



Weatherford

**COMPACT TRIPLE COMBO
QUICKLOOK
LOG**

COMPANY

EAST CHEYENNE GAS STORAGE LLC

WELL

ECGS No 6-21 WPD004-2

FIELD

WEST PEETZ

PROVINCE/COUNTY

LOGAN

COUNTRY/STATE

U.S.A / COLORADO

LOCATION

SHL: 1440' FSL & 2297' FWL

SEC 6

TWP 11N RGE 52W

Other Services

Latitude

Longitude

API Number 0507509426-0000

Permanent Datum GL, Elevation 4557 feet

Log Measured From KB

Drilling Measured From KB

Elevations:
KB 4567.00
DF 4566.00
GL 4557.00

Date 18-OCT-2014

Run Number 1

Service Order 2577-100789597

Depth Driller 5440.00 feet

Depth Logger 5440.00 feet

First Reading 5437.00 feet

Last Reading 1213.00 feet

Casing Driller 1220.00 feet

Casing Logger 1213.00 feet

Bit Size 8.750 inches

Hole Fluid Type WBM

Density / Viscosity 9.60 lb/USg 70.00 SEC/QT

PH / Fluid Loss 8.00

Sample Source FLOWLINE

Rm @ Measured Temp 2.21 @ 65.7 ohm-m

Rmf @ Measured Temp 1.76 @ 65.7 ohm-m

Rmc @ Measured Temp 2.65 @ 65.7 ohm-m

Source Rmf / Rmc FLOWLINE

Rm @ BHT 0.89 @ 168.0 ohm-m

Time Since Circulation 5 HOURS

Max Recorded Temp 168.00 deg F

Equipment / Base 13173 CASPER

Recorded By M.RICHINS

Witnessed By R.LYNDE

BOREHOLE RECORD

Last Edited: 17-OCT-2014 20:59

Bit Size
inches

8.750

Depth From
feet

1219.00

Depth To
feet

5260.00

CASING RECORD

Type

Size
inches

9.625

Depth From
feet

0.00

Shoe Depth
feet

1219.00

Weight
pounds/ft

36.00

REMARKS

SOFTWARE VERSION: 14.01.3220

MCG, MDN, MPD, MFE, MIE, AND MAI RAN IN COMBINATION.

HARDWARE: MAI: 0.5" STAND OFF, SEE TOOL STRING.

TIGHT PULLS, BOREHOLE SIZE AND RUGOSITY WILL AFFECT REPEATABILITY AND DATA QUALITY.

ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.

IMAGE TOOL PACKED UP WITH MUD AND WELL DEBRIS. REPEAT PASS PRESENTED INSTEAD OF MAIN. IMAGE PULLED 300 FEET OFF BOTTOM.

POROSITY TOOLS PULLED TO 3900 FEET PER CUSTOMER REQUEST.

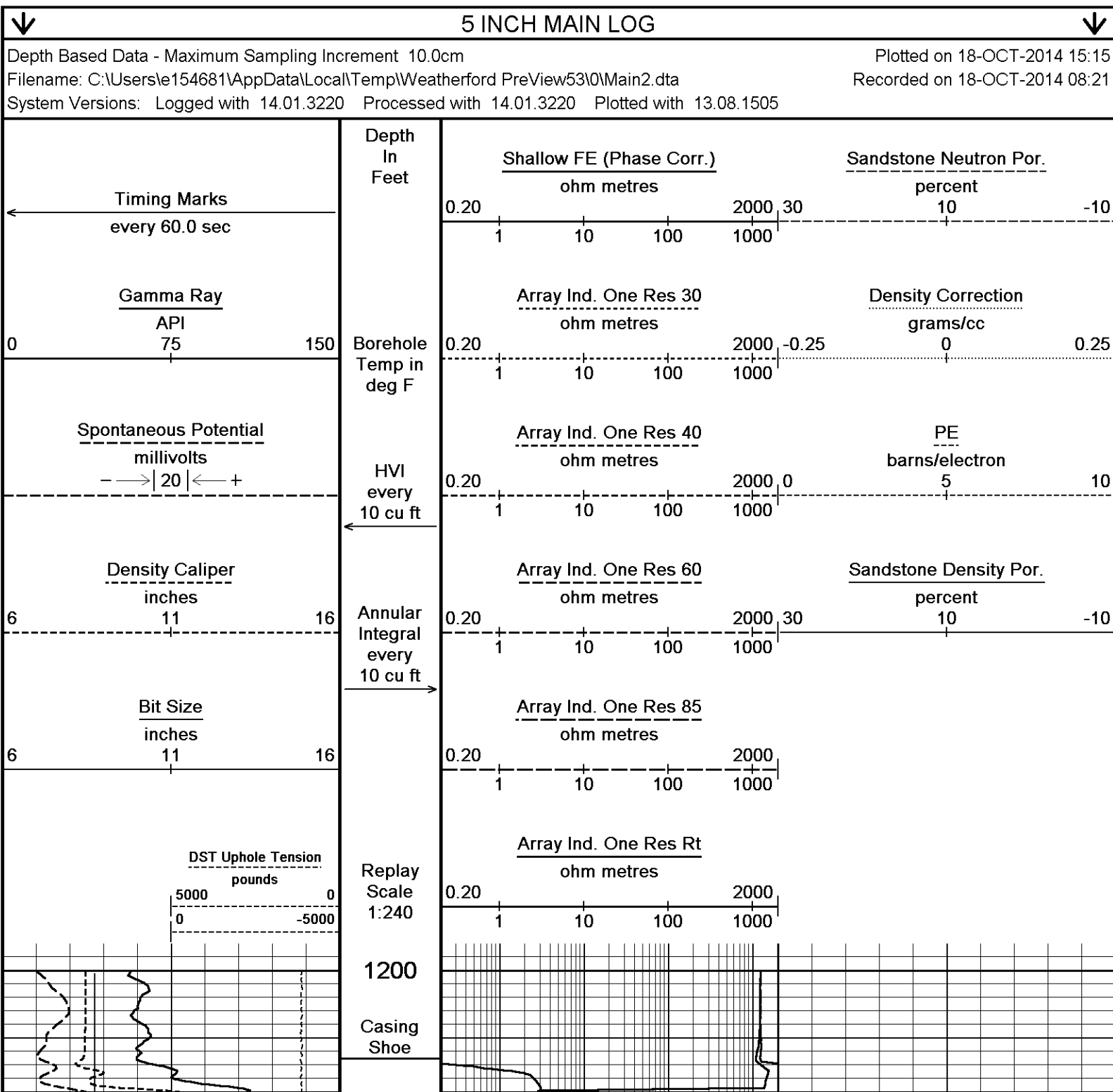
RESISTIVITY PULLED TO SURFACE CASING, AND GAMMA PULLED TO SURFACE.

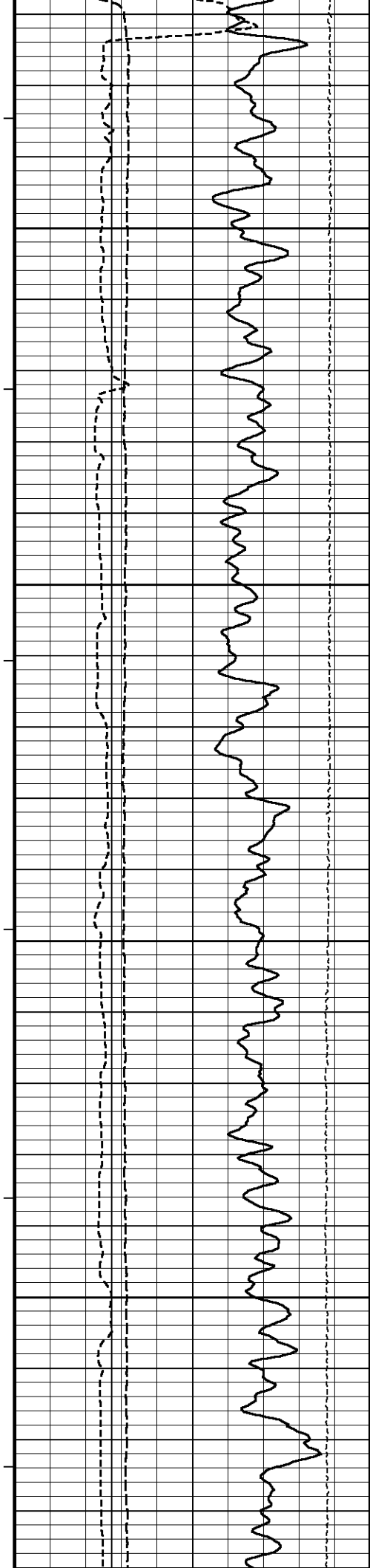
TOTAL HOLE VOLUME FROM TD (5440 FEET) TO SURFACE CASING = 1840 CUBIC FEET

ANNULAR HOLE VOLUME FROM TD (5115 FEET) TO SURFACE CASING = 1015.0001 CU FT.

ANNULAR HOLE VOLUME WITH 7' CASING FROM TD TO SURFACE CASING = 720

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.



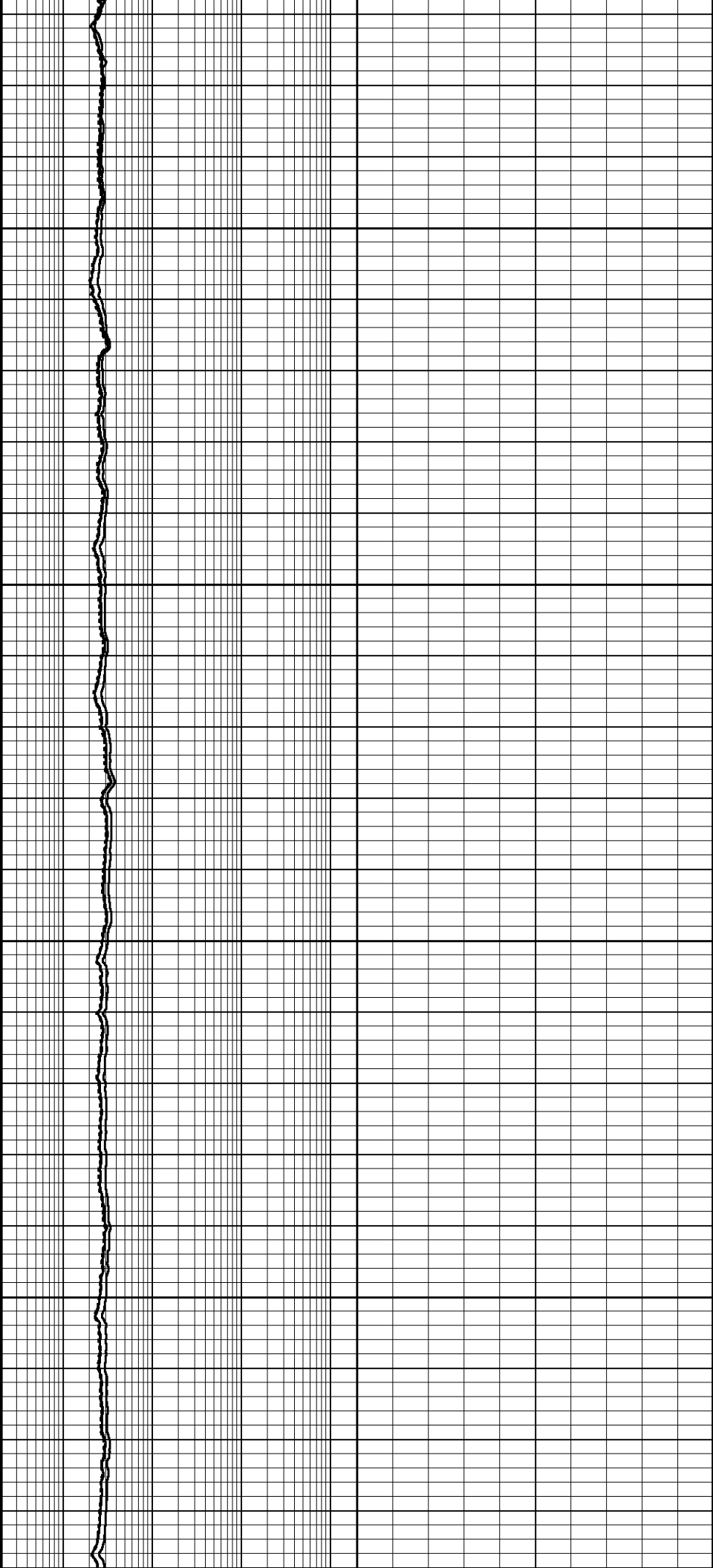


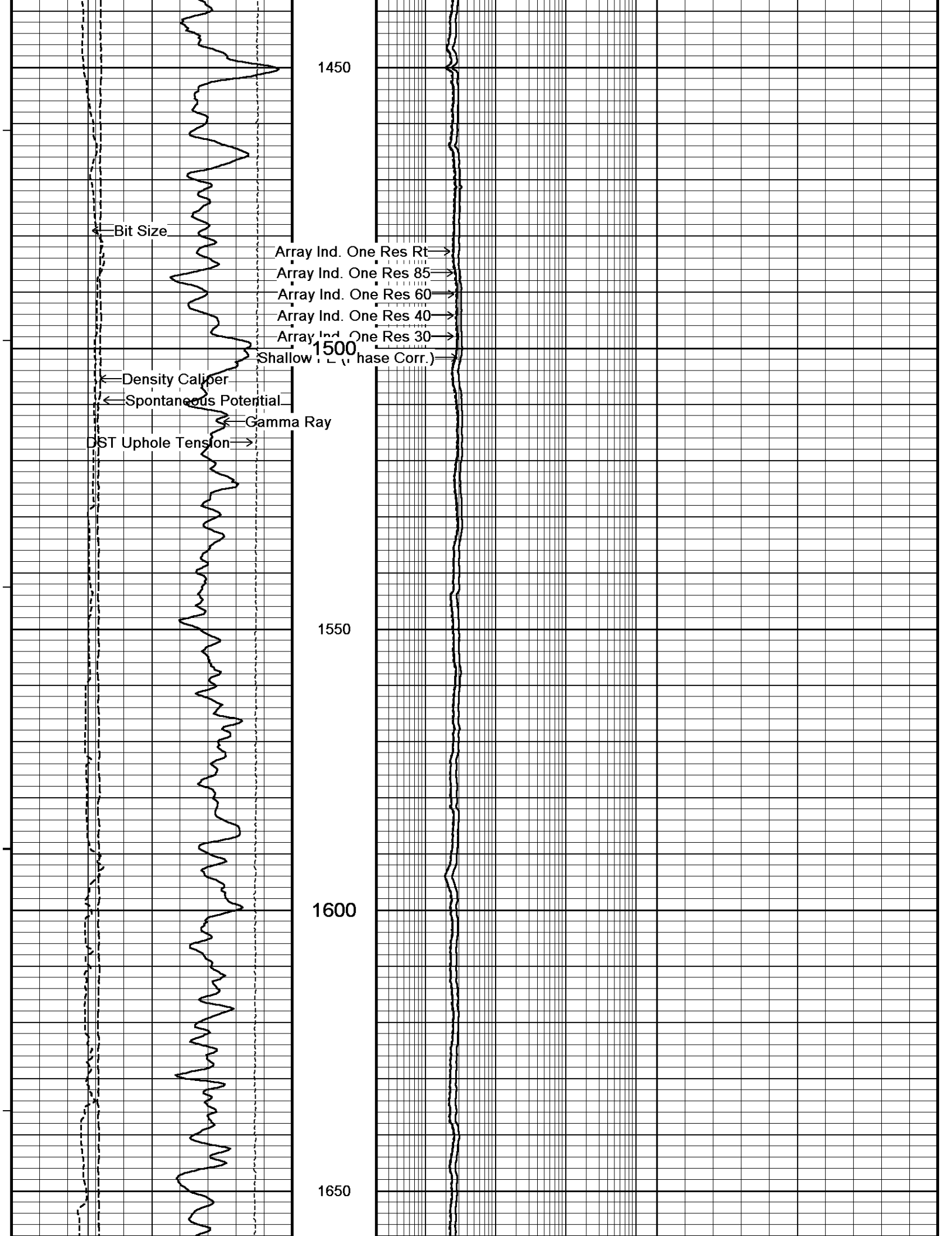
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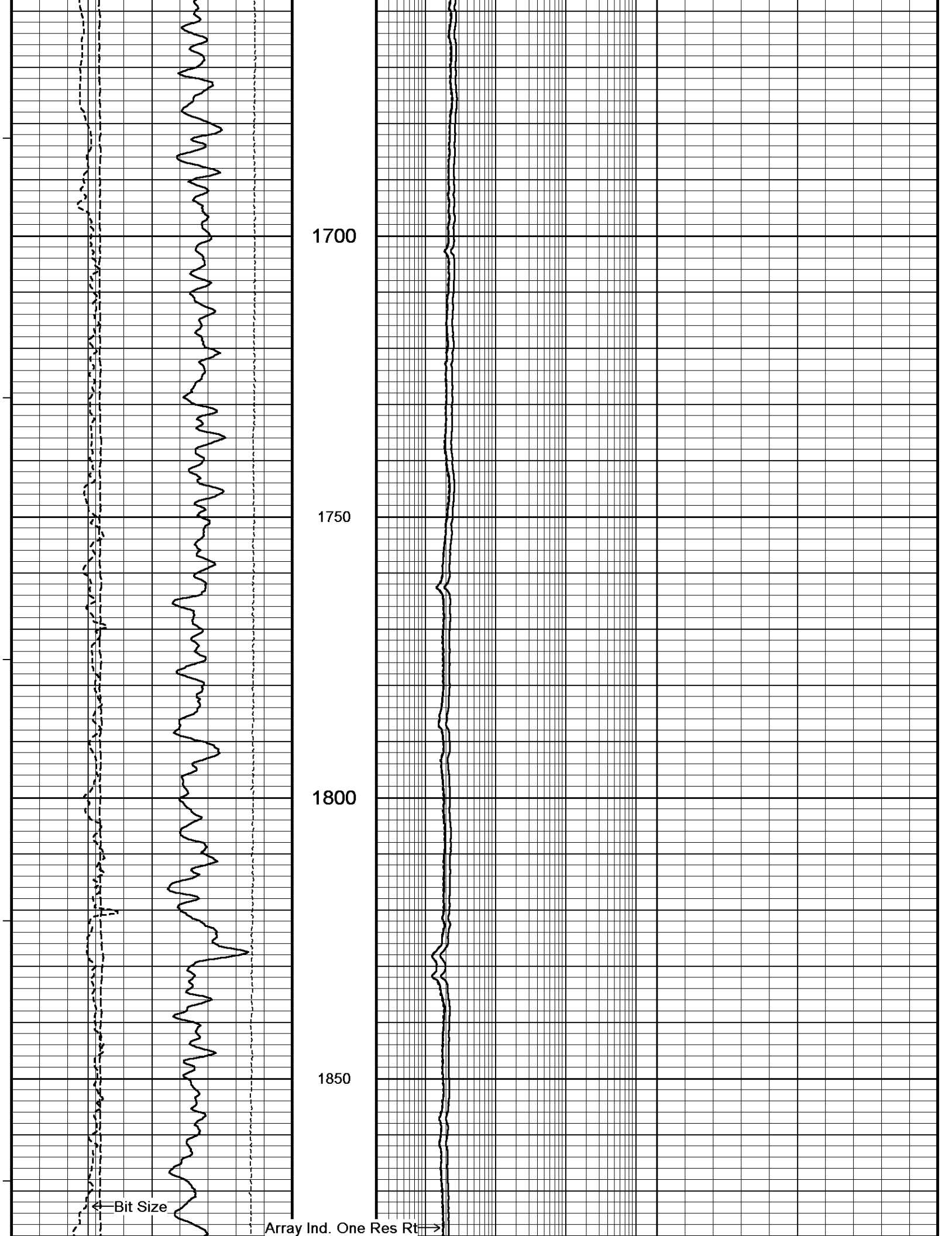
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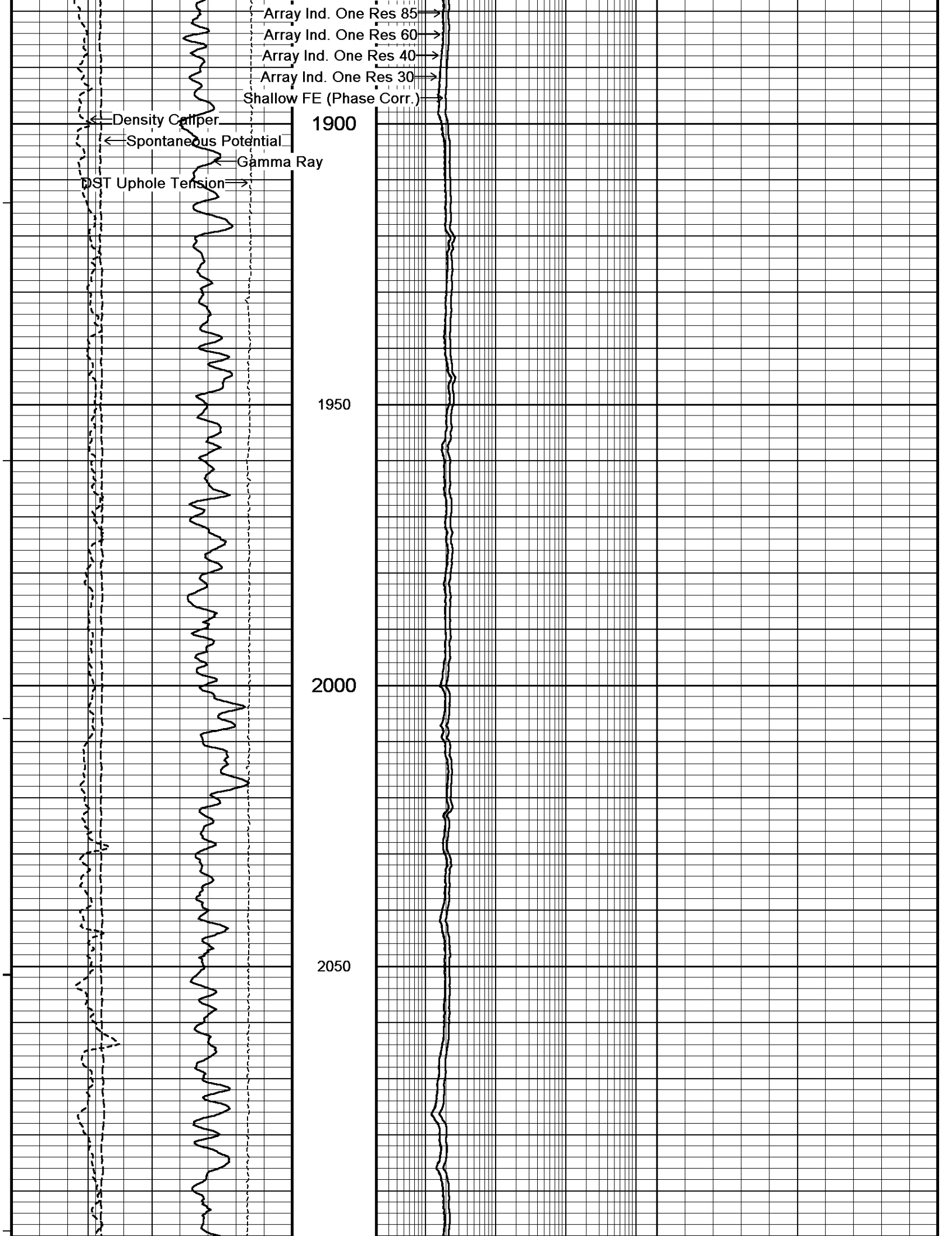
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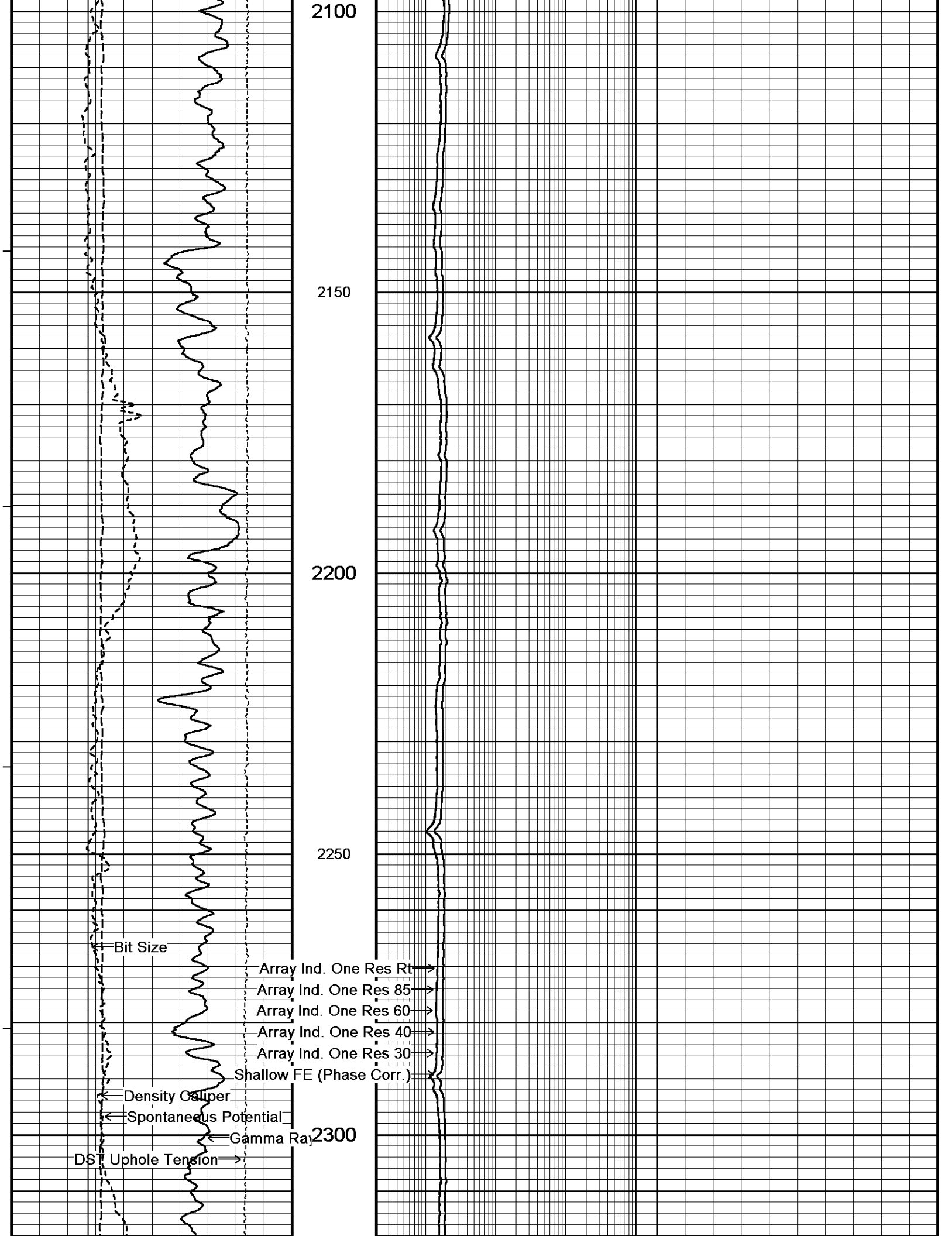
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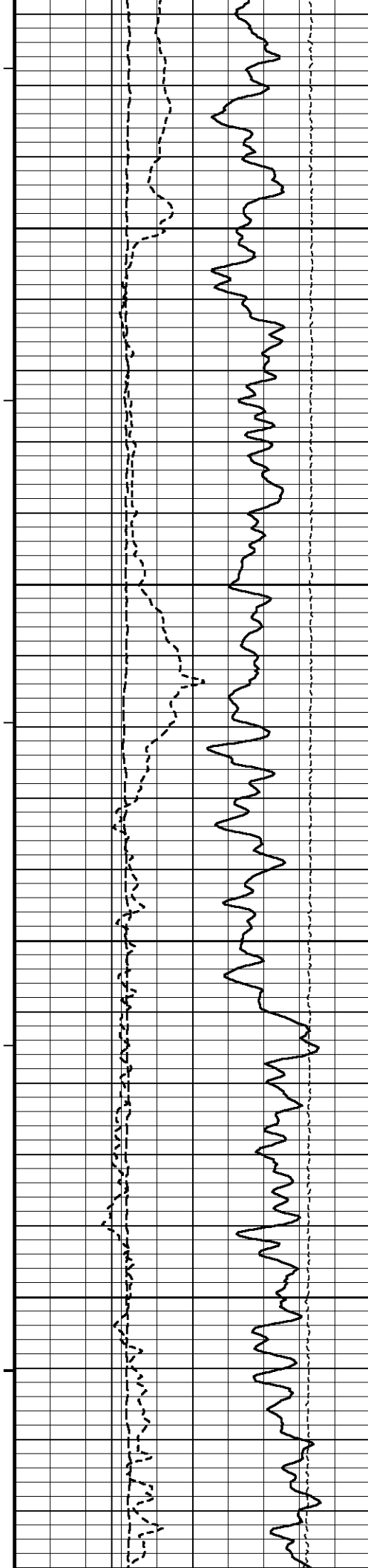










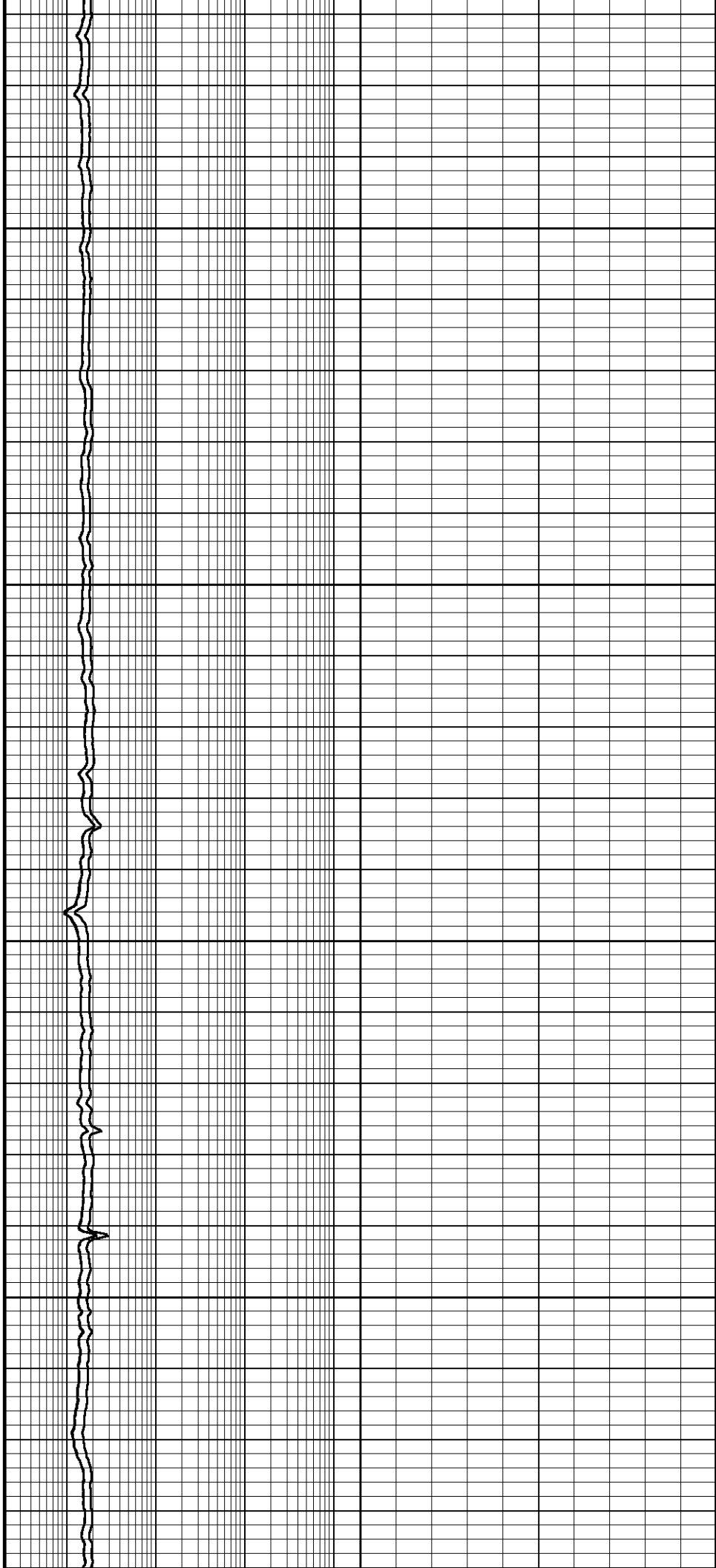


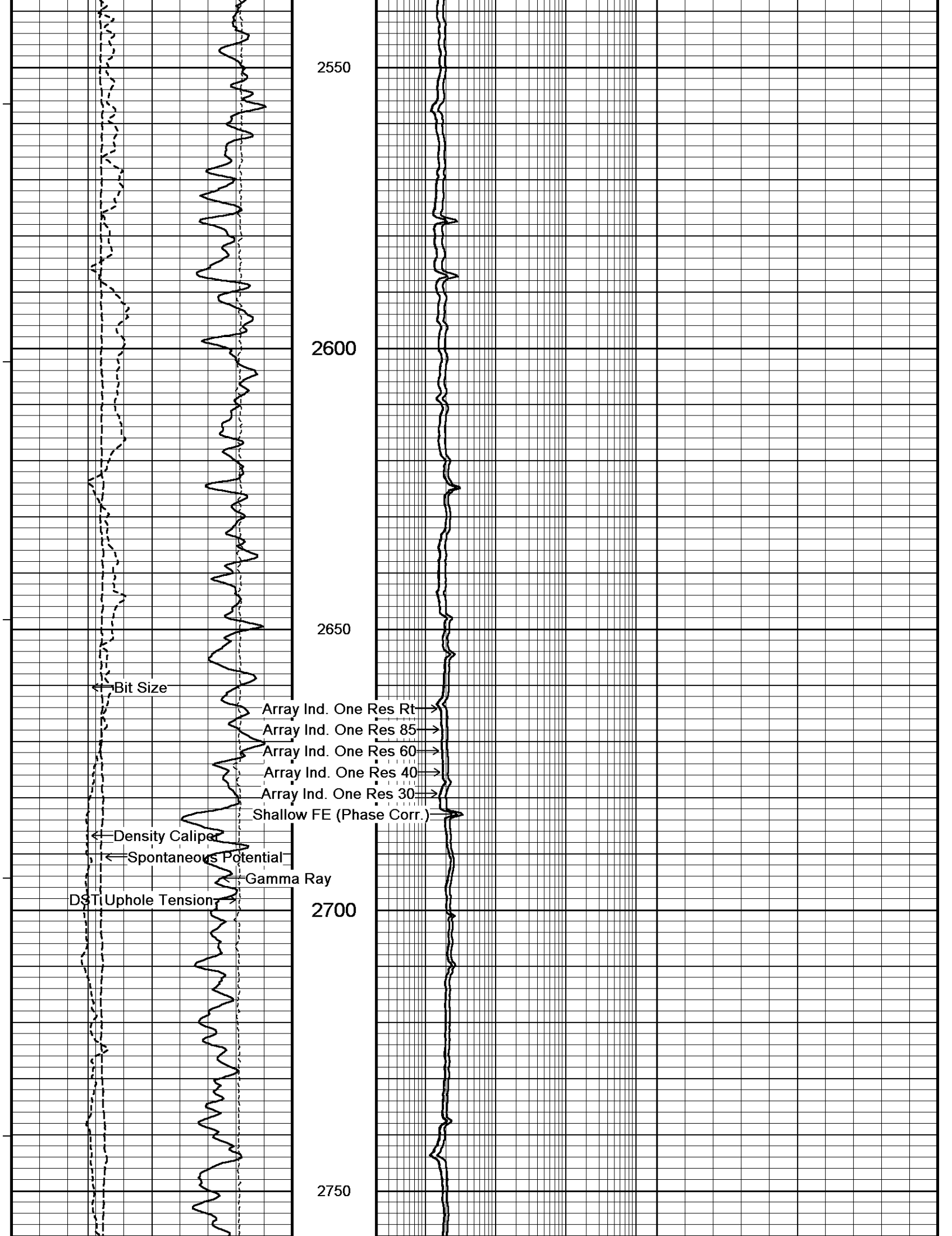
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2400

2450

2500





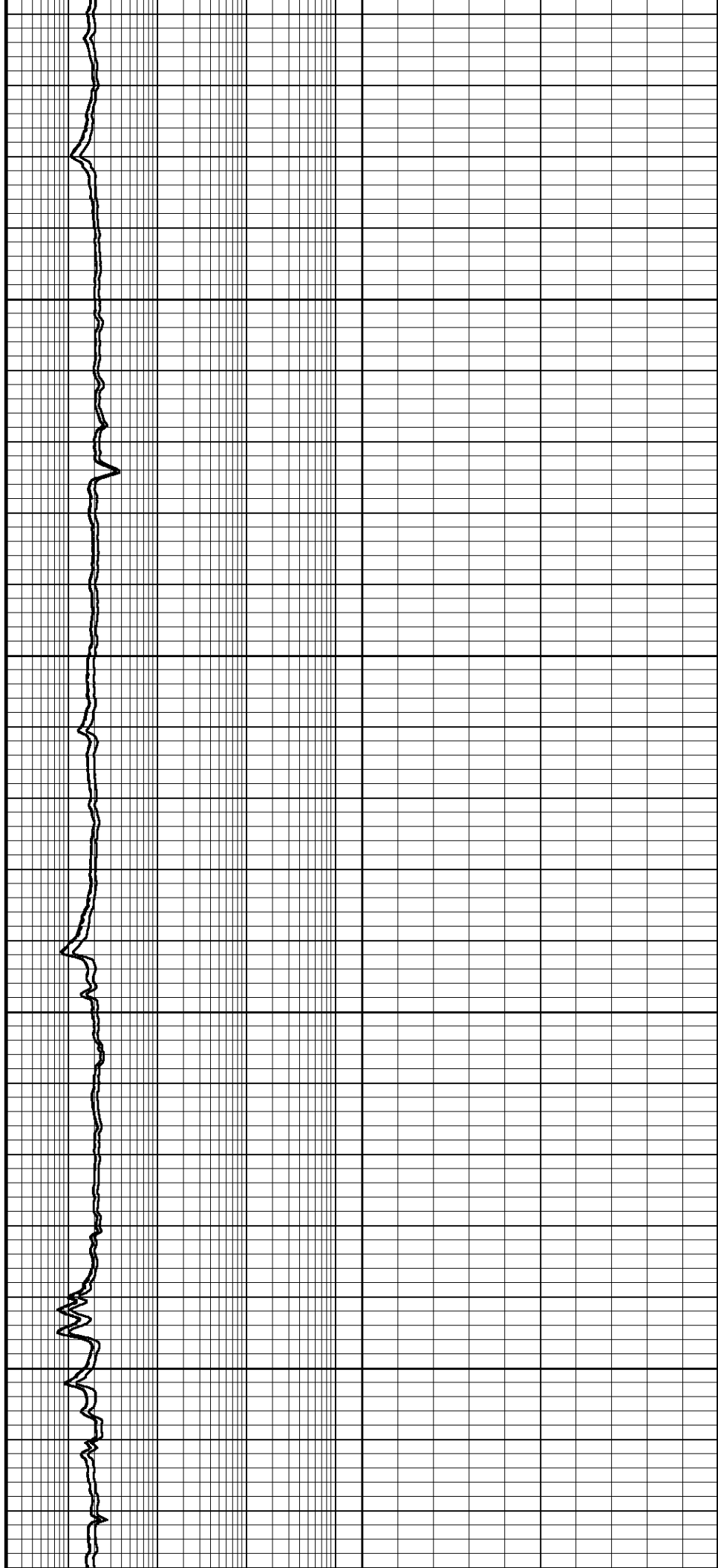


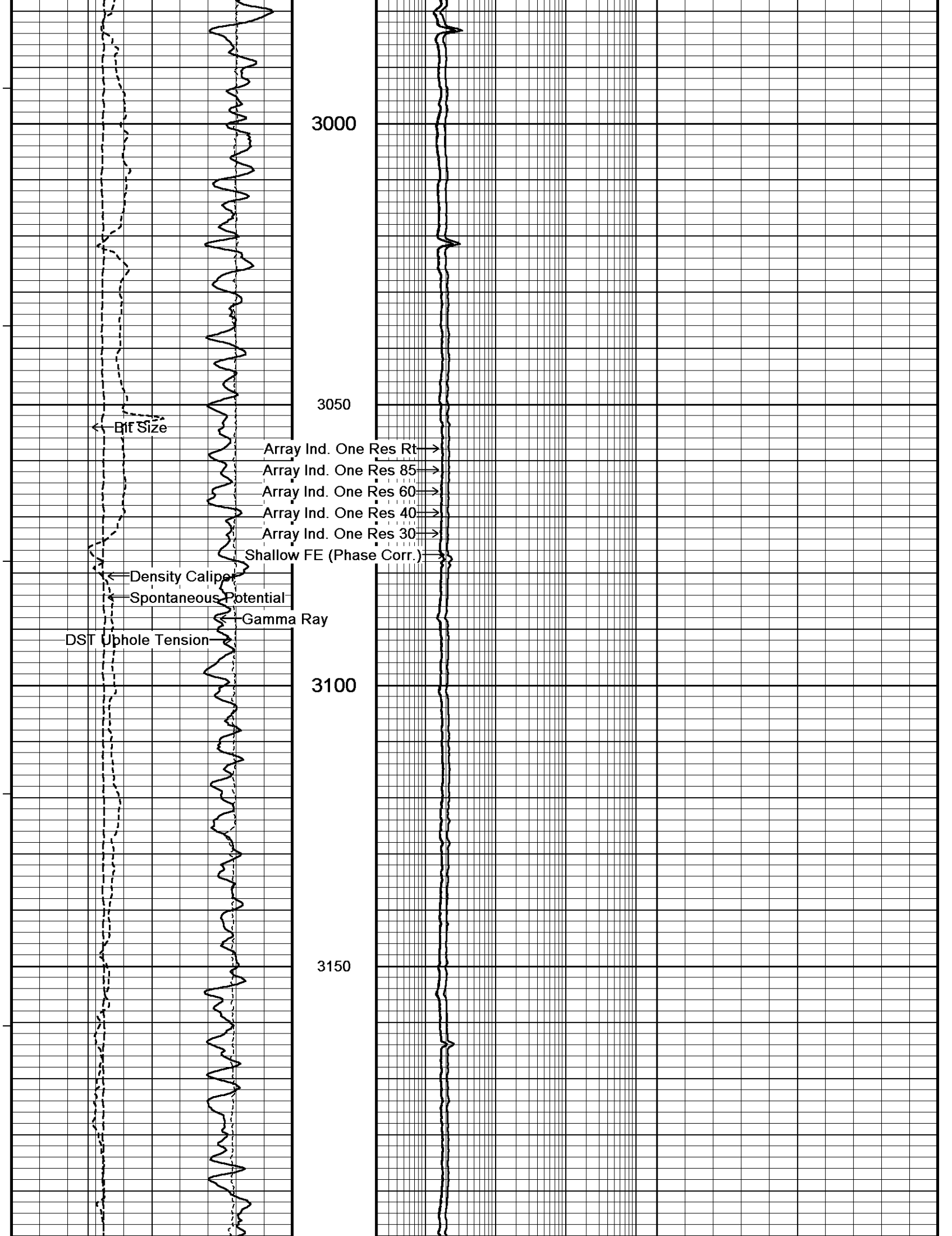
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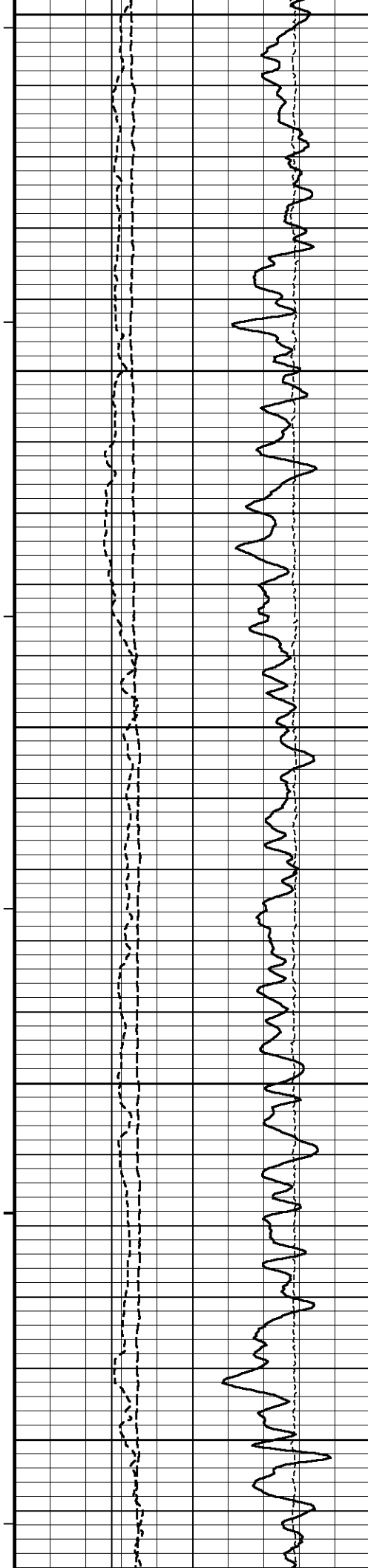
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2900

2950







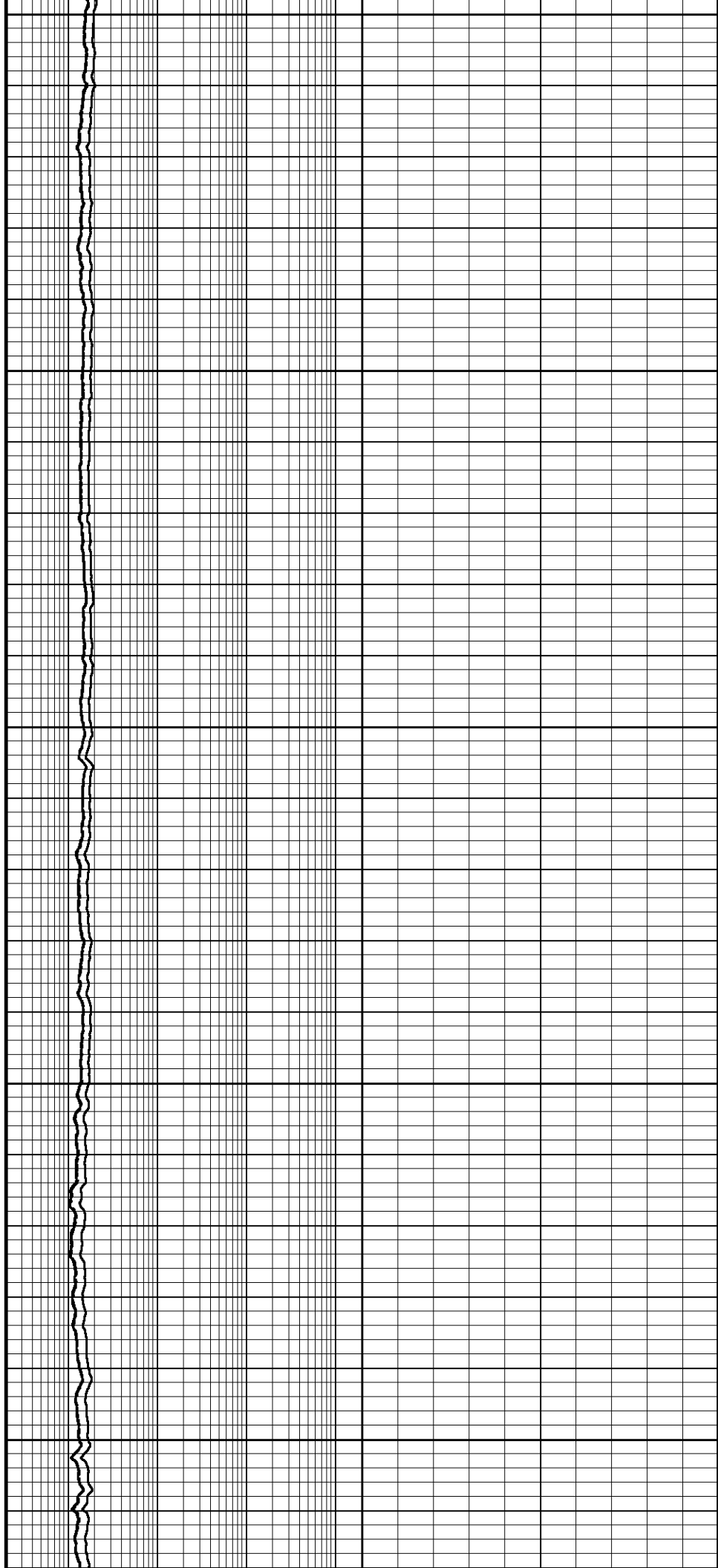
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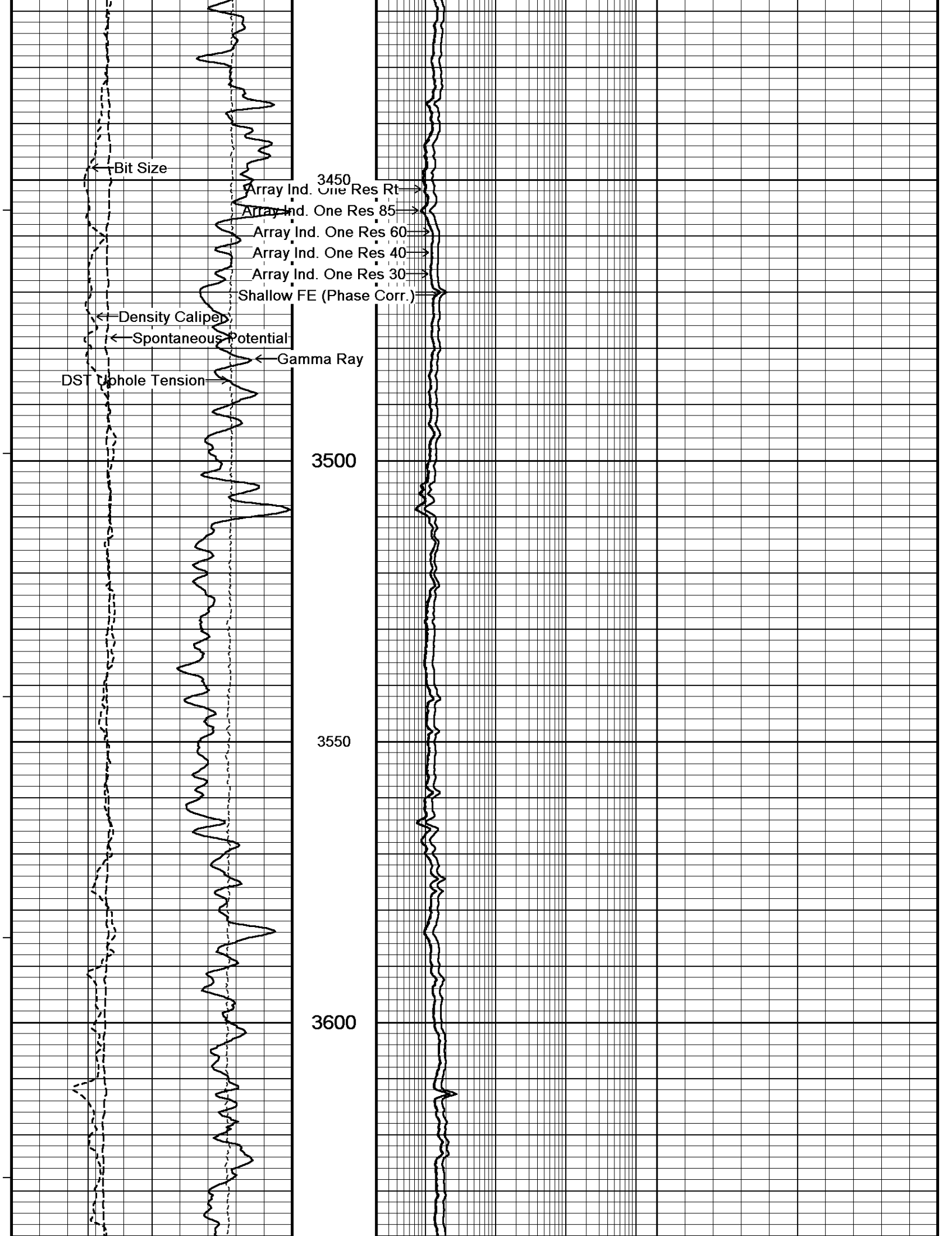
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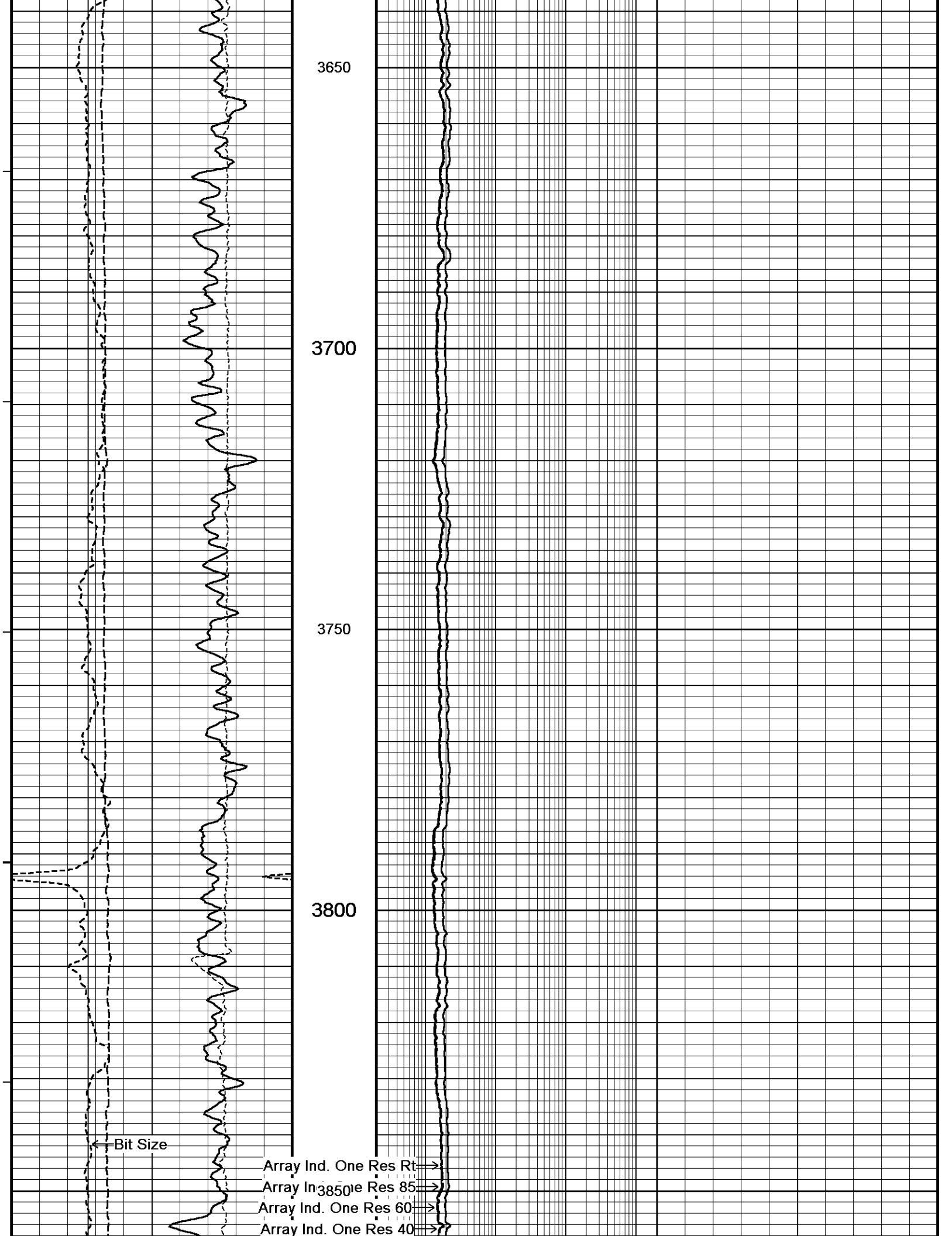
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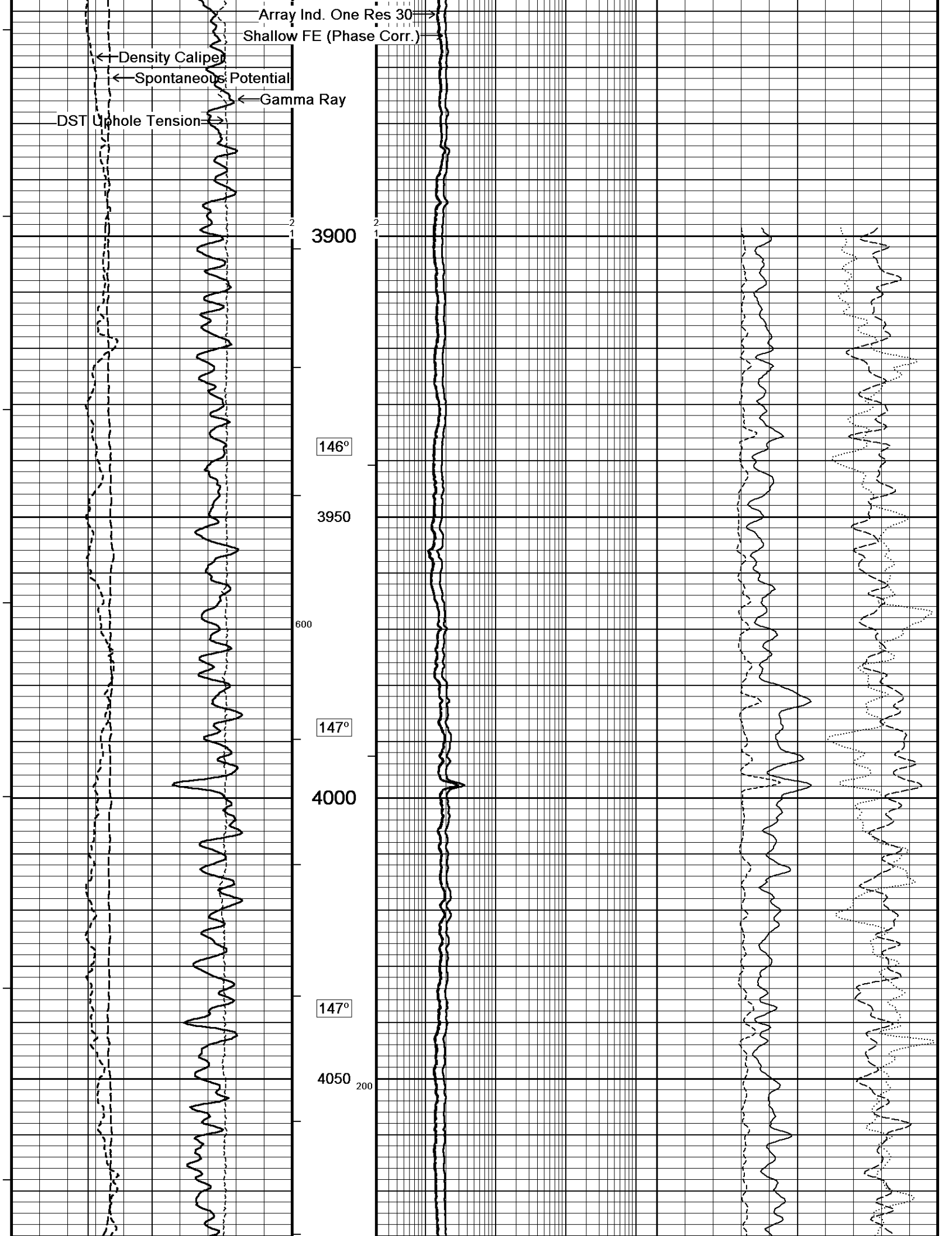
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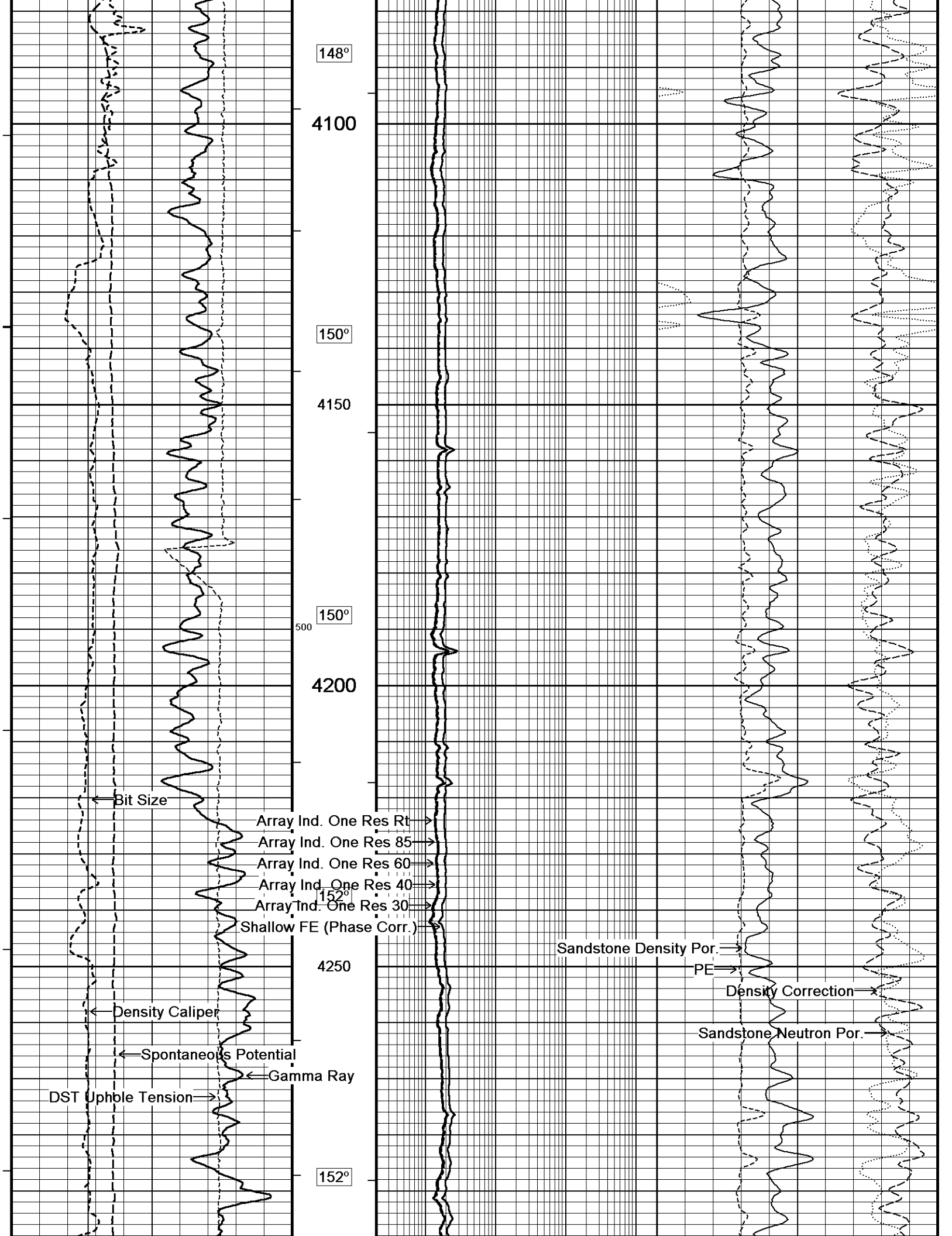
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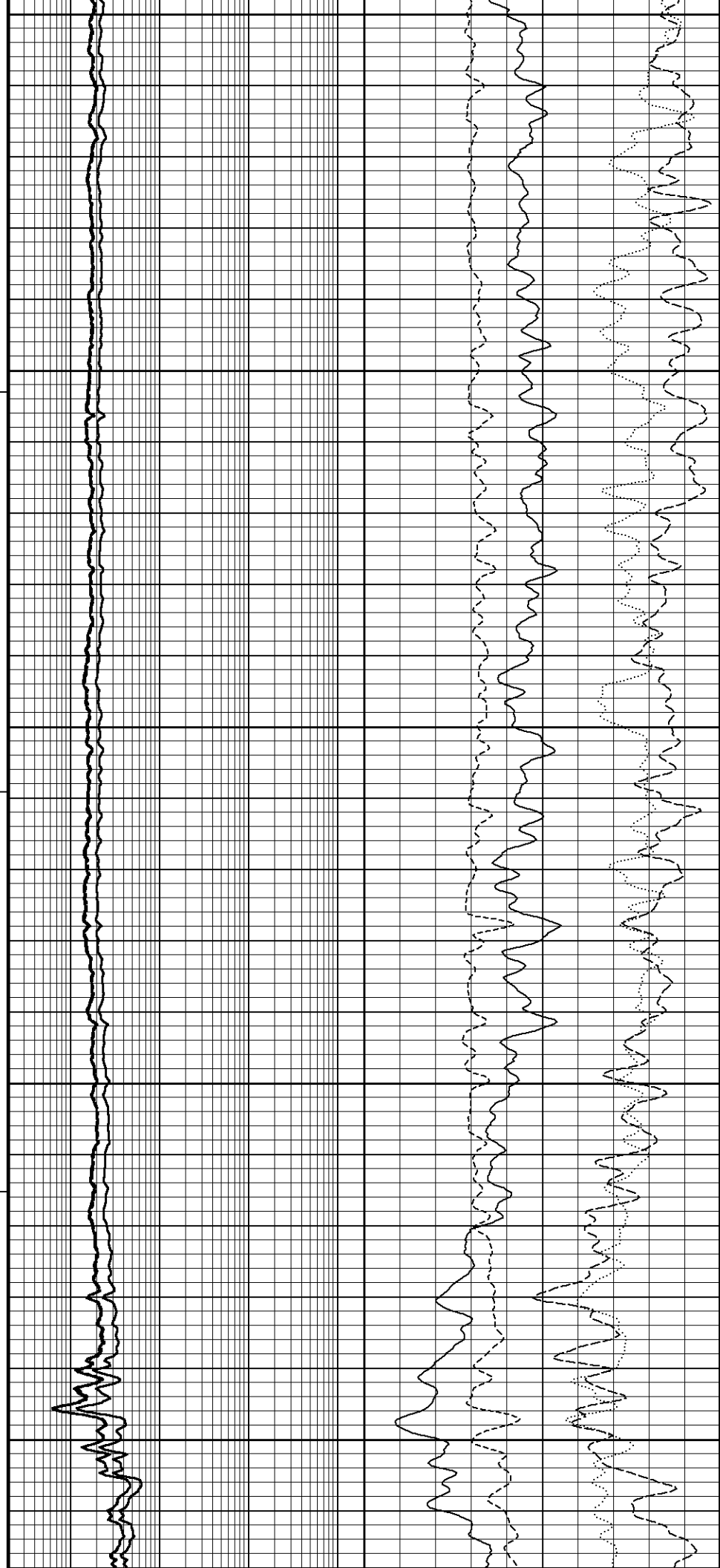
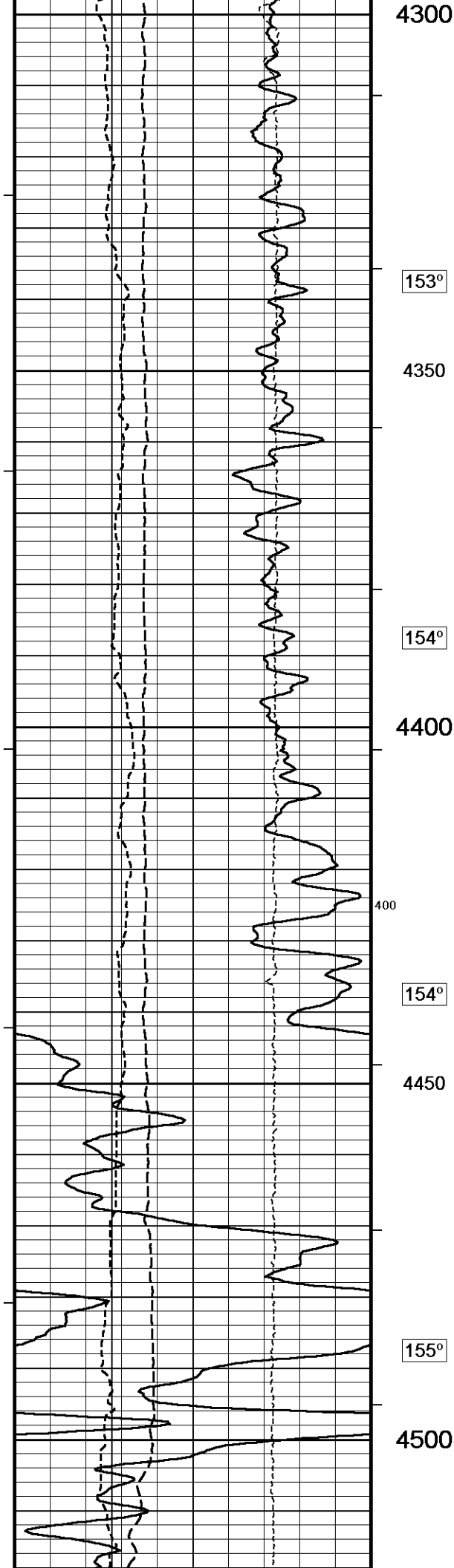


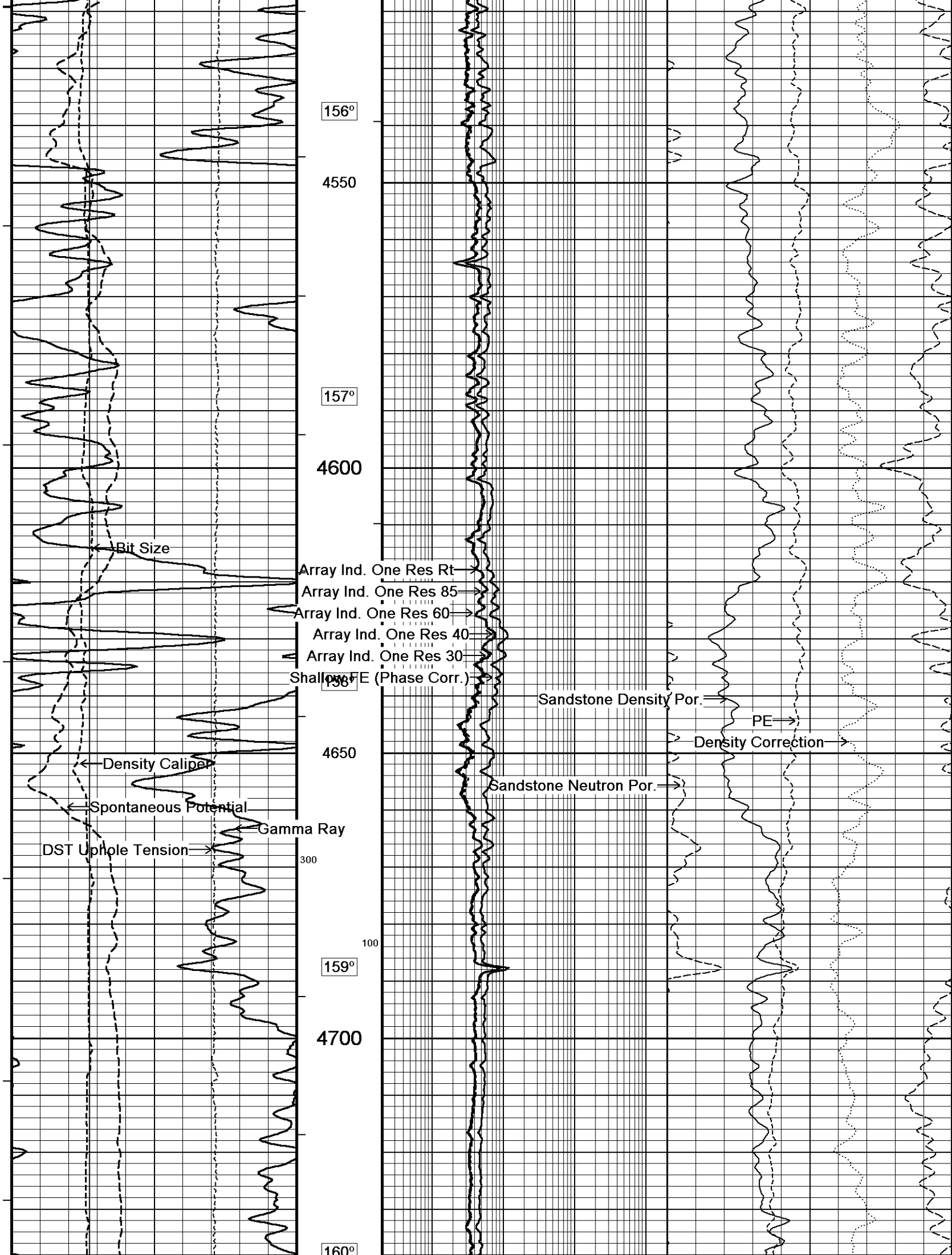


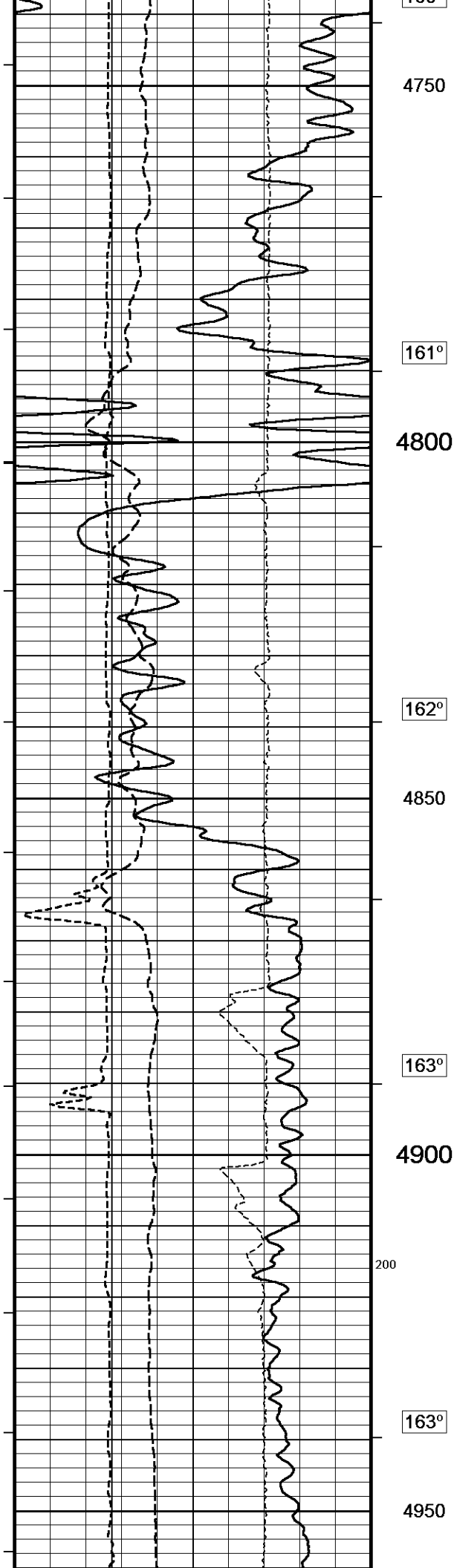












163°

4750

161°

4800

162°

4850

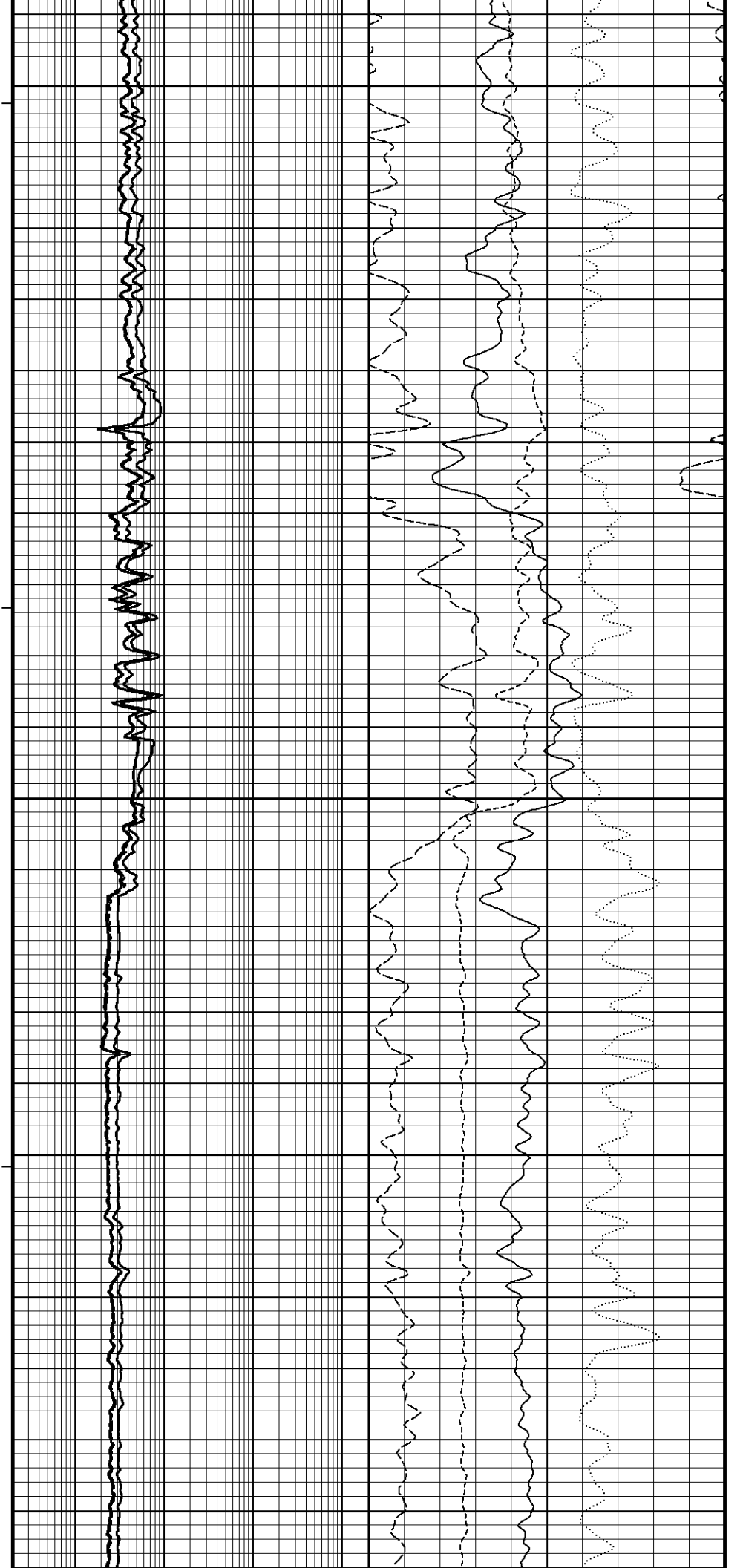
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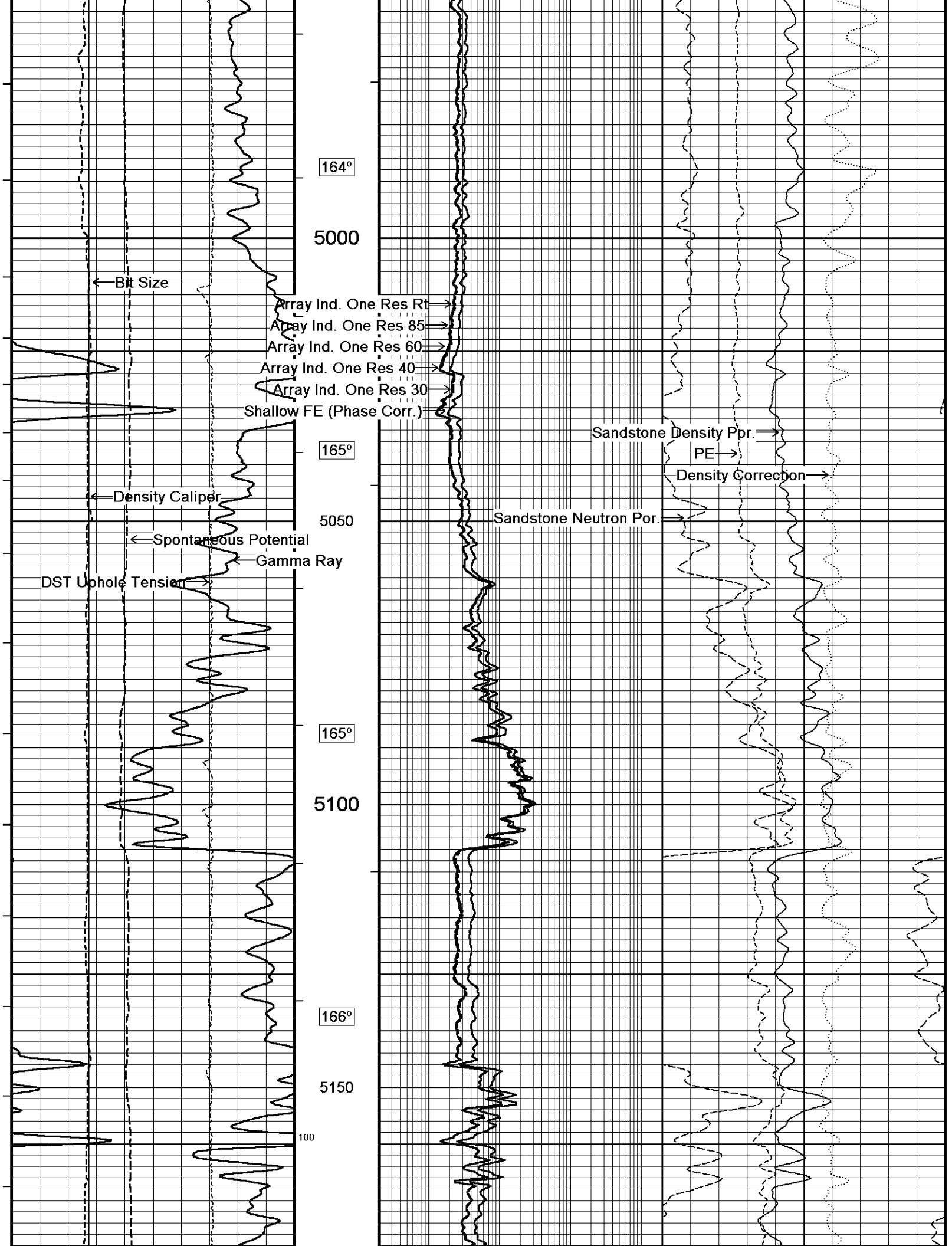
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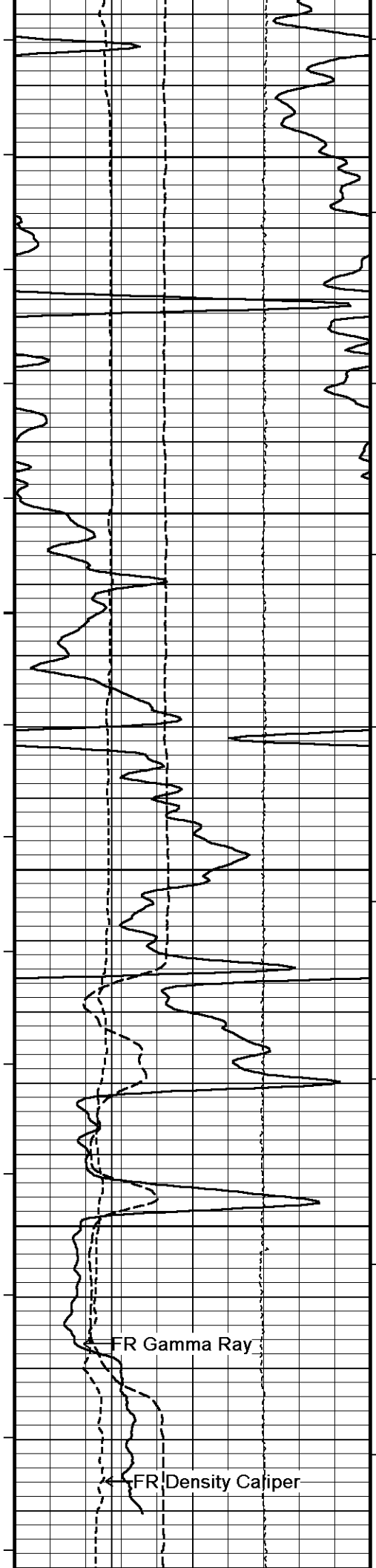
200

163°

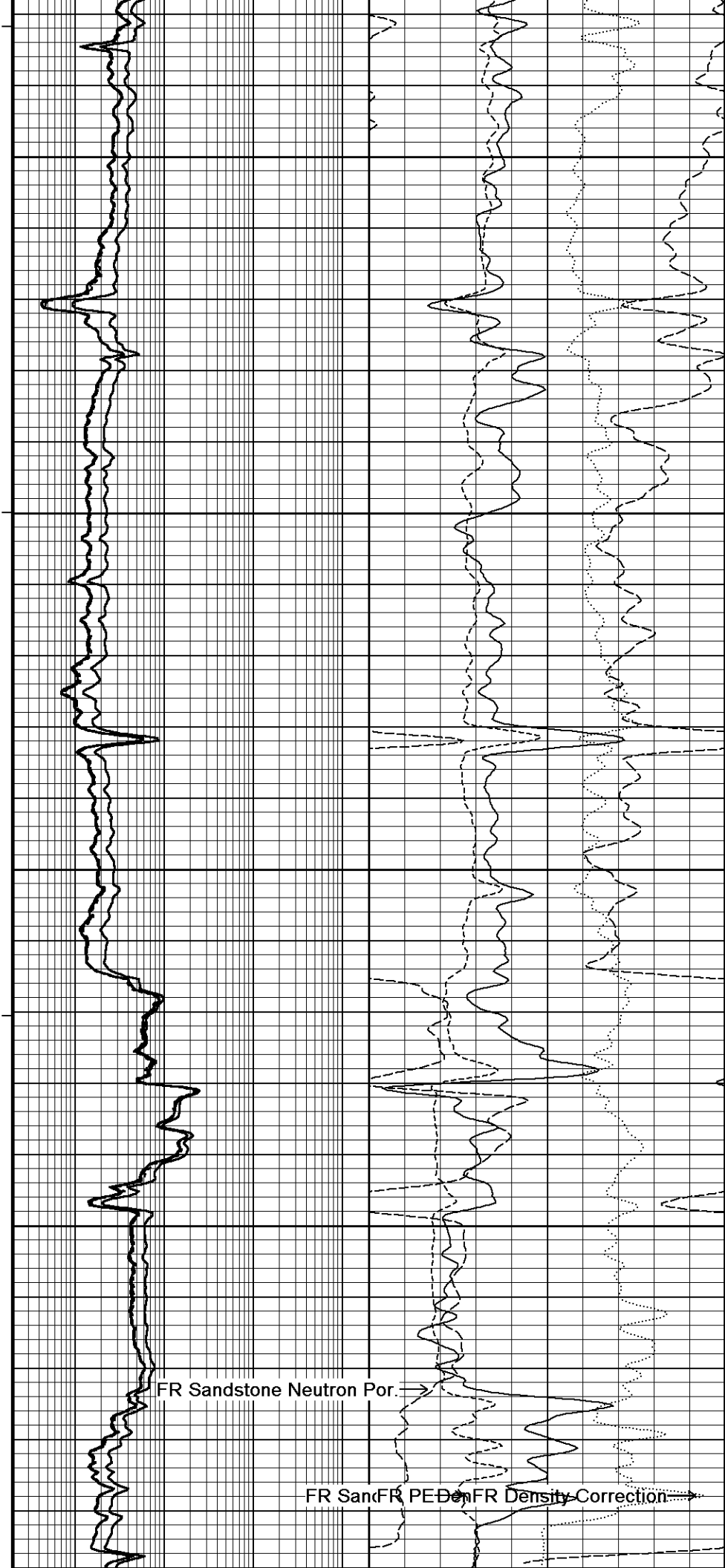
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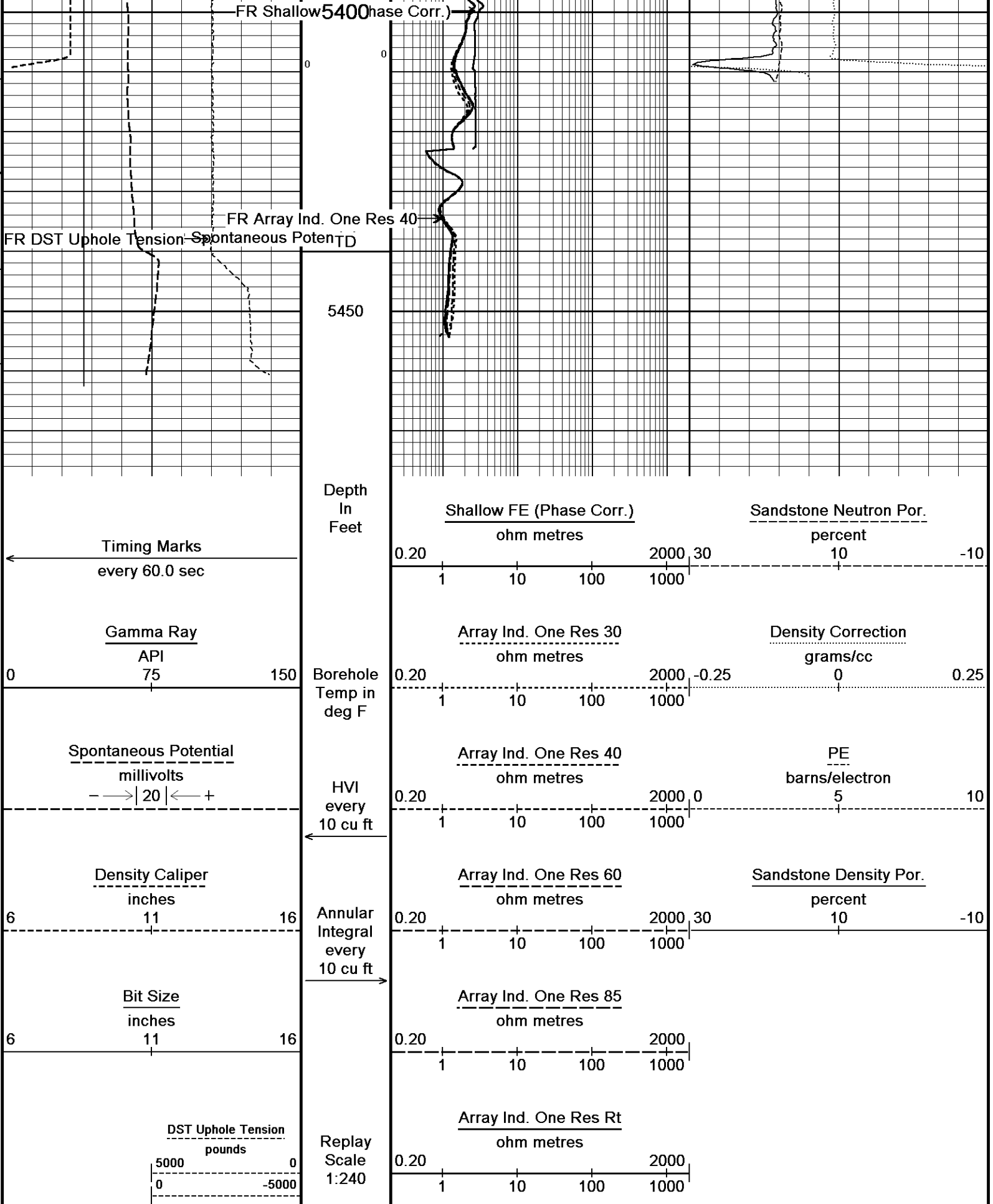


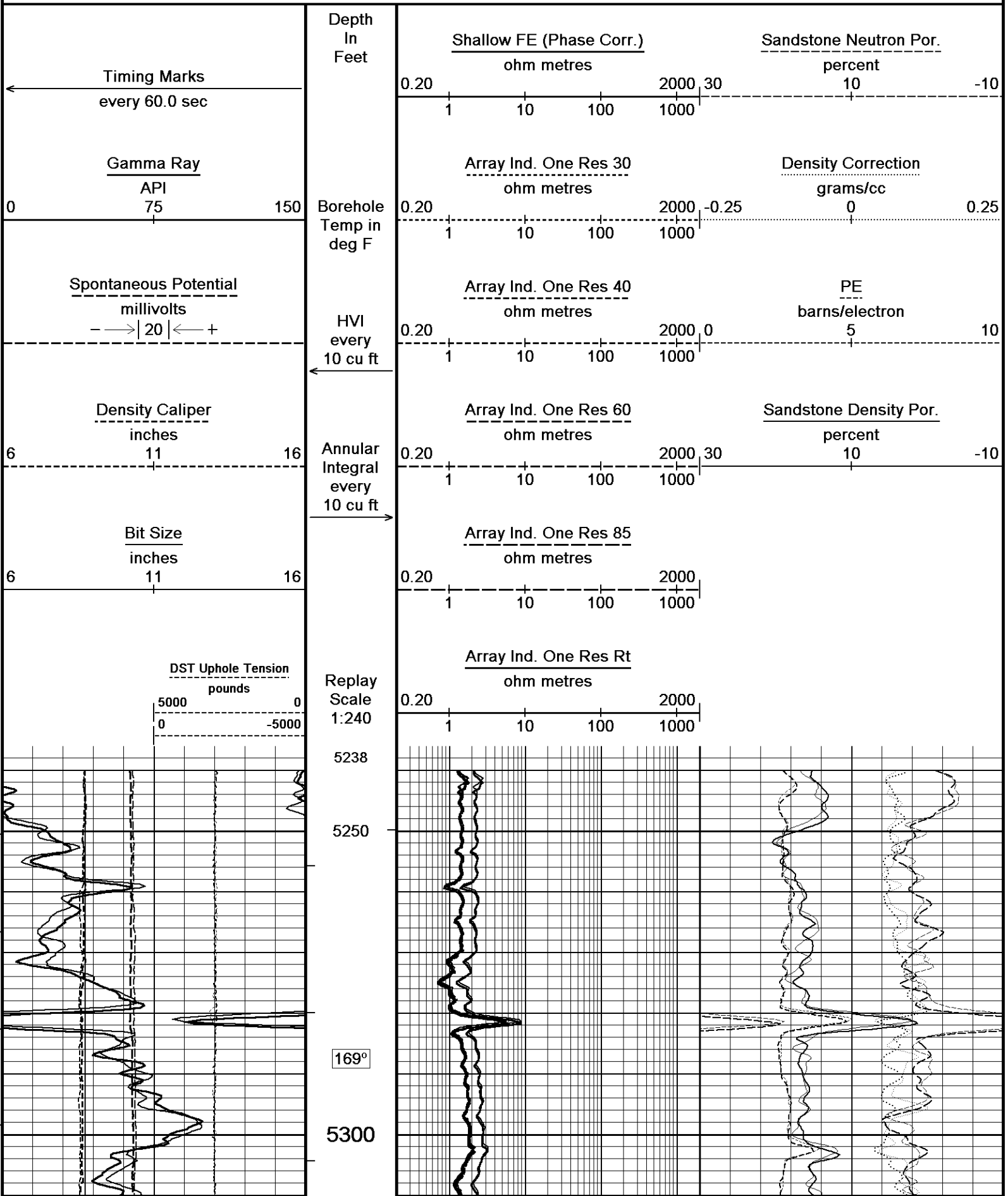


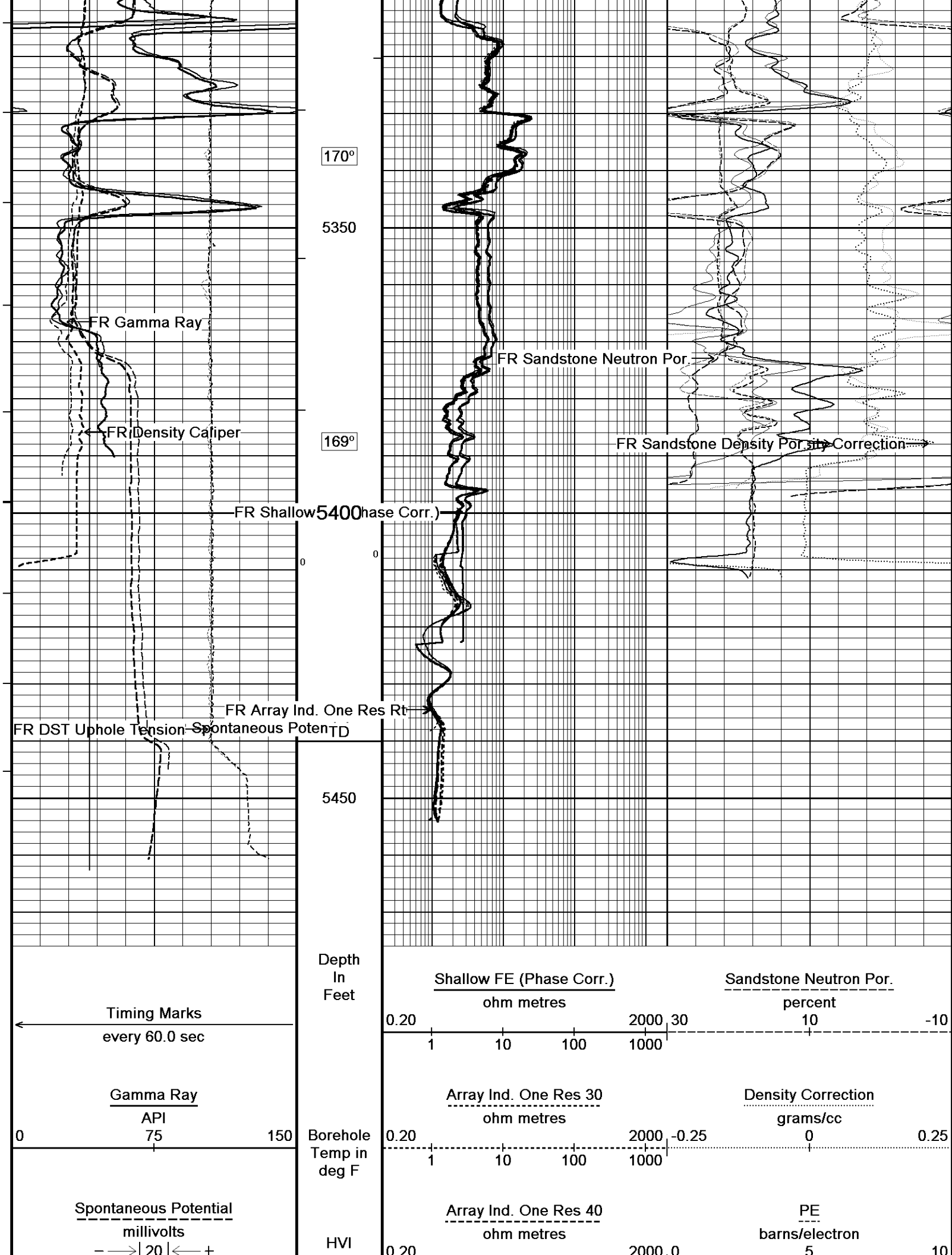


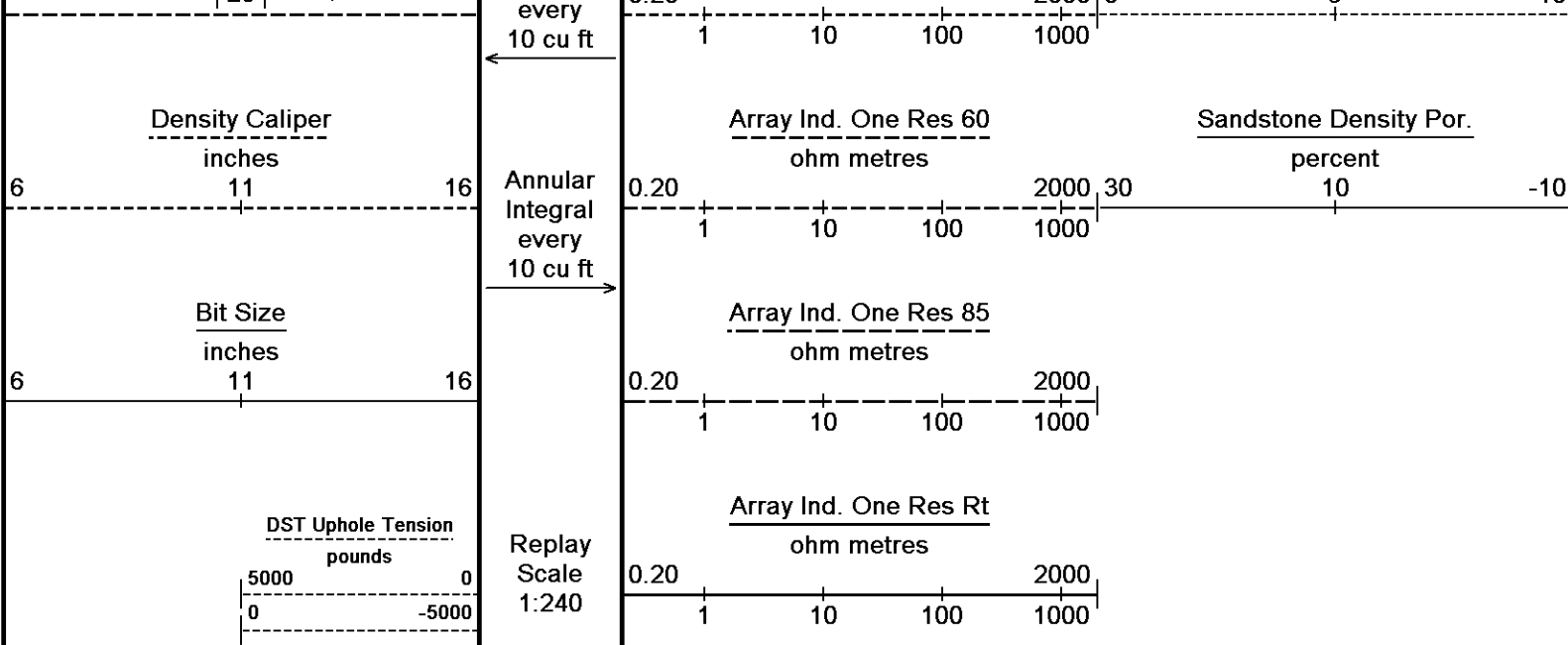
166°
5200
167°
5250
169°
5300
170°
5350
169°











Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 18-OCT-2014 15:15
 Filename: C:\Users\le154681\AppData\Local\Temp\Weatherford PreView53\0\Main2.dta
 Recorded on 18-OCT-2014 08:21
 Filename: C:\Users\le154681\AppData\Local\Temp\Weatherford PreView53\0\Repeat.dta
 Recorded on 18-OCT-2014 05:42
 System Versions: Logged with 14.01.3220 Processed with 14.01.3220 Plotted with 13.08.1505

↑ OVERLAY ↑

BEFORE SURVEY CALIBRATION

C:\Users\le154681\AppData\Local\Temp\Weatherford PreView53\0\Main2.dta

General Constants All 000			Last Edited on 18-OCT-2014,09:49
General Parameters			
Mud Resistivity	2.210	ohm-metres	
Mud Resistivity Temperature	65.700	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	7.000	inches	
Caliper for Differential Caliper	Density Caliper		
Rwa Parameters			
Porosity used	Base Density Porosity		
Resistivity used	Array Ind. One Res Rt		
RWA Constant A	0.610		
RWA Constant M	2.150		
SW/APOR Tool Source	0.000		

Gamma Calibration MCG-E.A 514		Field Calibration on 17-OCT-2014 21:37	
	Measured	Calibrated (API)	
Background	158	108	
Calibrator (Gross)	1491	1020	
Calibrator (Net)	1333	912	

Gamma Constants MCG-E.A 514		Last Edited on 18-OCT-2014,09:49	
Gamma Calibrator Number	GRC 72		
Mud Density	1.15	gm/cc	
Caliper Source for Processing	Density Caliper		
Tool Position	Eccentred		
Concentration of KCl		kppm	
K Mud Type	Chloride		
K Mud Concentration	0.09	%	

High Resolution Temperature Calibration MCG-E.A 514

Field Calibration on 18-OCT-2014,09:50

	Measured	Calibrated(Deg F)
Lower	32.00	32.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-E.A 514

Last Edited on 18-OCT-2014,09:50

Pre-filter Length	11
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Neutron Calibration MDN-B.A 296

Base Calibration on 14-OCT-2014 15:28

Field Check on 17-OCT-2014 21:17

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3058	94	3714	110
Ratio	32.603		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	1382	2066
Ratio	0.669	

Field Check

	Calibrated (cps)	
	1445	2146
Ratio	0.673	

Neutron Constants MDN-B.A 296

Last Edited on 18-OCT-2014,09:50

Neutron Source Id	N1057
Neutron Jig Number	NJ5236
Epithermal Neutron	No
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	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

FE Calibration MFE-B.A 219

Base Calibration on 14-OCT-2014 11:10

Field Check on 17-OCT-2014 21:05

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	968.6	126.8

Base Check	280.2
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Field Check	280.4
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FE Constants MFE-B.A 219

Last Edited on 18-OCT-2014,09:51

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.	MCG External Temperature
Stand-off	Centred inches

Imager Pad Check MIE-A.J 244

Field Check on 14-OCT-2014 16:09

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 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.J 244			Last Edited on 07-JUN-2012 08:23		
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		11111111.0000	mAmp		
Image Processing		11111111			

Navigation Constants MIE-A.J 244			Last Edited on 11-JUL-2012 12:21		
Magnetic Declination		0.00	degrees	East	

Magnetometer Parameters MIE-A.J 244				
Date Of Last Magnetometer Calibration		22-AUG-2013,09:56		
	X Magnetometer	Y Magnetometer	Z Magnetometer	
Slope	-1.000000	-1.011965	-0.991340	
Offset	0.010303	-0.015788	0.008269	

Magnetometer Constants MIE-A.J 244		Last Edited on	
Magnetometer Calibrator Number	000		

Accelerometer Parameters MIE-A.J 244				
Date Of Last Accelerometer Calibration		13-FEB-2013,14:31		
	X Accelerometer	Y Accelerometer	Z Accelerometer	
Slope	-1.103572	-1.107641	-1.103778	
Offset	-0.006989	0.006286	-0.003996	

Accelerometer Constants MIE-A.J 244			Last Edited on 14-OCT-2014,16:12		
Accelerometer Calibrator Number		000			
Accelerometer Temperature Characterisation					
X Accelerometer					
Serial Number		1016			
Calibration Date		12-Apr-2011			
	B0	B1	B2	B3	
Bias(g)	0.00000e+000	1.93698e-005	-7.60293e-010	6.54727e-011	
	SF0	SF1	SF2	SF3	
Scale Factor(mA/g)	3.00000e+000	2.59257e-004	6.13375e-007	-3.90888e-010	
Y Accelerometer					
Serial Number		973			
Calibration Date		19-Jan-2011			
	B0	B1	B2	B3	
Bias(g)	0.00000e+000	1.95276e-005	-1.88058e-008	2.74122e-010	
	SF0	SF1	SF2	SF3	
Scale Factor(mA/g)	3.00000e+000	2.75268e-004	3.53140e-007	7.52116e-010	
Z Accelerometer					
Serial Number		1032			
Calibration Date		18-Apr-2011			
	B0	B1	B2	B3	
Bias(g)	0.00000e+000	-1.14960e-005	3.94288e-009	8.97135e-011	
	SF0	SF1	SF2	SF3	
Scale Factor(mA/g)	3.00000e+000	2.88058e-004	2.44833e-007	8.38007e-010	

Caliper Calibration MIE-A.J 244				Base Calibration on 14-OCT-2014 16:03
				Field Calibration on 14-OCT-2014 16:04
Base Calibration				
Reading No	Pads 1-5 Meas	Pads 3-7 Meas	Calibrator Size (in)	

Reading No	1	2	3	4	5
Pad 1 Meas.	24598	34609	44567	55923	0
Pad 3 Meas.	25678	35979	45592	57146	0
Calibrator Size (in)	5.96	7.97	9.84	11.91	0.00

Reading No	Pad 2 Meas.	Pad 4 Meas.	Pad 6 Meas.	Pad 8 Meas.	Calibrator Size (in)
1	24589	26958	24376	23838	5.96
2	33342	35325	33013	32430	7.97
3	41271	43620	41279	40227	9.84
4	51419	52989	50755	49959	11.91
5	0	0	0	0	0.00

Field Calibration					
	Measured Pads 1-5 Caliper(in)	Measured Pads 3-7 Caliper(in)		Actual Caliper(in)	
	8.00	7.94		7.97	
	Measured Pad 2 Caliper(in)	Measured Pad 4 Caliper(in)	Measured Pad 6 Caliper(in)	Measured Pad 8 Caliper(in)	Actual Caliper(in)
	3.99	3.99	3.97	3.98	7.97

Caliper Constants	MIE-A.J 244	Last Edited on 07-JUN-2012 08:23			
Caliper Difference for BRKT	0.120	inches			

Induction Calibration MAI-B.A 269				Base Calibration on 14-OCT-2014,11:18	
				Field Check on 17-OCT-2014 21:04	
Base Calibration					
Test Loop Calibration		Measured		Calibrated (mmho/m)	
Channel	Low	High		Low	High
1	17.5	492.3		9.3	966.2
2	5.8	384.1		7.6	821.4
3	3.3	264.1		5.2	566.0
4	2.7	135.6		2.6	279.2
Array Temperature		27.0	Deg F		
Channel		Base Check (mmho/m)		Field Check (mmho/m)	
		Low	High	Low	High
	1			11.4	3698.6
	2			30.7	3519.3
	3			28.4	3006.1
	4			17.6	2057.6
	Deep			15.0	1925.1
	Medium			44.1	3990.6
	Shallow			48.9	5253.0
Array Temperature				54.2	Deg F

Induction Constants MAI-B.A 269				Last Edited on 18-OCT-2014,09:52			
Induction Model		RtAP-WBM					
Caliper for Borehole Corr.		Density Caliper					
Hole Size for Borehole Correction		N/A		inches			
Tool Centred		Yes					
Stand-off Type		N/A					
Stand-off		N/A		inches			
Number of Fins on Stand-off		N/A					
Stand-off Fin Angle		N/A		degrees			
Stand-off Fin Width		N/A		inches			
Borehole Corr. Rm Source		Temperature Corr					
Temp. for Rm Corr.		MCG External Temperature					
Squasher Start		0.0020		mhos/metre			
Squasher Offset		N/A		mhos/metre			
Borehole Normalisation							
DRM1	0.0000	DRC1	0.0000				
DRM2	0.0000	DRC2	0.0000				
MRM1	0.0000	MRC1	0.0000				
MRM2	0.0000	MRC2	0.0000				
SRM1	0.0000	SRC1	0.0000				
SRM2	0.0000	SRC2	0.0000				

SRMZ 0.0000 SRCZ 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 460

Base Calibration on 14-OCT-2014 10:20
Field Calibration on 17-OCT-2014 21:07

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	18461	3.98
2	26997	5.96
3	35483	7.97
4	43651	9.84
5	53133	11.91
6	N/A	N/A

Field Calibration

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

Photo Density Calibration MPD-D.A 460

Base Calibration on 14-OCT-2014 14:09
Field Check on 17-OCT-2014 21:12

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1298	1497		
Reference 1	57019	26155	59827	30835
Reference 2	22831	2654	24869	2514

Field Check at Base

1298.4 1497.0

Field Check

1300.4 1513.3

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	247	1158		
Reference 1	24103	56800	0.429	0.367
Reference 2	6793	22680	0.304	0.269

Field Check at Base

247.0 1157.5

Field Check

248.8 1160.9

Density Constants MPD-D.A 460

Last Edited on 18-OCT-2014,09:51

Density Source Id	P50562B
Nylon Calibrator Number	658
Aluminium Calibrator Number	658
Density Shoe Profile	8 inch
Caliper Source for Processing	Density Caliper
PE Correction to Density	Not Applied
Mud Density	1.15 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)	
2.65	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:\Users\le154681\AppData\Local\Temp\Weatherford PreView53\0\Main2.dta

SHA-J.B Compact Swivel Head Adaptor

SHA-J.B 587 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

Compact Comms Gamma

MCG-E.A 514 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Neutron

MDN-B.A 296 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

MIS-D.B Compact Inline Bowspring sub

MIS-D.B 702 LG: 5.70 ft WT: 33.1 lb OD: 2.240 in

Compact Density/Caliper

MPD-D.A 460 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

SKJ-D.A Compact Knuckle Joint

SKJ-D.A 115 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

MIS-E.B Compact Inline Standoff sub

MIS-E.B 786 LG: 2.14 ft WT: 15.4 lb OD: 2.244 in

SKJ-D.A Compact Knuckle Joint

SKJ-D.A 88 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

Compact Focussed Electric

MFE-B.A 219 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact MMI Memory Section

MIM-A.J 244 LG: 4.65 ft WT: 26.5 lb OD: 2.244 in

Compact MMI Electrode Section

MIE-A.J 244 LG: 13.96 ft WT: 99.2 lb OD: 4.094 in

MIS-D.B Compact Inline Bowspring sub

MIS-D.B 730 LG: 5.70 ft WT: 33.1 lb OD: 2.240 in

Compact Induction

MAI-B.A 269 LG: 10.81 ft WT: 48.5 lb OD: 2.240 in

Total Length: 78.96 ft Weight: 579.8 lb

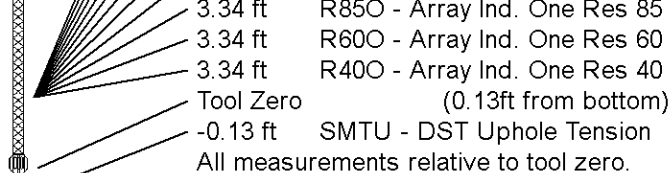


71.38 ft GRGC - Gamma Ray
68.47 ft CGXT - MCG External Temperature

64.92 ft NPRD - Dolomite Neutron Por.
64.92 ft NPRS - Sandstone Neutron Por.
64.92 ft NPRL - Limestone Neutron Por.
64.92 ft NPOR - Base Neutron Porosity

51.98 ft AVOL - Annular Volume
51.98 ft HVOL - Hole Volume
51.98 ft CLDC - Density Caliper
50.05 ft DPRD - Dolomite Density Por.
50.05 ft DPRS - Sandstone Density Por.
50.05 ft DPRL - Limestone Density Por.
50.05 ft DPOR - Base Density Porosity
50.05 ft DEN - Compensated Density
50.05 ft DCOR - Density Correction
49.99 ft PDPE - PE

3.34 ft R60T - Array Ind. Two Res 60
3.34 ft R40T - Array Ind. Two Res 40
3.34 ft R30T - Array Ind. Two Res 30
3.34 ft CTAT - Array Ind. Two Cond Ct
3.34 ft R85T - Array Ind. Two Res 85
3.34 ft R30O - Array Ind. One Res 30
3.34 ft CTAO - Array Ind. One Cond Ct
3.34 ft RTAT - Array Ind. Two Res Rt
3.34 ft RTAO - Array Ind. One Res Rt



COMPANY	EAST CHEYENNE GAS STORAGE LLC
WELL	ECGS No 6-21 WPD004-2
FIELD	WEST PEETZ
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A / COLORADO

Elevation Kelly Bushing	4567.00	feet	First Reading	5437.00	feet
Elevation Drill Floor	4566.00	feet	Depth Driller	5440.00	feet
Elevation Ground Level	4557.00	feet	Depth Logger	5440.00	feet



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COMPACT TRIPLE COMBO
 QUICKLOOK
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