



Weatherford®

**ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**

COMPANY					GRAND MESA OPERATING CO.				
WELL					RIO LOBO 1-30				
FIELD					WILDCAT				
PROVINCE/COUNTY					WASHINGTON				
COUNTRY/STATE					U.S.A. / COLORADO				
LOCATION					SHL: 2474' FNL & 610' FWL				
SEC 30	TWP 5S	RGE 53W	Other Services		COMPENSATED SONIC				
Latitude	39.586820		DUAL SPACED NEUTRON		MICROLOG				
Longitude	-103.366370		PHOTO DENSITY						
API Number	05-121-11065								
Permanent Datum GL, Elevation 5138 feet									
Log Measured From KB, 19.00 feet above Permanent Datum									
Drilling Measured From KB									
Date	04-JUL-2017								
Run Number	ONE								
Service Order	8367-186414219								
Depth Driller	8099.00				feet				
Depth Logger	8095.00				feet				
First Reading	8092.00				feet				
Last Reading	376.00				feet				
Casing Driller	386.00				feet				
Casing Logger	386.00				feet				
Bit Size	7.875				inches				
Hole Fluid Type	CHEMICAL								
Density / Viscosity	9.40 lb/USg		76.00 CP						
PH / Fluid Loss	---		---						
Sample Source	FLOWLINE								
Rm @ Measured Temp	1.20 @ 50.0				ohm-m				
Rmf @ Measured Temp	0.96 @ 50.0				ohm-m				
Rmc @ Measured Temp	1.44 @ 50.0				ohm-m				
Source Rmf / Rmc	CALC		CALC						
Rm @ BHT	0.347 @183.0		ohm-m						
Time Since Circulation	12 HOURS								
Max Recorded Temp	183.00				deg F				
Equipment / Base	13174		CASPER						
Recorded By	ANDREW EASTAUGHFFE								
Witnessed By	KENT MATSON								

BOREHOLE RECORD					Last Edited: 05-JUL-2017 02:23
Bit Size inches		Depth From feet		Depth To feet	
7.875		386.00		8099.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
SURFACE	8.625	0.00	386.00	24.00	

REMARKS
- SOFTWARE: LOGGED WITH WLS 17.01.7206
- RUN ONE: MAI, MFE, MSS, SKJ, MISE, SKJ, MISD, MPD, MDN, MMR(MML), MCG, SHA, MTA, CBH RUN IN COMBINATION. - HARDWARE: MDN: DUAL BOWSPRING ECCENTRALIZER MPD: 8 INCH PROFILE PLATE MFE: 1 X 0.5 INCH STANDOFF MSS: 3 X 0.5 INCH STANDOFFS MAI 1 X 0.5 INCH STANDOFF AT TOP, 1 X 0.5 INCH PINEAPPLE STANDOFF AT BOTTOM.
- RUN TWO: HFS, MISD, MIE, MIM, MCG, SHA, MTA, CBH RUN IN COMBINATION. HARDWARE: MIM: OVERBODY CENTRALIZER BASKET MIE: PROTECTIVE STANDOFF AT BASE
- 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

ALL INTERVALS LOGGED AND CORRECTED PER CUSTOMER REQUEST.

- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 3440 CU.FT.

- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING: 2190 CU.FT.

- LATITUDE: 39.586820

- LONGITUDE: -103.366370

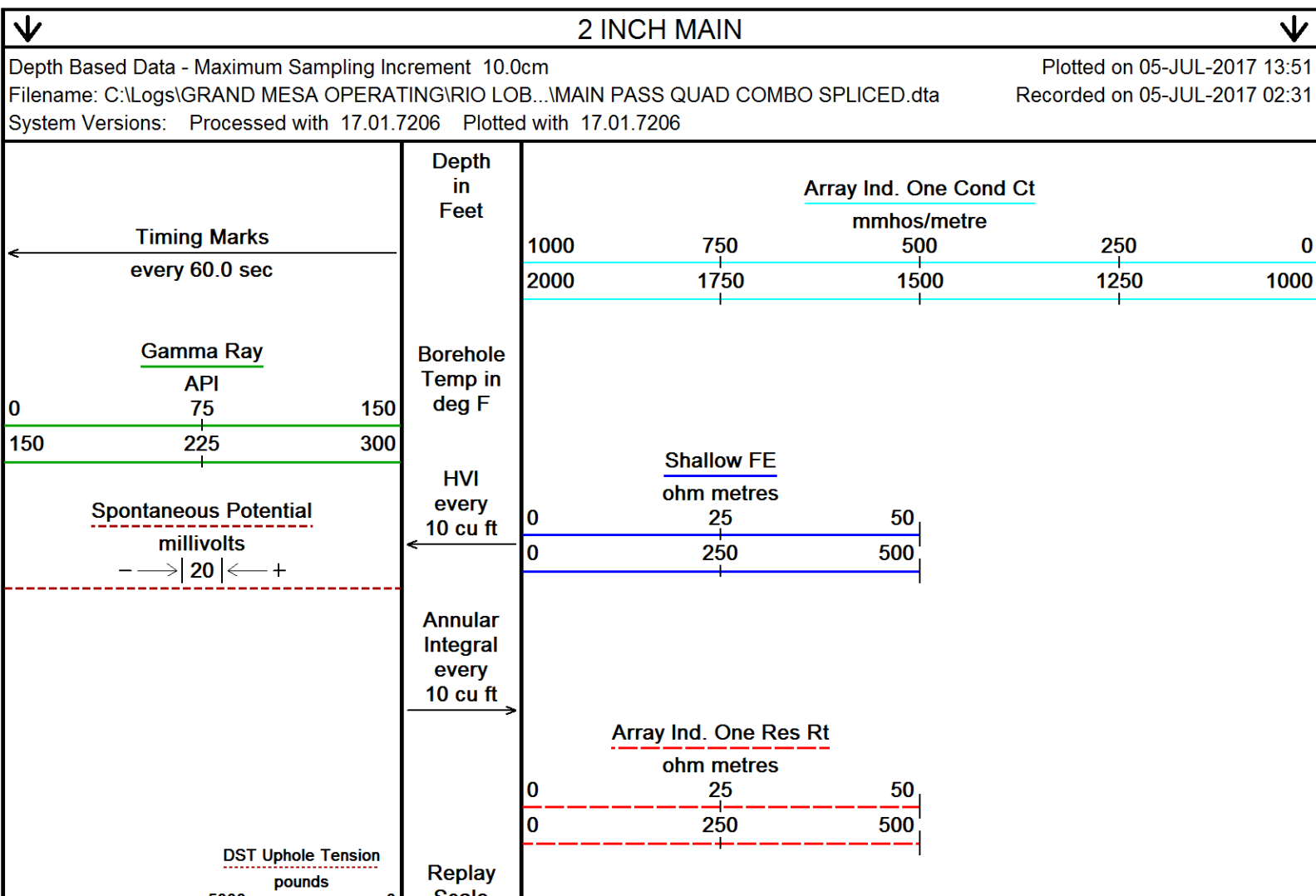
- MAG DEC FROM NOAA WEBSITE: 7.38 DEG EAST

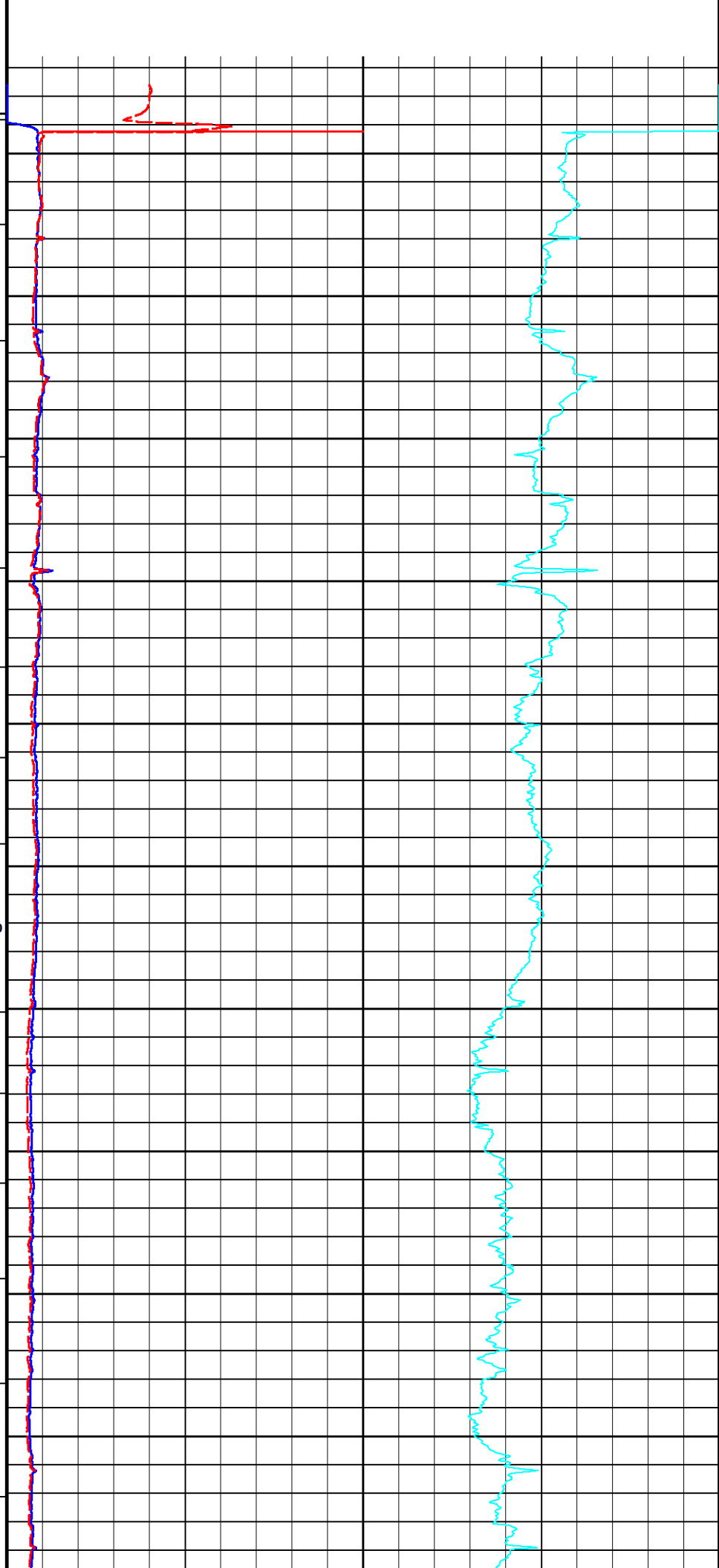
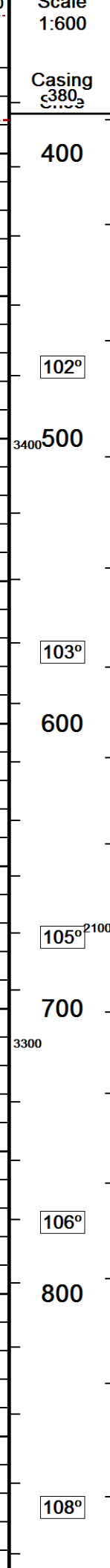
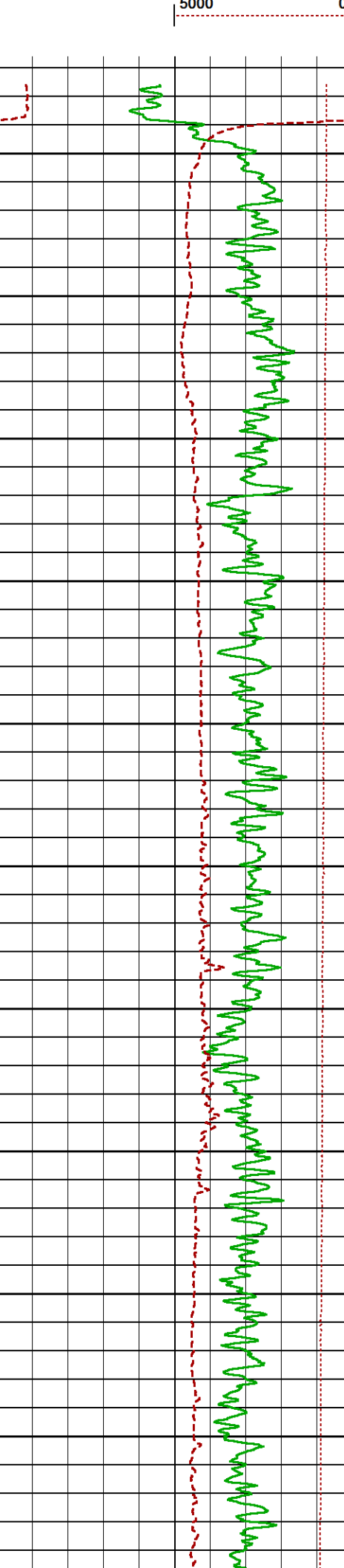
- RIG: WW DRILLING #20.

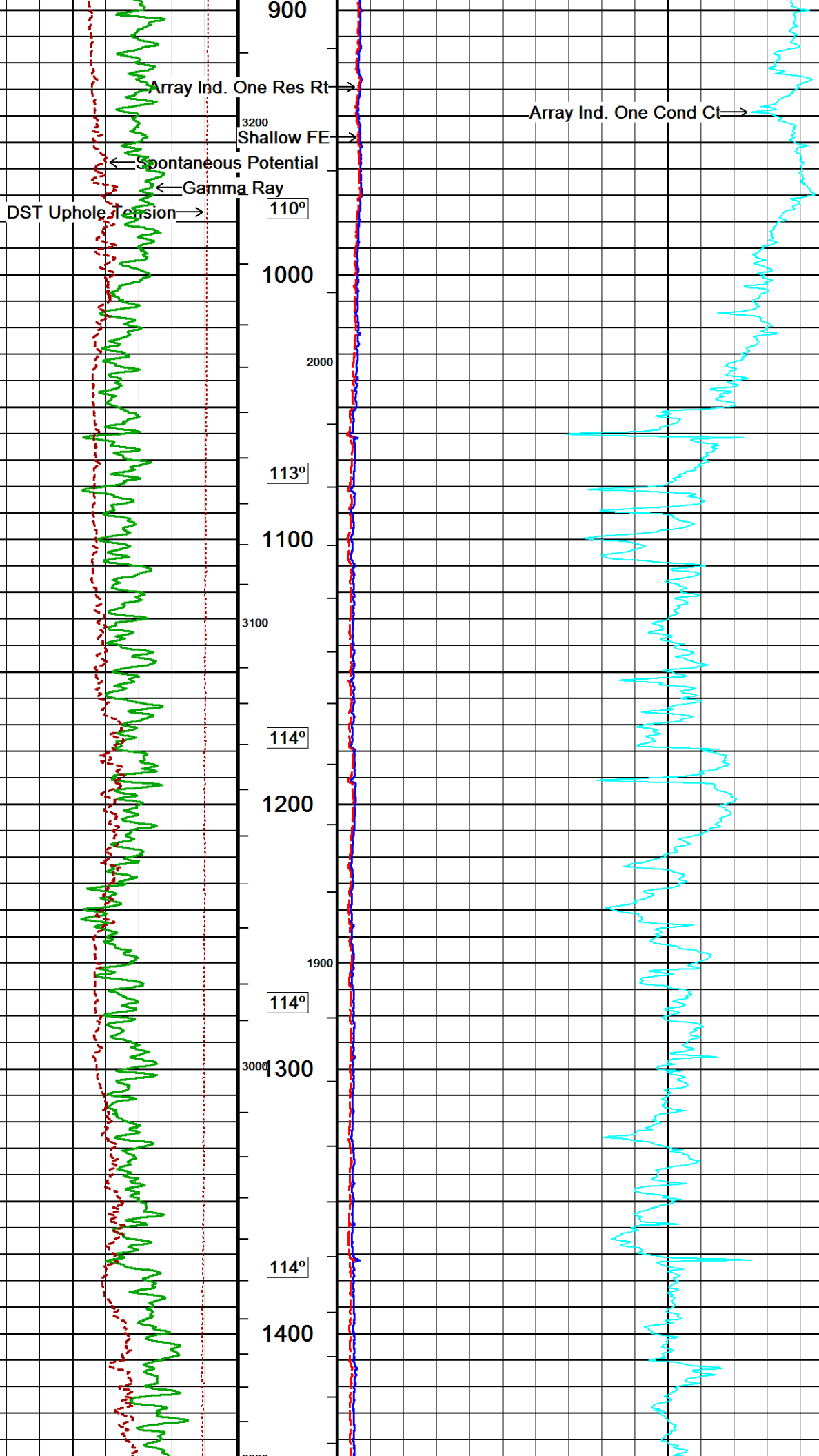
- ENGINEER: A. A. EASTAUGHFFE

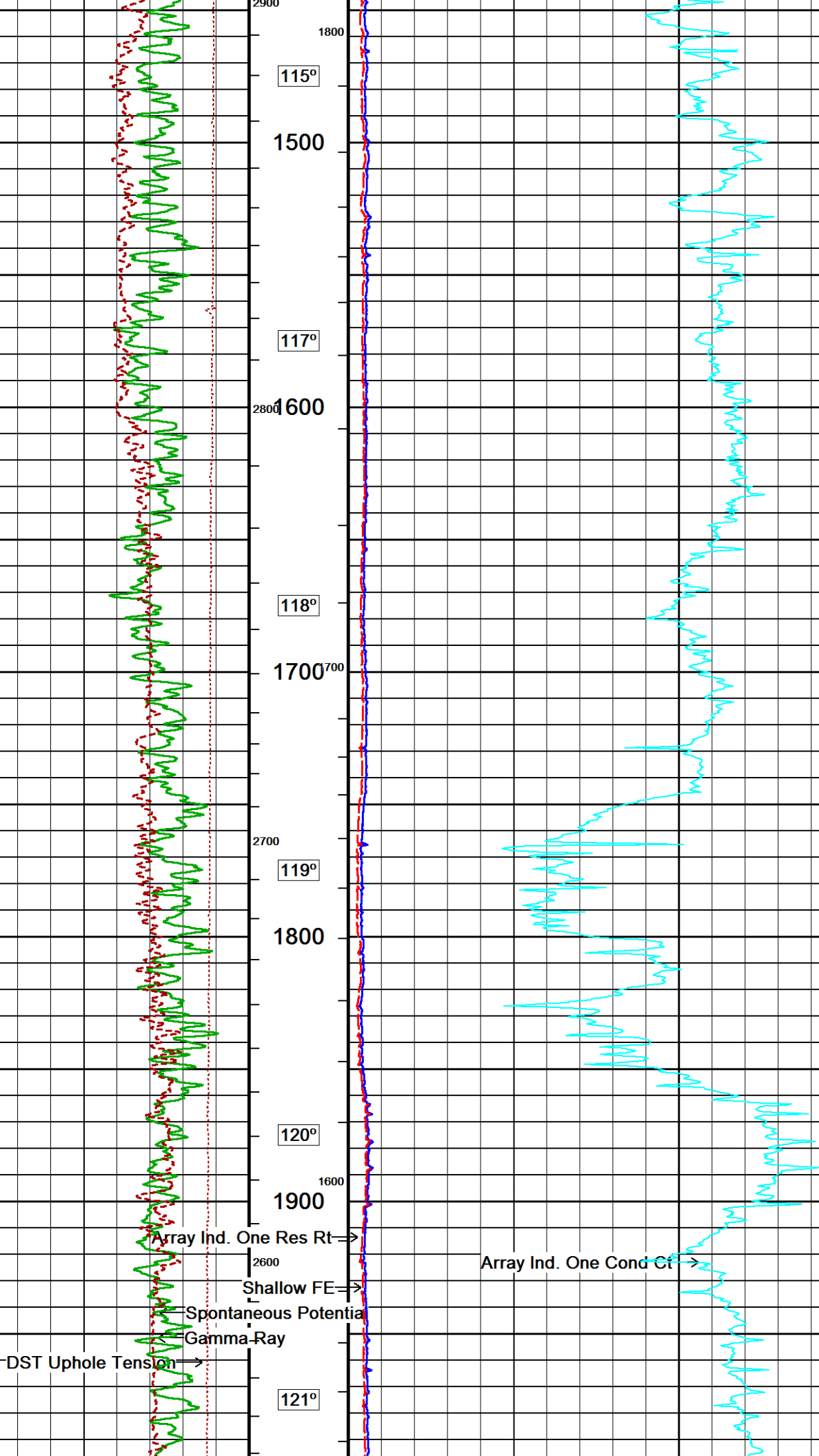
- OPERATOR: P. B. MEYER

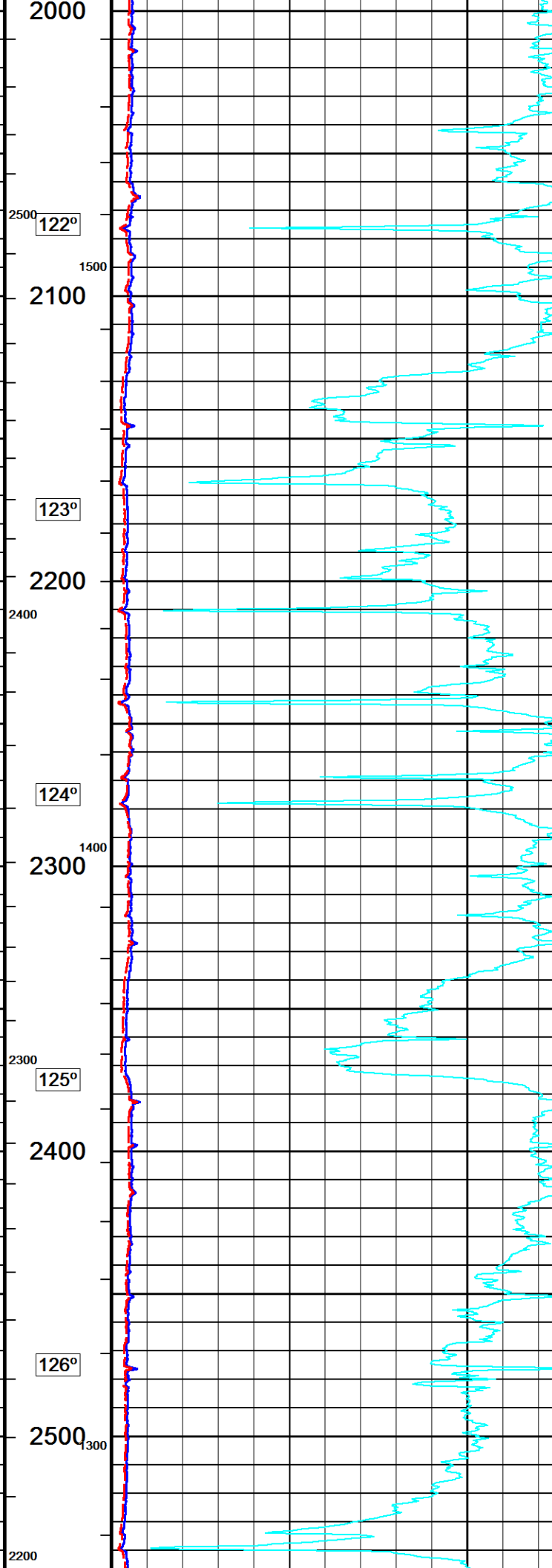
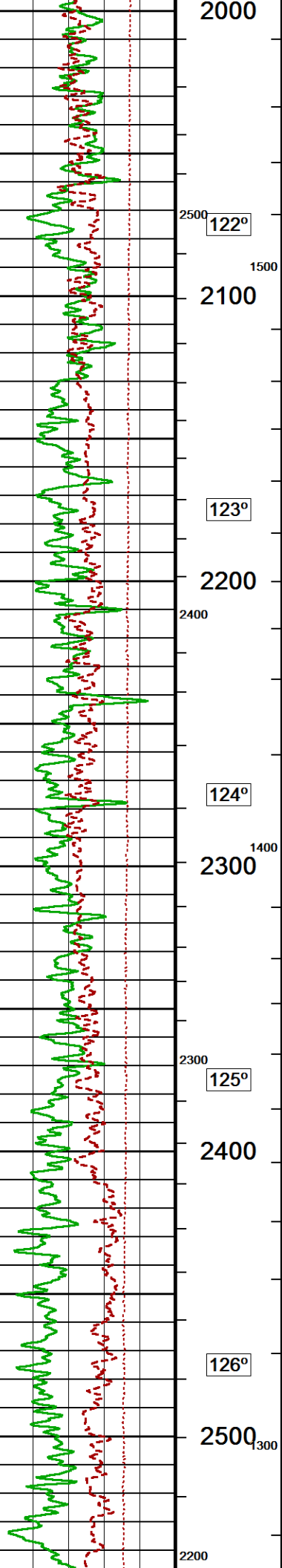
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will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

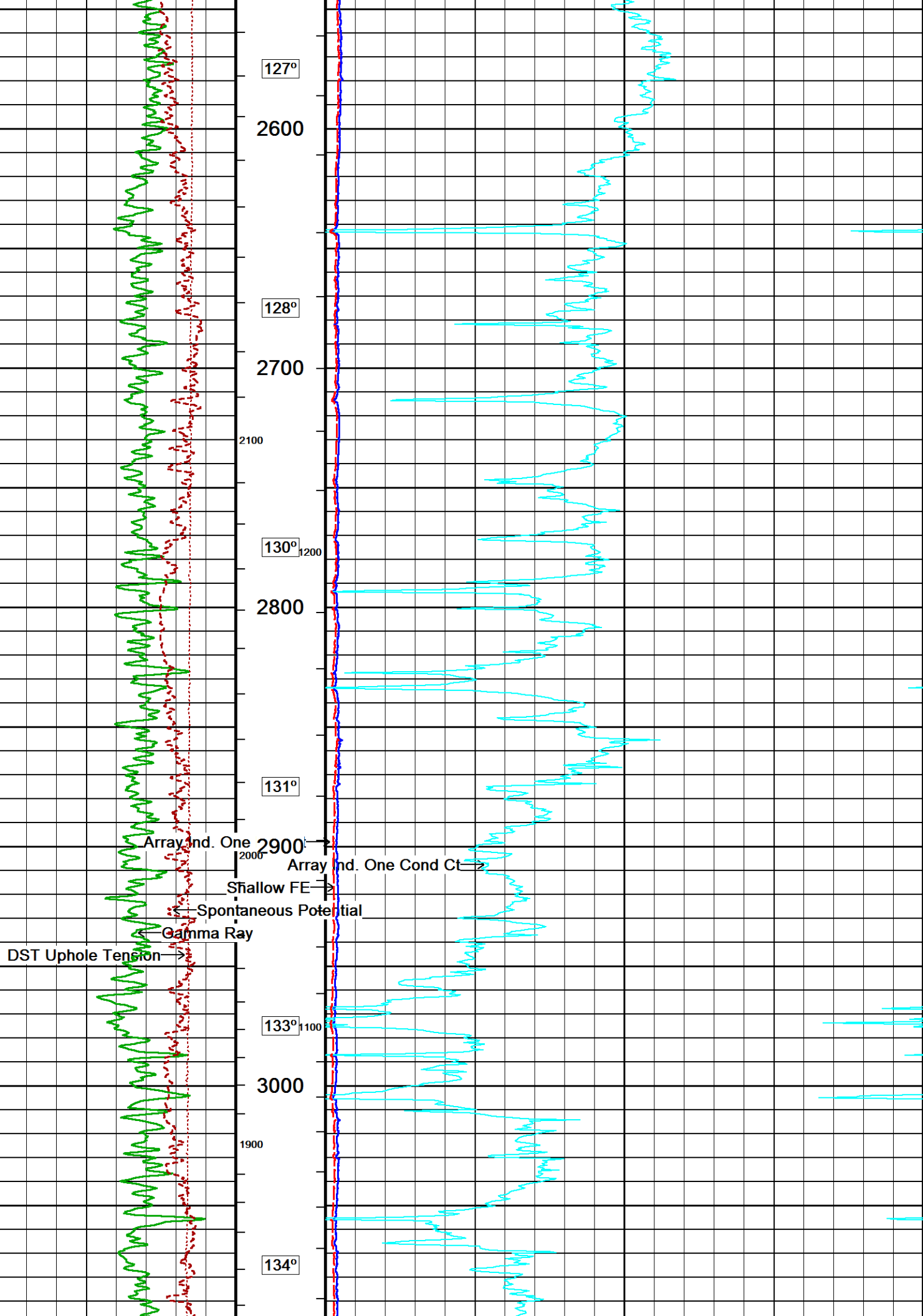


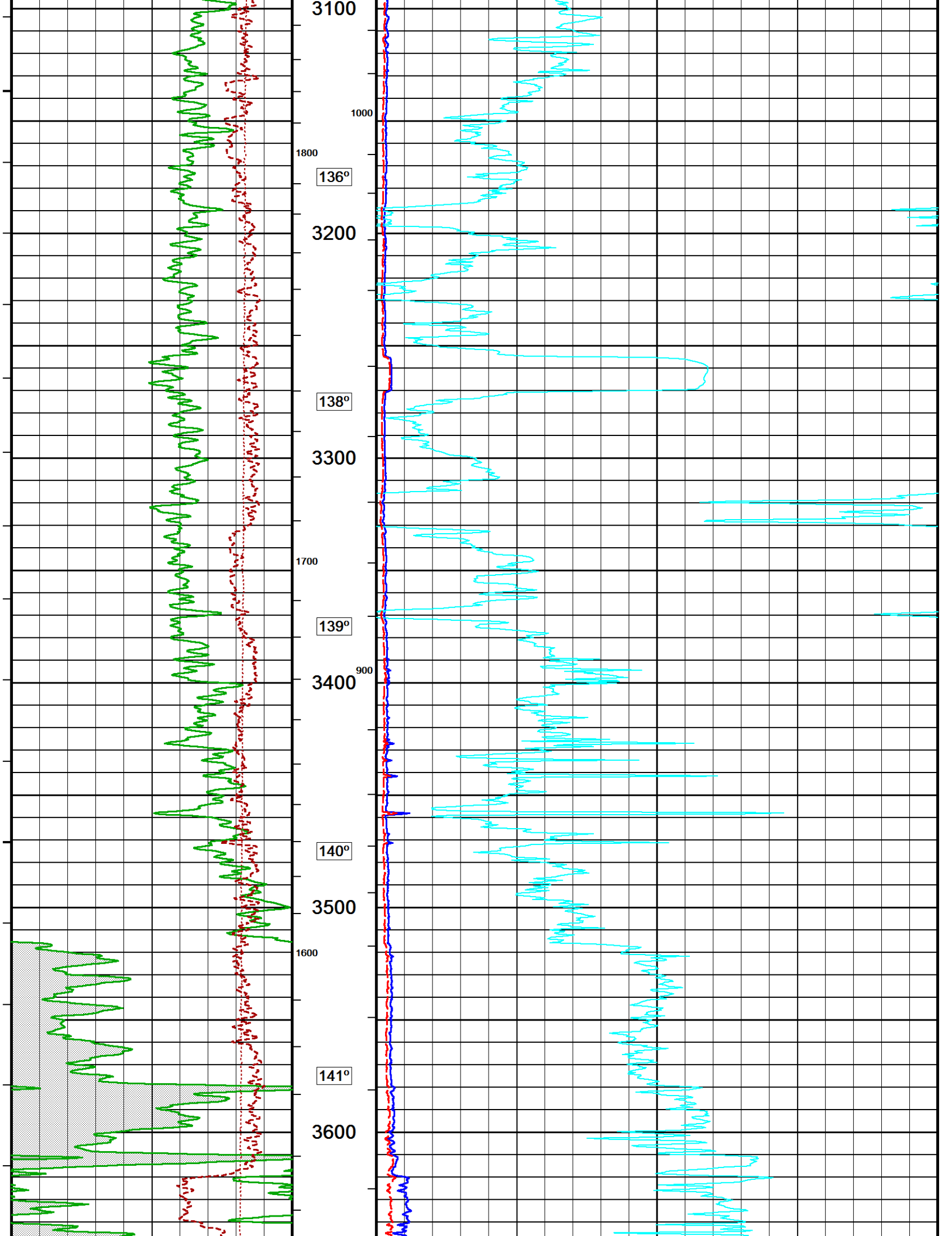


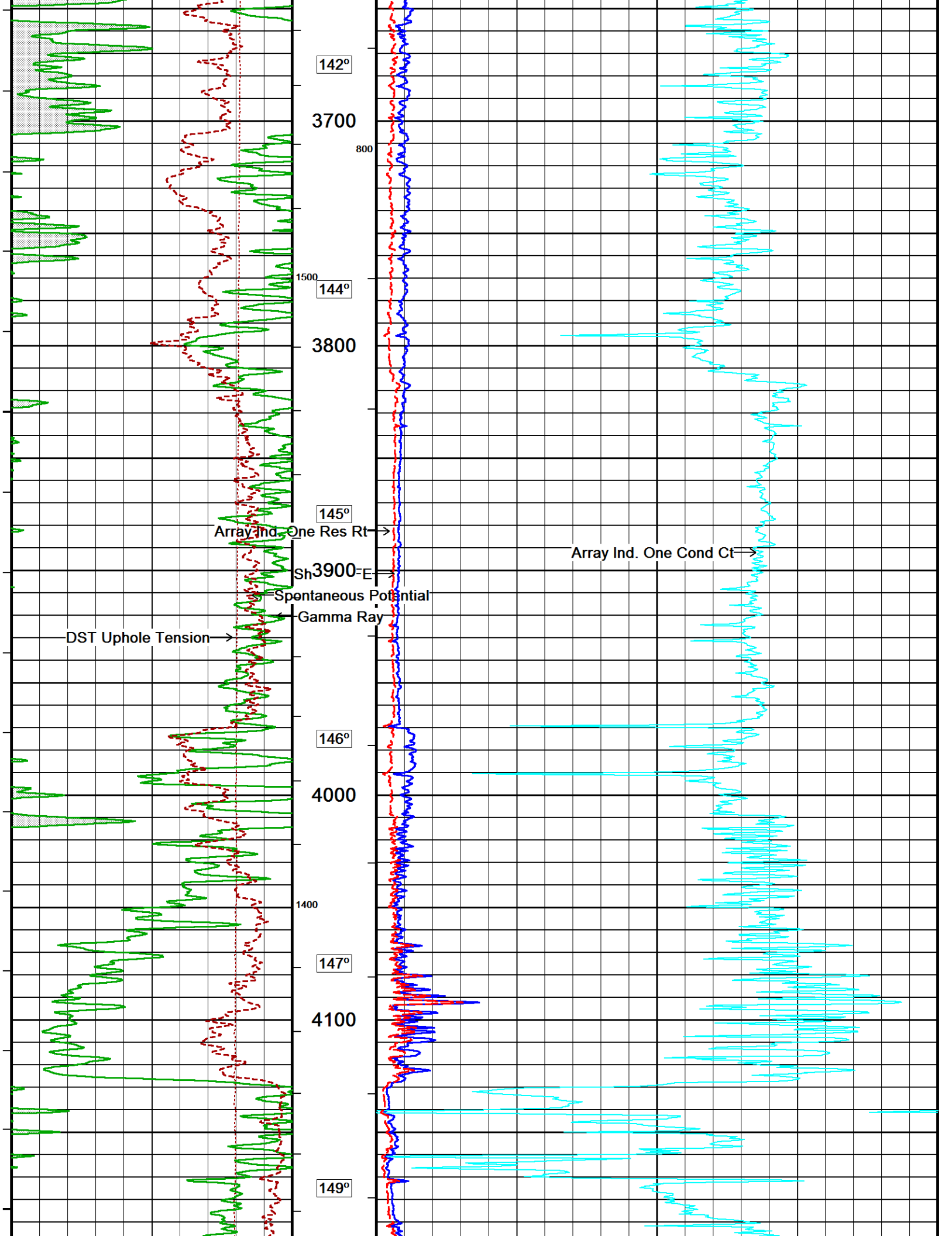


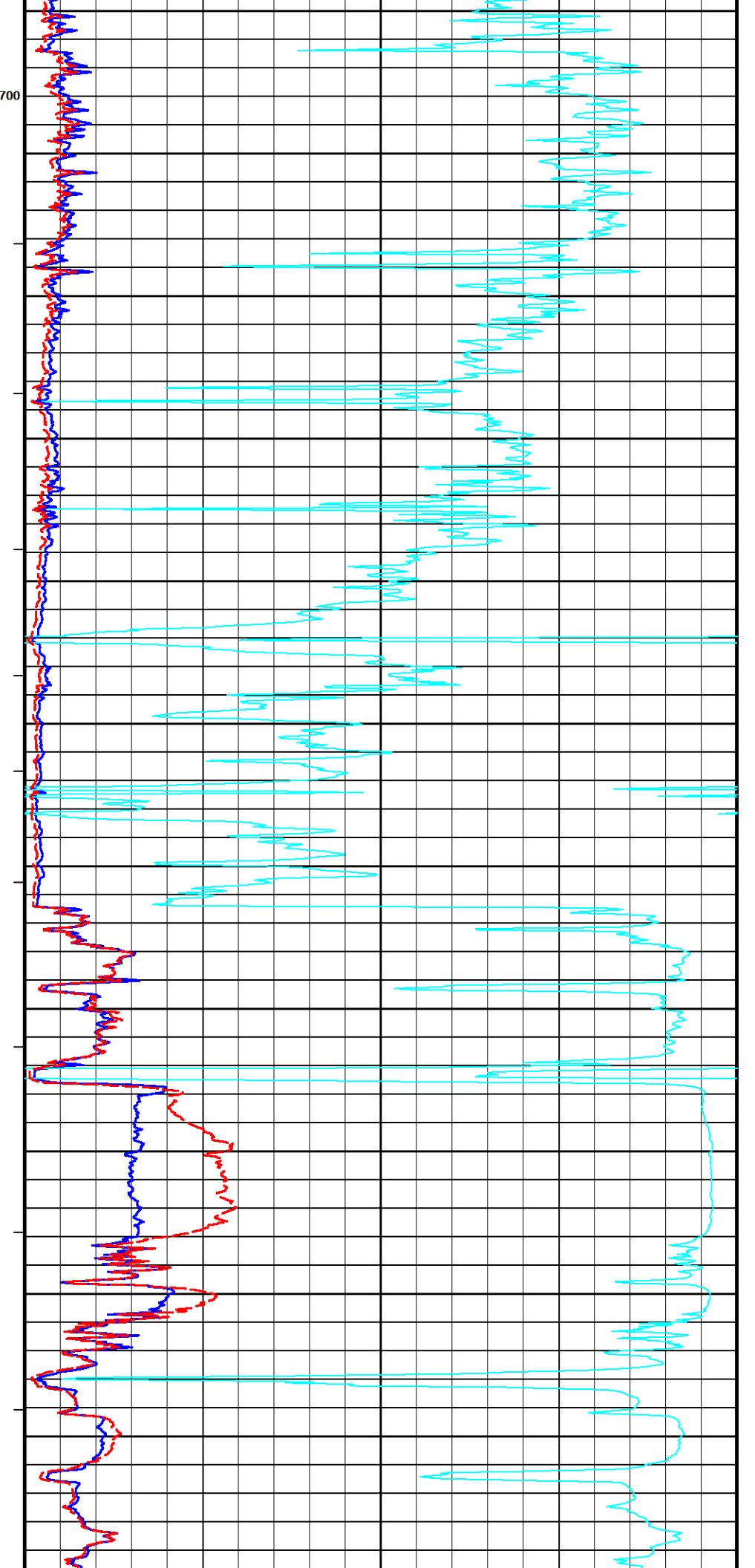
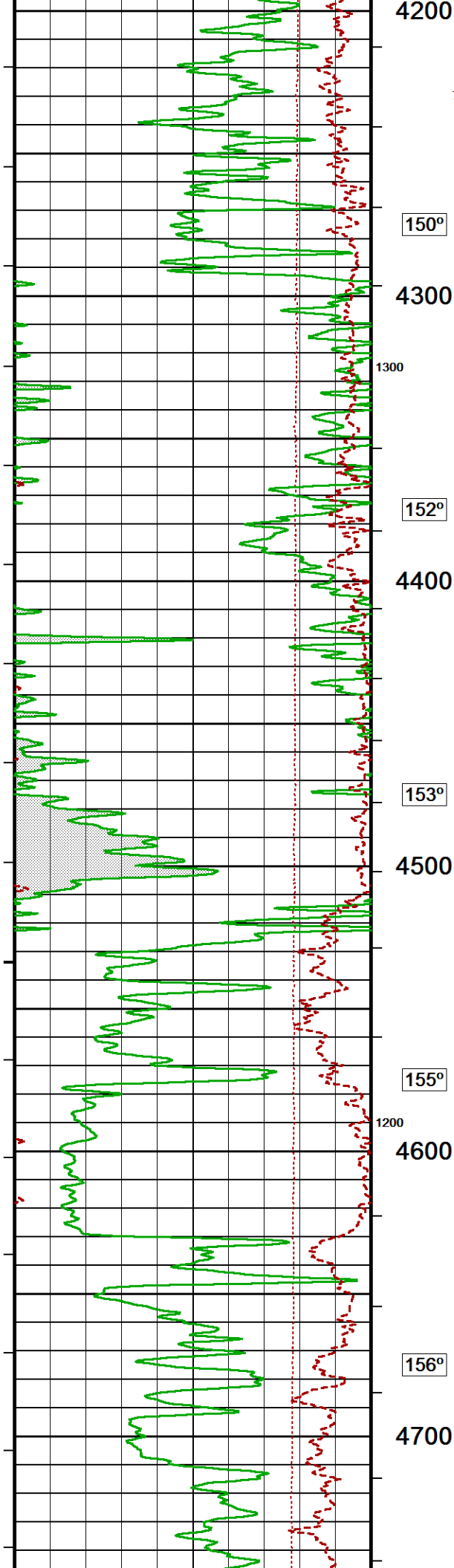


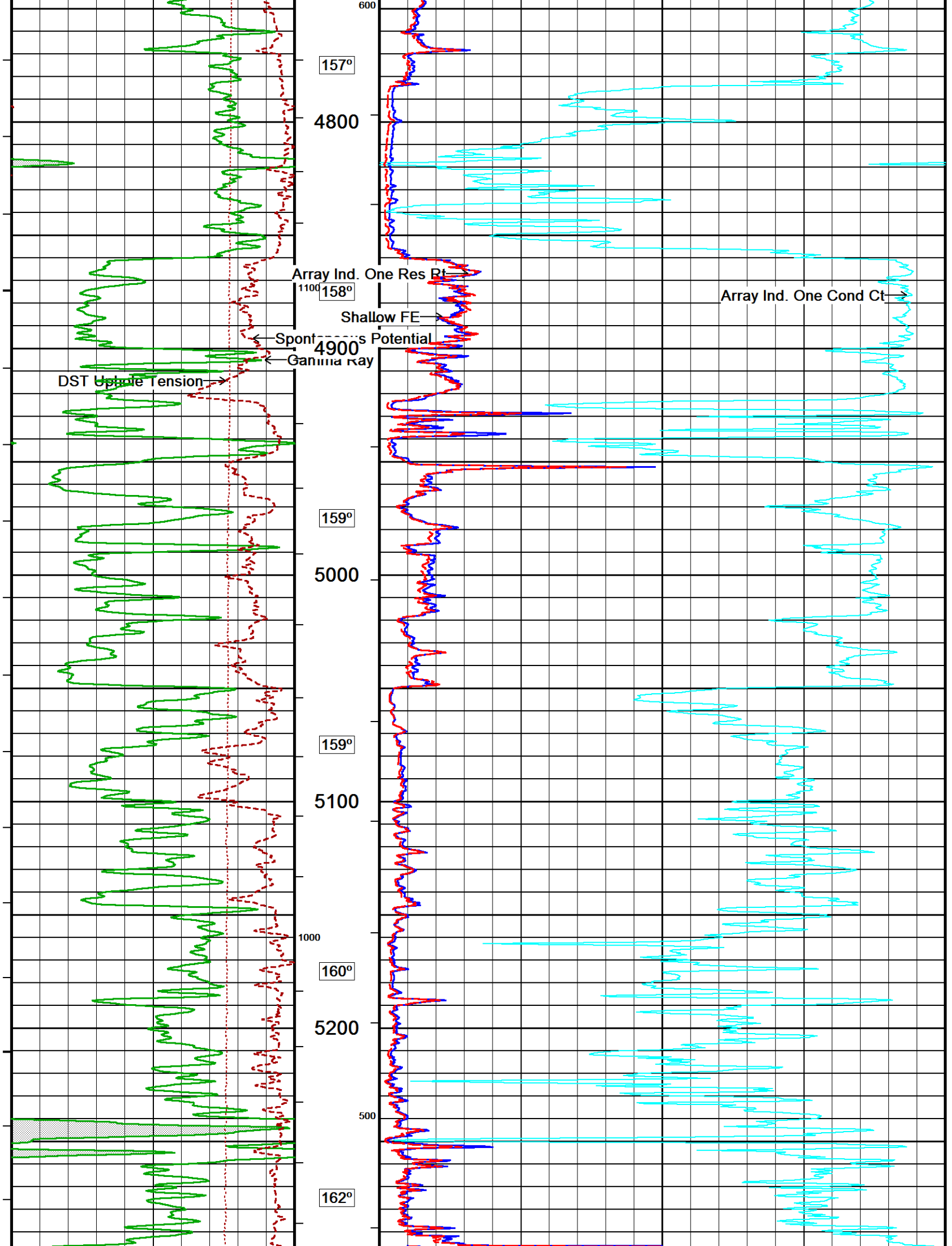


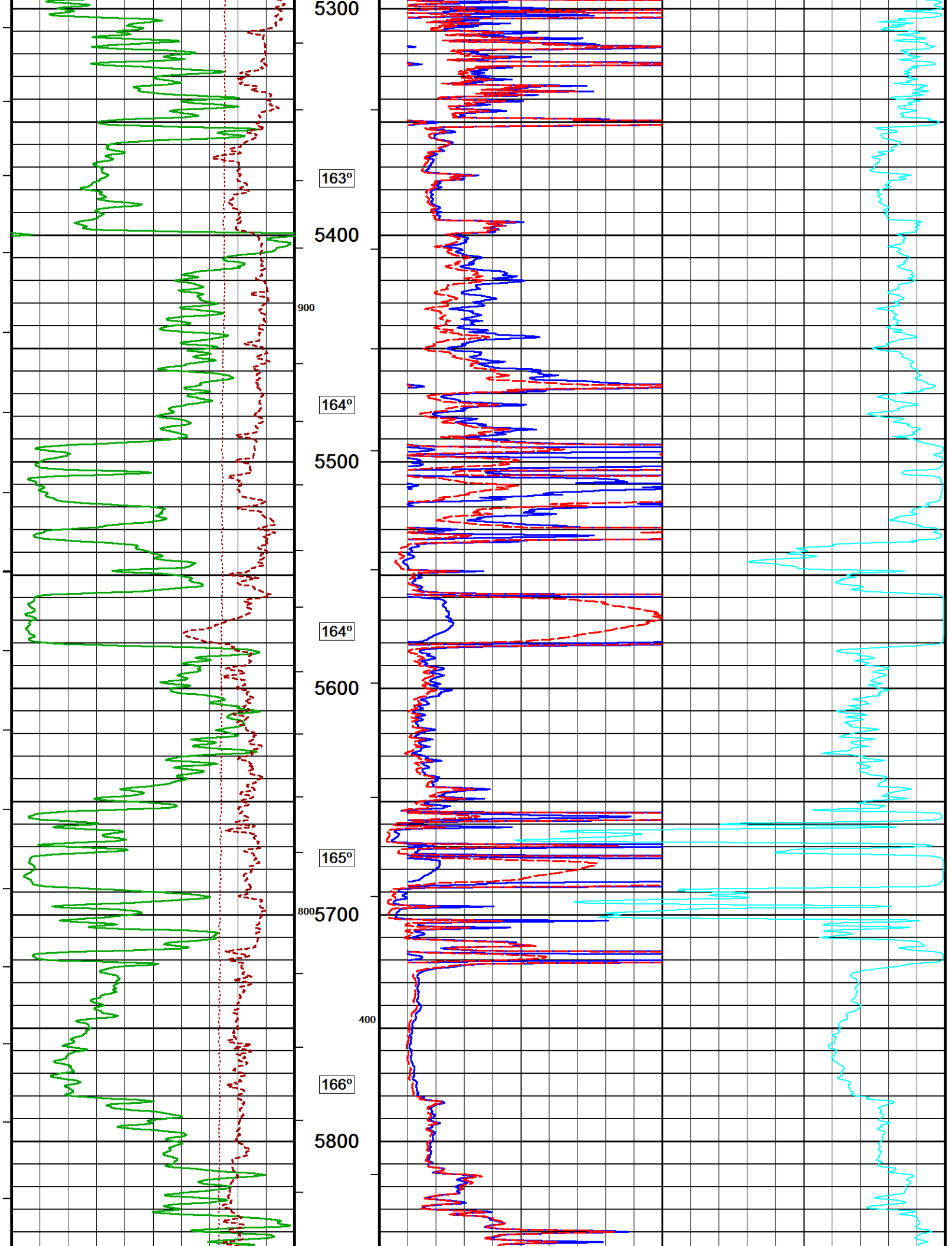


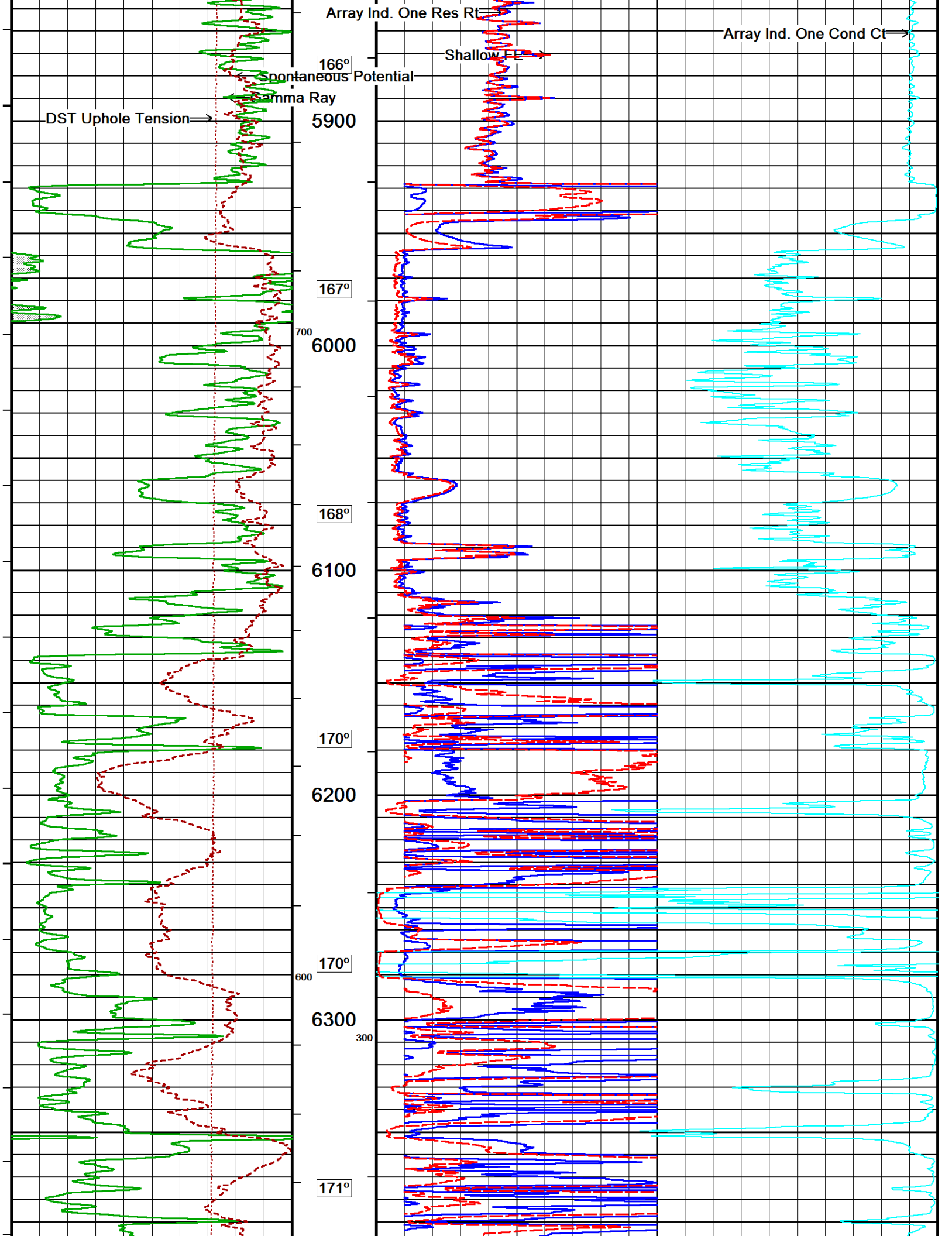


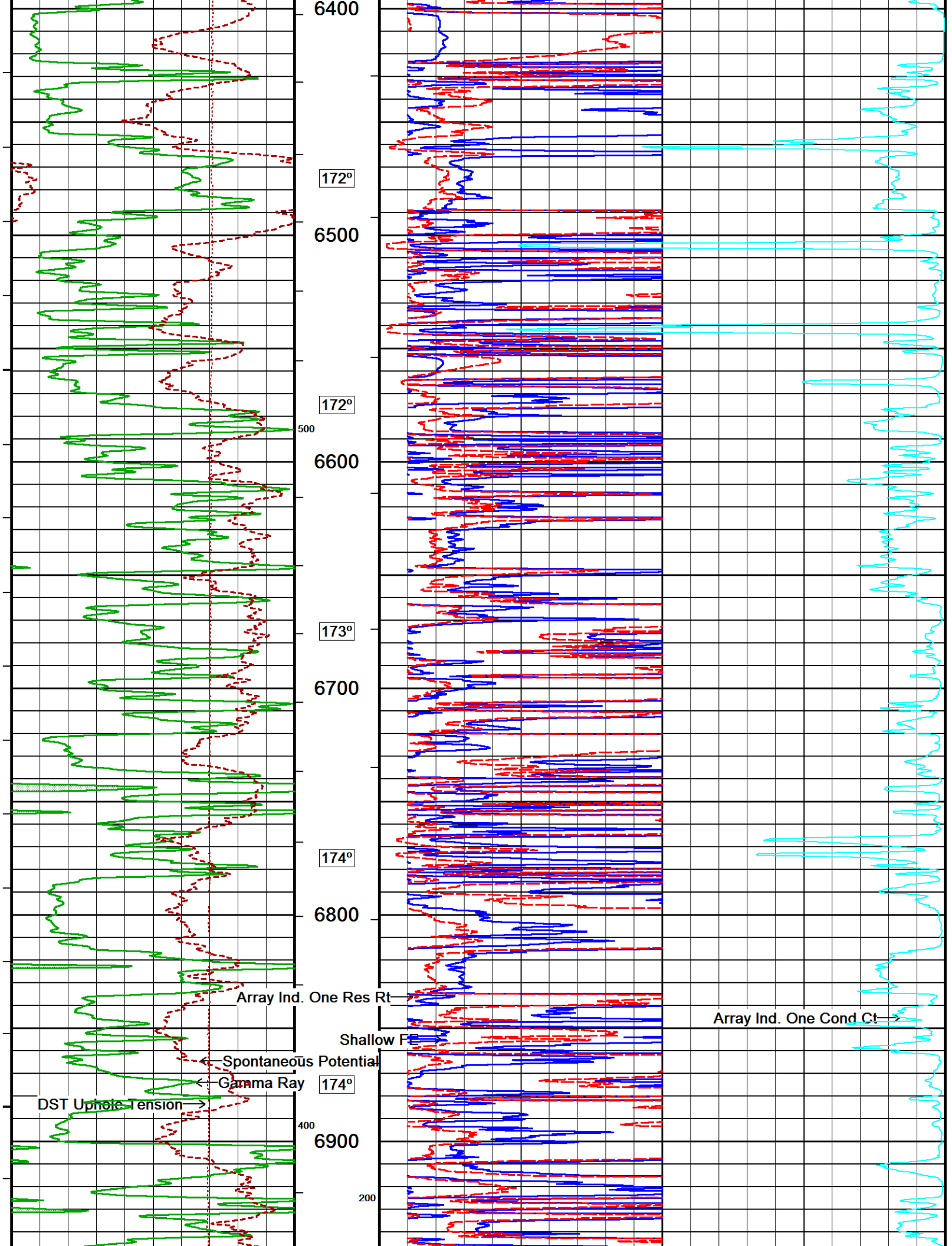


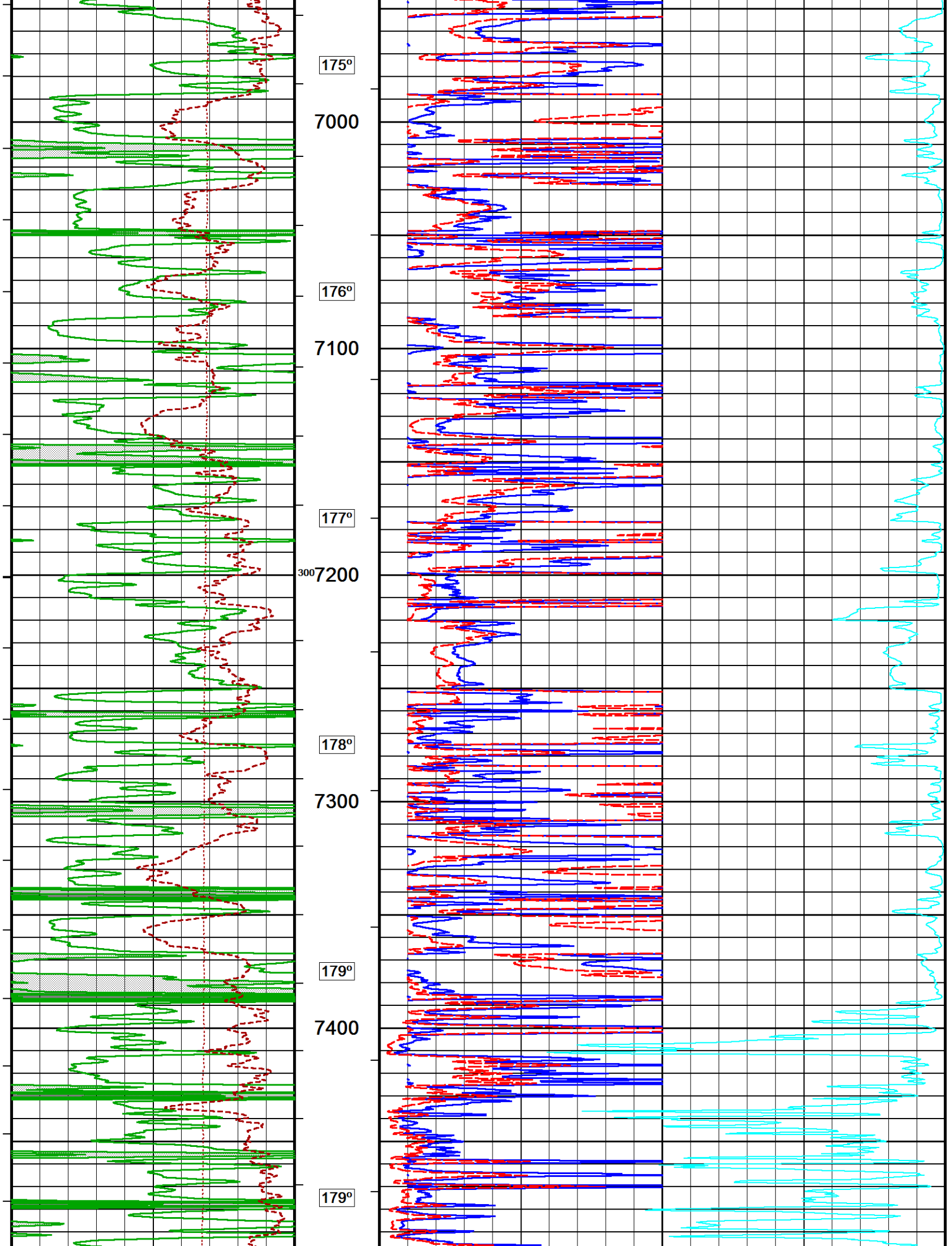


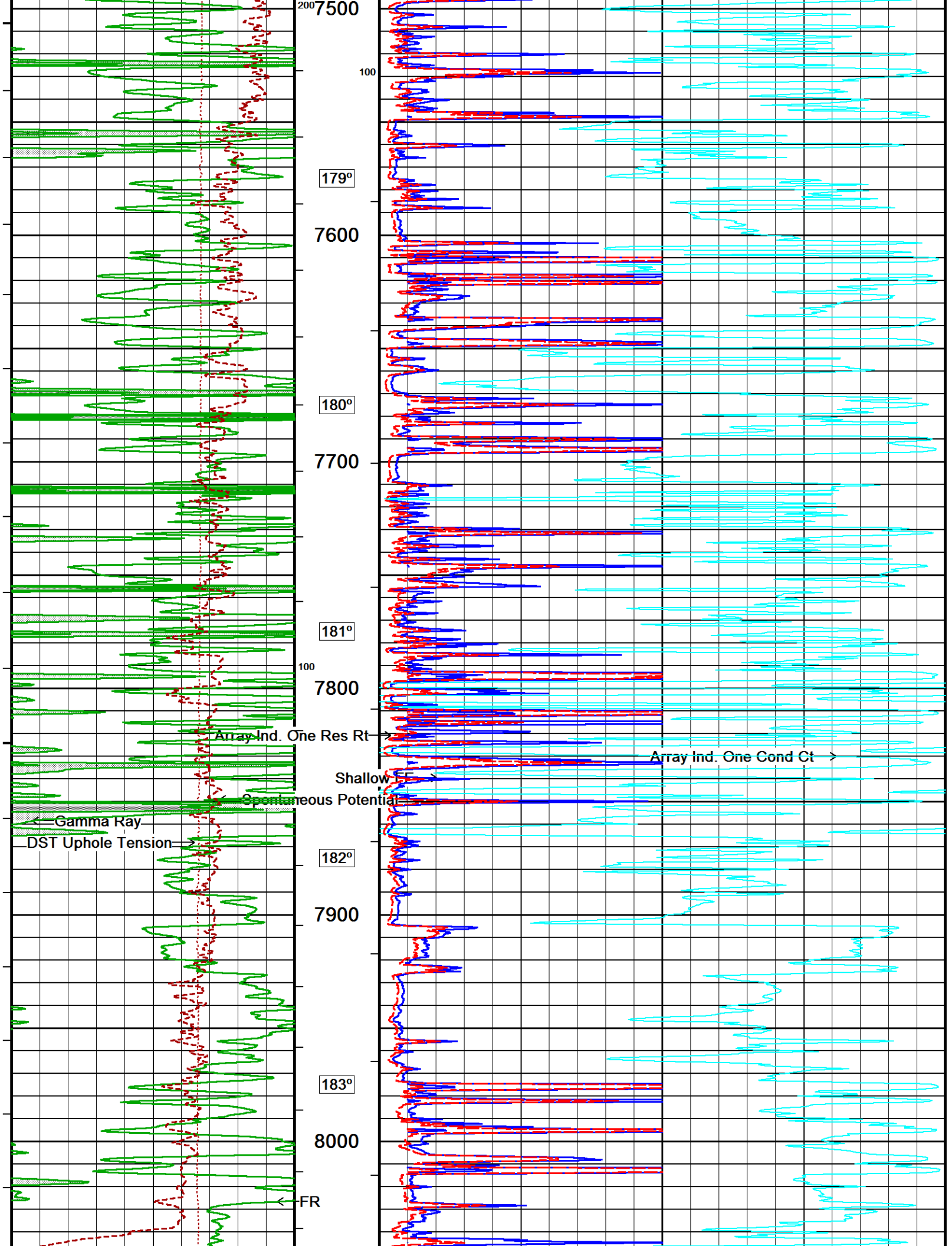


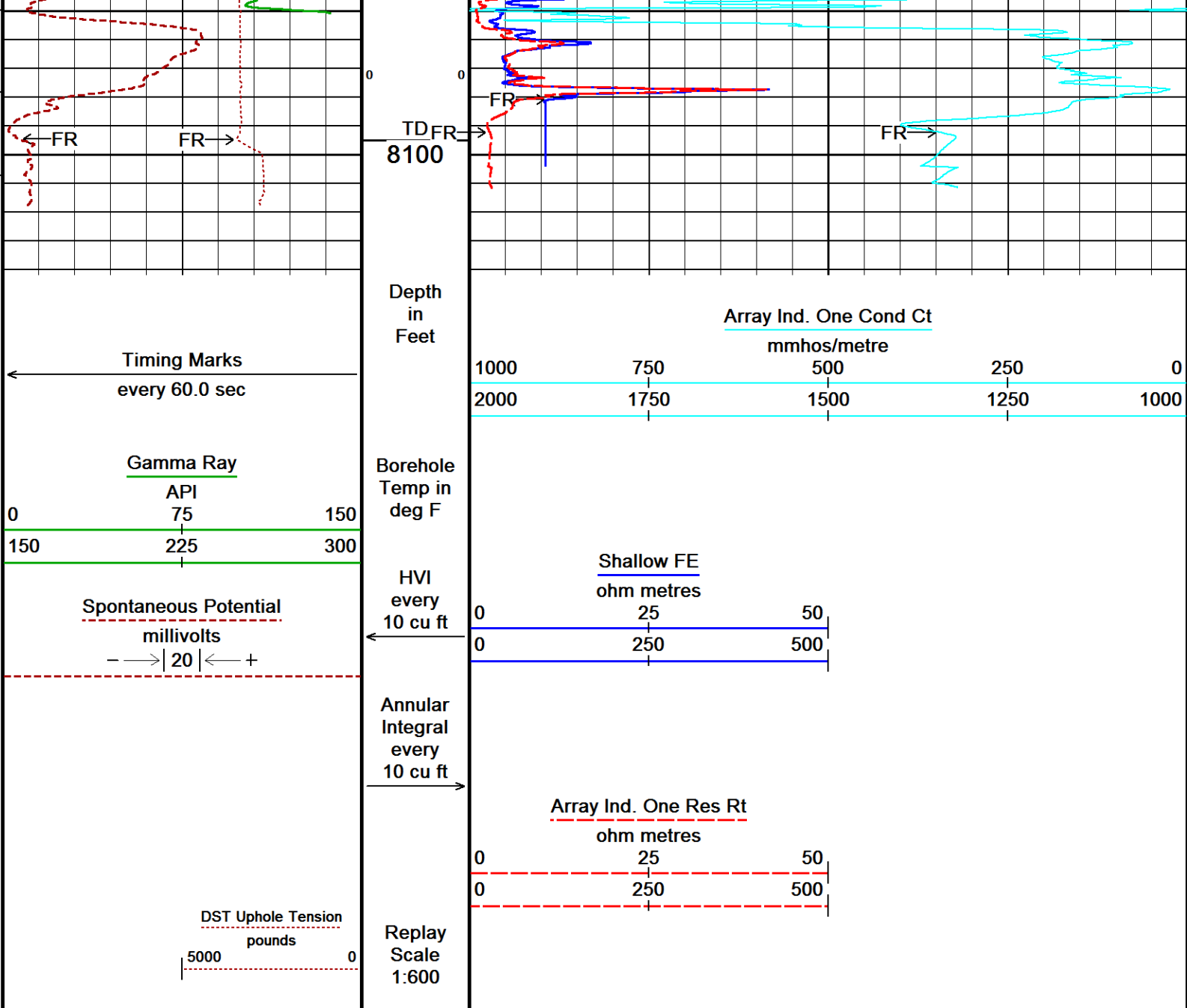












Depth Based Data - Maximum Sampling Increment 10.0cm

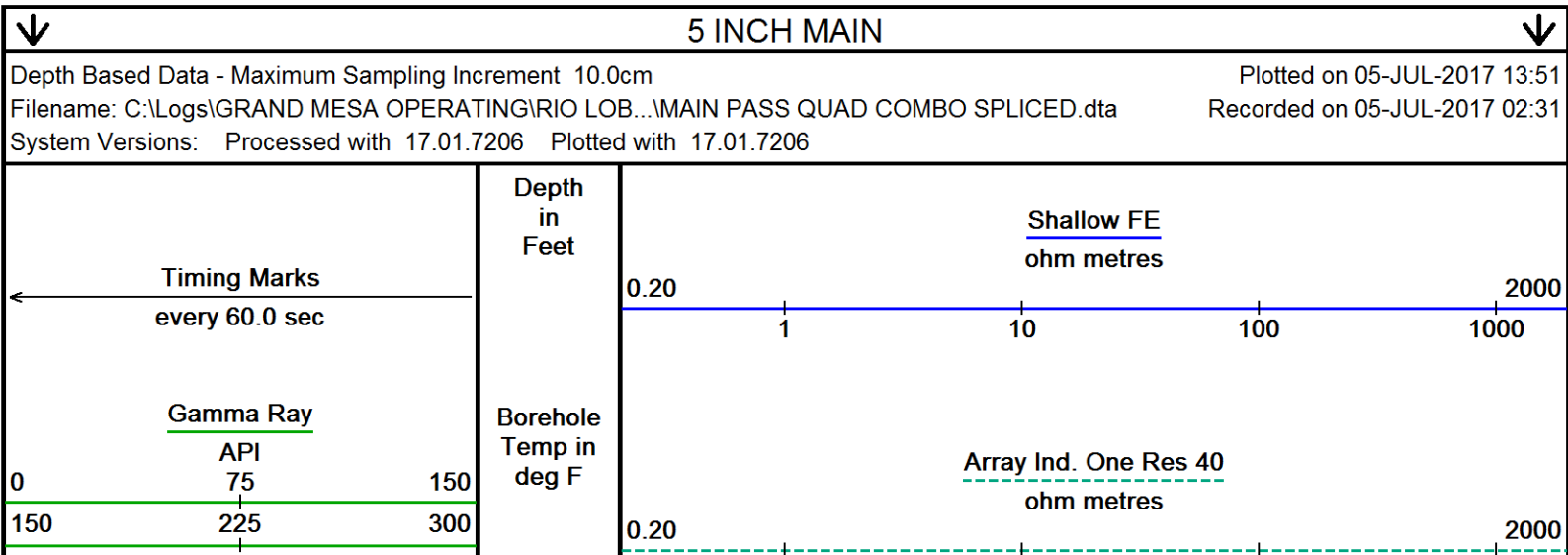
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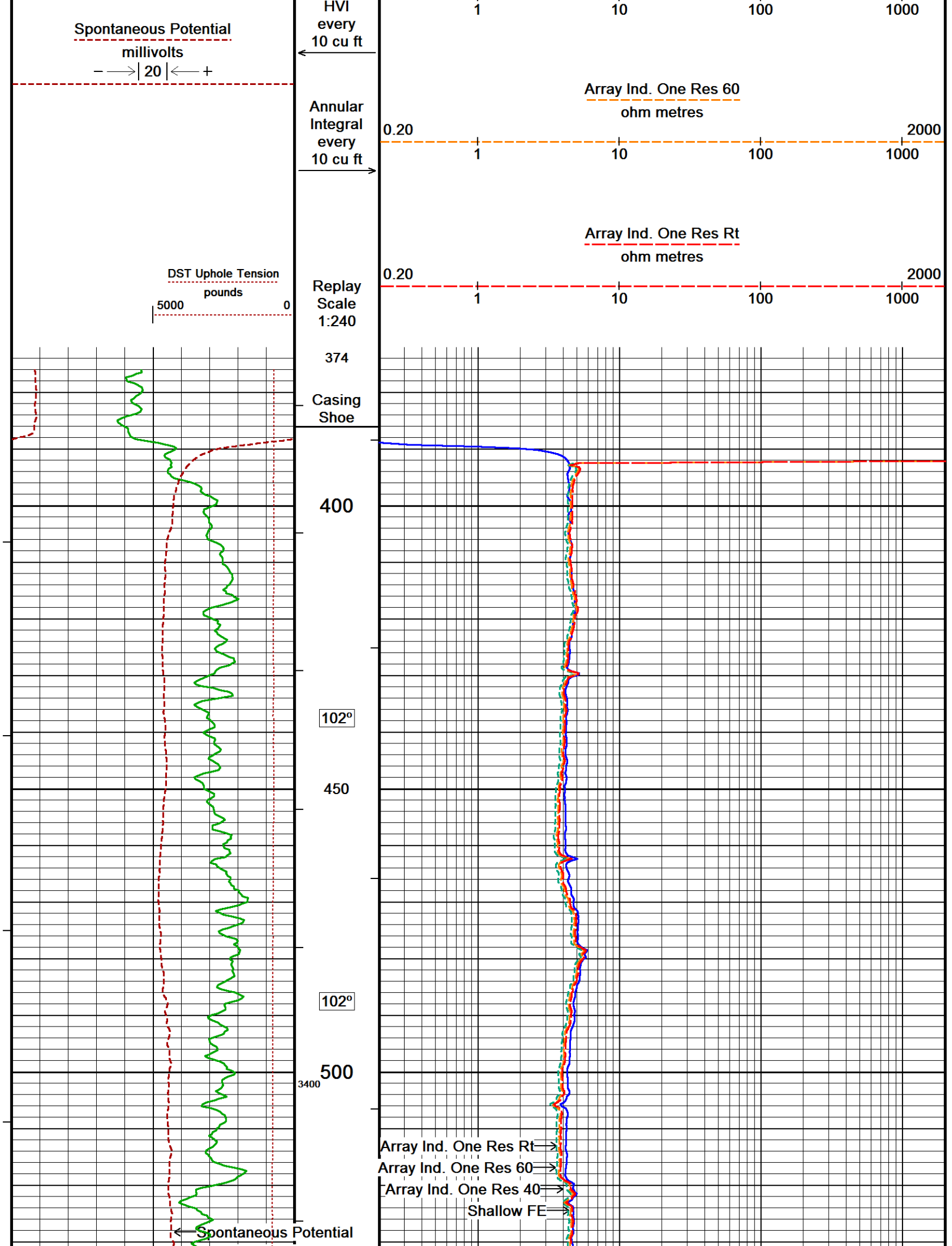
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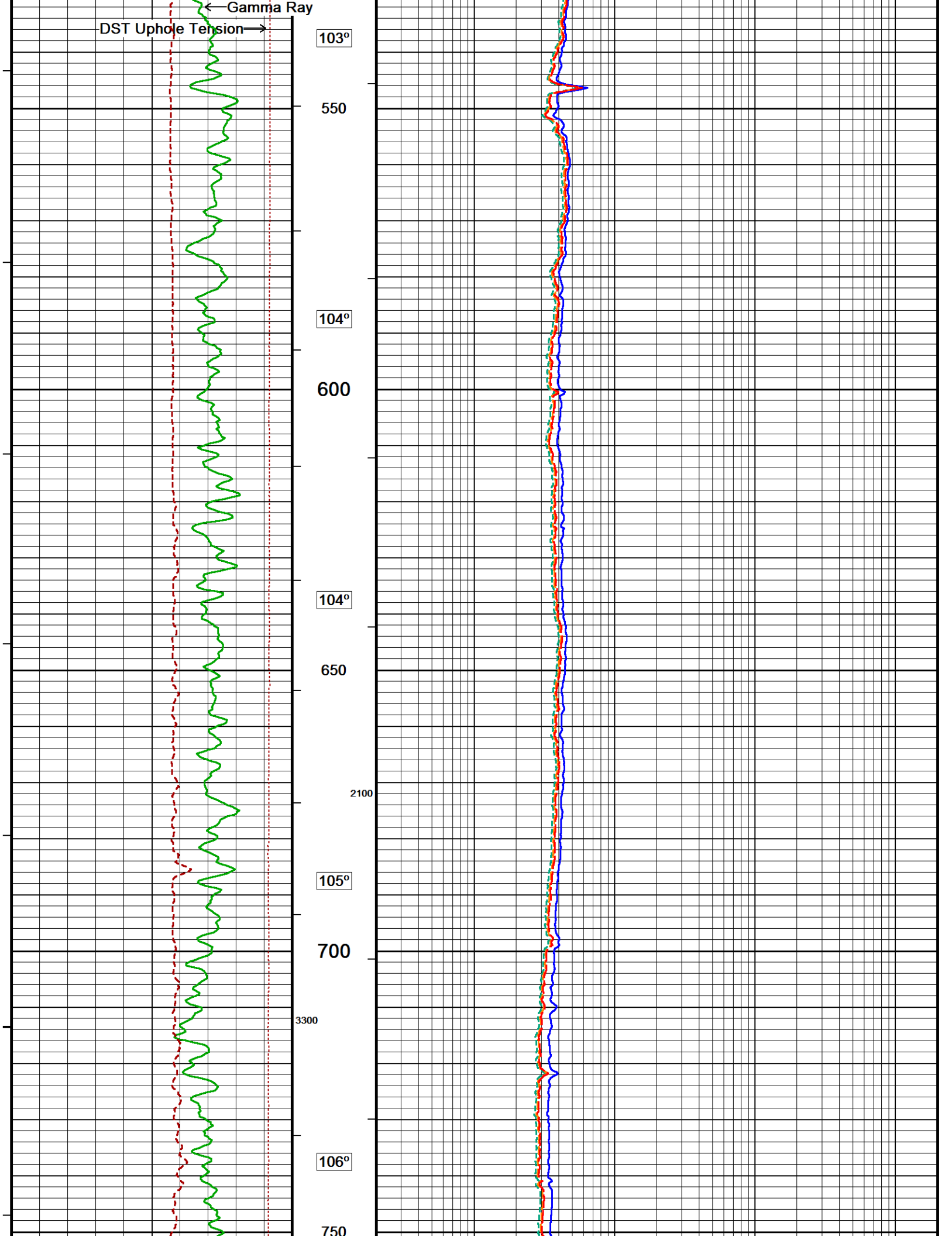
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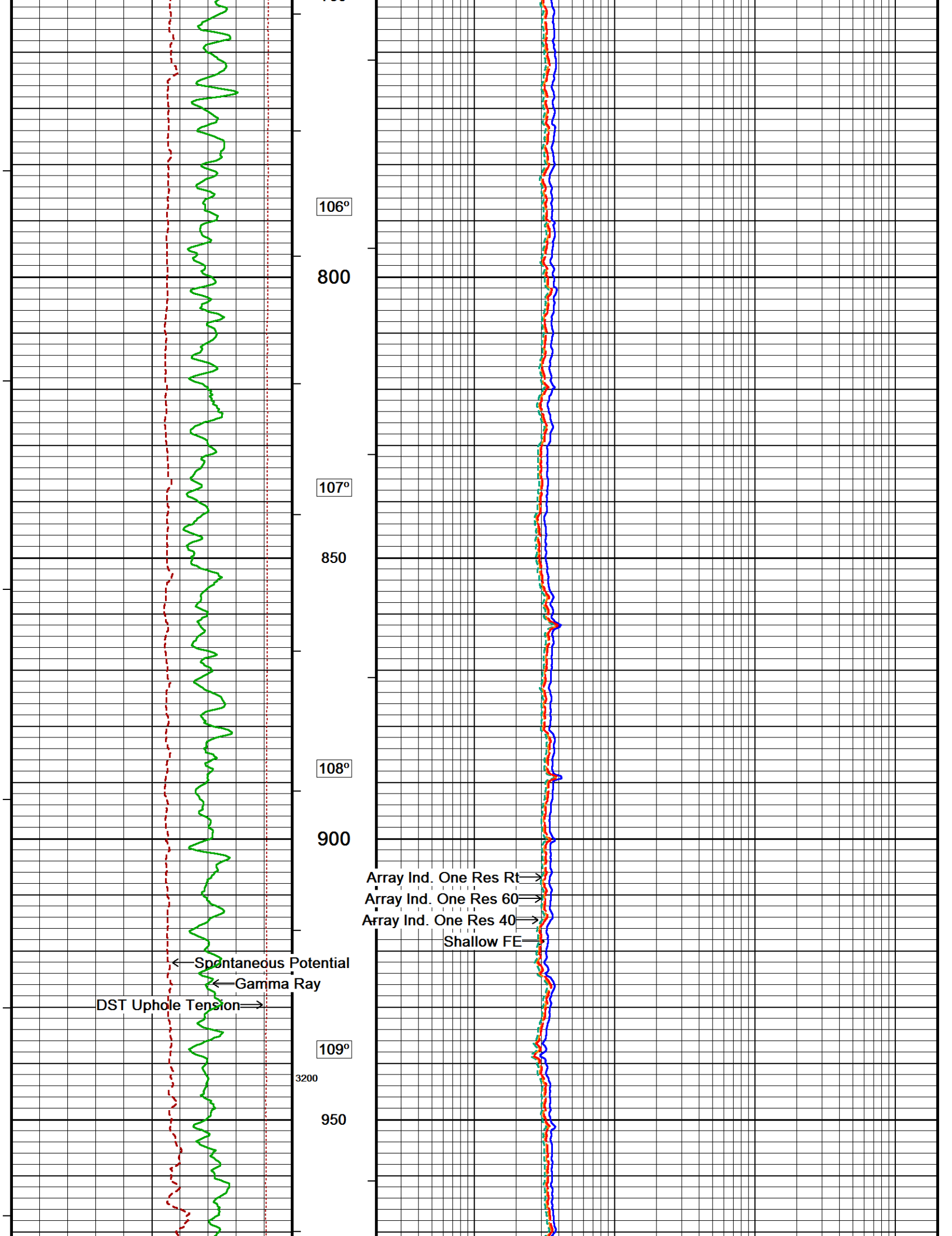
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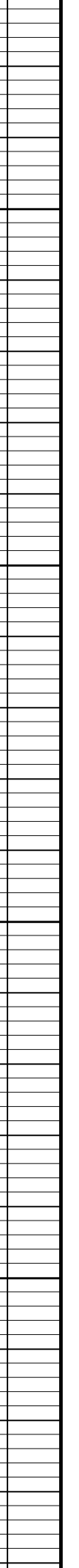
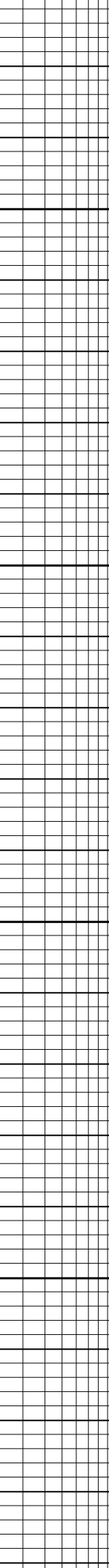
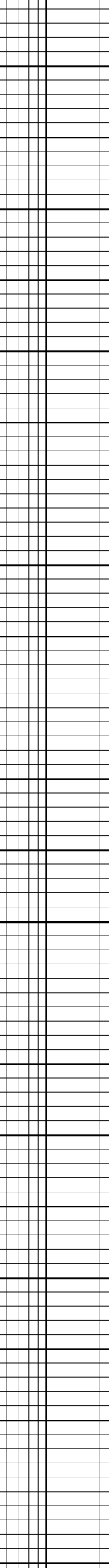
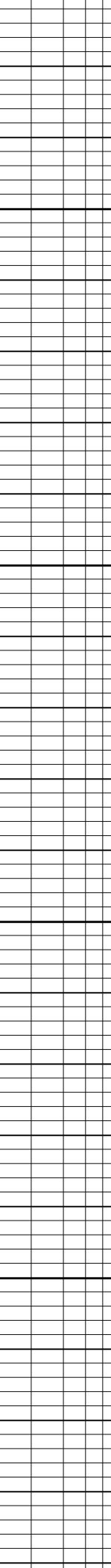
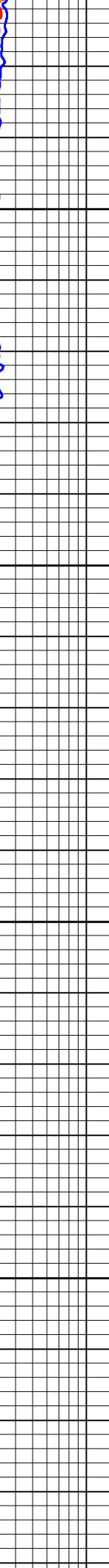
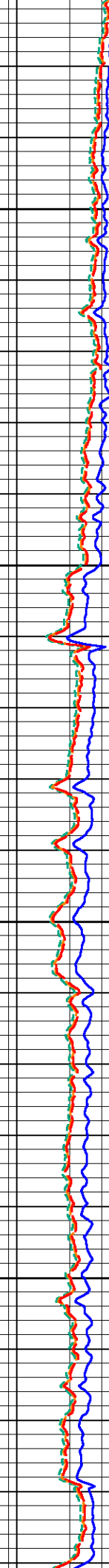
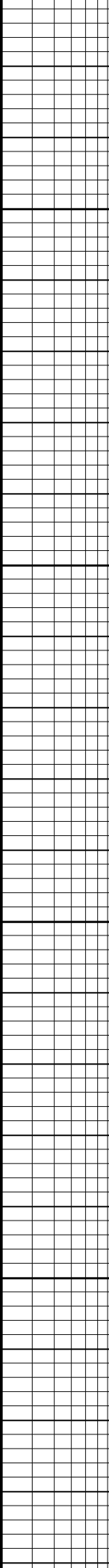
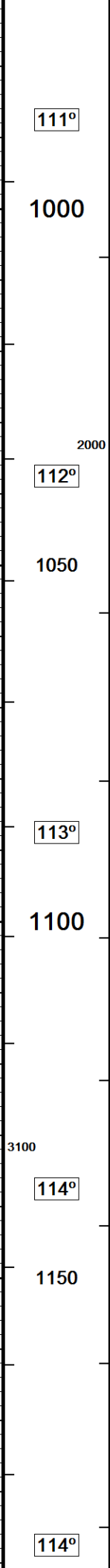
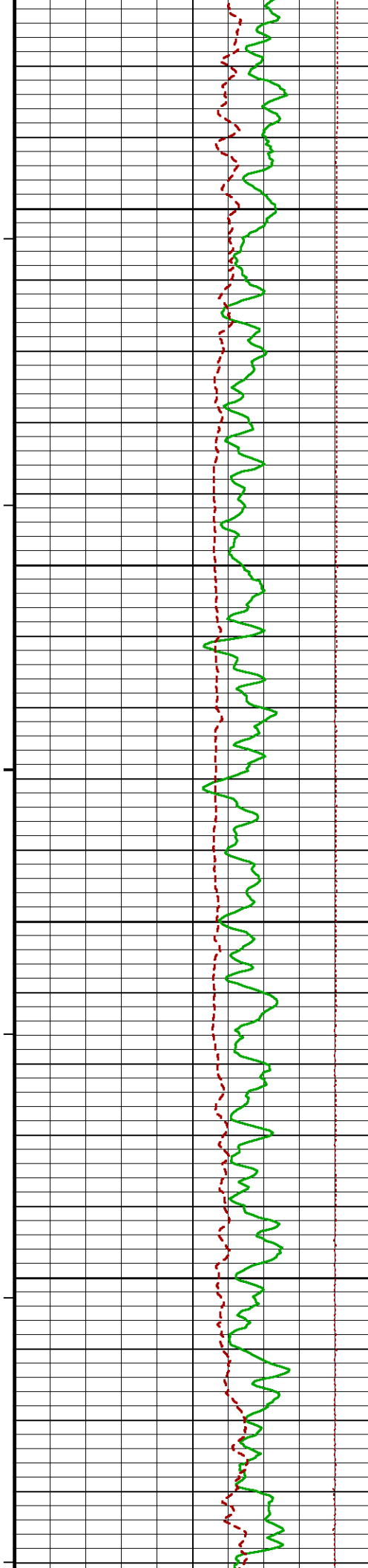
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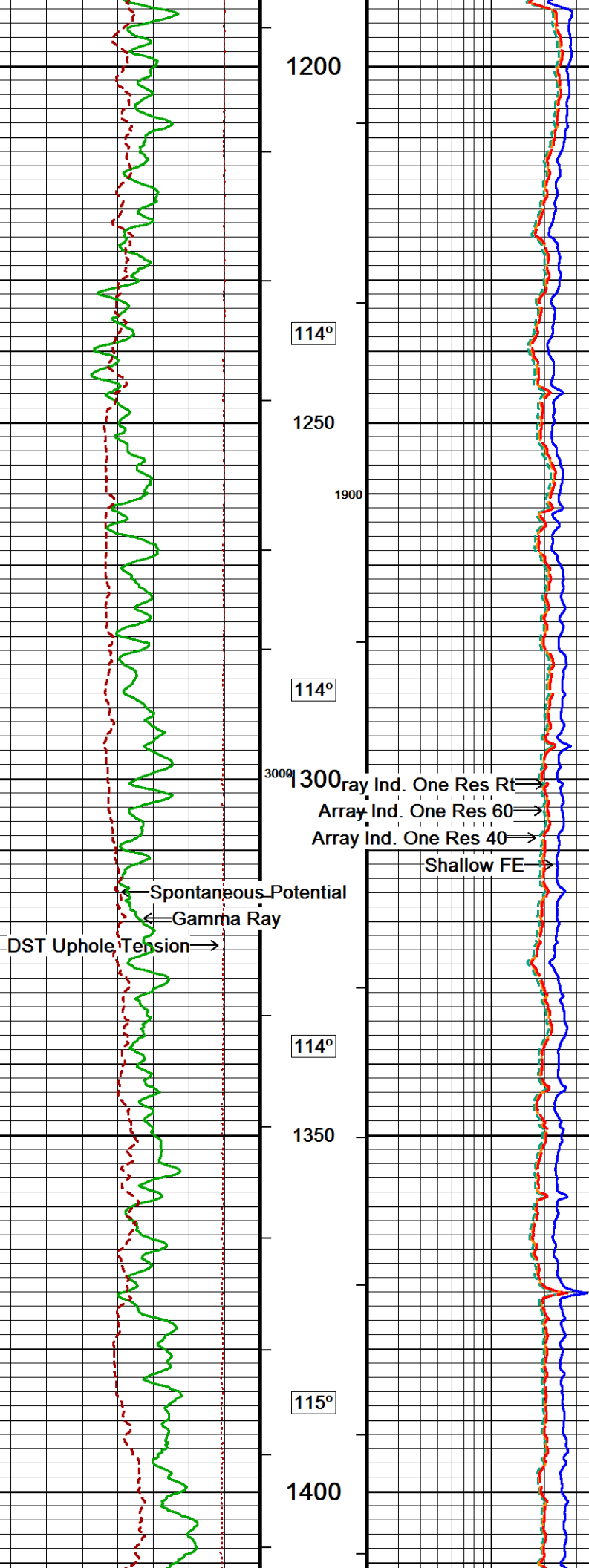


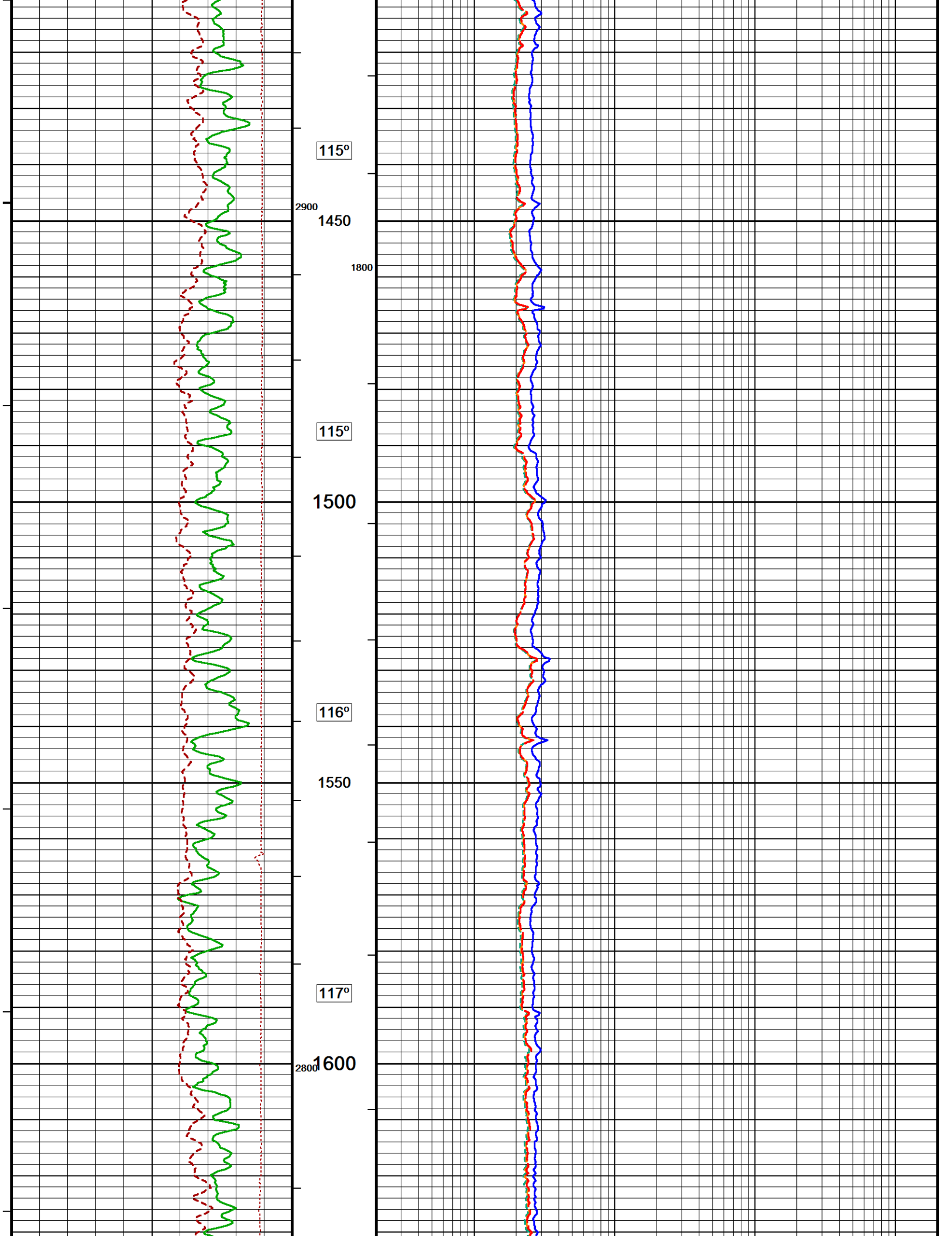


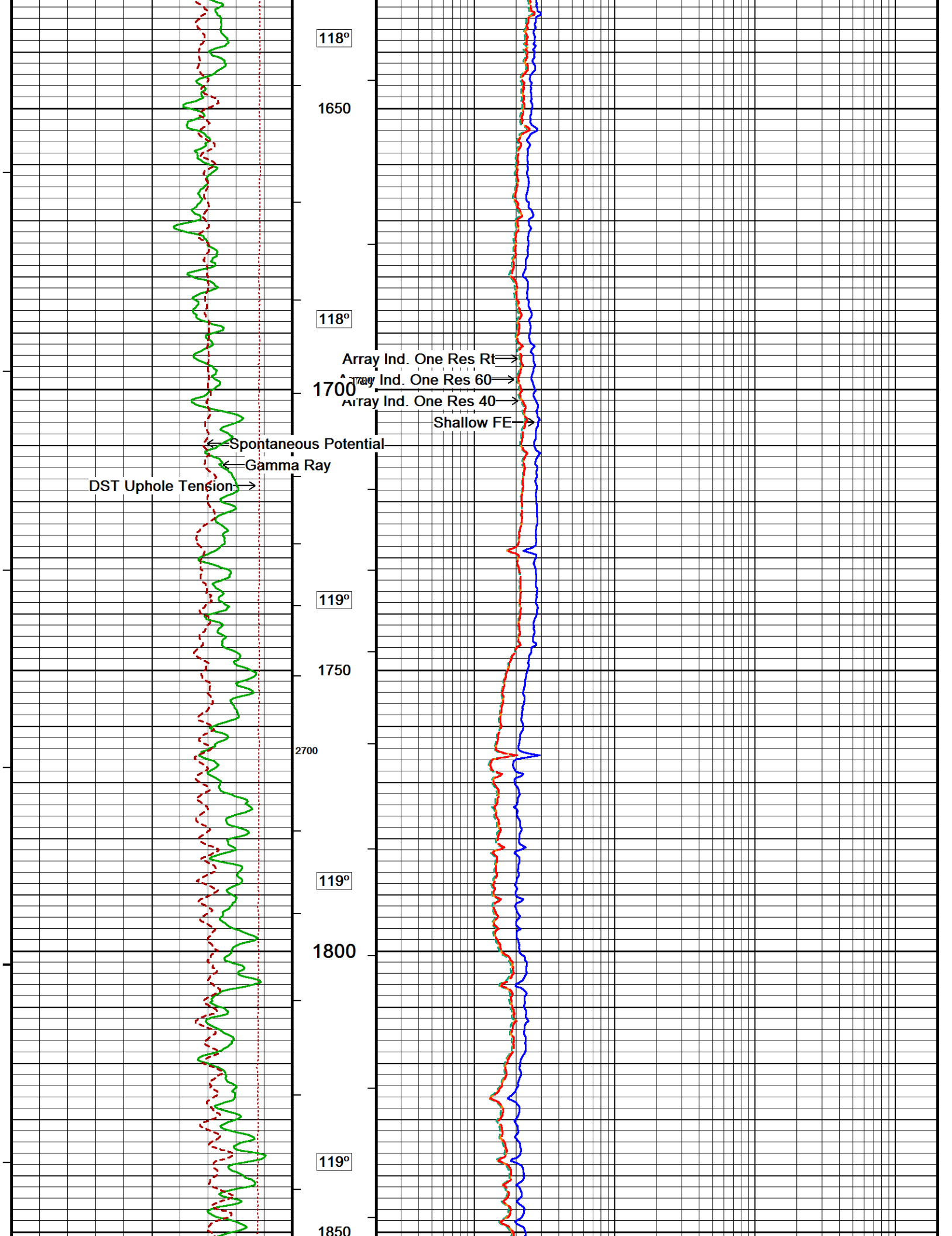


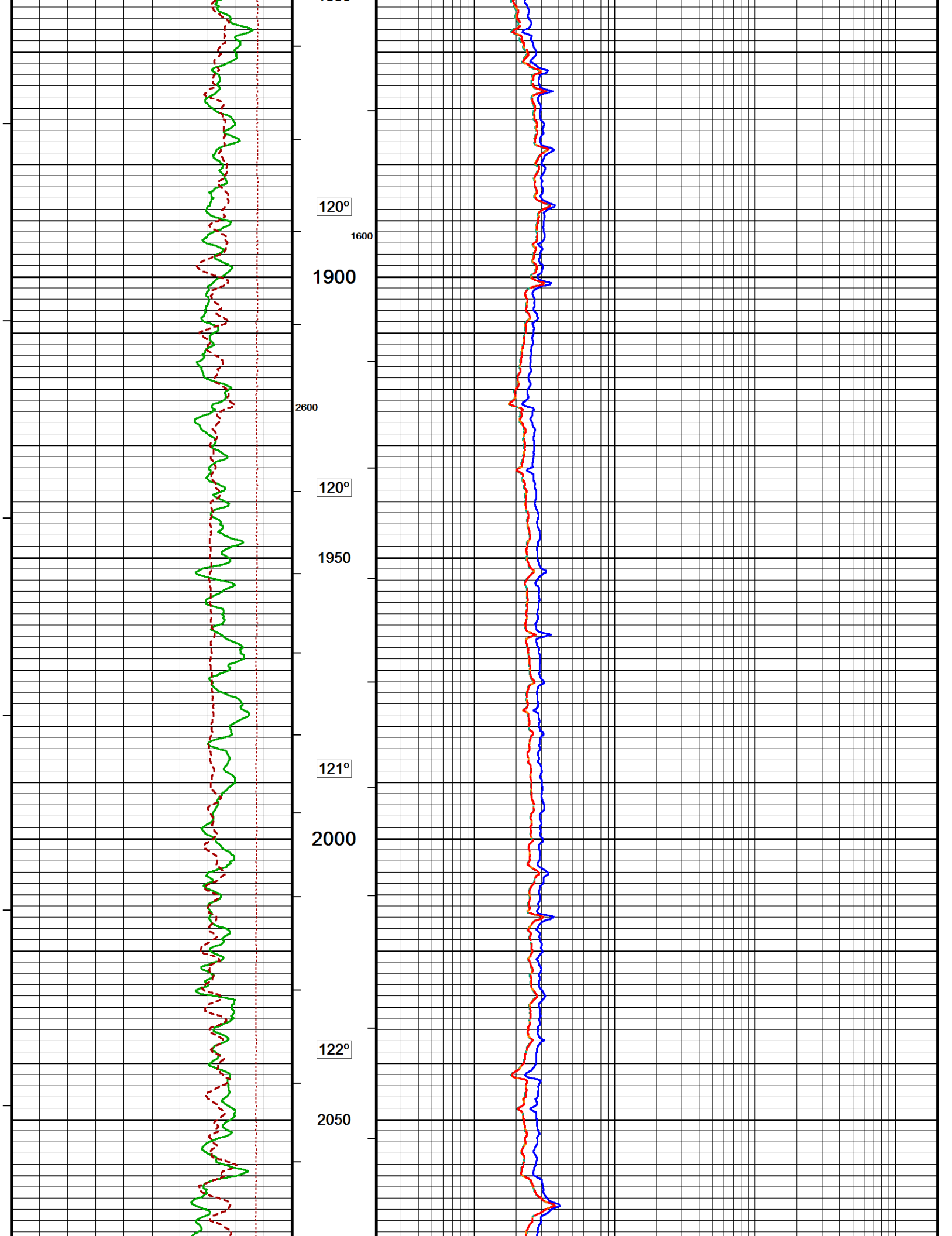


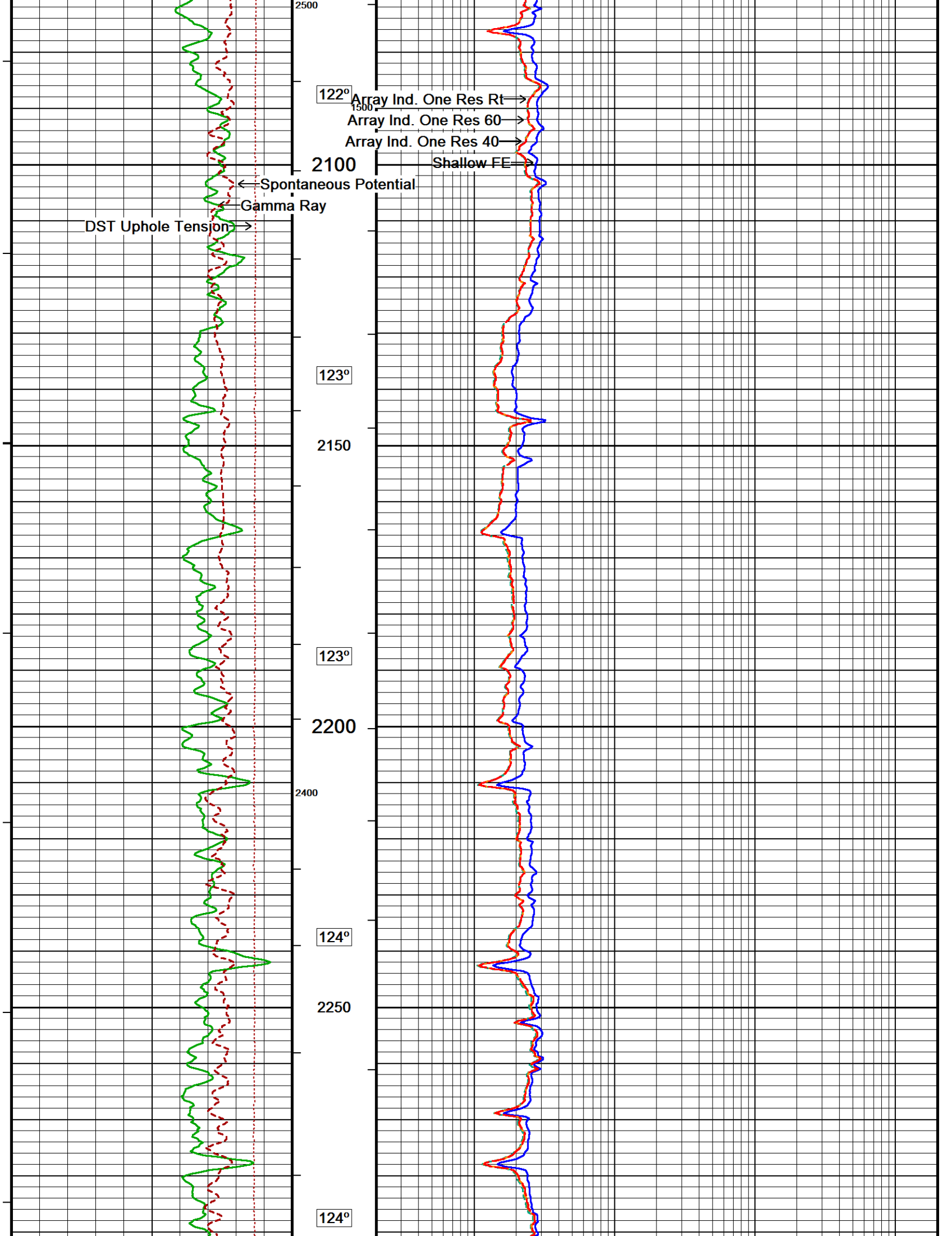


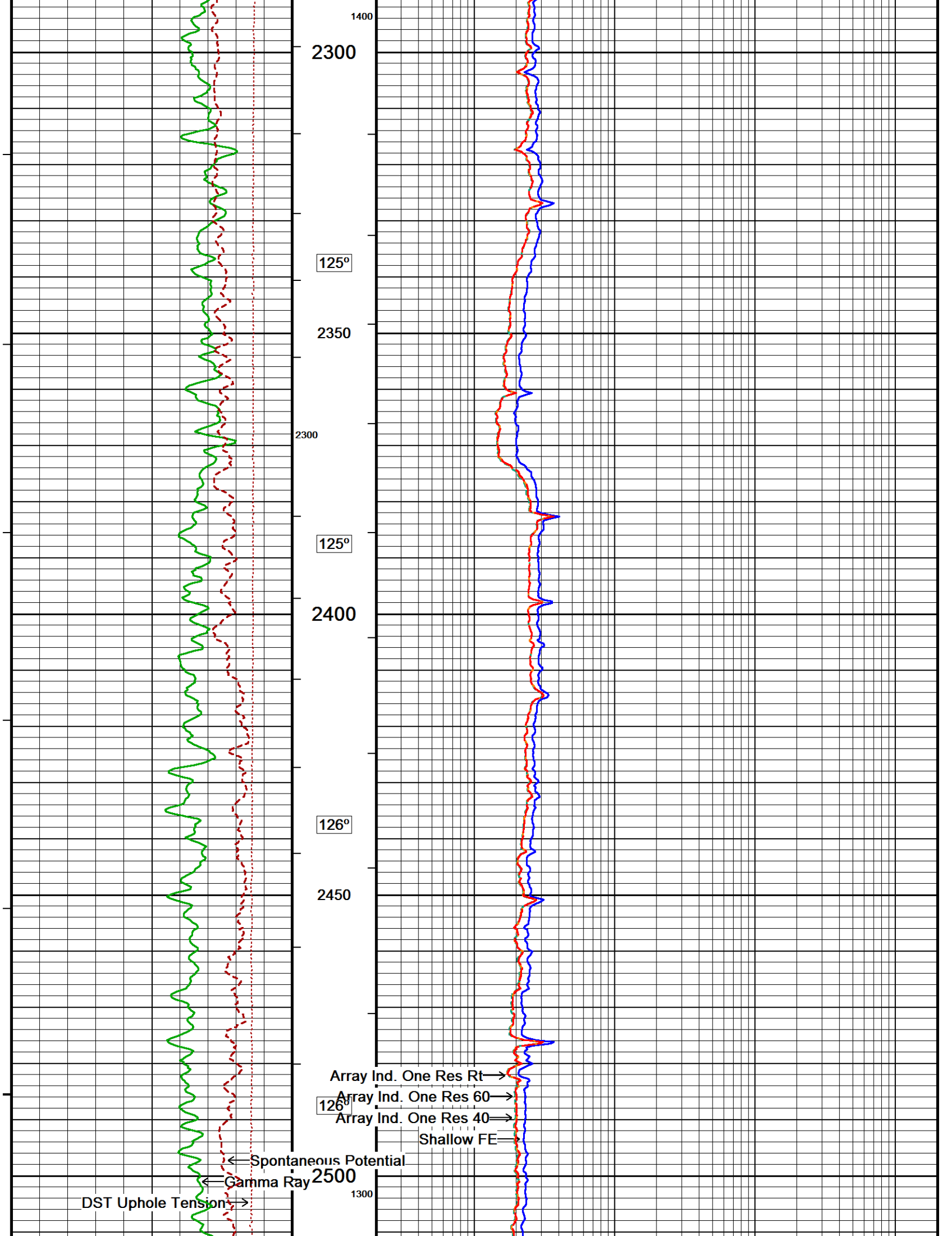


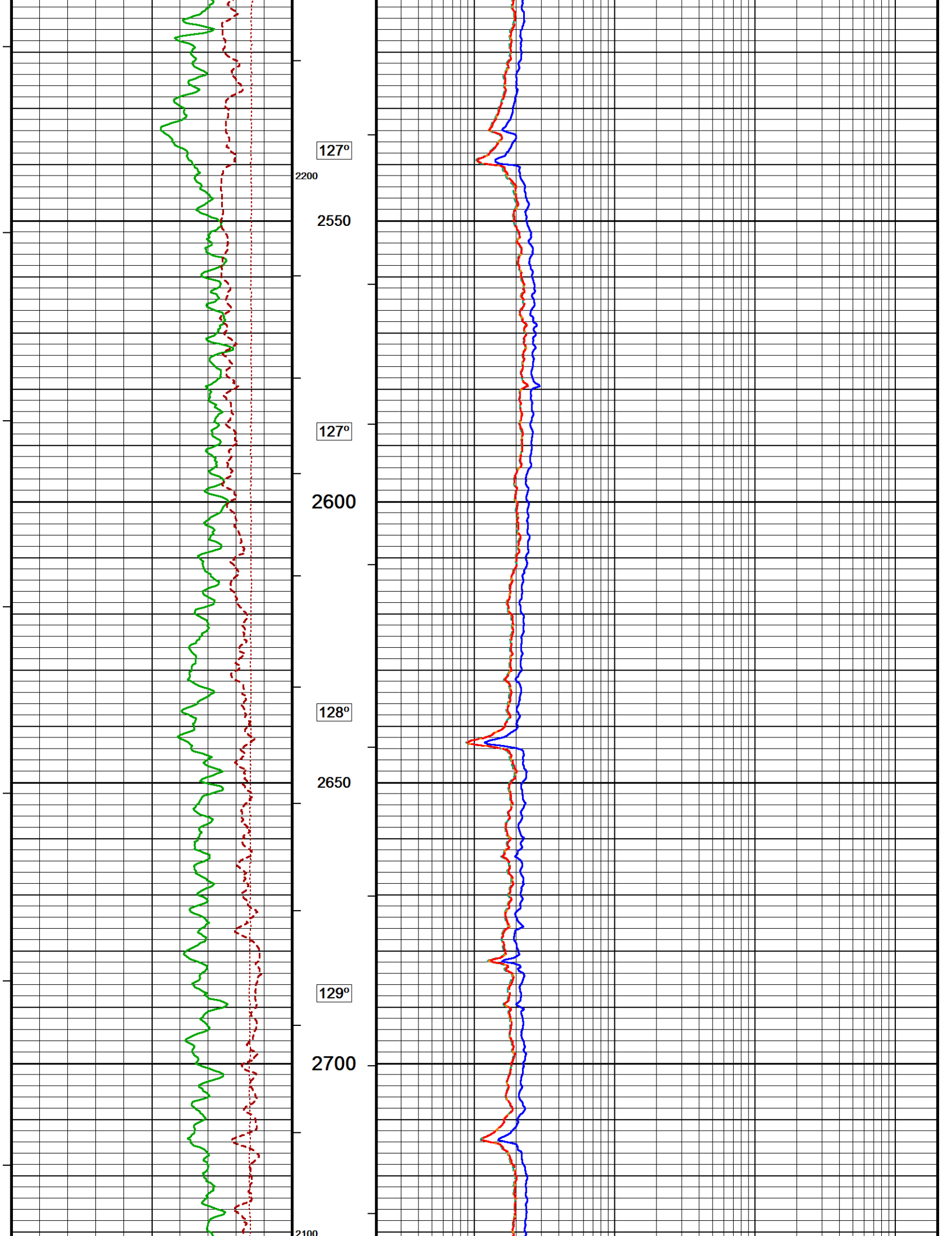


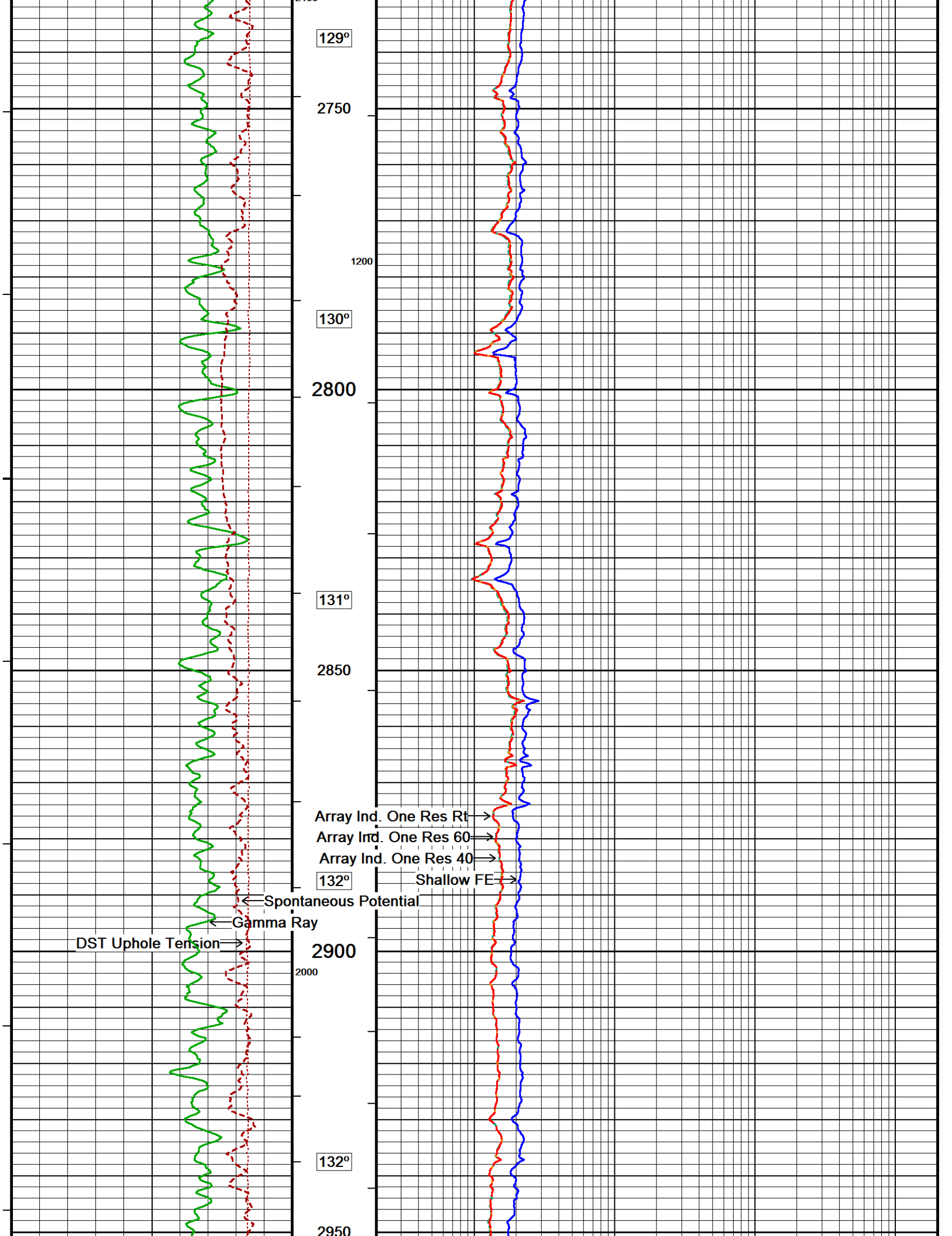


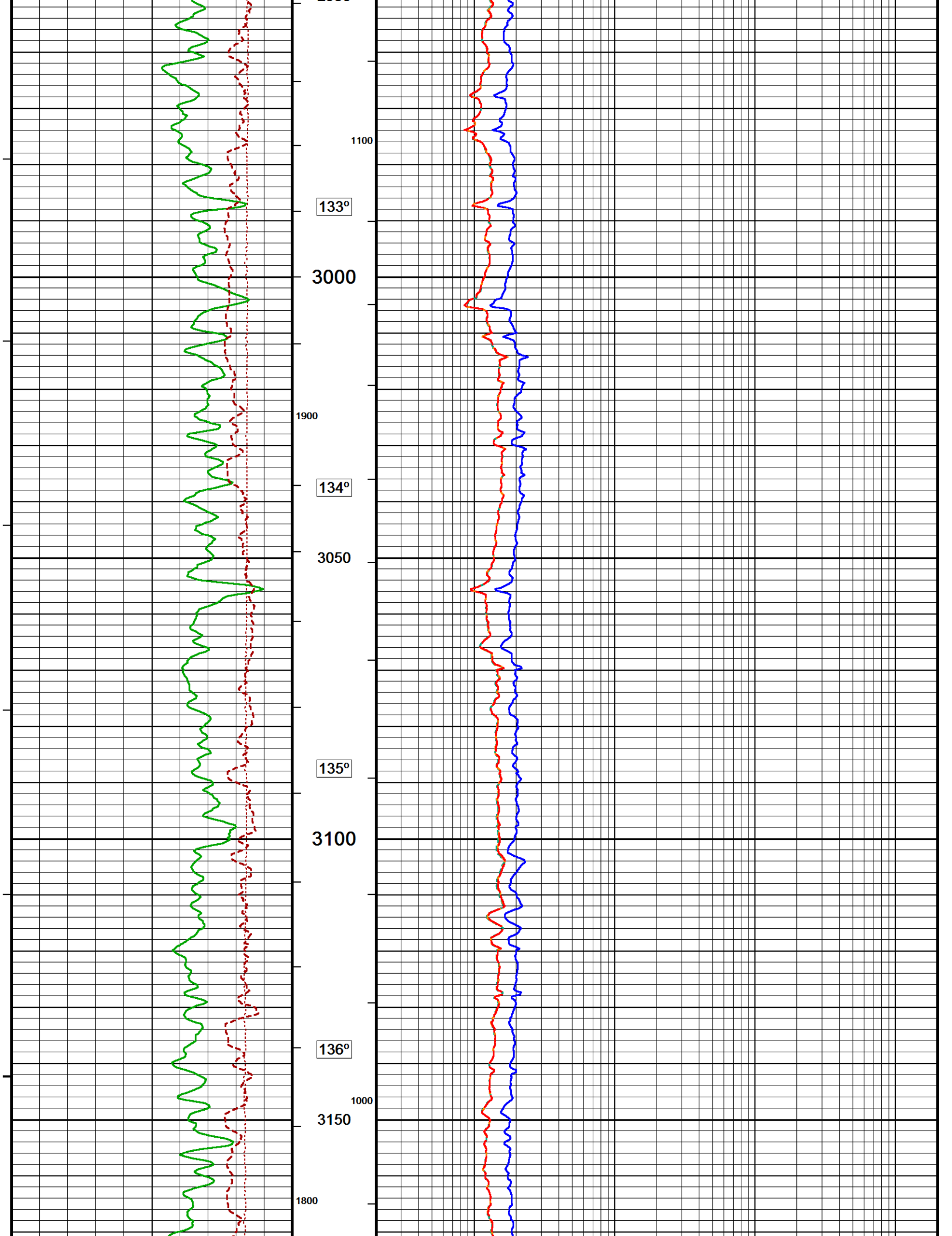


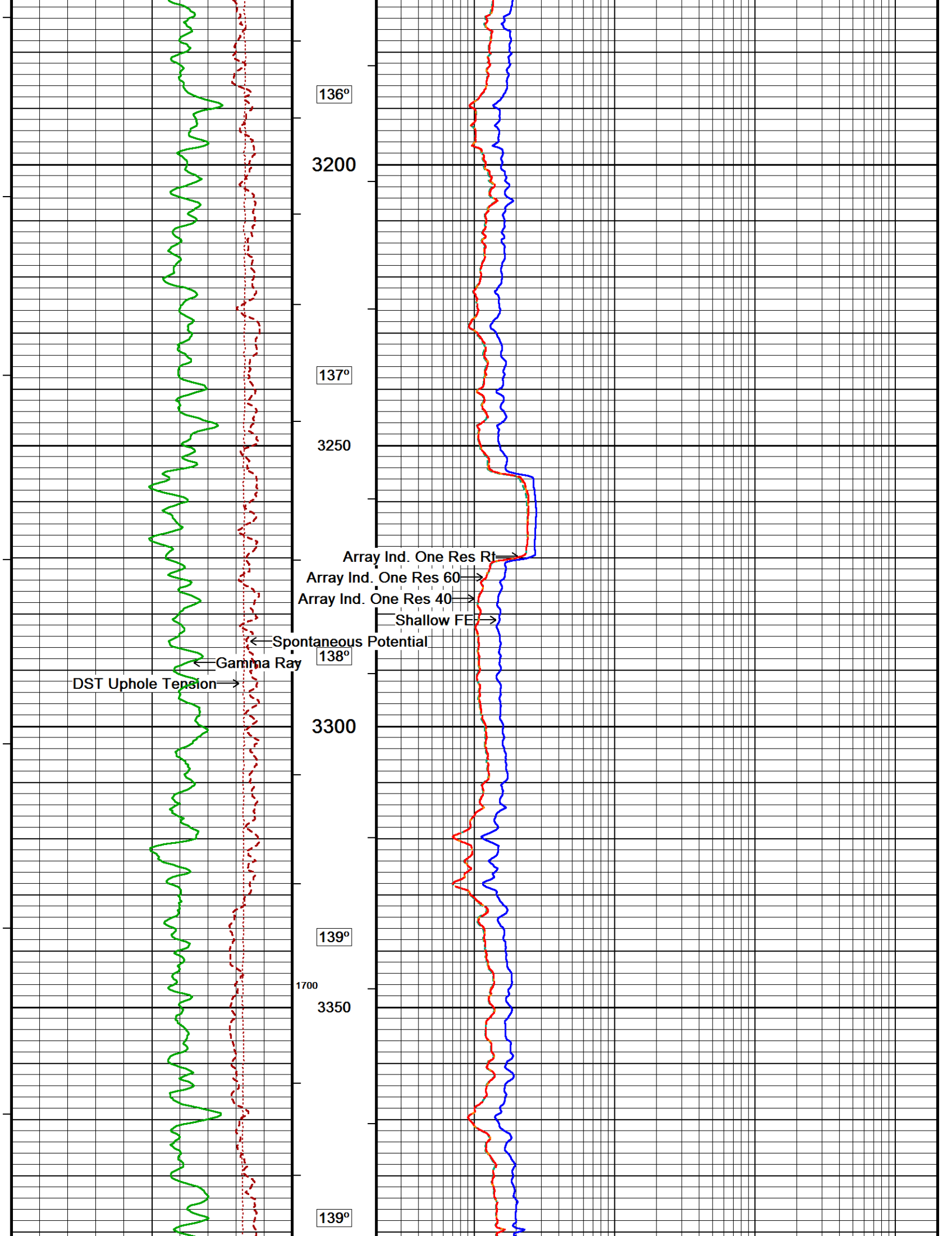


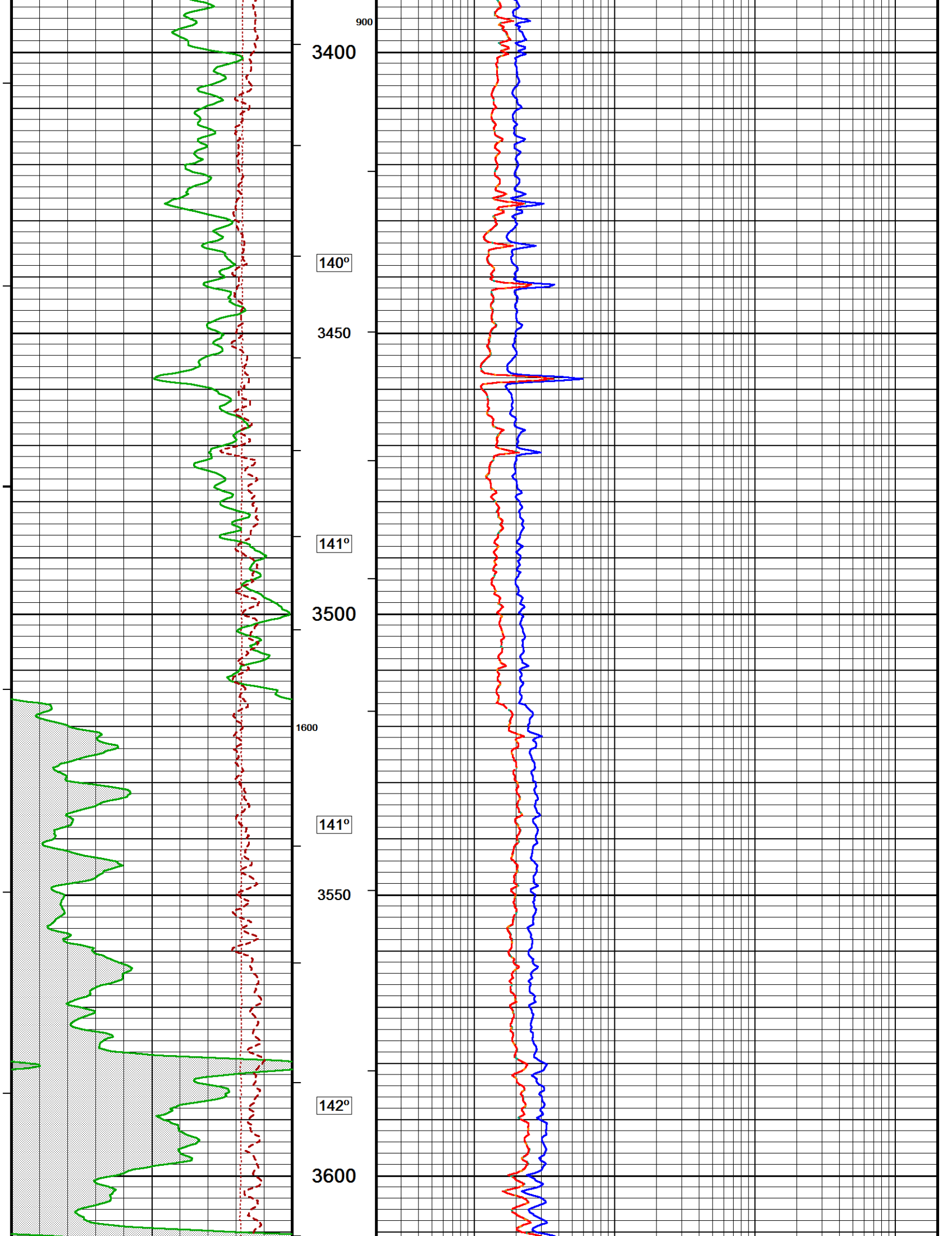


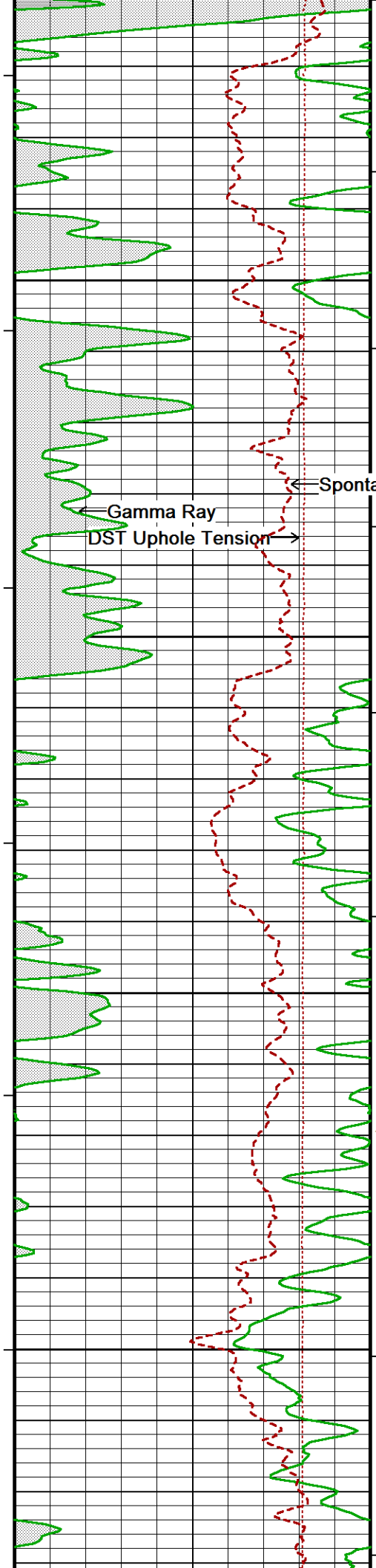












142°

3650

Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow F

← Spontaneous Potential

143°

3700

800

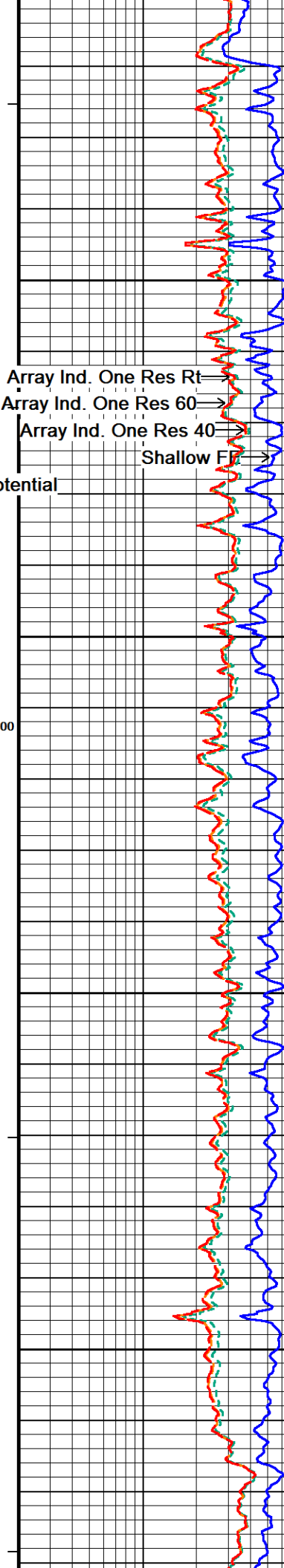
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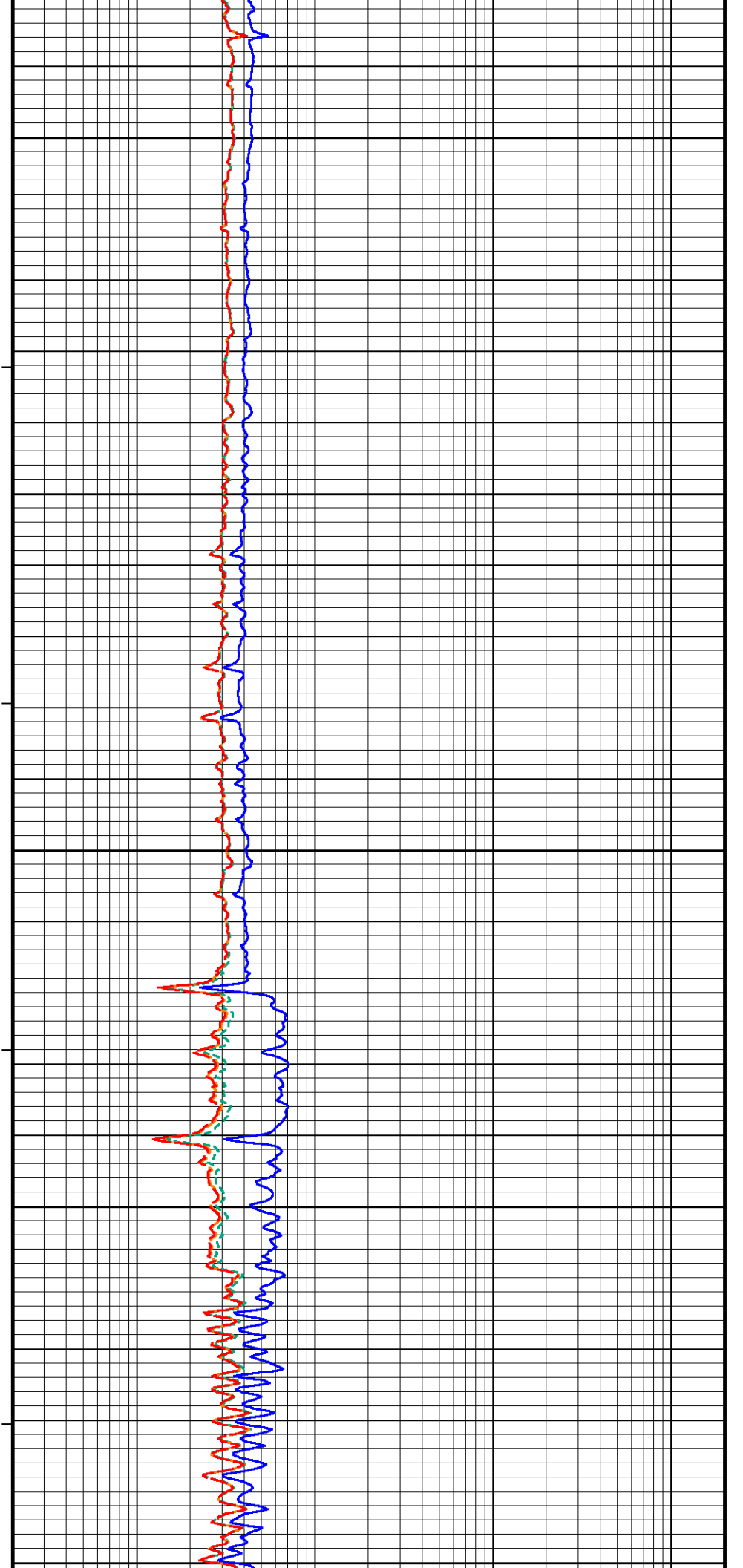
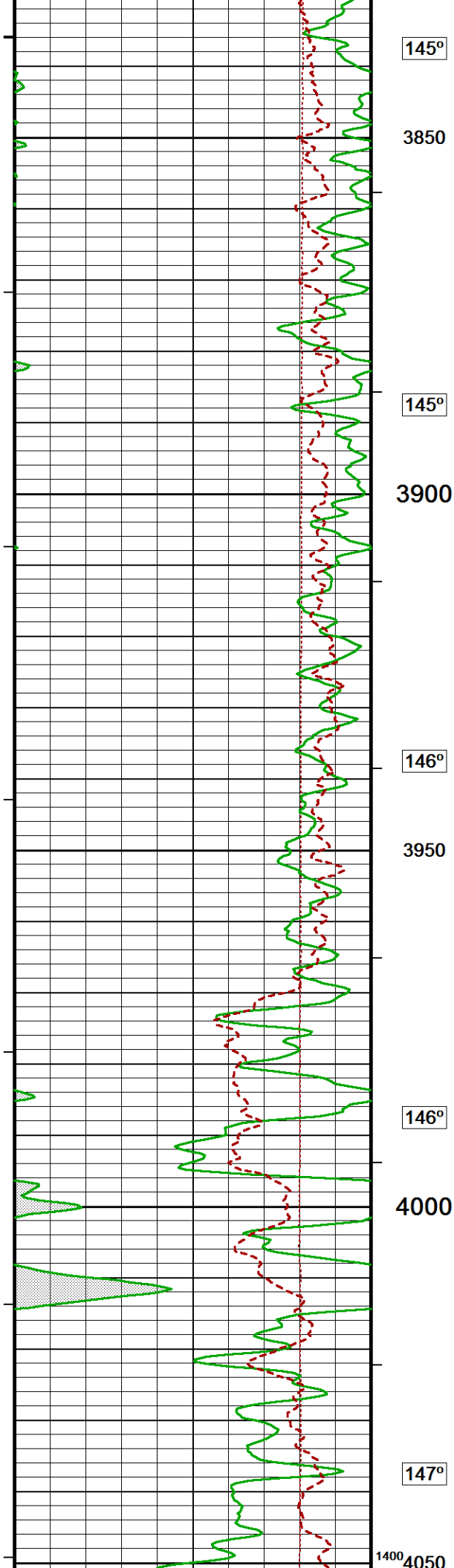
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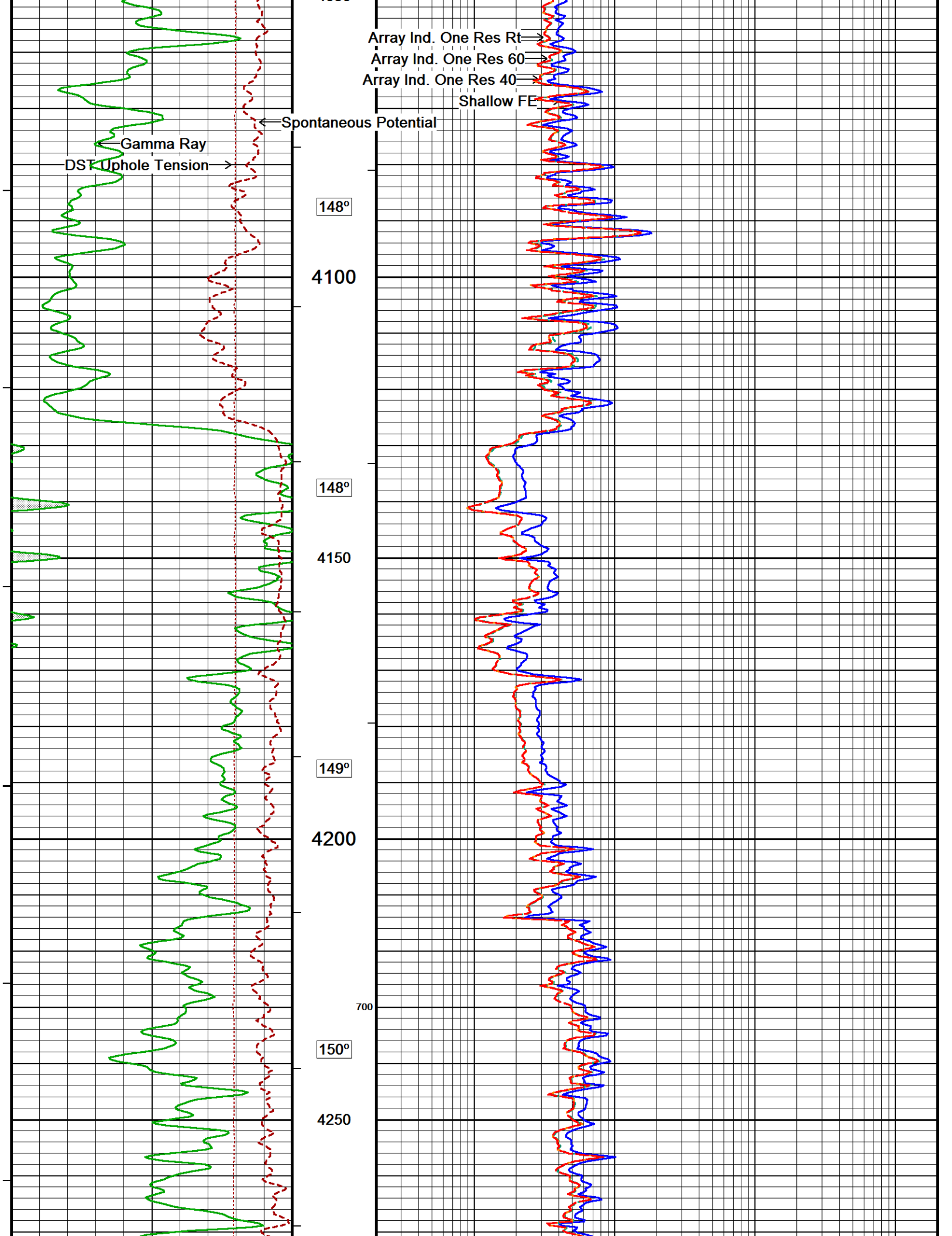
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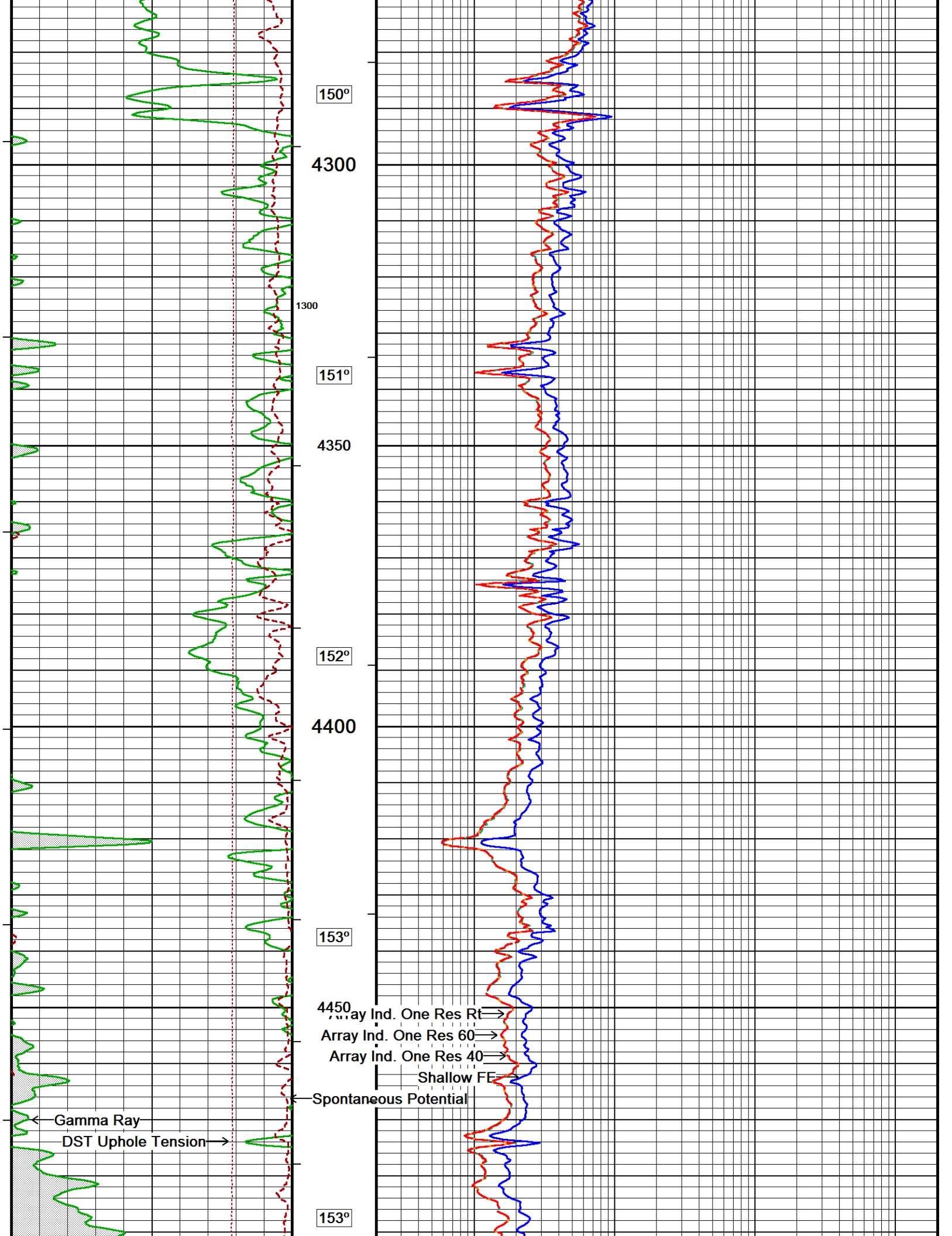
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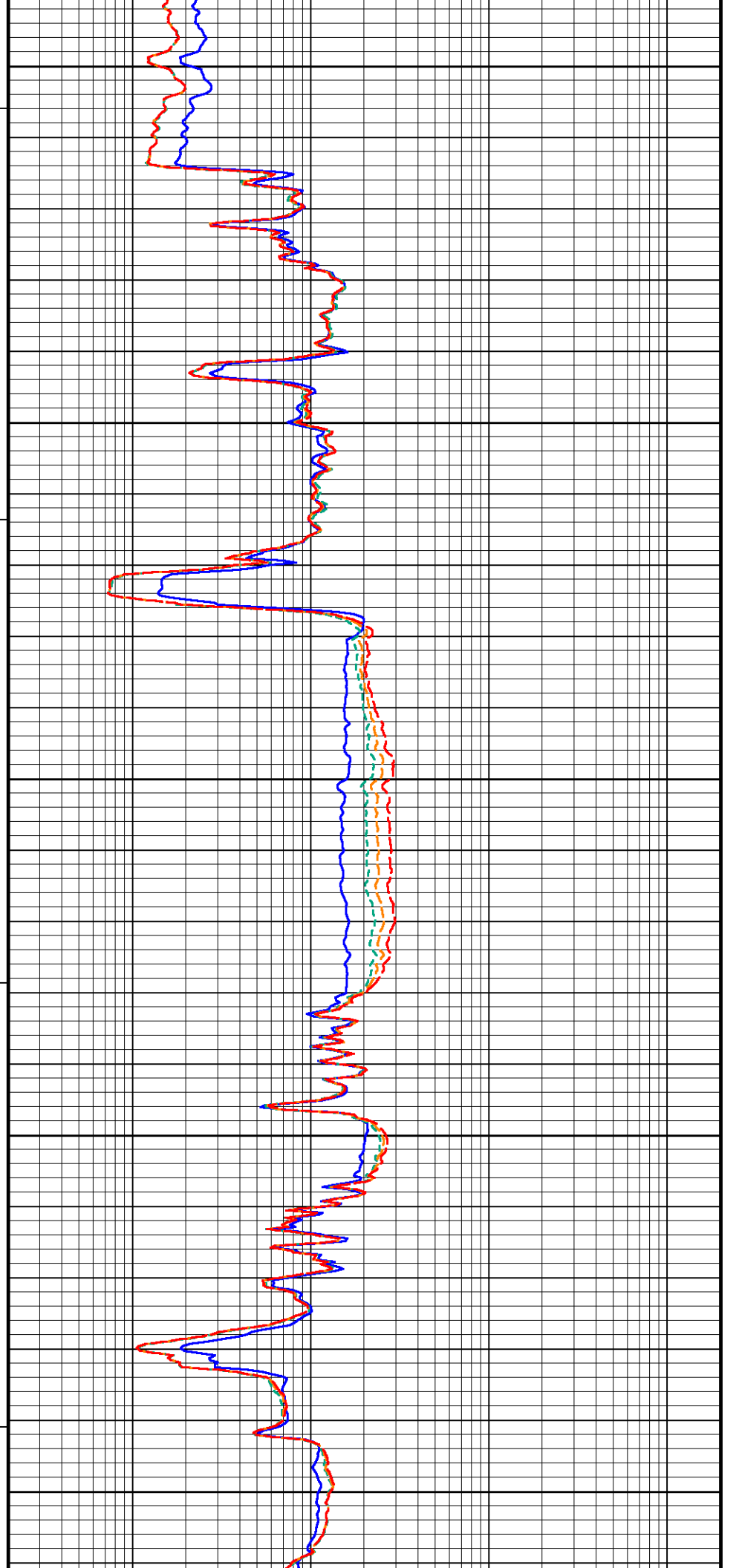
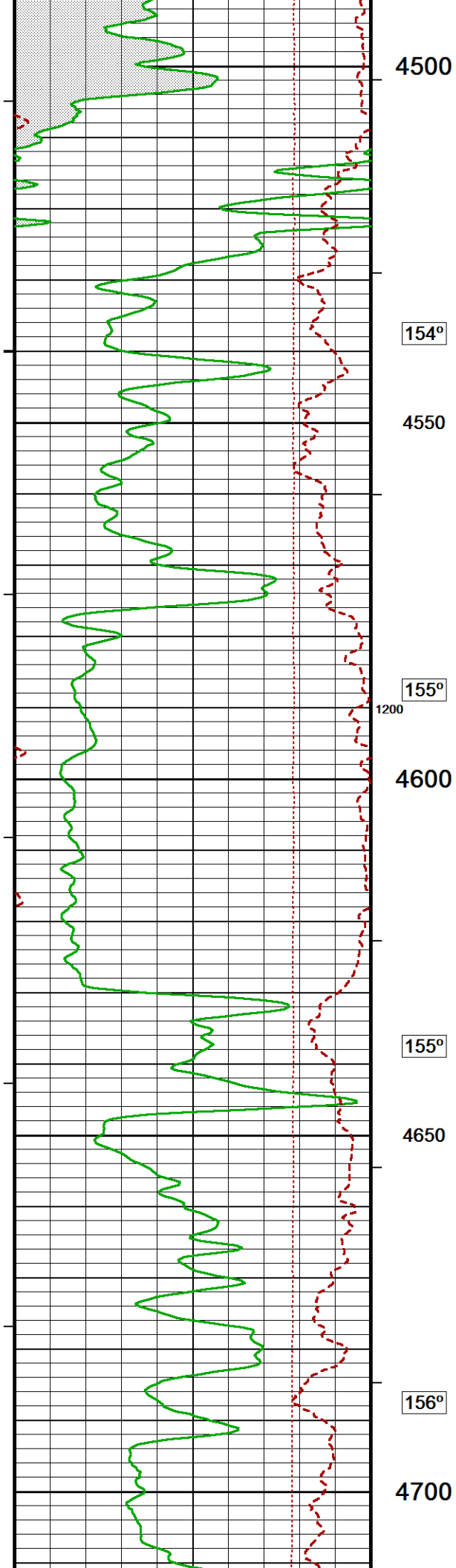
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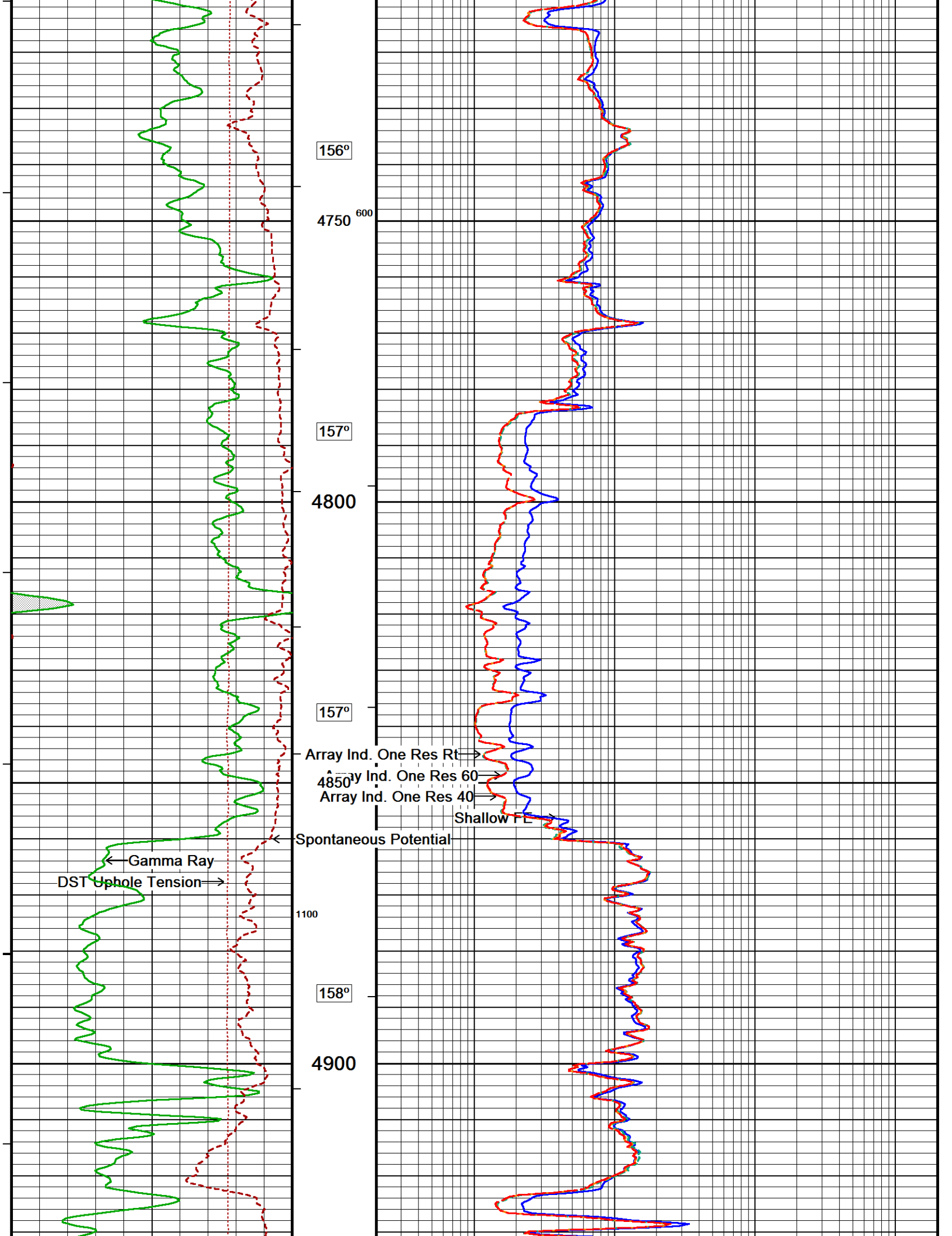


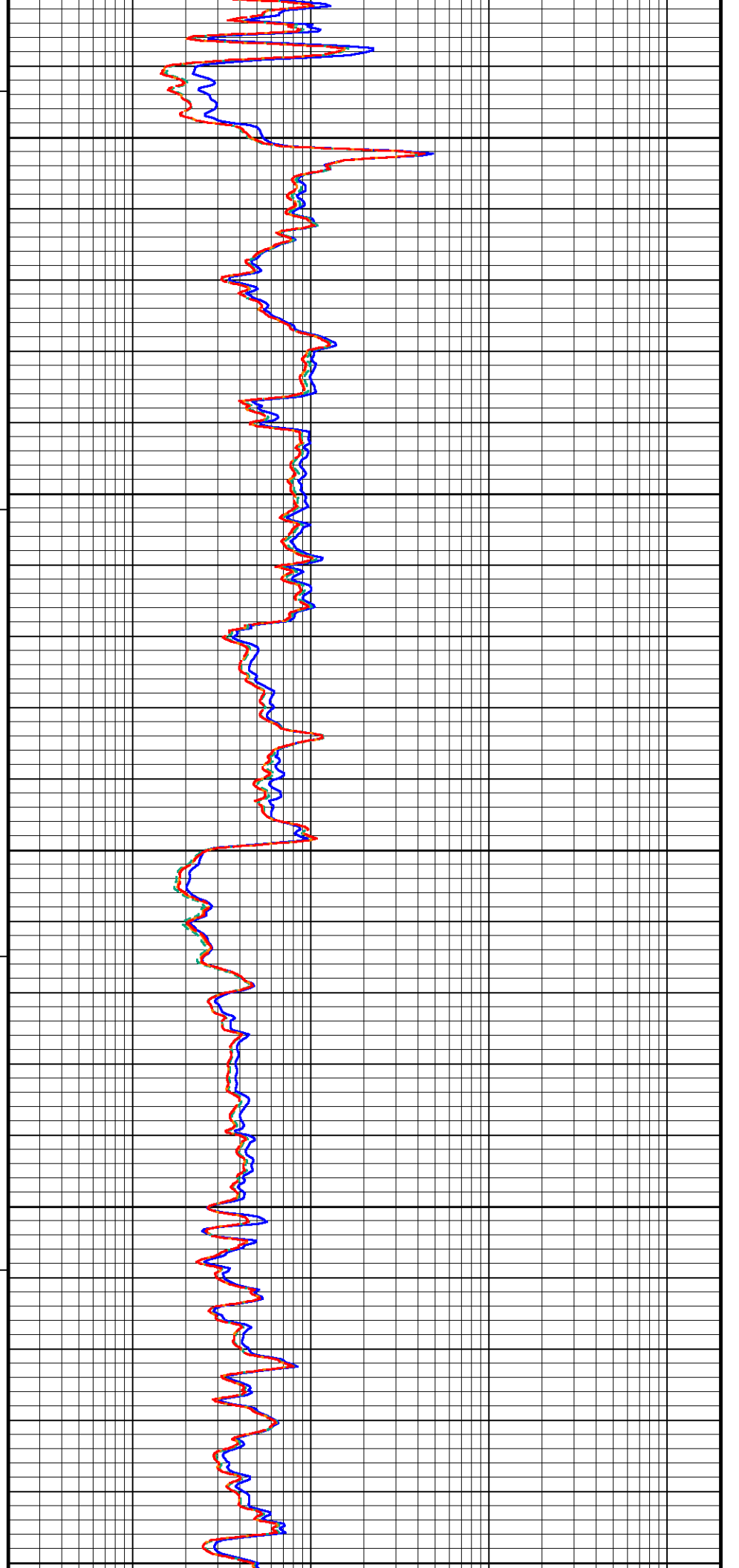
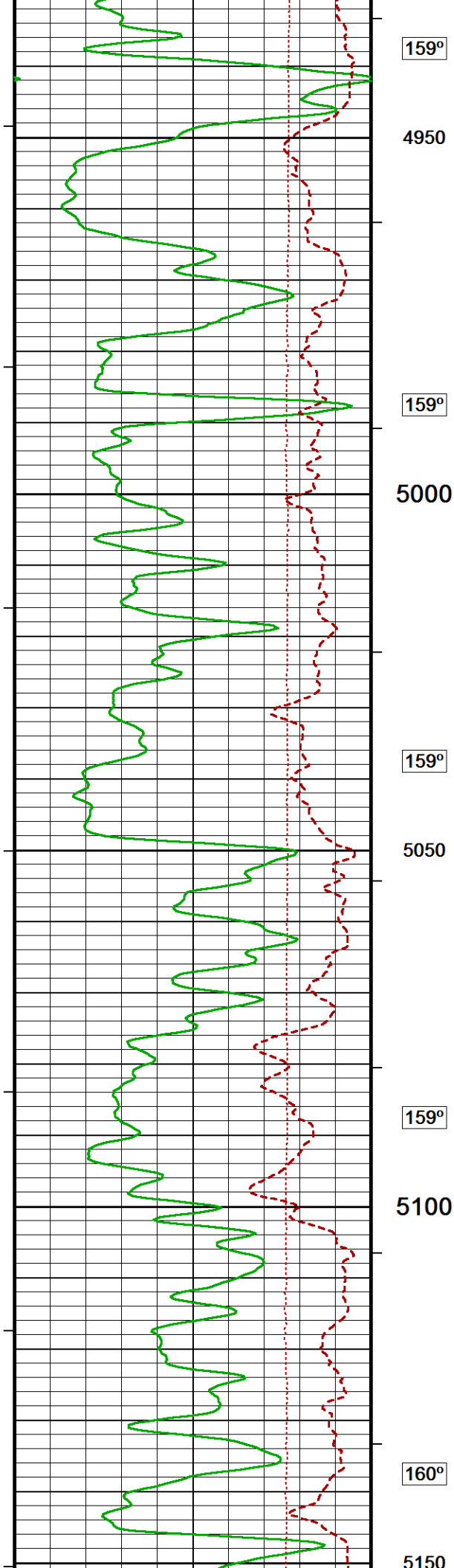


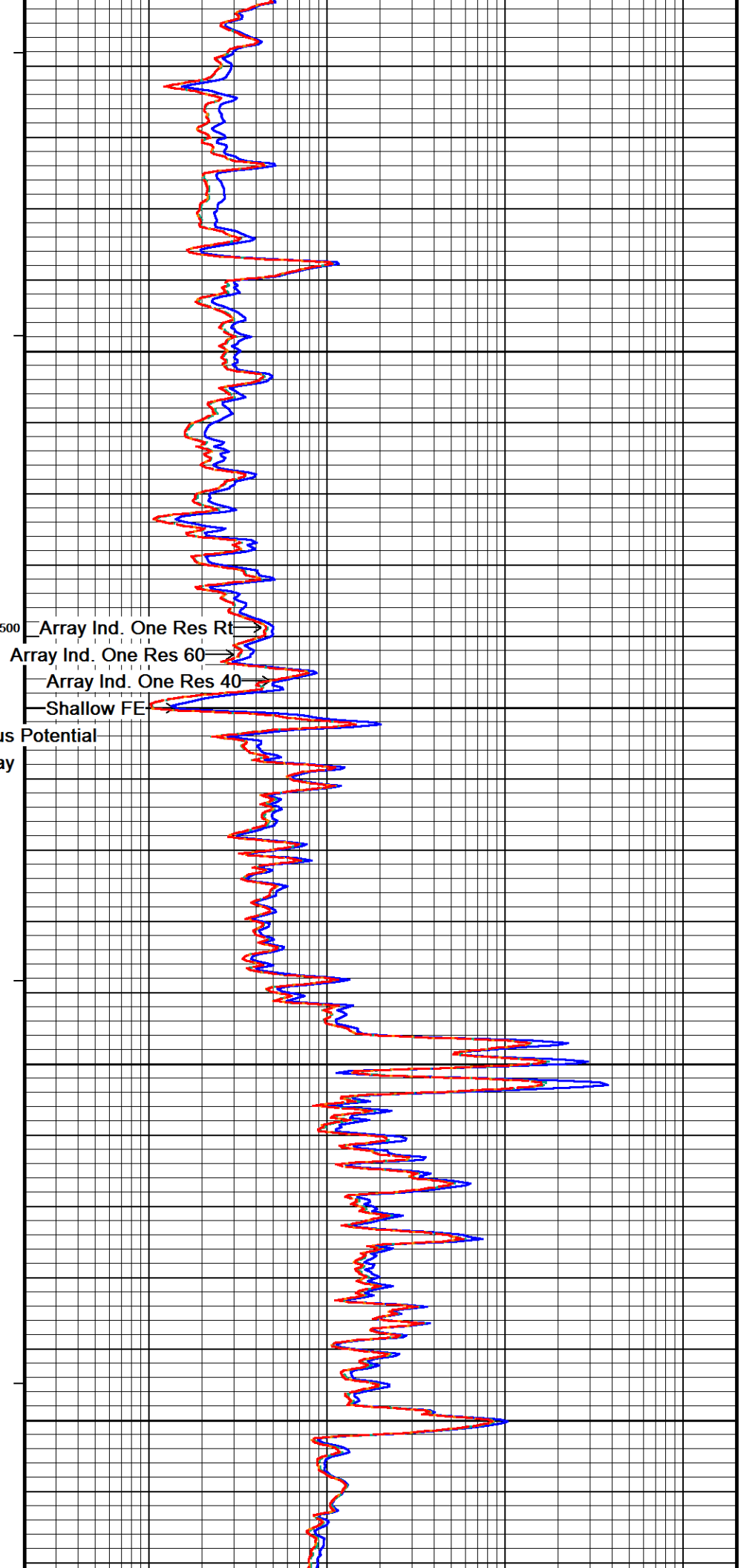
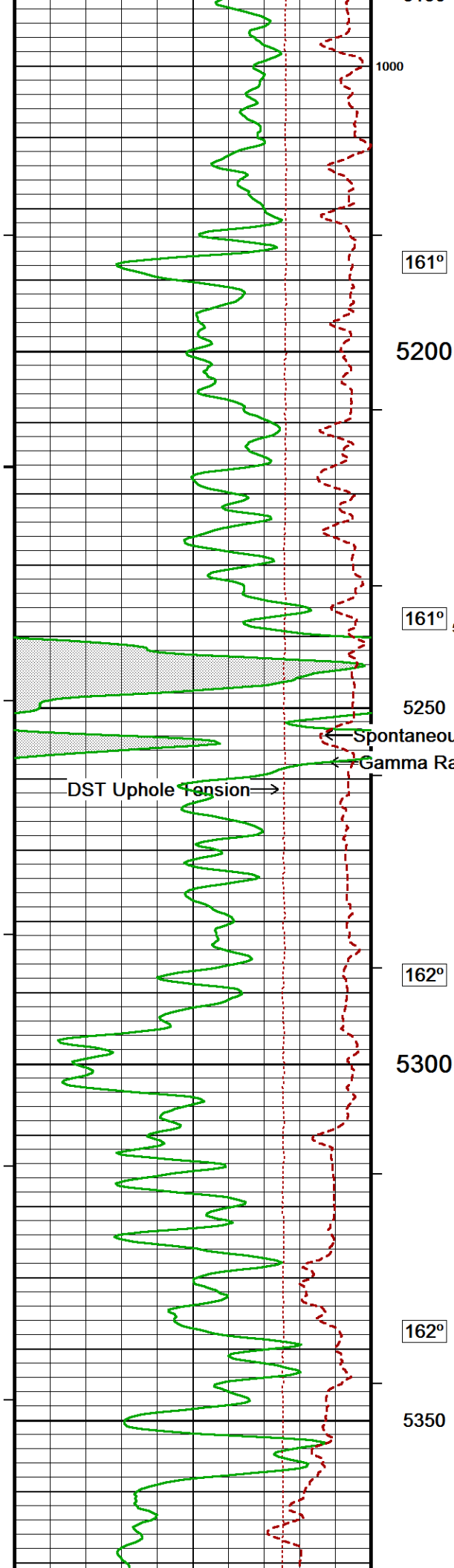


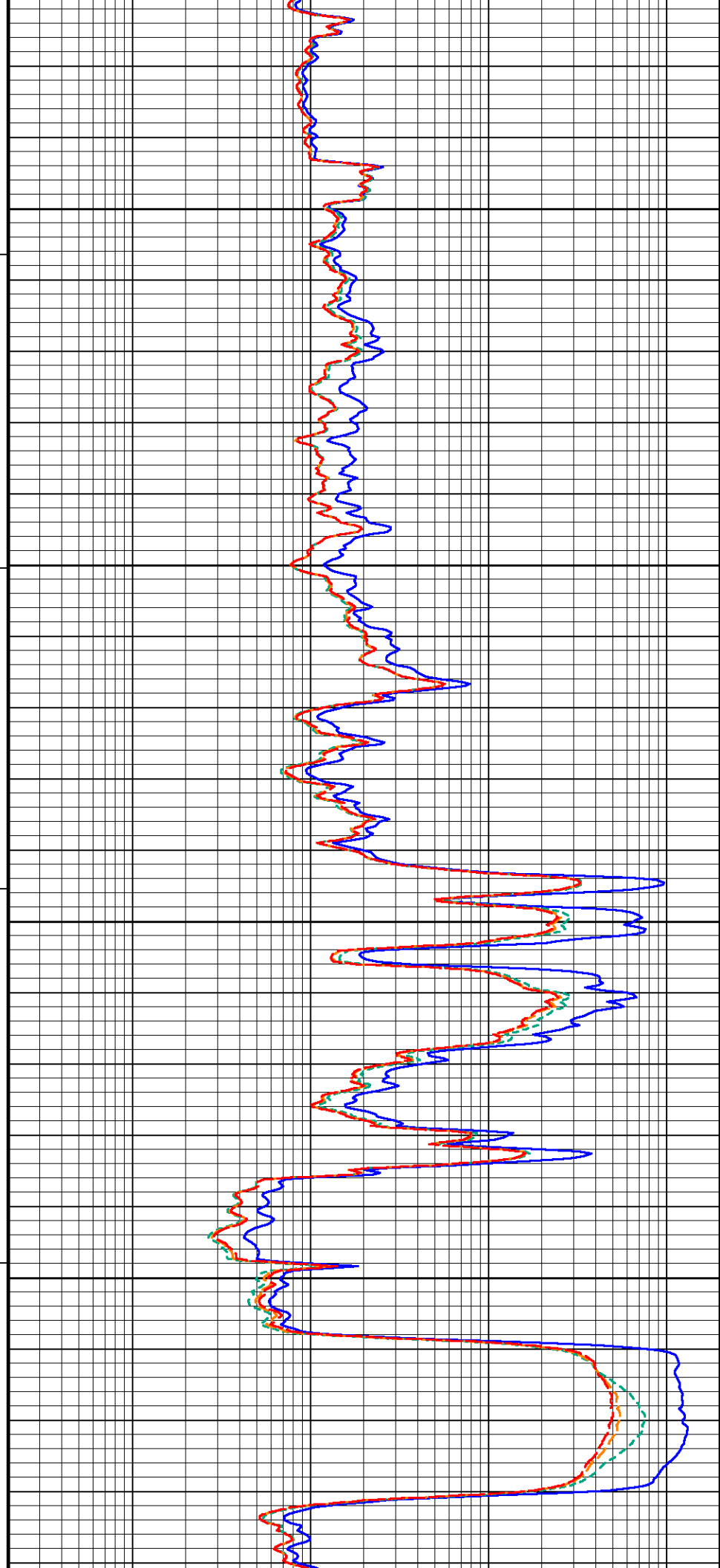
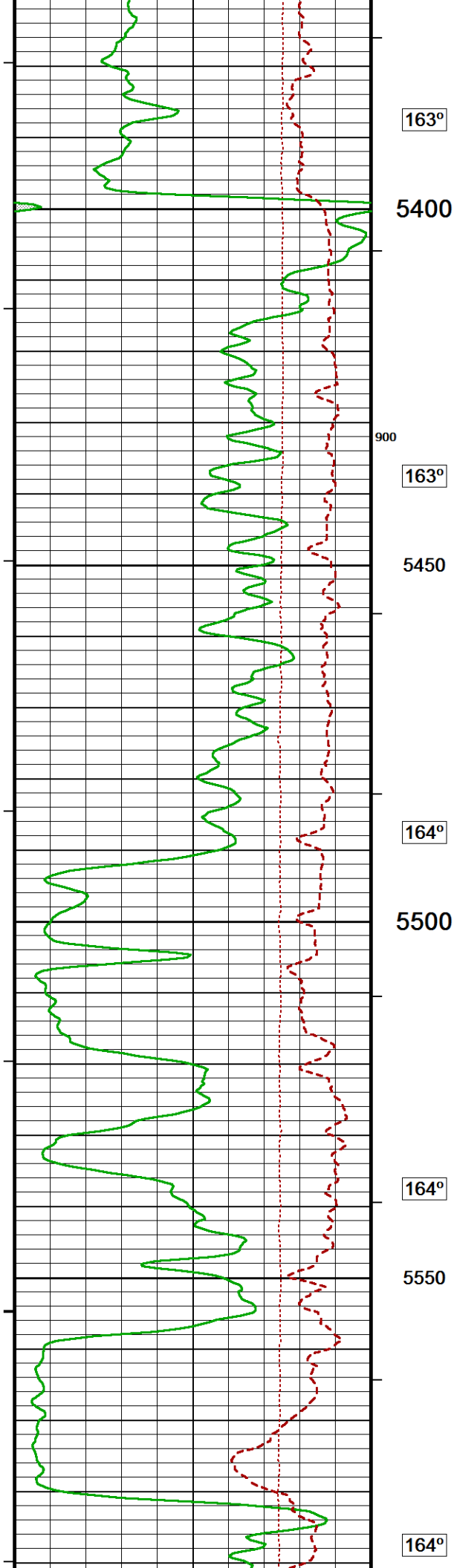


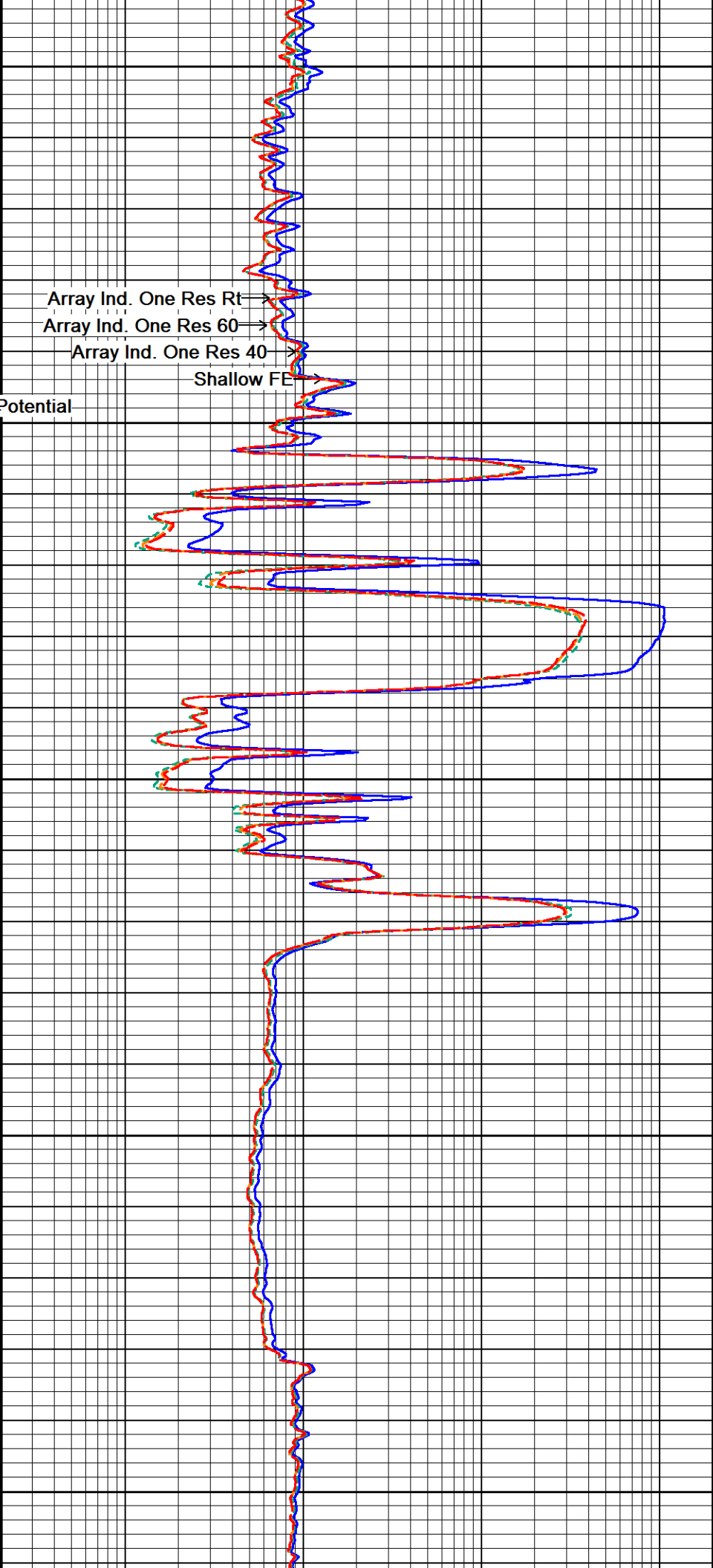
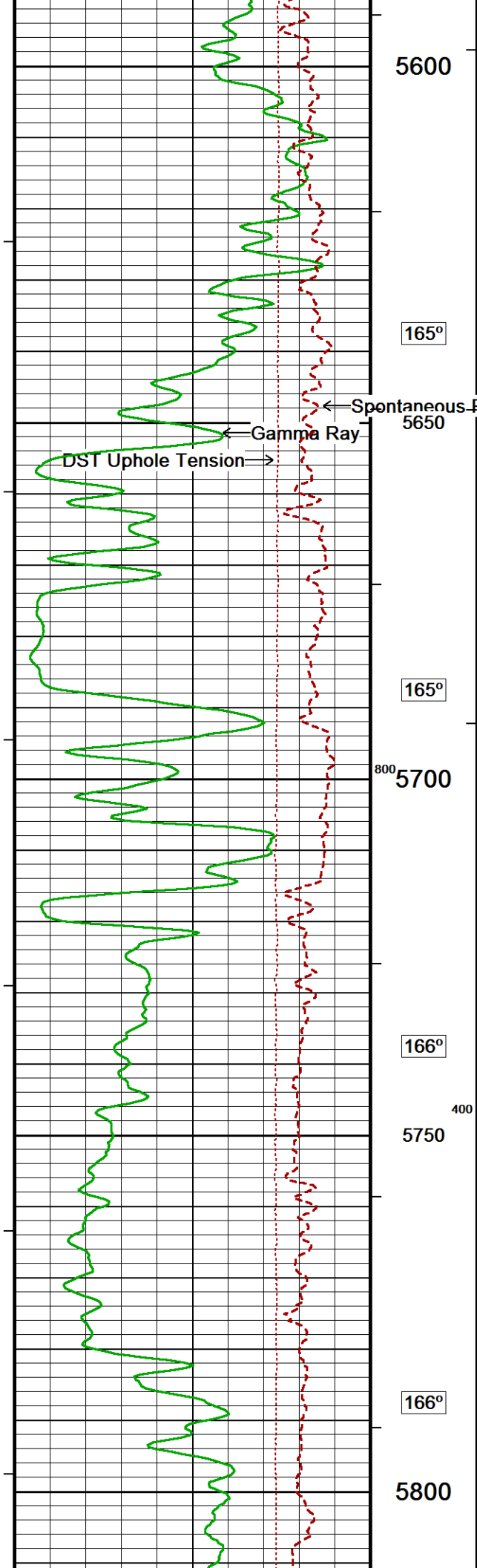


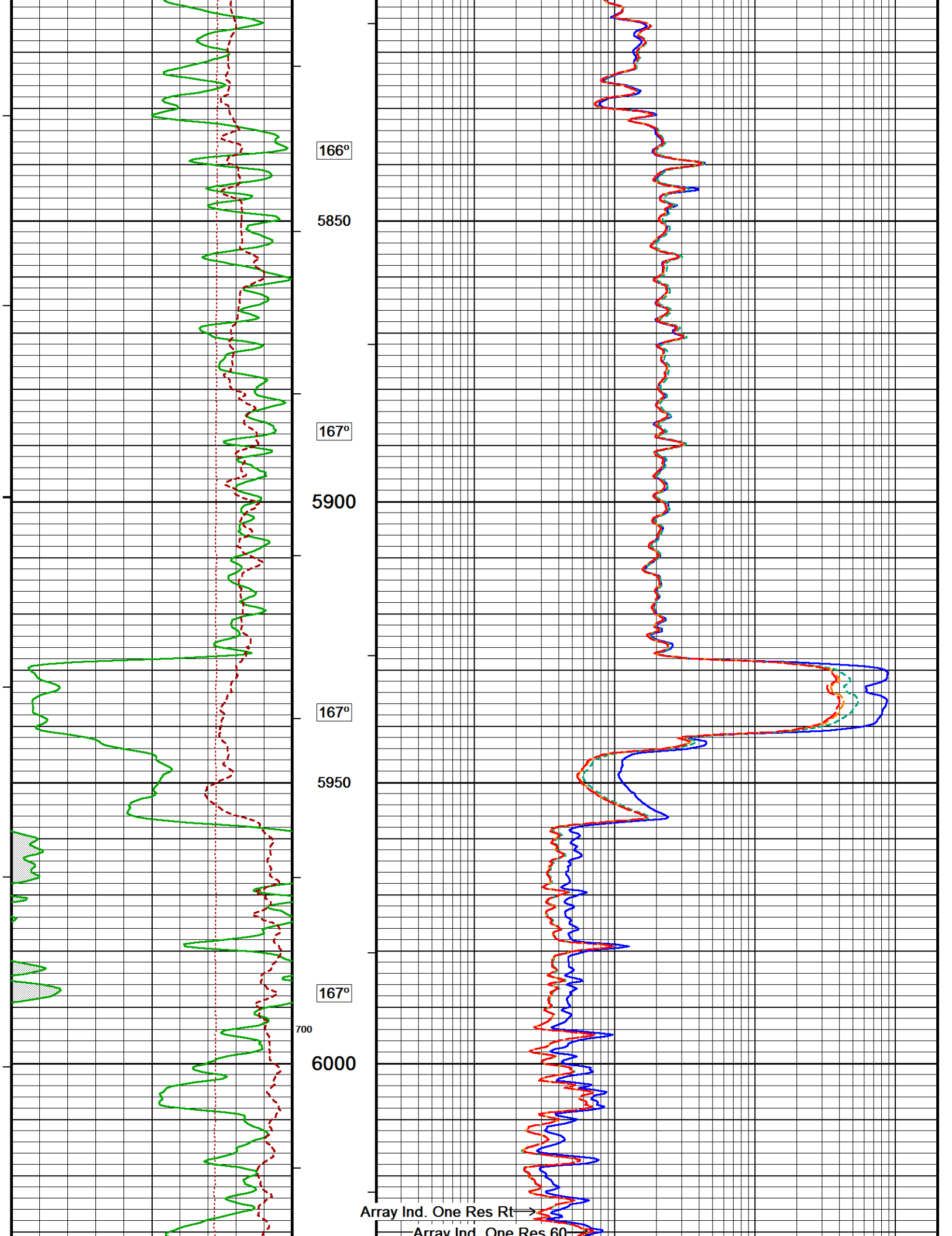


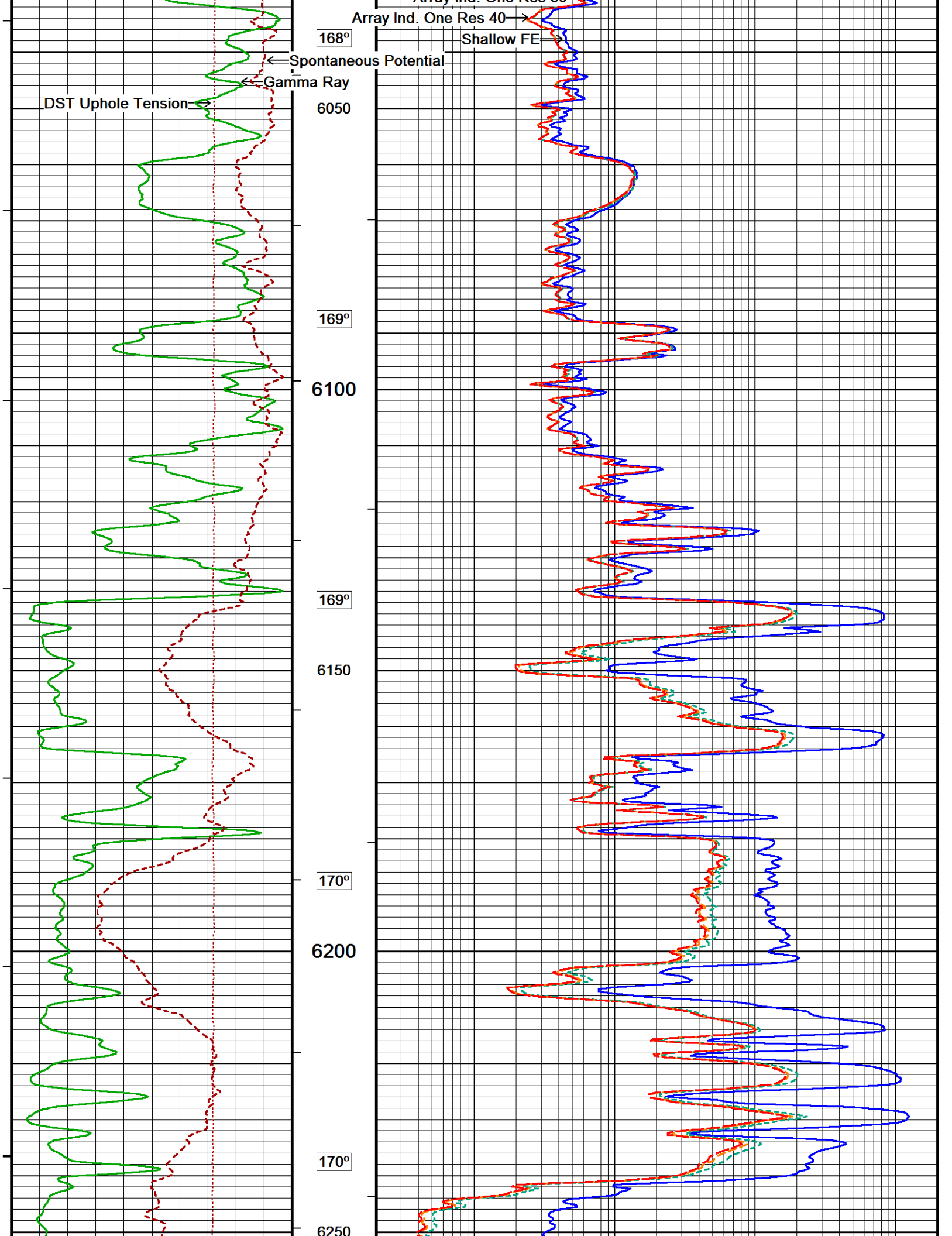


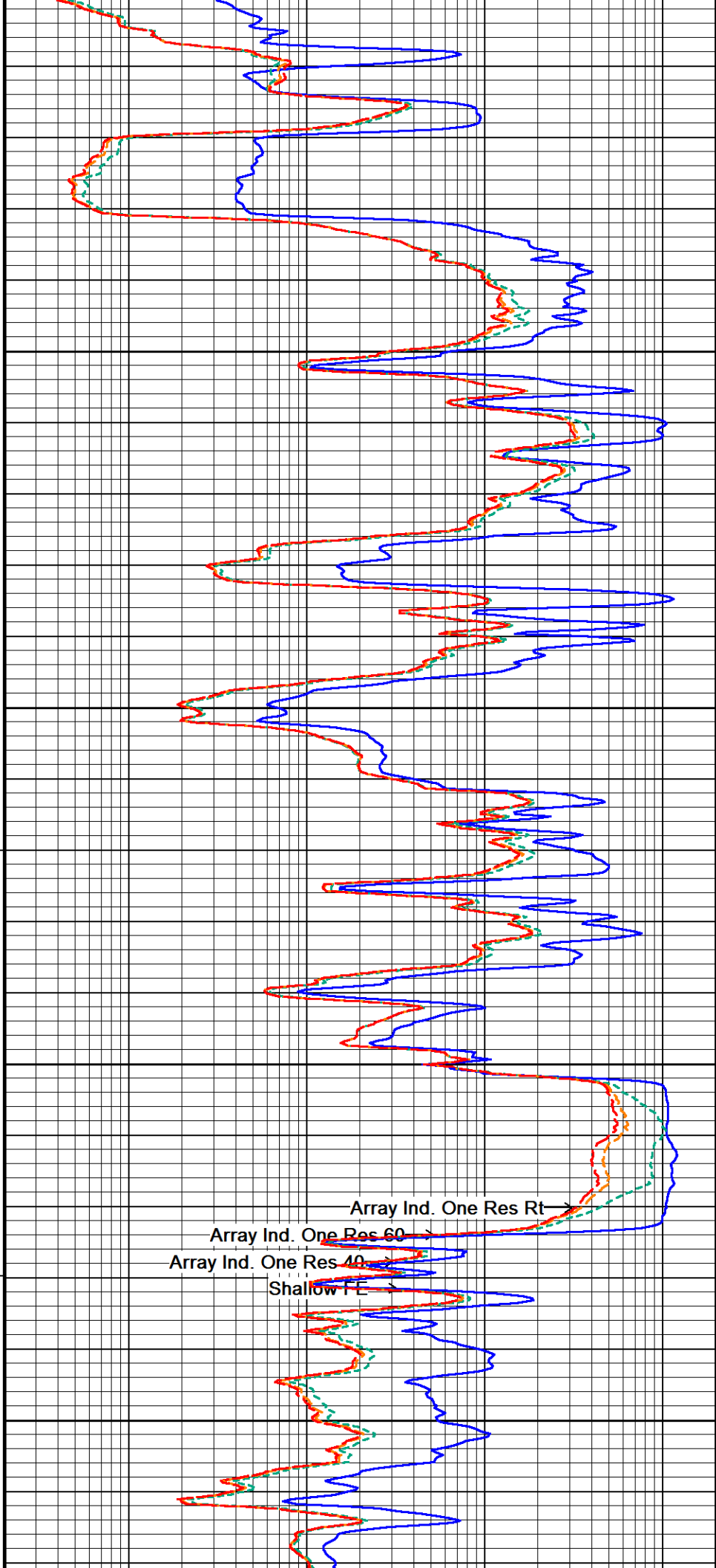
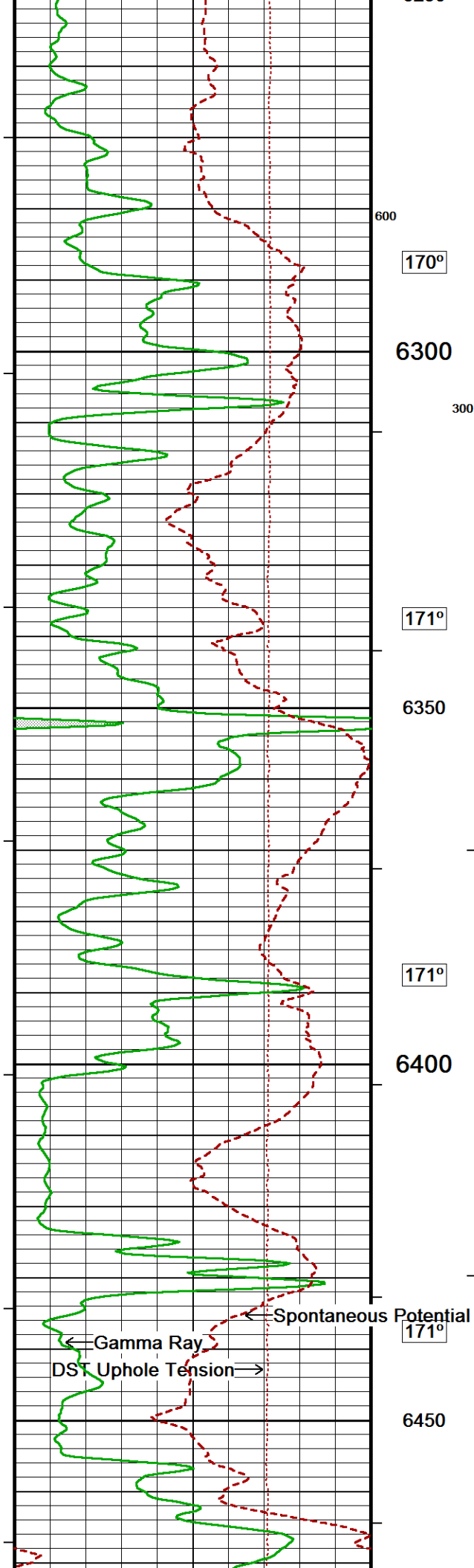


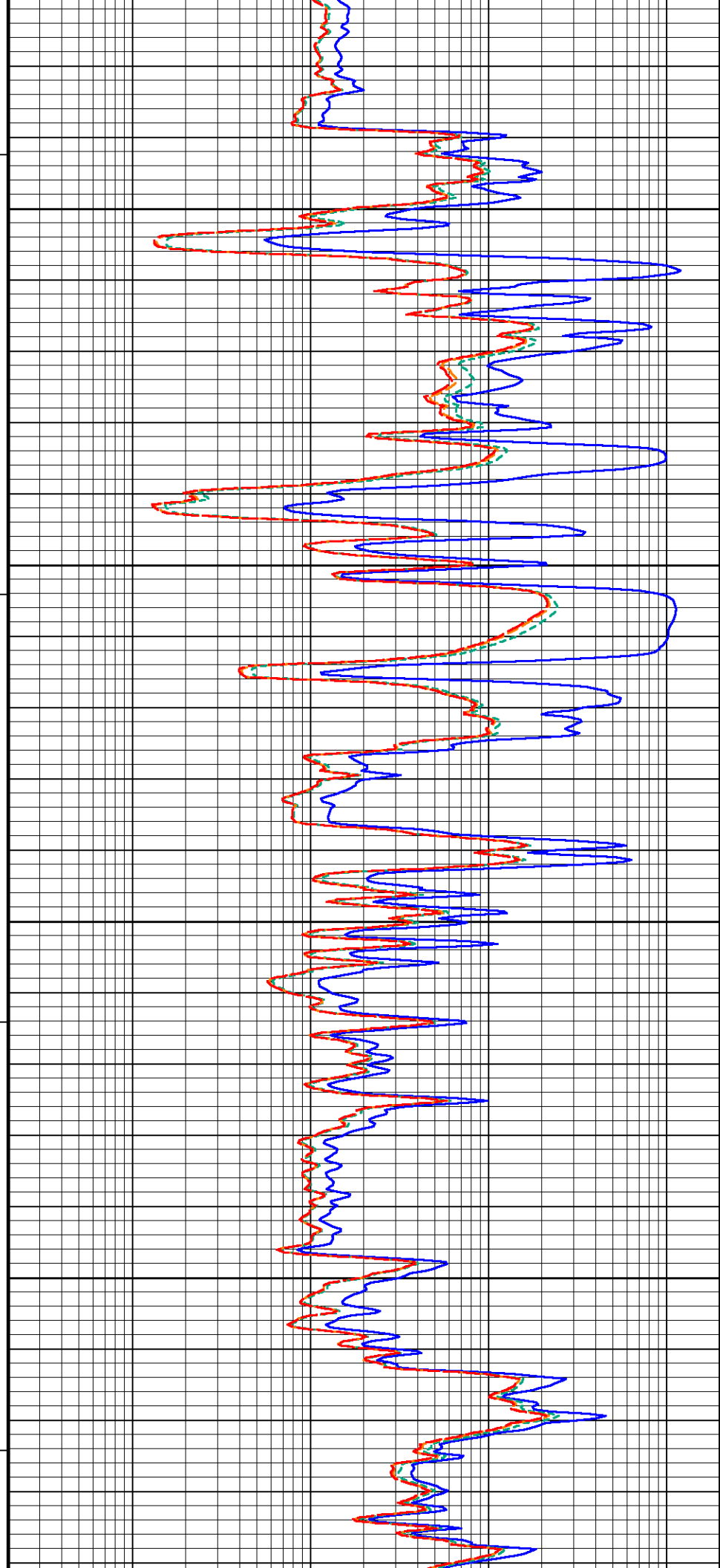
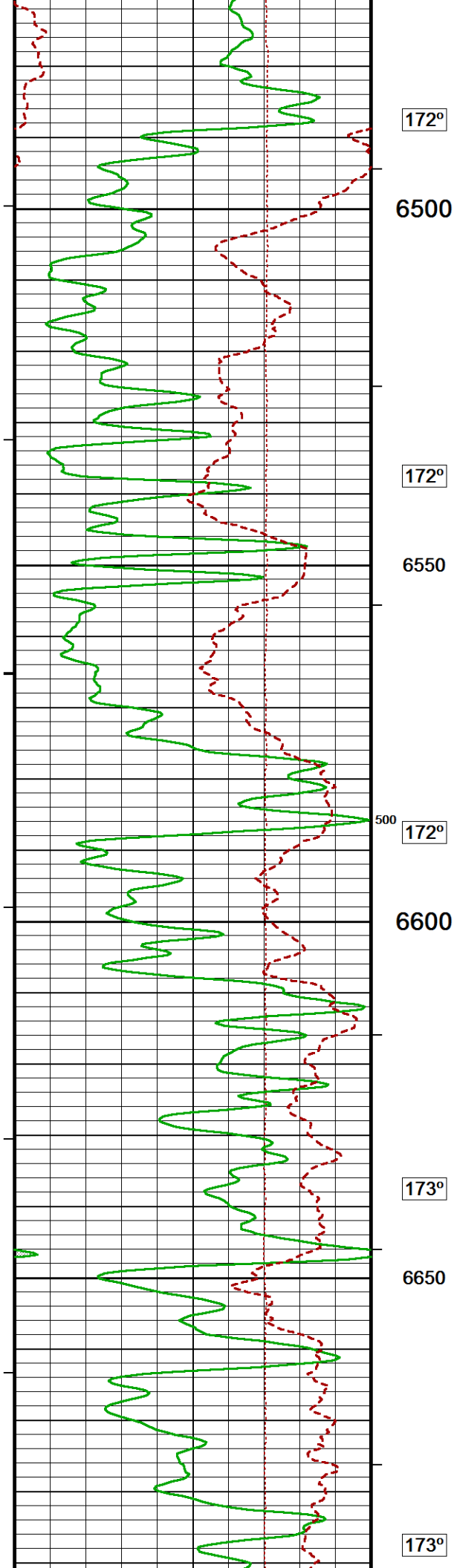


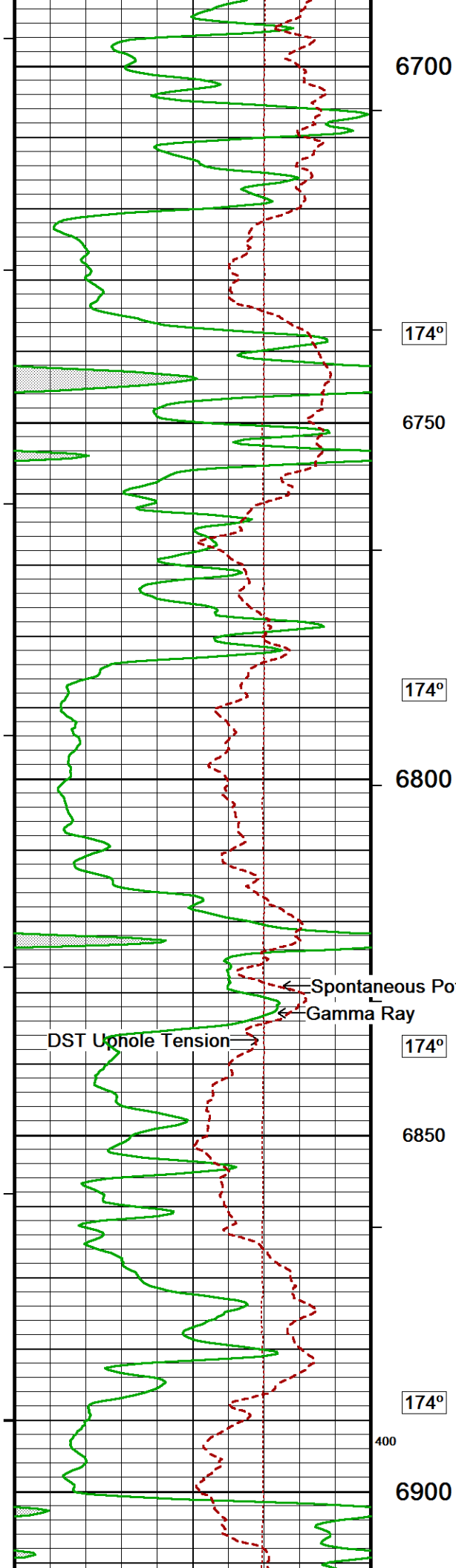












6700

174°

6750

174°

6800

174°

6850

174°

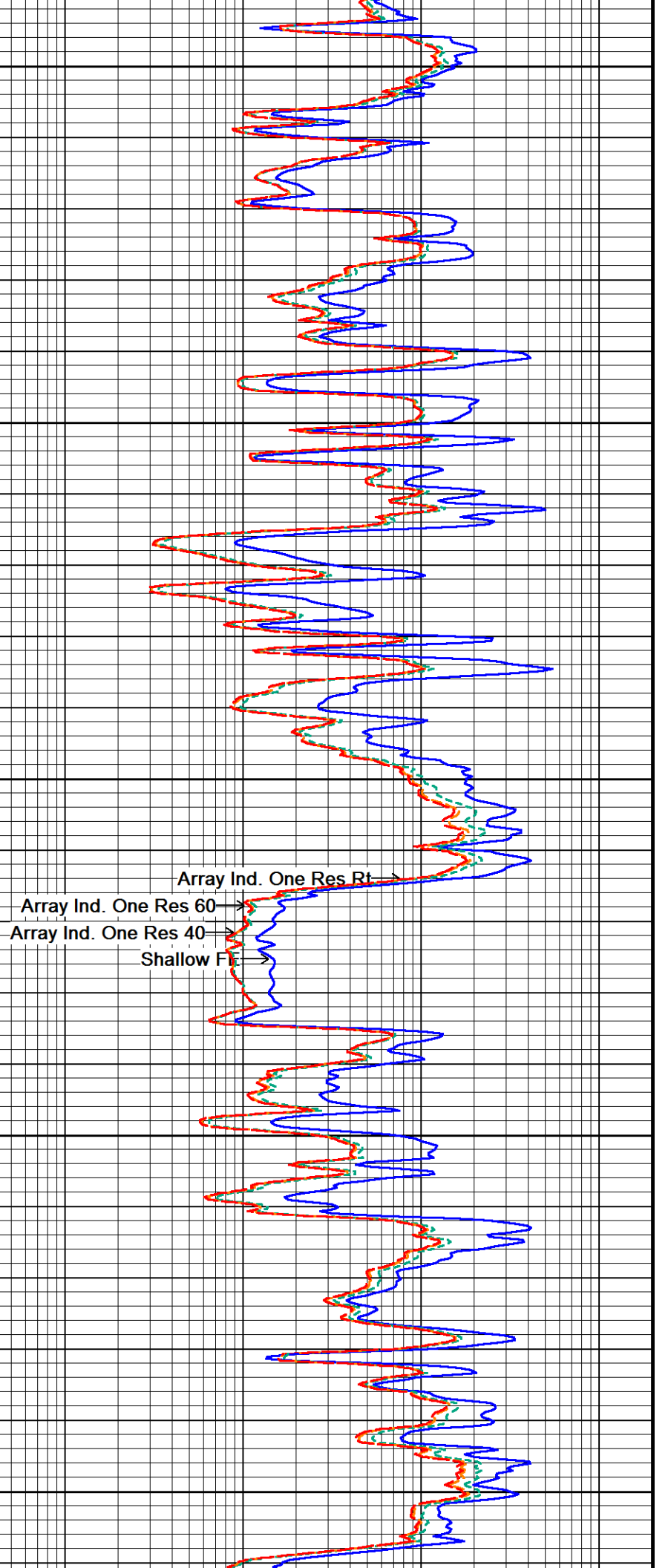
400

6900

DST Uphole Tension

Spontaneous Potential

Gamma Ray

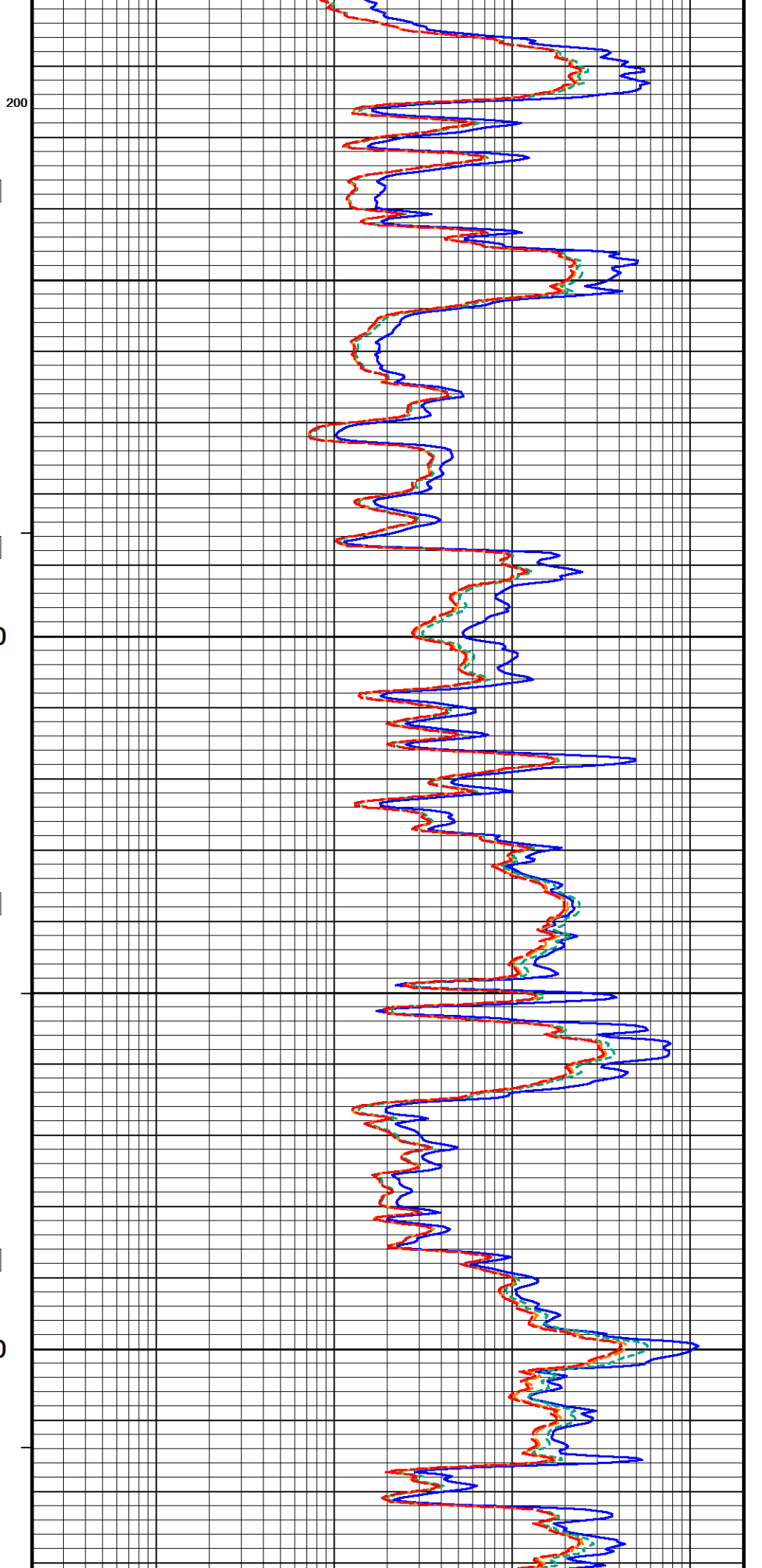
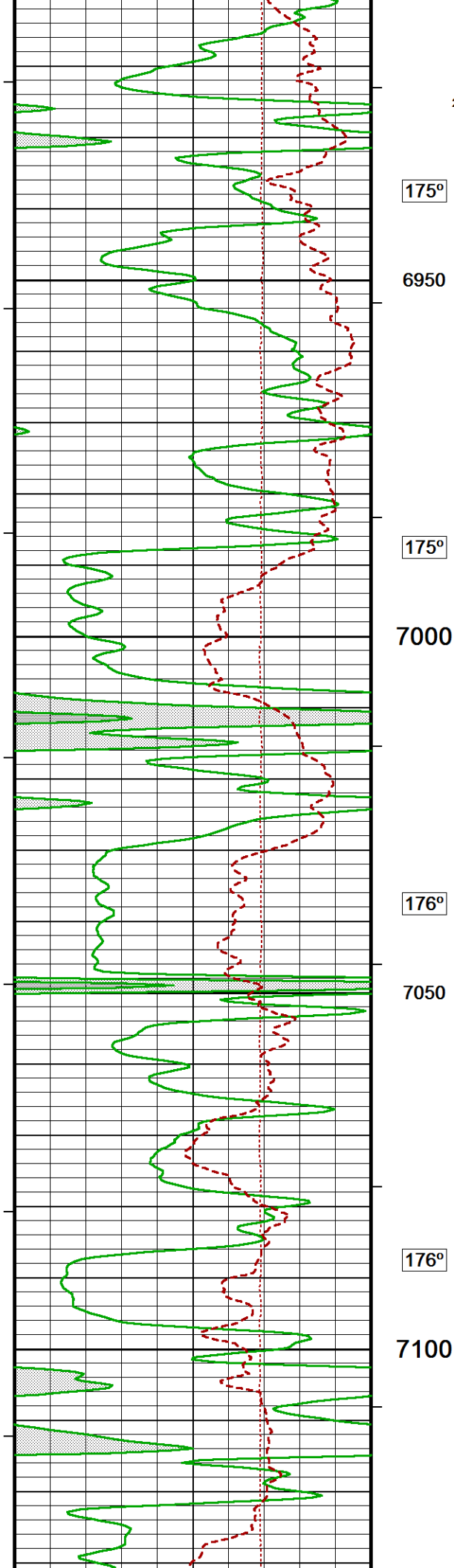


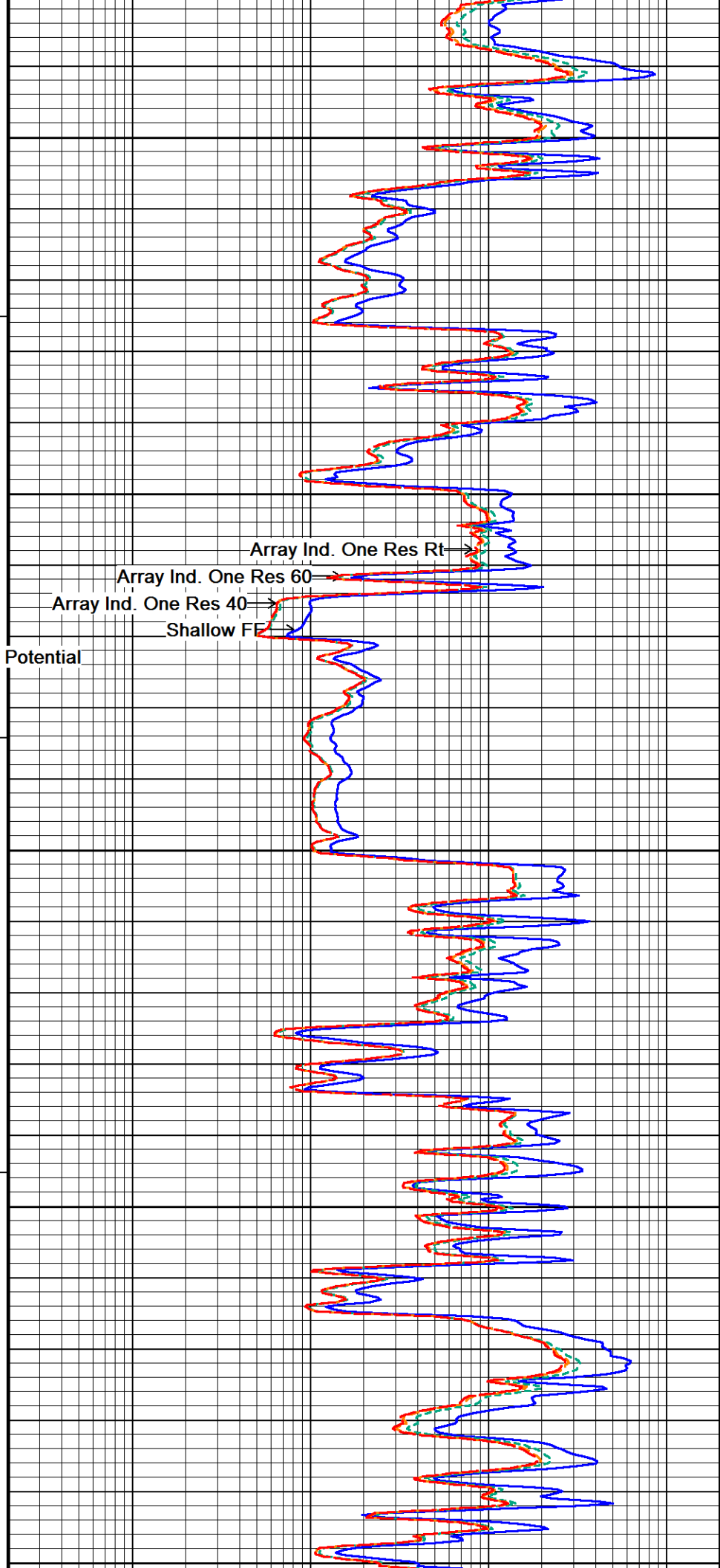
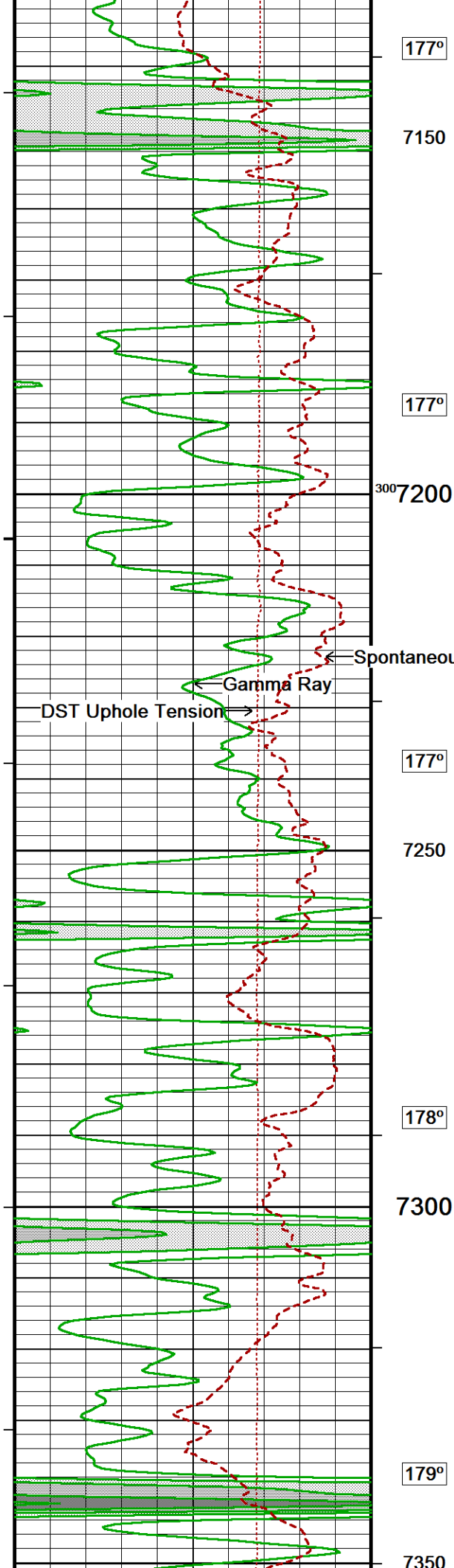
Array Ind. One Res Rt

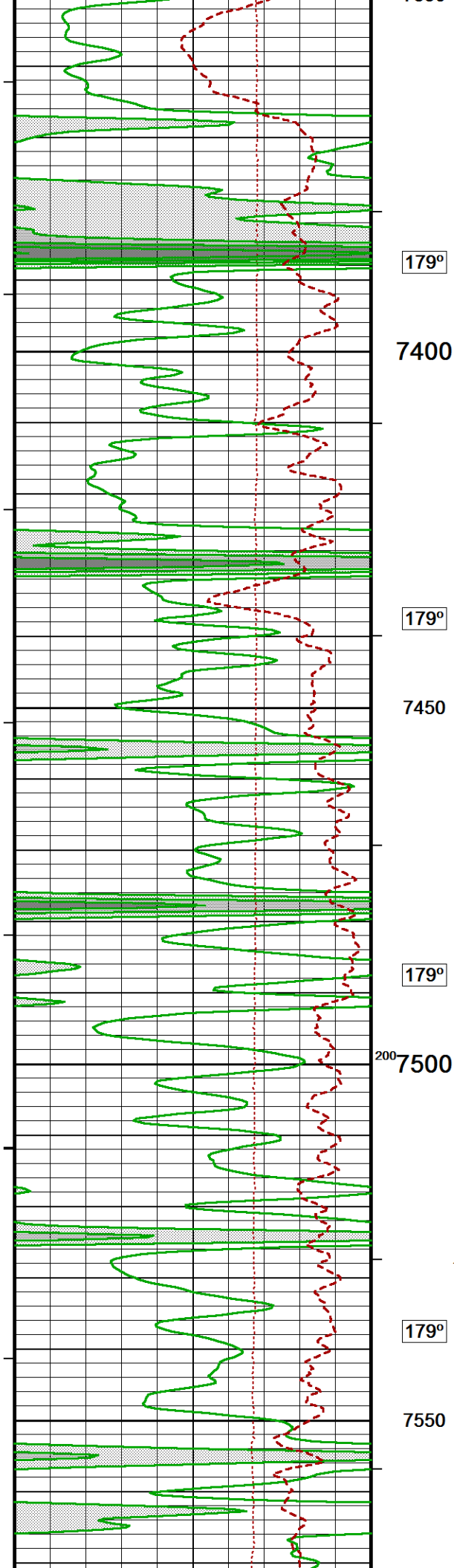
Array Ind. One Res 60

Array Ind. One Res 40

Shallow FF







179°

7400

179°

7450

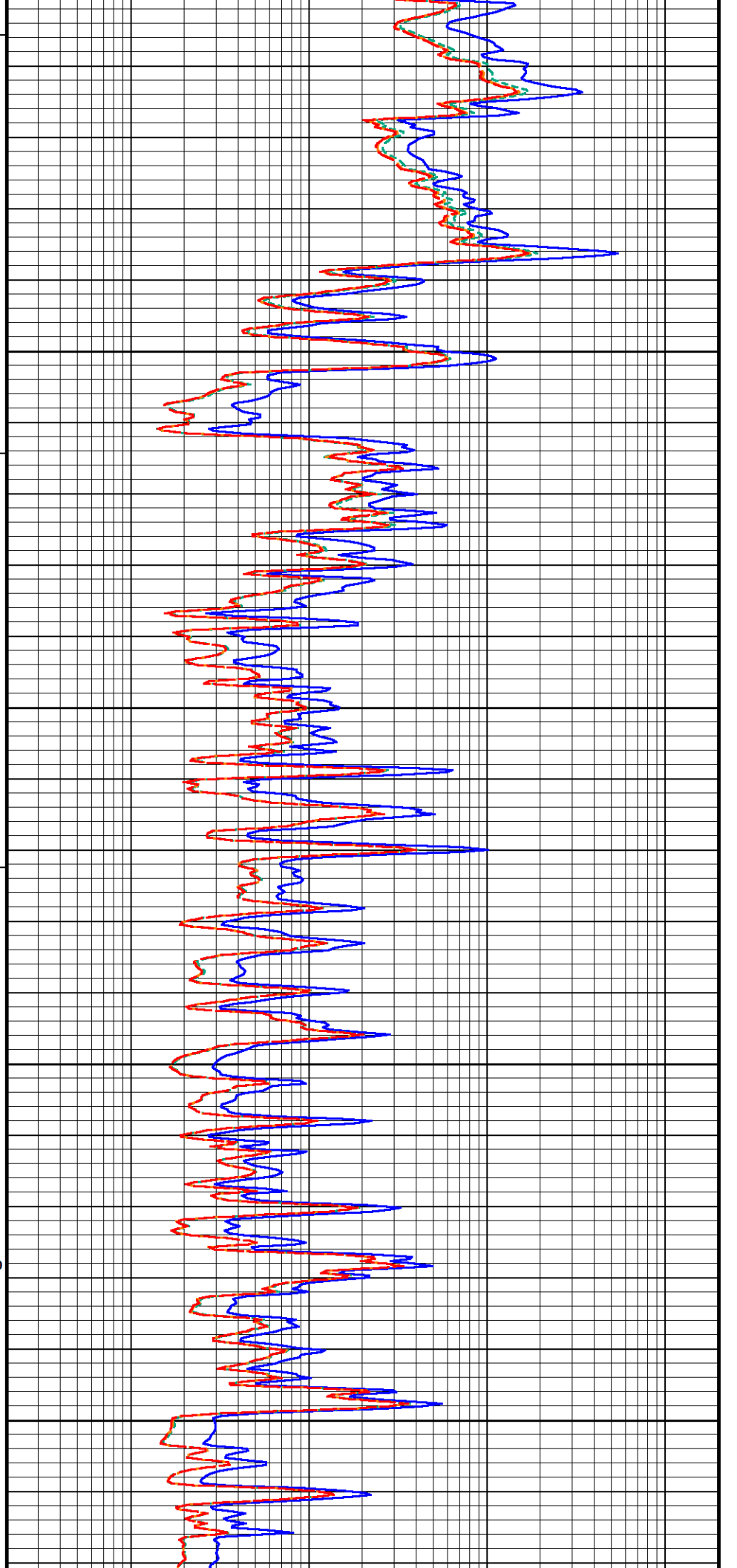
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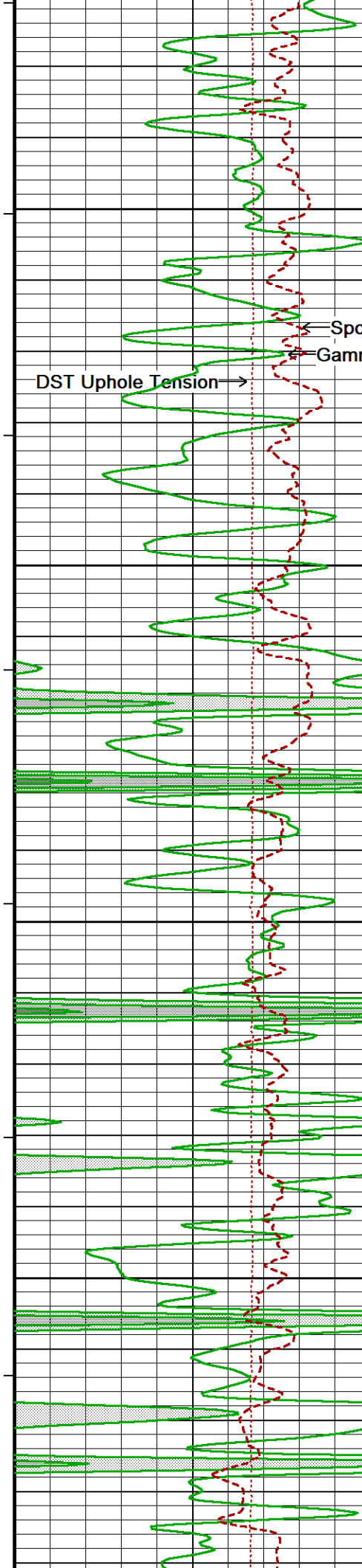
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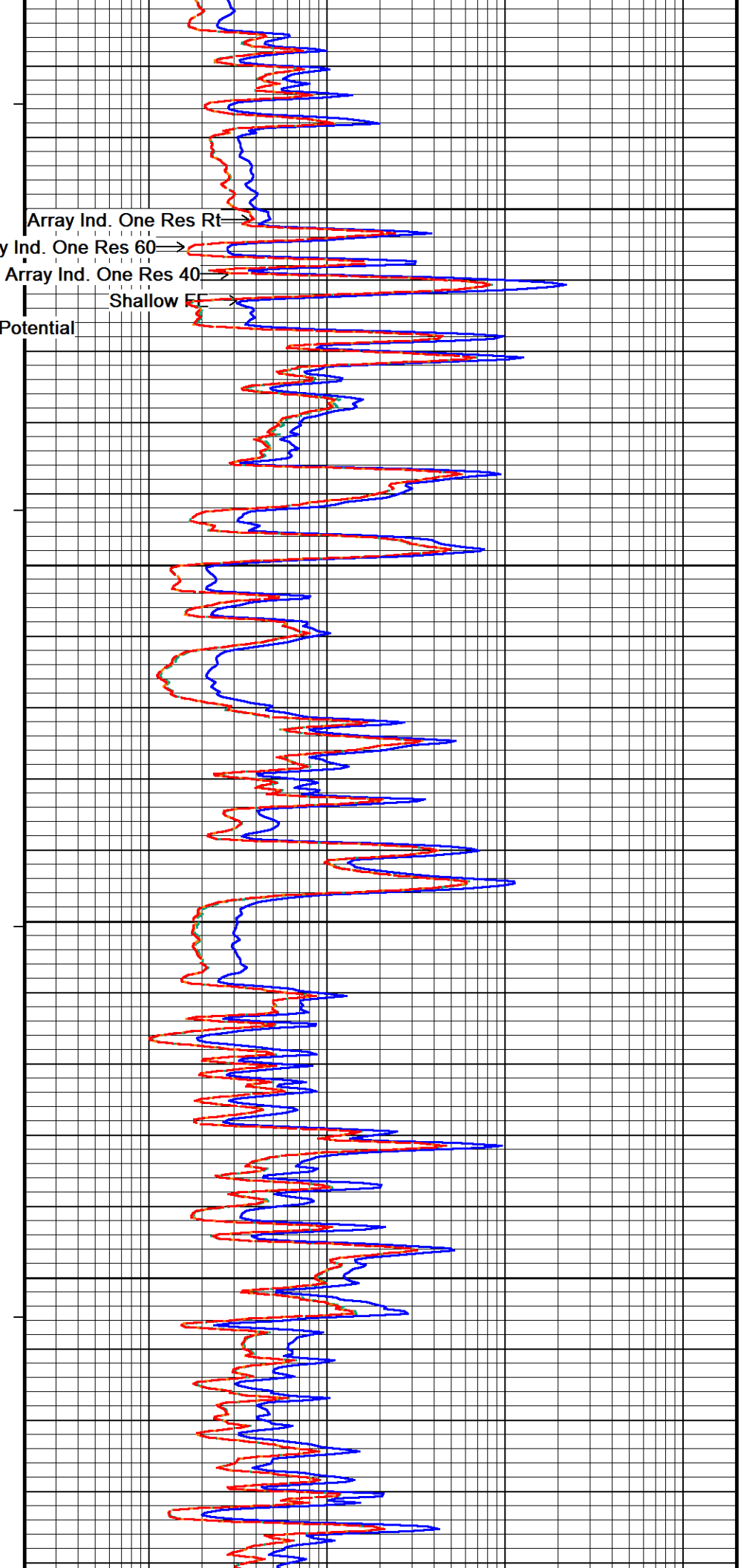
179°

7550





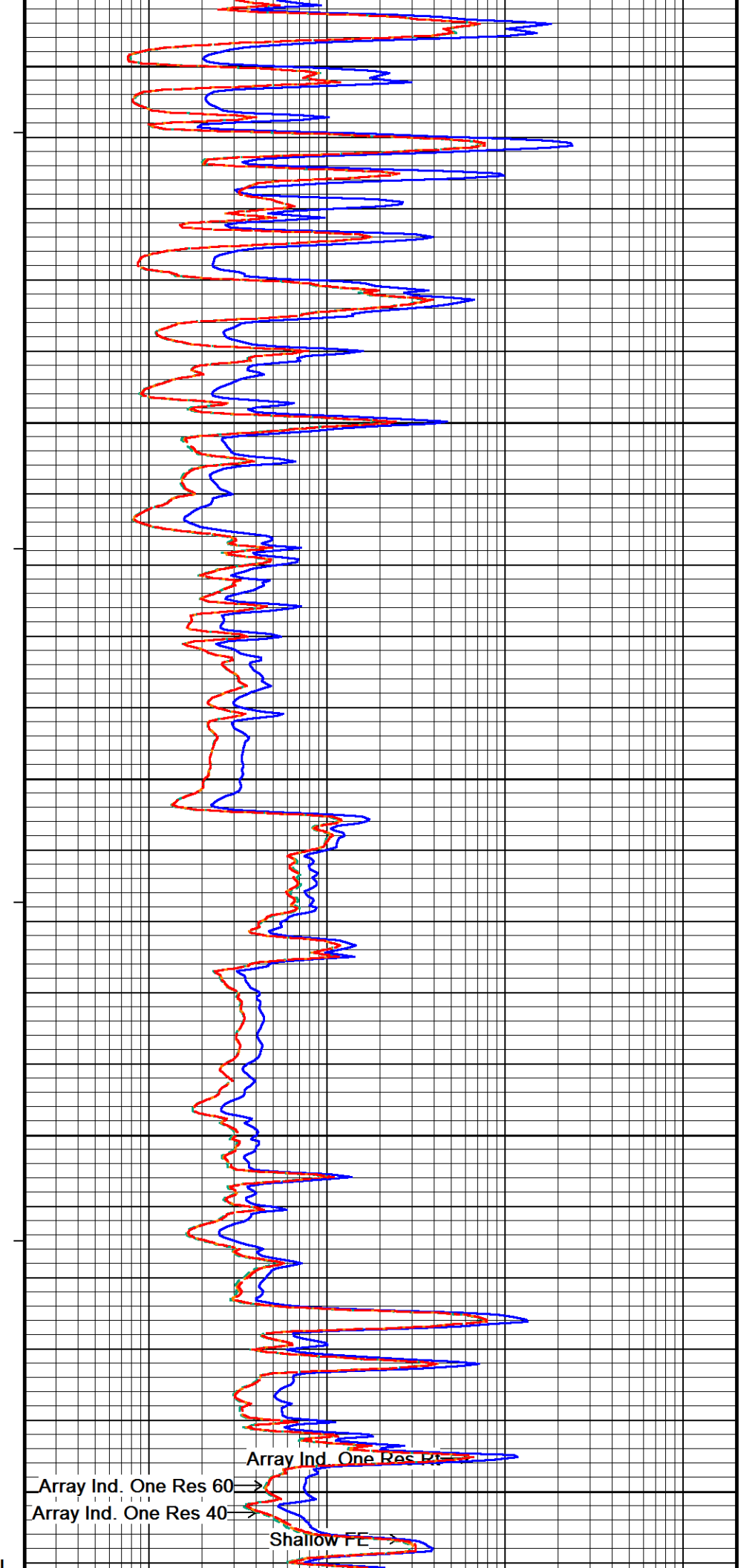
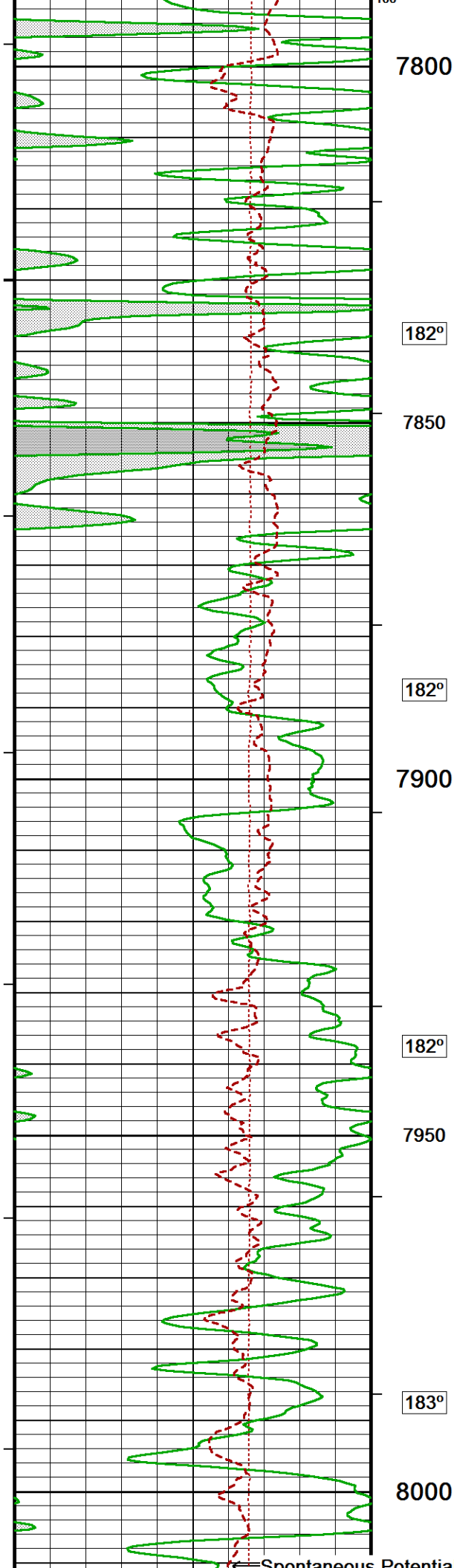
179°
7600
180°
7650
180°
7700
181°
7750
181°

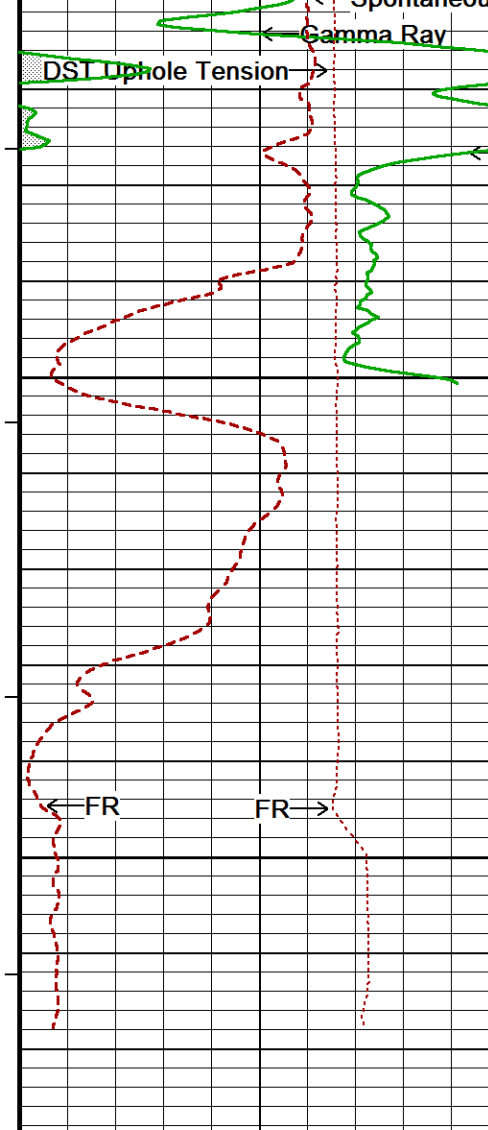


Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FF

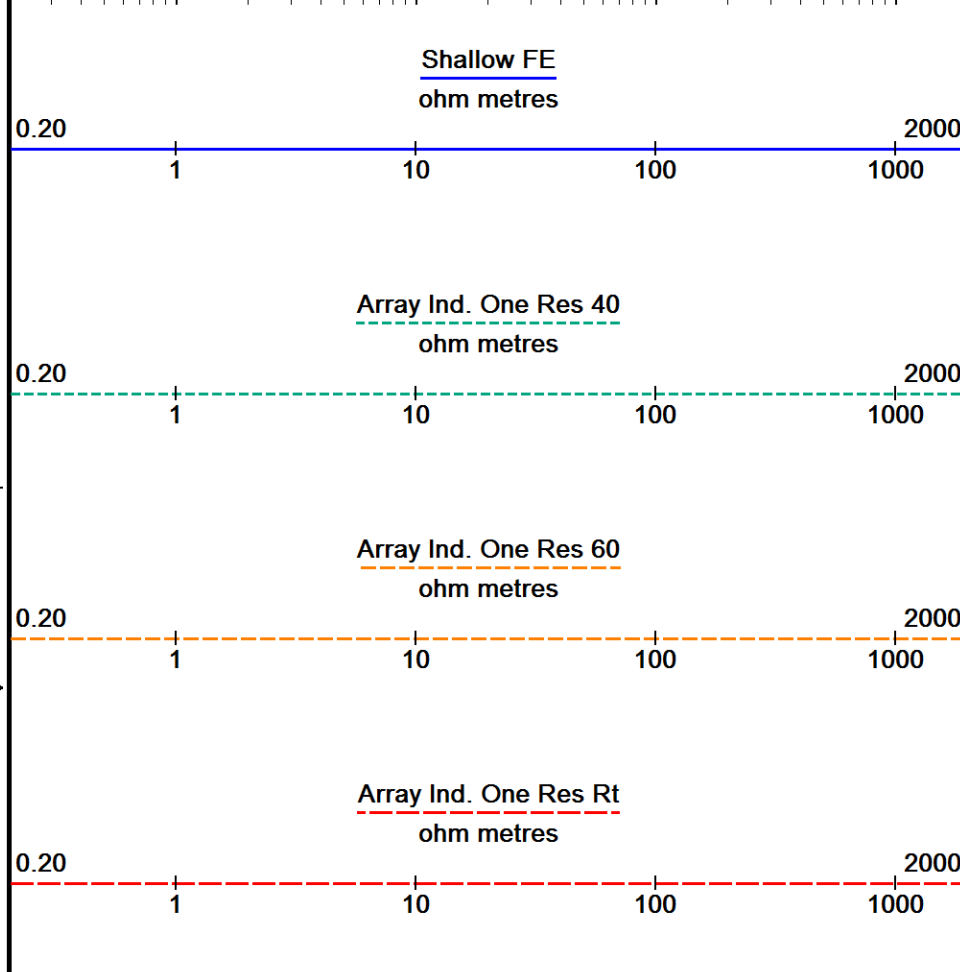
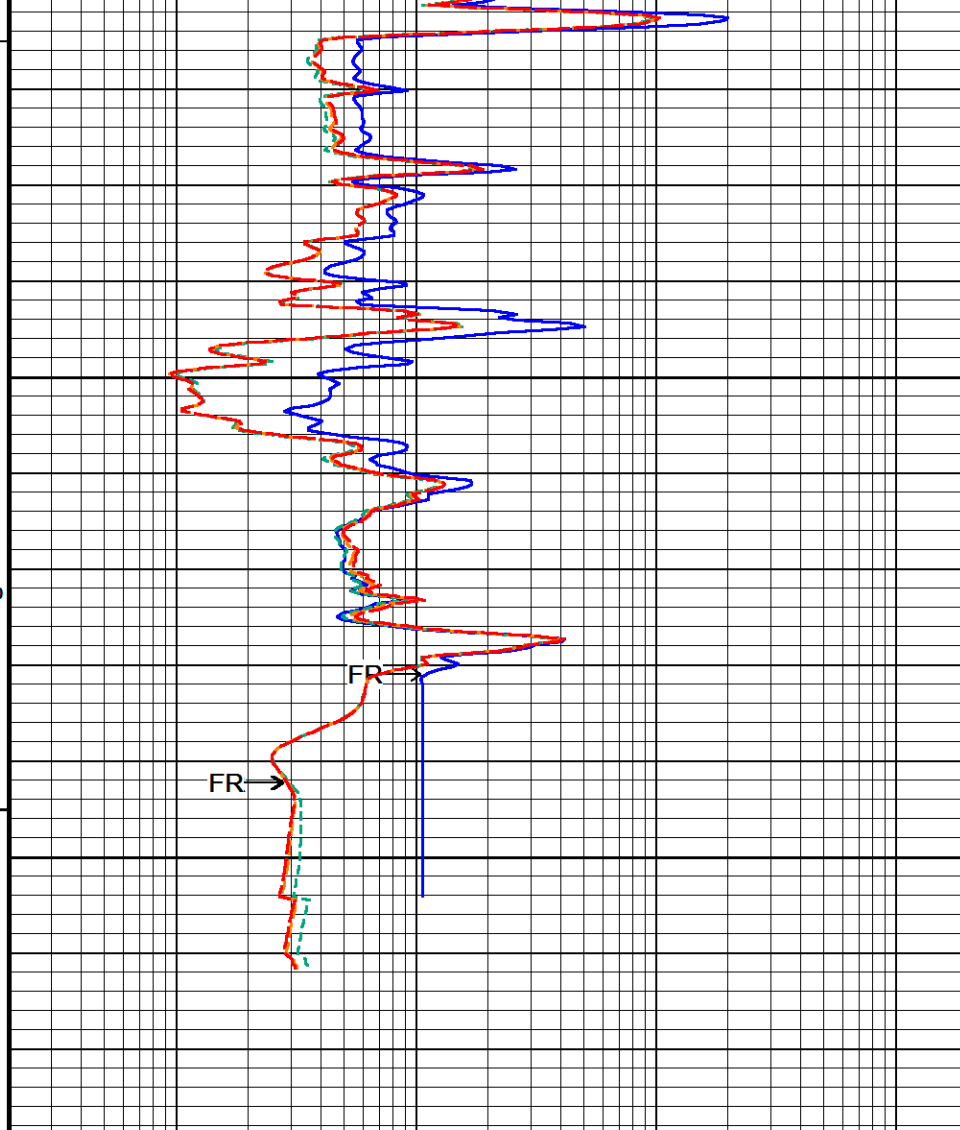
Spontaneous Potential
Gamma Ray

DST Uphole Tension





Spontaneous Potential
Gamma Ray
DST Uphole Tension
FR
183°
8050
0
TD
8100



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
Replay
Scale
1:240

↑

5 INCH MAIN

↑

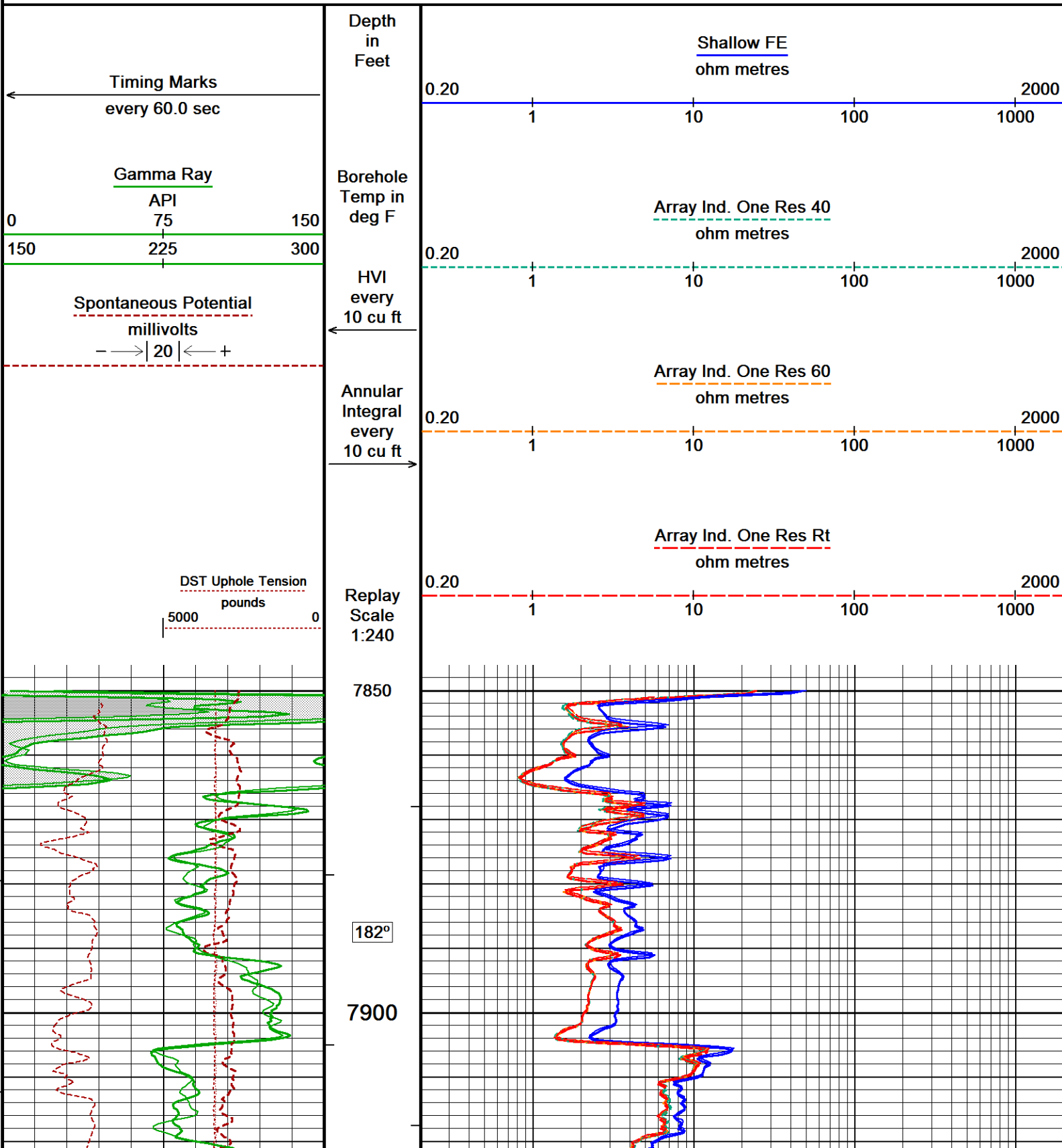
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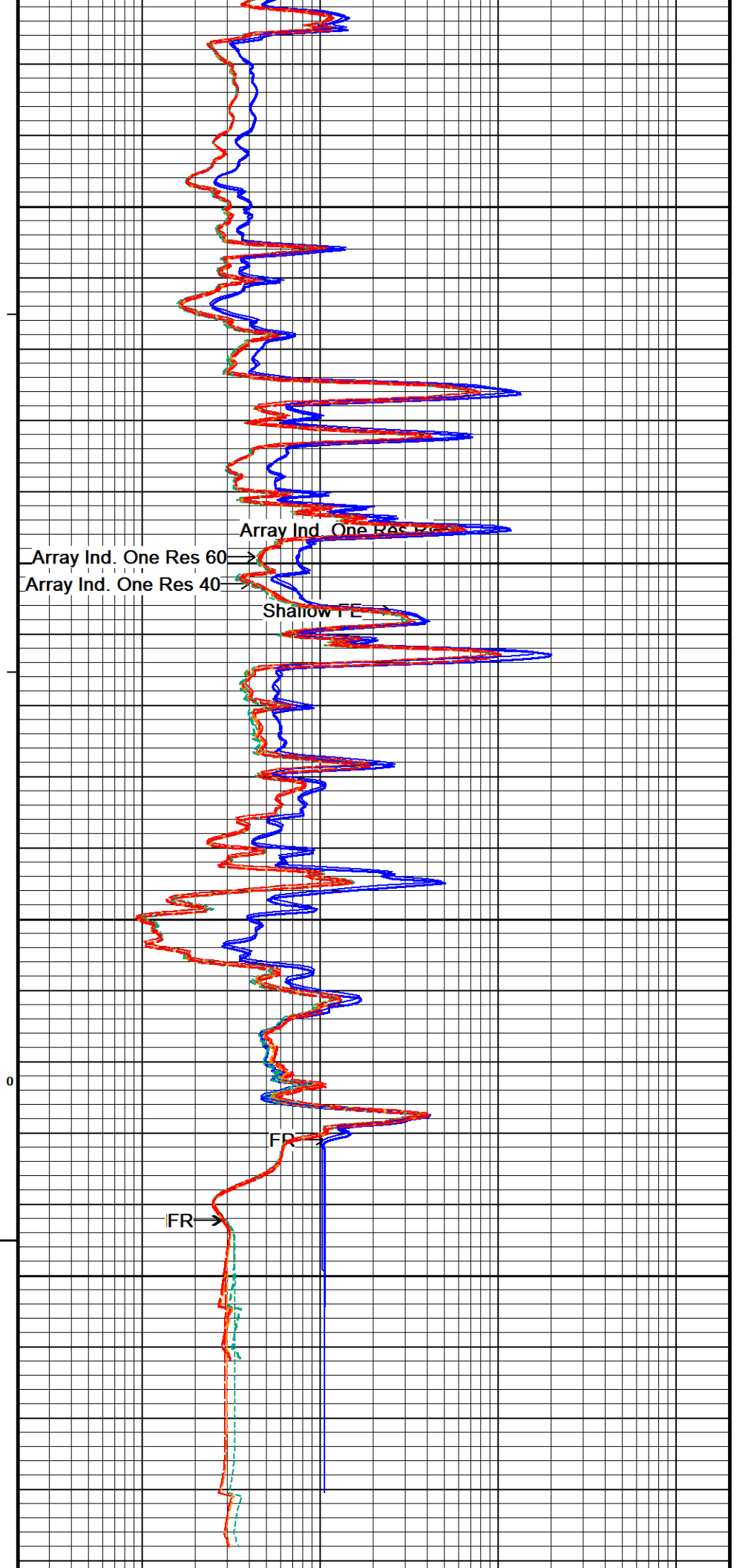
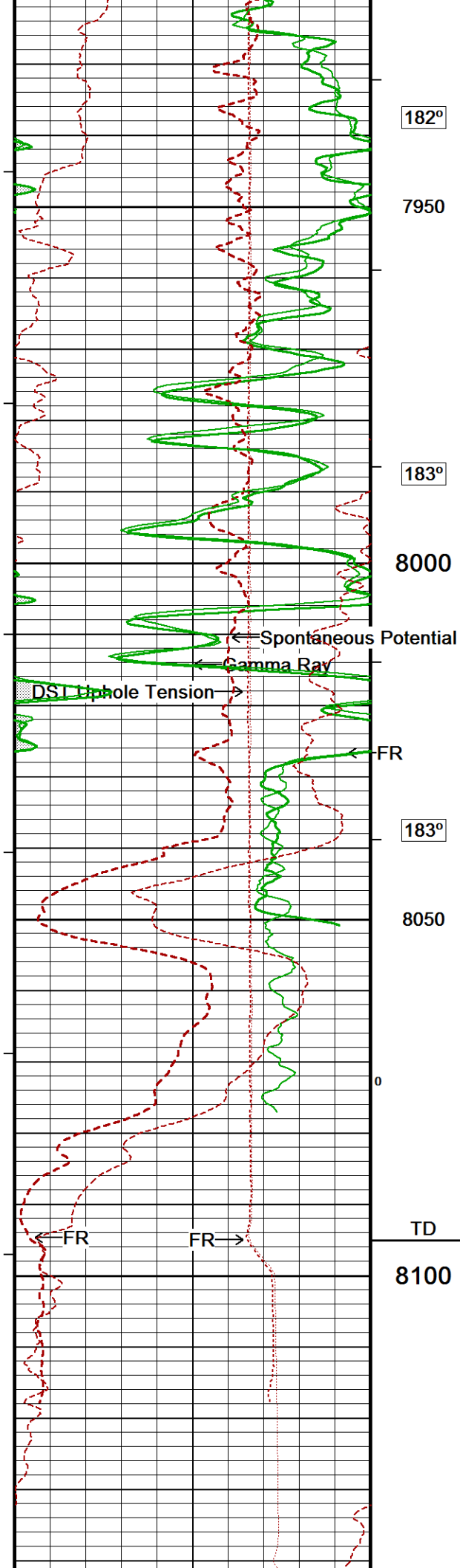
REPEAT SECTION

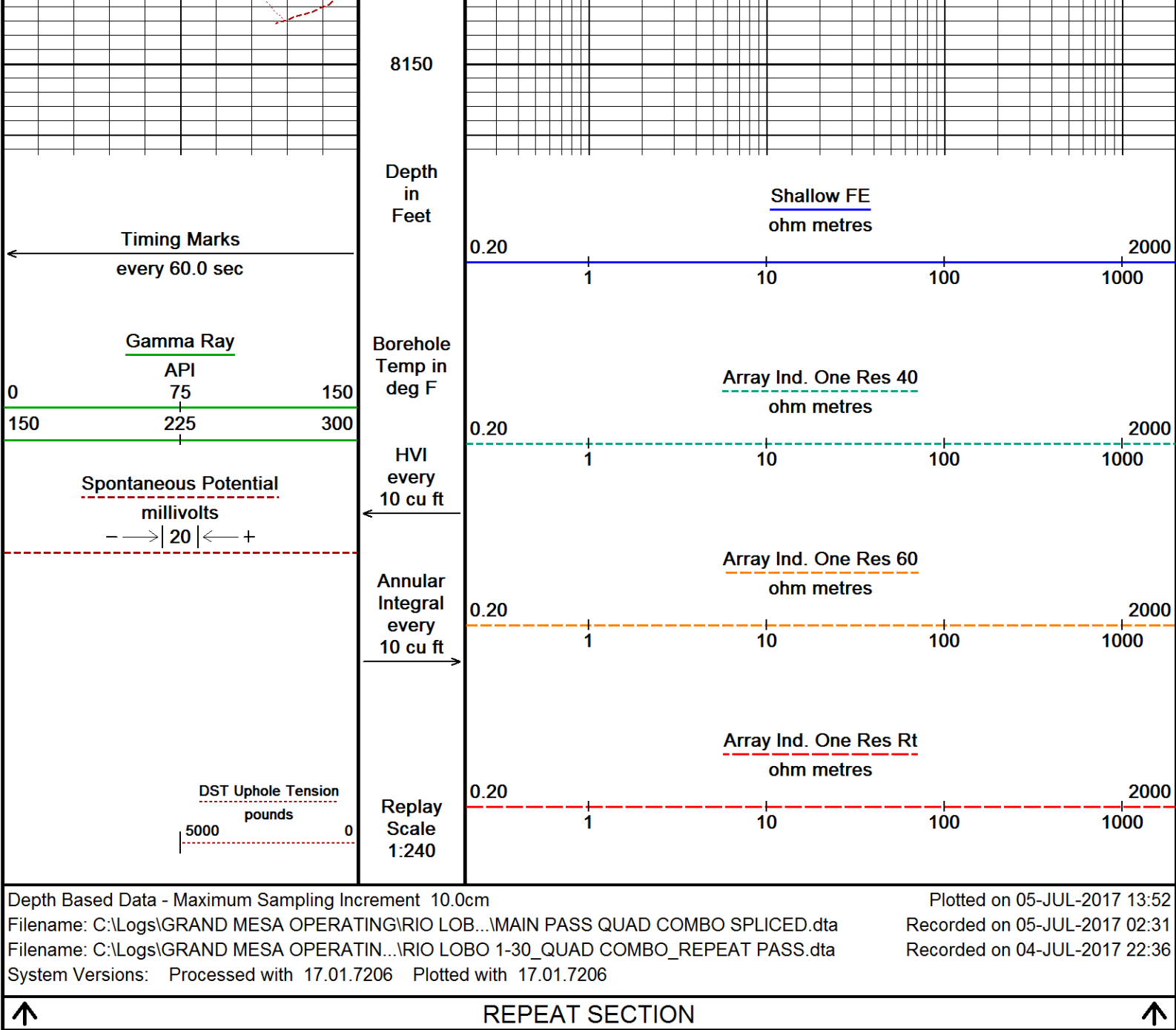
↓

Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Logs\GRAND MESA OPERATING\RIO LOB...\MAIN PASS QUAD COMBO SPLICED.dta
System Versions: Processed with 17.01.7206 Plotted with 17.01.7206

Plotted on 05-JUL-2017 13:52
Recorded on 05-JUL-2017 02:31
Recorded on 04-JUL-2017 22:36







BEFORE SURVEY CALIBRATION		
C:\Logs\GRAND MESA OPERATING\RIO LOBO 1-30\RUN_1\8367-186414219\MAIN PASS QUAD COMBO SPLICED.dta		
Caliper Calibration MPD-C.A 310		Base Calibration on 28-JUN-2017 12:55 Field Calibration on 30-JUN-2017 14:33
Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	14863	3.99
2	23472	5.96
3	32082	7.96
4	40369	9.85
5	49632	11.88
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	7.93	7.96
Caliper Calibration Tolerances MPD-C.A 310		
Long Arm Field Cal.	7.93	7.56 7.96 8.36 in

Density Calibration

Base Calibration

	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1089	1384		
Reference 1	52195	25389	59443	30683
Reference 2	20921	2506	24540	2525

Field Check at Base

1088.9 1383.8

Field Check

1091.4 1397.8

PE Calibration

Base Calibration

	WS	Measured		Calibrated
		WH	Ratio	Ratio
Background	202	980		
Reference 1	21840	52024	0.424	0.372
Reference 2	6003	20806	0.293	0.271

Field Check at Base

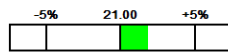
202.3 979.7

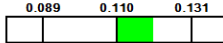
Field Check

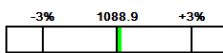
205.3 982.8

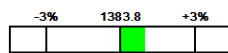
Photo Density Calibration Tolerances MPD-C.A 310

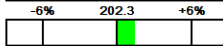
Near Density Ratio 2.58 

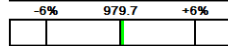
Far Density Ratio 21.39 

PE Calibration 0.120 

Near Den. Field Check 1091.4 

Far Den. Field Check 1397.8 

PE WS Field Check 205.3 

PE WH Field Check 982.8 

Density Constants MPD-C.A 310

Last Edited on 04-JUL-2017,21:40

Density Source Id	P50562B
Nylon Calibrator Number	DNC.E.652
Aluminium Calibrator Number	DACD631
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 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	Not 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	0.00

High Resolution Temperature Calibration MAI-B.J 363

Field Calibration on 19-JUN-2017,16:22

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	100.00

High Resolution Temperature Constants MAI-B.J 363

Last Edited on 19-JUN-2017,16:22

Induction Calibration MAI-B.J 363

Base Calibration on 19-JUN-2017,16:57

Field Check on 30-JUN-2017 14:44

Base Calibration

Test Loop Calibration

Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	17.8	467.2	9.3	966.2
2	6.3	374.8	7.6	821.4
3	3.8	260.7	5.2	566.0
4	2.0	132.4	2.6	279.2

Array Temperature 69.4 Deg F

Test Loop Calibration Verified

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	13.2	3898.1
2	0.0	0.0	30.7	3604.8
3	0.0	0.0	28.1	3043.1
4	0.0	0.0	19.6	2093.7
Deep	0.0	0.0	16.5	1946.5
Medium	0.0	0.0	41.2	4012.2
Shallow	0.0	0.0	46.9	5394.3
Array Temperature	0.0		89.9	Deg F

Induction Calibration Tolerances MAI-B.J 363

Low Conductivity 1	17.8		mmho/m	High Conductivity 1	467.2		mmho/m
Low Conductivity 2	6.3		mmho/m	High Conductivity 2	374.8		mmho/m
Low Conductivity 3	3.8		mmho/m	High Conductivity 3	260.7		mmho/m
Low Conductivity 4	2.0		mmho/m	High Conductivity 4	132.4		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-B.J 363

Last Edited on 04-JUL-2017,20:42

Induction Model

RtAP-WBM

Borehole Correction Constants

Tool Centred	Yes
Hole Size Source	Density Caliper
Hole Size Constant Value	N/A inches
Stand-off Type	N/A
Stand-off	N/A inches
Number of Fins on Stand-off	N/A
Stand-off Fin Angle	N/A degrees
Stand-off Fin Width	N/A 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	mhos/metre
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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	

FE Calibration MFE-C.A 417

Base Calibration on 09-MAY-2017 12:36
Field Check on 10-JUN-2017 03:57

Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	962.4	126.8
Base Check		281.5
Field Check		281.6

FE Calibration Tolerances MFE-C.A 417

Reference 2	962.4	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm
Base Check	281.5	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm-m
Field Check	281.6	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm-m

FE Constants MFE-C.A 417

Last Edited on 04-JUL-2017,20:42

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	

Sonic Constants MSS-D.A 387

Last Edited on 16-JUN-2017,09:44

Maximum Boundary Contrast	70.00	micro-sec/ft
Fluid Transit Time	189.00	micro-sec/ft
Limestone Transit Time	47.50	micro-sec/ft
Sandstone Transit Time	55.50	micro-sec/ft
Dolomite Transit Time	43.50	micro-sec/ft
Sonic used for Porosities	3-5' Compensated	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	0.00	micro-sec
MX3FT	1500.00	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft

Sonde Mode	Compensated
Hole Type	Open Hole

Sonde Parameters

Offset	Measured	Calibrated
	0.0000	0.0000
Free Pipe	0.0000	

Peak Amplitude Source

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

Processed Fixed Gate Parameters

Waveform Used For Processing		N/A		
Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	Depth (ft)	
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	
0.00	0.00	0.00	0.00	

Full Waveform Parameters

Use 3' Waveform to derive TR	No	
Use 4' Waveform to derive TR	No	
Use 5' Waveform to derive TR	No	
Use 6' Waveform to derive TR	No	
3' Waveform Discriminator Level	0.30	mV
4' Waveform Discriminator Level	0.30	mV
5' Waveform Discriminator Level	0.15	mV
6' Waveform Discriminator Level	0.15	mV
Waveform Discriminator Filter	Not Applied	
Semblance Window Width	150.00	micro-sec
Sonic Despiker		

Neutron Calibration MDN-C.A 464

Base Calibration on 28-JUN-2017 15:50
Field Check on 30-JUN-2017 14:30

Base Calibration					
		Measured		Calibrated (cps)	
		Near	Far	Near	Far
		3028	93	3714	110
Ratio		32.626		33.764	
Field Calibrator at Base					
				Calibrated (cps)	
				1393	2071
Ratio				0.673	
Field Check					
				Calibrated (cps)	
				1399	2063
Ratio				0.678	

Neutron Calibration Tolerances MDN-C.A 464

Ratio	32.626	<div> <div>-5%</div> <div>33</div> <div>+5%</div> </div>
Base Check	0.673	<div> <div>0.65</div> <div>0.7</div> <div>0.75</div> </div>
Field Check	0.678	<div> <div>0.653</div> <div>0.673</div> <div>0.693</div> </div>

Neutron Constants MDN-C.A 464

Last Edited on 30-JUN-2017,16:18

Neutron Source Id	N-1057	
Neutron Jig Number	5922NE	
Air Hole Processing	Modified Ratio	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	7.00	cu
Dolomite Sigma	4.70	cu

Formation Pressure Source	Constant Value	
Formation Pressure	0.00	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	Constant Value	
Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	

Micro Normal and Micro Inverse Calibration MMR-C.A 229

Base Calibration on 25-MAY-2017 02:03
Field Check on 04-JUL-2017 18:58

Base Calibration

Channel	Measured		Calibrated (ohm-m)	
	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	9.9	49.5	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	93.9	93.9
Micro Inverse	62.2	62.2

Micro Normal & Micro Inverse Calibration Tolerance MMR-C.A 229

Micro Normal Res. 1	9.9	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm	Micro Normal Res. 2	49.5	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm
Micro Inverse Res. 1	10.0	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm	Micro Inverse Res. 2	49.5	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm
Micro Normal Base Check	93.9	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm-m				
Micro Inverse Base Check	62.2	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm-m				
Micro Normal Field Check	93.9	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm-m				
Micro Inverse Field Check	62.2	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm-m				

Micro Normal and Micro Inverse Constants MMR-C.A 229

Last Edited on 25-MAY-2017,01:53

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	

Micro Laterolog Calibration MMR-C.A 229

Base Calibration on 23-MAY-2017,23:57
Field Check on 23-MAY-2017,23:57

Base Calibration

Ref 1	Measured		Calibrated (ohm-m)	
	Ref 1	Ref 2	Ref 1	Ref 2
0.0	9911.7	0.0	128.0	

Base Check (ohm-m)	Field Check (ohm-m)
5.2	5.2

Micro Laterolog Calibration Tolerances MMR-C.A 229

Ref 2	9911.7	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm
Base Check	5.2	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm-m
Field Check	5.2	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm-m

Micro Laterolog Constants MMR-C.A 229

Last Edited on 24-MAY-2017,12:42

Pad Type	6 in Solid Nylon B23059		
Micro Laterolog K Factor	0.0128		
Standoff Offset	0.0000	inches	

Mudcake Thickness Correction Constants

Mud Cake Source	Constant Value	
Mud Cake Thickness	0.4000	inches
Mud Cake Thickness Caliper	N/A	

Mud Cake Resistivity	0.1500	ohm-m
Mud Cake Resistivity Temp.	68.00	Deg F
Mud Cake Resistivity Source	Constant Value	
Temp. for Rmc Corr.	N/A	

Caliper Calibration MMR-C.A 229			Base Calibration on 04-JUL-2017 18:55
			Field Calibration on 04-JUL-2017 18:57
Base Calibration			
Reading No	Measured	Calibrator Size (in)	
1	13741	5.96	
2	16951	7.96	
3	20207	9.85	
4	24130	11.88	
5	0	0.00	
6	N/A	N/A	
Field Calibration			
	Measured Caliper (in)	Actual Caliper (in)	
	7.98	7.96	

Caliper Calibration Tolerances MMR-C.A 229			
Short Arm Field Cal.	7.98	<div> <div>7.76</div> <div>7.96</div> <div>8.16</div> </div>	in

Micro-Resistivity Caliper Constants MMR-C.A 229		Last Edited on
Sonde Configuration	Resistivity Mode	

High Resolution Temperature Calibration MCG-D.K 483			Field Calibration on 05-MAY-2017,11:02
	Measured	Calibrated(Deg F)	
Lower	66.00	66.00	
Upper	209.00	209.00	

High Resolution Temperature Constants MCG-D.K 483			Last Edited on 28-APR-2017,13:18
Pre-filter Length	11		

SP Calibration MCG-D.K 483			Field Calibration on 16-MAY-2017 09:09
	Measured	Calibrated (mV)	
Reference 1	100.8	100.0	
Reference 2	-97.0	-97.0	

Gamma Calibration MCG-D.K 483			Field Calibration on 30-JUN-2017 14:25
	Measured	Calibrated (API)	
Background	208	142	
Calibrator (Gross)	1551	1054	
Calibrator (Net)	1343	912	

Gamma Calibration Tolerances MCG-D.K 483			
Ratio	1.472	<div> <div>1.40</div> <div>1.475</div> <div>1.55</div> </div>	Counts/API

Gamma Constants MCG-D.K 483			Last Edited on 01-JUL-2017,10:32
Gamma Calibrator Number	GRC.C.072		
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	%	

General Constants All 000			Last Edited on 04-JUL-2017,22:51
General Parameters			
Mud Resistivity	1.200	ohm-metres	
Mud Resistivity Temperature	50.000	degrees F	
Water Level	0.000	feet	
Borehole Fluid Processing	Wet Hole		

Hole/Annular Volume and Differential Caliper Parameters	Single Caliper	
HVOL Method	Density Caliper	
HVOL Caliper 1	N/A	
HVOL Caliper 2	5.500	inches
Annular Volume Diameter	Density Caliper	
Caliper for Differential Caliper		

Rwa Parameters	
Porosity used	Crossplot Porosity
Resistivity used	Array Ind. One Res Rt
RWA Constant A	0.620
RWA Constant M	2.150
SW/APOR Tool Source	0.000

DOWNHOLE EQUIPMENT

C:\Logs\GRAND MESA OPERATING\RIO LOBO 1-30\RUN_118367-186414219\MAIN PASS QUAD COMBO SPLICED.dta

Cablehead, 11 pin
CBH-CA 121 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

11C-11B Compact Tool Adaptor
MTA-K.A 164 LG: 1.53 ft WT: 13.2 lb OD: 2.240 in

Compact Swivel Head Adaptor
SHA-J.B 588 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

Compact Comms Gamma
MCG-D.K 483 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity
MMR-C.A 229 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron
MDN-C.A 464 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-C.A 310 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Inline Bowspring sub
MIS-D.B 823 LG: 5.70 ft WT: 33.1 lb OD: 2.244 in

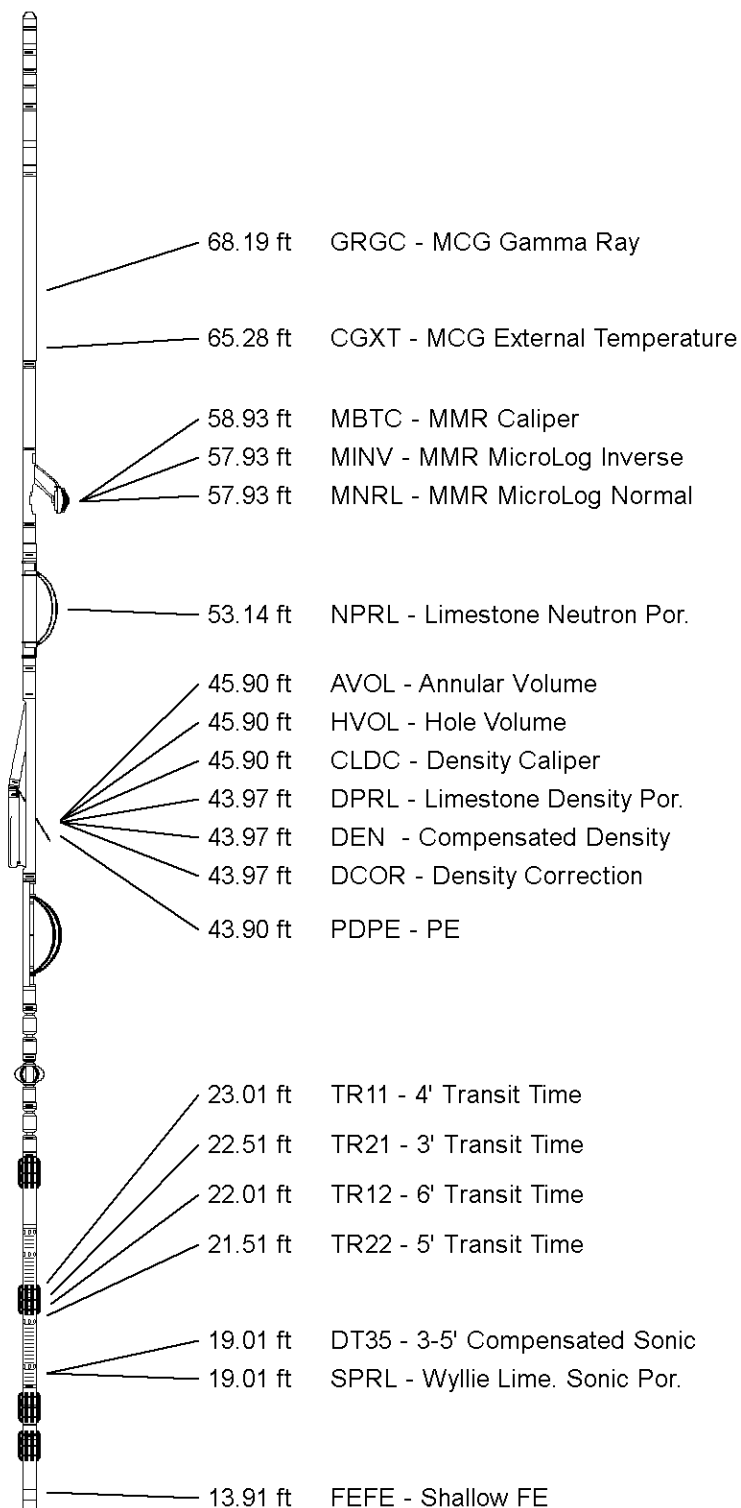
Compact Knuckle Joint
SKJ-E.B 533 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

Compact Inline Standoff sub
MIS-E.B 784 LG: 2.14 ft WT: 15.4 lb OD: 2.244 in

Compact Knuckle Joint
SKJ-E.A 244 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

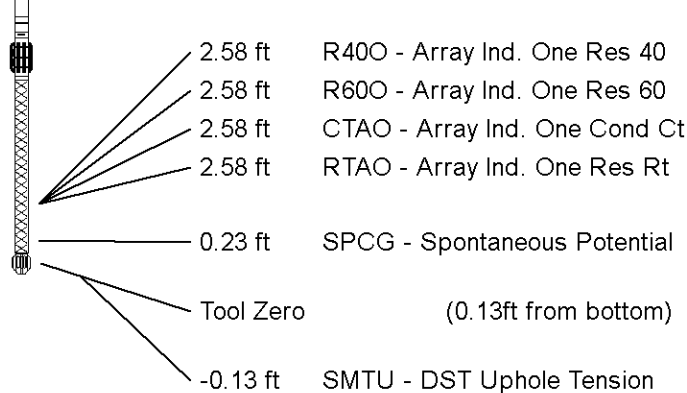
Compact Sonic
MSS-D.A 387 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Focussed Electric
MFE-C.A 417 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in



Compact Induction
MAI-B.J 363 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 79.69 ft Weight: 612.9 lb



All measurements relative to tool zero.

COMPANY GRAND MESA OPERATING CO.
WELL RIO LOBO 1-30
FIELD WILDCAT
PROVINCE/COUNTY WASHINGTON
COUNTRY/STATE U.S.A. / COLORADO

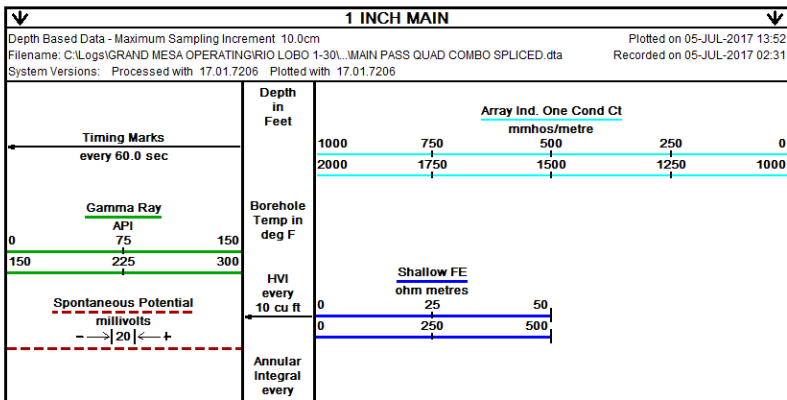
Elevation Kelly Bushing	5157	feet	First Reading	8092.00	feet
Elevation Drill Floor	5157	feet	Depth Driller	8099.00	feet
Elevation Ground Level	5138	feet	Depth Logger	8095.00	feet

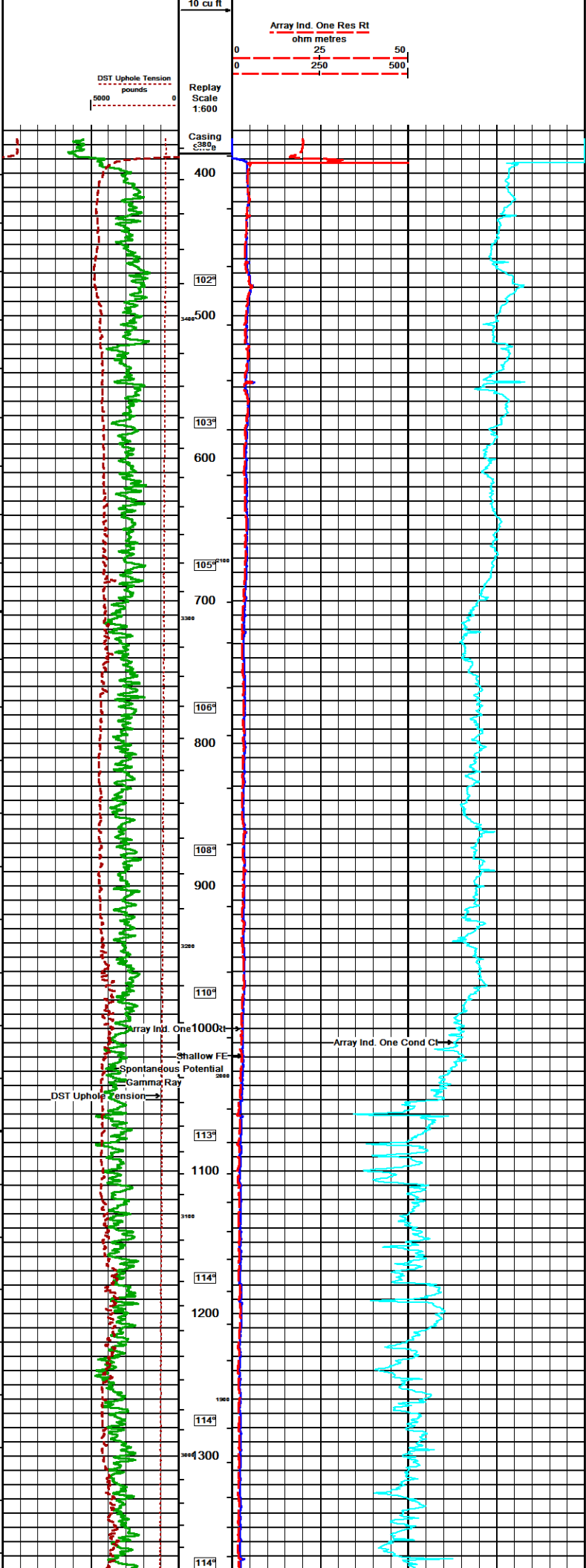


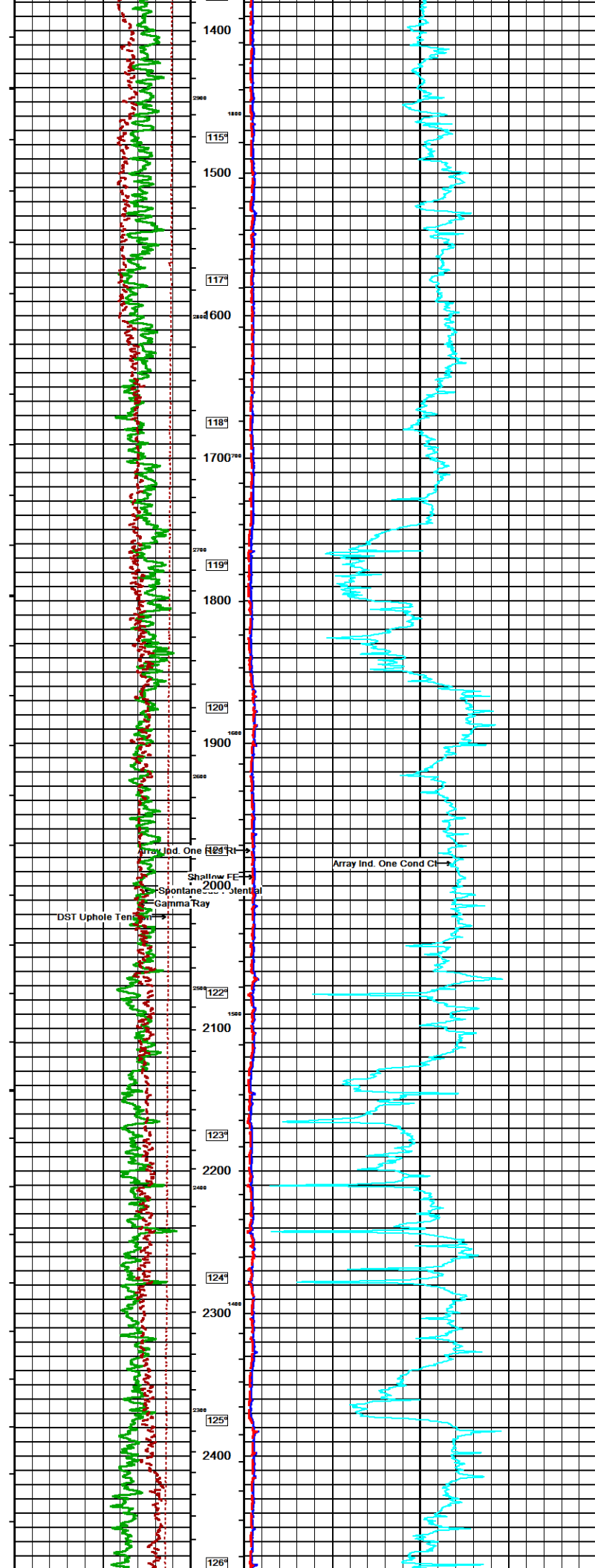
ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

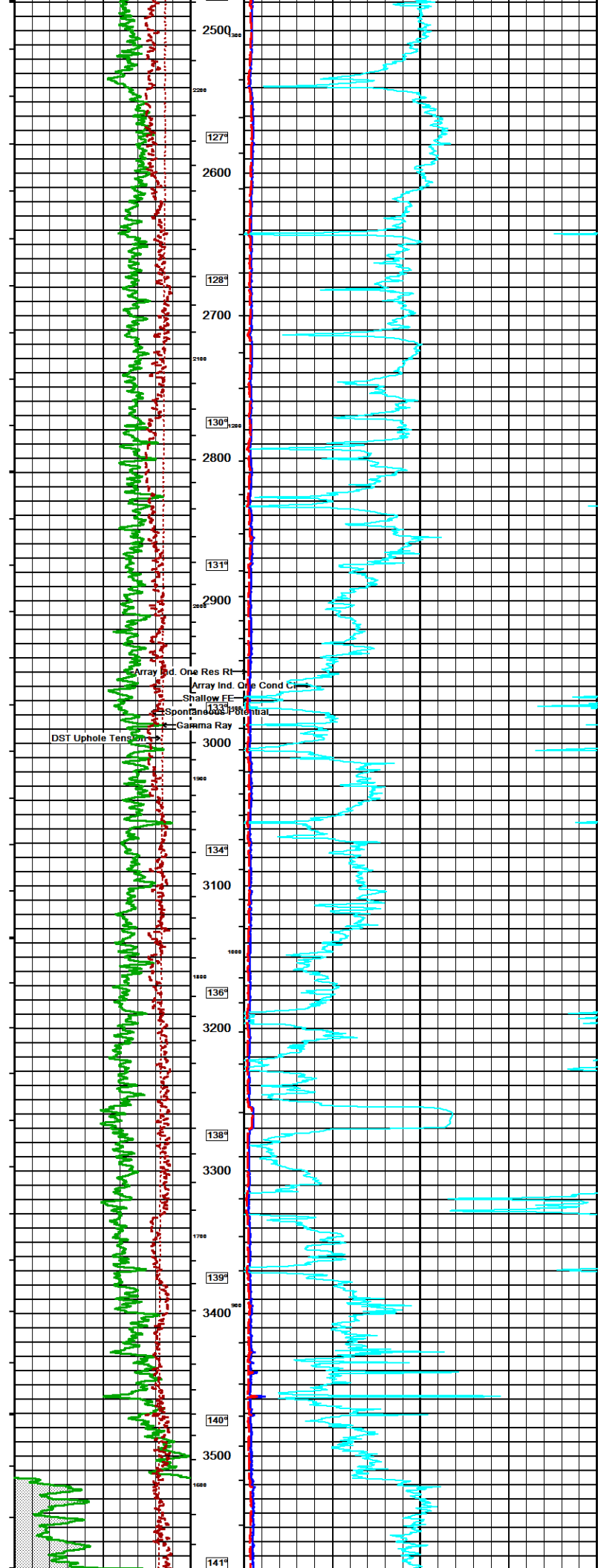
Weatherford®

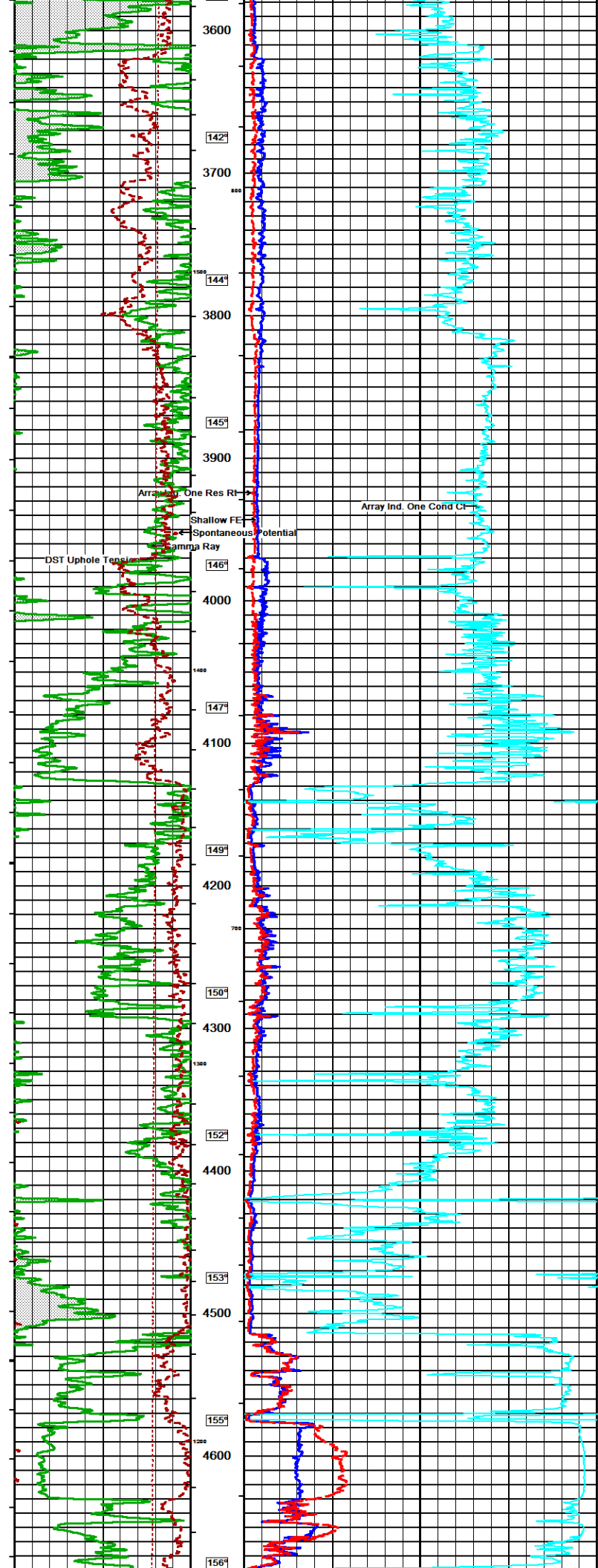
Weatherford®		ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG	
COMPANY	GRAND MESA OPERATING CO.	WELL	RIO LOBO 1-30
FIELD	WILDCAT	PROVINCE/COUNTY	WASHINGTON
COUNTRY/STATE	U.S.A. / COLORADO	LOCATION	SHL: 2474' FWL & 610' FWL
SEC 30	TWP 5S	RGE 53N	TIME SAMP
Latitude	39.588320	DUAL SPACED NEUTRON	COMPENSATED SONIC
Longitude	-103.888192	PHOTO DENSITY	MICROLOG
Log Number	05-12-11063		
Permanent Datum GL Elevation	5138 feet		
Log Measured From KB	10.00 feet above Permanent Datum		
Drilling Measured From KB			
Date	04-JUL-2017		
Run Number	ONE		
Service Order	8367-186414219		
Depth Driller	8099.00	feet	
Depth Logger	8095.00	feet	
First Reading	8092.00	feet	
Last Reading	376.00	feet	
Casing Driller	386.00	feet	
Casing Logger	386.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.40 lb/cu ft	76.00 CP	
pH / Fluid Loss	---	---	
Sample Source	FLOWLINE		
Rm @ Measured Temp	1.20 @ 50.0	ohm-m	
Rmt @ Measured Temp	0.96 @ 50.0	ohm-m	
Rinc @ Measured Temp	1.44 @ 50.0	ohm-m	
Source Rmt / Rinc	CALC	CALC	
Rm @ BHT	0.347 @ 183.0	ohm-m	
Time Since Circulation	12 HOURS		
Max Recorded Temp	183.00	deg F	
Equipment / Base	13174	CASPER	
Recorded By	ANDREW ESTAUCHOFFE		
Witnessed By	KENT MATSON		

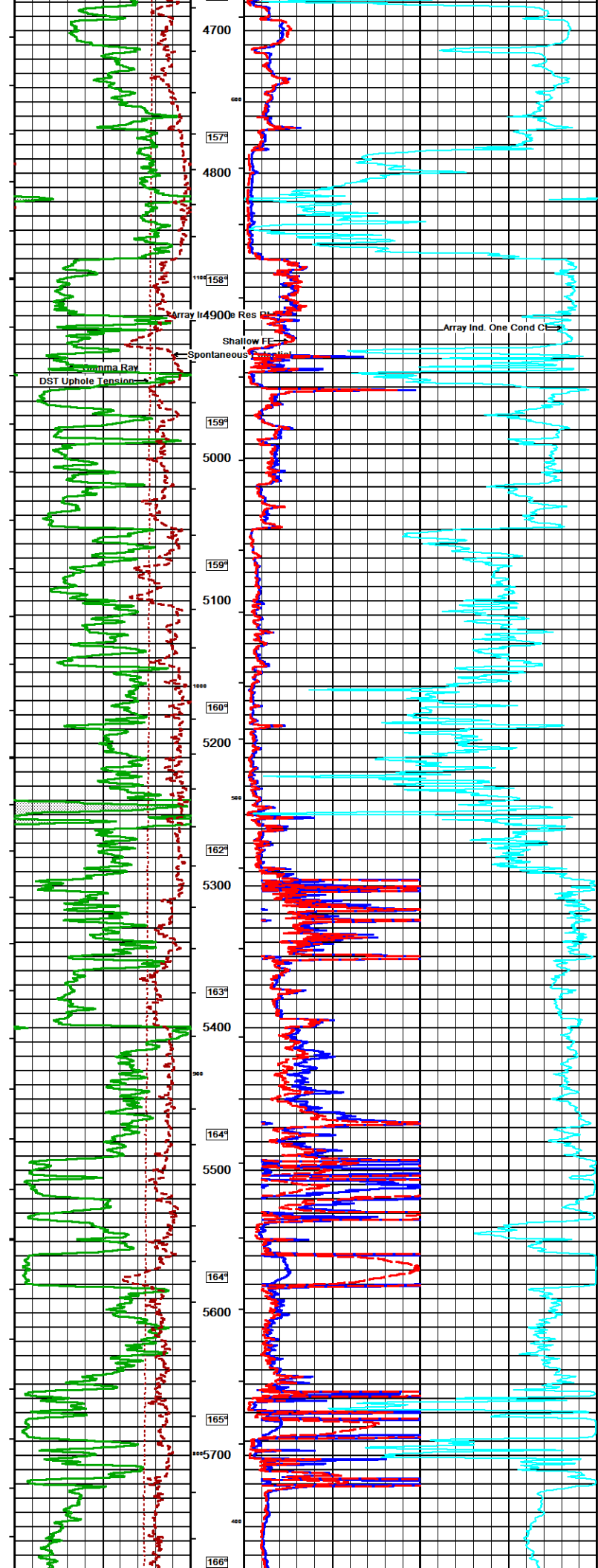


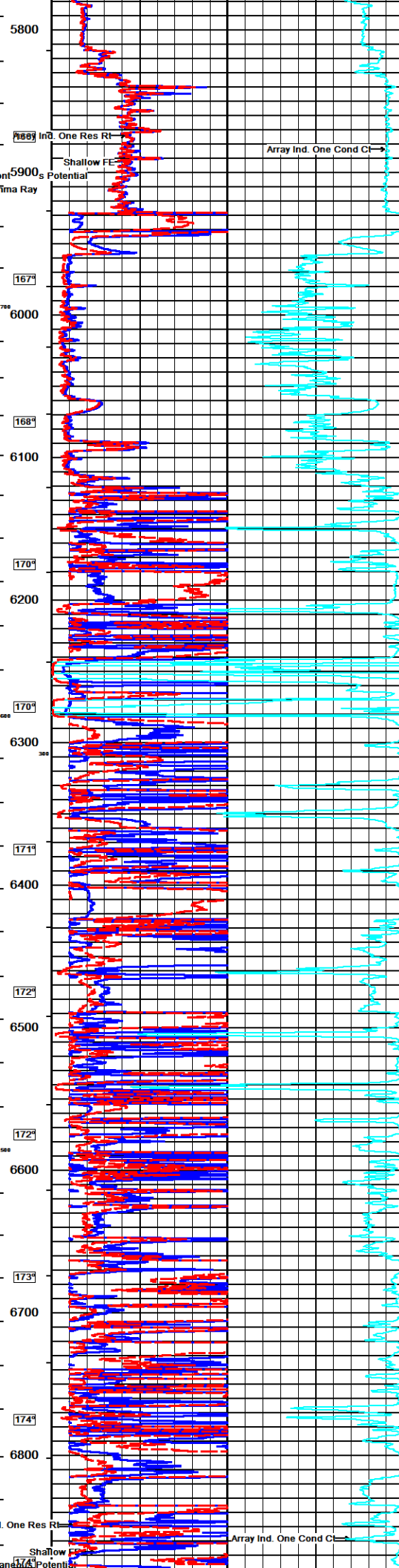
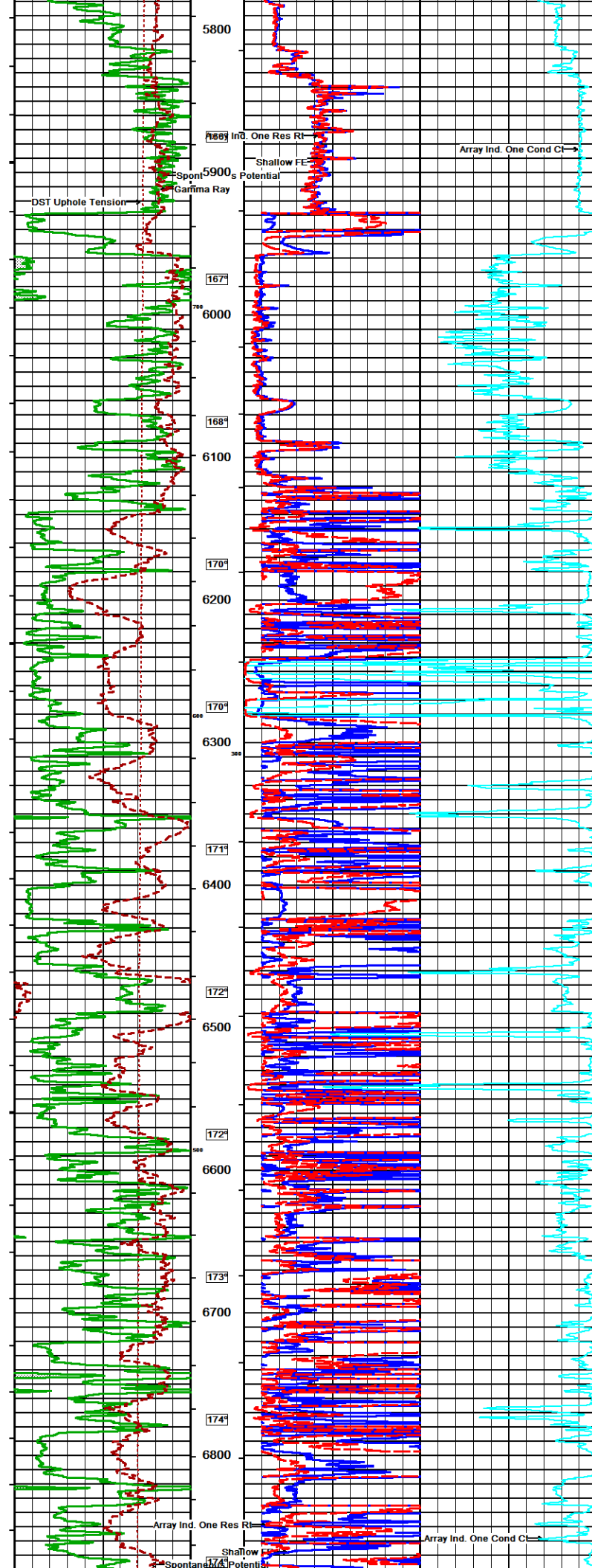


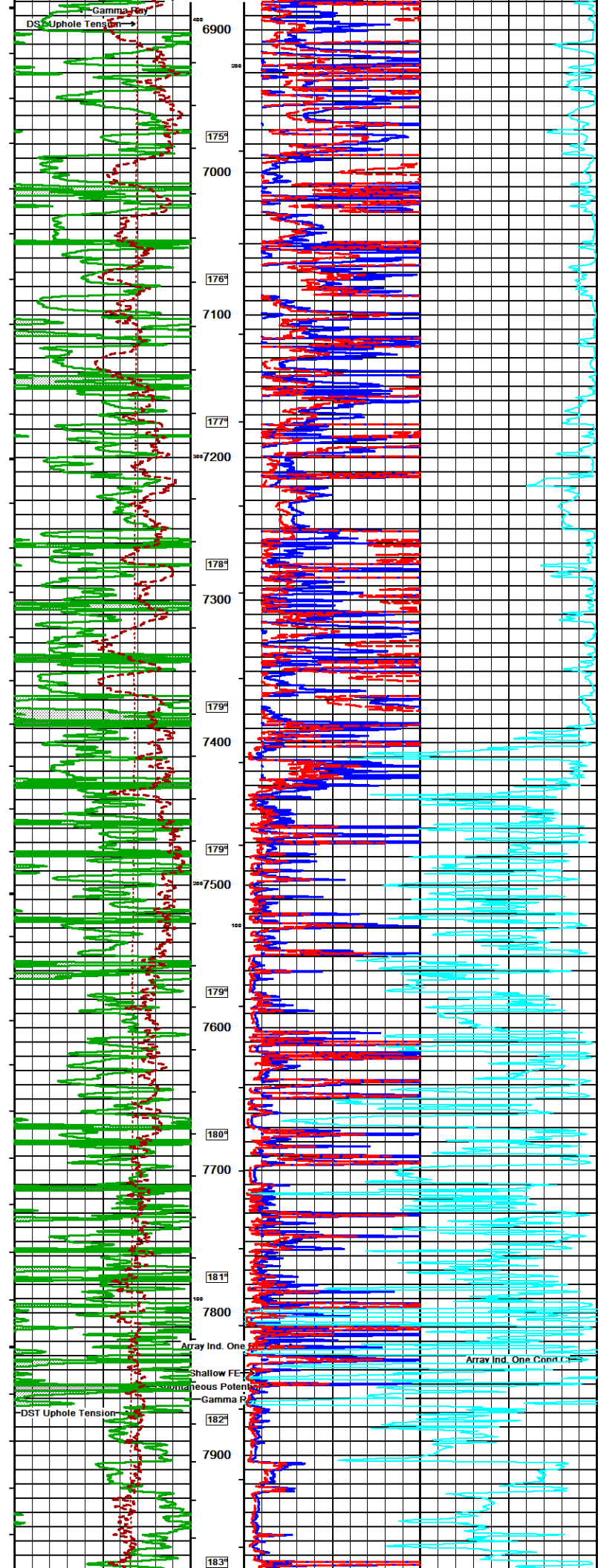


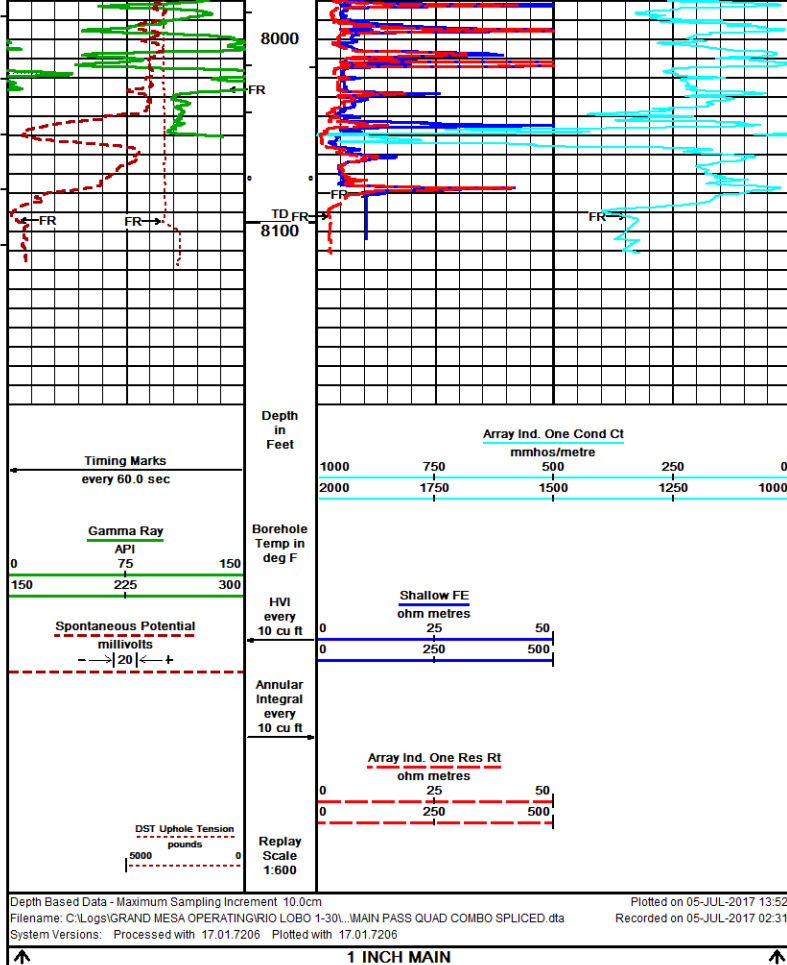












ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG