



**Weatherford**

**CML MESSENGER SHUTTLE  
ARRAY INDUCTION  
ELECTRIC LOG**

COMPANY **WHITTING OIL AND GAS CORPORATION**  
WELL **RAZOR 26-2306B**  
FIELD **REDTAIL**  
PROVINCE/COUNTY **WELD**  
COUNTRY/STATE **U.S.A. / COLORADO**  
LOCATION **SHL: 2373' FSL & 1948' FWL**

SEC **TWP** **RGE** **Other Services**  
**26** **10N** **58W** **SGS**  
API Number **05-123-37878** **CMI**  
Permit Number **MDN, MPD**

Permanent Datum G.L., Elevation 4737 feet  
Log Measured From **KB** Elevations: **KB** **4759.50**  
Drilling Measured From **KB** **DF** **4759.50**  
**GL** **4737.00**

Date	22-JAN-2014
Run Number	1
Service Order	3795-77499695
Depth Driller	13220.00 feet
Depth Logger	12661.00 feet
First Reading	12591.00 feet
Last Reading	6087.00 feet
Casing Driller	6088.00 feet
Casing Logger	6087.00 feet
Bit Size	6.000 inches
Hole Fluid Type	WATER BASED
Density / Viscosity	10.50 g/cc 45.00 CP
PH / Fluid Loss	9.80 19.00 ml/30Min
Sample Source	MUD PIT
Rm @ Measured Temp	1.30 @ 56.0 ohm-m
Rmf @ Measured Temp	0.98 @ 56.0 ohm-m
Rmc @ Measured Temp	1.63 @ 56.0 ohm-m
Source Rmf / Rmc	CALC CALC
Rm @ BHT	0.35 @ 216.0 ohm-m
Time Since Circulation	1 HOUR
Max Recorded Temp	216.00 deg F
Equipment / Base	18004 S.A.
Recorded By	MICHAEL RYAN
Witnessed By	PETER BUCKNAM
	RIG: FRONTIER 26

**REMARKS**

LOGGED USING 13.04.8723  
ANNULAR VOLUME CALCULATED WITH 4.5 INCH CASING.  
POROSITY CALCULATED USING SANDSTONE MATRIX (2.71 gm/cc).  
WELL WAS LOGGED WITH THE COMPACT WELL SHUTTLE SYSTEM.  
LOG INTERVALS FROM TD - CASING SHOE AS PER CUSTOMER REQUESTED  
DEPTH WAS RECORDED WITH THE WEATHERFORD PASON AQUISITION SYSTEM.  
THE DEPTH WAS CORRECTED TO THE DRILLERS STRAP.  
HARDWARE: SEE THE TOOL DIAGRAM.  
LAT: 40.808886 LON: -103.834644  
BIT DEPTH DURING DEPLOYMENT 12,490 FT  
TOOL DEPTH AFTER DEPLOYMENT 12,597 FT  
THANK YOU FOR USING "WEATHERFORD".

**BOREHOLE RECORD**

Last Edited: 22-JAN-2014 20:36

Bit Size inches	Depth From feet	Depth To feet
6.000	6088.00	13385.00

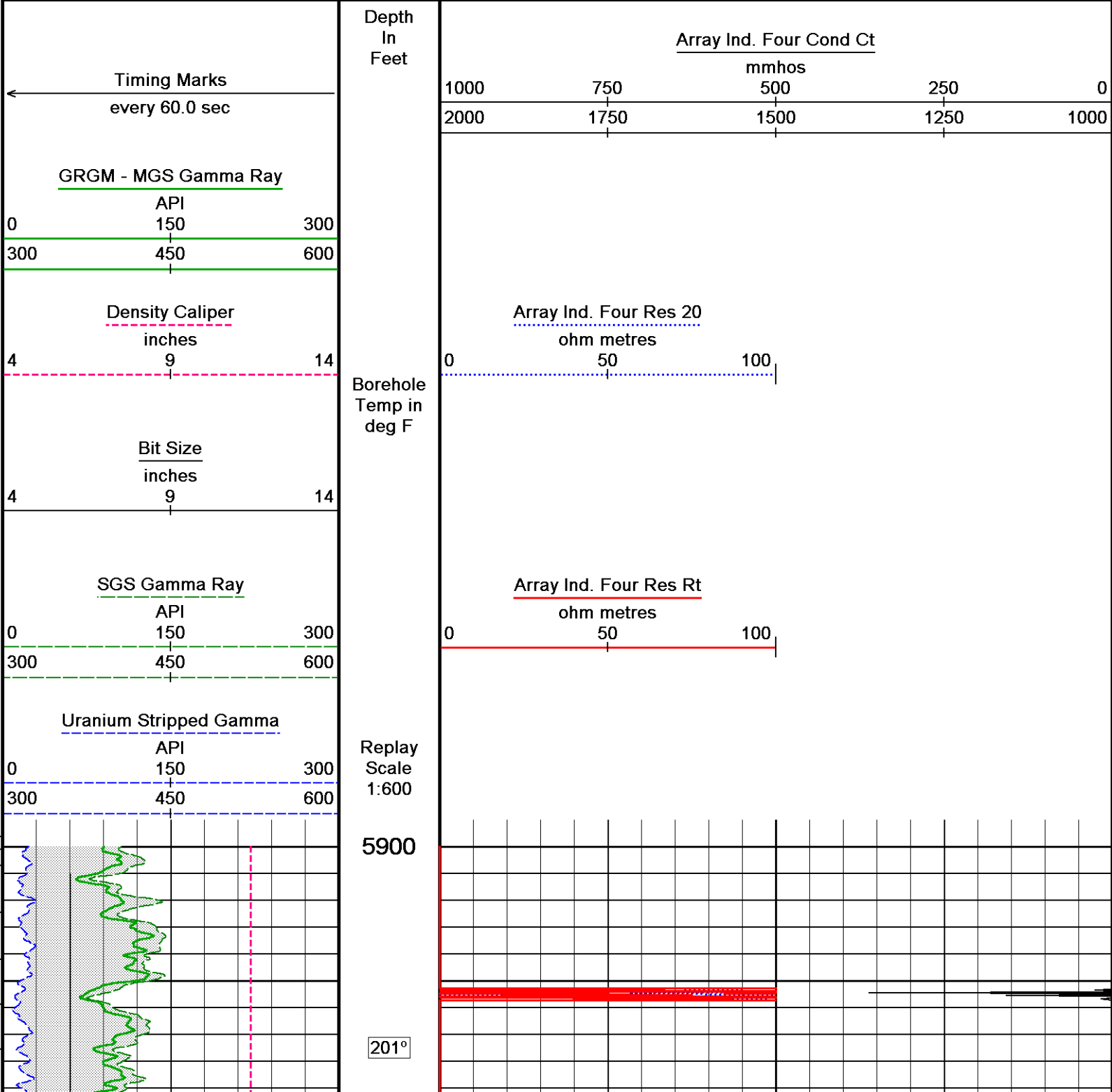
# CASING RECORD

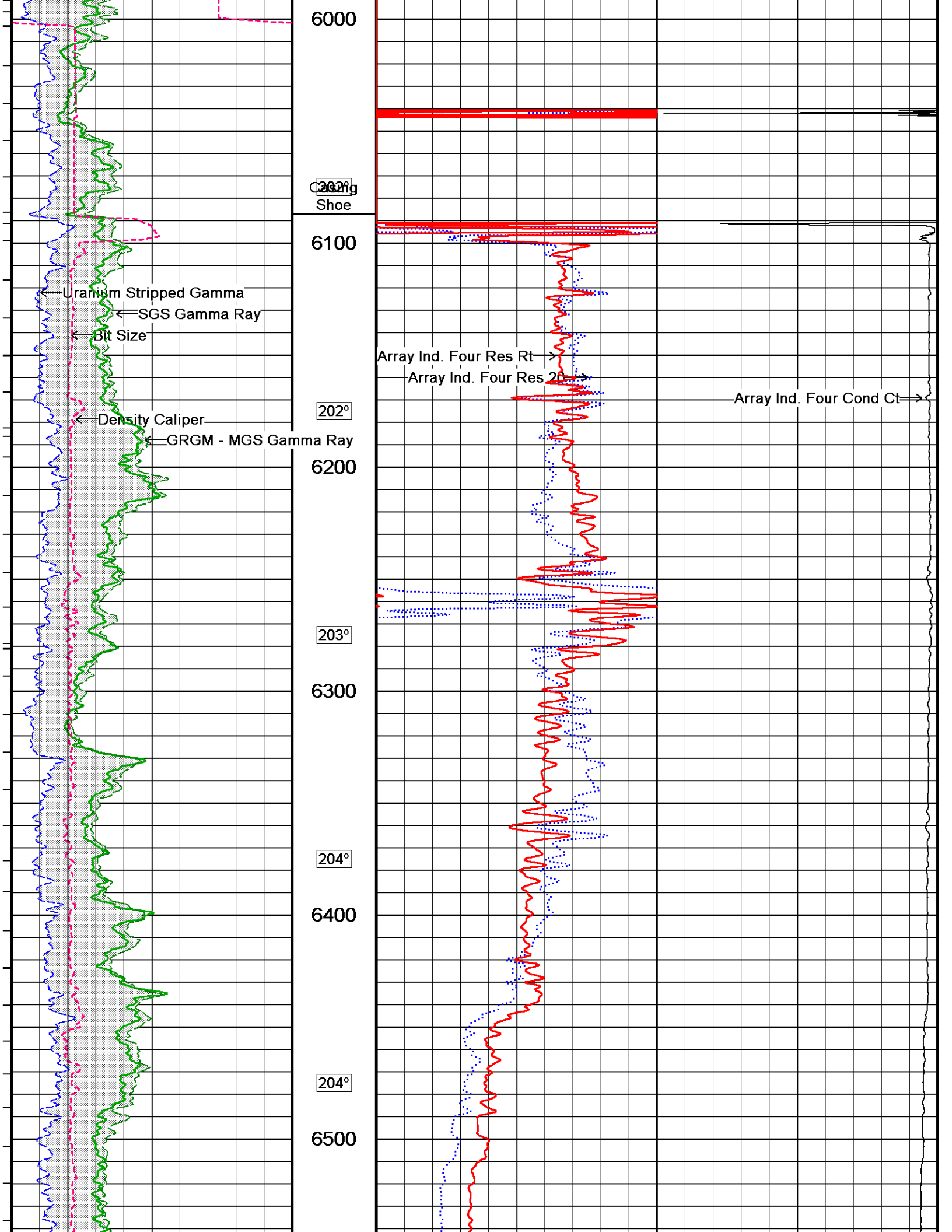
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
	7.000	0.00	6087.00	24.00

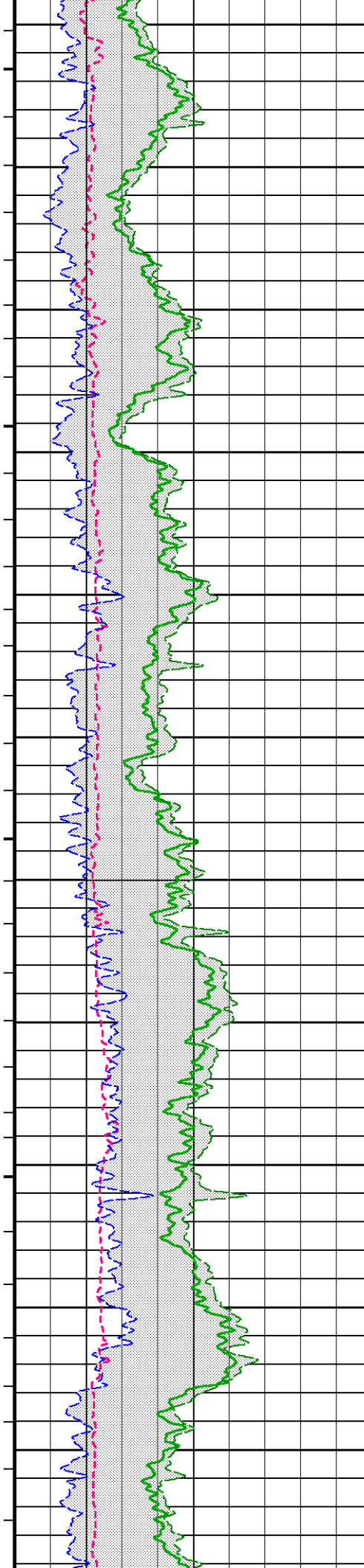
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions in our price schedule.

## DSC

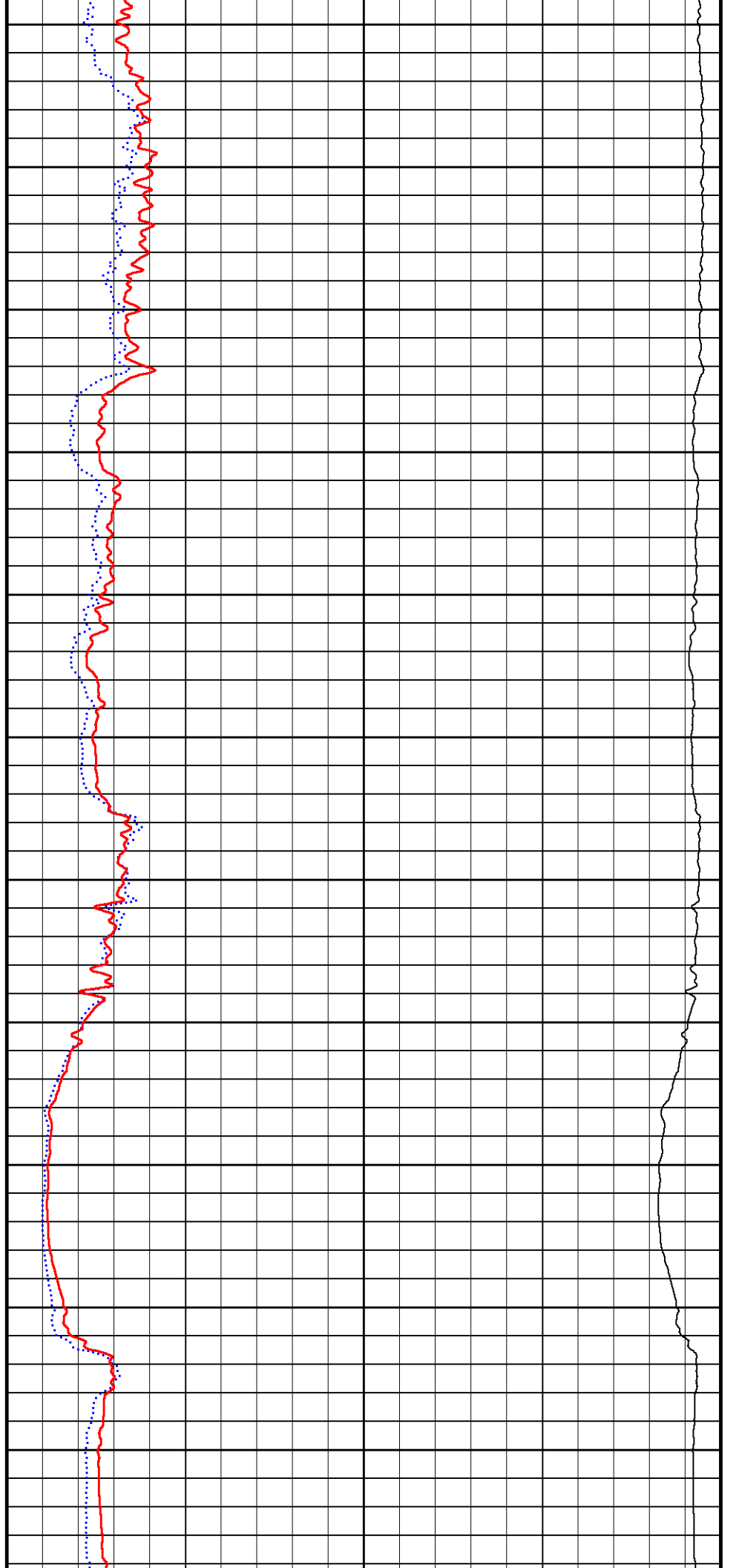
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 23-JAN-2014 16:00  
 Filename: F:\Razor 26k-2306b\cmitsgs\_008.dta Recorded on 22-JAN-2014 21:22  
 System Versions: Processed with 13.04.8723 Plotted with 13.04.8723

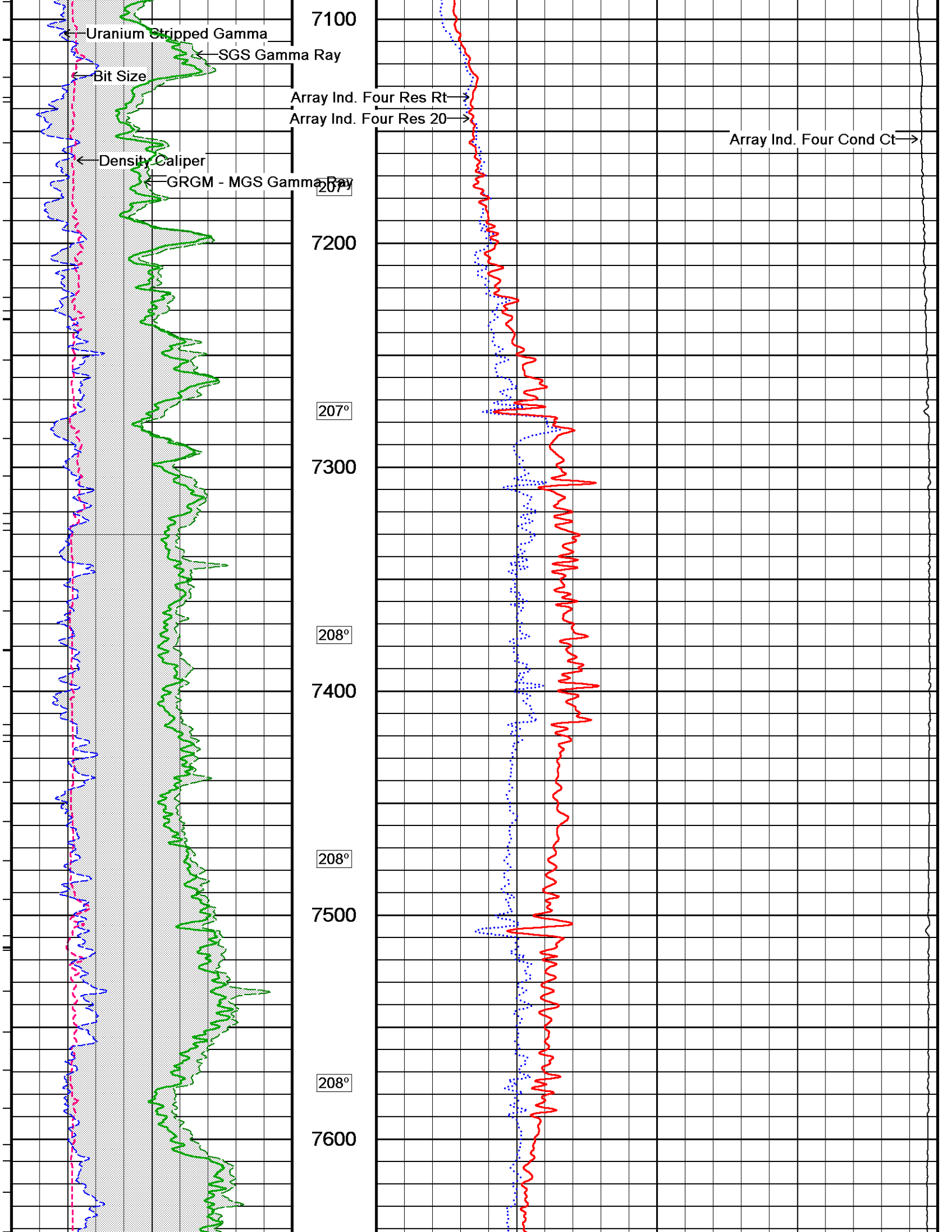


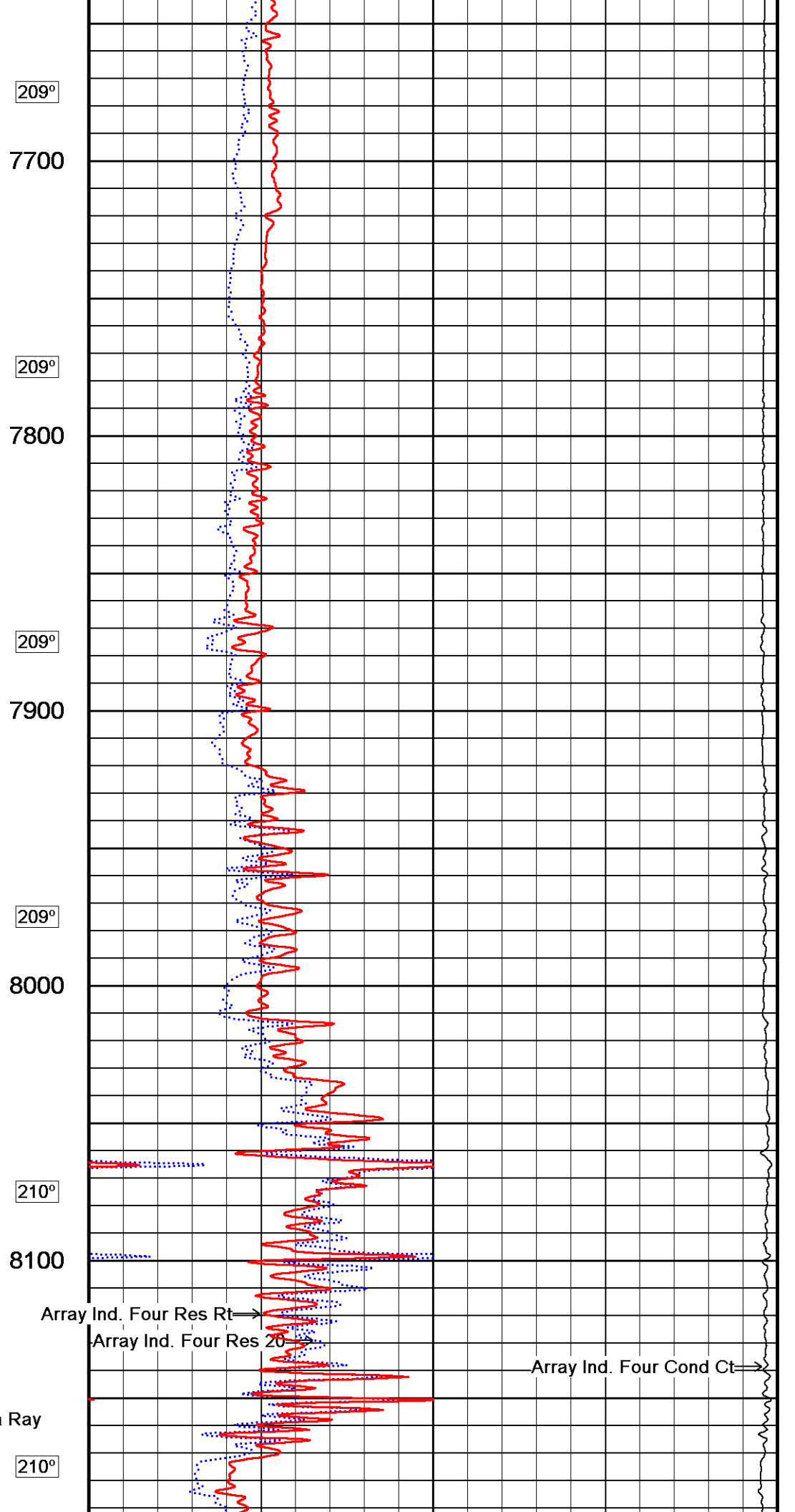
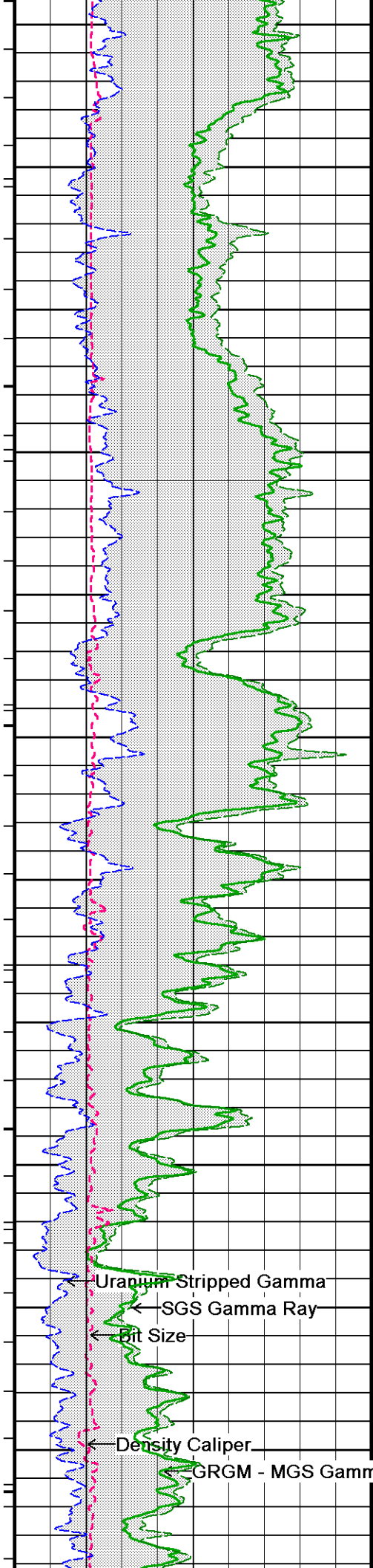




204°  
6600  
205°  
6700  
205°  
6800  
206°  
6900  
206°  
7000  
206°







Uranium Stripped Gamma

← SGS Gamma Ray

← Bit Size

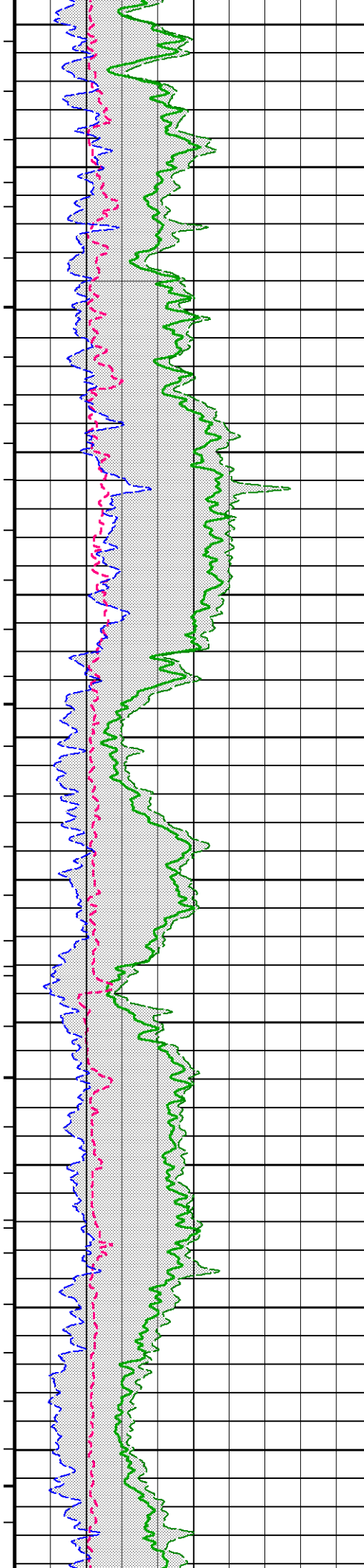
← Density Caliper

GRGM - MGS Gamma Ray

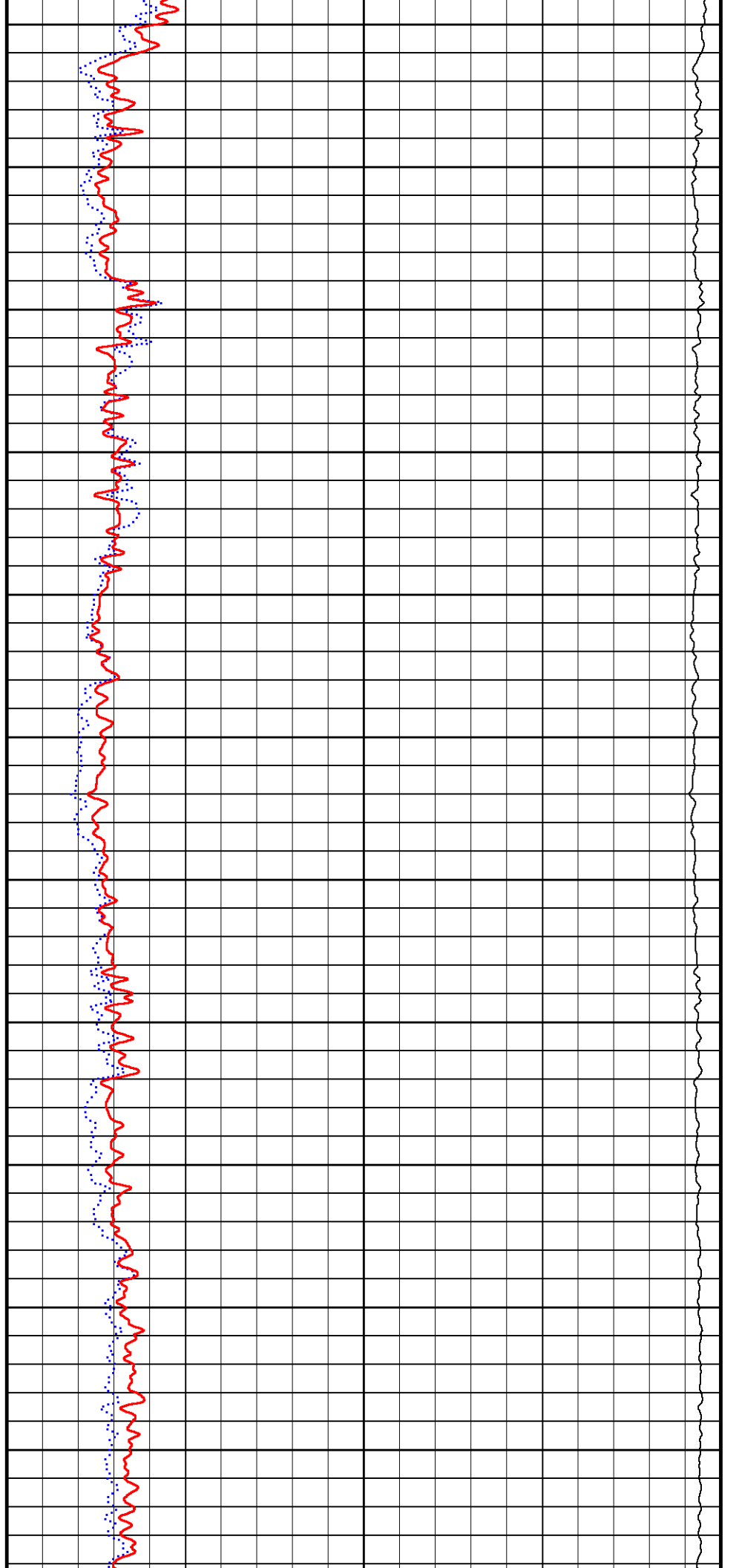
Array Ind. Four Res Rt →

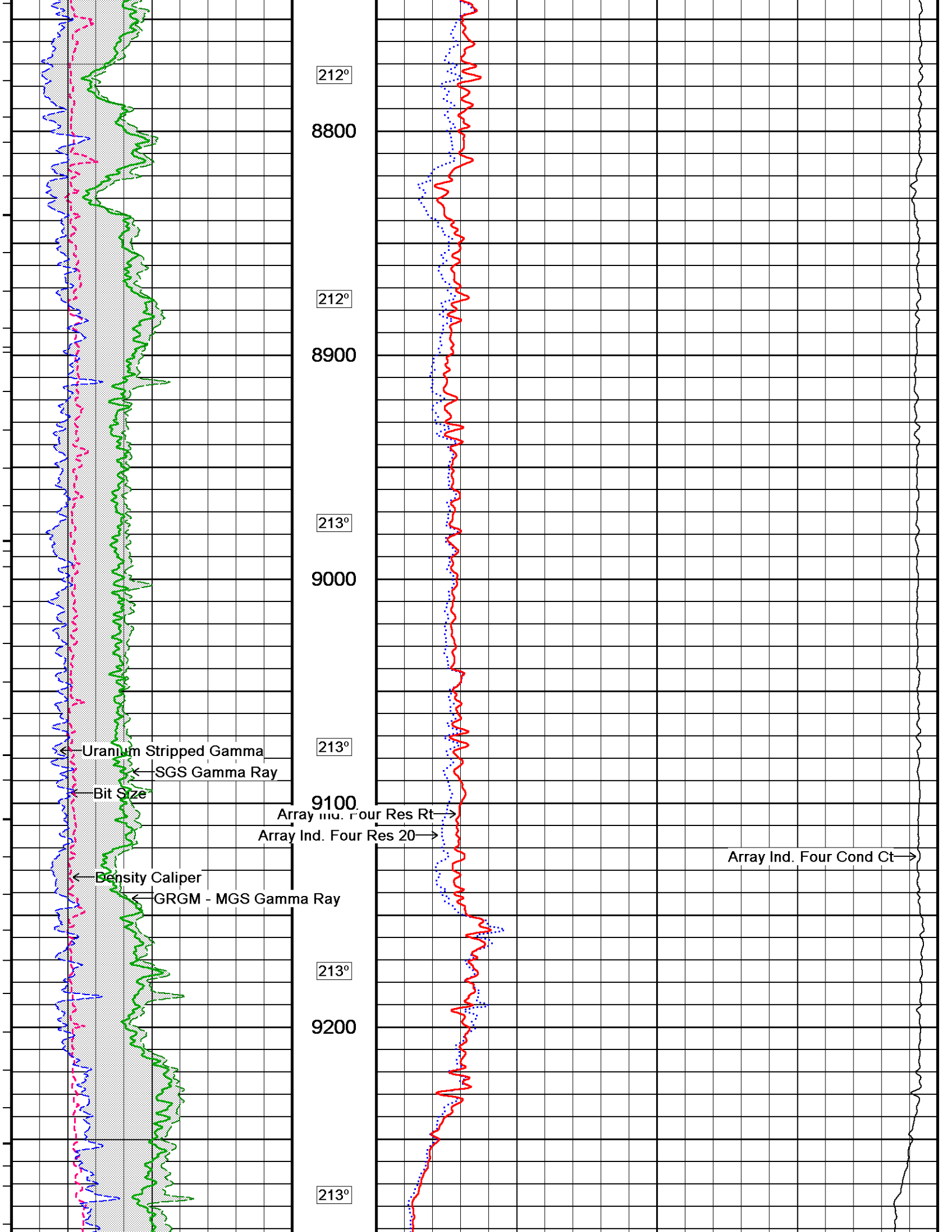
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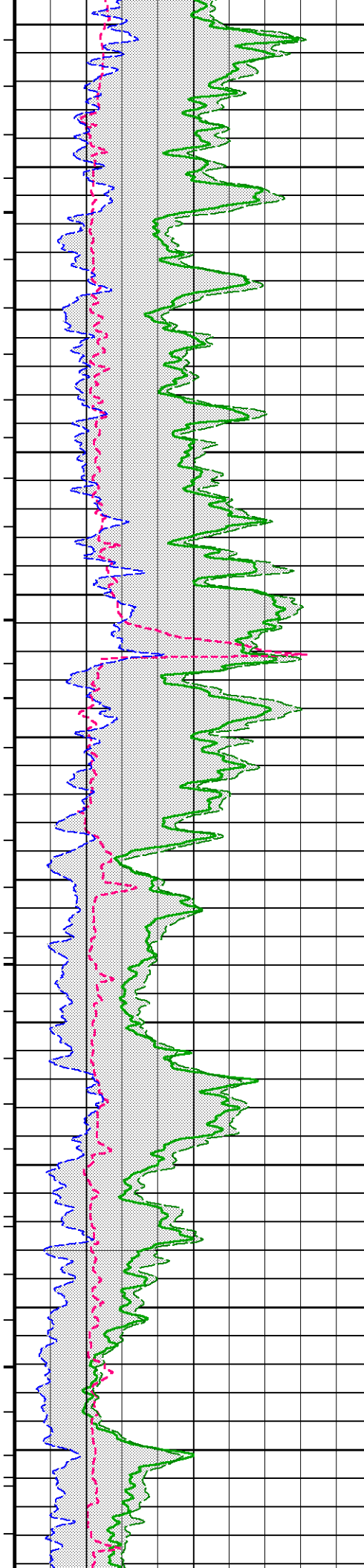
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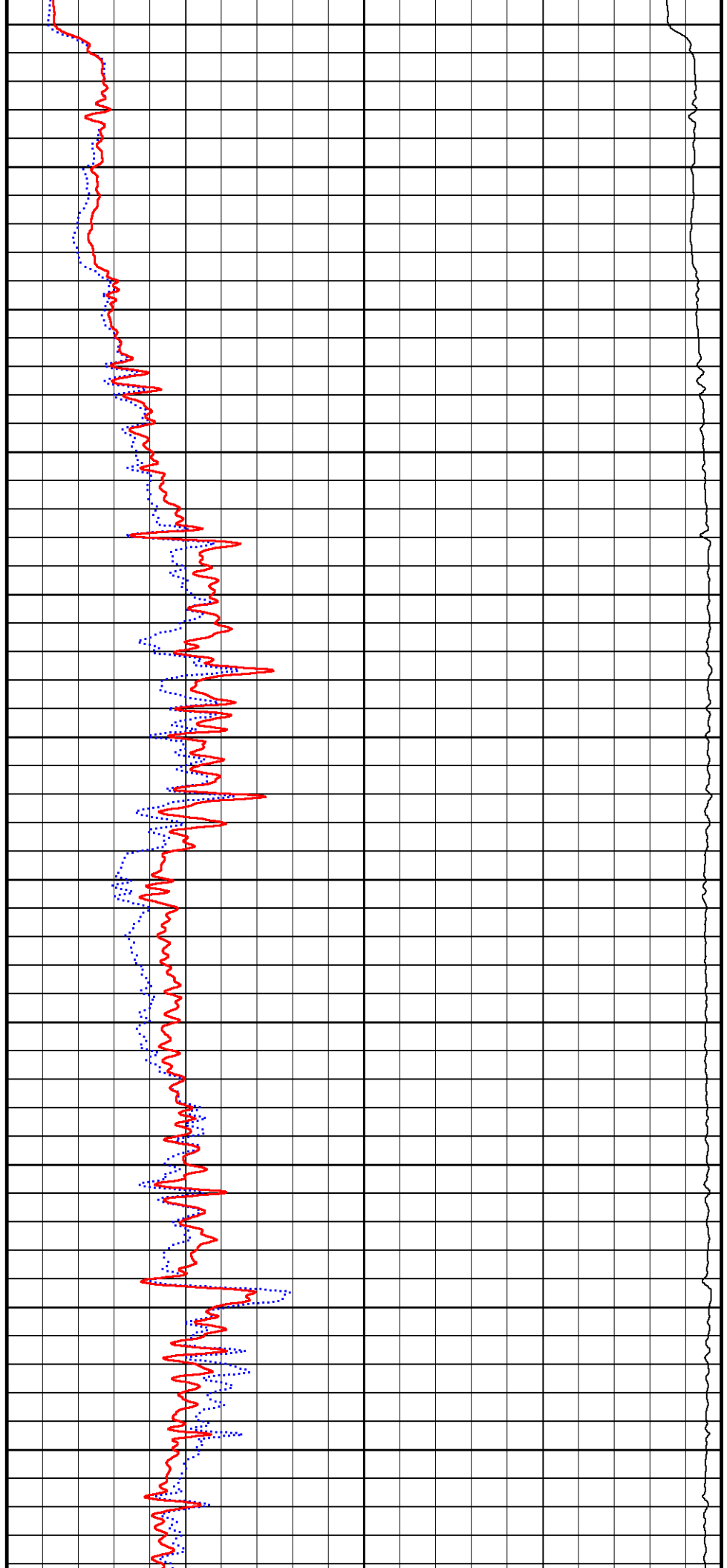
8200  
211°  
8300  
211°  
8400  
211°  
8500  
211°  
8600  
212°  
8700

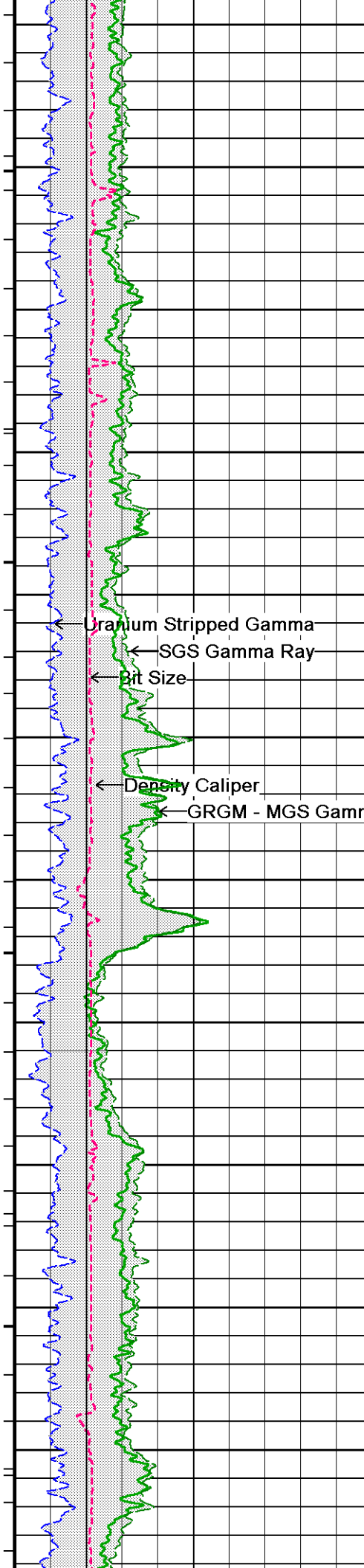






9300  
214°  
9400  
214°  
9500  
214°  
9600  
215°  
9700  
215°  
9800

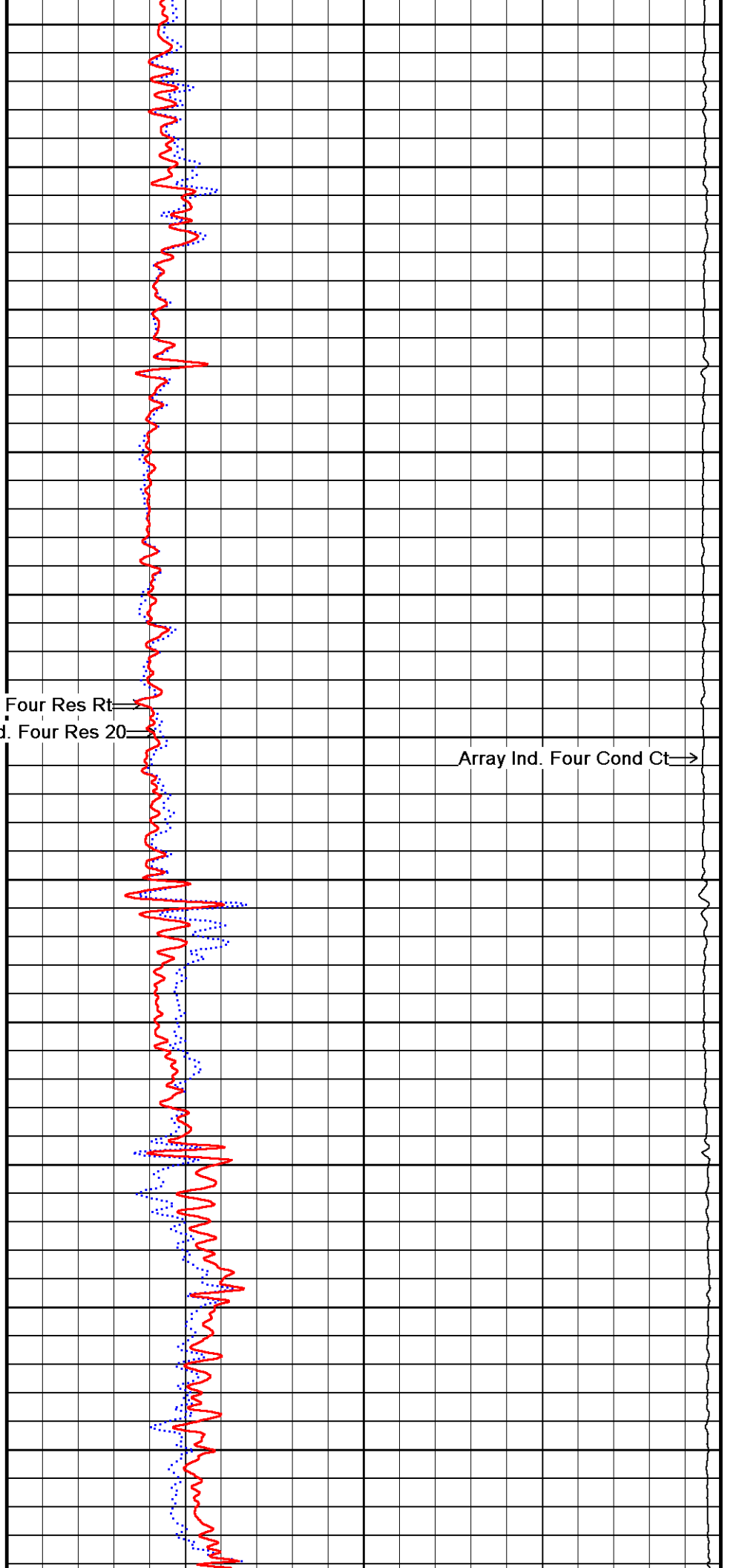


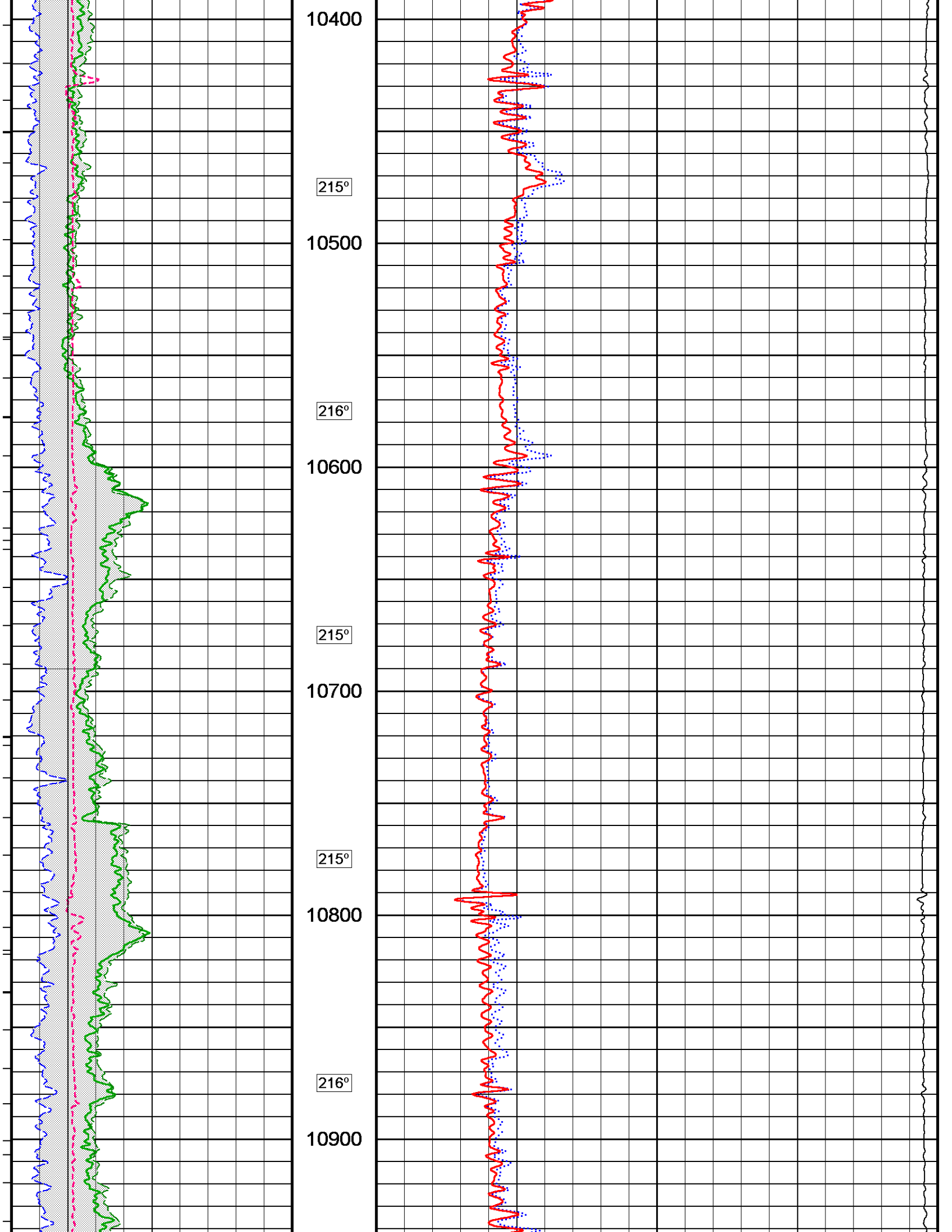


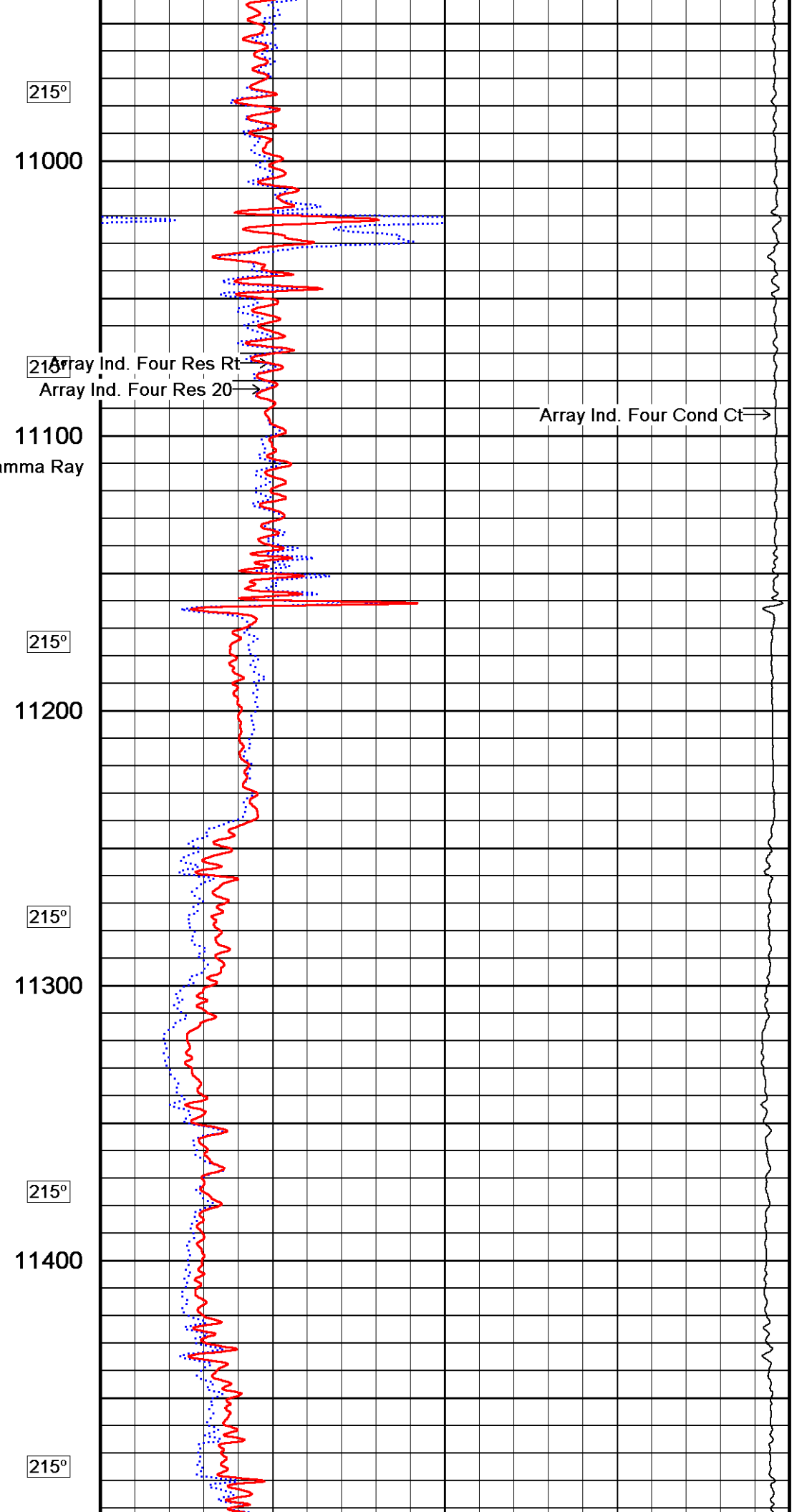
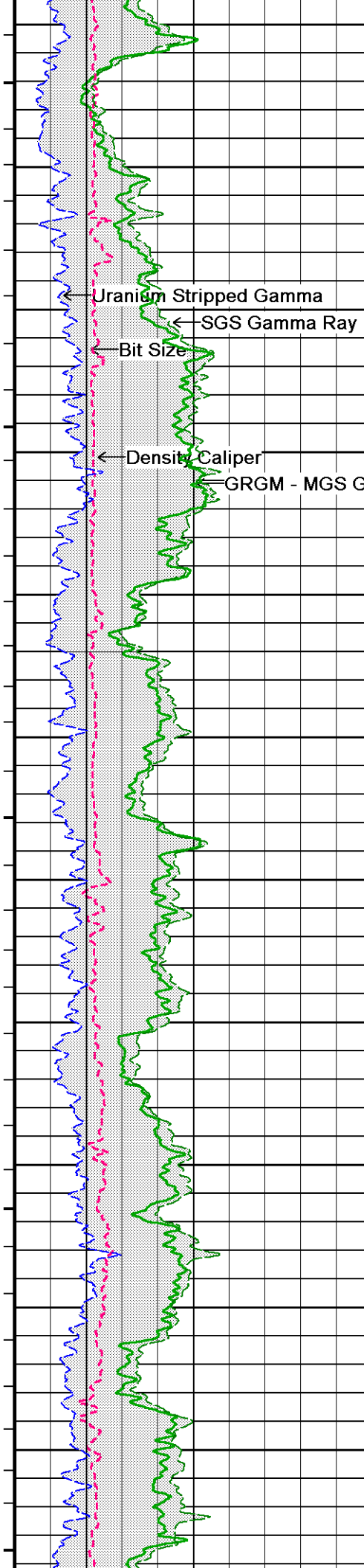
215°  
9900  
215°  
10000  
215°  
10100  
215°  
10200  
215°  
10300  
215°

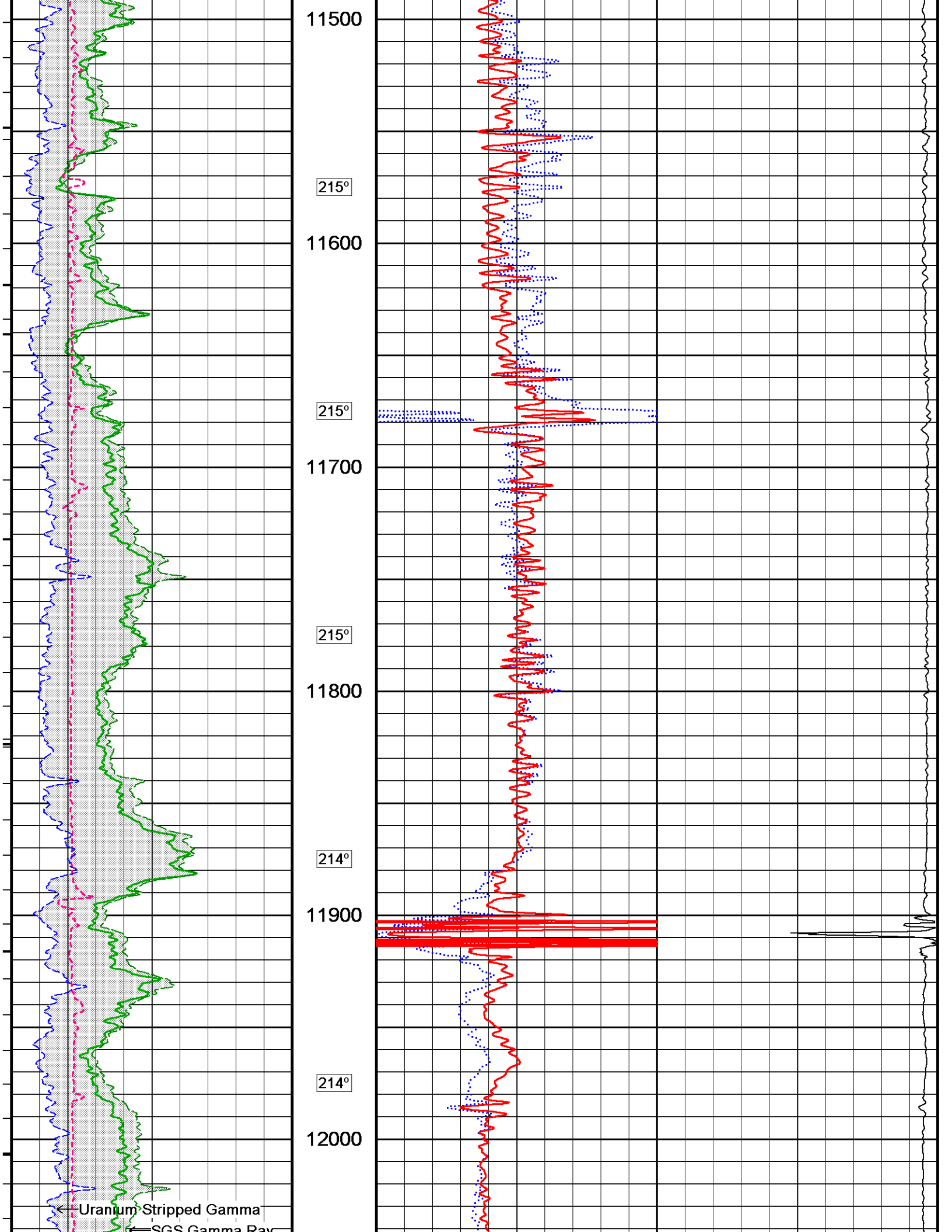
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10100  
id. Four Res 20

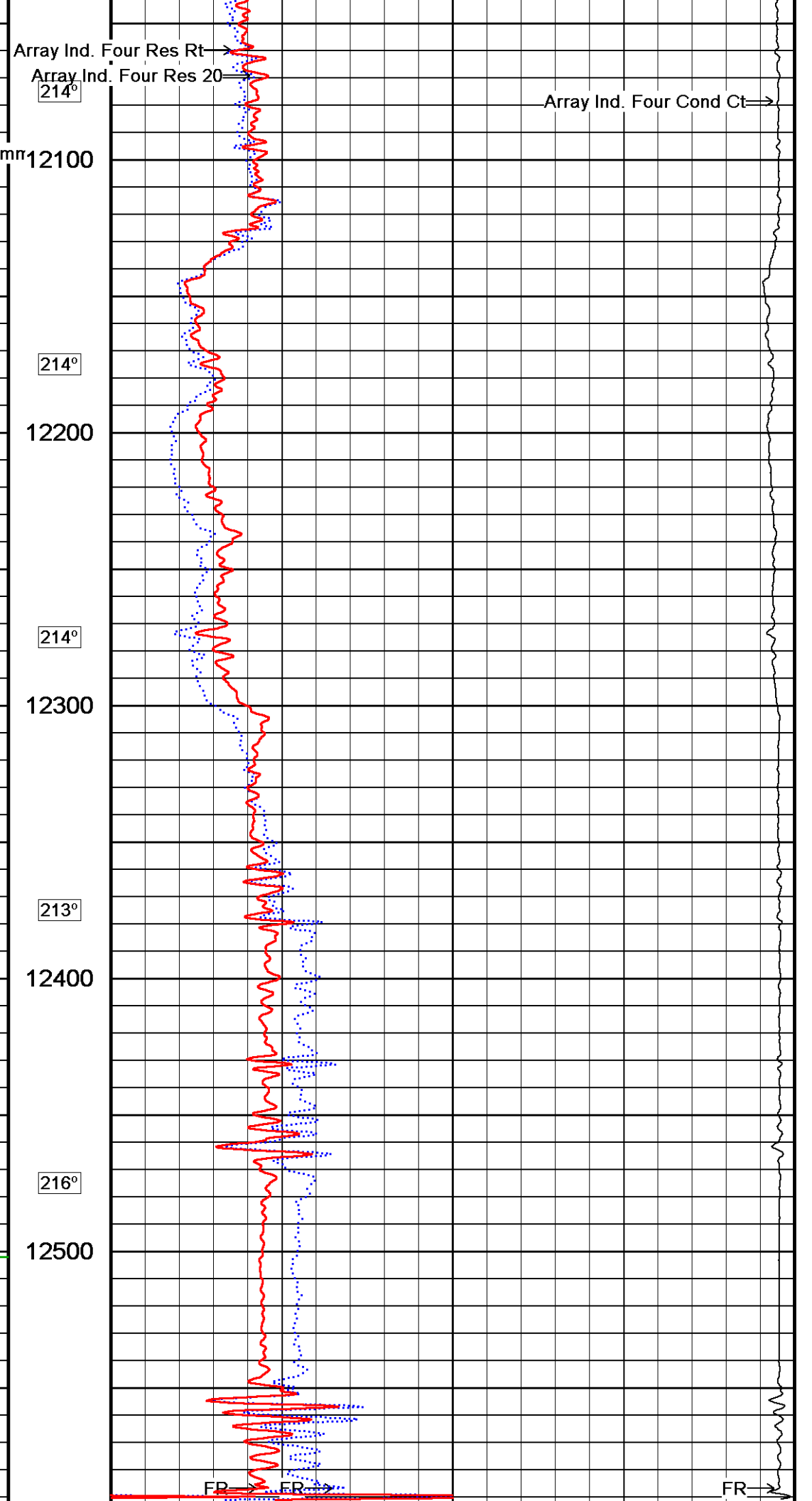
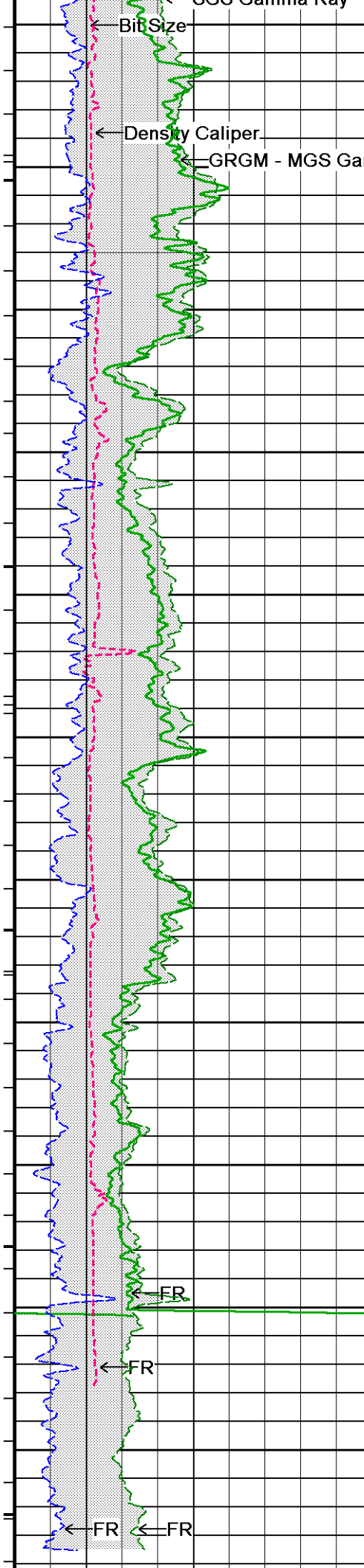
Array Ind. Four Cond Ct →









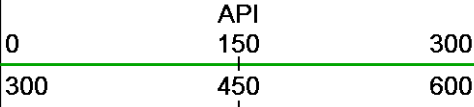


12600

12630  
Depth  
In  
Feet

Timing Marks  
every 60.0 sec

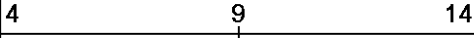
GRGM - MGS Gamma Ray



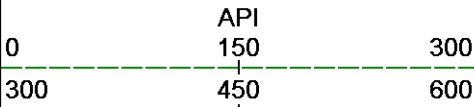
Density Caliper  
inches



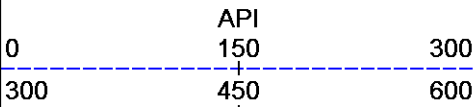
Bit Size  
inches



SGS Gamma Ray



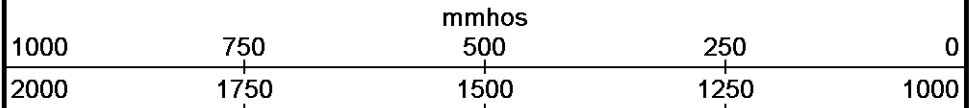
Uranium Stripped Gamma



Borehole  
Temp in  
deg F

Replay  
Scale  
1:600

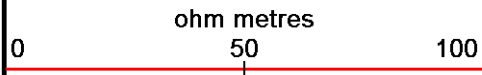
Array Ind. Four Cond Ct



Array Ind. Four Res 20  
ohm metres



Array Ind. Four Res Rt



Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 23-JAN-2014 16:00

Filename: F:\Razor 26k-2306b\cmitsgs\_008.dta

Recorded on 22-JAN-2014 21:22

System Versions: Processed with 13.04.8723 Plotted with 13.04.8723



DSC



DSC



Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 23-JAN-2014 16:00

Filename: F:\Razor 26k-2306b\cmitsgs\_008.dta

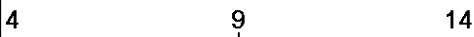
Recorded on 22-JAN-2014 21:22

System Versions: Processed with 13.04.8723 Plotted with 13.04.8723

Depth  
In  
Feet

Timing Marks  
every 60.0 sec

Density Caliper  
inches



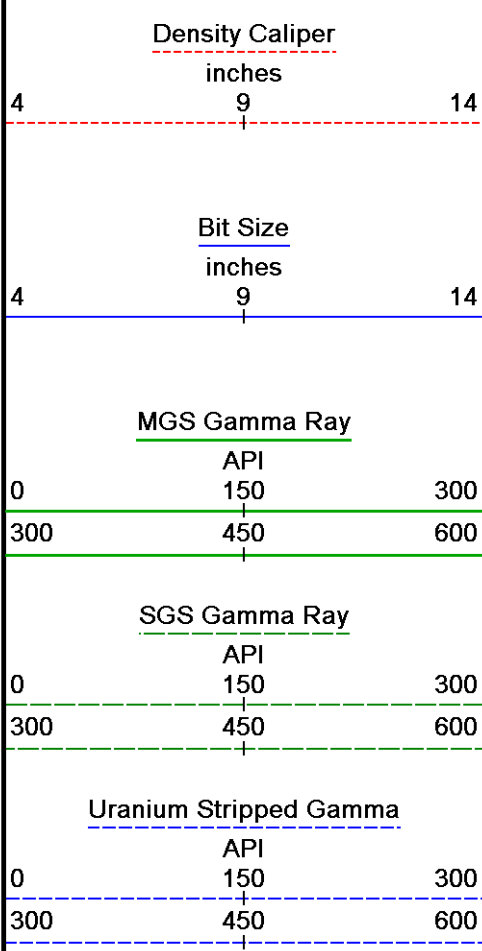
HVI

Array Ind. Four Res 20  
ohm metres



Array Ind. Four Res 30  
ohm metres





every  
10 cu ft

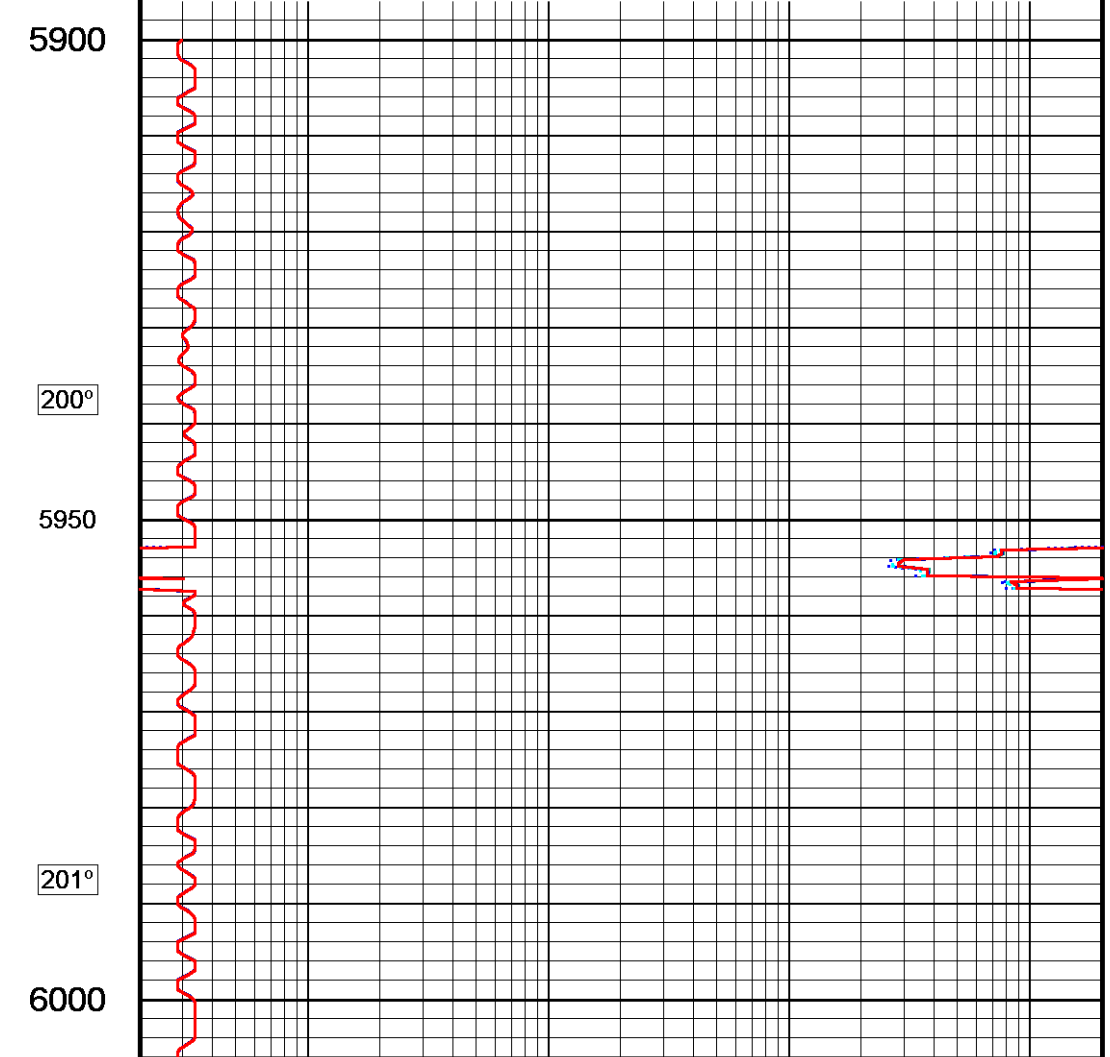
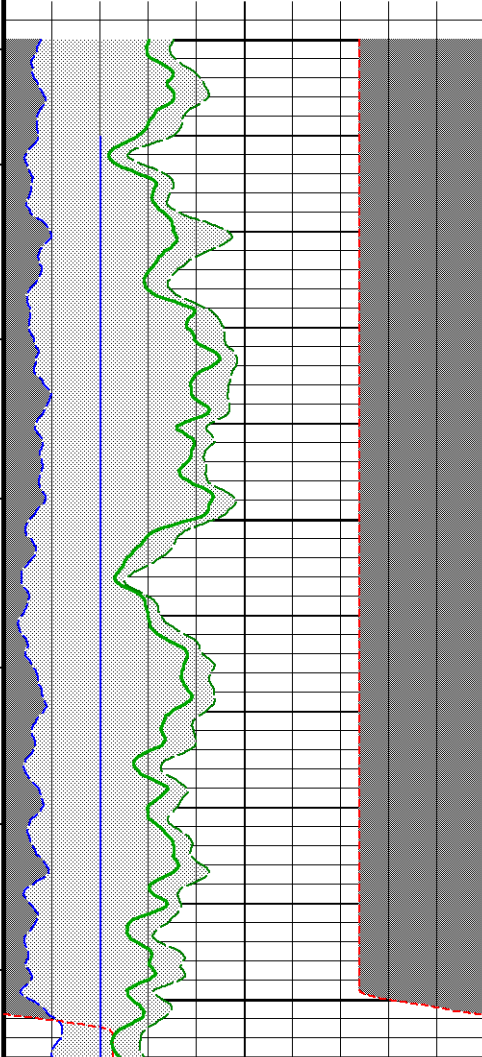
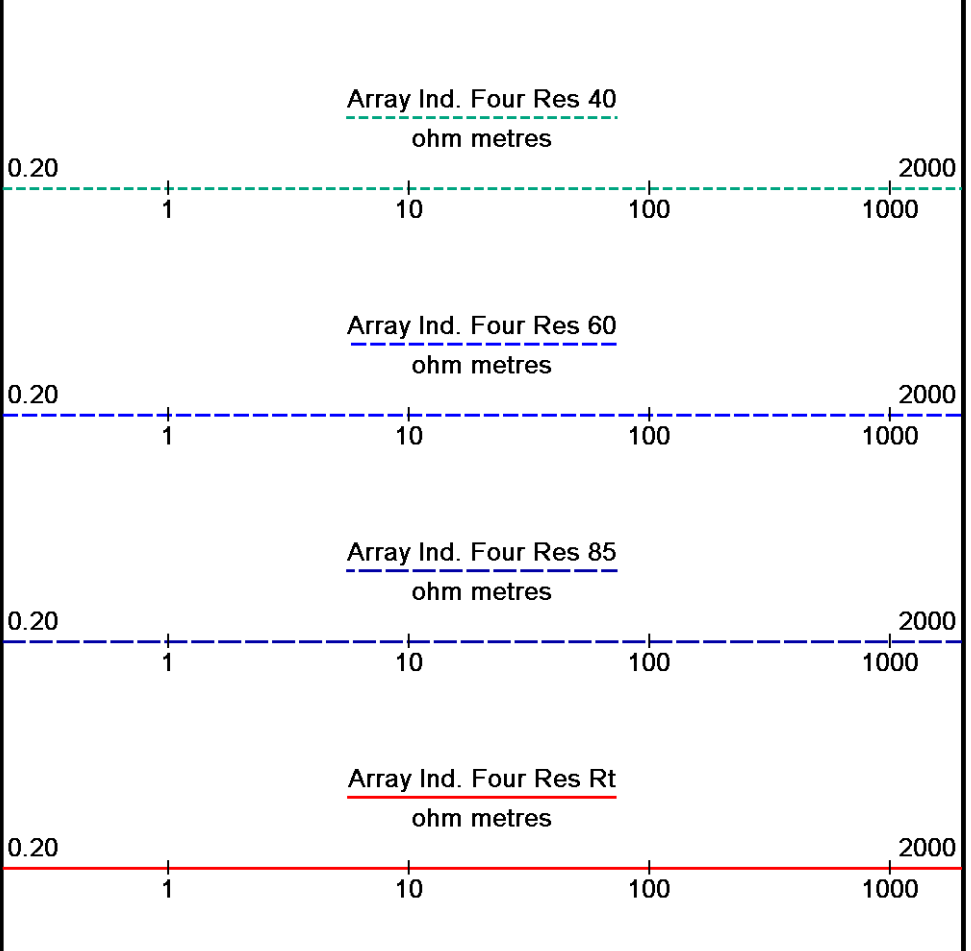
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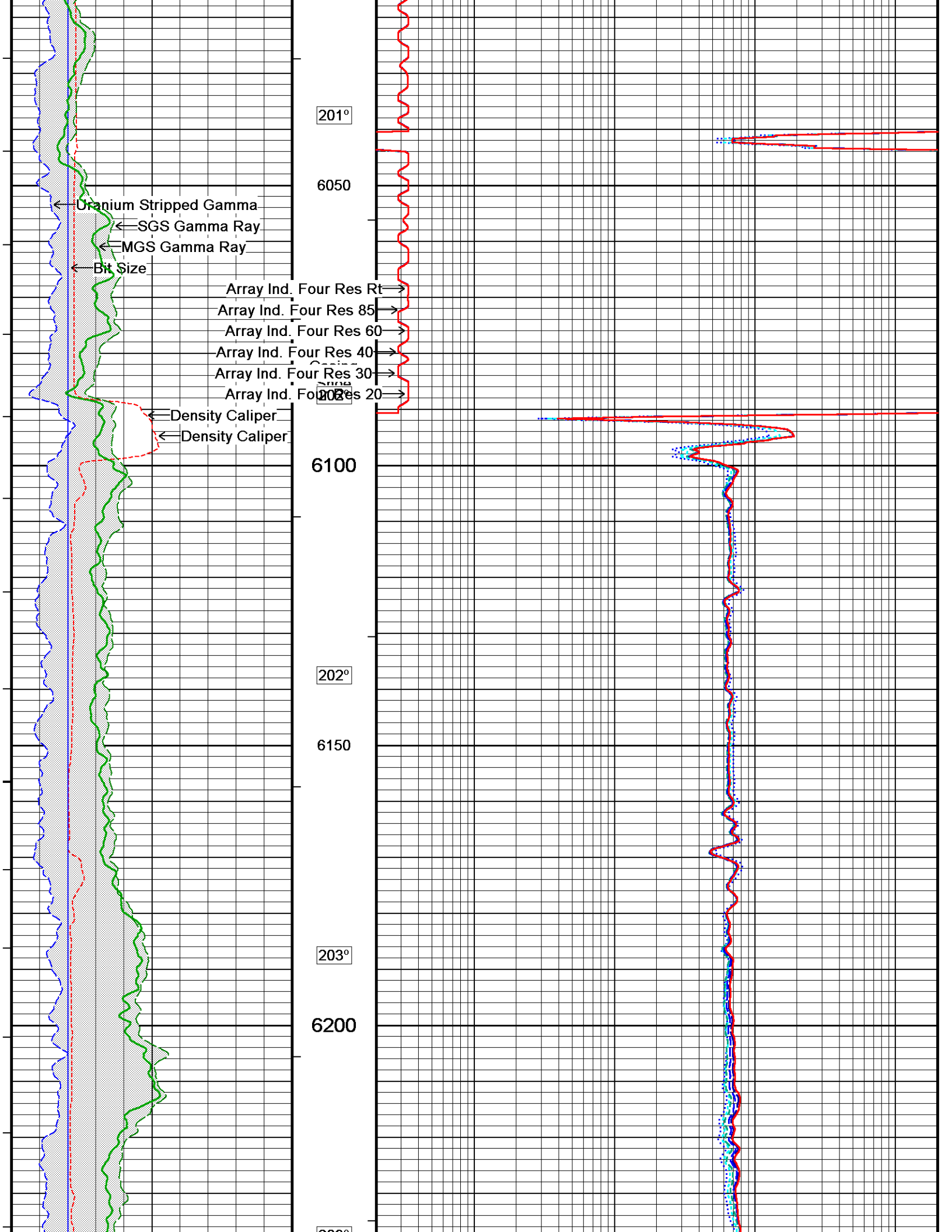
Annular  
Integral  
every  
10 cu ft

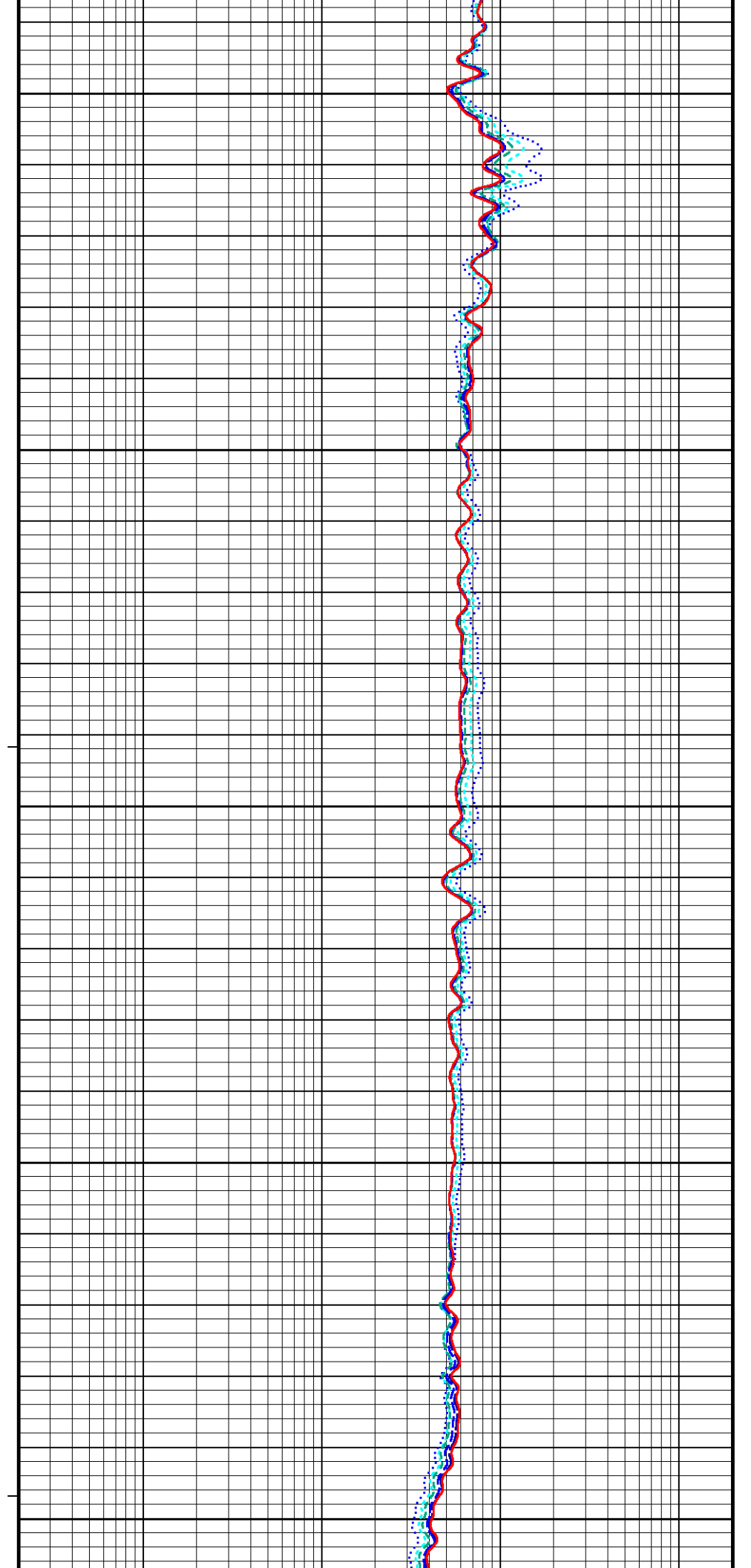
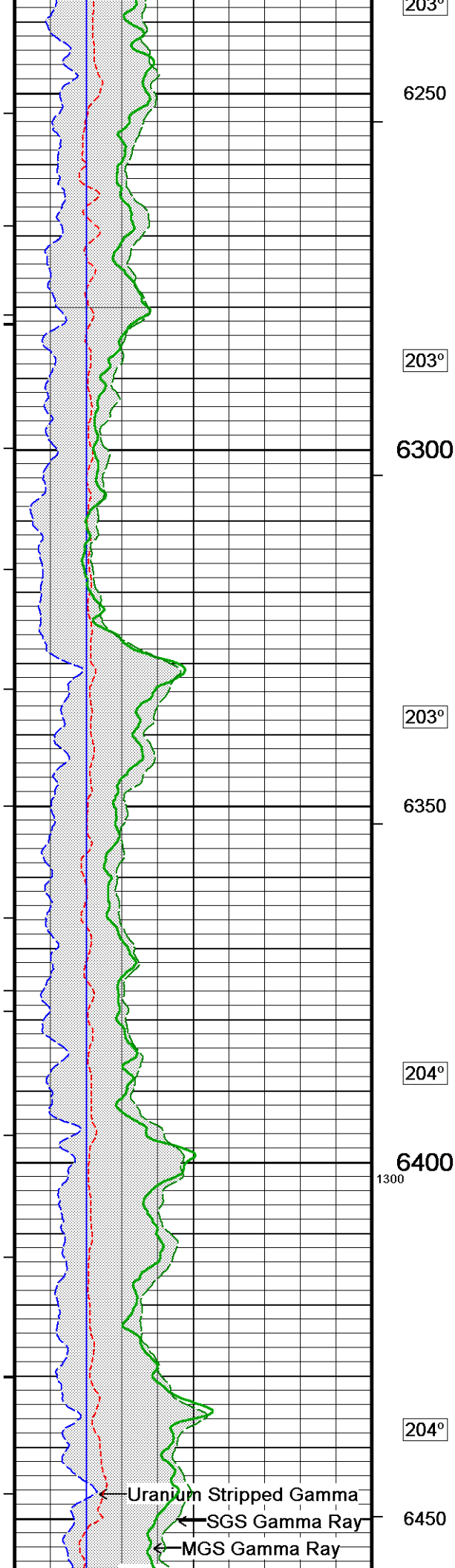
→

Borehole  
Temp in  
deg F

Replay  
Scale  
1:240

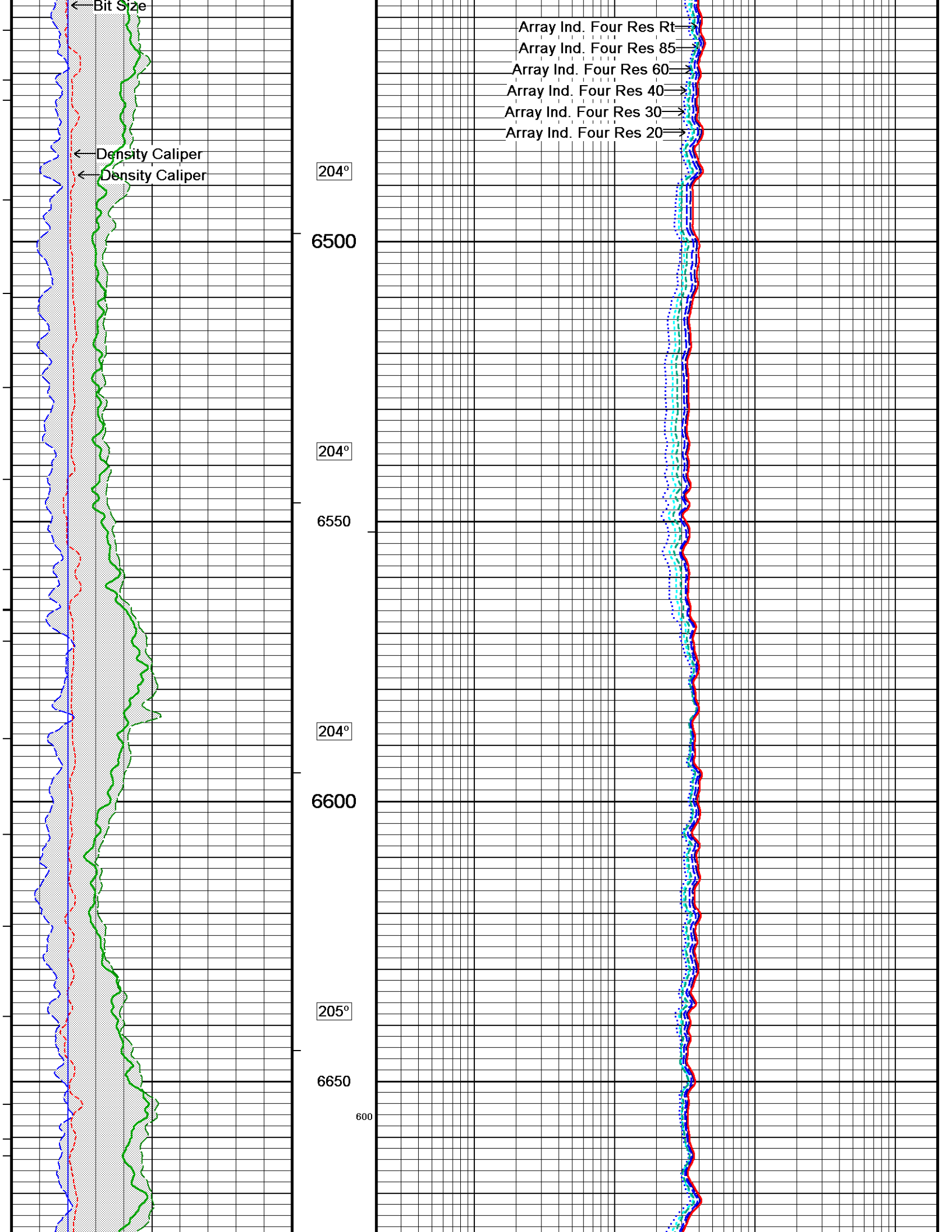


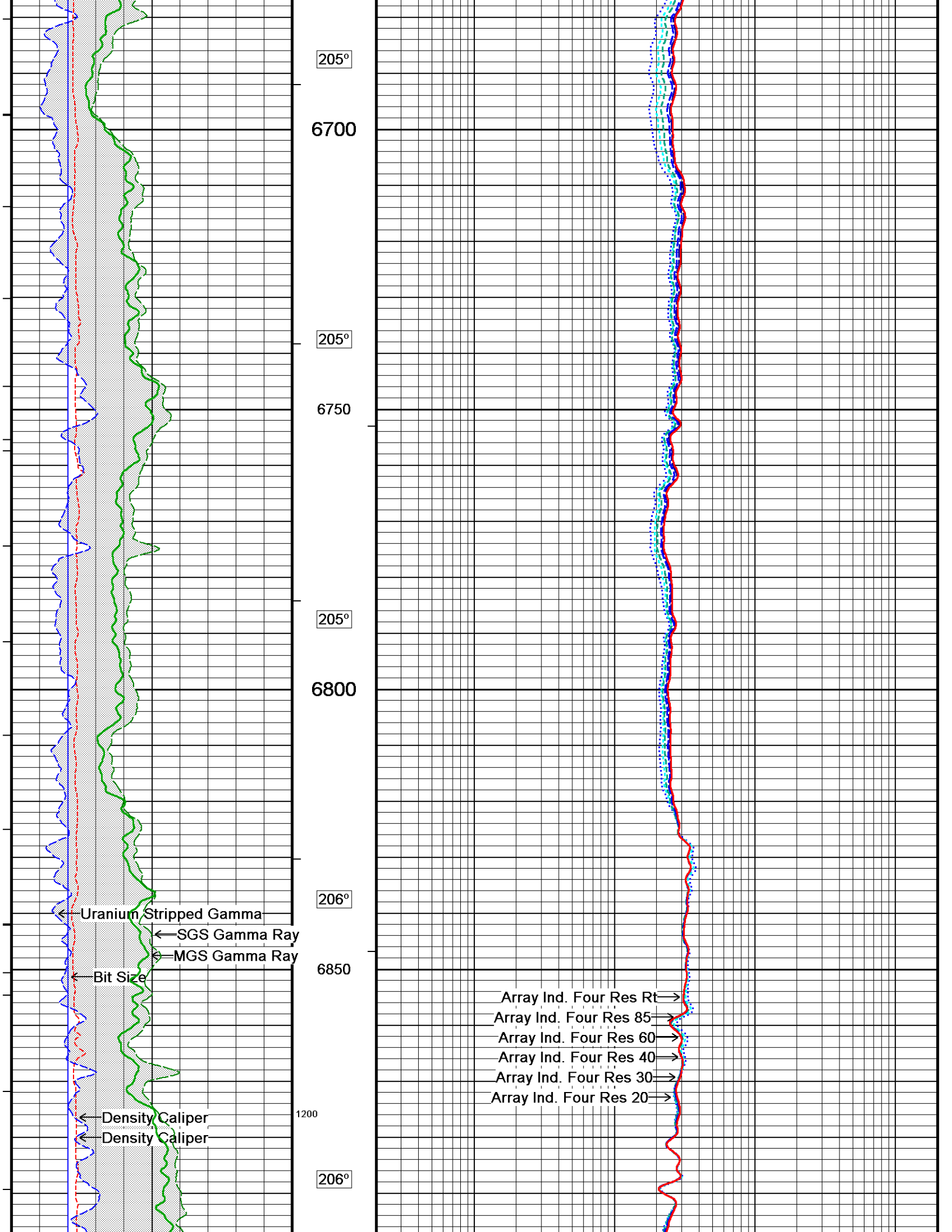


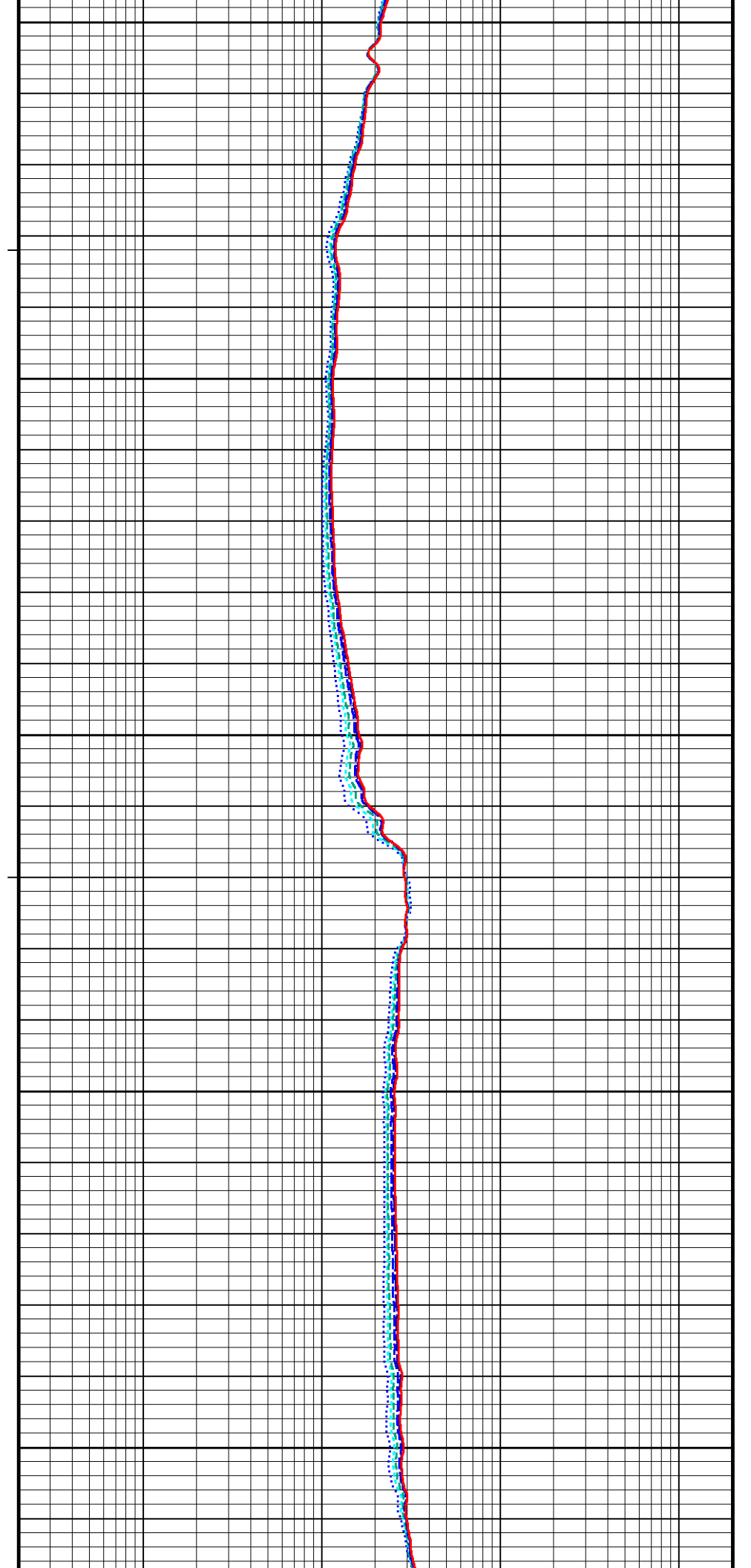
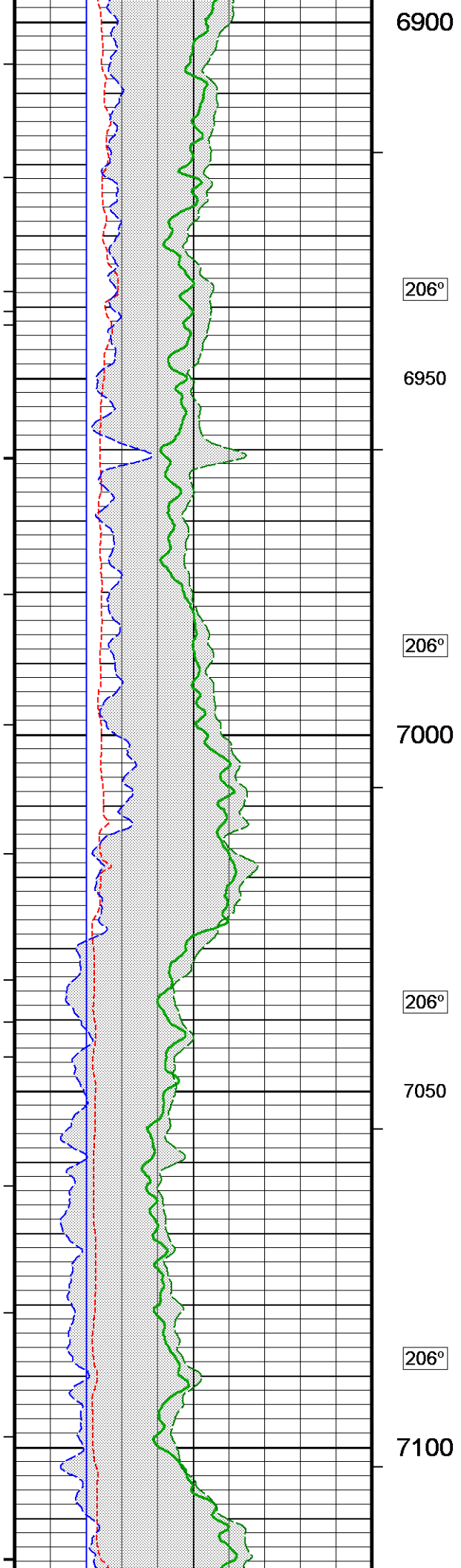


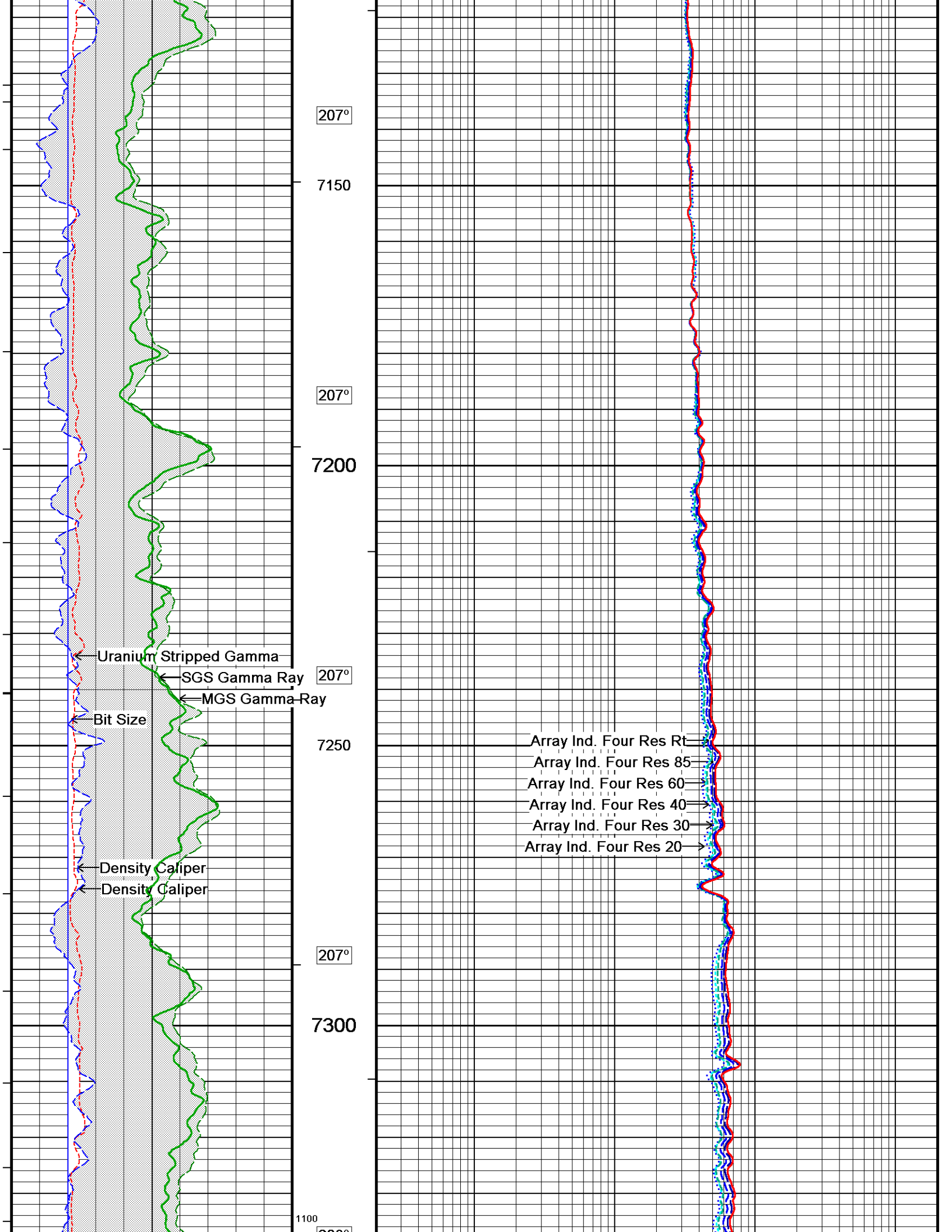
← Uranium Stripped Gamma  
← SGS Gamma Ray  
← MGS Gamma Ray

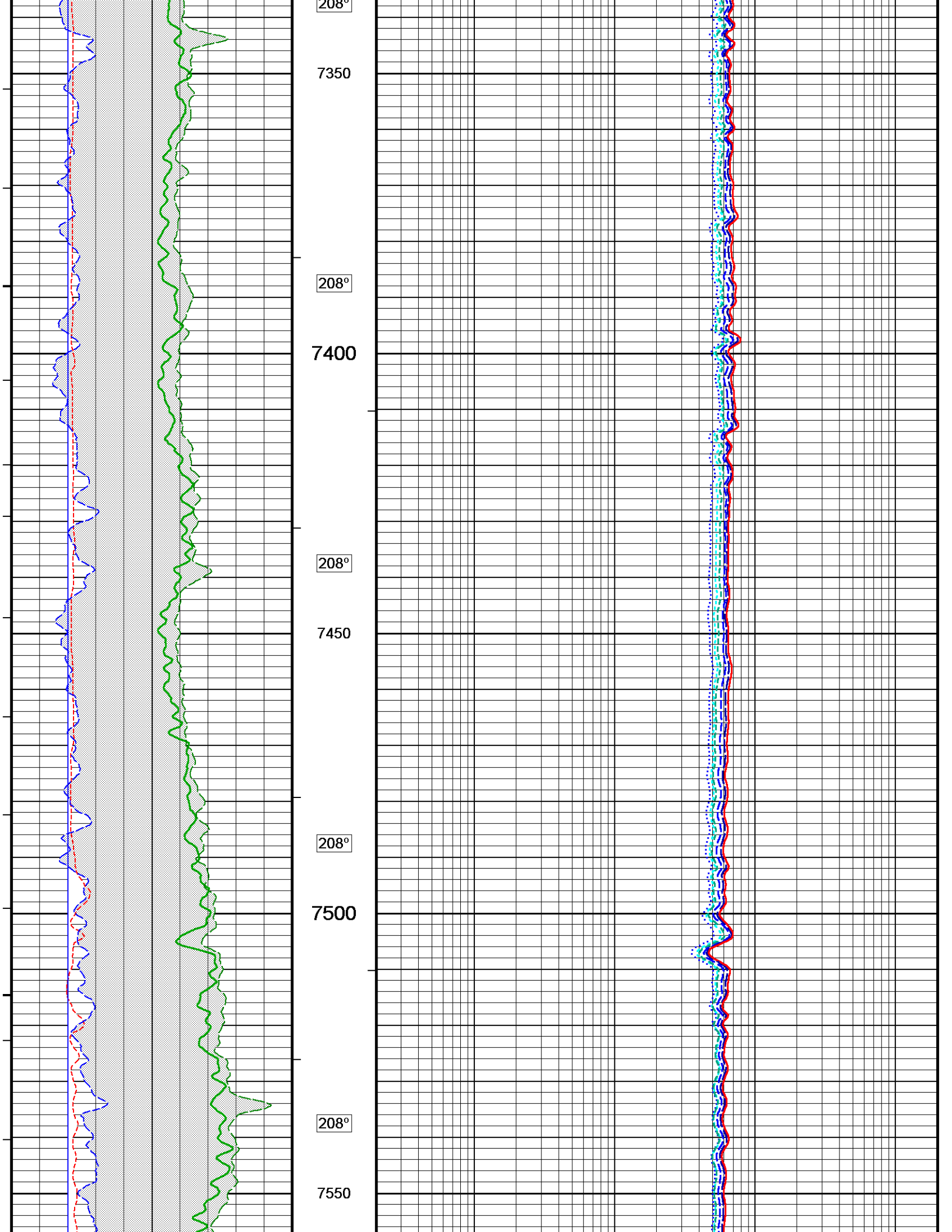
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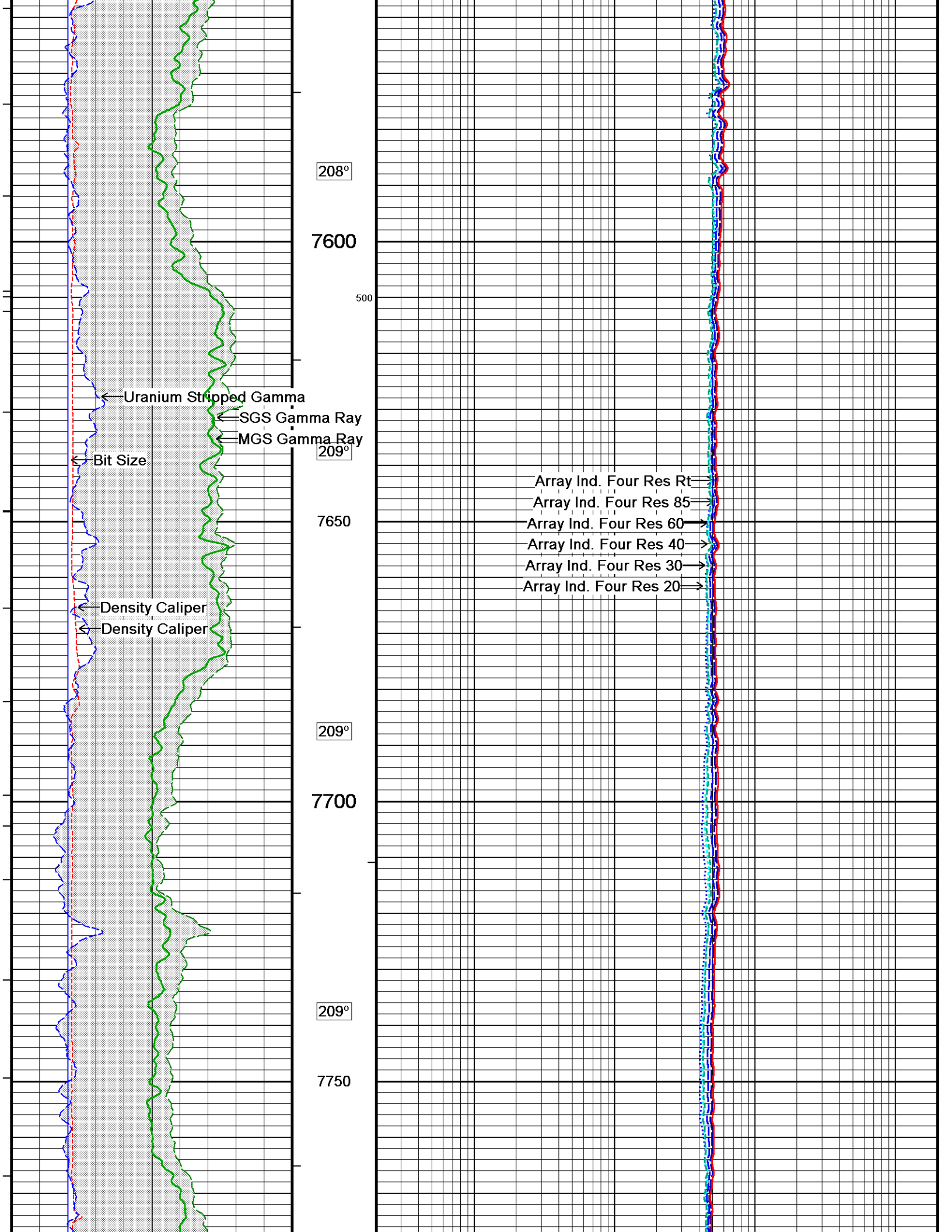












208°

7600

500

← Uranium Stripped Gamma

← SGS Gamma Ray

← MGS Gamma Ray

← Bit Size

209°

7650

Array Ind. Four Res Rt →

Array Ind. Four Res 85 →

Array Ind. Four Res 60 →

Array Ind. Four Res 40 →

Array Ind. Four Res 30 →

Array Ind. Four Res 20 →

← Density Caliper

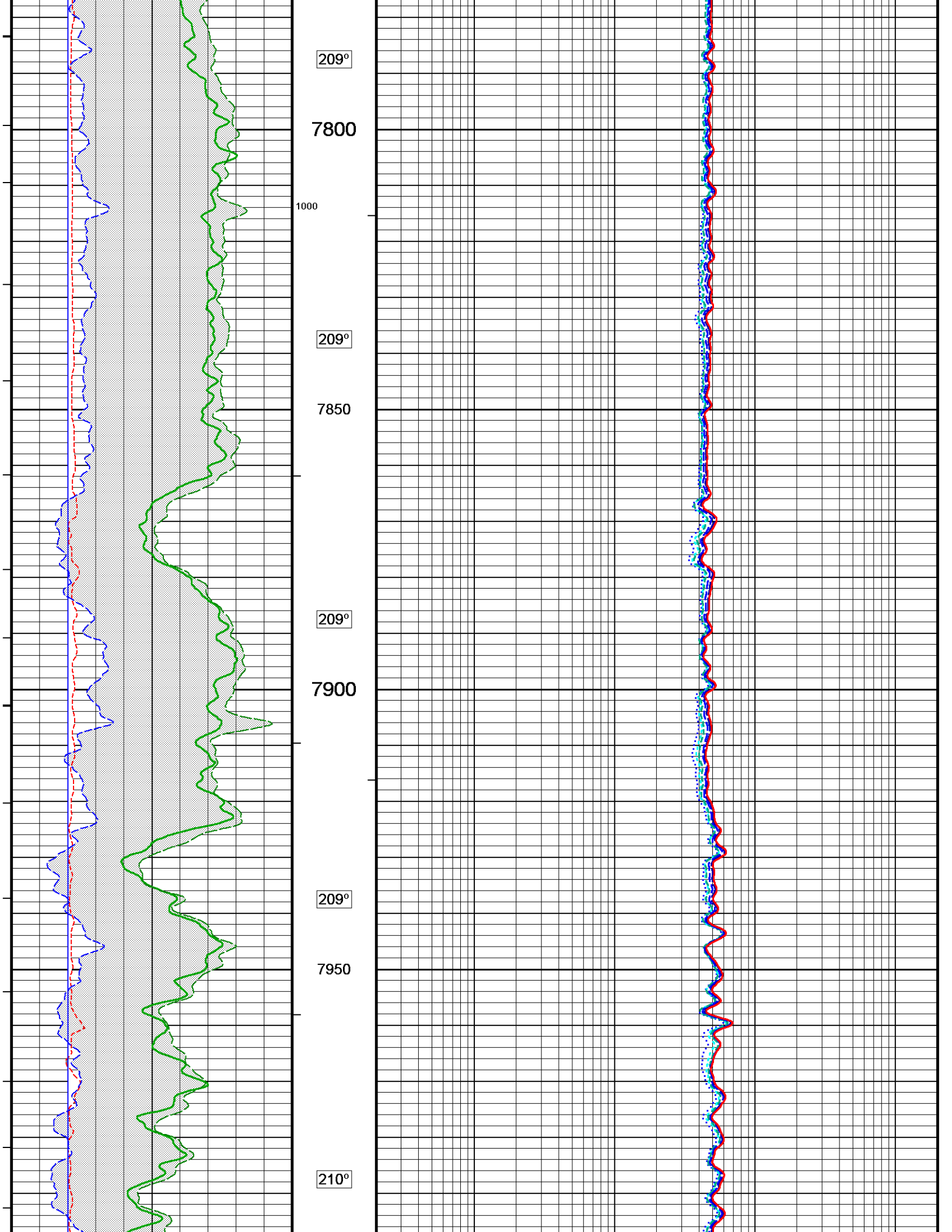
← Density Caliper

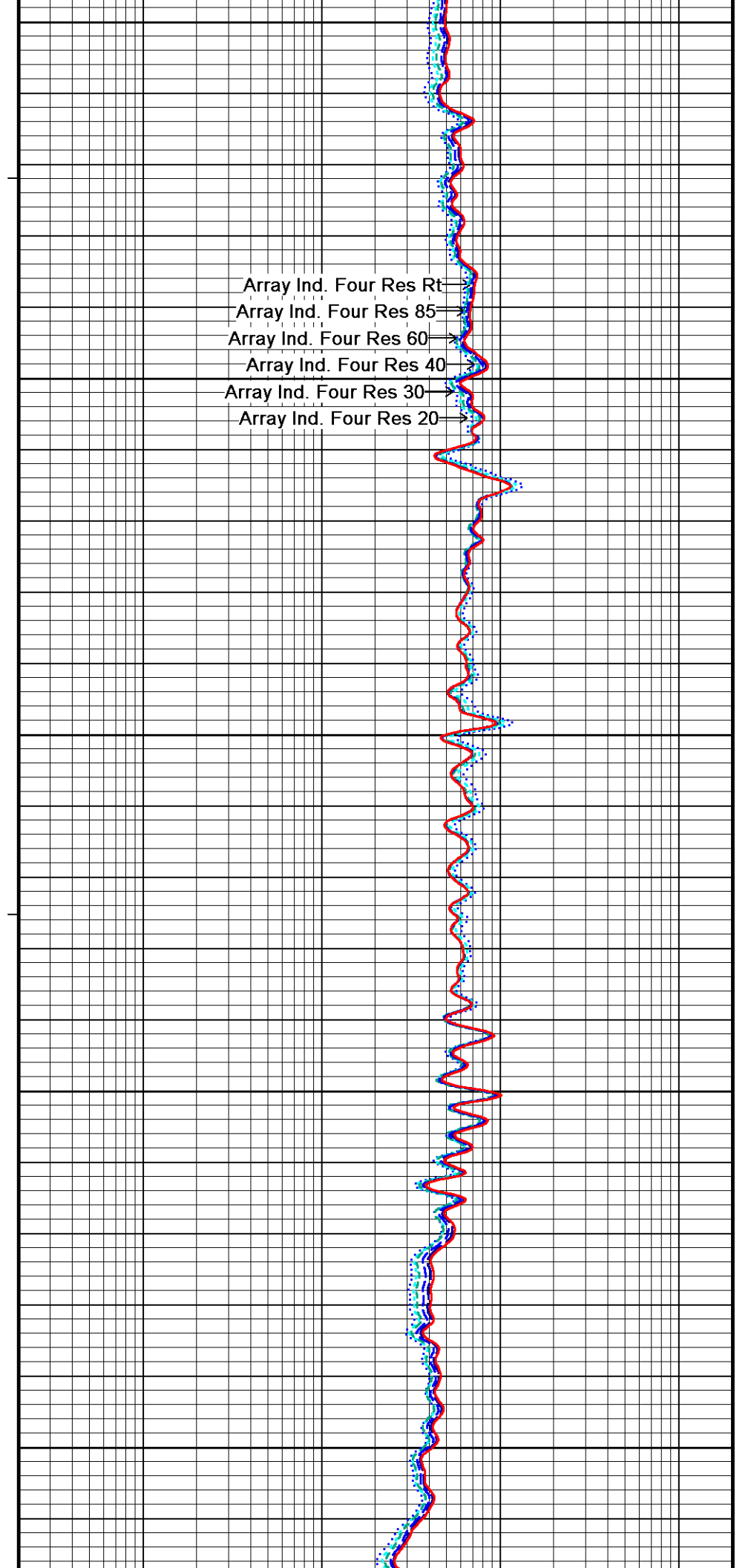
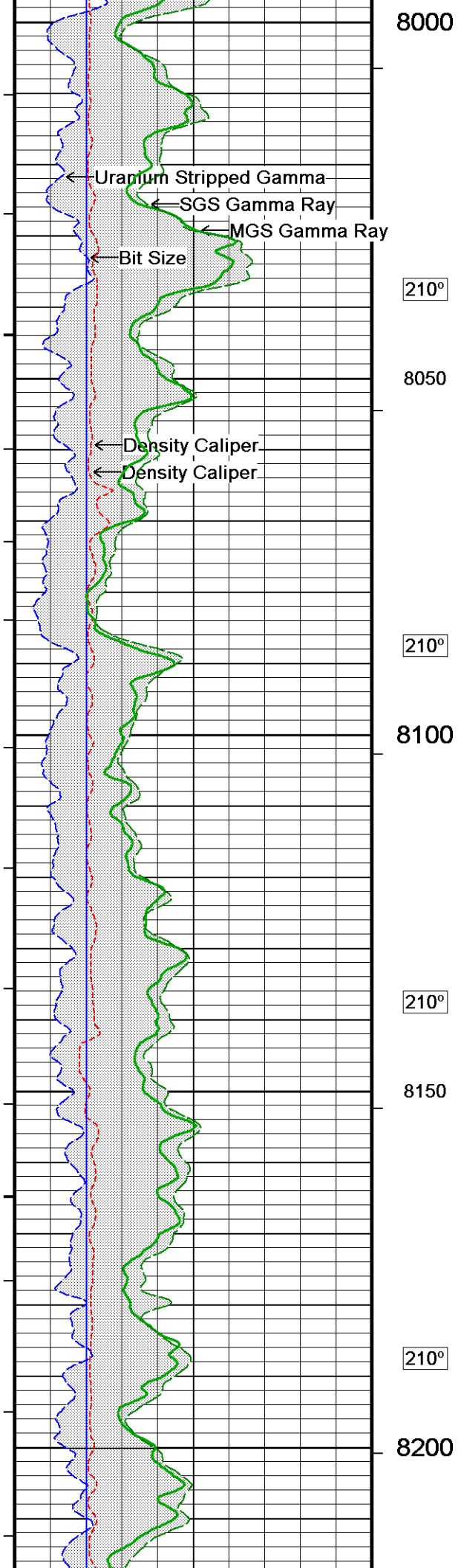
209°

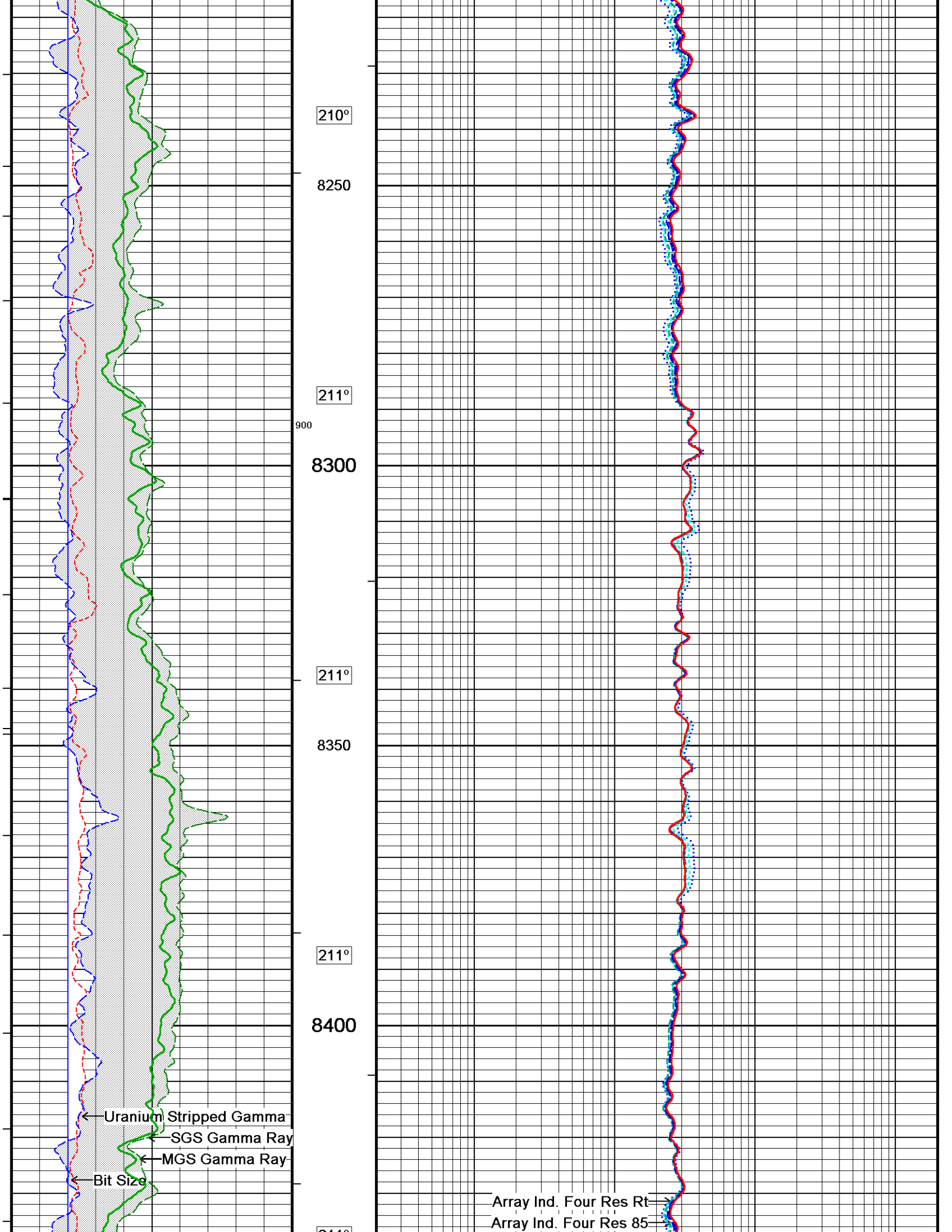
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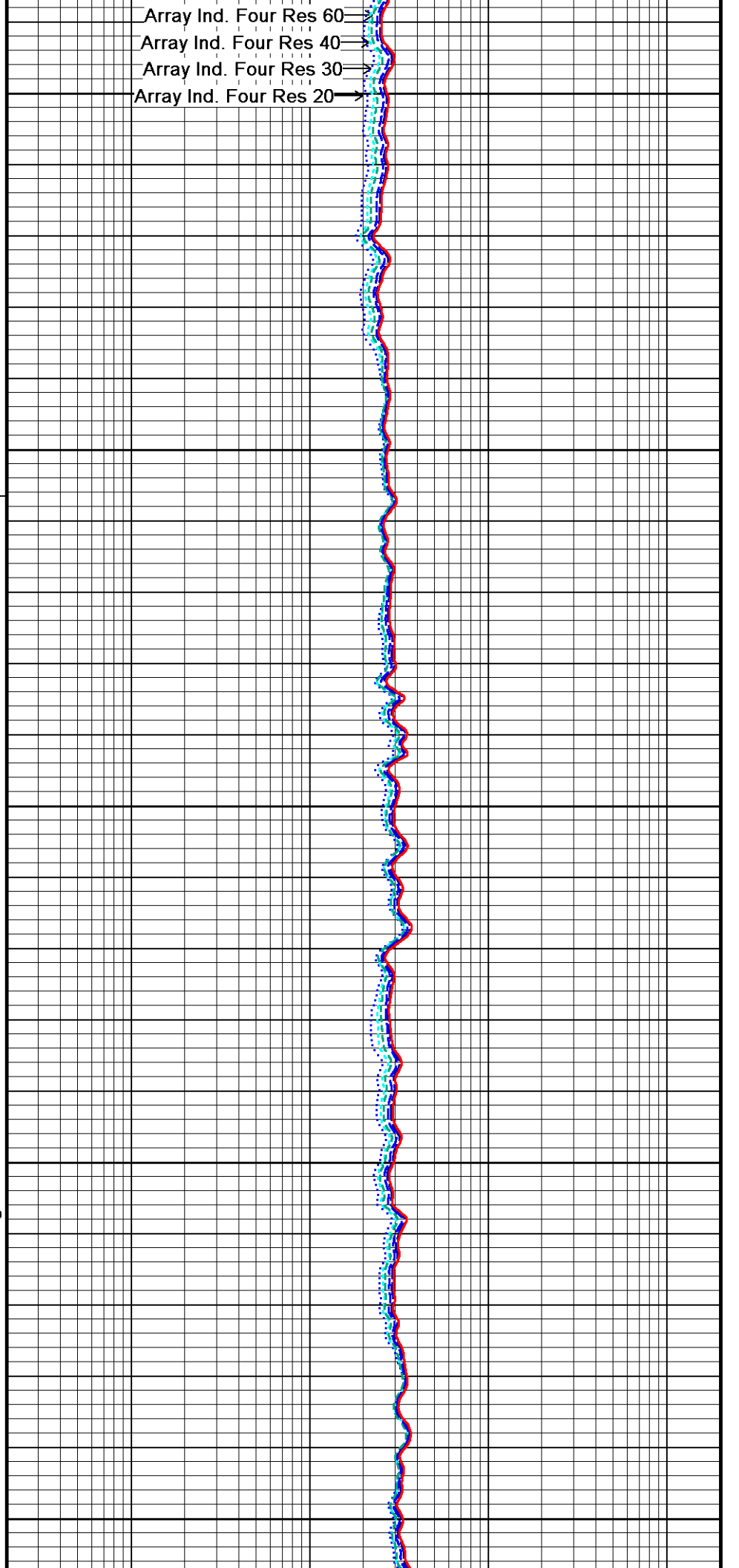
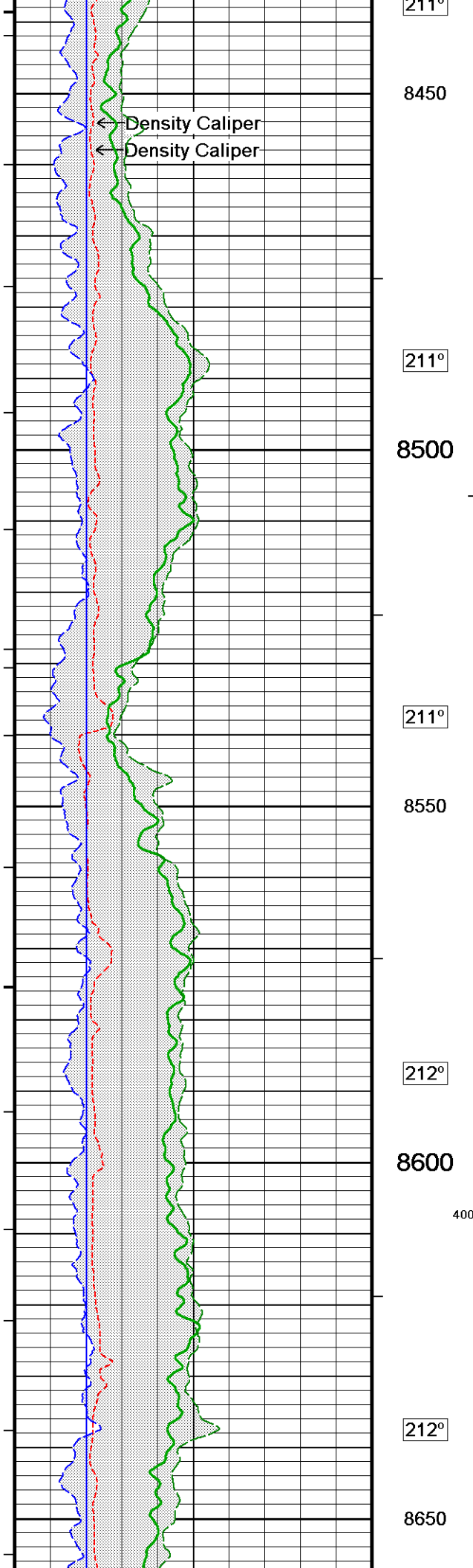
209°

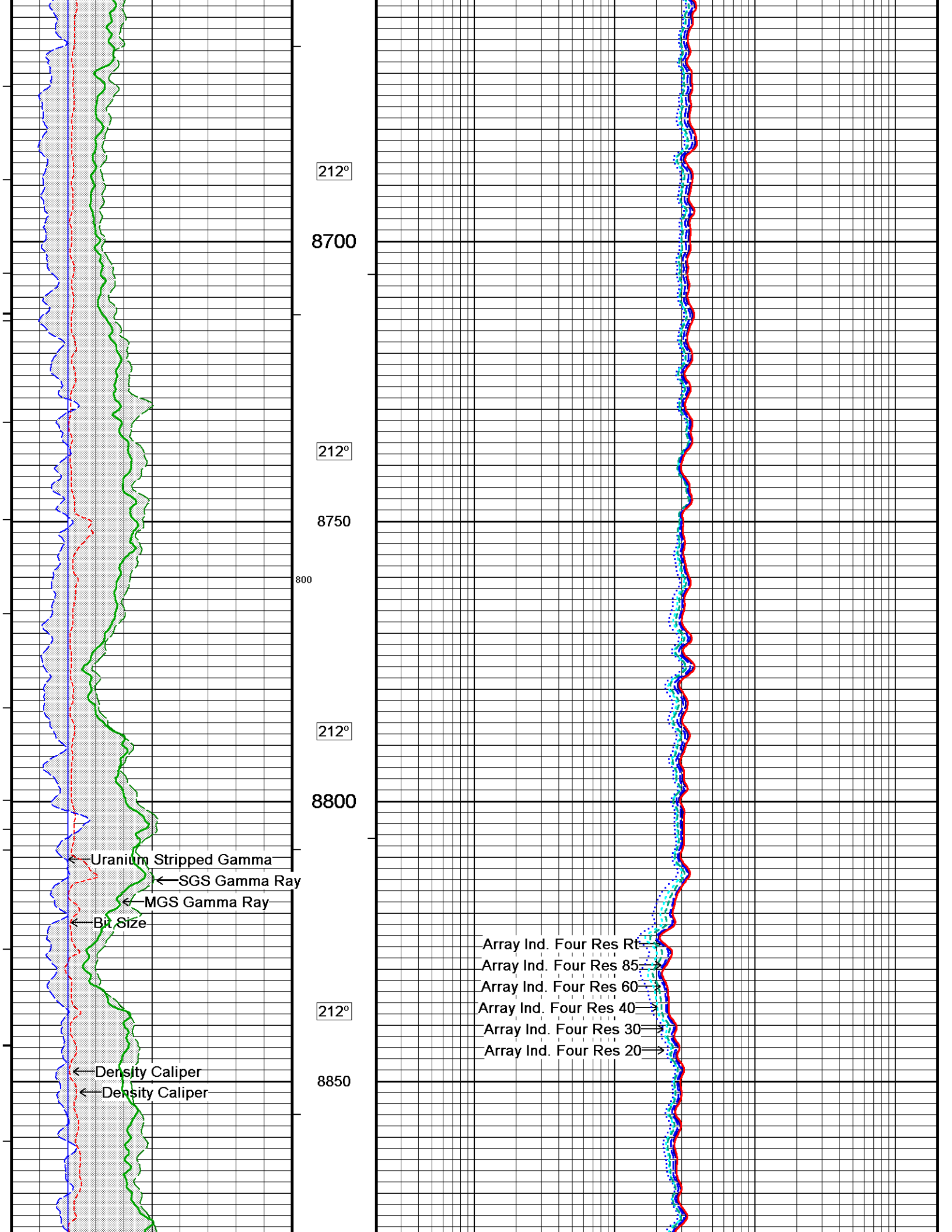
7750

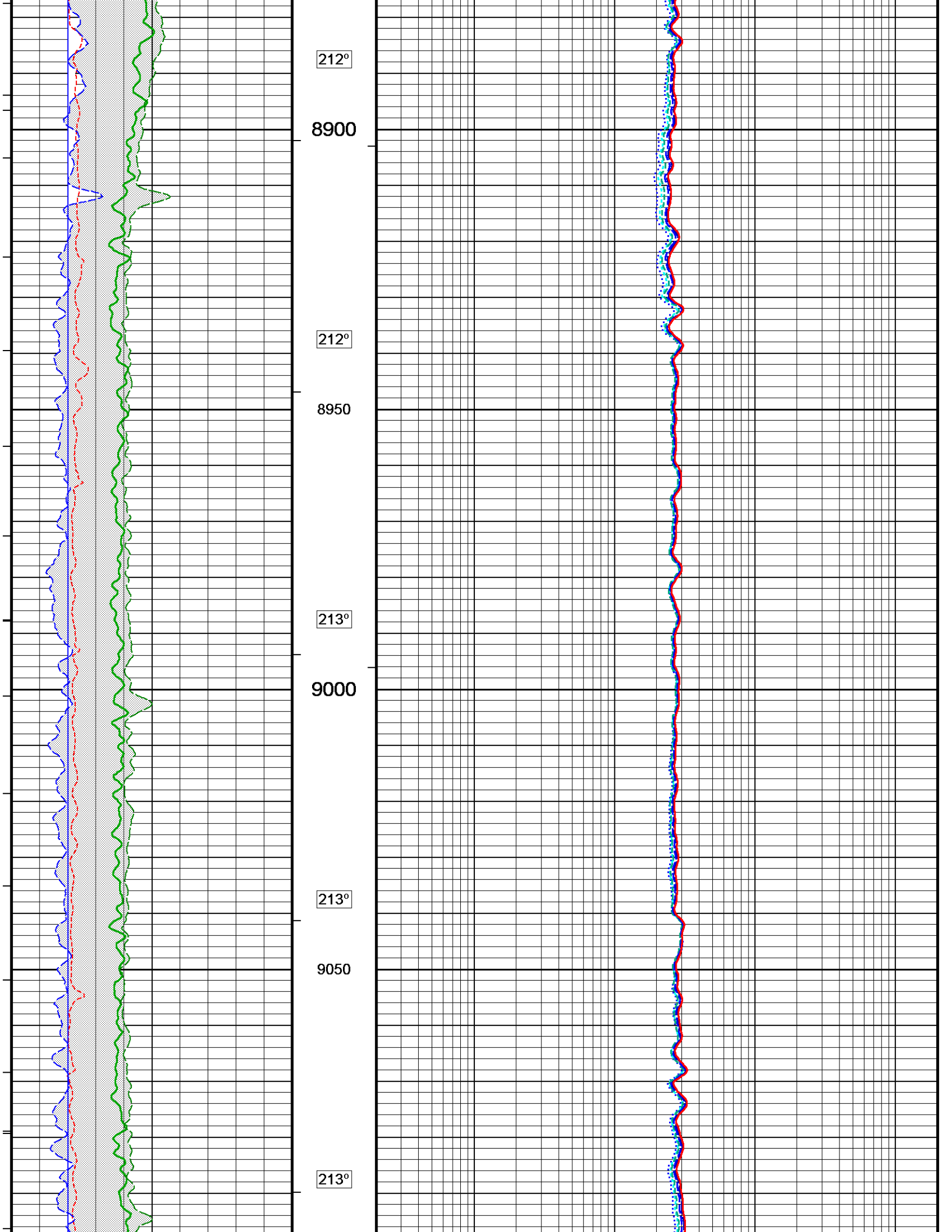


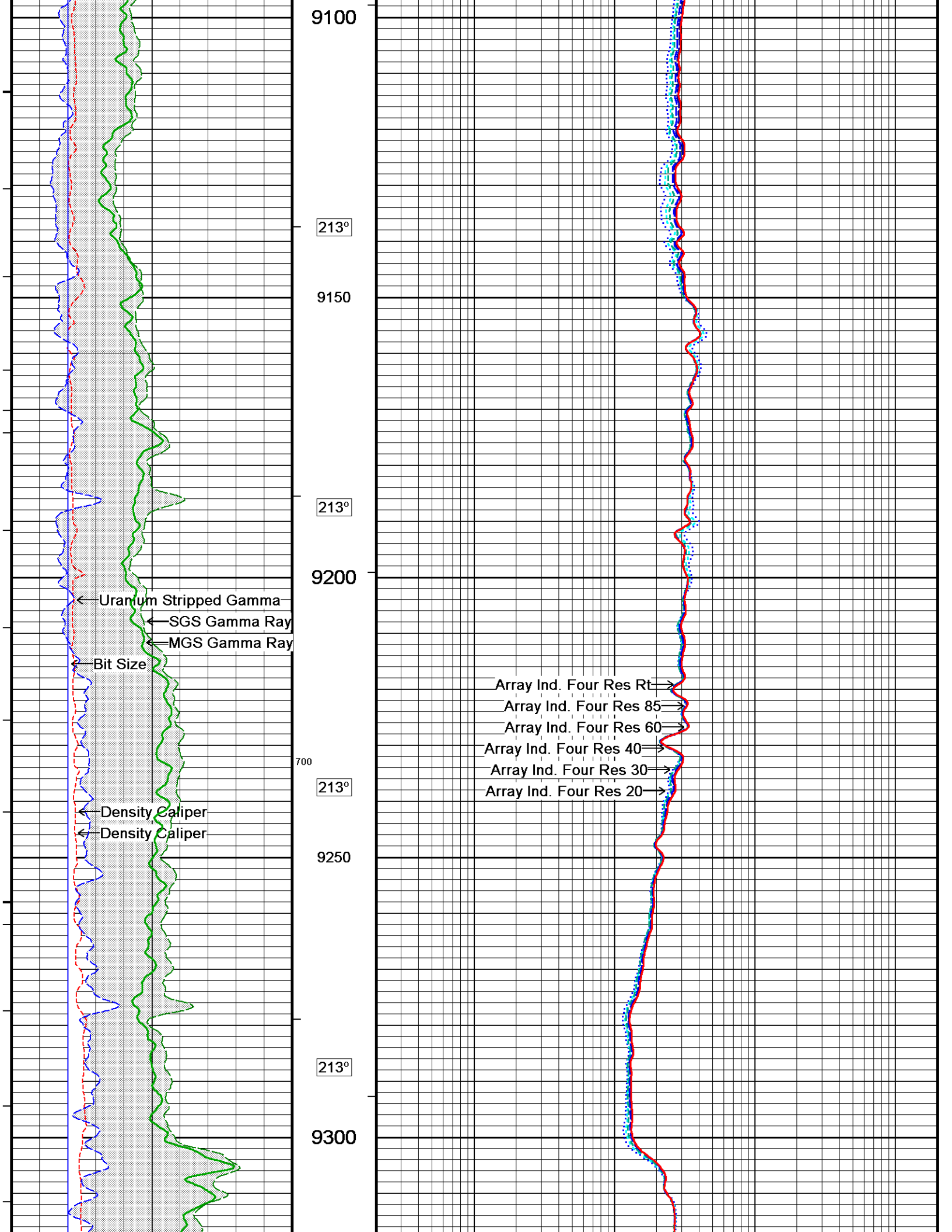












9100

213°

9150

213°

9200

← Uranium Stripped Gamma  
← SGS Gamma Ray  
← MGS Gamma Ray

← Bit Size

700

213°

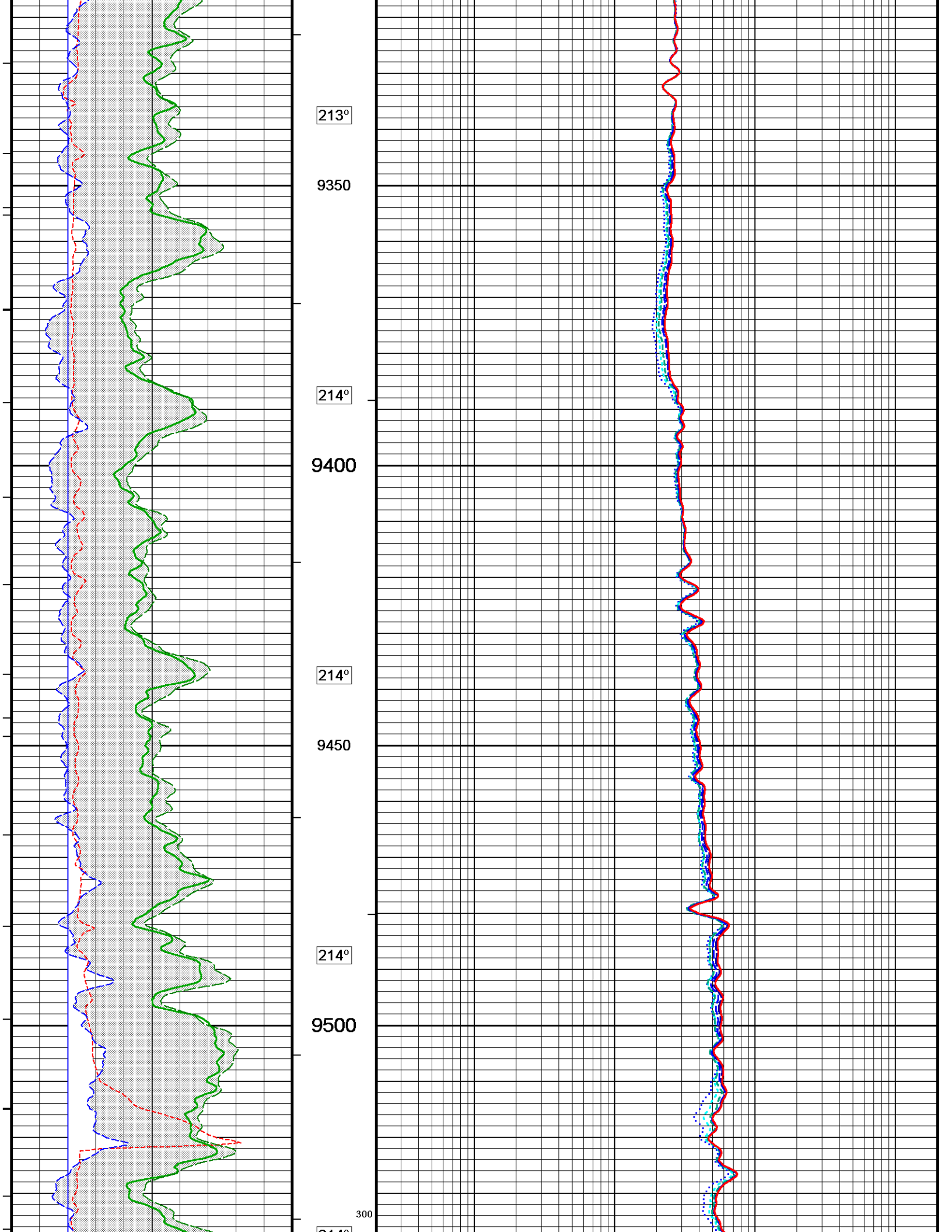
← Density Caliper  
← Density Caliper

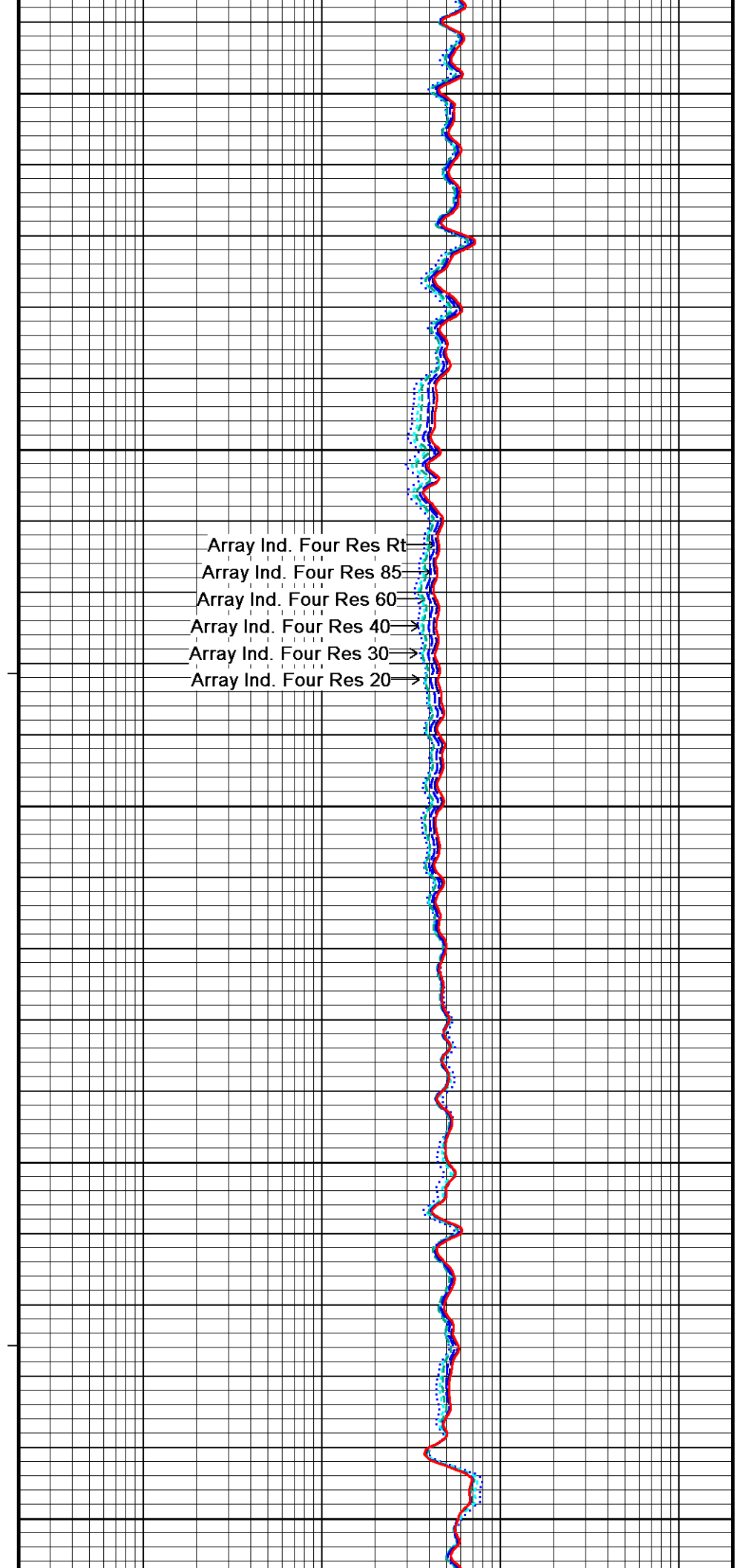
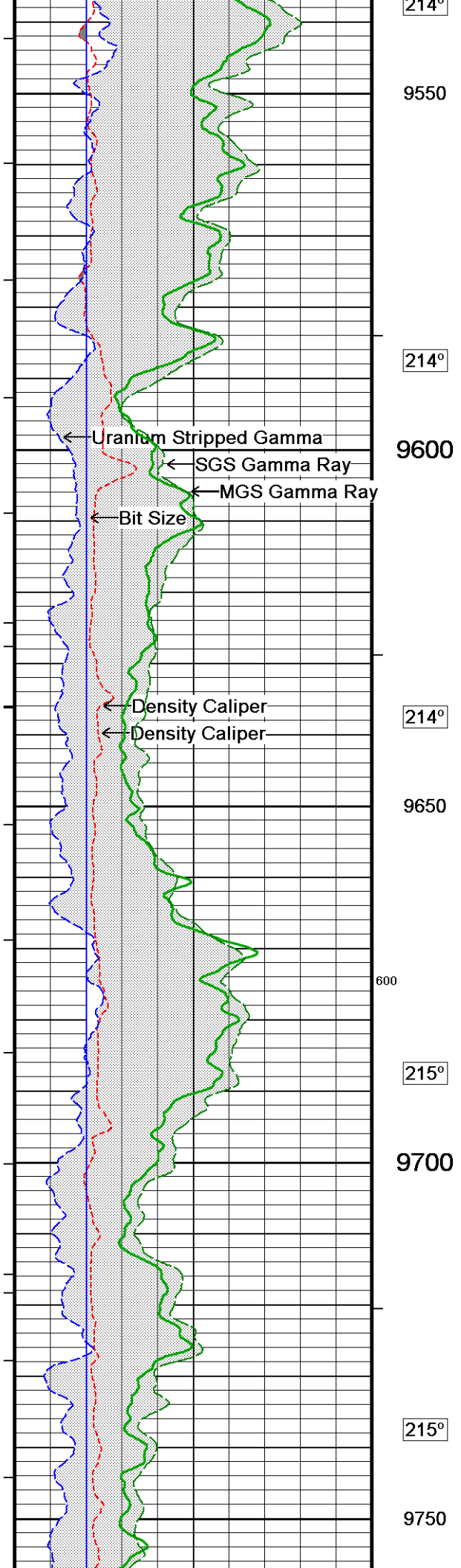
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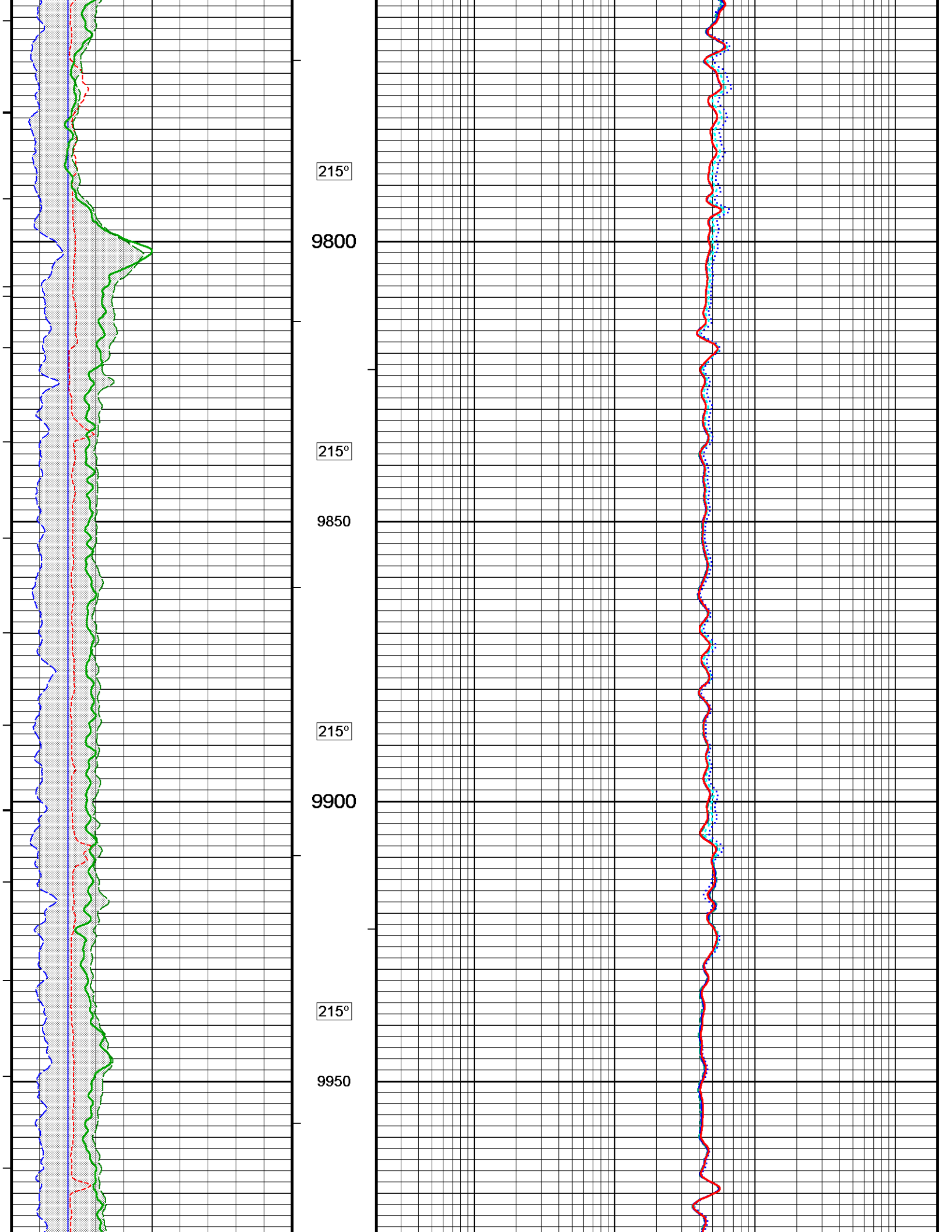
213°

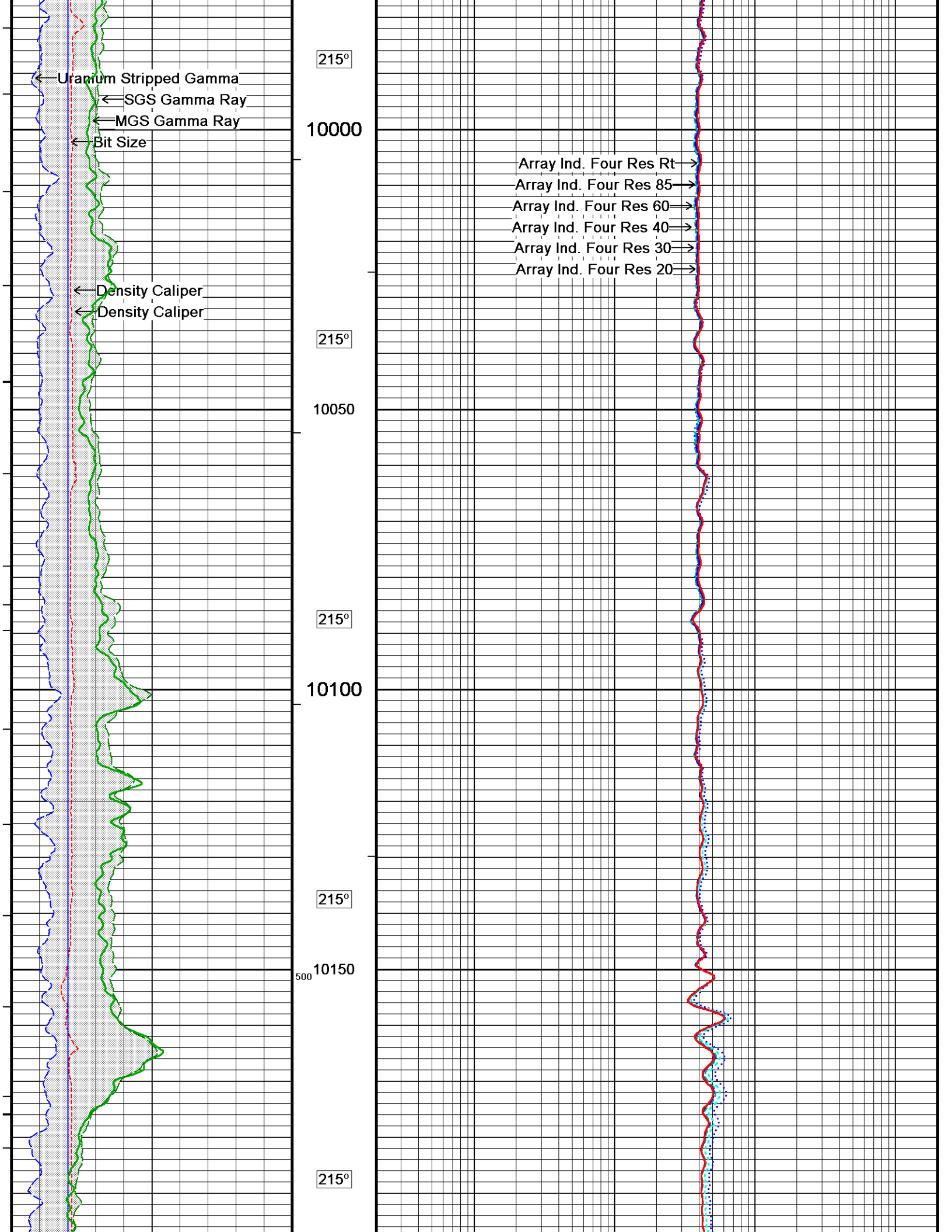
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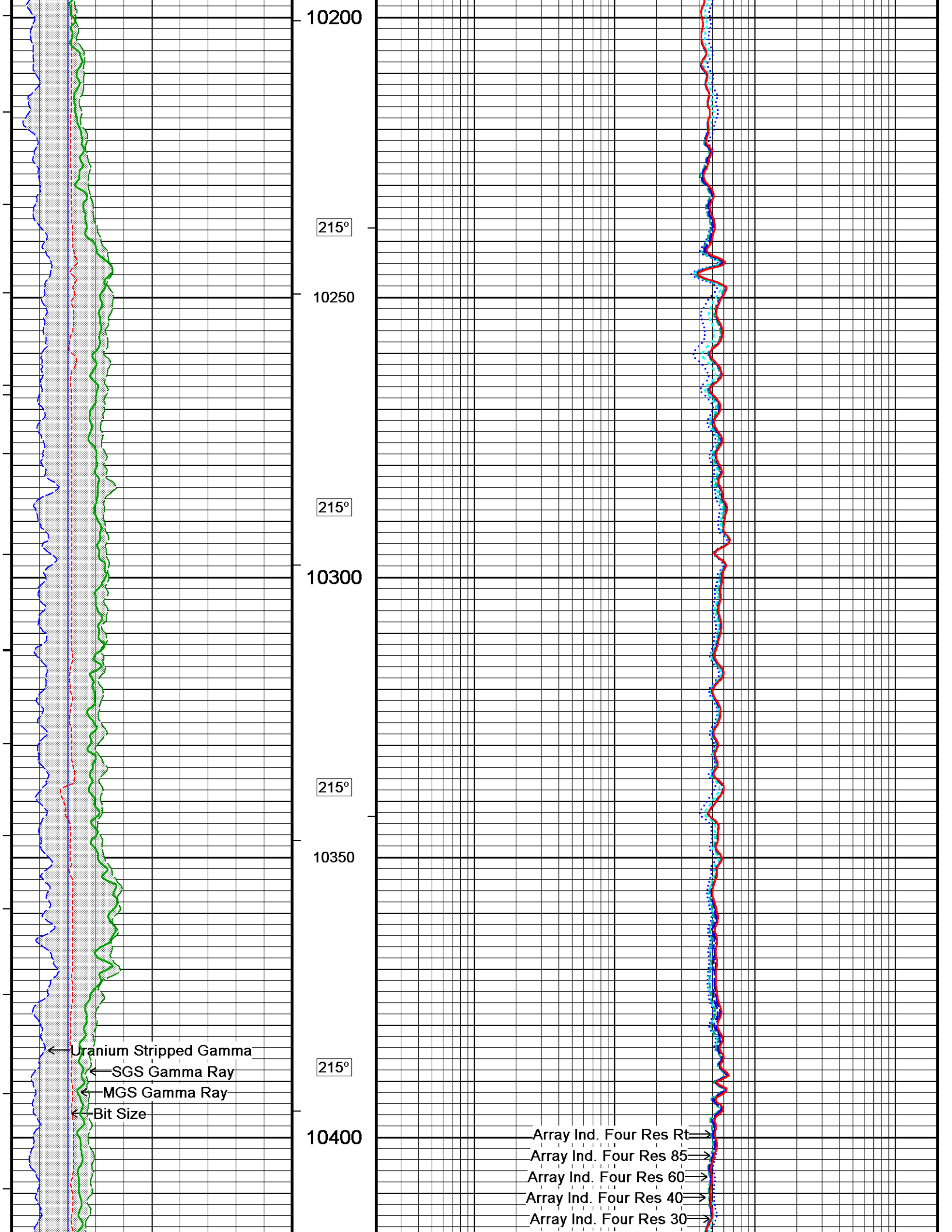
→ Array Ind. Four Res Rt  
→ Array Ind. Four Res 85  
→ Array Ind. Four Res 60  
→ Array Ind. Four Res 40  
→ Array Ind. Four Res 30  
→ Array Ind. Four Res 20

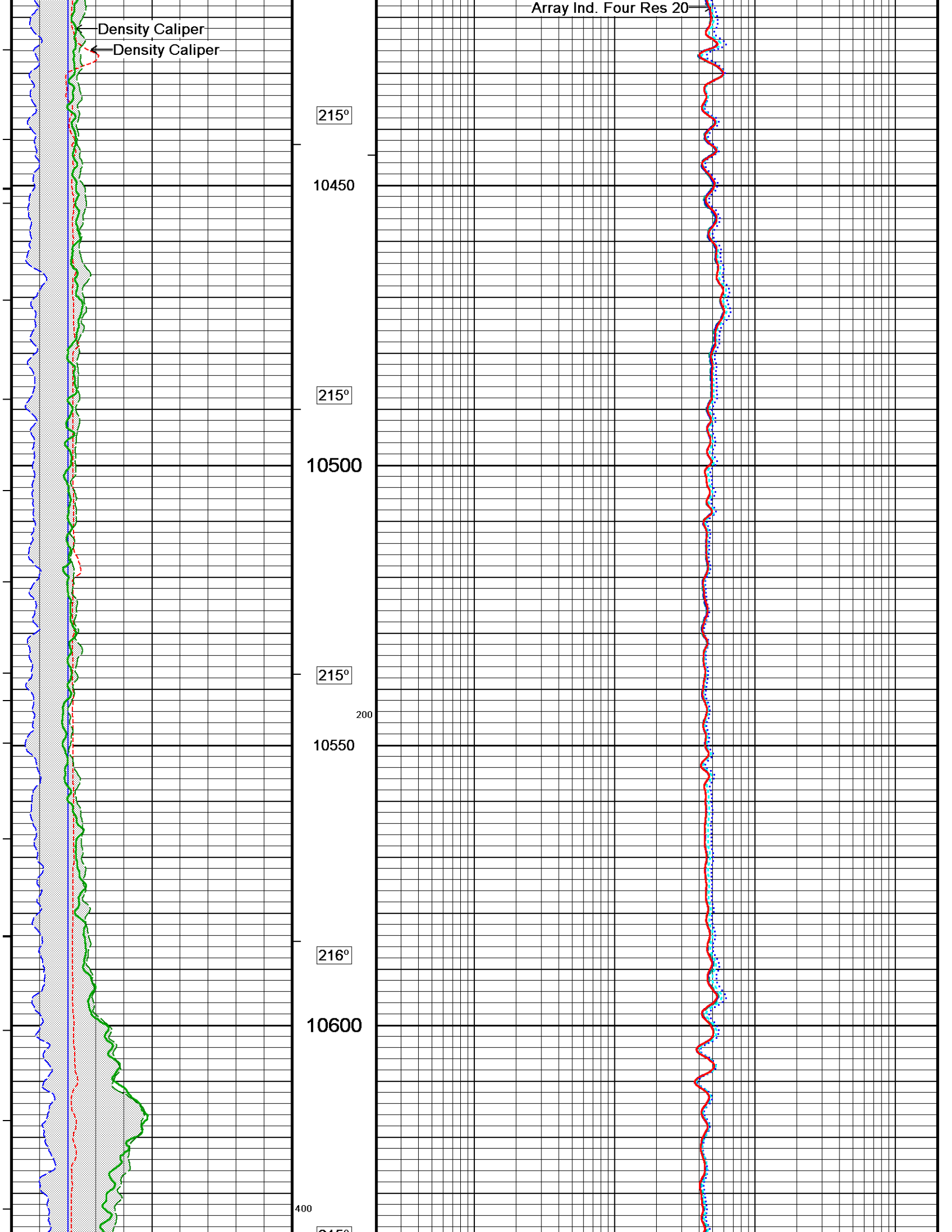


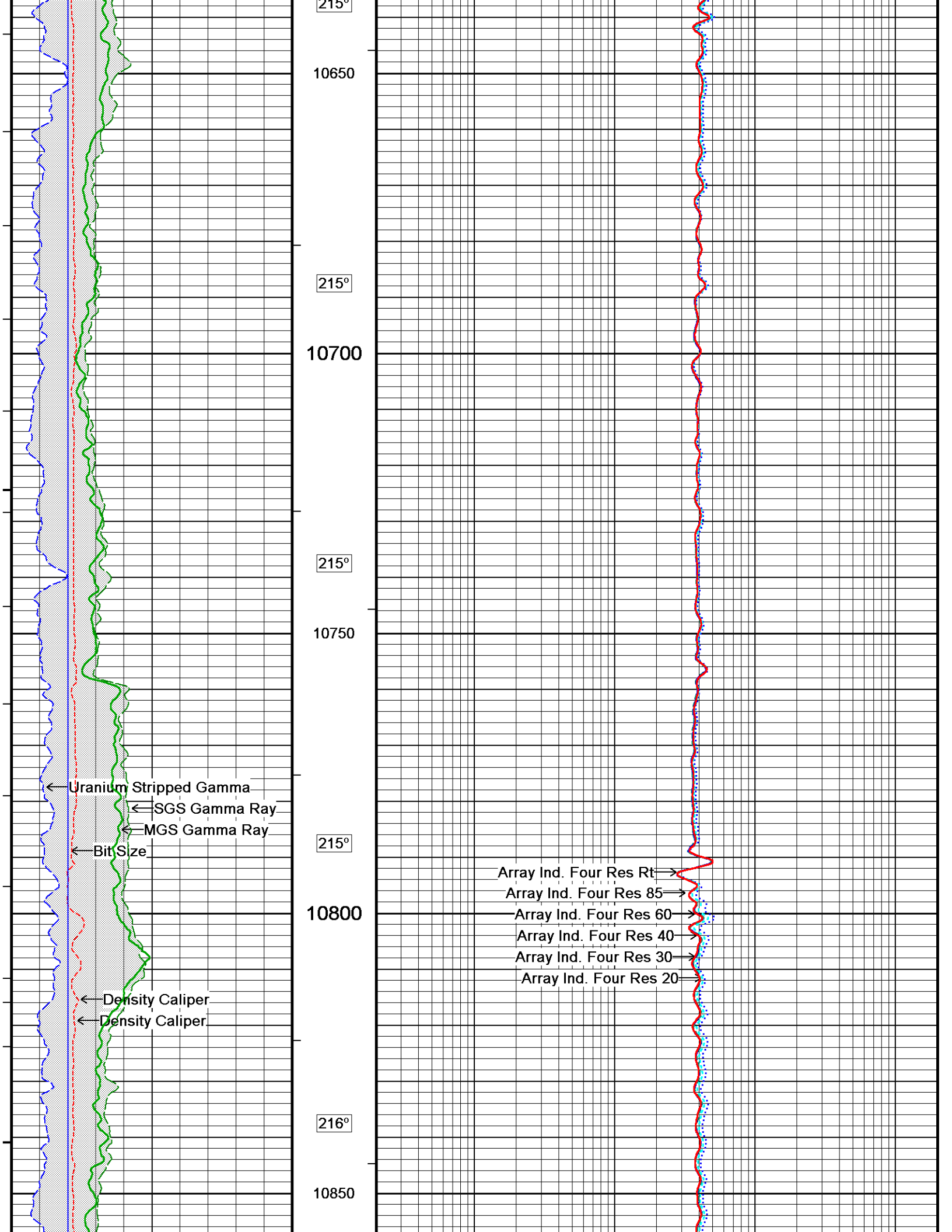


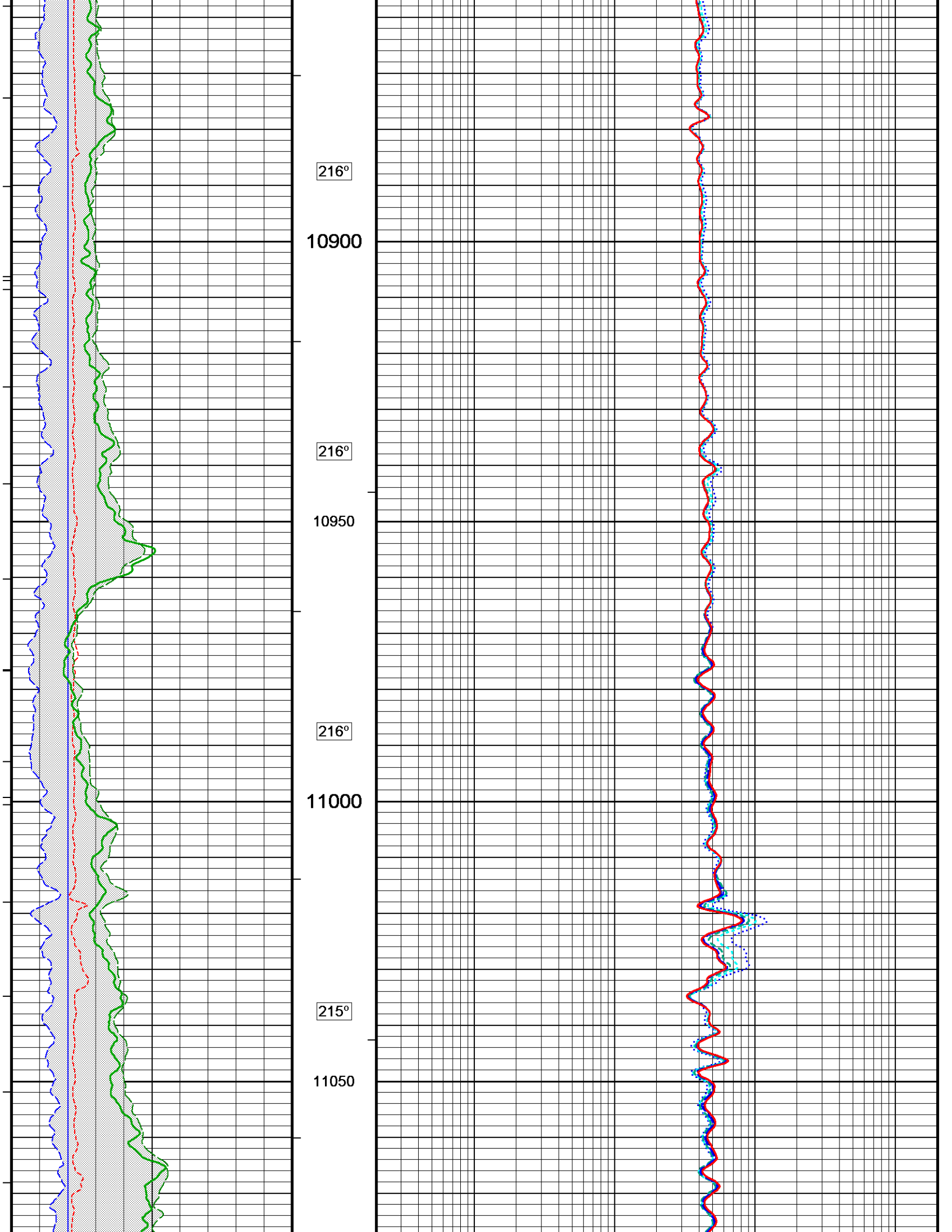


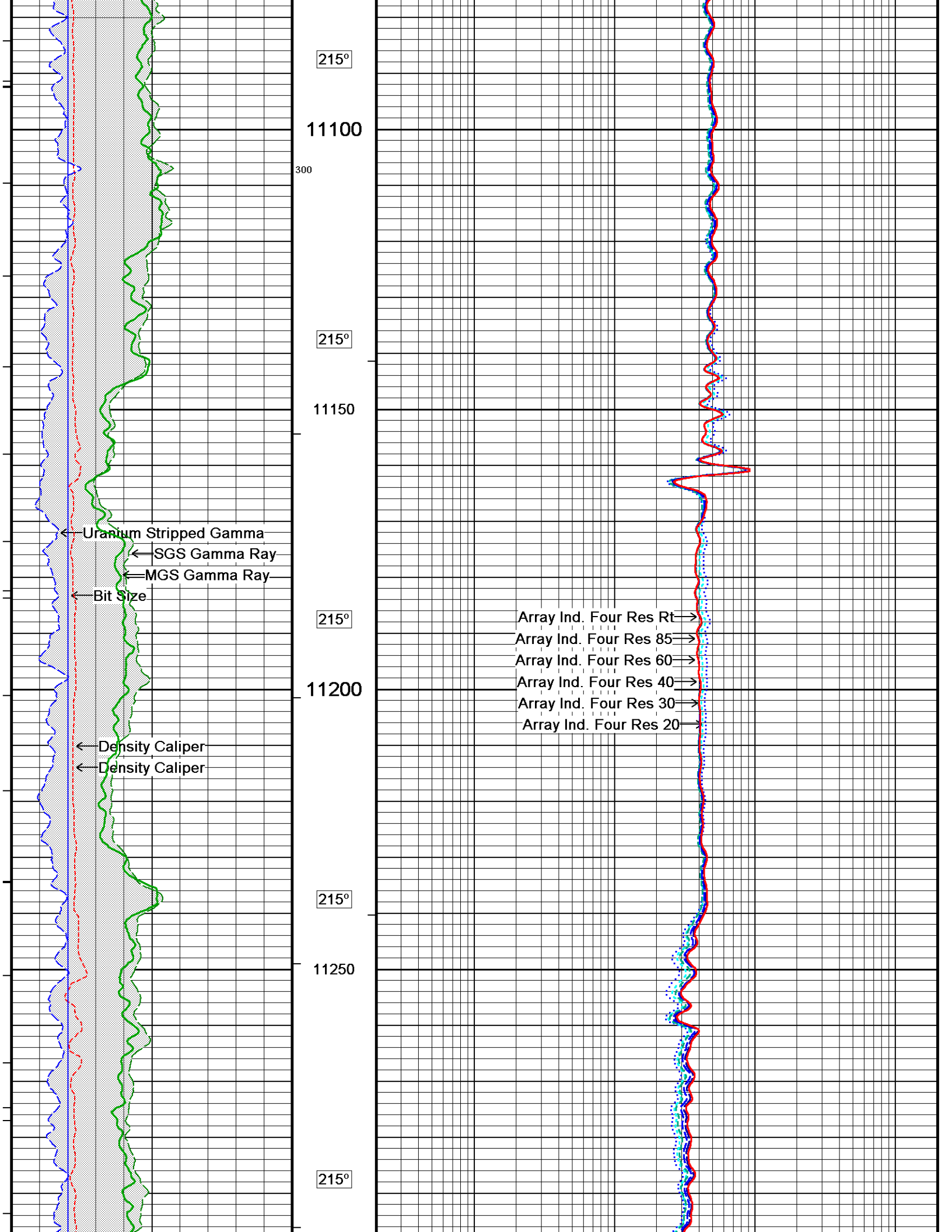


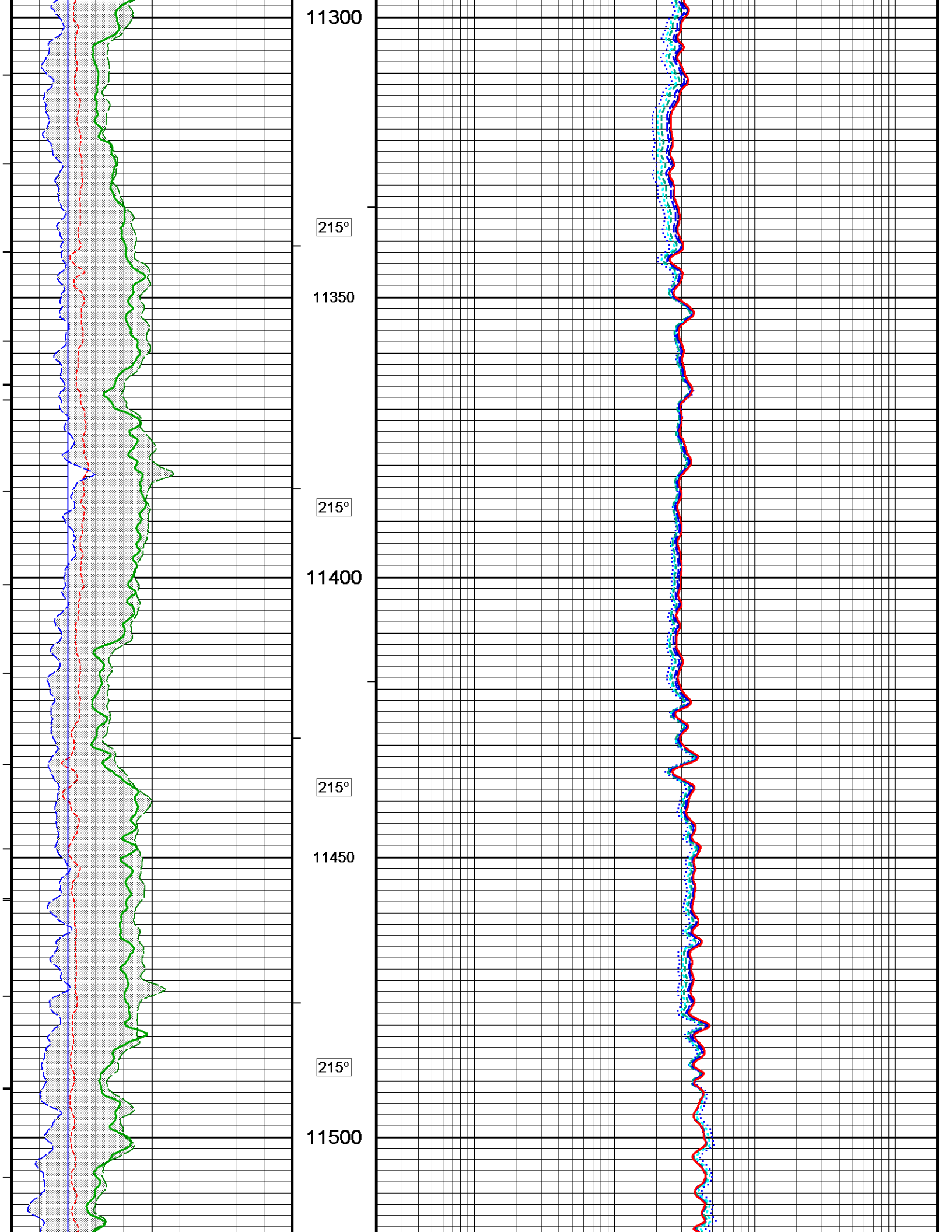


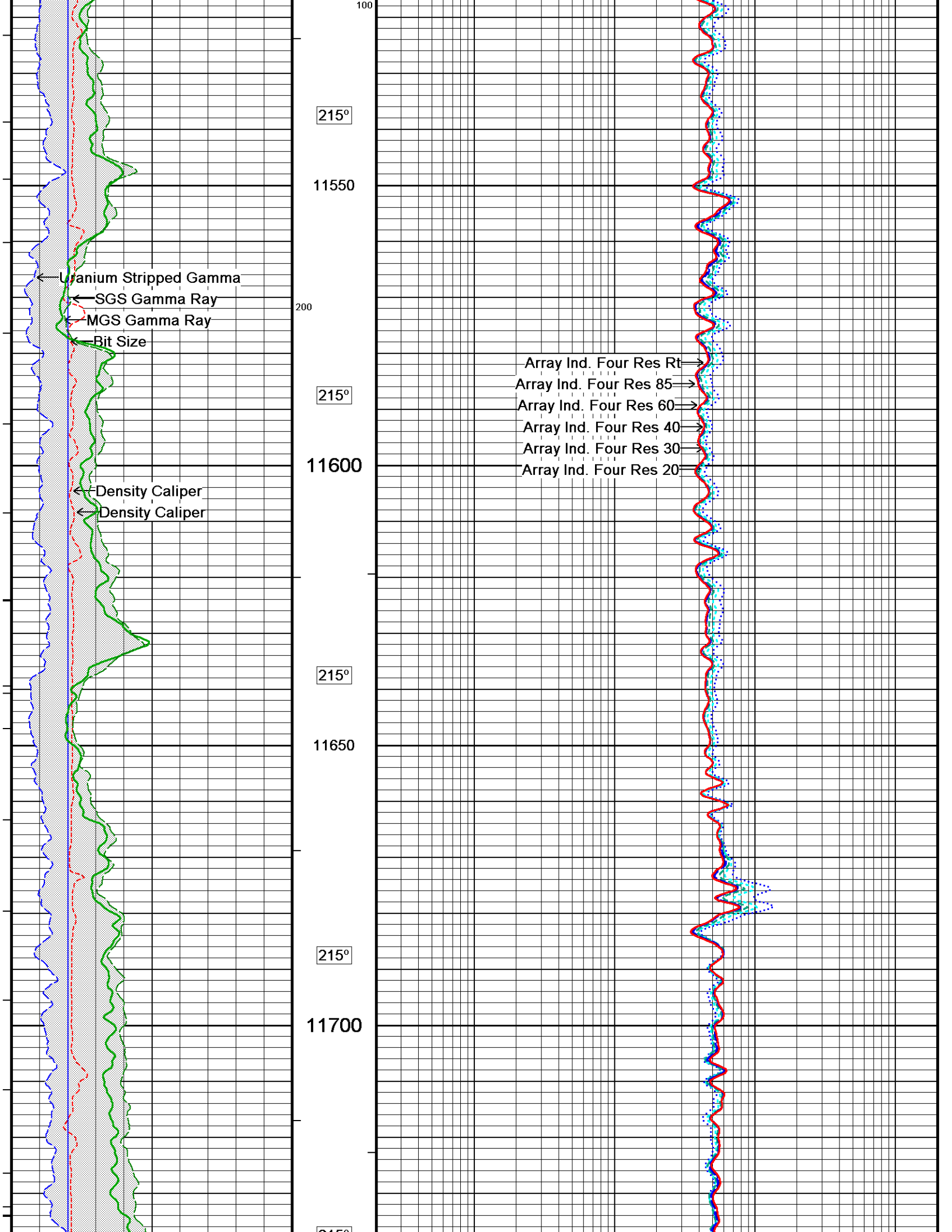


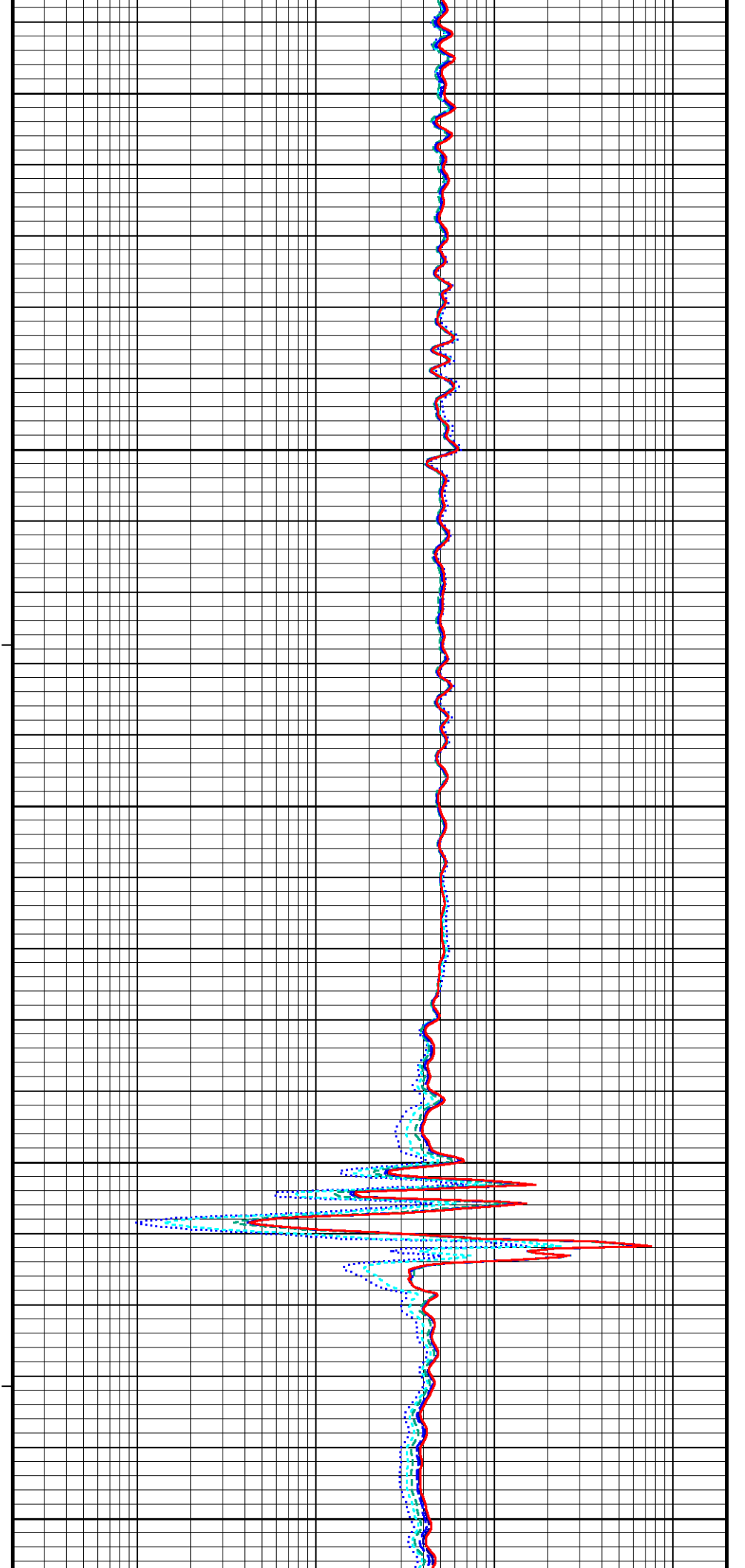
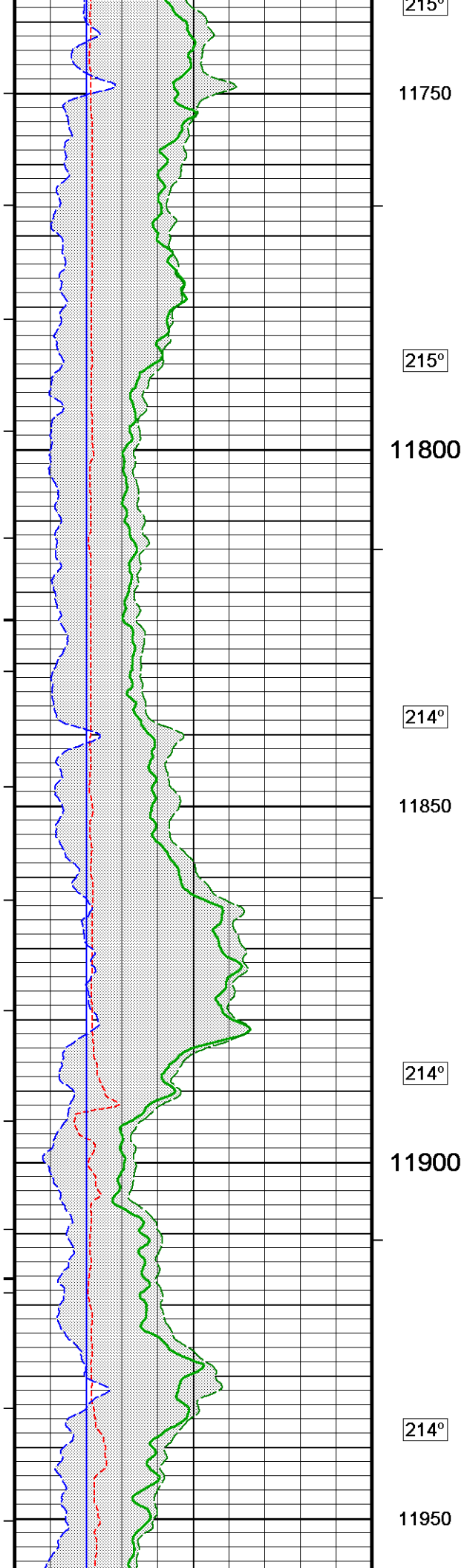


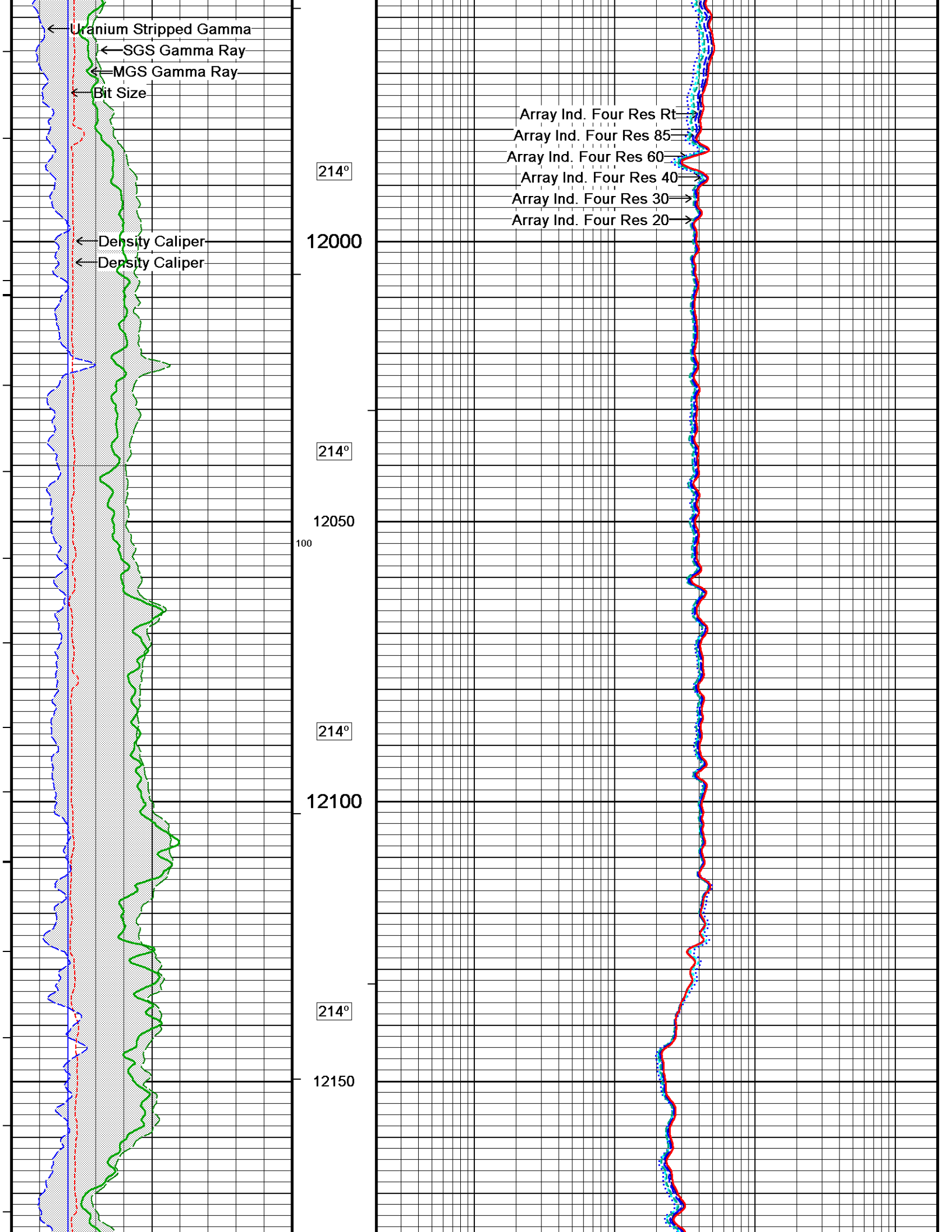


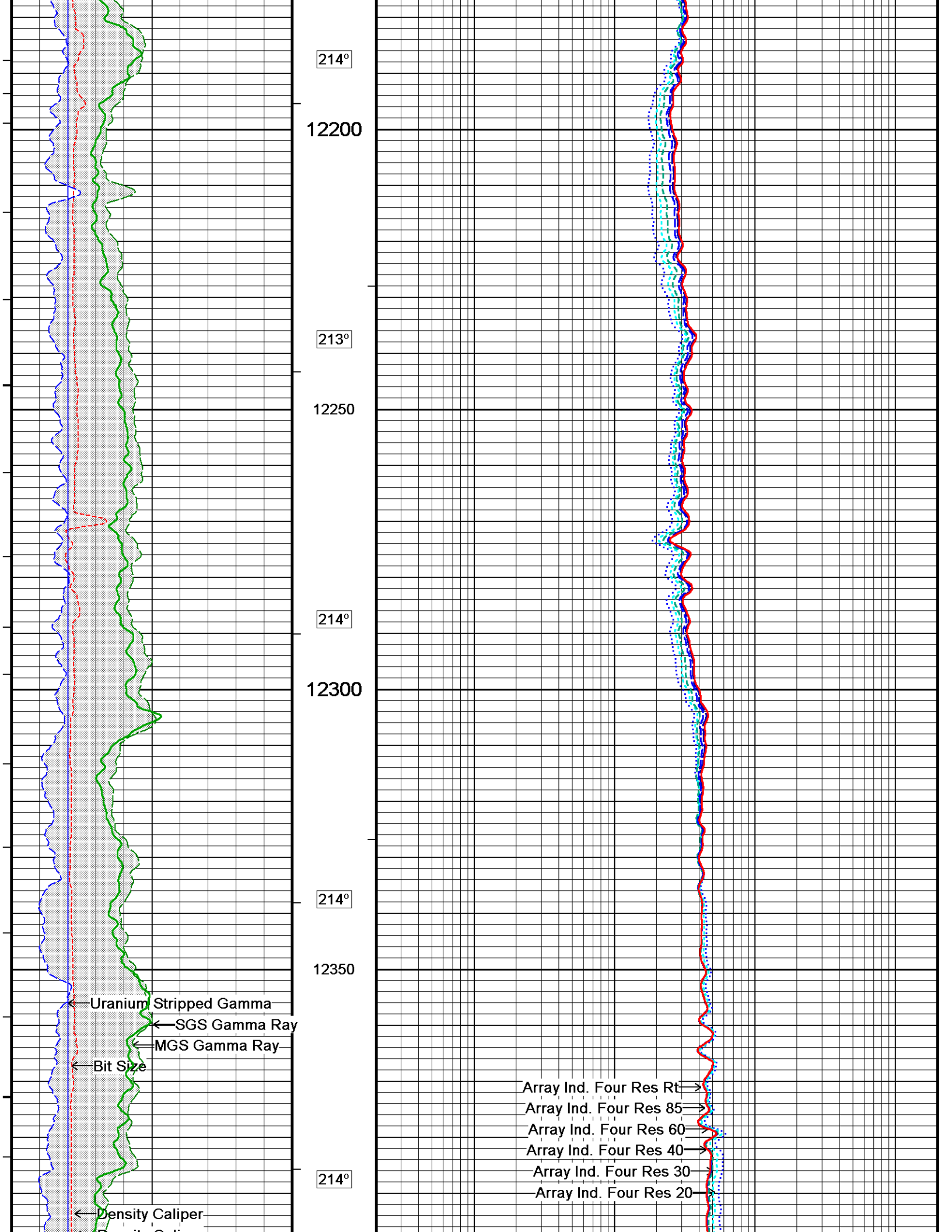


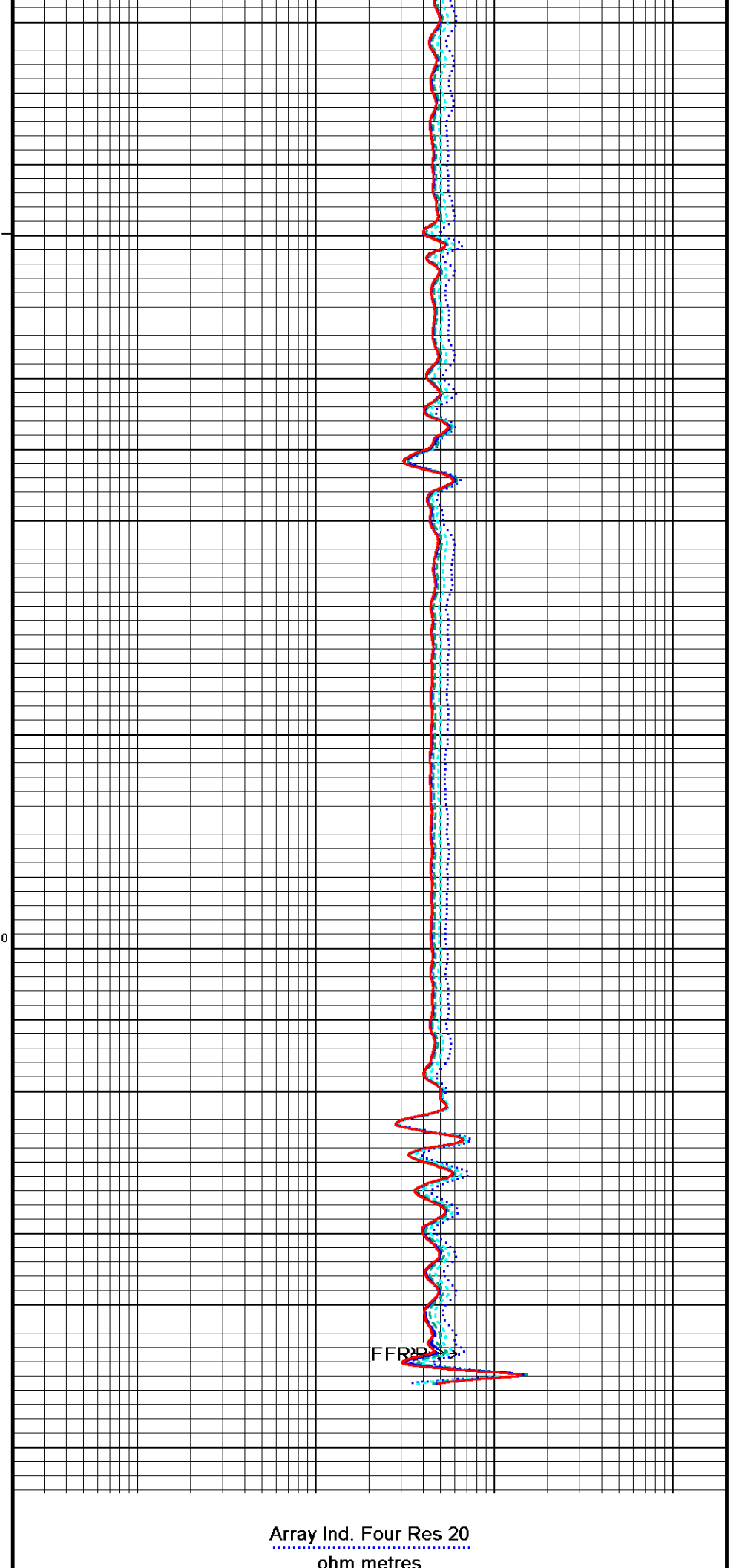
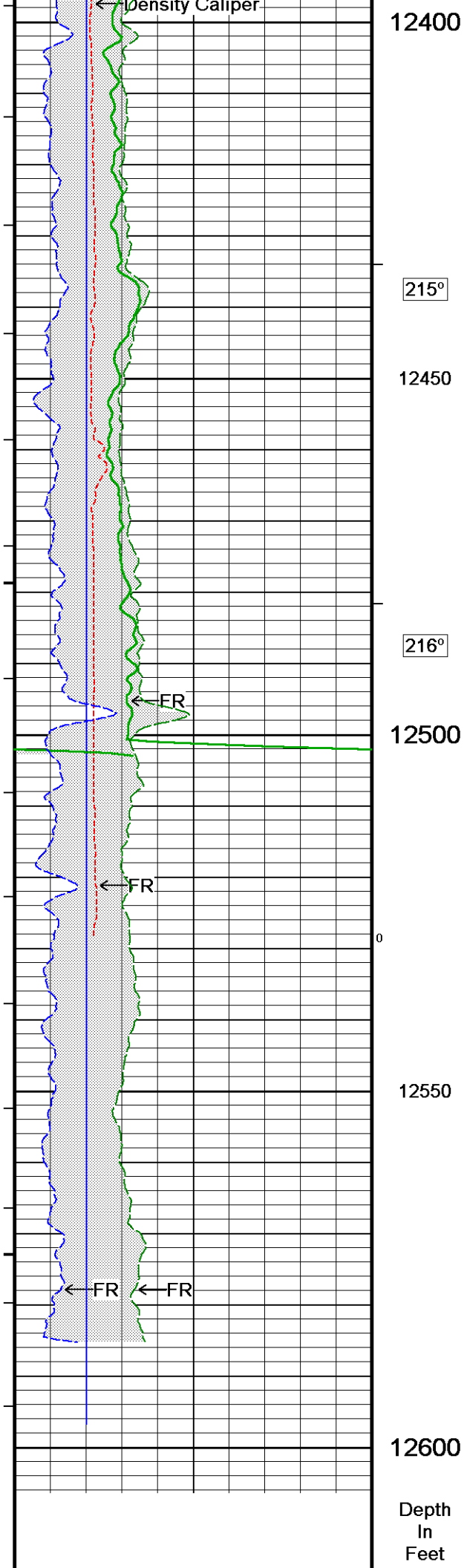


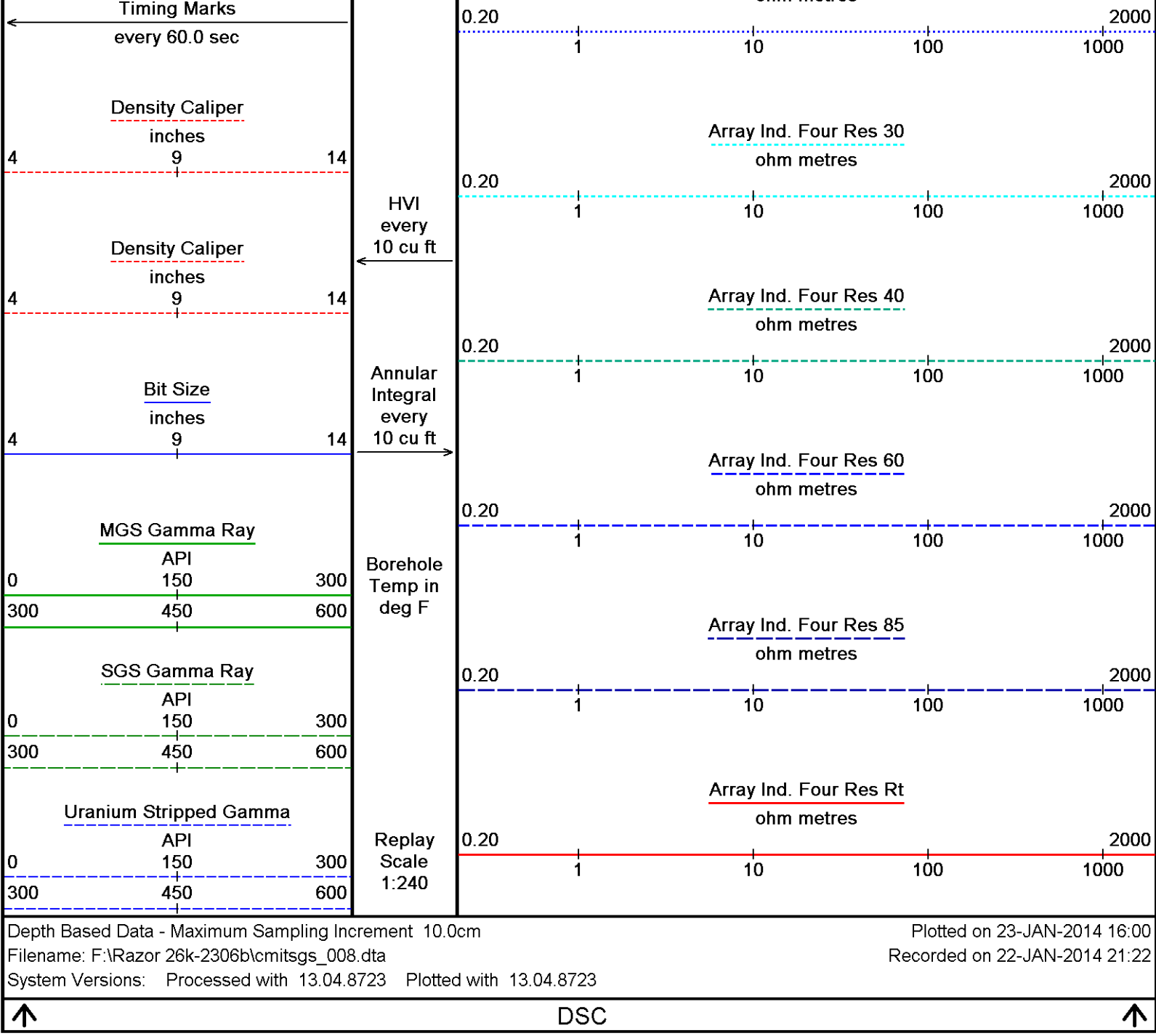












### BEFORE SURVEY CALIBRATION

F:\Razor 26k-2306b\cmitsgs\_008.dta

General Constants All 000

Last Edited on 21-JAN-2014,12:29

#### General Parameters

Mud Resistivity	1.000	ohm-metres
Mud Resistivity Temperature	80.000	degrees F
Water Level	0.000	feet
Borehole Fluid Processing	Wet Hole	

#### Hole/Annular Volume and Differential Caliper Parameters

HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	Density Caliper	

#### Rwa Parameters

Porosity used	Sandstone Density Por.
Resistivity used	Array Ind. Four Res Rt

RWA Constant A 0.610  
RWA Constant M 2.150

High Resolution Temperature Calibration MGS-D.A 216

Field Calibration on 25-JUN-2013,14:57

	Measured	Calibrated(Deg F)
Lower	77.00	77.00
Upper	300.00	300.00

High Resolution Temperature Constants MGS-D.A 216

Last Edited on 25-JUN-2013,14:57

Pre-filter Length 11

Gamma Calibration MGS-D.A 216

Field Calibration on 19-JAN-2014 17:48

	Measured	Calibrated (API)
Background	121	79
Calibrator (Gross)	1374	905
Calibrator (Net)	1253	826

Gamma Constants MGS-D.A 216

Last Edited on 21-JAN-2014,12:21

Gamma Calibrator Number	GRC_064	
Mud Density	1.22	gm/cc
Caliper Source for Processing	Bit Size	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

Imager Pad Check MIE-A.A 152

Field Check on 06-NOV-2012 14:52

Pad 1	20/20 Buttons Verified	Pad 5	20/20 Buttons Verified
Pad 2	24/24 Buttons Verified	Pad 6	24/24 Buttons Verified
Pad 3	20/20 Buttons Verified	Pad 7	20/20 Buttons Verified
Pad 4	24/24 Buttons Verified	Pad 8	24/24 Buttons Verified

Compact Micro Imager Constants MIE-A.A 152

Last Edited on 21-JAN-2014,11:24

Sonde Configuration	Imager Mode	
Arm-Pad Kit	Normal Pads (12.25 in)	
Arm-Pad Kit Serial Number		
Centre Pad 1 Rotational Offset	0.00	degrees
Image/Borehole Ovality Reference	Azimuth of Pad 1	
Non Active Buttons	Omit	
Search Angle	0.00	degrees
Correlation Interval	3.28	feet
Correlation Step	1.64	feet
Current Offset	0.0000	mAmp
Squasher Start	N/A	mAmp
Image Processing	Enabled	

Navigation Constants MIE-A.A 152

Last Edited on 06-MAY-2013,14:40

Magnetic Declination 0.00 degrees East

Magnetometer Parameters MIE-A.A 152

Date Of Last Magnetometer Calibration	23-OCT-2013,14:04		
Slope	X Magnetometer	Y Magnetometer	Z Magnetometer
	-1.000000	-1.011308	-1.009313
Offset	0.014784	-0.018048	0.011120

Magnetometer Constants MIE-A.A 152

Last Edited on

Magnetometer Calibrator Number 000

Accelerometer Parameters MIE-A.A 152

Date Of Last Accelerometer Calibration	22-OCT-2013,17:26		
Slope	X Accelerometer	Y Accelerometer	Z Accelerometer
	-1.115516	-1.113946	-1.107642
Offset	0.005263	0.007295	-0.003463

Accelerometer Constants MIE-A.A 152

Last Edited on 21-JAN-2014,11:23

Accelerometer Calibrator Number

000

## Accelerometer Temperature Characterisation

## X Accelerometer

Serial Number	507			
Calibration Date	17-Dec-2007			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	2.33131e-005	-3.14945e-008	1.78935e-010
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.78190e-004	5.47258e-007	-2.50879e-010

## Y Accelerometer

Serial Number	493			
Calibration Date	17-Dec-2007			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	-1.45357e-005	1.15075e-008	1.28767e-010
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.78988e-004	5.43234e-007	-1.61097e-010

## Z Accelerometer

Serial Number	477			
Calibration Date	17-Dec-2007			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	1.79322e-005	-8.77826e-009	6.28113e-011
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.74904e-004	6.33380e-007	-4.25536e-010

## Caliper Calibration MIE-A.A 152

Base Calibration on 21-JAN-2014,11:22

Field Calibration on 21-JAN-2014 12:19

## Base Calibration

Reading No	Pads 1-5 Meas.	Pads 3-7 Meas.	Calibrator Size (in)		
1	23924	24299	5.96		
2	34363	34920	7.98		
3	44375	44525	9.94		
4	55279	55401	11.90		
5	0	0	0.00		

Reading No	Pad 2 Meas.	Pad 4 Meas.	Pad 6 Meas.	Pad 8 Meas.	Calibrator Size (in)
1	24409	24570	25315	24442	5.96
2	33087	33317	33733	33230	7.98
3	41703	41529	42192	41868	9.94
4	50890	51070	51451	50730	11.90
5	0	0	0	0	0.00

## Field Calibration

Measured		Measured		Actual	
Pads 1-5 Caliper(in)		Pads 3-7 Caliper(in)		Caliper(in)	
6.09		6.01		5.96	

Measured		Measured		Actual	
Pad 2 Caliper(in)		Pad 4 Caliper(in)		Pad 8 Caliper(in)	
3.02		3.00		2.98	
				3.01	
				5.96	

## Caliper Constants MIE-A.A 152

Last Edited on 30-DEC-2011,10:36

Caliper Difference for BRKT 0.120 inches

## Induction Calibration MAI-C.A 401

Base Calibration on 21-JUL-2011 11:50

Field Check on

## Base Calibration

Test Loop Calibration Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	16.8	459.1	9.3	966.2
2	5.9	373.4	7.6	821.4
3	3.5	256.8	5.2	566.0
4	1.6	132.9	2.6	279.2

Array Temperature 74.5 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	-3.7	2106.2		
2	14.5	1928.5		
3	11.5	1017.0		

3	14.5	1647.0
4	10.6	1108.9
Deep	8.3	1053.6
Medium	22.7	2184.2
Shallow	22.1	2881.5

Array Temperature 90.9

Deg F

Induction Constants MAI-C.A 401

Last Edited on 23-JAN-2014,00:01

Induction Model	RtAP-WBM		
Caliper for Borehole Corr.	Bit Size		
Hole Size for Borehole Correction	N/A	inches	
Tool Centred	No		
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	
Borehole Corr. Rm Source	Temperature Corr		
Temp. for Rm Corr.	Borehole Temp. Unfilt.		
Squasher Start	0.0020	mhos/metre	
Squasher Offset	N/A		
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	

Apparent Porosity and Water Saturation Constants			
Archie Constant (A)	1.00		
Cementation Exponent (M)	2.00		
Saturation Exponent (N)	2.00		
Saturation of Water for Apor	100.00	percent	
Resistivity of Water for Apor and Sw	0.05	ohm-m	
Resistivity of Mud Filtrate for Sw	0.00	ohm-m	
Source for Rt	0.00		
Source for Rxo	0.00		

Caliper Calibration MPD-D.A 410

Base Calibration on 03-DEC-2013,15:21  
Field Calibration on 19-JAN-2014 17:37

Base Calibration			
Reading No	Measured	Calibrator Size (in)	
1	16379	4.01	
2	25748	5.96	
3	35807	7.98	
4	45926	9.94	
5	56769	11.90	
6	N/A	N/A	
Field Calibration			
	Measured Caliper (in)	Actual Caliper (in)	
	7.95	7.98	

Spectral Gamma Calibration SGS-E.J 128

Base Calibration on 21-JAN-2014,12:43  
Field Calibration on 21-JAN-2014,12:43

Base Calibration					
Potassium Calibrator					
	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	152.7	53.5	5.8	1.8	2.9
Calibrator (Gross)	288.3	145.3	31.8	3.1	3.1
Calibrator (Net)	135.6	91.8	26.0	1.3	0.2

Concentrations

K %  
5.9

U ppm  
0.0

Th ppm  
0.0

Uranium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	152.7	53.5	5.8	1.8	2.9
Calibrator (Gross)	611.7	218.9	19.7	12.4	6.2
Calibrator (Net)	459.0	165.4	13.9	10.6	3.3

Concentrations

K %  
0.0

U ppm  
16.6

Th ppm  
0.0

Thorium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	152.7	53.5	5.8	1.8	2.9
Calibrator (Gross)	474.2	174.3	14.4	7.6	18.0
Calibrator (Net)	321.5	120.8	8.6	5.8	15.2

Concentrations

K %  
0.0

U ppm  
0.0

Th ppm  
44.7

Mixture Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	152.7	53.5	5.8	1.8	2.9
Calibrator (Gross)	950.5	384.4	50.5	14.9	20.8
Calibrator (Net)	797.9	330.9	44.7	13.1	17.9

Field Calibration

Gamma Ray

	Measured	Calibrated (API)
Background	223	45
Calibrator (Gross)	1428	285
Calibrator (Net)	1205	240

Mixture Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	152.7	53.5	5.8	1.8	2.9
Calibrator (Gross)	950.5	384.4	50.5	14.9	20.8
Calibrator (Net)	797.9	330.9	44.7	13.1	17.9

Spectral Gamma Constants SGS-E.J 128

Last Edited on 21-JAN-2014,12:40

Background Calibrator Number	440	
Mixture Calibrator Number	450	
Potassium Calibrator Number	500	
Uranium Calibrator Number	506	
Thorium Calibrator Number	503	
Mud Density	1.22	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

DOWNHOLE EQUIPMENT

F:\Razor 26k-2306b\cmitsgs\_008.dta

Shuttle Running Tool 3.5" )  
SRT-A.A 57 LG: 6.62 ft WT: 37.5 lb OD: 2.52 in

MIS-E.B Compact Inline Standoff sub  
MIS-E.B 716 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Linker 400v mbs  
MLK-E.A 117 LG: 14.24 ft WT: 99.2 lb OD: 2.24 in



Compact Linker 200 v std batt w xover  
MLK-D.A 104 LG: 10.55 ft WT: 30.9 lb OD: 2.24 in

SKJ-E.A Compact Knuckle Joint  
SKJ-E.A 455 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

MBS-F.A 200v Compact Battery Sub  
MBS-F.A 130 LG: 17.06 ft WT: 123.5 lb OD: 2.24 in

Compact Memory Sub F.A  
MMS-F.A 247 LG: 5.20 ft WT: 37.5 lb OD: 2.24 in

Compact Tool Isolator sub.  
MTI-B.A 49 LG: 1.54 ft WT: 13.2 lb OD: 2.24 in

Compact Short Gamma  
MGS-D.A 216 LG: 3.41 ft WT: 24.3 lb OD: 2.24 in

Compact Collar Locator  
MCL-C.A 121 LG: 3.17 ft WT: 26.5 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint  
SKJ-E.B 581 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SHA-J.B Compact Swivel Head Adaptor  
SHA-J.B 582 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

MIS-D.B Compact Inline Bowspring sub  
MIS-D.B 722 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

Compact Neutron  
MDN-C.A 399 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper  
MPD-D.A 410 LG: 9.59 ft WT: 90.4 lb OD: 2.24 in

MIS-D.B Compact Inline Bowspring sub  
MIS-D.B 720 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SHA-J.B Compact Swivel Head Adaptor  
SHA-J.B 549 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint  
SKJ-E.B 580 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

MIS-E.B Compact Inline Standoff sub  
MIS-E.B 718 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint  
SKJ-E.B 579 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

MIS-D.A Compact Inline Bowspring sub  
MIS-D.A 721 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in



95.68 ft  
93.69 ft

GRGM - MGS Gamma Ray  
GSX1 - MGS External Temperature

69.5 / ft

CLLDC - Density Caliper

Compact MMI Memory Section  
 MIM-A.A 152 LG: 4.65 ft WT: 26.5 lb OD: 2.24 in

Compact MMI Electrode Section  
 MIE-A.A 152 LG: 13.96 ft WT: 99.2 lb OD: 4.09 in

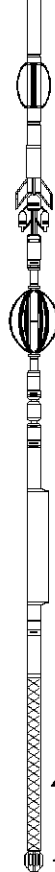
MIS-D.A Compact Inline Bowspring sub  
 MIS-D.A 324 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SKJ-E.A Compact Knuckle Joint  
 SKJ-E.A 474 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

Spectral Gamma Ray Sub  
 SGS-E.J 128 LG: 7.78 ft WT: 105.8 lb OD: 3.54 in

Compact Induction  
 MAI-C.A 401 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 156.11 ft Weight: 1142.0 lb



3.34 ft R60F - Array Ind. Four Res 60  
 3.34 ft R40F - Array Ind. Four Res 40  
 3.34 ft R30F - Array Ind. Four Res 30  
 3.34 ft R20F - Array Ind. Four Res 20  
 3.34 ft R85F - Array Ind. Four Res 85  
 3.34 ft R1AF - Array Ind. Four Res Rt  
 Tool Zero (0.13ft from bottom)  
 All measurements relative to tool zero.

COMPANY	WHITING OIL AND GAS CORPORATION
WELL	RAZOR 26-2306B
FIELD	REDTAIL
PROVINCE/COUNTY	WELD
COUNTRY/STATE	U.S.A. / COLORADO

Elevation Kelly Bushing	4759.50	feet	First Reading	12591.00	feet
Elevation Drill Floor	4759.50	feet	Depth Driller	13220.00	feet
Elevation Ground Level	4737.00	feet	Depth Logger	12661.00	feet



**Weatherford**<sup>®</sup>

CML MESSENGER SHUTTLE  
 ARRAY INDUCTION  
 ELECTRIC LOG