



Weatherford®

**COMPACT TRIPLE COMBO
QUICKLOOK LOG**

COMPANY				EXTRACTION OIL & GAS			
WELL				LEONARD 6N			
FIELD				WATTENBURG			
PROVINCE/COUNTY WELD							
COUNTRY/STATE				U.S.A. / COLORADO			
LOCATION				SHL: NWSW, 182' FSL & 494' FWL			
SEC 21	TWP 2N	RGE 67W	Other Services				
Latitude		40.121492					
Longitude		-104.903278					
API Number		05-123-450747					
Permanent Datum GL, Elevation 5004 feet				Elevations:			
Log Measured From KB, 28.00 feet above Permanent Datum				KB	5032.00		
Drilling Measured From KB				DF	5032.00		
				GL	5004.00		
Date	24-SEP-2017						
Run Number	1						
Service Order	8367-193388399						
Depth Driller	12096.00			feet			
Depth Logger	6845.00			feet			
First Reading	6845.00			feet			
Last Reading	18.00			feet			
Casing Driller	1590.00			feet			
Casing Logger	1591.00			feet			
Bit Size	8.500			inches			
Hole Fluid Type	O.B.M.						
Density / Viscosity	9.55 lb/USg		40.00	sec/Ct			
PH / Fluid Loss	---		---				
Sample Source	FLOW LINE						
Rm @ Measured Temp	---						
Rmf @ Measured Temp	---						
Rmc @ Measured Temp	---						
Source Rmf / Rmc	---		---				
Rm @ BHT	---						
Time Since Circulation	8 HOURS						
Max Recorded Temp	220.00		deg F				
Equipment / Base	13174		CASPER				
Recorded By	ANDREW EASTAUGHFFE						
Witnessed By	JOSE TORRES						

BOREHOLE RECORD					Last Edited: 23-SEP-2017 21:22
Bit Size inches		Depth From feet		Depth To feet	
8.500		1590.00		12096.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
SURFACE	9.625	0.00	1590.00	36.00	

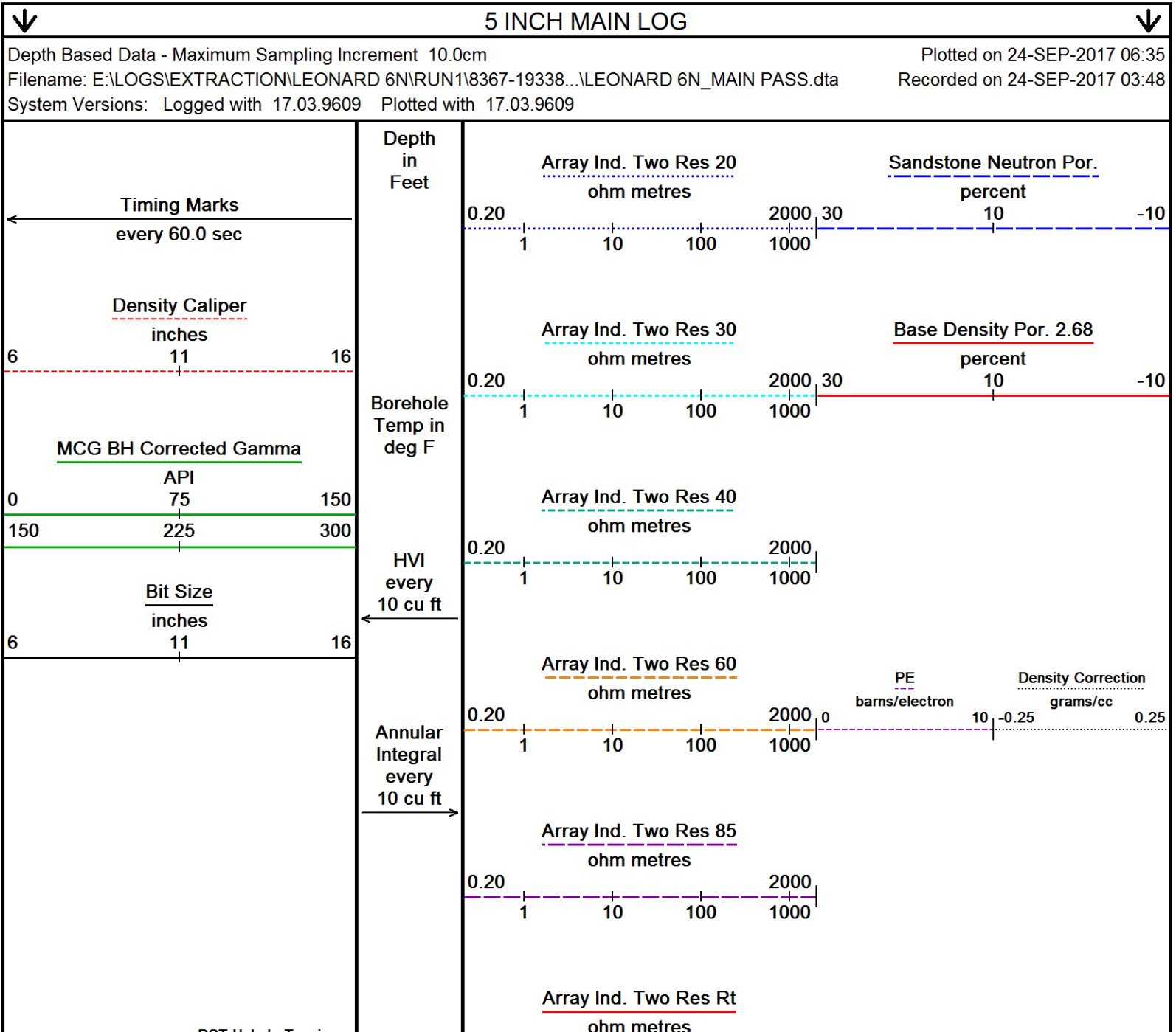
REMARKS
SOFTWARE: LOGGED WITH WLS 17.03.9609
TOOLS: MAI, SKJ, MPD, MVC, MDN, MCG, SHA, MTAK, CBH RAN IN COMBINATION
HARDWARE: MPD: 8 INCH PROFILE PLATE FITTED MDN: DUAL BOWSPRING ECCENTRALIZER MAI: 1 X 0.5" STANDOFF AT TOP; 1 x 0.5" PINEAPPLE STANDOFF AT BOTTOM
MATRIX FOR POROSITY CALCULATION : 2.68g/cc
TOTAL HOLE VOLUME FROM 6845FT TO CASING SHOE AT 1591FT = 2150 CUBIC FEET ANNULAR VOLUME WITH 5.5 INCH PRODUCTION CASING FROM 6845FT TO CASING SHOE AT 1591FT = 1260 CUBIC FEET
ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
RUGOSITY AND WASHOUTS WILL AFFECT REPEATABILITY AND DATA QUALITY.
HOLE INCLUDES LATERAL SECTION NOT GOING INTO LATERAL SECTION LOGGING UP FROM APPROX K O P ONLY AS

ALL INCLUDED EXTERNAL LOGS: NOT SCANNED TO EXTERNAL SECTION: LOGGING PROXIMITY: NOT AS INSTRUCTED.

CREW:
ANDREW.A.EASTAUGHFFE, PETER B. MEYER

RIG: CYCLONE 37

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.



DS1 Uphole Tension
pounds

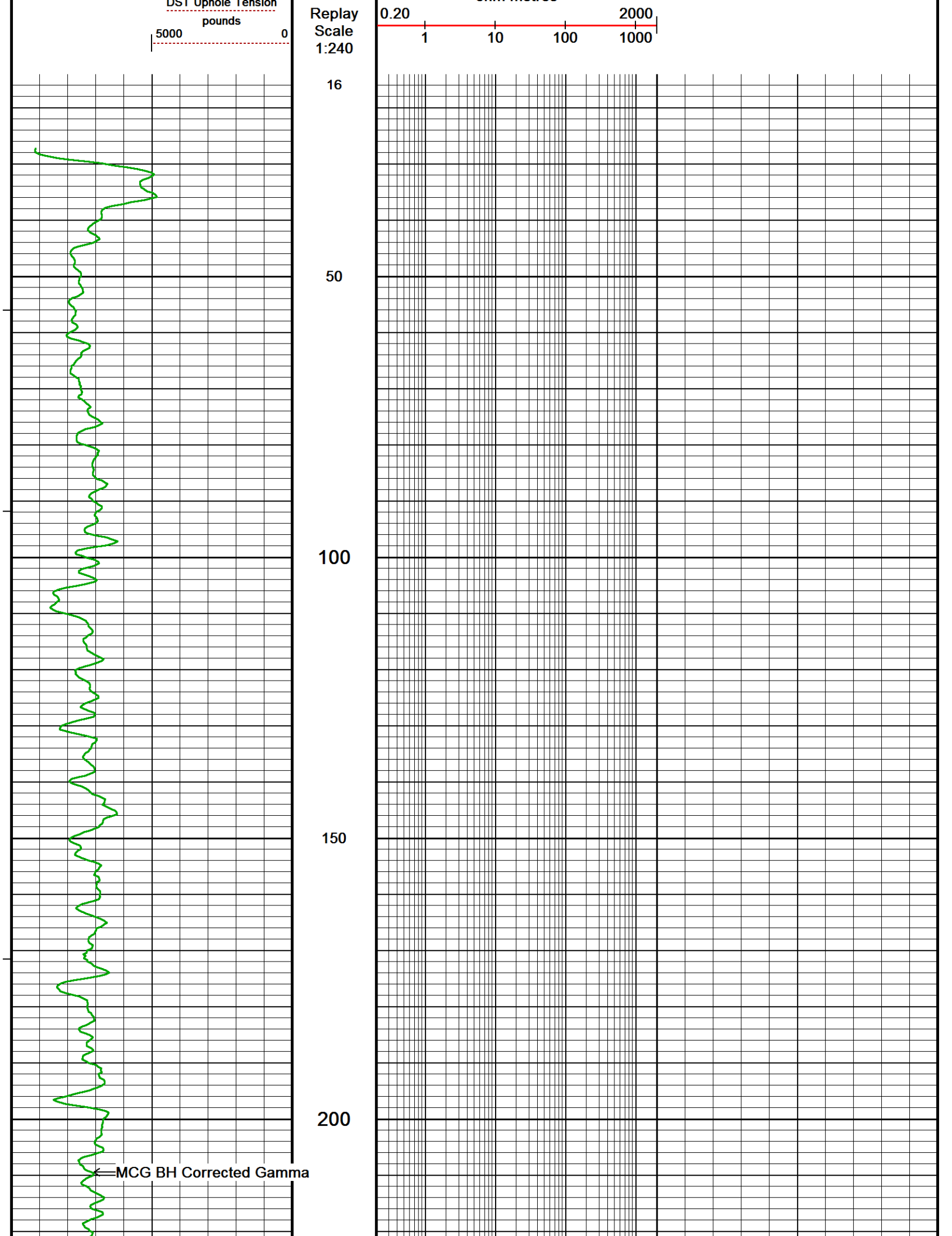
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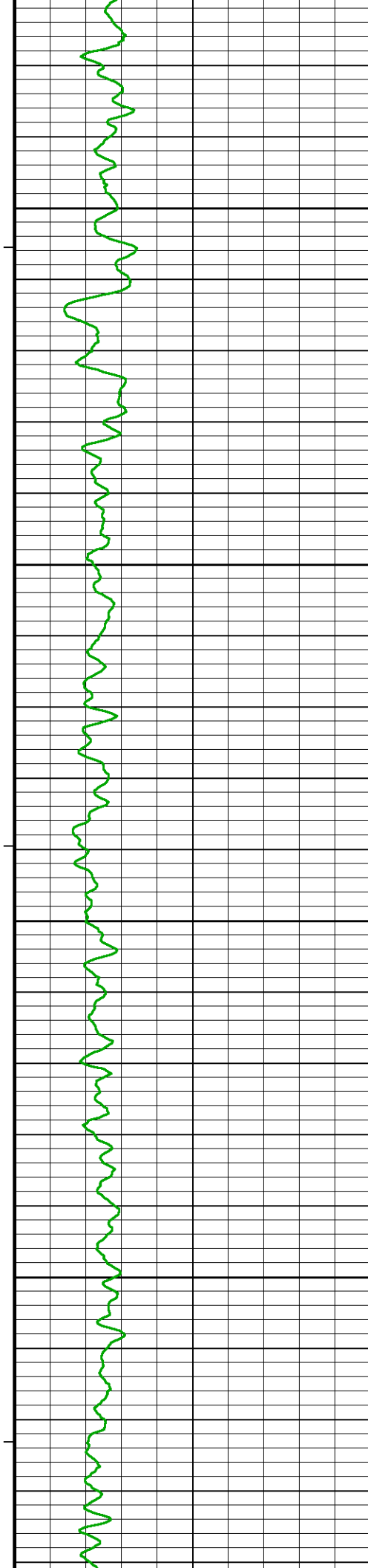
Replay
Scale
1:240

0.20 1 10 100 1000 2000

16
50
100
150
200

← MCG BH Corrected Gamma



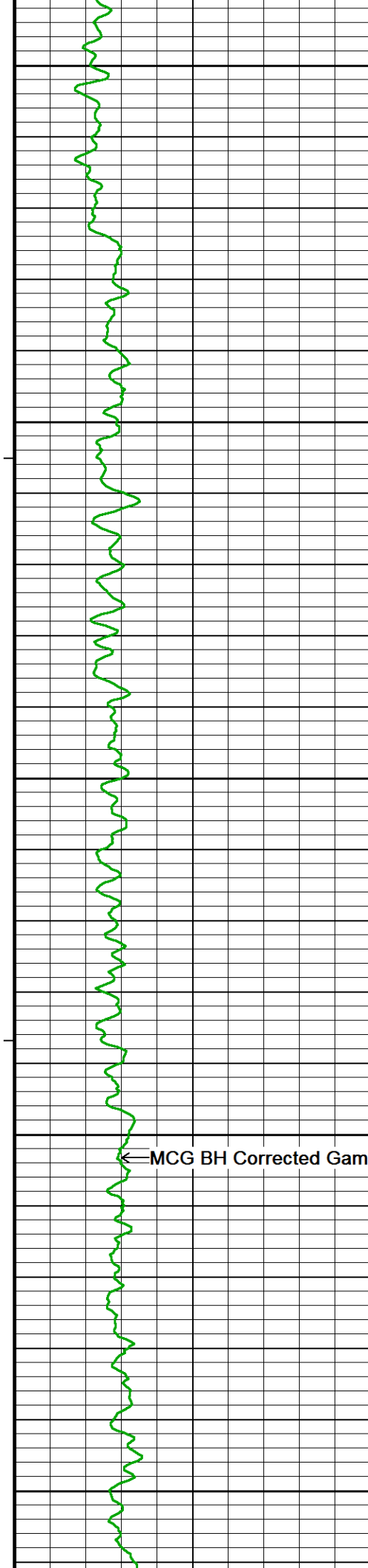


250

300

350

400



450

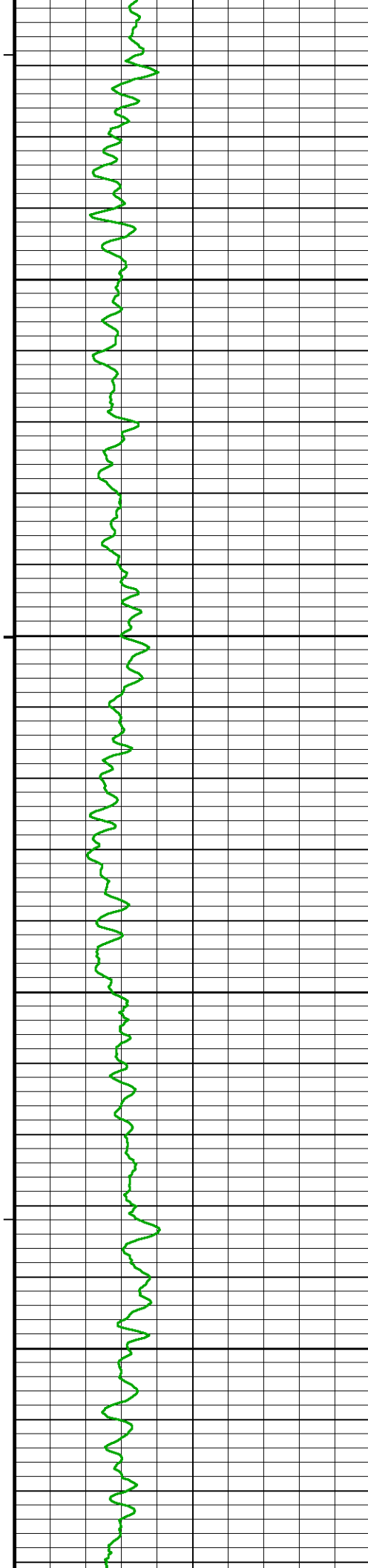
500

550

600

650

← MCG BH Corrected Gamma

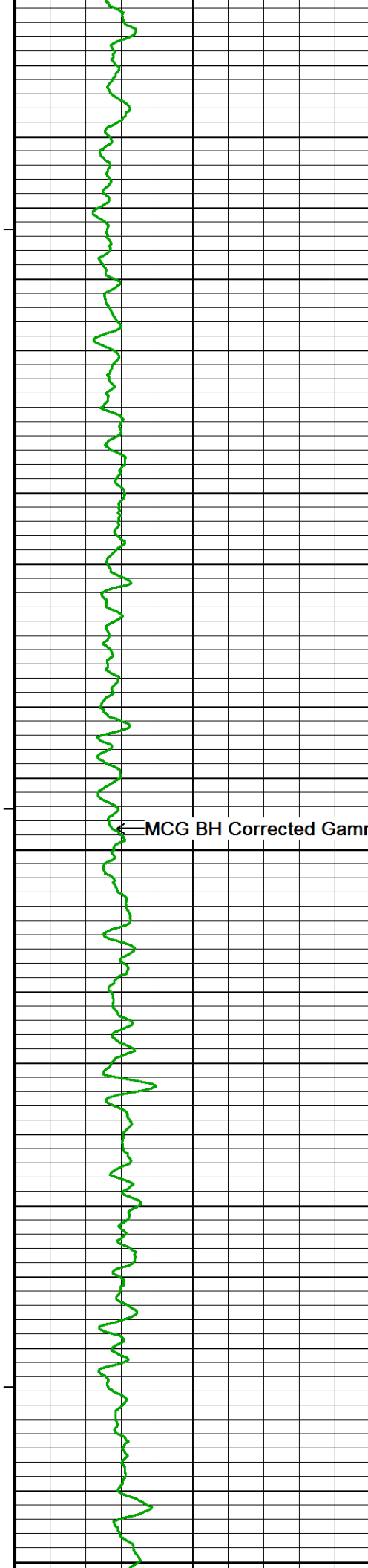


700

750

800

850



900

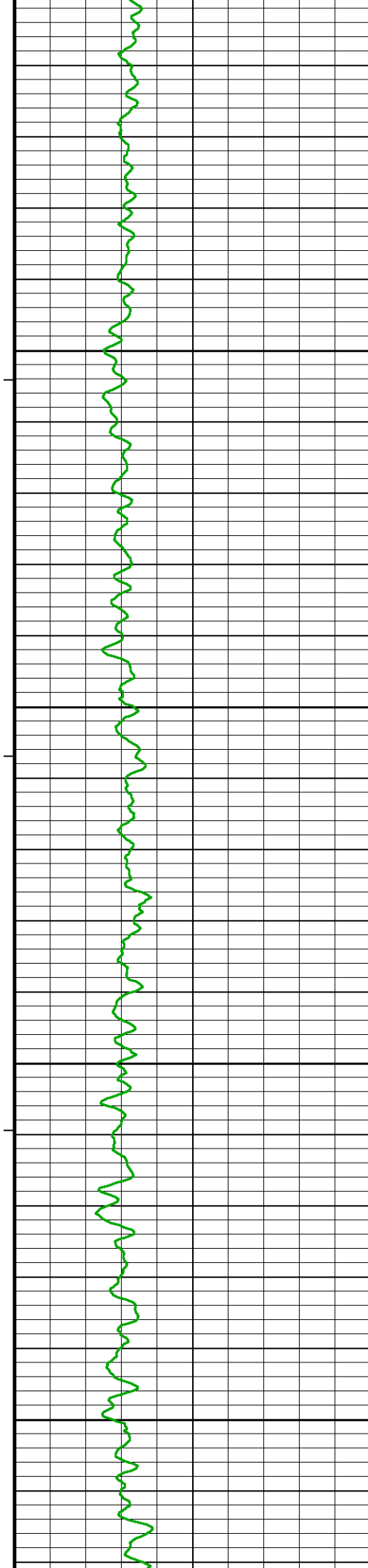
950

1000

1050

1100

← MCG BH Corrected Gamma



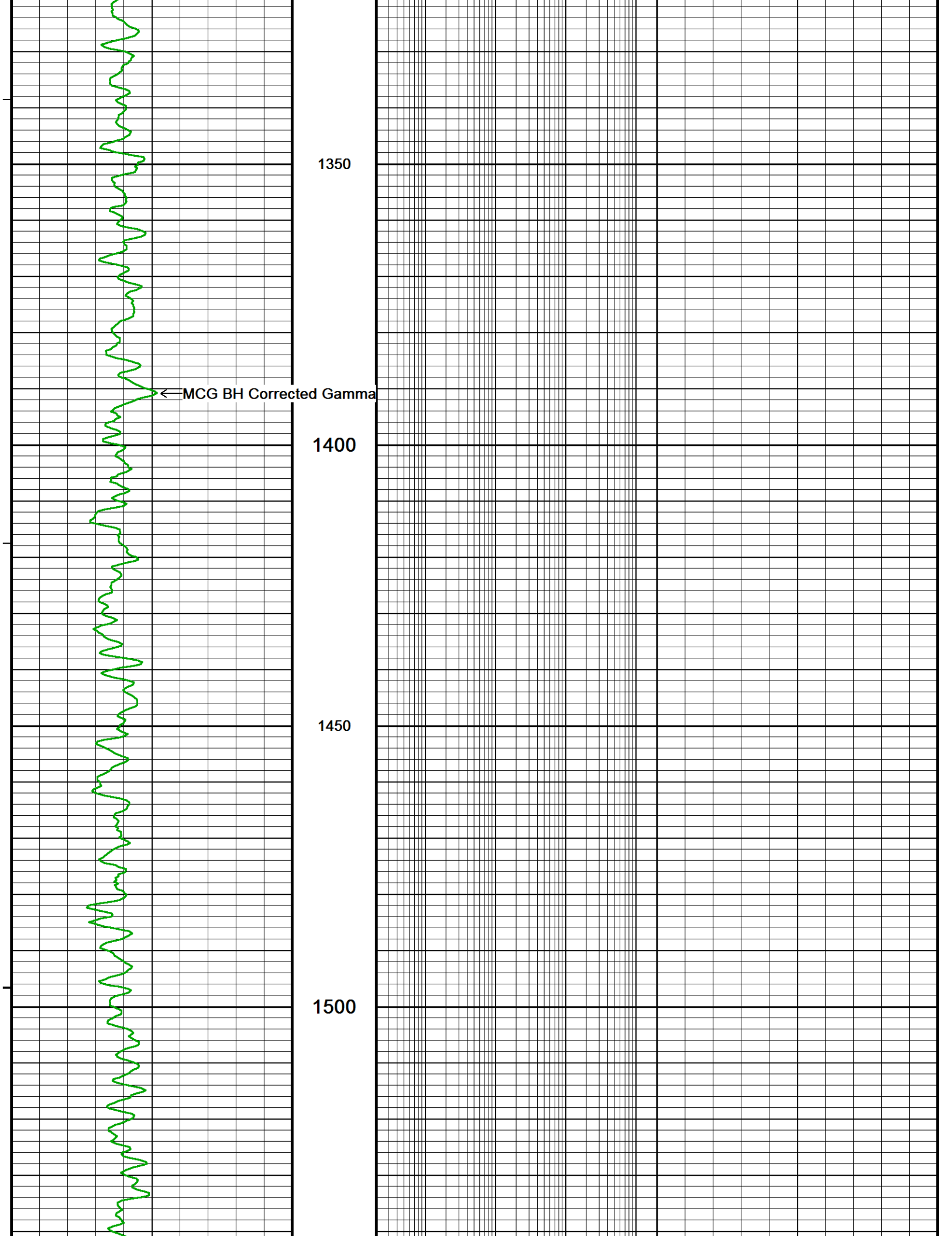
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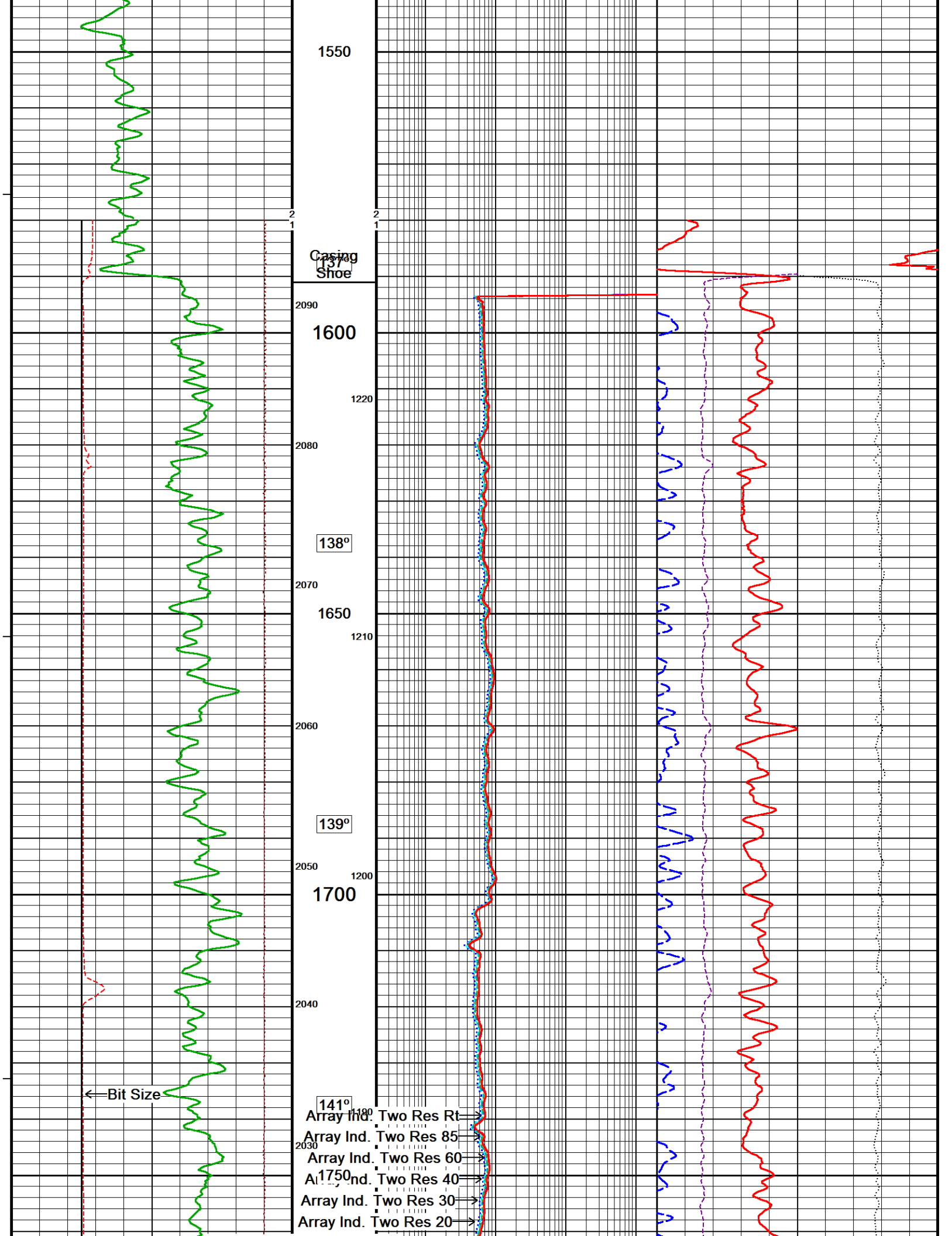
1150

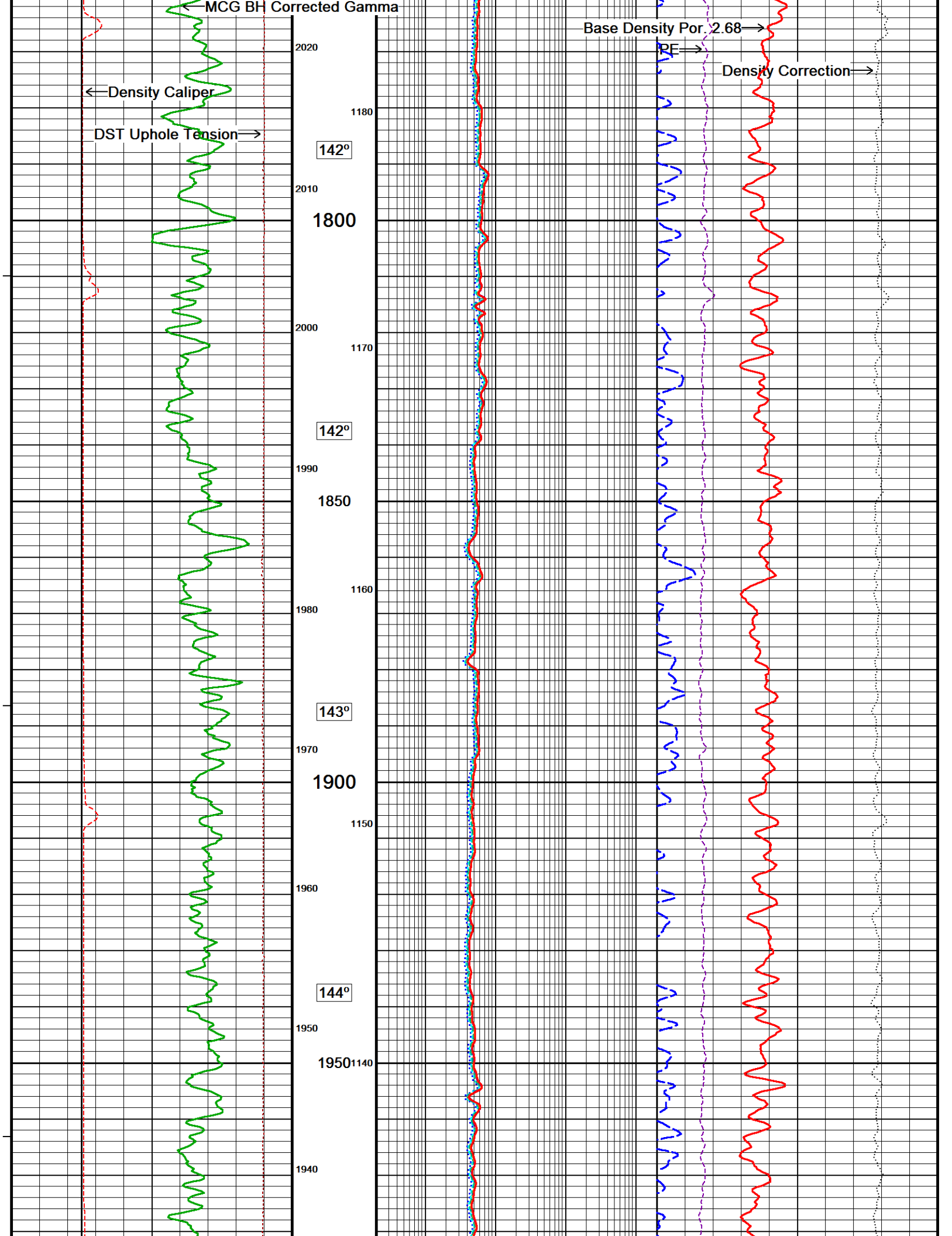
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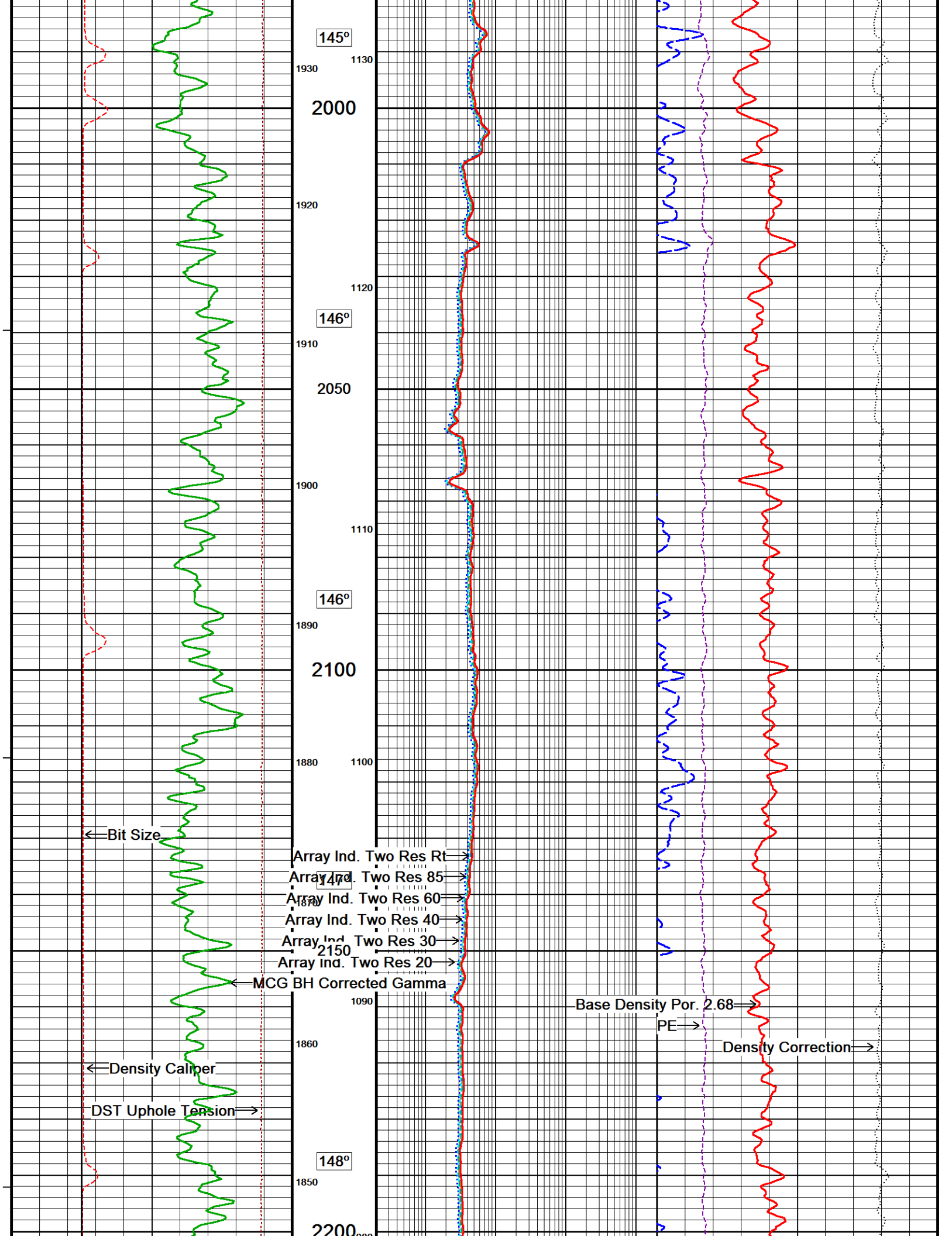
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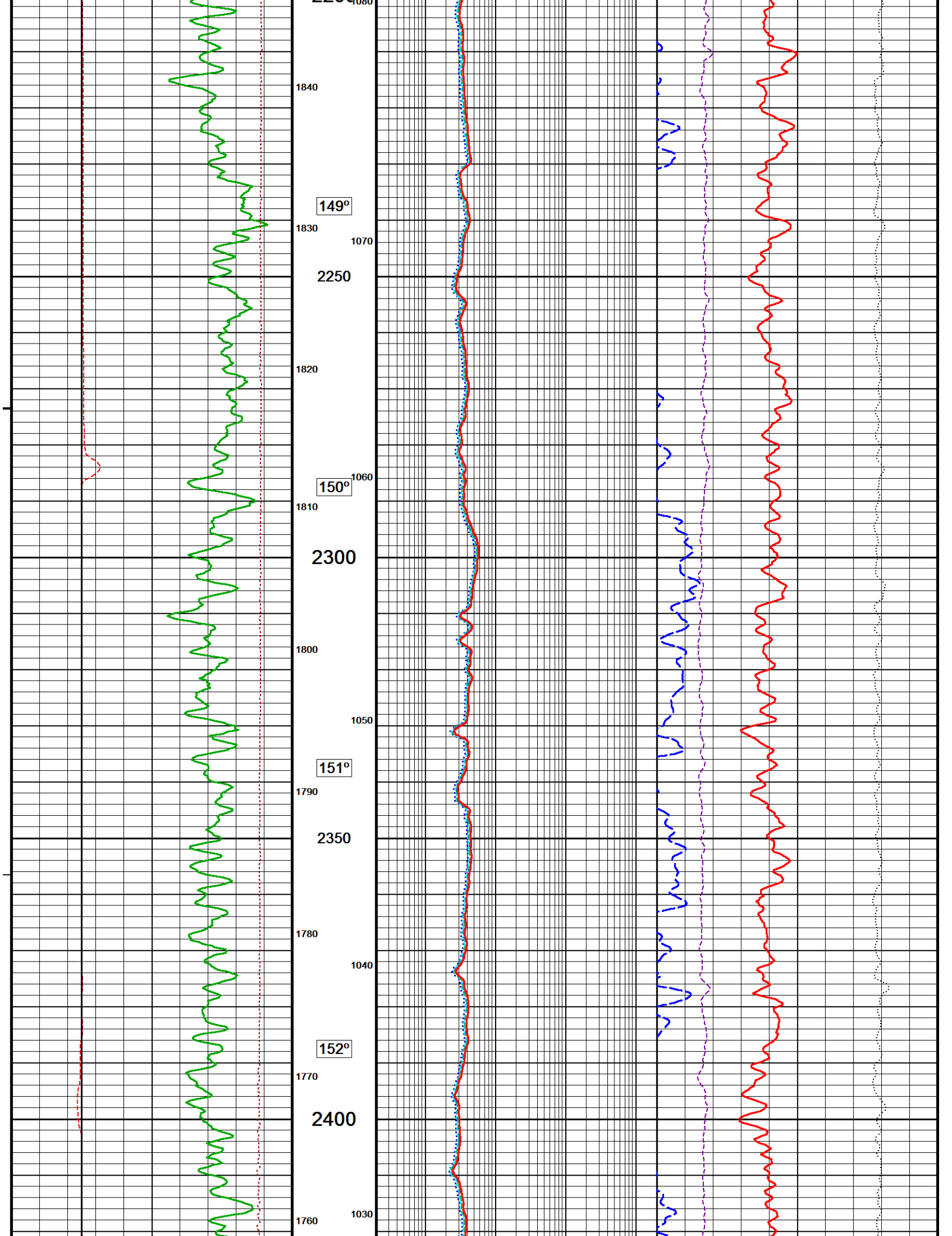
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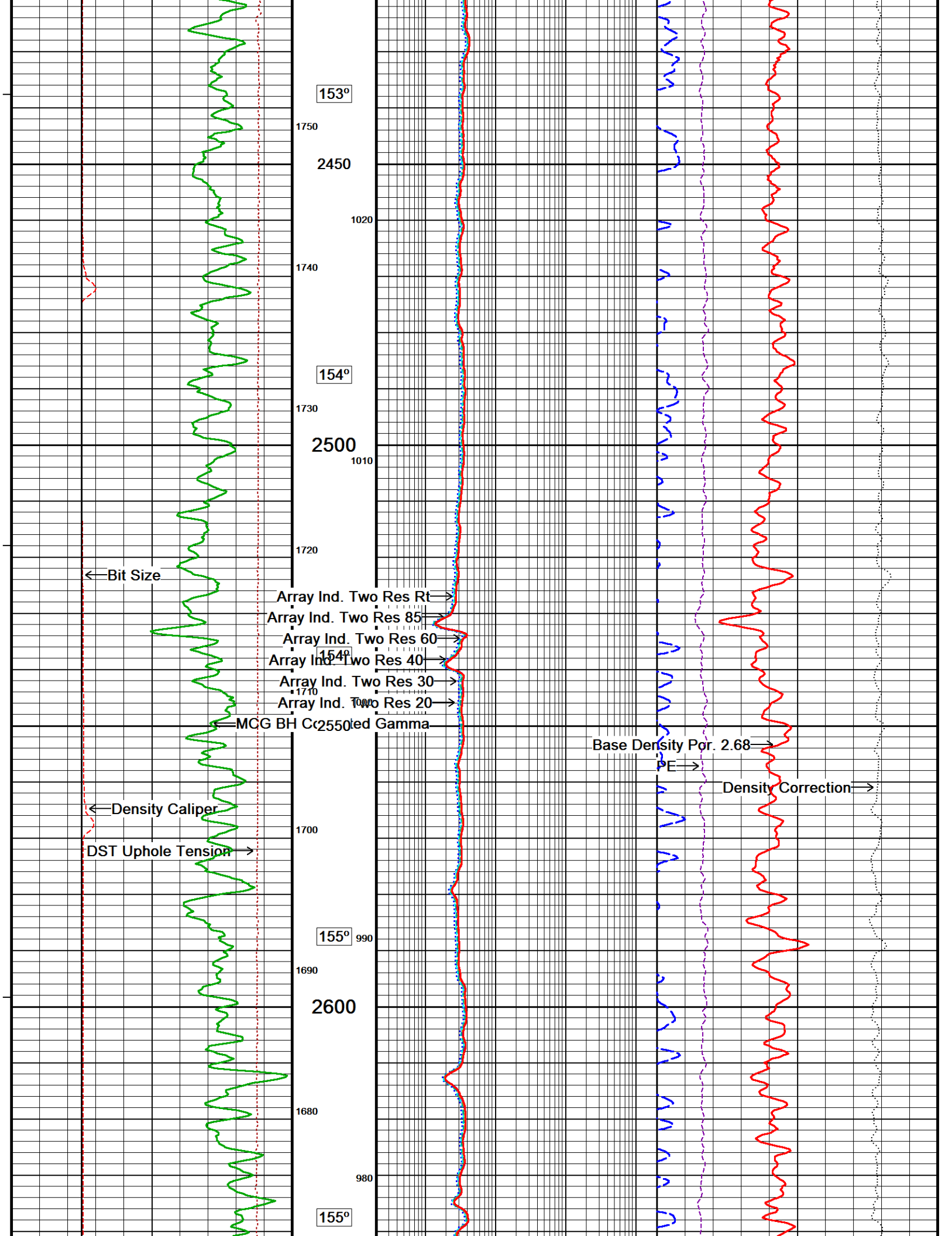


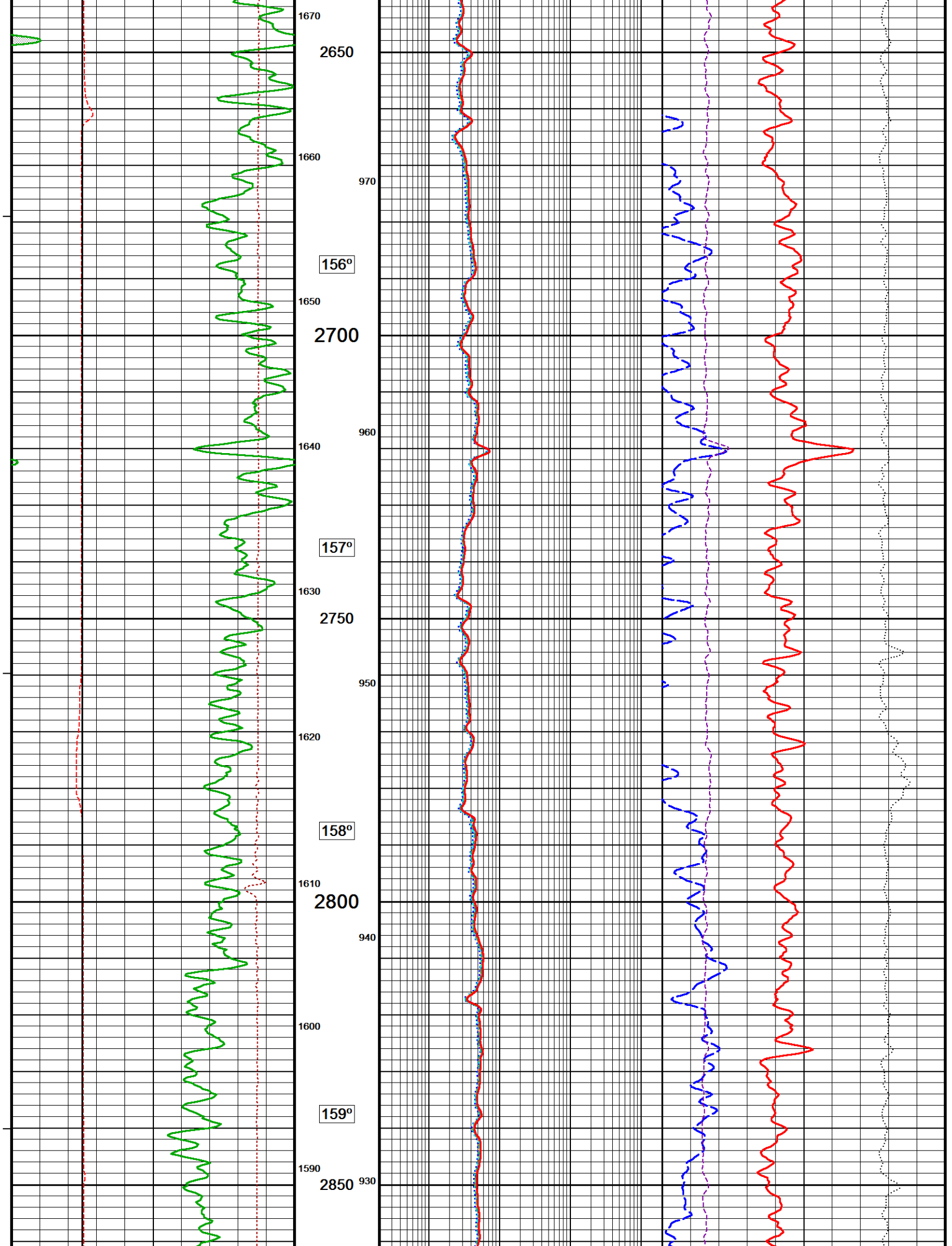


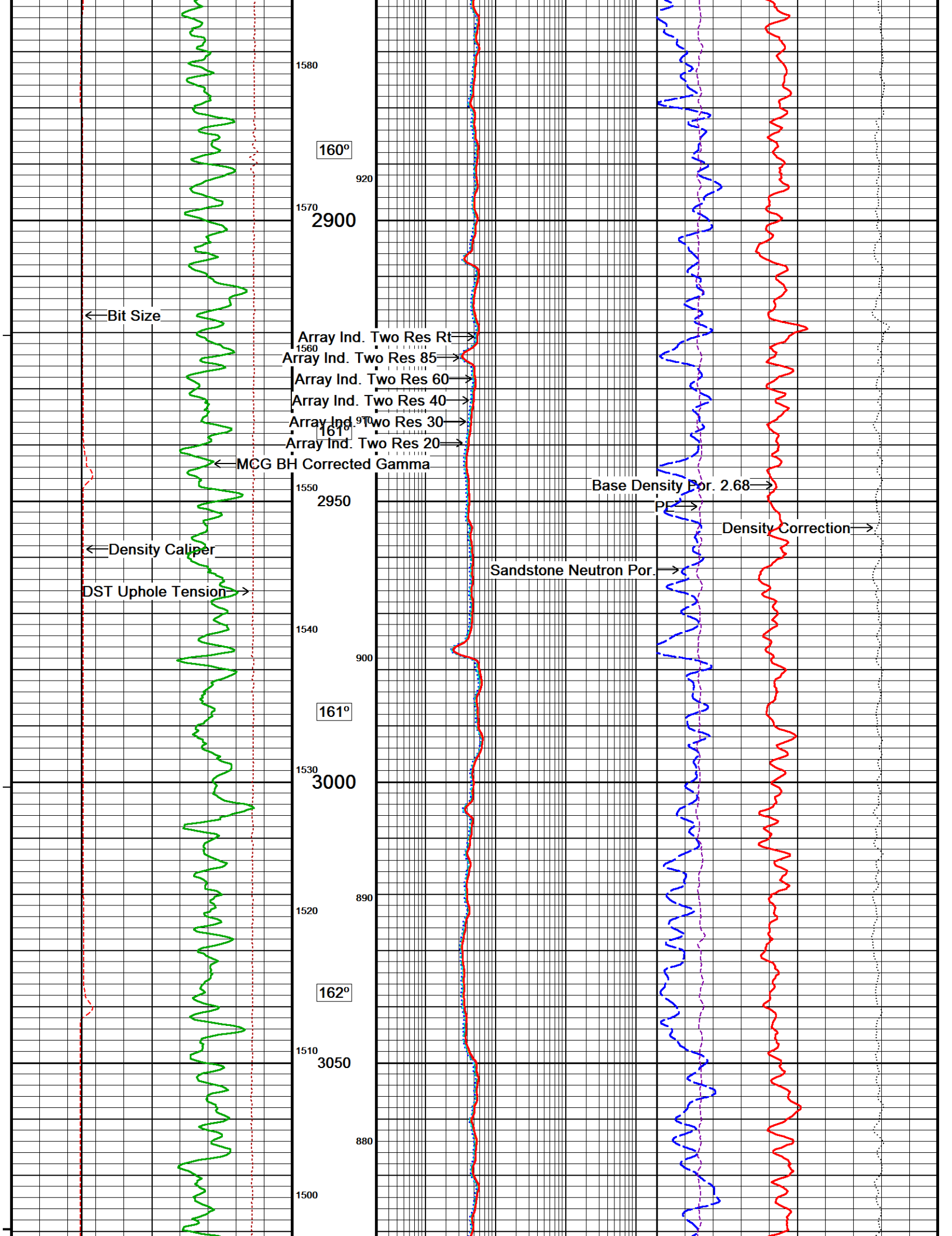


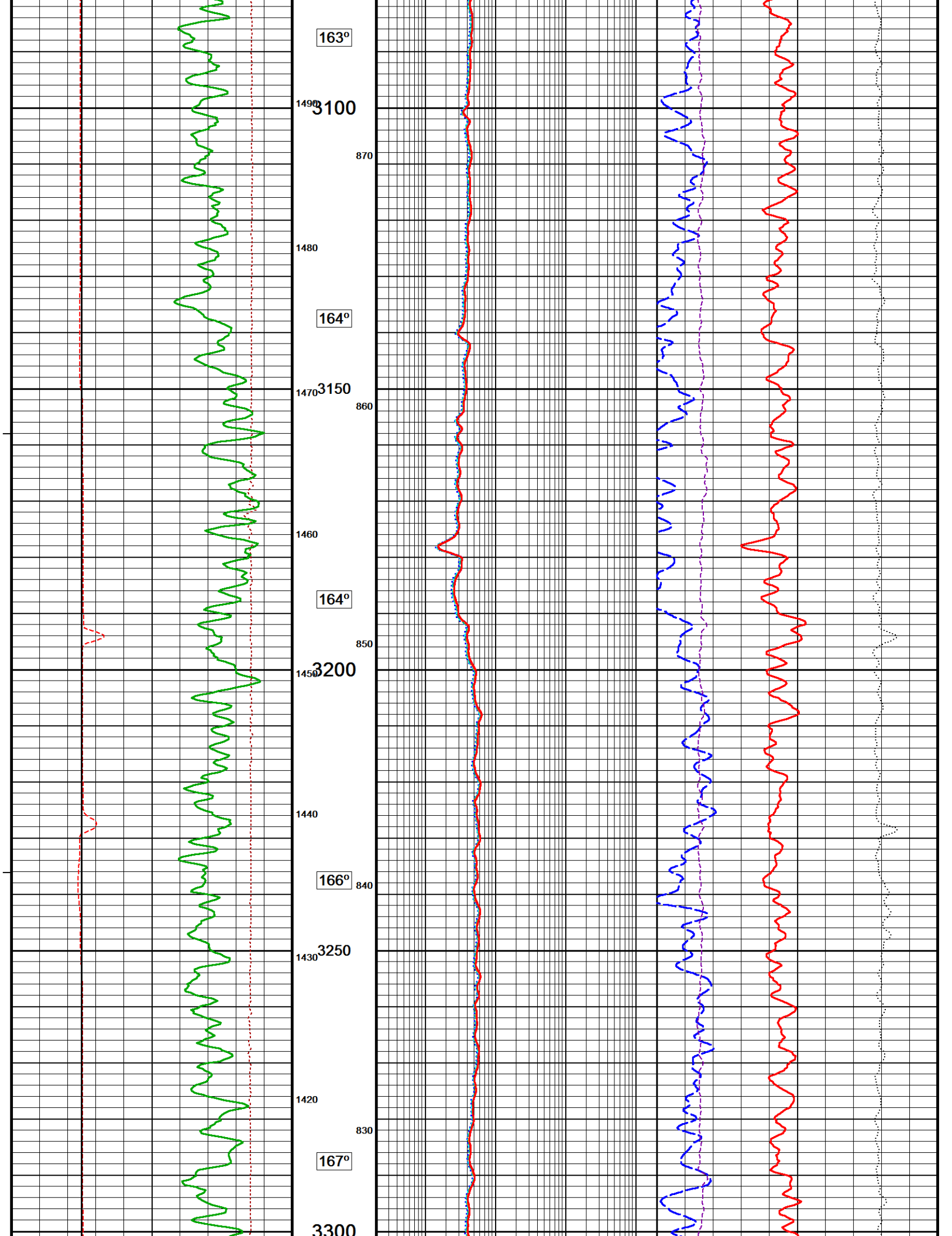












← Bit Size

Array Ind. Two Res Rt
Array Ind. Two Res 85
Array Ind. Two Res 60
Array Ind. Two Res 40
Array Ind. Two Res 30
Array Ind. Two Res 20

← MCG BH Corrected Gamma

Base Density Por. 2.68

PE

Density Correction

← Density Caliper

DST Uphole Tension

Sandstone Neutron Por.

3350

1390

1380

3400

1370

1360

3450

1350

1340

3500

1330

168°

169°

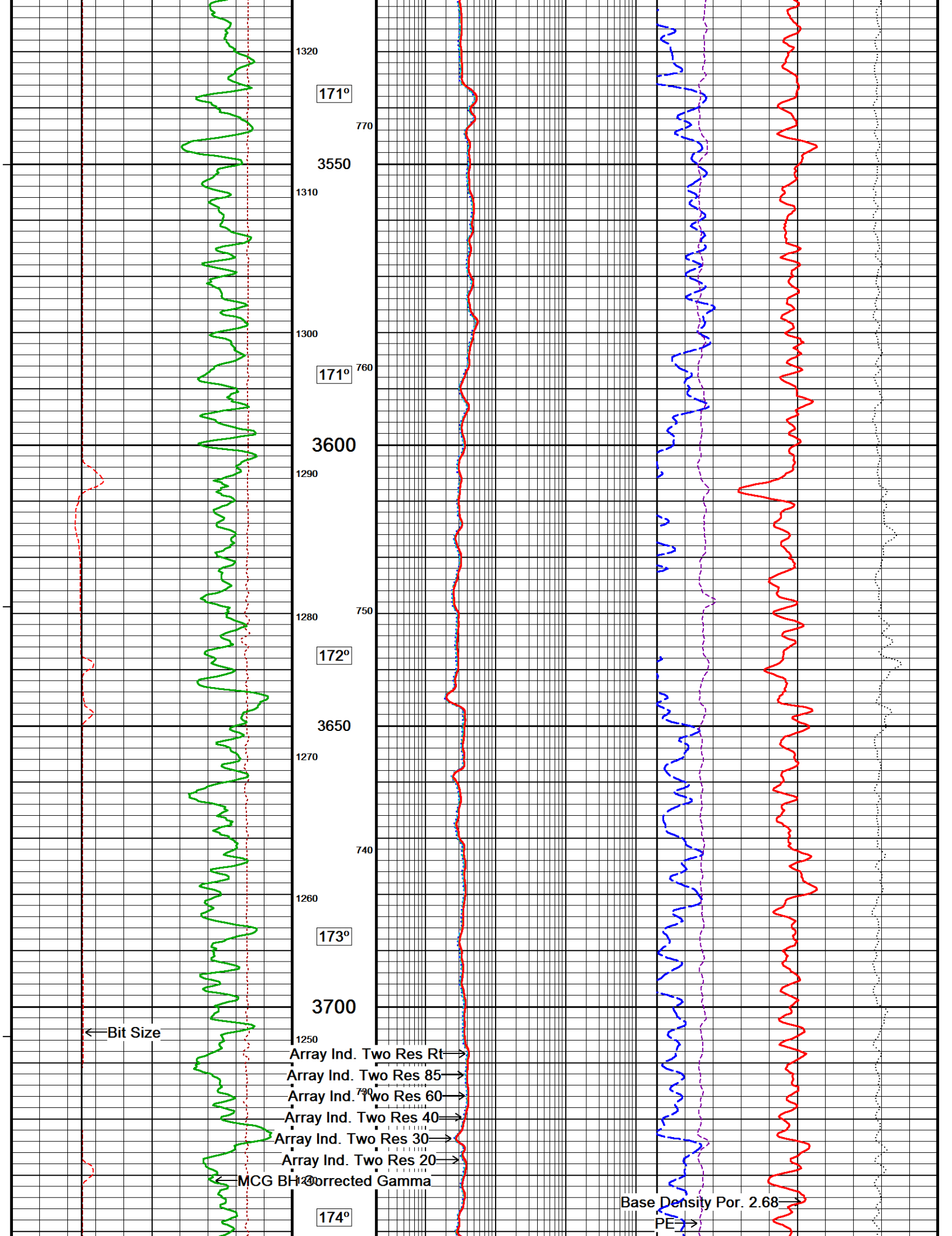
170°

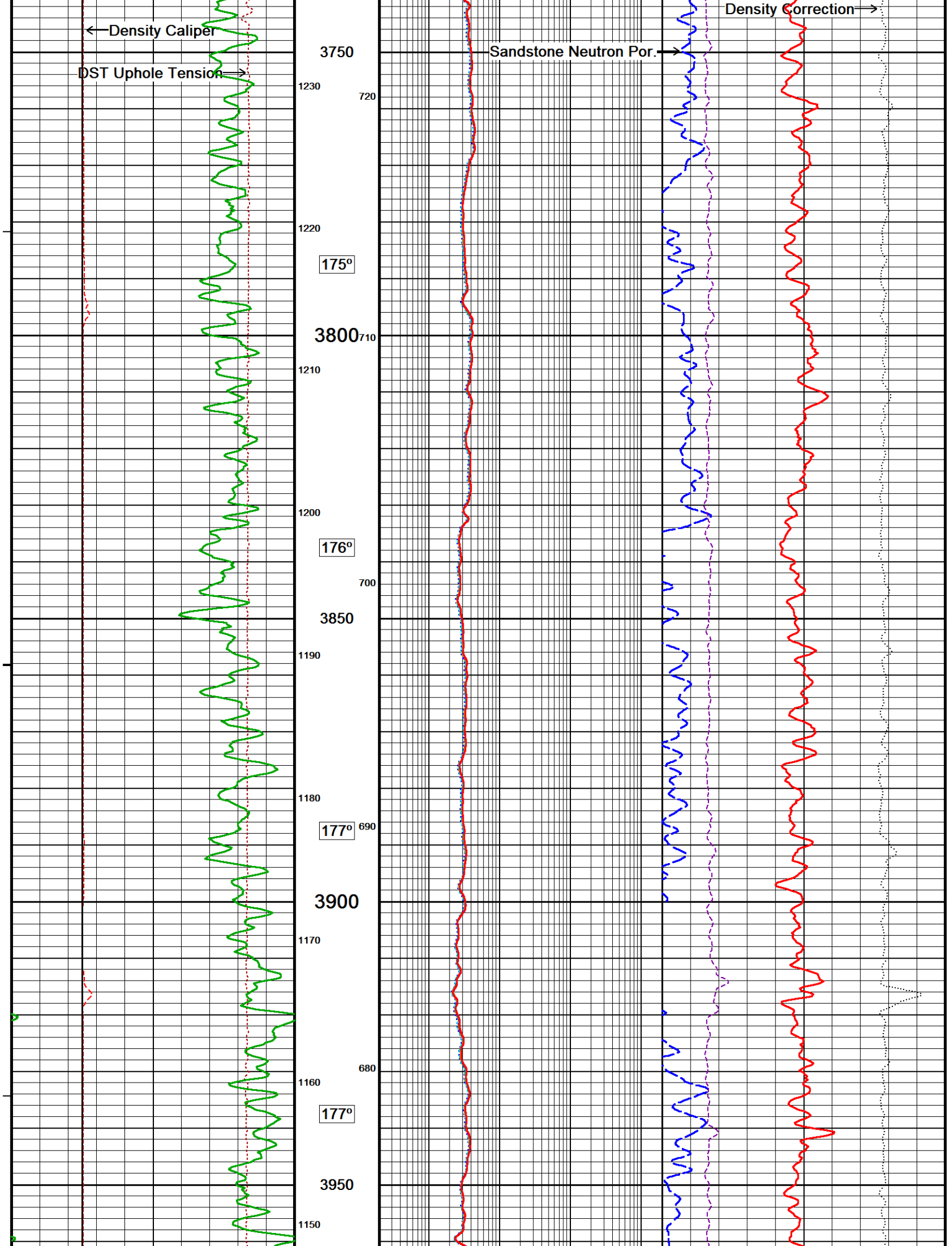
780

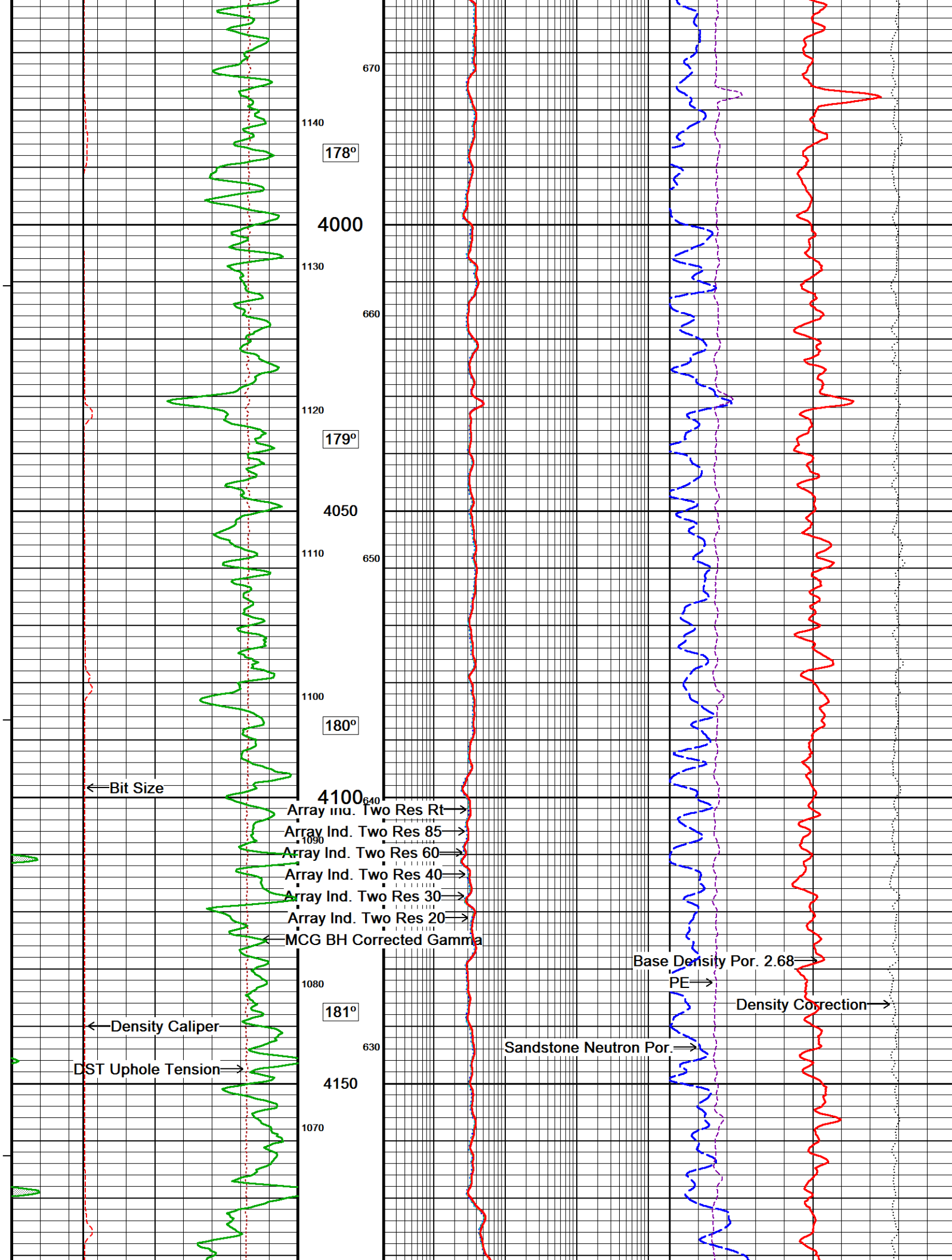
790

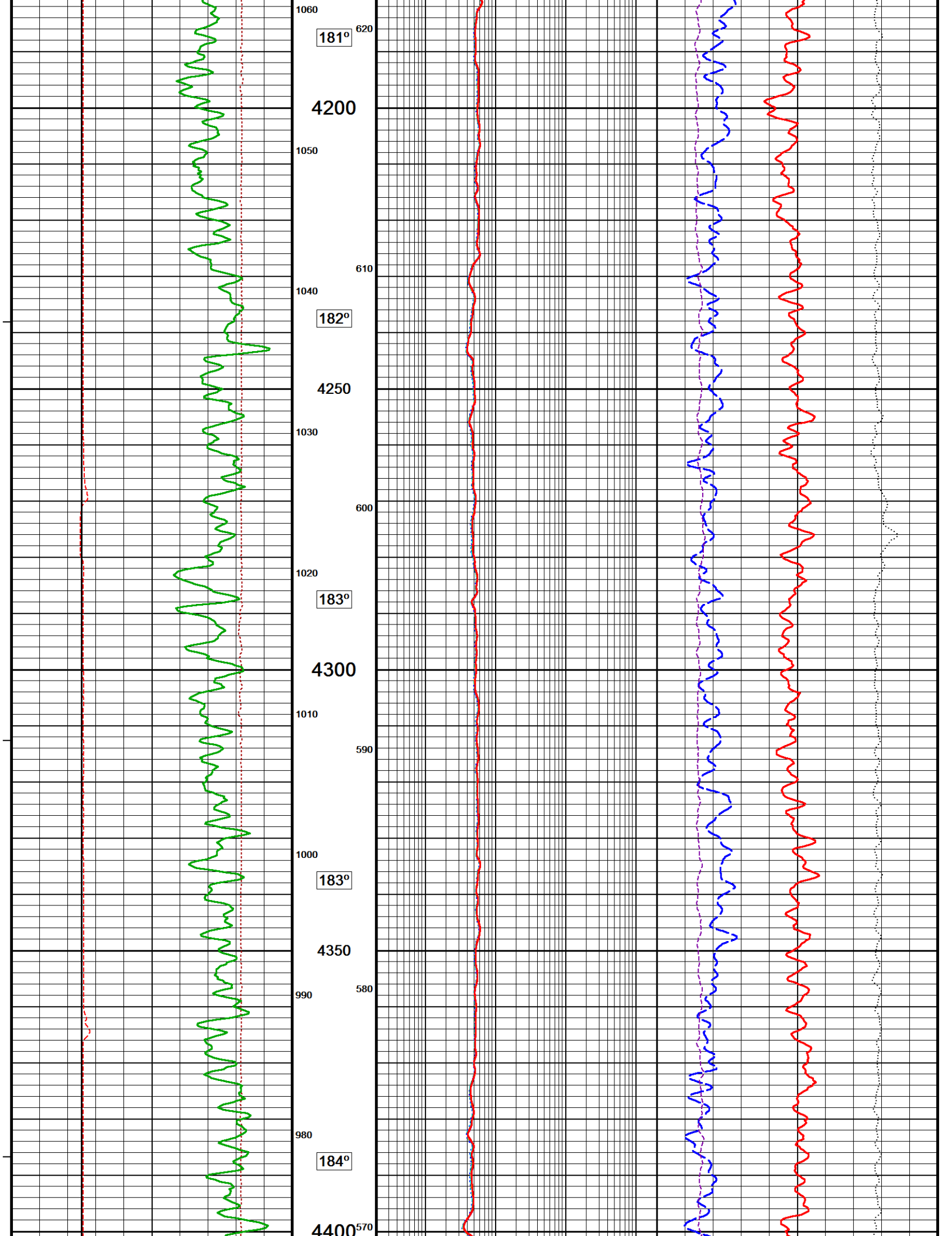
810

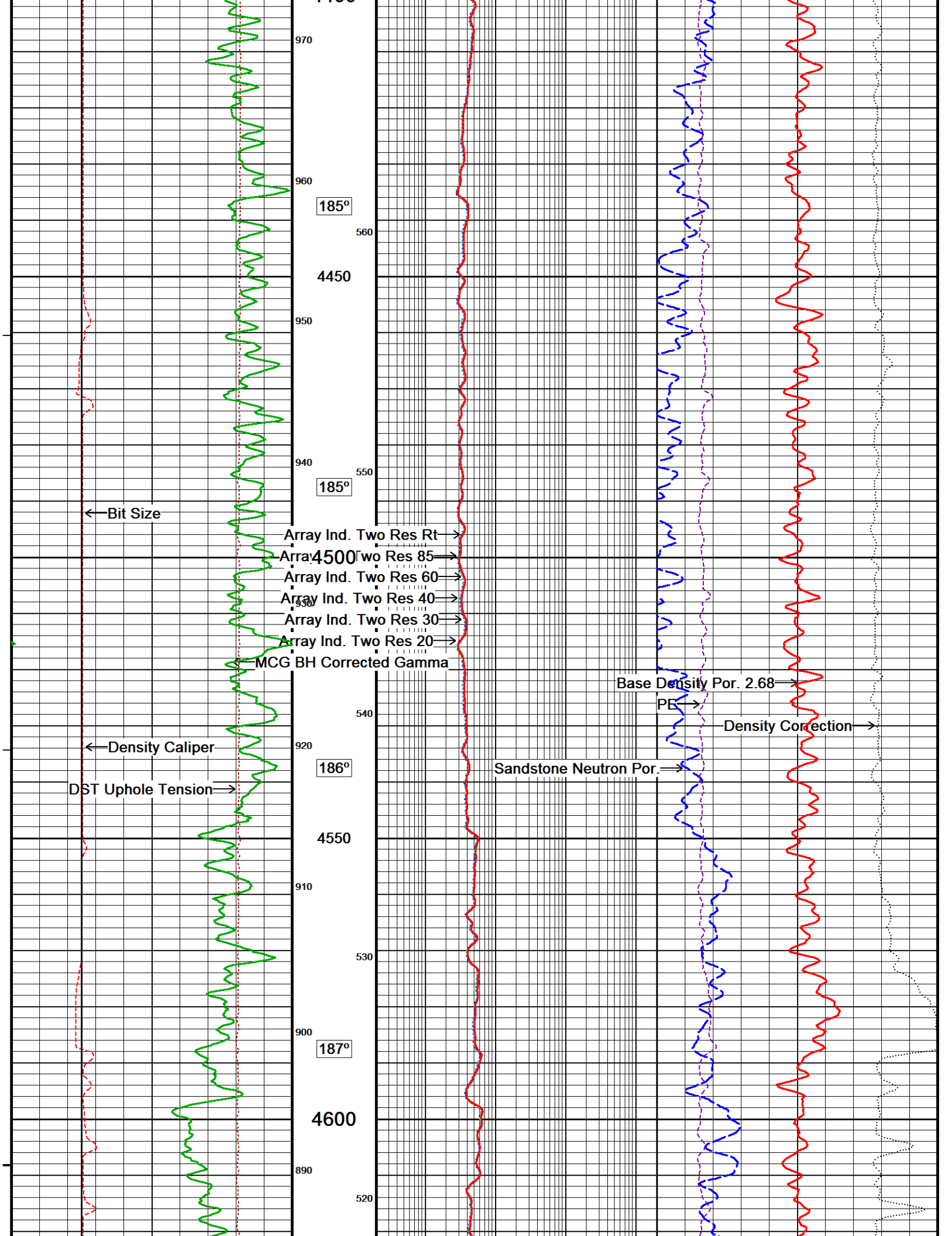
820

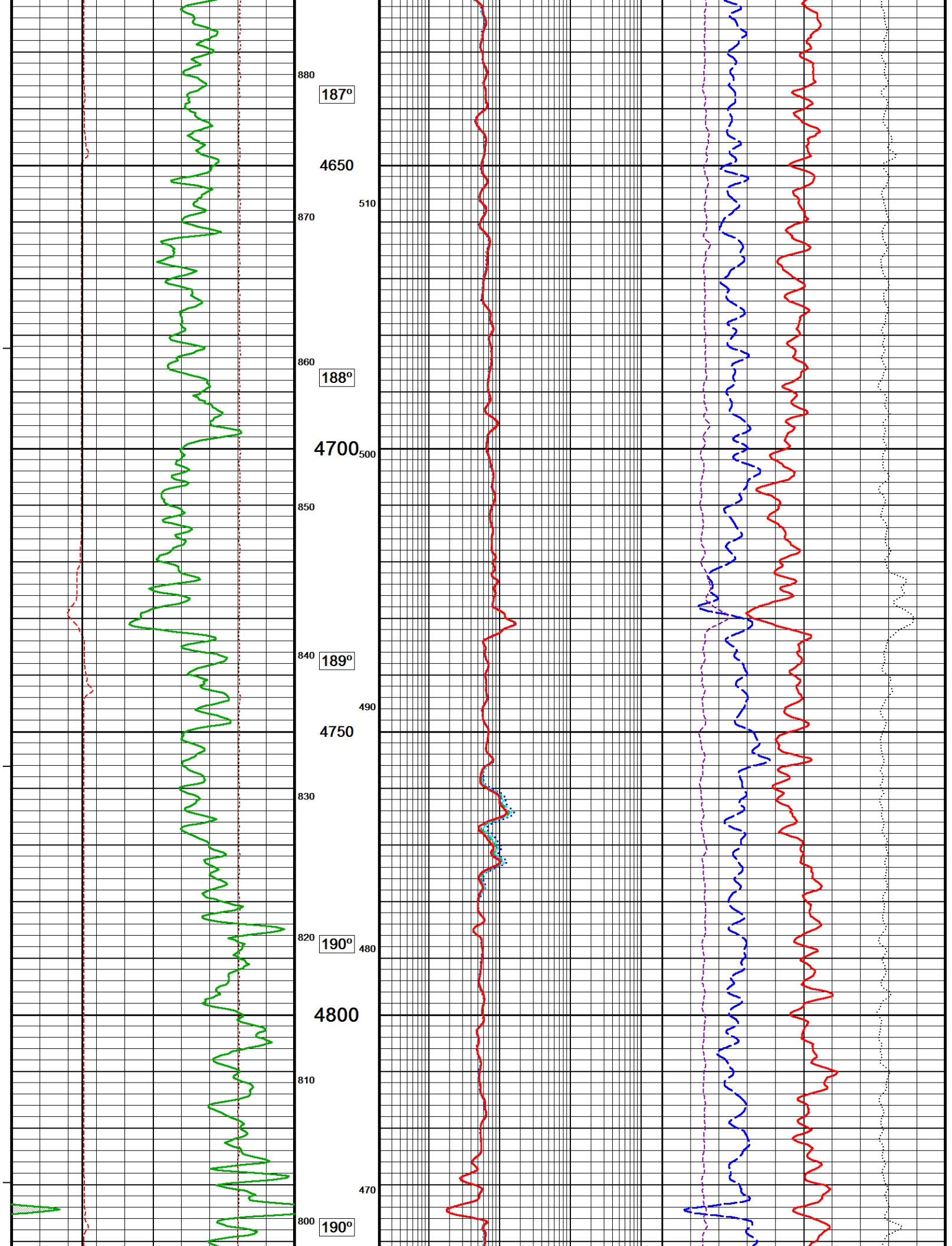


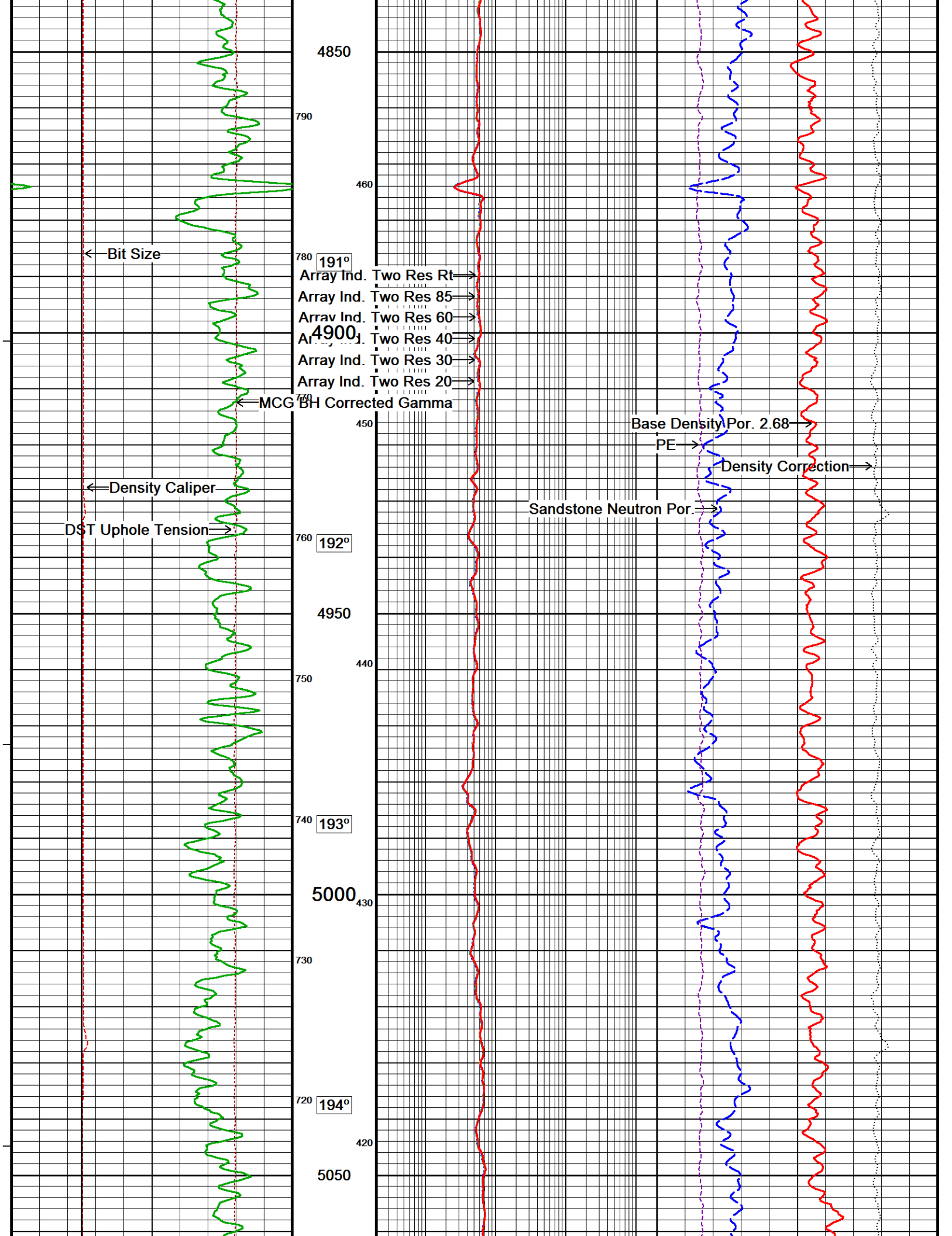


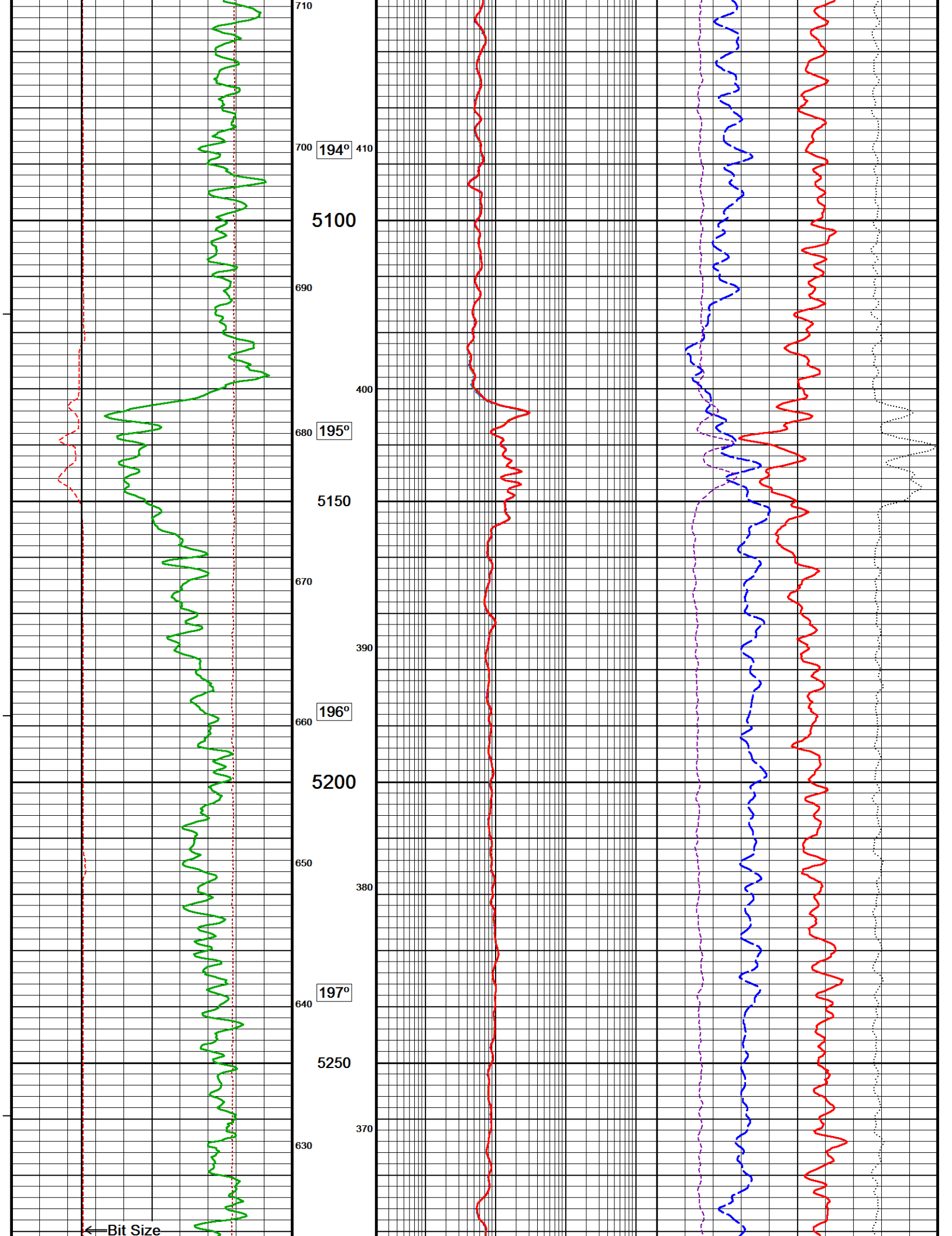


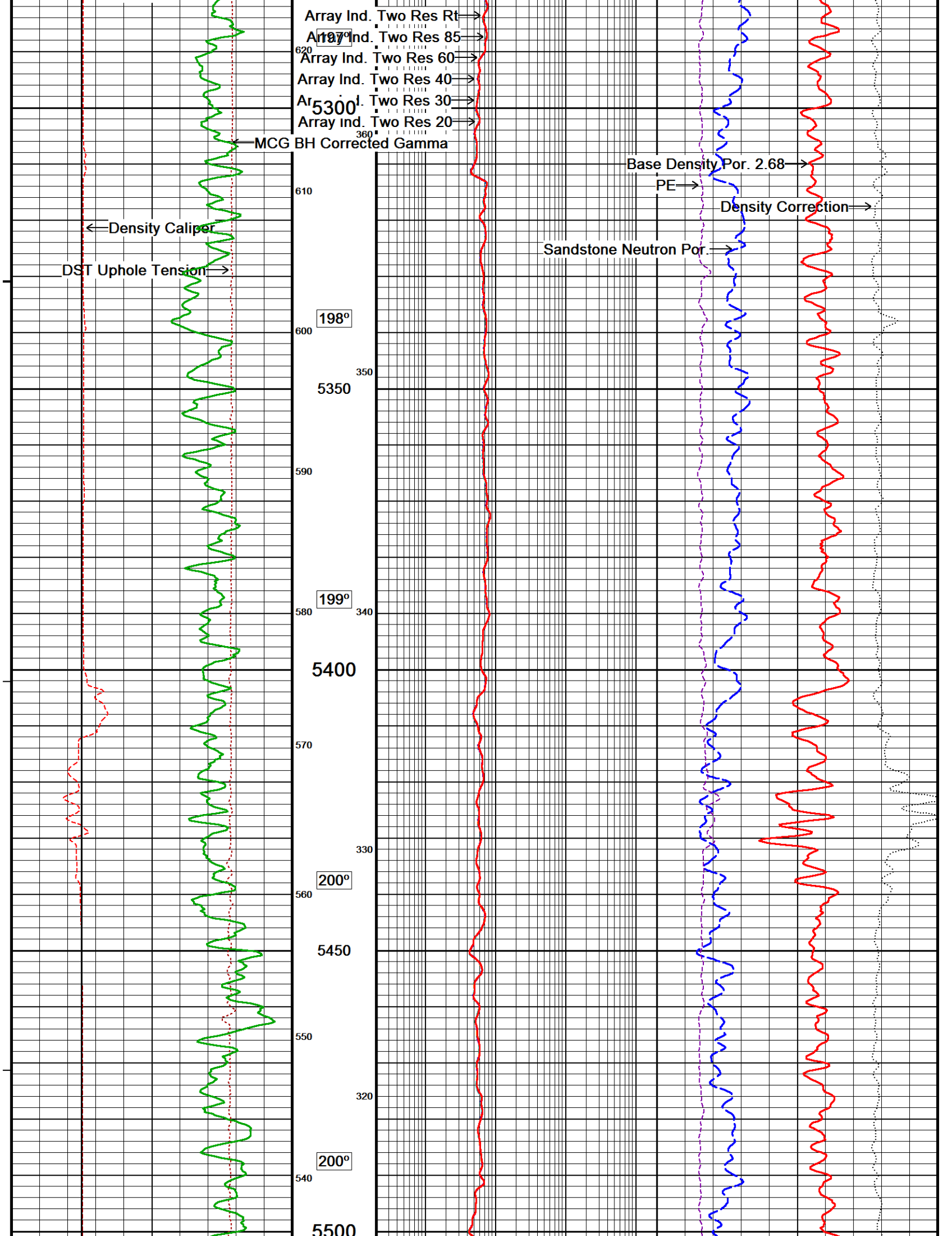


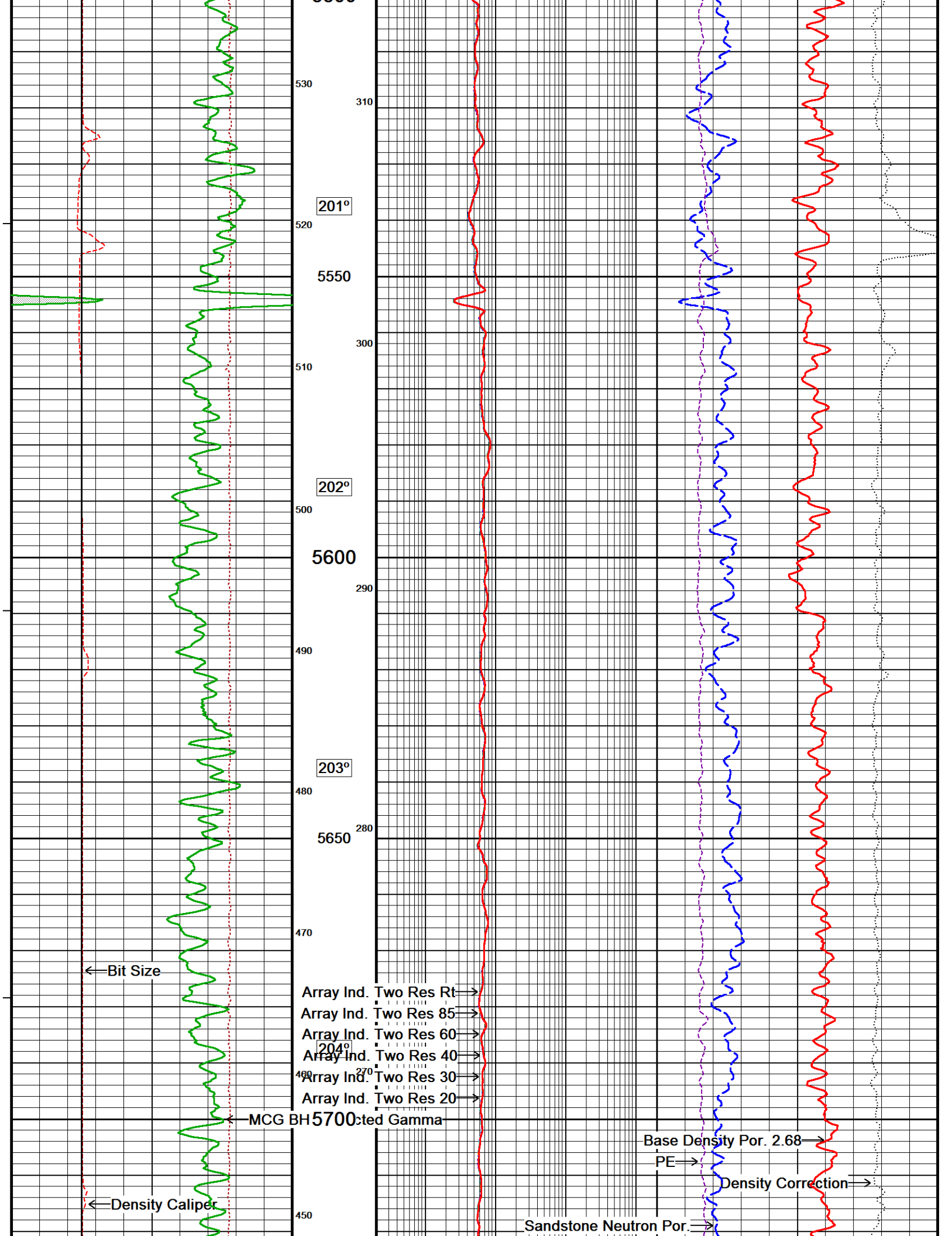


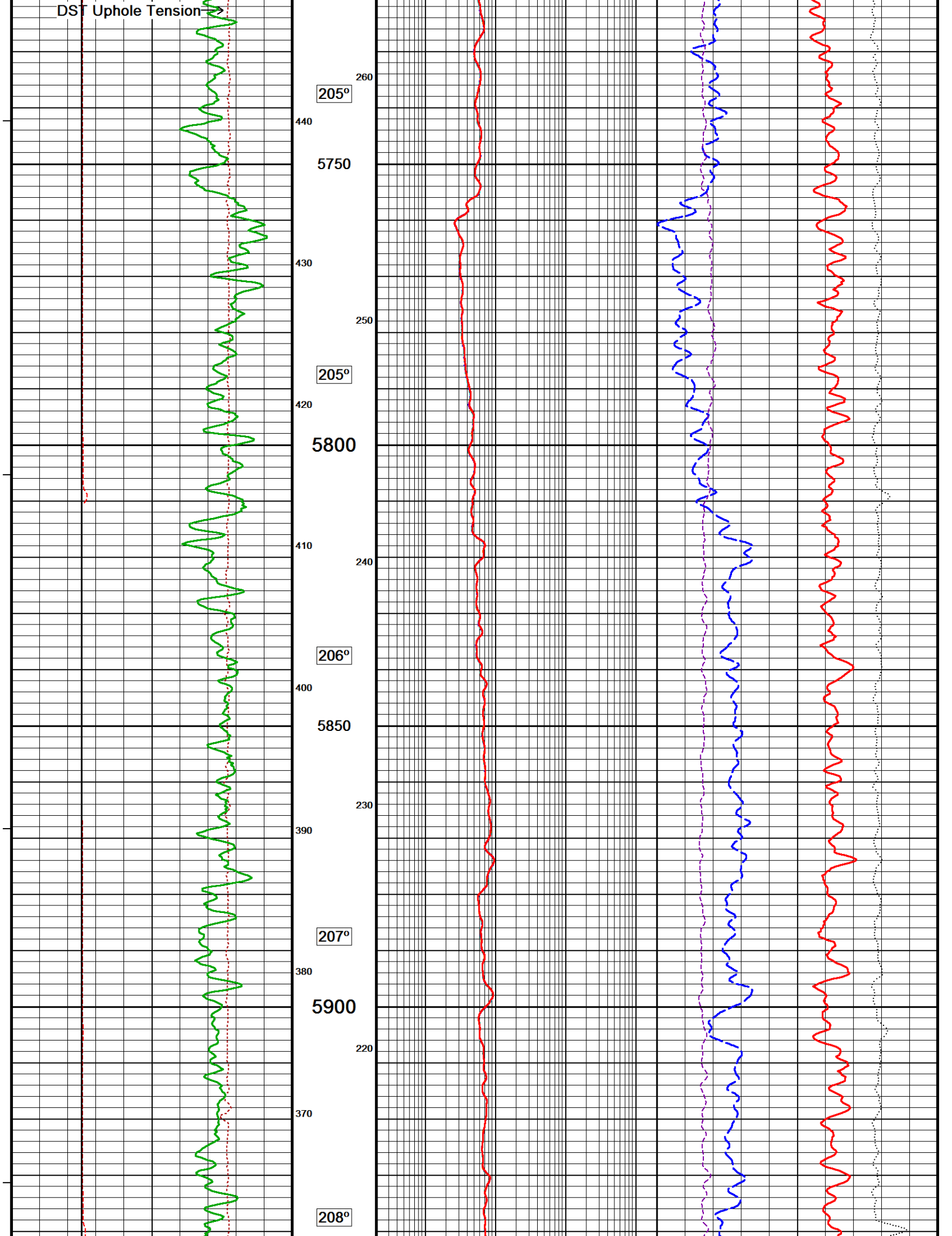


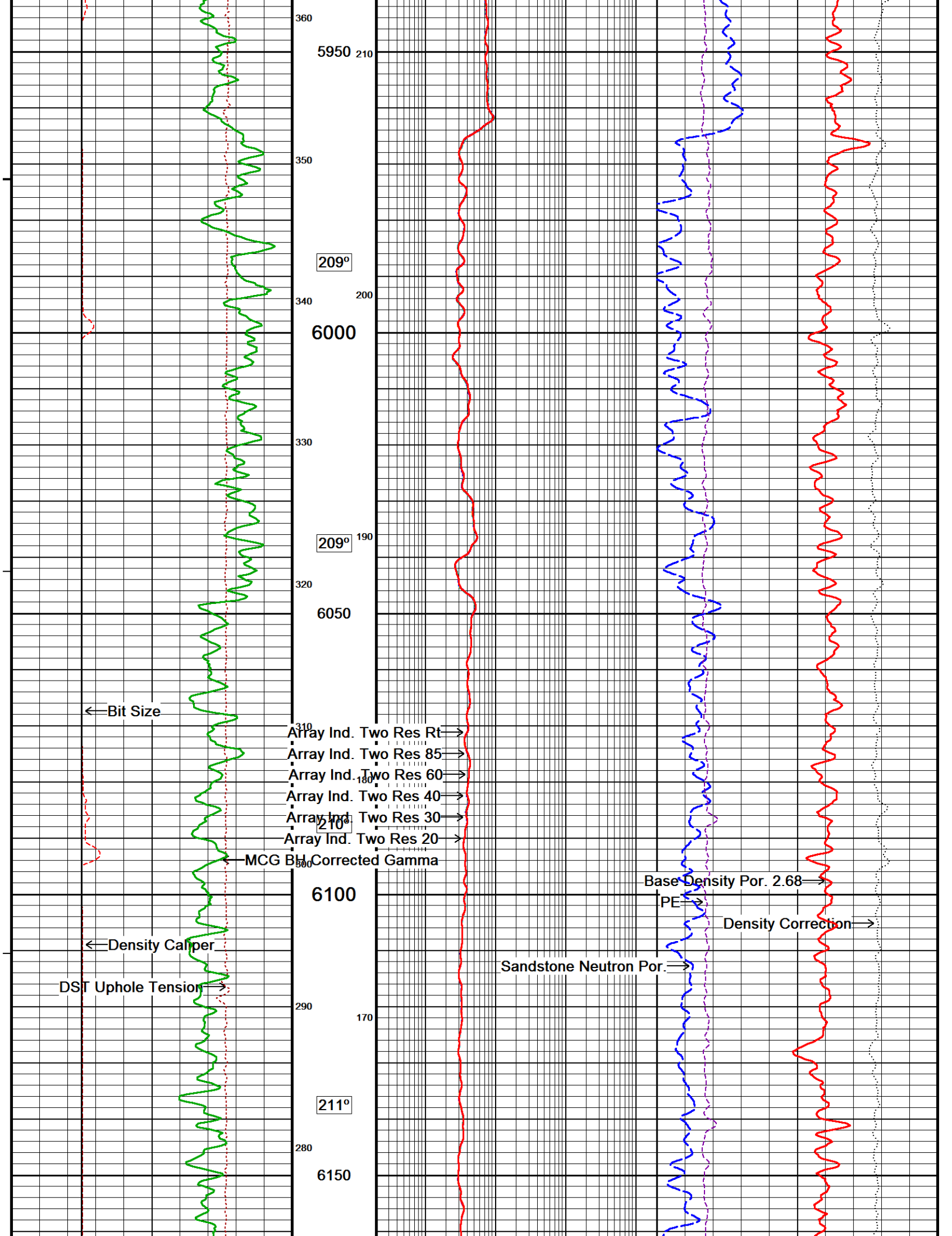


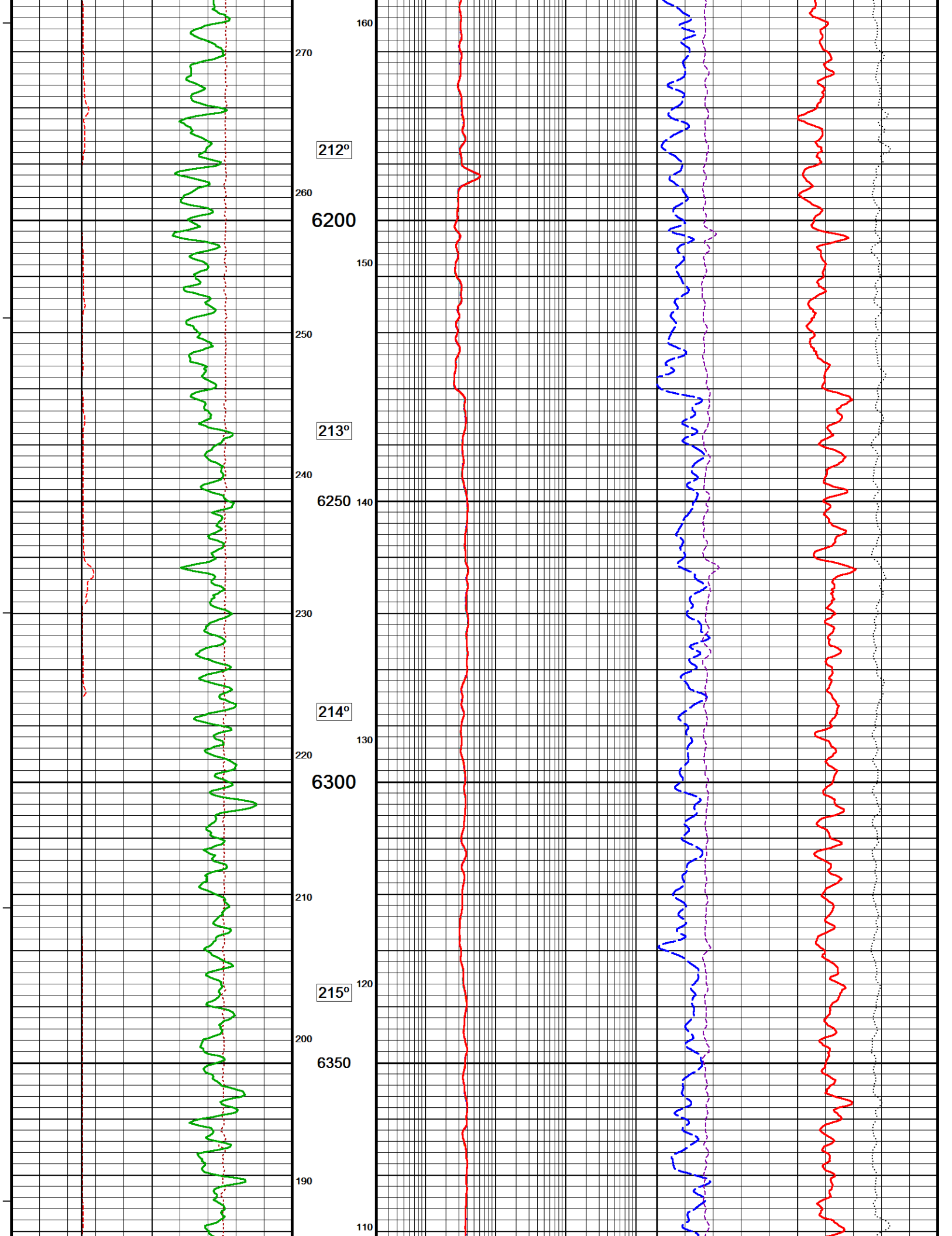


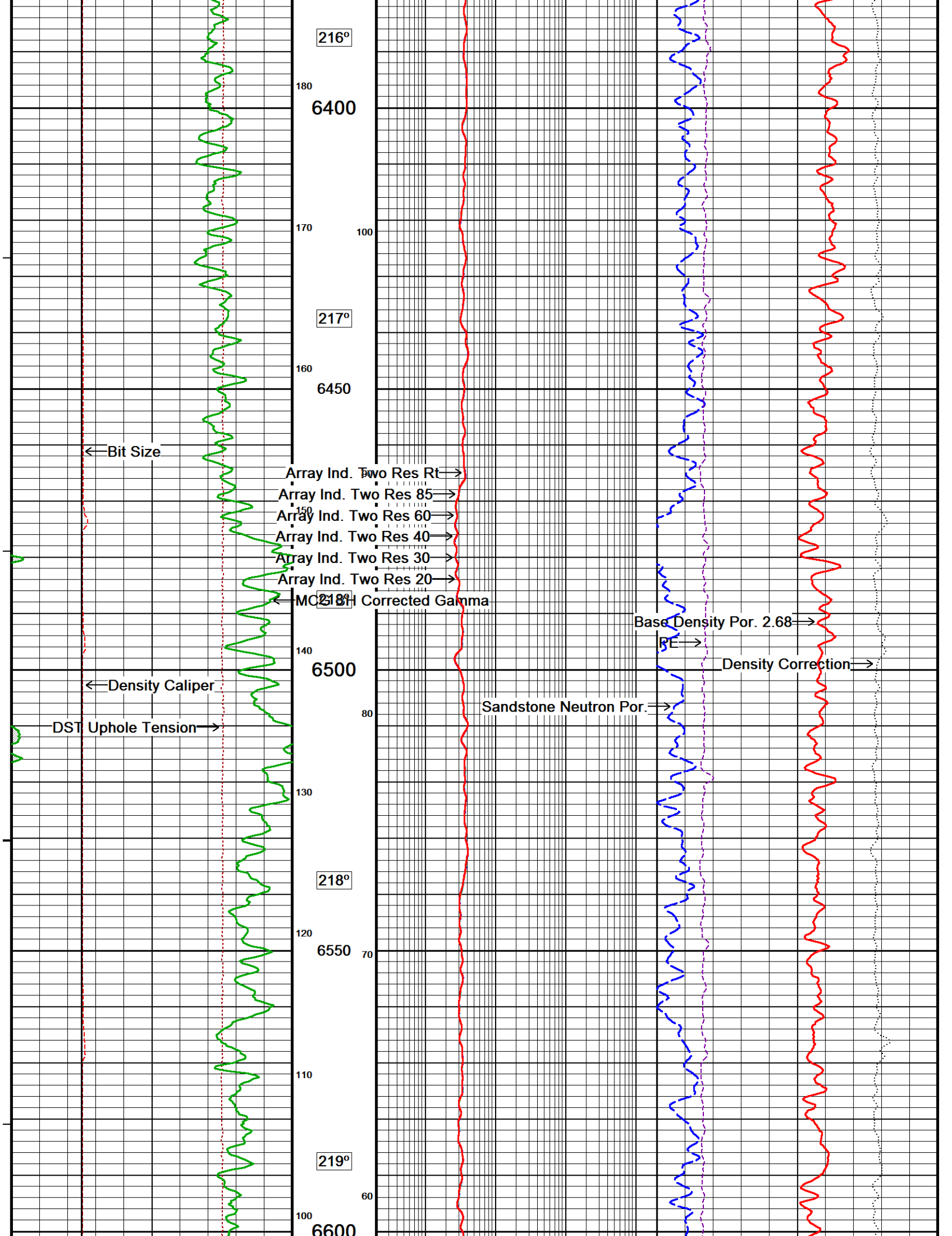


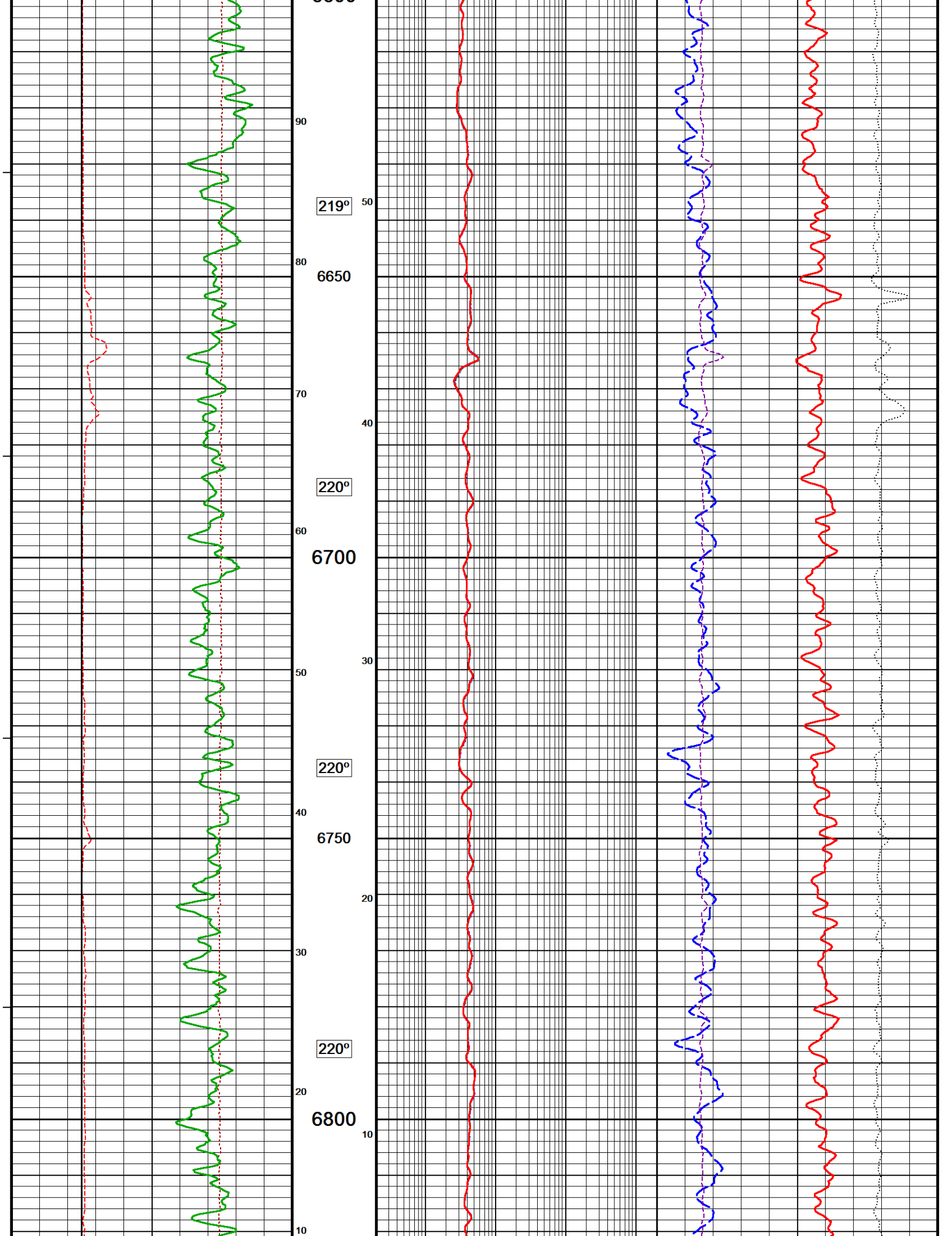


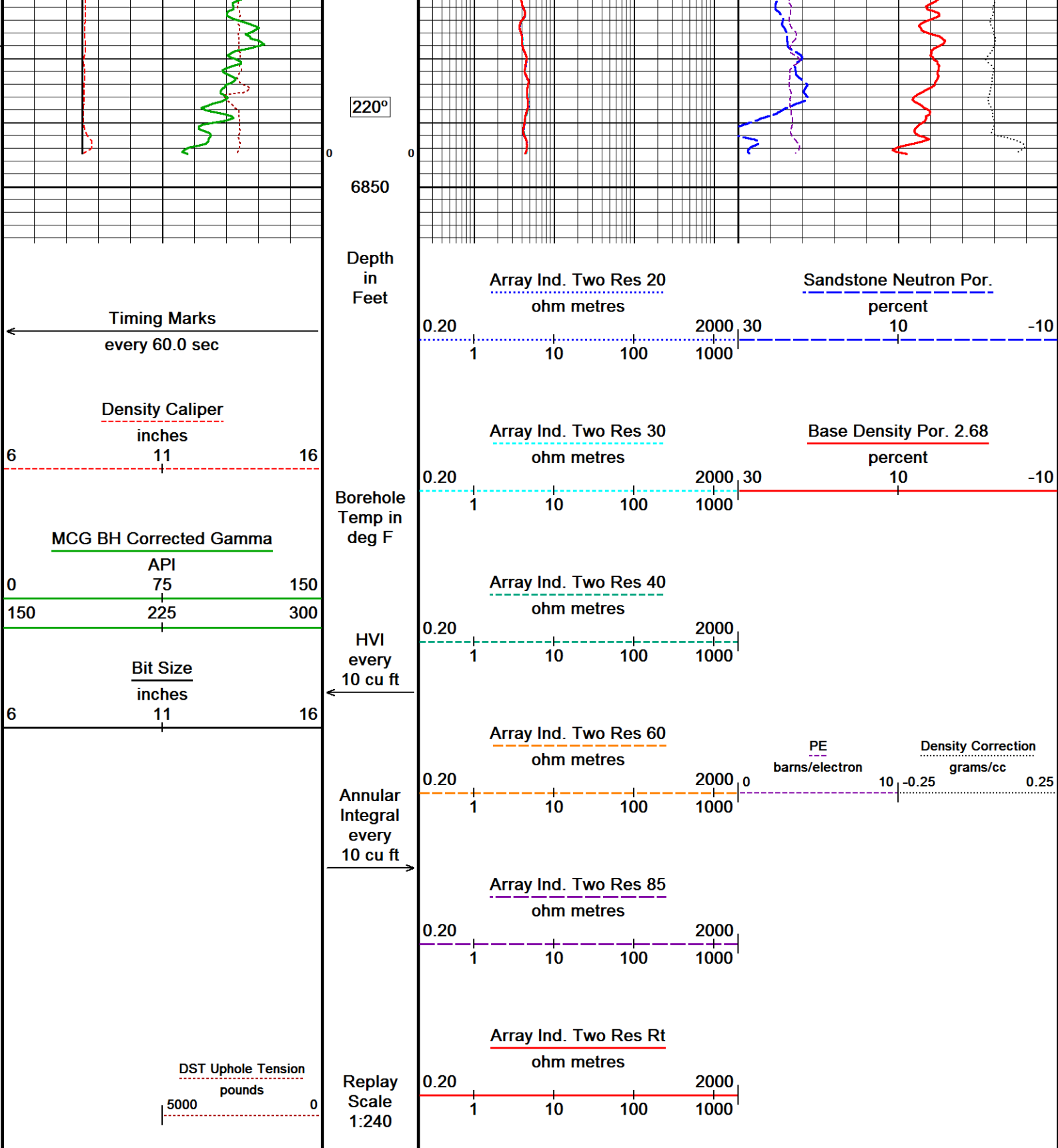












Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: E:\LOGS\EXTRACTION\LEONARD 6N\RUN1\8367-19338...\LEONARD 6N_MAIN PASS.dta
System Versions: Logged with 17.03.9609 Plotted with 17.03.9609

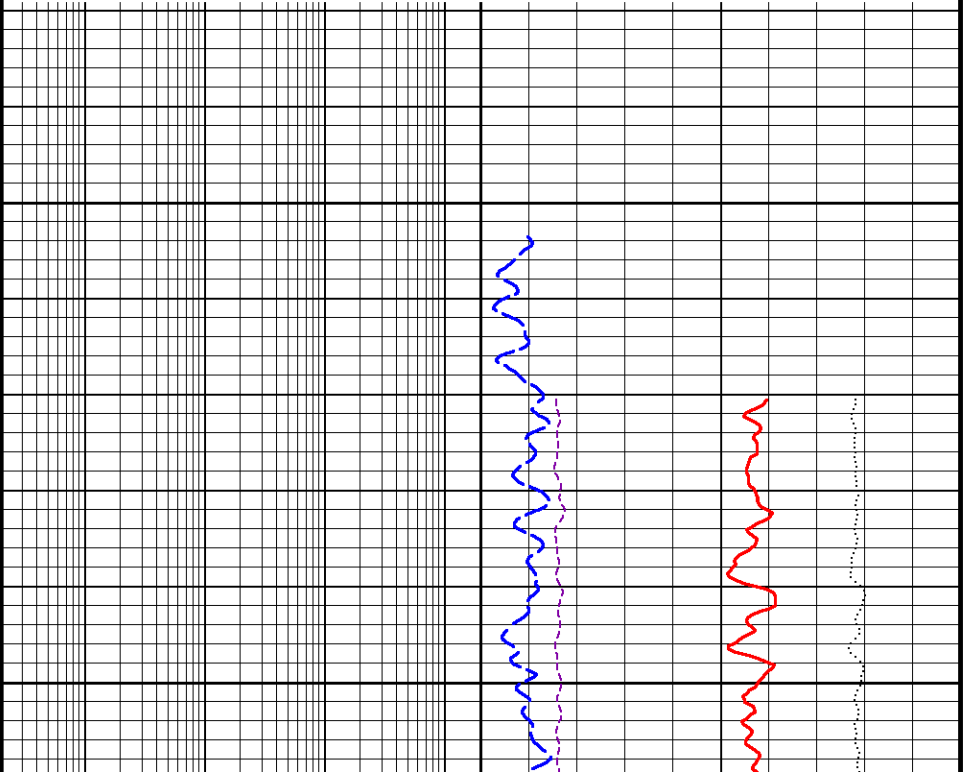
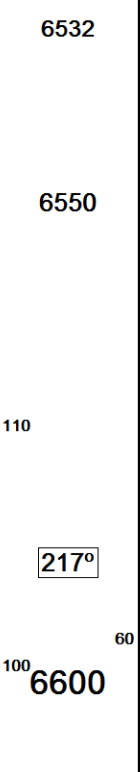
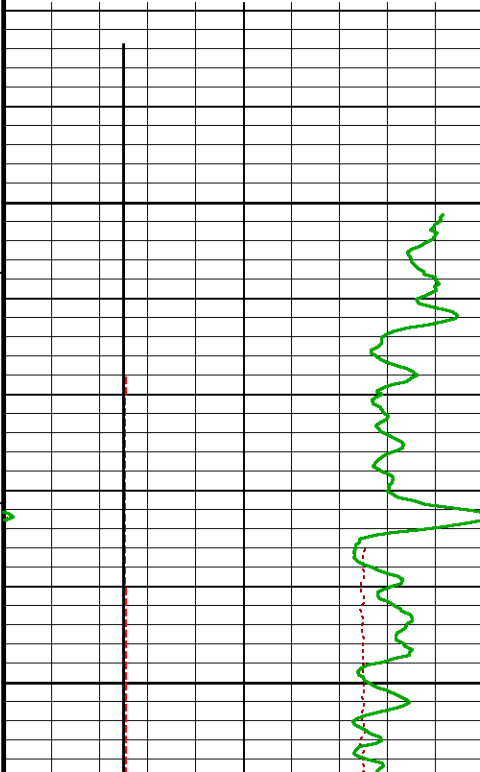
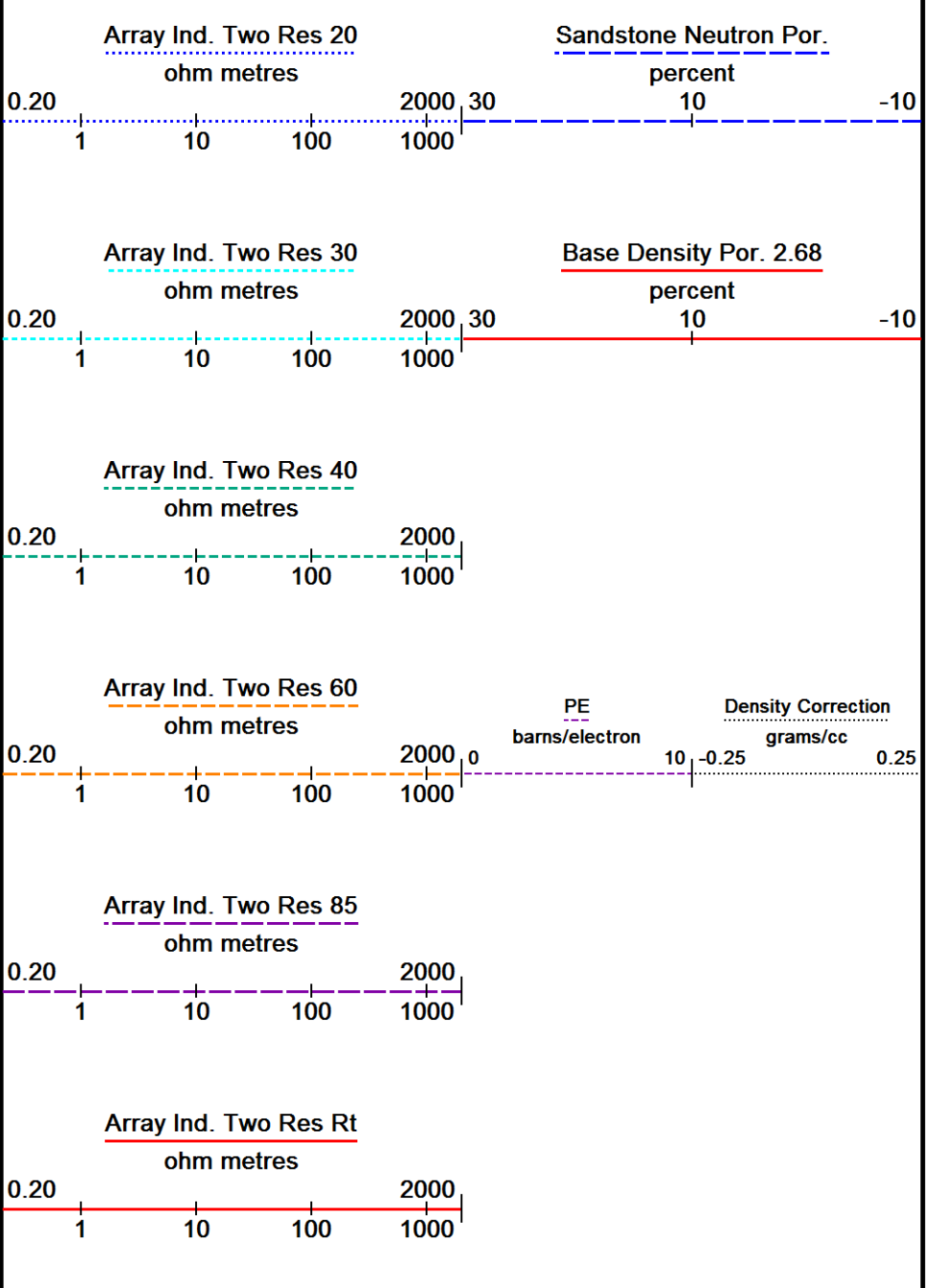
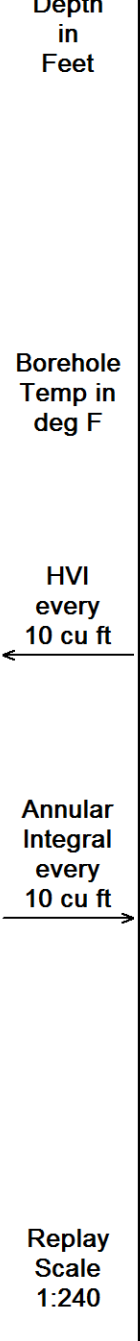
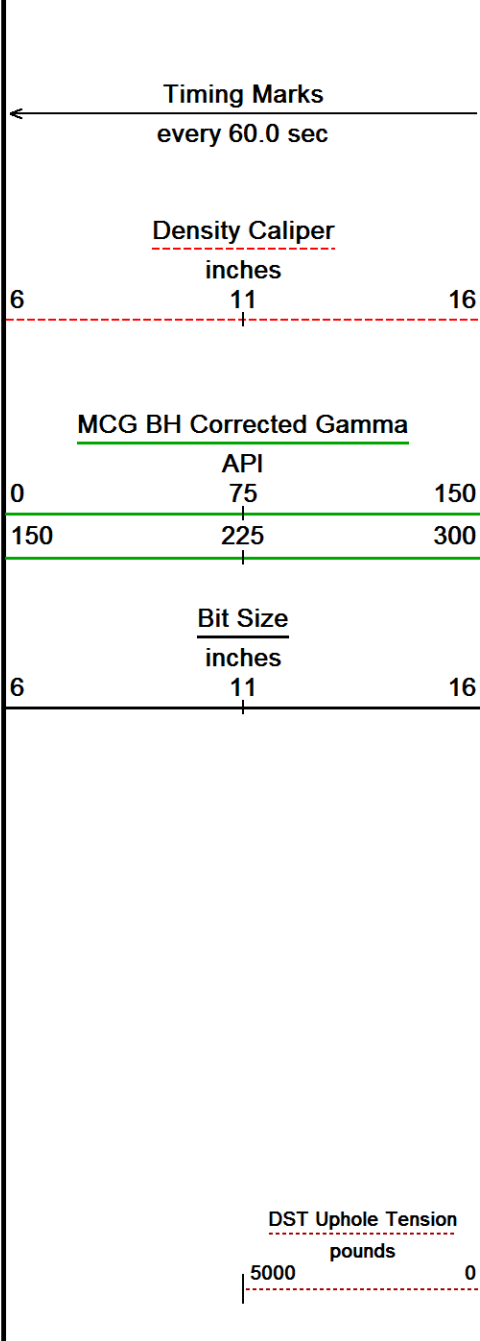
Plotted on 24-SEP-2017 06:35
Recorded on 24-SEP-2017 03:48

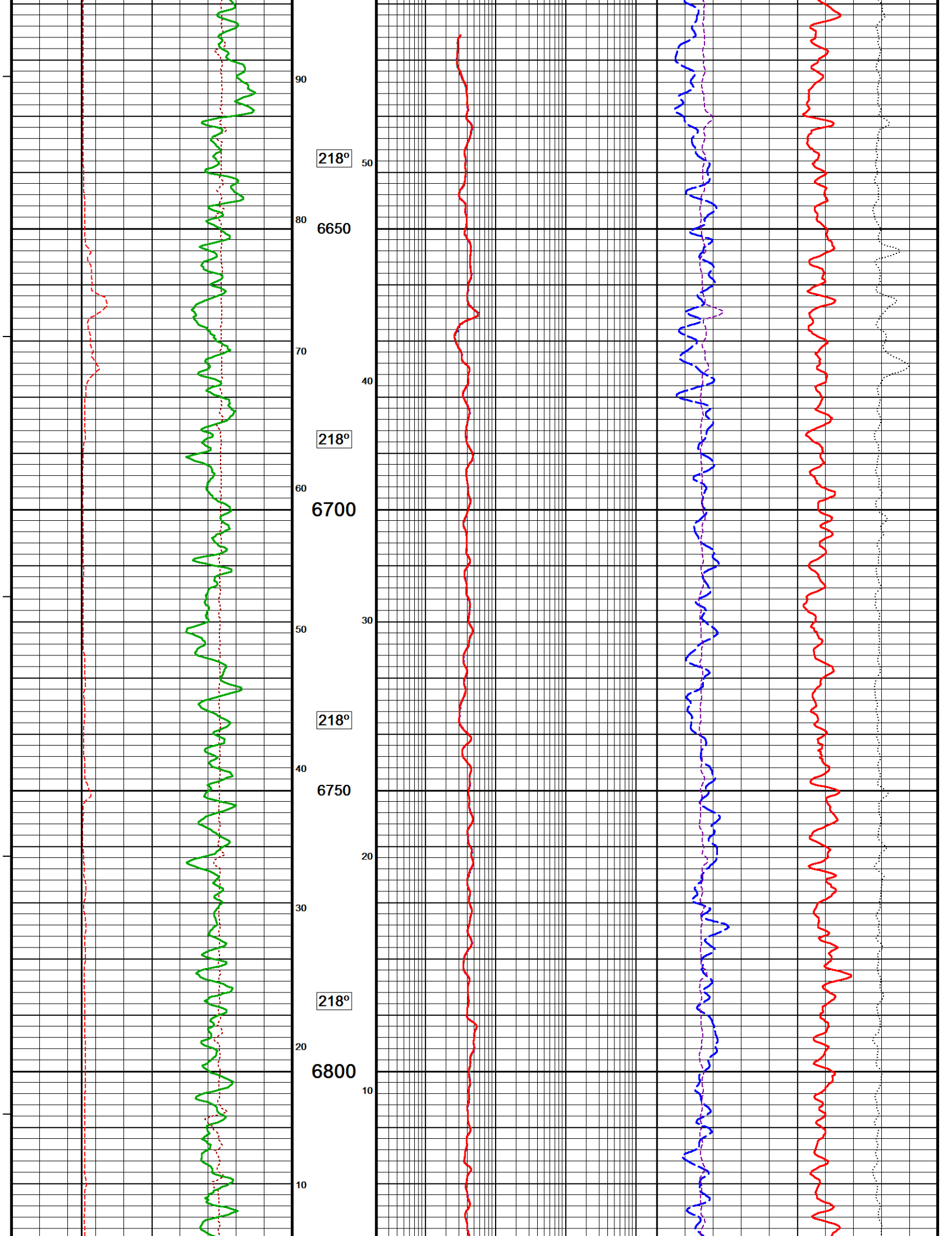
5 INCH MAIN LOG

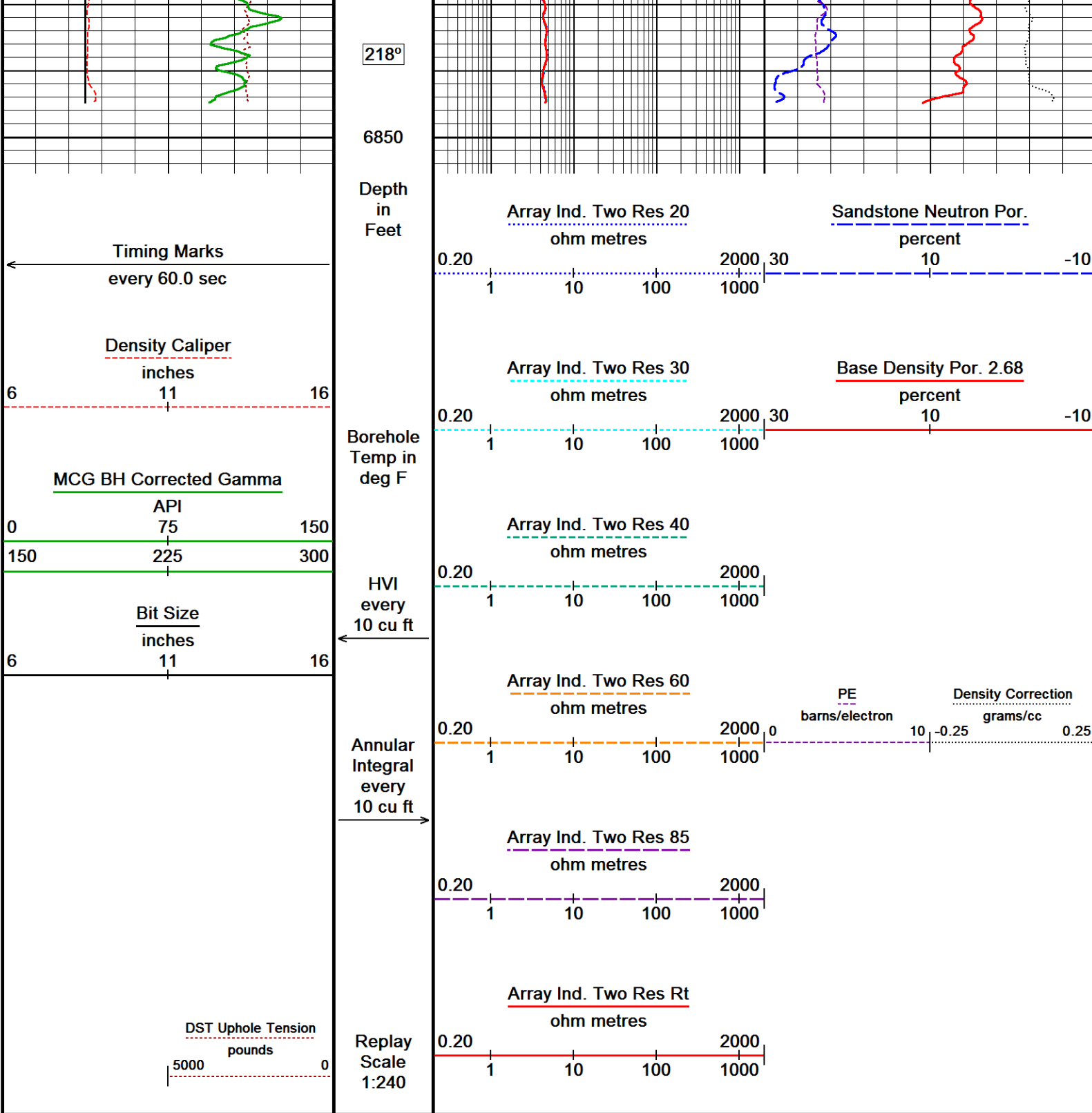
Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: E:\LOGS\EXTRACTION\LEONARD 6N\RUN1\8367-19...\LEONARD 6N_REPEAT PASS.dta
System Versions: Logged with 17.03.9609 Plotted with 17.03.9609

Plotted on 24-SEP-2017 06:35
Recorded on 24-SEP-2017 03:27

5 INCH REPEAT SECTION







Depth Based Data - Maximum Sampling Increment 10.0cm

Filename: E:\LOGS\EXTRACTION\LEONARD 6N\RUN1\8367-19...LEONARD 6N_REPEAT PASS.dta

System Versions: Logged with 17.03.9609 Plotted with 17.03.9609

Plotted on 24-SEP-2017 06:35

Recorded on 24-SEP-2017 03:27

↑ 5 INCH REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION

E:\LOGS\EXTRACTION\LEONARD 6N\RUN1\8367-193388399\LEONARD 6N_REPEAT PASS.dta

General Constants All 000

Last Edited on 23-SEP-2017,22:58

General Parameters		
Mud Resistivity	1000.000	ohm-metres
Mud Resistivity Temperature	77.000	degrees F
Water Level	0.000	feet

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

Down-hole Tension Calibration SMS 0

Field Calibration on 03-SEP-2017 18:56

Reading No	Measured	
1	15309.82	0.00
2	16554.02	712.00

Gamma Calibration MCG-D.K 482

Field Calibration on 23-SEP-2017 21:51

	Measured	Calibrated (API)
Background	216	143
Calibrator (Gross)	1601	1055
Calibrator (Net)	1385	912

Gamma Calibration Tolerances MCG-D.K 482

Ratio	1.518	<div style="display: inline-block; width: 100px; height: 15px; border: 1px solid black; position: relative;"> <div style="position: absolute; left: 0; width: 20%; height: 100%; background-color: white;"></div> <div style="position: absolute; left: 20%; width: 20%; height: 100%; background-color: yellow;"></div> <div style="position: absolute; left: 40%; width: 20%; height: 100%; background-color: red;"></div> <div style="position: absolute; left: 60%; width: 20%; height: 100%; background-color: white;"></div> </div>	Counts/API
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Gamma Constants MCG-D.K 482

Last Edited on 23-SEP-2017,22:58

Gamma Calibrator Number	GRC.C.072	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.14	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	2.55	%

SP Calibration MCG-D.K 482

Field Calibration on 13-SEP-2017,14:59

	Measured	Calibrated (mV)
Reference 1	99.2	99.4
Reference 2	-98.4	-98.5

High Resolution Temperature Calibration MCG-D.K 482

Field Calibration on 03-AUG-2017 02:21

	Measured	Calibrated(Deg F)
Lower	33.00	33.00
Upper	210.00	210.00

High Resolution Temperature Constants MCG-D.K 482

Last Edited on 03-AUG-2017 02:21

Pre-filter Length	11
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Neutron Calibration MDN-B.J 426

Base Calibration on 23-AUG-2017 17:34

Field Check on 23-SEP-2017 22:00

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3203	99	3714	110
Ratio	32.419		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	1352	1933
Ratio	0.700	

Field Check

	Calibrated (cps)	
	1272	1096

Ratio

0.687

Neutron Calibration Tolerances MDN-B.J 426

Ratio	32.419	<div><div></div><div></div><div></div><div></div><div></div></div>
Base Check	0.700	<div><div></div><div></div><div></div><div></div><div></div></div>
Field Check	0.687	<div><div></div><div></div><div></div><div></div><div></div></div>

Neutron Constants MDN-B.J 426

Last Edited on 23-SEP-2017,21:55

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	

Caliper Calibration MVC-A.A 141

Base Calibration on 16-SEP-2017 04:32

Field Calibration on 23-SEP-2017 22:24

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	9071	3.99
2	15853	5.96
3	22815	7.96
4	29441	9.85
5	36696	11.88
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	7.99	7.96

High Resolution Temperature Calibration MAI-B.J 363

Field Calibration on 01-AUG-2017 12:21

	Measured	Calibrated(Deg F)
Lower	33.00	33.00
Upper	210.00	210.00

High Resolution Temperature Constants MAI-B.J 363

Last Edited on 01-AUG-2017 12:20

Pre-filter Length	11
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Induction Calibration MAI-B.J 363

Factory Loop Calibration 07-SEP-2017 12:41

Field Check on 23-SEP-2017 22:27

Factory Loop Calibration

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

Array	Measured Signal (unitless)		Reference Conductivity (mmho/m)		Calibration	
	Low	High	Low	High	Gain	Offset
1 (near)	17.8	467.2	9.3	966.2	2.1	-28.6
2	6.3	374.8	7.6	821.4	2.2	-6.3
3	3.8	260.7	5.2	566.0	2.2	-3.0
4 (far)	2.0	132.4	2.6	279.2	2.1	-1.7
Array Temperature	69.4		Deg F			

Tool Checks

Factory Reference (mmho/m)			Before Survey (mmho/m)		
Array	Low	High	Low	High	
1 (near)	11.1	3889.7	11.0	3886.8	
2	30.2	3597.4	30.0	3597.8	
3	27.8	3036.9	27.6	3038.2	
4 (far)	19.4	2089.4	19.4	2090.2	
Array Temperature		112.3		49.4	Deg F

Induction Check Tolerances MAI-B.J 363					
Low Array 1	11.0	<div><div>9.611.112.6</div></div>	mmho/m High Array 1	3886.8	<div><div>3886.23889.73891.2</div></div> mmho/m
Low Array 2	30.0	<div><div>28.730.231.7</div></div>	mmho/m High Array 2	3597.8	<div><div>3595.93597.43598.9</div></div> mmho/m
Low Array 3	27.6	<div><div>26.327.829.3</div></div>	mmho/m High Array 3	3038.2	<div><div>3035.43036.93038.4</div></div> mmho/m
Low Array 4	19.4	<div><div>17.919.420.9</div></div>	mmho/m High Array 4	2090.2	<div><div>2087.92089.42090.9</div></div> mmho/m

Induction Constants MAI-B.J 363			Last Edited on 23-SEP-2017,22:25	
Induction Model		RtAP-NC		
Borehole Correction Constants				
Tool Centred		No		
Hole Size Source		Density Caliper		
Hole Size Constant Value		2.500	inches	
Stand-off Type		Pineapple		
Stand-off		0.49	inches	
Number of Fins on Stand-off		5.0000		
Stand-off Fin Angle		72.00	degrees	
Stand-off Fin Width		1.3878	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		

Density Calibration

Base Calibration

	Measured	Calibrated (sdu)
	Near	Far
Background	1089	1383
Reference 1	51858	25417
Reference 2	20829	2512

Field Check at Base

1089.0 1383.4

Field Check

1085.0 1388.4

PE Calibration

Base Calibration

	Measured	Calibrated
	WH	Ratio
Background	201	982
Reference 1	21549	51686
Reference 2	5985	20715

Field Check at Base

201.3 982.1

Field Check

202.4 976.5

Photo Density Calibration Tolerances MPD-C.A 310

Near Density Ratio	2.57	-5%	2.52	+5%
PE Calibration	0.117	0.089	0.110	0.131

Far Density Ratio	21.29	-5%	21.00	+5%
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Near Den. Field Check	1085.0	-3%	1089.0	+3%
PE WS Field Check	202.4	-6%	201.3	+6%

Far Den. Field Check	1388.4	-3%	1383.4	+3%
PE WH Field Check	976.5	-6%	982.1	+6%

Density Constants MPD-C.A 310

Last Edited on 23-SEP-2017,22:57

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	1.14 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)
2.68	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.A 310

Base Calibration on 21-AUG-2017 16:44
Field Calibration on 23-SEP-2017 22:07

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14927	3.99
2	23616	5.96
3	32256	7.96
4	40513	9.85
5	49725	11.88

Field Calibration

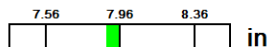
Measured Caliper (in)
7.88

Actual Caliper (in)
7.96

Caliper Calibration Tolerances MPD-C.A 310

Long Arm Field Cal.

7.88



in

DOWNHOLE EQUIPMENT

E:\LOGS\EXTRACTION\LEONARD 6N\RUN1\8367-193388399\LEONARD 6N_REPEAT PASS.dta

Cablehead, 11 pin

CBH-CA 121 LG: 2.40 ft WT: 24.3 lb OD: 2.240 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 723 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

Compact Comms Gamma

MCG-D.K 482 LG: 8.70 ft WT: 63.9 lb OD: 2.240 in

Compact Neutron

MDN-B.J 426 LG: 5.04 ft WT: 50.7 lb OD: 2.240 in

Compact Vee Arm Caliper

MVC-A.A 141 LG: 8.06 ft WT: 61.7 lb OD: 2.244 in

Compact Density/Caliper

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

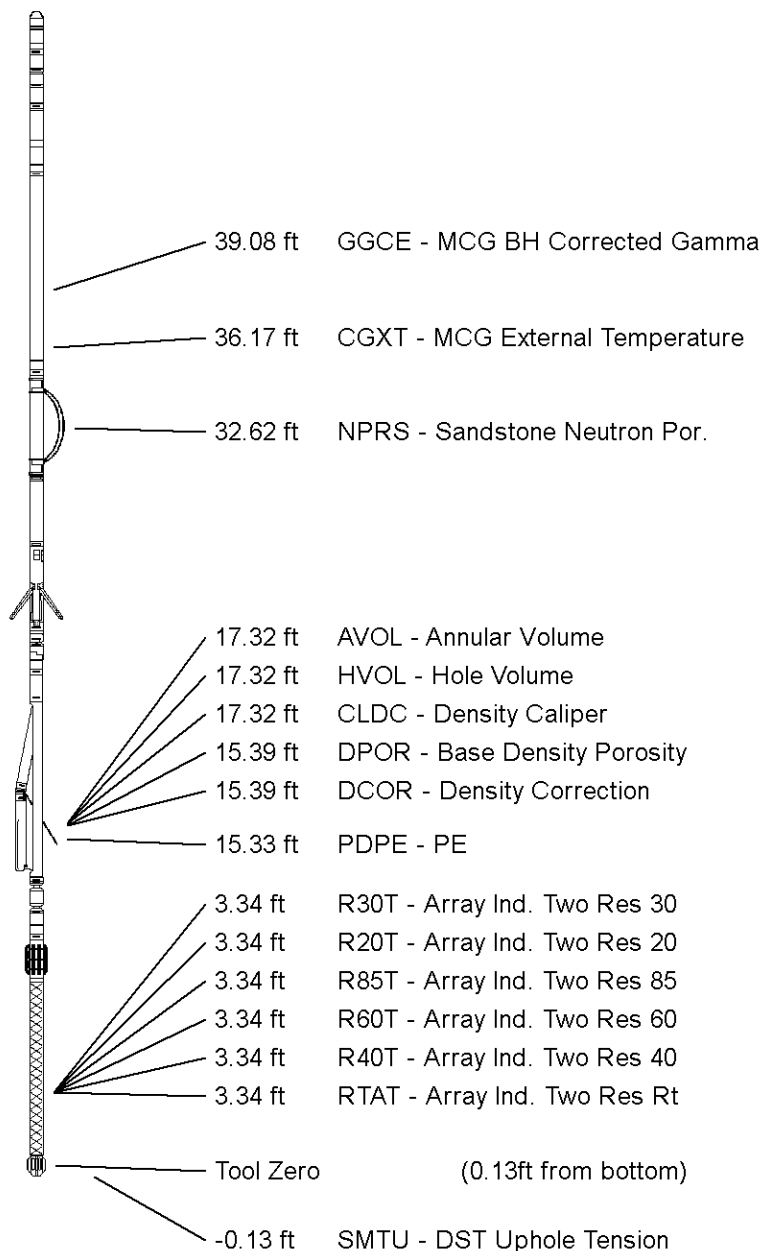
Compact Knuckle Joint

SKJ-E.B 730 LG: 2.17 ft WT: 24.3 lb OD: 2.240 in

Compact Induction

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

Total Length: 50.58 ft Weight: 399.0 lb



All measurements relative to tool zero.

COMPANY

EXTRACTION OIL & GAS

WELL

LEONARD 6N

FIELD

WATTENBURG

PROVINCE/COUNTY

WELD

COUNTRY/STATE

U.S.A. / COLORADO

Elevation Kelly Bushing	5032	feet	First Reading	6845.00	feet
Elevation Drill Floor	5032	feet	Depth Driller	12096.00	feet
Elevation Ground Level	5004	feet	Depth Logger	6845.00	feet



Weatherford[®]

COMPACT TRIPLE COMBO
QUICKLOOK LOG