



Weatherford

**COMPENSATED SONIC
WITH INTEGRATED TRANSIT TIME**

COMPANY	FIML NATURAL RESOURCES, LLC.		
WELL	MULVILLE #15B-18-2029		
FIELD	WILDCAT		
PROVINCE/COUNTY LANE	U.S.A. / KANSAS		
COUNTRY/STATE	900' FSL & 2280' FEL		
LOCATION	U.S.A. / KANSAS		
SEC 18	TWP 20S	RGE 29W	Other Services
Latitude			MPD/MDN
Longitude			MML
API Number	15-101-22501		MAI/MFE
Permanent Datum GL, Elevation	2899 feet		Elevations:
Log Measured From KB			KB 2899.00
Drilling Measured From KB			DF 2897.00
			GL 2889.00
Date	01-APR-2014		
Run Number	ONE		
Service Order	4558-83548386		
Depth Driller	4935.00	feet	
Depth Logger	4938.00	feet	
First Reading	4925.00	feet	
Last Reading	438.00	feet	
Casing Driller	435.00	feet	
Casing Logger	438.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.40 lb/USg	68.00 CP	
PH / Fluid Loss	10.00	8.00 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	0.81 @ 95.0	ohm-m	
Rmf @ Measured Temp	0.65 @ 95.0	ohm-m	
Rmc @ Measured Temp	0.97 @ 95.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.64 @121.0	ohm-m	
Time Since Circulation	4 HOURS		
Max Recorded Temp	121.00	deg F	
Equipment / Base	13244	LIB	
Recorded By	ADAM SILL		
Witnessed By	JIM MUSGROVE		GARY DOKE
JOB #	LB14-098		

BOREHOLE RECORD			Last Edited: 01-APR-2014 12:37	
Bit Size inches	Depth From feet	Depth To feet		
7.875	435.00	4935.00		

CASING RECORD				
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	435.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.08.2113.

- 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.

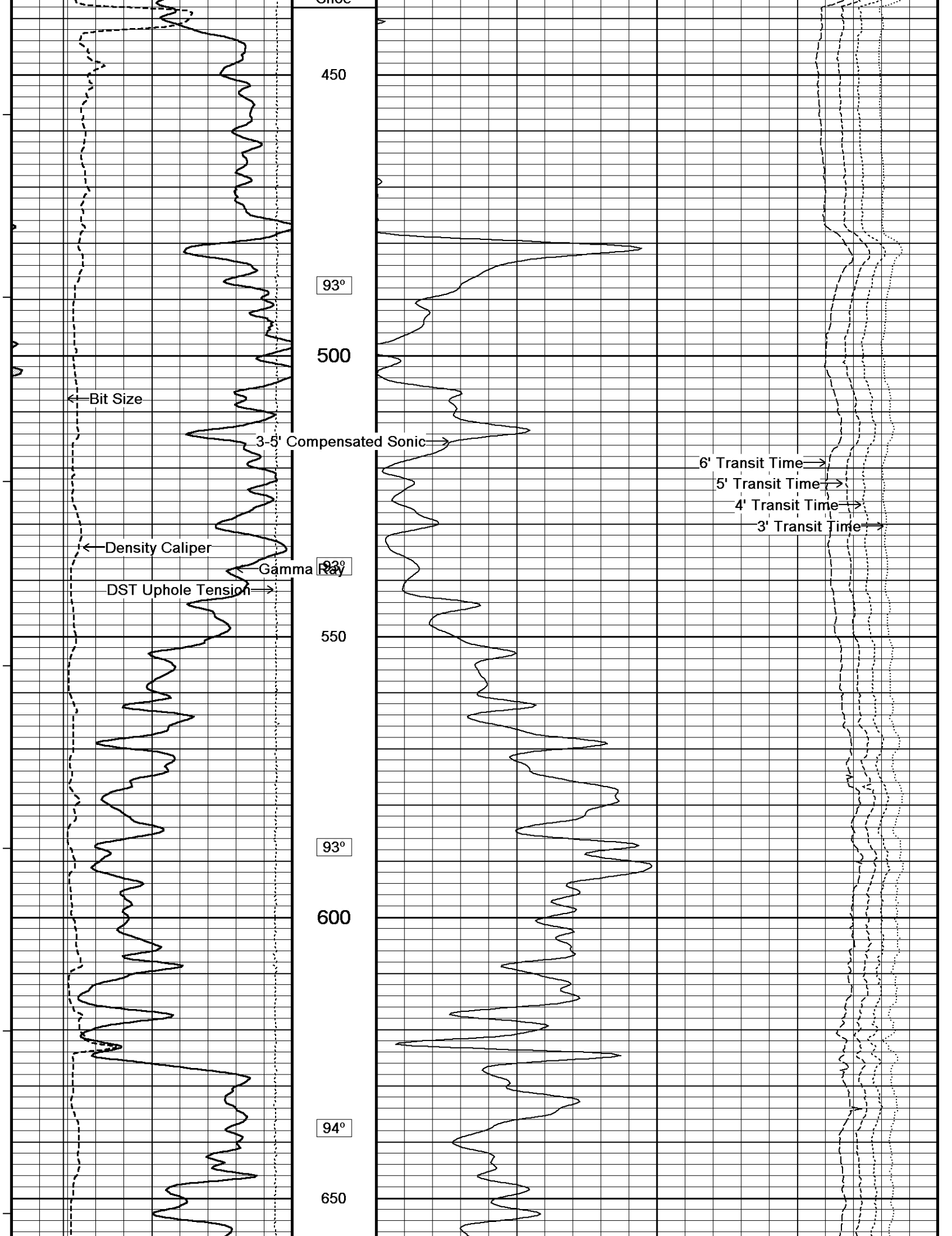
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.

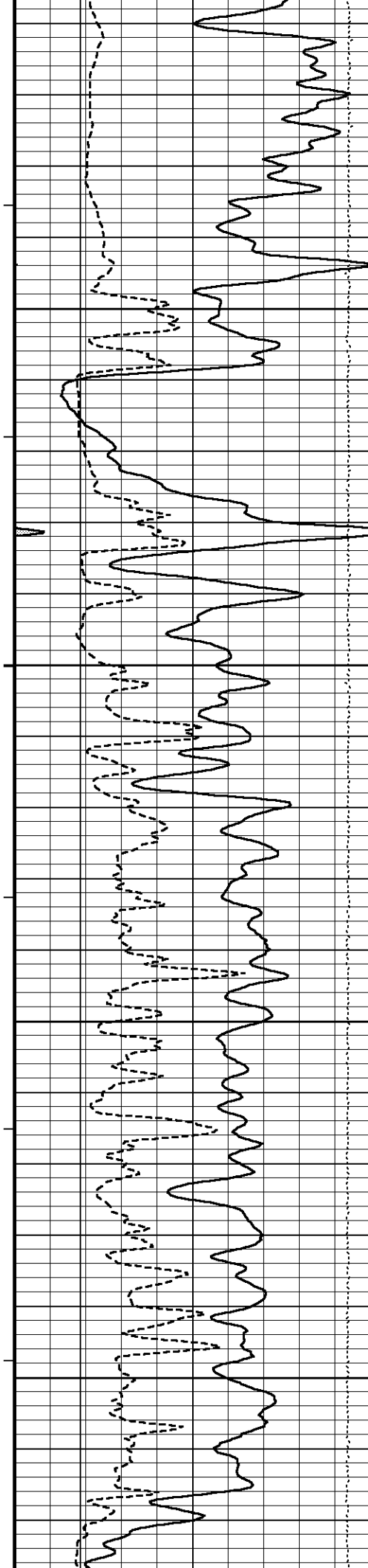
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.

- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.

- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 1745 CU.FT.

- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING: 1005 CU.FT.





95°

700

95°

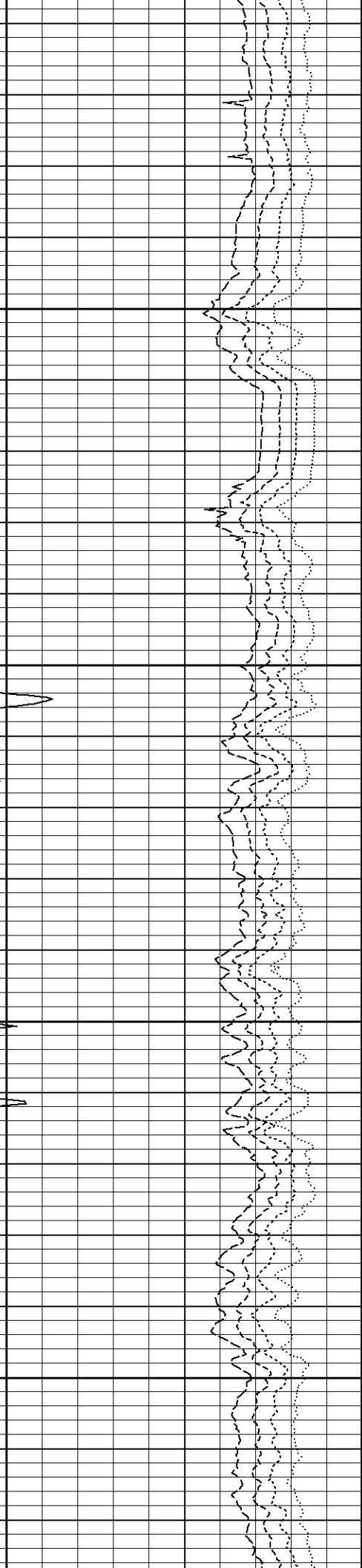
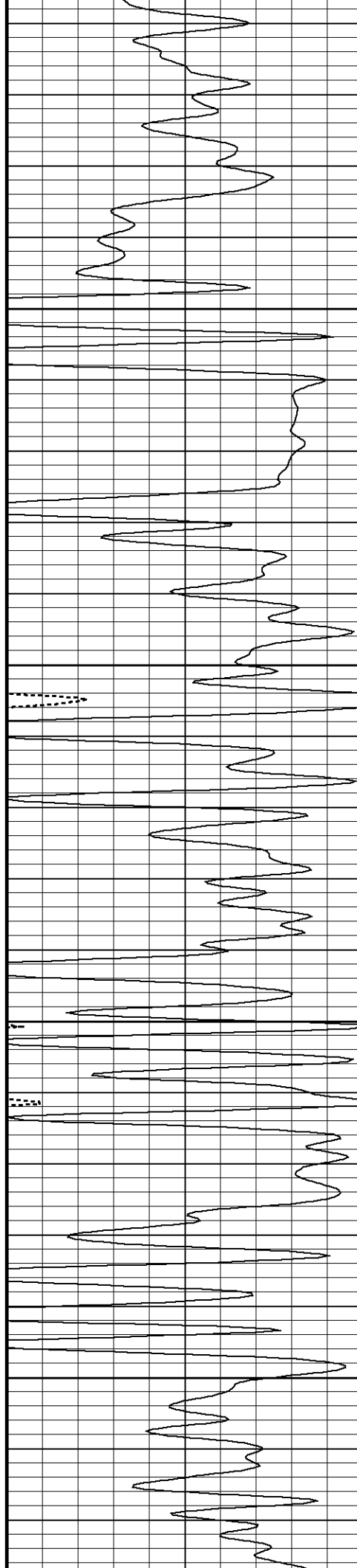
750

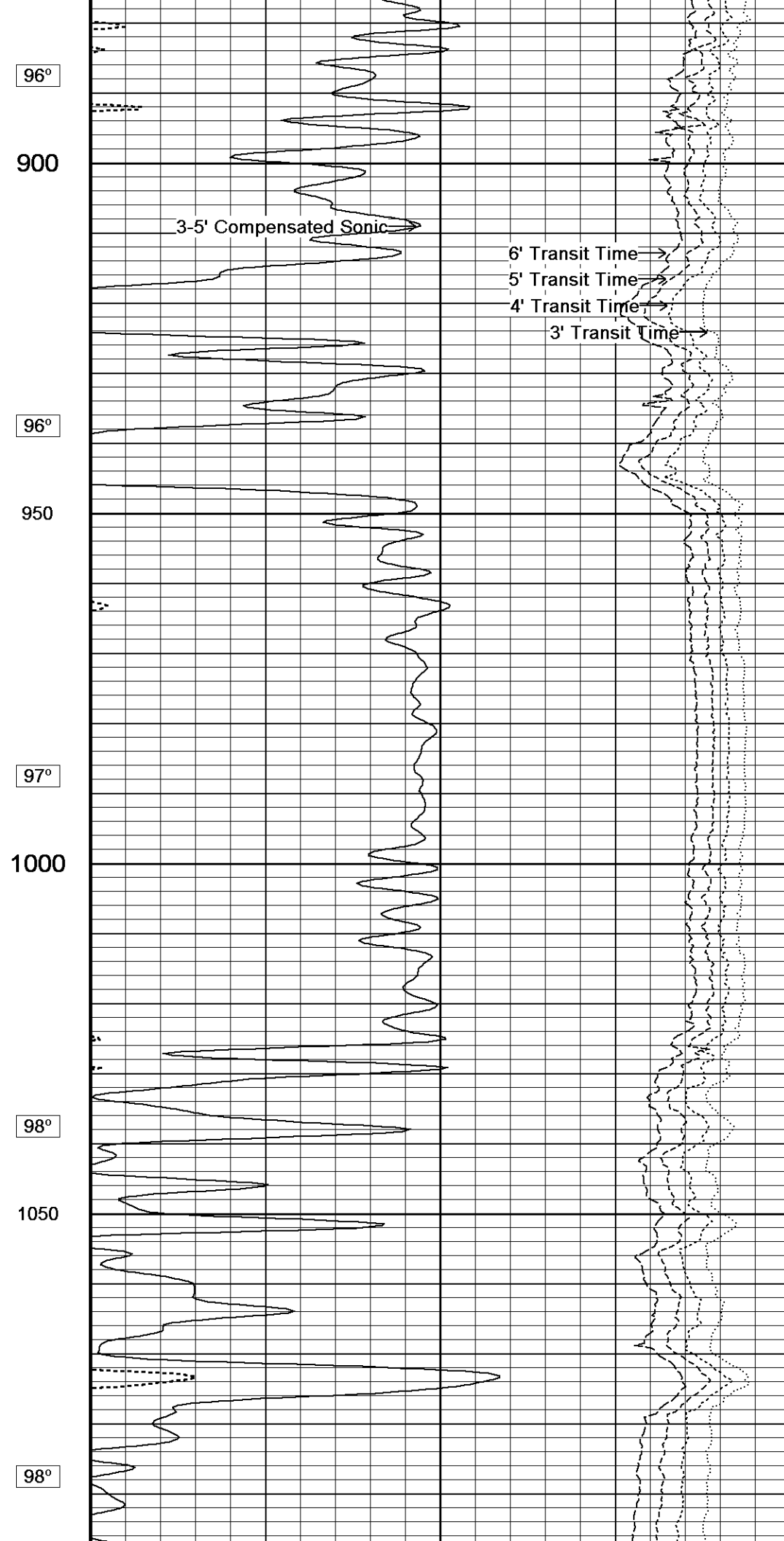
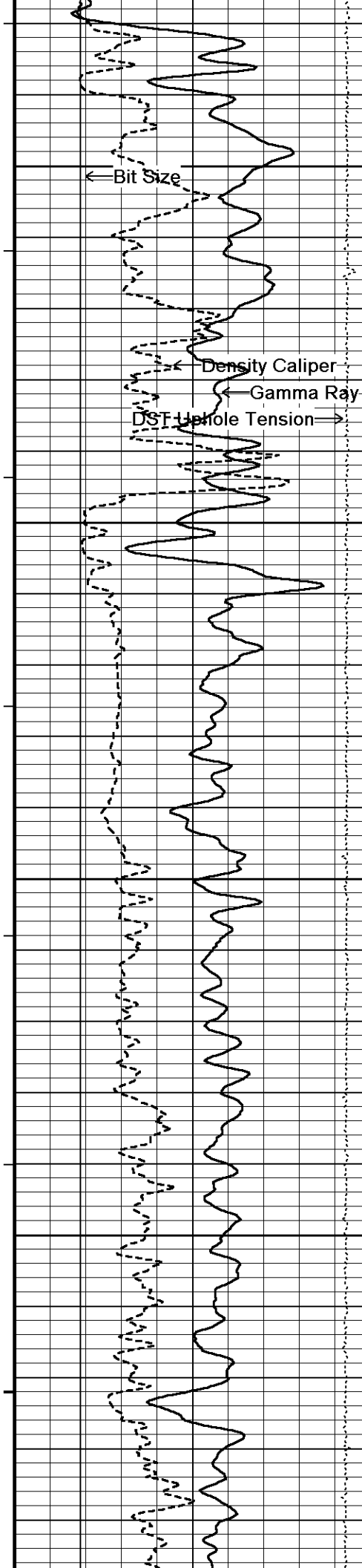
96°

800

96°

850





96°
900
96°
950
97°
1000
98°
1050
98°

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

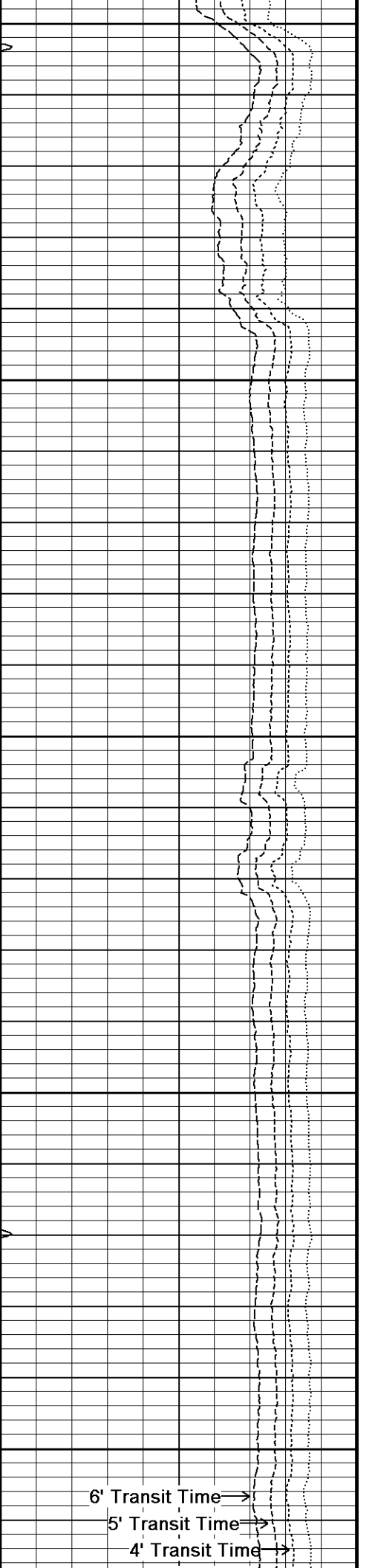
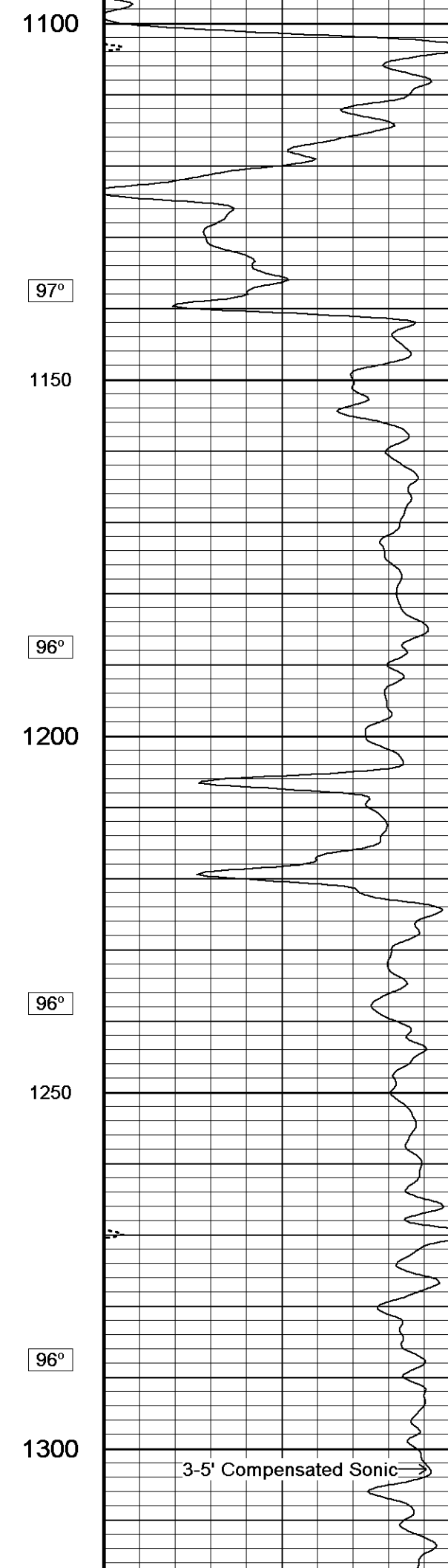
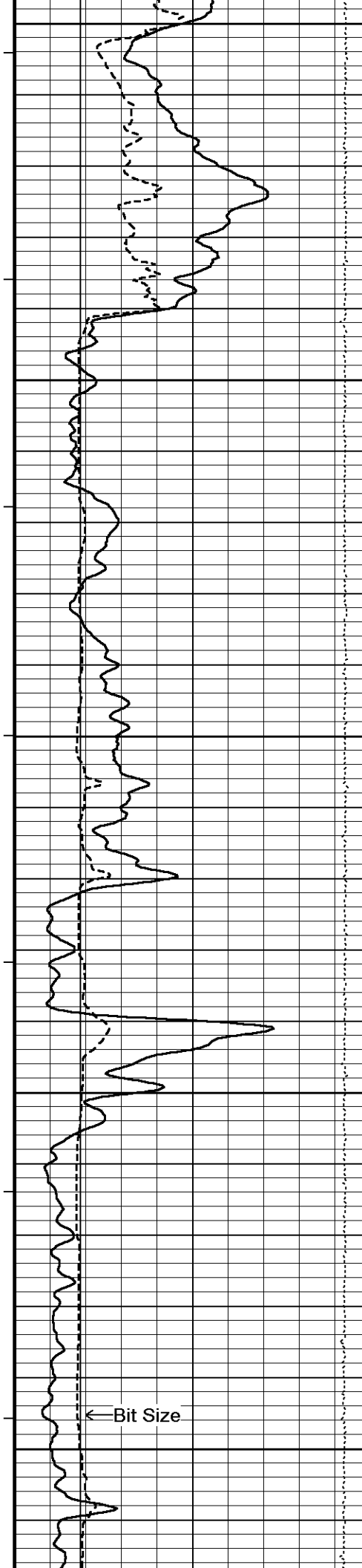
3-5' Compensated Sonic →

← Bit Size

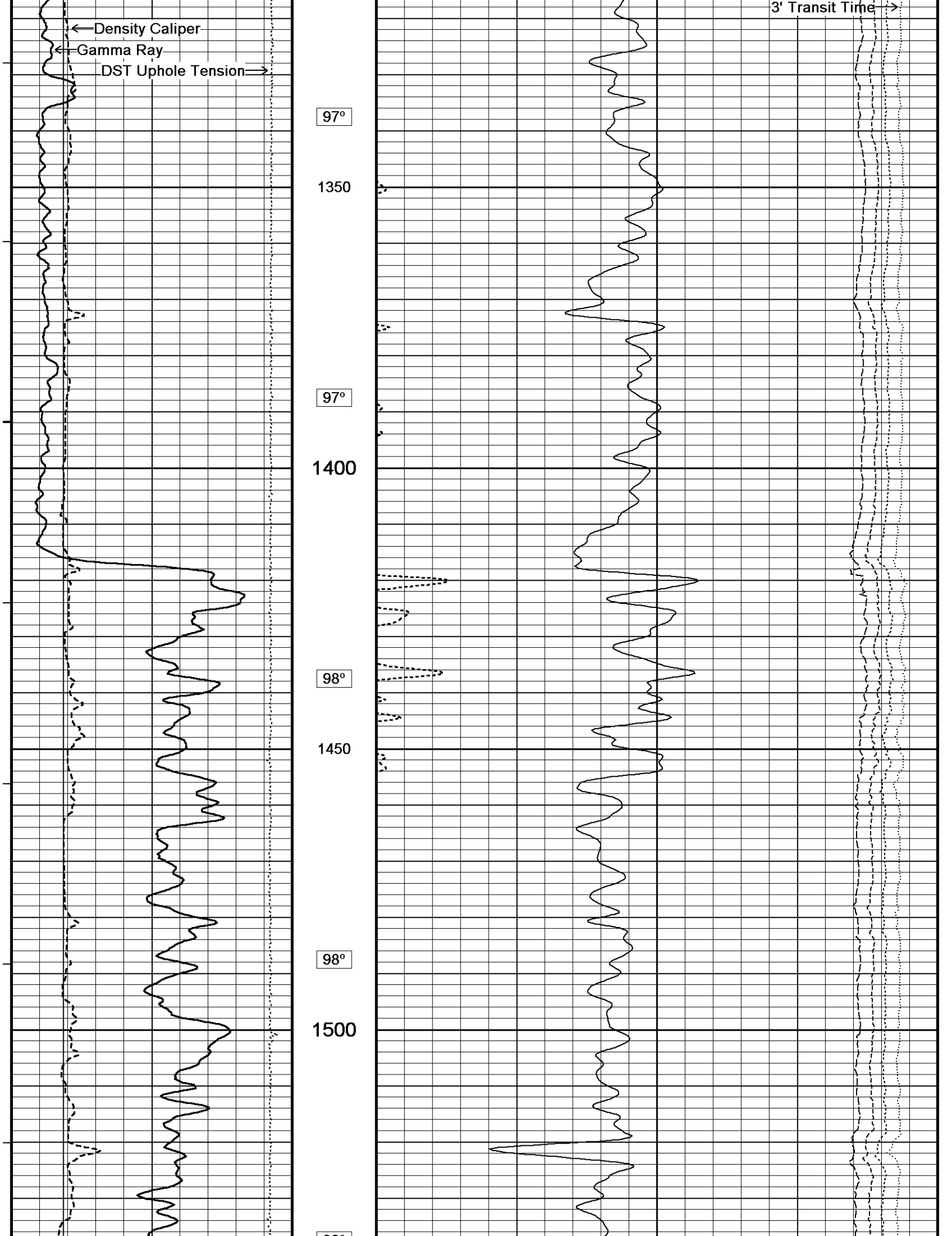
← Density Caliper

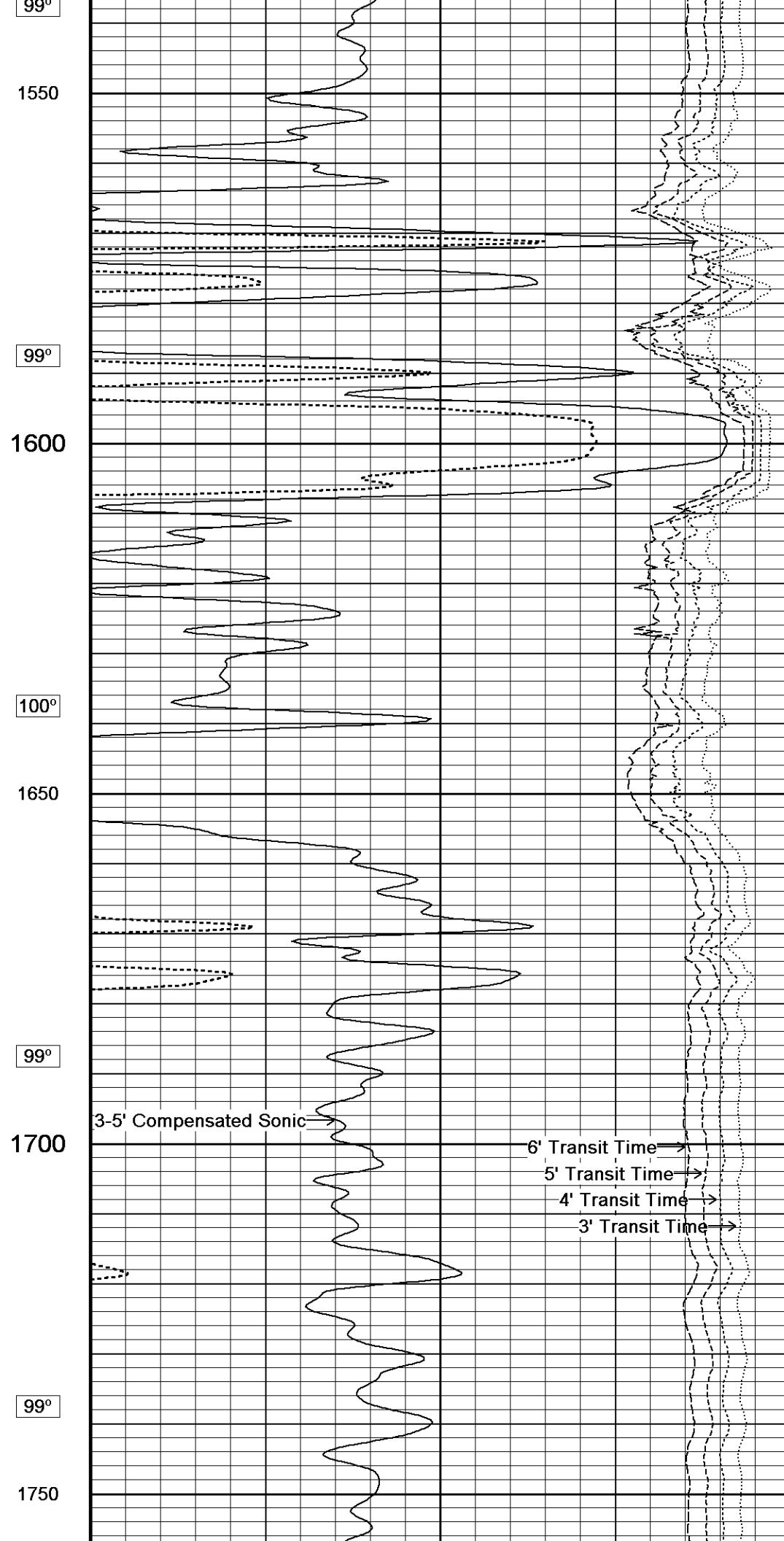
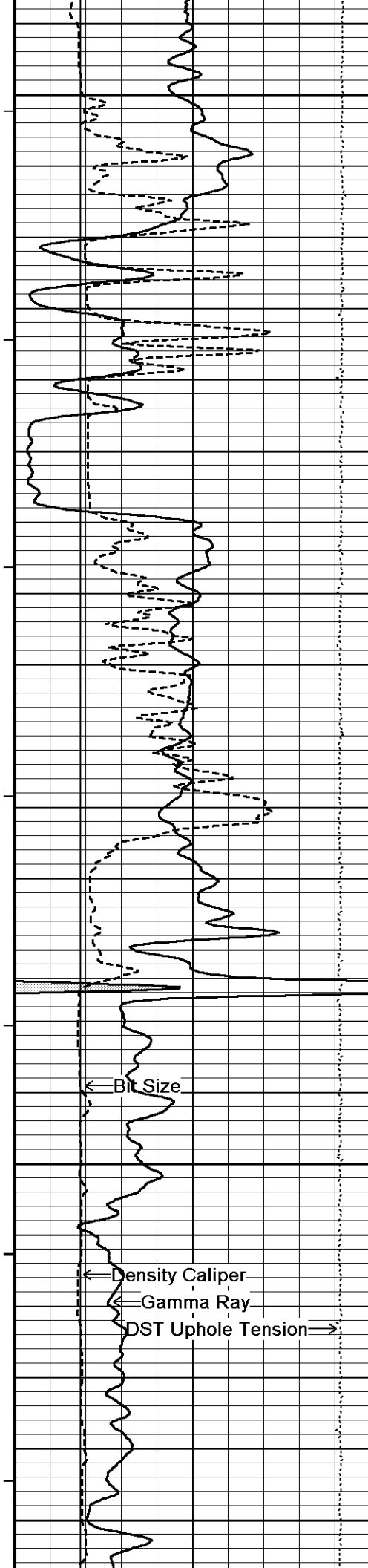
← Gamma Ray

DST Uphole Tension →



3-5' Compensated Sonic →
6' Transit Time →
5' Transit Time →
4' Transit Time →





← Bit Size

← Density Caliper

← Gamma Ray

← DST Uphole Tension →

3-5' Compensated Sonic →

6' Transit Time →

5' Transit Time →

4' Transit Time →

3' Transit Time →

99°

1550

99°

1600

100°

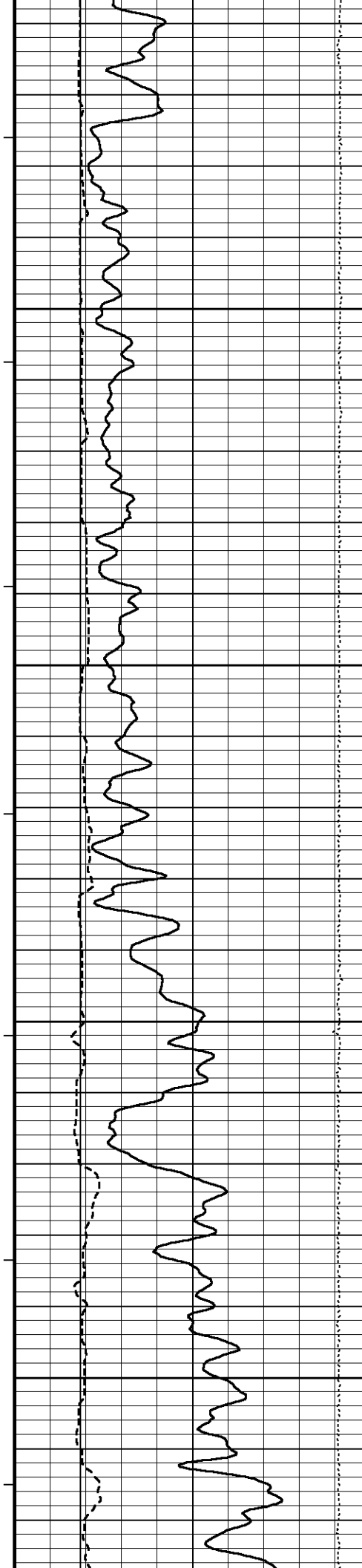
1650

99°

1700

99°

1750



100°

1800

100°

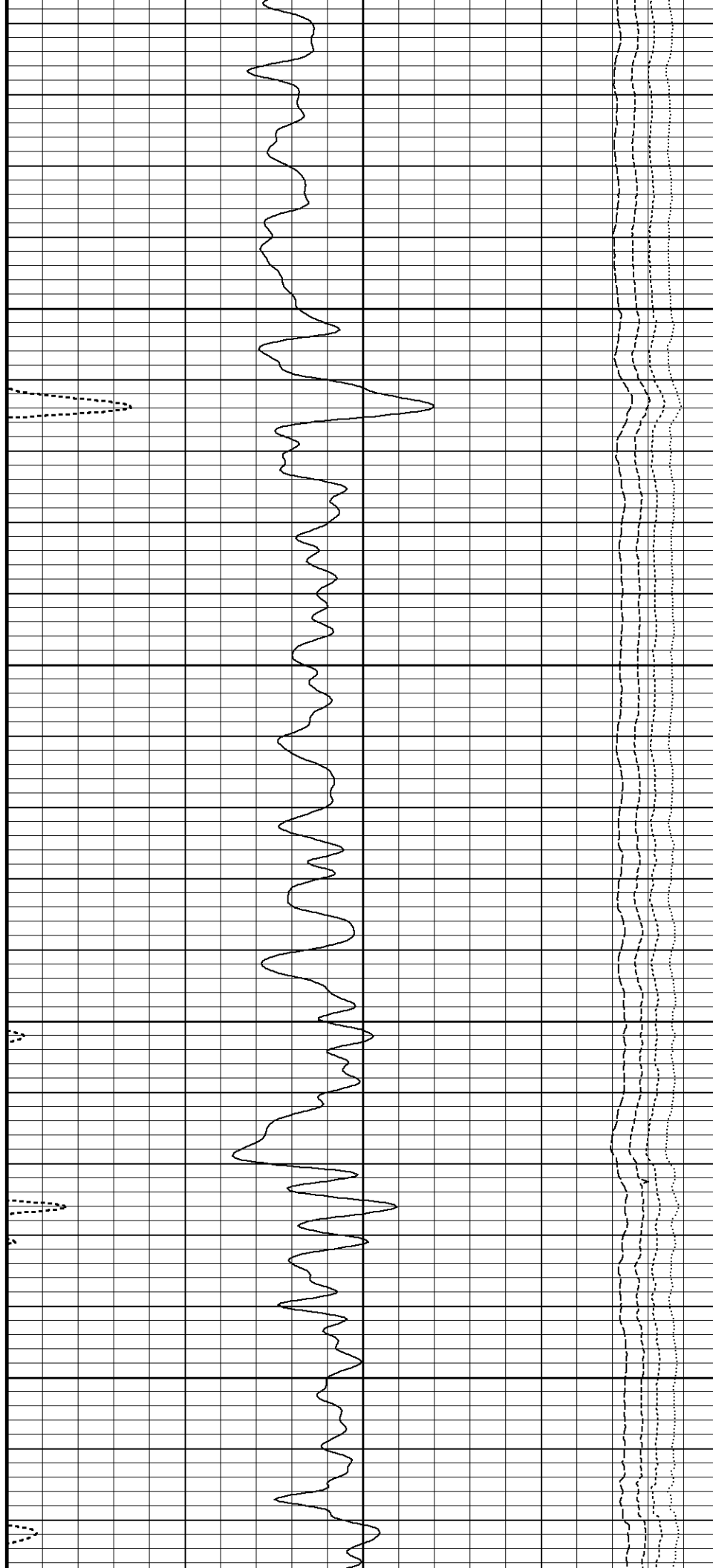
1850

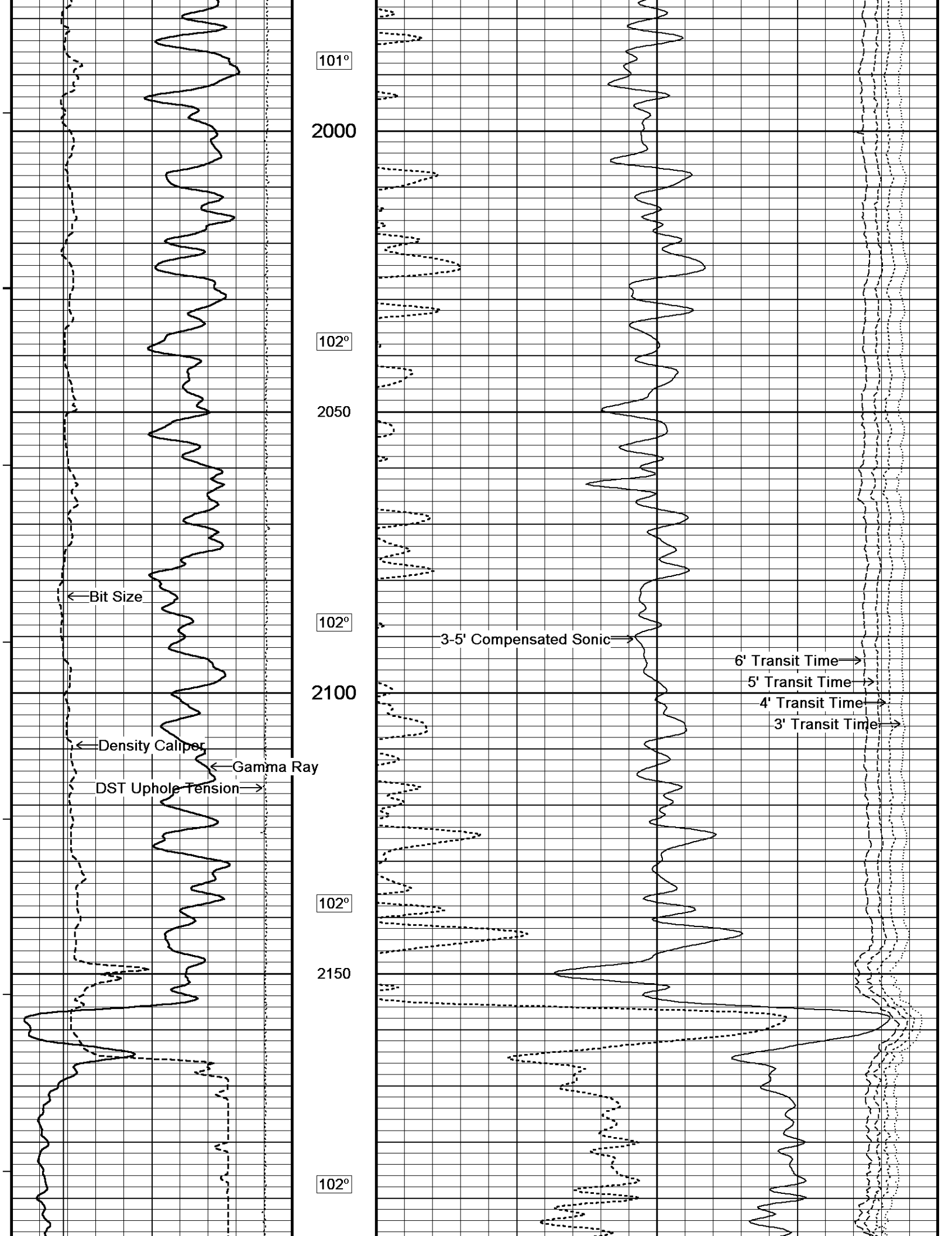
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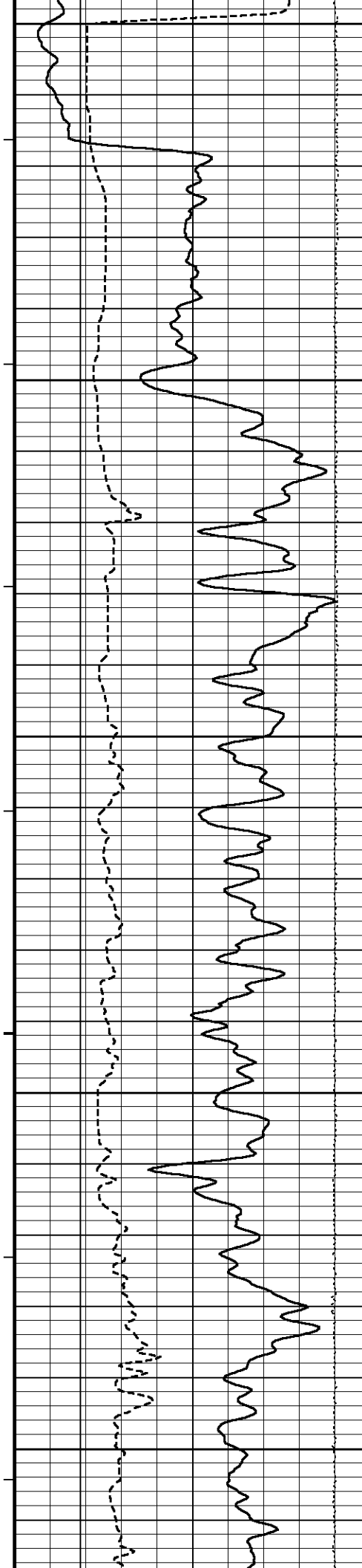
1900

101°

1950







2200

102°

2250

103°

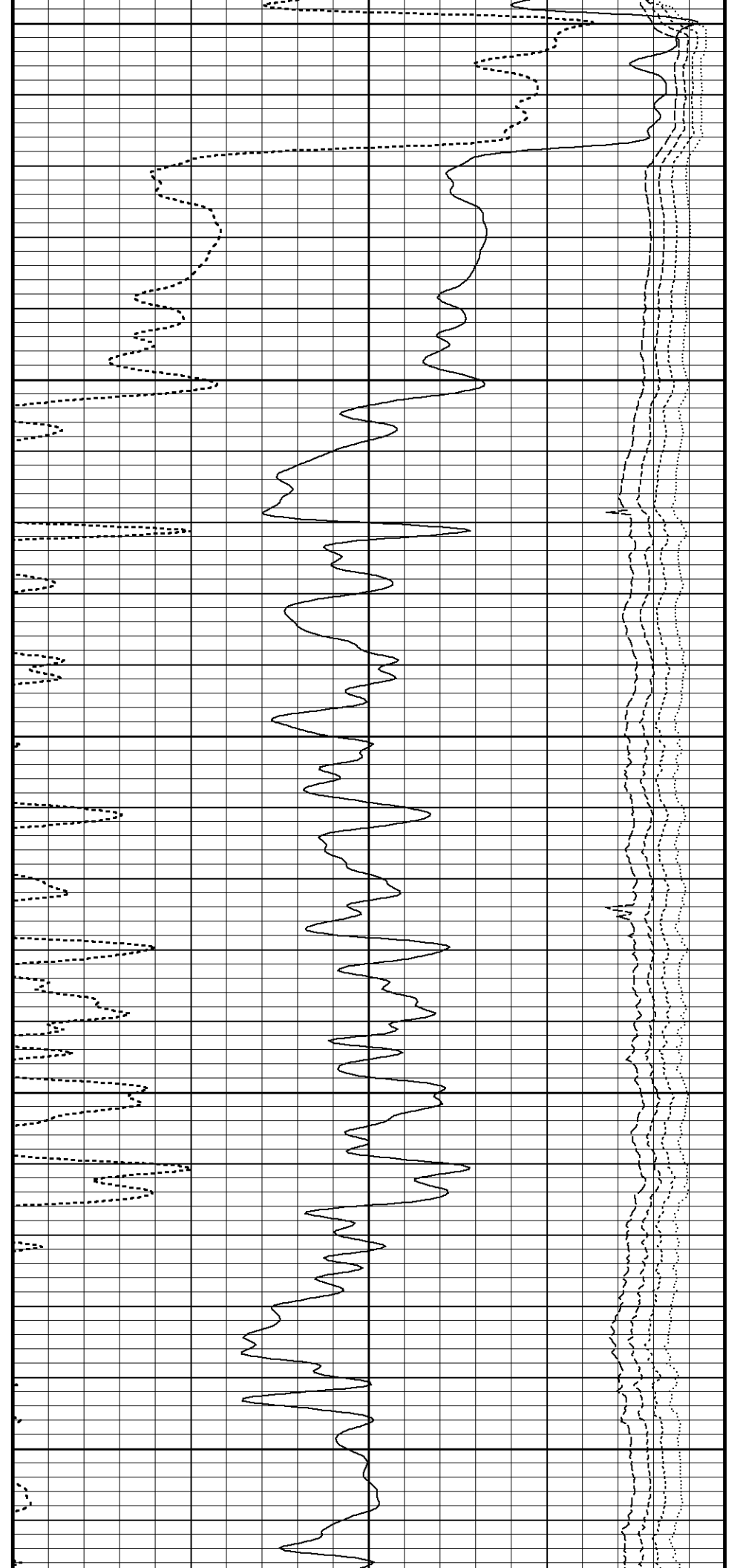
2300

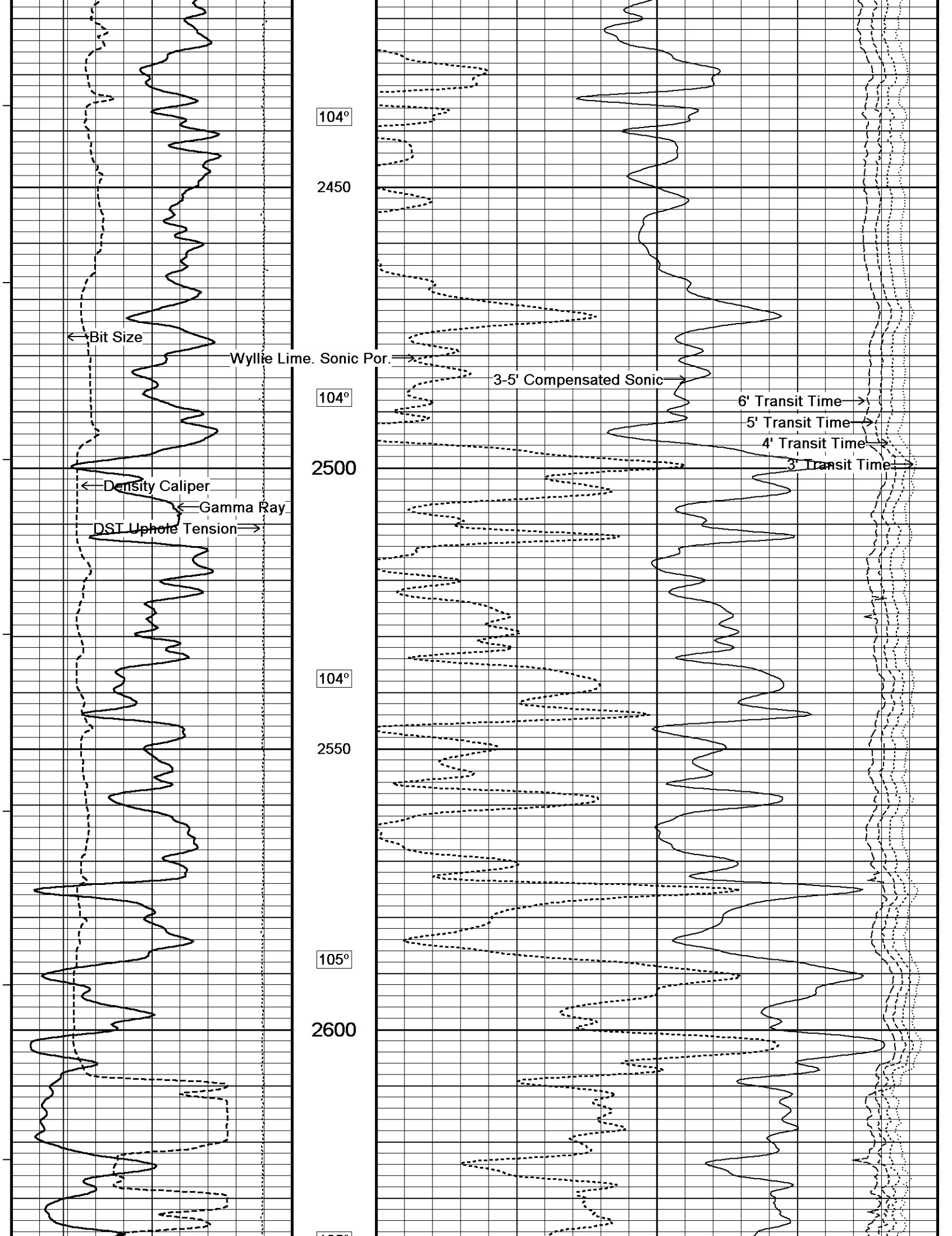
103°

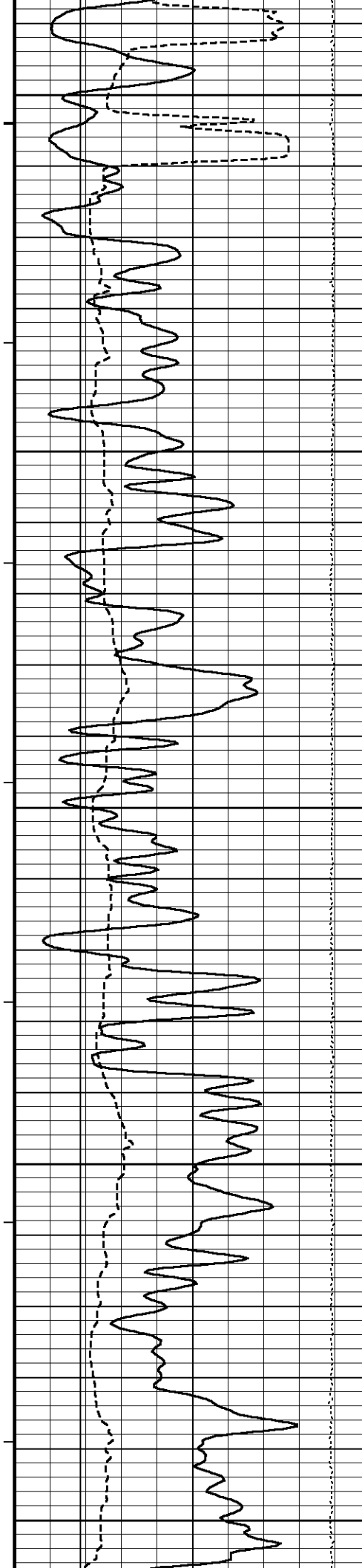
2350

104°

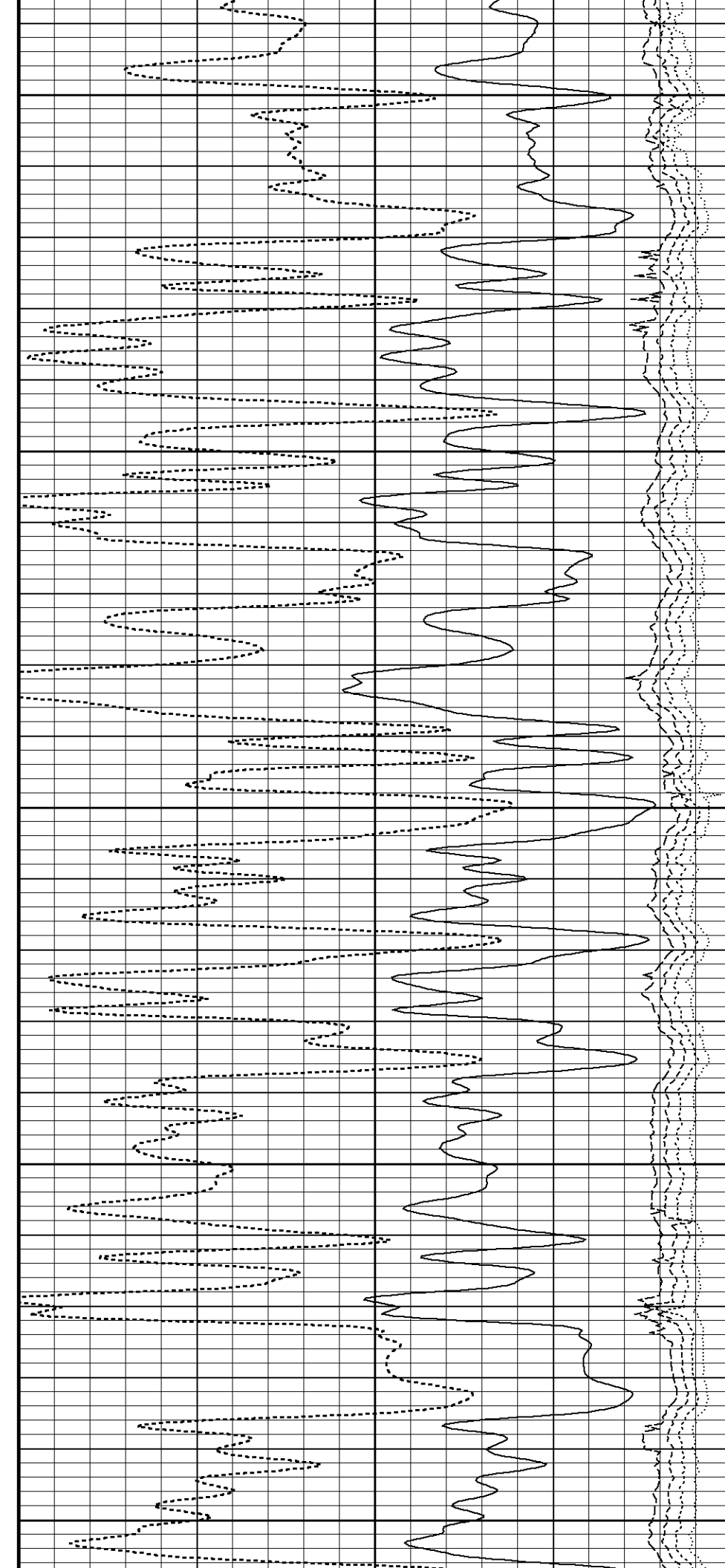
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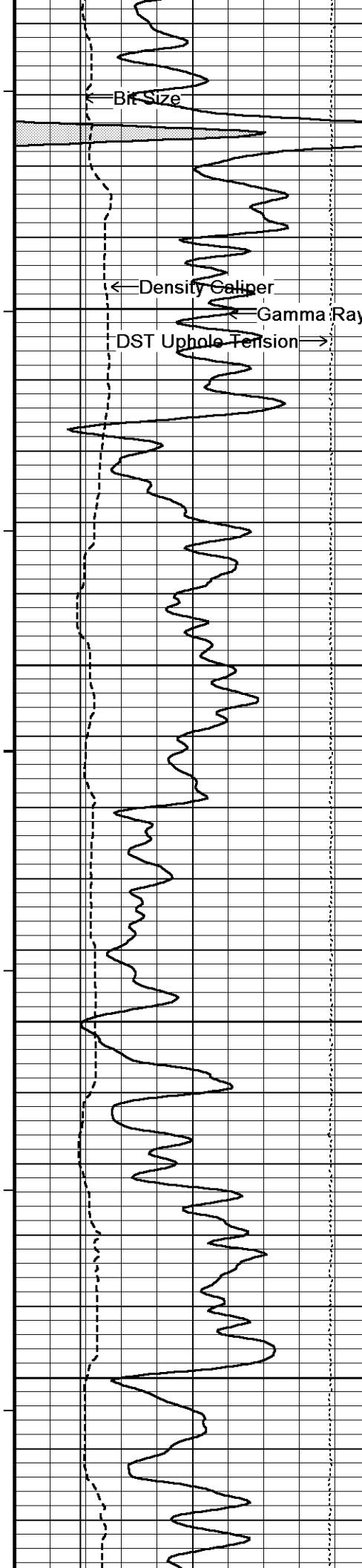






105°
2650
105°
2700
106°
2750
106°
2800
106°
2850





106°

2900

107°

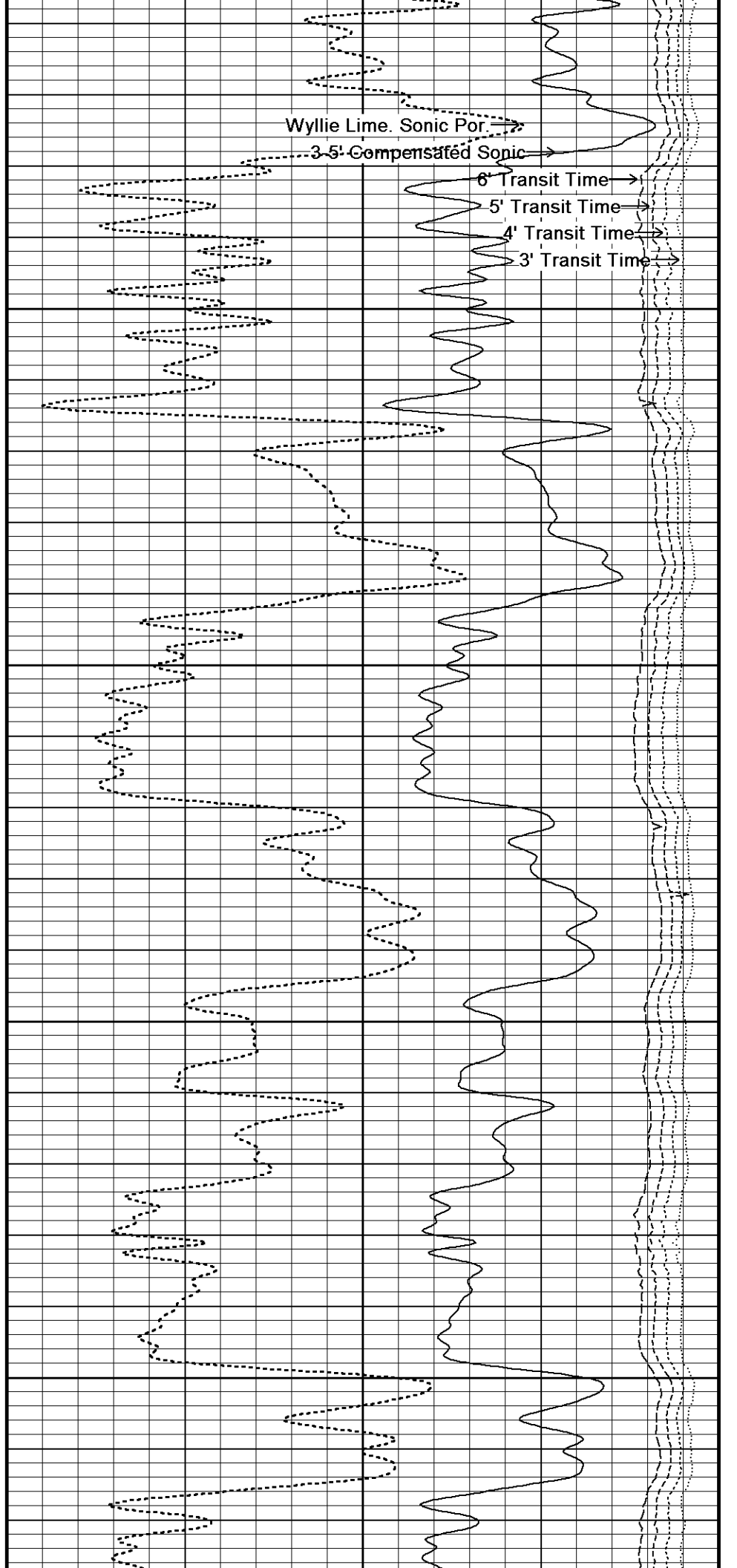
2950

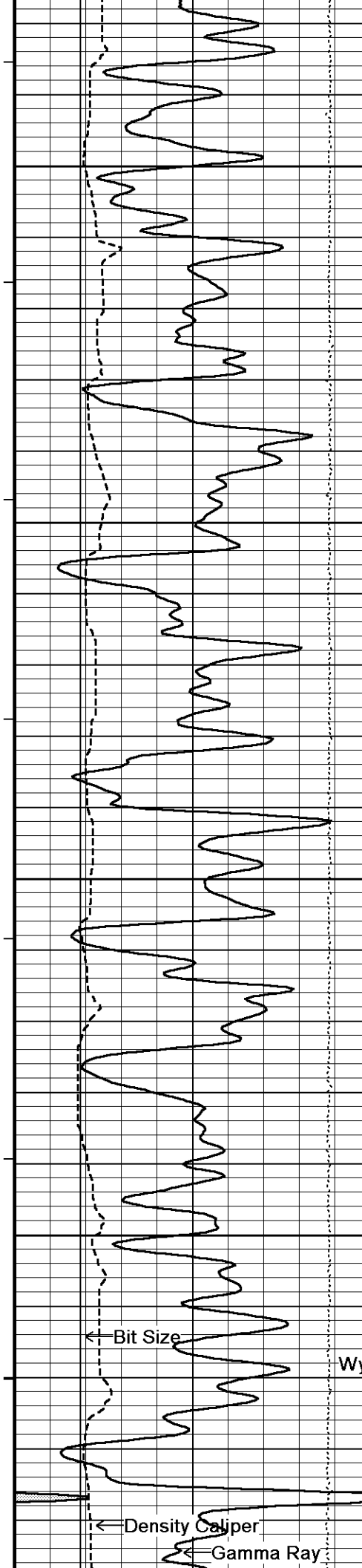
107°

3000

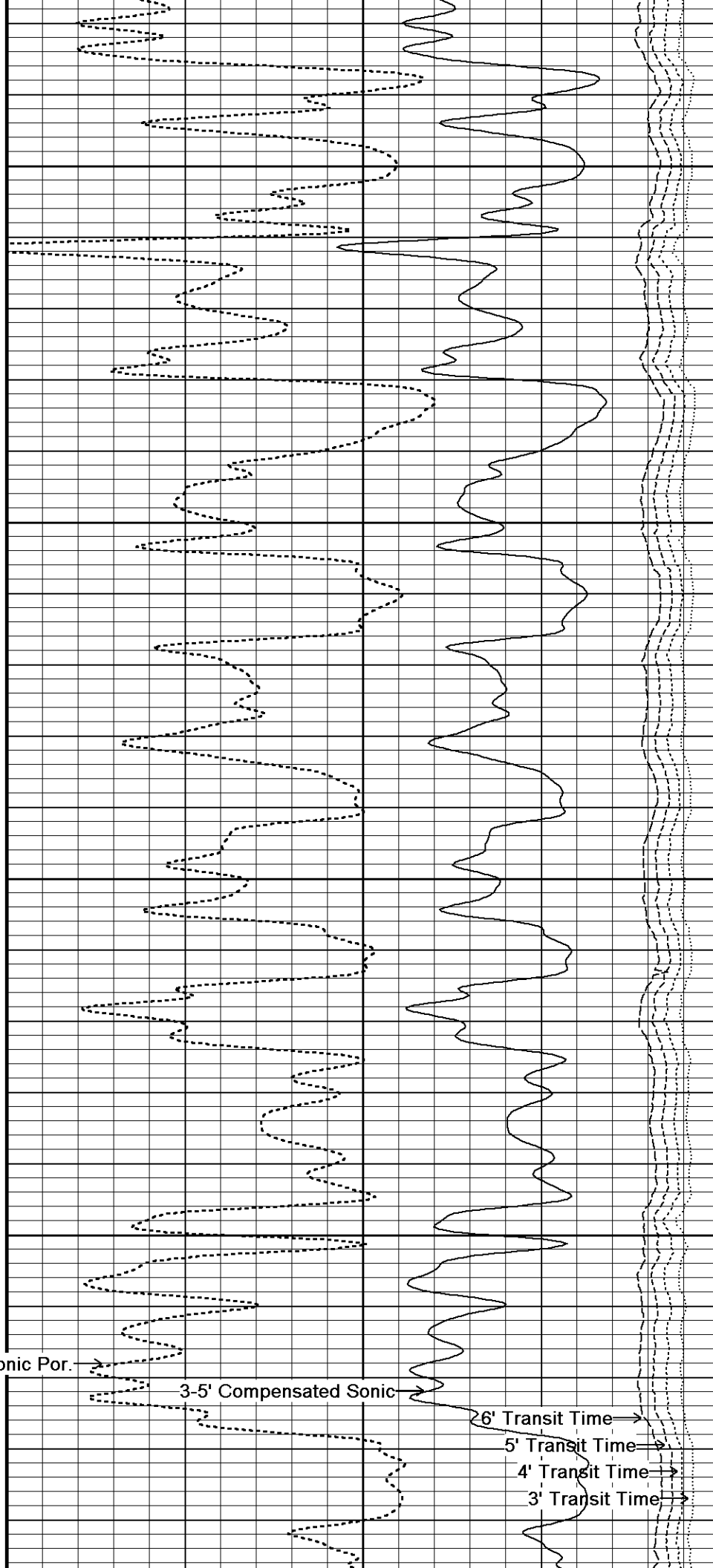
108°

3050

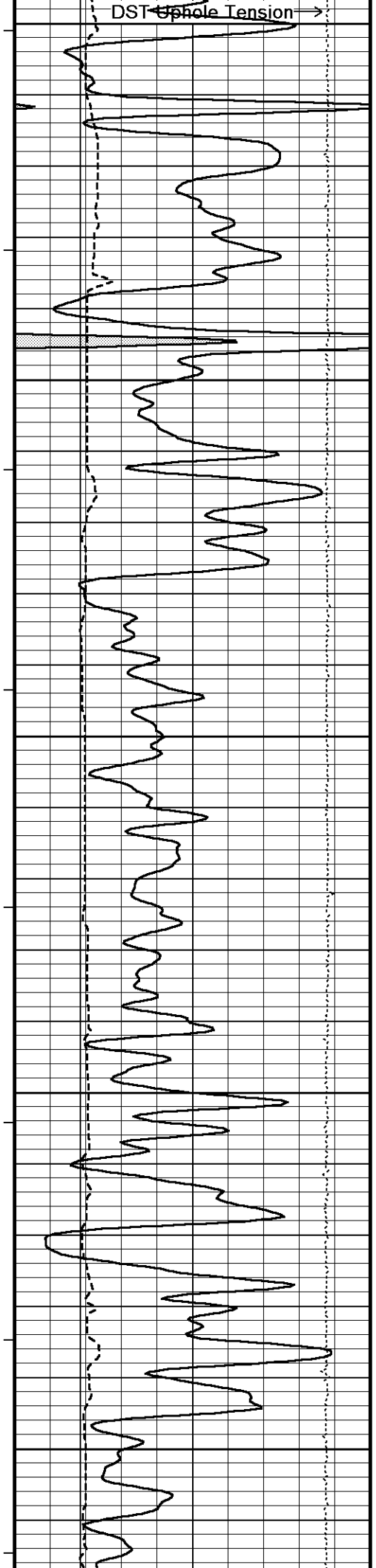




108°
3100
108°
3150
108°
3200
109°
3250
109°



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



3300

109°

3350

110°

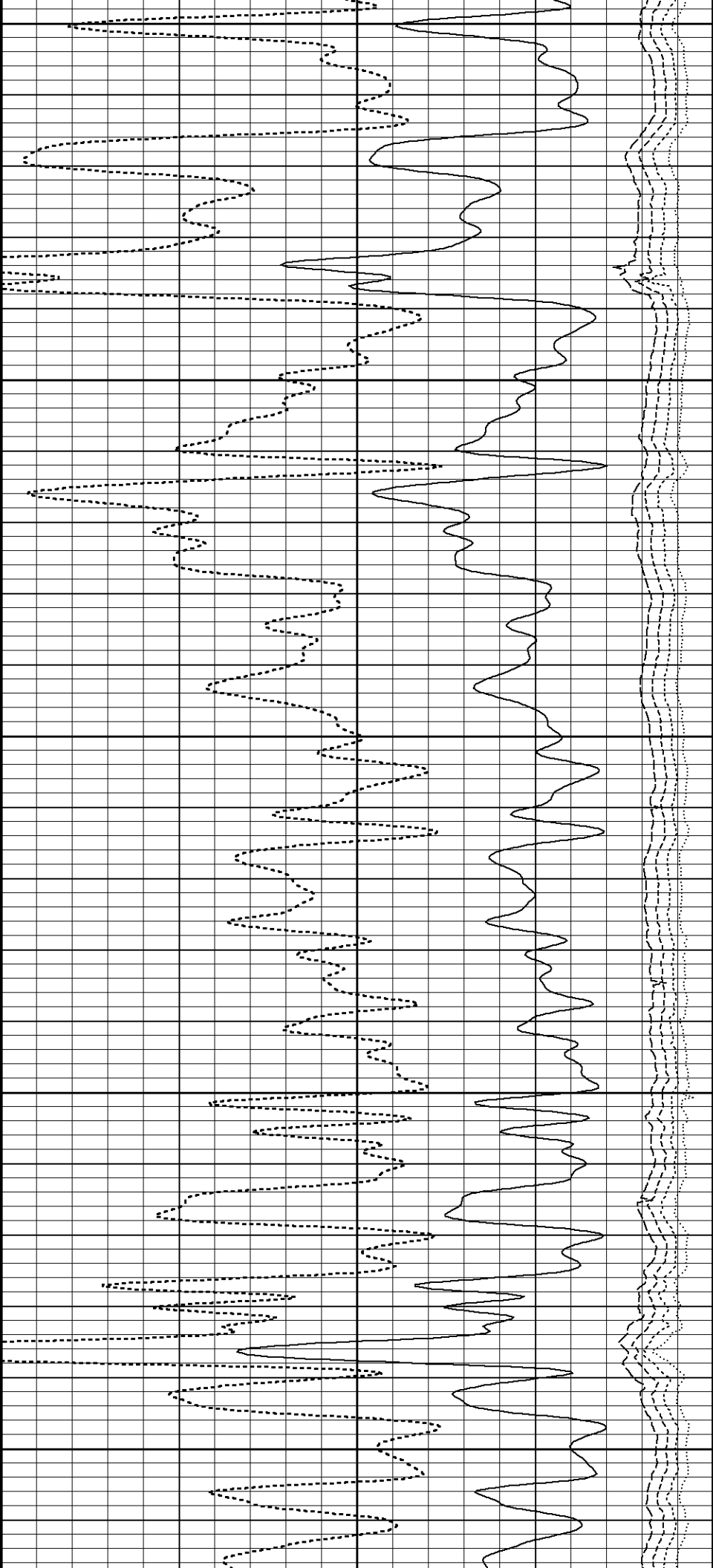
3400

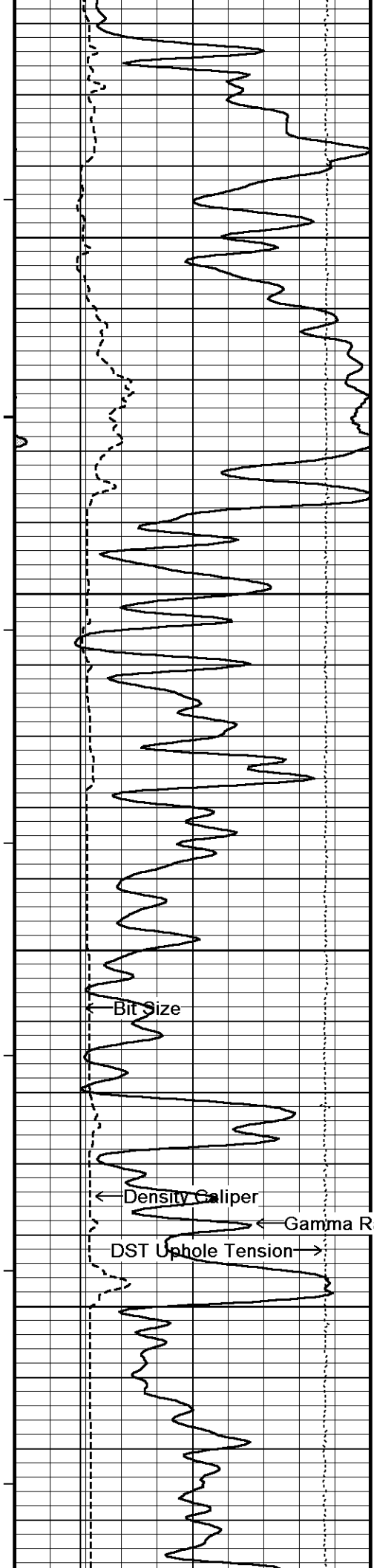
110°

3450

110°

3500





111°

3550

111°

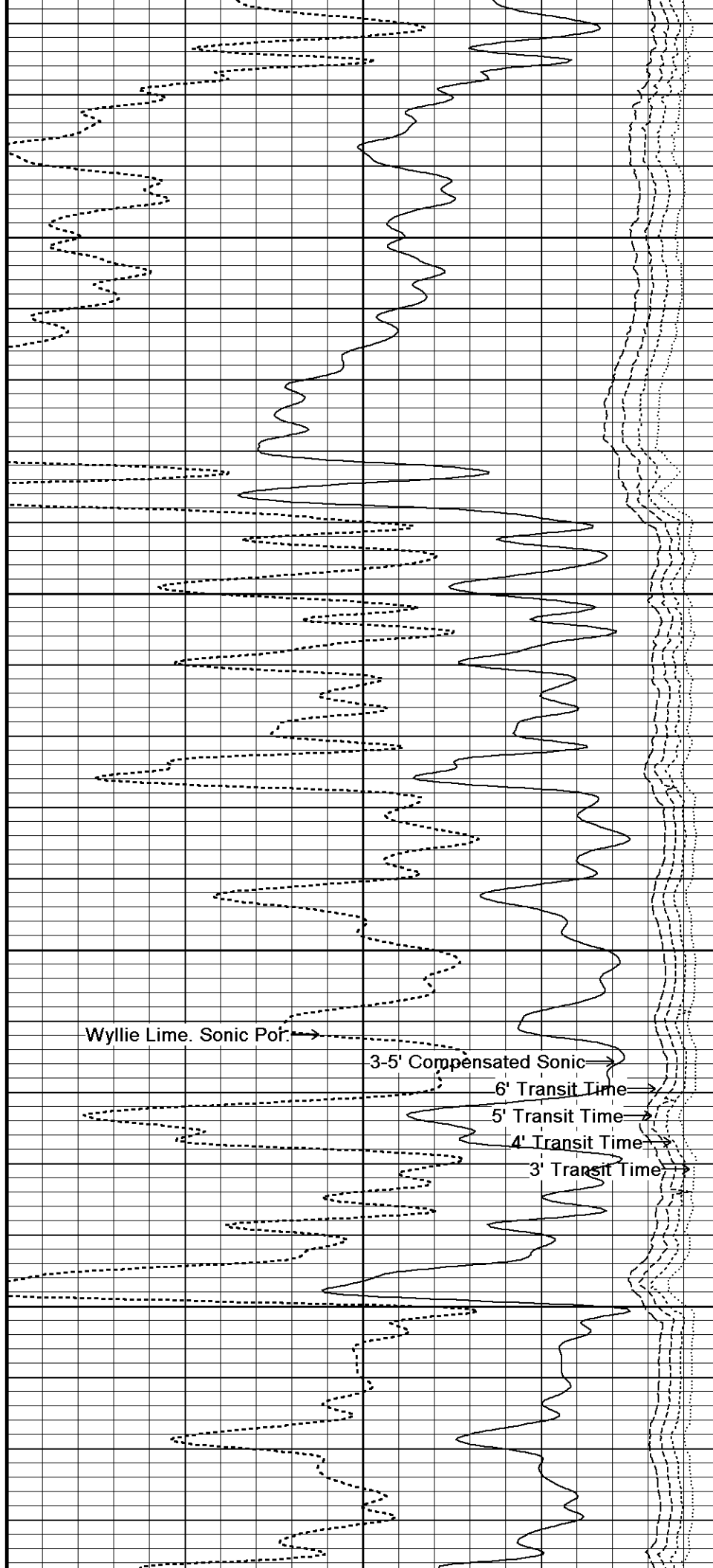
3600

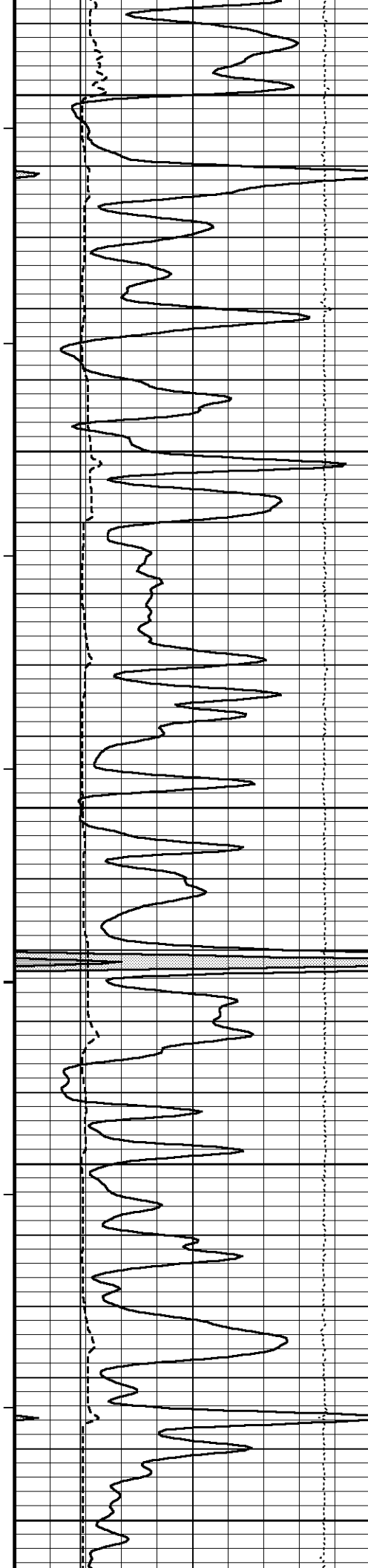
112°

3650

112°

3700





112°

3750

113°

3800

113°

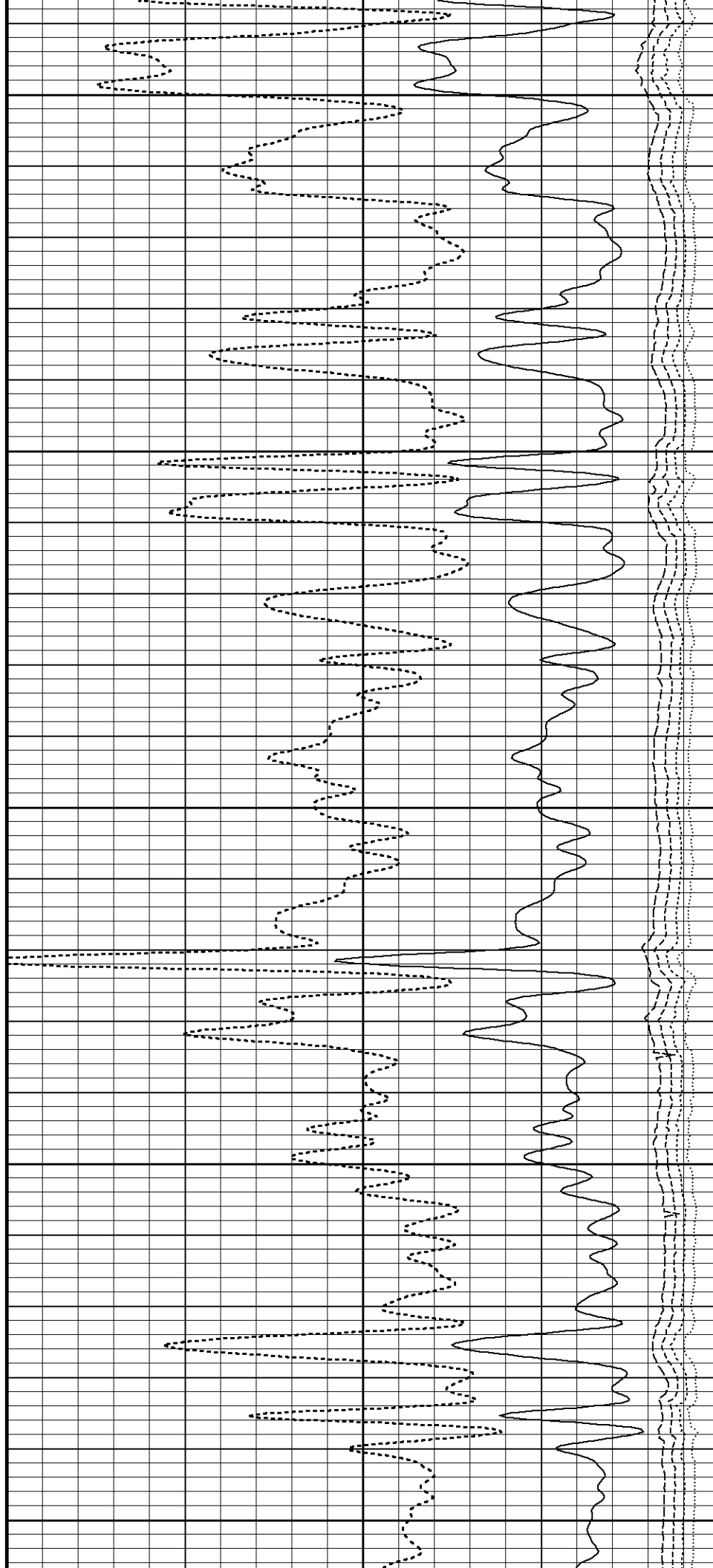
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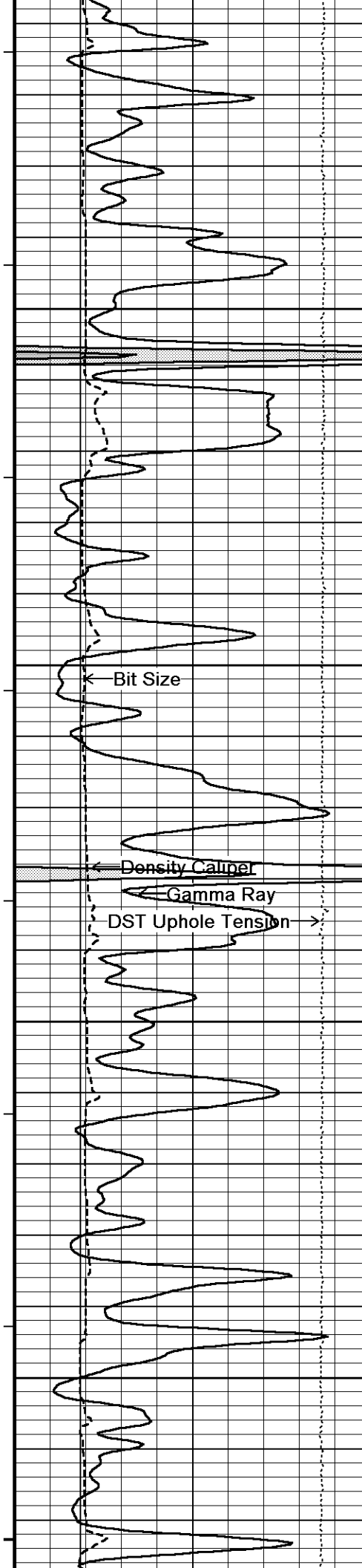
113°

3900

113°

3950





114°

4000

114°

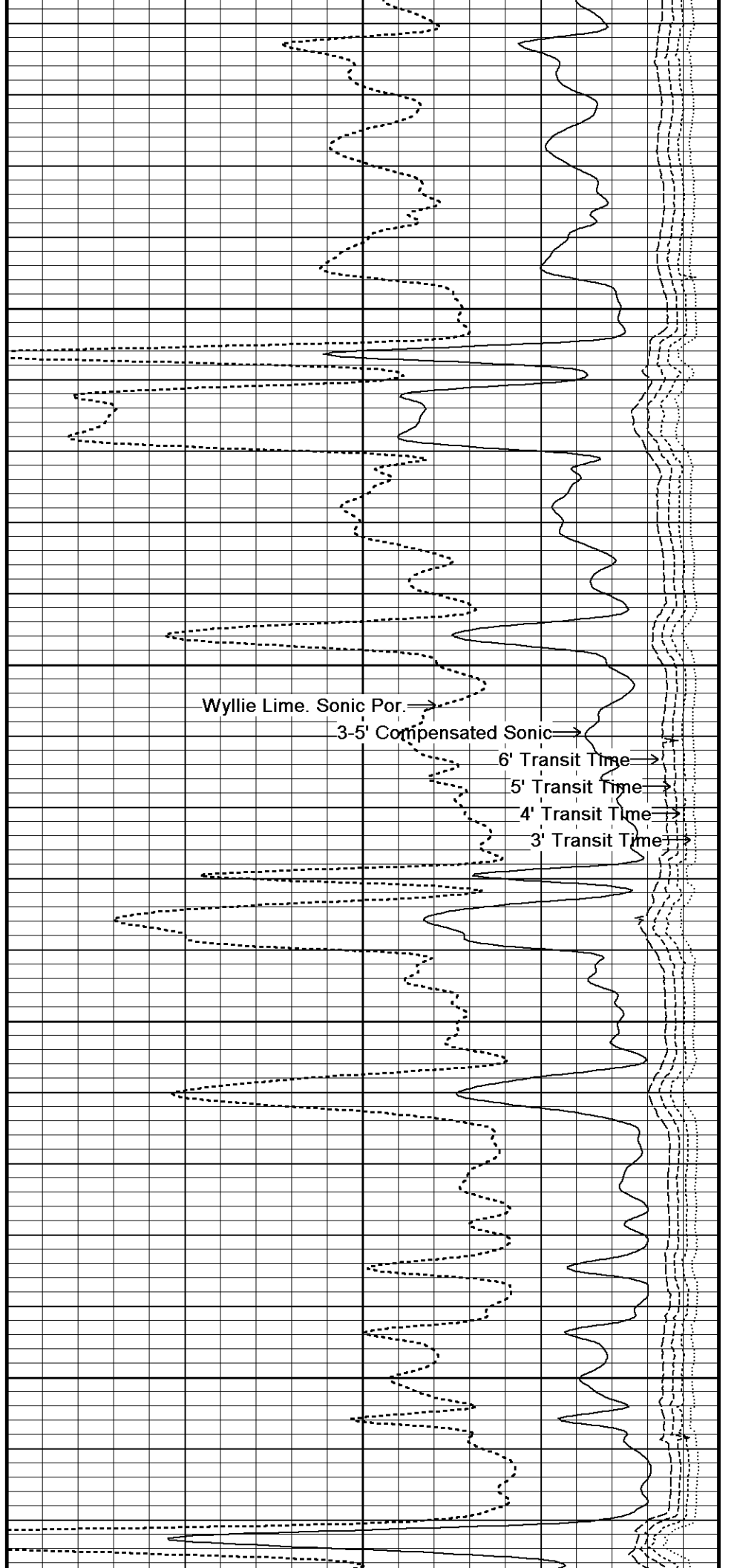
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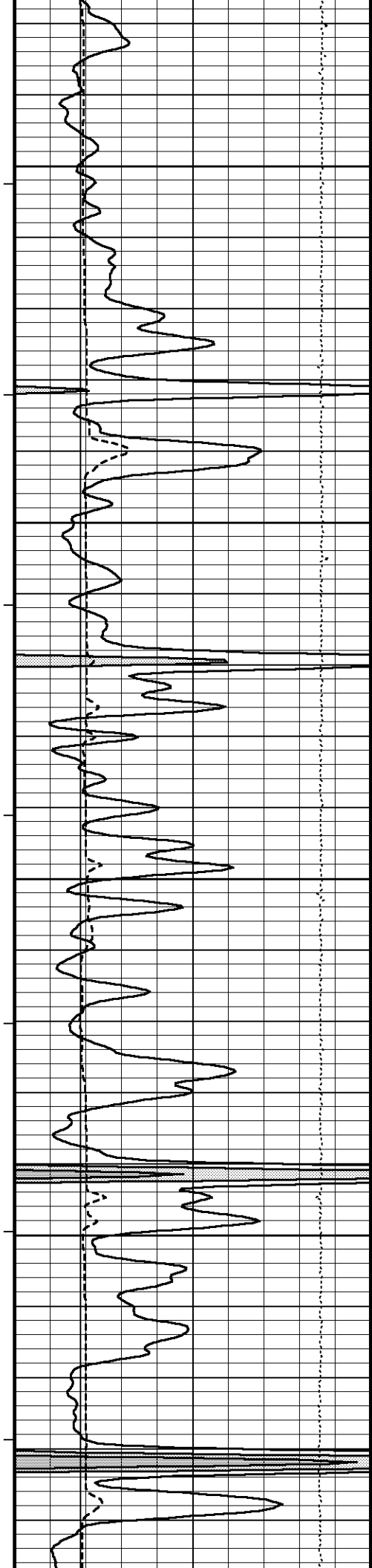
114°

4100

115°

4150





115°

4200

115°

4250

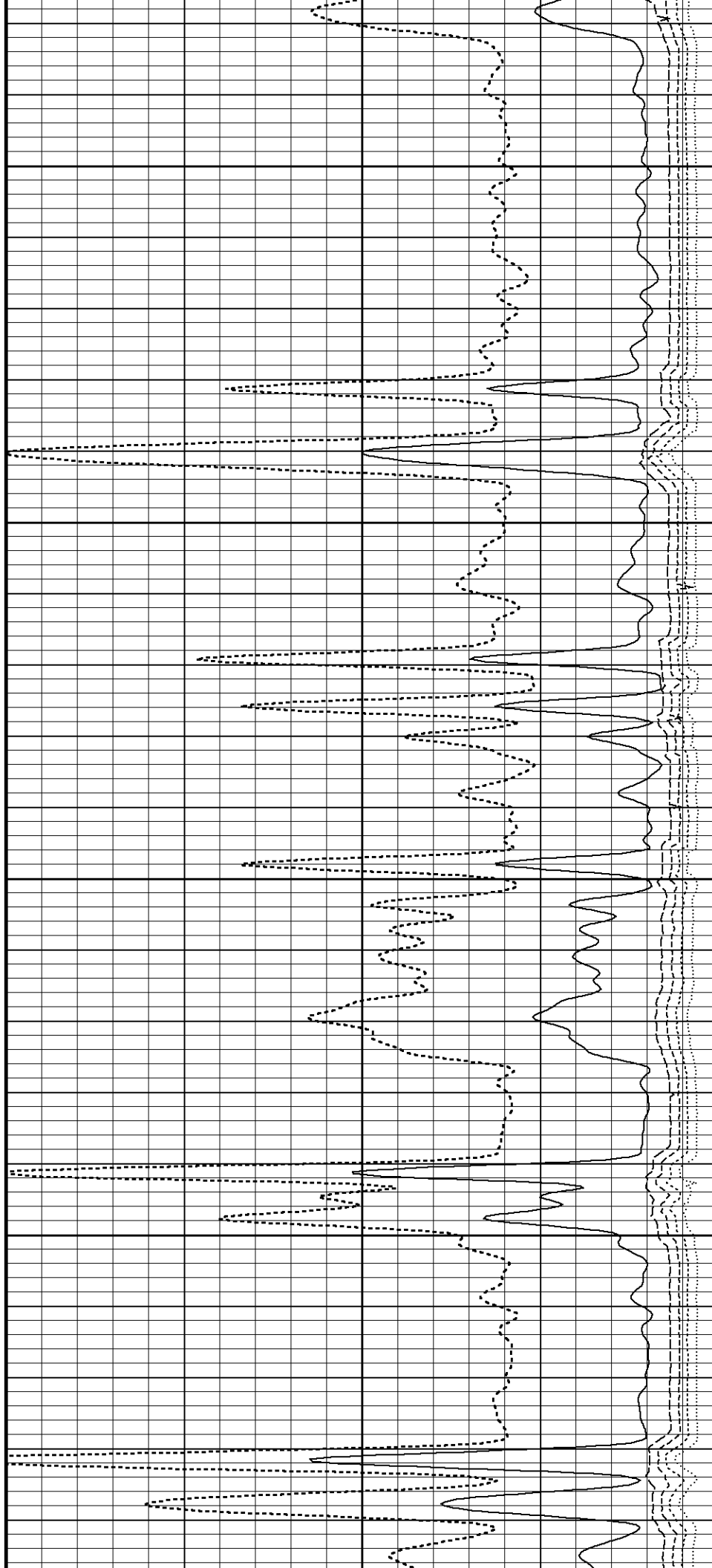
116°

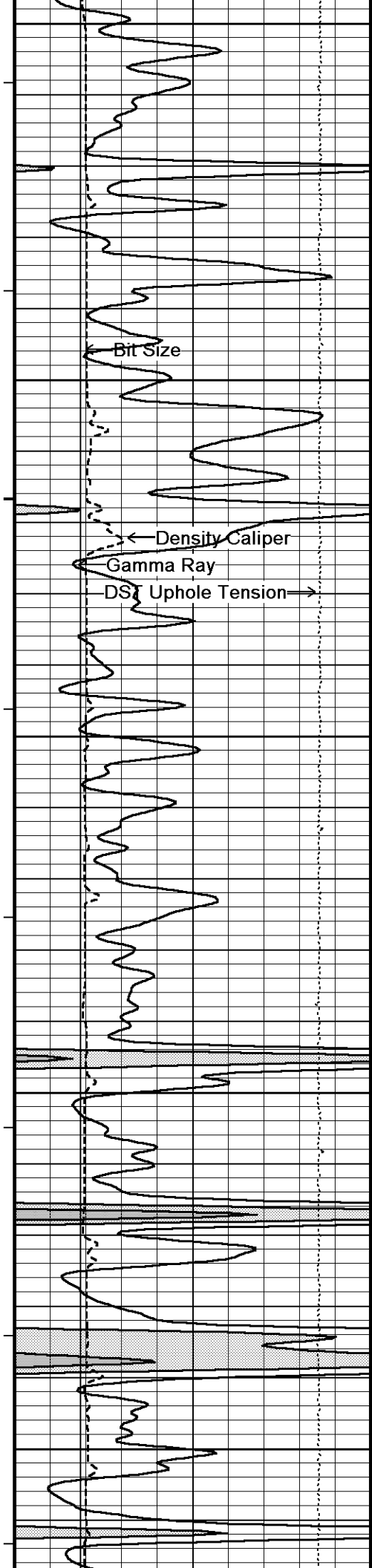
4300

116°

4350

116°





4400

117°

4450

117°

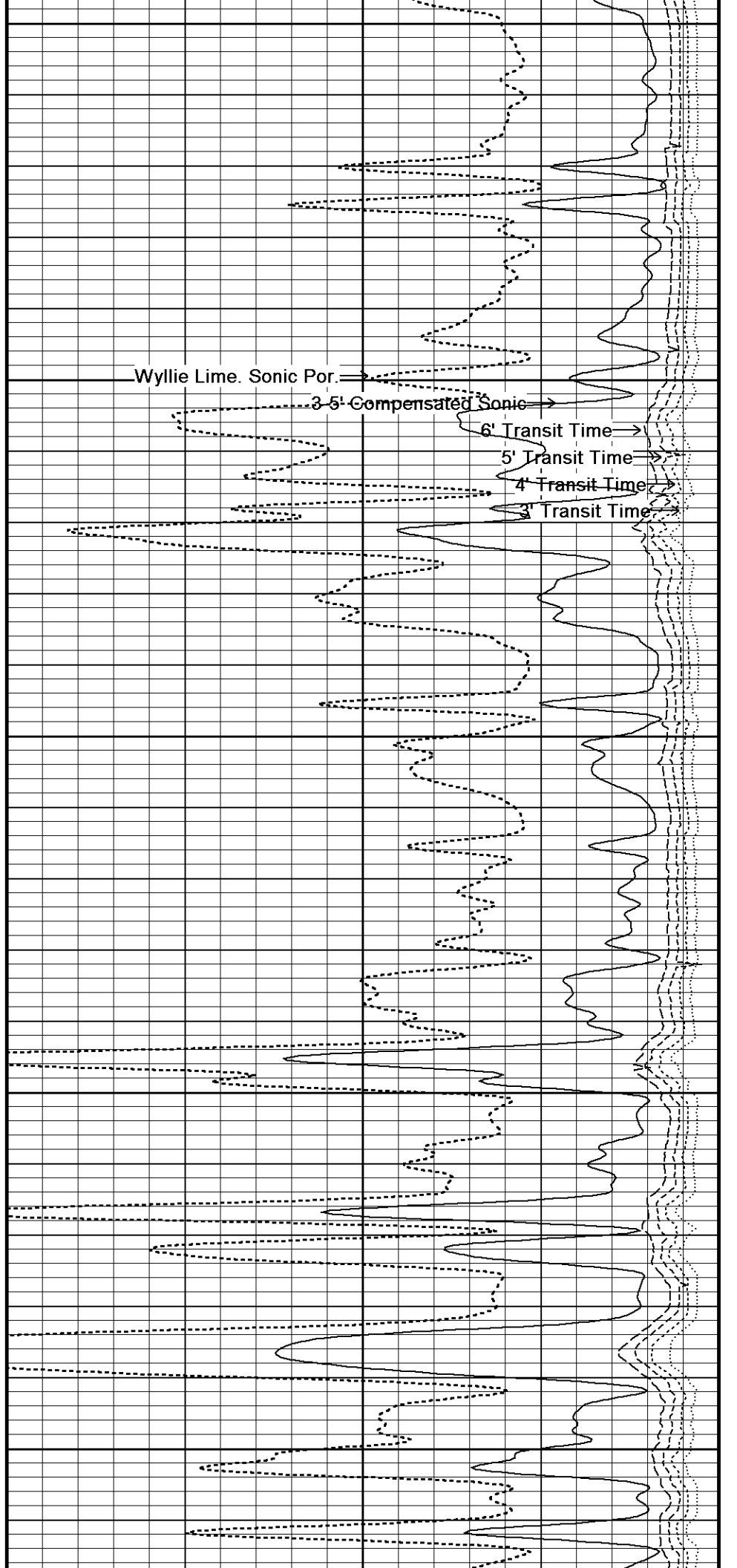
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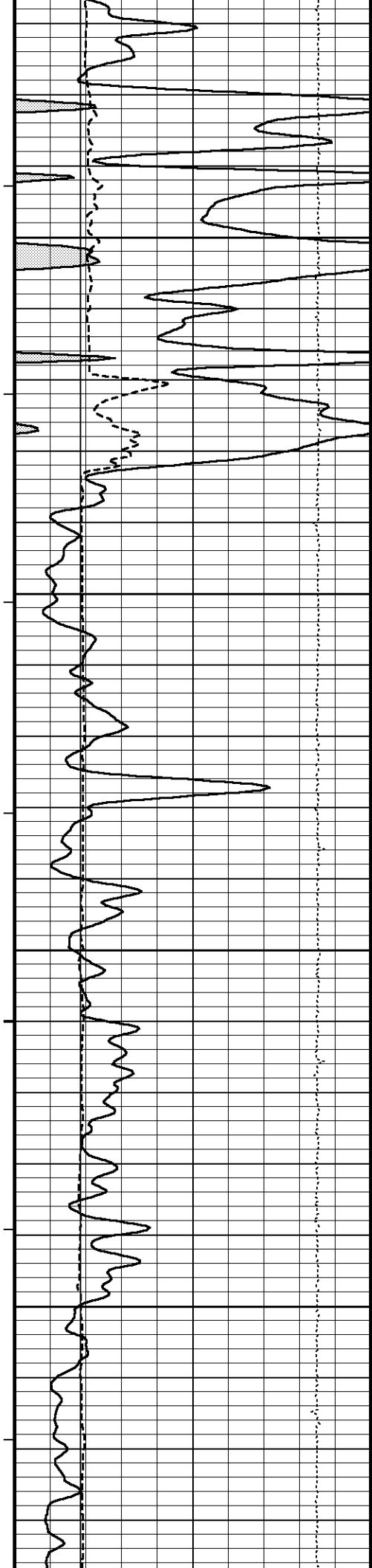
117°

4550

118°

4600





119°

4650

120°

4700

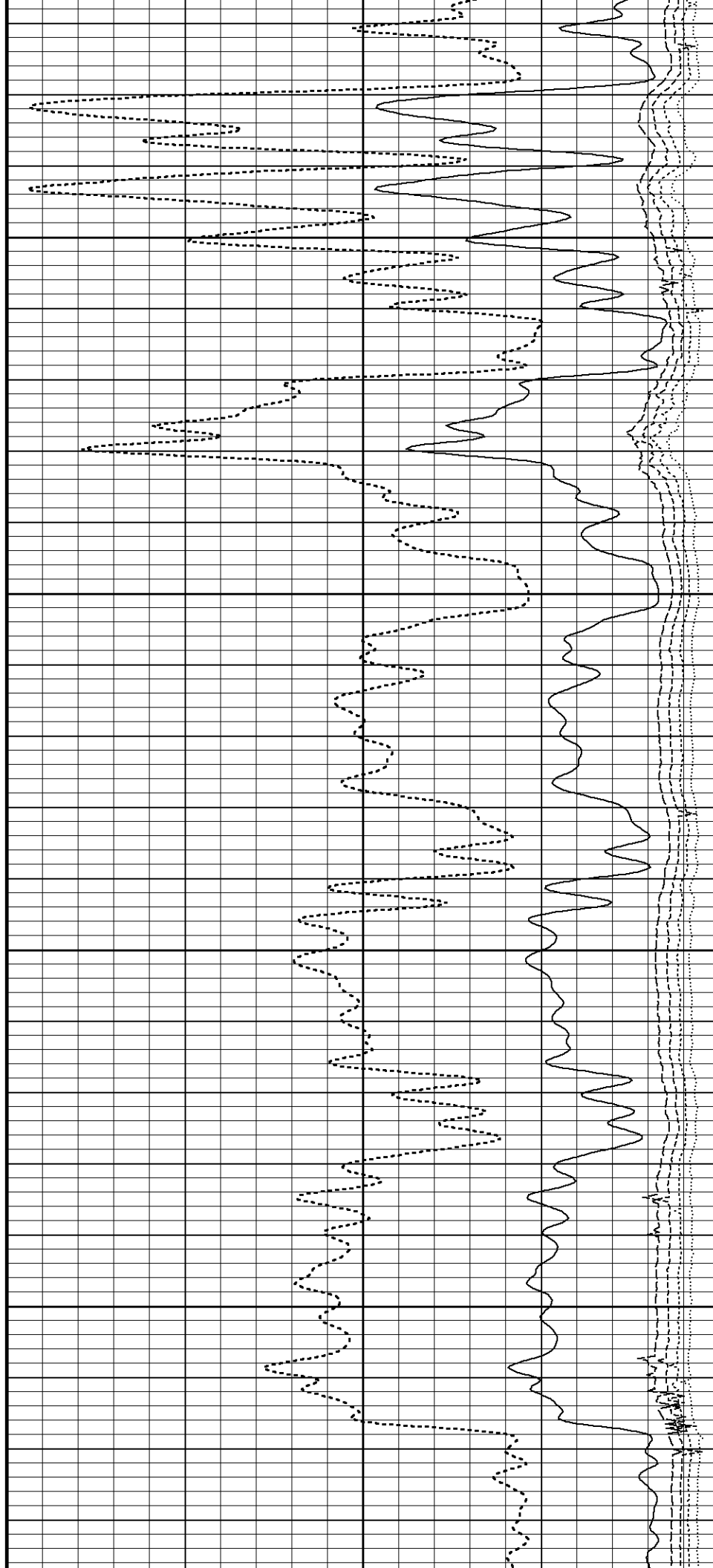
121°

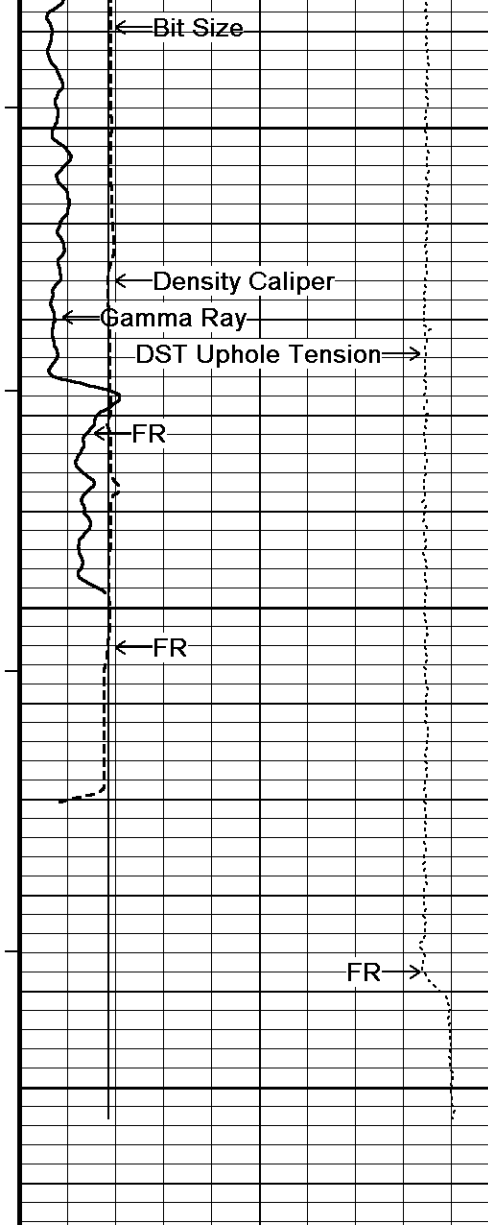
4750

121°

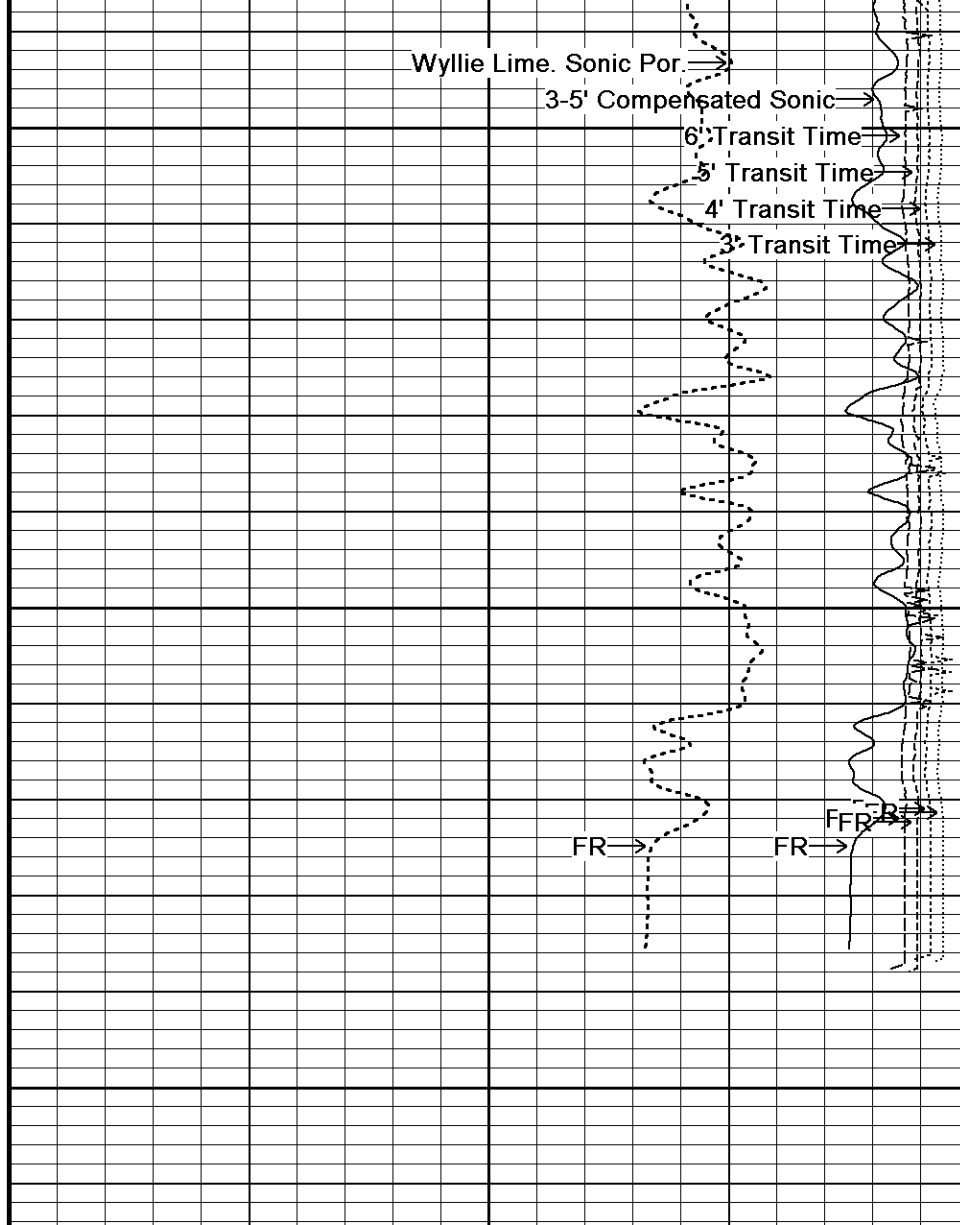
4800

121°





121°
 4850
 120°
 4900
 4950
 4962
 Depth in Feet



← Timing Marks every 60.0 sec

Gamma Ray

API		
0	75	150
150	225	300

Density Caliper inches

6	11	16
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Bit Size inches

6	11	16
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3-5' Compensated Sonic
 microsec/foot
 140 115 90 65 40

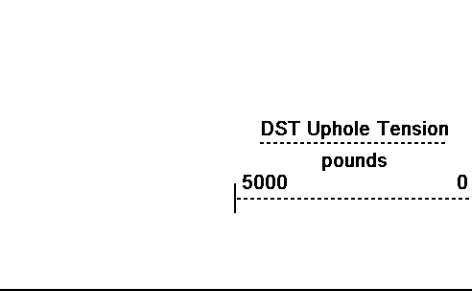
Wyllie Lime. Sonic Por.
 percent
 30 20 10 0 -10

Borehole Temp in deg F

3' Transit Time
 microseconds
 1100 100

4' Transit Time
 microseconds
 1100 100

5' Transit Time



Replay Scale 1:240

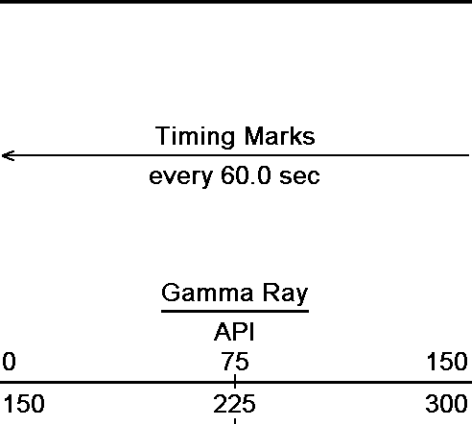


Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 01-APR-2014 18:41
 Filename: C:\Minimus 13.08.2113\Logs\FIML ...\FIML Natural Resources Mulville #15B-18-2029_002.dta
 Recorded on 01-APR-2014 15:18
 System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

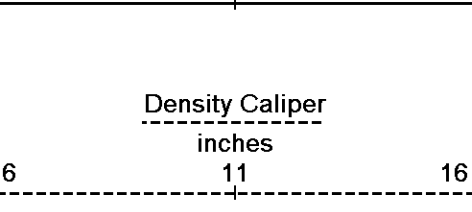
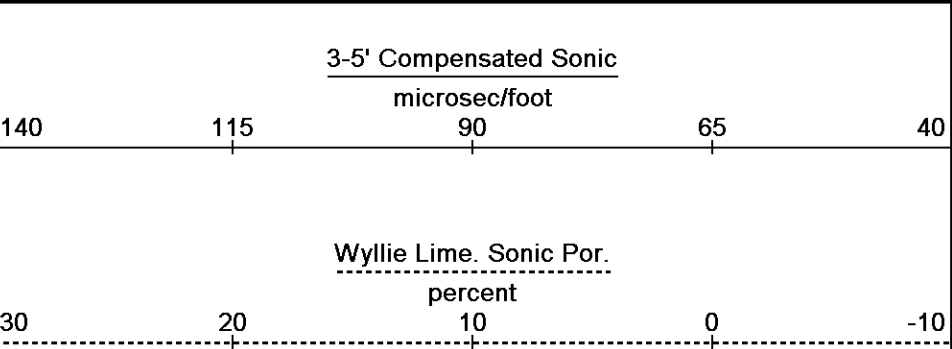
5 INCH MAIN

REPEAT SECTION

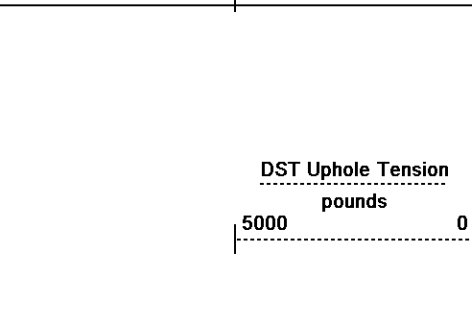
Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 01-APR-2014 18:41
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 System Versions: Logged with 13.08.2113 Plotted with 13.08.2113



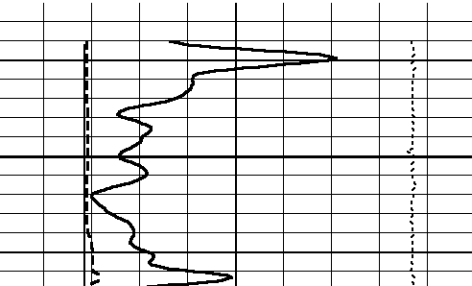
Depth in Feet



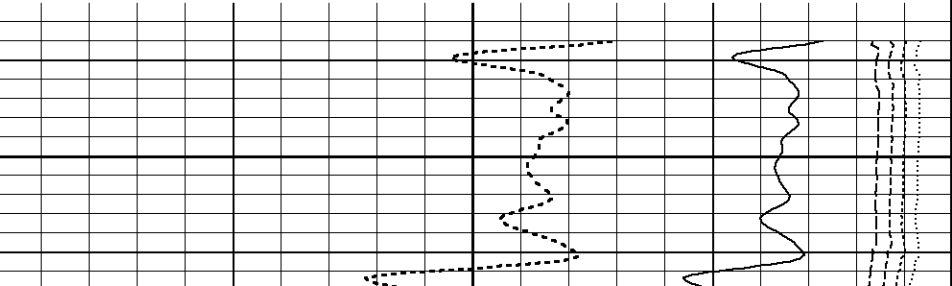
Borehole Temp in deg F

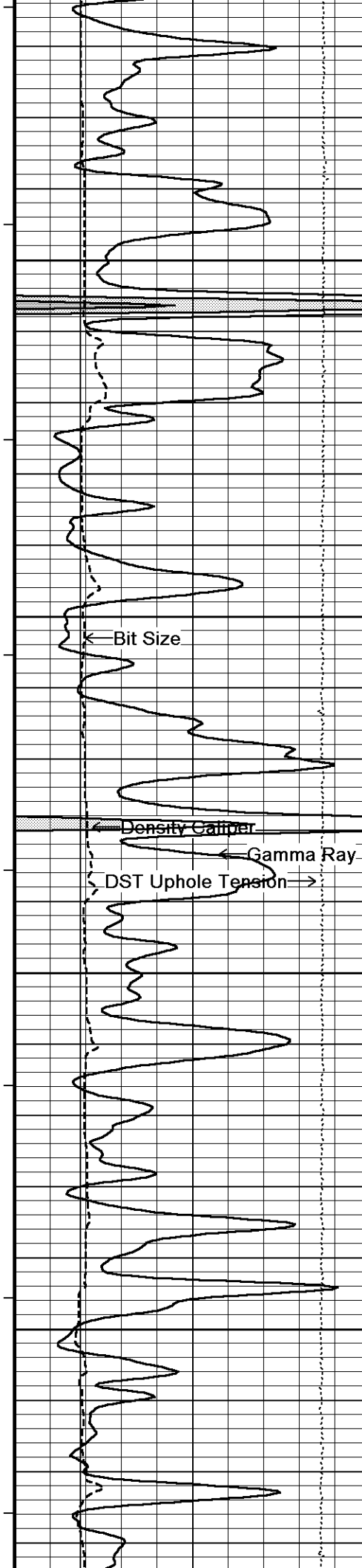


Replay Scale 1:240

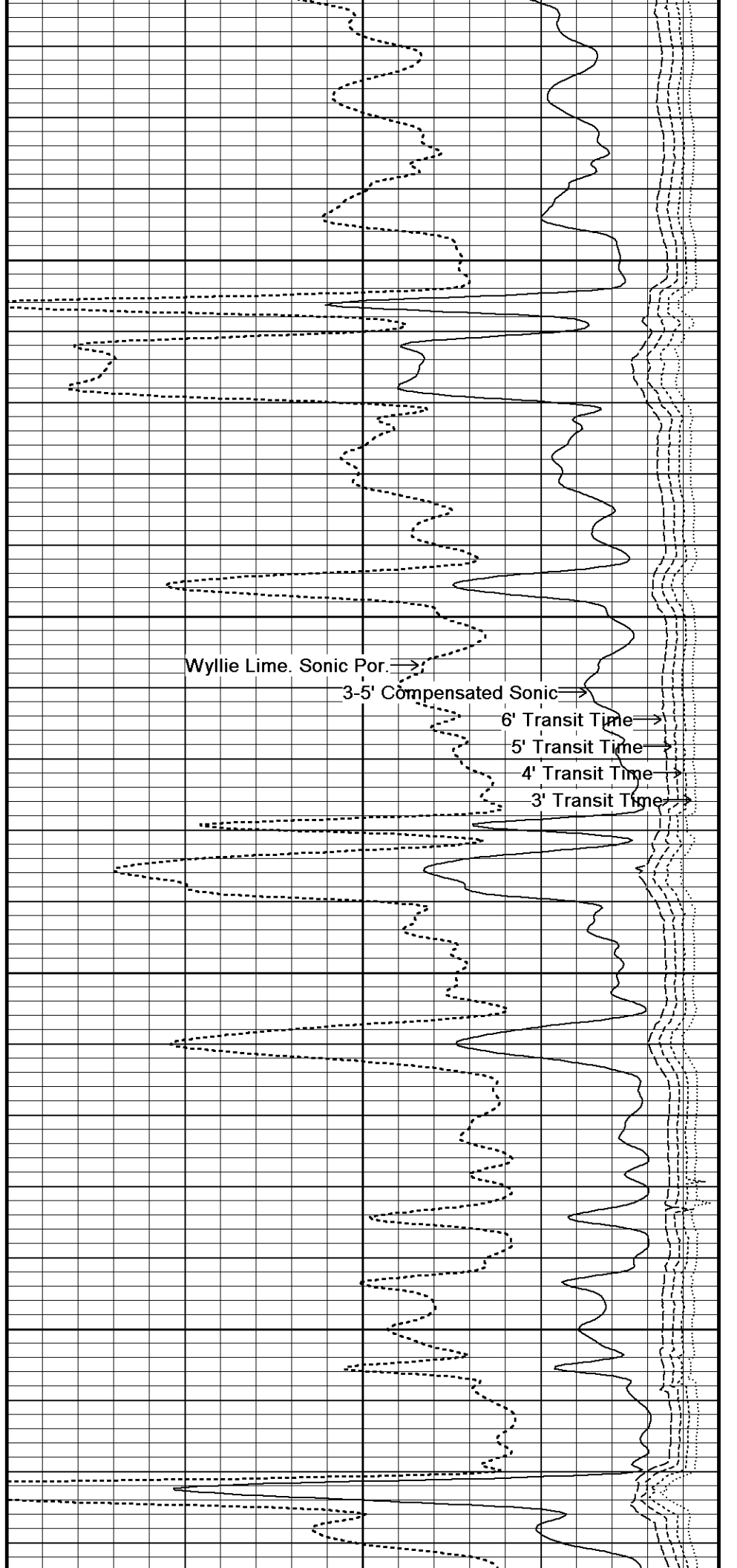


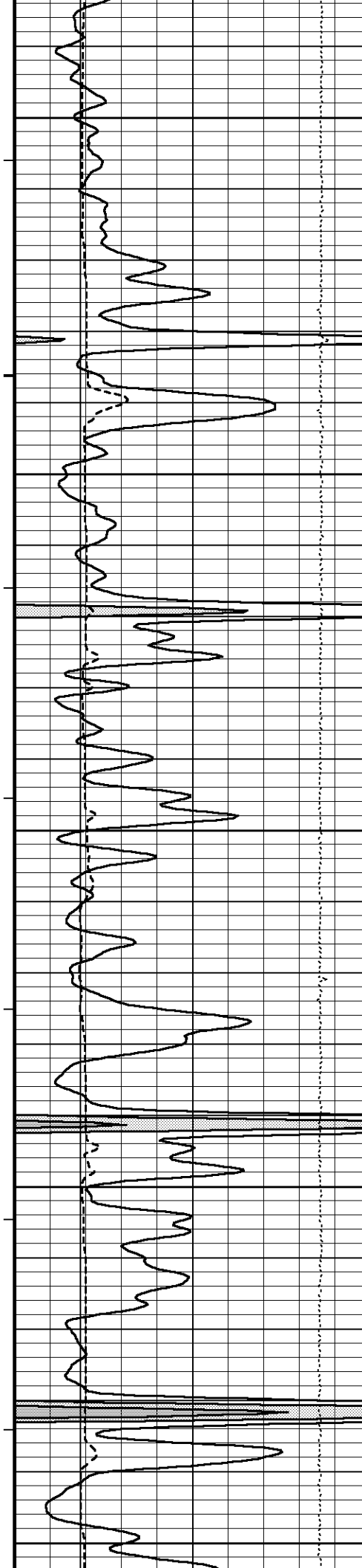
3936
3950





113°
4000
113°
4050
114°
4100
114°
4150





114°

4200

115°

4250

115°

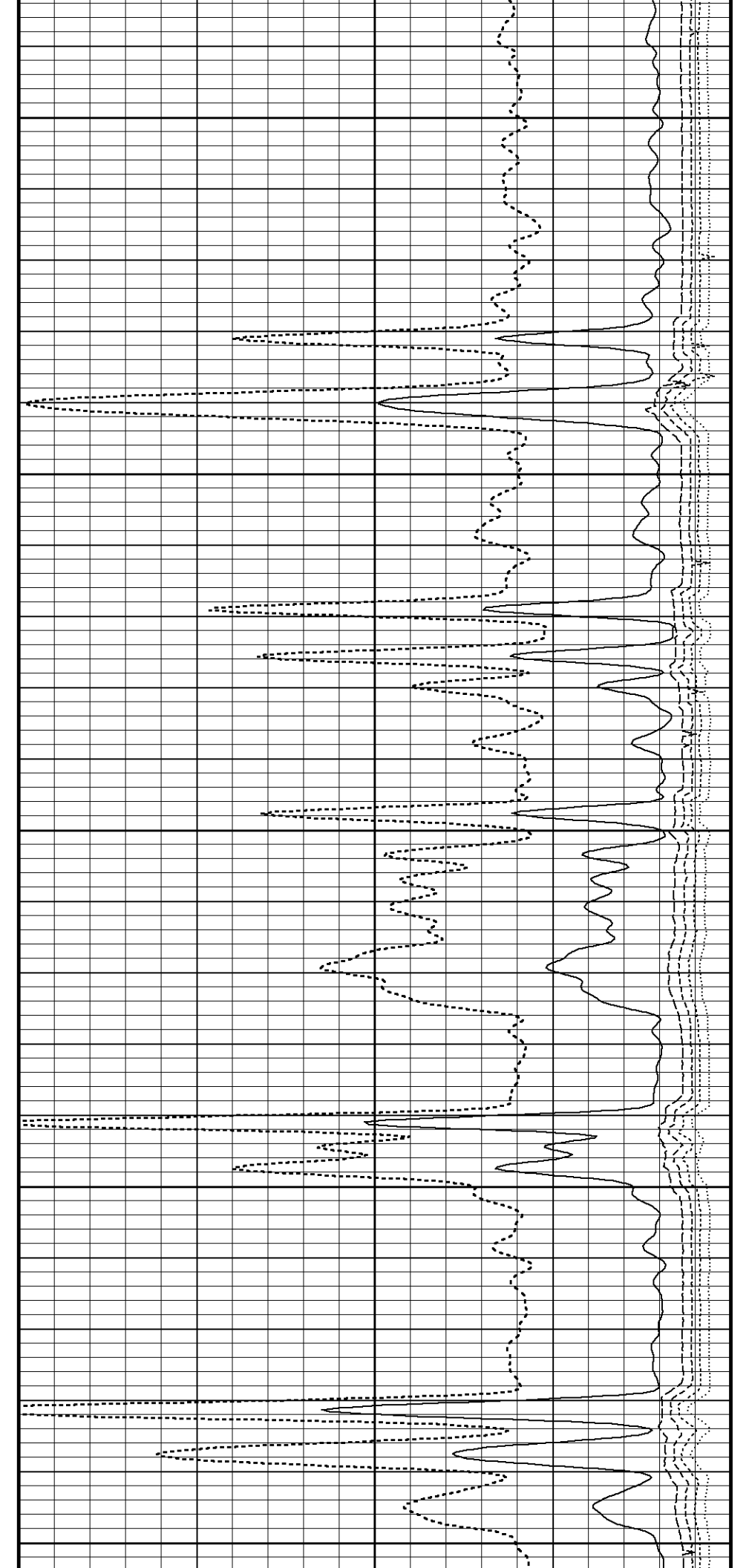
4300

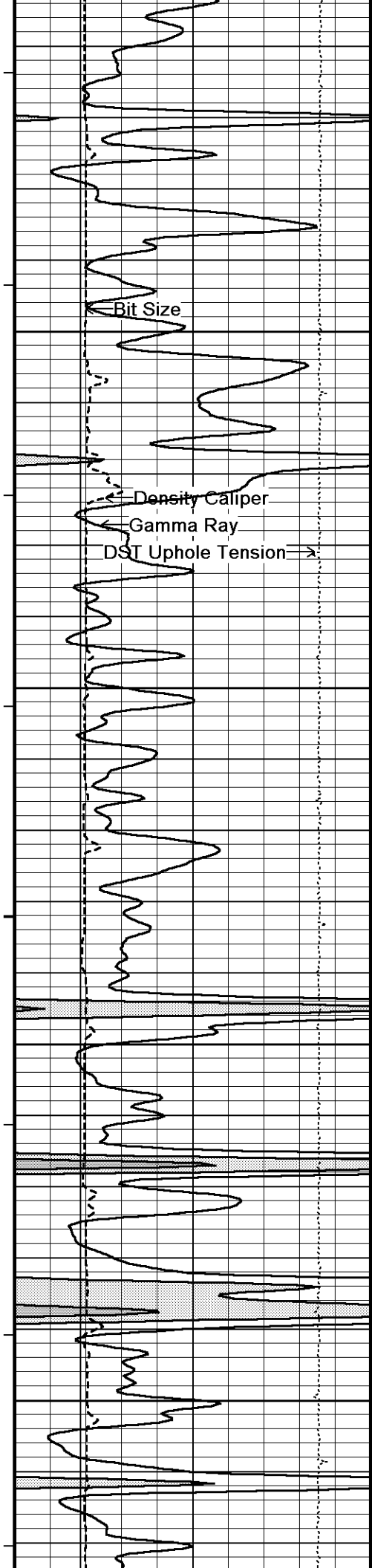
115°

4350

115°

4400





115°

4450

116°

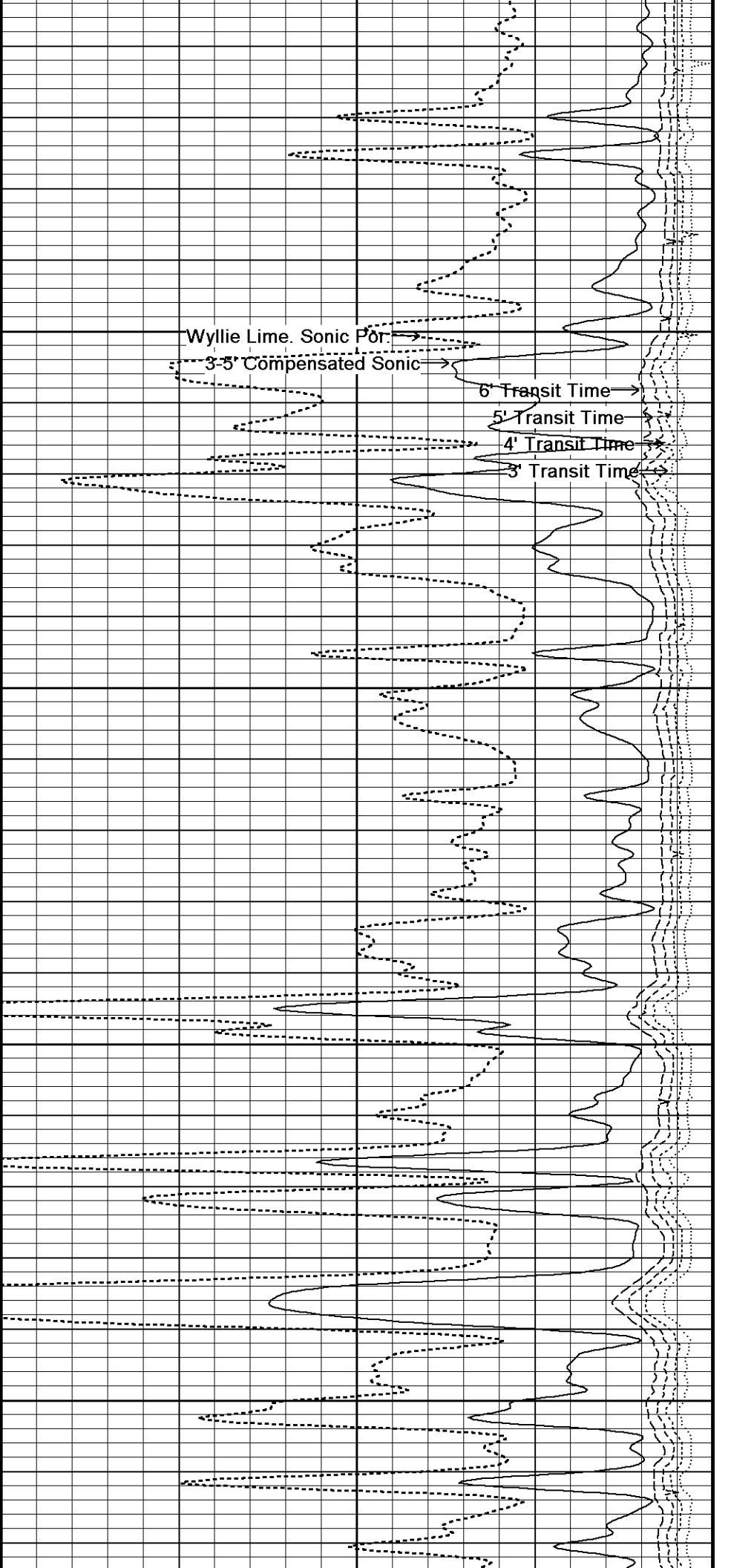
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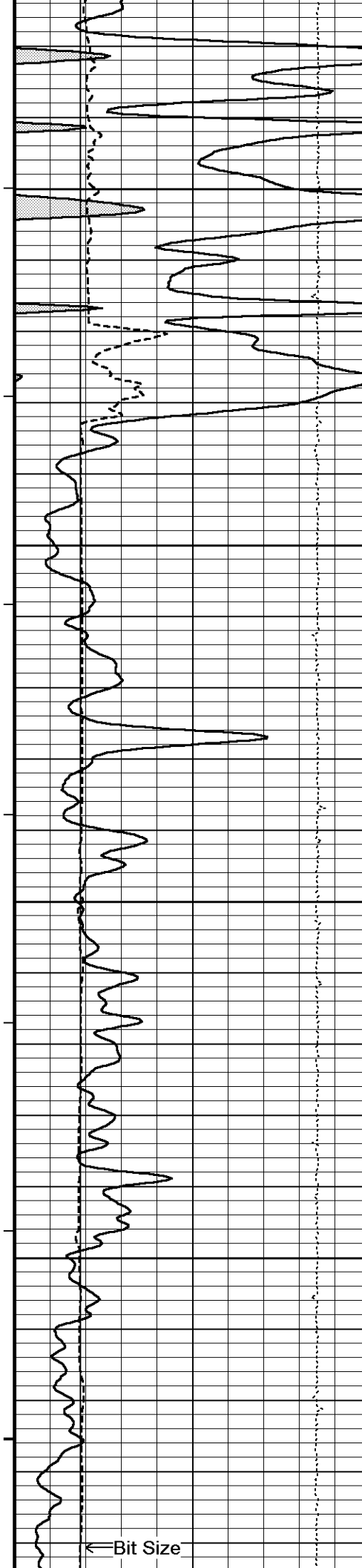
116°

4550

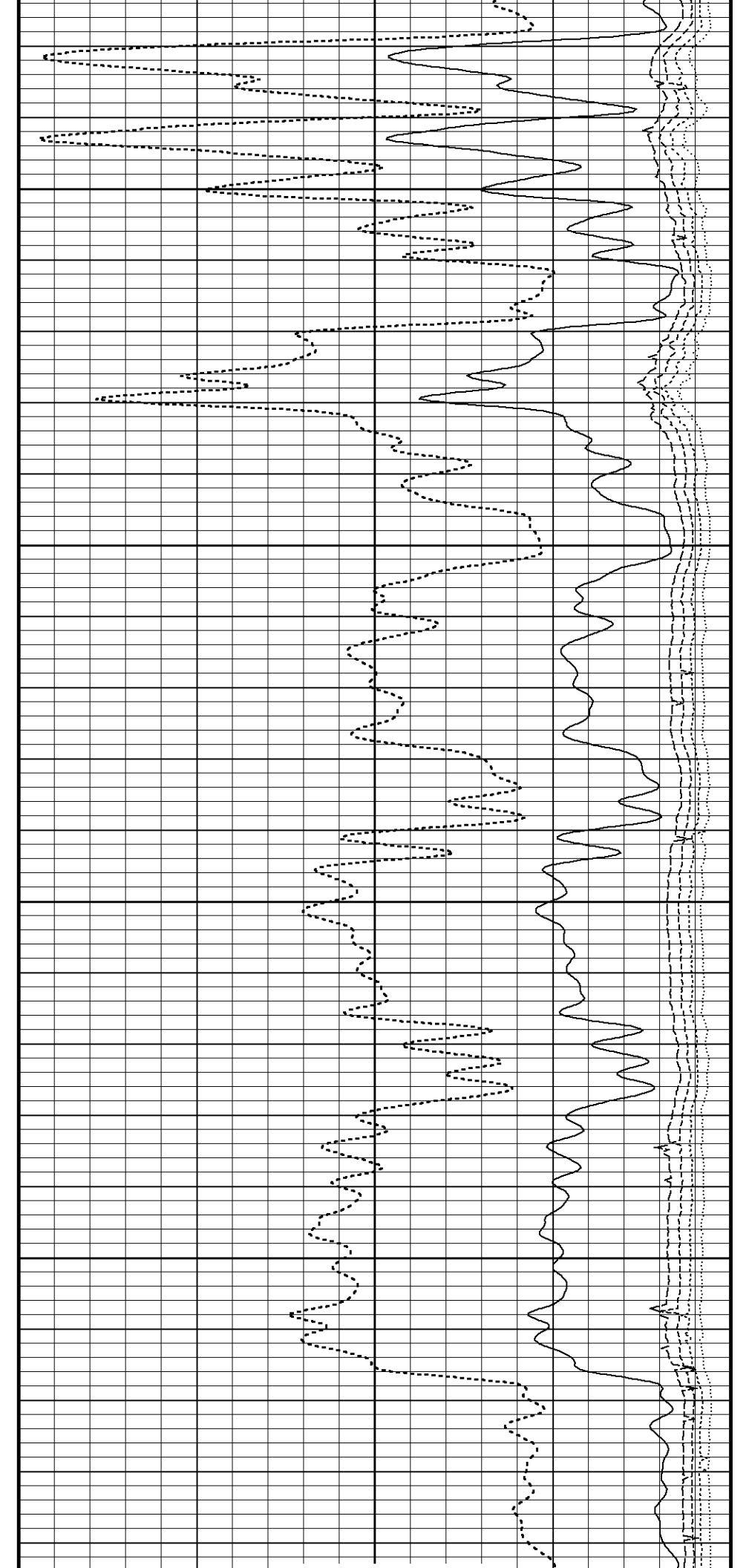
117°

4600

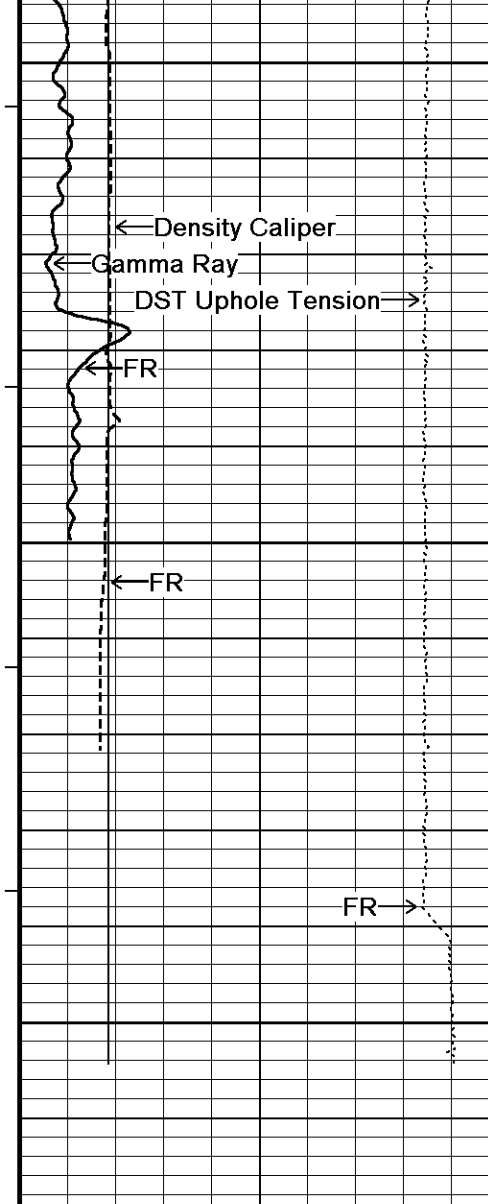




118°
4650
119°
4700
119°
4750
119°
4800
119°



← Bit Size

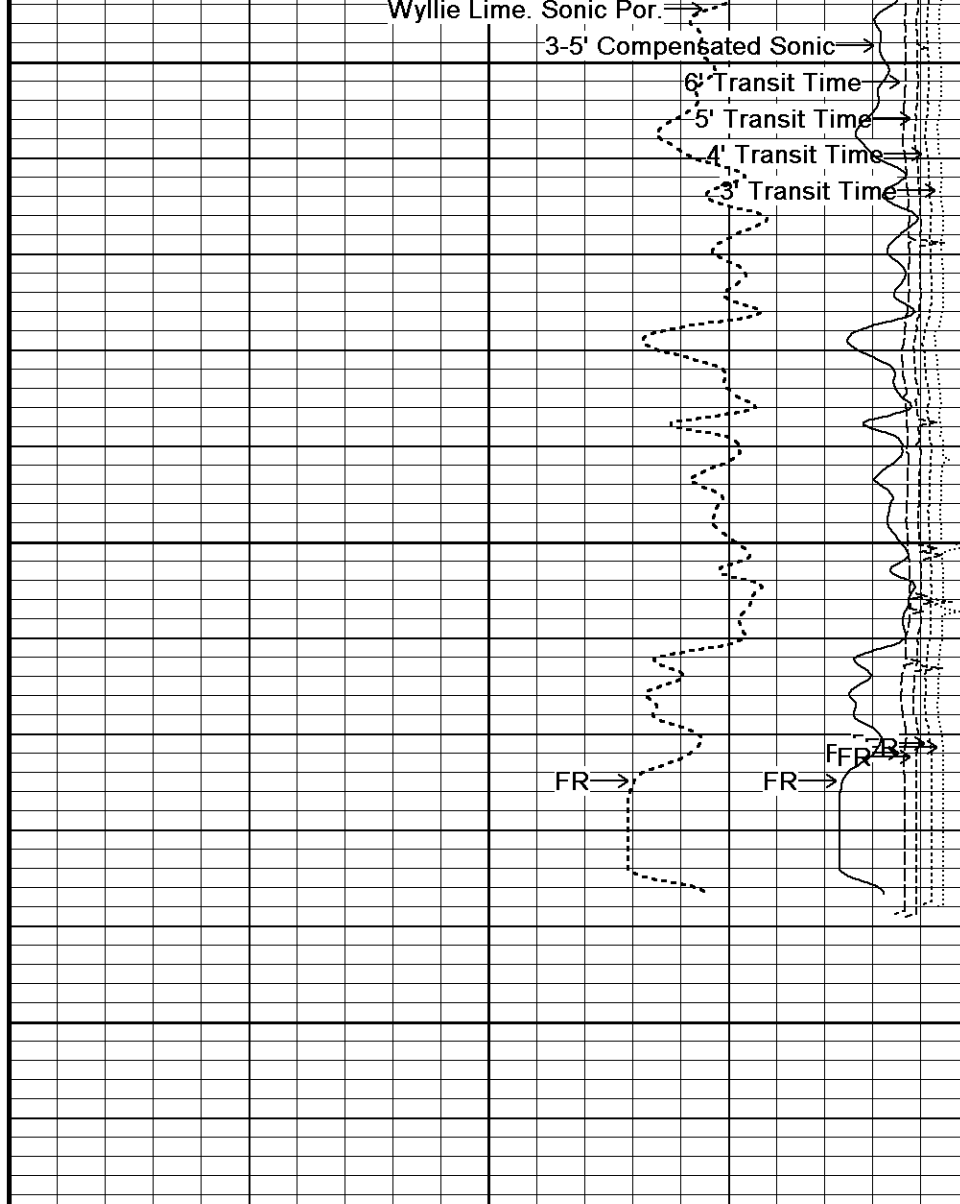


4850

118°

4900

4950



← Timing Marks every 60.0 sec

Gamma Ray
 API
 0 75 150
 150 225 300

Density Caliper
 inches
 6 11 16

Bit Size
 inches
 6 11 16

Depth in Feet

3-5' Compensated Sonic
 microsec/foot
 140 115 90 65 40

Wyllie Lime. Sonic Por.
 percent
 30 20 10 0 -10

Borehole Temp in deg F

3' Transit Time
 microseconds
 1100 100

4' Transit Time
 microseconds
 1100 100

5' Transit Time
 microseconds



Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 01-APR-2014 18:41
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 Recorded on 01-APR-2014 14:29
 System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION

C:\Minimus 13.08.2113\Logs\FIML Natural Resources Mulville #15B-18-2... \FIML Natural Resources Mulville #15B-18-2029_002.dta

General Constants All 000 Last Edited on 01-APR-2014,14:04

General Parameters		
Mud Resistivity	0.810	ohm-metres
Mud Resistivity Temperature	95.000	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	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	

Down-hole Tension Calibration SMS 0 Field Calibration on 18-MAR-2014 09:04

Reading No	Measured	Calibrated (lbs)
1	15374.81	0.00
2	15847.36	399.00

Gamma Calibration MCG-C 150 Field Calibration on 01-APR-2014 09:38

	Measured	Calibrated (API)
Background	70	48
Calibrator (Gross)	1142	773
Calibrator (Net)	1072	725

Gamma Constants MCG-C 150 Last Edited on 01-APR-2014,12:39

Gamma Calibrator Number	GRC038	
Mud Density	1.13	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

SP Calibration MCG-C 150 Field Calibration on 10-MAR-2014 13:42

	Measured	Calibrated (mV)
Reference 1	99.9	99.0
Reference 2	-97.7	-98.8

High Resolution Temperature Calibration MCG-C 150 Field Calibration on 08 MAR 2014 10:59

Measured Calibrated(Deg F)

Lower	50.00	50.00
Upper	75.00	75.00

High Resolution Temperature Constants MCG-C 150

Last Edited on 19-MAR-2014,20:39

Pre-filter Length 11

Caliper Calibration MMR-C.A 248

Base Calibration on 24-MAR-2014 11:12

Field Calibration on 01-APR-2014 09:23

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13253	5.96
2	16528	7.97
3	19726	9.95
4	23473	11.91
5	0	0.00
6	N/A	N/A

Field Calibration

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

Micro Normal and Micro Inverse Calibration MMR-C.A 248

Base Calibration on 24-MAR-2014 11:03

Field Check on 01-APR-2014 09:24

Base Calibration

Channel	Resistor 1	Measured		Calibrated (ohm-m)	
		Resistor 2	Resistor 1	Resistor 2	Resistor 2
Micro Normal	10.1	49.8	5.1	25.6	
Micro Inverse	9.9	49.5	3.4	16.9	

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	93.6	93.6
Micro Inverse	62.2	62.2

Micro Normal and Micro Inverse Constants MMR-C.A 248

Last Edited on 23-JAN-2014,17:04

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

Neutron Calibration MDN-B.J 387

Base Calibration on 21-JAN-2014 13:56

Field Check on 01-APR-2014 09:42

Base Calibration

Ratio	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2848	86	3714	110
	32.942		33.764	

Field Calibrator at Base

Ratio	Calibrated (cps)
	1737 2564
	0.677

Field Check

Ratio	Calibrated (cps)
	1718 2552
	0.668

Neutron Constants MDN-B.J 387

Last Edited on 01-APR-2014,12:39

Neutron Source Id	P58125B
Neutron Jig Number	5824NE
Epithermal Neutron	
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

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-A.A 55

Base Calibration on 24-MAR-2014 10:21
Field Check on 01-APR-2014 09:13

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	951.2	126.8
Base Check		281.7
Field Check		281.7

FE Constants MFE-A.A 55

Last Edited on 01-APR-2014,12:38

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	0.5	inches

Sonic Constants MSS-A.A 73

Last Edited on 01-APR-2014,12:38

Maximum Boundary Contrast	100.00	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 Sonic	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	N/A	micro-sec
MX3FT	N/A	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft

Sonde Mode	Compensated
Hole Type	Open Hole

Sonde Parameters

	Measured	Calibrated
Offset	N/A	0.0000
Free Pipe	N/A	N/A
Peak Amplitude Source		N/A

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)	N/A	
N/A	N/A	N/A		N/A
N/A	N/A	N/A		N/A
N/A	N/A	N/A		N/A
N/A	N/A	N/A		N/A
N/A	N/A	N/A		N/A

Full Waveform Parameters

Use 3' Waveform to derive TR	N/A
Use 4' Waveform to derive TR	N/A
Use 5' Waveform to derive TR	N/A

Use 6' Waveform to derive TR	N/A	
3' Waveform Discriminator Level	N/A	mV
4' Waveform Discriminator Level	N/A	mV
5' Waveform Discriminator Level	N/A	mV
6' Waveform Discriminator Level	N/A	mV
3' Waveform Filter	N/A	
4' Waveform Filter	N/A	
5' Waveform Filter	N/A	
6' Waveform Filter	N/A	

Semblance Level	N/A	
Semblance Window Width	N/A	micro-sec
Sonic 1 Despiker	N/A	N/A
Sonic 2 Despiker	N/A	N/A

Induction Calibration MAI-A.A 5

Base Calibration on 21-JAN-2014,09:50
Field Check on 01-APR-2014 09:12

Base Calibration

Test Loop Calibration		Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High	
1	16.3	470.8	9.3	966.2	
2	5.6	376.1	7.6	821.4	
3	2.6	266.1	5.2	566.0	
4	1.6	130.0	2.6	279.2	

Array Temperature 71.1 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			14.4	3862.9
2			31.7	3592.6
3			29.9	2973.5
4			20.8	2127.8
Deep			18.5	1913.8
Medium			43.2	3864.1
Shallow			47.2	5374.9

Array Temperature 57.5 Deg F

Induction Constants MAI-A.A 5

Last Edited on 01-APR-2014,12:38

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	8.0000	
Stand-off Fin Angle	45.00	degrees
Stand-off Fin Width	0.5000	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

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

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-A.A 5

Field Calibration on 21-JAN-2014,15:43

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	75.00	75.00

High Resolution Temperature Constants MAI-A.A 5

Last Edited on 12-MAR-2014,16:38

Pre-filter Length	11
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Photo Density Calibration MPD-B 64

Base Calibration on 21-JAN-2014 13:19

Field Check on 01-APR-2014 09:21

Density Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Base Calibration				
Background	1151	1332		
Reference 1	54413	28212	59556	30836
Reference 2	21794	2569	24941	2541

Field Check at Base	1151.0	1331.7
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Field Check	1136.0	1330.1
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PE Calibration	Base Calibration	WS	Measured		Calibrated Ratio
			WH	Ratio	
		207	1021		
		20693	54218	0.385	0.371
		5952	21660	0.278	0.272

Field Check at Base	206.5	1020.6
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Field Check	206.1	1008.0
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Density Constants MPD-B 64

Last Edited on 01-APR-2014,12:39

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 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	0.00
0.00	0.00

Caliper Calibration MPD-B 64

Base Calibration on 13-FEB-2014 15:49

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	16976	3.99
2	26016	5.98
3	34528	7.97
4	42943	9.86
5	52224	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.94	7.97

DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Logs\FIML Natural Resources Mulville #15B-18-2...\FIML Natural Resources Mulville #15B-18-2029_002.dta

CBH-C, Cablehead, 11 pin

CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma

MCG-C 150 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity

MMR-C.A 248 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron

MDN-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper

MPD-B 64 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric

MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

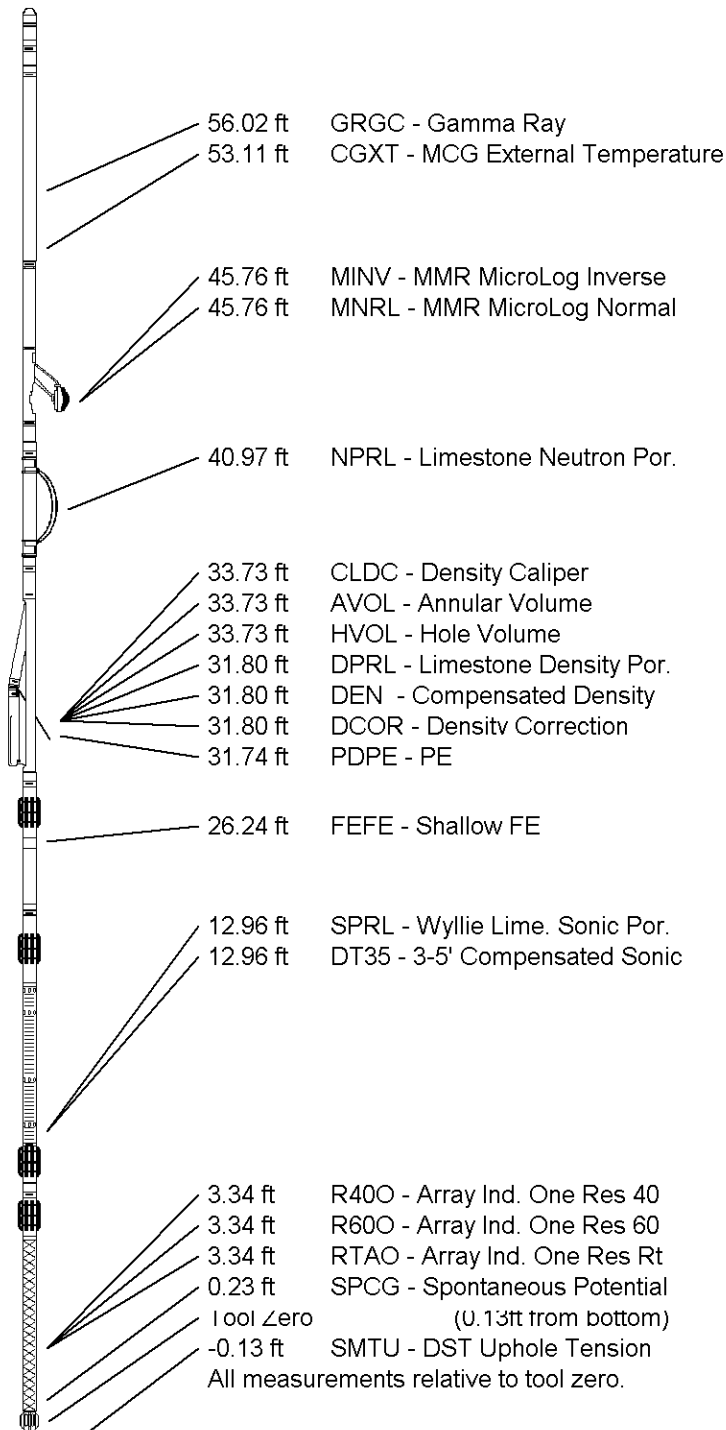
Compact Sonic

MSS-A.A 73 LG: 12.52 ft WT: 72.8 lb OD: 2.240 in

Compact Induction

MAI-A.A 5 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 63.70 ft Weight: 480.6 lb



COMPANY FIML NATURAL RESOURCES, LLC.
WELL MULVILLE #15B-18-2029
FIELD WILDCAT
PROVINCE/COUNTY LANE
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	2899.00	feet	First Reading	4925.00	feet
Elevation Drill Floor	2897.00	feet	Depth Driller	4935.00	feet
Elevation Ground Level	2889.00	feet	Depth Logger	4938.00	feet



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