ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

Weatherford®

COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	HUSH #2-9
FIELD	BRUNO NE PROSPECT
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	100' FSL & 660' FEL

SEC 9	TWP 33S	RGE 30W	Other Services
Latitude			MDN/MPD MML
Longitude			
API Number	15-119-21393		

Permanent Datum GL, Elevation 2729 feet
Log Measured From KB
Drilling Measured From KB @ 13 FEET

Elevations:	feet
KB	2742.00
DF	2740.00
GL	2729.00

Date	02-NOV-2015		
Run Number	ONE		
Service Order	4558-133683407		
Depth Driller	6400.00 feet		
Depth Logger	6399.00 feet		
First Reading	6396.00 feet		
Last Reading	1492.00 feet		
Casing Driller	1487.00 feet		
Casing Logger	1492.00 feet		
Bit Size	7.875 inches		
Hole Fluid Type	WBM		
Density / Viscosity	9.20 lb/USg	62.00 CP	
PH / Fluid Loss	9.50	8.60 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	1.54 @ 75.0 ohm-m		
Rmf @ Measured Temp	1.23 @ 75.0 ohm-m		
Rmc @ Measured Temp	1.85 @ 75.0 ohm-m		
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.92 @ 75.0 ohm-m		
Time Since Circulation	4 HOURS		
Max Recorded Temp	125.00 deg F		
Equipment / Base	13096	OKC	
Recorded By	ADAM SILL		
Witnessed By	ROGER PEARSON		PETE DEBENHAM

BOREHOLE RECORD

Last Edited: 03-NOV-2015 02:00

Bit Size inches	Depth From feet	Depth To feet
7.875	1495.00	6400.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1487.00	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: 1778 CU.FT.
- ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO 4200 FEET: 497 CU.FT.
- RIG: DUKE #9

- RIG: DSRE #6.

- ENGINEER: A. SILL.

- OPERATOR: J. LaPOINT.

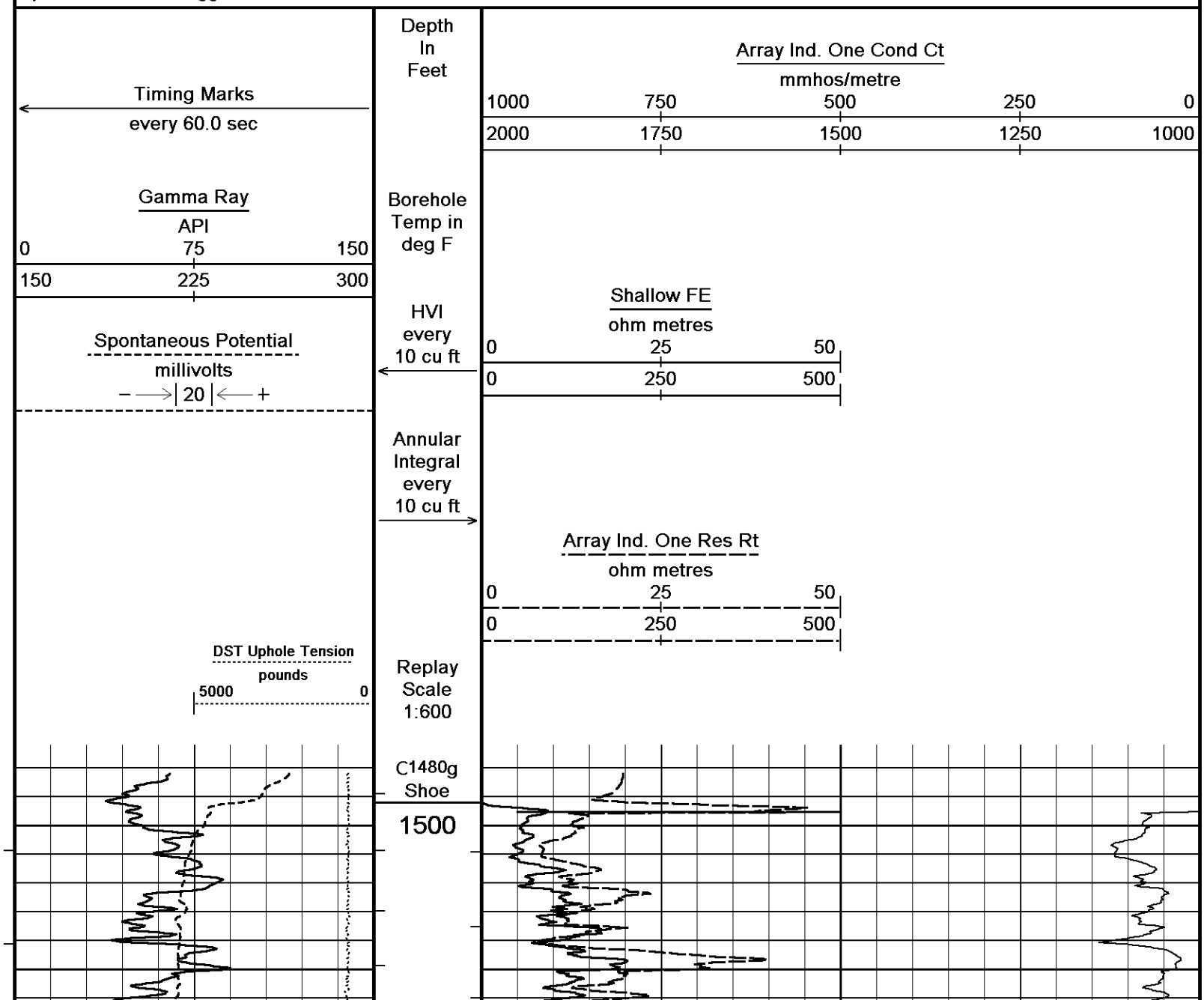
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will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

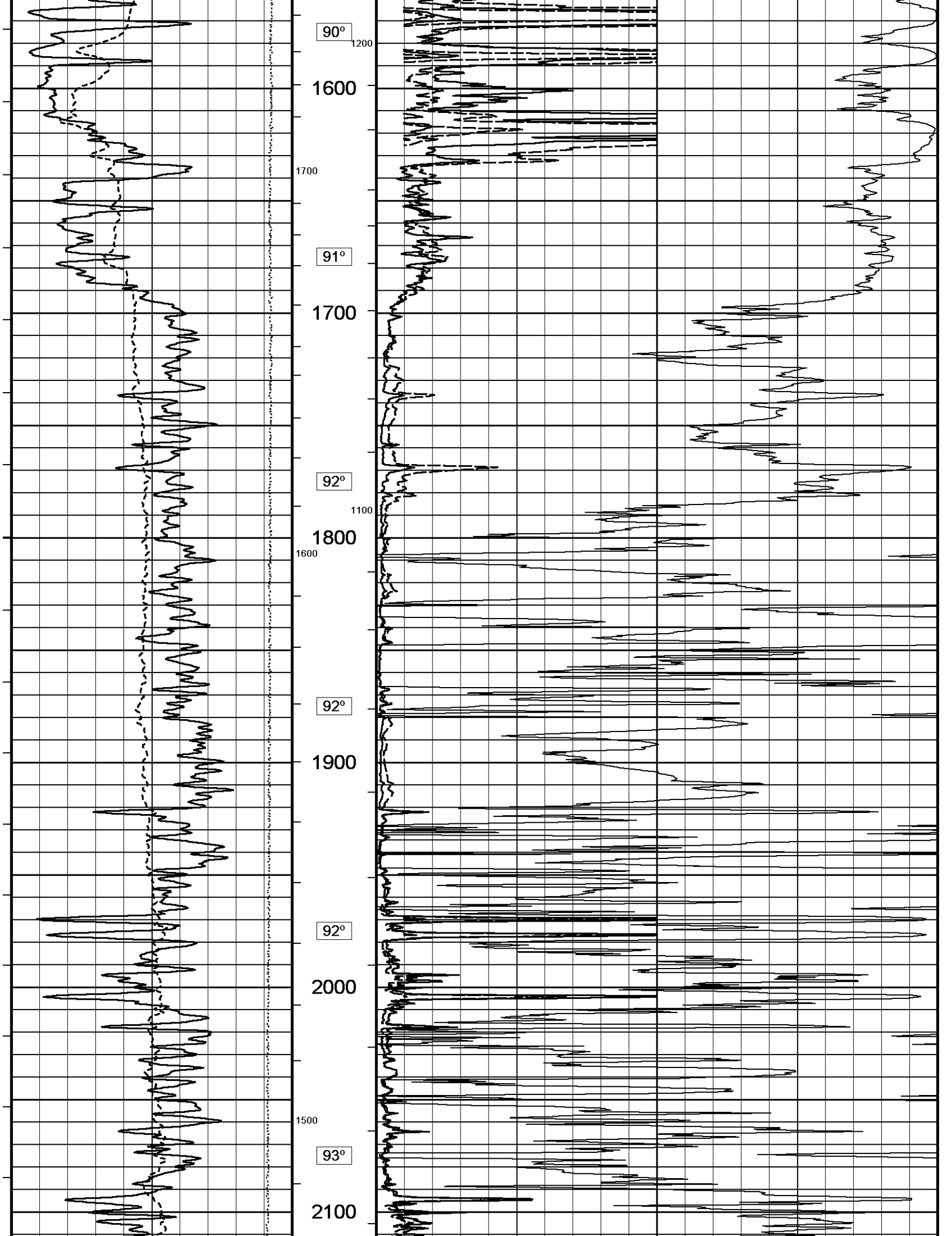
2 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 03-NOV-2015 02:02

Filename: C:\Minimus 15.03.5939\Logs\O'Brien Hush #2-9\O'Brien Hush #2-9_003.dta — Recorded on 02-NOV-2015 21:51

System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939

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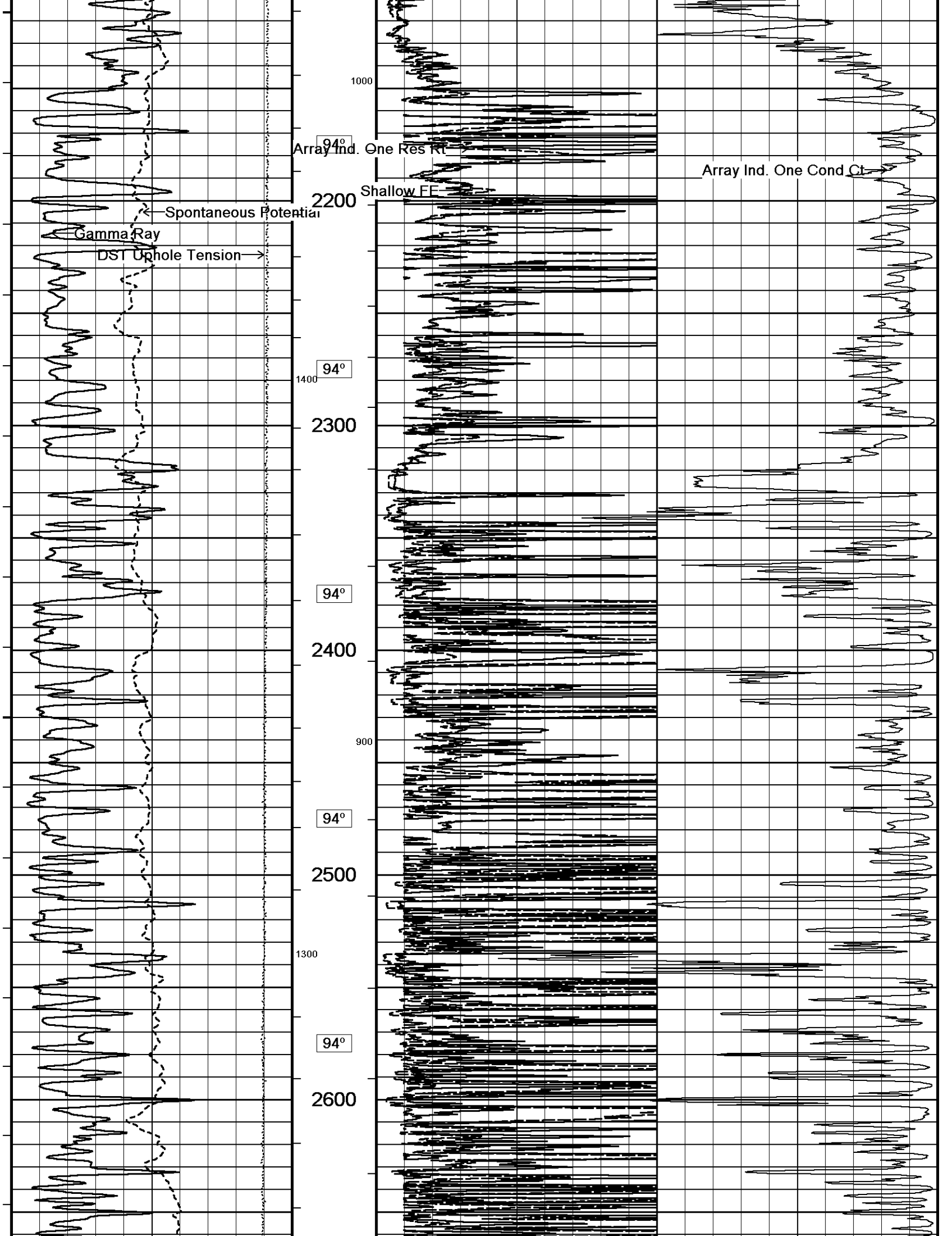
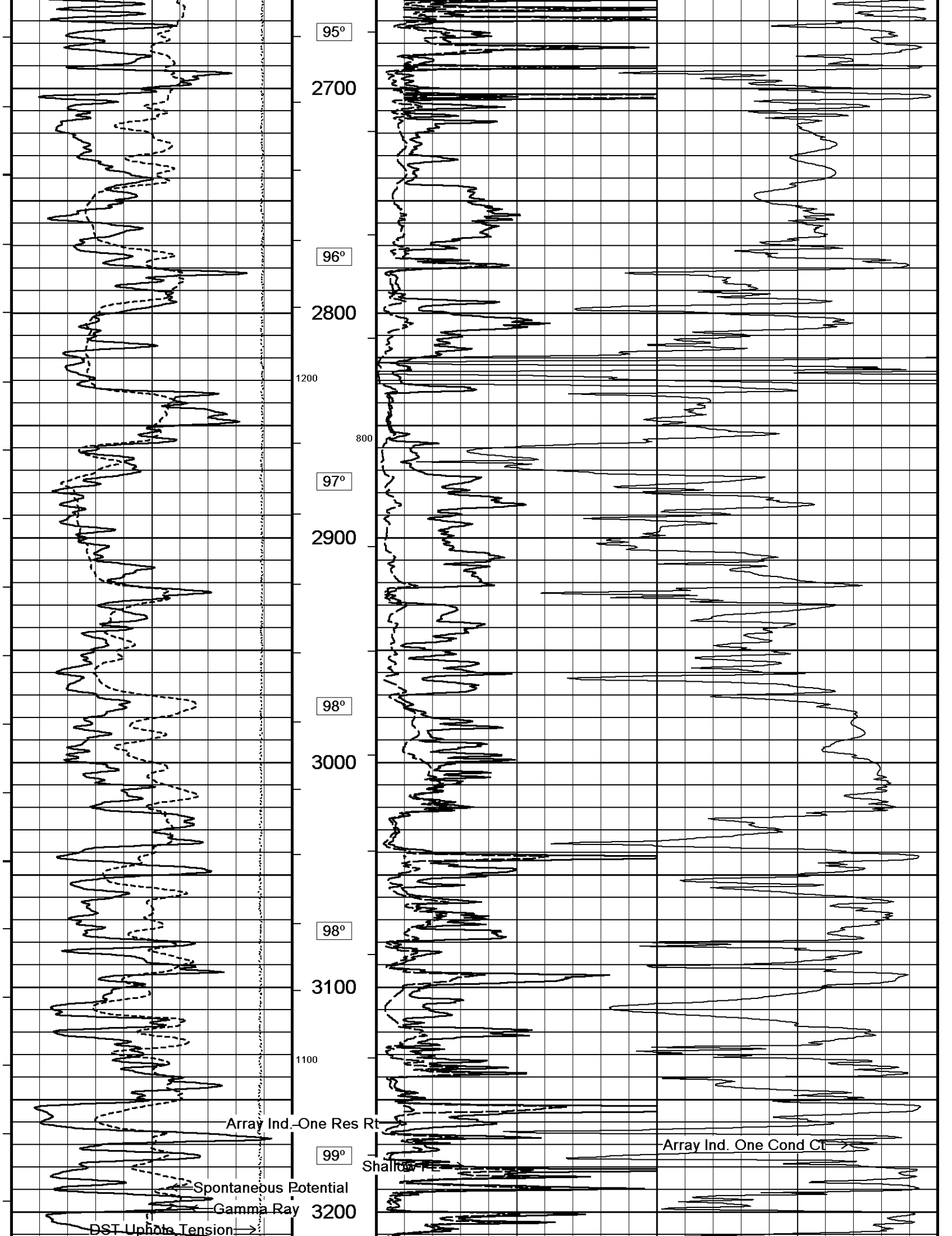
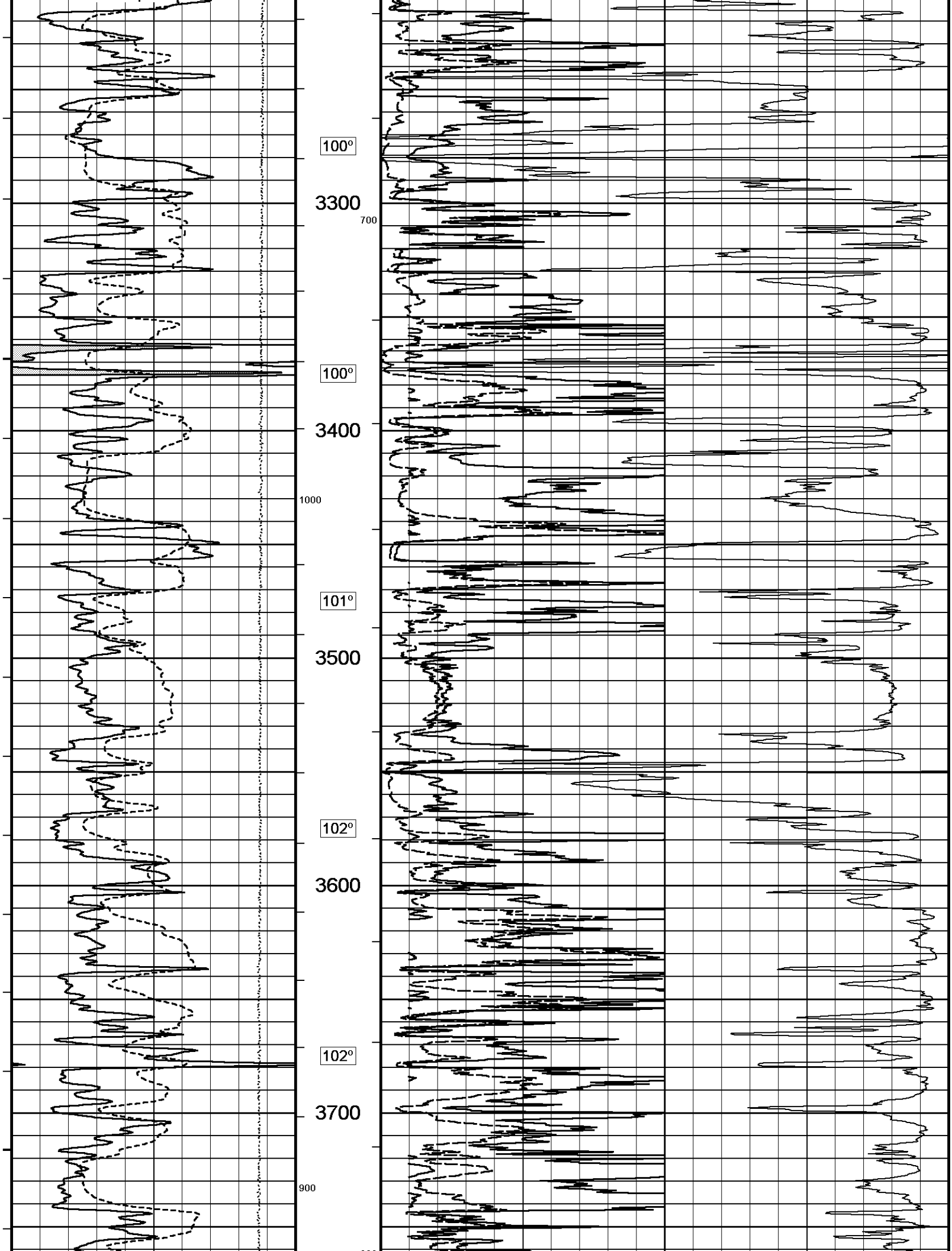
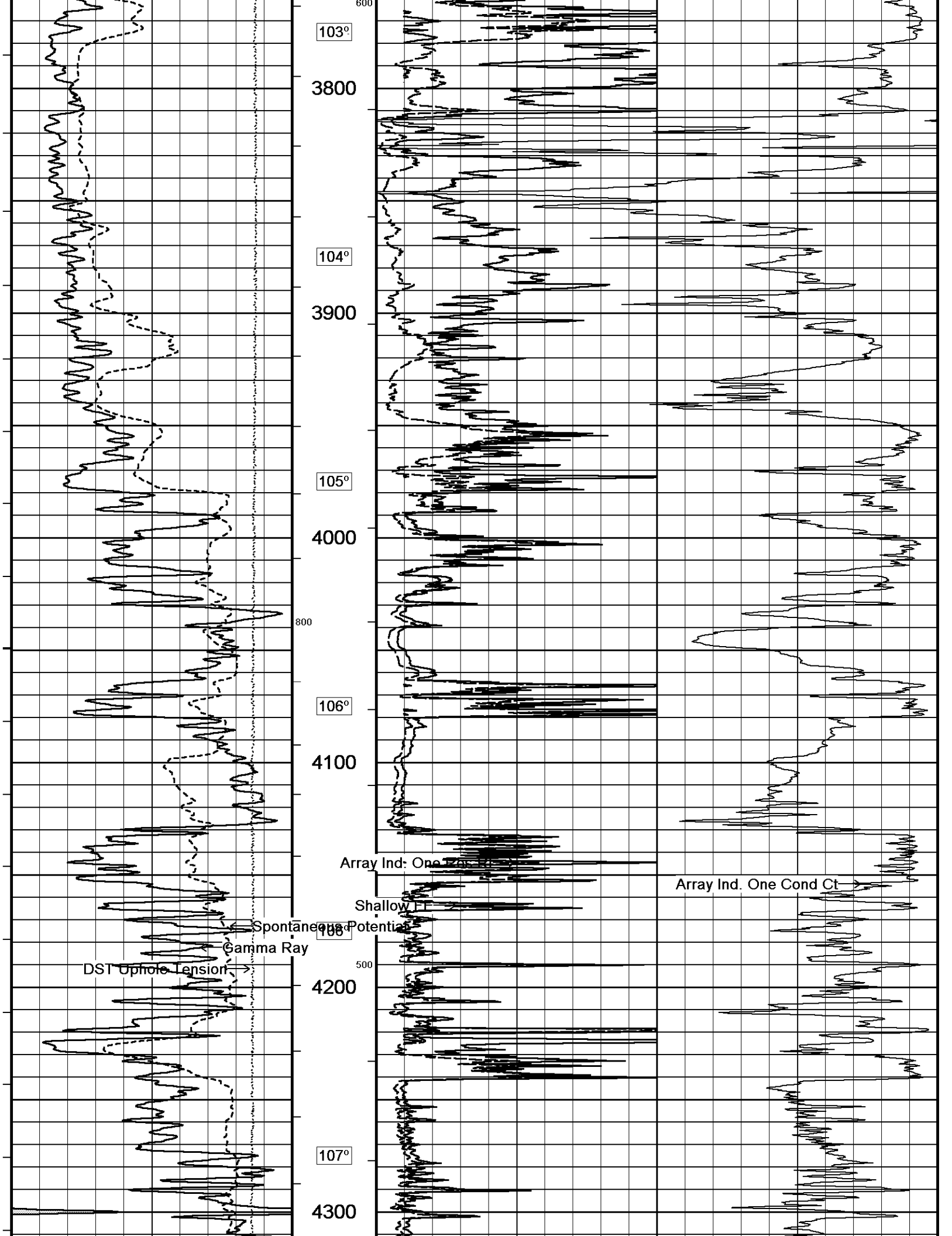
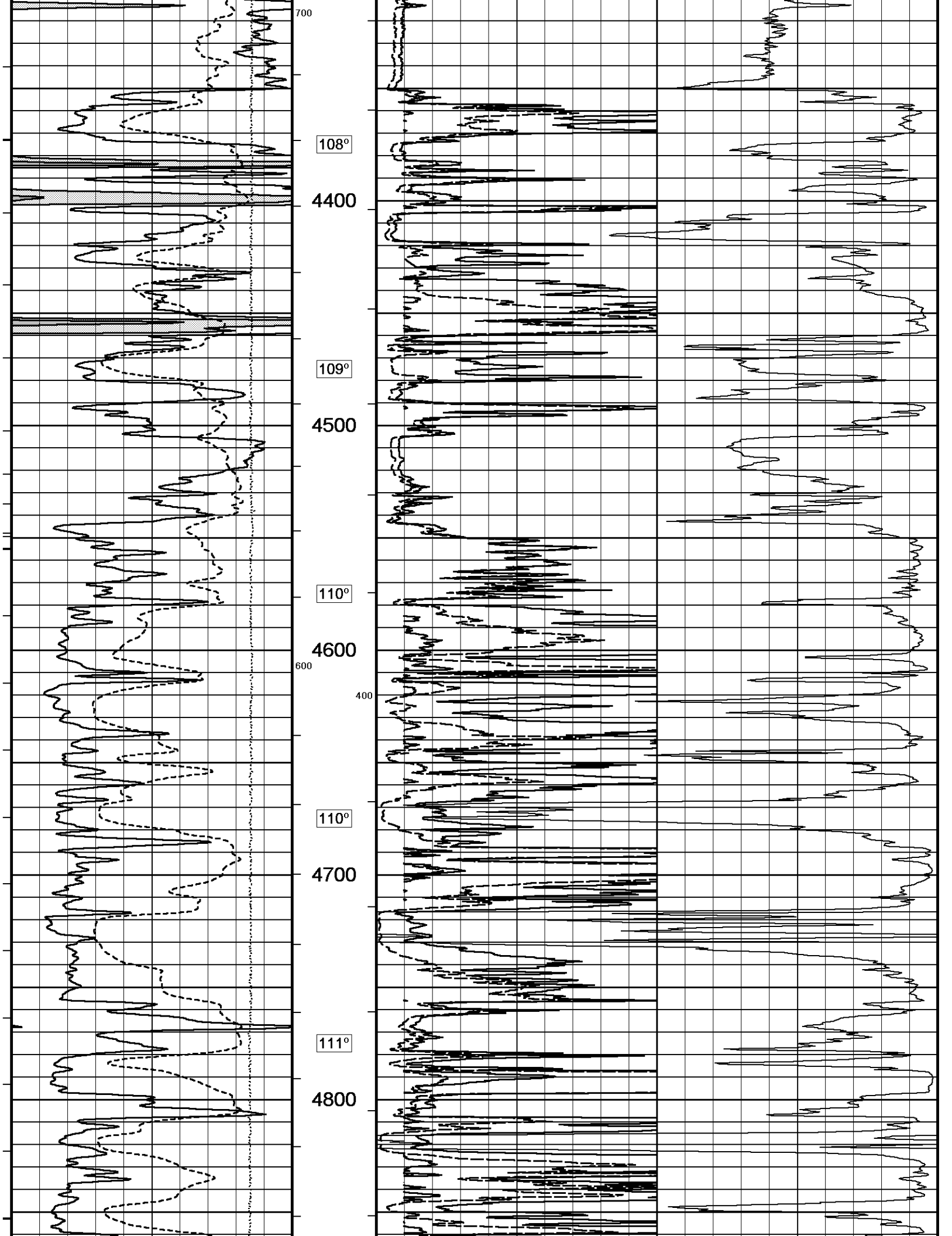
1200
1600
1700
91°
1700
92°
1100
1800
1600
92°
1900
92°
2000
1500
93°
2100

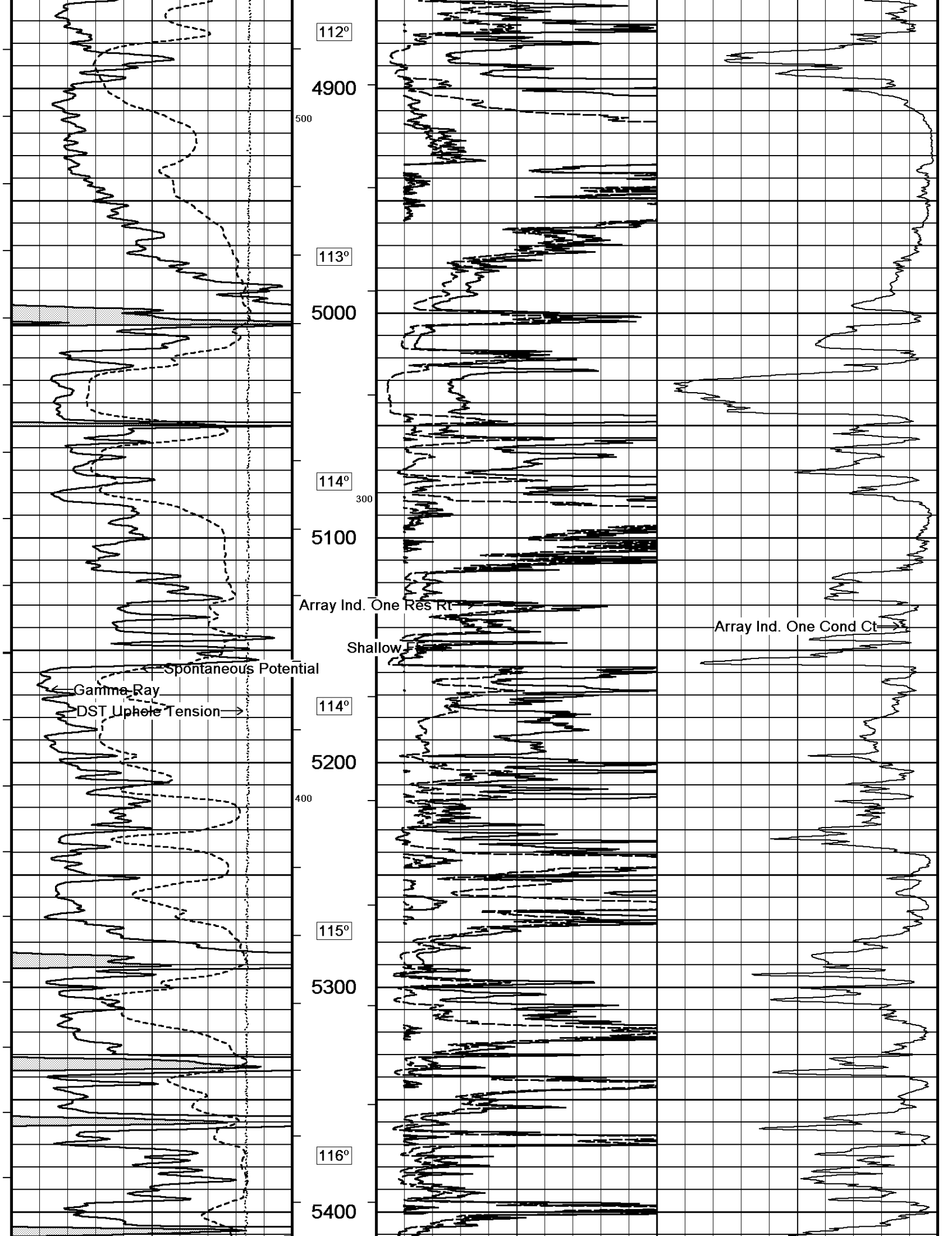

Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
94°
94°
94°
94°
1000
1400
900
1300
2200
2300
2400
2500
2600

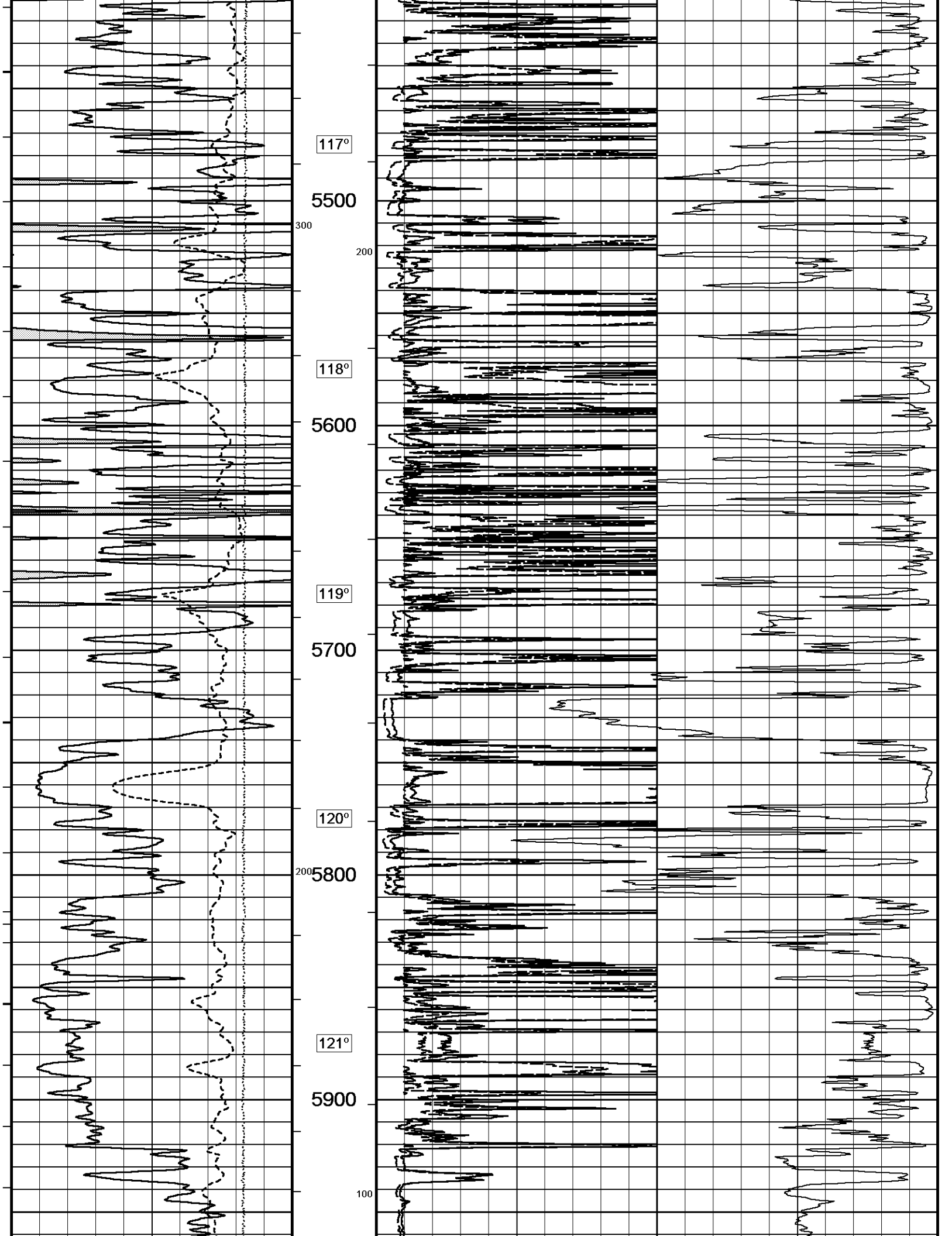

95°
2700
96°
2800
1200
800
97°
2900
98°
3000
98°
3100
1100
Array Ind. One Res Rt
99°
Shallow Rt
Array Ind. One Cond Ct
Spontaneous Potential
Gamma Ray
3200
DST Uphole Tension

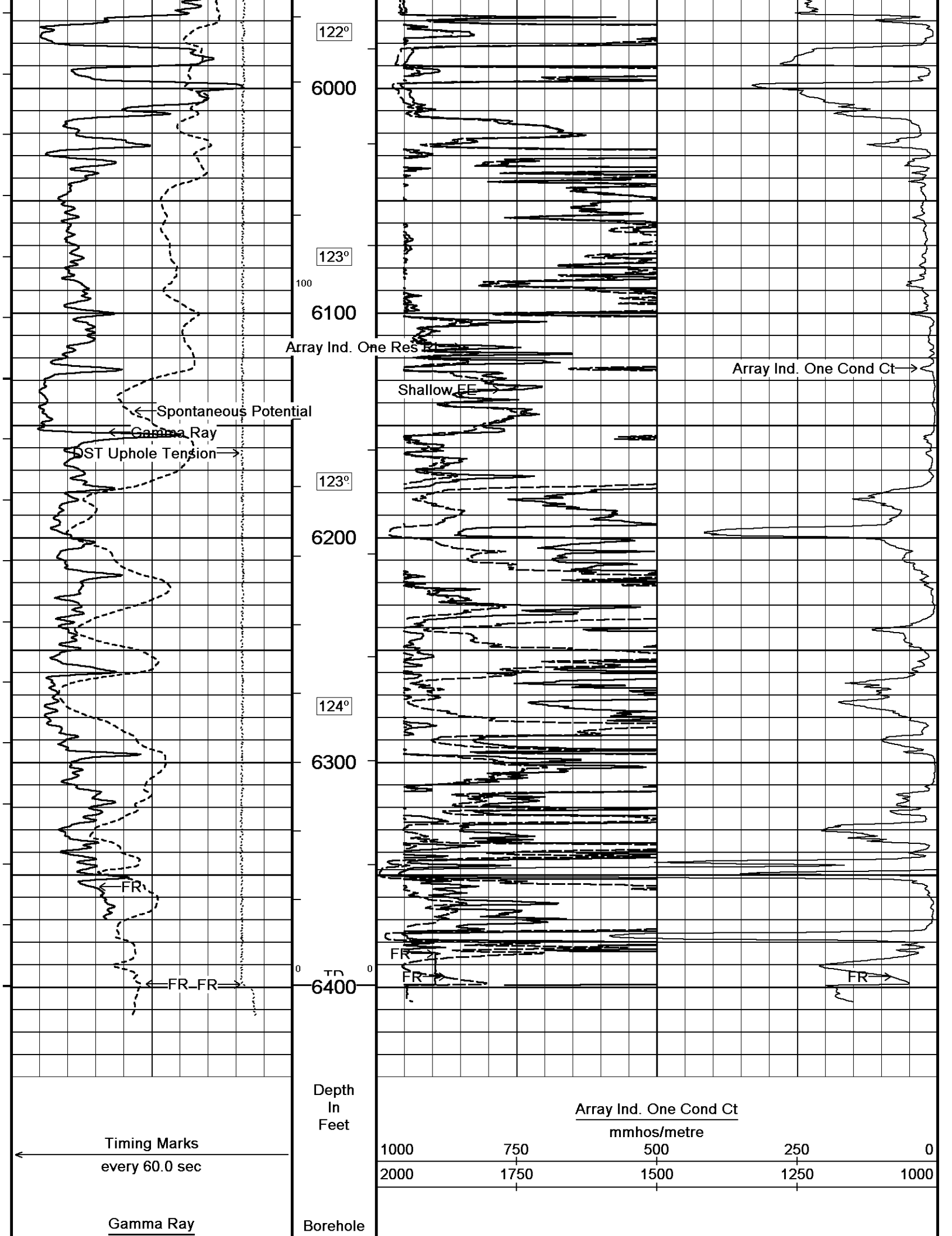

100°
3300
700
100°
3400
1000
101°
3500
102°
3600
102°
3700
900


600
103°
3800
104°
3900
105°
4000
800
106°
4100
Array Ind. One Cond Ct
Shallow FT
Spontaneous Potential
106°
Gamma Ray
500
DST Uphole Tension
4200
107°
4300


700
108°
4400
109°
4500
110°
4600
600
400
110°
4700
111°
4800


112°
4900
500
113°
5000
114°
300
5100
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow F
Spontaneous Potential
Gamma Ray
DST Uphole Tension
114°
5200
400
115°
5300
116°
5400


117°
5500
300
200
118°
5600
119°
5700
120°
200
5800
121°
5900
100


122°
6000
123°
100
6100
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
123°
6200
124°
6300
FR
FR
FR
FR–FR
0
TD
0
6400
Depth
In
Feet
Timing Marks
every 60.0 sec
Gamma Ray
Borehole
Array Ind. One Cond Ct
mmhos/metre
1000
750
500
250
0
2000
1750
1500
1250
1000

API
0 75 150
150 225 300

Temp in deg F

Shallow FE
ohm metres
0 25 50
0 250 500

Spontaneous Potential
millivolts
− → | 20 | ← +

HVI every 10 cu ft

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

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 03-NOV-2015 02:02
Filename: C:\Minimus 15.03.5939\Logs\O'Brien Hush #2-9\O'Brien Hush #2-9_003.dta — Recorded on 02-NOV-2015 21:51
System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939

2 INCH MAIN

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 03-NOV-2015 02:02
Filename: C:\Minimus 15.03.5939\Logs\O'Brien Hush #2-9\O'Brien Hush #2-9_003.dta — Recorded on 02-NOV-2015 21:51
System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939

Timing Marks
every 60.0 sec

Depth in Feet

Shallow FE
ohm metres
0.20 2000
1 10 100 1000

Gamma Ray
API
0 75 150
150 225 300

Borehole Temp in deg F

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

Spontaneous Potential
millivolts
− → | 20 | ← +

HVI every 10 cu ft

Annular Integral every 10 cu ft

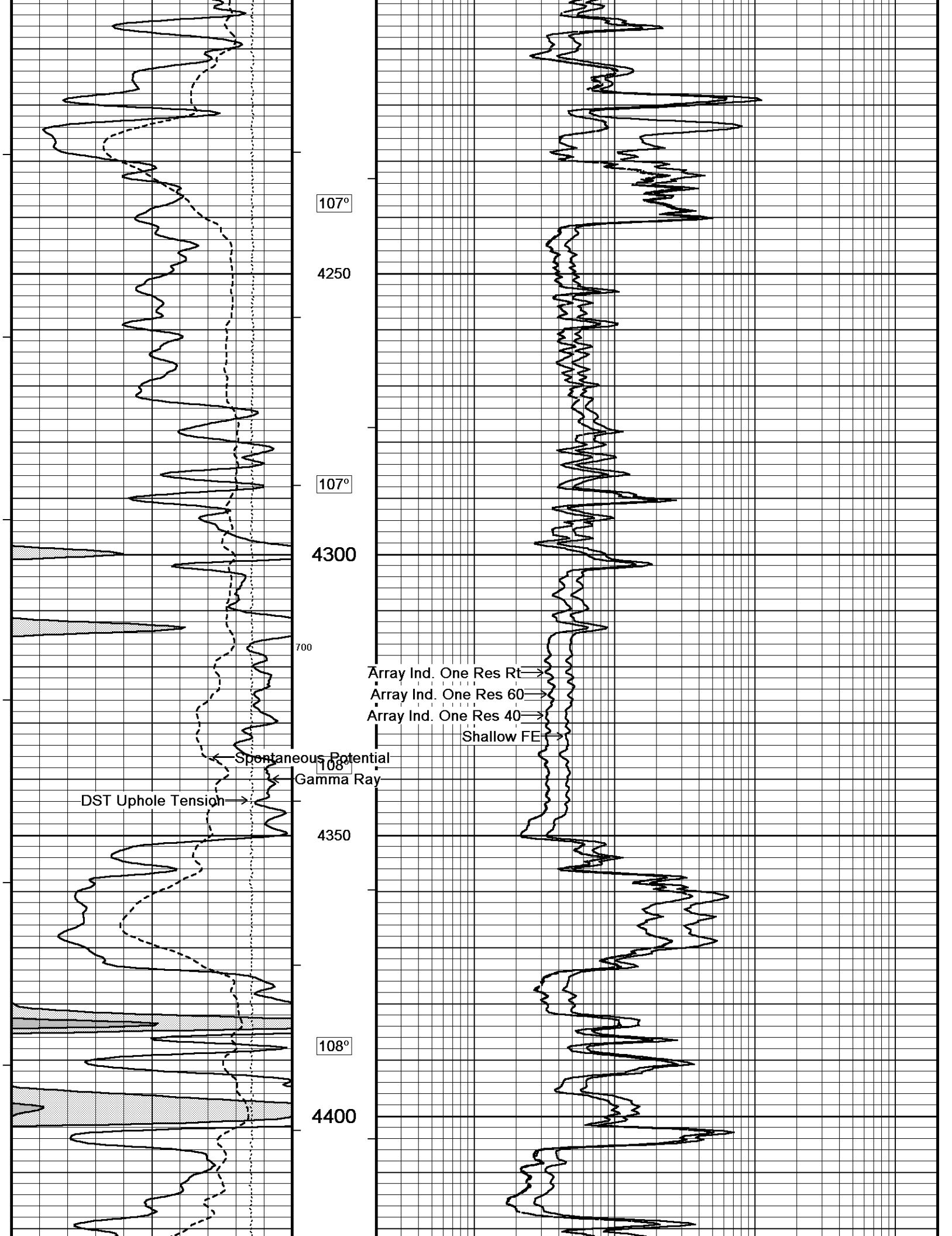
Array Ind. One Res 60
ohm metres
0.20 2000
1 10 100 1000

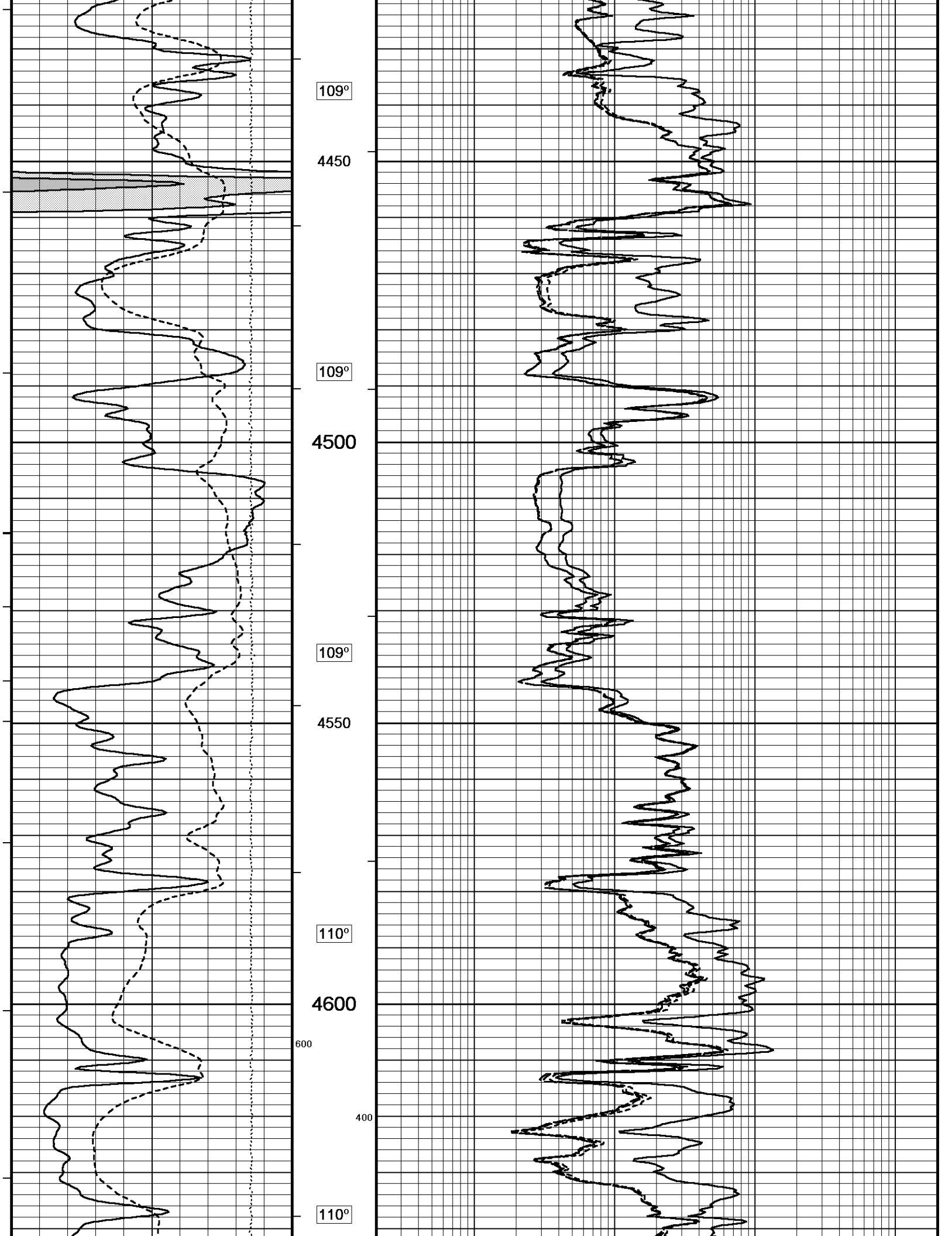
Array Ind. One Res Rt
ohm metres
0.20 2000
1 10 100 1000

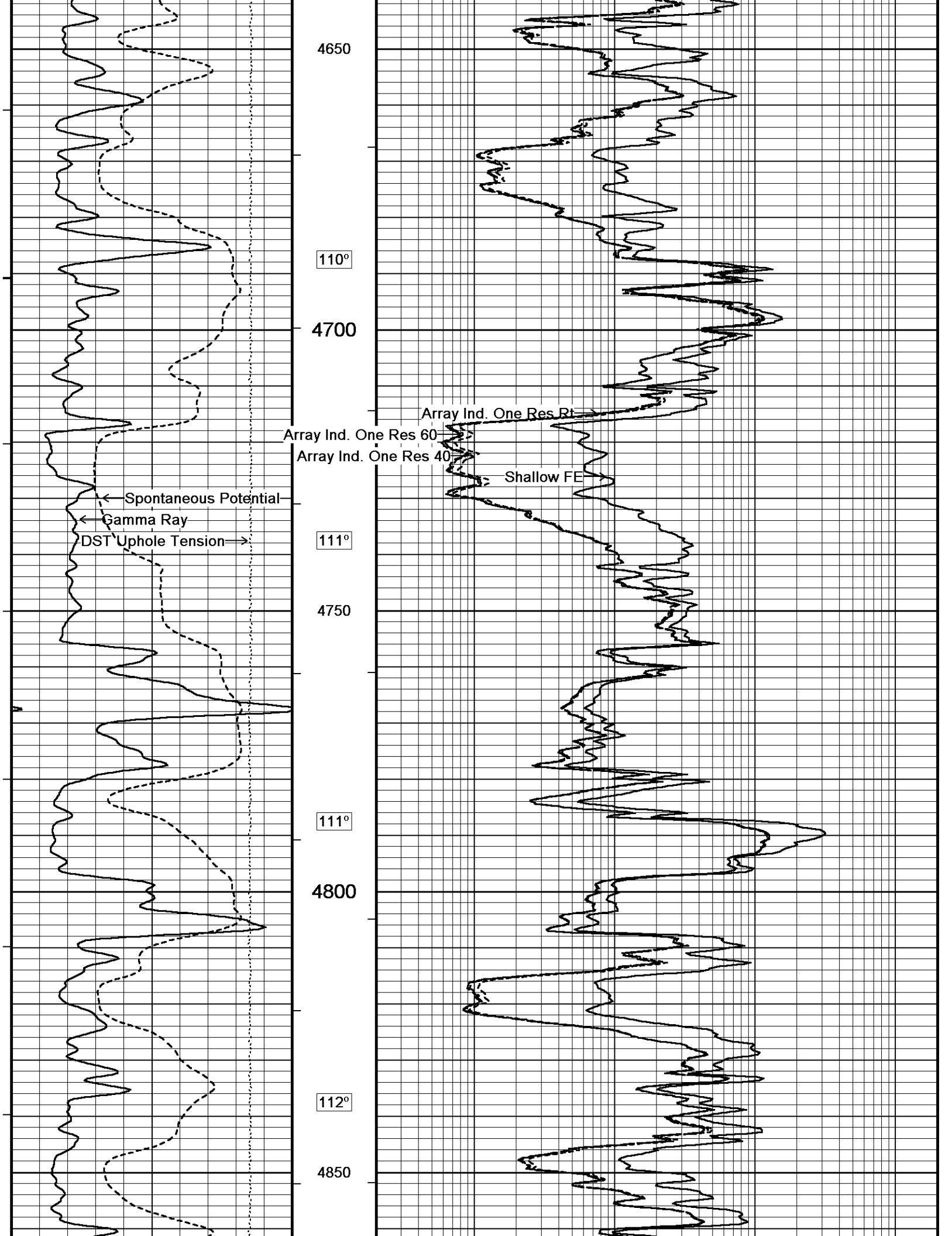
DST Uphole Tension
pounds
5000 0

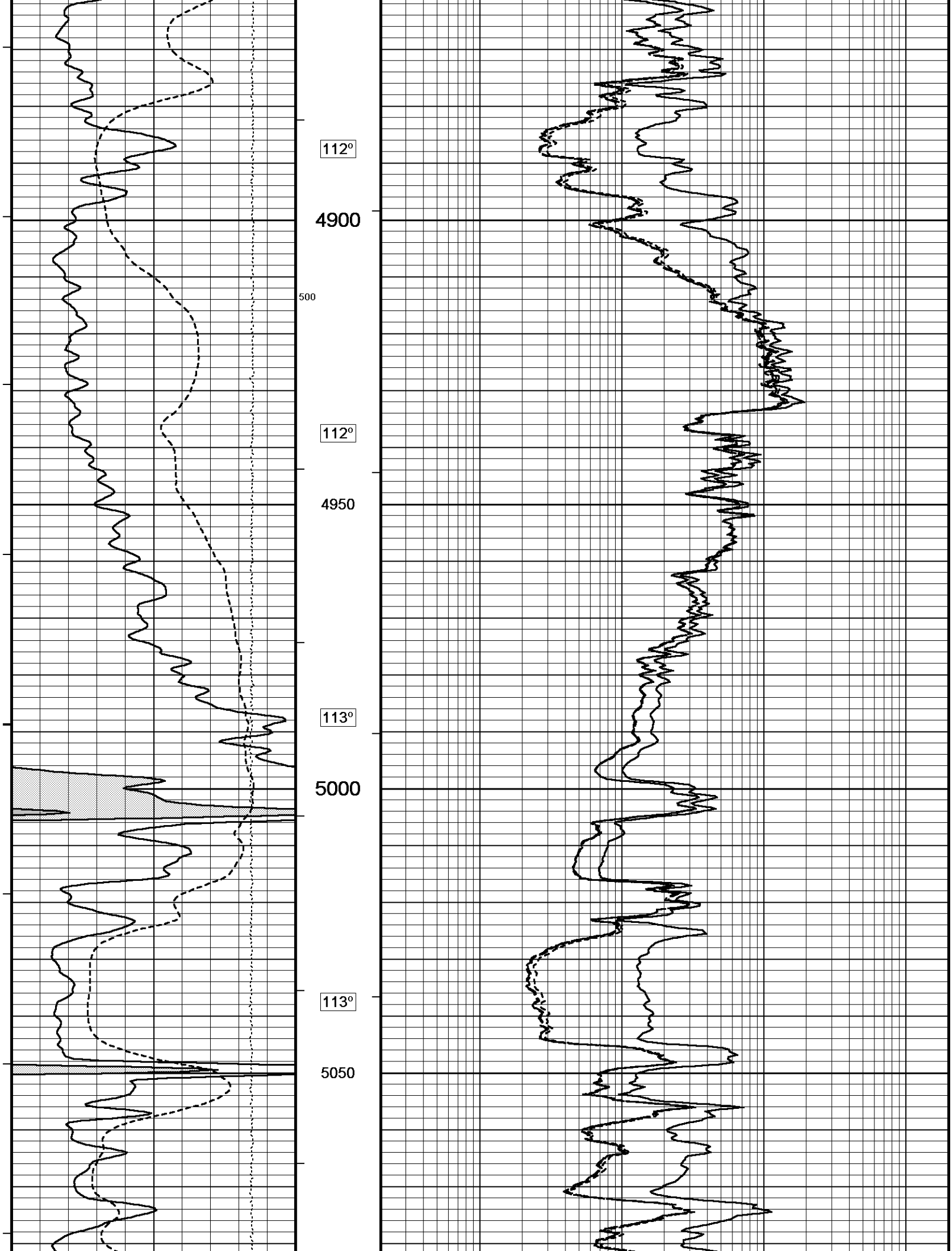
Replay Scale 1:240

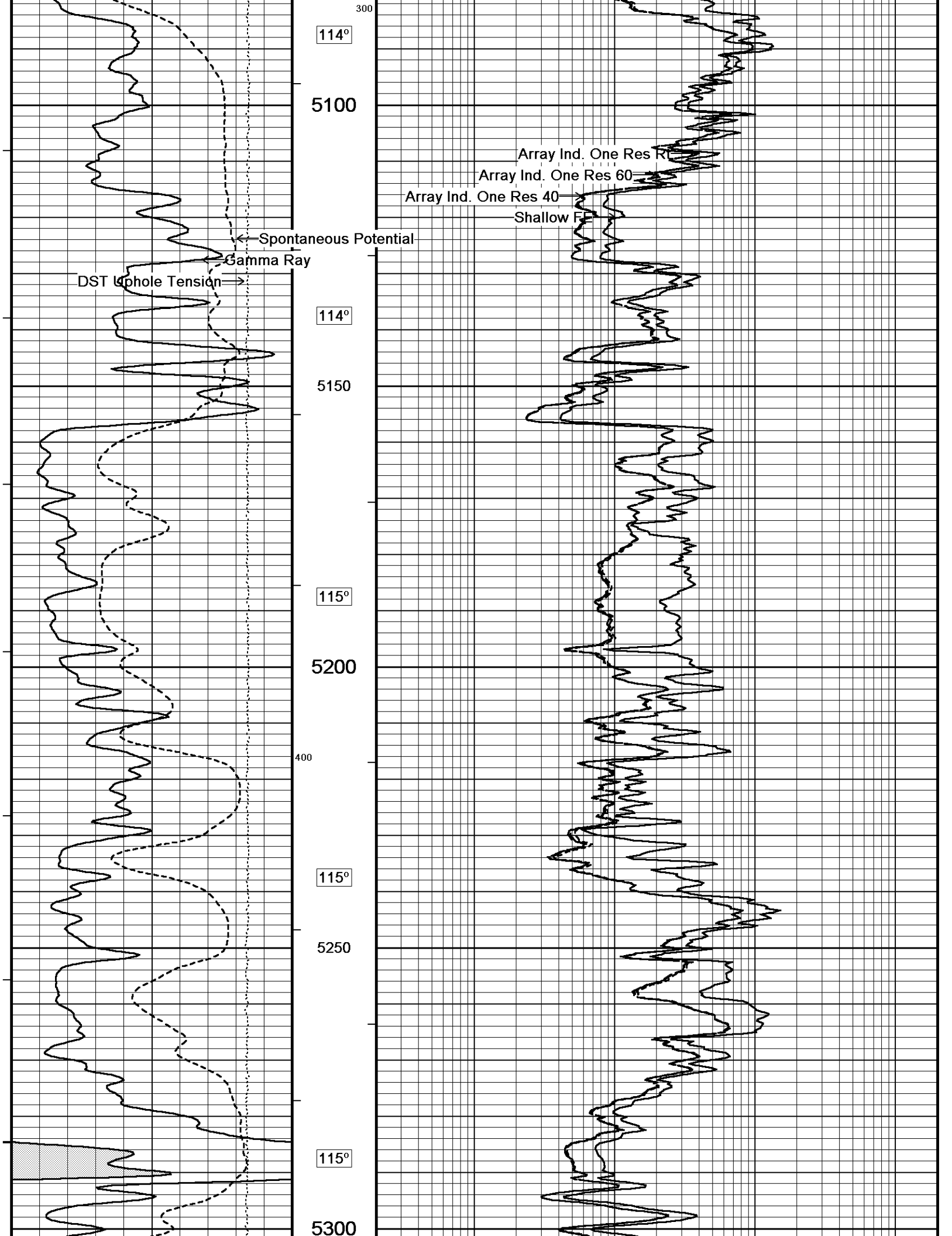
4200

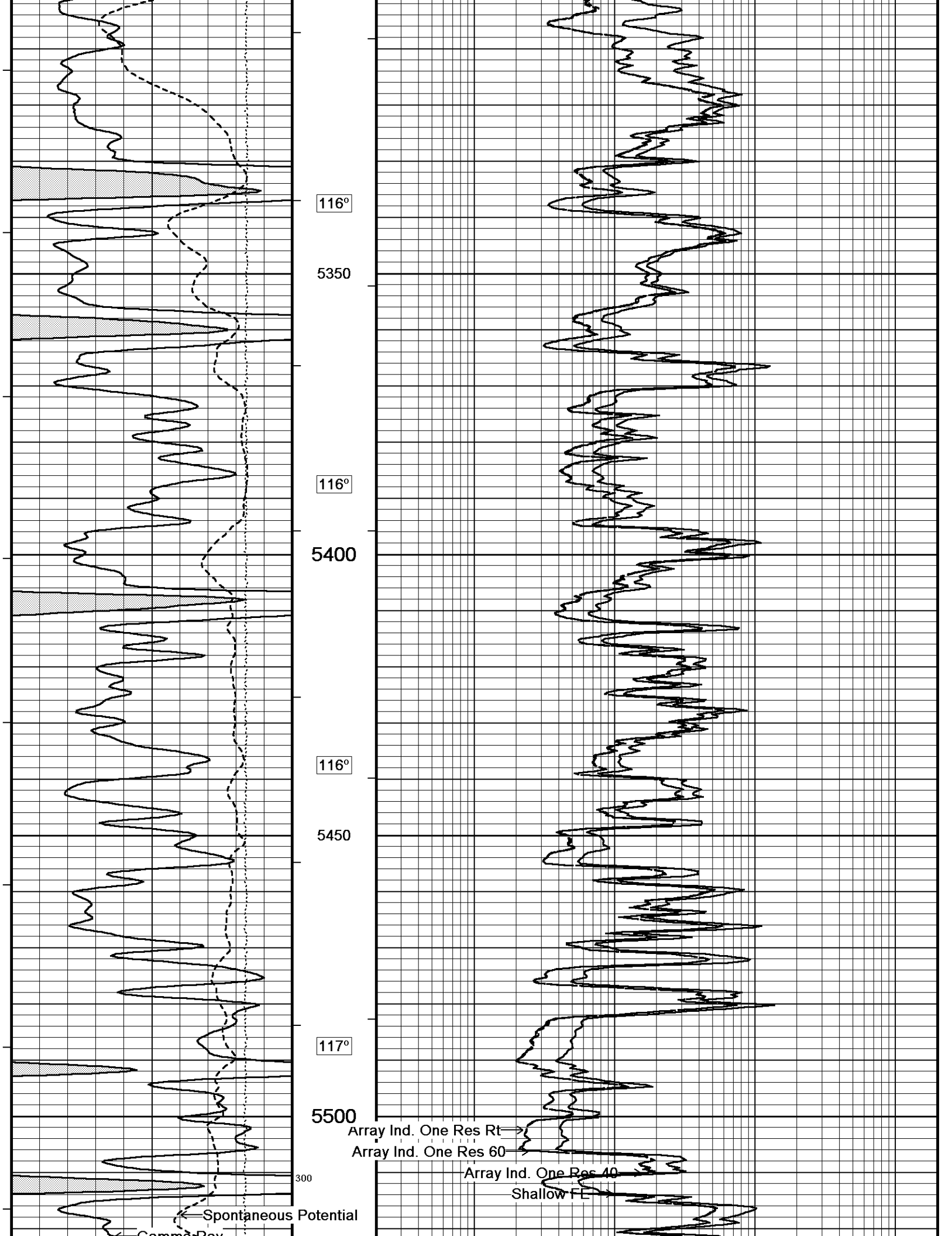

107°
4250
107°
4300
700
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
108°
Gamma Ray
DST Uphole Tension
4350
108°
4400

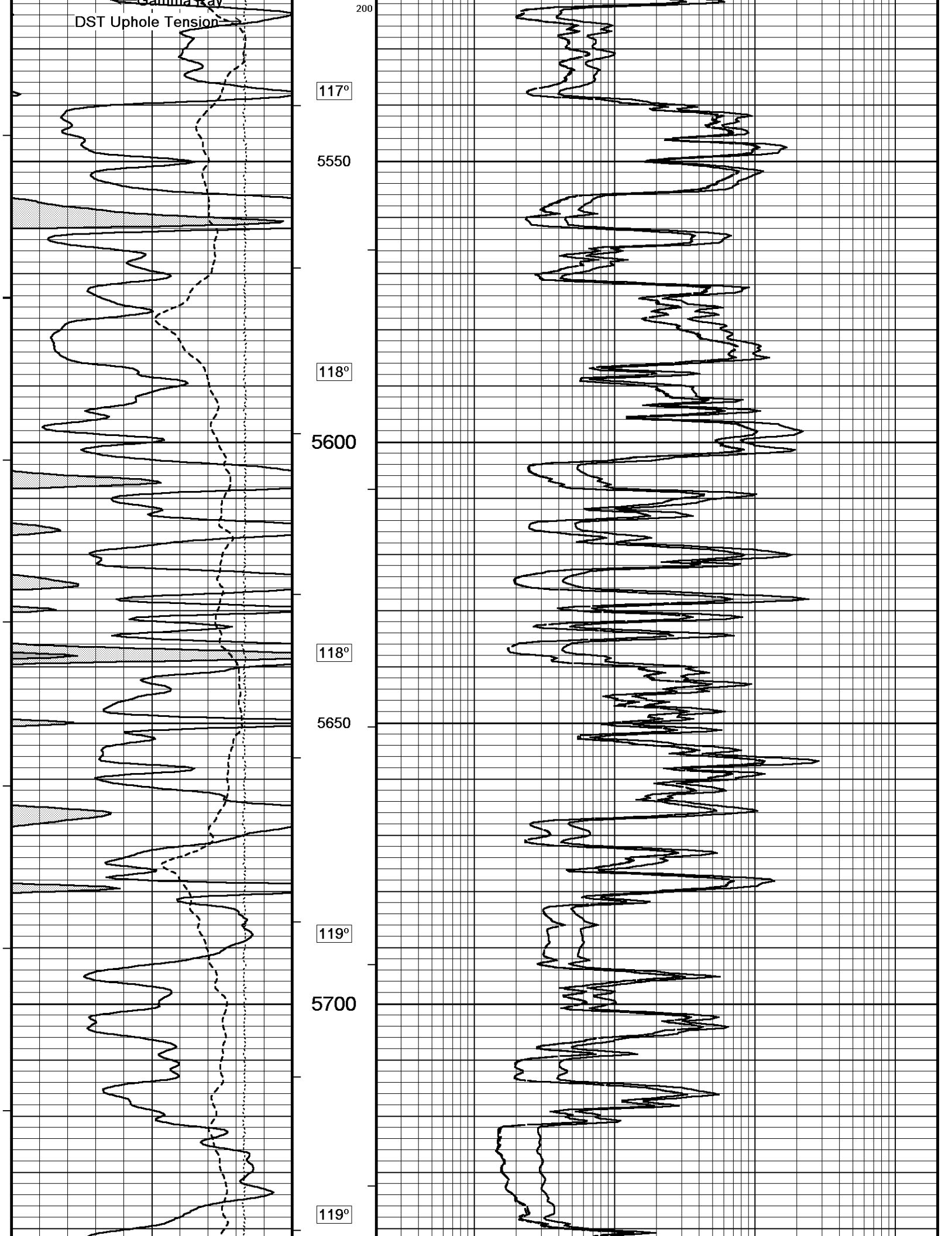

109°
4450
109°
4500
109°
4550
110°
4600
600
400
110°

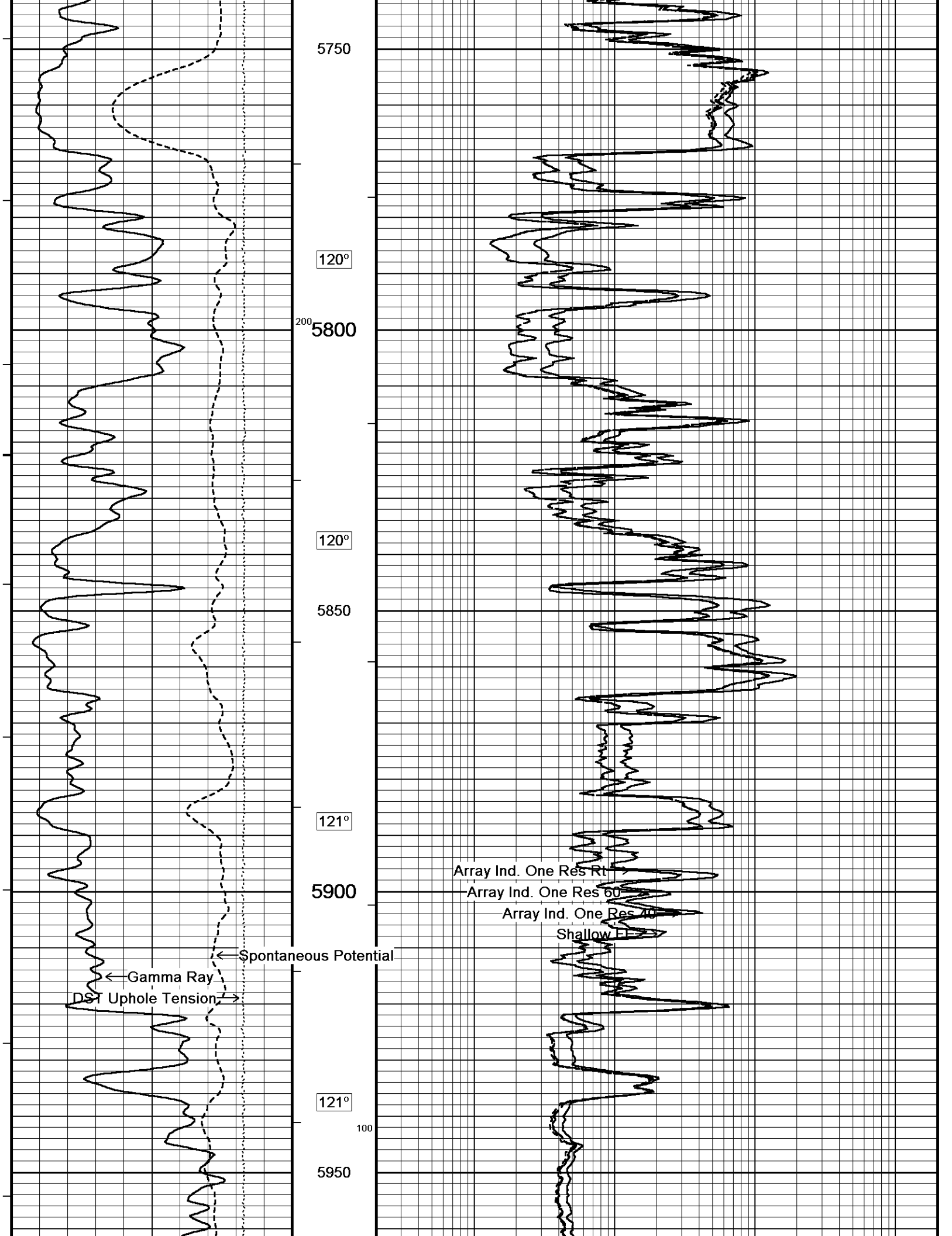

4650
110°
4700
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
111°
4750
111°
4800
112°
4850

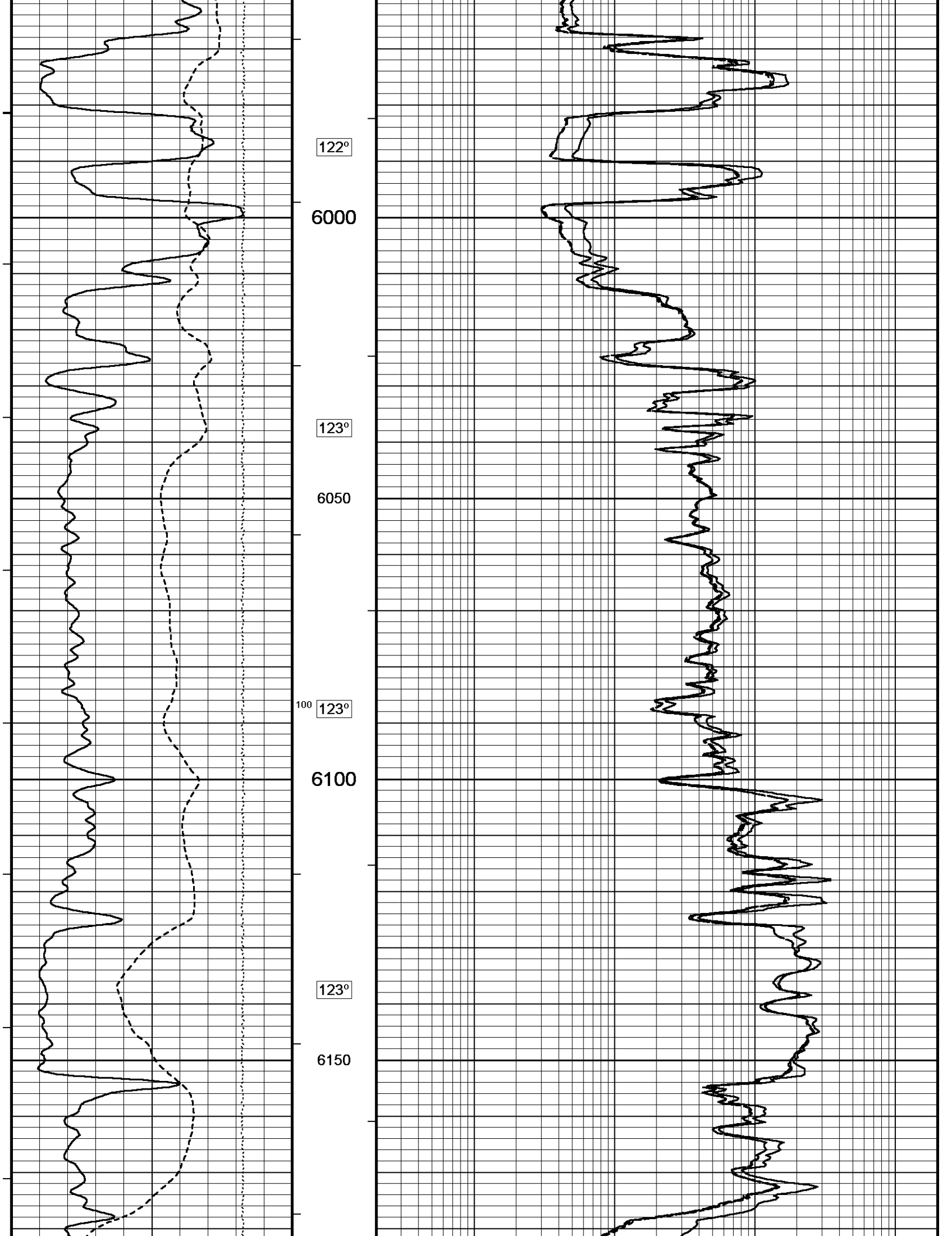

112°
4900
500
112°
4950
113°
5000
113°
5050

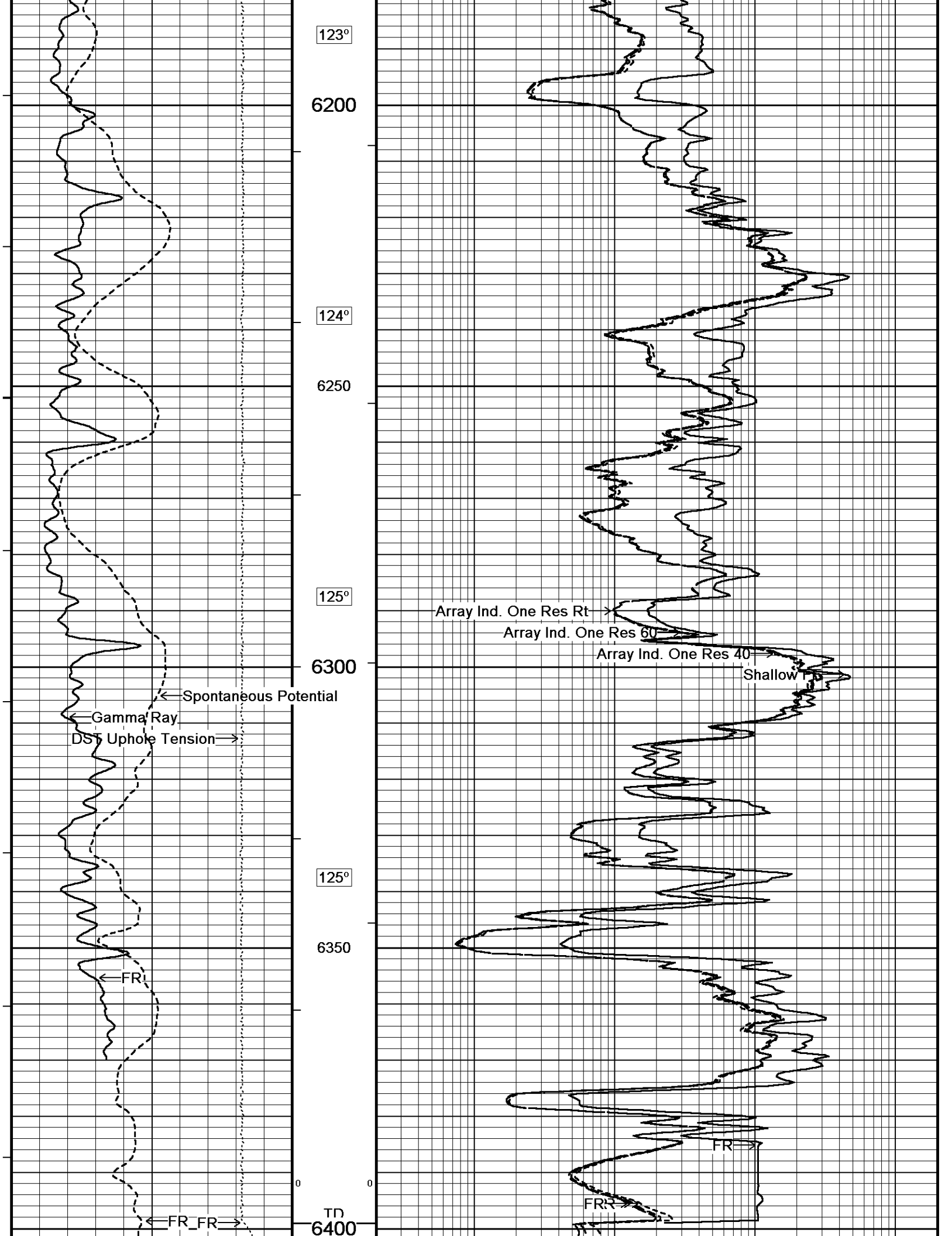

300
114°
5100
Array Ind. One Res R
Array Ind. One Res 60
Array Ind. One Res 40
Shallow F
Spontaneous Potential
Gamma Ray
DST Uphole Tension
114°
5150
115°
5200
400
115°
5250
115°
5300

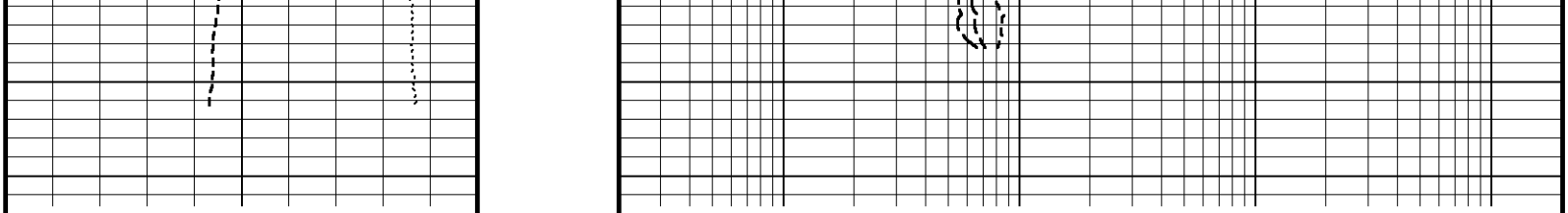

116°
5350
116°
5400
116°
5450
117°
5500
300
Spontaneous Potential
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE


Gamma Ray
DST Uphole Tension
200
117°
5550
118°
5600
118°
5650
119°
5700
119°


5750
120°
200
5800
120°
5850
121°
5900
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FF
Spontaneous Potential
Gamma Ray
DST Uphole Tension
121°
100
5950


122°
6000
123°
6050
100
123°
6100
123°
6150


123°
6200
124°
6250
125°
6300
125°
6350
TD
6400
Spontaneous Potential
Gamma Ray
DST Uphole Tension
FR
FR_FR
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FR
FR
FR
0
0



Depth in Feet

Timing Marks
every 60.0 sec

Shallow FE
ohm metres
0.20 1 10 100 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 2000

HVI every 10 cu ft

Spontaneous Potential
millivolts
− → | 20 | ← +

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

Annular Integral every 10 cu ft

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

DST Uphole Tension
pounds
5000 0

Replay Scale 1:240

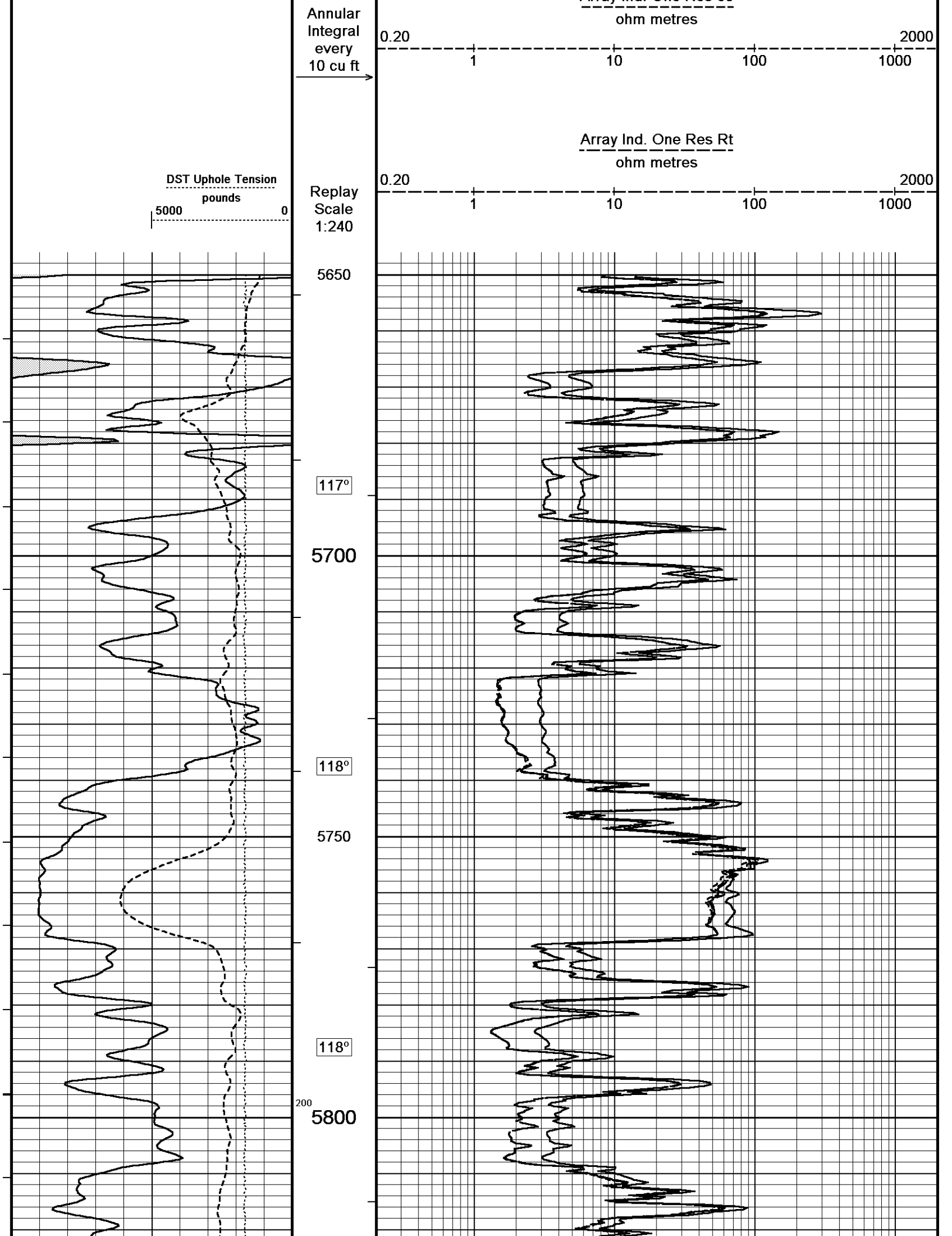
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 03-NOV-2015 02:02
Filename: C:\Minimus 15.03.5939\Logs\O'Brien Hush #2-9\O'Brien Hush #2-9_003.dta — Recorded on 02-NOV-2015 21:51
System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939

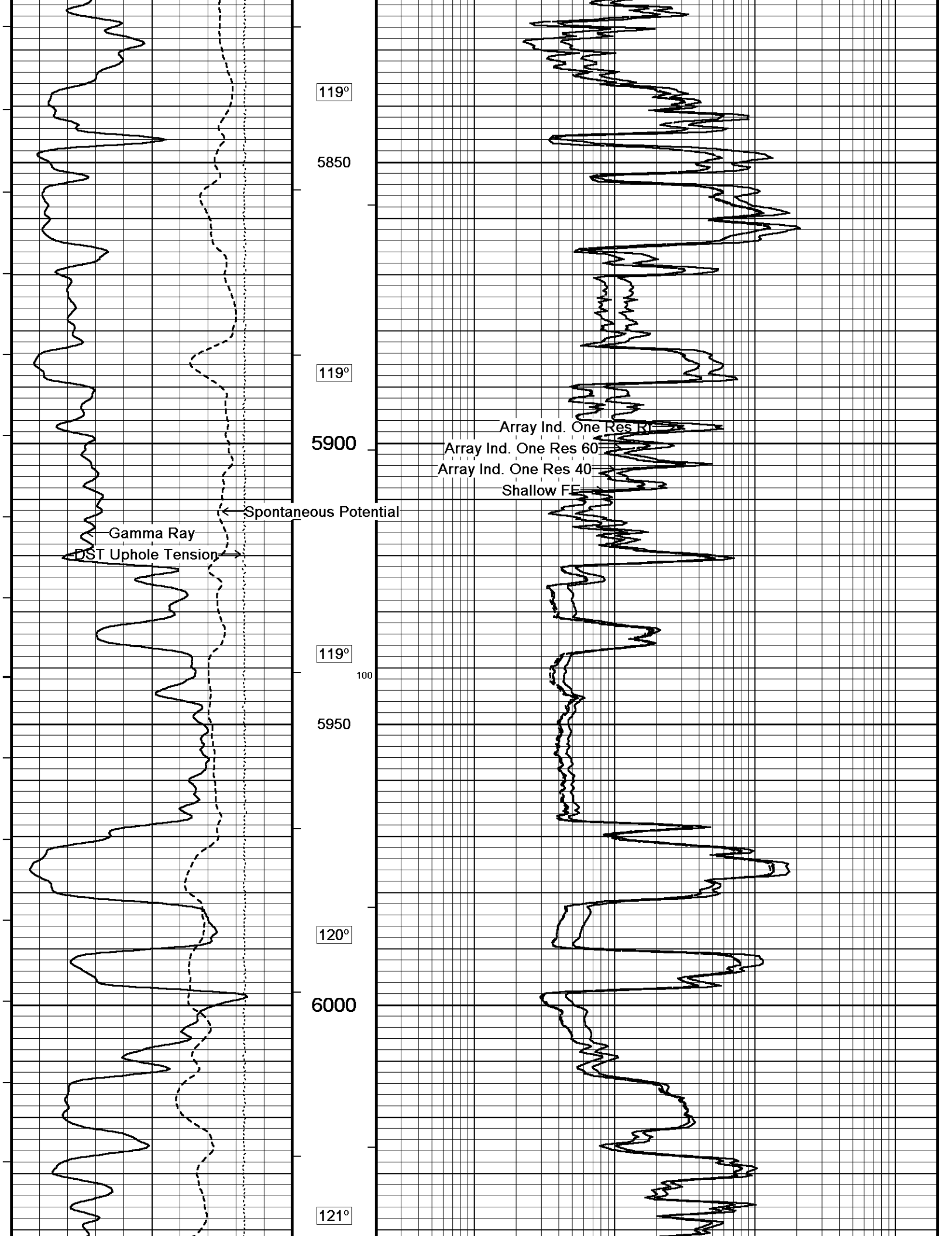
5 INCH MAIN

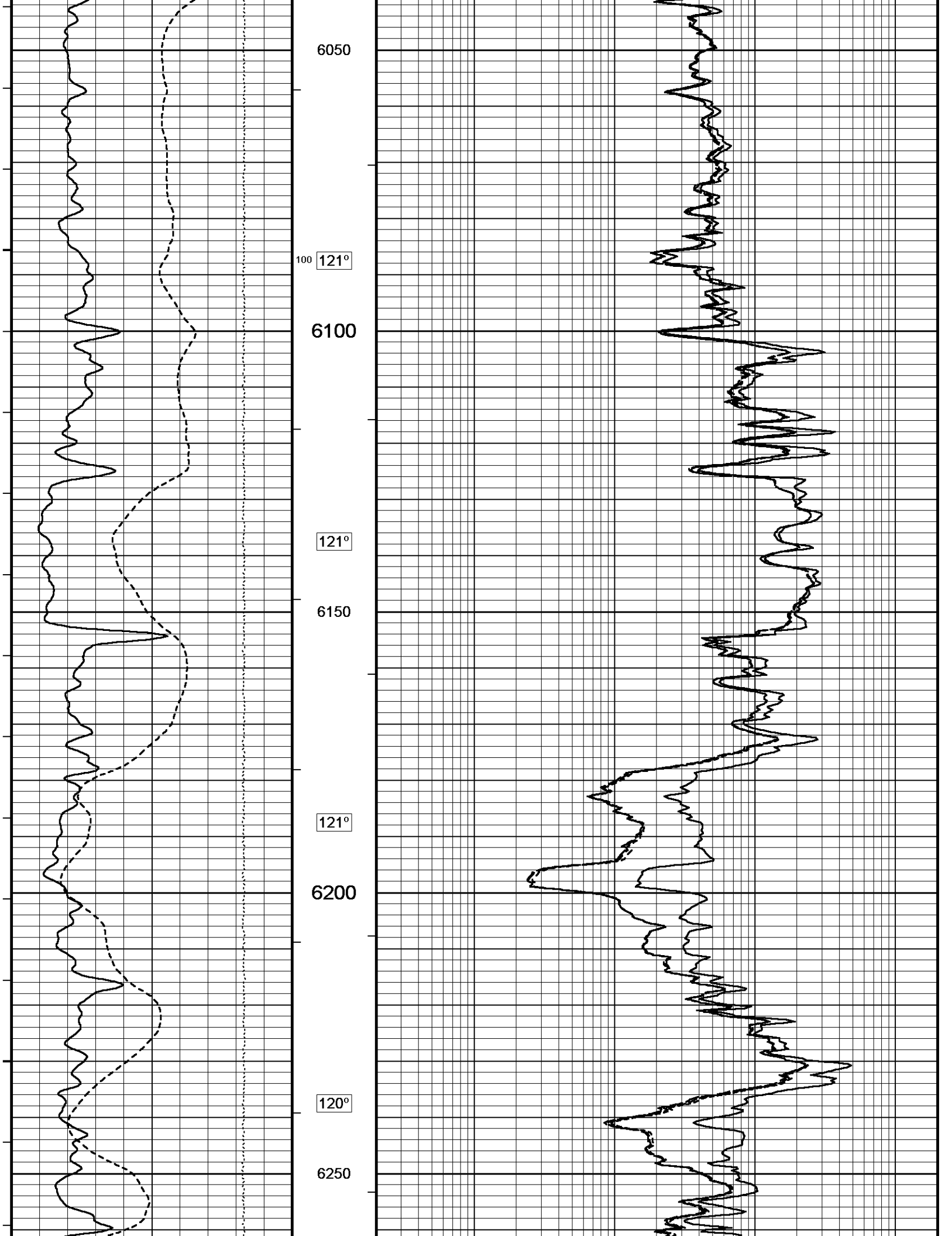
REPEAT SECTION

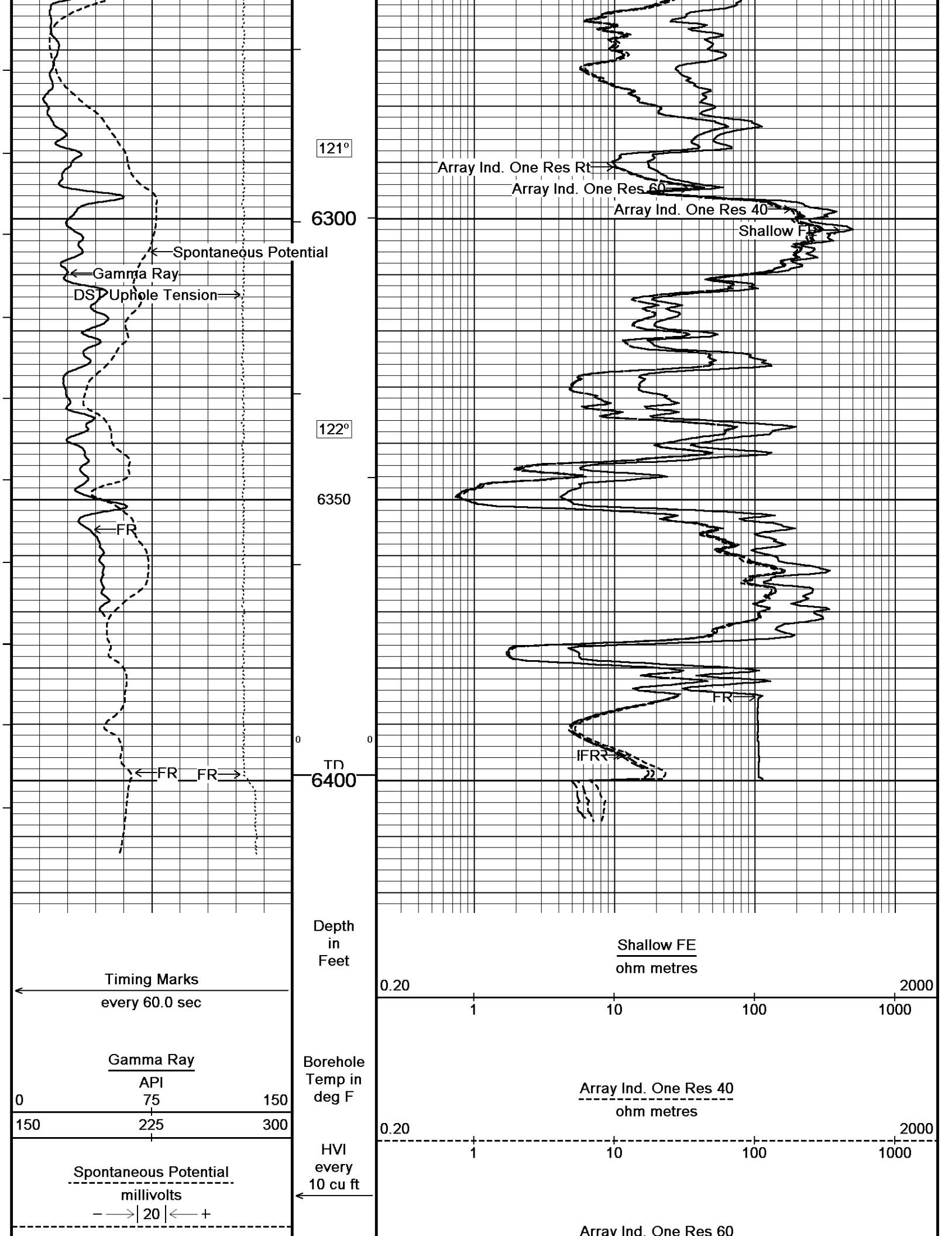
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 03-NOV-2015 02:02
Filename: C:\Minimus 15.03.5939\Logs\O'Brien Hush #2-9\O'Brien Hush #2-9_002.dta — Recorded on 02-NOV-2015 20:23
System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939

Depth in Feet
Timing Marks
every 60.0 sec
Shallow FE
ohm metres
0.20 1 10 100 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 2000
HVI every 10 cu ft
Spontaneous Potential
millivolts
− → | 20 | ← +
Array Ind. One Res 60


Annular
Integral
every
10 cu ft
DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
Array Ind. One Res Rt
ohm metres
0.20
2000
1
10
100
1000
Array Ind. One Res Rt
ohm metres
0.20
2000
1
10
100
1000
5650
117°
5700
118°
5750
118°
200
5800


119°
5850
119°
5900
Array Ind. One Res RT
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
119°
100
5950
120°
6000
121°


6050
100
121°
6100
121°
6150
121°
6200
120°
6250


121°
6300
122°
6350
TD
6400
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
FR
FR
FR
IFR
FR
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
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

Annular Integral every 10 cu ft

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

DST Uphole Tension
pounds
5000 0

Replay Scale 1:240

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 03-NOV-2015 02:02
Filename: C:\Minimus 15.03.5939\Logs\O'Brien Hush #2-9\O'Brien Hush #2-9_002.dta
Recorded on 02-NOV-2015 20:23
System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939

REPEAT SECTION

10 INCH HIGH RESOLUTION

Depth Based Data - Maximum Sampling Increment 2.5cm
Plotted on 03-NOV-2015 02:02
Filename: C:\Minimus 15.03.5939\Logs\O'Brien Hush #2-9\O'Brien Hush #2-9_001.dta
Recorded on 02-NOV-2015 20:23
System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

Depth in Feet

Timing Marks
every 60.0 sec

Shallow FE
ohm metres
0.20 2000
1 10 100 1000

Gamma Ray
API
0 75 150
150 225 300

Borehole Temp in deg F

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

HVI every 10 cu ft

Spontaneous Potential
millivolts
− 20 +

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

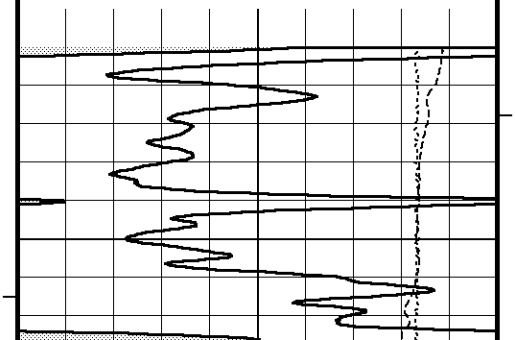
Annular Integral every 10 cu ft

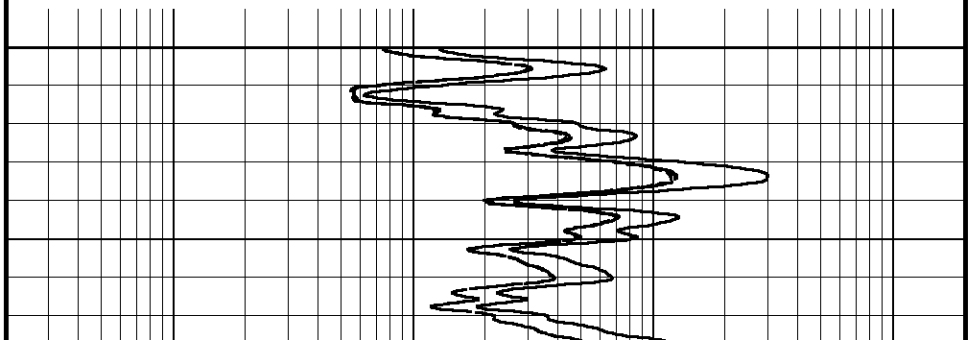
Array Ind. One Res Rt
ohm metres
0.20 2000
1 10 100 1000

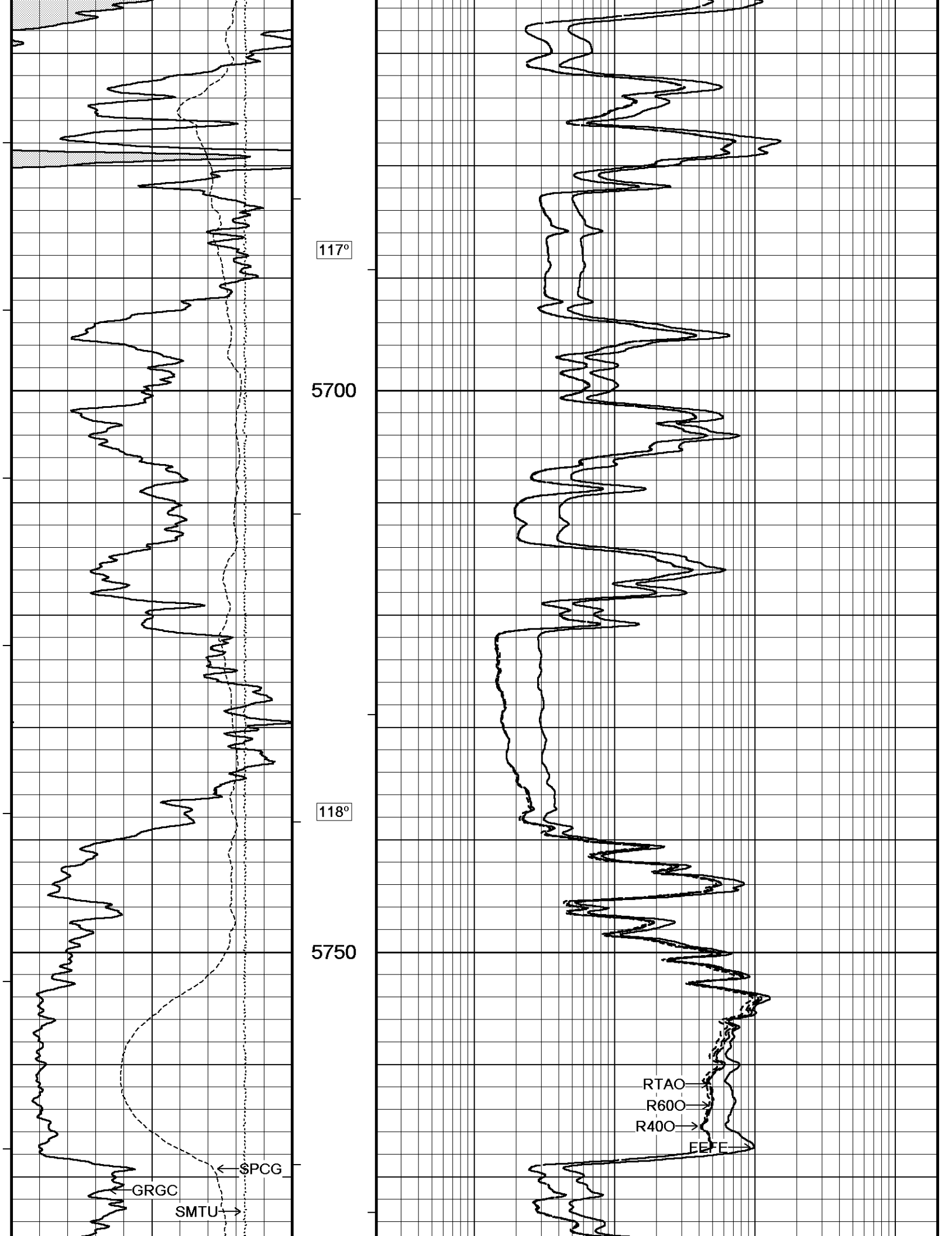
DST Uphole Tension
pounds
5000 0

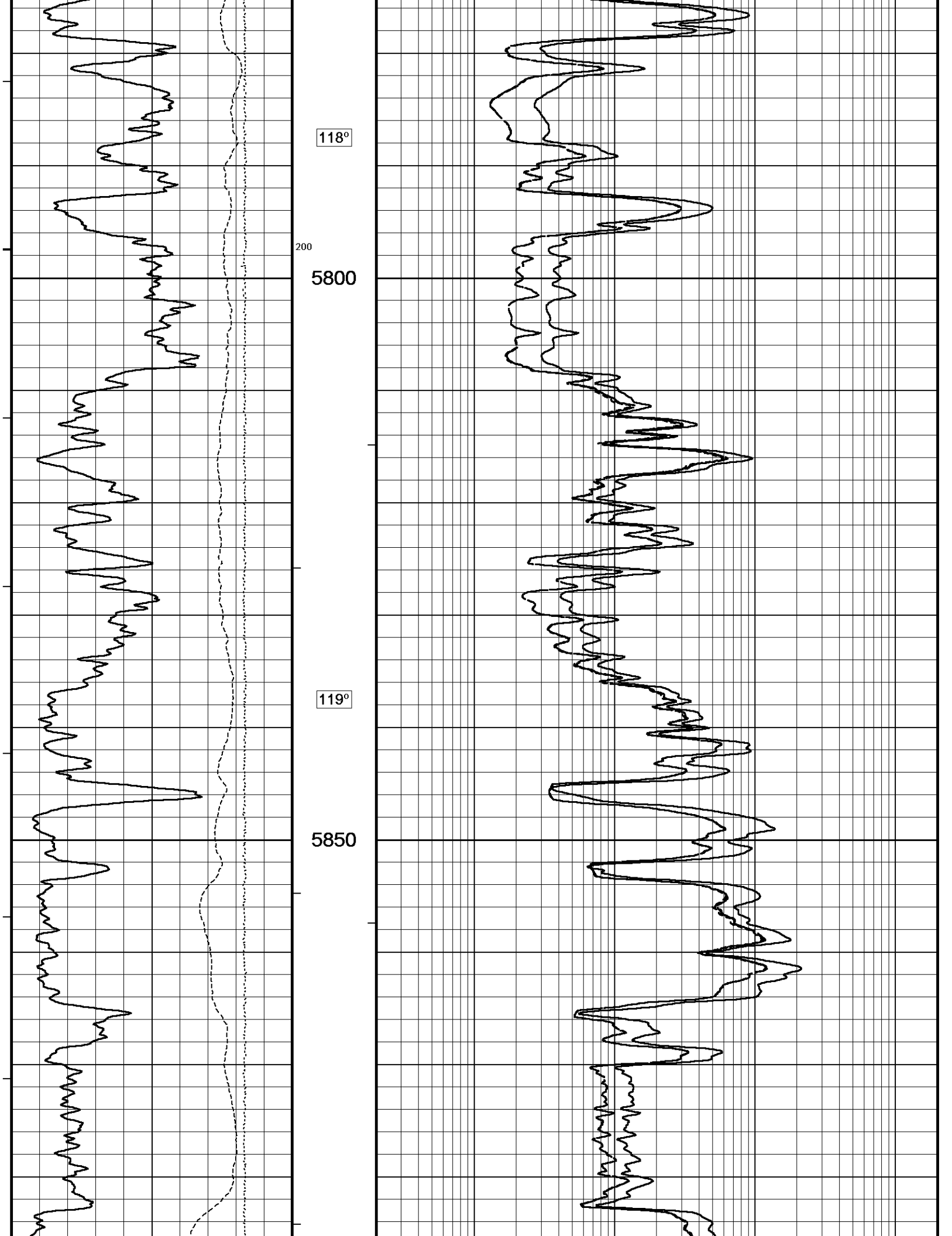
Replay Scale 1:120

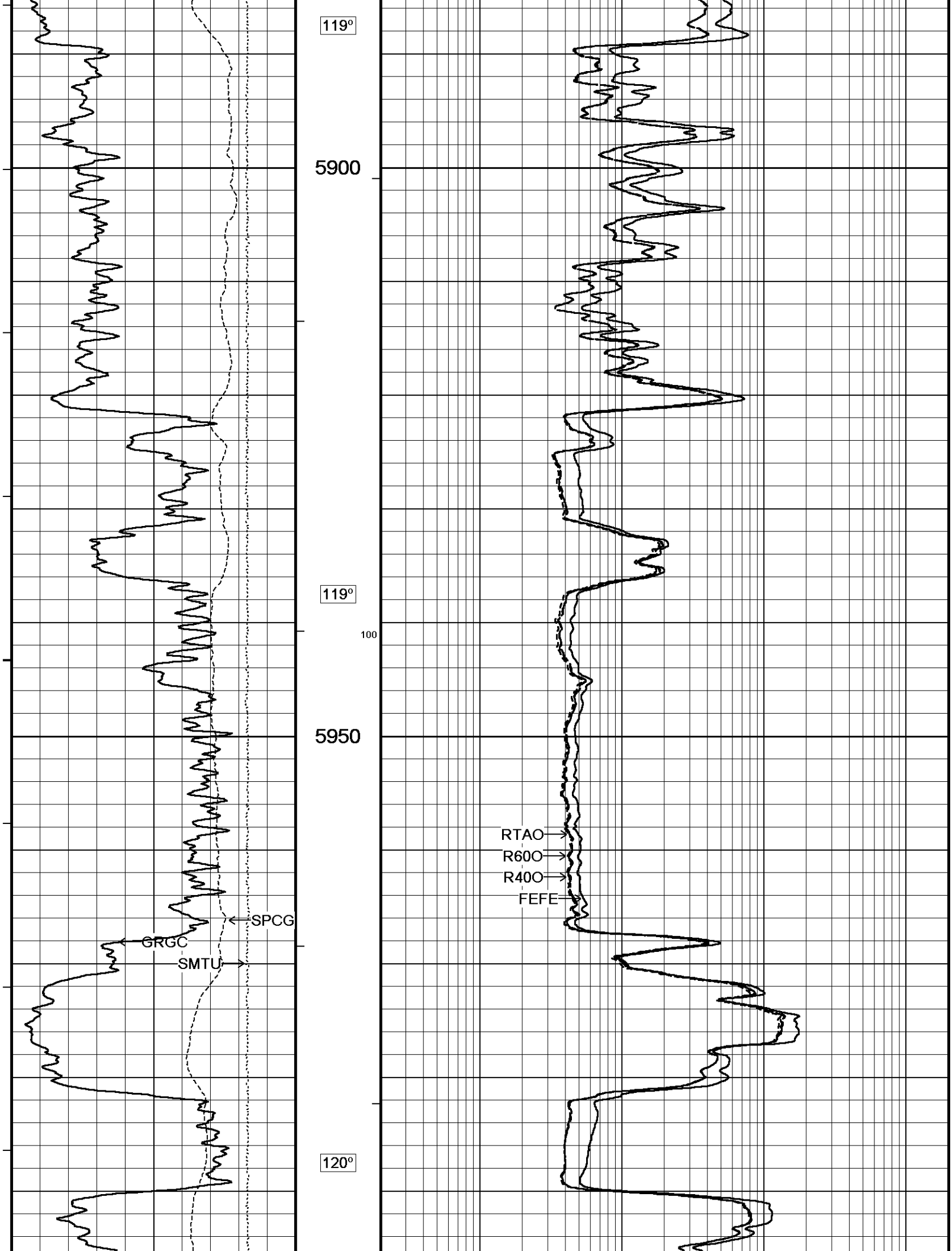
5650

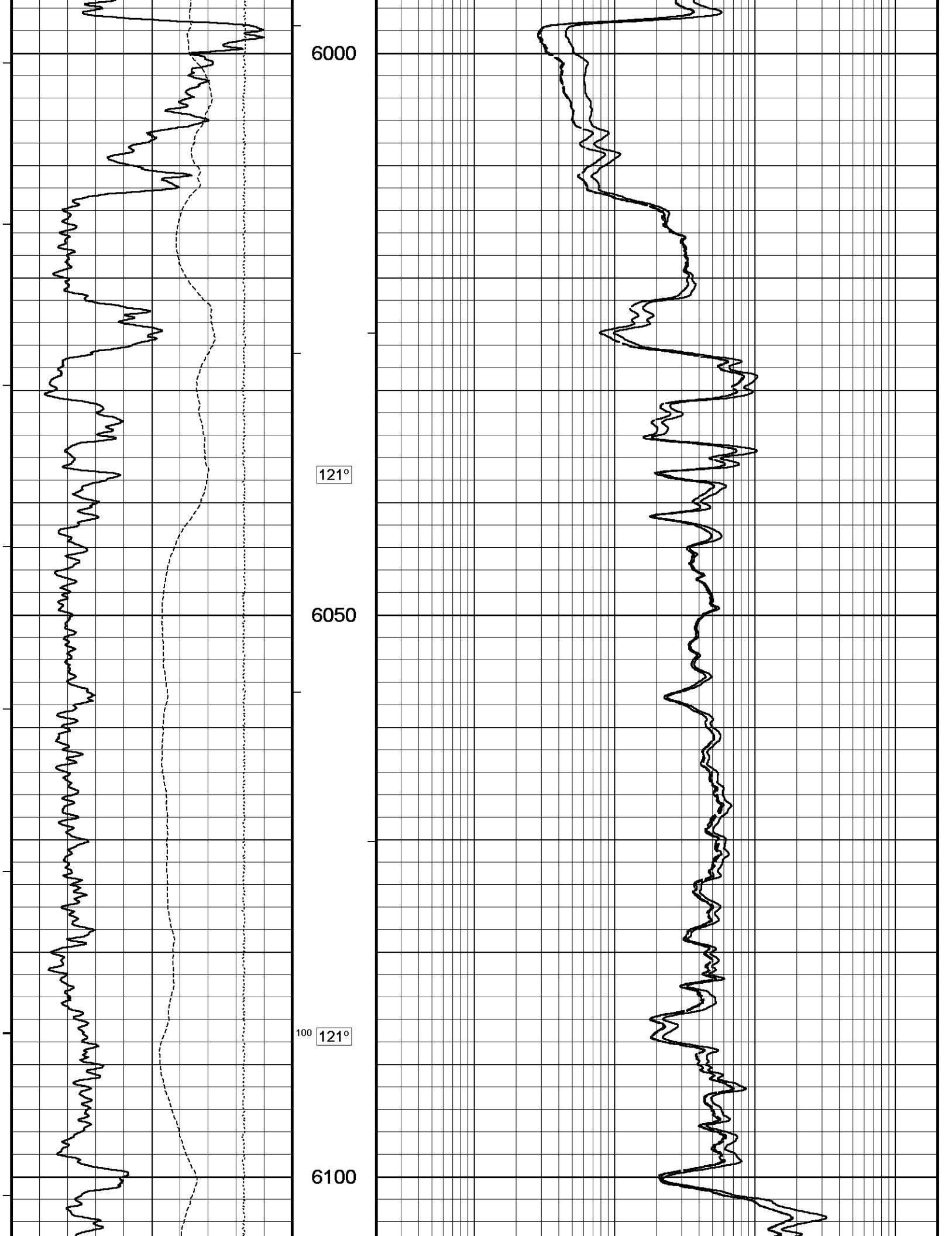


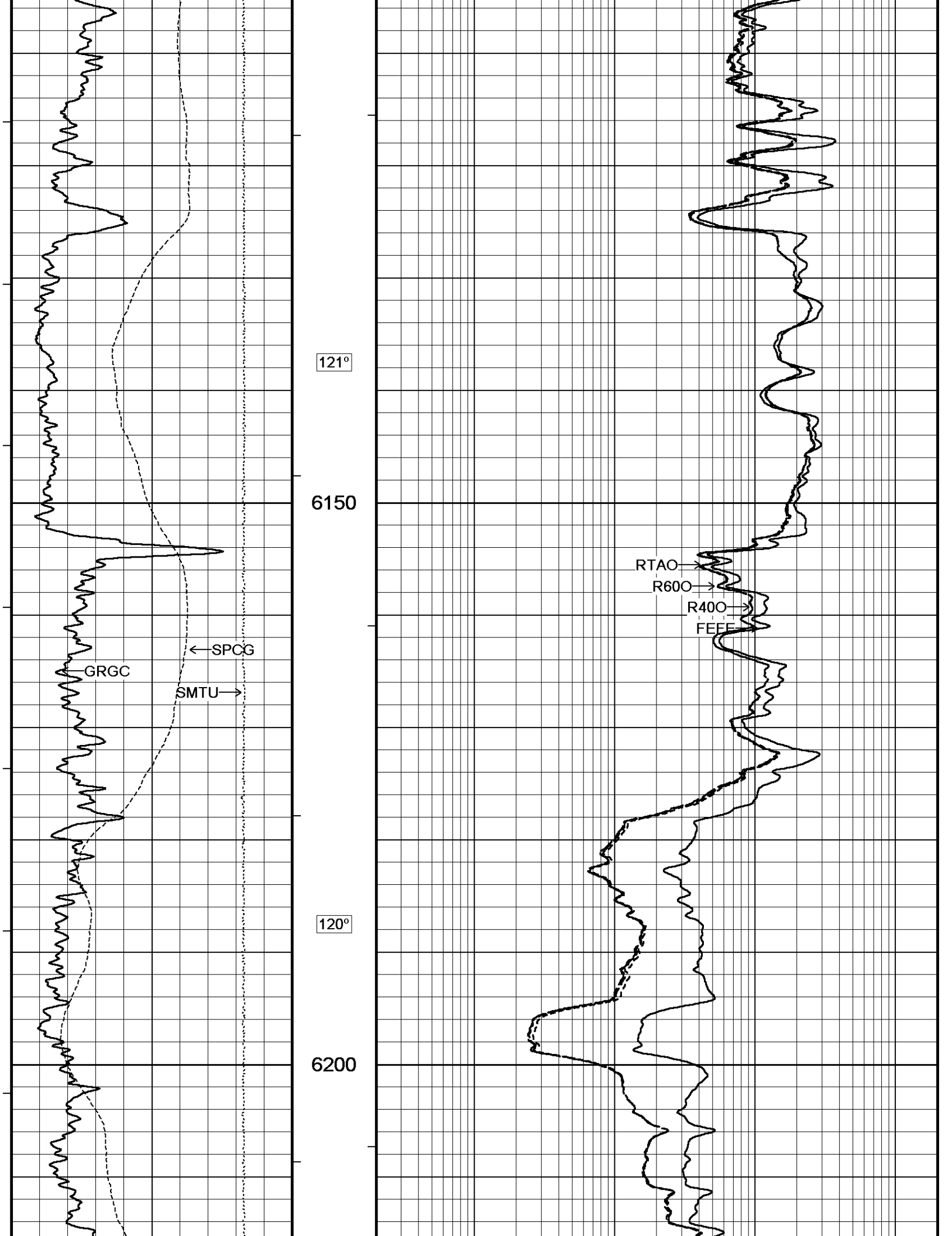


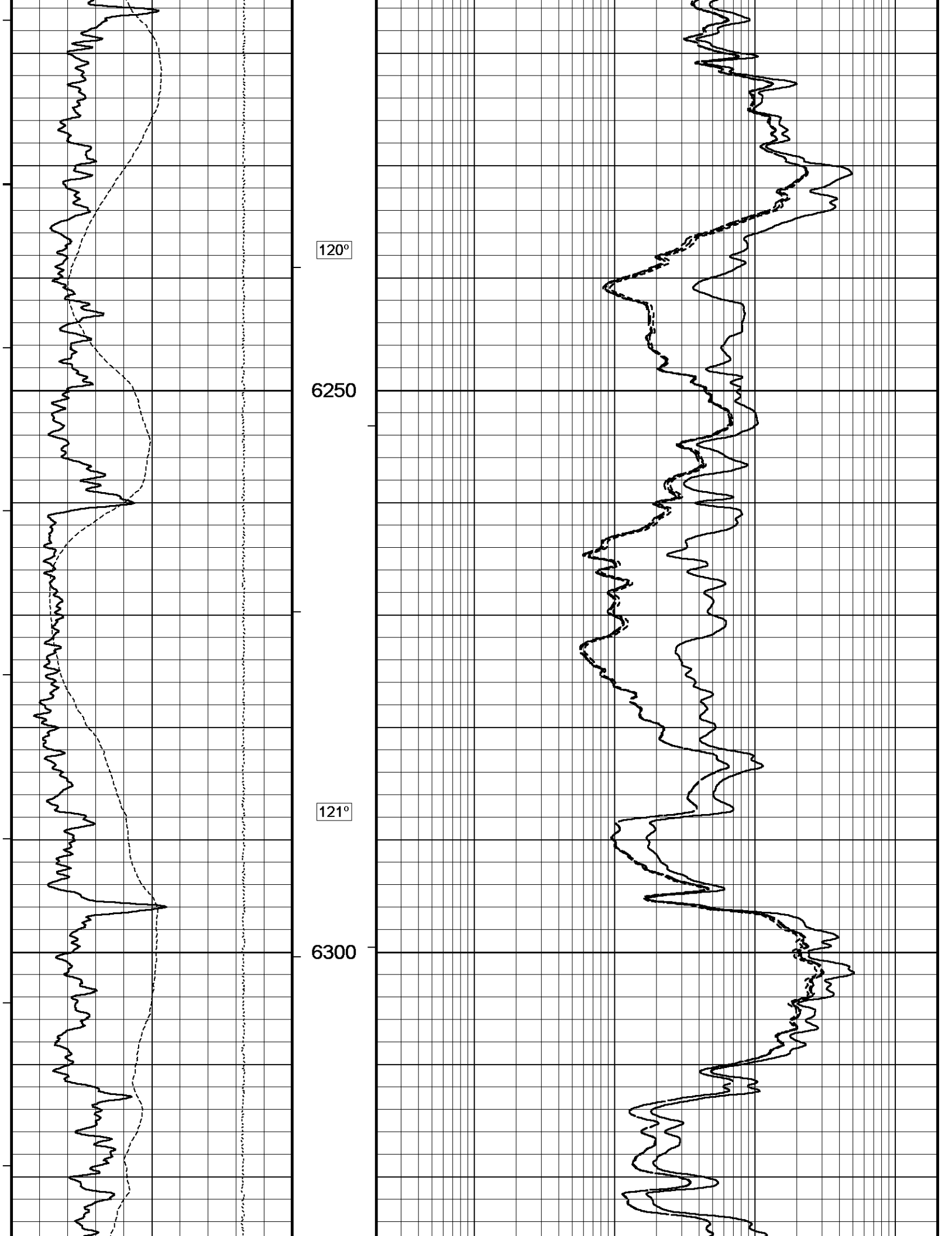

117°
5700
118°
5750
SPCG
GRGC
SMTU
RTAO
R60O
R40O
FEFE

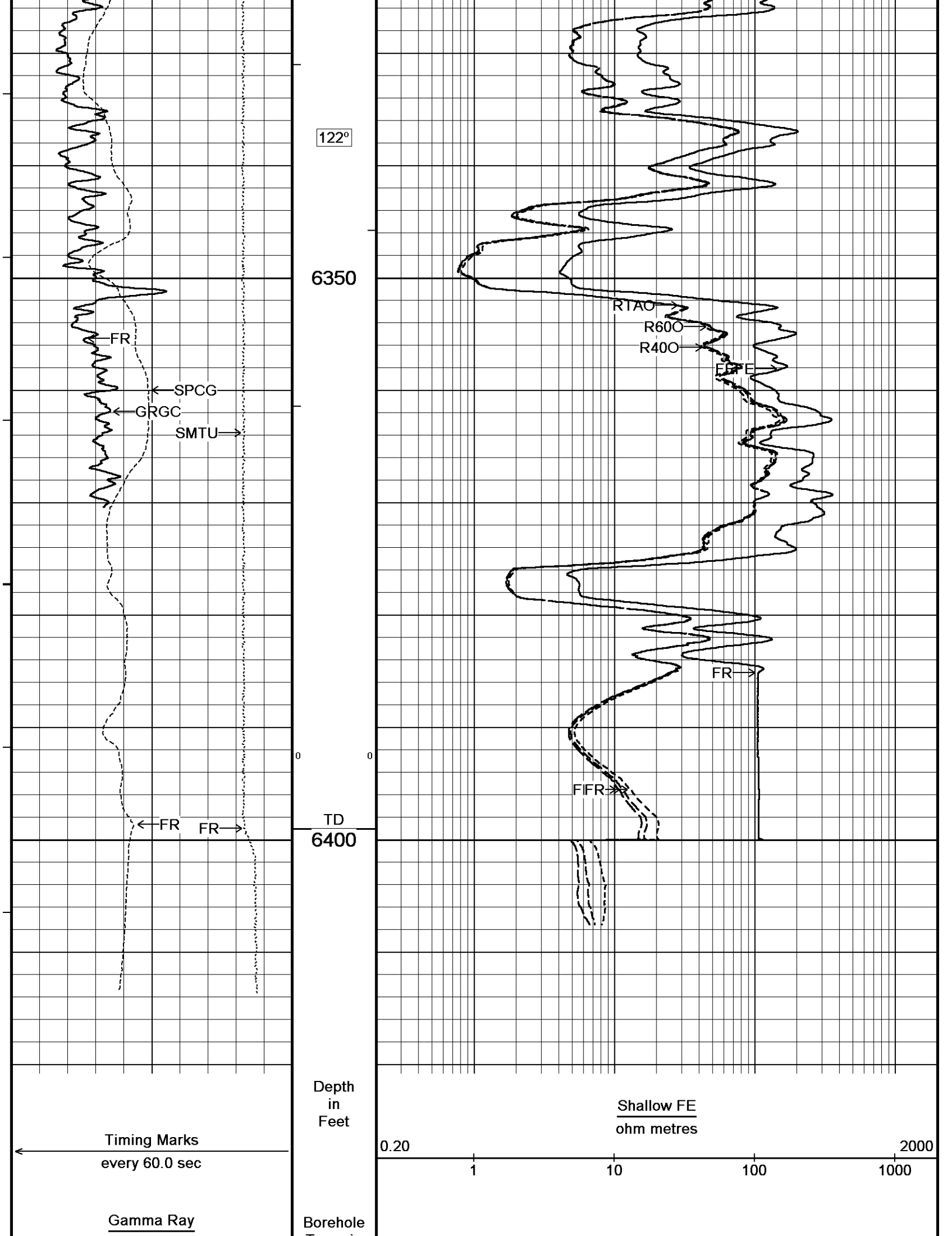

118°
200
5800
119°
5850

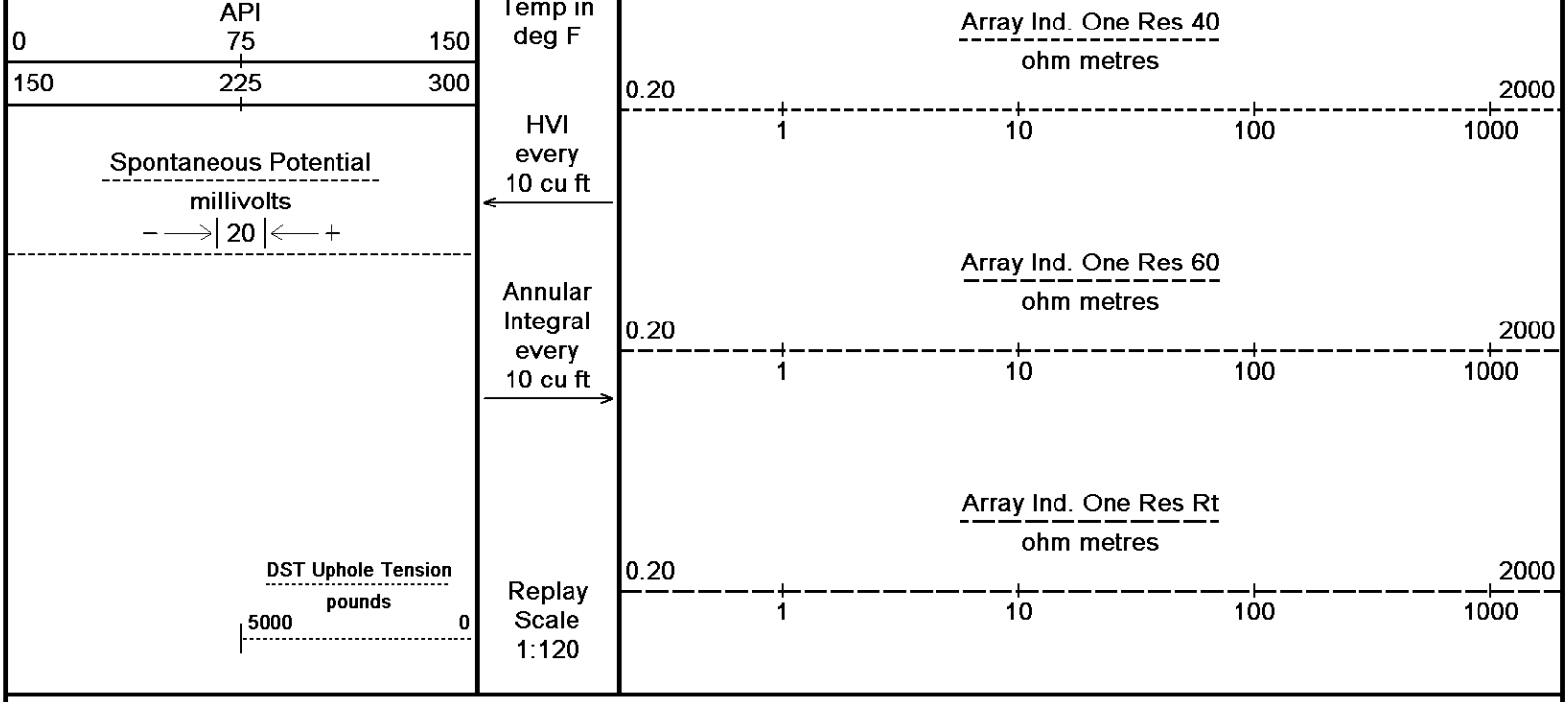

119°
5900
119°
100
5950
120°
RTAO
R60O
R40O
FEFE
SPCG
GRGC
SMTU


6000
121°
6050
100
121°
6100


121°
6150
120°
6200
SPCG
GRGC
SMTU
RTAO
R60O
R40O
FEFE


120°
6250
121°
6300


122°
6350
FR
SPCG
GRGC
SMTU
FR
FR
RTAO
R60O
R40O
FE
FE
FR
FIFR
TD
6400
Depth
in
Feet
Timing Marks
every 60.0 sec
Gamma Ray
Shallow FE
ohm metres
0.20
2000
1
10
100
1000
Borehole



Depth Based Data - Maximum Sampling Increment 2.5cm — Plotted on 03-NOV-2015 02:02

Filename: C:\Minimus 15.03.5939\Logs\O'Brien Hush #2-9\O'Brien Hush #2-9_001.dta — Recorded on 02-NOV-2015 20:23

System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

10 INCH HIGH RESOLUTION

BEFORE SURVEY CALIBRATION

C:\Minimus 15.03.5939\Logs\O'Brien Hush #2-9\O'Brien Hush #2-9_002.dta

General Constants All 000

Last Edited on 02-NOV-2015,19:02

General Parameters		
Mud Resistivity	1.540	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	Density Caliper	
Rwa Parameters		
Porosity used	Crossplot Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0

Field Calibration on 31-OCT-2015 20:52

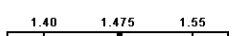
Reading No	Measured	Calibrated (lbs)
1	13795.62	0.00
2	14302.19	324.00

Gamma Calibration MCG-C 123

Field Calibration on 02-NOV-2015 16:32

	Measured	Calibrated (API)
Background	64	43
Calibrator (Gross)	739	499
Calibrator (Net)	675	456

Gamma Calibration Tolerances MCG-C 123



Ratio	1.480		Counts/API

Gamma Constants MCG-C 123

Last Edited on 02-NOV-2015,18:45

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.10	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
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 20-OCT-2015 12:47
Field Check on 02-NOV-2015 15:54

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	9.9	49.5	5.1	25.6
Micro Inverse	9.9	49.5	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	93.9	93.9
Micro Inverse	62.2	62.2

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

Micro Normal Res. 1	9.9	-5% 10.0 +5%	ohm	Micro Normal Res. 2	49.5	-5% 50.0 +5% ohm
Micro Inverse Res. 1	9.9	-5% 10.0 +5%	ohm	Micro Inverse Res. 2	49.5	-5% 50.0 +5% ohm
Micro Normal Base Check	93.9	-2% 93.86 +2%	ohm-m			
Micro Inverse Base Check	62.2	-2% 62.15 +2%	ohm-m			
Micro Normal Field Check	93.9	-2% 93.9 +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 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 20-OCT-2015 12:39
Field Calibration on 02-NOV-2015 15:48

Base Calibration

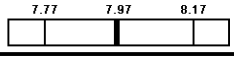
Reading No	Measured	Calibrator Size (in)
1	14395	5.98
2	17722	7.97
3	20970	9.86
4	24935	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

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

Caliper Calibration Tolerances MMR-C.A 247

Short Arm Field Cal. 7.95 in



Micro-Resistivity Caliper Constants MMR-C.A 247

Last Edited on

Sonde Configuration	Resistivity Mode

Neutron Calibration MDN-A.B 114

Base Calibration on 09-OCT-2015 17:26
Field Check on 02-NOV-2015 16:43

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3115	97	3714	110
Ratio	32.183		33.764	

Field Calibrator at Base

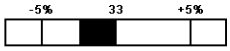
	Calibrated (cps)	
	2099	3004
Ratio	0.699	

Field Check

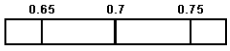
	Calibrated (cps)	
	2108	3030
Ratio	0.696	

Neutron Calibration Tolerances MDN-A.B 114

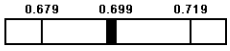
Ratio 32.183



Base Check 0.699



Field Check 0.696



Neutron Constants MDN-A.B 114

Last Edited on 02-NOV-2015,18:45

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

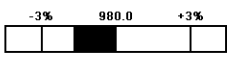
Base Calibration on 15-OCT-2015 15:11
Field Check on 02-NOV-2015 15:46

Base Calibration

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

FE Calibration Tolerances MFE-A.A 135

Reference 2 963.1 ohm



Base Check	281.2	-2% 277.0 +2%	ohm-m
Field Check	281.2	-2% 281.2 +2%	ohm-m

FE Constants MFE-A.A 135

Last Edited on 02-NOV-2015,18:45

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 02-NOV-2015 15:39

Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	17.6	473.6	9.3	966.2
2	6.4	385.9	7.6	821.4
3	3.2	264.0	5.2	566.0
4	2.1	135.5	2.6	279.2
Array Temperature		23.0	Deg F	

Test Loop Calibration Verified 27-OCT-2015 14:48

Channel	Base Check (mmho/m)		Field Check (mmho/m)		
	Low	High	Low	High	
1	0.0	0.0	10.1	3871.3	
2	0.0	0.0	27.9	3526.5	
3	0.0	0.0	27.4	3019.9	
4	0.0	0.0	18.0	2057.5	
Deep			16.7	1961.1	
Medium			40.9	3974.7	
Shallow			41.6	5230.4	
Array Temperature		0.0	67.1		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 02-NOV-2015,18:44

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

Caliper Calibration MPD-C.A 216

Base Calibration on 27-OCT-2015 15:00
Field Calibration on 02-NOV-2015 15:57

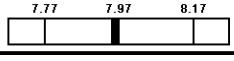
Base Calibration

Reading No	Measured	Calibrator Size (in)
1	20748	3.99
2	30736	5.98
3	40832	7.97
4	50672	9.86
5	61360	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.94	7.97

Caliper Calibration Tolerances MPD-C.A 216

Short Arm Field Cal. 7.94 

in

Photo Density Calibration MPD-C.A 216

Base Calibration on 27-OCT-2015 15:24
Field Check on 02-NOV-2015 16:03

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1075	1260		
Reference 1	52868	25509	59556	30836
Reference 2	21121	2391	24941	2541

Field Check at Base

	1074.9	1260.2

Field Check

	1070.4	1266.4

PE Calibration

Base Calibration

	WS	Measured WH	Ratio	Calibrated Ratio
Background	196	953		
Reference 1	21690	52686	0.415	0.371
Reference 2	5992	20992	0.289	0.272

Field Check at Base

	195.7	953.2

Field Check

	194.2	948.7

Photo Density Calibration Tolerances MPD-C.A 216

Near Density Ratio	2.58	-5% 2.52 +5%	Far Density Ratio	21.44	-5% 21.00 +5%
PE Calibration	0.118	0.089 0.110 0.131			
Near Den. Field Check	1070.4	-3% 1074.9 +3%	Far Den. Field Check	1266.4	-3% 1260.2 +3%
PE WS Field Check	194.2	-6% 195.7 +6%	PE WH Field Check	948.7	-6% 953.2 +6%

Density Constants MPD-C.A 216

Last Edited on 02-NOV-2015,18:45

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	1.10	gm/cc
Mud Density Z/A Multiplier	1.11	
Mud Filtrate Density	1.00	gm/cc
Dry Hole Mud Filtrate Density	1.00	gm/cc
DNCT	0.00	gm/cc
CRCT	0.00	gm/cc
Density Z/A Correction	Hybrid	

Matrix Density (gm/cc)	Depth (ft)
2.71	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	

DOWNHOLE EQUIPMENT

C:\Minimus 15.03.5939\Logs\O'Brien Hush #2-9\O'Brien Hush #2-9_002.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

43.50 ft GRGC - MCG Gamma Ray

40.59 ft CGXT - MCG External Temperature

Compact Micro-Resistivity

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

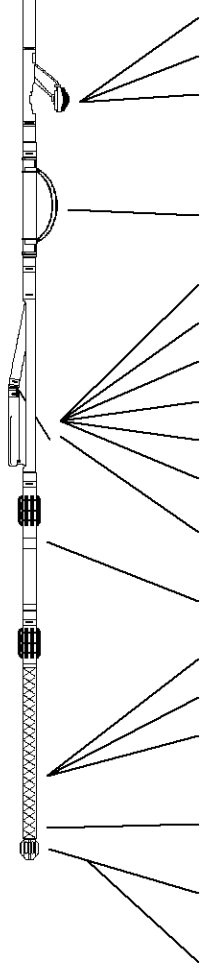
Compact Neutron
MDN-A.B 114 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

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



34.24 ft	MBTC - MMR Caliper
33.24 ft	MINV - MMR MicroLog Inverse
33.24 ft	MNRL - MMR MicroLog Normal
28.45 ft	NPRL - Limestone Neutron Por.
21.21 ft	AVOL - Annular Volume
21.21 ft	HVOL - Hole Volume
21.21 ft	CLDC - Density Caliper
19.28 ft	DEN - Compensated Density
19.28 ft	DCOR - Density Correction
19.28 ft	DPRL - Limestone Density Por.
19.22 ft	PDPE - PE
13.72 ft	FEFE - Shallow FE
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 ENERGY RESOURCES CORP.
WELL	HUSH #2-9
FIELD	BRUNO NE PROSPECT
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2742.00	feet	First Reading	6396.00	feet
Elevation Drill Floor	2740.00	feet	Depth Driller	6400.00	feet
Elevation Ground Level	2729.00	feet	Depth Logger	6399.00	feet

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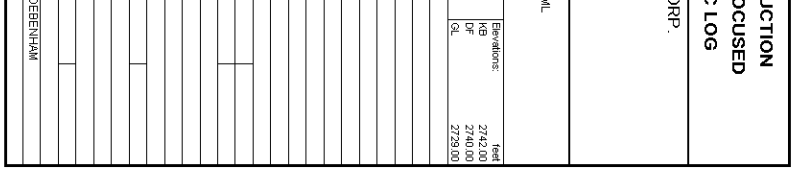
COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	HUSH #2-9
FIELD	BRUNO NE PROSPECT
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	100' FSL & 660' FEL
SEC 9	TWP 33S RGE 30W
Latitude	Other Services
Longitude	MDN/MFD
API Number	15-119-21393
Permanent Datum GL, Elevation 2729 feet	
Log Measured From KB	
Drilling Measured From KB @ 13 FEET	

Date	02-NOV-2015		
Run Number	ONE		
Service Order	4558-133683407		
Depth Driller	6400.00	feet	
Depth Logger	6399.00	feet	
First Reading	6396.00	feet	
Last Reading	1492.00	feet	
Casing Driller	1487.00	feet	
Casing Logger	1492.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	WBM		
Density/Viscosity	9.20	lb/USg	62.00 CP
PH/Fluid Loss	9.50		8.60 ml/30Min
Sample Source	FLOWLINE		
Rm @ Measured Temp	1.54 @ 75.0	ohm-m	
Rmf @ Measured Temp	1.23 @ 75.0	ohm-m	
Rmc @ Measured Temp	1.85 @ 75.0	ohm-m	
Source Rmf/Rmc	CALC		CALC
Rm @ BHT	0.92 @ 75.0	ohm-m	
Time Since Circulation	4 HOURS		
Max Recorded Temp	125.00	deg F	
Equipment / Base	13096	OKC	
Recorded By	ADAM SILL		
Witnessed By	ROGER PEARSON		PETE



1 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 03-NOV-2015 02:02

Filename: C:\Minimus 15.03.5939\Logs\O'Brien Hush #2-9\O'Brien Hush #2-9_003.dta — Recorded on 02-NOV-2015 21:51

System Versions: Logged with 15.03.5939 Processed 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|←+

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

HVI every 10 cu ft

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 / 0 250 500

DST Uphole Tension pounds 5000 0

Replay Scale 1:600

C1480 g Shoe

1500

90°

1600

91°

1700

92°

1800

92°

1900

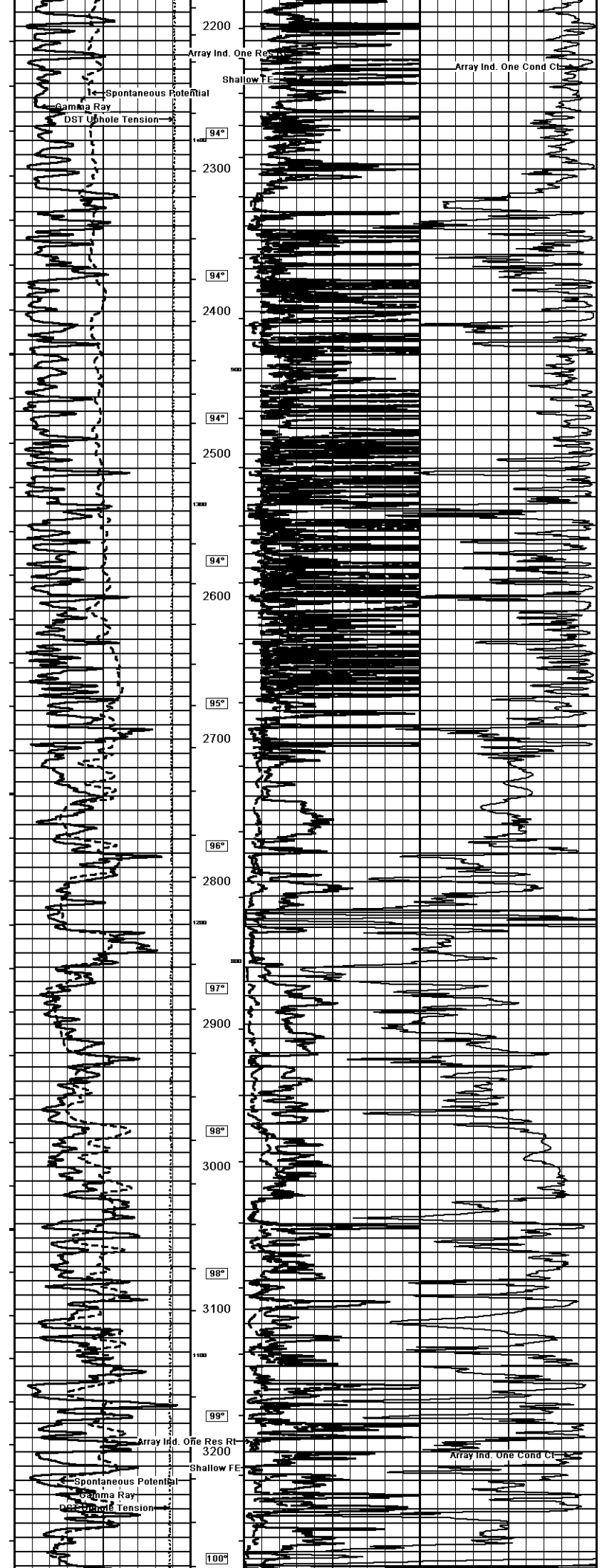
92°

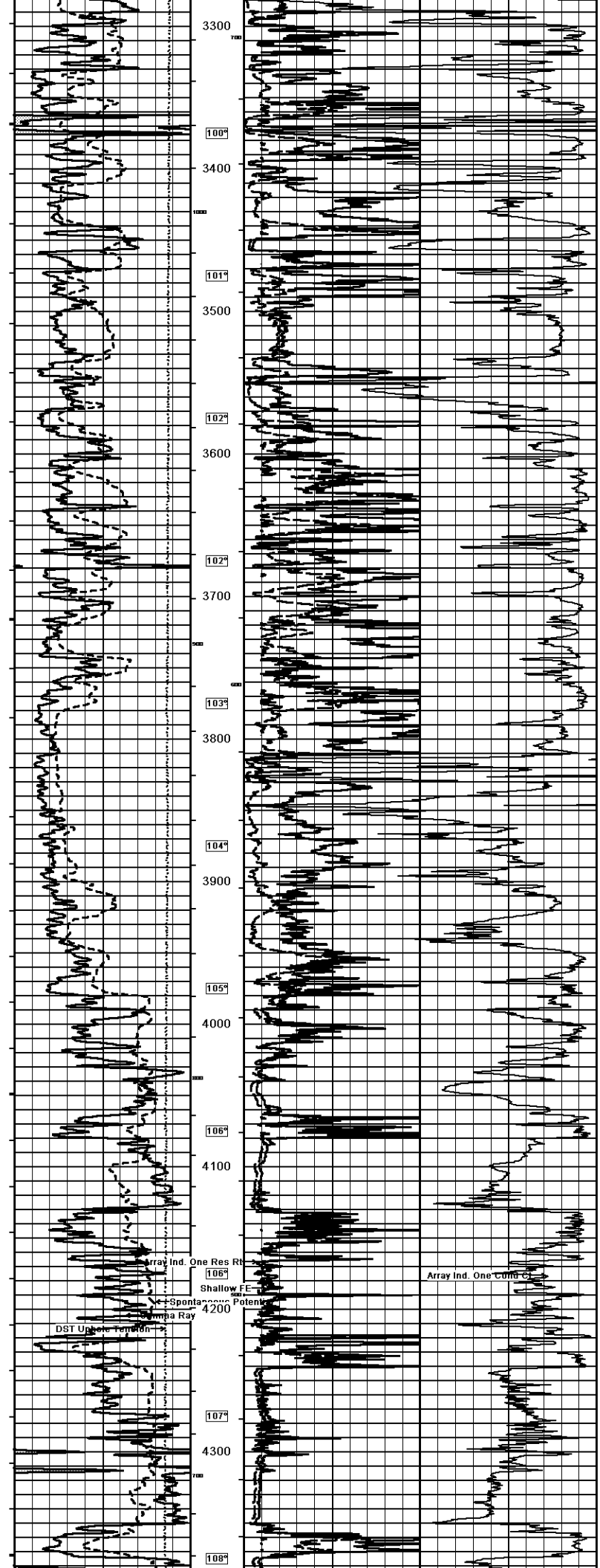
2000

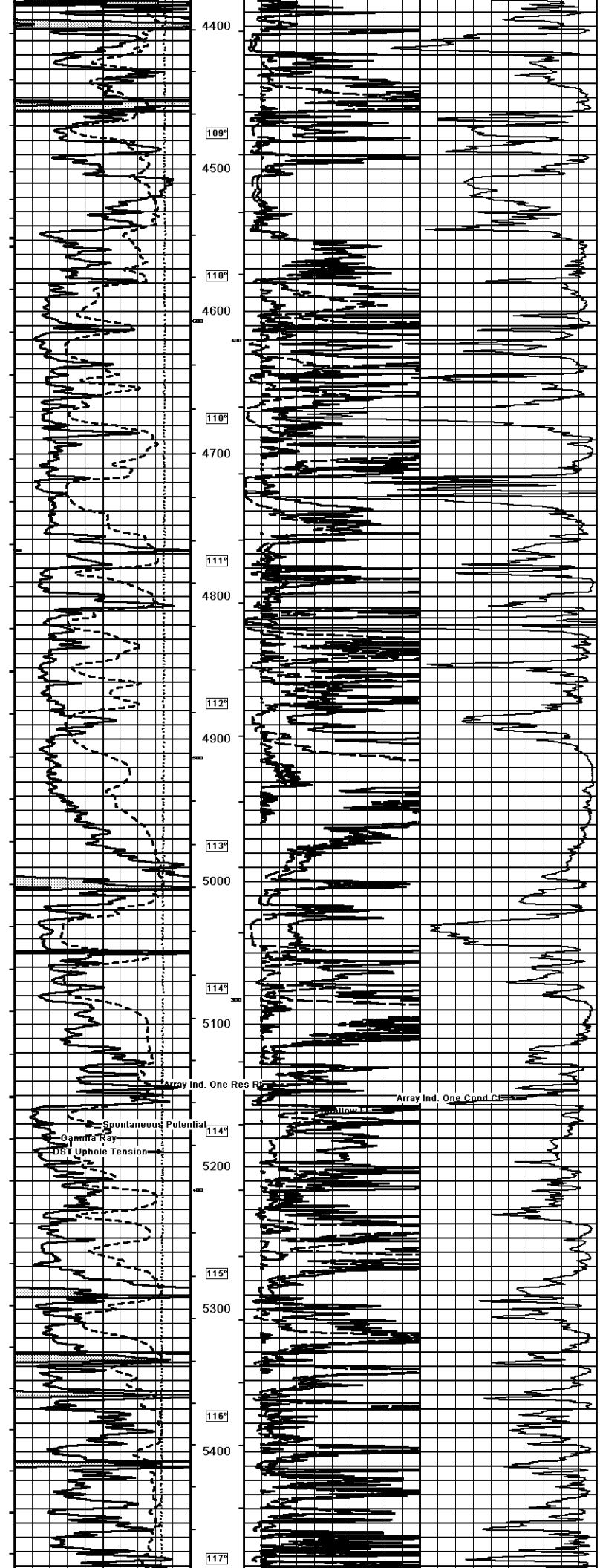
93°

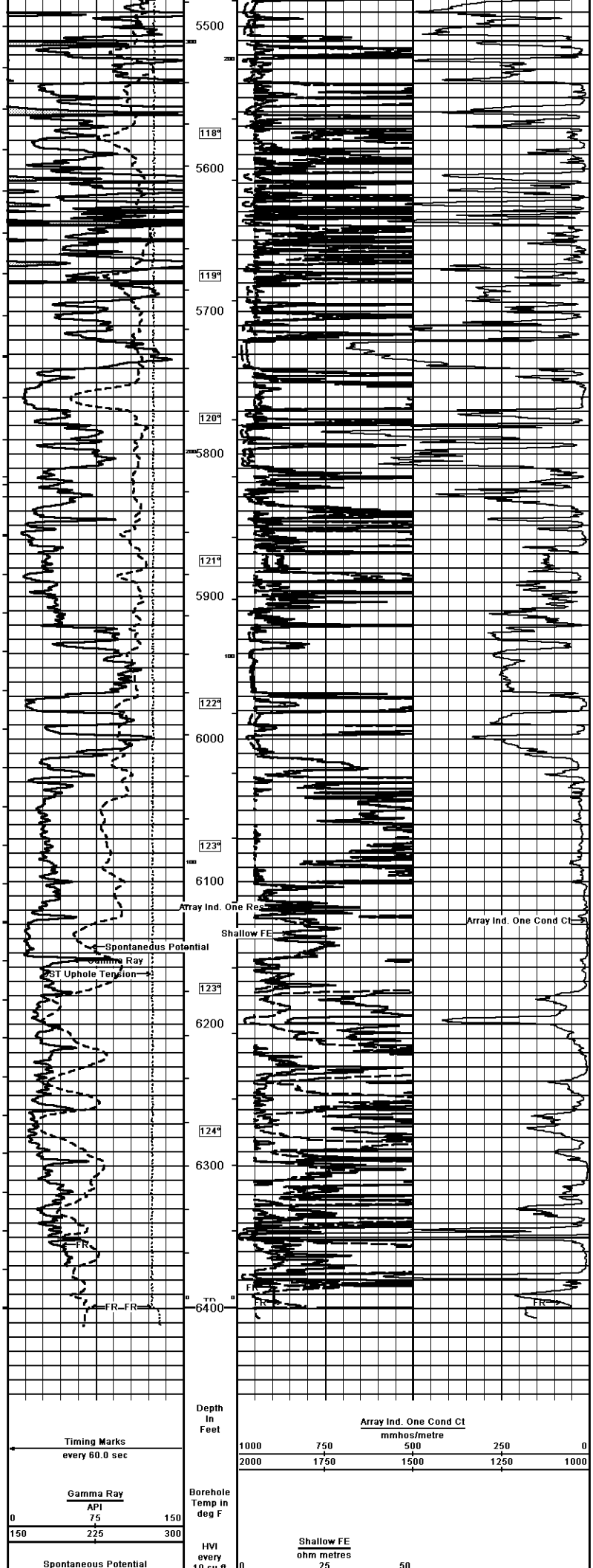
2100

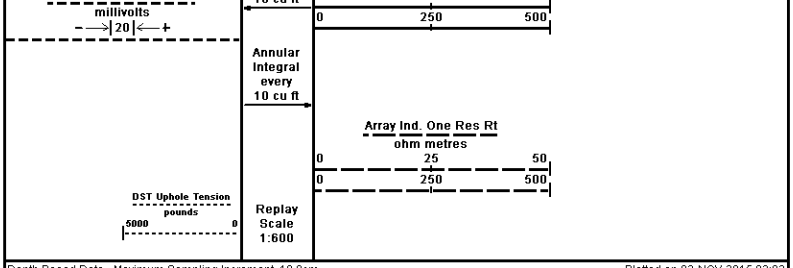
94°


2200
Array Ind. One Res Rt
Array Ind. One Cond Cl
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
94°
2300
94°
2400
94°
2500
94°
2600
95°
2700
96°
2800
97°
2900
98°
3000
98°
3100
99°
Array Ind. One Res Rt
3200
Array Ind. One Cond Cl
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
100°


3300
100
3400
101
3500
102
3600
102
3700
103
3800
104
3900
105
4000
106
4100
106
4200
107
4300
108
Array Ind. One Res Rt
Shallow FE
Spontaneous Potenti
Gamma Ray
DST Uphole Tension
Array Ind. One Comp C


4400
109°
4500
110°
4600
110°
4700
111°
4800
112°
4900
113°
5000
114°
5100
Array Ind. One Res R
Array Ind. One Cond C
Spontaneous Potential
Gamma Ray
DST Uphole Tension
114°
5200
115°
5300
116°
5400
117°


5500
118°
5600
119°
5700
120°
5800
121°
5900
122°
6000
123°
6100
Array Ind. One Res
Shallow FE
Array Ind. One Cond Ct
Spontaneous Potential
Gamma Ray
BST Uphole Tension
123°
6200
124°
6300
FR
FR–FR
TD
6400
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Spontaneous Potential
Depth
In
Feet
Borehole
Temp in
deg F
HVI
every
Array Ind. One Cond Ct
mmhos/metre
1000
750
500
250
0
2000
1750
1500
1250
1000
Shallow FE
ohm metres
0
25
50



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 03-NOV-2015 02:02

Filename: C:\Minimus 15.03.5939\Logs\O'Brien Hush #2-9\O'Brien Hush #2-9_003.dta — Recorded on 02-NOV-2015 21:51

System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939

1 INCH MAIN

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WELL	HUSH #2-9
FIELD	BRUNO NE PROSPECT
PROVINCE/COUNTY	MEADE
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