



Weatherford

COMPENSATED SONIC WITH INTEGRATED TRANSIT TIME

COMPANY

GRAND MESA OPERATING COMPANY

WELL

Q-B #1-17

FIELD

WILDCAT

PROVINCE/COUNTY

GOVE

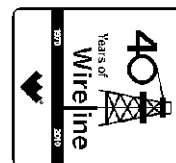
COUNTRY/STATE

U.S.A. / KANSAS

LOCATION

1477' FNL & 2519' FWL

NE NE SE NW



SEC

TWP

RGE

Other Services

MAI/MFE

17

11S

26W

MPD/MDN

MML

Permit Number

15-063-21990

Permanent Datum G.L., Elevation 2644 feet

Log Measured From KB

Drilling Measured From K.B.

Date

20-MAY-2012

Elevations:

feet

KB

2649.00

DF

2648.00

GL

2644.00

Run Number

ONE

Depth Driller

4632.00

feet

Depth Logger

4633.00

feet

First Reading

4620.00

feet

Last Reading

260.00

feet

Casing Driller

260.00

feet

Casing Logger

260.00

feet

Bit Size

7.875

inches

Hole Fluid Type

CHEMICAL

Density / Viscosity

9.20

lb/USg

50.00

CP

PH / Fluid Loss

9.50

8.80

ml/30Min

Sample Source

FLOWLINE

Rm @ Measured Temp

0.88 @ 93.0

ohm-m

Rmf @ Measured Temp

0.70 @ 93.0

ohm-m

Rmc @ Measured Temp

1.06 @ 93.0

ohm-m

Source Rmf / Rmc

CALC

CALC

Rm @ BHT

0.68 @ 120.0

ohm-m

Time Since Circulation

4 HOURS

Max Recorded Temp

120.00

deg F

Equipment Name

COMPACT

Equipment / Base

13057

LIB

Recorded By

L. SCOTT

Witnessed By

JOHN GOLDSMITH

STEVE STRIBLING

S.O.# / JOB#

3534580

LB12-130

BOREHOLE RECORD

Last Edited: 20-MAY-2012 14:40

Bit Size
inches

7.875

Depth From
feet

260.00

Depth To
feet

4633.00

CASING RECORD

Type

Size
inches

8.625

Depth From
feet

0.00

Shoe Depth
feet

260.00

Weight
pounds/ft

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: 0.5 inch Standoff = 1

MAI: 0.5 inch Standoff = 1

MSS: 0.5 inch Standoffs = 2

2.71 g/cc Limestone Density Matrix used to calculate porosity.

Sonic porosity calculated using (47.5usec/ft) Limestone scale.

All intervals logged and scaled per customer's request.

Annular volume with 5.5 inch production casing= 185 cu. ft.

Total hole volume from TD to surface casing= 1844 cu. ft.

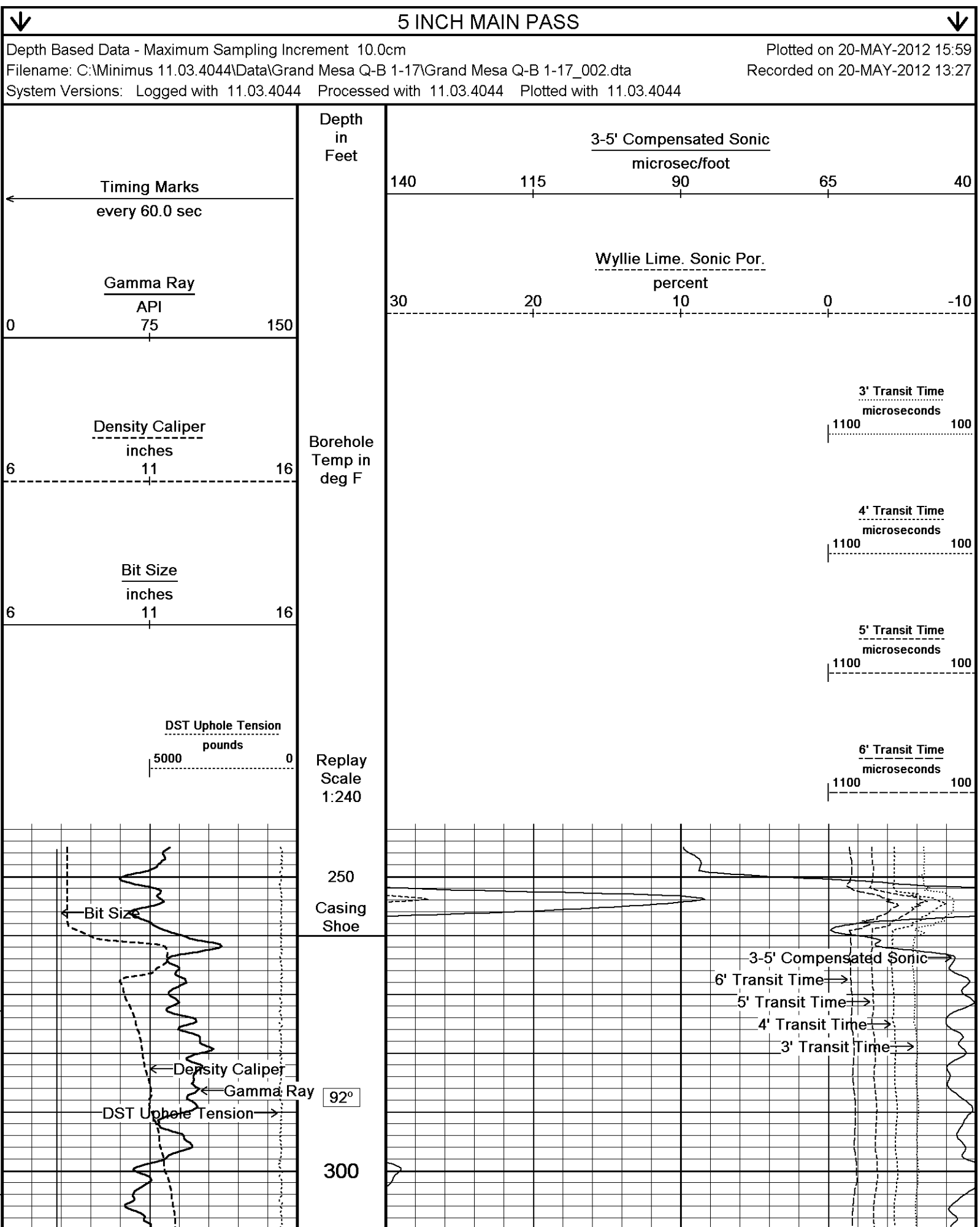
Service order: #3534580

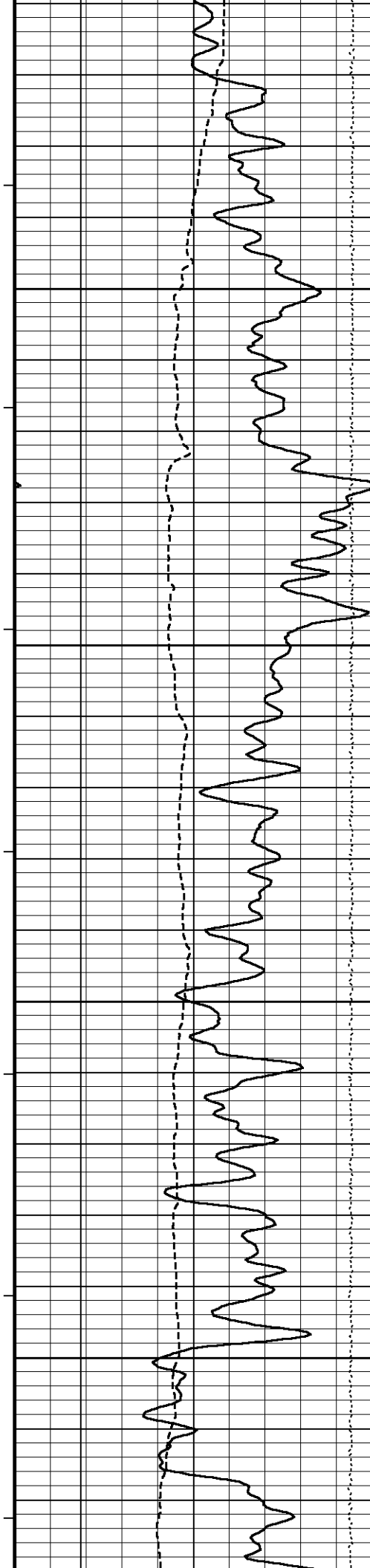
Rig: Murfin #24

Engineer: L. Scott

Operator(s): B. Johnson

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





92°

350

92°

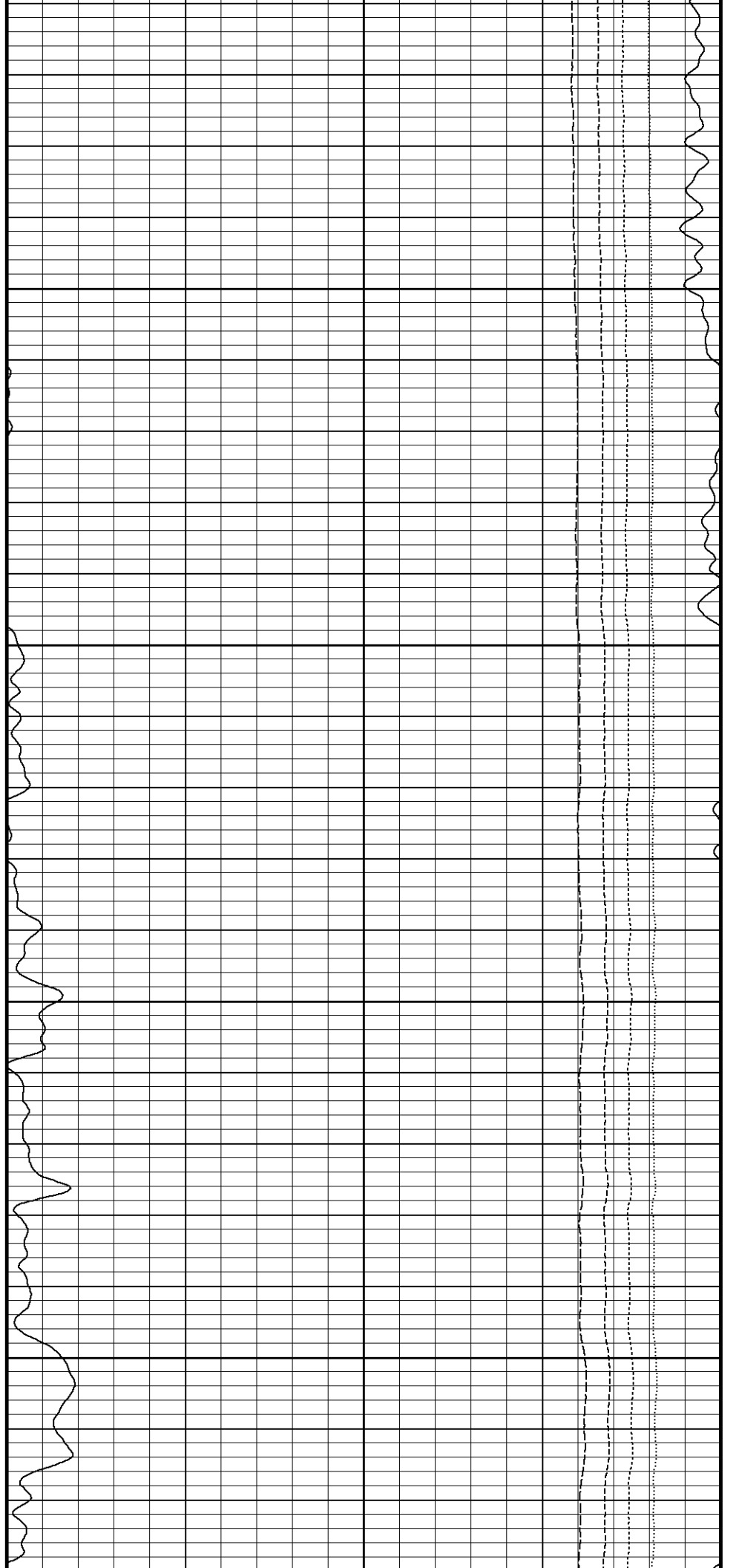
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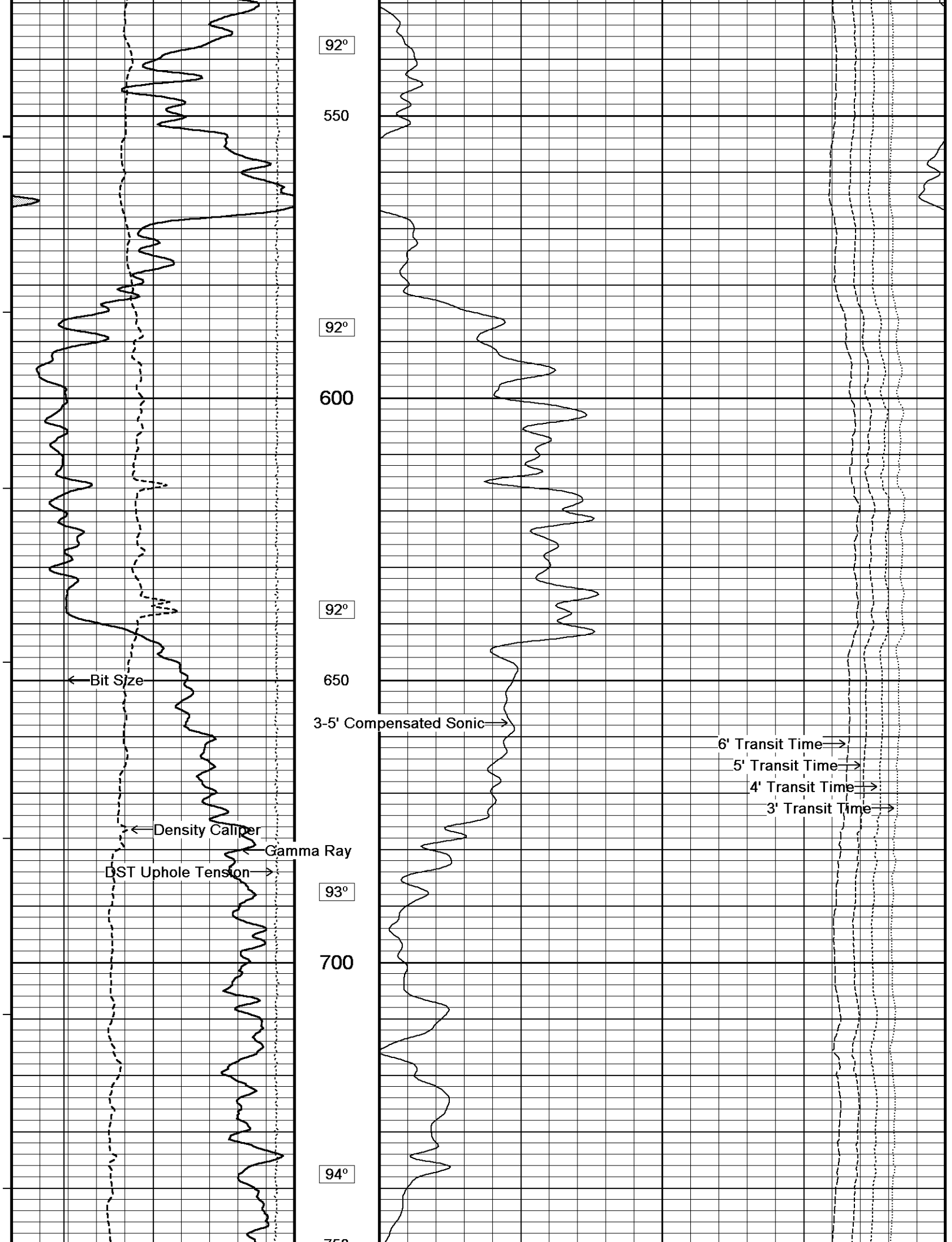
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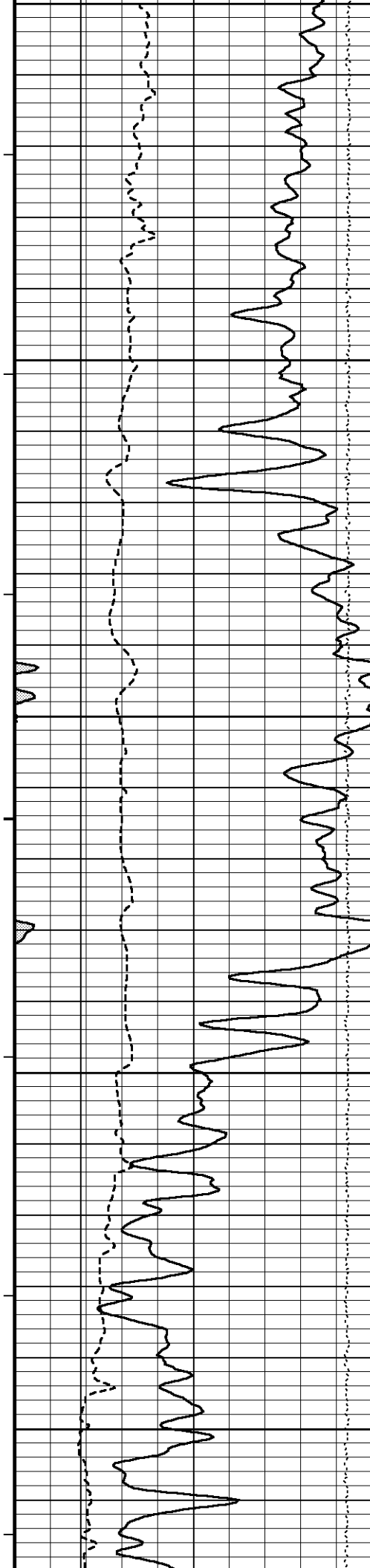
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92°

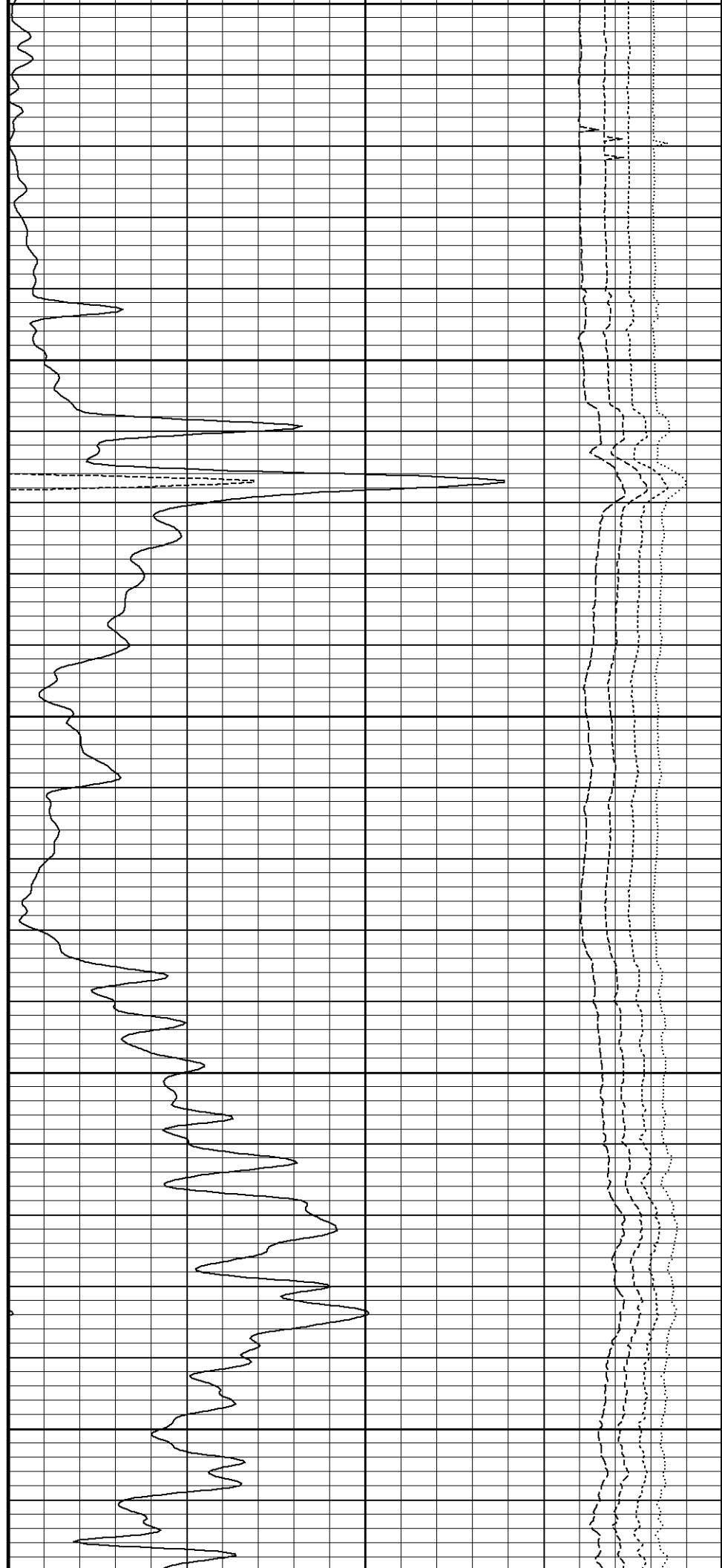
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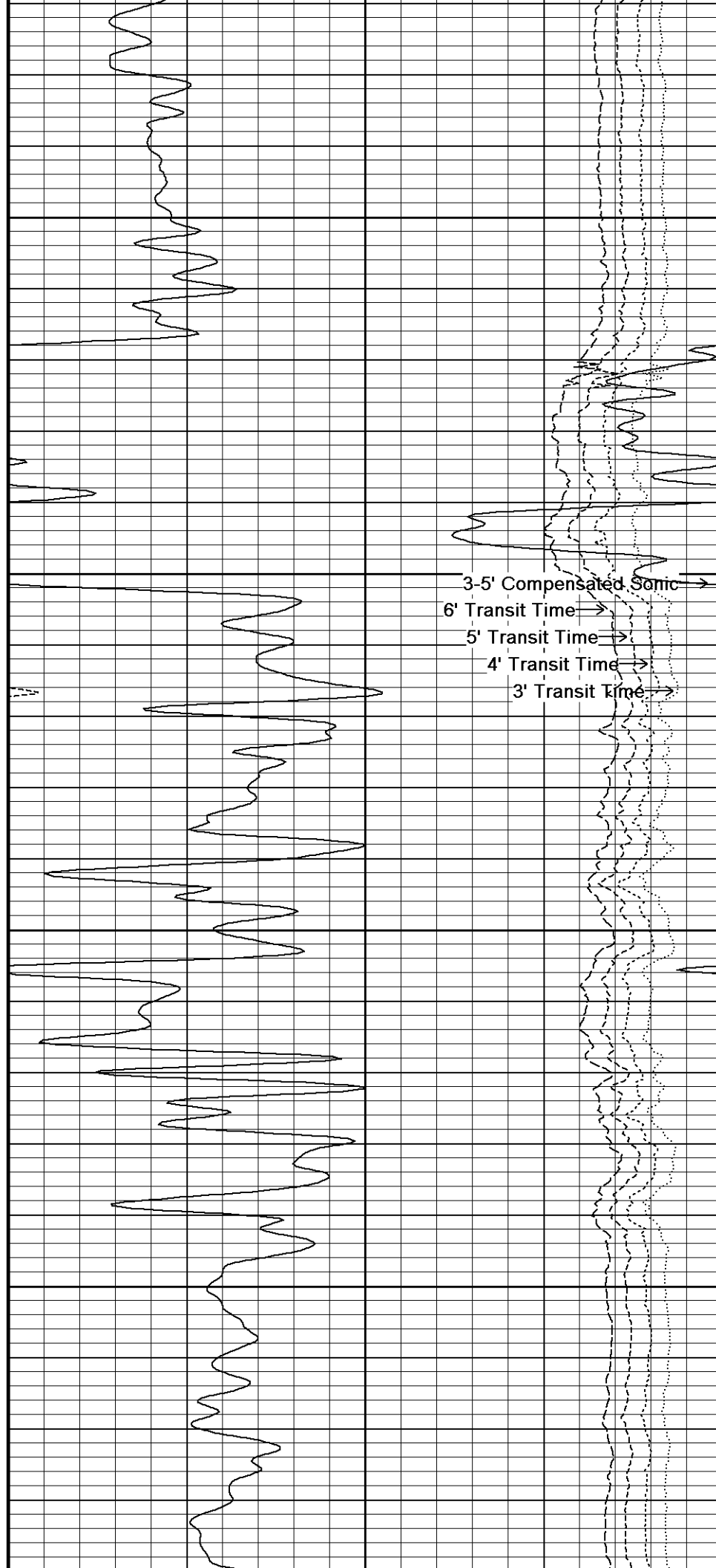
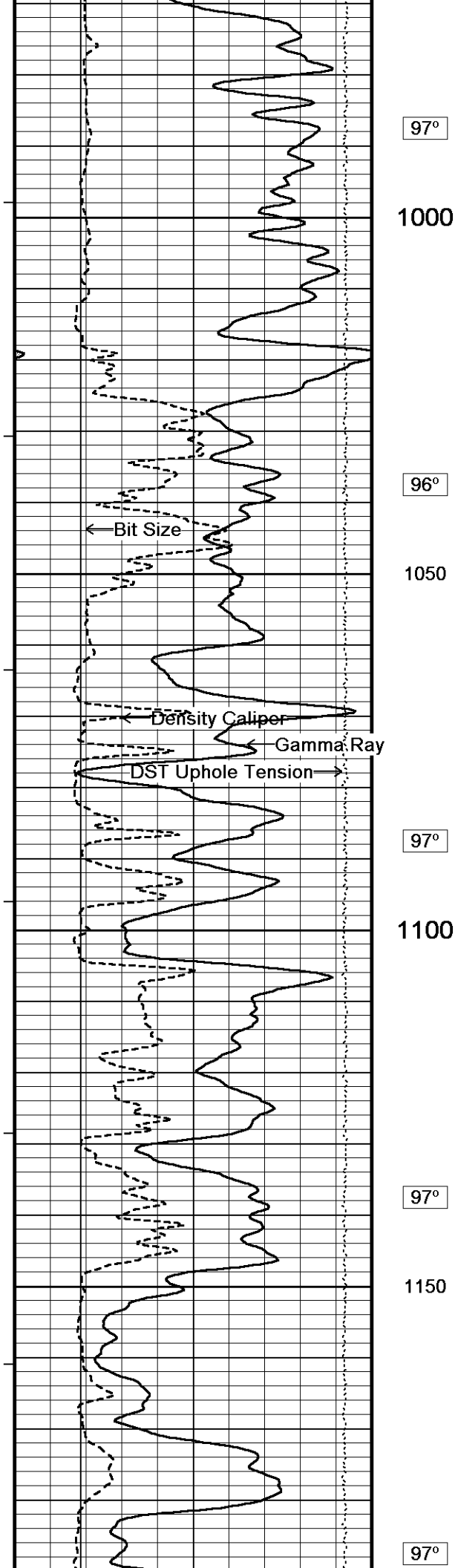


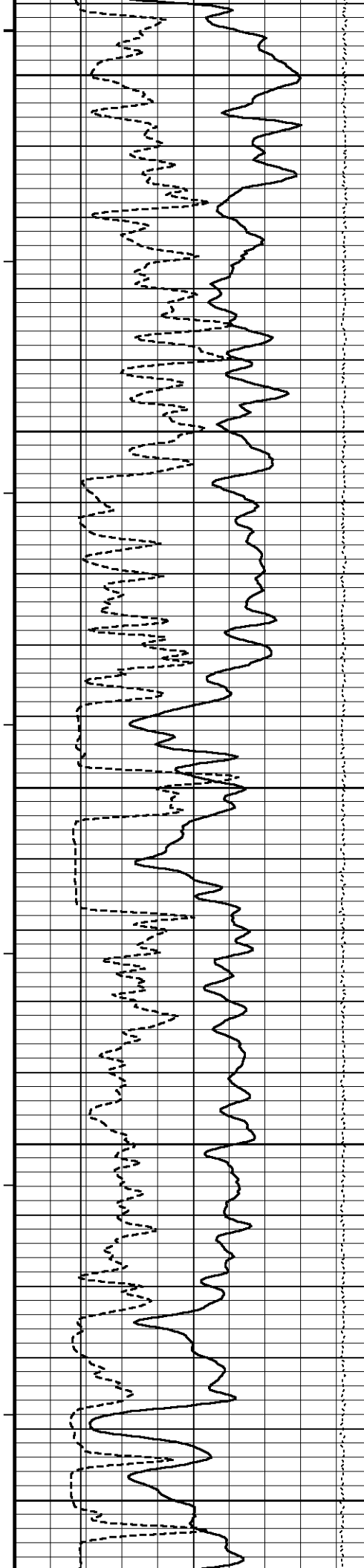




750
95°
800
95°
850
96°
900
96°
950







1200

98°

1250

98°

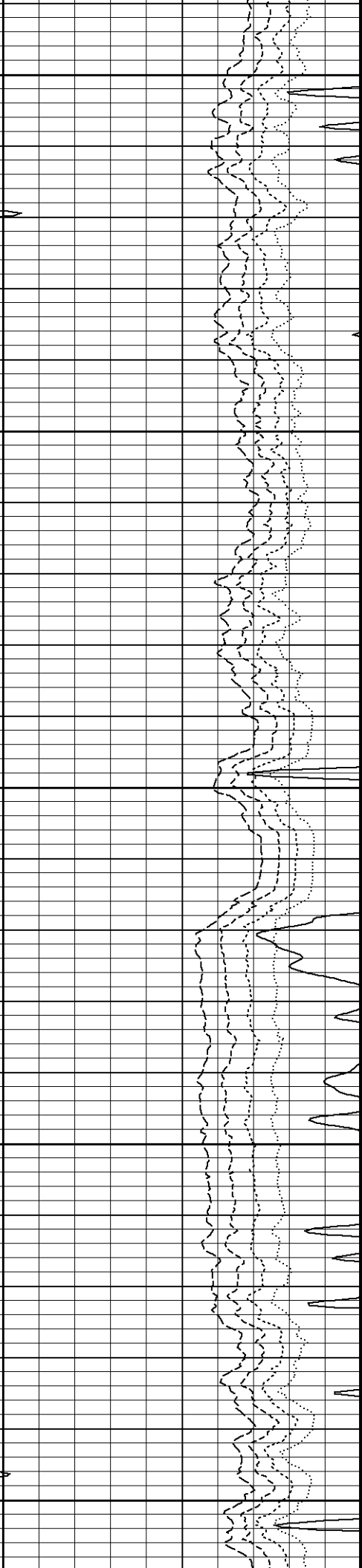
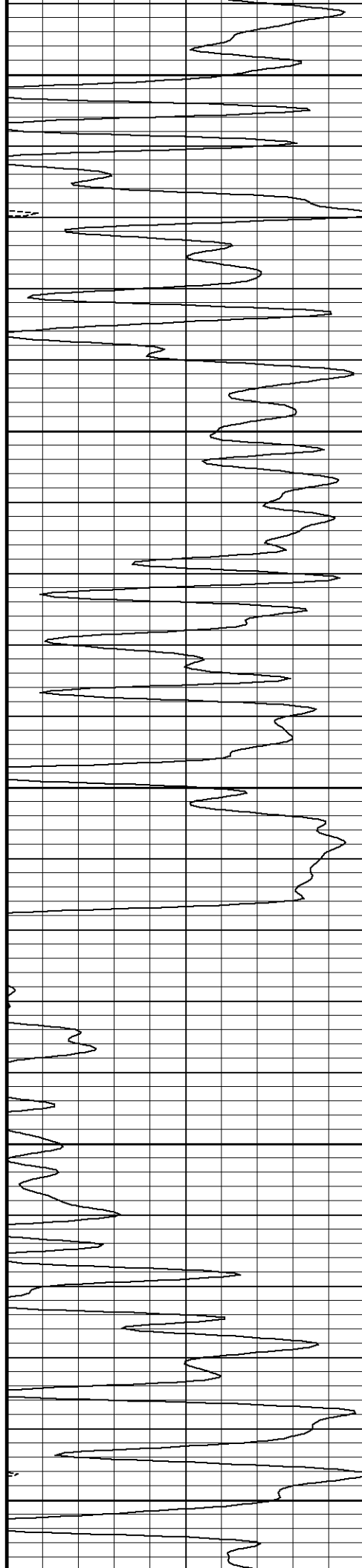
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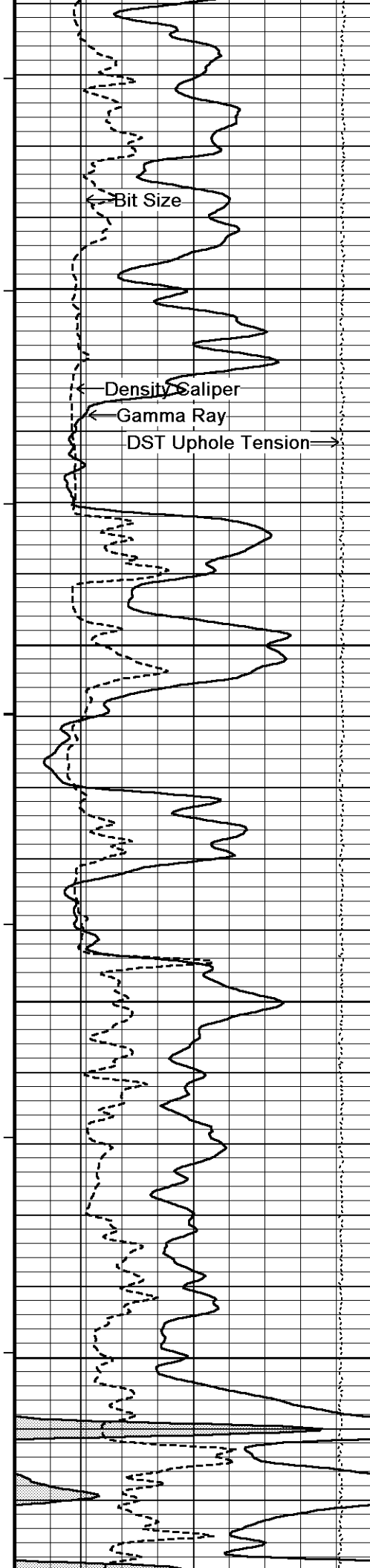
99°

1350

99°

1400





99°

1450

100°

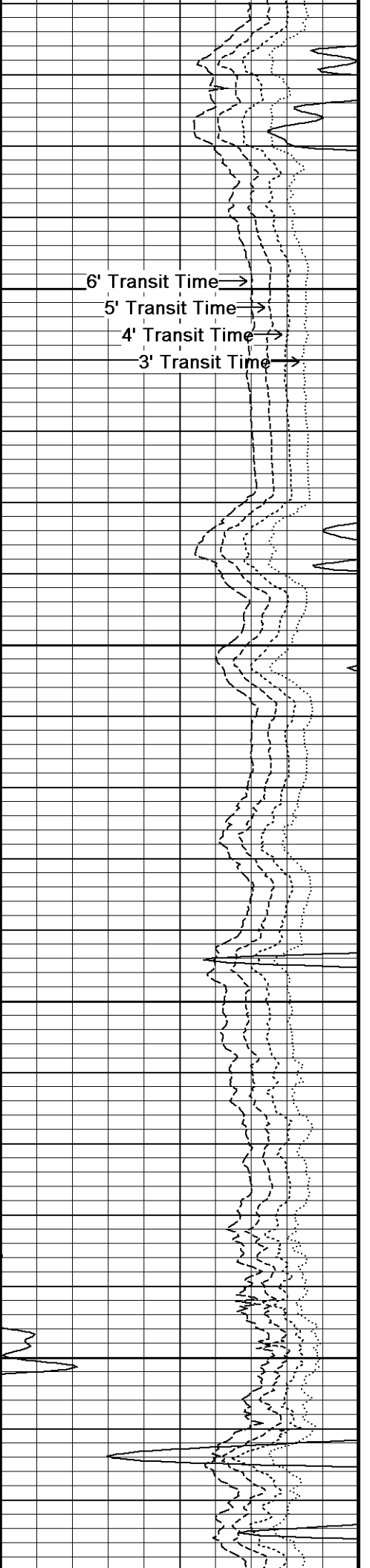
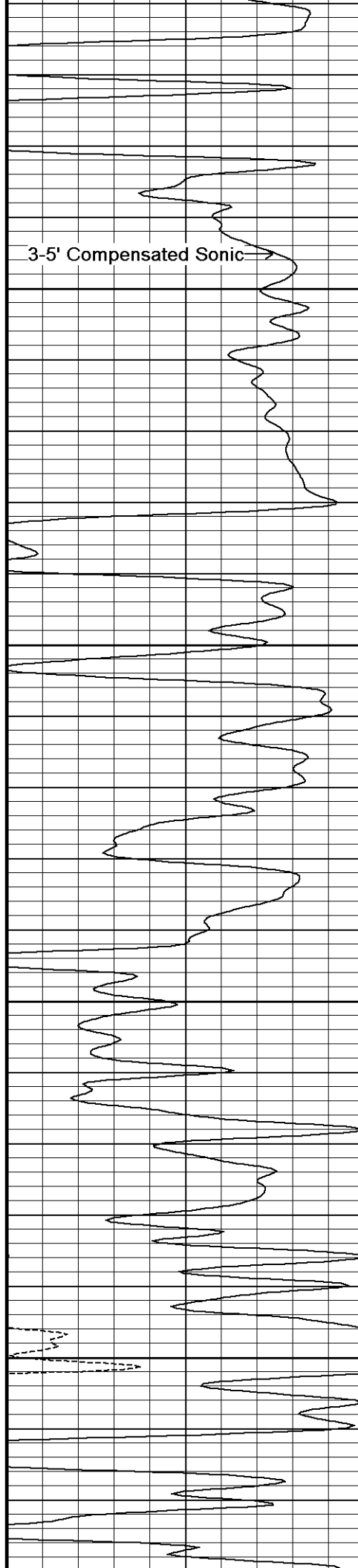
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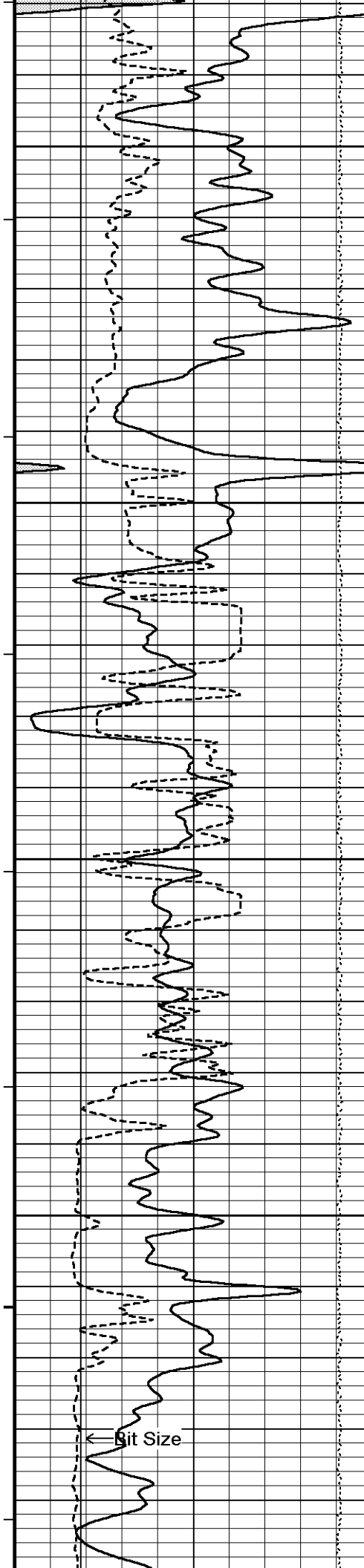
100°

1550

100°

1600





101°

1650

101°

1700

101°

1750

101°

1800

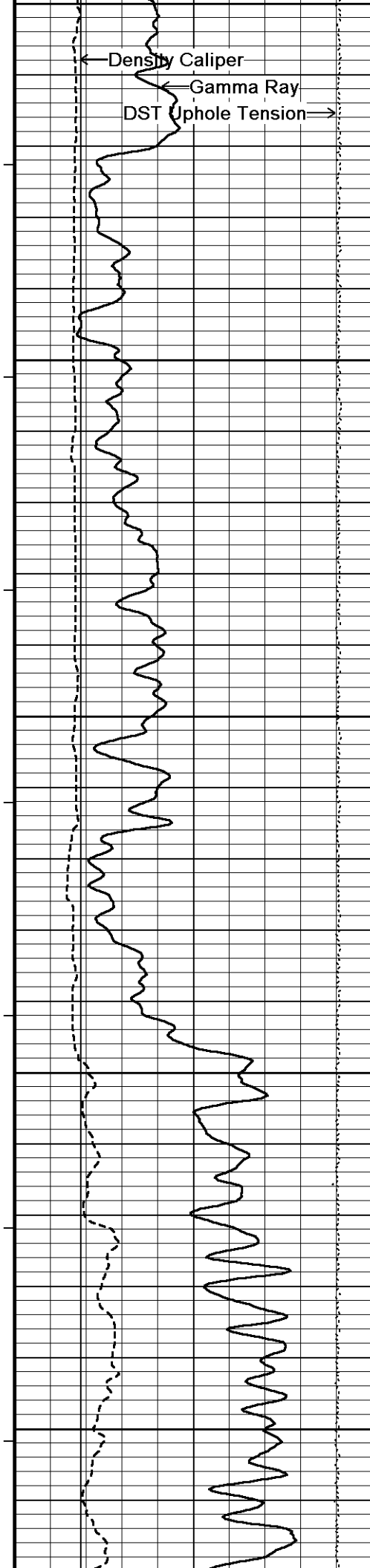
101°

1850

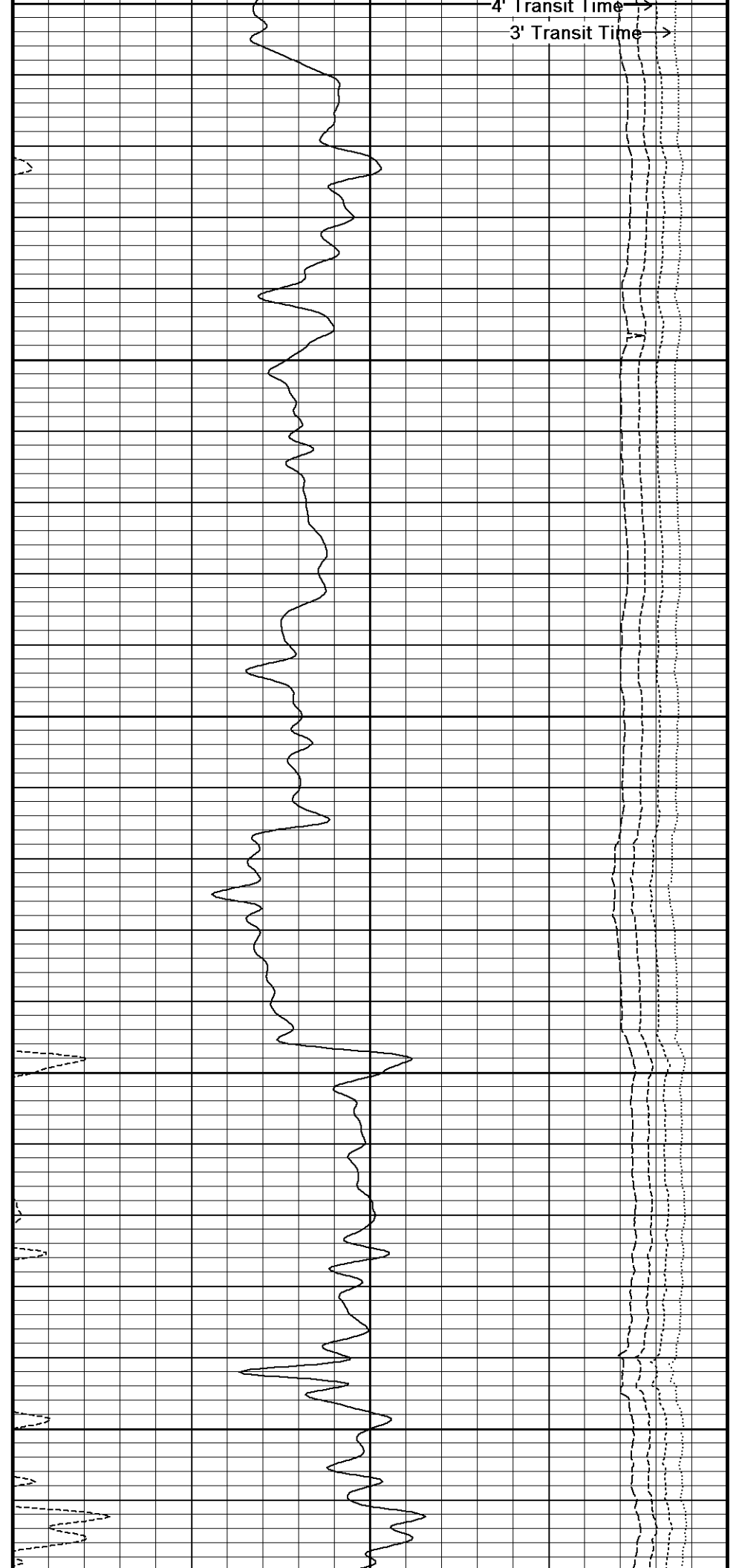
3-5' Compensated Sonic

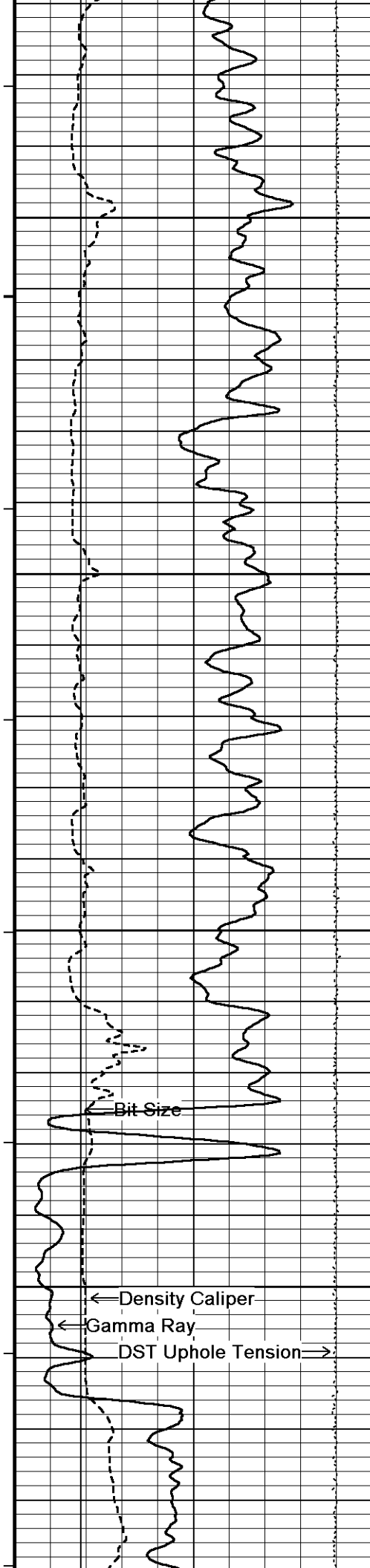
6' Transit Time

5' Transit Time



1850
101°
1900
101°
1950
102°
2000
102°
2050





102°

2100

103°

2150

103°

2200

103°

2250

103°

Wyllie Lime. Sonic Per. →

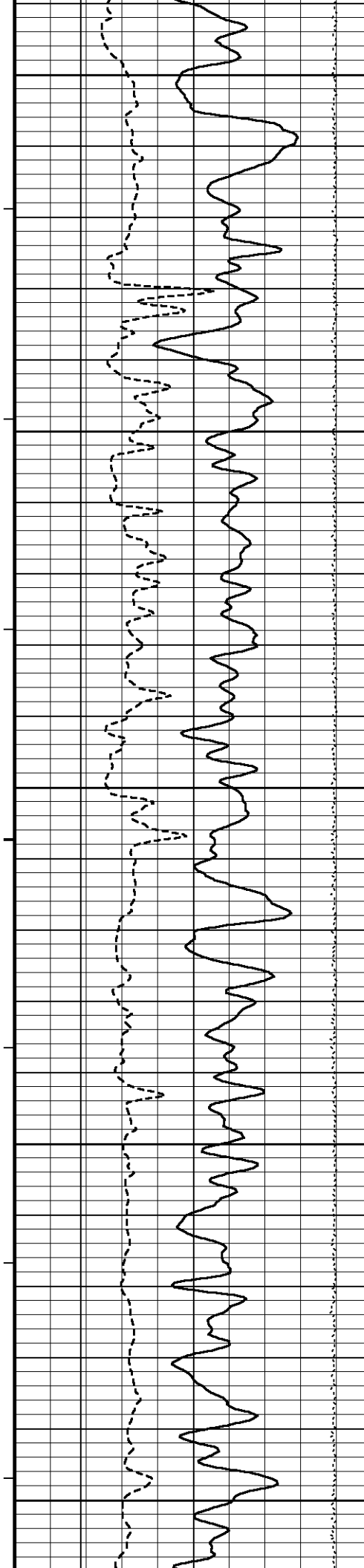
3-5' Compensated Sonic →

6' Transit Time →

5' Transit Time →

4' Transit Time →

3' Transit Time →



2300

104°

2350

104°

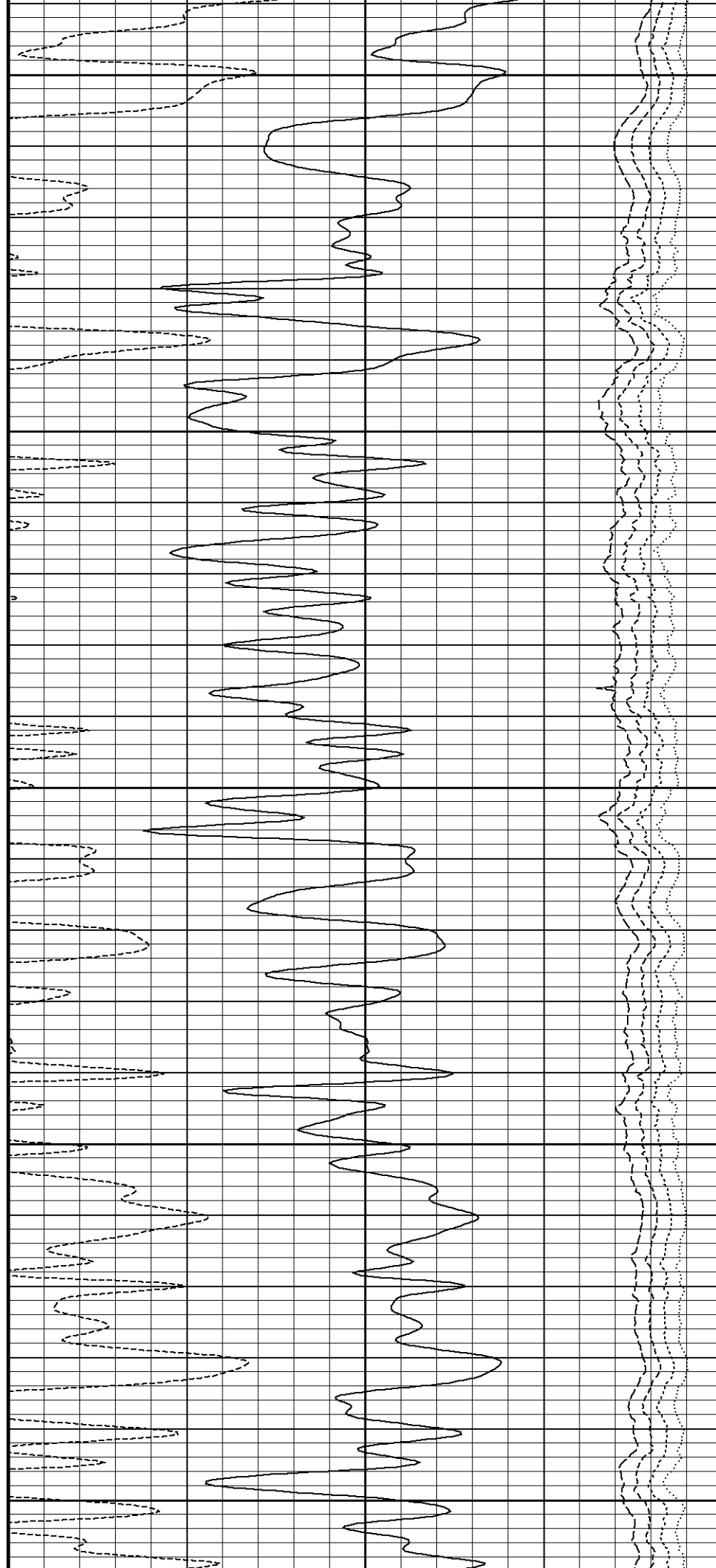
2400

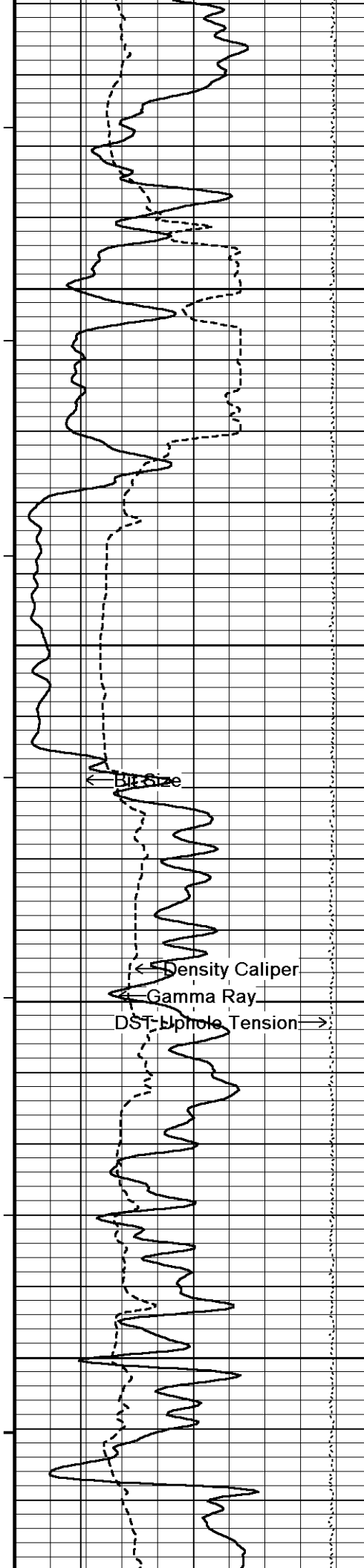
104°

2450

105°

2500





105°

2550

105°

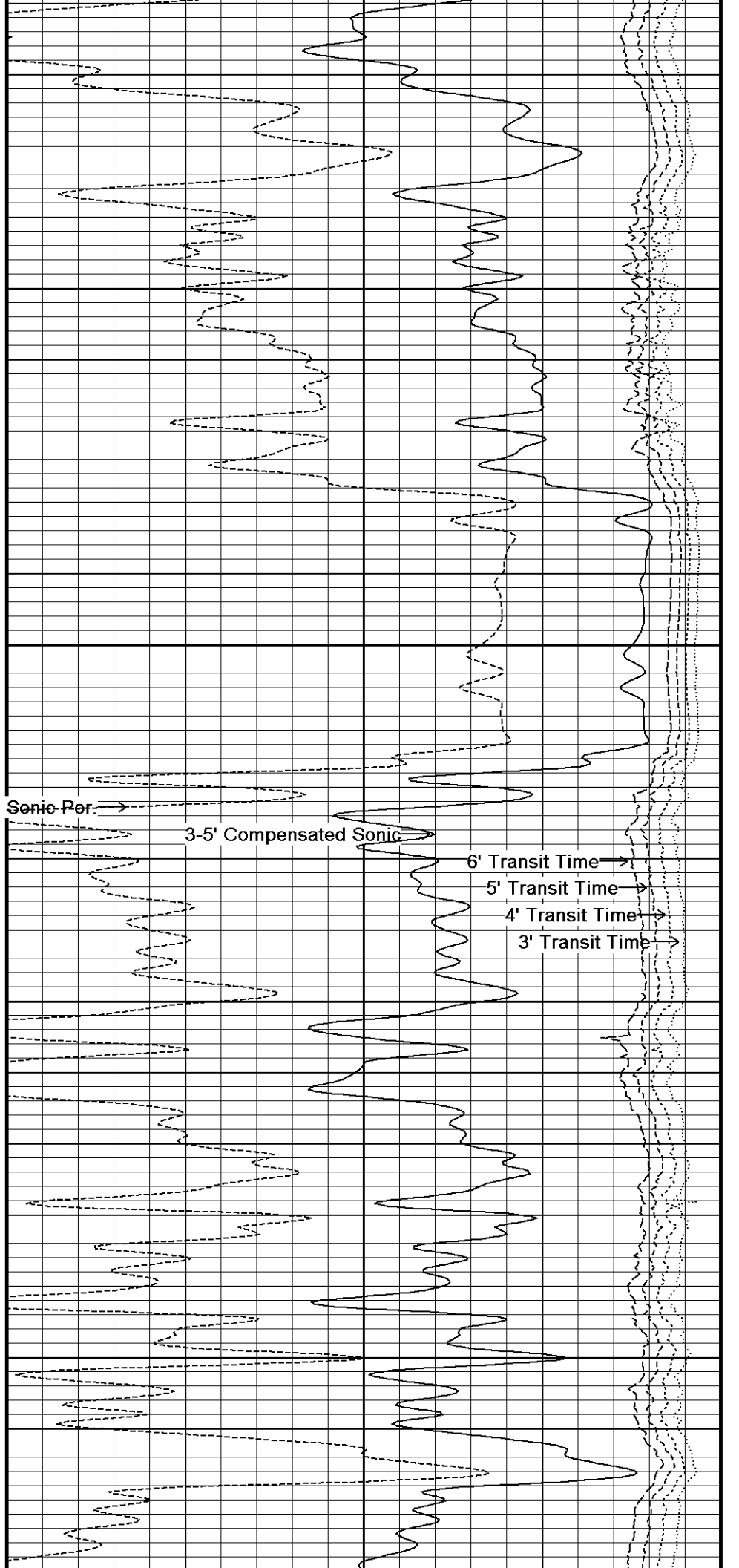
2600

105°

2650

106°

2700



Wyllie Lime. Sonic Per. →

3-5' Compensated Sonic

6' Transit Time →

5' Transit Time →

4' Transit Time →

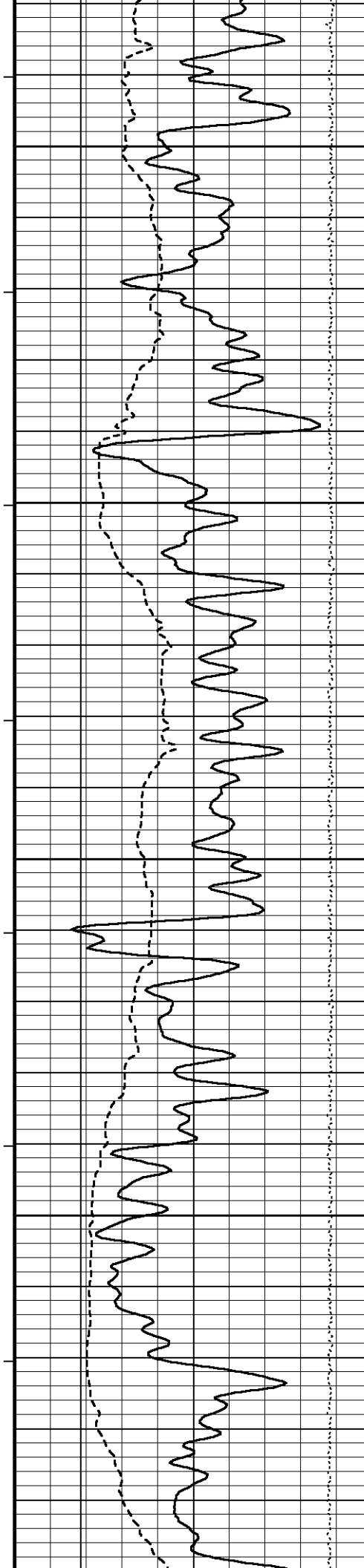
3' Transit Time →

Bit Size

Density Caliper

Gamma Ray

DST: Borehole Tension →



106°

2750

106°

2800

106°

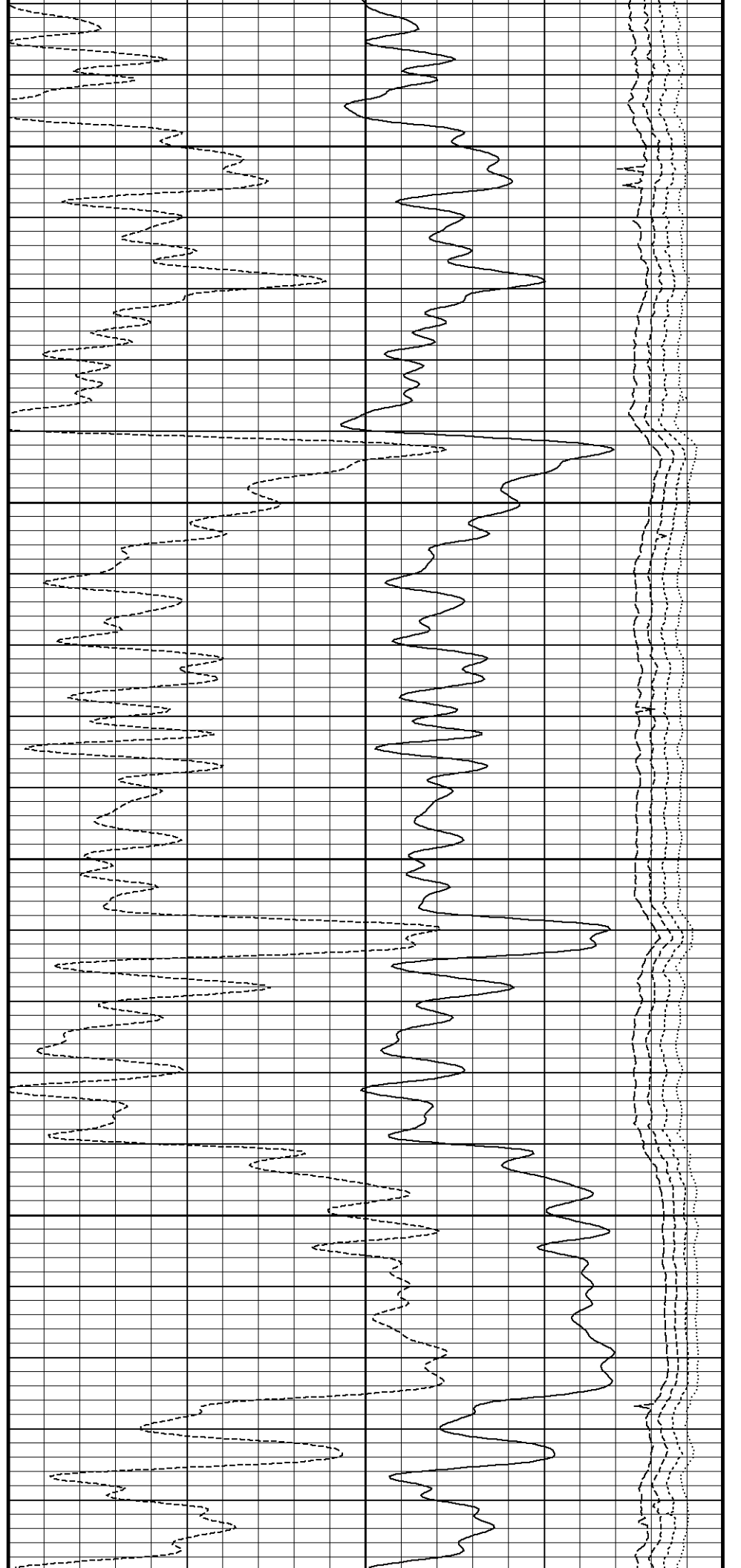
2850

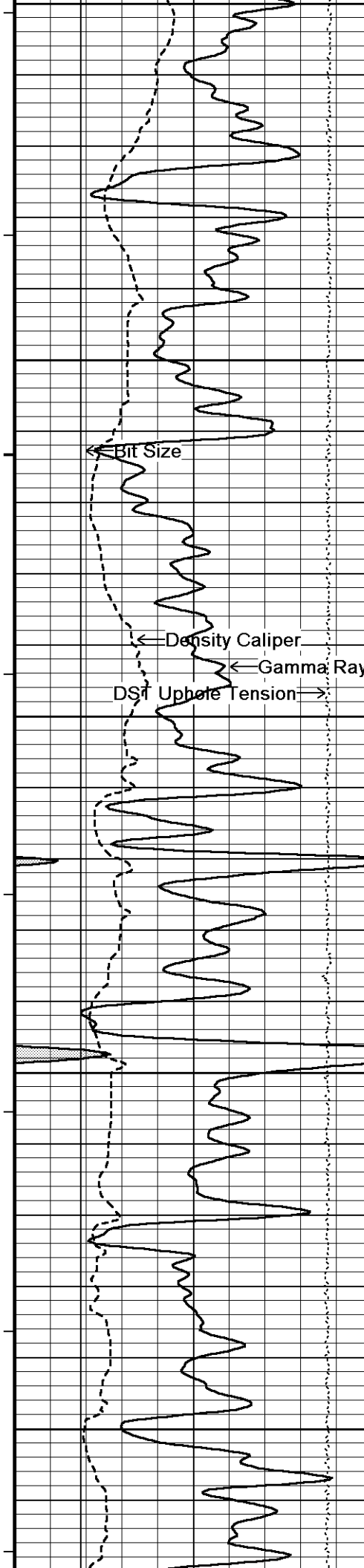
107°

2900

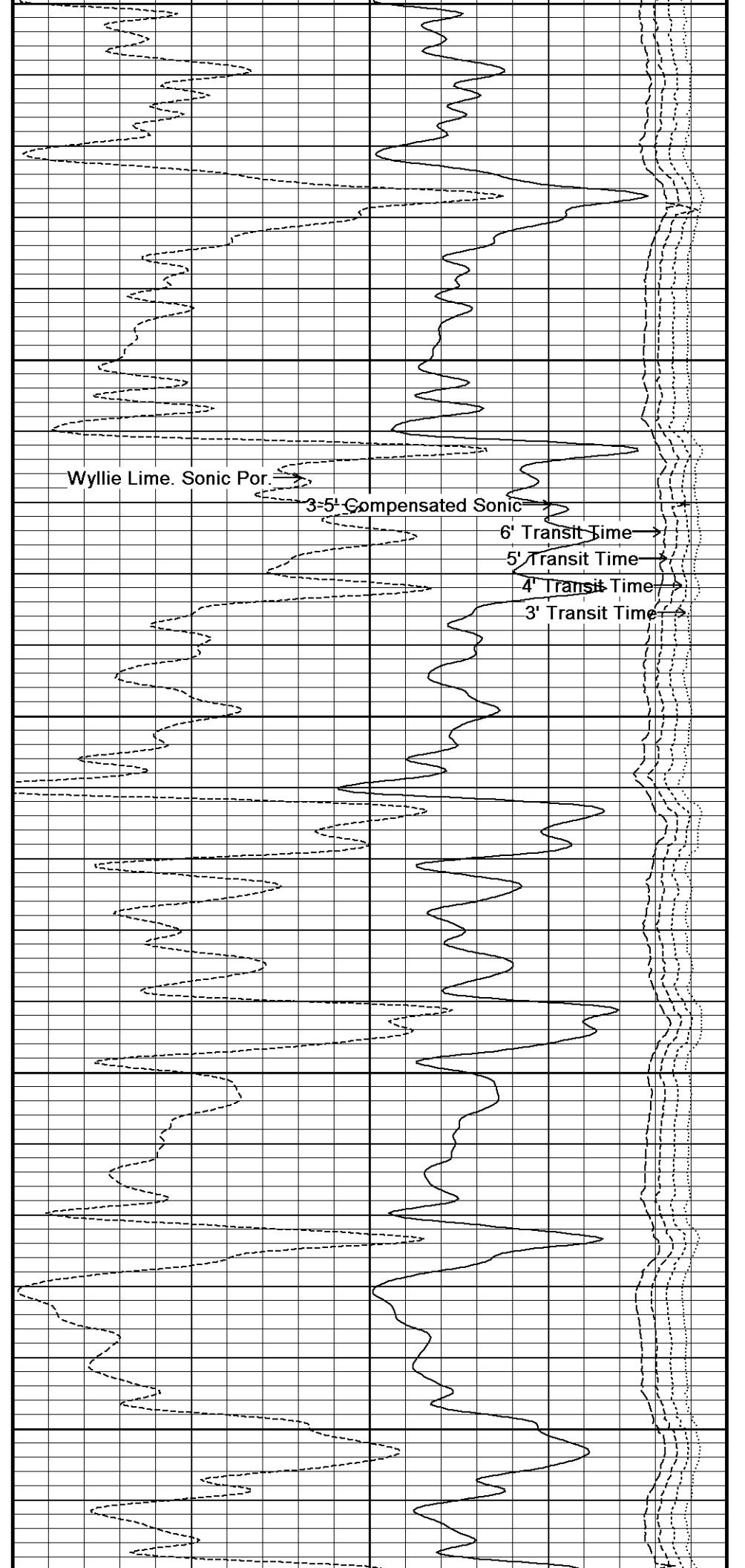
107°

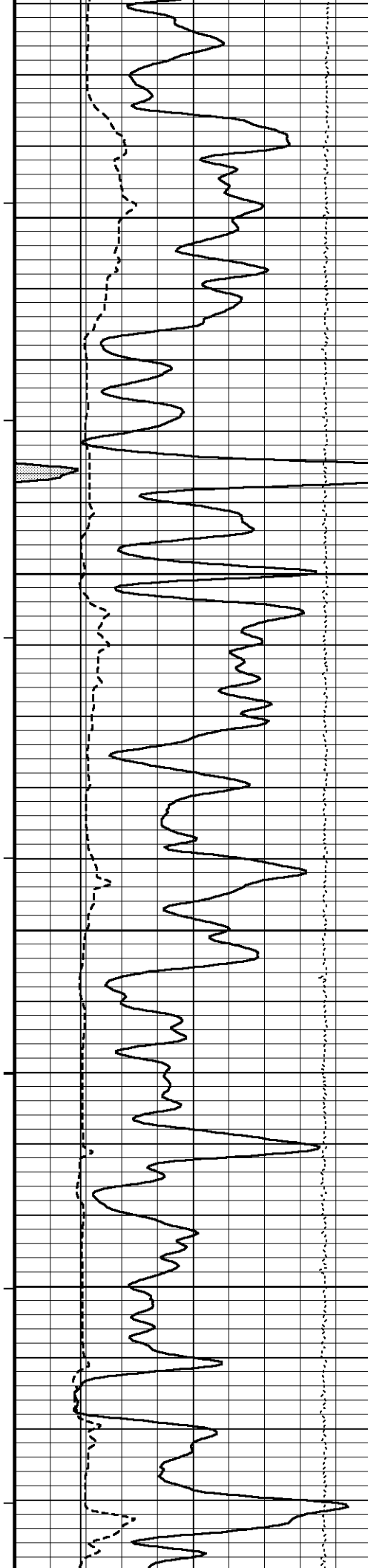
2950





2950
107°
3000
107°
3050
108°
3100
108°
3150





108°

3200

108°

3250

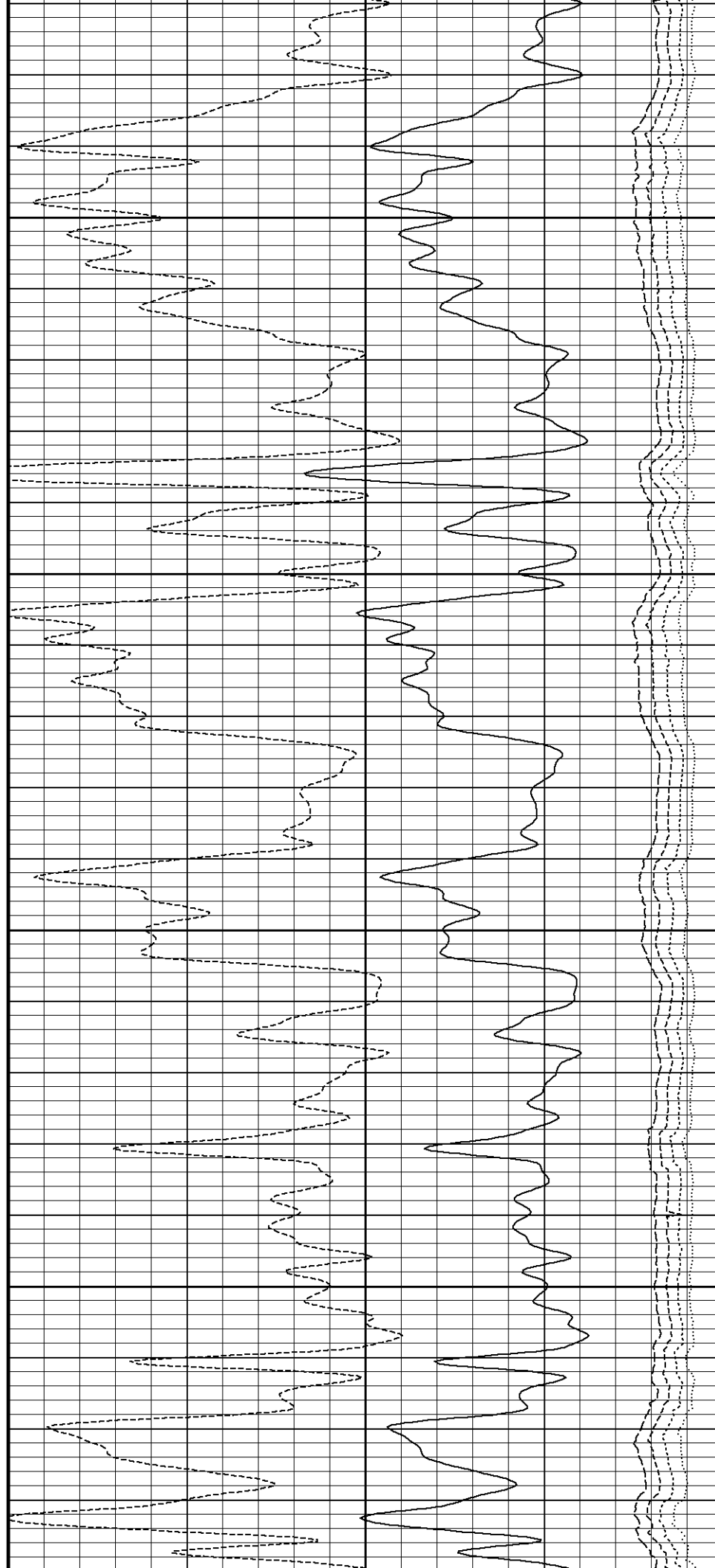
109°

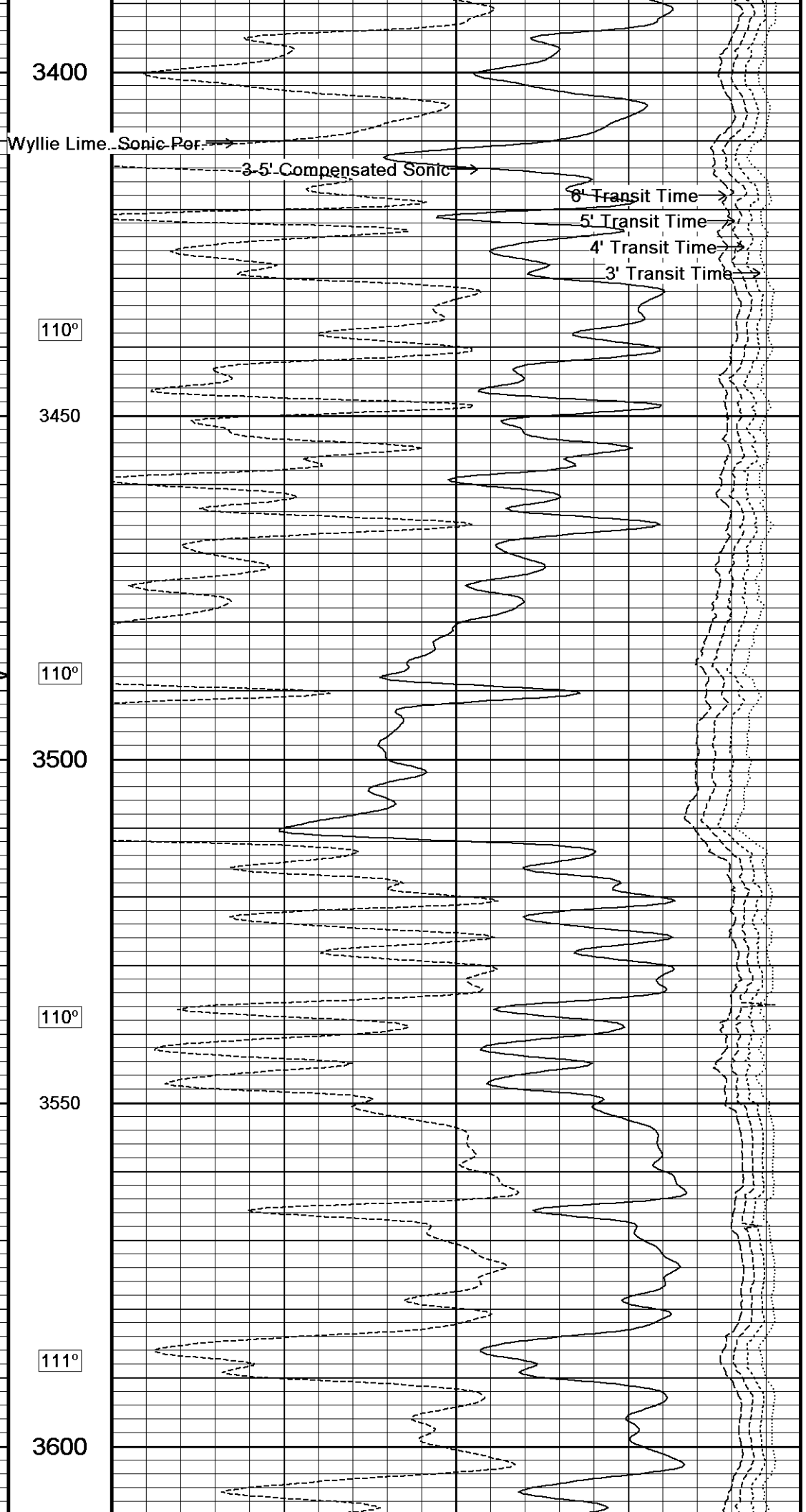
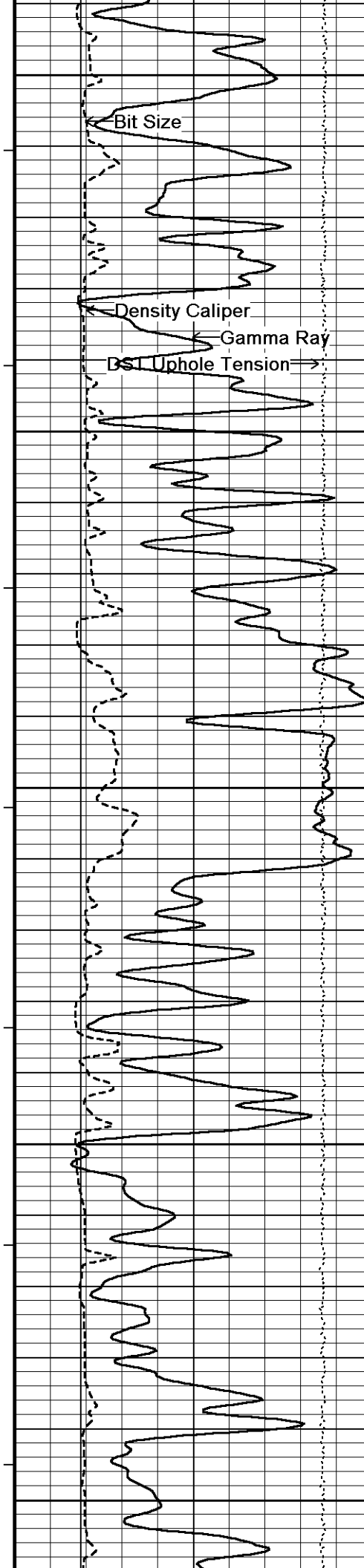
3300

109°

3350

109°







111°

3650

111°

3700

111°

3750

112°

3800

Bit Size

Density Caliper

Wyllie Lime. Sonic Por. →

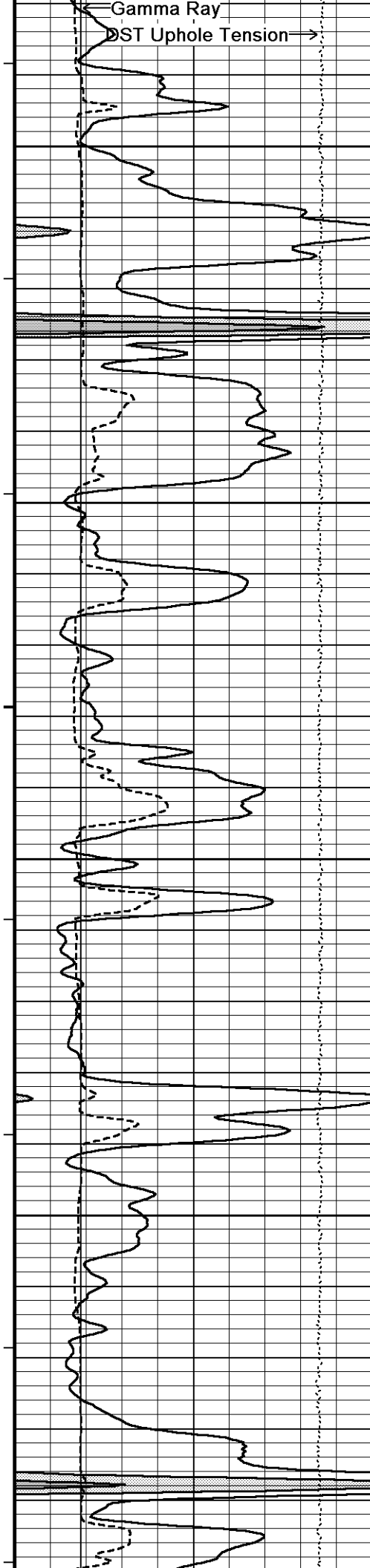
3-5' Compensated Sonic →

6' Transit Time →

5' Transit Time →

4' Transit Time →

3' Transit Time →



112°

3850

112°

3900

113°

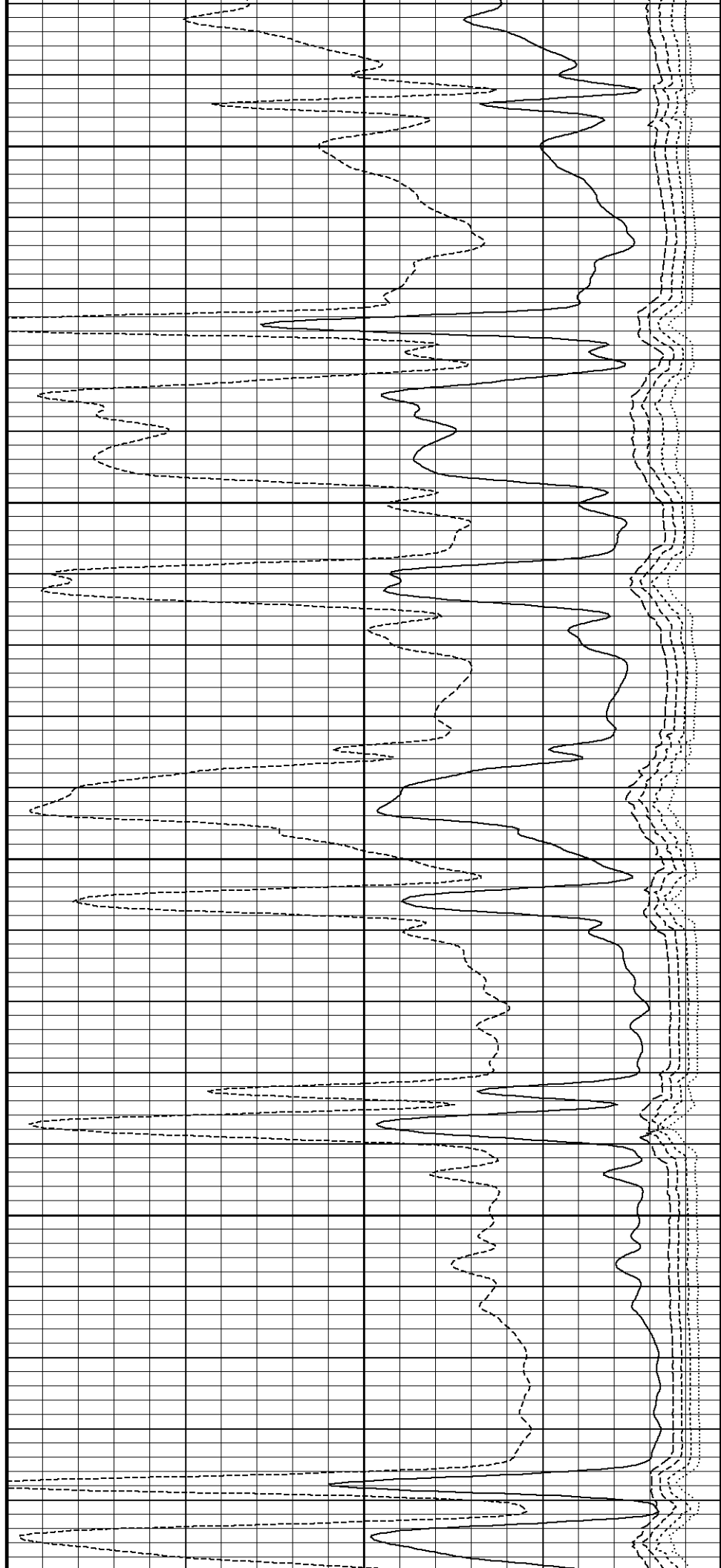
3950

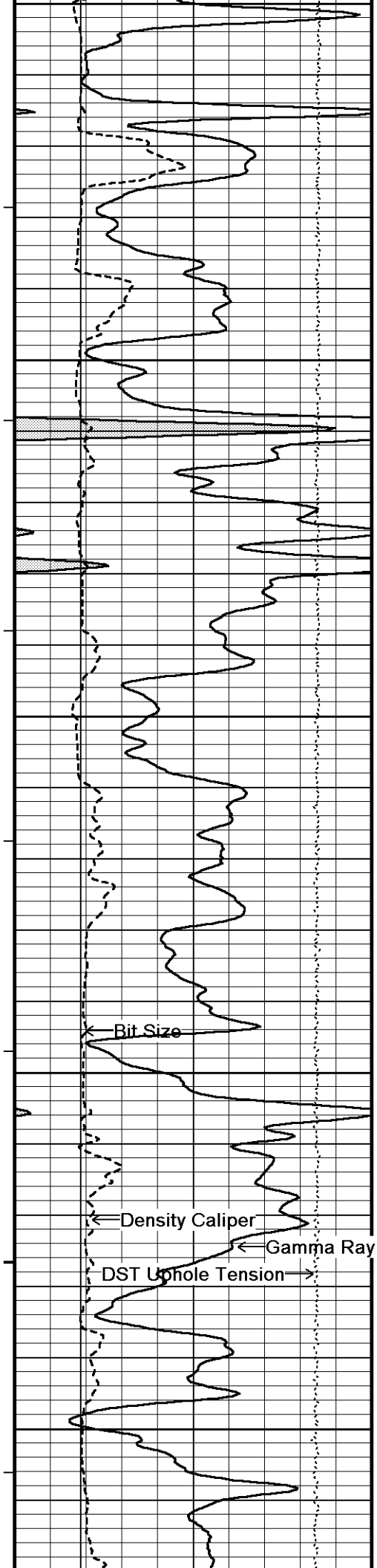
113°

4000

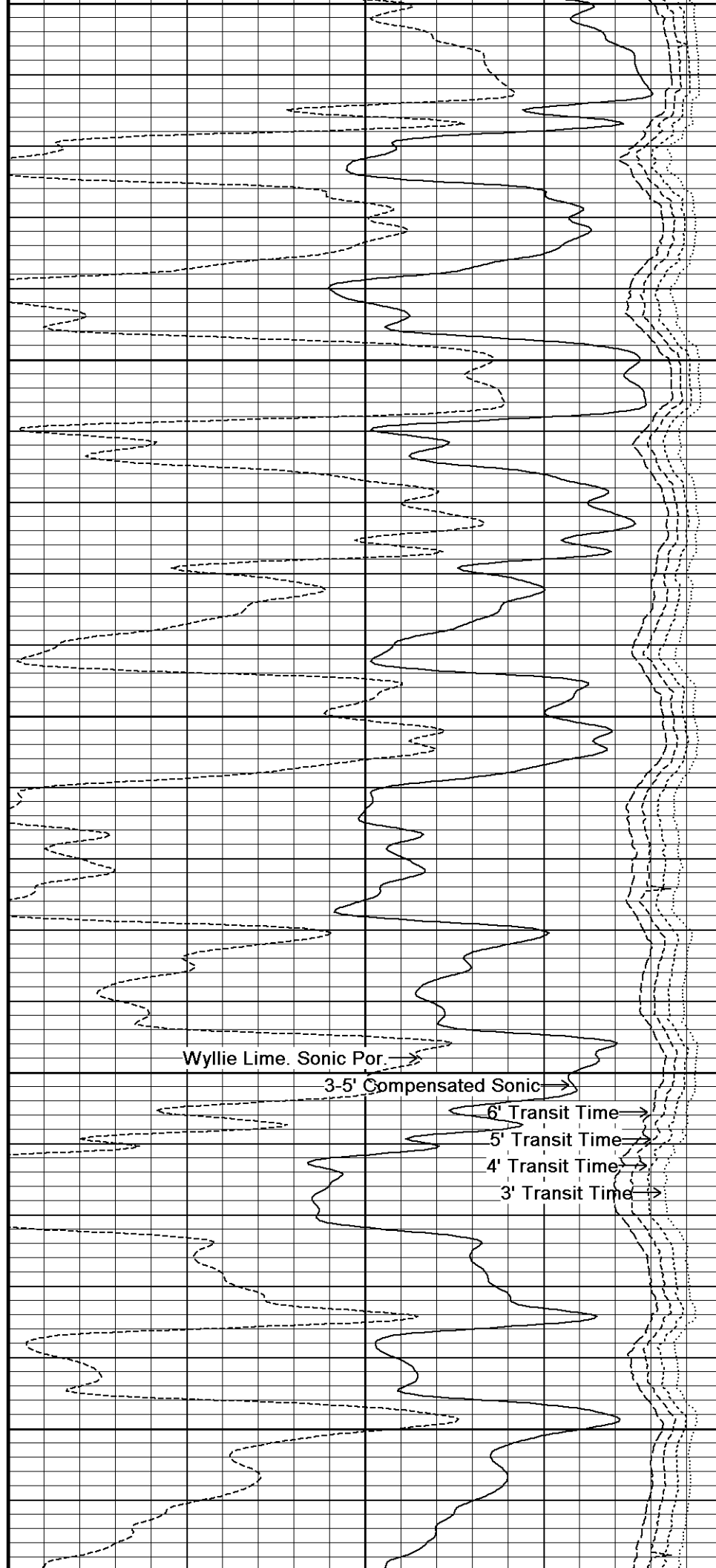
113°

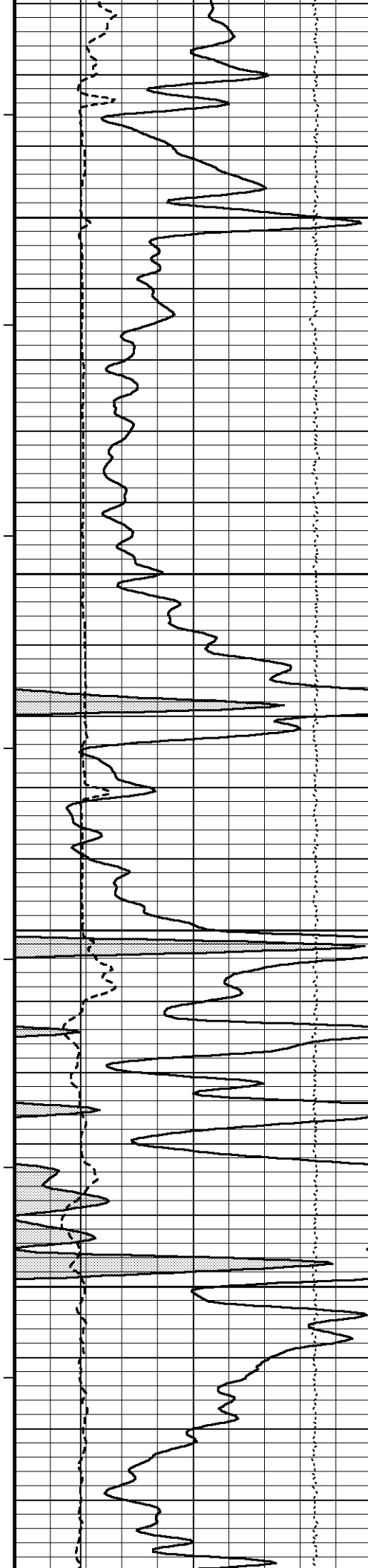
4050





4050
114°
4100
114°
4150
115°
4200
115°
4250





116°

4300

117°

4350

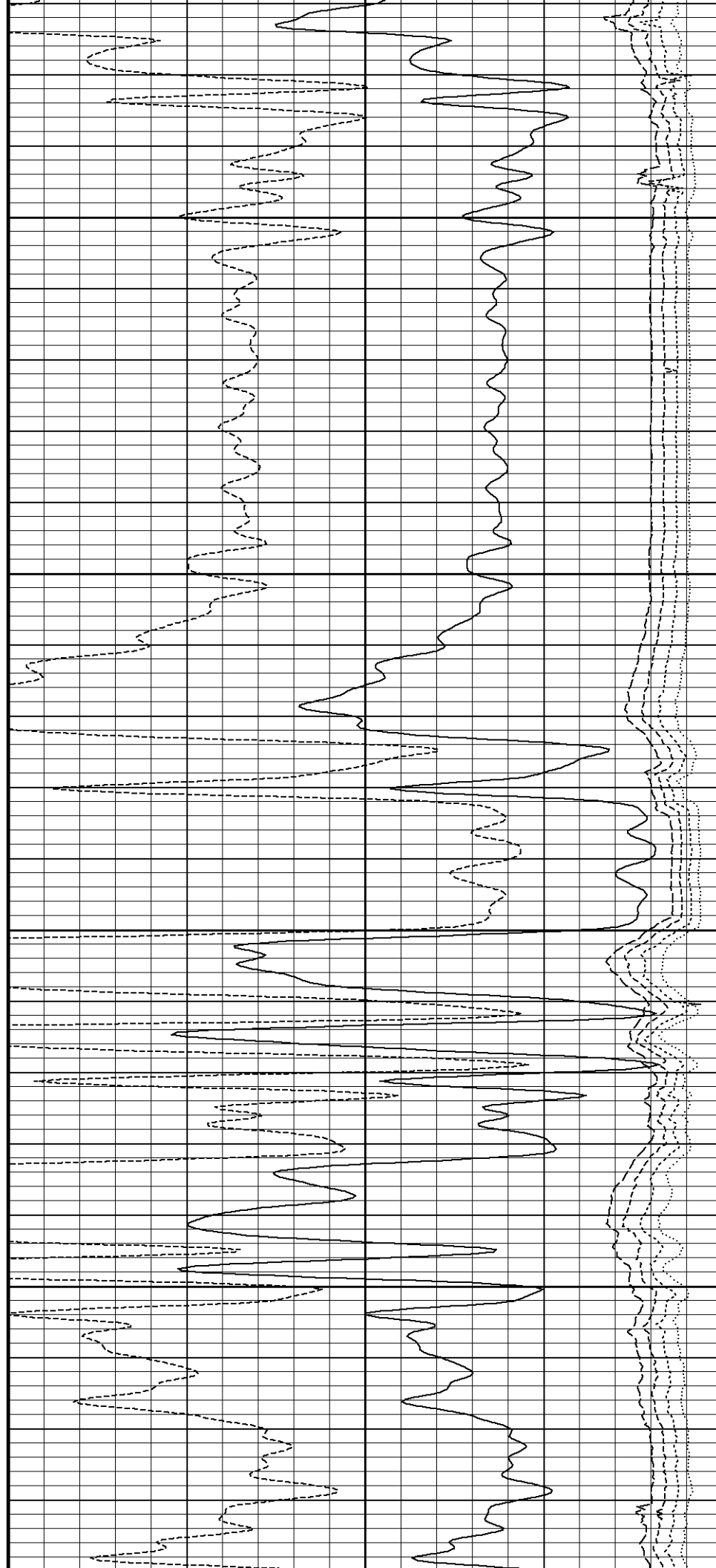
117°

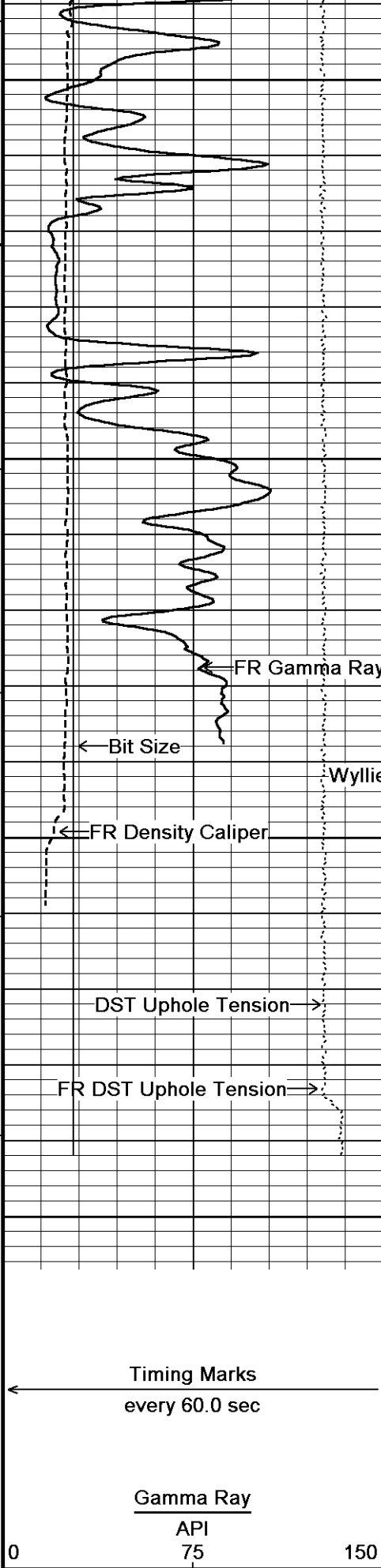
4400

118°

4450

120°





4500

120°

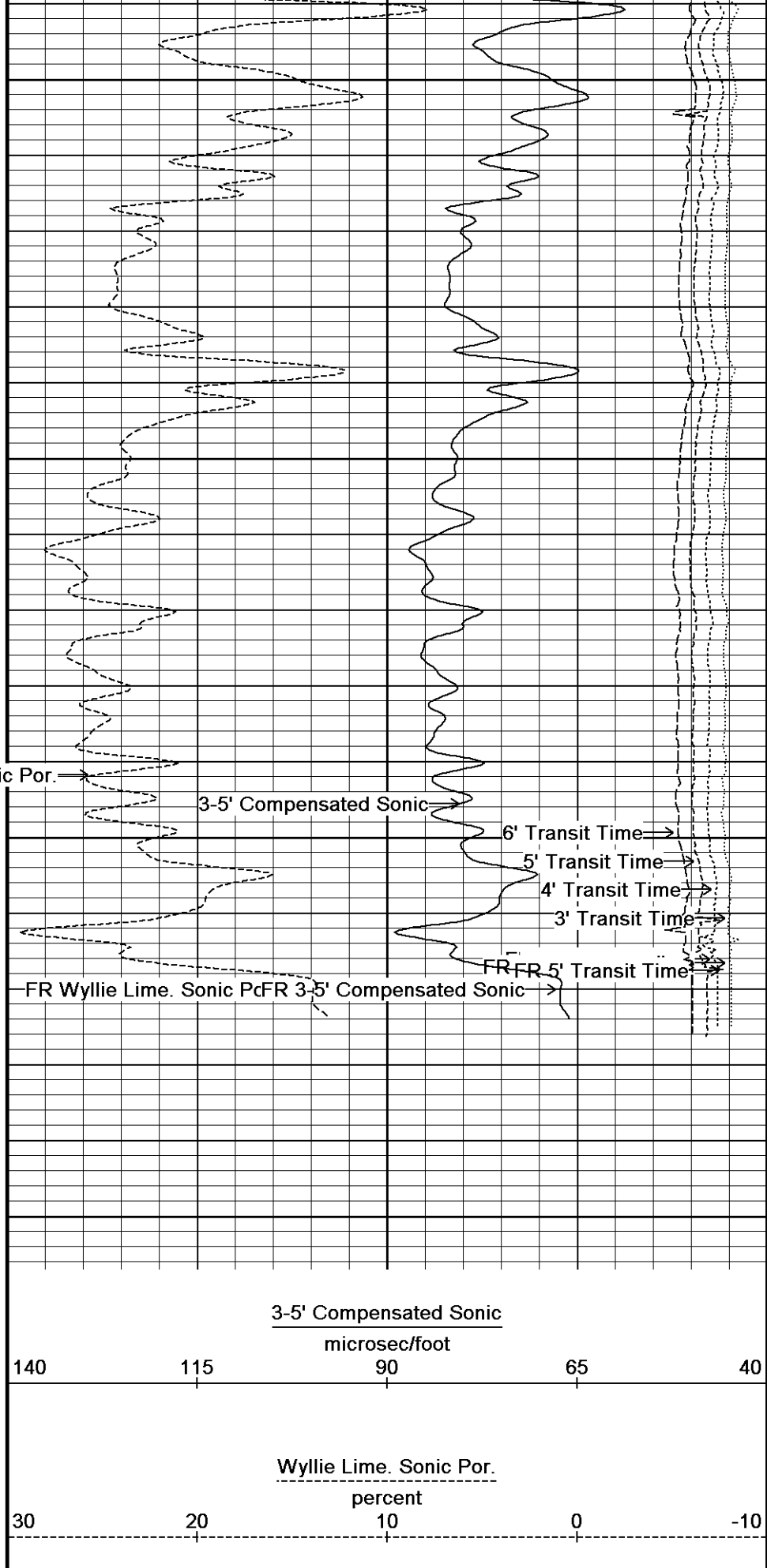
4550

120°

4600

4650

Depth
in
Feet



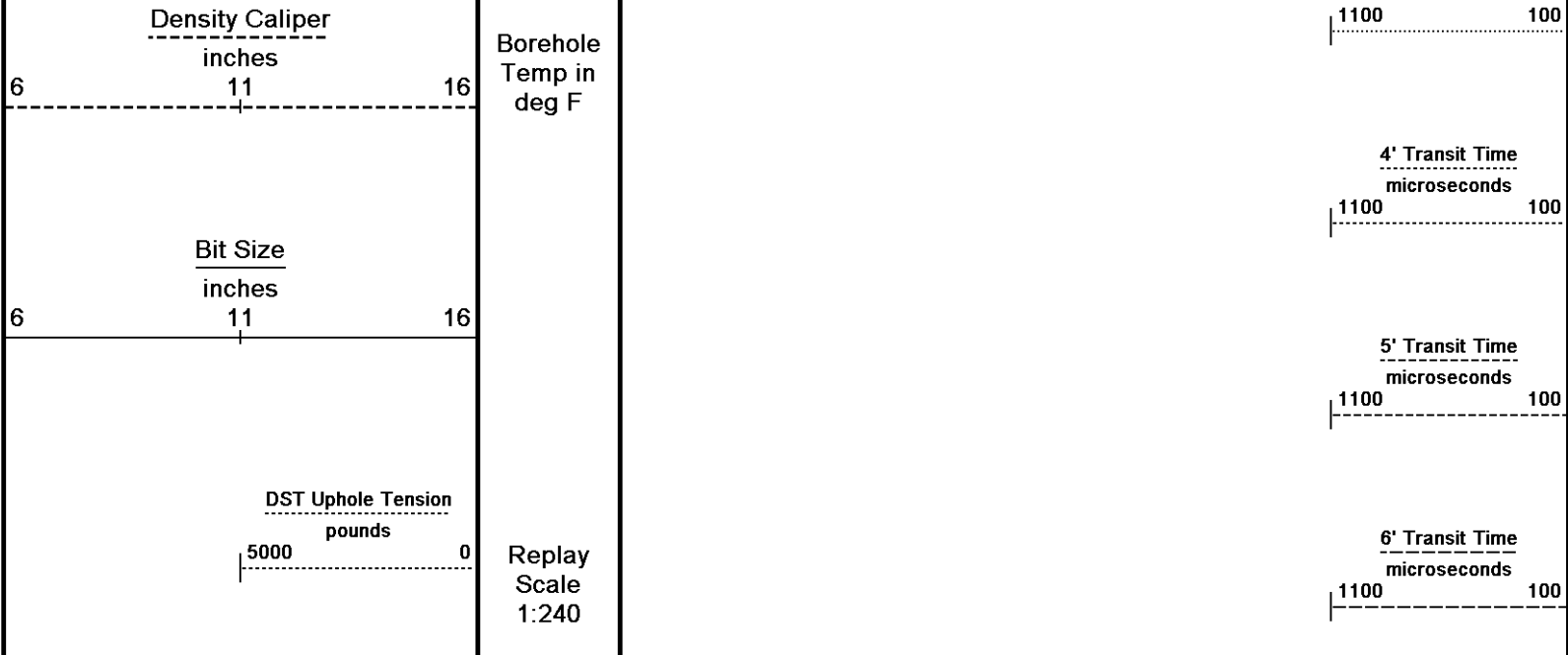
3-5' Compensated Sonic
microsec/foot

140 115 90 65 40

Wyllie Lime. Sonic Por.
percent

30 20 10 0 -10

3' Transit Time
microseconds



Depth Based Data - Maximum Sampling Increment 10.0cmPlotted on 20-MAY-2012 16:00

Filename: C:\Minimus 11.03.4044\Data\Grand Mesa Q-B 1-17\Grand Mesa Q-B 1-17_002.dtaRecorded on 20-MAY-2012 13:27

System Versions: Logged with 11.03.4044Processed with 11.03.4044Plotted with 11.03.4044

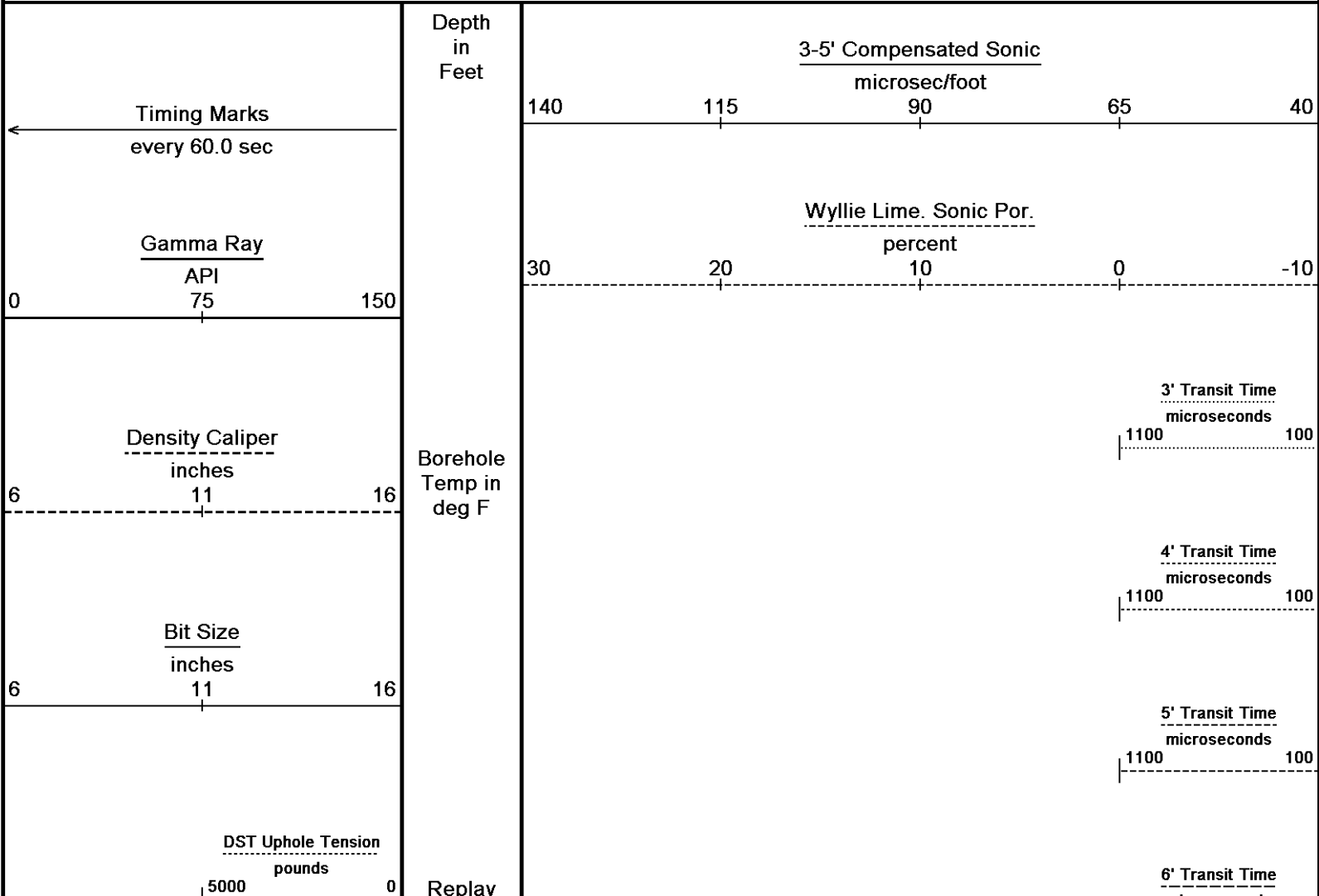
↑5 INCH MAIN PASS↑

↓5 INCH REPEAT PASS↓

Depth Based Data - Maximum Sampling Increment 10.0cmPlotted on 20-MAY-2012 16:00

Filename: C:\Minimus 11.03.4044\Data\Grand Mesa Q-B 1-17\Grand Mesa Q-B 1-17_001.dtaRecorded on 20-MAY-2012 13:06

System Versions: Logged with 11.03.4044Processed with 11.03.4044Plotted with 11.03.4044



Scale
1:240

1100 100
microseconds

4300

115°

4350

116°

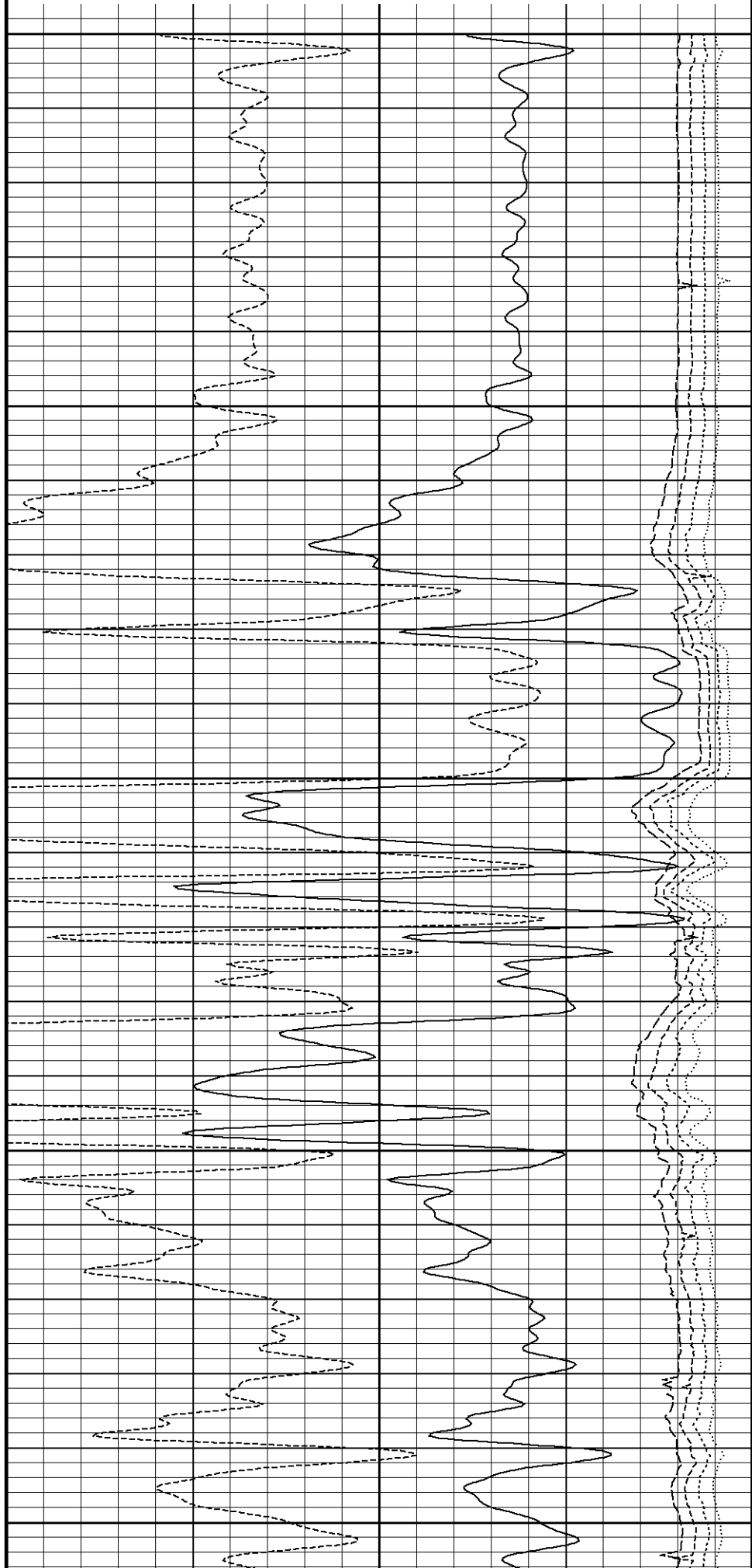
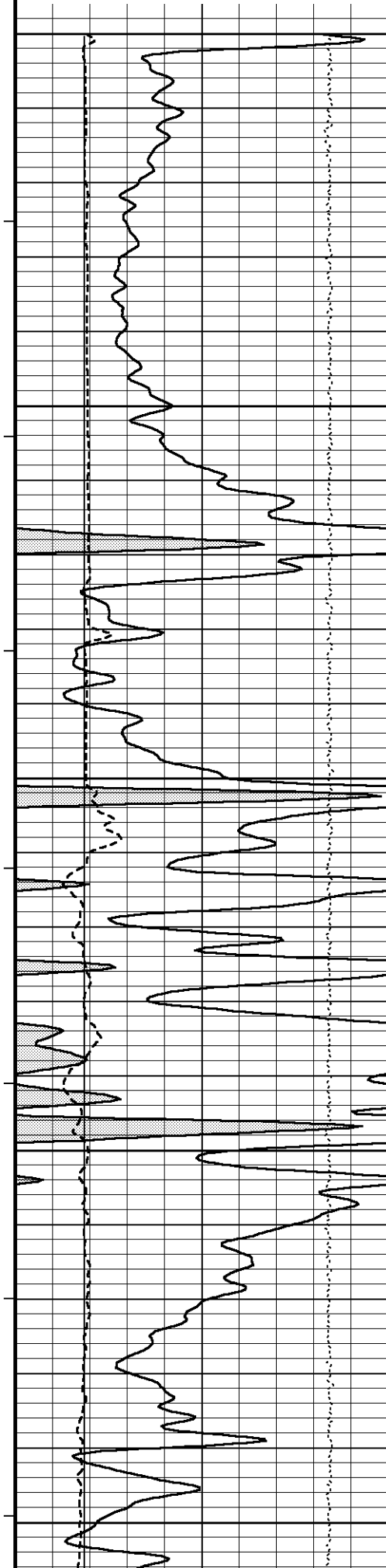
4400

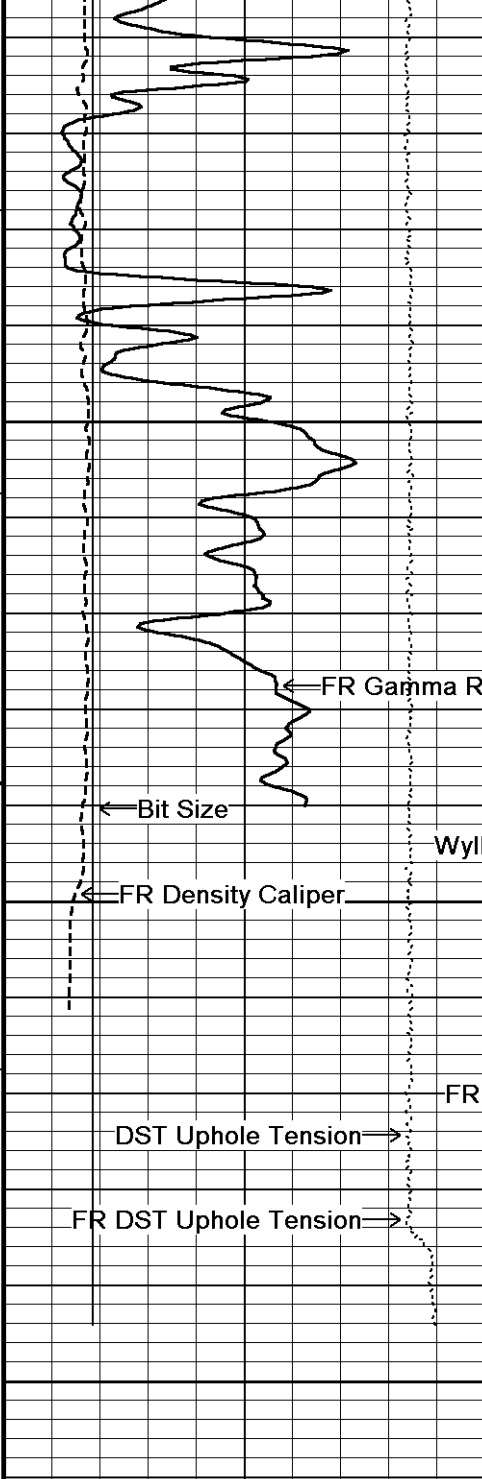
117°

4450

119°

4500





119°

4550

118°

4600

4650

4658

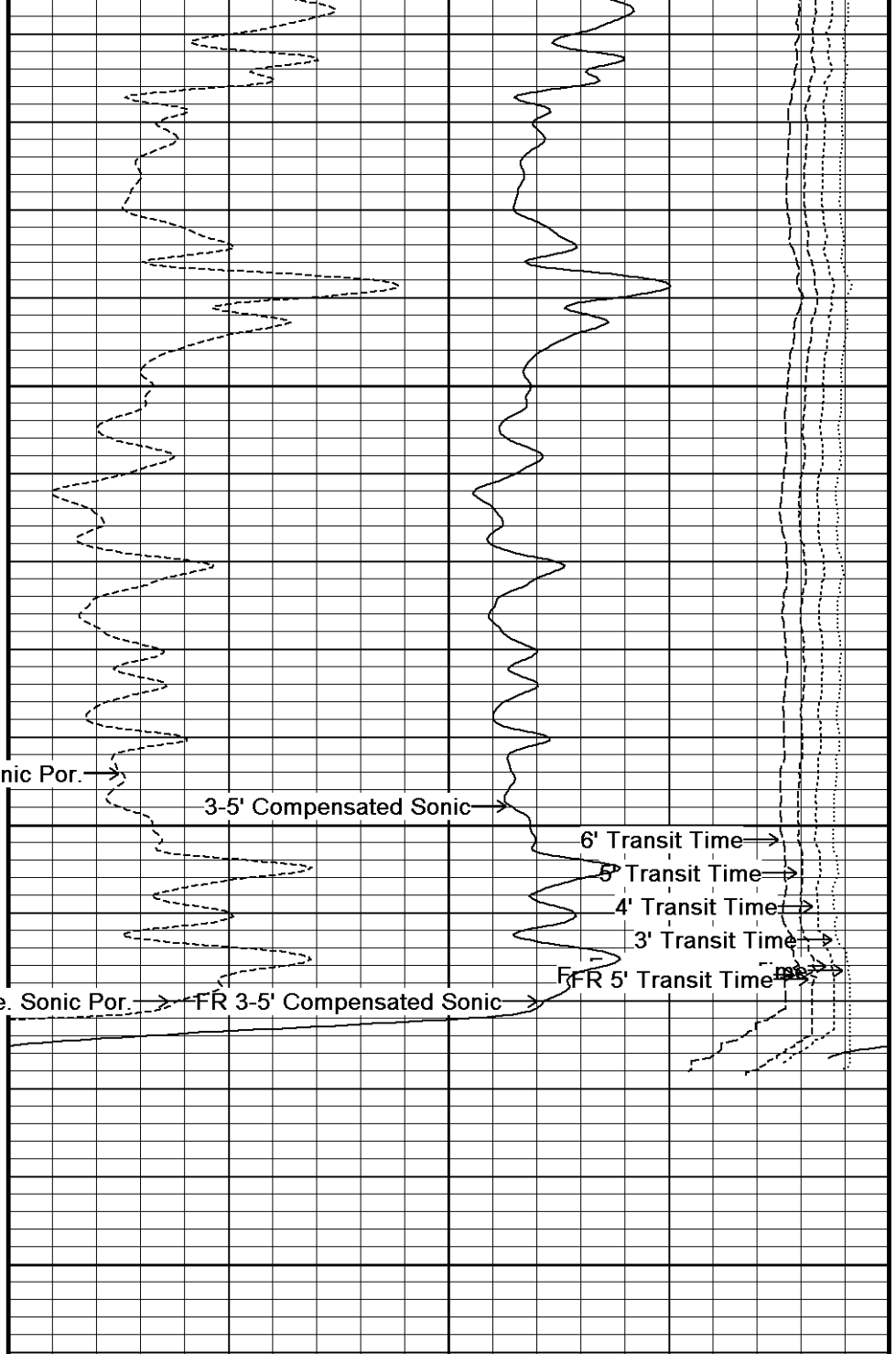
Depth
in
Feet

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150

Density Caliper
inches
6 11 16

Borehole
Temp in
deg F



Wyllie Lime. Sonic Por.

3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time

FR 5' Transit Time

FR Wyllie Lime. Sonic Por.

FR 3-5' Compensated Sonic

DST Uphole Tension

FR DST Uphole Tension

3-5' Compensated Sonic
microsec/foot

140 115 90 65 40

Wyllie Lime. Sonic Por.
percent

30 20 10 0 -10

3' Transit Time
microseconds

1100 100

4' Transit Time
microseconds

1100 100

Bit Size

inches

11

6

16

5' Transit Time
microseconds

1100 100

DST Uphole Tension
pounds

5000 0

Replay
Scale
1:240

6' Transit Time
microseconds

1100 100

Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 20-MAY-2012 16:00

Filename: C:\Minimus 11.03.4044\Data\Grand Mesa Q-B 1-17\Grand Mesa Q-B 1-17_001.dta

Recorded on 20-MAY-2012 13:06

System Versions: Logged with 11.03.4044 Processed with 11.03.4044 Plotted with 11.03.4044



5 INCH REPEAT PASS



BEFORE SURVEY CALIBRATION

C:\Minimus 11.03.4044\Data\Grand Mesa Q-B 1-17\Grand Mesa Q-B 1-17.dta

General Constants All 000

Last Edited on 20-MAY-2012,12:39

General Parameters

Mud Resistivity	0.880	ohm-metres
Mud Resistivity Temperature	93.000	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	5.500	inches
Caliper for Differential Caliper	Density Caliper	

Rwa Parameters

Porosity used	Limestone Density Por.
Resistivity used	Array Ind. One Res Rt
RWA Constant A	1.000
RWA Constant M	2.000

Down-hole Tension Calibration SMS 0

Field Calibration on 11-MAY-2012 11:47

Reading No	Measured	Calibrated (lbs)
1	13322.68	0.00
2	13679.25	383.60

Gamma Calibration MCG-C 84

Field Calibration on 20-MAY-2012 07:19

	Measured	Calibrated (API)
Background	71	48
Calibrator (Gross)	1143	773
Calibrator (Net)	1073	725

Gamma Constants MCG-C 84

Last Edited on 20-MAY-2012,12:40

Gamma Calibrator Number	grc38	
Mud Density	1.10	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 01-MAY-2012 02:00

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

High Resolution Temperature Calibration MCG-C 84

Field Calibration on 01-MAY-2012,03:10

	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

Caliper Calibration MML-A 16

Base Calibration on 09-MAY-2012 08:19

Field Calibration on 20-MAY-2012 07:11

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	14458	5.98
2	17779	7.97
3	21092	9.86
4	25087	11.92
5	0	0.00
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	6.02	5.98

Micro Normal and Micro Inverse Calibration MML-A 16

Base Calibration on 09-MAY-2012 08:25

Field Check on 20-MAY-2012 07:13

Base Calibration				
		Measured	Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.2	60.2	5.0	25.0
Micro Inverse	15.6	78.3	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 16

Last Edited on 18-MAY-2012,04:40

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 65

Base Calibration on 27-APR-2012 16:25

Field Check on 20-MAY-2012 07:37

Base Calibration				
		Measured	Calibrated (cps)	
	Near	Far	Near	Far
	3227	100	3714	110
Ratio	32.312		33.764	
Field Calibrator at Base				
			Calibrated (cps)	
			1605	2333
Ratio	0.688			
Field Check				
			Calibrated (cps)	
			1579	2286
Ratio	0.691			

Neutron Constants MDN-A.B 65

Last Edited on 20-MAY-2012,07:19

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	

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

High Resolution Temperature Calibration MAI-A.A 45

Field Calibration on 12-JAN-2012,13:36

	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
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Induction Calibration MAI-A.A 45

Base Calibration on 12-JAN-2012,13:34

Field Check on 20-MAY-2012 06:59

Base Calibration

Test Loop Calibration

Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	14.4	472.6	9.3	966.2
2	5.7	374.0	7.6	821.4
3	3.4	261.2	5.2	566.0
4	2.5	133.9	2.6	279.2

Array Temperature	79.4	Deg F
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Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	18.5	3851.8
2	0.0	0.0	31.7	3630.1
3	0.0	0.0	28.7	3050.0
4	0.0	0.0	18.3	2079.5
Deep	0.0	0.0	16.1	1911.5
Medium	0.0	0.0	42.6	4061.6
Shallow	0.0	0.0	49.6	5484.3

Array Temperature	0.0	67.3	Deg F
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Induction Constants MAI-A.A 45

Last Edited on 20-MAY-2012,06:57

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	

Caliper Calibration MPD-B 59

Base Calibration on 16-MAY-2012 14:32

Field Calibration on 20-MAY-2012 07:02

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	19200	3.99
2	29152	5.98
3	39216	7.97
4	48949	9.86
5	60064	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.94	5.98

Photo Density Calibration MPD-B 59

Base Calibration on 16-MAY-2012 14:49

Field Check on 20-MAY-2012 07:09

Density Calibration

Base Calibration	Near	Measured Far	Calibrated (sdu)	
			Near	Far
Reference 1	49293	24802	59556	30836
Reference 2	20819	2436	24941	2541

Field Check at Base

1213.5	1290.5
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Field Check

1207.8	1289.0
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PE Calibration

Base Calibration	WS	Measured		Calibrated Ratio
		WH	Ratio	
Background	220	1092		
Reference 1	18022	49118	0.371	0.371
Reference 2	5449	20689	0.267	0.272

Field Check at Base

220.3	1091.9
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Field Check

218.1	1085.7
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Density Constants MPD-B 59

Last Edited on 20-MAY-2012,12:40

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	1.10	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	

DOWNHOLE EQUIPMENT

C:\Minimus 11.03.4044\Data\Grand Mesa Q-B 1-17\Grand Mesa Q-B 1-17.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 16 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Micro-log
MML-A 16 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 59 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

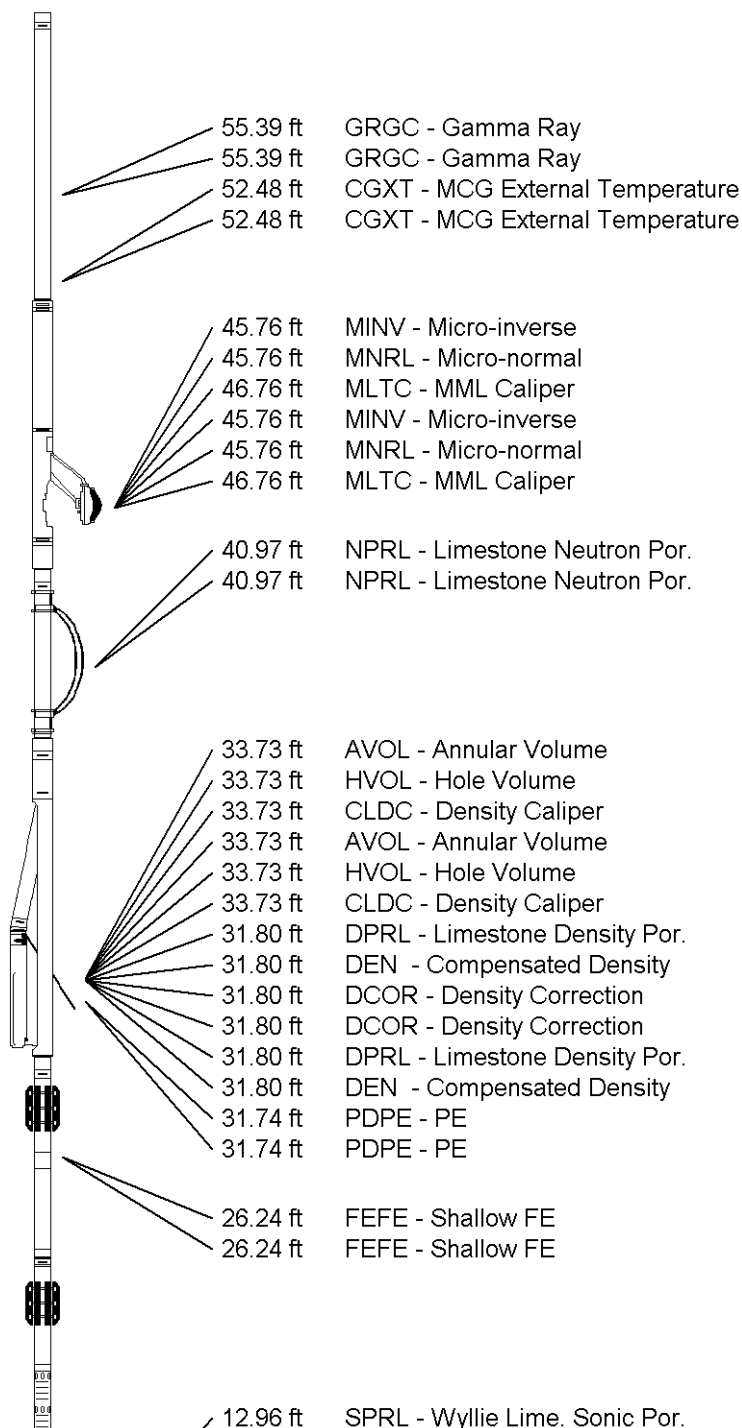
Compact Density/Caliper
MPD-B 59 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

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

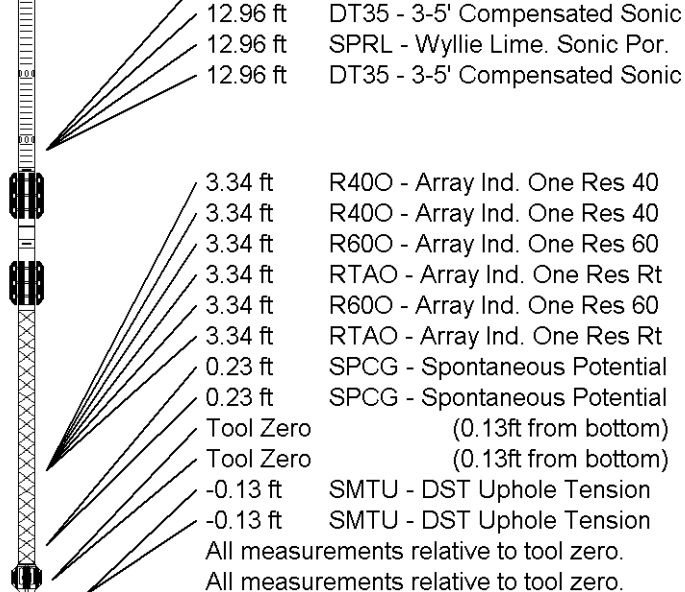
MAI-A.A 45 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

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



COMPANY	GRAND MESA OPERATING COMPANY
WELL	Q-B #1-17
FIELD	WILDCAT
PROVINCE/COUNTY	GOVE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2649.00	feet	First Reading	4620.00	feet
Elevation Drill Floor	2648.00	feet	Depth Driller	4632.00	feet
Elevation Ground Level	2644.00	feet	Depth Logger	4633.00	feet



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