Weatherford

COMPENSATED SONIC WITH INTEGRATED TRANSIT TIME

COMPANY	GRAND MESA OPERATING COMPANY
WELL	OBRIEN #1-9
FIELD	WILDCAT
PROVINCE/COUNTY	LANE
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	2225' FSL & 2305' FEL

SEC 9	TWP 16S	RGE 29W	Other Services
Latitude			MAI/MFE MPD/MDN
Longitude			MML
API Number	15-101-22619		

Permanent Datum GL, Elevation 2656 feet
Log Measured From KB, 5.00 feet above Permanent Datum
Drilling Measured From KB

Elevations:	feet
KB	2661.00
DF	2659.00
GL	2656.00

Date	12-DEC-2018			
Run Number	ONE			
Service Order	4558-231823318			
Depth Driller	4520.00	feet		
Depth Logger	4521.00	feet		
First Reading	4508.00	feet		
Last Reading	219.00	feet		
Casing Driller	219.00	feet		
Casing Logger	219.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.30 lb/USg		52.00 CP	
PH / Fluid Loss	10.00		7.20 ml/30Min	
Sample Source	FLOWLINE			
Rm @ Measured Temp	1.27 @ 75.0	ohm-m		
Rmf @ Measured Temp	1.02 @ 75.0	ohm-m		
Rmc @ Measured Temp	1.52 @ 75.0	ohm-m		
Source Rmf / Rmc	CALC		CALC	
Rm @ BHT	0.81 @117.0	ohm-m		
Time Since Circulation	4 HOURS			
Max Recorded Temp	117.00	deg F		
Equipment / Base	13096		LIB	
Recorded By	ADAM SILL			
Witnessed By	GARET DINKEL			

BOREHOLE RECORD

Last Edited: 12-DEC-2018 16:55

Bit Size inches	Depth From feet	Depth To feet
7.875	219.00	4520.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	219.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 18.03.9344.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING USED ON MDN.
  0.5 INCH STANDOFF USED ON MFE.
  TWO 0.5 INCH STANDOFFS USED ON MSS.
  0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 1802 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING: 1096 CU.FT.

- RIG: WW DRILLING #2.

- ENGINEER: A. SILL.

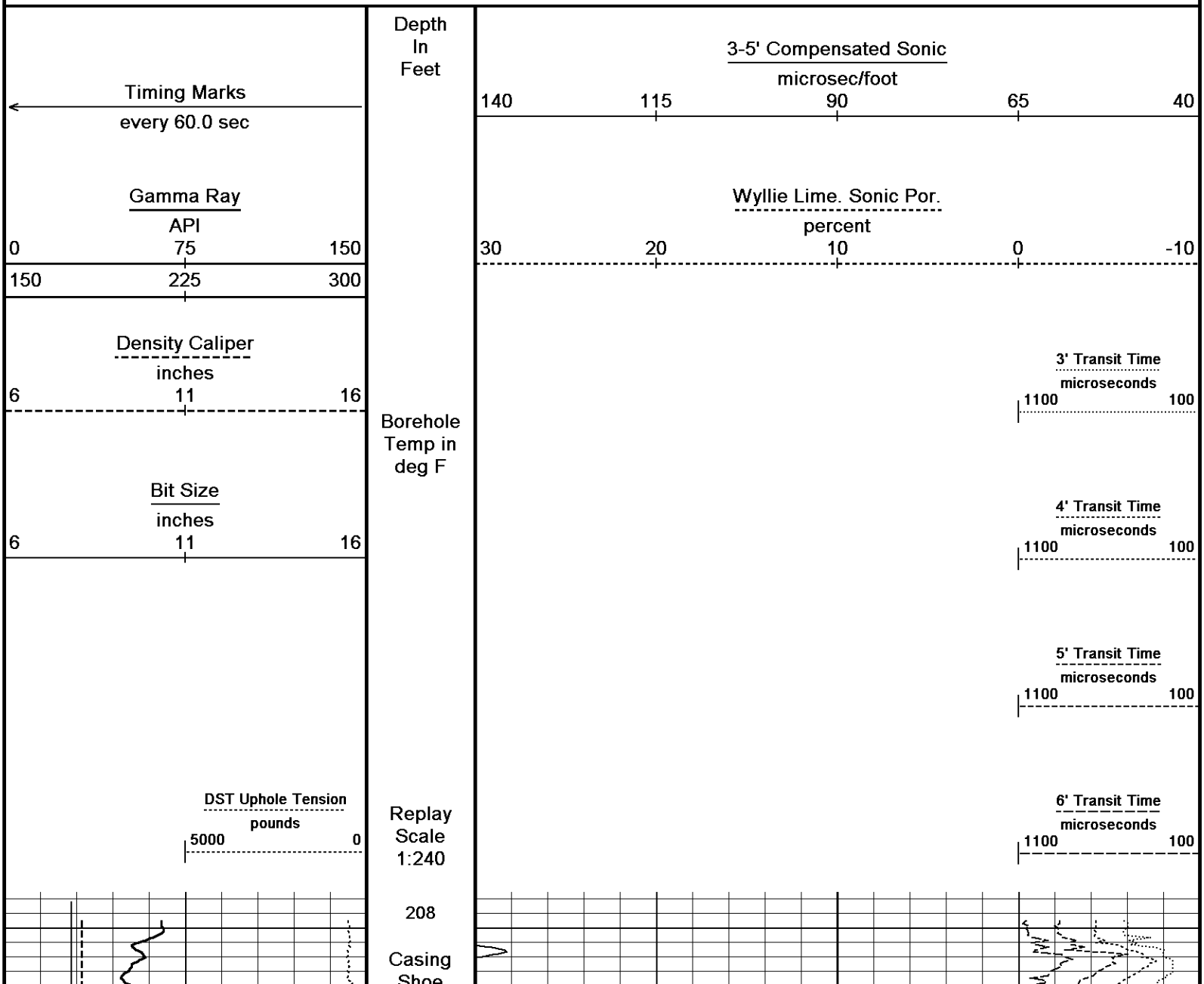
- OPERATOR: B. TOVAR, B. COPELAND.

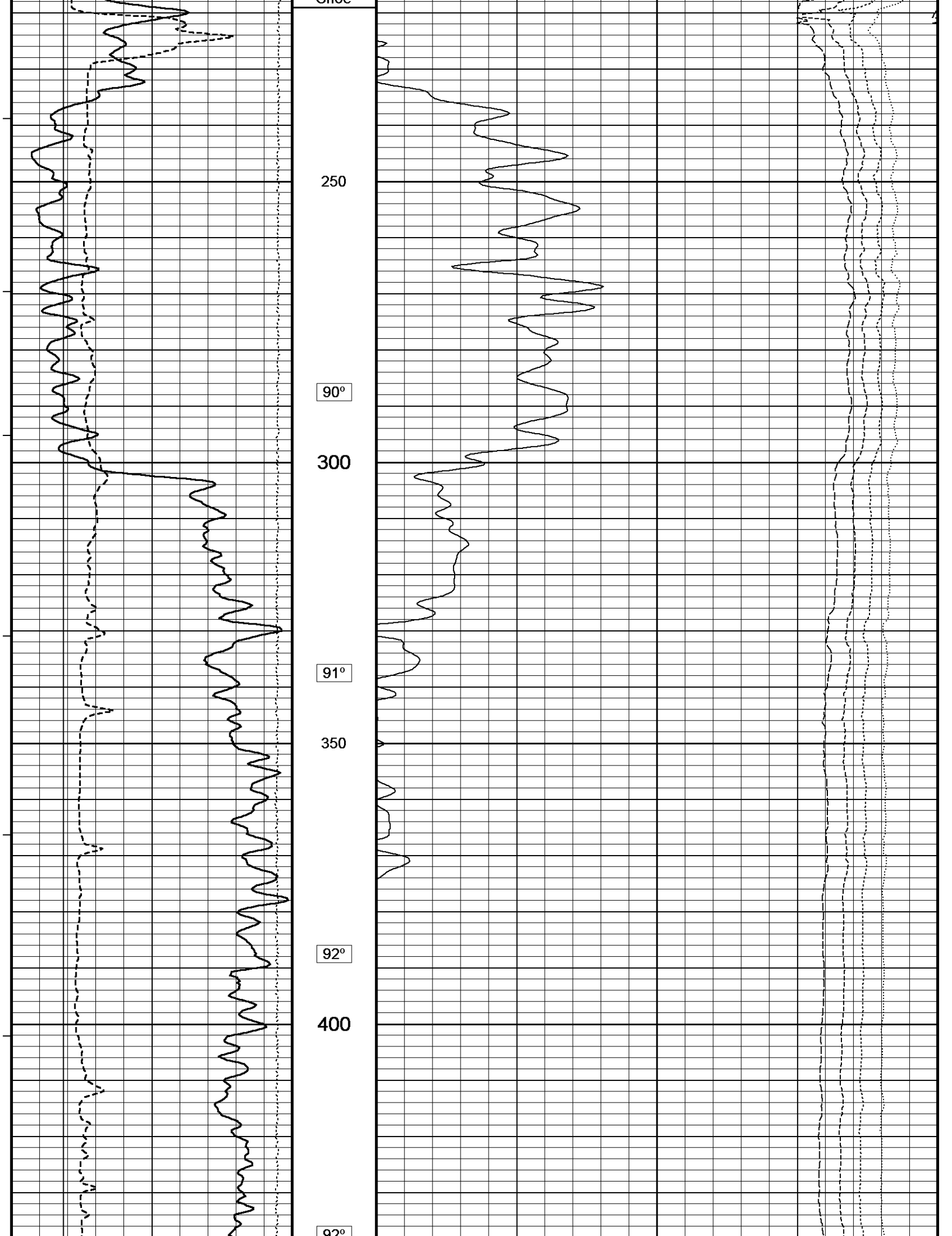
5 INCH MAIN

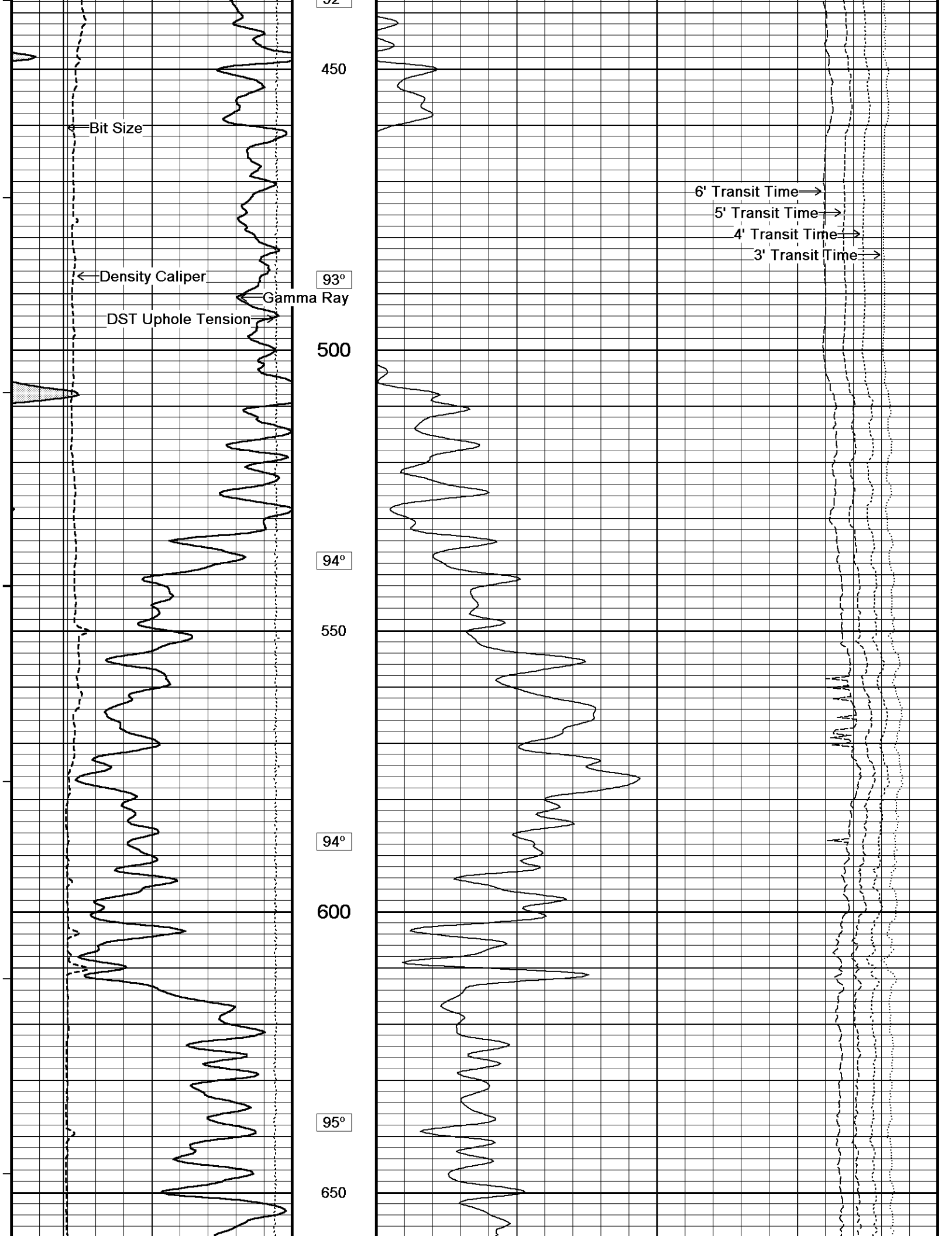
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 12-DEC-2018 22:48

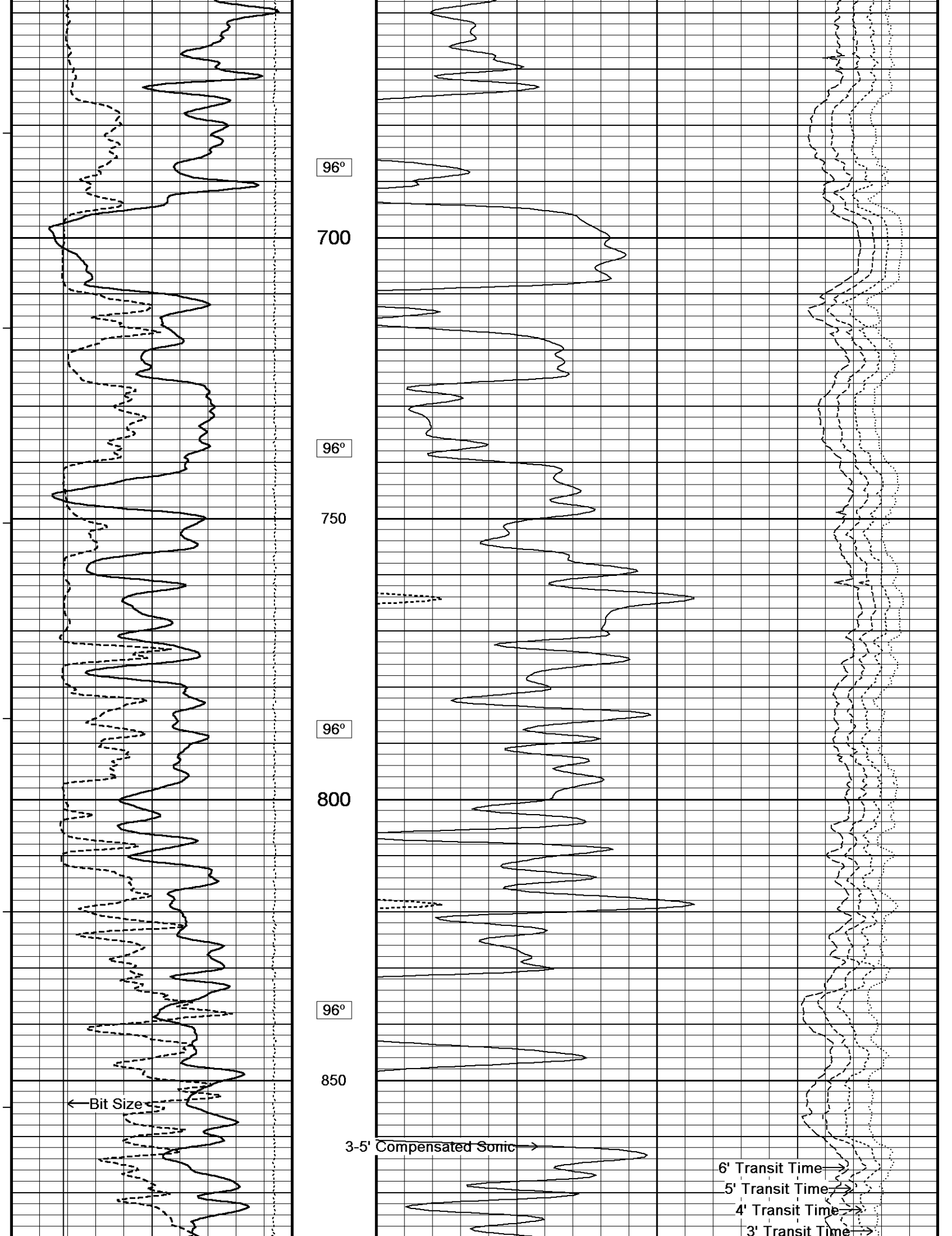
Filename: C:\Minimus 18.03.9344\Data\Grand Mesa O'Brien #1-9\Grand Mesa O'Brien #1-9_002.dta — Recorded on 12-DEC-2018 19:44

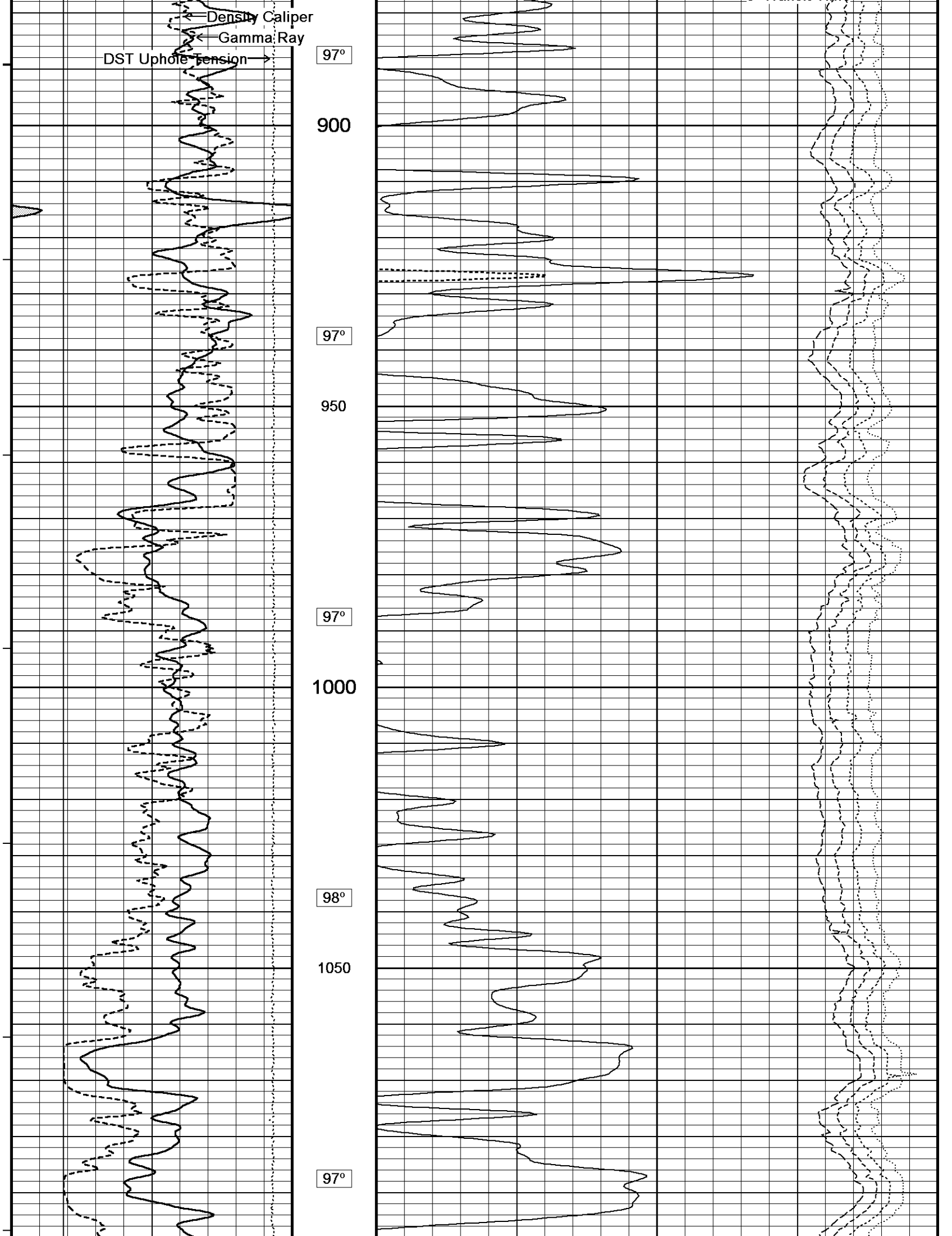
System Versions: Logged with 18.03.9344 Plotted with 18.03.9344

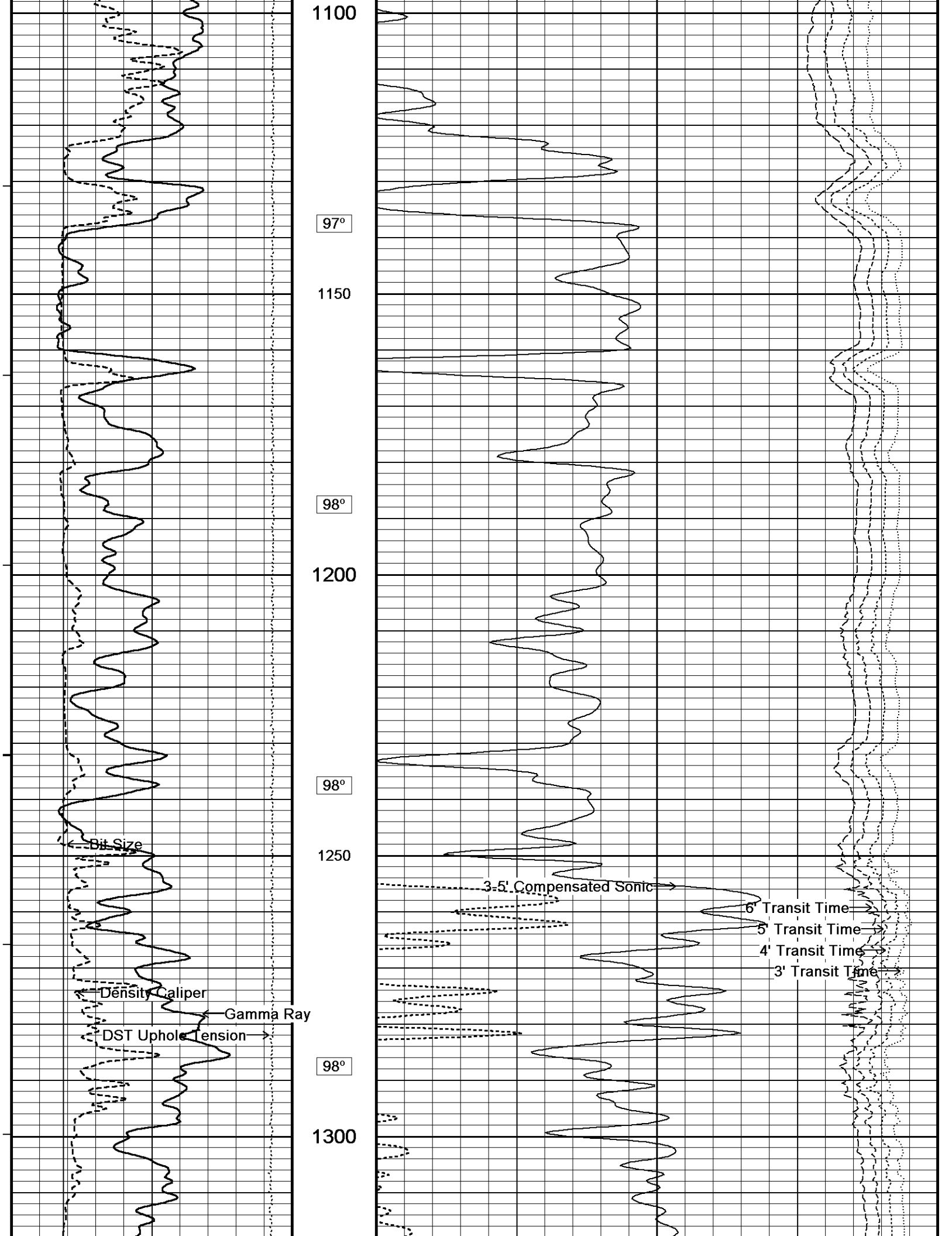


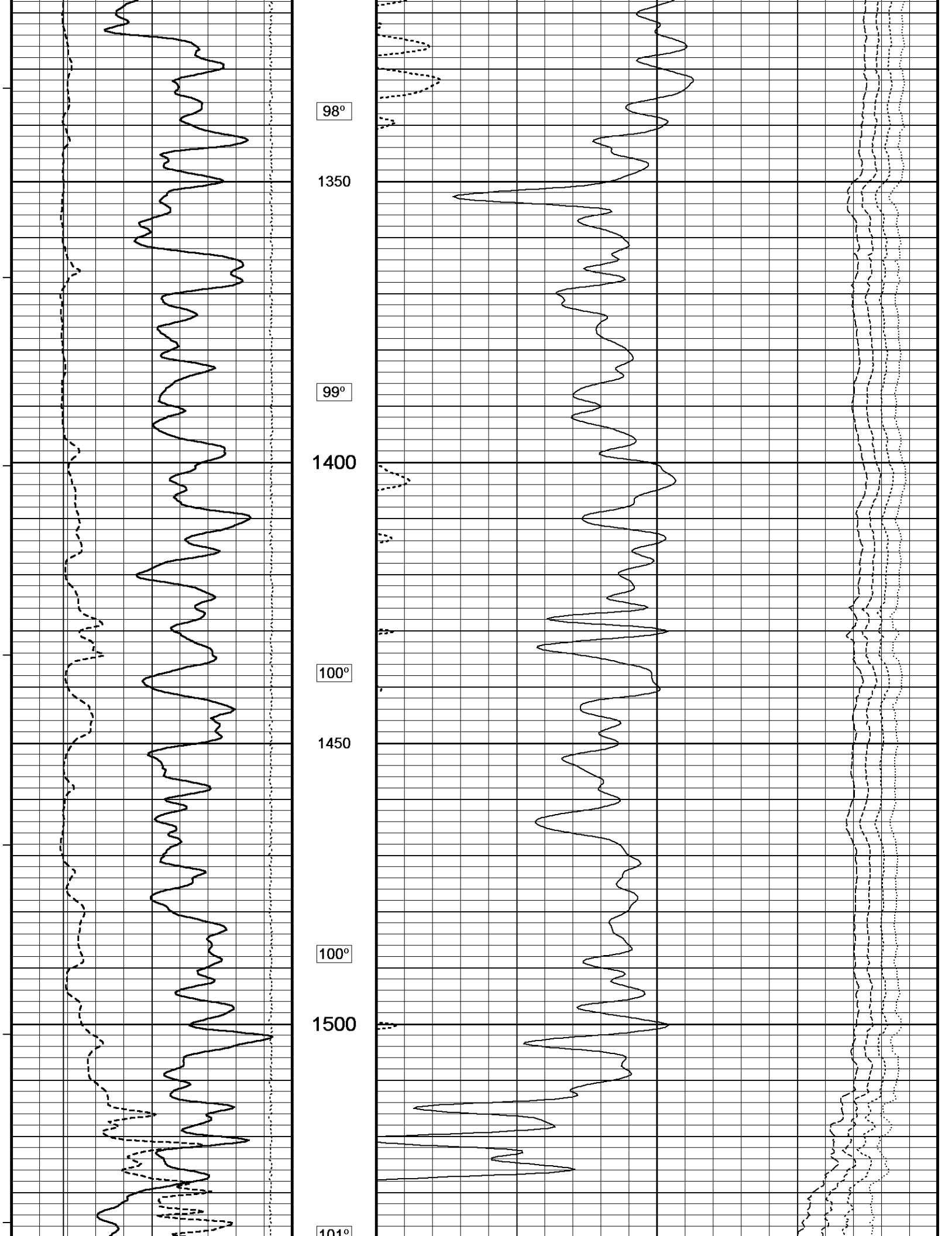

250
90°
300
91°
350
92°
400
92°

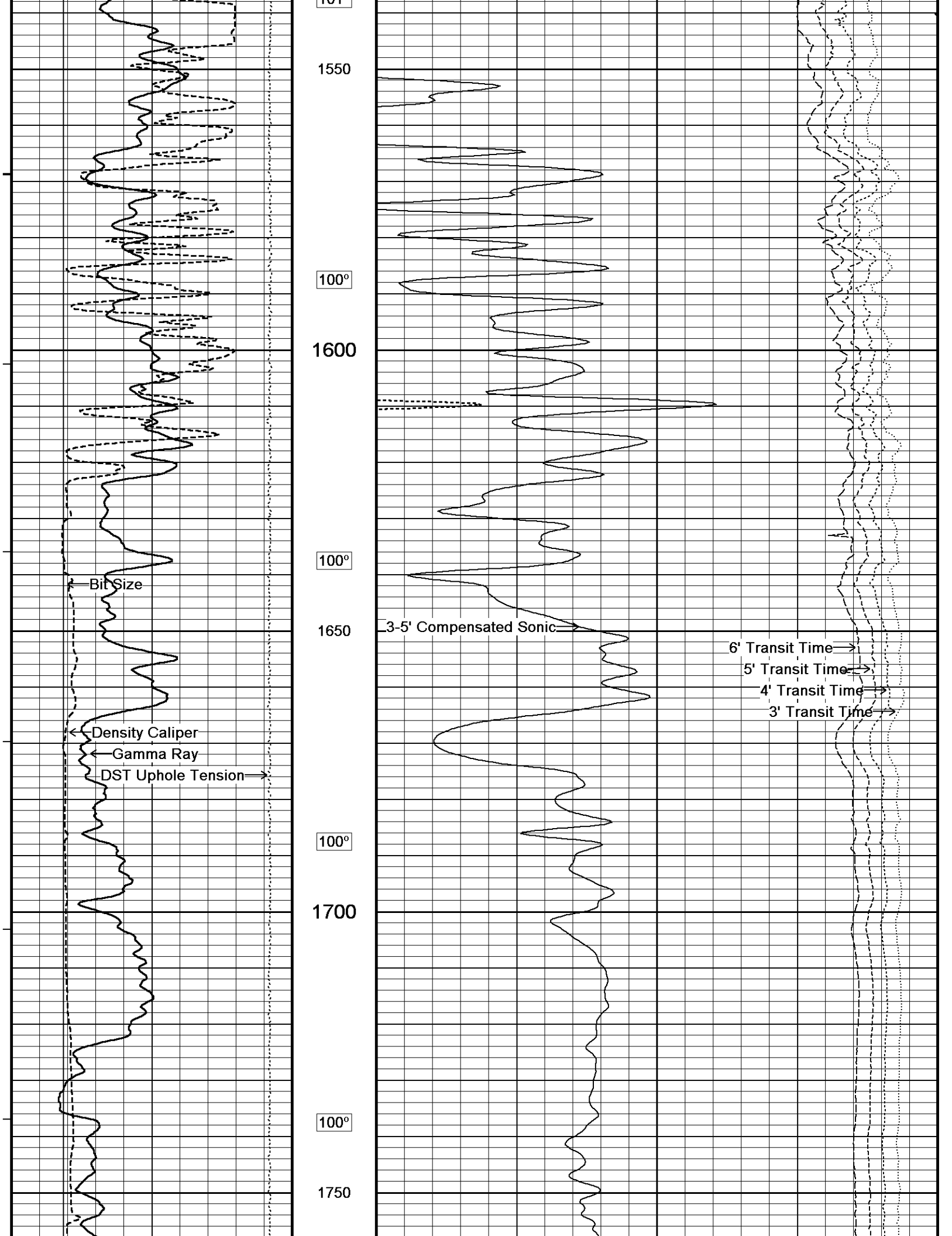

450
Bit Size
Density Caliper
93°
Gamma Ray
DST Uphole Tension
500
94°
550
94°
600
95°
650
6' Transit Time
5' Transit Time
4' Transit Time
3' Transit Time

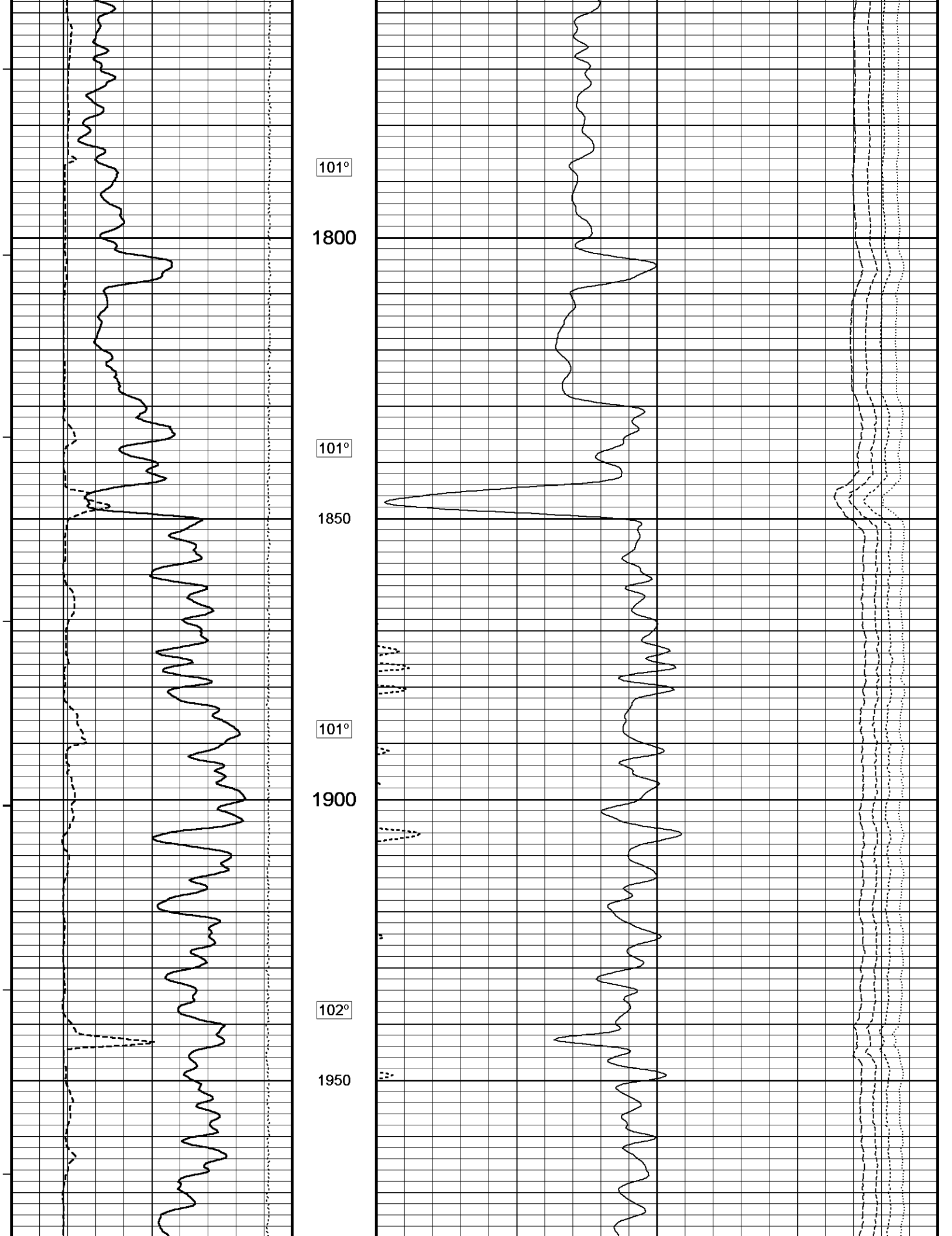

96°
700
96°
750
96°
800
96°
850
←Bit Size→
3-5' Compensated Sonic→
6' Transit Time→
5' Transit Time→
4' Transit Time→
3' Transit Time→

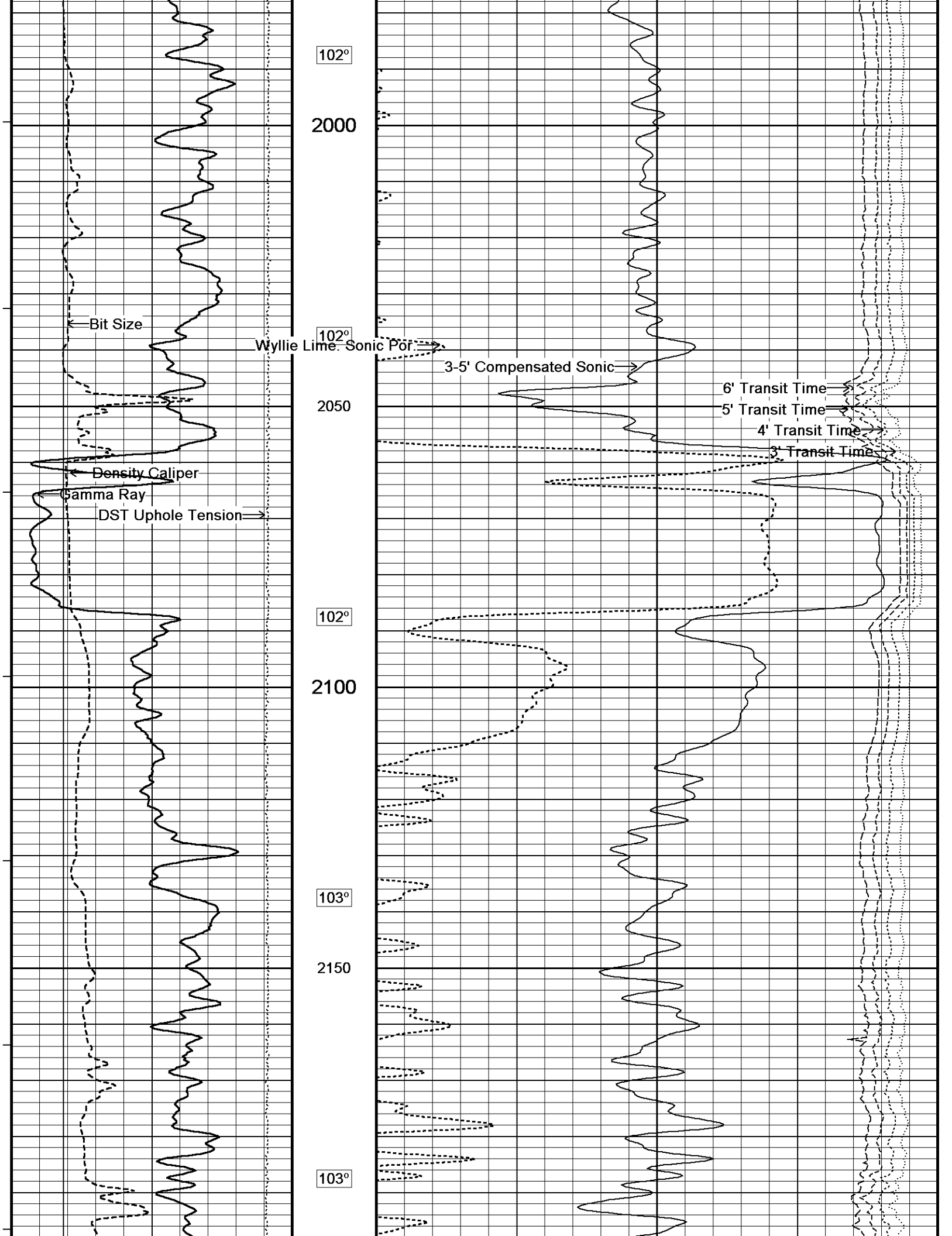

Density Caliper
Gamma Ray
DST Uphole Tension
97°
900
97°
950
97°
1000
98°
1050
97°

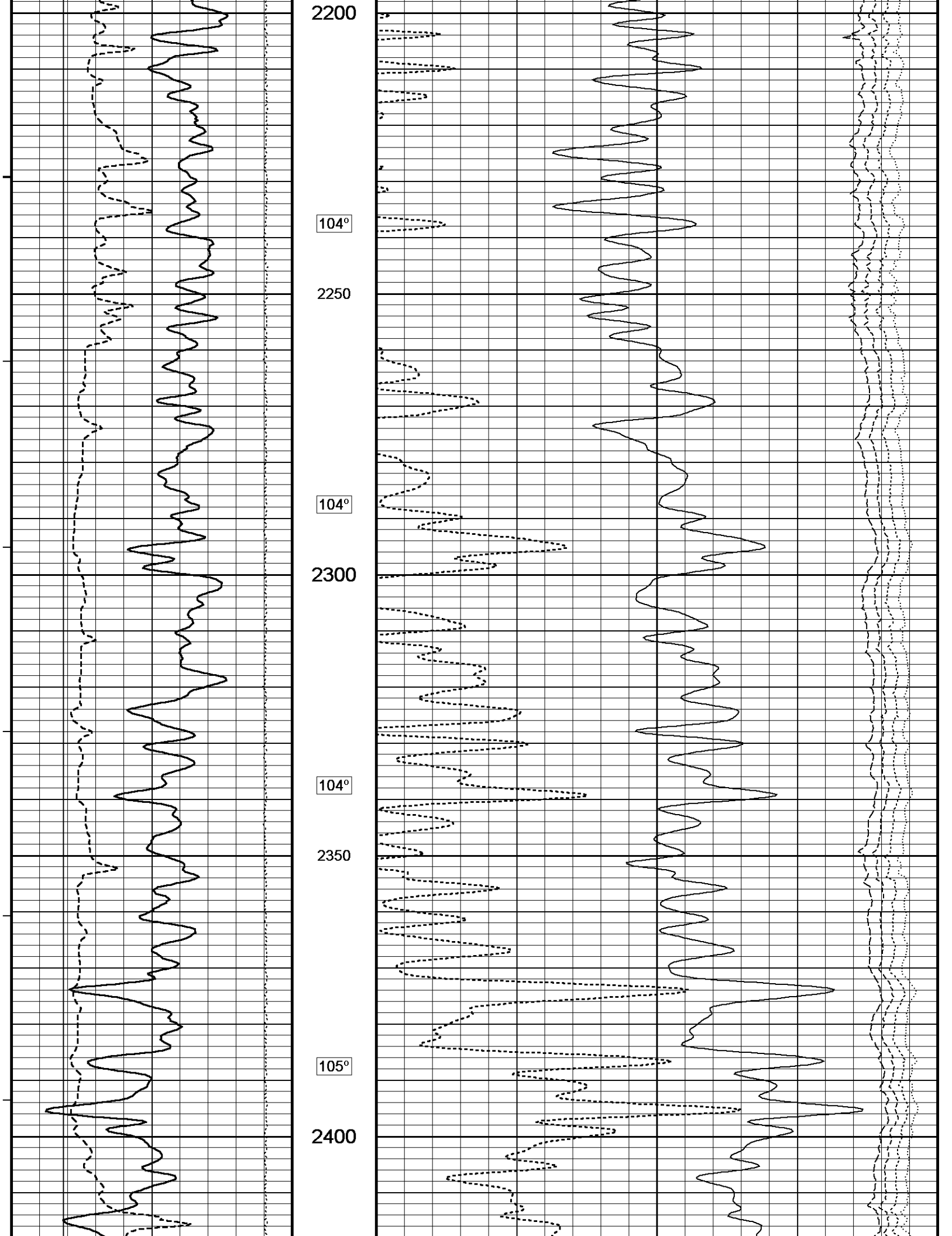

1100
97°
1150
98°
1200
98°
Bit Size
1250
3-5' Compensated Sonic
6' Transit Time
5' Transit Time
4' Transit Time
3' Transit Time
Density Caliper
Gamma Ray
DST Uphole Tension
98°
1300

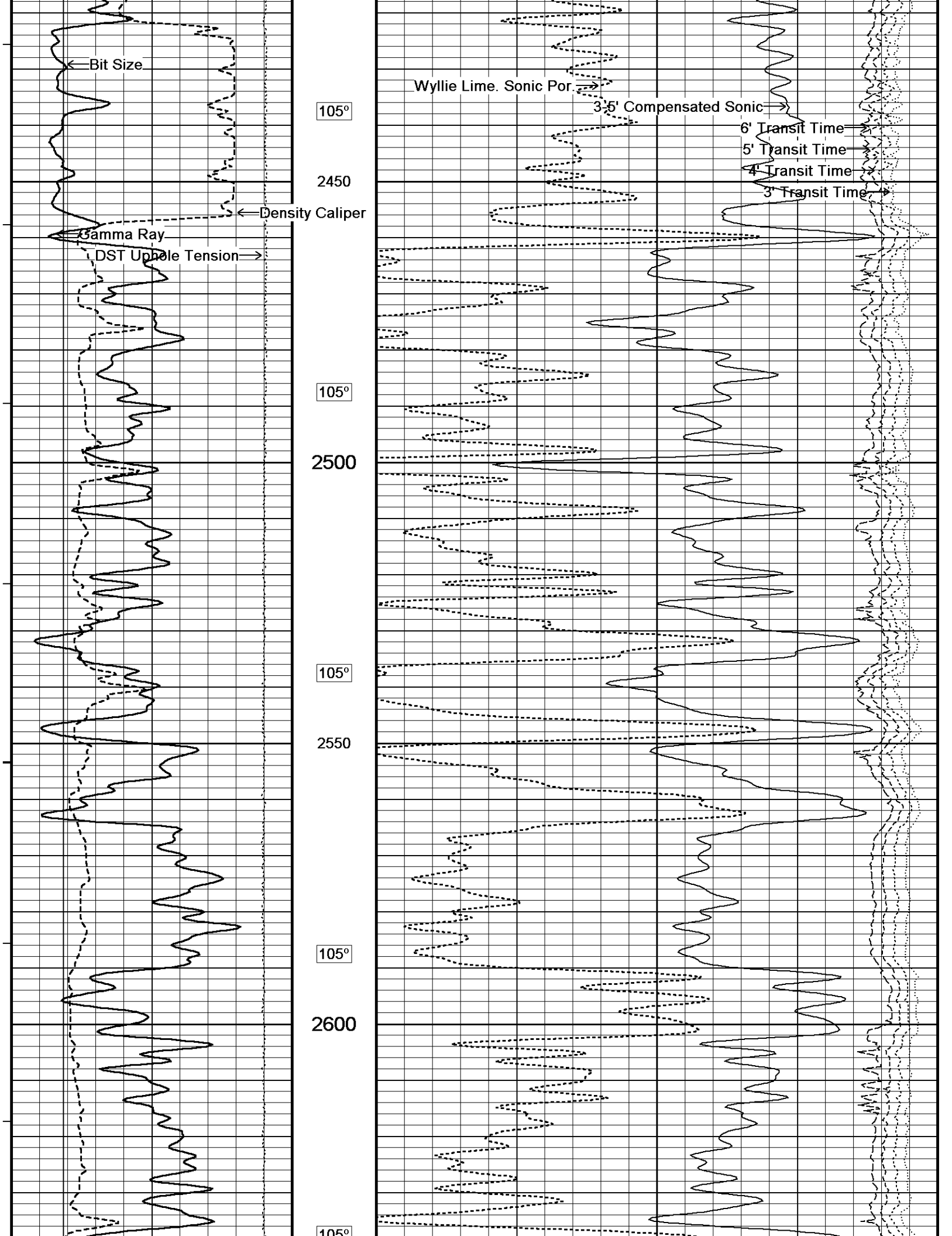

98°
1350
99°
1400
100°
1450
100°
1500
101°

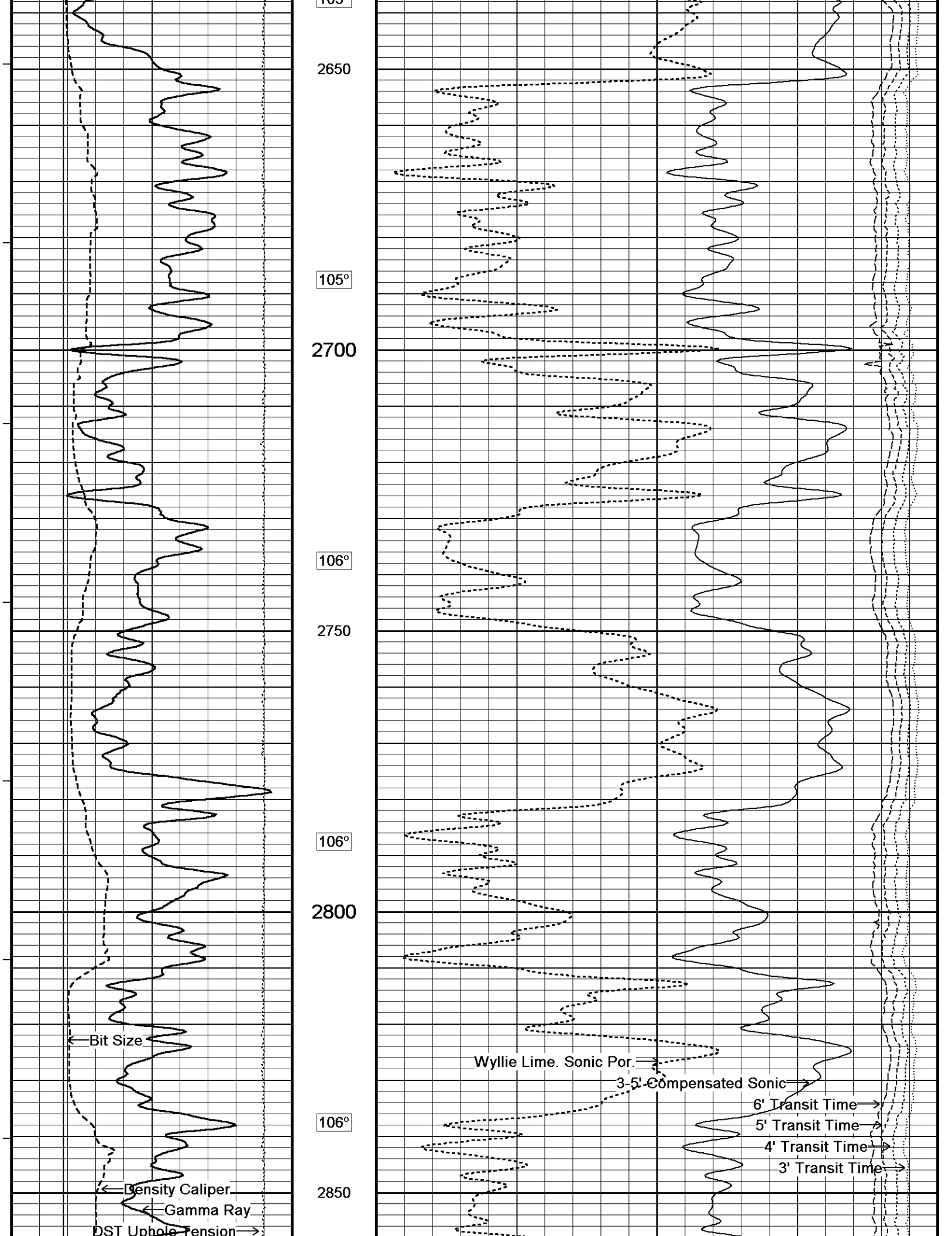

1550
100°
1600
100°
1650
100°
1700
100°
1750
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
3-5' Compensated Sonic
6' Transit Time
5' Transit Time
4' Transit Time
3' Transit Time

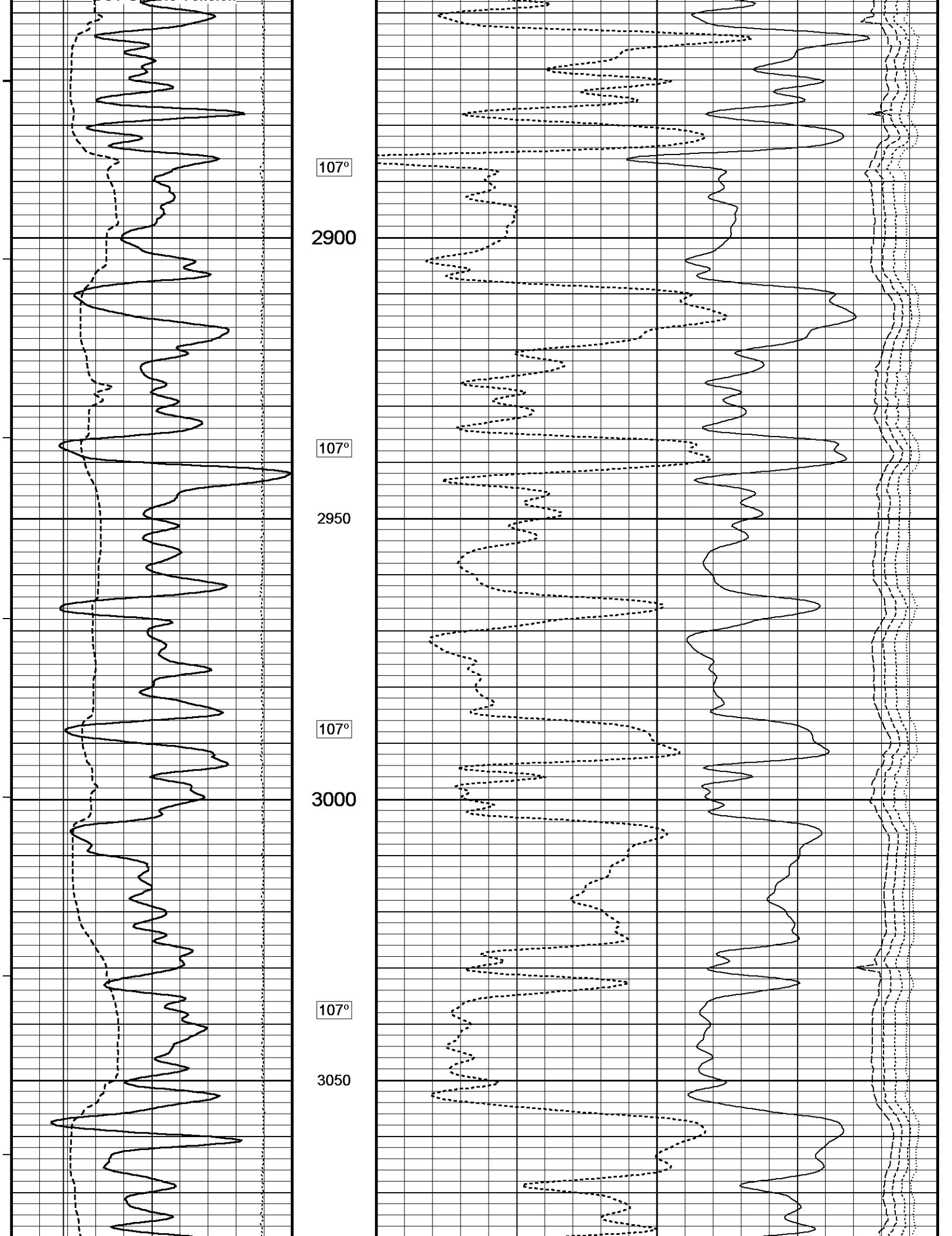

101°
1800
101°
1850
101°
1900
102°
1950

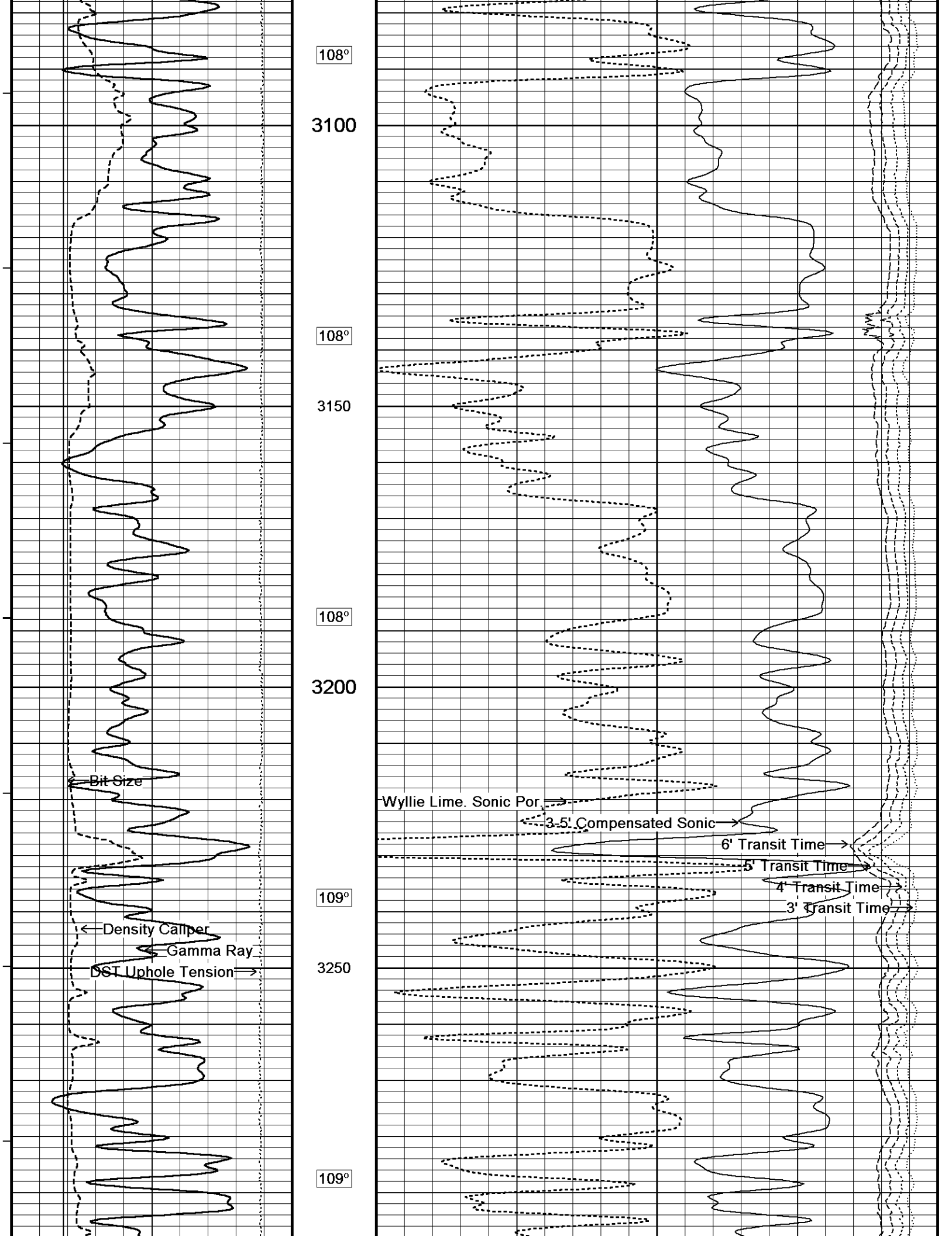

102°
2000
102°
Bit Size
Wyllie Lime. Sonic Por.
3-5' Compensated Sonic
6' Transit Time
5' Transit Time
4' Transit Time
3' Transit Time
2050
Density Caliper
Gamma Ray
DST Uphole Tension
102°
2100
103°
2150
103°

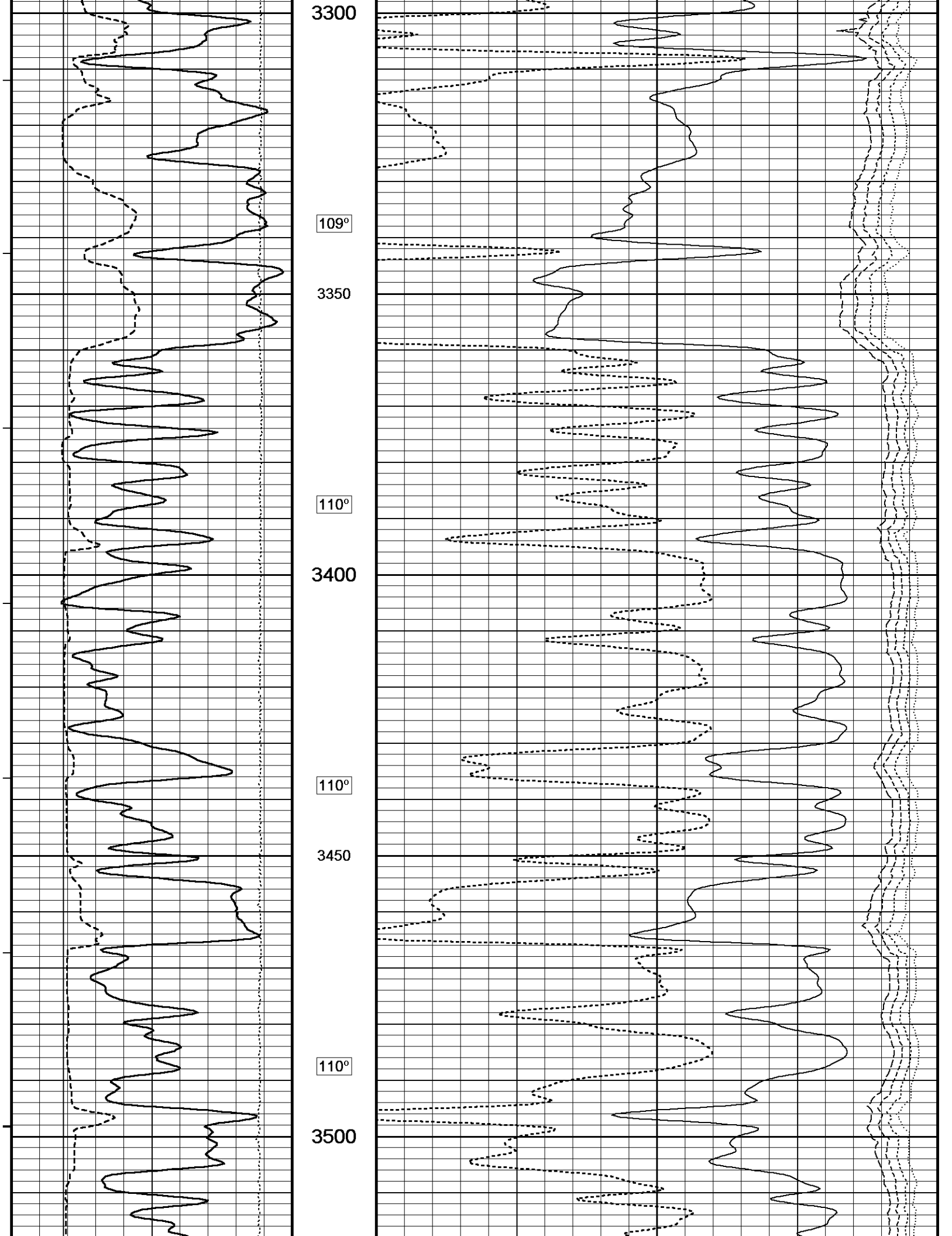

2200
104°
2250
104°
2300
104°
2350
105°
2400

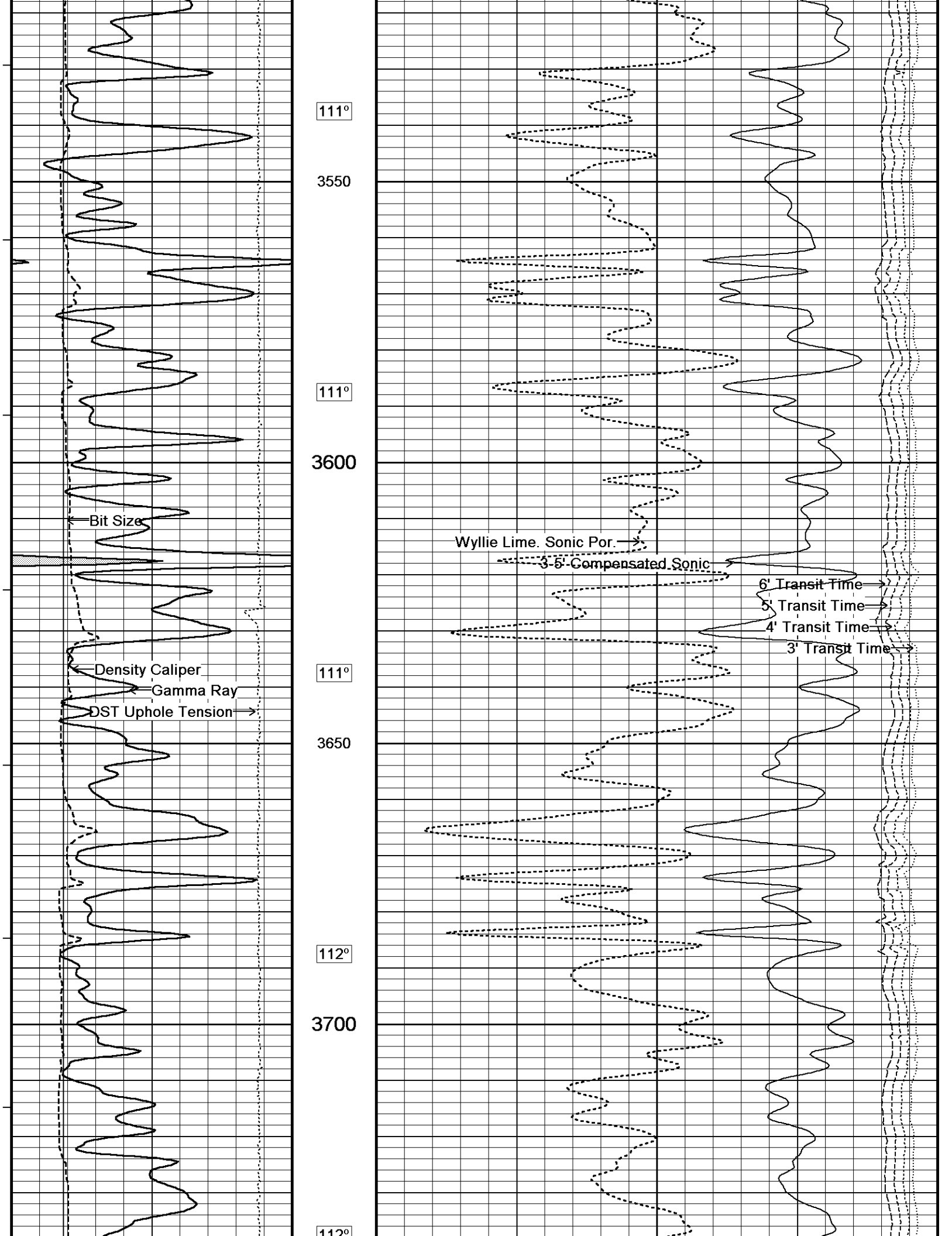

Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Wyllie Lime. Sonic Por
3-5' Compensated Sonic
6' Transit Time
5' Transit Time
4' Transit Time
3' Transit Time
105°
2450
105°
2500
105°
2550
105°
2600
105°

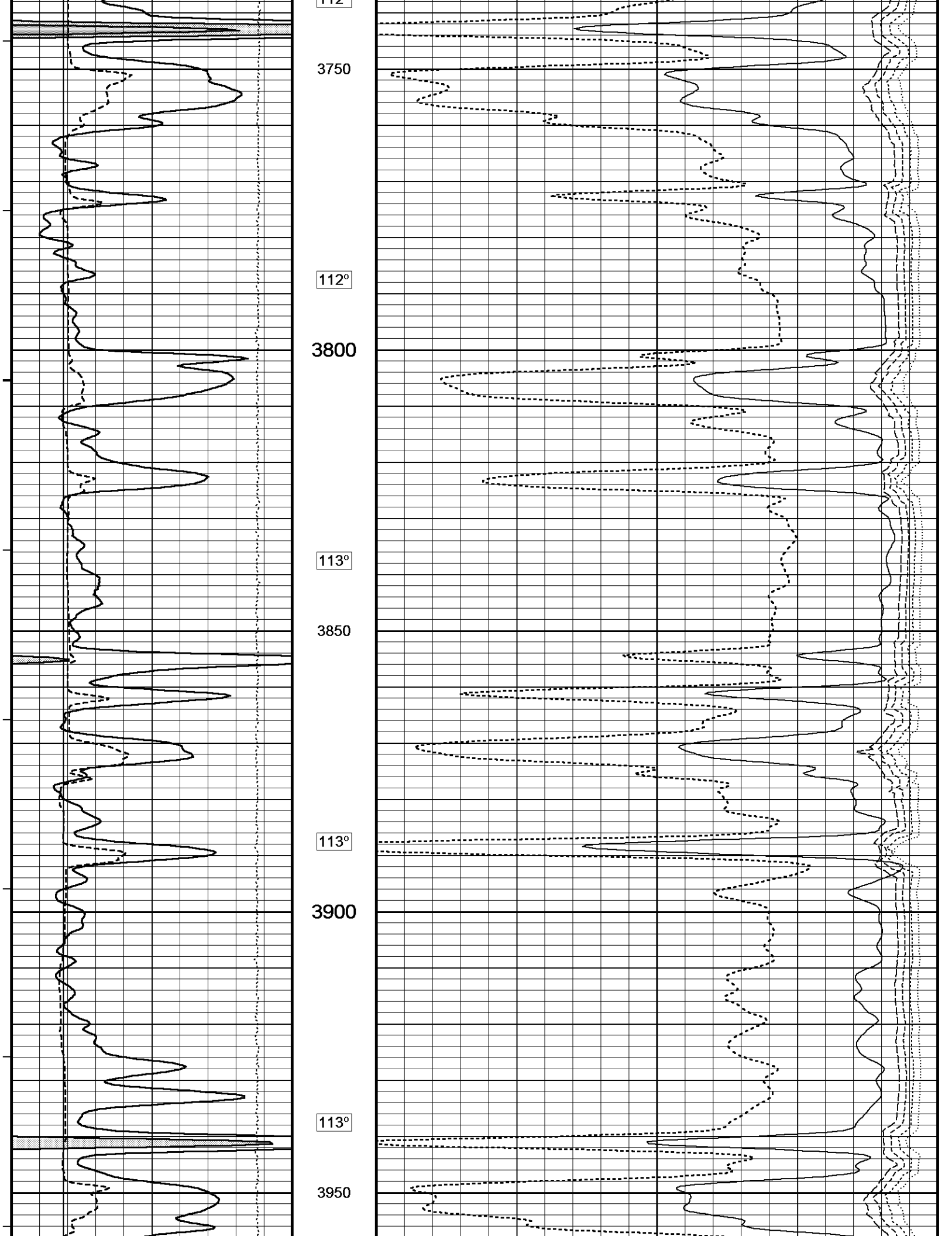

2650
105°
2700
106°
2750
106°
2800
106°
2850
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Wyllie Lime. Sonic Por.
3-5' Compensated Sonic
6' Transit Time
5' Transit Time
4' Transit Time
3' Transit Time

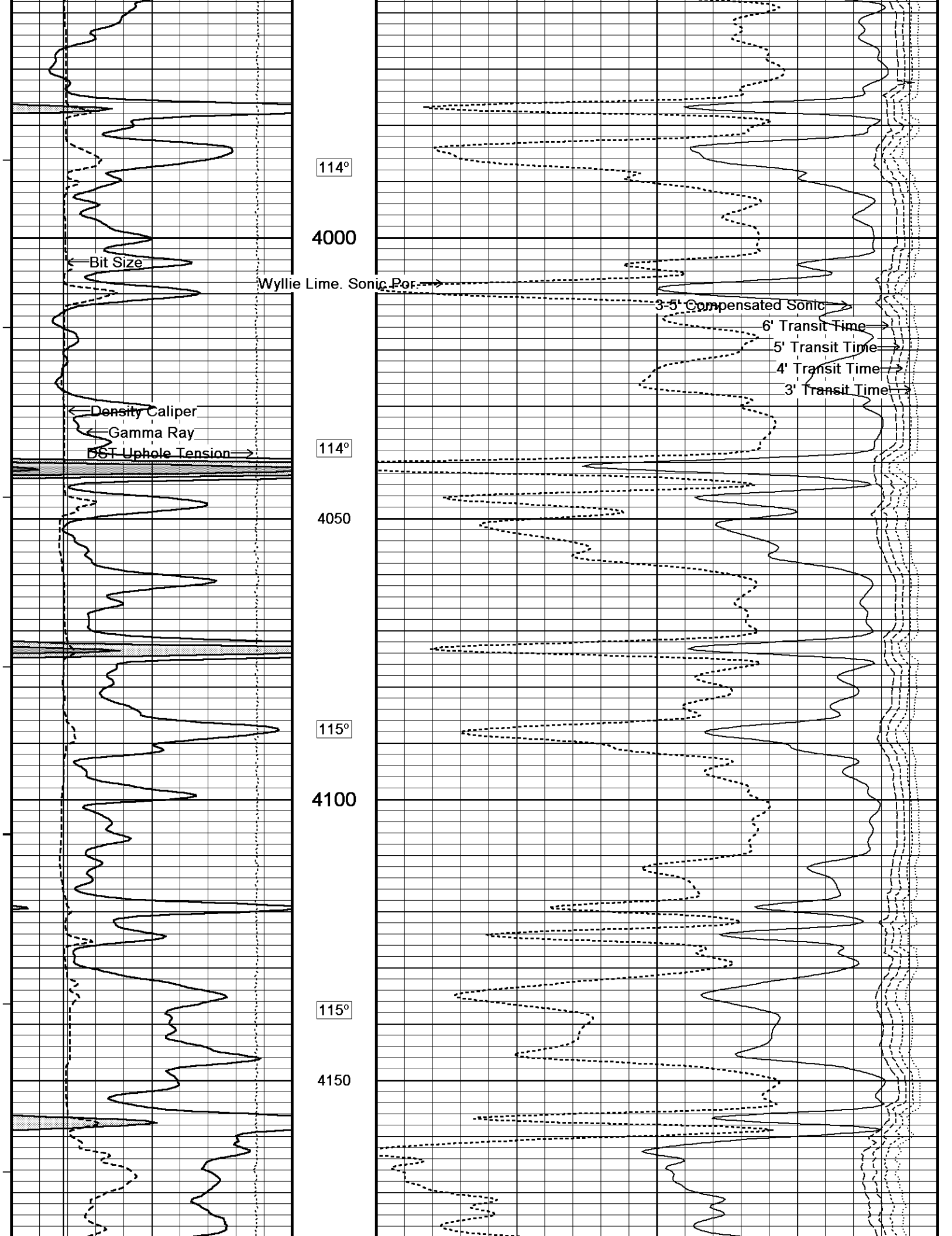

107°
2900
107°
2950
107°
3000
107°
3050

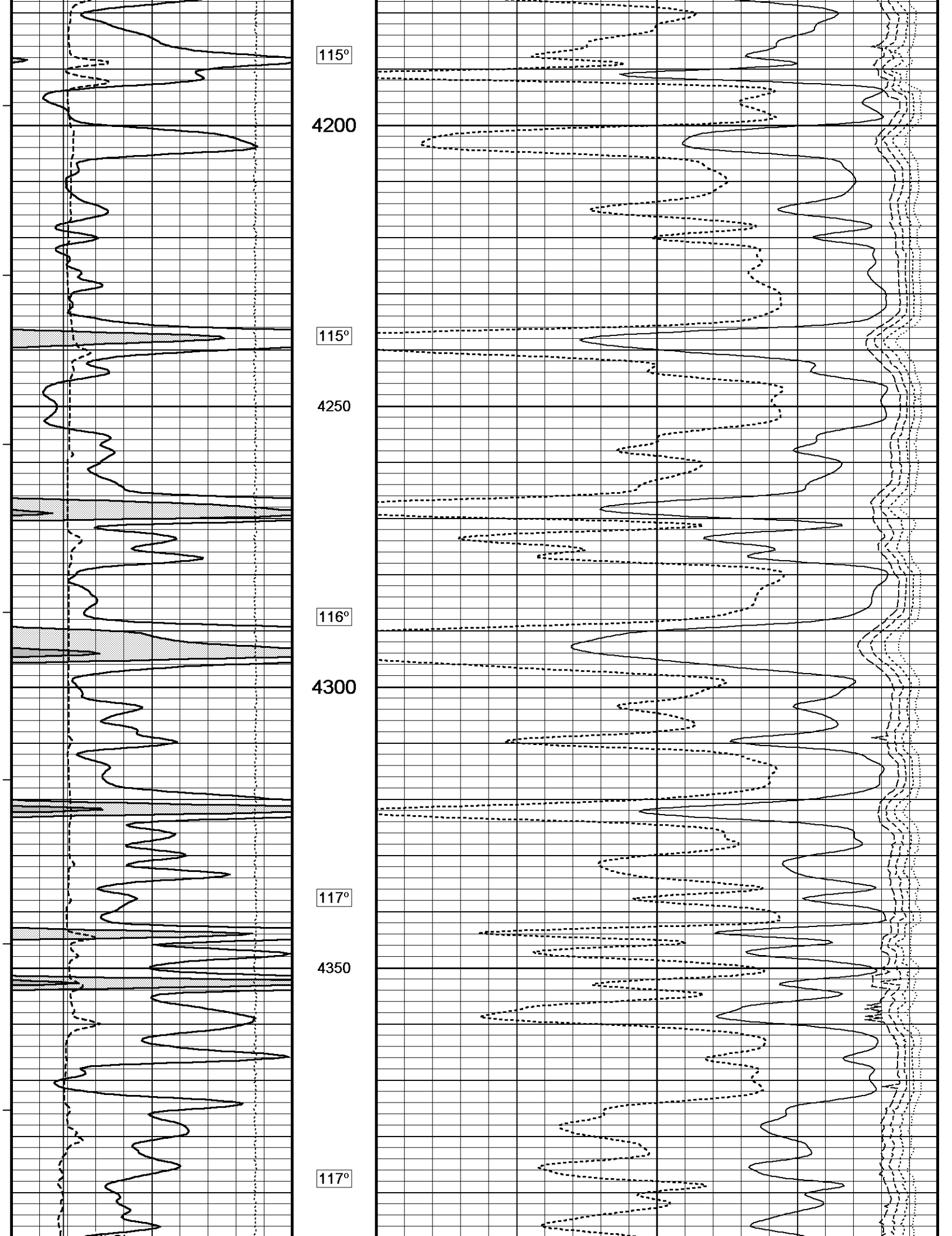

108°
3100
108°
3150
108°
3200
109°
3250
109°
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Wyllie Lime. Sonic Por
3-5' Compensated Sonic
6' Transit Time
5' Transit Time
4' Transit Time
3' Transit Time

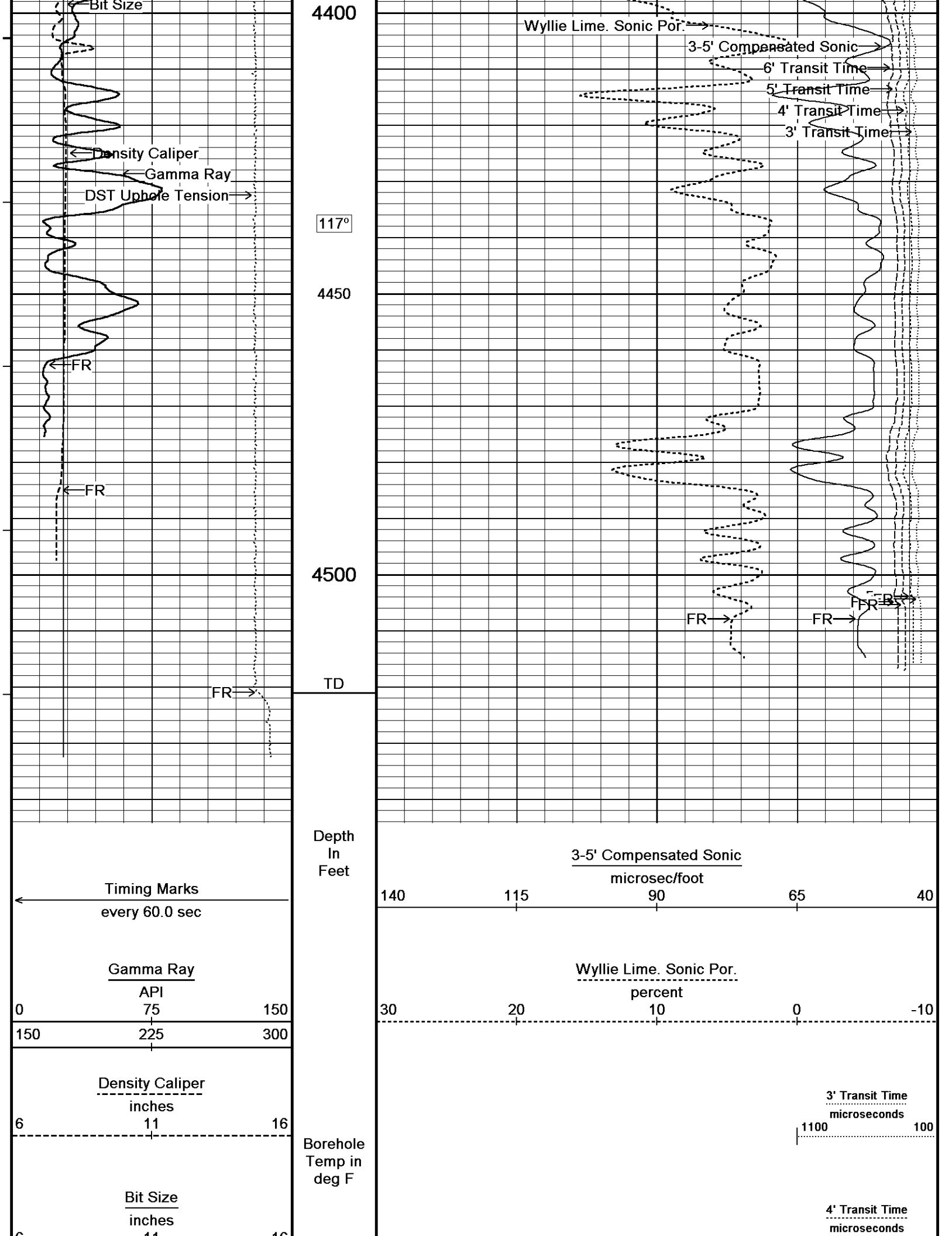

3300
109°
3350
110°
3400
110°
3450
110°
3500


111°
3550
111°
3600
Bit Size
Wyllie Lime. Sonic Por.
3-5' Compensated Sonic
6' Transit Time
5' Transit Time
4' Transit Time
3' Transit Time
Density Caliper
Gamma Ray
DST Uphole Tension
111°
3650
112°
3700
112°


112
3750
112°
3800
113°
3850
113°
3900
113°
3950


114°
4000
Bit Size
Wyllie Lime. Sonic Por.
3-5' Compensated Sonic
6' Transit Time
5' Transit Time
4' Transit Time
3' Transit Time
Density Caliper
Gamma Ray
DST Uphole Tension
114°
4050
115°
4100
115°
4150


115°
4200
115°
4250
116°
4300
117°
4350
117°


Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
FR
FR
FR
4400
117°
4450
4500
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
Depth
In
Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Density Caliper
inches
6
11
16
Bit Size
inches
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
Borehole
Temp in
deg F

6 11 16

1100 100

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 12-DEC-2018 22:48
Filename: C:\Minimus 18.03.9344\Data\Grand Mesa O'Brien #1-9\Grand Mesa O'Brien #1-9_002.dta — Recorded on 12-DEC-2018 19:44
System Versions: Logged with 18.03.9344 Plotted with 18.03.9344

5 INCH MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 12-DEC-2018 22:48
Filename: C:\Minimus 18.03.9344\Data\Grand Mesa O'Brien #1-9\Grand Mesa O'Brien #1-9_001.dta — Recorded on 12-DEC-2018 18:51
System Versions: Logged with 18.03.9344 Plotted with 18.03.9344

Depth
in
Feet

Timing Marks
every 60.0 sec

3-5' Compensated Sonic
microsec/foot
140 115 90 65 40

Gamma Ray
API
0 75 150
150 225 300

Wyllie Lime. Sonic Por.
percent
30 20 10 0 -10

Density Caliper
inches
6 11 16

3' Transit Time
microseconds
1100 100

Borehole
Temp in
deg F

Bit Size
inches
6 11 16

4' Transit Time
microseconds
1100 100

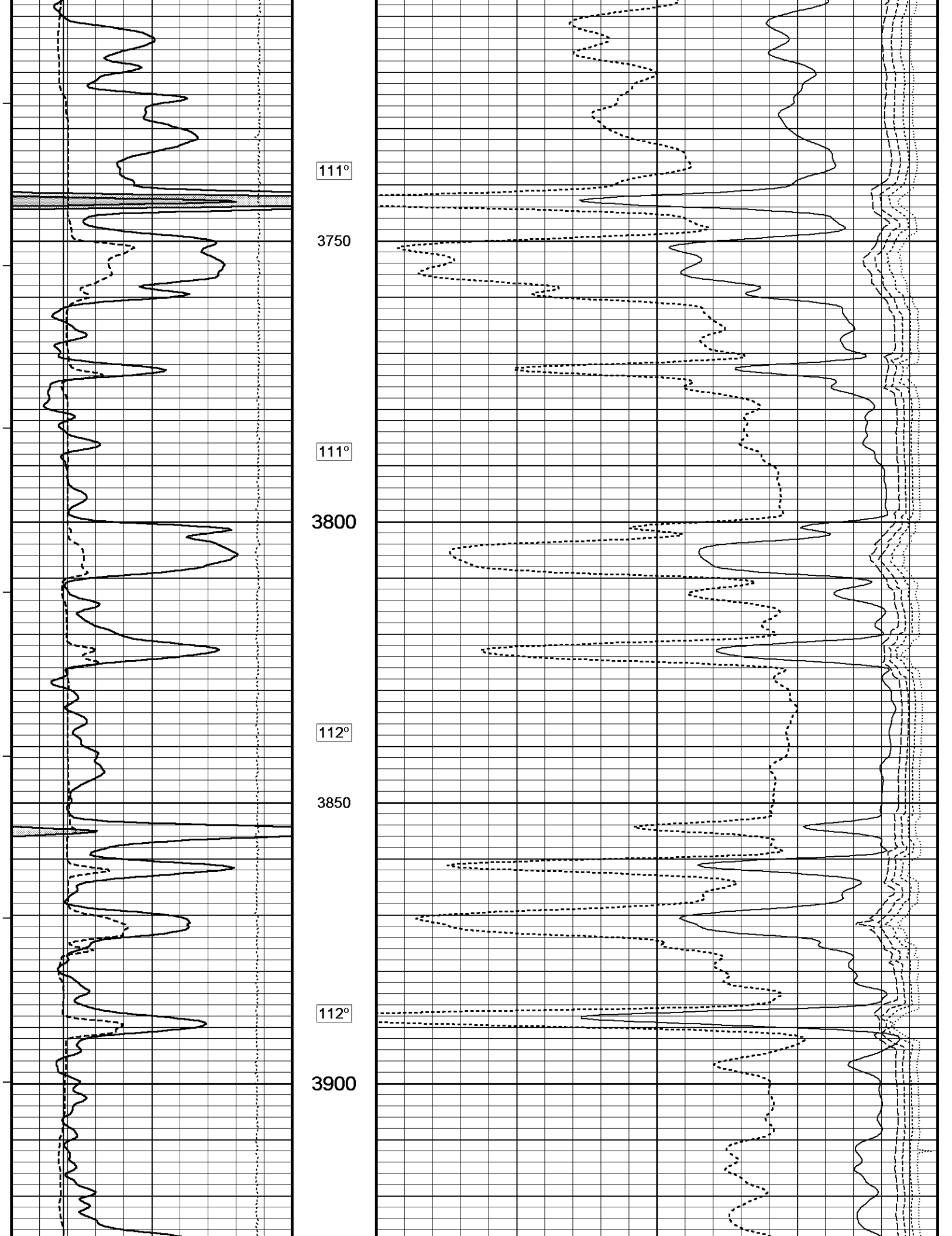
5' Transit Time
microseconds
1100 100

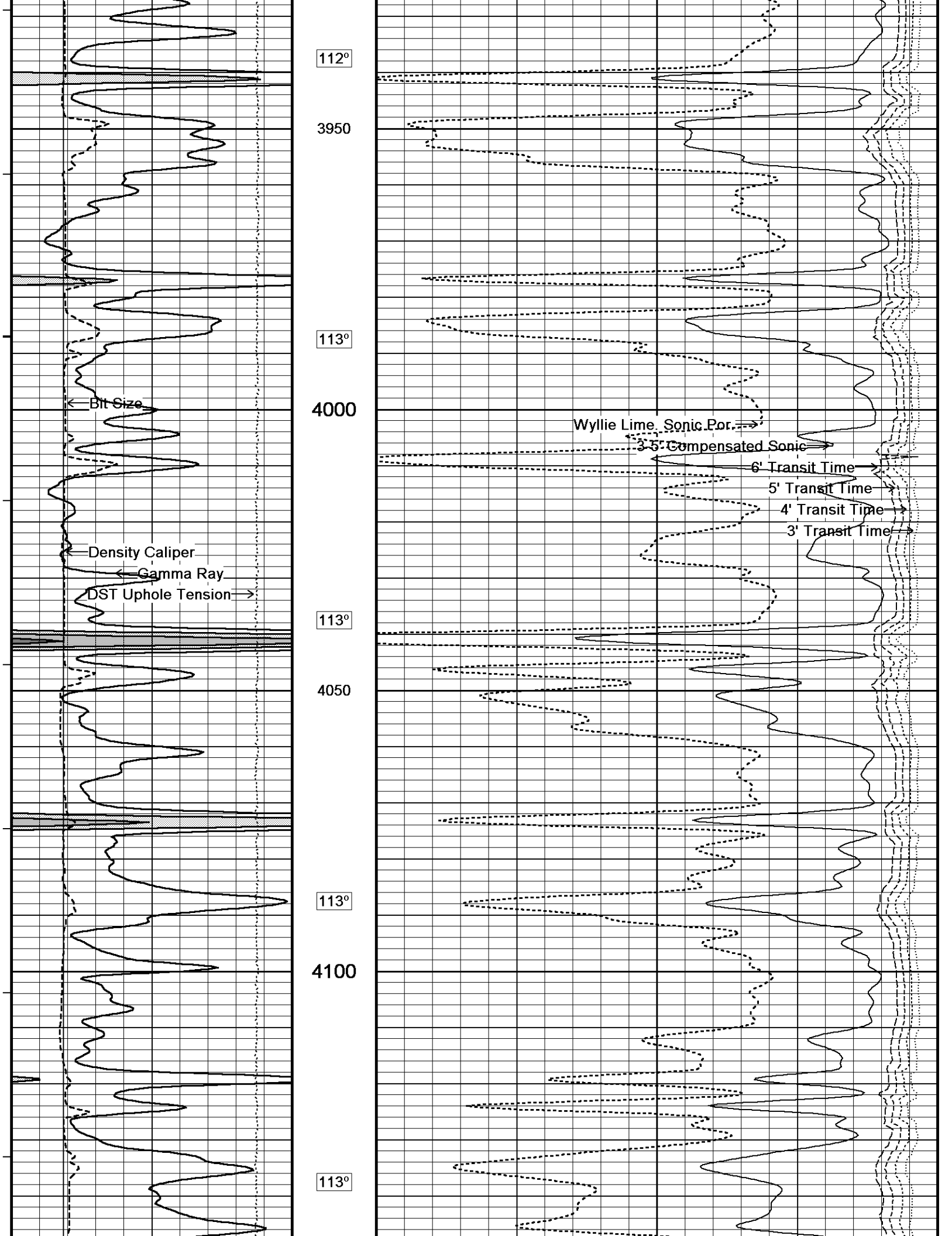
DST Uphole Tension
pounds
5000 0

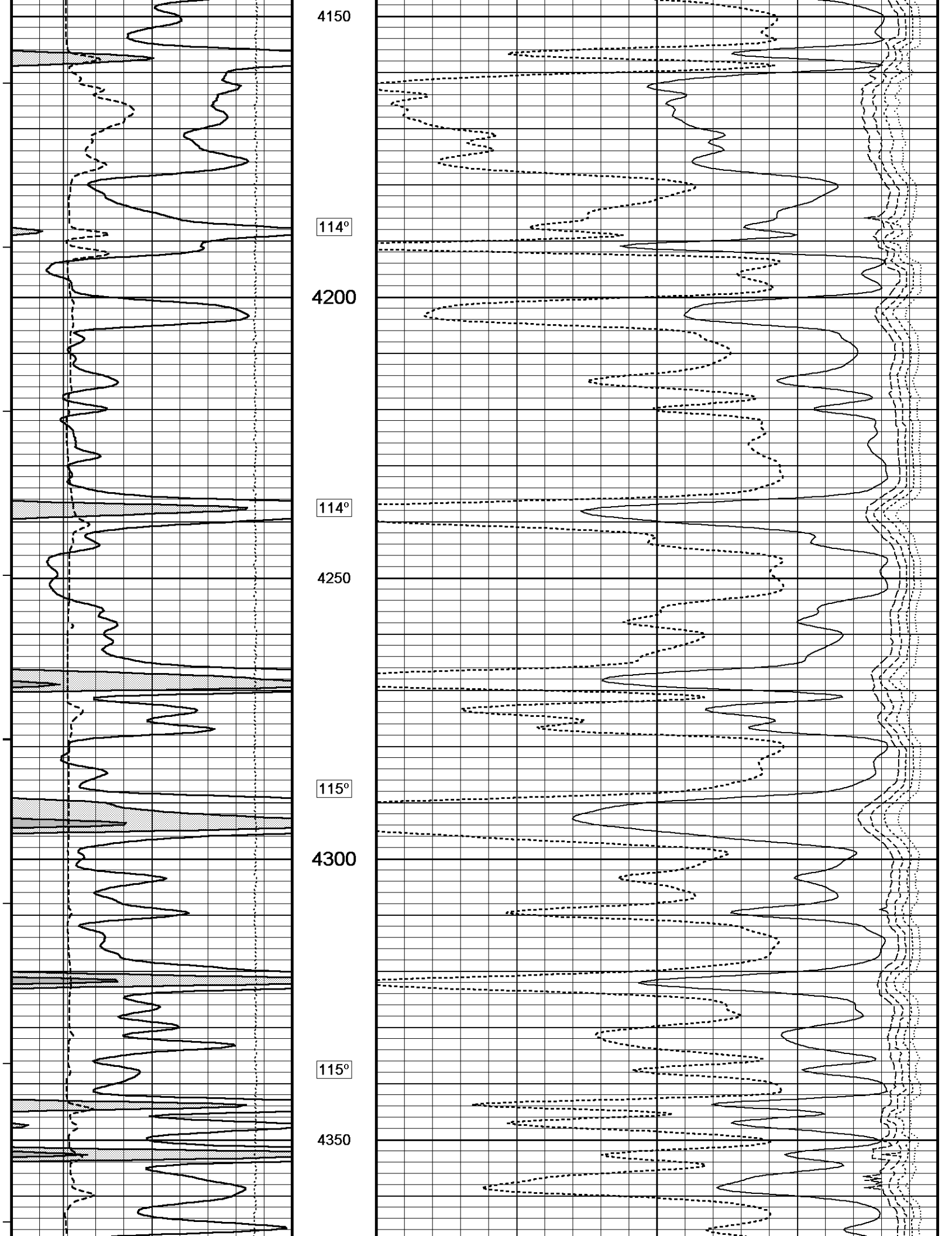
Replay
Scale
1:240

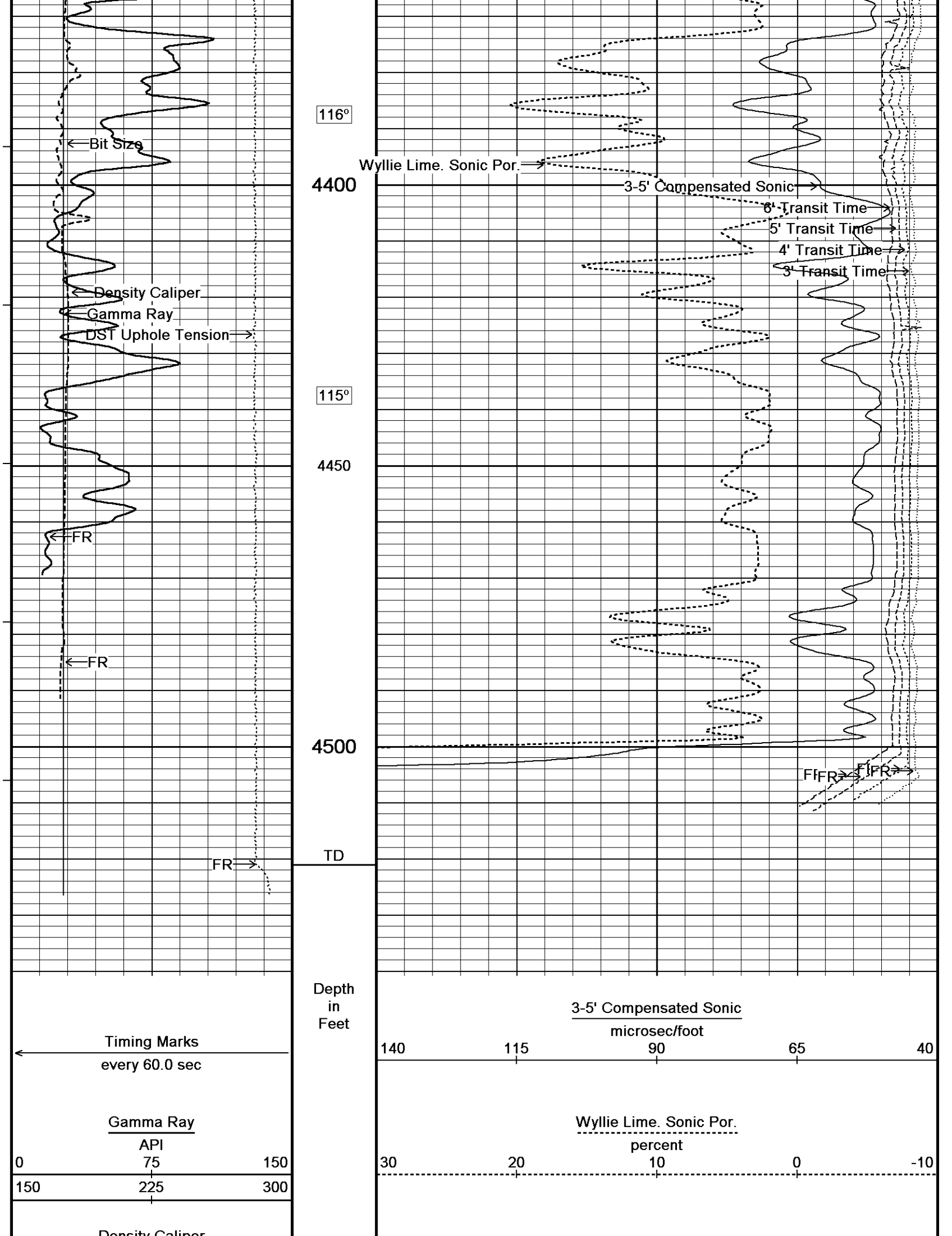
6' Transit Time
microseconds
1100 100

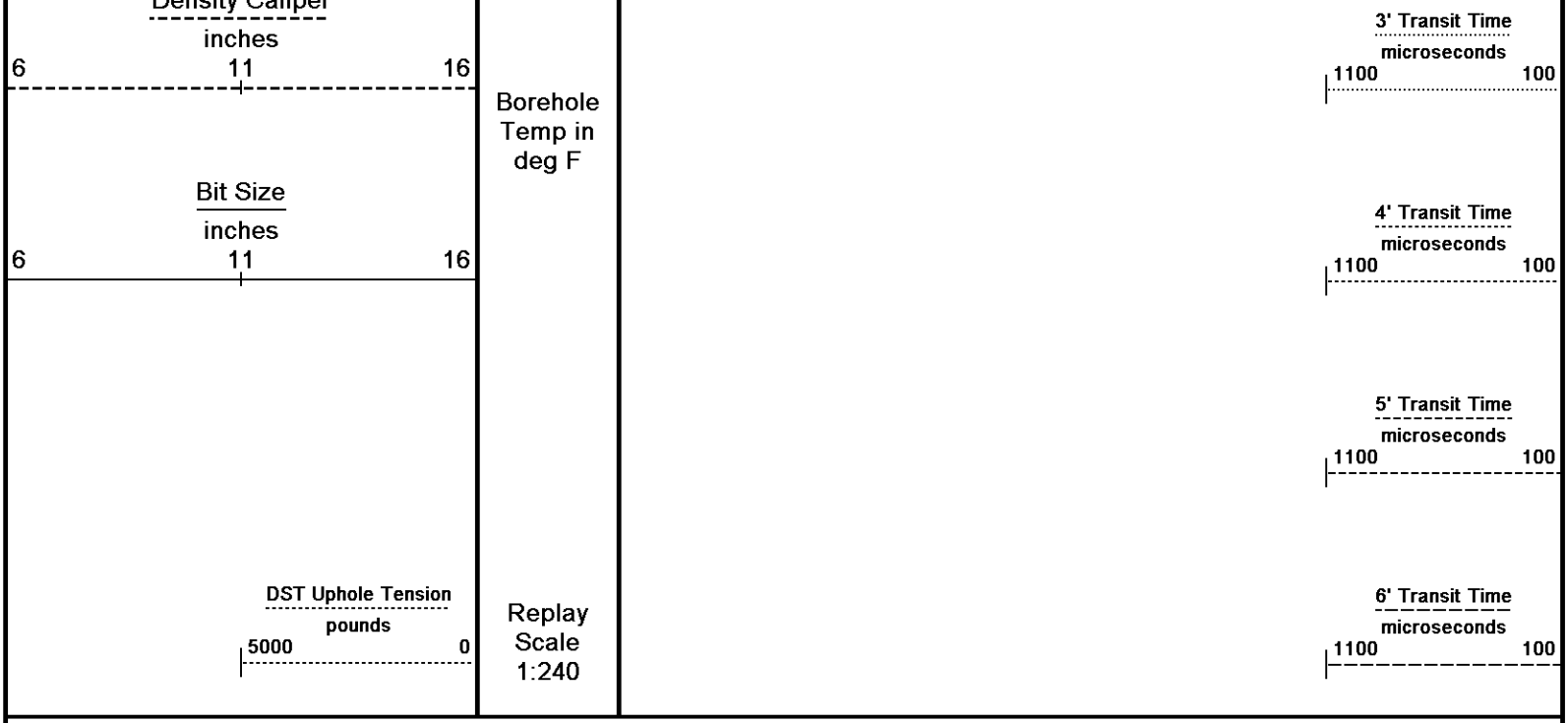
3700


111°
3750
111°
3800
112°
3850
112°
3900


112°
3950
113°
Bit Size
4000
Wyllie Lime. Sonic Por.
3-5' Compensated Sonic
6' Transit Time
5' Transit Time
4' Transit Time
3' Transit Time
Density Caliper
Gamma Ray
DST Uphole Tension
113°
4050
113°
4100
113°


4150
114°
4200
114°
4250
115°
4300
115°
4350


116°
Bit Size
Wyllie Lime. Sonic Por.
4400
3-5' Compensated Sonic
6' Transit Time
5' Transit Time
4' Transit Time
3' Transit Time
Density Caliper
Gamma Ray
DST Uphole Tension
115°
4450
FR
FR
4500
FR
FR
FR
TD
Depth
in
Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Density Caliper
3-5' Compensated Sonic
microsec/foot
140
115
90
65
40
Wyllie Lime. Sonic Por.
percent
30
20
10
0
-10



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 12-DEC-2018 22:48

Filename: C:\Minimus 18.03.9344\Data\Grand Mesa O'Brien #1-9\Grand Mesa O'Brien #1-9_001.dta — Recorded on 12-DEC-2018 18:51

System Versions: Logged with 18.03.9344 Plotted with 18.03.9344

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 18.03.9344\Data\Grand Mesa O'Brien #1-9\Grand Mesa O'Brien #1-9_001.dta

General Constants All 000

Last Edited on 12-DEC-2018,18:23

General Parameters		
Mud Resistivity	1.270	ohm-metres
Mud Resistivity Temperature	75.000	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	Density Caliper	
Rwa Parameters		
Porosity used	Crossplot Porosity	
Resistivity used	Array Ind. Two Res Rt	
RWA Constant A	0.620	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0

Field Calibration on 12-DEC-2018 18:04

Reading No	Measured	Calibrated (lbs)
1	15451.74	0.00
2	16881.45	527.00

SP Calibration MCG-D.K 443

Field Calibration on 10-DEC-2018 15:37

	Measured	Calibrated (mV)
Reference 1	100.8	99.9
Reference 2	-98.4	-99.9

High Resolution Temperature Calibration MCG-D.K 443

Field Calibration on 12-OCT-2018,05:20

	Measured	Calibrated(Deg F)

Lower	50.00	50.00
Upper	212.00	212.00

High Resolution Temperature Constants MCG-D.K 443

Last Edited on 12-OCT-2018,05:20

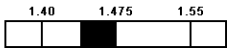
Pre-filter Length	11

Gamma Calibration MCG-D.K 443

Field Calibration on 10-DEC-2018 18:45

	Measured	Calibrated (API)
Background	103	72
Calibrator (Gross)	759	528
Calibrator (Net)	656	456

Gamma Calibration Tolerances MCG-D.K 443

Ratio	1.439		Counts/API

Gamma Constants MCG-D.K 443

Last Edited on 12-DEC-2018,16:59

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.12	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

Micro Normal and Micro Inverse Calibration MMR-B.A 91

Base Calibration on 04-DEC-2018 12:12
Field Check on 10-DEC-2018 18:31

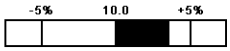
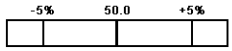
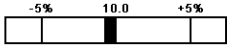
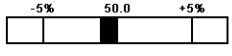
	Resistor 1 (ohm)	Resistor 2 (ohm)
	10.0	50.0

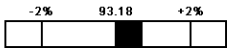
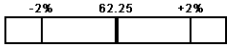
Base Calibration

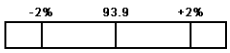
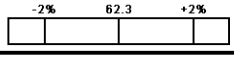
	Measured		Calibrated (ohm-m)	
Micro Normal	10.4	49.9	5.1	25.6
Micro Inverse	9.9	49.4	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	93.9	93.9
Micro Inverse	62.3	62.3

Micro Normal & Micro Inverse Calibration Tolerance MMR-B.A 91

Micro Normal Res. 1	10.4		ohm	Micro Normal Res. 2	49.9		ohm
Micro Inverse Res. 1	9.9		ohm	Micro Inverse Res. 2	49.4		ohm

Micro Normal Base Check	93.9		ohm-m
Micro Inverse Base Check	62.3		ohm-m

Micro Normal Field Check	93.9		ohm-m
Micro Inverse Field Check	62.3		ohm-m

Micro Normal and Micro Inverse Constants MMR-B.A 91

Last Edited on 13-APR-2018,05:04

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	0.0000	inches

Caliper Calibration MMR-B.A 91

Base Calibration on 04-DEC-2018 12:06
Field Calibration on 10-DEC-2018 18:30

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14099	5.98
2	17485	7.97
3	20790	9.86
4	24525	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

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

Caliper Calibration Tolerances MMR-B.A 91

		7.77	7.97	8.17	
Short Arm Field Cal.	7.97				in

Micro-Resistivity Caliper Constants MMR-B.A 91

Sonde Configuration	Resistivity Mode

Micro Laterolog Calibration MMR-B.A 91

Base Calibration on 31-DEC-1999 00:00
Field Check on 31-DEC-1999 00:00

	Resistor 1 (ohm)	Resistor 2 (ohm)
	0.0	0.0

Base Calibration

	Measured		Calibrated (ohm-m)	
	Ref 1	Ref 2	Ref 1	Ref 2
	0.0	0.0	0.0	0.0

Base Check (ohm-m)	Field Check (ohm-m)
0.0	0.0

Micro Laterolog Constants MMR-B.A 91

Pad Type	6 in Solid Nylon B23059	
Standoff Offset	0.0000	inches
Micro Laterolog K Factor	0.0128	
Micro Laterolog Rm K Factor	N/A	

Mudcake Thickness Correction Constants

Mud Cake Source	Constant Value	
Mud Cake Thickness	0.4000	inches
Mud Cake Thickness Caliper		
Mud Cake Resistivity	0.1500	ohm-m
Mud Cake Resistivity Temp.	20.00	Degrees C
Mud Cake Resistivity Source	Constant Value	
Temp. for Rmc Corr.	MCG External Temperature	

Neutron Calibration MDN-B.A 292

Base Calibration on 04-DEC-2018,13:14
Field Check on 10-DEC-2018 18:51

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2910	91	3714	110
Ratio	31.871		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2207	3209
Ratio	0.688	

Field Check

	Calibrated (cps)	
	2173	3158
Ratio	0.688	

Neutron Calibration Tolerances MDN-B.A 292

		-5%	33	+5%
Ratio	31.871			

		0.65	0.7	0.75
Base Check	0.688			

		0.668	0.688	0.708
Field Check	0.688			

Neutron Constants MDN-B.A 292

Last Edited on 12-DEC-2018,16:59

Neutron Source Id	P0204NN	
Neutron Jig Number	NJ5736	
Air Hole Processing	Legacy	
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-B.J 352

Base Calibration on 04-DEC-2018 11:51
Field Check on 10-DEC-2018 18:20

	Resistor 1 (ohm)	Resistor 2 (ohm)
	0.0	1000.0
Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	982.1	126.8
Base Check		276.0
Field Check		275.6

FE Calibration Tolerances MFE-B.J 352

Reference 2	982.1	-3% 980.0 +3%	ohm
Base Check	276.0	-2% 277.0 +2%	ohm-m
Field Check	275.6	-2% 276.0 +2%	ohm-m

FE Constants MFE-B.J 352

Last Edited on 12-DEC-2018,16:58

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Borehole Correction Constants		
Sonde Position	0.5	inches
Hole Size Source	Density Caliper	
Hole Size Constant Value	N/A	inches
Rm Source	Global Value: Temperature Corrected	
Temp. for Rm Corr.	MCG External Temperature	

Sonic Constants MSS-C.K 319

Last Edited on 08-JUL-2018,09:57

Maximum Boundary Contrast	70.00	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
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

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
Waveform Discriminator Filter	Not Applied	
Semblance Window Width	150.00	micro-sec
Semblance Processing Enabled	Yes	
Tracking Boxes Enabled In Processing	Yes	

Induction Calibration MAI-B.J 390

Factory Loop Calibration 10-DEC-2018 18:16
Field Check on 10-DEC-2018 18:19

Factory Loop Calibration

High Conductivity Reference Resistor	3.3	ohm
Low Conductivity Reference Resistor	333.3	ohm

	Measured Signal (unitless)		Reference Conductivity (mmho/m)		Calibration	
Array	Low	High	Low	High	Gain	Offset
1 (near)	16.8	458.6	9.3	966.2	2.166	-27.2
2	6.3	377.7	7.6	821.4	2.191	-6.2
3	3.8	258.6	5.2	566.0	2.200	-3.0
4 (far)	1.9	132.3	2.6	279.2	2.121	-1.4

Array Temperature 77.9 Deg F

Tool Checks

	Factory Reference (mmho/m)		Before Survey (mmho/m)		
Array	Low	High	Low	High	
1 (near)	12.1	3958.5	12.1	3958.4	
2	28.9	3562.3	29.0	3562.1	
3	27.1	3060.6	27.1	3060.6	
4 (far)	19.1	2087.5	19.1	2087.5	
Array Temperature		63.5		63.6	Deg F

Induction Check Tolerances MAI-B.J 390

Low Array 1	12.1	10.6 / 12.1 / 13.6	mmho/m	High Array 1	3958.4	-0.5% / 3958.5 / +0.5%	mmho/m
Low Array 2	29.0	27.4 / 28.9 / 30.4	mmho/m	High Array 2	3562.1	-0.5% / 3562.3 / +0.5%	mmho/m
Low Array 3	27.1	25.6 / 27.1 / 28.6	mmho/m	High Array 3	3060.6	-0.5% / 3060.6 / +0.5%	mmho/m
Low Array 4	19.1	17.6 / 19.1 / 20.6	mmho/m	High Array 4	2087.5	-0.5% / 2087.5 / +0.5%	mmho/m

Induction Constants MAI-B.J 390

Last Edited on 12-DEC-2018,16:58

Induction Model	RtAP-WBM

Borehole Correction Constants

Tool Centred	No
Hole Size Source	Density Caliper

Hole Size Constant Value	N/A	inches
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
Rm Source	Global Value: Constant Temperature	
Temp. for Rm Corr.	N/A	
Borehole Correction Method	Default	
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

Symmetrised Receiver Gains

Receiver 1	1.00
Receiver 2	1.00
Receiver 3	1.00
Receiver 4	1.00

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-B.J 390

Field Calibration on 15-MAY-2018,12:48

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

High Resolution Temperature Constants MAI-B.J 390

Last Edited on 06-MAR-2018,13:01

Pre-filter Length	11

Caliper Calibration MPD-C.A 216

Base Calibration on 04-DEC-2018 12:24
Field Calibration on 10-DEC-2018 18:22

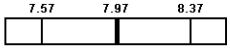
Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15599	3.99
2	24289	5.98
3	32989	7.97
4	41250	9.86
5	50464	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.99	7.97

Caliper Calibration Tolerances MPD-C.A 216

Long Arm Field Cal. 7.99 

in

Photo Density Calibration MPD-C.A 216

Base Calibration on 04-DEC-2018 12:43
Field Check on 10-DEC-2018 18:28

Density Calibration

Base Calibration	Measured Near	Measured Far	Calibrated (sdu) Near	Calibrated (sdu) Far
Background	996	1188		
Reference 1	49174	23910	59556	30836
Reference 2	19716	2252	24941	2541
Field Check at Base	996.3	1187.9		
Field Check	998.9	1196.1		

PE Calibration

Base Calibration	WS	Measured WH	Measured Ratio	Calibrated Ratio
Background	183	895		
Reference 1	20502	49024	0.422	0.371
Reference 2	5636	19607	0.291	0.272
Field Check at Base	182.6	895.4		
Field Check	184.9	897.0		

Photo Density Calibration Tolerances MPD-C.A 216

Near Density Ratio	2.57	-5% 2.52 +5%	Far Density Ratio	21.36	-5% 21.00 +5%
PE Calibration	0.122	0.089 0.110 0.131			
Near Den. Field Check	998.9	-3% 996.3 +3%	Far Den. Field Check	1196.1	-3% 1187.9 +3%
PE WS Field Check	184.9	-6% 182.6 +6%	PE WH Field Check	897.0	-6% 895.4 +6%

Density Constants MPD-C.A 216

Last Edited on 12-DEC-2018,16:59

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	1.12	gm/cc
Mud Density Type		
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	
Precision Enhanced Density Processing	Applied	

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 18.03.9344\Data\Grand Mesa O'Brien #1-9\Grand Mesa O'Brien #1-9_001.dta

Cablehead, 11 pin

Cablehead, 1" pin
CBH-CB 264 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Swivel Head Adaptor
SHA-J.B 595 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

Compact Comms Gamma
MCG-D.K 443 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity
MMR-B.A 91 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron
MDN-B.A 292 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.913 in

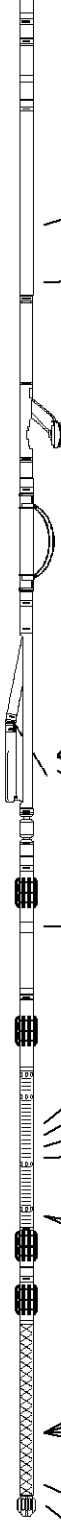
Compact Knuckle Joint
SKJ-D.A 167 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic
MSS-C.K 319 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction
MAI-B.J 390 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 68.16 ft Weight: 526.9 lb



58.18 ft	GRGC - MCG Gamma Ray
55.28 ft	CGXT - MCG External Temperature
48.92 ft	MBTC - MMR Caliper
47.93 ft	MINV - Micro-inverse
47.93 ft	MNRL - Micro-normal
43.13 ft	NPRL - Limestone Neutron Por.
35.89 ft	AVOL - Annular Volume
35.89 ft	HVOL - Hole Volume
35.89 ft	CLDC - Density Caliper
33.96 ft	DPRL - Limestone Density Por.
33.96 ft	DEN - Compensated Density
33.96 ft	DCOR - Density Correction
33.90 ft	PDPE - PE
26.24 ft	FEFE - Shallow FE
16.96 ft	TR11 - 4' Transit Time
16.46 ft	TR21 - 3' Transit Time
15.95 ft	TR12 - 6' Transit Time
15.46 ft	TR22 - 5' Transit Time
12.96 ft	SPRL - Wyllie Lime. Sonic Por.
12.96 ft	DT35 - 3-5' Compensated Sonic
3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	R60O - Array Ind. One Res 60
3.34 ft	CTAO - Array Ind. One Cond Ct
3.34 ft	RTAO - Array Ind. One Res Rt
0.23 ft	SPCG - Spontaneous Potential
Tool Zero	(0.13ft from bottom)
-0.13 ft	SMTU - DST Uphole Tension

All measurements relative to tool zero.

COMPANY	GRAND MESA OPERATING COMPANY
WELL	OBRIEN #1-9
FIELD	WILDCAT
PROVINCE/COUNTY	LANE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2661	feet	First Reading	4508.00	feet

Elevation Kelly Bushing	2664	feet	First Reading	4500.00	feet
Elevation Drill Floor	2659	feet	Depth Driller	4520.00	feet
Elevation Ground Level	2656	feet	Depth Logger	4521.00	feet

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