



Weatherford

**COMPENSATED SONIC
WITH INTEGRATED TRANSIT TIME**

COMPANY

MURFIN DRILLING COMPANY, INC.

WELL

RED POLL #8-21

FIELD

WILDCAT

PROVINCE/COUNTY

LINCOLN

COUNTRY/STATE

U.S.A. / COLORADO

LOCATION

1900' FNL & 605' FEL

SEC 21

TWP 10S

RGE 56W

Other Services

Latitude

Longitude

API Number

05-073-06754

MAI/MFE

MML

MPD/MDN

Permanent Datum GL, Elevation 5489 feet

Log Measured From KB, 13.00 feet above Permanent Datum

Drilling Measured From KB

Date

09-DEC-2018

Run Number

ONE

Service Order

4558-231541832

Depth Driller

8400.00 feet

Depth Logger

8402.00 feet

First Reading

8389.00 feet

Last Reading

432.00 feet

Casing Driller

432.00 feet

Casing Logger

432.00 feet

Bit Size

7.875

inches

Hole Fluid Type

CHEMICAL

Density / Viscosity

9.40 lb/USg 68.00 CP

PH / Fluid Loss

9.00 8.00 ml/30Min

Sample Source

FLOWLINE

Rm @ Measured Temp

1.15 @ 75.0 ohm-m

Rmf @ Measured Temp

0.92 @ 75.0 ohm-m

Rmc @ Measured Temp

1.38 @ 75.0 ohm-m

Source Rmf / Rmc

CALC CALC

Rm @ BHT

0.47 @182.0 ohm-m

Time Since Circulation

5 HOURS

Max Recorded Temp

182.00 deg F

Equipment / Base

13096 LIB

Recorded By

ADAM SILL

Witnessed By

GREGG SMITH

Elevations:
KB 5502.00 feet
DF 5500.00
GL 5489.00

BOREHOLE RECORD

Last Edited: 09-DEC-2018 04:36

Bit Size inches	Depth From feet	Depth To feet
7.875	432.00	8400.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	432.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 18.03.9344.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
 - HARDWARE: DUAL BOWSPRING USED ON MDN.
 - 0.5 INCH STANDOFF USED ON MFE.
 - TWO 0.5 INCH STANDOFFS USED ON MSS.
 - 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 3751 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 4200 FEET: 732 CU.FT.

- RIG: MURFIN #25.

- ENGINEER: A. SILL.

- OPERATOR: B. TOVAR, B. COPELAND.

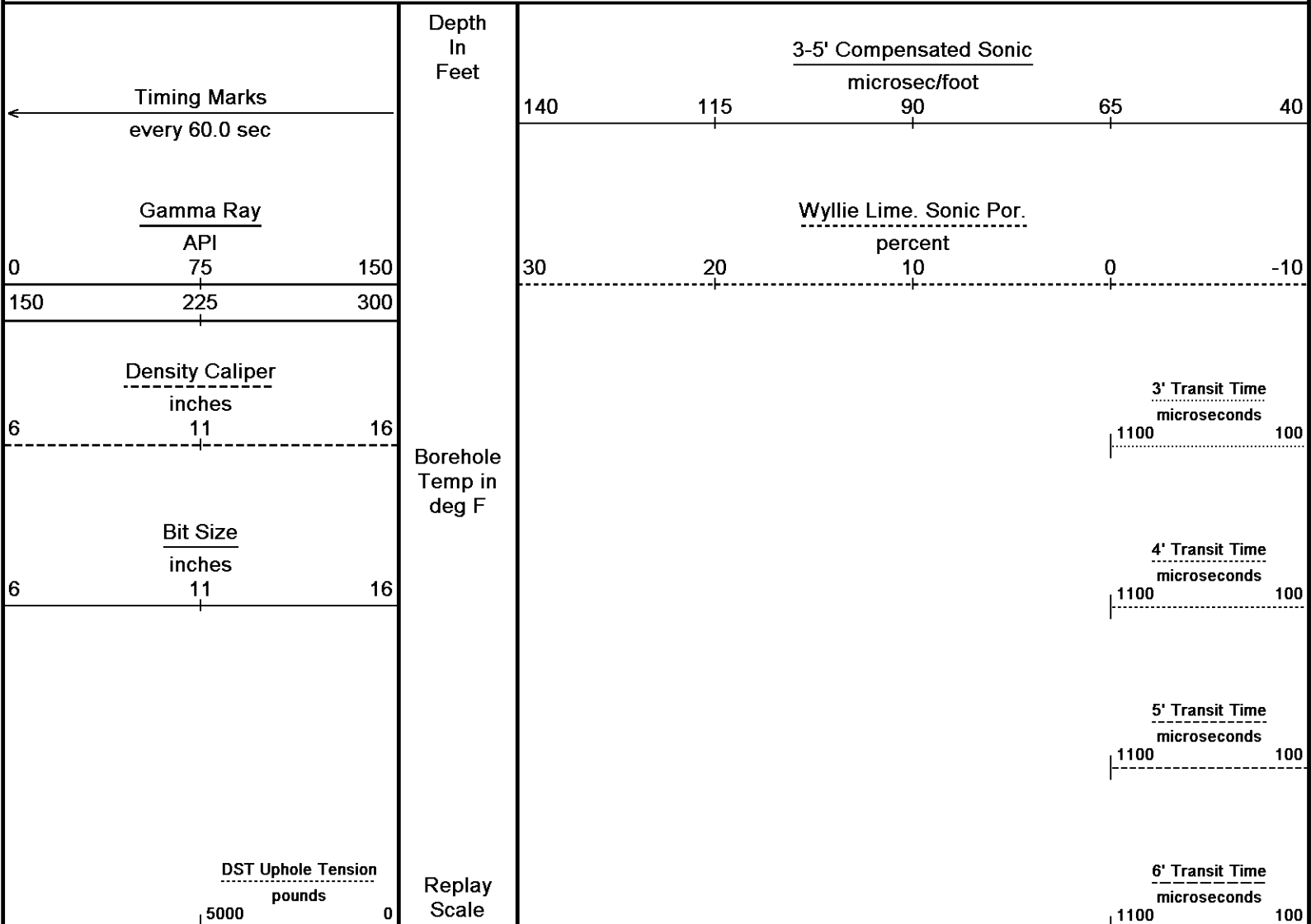
**** CALIPERS WERE CLOSED BETWEEN 5750 FEET AND 5920 FEET AS PER CUSTOMER'S REQUEST, DUE TO HOLE CONDITIONS THROUGH THAT INTERVAL. TOOL READINGS MAY NOT BE ACCURATE THROUGH THIS INTERVAL. ****

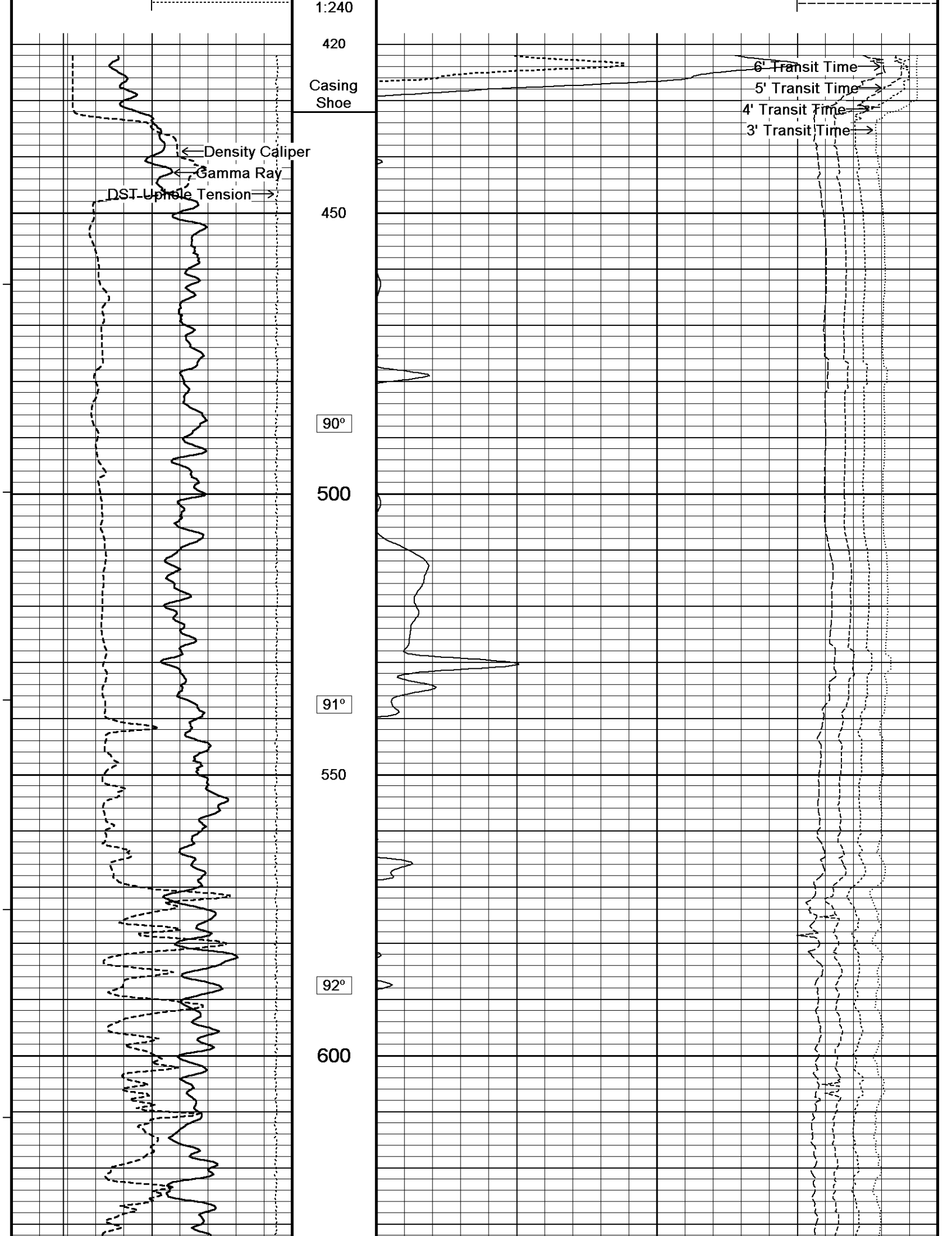
**** SP IS A LITTLE ERRATIC IN PLACES DUE TO AN UNKNOWN CAUSE. CHECKED SP PLACEMENT AND CHECKED FOR SOMETHING THAT MAY BE CAUSING STRAY VOLTAGE AND COULD NOT FIND A CAUSE. ****

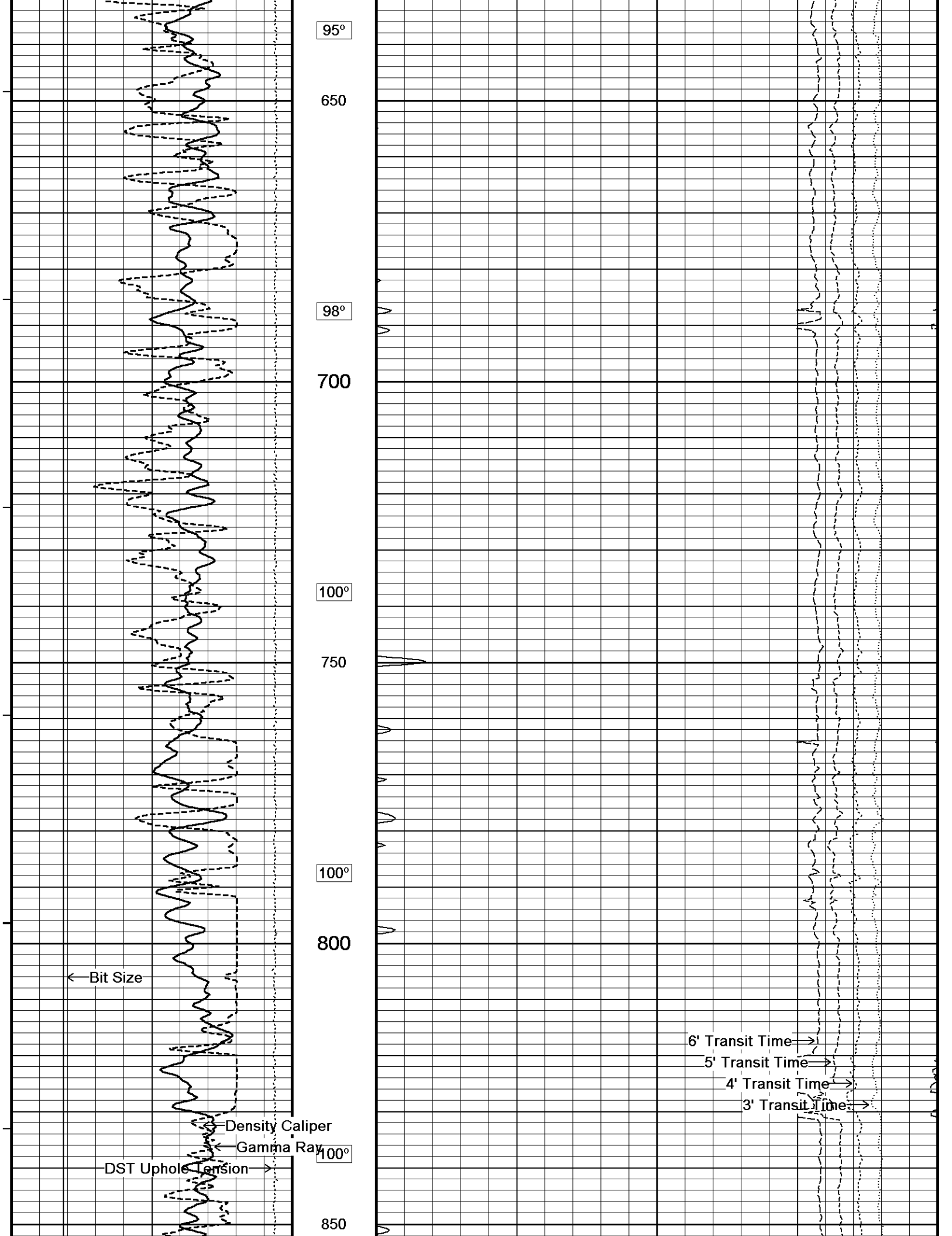
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will 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.

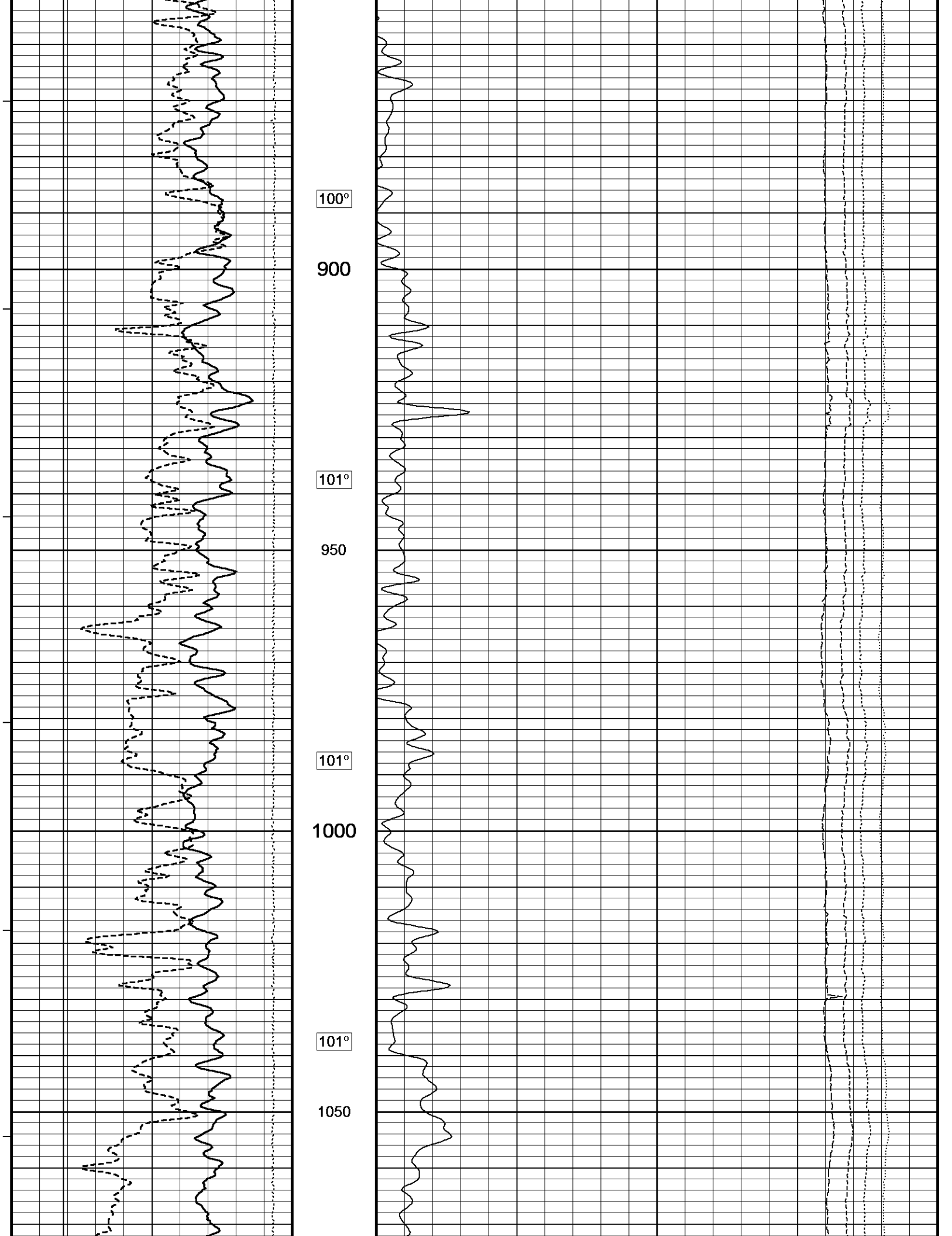
5 INCH MAIN

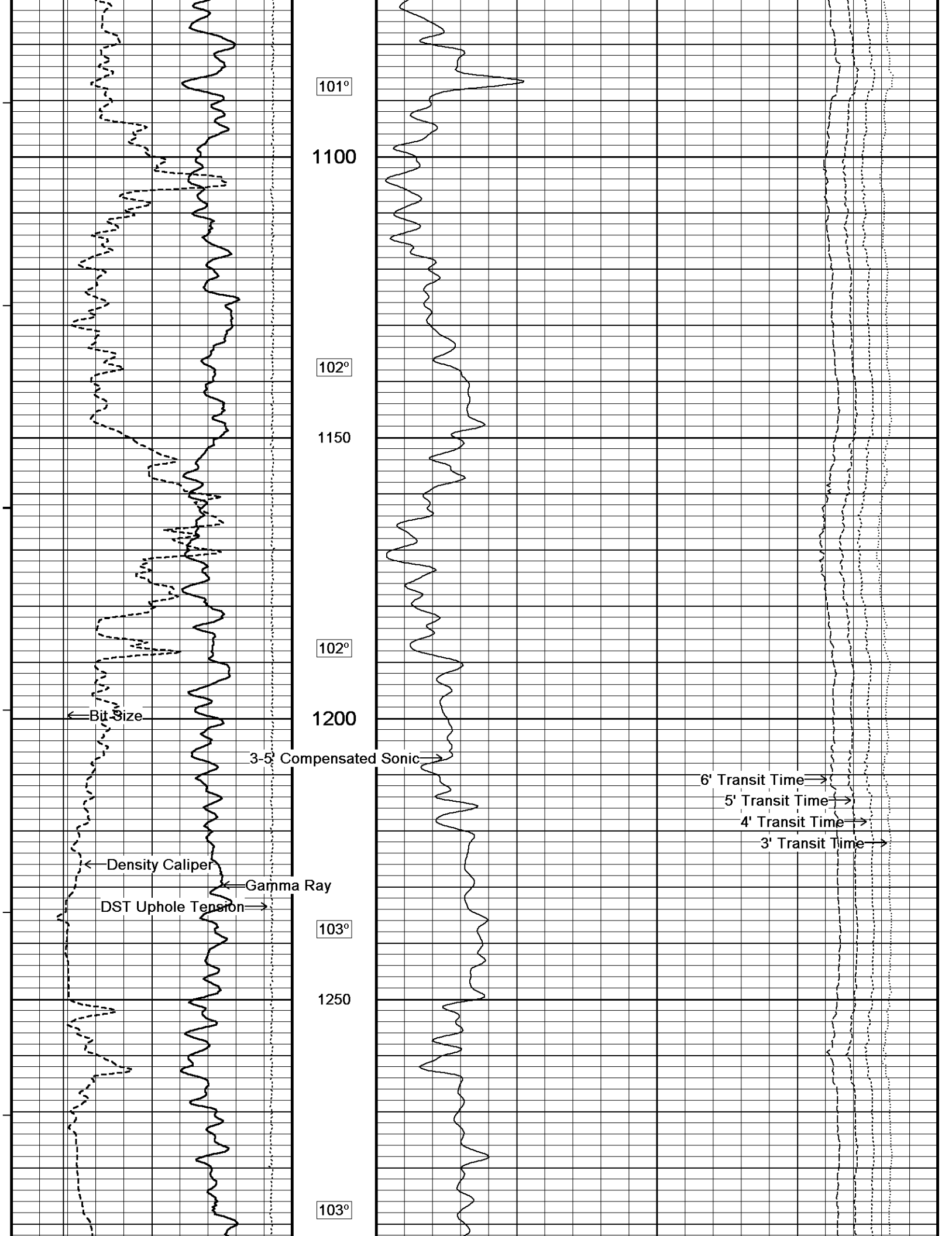
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 09-DEC-2018 13:08
Filename: C:\Minimus 18.03.9344\Data\Murfin Red Poll #8-21\Murfin Red Poll #8-21_003.dta Recorded on 09-DEC-2018 07:52
System Versions: Logged with 18.03.9344 Plotted with 18.03.9344

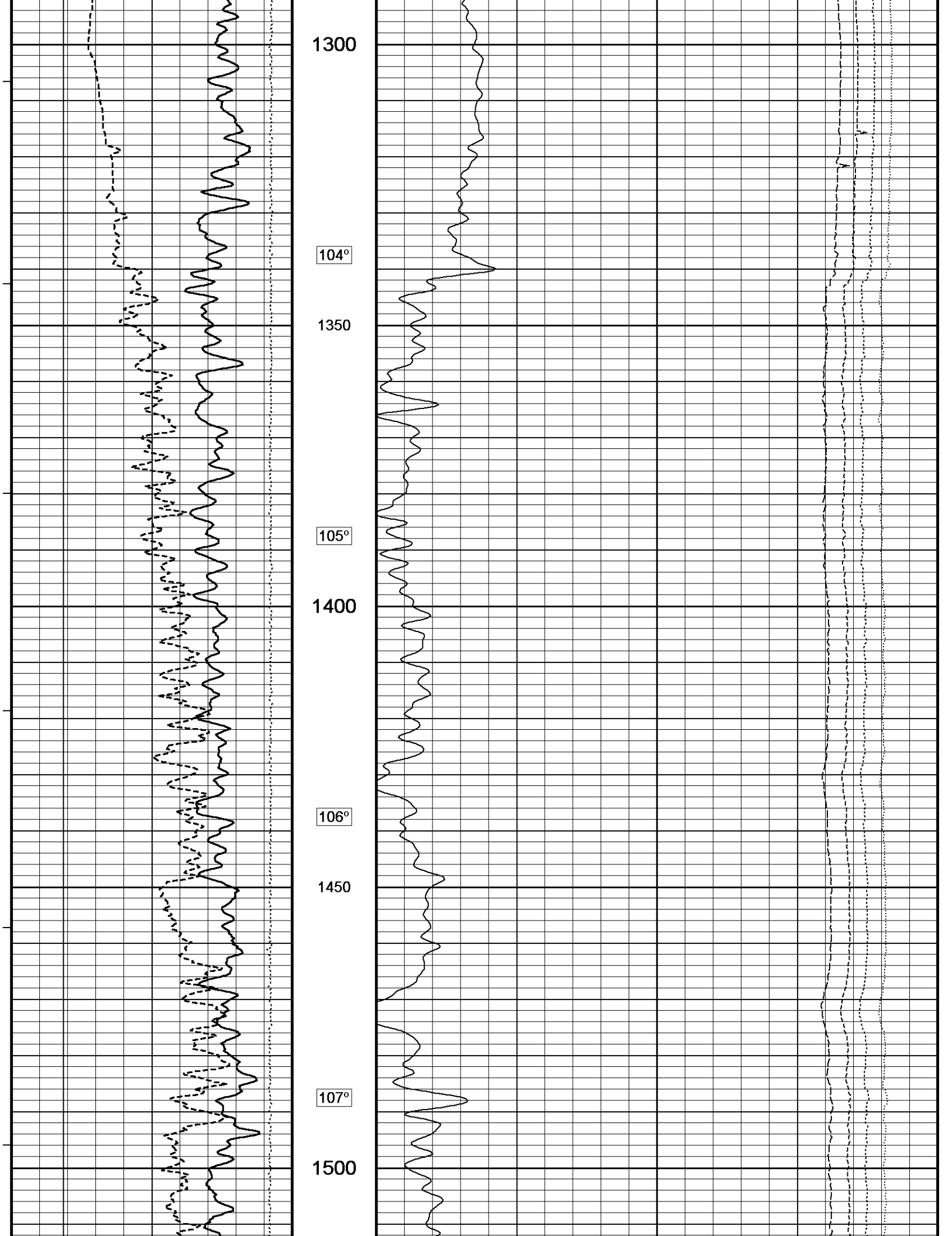


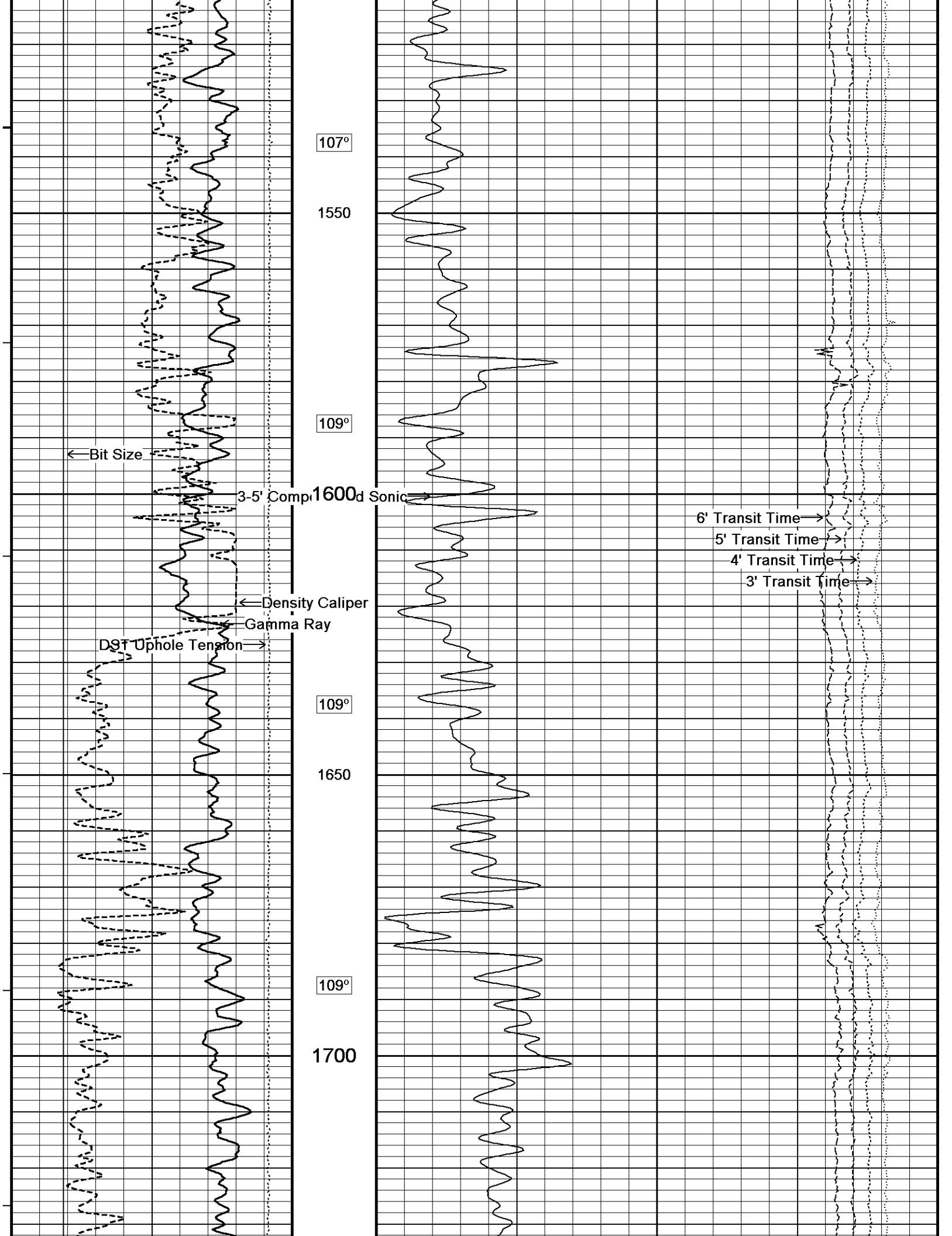


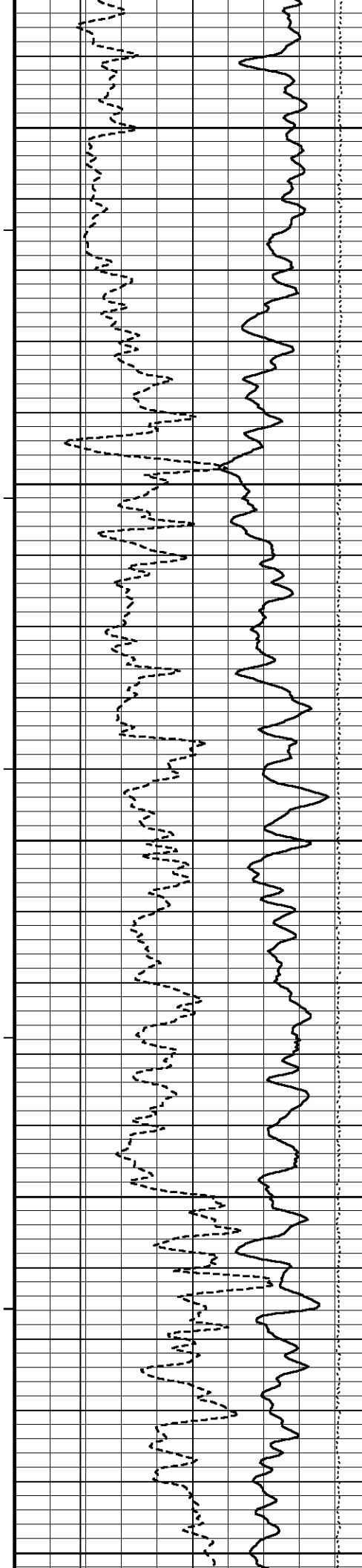












109°

1750

110°

1800

111°

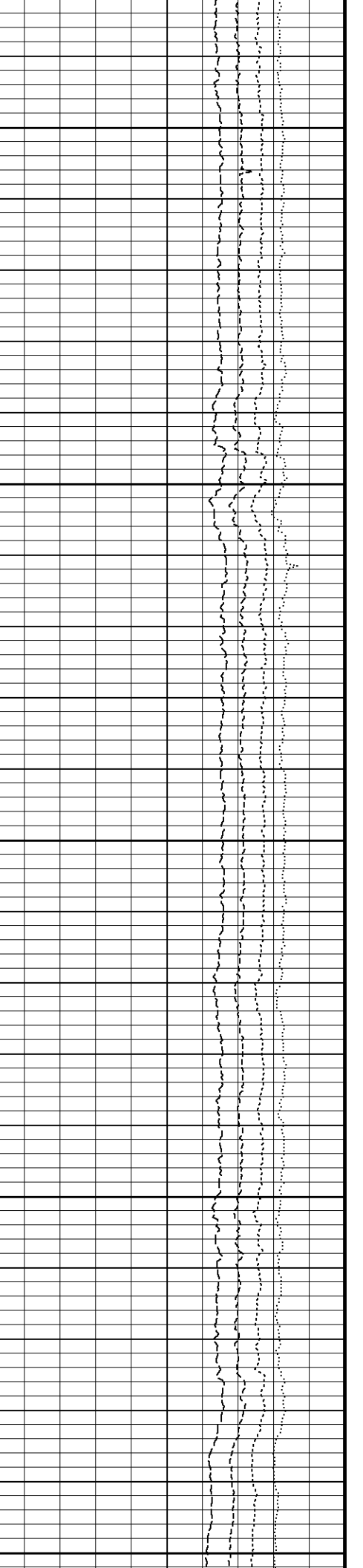
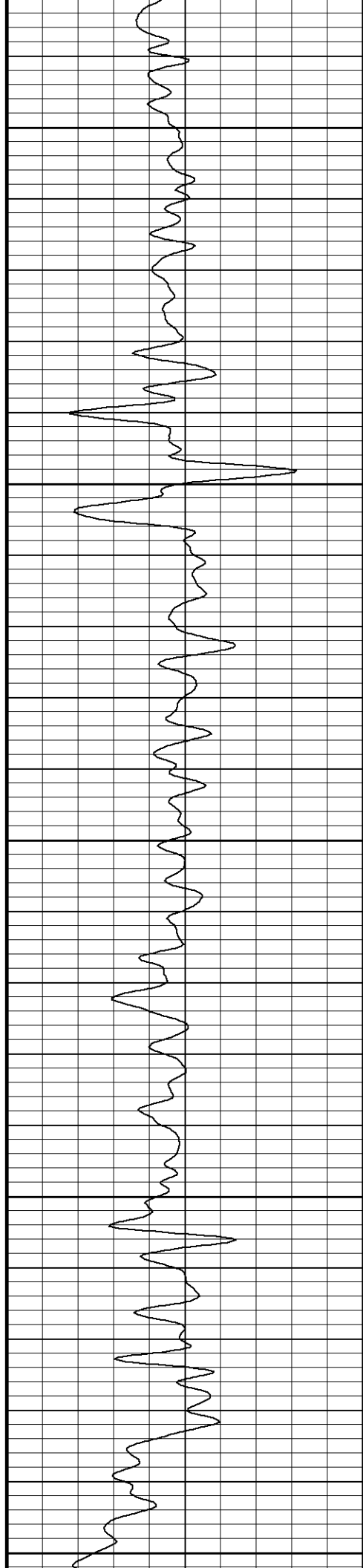
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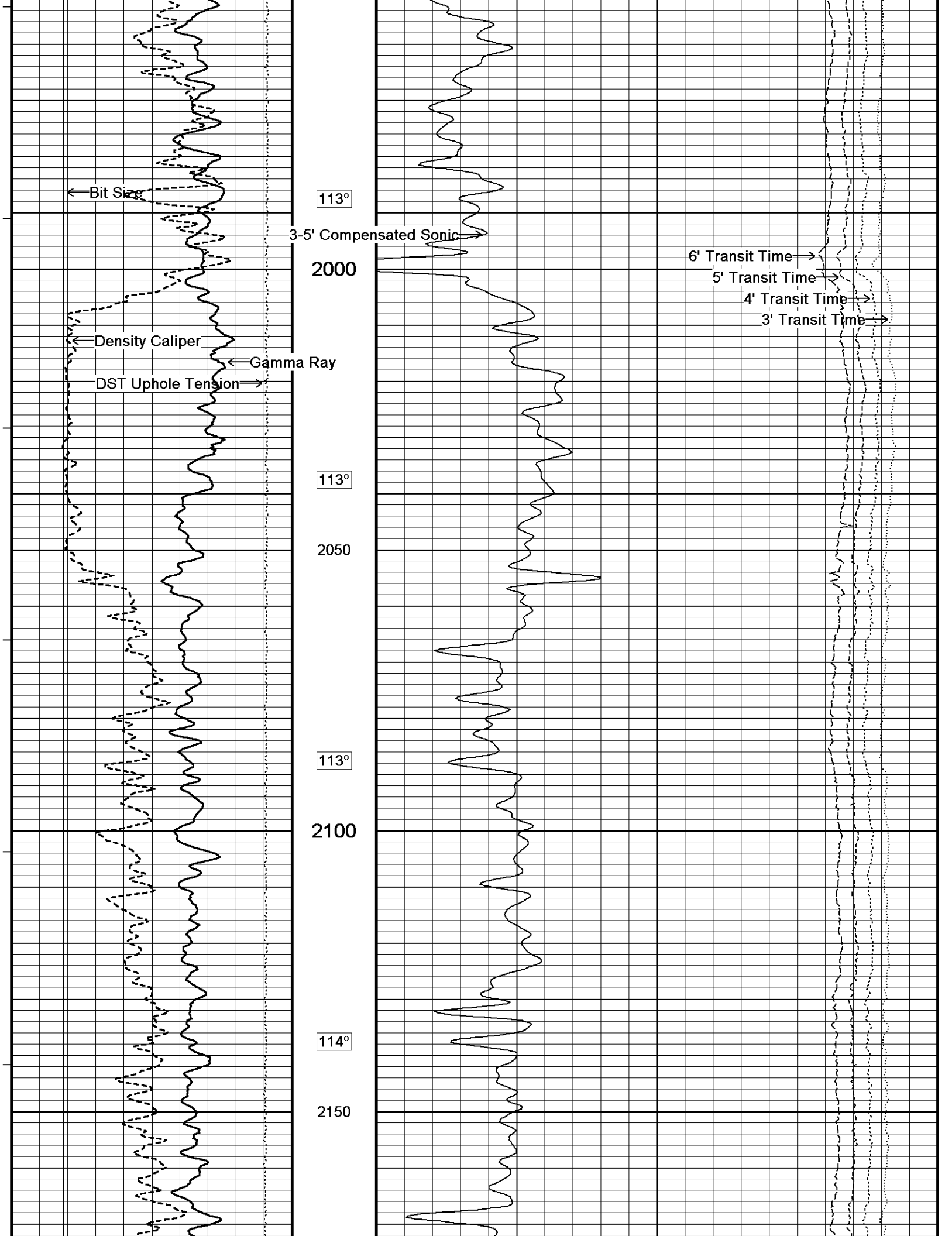
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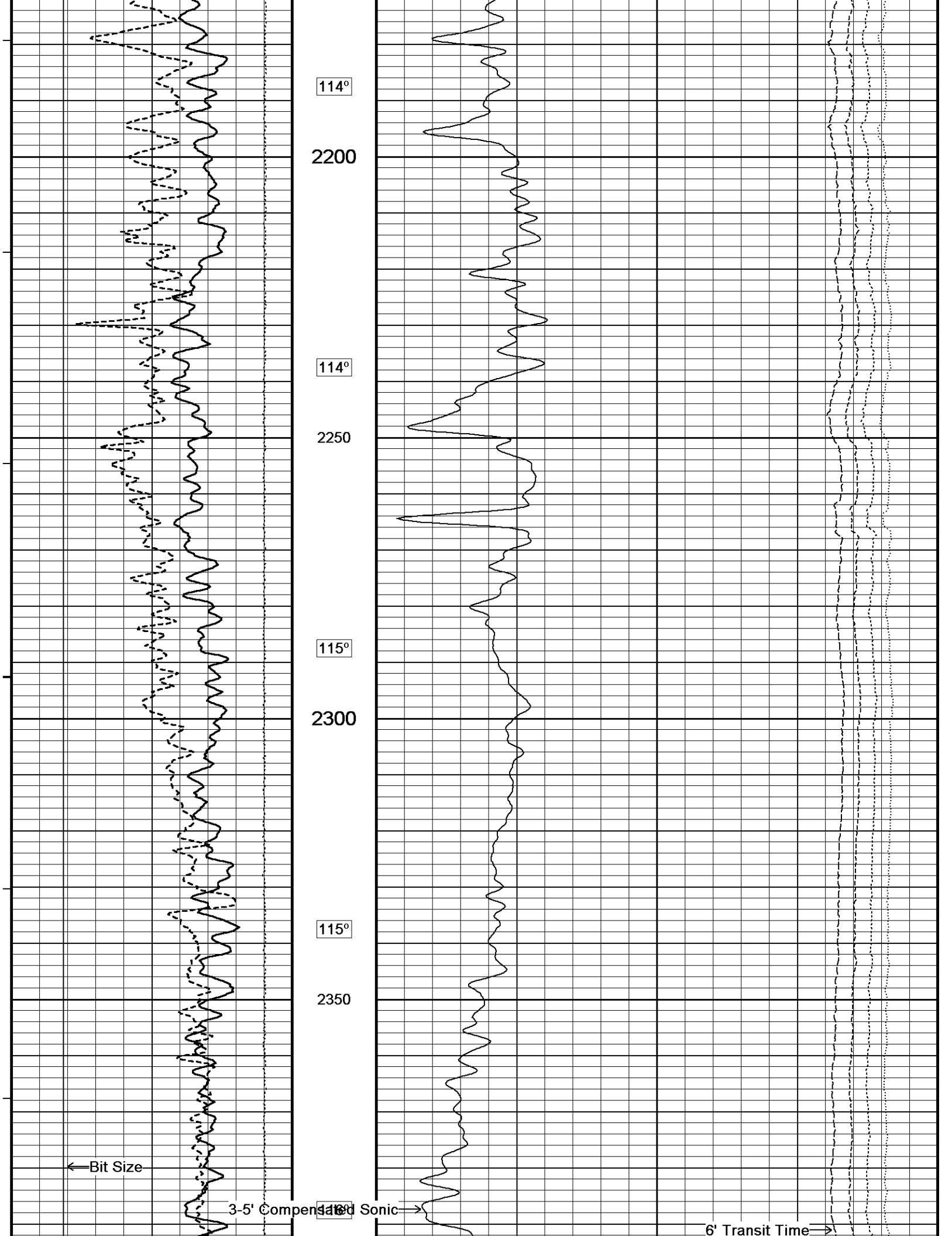
1900

112°

1950







Density Caliper
Gamma Ray
DST Uphole Tension

2400

117°

2450

117°

2500

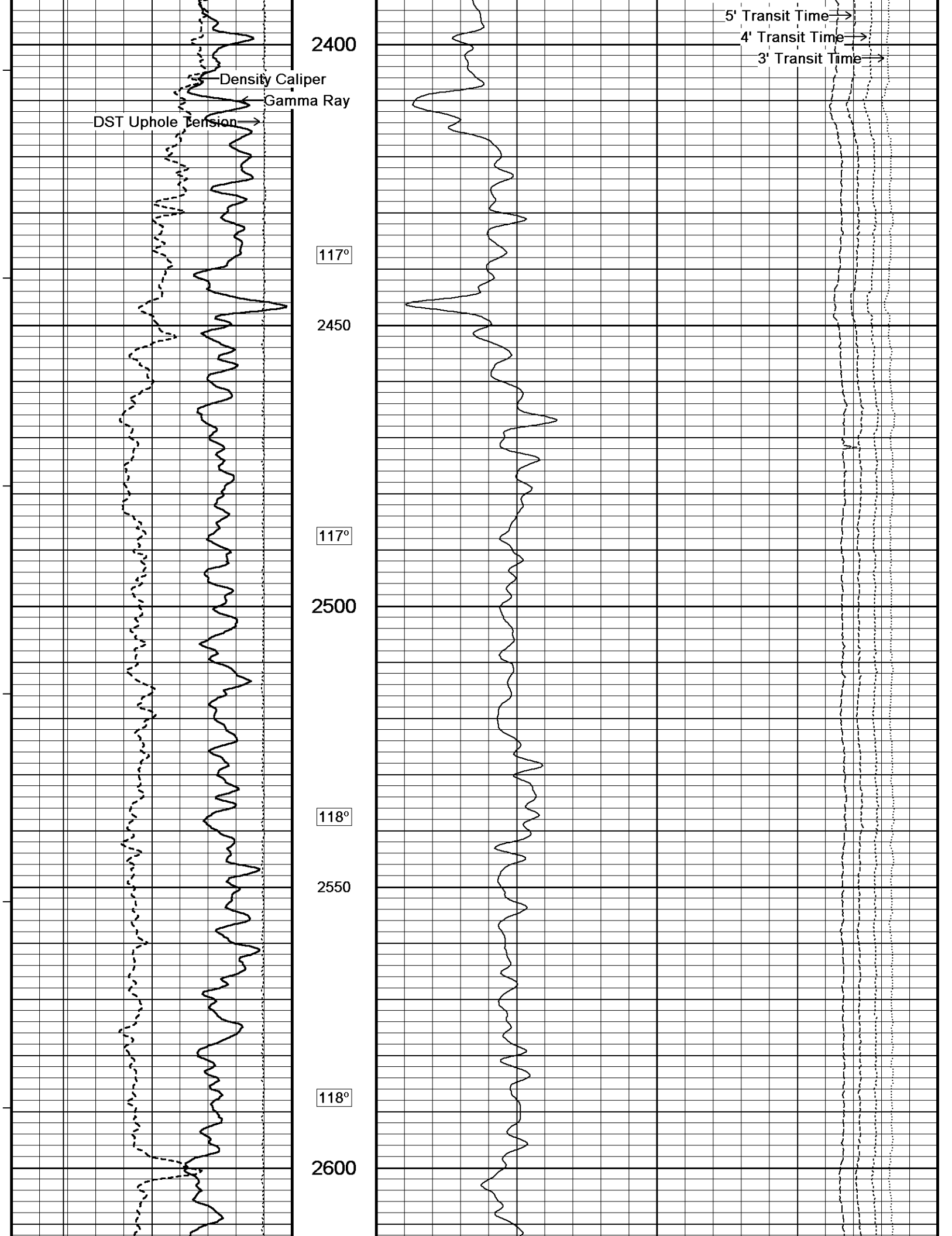
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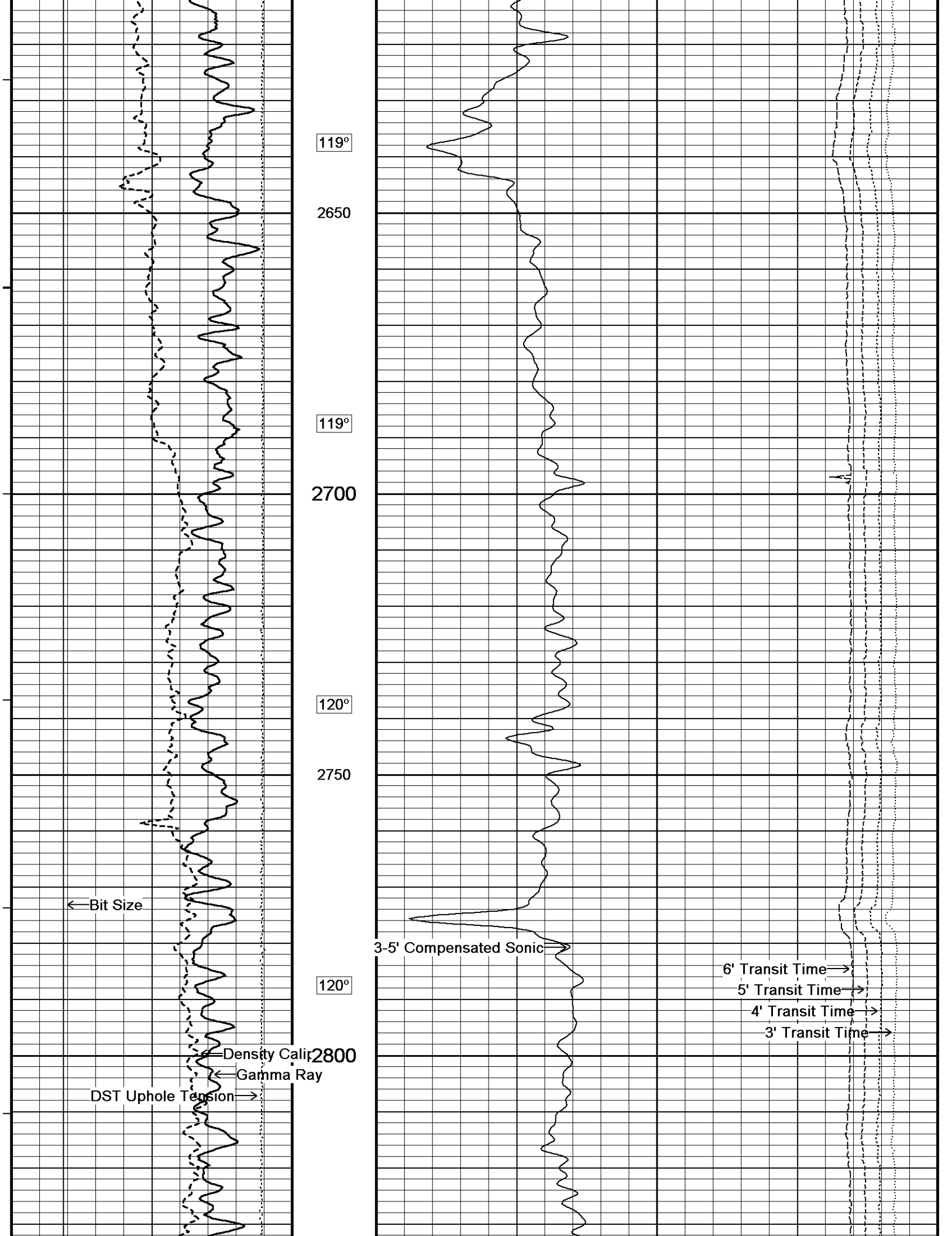
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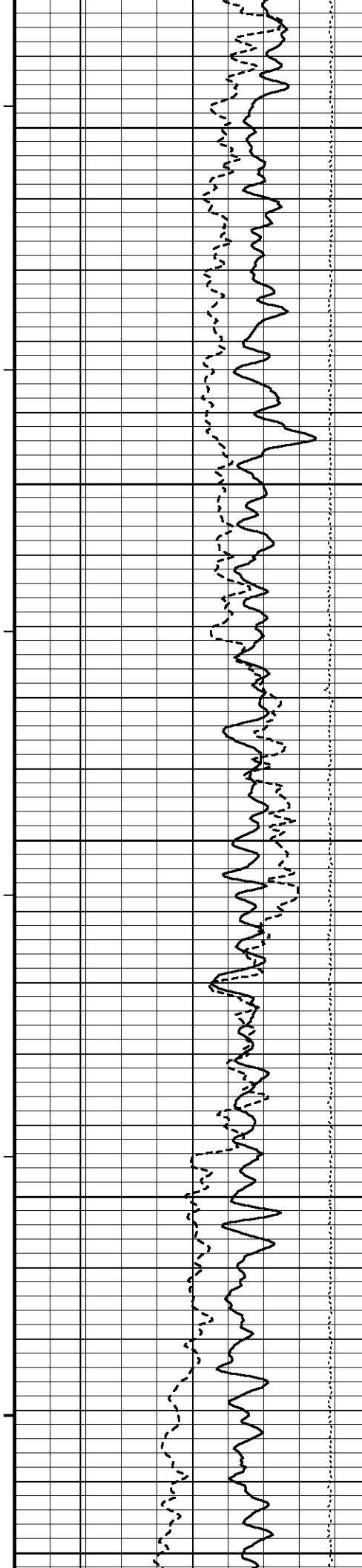
118°

2600

5' Transit Time →
4' Transit Time →
3' Transit Time →







121°

2850

122°

2900

122°

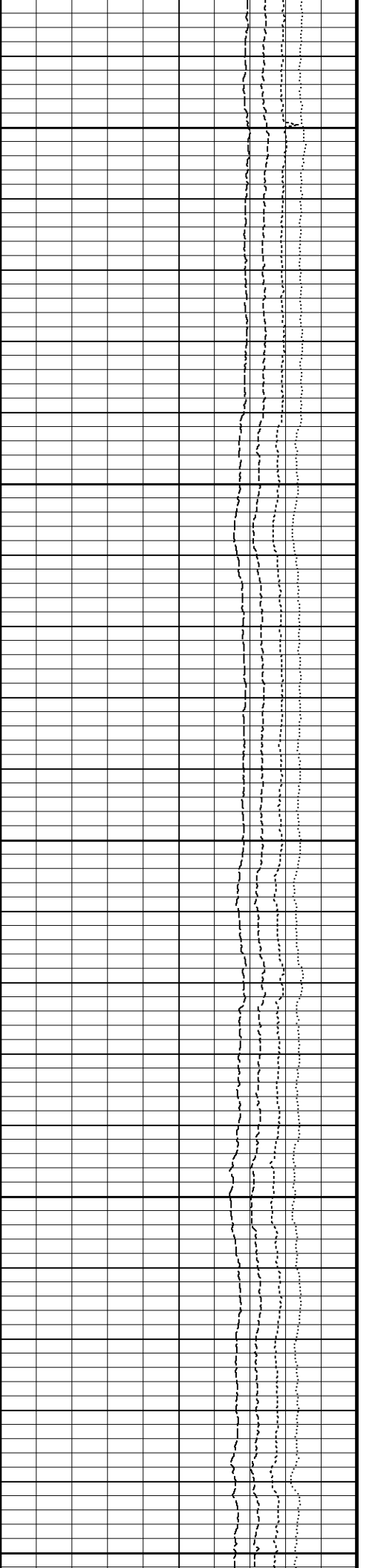
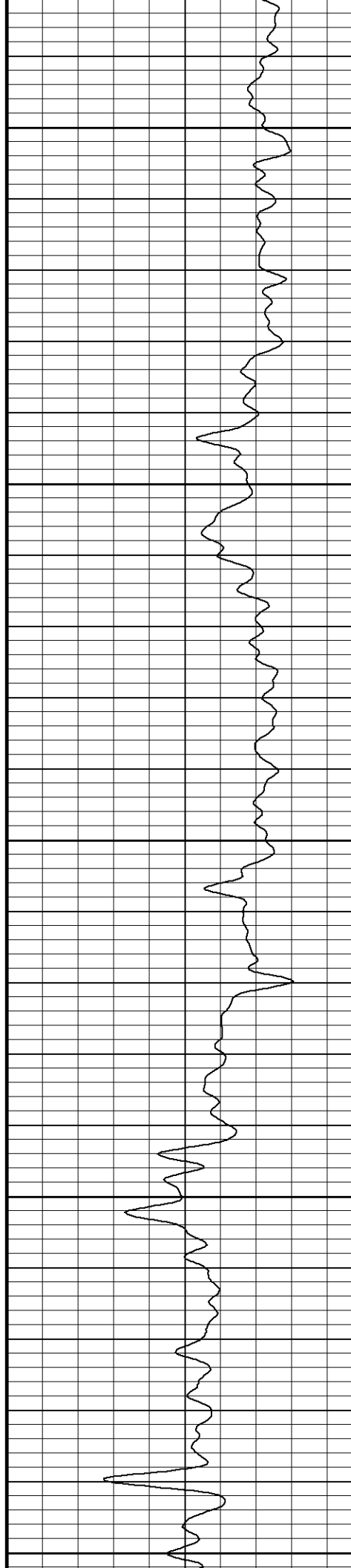
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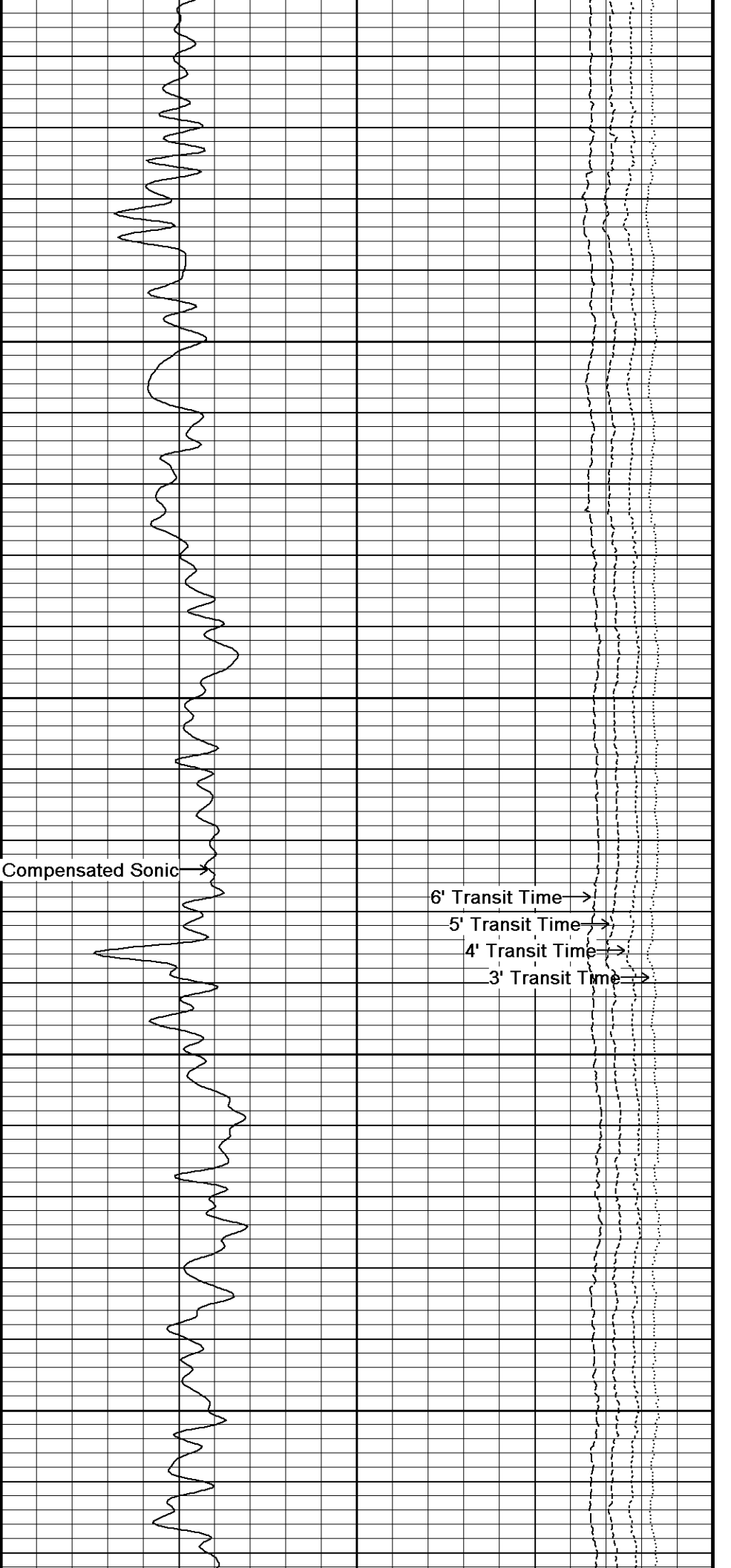
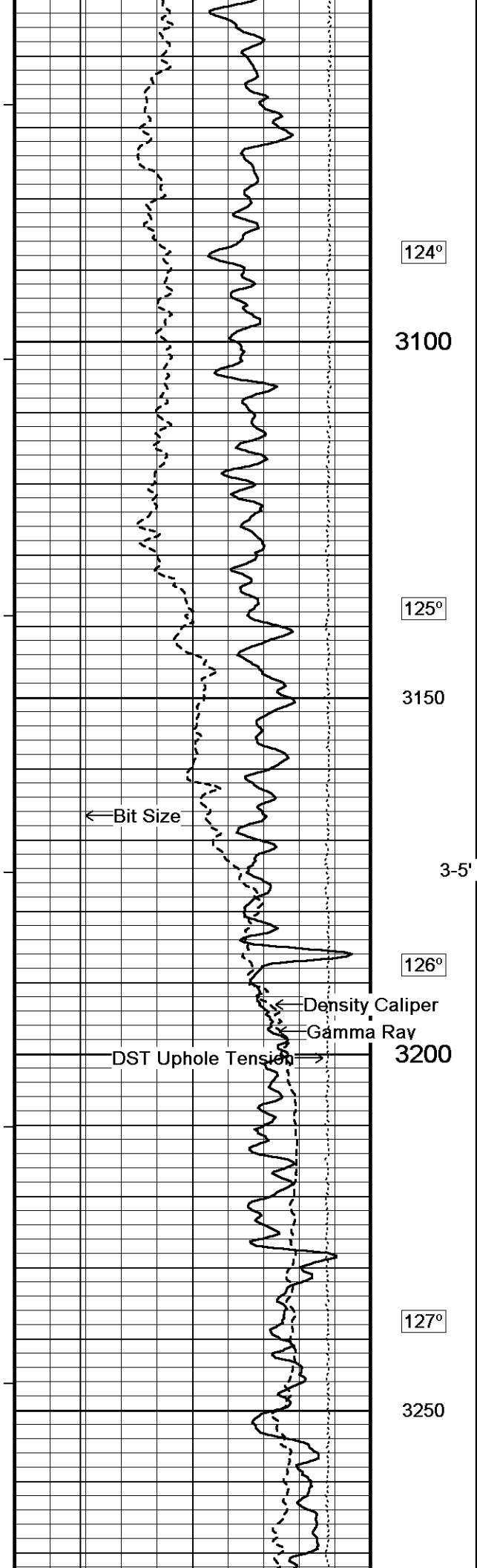
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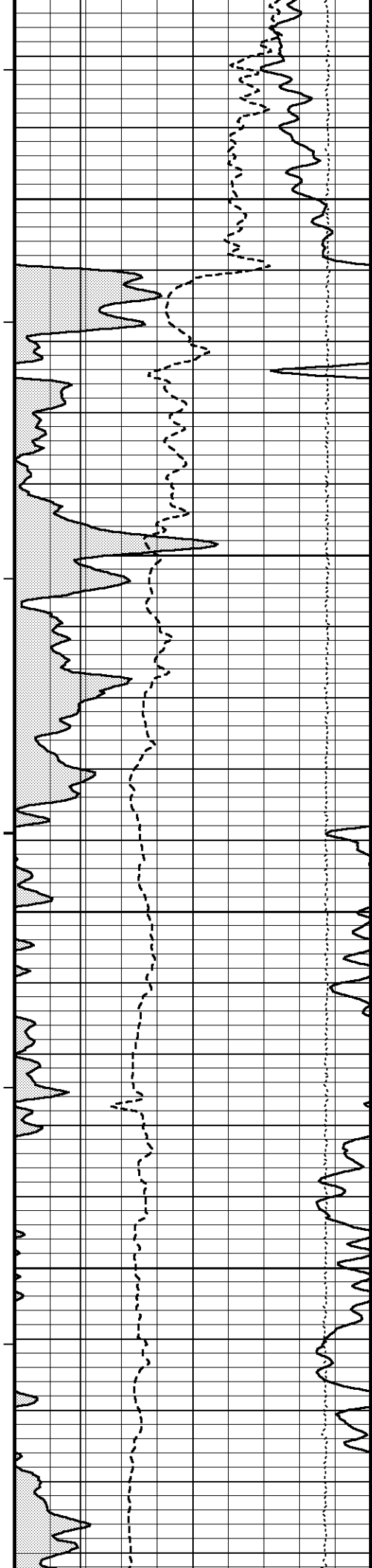
3000

124°

3050







127°

3300

128°

3350

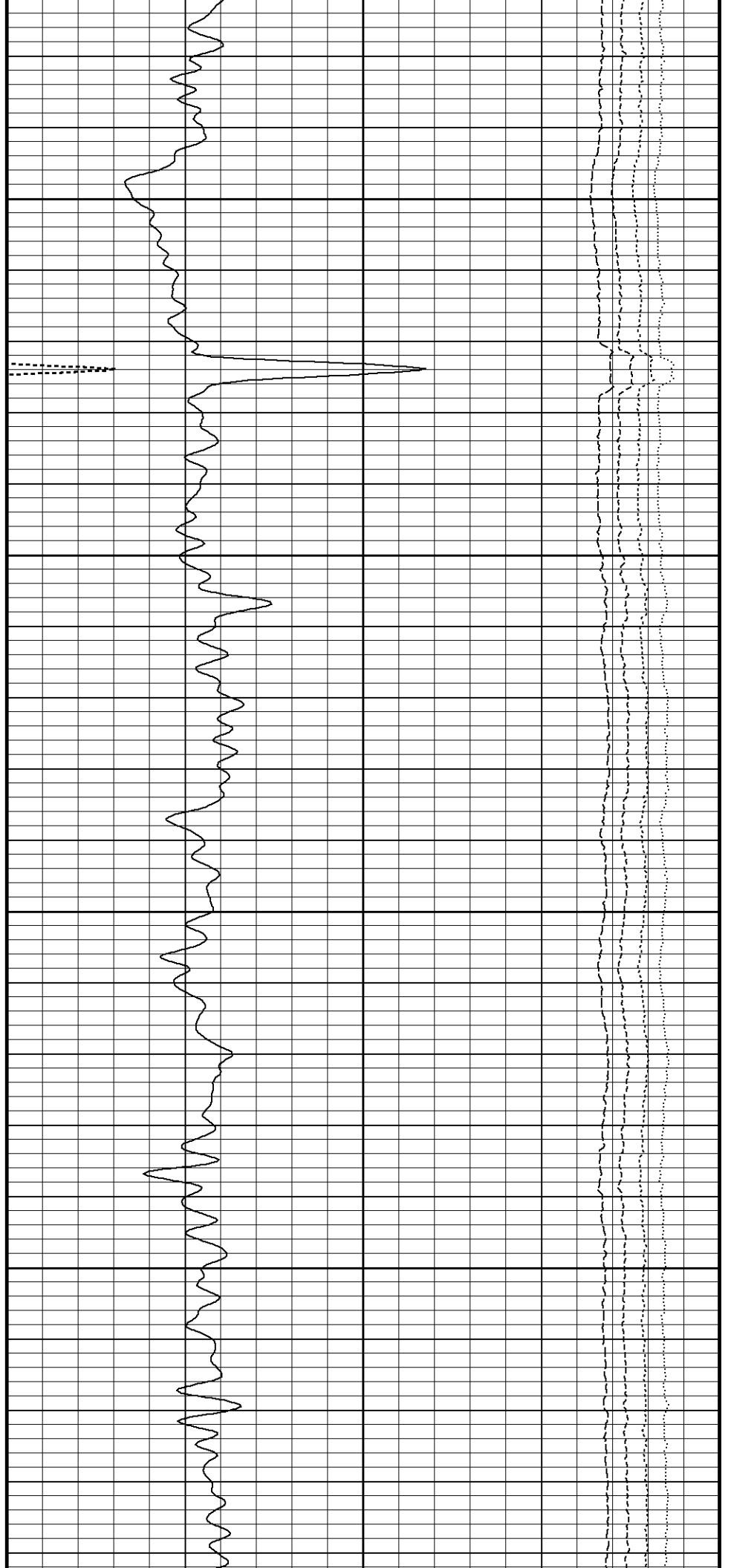
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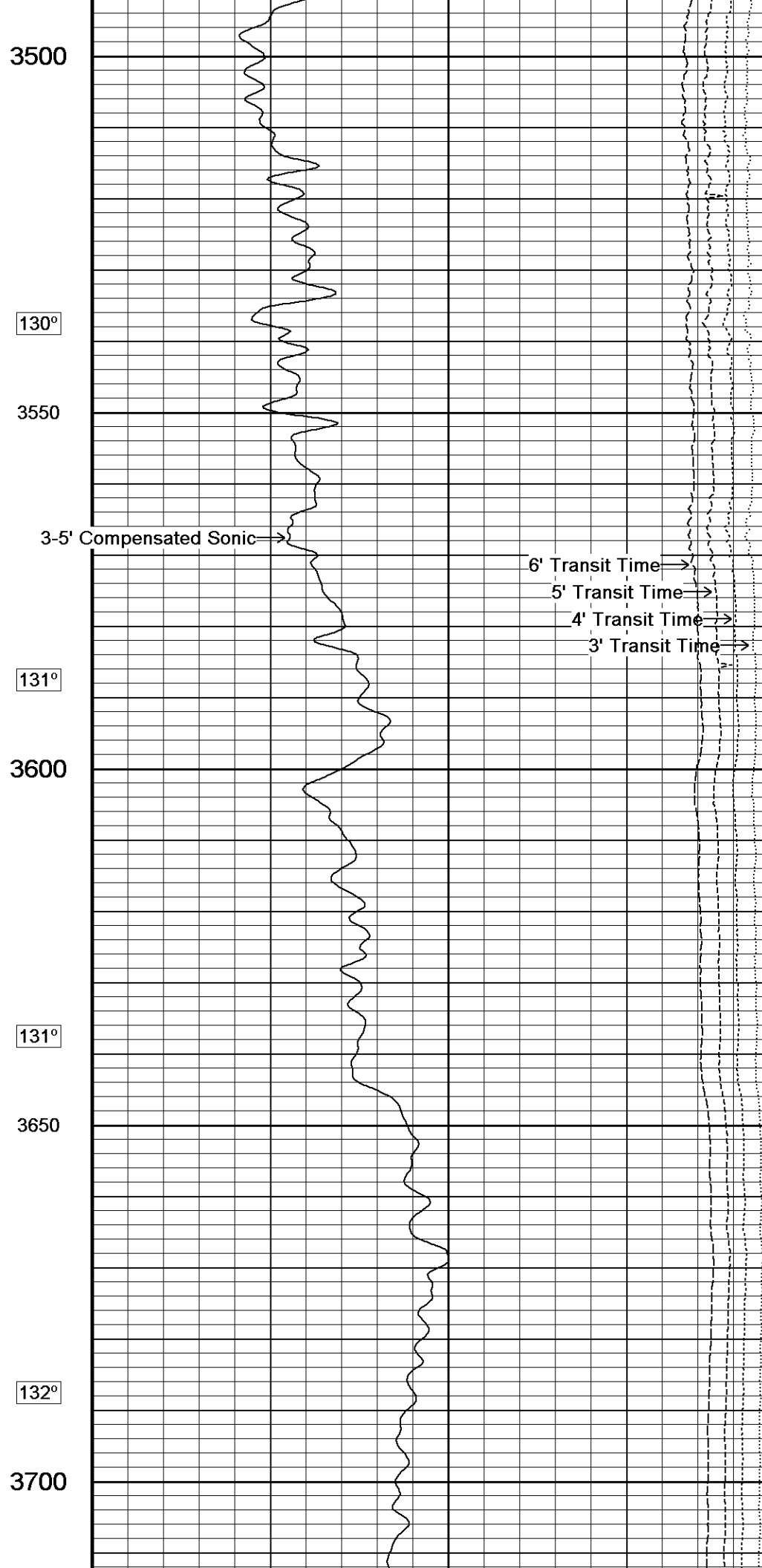
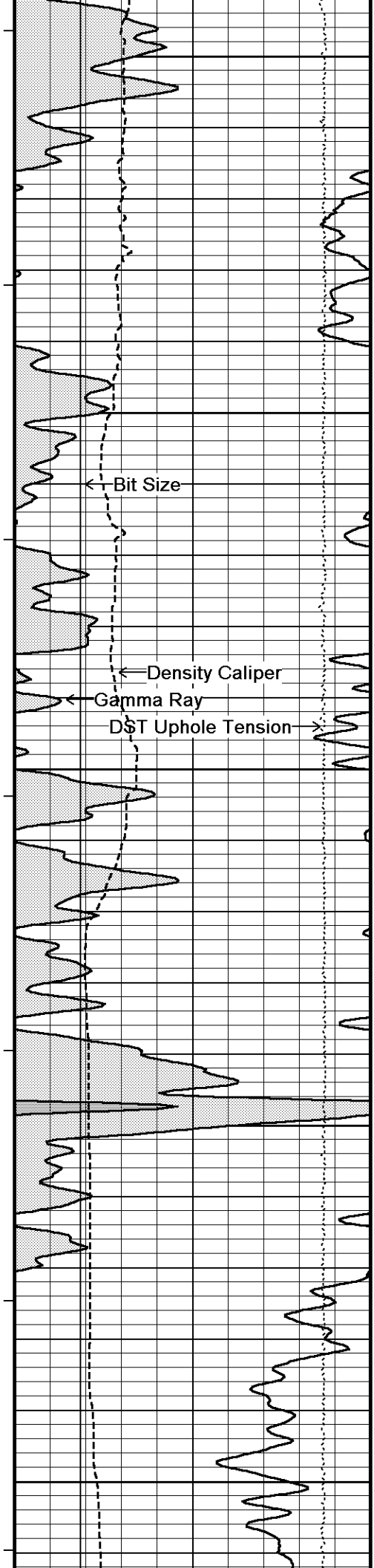
3400

129°

3450

130°





3500

130°

3550

131°

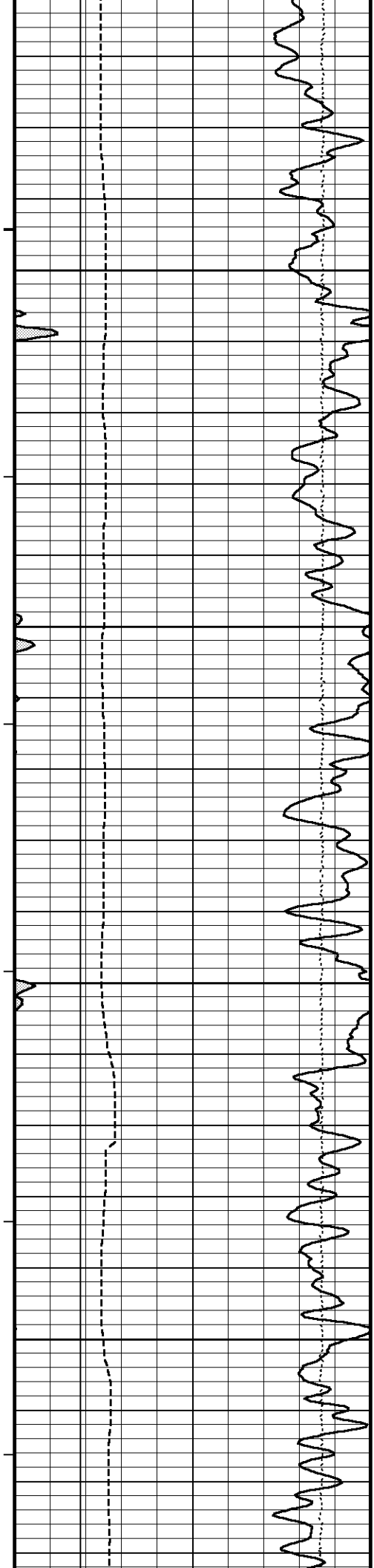
3600

131°

3650

132°

3700



133°

3750

134°

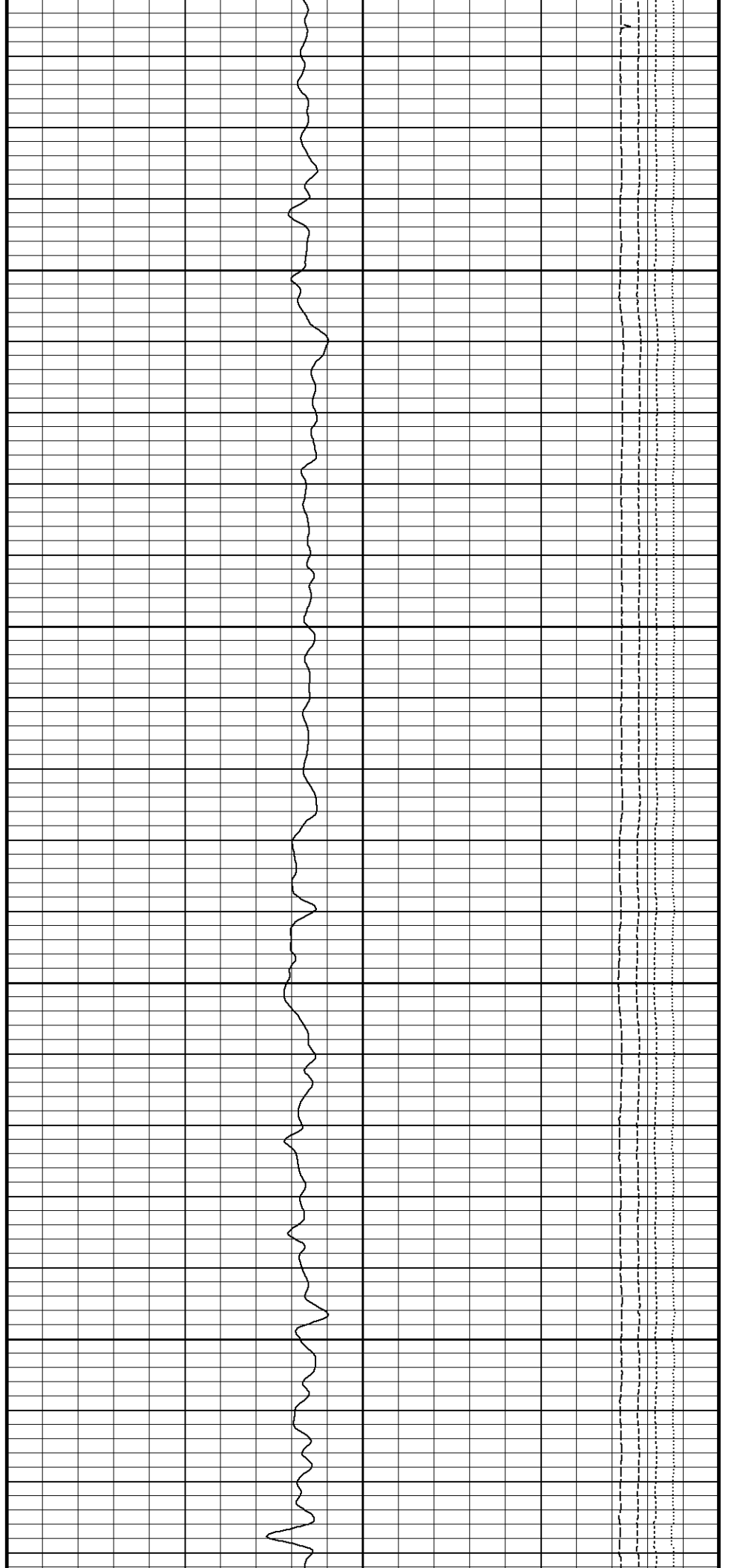
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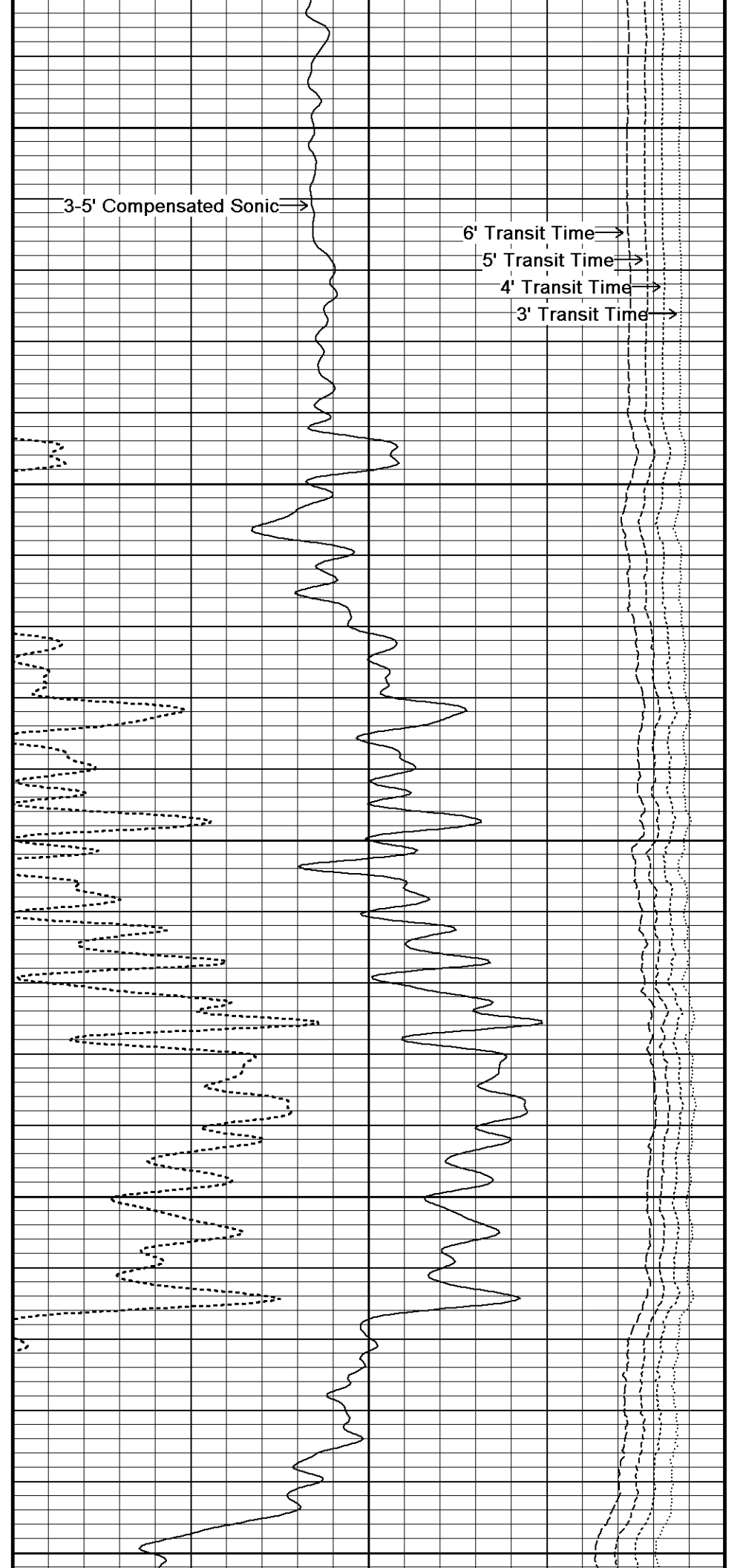
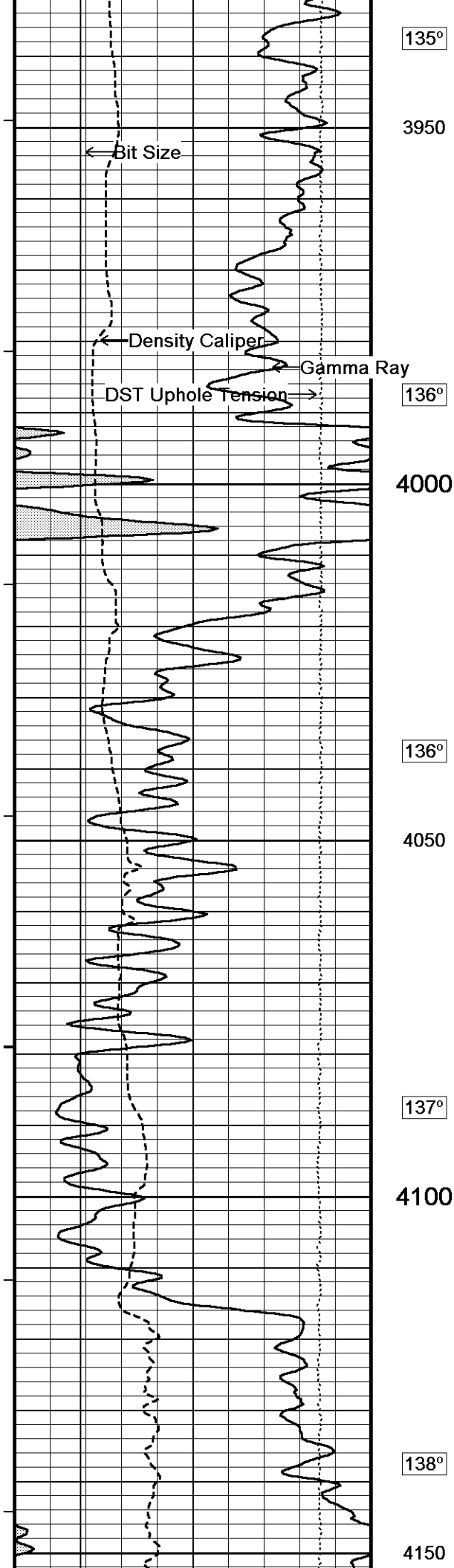
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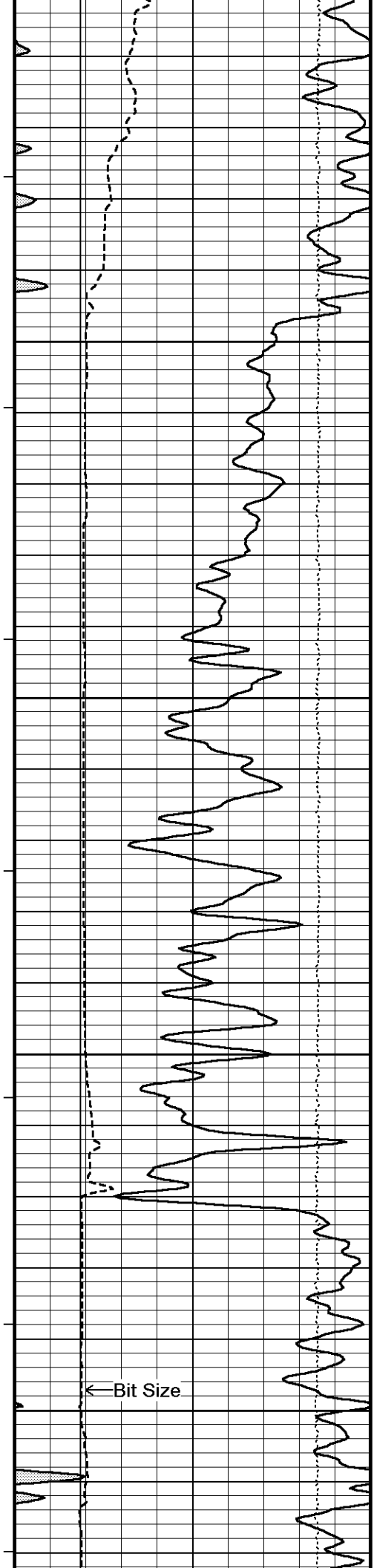
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135°

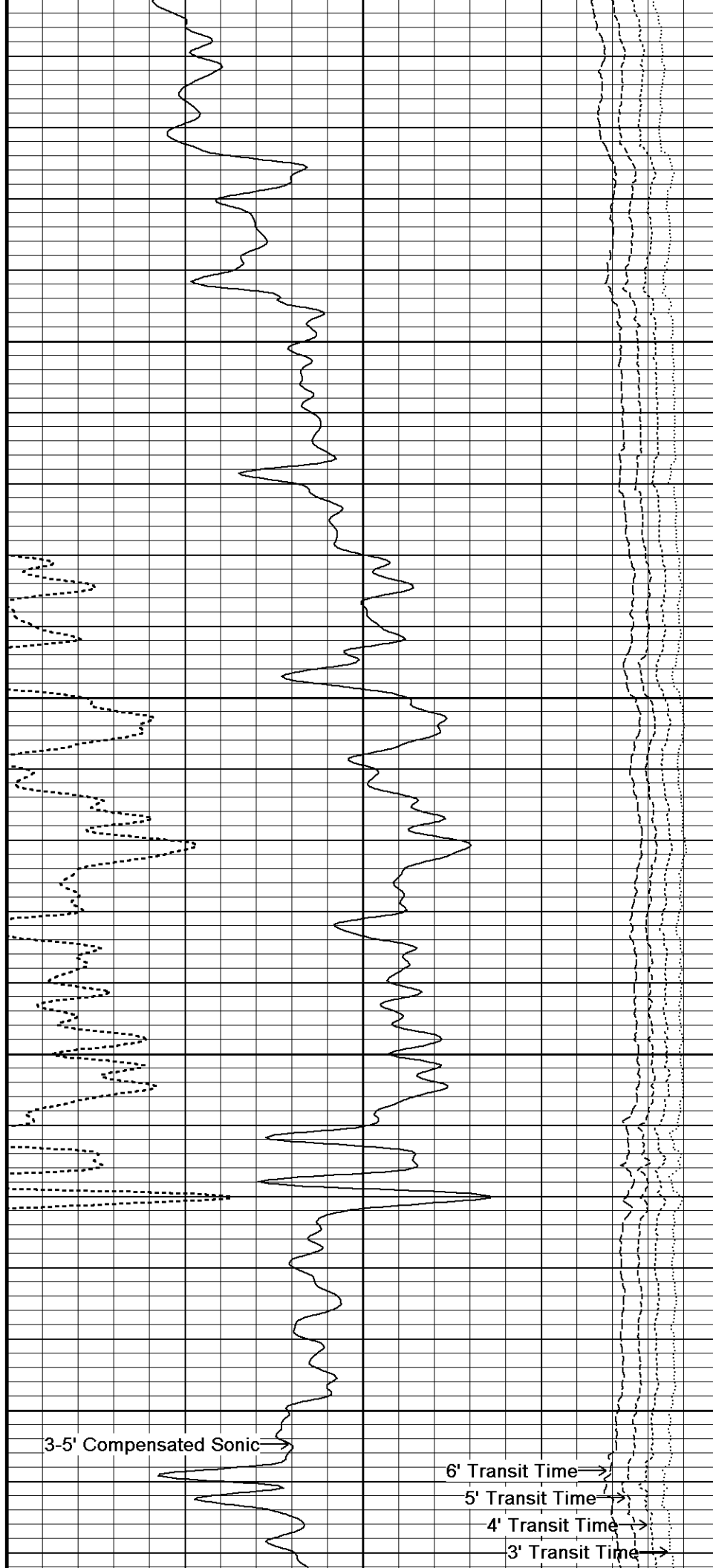
3900







138°
4200
139°
4250
139°
4300
140°
4350



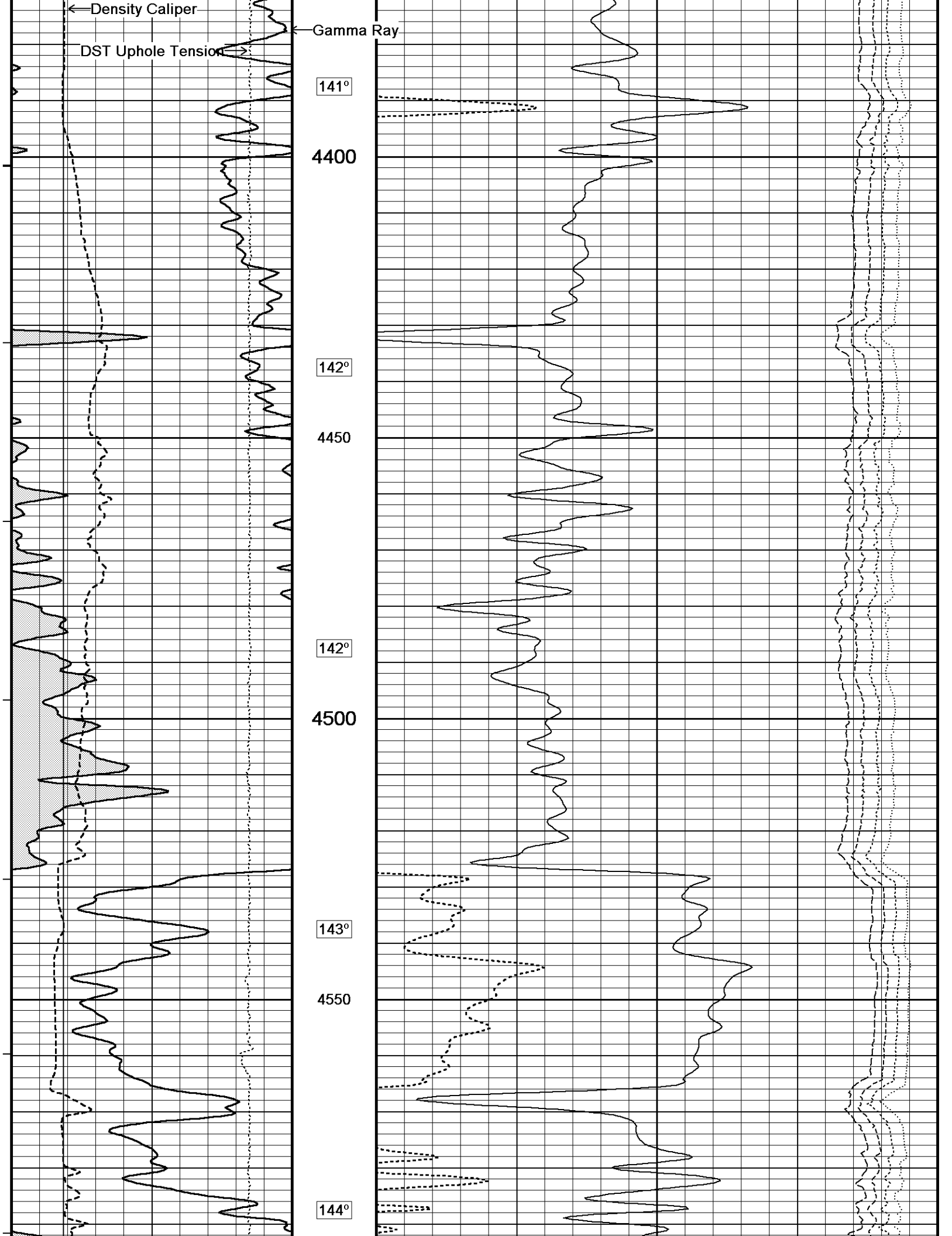
3-5' Compensated Sonic →

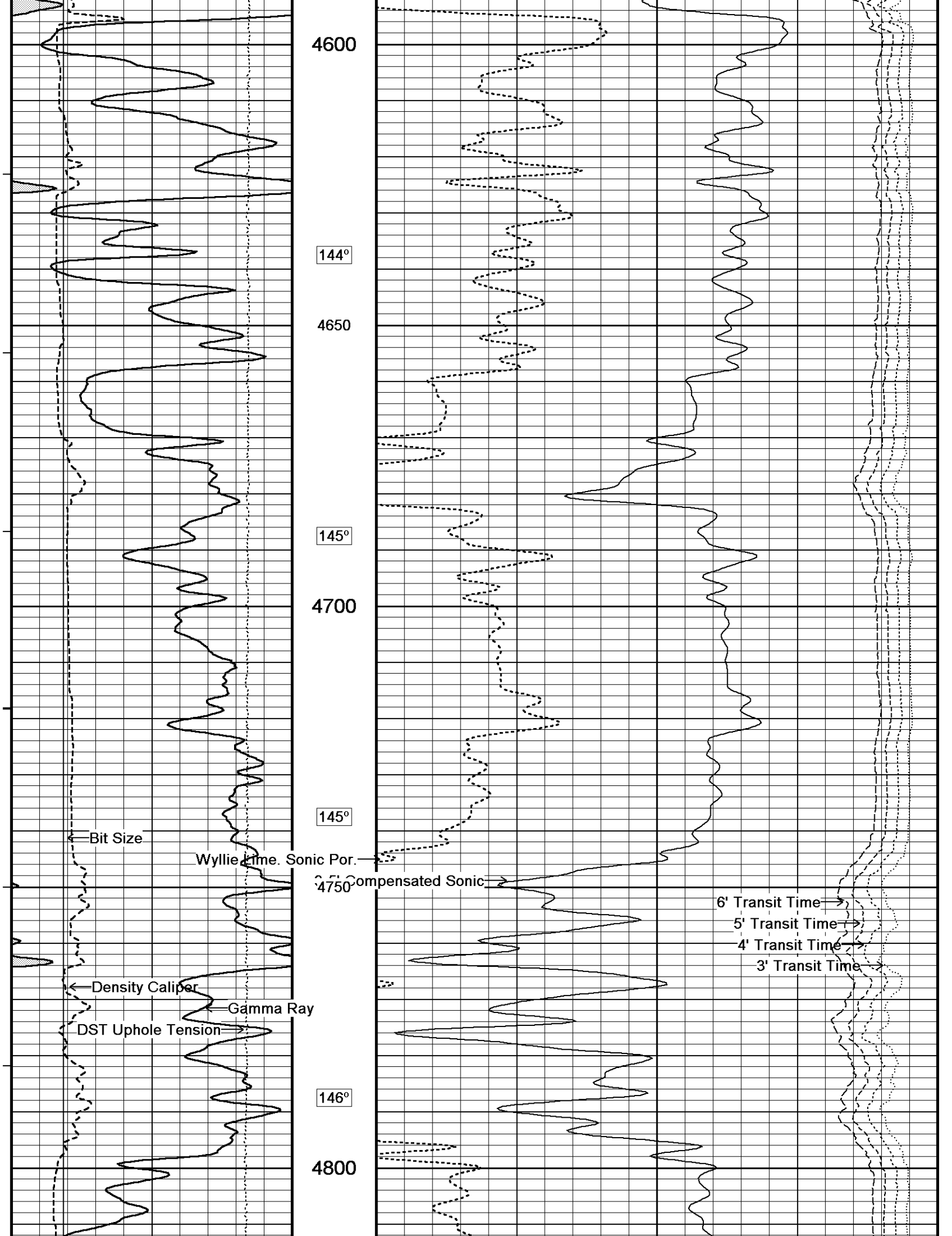
6' Transit Time →

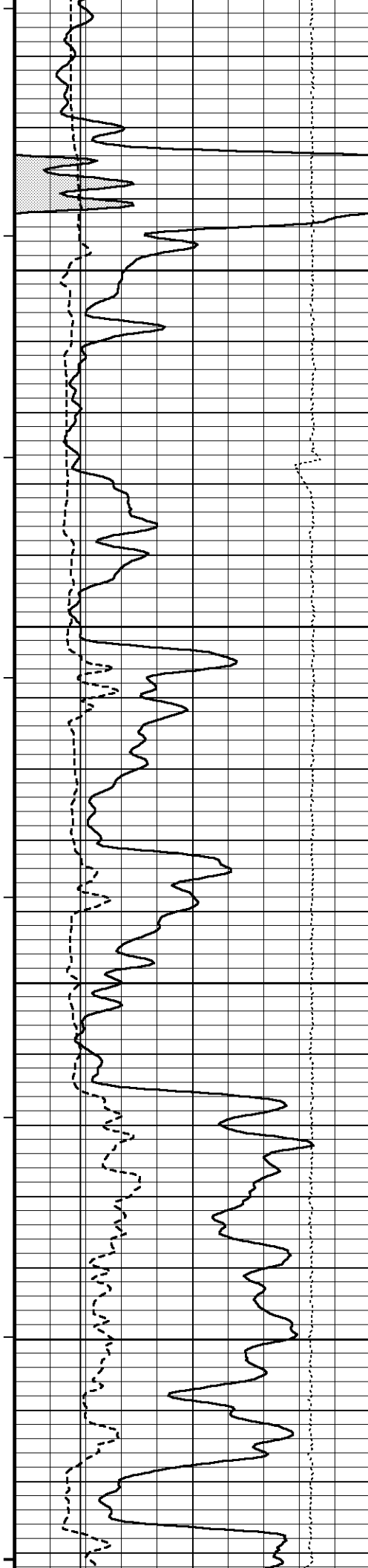
5' Transit Time →

4' Transit Time →

3' Transit Time →







147°

4850

147°

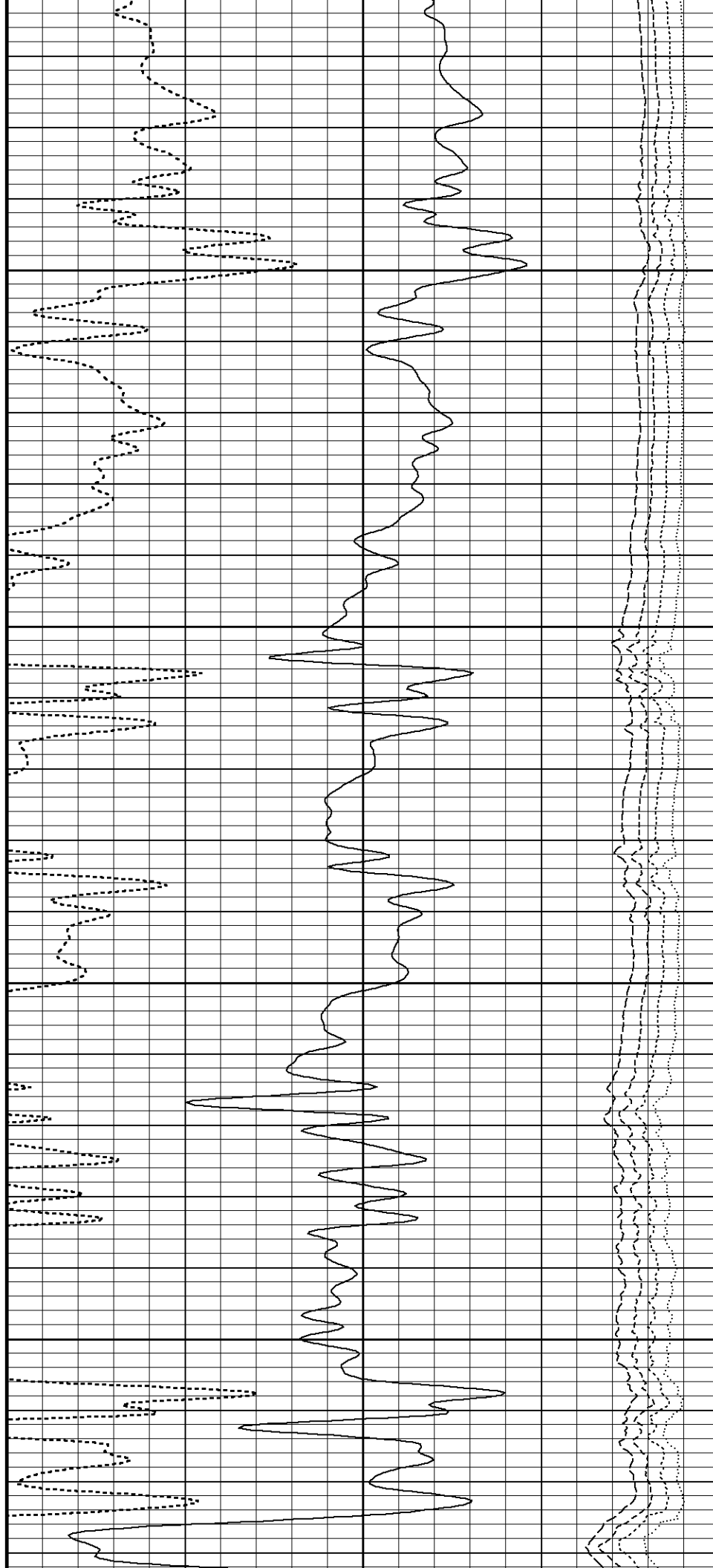
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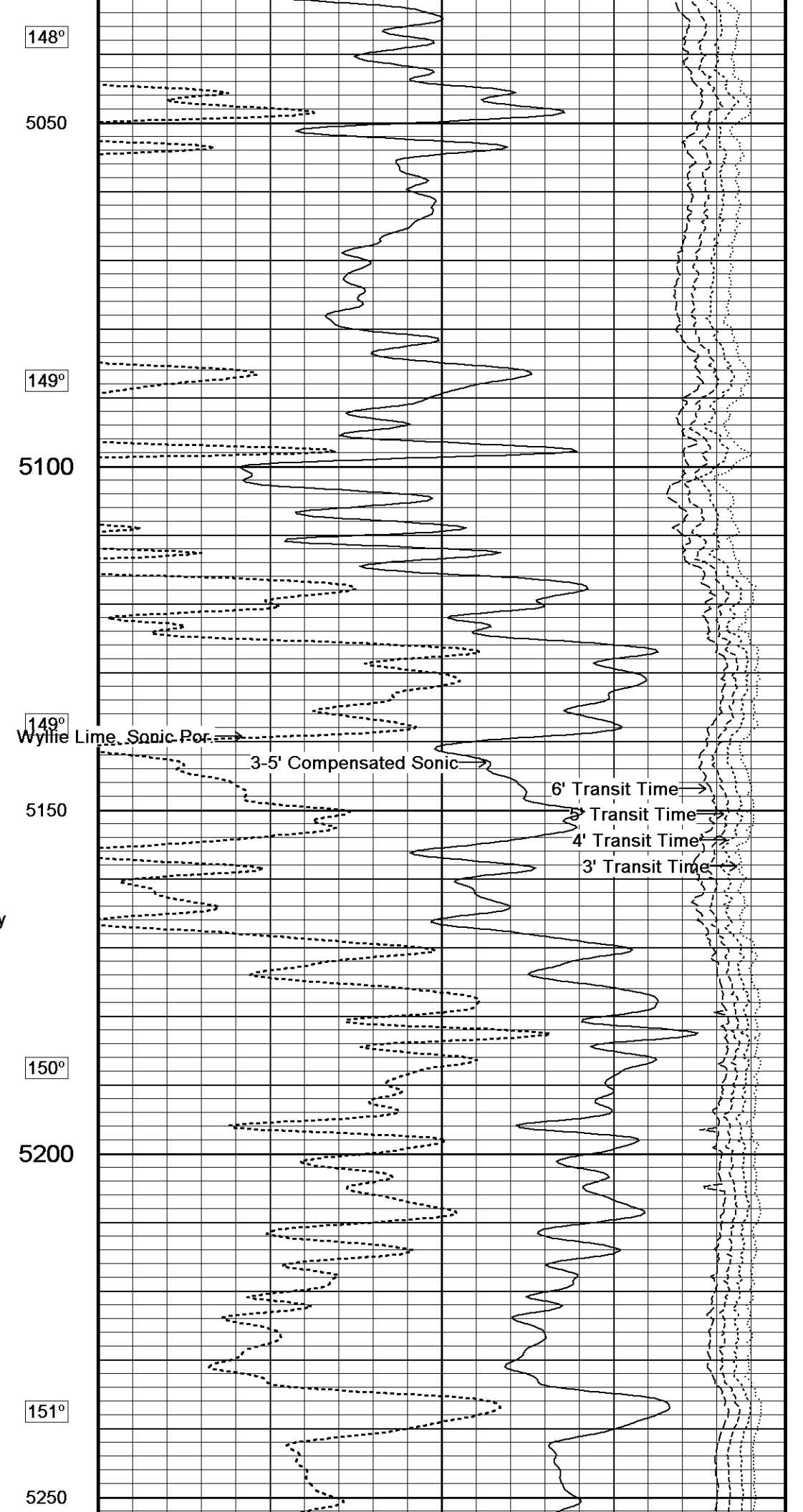
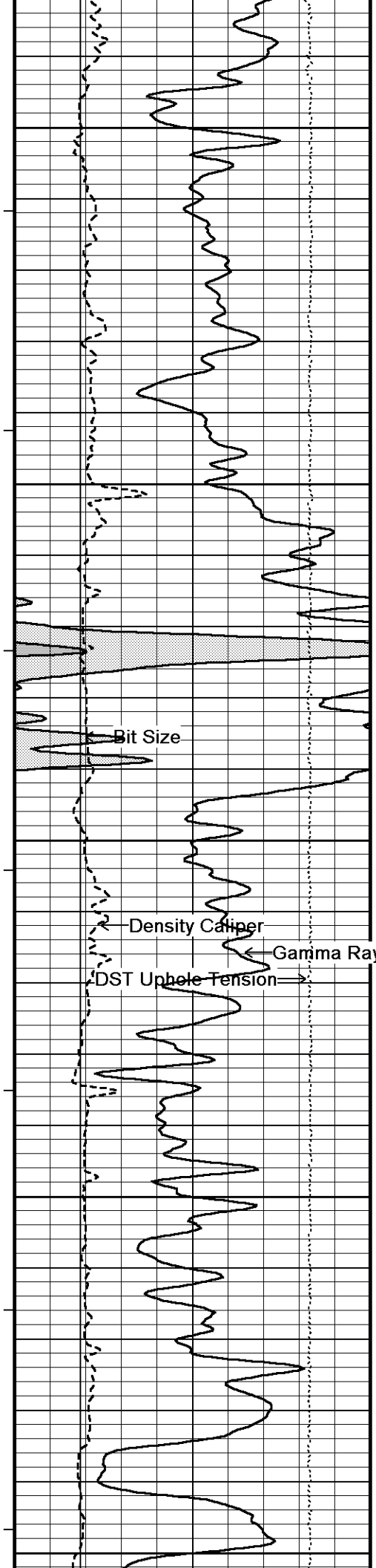
148°

4950

148°

5000





148°

5050

149°

5100

149°

5150

150°

5200

151°

5250

Bit Size

Density Caliper

Gamma Ray

DST Up-hole Tension

Wyllie Lime Sonic Por.

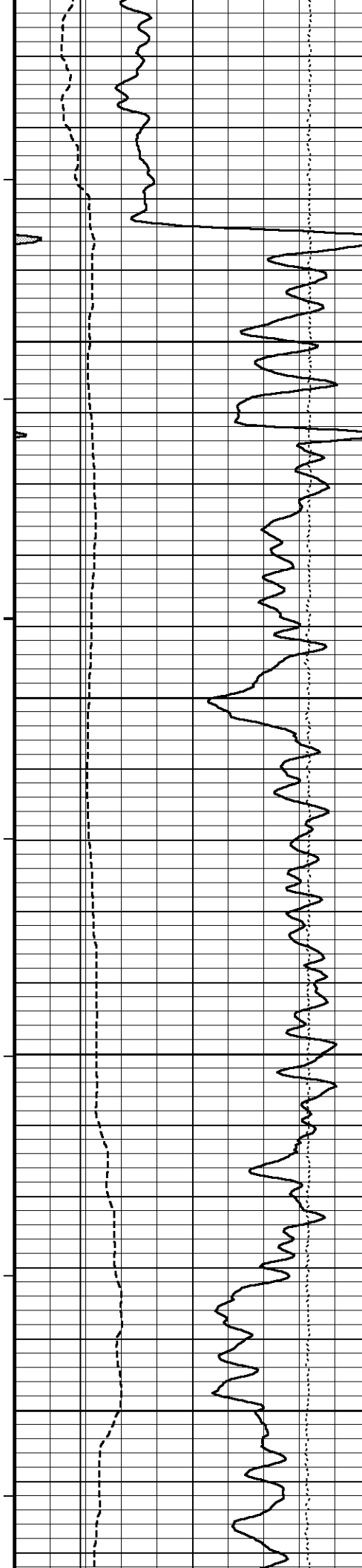
3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time



151°

5300

152°

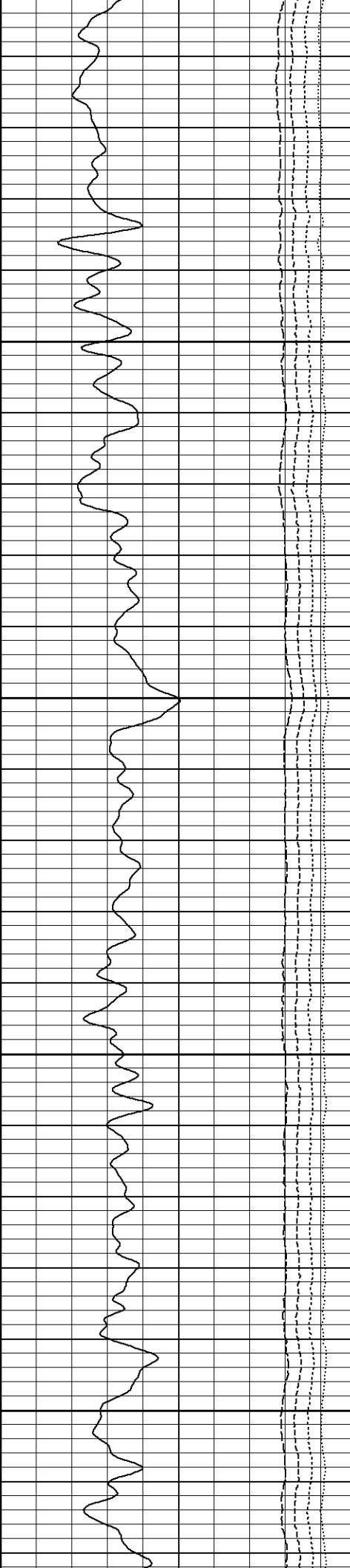
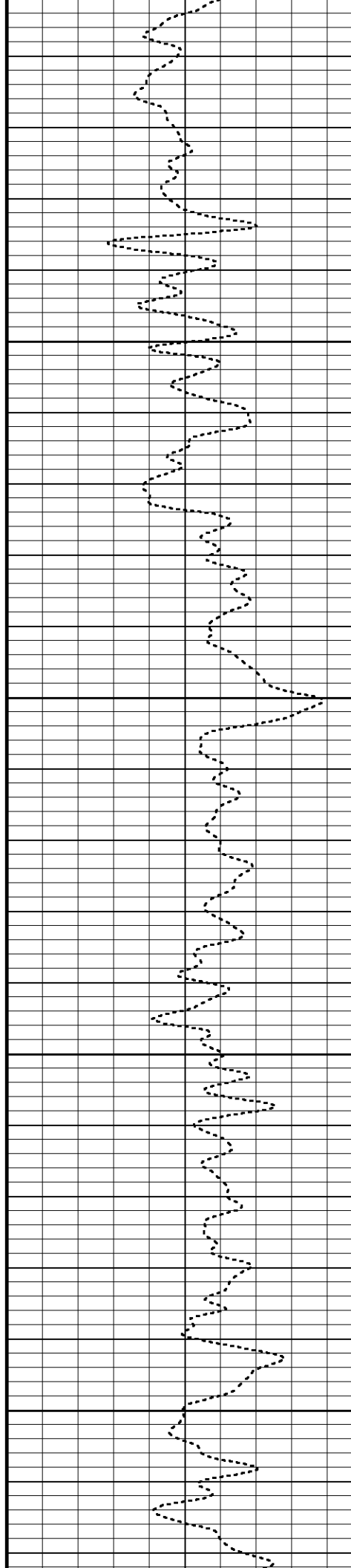
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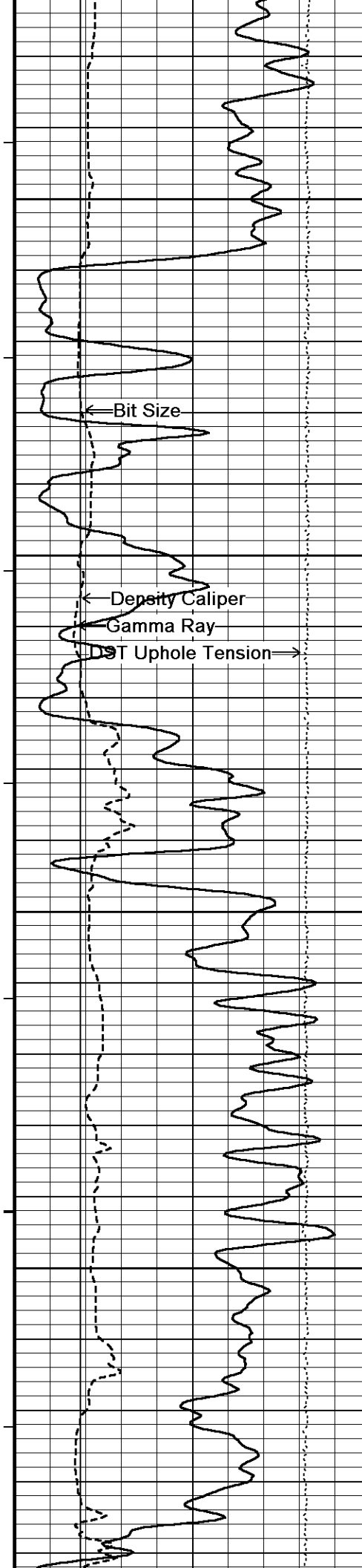
152°

5400

153°

5450





153°

5500

154°

5550

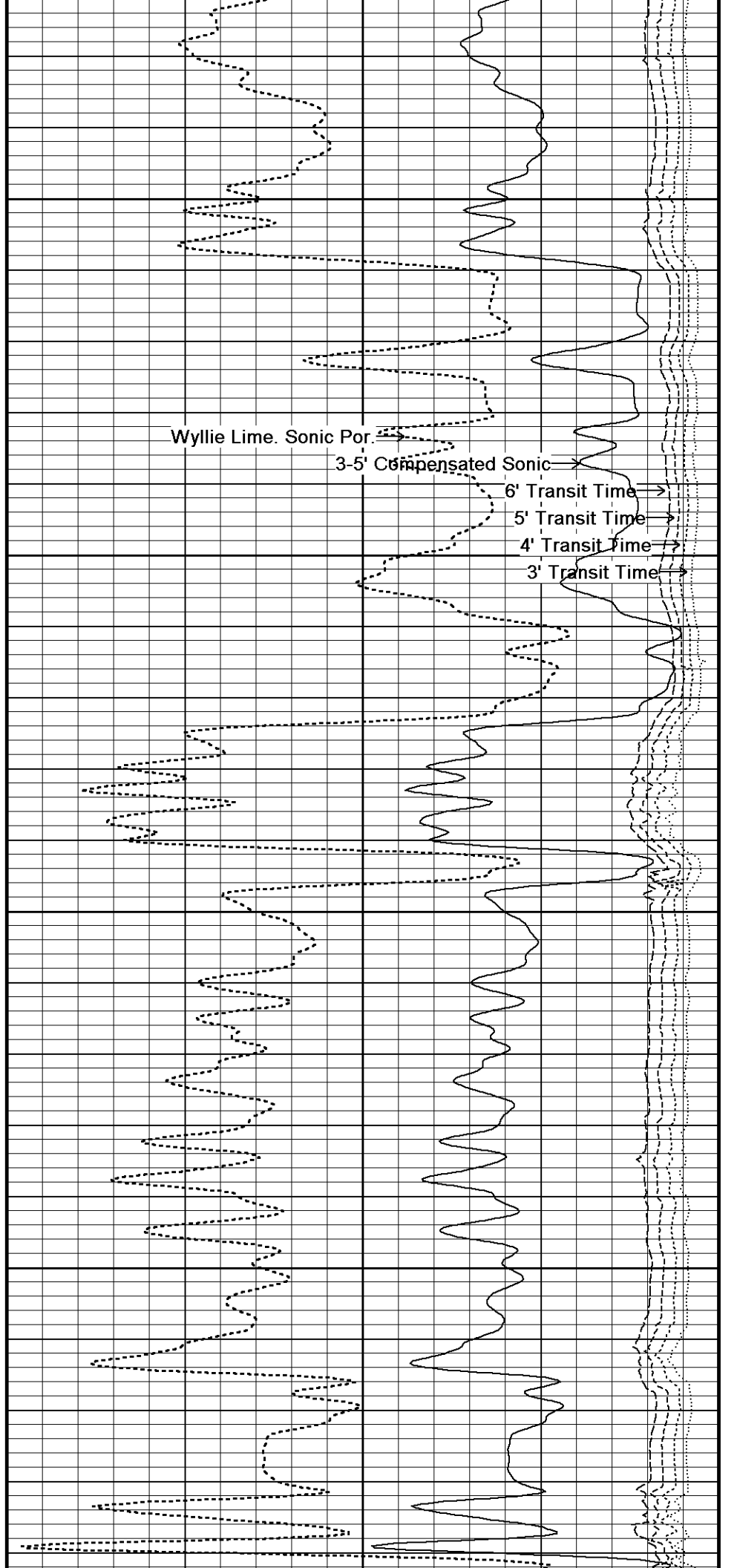
154°

5600

154°

5650

154°



Wyllie Lime. Sonic Por.

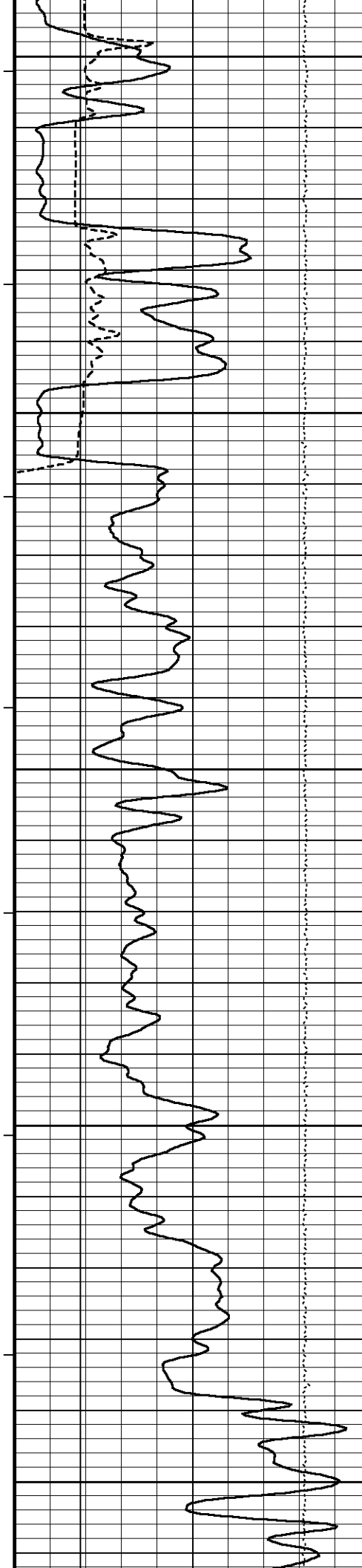
3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time



5700

155°

5750

155°

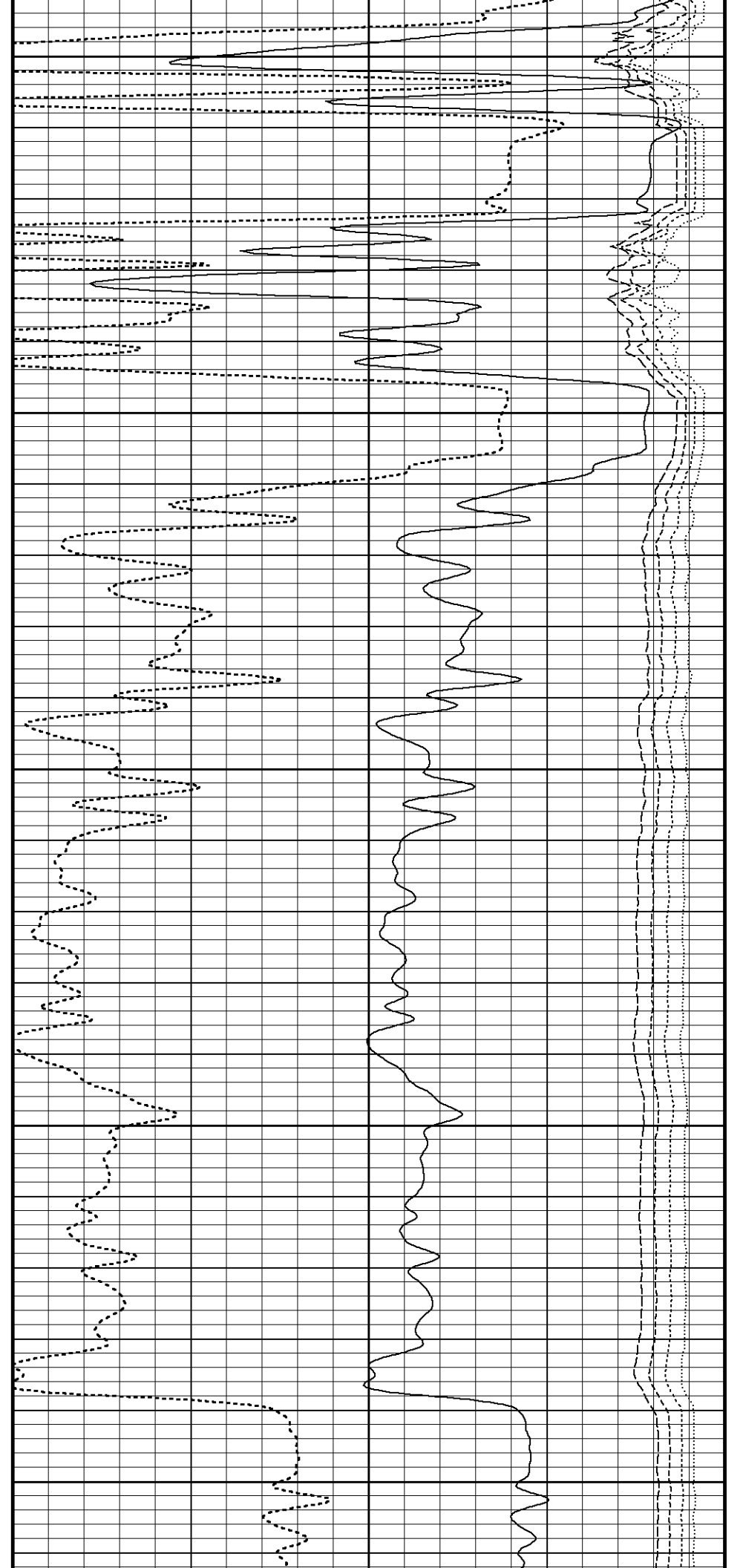
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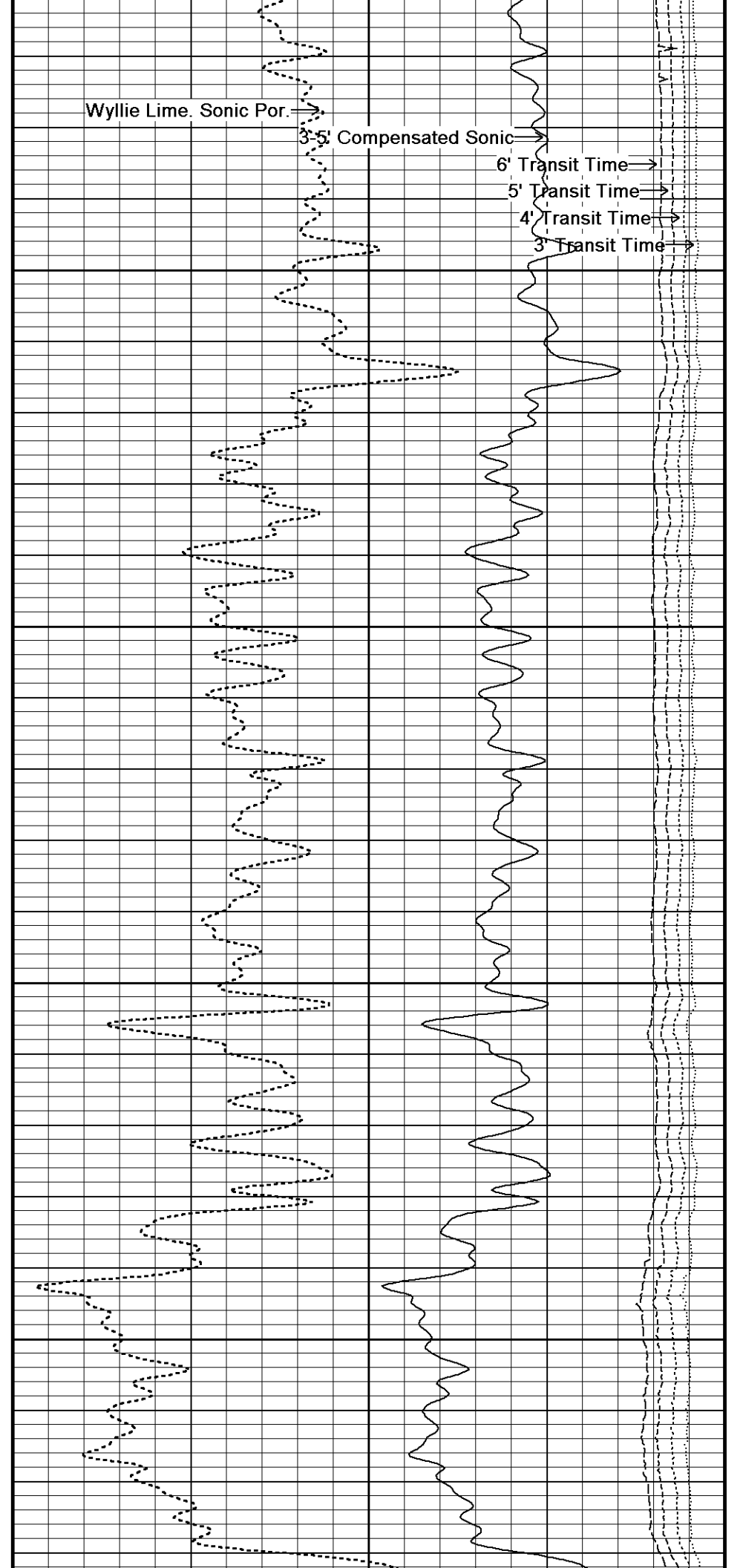
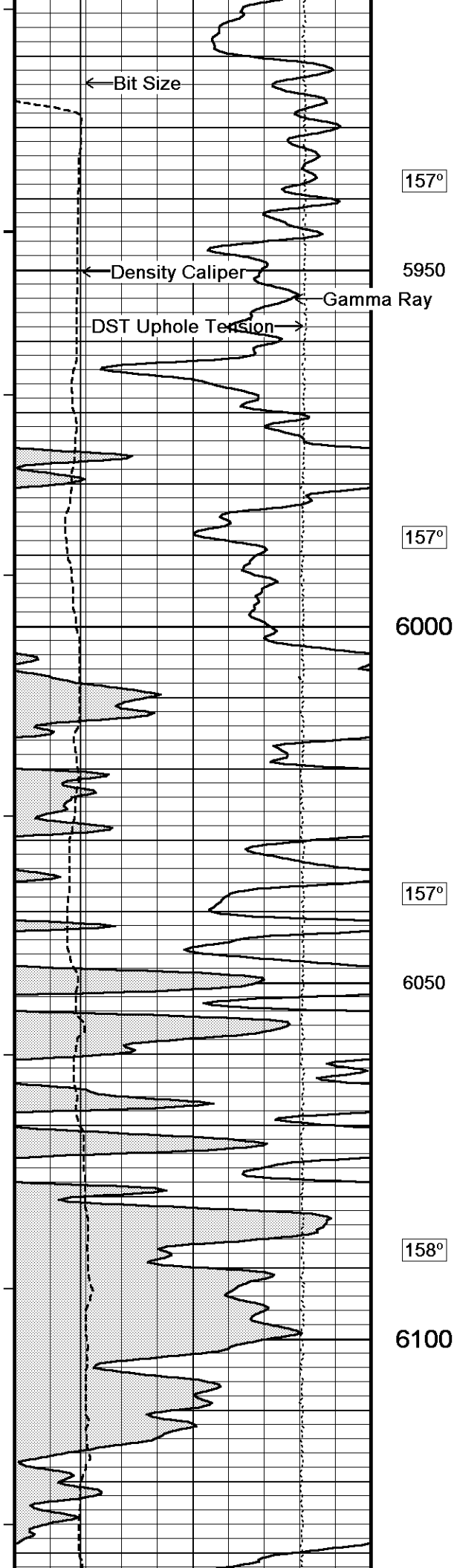
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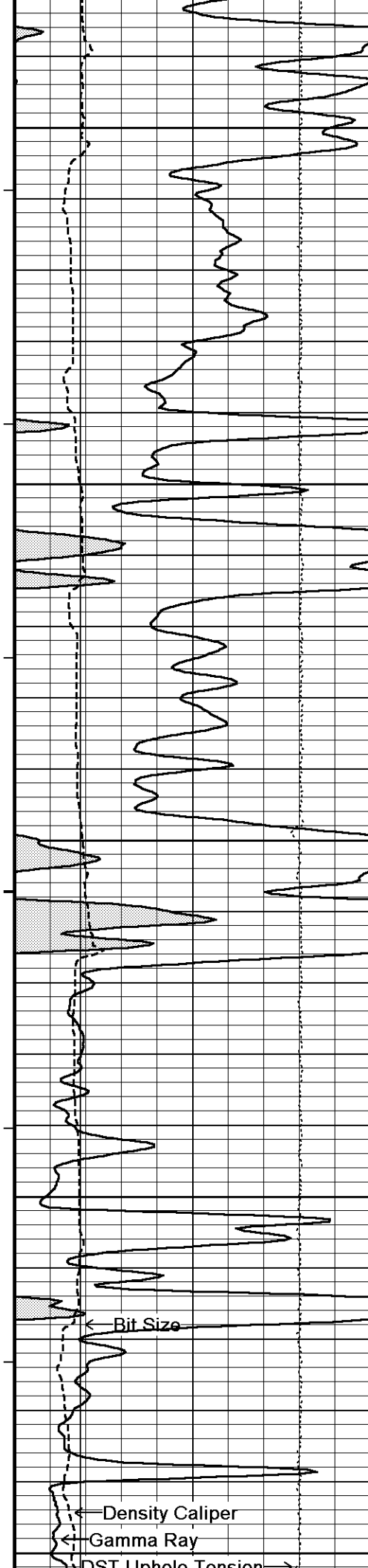
5850

156°

5900







158°

6150

159°

6200

159°

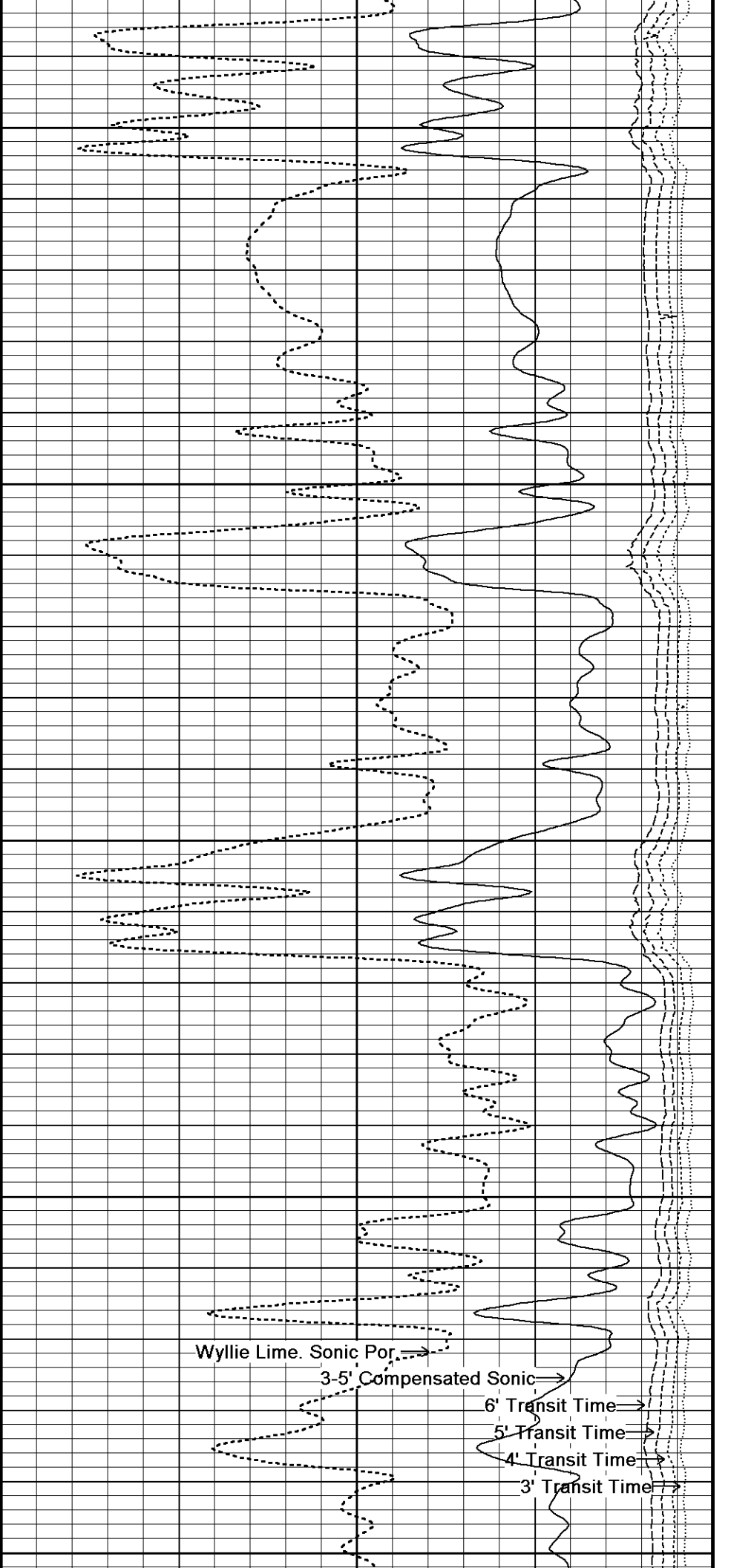
6250

159°

6300

160°

6350



← Bit Size

← Density Caliper

← Gamma Ray

← DST Uphole Tension

Wyllie Lime. Sonic Por. →

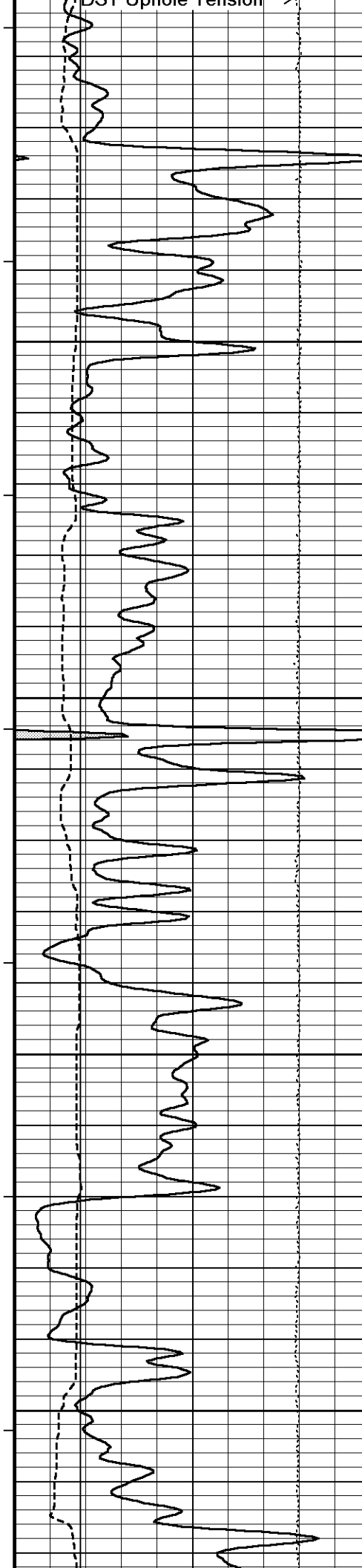
3-5' Compensated Sonic →

6' Transit Time →

5' Transit Time →

4' Transit Time →

3' Transit Time →



161°

6400

161°

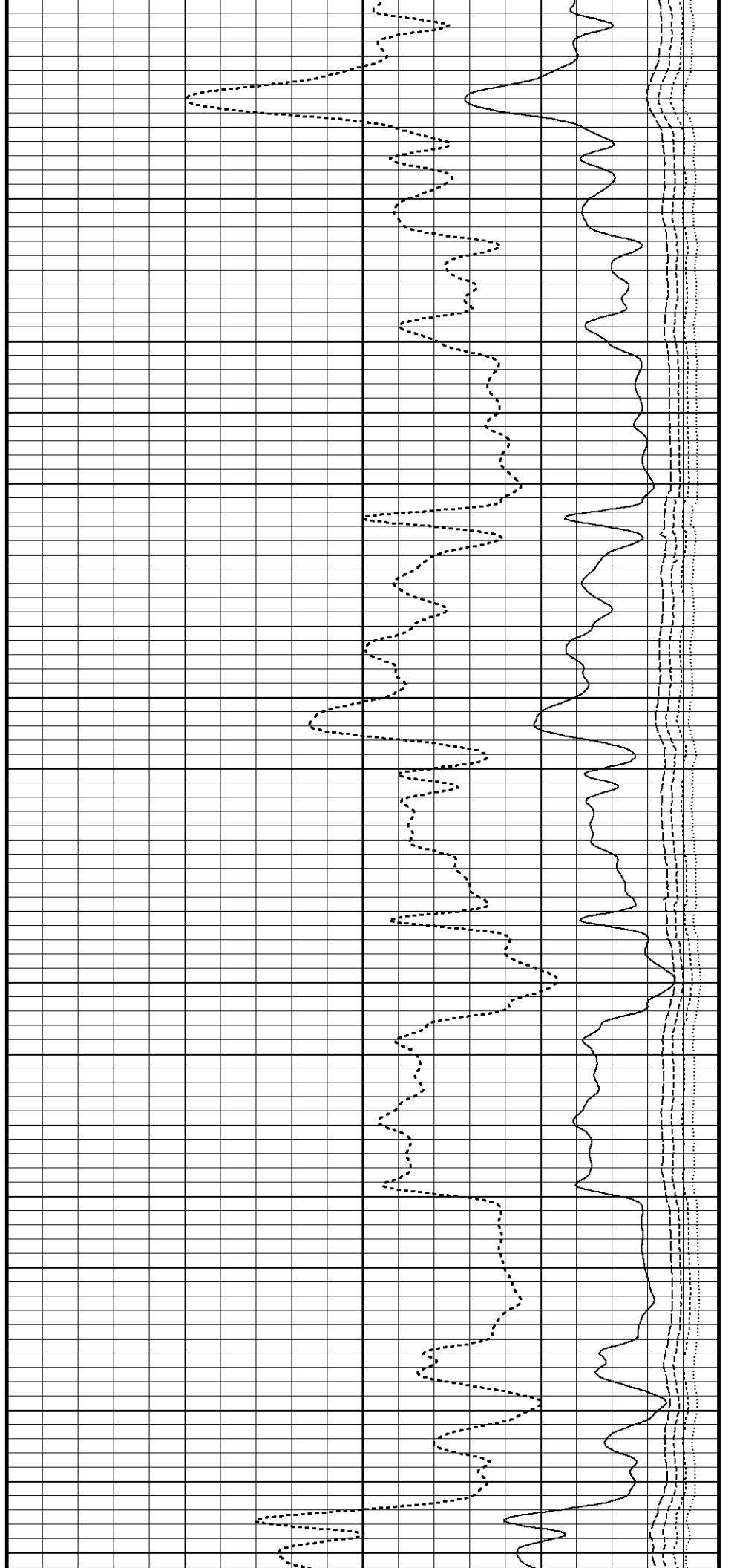
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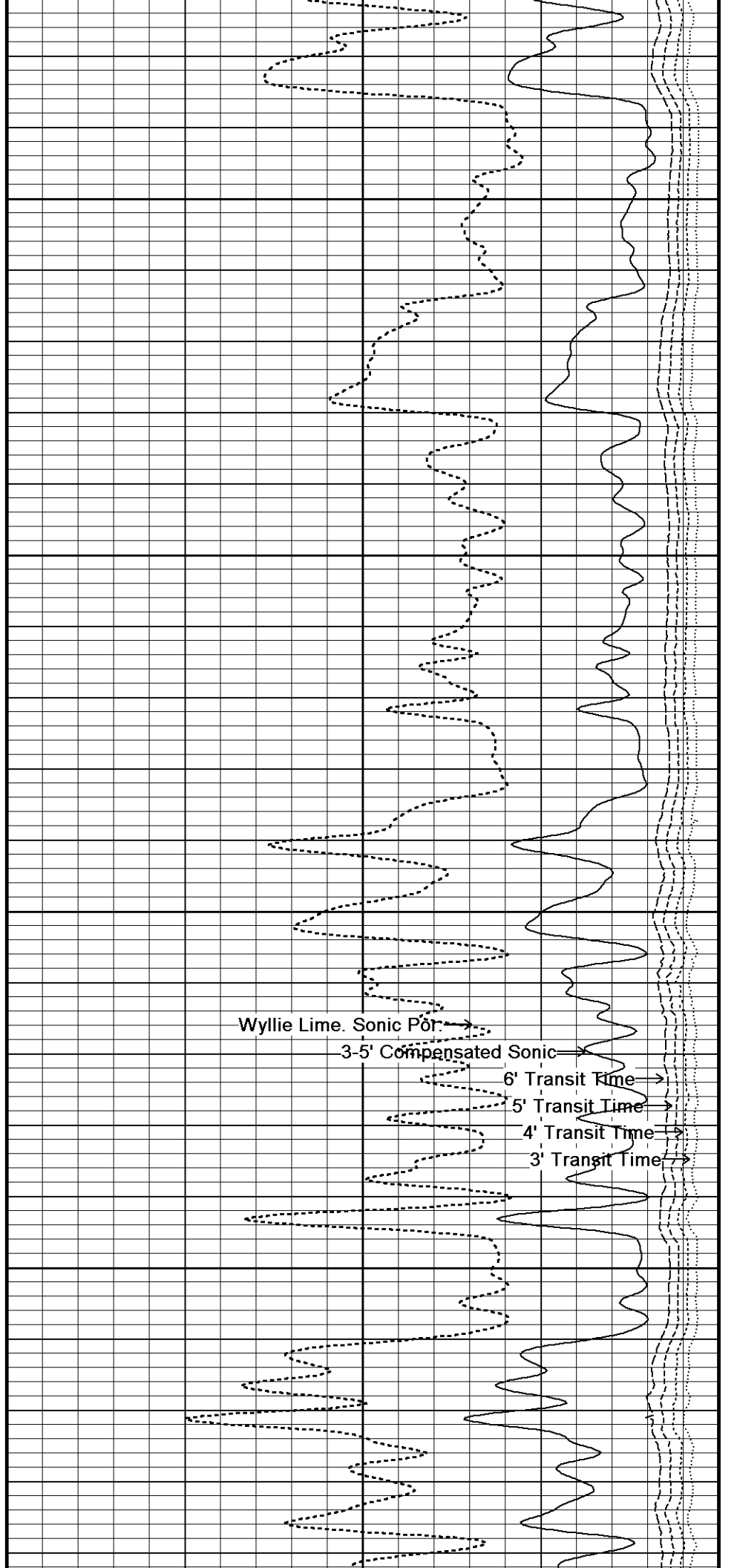
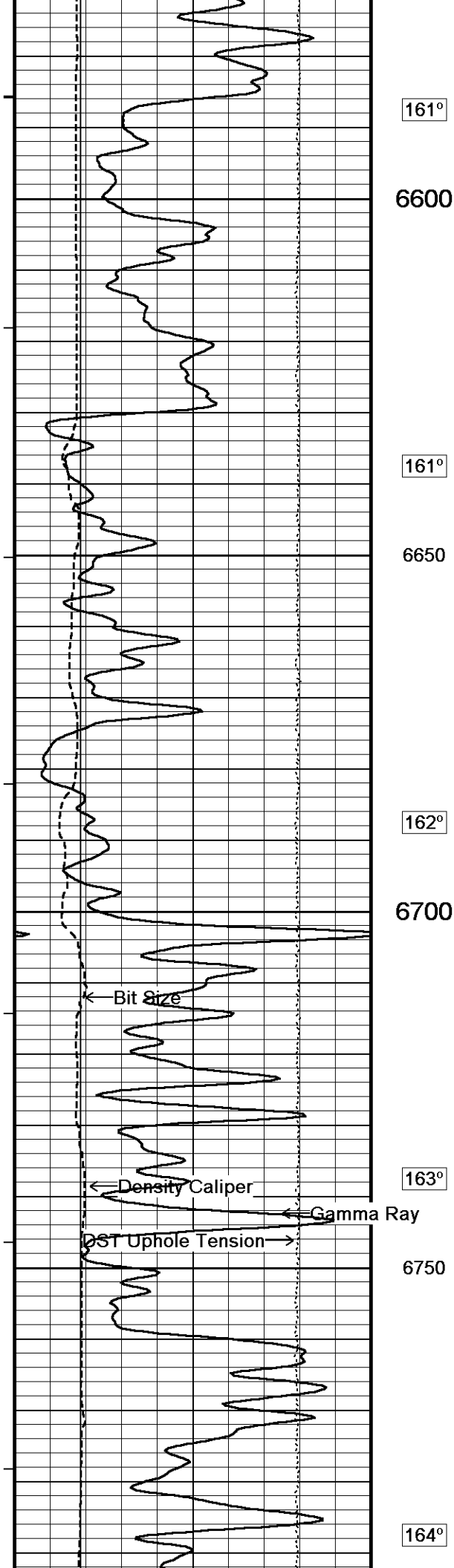
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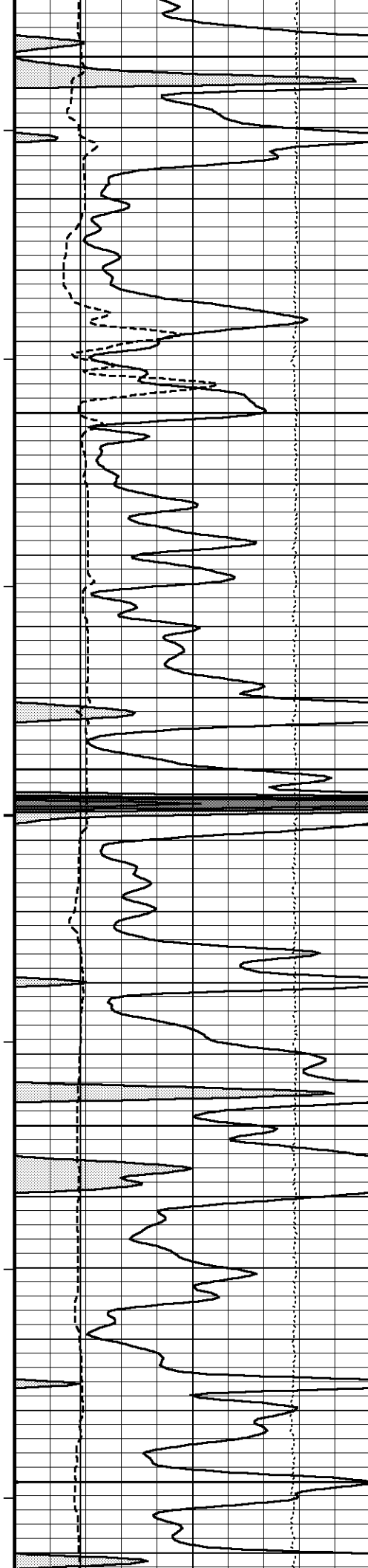
6500

161°

6550







6800

165°

6850

165°

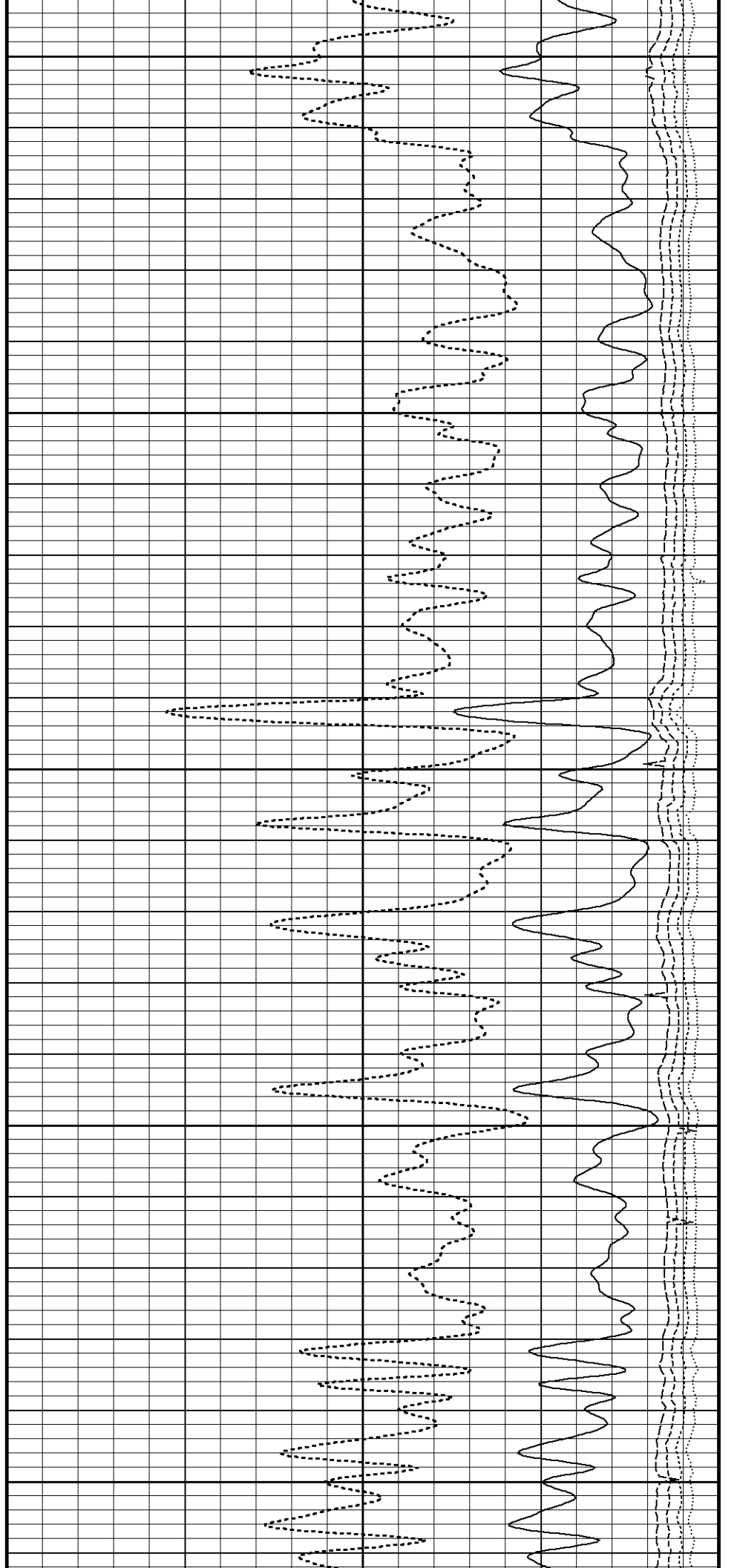
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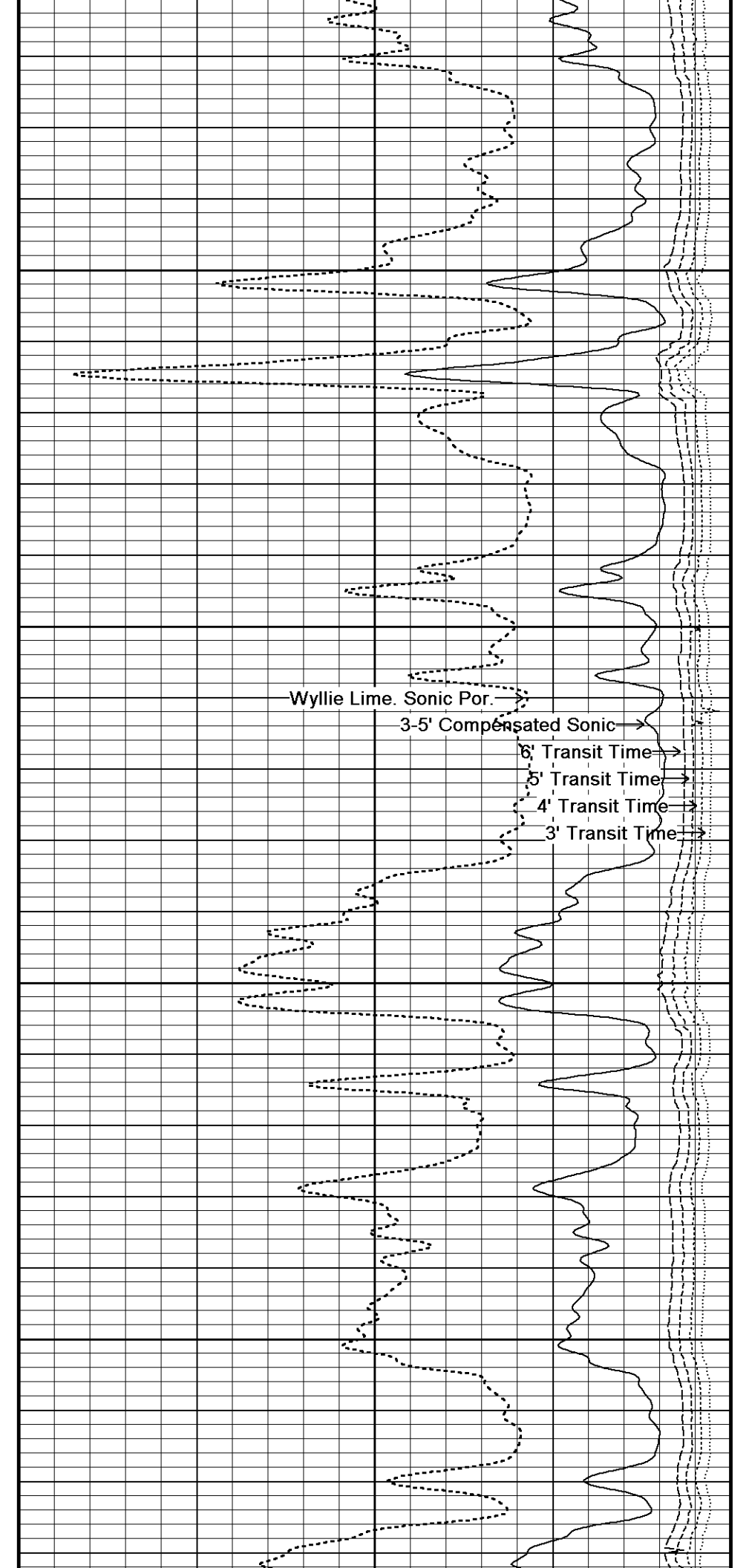
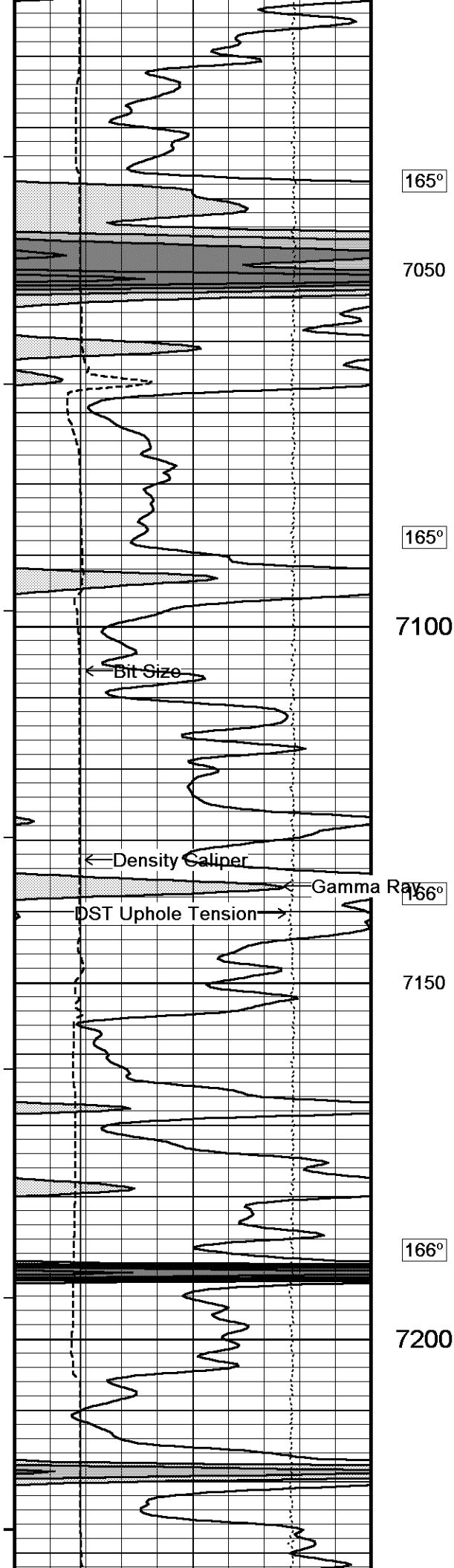
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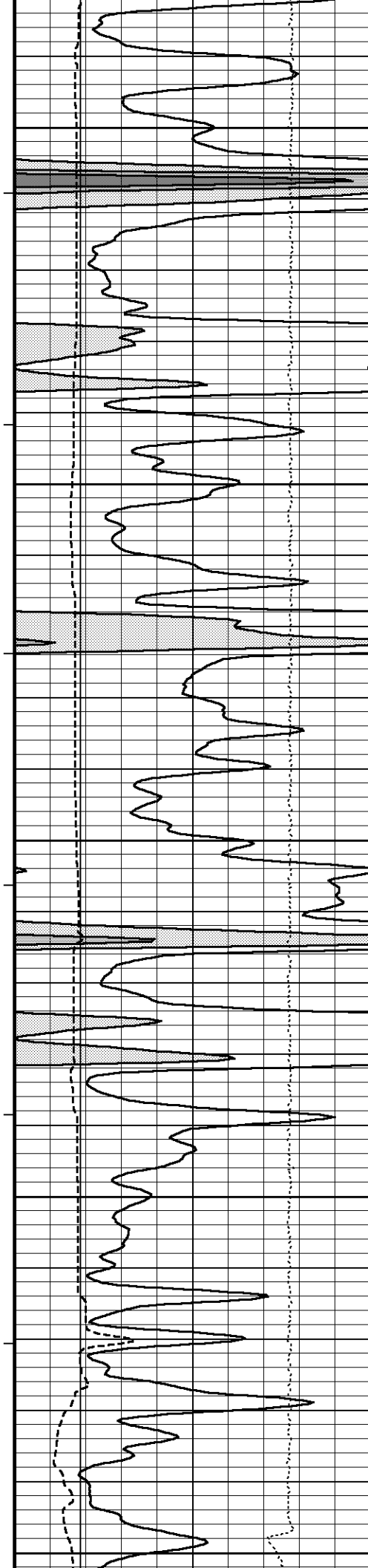
6950

165°

7000







166°

7250

166°

7300

166°

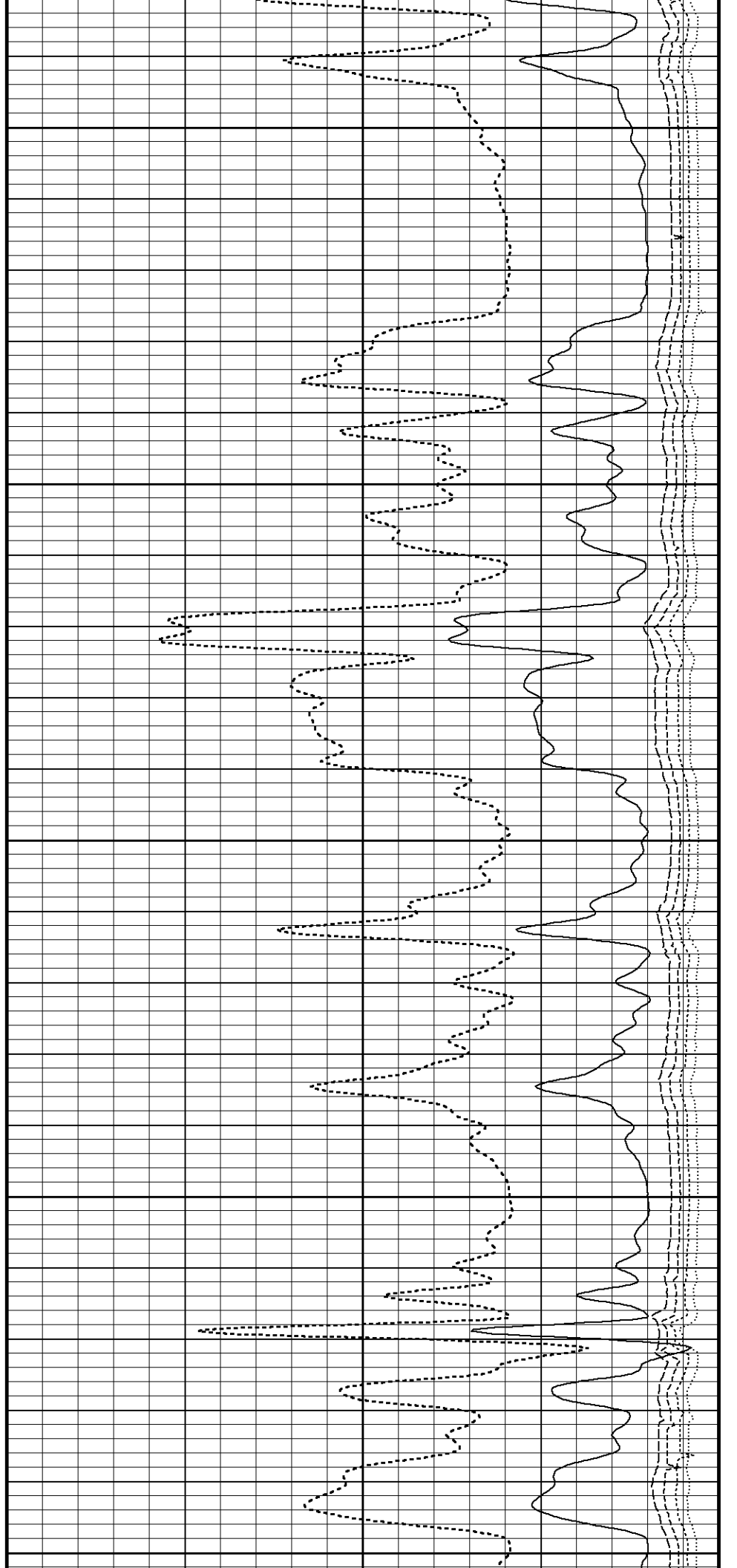
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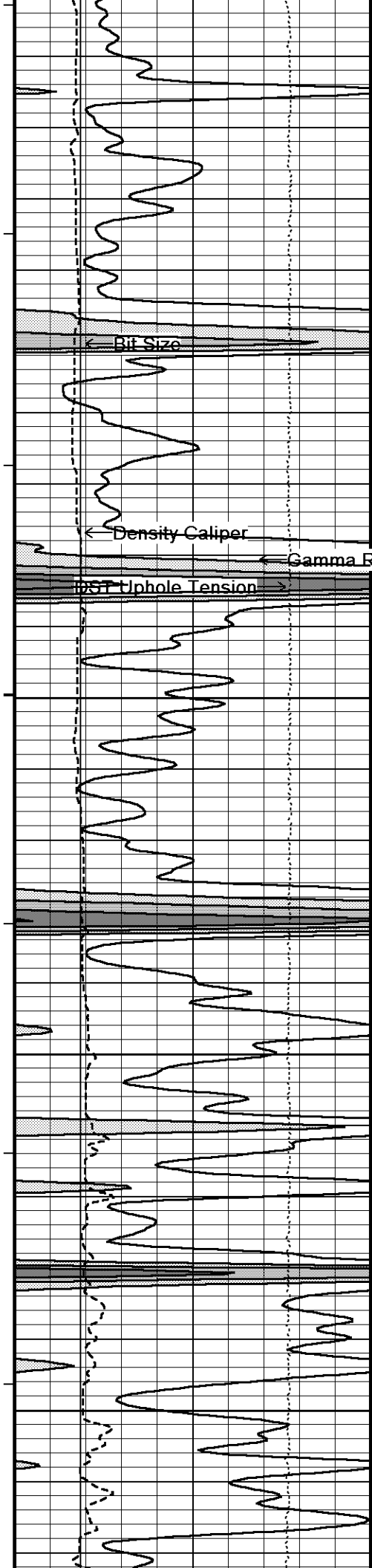
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7400

166°

7450





167°

7500

168°

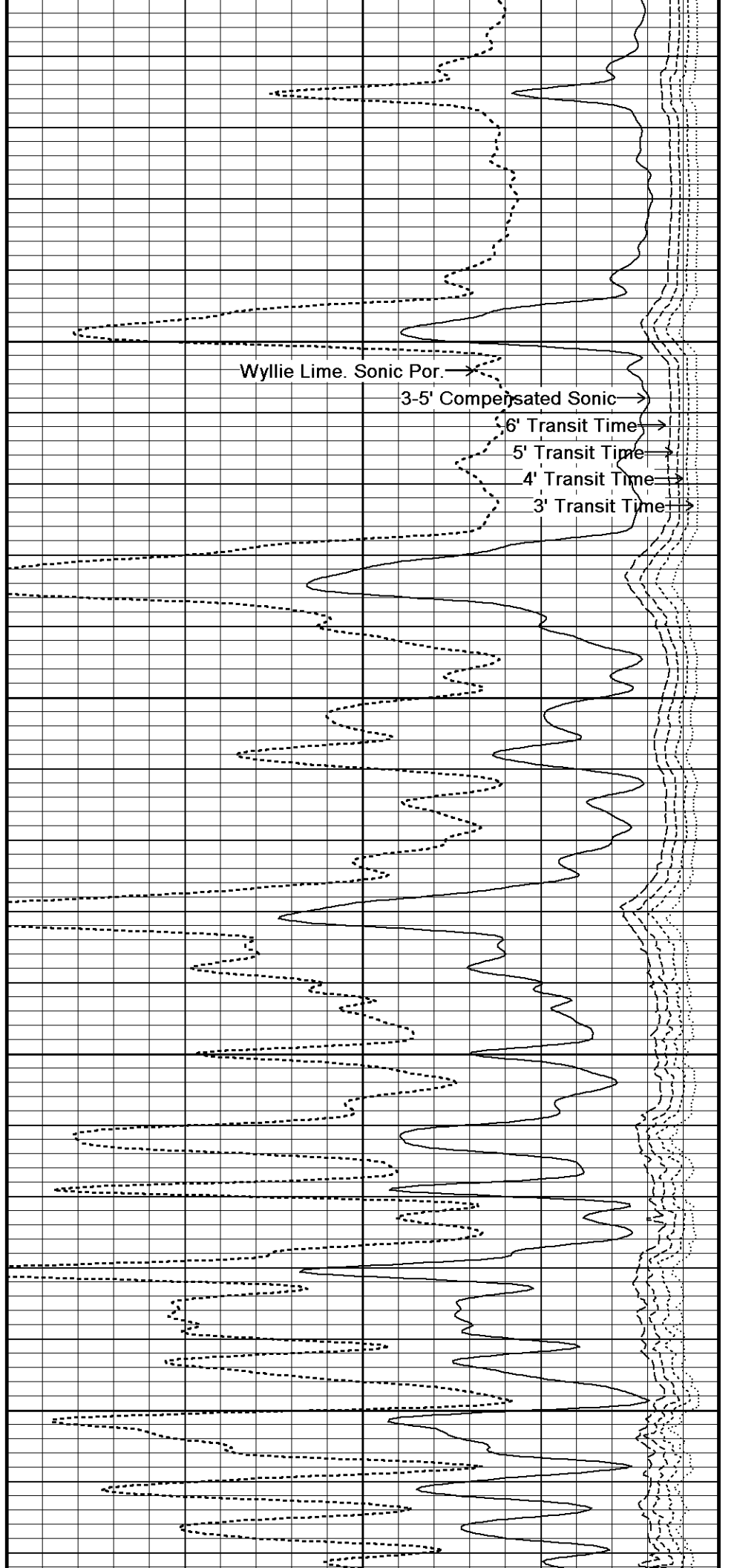
7550

168°

7600

169°

7650



Wyllie Lime. Sonic Por.

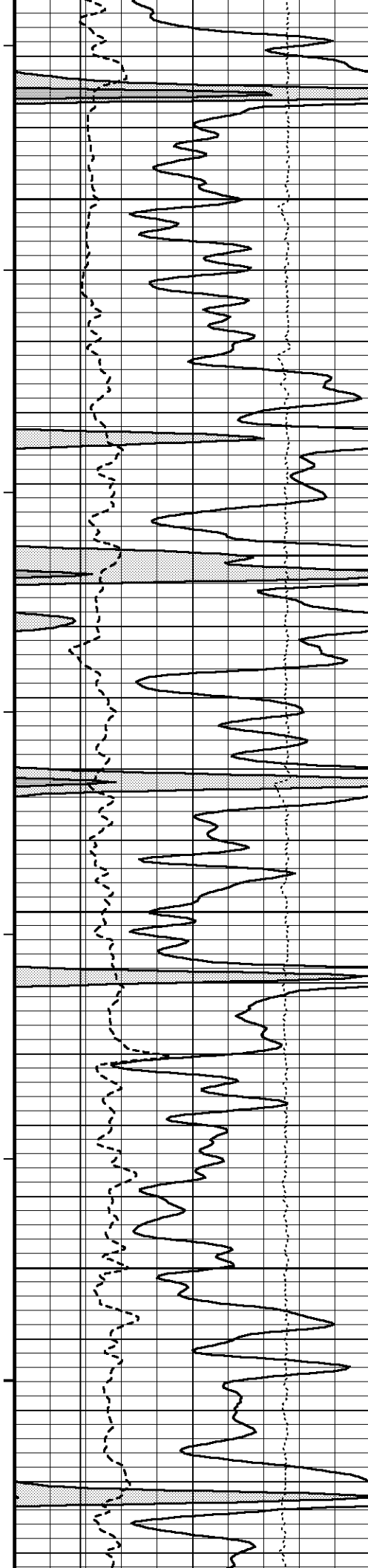
3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time



169°

7700

169°

7750

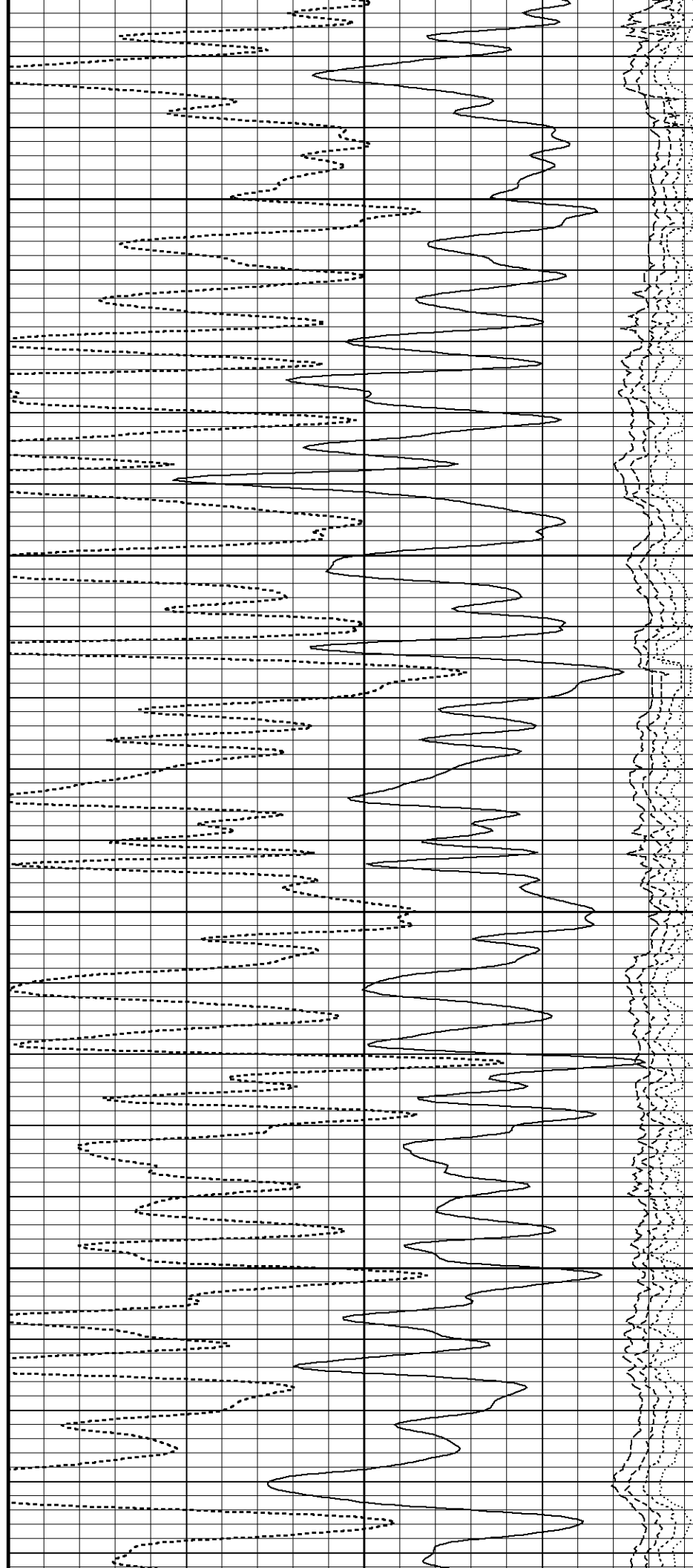
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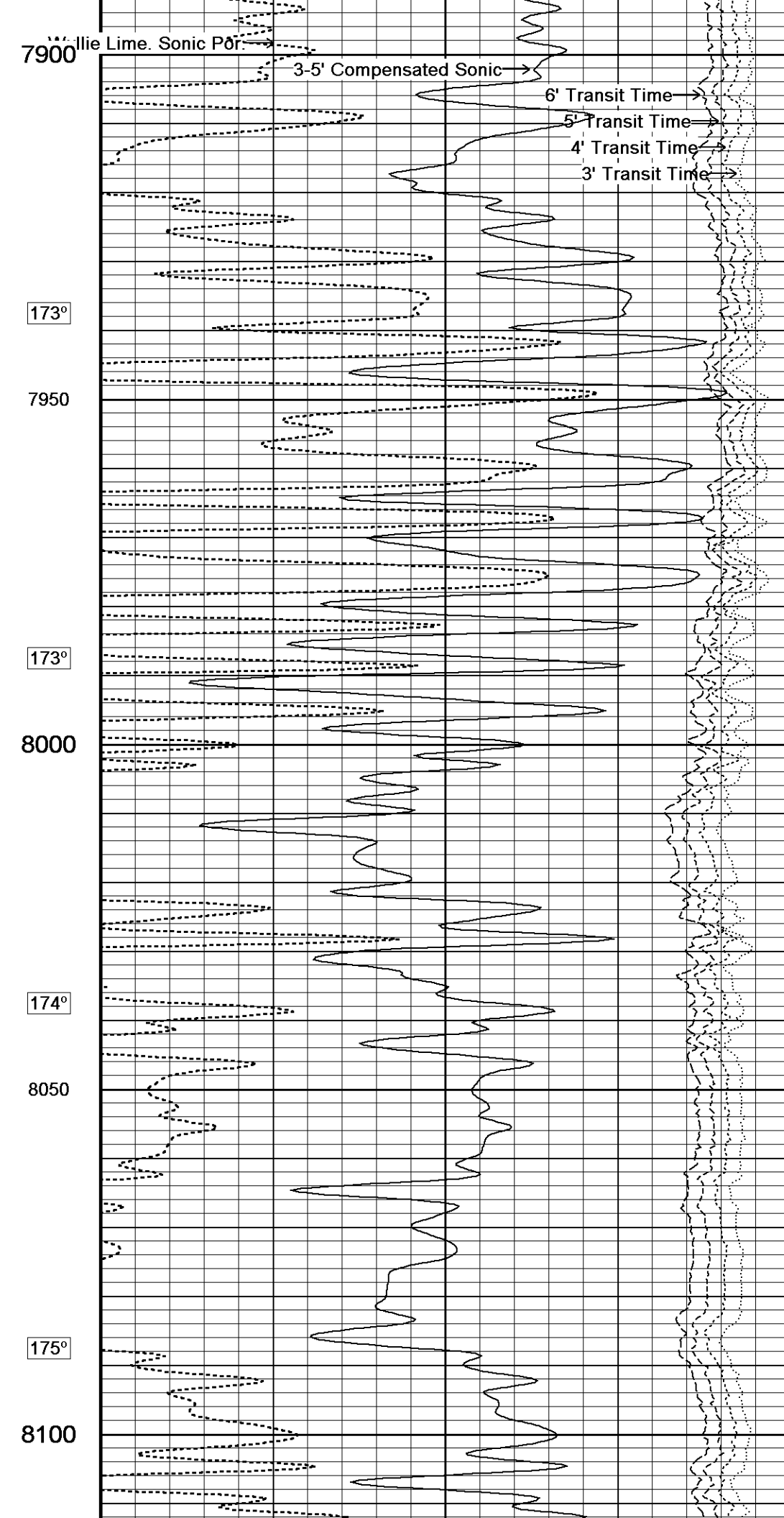
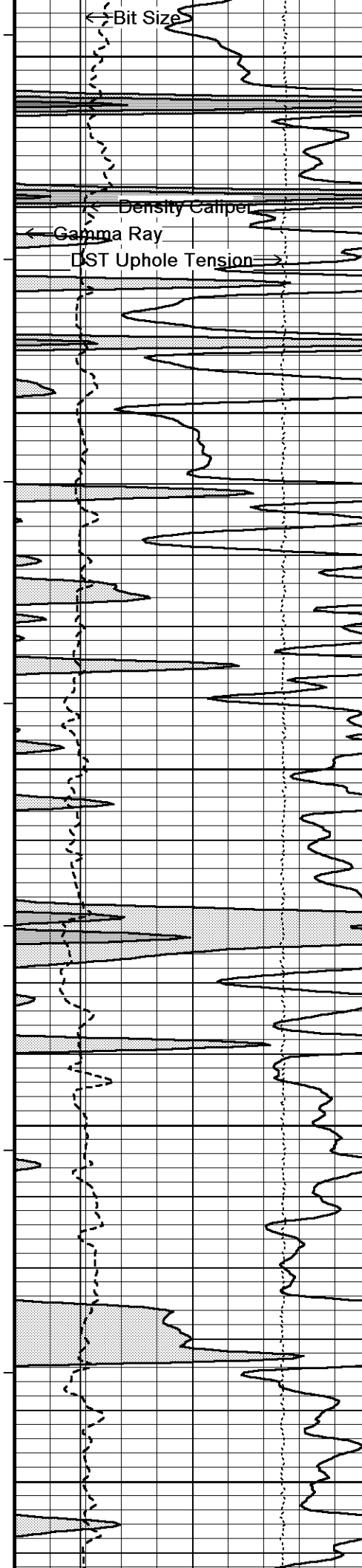
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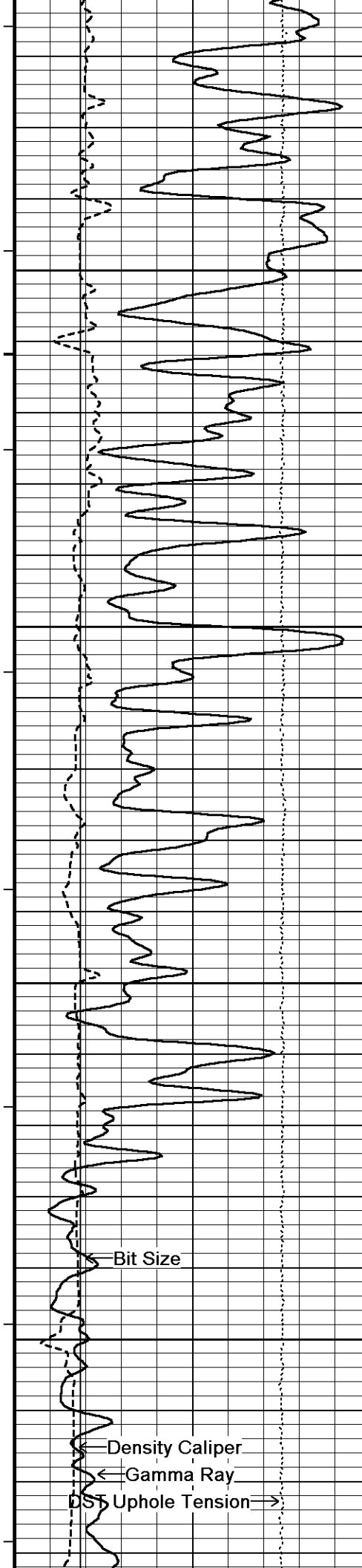
170°

7850

172°







175°

8150

177°

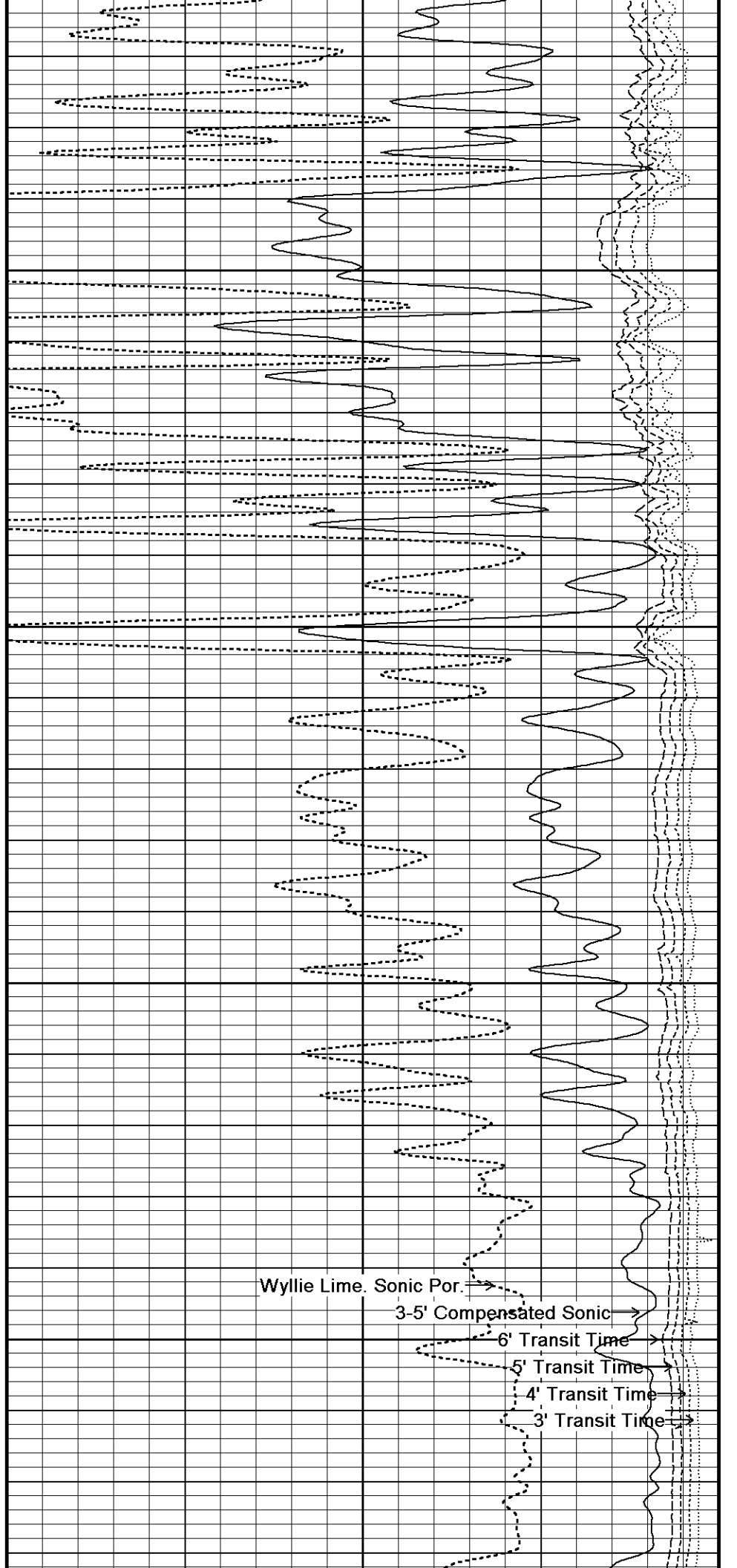
8200

179°

8250

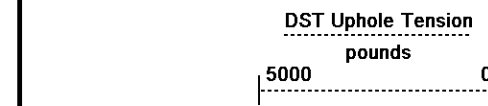
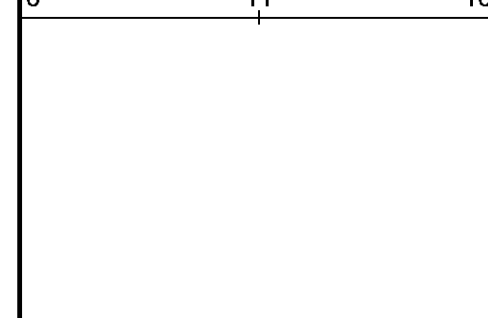
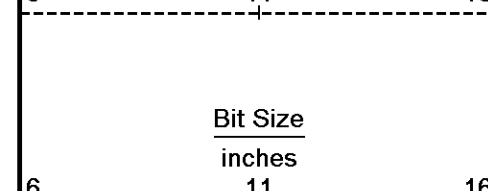
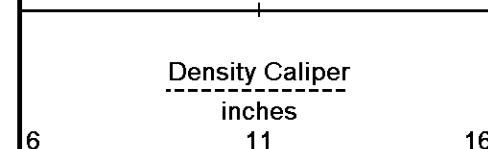
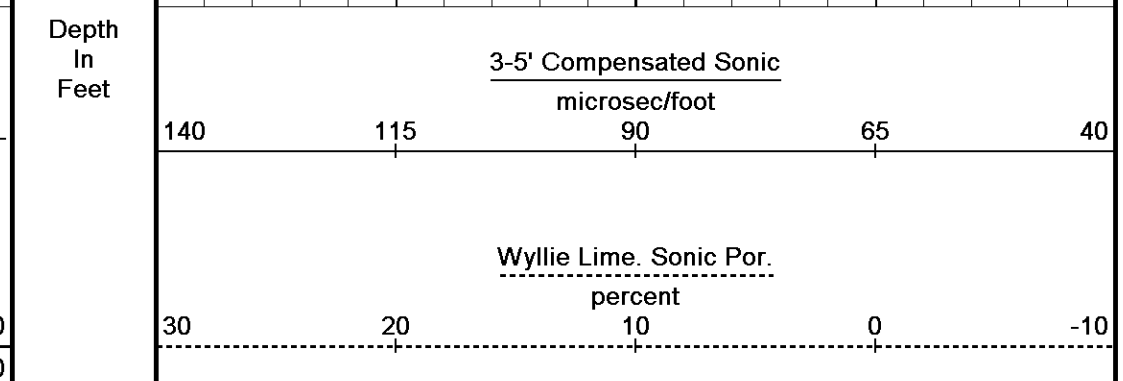
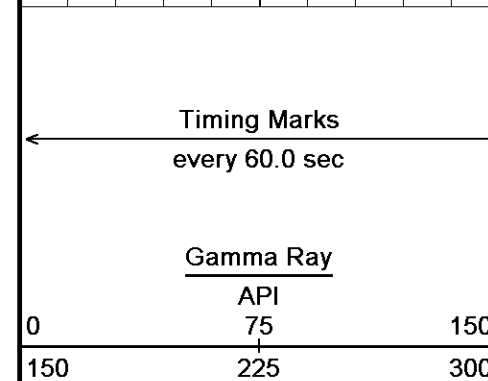
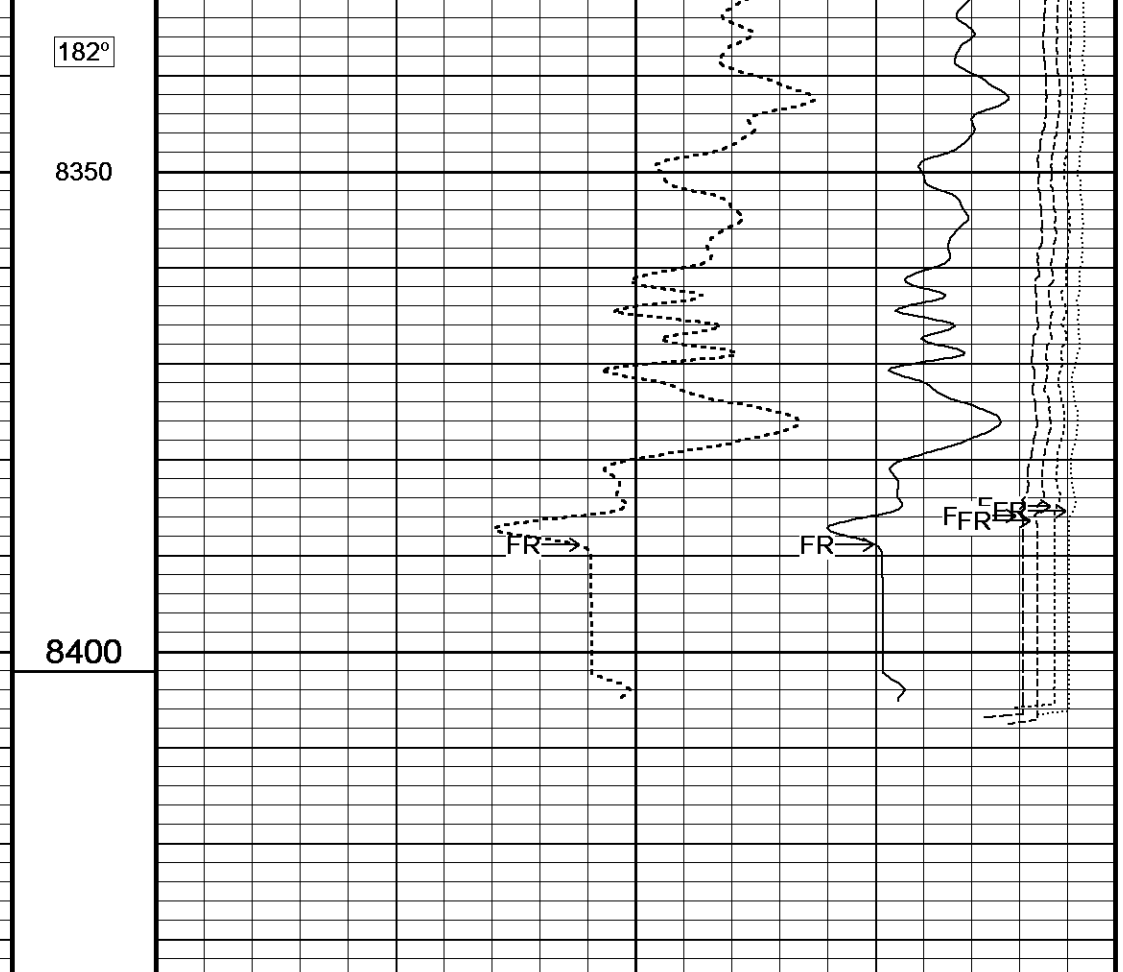
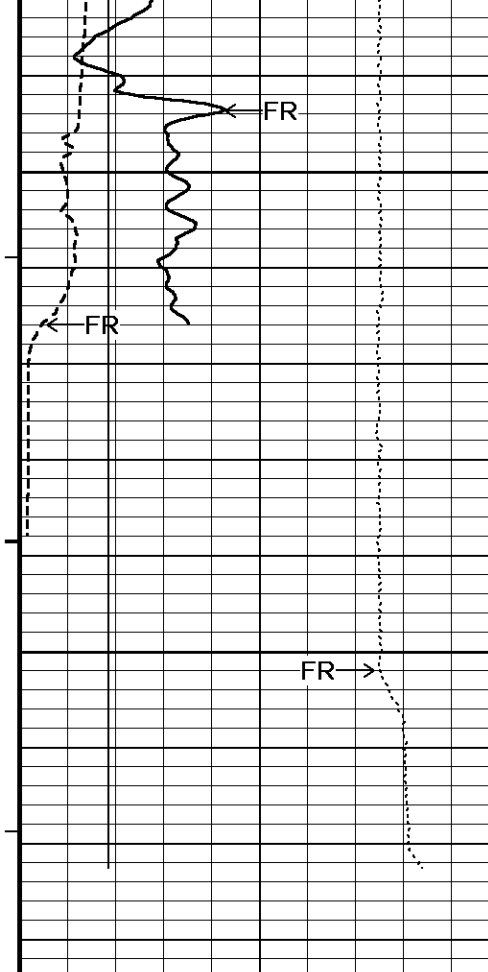
181°

8300



Wyllie Lime Sonic Por. →
3-5' Compensated Sonic →
6' Transit Time →
5' Transit Time →
4' Transit Time →
3' Transit Time →

Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension →



Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 09-DEC-2018 13:08

Filename: C:\Minimus 18.03.9344\Data\Murfin Red Poll #8-21\Murfin Red Poll #8-21_003.dta

Recorded on 09-DEC-2018 07:52

System Versions: Logged with 18.03.9344 Plotted with 18.03.9344



5 INCH MAIN



REPEAT SECTION



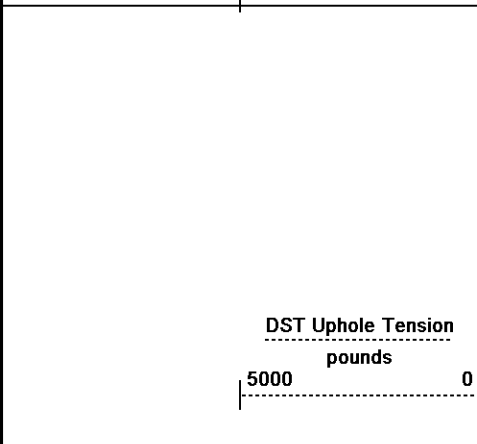
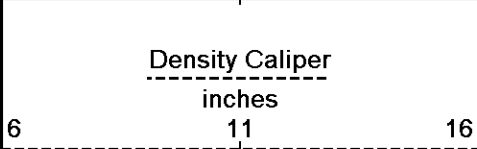
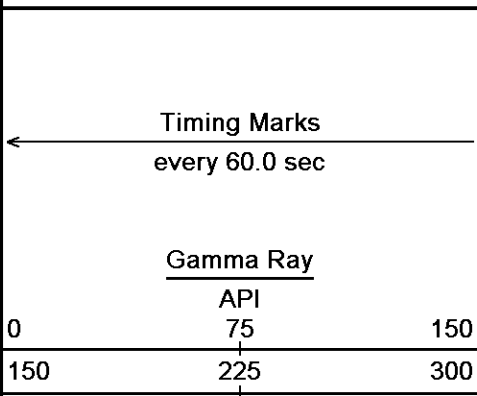
Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 09-DEC-2018 13:08

Filename: C:\Minimus 18.03.9344\Data\Murfin Red Poll #8-21\Murfin Red Poll #8-21_002.dta

Recorded on 09-DEC-2018 07:23

System Versions: Logged with 18.03.9344 Plotted with 18.03.9344



Depth in Feet

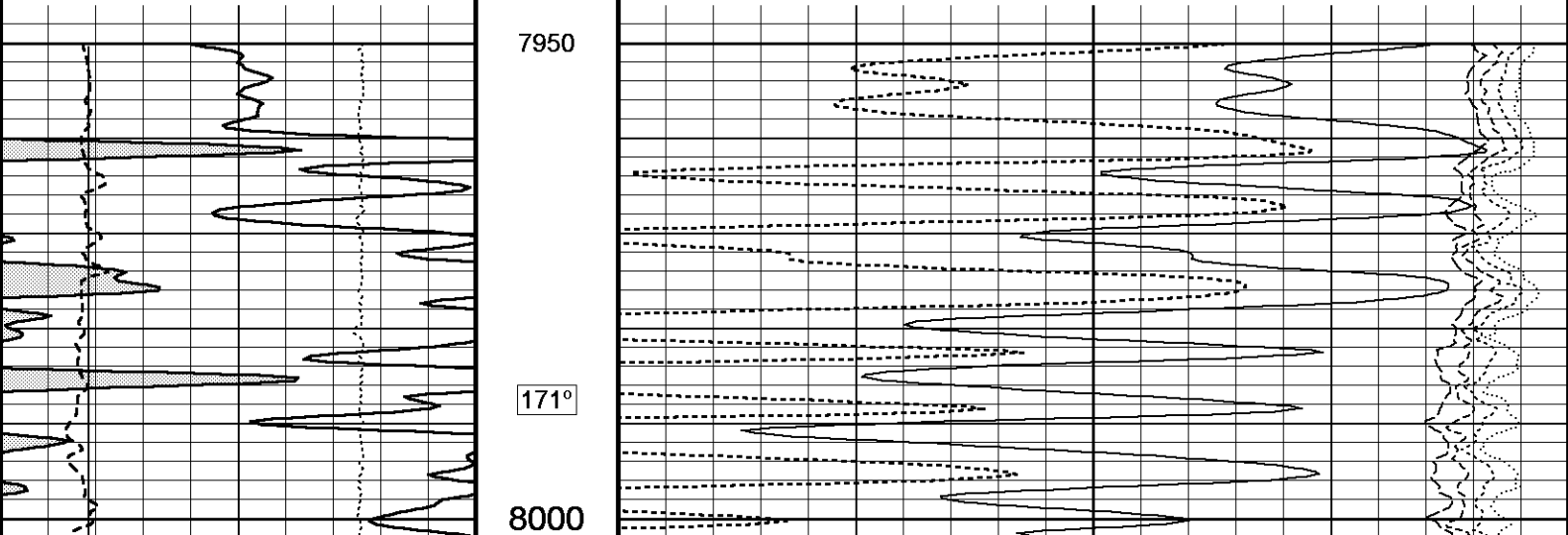
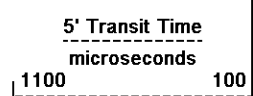
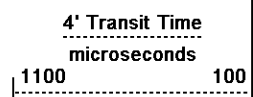
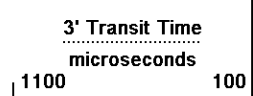
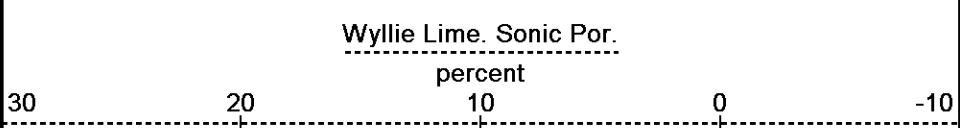
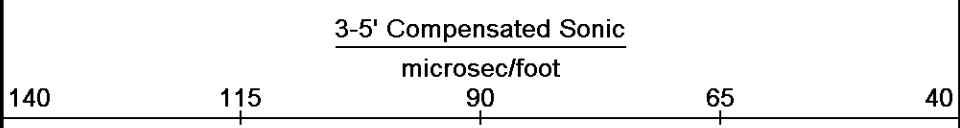
Borehole Temp in deg F

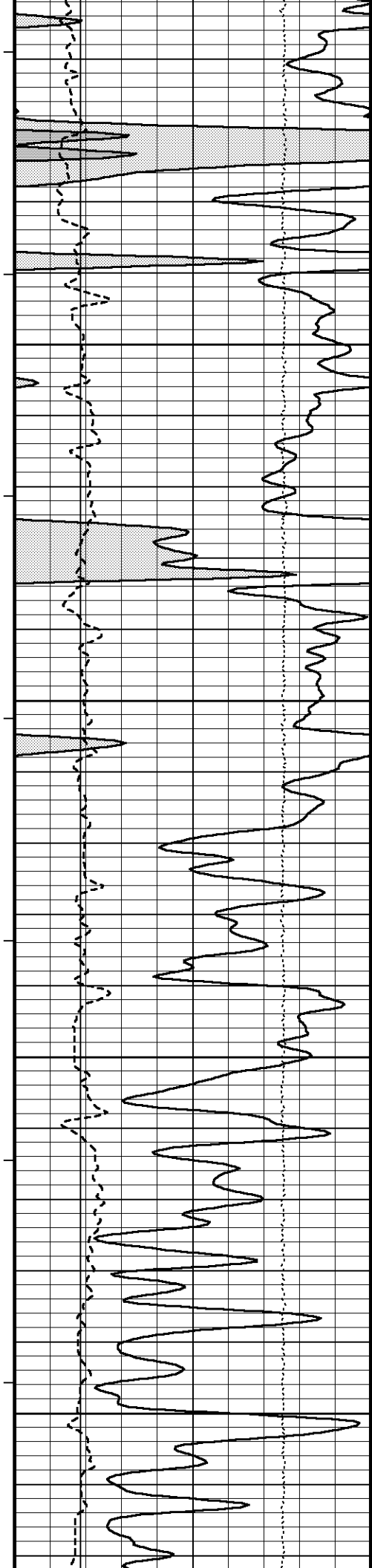
Replay Scale 1:240

7950

171°

8000





171°

8050

172°

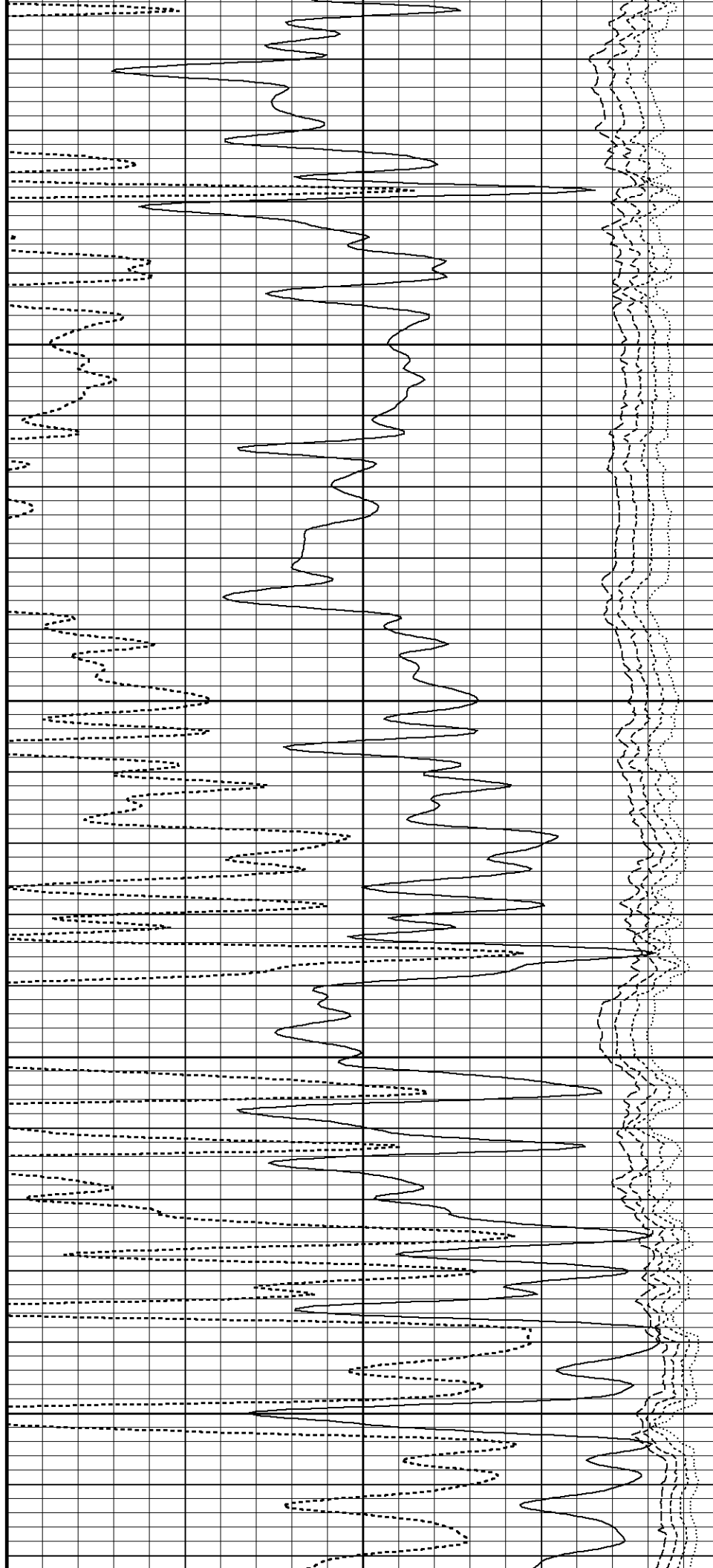
8100

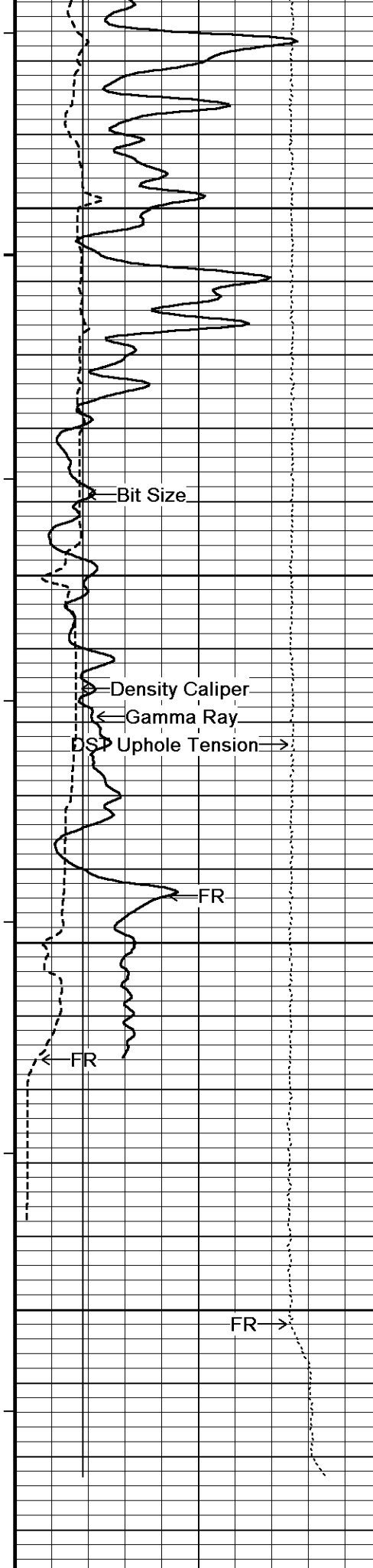
173°

8150

175°

8200





176°

8250

179°

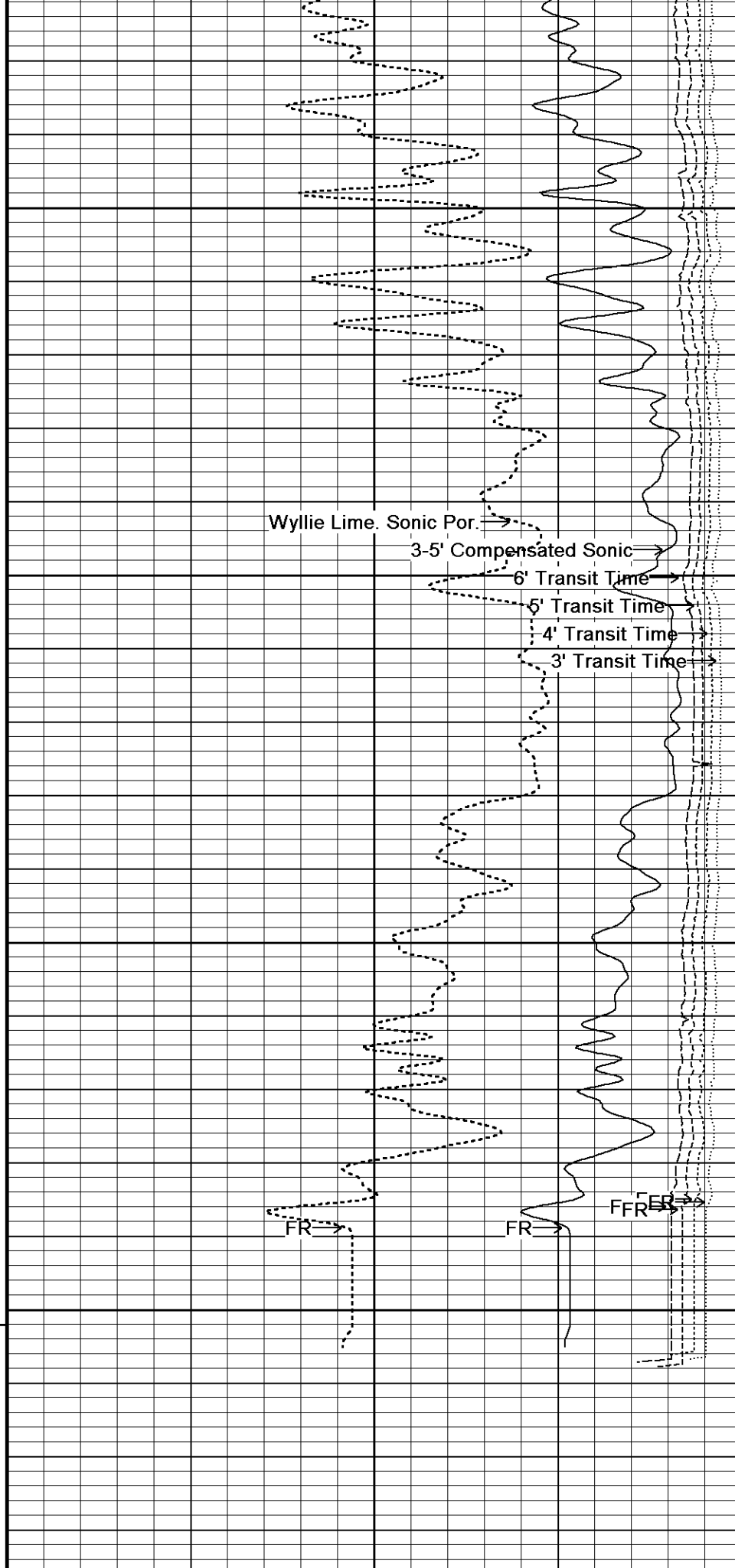
8300

180°

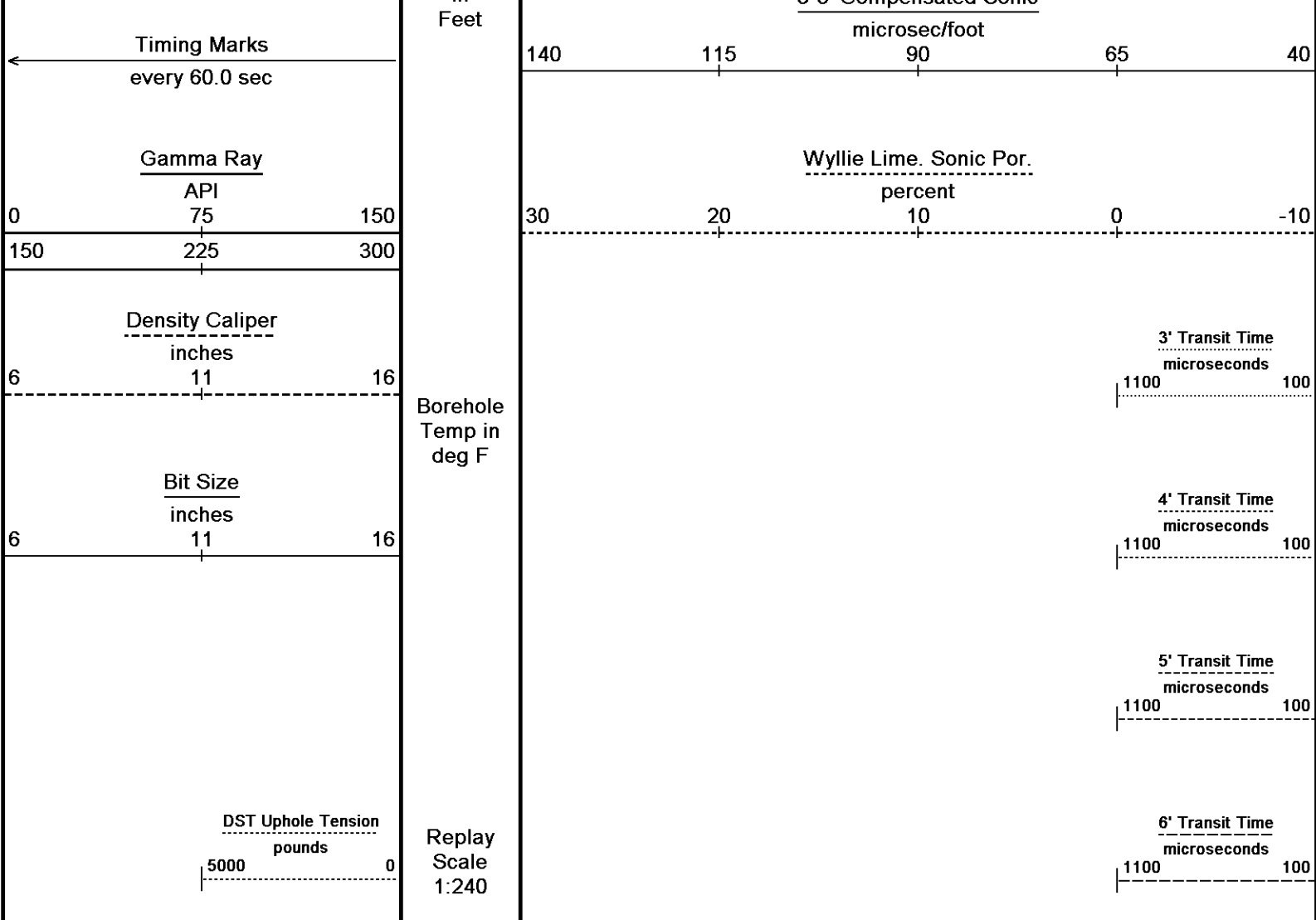
8350

8400

Depth
in



3-5' Compensated Sonic



Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 09-DEC-2018 13:08
 Filename: C:\Minimus 18.03.9344\Data\Murfin Red Poll #8-21\Murfin Red Poll #8-21_002.dta Recorded on 09-DEC-2018 07:23
 System Versions: Logged with 18.03.9344 Plotted with 18.03.9344

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION		
C:\Minimus 18.03.9344\Data\Murfin Red Poll #8-21\Murfin Red Poll #8-21_002.dta		
General Constants All 000		Last Edited on 09-DEC-2018,06:28
General Parameters		
Mud Resistivity	1.150	ohm-metres
Mud Resistivity Temperature	75.000	degrees F
Water Level	0.000	feet
Borehole Fluid Processing	Wet Hole	
Hole/Annular Volume and Differential Caliper Parameters		
HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	5.500	inches
Caliper for Differential Caliper	Density Caliper	
Rwa Parameters		
Porosity used	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

Reading No	Measured	Calibrated (lbs)
1	15575.87	0.00
2	16627.02	527.00

SP Calibration MCG-D.K 443

Field Calibration on 12-OCT-2018,05:20

	Measured	Calibrated (mV)
Reference 1	103.5	100.0
Reference 2	-96.9	-100.1

High Resolution Temperature Calibration MCG-D.K 443

Field Calibration on 12-OCT-2018,05:20

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	212.00	212.00

High Resolution Temperature Constants MCG-D.K 443

Last Edited on 12-OCT-2018,05:20

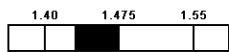
Pre-filter Length 11

Gamma Calibration MCG-D.K 443

Field Calibration on 07-DEC-2018,13:43

	Measured	Calibrated (API)
Background	106	74
Calibrator (Gross)	758	530
Calibrator (Net)	652	456

Gamma Calibration Tolerances MCG-D.K 443

Ratio 1.430  Counts/API

Gamma Constants MCG-D.K 443

Last Edited on 08-DEC-2018,00:26

Gamma Calibrator Number MCGGRCC141
 GRC-M Calibrator Jig in Use? NO
 Inactive Background Jig in Use? NO
 Mud Density 1.13 gm/cc
 Caliper Source for Processing Density Caliper
 Tool Position Eccentred
 Potassium Equivalence Chloride
 K Mud Concentration 0.00 %

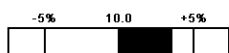
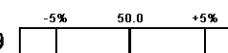
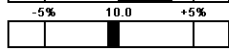
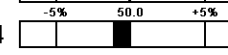
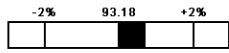
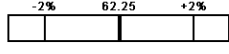
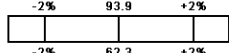
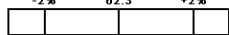
Micro Normal and Micro Inverse Calibration MMR-B.A 91

Base Calibration on 04-DEC-2018 12:12

Field Check on 07-DEC-2018 13:08

	Resistor 1 (ohm)	Resistor 2 (ohm)
	10.0	50.0
Base Calibration		
	Measured	Calibrated (ohm-m)
Micro Normal	10.4 49.9	5.1 25.6
Micro Inverse	9.9 49.4	3.4 16.9
Channel		
	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	93.9	93.9
Micro Inverse	62.3	62.3

Micro Normal & Micro Inverse Calibration Tolerance MMR-B.A 91

Micro Normal Res. 1	10.4		ohm	Micro Normal Res. 2	49.9		ohm
Micro Inverse Res. 1	9.9		ohm	Micro Inverse Res. 2	49.4		ohm
Micro Normal Base Check	93.9		ohm-m				
Micro Inverse Base Check	62.3		ohm-m				
Micro Normal Field Check	93.9		ohm-m				
Micro Inverse Field Check	62.3		ohm-m				

Micro Normal and Micro Inverse Constants MMR-B.A 91

Last Edited on 13-APR-2018,05:04

Pad Type 8-12 in Soft Rubber Inflatable 006-9011-159
 Micro Normal K Factor 0.5110

Micro Inverse K Factor 0.3380
Standoff Offset 0.0000 inches

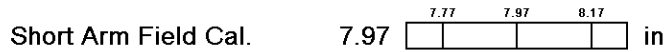
Caliper Calibration MMR-B.A 91

Base Calibration on 04-DEC-2018 12:06
Field Calibration on 07-DEC-2018 13:04

Base Calibration Reading No	Measured	Calibrator Size (in)
1	14099	5.98
2	17485	7.97
3	20790	9.86
4	24525	11.92
5	0	0.00
6	N/A	N/A

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

Caliper Calibration Tolerances MMR-B.A 91



Micro-Resistivity Caliper Constants MMR-B.A 91

Sonde Configuration Resistivity Mode

Micro Laterolog Calibration MMR-B.A 91

Base Calibration on 31-DEC-1999 00:00
Field Check on 31-DEC-1999 00:00

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

Micro Laterolog Constants MMR-B.A 91

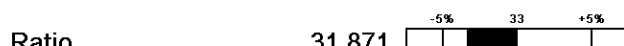
Pad Type	6 in Solid Nylon B23059	
Standoff Offset	0.0000	inches
Micro Laterolog K Factor	0.0128	
Micro Laterolog Rm K Factor	N/A	
Mudcake Thickness Correction Constants		
Mud Cake Source	Constant Value	
Mud Cake Thickness	0.4000	inches
Mud Cake Thickness Caliper		
Mud Cake Resistivity	0.1500	ohm-m
Mud Cake Resistivity Temp.	20.00	Degrees C
Mud Cake Resistivity Source	Constant Value	
Temp. for Rmc Corr.	MCG External Temperature	

Neutron Calibration MDN-B.A 292

Base Calibration on 04-DEC-2018,13:14
Field Check on 07-DEC-2018 13:13

Base Calibration	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2910	91	3714	110
Ratio	31.871		33.764	
Field Calibrator at Base			Calibrated (cps)	
			2207	3209
Ratio			0.688	
Field Check			Calibrated (cps)	
			2213	3208
Ratio			0.690	

Neutron Calibration Tolerances MDN-B.A 292



Rate	0.688	
Base Check	0.688	
Field Check	0.690	

Neutron Constants MDN-B.A 292

Last Edited on 08-DEC-2018,00:26

Neutron Source Id	P0204NN	
Neutron Jig Number	NJ5736	
Air Hole Processing	Legacy	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	
Temperature	68.00	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.J 352

Base Calibration on 04-DEC-2018 11:51
Field Check on 07-DEC-2018 12:55

	Resistor 1 (ohm)	Resistor 2 (ohm)
Base Calibration	0.0	1000.0
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	982.1	126.8
Base Check		276.0
Field Check		276.0

FE Calibration Tolerances MFE-B.J 352

Reference 2	982.1		ohm
Base Check	276.0		ohm-m
Field Check	276.0		ohm-m

FE Constants MFE-B.J 352

Last Edited on 08-DEC-2018,00:24

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Borehole Correction Constants		
Sonde Position	0.5	inches
Hole Size Source	Density Caliper	
Hole Size Constant Value	N/A	inches
Rm Source	Global Value: Temperature Corrected	
Temp. for Rm Corr.	MCG External Temperature	

Sonic Constants MSS-C.K 319

Last Edited on 08-JUL-2018,09:57

Maximum Boundary Contrast	70.00	micro-sec/ft
Fluid Transit Time	189.00	micro-sec/ft
Limestone Transit Time	47.50	micro-sec/ft
Sandstone Transit Time	55.50	micro-sec/ft
Dolomite Transit Time	43.50	micro-sec/ft
Sonic used for Porosities	3-5' Compensated	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3ET	0.00	micro-sec

MX3FT 1500.00 micro-sec
 Hunt-Raymer Constant 83.13 micro-sec/ft

Sonde Mode Compensated
 Hole Type Open Hole

Sonde Parameters

	Measured	Calibrated
Offset		0.0000
Free Pipe	0.0000	

Peak Amplitude Source

Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)
3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A

Processed Fixed Gate Parameters

Waveform Used For Processing	N/A			
Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	Depth (ft)	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	

Full Waveform Parameters

Use 3' Waveform to derive TR	No
Use 4' Waveform to derive TR	No
Use 5' Waveform to derive TR	No
Use 6' Waveform to derive TR	No
3' Waveform Discriminator Level	0.30 mV
4' Waveform Discriminator Level	0.30 mV
5' Waveform Discriminator Level	0.15 mV
6' Waveform Discriminator Level	0.15 mV

Waveform Discriminator Filter	Not Applied	
Semblance Window Width	150.00	micro-sec
Semblance Processing Enabled	Yes	
Tracking Boxes Enabled In Processing	Yes	

Induction Calibration MAI-B.J 390

Factory Loop Calibration 07-DEC-2018 12:52
 Field Check on 07-DEC-2018 12:54

Factory Loop Calibration

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

Array	Measured Signal (unitless)		Reference Conductivity (mmho/m)		Calibration	
	Low	High	Low	High	Gain	Offset
1 (near)	16.8	458.6	9.3	966.2	2.166	-27.2
2	6.3	377.7	7.6	821.4	2.191	-6.2
3	3.8	258.6	5.2	566.0	2.200	-3.0
4 (far)	1.9	132.3	2.6	279.2	2.121	-1.4
Array Temperature	77.9		Deg F			

Tool Checks

Array	Factory Reference (mmho/m)		Before Survey (mmho/m)		Deg F
	Low	High	Low	High	
1 (near)	10.3	3956.5	10.3	3956.3	
2	27.4	3560.4	27.4	3560.4	
3	25.7	3059.0	25.7	3059.0	
4 (far)	18.2	2086.3	18.2	2086.3	
Array Temperature	64.9		65.0		Deg F

Induction Check Tolerances MAI-B.J 390

Low Array 1	10.3	<table border="1"><tr><td>25.9</td><td>27.4</td><td>28.9</td></tr></table>	25.9	27.4	28.9	mmho/m	High Array 1	3956.3	<table border="1"><tr><td>-0.5%</td><td>3560.4</td><td>+0.5%</td></tr></table>	-0.5%	3560.4	+0.5%	mmho/m
25.9	27.4	28.9											
-0.5%	3560.4	+0.5%											
Low Array 2	27.4	<table border="1"><tr><td>24.2</td><td>25.7</td><td>27.2</td></tr></table>	24.2	25.7	27.2	mmho/m	High Array 2	3560.4	<table border="1"><tr><td>-0.5%</td><td>3059.0</td><td>+0.5%</td></tr></table>	-0.5%	3059.0	+0.5%	mmho/m
24.2	25.7	27.2											
-0.5%	3059.0	+0.5%											
Low Array 3	25.7	<table border="1"><tr><td>16.7</td><td>18.2</td><td>19.7</td></tr></table>	16.7	18.2	19.7	mmho/m	High Array 3	3059.0	<table border="1"><tr><td>-0.5%</td><td>2086.3</td><td>+0.5%</td></tr></table>	-0.5%	2086.3	+0.5%	mmho/m
16.7	18.2	19.7											
-0.5%	2086.3	+0.5%											
Low Array 4	18.2	<table border="1"><tr><td></td><td></td><td></td></tr></table>				mmho/m	High Array 4	2086.3	<table border="1"><tr><td></td><td></td><td></td></tr></table>				mmho/m

Induction Constants MAI-B.J 390

Last Edited on 08-DEC-2018,00:24

Induction Model		RtAP-WBM	
Borehole Correction Constants			
Tool Centred		No	
Hole Size Source		Density Caliper	
Hole Size Constant Value		N/A	inches
Stand-off Type		Fins	
Stand-off		0.50	inches
Number of Fins on Stand-off		8.0000	
Stand-off Fin Angle		45.00	degrees
Stand-off Fin Width		0.5000	inches
Rm Source	Global Value: Constant Temperature		
Temp. for Rm Corr.		N/A	
Borehole Correction Method		Default	
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
Symmetrised Receiver Gains			
Receiver 1		1.00	
Receiver 2		1.00	
Receiver 3		1.00	
Receiver 4		1.00	
Apparent Porosity and Water Saturation Constants			
Archie Constant (A)		1.00	
Cementation Exponent (M)		2.00	
Saturation Exponent (N)		2.00	
Saturation of Water for Apor		100.00	percent
Resistivity of Water for Apor and Sw		0.05	ohm-m
Resistivity of Mud Filtrate for Sw		0.00	ohm-m
Source for Rt		0.00	
Source for Rxo		0.00	

High Resolution Temperature Calibration MAI-B.J 390

Field Calibration on 15-MAY-2018,12:48

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

High Resolution Temperature Constants MAI-B.J 390

Last Edited on 06-MAR-2018,13:01

Pre-filter Length	11
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Caliper Calibration MPD-C.A 216

Base Calibration on 04-DEC-2018 12:24
Field Calibration on 07-DEC-2018 12:57

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	15599	3.99
2	24222	5.00

2	24289	5.98
3	32989	7.97
4	41250	9.86
5	50464	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.92	7.97

Caliper Calibration Tolerances MPD-C.A 216

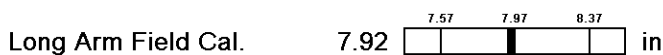


Photo Density Calibration MPD-C.A 216

Base Calibration on 04-DEC-2018 12:43
Field Check on 07-DEC-2018 13:02

Density Calibration		Measured		Calibrated (sdu)	
Base Calibration		Near	Far	Near	Far
Background		996	1188		
Reference 1		49174	23910	59556	30836
Reference 2		19716	2252	24941	2541

Field Check at Base

	996.3	1187.9
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Field Check

	1001.3	1190.0
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PE Calibration

Base Calibration		Measured		Calibrated	
		WS	WH	Ratio	Ratio
Background		183	895		
Reference 1		20502	49024	0.422	0.371
Reference 2		5636	19607	0.291	0.272

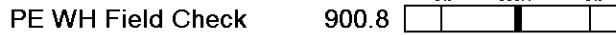
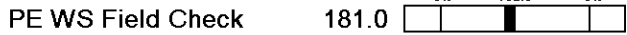
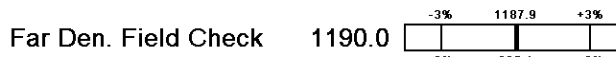
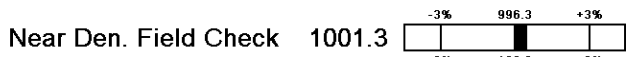
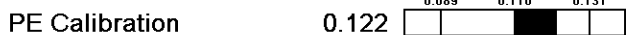
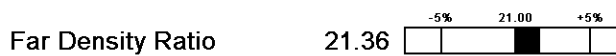
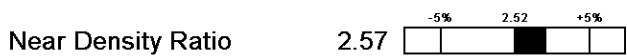
Field Check at Base

	182.6	895.4
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Field Check

	181.0	900.8
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Photo Density Calibration Tolerances MPD-C.A 216



Density Constants MPD-C.A 216

Last Edited on 08-DEC-2018,00:25

Density Source Id	P50557B	
Nylon Calibrator Number	DNCE695	
Aluminium Calibrator Number	DACD698	
Density Shoe Profile	8 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.13	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	Applied	
Matrix Density (gm/cc)	Depth (ft)	
2.71	0.00	
0.00	0.00	

0.00
0.00
0.00
0.00
0.00
0.00
0.00

0.00
0.00
0.00
0.00
0.00
0.00

DOWNHOLE EQUIPMENT

C:\Minimus 18.03.9344\Data\Murfin Red Poll #8-21\Murfin Red Poll #8-21_002.dta

Cablehead, 11 pin
CBH-CB 264 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Swivel Head Adaptor
SHA-J.B 595 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

Compact Comms Gamma
MCG-D.K 443 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity
MMR-B.A 91 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron
MDN-B.A 292 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.913 in

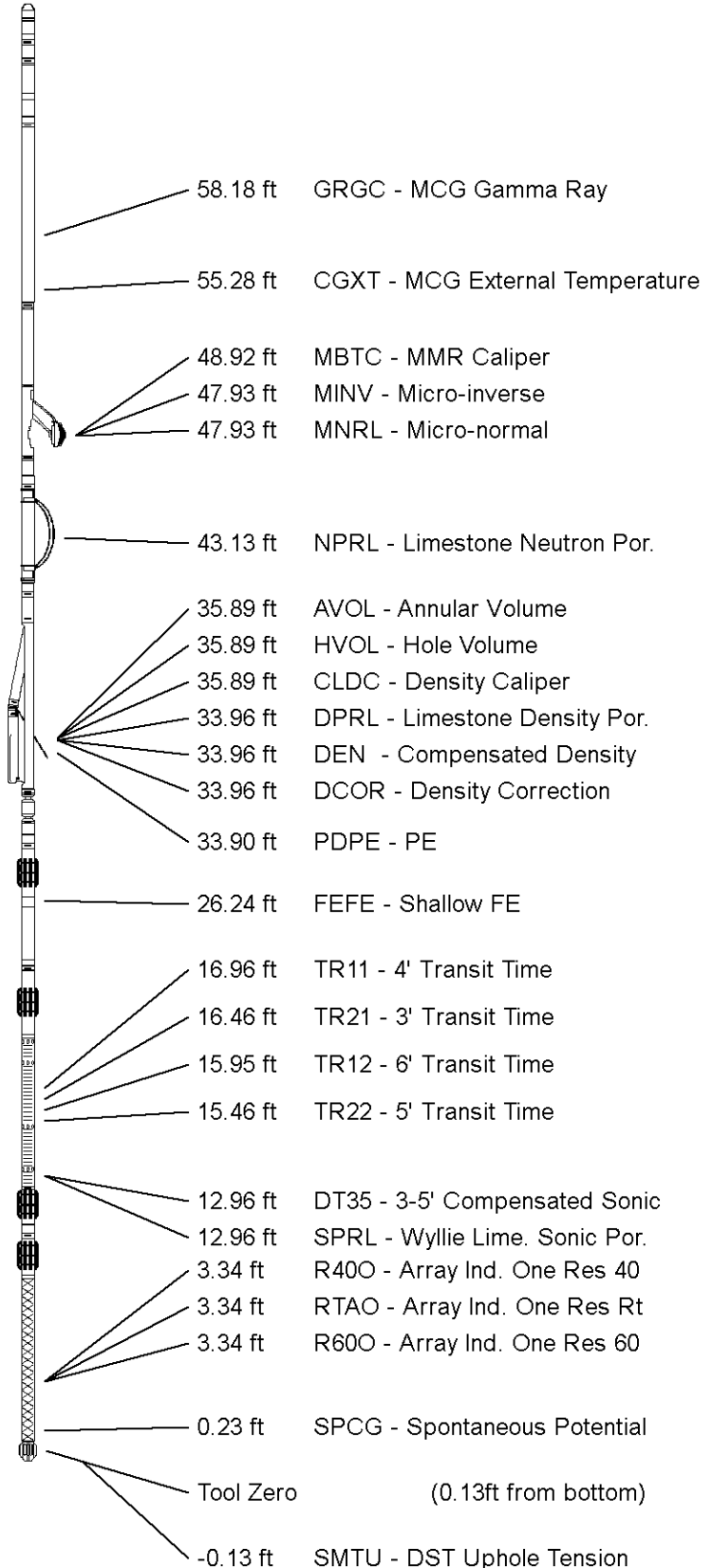
Compact Knuckle Joint
SKJ-D.A 167 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic
MSS-C.K 319 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction
MAI-B.J 390 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 68.16 ft Weight: 526.9 lb



All measurements relative to tool zero.

COMPANY	MURFIN DRILLING COMPANY, INC.
WELL	RED POLL #8-21
FIELD	WILDCAT
PROVINCE/COUNTY	LINCOLN
COUNTRY/STATE	U.S.A. / COLORADO

Elevation Kelly Bushing	5502	feet	First Reading	8389.00	feet
Elevation Drill Floor	5500	feet	Depth Driller	8400.00	feet
Elevation Ground Level	5489	feet	Depth Logger	8402.00	feet



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WITH INTEGRATED TRANSIT TIME