Weatherford®

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	PREEDY #3-4
FIELD	ANGELL SOUTHEAST
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1980' FSL & 2305' FEL

SEC 3	TWP 33S	RGE 29W	Other Services: MPD/MDN, MML
Latitude			
Longitude			
API Number	15-119-21425		

Permanent Datum GL, Elevation 2668 feet
Log Measured From KB, 13.00 feet above Permanent Datum
Drilling Measured From KB

Elevations:	feet
KB	2681.00
DF	2679.00
GL	2668.00

Date	07-SEP-2018				
Run Number	ONE				
Service Order	4558-223534615				
Depth Driller	6350.00	feet			
Depth Logger	6351.00	feet			
First Reading	6348.00	feet			
Last Reading	1530.00	feet			
Casing Driller	1528.00	feet			
Casing Logger	1530.00	feet			
Bit Size	7.875	inches			
Hole Fluid Type	CHEMICAL				
Density / Viscosity	9.10	lb/USg	58.00	CP	
PH / Fluid Loss	10.50		7.20	ml/30Min	
Sample Source	FLOWLINE				
Rm @ Measured Temp	1.18 @ 75.0	ohm-m			
Rmf @ Measured Temp	0.94 @ 75.0	ohm-m			
Rmc @ Measured Temp	1.42 @ 75.0	ohm-m			
Source Rmf / Rmc	CALC		CALC		
Rm @ BHT	0.69 @129.0	ohm-m			
Time Since Circulation	5 HOURS				
Max Recorded Temp	129.00	deg F			
Equipment / Base	13096		LIB		
Recorded By	ADAM SILL				
Witnessed By	CASEY COATS			PETE DEBENHAM	

Last Edited: 07-SEP-2018 15:29

BOREHOLE RECORD

Bit Size inches	Depth From feet	Depth To feet
7.875	1528.00	6350.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1528.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 18.01.6830.
- 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.
- 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 2150 FEET: 1455 CU.FT.
- ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO 4000 FEET: 533 CU.FT.
- RIG: DUKE #7.

- ENGINEER: A. SILL.

- OPERATOR: B. TOVAR, B. COPELAND.

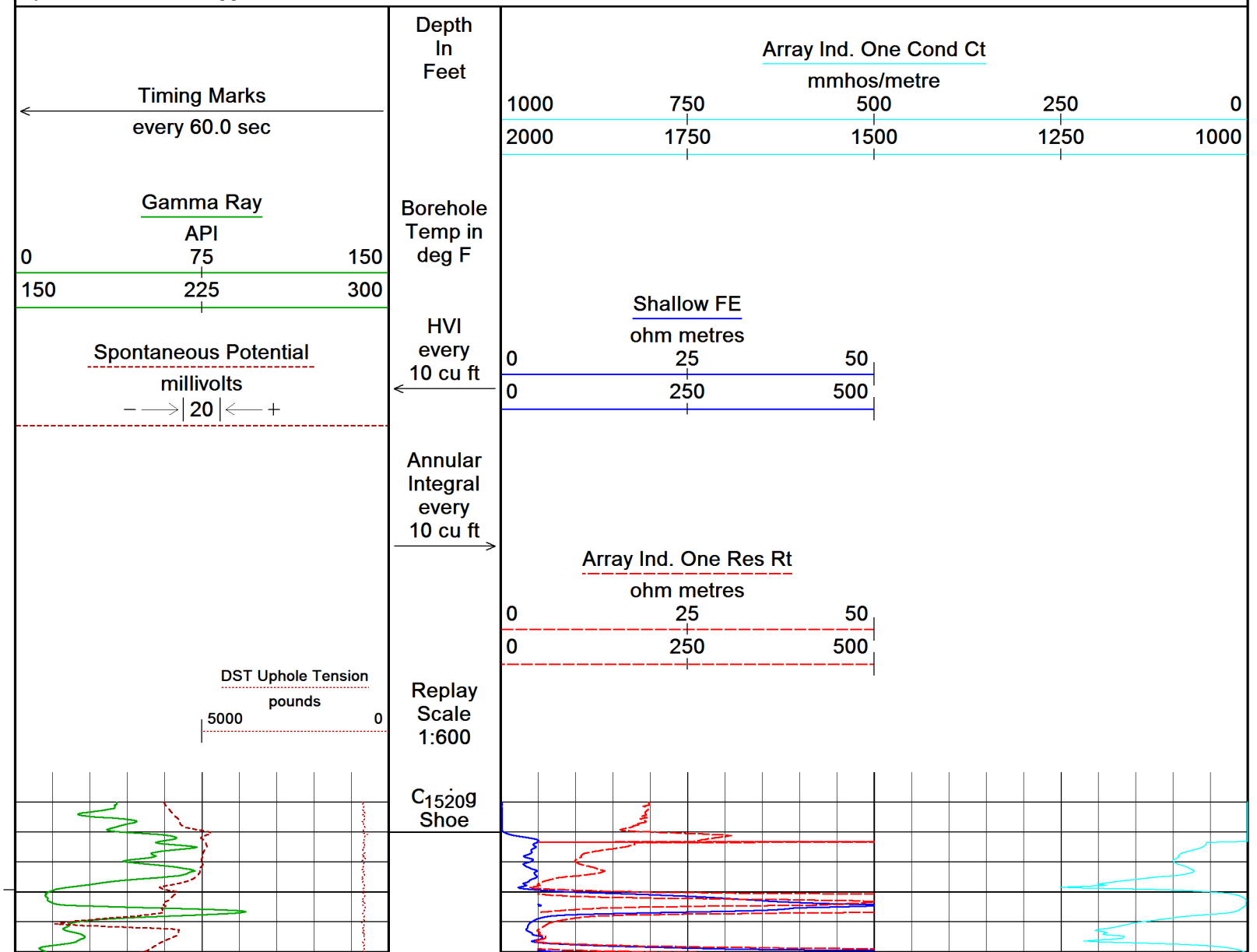
**** PULLED TIGHT SEVERAL TIMES FROM 2130 FEET TO 2100 FEET. HAD TO CLOSE CALIPERS TO PULL THROUGH THE TIGHT SPOTS. ONCE THROUGH THE TIGHT SPOTS THE DECISION WAS MADE TO KEEP CALIPERS CLOSED TO HELP AVOID ANY FURTHER TIGHT PULLS. ****

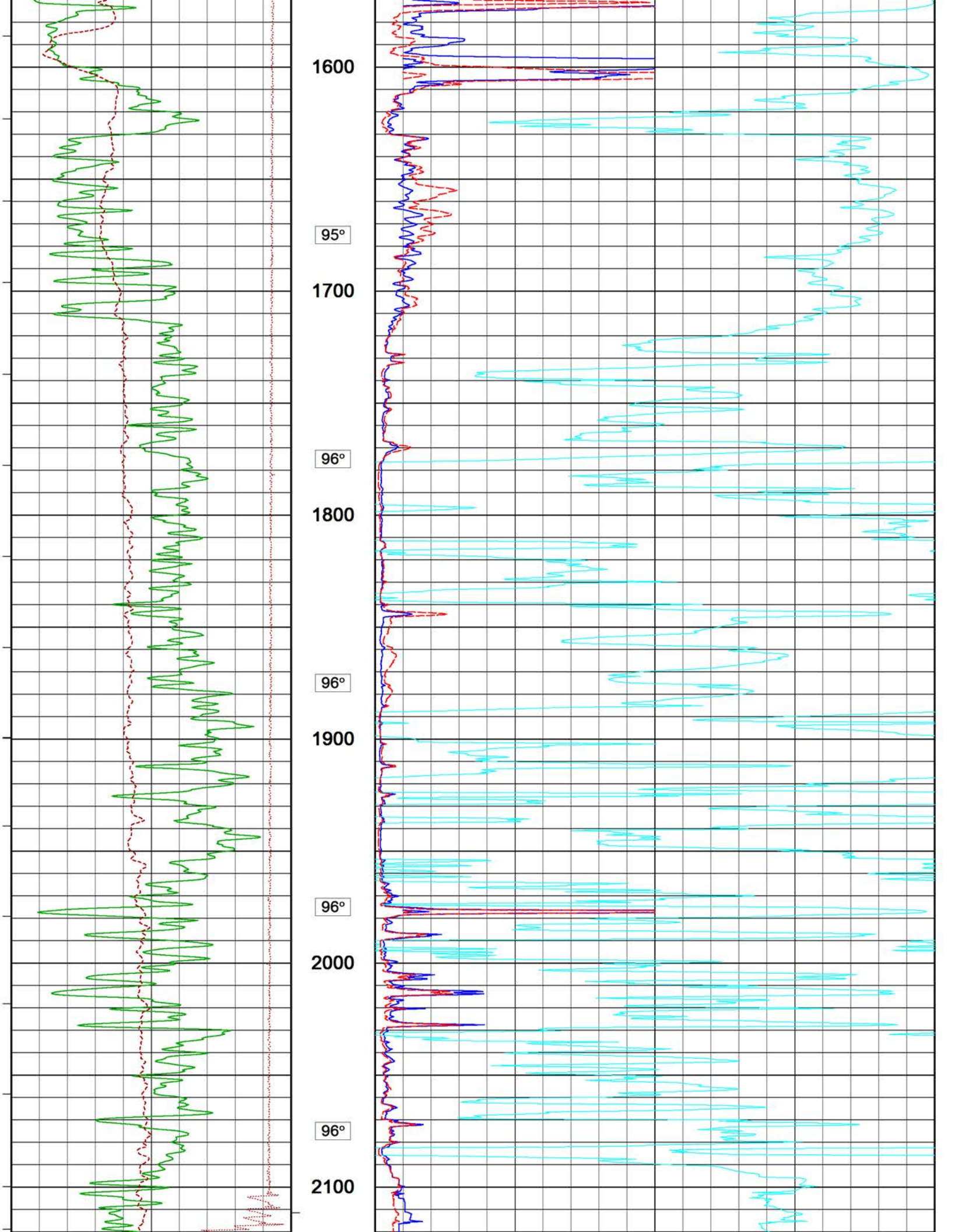
2 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 14-DEC-2018 15:19

Filename: C:\Users\John\AppData\Local\Temp\Weatherford PreVi...\O'Brien Preedy #3-4_003.dta — Recorded on 07-SEP-2018 18:49

System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.03.8669

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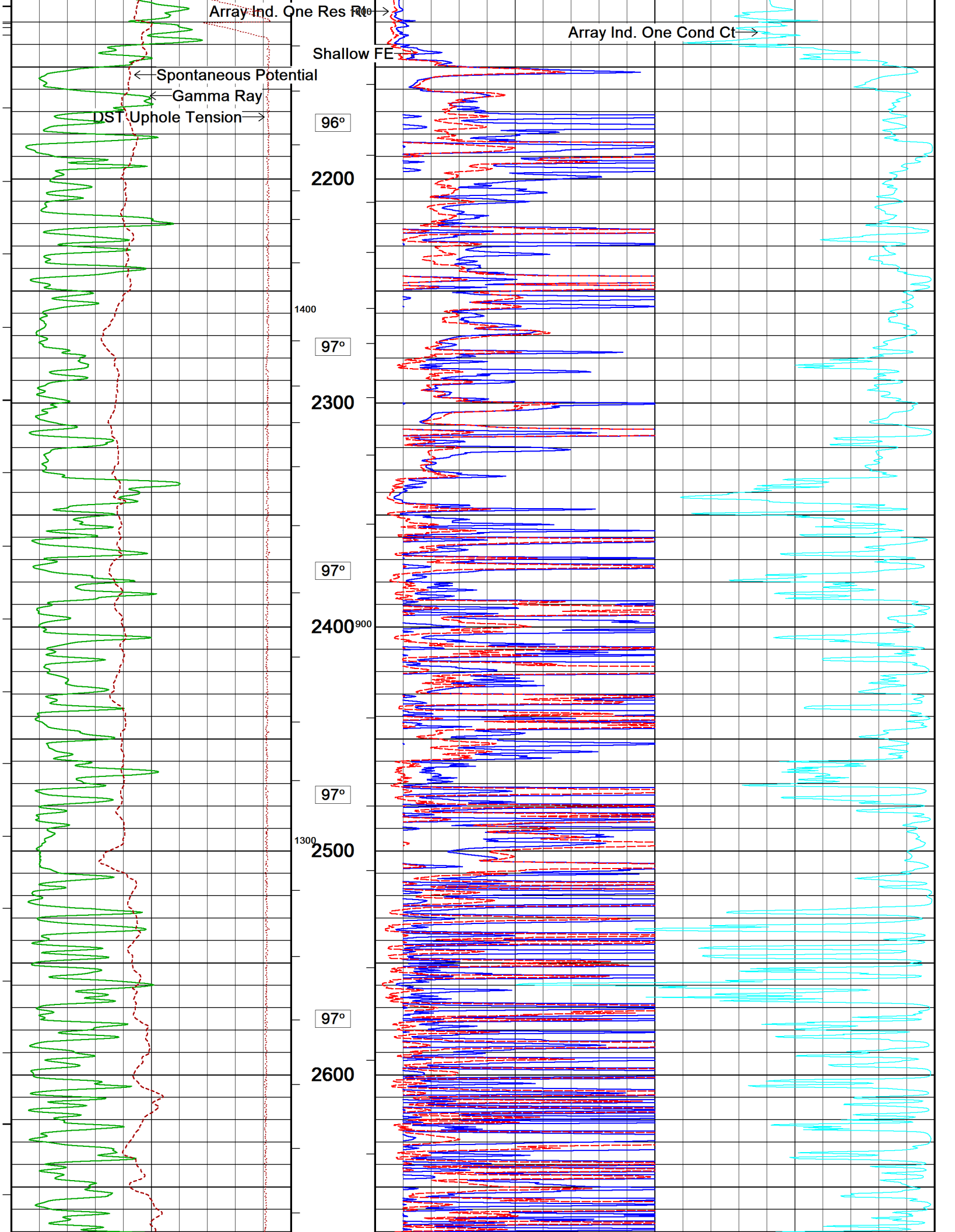
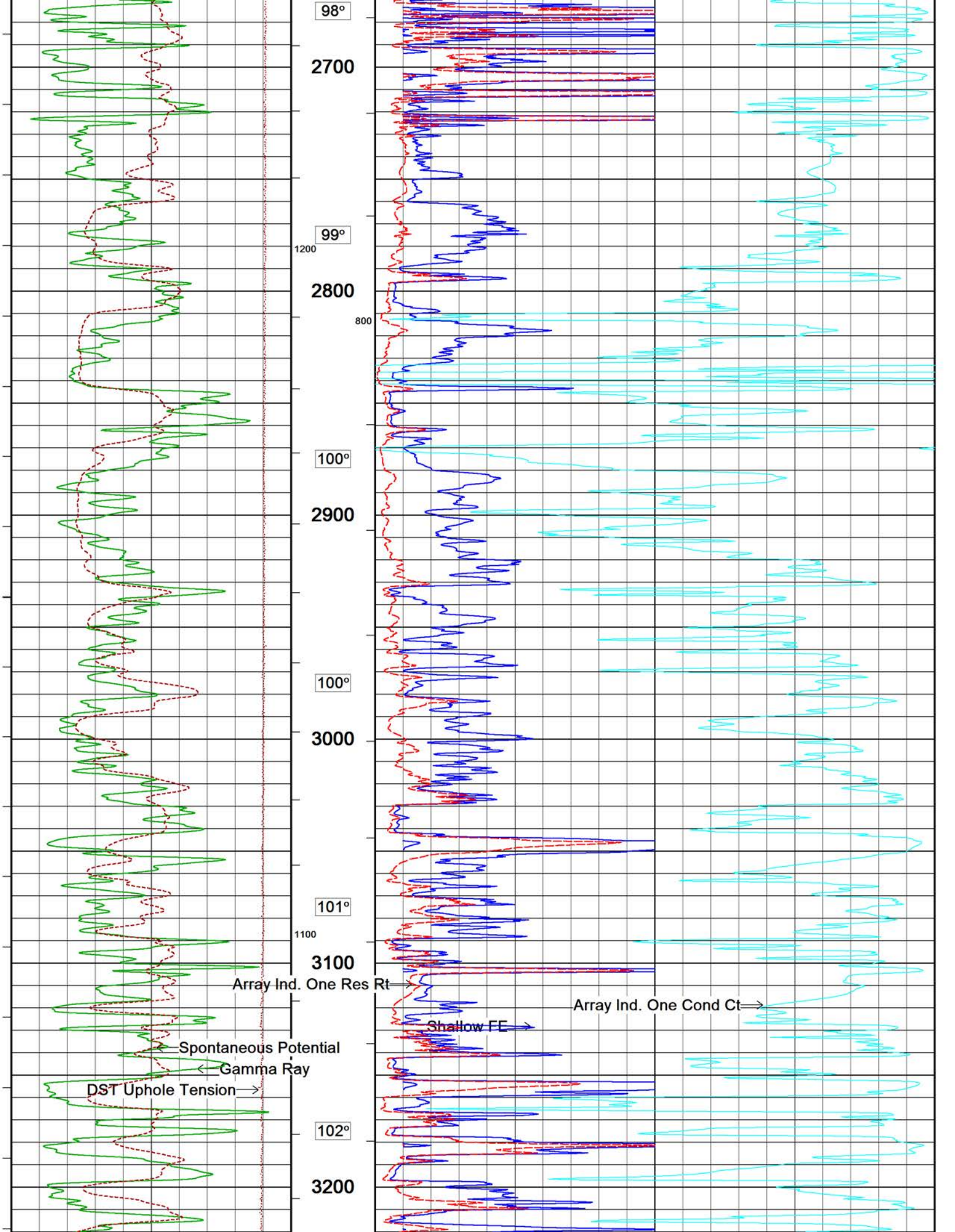
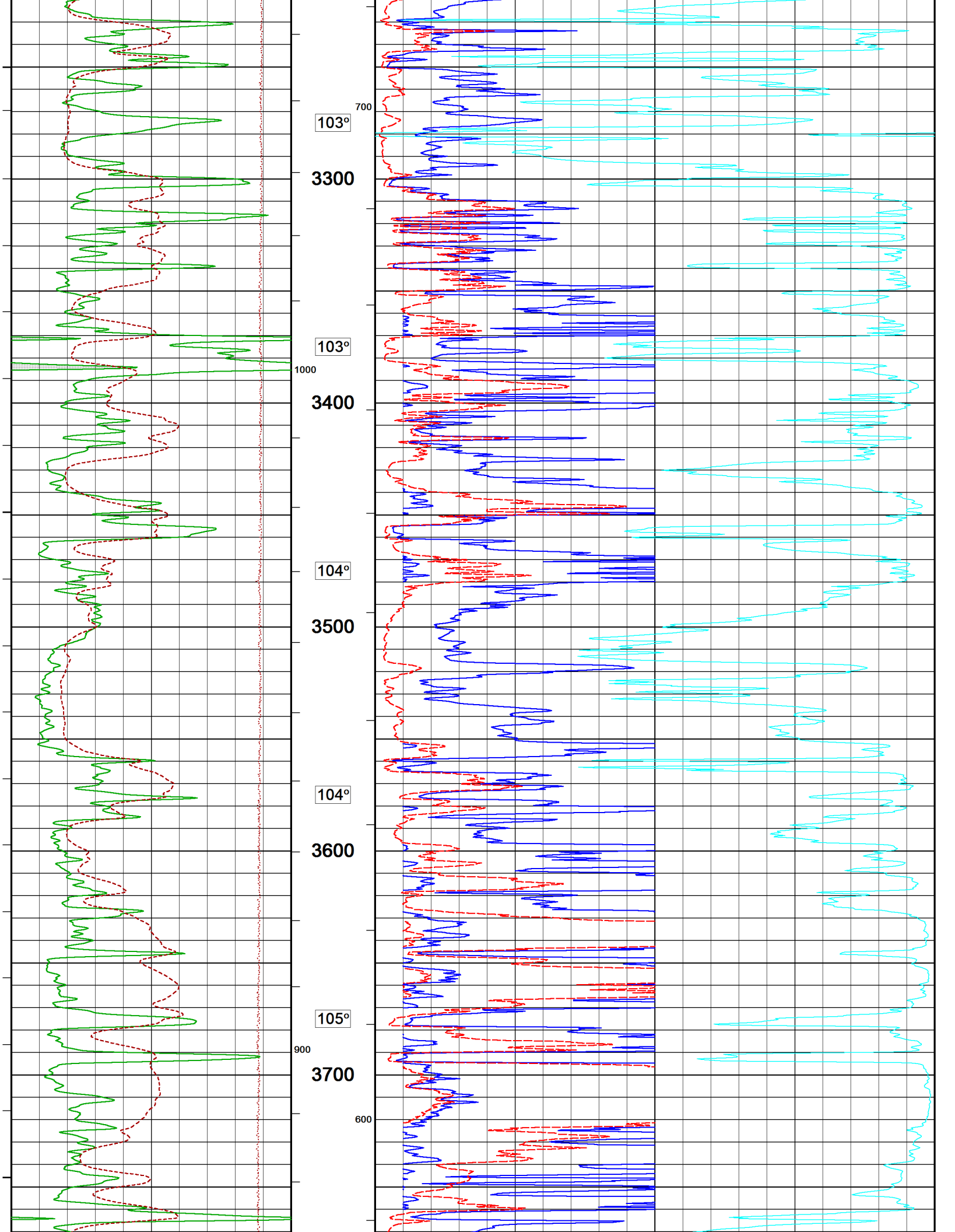
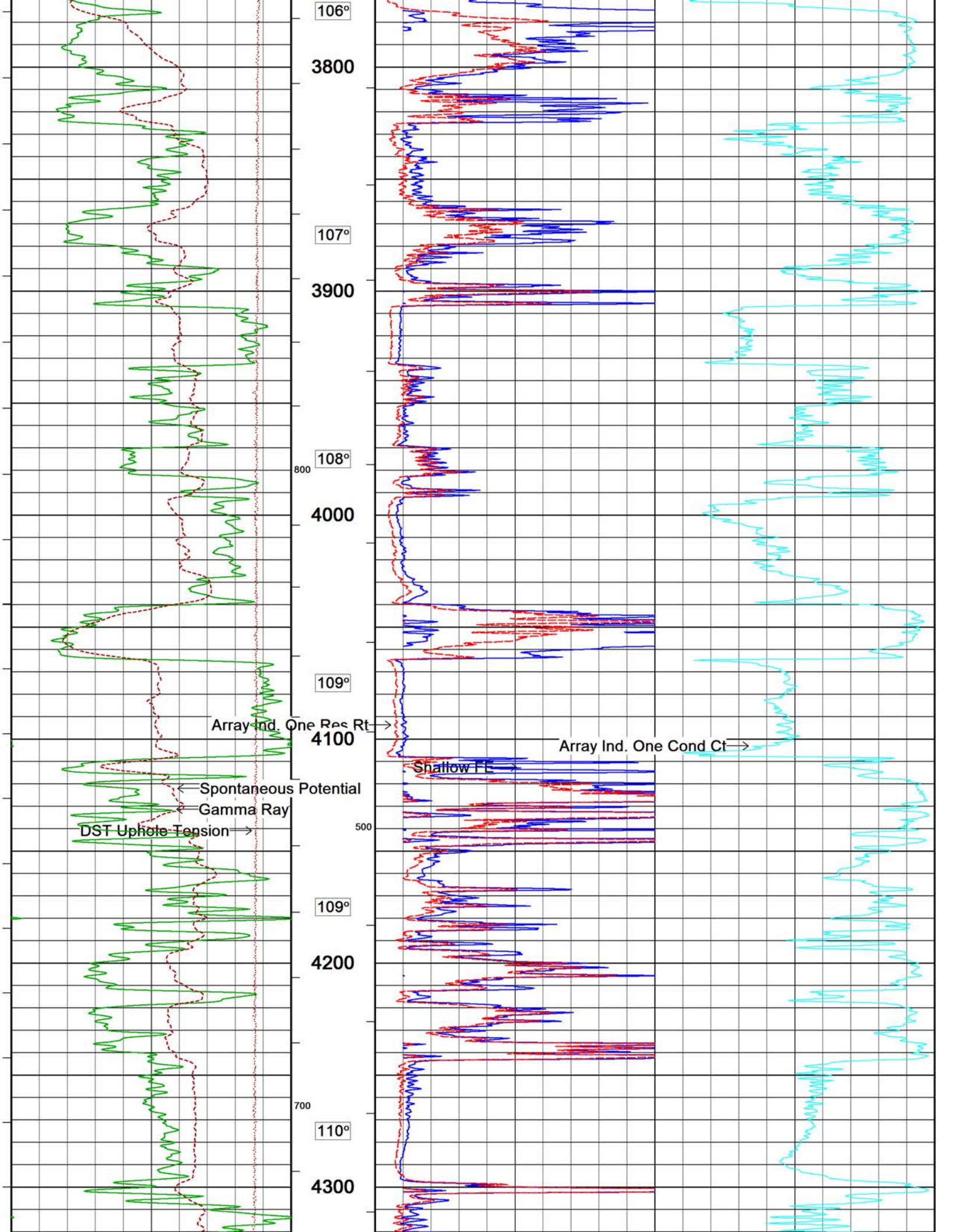
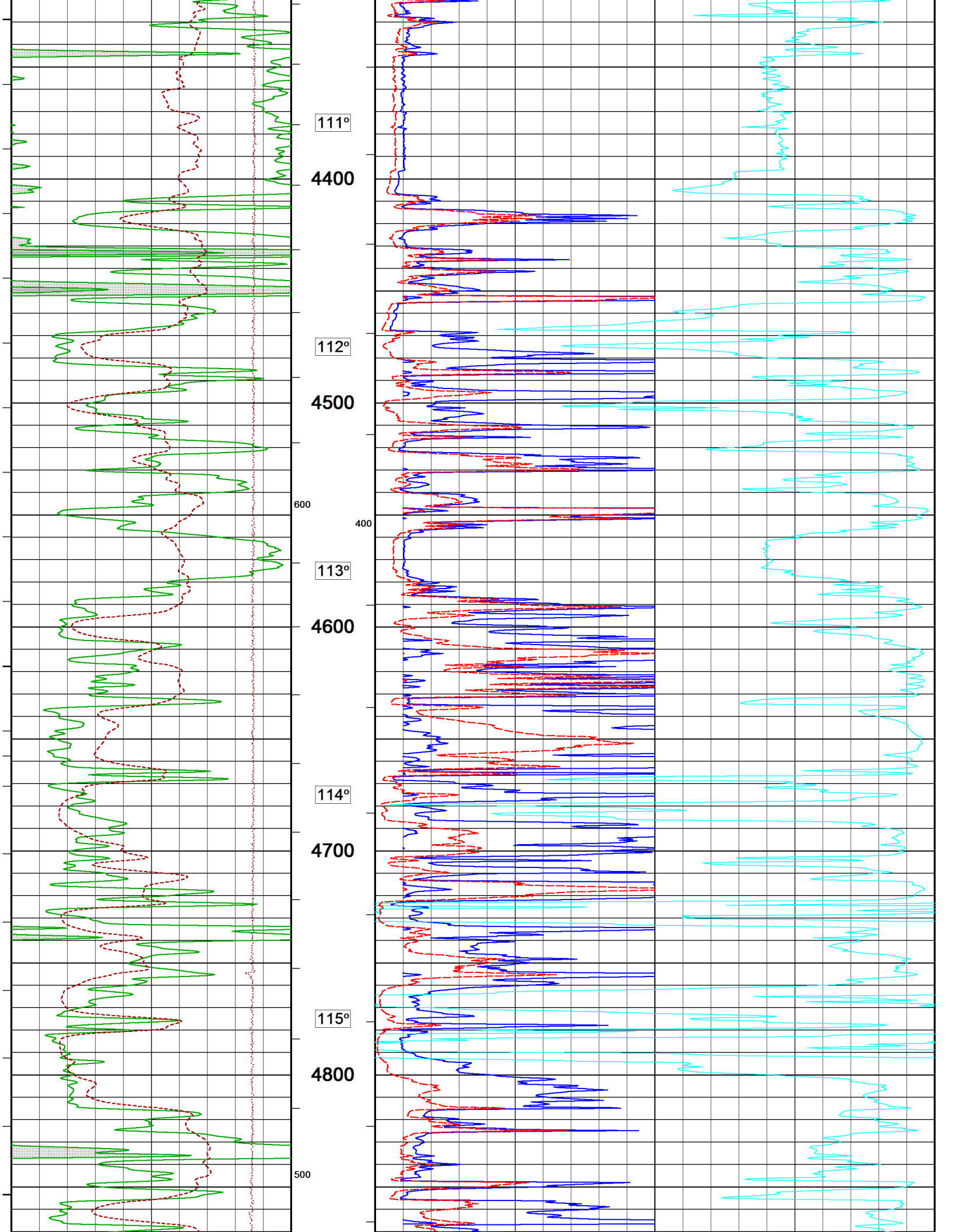
95°
1700
96°
1800
96°
1900
96°
2000
96°
2100

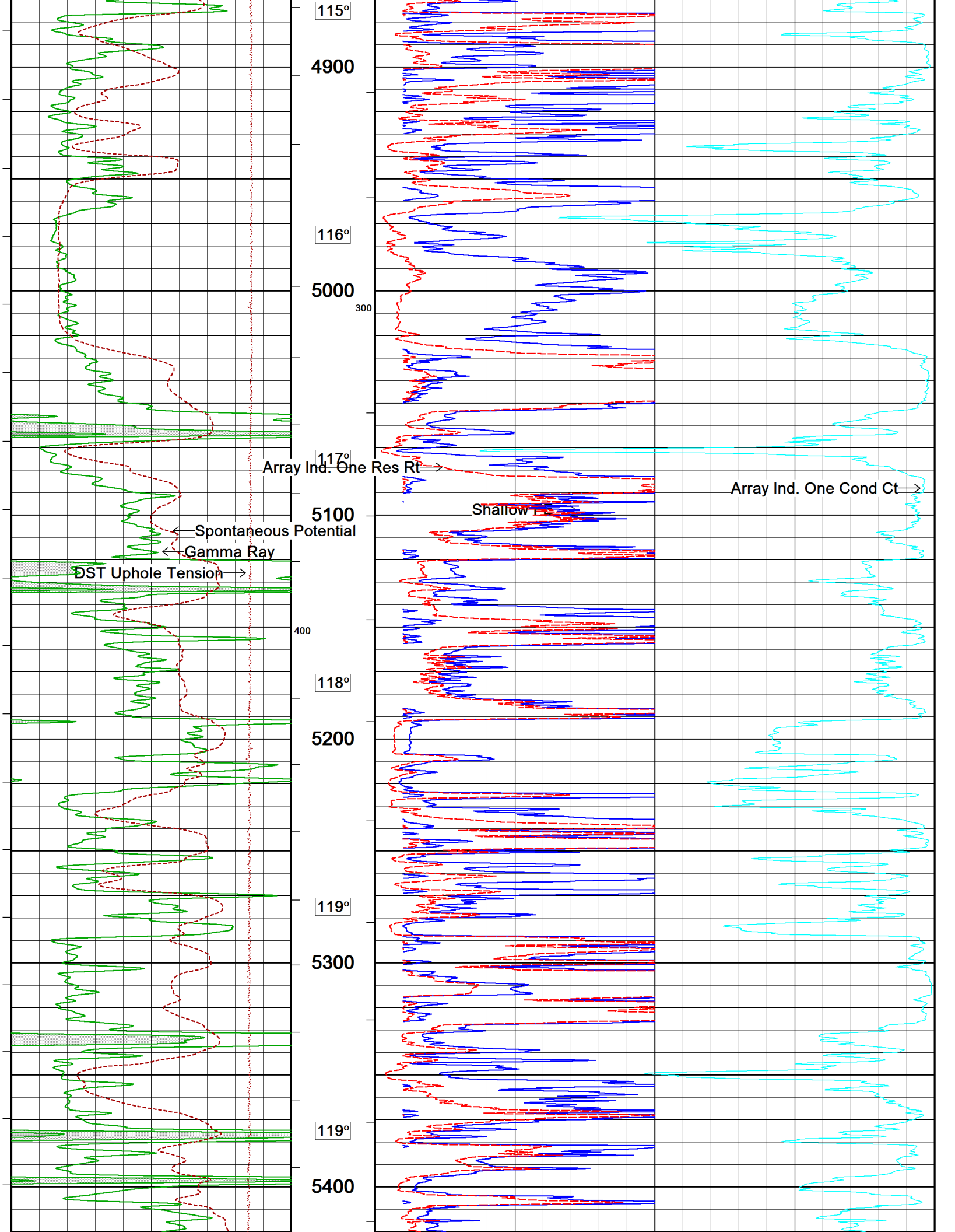

Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
96°
2200
1400
97°
2300
97°
2400
900
97°
1300
2500
97°
2600

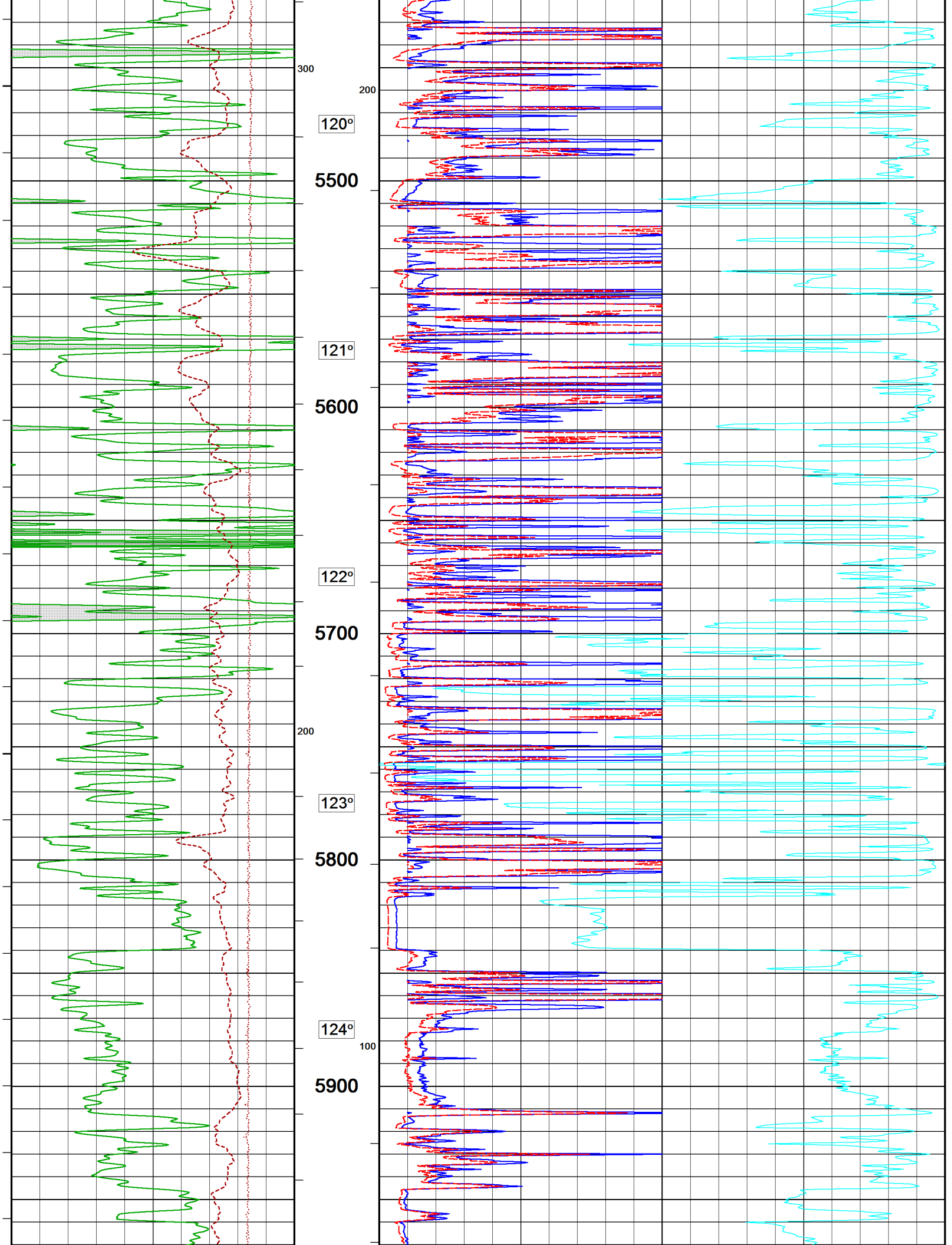

98°
2700
99°
1200
2800
800
100°
2900
100°
3000
101°
1100
3100
102°
3200
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension

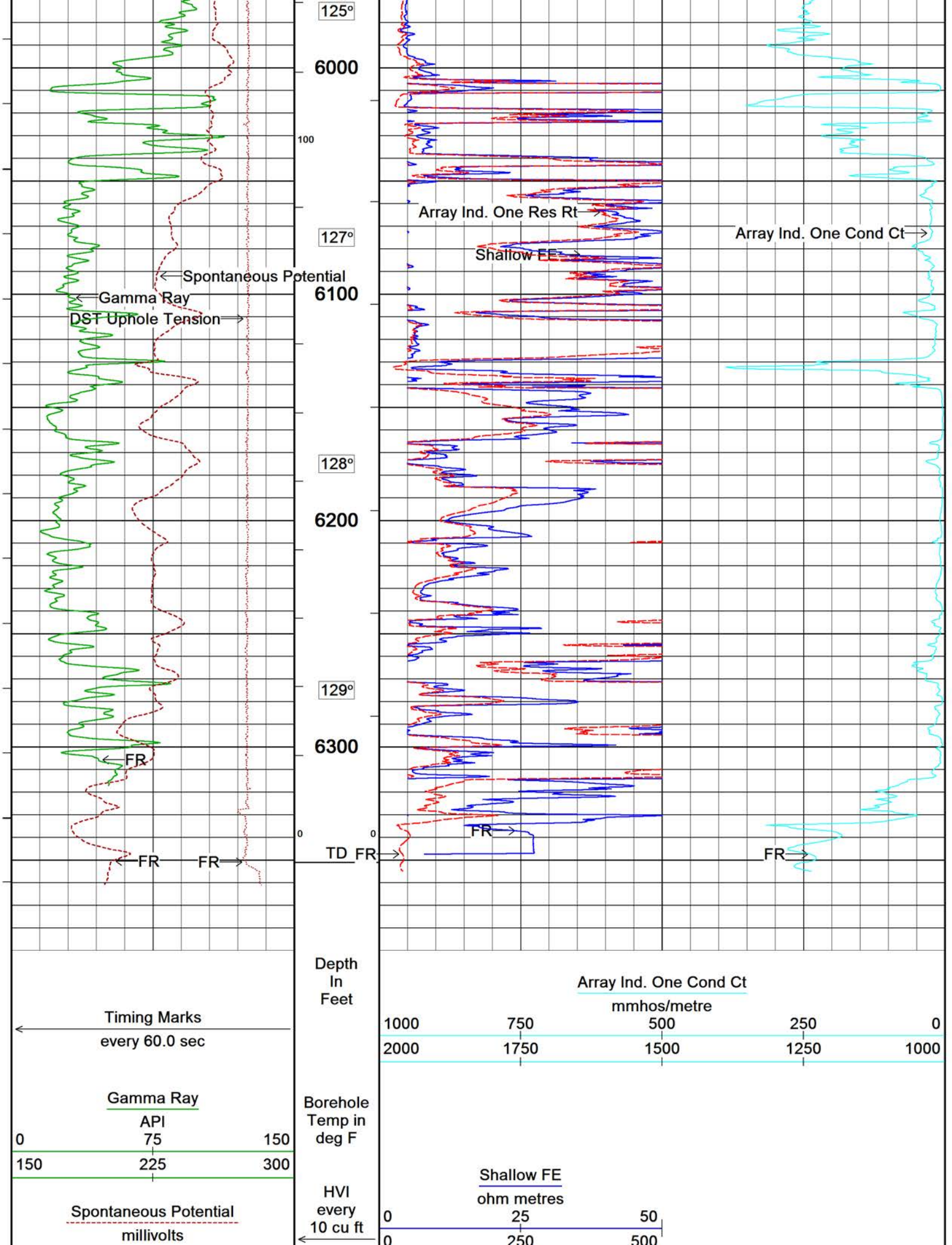

700
103°
3300
103°
1000
3400
104°
3500
104°
3600
105°
900
3700
600

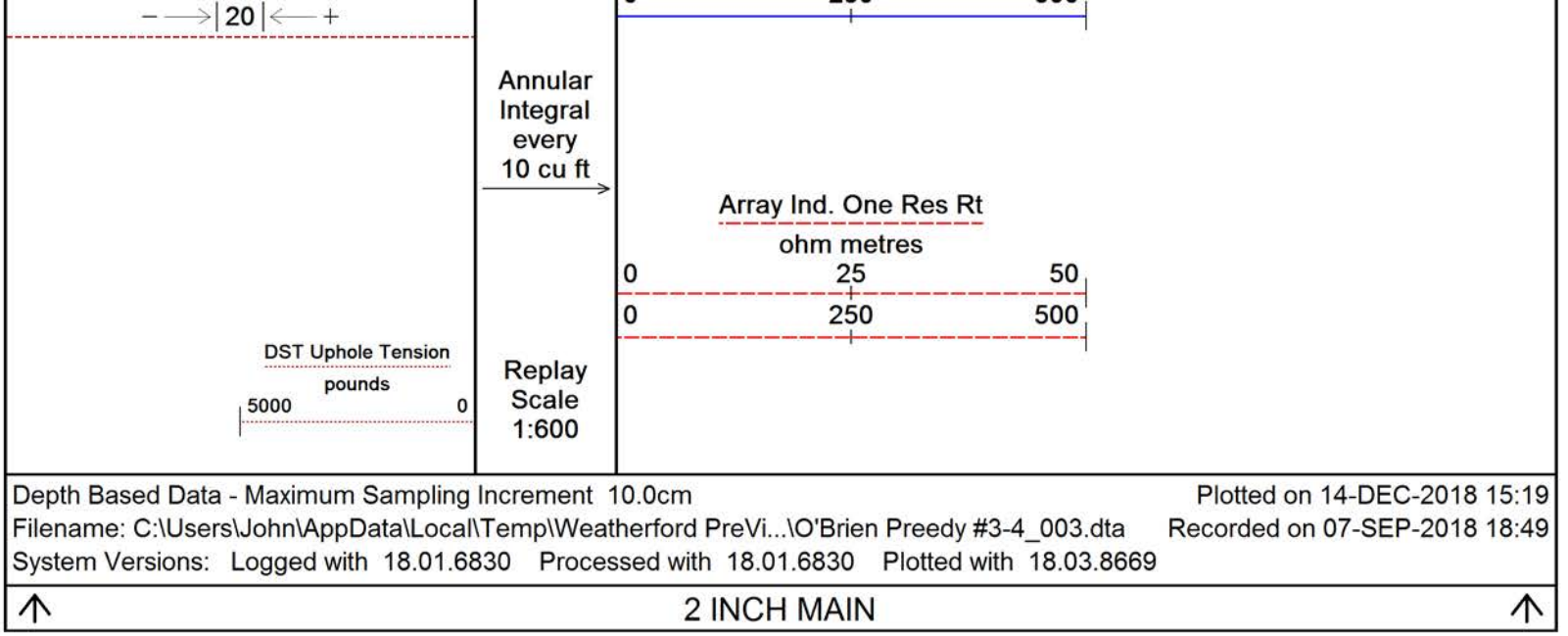

106°
3800
107°
3900
108°
800
4000
109°
Array Ind. One Res Rt
4100
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
500
109°
4200
700
110°
4300


111°
4400
112°
4500
600
400
113°
4600
114°
4700
115°
4800
500


115°
4900
116°
5000
300
117°
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow
5100
Spontaneous Potential
Gamma Ray
DST Uphole Tension
400
118°
5200
119°
5300
119°
5400


300
200
120°
5500
121°
5600
122°
5700
200
123°
5800
124°
100
5900


125°
6000
100
127°
6100
128°
6200
129°
6300
0
0
Array Ind. One Res Rt
Shallow FE
Array Ind. One Cond Ct
Spontaneous Potential
Gamma Ray
DST Uphole Tension
FR
FR
FR
TD
FR
FR
Depth
In
Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Spontaneous Potential
millivolts
Borehole
Temp in
deg F
HVI
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



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 14-DEC-2018 15:19
Filename: C:\Users\John\AppData\Local\Temp\Weatherford PreVi...\O'Brien Preedy #3-4_003.dta — Recorded on 07-SEP-2018 18:49
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2 INCH MAIN

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 14-DEC-2018 15:19
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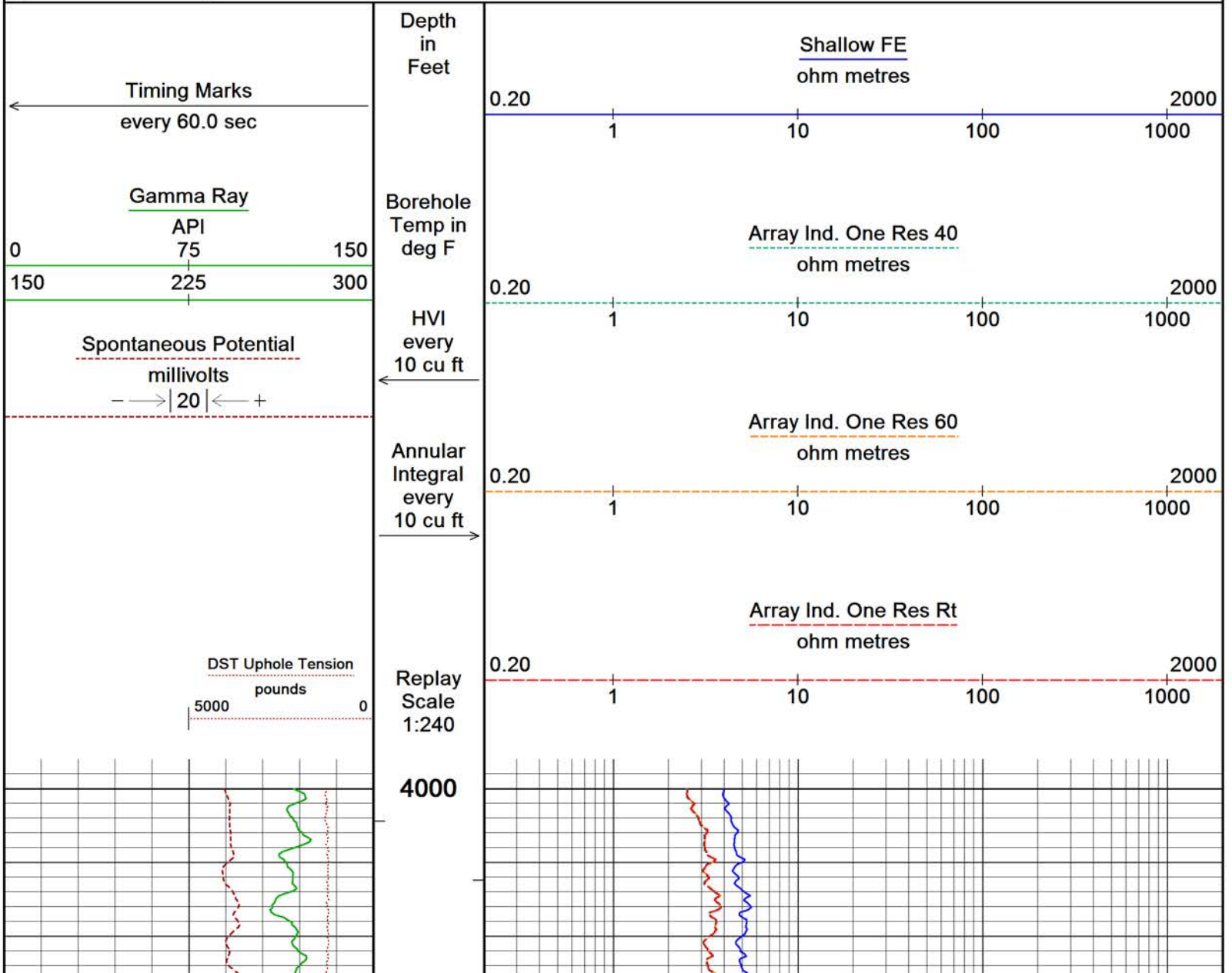
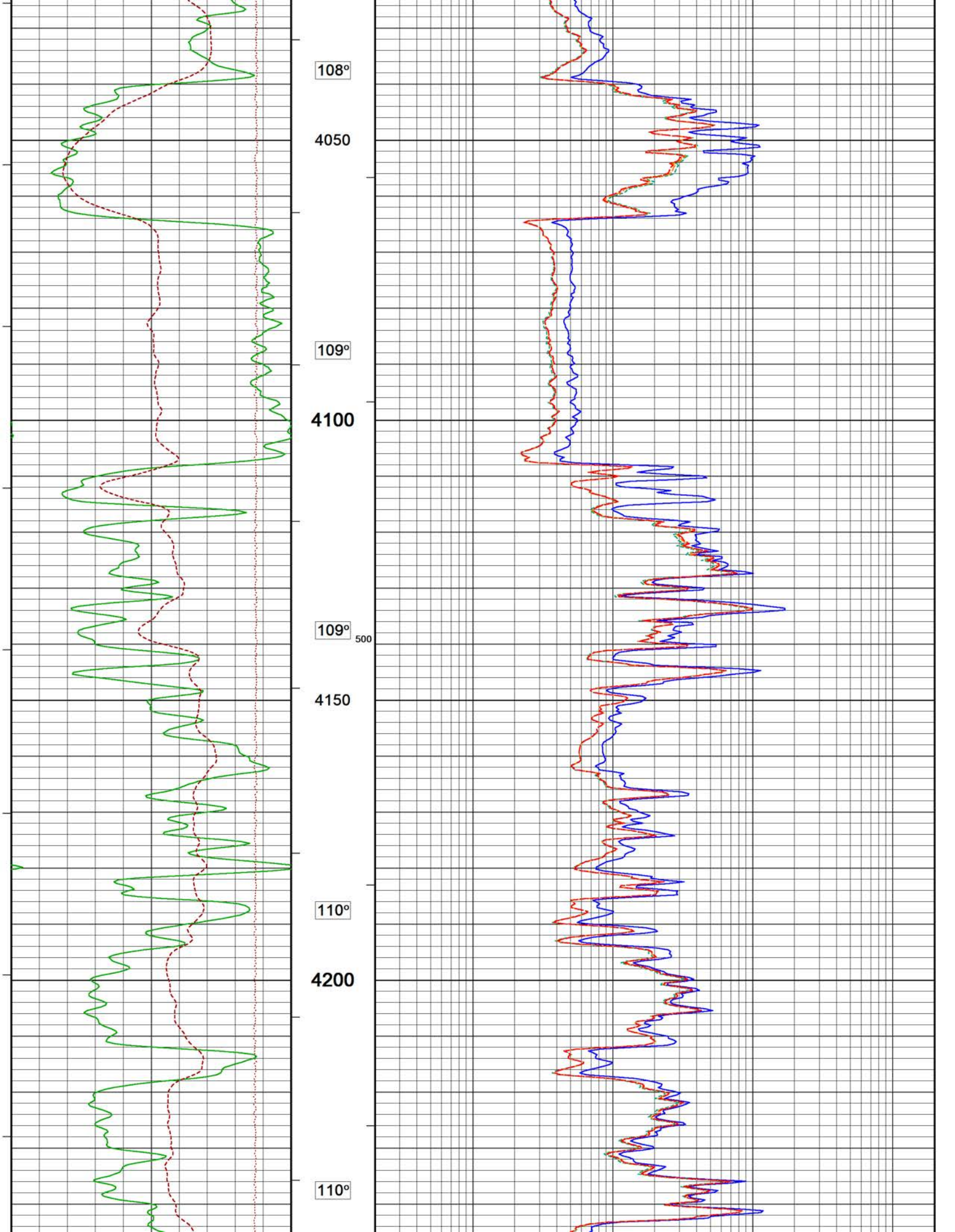
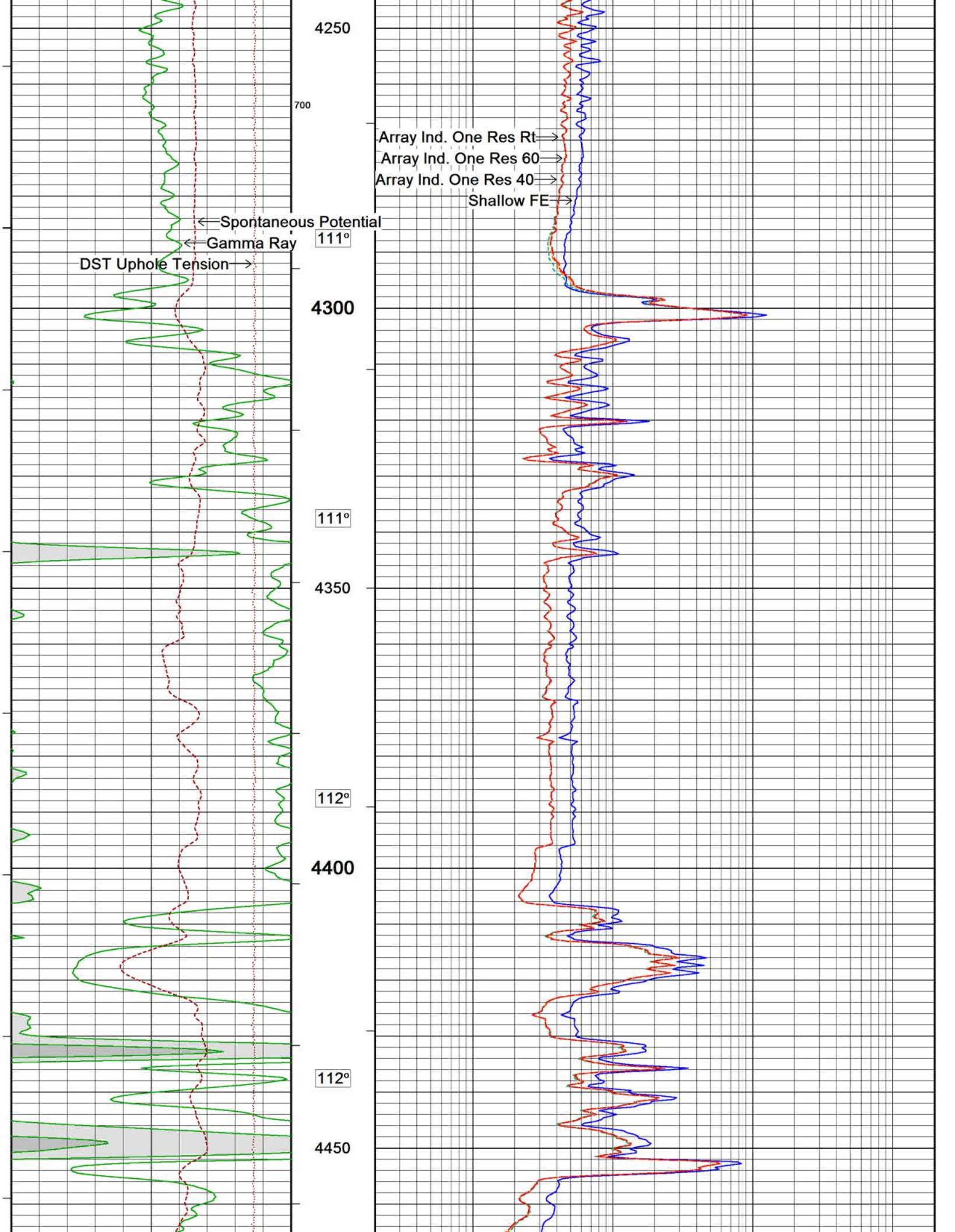
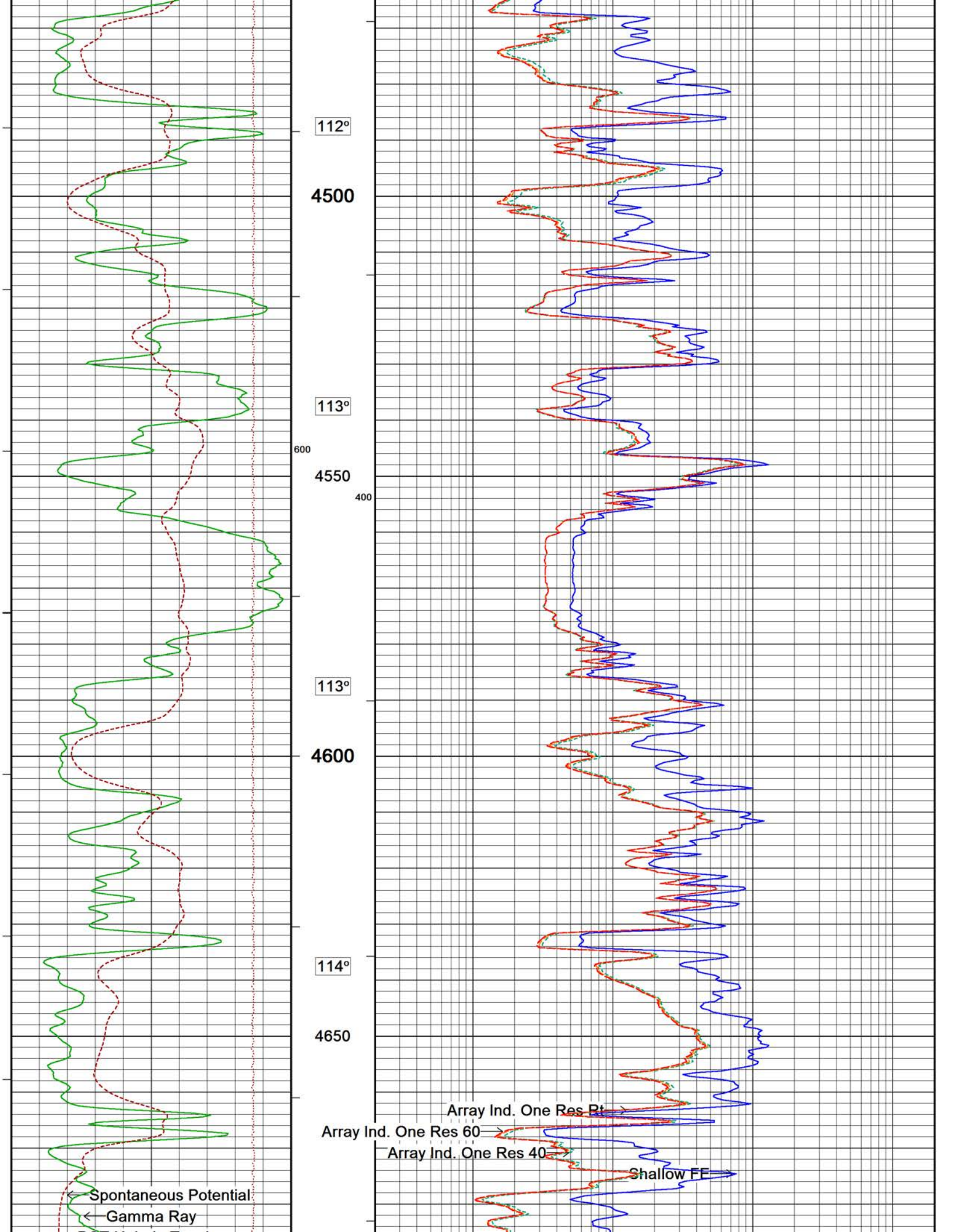
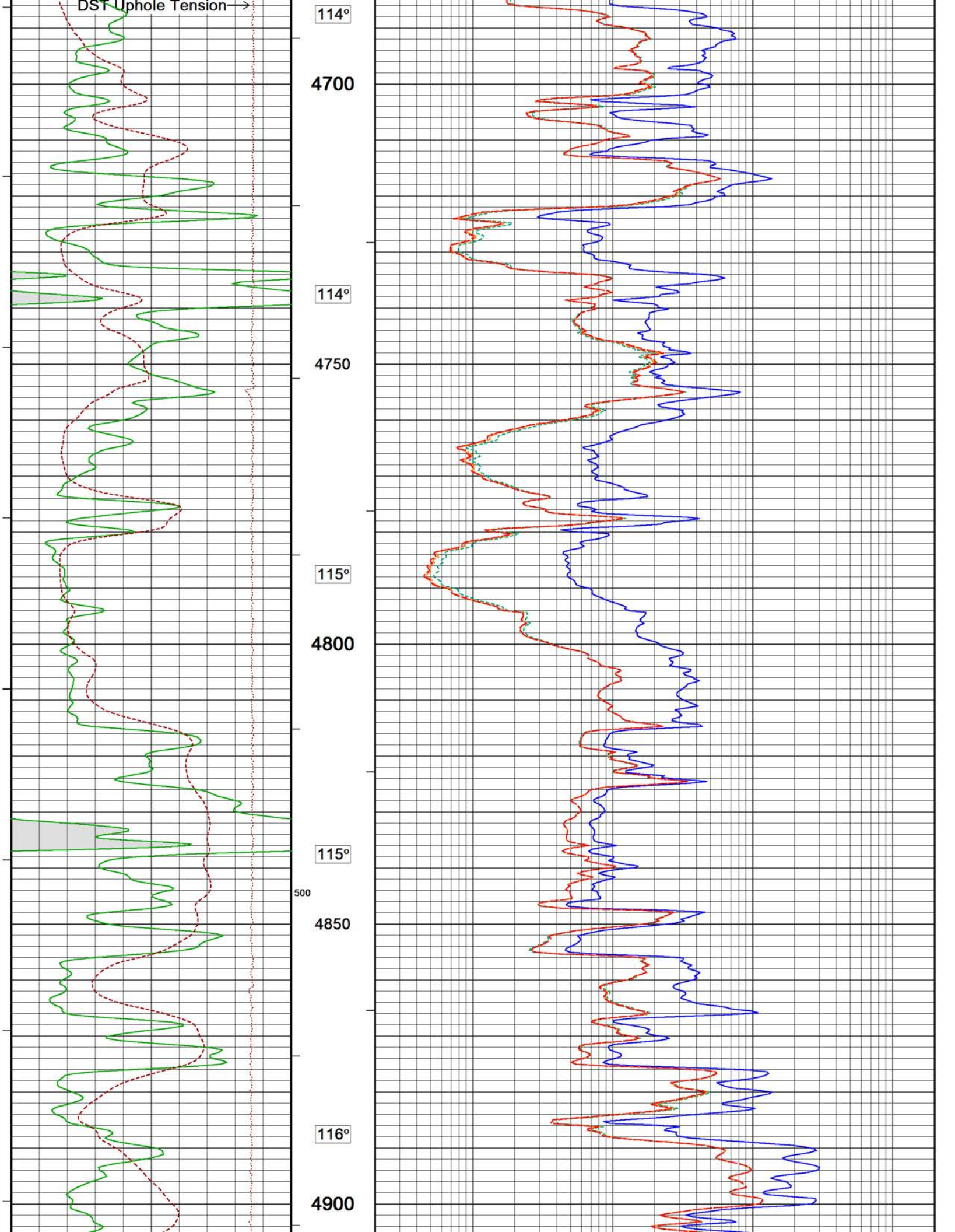
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.03.8669

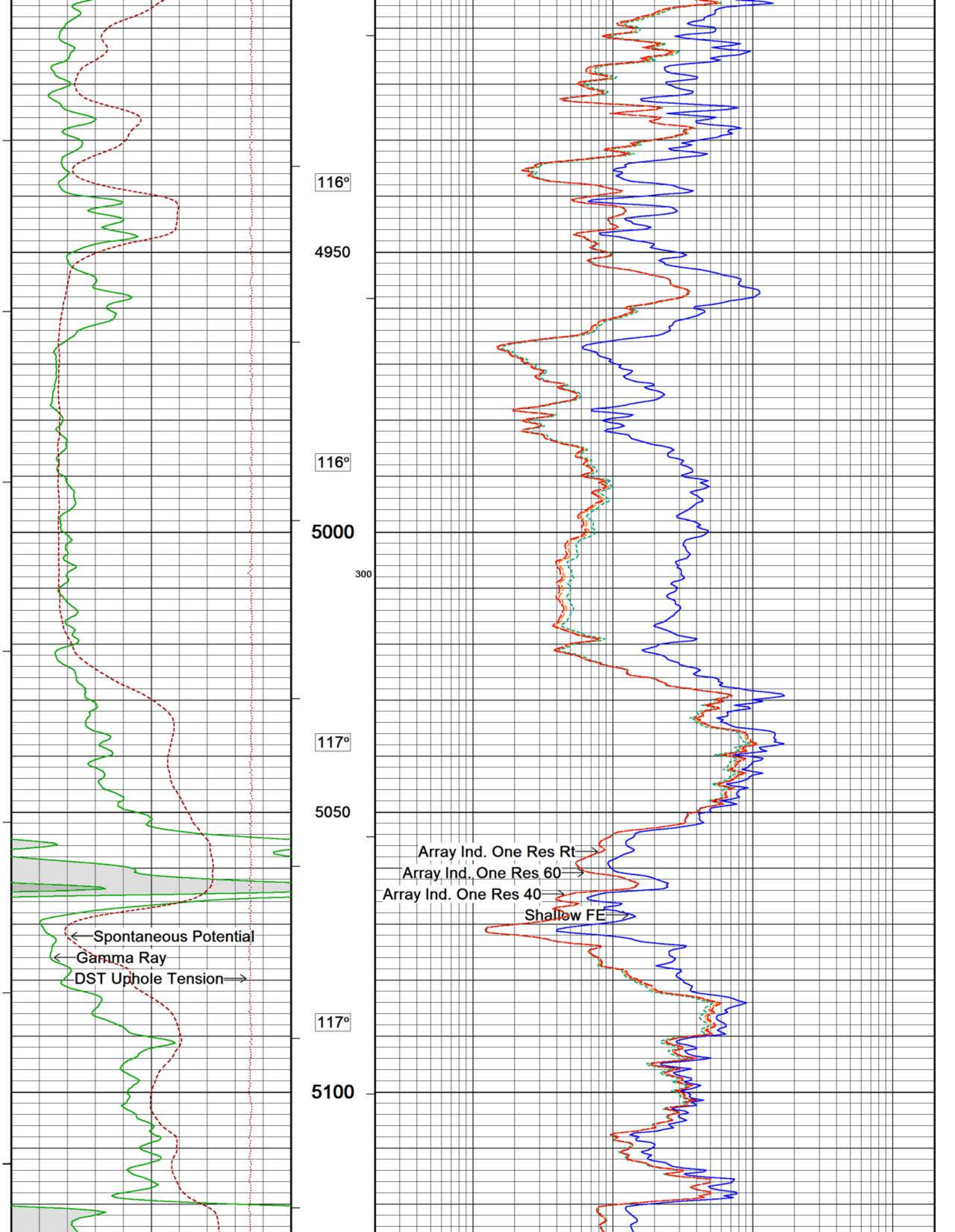


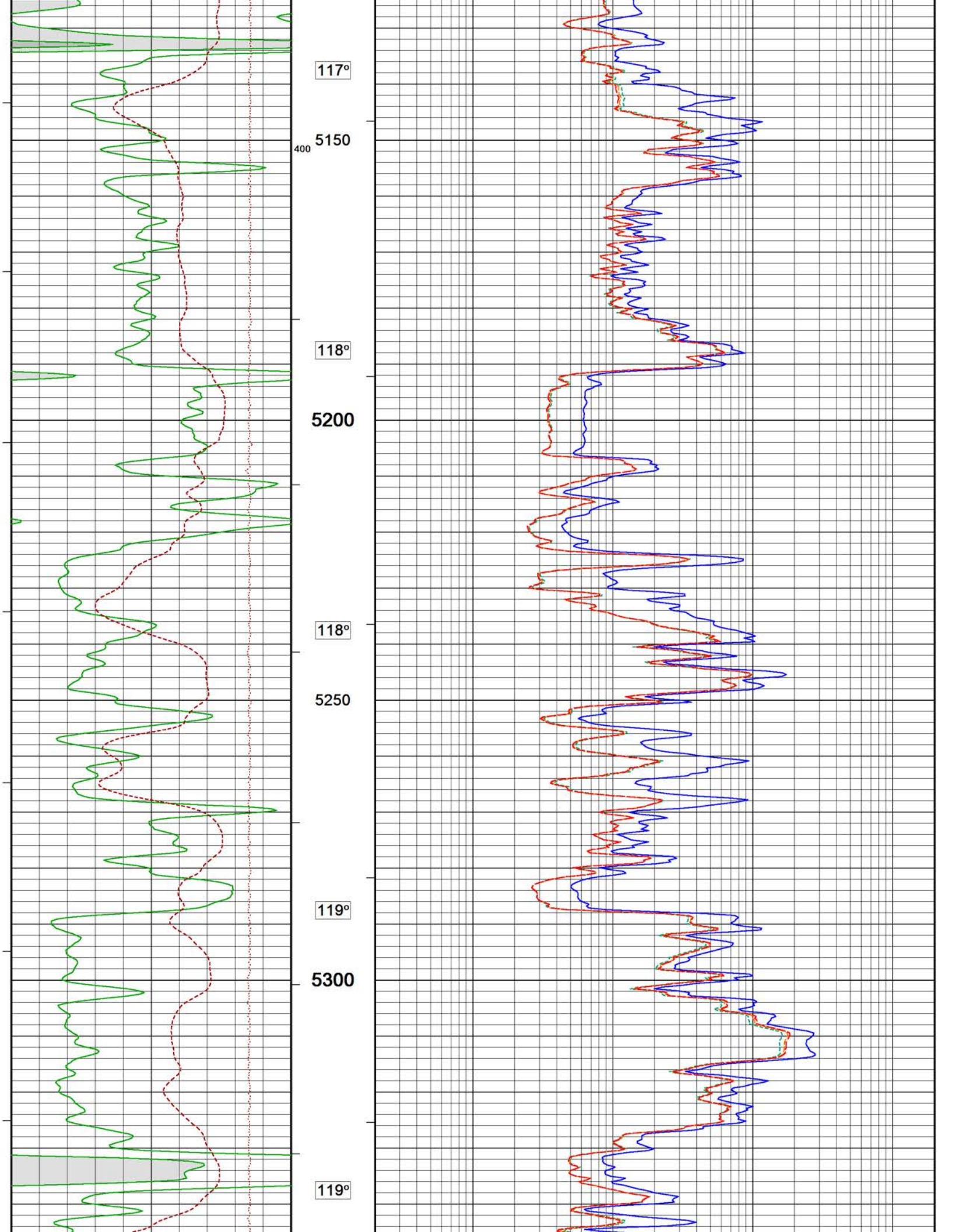

108°
4050
109°
4100
109°
500
4150
110°
4200
110°

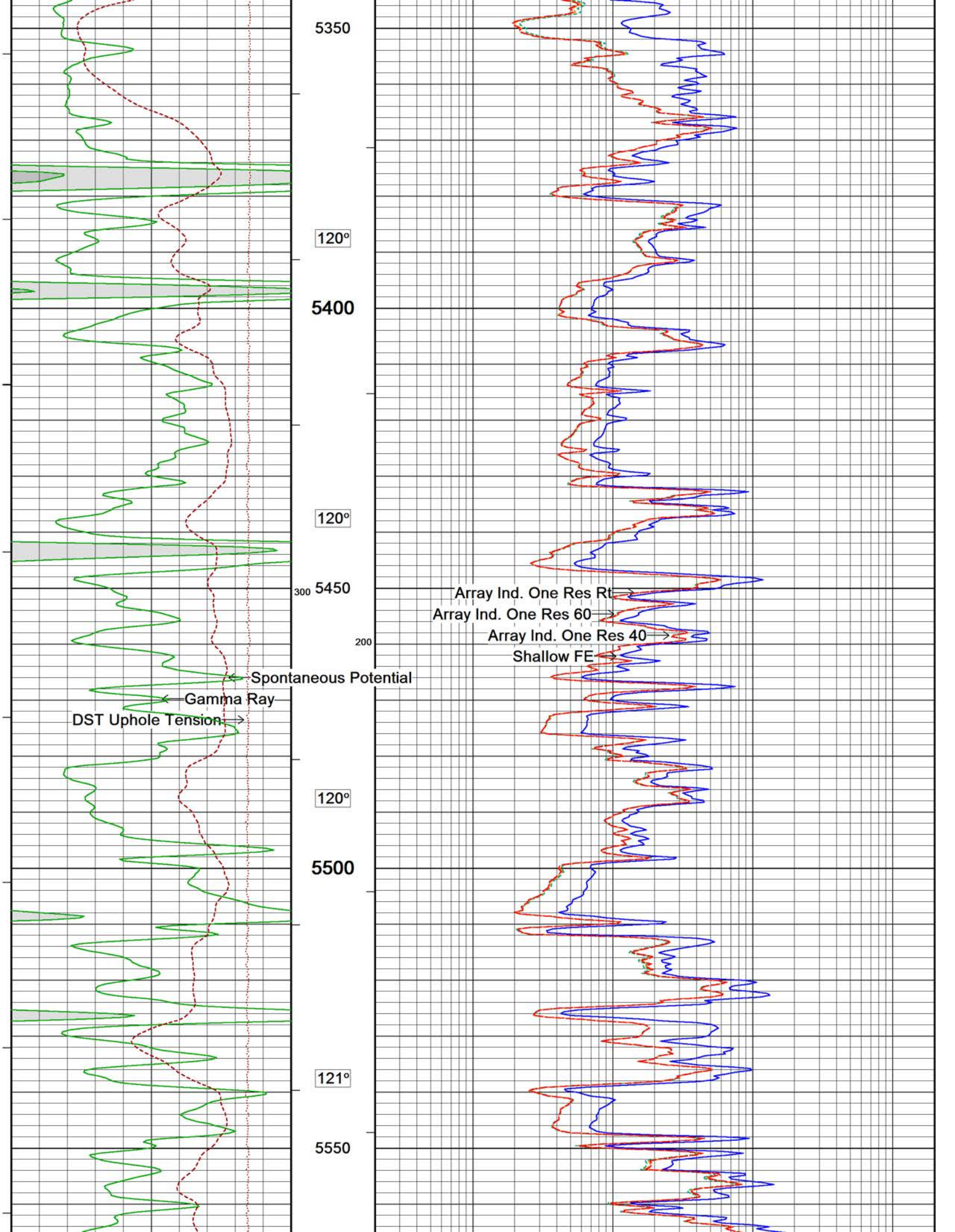

4250
700
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
111°
4300
111°
4350
112°
4400
112°
4450

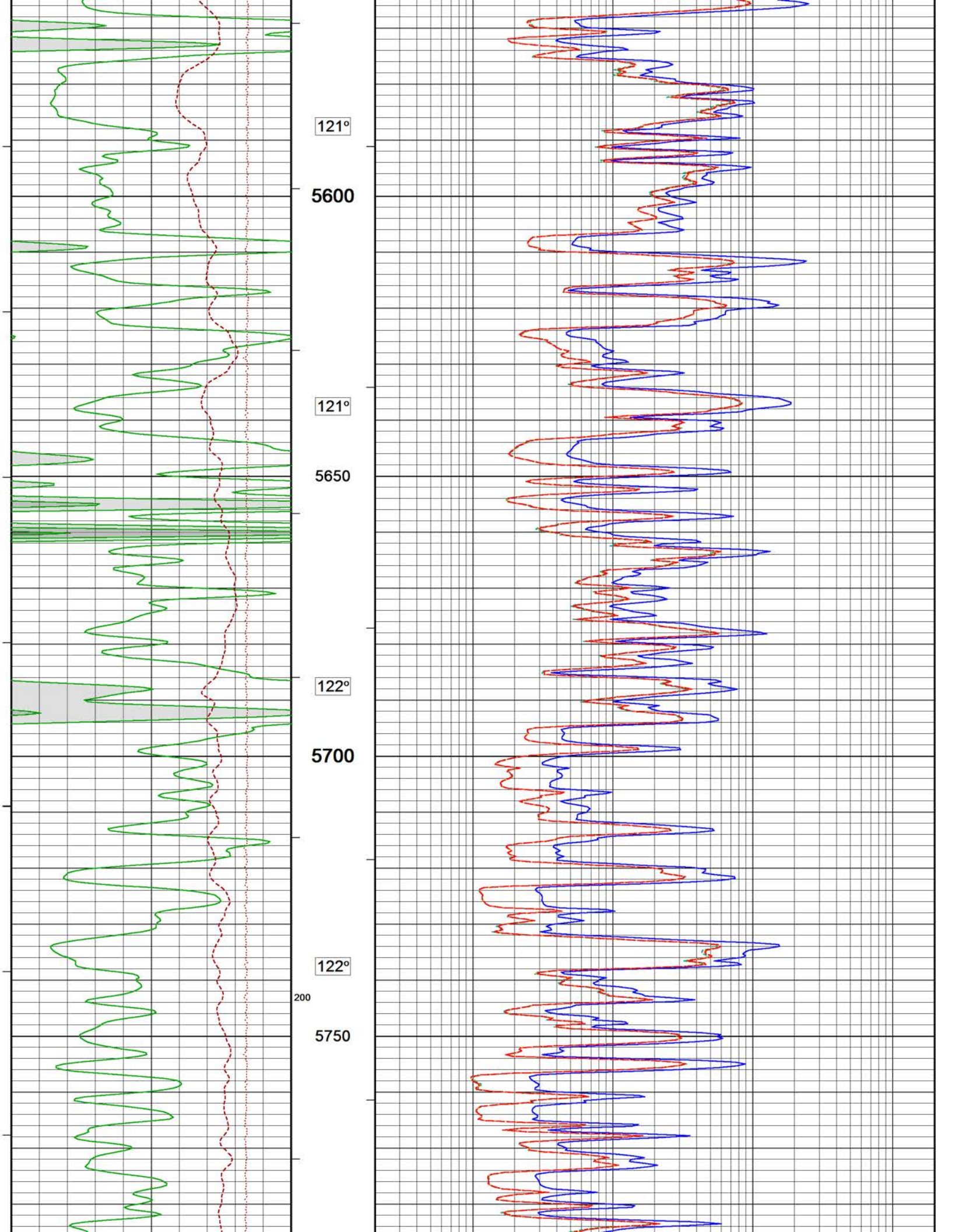

112°
4500
113°
600
4550
400
113°
4600
114°
4650
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray

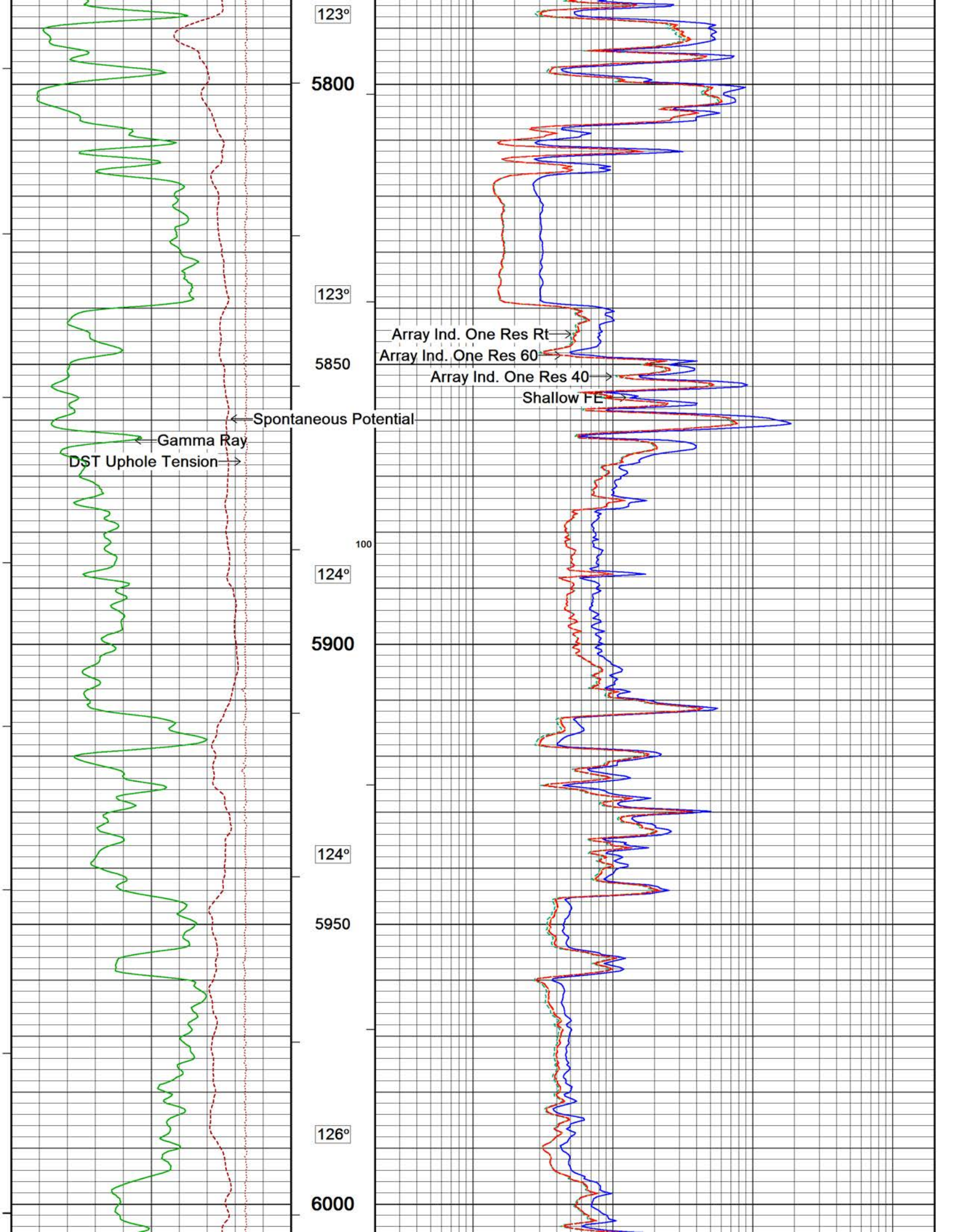

DST Uphole Tension→
114°
4700
114°
4750
115°
4800
115°
500
4850
116°
4900

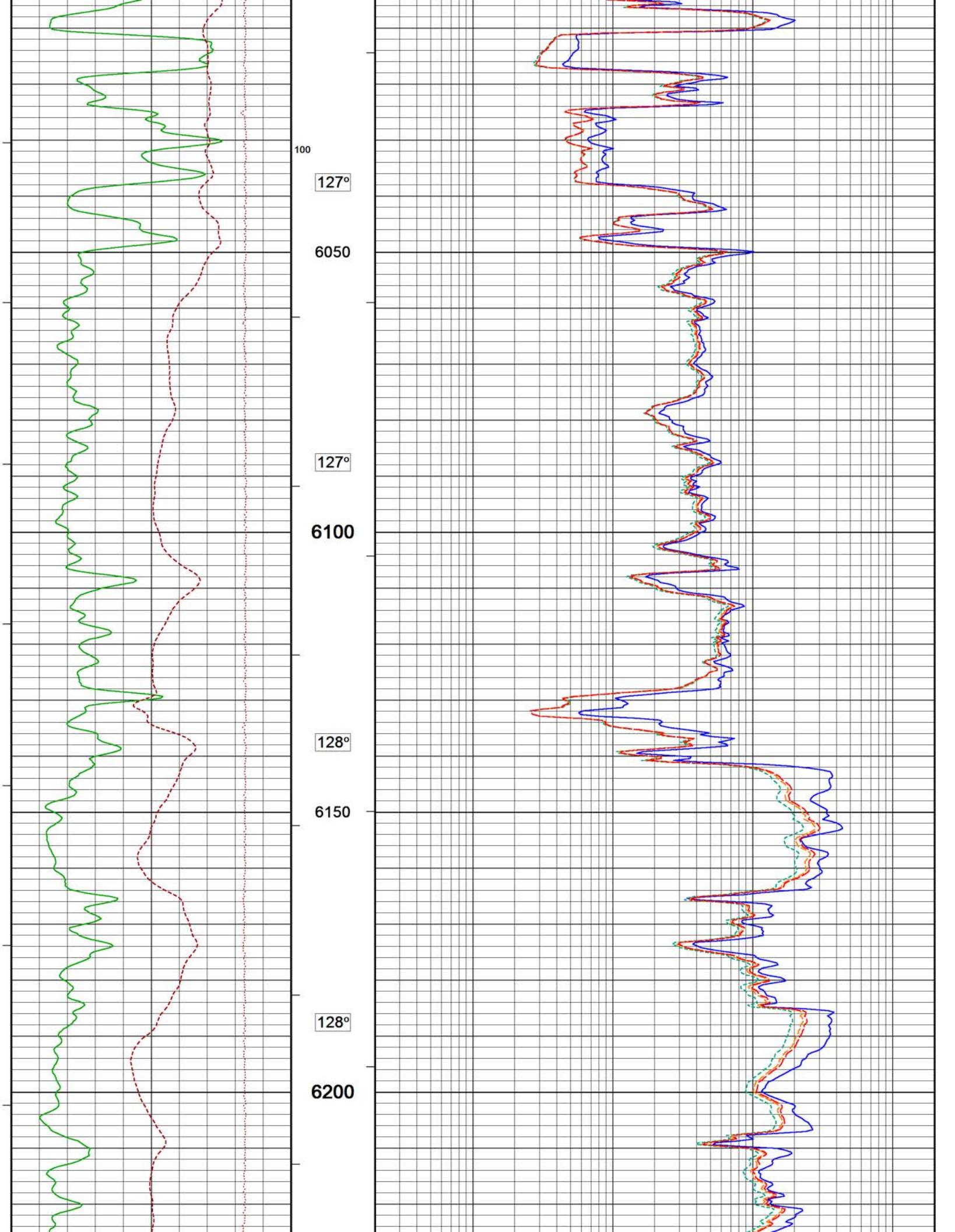

116°
4950
116°
5000
300
117°
5050
117°
5100
Spontaneous Potential
Gamma Ray
DST Uphole Tension
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE

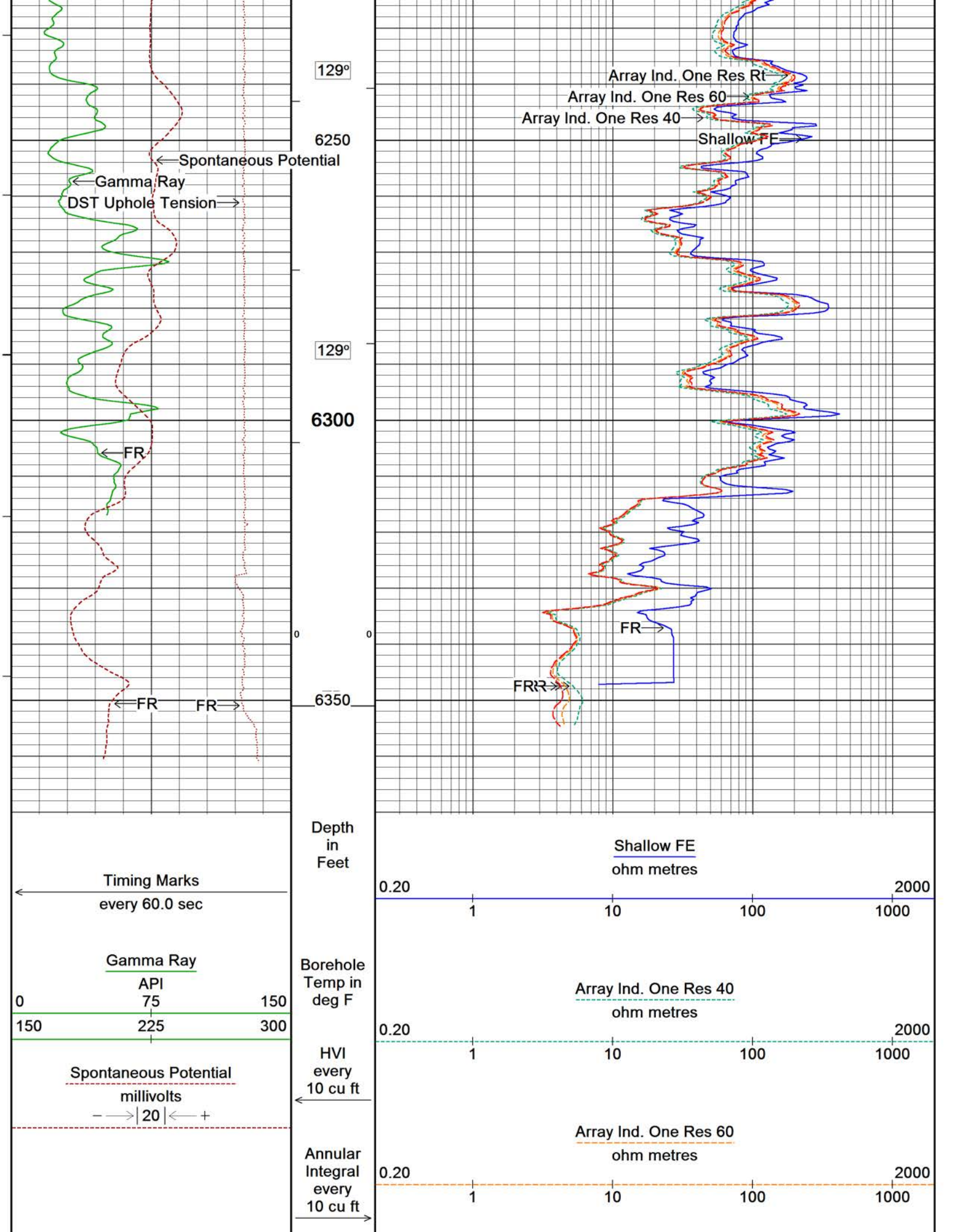

117°
400
5150
118°
5200
118°
5250
119°
5300
119°


5350
120°
5400
120°
300
5450
200
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
120°
5500
121°
5550


121°
5600
121°
5650
122°
5700
122°
200
5750


123°
5800
123°
Array Ind. One Res Rt
Array Ind. One Res 60
5850
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
100
124°
5900
124°
5950
126°
6000


100
127°
6050
127°
6100
128°
6150
128°
6200


129°
6250
Spontaneous Potential
Gamma Ray
DST Uphole Tension
129°
6300
FR
FR
FR
6350
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
FR
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
Annular
Integral
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
ohm metres
0.20
2000
1
10
100
1000

DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240

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

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 14-DEC-2018 15:19
Filename: C:\Users\John\AppData\Local\Temp\Weatherford PreVi...\O'Brien Preedy #3-4_003.dta
Recorded on 07-SEP-2018 18:49
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5 INCH MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 14-DEC-2018 15:19
Filename: C:\Users\John\AppData\Local\Temp\Weatherford PreVi...\O'Brien Preedy #3-4_002.dta
Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.03.8669

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

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

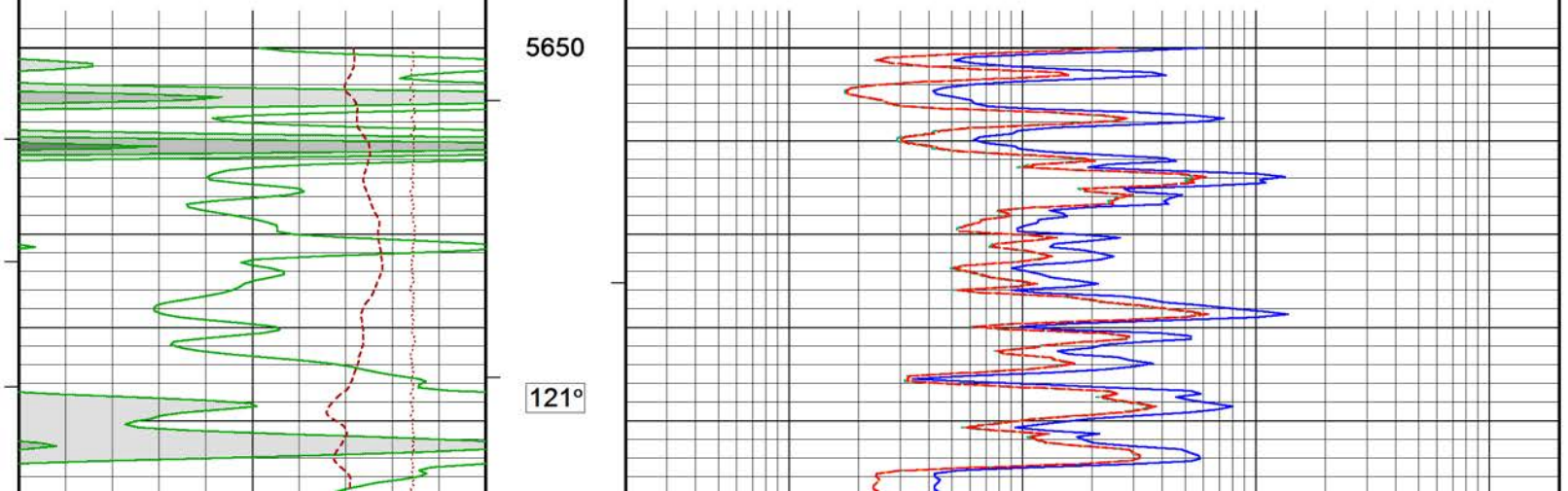
Array Ind. One Res Rt
ohm metres
0.20 2000
1 10 100 1000

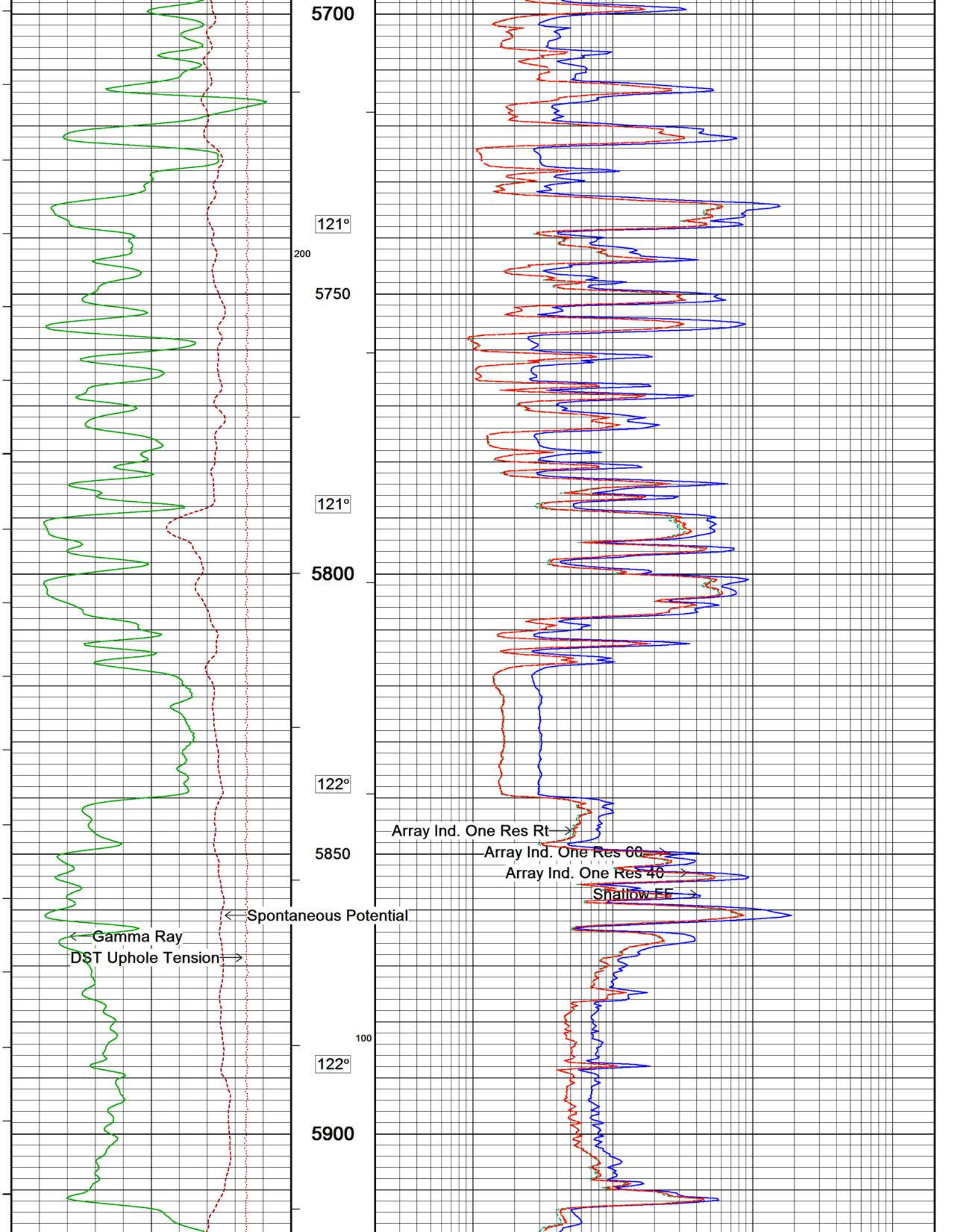
DST Uphole Tension
pounds
5000 0

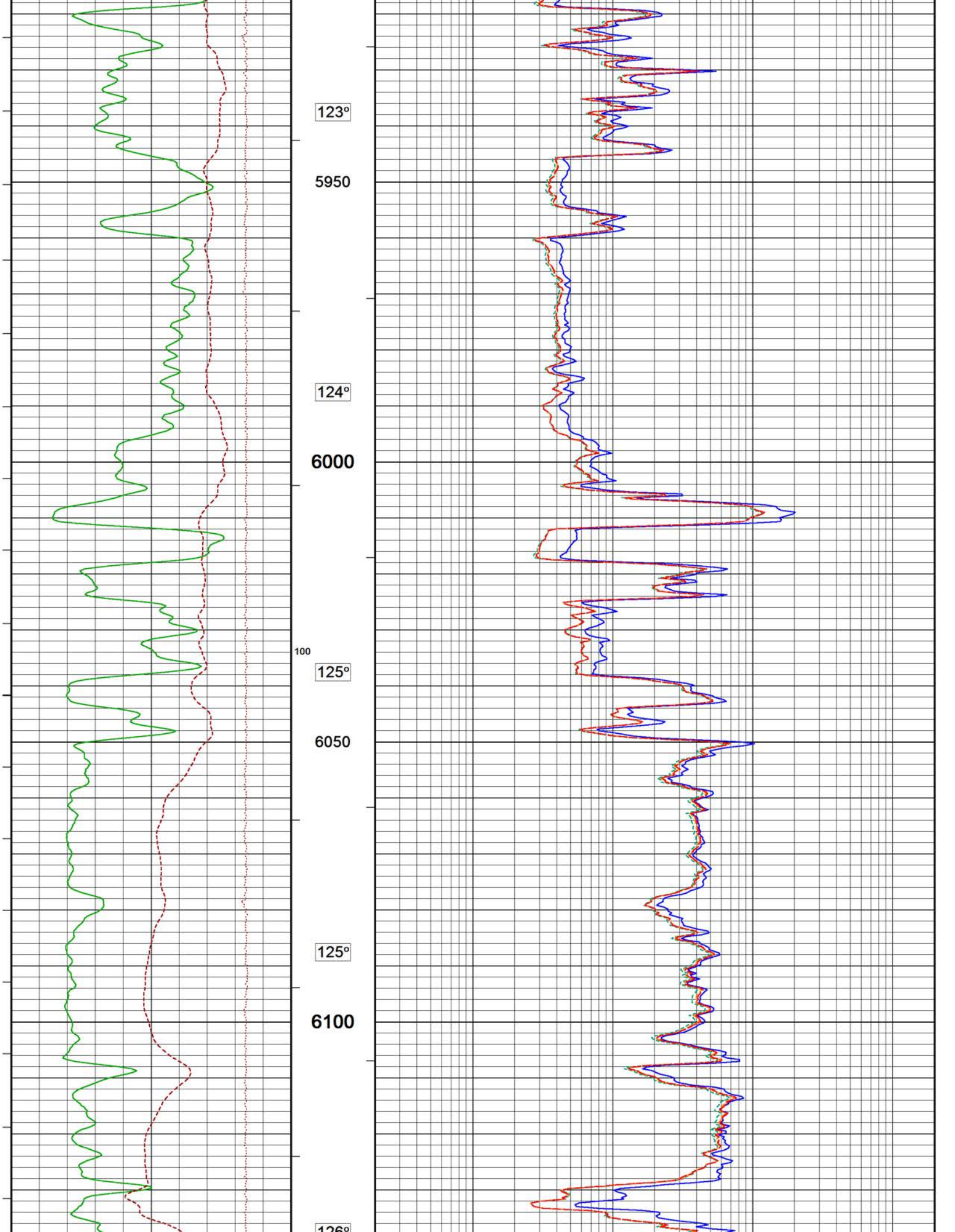
Replay
Scale
1:240

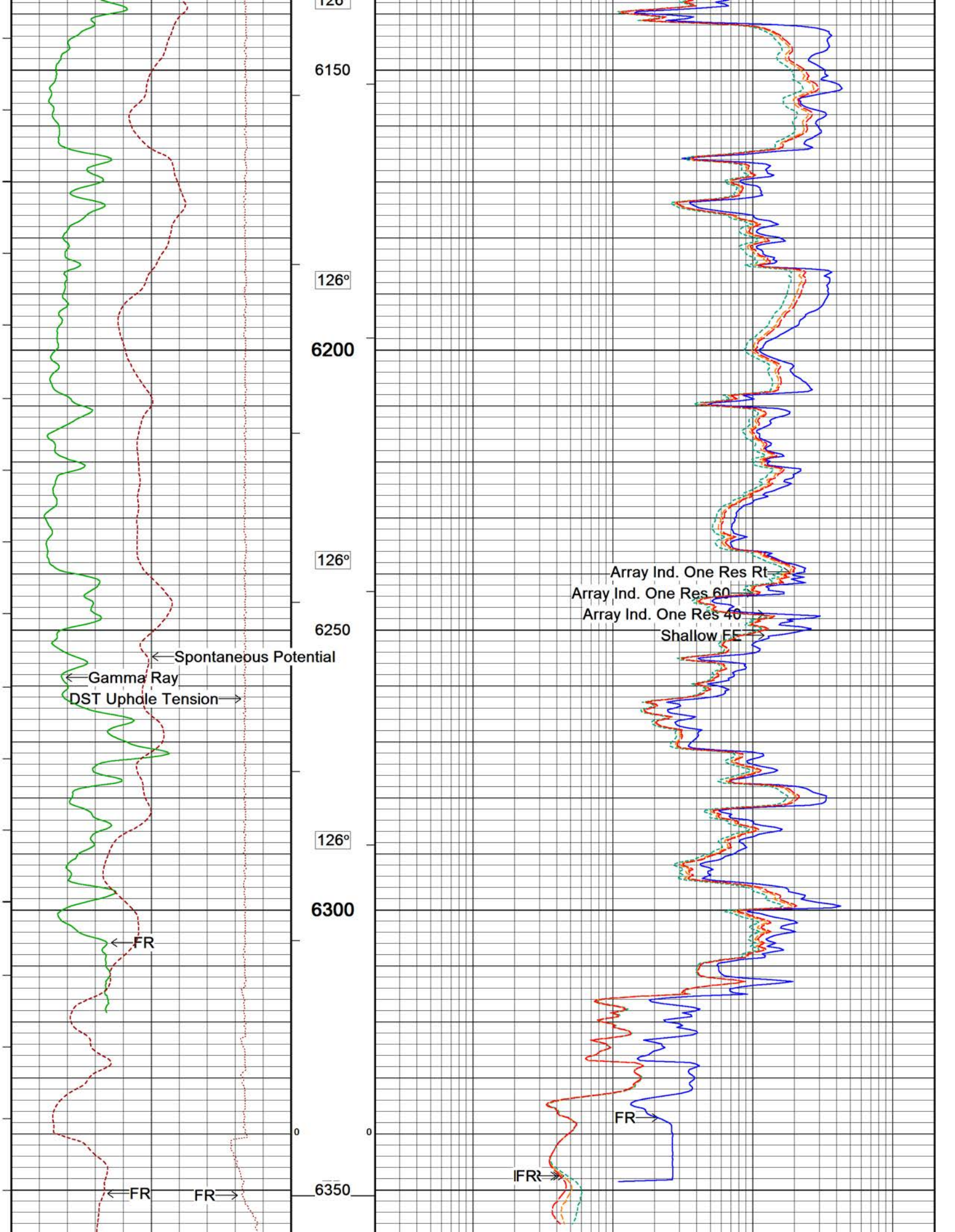
5650

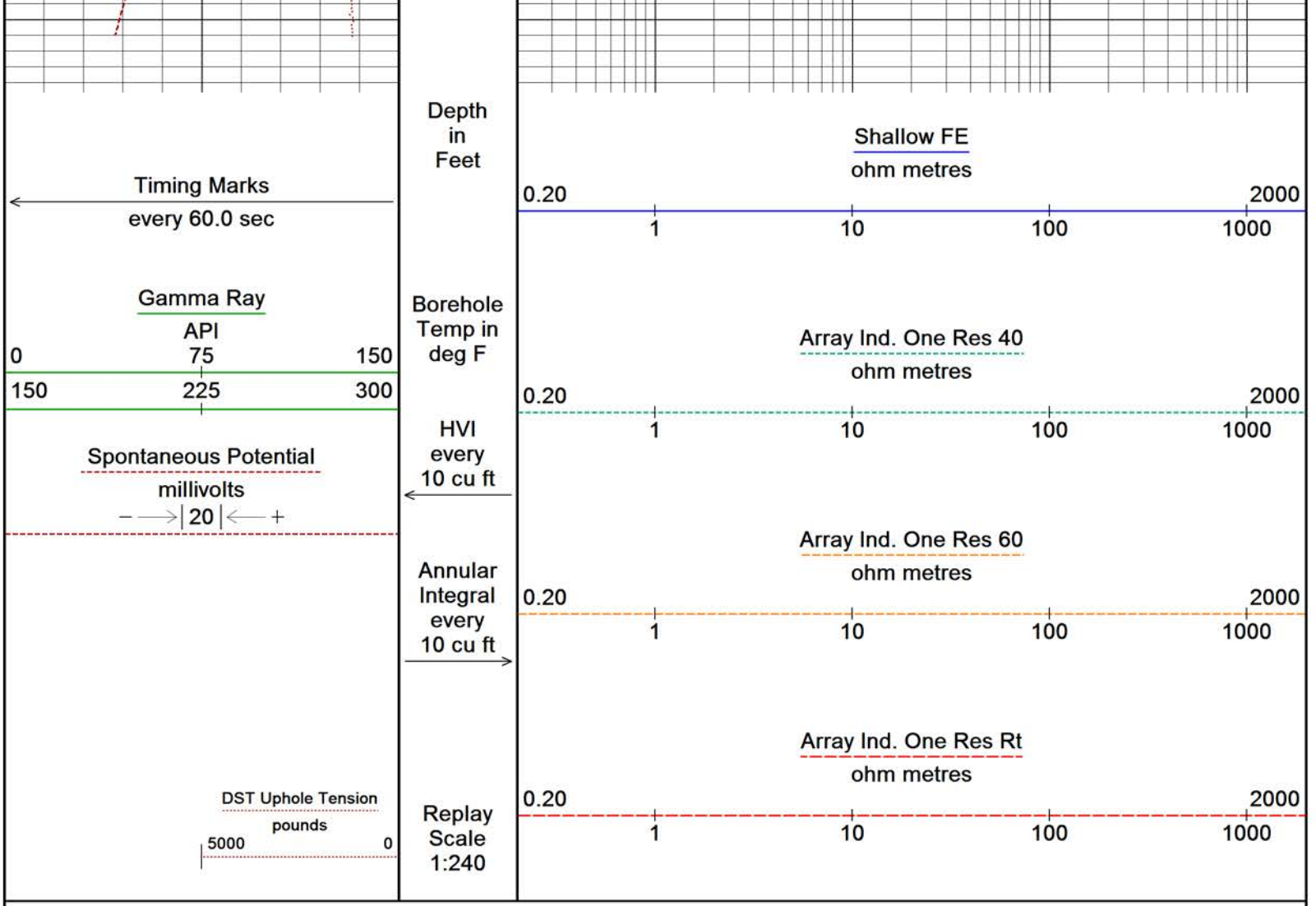
121°




5700
121°
200
5750
121°
5800
122°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FF
5850
Spontaneous Potential
Gamma Ray
DST Uphole Tension
100
122°
5900


123°
5950
124°
6000
100
125°
6050
125°
6100
126°


126
6150
126°
6200
126°
6250
126°
6300
0
0
6350
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 FE
FR
IFR

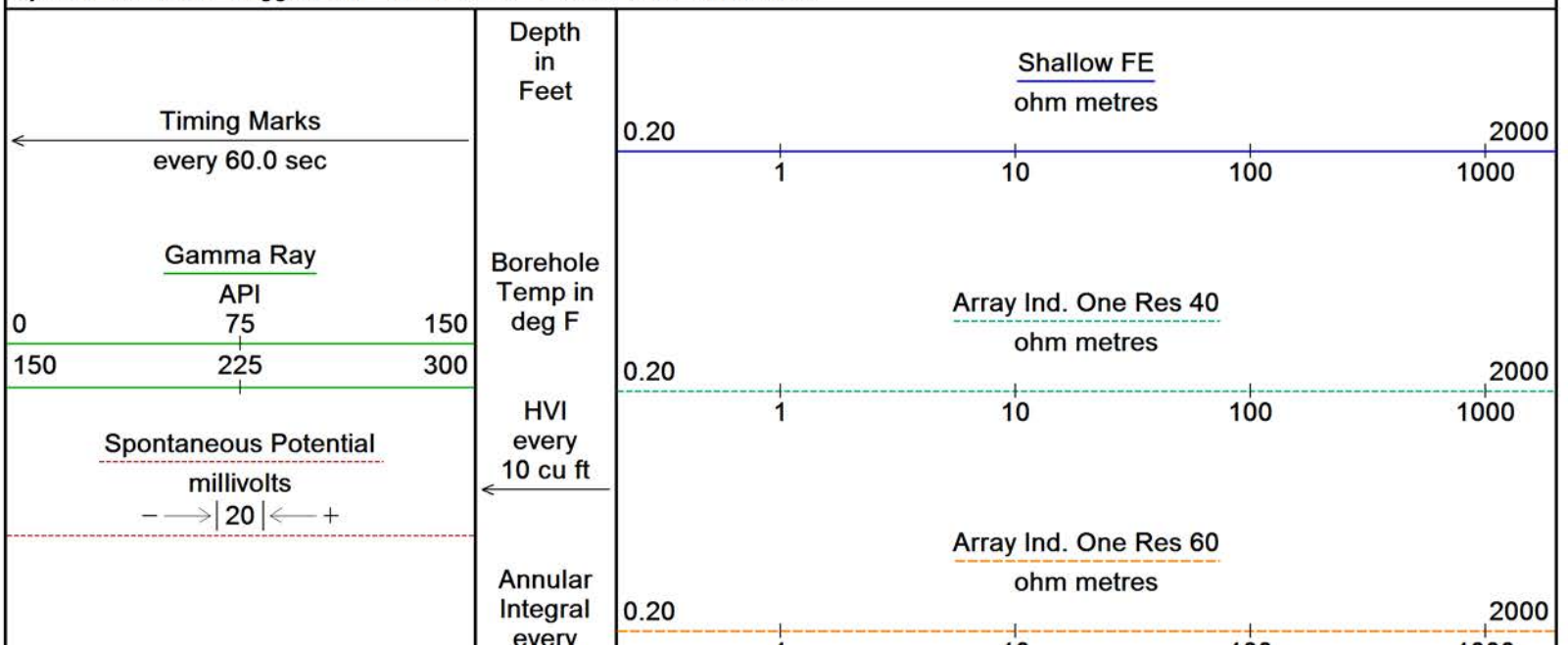


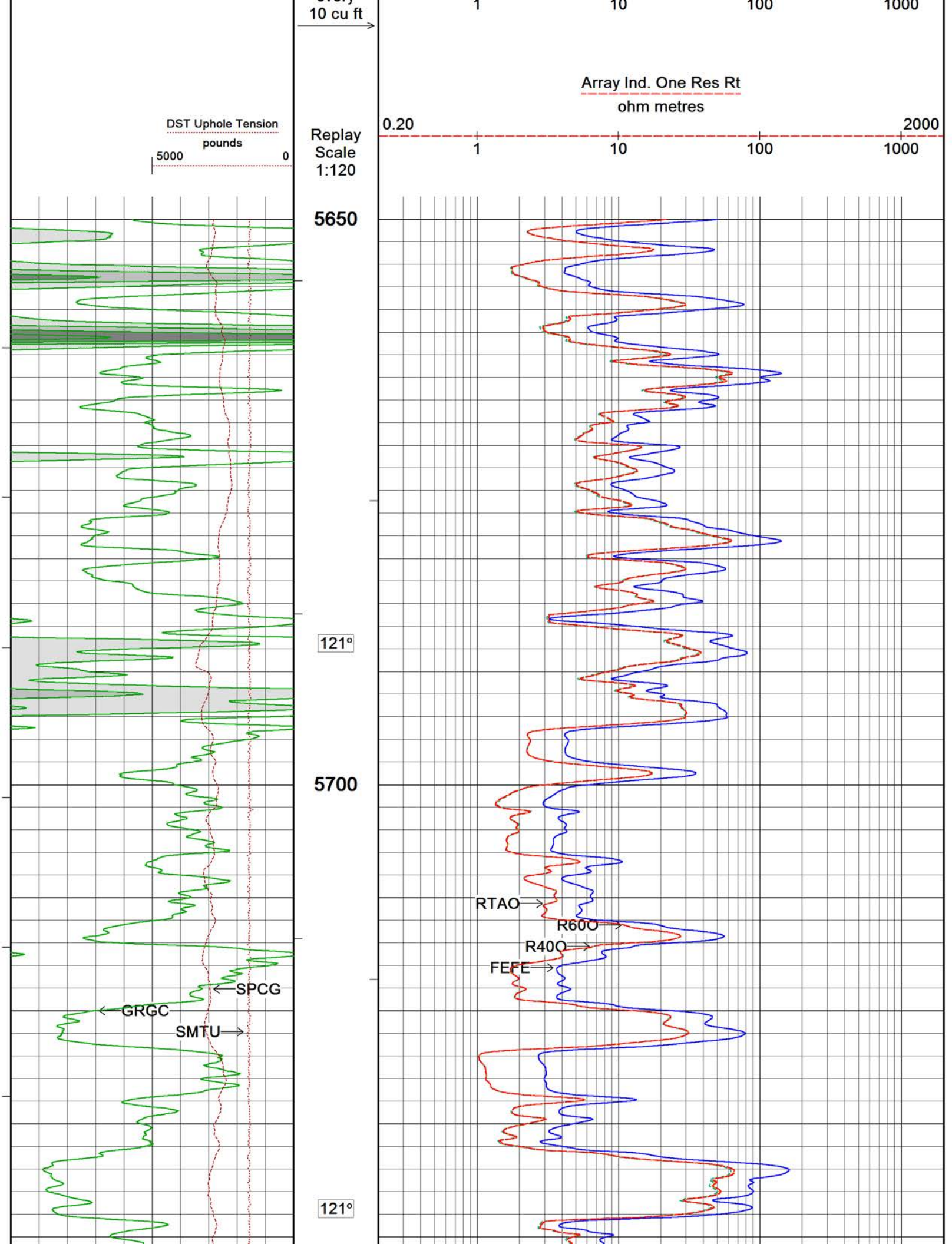
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 14-DEC-2018 15:19
Filename: C:\Users\John\AppData\Local\Temp\Weatherford PreVi...\O'Brien Preedy #3-4_002.dta — Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.03.8669

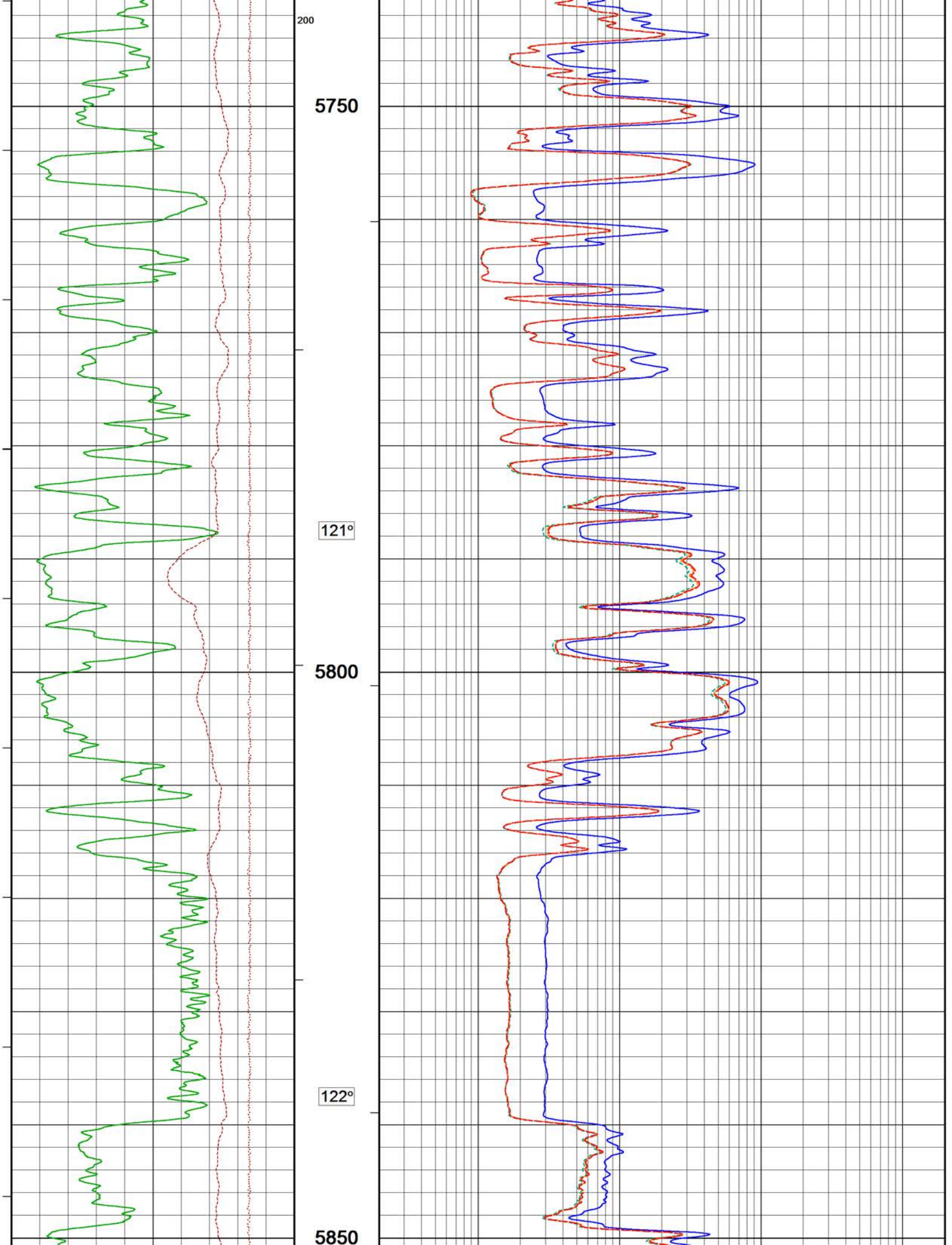
REPEAT SECTION

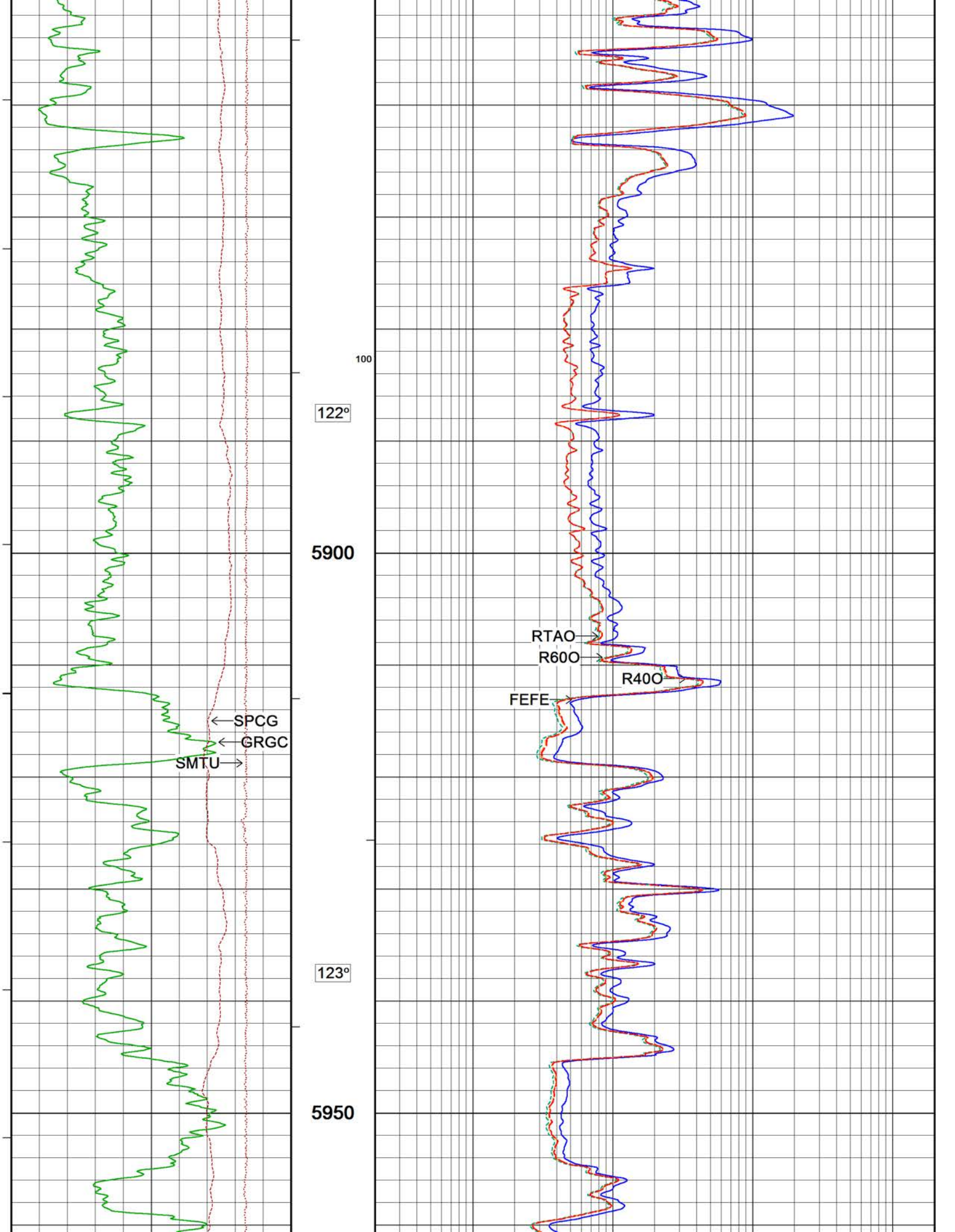
10 INCH HIGH RESOLUTION

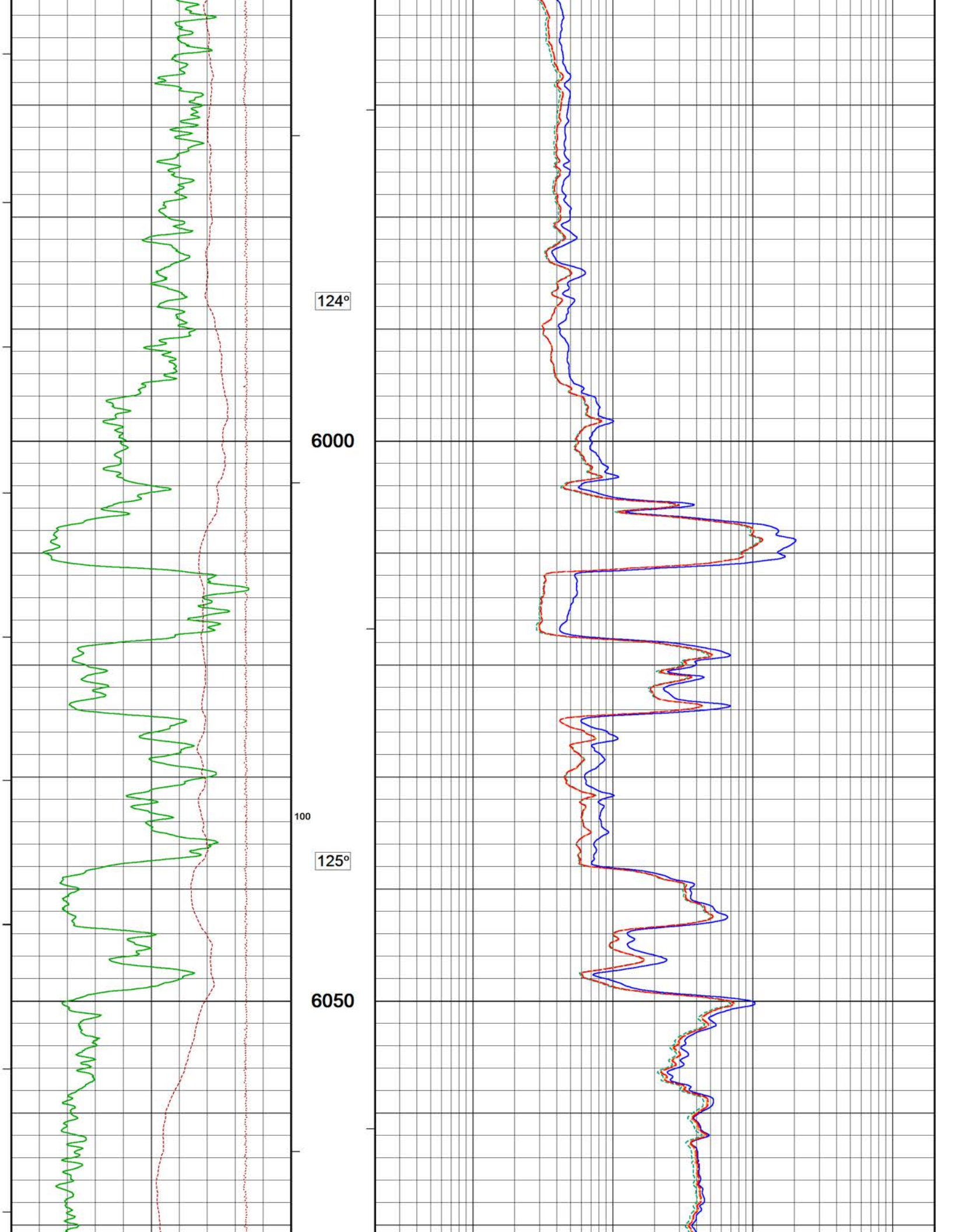
Depth Based Data - Maximum Sampling Increment 2.5cm — Plotted on 14-DEC-2018 15:19
Filename: C:\Users\John\AppData\Local\Temp\Weatherford PreVi...\O'Brien Preedy #3-4_001.dta — Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Plotted with 18.03.8669

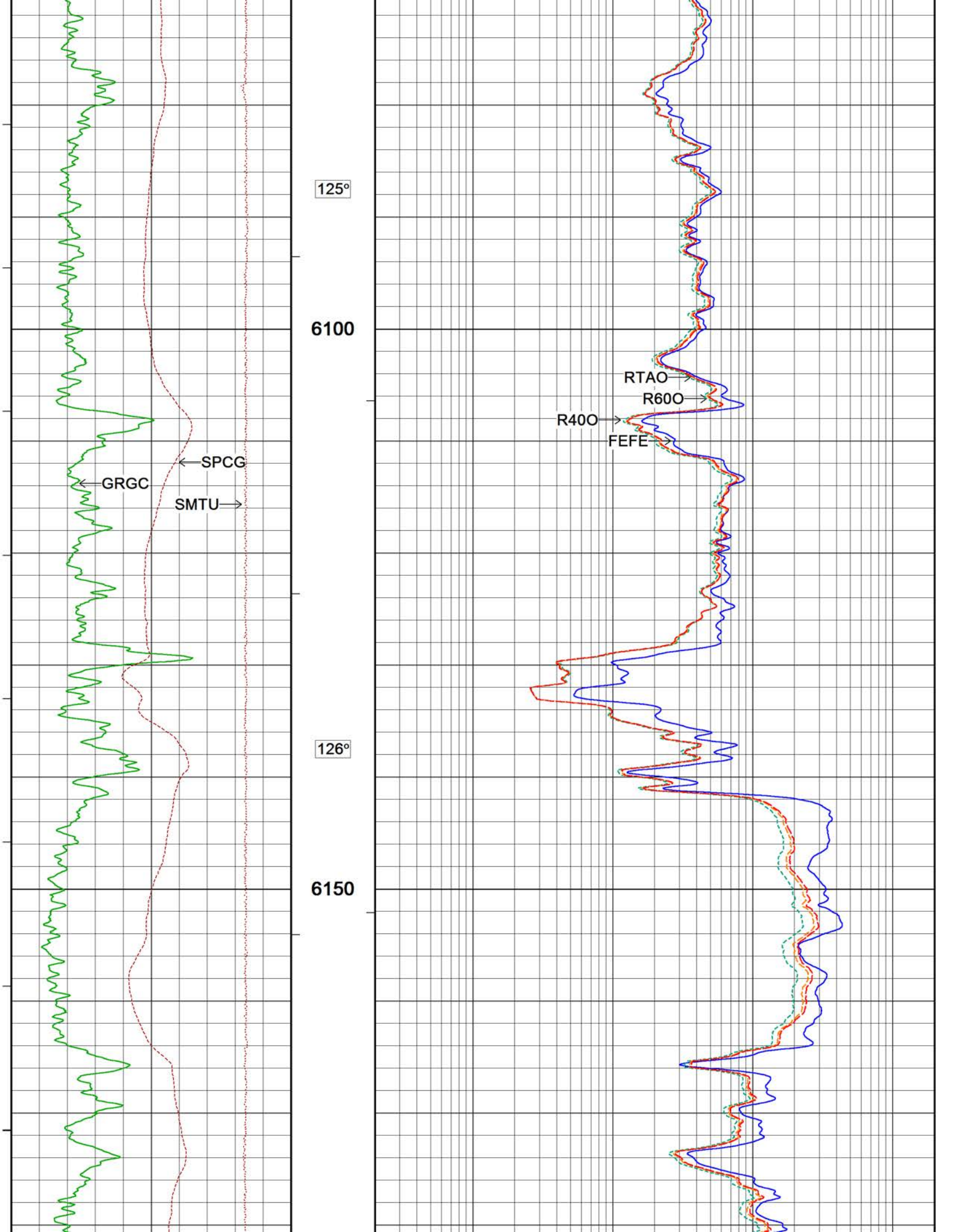


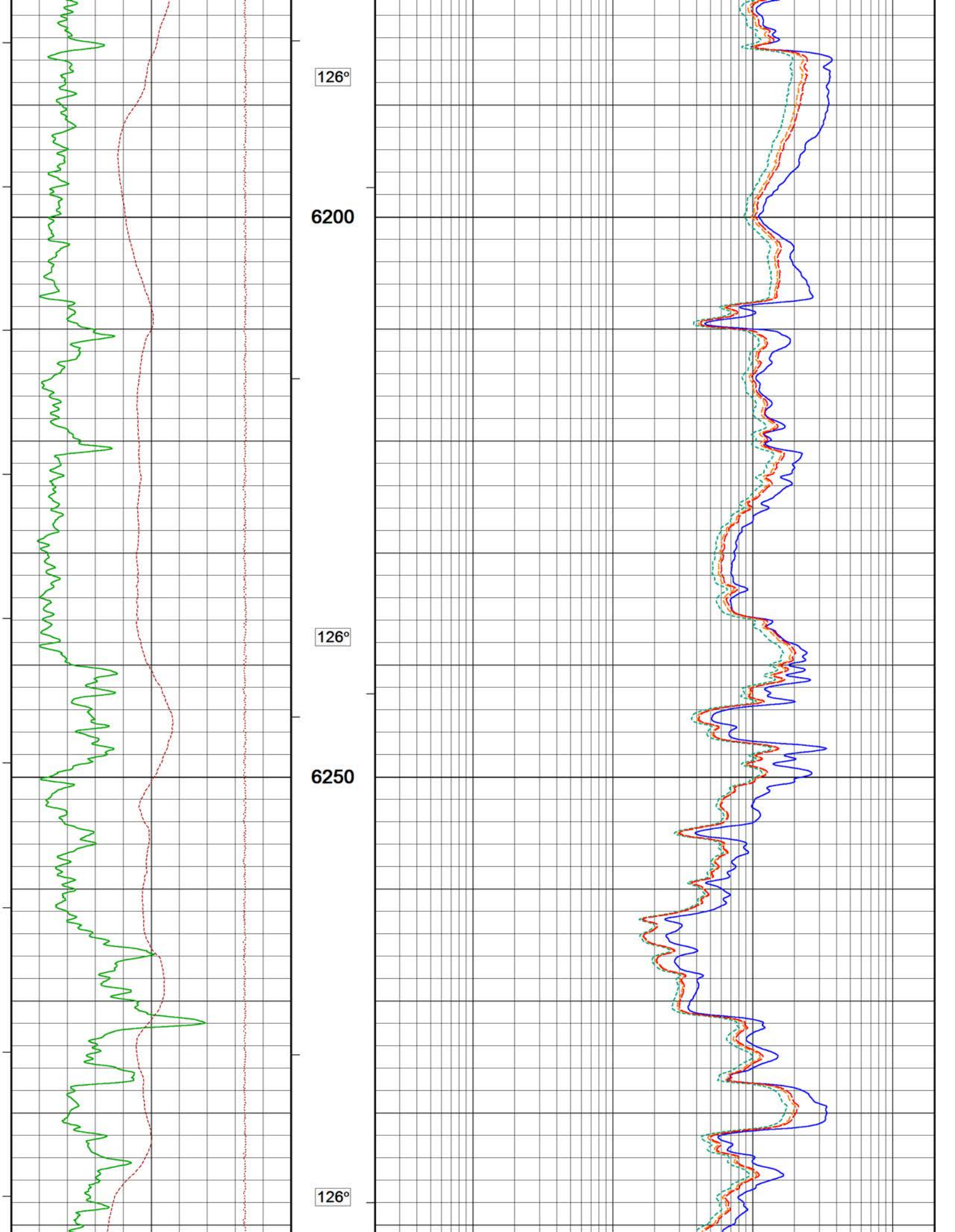

10 cu ft
1
10
100
1000
Array Ind. One Res Rt
ohm metres
0.20
2000
1
10
100
1000
DST Uphole Tension
pounds
5000
0
Replay
Scale
1:120
5650
121°
5700
121°
RTAO
R60O
R40O
FEFE
SPCG
GRGC
SMTU

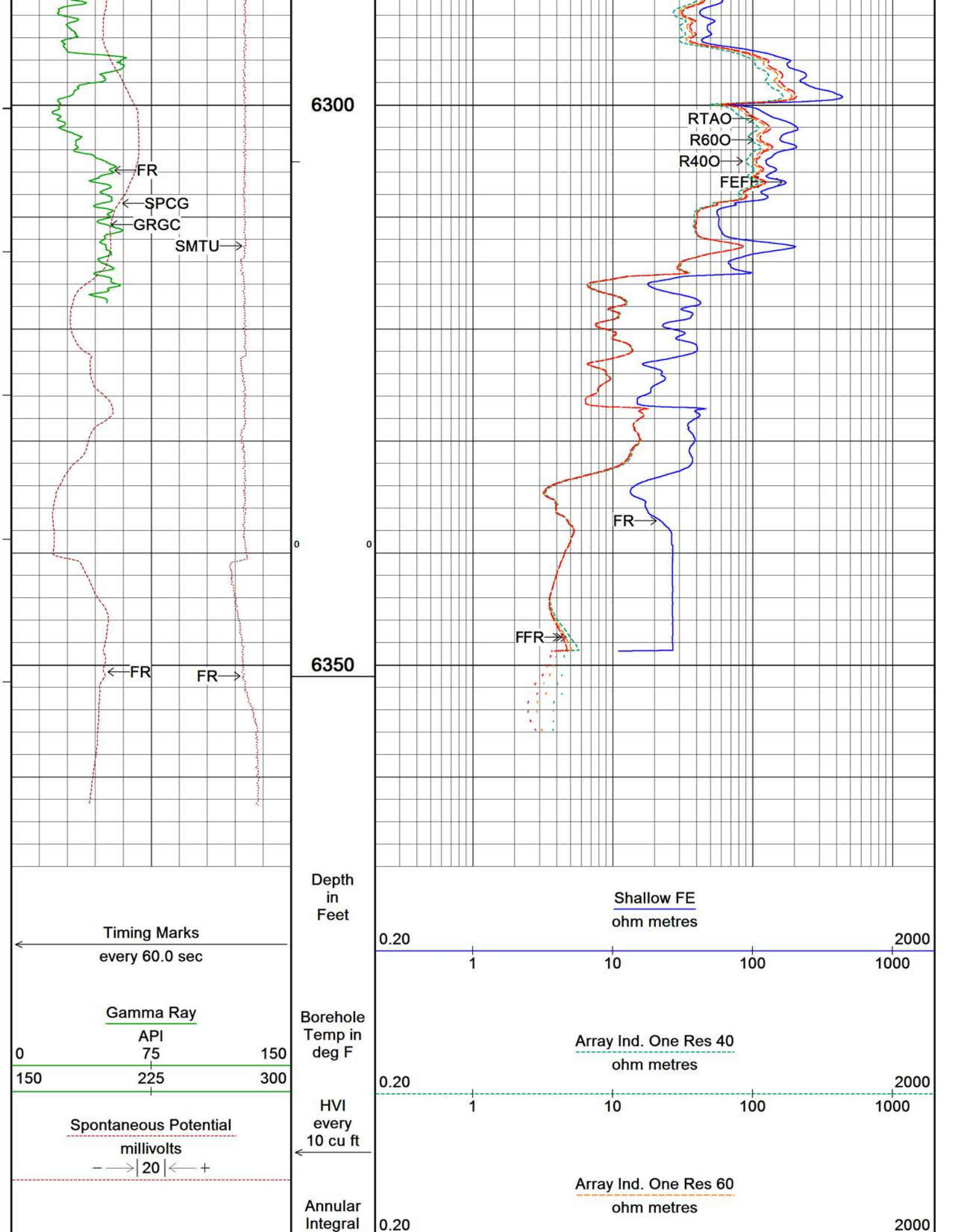

200
5750
121°
5800
122°
5850

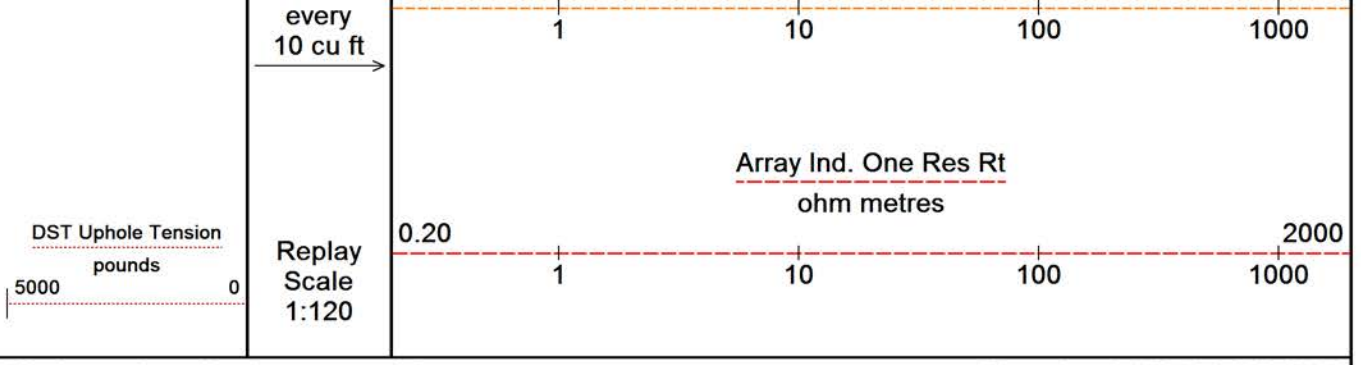

100
122°
5900
RTAO
R60O
R40O
FEFE
SPCG
GRGC
SMTU
123°
5950


124°
6000
100
125°
6050


125°
6100
126°
6150
SPCG
GRGC
SMTU
RTAO
R60O
R40O
FEFE


126°
6200
126°
6250
126°


6300
6350
FR
SPCG
GRGC
SMTU
FR
FR
FR
RTAO
R60O
R40O
FEFE
FR
FFR
0
0
Depth in Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Spontaneous Potential
millivolts
20
Borehole Temp in deg F
HVI every 10 cu ft
Annular Integral
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



Depth Based Data - Maximum Sampling Increment 2.5cm — Plotted on 14-DEC-2018 15:19
Filename: C:\Users\John\AppData\Local\Temp\Weatherford PreVi...\O'Brien Preedy #3-4_001.dta — Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Plotted with 18.03.8669

10 INCH HIGH RESOLUTION

BEFORE SURVEY CALIBRATION

C:\Users\John\AppData\Local\Temp\Weatherford PreView\0\O'Brien Preedy #3-4_002.dta

General Constants All 000

Last Edited on 07-SEP-2018,16:38

General Parameters		
Mud Resistivity	1.180	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. Two Res Rt	
RWA Constant A	0.620	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0

Field Calibration on 06-SEP-2018 14:13

Reading No	Measured	Calibrated (lbs)
1	14944.57	0.00
2	15736.14	527.00

Gamma Calibration MCG-D.A 246

Field Calibration on 06-SEP-2018,04:31

	Measured	Calibrated (API)
Background	107	75
Calibrator (Gross)	763	531
Calibrator (Net)	656	456

Gamma Calibration Tolerances MCG-D.A 246

Ratio 1.438 (1.40 – 1.475 – 1.55) Counts/API

Gamma Constants MCG-D.A 246

Last Edited on 07-SEP-2018,15:32

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.09	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-D.A 246

Field Calibration on 01-AUG-2018,13:29

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	212.00	212.00

High Resolution Temperature Constants MCG-D.A 246

Last Edited on 07-JUN-2018,10:42

Pre-filter Length	11

SP Calibration MCG-D.A 246

Field Calibration on 01-AUG-2018,13:35

	Measured	Calibrated (mV)
Reference 1	103.5	100.0
Reference 2	-96.9	-100.1

Caliper Calibration MML-A 7

Base Calibration on 07-SEP-2018 12:58
Field Calibration on 07-SEP-2018 13:00

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14194	5.98
2	17673	7.97
3	20976	9.86
4	25017	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

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

Caliper Calibration Tolerances MML-A 7

Short Arm Field Cal. 7.98 (7.77 | 7.97 | 8.17) in

Micro Normal and Micro Inverse Calibration MML-A 7

Base Calibration on 07-SEP-2018 13:13
Field Check on 07-SEP-2018 13:16

	Resistor 1 (ohm)		Resistor 2 (ohm)	
	10.0		50.0	
Base Calibration				
	Measured		Calibrated (ohm-m)	
Micro Normal	10.2	50.4	5.1	25.6
Micro Inverse	10.0	50.1	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	76.7	76.7
Micro Inverse	51.0	51.0

Micro Normal & Micro Inverse Calibration Tolerance MML-A 7

Micro Normal Res. 1 10.2 (-5% | 10.0 | +5%) ohm
Micro Inverse Res. 1 10.0 (-5% | 10.0 | +5%) ohm
Micro Normal Res. 2 50.4 (-5% | 50.0 | +5%) ohm
Micro Inverse Res. 2 50.1 (-5% | 50.0 | +5%) ohm

Micro Normal Base Check 76.7 (-2% | 76.54 | +2%) ohm-m
Micro Inverse Base Check 51.0 (-2% | 50.95 | +2%) ohm-m

Micro Normal Field Check 76.7 (-2% | 76.7 | +2%) ohm-m
Micro Inverse Field Check 51.0 (-2% | 51.0 | +2%) ohm-m

Micro Normal and Micro Inverse Constants MML-A 7

Last Edited on 07-SEP-2018,15:32

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

Neutron Calibration MDN-B.A 292

Base Calibration on 02-SEP-2018,10:44
Field Check on 06-SEP-2018,04:24

Base Calibration

	Measured	Calibrated (cps)

	Near	Far	Near	Far
	2951	93	3714	110
Ratio	31.695		33.764	

Field Calibrator at Base	Calibrated (cps)	
	2190	3136
Ratio	0.698	

Field Check	Calibrated (cps)	
	2180	3125
Ratio	0.698	

Neutron Calibration Tolerances MDN-B.A 292

		-5%		33		+5%
Ratio	31.695					

		0.65		0.7		0.75
Base Check	0.698					

		0.678		0.698		0.718
Field Check	0.698					

Neutron Constants MDN-B.A 292

Last Edited on 07-SEP-2018,15:32

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-A.A 135

Base Calibration on 02-SEP-2018,10:12
Field Check on 06-SEP-2018,04:16

	Resistor 1 (ohm)	Resistor 2 (ohm)
	0.0	1000.0
Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	962.9	126.8
Base Check		281.0
Field Check		281.1

FE Calibration Tolerances MFE-A.A 135

		-3%		980.0		+3%	
Reference 2	962.9						ohm

		-2%		277.0		+2%	
Base Check	281.0						ohm-m

		-2%		281.0		+2%	
Field Check	281.1						ohm-m

FE Constants MFE-A.A 135

Last Edited on 07-SEP-2018,15:32

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	

High Resolution Temperature Calibration MAI-A.A 111

Field Calibration on 01-AUG-2018,13:29

	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

Induction Calibration MAI-A.A 111

Factory Loop Calibration 09-AUG-2018 16:18
Field Check on 06-SEP-2018,04:15

Factory Loop Calibration

High Conductivity Reference Resistor	3.3	ohm
Low Conductivity Reference Resistor	333.3	ohm

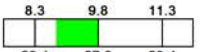
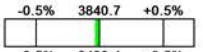
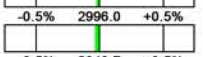
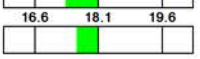
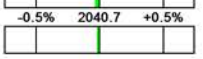
	Measured Signal (unitless)		Reference Conductivity (mmho/m)		Calibration	
Array	Low	High	Low	High	Gain	Offset
1 (near)	17.6	473.6	9.3	966.2	0.000	0.0
2	6.4	385.9	7.6	821.4	0.000	0.0
3	3.2	264.0	5.2	566.0	0.000	0.0
4 (far)	2.1	135.5	2.6	279.2	0.000	0.0

Array Temperature	23.0	Deg F

Tool Checks

	Factory Reference (mmho/m)		Before Survey (mmho/m)		
Array	Low	High	Low	High	
1 (near)	9.8	3840.7	8.8	3839.2	
2	27.9	3498.4	27.0	3497.5	
3	27.5	2996.0	26.7	2994.9	
4 (far)	18.1	2040.7	17.6	2040.3	
Array Temperature		87.9		85.9	Deg F

Induction Check Tolerances MAI-A.A 111

Low Array 1	8.8		mmho/m	High Array 1	3839.2		mmho/m
Low Array 2	27.0		mmho/m	High Array 2	3497.5		mmho/m
Low Array 3	26.7		mmho/m	High Array 3	2994.9		mmho/m
Low Array 4	17.6		mmho/m	High Array 4	2040.3		mmho/m

Induction Constants MAI-A.A 111

Last Edited on 07-SEP-2018,15:31

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.	Borehole Temp. Unfilt.	
Borehole Correction Method	Default	
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	

Caliper Calibration MPD-C.A 216

Base Calibration on 02-SEP-2018,10:42
Field Calibration on 06-SEP-2018,04:16

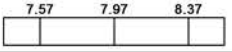
Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14688	3.99
2	23495	5.98
3	32176	7.97
4	40480	9.86
5	49713	11.92
6	N/A	N/A

Field Calibration

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

Caliper Calibration Tolerances MPD-C.A 216

Long Arm Field Cal. 7.97 

in

Photo Density Calibration MPD-C.A 216

Base Calibration on 02-SEP-2018,10:27
Field Check on 06-SEP-2018,04:18

Density Calibration

Base Calibration	Measured Near	Measured Far	Calibrated (sdu) Near	Calibrated (sdu) Far
Background	1002	1196		
Reference 1	49599	24164	59556	30836
Reference 2	19816	2269	24941	2541

Field Check at Base

1002.2	1196.2

Field Check

1009.6	1208.8

PE Calibration

Base Calibration	WS	Measured WH	Ratio	Calibrated Ratio
Background	183	902		
Reference 1	21103	49447	0.431	0.371
Reference 2	5778	19707	0.298	0.272

Field Check at Base

183.1	901.7

Field Check

	187.2		908.2

Photo Density Calibration Tolerances MPD-C.A 216

		-5%		+5%
Near Density Ratio	2.58		2.52	
PE Calibration	0.125	0.089	0.110	0.131
Far Density Ratio	21.41	-5%	21.00	+5%
Near Den. Field Check	1009.6	-3%	1002.2	+3%
PE WS Field Check	187.2	-6%	183.1	+6%
Far Den. Field Check	1208.8	-3%	1196.2	+3%
PE WH Field Check	908.2	-6%	901.7	+6%

Density Constants MPD-C.A 216

Last Edited on 07-SEP-2018,15:32

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	1.09	gm/cc
Mud Density Type		
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	
Precision Enhanced Density Processing	Applied	

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:\Users\John\AppData\Local\Temp\Weatherford PreView\0\O'Brien Preedy #3-4_002.dta

Cablehead, 11 pin
CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Swivel Head Adaptor
SHA-J.B 595 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

Compact Comms Gamma
MCG-D.A 246 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-log
MML-A 7 LG: 7.97 ft WT: 81.6 lb OD: 2.244 in

Compact Neutron
MDN-B.A 292 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

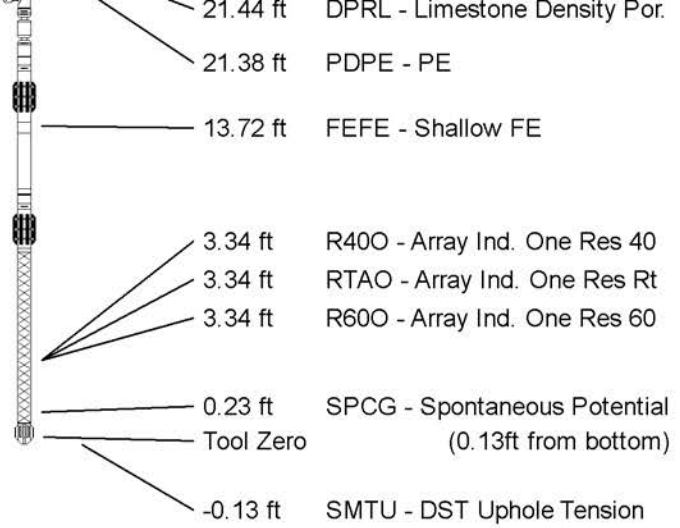
Compact Knuckle Joint
SKJ-D.A 167 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

45.04 ft GRGC - MCG Gamma Ray
42.13 ft CGXT - MCG External Temperature
36.40 ft MLTC - MML Caliper
35.41 ft MINV - Micro-inverse
35.41 ft MNRL - Micro-normal
30.61 ft NPRL - Limestone Neutron Por.
23.37 ft AVOL - Annular Volume
23.37 ft HVOL - Hole Volume
23.37 ft CLDC - Density Caliper
21.44 ft DEN - Compensated Density
21.44 ft DCOR - Density Correction

Compact Focussed Electric
MFE-A.A 135 LG: 6.05 ft WT: 48.5 lb OD: 2.240 in

Compact Induction
MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.240 in

Total Length: 55.02 ft Weight: 454.2 lb



All measurements relative to tool zero.

COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	PREEDY #3-4
FIELD	ANGELL SOUTHEAST
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2681	feet	First Reading	6348.00	feet
Elevation Drill Floor	2679	feet	Depth Driller	6350.00	feet
Elevation Ground Level	2668	feet	Depth Logger	6351.00	feet

Weatherford®

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

Weatherford

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

COMPANY O'BRIEN ENERGY RESOURCES CORP.
WELL PREEDY #3-4
FIELD ANGELL SOUTHEAST
PROVINCE/COUNTY MEADE
COUNTRY/STATE U.S.A. / KANSAS
LOCATION 1980' FSL & 2305' FEL
SEC 3 TWP 33S RGE 29W Other Services
Latitude MML
Longitude
API Number 15-119-21425
Permanent Datum GL Elevation 2668 feet MPD/MDN
Log Measured From KB 13.00 feet above Permanent Datum
Drilling Measured From KB

		Elevations:	feet
		KB	2681.00
		DF	2679.00
		GL	2668.00

Date	07-SEP-2018	
Run Number	ONE	
Service Order	4558-223534615	
Depth Driller	6350.00	feet
Depth Logger	6351.00	feet
First Reading	6348.00	feet
Last Reading	1530.00	feet
Casing Driller	1528.00	feet
Casing Logger	1530.00	feet
Bit Size	7.875	inches
Hole Fluid Type	CHEMICAL	
Density / Viscosity	9.10 lb/USg	58.00 CP
PH / Fluid Loss	10.50	7.20 ml/30Min
Sample Source	FLOWLINE	
Rm @ Measured Temp	1.18 @ 75.0	ohm-m
Rmf @ Measured Temp	0.94 @ 75.0	ohm-m
Rmc @ Measured Temp	1.42 @ 75.0	ohm-m
Source Rmf / Rmc	CALC	CALC
Rm @ BHT	0.69 @129.0	ohm-m
Time Since Circulation	5 HOURS	
Max Recorded Temp	129.00	deg F
Equipment / Base	13096	LIB
Recorded By	ADAM SILL	
Witnessed By	CASEY COATS	PETE DEBENHAM

1 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 14-DEC-2018 15:19
Filename: C:\Users\John\AppData\Local\Temp\Weatherford PreVie...\O'Brien Preedy #3-4_003.dta Recorded on 07-SEP-2018 18:49
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.03.8669

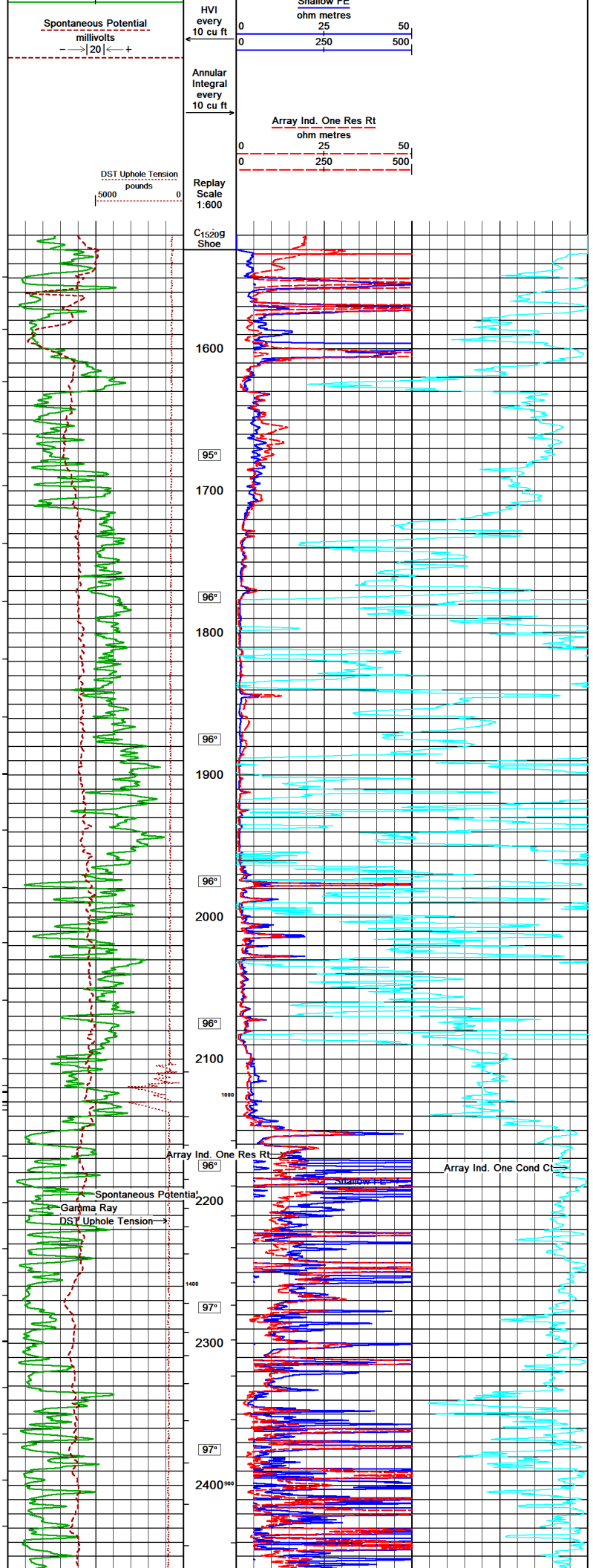
Timing Marks
every 60.0 sec

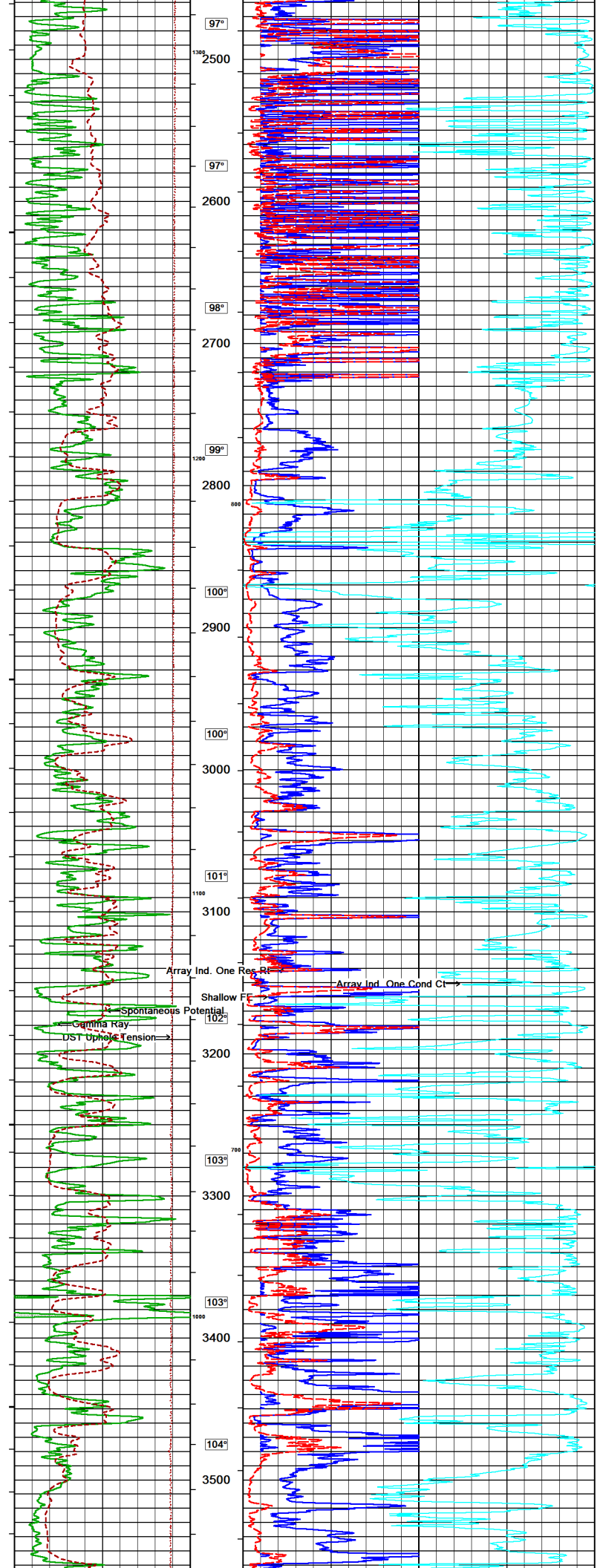
Gamma Ray
API
0 75 150
150 225 300

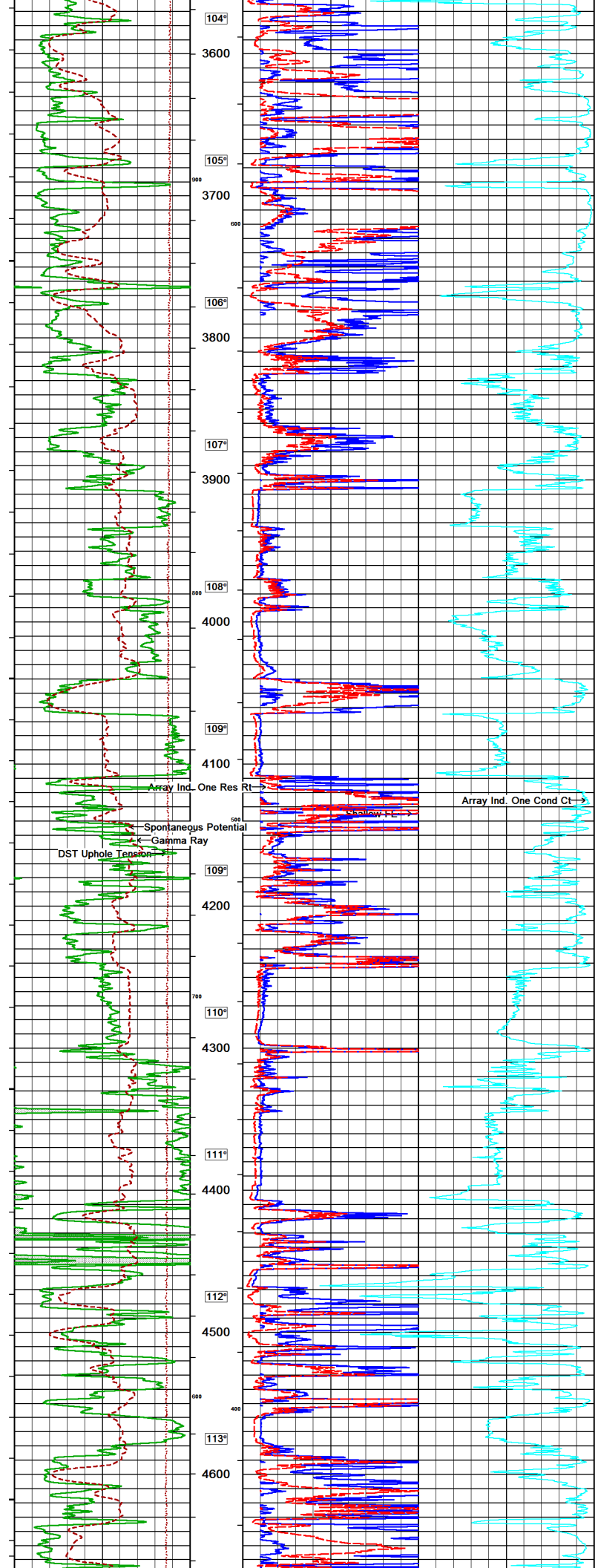
Depth In Feet

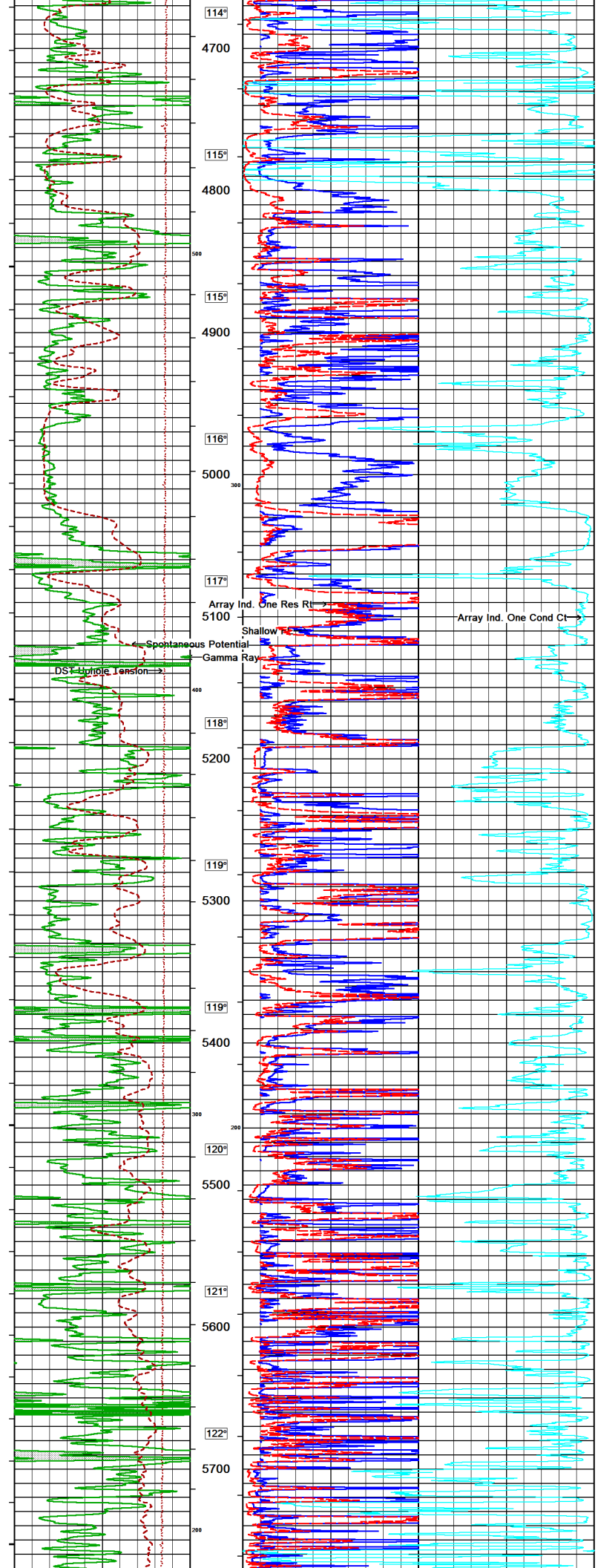
Borehole Temp in deg F

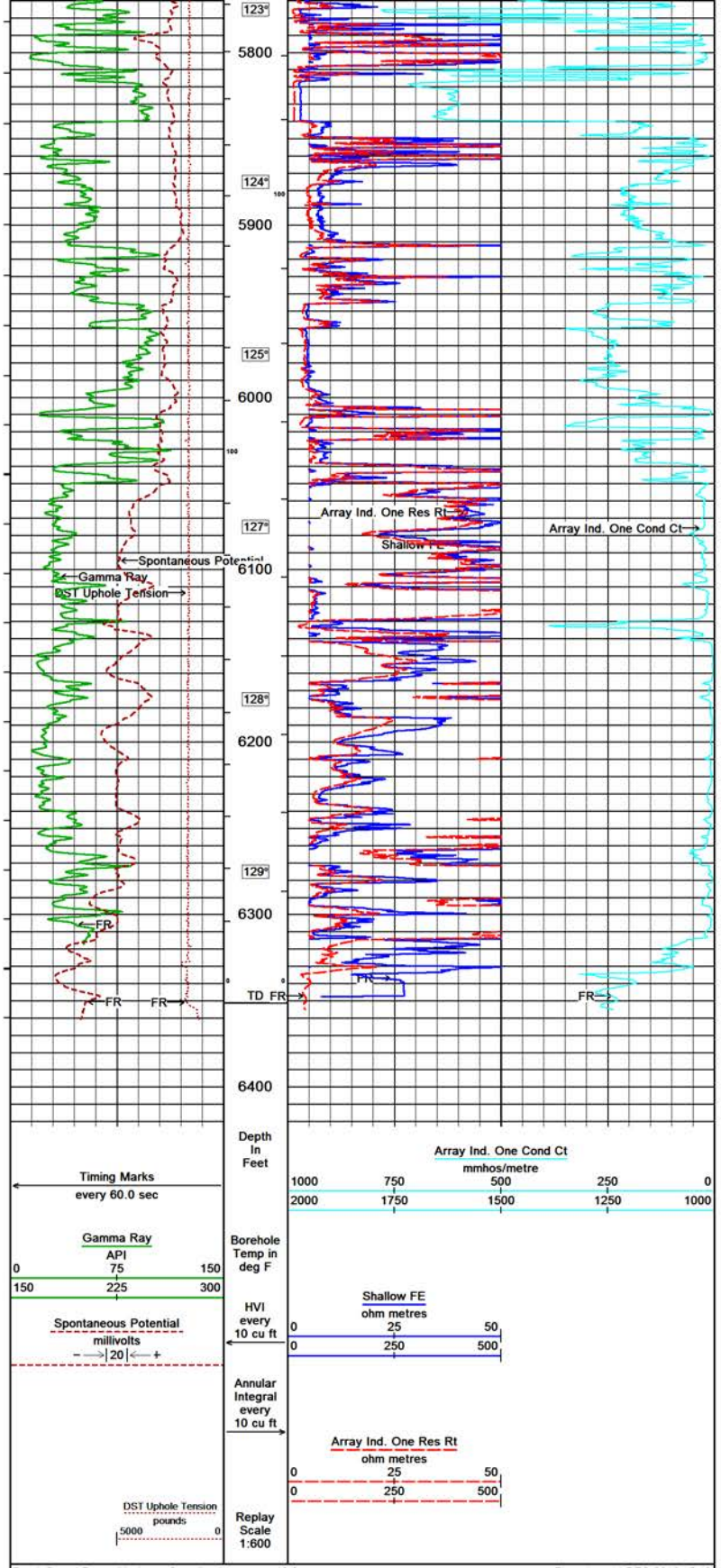
Array Ind. One Cond Ct
mmhos/metre
1000 750 500 250 0
2000 1750 1500 1250 1000


Spontaneous Potential
millivolts
20
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
C1520g
Shoe
1600
95°
1700
96°
1800
96°
1900
96°
2000
96°
2100
1000
Array Ind. One Res Rt
96°
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
2200
Gamma Ray
DST Uphole Tension
1400
97°
2300
97°
2400
900


97°
2500
97°
2600
98°
2700
99°
2800
100°
2900
100°
3000
101°
3100
Array Ind. One Res Rt
Array Ind. One Cond Ct⟶
Shallow FF
⟵Spontaneous Potential
102°
⟵Gamma Ray
DST Uphole Tension⟶
3200
103°
3300
103°
3400
104°
3500


104°
3600
105°
900
3700
600
106°
3800
107°
3900
800
108°
4000
109°
4100
Array Ind. One Res Rt
500
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
109°
4200
700
110°
4300
111°
4400
112°
4500
600
400
113°
4600


114°
4700
115°
4800
500
115°
4900
116°
5000
300
117°
Array Ind. One Res Rt
5100
Shallow R
Array Ind. One Cond Ct
Spontaneous Potential
Gamma Ray
DST Uphole Tension
400
118°
5200
119°
5300
119°
5400
300
200
120°
5500
121°
5600
122°
5700
200



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 14-DEC-2018 15:19
Filename: C:\Users\John\AppData\Local\Temp\Weatherford PreVie...\O'Brien Preedy #3-4_003.dta — Recorded on 07-SEP-2018 18:49
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.03.8669

1 INCH MAIN

COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	PREEDY #3-4
FIELD	ANGELL SOUTHEAST
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2681	feet	First Reading	6348.00	feet
Elevation Drill Floor	2679	feet	Depth Driller	6350.00	feet
Elevation Ground Level	2668	feet	Depth Logger	6351.00	feet

Weatherford®

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG