



**ARRAY INDUCTION  
SHALLOW FOCUSED  
\*\*\* TVD \*\*\***

COMPANY		NAVEX RESOURCES LLC	
WELL		PFAFFLY #1-12	
FIELD		NORTH CHEYENNE PROJECT/ PFAFFLY PROSPECT	
COUNTY		KIT CARSON	
STATE		COLORADO	
LOCATION		1602' FSL & 1269' FWL	
SEC 12	TWP 11S	RGE 46W	Other Services
Latitude	39.1037632	PHOTO-DENSITY	NEUTRON
Longitude	-102.5167609	COMPENSATED SONIC	MICRO LOG
API Number	05-063-06363		
Permanent Datum Gl. Elevation 4466.9 feet			
Log Measured From KB		12.10 feet above Permanent Datum	
Drilling Measured From KB			
Date	26-MAY-2023		Elevations: KB 4479.00 DF 4479.00 GL 4466.90
Run Number	ONE		
Service Order	T1-230526WFT		
Depth Driller	6076.00	feet	
Depth Logger	6082.00	feet	
First Reading	6078.00	feet	
Last Reading	648.00	feet	
Casing Driller	651.00	feet	
Casing Logger	648.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	WBM		
Density / Viscosity	9.10 lb/USg	63.00 sec/qt	
PH / Fluid Loss	10.00	8.00 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	0.71 @ 86.0	ohm-m	
Rmf @ Measured Temp	0.61 @ 86.0	ohm-m	
Rmc @ Measured Temp	1.01 @ 86.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.36 @154.0	ohm-m	
Time Since Circulation	8 HRS		
Max Recorded Temp	154.00	deg F	
Equipment / Base	10001	OKC	
Recorded By	B. GRAHMANN		
Witnessed By	CRAIG ADAMS		
Rig Name	DUKE #9		

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.

Powered by Weatherford tools, acquisition systems, and software

BOREHOLE RECORD			Last Edited: 26-MAY-2023 11:08
Bit Size inches	Depth From feet	Depth To feet	
12.250	0.00	651.00	
7.875	651.00	6076.00	
CASING RECORD			
Type	Size inches	Depth From feet	Shoe Depth feet
SURFACE	8.625	0.00	651.00
			Weight pounds/ft
			36.00

REMARKS

WWLS VERSION 21.11

- TOOLSTRING:

RUN 1 : MAI, MSS, MFE, SKJ, MVC, MPD, MDN, MMR, MCG, SHA, MTA, CBHC

- HARDWARE USED:

MAI: 1" STANDOFF  
 MFE: 1" STANDOFF  
 MSS: 1" STANDOFFS  
 MDN: DUAL ECCENTERED BOWSPRING

- 2.71 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY.

- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING

- CREW

J. WILLIS, D. STEELE

2 INCH MAIN PASS TVD

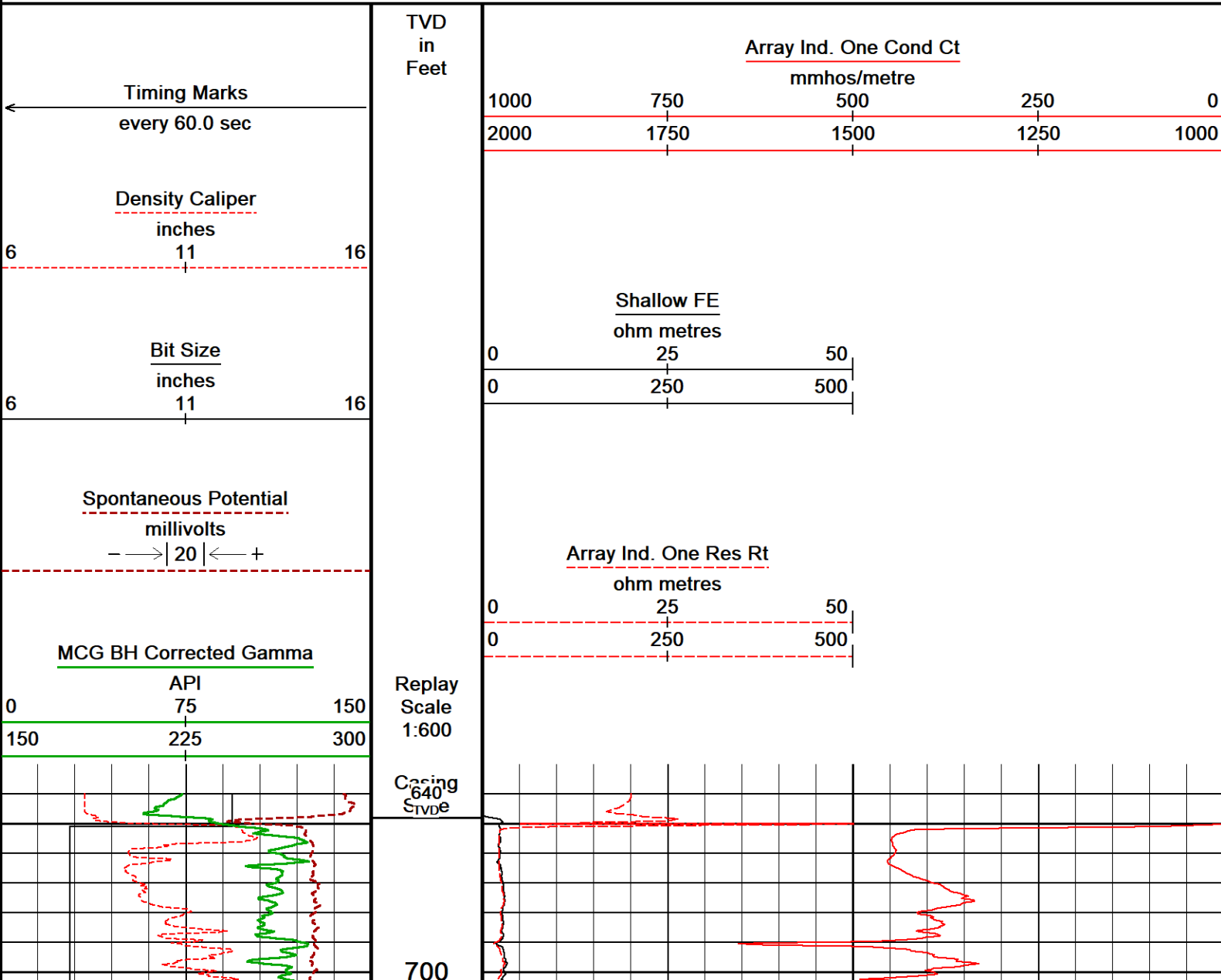
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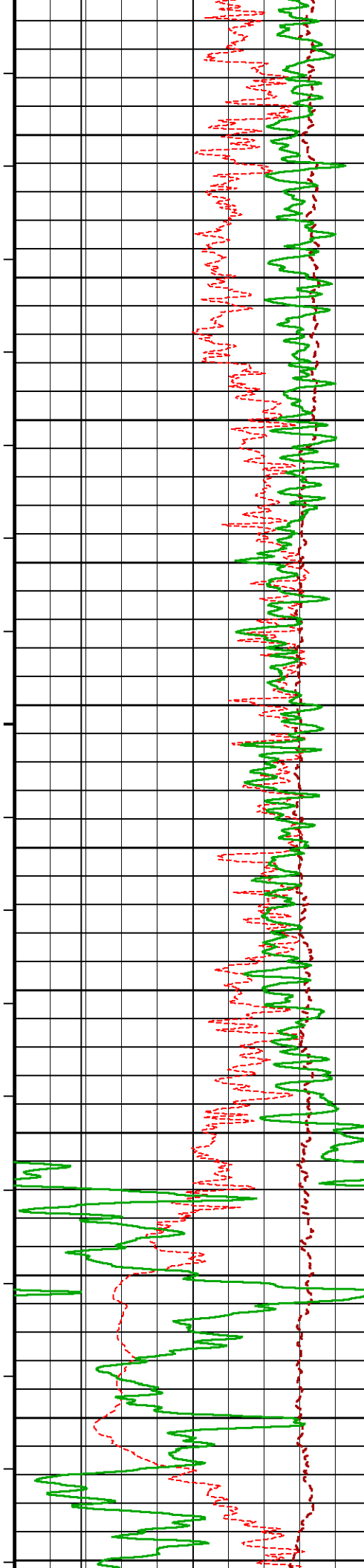
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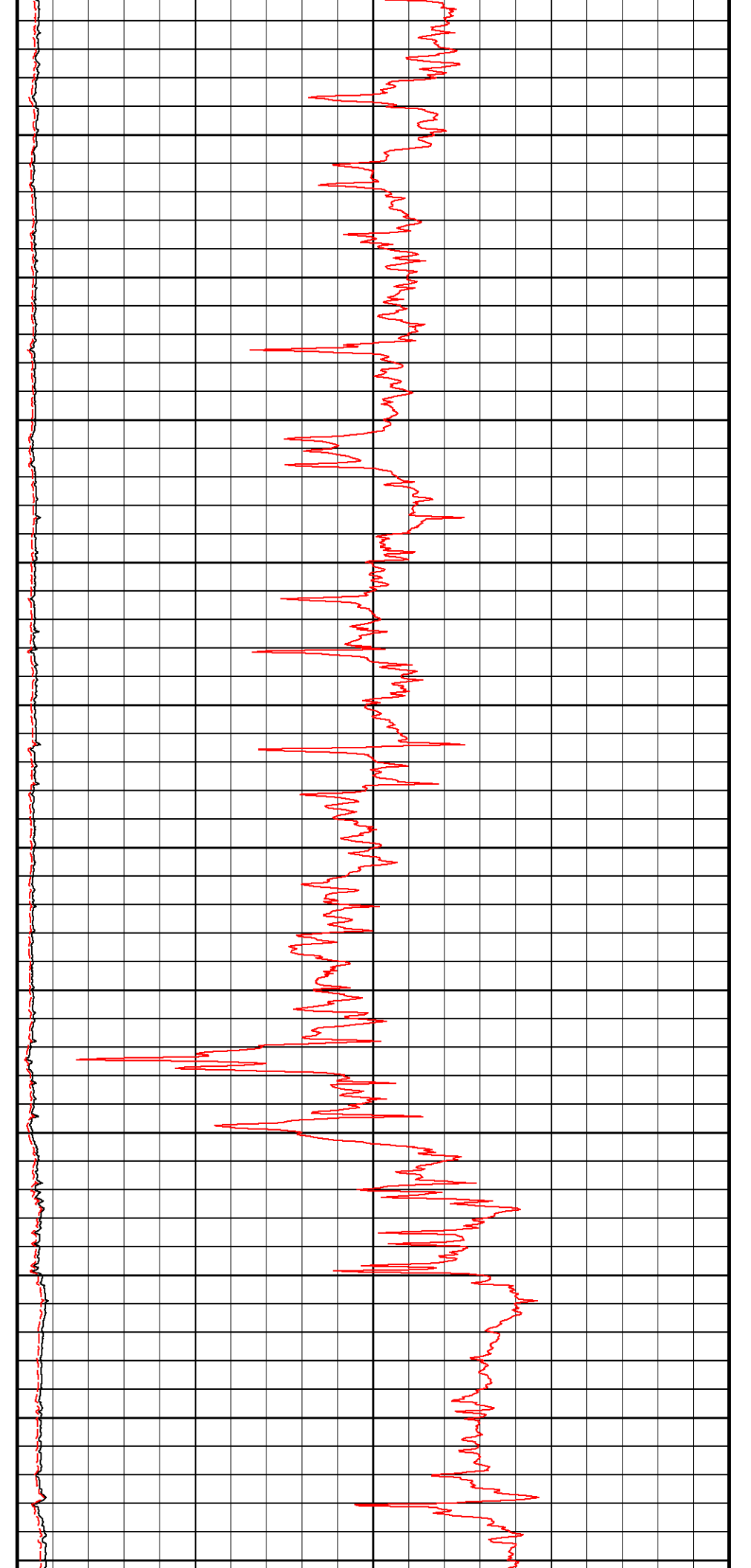
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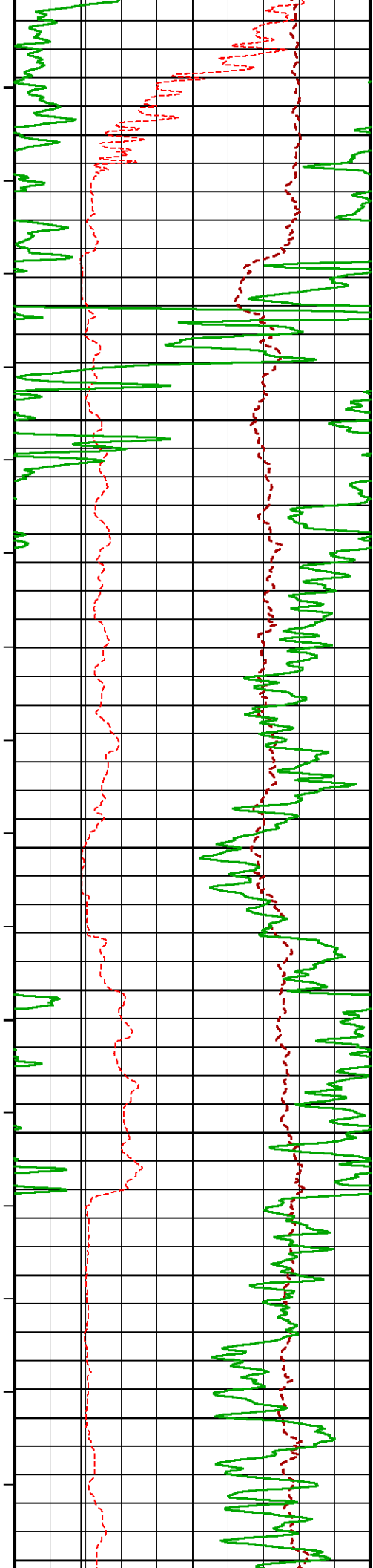
System Versions: Logged with 21.11.3172 Processed with 22.15.1312 Plotted with 22.15.1312





TVD  
800  
TVD  
900  
TVD  
1000  
TVD  
1100  
TVD  
1200  
TVD





1300  
TVD

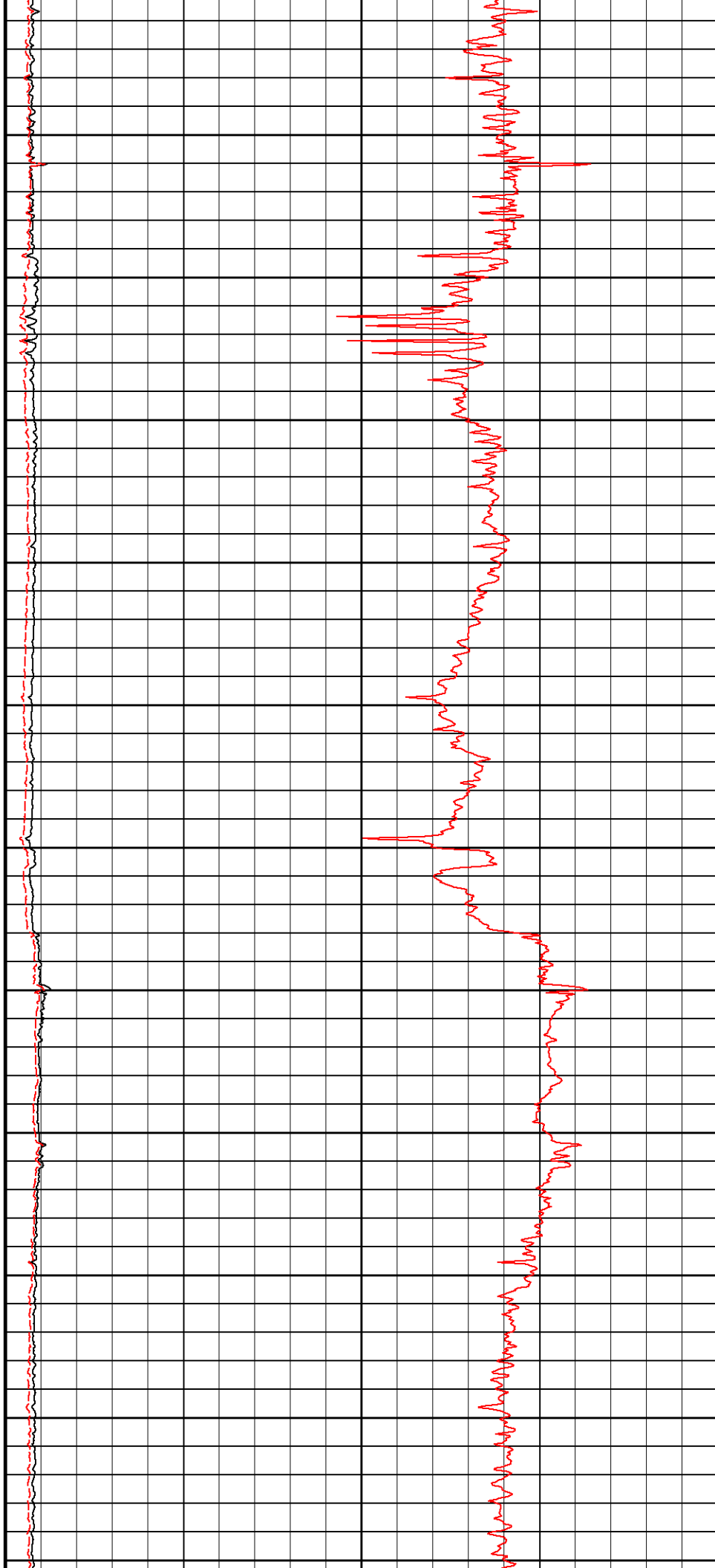
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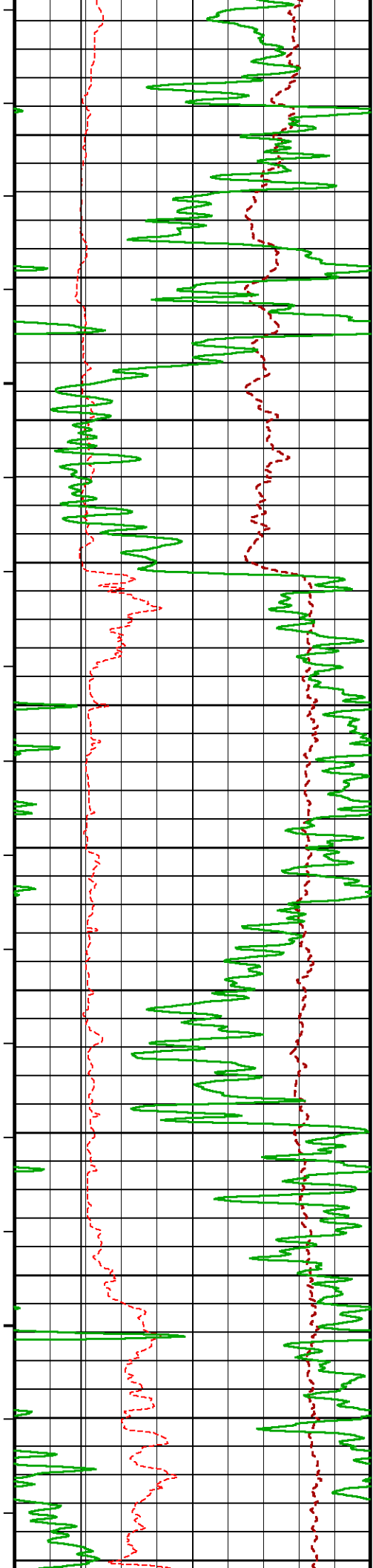
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1600  
TVD

1700  
TVD

1800  
TVD





TVD

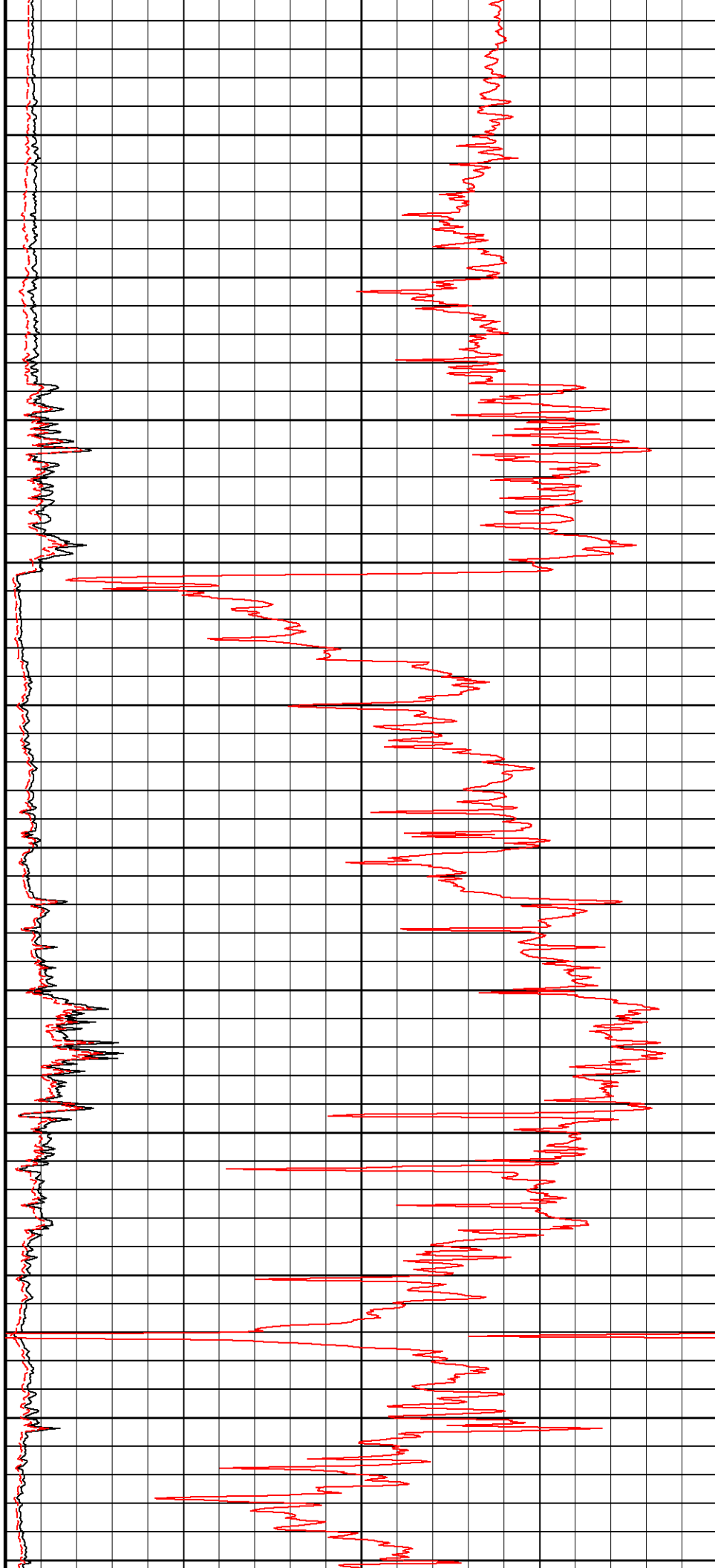
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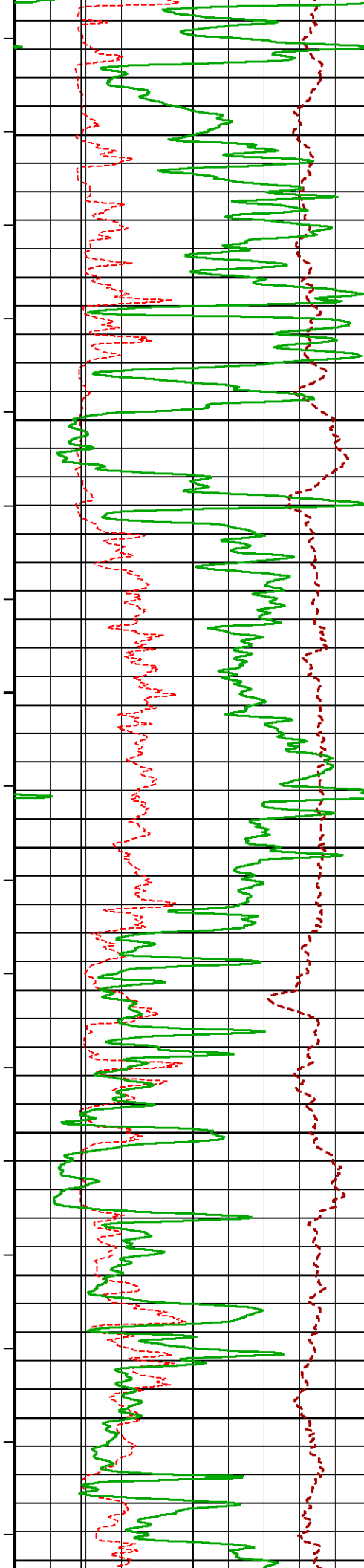
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2100  
TVD

2200  
TVD

2300  
TVD





2400  
TVD

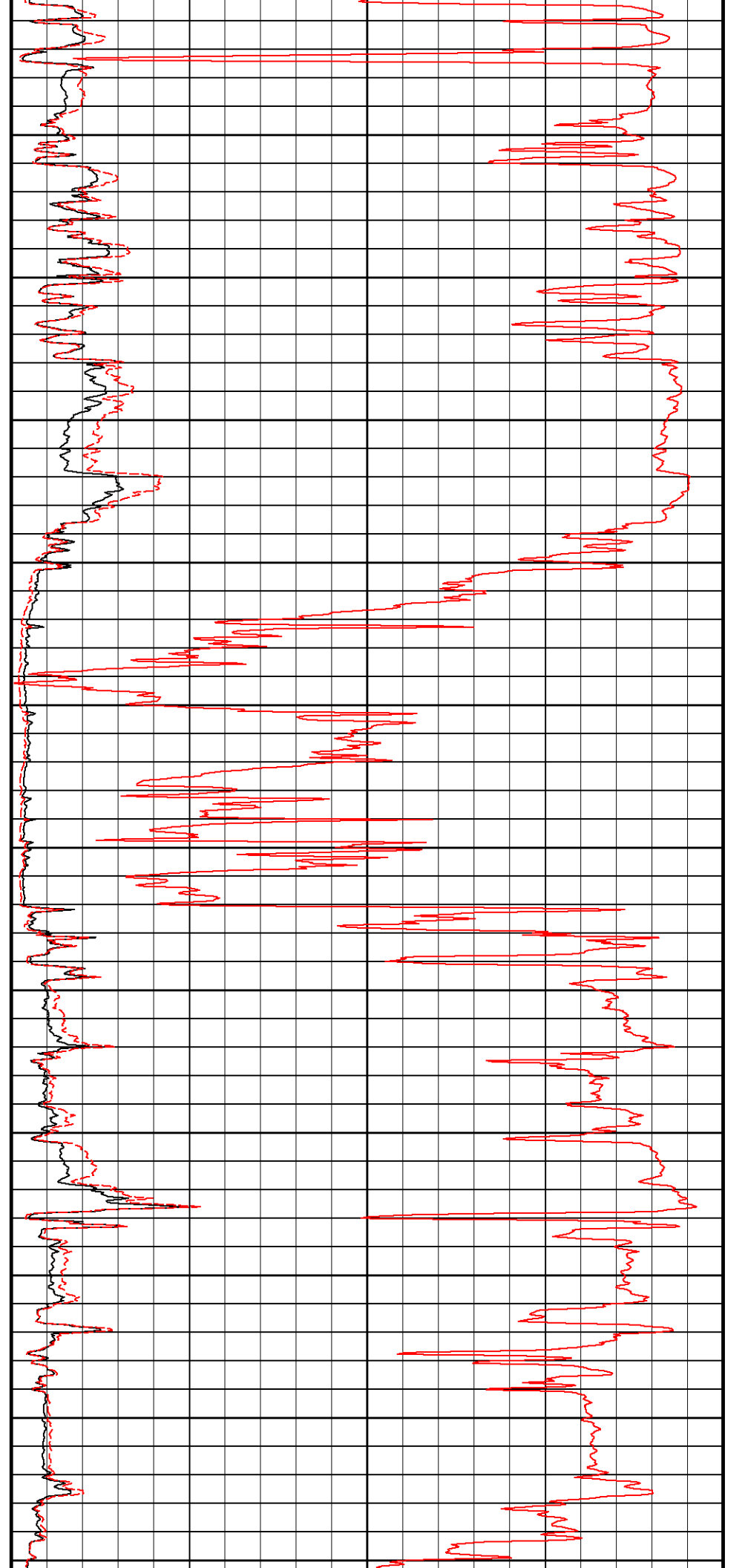
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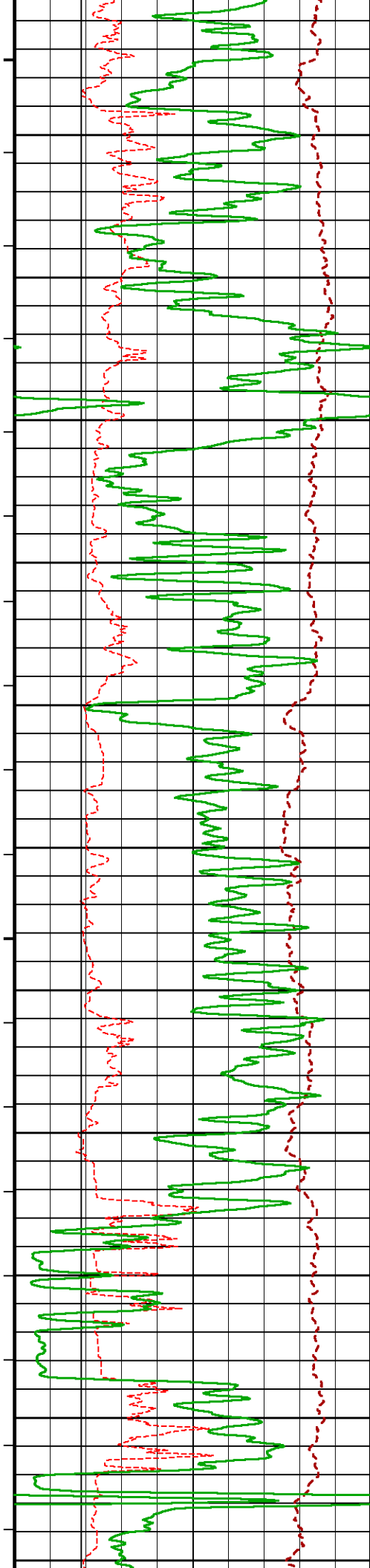
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2700  
TVD

2800  
TVD

2900





TVD

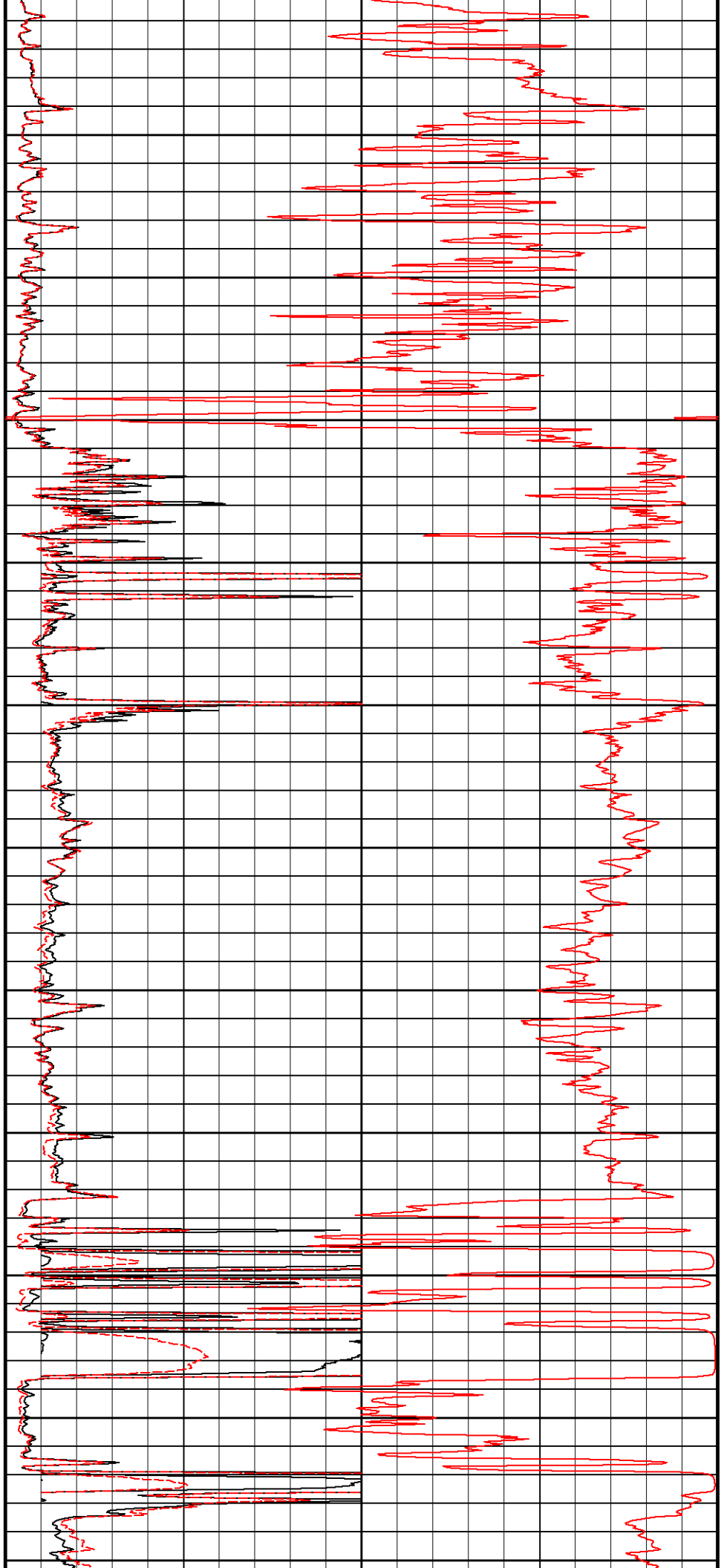
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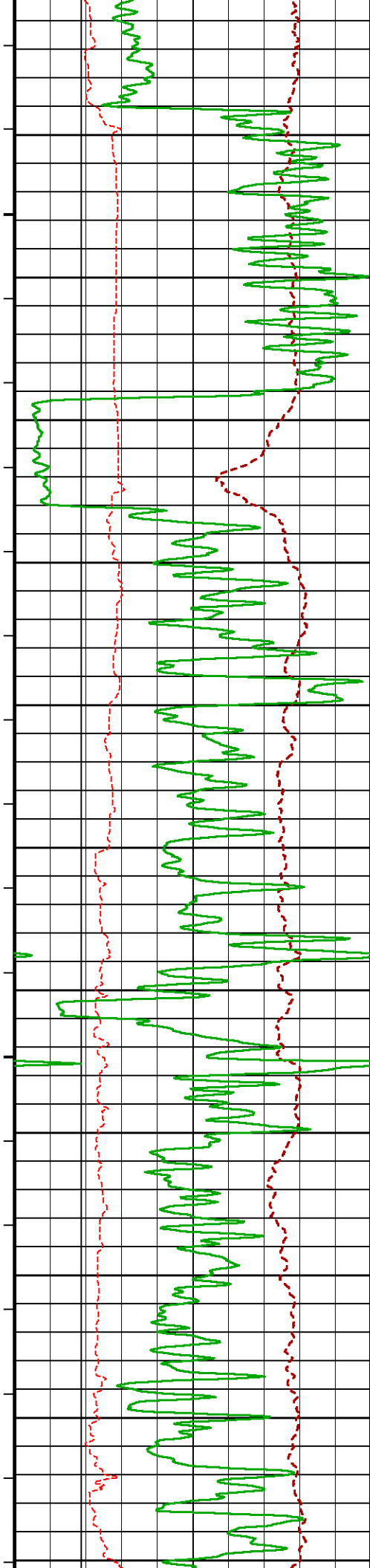
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3200  
TVD

3300  
TVD

3400  
TVD





3500  
TVD

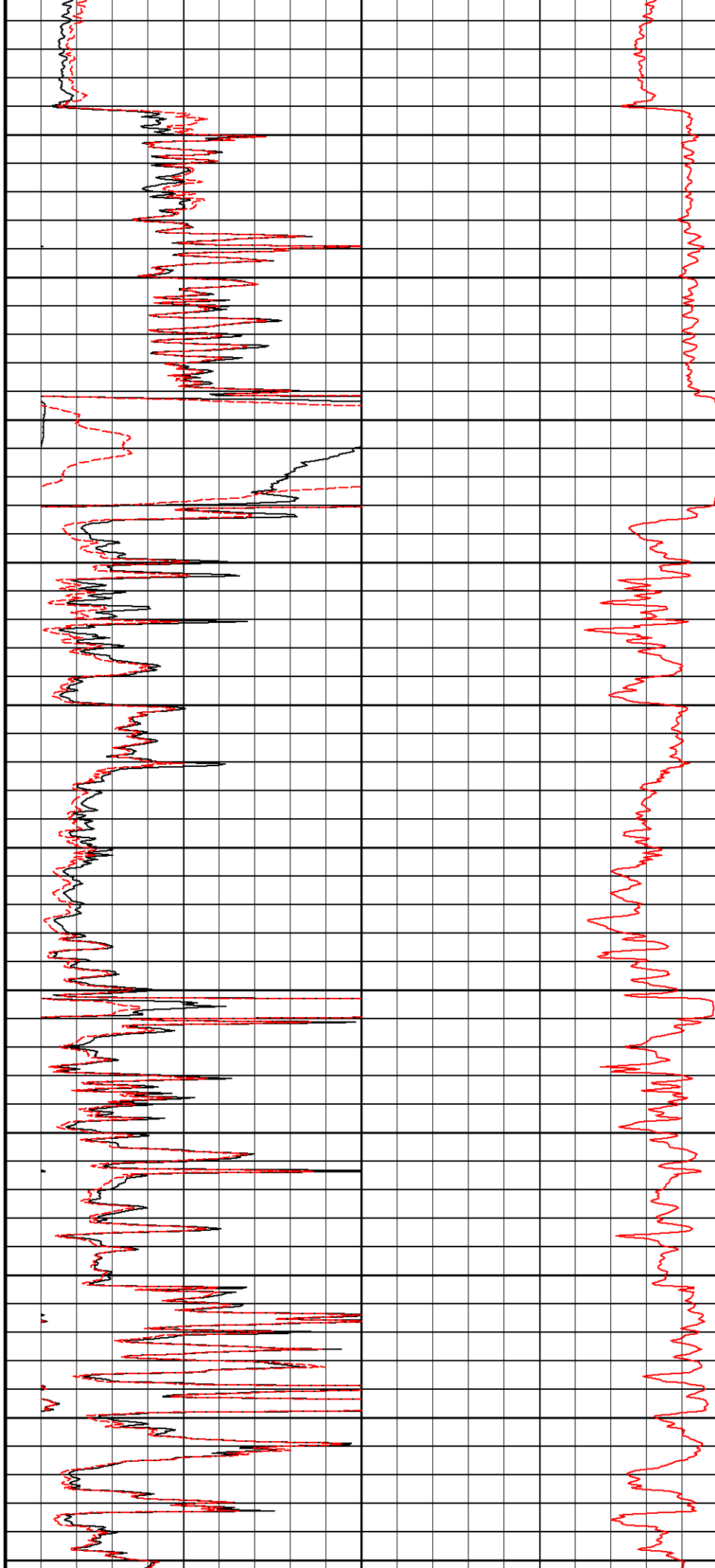
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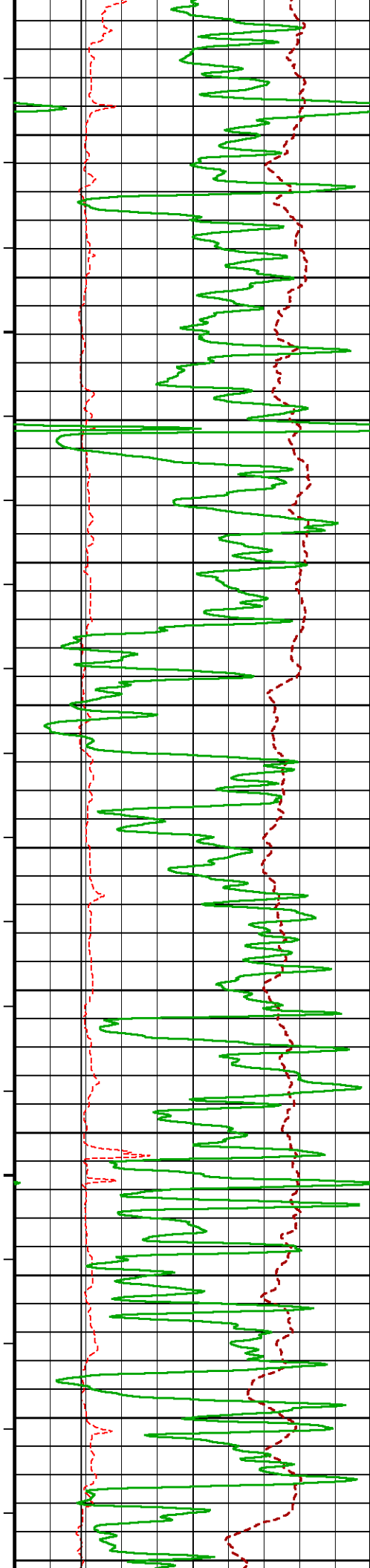
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TVD

3800  
TVD

3900  
TVD

4000  
TVD





TVD

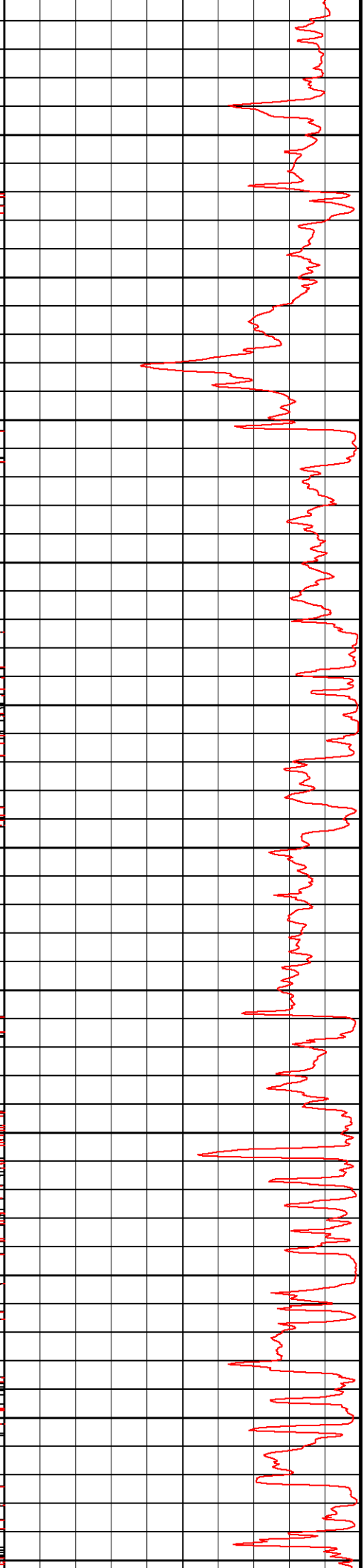
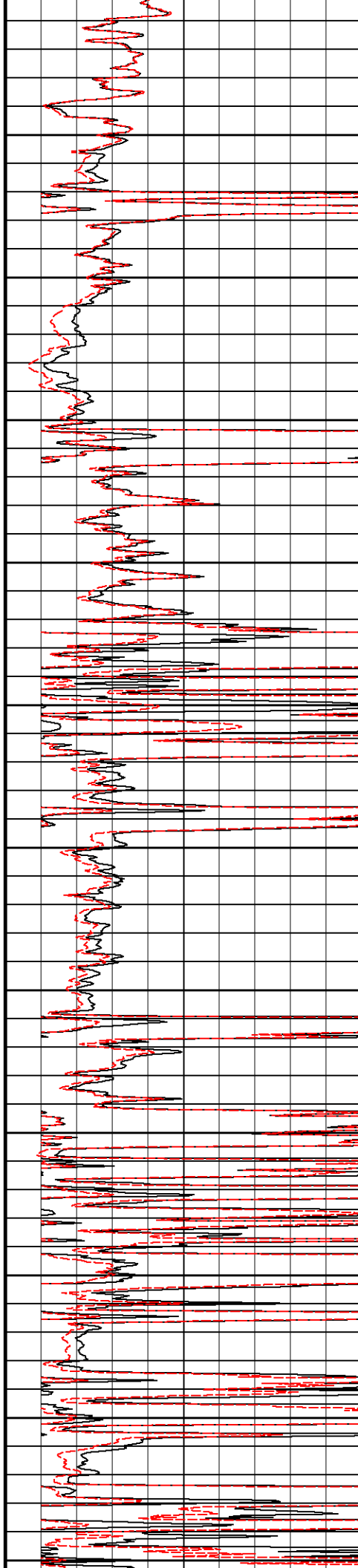
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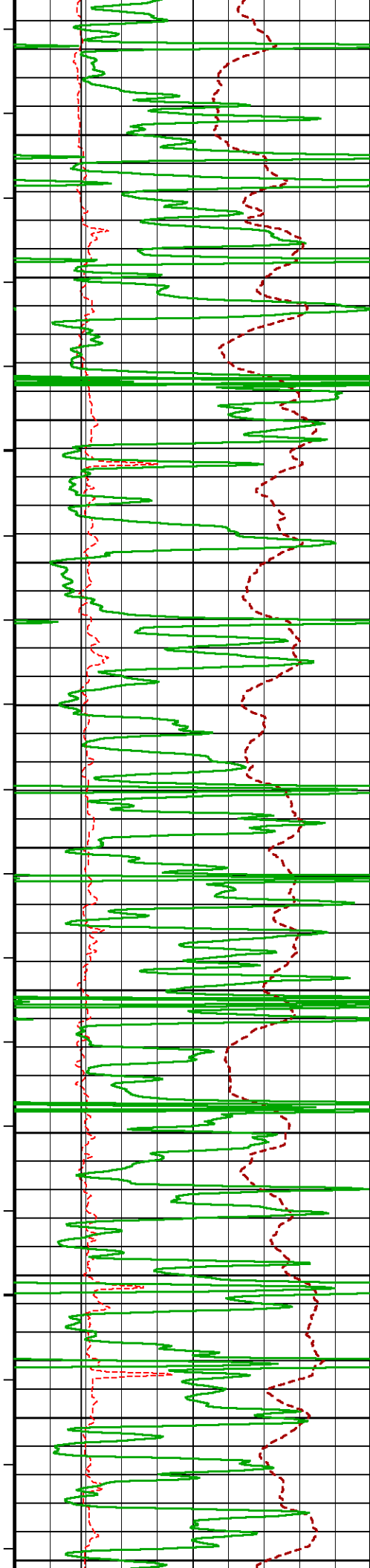
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4300  
TVD

4400  
TVD

4500  
TVD





4600  
TVD

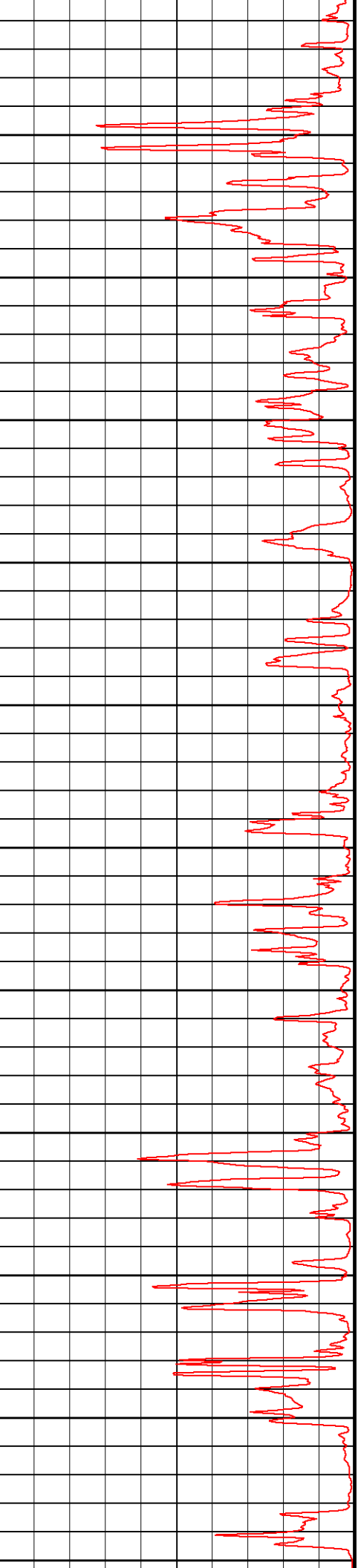
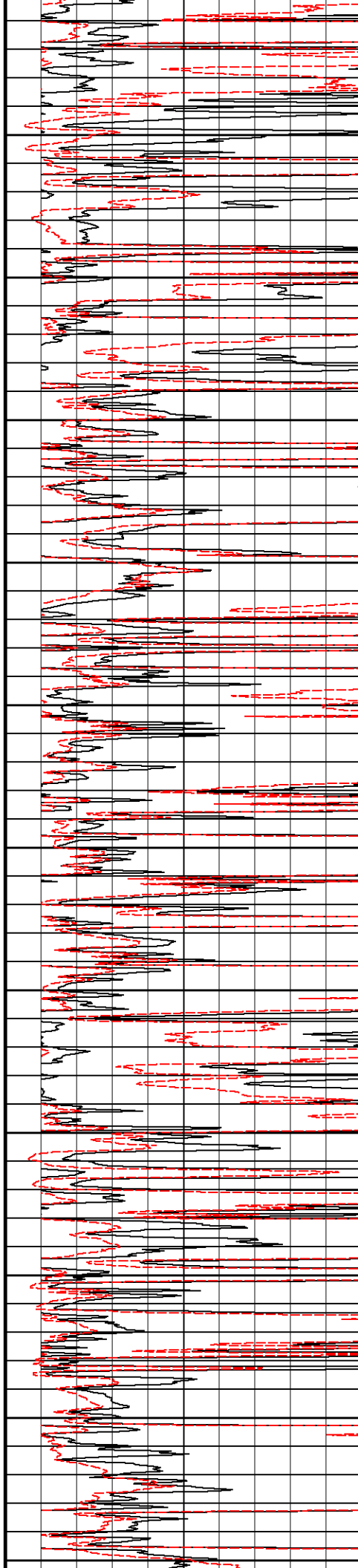
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TVD

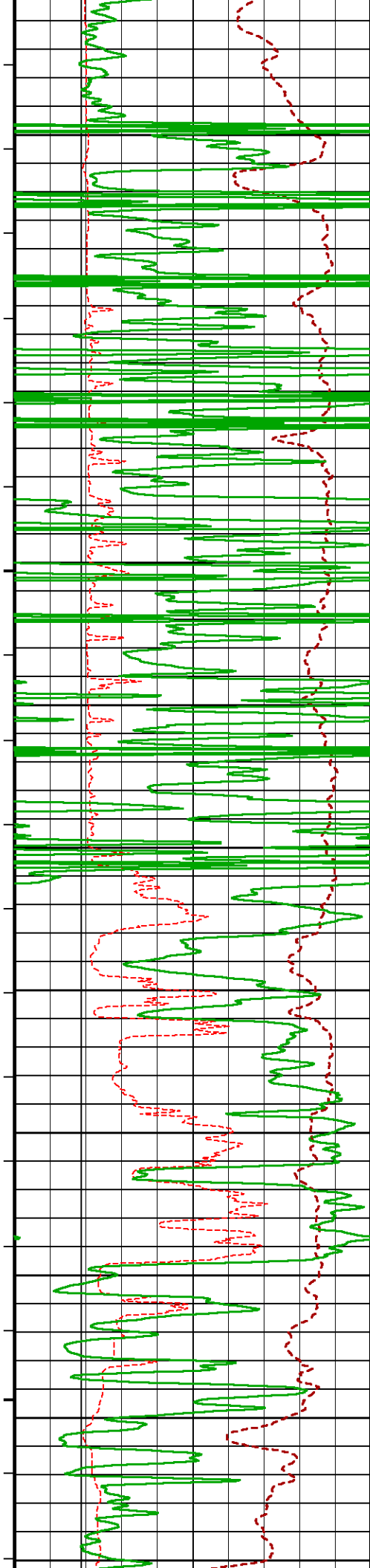
4800  
TVD

4900  
TVD

5000  
TVD

5100





TVD

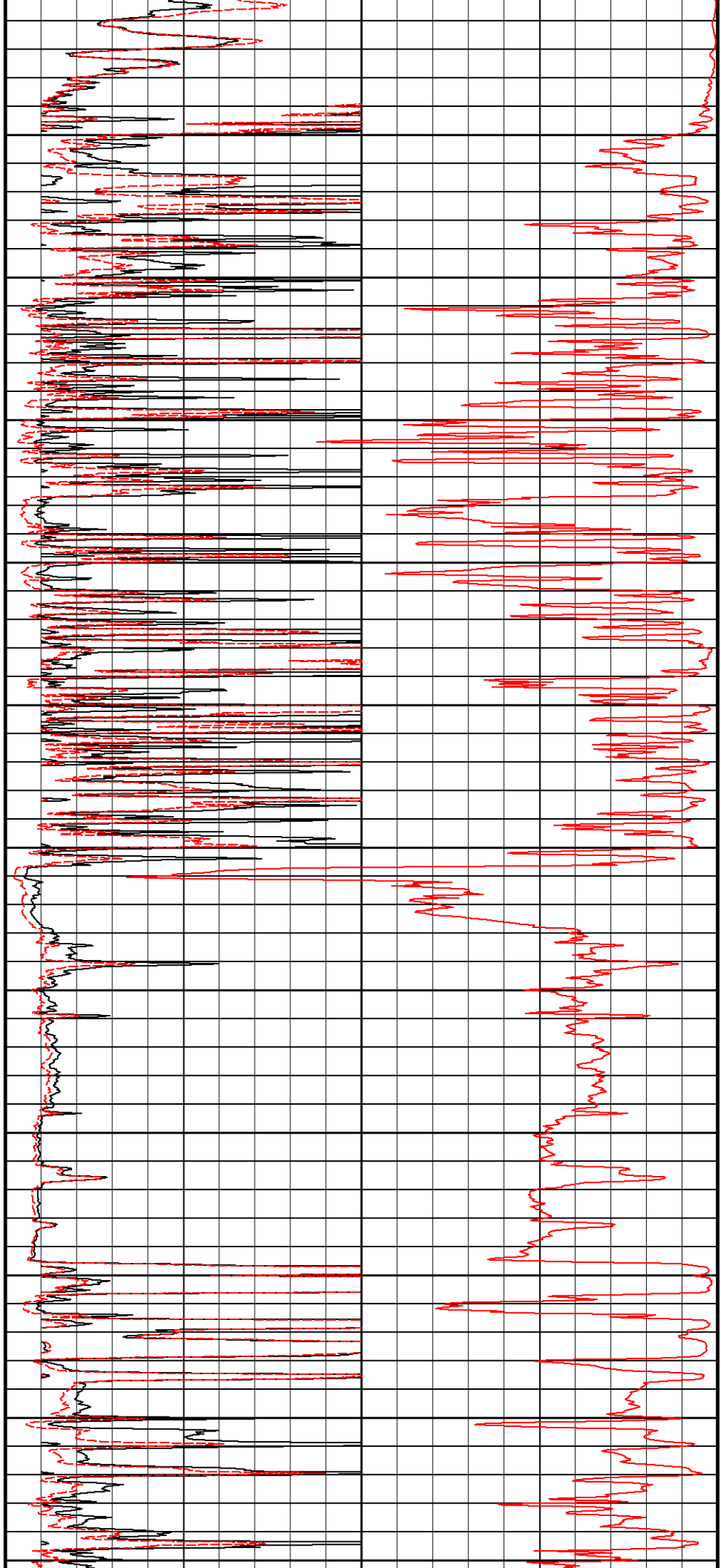
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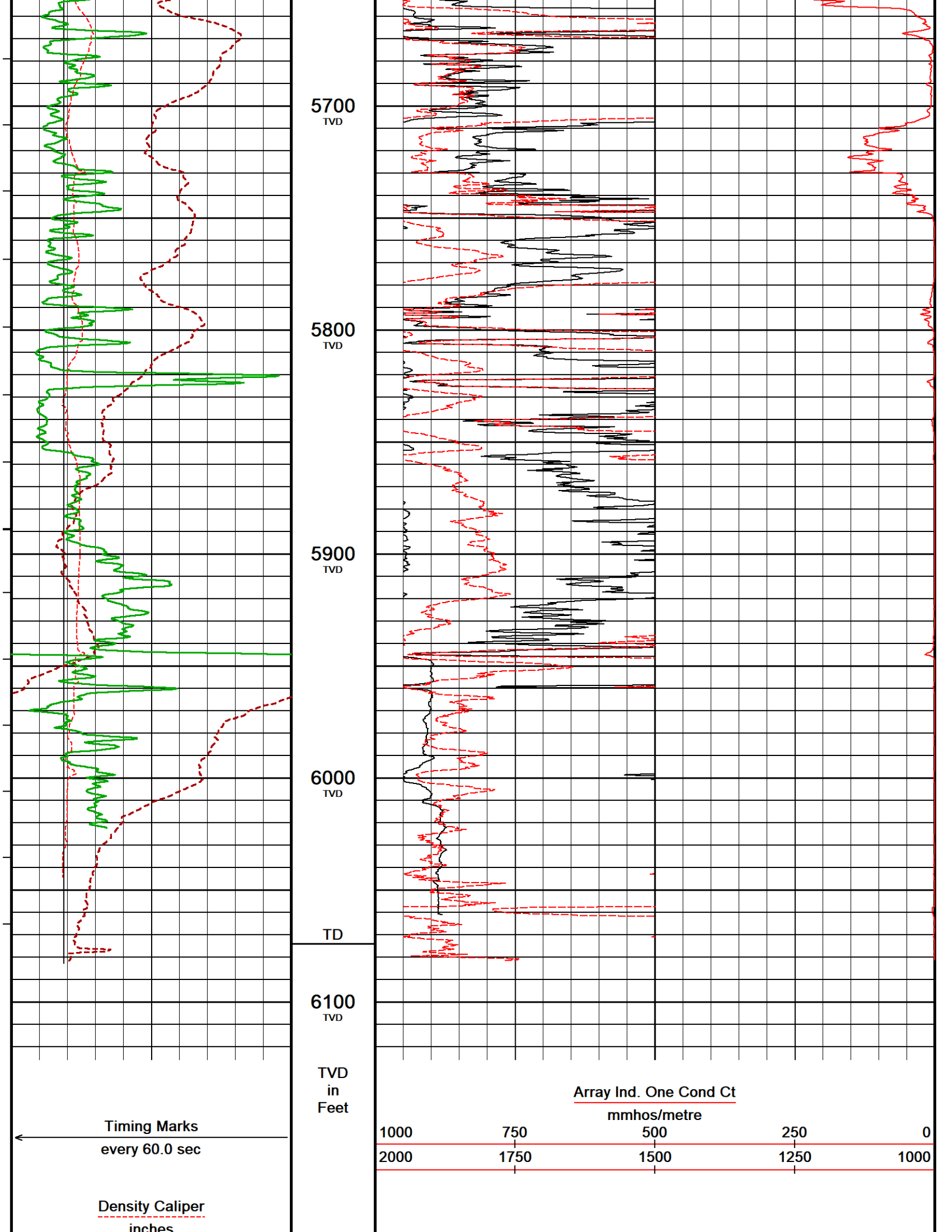
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TVD

5400  
TVD

5500  
TVD

5600  
TVD





5700  
TVD

5800  
TVD

5900  
TVD

6000  
TVD

TD

6100  
TVD

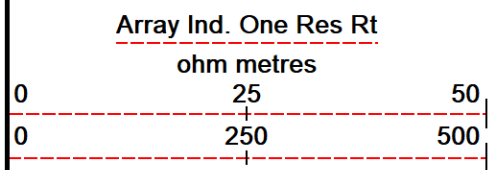
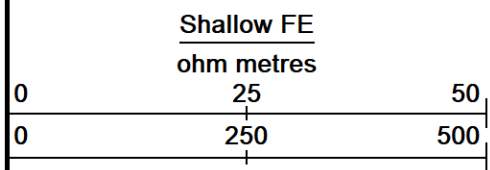
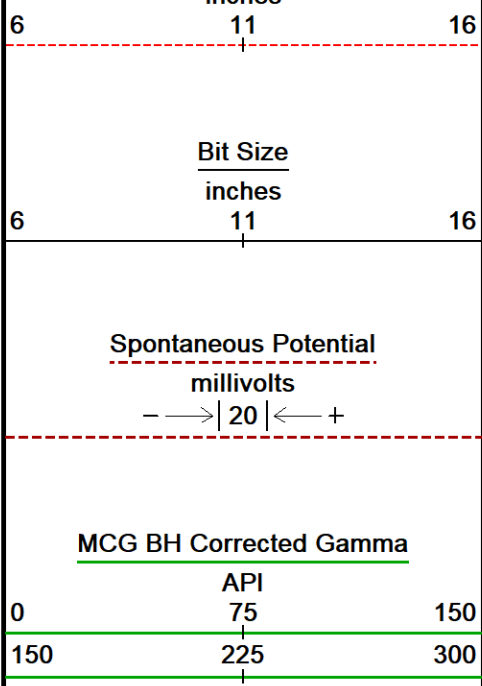
TVD  
in  
Feet

Array Ind. One Cond Ct  
mmhos/metre

1000 750 500 250 0  
2000 1750 1500 1250 1000

Timing Marks  
every 60.0 sec

Density Caliper  
inches



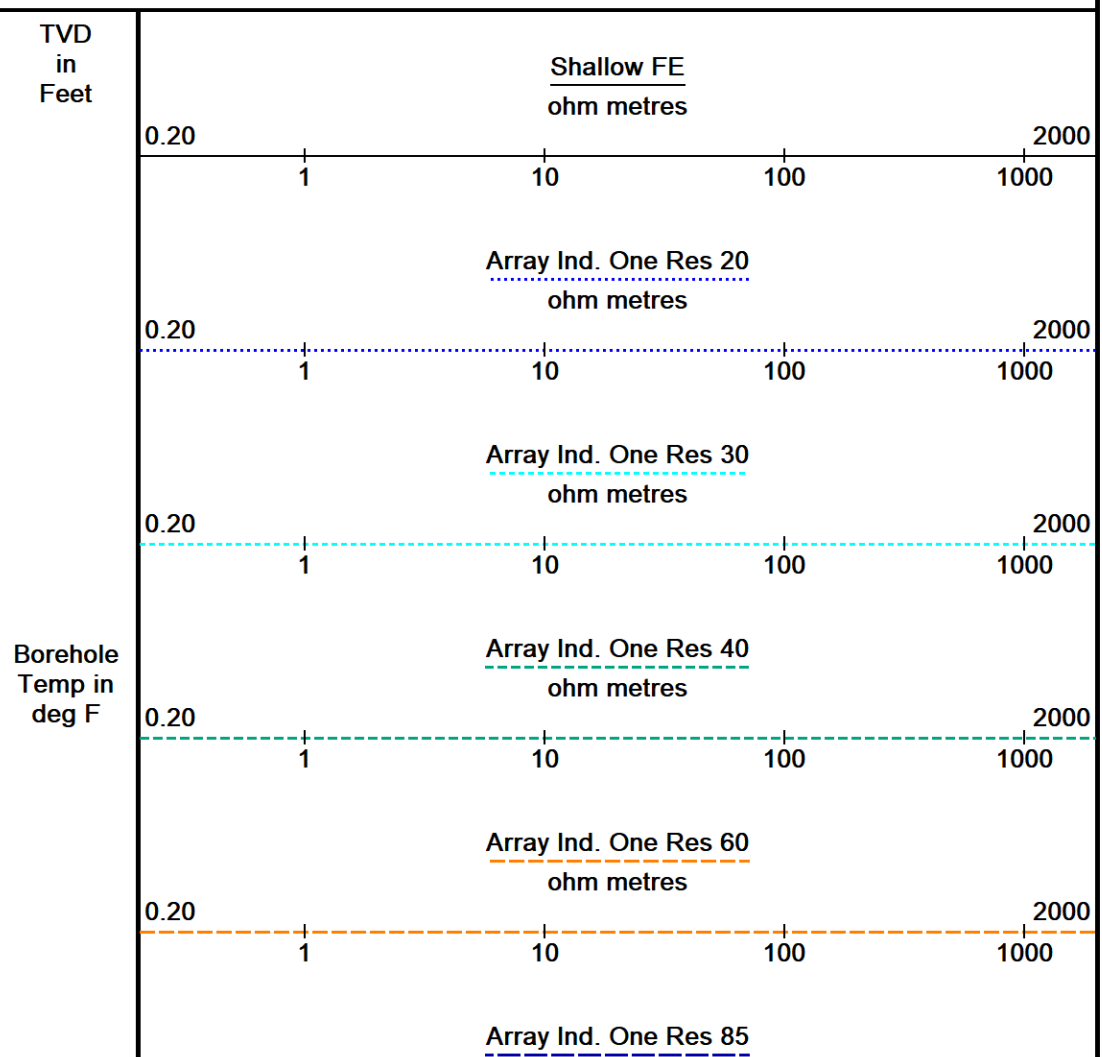
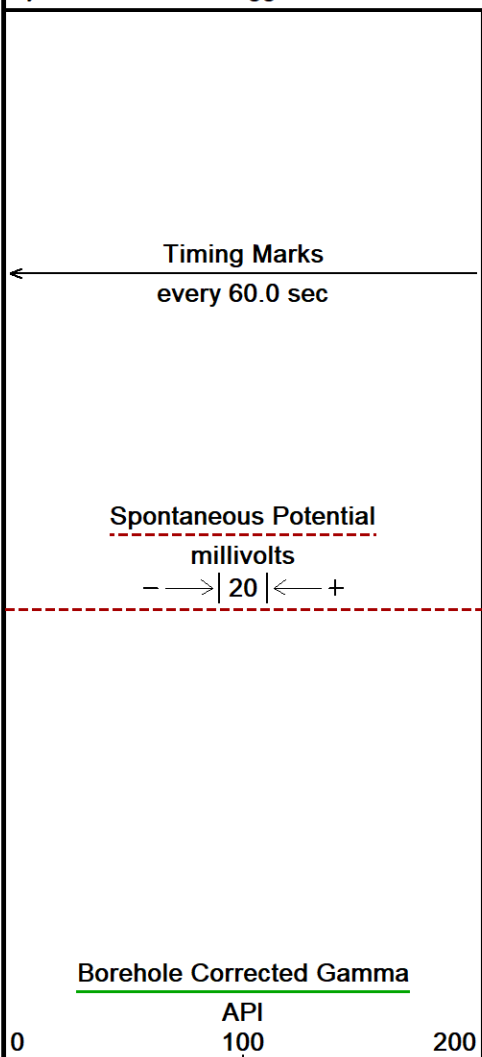
Replay  
Scale  
1:600

Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 01-JUN-2023 17:25  
 Filename: C:\Users\grahm\AppData\Local\Temp\Weatherford PreView6\0\MainPass.dta  
 Recorded on 26-MAY-2023 13:17  
 System Versions: Logged with 21.11.3172 Processed with 22.15.1312 Plotted with 22.15.1312

↑ 2 INCH MAIN PASS TVD ↑

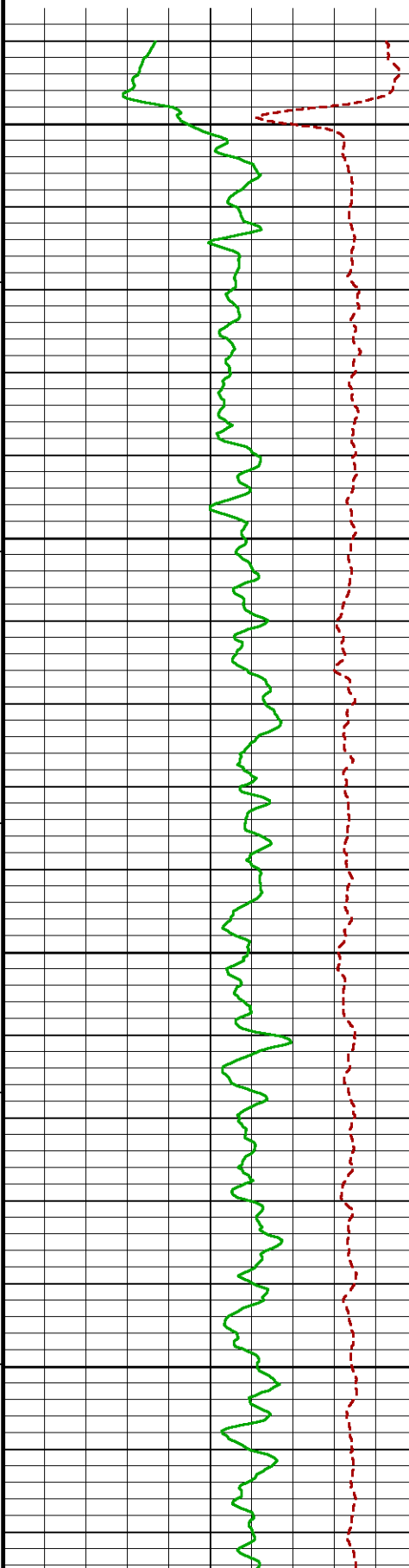
↓ 5 INCH MAIN PASS TVD ↓

Depth Based Data - Maximum Sampling Increment 10.0cm  
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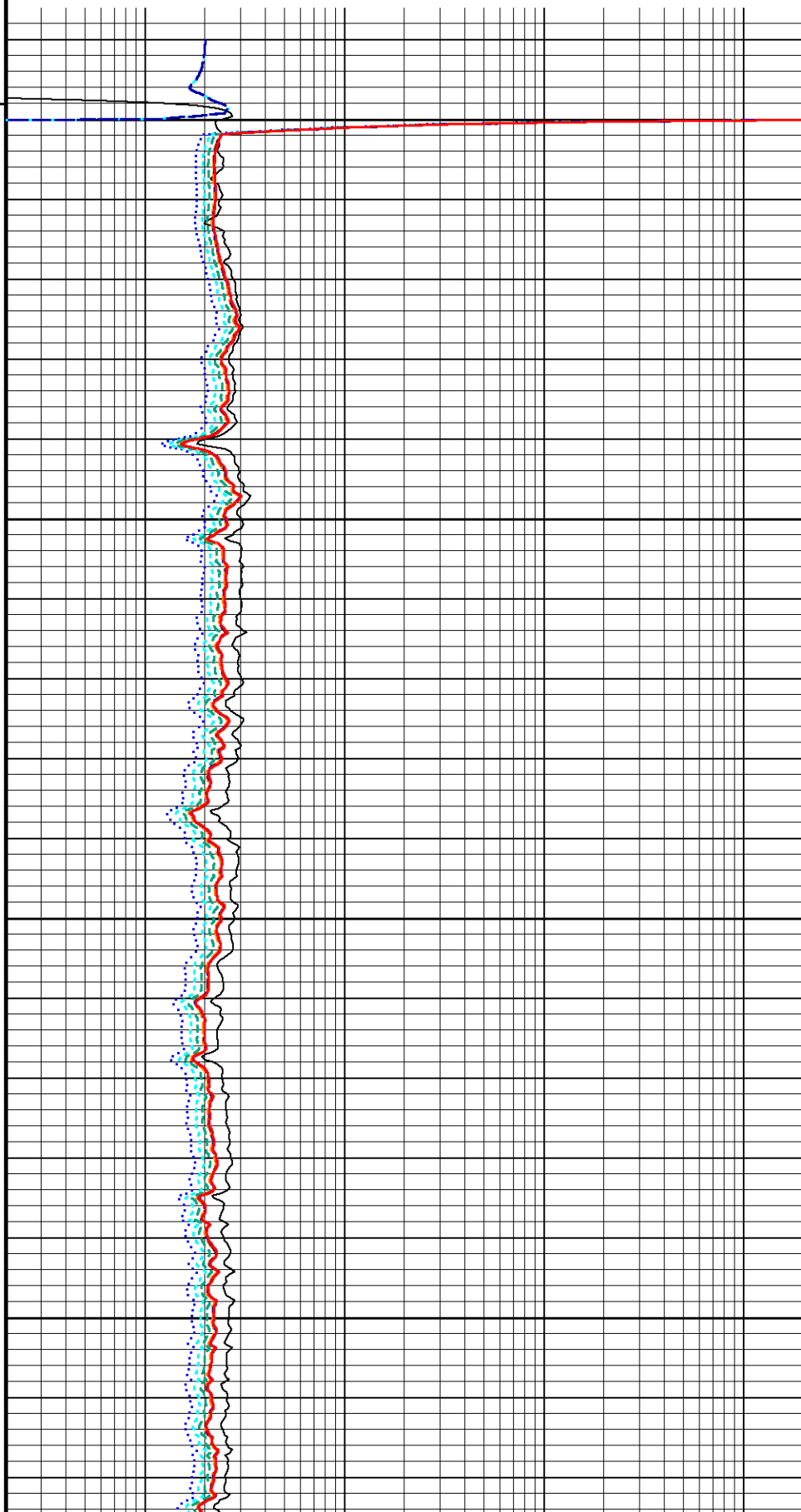
Timing Marks  
every 60.0 sec

200 300 400



0.20 1 10 100 1000 2000 ohm metres

0.20 1 10 100 1000 2000 ohm metres



Replay Scale 1:240

638 TVD Casing Shoe

650 TVD

109°

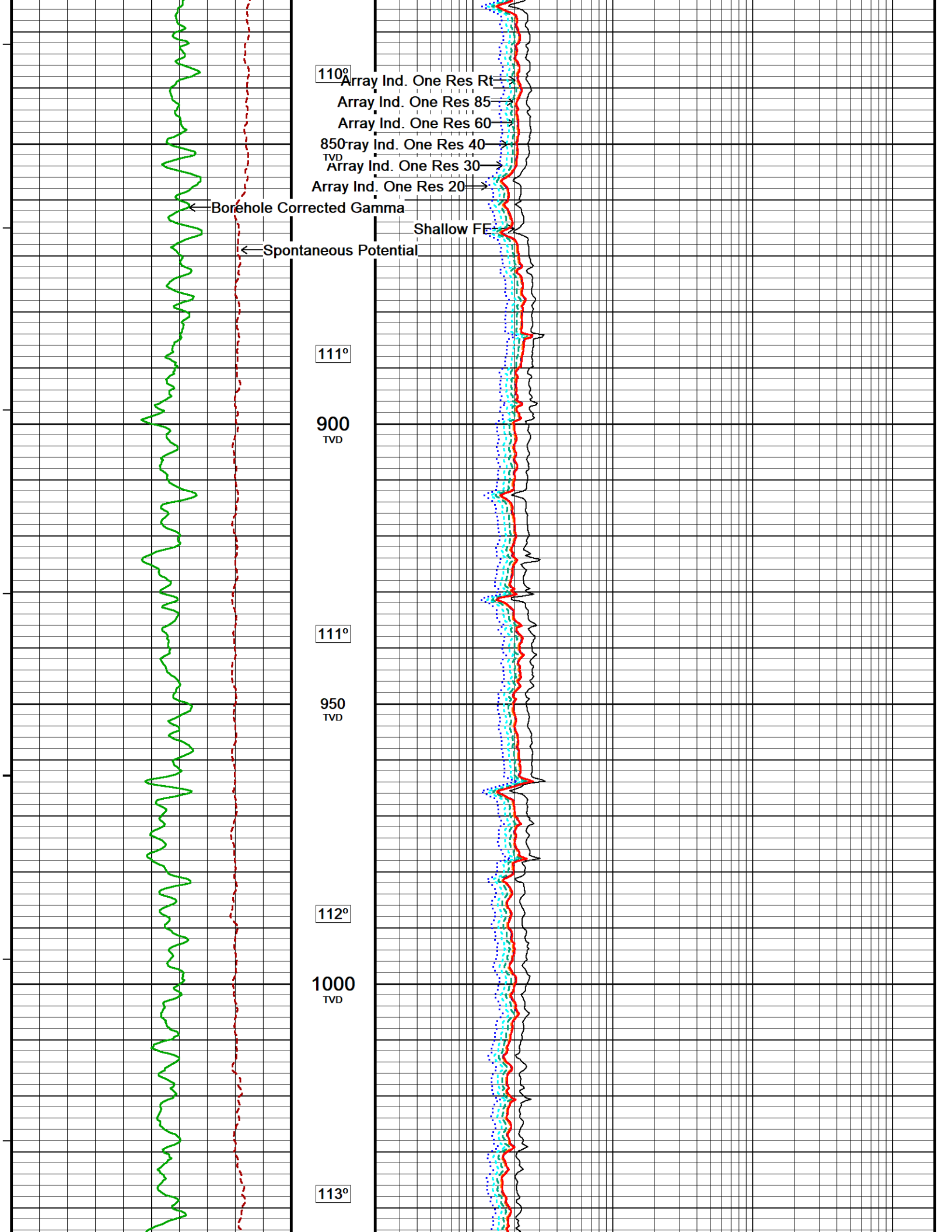
700 TVD

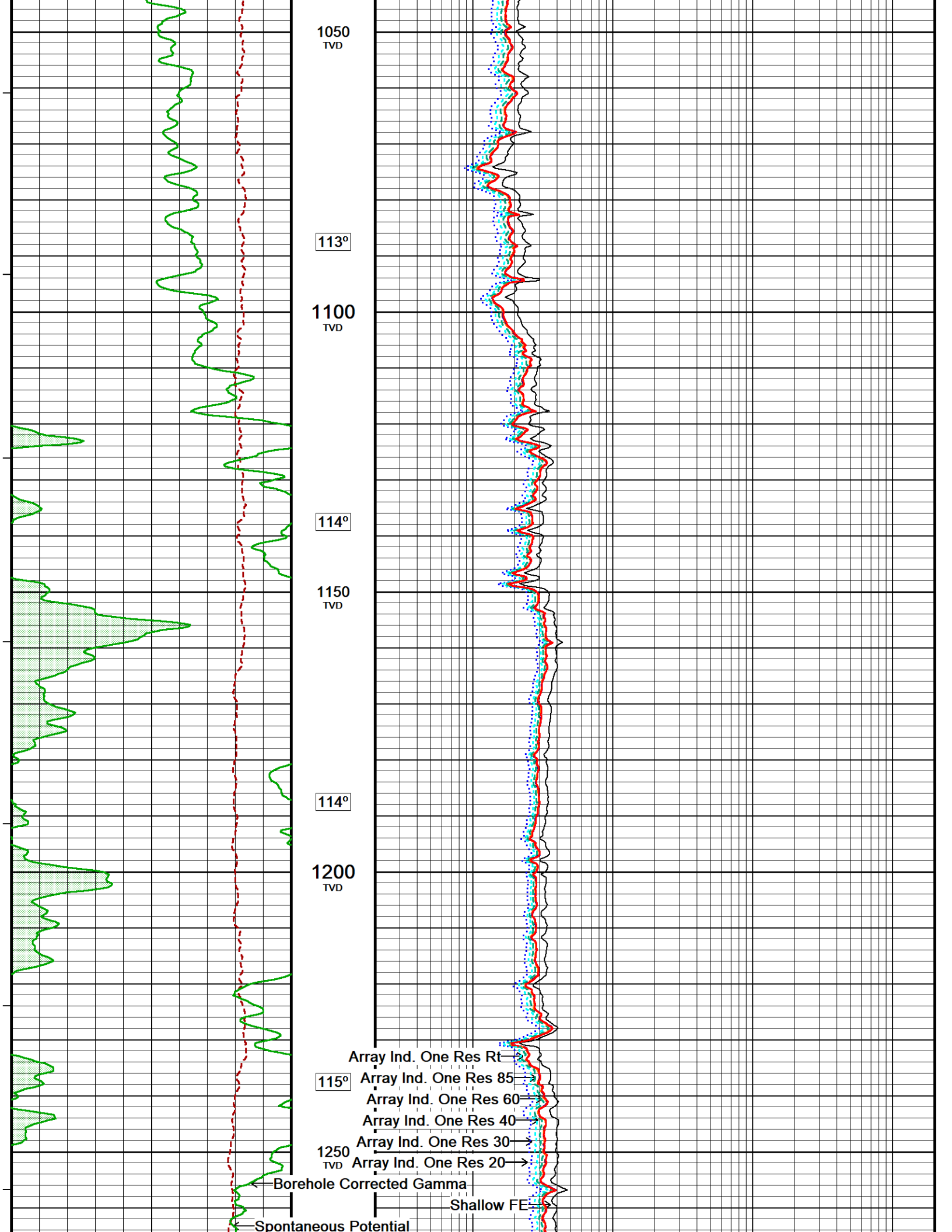
109°

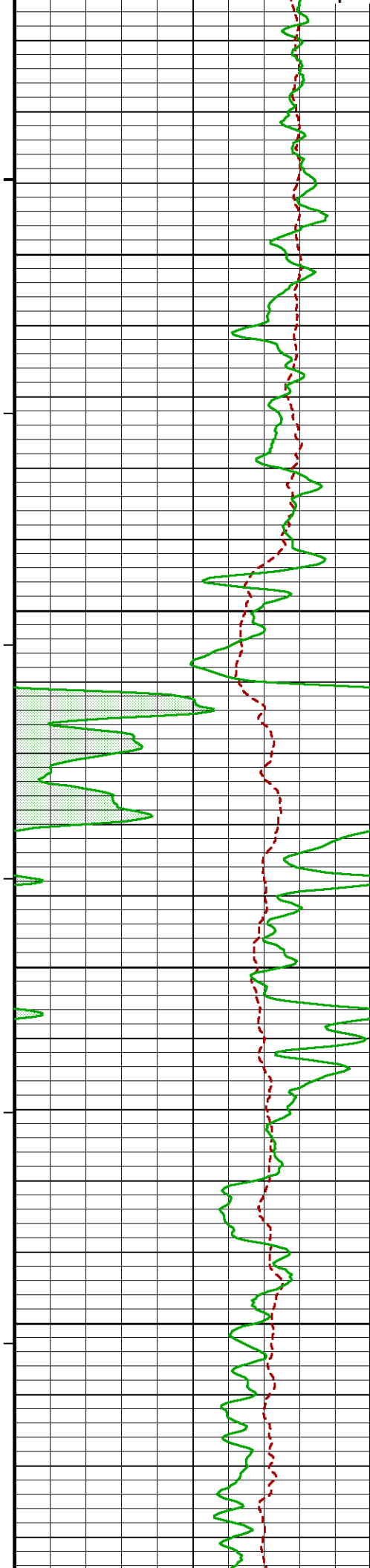
750 TVD

110°

800 TVD







115°

1300  
TVD

115°

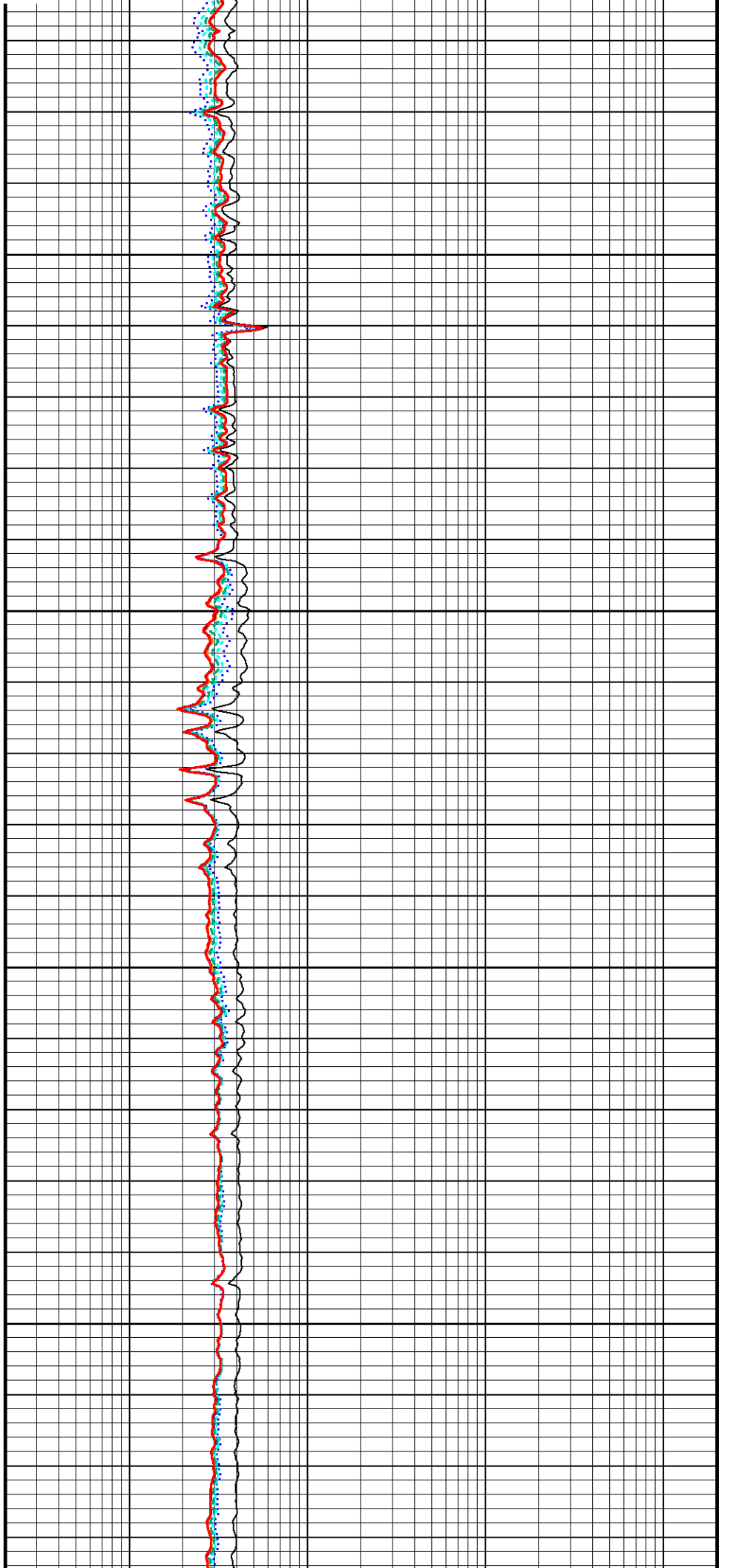
1350  
TVD

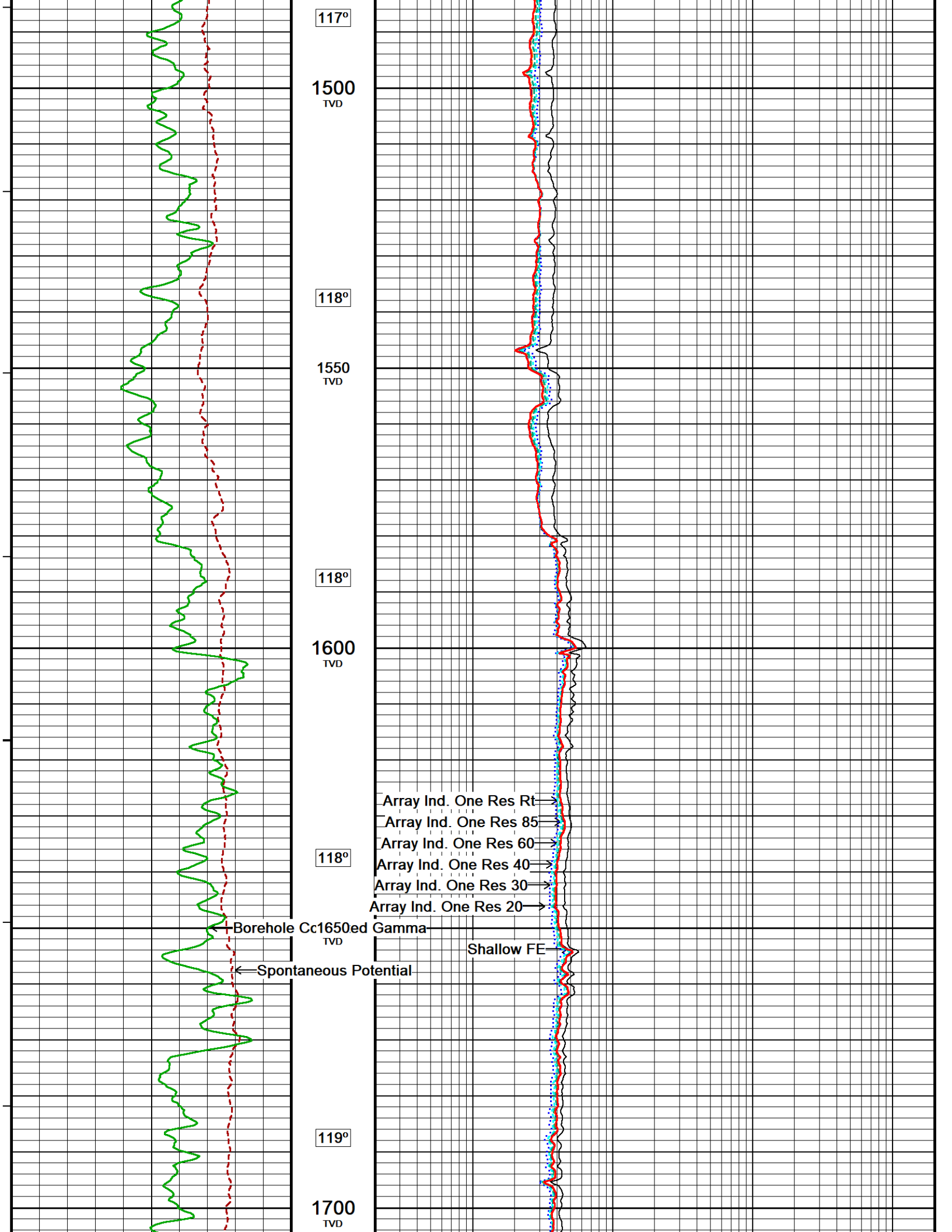
116°

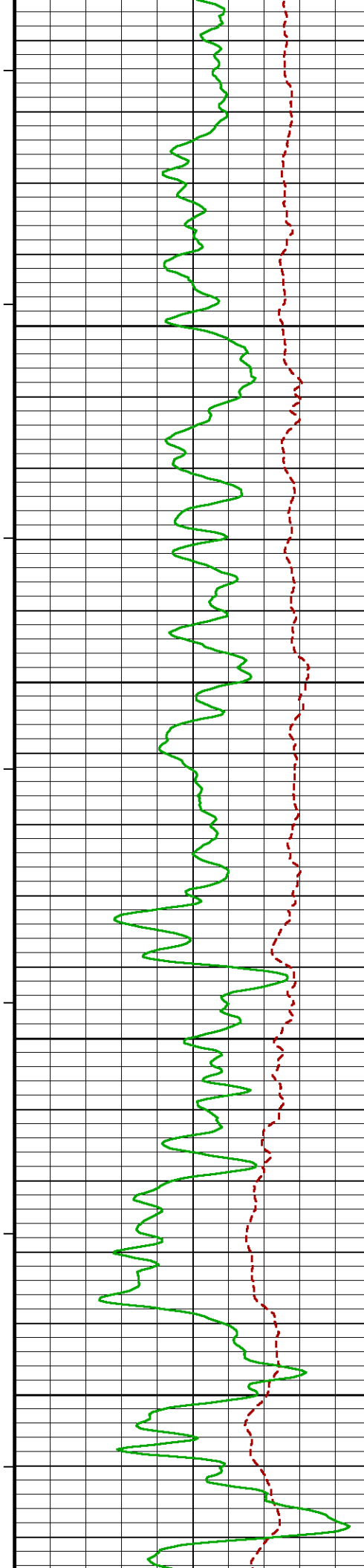
1400  
TVD

116°

1450  
TVD







119°

1750  
TVD

120°

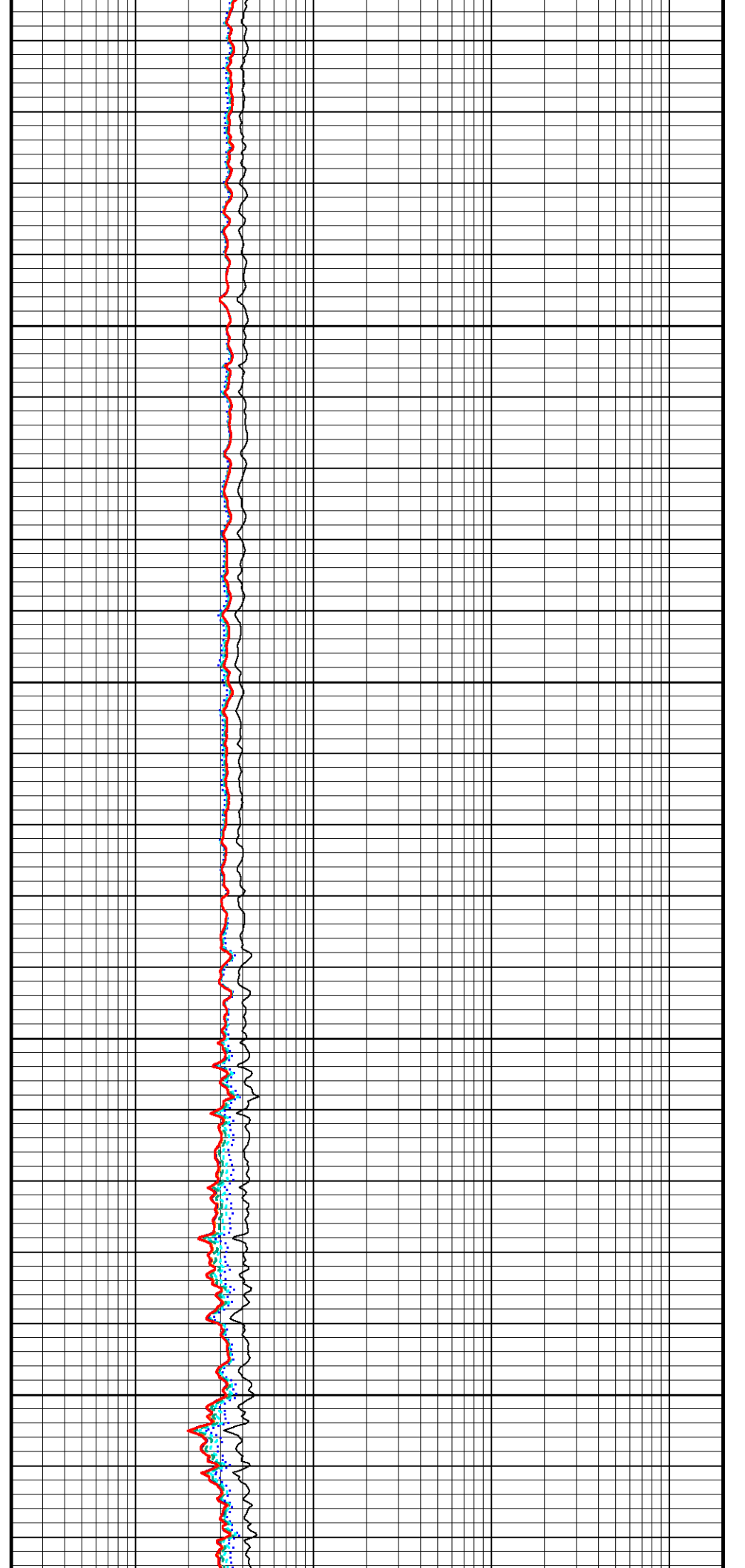
1800  
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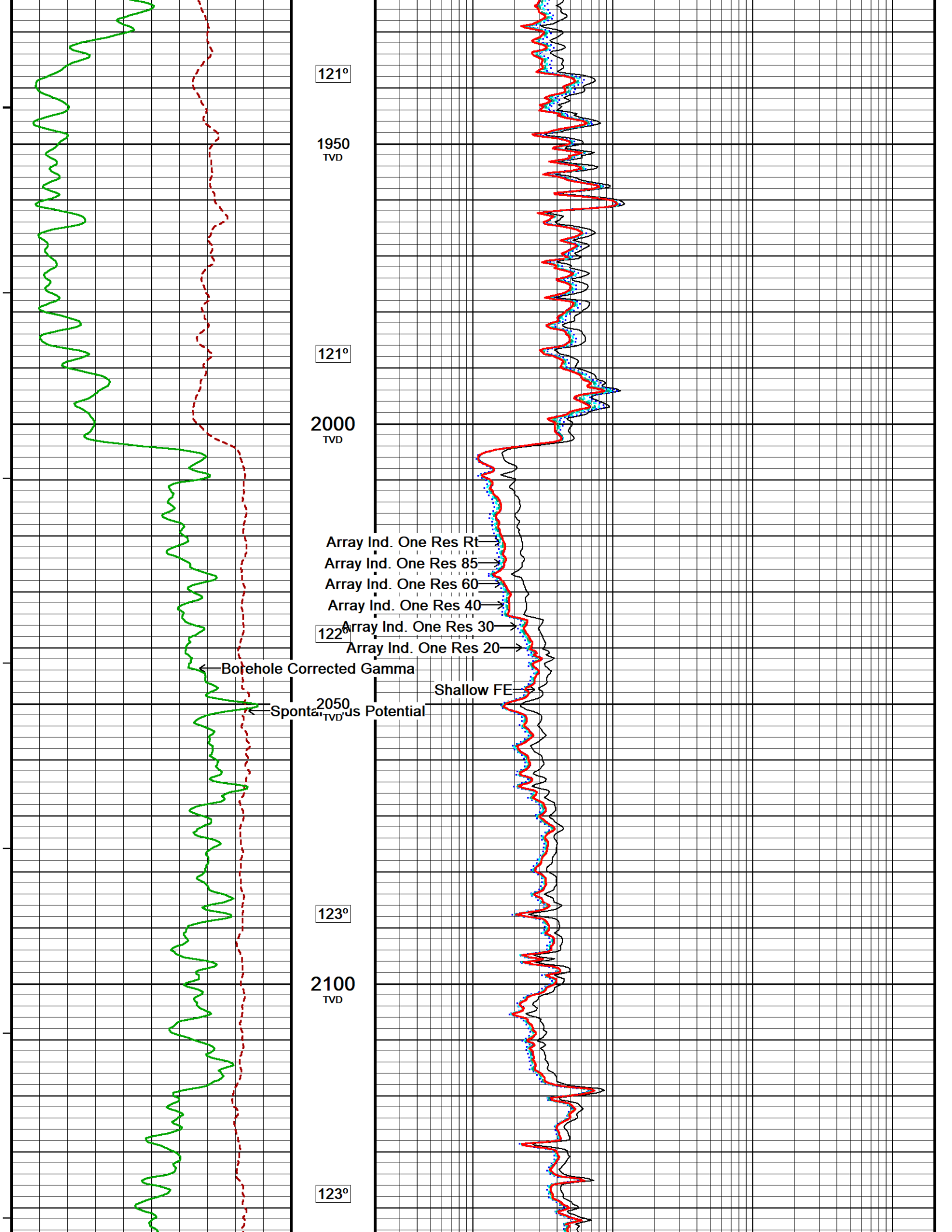
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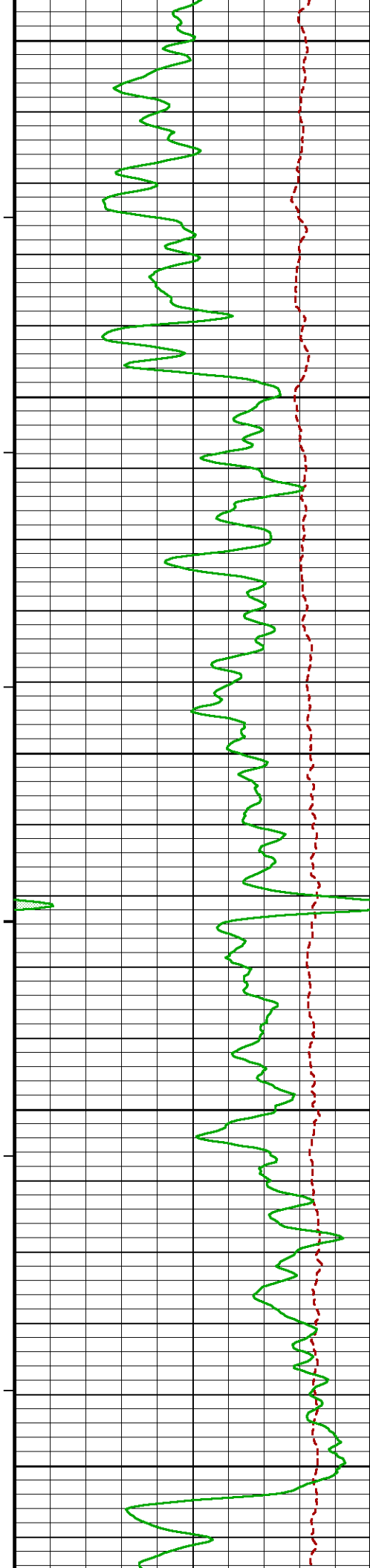
1850  
TVD

120°

1900  
TVD







2150  
TVD

123°

2200  
TVD

124°

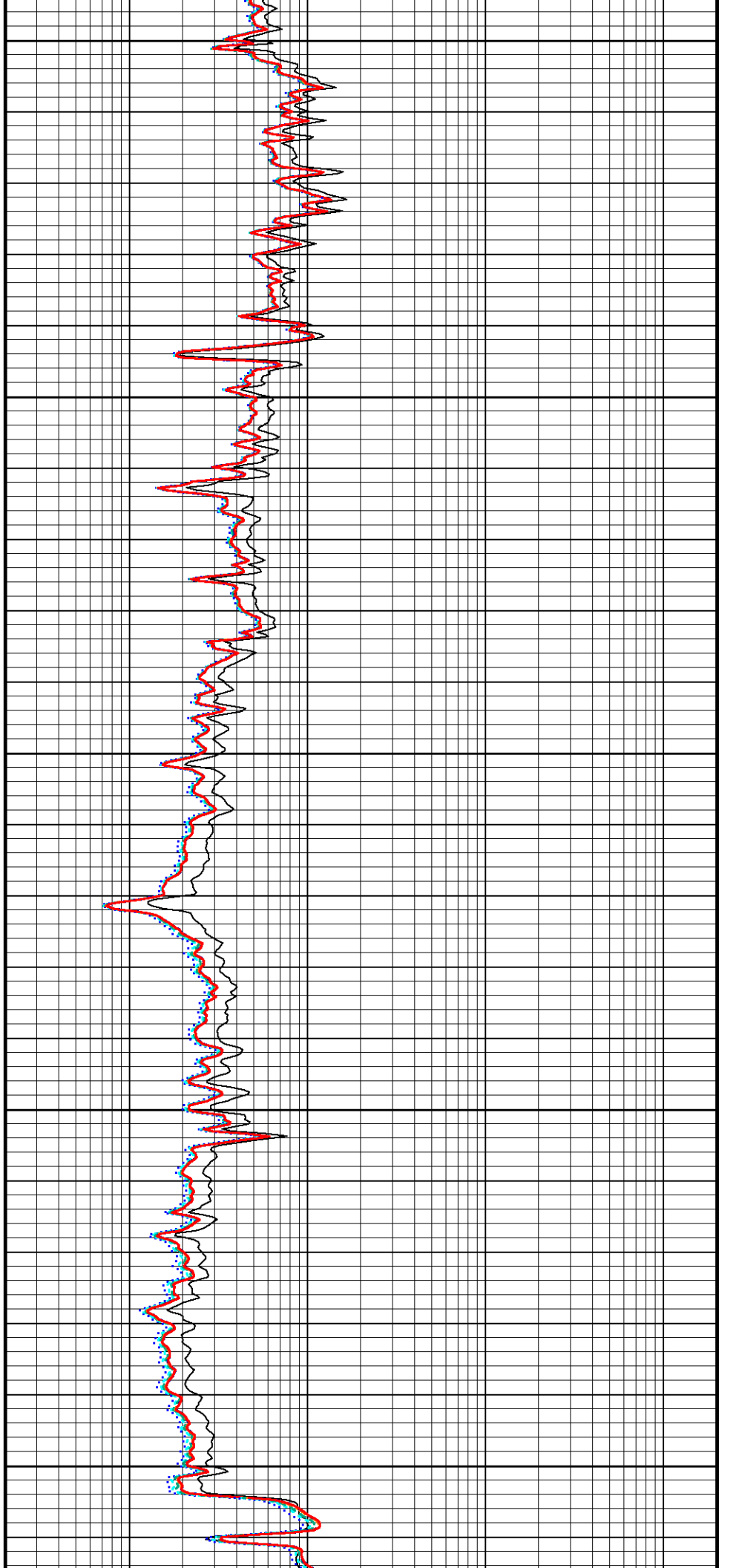
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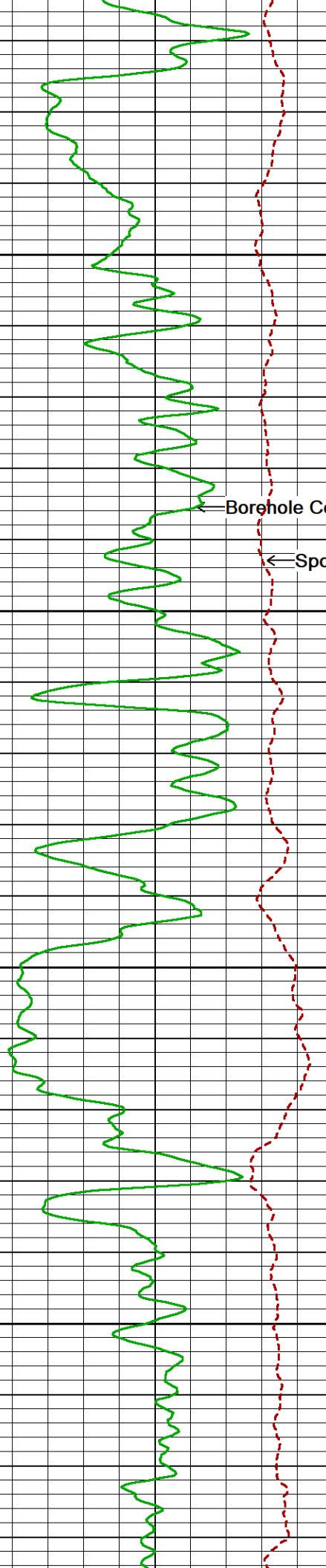
125°

2300  
TVD

125°

2350  
TVD





125°

2400  
TVD

125°

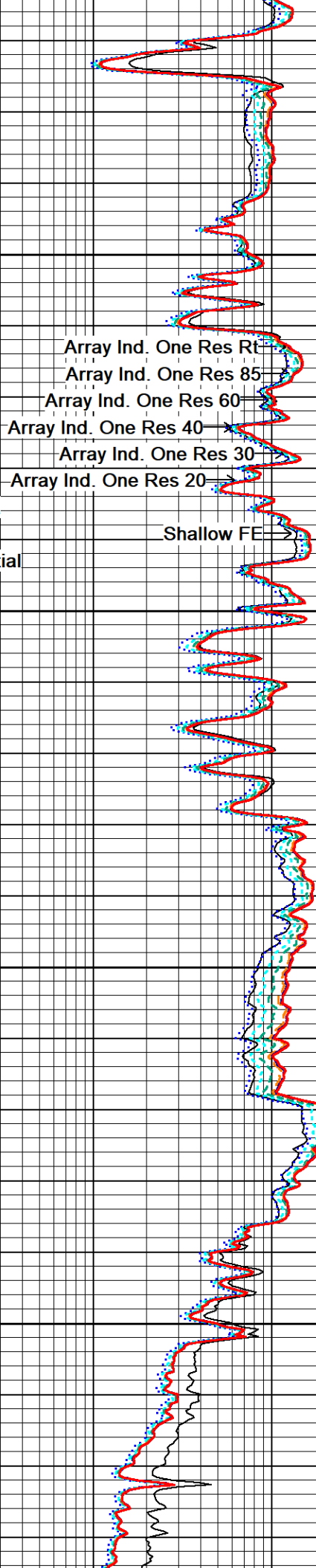
2450  
TVD

126°

2500  
TVD

127°

2550  
TVD



Array Ind. One Res Rt

Array Ind. One Res 85

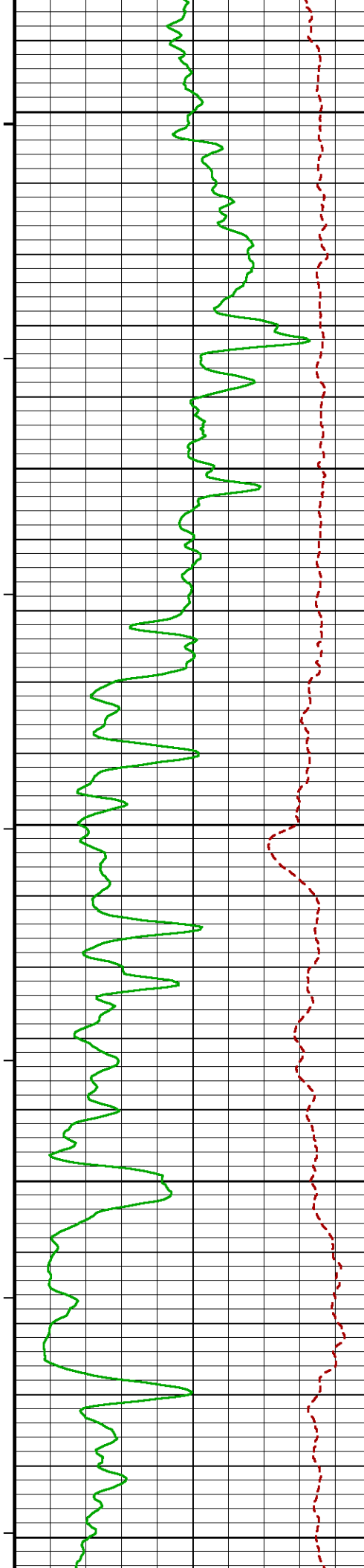
Array Ind. One Res 60

Array Ind. One Res 40

Array Ind. One Res 30

Array Ind. One Res 20

Shallow FE



127°

2600  
TVD

128°

2650  
TVD

128°

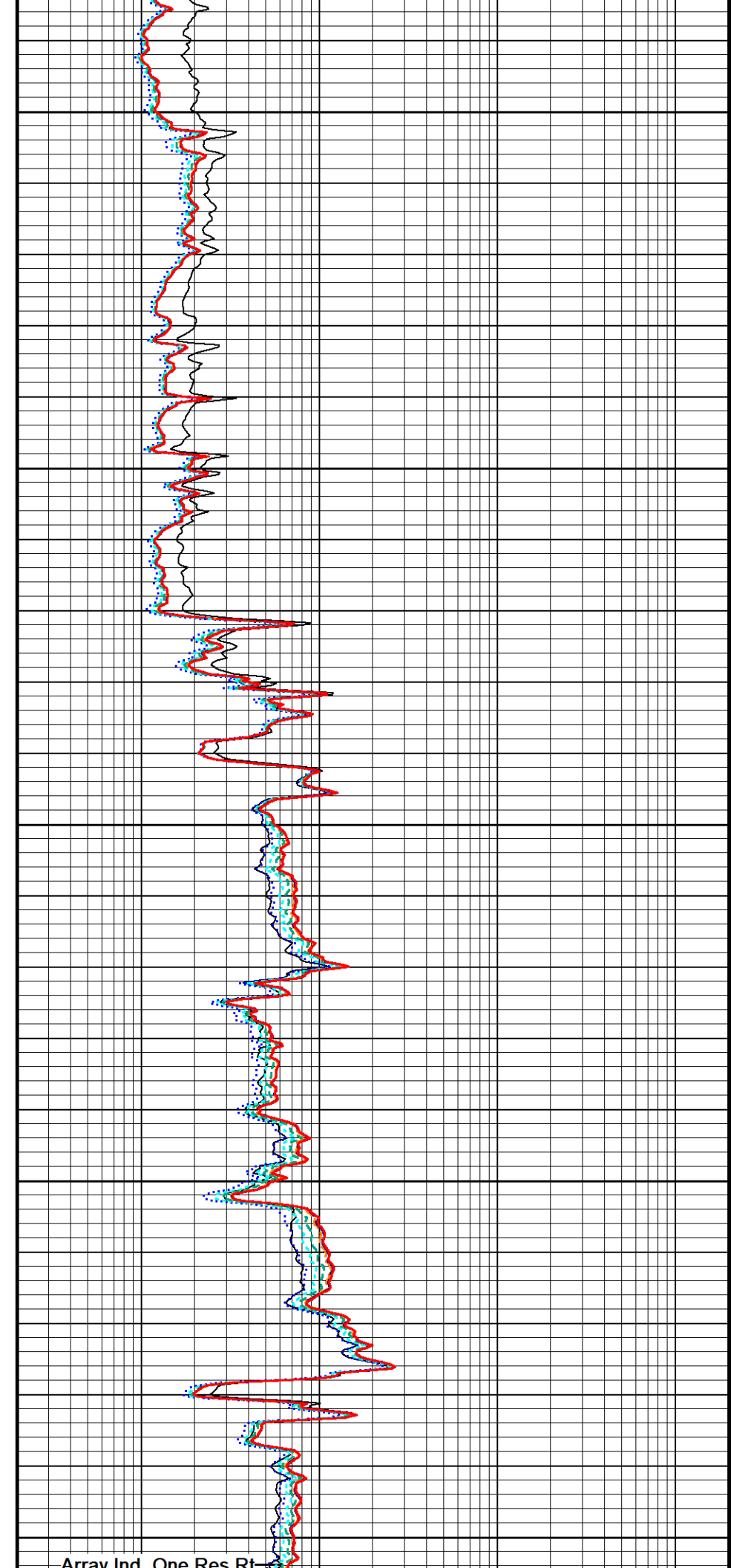
2700  
TVD

128°

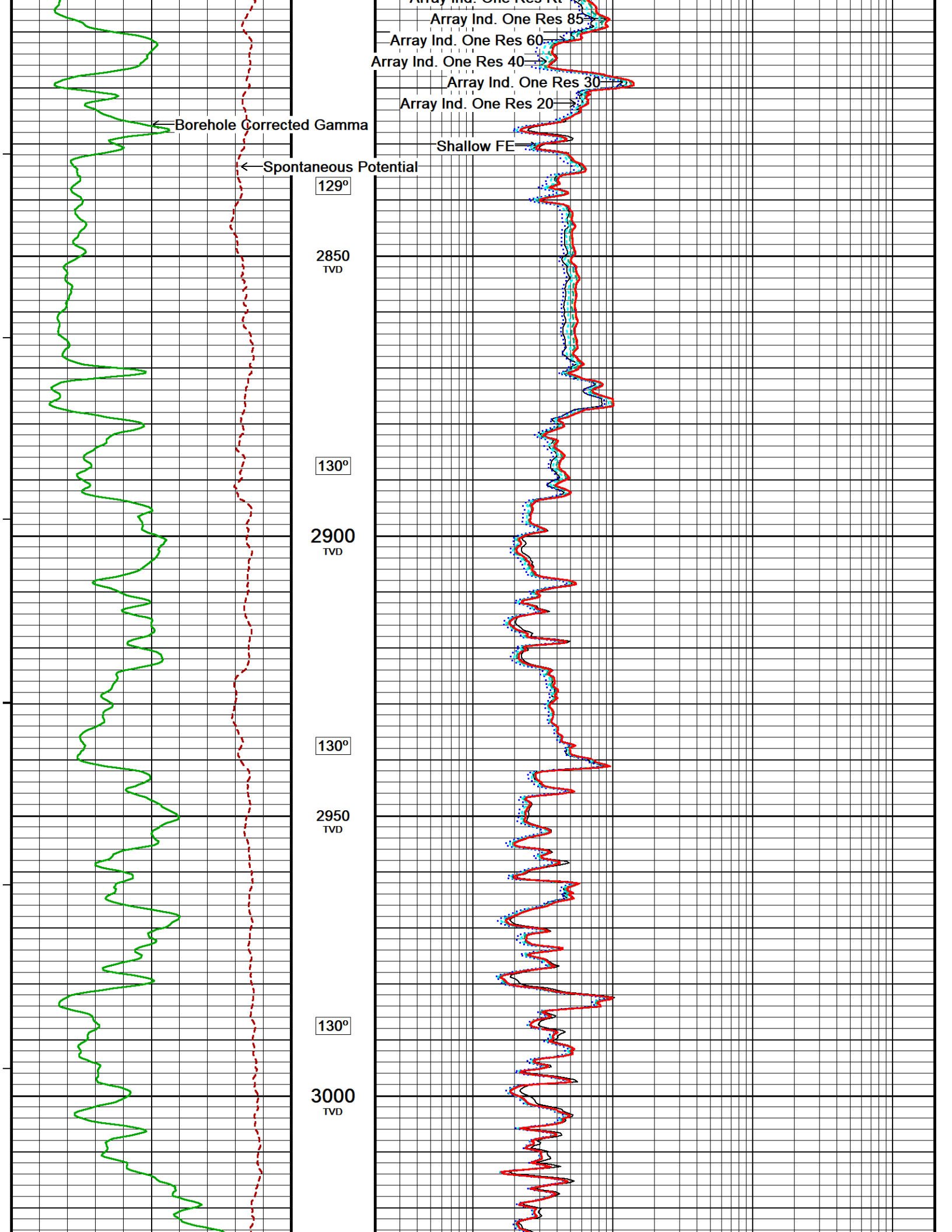
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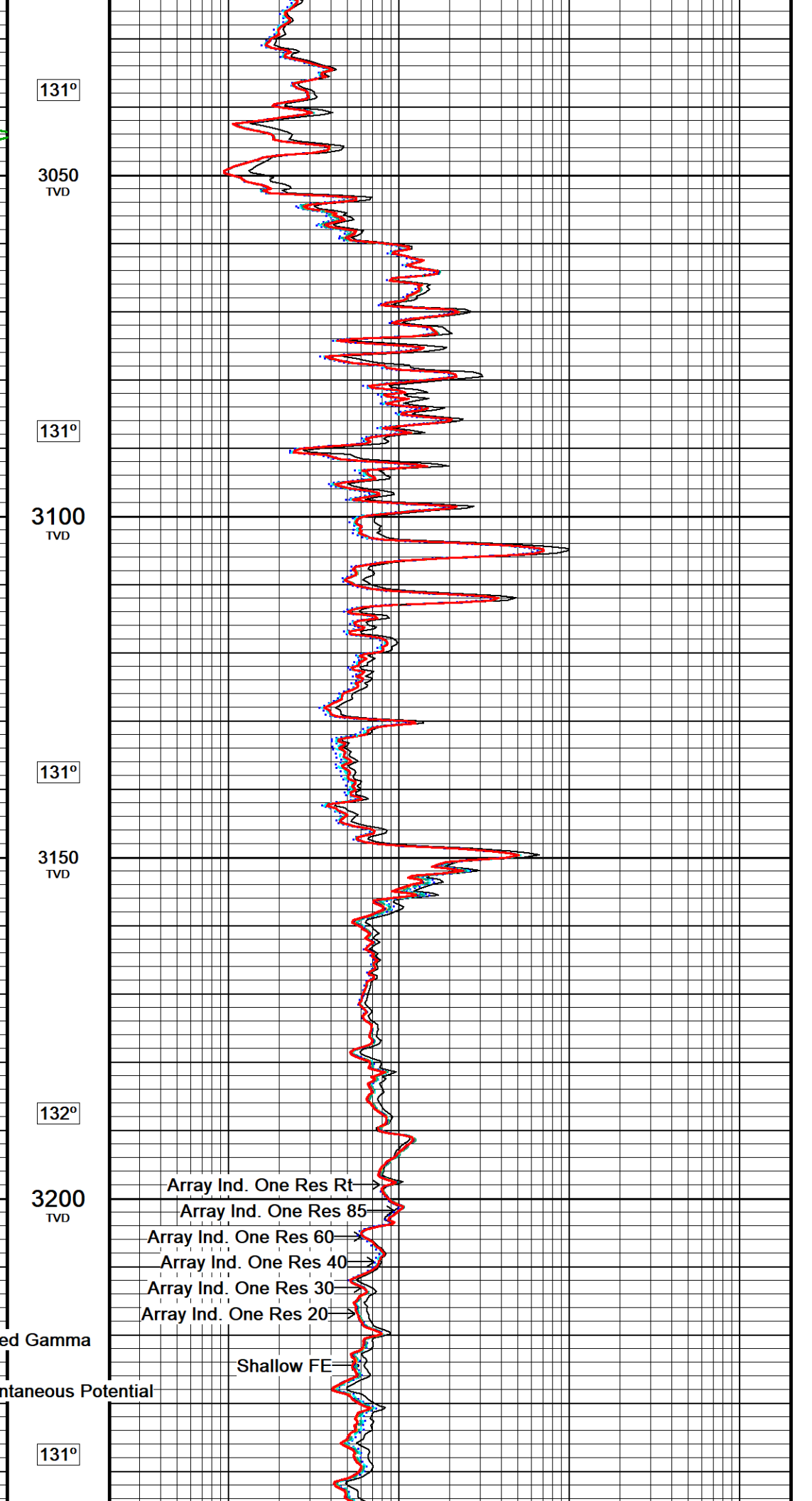
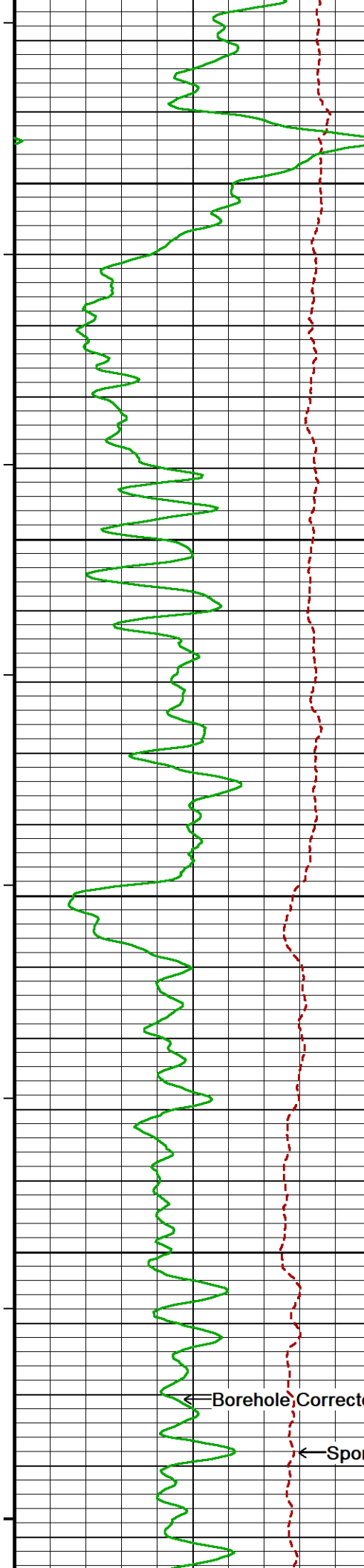
129°

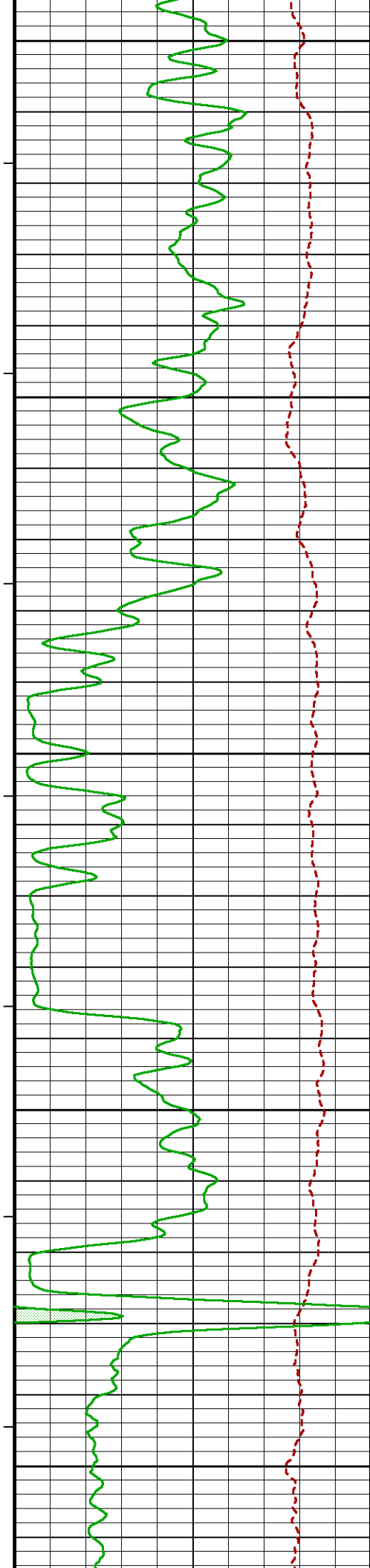
2800  
TVD



Array Ind. One Res Rt







3250  
TVD

132°

3300  
TVD

132°

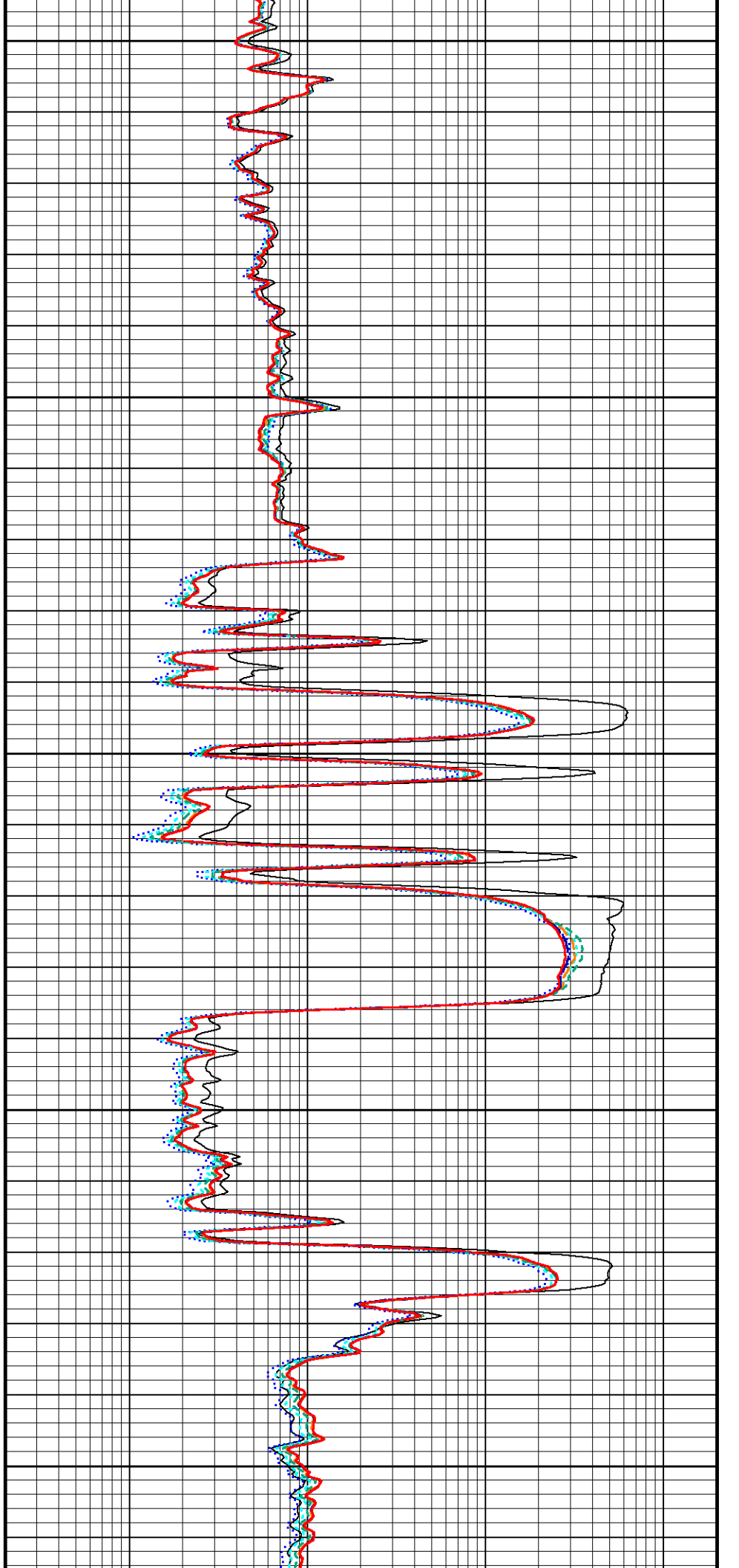
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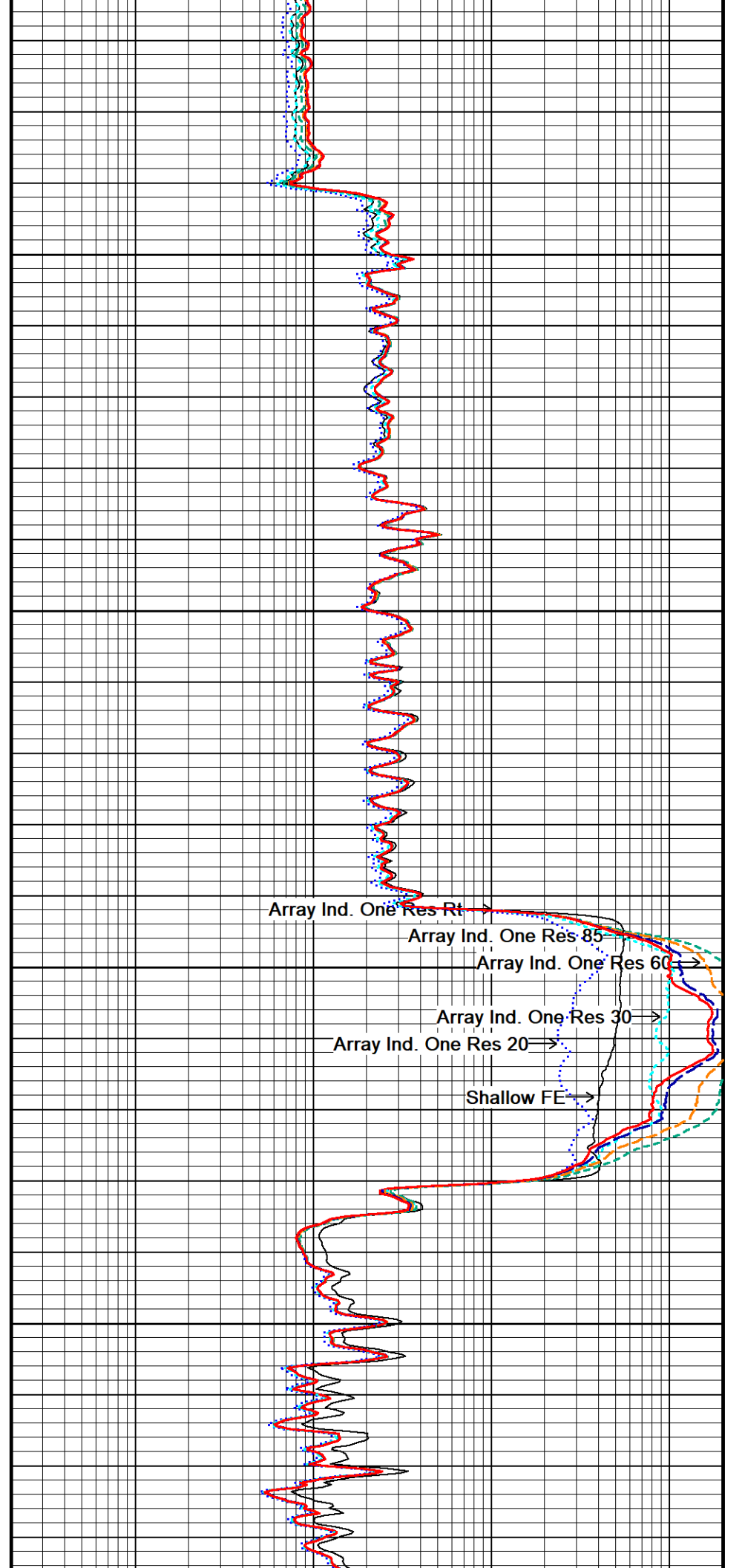
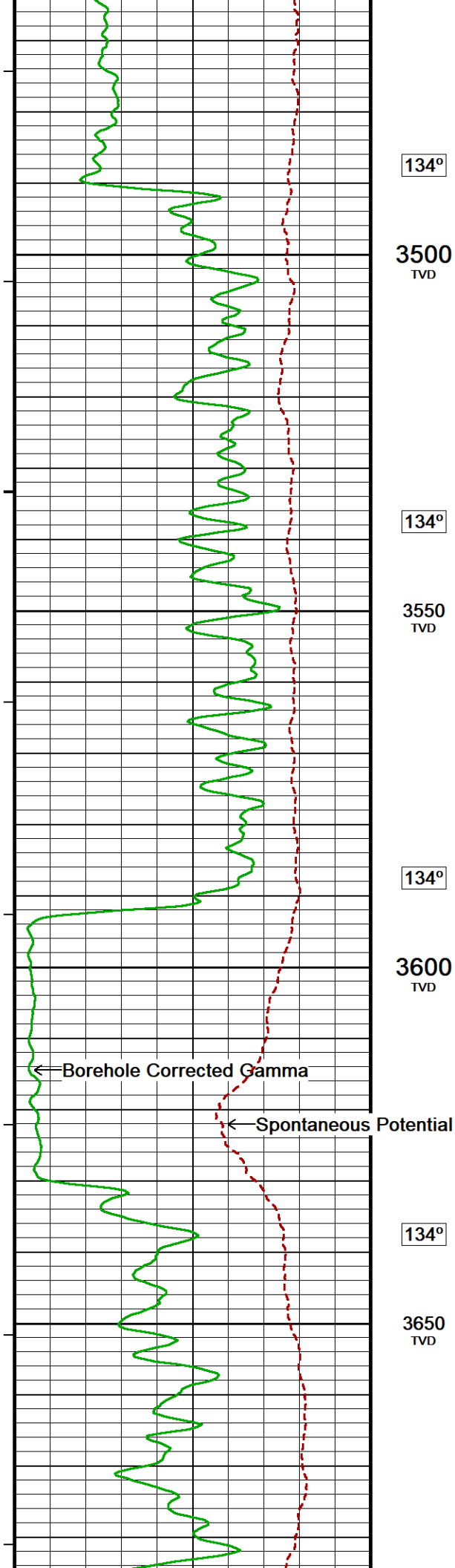
133°

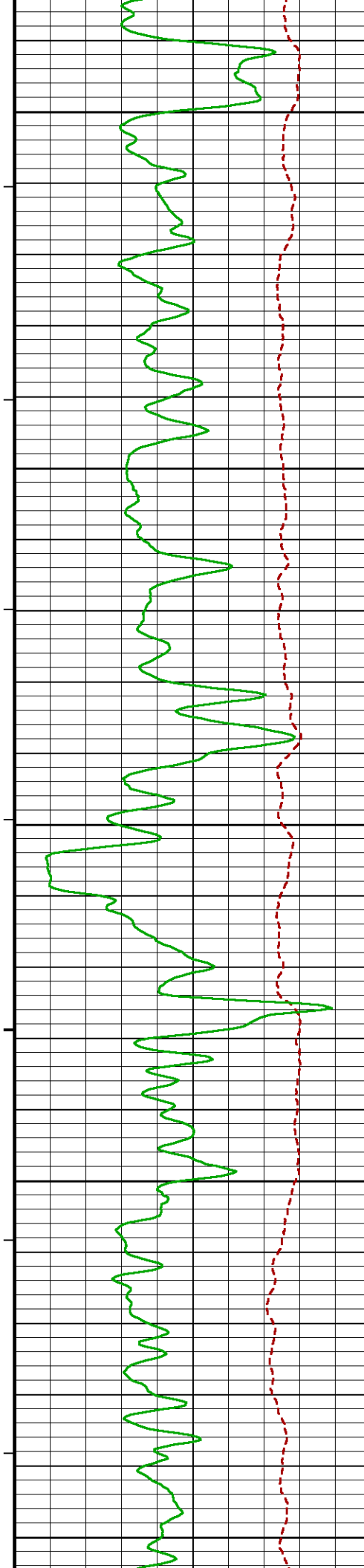
3400  
TVD

133°

3450  
TVD







134°

3700  
TVD

135°

3750  
TVD

135°

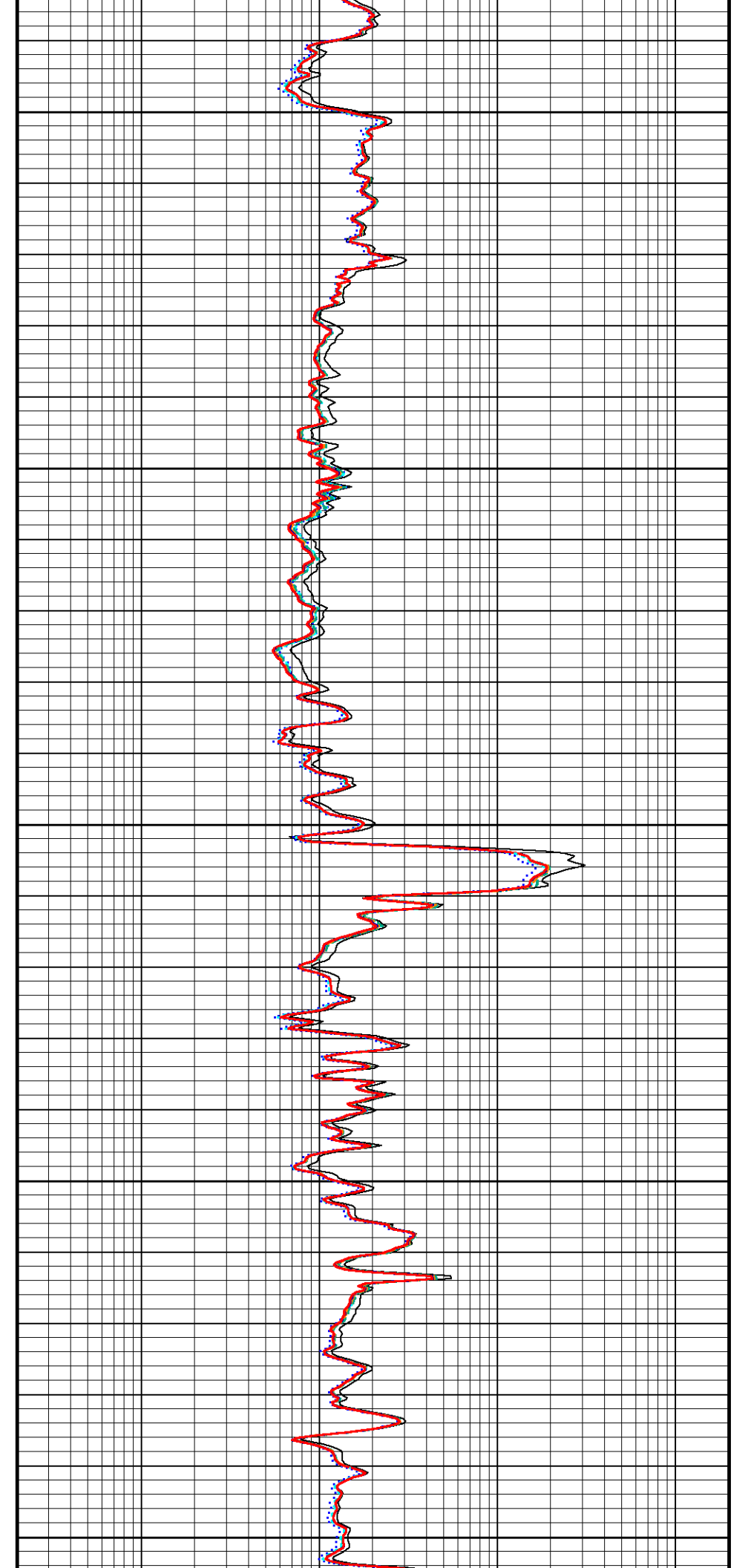
3800  
TVD

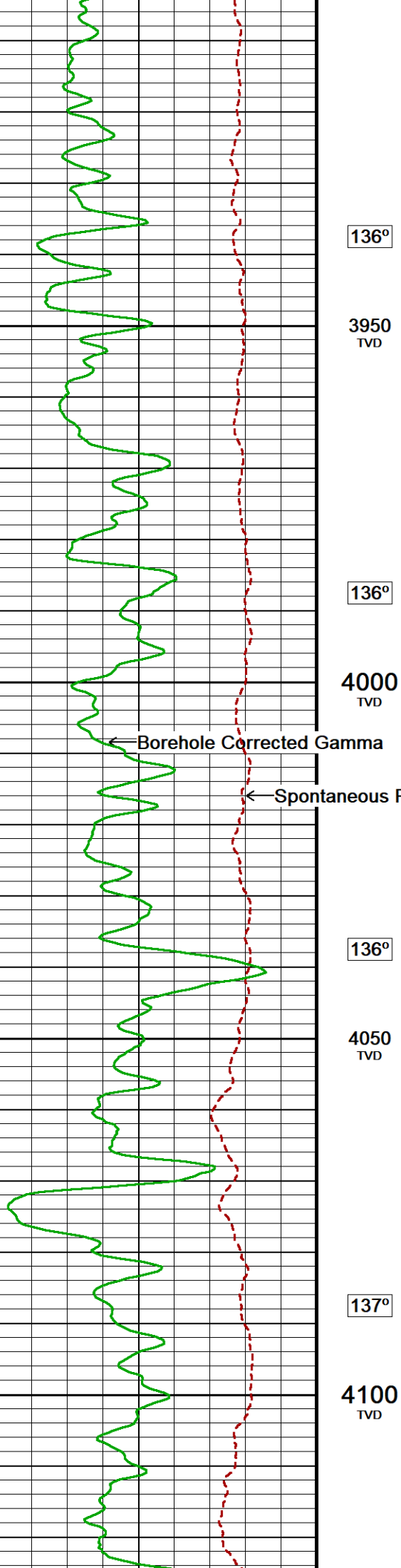
135°

3850  
TVD

135°

3900  
TVD





136°

3950  
TVD

136°

4000  
TVD

← Borehole Corrected Gamma

← Spontaneous Potential

136°

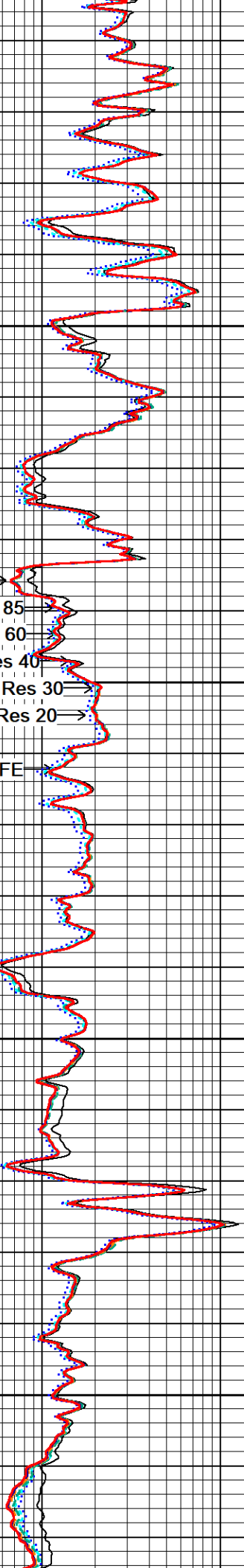
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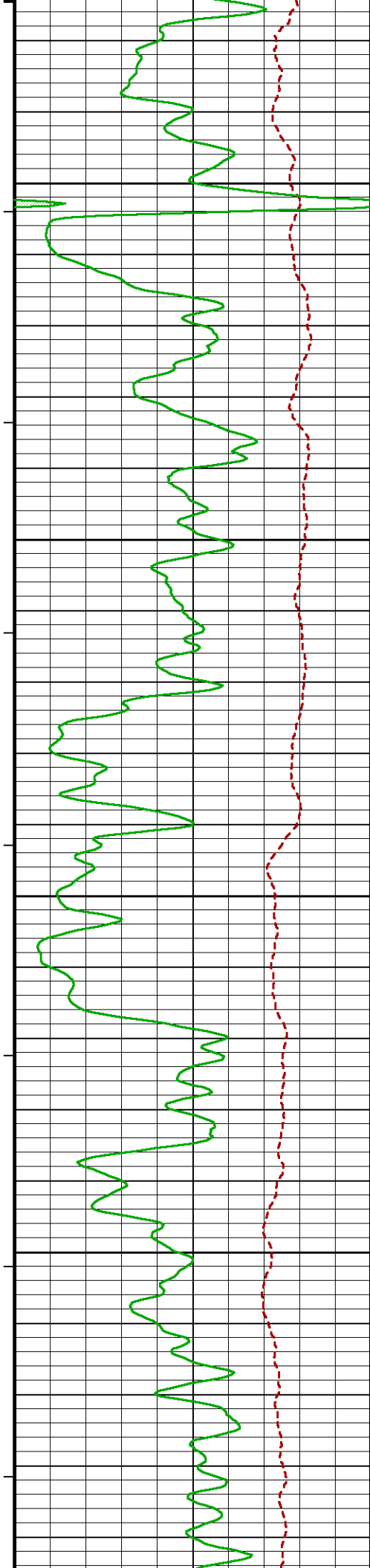
137°

4100  
TVD

Array Ind. One Res Rt →  
Array Ind. One Res 85 →  
Array Ind. One Res 60 →  
Array Ind. One Res 40 →  
Array Ind. One Res 30 →  
Array Ind. One Res 20 →

Shallow FE →





137°

4150  
TVD

137°

4200  
TVD

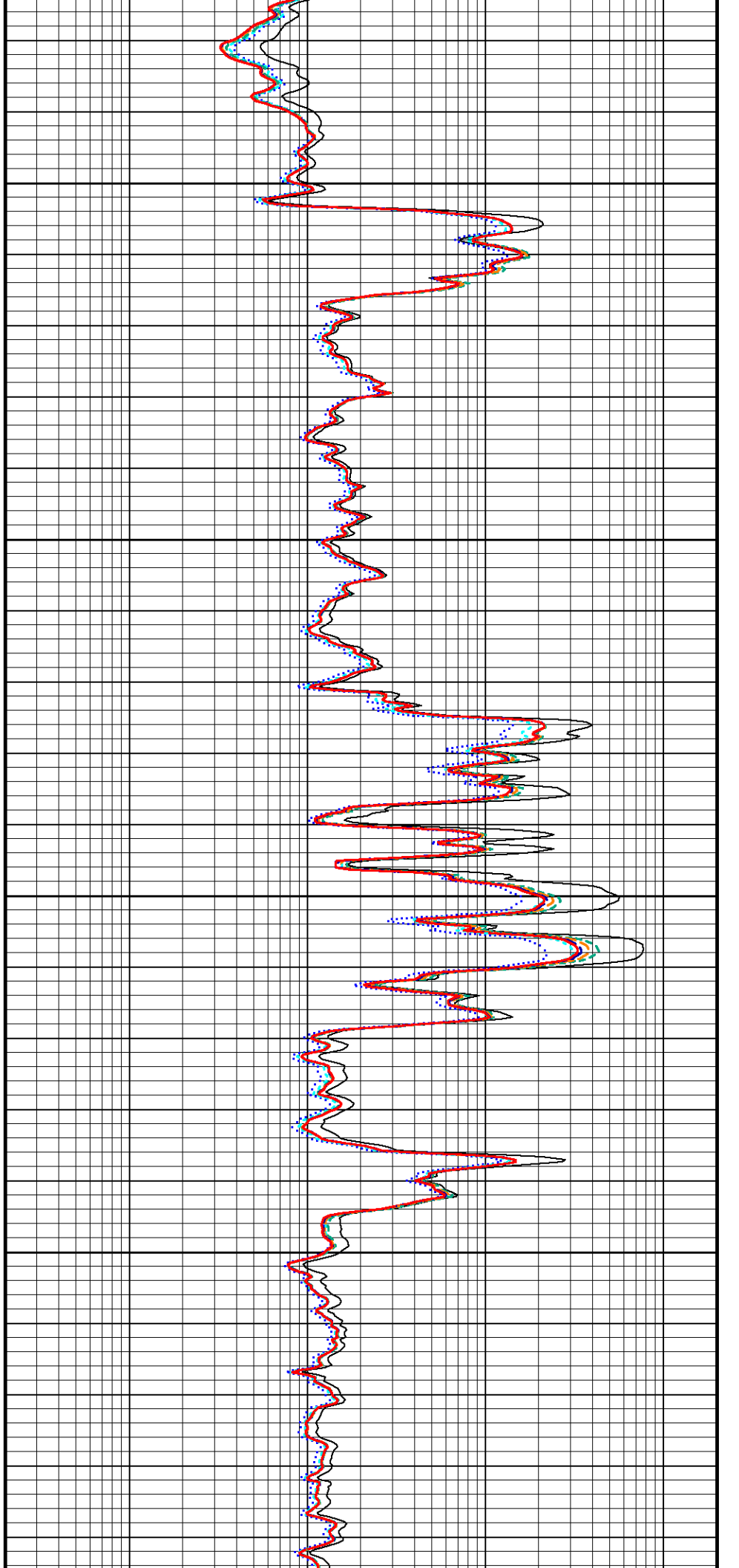
138°

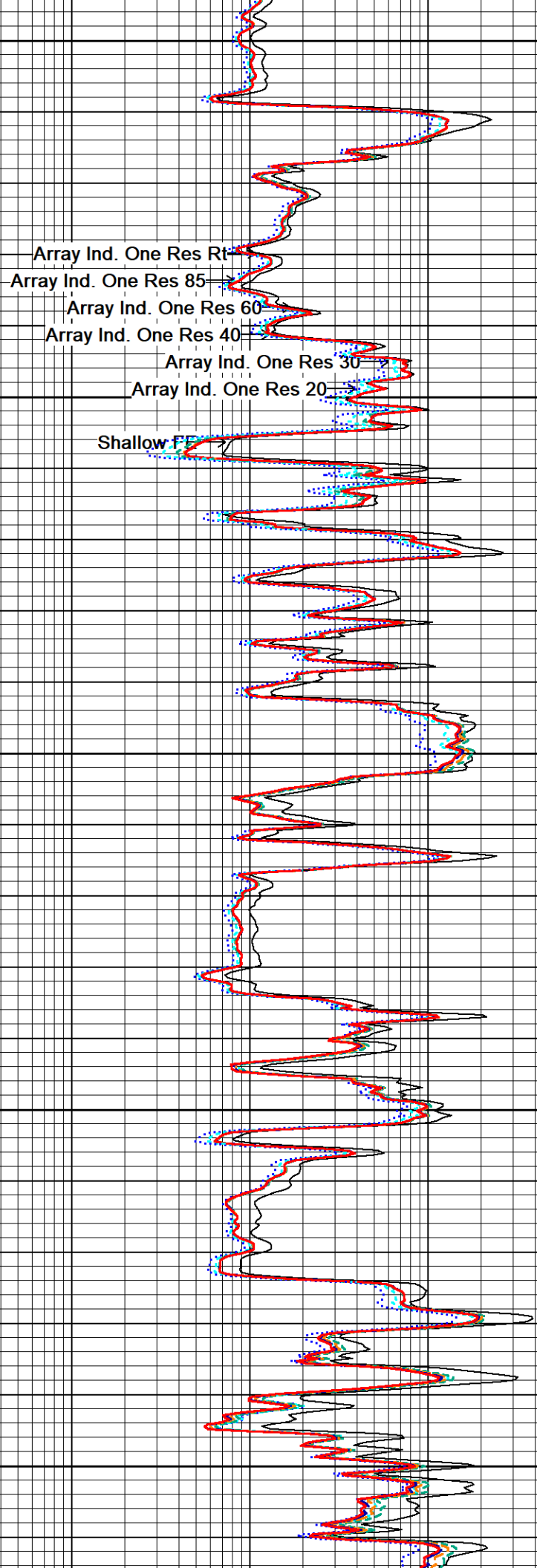
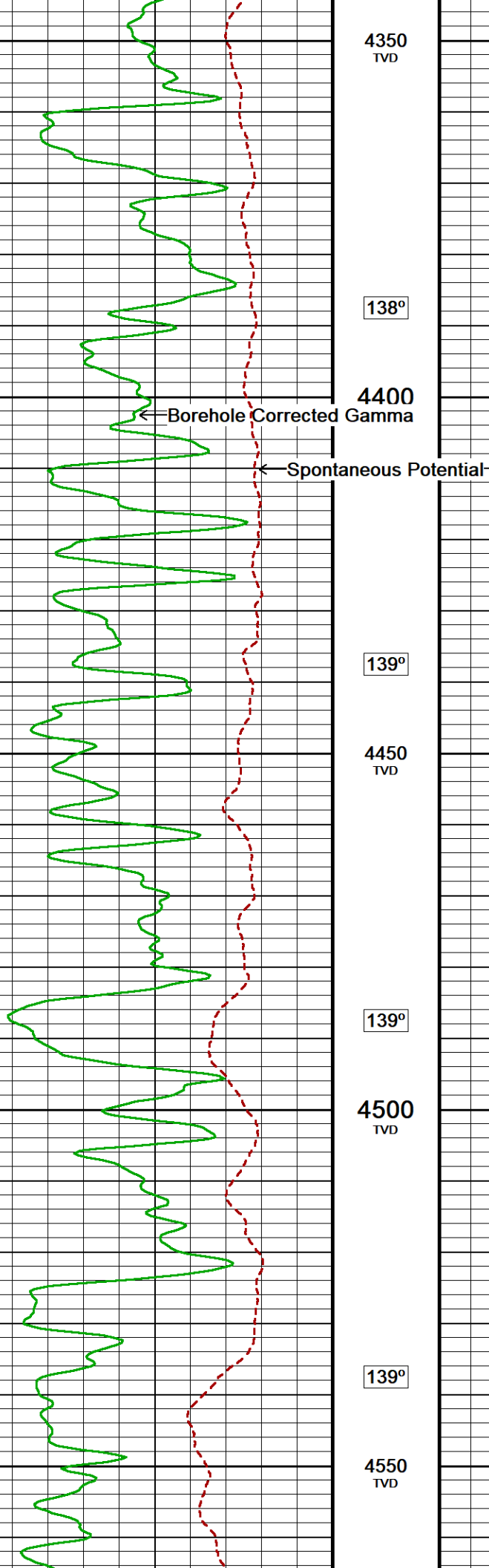
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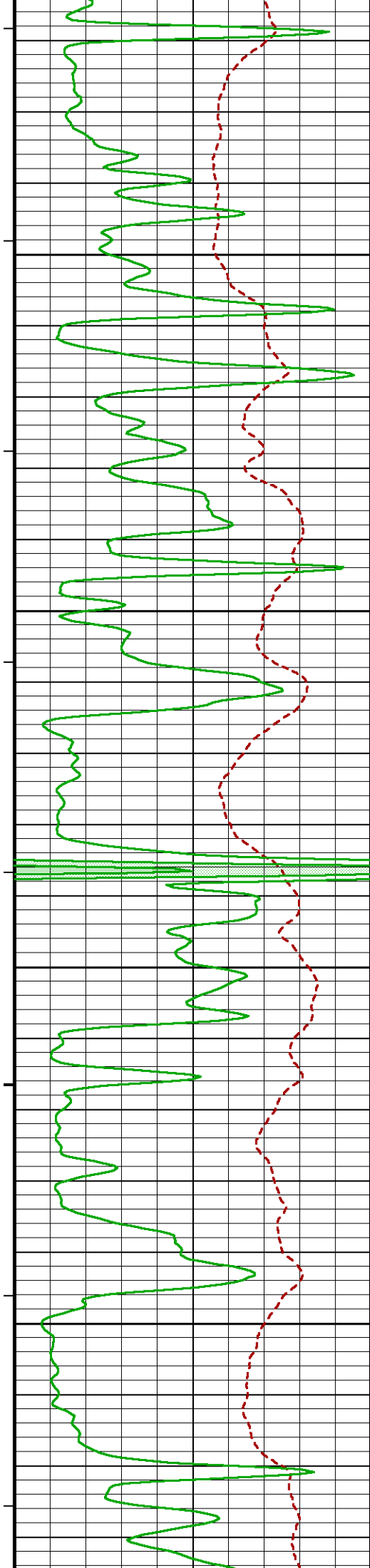
138°

4300  
TVD

138°







140°

4600  
TVD

140°

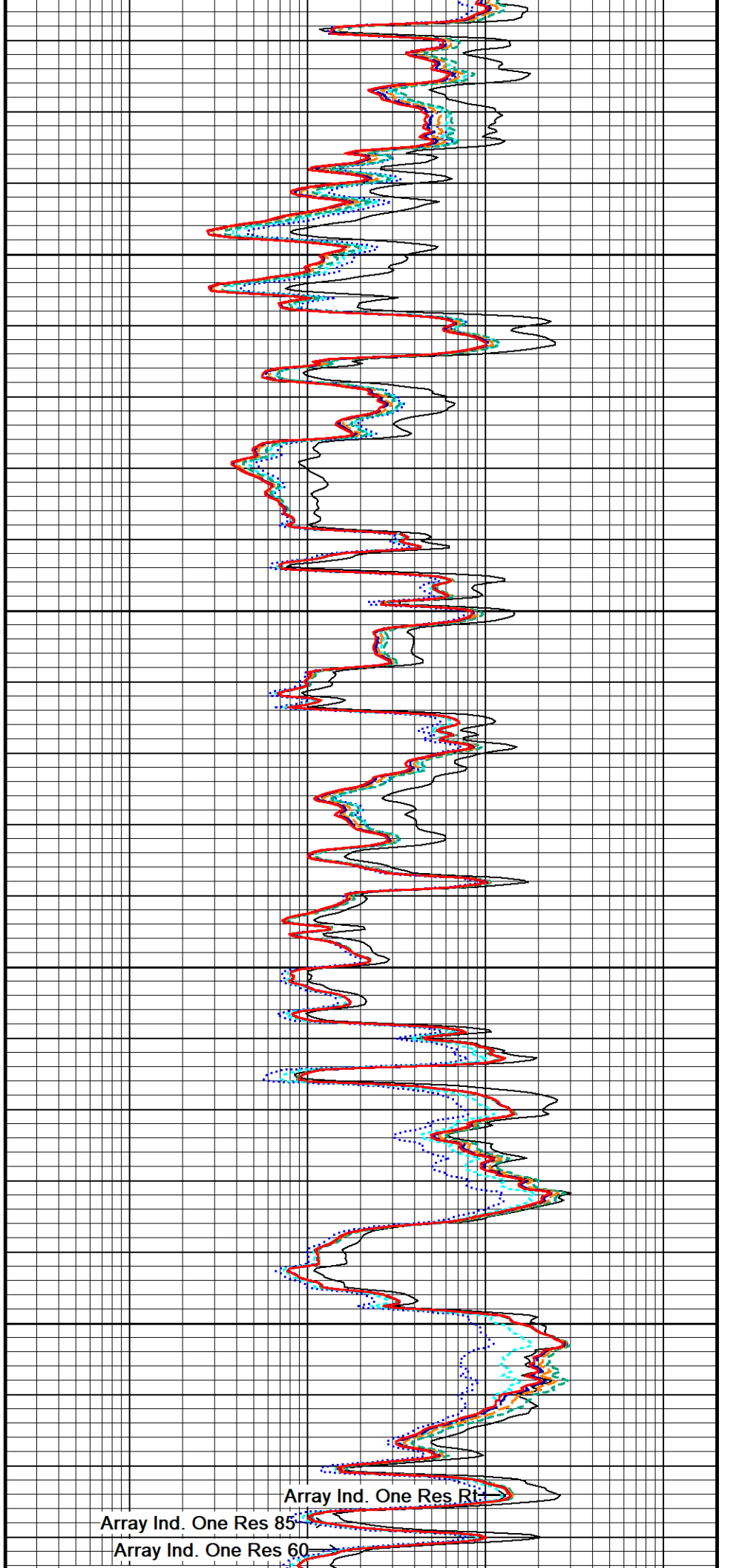
4650  
TVD

140°

4700  
TVD

141°

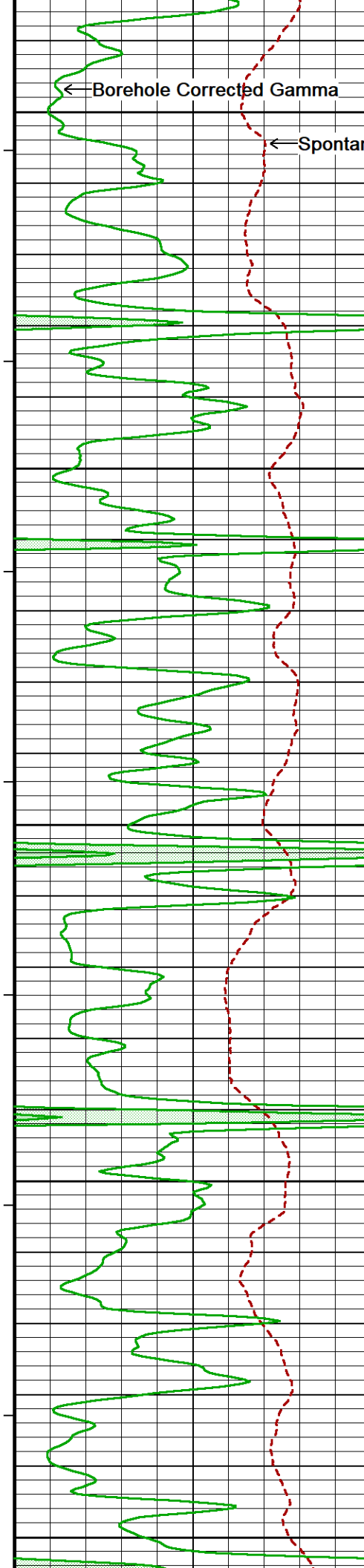
4750  
TVD



Array Ind. One Res 85

Array Ind. One Res 85

Array Ind. One Res 60



141°

4800  
TVD

141°

4850  
TVD

142°

4900  
TVD

142°

4950  
TVD

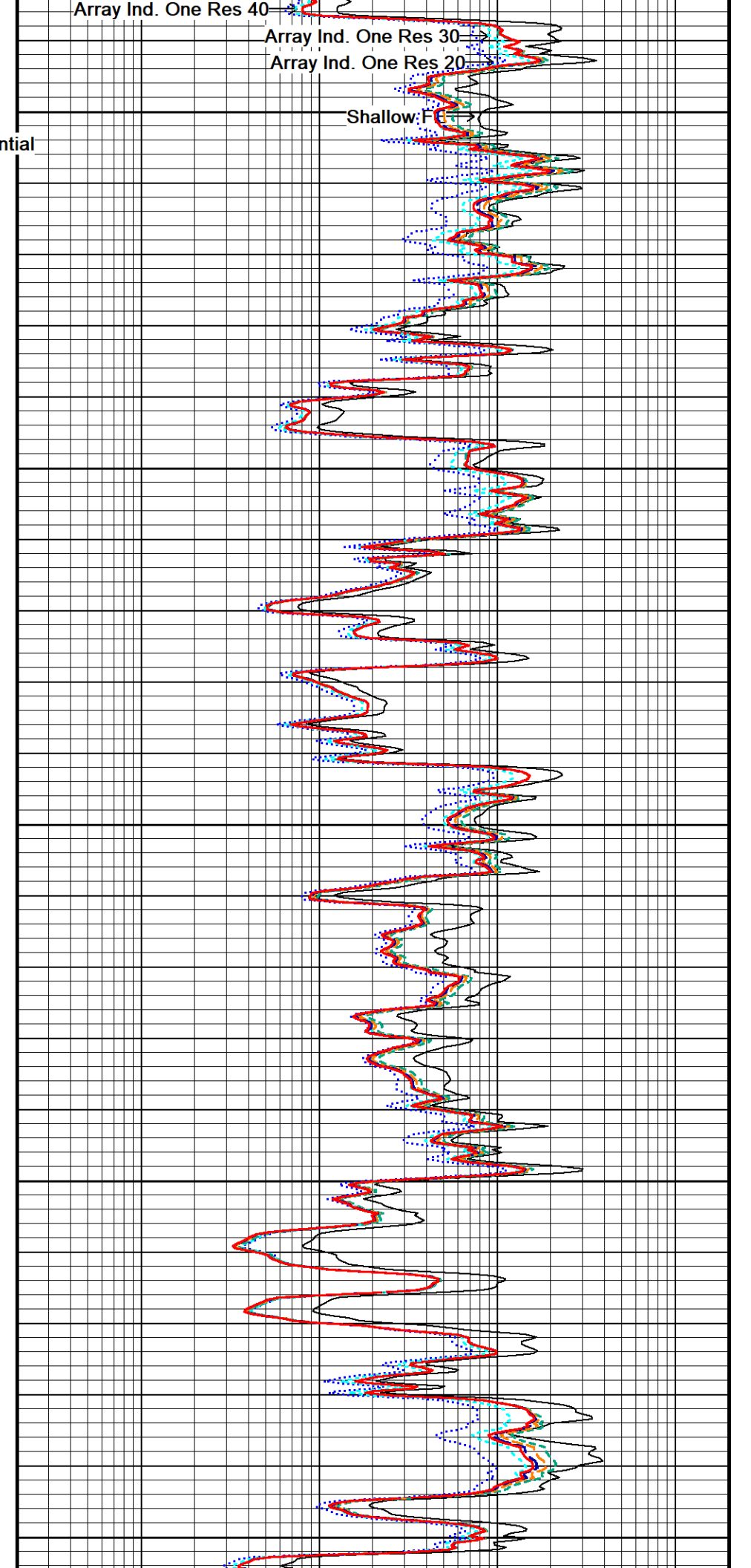
142°

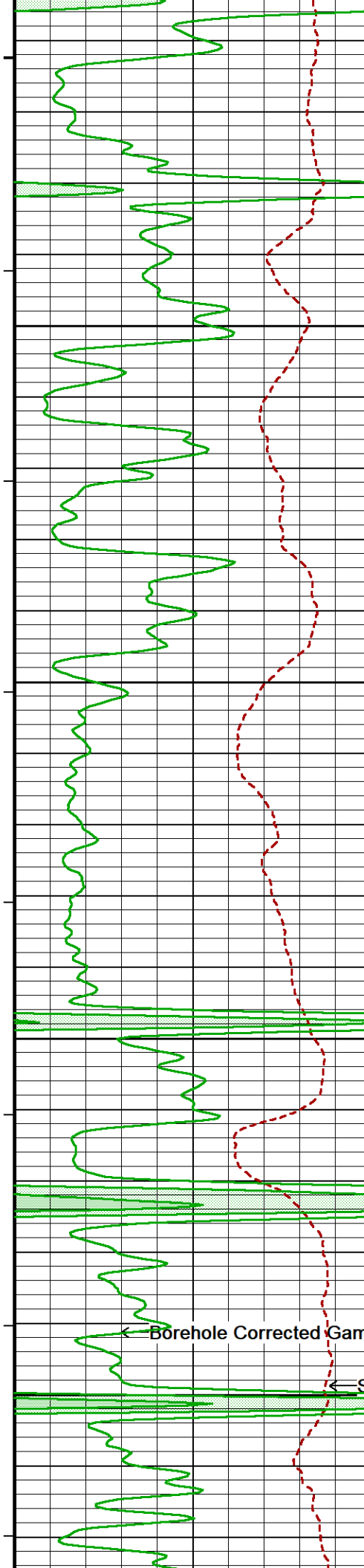
5000  
TVD

Array Ind. One Res 40

Array Ind. One Res 30  
Array Ind. One Res 20

Shallow: F





143°

5050  
TVD

143°

5100  
TVD

143°

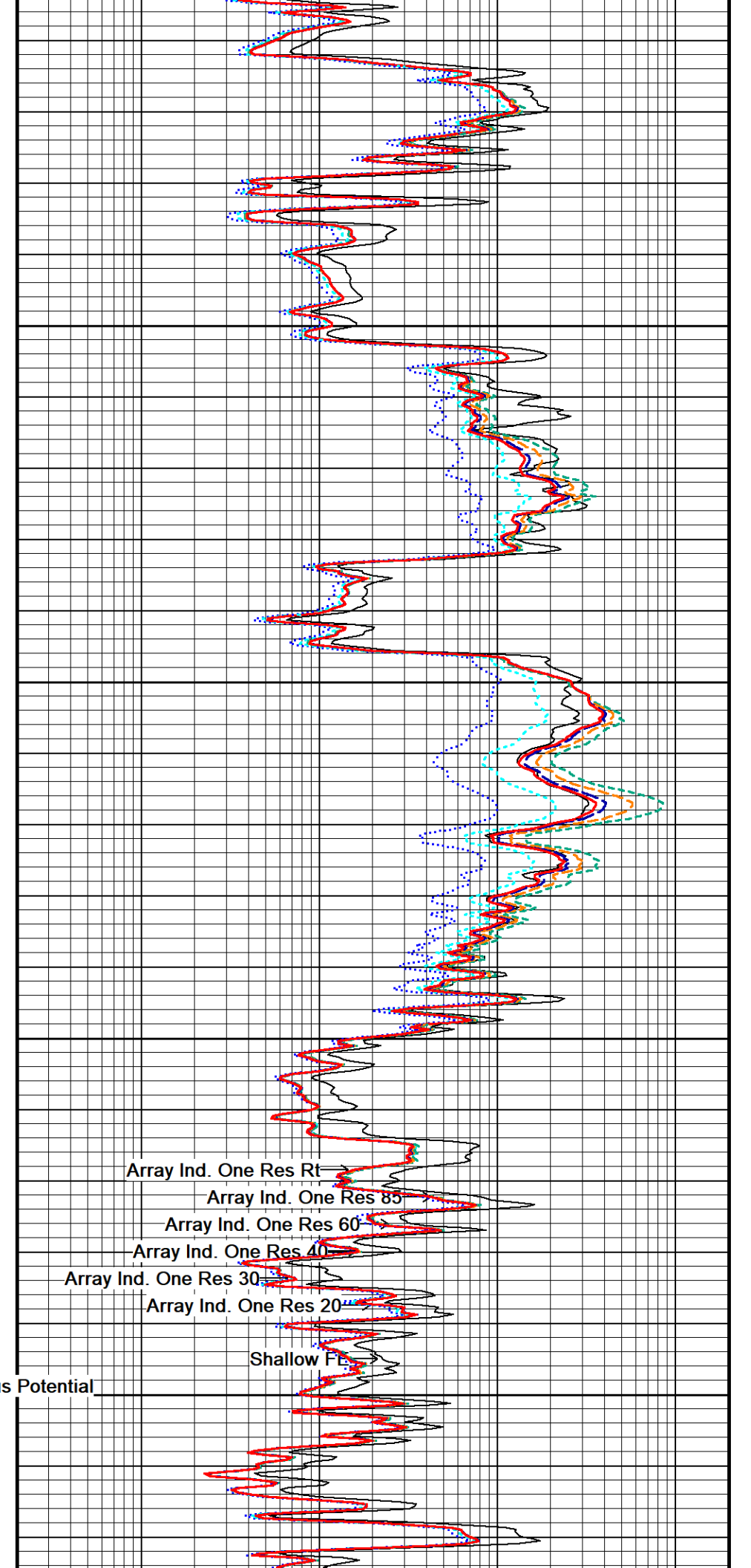
5150  
TVD

144°

5200  
TVD

← Borehole Corrected Gamma

← Spontaneous Potential



Array Ind. One Res Rt

Array Ind. One Res 85

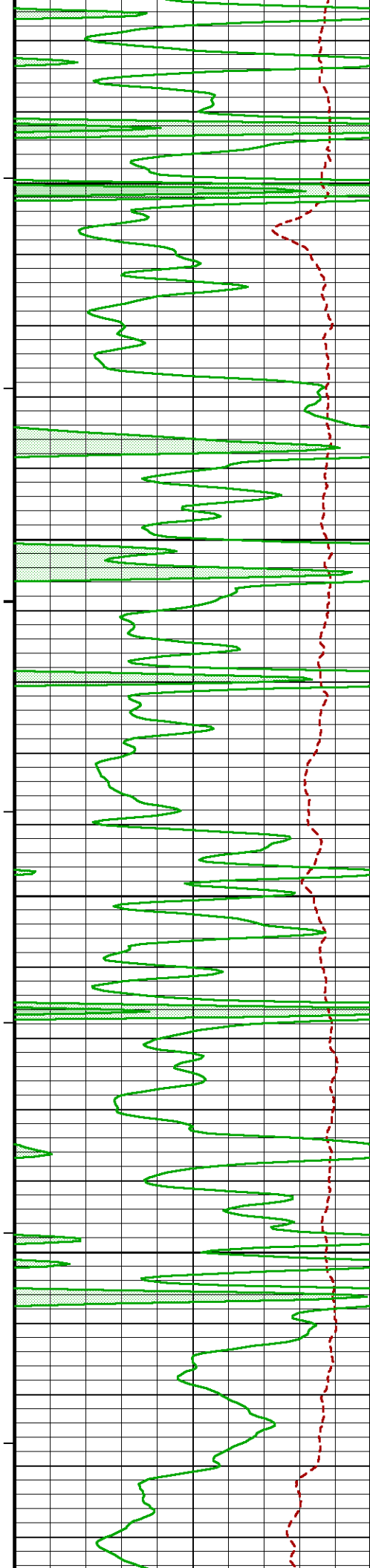
Array Ind. One Res 60

Array Ind. One Res 40

Array Ind. One Res 30

Array Ind. One Res 20

Shallow FL



144°

5250  
TVD

144°

5300  
TVD

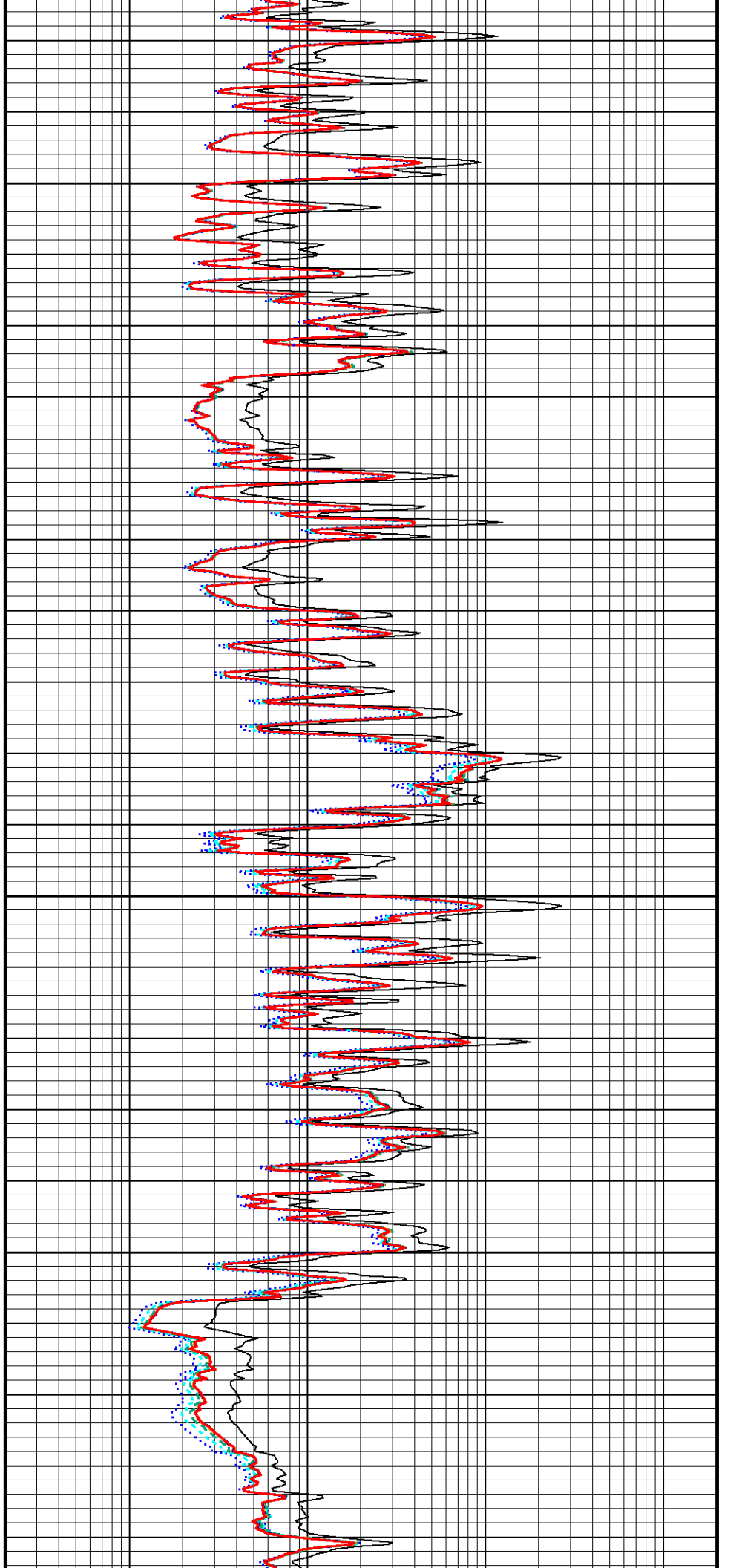
144°

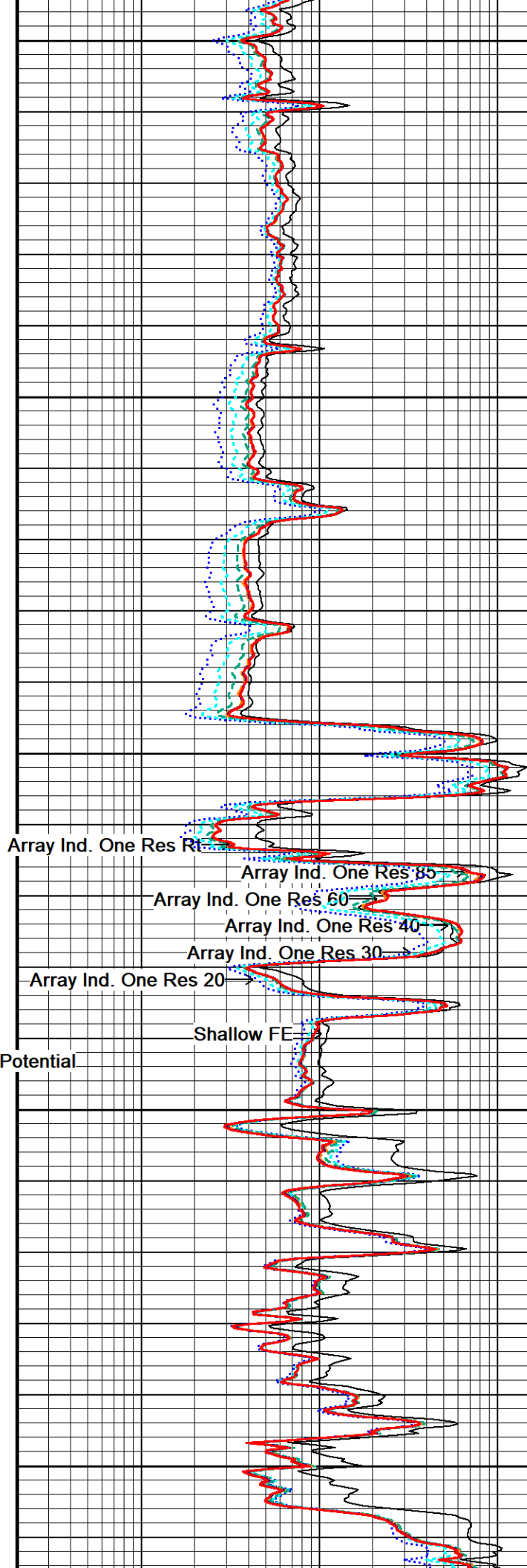
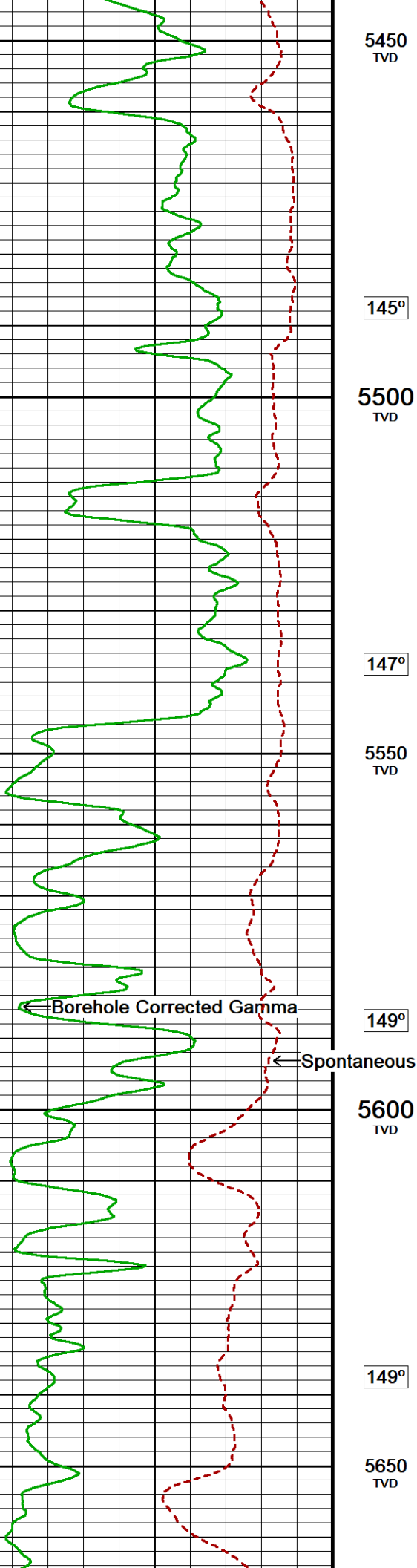
5350  
TVD

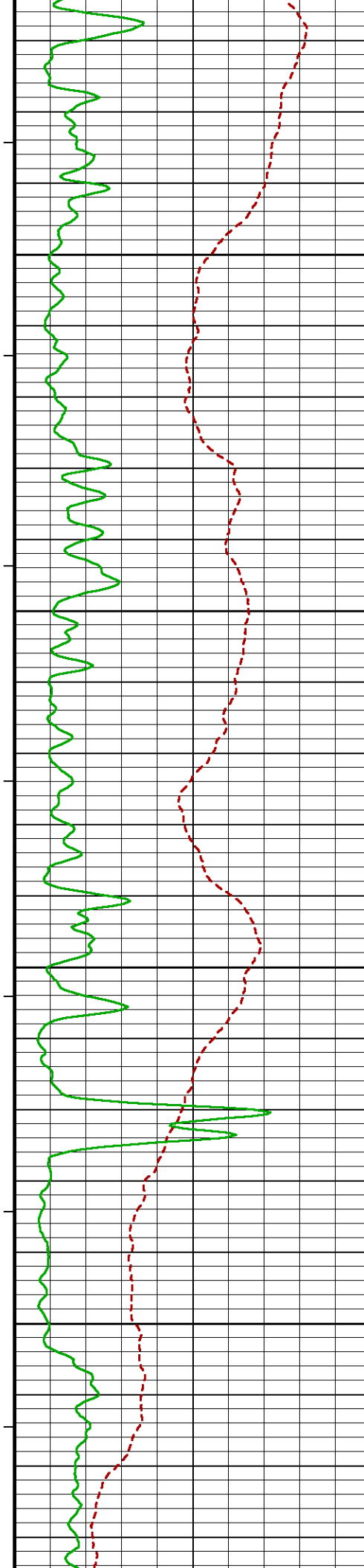
144°

5400  
TVD

145°







150°

5700  
TVD

151°

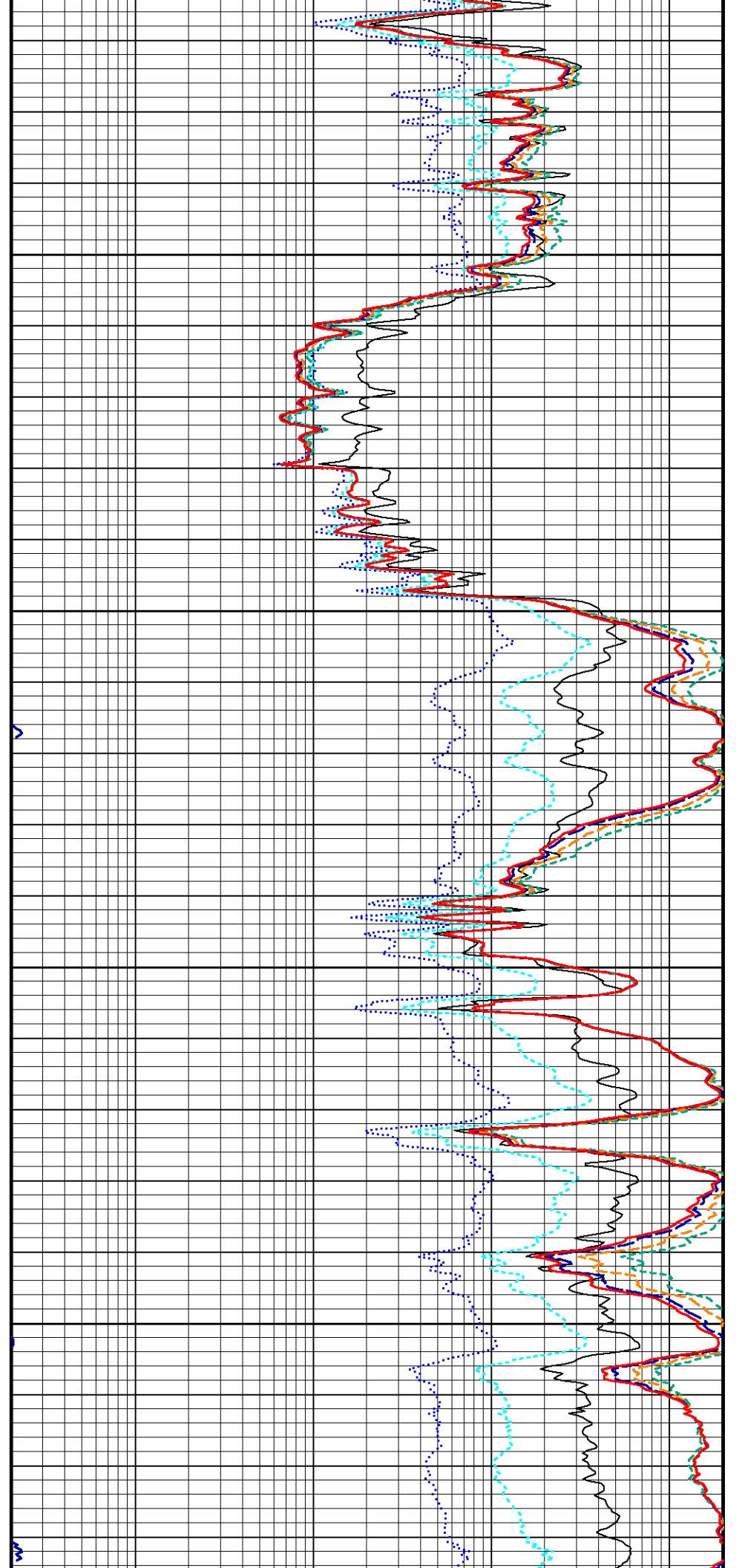
5750  
TVD

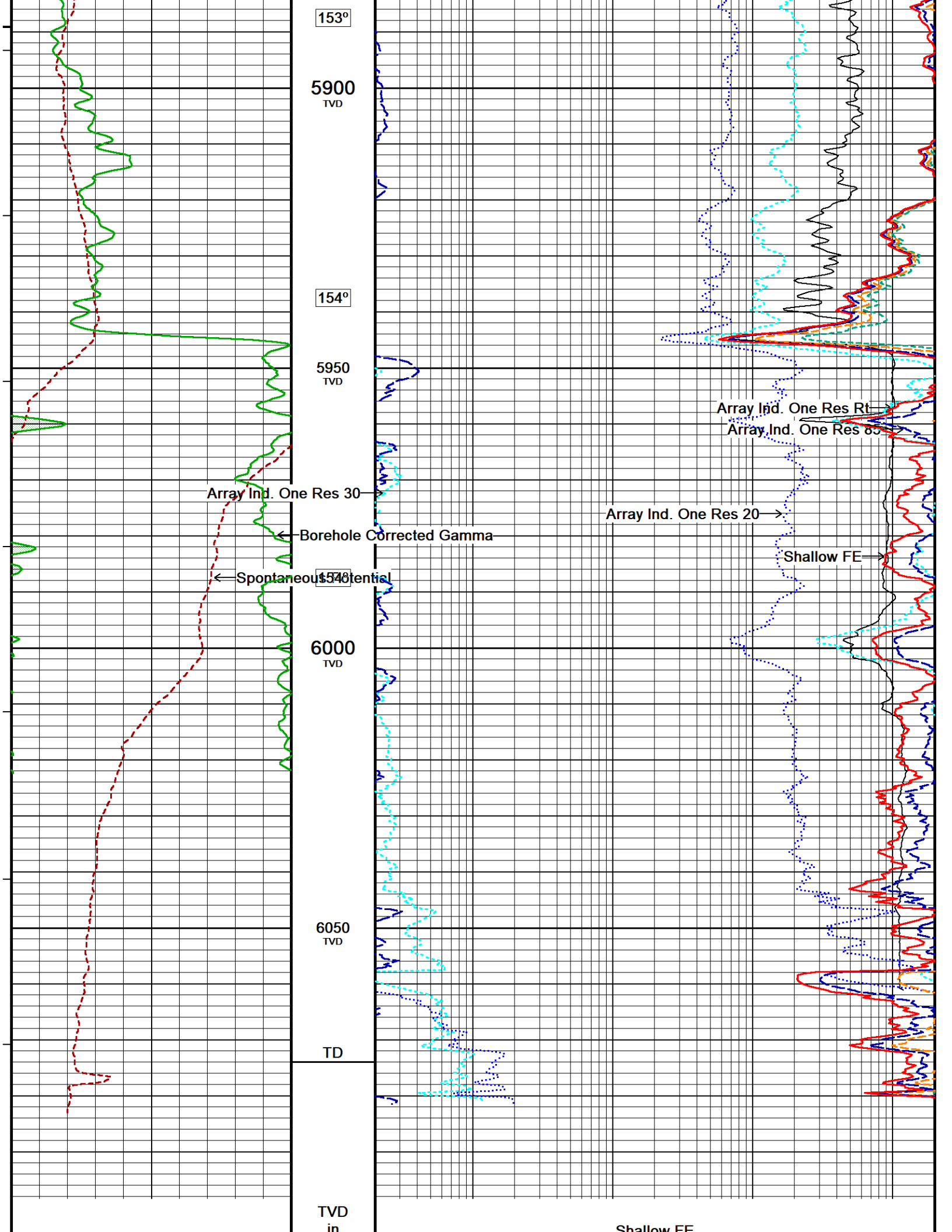
152°

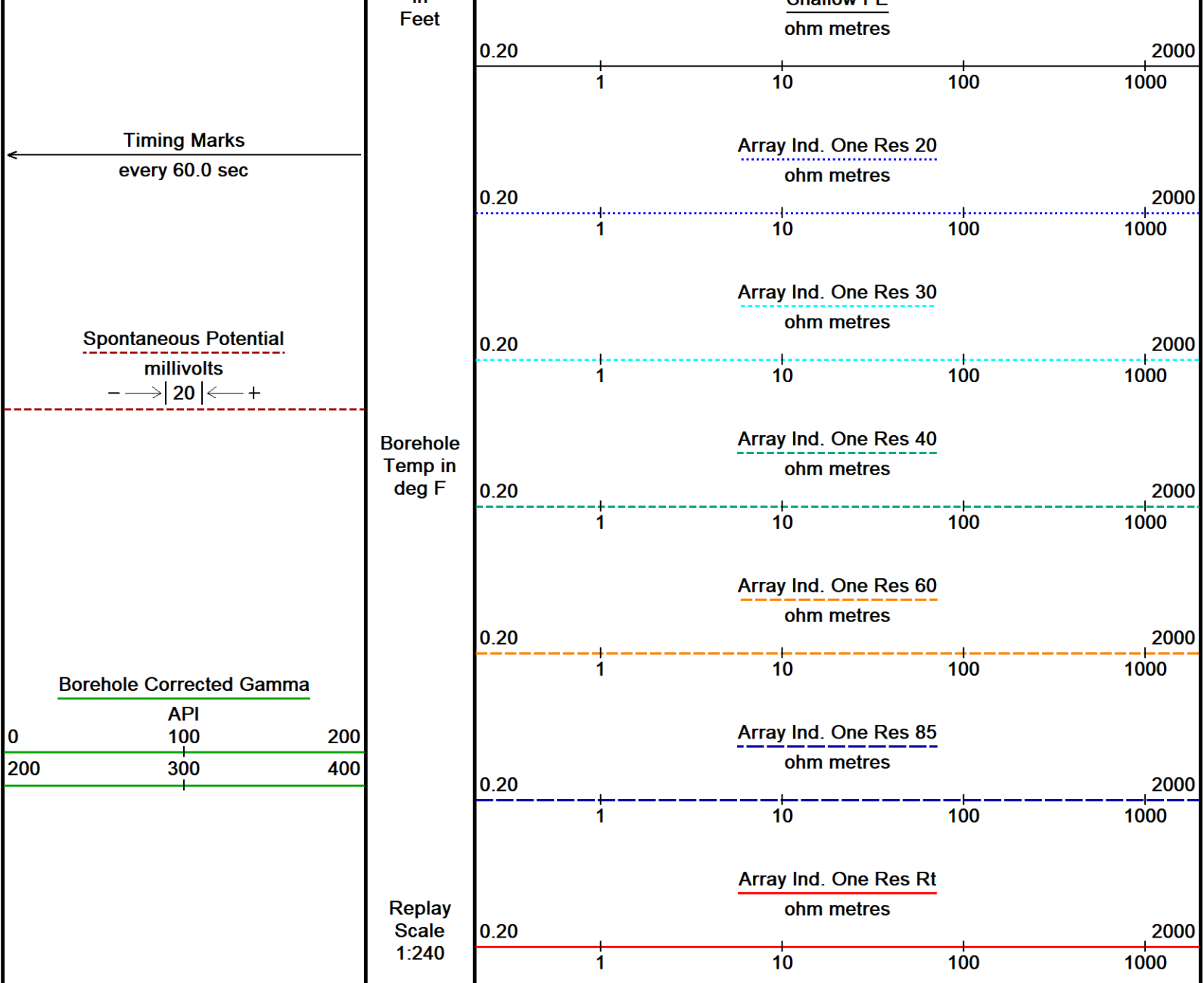
5800  
TVD

152°

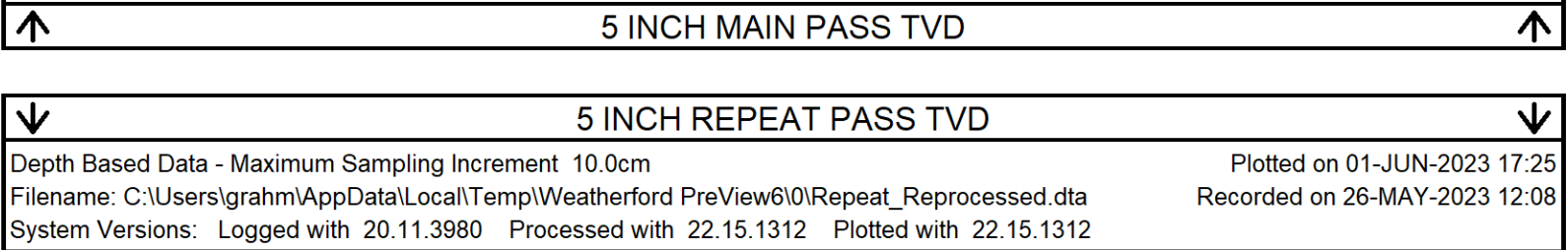
5850  
TVD







↑ 5 INCH MAIN PASS TVD ↑



↓ 5 INCH REPEAT PASS TVD ↓

Spontaneous Potential

millivolts

- -> | 20 | <- - +

Borehole Corrected Gamma

API

100

200

300

400

Borehole  
Temp in  
deg F

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 85

ohm metres

0.20

2000

1

10

100

1000

Array Ind. One Res Rt

ohm metres

0.20

2000

1

10

100

1000

Replay  
Scale  
1:240

5490  
TVD

5500  
TVD

145°

5550  
TVD

147°

5600  
TVD

← Borehole Corrected Gamma

← Spontaneous Potential

Array Ind. One Res Rt

Array Ind. One Res 85

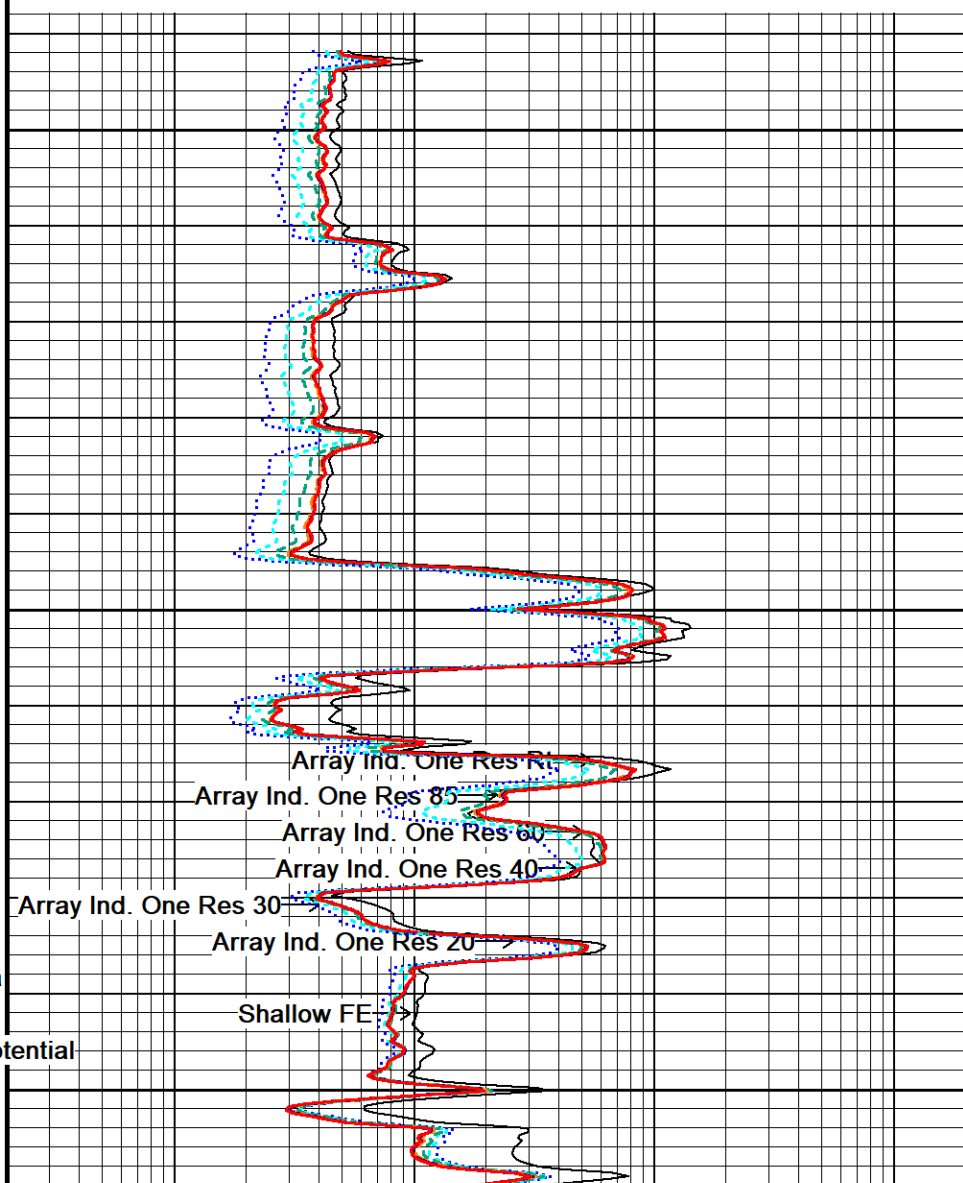
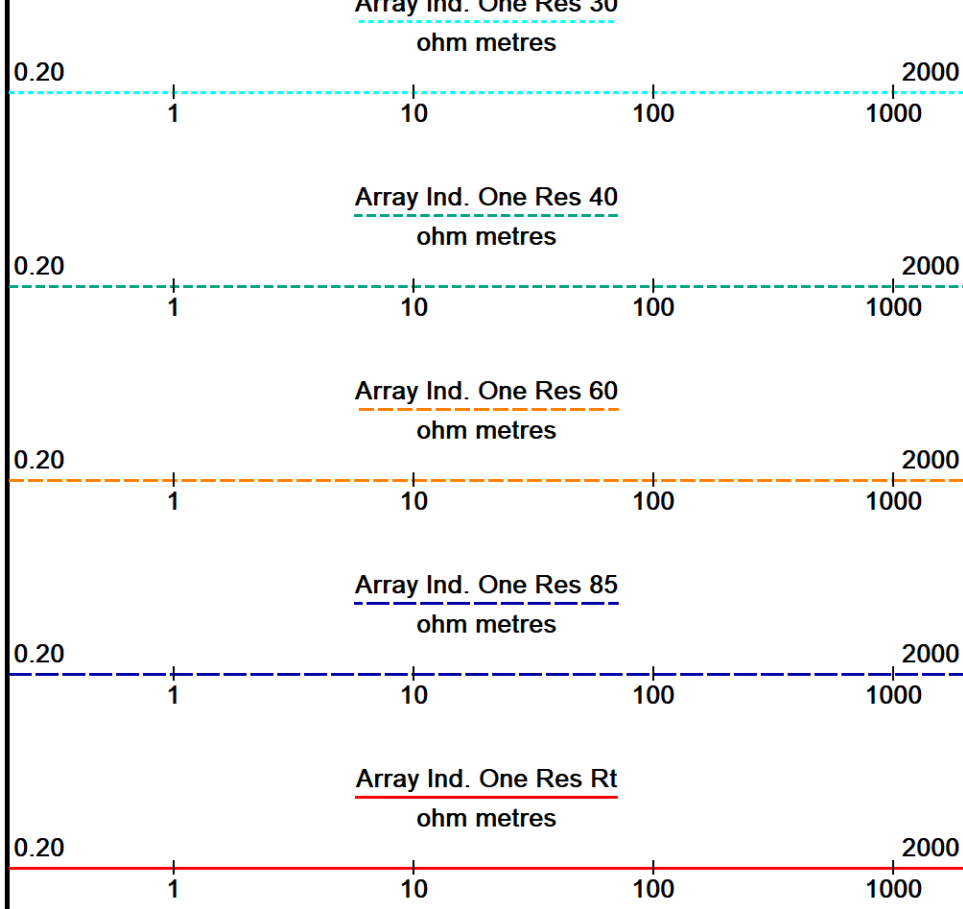
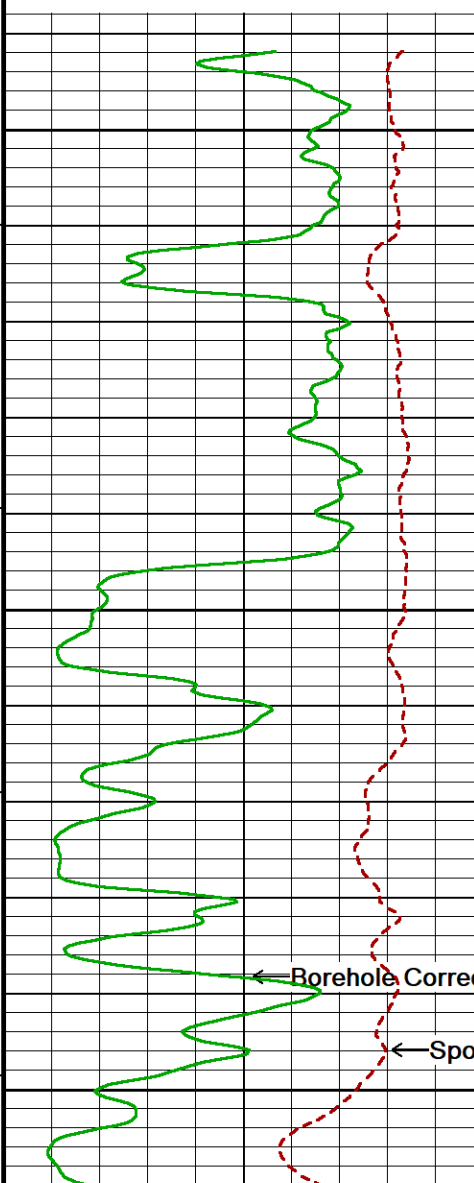
Array Ind. One Res 60

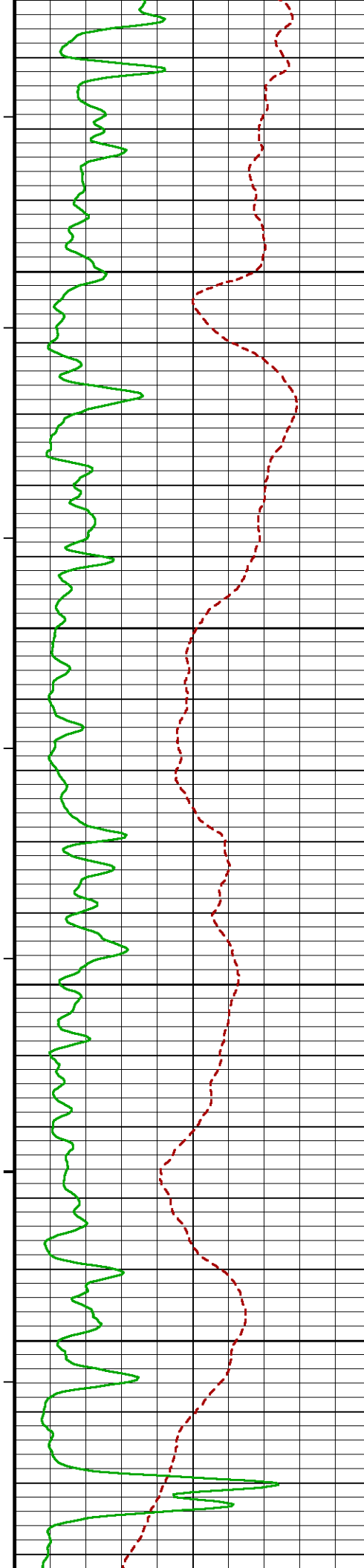
Array Ind. One Res 40

Array Ind. One Res 30

Array Ind. One Res 20

Shallow FE





147°

5650  
TVD

148°

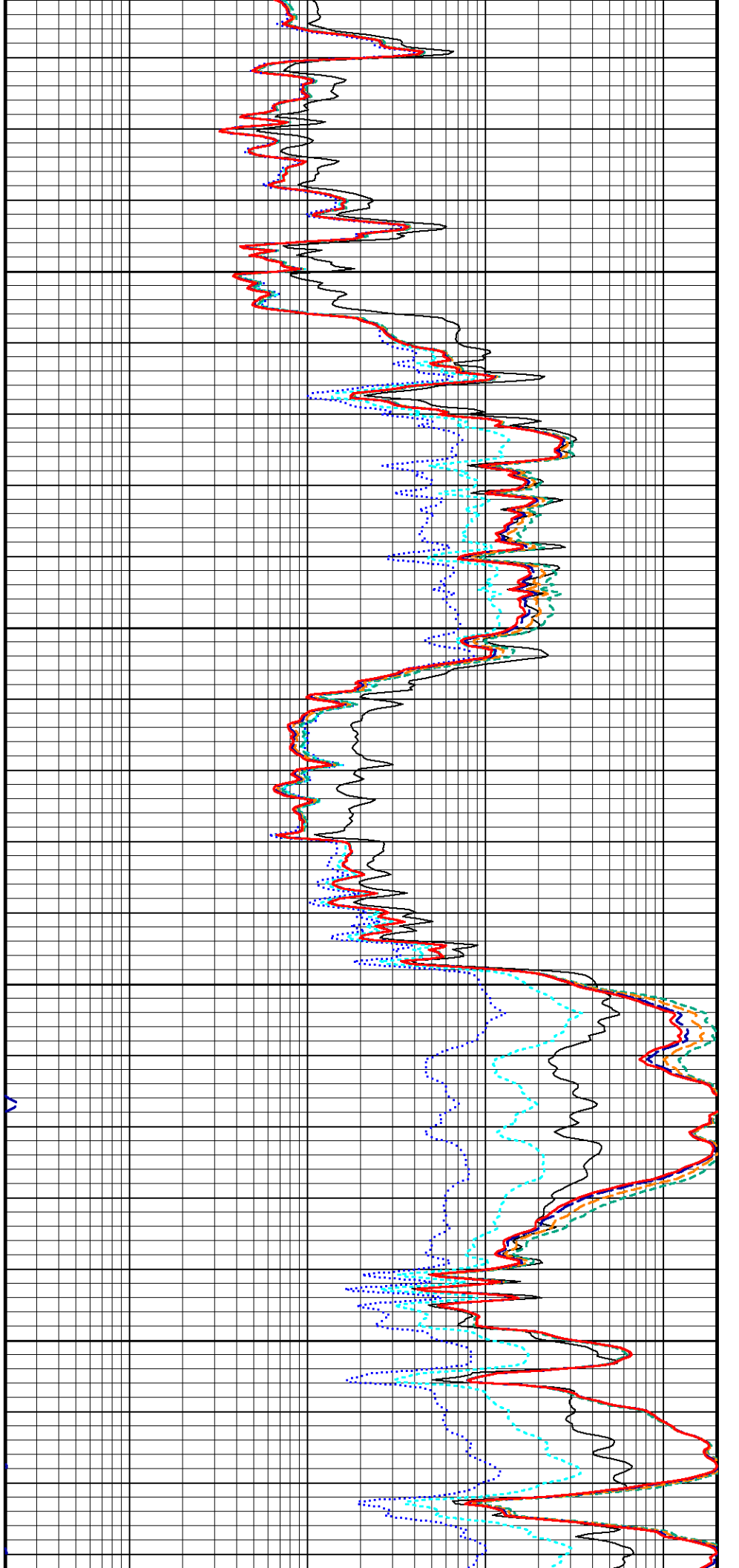
5700  
TVD

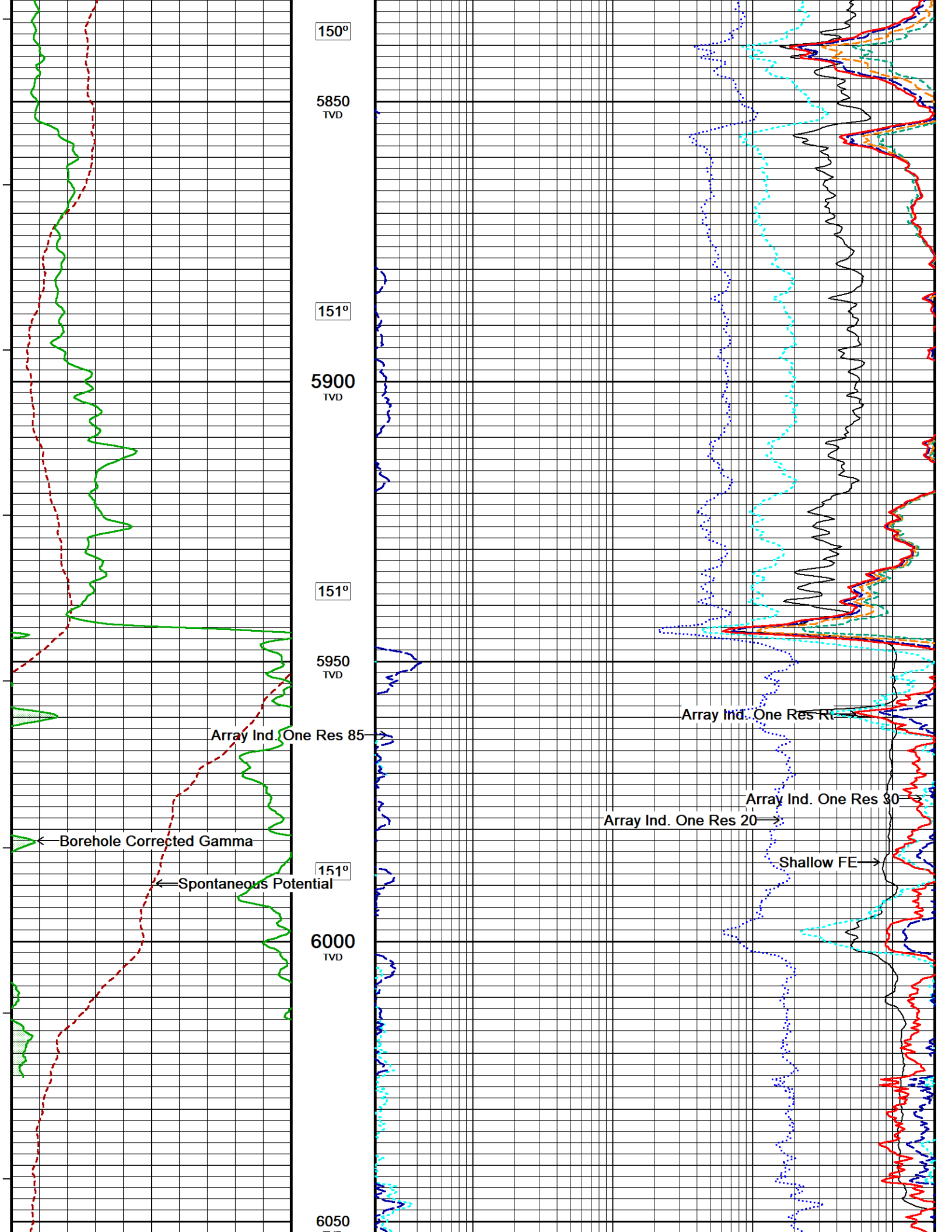
148°

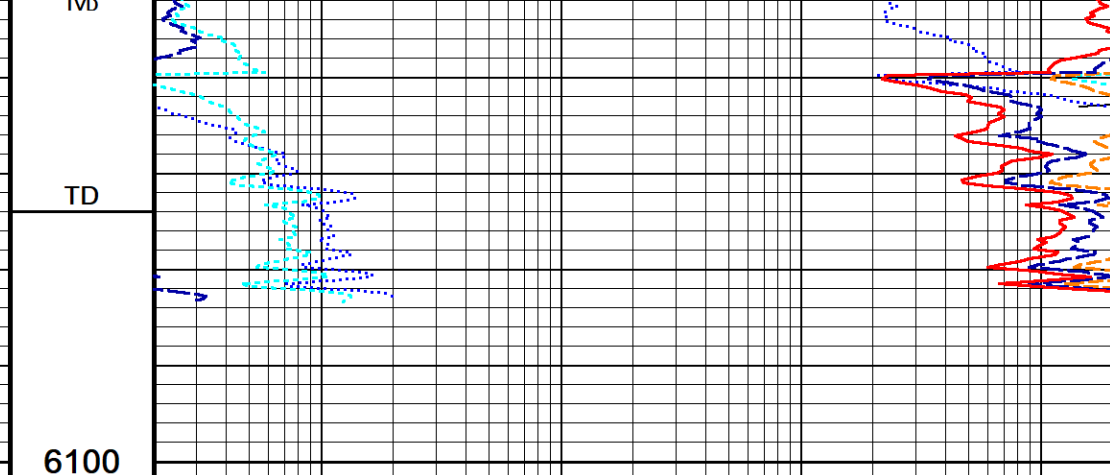
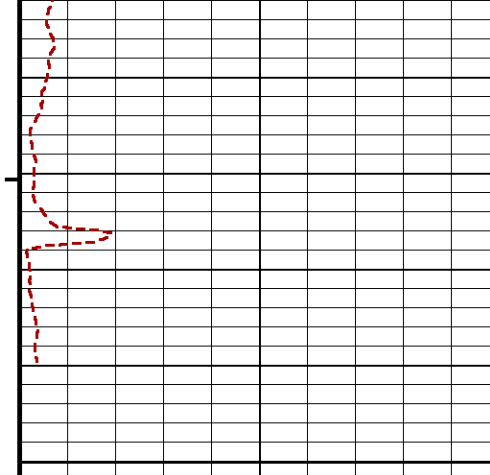
5750  
TVD

149°

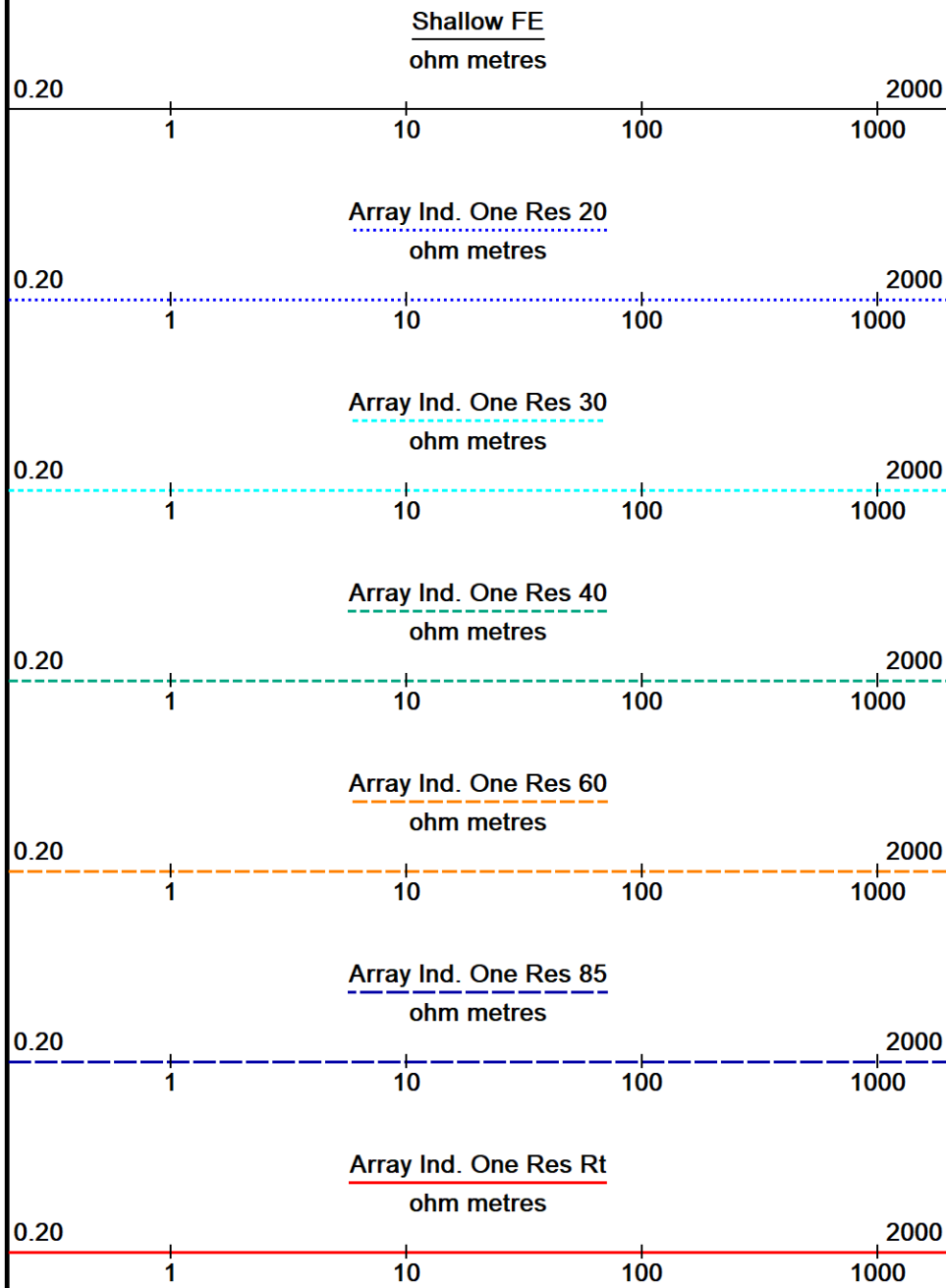
5800  
TVD







6100  
TVD  
in  
Feet



Borehole  
Temp in  
deg F

Borehole Corrected Gamma

0	API	200
	100	
200	300	400

Replay  
Scale  
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 01-JUN-2023 17:25  
 Filename: C:\Users\grahm\AppData\Local\Temp\Weatherford PreView6\0\Repeat\_Reprocessed.dta  
 Recorded on 26-MAY-2023 12:08  
 System Versions: Logged with 20.11.3980 Processed with 22.15.1312 Plotted with 22.15.1312

↑ 5 INCH REPEAT PASS TVD ↑

BEFORE SURVEY CALIBRATION

## General Constants All 000

Last Edited on 26-MAY-2023,12:35

## General Parameters

Mud Resistivity	0.750	ohm-metres
Mud Resistivity Temperature	86.000	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	5.500	inches
Caliper for Differential Caliper	Density Caliper	

## Rwa Parameters

Porosity used	Limestone Density Por.	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	1.000	
RWA Constant M	2.000	
SW/APOR Tool Source	0.000	

## Down-hole Tension Calibration SMS 0

Field Calibration on 25-APR-2023 19:13

Reading No	Measured	Calibrated (lbs)
1	15436.25	0.00
2	16961.69	516.00

## High Resolution Temperature Constants MCG-E.A 551

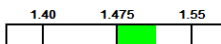
Pre-filter Length	11
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## Gamma Calibration MCG-E.A 551

Field Calibration on 20-APR-2023 13:00

	Measured	Calibrated (API)
Background	52	35
Calibrator (Gross)	860	568
Calibrator (Net)	807	533

## Gamma Calibration Tolerances MCG-E.A 551

Ratio	1.515		Counts/API
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## Gamma Constants MCG-E.A 551

Last Edited on 26-MAY-2023,12:36

Gamma Calibrator Number	MCG 111	
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	%

## Micro-Resistivity Caliper Constants MMR-C.A 257

Sonde Configuration	Resistivity Mode
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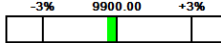
## Micro Laterolog Calibration MMR-C.A 257

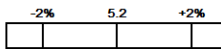
Base Calibration on 31-MAY-2021 11:30

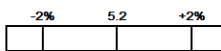
Field Check on 31-MAY-2021 11:32

	Resistor 1 (ohm)	Resistor 2 (ohm)
	0.0	10000.0
Base Calibration	Measured	Calibrated (ohm-m)
	Ref 1 Ref 2	Ref 1 Ref 2
	0.0 9858.5	0.0 128.0
	Base Check (ohm-m)	Field Check (ohm-m)
	5.2	5.2

## Micro Laterolog Calibration Tolerances MMR-C.A 257

Ref 2 9858.5  ohm

Base Check 5.2  ohm-m

Field Check 5.2  ohm-m

Micro Laterolog Constants MMR-C.A 257

Last Edited on 14-OCT-2020,10:32

Pad Type 6 in Solid Nylon B23059  
Standoff Offset 0.5000 inches  
Micro Laterolog K Factor 0.0128  
Micro Laterolog Rm K Factor N/A

Mudcake Thickness Correction Constants

Mud Cake Source Differential Caliper  
Mud Cake Thickness N/A inches  
Mud Cake Thickness Caliper MMR Caliper  
Mud Cake Resistivity 0.0470 ohm-m  
Mud Cake Resistivity Temp. 72.00 Deg F  
Mud Cake Resistivity Source Temperature Corr  
Temp. for Rmc Corr. MCG External Temperature

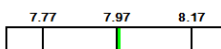
Caliper Calibration MMR-C.A 257

Base Calibration on 01-MAY-2023 11:12  
Field Calibration on 01-MAY-2023 11:13

Base Calibration Reading No	Measured	Calibrator Size (in)
1	13341	5.96
2	16469	7.97
3	19652	9.86
4	23513	11.88
5	0	0.00
6	N/A	N/A

Field Calibration  
Measured Caliper (in) 7.99  
Actual Caliper (in) 7.97

Caliper Calibration Tolerances MMR-C.A 257

Short Arm Field Cal. 7.99  in

Micro Normal and Micro Inverse Calibration MMR-C.A 257

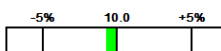
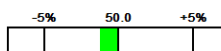
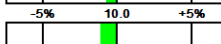
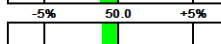
Base Calibration on 01-MAY-2023 11:02  
Field Check on 01-MAY-2023 11:04

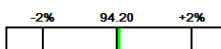
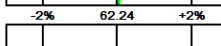
Resistor 1 (ohm) 10.0  
Resistor 2 (ohm) 50.0

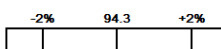
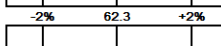
Base Calibration	Measured	Calibrated (ohm-m)
Micro Normal	9.9 49.4	5.1100 25.5500
Micro Inverse	9.9 49.4	3.3800 16.9000

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	94.3	94.3
Micro Inverse	62.3	62.3

Micro Normal & Micro Inverse Calibration Tolerance MMR-C.A 257

Micro Normal Res. 1 9.9  ohm  
Micro Normal Res. 2 49.4  ohm  
Micro Inverse Res. 1 9.9  ohm  
Micro Inverse Res. 2 49.4  ohm

Micro Normal Base Check 94.3  ohm-m  
Micro Inverse Base Check 62.3  ohm-m

Micro Normal Field Check 94.3  ohm-m  
Micro Inverse Field Check 62.3  ohm-m

Micro Normal and Micro Inverse Constants MMR-C.A 257

Last Edited on 09-FEB-2023,09:37

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

Neutron Calibration MDN-C.A 399

Base Calibration on 19-APR-2023 11:09  
Field Check on 19-APR-2023 11:27

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3110	96	3714	110
Ratio	32.539		33.764	

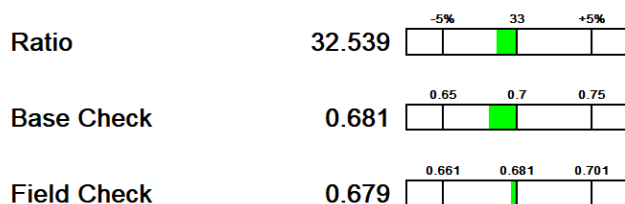
Field Calibrator at Base

	Calibrated (cps)	
	2014	2960
Ratio	0.681	

Field Check

	Calibrated (cps)	
	2016	2970
Ratio	0.679	

Neutron Calibration Tolerances MDN-C.A 399



Neutron Constants MDN-C.A 399

Last Edited on 26-MAY-2023,12:36

Neutron Source Id	N-1054	
Neutron Jig Number	NJ5239	
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	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	None	
Formation Pressure	N/A	kpsi
Temperature Source	None	
Temperature	N/A	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	

Caliper Calibration MVC-A.A 146

Base Calibration on 02-MAR-2023 08:28  
Field Calibration on 02-MAR-2023 08:31

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	10494	4.01
2	17351	5.96
3	24456	7.97
4	31239	9.86
5	38707	11.88
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.00	7.97

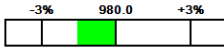
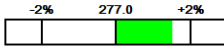
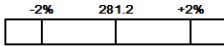
FE Calibration MFE-C.A 399

Base Calibration on 20-APR-2023 09:32  
Field Check on 20-APR-2023 09:38

	Resistor 1 (ohm)	Resistor 2 (ohm)
	0.0	1000.0
Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0

Reference 2	964.6	126.8
Base Check		281.2
Field Check		281.2

FE Calibration Tolerances MFE-C.A 399

Reference 2	964.6		ohm
Base Check	281.2		ohm-m
Field Check	281.2		ohm-m

FE Constants MFE-C.A 399

Last Edited on 26-MAY-2023,12:37

Running Mode No Sleeve  
MFE K Factor 0.1268

Borehole Correction Constants

Sonde Position 1.0 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-C.K 374

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 83.12 micro-sec/ft

Sonde Mode Compensated  
Hole Type Open Hole

Sonde Parameters

	Measured	Calibrated
Offset		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 (m)	
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

Use 6' Waveform to derive IR	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
Semblance Processing Enabled	Yes	
Tracking Boxes Enabled In Processing	Yes	

Induction Calibration MAI-C.A 490

Factory Loop Calibration 17-DEC-2012,20:04  
Field Check on 10-MAY-2022 15:43

Factory Loop Calibration

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

Array	Measured Signal (unitless)		Reference Conductivity (mmho/m)		Calibration	
	Low	High	Low	High	Gain	Offset
1 (near)	15.2	455.2	9.3	966.2	0.000	0.0
2	5.9	373.9	7.6	821.4	0.000	0.0
3	3.7	251.6	5.2	566.0	0.000	0.0
4 (far)	1.8	128.7	2.6	279.2	0.000	0.0
Array Temperature	75.6		Deg F			

Tool Checks 10-MAY-2022 15:40

Array	Factory Reference (mmho/m)		Before Survey (mmho/m)		Deg F
	Low	High	Low	High	
1 (near)	-2.2	2114.9	-2.2	2114.9	
2	14.0	1921.9	13.9	1922.0	
3	14.0	1678.9	14.0	1679.0	
4 (far)	10.3	1145.1	10.3	1145.2	
Array Temperature	89.0		89.2		Deg F

Tool Zero Corrections

Array	Low	High	mmho/m
1 (near)		0.0	mmho/m
2		0.0	mmho/m
3		0.0	mmho/m
4 (far)		0.0	mmho/m

Induction Check Tolerances MAI-C.A 490

Low Array 1	-2.2		mmho/m	High Array 1	2114.9		mmho/m
Low Array 2	13.9		mmho/m	High Array 2	1922.0		mmho/m
Low Array 3	14.0		mmho/m	High Array 3	1679.0		mmho/m
Low Array 4	10.3		mmho/m	High Array 4	1145.2		mmho/m

Induction Constants MAI-C.A 490

Last Edited on 26-MAY-2023,12:37

Induction Model	RtAP	
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	6.0000	
Stand-off Fin Angle	60.00	degrees
Stand-off Fin Width	0.5000	inches
Rm Source	Global Value: Temperature Corrected	
Temp. for Rm Corr.	MCG External Temperature	
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	

High Resolution Temperature Calibration MAI-C.A 490

Field Calibration on 17-DEC-2012,07:08

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

High Resolution Temperature Constants MAI-C.A 490

Last Edited on 17-DEC-2012,20:09

Pre-filter Length 11

Photo Density Calibration MPD-C.J 438

Base Calibration on 06-APR-2023 14:01  
Field Check on 06-APR-2023 14:07

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	973	1140		
Reference 1	44856	20382	59814	31141
Reference 2	18117	2083	24963	2524

Field Check at Base  
972.8 1140.5

Field Check  
974.0 1140.0

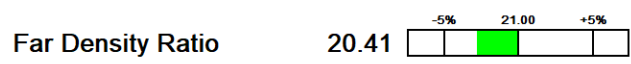
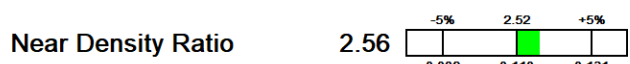
PE Calibration

Base Calibration	Measured			Calibrated Ratio
	WS	WH	Ratio	
Background	183	877		
Reference 1	20347	44708	0.460	
Reference 2	5757	18012	0.325	

Field Check at Base  
182.7 877.2

Field Check  
182.8 875.9

Photo Density Calibration Tolerances MPD-C.J 438



PE Calibration 0.131

Near Den. Field Check 974.0    -3%      +3%

PE WS Field Check 182.8    -6%      +6%

Far Den. Field Check 1140.0    -3%      +3%

PE WH Field Check 875.9    -6%      +6%

Density Constants MPD-C.J 438

Last Edited on 26-MAY-2023,12:37

Density Source Id H79956B  
 Nylon Calibrator Number DNCE 687  
 Aluminium Calibrator Number DACD 526  
 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 Non-Barite  
 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  
 Density Detector Type Compensated Density

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

Caliper Calibration MPD-C.J 438

Base Calibration on 06-APR-2023 14:51  
 Field Calibration on 06-APR-2023 14:52

Base Calibration Reading No	Measured	Calibrator Size (in)
1	15285	4.01
2	23599	5.96
3	32288	7.97
4	40480	9.86
5	49552	11.88
6	N/A	N/A

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

Caliper Calibration Tolerances MPD-C.J 438

Long Arm Field Cal. 7.98    in

DOWNHOLE EQUIPMENT

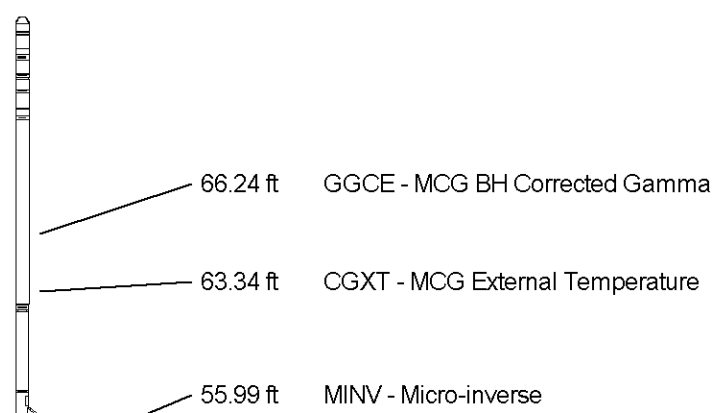
C:\Users\grahm\AppData\Local\Temp\Weatherford PreView610\MainPass.dta

Cablehead, 11 pin  
 CBH-CC 348 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

11C-11B Compact Tool Adaptor  
 MTA-K.A 189 LG: 1.53 ft WT: 13.2 lb OD: 2.240 in

Compact Comms Gamma  
 MCG-E.A 551 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity



MMR-C.A 257 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron  
MDN-C.A 399 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper  
MPD-C.J 438 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Vee Arm Caliper  
MVC-A.A 146 LG: 8.06 ft WT: 61.7 lb OD: 2.244 in

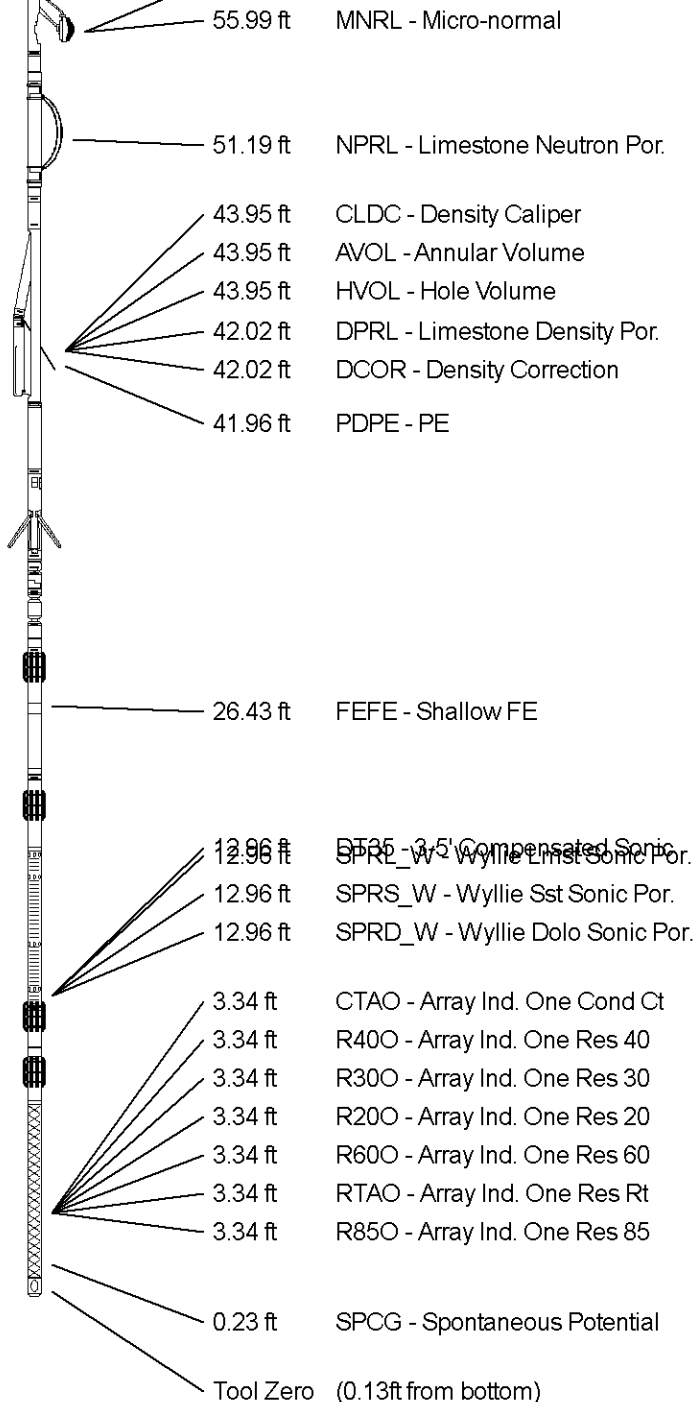
Compact Knuckle Joint  
SKJ-E.B 694 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

Compact Focussed Electric  
MFE-C.A 399 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic  
MSS-C.K 374 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction  
MAI-C.A 490 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 75.45 ft Weight: 579.8 lb



All measurements relative to tool zero.

<b>COMPANY</b>	<b>NAVEX RESOURCES LLC</b>
<b>WELL</b>	<b>PFAFFLY #1-12</b>
<b>FIELD</b>	<b>NORTH CHEYENNE PROJECT/ PFAFFLY PROSPECT</b>
<b>PROVINCE/COUNTY</b>	<b>KIT CARSON</b>
<b>COUNTRY/STATE</b>	<b>COLORADO</b>

Elevation Kelly Bushing	4479.00	feet	Last Reading	648.00	feet
Elevation Drill Floor	4479.00	feet	First Reading	6078.00	feet
Elevation Ground Level	4466.90	feet	Depth Driller	6076.00	feet
			Depth Logger	6082.00	feet

**WIRELINE LOGGING SOLUTIONS** ARRAY INDUCTION  
 SHALLOW FOCUSED  
 \*\*\* TVD \*\*\*

# WIRELINE LOGGING SOLUTIONS

ARRAY INDUCTION  
SHALLOW FOCUSED  
\*\*\* TVD \*\*\*

COMPANY: NAVEX RESOURCES LLC

WELL: PFAFFLY #1-12

FIELD: NORTH CHEYENNE PROJECT/ PFAFFLY PROSPECT

COUNTY: KIT CARSON

STATE: COLORADO

LOCATION: 1692' FSL & 1269' FWL

SEC: T2 TYPE: T1S REE: 48W OTHER SERVICES:

Latitude: 38.1071624 PACTO DENSIY

Longitude: -102.5176169 COMPLENSED SONIC

API Number: 05-883-5834

Permanent Datum GL, Elevation 4466.9 feet

Log Measured From KB, 12.10 feet above Permanent Datum

Drilling Measured From KB

Date: 26-MAY-2023

Run Number: ONE

Service Order: IT1-230226WFT

Depth Driller: 6076.00 feet

Depth Logger: 6092.00 feet

First Reading: 6078.00 feet

Last Reading: 648.00 feet

Casing Driller: 651.00 feet

Casing Logger: 648.00 feet

Bit Size: 7.875 inches

Hole Fluid Type: WBM

Density/Viscosity: 9.10 lb/cu ft

PH/Fluid Loss: 10.00

Sample Source: FLOWLINE

Rm @ Measured Temp: 0.71 @ 86.0 ohm-m

Rm @ Measured Temp: 0.67 @ 86.0 ohm-m

Rm @ Measured Temp: 1.01 @ 86.0 ohm-m

Source Rm/Rmc: CALC

Rm @ BHT: 0.36 @ 154.0 ohm-m

Time Since Circulation: 8 HRS

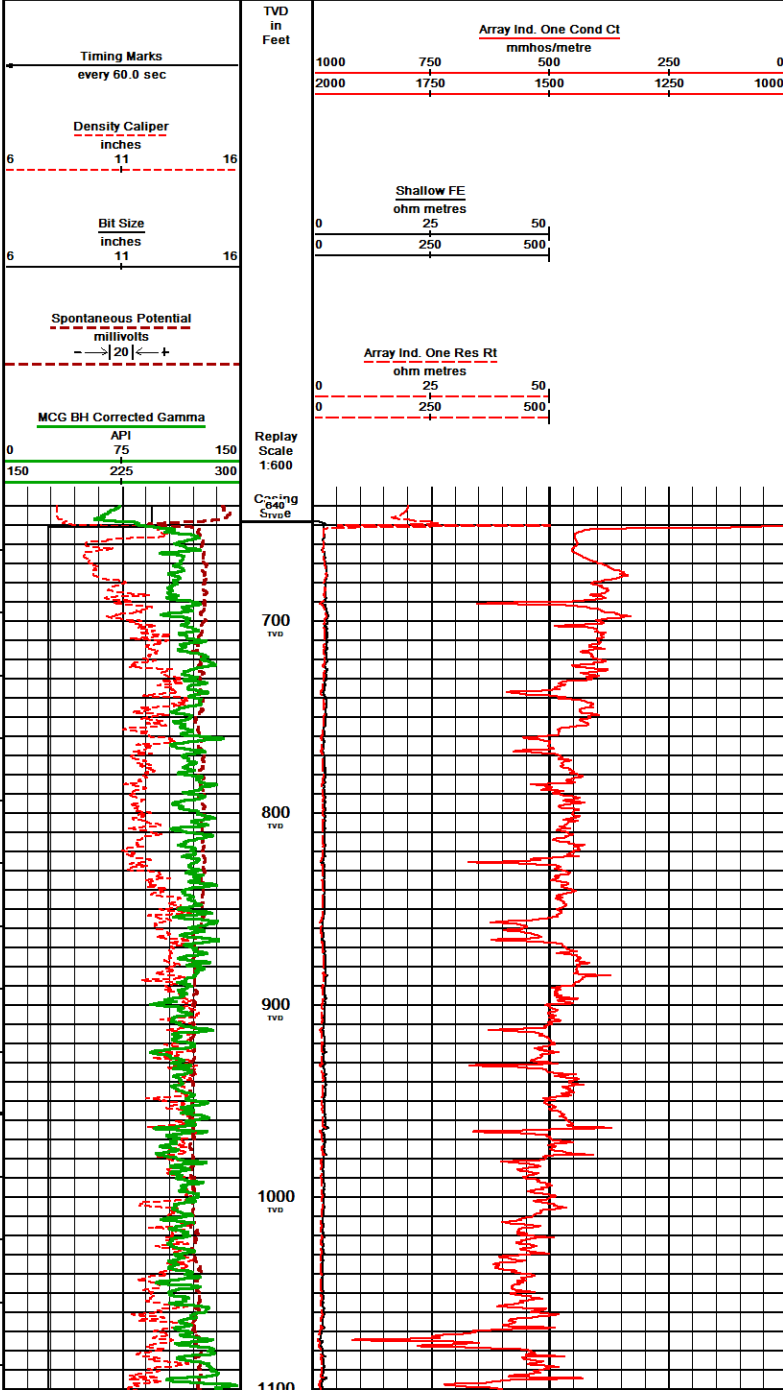
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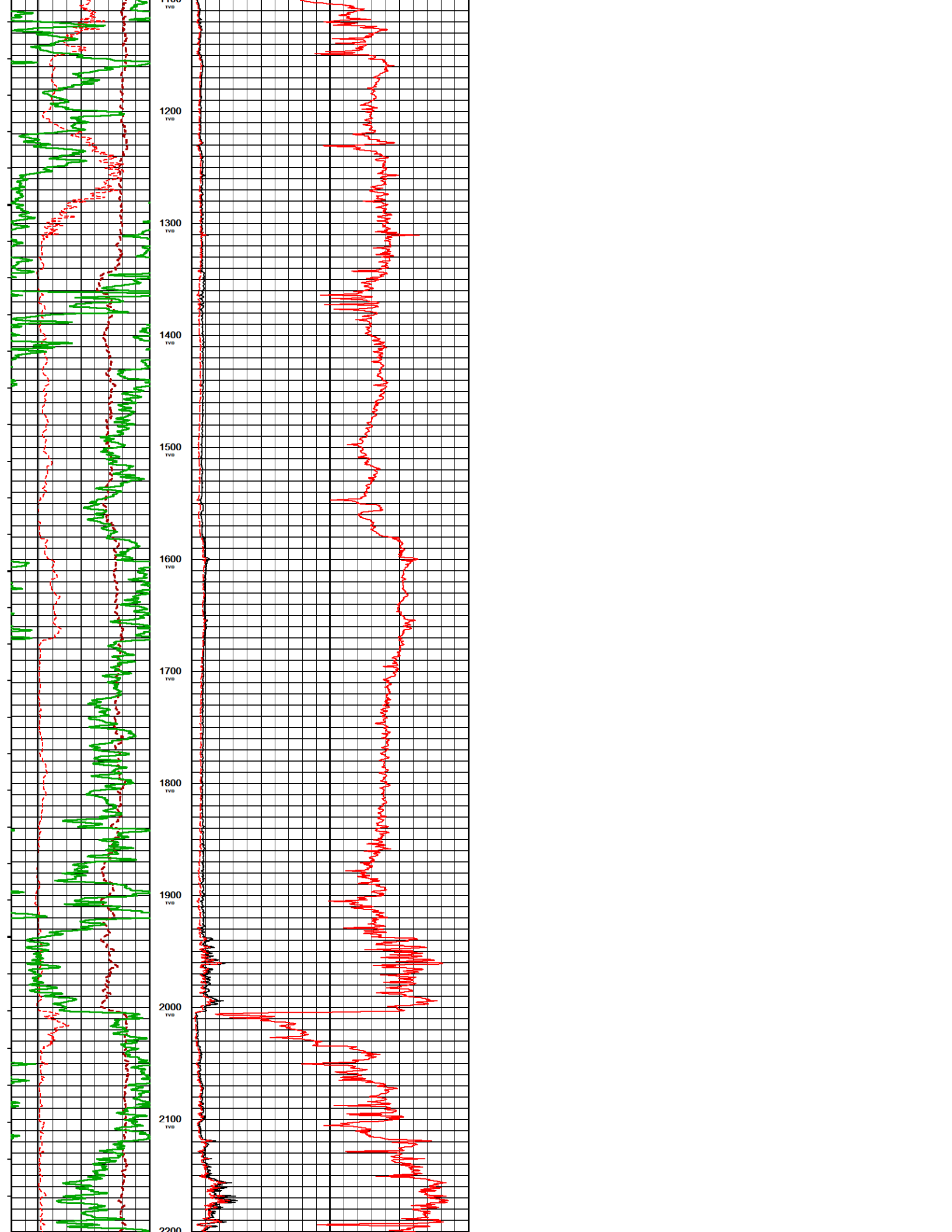
Equipment/Base: 10001

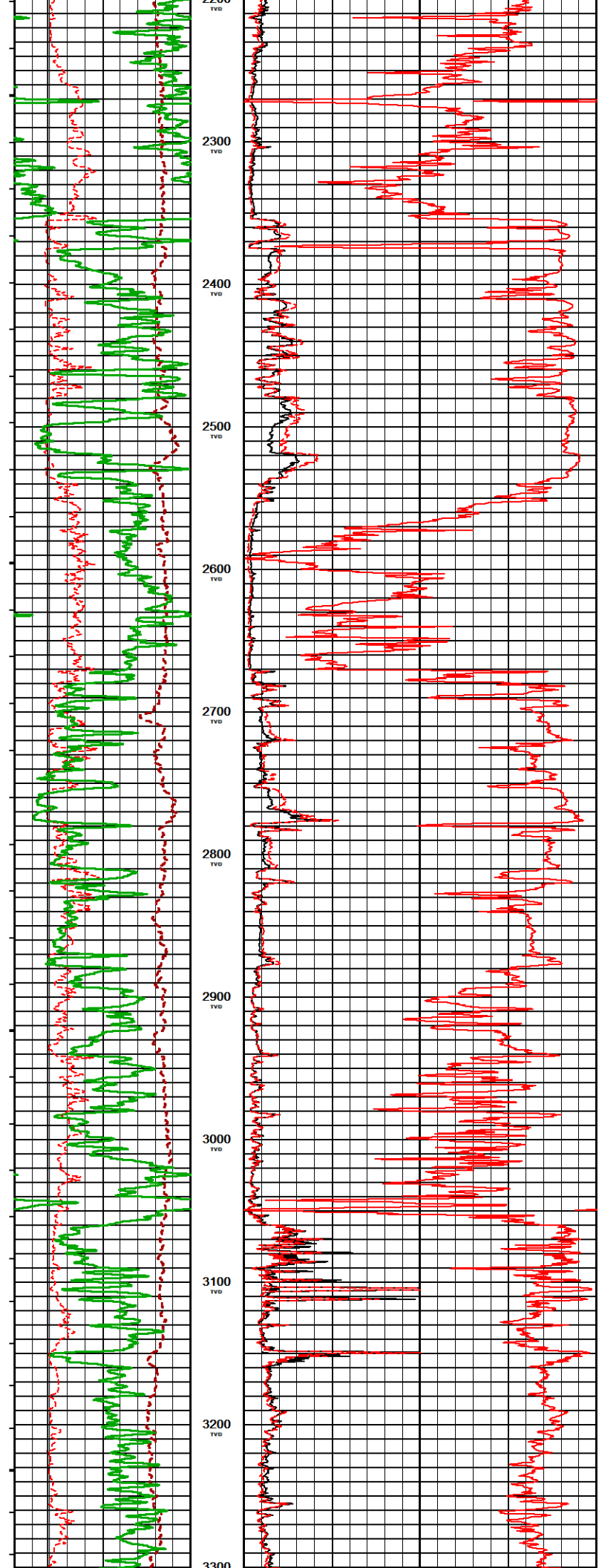
Elevations:  
GL: 4479.00  
PF: 4479.00  
GL: 4466.90

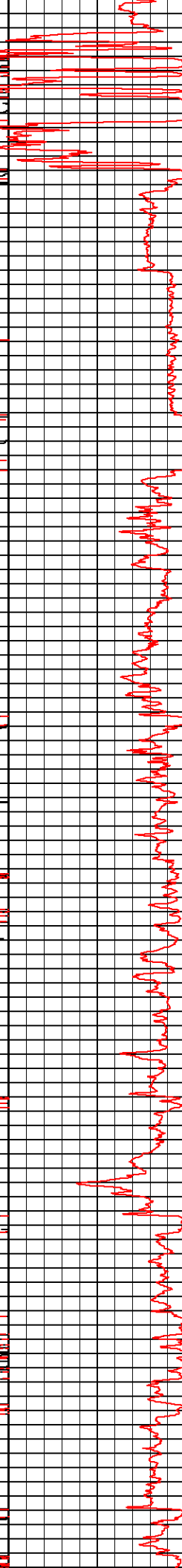
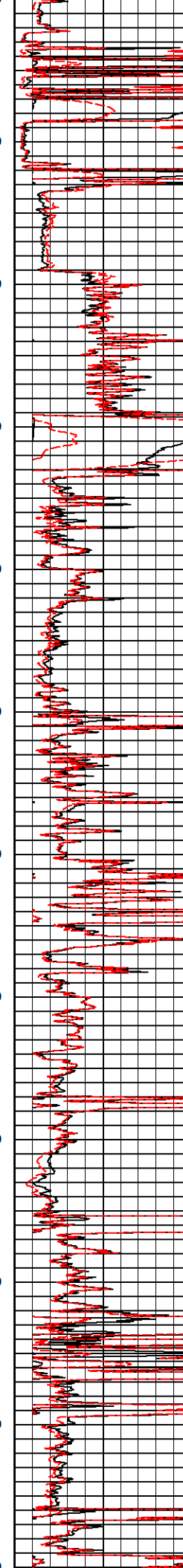
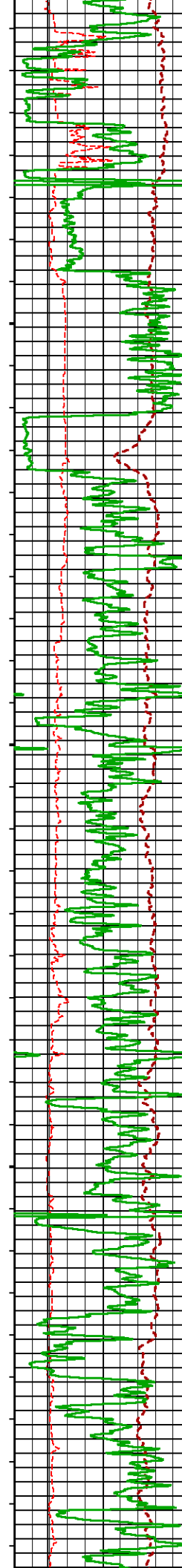
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 Recorded on 26-MAY-2023 13:17  
 System Versions: Logged with 21.11.3172 Processed with 22.15.1312 Plotted with 22.15.1312









3300  
TVD

3400  
TVD

3500  
TVD

3600  
TVD

3700  
TVD

3800  
TVD

3900  
TVD

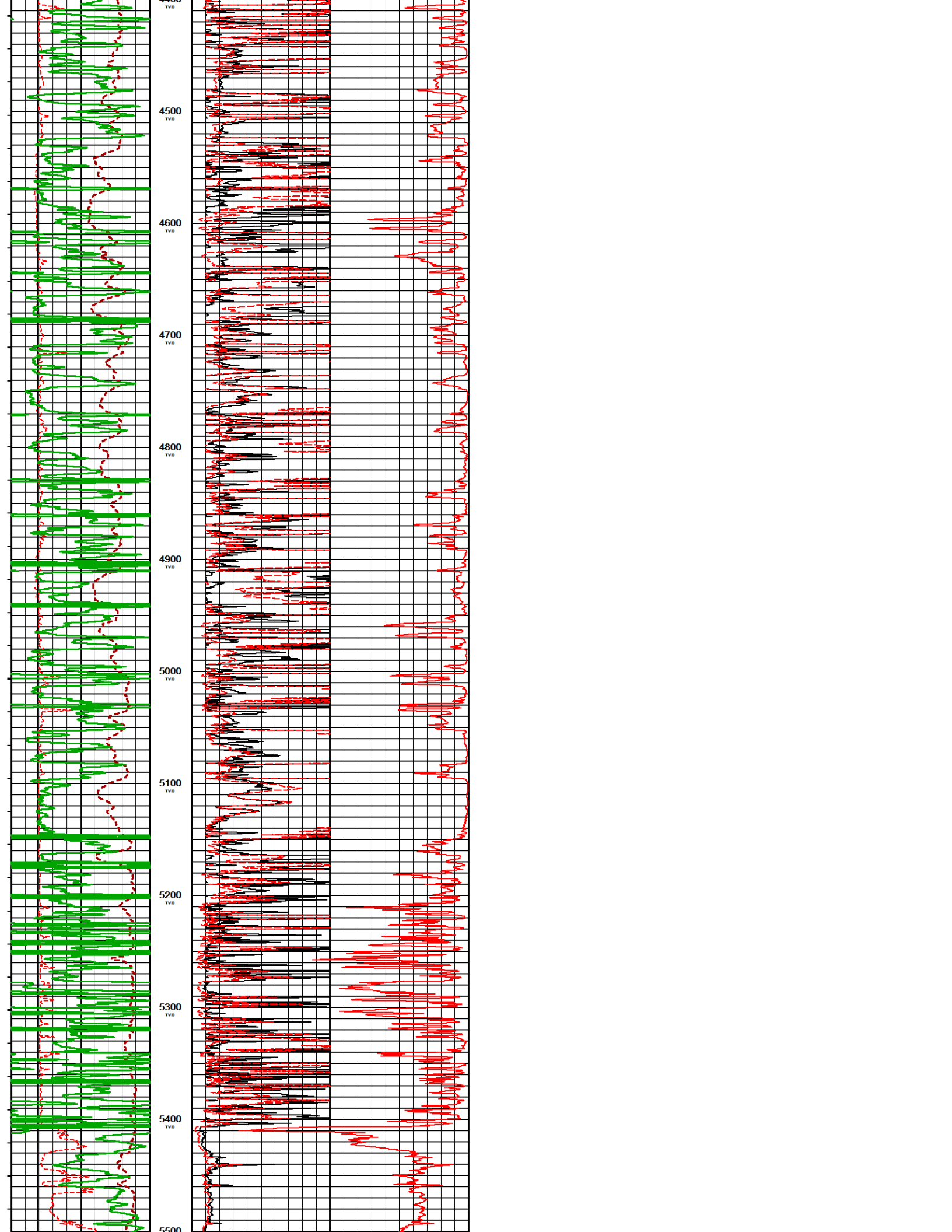
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TVD

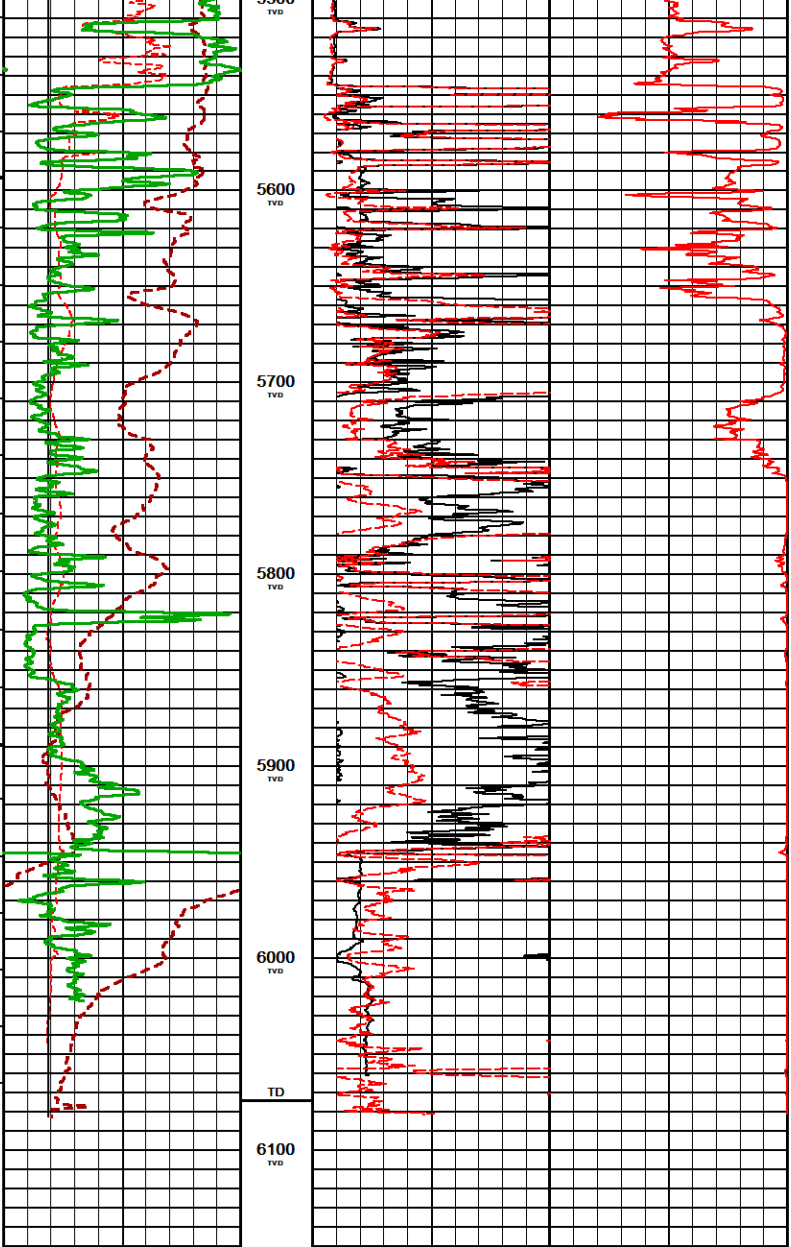
4100  
TVD

4200  
TVD

4300  
TVD

4400  
TVD





Timing Marks  
every 60.0 sec

Density Caliper  
inches  
6 11 16

Bit Size  
inches  
6 11 16

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

MCG BH Corrected Gamma  
API  
0 75 150  
150 225 300

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

Shallow FE  
ohm metres  
0 25 50  
0 250 500

Array Ind. One Res Rt  
ohm metres  
0 25 50  
0 250 500

Replay Scale  
1:600

Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 01-JUN-2023 17:25  
 Recorded on 26-MAY-2023 13:17  
 Filename: C:\Users\lgm\AppData\Local\Temp\Weatherford PreView6\0MainPass.dta  
 System Versions: Logged with 21.11.13172 Processed with 22.15.1312 Plotted with 22.15.1312

1 INCH MAIN PASS TVD

COMPANY	NAVEX RESOURCES LLC				
WELL	PFAFFLY #1-12				
FIELD	NORTH CHEYENNE PROJECT/ PFAFFLY PROSPECT				
PROVINCE/COUNTY	KIT CARSON				
COUNTRY/STATE	COLORADO				
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