



Weatherford

COMPENSATED SONIC WITH INTEGRATED TRANSIT TIME

COMPANY

SHAKESPEARE OIL COMPANY, INC.

WELL

ZANOBIA #1-22

FIELD

WILDCAT

PROVINCE/COUNTY

LOGAN

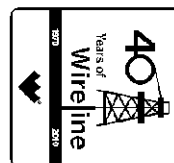
COUNTRY/STATE

U.S.A. / KANSAS

LOCATION

1090' FSL & 2305' FWL

SW/4



SEC	TWP	RGE	Other Services	MAI/MFE
22	15S	33W	MPD/MDN	
API Number	15-109-21088	MML		
Permit Number				
Permanent Datum G.L., Elevation 2802 feet				
Log Measured From KB				Elevations: KB 2812.00 DF 2811.00 GL 2802.00
Drilling Measured From K.B.				
Date	13-JUL-2012			
Run Number	ONE			
Depth Driller	4585.00	feet		
Depth Logger	4585.00	feet		
First Reading	4572.00	feet		
Last Reading	253.00	feet		
Casing Driller	253.00	feet		
Casing Logger	253.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	8.70 lb/USg	54.00 CP		
PH / Fluid Loss	10.00	10.40 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.34 @ 87.0	ohm-m		
Rmf @ Measured Temp	0.27 @ 87.0	ohm-m		
Rmc @ Measured Temp	0.41 @ 87.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.27 @109.0	ohm-m		
Time Since Circulation	4 HOURS			
Max Recorded Temp	109.00	deg F		
Equipment Name	COMPACT			
Equipment / Base	13057	LIB		
Recorded By	L. SCOTT			
Witnessed By	TIM PRIEST			
S.O.# / JOB#	3534557			LB12-179

BOREHOLE RECORD

Last Edited: 13-JUL-2012 12:39

Bit Size inches	Depth From feet	Depth To feet
7.875	253.00	4585.00

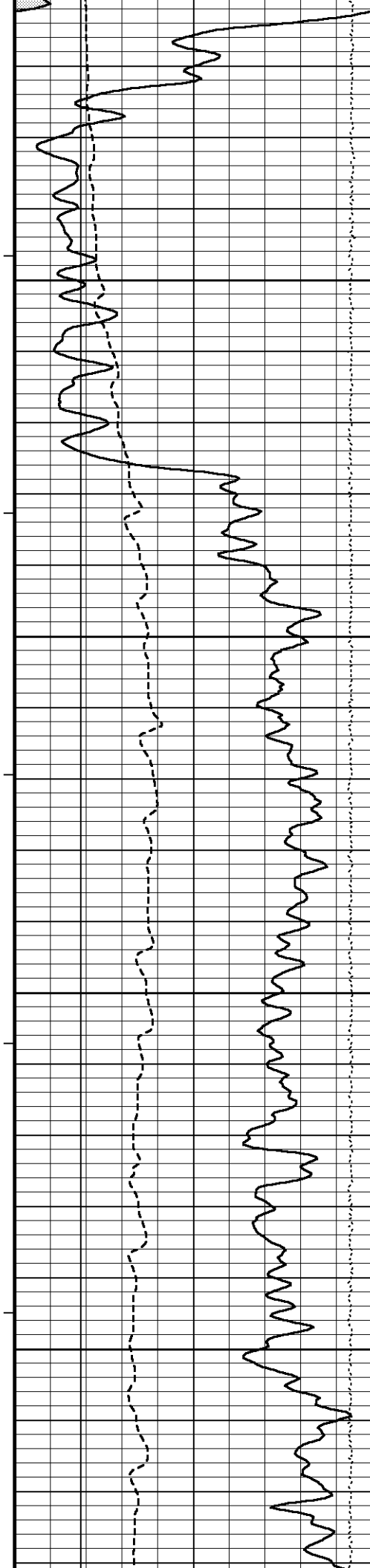
CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	253.00	24.00

REMARKS

Tools Ran: MCG, MML, MDN, MPD, MFE, MSS, MAI.
Hardware Used: MDN Dual Eccentralizer used. MPD 8 inch profile plate used. MFE, MSS and MAI 0.5 inch standoffs used.
2.71 g/cc Limestone Density Matrix used to calculate porosity.
Sonic porosity calculated using a Limestone scale (47.5 usec/ft).
All intervals logged and scaled per customer's request.
Tight pulls, washouts and borehole rugosity will affect data quality.
Annular volume with 4.5 inch production casing= 247 cu. ft.
Total hole volume from TD to Surface casing= 2128 cu. ft.
Service order: #3534557
Rig: HD Drilling #2
Engineer: L. Scott
Operator(s): N. 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.



89°

350

89°

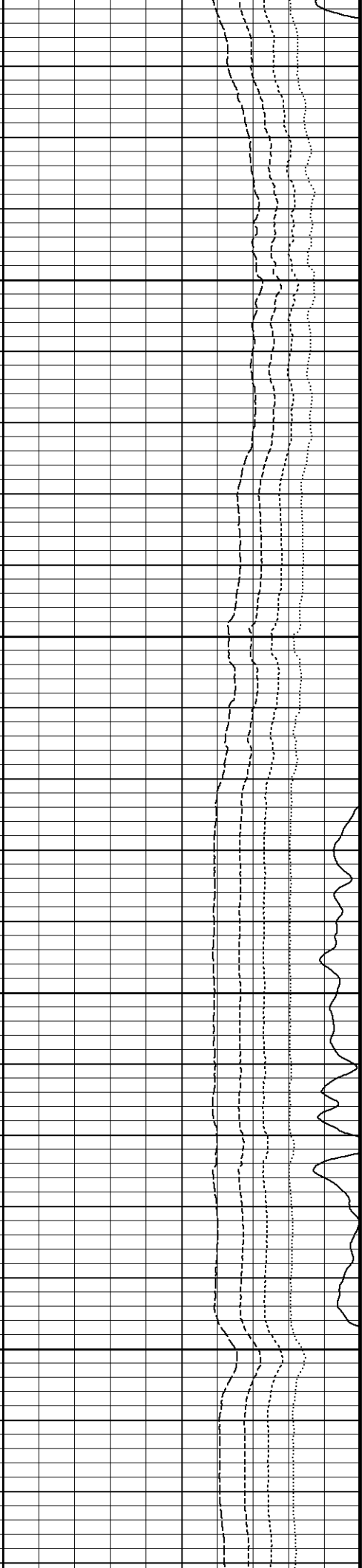
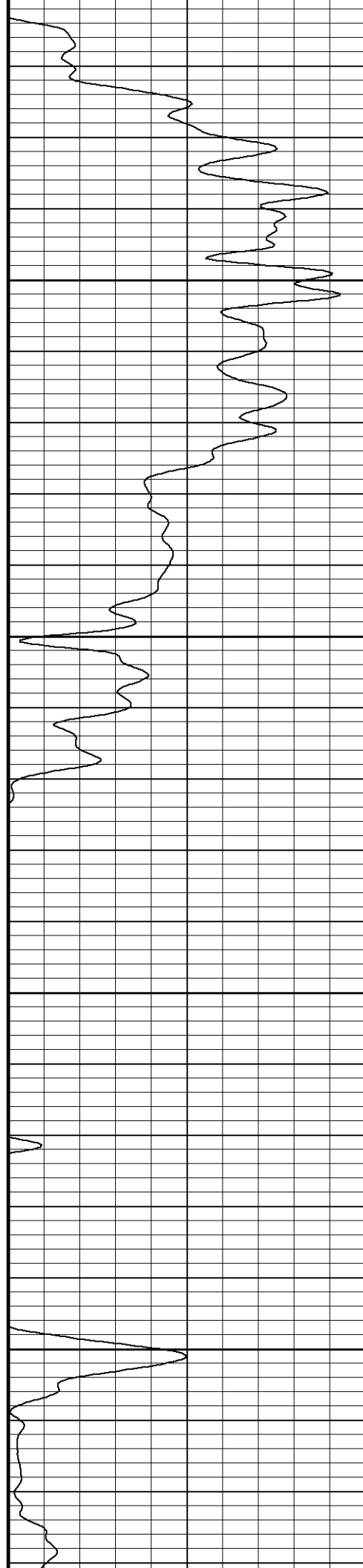
400

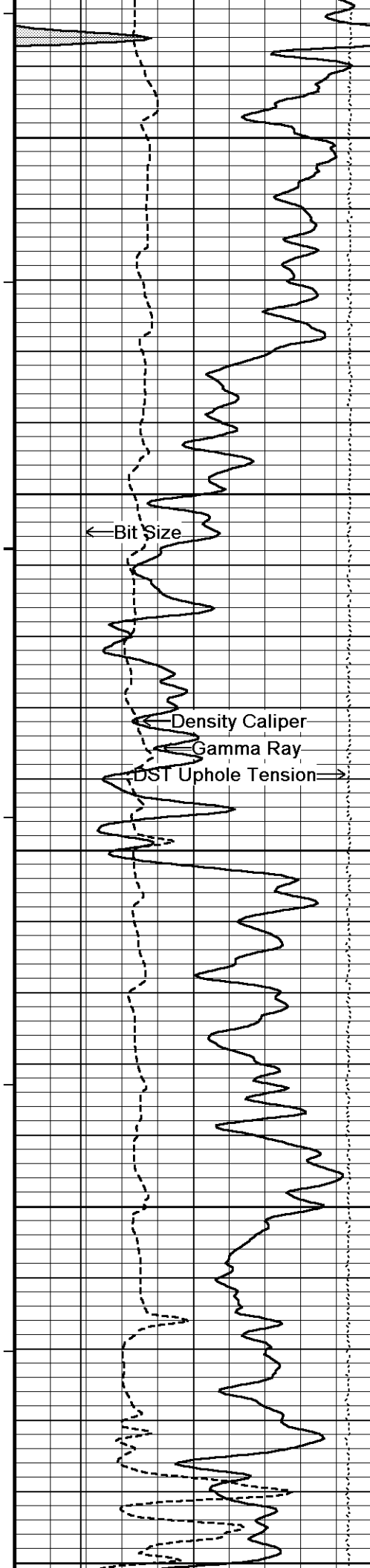
90°

450

90°

500





90°

550

90°

600

90°

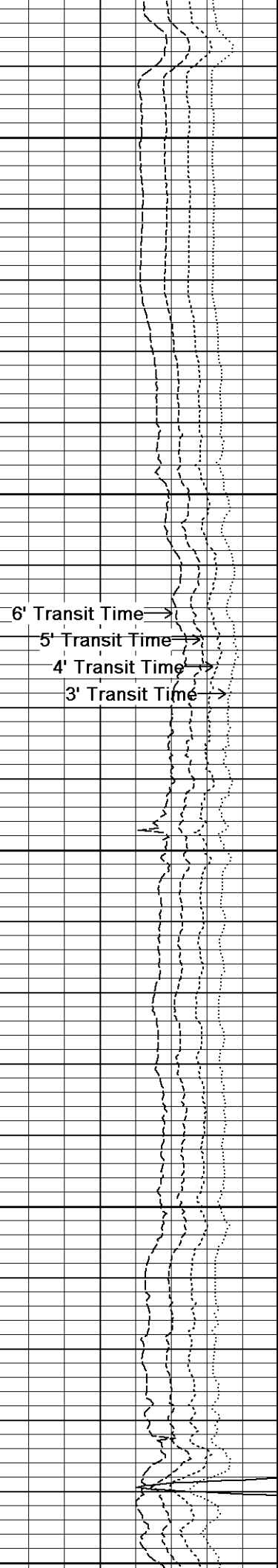
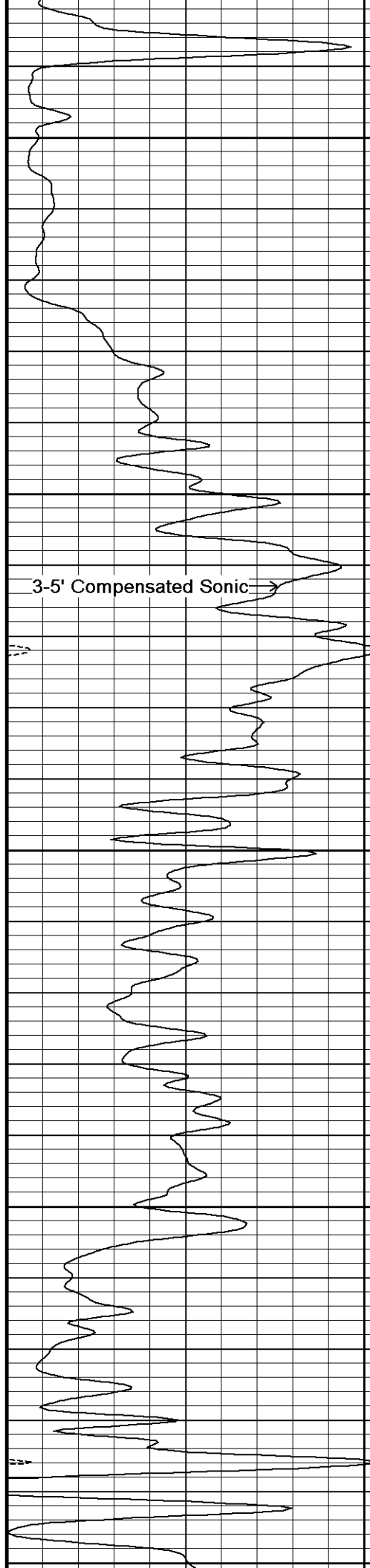
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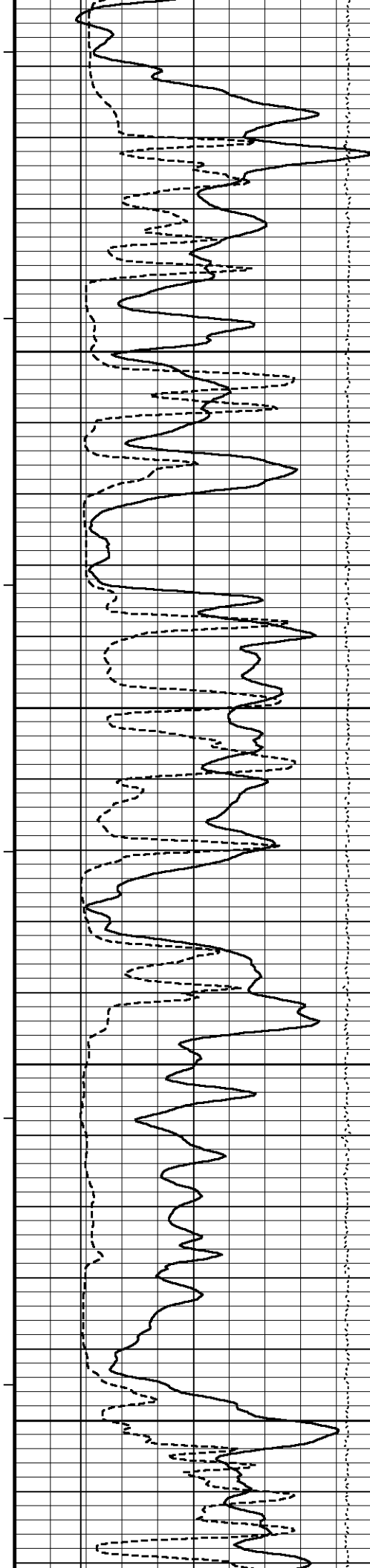
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700

90°

750





90°

800

90°

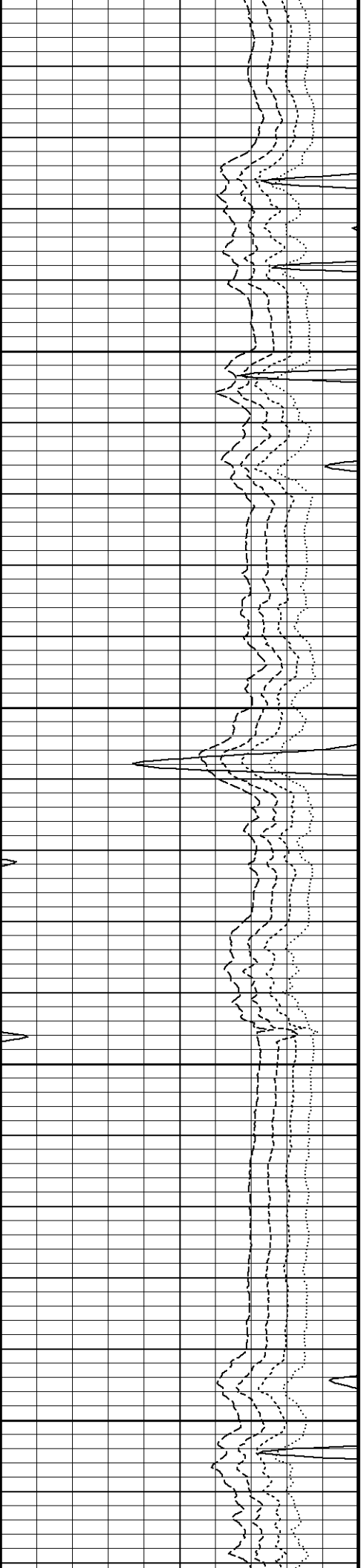
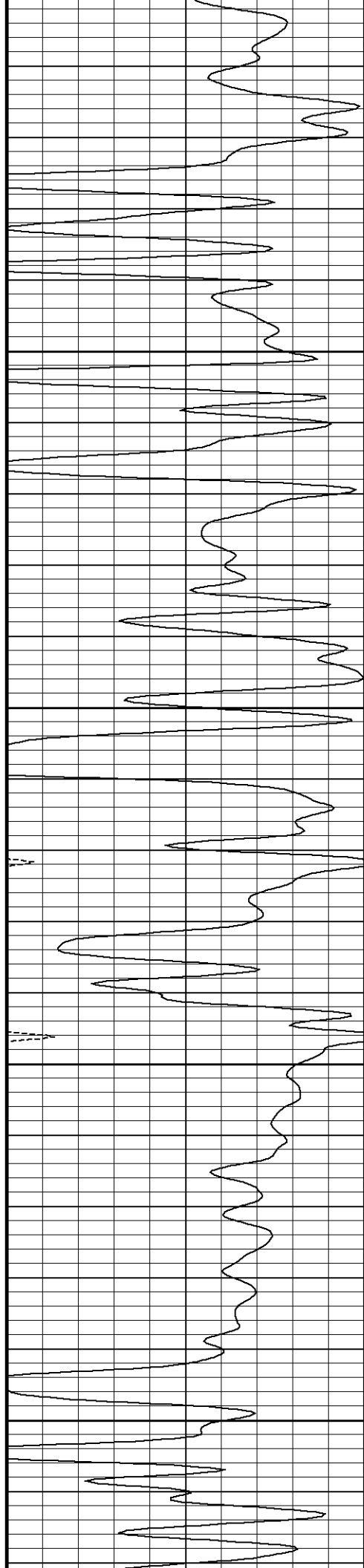
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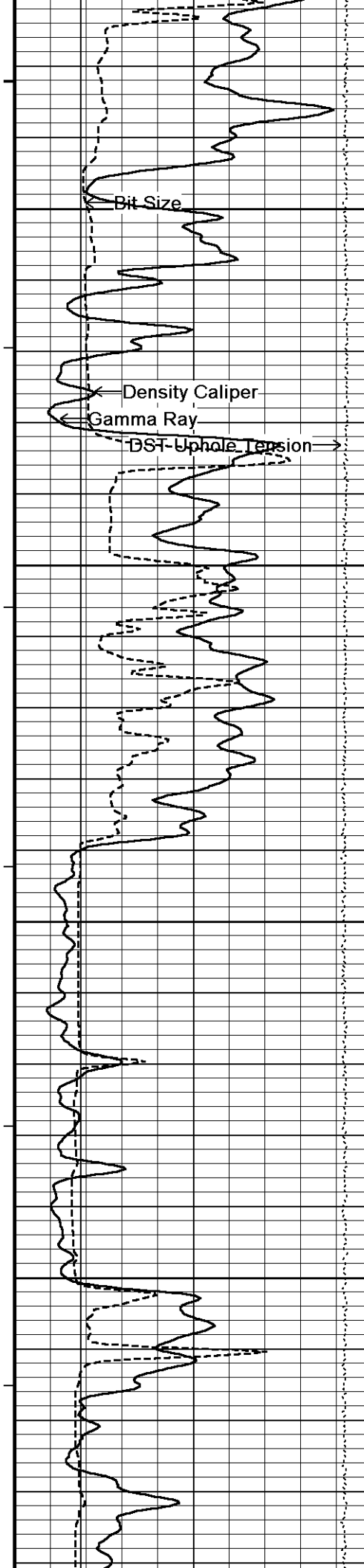
91°

900

91°

950





92°

1000

92°

1050

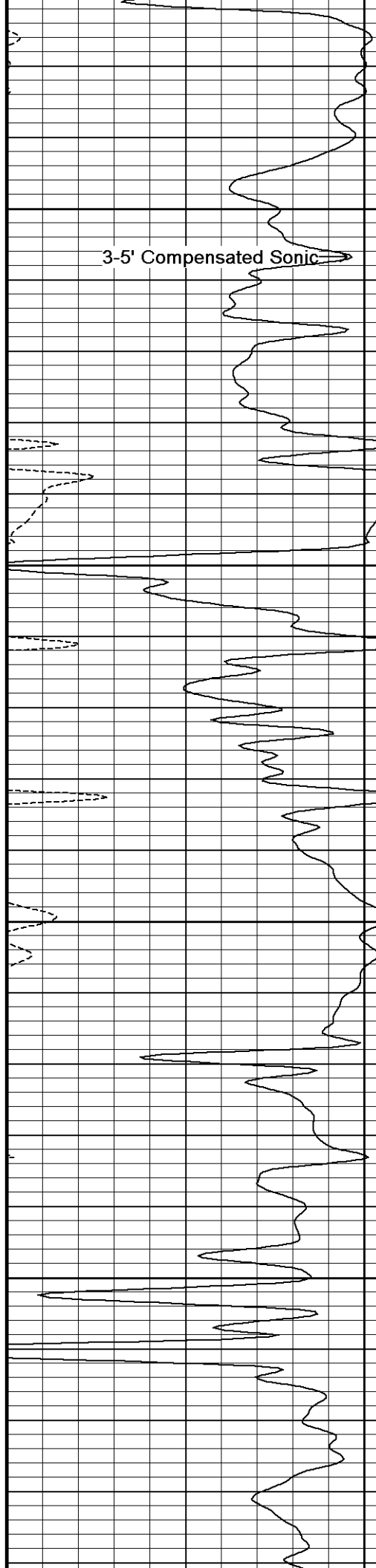
92°

1100

93°

1150

93°

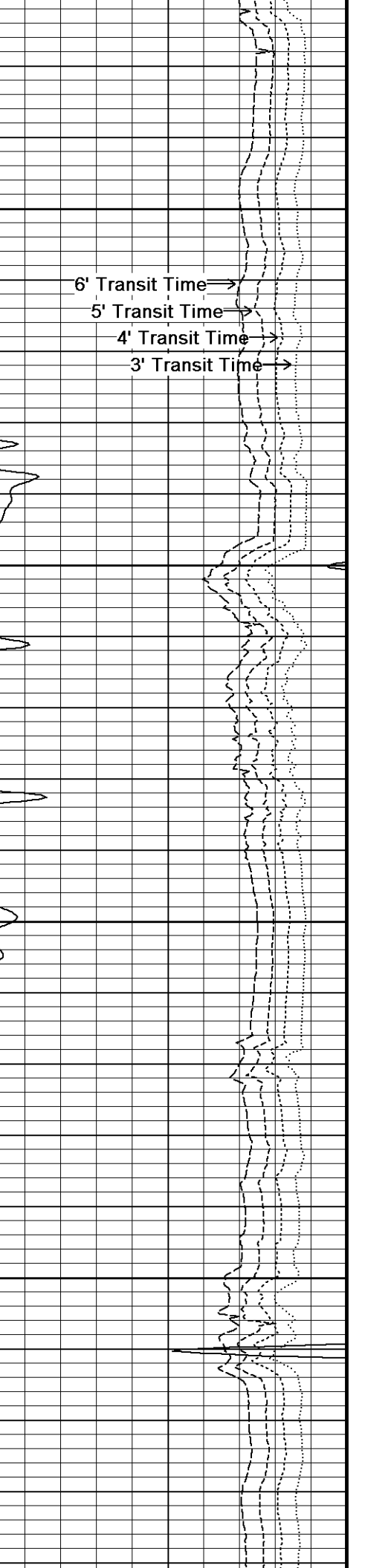


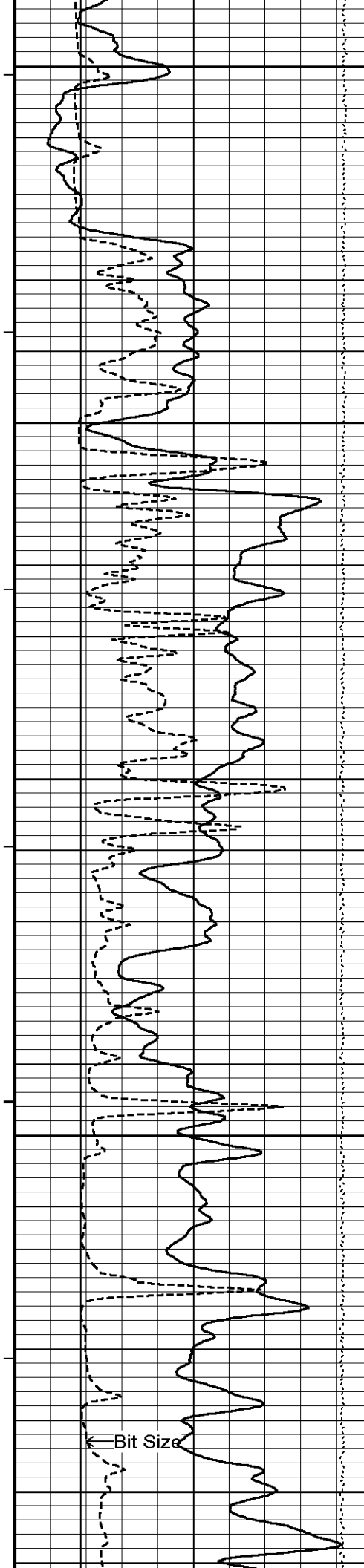
6' Transit Time →

5' Transit Time →

4' Transit Time →

3' Transit Time →





1200

93°

1250

94°

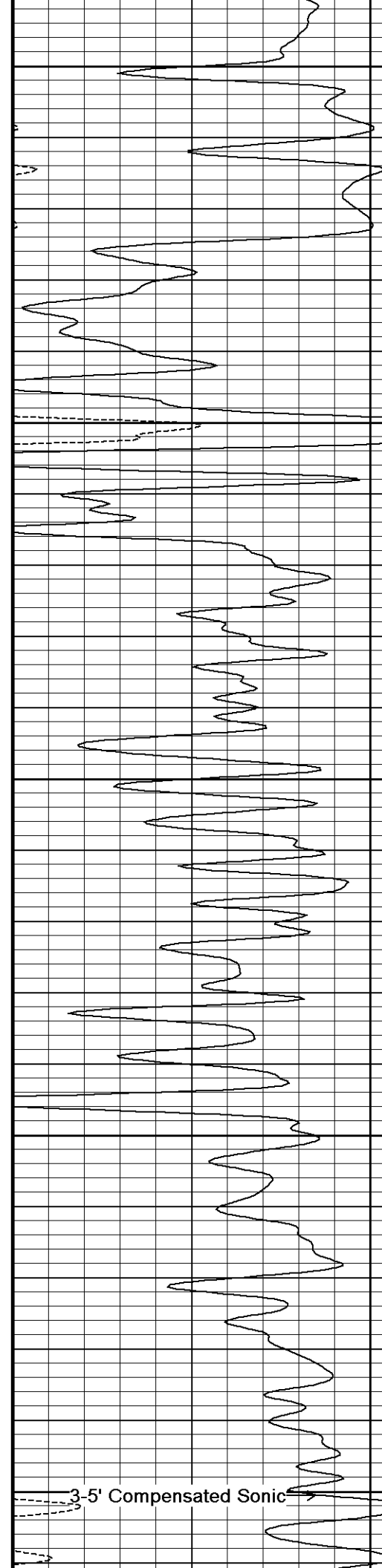
1300

94°

1350

94°

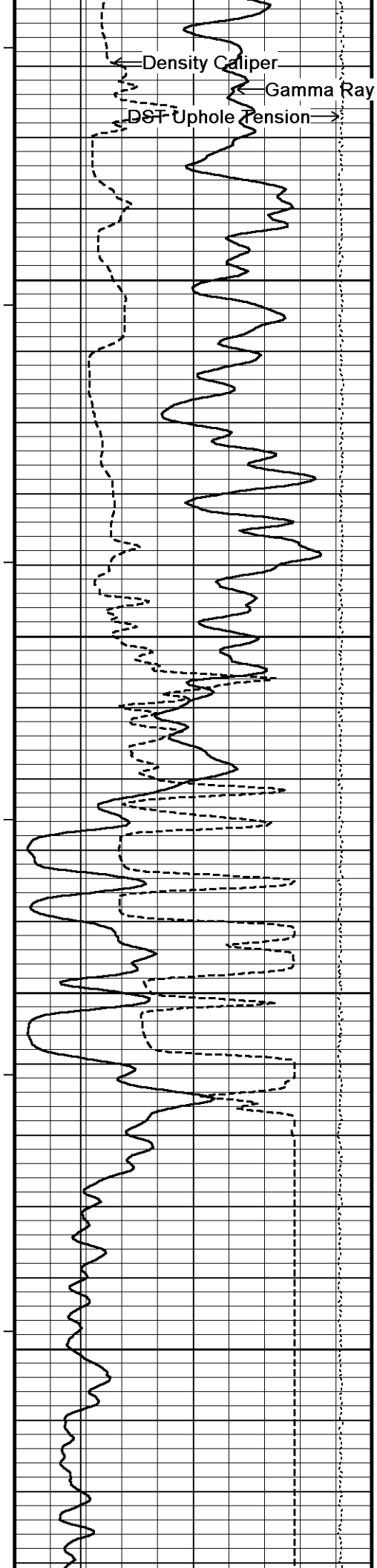
1400



3-5' Compensated Sonic

6' Transit Time

5' Transit Time



94°

1450

94°

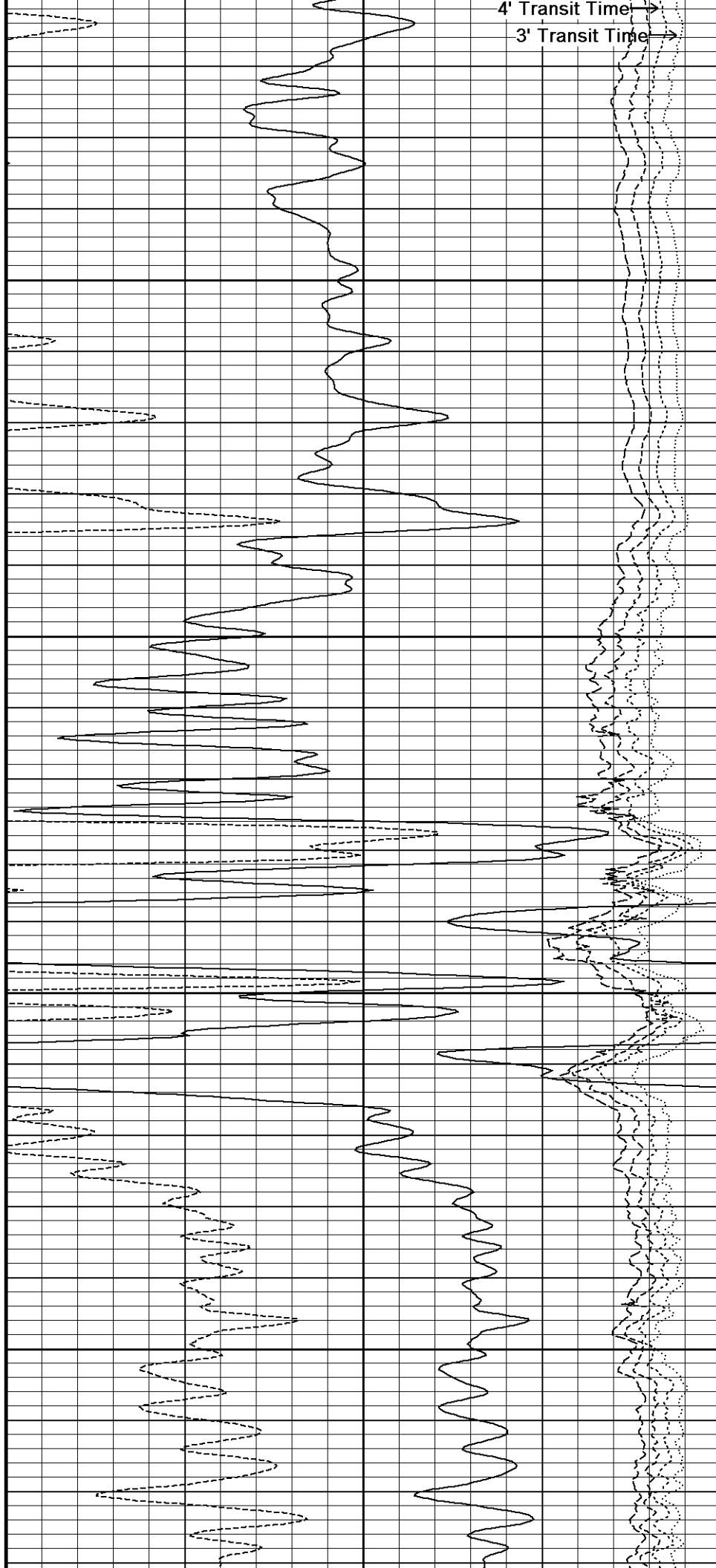
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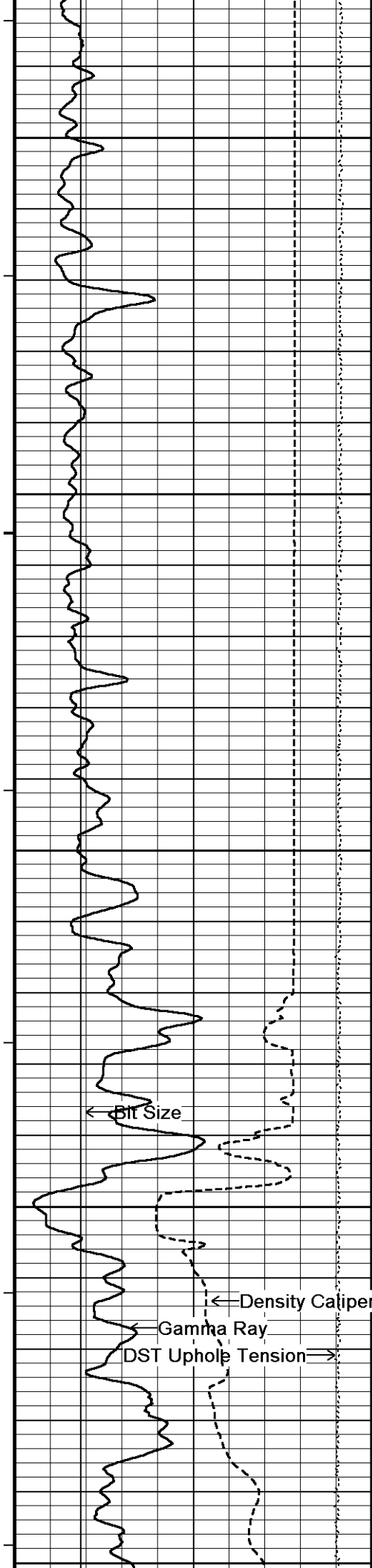
93°

1550

94°

1600





94°

1650

94°

1700

94°

1750

94°

Wyllie Lime. Sonic Por. →

1800

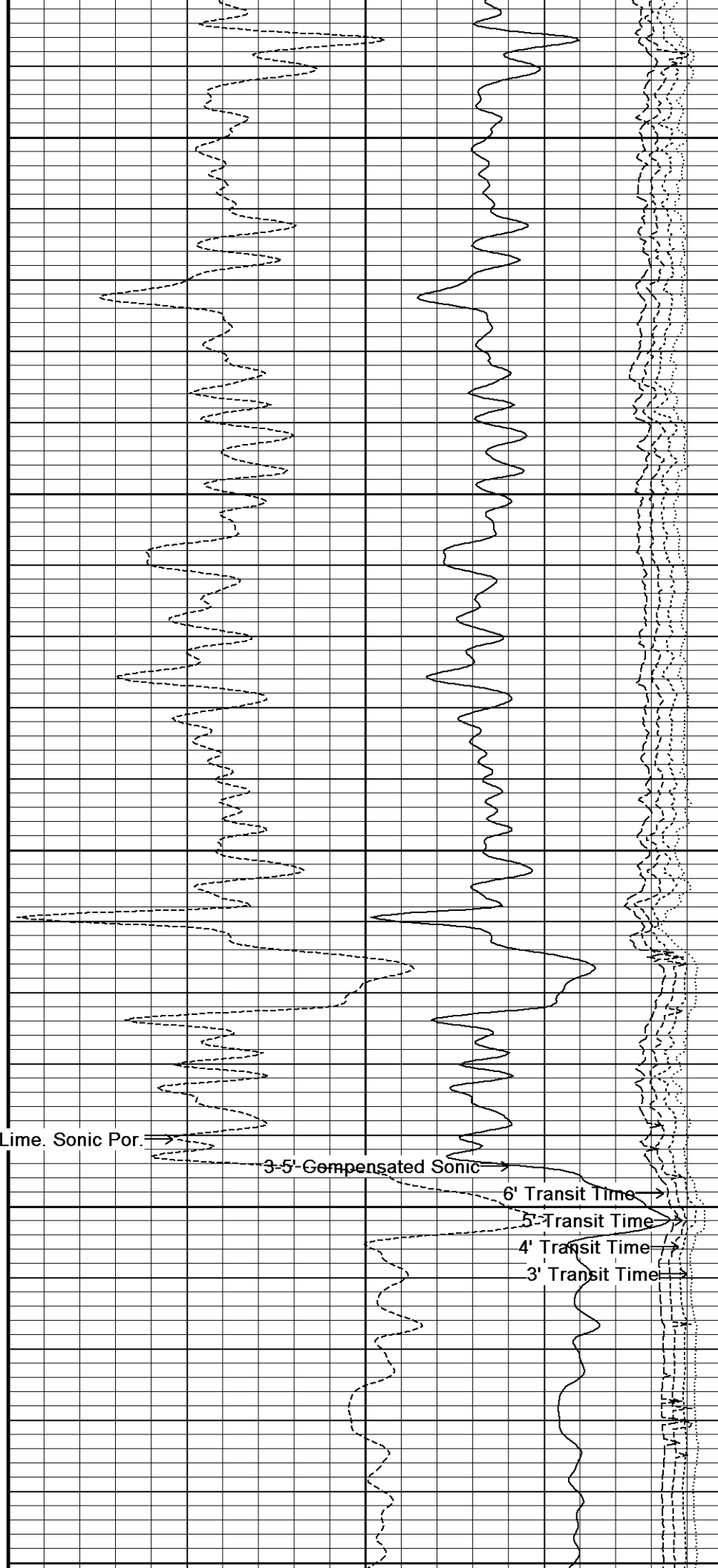
← Density Caliper

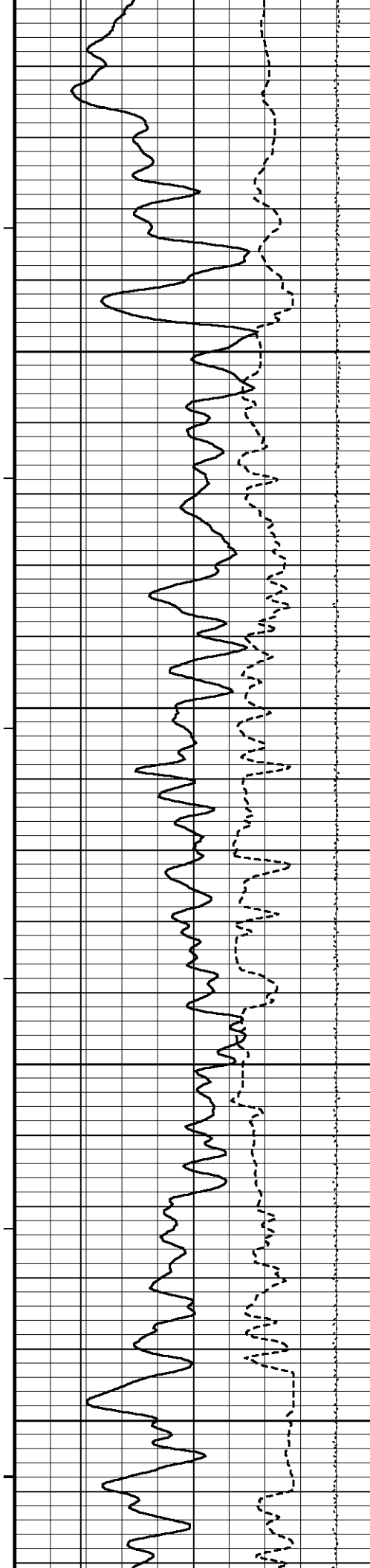
← Gamma Ray

DST Uphole Tension →

95°

1850





95°

1900

95°

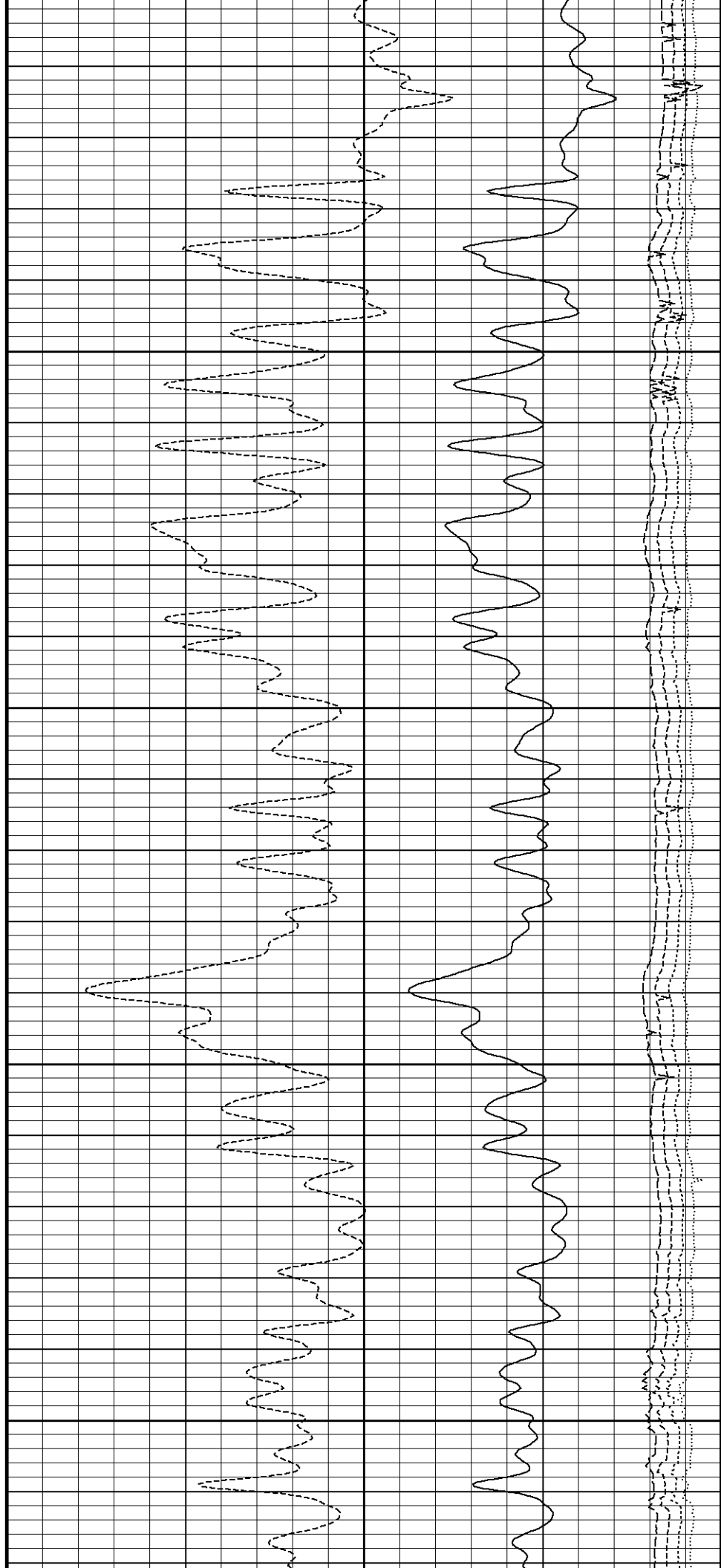
1950

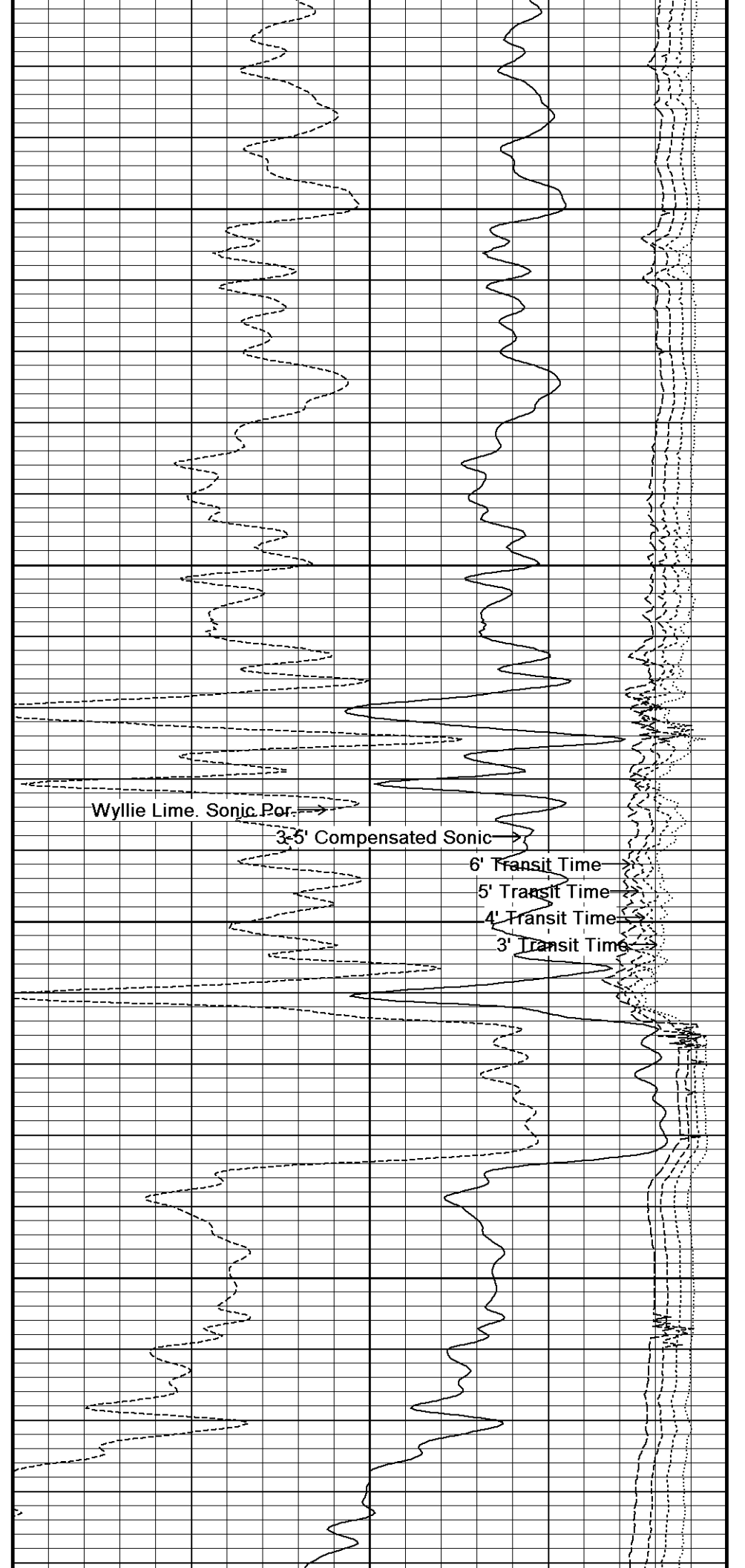
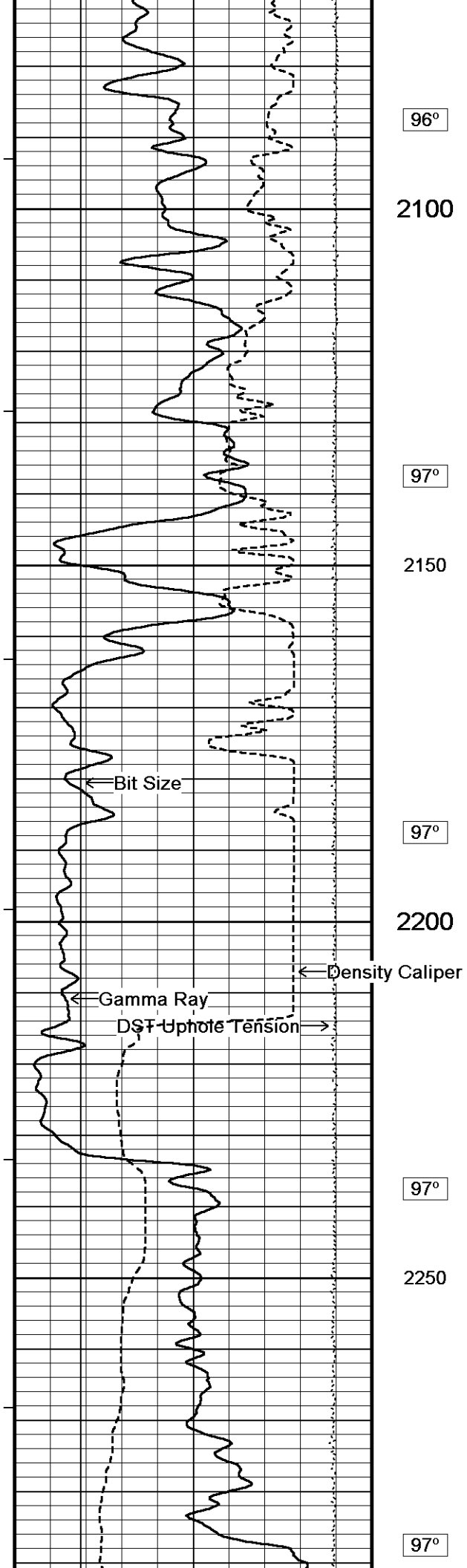
96°

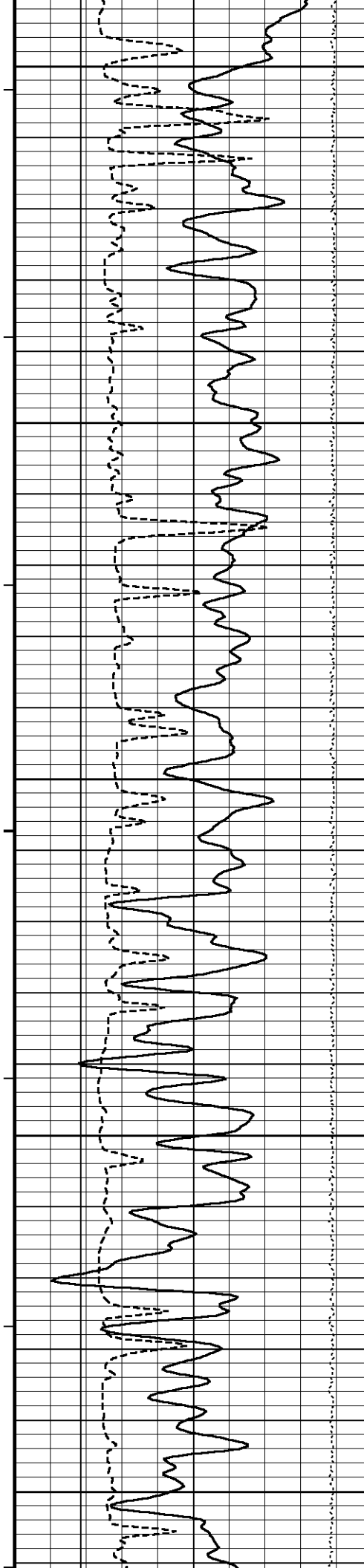
2000

96°

2050







2300

98°

2350

98°

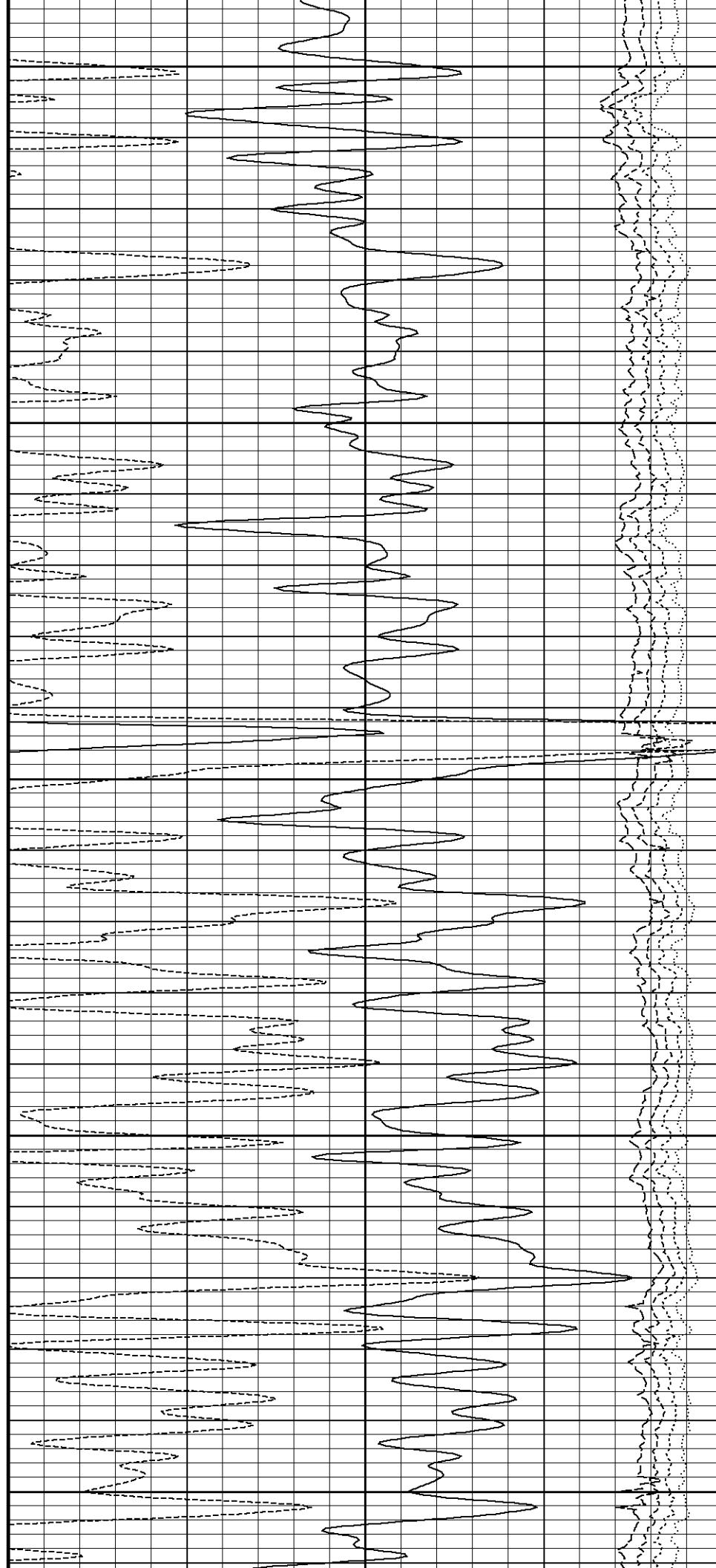
2400

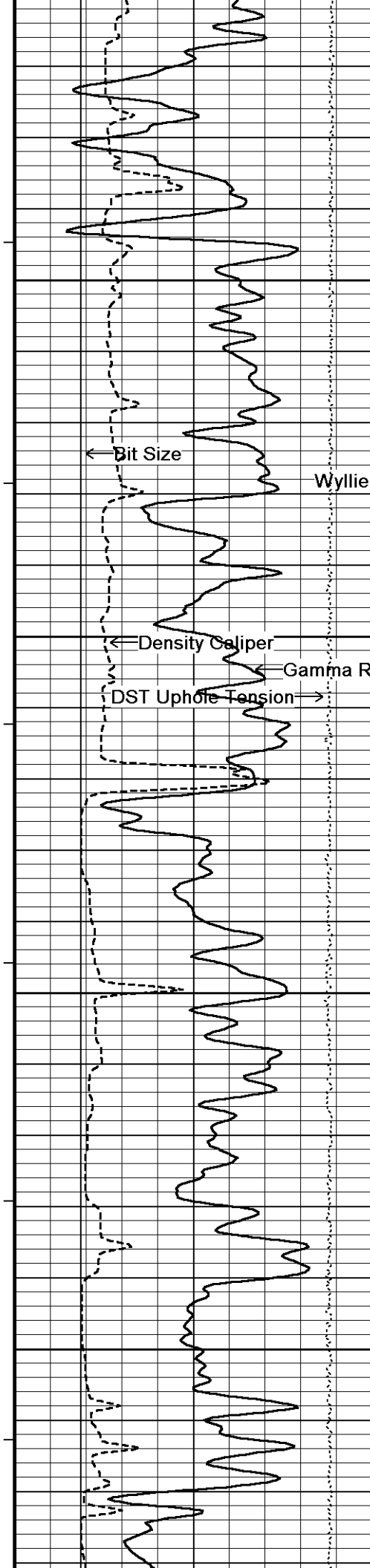
98°

2450

98°

2500





99°

2550

Wyllie Lime. Sonic Por. →

99°

2600

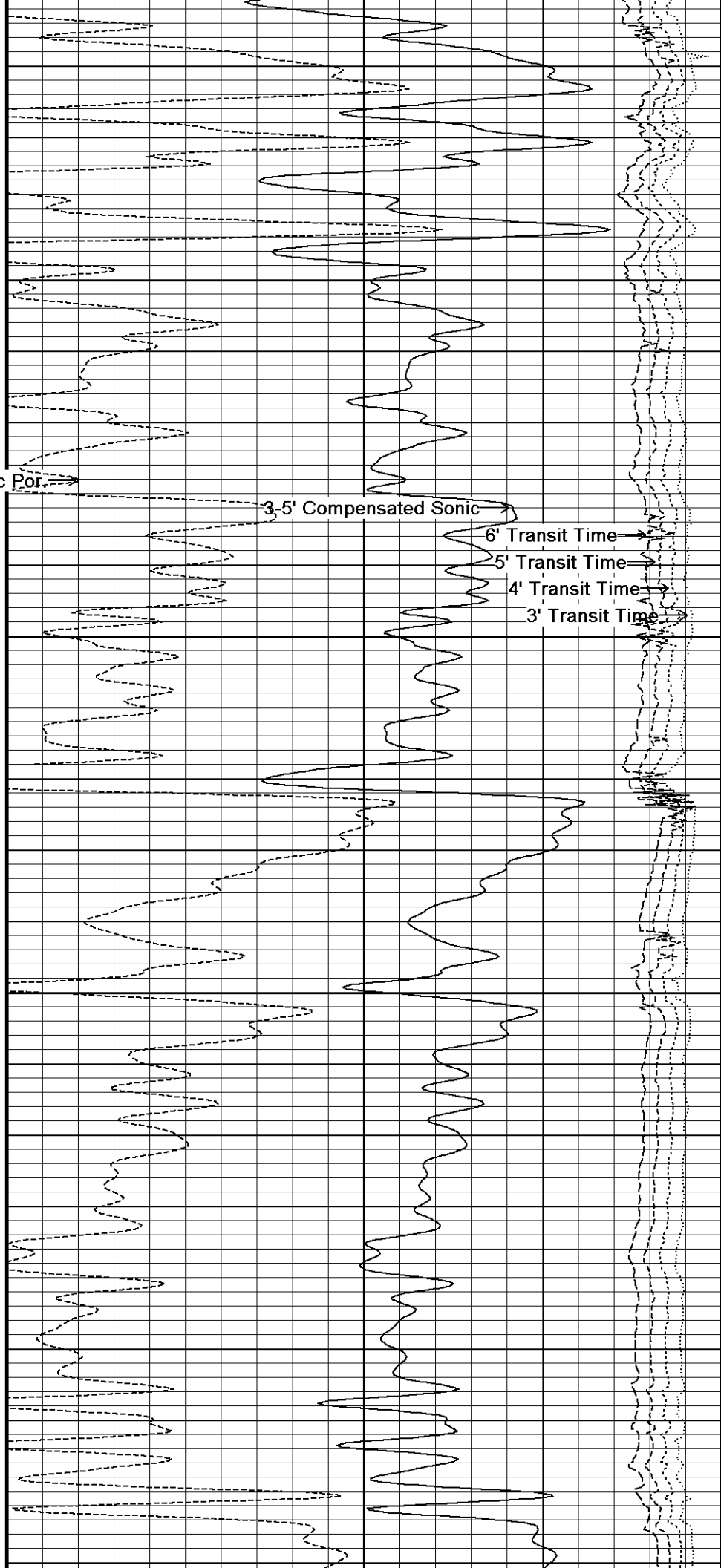
← Density Caliper
← Gamma Ray
← DST Uphole Tension →

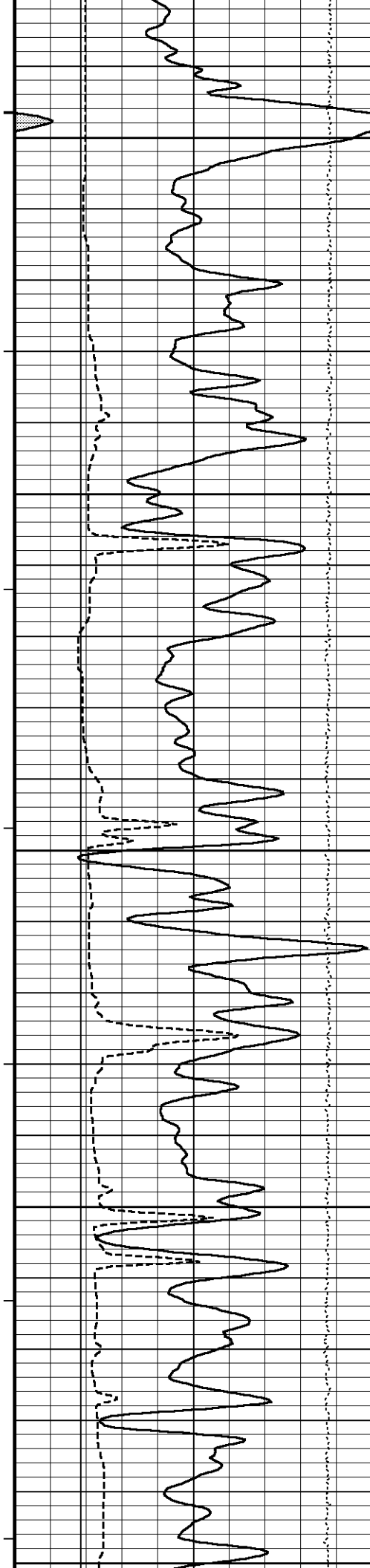
99°

2650

99°

2700





99°

2750

100°

2800

100°

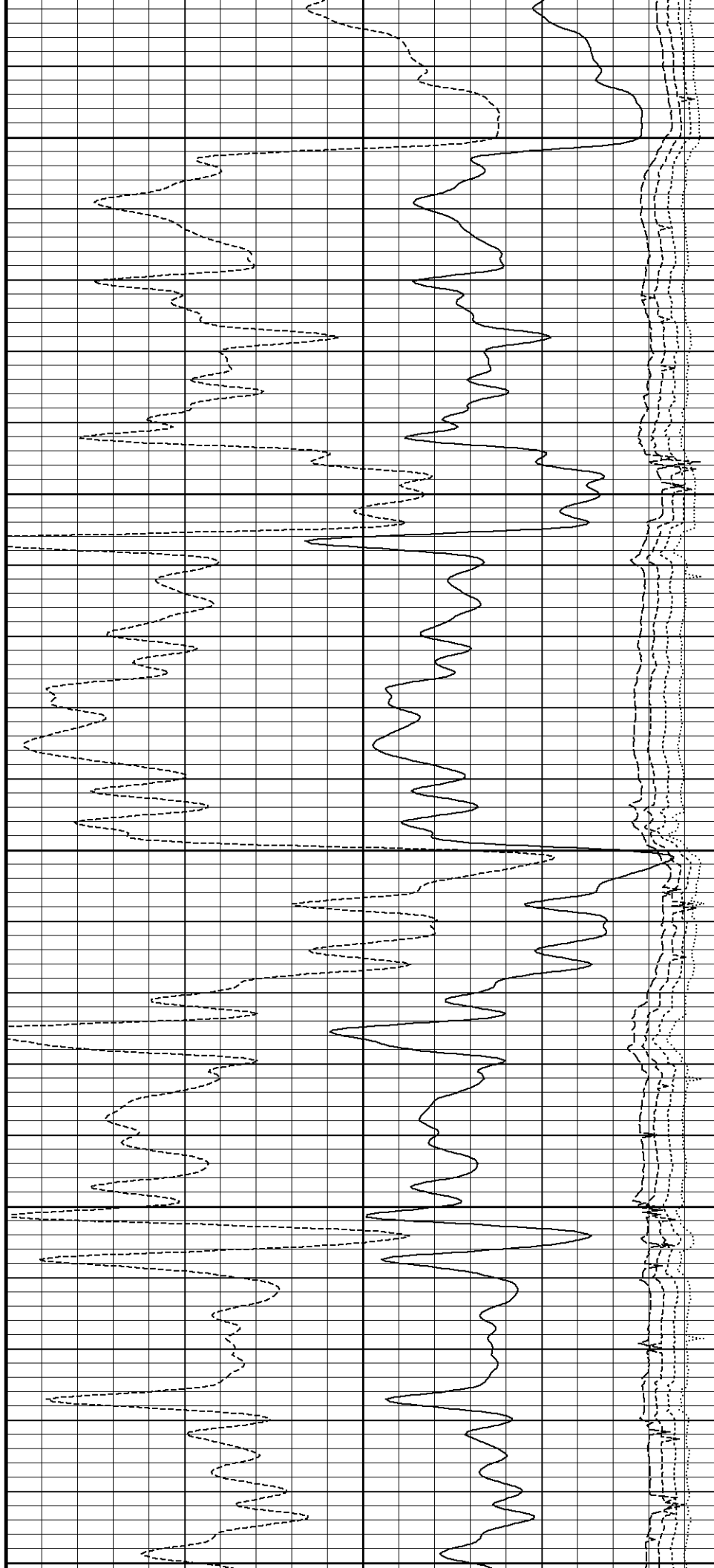
2850

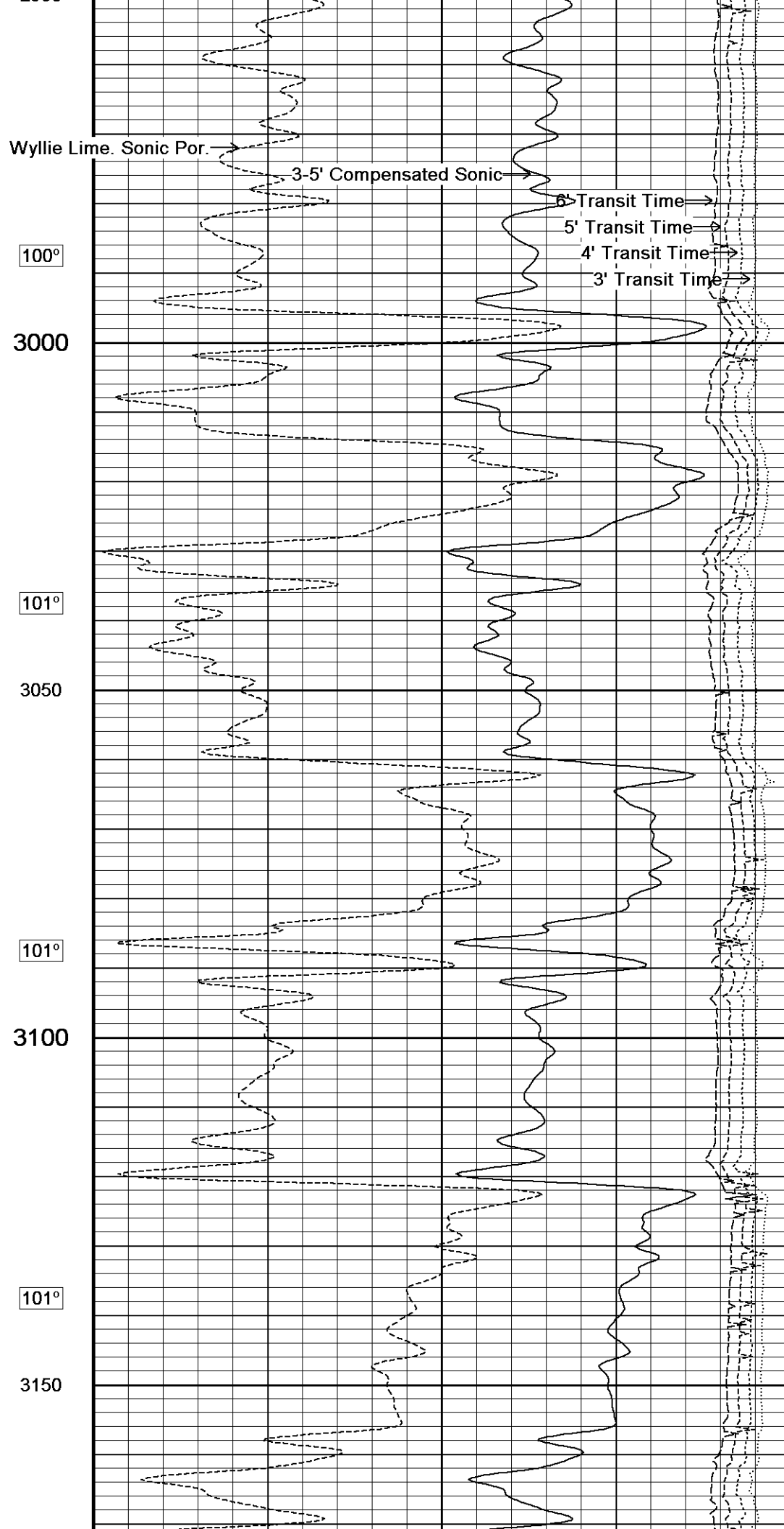
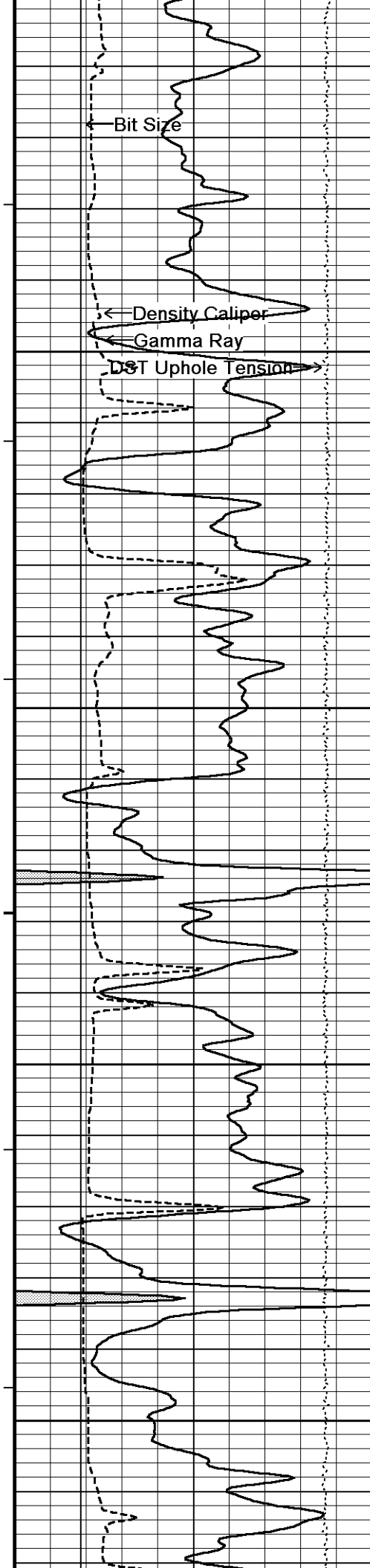
100°

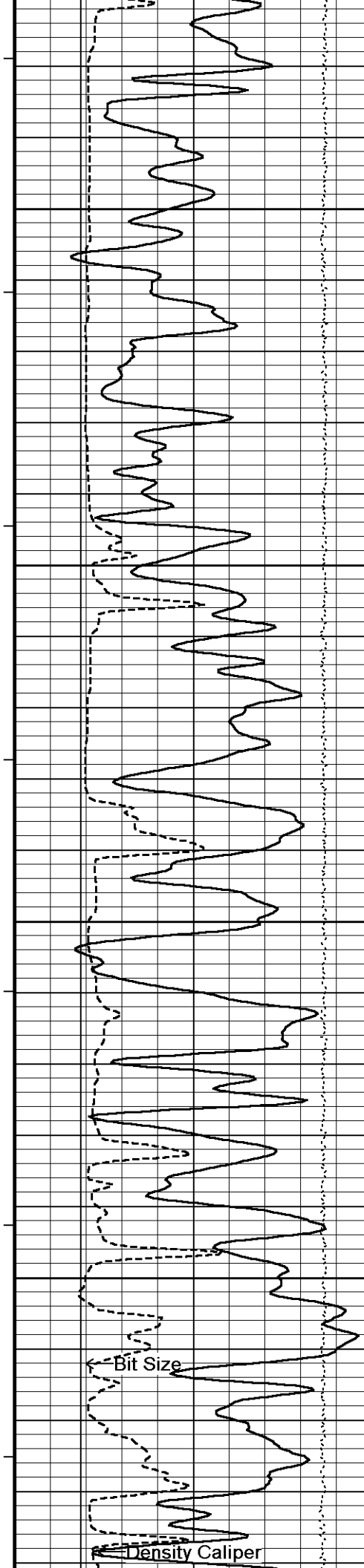
2900

100°

2950







102°

3200

102°

3250

102°

3300

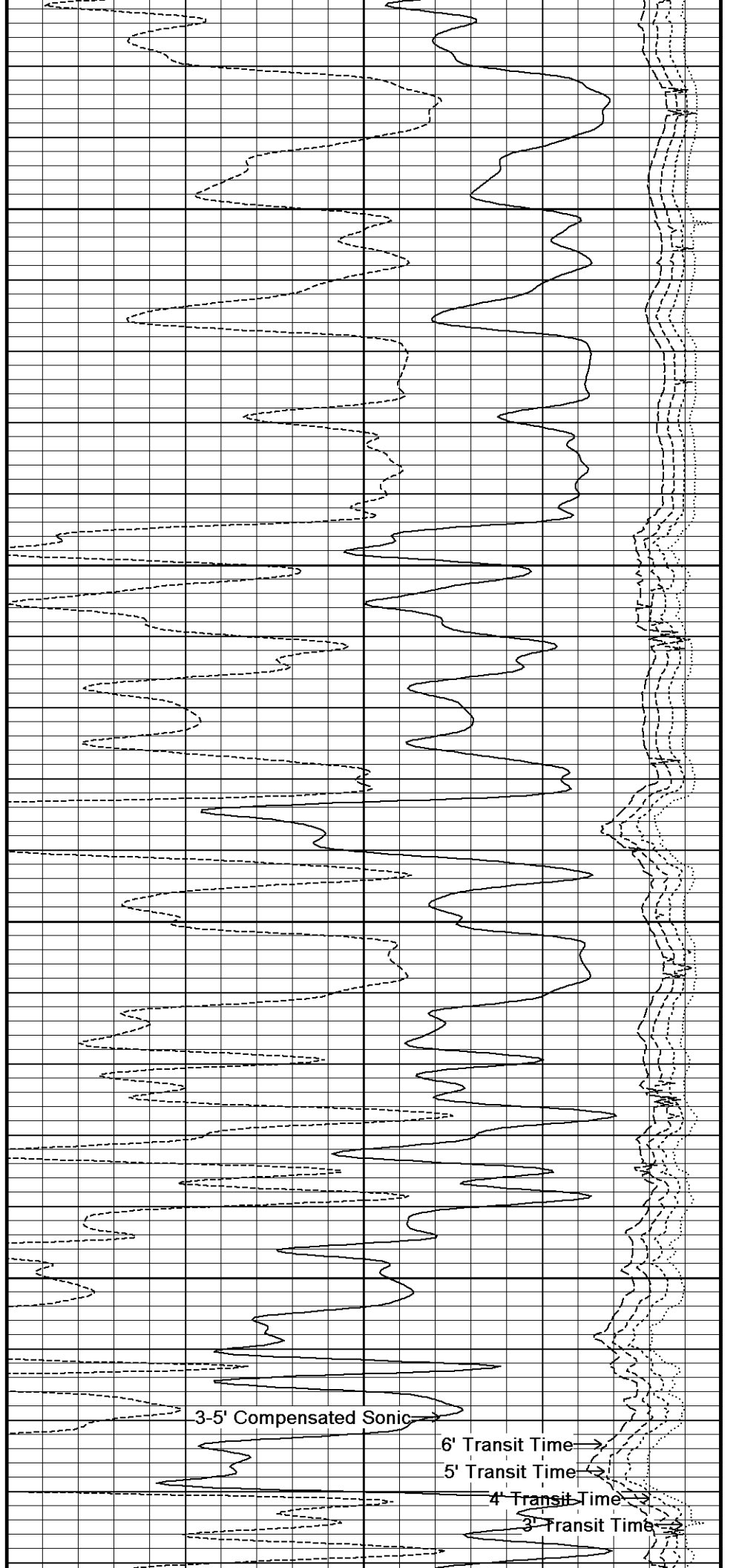
102°

3350

103°

Bit Size

Density Caliper



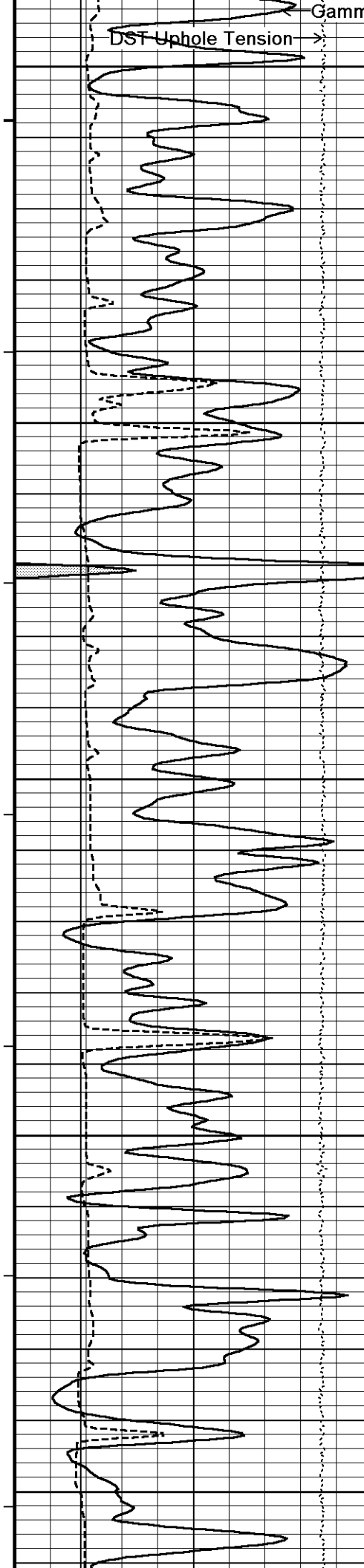
3-5' Compensated Sonic

6' Transit Time

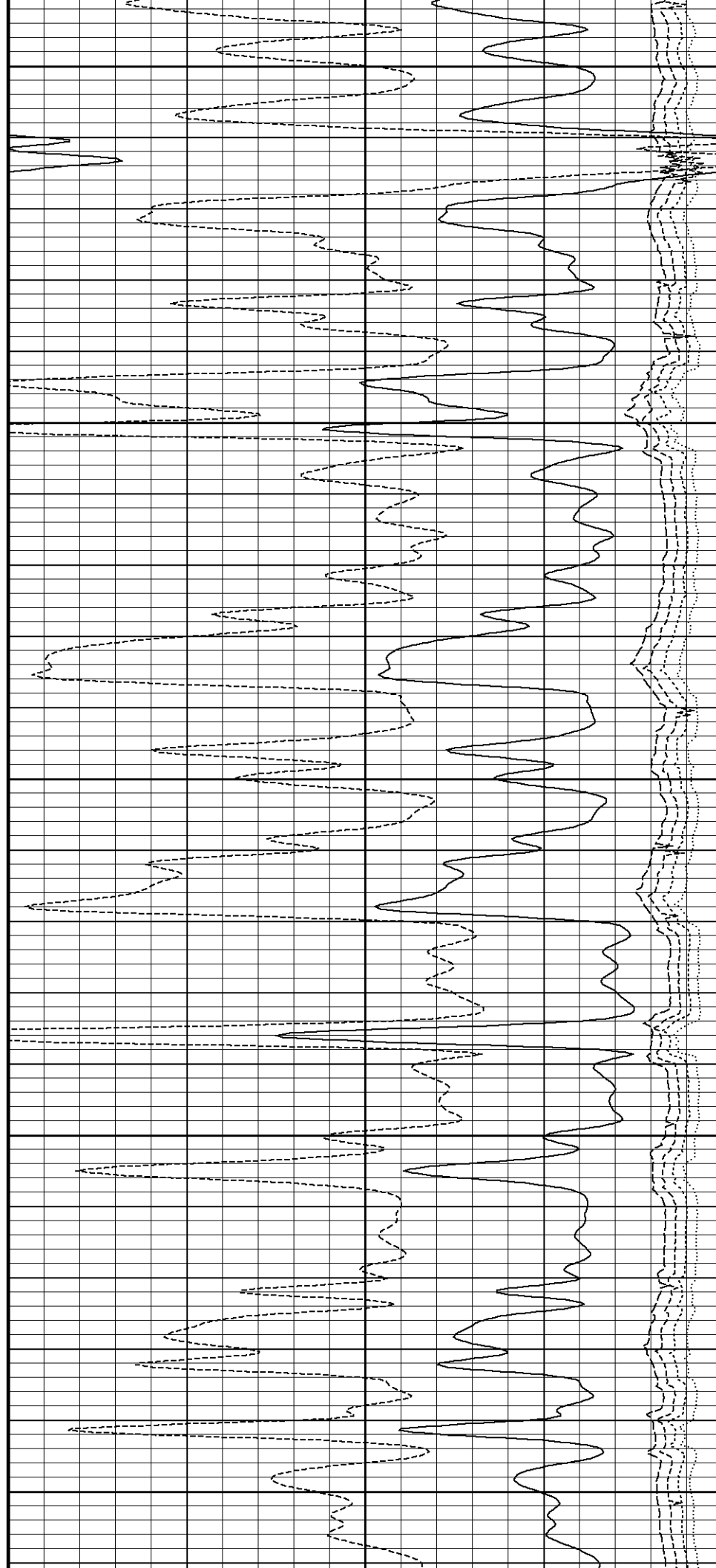
5' Transit Time

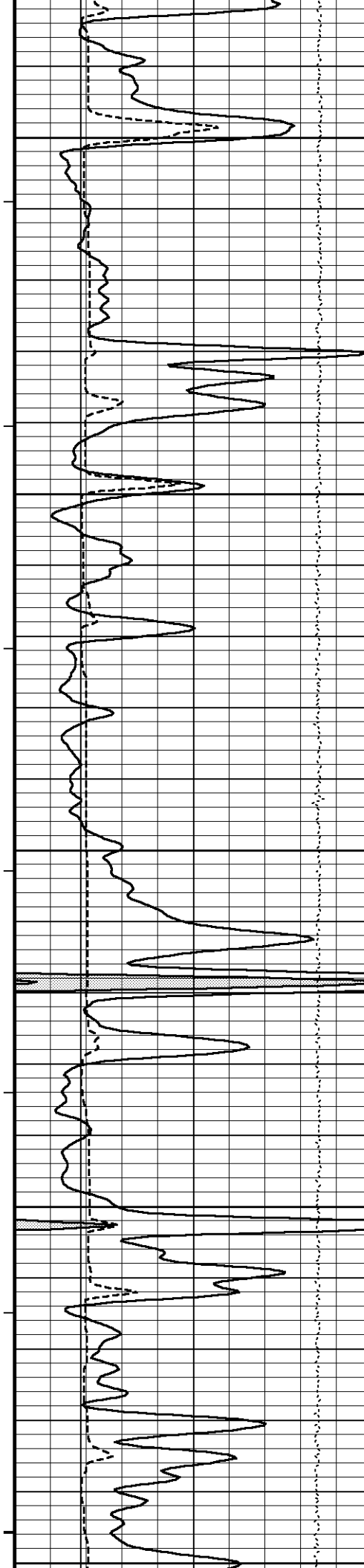
4' Transit Time

3' Transit Time



3400
103°
3450
103°
3500
104°
3550
104°
3600





105°

3850

105°

3900

106°

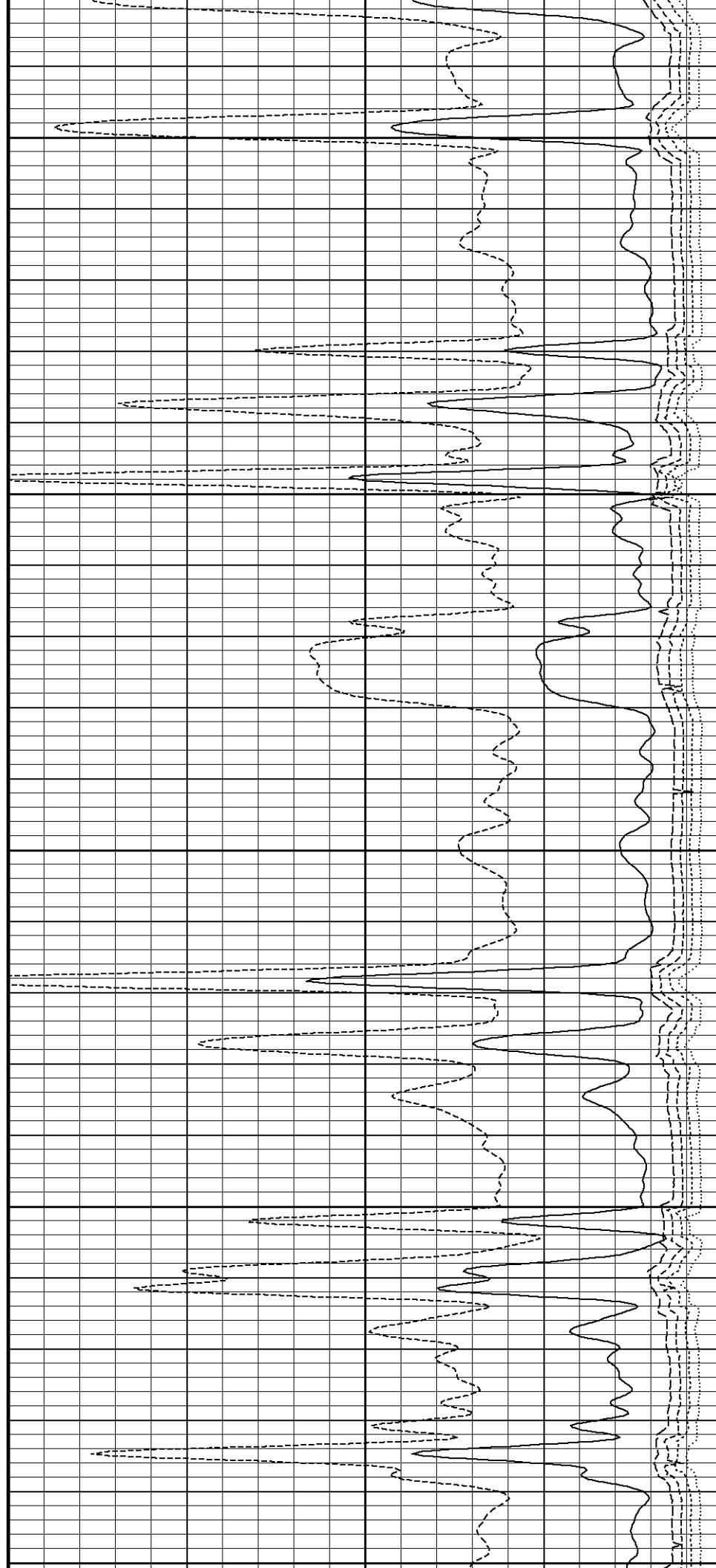
3950

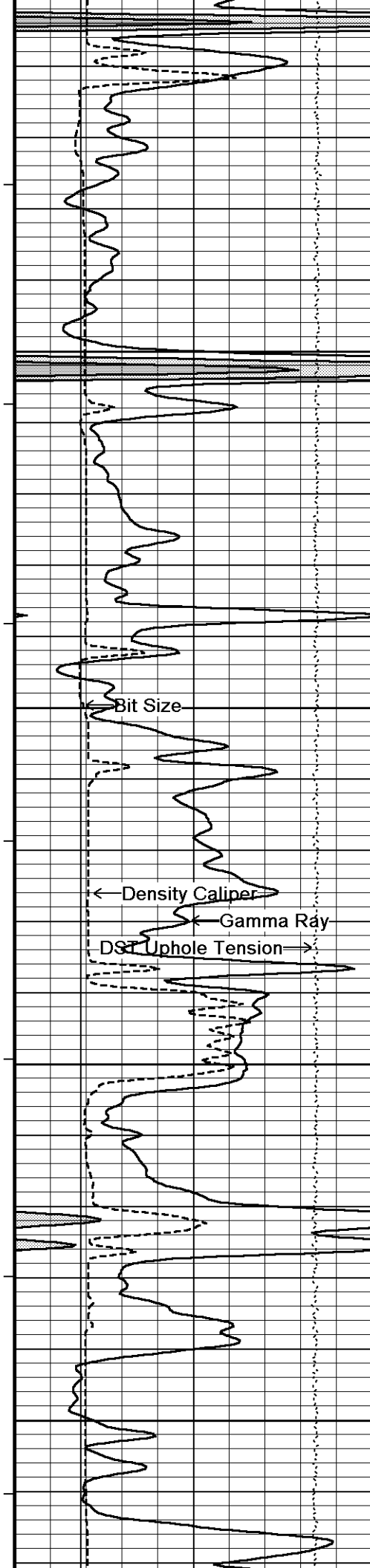
106°

4000

106°

4050





106°

4100

106°

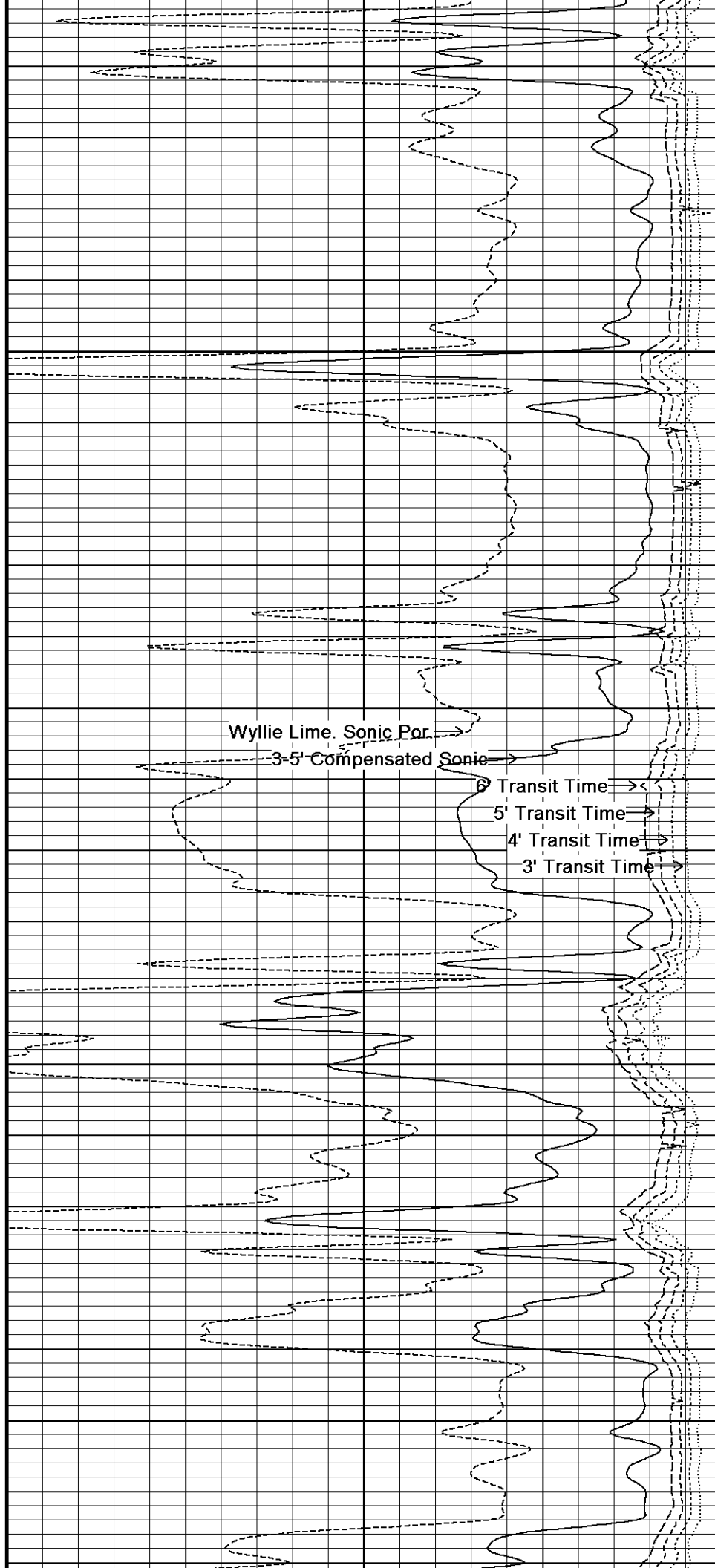
4150

107°

4200

107°

4250



Wyllie Lime Sonic Por.

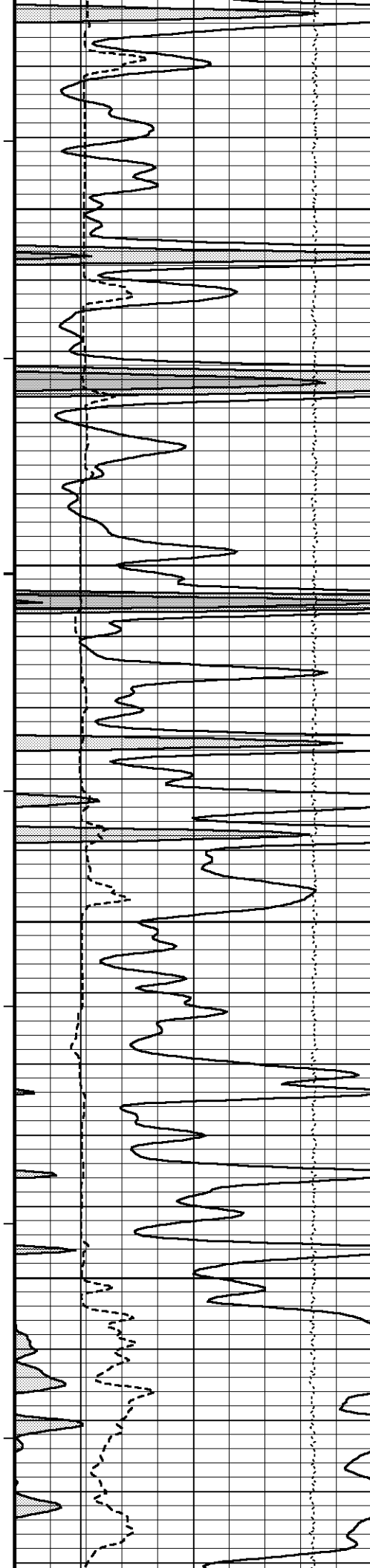
3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time



108°

4300

109°

4350

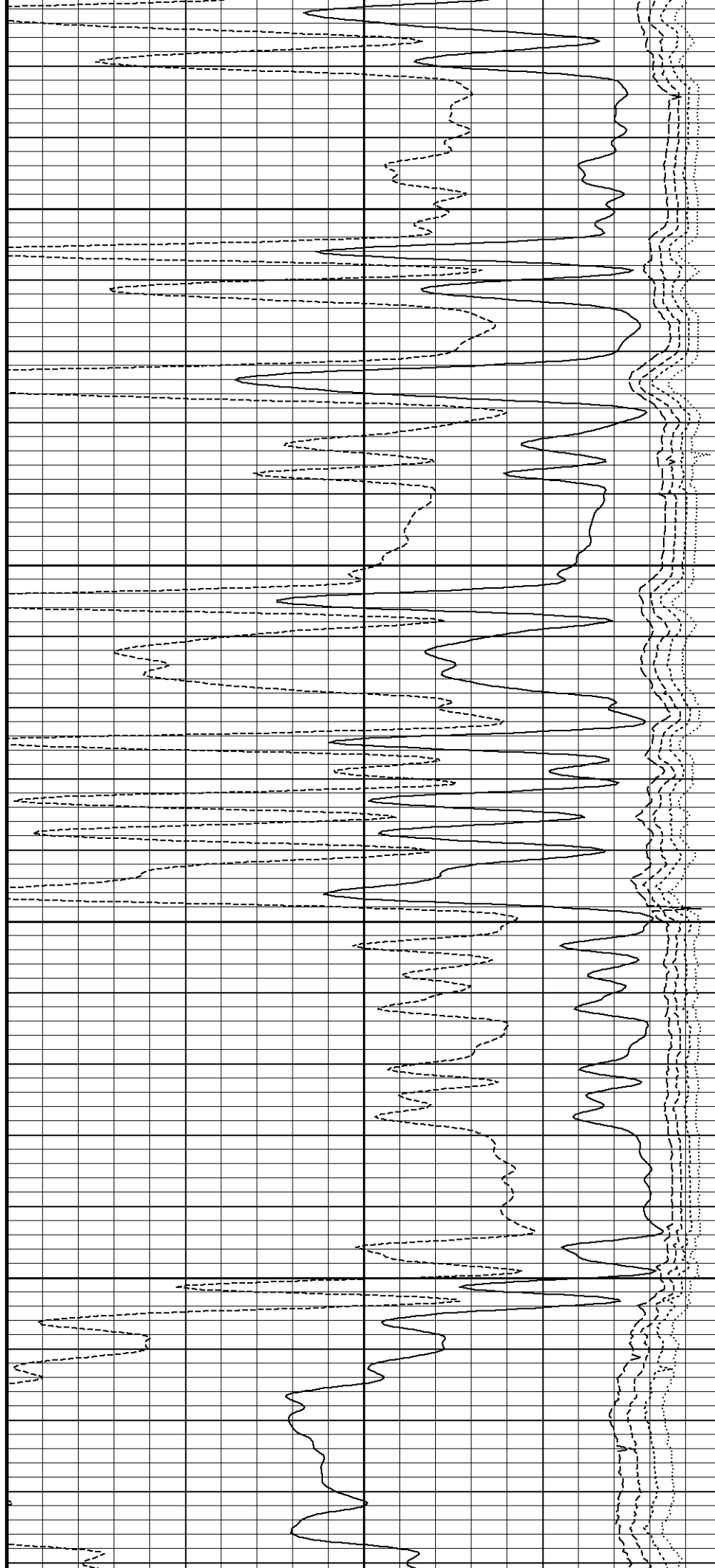
109°

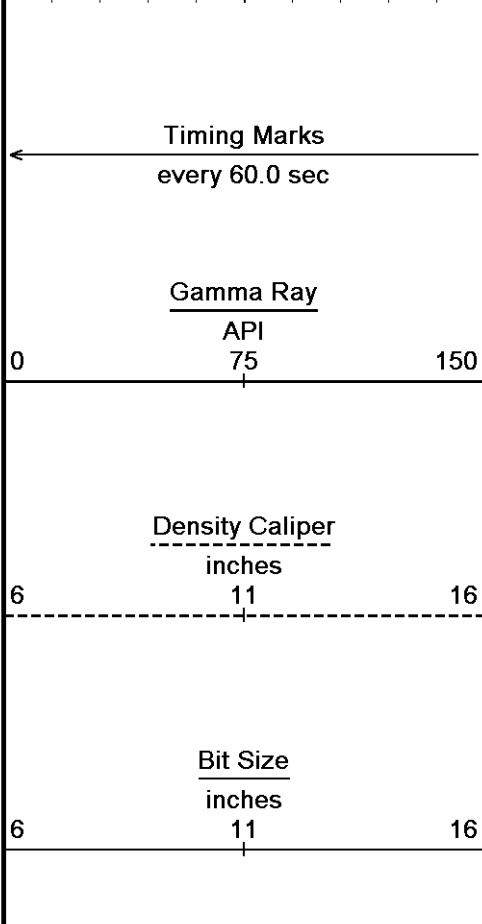
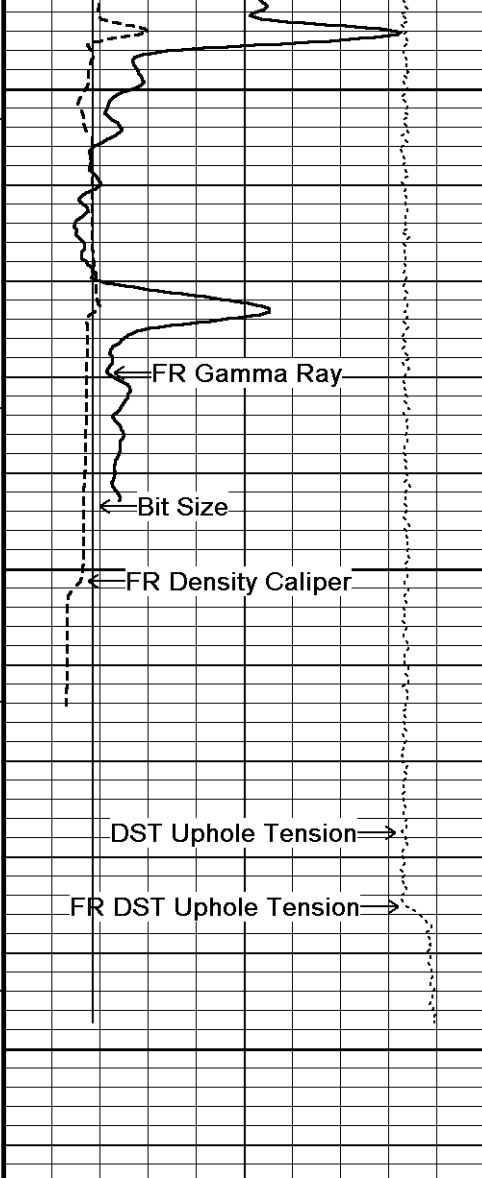
4400

109°

4450

110°





4500

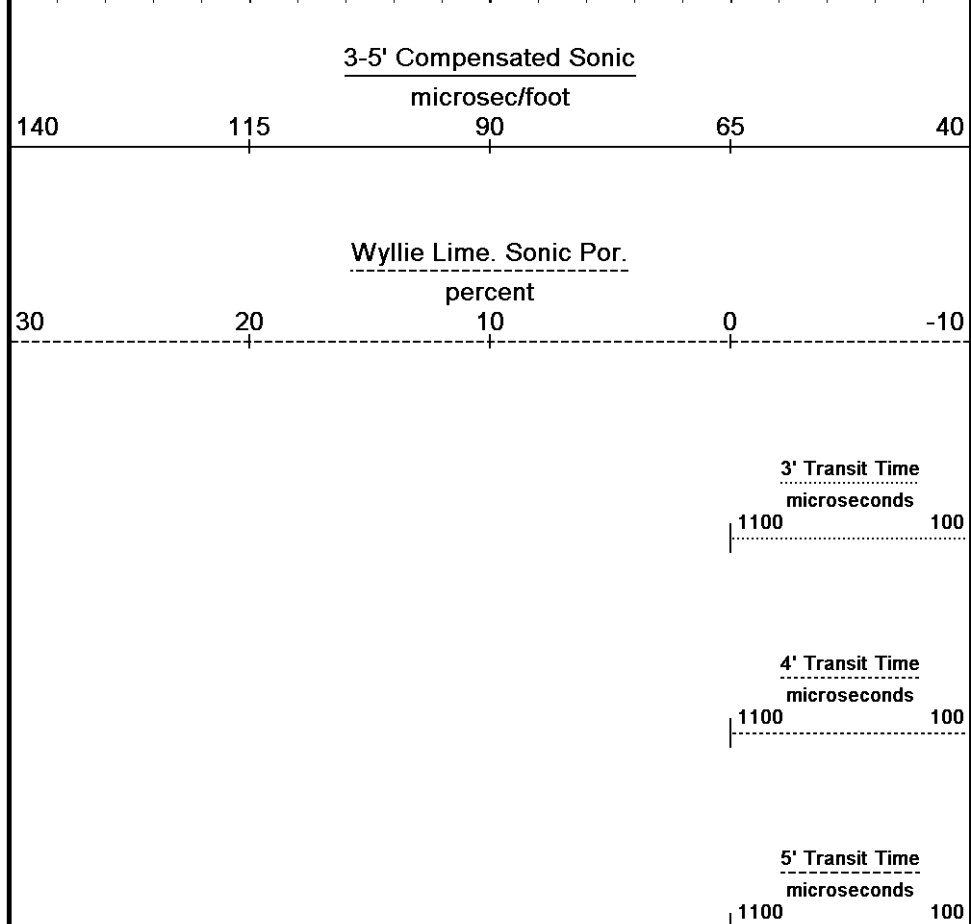
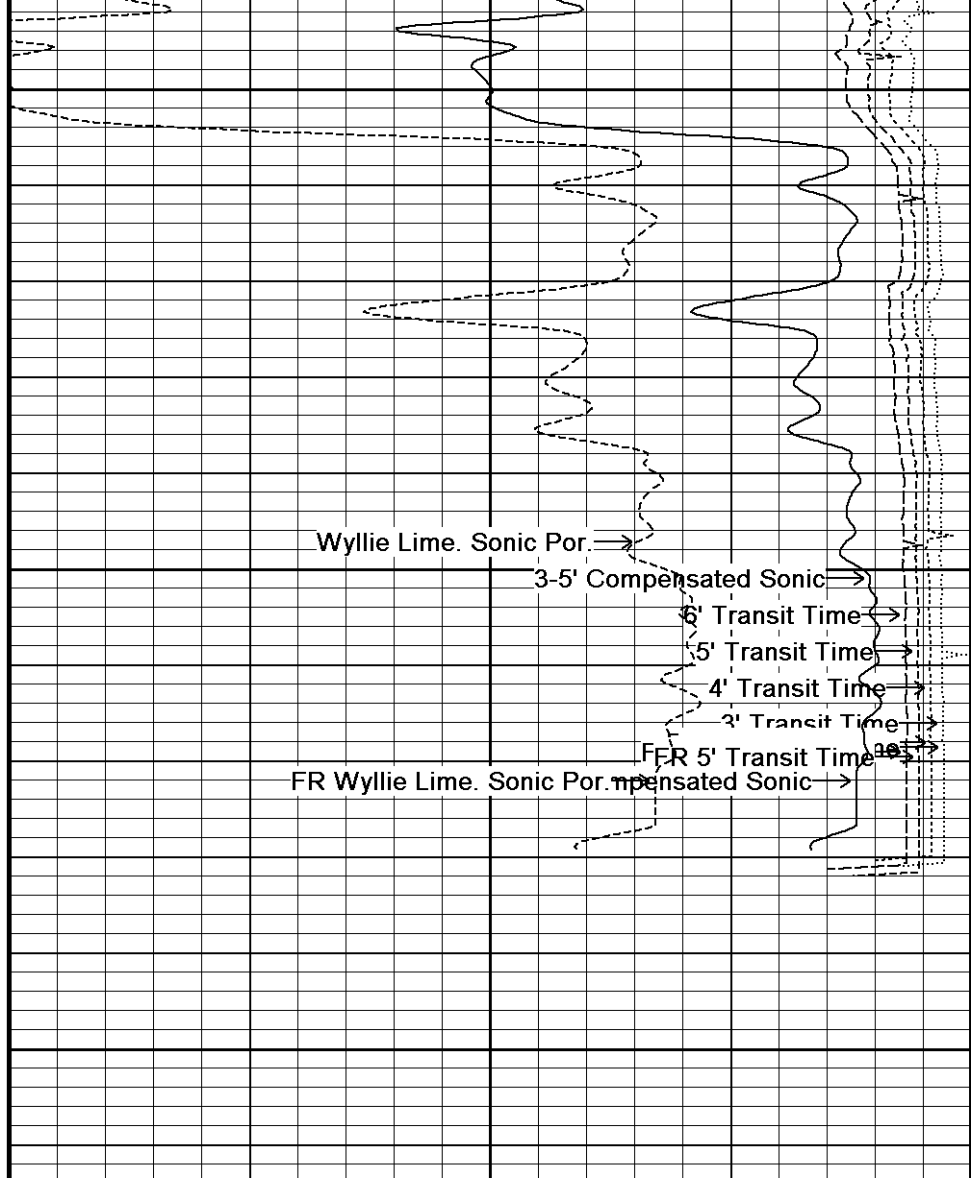
109°

4550

4600

4612
Depth
in
Feet

Borehole
Temp in
deg F



DST Uphole Tension
pounds
50000

Replay
Scale
1:240

6' Transit Time
microseconds
1100100

Depth Based Data - Maximum Sampling Increment 10.0cmPlotted on 13-JUL-2012 12:44

Filename: C:\Minimus 11.03.4044\Data\Shakespeare Zanobia #1...\Shakespeare Zanobia 1-22_002.dtaRecorded on 13-JUL-2012 10:29

System Versions: Logged with 11.03.4044Plotted with 11.03.4044

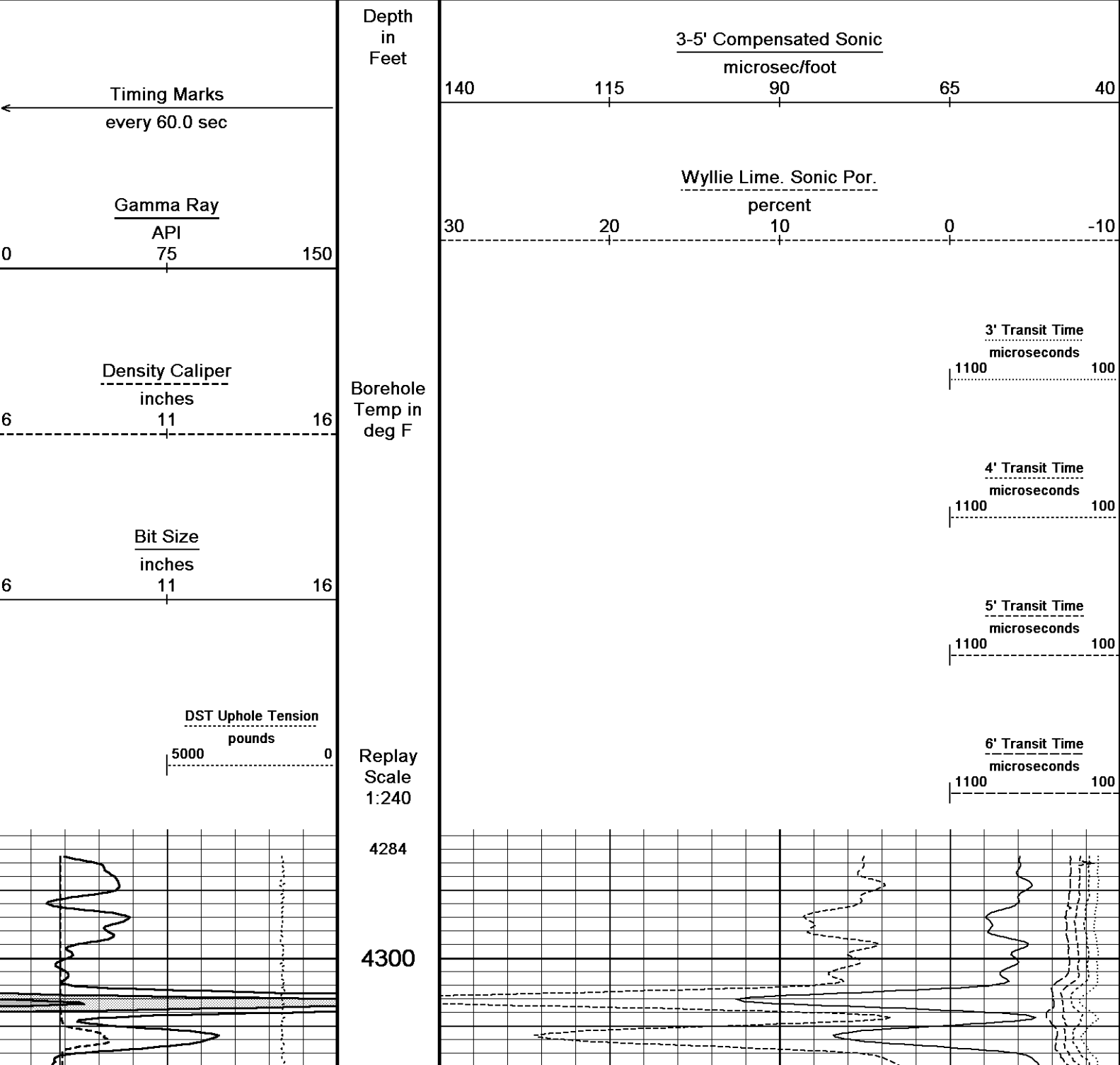
5 INCH MAIN PASS

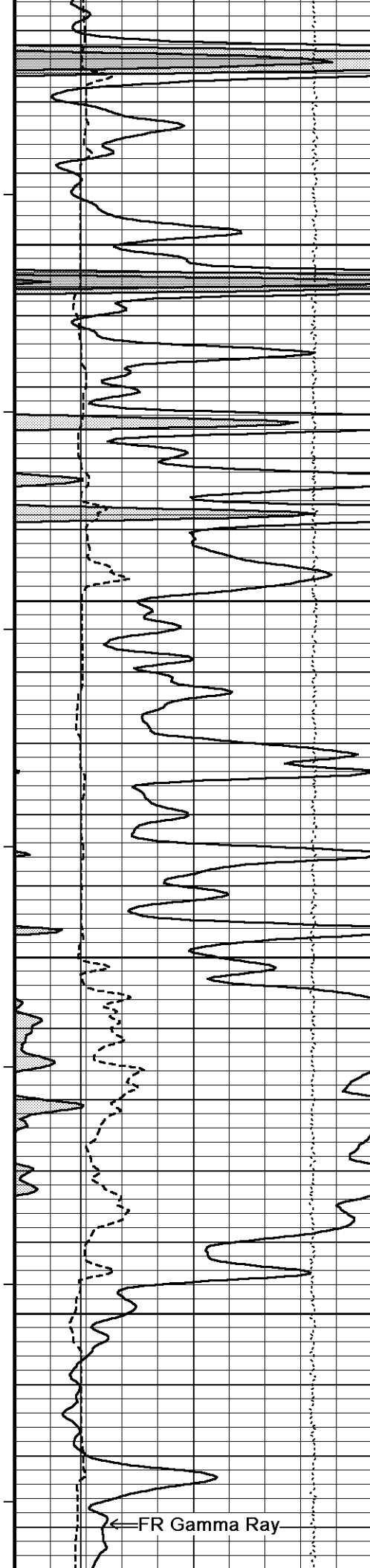
5 INCH REPEAT PASS

Depth Based Data - Maximum Sampling Increment 10.0cmPlotted on 13-JUL-2012 12:44

Filename: C:\Minimus 11.03.4044\Data\Shakespeare Zanobia #1...\Shakespeare Zanobia 1-22_001.dtaRecorded on 13-JUL-2012 10:09

System Versions: Logged with 11.03.4044Plotted with 11.03.4044





108°

4350

108°

4400

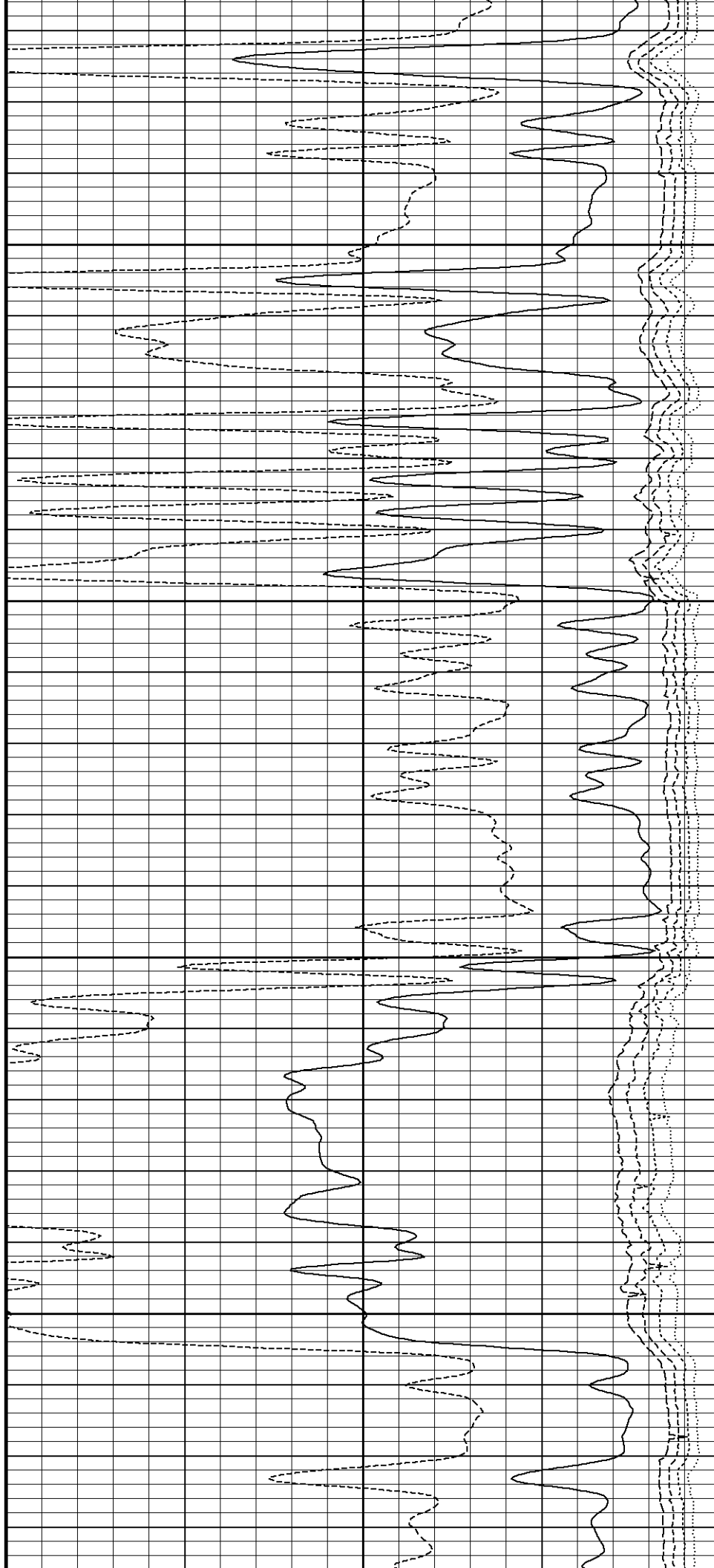
109°

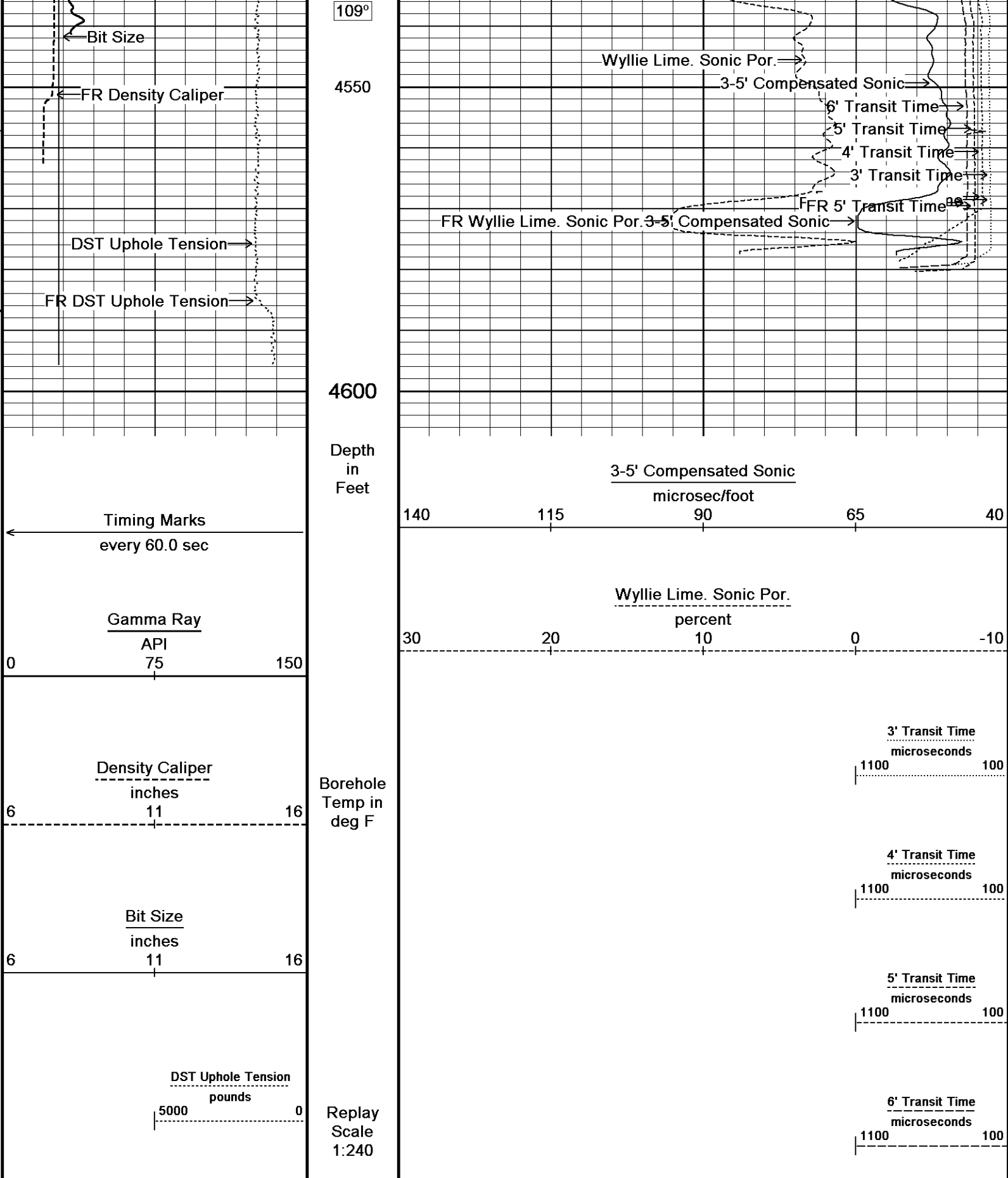
4450

110°

4500

←FR Gamma Ray





General Constants All 000

Last Edited on 13-JUL-2012,09:08

General Parameters

Mud Resistivity	0.340	ohm-metres
Mud Resistivity Temperature	87.000	degrees F
Water Level	0.000	feet
Density/Neutron Processing	Wet Hole	

Hole/Annular Volume and Differential Caliper Parameters

HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	Density Caliper	

Rwa Parameters

Porosity used	Limestone Density Por.	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

Down-hole Tension Calibration SMS 0

Field Calibration on 08-JUL-2012 04:57

Reading No	Measured	Calibrated (lbs)
1	13893.37	0.00
2	13954.26	582.00

Gamma Calibration MCG-C 84

Field Calibration on 12-JUL-2012 15:43

	Measured	Calibrated (API)
Background	72	49
Calibrator (Gross)	1139	774
Calibrator (Net)	1067	725

Gamma Constants MCG-C 84

Last Edited on 13-JUL-2012,09:08

Gamma Calibrator Number	GR38	
Mud Density	1.04	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

SP Calibration MCG-C 84

Field Calibration on 06-JUL-2012 09:32

	Measured	Calibrated (mV)
Reference 1	105.6	101.0
Reference 2	-96.1	-101.0

High Resolution Temperature Calibration MCG-C 84

Field Calibration on 28-MAY-2012,07:32

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

High Resolution Temperature Constants MCG-C 84

Last Edited on

Pre-filter Length	11
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Micro Normal and Micro Inverse Calibration MML-A 4

Base Calibration on 28-JUN-2012 09:09

Field Check on 12-JUL-2012 15:34

Base Calibration

		Measured	Calibrated (ohm-m)
Channel	Resistor 1	Resistor 2	Resistor 1 Resistor 2
Micro Normal	12.2	60.3	5.0 25.0
Micro Inverse	15.7	78.4	5.0 25.0

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	62.9	62.9
Micro Inverse	48.2	48.2

Micro Normal and Micro Inverse Constants MML-A 4

Last Edited on 12-JUL-2012,15:32

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	

Caliper Calibration MML-A 4			Base Calibration on 28-JUN-2012 09:05
			Field Calibration on 12-JUL-2012 15:32
Base Calibration			
Reading No	Measured	Calibrator Size (in)	
1	15261	5.98	
2	18643	7.97	
3	21962	9.86	
4	25966	11.92	
5	0	0.00	
6	N/A	N/A	
Field Calibration			
	Measured Caliper (in)	Actual Caliper (in)	
	6.09	5.98	

Neutron Calibration MDN-A.B 65				Base Calibration on 28-JUN-2012 11:51	
				Field Check on 12-JUL-2012 15:50	
Base Calibration					
		Measured		Calibrated (cps)	
	Near	Far		Near	Far
	3161	99		3714	110
Ratio	31.971			33.764	
Field Calibrator at Base					
				Calibrated (cps)	
				1631	2328
Ratio				0.700	
Field Check					
				Calibrated (cps)	
				1629	2346
Ratio				0.695	

Neutron Constants MDN-A.B 65			Last Edited on 13-JUL-2012,09:09		
Neutron Source Id	PN-521				
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			
Formation Fluid Salinity Source	Constant Value				
Formation Fluid Salinity	0.00	kppm			
Barite Mud Correction	Not Applied				

FE Calibration MFE-A.A 55			Base Calibration on 19-JUN-2012 09:07 Field Check on 12-JUL-2012 15:22	
Base Calibration				
	Measured	Calibrated (ohm-m)		
Reference 1	0.0	0.0		
Reference 2	952.0	126.8		
Base Check			281.3	
Field Check			281.3	

FE Constants MFE-A.A 55		Last Edited on 13-JUL-2012,09:09	
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-C.K 330

Last Edited on 13-JUL-2012,09:09

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)
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
Sonic 2 Despiker	N/A

Induction Calibration MAI-A.A 45

Base Calibration on 12-JAN-2012,13:34
Field Check on 12-JUL-2012 15:21

Base Calibration					
Test Loop Calibration		Measured		Calibrated (mmho/m)	
Channel		Low	High	Low	High
1		14.4	472.6	9.3	966.2
2		5.7	374.0	7.6	821.4
3		2.4	224.2	5.2	522.2

3	3.4	261.2	5.2	566.0
4	2.5	133.9	2.6	279.2
Array Temperature		79.4	Deg F	
Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	18.3	3851.8
2	0.0	0.0	31.6	3629.8
3	0.0	0.0	28.6	3049.8
4	0.0	0.0	18.3	2079.3
Deep	0.0	0.0	16.0	1911.3
Medium	0.0	0.0	42.5	4061.2
Shallow	0.0	0.0	49.5	5483.8
Array Temperature		0.0	88.5	Deg F

Induction Constants MAI-A.A 45

Last Edited on 13-JUL-2012,09:09

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	
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 45

Field Calibration on 28-JUN-2012,09:51

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MAI-A.A 45

Last Edited on 12-JAN-2012,11:13

Pre-filter Length 11

Caliper Calibration MPD-B 31

Base Calibration on 17-JUN-2012 20:26

Field Calibration on 12-JUL-2012 15:23

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	17360	3.99
2	25891	5.98

2	23851	9.98
3	34800	7.97
4	43168	9.86
5	52528	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.00	5.98

Photo Density Calibration MPD-B 31

Base Calibration on 17-JUN-2012 20:49
Field Check on 12-JUL-2012 15:29

Density Calibration

Base Calibration

	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	48464	24458	59556	30836
Reference 2	19785	1991	24941	2541

Field Check at Base

695.5 853.6

Field Check

693.4 856.0

PE Calibration

Base Calibration

	WS	Measured		Calibrated
		WH	Ratio	Ratio
Background	128	610		
Reference 1	19401	48326	0.404	0.371
Reference 2	5740	19688	0.294	0.272

Field Check at Base

128.0 610.0

Field Check

127.7 608.0

Density Constants MPD-B 31

Last Edited on 13-JUL-2012,09:09

Density Source Id	254
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	1.04 gm/cc
Mud Density Z/A Multiplier	1.11
Mud Filtrate Density	1.00 gm/cc
Dry Hole Mud Filtrate Density	1.00 gm/cc
DNCT	0.00 gm/cc
CRCT	0.00 gm/cc
Density Z/A Correction	Hybrid
Matrix Density (gm/cc)	Depth (ft)
2.71	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

DOWNHOLE EQUIPMENT

C:\Minimus 11.03.4044\Data\Shakespeare Zanobia #1-22\Shakespeare Zanobia 1-22.dta

Compact Comms Gamma
MCG-C 84 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in



Compact Comms Gamma
MCG-C 84 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 4 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Micro-log
MML-A 4 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Neutron
MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Neutron
MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 31 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Density/Caliper
MPD-B 31 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focussed Electric
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Focussed Electric
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Sonic
MSS-C.K 330 LG: 12.52 ft WT: 72.8 lb OD: 2.24 in

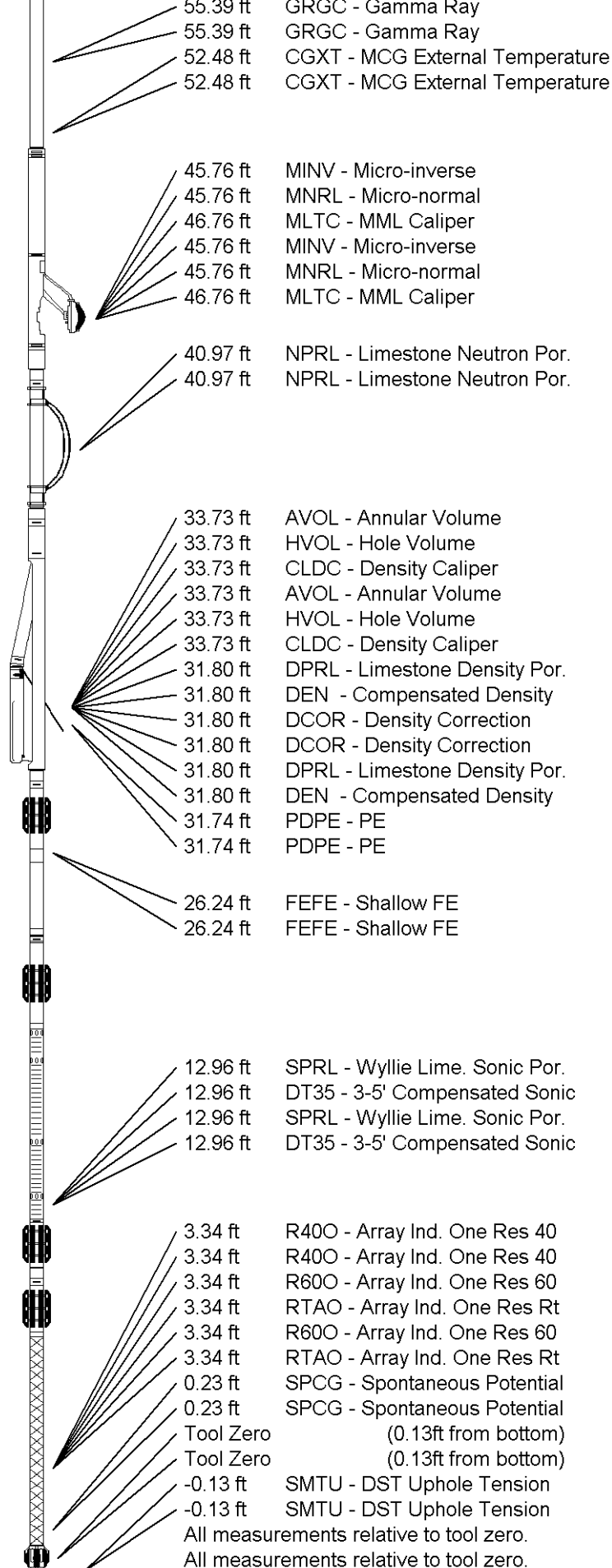
Compact Sonic
MSS-C.K 330 LG: 12.52 ft WT: 72.8 lb OD: 2.24 in

Compact Induction
MAI-A.A 45 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 45 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 60.68 ft Weight: 456.4 lb

Total Length: 60.68 ft Weight: 456.4 lb



FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2812.00	feet	First Reading	4572.00	feet
Elevation Drill Floor	2811.00	feet	Depth Driller	4585.00	feet
Elevation Ground Level	2802.00	feet	Depth Logger	4585.00	feet



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WITH INTEGRATED TRANSIT TIME

