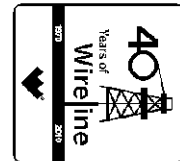




Weatherford[®]

**CML IMPULSE SHUTTLE
ARRAY INDUCTION
LOG**

COMPANY **SANDRIDGE E&P LLC**
WELL **BROCK 3418 1-24H**
FIELD **HAAS WEST**
PROVINCE/COUNTY **COMANCHE**
COUNTRY/STATE **USA / KANSAS**
LOCATION **SHL: 200' FSL & 1000' FEL**
BHL: 330' FNL & 1000' FEL



SEC 24	TWP 34S	RGE 18W	Other Services MPD/MDN	Elevations: KB 1883.50 DF 1883.50 GL 1864.00
API Number 15-033-21639-01				
Permit Number				
Permanent Datum G.L., Elevation 1864 feet				
Log Measured From DF				
Drilling Measured From DF @ 19.5 FEET				
Date	16-JUN-2012			

Run Number	ONE	
Depth Driller	9747.00	feet
Depth Logger	9747.00	feet
First Reading	9730.00	feet
Last Reading	3500.00	feet
Casing Driller	5840.00	feet
Casing Logger	5840.00	feet
Bit Size	6.125	inches
Hole Fluid Type	WATER	
Density / Viscosity	8.30 lb/USg	33.00 CP
PH / Fluid Loss	10.00	60.00 ml/30Min
Sample Source	FLOWLINE	
Rm @ Measured Temp	0.60 @ 98.0	ohm-m
Rmf @ Measured Temp	0.48 @ 98.0	ohm-m
Rmc @ Measured Temp	0.72 @ 98.0	ohm-m
Source Rmf / Rmc	CALC	CALC
Rm @ BHT	0.43 @ 135.0	ohm-m
Time Since Circulation	0 HOURS	
Max Recorded Temp	135.00	deg F
Equipment Name	COMPACT	
Equipment / Base	18006	OKC
Recorded By	D. ROWELL	
Witnessed By	K. GENTRY	
S.O.# AFE	3535163 / DC12080	

BOREHOLE RECORD

Last Edited: 16-JUN-2012 21:59

Bit Size inches	Depth From feet	Depth To feet
6.125	5840.00	9747.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
INTERMED	7.000	0.00	5840.00	26.00

REMARKS

WLS SOFTWARE VERSION 12.02.4401 USED.
 200V COMPACT MEMORY LOGGING - SHUTTLE IMPULSE SYSTEM

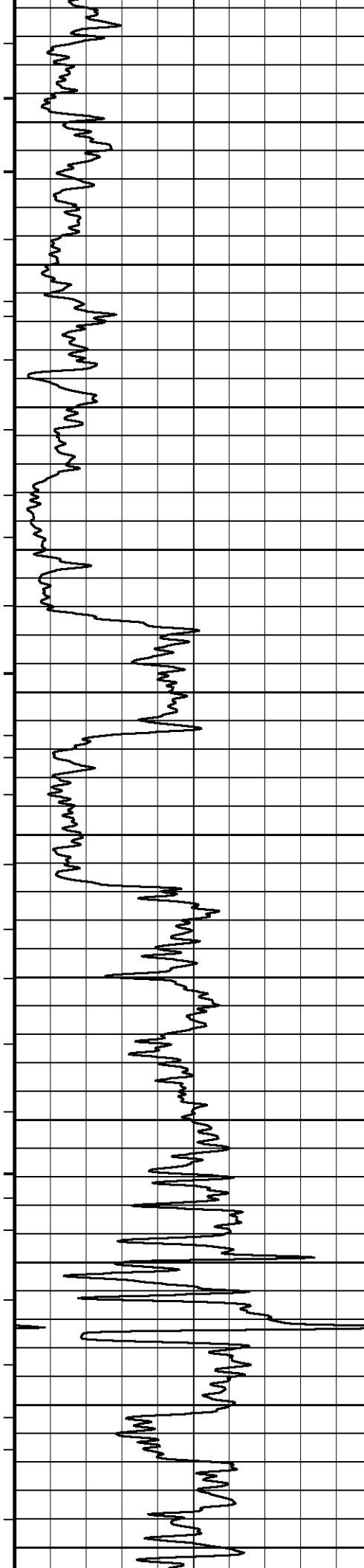
HARDWARE: BHA: SMS, SLS, SSS, 3 JOINTS OF 3.5" IF GARAGE PIPE, SLL, SUL, 3.5" DP, SFV, 3.5" DP

MPD: ECCENTRALISED SINGLE MIS.D, SHA, SKJ (BOTTOM)
 MDN: SKJ, SHA, ECCENTRALISED DOUBLE MIS.D (TOP)
 MFE: 0.5" STANDOFF - MIS.E INLINE STANDOFF (TOP), MIS.E INLINE STANDOFF (BOTTOM)
 MAI: 0.5" STANDOFF- MIS.E INLINE STANDOFF (TOP), INDUCTION STANDOFF ASSEMBLY (BOTTOM)

DEPTH MEASURED USING ADVANTAGE RIG DEPTH SYSTEM CORRECTED TO PIPE STRAP. VERIFIED WITH MWD LOGS.

TOOLS DEPLOYED WITH END OF BHA AT : 9643FT.
 AFTER DEPLOYMENT LOGGING TOOL WAS AT: 9730FT.

CHOLORIDES 10000 Mg/L



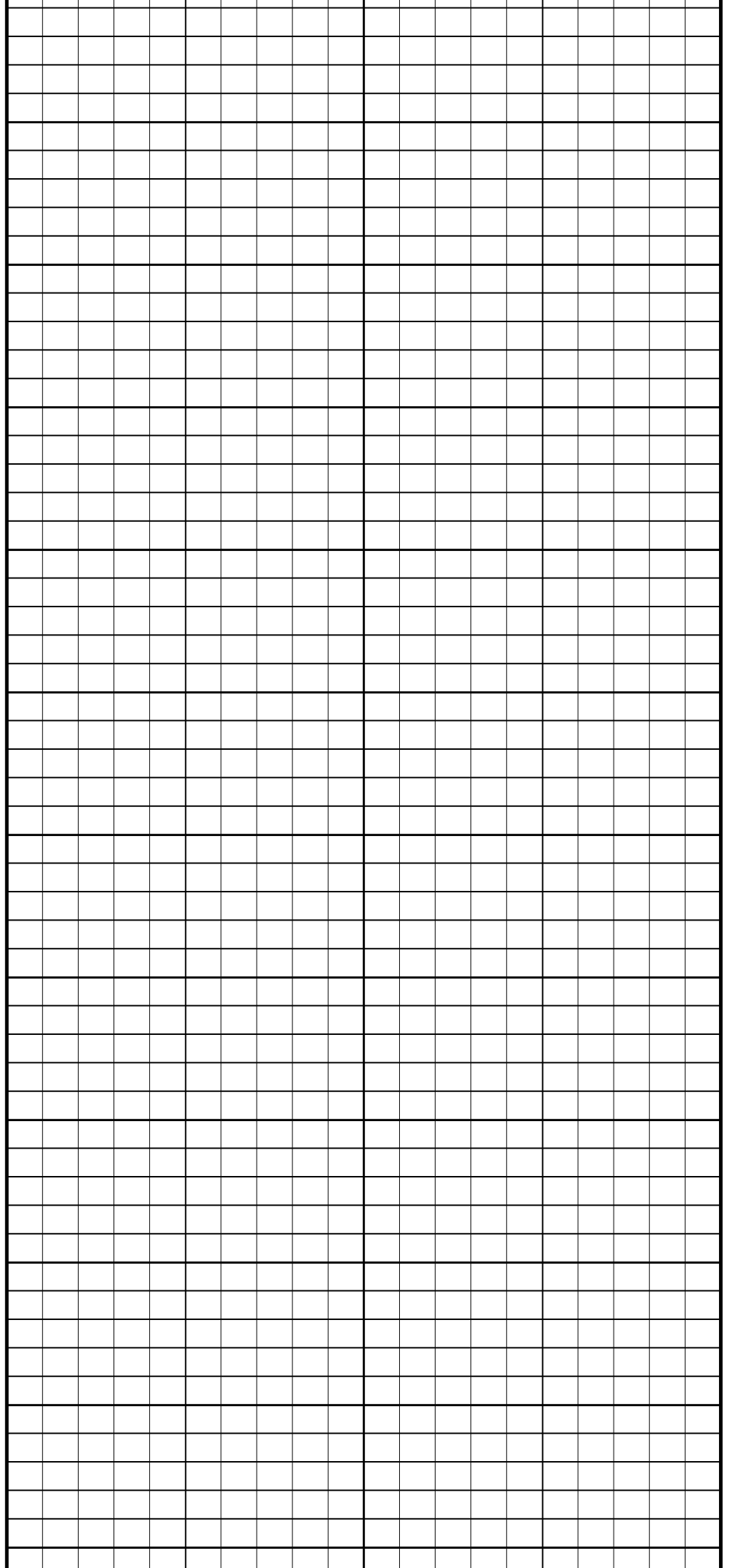
3800

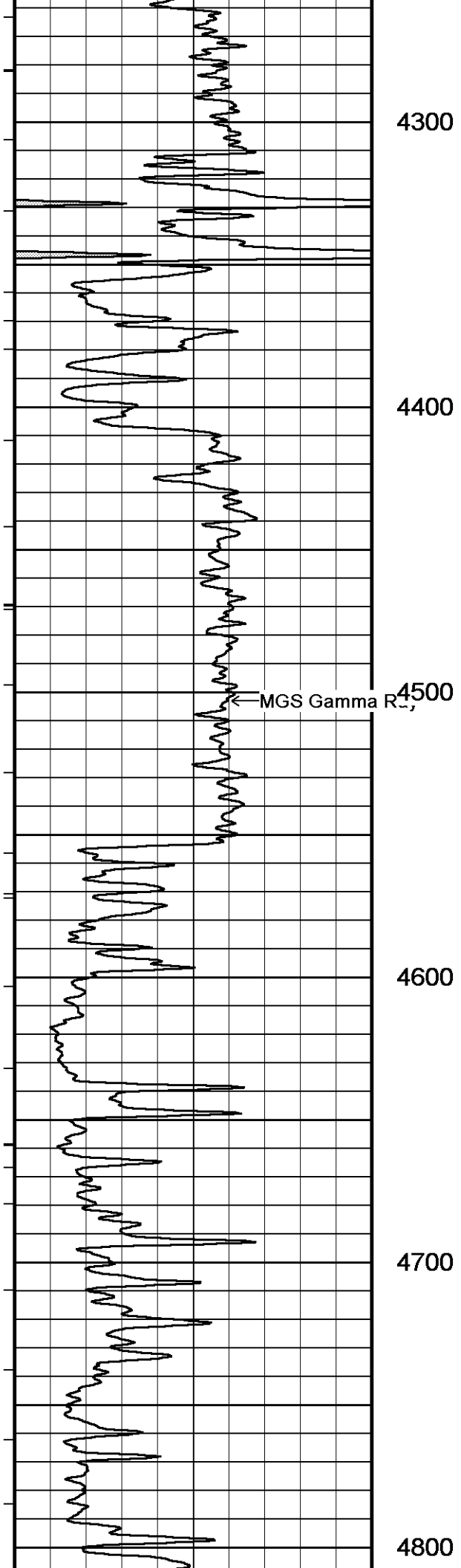
3900

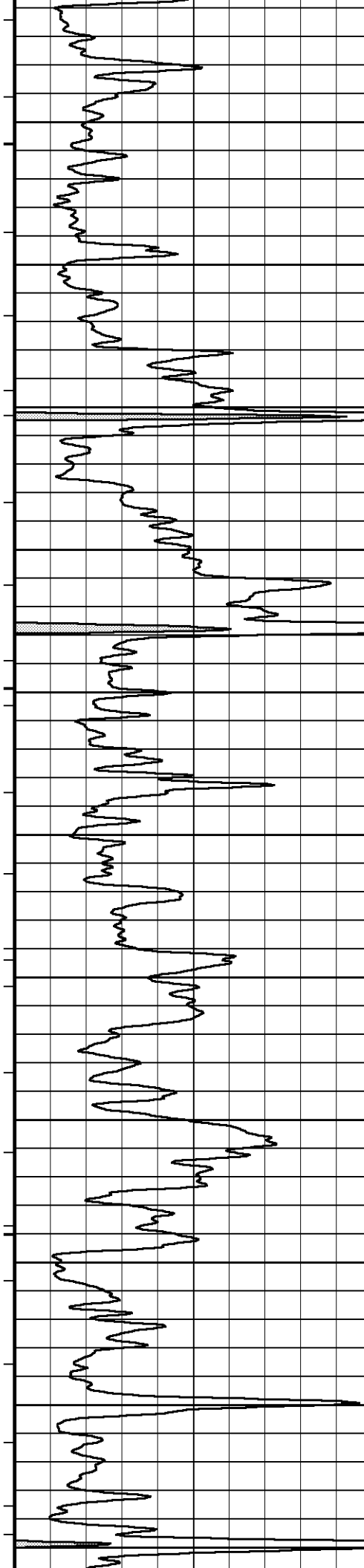
4000

4100

4200







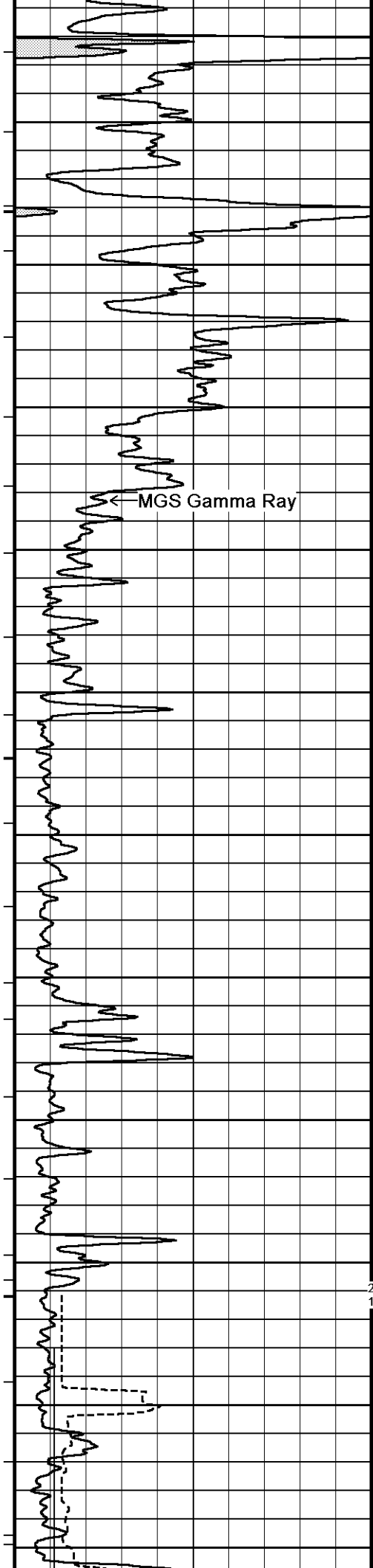
4900

5000

5100

5200

5300



5400

5500

5600

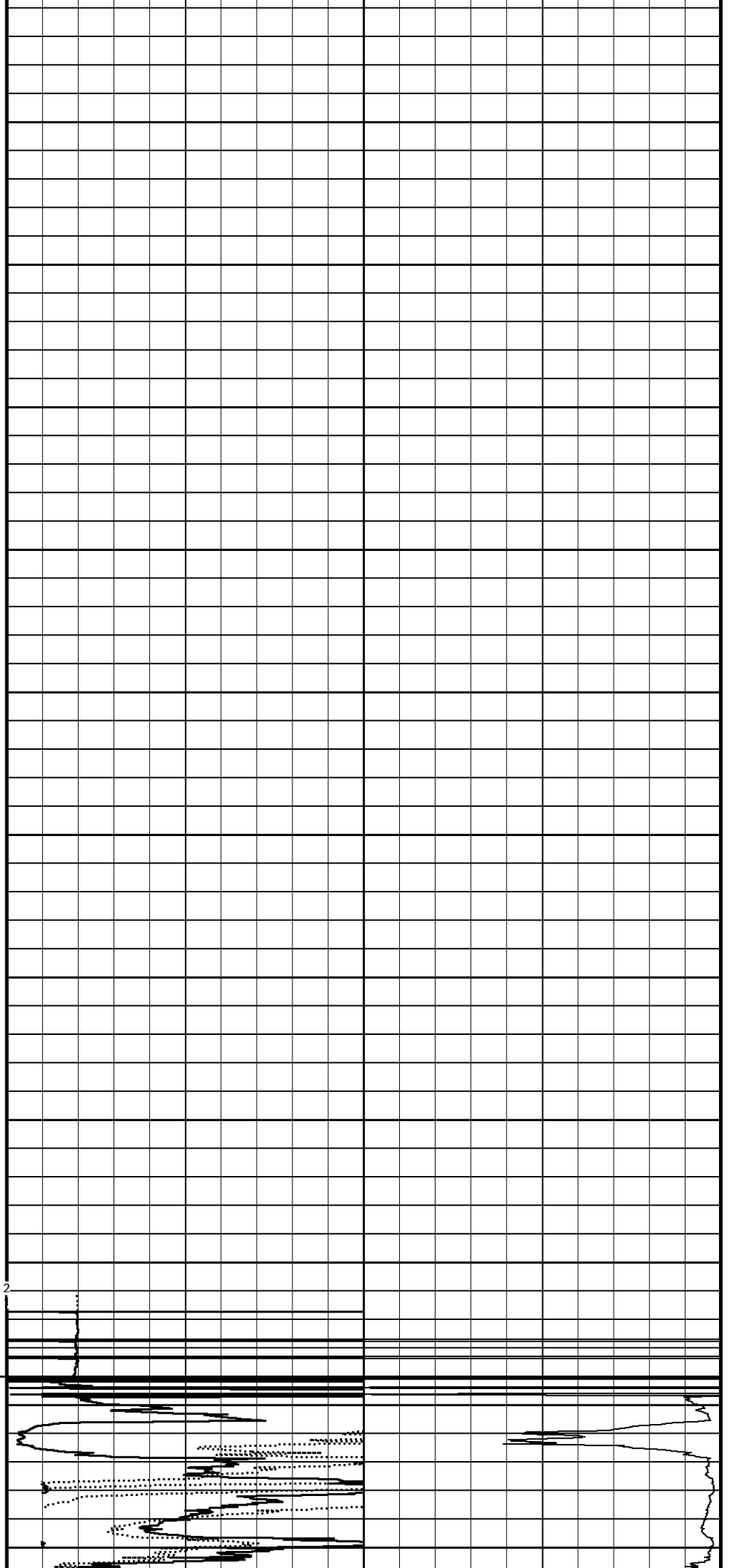
5700

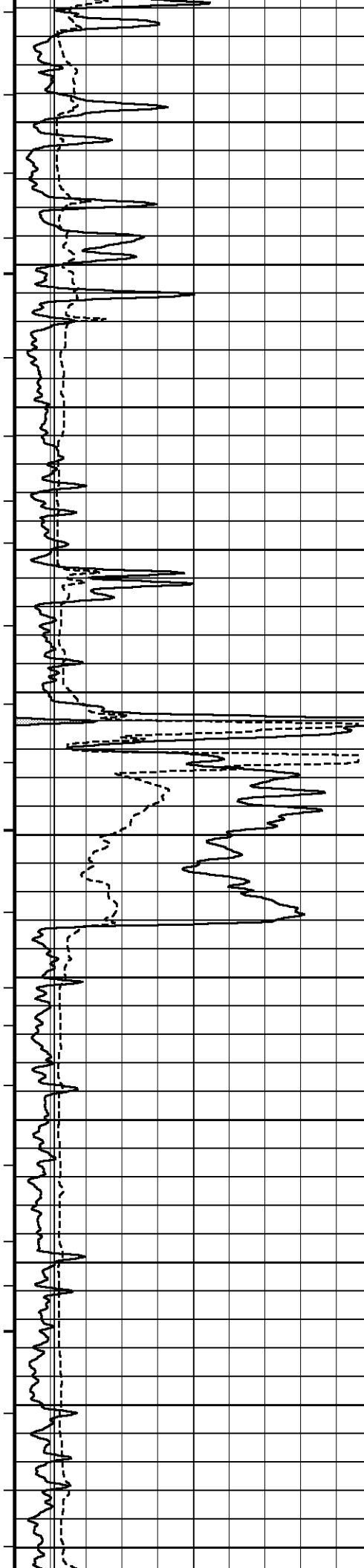
5800

Casing Shoe

133°

5900





133°

6000

133°

6100

134°

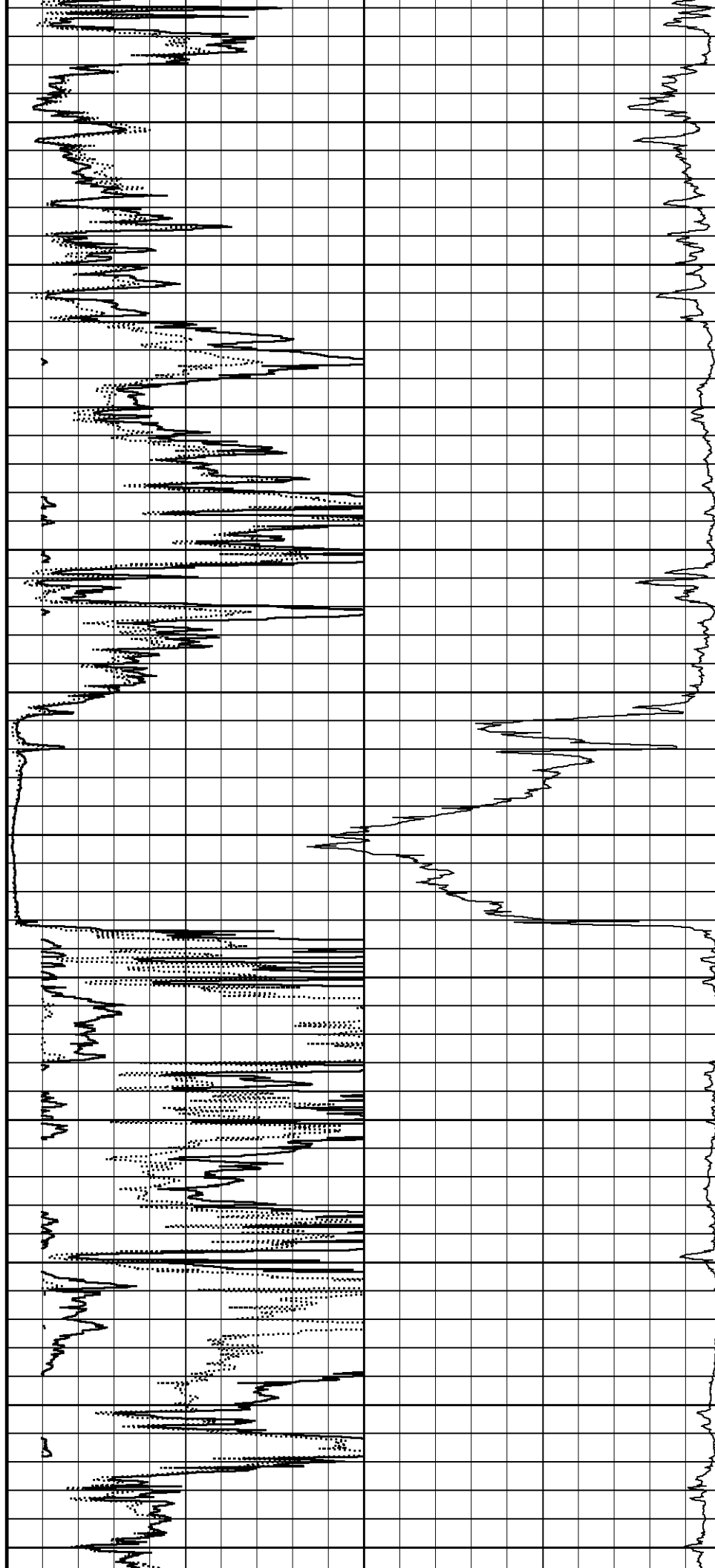
6200

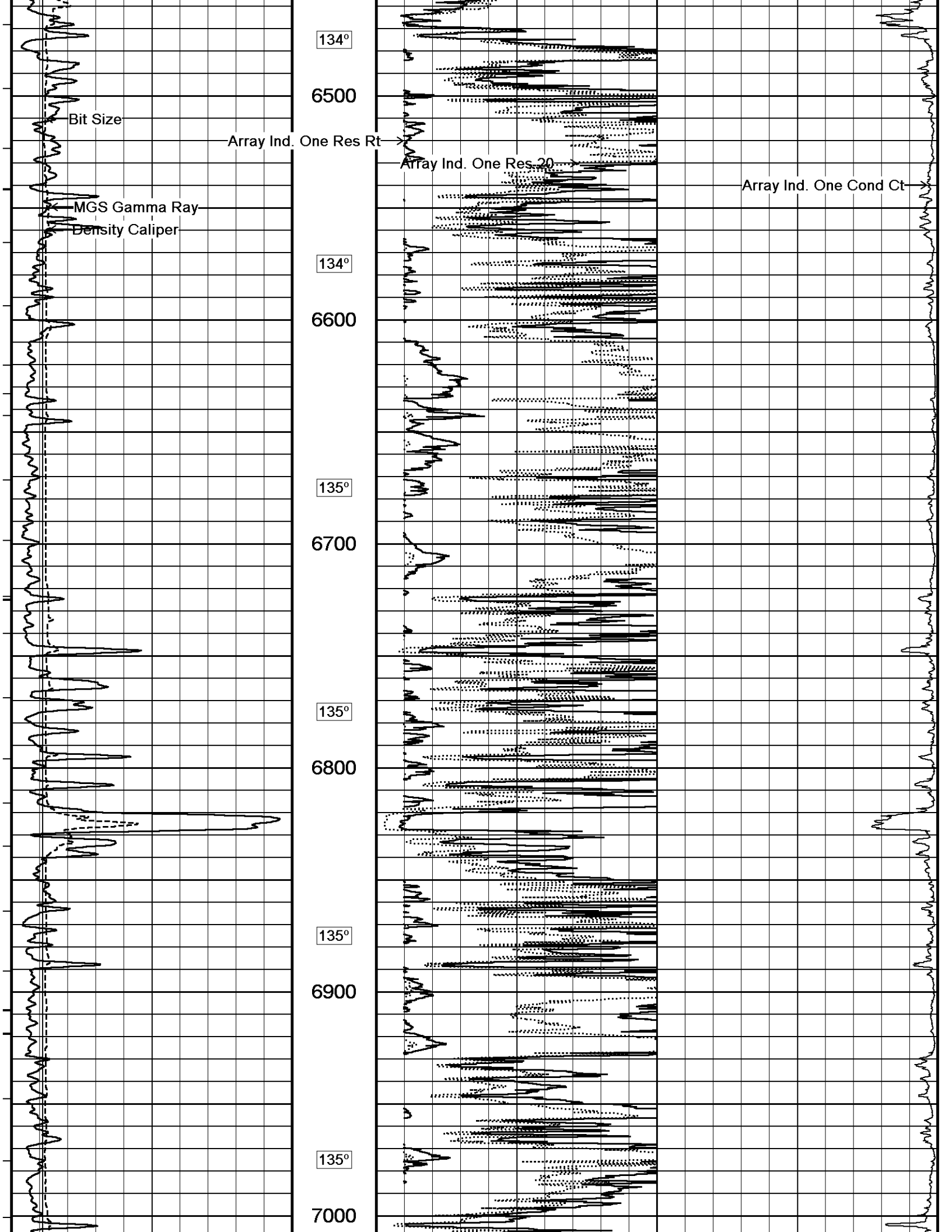
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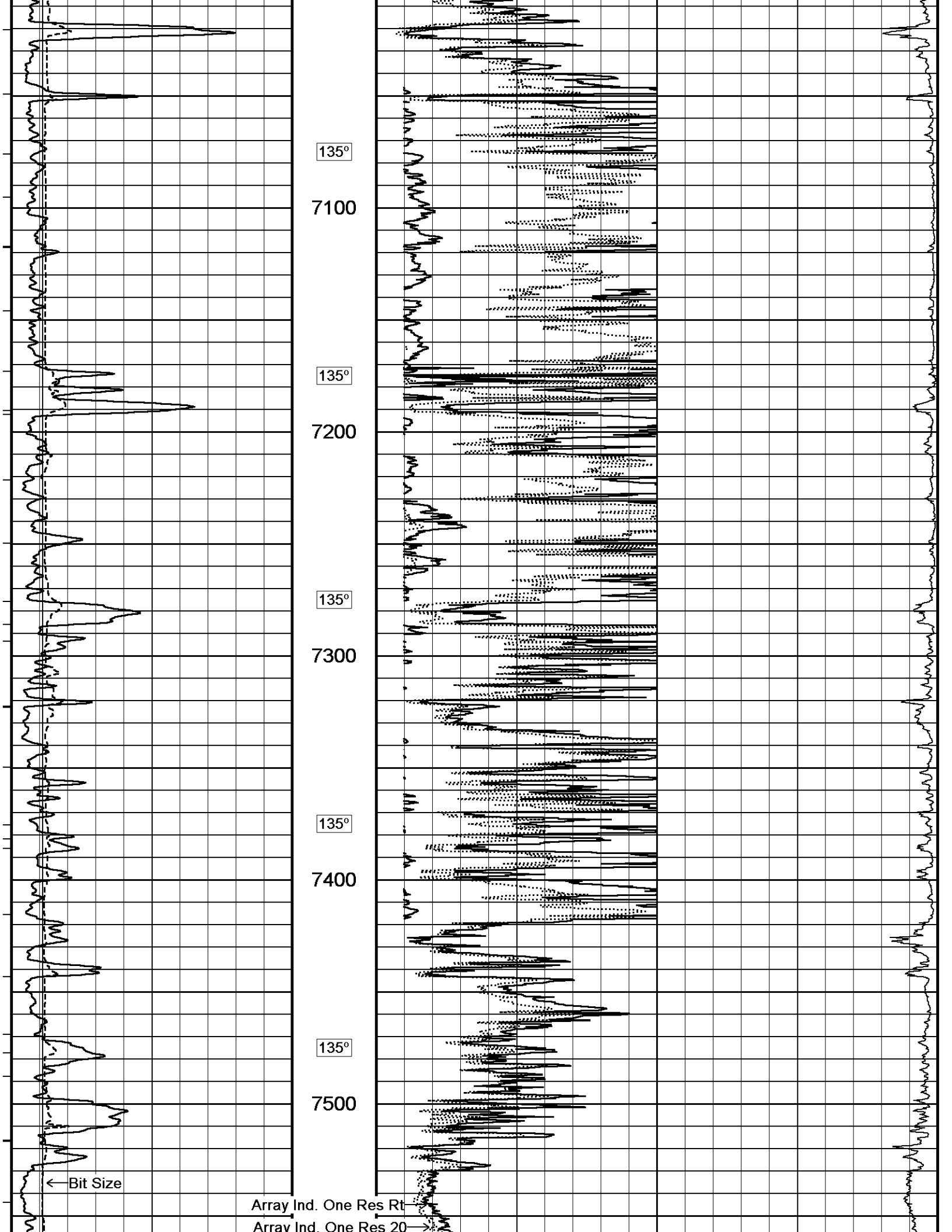
6300

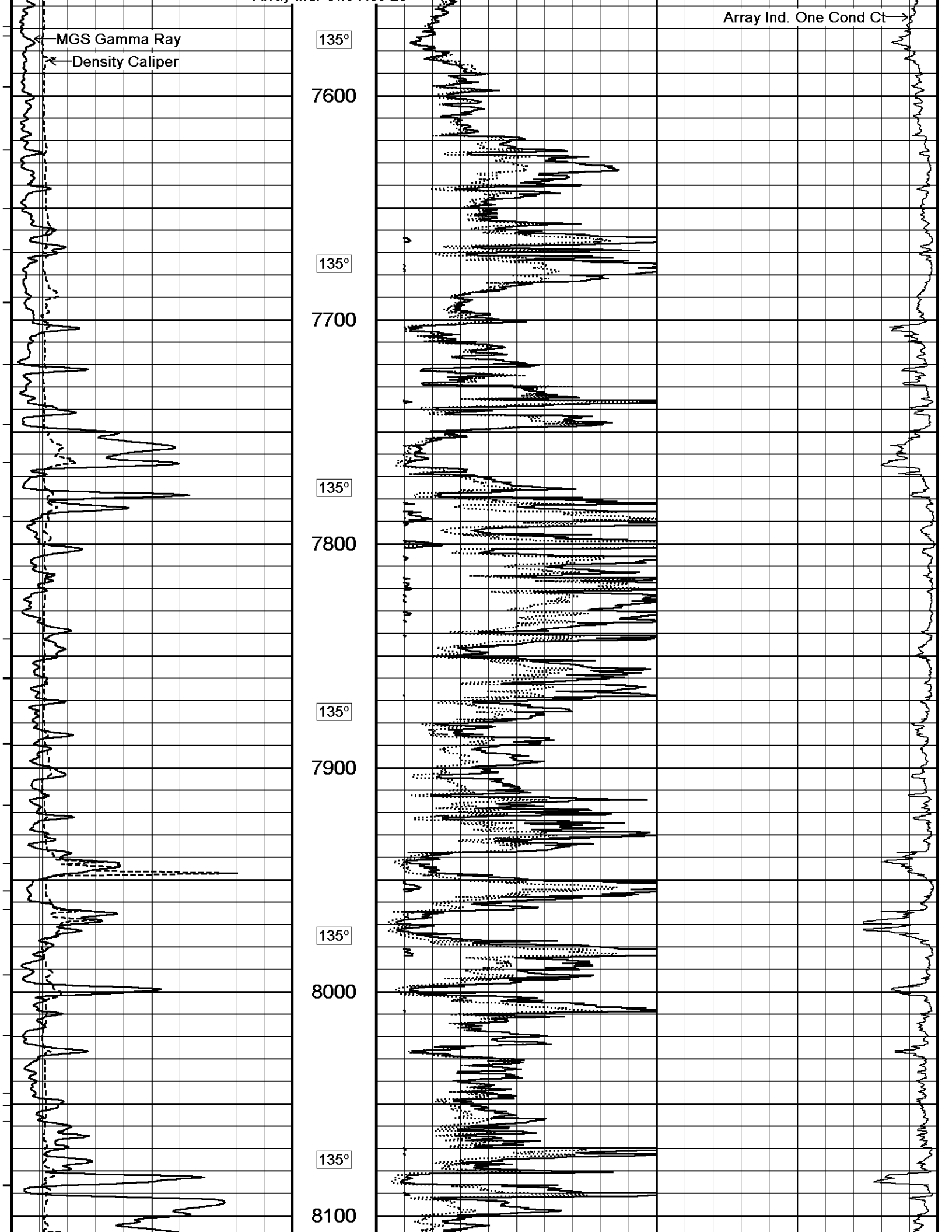
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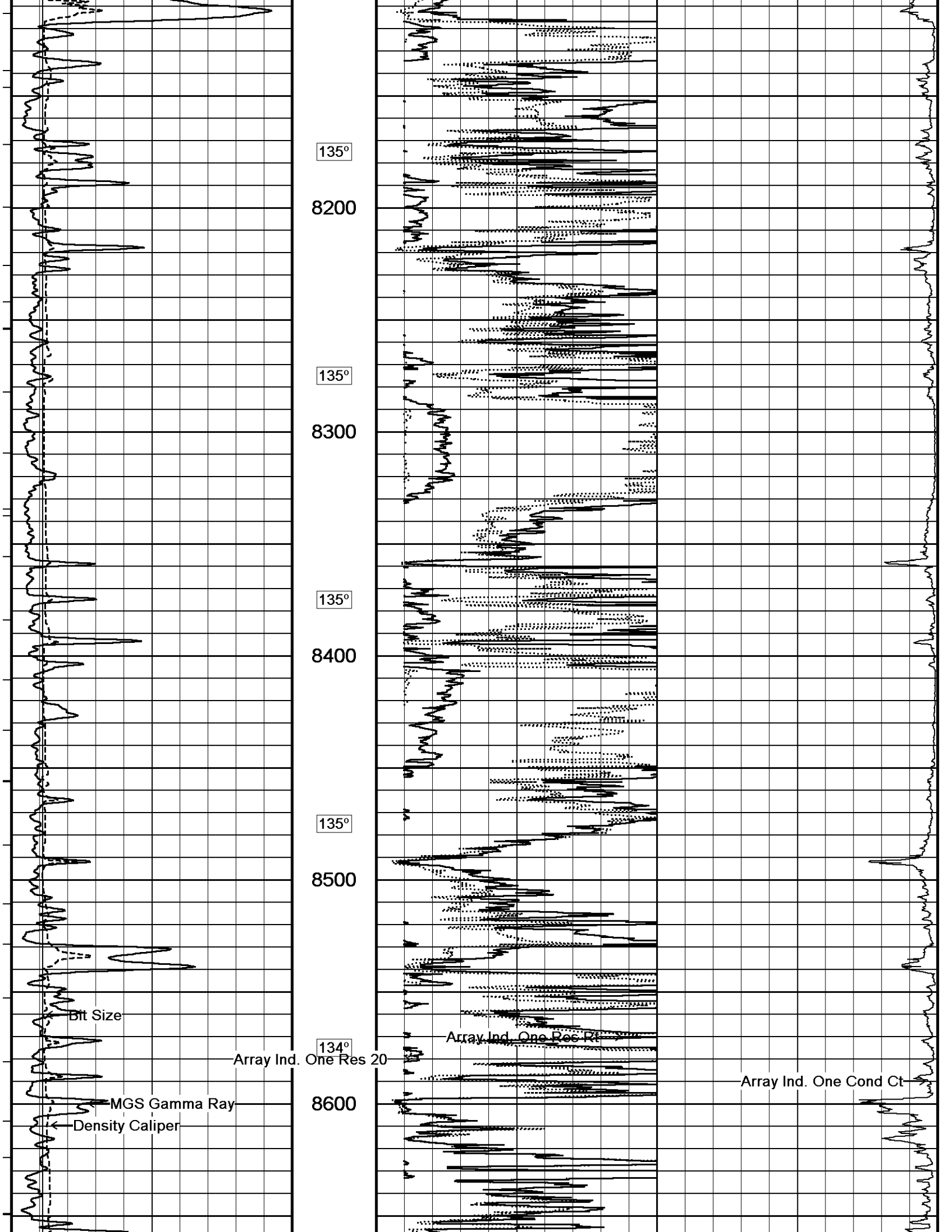
6400











135°

8200

135°

8300

135°

8400

135°

8500

134°

8600

Bit Size

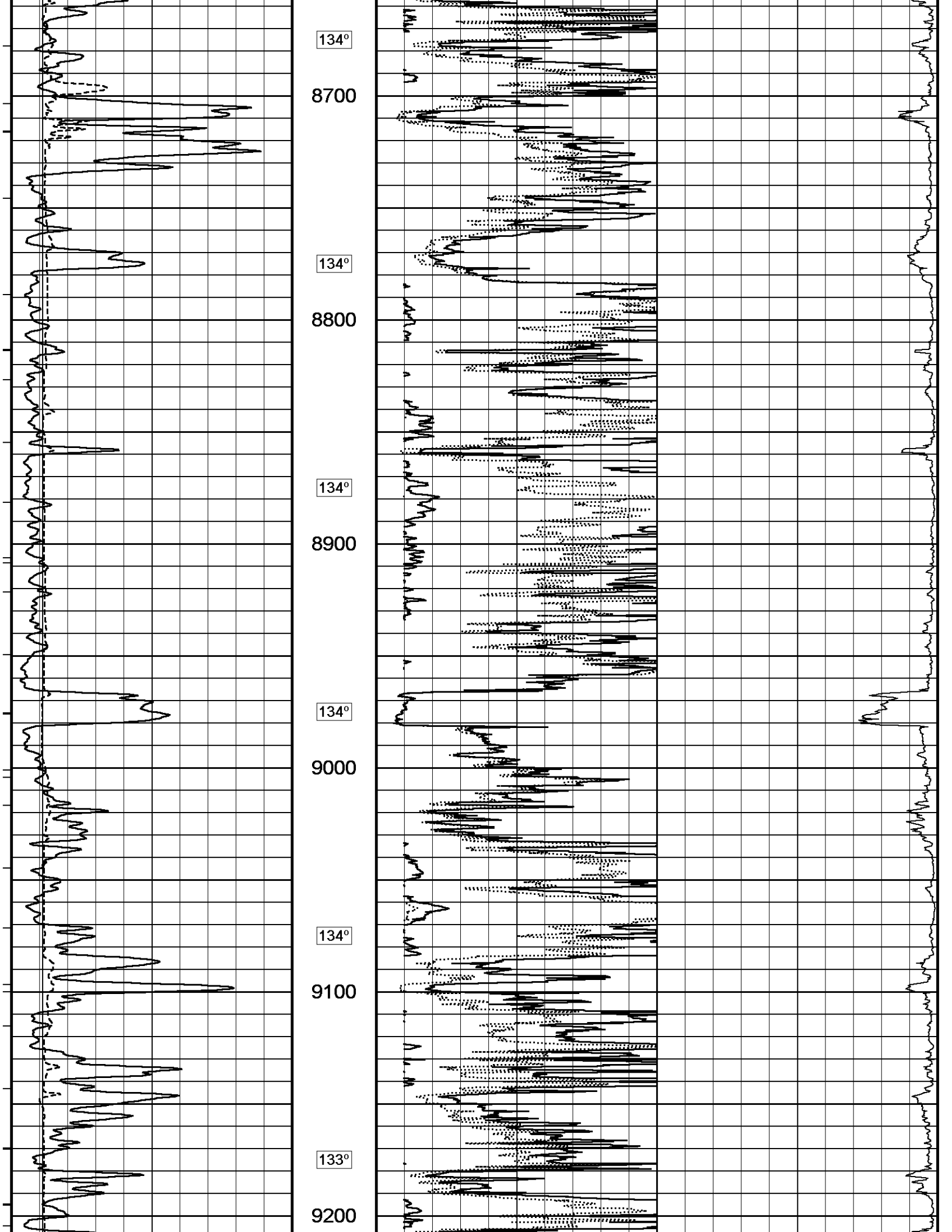
Array Ind. One Res 20

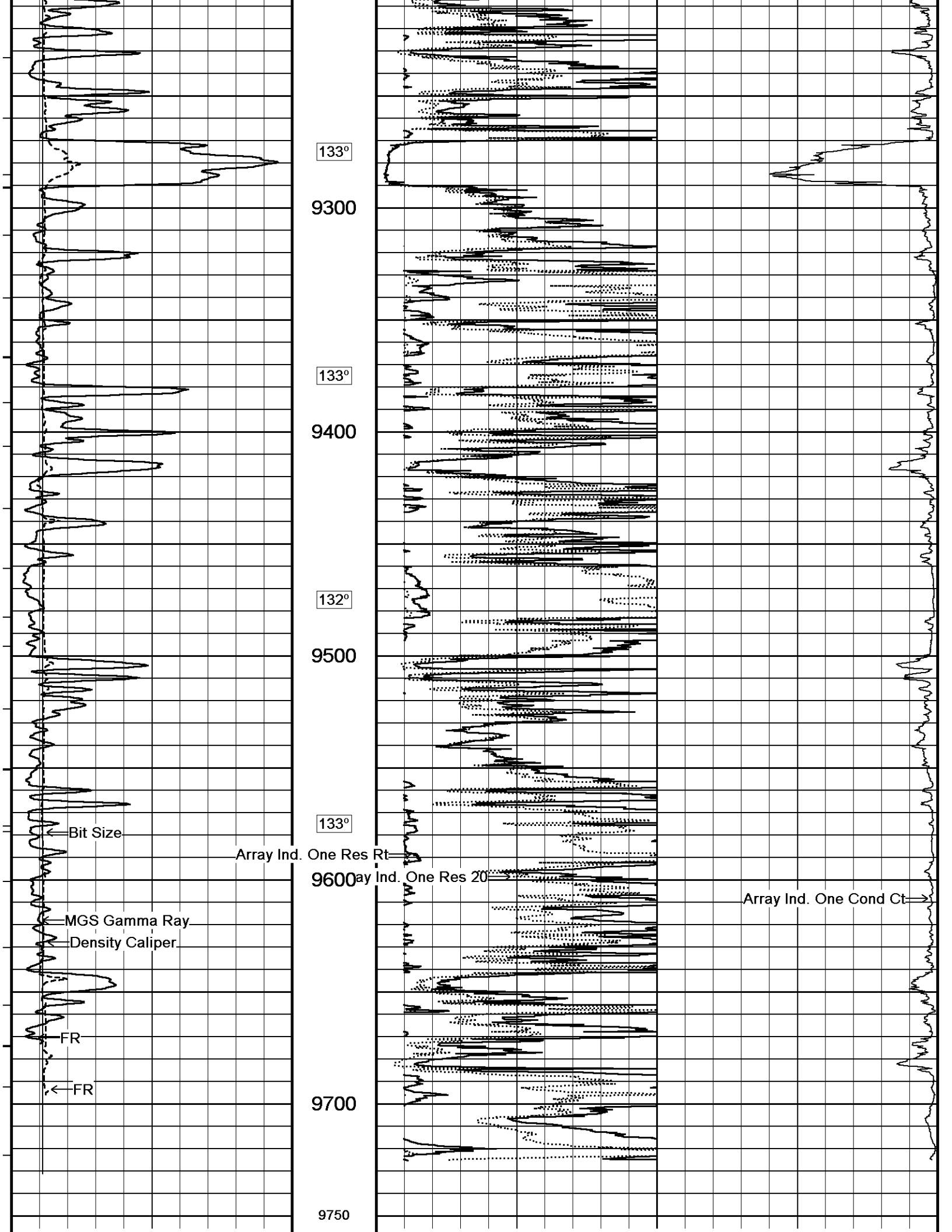
Array Ind. One Res Pt

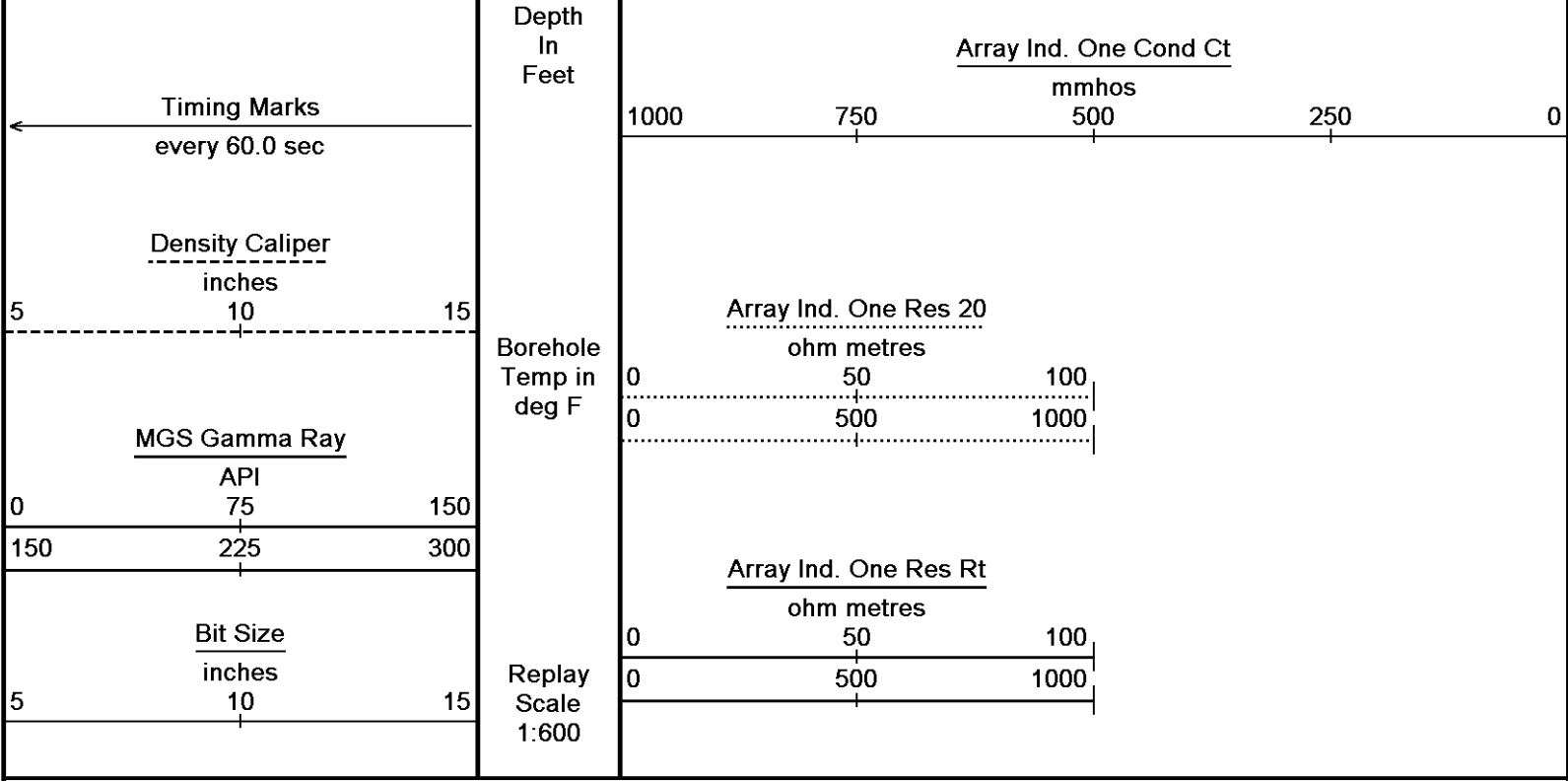
Array Ind. One Cond Ct

MGS Gamma Ray

Density Caliper





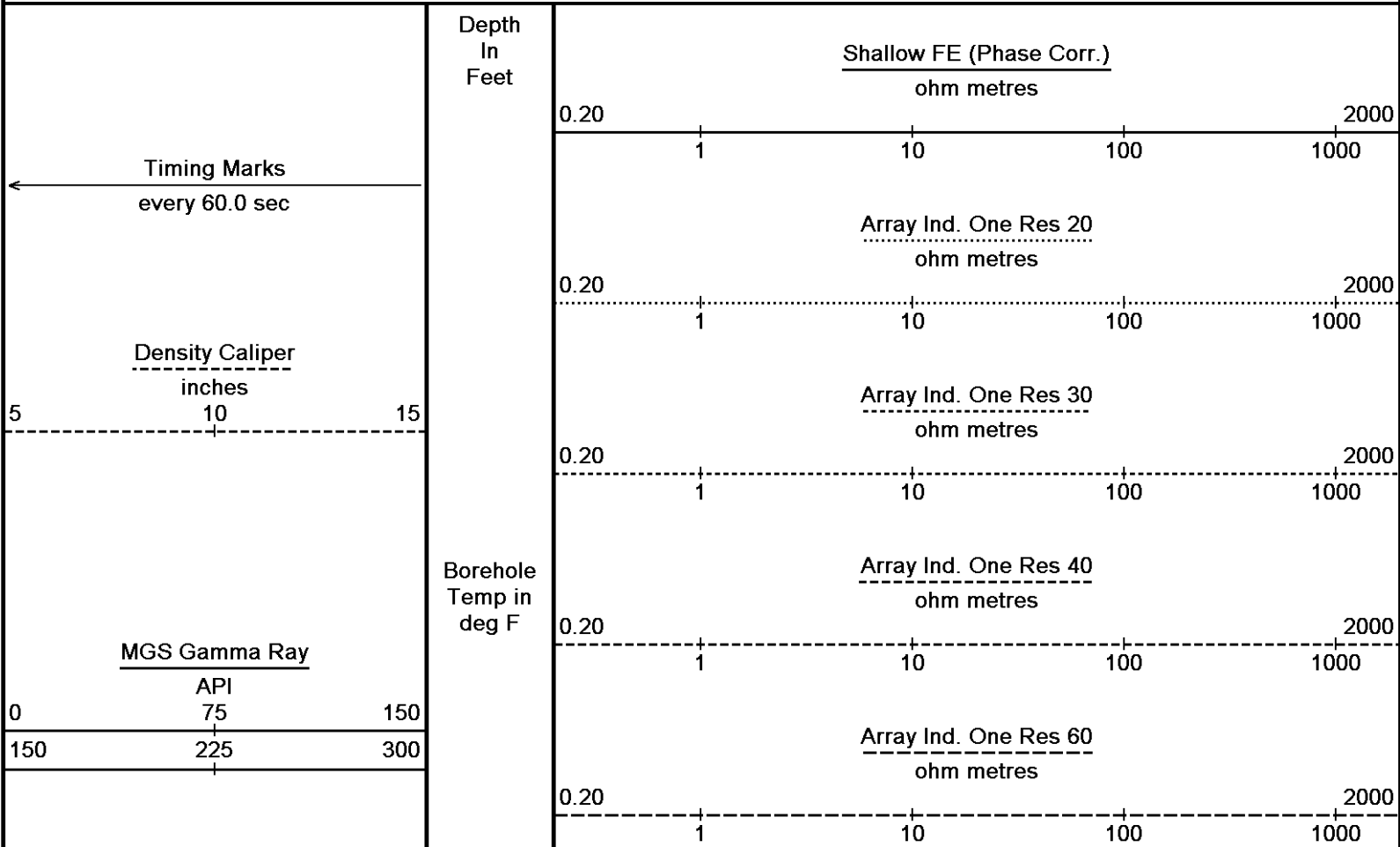


Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 17-JUN-2012 14:55
 Filename: C:\Minimus 12.02.4401\Data\SDRGE (BROCK 3418 1-24H)\32543 RTAP GOOD.dta Recorded on 17-JUN-2012 13:40
 System Versions: Processed with 12.02.4401 Plotted with 12.02.4401

↑ DSC ↑

↓ DSC ↓

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 17-JUN-2012 14:55
 Filename: C:\Minimus 12.02.4401\Data\SDRGE (BROCK 3418 1-24H)\32543 RTAP GOOD.dta Recorded on 17-JUN-2012 13:40
 System Versions: Processed with 12.02.4401 Plotted with 12.02.4401



Bit Size
inches
10

5 15

Array Ind. One Res 85
ohm metres
0.20 1 10 100 2000

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

Replay
Scale
1:240

5800

Casing
Side

5850

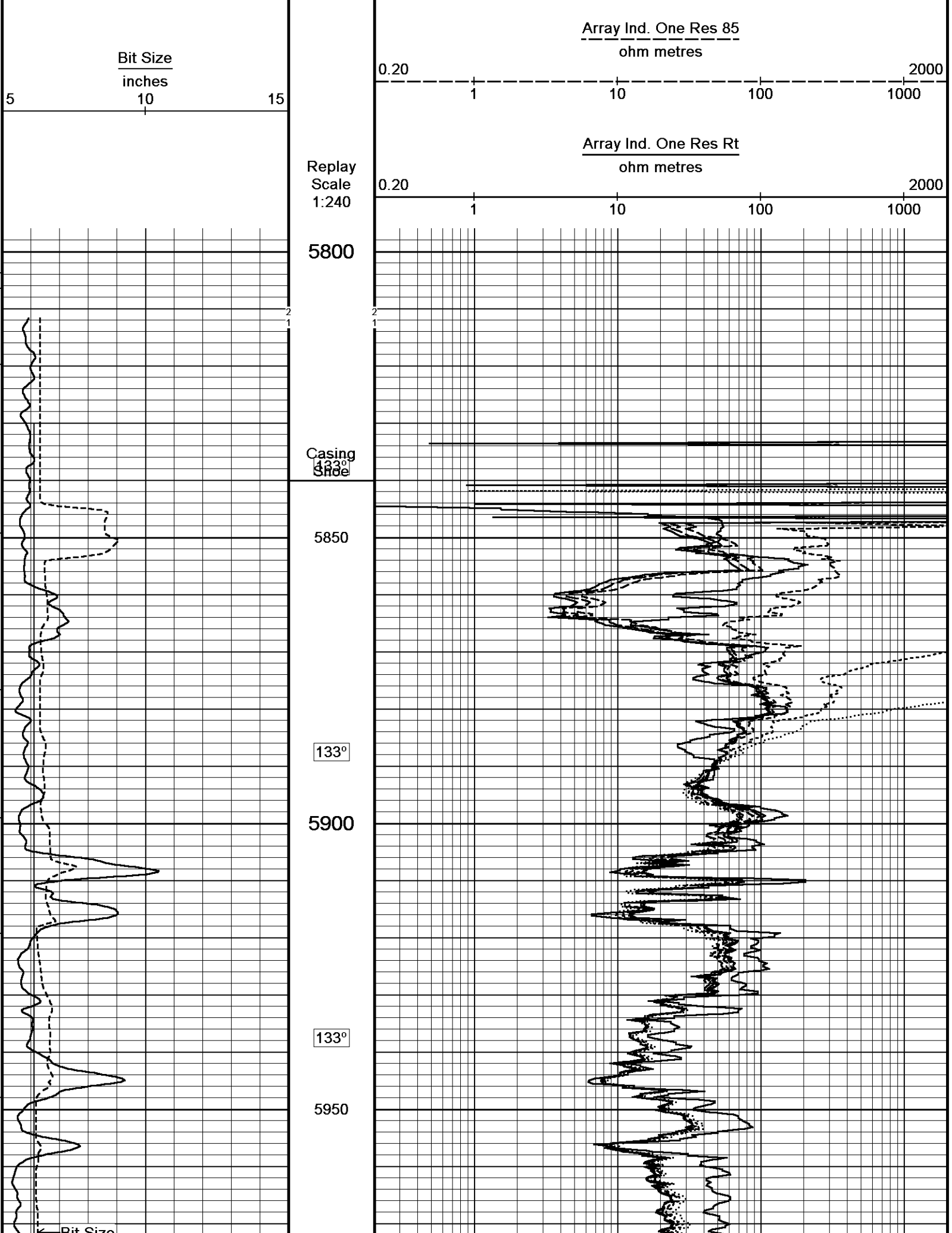
133°

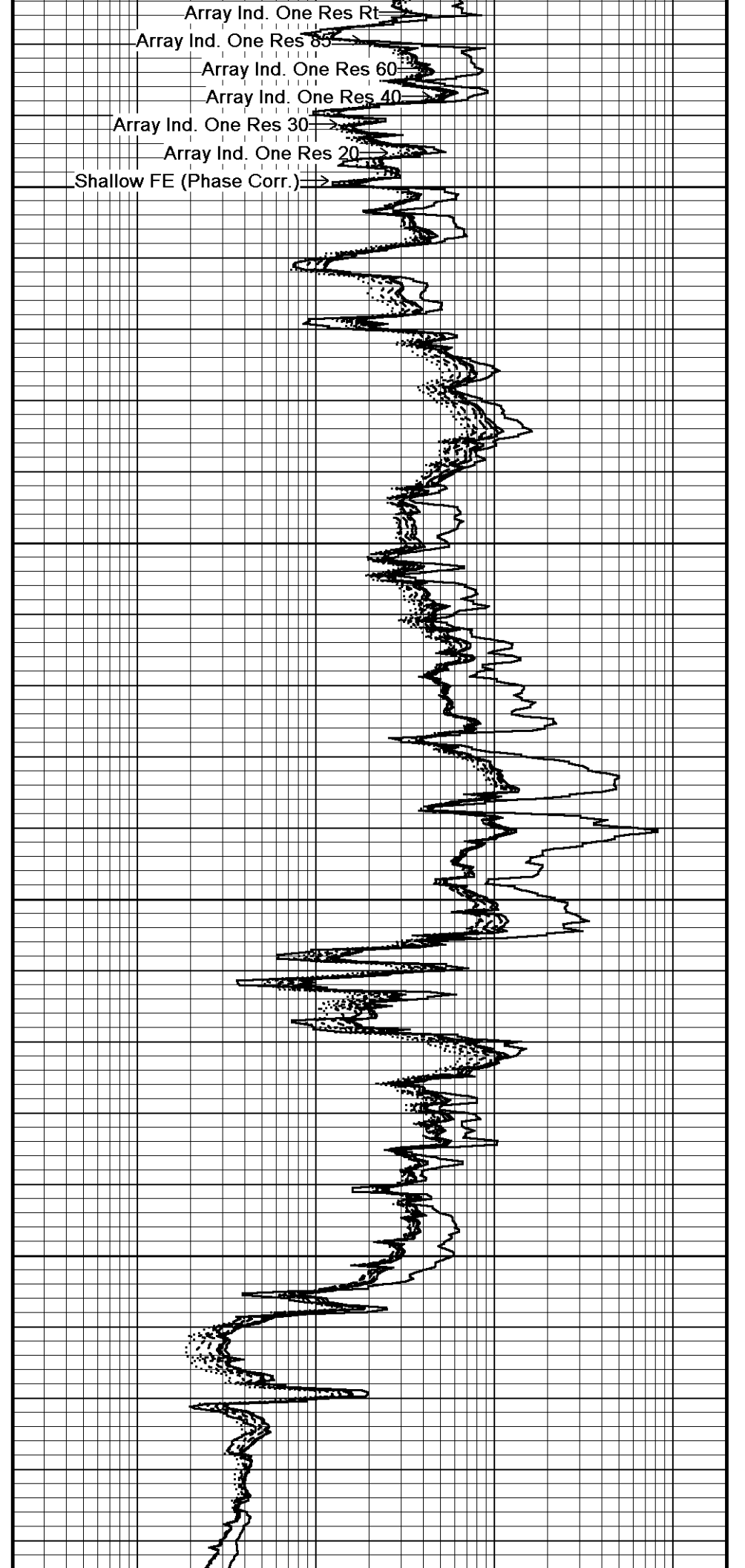
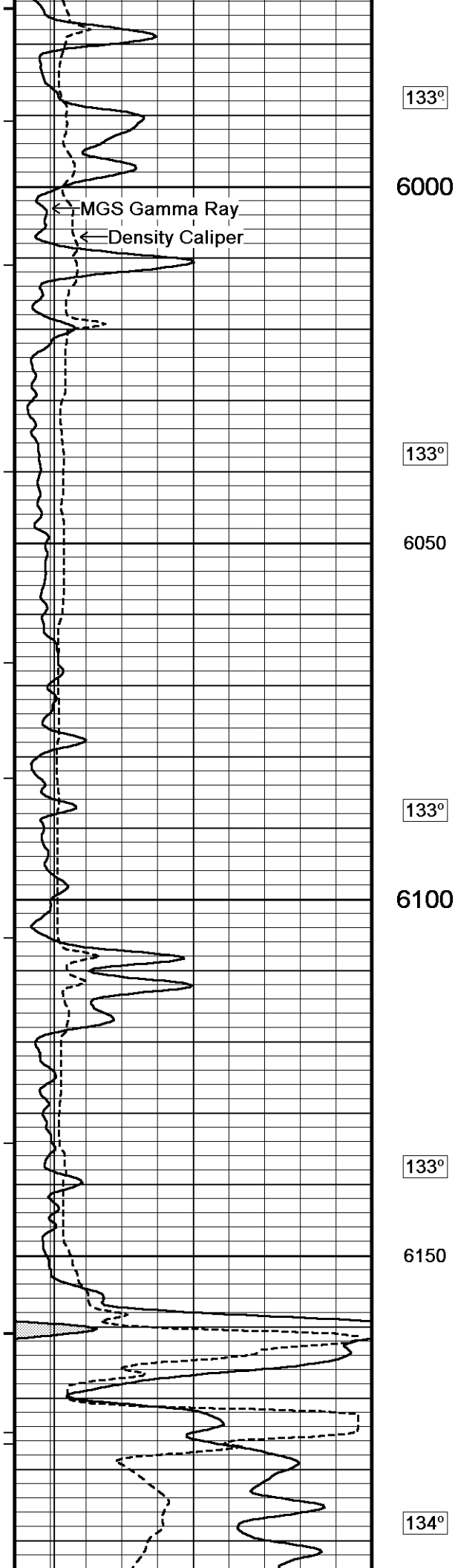
5900

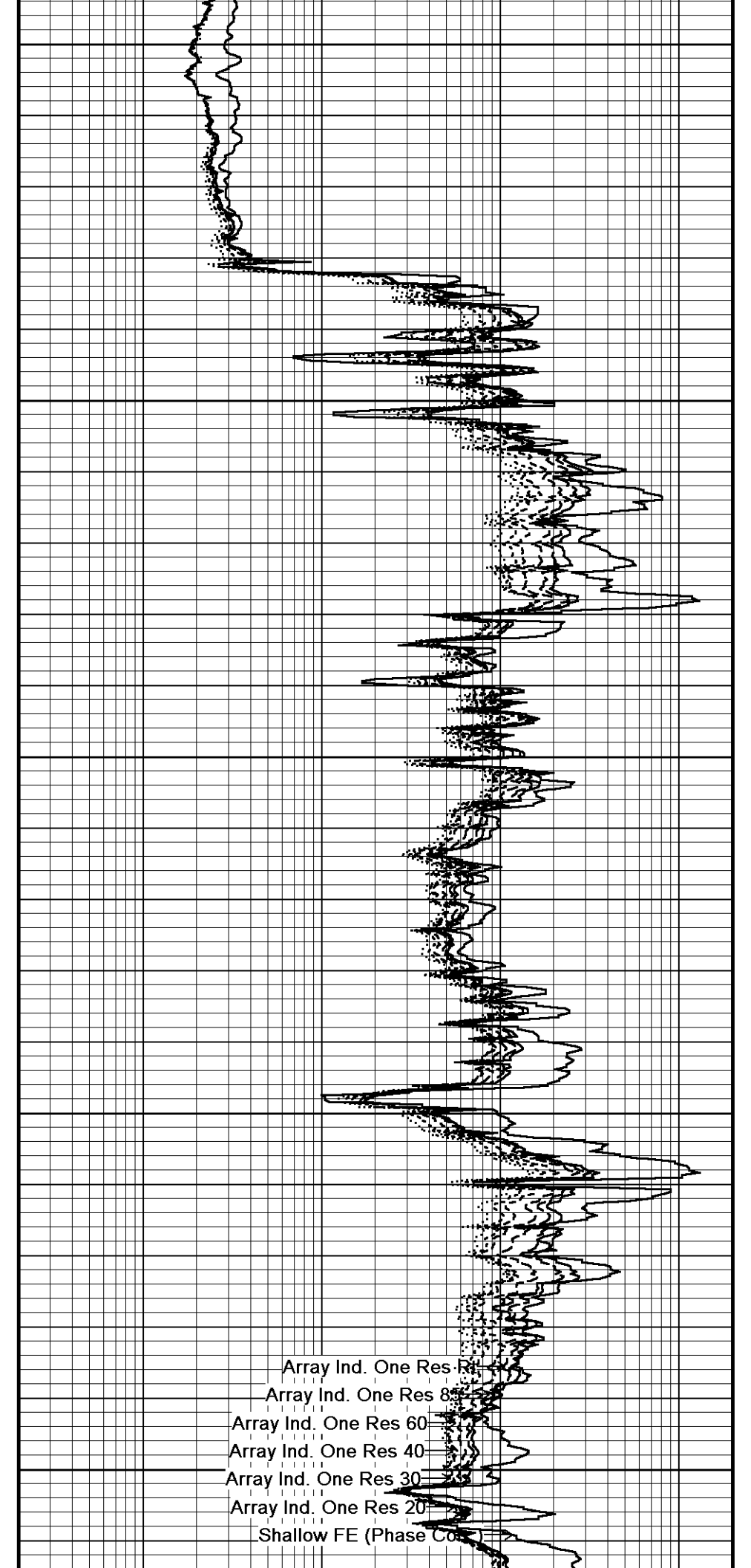
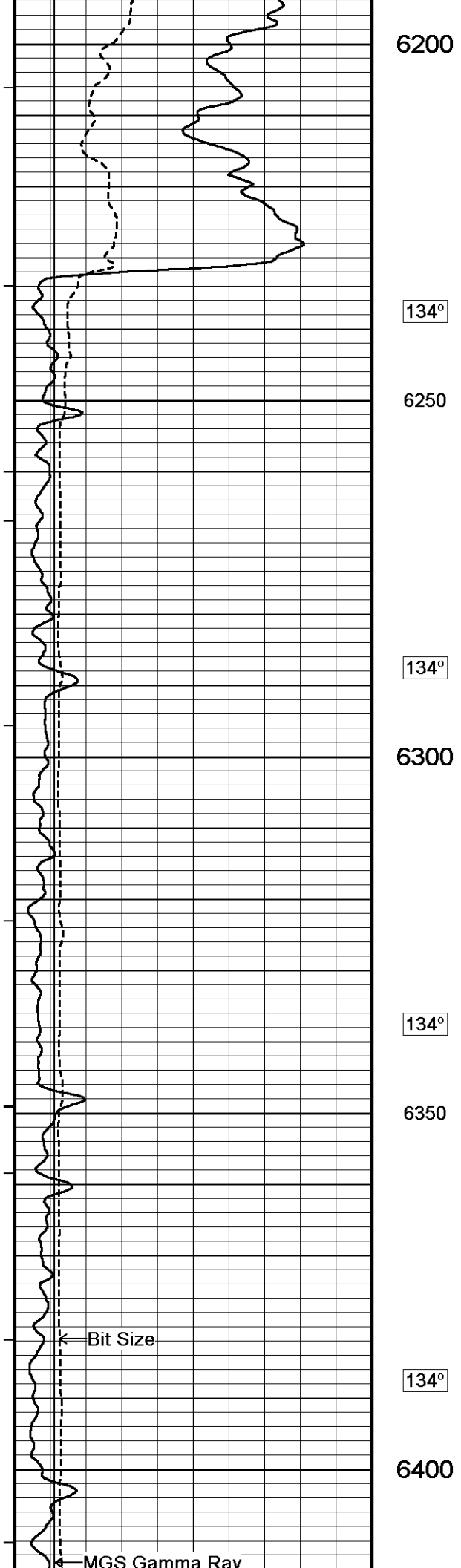
133°

5950

← Bit Size









134°

6450

134°

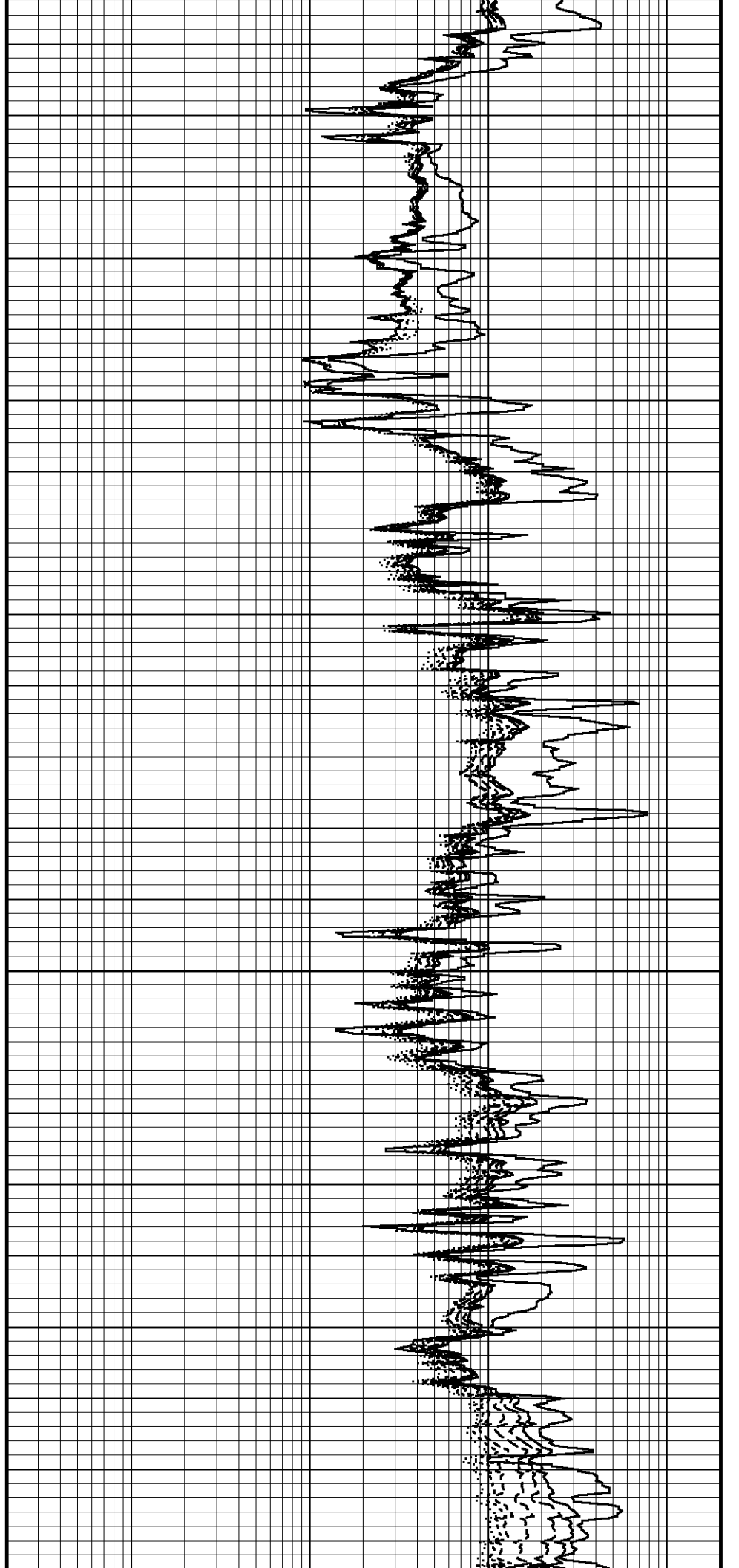
6500

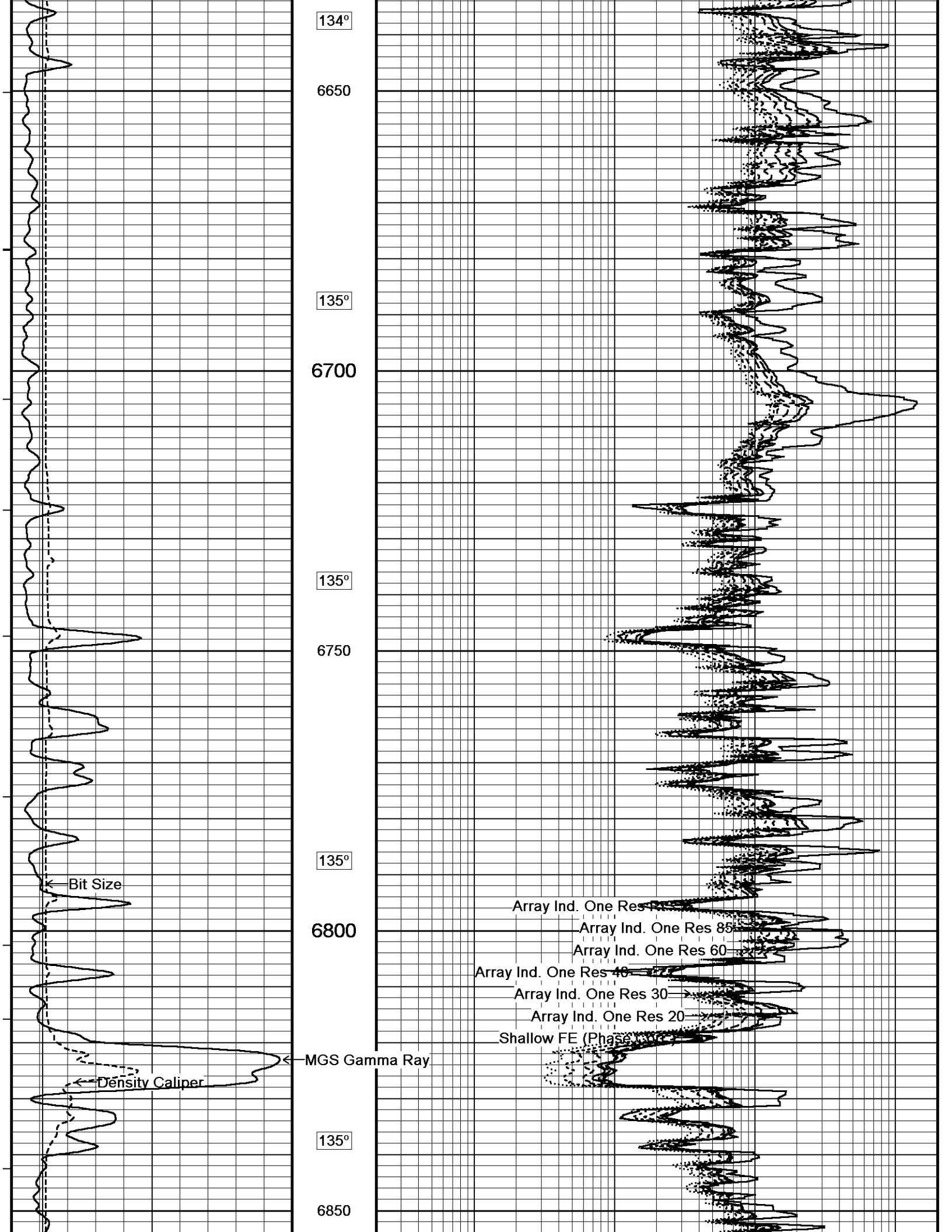
134°

6550

134°

6600





134°

6650

135°

6700

135°

6750

135°

6800

135°

6850

Bit Size

Density Caliper

MGS Gamma Ray

Array Ind. One Res 100

Array Ind. One Res 85

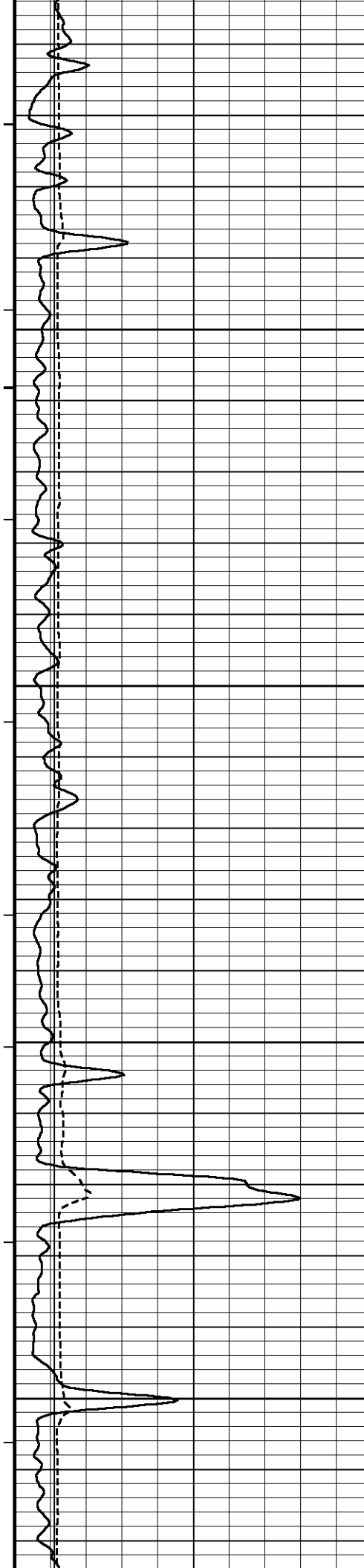
Array Ind. One Res 60

Array Ind. One Res 40

Array Ind. One Res 30

Array Ind. One Res 20

Shallow FE (Phase)



135°

6900

135°

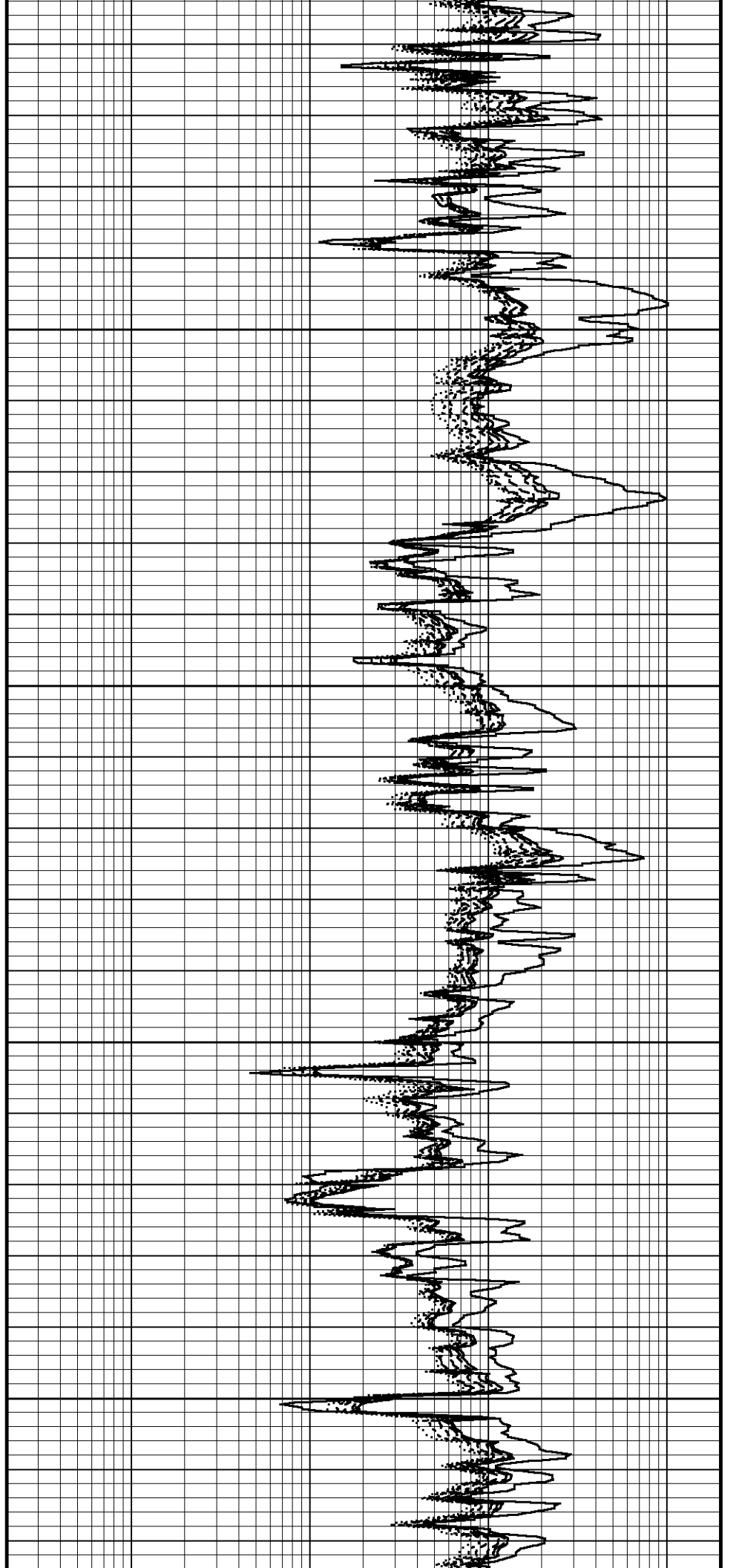
6950

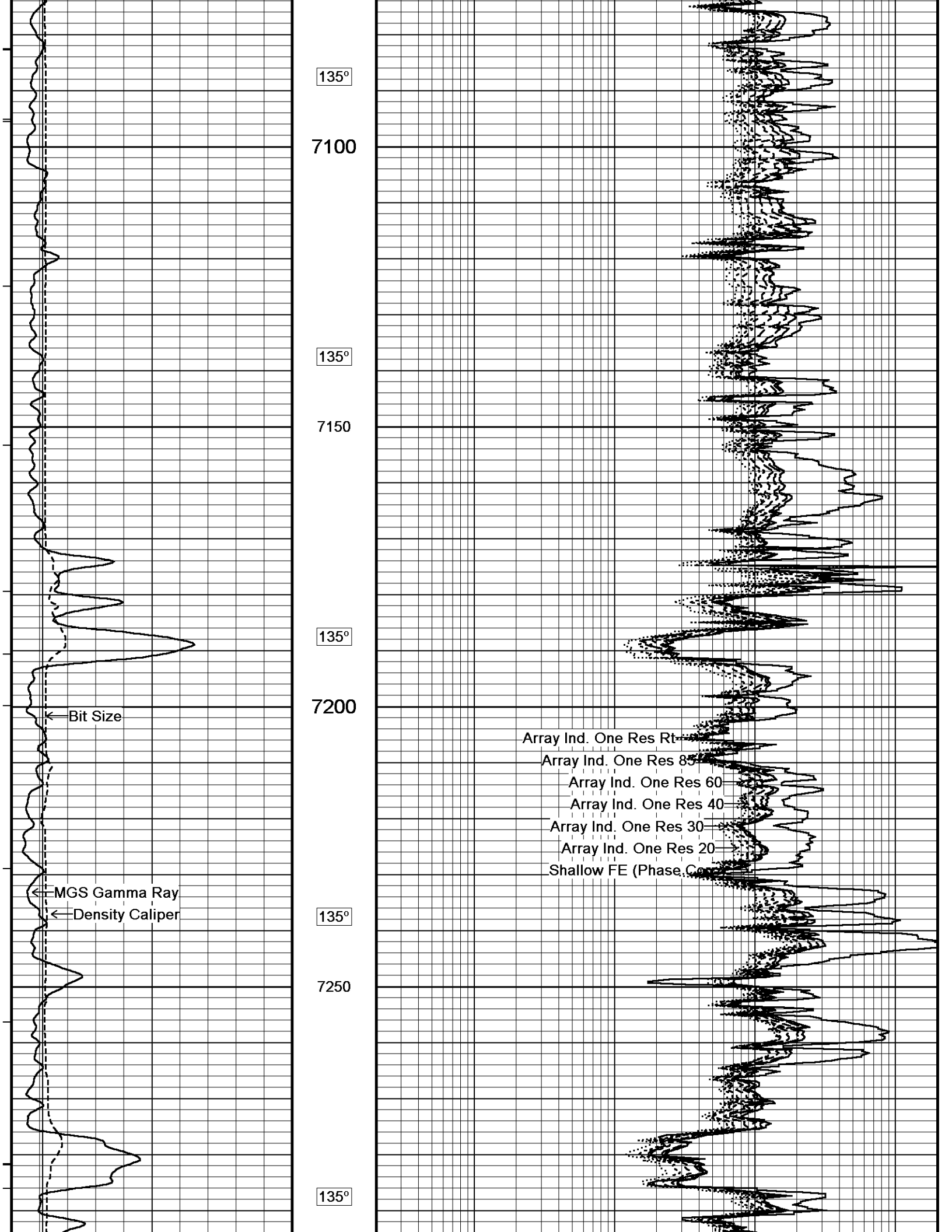
135°

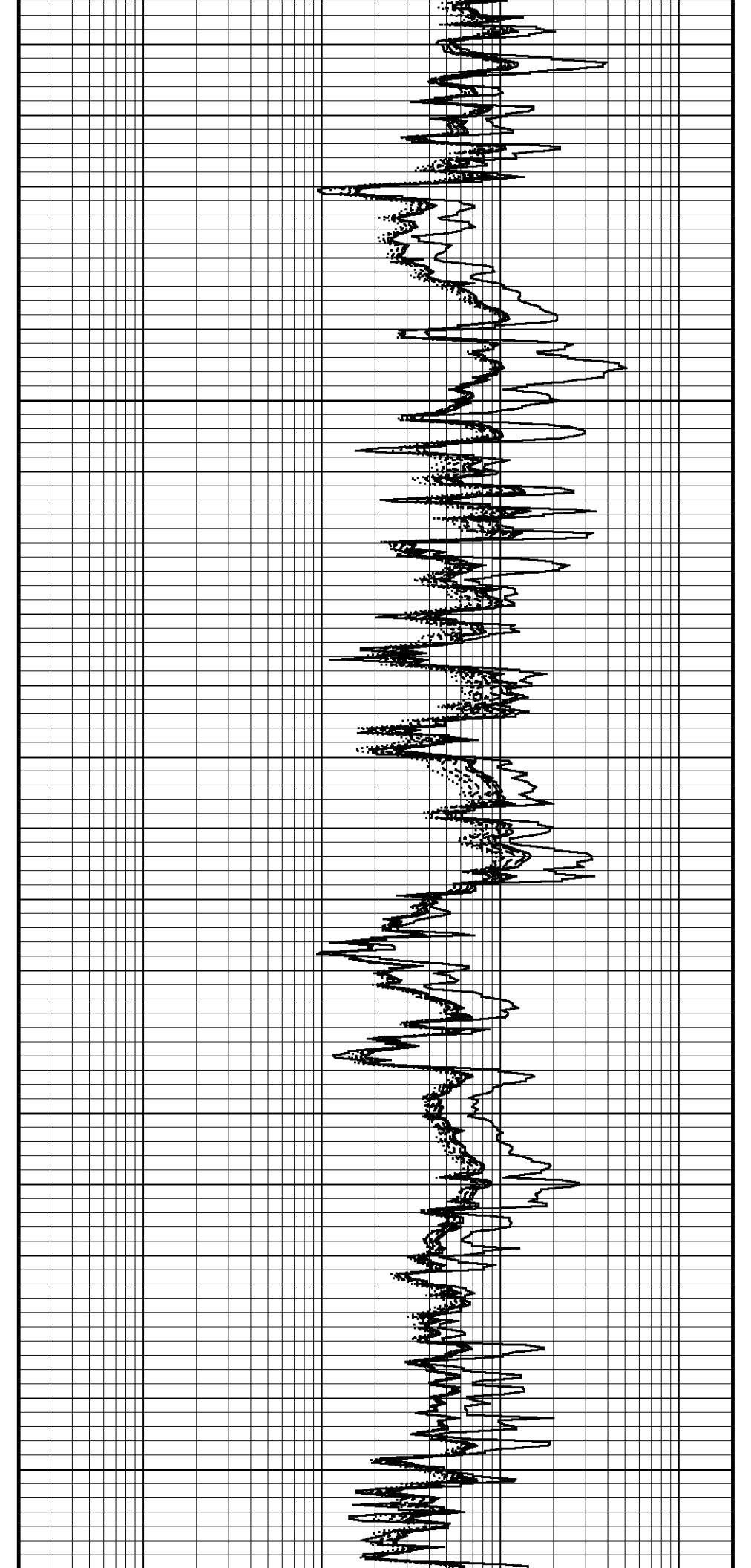
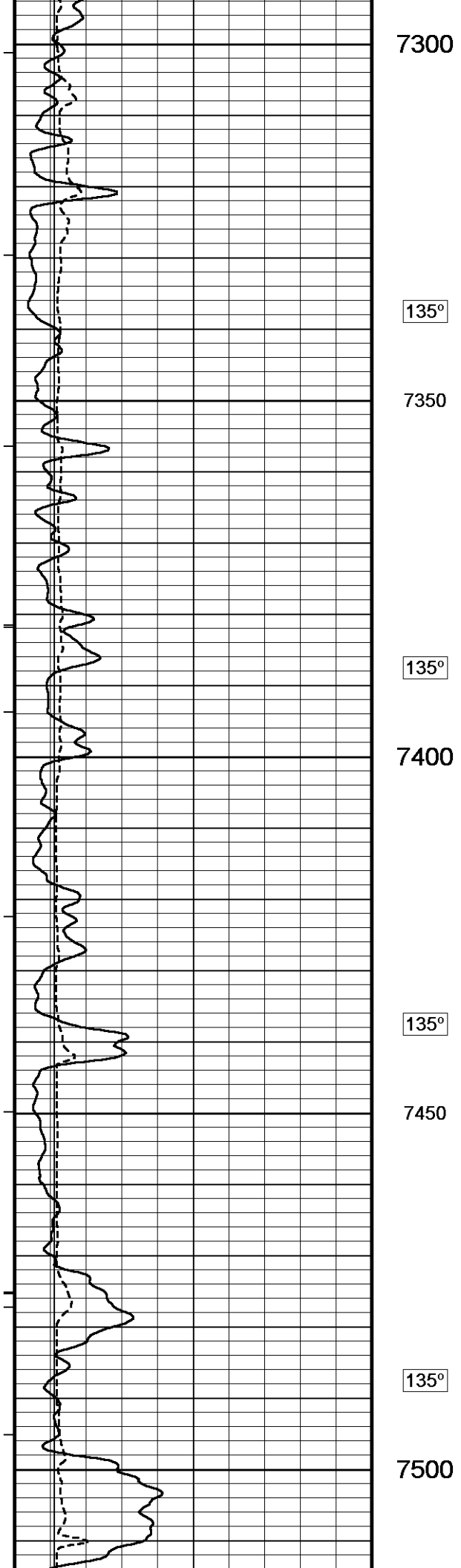
7000

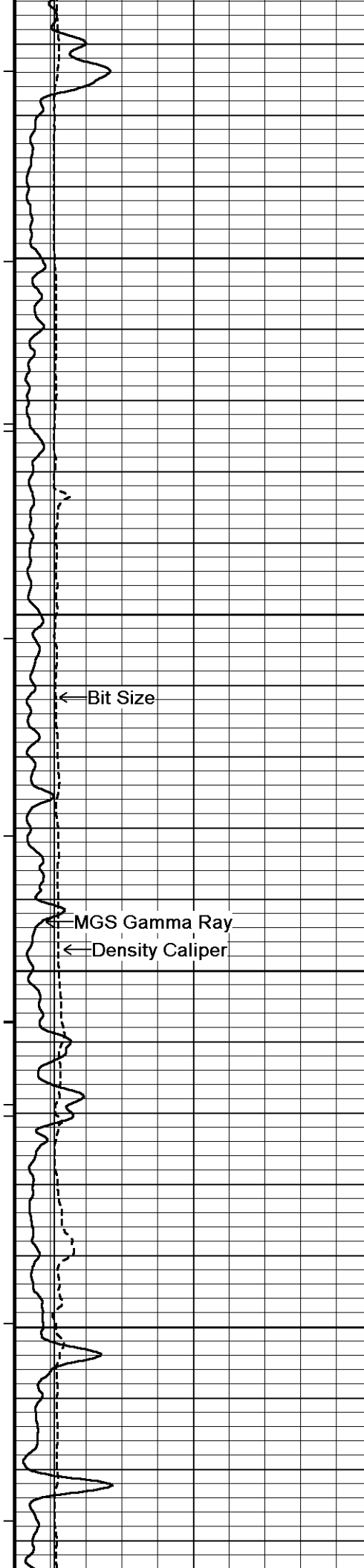
135°

7050









135°

7550

135°

7600

← Bit Size

135°

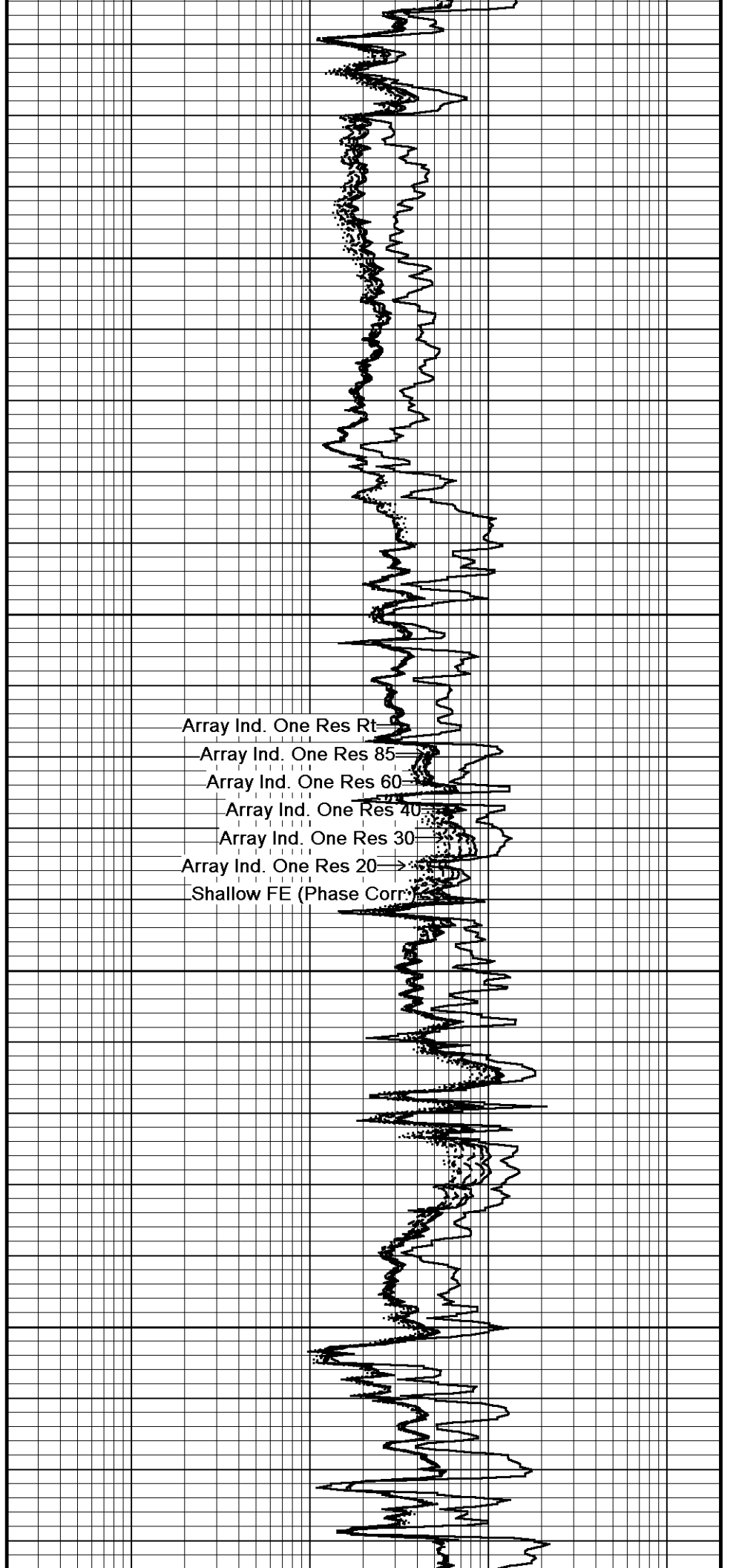
← MGS Gamma Ray
← Density Caliper

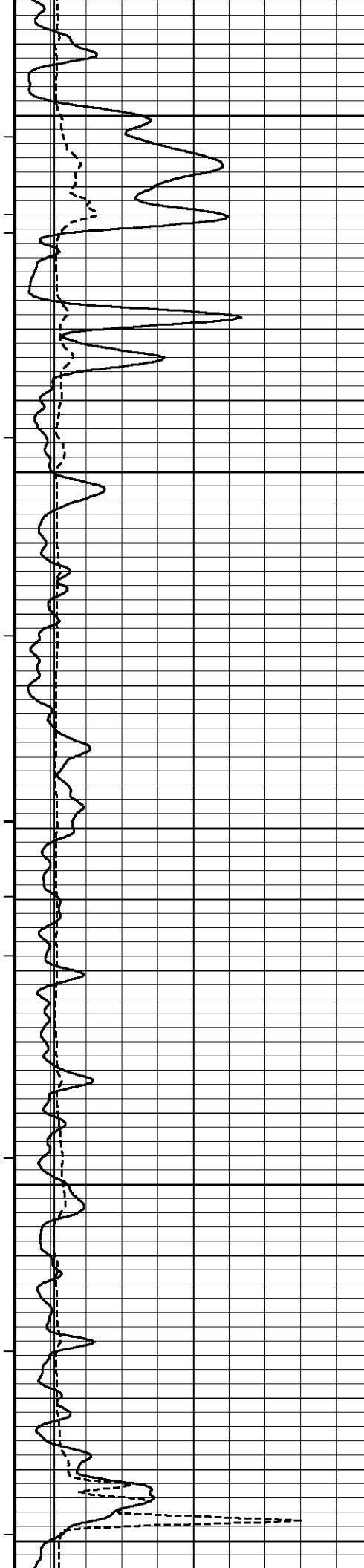
7650

135°

7700

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 (Phase Corr)





135°

7750

135°

7800

135°

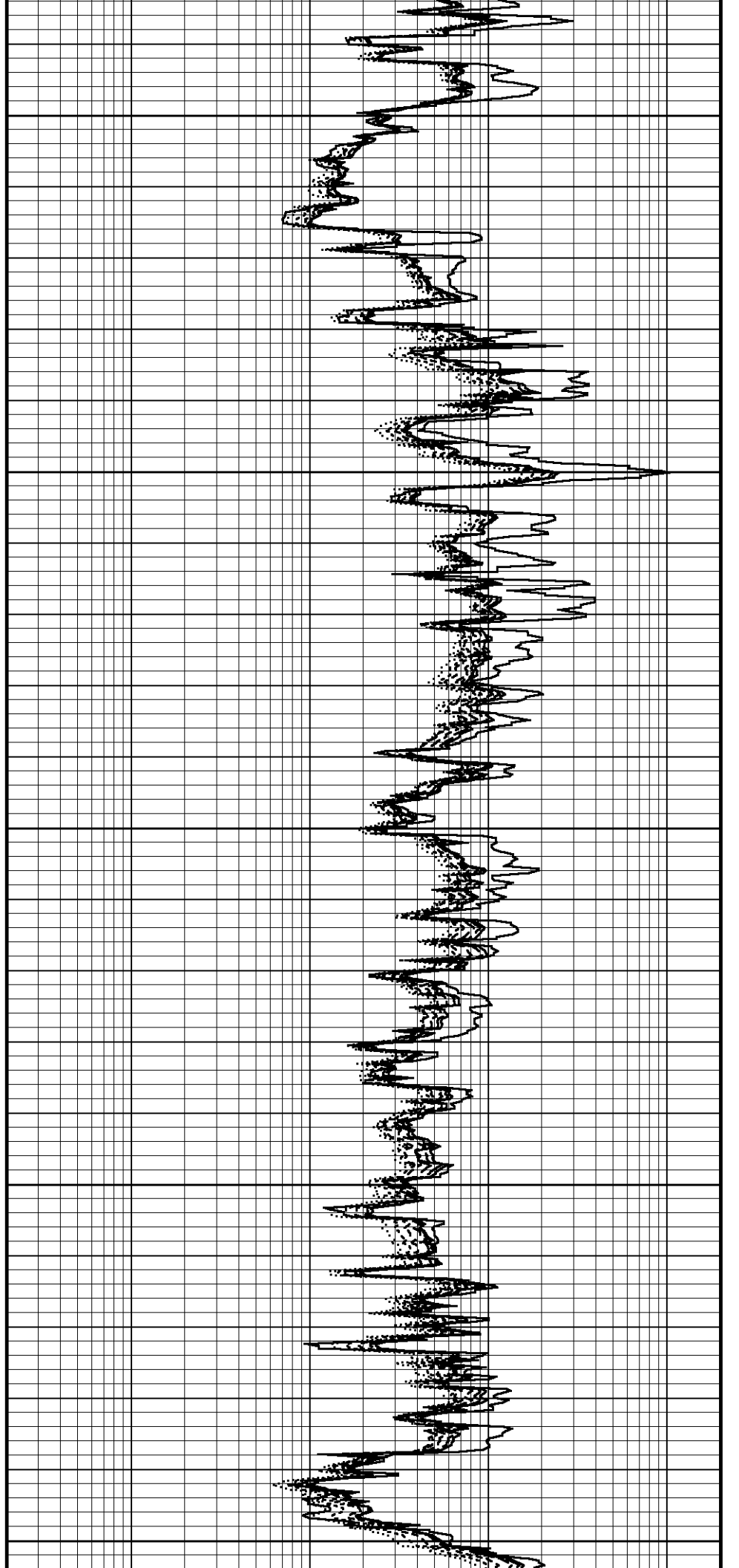
7850

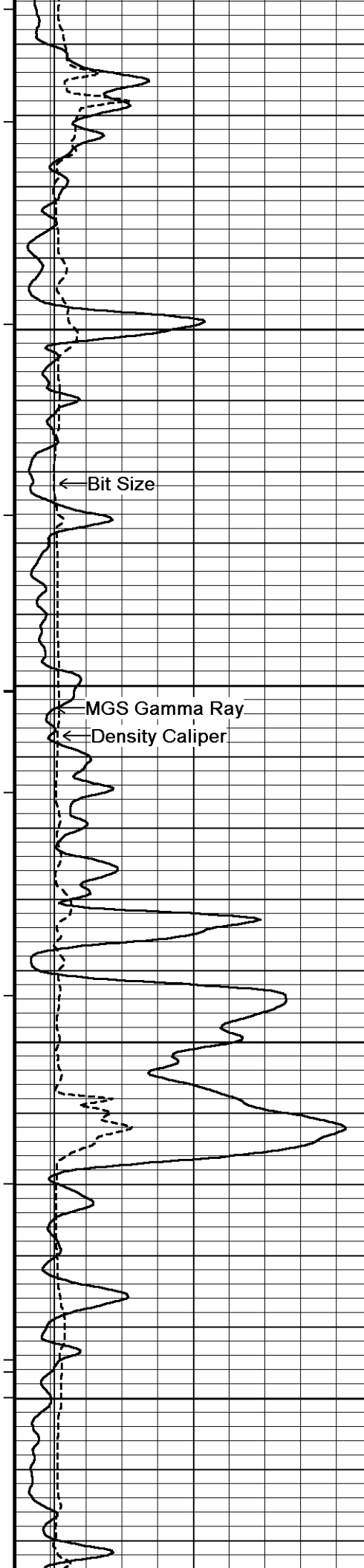
135°

7900

135°

7950





135°

8000

135°

8050

135°

8100

135°

8150

Array Ind. One Res Rt

Array Ind. One Res 85

Array Ind. One Res 60

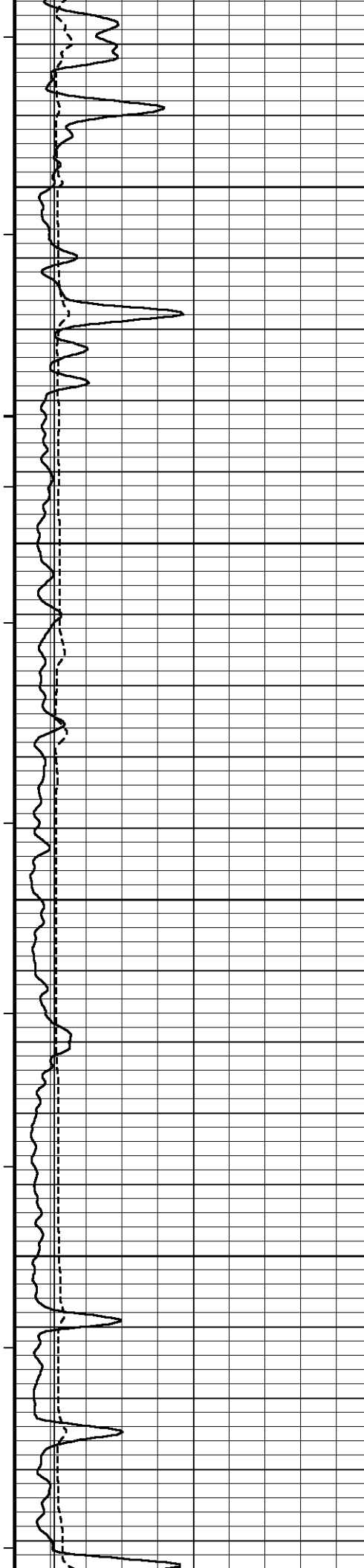
Array Ind. One Res 40

Array Ind. One Res 30

Array Ind. One Res 20

Shallow FE (Phase Corr.)

This figure shows the right portion of a well log plot, containing several resistivity curves. The curves are labeled as follows: 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, and Shallow FE (Phase Corr.). The curves are plotted on a grid with major depth markers at 8000, 8050, 8100, and 8150.



135°

8200

135°

8250

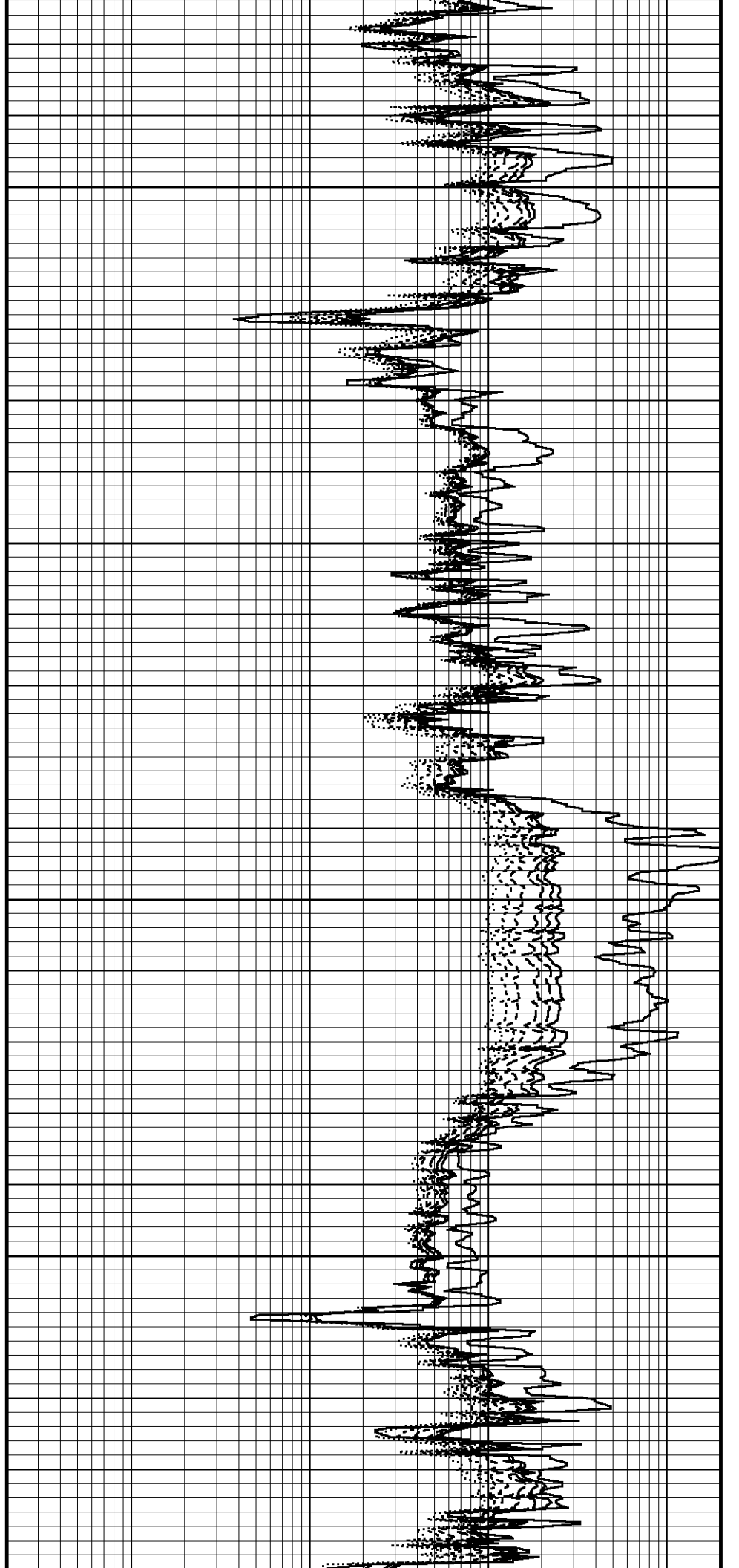
135°

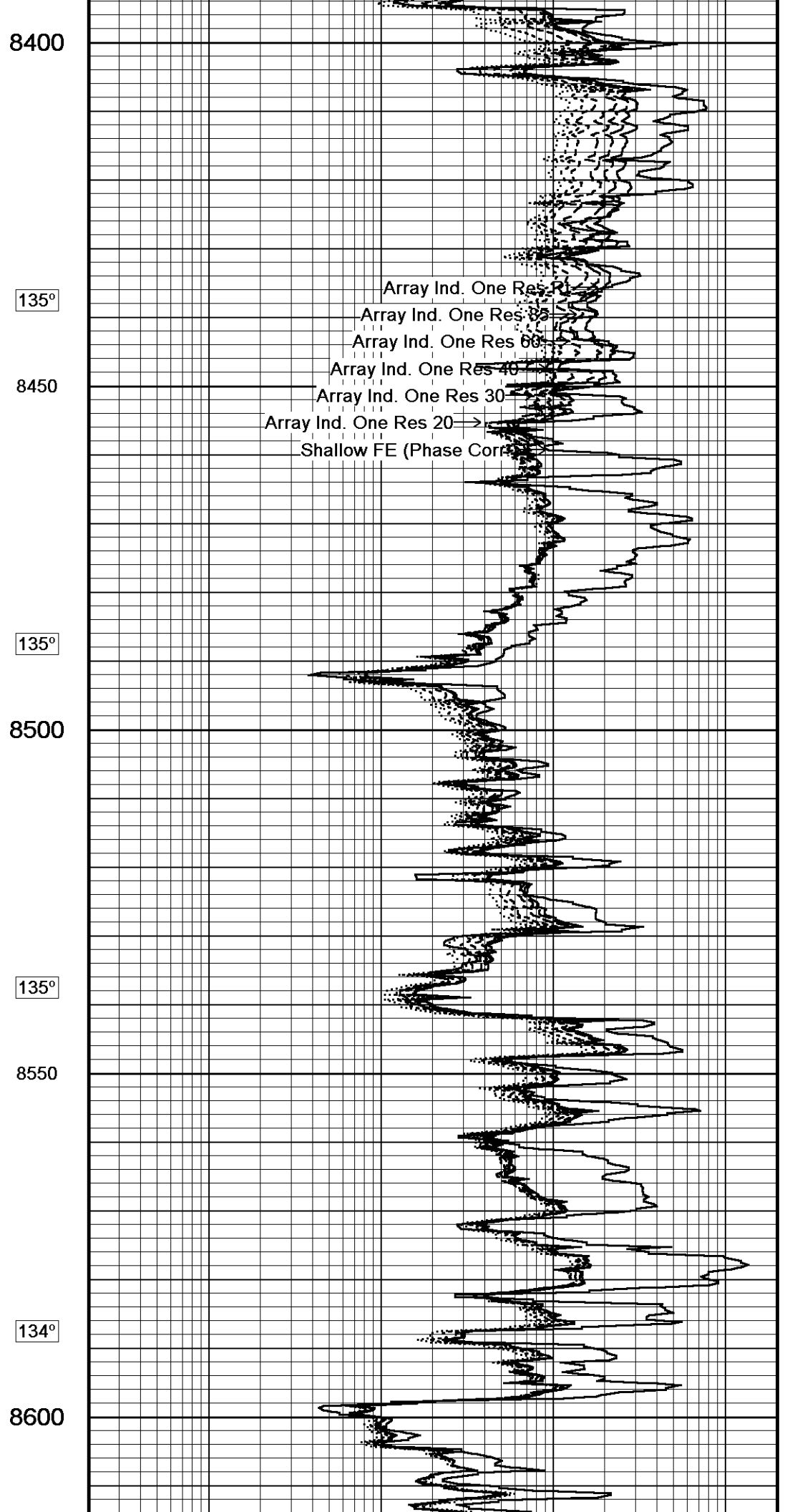
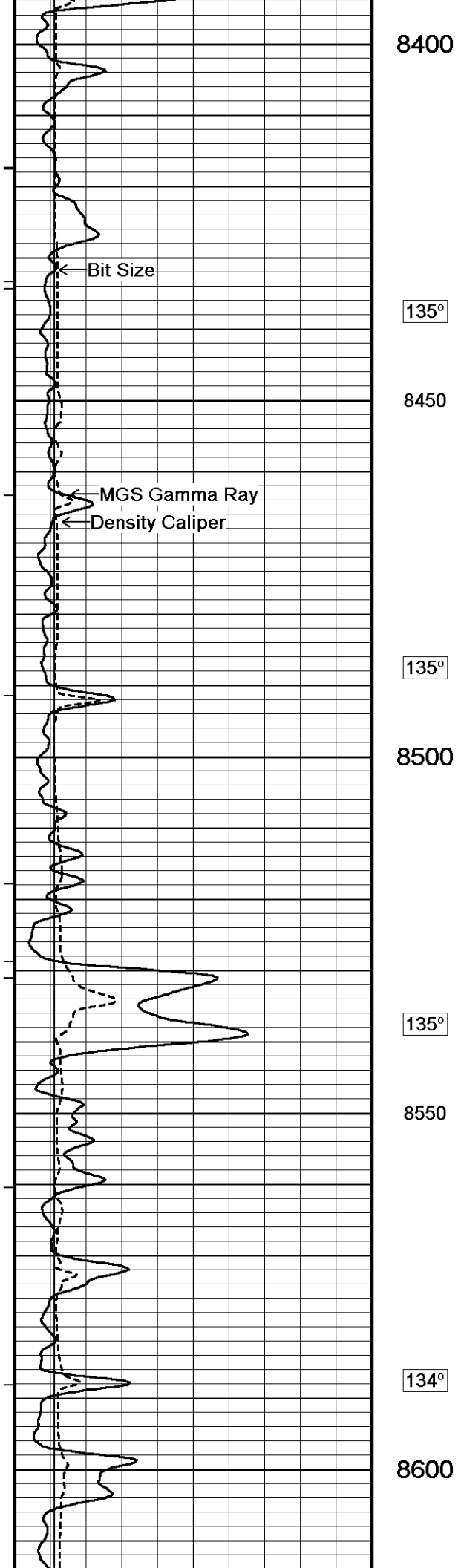
8300

135°

8350

135°







134°

8650

134°

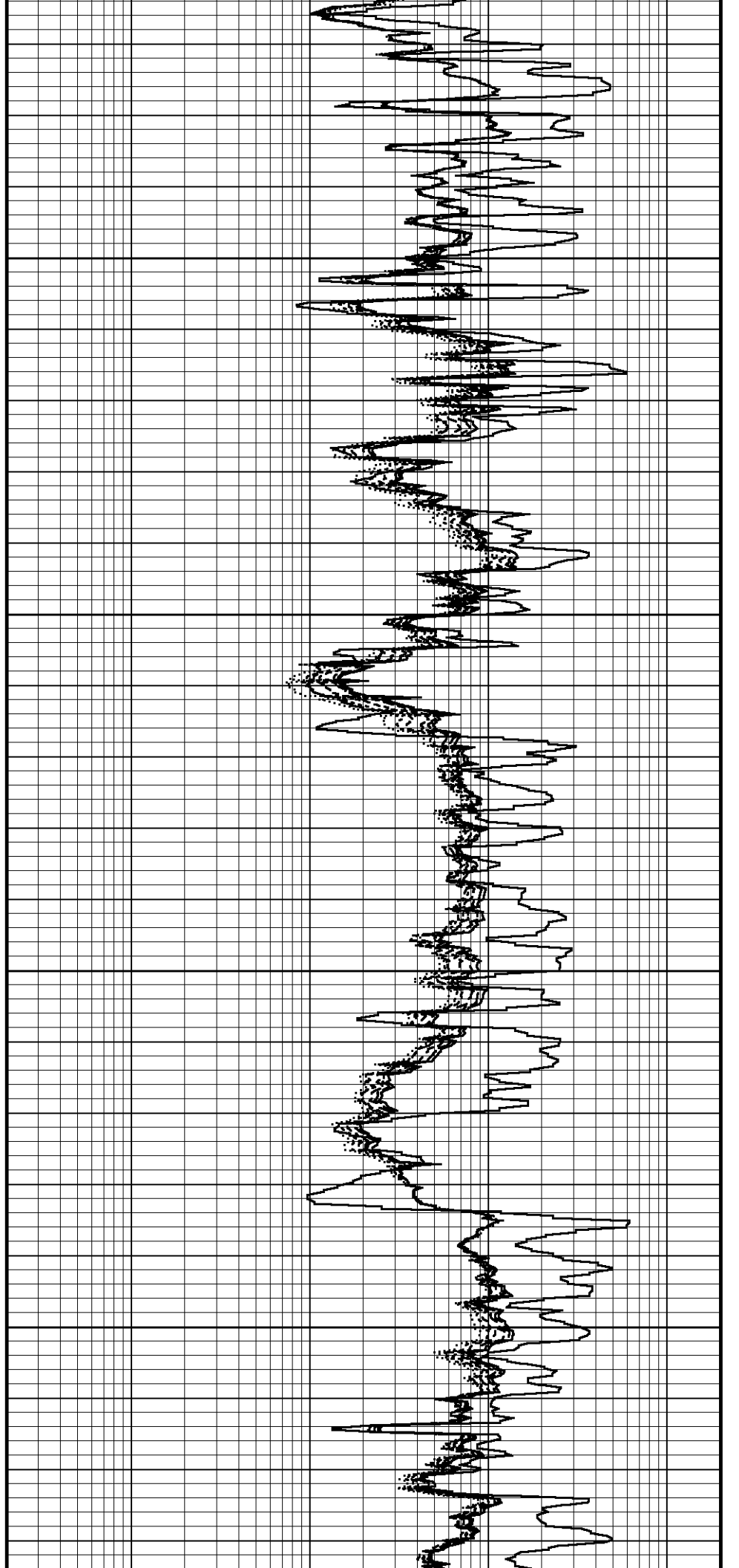
8700

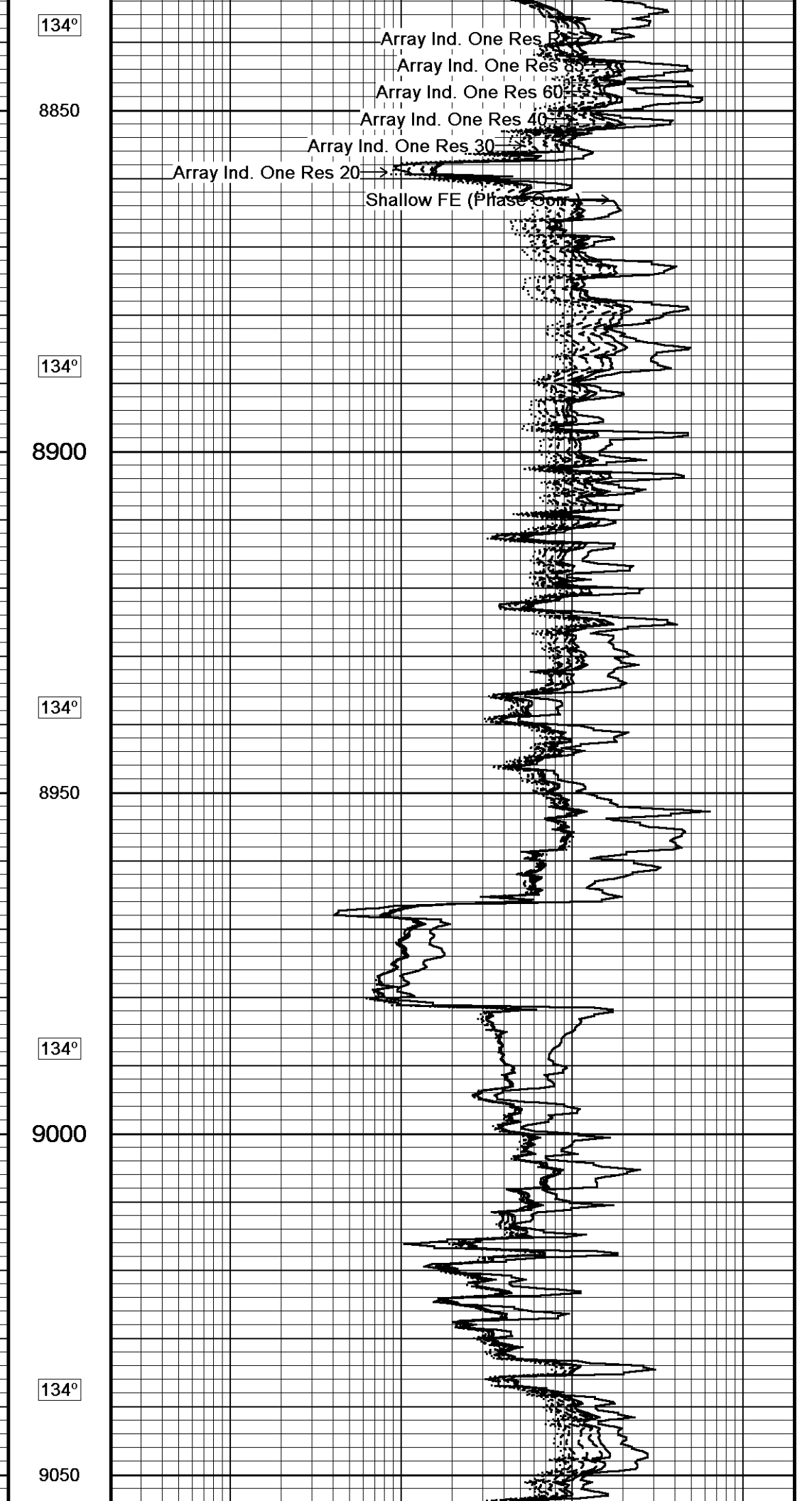
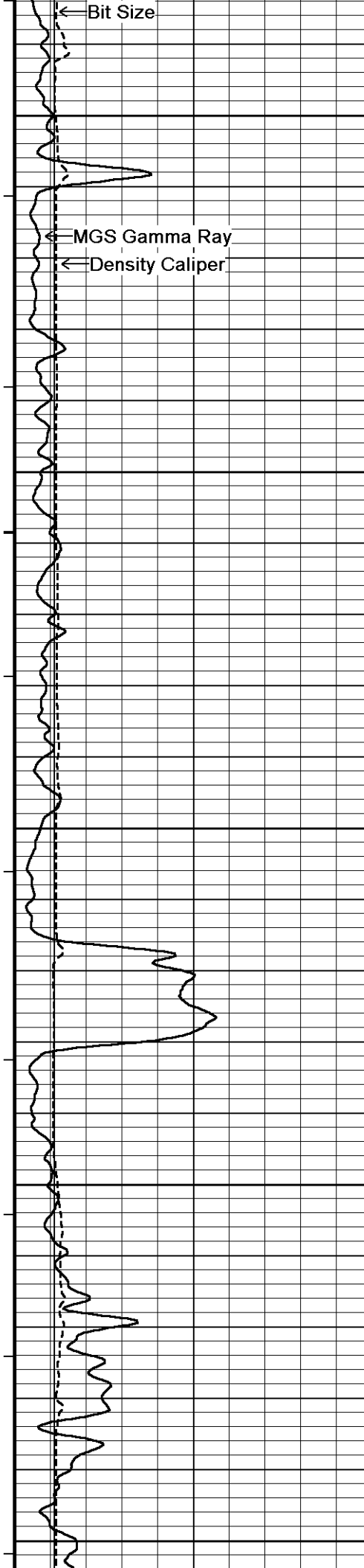
134°

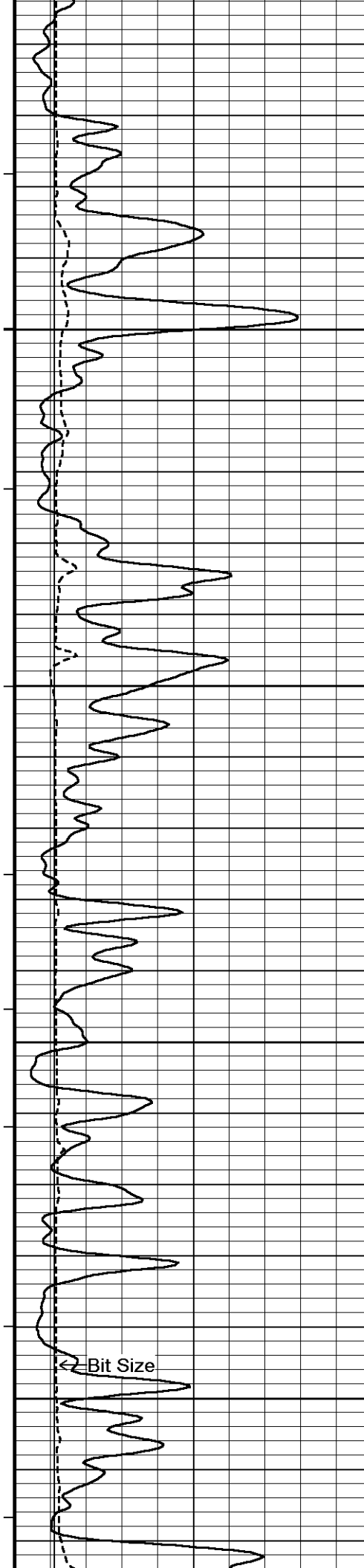
8750

134°

8800







134°

9100

133°

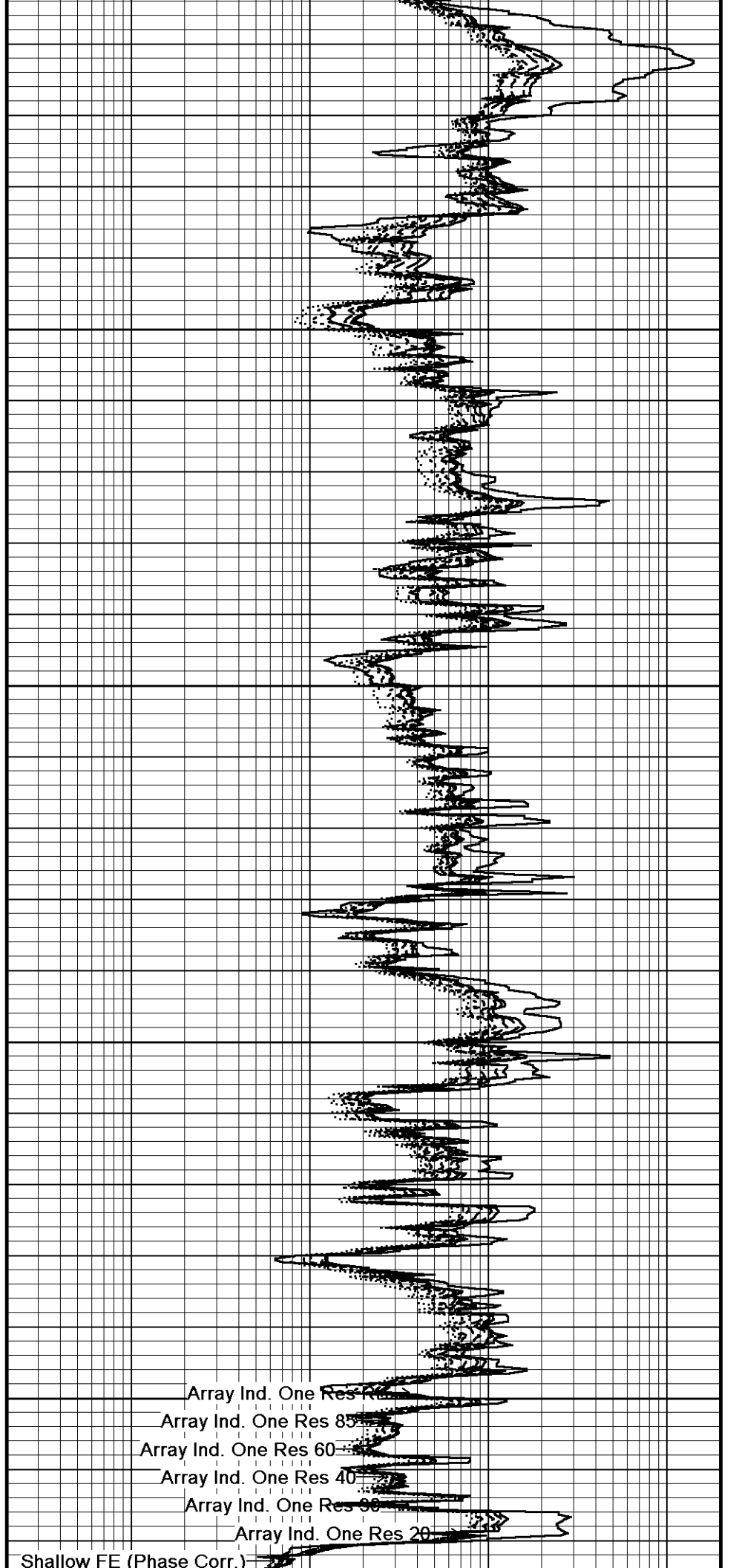
9150

133°

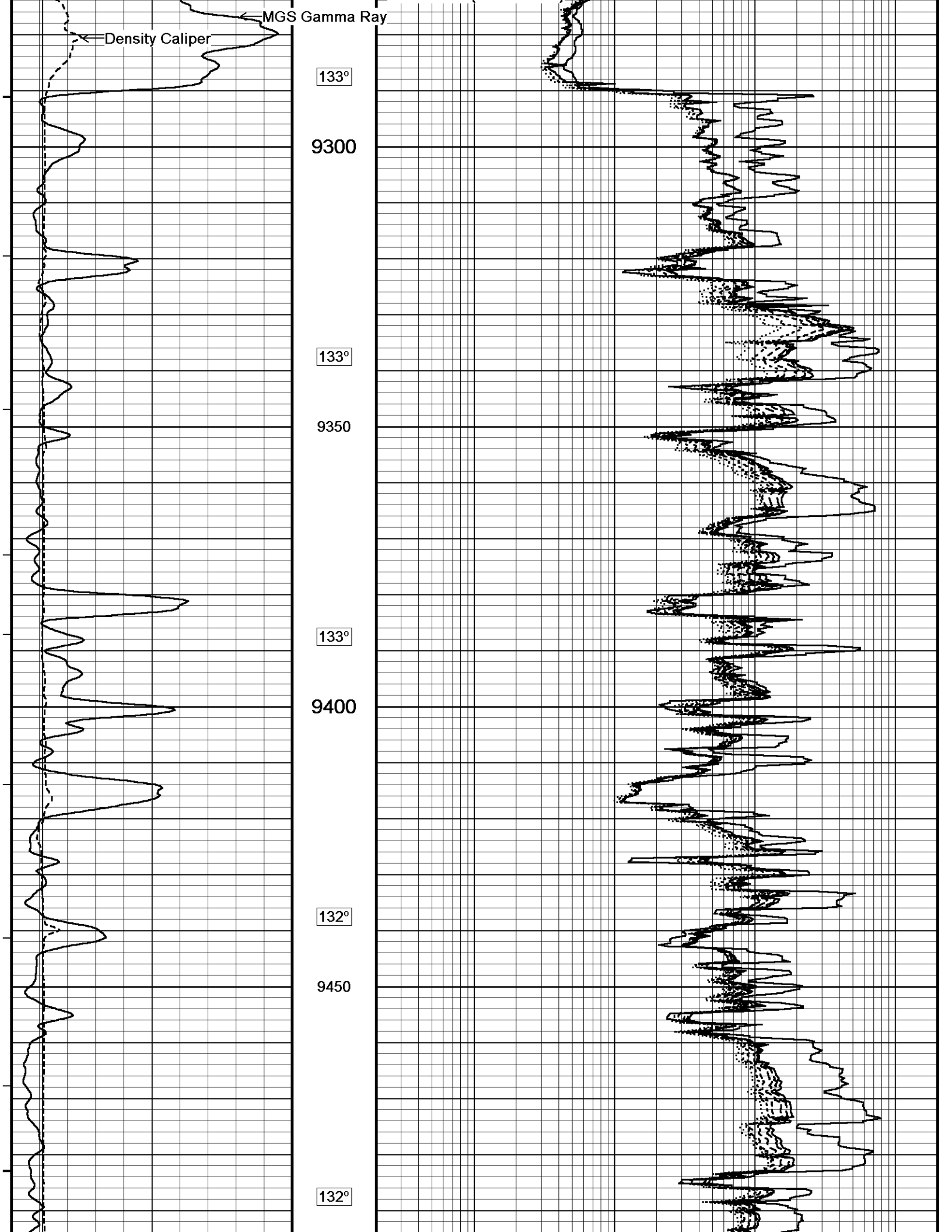
9200

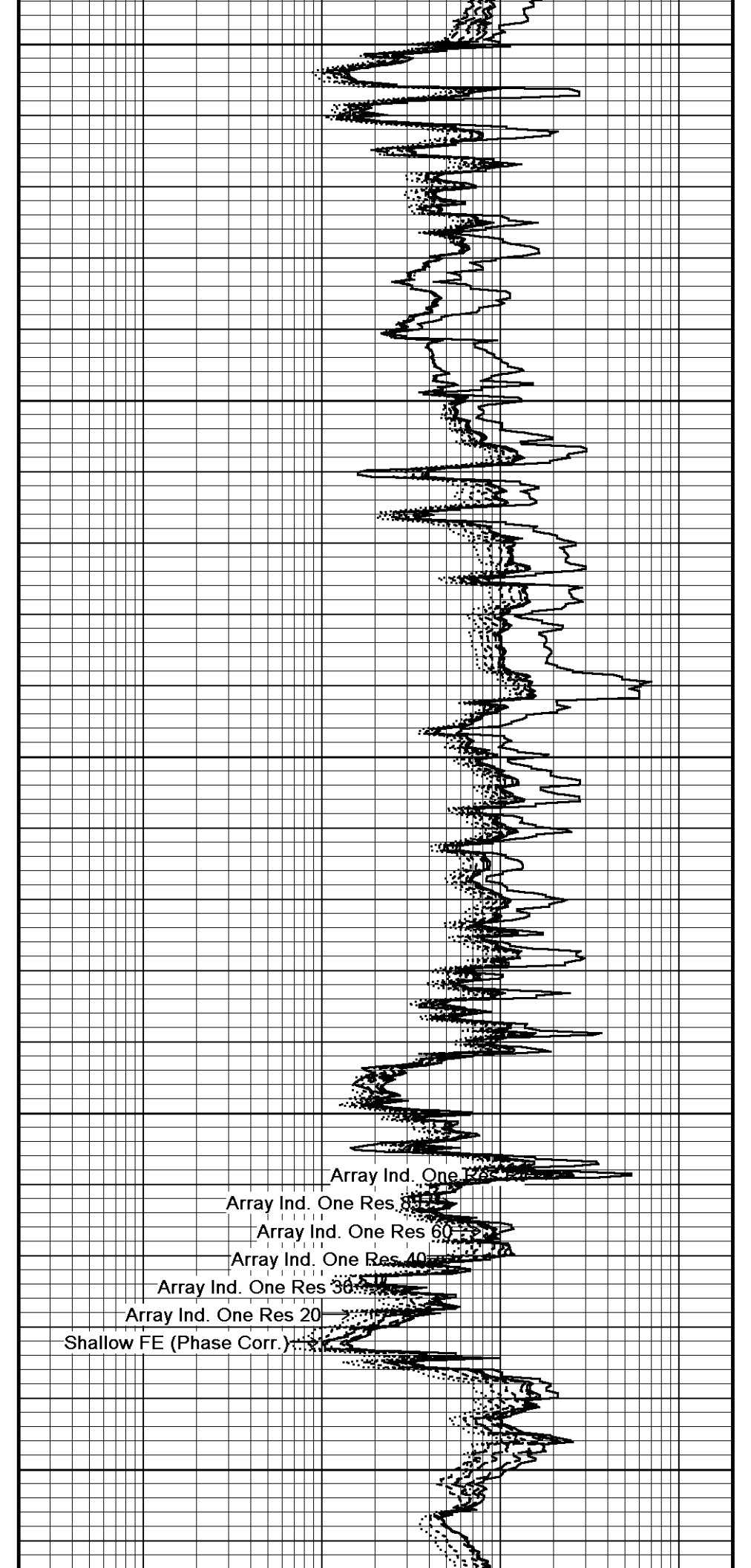
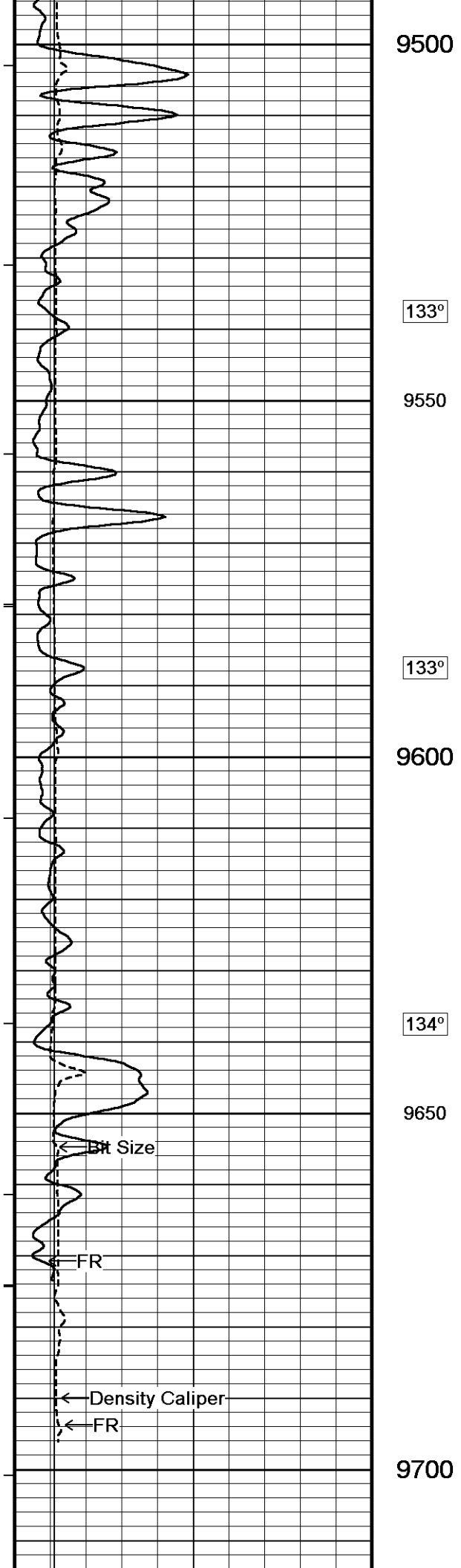
133°

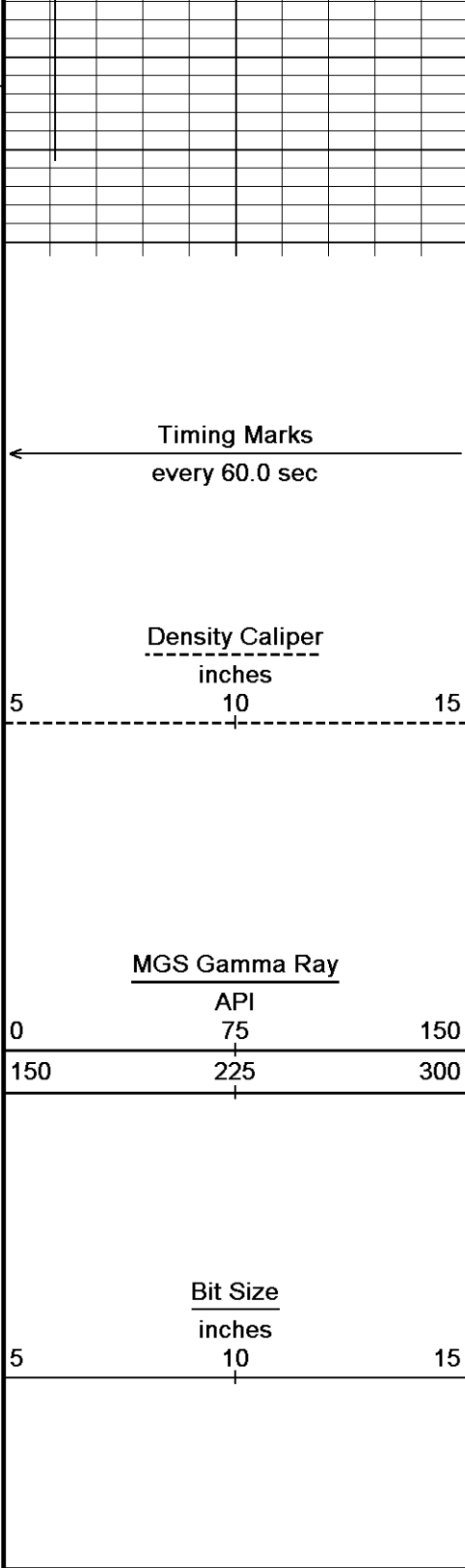
9250



- Array Ind. One Res 100
- 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 (Phase Corr.)



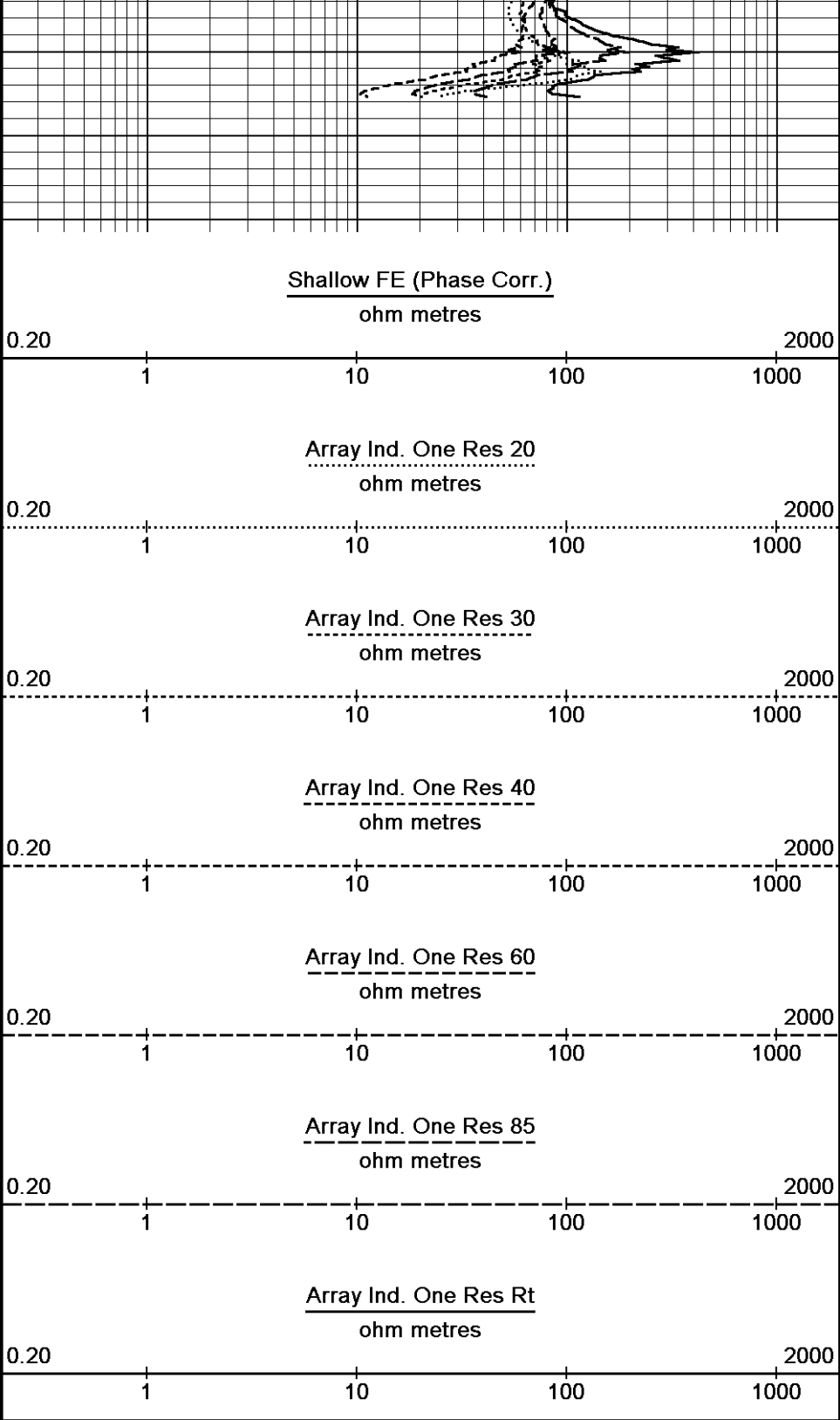




9740
Depth In Feet

Borehole Temp in deg F

Replay Scale 1:240



Depth Based Data - Maximum Sampling Increment 10.0cm
 Filename: C:\Minimus 12.02.4401\Data\SDRGE (BROCK 3418 1-24H)\32543 RTAP GOOD.dta
 System Versions: Processed with 12.02.4401 Plotted with 12.02.4401
 Plotted on 17-JUN-2012 14:55
 Recorded on 17-JUN-2012 13:40

↑ DSC ↑

BEFORE SURVEY CALIBRATION
 C:\Minimus 12.02.4401\Data\SDRGE (BROCK 3418 1-24H)\32543 RTAP GOOD.dta

Down-hole Tension Calibration All 000 Field Calibration on 24-FEB-2009 00:00

Reading No	Measured	Calibrated (lbs)
1	14953.75	0.00
2	17846.38	1500.00

General Parameters

Mud Resistivity	0.600	ohm-metres
Mud Resistivity Temperature	125.000	degrees F
Water Level	0.000	feet
Density/Neutron 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	Limestone Density Por.
Resistivity used	Array Ind. One Res Rt
RWA Constant A	0.610
RWA Constant M	2.150

Down-hole Tension Calibration SMS 0

Field Calibration on 29-MAR-2011 00:00

Reading No	Measured	Calibrated (lbs)
1	15152.07	0.00
2	19175.97	2000.00

Strain Gauge Constants SER-B.A 150

Last Edited on 16-JUN-2012 14:16

Atmospheric Pressure	14.70	psi						
Serial Number	0							
Calibration Date	000000000000							
Base Check Date								
Dead Weight Serial Number	0							
Dead Weight Gravitational Correction	1.0							
Temperature	75.0	150.0	250.0	350.0	degrees F			
Pressure psia	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.
0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4000.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6000.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8000.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10000.0	0.000		0.000		0.000		0.000	

High Resolution Temperature Calibration MGS-C.J 136

Field Calibration on 17-JUN-2012 14:39

	Measured	Calibrated(Deg F)
Lower	0.00	0.00
Upper	0.00	0.00

High Resolution Temperature Constants MGS-C.J 136

Last Edited on

Pre-filter Length	11
-------------------	----

SP Calibration MGS-C.J 136

Field Calibration on 07-DEC-2011 09:21

	Measured	Calibrated (mV)
Reference 1	102.2	98.7
Reference 2	-94.7	-98.3

Gamma Calibration MGS-C.J 136

Field Calibration on 07-DEC-2011 09:21

	Measured	Calibrated (API)
Background	41	29
Calibrator (Gross)	1250	886
Calibrator (Net)	1209	857

Gamma Constants MGS-C.J 136

Last Edited on 16-JUN-2012 22:37

Gamma Calibrator Number	000	
Mud Density	0.99	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	

Concentration of KCl 0.00 kppm

High Resolution Temperature Calibration MAI-B.J 389			Field Calibration on 19-OCT-2011 09:44
	Measured	Calibrated(Deg F)	
Lower	10.00	50.00	
Upper	100.00	212.00	

High Resolution Temperature Constants MAI-B.J 389		Last Edited on
Pre-filter Length	11	

Induction Calibration MAI-B.J 389			Base Calibration on 19-OCT-2011 09:44		Field Check on 26-JAN-2012 08:55
Base Calibration					
Test Loop Calibration					
Channel	Low	High	Low	High	
1	16.7	465.5	9.3	966.2	
2	6.4	384.0	7.6	821.4	
3	3.1	258.9	5.2	566.0	
4	1.8	133.7	2.6	279.2	
Array Temperature	78.1		Deg F		
Channel	Base Check (mmho/m)		Field Check (mmho/m)		
	Low	High	Low	High	
1	0.0	0.0	13.3	3897.9	
2	0.0	0.0	29.6	3510.2	
3	0.0	0.0	29.8	3051.0	
4	0.0	0.0	20.0	2064.1	
Deep	0.0	0.0	19.4	2014.0	
Medium	0.0	0.0	43.1	4006.5	
Shallow	0.0	0.0	42.5	5154.2	
Array Temperature	0.0		51.8	Deg F	

Induction Constants MAI-B.J 389			Last Edited on 17-JUN-2012 14:42	
Induction Model	RtAP-WBM			
Caliper for Borehole Corr.	Density Caliper			
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	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		
Apparent Porosity and Water Saturation Constants				
Archie Constant (A)	1.00			
Cementation Exponent (M)	2.00			
Saturation Exponent (N)	2.00			
Saturation of Water for Apor	100.00	percent		
Resistivity of Water for Apor and Sw	0.05	ohm-m		

Resistivity of Mud Filtrate for Sw	0.00	ohm-m
Source for Rt	0.00	
Source for Rxo	0.00	

FE Calibration MFE-B.J 329

 Base Calibration on 08-MAR-2012 10:58
 Field Check on 08-MAR-2012 11:13

Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	964.2	126.8
Base Check		281.9
Field Check		281.9

FE Constants MFE-B.J 329

Last Edited on 16-JUN-2012 22:37

Running Mode	No Sleeve
MFE K Factor	0.1268
Caliper Source for FE correction	Density Caliper
Caliper Value for FE correction	N/A inches
Rm Source for FE correction	Temperature Corr
Temp. for Rm Corr.	MGS External Temperature
Stand-off	0.5 inches

Neutron Calibration MDN-B.J 390

 Base Calibration on 24-APR-2012 16:14
 Field Check on

Base Calibration		
	Measured	Calibrated (cps)
	Near Far	Near Far
	2974 91	3714 110
Ratio	32.653	33.764
Field Calibrator at Base		
		Calibrated (cps)
		1236 1843
Ratio		0.671
Field Check		
		Calibrated (cps)
		0 0
Ratio		0.000

Neutron Constants MDN-B.J 390

Last Edited on 16-JUN-2012 14:17

Neutron Source Id	P31112B
Neutron Jig Number	5917NC
Epithermal Neutron	No
Caliper Source for Processing	Bit Size
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	Constant Value
Formation Pressure	0.00 kpsi
Temperature Source	Constant Value
Temperature	68.00 degrees F
Mud Salinity	0.00 kppm
Formation Fluid Salinity Source	Constant Value
Formation Fluid Salinity	0.00 kppm
Barite Mud Correction	Not Applied
Salinity Correction	Not Applied

Caliper Calibration MPD-C.J 393

 Base Calibration on 09-APR-2012 15:26
 Field Calibration on 09-APR-2012 15:26

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	16224	4.01
2	24416	5.96
3	32900	7.98
4	41094	9.86
5	50128	11.88
6	N/A	N/A

Field Calibration

Measured Caliper (in)

5.92

Actual Caliper (in)

5.96

Photo Density Calibration MPD-C.J 393

Base Calibration on 09-APR-2012 15:24

Field Check on 09-APR-2012 15:25

Density Calibration

Base Calibration

	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	58016	27308	59869	31110
Reference 2	24483	2694	24557	2522

Field Check at Base

1260.5 1380.6

Field Check

1239.6 1366.0

PE Calibration

Base Calibration

	WS	Measured		Calibrated Ratio
		WH	Ratio	
Background	235	1137		
Reference 1	23358	57816	0.408	0.369
Reference 2	6927	24347	0.288	0.271

Field Check at Base

235.4 1137.5

Field Check

229.1 1117.2

Density Constants MPD-C.J 393

Last Edited on 16-JUN-2012 22:37

Density Source Id	p31112b	
Nylon Calibrator Number	18006	
Aluminium Calibrator Number	18006	
Density Shoe Profile	8 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	0.99	gm/cc
Mud Density Z/A Multiplier	1.11	
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	

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

DOWNHOLE EQUIPMENT

C:\Minimus 12.02.4401\Data\SDRGE (BROCK 3418 1-24H)\32543 RTAP GOOD.dta

Shuttle Mechanical Release (SMR A)
SMR-A 149 LG: 8.53 ft WT: 77.2 lb OD: 2.52 in

Shuttle Electrical Release
SER-B.A 150 LG: 6.90 ft WT: 50.7 lb OD: 2.24 in

MBS-F.A 200v Compact Battery Sub
MBS-F.A 135 LG: 10.22 ft WT: 81.6 lb OD: 2.24 in



Compact Memory Sub E.B
 MMS-E.B 167 LG: 5.20 ft WT: 37.5 lb OD: 2.24 in

Compact Tool Isolator sub.
 MTI-B.A 61 LG: 1.54 ft WT: 13.2 lb OD: 2.24 in

Compact Short Gamma
 MGS-C.J 136 LG: 3.41 ft WT: 24.3 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint
 SKJ-E.B 417 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SHA-J.A Compact Swivel Head Adaptor
 SHA-J.A 451 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

MIS-D.A Compact Inline Bowspring sub
 MIS-D.A 596 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

Compact Neutron
 MDN-B.J 390 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
 MPD-C.J 393 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

MIS-A.A Compact Inline Bowspring sub
 MIS-A.A 277 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SHA-F Compact Swivel Head Adaptor
 SHA-F 48 LG: 2.74 ft WT: 26.5 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint
 SKJ-E.B 472 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

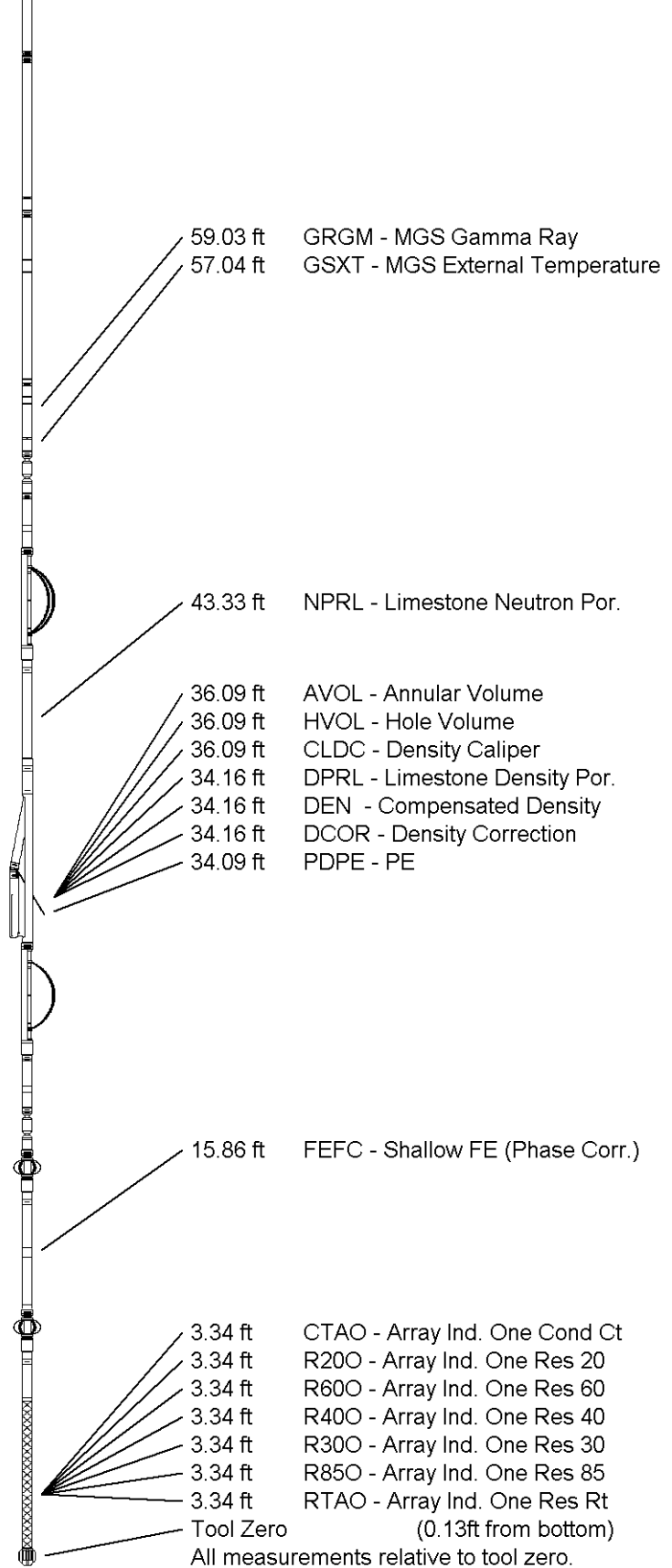
MIS-E.B Compact Inline Standoff sub
 MIS-E.B 565 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Focussed Electric
 MFE-B.J 329 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

MIS-E.B Compact Inline Standoff sub
 MIS-E.B 573 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Induction
 MAI-B.J 389 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 92.34 ft Weight: 716.5 lb



COMPANY	SANDRIDGE E&P LLC
WELL	BROCK 3418 1-24H
FIELD	HAAS WEST
PROVINCE/COUNTY	COMANCHE
COUNTRY/STATE	USA / KANSAS

Elevation Kelly Bushing 1883.50 feet

First Reading 9730.00 feet

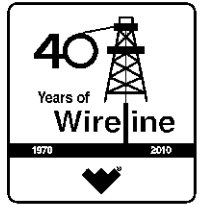
Elevation Drill Floor 1883.50 feet
Elevation Ground Level 1864.00 feet

Depth Driller 9747.00 feet
Depth Logger 9747.00 feet



Weatherford®

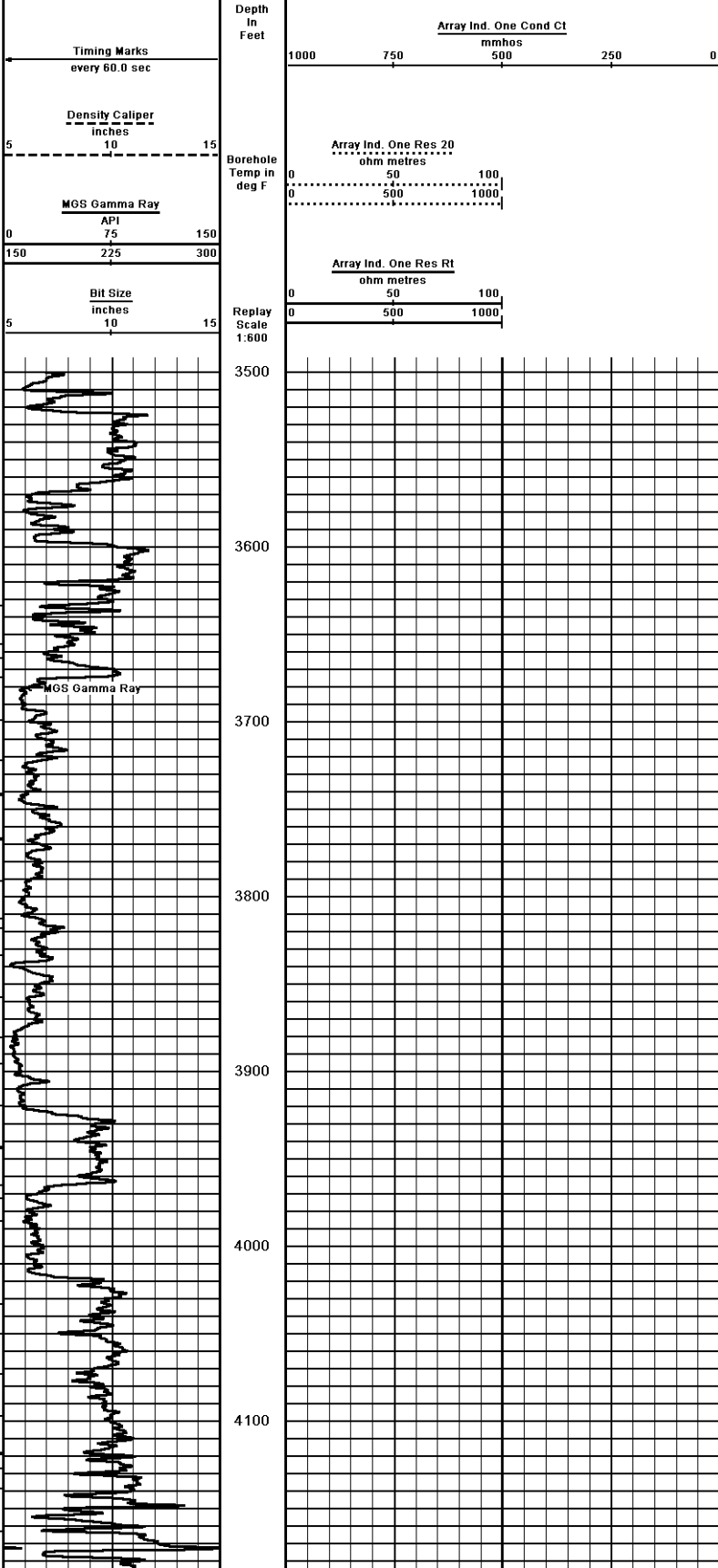
CML IMPULSE SHUTTLE ARRAY INDUCTION LOG

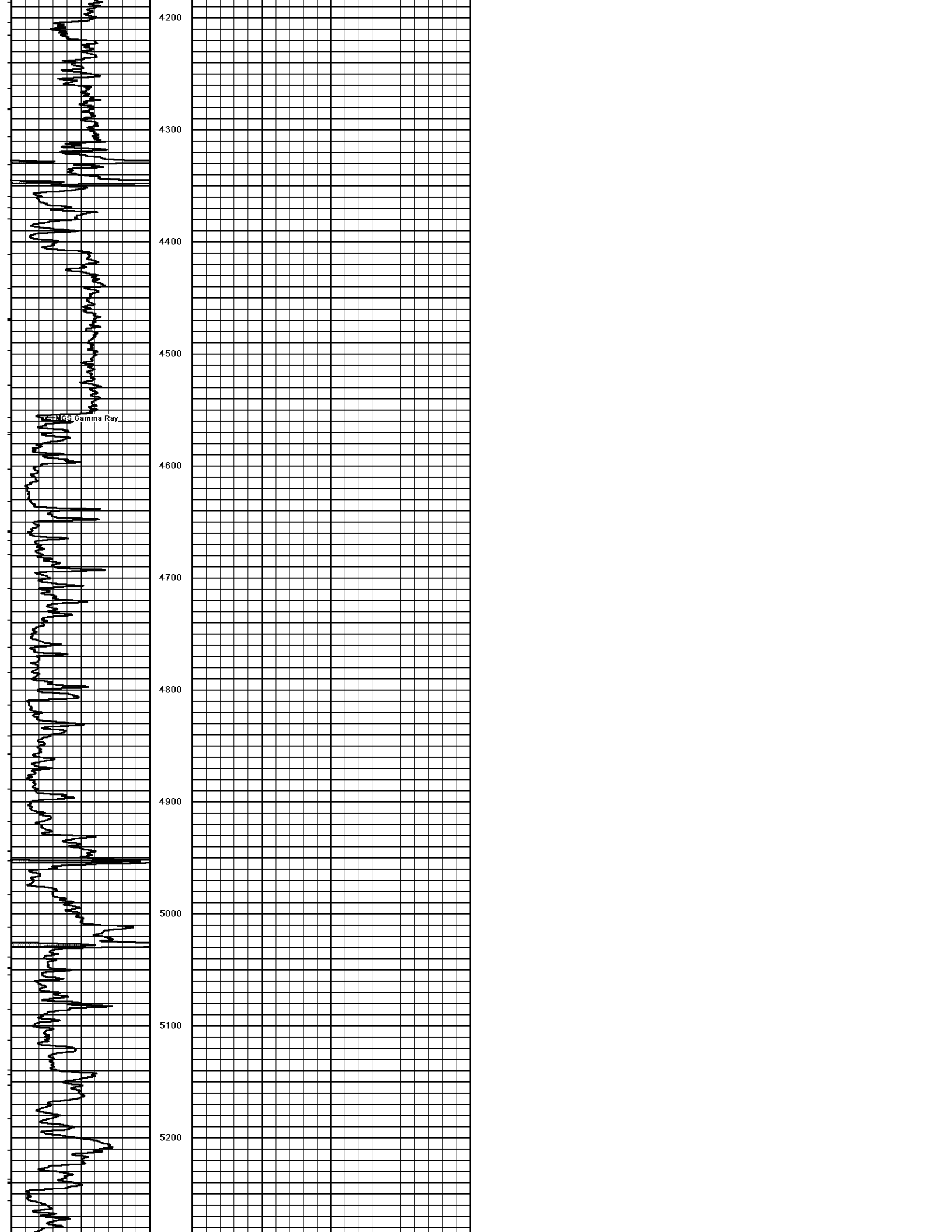


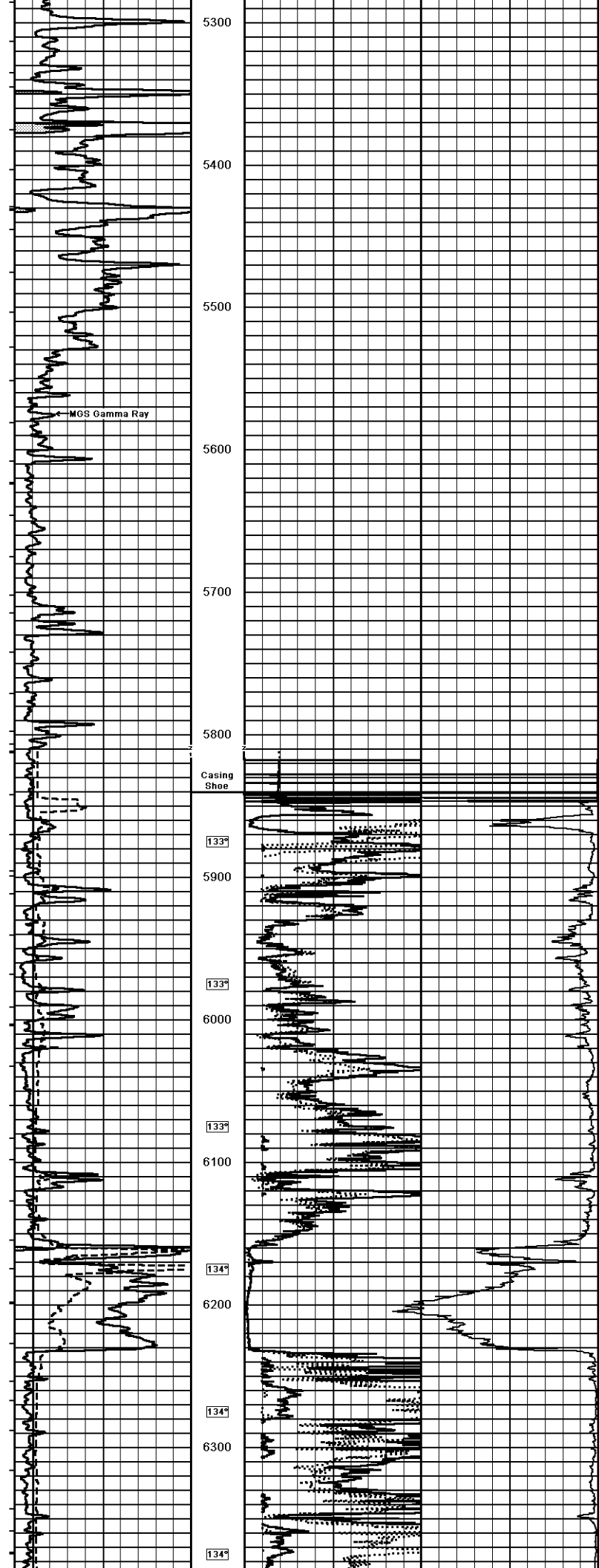
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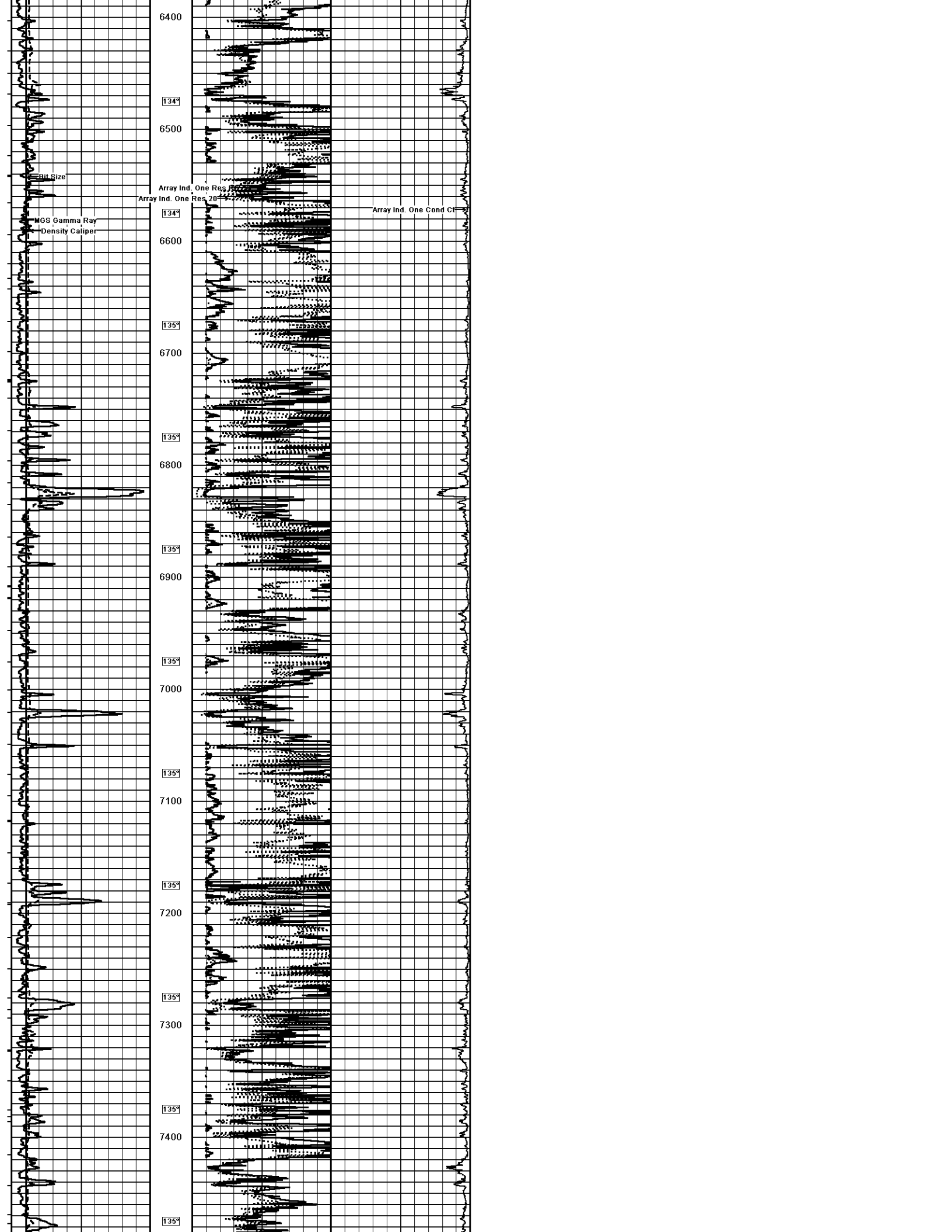
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System Versions: Processed with 12.02.4401 Plotted with 12.02.4401

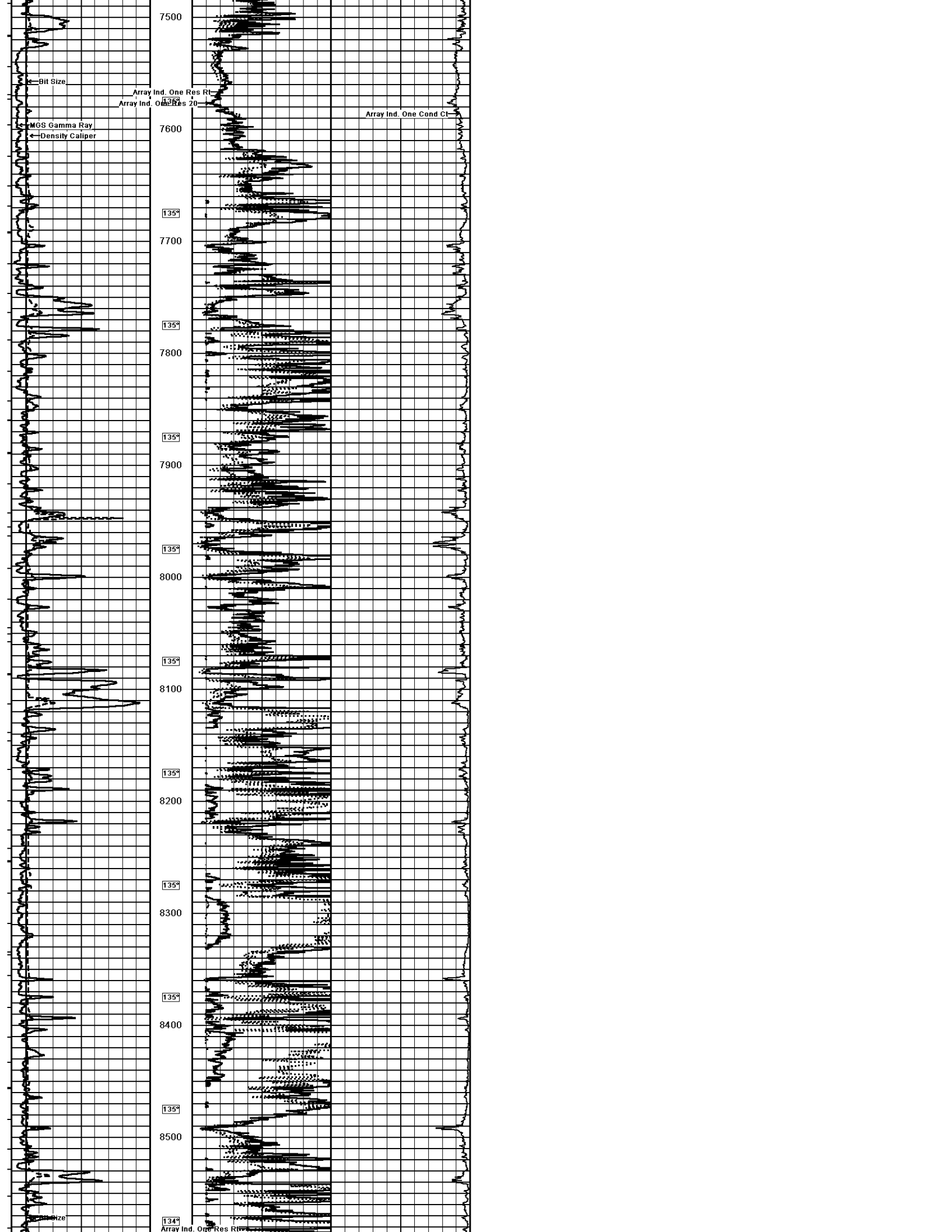
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Recorded on 17-JUN-2012 13:40

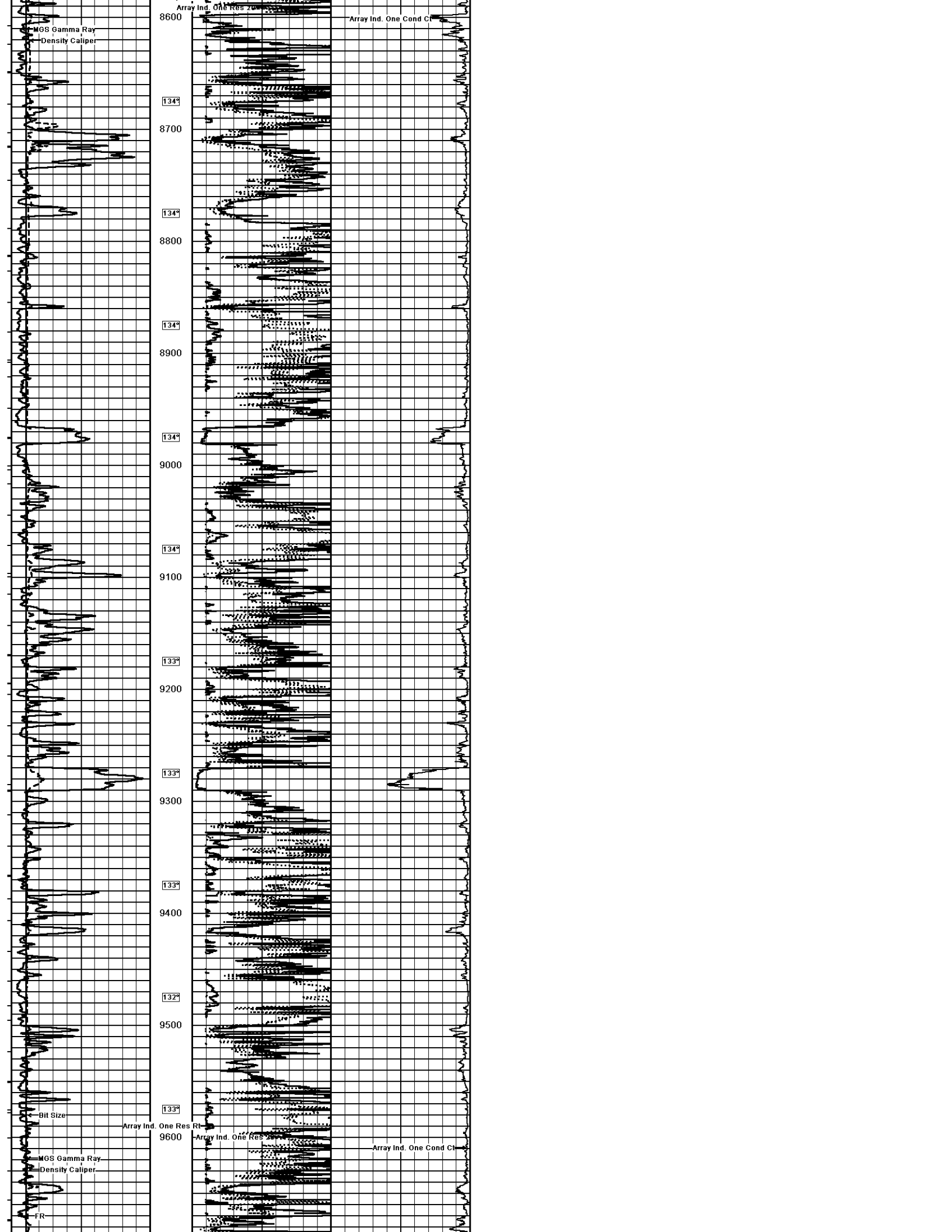


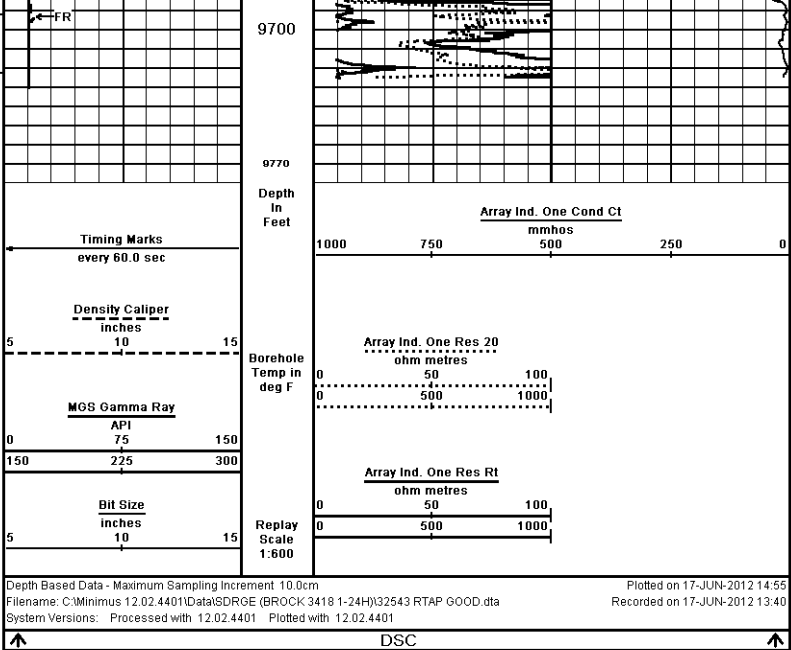












COMPANY		SANDRIDGE E&P LLC	
WELL		BROCK 3418 1-24H	
FIELD		HAAS WEST	
PROVINCE/COUNTY		COMANCHE	
COUNTRY/STATE		USA / KANSAS	
Elevation Kelly Bushing	1883.50 feet	First Reading	9730.00 feet
Elevation Drill Floor	1883.50 feet	Depth Driller	9747.00 feet
Elevation Ground Level	1864.00 feet	Depth Logger	9747.00 feet

Weatherford

CML IMPULSE SHUTTLE
 ARRAY INDUCTION
 LOG