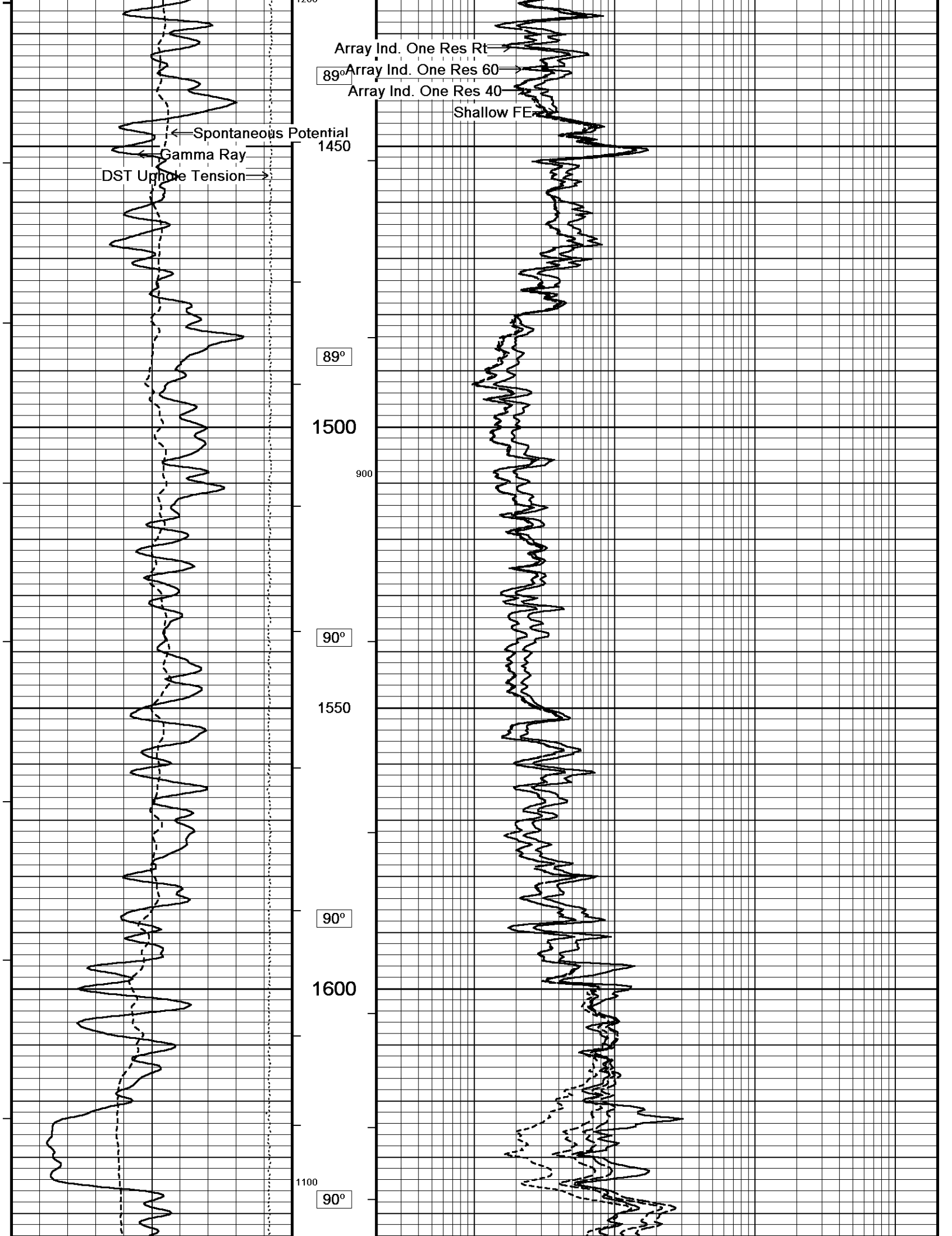

1700
83°
350
1300
83°
400
82°
450
81°
500
1600
80°

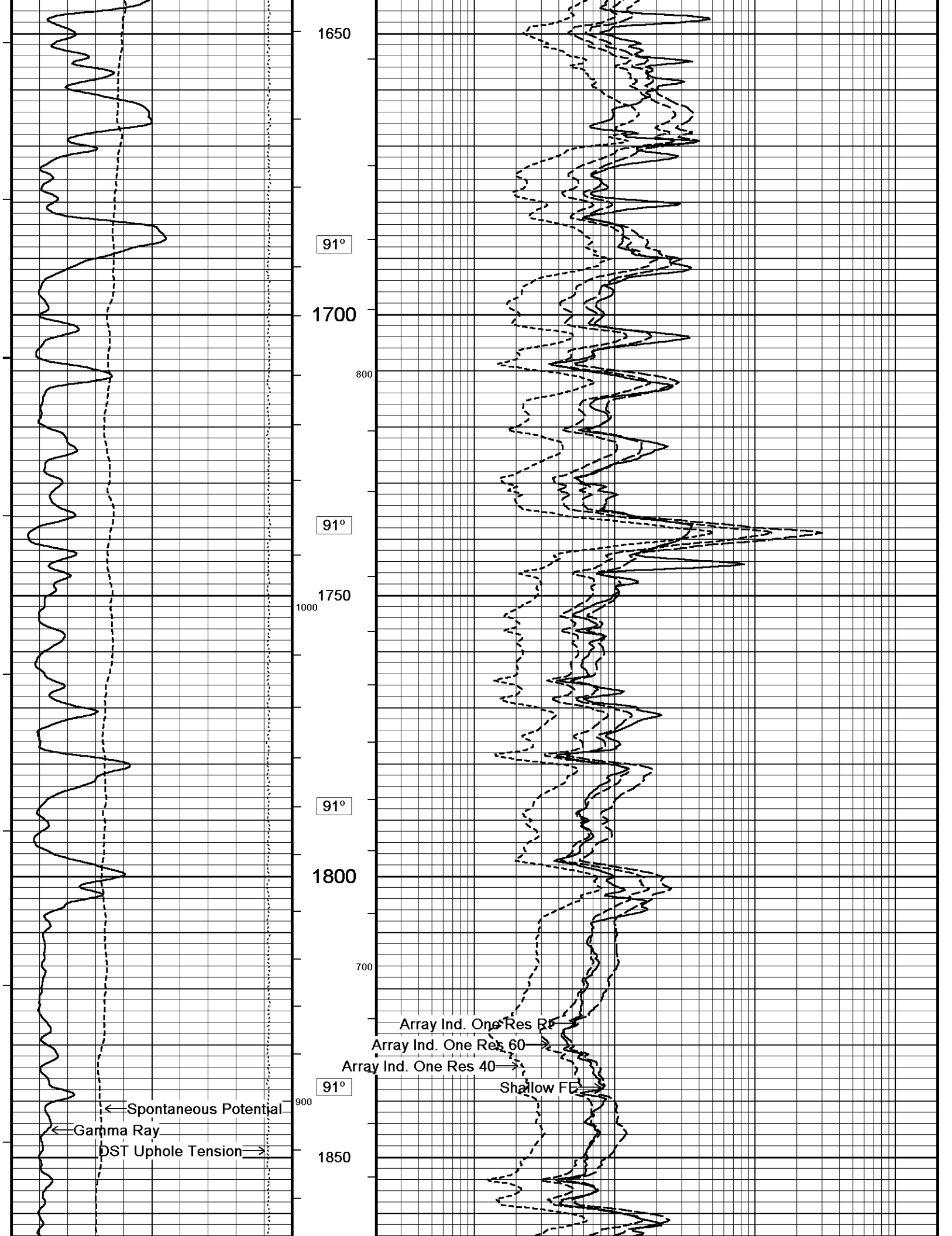

550
1200
80°
600
81°
Array Ind. One Res Rt
Ar
650
Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
81°
1500
700
81°
750

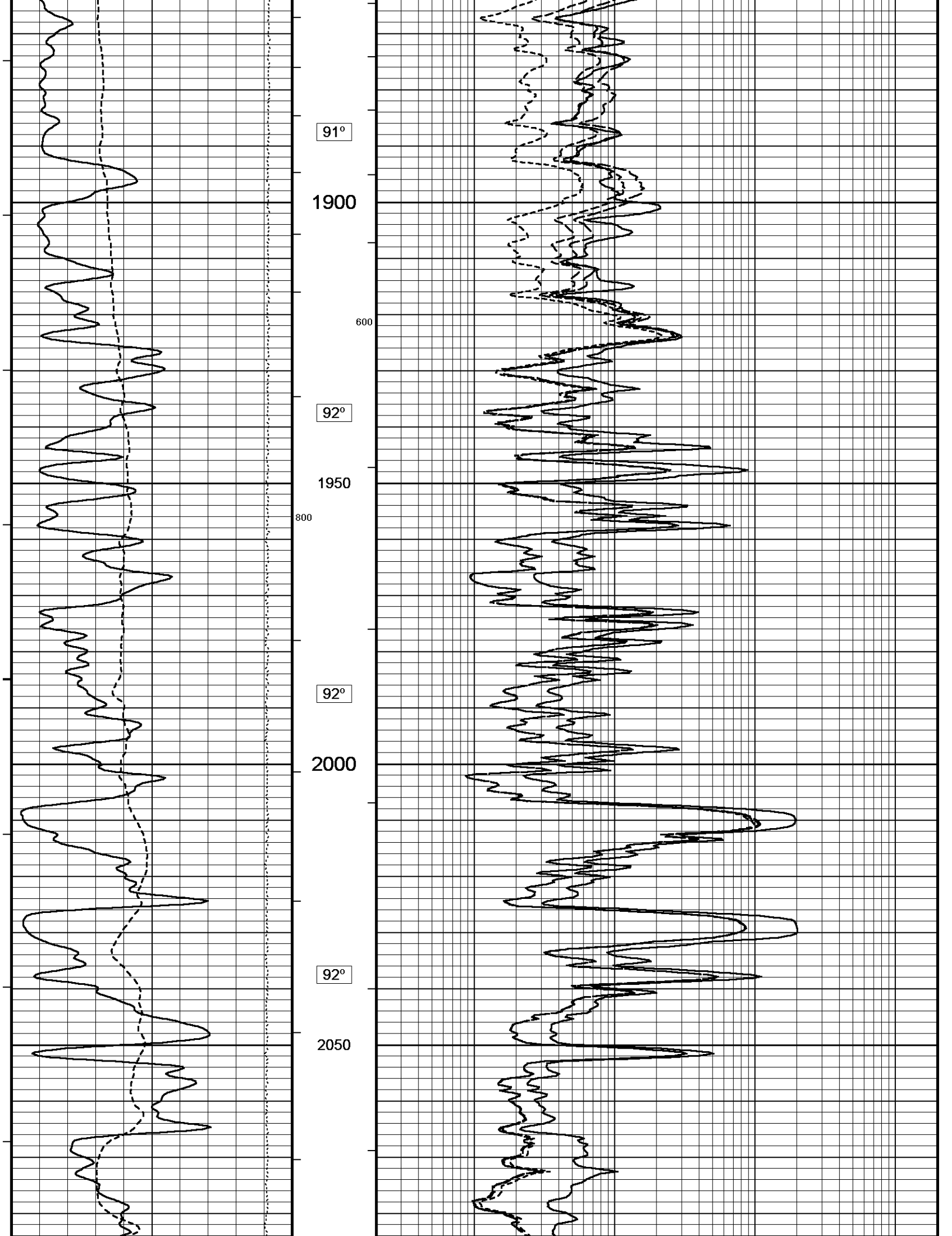

82°
800
83°
1100
850
84°
900
1400
85°
950

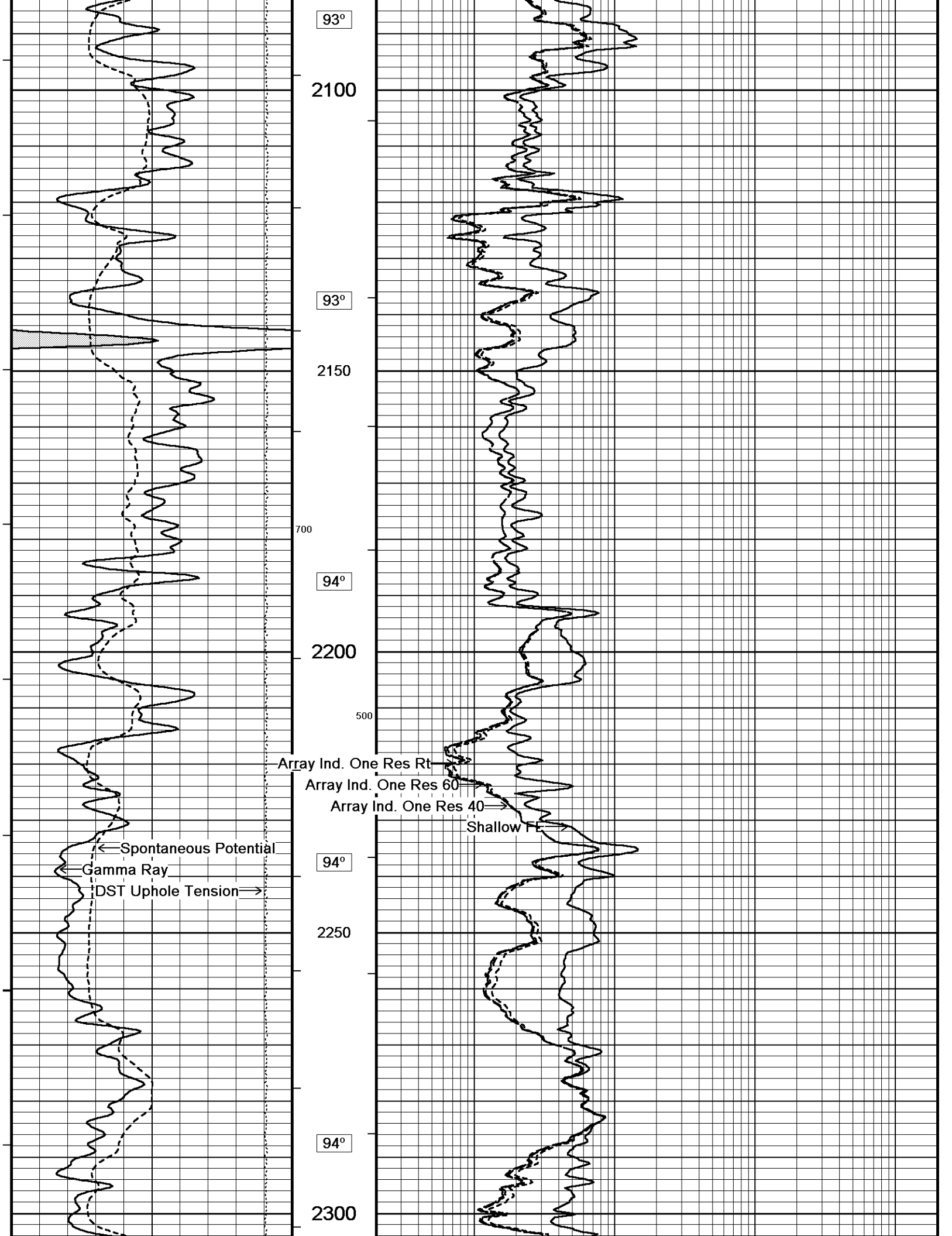

85°
1000
86°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
1050
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
86°
1100
86°
1150
1300
87°
1000
1200

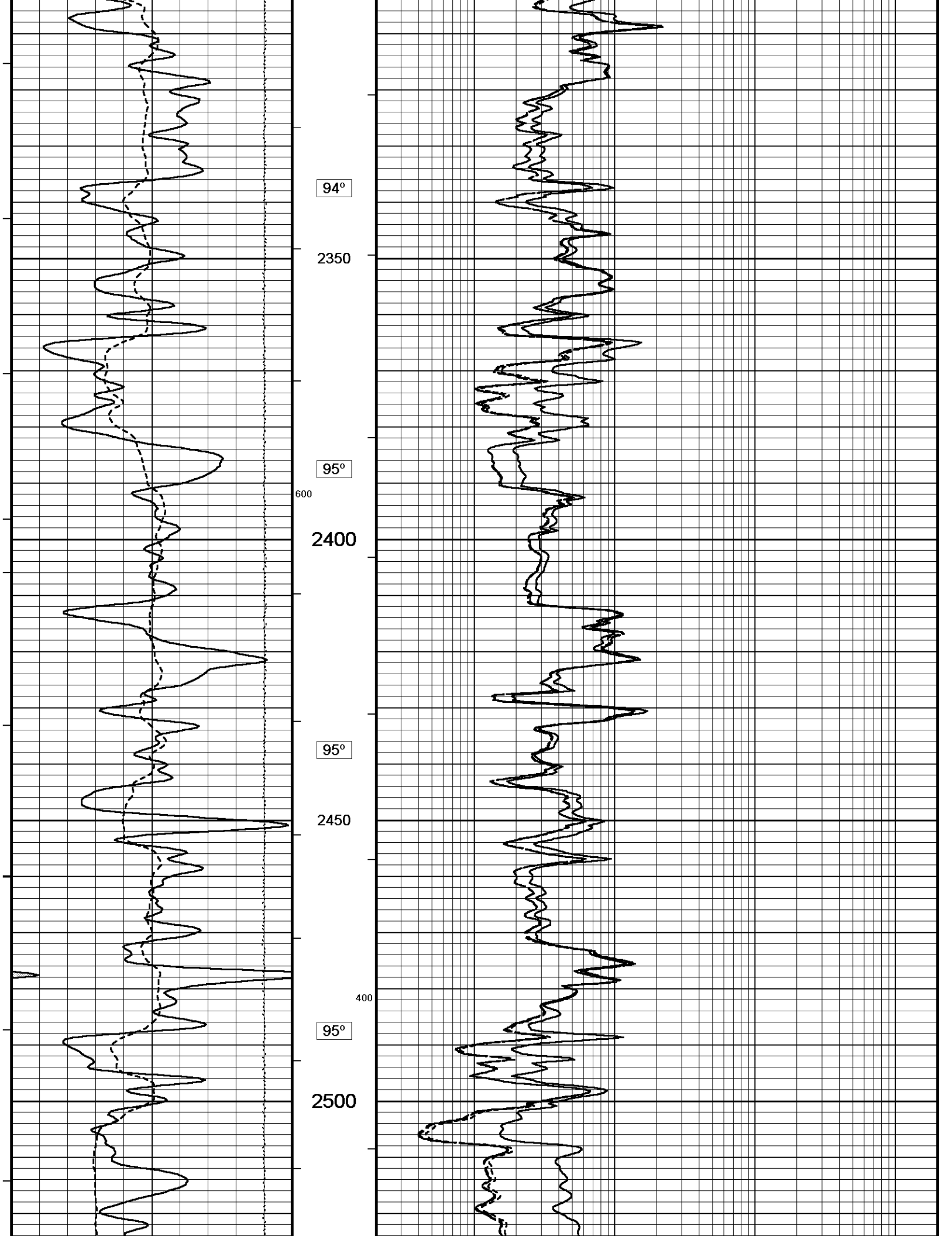

87°
1250
88°
1300
88°
1350
88°
1400
1200

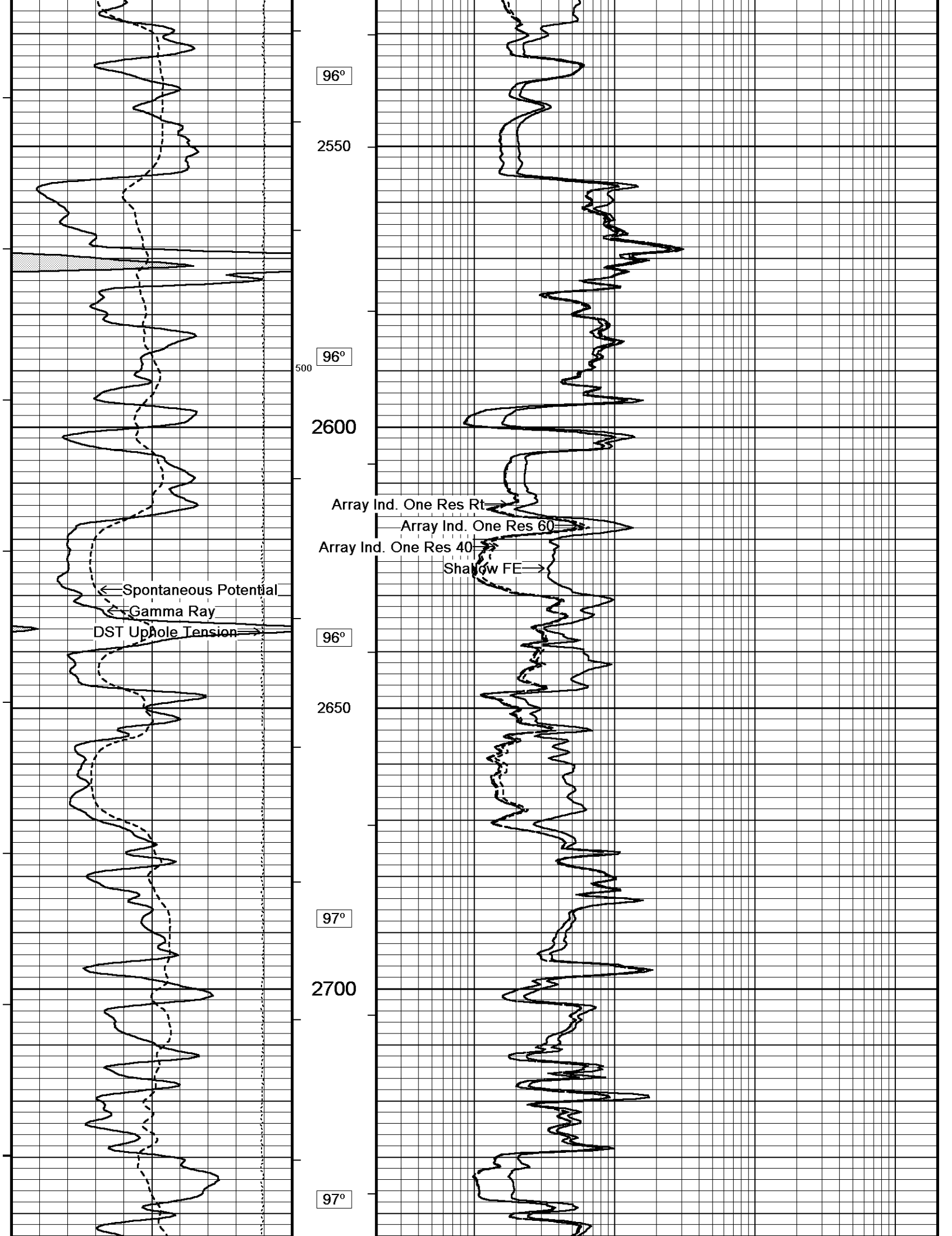

Array Ind. One Res Rt
89°
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
1450
89°
1500
900
90°
1550
90°
1600
1100
90°

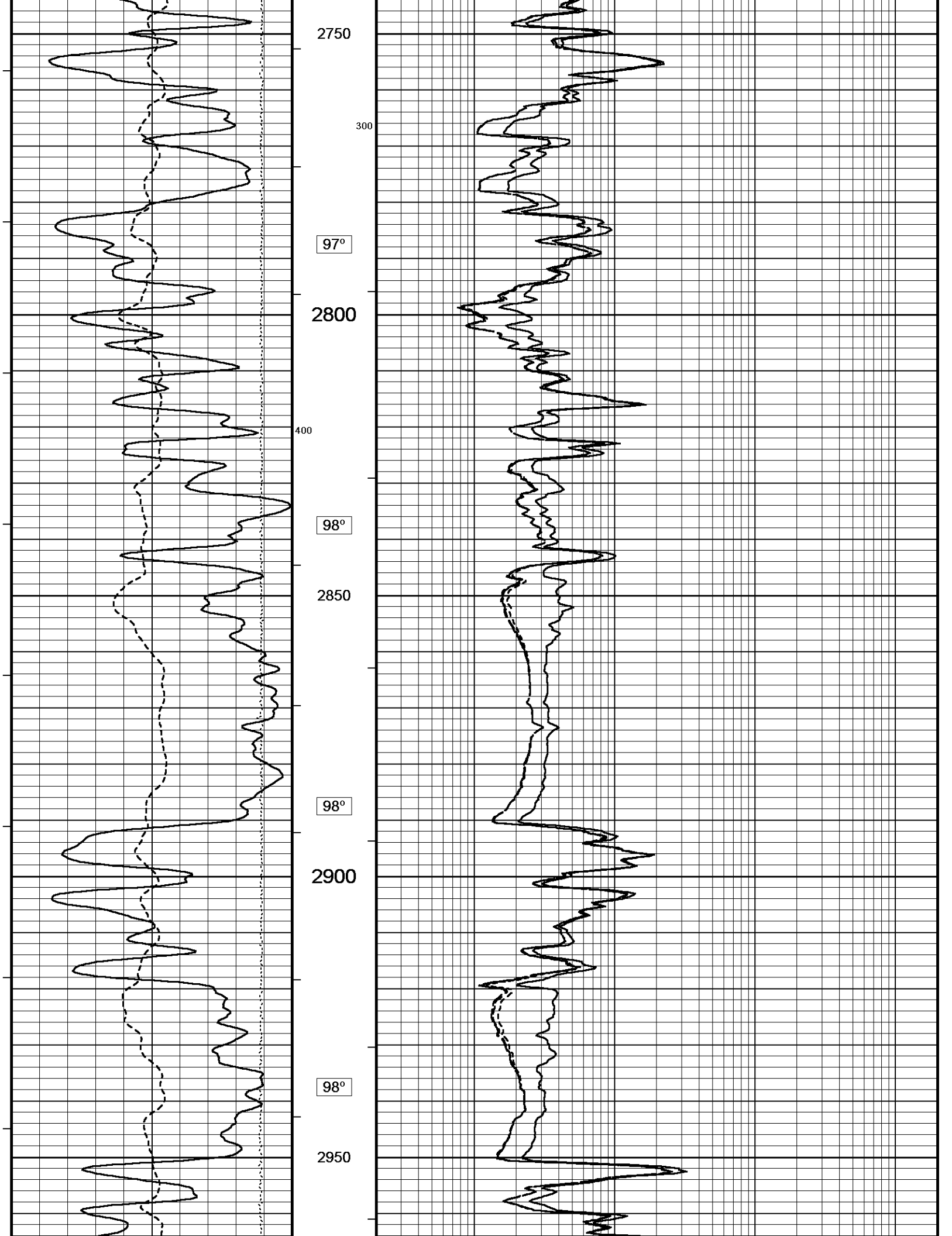

1650
91°
1700
800
91°
1000
1750
91°
1800
700
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
91°
900
1850
Spontaneous Potential
Gamma Ray
DST Uphole Tension

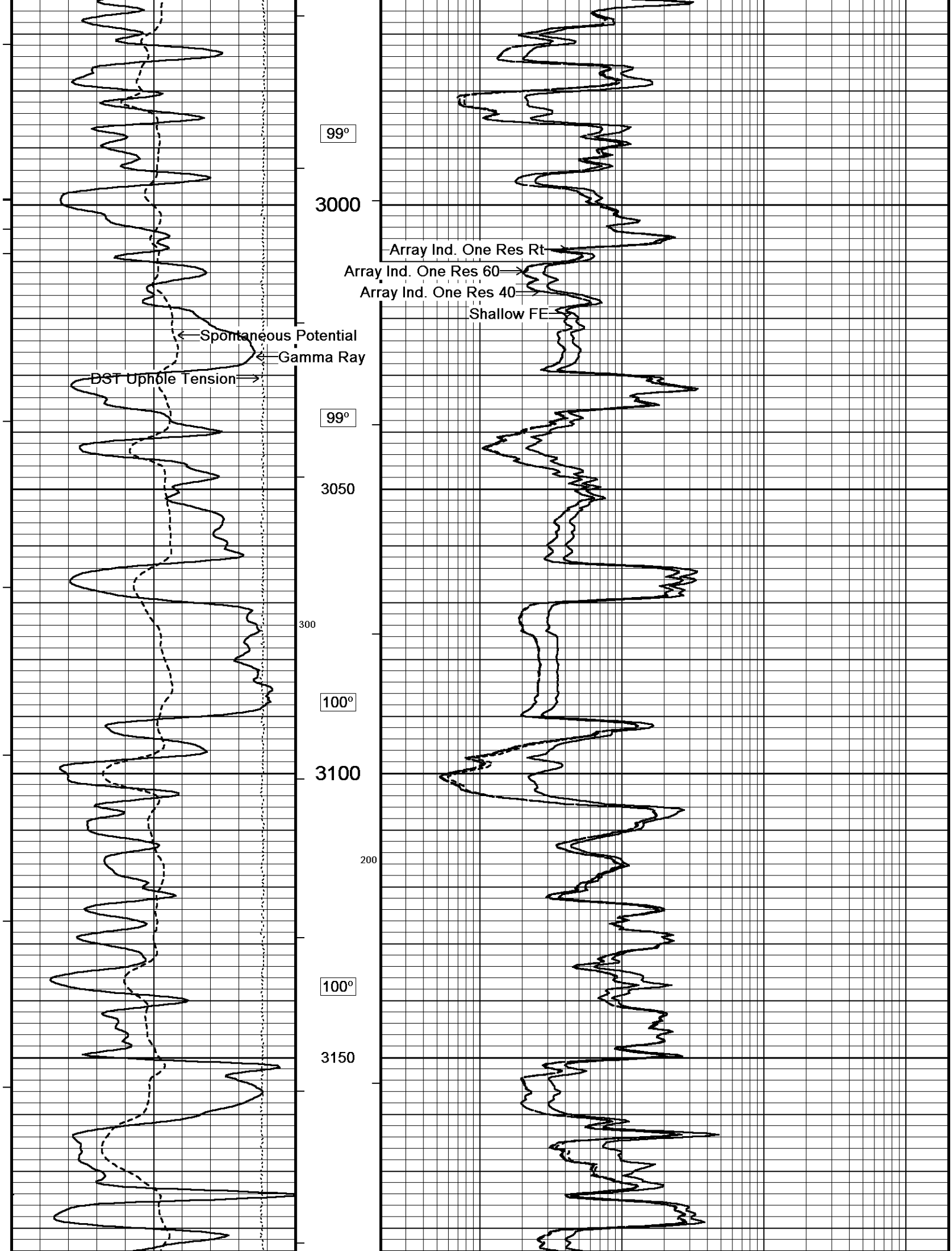

91°
1900
600
92°
1950
800
92°
2000
92°
2050

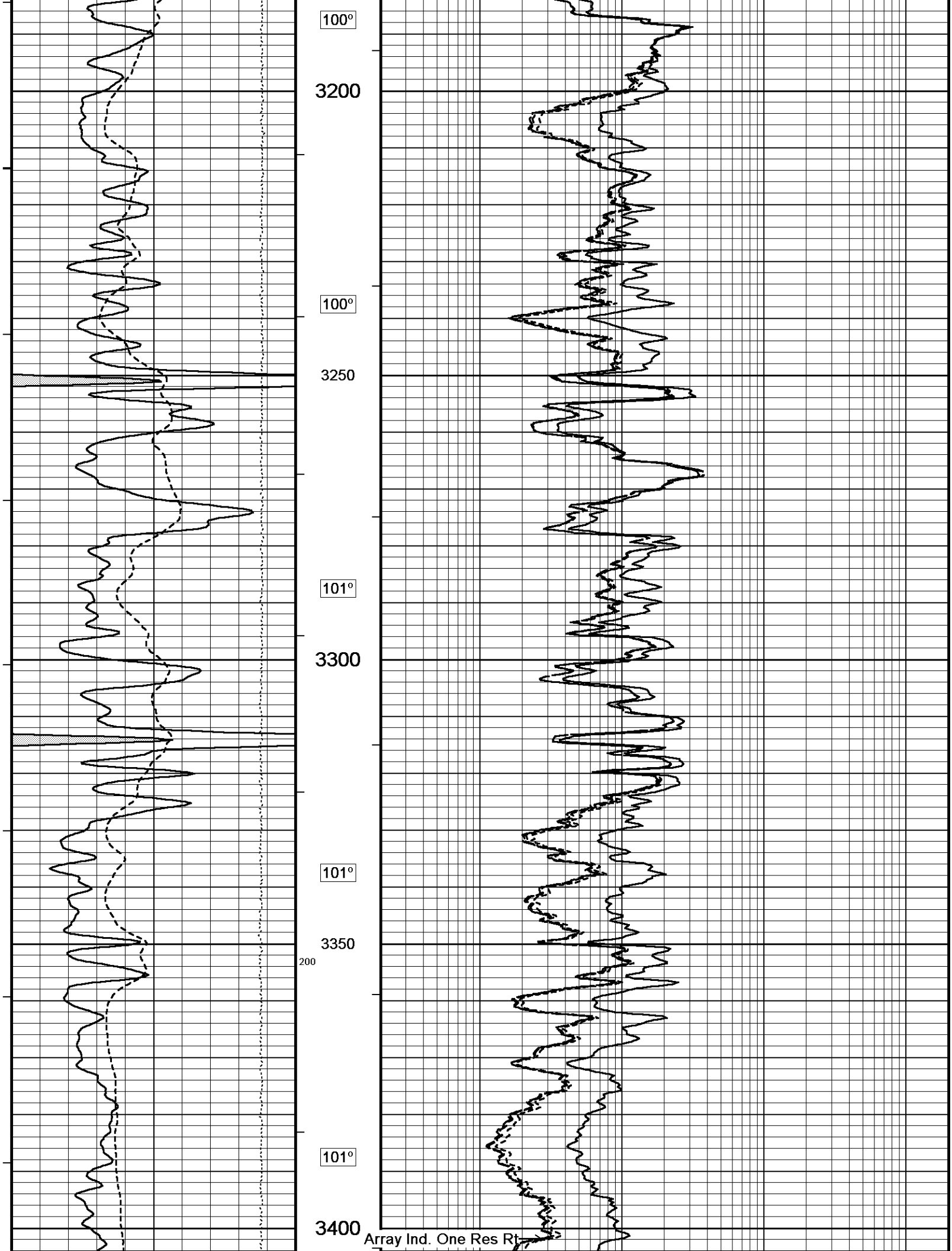

93°
2100
93°
2150
700
94°
2200
500
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
94°
2250
94°
2300

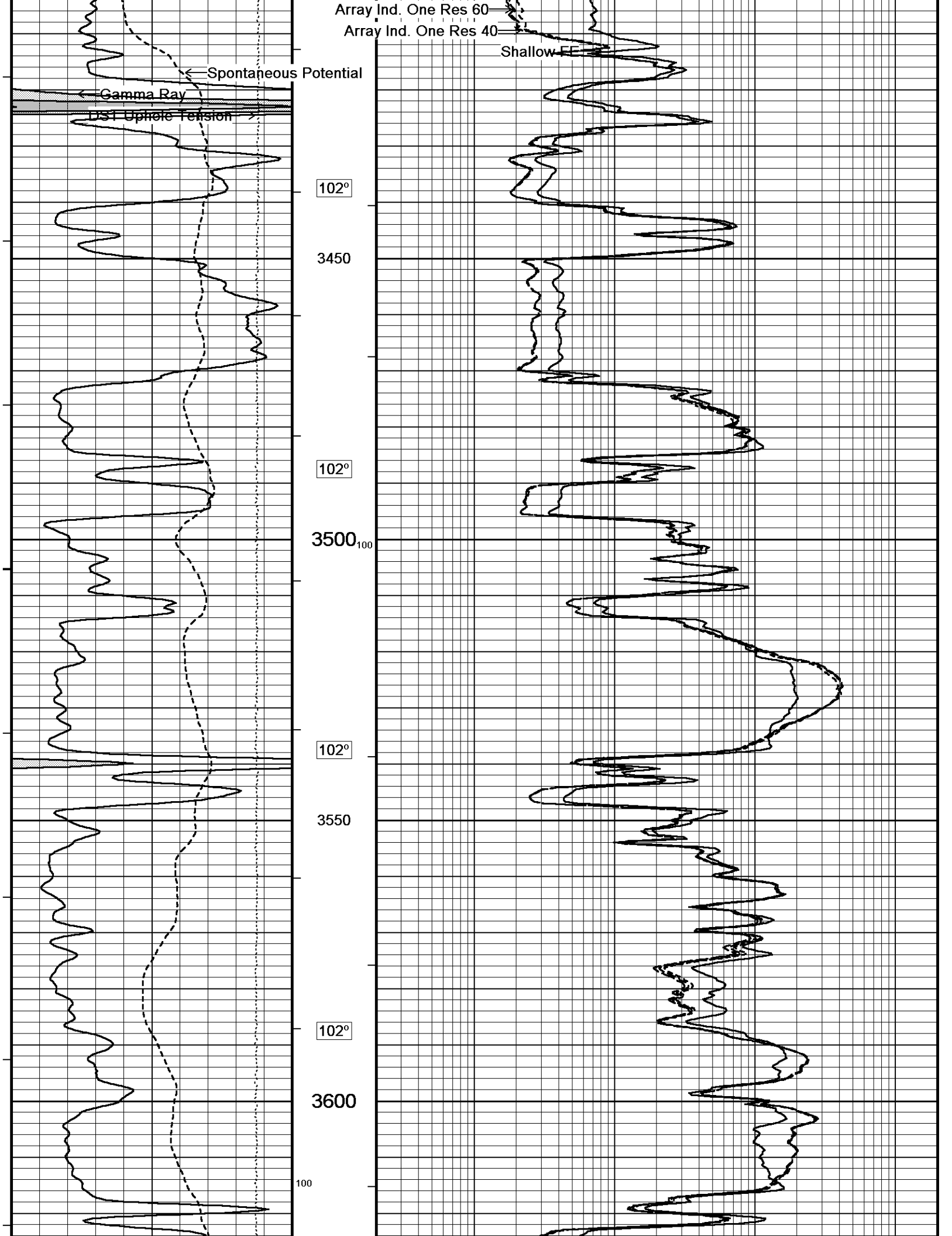

94°
2350
95°
600
2400
95°
2450
400
95°
2500

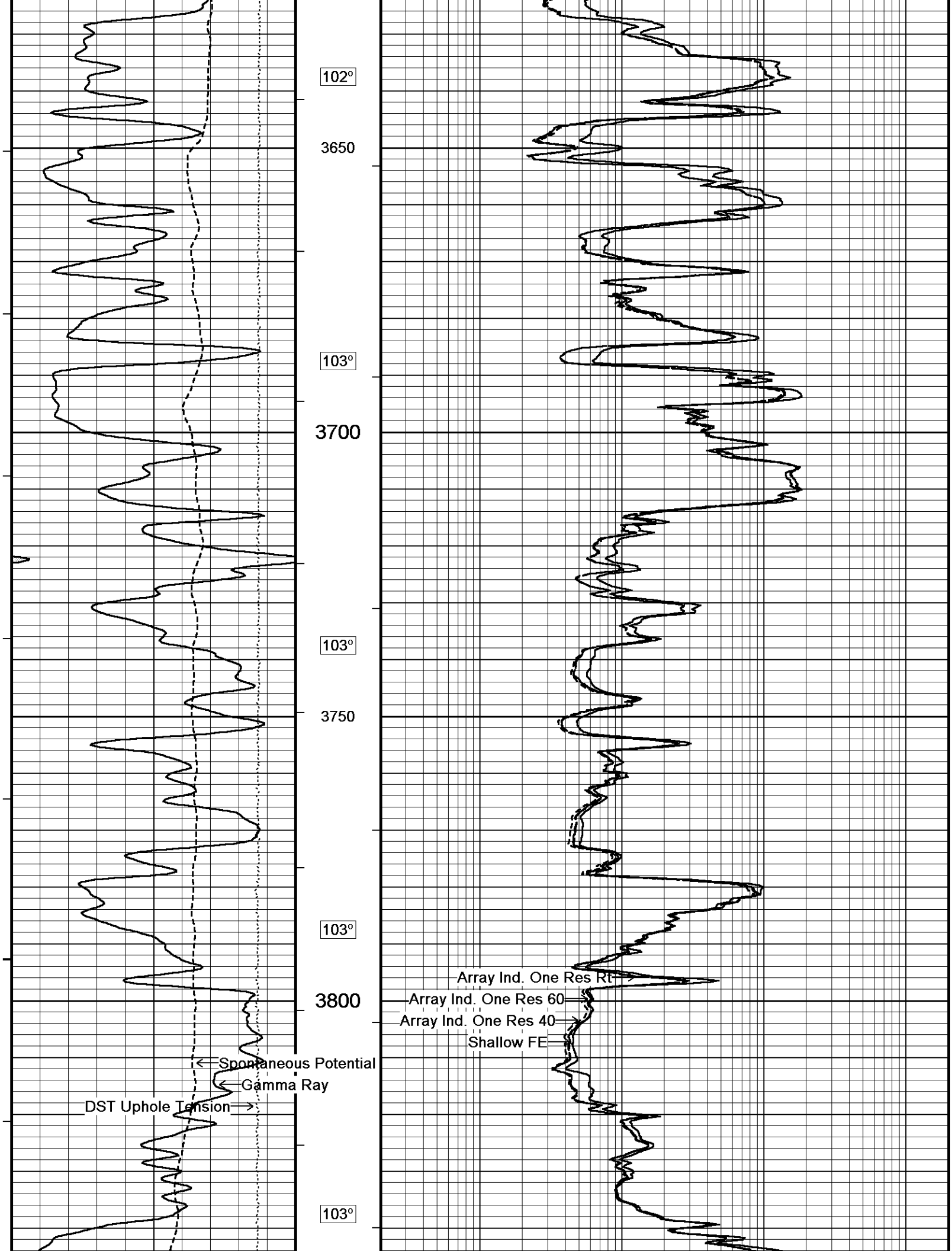

96°
2550
96°
500
2600
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST UpHole Tension
96°
2650
97°
2700
97°

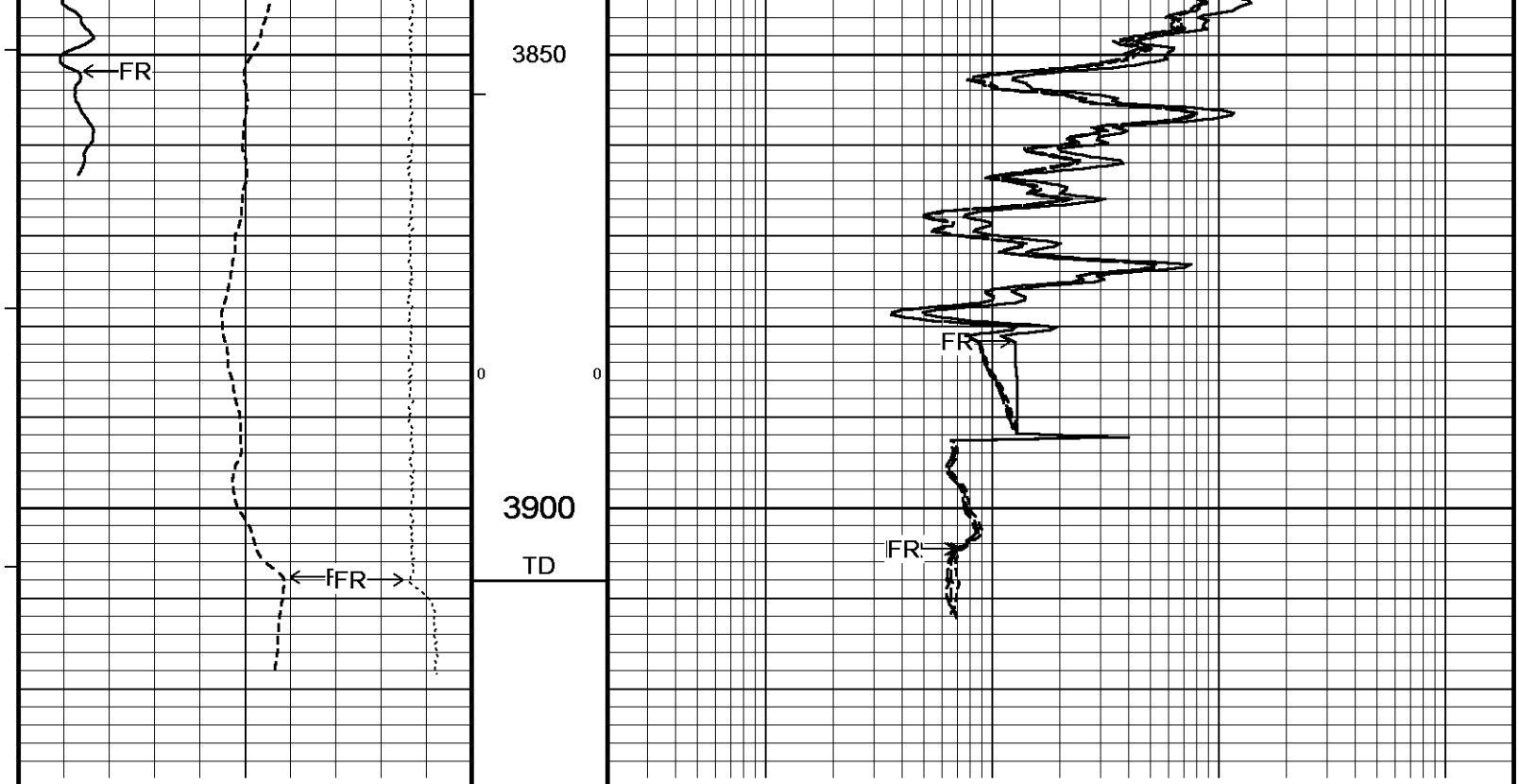

2750
300
97°
2800
400
98°
2850
98°
2900
98°
2950


99°
3000
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°
3050
300
100°
3100
200
100°
3150


100°
3200
100°
3250
101°
3300
101°
3350
200
101°
3400
Array Ind. One Res Rt


Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
102°
3450
102°
3500
100
102°
3550
102°
3600
100


102°
3650
103°
3700
103°
3750
103°
3800
103°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension



Depth In Feet

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

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

Shallow FE
ohm metres
0.20 1 10 100 2000

Array Ind. One Res 40
ohm metres
0.20 1 10 100 2000

Array Ind. One Res 60
ohm metres
0.20 1 10 100 2000

Array Ind. One Res Rt
ohm metres
0.20 1 10 100 2000

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 04-OCT-2016 18:58
Filename: C:\Minimus 15.03.5939\Logs\O'Brien (LA) Jecha 4 #2\O'Brien (LA) Jecha 4 #2_002.dta
Recorded on 04-OCT-2016 16:29
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5 INCH MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 04-OCT-2016 18:58

Filename: C:\Minimus 15.03.5939\Logs\O'Brien (LA) Jecha 4 #2\O'Brien (LA) Jecha 4 #2_001.dta Recorded on 04-OCT-2016 16:05
System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

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

Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

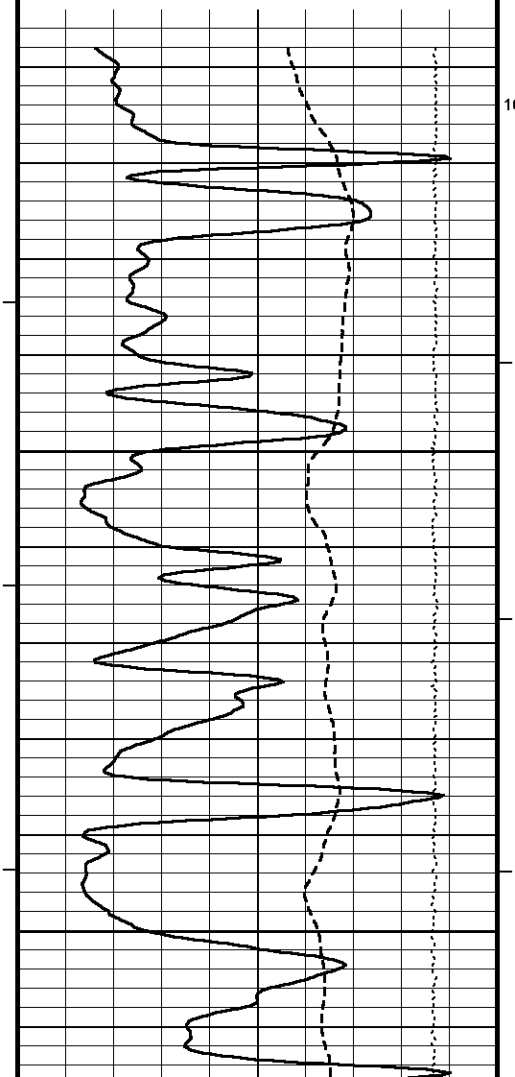
Shallow FE
ohm metres
0.20 2000
1 10 100 1000

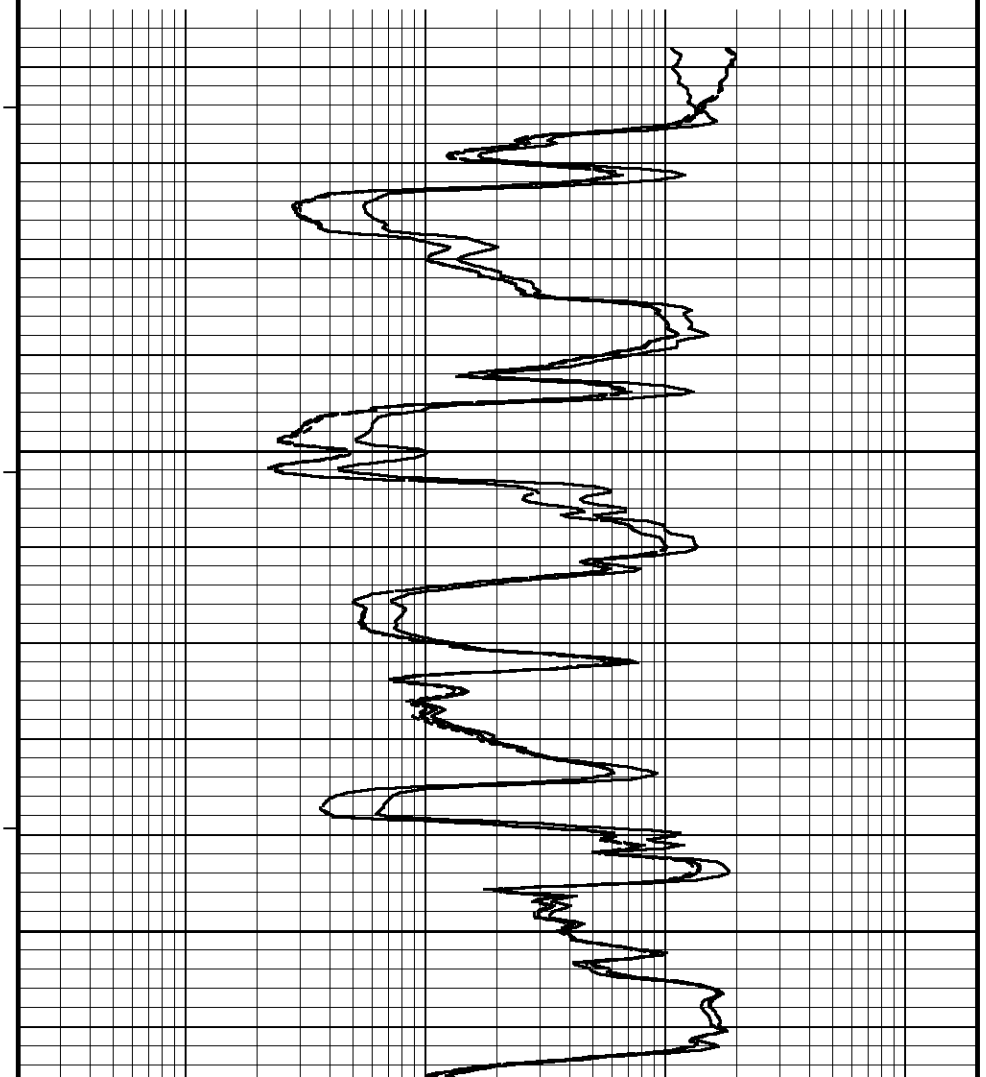
Array Ind. One Res 40
ohm metres
0.20 2000
1 10 100 1000

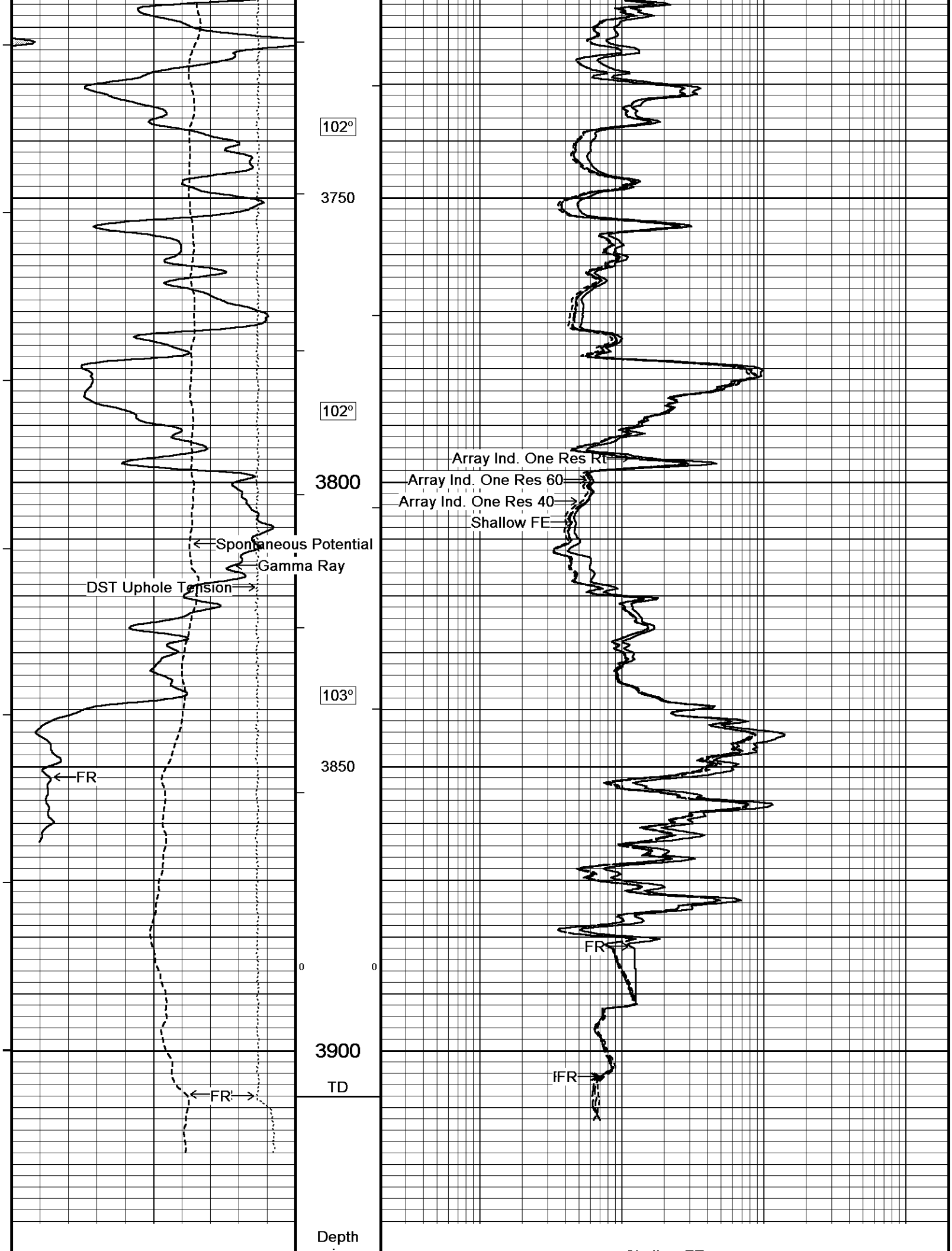
Array Ind. One Res 60
ohm metres
0.20 2000
1 10 100 1000

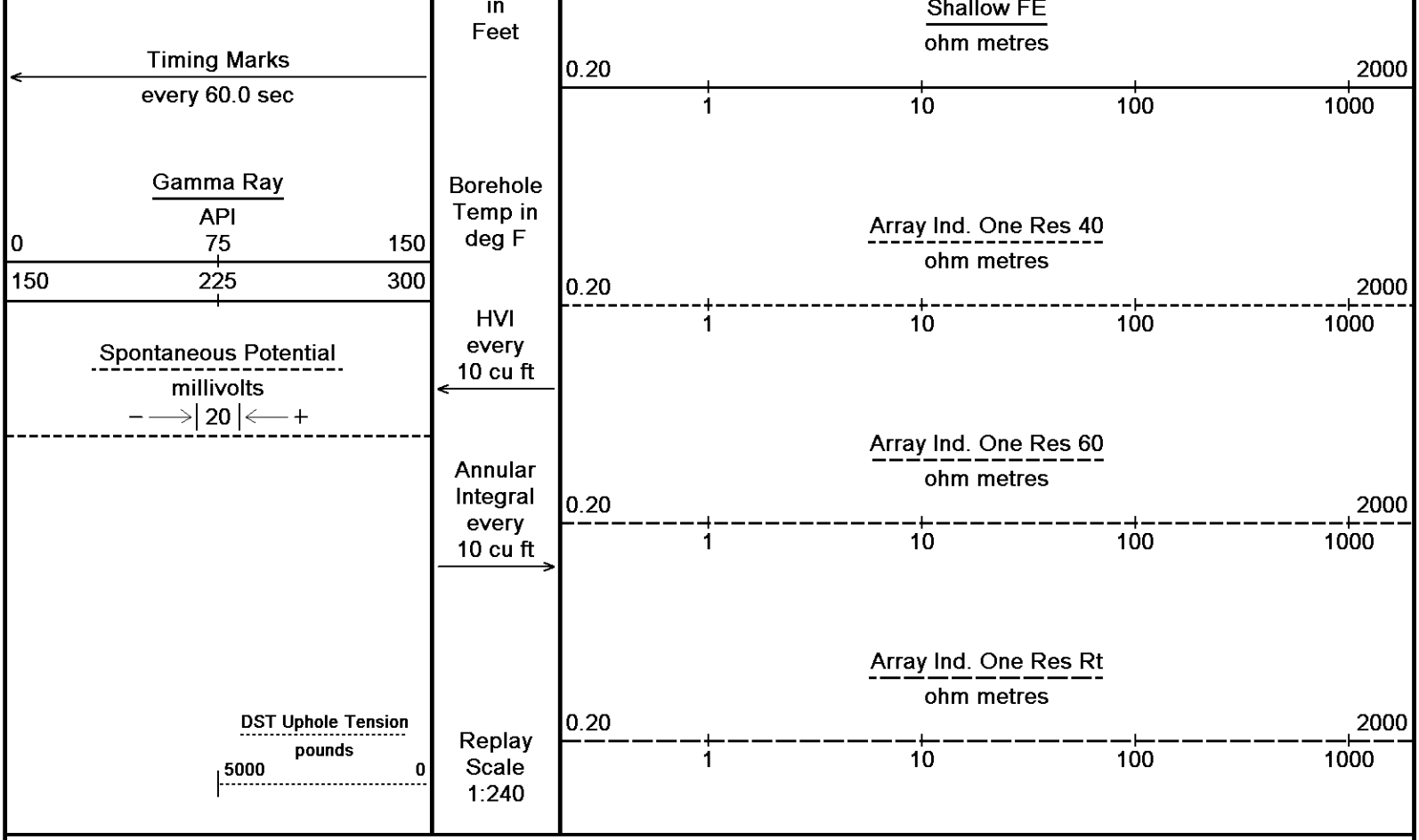
Array Ind. One Res Rt
ohm metres
0.20 2000
1 10 100 1000

3606
100
3650
102°
3700






102°
3750
102°
3800
103°
3850
0
0
3900
TD
Depth
Spontaneous Potential
Gamma Ray
DST Uphole Tension
FR
FR'
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
FR
IFR



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 04-OCT-2016 18:58

Filename: C:\Minimus 15.03.5939\Logs\O'Brien (LA) Jecha 4 #2\O'Brien (LA) Jecha 4 #2_001.dta — Recorded on 04-OCT-2016 16:05

System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 15.03.5939\Logs\O'Brien (LA) Jecha 4 #2\O'Brien (LA) Jecha 4 #2_001.dta

General Constants All 000

Last Edited on 04-OCT-2016,15:43

General Parameters		
Mud Resistivity	0.460	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	4.500	inches
Caliper for Differential Caliper	None	
Rwa Parameters		
Porosity used	Limestone Density Por.	
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 24-JUL-2016 15:20

Reading No	Measured	Calibrated (lbs)
1	15235.81	0.00
2	16026.61	481.00

Gamma Calibration MCG-C 123

Field Calibration on 04-OCT-2016 08:13

Field Calibration on 04-OCT-2016 08:13

	Measured	Calibrated (API)
Background	143	100
Calibrator (Gross)	795	556
Calibrator (Net)	652	456

Gamma Calibration Tolerances MCG-C 123

Ratio	1.431	1.40 1.475 1.55	Counts/API

Gamma Constants MCG-C 123

Last Edited on 04-OCT-2016,13:32

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.12	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-C 123

Field Calibration on 31-OCT-2015,17:05

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

High Resolution Temperature Constants MCG-C 123

Last Edited on 22-SEP-2015,11:43

Pre-filter Length	11

SP Calibration MCG-C 123

Field Calibration on 14-JUL-2016 12:06

	Measured	Calibrated (mV)
Reference 1	101.2	100.6
Reference 2	-99.1	-99.9

Micro Normal and Micro Inverse Calibration MMR-C.A 247

Base Calibration on 28-AUG-2016 19:13
Field Check on 04-OCT-2016 15:26

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	10.2	49.9	5.1	25.6
Micro Inverse	10.0	49.5	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	93.6	93.6
Micro Inverse	62.2	62.2

Micro Normal & Micro Inverse Calibration Tolerance MMR-C.A 247

Micro Normal Res. 1	10.2	-5% 10.0 +5%	ohm	Micro Normal Res. 2	49.9	-5% 50.0 +5% ohm
Micro Inverse Res. 1	10.0	-5% 10.0 +5%	ohm	Micro Inverse Res. 2	49.5	-5% 50.0 +5% ohm
Micro Normal Base Check	93.6	-2% 93.19 +2%	ohm-m			
Micro Inverse Base Check	62.2	-2% 62.11 +2%	ohm-m			
Micro Normal Field Check	93.6	-2% 93.6 +2%	ohm-m			
Micro Inverse Field Check	62.2	-2% 62.2 +2%	ohm-m			

Micro Normal and Micro Inverse Constants MMR-C.A 247

Last Edited on 26-JUN-2016,15:44

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	0.0000	inches

Caliper Calibration MMR-C.A 247

Base Calibration on 28-AUG-2016 19:08
Field Calibration on 04-OCT-2016 15:24

Base Calibration

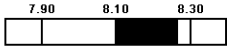
Reading No	Measured	Calibrator Size (in)

1	14869	5.98
2	18207	7.97
3	21411	9.86
4	25389	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.27	8.10

Caliper Calibration Tolerances MMR-C.A 247

Short Arm Field Cal. 8.27 

in

Micro-Resistivity Caliper Constants MMR-C.A 247

Last Edited on

Sonde Configuration Resistivity Mode

Neutron Calibration MDN-A.B 66

Base Calibration on 22-MAY-2016,18:15
Field Check on 04-OCT-2016 08:22

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3116	97	3714	110
Ratio	32.277		33.764	

Field Calibrator at Base

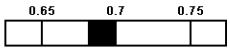
	Calibrated (cps)	
	2061	3028
Ratio	0.681	

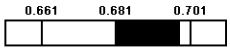
Field Check

	Calibrated (cps)	
	2167	3105
Ratio	0.698	

Neutron Calibration Tolerances MDN-A.B 66

Ratio 32.277 

Base Check 0.681 

Field Check 0.698 

Neutron Constants MDN-A.B 66

Last Edited on 04-OCT-2016,13:32

Neutron Source Id	P0204NN	
Neutron Jig Number	NJ5736	
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 352

Base Calibration on 28-AUG-2016 18:58
Field Check on 04-OCT-2016 15:05

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.3	126.8

Base Check	281.3
Field Check	281.4

FE Calibration Tolerances MFE-B.J 352

Reference 2	963.3	-3% 980.0 +3%	ohm
Base Check	281.3	-2% 277.0 +2%	ohm-m
Field Check	281.4	-2% 281.3 +2%	ohm-m

FE Constants MFE-B.J 352

Last Edited on 04-OCT-2016,15:04

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	

Sonic Constants MSS-A.A 55

Last Edited on 04-OCT-2016,13:31

Maximum Boundary Contrast	100.00	micro-sec/ft
Fluid Transit Time	189.00	micro-sec/ft
Limestone Transit Time	47.50	micro-sec/ft
Sandstone Transit Time	55.50	micro-sec/ft
Dolomite Transit Time	43.50	micro-sec/ft
Sonic used for Porosities	3-5' Compensated Sonic	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	N/A	micro-sec
MX3FT	N/A	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft
Sonde Mode	Compensated	
Hole Type	Open Hole	

Sonde Parameters

	Measured	Calibrated
Offset	N/A	0.0000
Free Pipe	N/A	N/A

Peak Amplitude Source: N/A

Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)
3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A

Processed Fixed Gate Parameters

Waveform Used For Processing: N/A

Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	N/A
N/A	N/A	N/A	
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	

Full Waveform Parameters

Use 3' Waveform to derive TR	N/A	
Use 4' Waveform to derive TR	N/A	
Use 5' Waveform to derive TR	N/A	
Use 6' Waveform to derive TR	N/A	
3' Waveform Discriminator Level	N/A	mV

4' Waveform Discriminator Level	N/A	mV
5' Waveform Discriminator Level	N/A	mV
6' Waveform Discriminator Level	N/A	mV
3' Waveform Filter	N/A	
4' Waveform Filter	N/A	
5' Waveform Filter	N/A	
6' Waveform Filter	N/A	
Semblance Level	N/A	
Semblance Window Width	N/A	micro-sec
Sonic 1 Despiker	N/A	N/A
Sonic 2 Despiker	N/A	N/A

Induction Calibration MAI-A.A 111

Base Calibration on 05-AUG-2014,09:34
Field Check on 04-OCT-2016 15:23

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) 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 22-MAY-2016,17:59

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High
1	12.1	3873.0	15.9	3871.4
2	29.8	3528.1	32.3	3525.6
3	29.1	3021.3	31.1	3019.0
4	19.1	2058.5	20.5	2056.8
Deep	17.7	1962.1	19.1	1960.6
Medium	43.1	3976.4	45.6	3973.2
Shallow	44.4	5232.7	48.1	5229.1
Array Temperature	65.8		86.7	Deg F

Induction Calibration Tolerances MAI-A.A 111

Low Conductivity 1	17.6	13.0 17.0 21.0	mmho/m	High Conductivity 1	473.6	430.0 475.0 520.0 mmho/m
Low Conductivity 2	6.4	4.5 6.0 7.5	mmho/m	High Conductivity 2	385.9	345.0 385.0 425.0 mmho/m
Low Conductivity 3	3.2	1.0 3.5 6.0	mmho/m	High Conductivity 3	264.0	240.0 260.0 280.0 mmho/m
Low Conductivity 4	2.1	0.0 2.0 4.0	mmho/m	High Conductivity 4	135.5	120.0 135.0 150.0 mmho/m
Background Vx 1	0.0	-110.0 -32.5 45.0	mmho/m	Phase Check Loop 1	0.0	-2.0 0.0 2.0 %
Background Vx 2	0.0	-35.0 20.0 75.0	mmho/m	Phase Check Loop 2	0.0	-2.0 0.0 2.0 %
Background Vx 3	0.0	-60.0 2.5 65.0	mmho/m	Phase Check Loop 3	0.0	-2.0 0.0 2.0 %
Background Vx 4	0.0	-50.0 -17.5 15.0	mmho/m	Phase Check Loop 4	0.0	-2.0 0.0 2.0 %

Induction Constants MAI-A.A 111

Last Edited on 04-OCT-2016,15:21

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.	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

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	

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

Photo Density Calibration MPD-B 104

Base Calibration on 28-AUG-2016 20:24
Field Check on 04-OCT-2016 15:09

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1145	1339		
Reference 1	49665	24007	59556	30836
Reference 2	20032	2442	24941	2541

Field Check at Base

	1144.9	1338.6

Field Check

	1142.9	1322.6

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	211	1021		
Reference 1	20773	49486	0.424	0.371
Reference 2	5807	19899	0.296	0.272

Field Check at Base

	211.3	1021.2

Field Check

	209.1	1022.7

Photo Density Calibration Tolerances MPD-B 104

Near Density Ratio 2.57 -5% 2.52 +5%

Far Density Ratio 20.54 -5% 21.00 +5%

Near Density Ratio	2.57	0.089 0.110 0.131	Far Density Ratio	20.54	
PE Calibration	0.119				
Near Den. Field Check	1142.9	-3% 1144.9 +3%	Far Den. Field Check	1322.6	-3% 1338.6 +3%
PE WS Field Check	209.1	-6% 211.3 +6%	PE WH Field Check	1022.7	-6% 1021.2 +6%

Density Constants MPD-B 104

Last Edited on 04-OCT-2016,15:09

Density Source Id	P50557B	
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	1.12	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

Caliper Calibration MPD-B 104

Base Calibration on 28-AUG-2016 19:51
Field Calibration on 04-OCT-2016 15:20

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13646	3.99
2	22688	5.98
3	31297	7.97
4	39521	9.86
5	48608	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.09	8.10

Caliper Calibration Tolerances MPD-B 104

Short Arm Field Cal.	8.09	7.90 8.10 8.30	in

DOWNHOLE EQUIPMENT

C:\Minimus 15.03.5939\Logs\O'Brien (LA) Jecha 4 #2\O'Brien (LA) Jecha 4 #2_001.dta

Cablehead, 11 pin
CBH-CA 176 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma
MCG-C 123 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity
MMR-C.A 247 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

56.02 ft	GRGC - MCG Gamma Ray
53.11 ft	CGXT - MCG External Temperature
46.76 ft	MBTC - MMR Caliper
45.76 ft	MINV - MMR MicroLog Inverse
45.76 ft	MNRL - MMR MicroLog Normal

Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

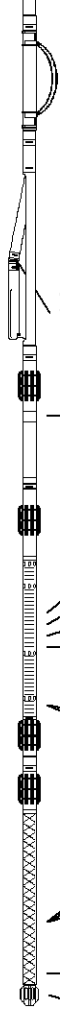
Compact Density/Caliper
MPD-B 104 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

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

Compact Sonic
MSS-A.A 55 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: 63.70 ft Weight: 480.6 lb



40.97 ft	NPRL - Limestone Neutron Por.
33.73 ft	AVOL - Annular Volume
33.73 ft	HVOL - Hole Volume
33.73 ft	CLDC - Density Caliper
31.80 ft	DPRL - Limestone Density Por.
31.80 ft	DCOR - Density Correction
31.74 ft	PDPE - PE
26.24 ft	FEFE - Shallow FE
16.96 ft	TR11 - 4' Transit Time
16.46 ft	TR21 - 3' Transit Time
15.95 ft	TR12 - 6' Transit Time
15.46 ft	TR22 - 5' Transit Time
12.96 ft	DT35 - 3-5' Compensated Sonic
12.96 ft	SPRL - Wyllie Lime. Sonic Por.
3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	RTAO - Array Ind. One Res Rt
3.34 ft	R60O - Array Ind. One Res 60
0.23 ft	SPCG - Spontaneous Potential
Tool Zero	(0.13ft from bottom)
-0.13 ft	SMTU - DST Uphole Tension

All measurements relative to tool zero.

COMPANY	O'BRIEN RESOURCES, LLC.
WELL	JECHA 4 #2
FIELD	WILDCAT
PROVINCE/COUNTY	RUSH
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2083.00	feet	First Reading	3905.00	feet
Elevation Drill Floor	2081.00	feet	Depth Driller	3907.00	feet
Elevation Ground Level	2070.00	feet	Depth Logger	3908.00	feet

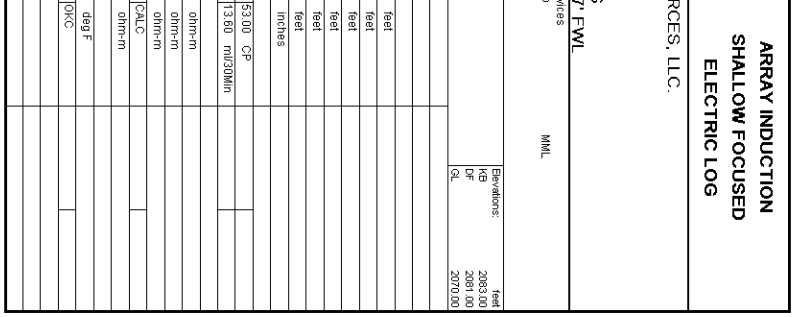
Weatherford®

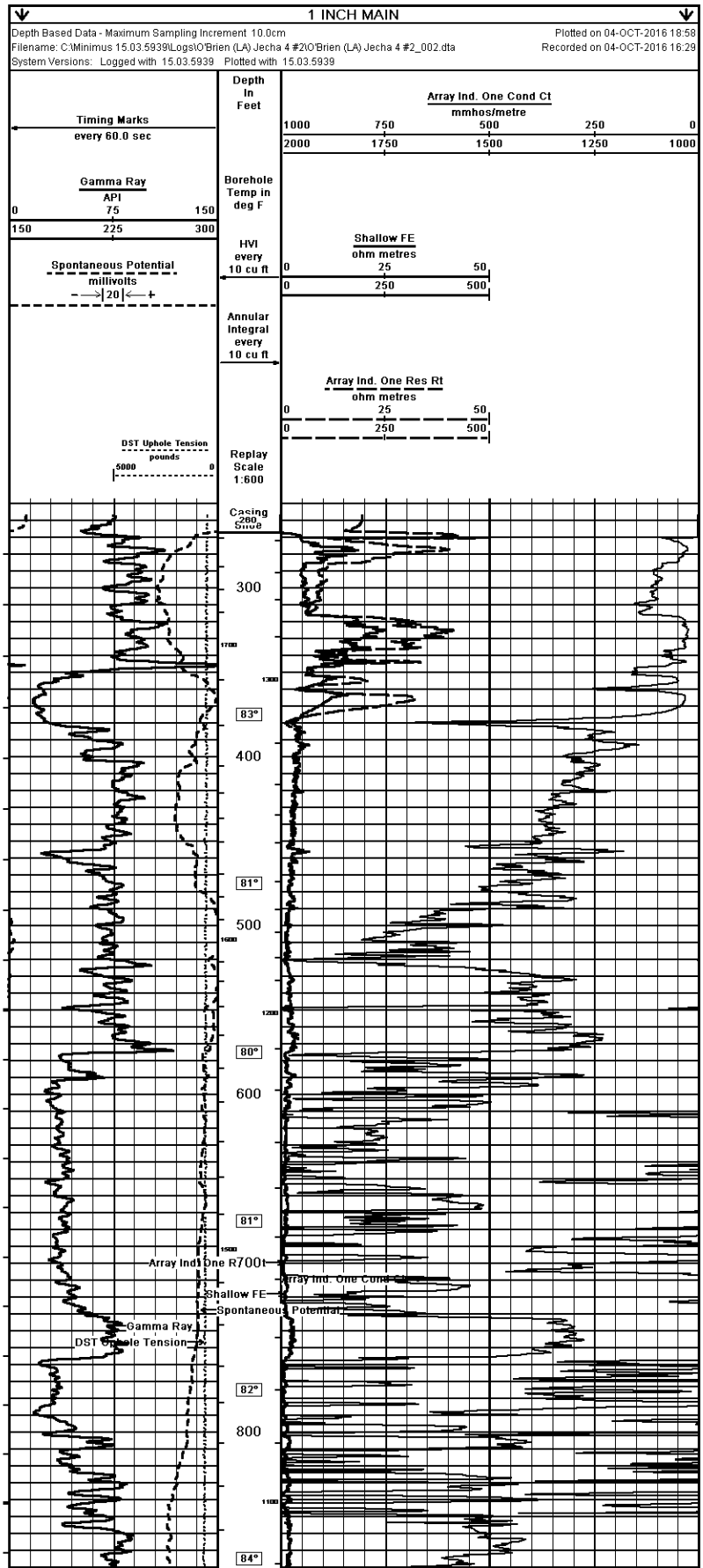
ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

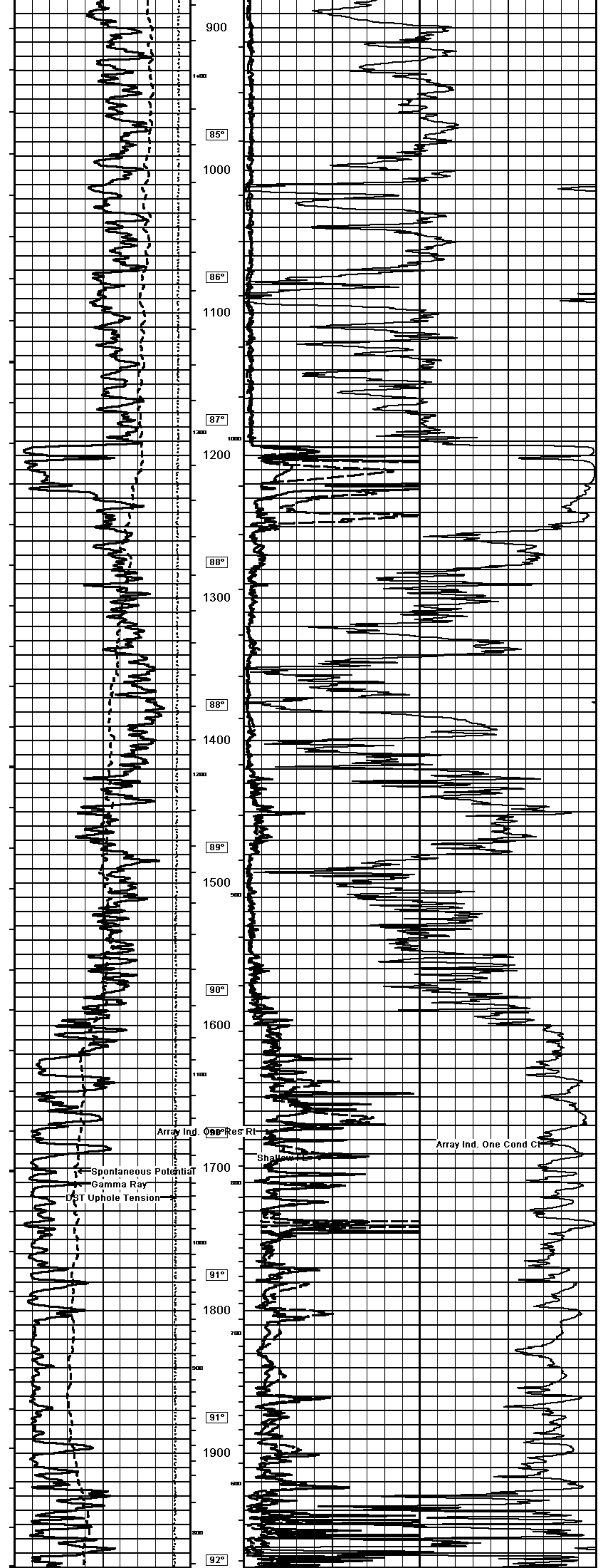
Weatherford

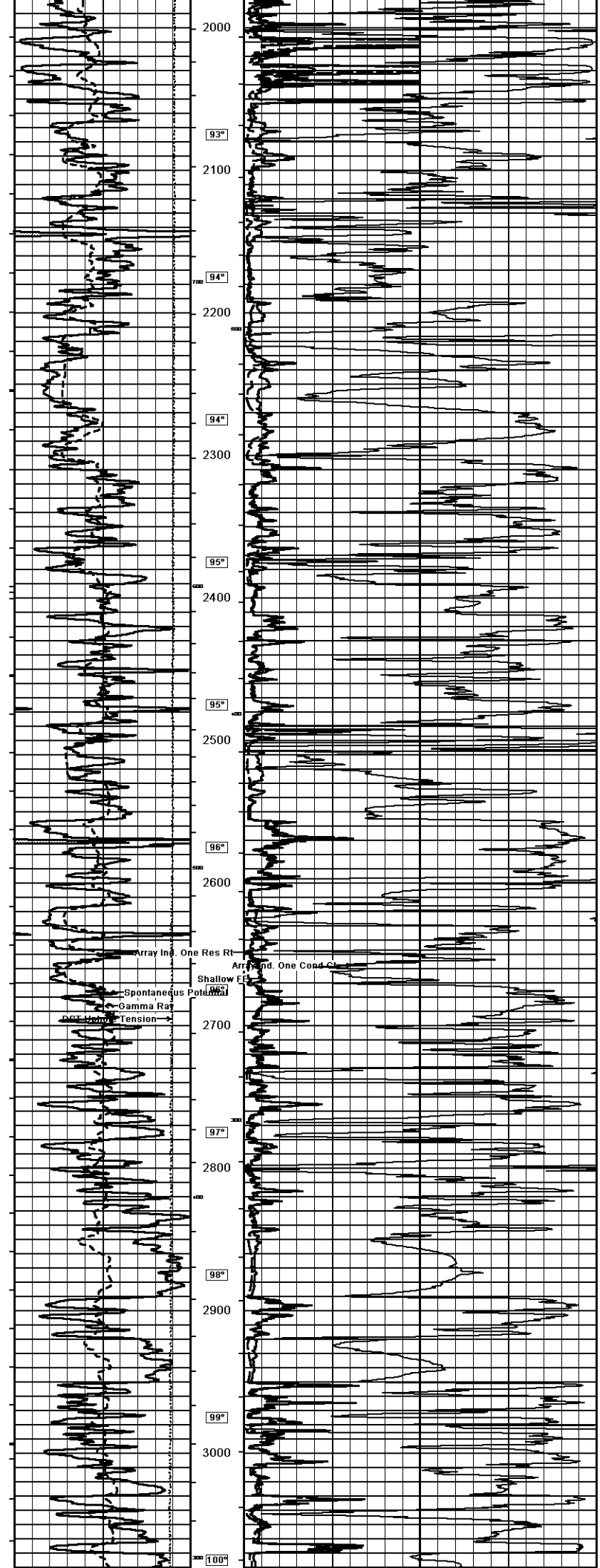
COMPANY	O'BRIEN RESOURCES, LLC.
WELL	JECHA 4 #2
FIELD	WILDCAT
PROVINCE/COUNTY	RUSH
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1302' FNL & 213' FWL
SEC 4	TWP 19S RGE 17W
Other Services	MDN/MPD/MAI/MSS
Latitude	
Longitude	
API Number	15-165-22137
Permanent Datum GL Elevation 2070 feet	
Log Measured From KB	
Drilling Measured From KB @ 13 FEET	
Date	04-OCT-2016
Run Number	ONE
Density / Viscosity	9.35 lb/USg
PH / Fluid Loss	9.50
Sample Source	FLOWLINE
Rm @ Measured Temp	0.46 @75.0
Rmf @ Measured Temp	0.37 @75.0
Rmc @ Measured Temp	0.55 @75.0
Source Rmf / Rmc	CALC
Rm @ BHT	0.33 @103.0
Time Since Circulation	4 HOURS
Max Recorded Temp	103.00
Equipment / Base	13096
Recorded By	ADAM SILL
Witnessed By	JIM MUSGROVE

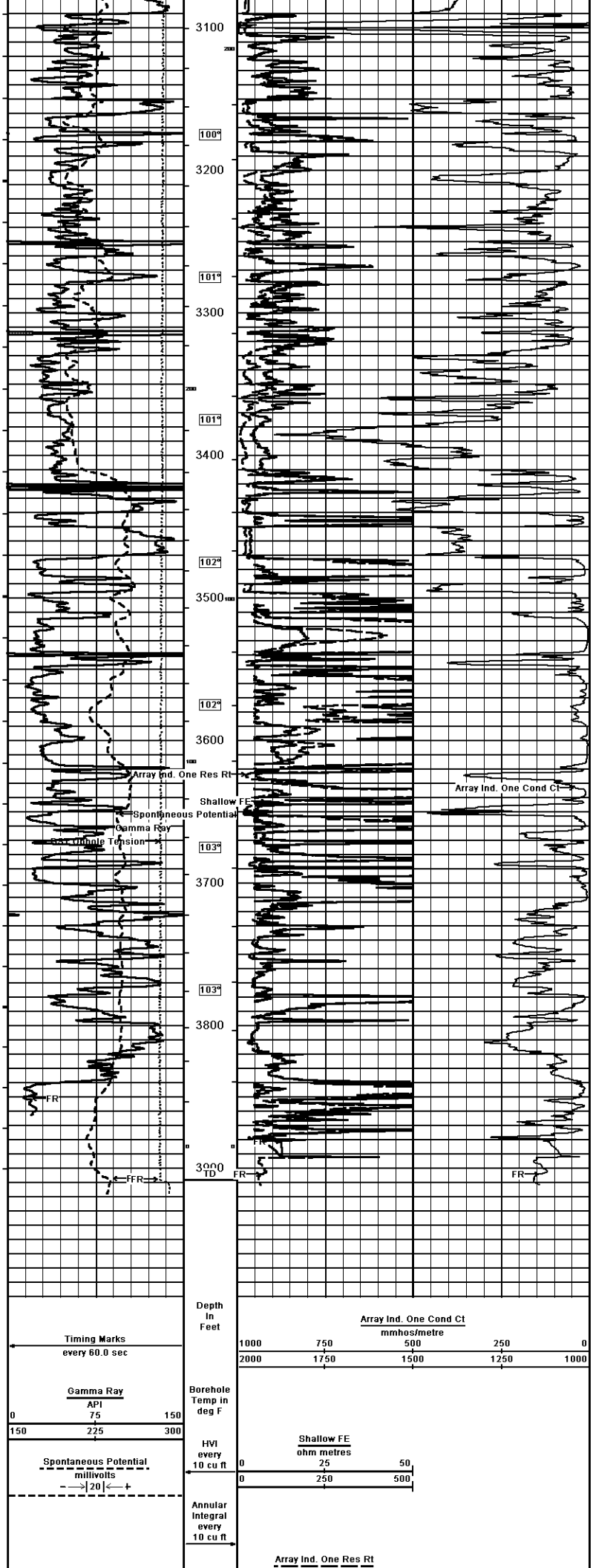
Service Order	4558-162772378
Depth Driller	3907.00
Depth Logger	3908.00
First Reading	3905.00
Last Reading	267.00
Casing Driller	265.00
Casing Logger	267.00
Bit Size	7.875
Hole Fluid Type	CHEMICAL

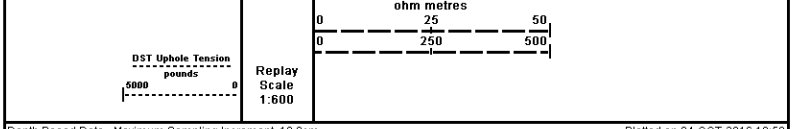

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG
RCES, LLC.
7' FWL
MML
Elevations:
KB
DF
GL
feet
2083.00
2081.00
2070.00
53.00 CP
13.60 mU30Min
inches
feet
feet
feet
feet
feet
feet
feet
feet
ohm-m
ohm-m
ohm-m
ohm-m
ohm-m
ohm-m
CALC
CALC
deg F
OKC


1 INCH MAIN
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 04-OCT-2016 18:58
Filename: C:\Minimus 15.03.5939\Logs\O'Brien (LA) Jecha 4 #2\O'Brien (LA) Jecha 4 #2_002.dta
Recorded on 04-OCT-2016 16:29
System Versions: Logged with 15.03.5939 Plotted with 15.03.5939
Depth In Feet
Timing Marks every 60.0 sec
Array Ind. One Cond Ct mmhos/metre
1000 750 500 250 0
2000 1750 1500 1250 1000
Gamma Ray API
0 75 150
150 225 300
Borehole Temp in deg F
HVI every 10 cu ft
Shallow FE ohm metres
0 25 50
0 250 500
Spontaneous Potential millivolts
Annular Integral every 10 cu ft
Array Ind. One Res Rt ohm metres
0 25 50
0 250 500
DST Uphole Tension pounds
5000 0
Replay Scale 1:600
Casing 260 Shoe
300
400
500
600
800
83°
81°
80°
81°
82°
84°
Array Ind One R700
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension


900
85°
1000
86°
1100
87°
1200
88°
1300
88°
1400
89°
1500
90°
1600
1700
91°
1800
91°
1900
92°
Array Ind. One Res Rt
Array Ind. One Cond Ct
Spontaneous Potential
Gamma Ray
DST Uphole Tension


2000
93°
2100
94°
2200
94°
2300
95°
2400
95°
2500
96°
2600
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
Tension
2700
97°
2800
98°
2900
99°
3000
100°


3100
100
3200
101
3300
101
3400
102
3500
102
3600
103
3700
103
3800
3000
TD
Array Ind. One Res Rt
Shallow FE
Spontaneous Potential
Gamma Ray
Cable Tension
Array Ind. One Cond Ct
FR
FFR
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Spontaneous Potential
millivolts
20
Depth
In
Feet
Borehole
Temp in
deg F
HVI
every
10 cu ft
Annular
Integral
every
10 cu ft
Array Ind. One Cond Ct
mmhos/metre
1000
750
500
250
0
2000
1750
1500
1250
1000
Shallow FE
ohm metres
0
25
50
0
250
500
Array Ind. One Res Rt



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 04-OCT-2016 18:58

Filename: C:\Minimus 15.03.5939\Logs\O'Brien (LA) Jecha 4 #2\O'Brien (LA) Jecha 4 #2_002.dta — Recorded on 04-OCT-2016 16:29

System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

1 INCH MAIN

COMPANY	O'BRIEN RESOURCES, LLC.
WELL	JECHA 4 #2
FIELD	WILDCAT
PROVINCE/COUNTY	RUSH
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2083.00	feet	First Reading	3905.00	feet
Elevation Drill Floor	2081.00	feet	Depth Driller	3907.00	feet
Elevation Ground Level	2070.00	feet	Depth Logger	3908.00	feet

Weatherford

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG