



Weatherford[®]

**COMPENSATED SONIC
WITH INTEGRATED TRANSIT TIME**

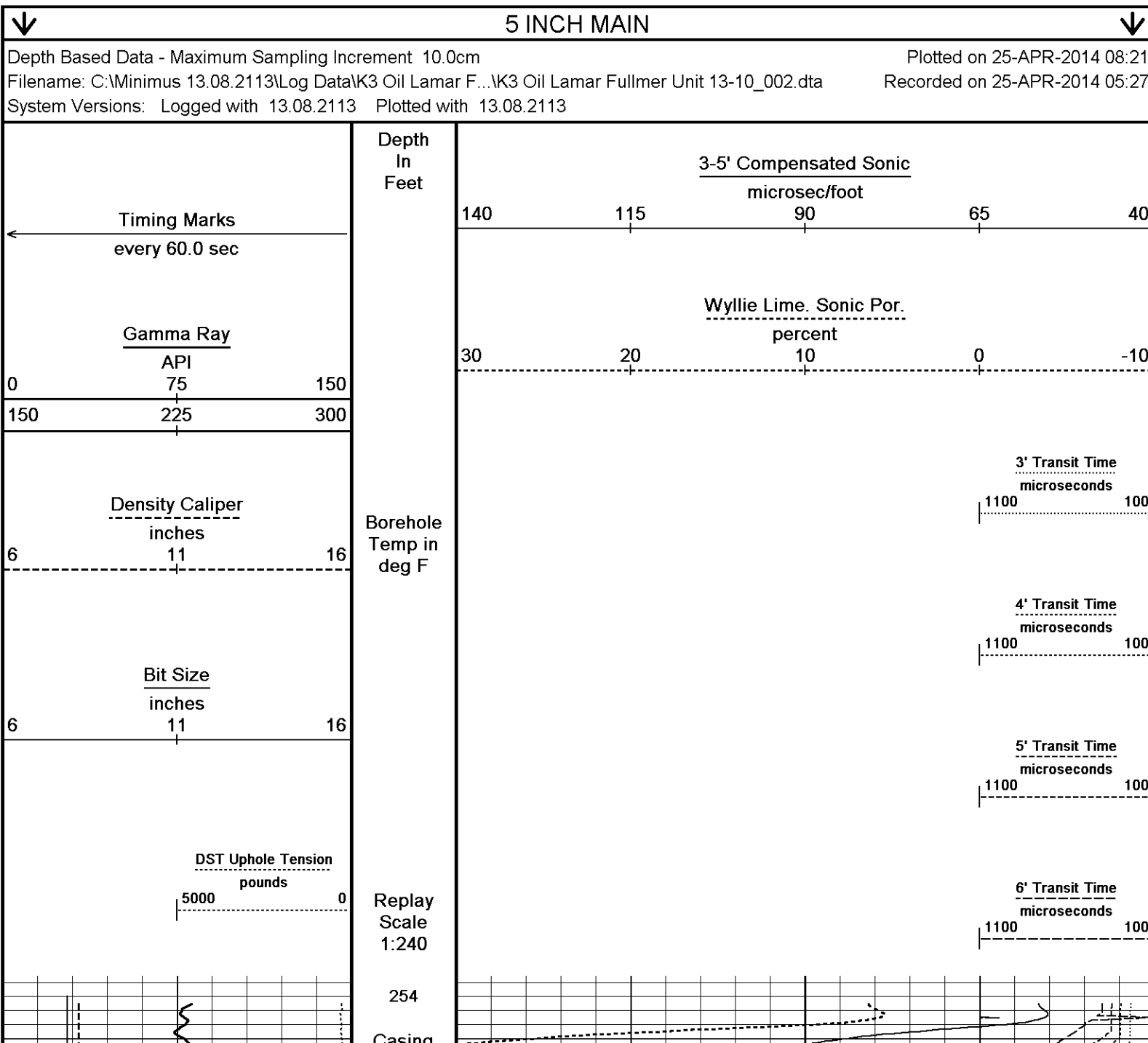
COMPANY										K3 OIL & GAS OPERATING COMPANY									
WELL										LAMAR FULLMER UNIT 13-10									
FIELD										WILDCAT									
PROVINCE/COUNTY										GOVE									
COUNTRY/STATE										U.S.A. / KANSAS									
LOCATION										1824' FSL & 1921' FEL									
SEC 13		TWP 15S		RGE 29W		Other Services				MPD/MDN									
Latitude						MAI/MFE													
Longitude						MML													
API Number		15-063-22199																	
Permanent Datum GL, Elevation 2448 feet																			
Log Measured From KB																			
Drilling Measured From KB										Elevations: KB 2456.00 DF 2454.00 GL 2448.00									
Date		25-APR-2014																	
Run Number		ONE																	
Service Order		4558-85583672																	
Depth Driller		4421.00				feet													
Depth Logger		4421.00				feet													
First Reading		4408.00				feet													
Last Reading		265.00				feet													
Casing Driller		270.00				feet													
Casing Logger		265.00				feet													
Bit Size		7.875				inches													
Hole Fluid Type		CHEMICAL																	
Density / Viscosity		9.30		lb/USg		48.00		CP											
PH / Fluid Loss		9.00				8.00		ml/30Min											
Sample Source		FLOWLINE																	
Rm @ Measured Temp		0.77 @ 92.0				ohm-m													
Rmf @ Measured Temp		0.62 @ 92.0				ohm-m													
Rmc @ Measured Temp		0.92 @ 92.0				ohm-m													
Source Rmf / Rmc		CALC				CALC													
Rm @ BHT		0.58 @123.0				ohm-m													
Time Since Circulation		4 HOURS																	
Max Recorded Temp		123.00				deg F													
Equipment / Base		13096				LIB													
Recorded By		ADAM SILL																	
Witnessed By		PAT DEENIHAN																	
JOB #		LB14-128																	

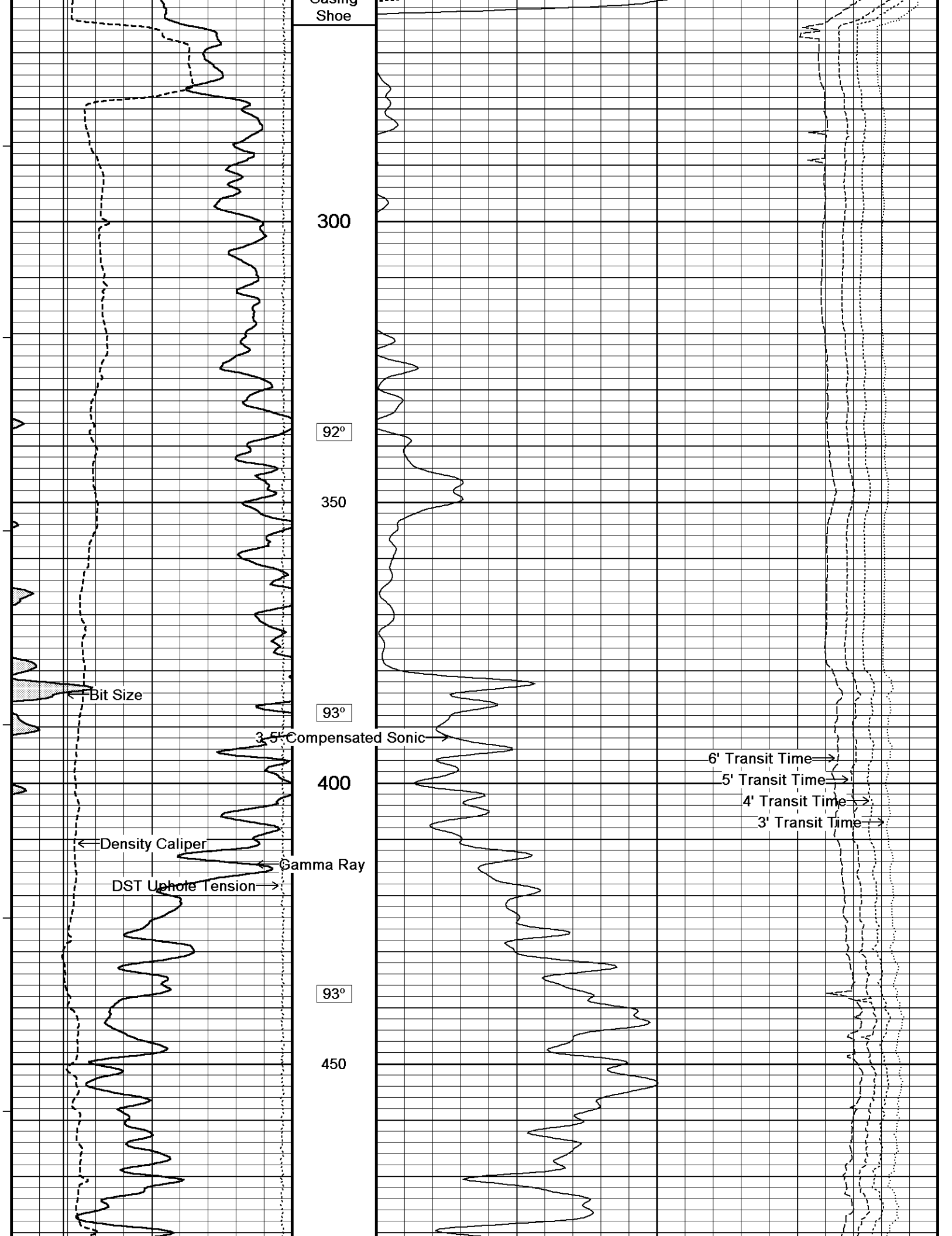
BOREHOLE RECORD					Last Edited: 25-APR-2014 02:45
Bit Size inches		Depth From feet		Depth To feet	
7.875		270.00		4421.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
SURFACE	8.625	0.00	270.00	24.00	

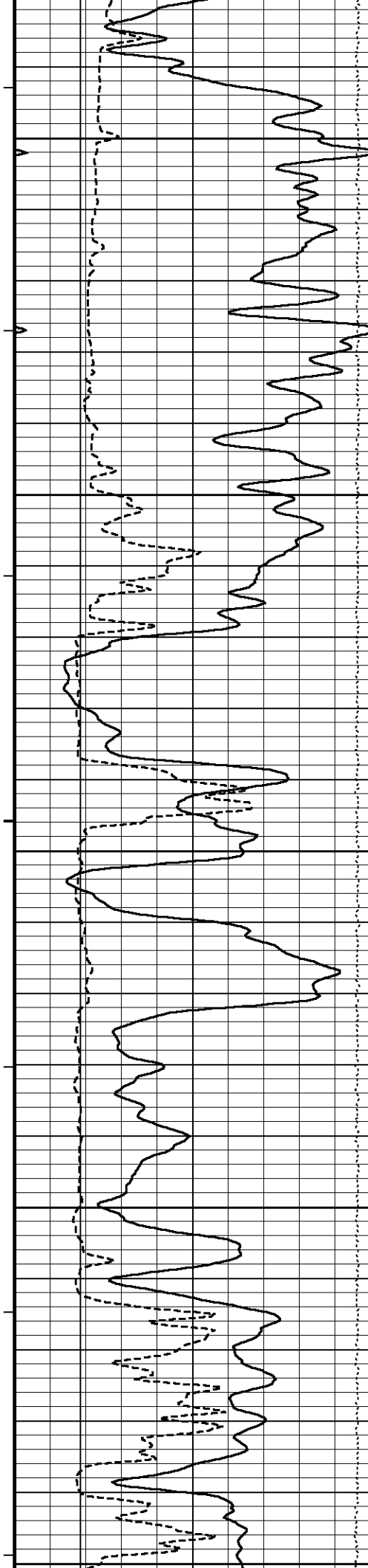
REMARKS
- SOFTWARE ISSUE: WLS 13.08.2113
- TOOL STRING: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION
- HARDWARE: DUAL BOWSPRING ECCENTRALIZER USED ON MDN. 0.5 INCH STANDOFF USED ON MFE. TWO 0.5 INCH STANDOFFS USED ON MSS. 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED 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: 1841 CU. FT.
- ANNUILLAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO 3300 FEET: 191 CU. FT.

- RIG: DUKE #8.
- ENGINEER: A. SILL.
- OPERATORS: J. LaPOINT.

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.







94°

500

94°

550

94°

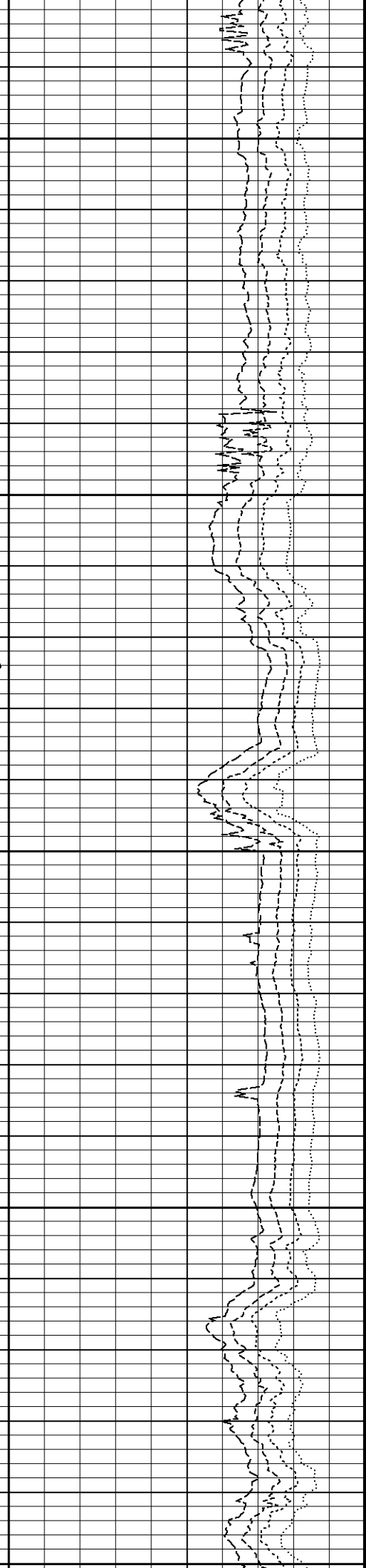
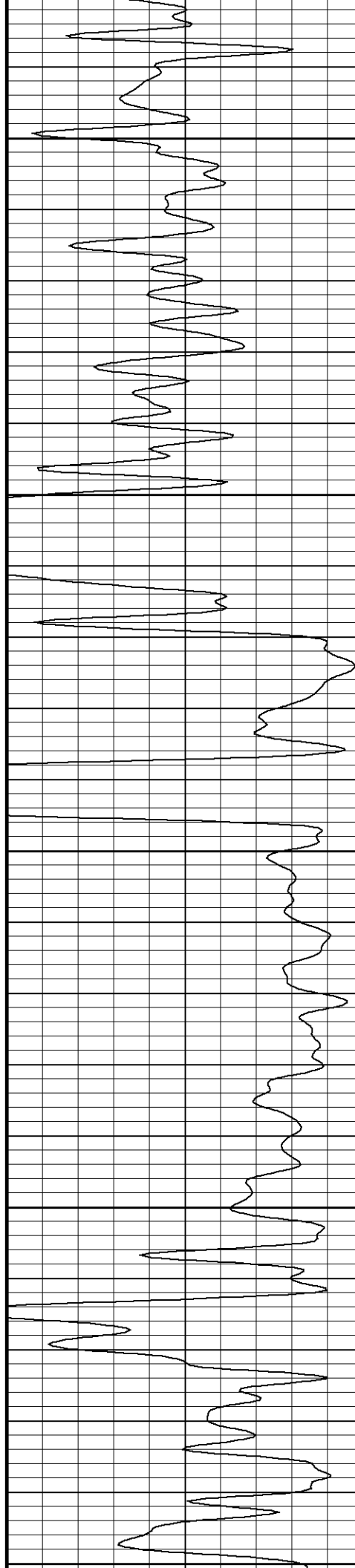
600

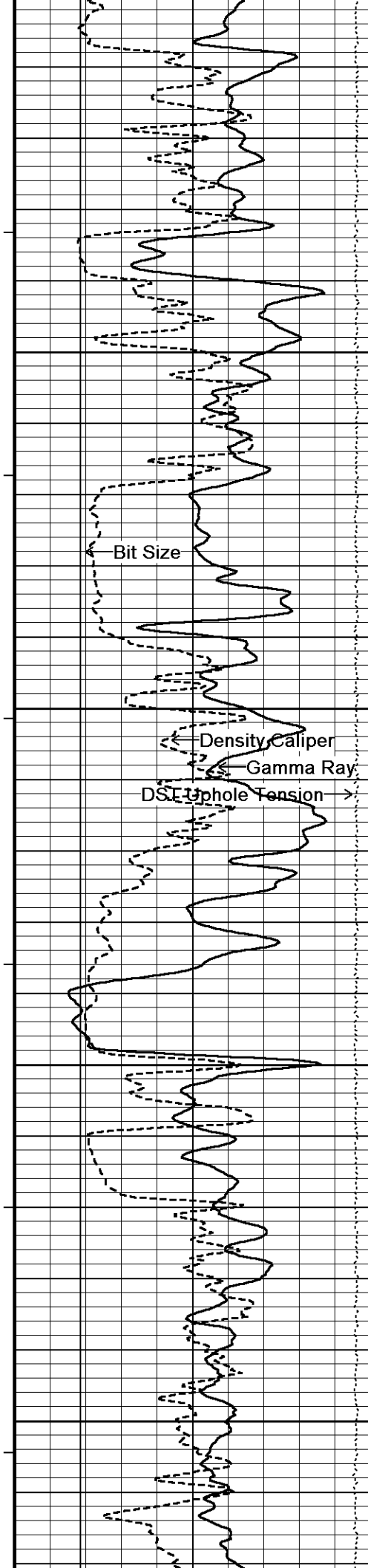
95°

650

96°

700





96°

750

96°

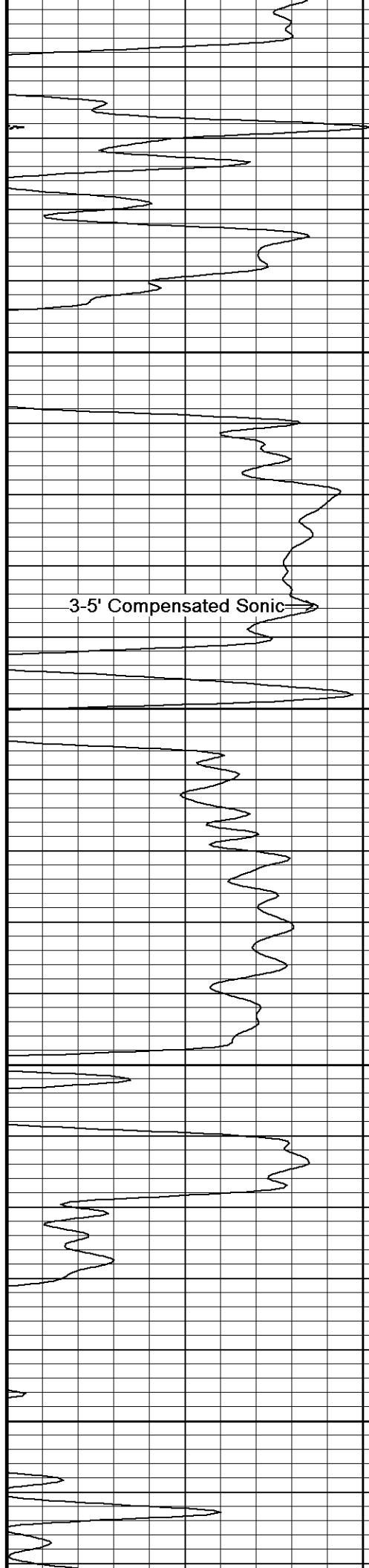
800

97°

850

99°

900



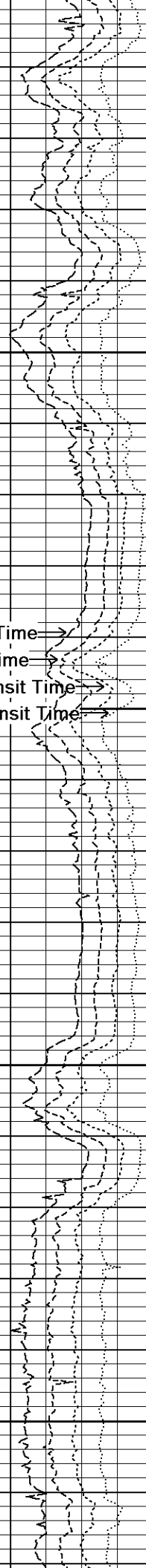
3-5' Compensated Sonic

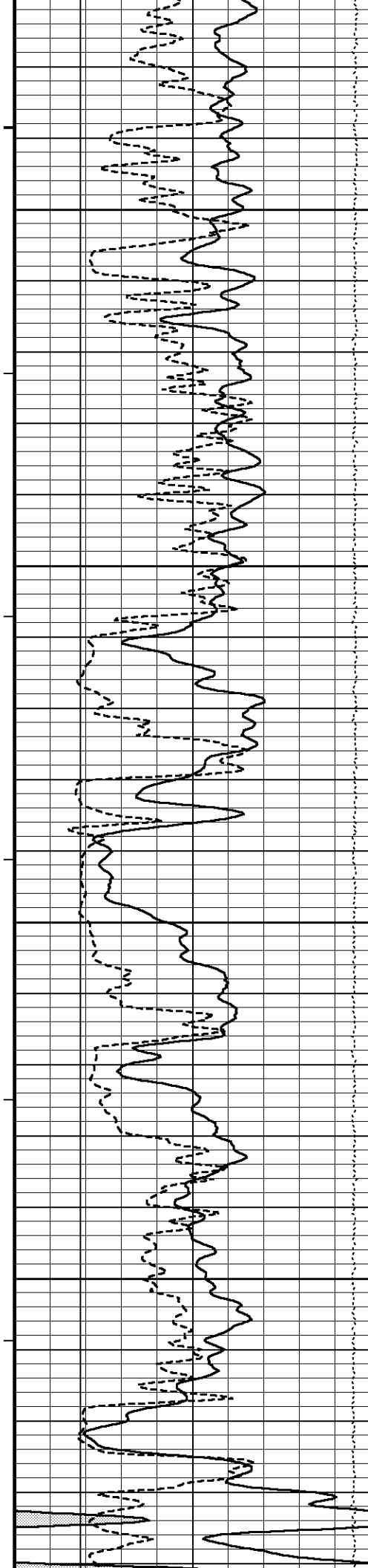
6' Transit Time →

5' Transit Time →

4' Transit Time →

3' Transit Time →





99°

950

99°

1000

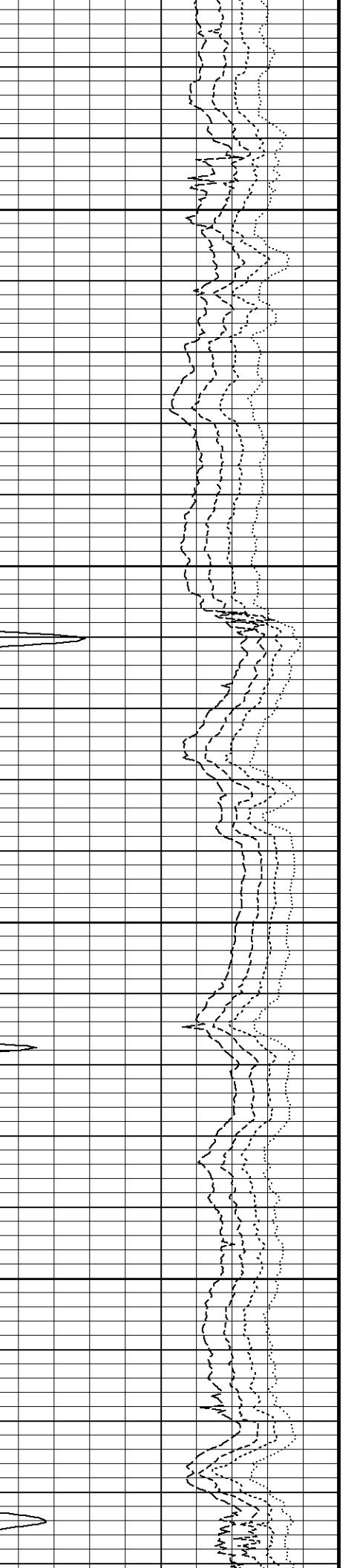
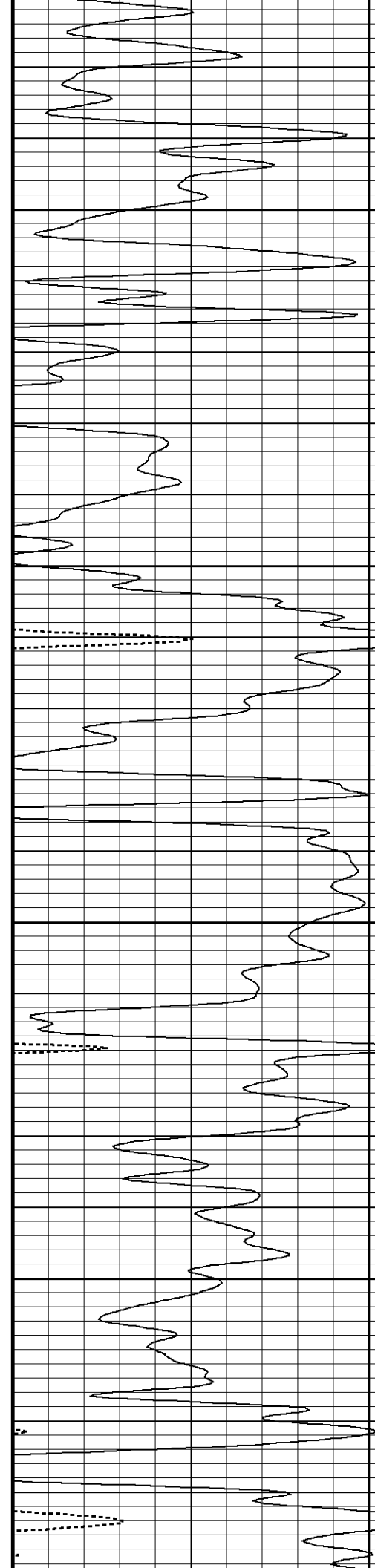
99°

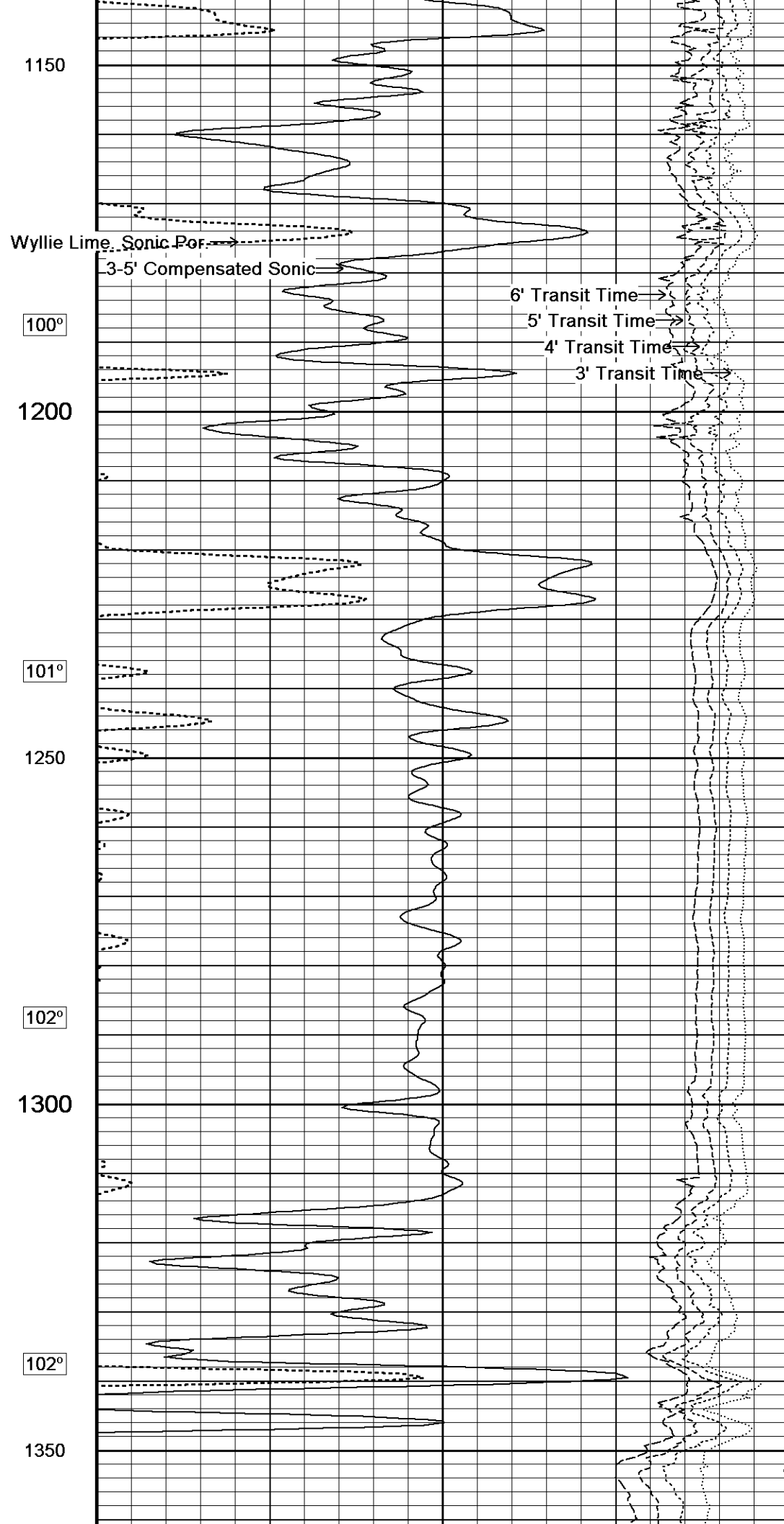
1050

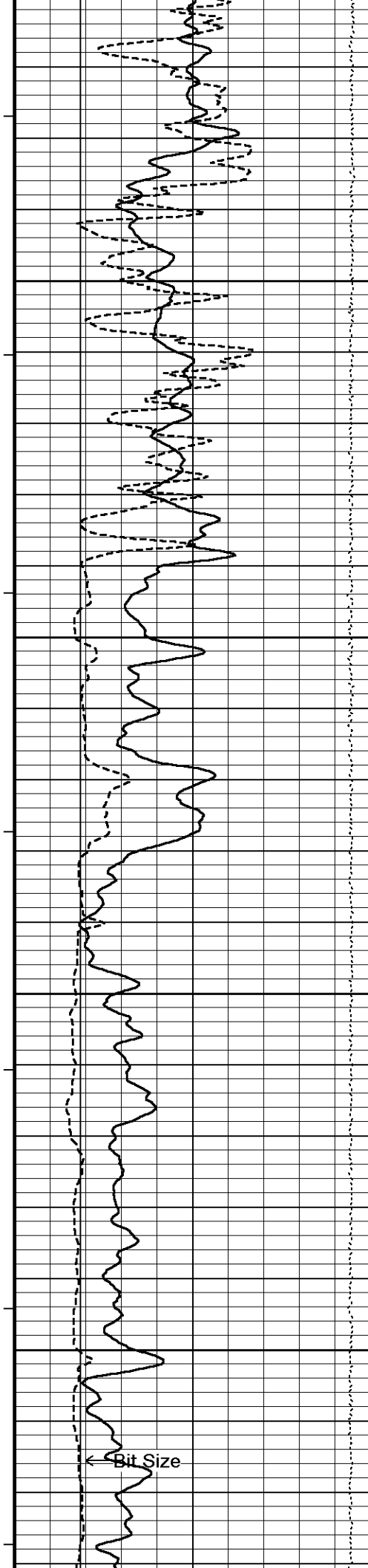
100°

1100

100°







102°

1400

101°

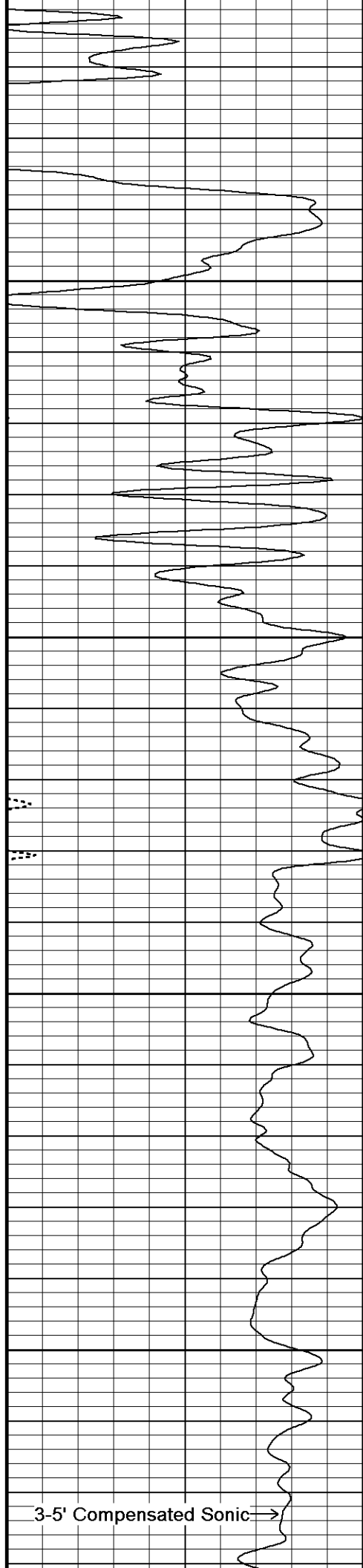
1450

101°

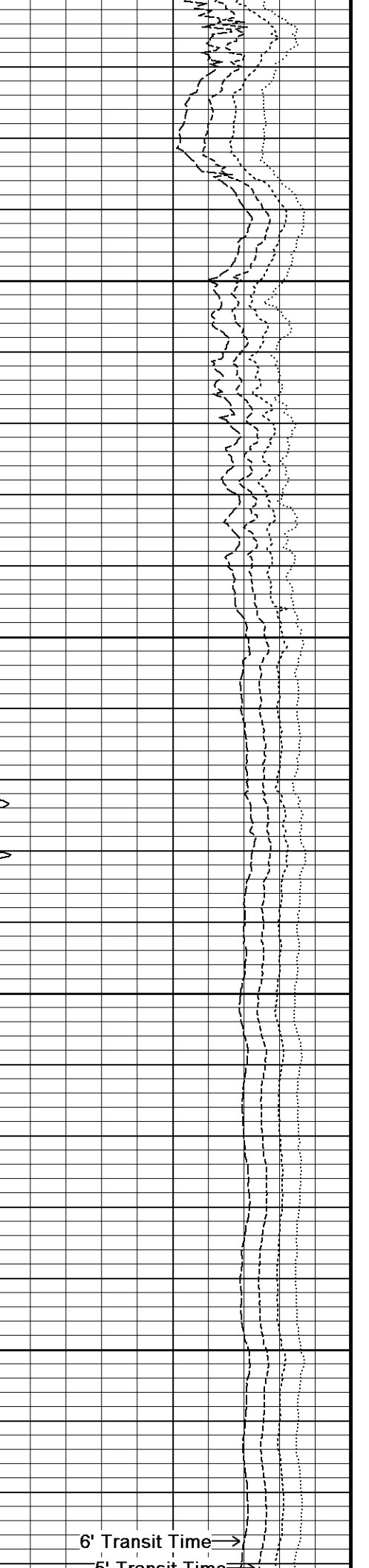
1500

102°

1550

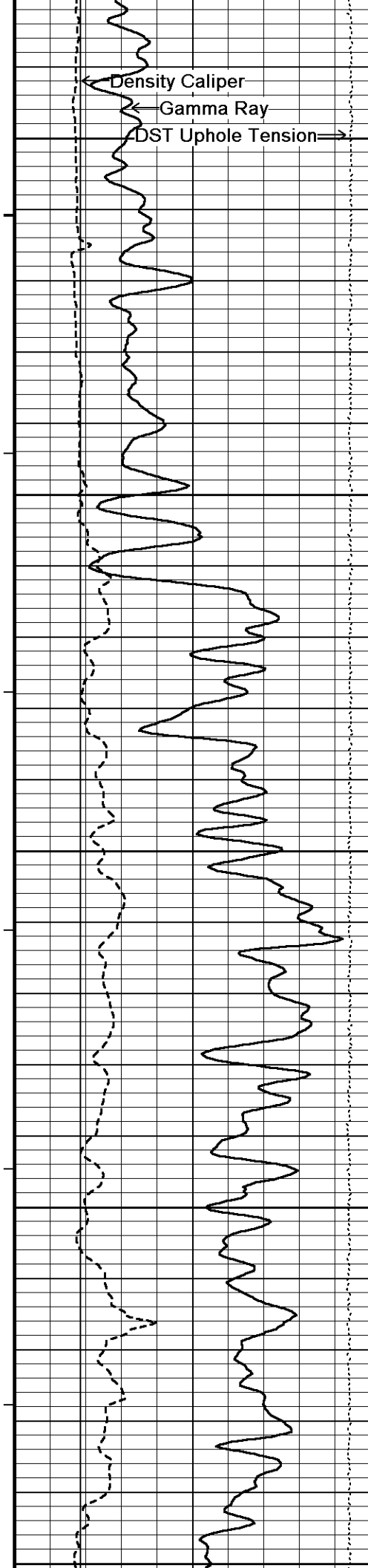


3-5' Compensated Sonic →



6' Transit Time →

5' Transit Time →



102°

1600

102°

1650

103°

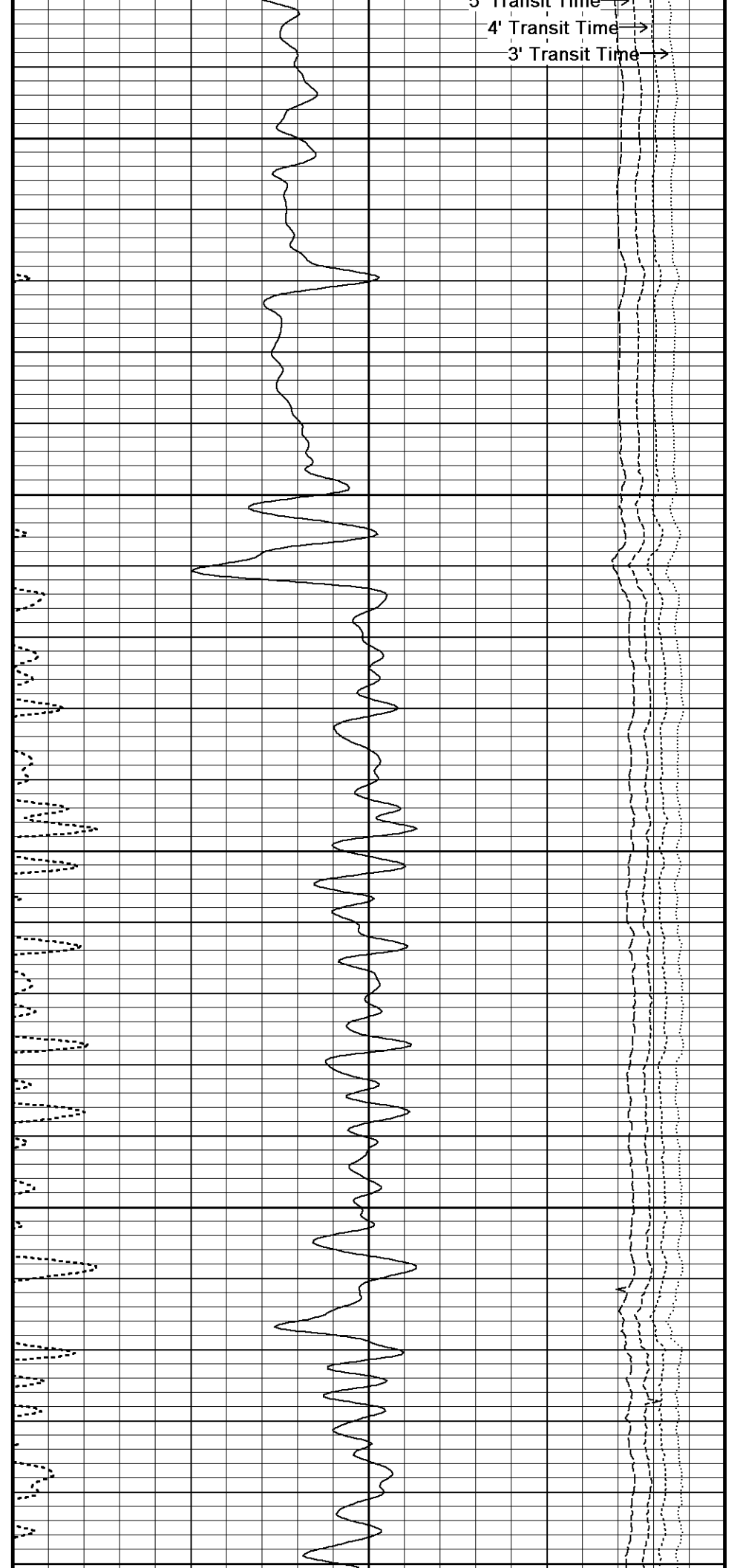
1700

103°

1750

103°

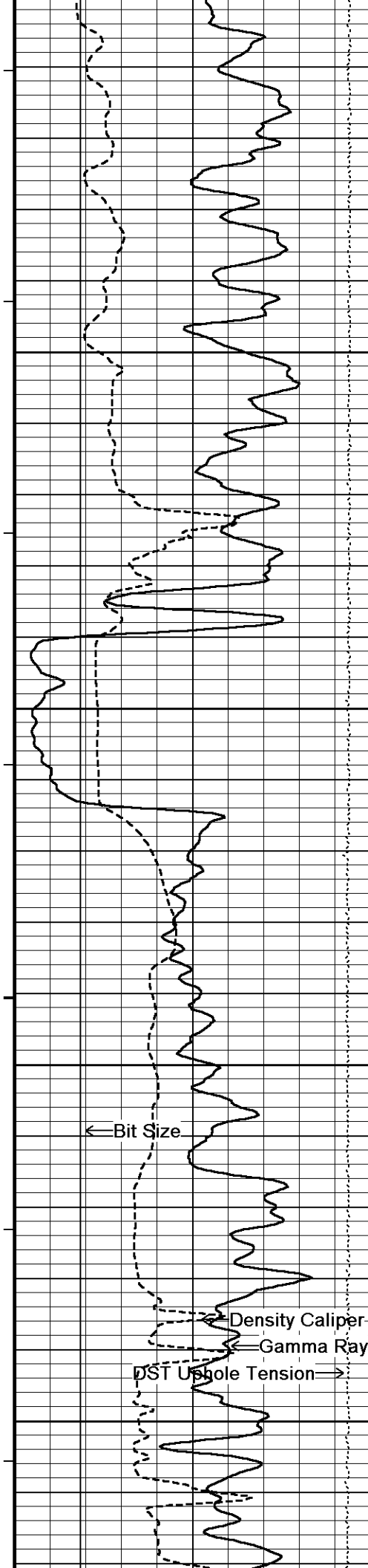
1800



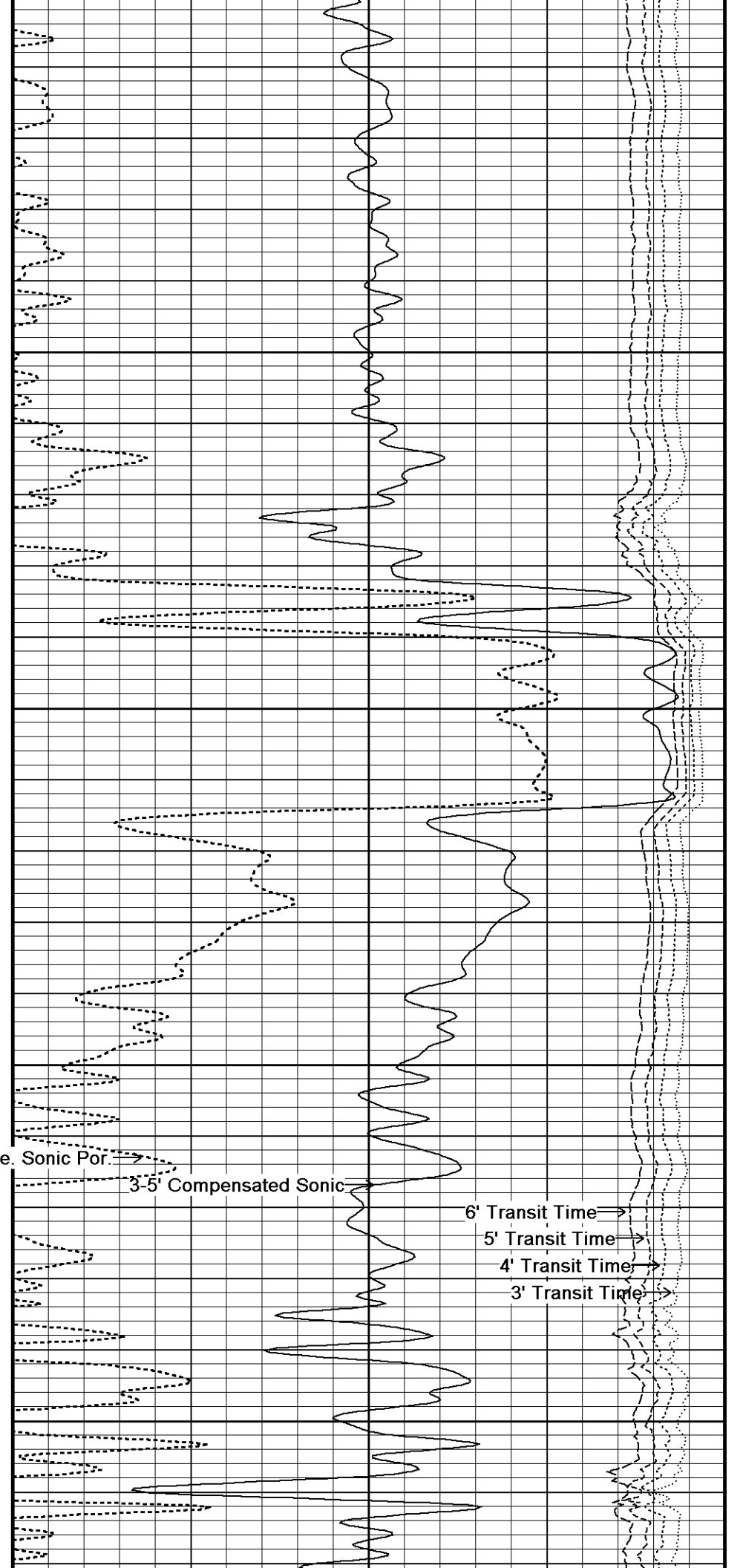
5' Transit Time →

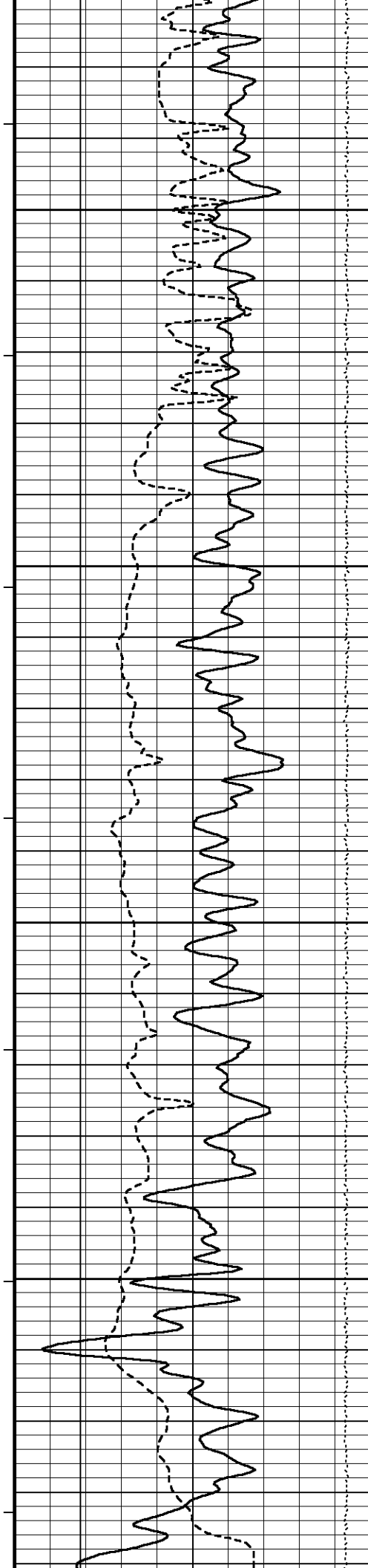
4' Transit Time →

3' Transit Time →



1880
103°
1850
104°
1900
104°
1950
Wyllie Lime. Sonic Por. →
105°
2000





105°

2050

106°

2100

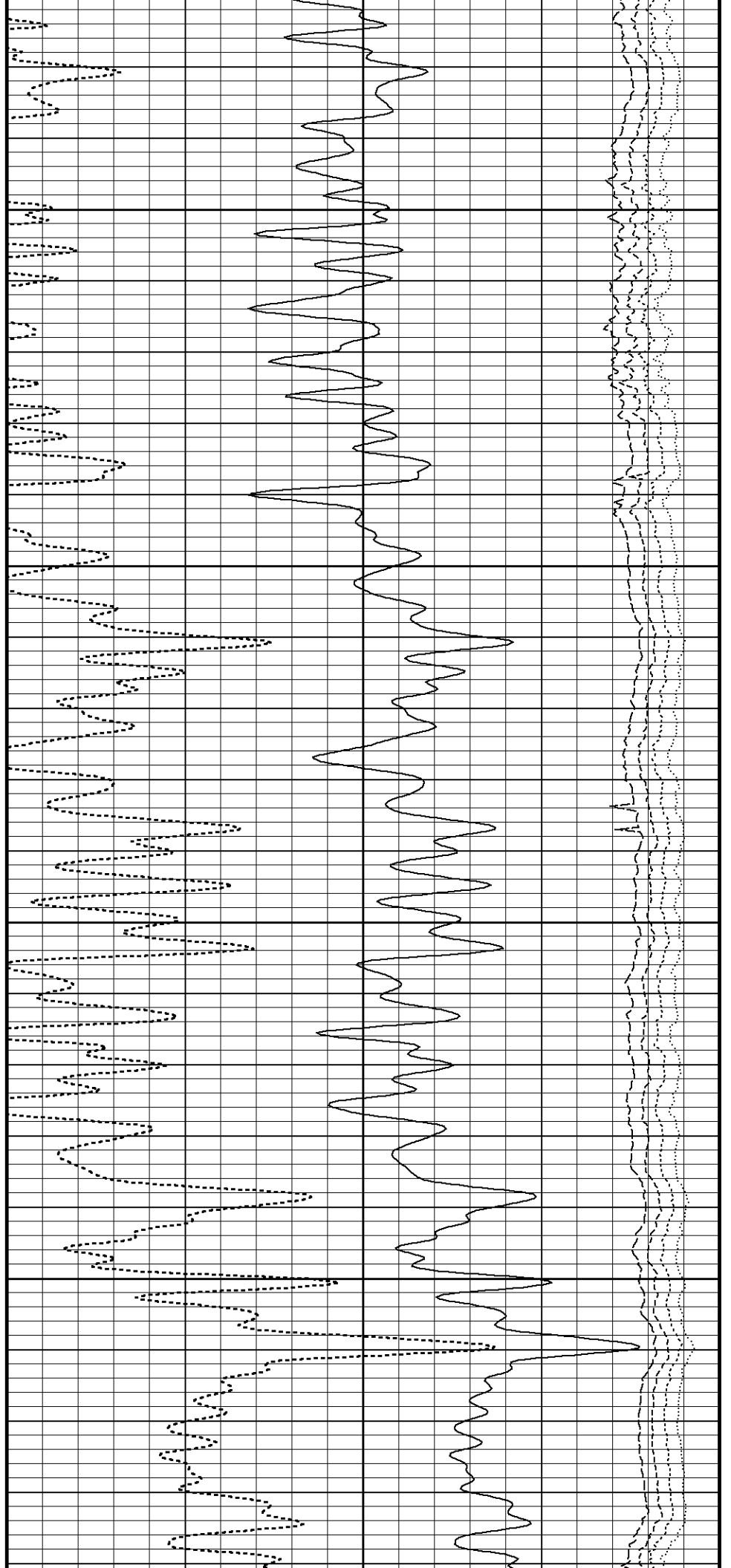
106°

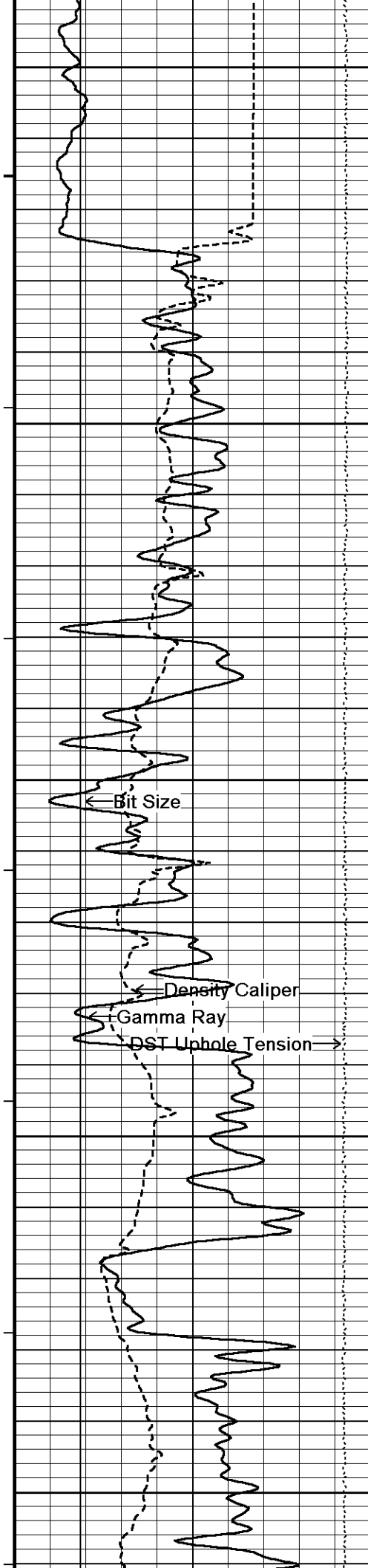
2150

106°

2200

107°





2250

107°

2300

107°

2350

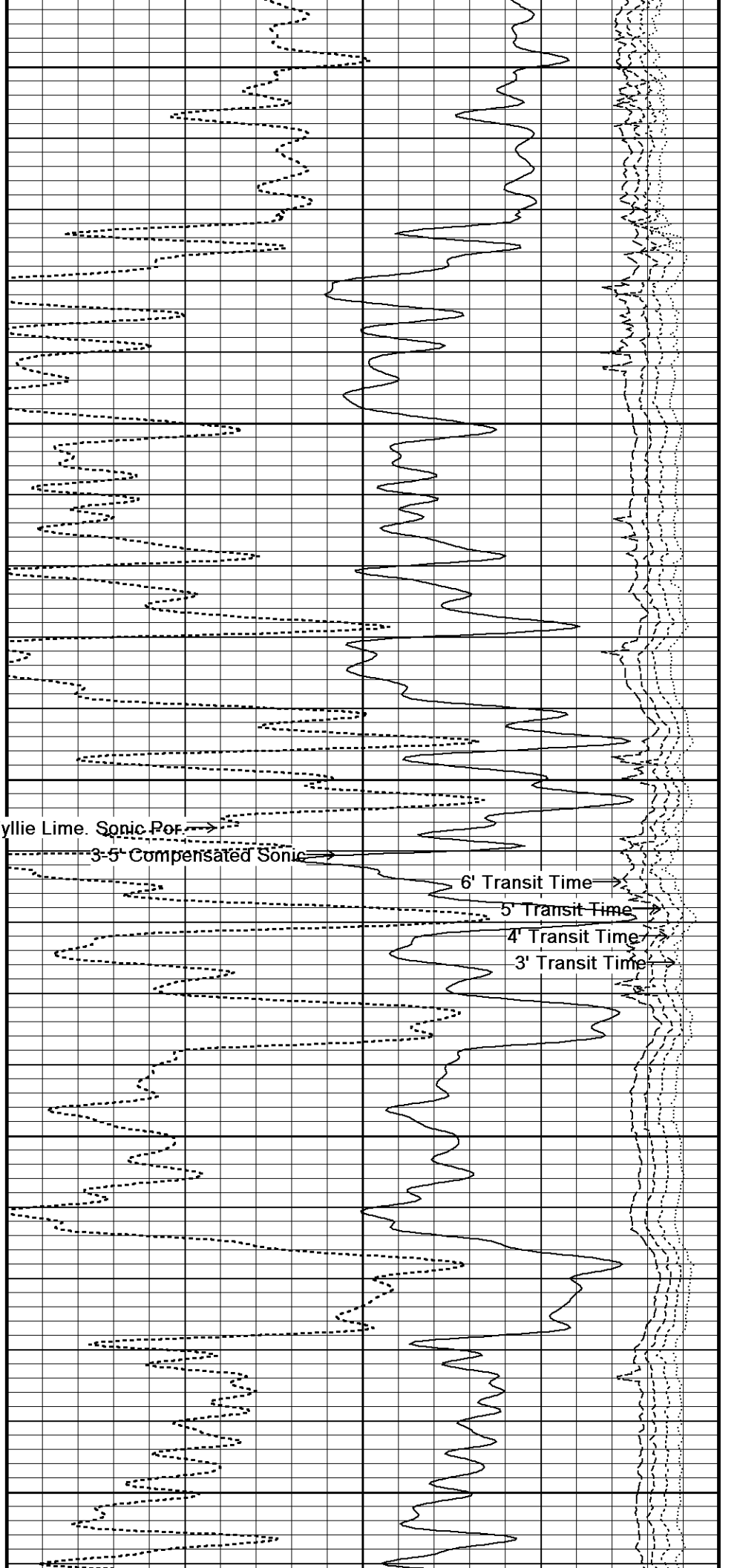
Wyllie Lime. Sonic Por. →
3-5' Compensated Sonic →

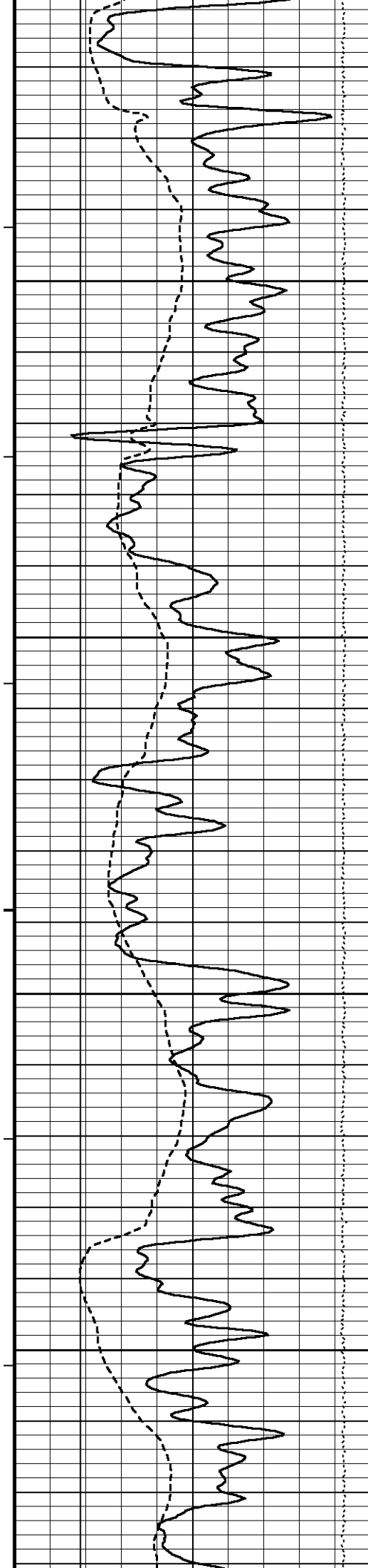
107°

2400

108°

2450





108°

2500

108°

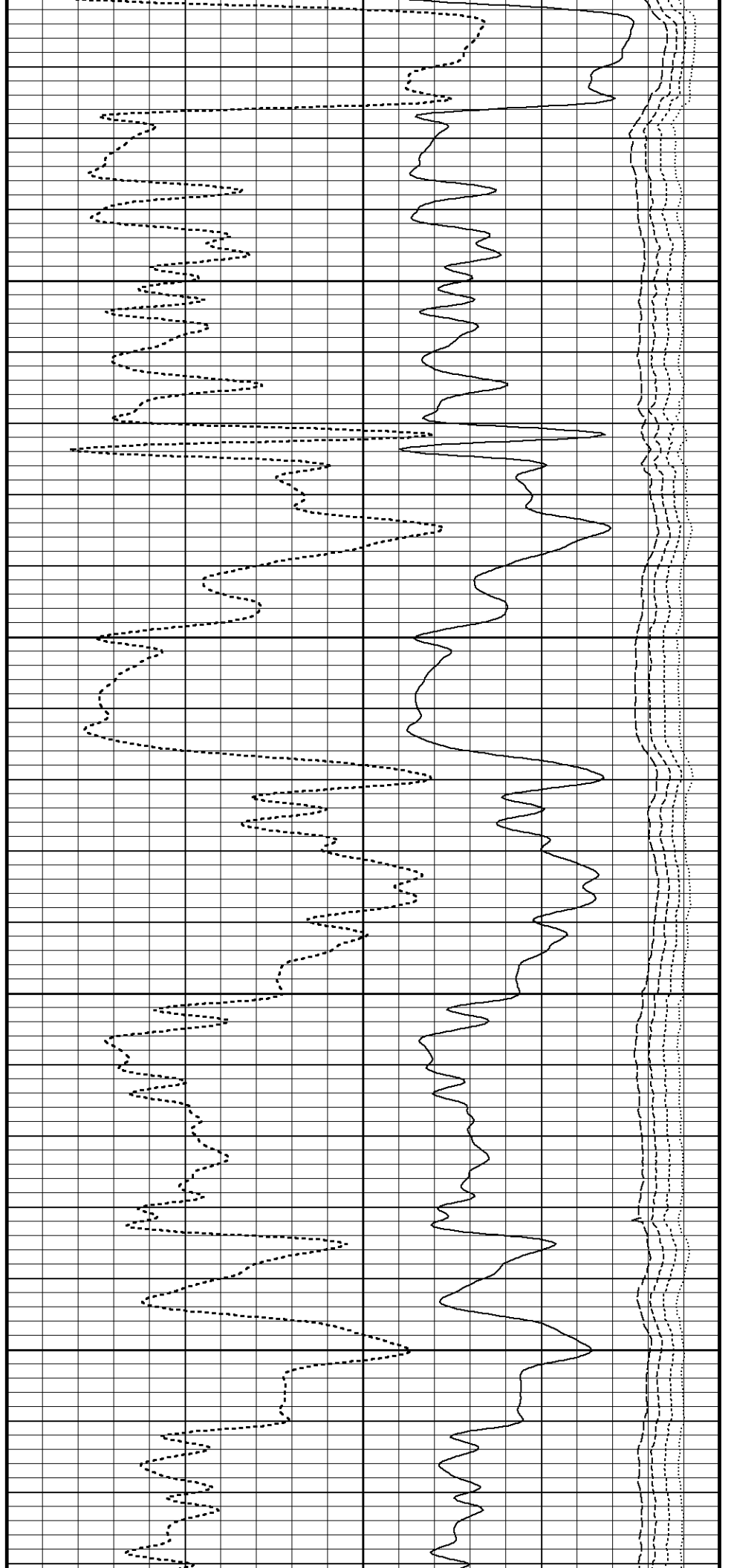
2550

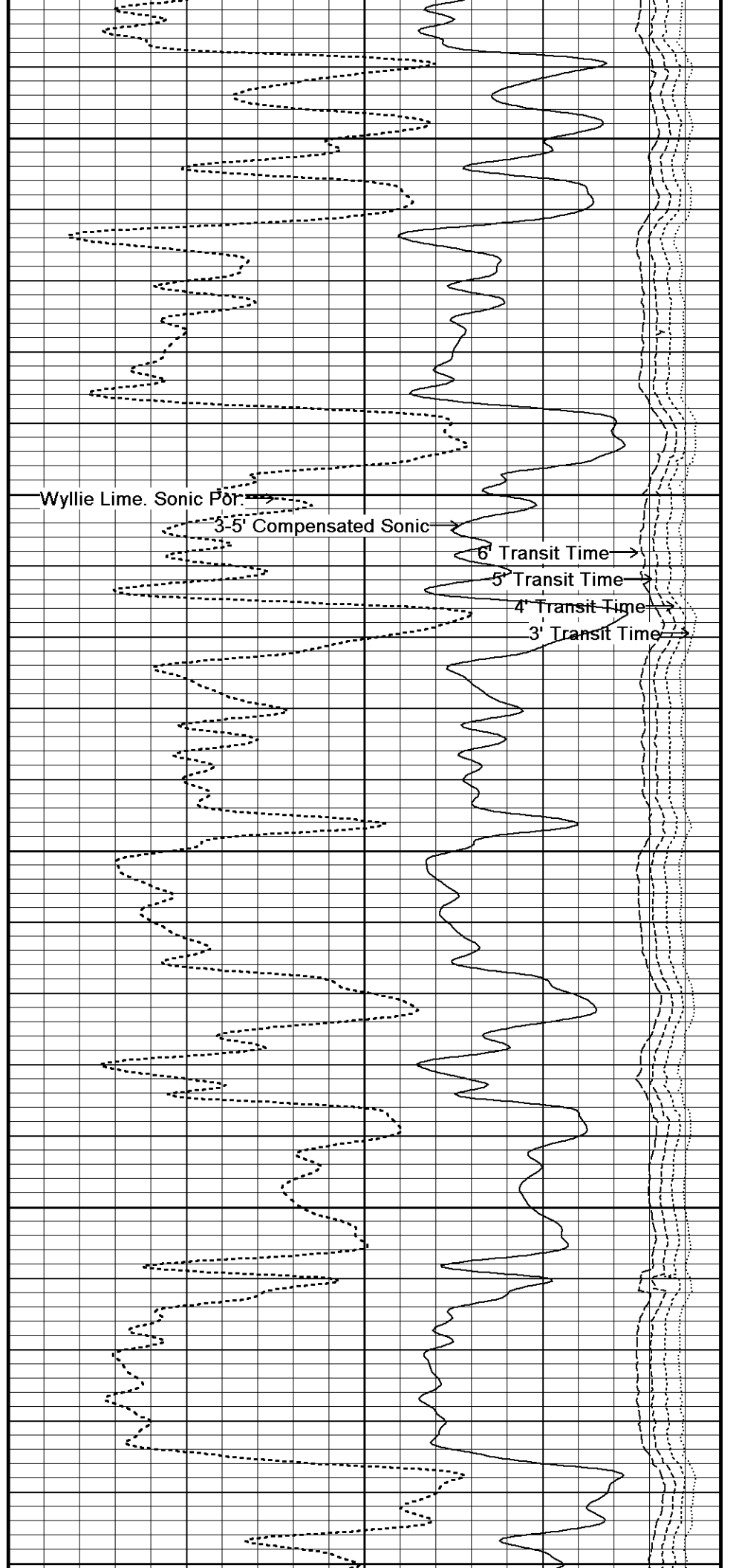
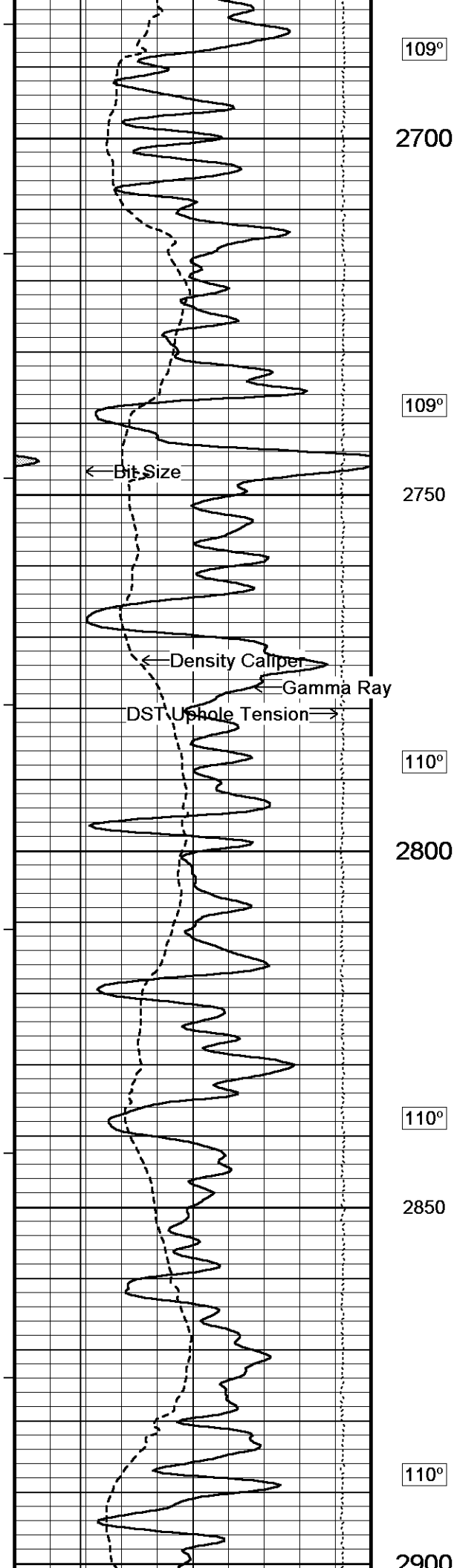
108°

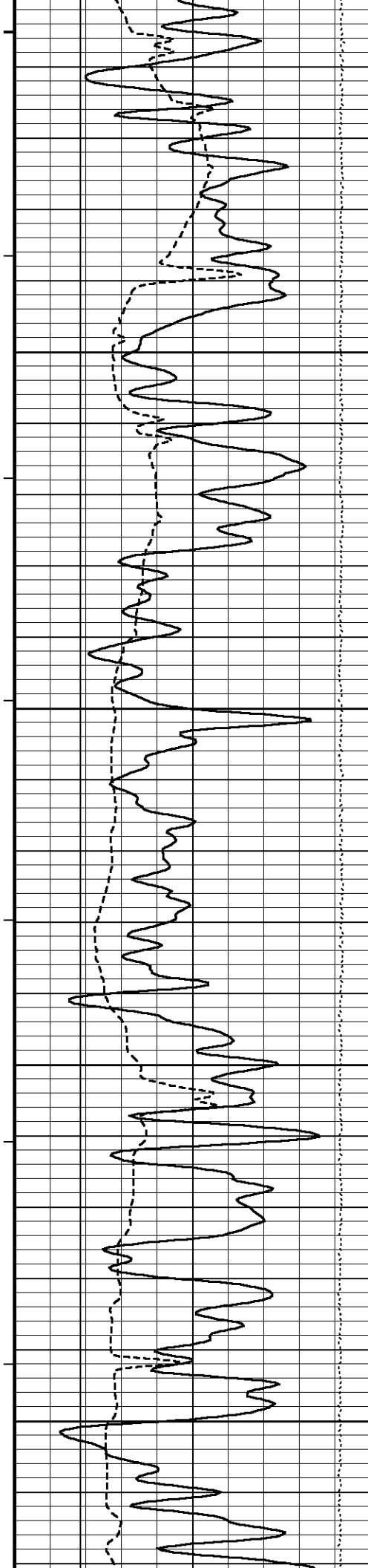
2600

109°

2650







2900

111°

2950

111°

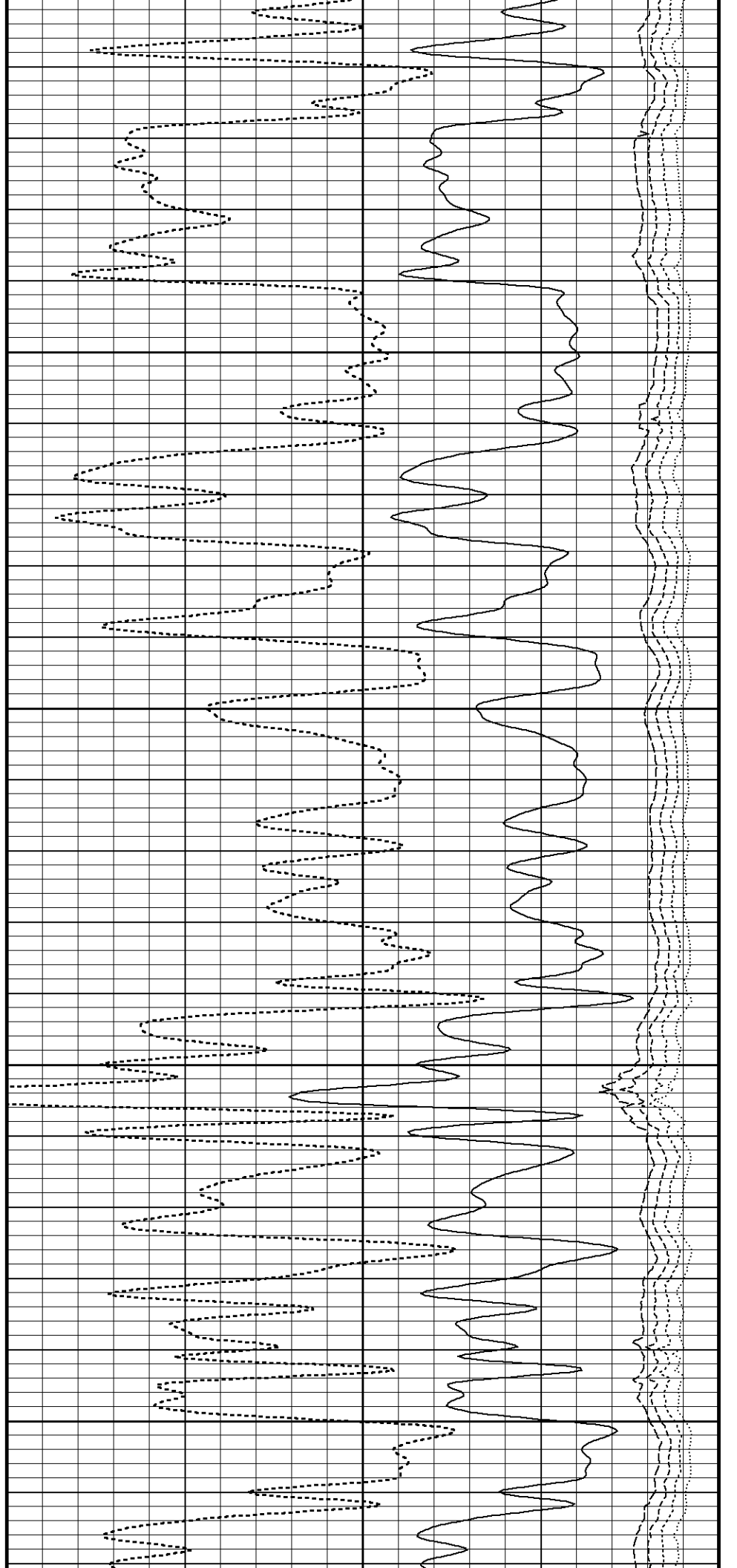
3000

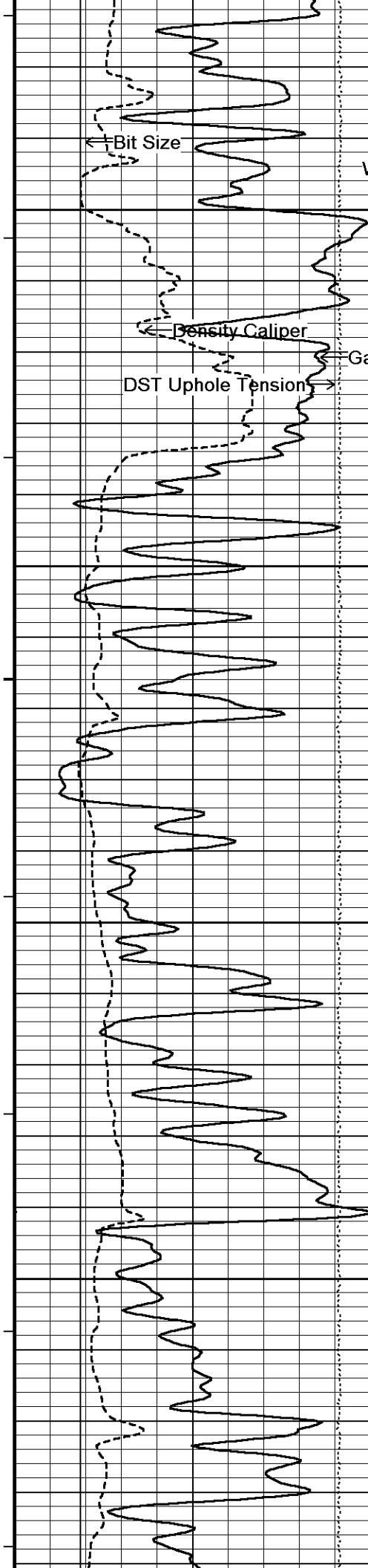
111°

3050

112°

3100





112°

Wyllie Lime.

3150

Density Caliper

DST Uphole Tension

Gamma Ray

113°

3200

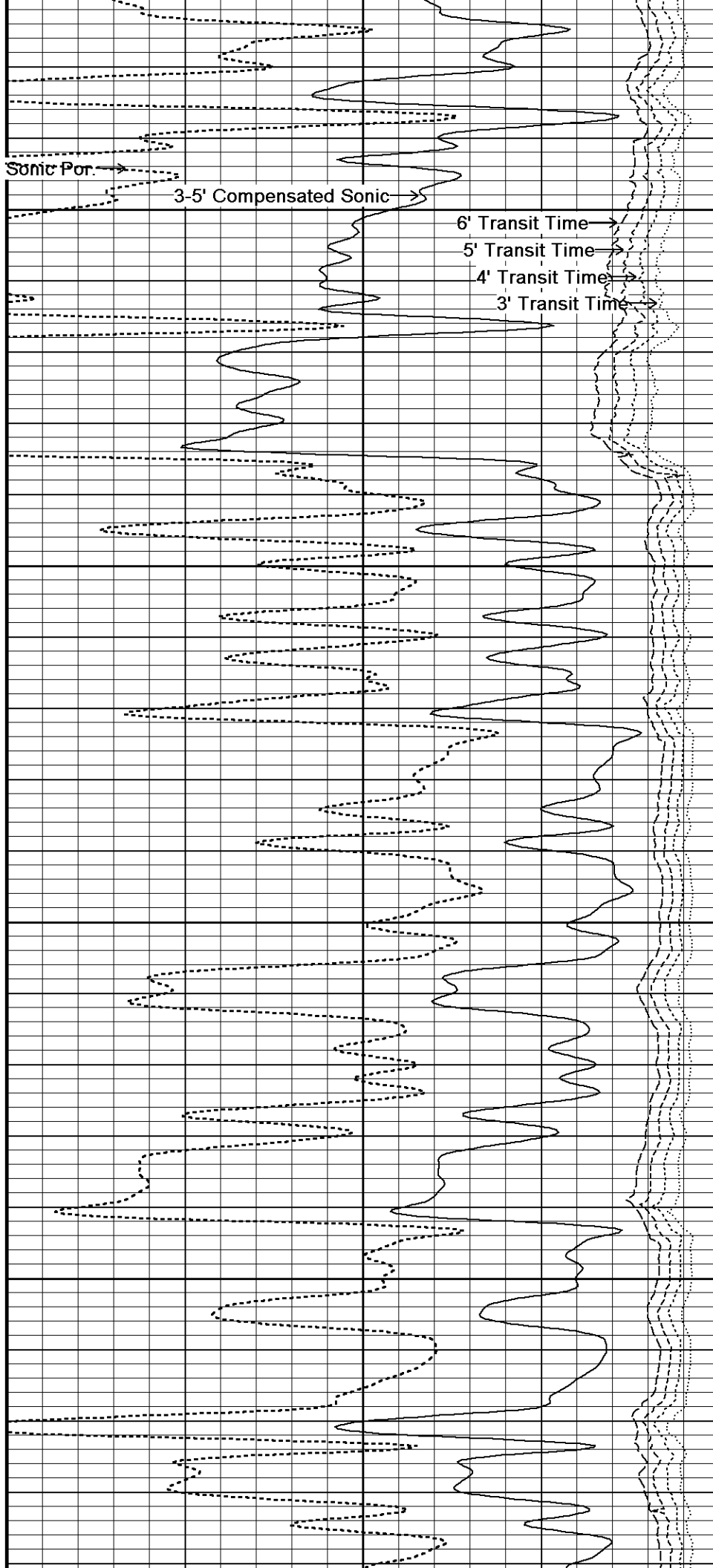
113°

3250

113°

3300

114°



Sonic Por.

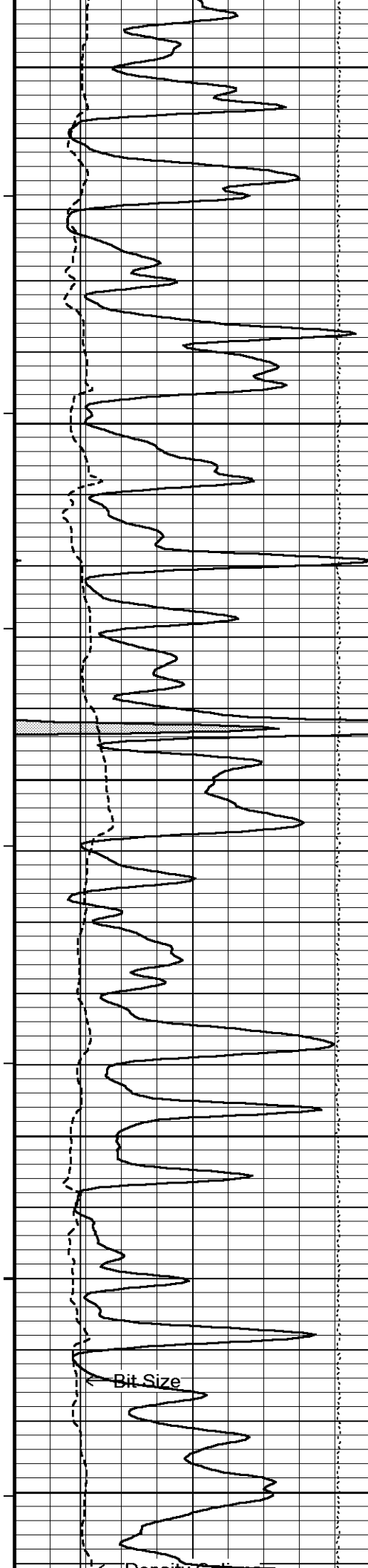
3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time



3350

114°

3400

114°

3450

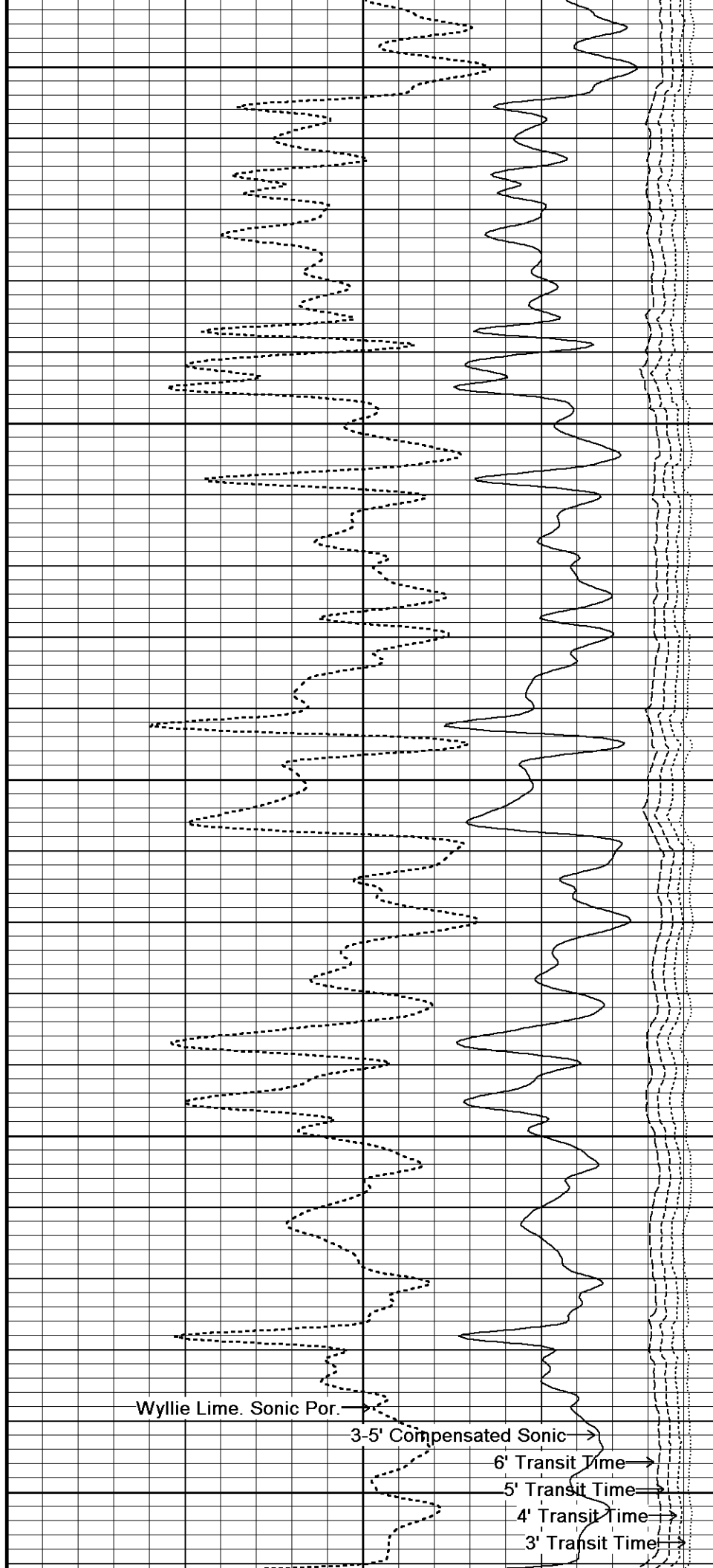
115°

3500

Bit Size

115°

3550



Wyllie Lime. Sonic Por.

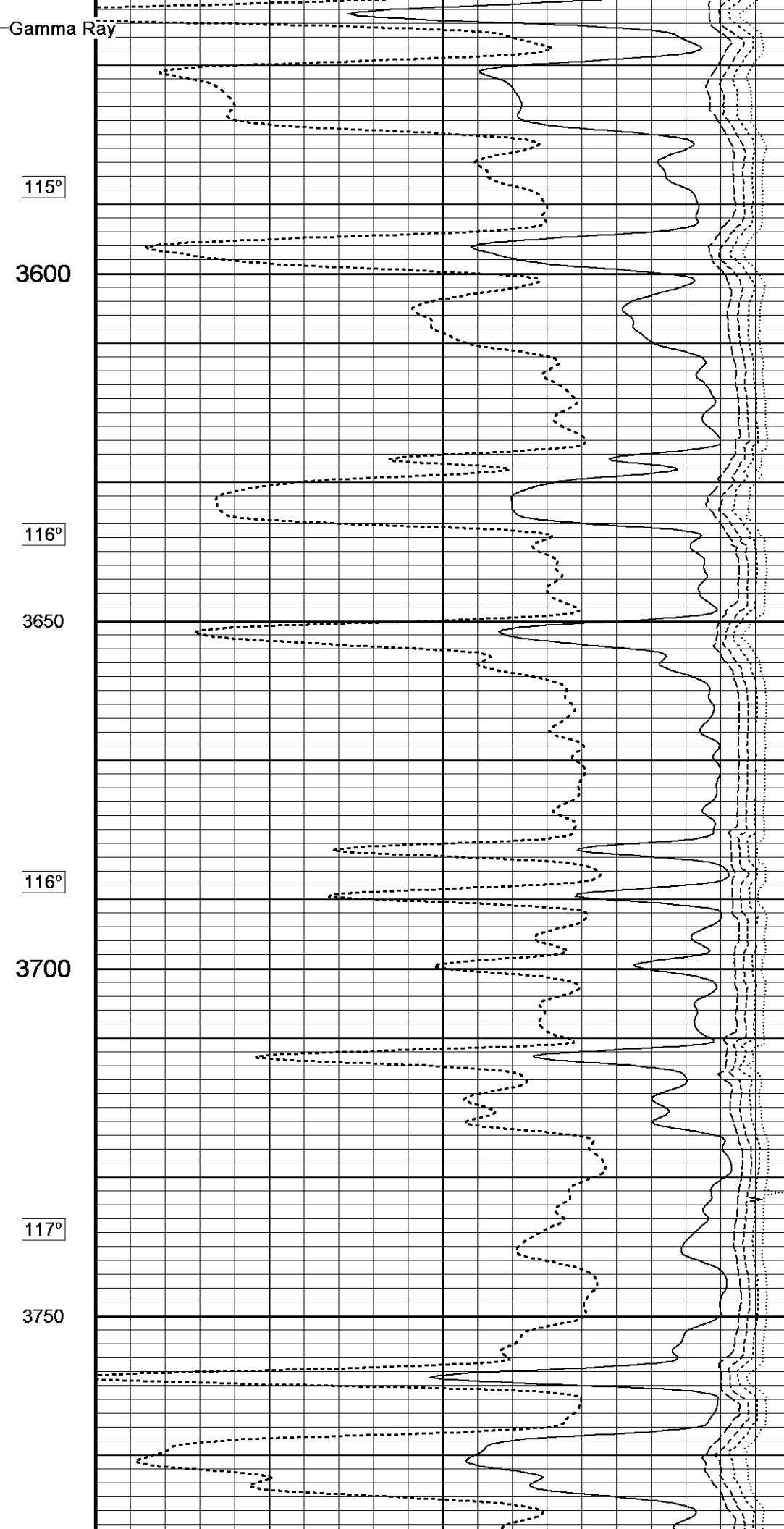
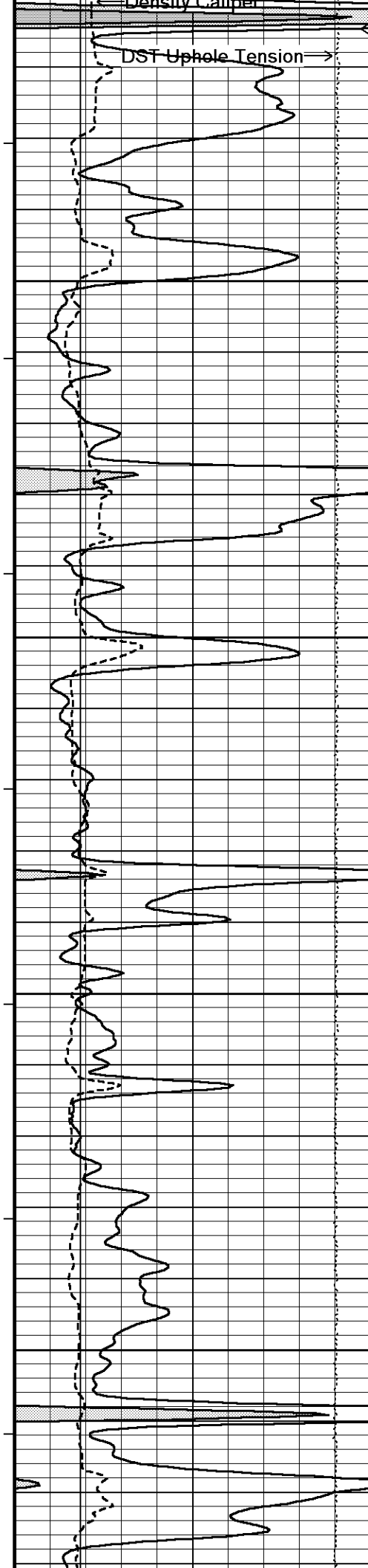
3-5' Compensated Sonic

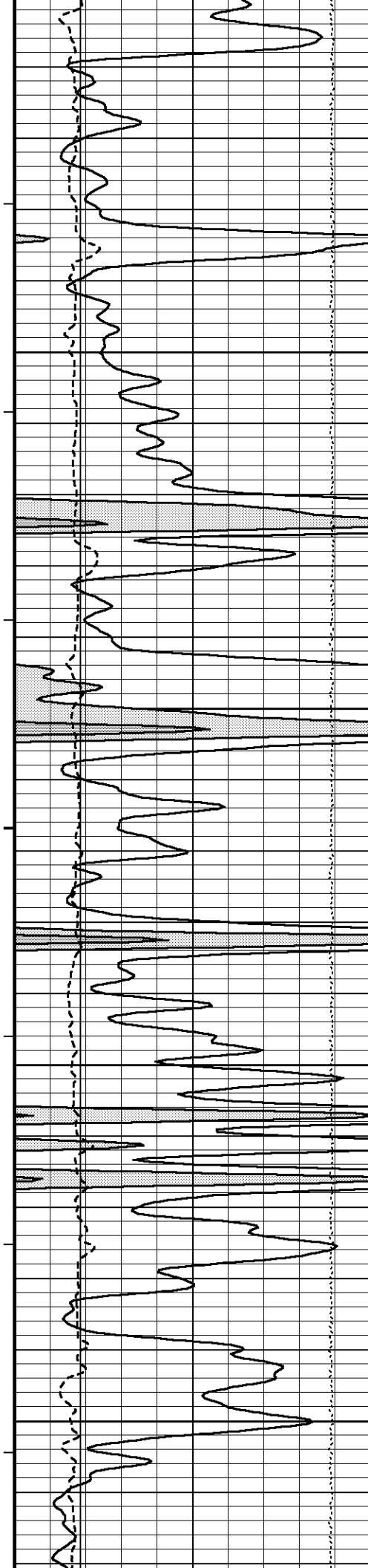
6' Transit Time

5' Transit Time

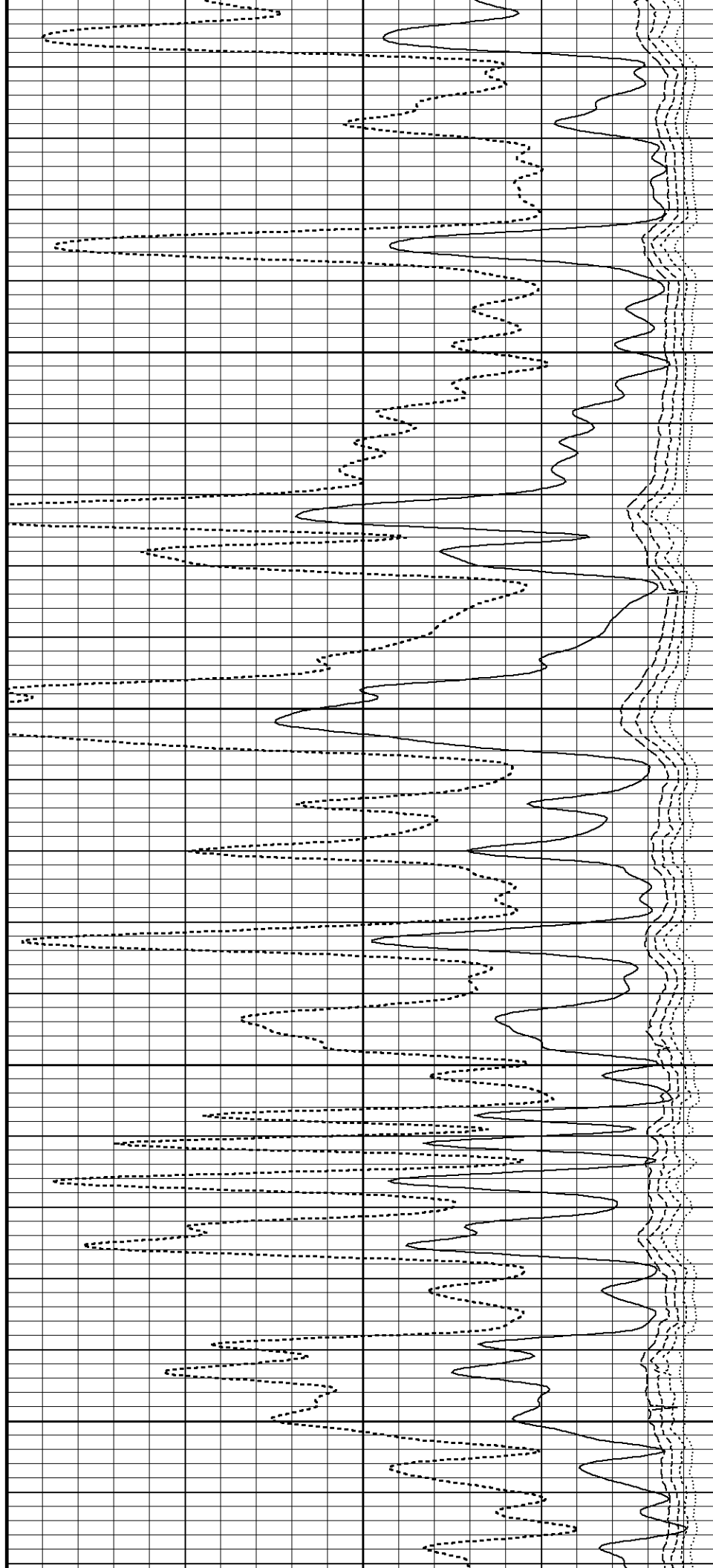
4' Transit Time

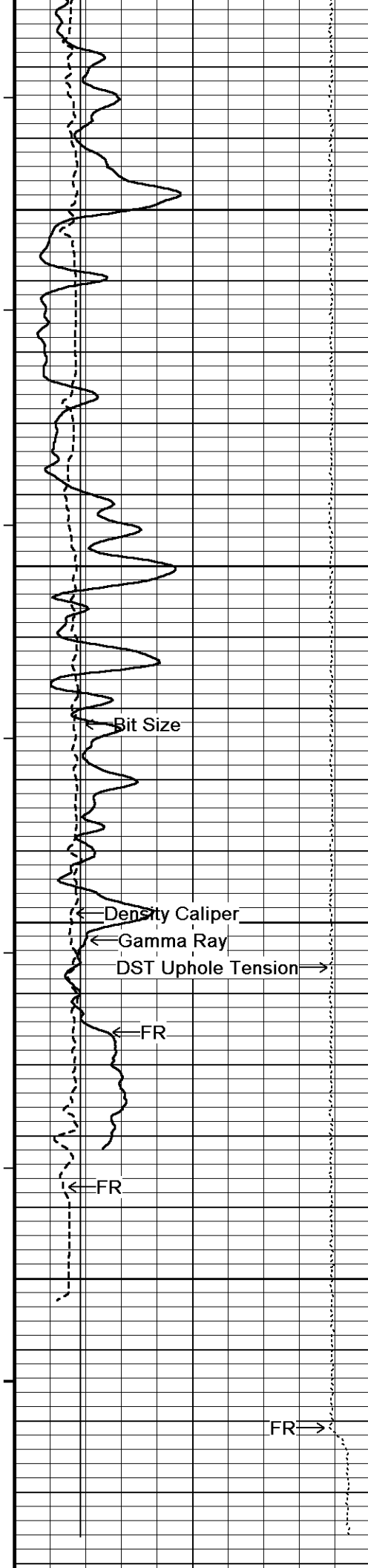
3' Transit Time





1300
120°
4050
121°
4100
121°
4150
122°
4200





123°

4250

123°

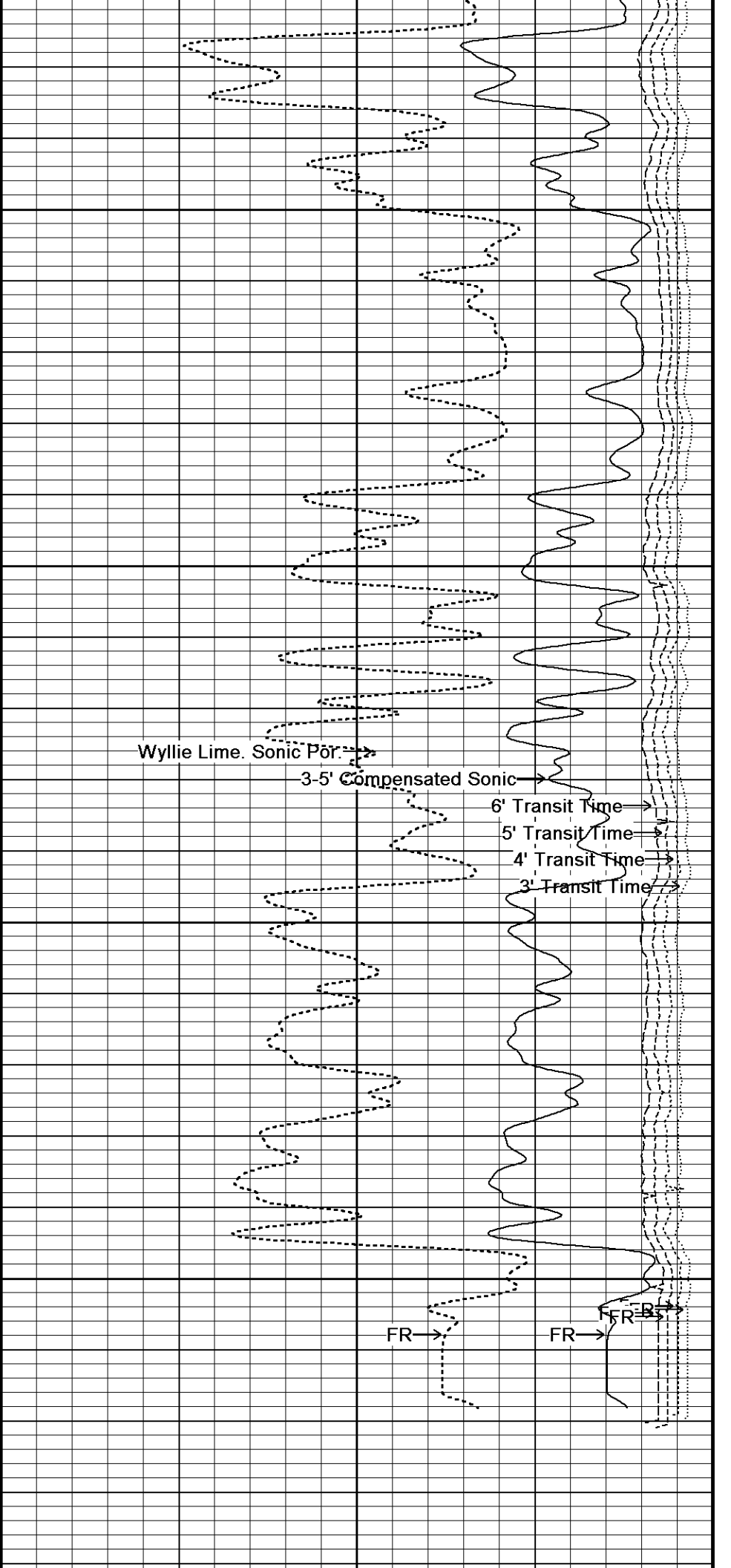
4300

123°

4350

4400

TD



Wyllie Lime. Sonic Por.

3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

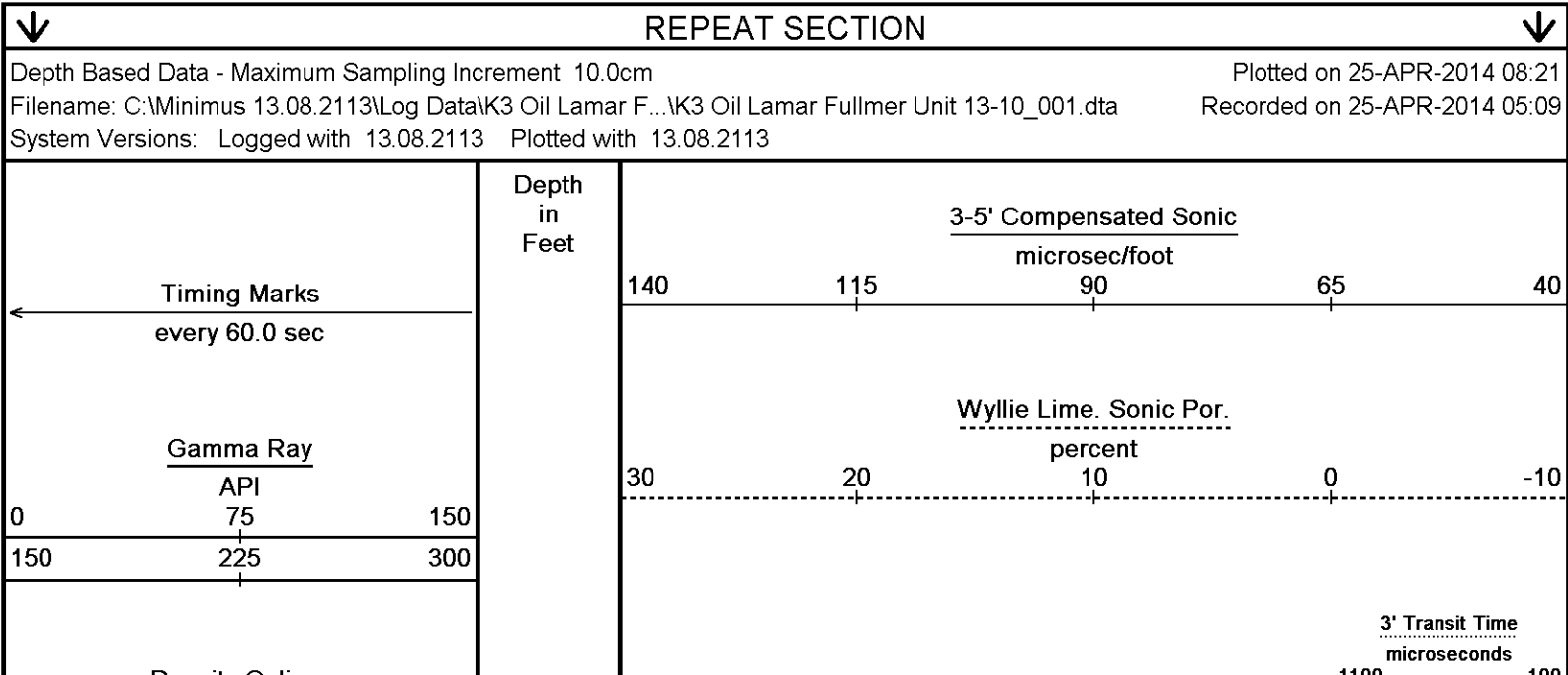
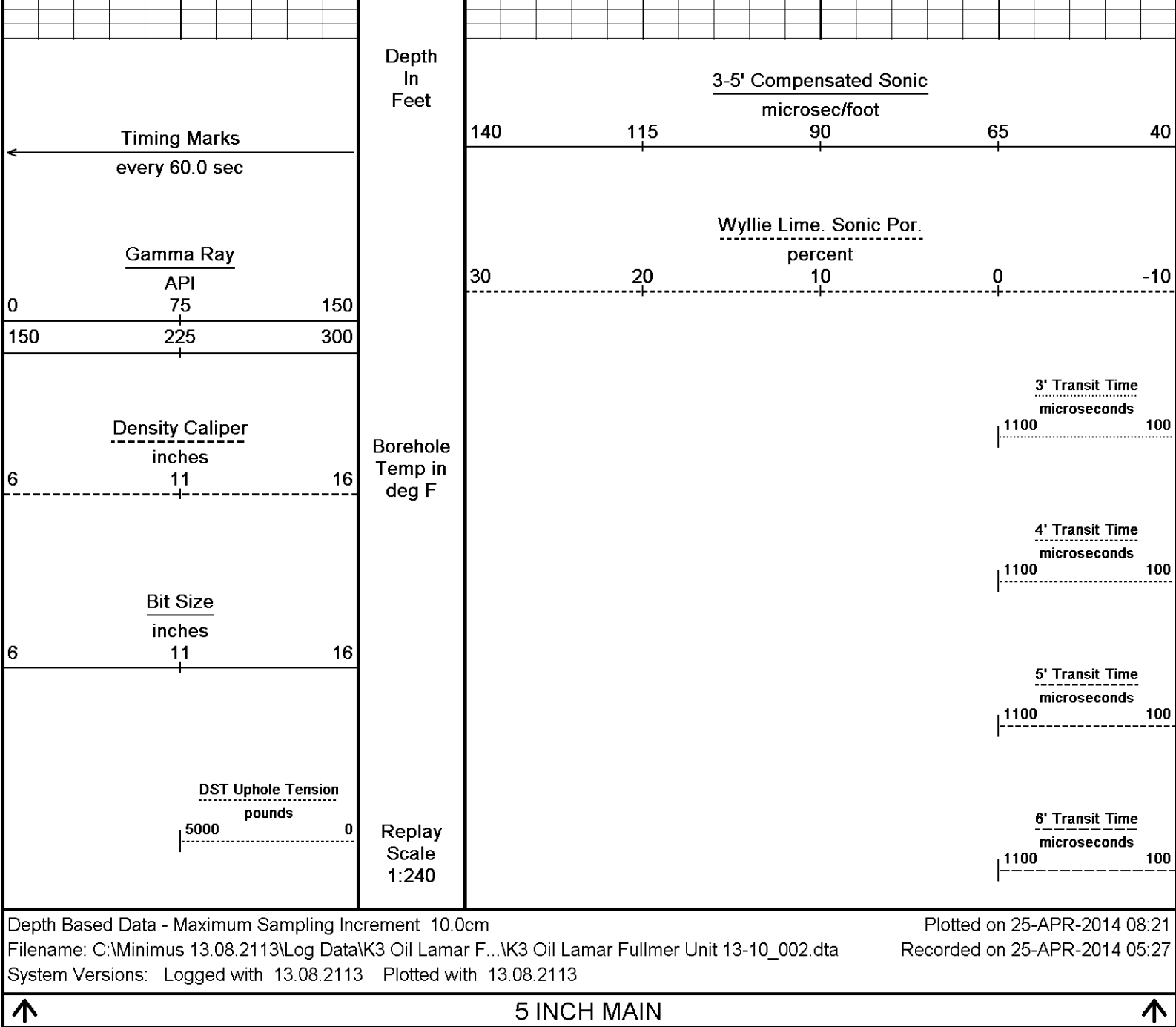
3' Transit Time

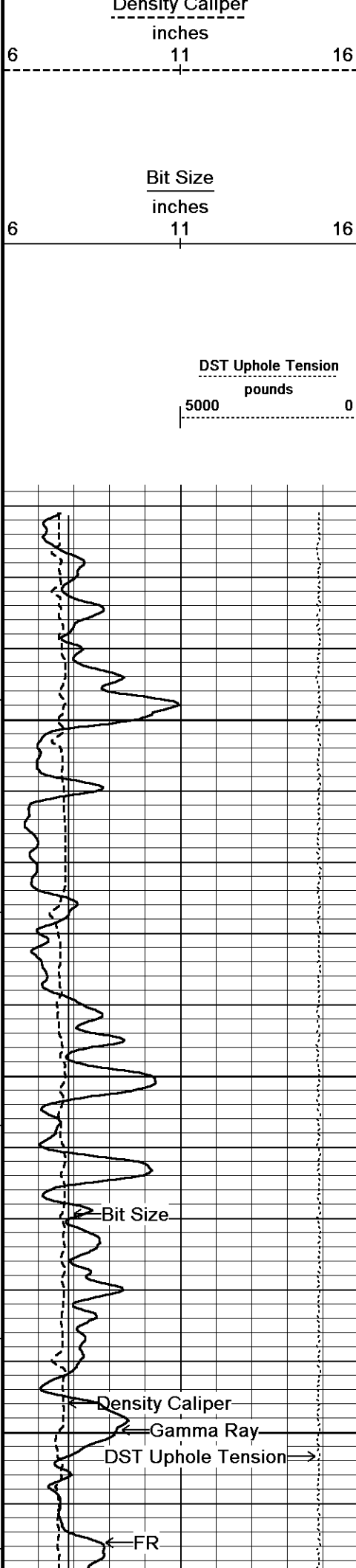
FR

FR

FR

FR

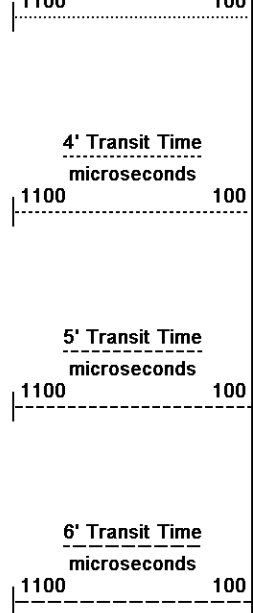




Borehole
Temp in
deg F

Replay
Scale
1:240

4220
4250
122°
4300
122°
4350



Wyllie Lime. Sonic Por. →

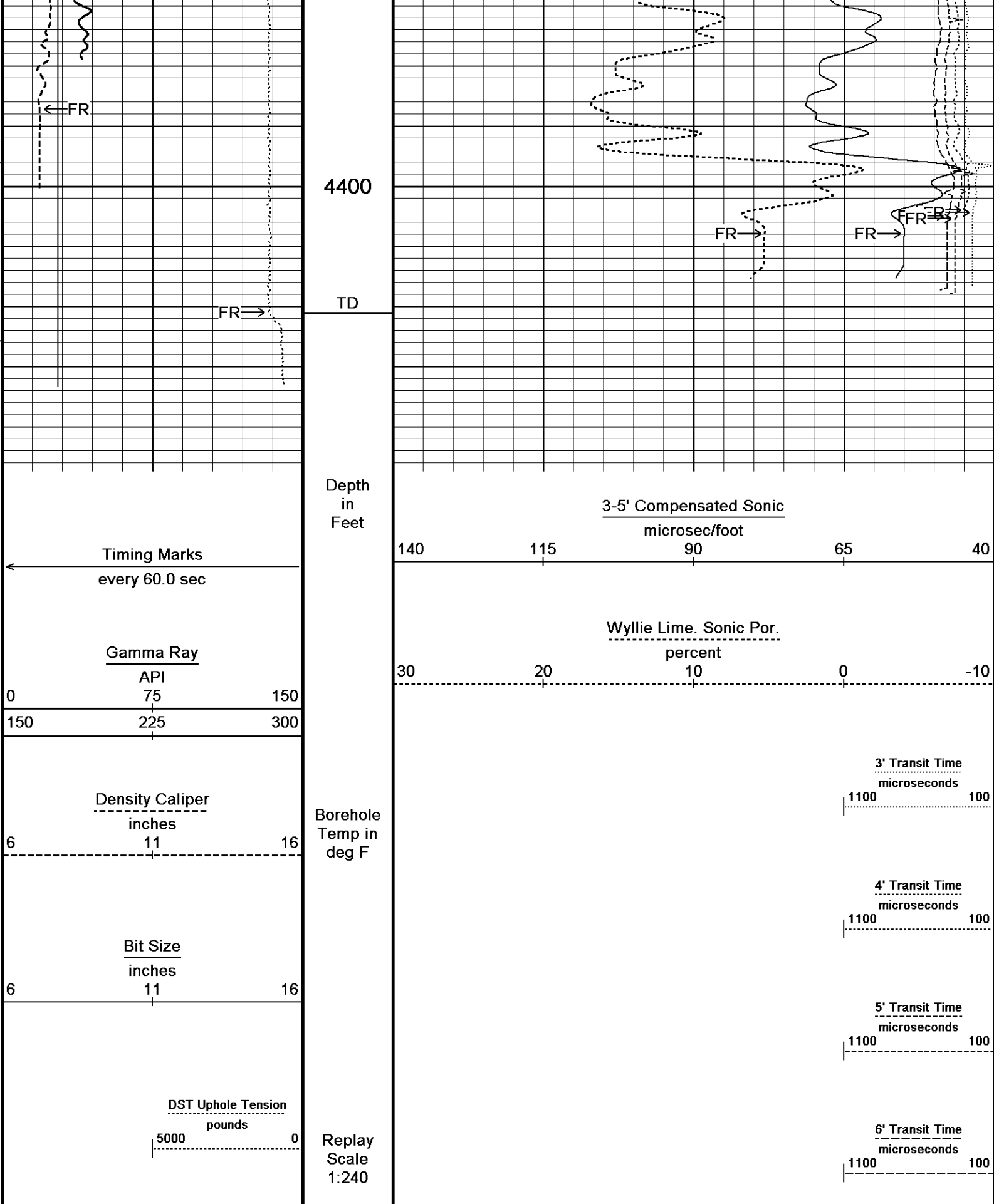
3-5' Compensated Sonic →

6' Transit Time →

5' Transit Time →

4' Transit Time →

3' Transit Time →



BEFORE SURVEY CALIBRATION

C:\Minimus 13.08.2113\Log Data\K3 Oil Lamar Fullmer Unit 13-10\K3 Oil Lamar Fullmer Unit 13-10_001.dta

General Constants All 000

Last Edited on 25-APR-2014,04:42

General Parameters

Mud Resistivity	0.770	ohm-metres
Mud Resistivity Temperature	92.000	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	MML Caliper	

Rwa Parameters

Porosity used	Crossplot Porosity
Resistivity used	Array Ind. One Res Rt
RWA Constant A	1.000
RWA Constant M	2.000
SW/APOR Tool Source	0.000

Down-hole Tension Calibration SMS 0

Field Calibration on 23-APR-2014 20:17

Reading No	Measured	Calibrated (lbs)
1	15076.45	0.00
2	16570.90	577.60

Gamma Calibration MCG-D.K 469

Field Calibration on 18-APR-2014 19:23

	Measured	Calibrated (API)
Background	73	50
Calibrator (Gross)	1115	775
Calibrator (Net)	1042	725

Gamma Constants MCG-D.K 469

Last Edited on 25-APR-2014,03:00

Gamma Calibrator Number	GRC038	
Mud Density	1.12	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-D.K 469

Field Calibration on 18-APR-2014,19:10

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

High Resolution Temperature Constants MCG-D.K 469

Last Edited on 25-APR-2014,03:00

Pre-filter Length	11
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SP Calibration MCG-D.K 469

Field Calibration on 17-APR-2014 09:58

	Measured	Calibrated (mV)
Reference 1	100.1	99.9
Reference 2	-99.0	-100.0

Caliper Calibration MML-A 3

Base Calibration on 25-MAR-2014 11:38

Field Calibration on 18-APR-2014 19:07

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14836	5.98
2	18178	7.97
3	21362	9.86
4	25372	11.92

5
60
N/A0.00
N/A

Field Calibration

Measured Caliper (in)
7.98Actual Caliper (in)
7.97

Micro Normal and Micro Inverse Calibration MML-A 3

Base Calibration on 25-MAR-2014 11:48

Field Check on 18-APR-2014 18:58

Base Calibration

Channel	Resistor 1	Measured		Calibrated (ohm-m)	
		Resistor 2	Resistor 1	Resistor 2	
Micro Normal	10.0	50.0	5.1	25.6	
Micro Inverse	10.0	49.9	3.4	16.9	

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	77.3	77.3
Micro Inverse	51.2	51.2

Micro Normal and Micro Inverse Constants MML-A 3

Last Edited on 25-APR-2014,03:00

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 N/A inches

Neutron Calibration MDN-A.B 66

Base Calibration on 24-MAR-2014 14:50

Field Check on 18-APR-2014 19:30

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3064	94	3714	110
Ratio	32.437		33.764	

Field Calibrator at Base

	Calibrated (cps)
	1641 2431
Ratio	0.675

Field Check

	Calibrated (cps)
	1667 2436
Ratio	0.684

Neutron Constants MDN-A.B 66

Last Edited on 25-APR-2014,03:00

Neutron Source Id P0204NN

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

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 135

Base Calibration on 25-MAR-2014 12:07

Field Check on 18-APR-2014 18:56

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.6	126.8

Base Check	281.2
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Field Check	281.2
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FE Constants MFE-A.A 135

Last Edited on 25-APR-2014,02:59

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 25-APR-2014,02:58

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	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	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	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
3' Waveform Filter	
4' Waveform Filter	
5' Waveform Filter	
6' Waveform Filter	

Semblance Level	0.50
Semblance Window Width	120.00 micro-sec
Sonic 1 Despiker	100.00 micro-sec/ft
Sonic 2 Despiker	100.00 micro-sec/ft

Base Calibration

Test Loop Calibration

Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	17.3	474.2	9.3	967.1
2	6.3	388.4	7.6	822.1
3	3.3	259.4	5.2	566.5
4	1.9	133.0	2.6	279.5

Array Temperature 76.8 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			12.7	3842.1
2			29.5	3479.9
3			29.1	3056.0
4			19.8	2083.9
Deep			18.6	2051.4
Medium			42.2	3994.9
Shallow			42.8	5057.7

Array Temperature 69.0 Deg F

Induction Constants MAI-A.A 167

Last Edited on 25-APR-2014,02:58

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 167

Field Calibration on 18-APR-2014,18:52

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

High Resolution Temperature Constants MAI-A.A 167

Last Edited on 18-APR-2014,18:52

Caliper Calibration MPD-D.A 482

Base Calibration on 10-APR-2014 12:34
Field Calibration on 17-APR-2014 10:16

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	16267	3.99
2	26446	5.98
3	36593	7.97
4	46367	9.86
5	57395	11.92
6	N/A	N/A

Field Calibration

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

Photo Density Calibration MPD-D.A 482

Base Calibration on 24-MAR-2014 13:51
Field Check on 17-APR-2014 10:21

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1244	1407		
Reference 1	59945	29818	59556	30836
Reference 2	25150	2828	24941	2541

Field Check at Base

1243.8 1406.7

Field Check

1236.7 1411.8

PE Calibration

Base Calibration	WS	Measured		Calibrated
		WH	Ratio	Ratio
Background	235	1114		
Reference 1	26220	59734	0.443	0.371
Reference 2	7692	25010	0.312	0.272

Field Check at Base

235.0 1114.4

Field Check

233.6 1108.6

Density Constants MPD-D.A 482

Last Edited on 25-APR-2014,02:59

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	1.12 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

CBH-C, Cablehead, 11 pin
CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma
MCG-D.K 469 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-log
MML-A.3 LG: 7.97 ft WT: 81.6 lb OD: 2.240 in

Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

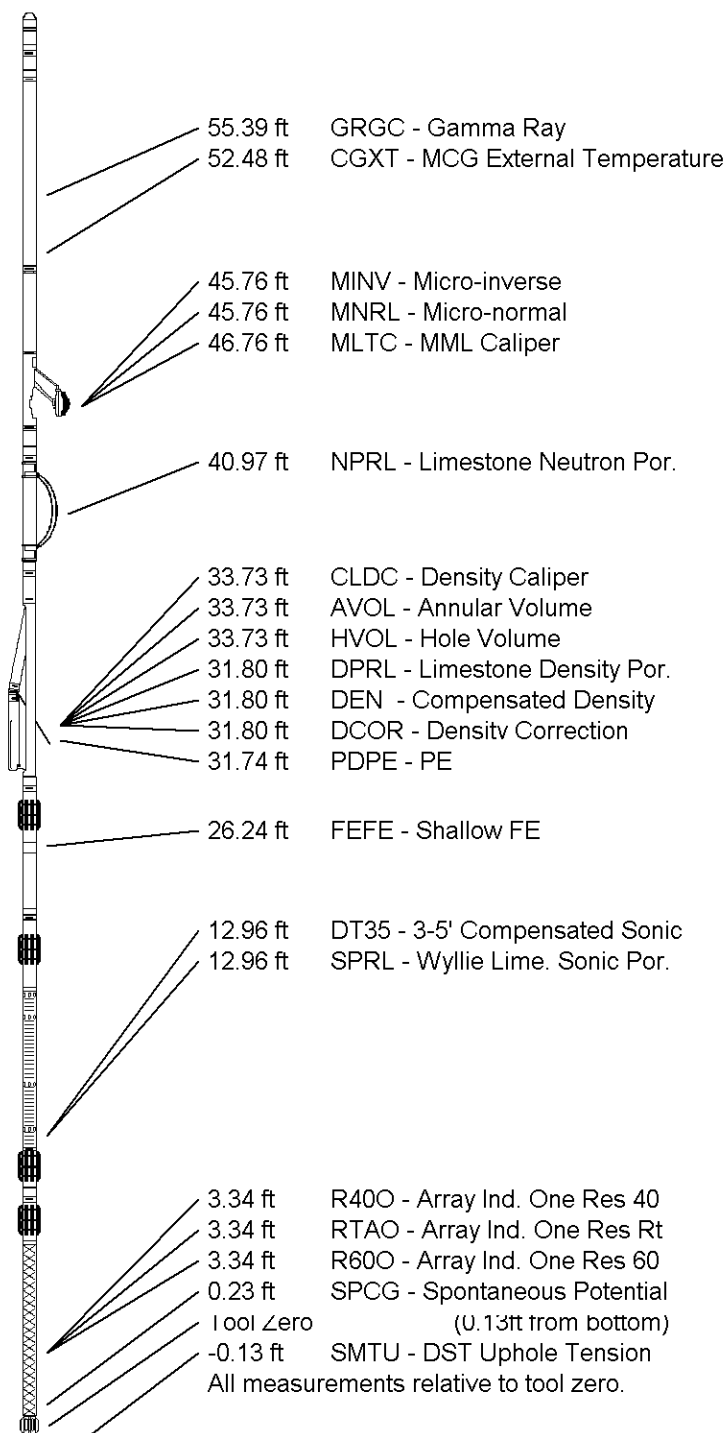
Compact Density/Caliper
MPD-D.A 482 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric
MFE-A.A 135 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: 2.244 in

Compact Induction
MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 63.07 ft Weight: 480.6 lb



COMPANY	K3 OIL & GAS OPERATING COMPANY
WELL	LAMAR FULLMER UNIT 13-10
FIELD	WILDCAT
PROVINCE/COUNTY	GOVE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2456.00	feet	First Reading	4408.00	feet
Elevation Drill Floor	2454.00	feet	Depth Driller	4421.00	feet
Elevation Ground Level	2448.00	feet	Depth Logger	4421.00	feet



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