



**Weatherford**

**ARRAY INDUCTION  
SHALLOW FOCUSED  
ELECTRIC LOG**

COMPANY	O'BRIEN ENERGY RESOURCES CORP.		
WELL	MARY #1-1		
FIELD	GRANGER CREEK		
PROVINCE/COUNTY	CLARK		
COUNTRY/STATE	U.S.A. / KANSAS		
LOCATION	2277' FNL & 2262' FEL		
SEC 1	TWP 31S	RGE 22W	Other Services
Latitude			MDN/MPD
Longitude			MML
API Number	15-025-21588		
Permanent Datum GL, Elevation	2252 feet		
Log Measured From	KB		
Drilling Measured From	KB @ 13 FEET		
Date	19-DEC-2015		
Run Number	ONE		
Service Order	4558-137748401		
Depth Driller	6500.00	feet	Elevations: KB 2265.00
Depth Logger	6502.00	feet	DF 2263.00
First Reading	6499.00	feet	GL 2252.00
Last Reading	647.00	feet	
Casing Driller	644.00	feet	
Casing Logger	647.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.45 lb/USg	48.00 CP	
PH / Fluid Loss	9.50	9.20 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	0.70 @ 75.0	ohm-m	
Rmf @ Measured Temp	0.56 @ 75.0	ohm-m	
Rmc @ Measured Temp	0.84 @ 75.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.44 @ 119.0	ohm-m	
Time Since Circulation	5 HOURS		
Max Recorded Temp	119.00	deg F	
Equipment / Base	13096	OKC	
Recorded By	ADAM SILL		
Witnessed By	ROGER PEARSON		PETE DEBENHAM

BOREHOLE RECORD			Last Edited: 19-DEC-2015 18:42
Bit Size inches	Depth From feet	Depth To feet	
7.875	644.00	6500.00	

CASING RECORD				
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	644.00	24.00

**REMARKS**

- SOFTWARE ISSUE: WLS 15.03.5939.

- RUN ONE: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION.  
 - HARDWARE: DUAL BOWSPRING USED ON MDN.  
 0.5 INCH STANDOFF USED ON MFE.  
 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: 2352 CU.FT.

- ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO 4000 FEET: 563 CU.FT.

- RIG: DIJKE #9

RIG: DORE #0.

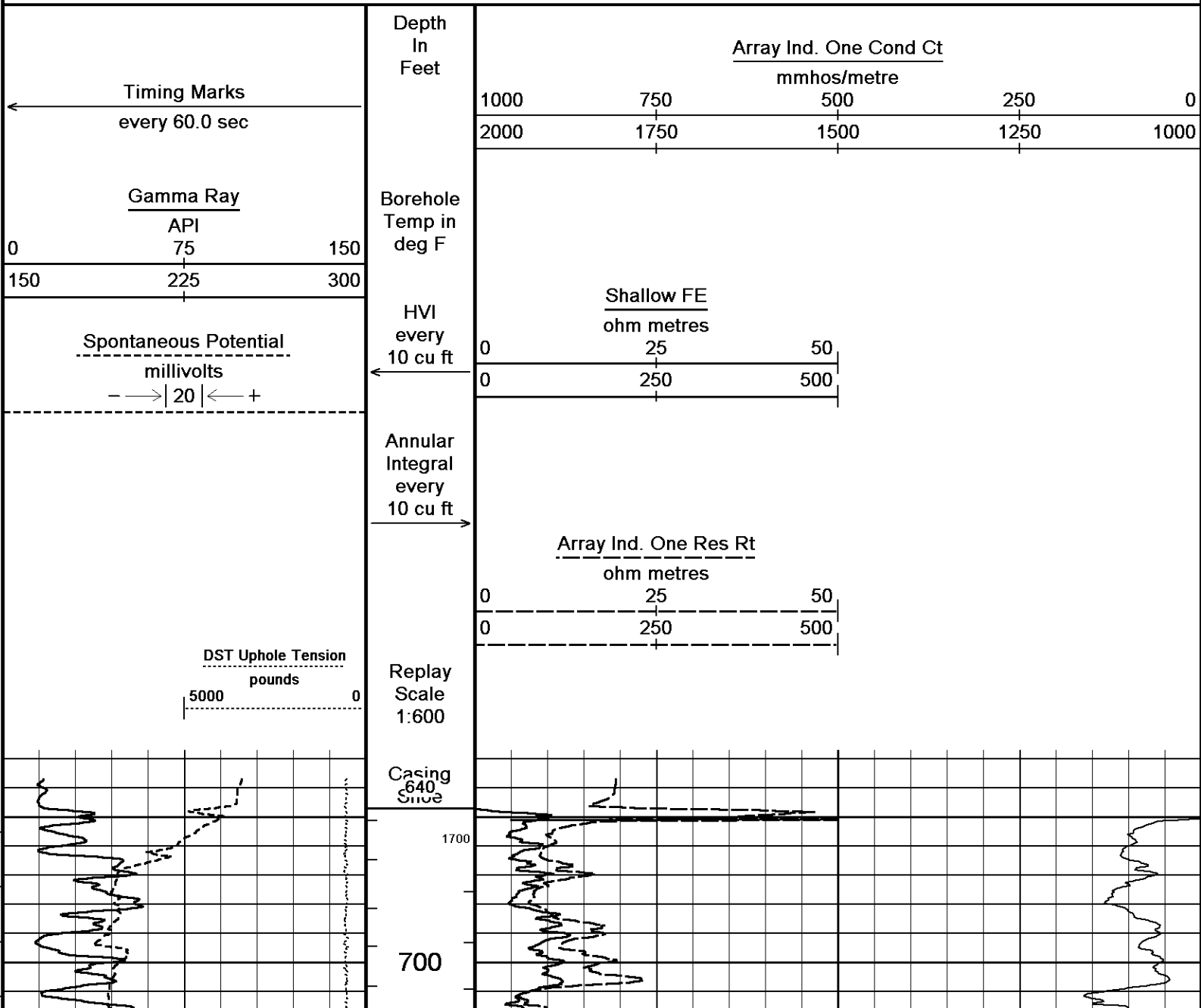
- ENGINEER: A. SILL.

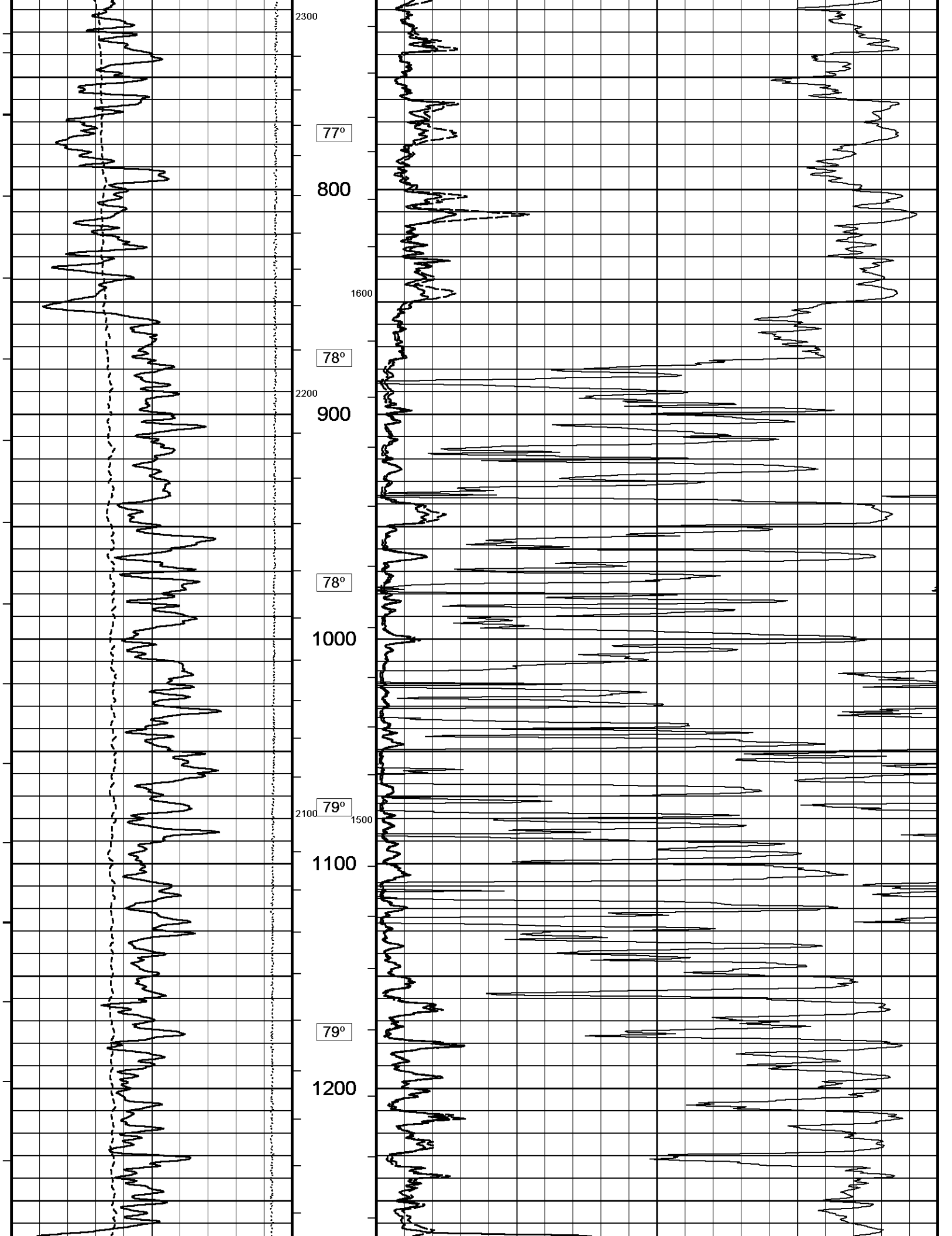
- OPERATOR: S. MENDEZ.

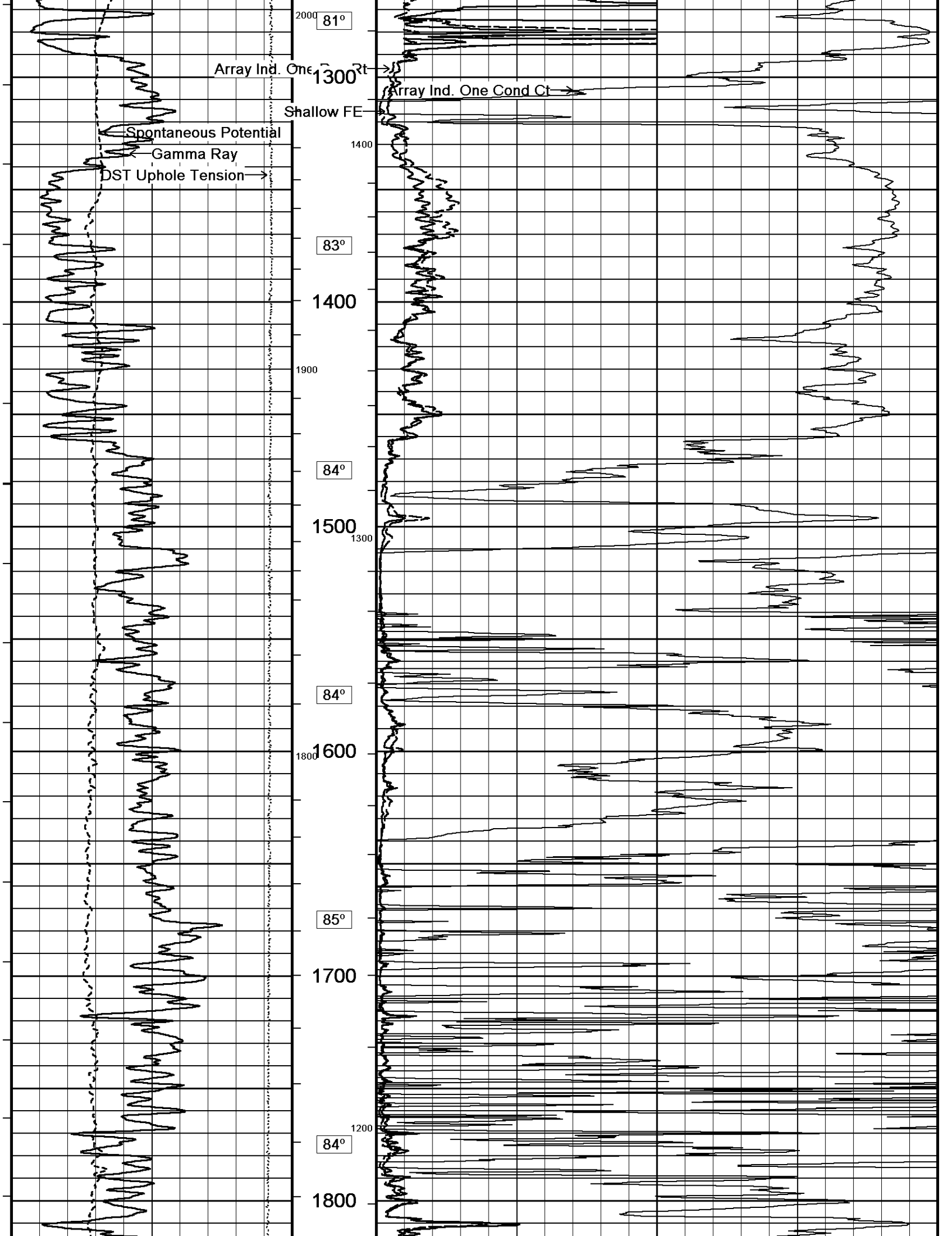
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will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

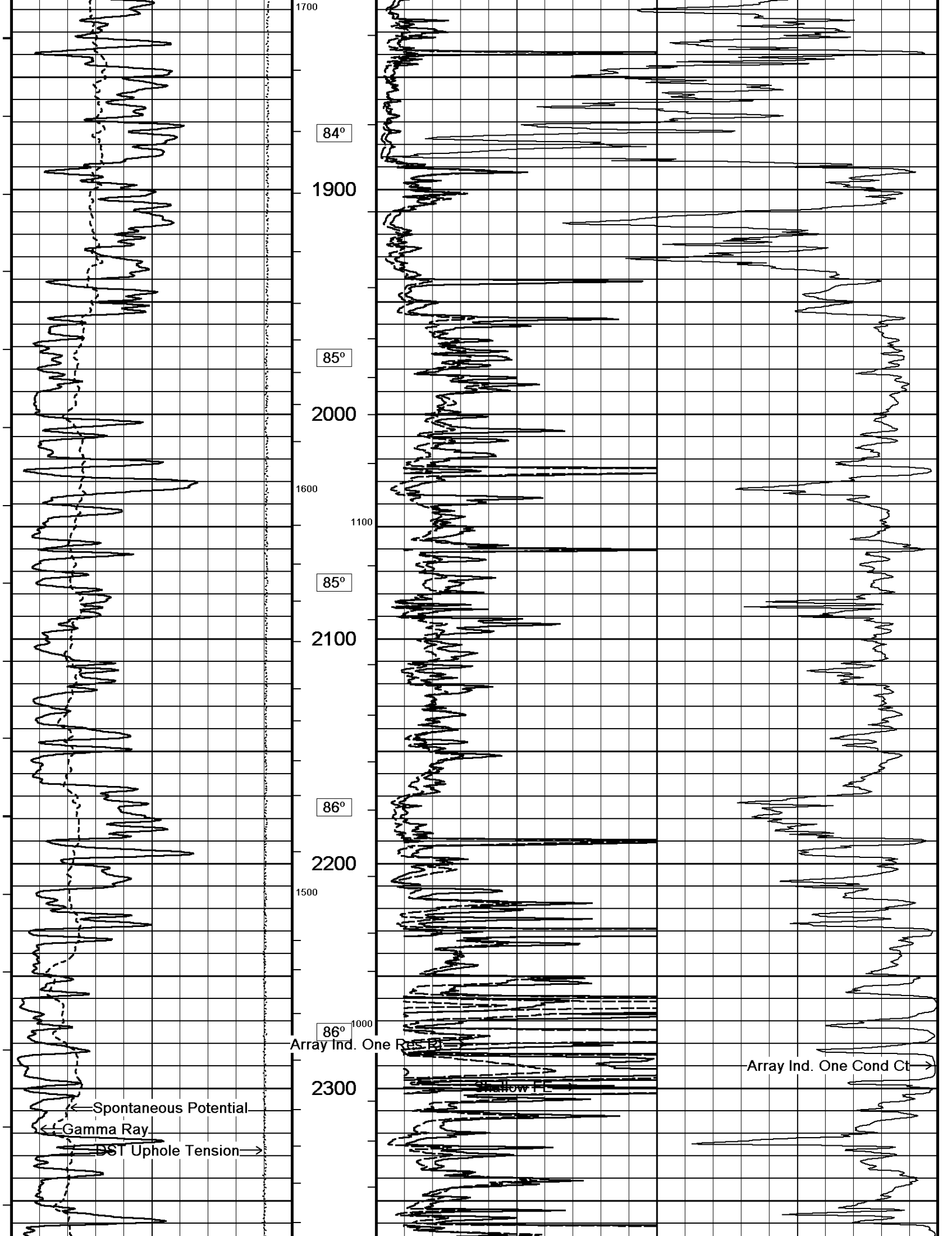
**2 INCH MAIN**

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 20-DEC-2015 03:07  
 Filename: C:\Minimus 15.03.5939\Logs\O'Brien Mary #1-1\O'Brien Mary #1-1 Main.dta Recorded on 19-DEC-2015 22:36  
 System Versions: Logged with 15.03.5939 Plotted with 15.03.5939







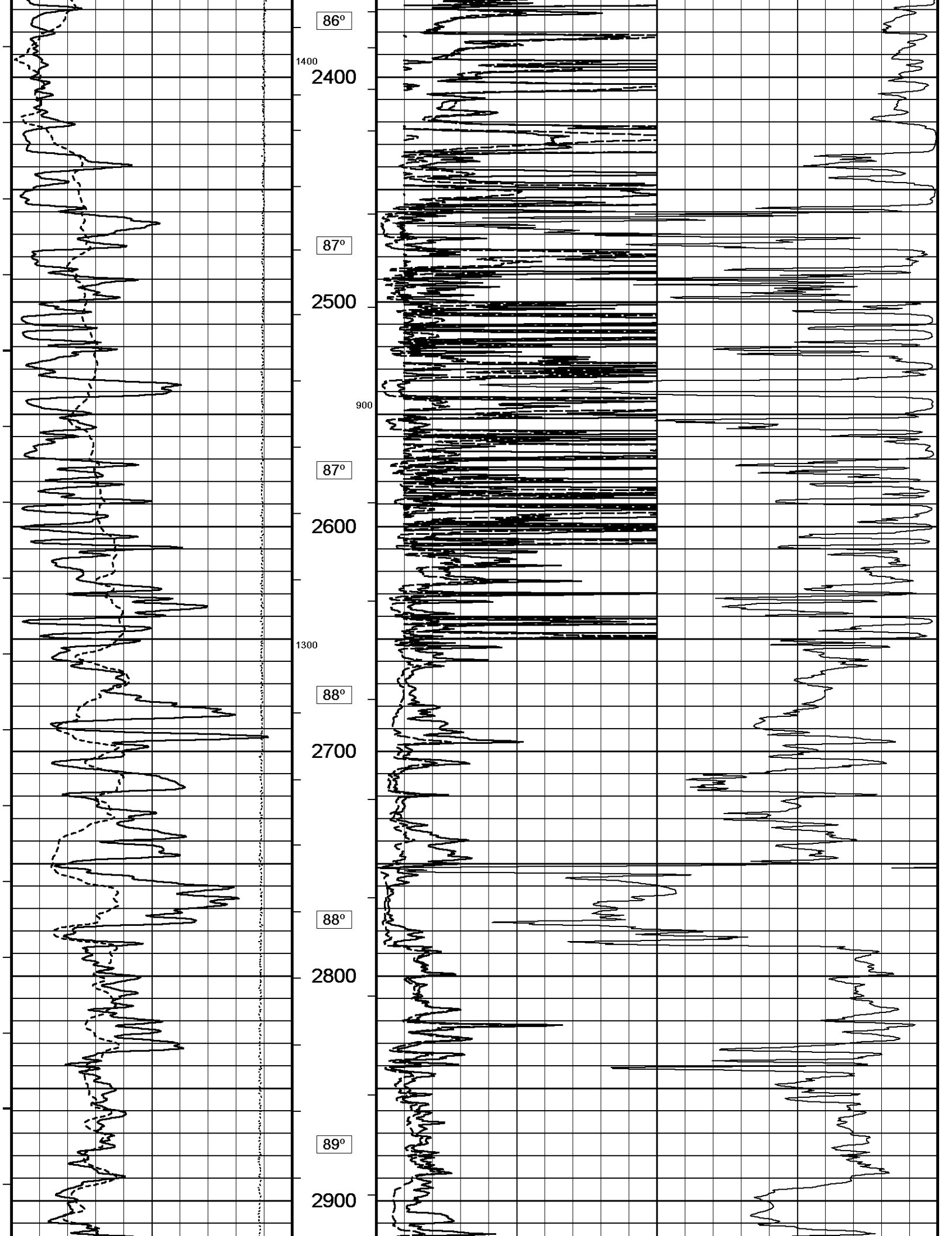


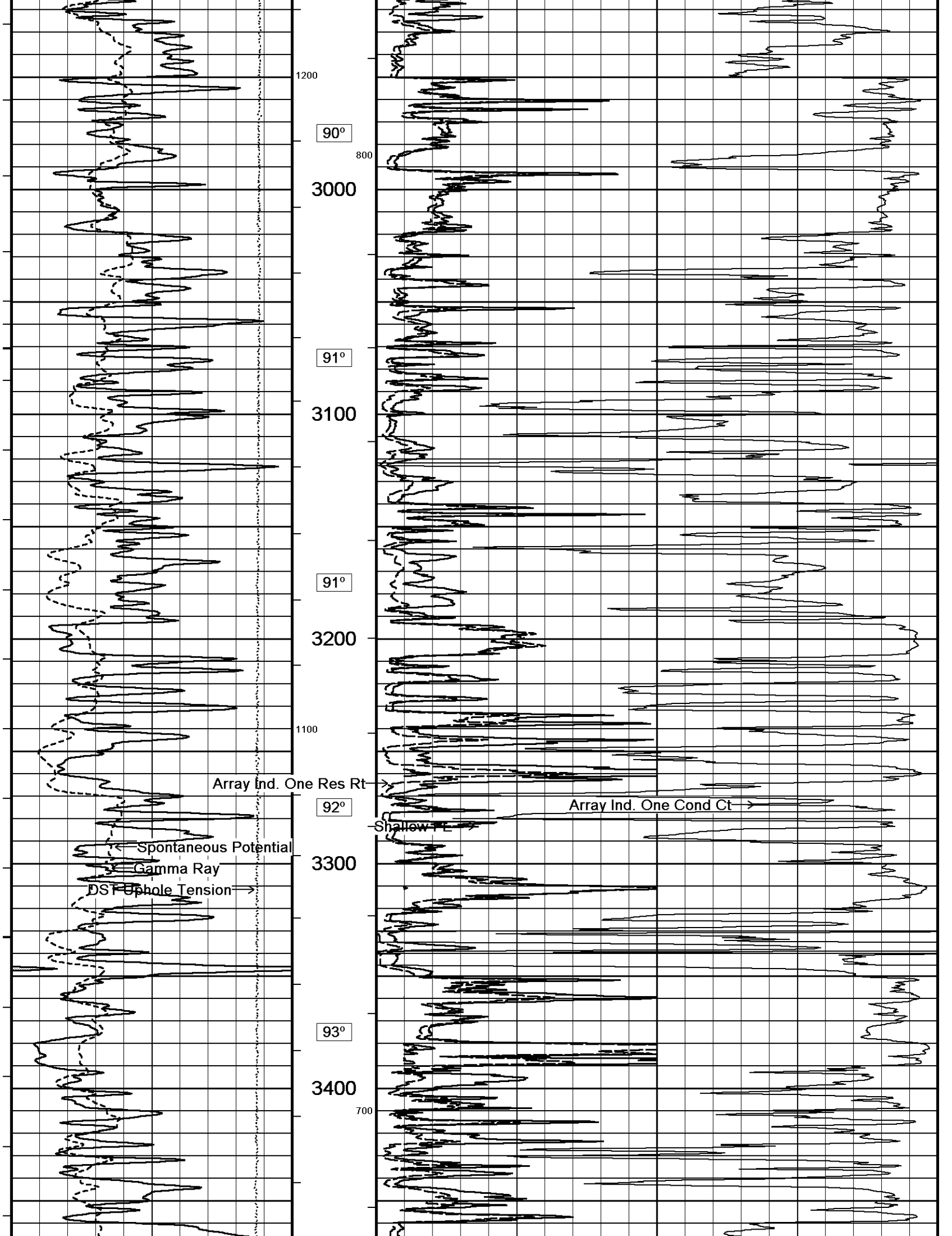
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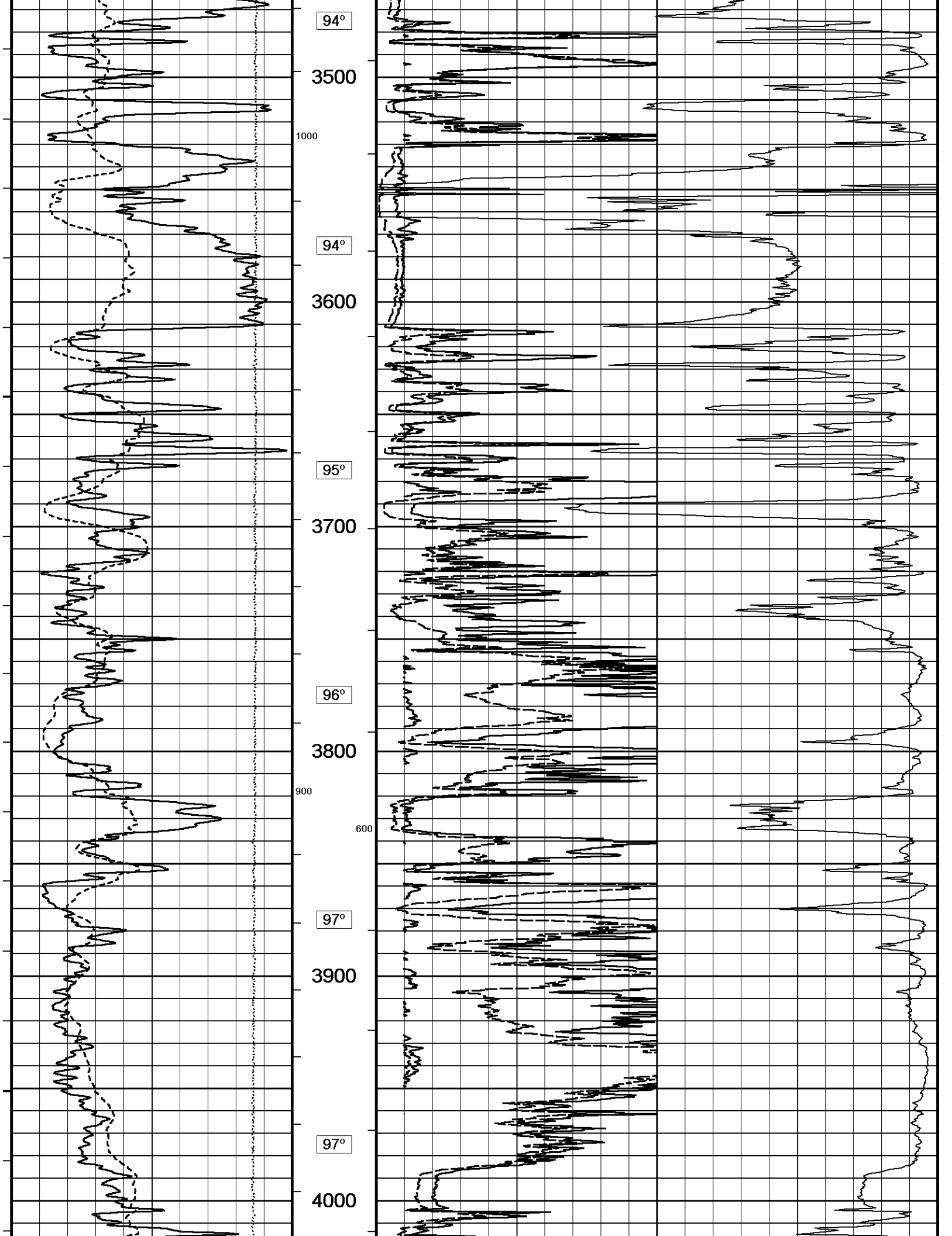
Array Ind. One Cond Ct

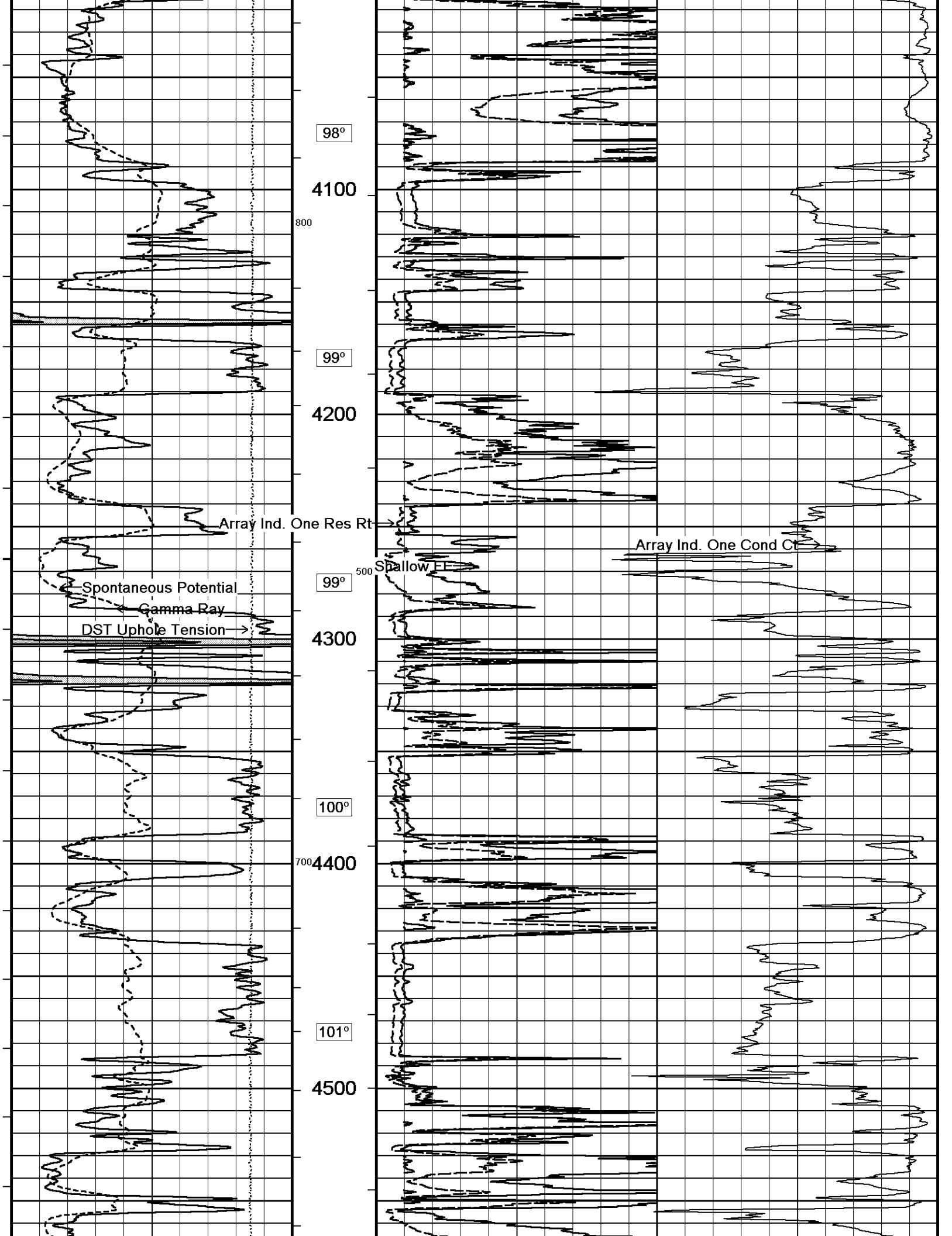
Spontaneous Potential  
Gamma Ray  
DST Uphole Tension

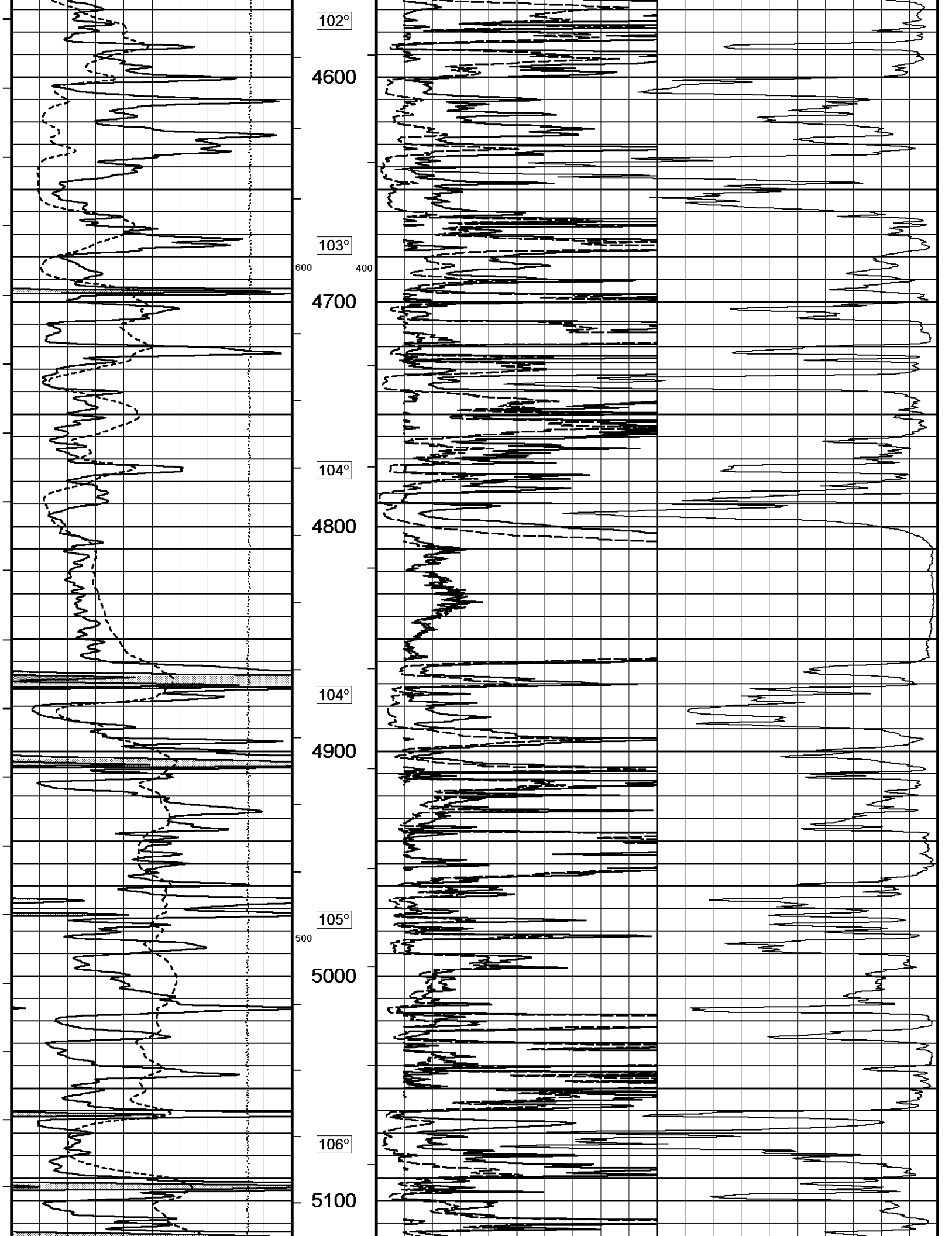
Shallow T.L.

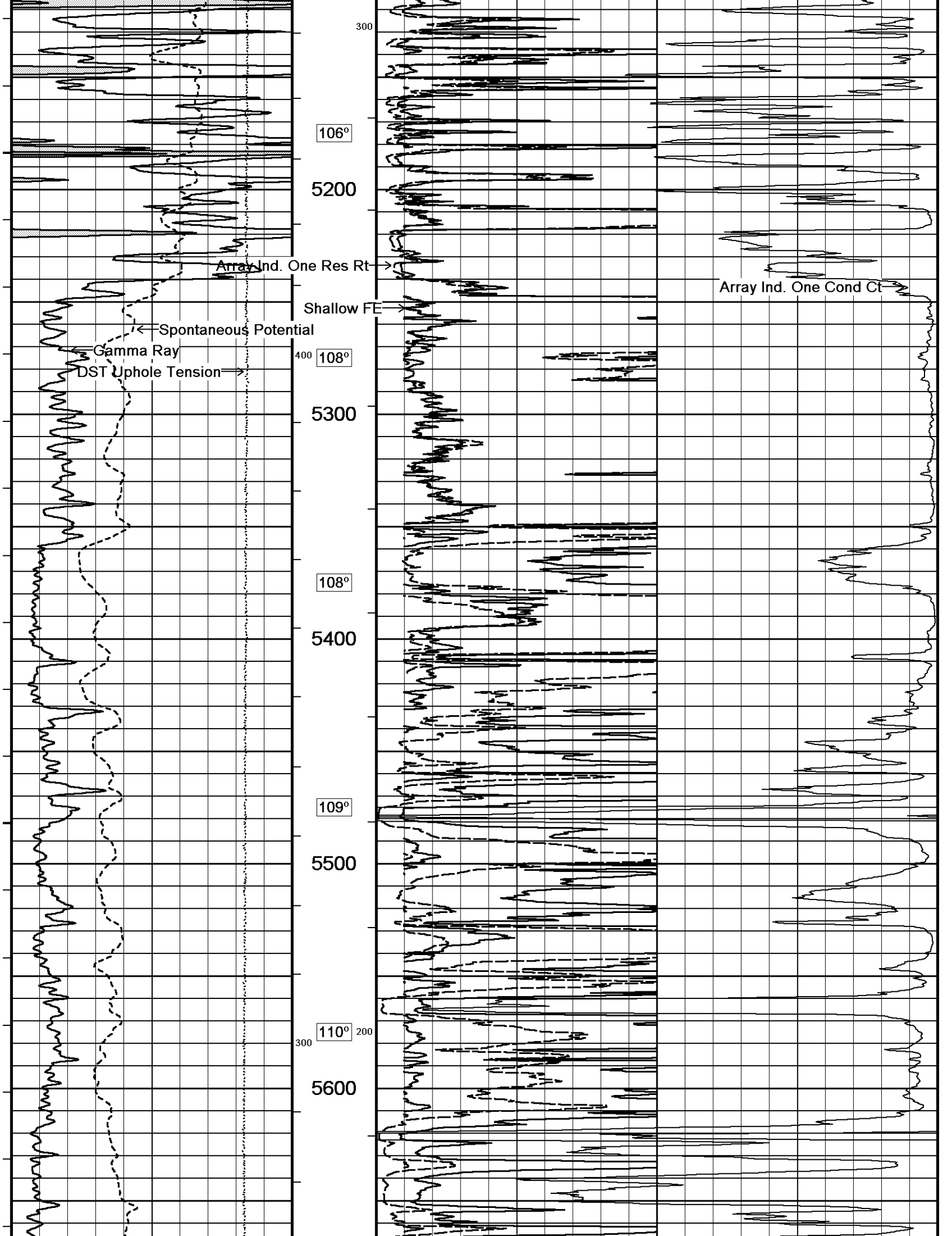


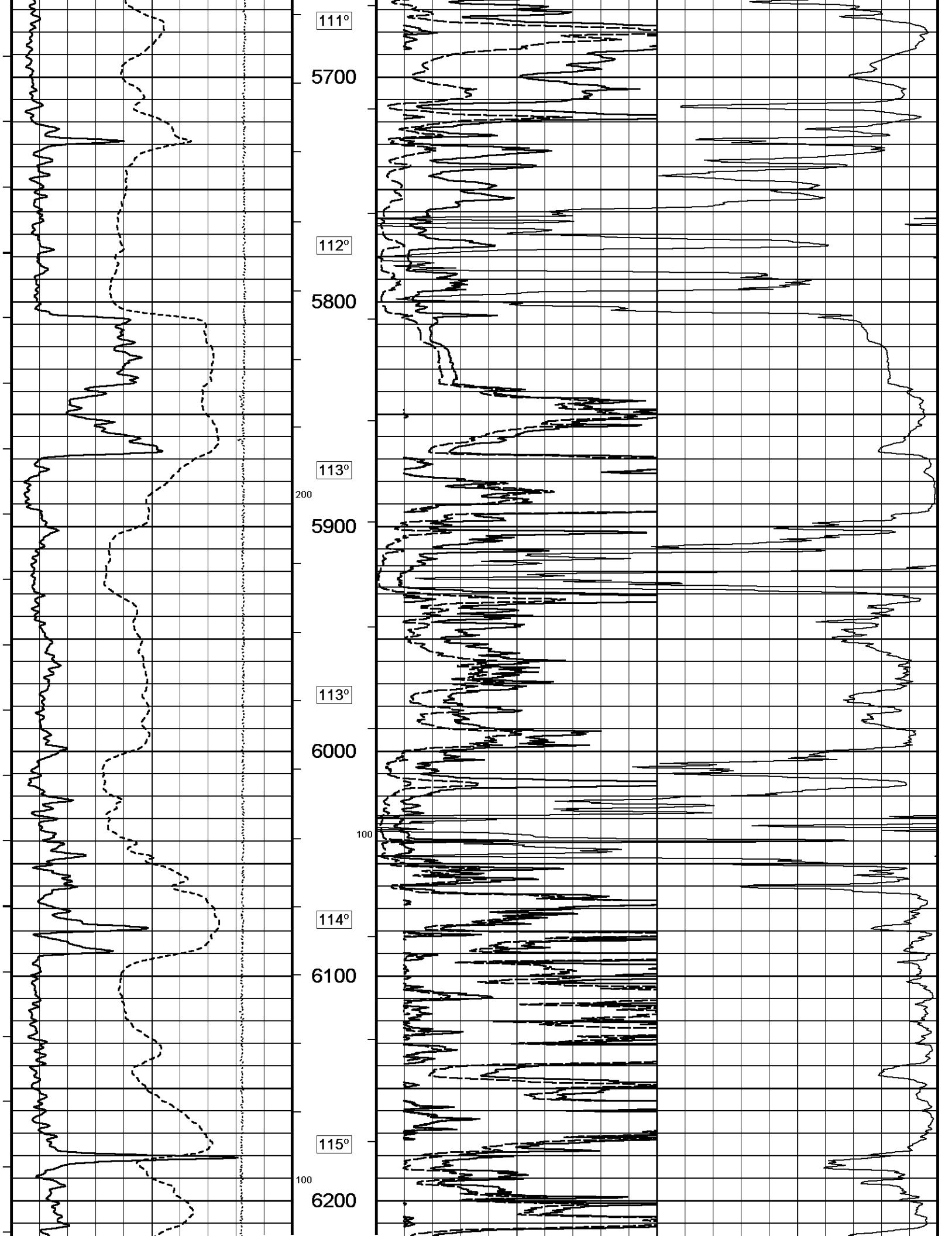


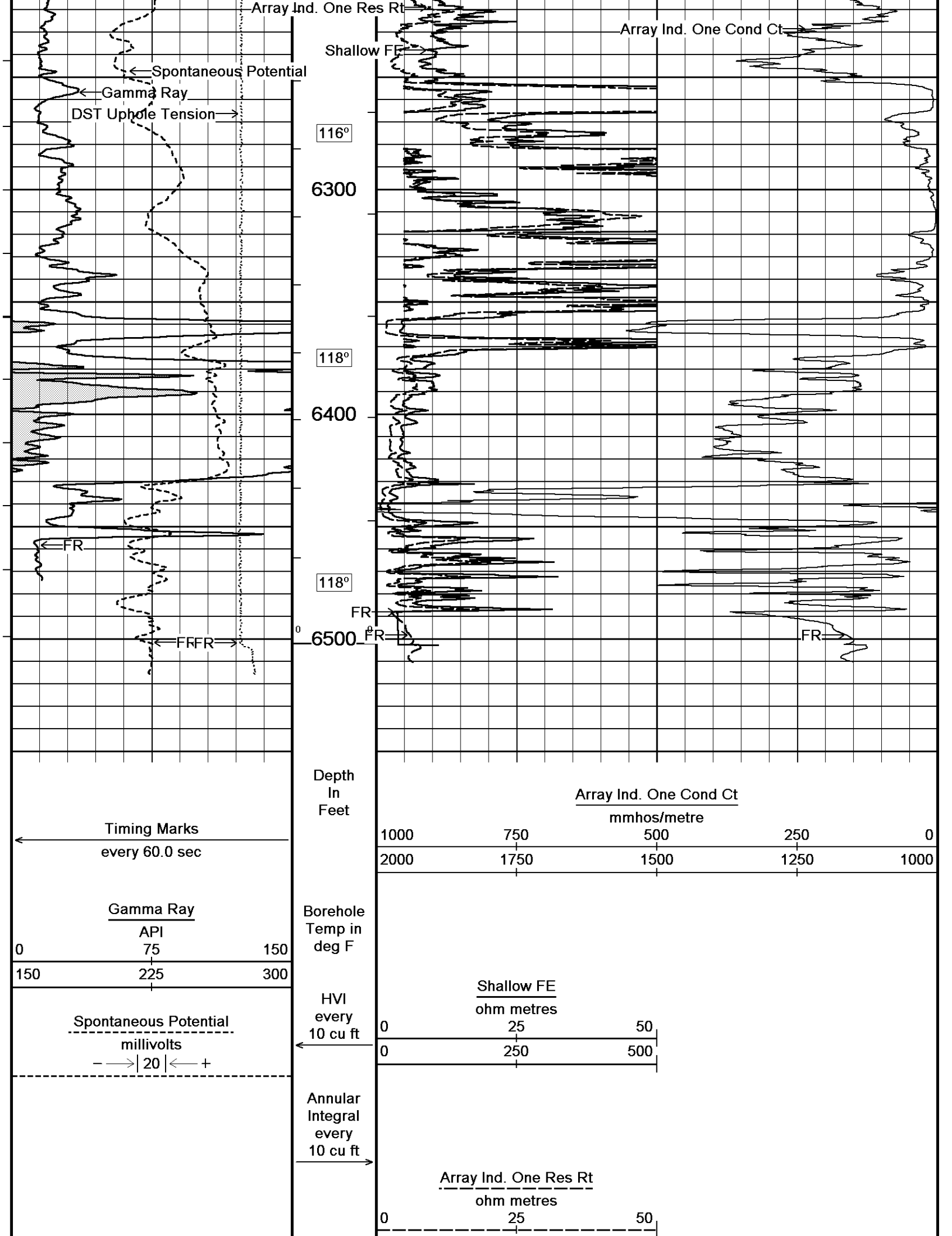












Array Ind. One Cond Ct

Shallow FE

116°

6300

118°

6400

118°

6500

← Spontaneous Potential  
← Gamma Ray  
DST Uphole Tension →

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

FR

← Timing Marks every 60.0 sec

Gamma Ray  
API  
0 75 150  
150 225 300

Spontaneous Potential  
millivolts  
- - - - -> | 20 | < - - - - - +

Annular Integral every 10 cu ft

Depth In Feet

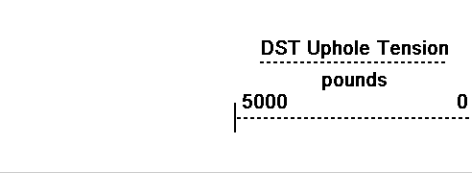
Array Ind. One Cond Ct  
mmhos/metre  
1000 750 500 250 0  
2000 1750 1500 1250 1000

Borehole Temp in deg F

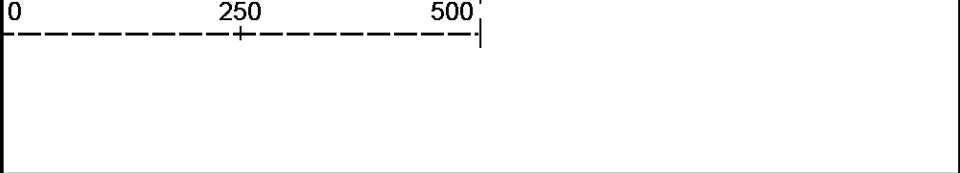
Shallow FE  
ohm metres  
0 25 50  
0 250 500

Annular Integral every 10 cu ft

Array Ind. One Res Rt  
ohm metres  
0 25 50

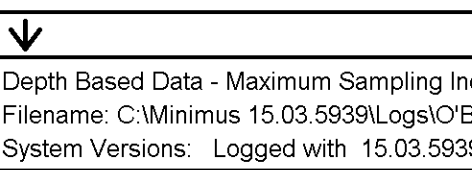


Replay  
Scale  
1:600



Depth Based Data - Maximum Sampling Increment 10.0cm  
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↑ 2 INCH MAIN ↑

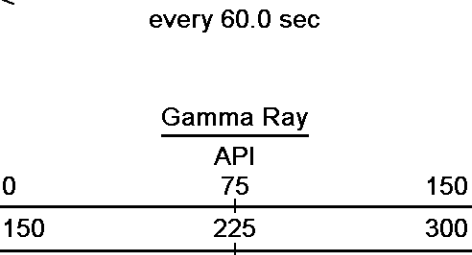


Depth  
in  
Feet

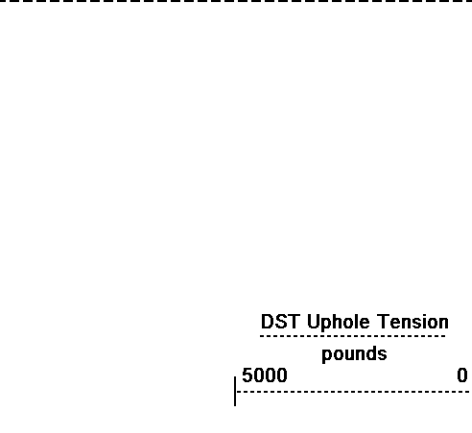
↓ 5 INCH MAIN ↓

Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 20-DEC-2015 03:07  
 Filename: C:\Minimus 15.03.5939\Logs\O'Brien Mary #1-1\O'Brien Mary #1-1 Main.dta  
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 System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

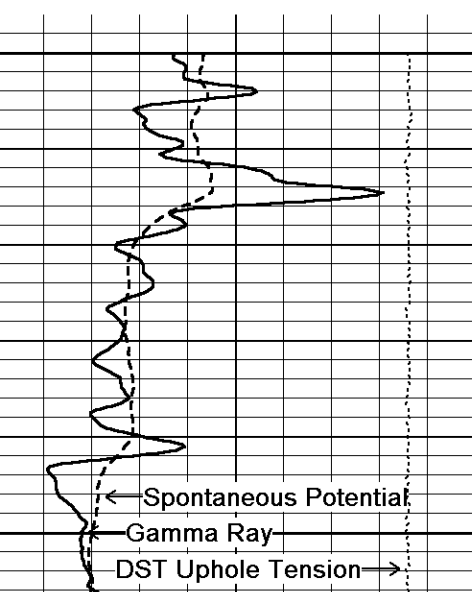
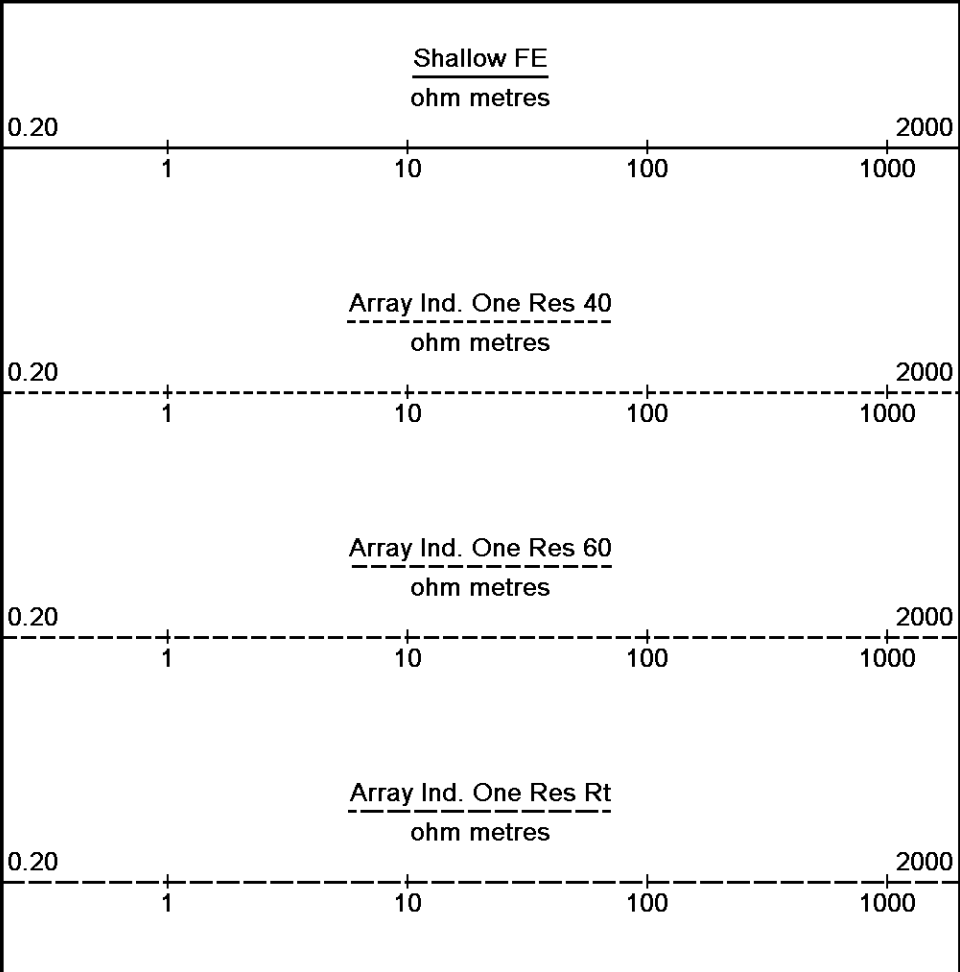
Timing Marks  
every 60.0 sec



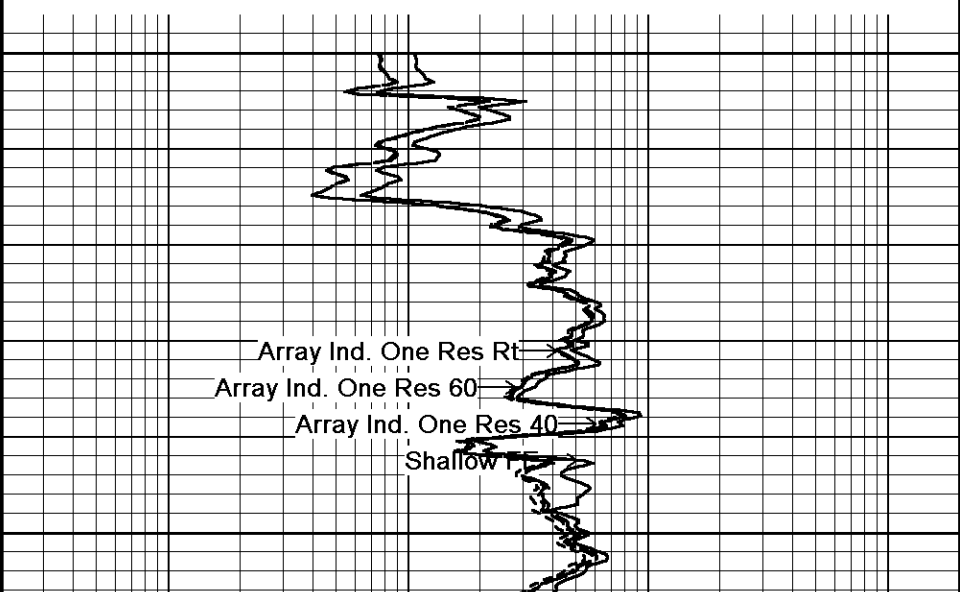
Spontaneous Potential  
millivolts  
-->|20|<--+

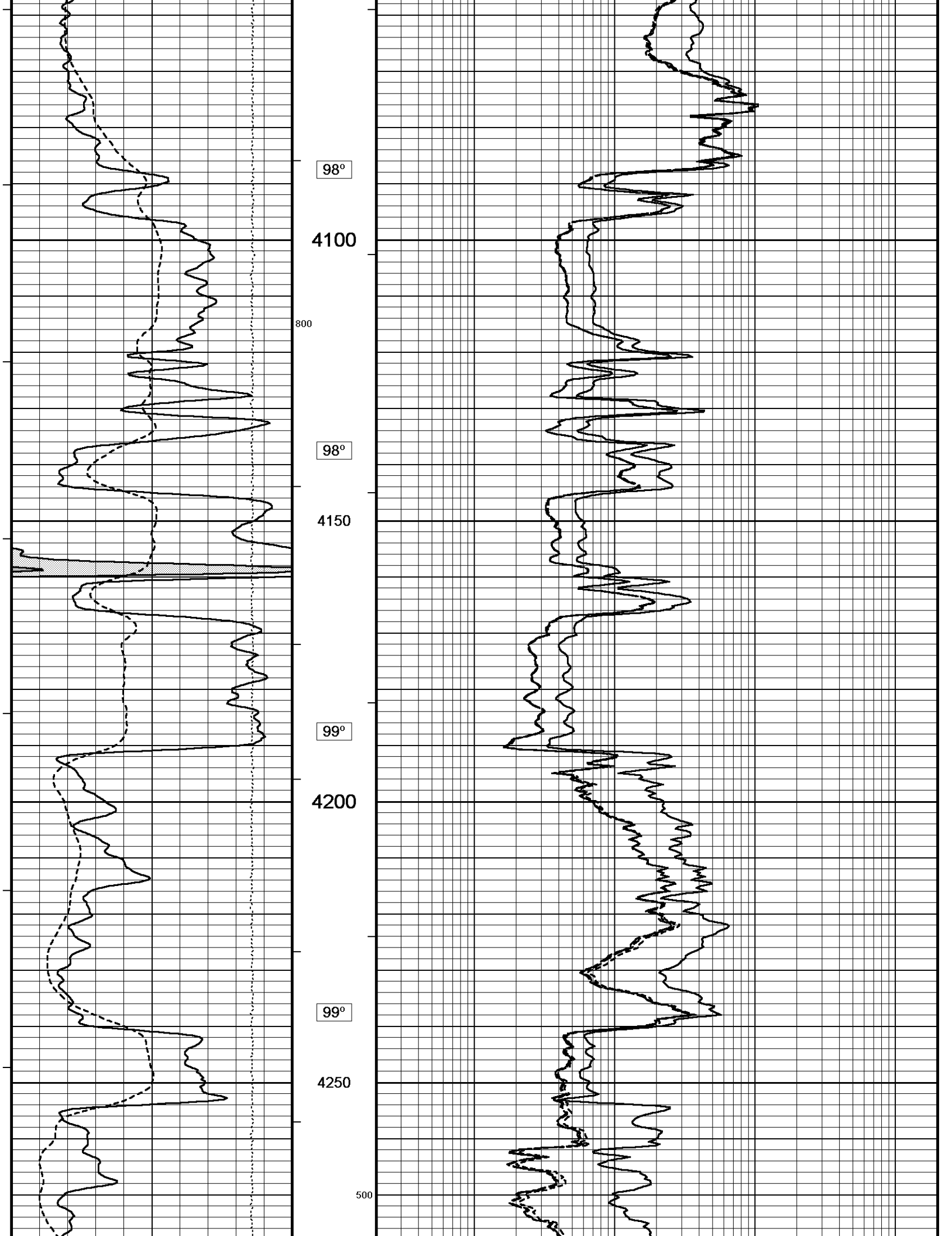


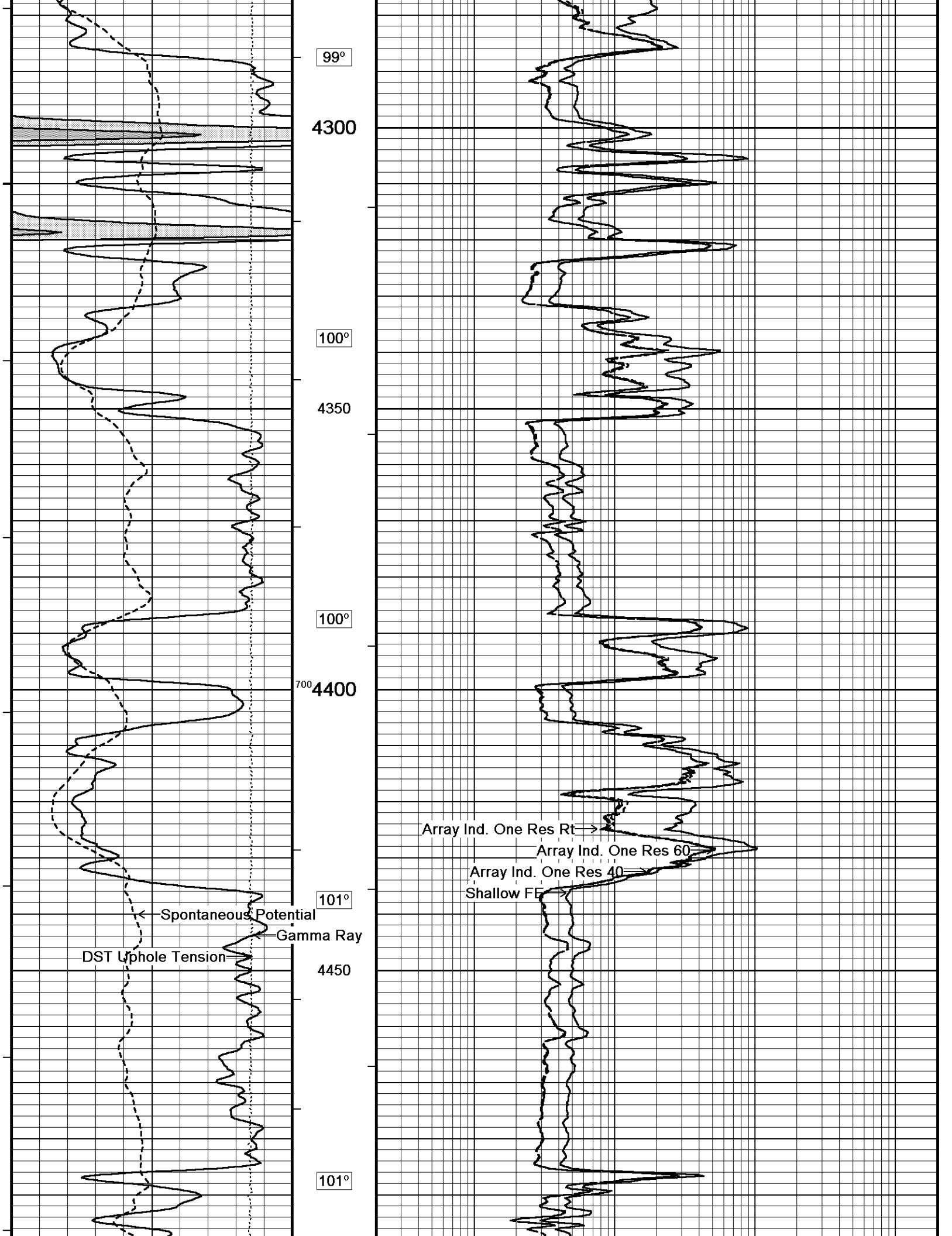
Borehole  
Temp in  
deg F  
HVI  
every  
10 cu ft  
Annular  
Integral  
every  
10 cu ft  
Replay  
Scale  
1:240

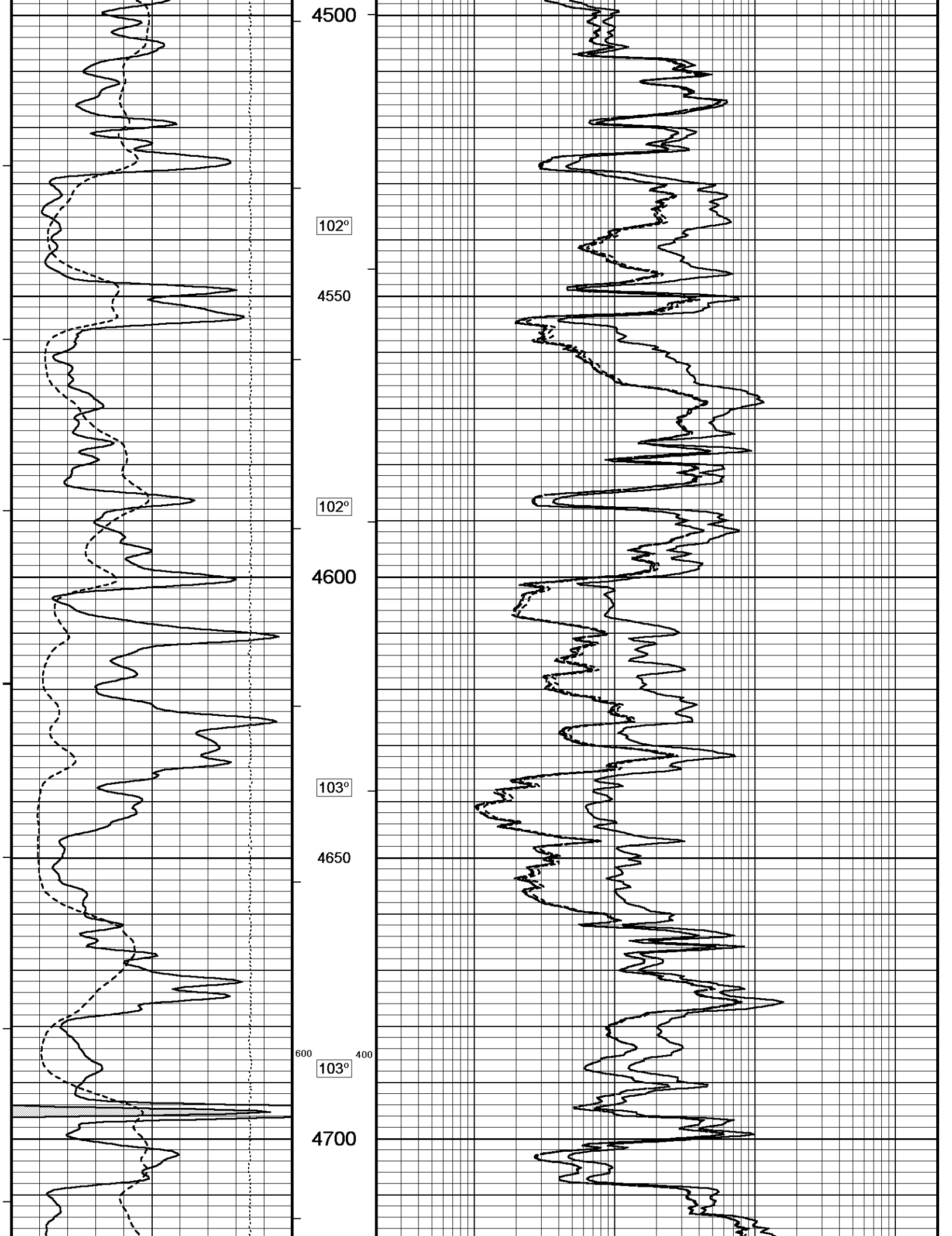


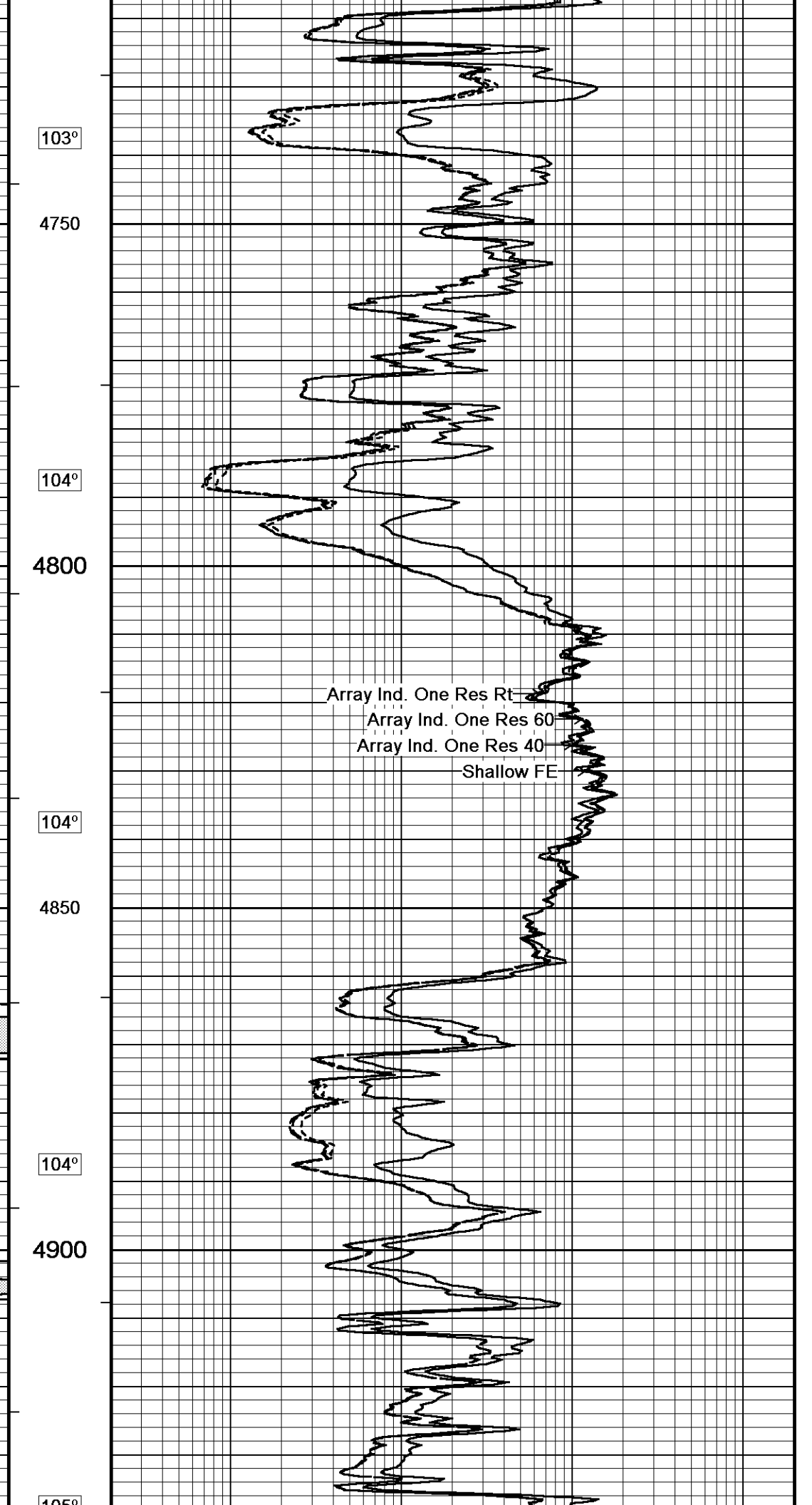
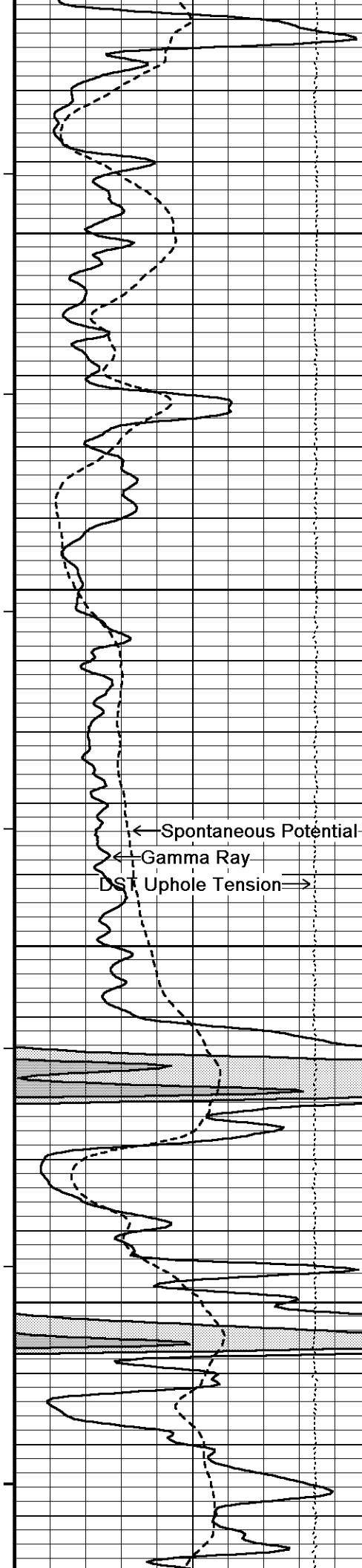
4000  
98°  
4050

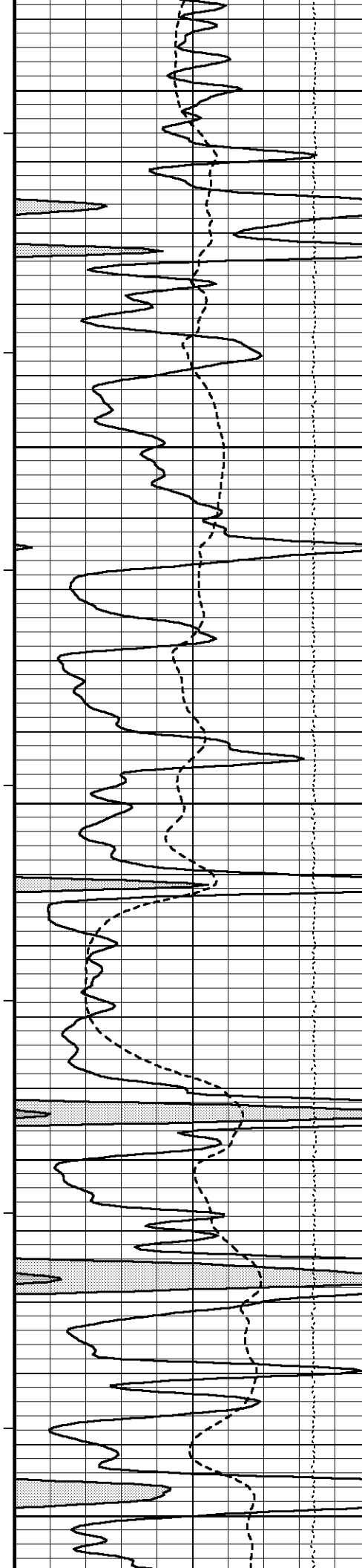




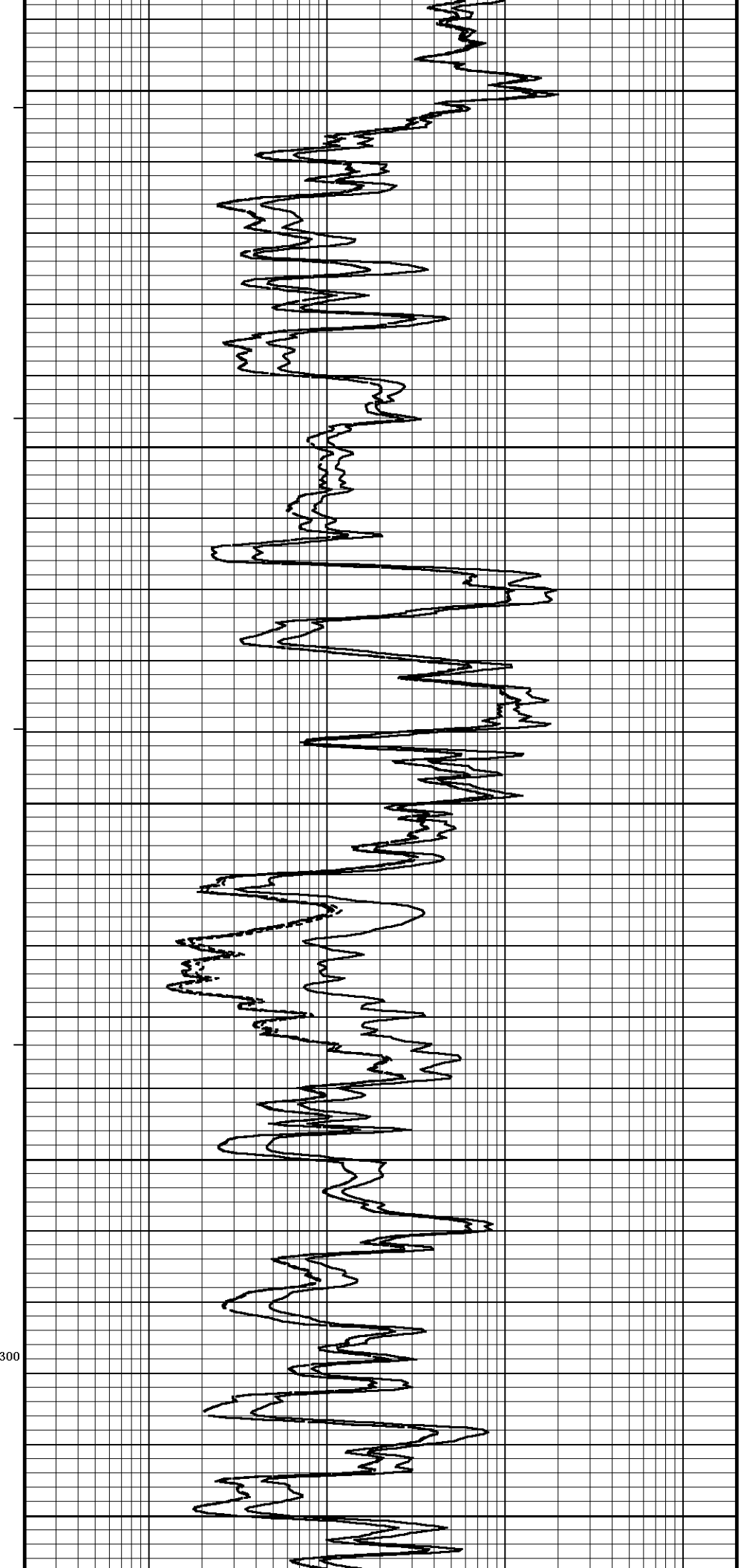


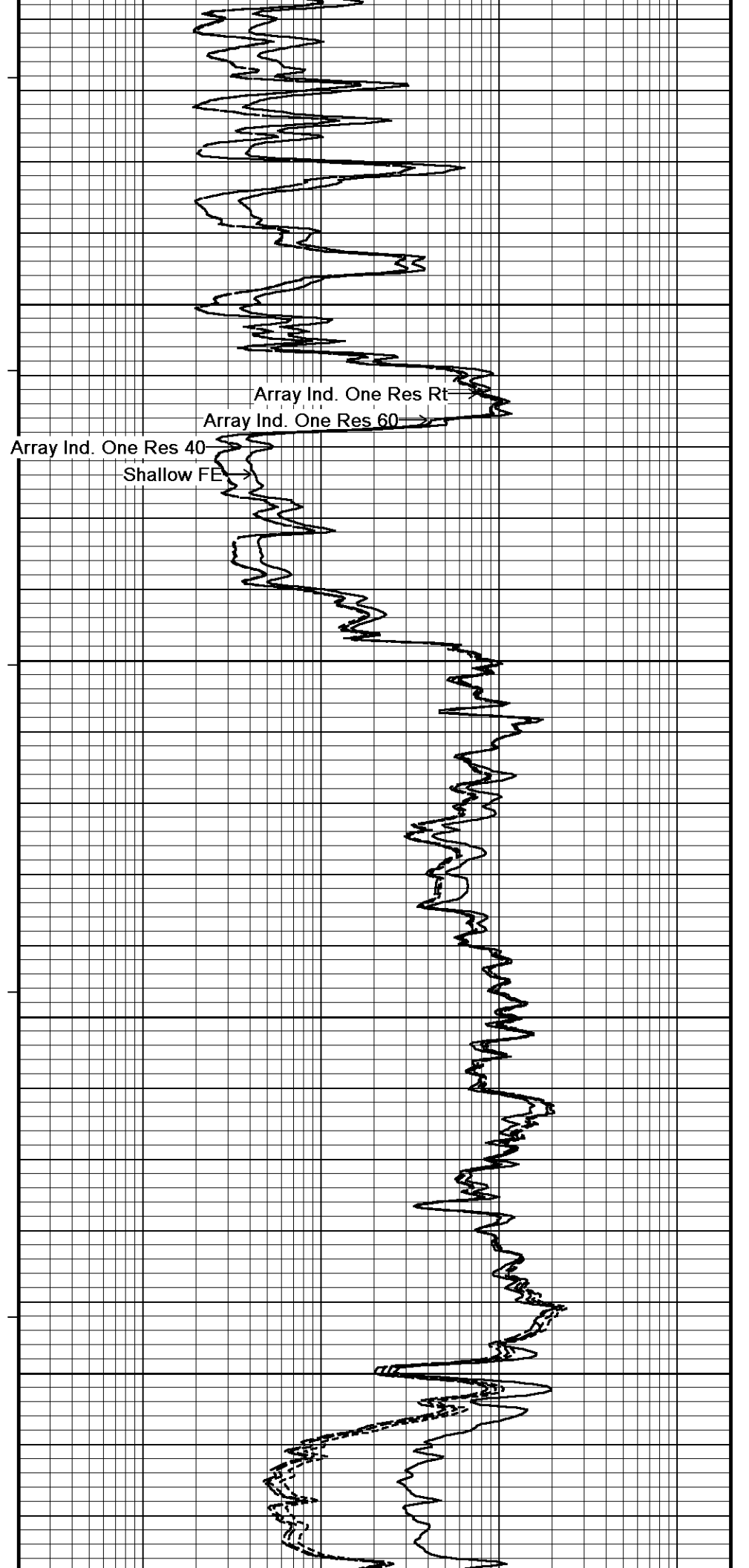
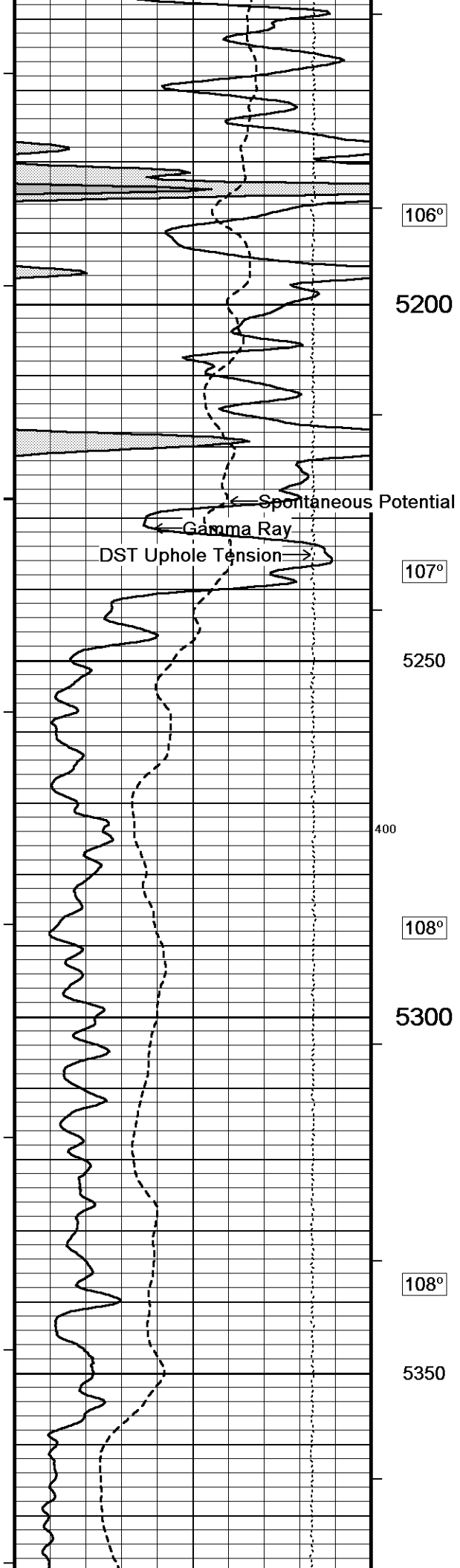


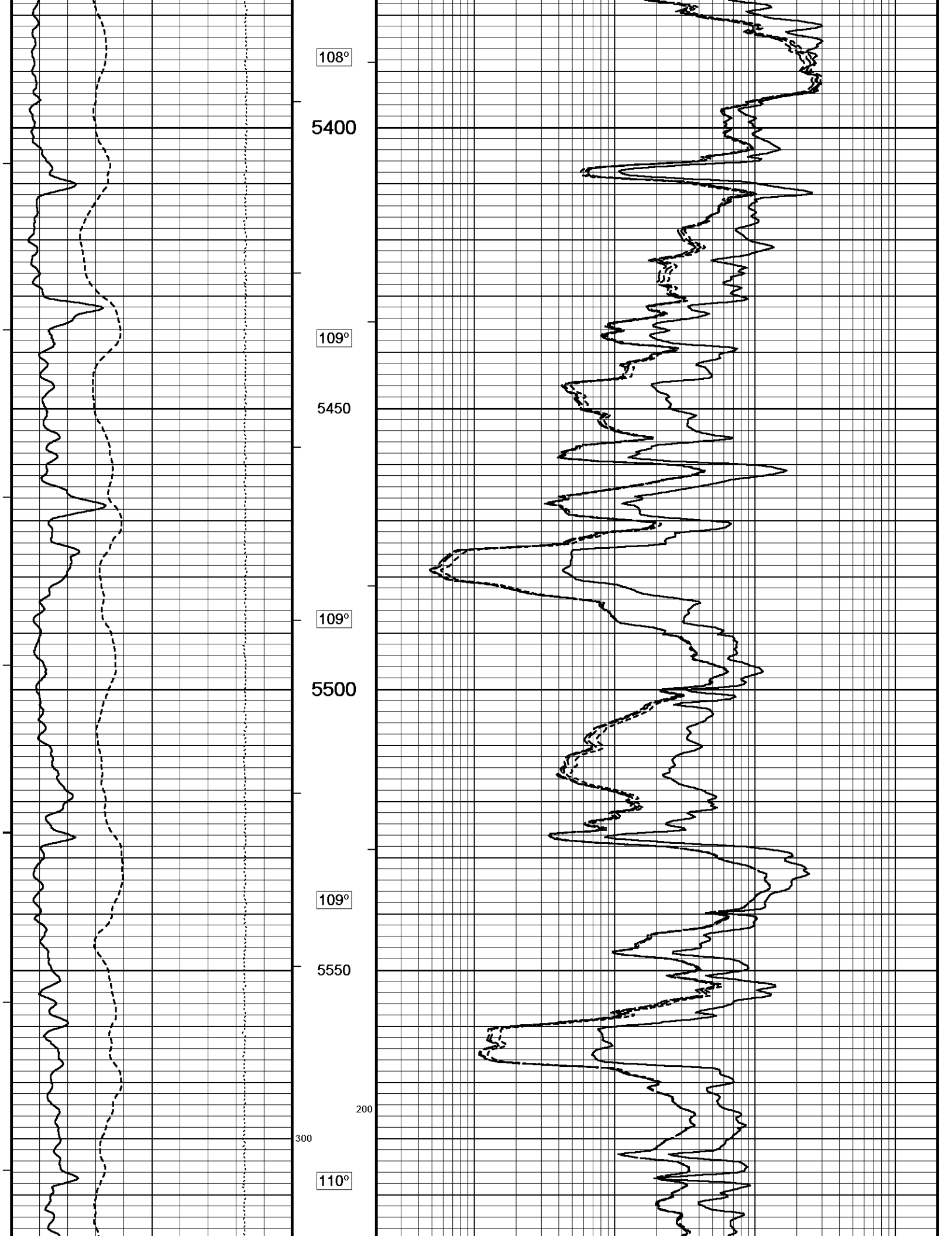


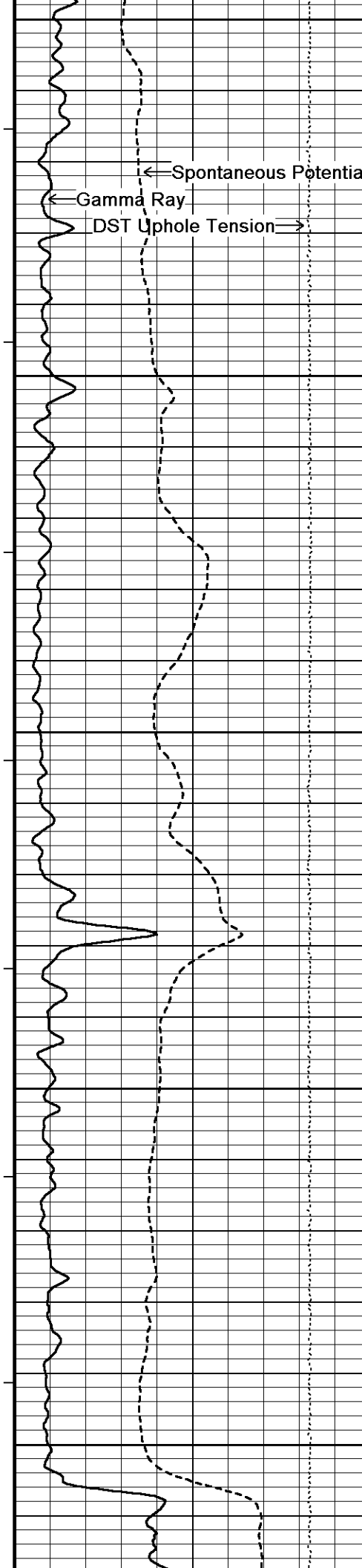


105°  
4950  
500  
105°  
5000  
106°  
5050  
106°  
5100  
300  
106°  
5150

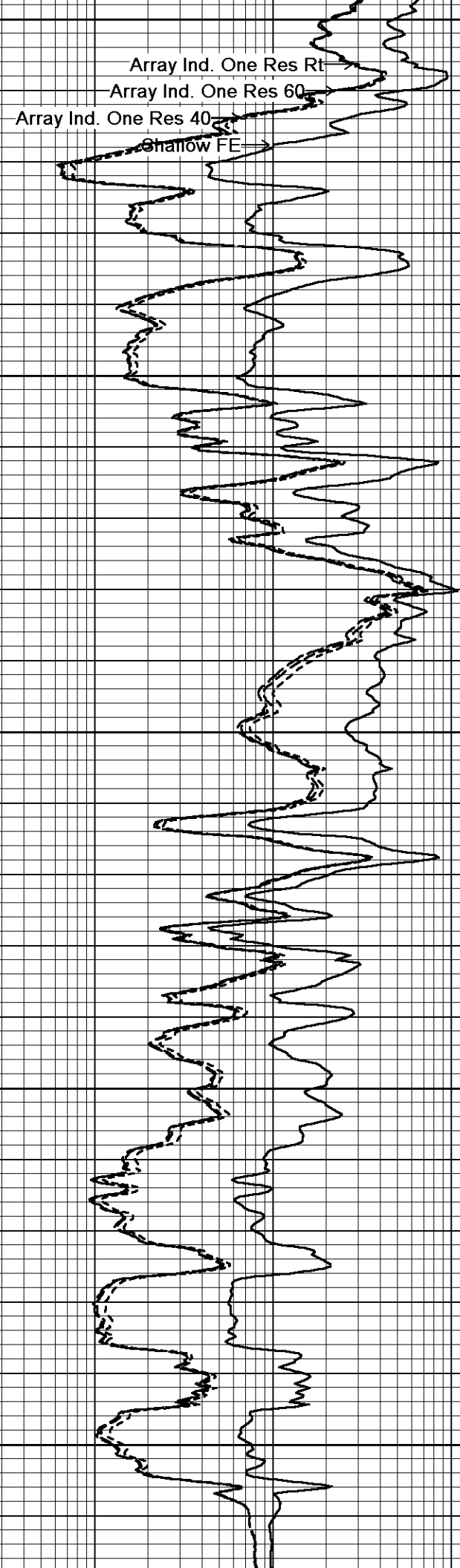


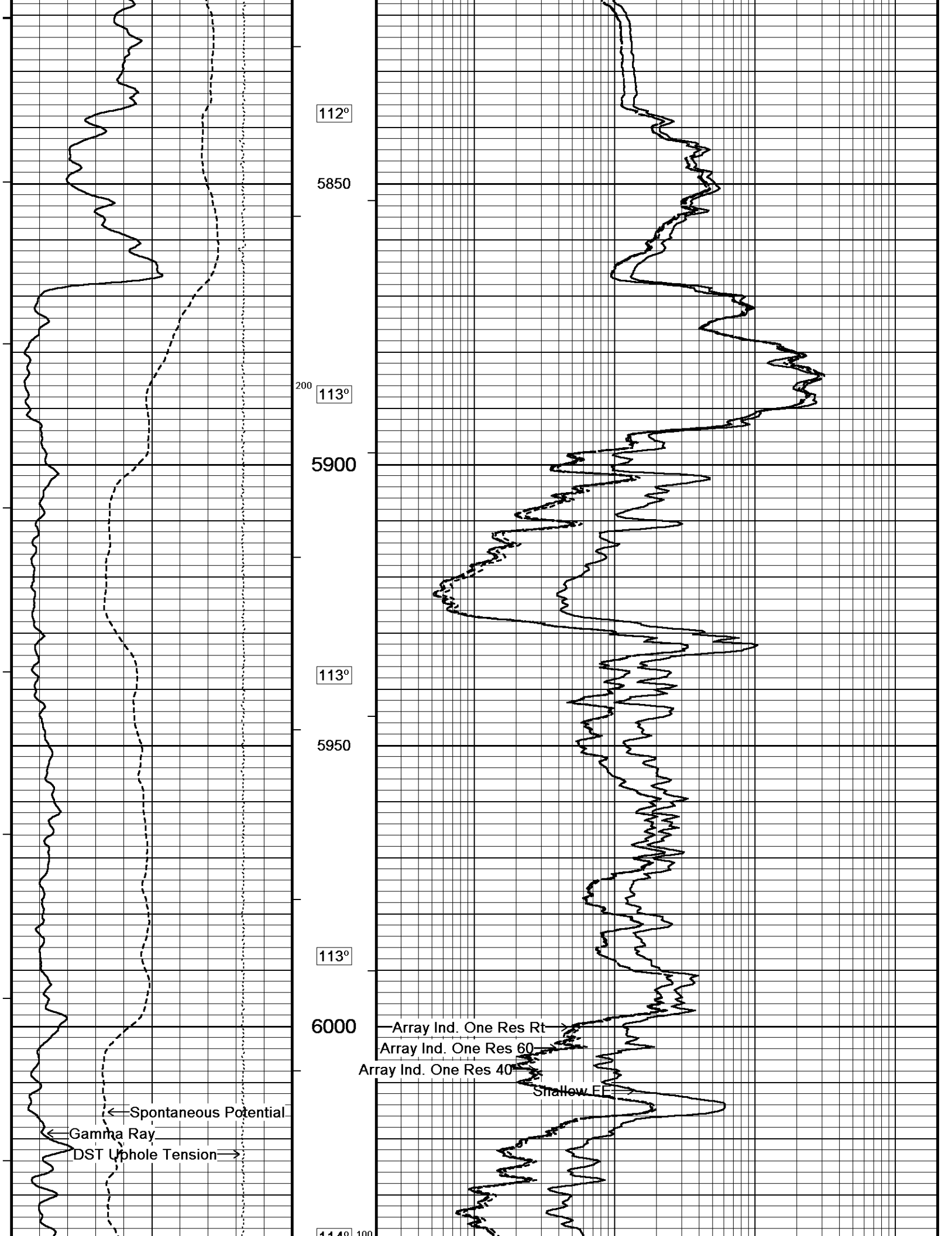


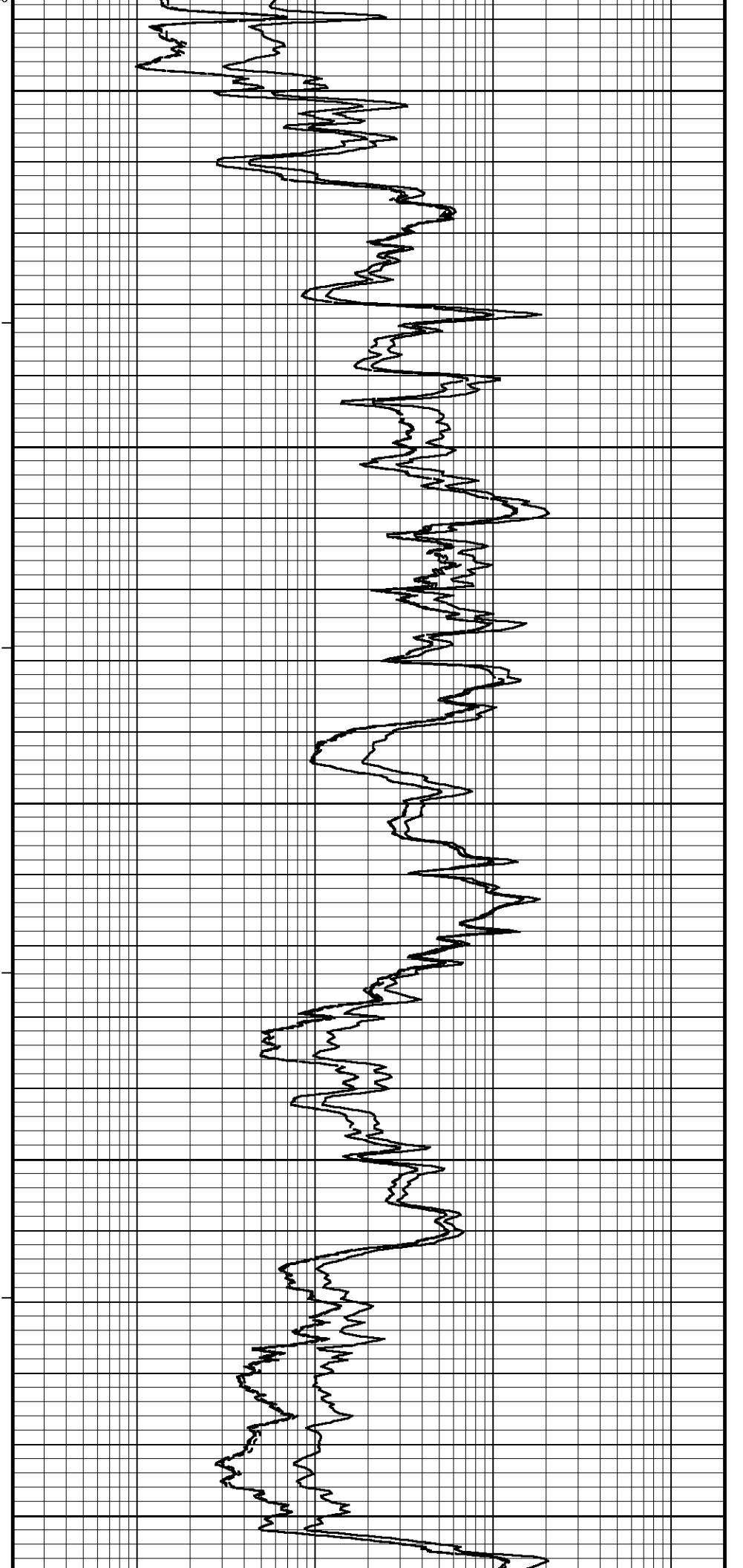
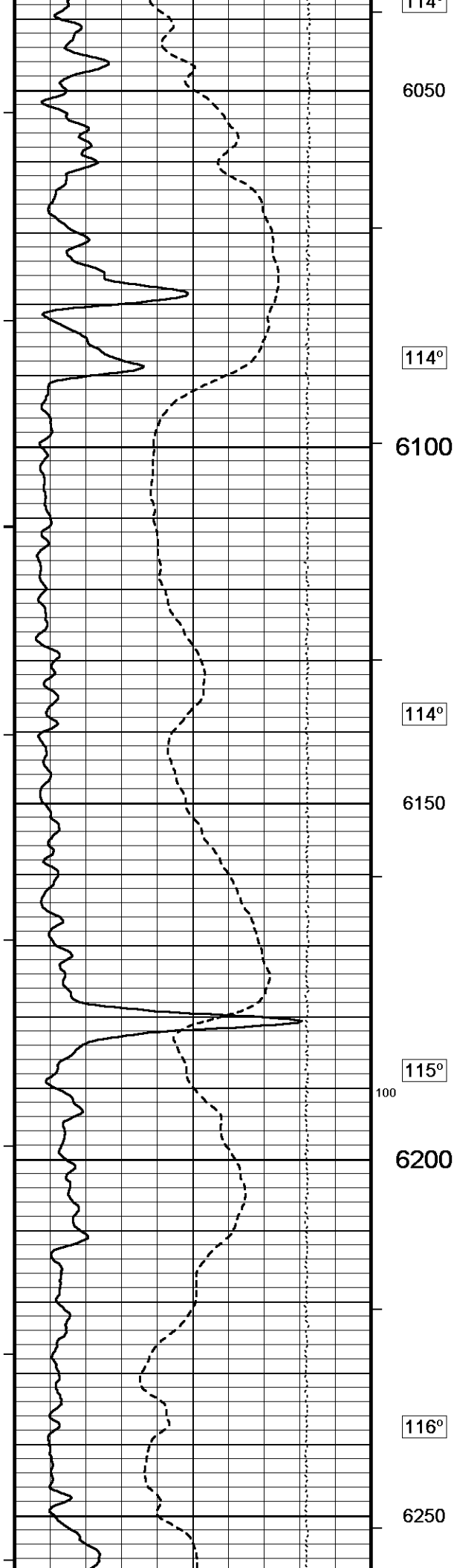


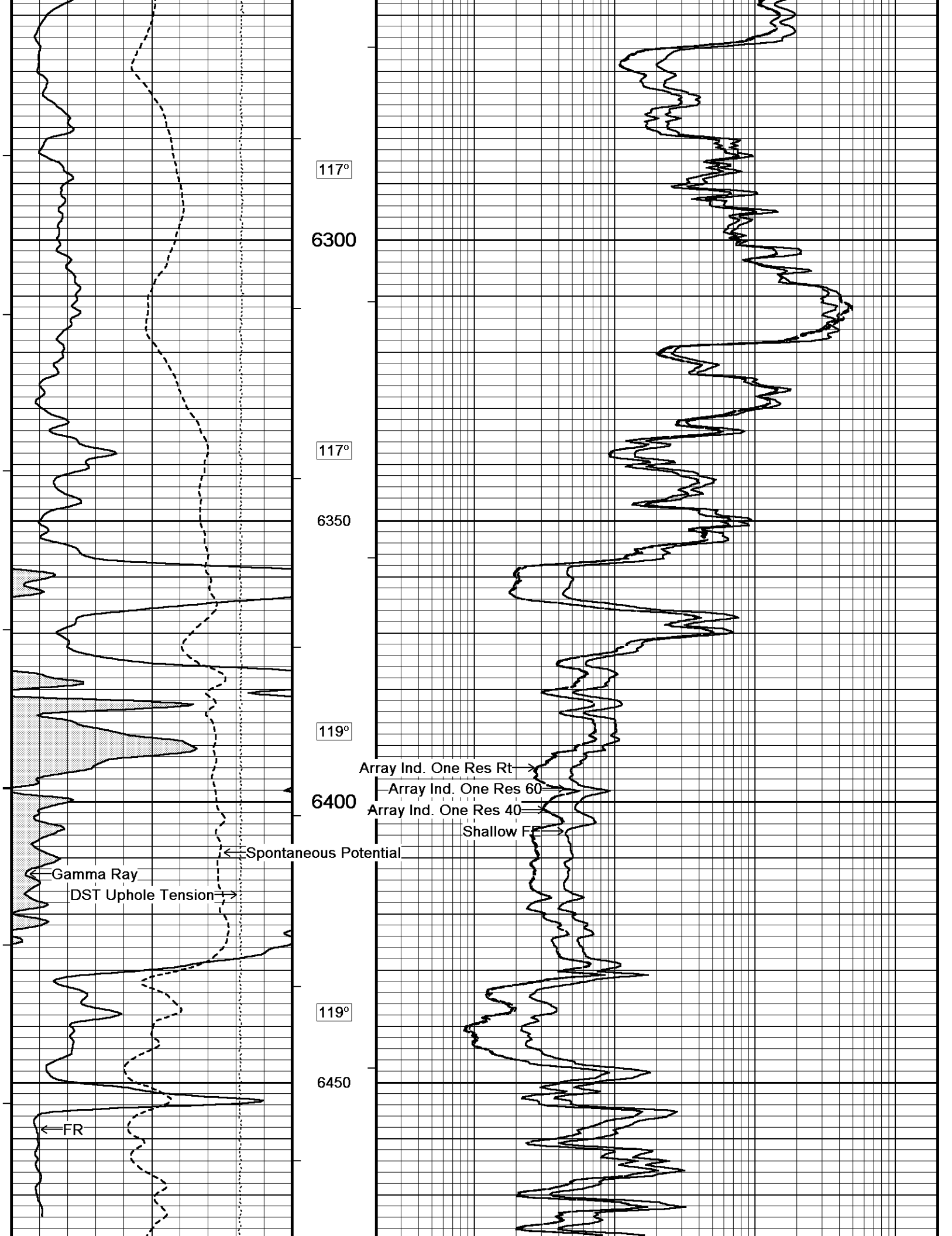


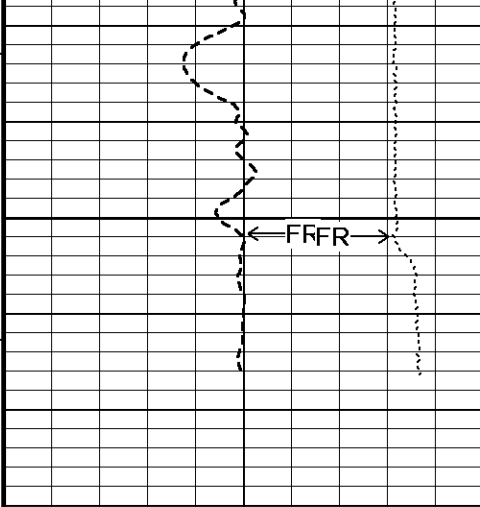
5600  
111°  
5650  
111°  
5700  
111°  
5750  
112°  
5800



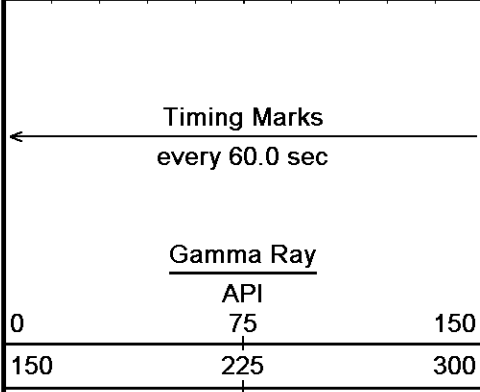
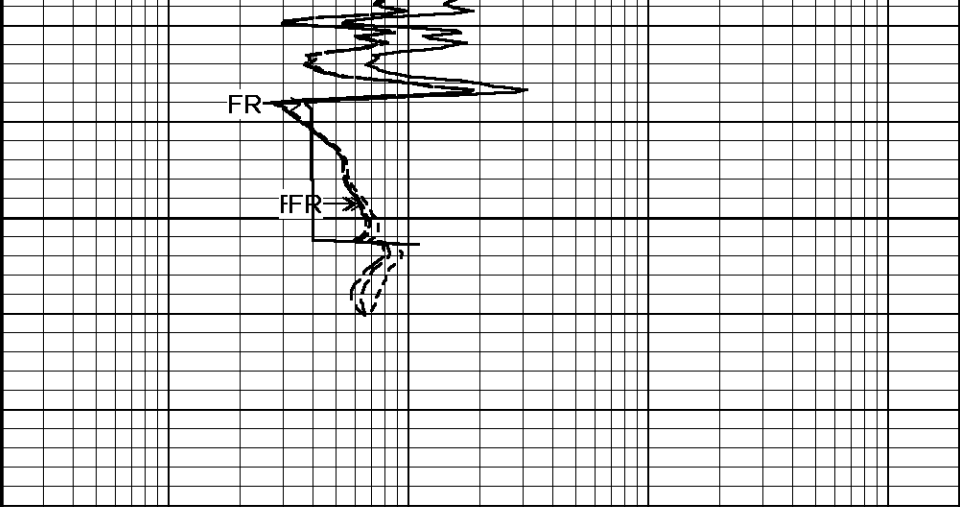






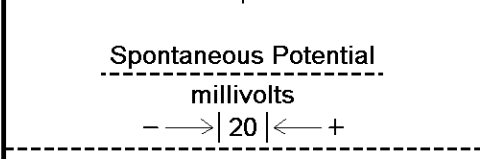
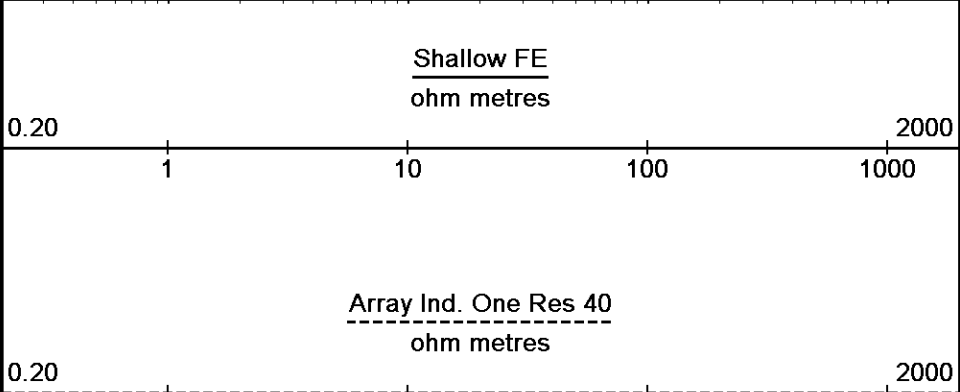


6500

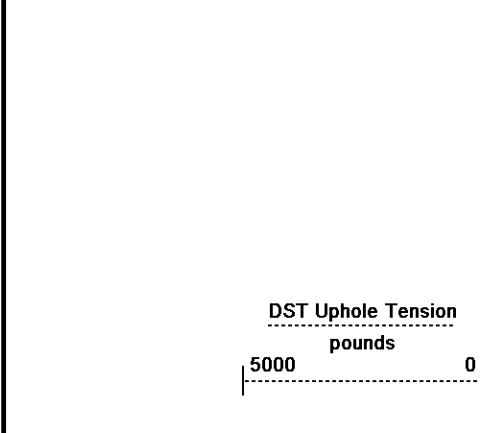
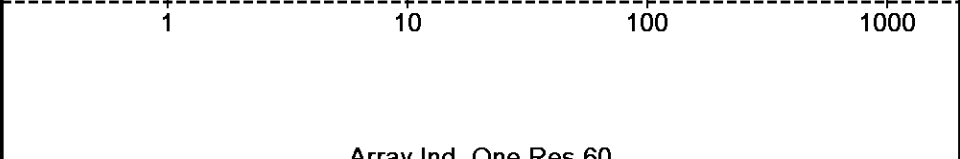


Depth in Feet

Borehole Temp in deg F

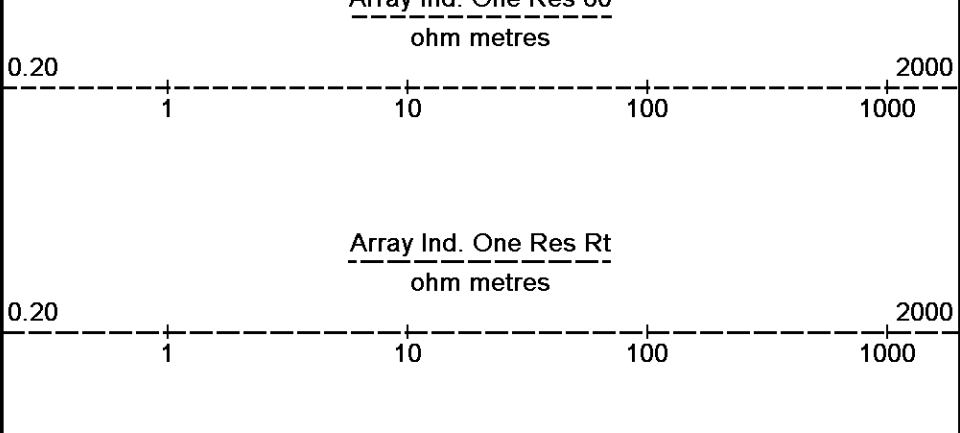


HVI every 10 cu ft



Annular Integral every 10 cu ft

Replay Scale 1:240

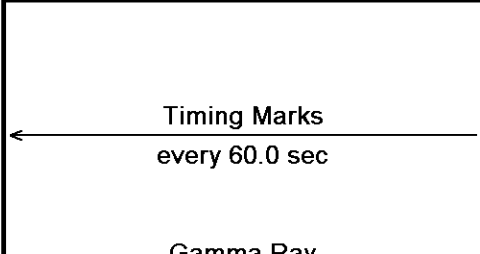


Depth Based Data - Maximum Sampling Increment 10.0cm  
 Filename: C:\Minimus 15.03.5939\Logs\O'Brien Mary #1-1\O'Brien Mary #1-1 Main.dta  
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↑ 5 INCH MAIN ↑

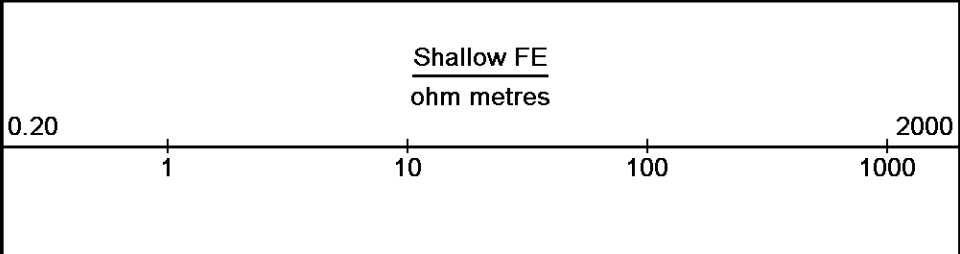
↓ REPEAT SECTION ↓

Depth Based Data - Maximum Sampling Increment 10.0cm  
 Filename: C:\Minimus 15.03.5939\Logs\O'Brien Mary #1-1\O'Brien Mary #1-1 Repeat.dta  
 System Versions: Logged with 15.03.5939 Plotted with 15.03.5939  
 Plotted on 20-DEC-2015 03:07  
 Recorded on 19-DEC-2015 22:13



Depth in Feet

Borehole



Gamma Ray		
0	API	150
	75	
150	225	300

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

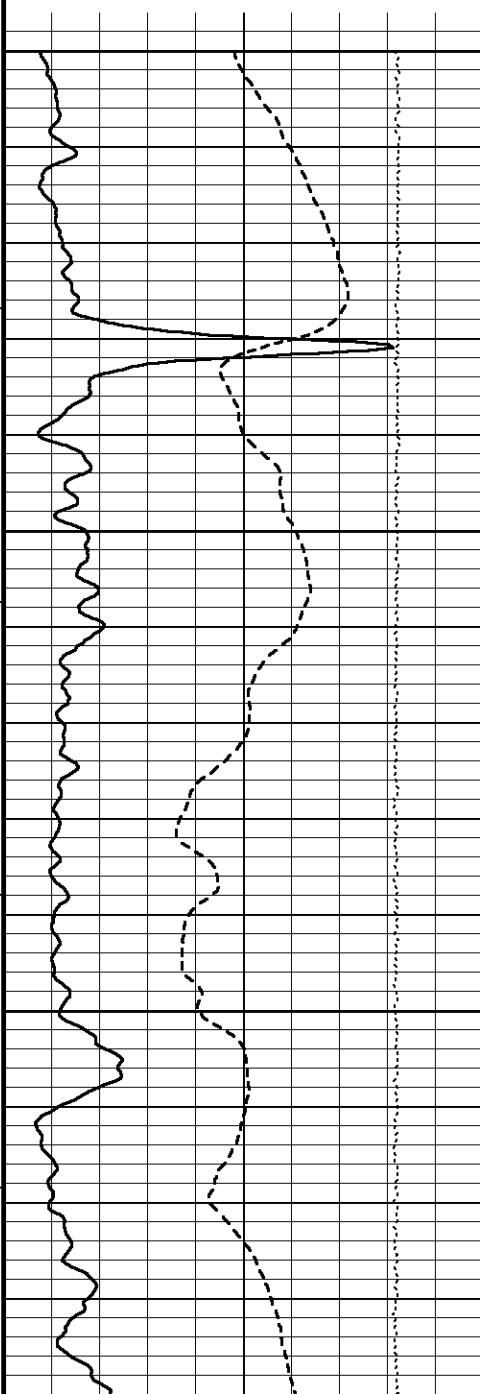
Spontaneous Potential millivolts  
 - - - - -> | 20 | < - - - - - +

DST Uphole Tension pounds  
 5000 0

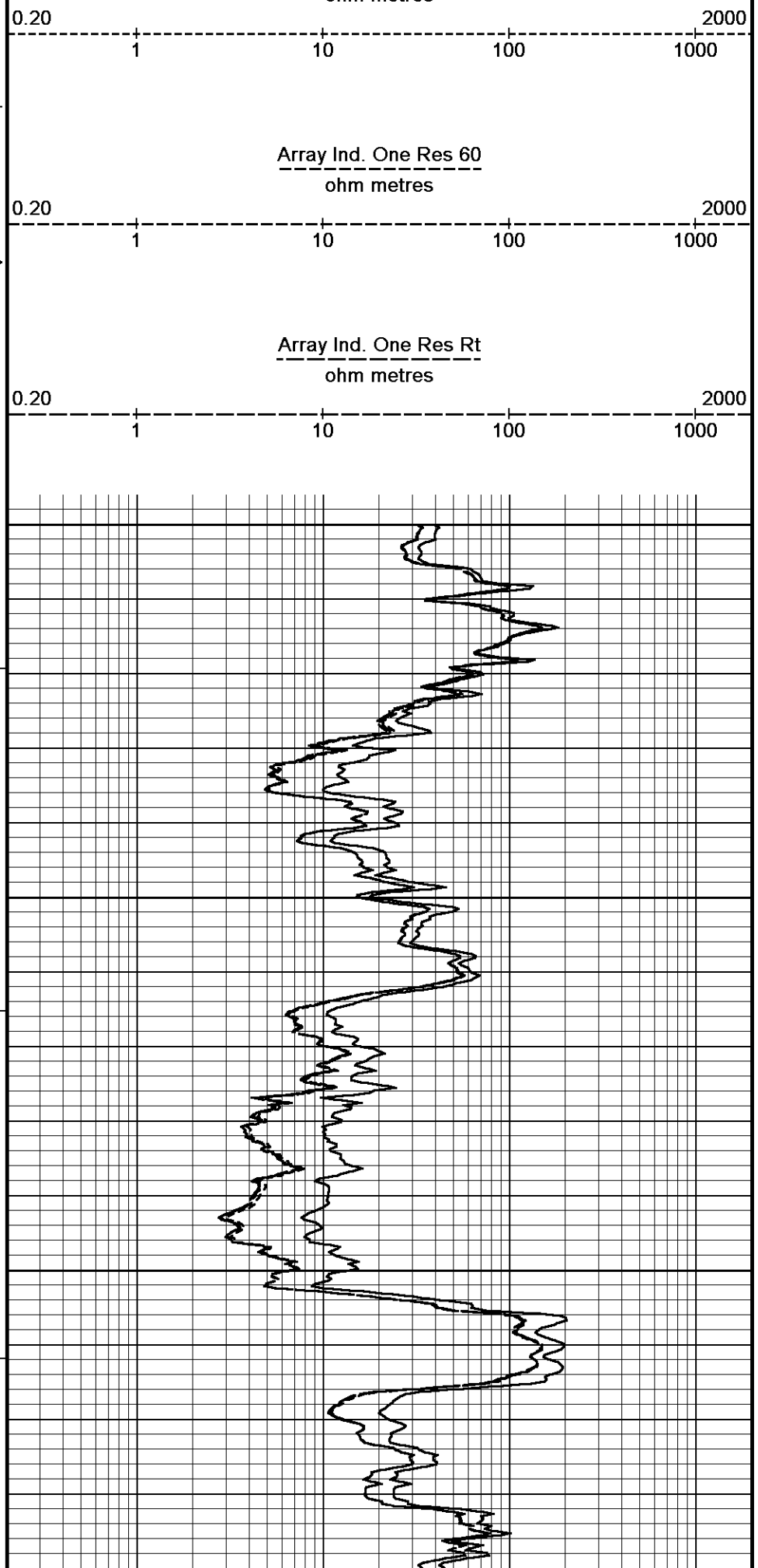
Array Ind. One Res 40 ohm metres

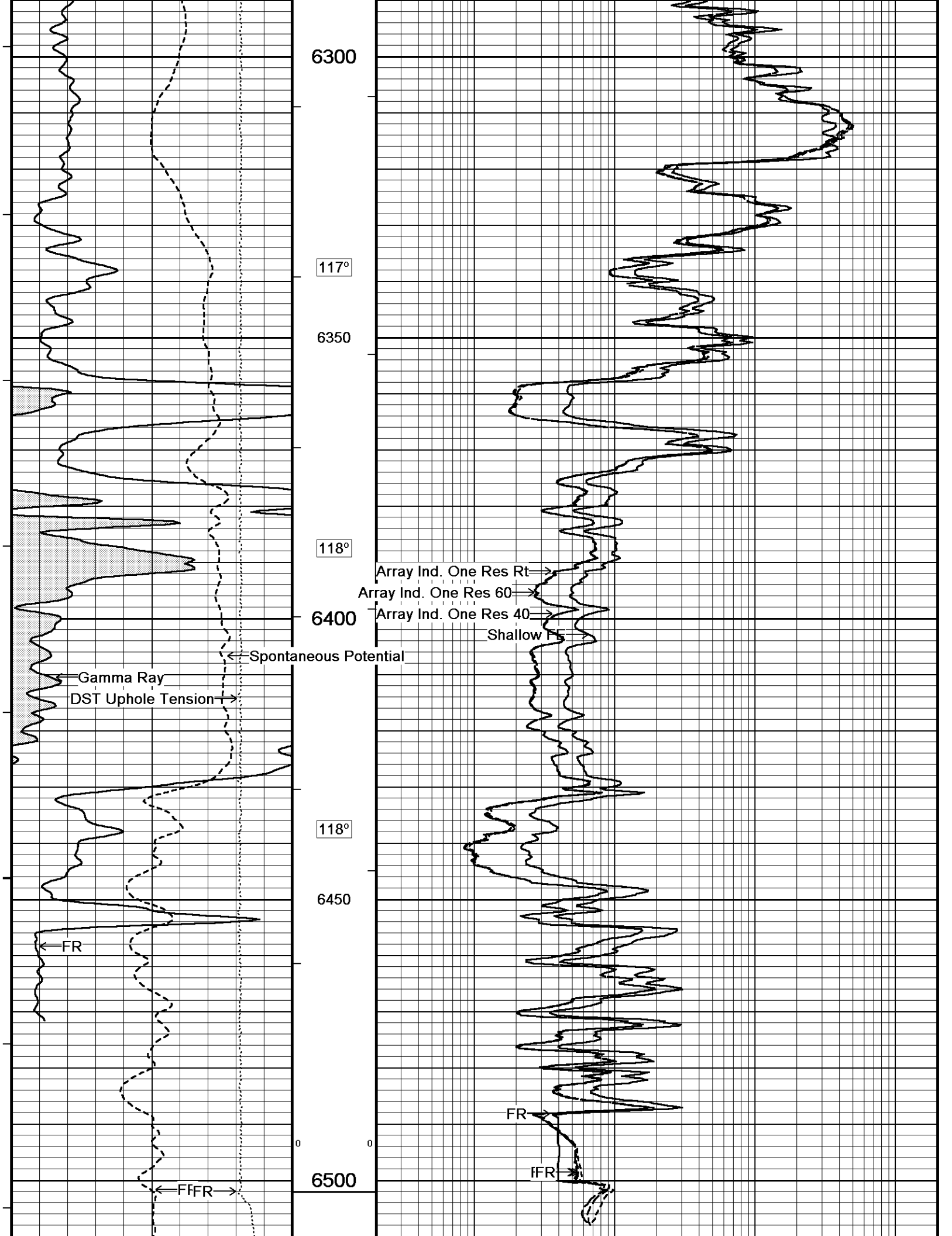
Array Ind. One Res 60 ohm metres

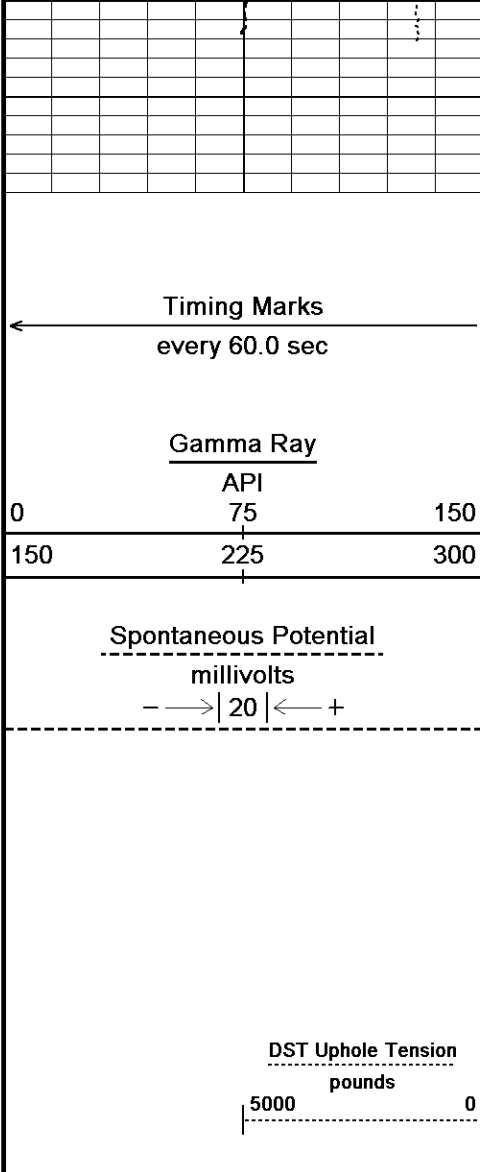
Array Ind. One Res Rt ohm metres



6150  
 100 114°  
 6200  
 115°  
 6250  
 116°







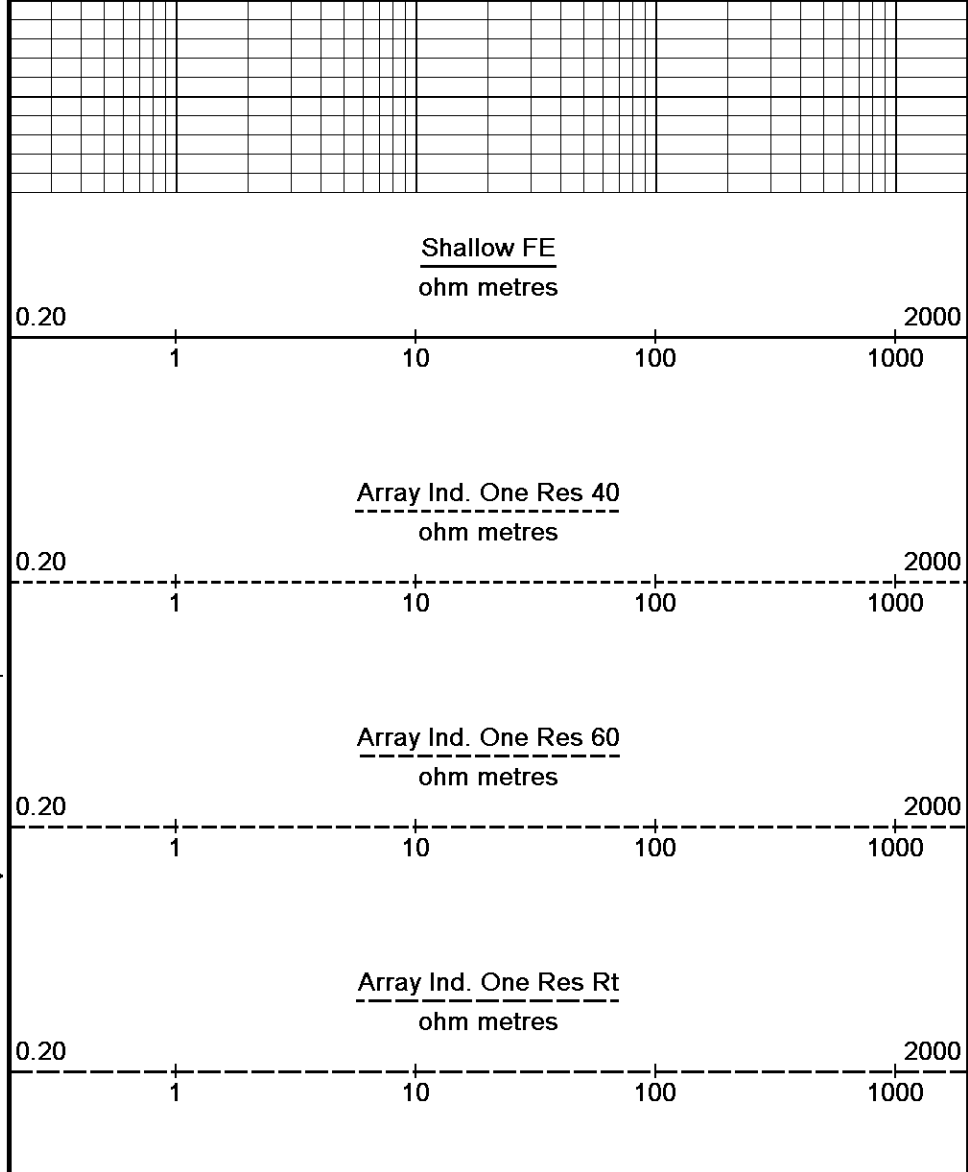
Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

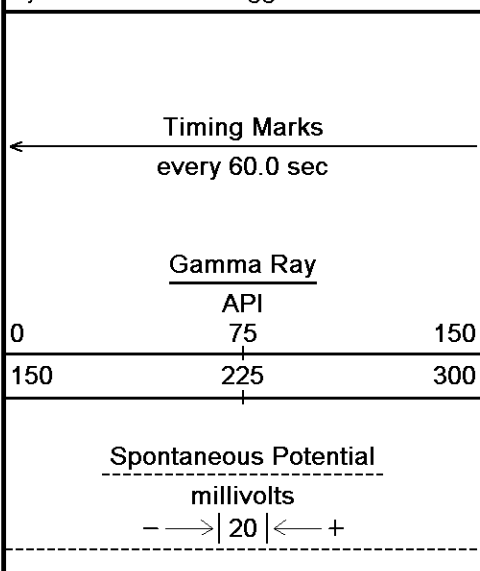


Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 20-DEC-2015 03:07  
 Filename: C:\Minimus 15.03.5939\Logs\O'Brien Mary #1-1\O'Brien Mary #1-1 Repeat.dta Recorded on 19-DEC-2015 22:13  
 System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

↑ REPEAT SECTION ↑

↓ 10 INCH HIGH RESOLUTION UPPER SECTION ↓

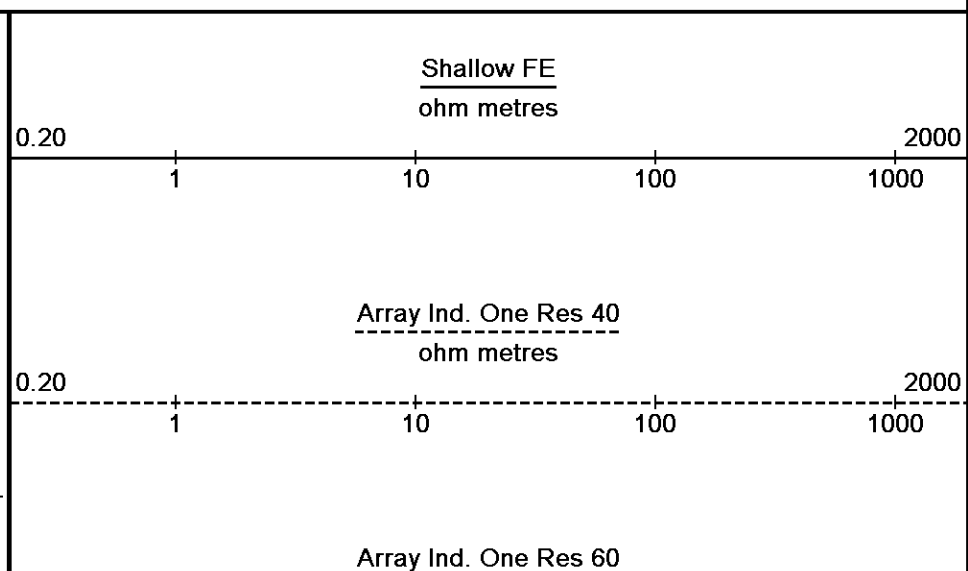
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 System Versions: Logged with 15.03.5939 Plotted with 15.03.5939



Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft



Annular  
Integral  
every  
10 cu ft

0.20

ohm metres

2000

1

10

100

1000

DST Uphole Tension  
pounds

5000 0

Replay  
Scale  
1:120

0.20

Array Ind. One Res Rt  
ohm metres

2000

1

10

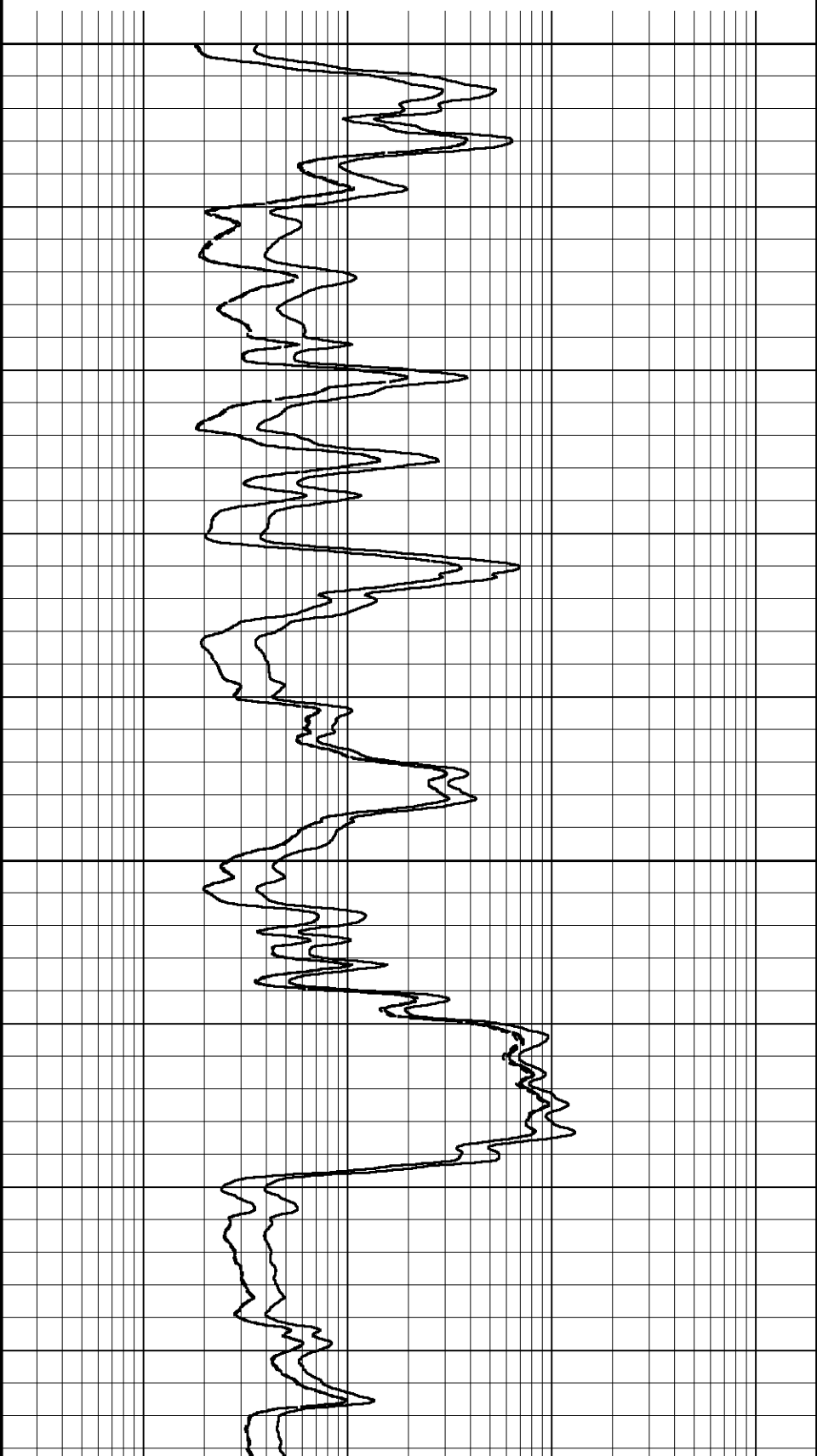
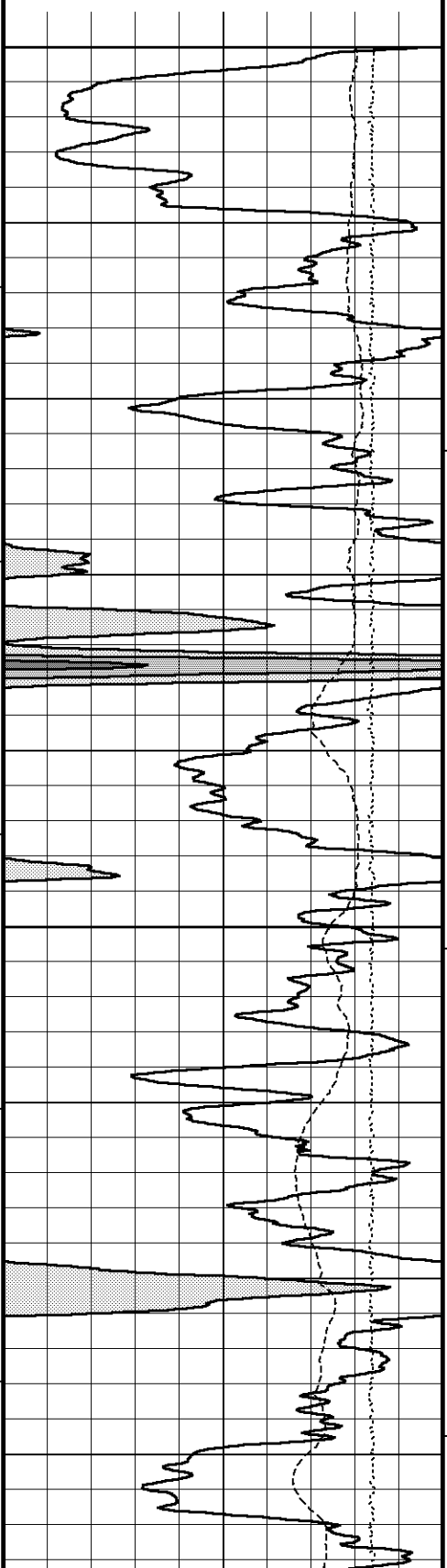
100

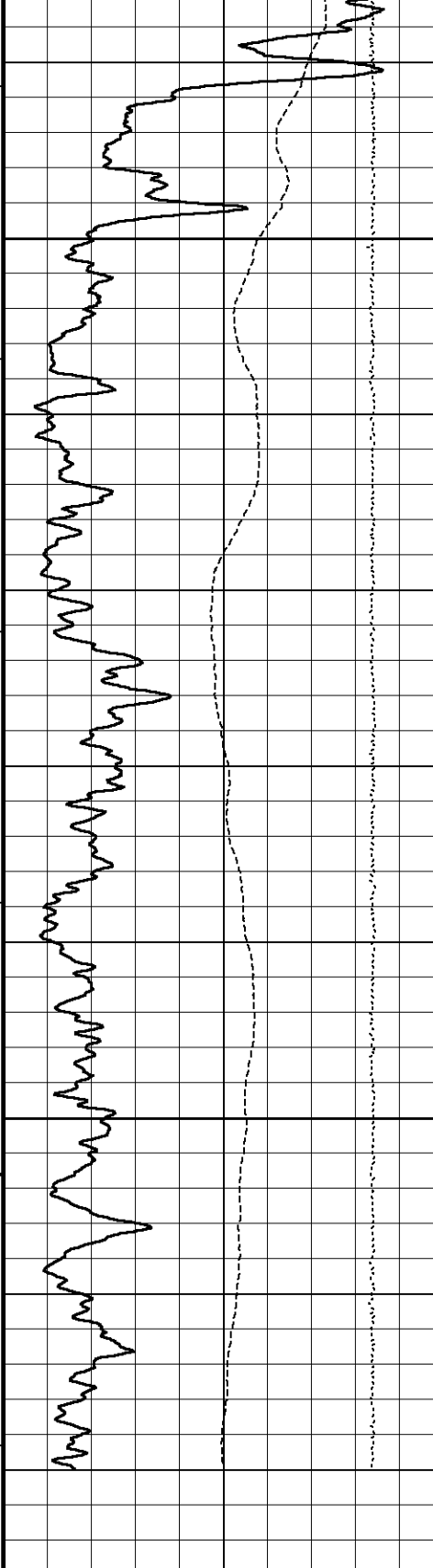
1000

5150

105°

5200





105°

5250

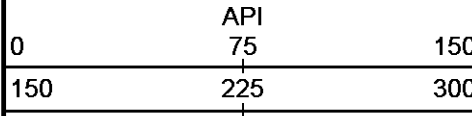
106°

5300

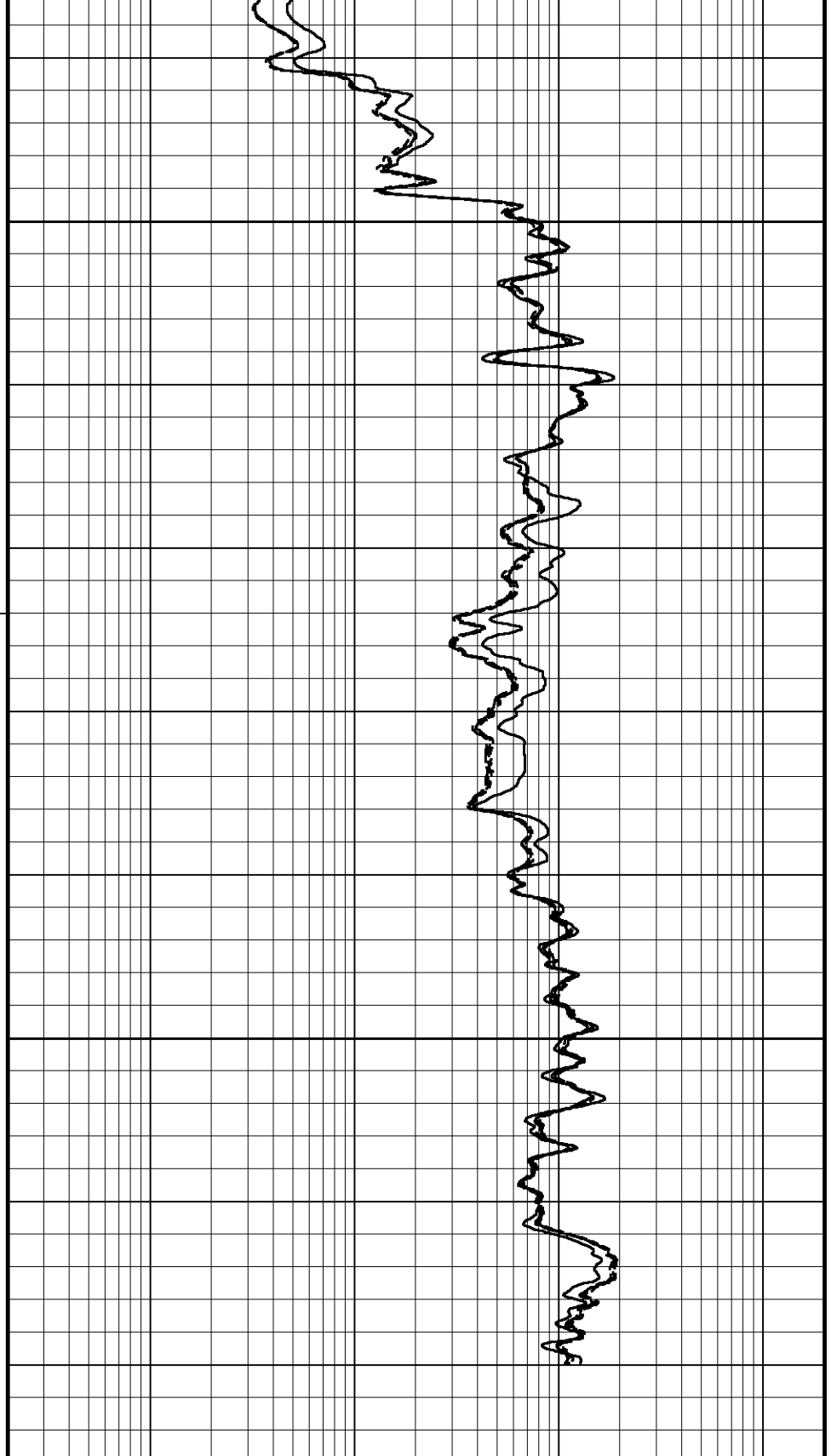
Depth  
in  
Feet

Timing Marks  
every 60.0 sec

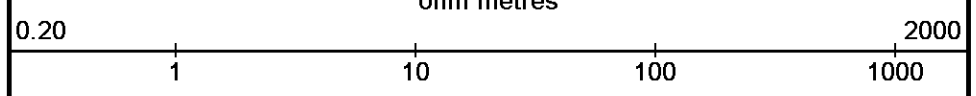
Gamma Ray  
API



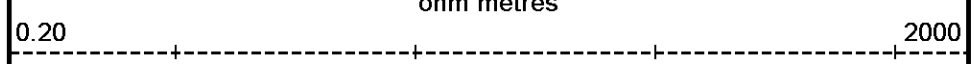
Borehole  
Temp in  
deg F

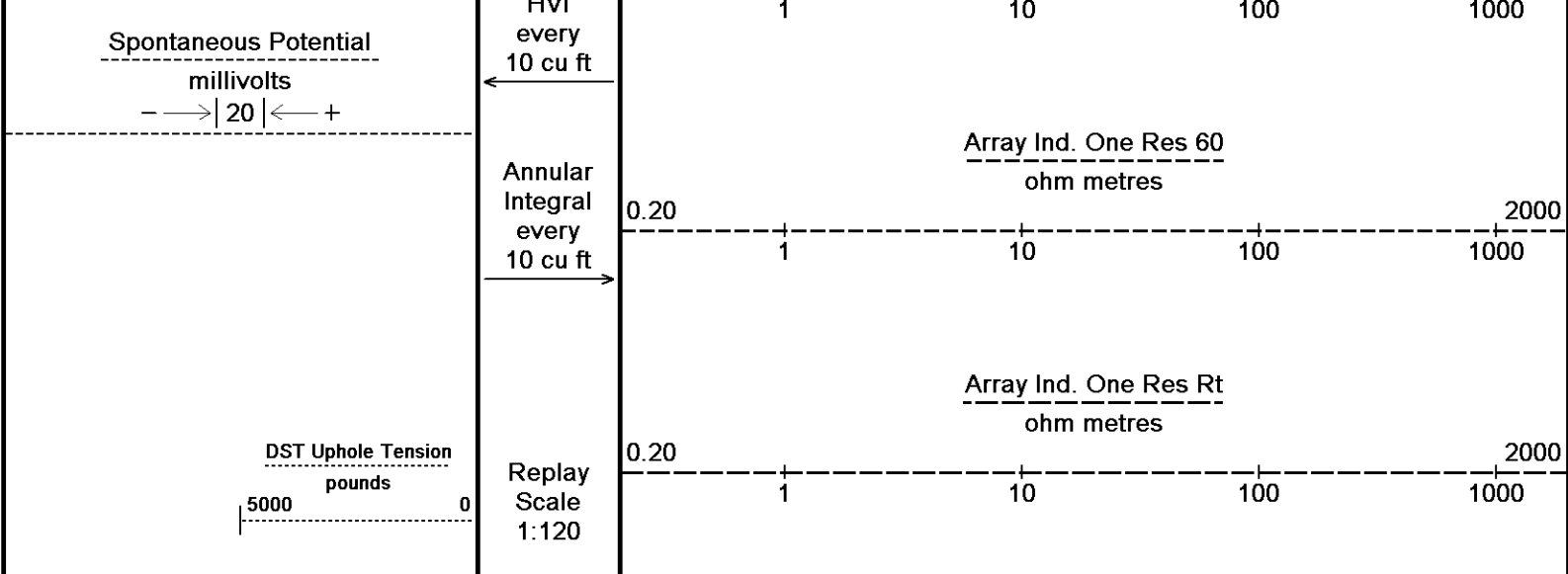


Shallow FE  
ohm metres



Array Ind. One Res 40  
ohm metres



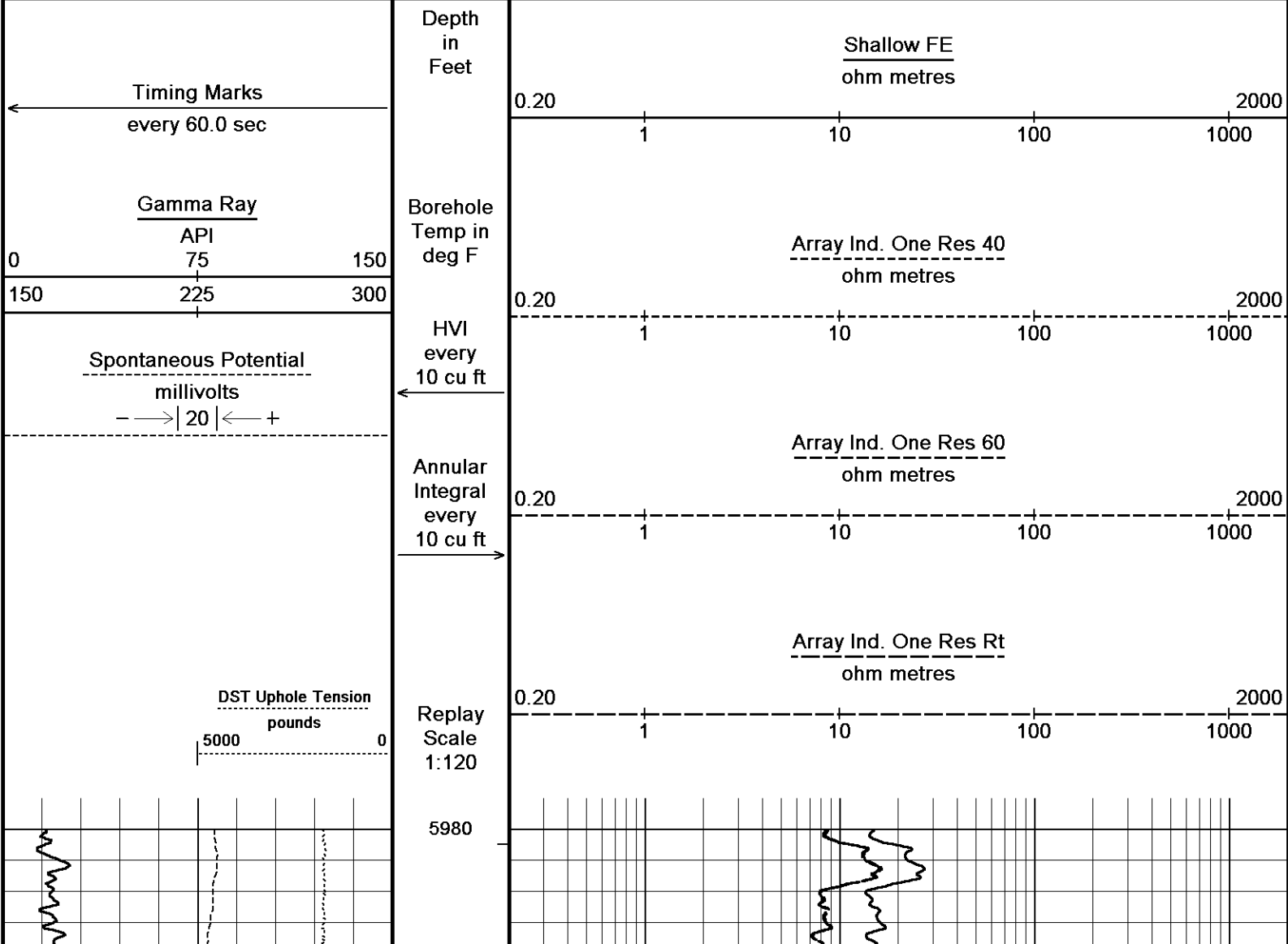


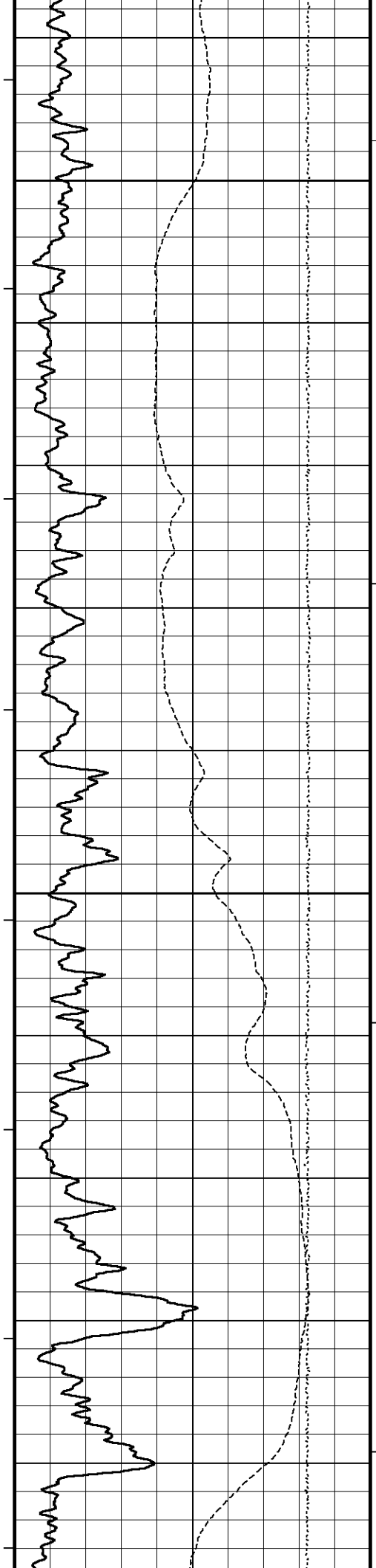
Depth Based Data - Maximum Sampling Increment 2.5cm  
 Plotted on 20-DEC-2015 03:07  
 Filename: C:\Minimus 15.03.5939\Logs\O'Brien Mary #1-1\O'Brien Mary #1-1 Hi-Res Upper.dta  
 Recorded on 19-DEC-2015 21:11  
 System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

↑ 10 INCH HIGH RESOLUTION UPPER SECTION ↑

↓ 10 INCH HIGH RESOLUTION LOWER SECTION ↓

Depth Based Data - Maximum Sampling Increment 2.5cm  
 Plotted on 20-DEC-2015 03:07  
 Filename: C:\Minimus 15.03.5939\Logs\O'Brien Mary #1-1\O'Brien Mary #1-1 Hi-Res Lower.dta  
 Recorded on 19-DEC-2015 21:43  
 System Versions: Logged with 15.03.5939 Plotted with 15.03.5939



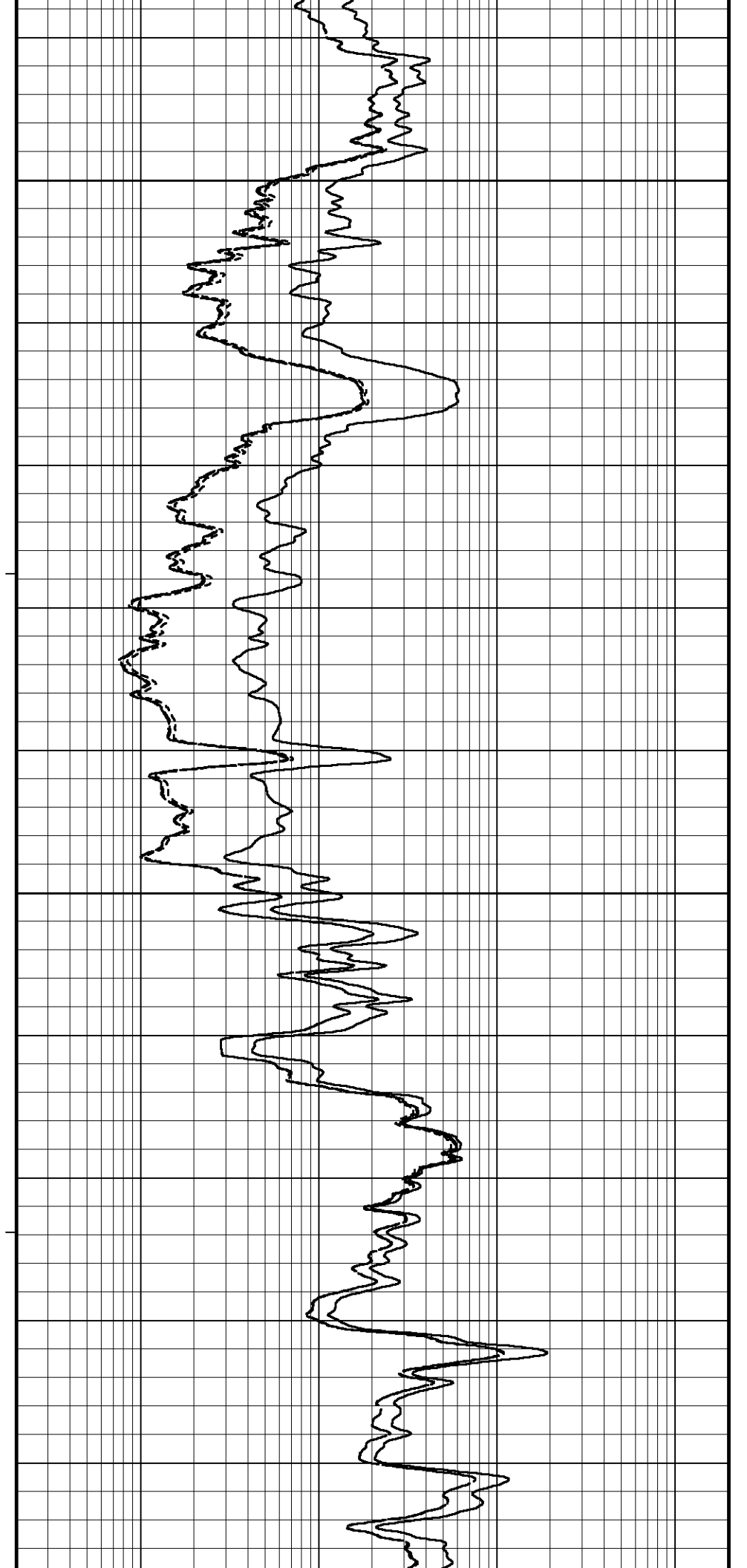


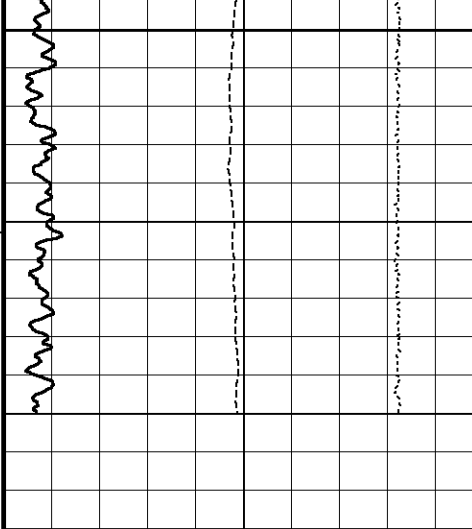
6000

$111^\circ$

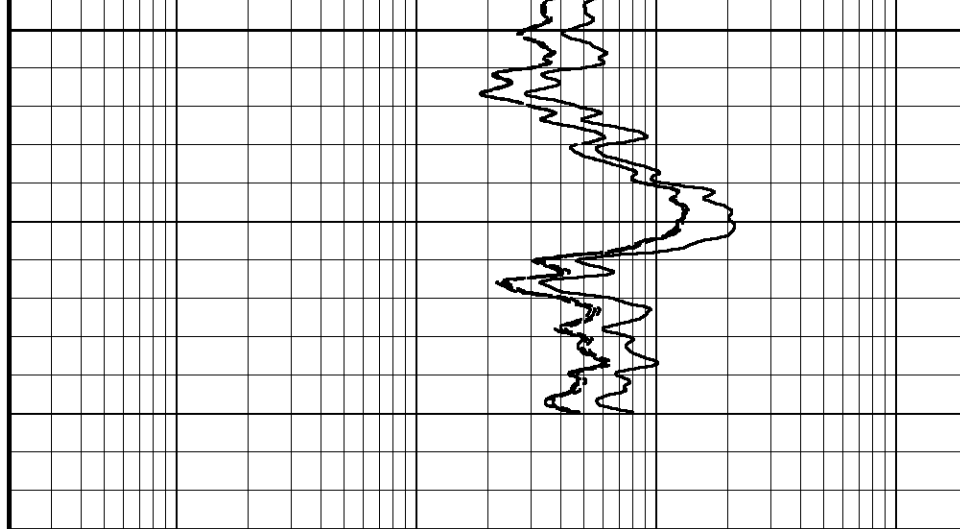
6050

$111^\circ$





6100



← 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 1:120

Shallow FE  
ohm metres  
0.20 1 10 100 1000 2000

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

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

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

Depth Based Data - Maximum Sampling Increment 2.5cm  
 Filename: C:\Minimus 15.03.5939\Logs\O'Brien Mary #1-1\O'Brien Mary #1-1 Hi-Res Lower.dta  
 System Versions: Logged with 15.03.5939 Plotted with 15.03.5939  
 Plotted on 20-DEC-2015 03:07  
 Recorded on 19-DEC-2015 21:43

↑ 10 INCH HIGH RESOLUTION LOWER SECTION ↑

BEFORE SURVEY CALIBRATION

C:\Minimus 15.03.5939\Logs\O'Brien Mary #1-1\O'Brien Mary #1-1 Repeat.dta

General Constants All 000		Last Edited on 19-DEC-2015,20:31	
General Parameters			
Mud Resistivity	0.700	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	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 15-DEC-2015 07:54


Reading No	Measured	Calibrated (lbs)
1	15210.27	0.00
2	16310.99	481.00

Gamma Calibration MCG-C 123

Field Calibration on 19-DEC-2015 14:25

	Measured	Calibrated (API)
Background	71	49
Calibrator (Gross)	729	505
Calibrator (Net)	658	456

Gamma Calibration Tolerances MCG-C 123

Ratio 1.443  Counts/API

Gamma Constants MCG-C 123

Last Edited on 19-DEC-2015,18:43

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.13	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 02-NOV-2015 16:50

	Measured	Calibrated (mV)
Reference 1	100.3	100.0
Reference 2	-100.1	-99.9

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

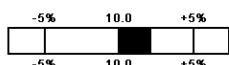
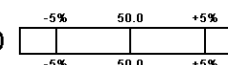
Base Calibration on 08-DEC-2015 14:10  
Field Check on 19-DEC-2015 14:13

Base Calibration

		Measured	Calibrated (ohm-m)
Channel	Resistor 1	Resistor 2	Resistor 1 Resistor 2
Micro Normal	10.2	50.0	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	93.5	93.5
Micro Inverse	62.2	62.2

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

Micro Normal Res. 1 10.2  ohm      Micro Normal Res. 2 50.0  ohm

Micro Inverse Res. 1	10.0		ohm	Micro Inverse Res. 2	49.5		ohm
Micro Normal Base Check	93.5		ohm-m				
Micro Inverse Base Check	62.2		ohm-m				
Micro Normal Field Check	93.5		ohm-m				
Micro Inverse Field Check	62.2		ohm-m				

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

Last Edited on 20-OCT-2015,12:33

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 08-DEC-2015 14:01  
Field Calibration on 19-DEC-2015 14:11

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	14497	5.98
2	17836	7.97
3	21070	9.86
4	24988	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 MMR-C.A 247**

Short Arm Field Cal.	7.96		in
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**Micro-Resistivity Caliper Constants MMR-C.A 247**

Last Edited on

Sonde Configuration	Resistivity Mode
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**Neutron Calibration MDN-A.B 114**

Base Calibration on 08-DEC-2015 14:59  
Field Check on 19-DEC-2015 14:30

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
Ratio	3047	94	3714	110
	32.339		33.764	

Field Calibrator at Base		Calibrated (cps)	
Ratio		2143	3132
		0.684	

Field Check		Calibrated (cps)	
Ratio		2126	3071
		0.692	

**Neutron Calibration Tolerances MDN-A.B 114**

Ratio	32.339	
Base Check	0.684	
Field Check	0.692	

**Neutron Constants MDN-A.B 114**

Last Edited on 19-DEC-2015,18:43

Neutron Source Id	P0204NN		
Neutron Jig Number	NJ5736		
Air Hole Processing	Legacy		
Caliper Source for Processing	Density Caliper		
Stand-off	0.00	inches	

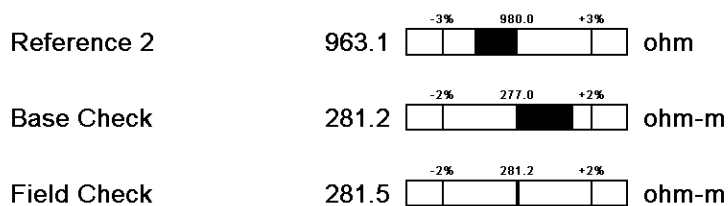
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	N/A	kppm
Barite Mud Correction	Not Applied	

**FE Calibration MFE-A.A 135**

Base Calibration on 08-DEC-2015 14:21  
Field Check on 19-DEC-2015 14:04

Base Calibration	
	Measured      Calibrated (ohm-m)
Reference 1	0.0              0.0
Reference 2	963.1            126.8
Base Check	281.2
Field Check	281.5

**FE Calibration Tolerances MFE-A.A 135**



**FE Constants MFE-A.A 135**

Last Edited on 19-DEC-2015,18:42

Running Mode	No Sleeve
MFE K Factor	0.1268
Borehole Correction Constants	
Sonde Position	0.5      inches
Hole Size Source	Density Caliper
Hole Size Constant Value	N/A      inches
Rm Source	Global Value: Temperature Corrected
Temp. for Rm Corr.	MCG External Temperature

**Induction Calibration MAI-A.A 111**

Base Calibration on 05-AUG-2014,09:34  
Field Check on 19-DEC-2015 14:03

Base Calibration	
Test Loop Calibration	
Channel	Measured      Calibrated (mmho/m)
	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      09-DEC-2015 11:03

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	12.1	3873.0	11.2	3872.7
2	29.8	3528.1	29.4	3528.3
3	29.1	3021.3	28.8	3021.7
4	19.1	2058.5	19.0	2058.8
Deep	17.7	1962.1	17.6	1962.4
Medium	43.1	3976.4	42.9	3977.0
Shallow	44.4	5232.7	43.8	5232.9
Array Temperature	65.8		54.4	Deg F

**Induction Calibration Tolerances MAI-A.A 111**

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 19-DEC-2015,18:42

Induction Model	RtAP-WBM		
Borehole Correction Constants			
Tool Centred	No		
Hole Size Source	Density Caliper		
Hole Size Constant Value	N/A	inches	
Stand-off Type	Fins		
Stand-off	0.50	inches	
Number of Fins on Stand-off	8.0000		
Stand-off Fin Angle	45.00	degrees	
Stand-off Fin Width	0.5000	inches	
Rm Source	Global Value: Temperature Corrected		
Temp. for Rm Corr.	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

## Caliper Calibration MPD-C.A 216

Base Calibration on 08-DEC-2015 13:20  
Field Calibration on 19-DEC-2015 14:06

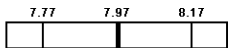
## Base Calibration

Reading No	Measured	Calibrator Size (in)
1	20896	3.99
2	31104	5.98
3	41152	7.97
4	51010	9.86
5	61632	11.92
6	N/A	N/A

## Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.98	7.97

## Caliper Calibration Tolerances MPD-C.A 216

Short Arm Field Cal. 7.98  in

## Photo Density Calibration MPD-C.A 216

Base Calibration on 08-DEC-2015 13:38  
Field Check on 19-DEC-2015 14:10

## Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1066	1262		
Reference 1	52985	25543	59556	30836
Reference 2	21151	2428	24941	2541

## Field Check at Base

1066.1 1261.6

## Field Check

1070.1 1262.5

## PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	194	945		
Reference 1	21734	52806	0.415	0.371
Reference 2	5972	21023	0.288	0.272

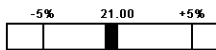
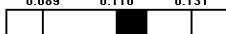
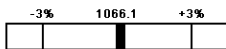
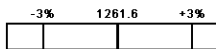
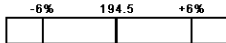
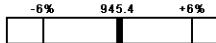
## Field Check at Base

194.5 945.4

## Field Check

194.1 950.3

## Photo Density Calibration Tolerances MPD-C.A 216

Near Density Ratio 2.58 Far Density Ratio 20.82 PE Calibration 0.119 Near Den. Field Check 1070.1 Far Den. Field Check 1262.5 PE WS Field Check 194.1 PE WH Field Check 950.3 

## Density Constants MPD-C.A 216

Last Edited on 19-DEC-2015,18:43

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	1.13	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	

### DOWNHOLE EQUIPMENT

C:\Minimus 15.03.5939\Log\O'Brien Mary #1-1\O'Brien Mary #1-1 Repeat.dta

Cablehead, 11 pin  
CBH-CA 155 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

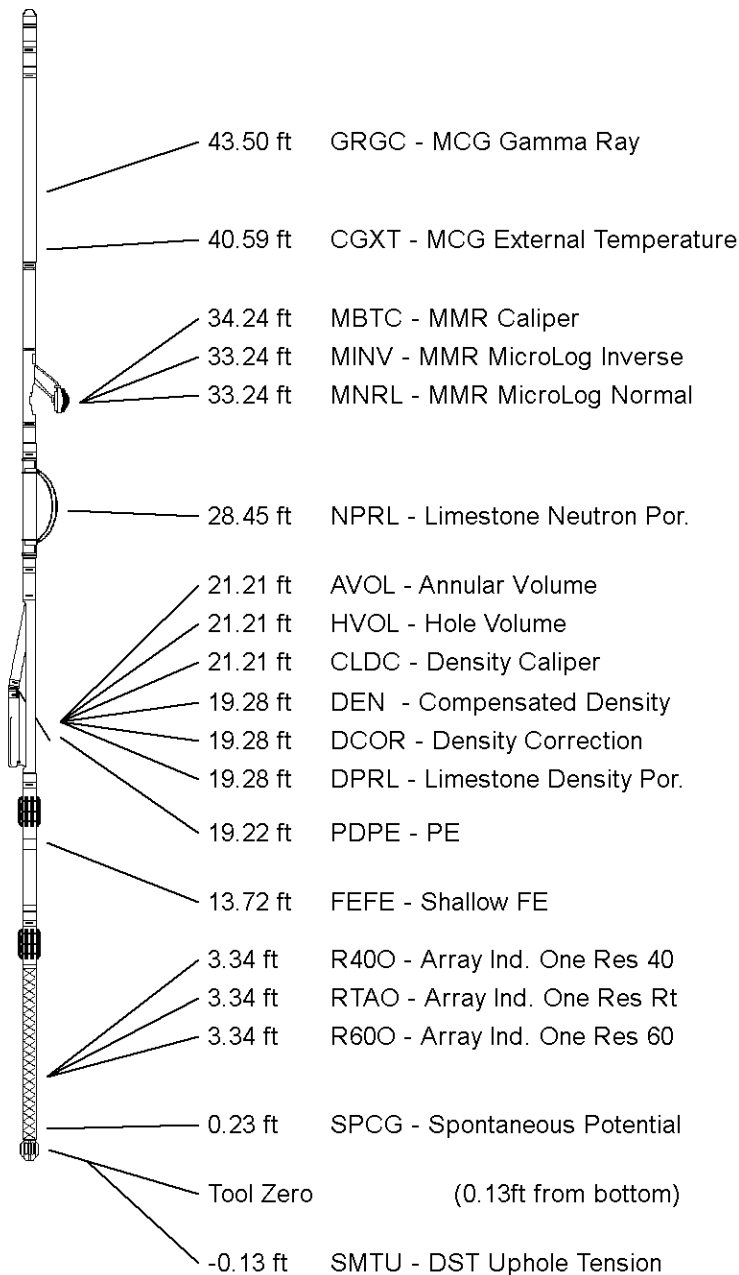
Compact Neutron  
MDN-A.B 114 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

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

Compact Focussed Electric  
MFE-A.A 135 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: 51.18 ft Weight: 407.9 lb



All measurements relative to tool zero.

COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	MARY #1-1
FIELD	GRANGER CREEK
PROVINCE/COUNTY	CLARK

PROVINCE/COUNTY CLARK  
 COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	2265.00	feet	First Reading	6499.00	feet
Elevation Drill Floor	2263.00	feet	Depth Driller	6500.00	feet
Elevation Ground Level	2252.00	feet	Depth Logger	6502.00	feet

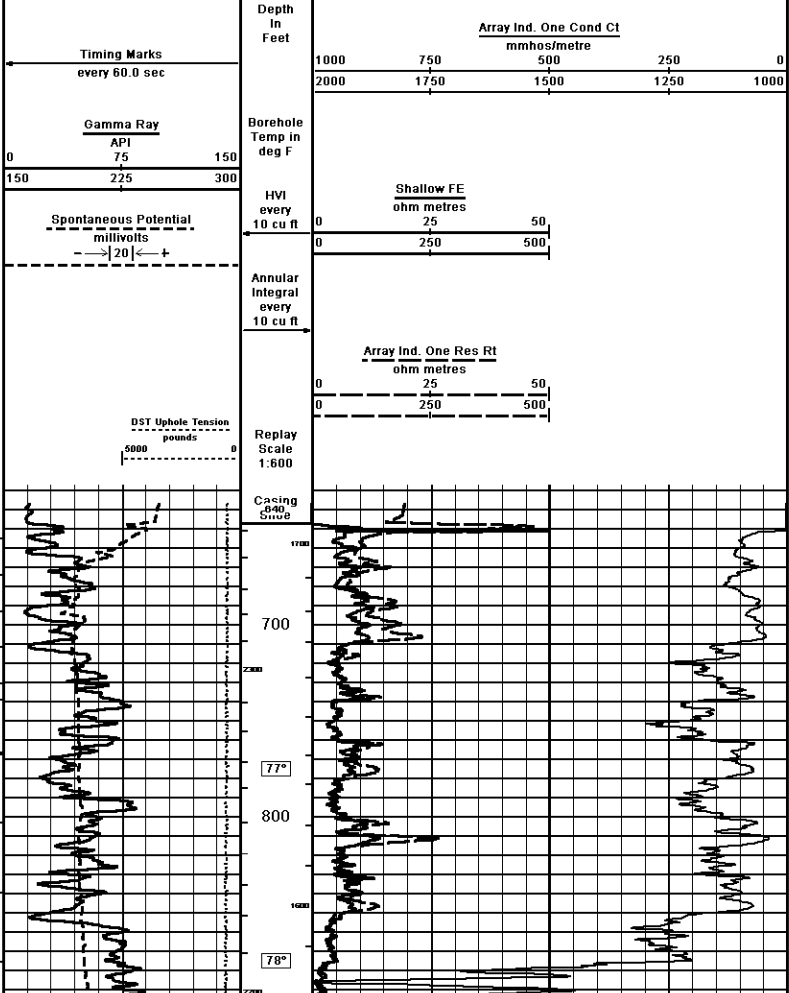


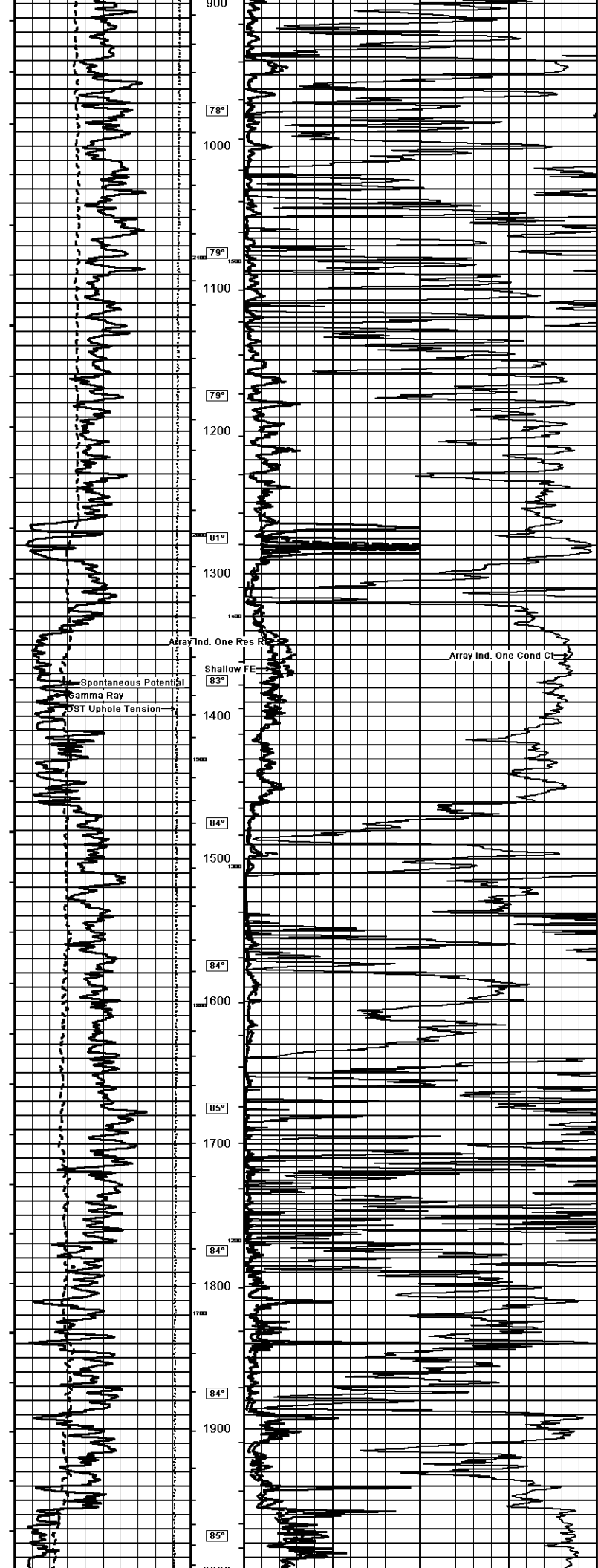
ARRAY INDUCTION  
 SHALLOW FOCUSED  
 ELECTRIC LOG

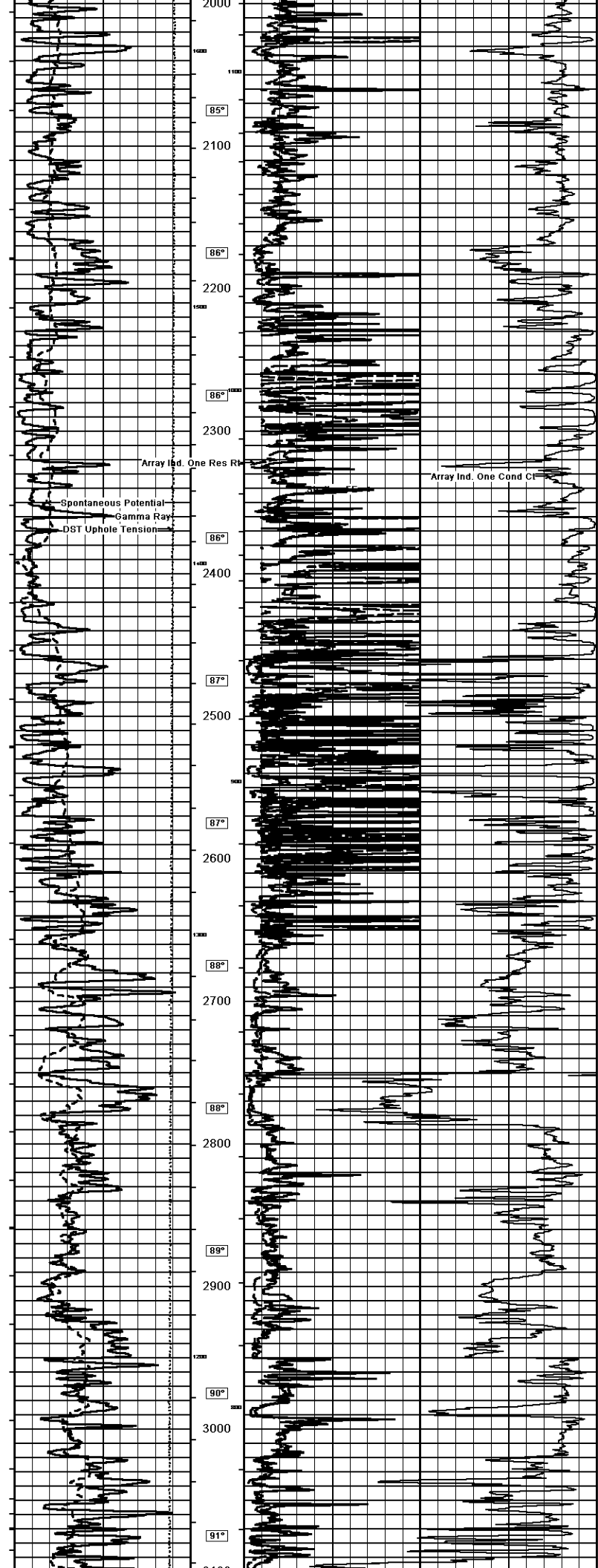
**Weatherford**<sup>®</sup>

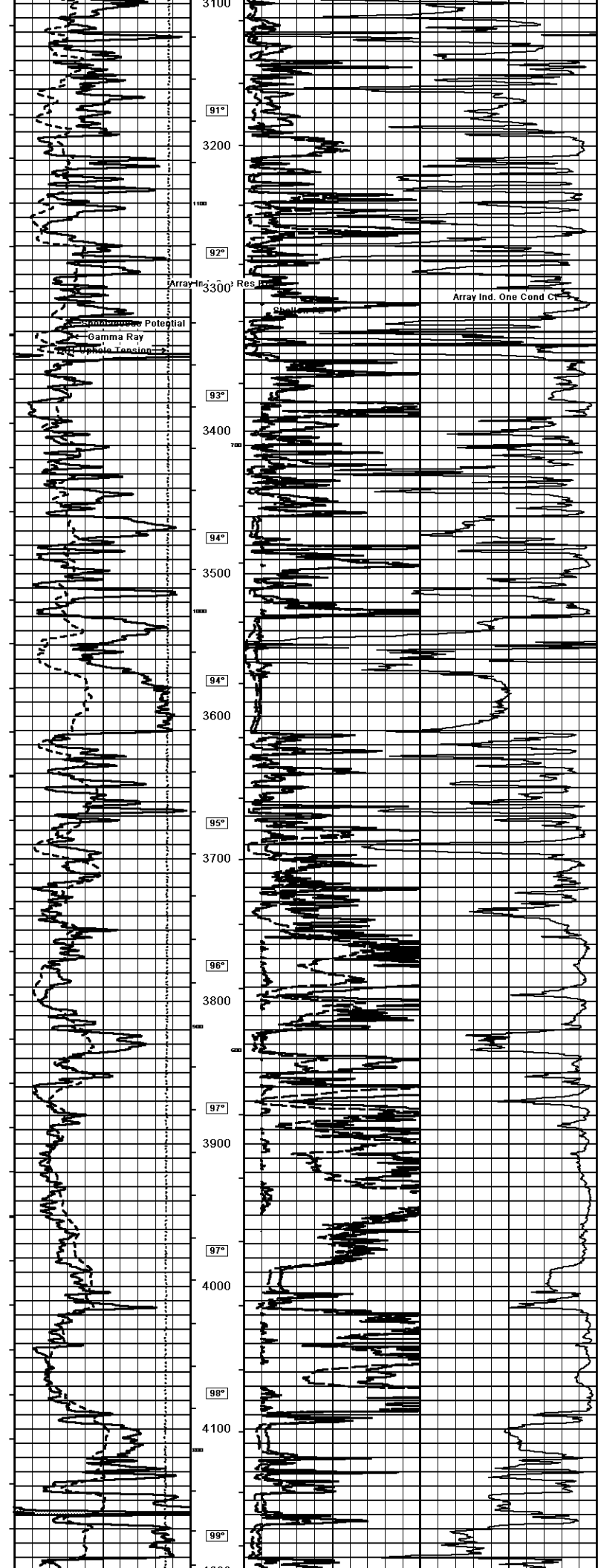
		<b>ARRAY INDUCTION          SHALLOW FOCUSED          ELECTRIC LOG</b>	
<b>Weatherford</b> COMPANY: O'BRIEN ENERGY RESOURCES CORP. WELL: MARY #1-1 FIELD: GRANGER CREEK PROVINCE/COUNTY: CLARK COUNTRY/STATE: U.S.A. / KANSAS LOCATION: 2277' ENL & 2282' FEL SEC: 1 TWP: 31S RGE: 22W COR: S20E State: MISSOURI Latitude: 36.9525 Longitude: -92.3500 Permit/Datum: G.L., Elevation: 2252.16ft Log Measured From: KB Drilling Measured From: KB @ 13 FEET Date: 19-DEC-2015		Run Number: ONE Service Order: 4558-137748401 Depth Driller: 6500.00 feet Depth Logger: 6502.00 feet First Reading: 6499.00 feet Last Reading: 647.00 feet Casing Driller: 644.00 feet Casing Logger: 647.00 feet Bit Size: 7.875 inches Hole Fluid Type: CHEMICAL Density/Viscosity: 9.45 lbm/sg 48.00 CP PH/Fluid Loss: FLOWLINE 9.20 ml/30min Sample Source: FLOWLINE Rm @ Measured Temp: 0.70 @ 75.0 ohm-m Rmt @ Measured Temp: 0.36 @ 75.0 ohm-m Rmt @ Measured Temp: 0.84 @ 75.0 ohm-m Source Rmt / Rmc: CALC CALC Rm @ BHT: 0.44 @ 119.0 ohm-m Time Since Circulation: 5 HOURS Max Recorded Temp: 119.00 deg F Equipment/Base: 13006 deg F Recorded By: ADAM SILL Witnessed By: ROGER PEARSON	
Encuttings: KG PF QL 2265.00 2263.00 2252.00		MML	

1 INCH MAIN  
 Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 20-DEC-2015 03:07  
 Filename: C:\Minimus 15.03.5938\Logs\O'Brien Mary #1-1\O'Brien Mary #1-1 Main.dta  
 Recorded on 19-DEC-2015 22:36  
 System Versions: Logged with 15.03.5938 Plotted with 15.03.5939









Array Ind. Two Cond CT

Array Ind. One Cond CT

Potential  
Gamma Ray  
Uphole Tension

91°

92°

93°

94°

94°

95°

96°

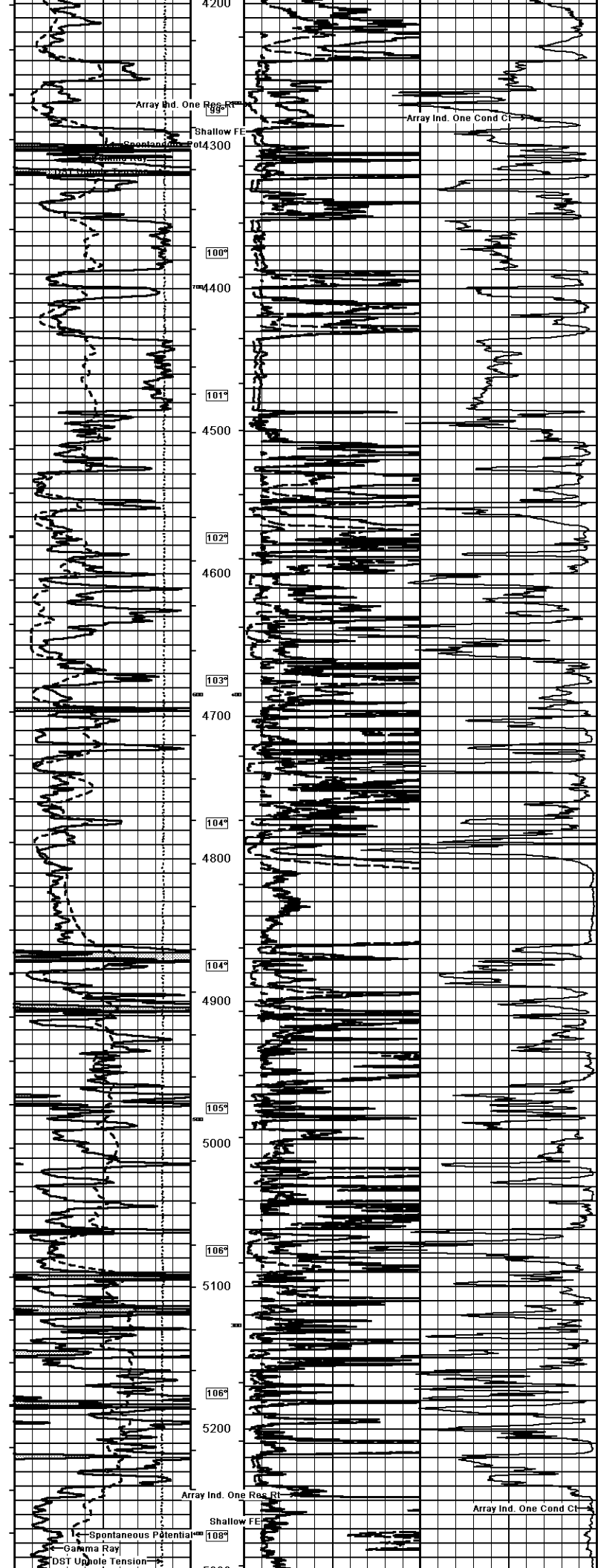
97°

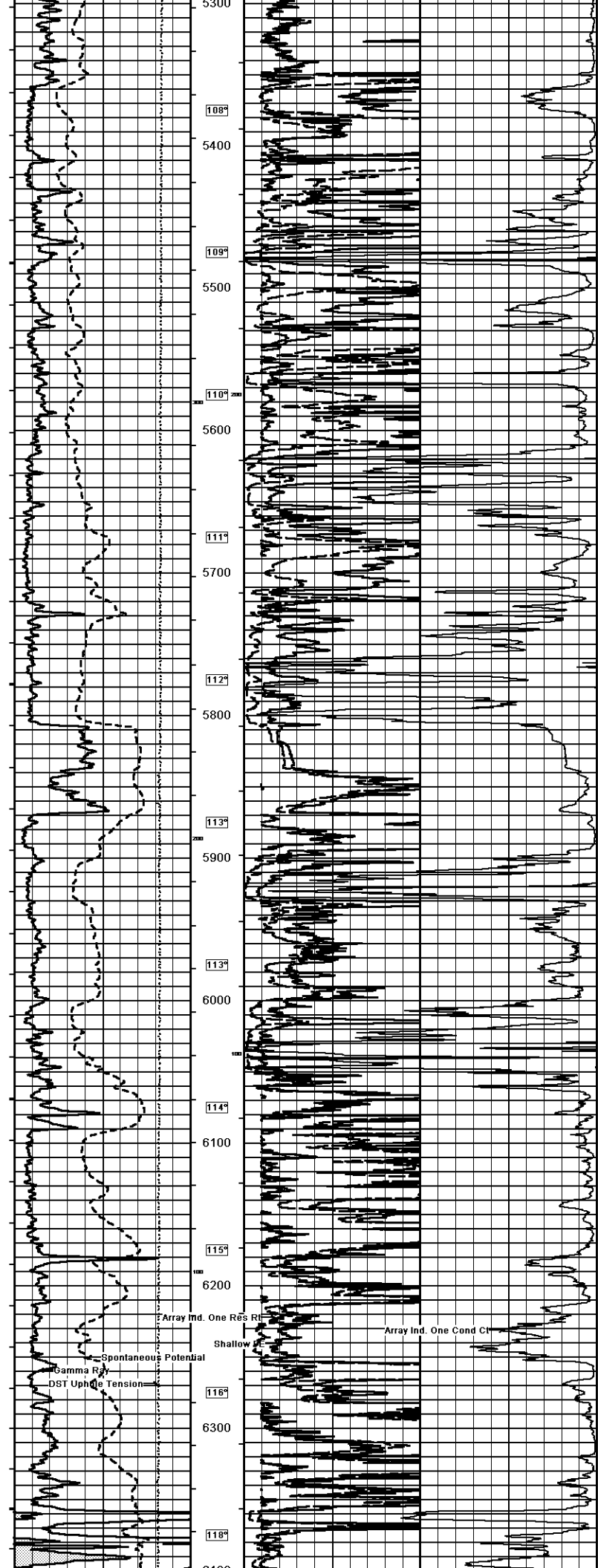
97°

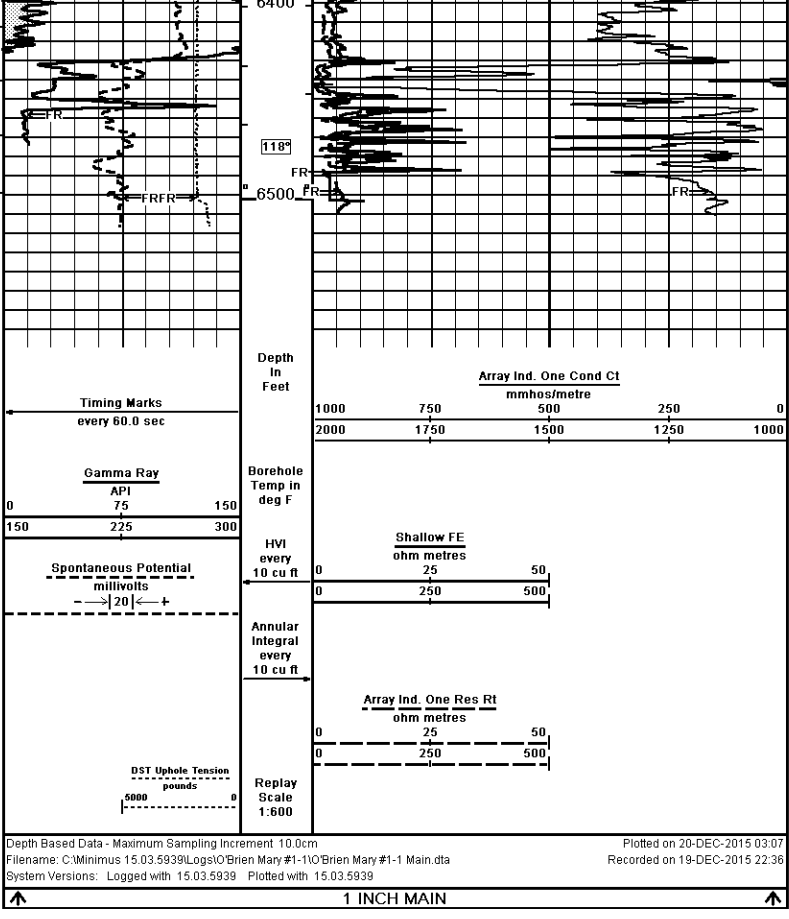
98°

99°

100°








↑ 1 INCH MAIN ↓

COMPANY	O'BRIEN ENERGY RESOURCES CORP.				
WELL	MARY #1-1				
FIELD	GRANGER CREEK				
PROVINCE/COUNTY	CLARK				
COUNTRY/STATE	U.S.A. / KANSAS				
Elevation Kelly Bushing	2265.00	feet	First Reading	6499.00	feet
Elevation Drill Floor	2263.00	feet	Depth Driller	6500.00	feet
Elevation Ground Level	2252.00	feet	Depth Logger	6502.00	feet



ARRAY INDUCTION  
 SHALLOW FOCUSED  
 ELECTRIC LOG