



Weatherford[®]

**COMPENSATED SONIC
WITH INTEGRATED TRANSIT TIME**

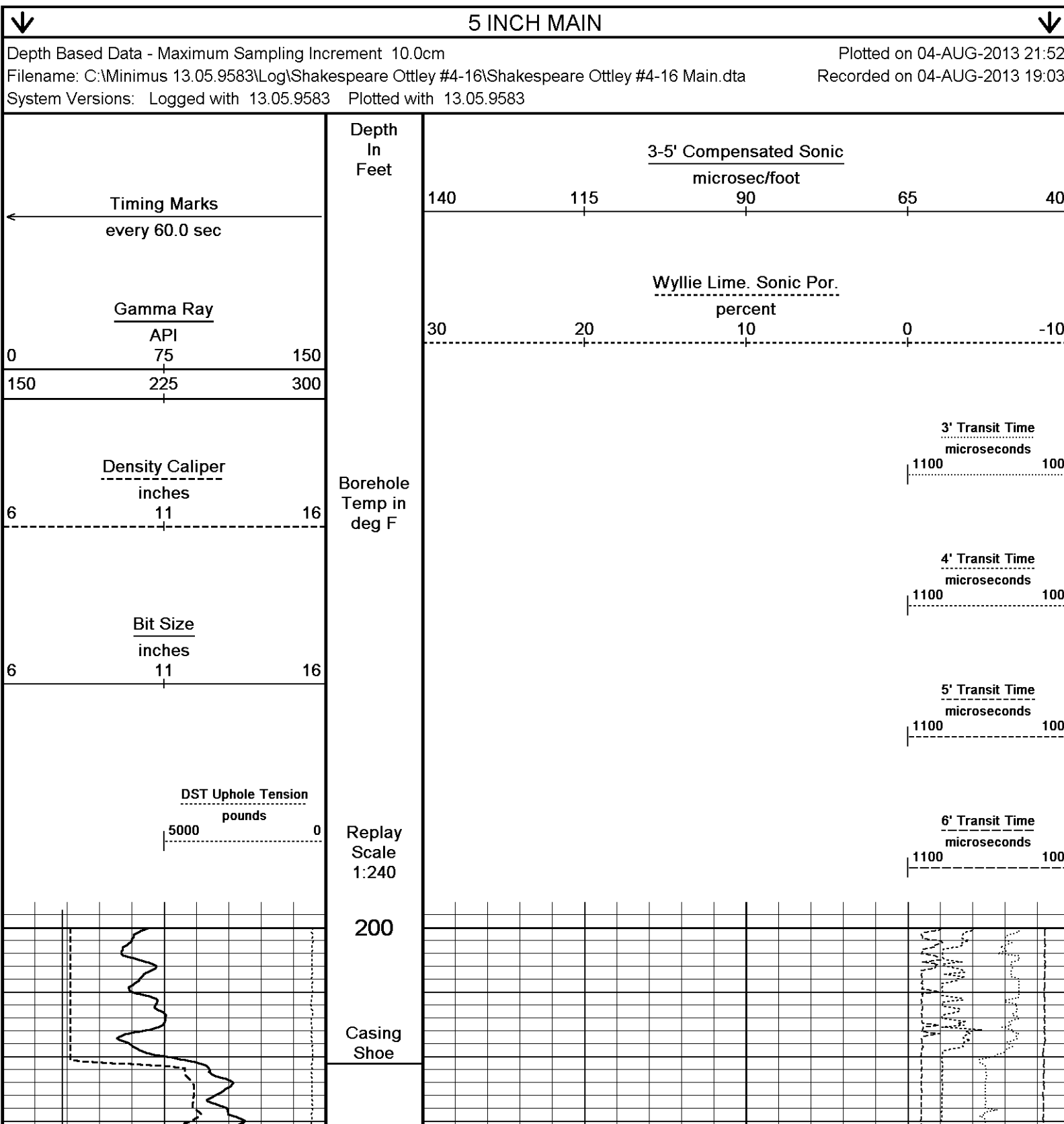
COMPANY				SHAKESPEARE OIL CO., INC.			
WELL				OTTELEY #4-16			
FIELD				WILDCAT			
PROVINCE/COUNTY				LOGAN			
COUNTRY/STATE				U.S.A. / KANSAS			
LOCATION				1599' FNL & 1852' FWL			
SEC	TWP	RGE	Other Services				
16	14S	32W	MPD/MDN				
API Number	15-109-21198		MAI/MFE				
Permit Number			MML				
Permanent Datum G.L., Elevation 2808 feet					Elevations:		
Log Measured From KB					KB 2818.00		
Drilling Measured From K.B. @10 FEET					DF 2816.00		
					GL 2808.00		
Date	04-AUG-2013						
Run Number	ONE						
Service Order	3539955						
Depth Driller	4530.00		feet				
Depth Logger	4528.00		feet				
First Reading	4515.00		feet				
Last Reading	221.00		feet				
Casing Driller	222.00		feet				
Casing Logger	221.00		feet				
Bit Size	7.875		inches				
Hole Fluid Type	CHEMICAL						
Density / Viscosity	9.10	lb/USg	55.00	CP			
PH / Fluid Loss	10.00		10.00	ml/30Min			
Sample Source	FLOWLINE						
Rm @ Measured Temp	0.51	@ 98.0	ohm-m				
Rmf @ Measured Temp	0.41	@ 98.0	ohm-m				
Rmc @ Measured Temp	0.61	@ 98.0	ohm-m				
Source Rmf / Rmc	CALC		CALC				
Rm @ BHT	0.44	@115.0	ohm-m				
Time Since Circulation	3 HOURS						
Max Recorded Temp	115.00	deg F					
Equipment / Base	13096		LIB				
Recorded By	ROB HOFFMAN						
Witnessed By	TIM PRIEST						
JOB #	LB13-218						

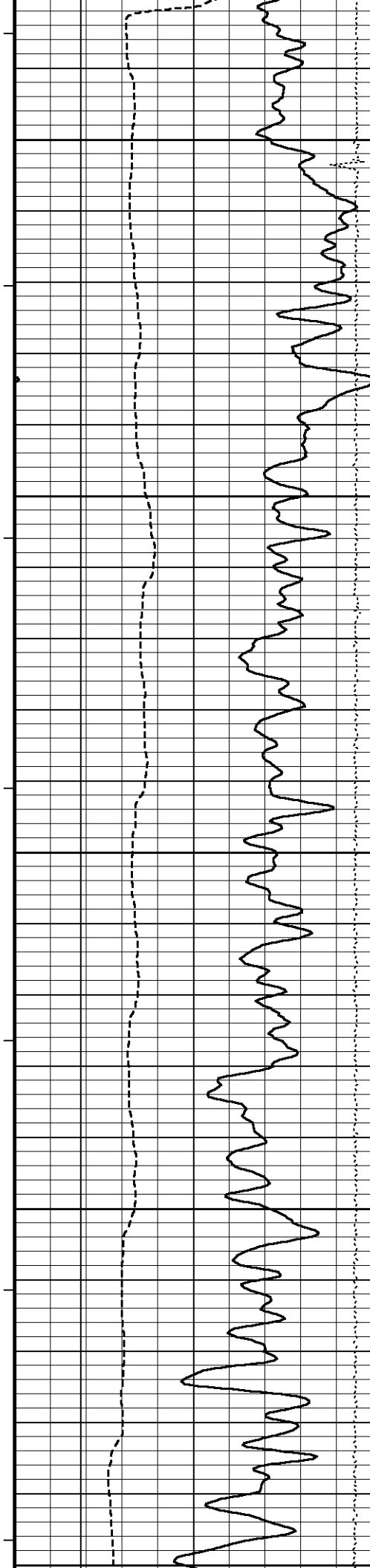
BOREHOLE RECORD				Last Edited: 04-AUG-2013 15:52
Bit Size inches		Depth From feet		Depth To feet
7.875		222.00		4530.00
CASING RECORD				
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	222.00	24.00

REMARKS
- SOFTWARE ISSUE: WLS 13.05.9583.
- 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: 1952 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO SURFACE CASING: 175 CU. FT.

- SERVICE ORDER # 3539955
- RIG: HD DRILLING #2.
- ENGINEER: ROB HOFFMAN
- OPERATOR(S): NICK ADAME

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





94°

250

94°

300

94°

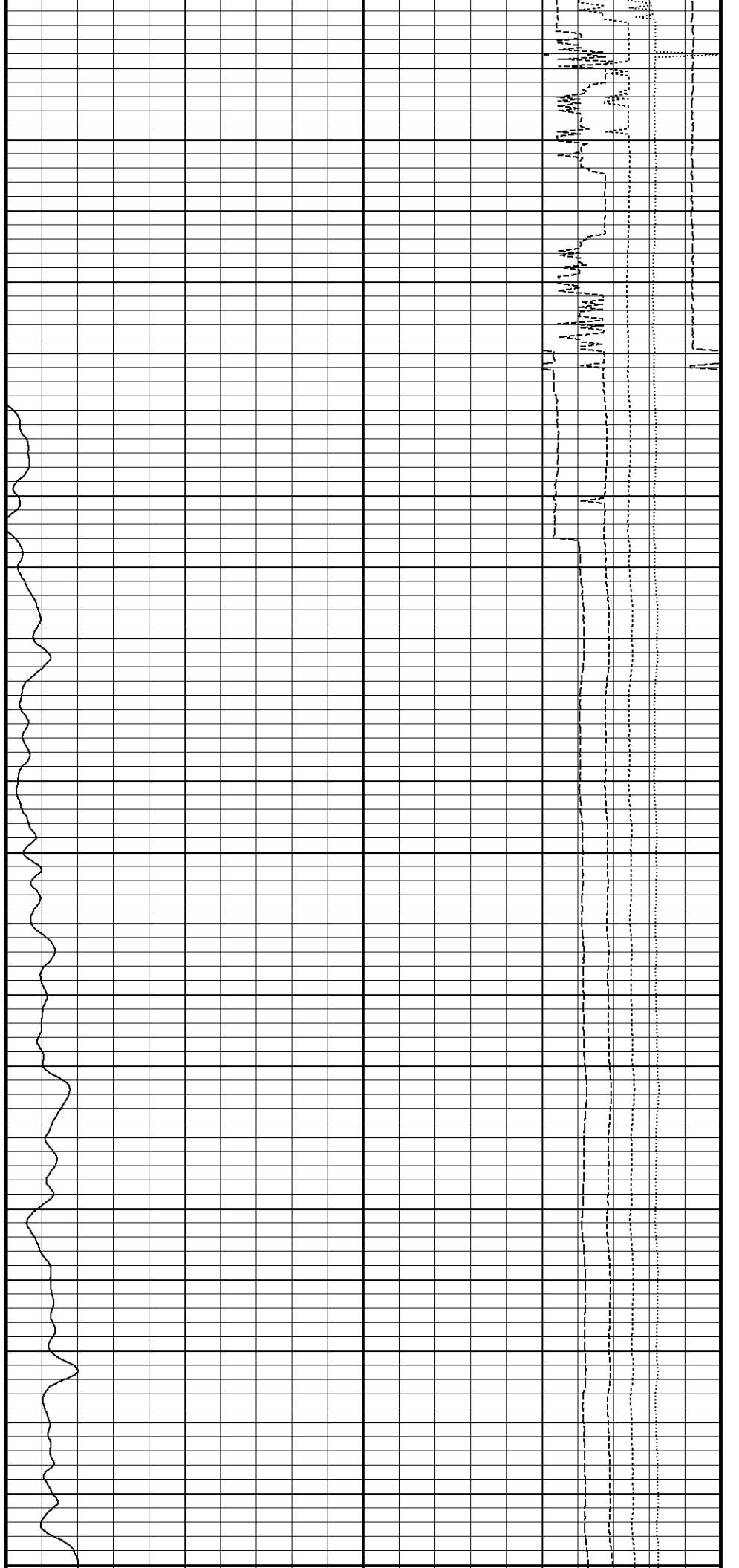
350

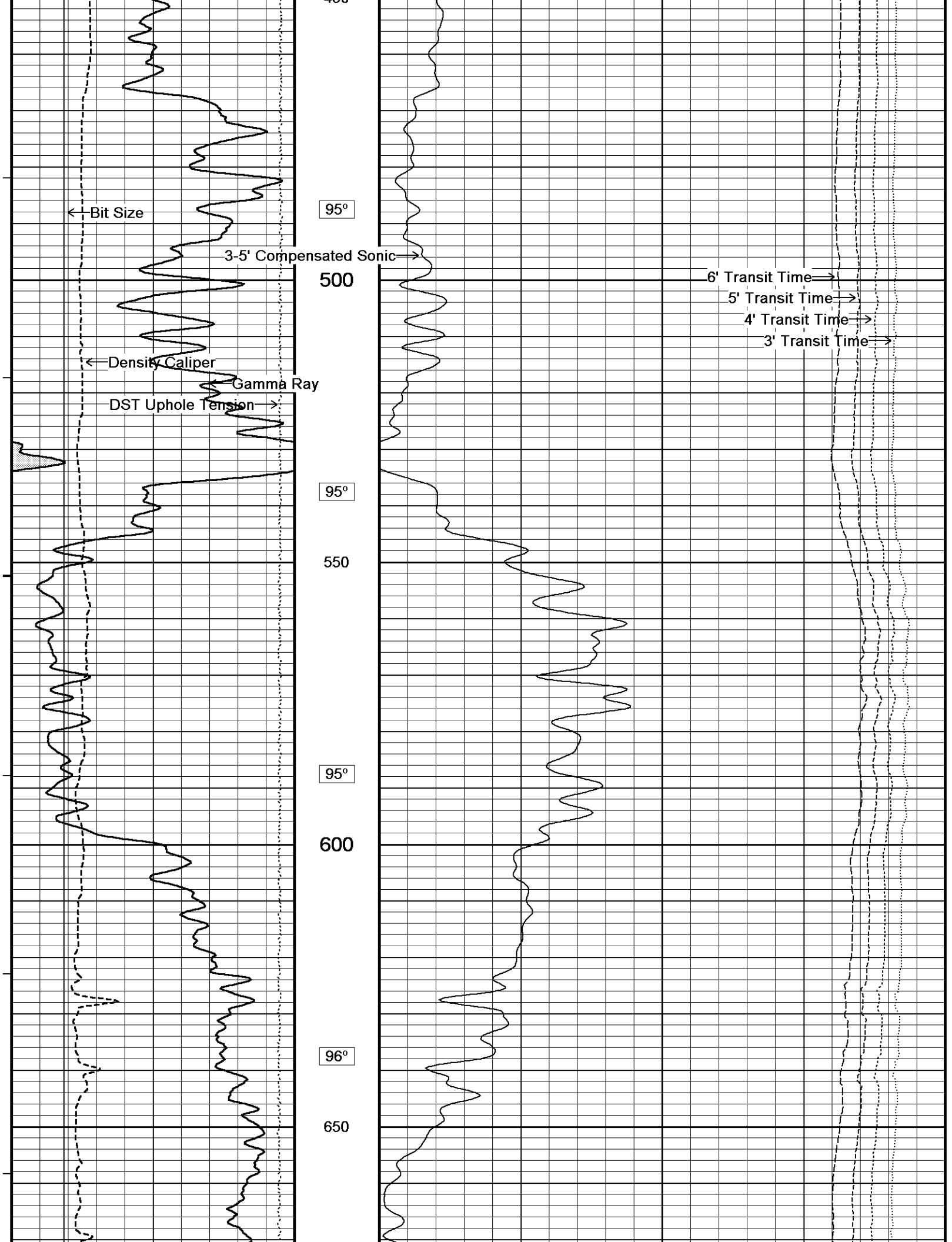
94°

400

95°

450







96°

700

97°

750

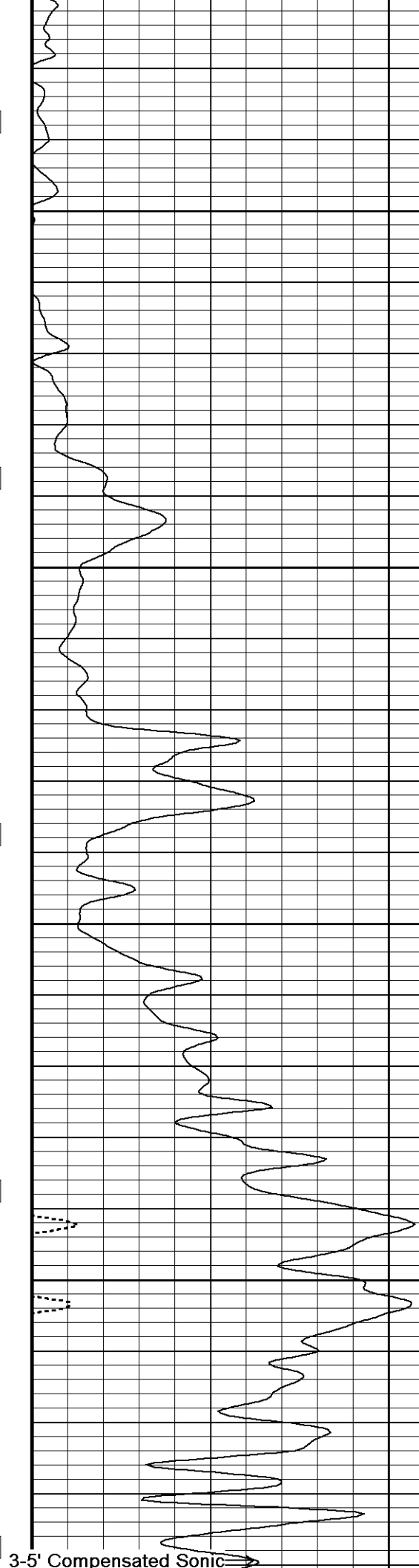
97°

800

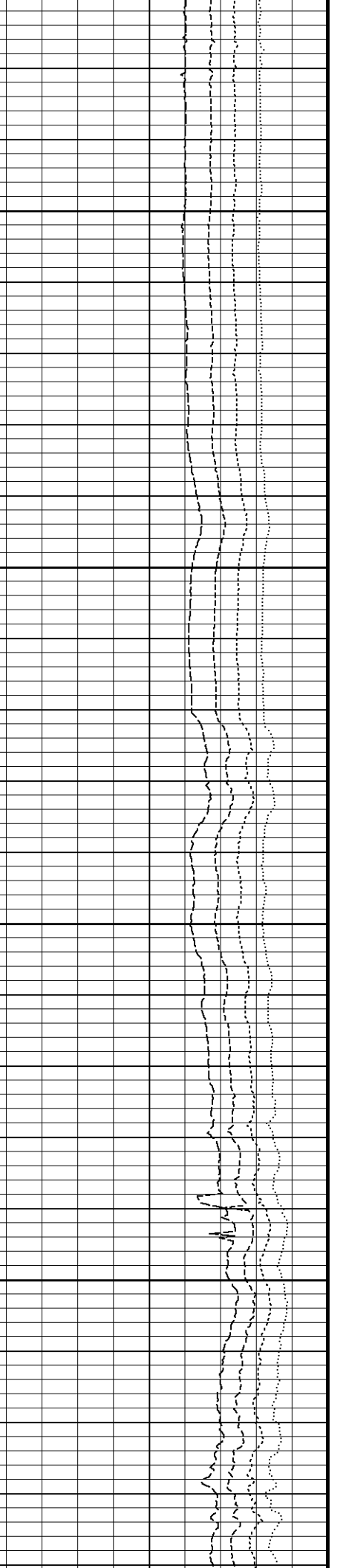
97°

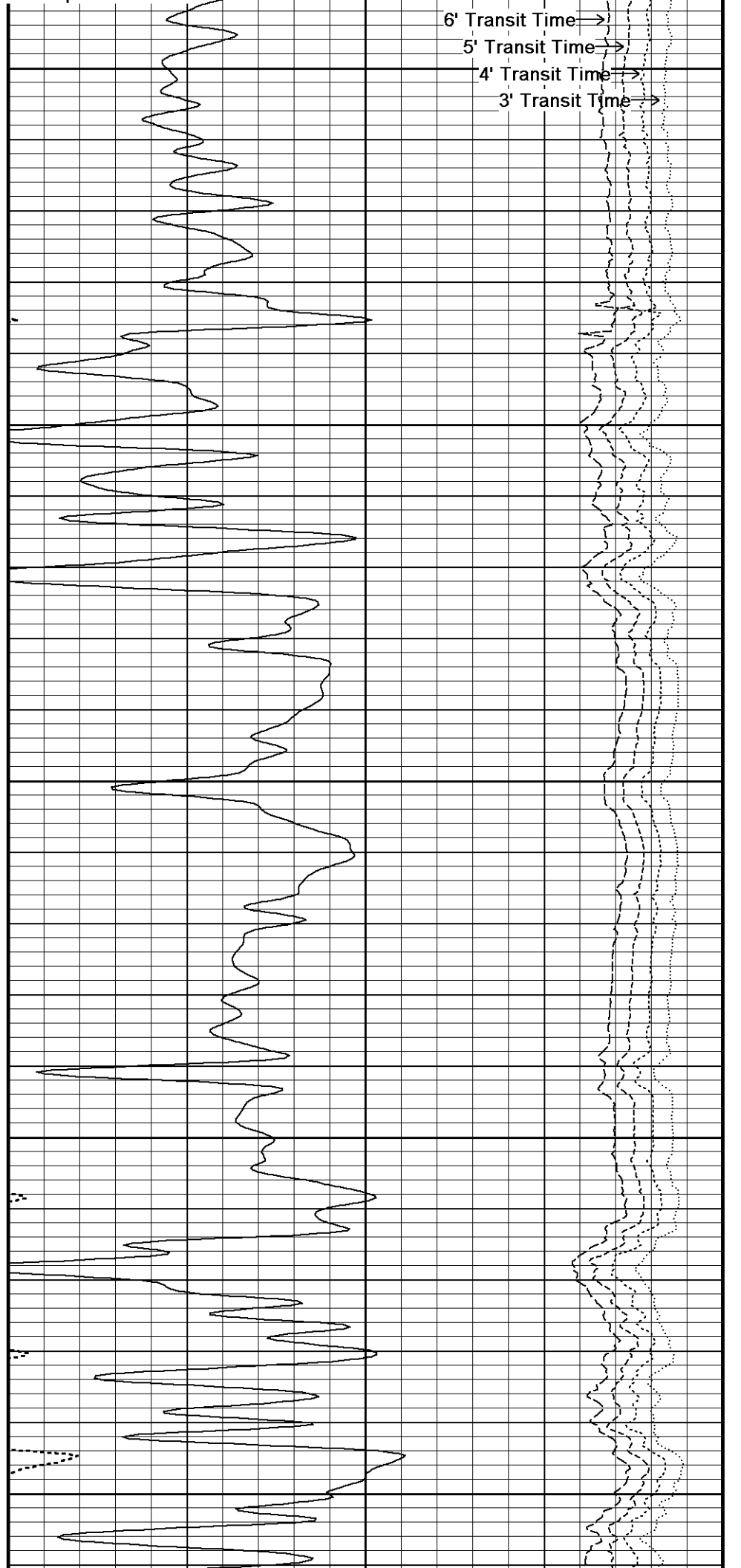
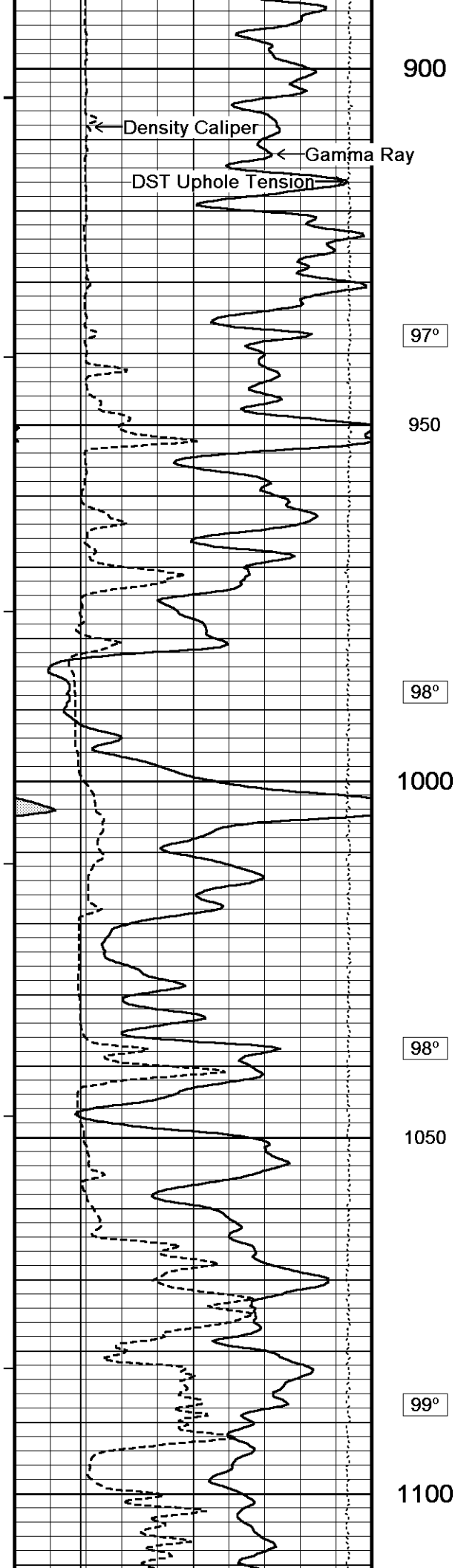
850

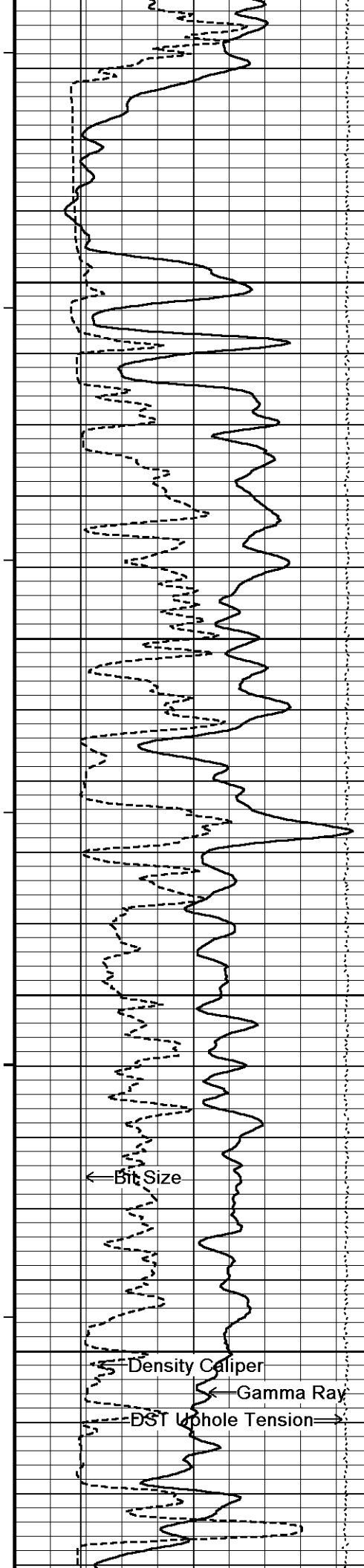
97°



3-5' Compensated Sonic







99°

1150

99°

1200

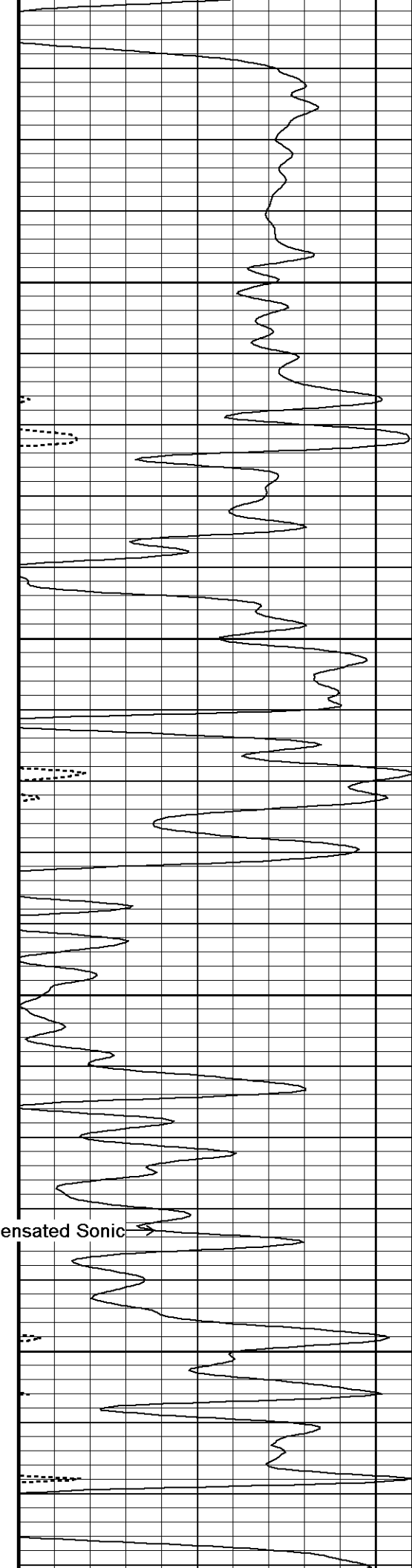
100°

1250

3-5' Compensated Sonic

100°

1300

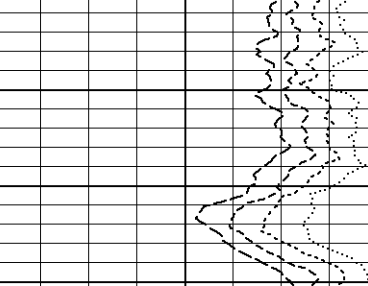


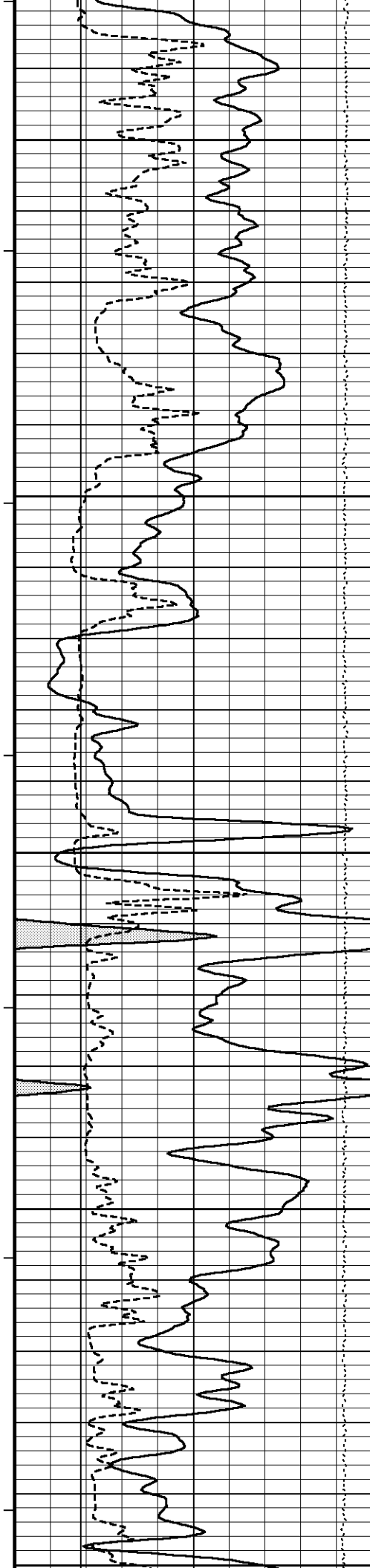
6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time





100°

1350

100°

1400

101°

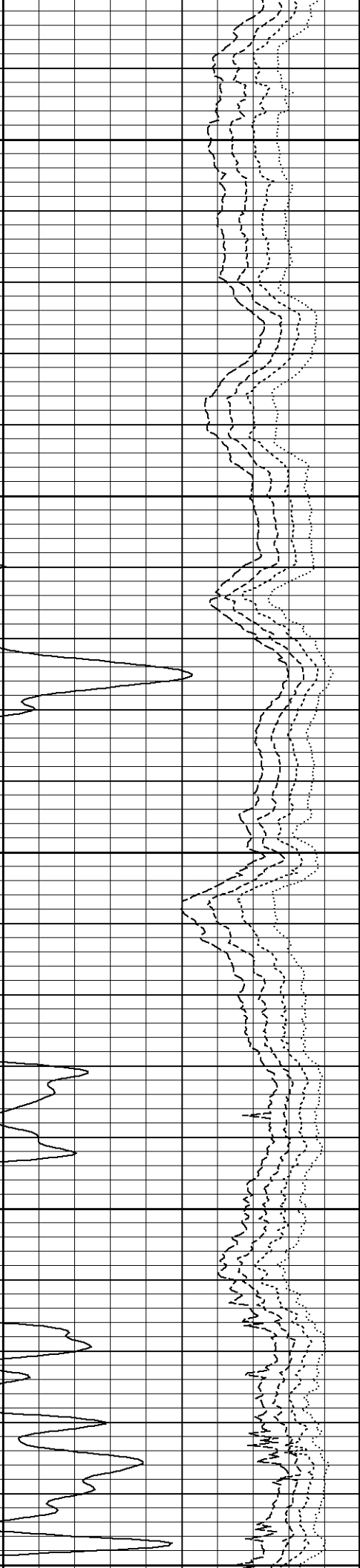
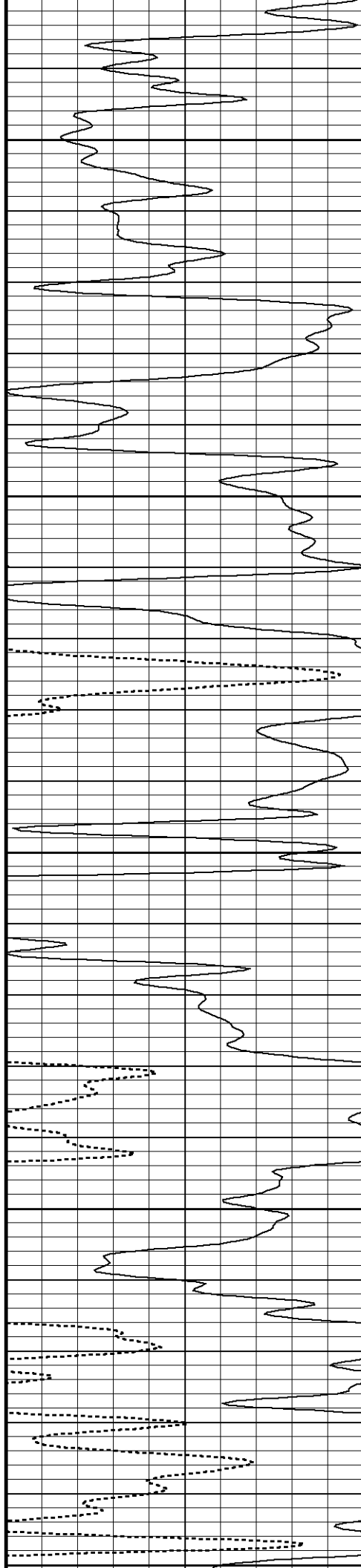
1450

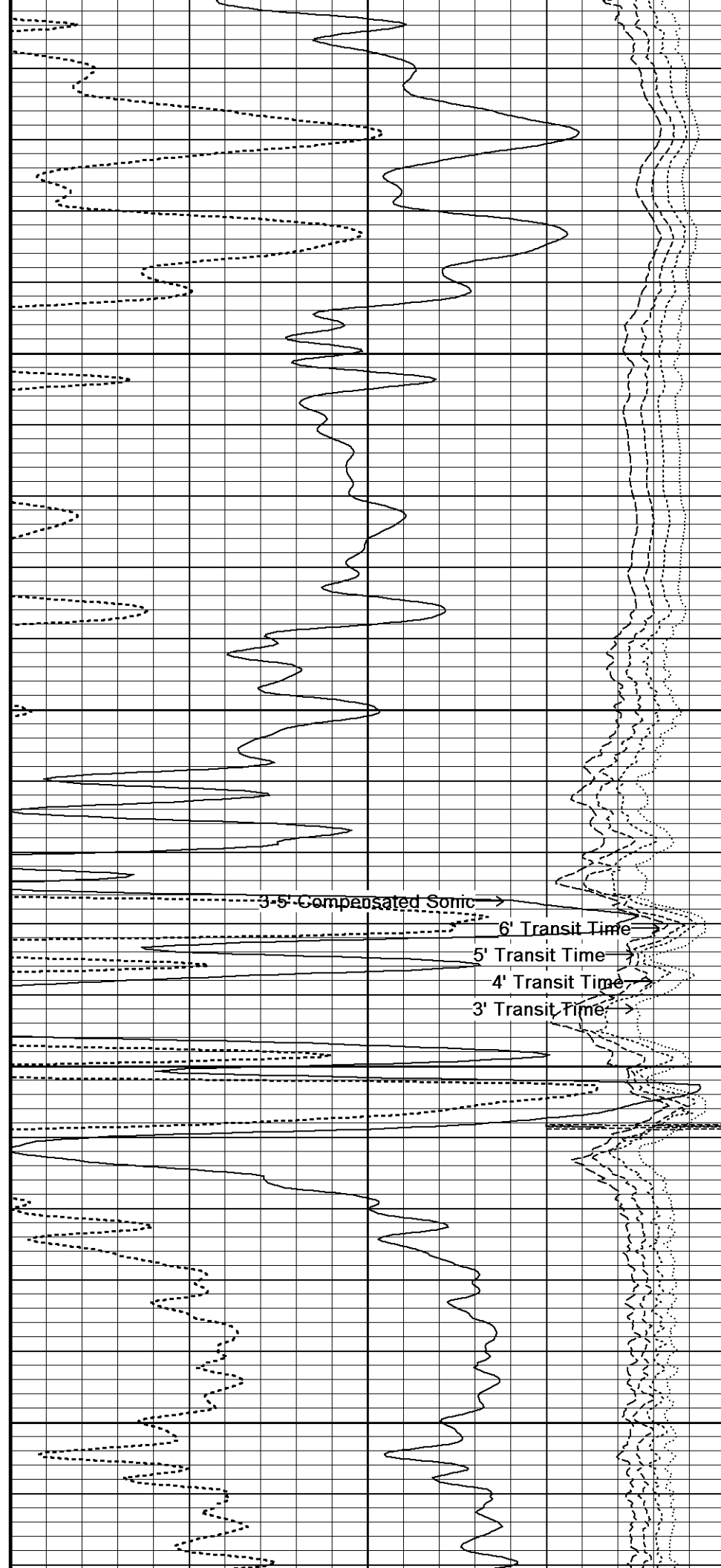
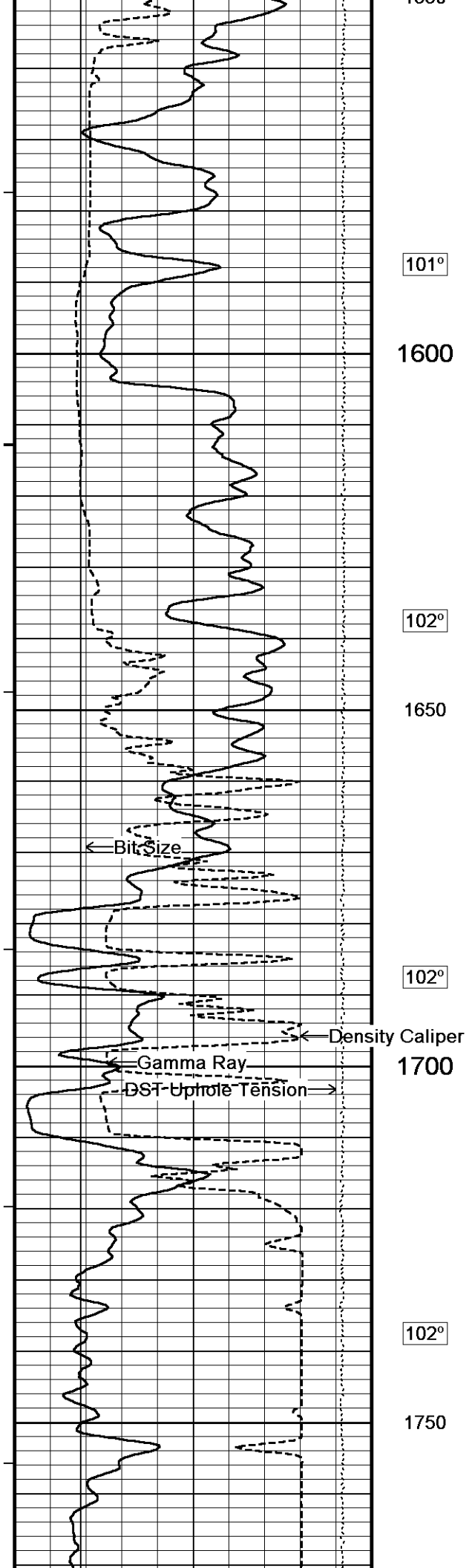
101°

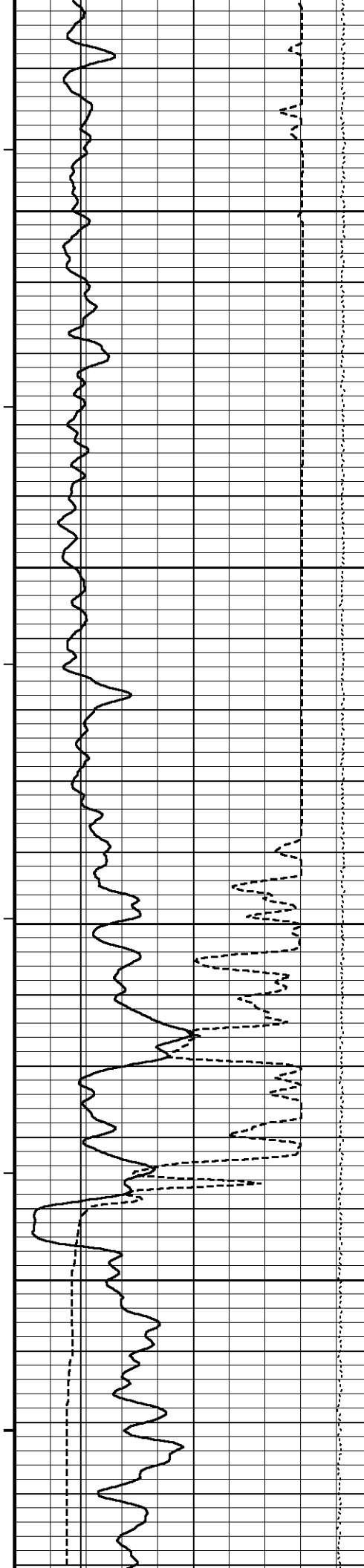
1500

101°

1550







102°

1800

102°

1850

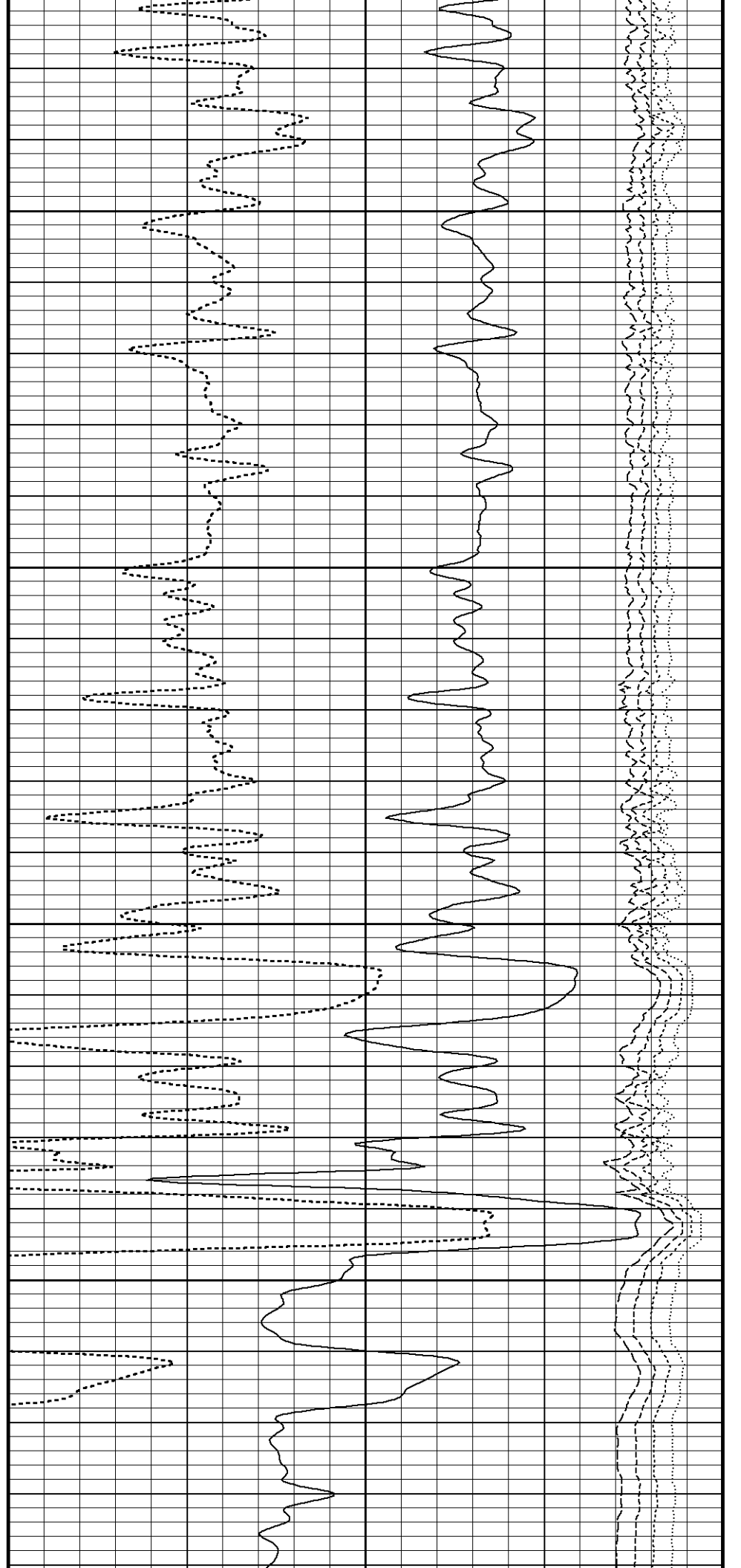
102°

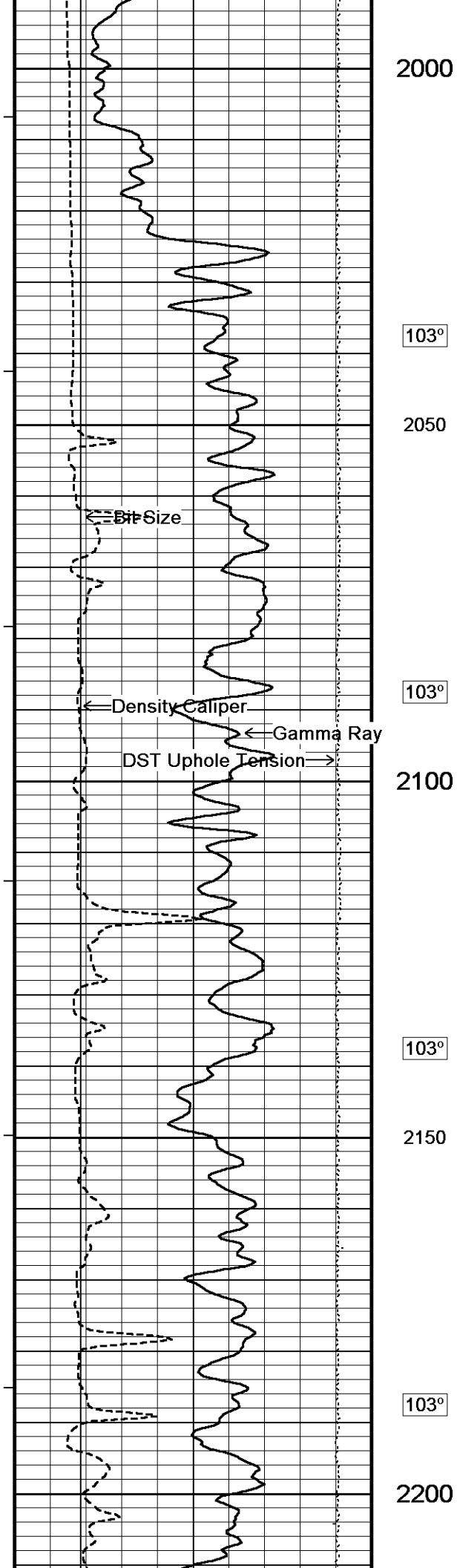
1900

102°

1950

103°





2000

103°

2050

103°

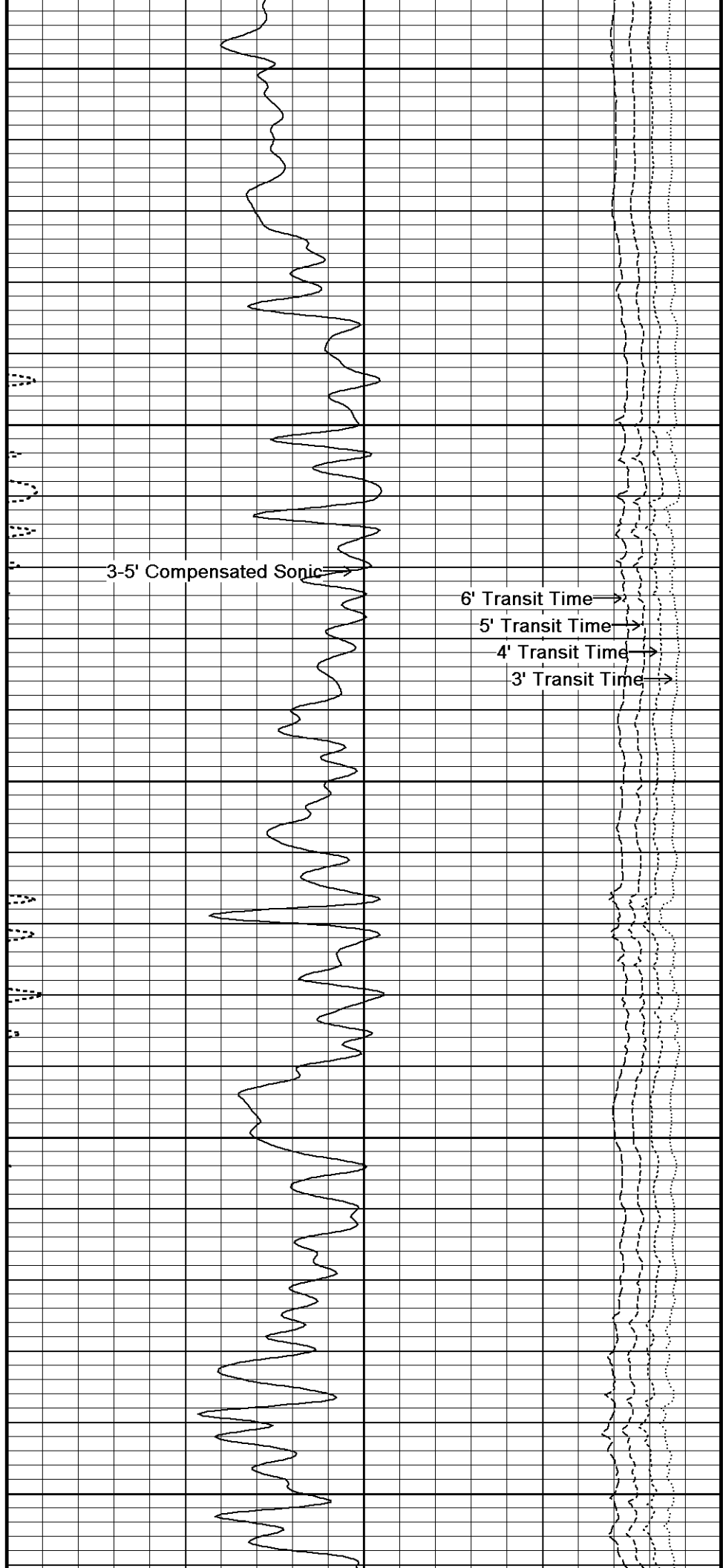
2100

103°

2150

103°

2200



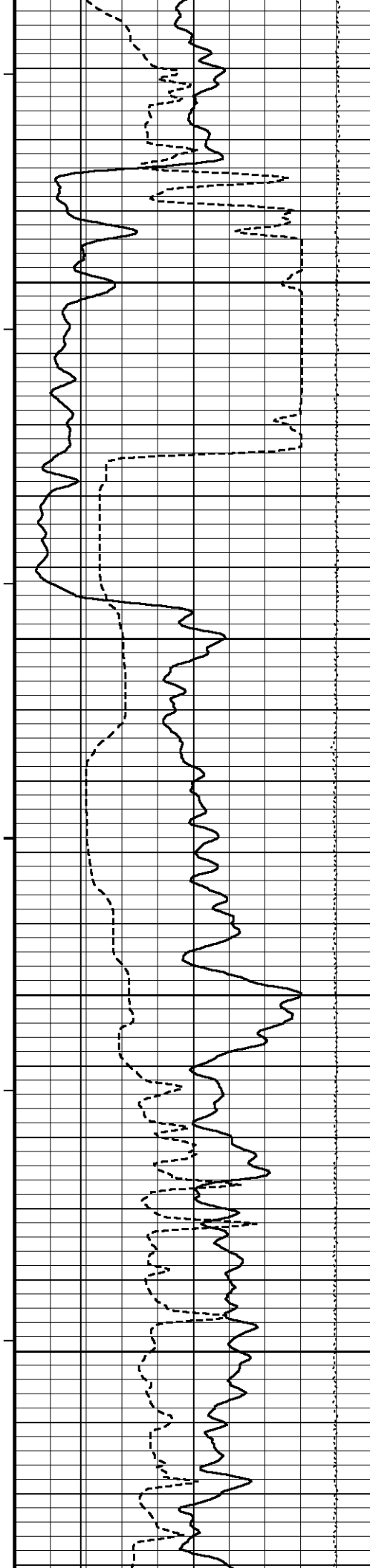
3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time



104°

2250

103°

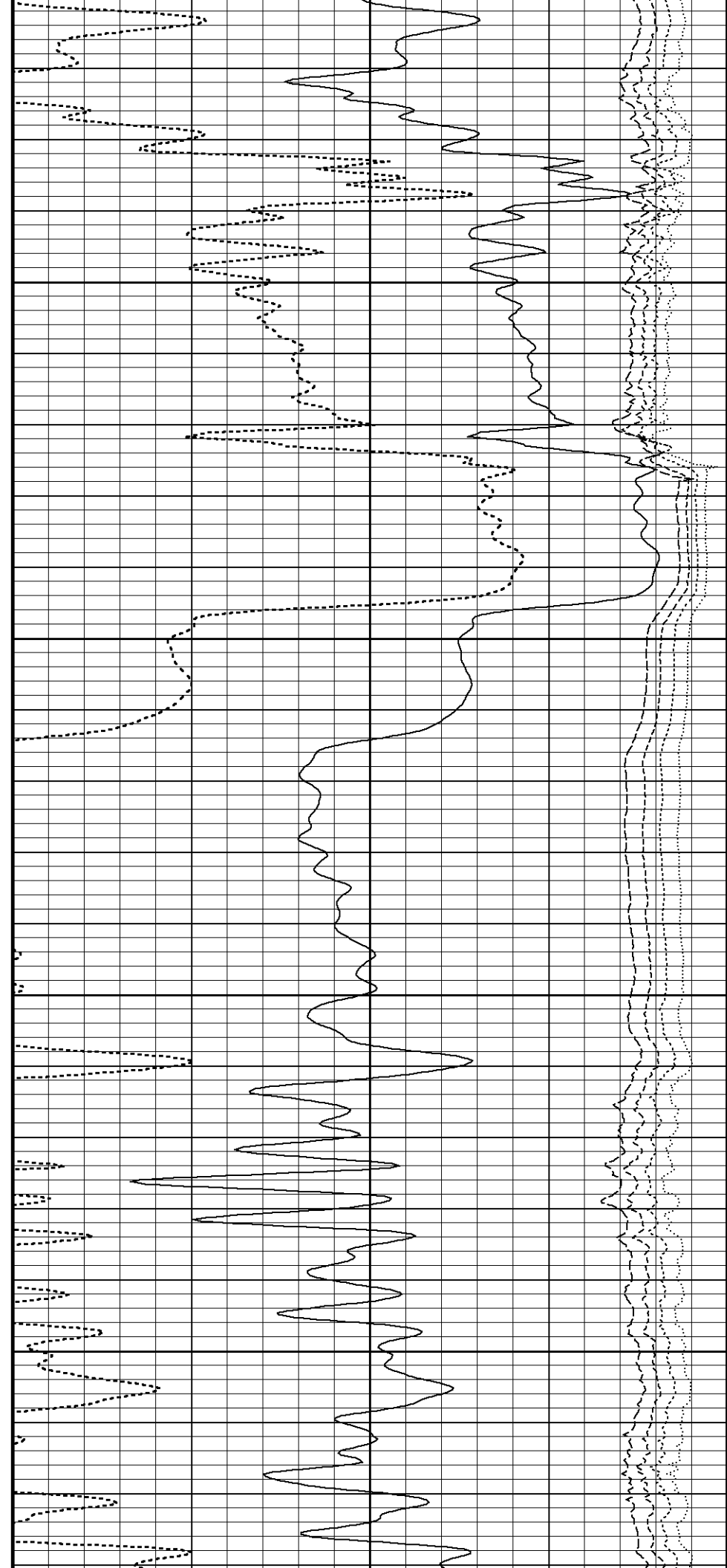
2300

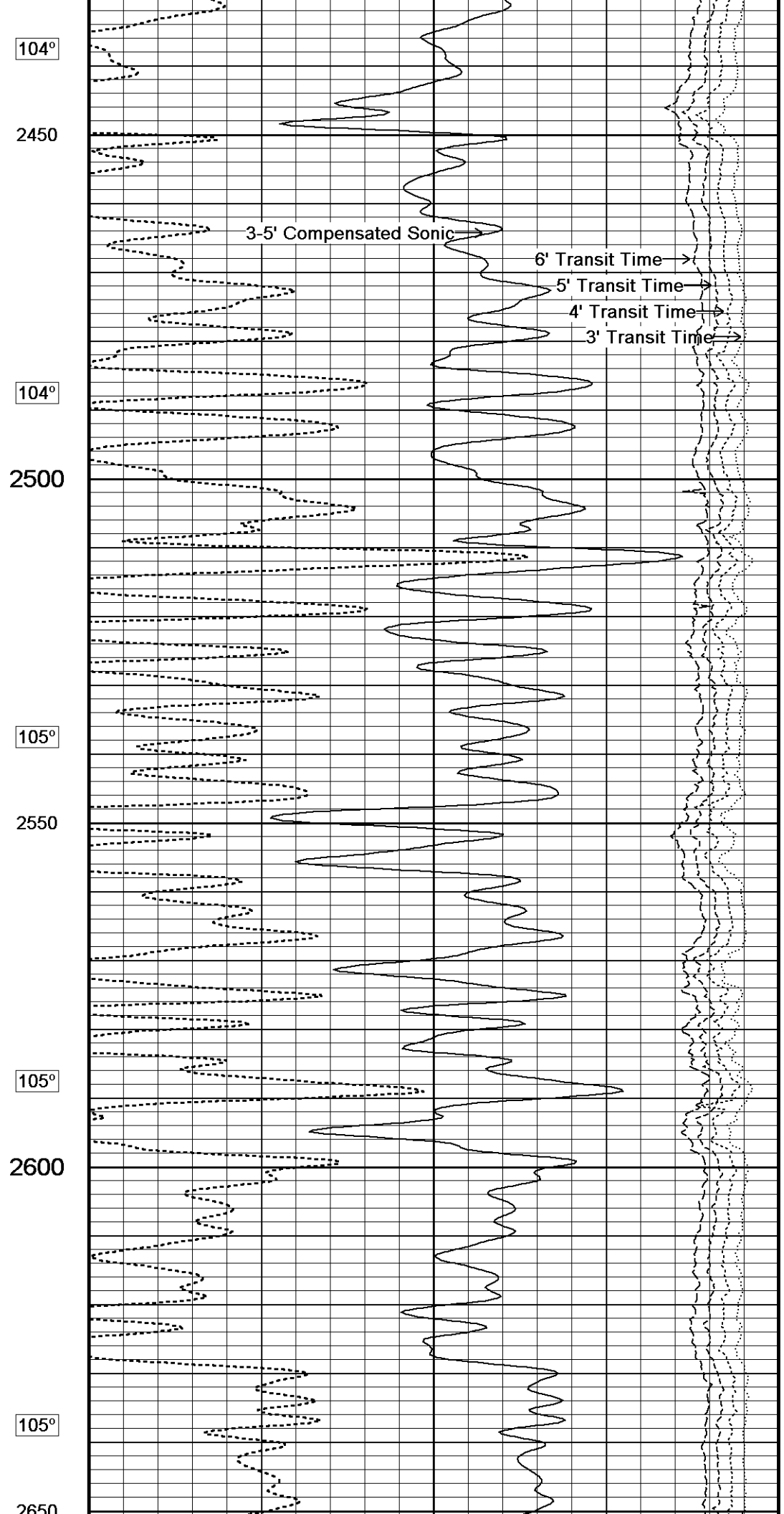
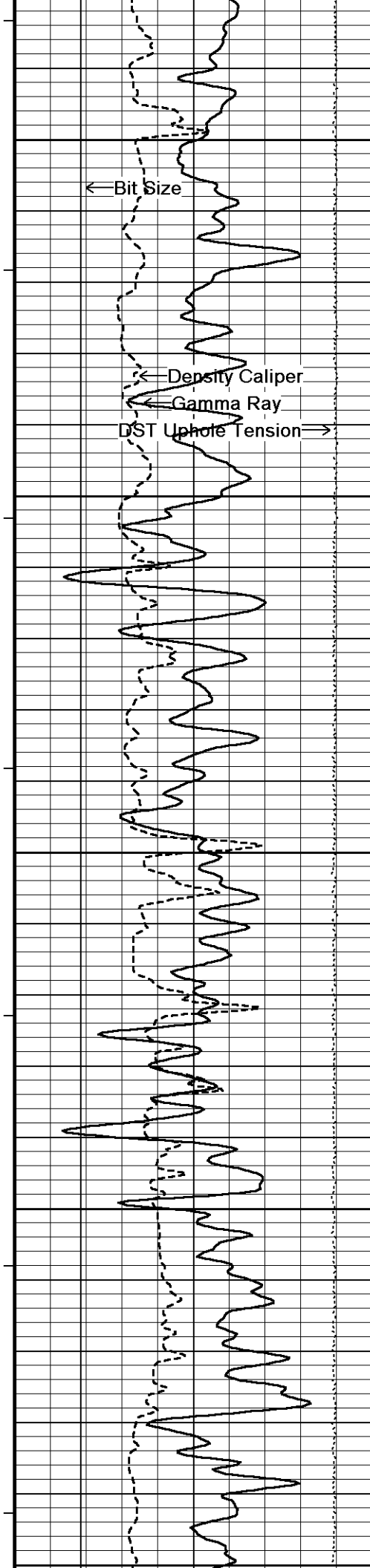
104°

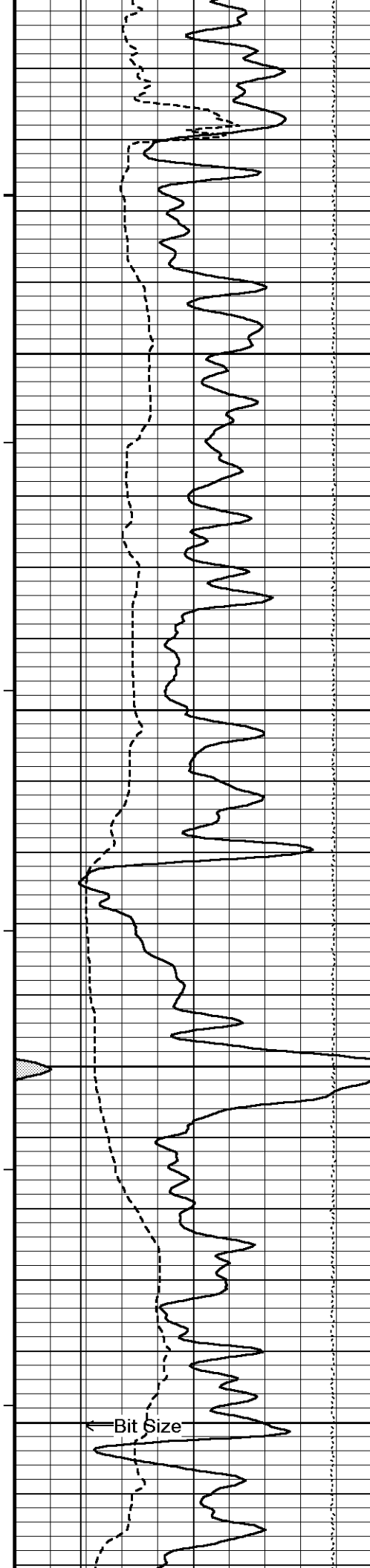
2350

104°

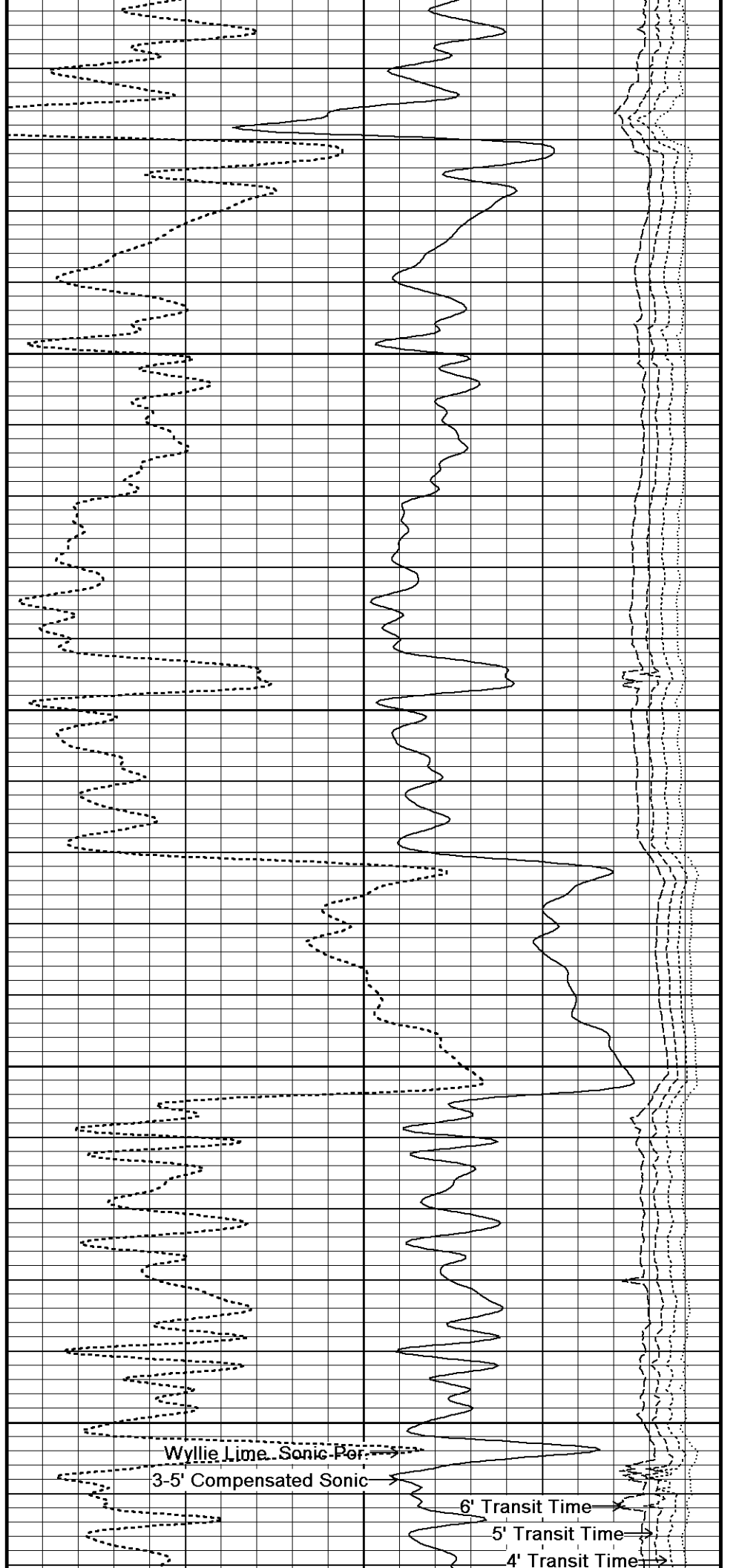
2400



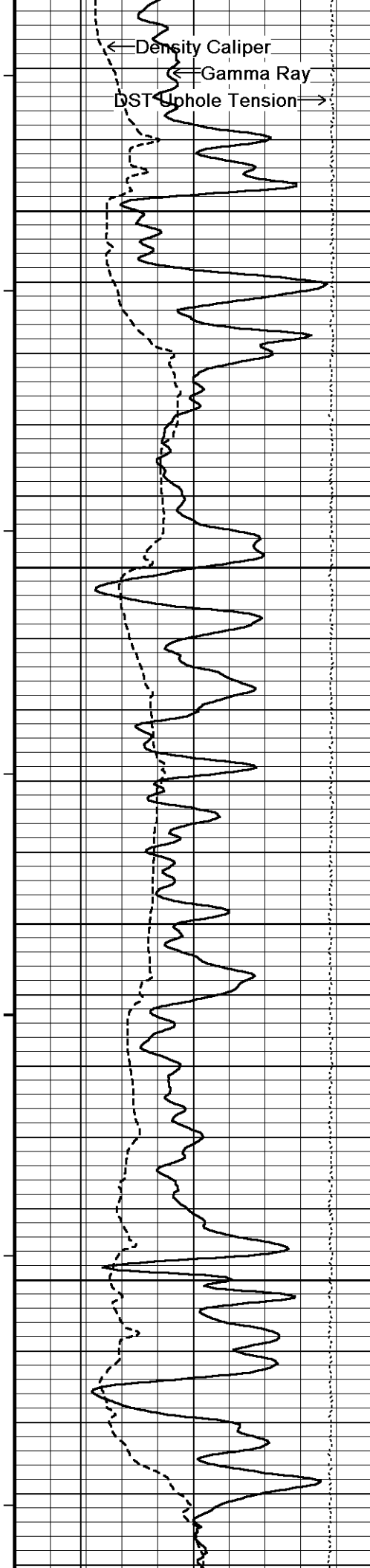




2650
105°
2700
106°
2750
106°
2800
106°
2850



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



107°

2900

107°

2950

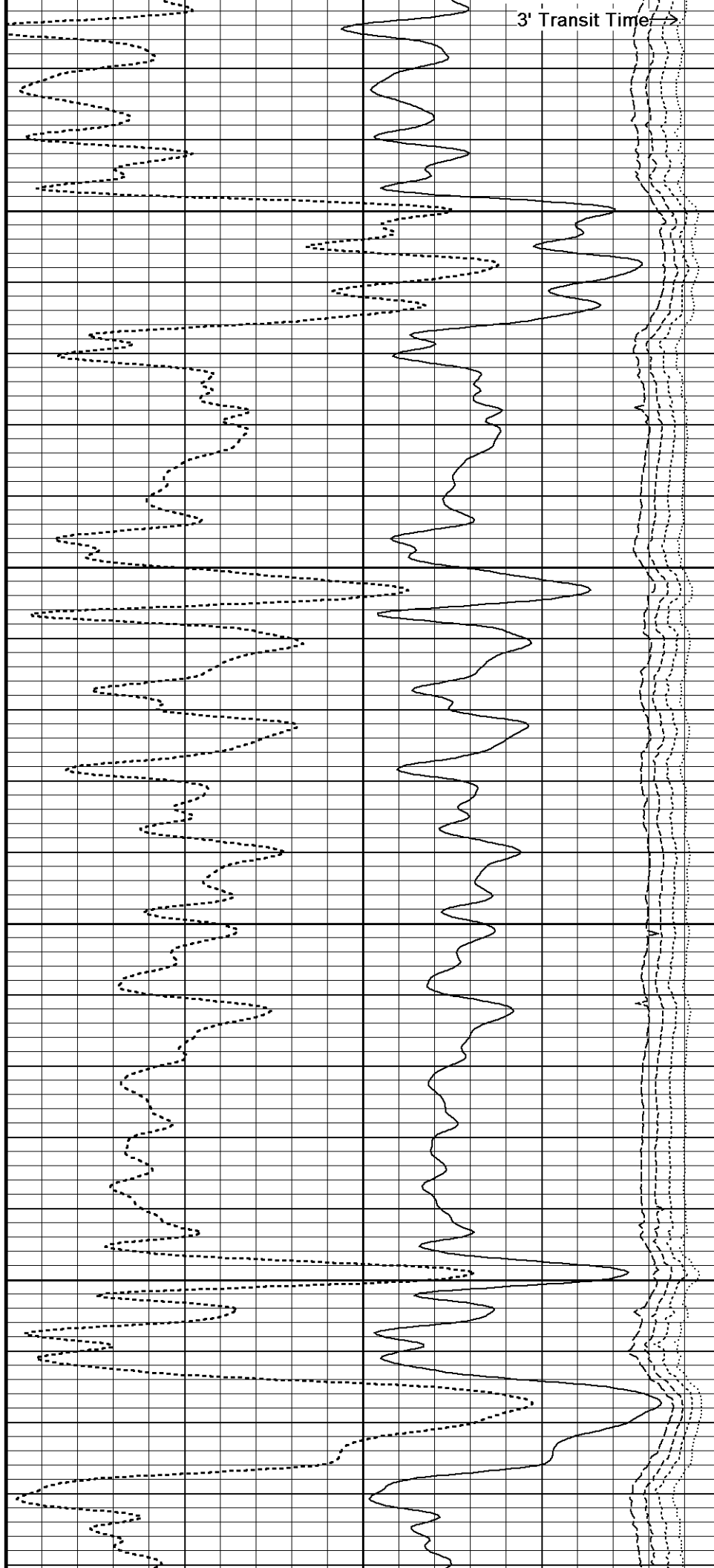
107°

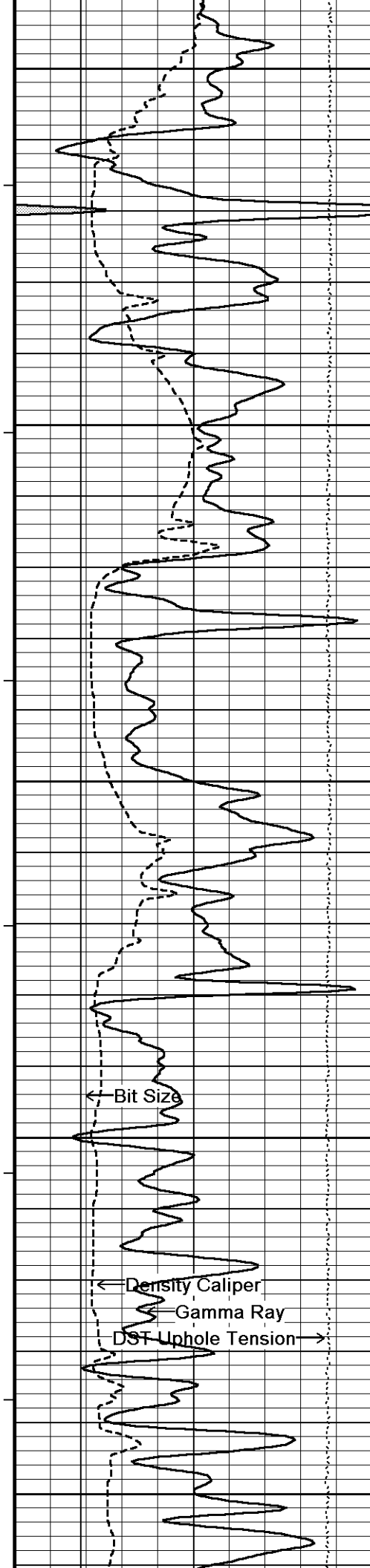
3000

107°

3050

107°





3100

107°

3150

108°

3200

108°

3250

Wyllie Lime. Sonic Por. →

3-5' Compensated Sonic →

6' Transit Time →

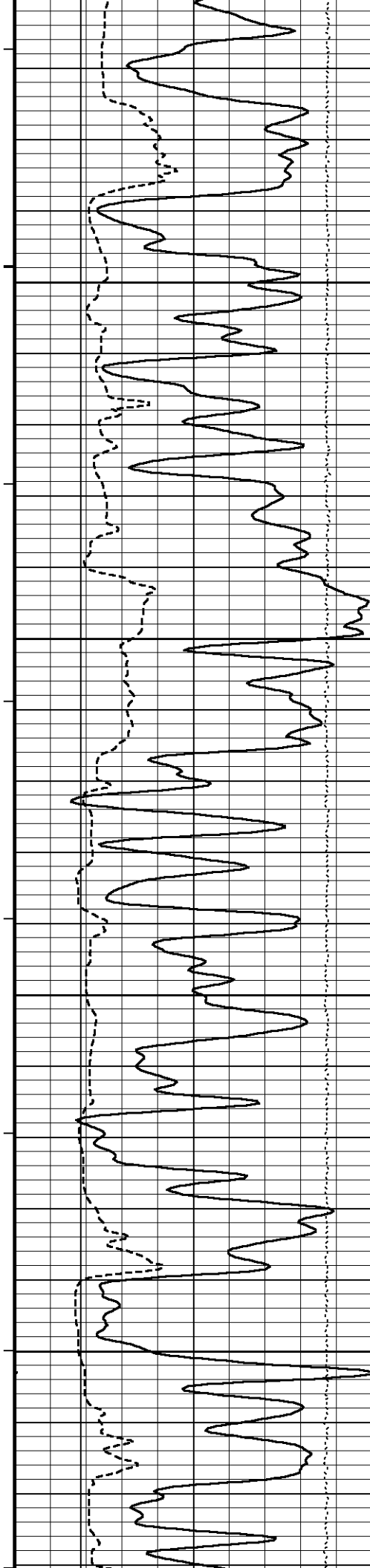
5' Transit Time →

4' Transit Time →

3' Transit Time →

108°

3300



108°

3350

109°

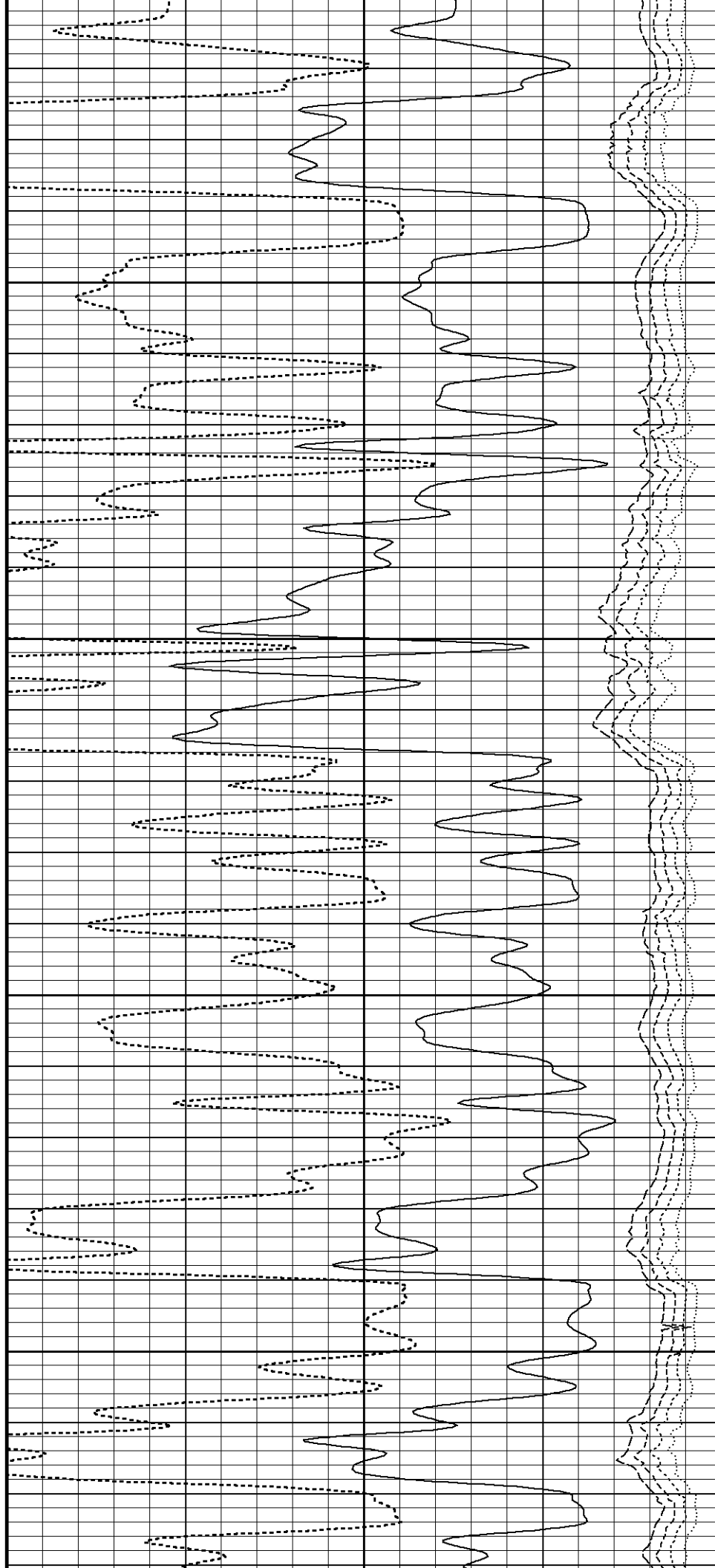
3400

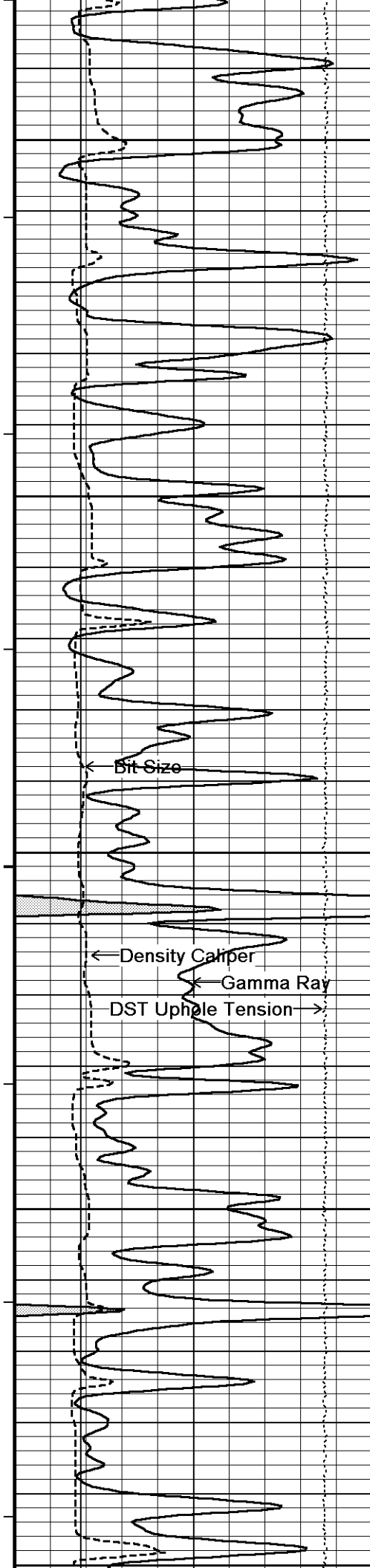
109°

3450

109°

3500





110°

3550

110°

3600

110°

3650

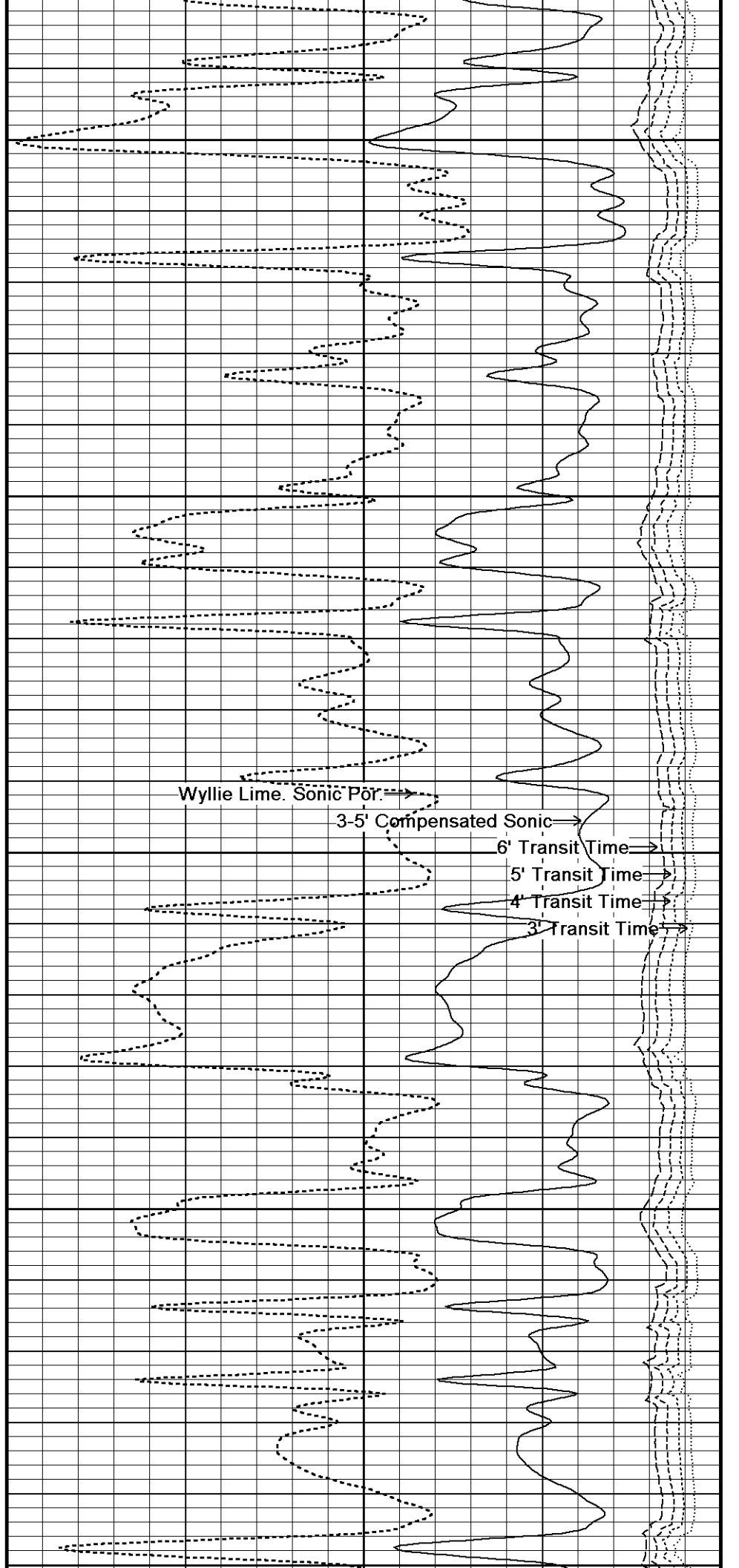
← Density Caliper
* Gamma Ray
DST Uphole Tension →

110°

3700

110°

3750



Wyllie Lime. Sonic Por. →

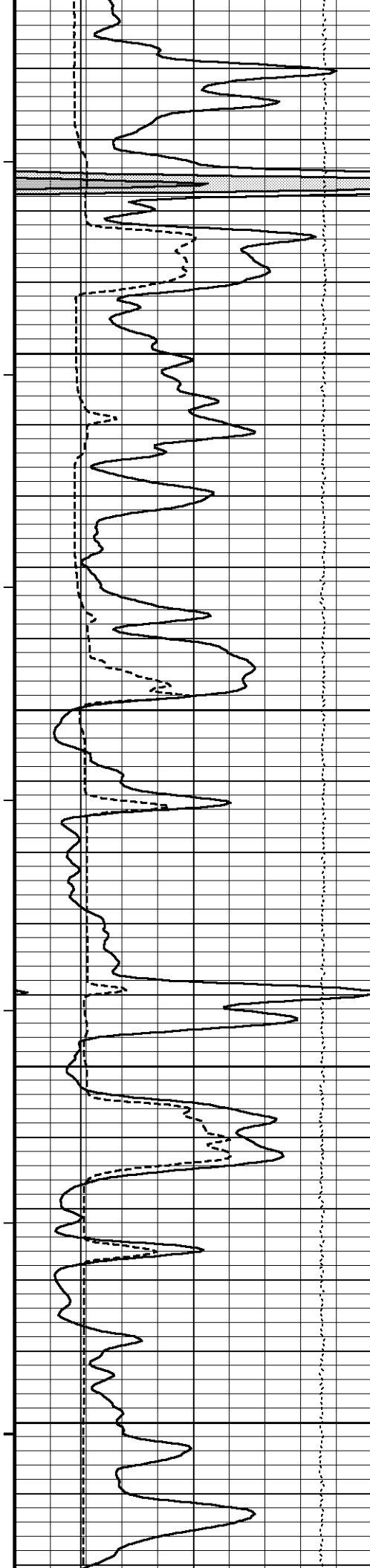
3-5' Compensated Sonic →

6' Transit Time →

5' Transit Time →

4' Transit Time →

3' Transit Time →



3750

110°

3800

110°

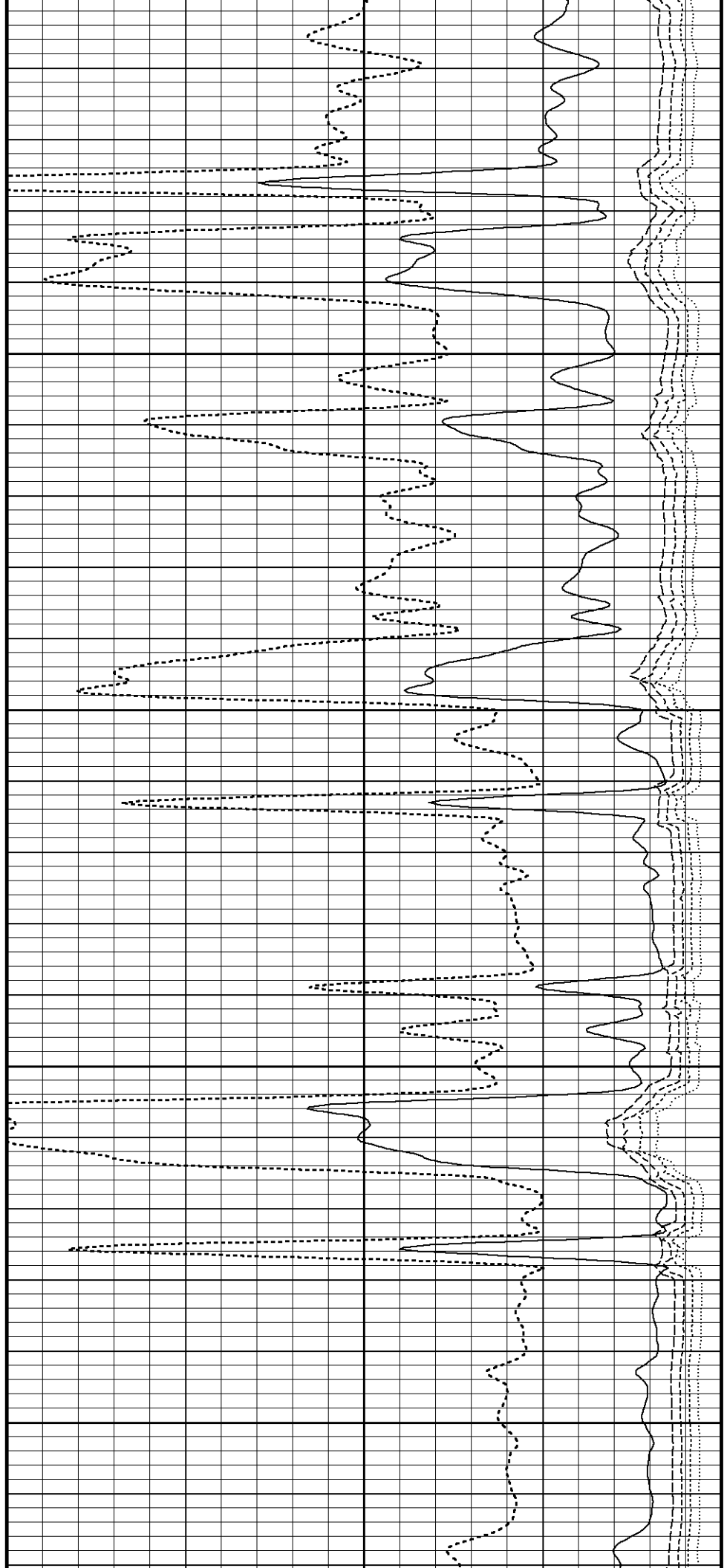
3850

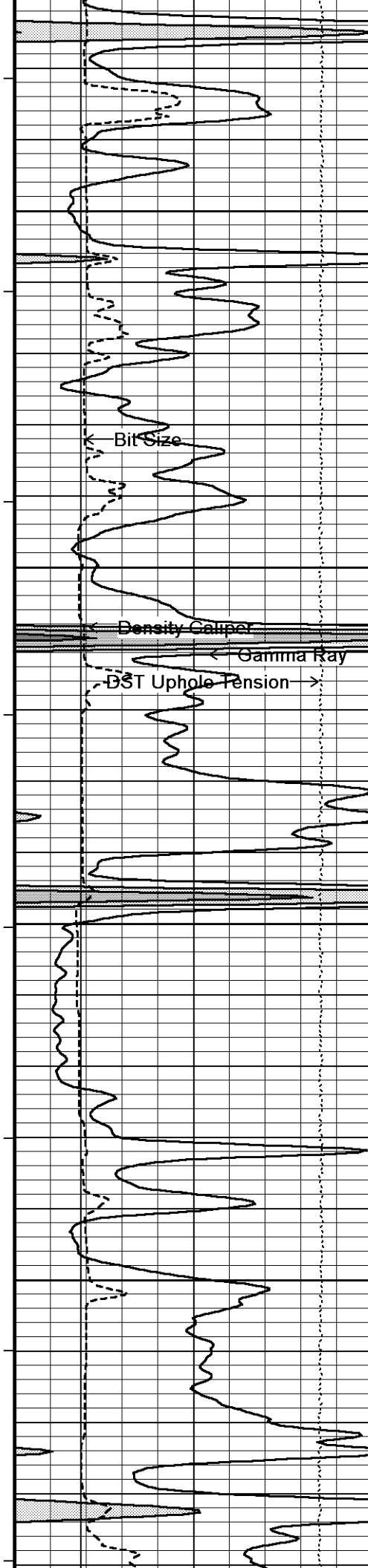
111°

3900

111°

3950





111°

4000

112°

4050

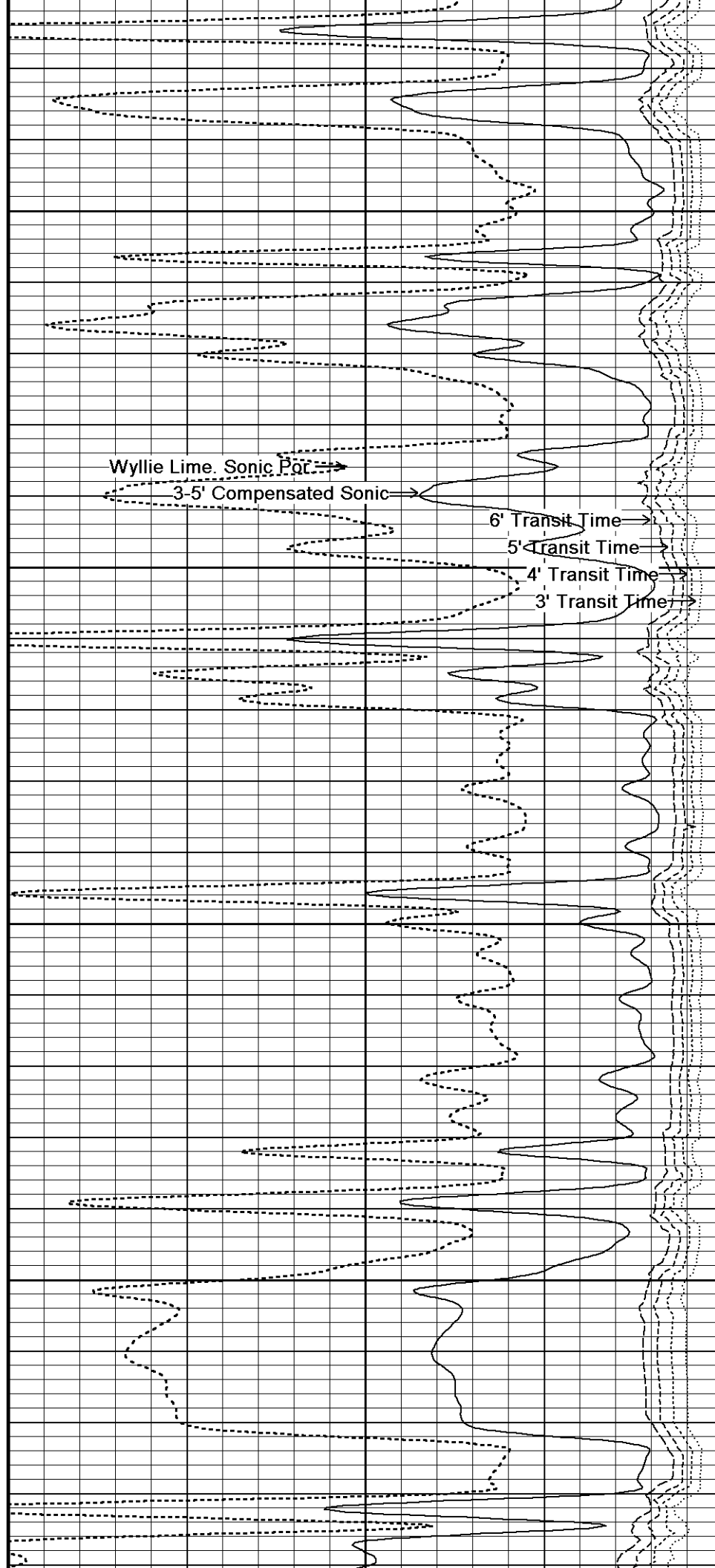
112°

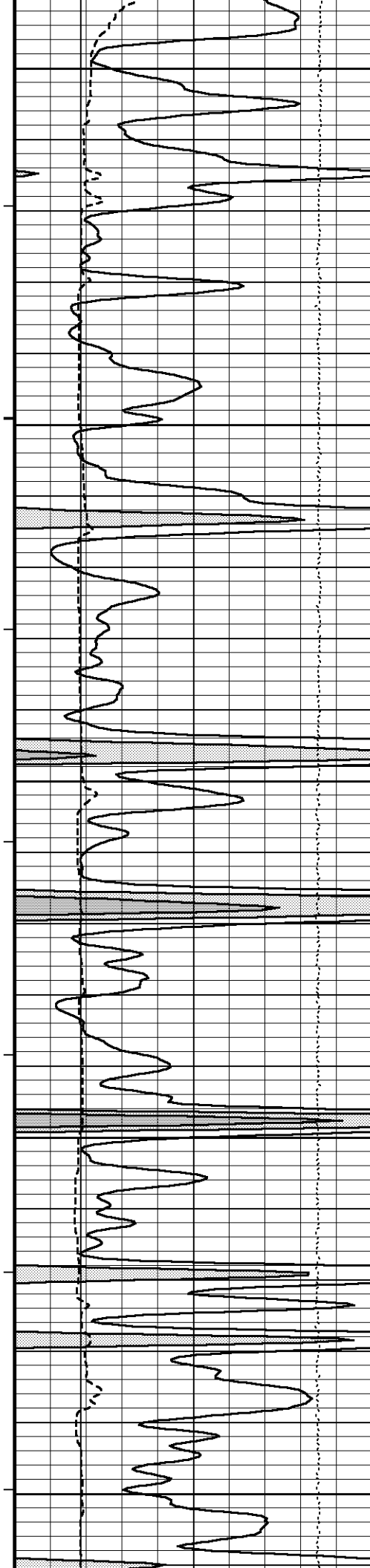
4100

113°

4150

113°





4200

114°

4250

114°

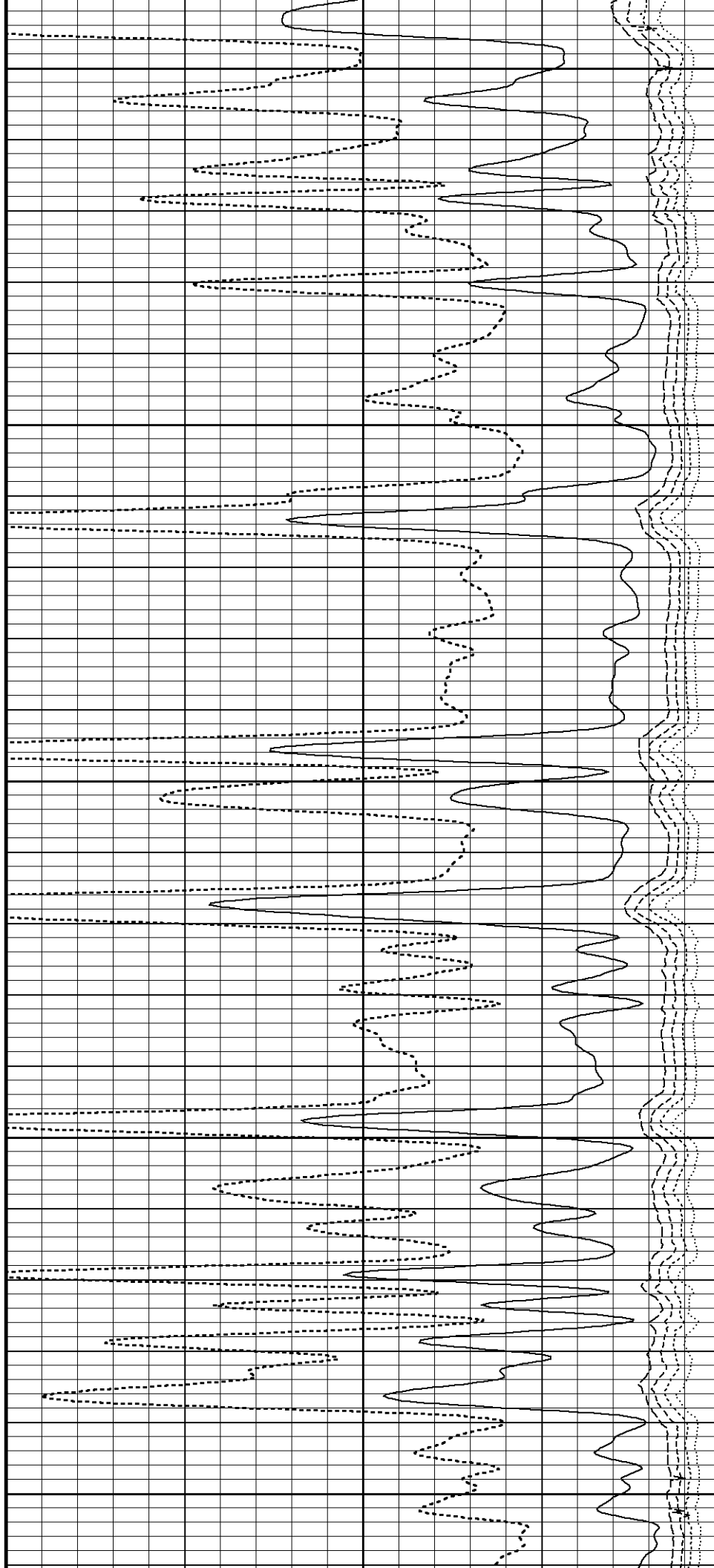
4300

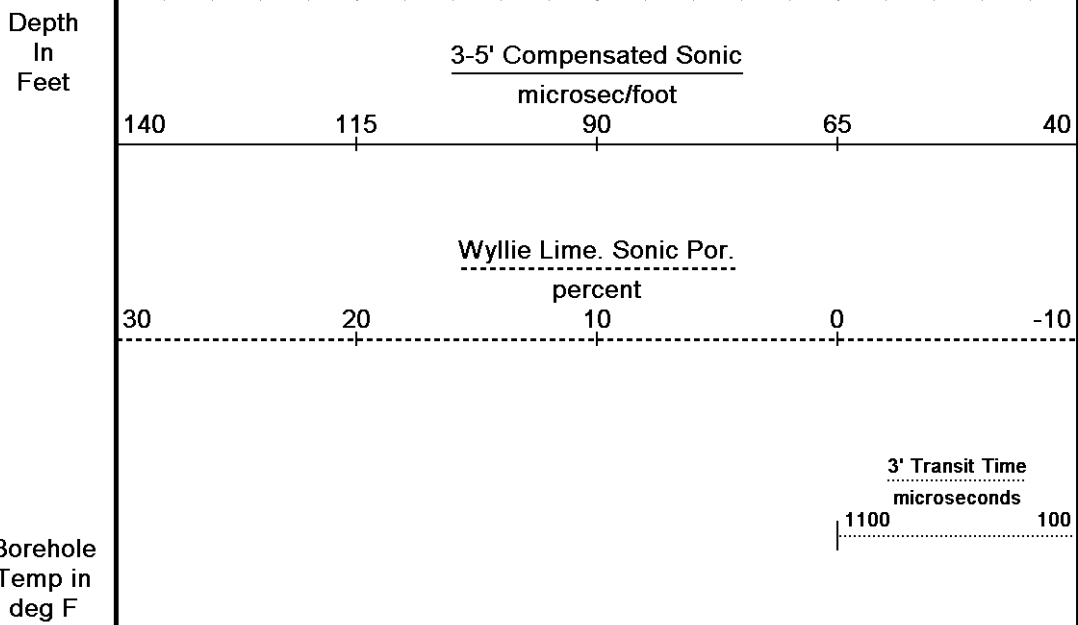
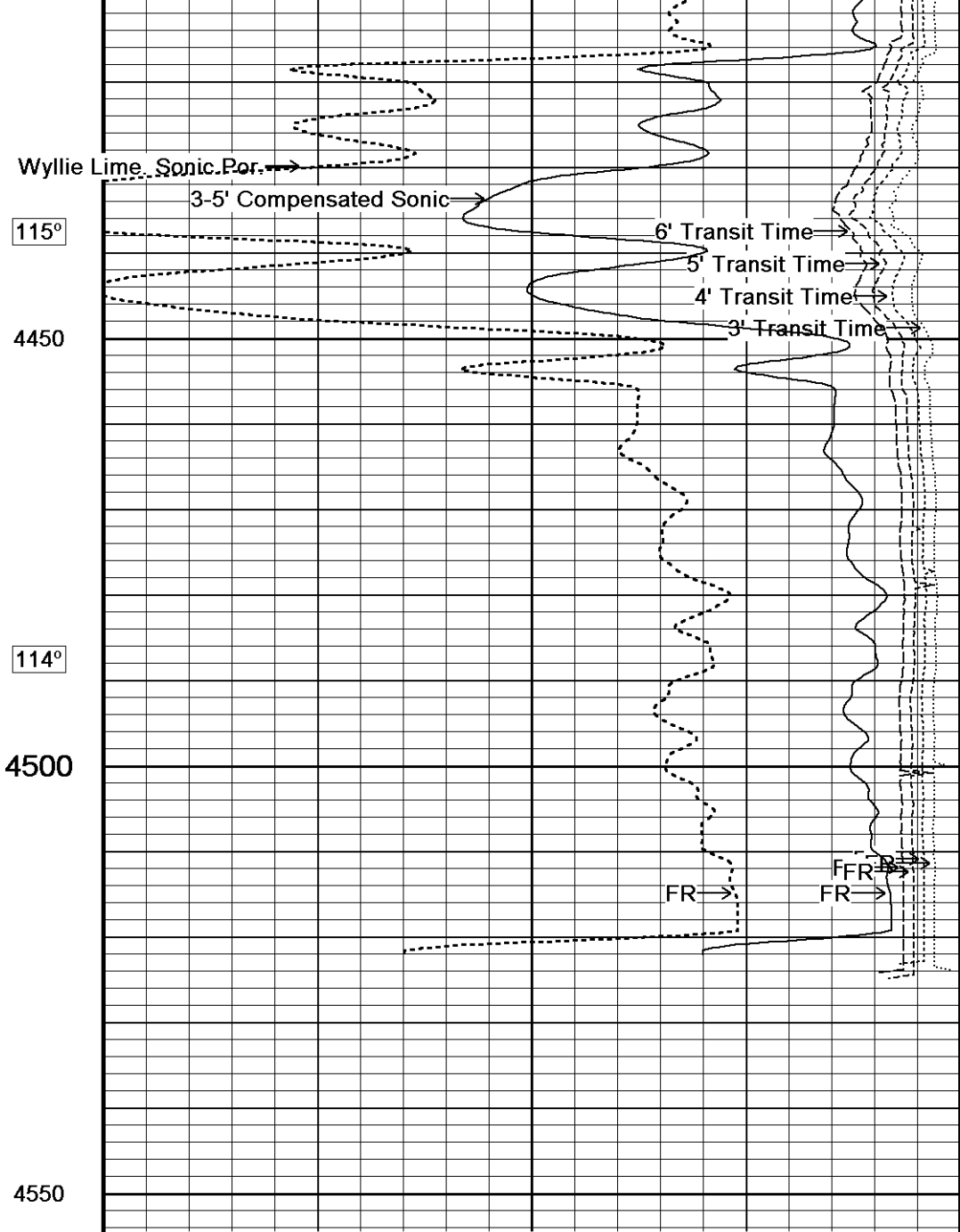
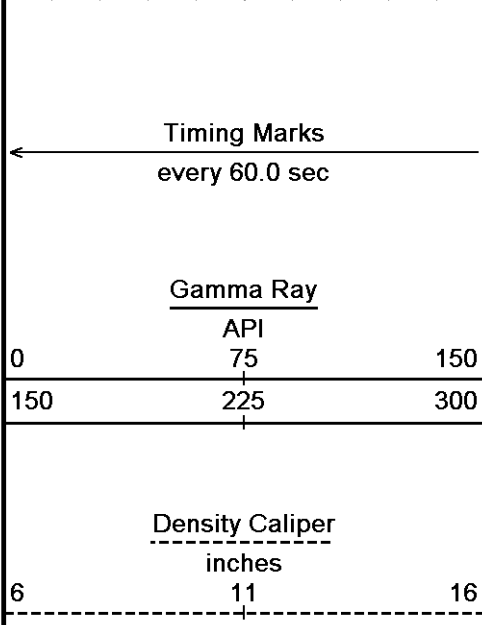
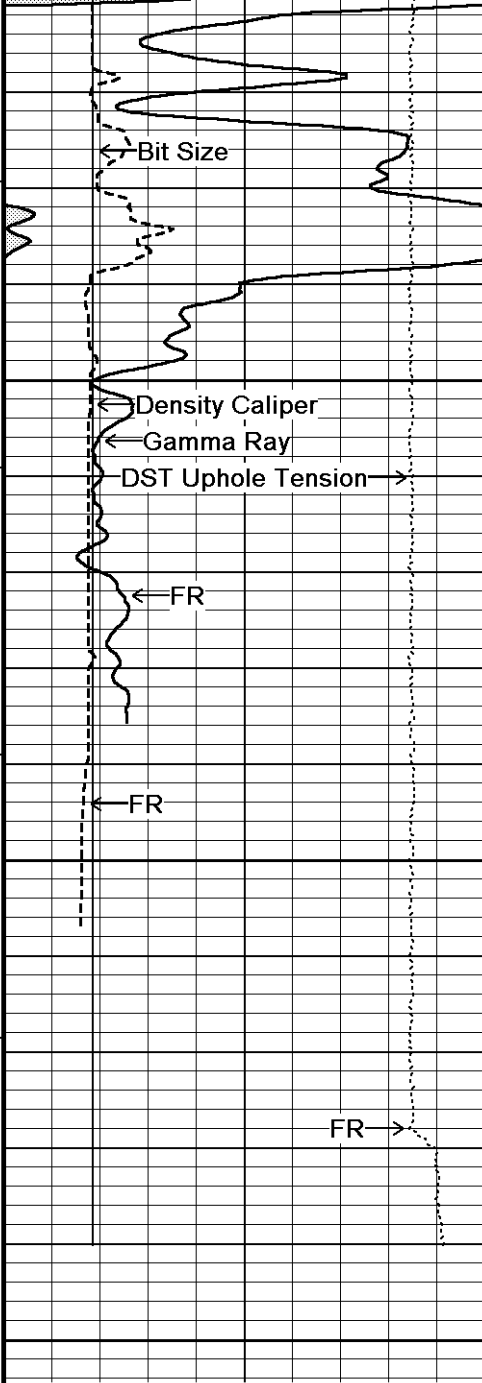
114°

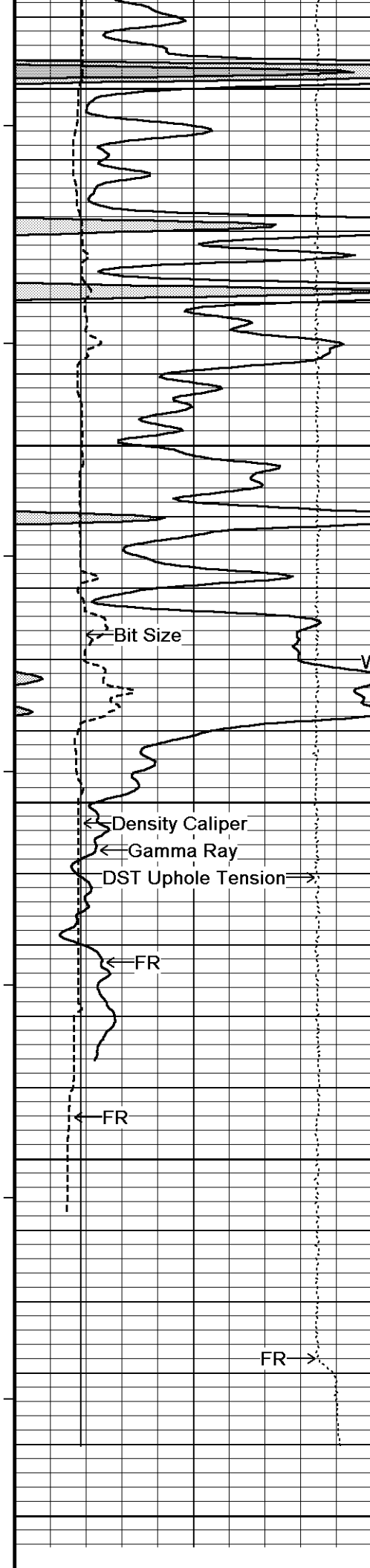
4350

115°

4400







4350

114°

4400

114°

4450

113°

4500

4550

Depth

Wyllie Lime. Sonic.Por.→

3-5' Compensated Sonic→

6' Transit Time→

5' Transit Time→

4' Transit Time→

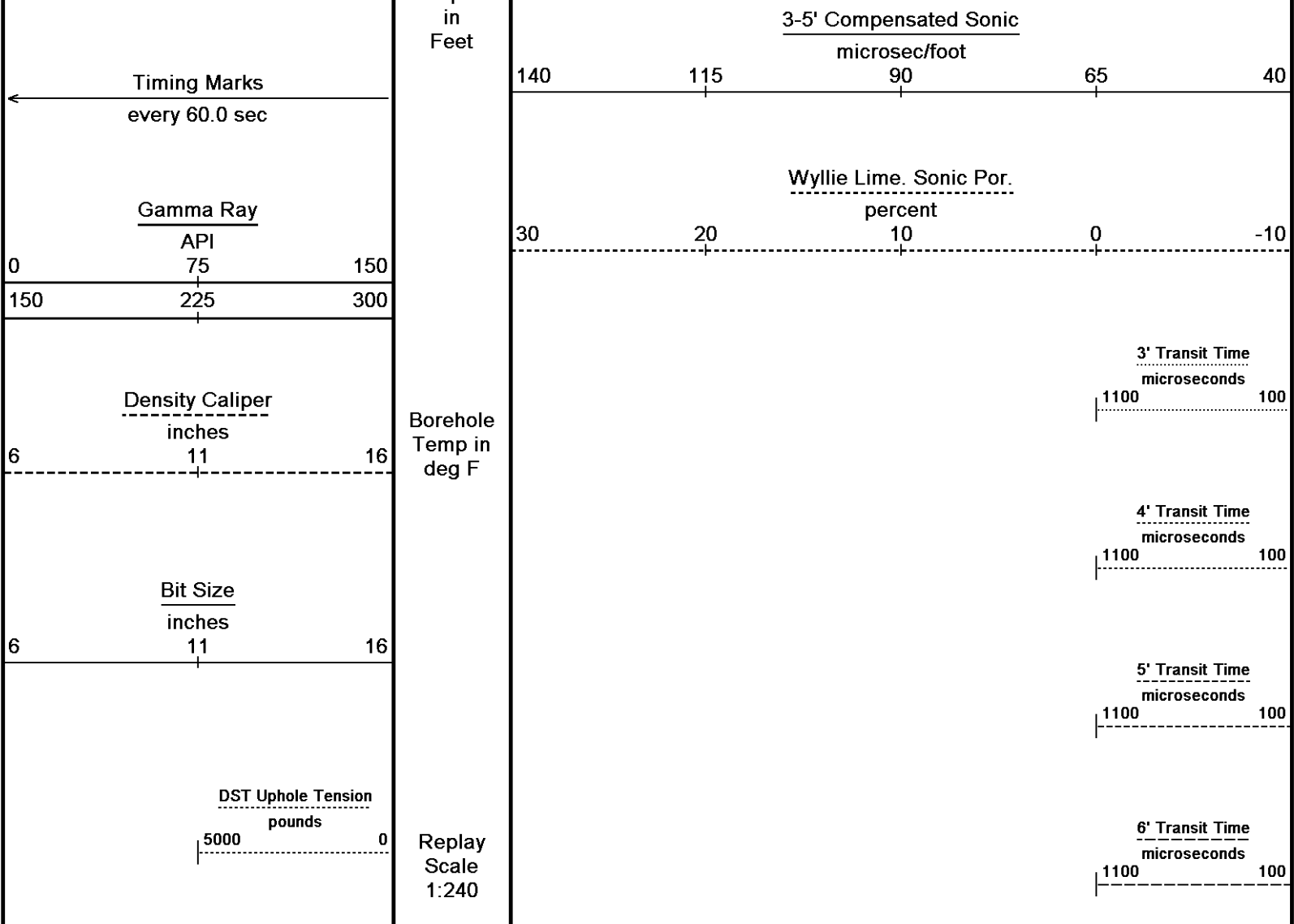
3' Transit Time→

FR→

FR→

FFR→

FR→



Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 04-AUG-2013 21:53

Filename: C:\Minimus 13.05.9583\Log\Shakespeare Ottley #4-16\Shakespeare Ottley #4-16 Repeat.dta Recorded on 04-AUG-2013 18:49

System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

↑
↑
 REPEAT SECTION

BEFORE SURVEY CALIBRATION C:\Minimus 13.05.9583\Log\Shakespeare Ottley #4-16\Shakespeare Ottley #4-16 Main.dta		
General Constants All 000		Last Edited on 04-AUG-2013,16:01
General Parameters Mud Resistivity Mud Resistivity Temperature Water Level Borehole Fluid Processing 0.510 98.000 0.000 Wet Hole ohm-metres degrees F feet		
Hole/Annular Volume and Differential Caliper Parameters HVOL Method HVOL Caliper 1 HVOL Caliper 2 Annular Volume Diameter Caliper for Differential Caliper Single Caliper Density Caliper N/A 5.500 Density Caliper inches		
Rwa Parameters Porosity used Resistivity used RWA Constant A RWA Constant M SW/APOR Tool Source Base Density Porosity Array Ind. Six Res Rt 1.000 2.000 0.000		

Down-hole Tension Calibration SMS 0

Field Calibration on 04-AUG-2013 18:05

Reading No	Measured	Calibrated (lbs)
1	13735.13	0.00
2	14289.75	471.00

Gamma Calibration MCG-B 39

Field Calibration on 04-AUG-2013 10:53

	Measured	Calibrated (API)
Background	64	43
Calibrator (Gross)	1141	768
Calibrator (Net)	1077	725

Gamma Constants MCG-B 39

Last Edited on 04-AUG-2013,16:01

Gamma Calibrator Number	GRC38	
Mud Density	1.09	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-B 39

Field Calibration on 30-JUL-2013,09:41

	Measured	Calibrated (mV)
Reference 1	105.8	100.0
Reference 2	-94.3	-100.0

High Resolution Temperature Calibration MCG-B 39

Field Calibration on 30-JUL-2013,09:41

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

High Resolution Temperature Constants MCG-B 39

Last Edited on 30-JUL-2013,09:41

Pre-filter Length	11
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Caliper Calibration MML-A 3

Base Calibration on 05-JUN-2013 15:43

Field Calibration on 04-AUG-2013 10:46

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	14624	5.98
2	17958	7.97
3	21263	9.86
4	25213	11.92
5	0	0.00
6	N/A	N/A

Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	6.15	5.98

Micro Normal and Micro Inverse Calibration MML-A 3

Base Calibration on 05-JUN-2013 15:36

Field Check on 04-AUG-2013 10:47

Base Calibration				
Channel	Measured		Calibrated (ohm-m)	
	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.2	60.2	5.0	25.0
Micro Inverse	15.7	78.3	5.0	25.0
Channel	Base Check (ohm-m)		Field Check (ohm-m)	
Micro Normal	63.0		63.0	
Micro Inverse	48.2		48.2	

Micro Normal and Micro Inverse Constants MML-A 3

Last Edited on 04-AUG-2013,10:46

Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159	
Micro Normal K Factor	1.0000	
Micro Inverse K Factor	1.0000	
Standoff Offset	N/A	inches

Neutron Calibration MDN-A.B 66

Base Calibration on 31-JUL-2013 10:25

Field Check on 04-AUG-2013 10:59

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3180	99	3714	110
Ratio	32.180		33.764	

Field Calibrator at Base

Calibrated (cps)	
1617	2323
Ratio	0.696

Field Check

Calibrated (cps)	
1624	2337
Ratio	0.697

Neutron Constants MDN-A.B 66

Last Edited on 04-AUG-2013,10:54

Neutron Source Id	P0204NN	
Neutron Jig Number	5824NE	
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	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	Constant Value	
Formation Pressure	0.00	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	Constant Value	
Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-B.J 353

Base Calibration on 22-MAY-2013 08:22

Field Check on 04-AUG-2013 10:23

Base Calibration

	Measured		Calibrated (ohm-m)	
Reference 1	0.0		0.0	
Reference 2	964.9		126.8	

Base Check 280.9

Field Check 280.8

FE Constants MFE-B.J 353

Last Edited on 04-AUG-2013,16:01

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 55

Last Edited on 04-AUG-2013,16:01

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	Not 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

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	

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 167

Base Calibration on 19-APR-2013,13:41
Field Check on 04-AUG-2013 10:21

Base Calibration

Test Loop Calibration

Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	17.3	474.2	9.3	966.2
2	6.3	388.4	7.6	821.4
3	3.3	259.4	5.2	566.0
4	1.9	133.0	2.6	279.2

Array Temperature 76.8 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			13.4	3838.7
2			29.7	3476.3
3			29.2	3052.4
4			19.8	2081.3
Deep			18.7	2048.6
Medium			42.3	3990.3
Shallow			43.1	5053.2

Array Temperature 78.6 Deg F

Induction Constants MAI-A.A 167

Last Edited on 04-AUG-2013,16:01

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		60.00	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	
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 167			
			Field Calibration on 30-JUL-2013,09:41
	Measured	Calibrated(Deg F)	
Lower	50.00	50.00	
Upper	75.00	75.00	
High Resolution Temperature Constants MAI-A.A 167			
			Last Edited on 30-JUL-2013,09:41
Pre-filter Length		11	
Caliper Calibration MPD-B 64			
			Base Calibration on 04-AUG-2013 10:37
			Field Calibration on 04-AUG-2013 10:38
Base Calibration			
Reading No	Measured	Calibrator Size (in)	
1	15388	3.99	
2	24325	5.98	
3	32740	7.97	
4	41178	9.86	
5	50491	11.92	
6	N/A	N/A	
Field Calibration			
	Measured Caliper (in)	Actual Caliper (in)	
	6.00	5.98	
Photo Density Calibration MPD-B 64			
			Base Calibration on 10-JUL-2013 10:09
			Field Check on 04-AUG-2013 10:44
Density Calibration			
Base Calibration			
	Near	Measured Far	Calibrated (sdu) Near Far
Reference 1	60252	33858	59556 30836
Reference 2	25108	2914	24941 2541
Field Check at Base			
	1163.0	1342.8	

Field Check

1165.2 1346.7

PE Calibration

Base Calibration	WS	Measured WH	Ratio	Calibrated Ratio
Background	211	1034		
Reference 1	22924	60048	0.385	0.371
Reference 2	6861	24971	0.278	0.272
Field Check at Base	210.7	1033.8		
Field Check	211.1	1036.7		

Density Constants MPD-B 64

Last Edited on 04-AUG-2013,16:01

Density Source Id	18235B
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	1.09 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 (m)
2.71	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

DOWNHOLE EQUIPMENT

C:\Minimus 13.05.9583\Log\Shakespeare Ottley #4-16\Shakespeare Ottley #4-16 Main.dta

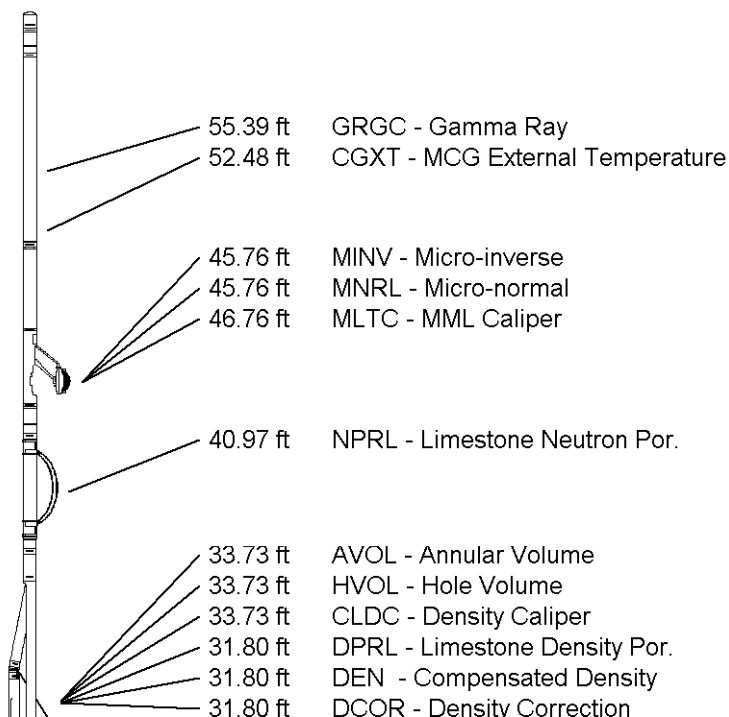
3/8" Triple Cone Cable Head (MCB C A)
MCB-C.A 5 LG: 1.58 ft WT: 15.4 lb OD: 2.24 in

Compact Comms Gamma
MCG-B 39 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 3 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 64 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

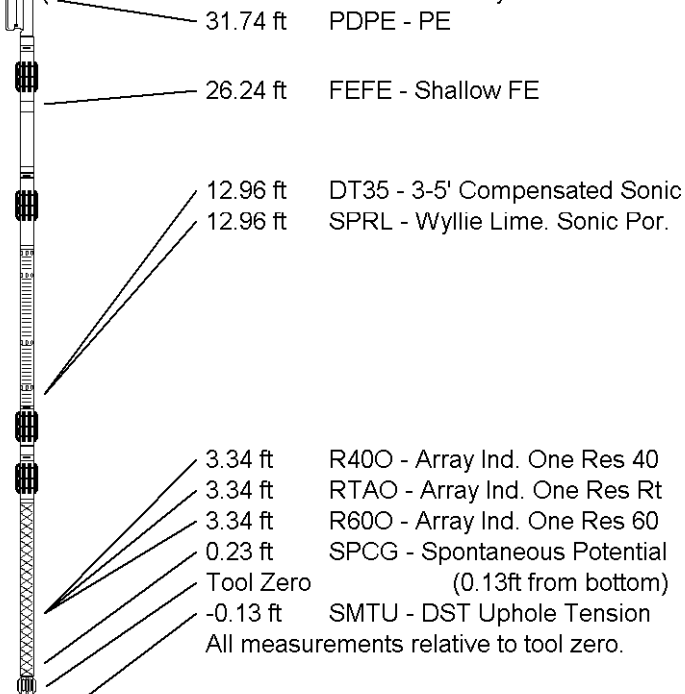


Compact Focussed Electric
MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Sonic
MSS-A.A 55 LG: 12.52 ft WT: 72.8 lb OD: 2.24 in

Compact Induction
MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 62.25 ft Weight: 471.8 lb



COMPANY	SHAKESPEARE OIL CO., INC.
WELL	OTTLEY #4-16
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2818.00	feet	First Reading	4515.00	feet
Elevation Drill Floor	2816.00	feet	Depth Driller	4530.00	feet
Elevation Ground Level	2808.00	feet	Depth Logger	4528.00	feet



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