

**Weatherford****COMPENSATED SONIC
WITH INTEGRATED TRANSIT TIME**

COMPANY

SHAKESPEARE OIL COMPANY, INC.

WELL

FREY 3-9

FIELD

STRATFORD WEST

PROVINCE/COUNTY

LOGAN

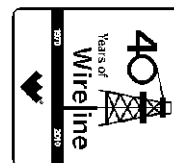
COUNTRY/STATE

U.S.A./KANSAS

LOCATION

2520' FSL & 1000' FEL

SE/4



SEC	TWP	RGE	Other Services
9	13S	32W	MAI/MFE MPD/MDN MML
API Number 15-109-20993			
Permit Number			
Permanent Datum G.L., Elevation 2989 feet			
Log Measured From K.B. @ 10 FEET above Permanent Datum			
Drilling Measured From K.B.			
Date	02-MAY-2011		Elevations: KB 2999.00 DF 2997.00 GL 2989.00
Run Number	ONE		
Depth Driller	4710.00	feet	
Depth Logger	4706.00	feet	
First Reading	4693.00	feet	
Last Reading	224.00	feet	
Casing Driller	224.00	feet	
Casing Logger	224.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.40 lb/USg	57.00 CP	
PH / Fluid Loss	9.50	9.60 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	1.25 @ 75.0	ohm-m	
Rmf @ Measured Temp	1.0 @ 75.0	ohm-m	
Rmc @ Measured Temp	1.50 @ 75.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.83 @ 113.0	ohm-m	
Time Since Circulation	4 hours		
Max Recorded Temp	113.00	deg F	
Equipment Name	COMPACT		
Equipment / Base	13025	LIB	
Recorded By	S. TOTTEY		
Witnessed By	STEVE DAVIS		
S.O. #/JOB #	3529184		LB11-097

BOREHOLE RECORD

Last Edited: 02-MAY-2011 06:45

Bit Size inches	Depth From feet	Depth To feet
7.875	224.00	4710.00

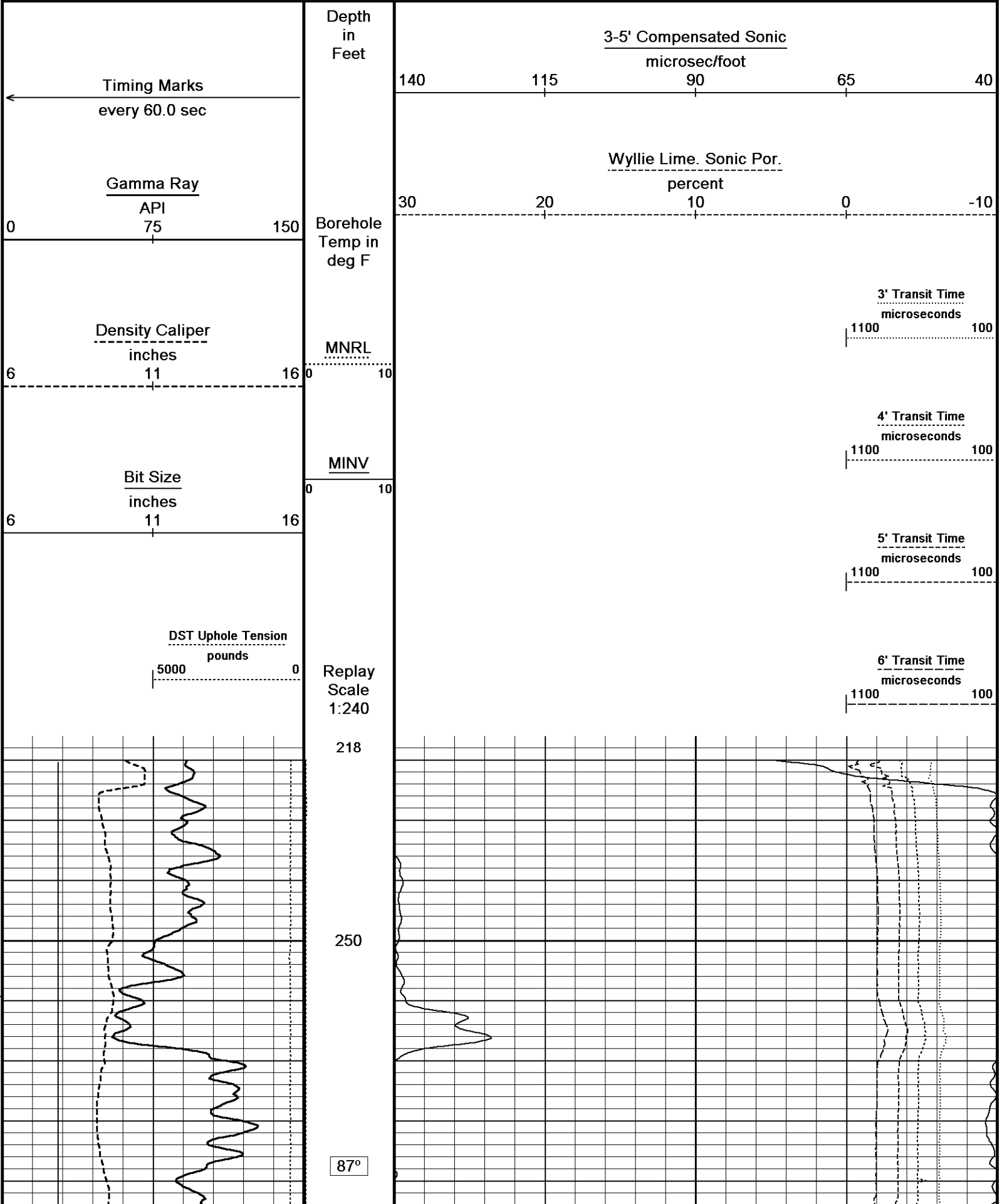
CASING RECORD

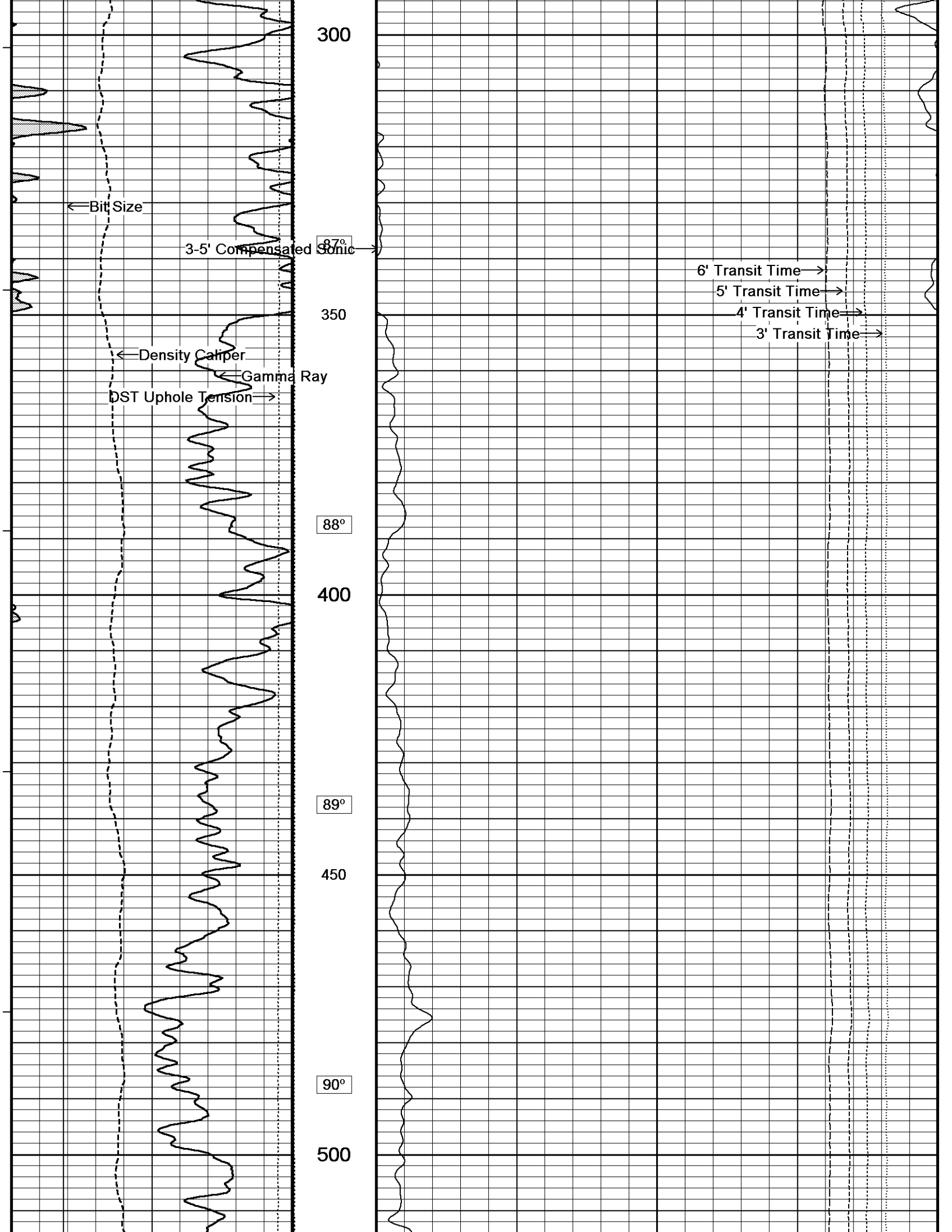
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	224.00	24.00

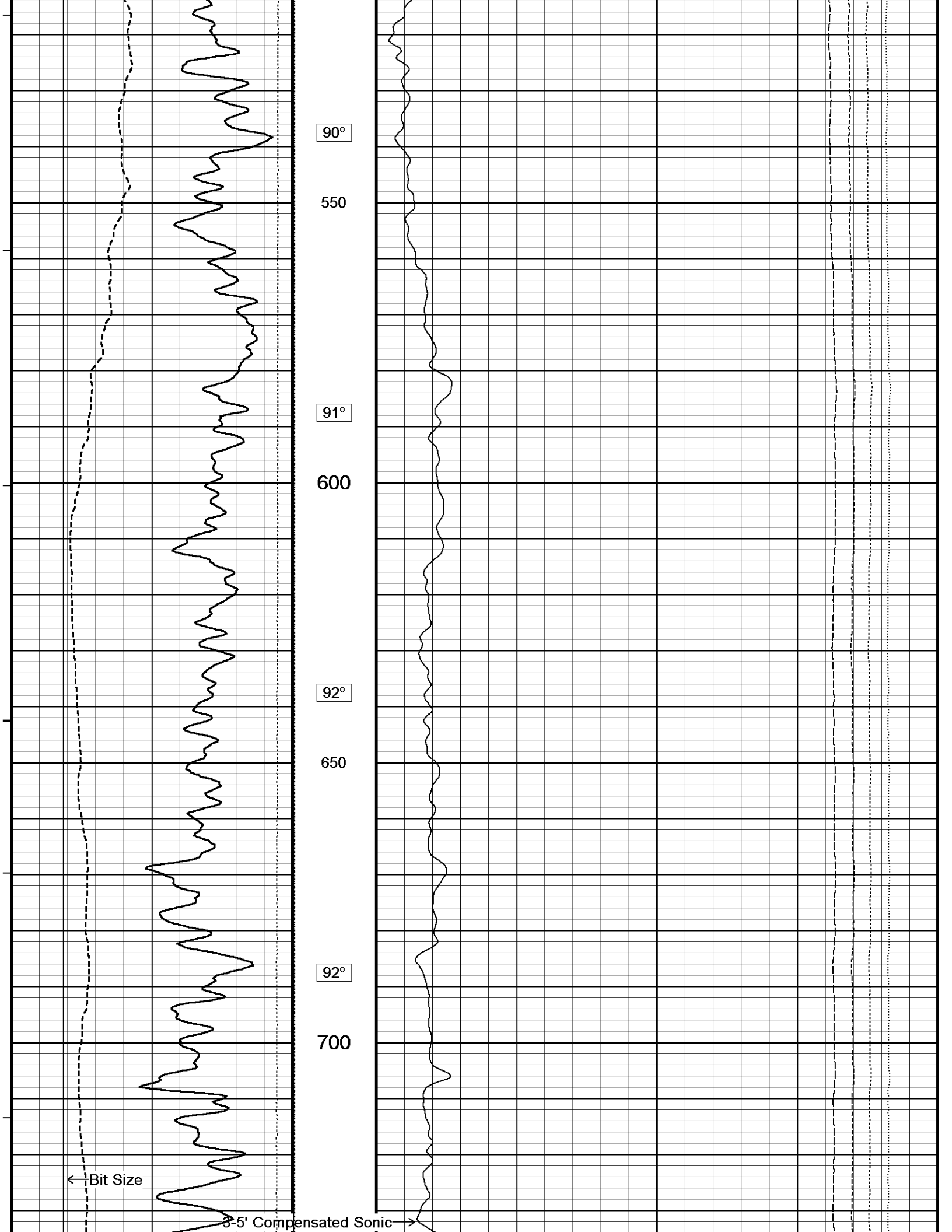
REMARKS

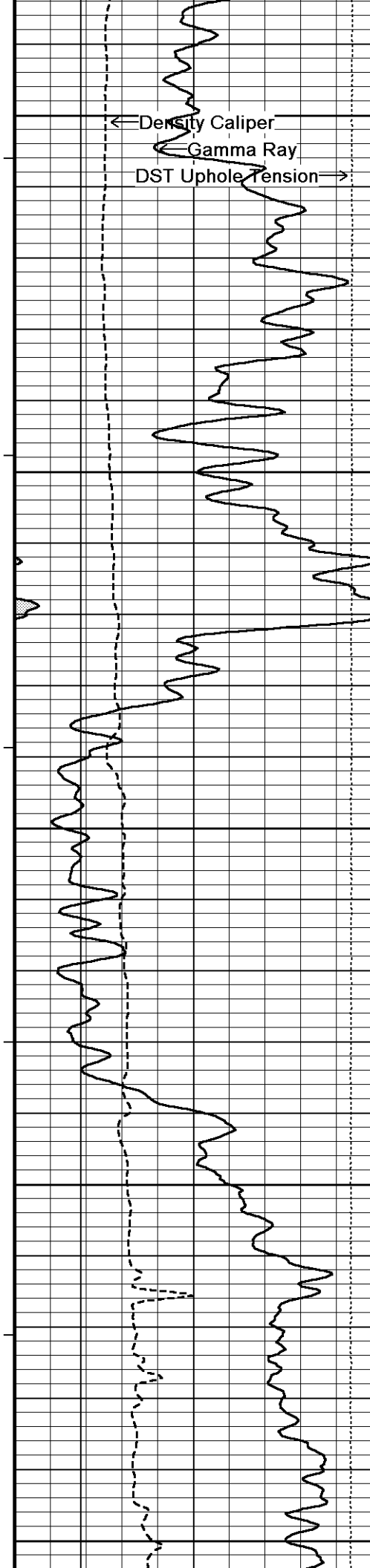
ols Used: MAI, MPD, MCG, MDN, MML, MFE, SKJ, MSS
Hardware: MPD: 8 inch profile plate. MAI, MSS and MFE: 0.5 Inch standoffs used. MDN: Dual Bowspring used.
2.71 G/CC Limestone density matrix used to calculate porosity.
Sonic porosity calculated on a limestone scale (47.5 usec/ft).
Borehole rugosity, tight pulls, and washouts will affect data quality.
All intervals logged and scaled per customer's request.
Annular volume with 5.5 inch production casing = cu. ft.
Service order #3529184
Rig: H-D Drilling #2
Engineer: S. Tottey, A. Sill
Operator(s): J. LaPoint

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.

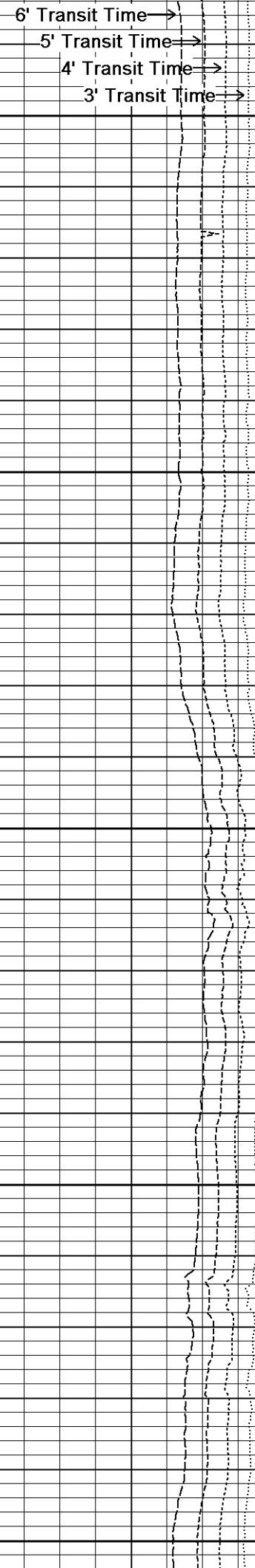
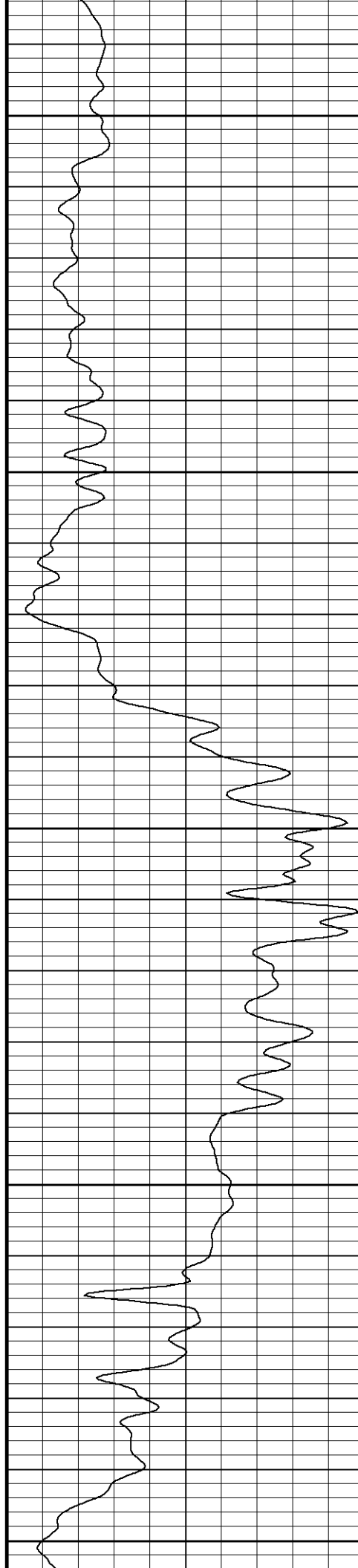




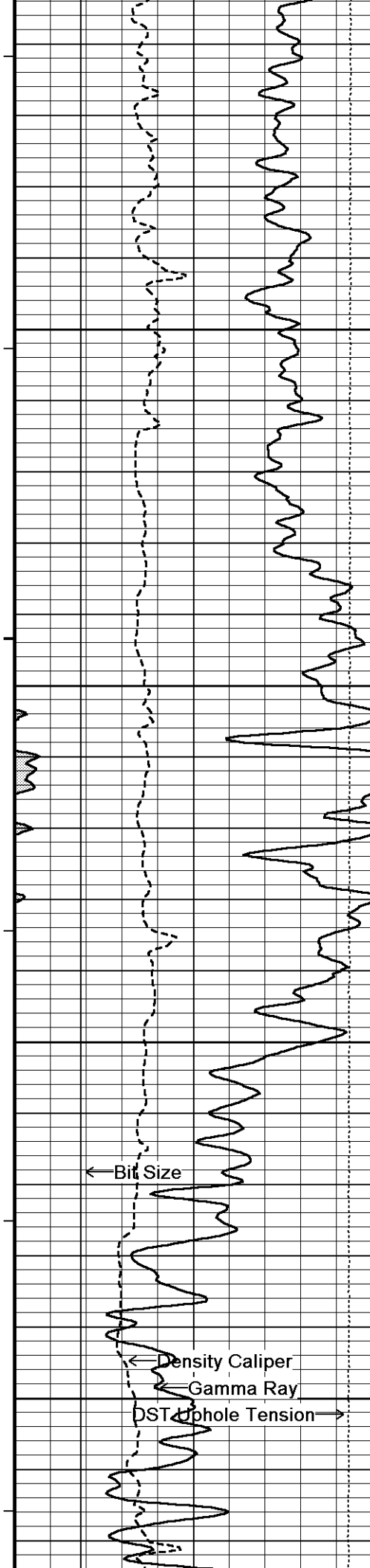




92° 750 92° 800 93° 850 93° 900 93° 950



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



94°

1000

94°

1050

95°

1100

← Bit Size

← Density Caliper

← Gamma Ray

← DST Uphole Tension →

95°

1150

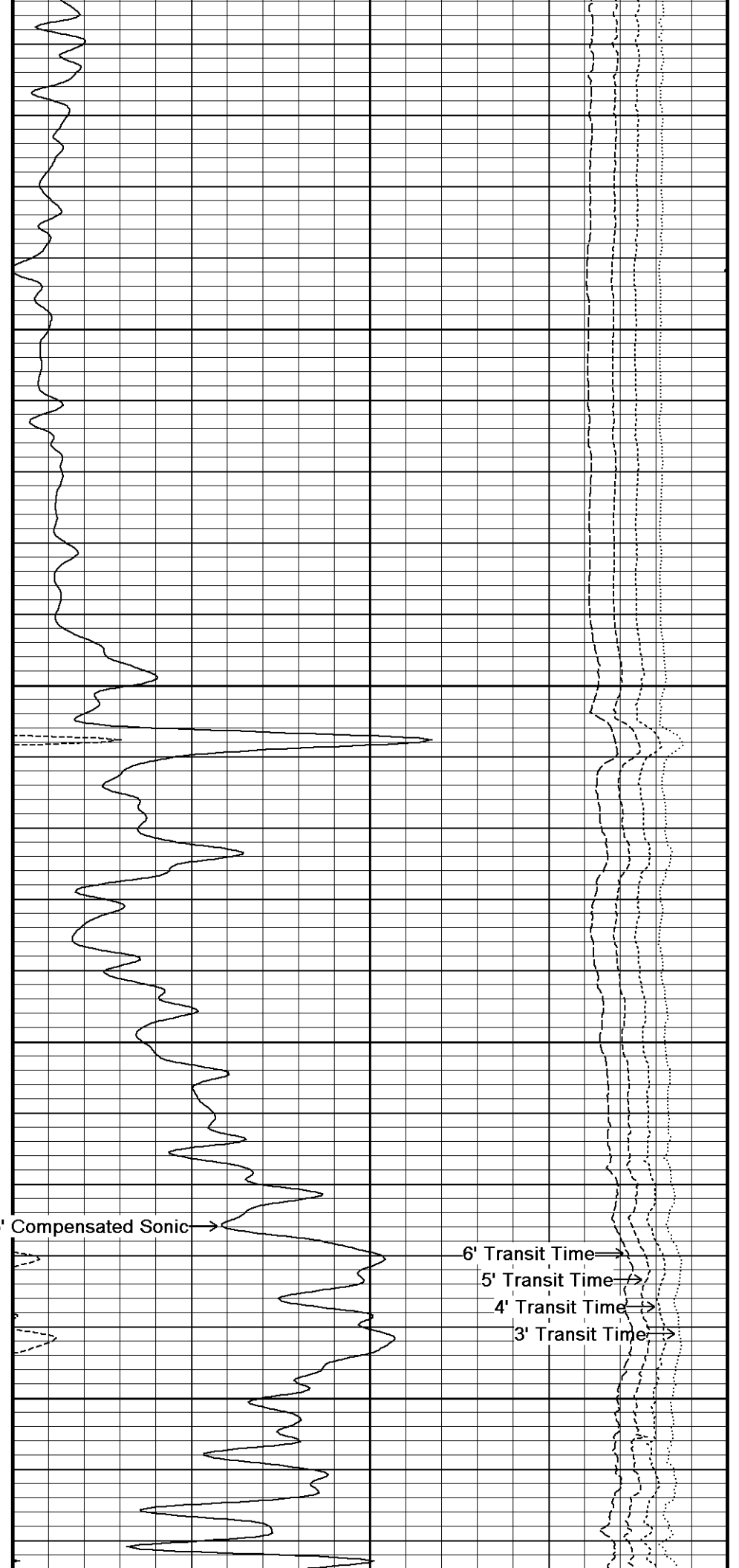
3-5' Compensated Sonic →

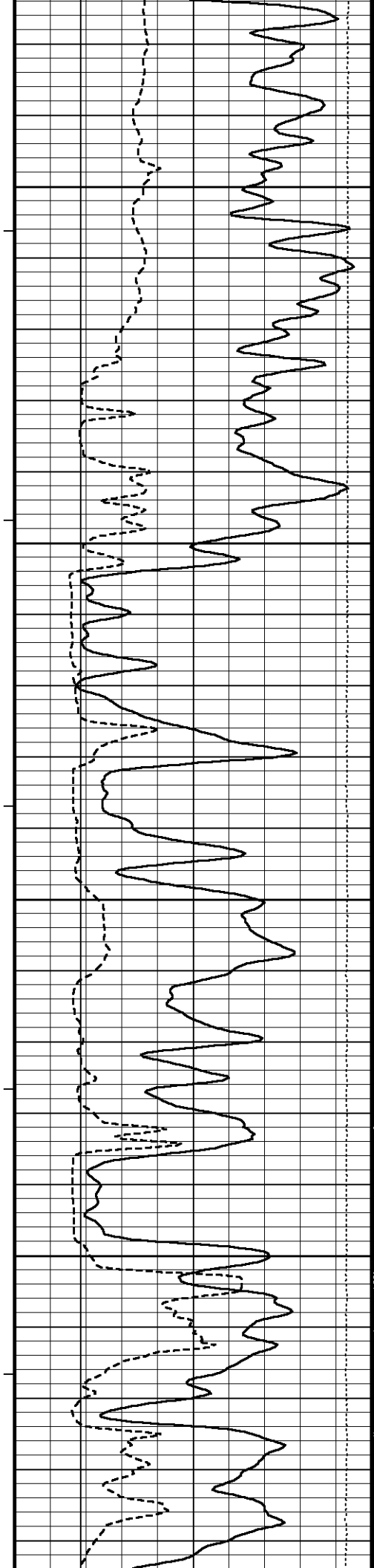
6' Transit Time →

5' Transit Time →

4' Transit Time →

3' Transit Time →





95°

1200

96°

1250

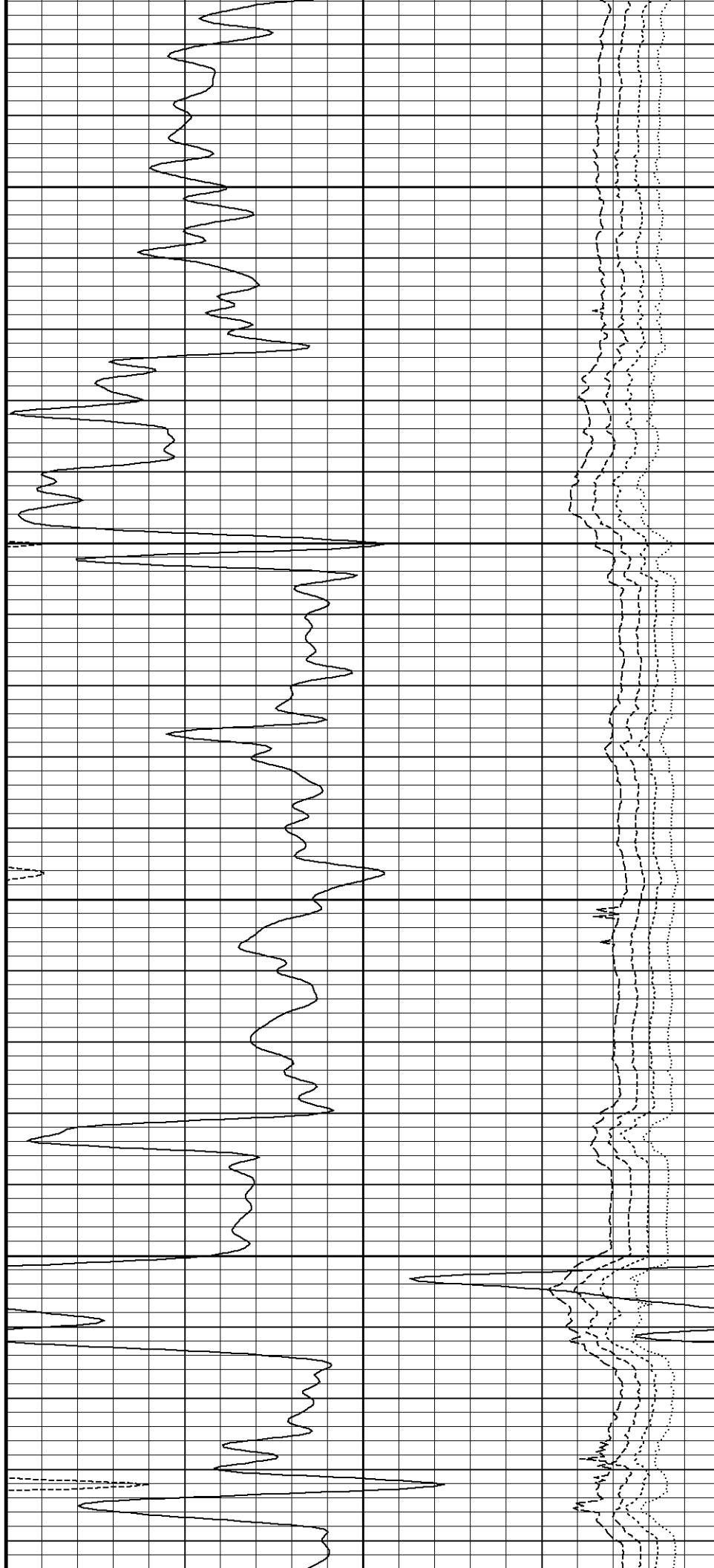
96°

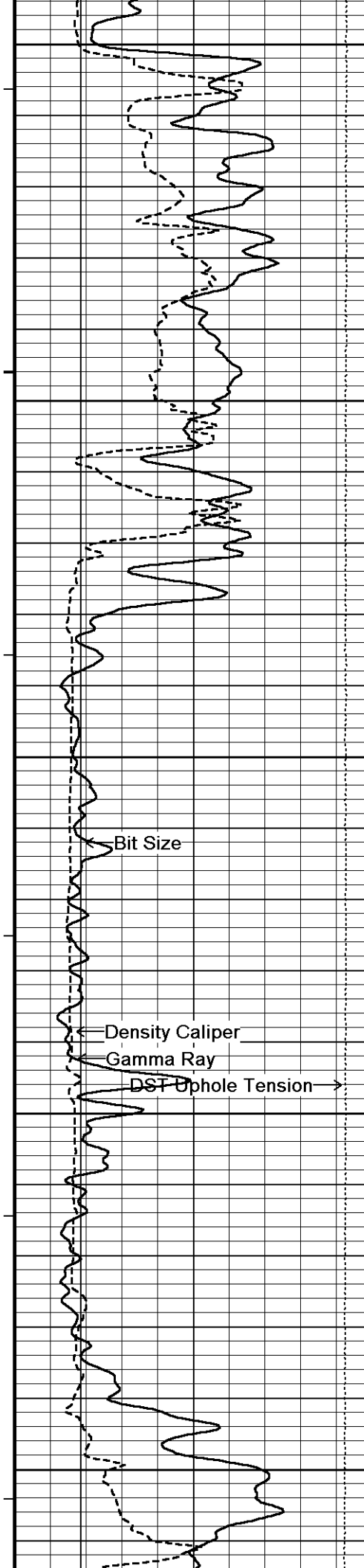
1300

96°

1350

96°





1400

97°

1450

97°

1500

Bit Size

Density Caliper

Gamma Ray

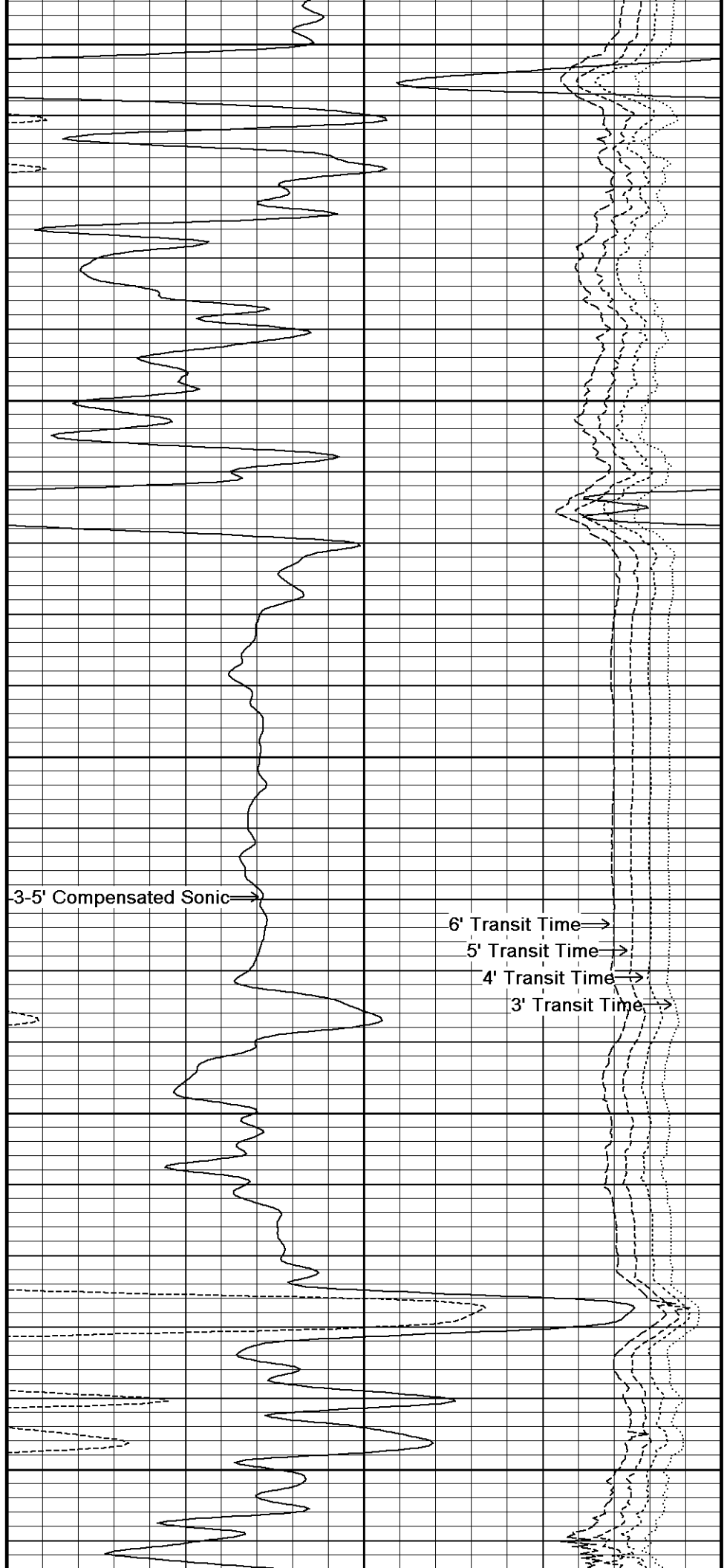
DST Uphole Tension

97°

1550

97°

1600



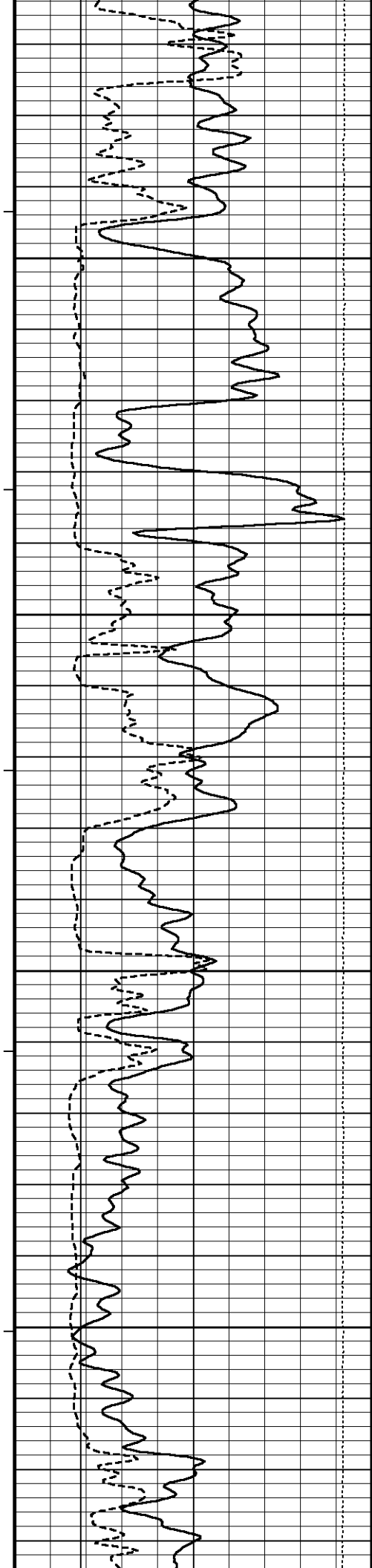
3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time



97°

1650

98°

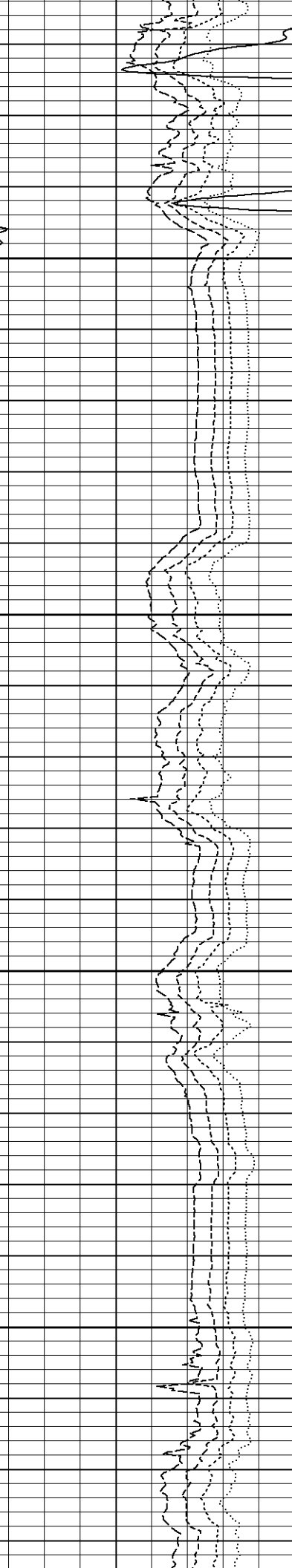
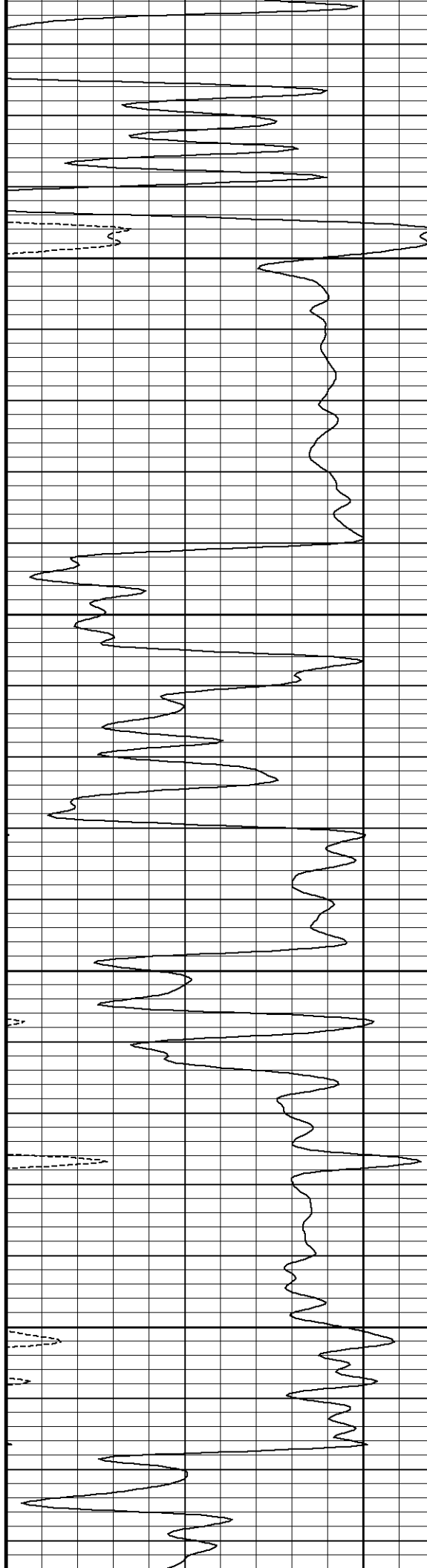
1700

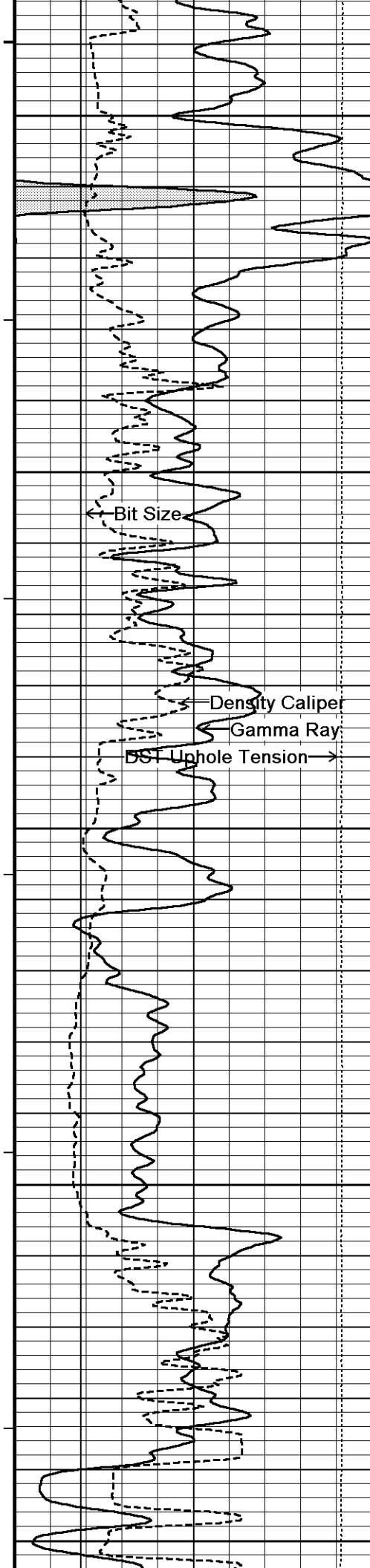
98°

1750

98°

1800





98"

1850

99"

1900

99"

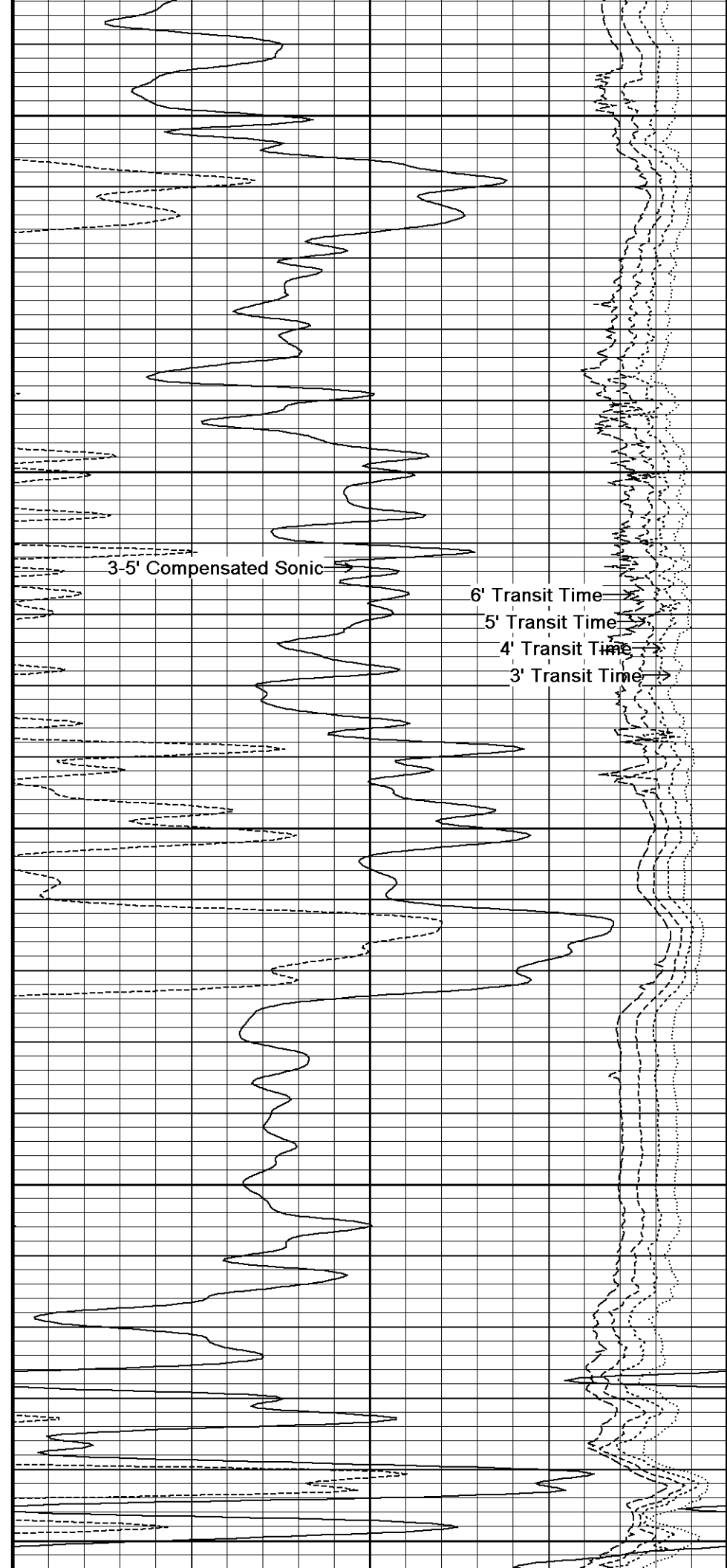
1950

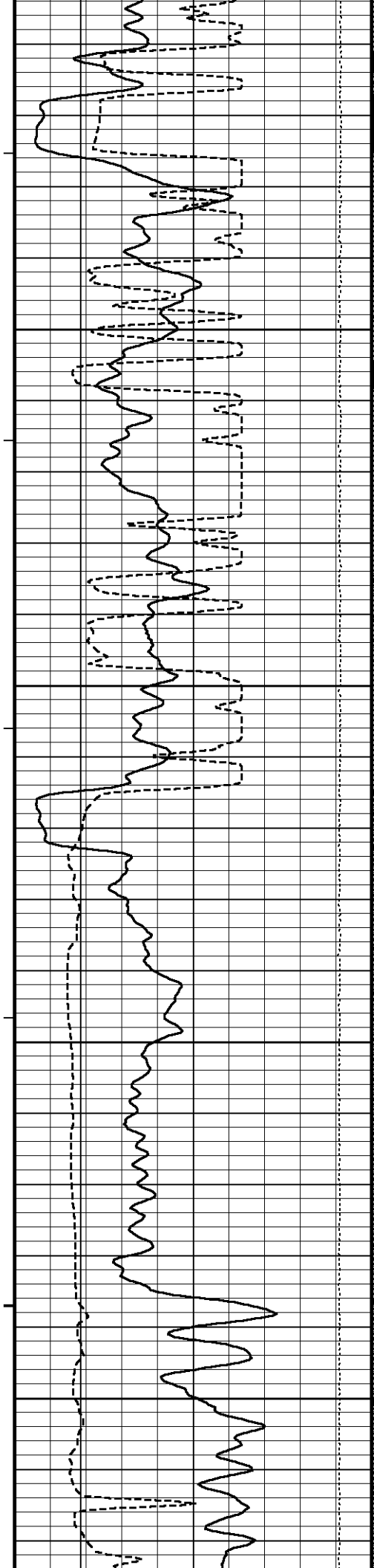
99"

2000

100"

2050





100°

2100

100°

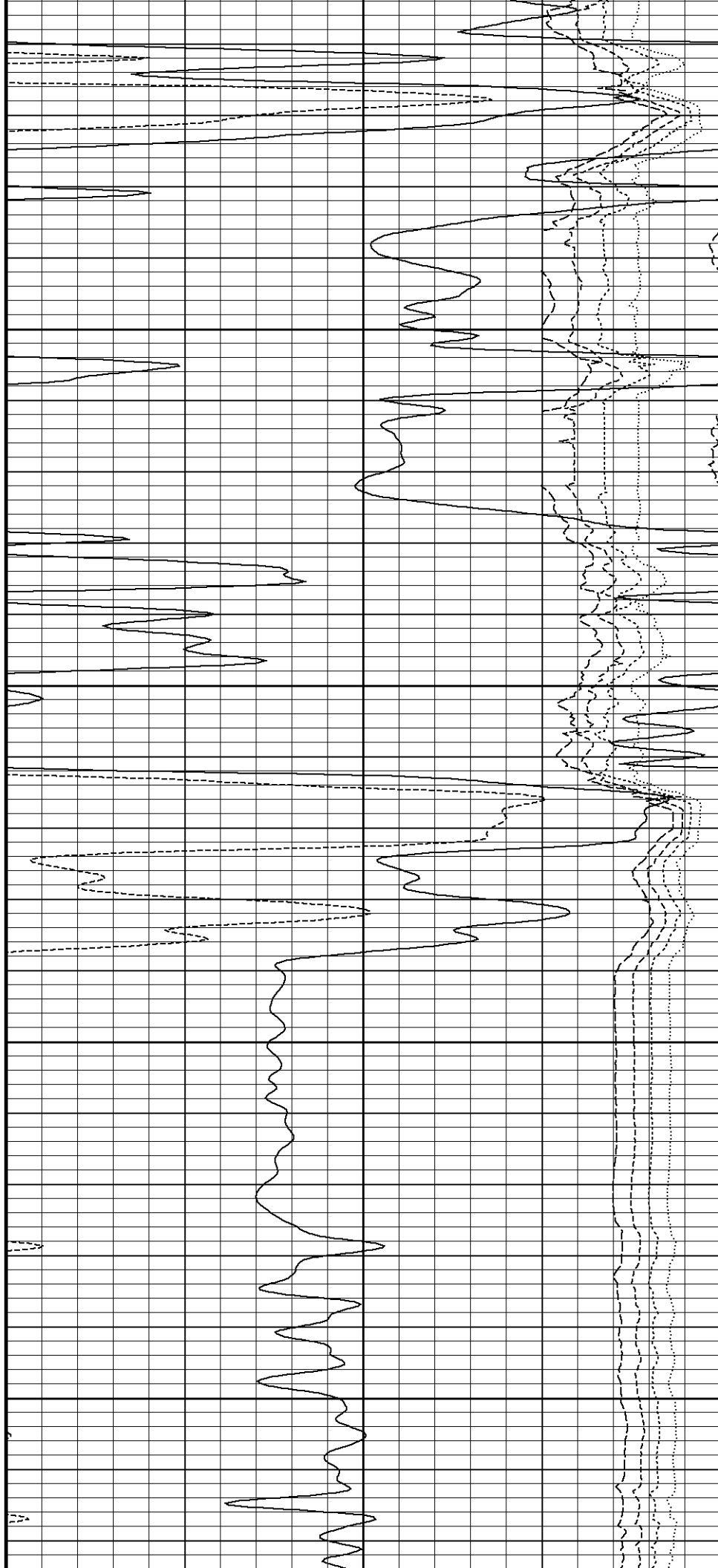
2150

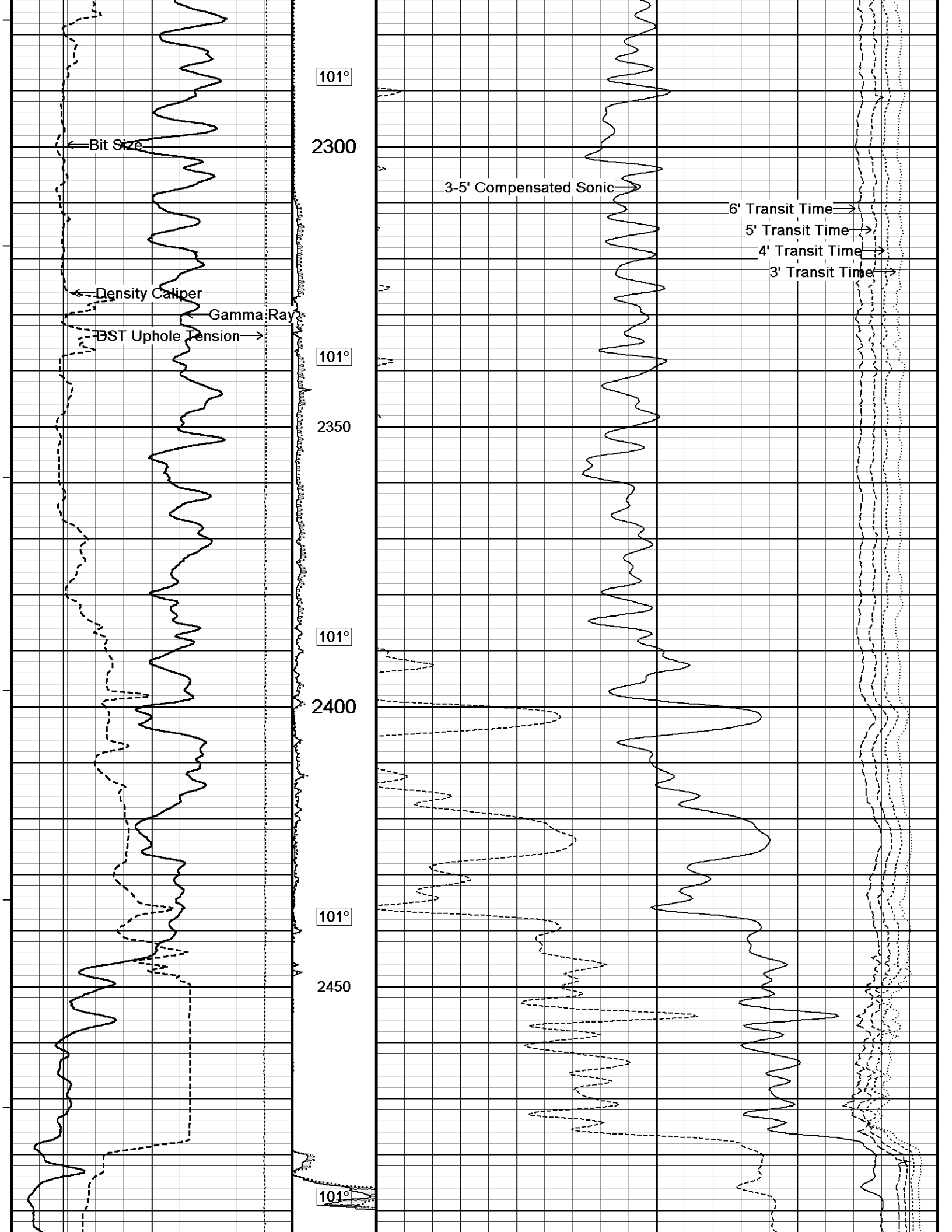
100°

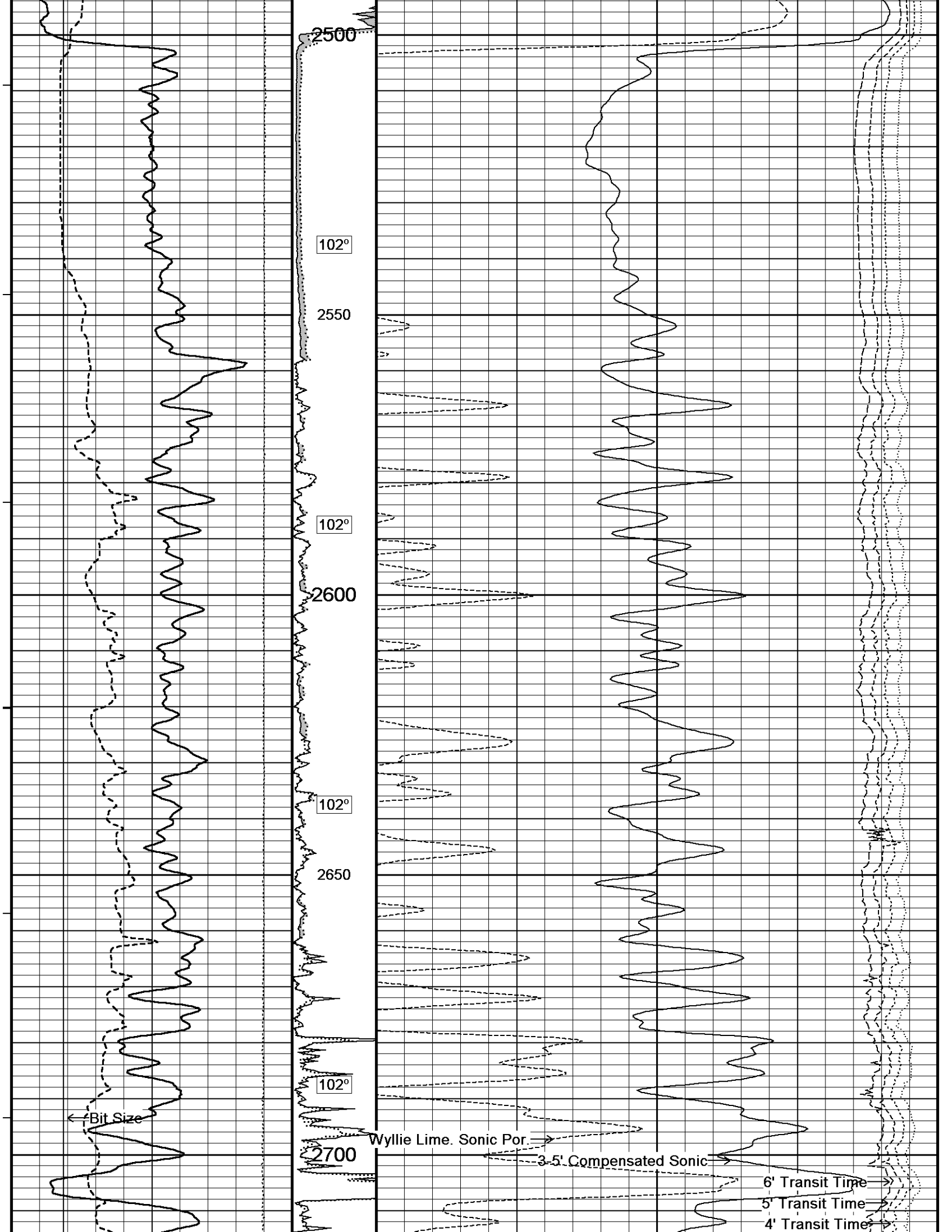
2200

100°

2250







Density Caliper
Gamma Ray
DST Uphole Tension

3' Transit Time

103°

2750

103°

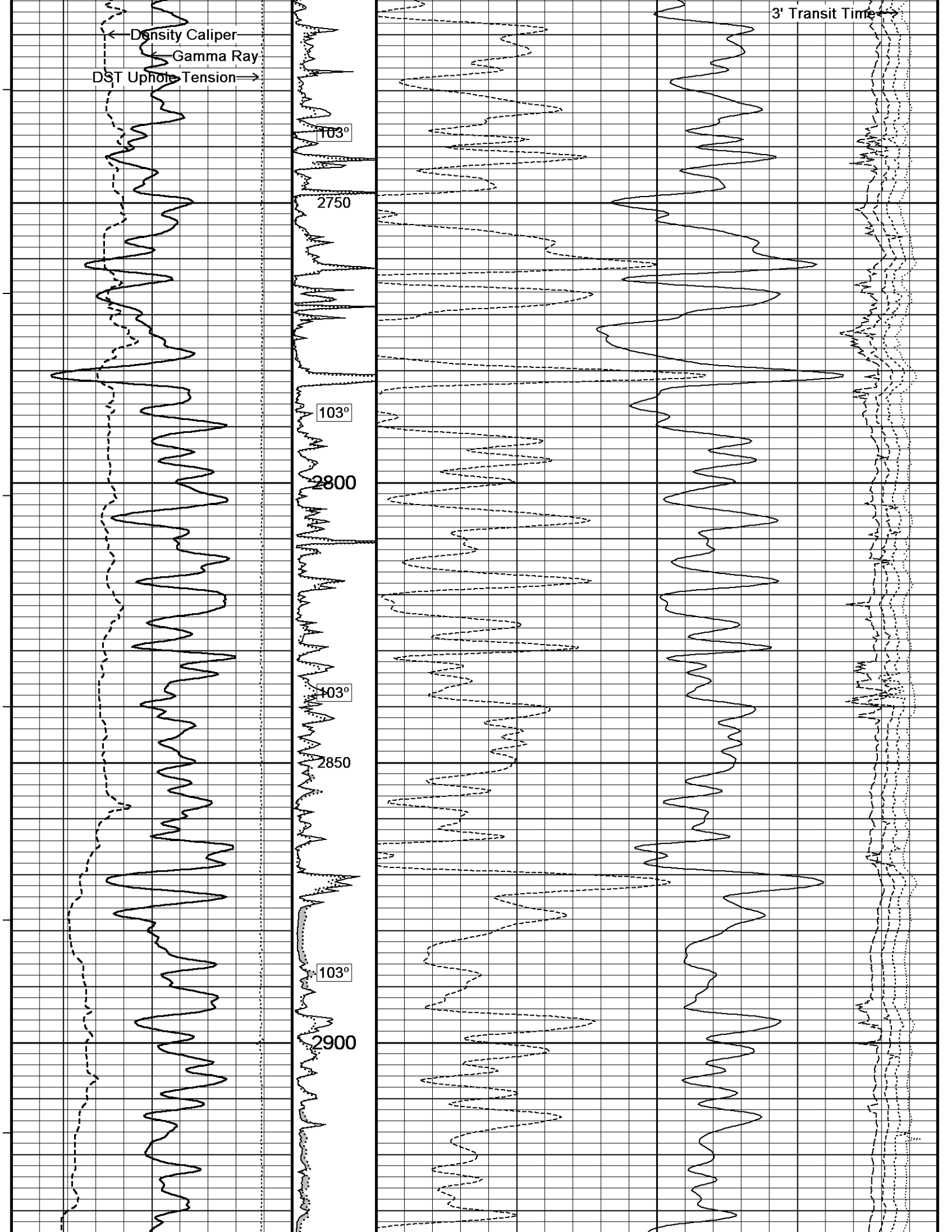
2800

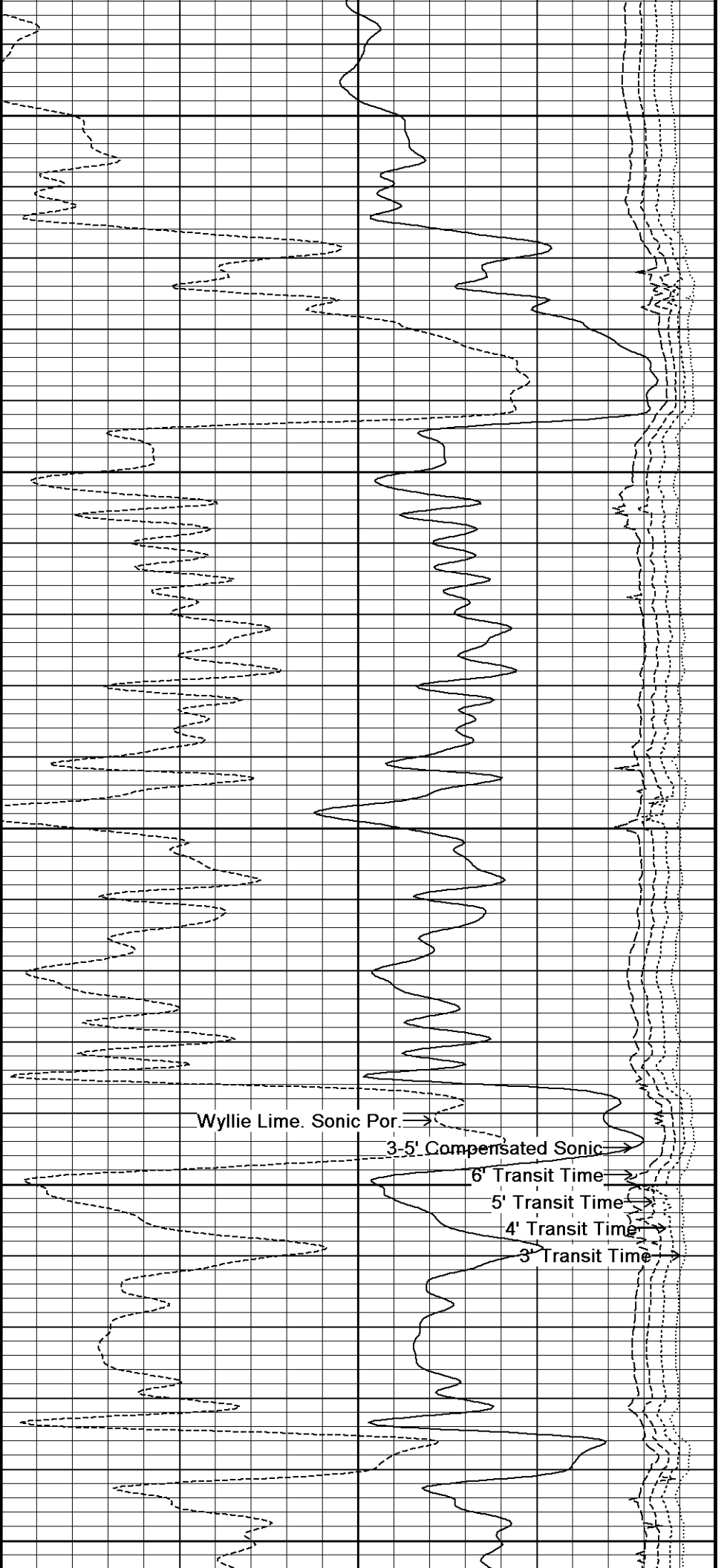
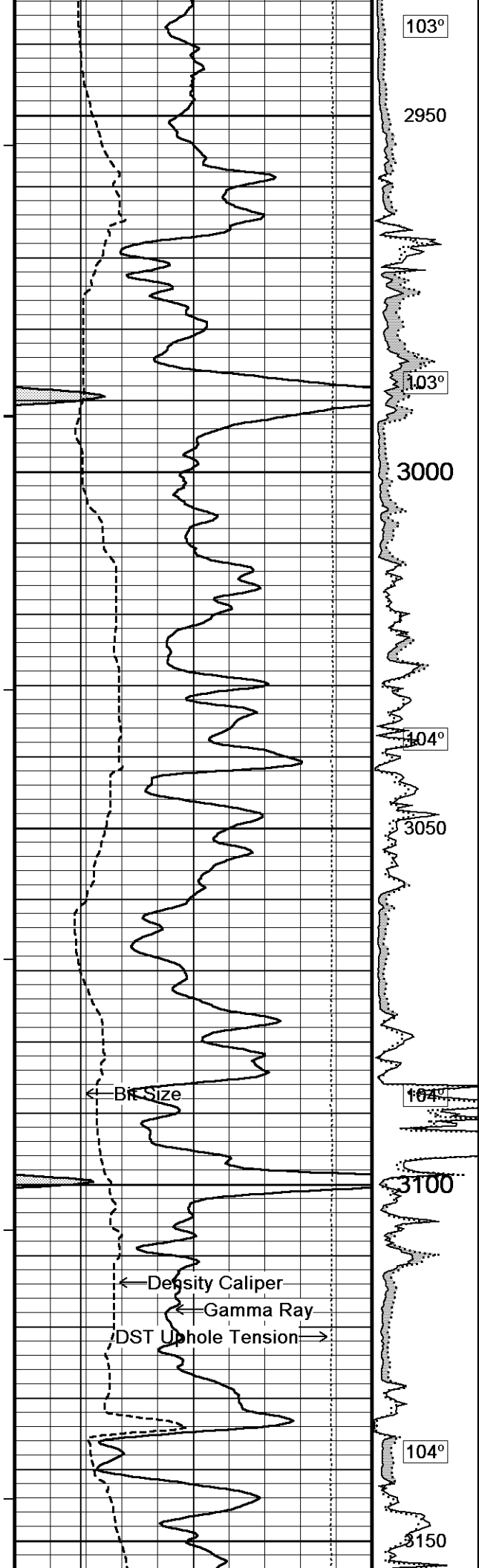
103°

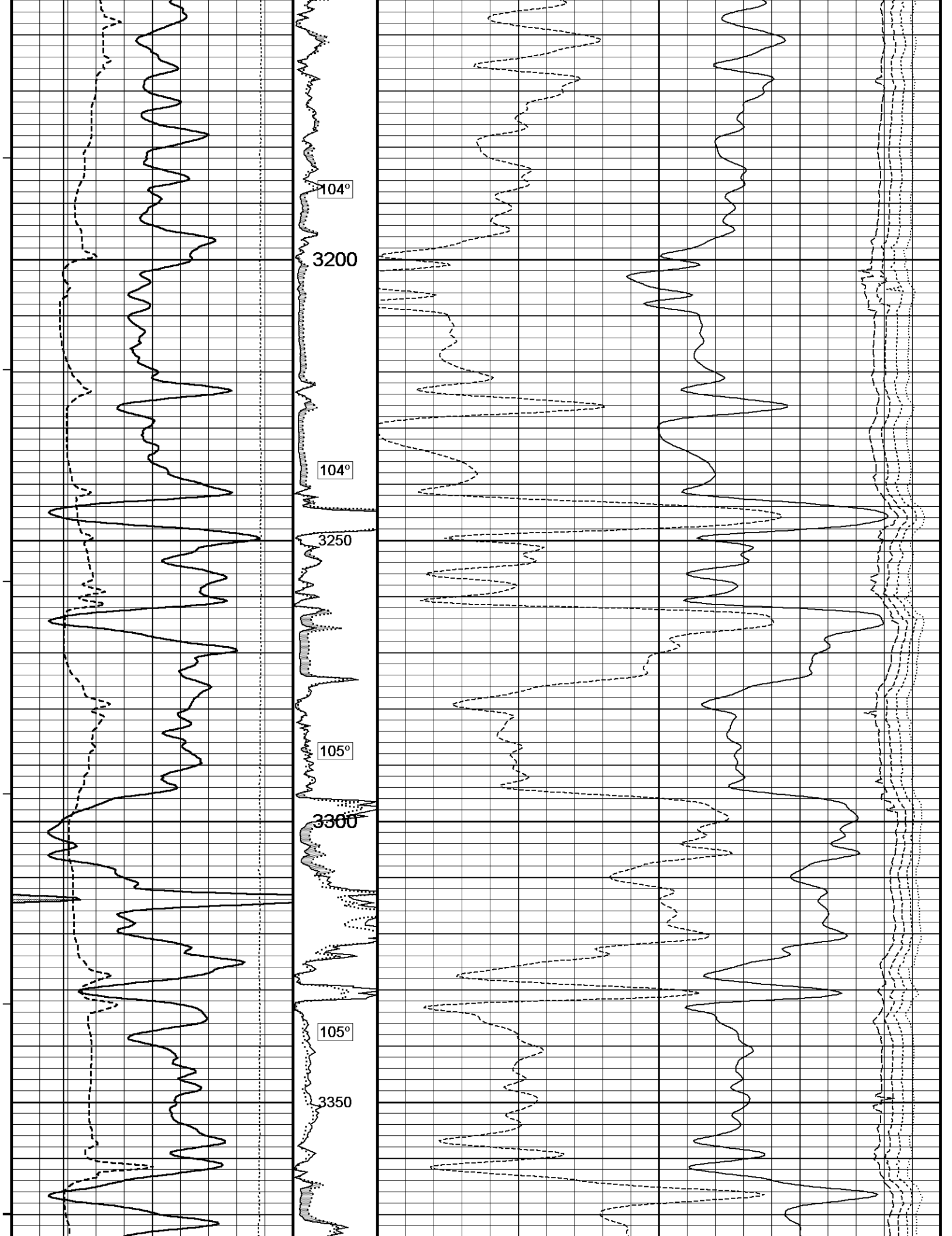
2850

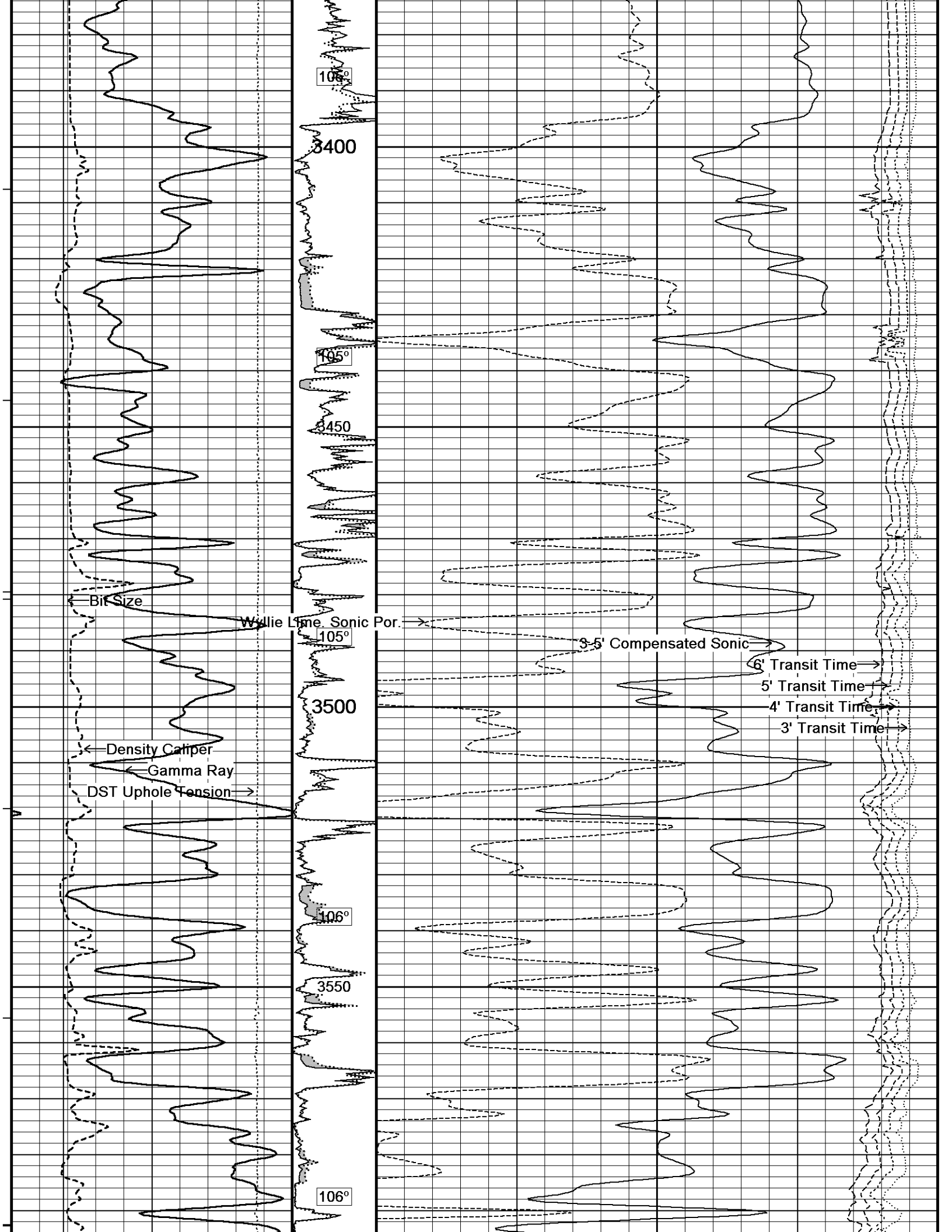
103°

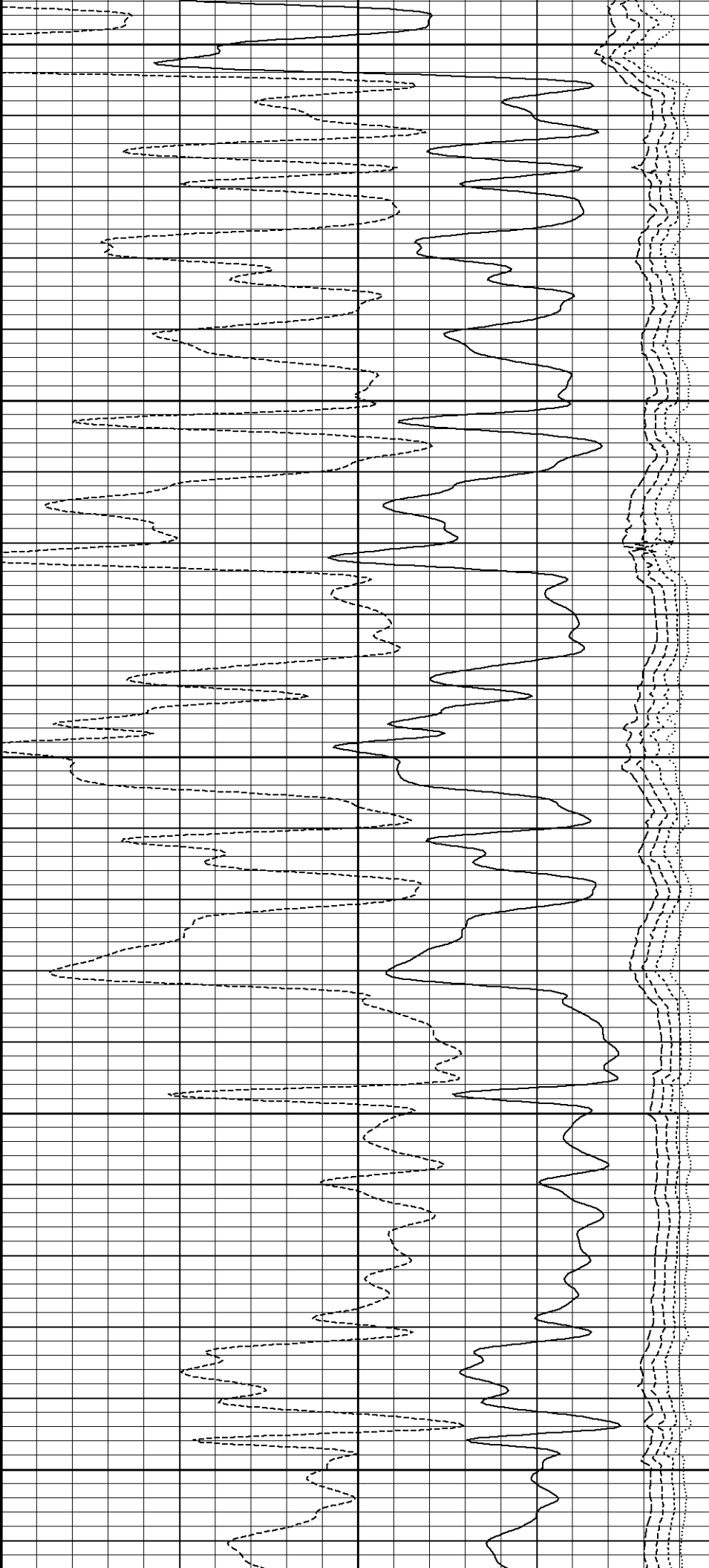
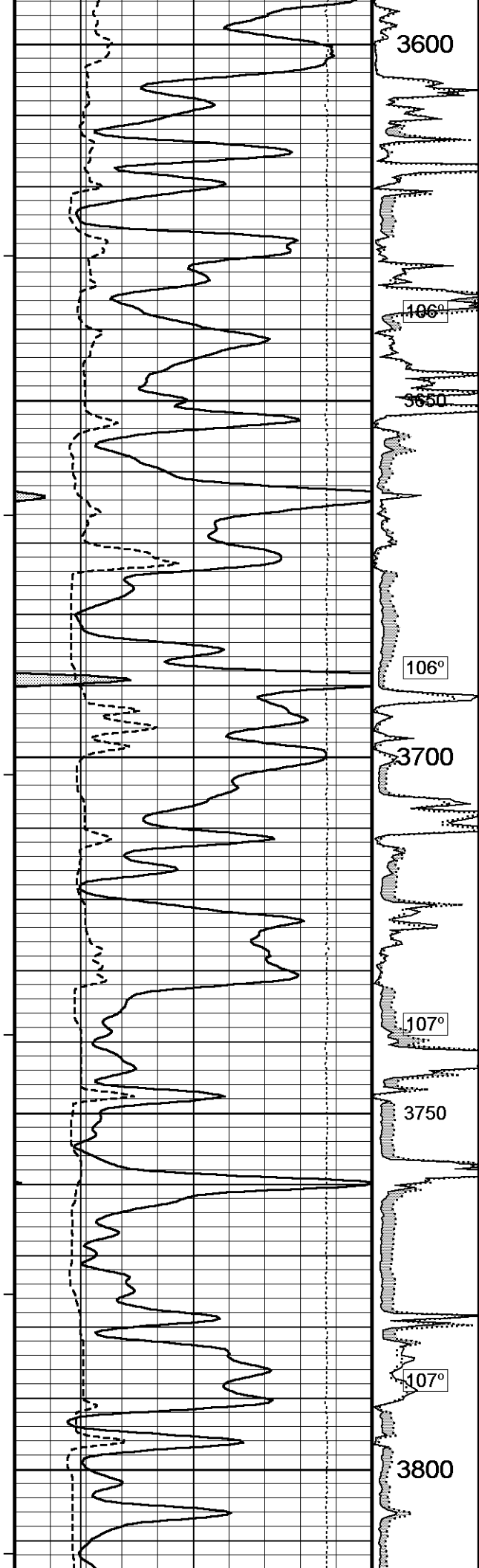
2900

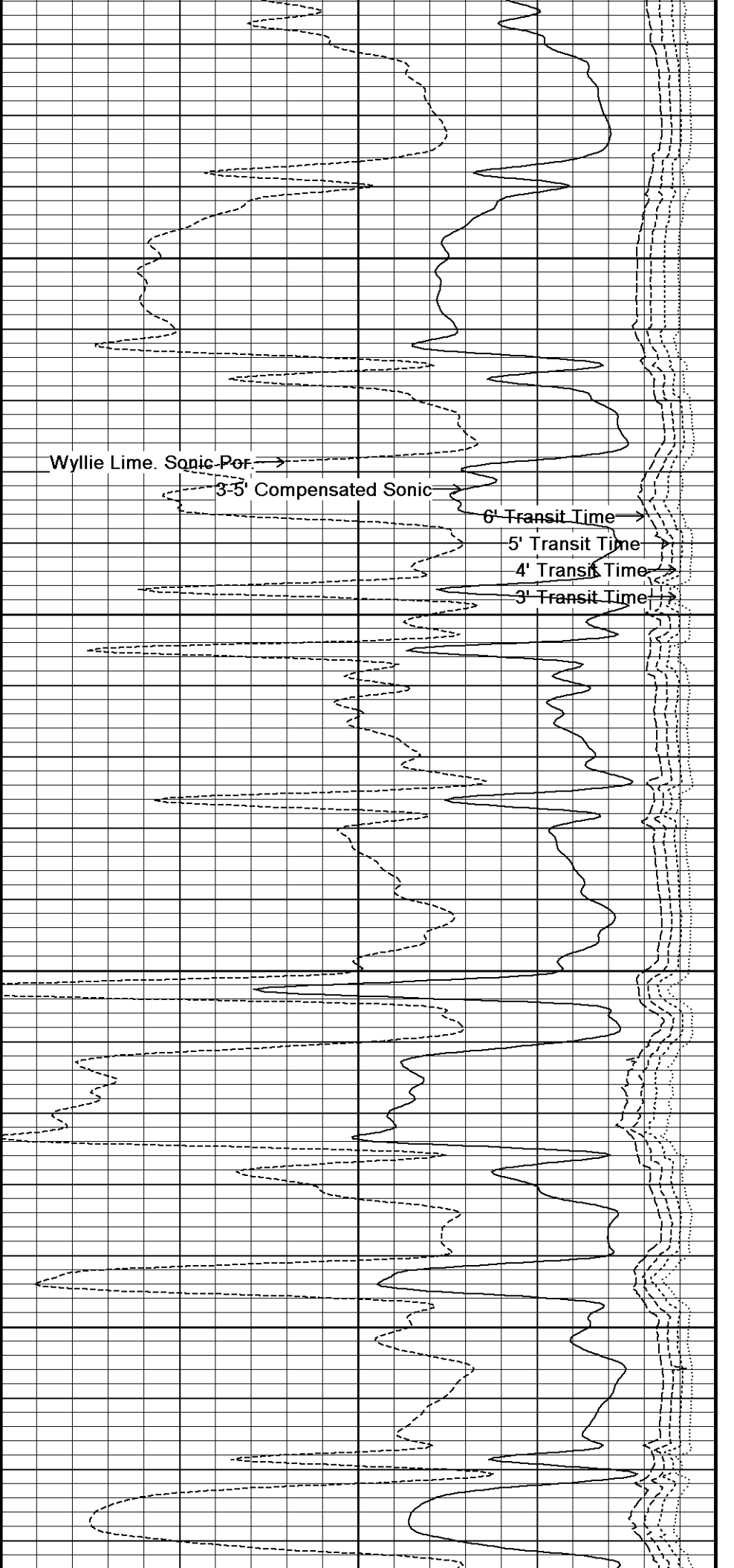
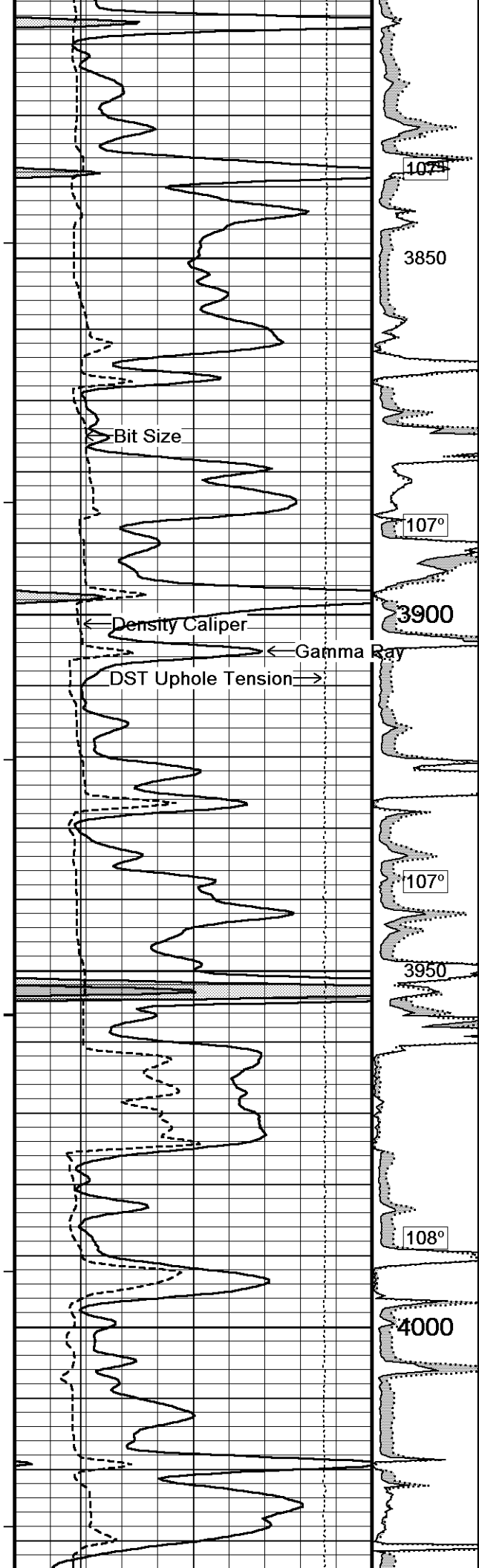


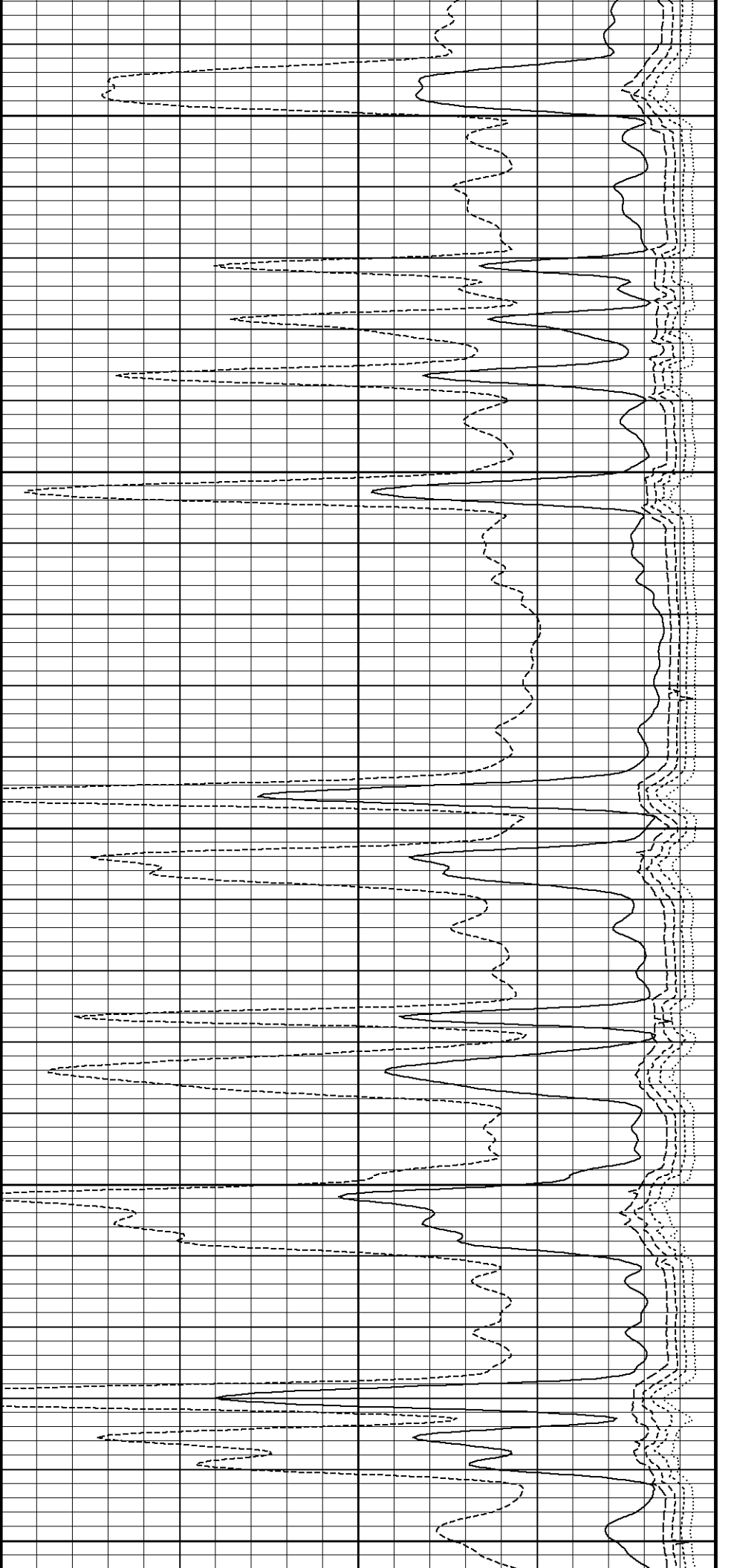
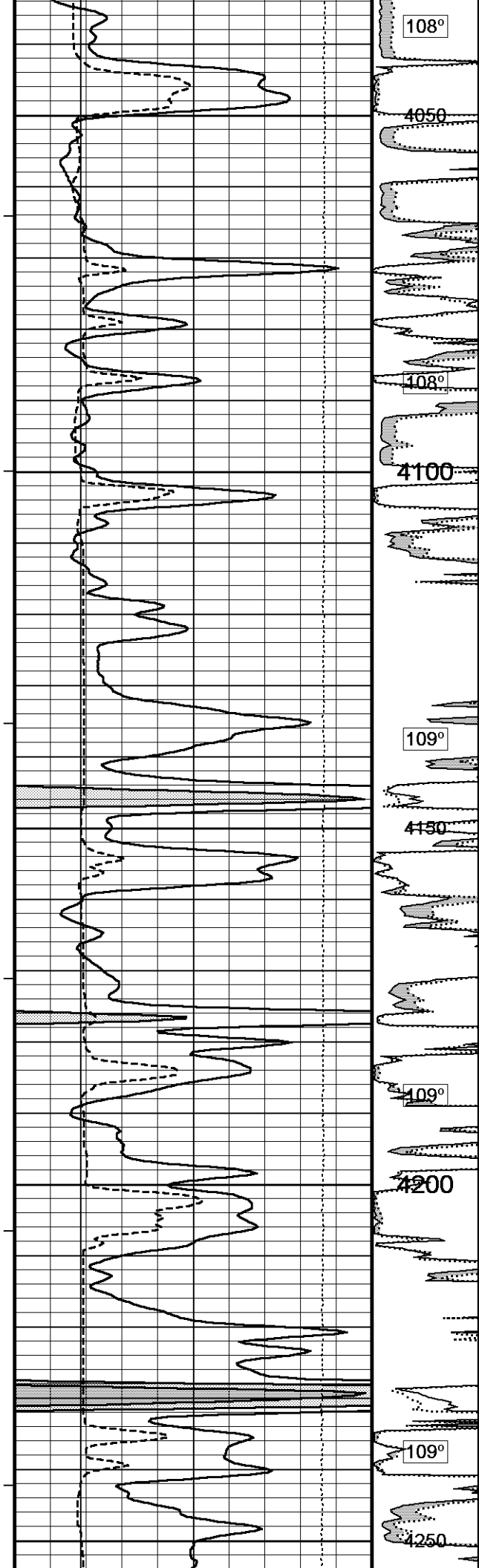


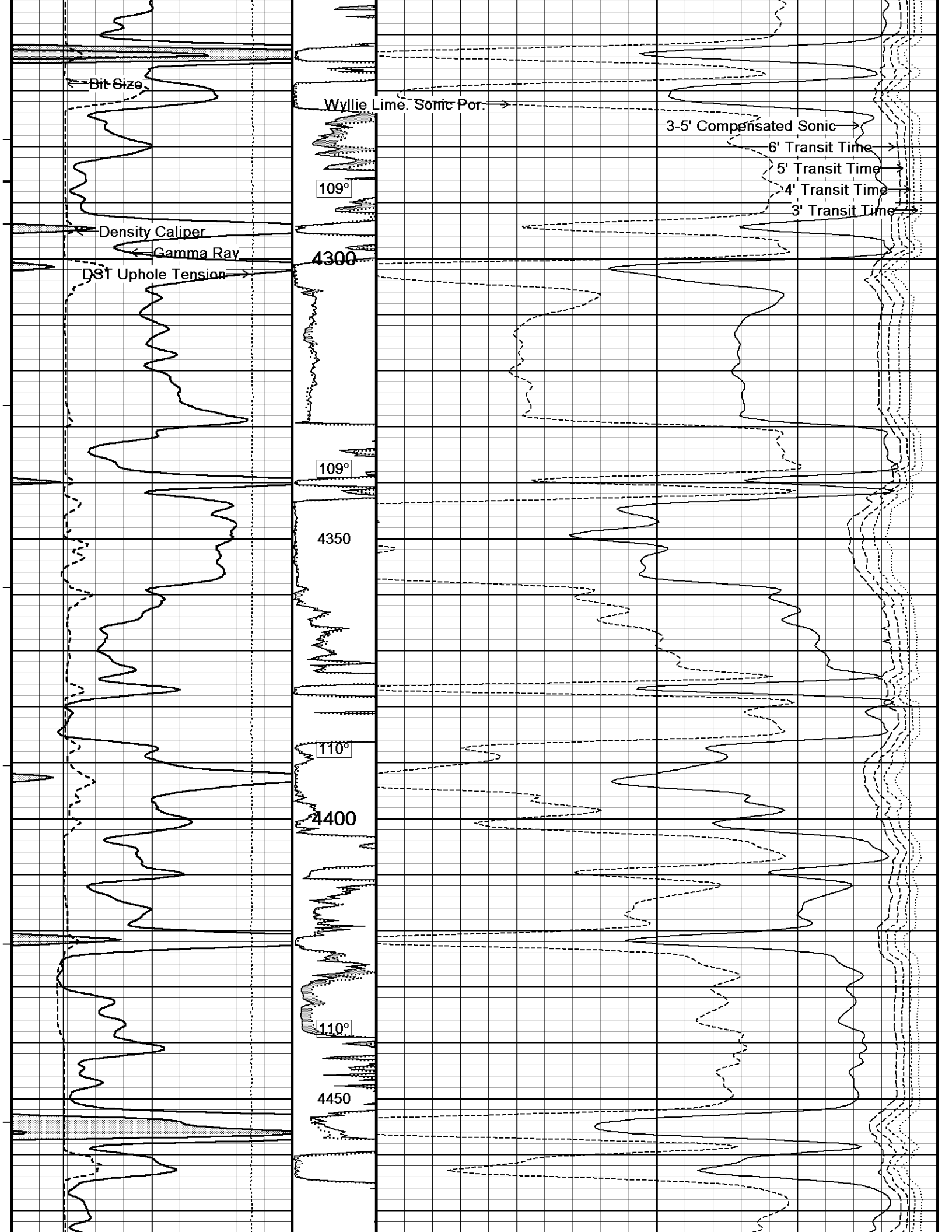


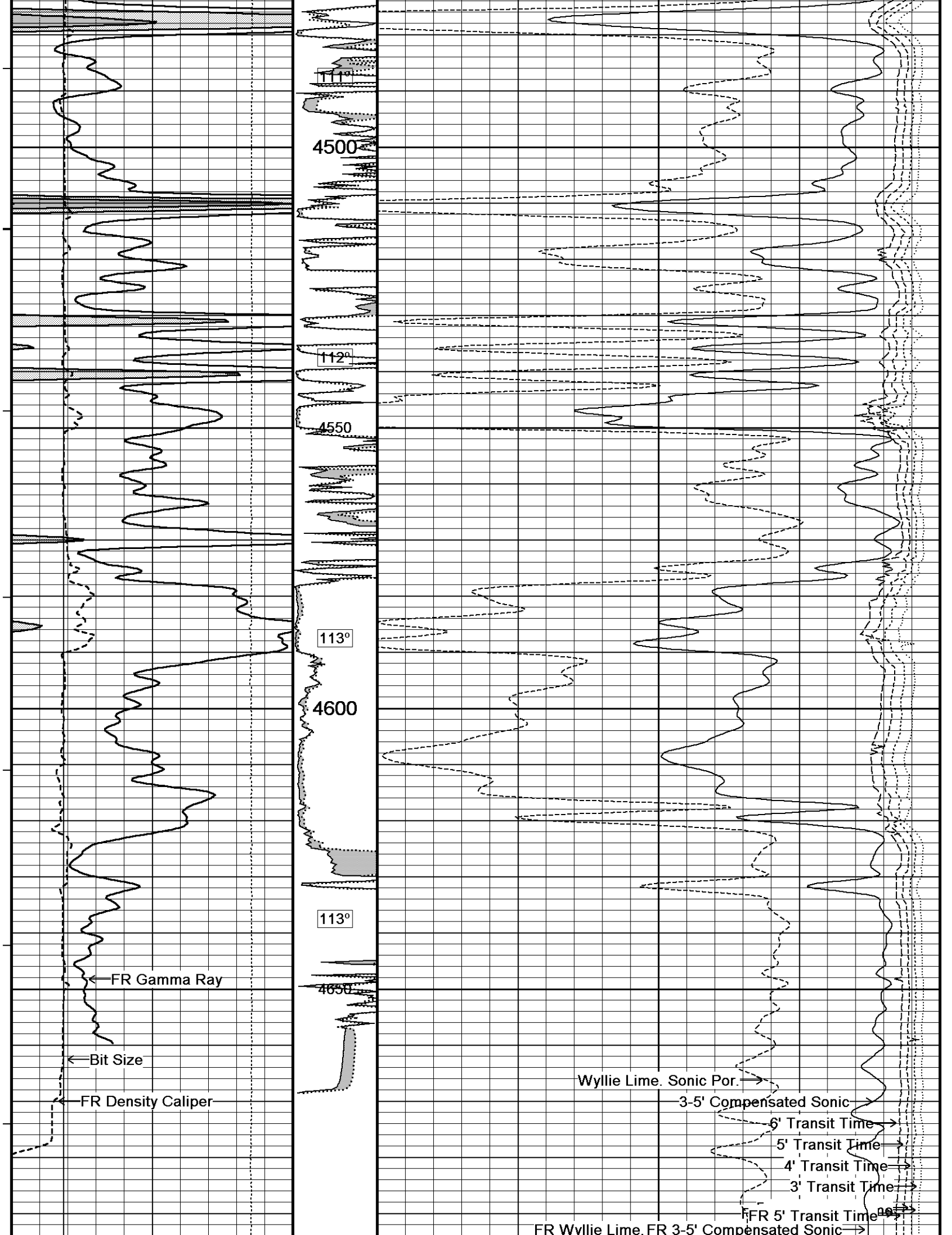


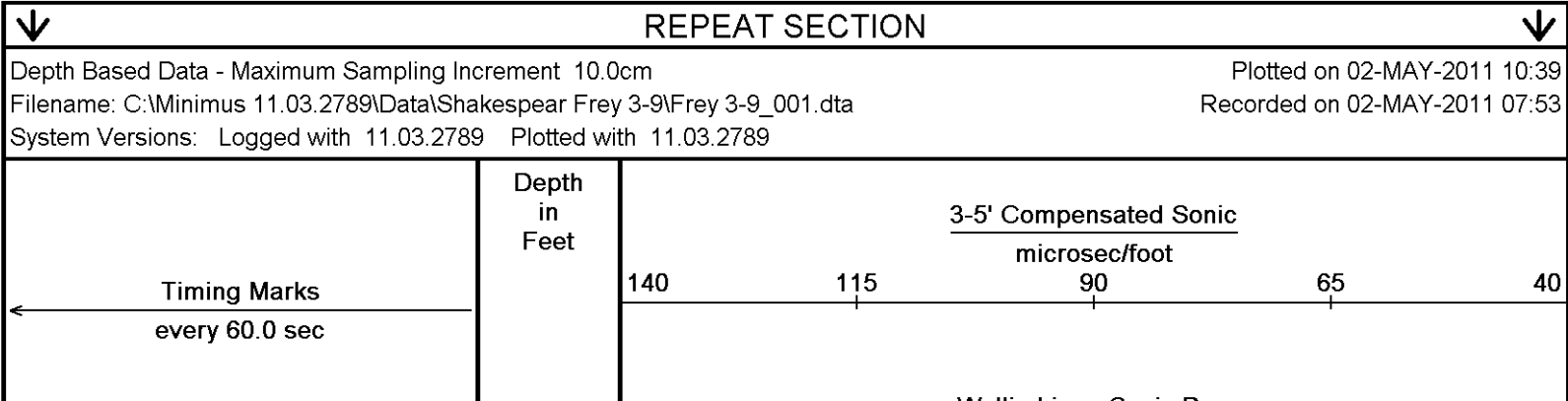
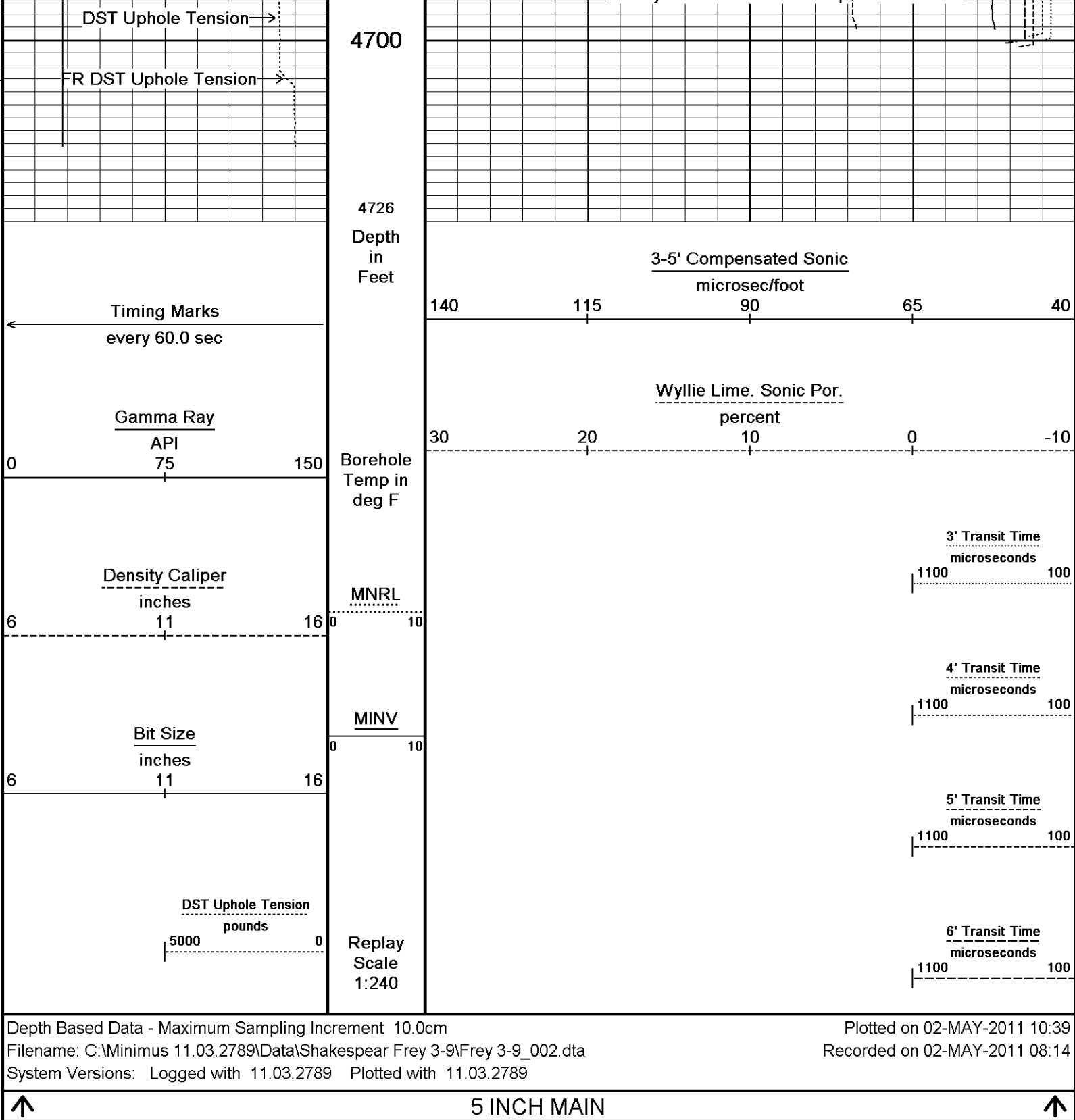


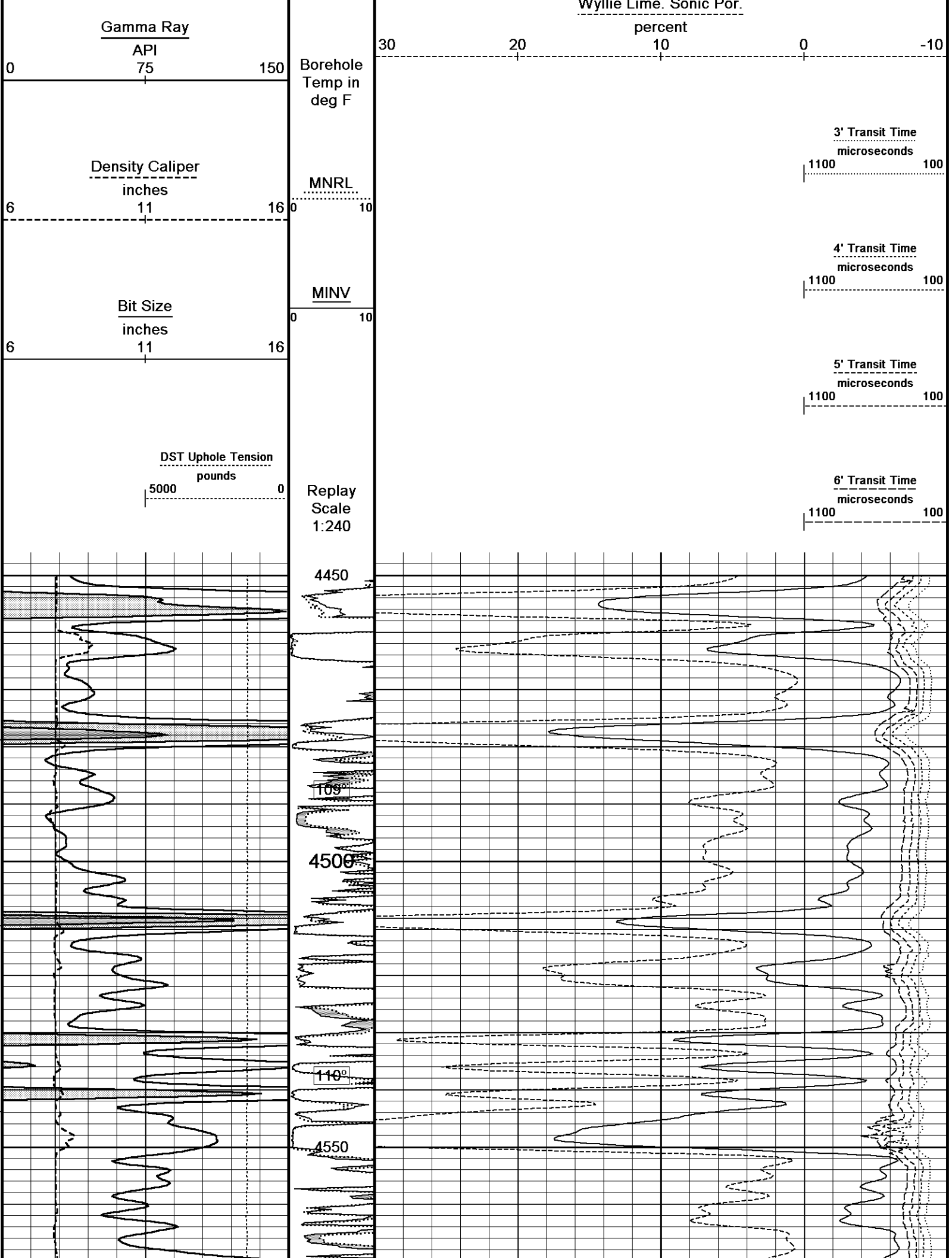


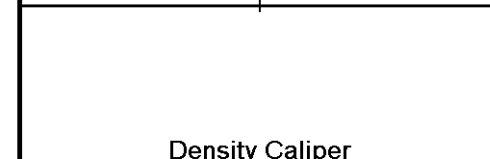
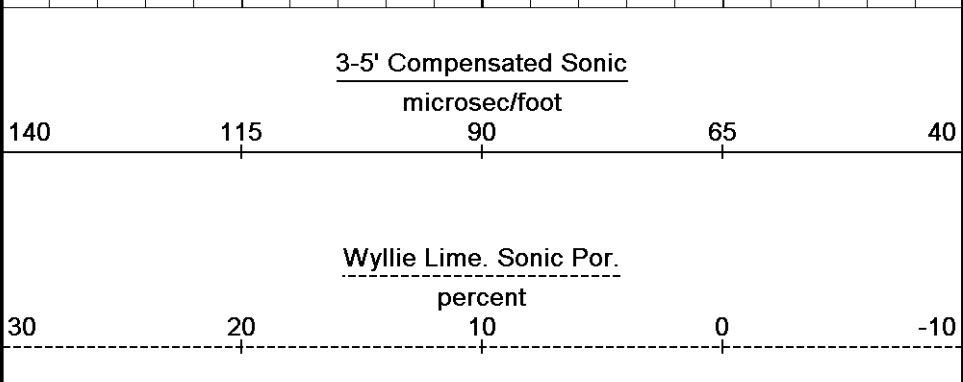
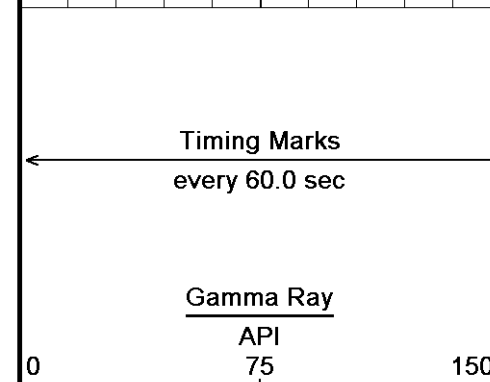
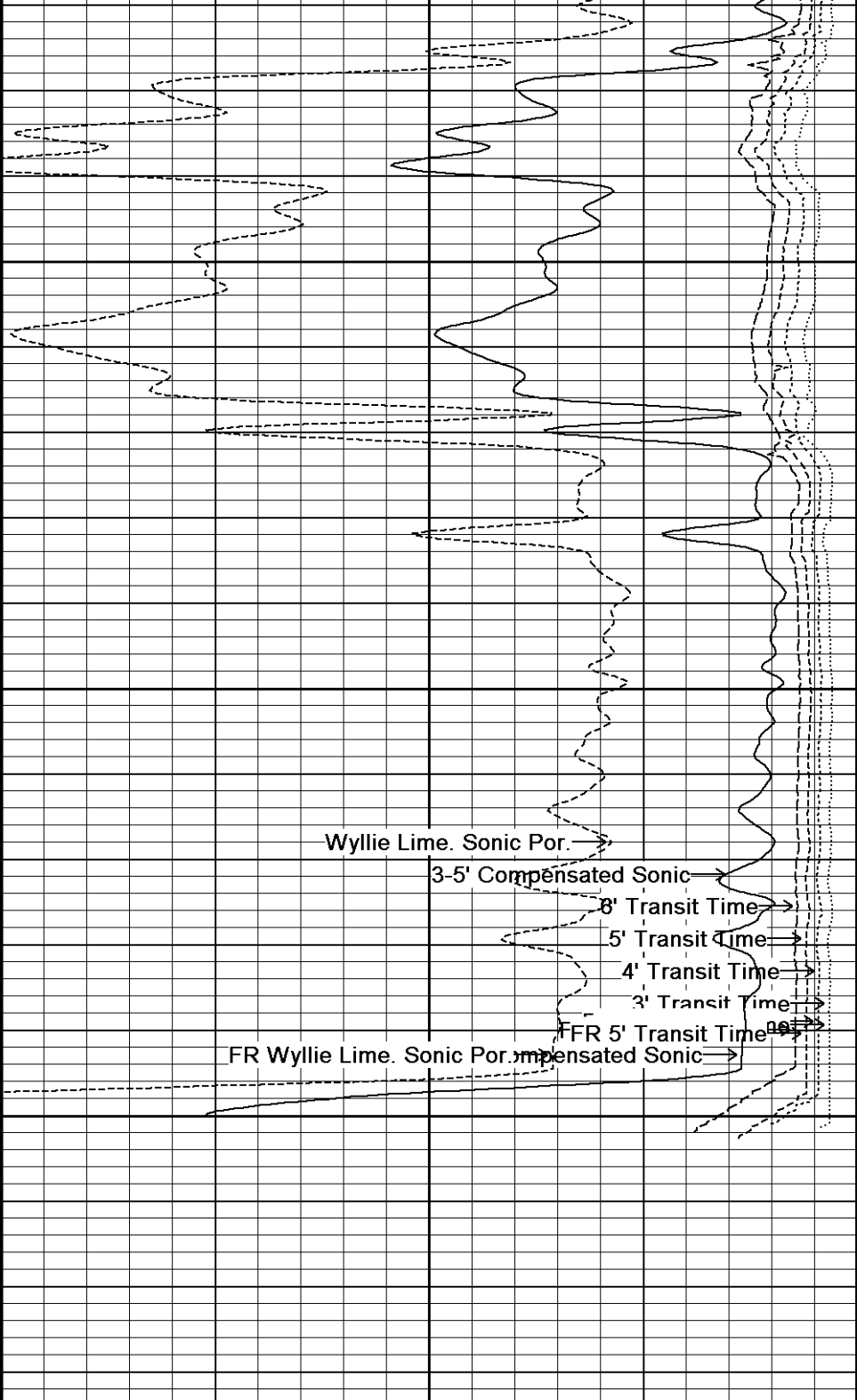
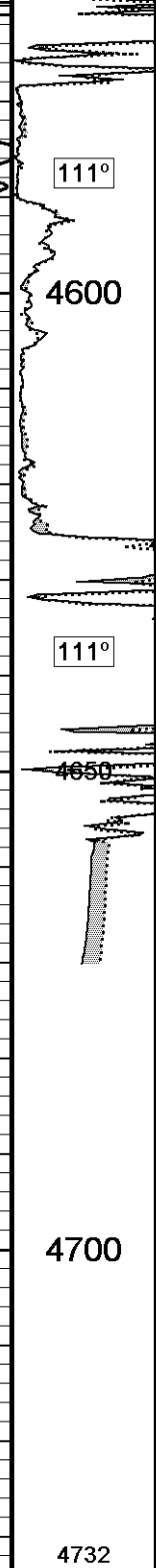
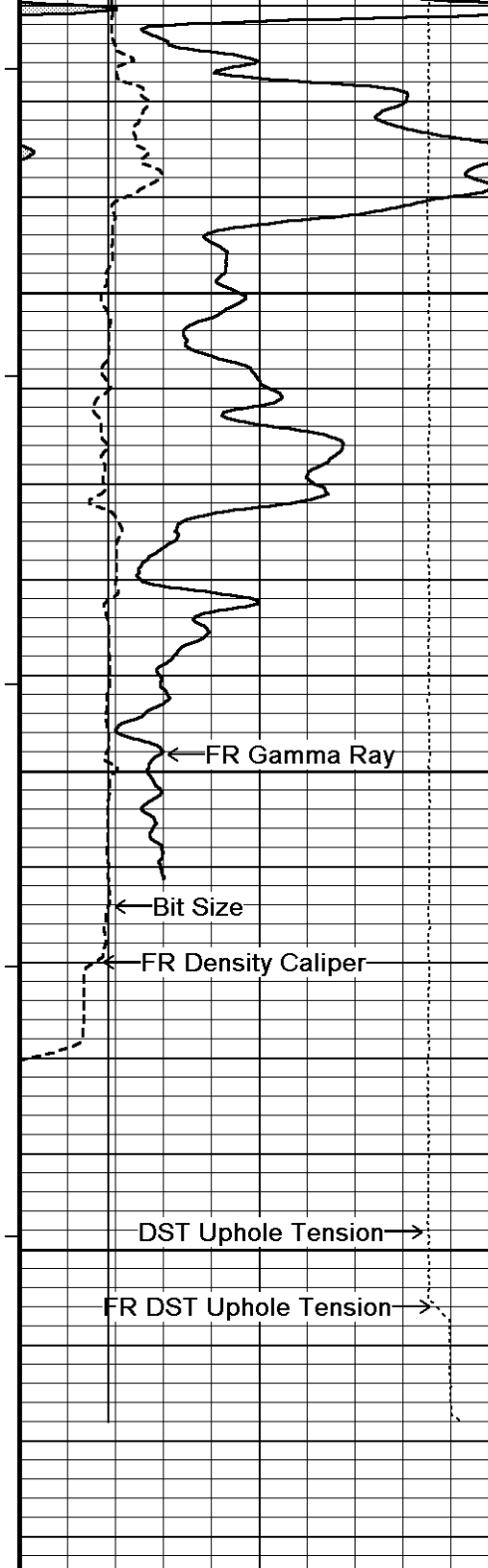


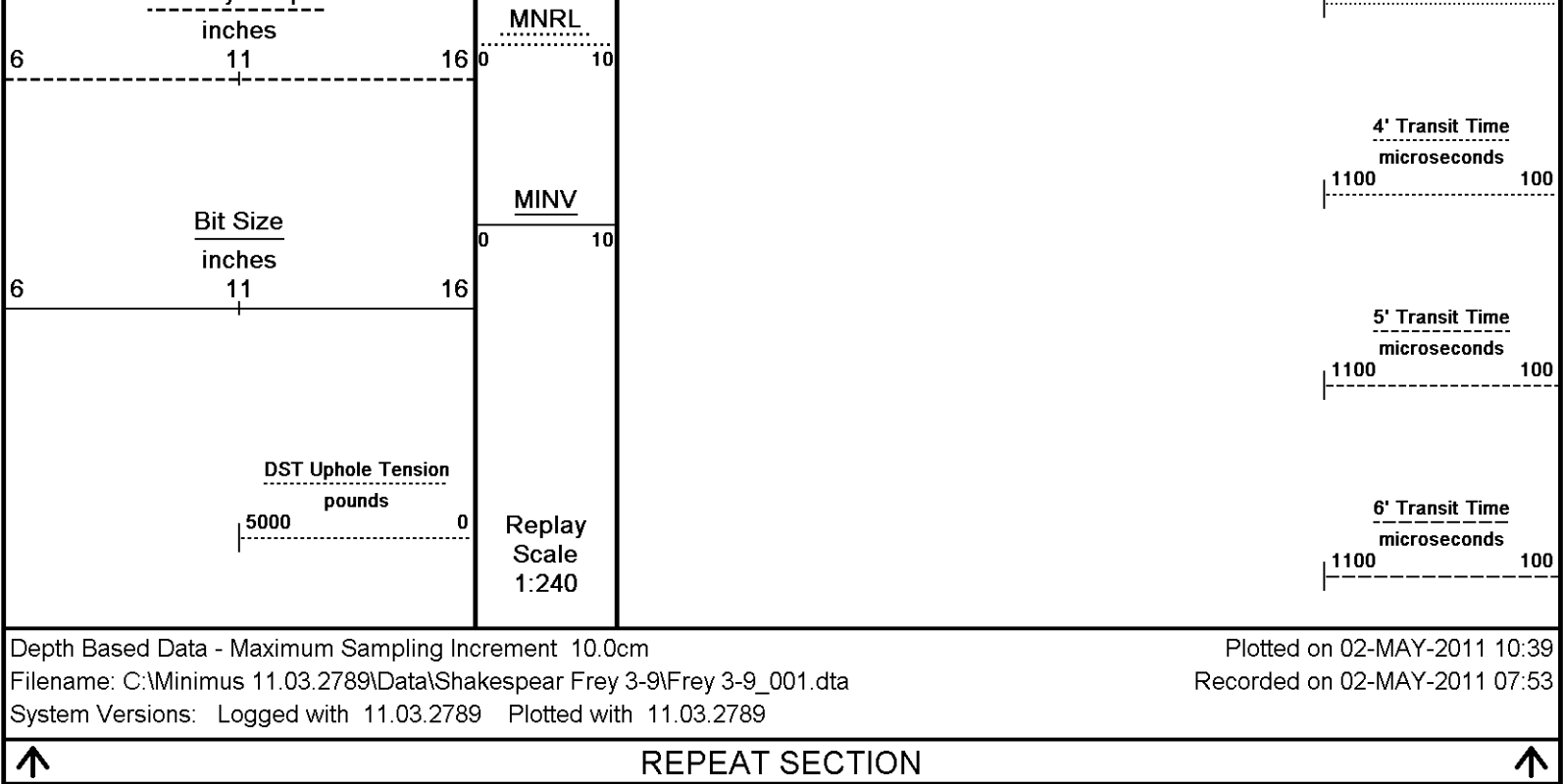












BEFORE SURVEY CALIBRATION			
C:\Minimus 11.03.2789\Data\Shakespear Frey 3-9\Frey 3-9.dta			
General Constants All 000			Last Edited on 02-MAY-2011,06:38
General Parameters			
Mud Resistivity	1.250	ohm-metres	
Mud Resistivity Temperature	75.000	degrees F	
Water Level	0.000	feet	
Density/Neutron Processing	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	Base Density Porosity		
Resistivity used	Array Ind. One Res Rt		
RWA Constant A	0.610		
RWA Constant M	2.150		
Down-hole Tension Calibration All 000			Field Calibration on 30-JUN-2010
Reading No	Measured	Calibrated (lbs)	
1	14112.01	10.00	
2	15164.79	427.00	
Down-hole Tension Calibration SMS 0			Field Calibration on 30-JUN-2010
Reading No	Measured	Calibrated (lbs)	
1	14112.01	10.00	
2	15164.79	427.00	
High Resolution Temperature Calibration MCG-C 139			Field Calibration on 03-SEP-2010,11:23
	Measured	Calibrated(Deg F)	
Lower	50.00	50.00	
Upper	75.00	75.00	
High Resolution Temperature Constants MCG-C 139			Last Edited on

Pre-filter Length		11	
SP Calibration MCG-C 139		Field Calibration on 04-MAR-2011 06:37	
	Measured	Calibrated (mV)	
Reference 1	103.7	100.0	
Reference 2	-96.9	-100.0	
Gamma Calibration MCG-C 139		Field Calibration on 25-APR-2011 20:54	
	Measured	Calibrated (API)	
Background	92	61	
Calibrator (Gross)	1187	786	
Calibrator (Net)	1095	725	
Gamma Constants MCG-C 139		Last Edited on 28-APR-2011,22:25	
Gamma Calibrator Number	grc38		
Mud Density	1.08	gm/cc	
Caliper Source for Processing	Density Caliper		
Tool Position	Eccentred		
Concentration of KCl	0.00	kppm	
Micro Normal and Micro Inverse Calibration MML-A 16		Base Calibration on 11-MAR-2011 11:10 Field Check on 25-APR-2011 20:38	
Base Calibration			
		Measured	Calibrated (ohm-m)
Channel	Resistor 1	Resistor 2	Resistor 1 Resistor 2
Micro Normal	12.2	60.2	2.6 12.8
Micro Inverse	15.6	78.3	1.7 8.4
Channel	Base Check (ohm-m)		Field Check (ohm-m)
Micro Normal	32.1		32.1
Micro Inverse	16.3		16.3
Micro Normal and Micro Inverse Constants MML-A 16		Last Edited on 11-APR-2011,09:08	
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
Caliper Calibration MML-A 16		Base Calibration on 11-MAR-2011 11:20 Field Calibration on 25-APR-2011 20:37	
Base Calibration			
Reading No	Measured		Calibrator Size (in)
1	13875		5.98
2	17350		7.97
3	20581		9.86
4	24656		11.92
5	0		0.00
6	N/A		N/A
Field Calibration			
	Measured Caliper (in)		Actual Caliper (in)
	6.03		5.98
Neutron Calibration MDN-A.B 66		Base Calibration on 11-MAR-2011 13:54 Field Check on 25-APR-2011 20:50	
Base Calibration			
		Measured	Calibrated (cps)
	Near	Far	Near Far
	3091	97	3714 110
Ratio	31.957		33.764
Field Calibrator at Base		Calibrated (cps)	
		1660	2371
Ratio	0.700		
Field Check		Calibrated (cps)	
		1673	2396
Ratio	0.698		

Neutron Source Id	P58125B	
Neutron Jig Number	5824NE	
Epithermal Neutron	No	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.08	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 52

Base Calibration on 11-MAR-2011 10:55

Field Check on 25-APR-2011 20:34

Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	965.7	126.8
Base Check		279.9
Field Check		279.9

FE Constants MFE-A.A 52

Last Edited on 28-APR-2011,22:25

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 126

Last Edited on 11-APR-2011,08:33

Maximum Boundary Contrast	100.00	micro-sec/ft
Fluid Transit Time	189.00	micro-sec/ft
Limestone Transit Time	47.50	micro-sec/ft
Sandstone Transit Time	55.50	micro-sec/ft
Dolomite Transit Time	43.50	micro-sec/ft
Sonic used for Porosities	3-5' Compensated Sonic	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	N/A	micro-sec
MX3FT	N/A	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft

Sonde Mode	Compensated
Hole Type	Open Hole

Sonde Parameters

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

Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)
3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A

Processed Fixed Gate Parameters

Waveform Used For Processing	N/A		
Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	Depth (ft)
N/A	N/A	N/A	0.00
N/A	N/A	N/A	0.00
N/A	N/A	N/A	0.00
N/A	N/A	N/A	0.00
N/A	N/A	N/A	0.00

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 167

Field Calibration on 17-JAN-2011,18:32

	Measured	Calibrated(Deg F)
Lower	1.00	33.80
Upper	11.00	51.80

High Resolution Temperature Constants MAI-A.A 167

Last Edited on

Pre-filter Length	11
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Induction Calibration MAI-A.A 167

Base Calibration on 11-MAR-2011,09:58
Field Check on 25-APR-2011 20:33

Base Calibration

Test Loop Calibration		Measured		Calibrated (mmho/m)	
Channel		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
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Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	12.0	3842.1
2	0.0	0.0	29.3	3480.2
3	0.0	0.0	28.9	3055.9
4	0.0	0.0	19.7	2083.5
Deep	0.0	0.0	18.4	2050.7
Medium	0.0	0.0	42.1	3995.2
Shallow	0.0	0.0	42.5	5059.1

Array Temperature	0.0	57.8	Deg F
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Induction Constants MAI-A.A 167

Last Edited on 24-APR-2011,22:39

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 35

Base Calibration on 11-MAR-2011 11:34

Field Calibration on 25-APR-2011 20:40

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	17936	3.99
2	28079	5.98
3	38384	7.97
4	48048	9.86
5	59047	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.02	5.98

Photo Density Calibration MPD-B 35

Base Calibration on 11-MAR-2011 11:54

Field Check on 25-APR-2011 20:44

Density Calibration				
Base Calibration		Measured	Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	57876	27553	59556	30836
Reference 2	23524	2615	24941	2541

Field Check at Base

1175.2 1398.5

Field Check

1171.2 1390.3

PE Calibration

Base Calibration		Measured	Calibrated	
	WS	WH	Ratio	Ratio
Background	211	1039		
Reference 1	21426	57673	0.375	0.371
Reference 2	6234	23377	0.270	0.272

Field Check at Base

211.2 1039.0

Field Check

210.1 1035.0

Density Source Id	p50557b	
Nylon Calibrator Number	dnce695	
Aluminium Calibrator Number	dacd698	
Density Shoe Profile	8 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.13	gm/cc
Mud Density Z/A Multiplier	1.11	
Mud Filtrate Density	1.00	gm/cc
Dry Hole Mud Filtrate Density	1.00	gm/cc
DNCT	0.00	gm/cc
CRCT	0.00	gm/cc
Density Z/A Correction	Hybrid	

Matrix Density (gm/cc)	Depth (ft)
2.71	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

DOWNHOLE EQUIPMENT

C:\Minimus 11.03.2789\Data\Shakespeare Frey 3-9\Frey 3-9.dta

Compact Comms Gamma
MCG-C 139 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

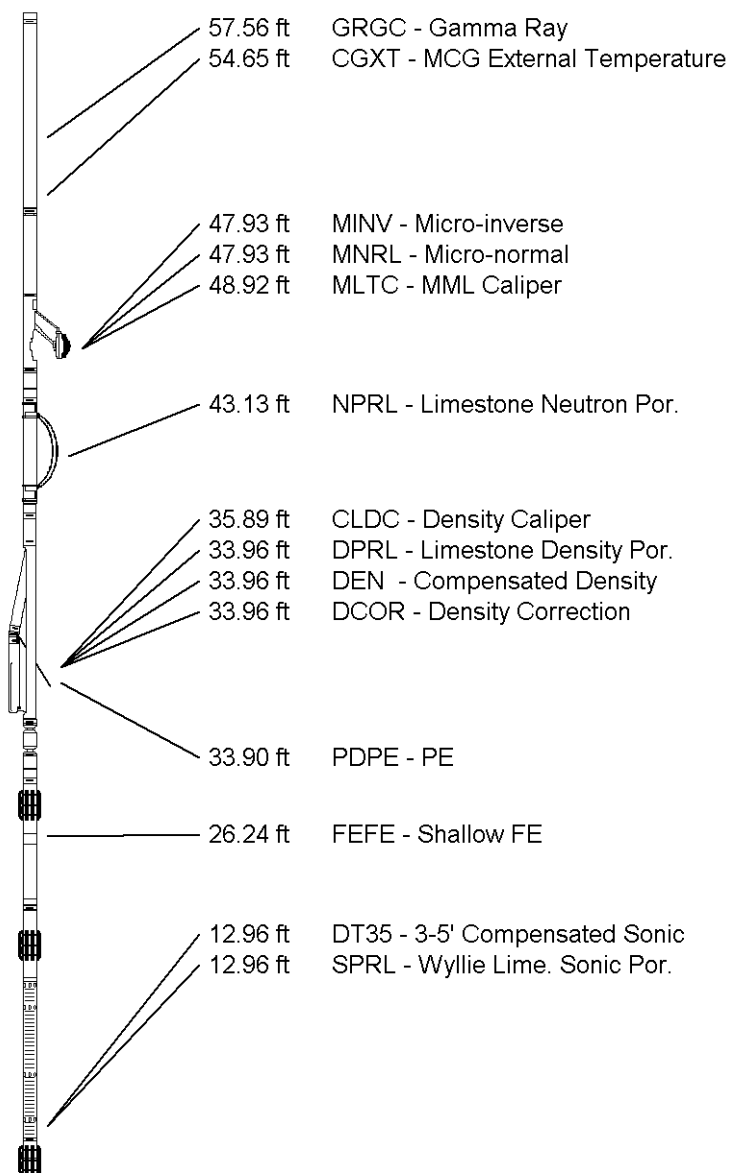
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 35 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 36 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

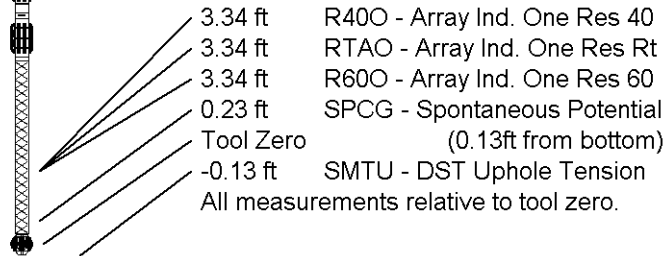
Compact Focussed Electric
MFE-A.A 52 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Sonic
MSS-A.A 126 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: 62.84 ft Weight: 480.6 lb



COMPANY	SHAKESPEAR OIL COMPANY, INC.
WELL	FREY 3-9
FIELD	STRATFORD WEST
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A./KANSAS

Elevation Kelly Bushing	2999.00	feet	First Reading		feet
Elevation Drill Floor	2997.00	feet	Depth Driller	4710.00	feet
Elevation Ground Level	2989.00	feet	Depth Logger		feet



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