

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

COMPANY	SHAKESPEARE OIL CO., INC.			
WELL	BAHM 2-21			
FIELD	WILDCAT			
PROVINCE/COUNTY	SCOTT			
COUNTRY/STATE	U.S.A. / KANSAS			
LOCATION	335' FNL & 2120' FEL			
PERMIT NUMBER	SE NW NW NE			
SEC 21	TWP 16S	RGE 34W	Other Services	
Latitude	38.655160581	MAI/MFE		MPD/MDN
Longitude	-101.080919172	MML		
API Number	15-171-21101			
Permanent Datum GL, Elevation 3135 feet				Elevations: KB 3145.00 DF 3143.00 GL 3135.00
Log Measured From KB				
Drilling Measured From KB @ 10 FEET				
Date	02-NOV-2014			
Run Number	ONE			
Service Order	7036-102129390			
Depth Driller	4890.00			
Depth Logger	4890.00			
First Reading	4877.04			
Last Reading	266.00			
Casing Driller	267.00			
Casing Logger	266.00			
Bit Size	7.875			
Hole Fluid Type	WBM			
Density / Viscosity	9.20	lb/USg	53.00	CP
PH / Fluid Loss	10.00		8.90	ml/30Min
Sample Source	MUDPIT			
Rm @ Measured Temp	0.425 @ 75.0			
Rmf @ Measured Temp	0.34 @ 75.0			
Rmc @ Measured Temp	0.51 @ 75.0			
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.297 @ 110.0			
Time Since Circulation	4 HOURS			
Max Recorded Temp	111.00			
Equipment / Base	13096	LIB		
Recorded By	DEREK CARTER			
Witnessed By	TIM PRIEST			
IOB #	LB14-343			

BOREHOLE RECORD

Last Edited: 02-NOV-2014 12:41

Bit Size inches	Depth From feet	Depth To feet
7.875	267.00	4890.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	267.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 14.03.4558
- TOOL STRING: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION
- HARDWARE:
 - MDN: DUAL BOWSPRING ECCENTRALIZER
 - MFE: 1 X 0.5 INCH STANDOFF
 - MSS: 2 X 0.5 INCH STANDOFF
 - MAI: 2 X 0.5 INCH STANDOFF
- 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 3800 FT.: 360 CU. FT.

- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO 380 FT.: 280 CU. FT.

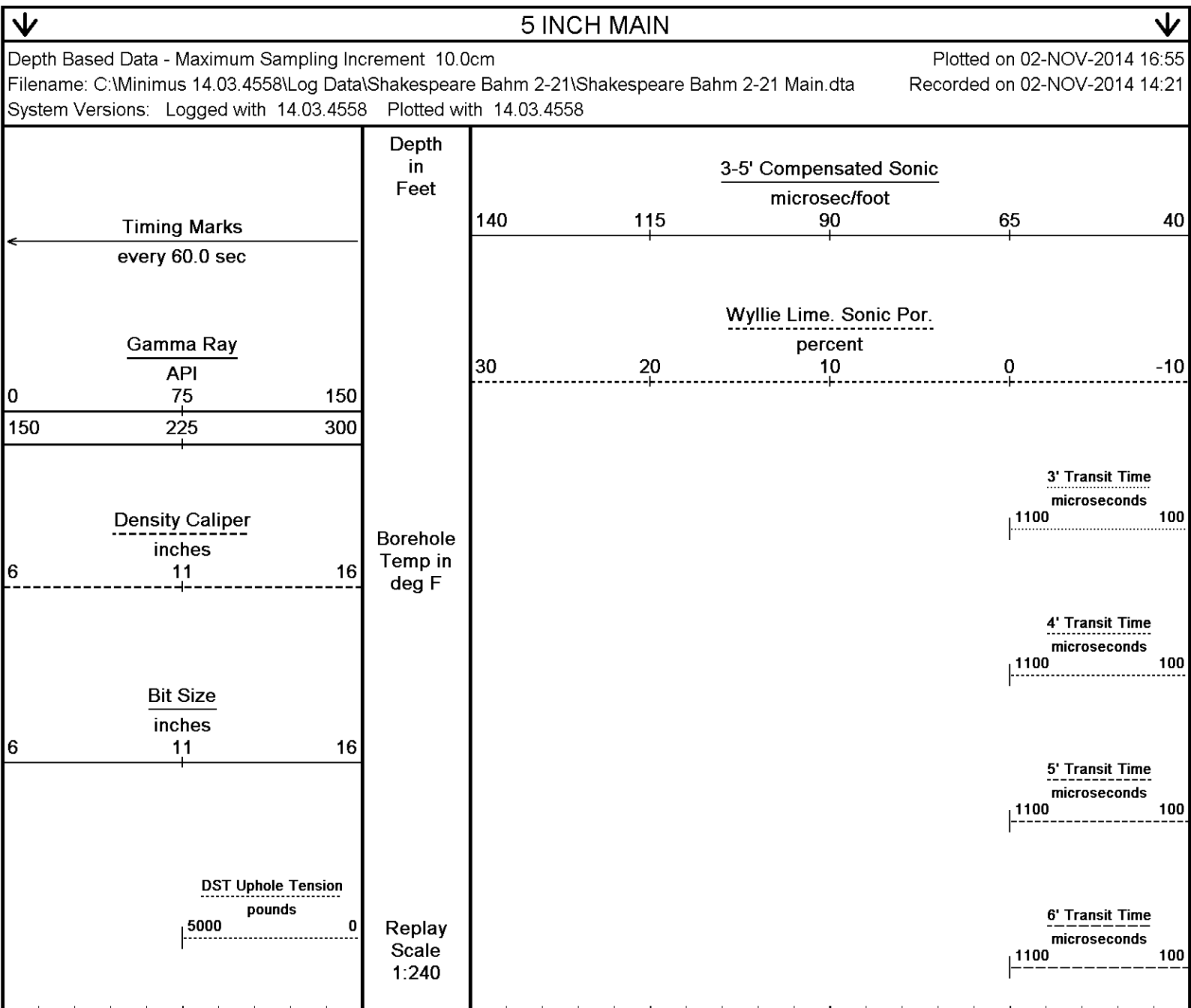
- SERVICE ORDER # 7036-102129390

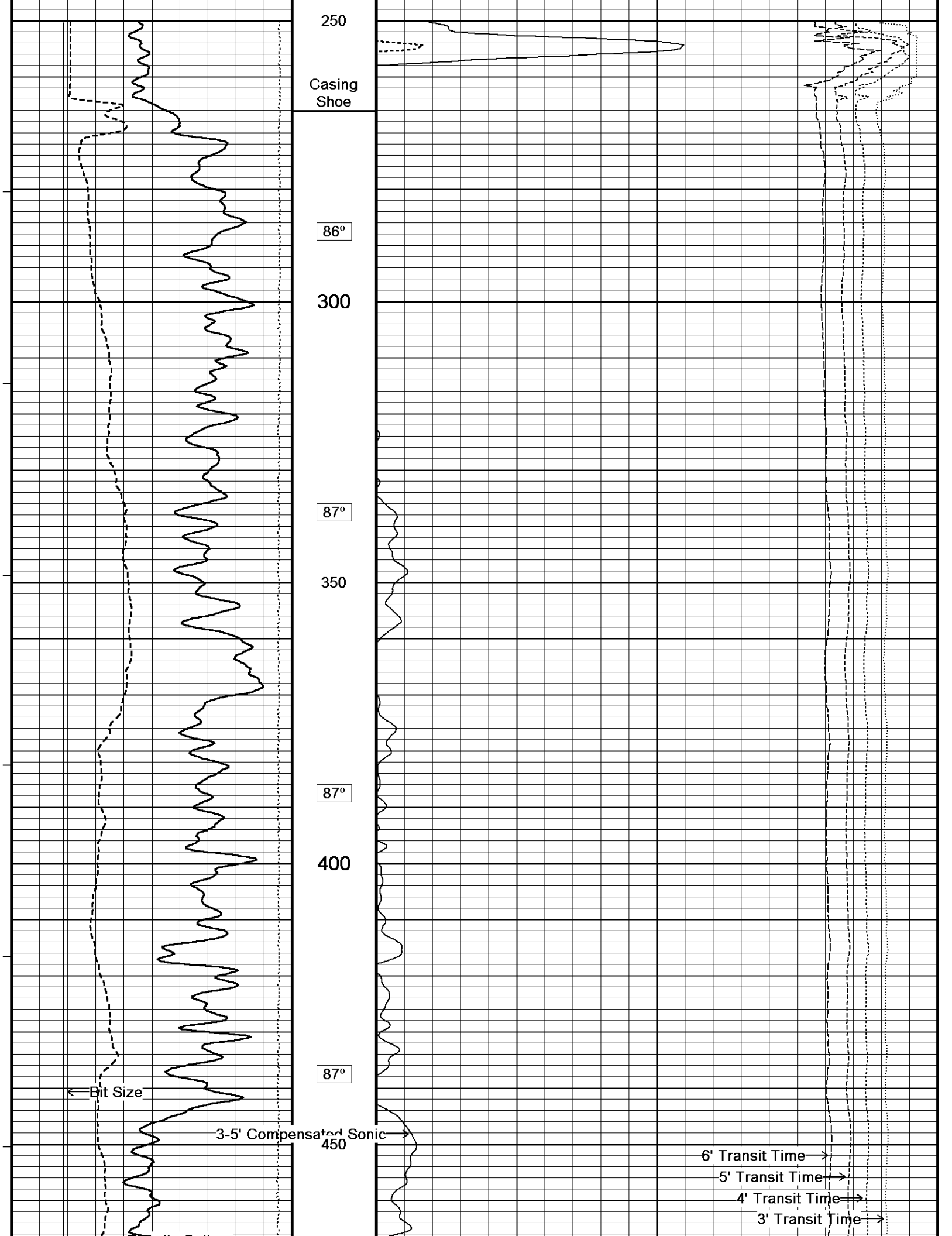
- RIG: H.D. DRILLING #2

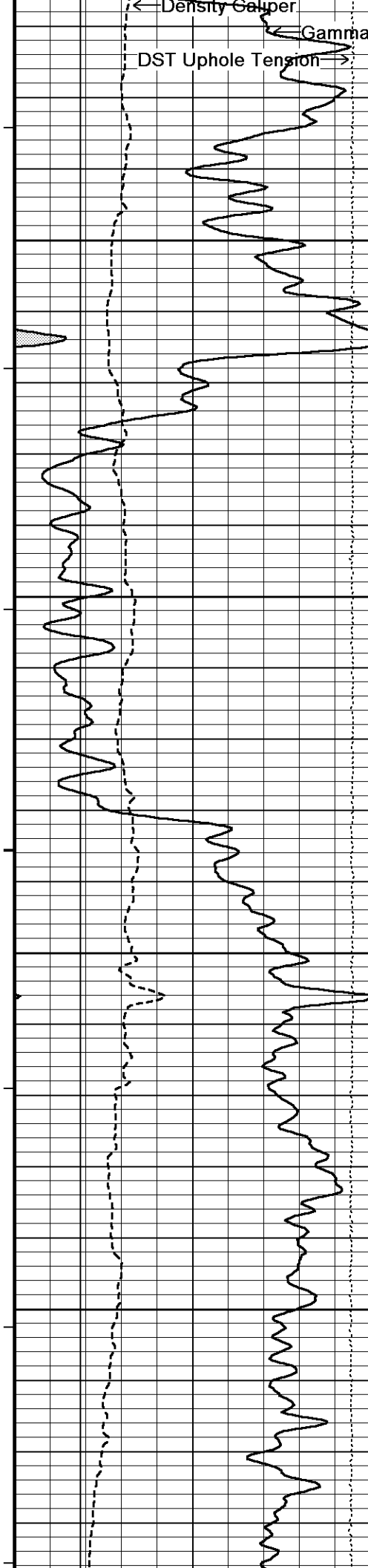
- ENGINEER: DEREK CARTER

- OPERATORS: CARLOS RAMIREZ

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.







88°

500

88°

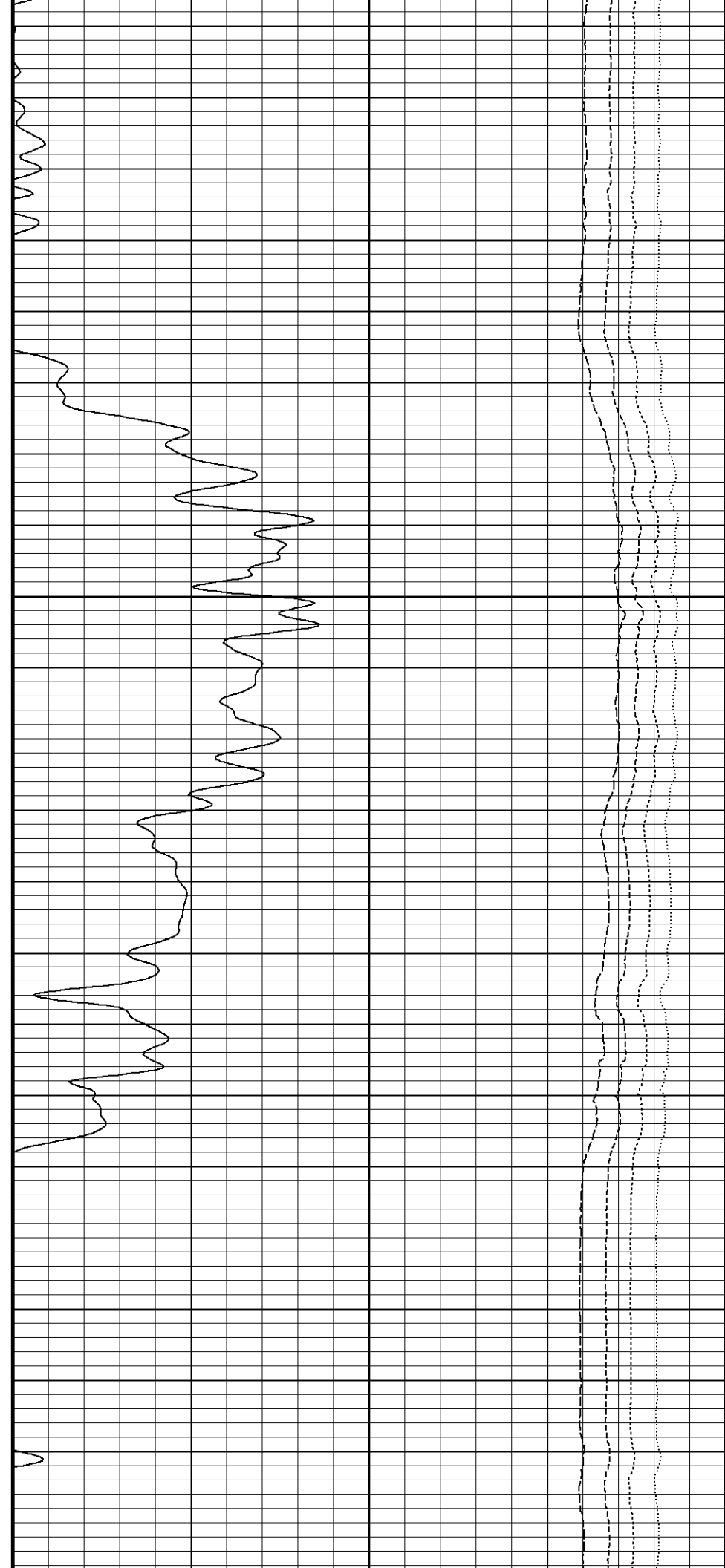
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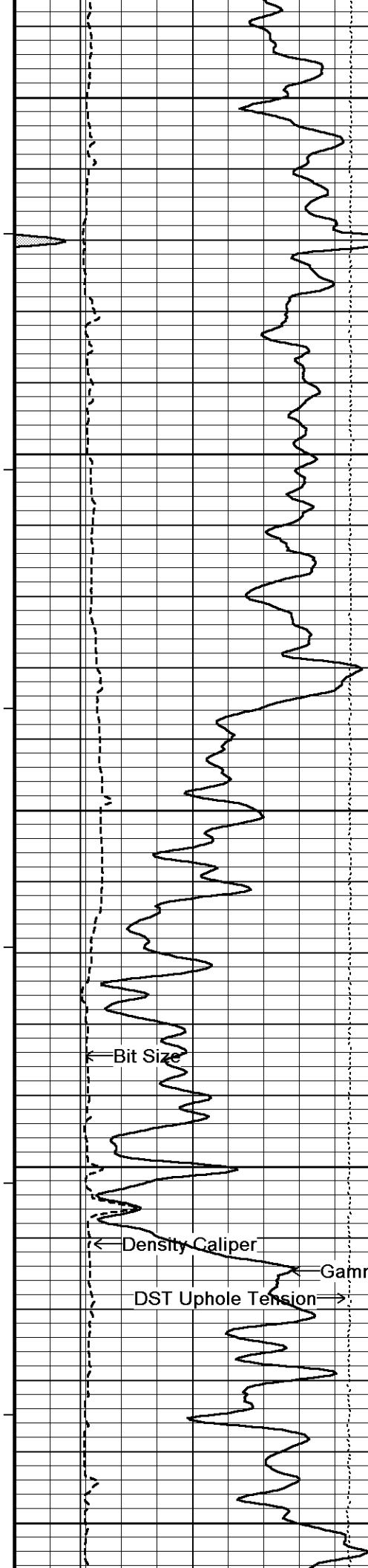
89°

600

89°

650





89°

700

90°

750

90°

800

90°

850

91°

900

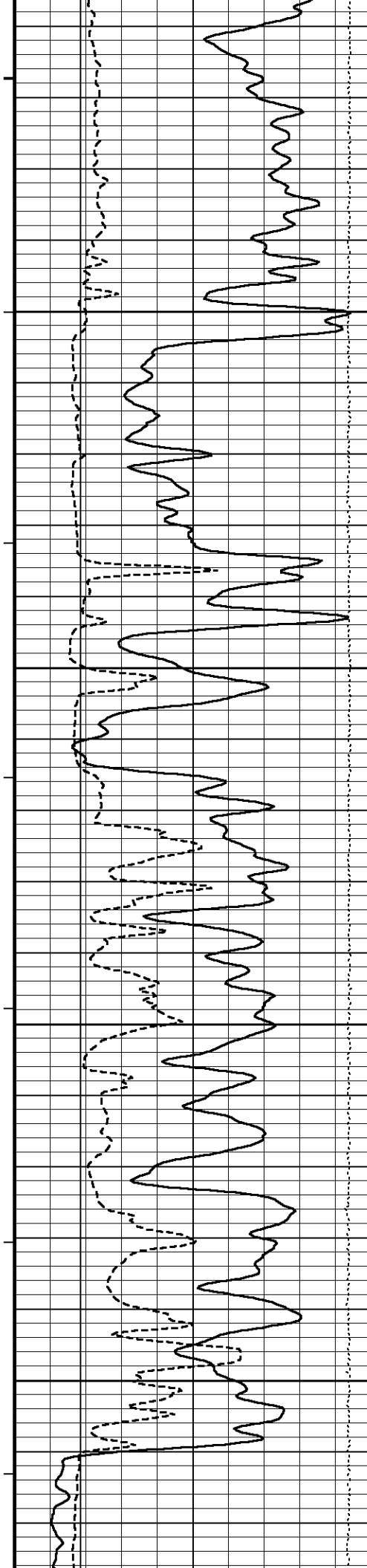
3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time



91°

950

91°

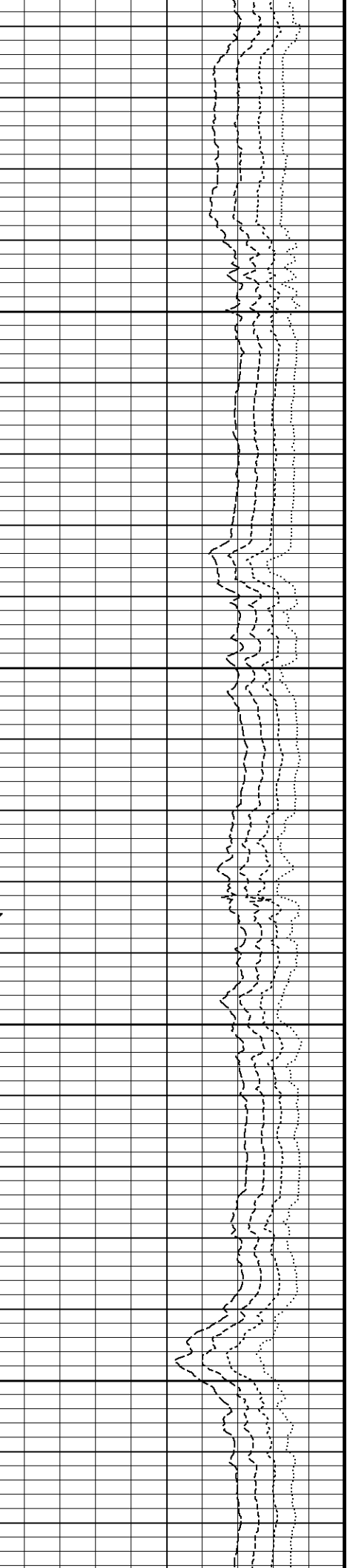
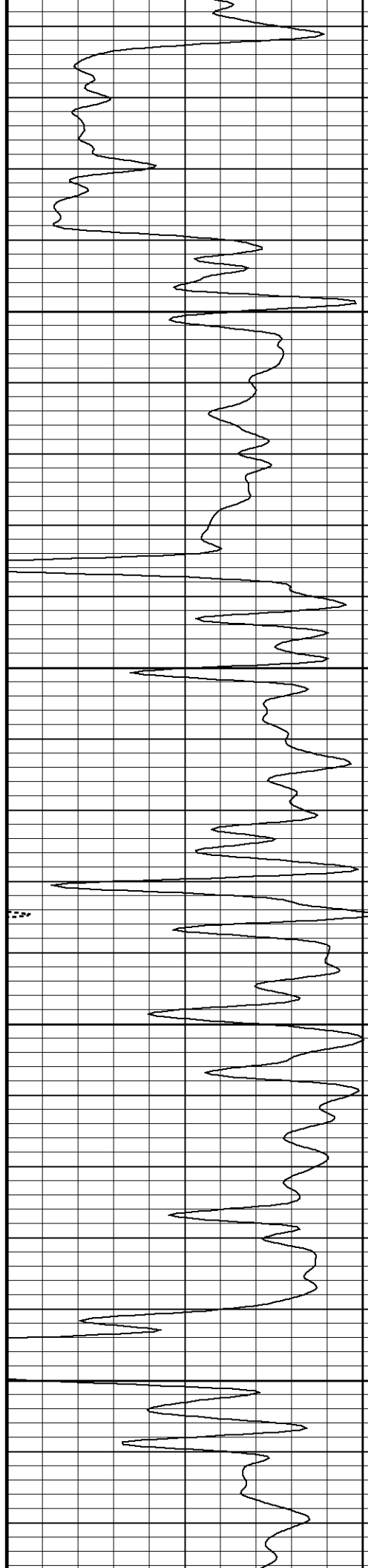
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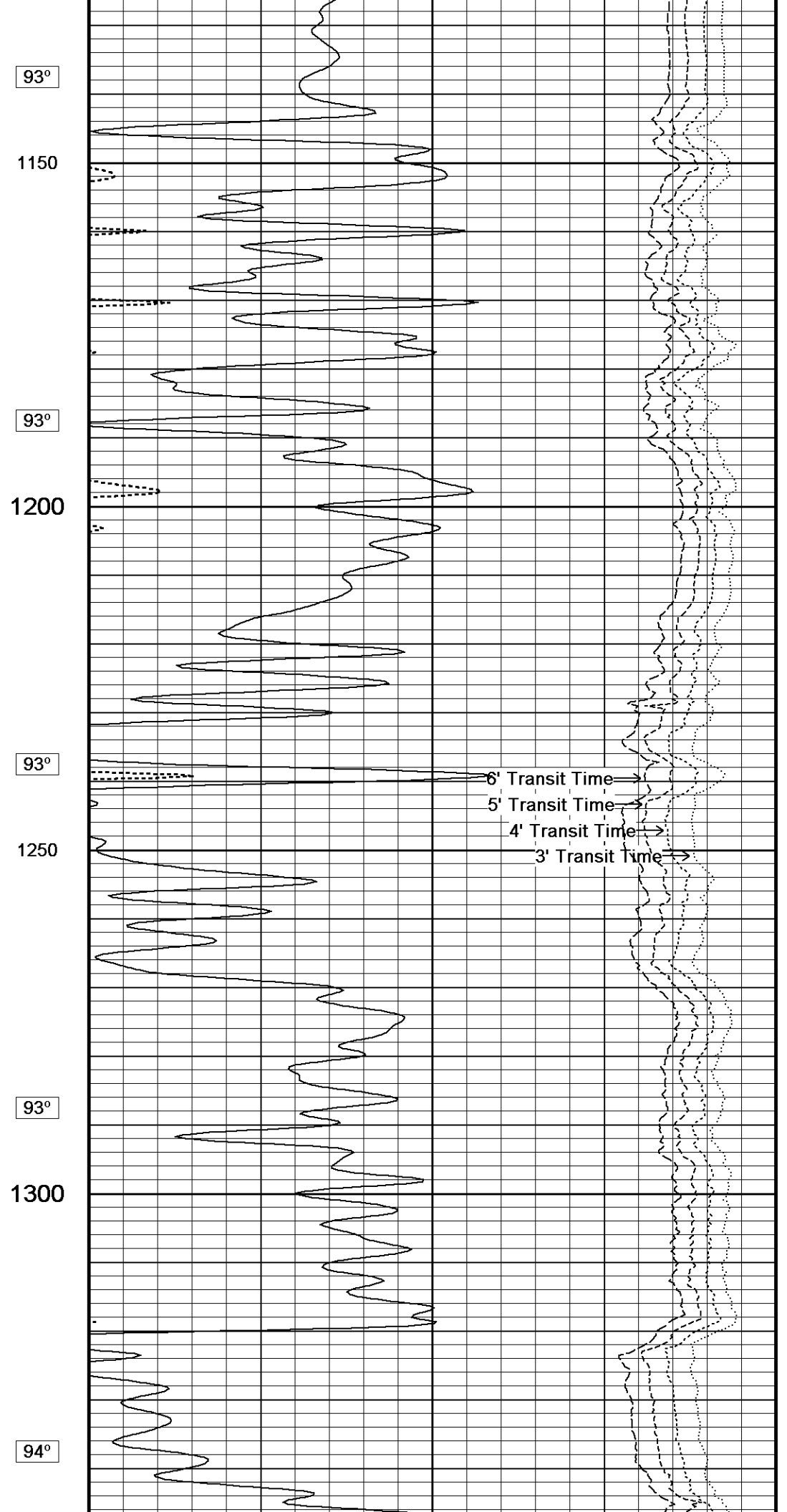
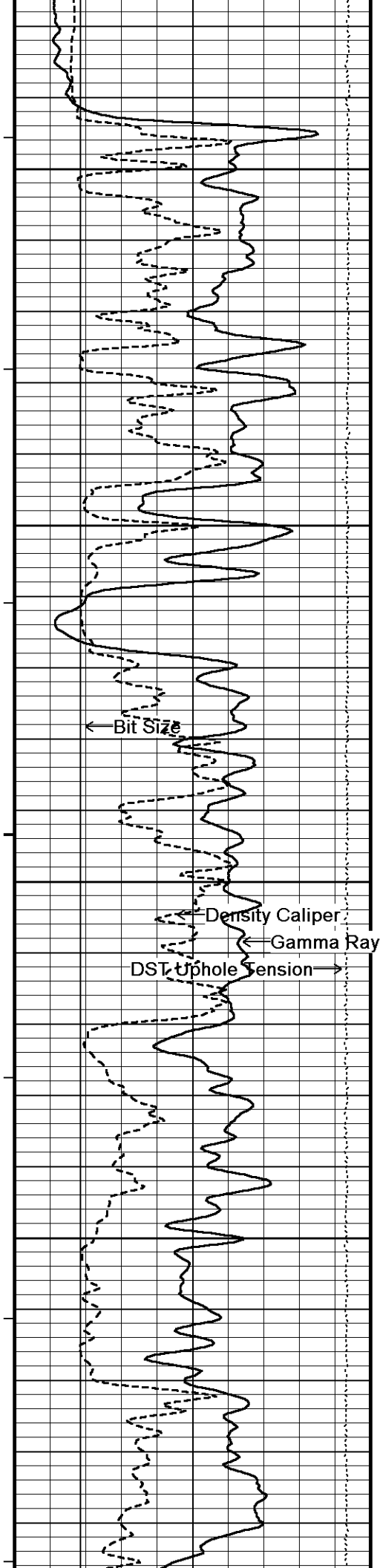
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1050

92°

1100







1350

94°

1400

94°

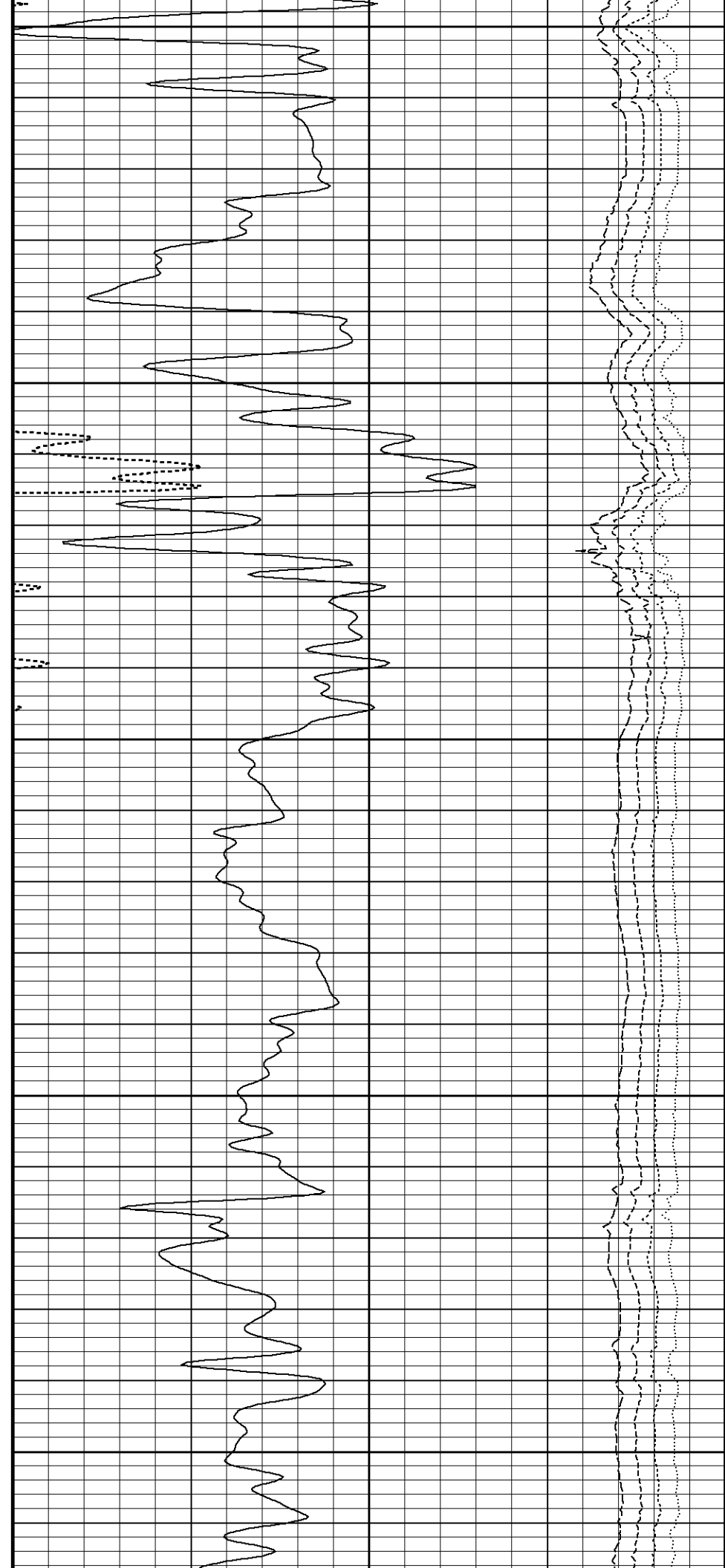
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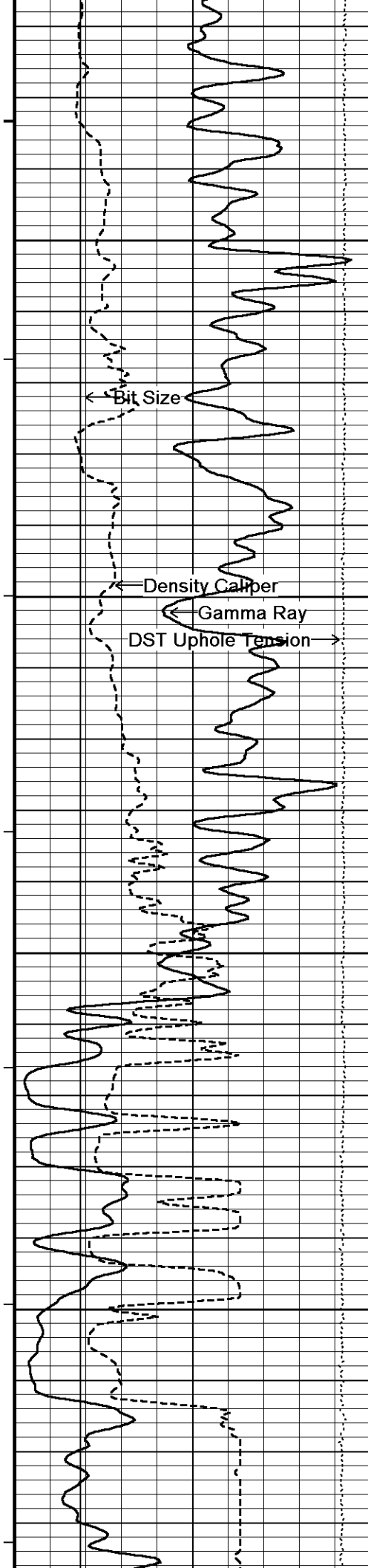
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1500

95°

1550





95°

1600

95°

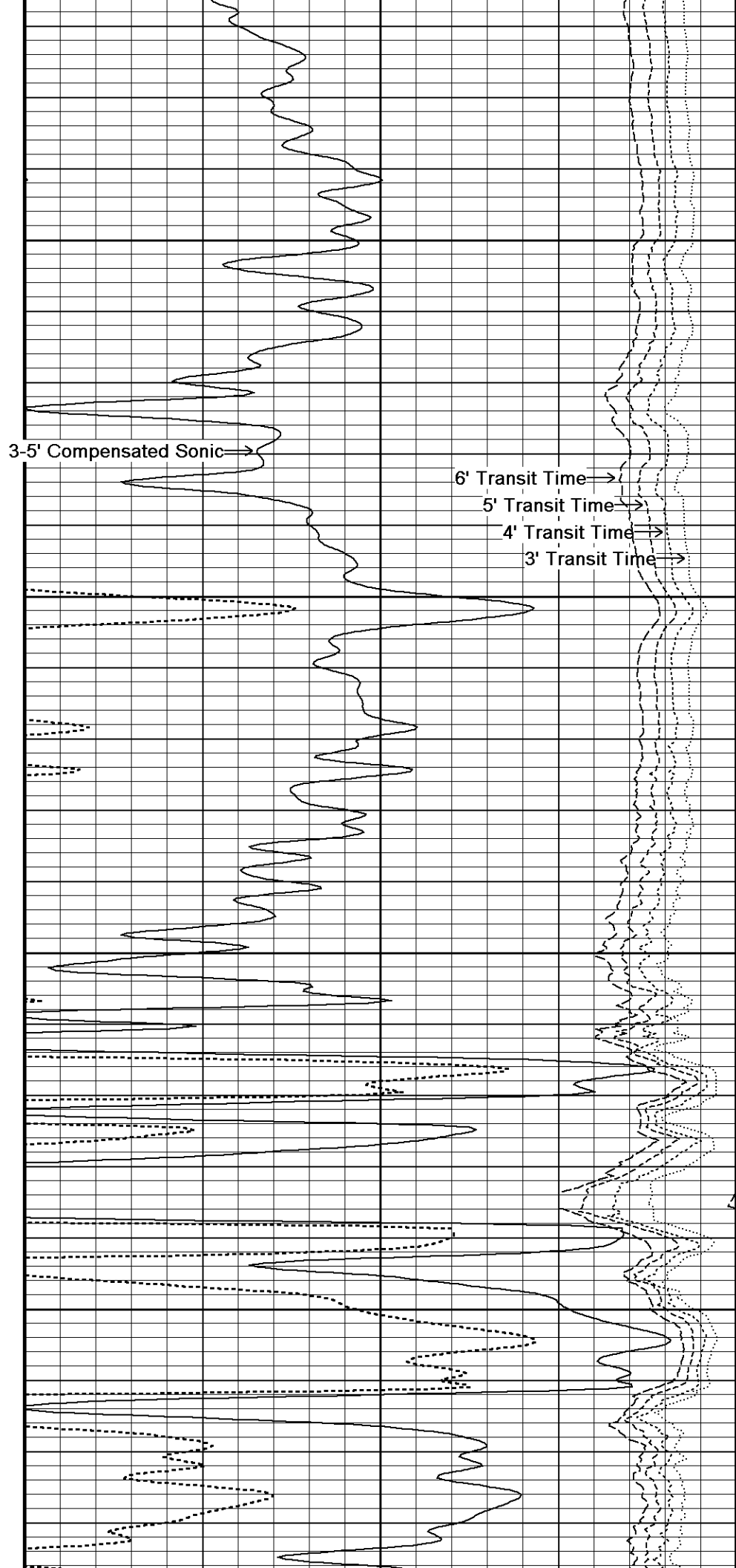
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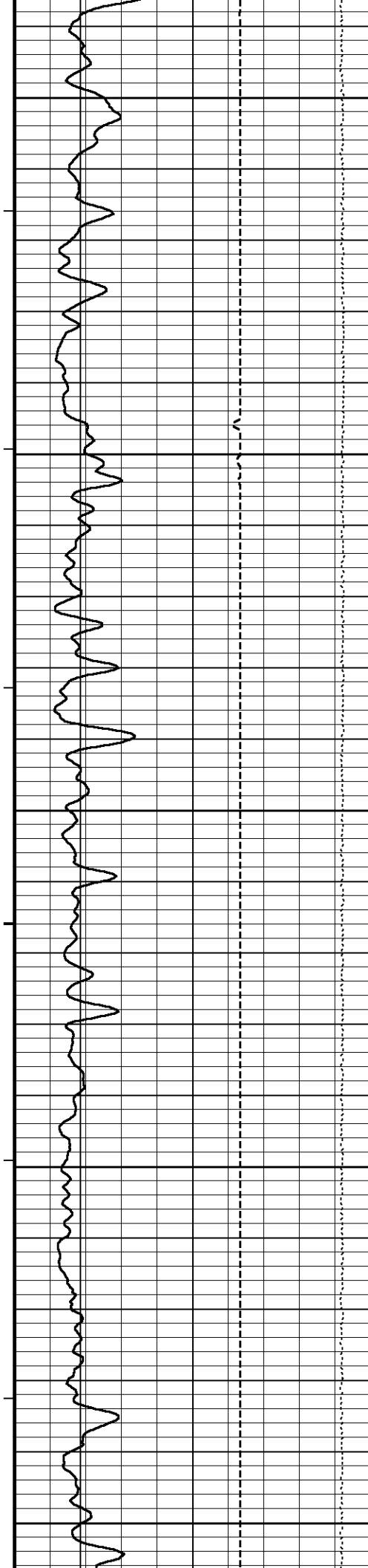
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1700

96°

1750





95°

1800

95°

1850

95°

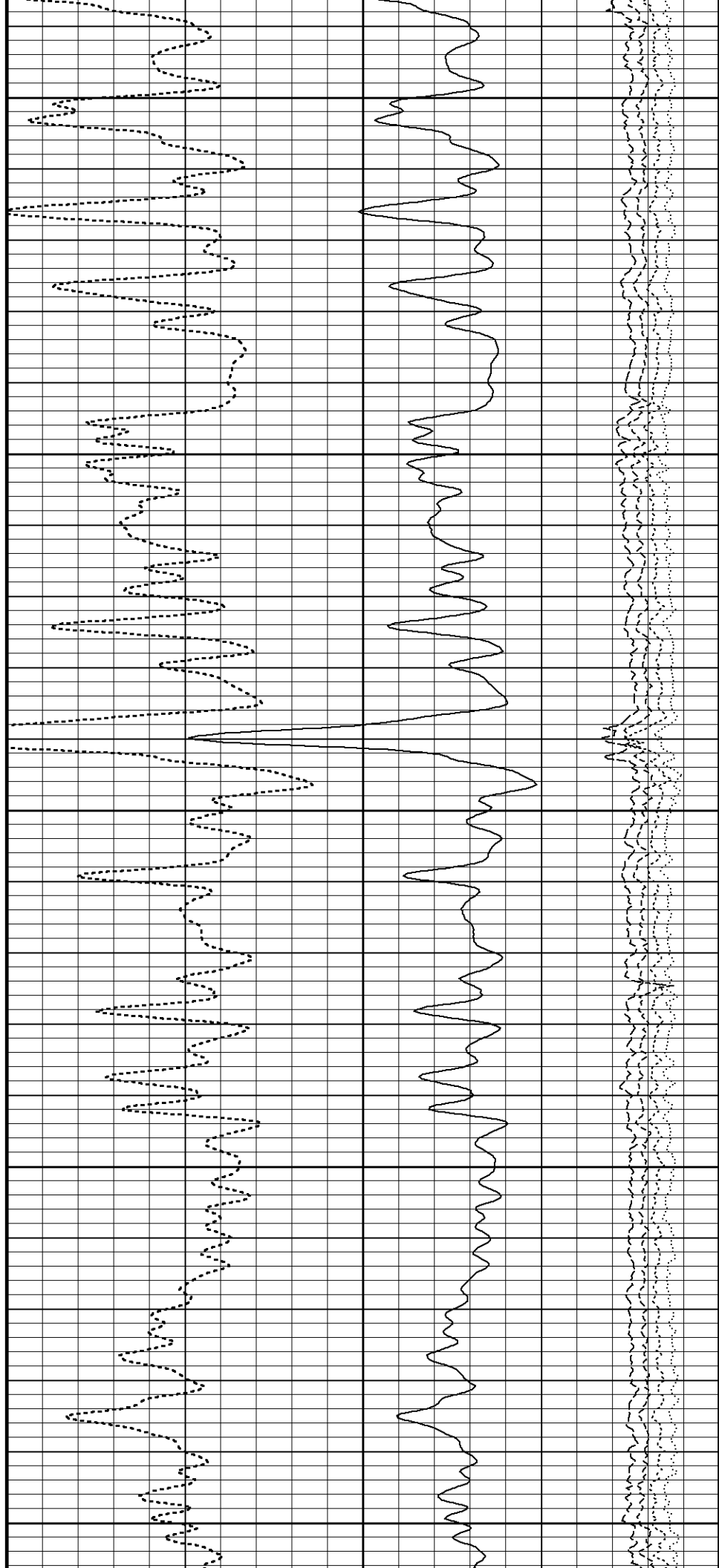
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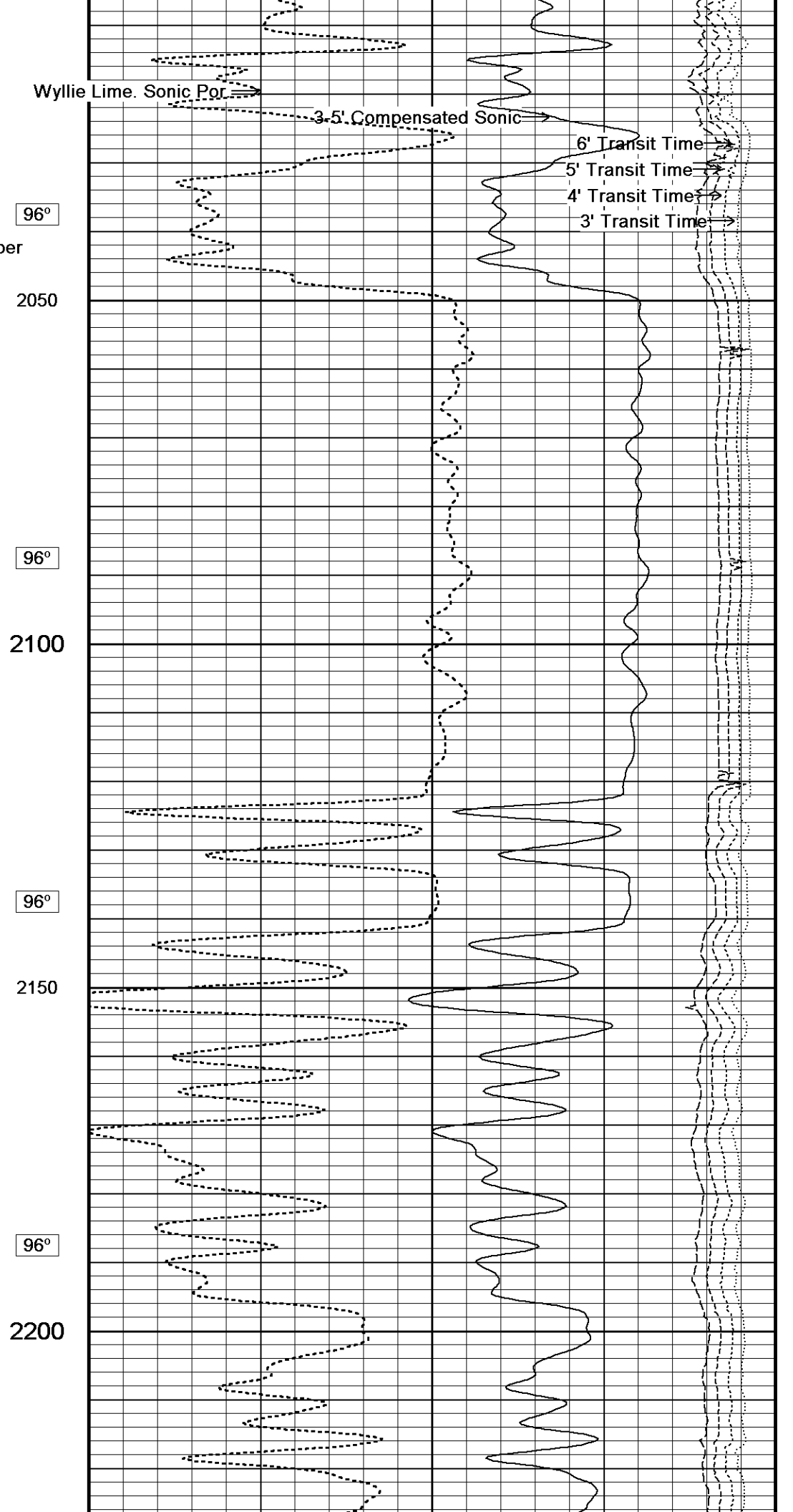
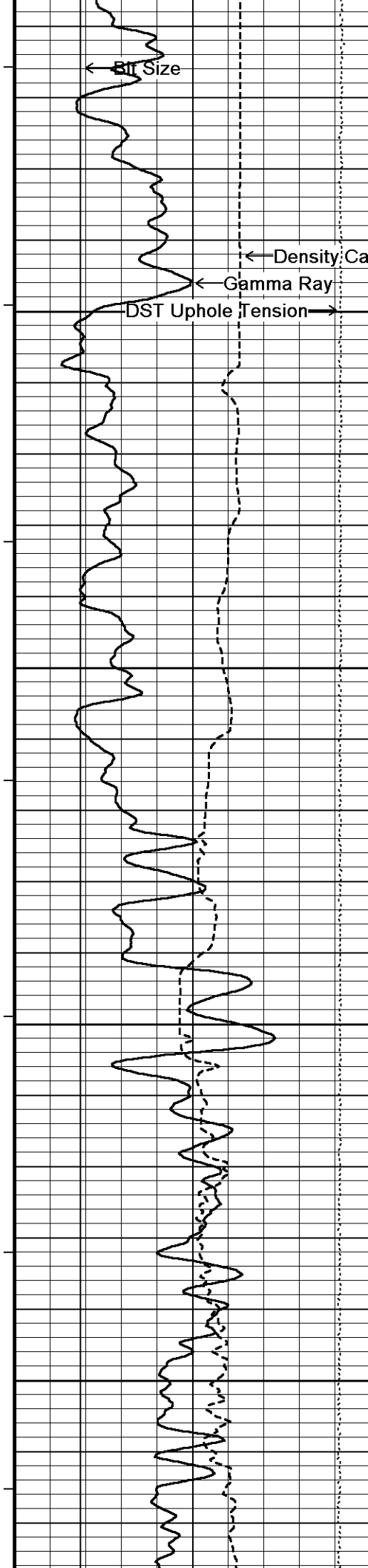
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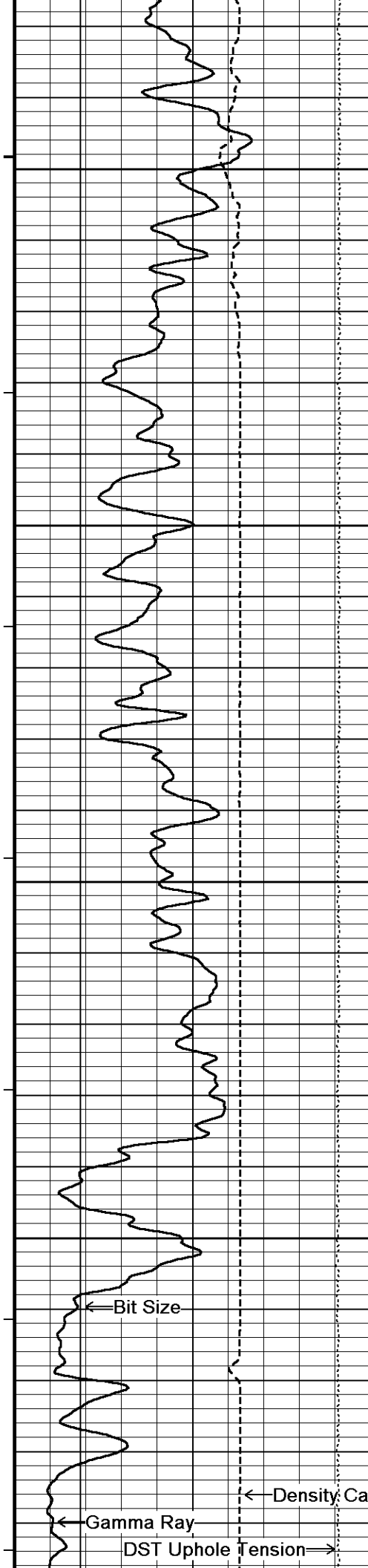
1950

95°

2000







97°

2250

97°

2300

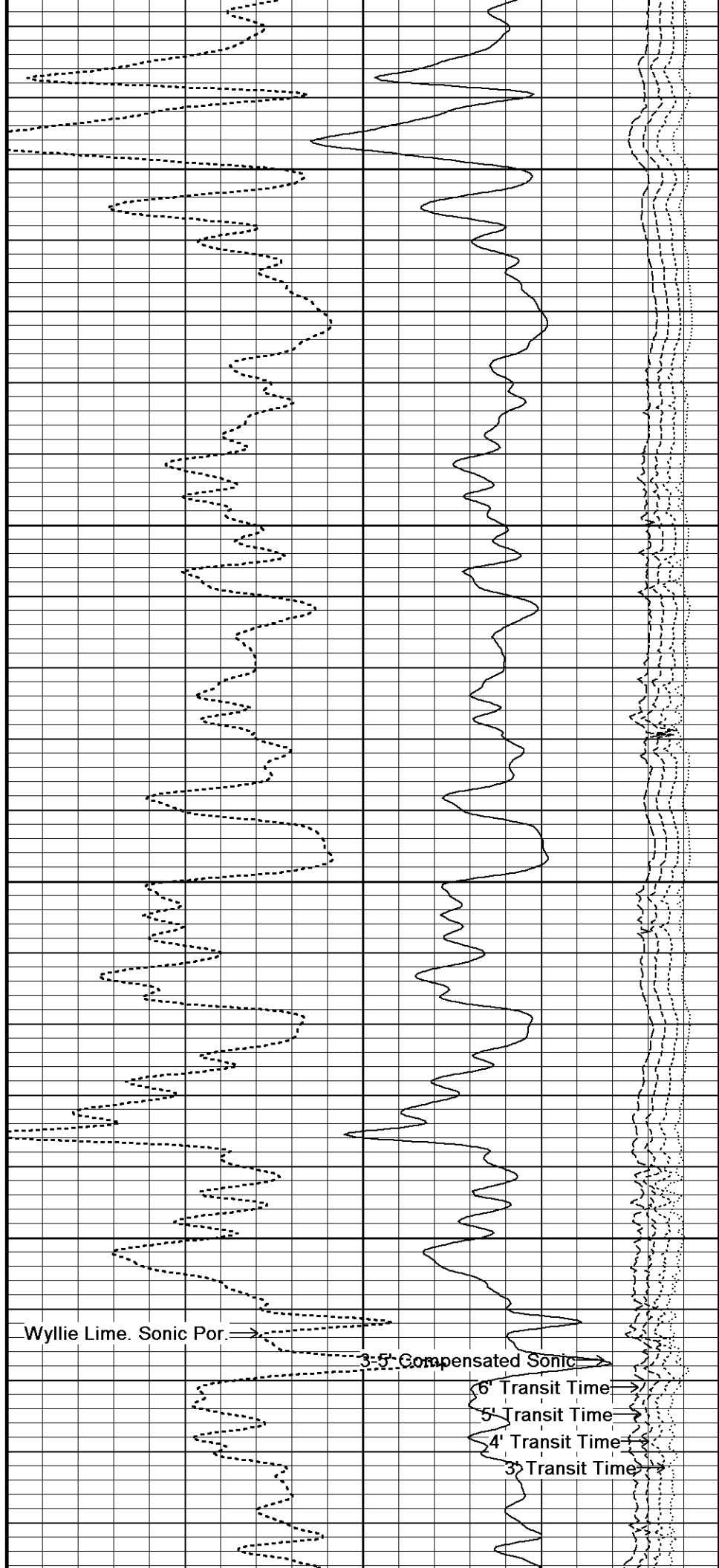
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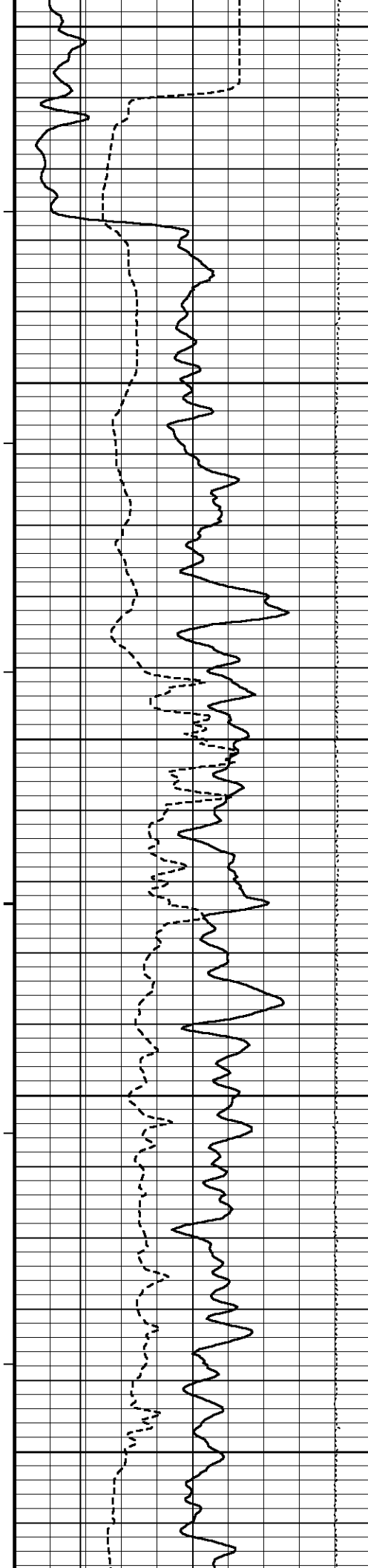
2350

97°

2400

98°





2450

98°

2500

98°

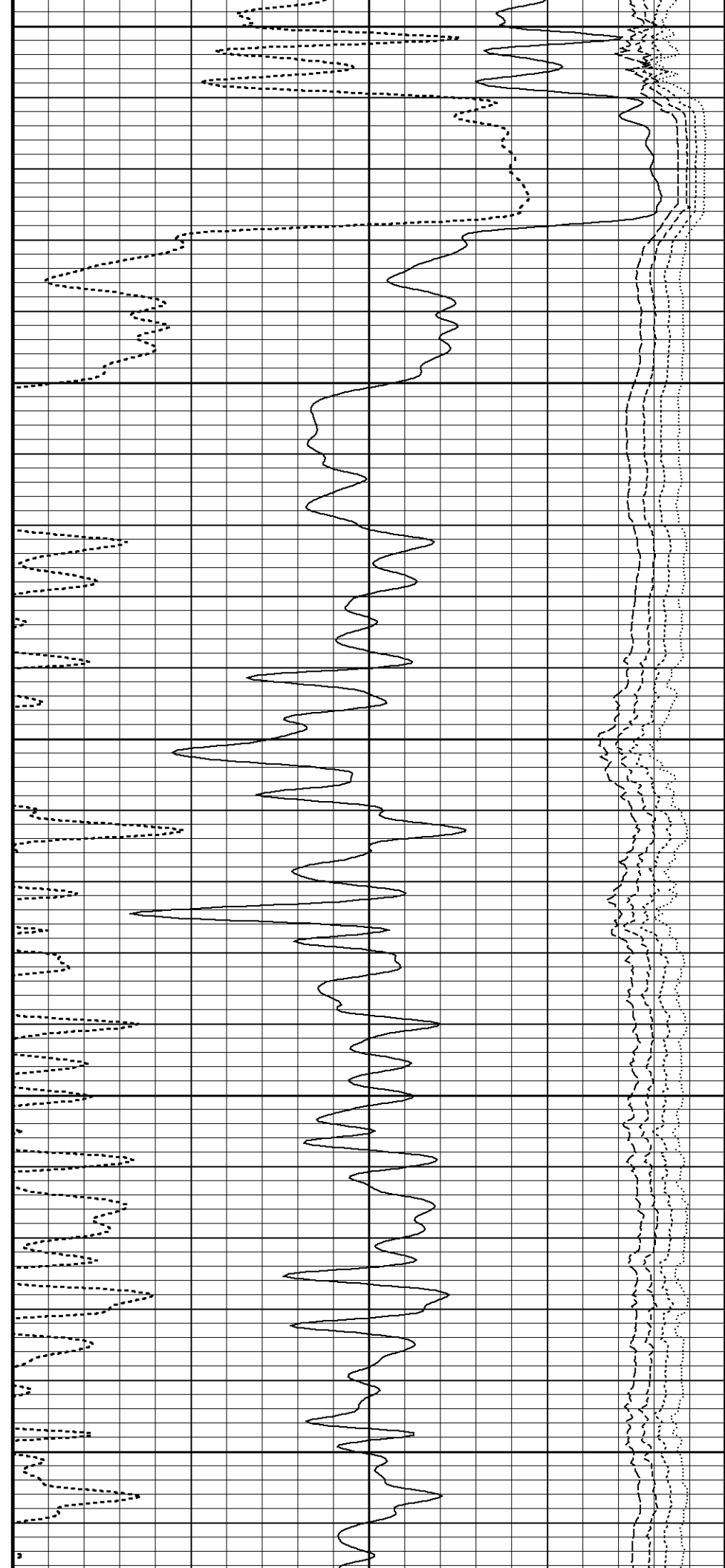
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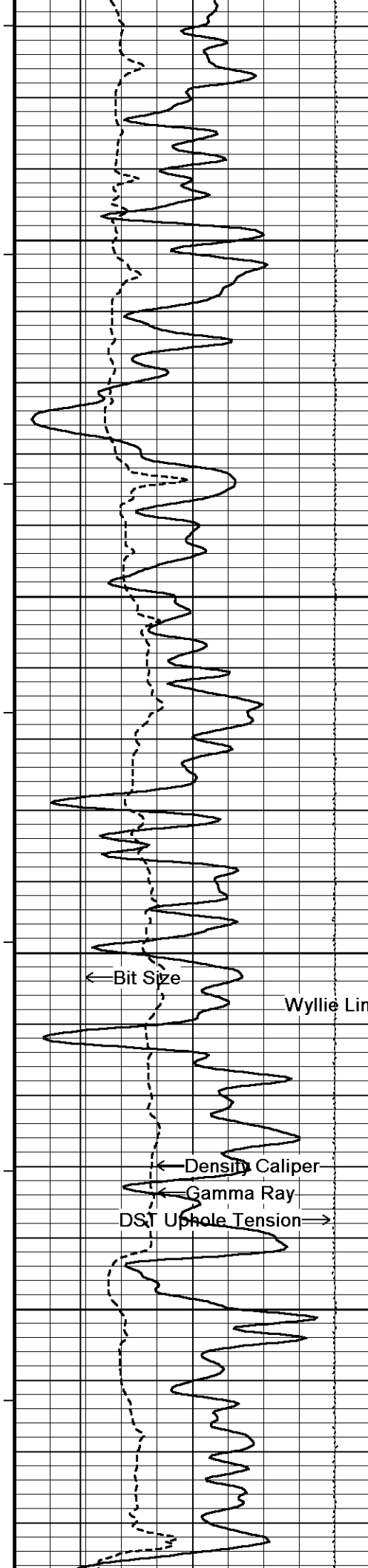
98°

2600

98°

2650





99°

2700

99°

2750

99°

2800

Wyllie Lime. Sonic Por. →

← Bit Size

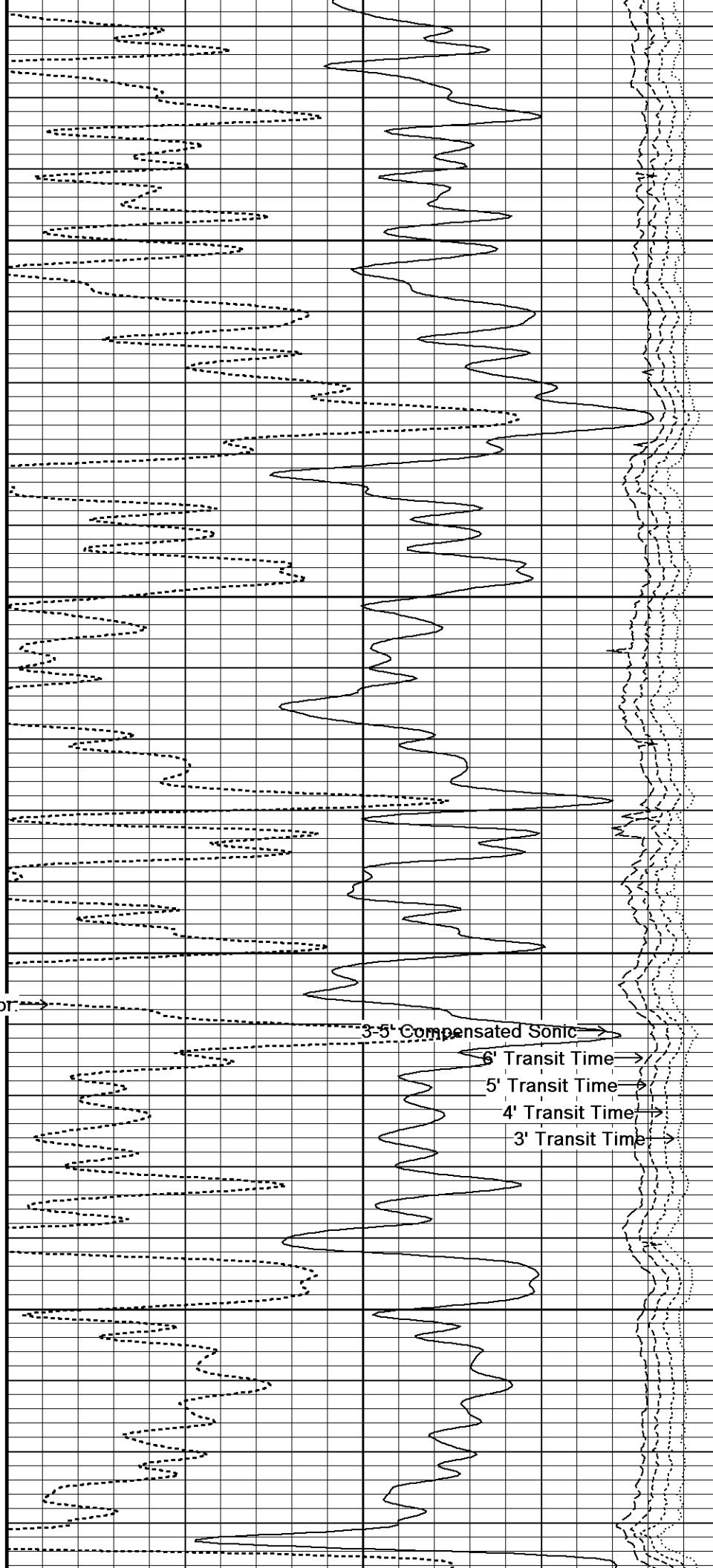
← Density Caliper

← Gamma Ray

DST Up-hole Tension →

100°

2850



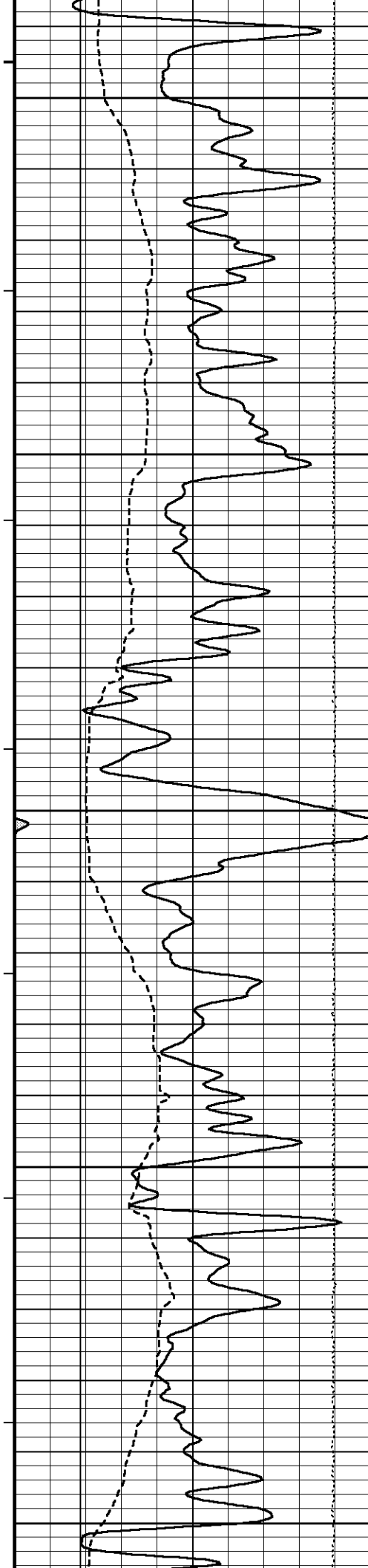
← 3-5' Compensated Sonic →

← 6' Transit Time →

← 5' Transit Time →

← 4' Transit Time →

← 3' Transit Time →



100°

2900

100°

2950

100°

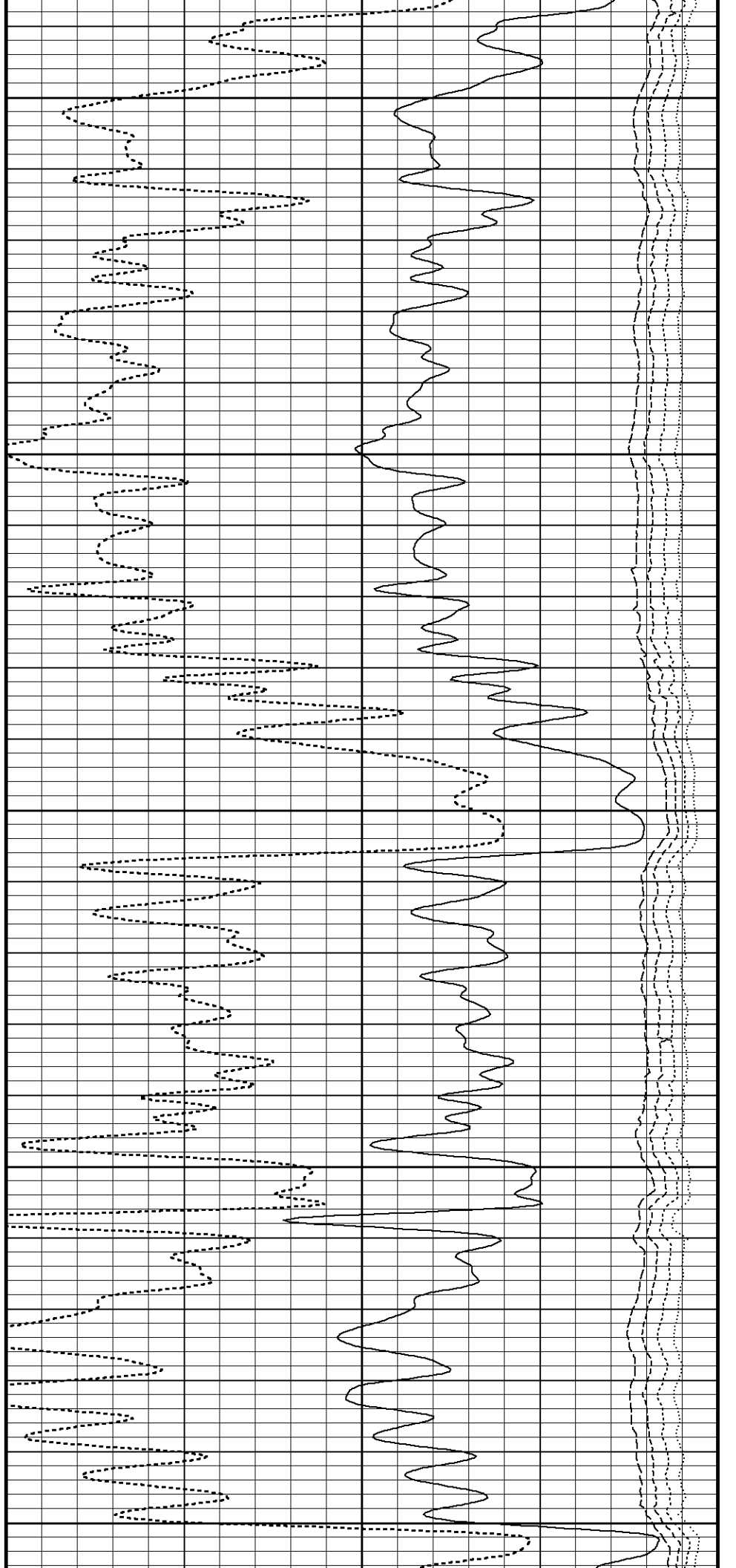
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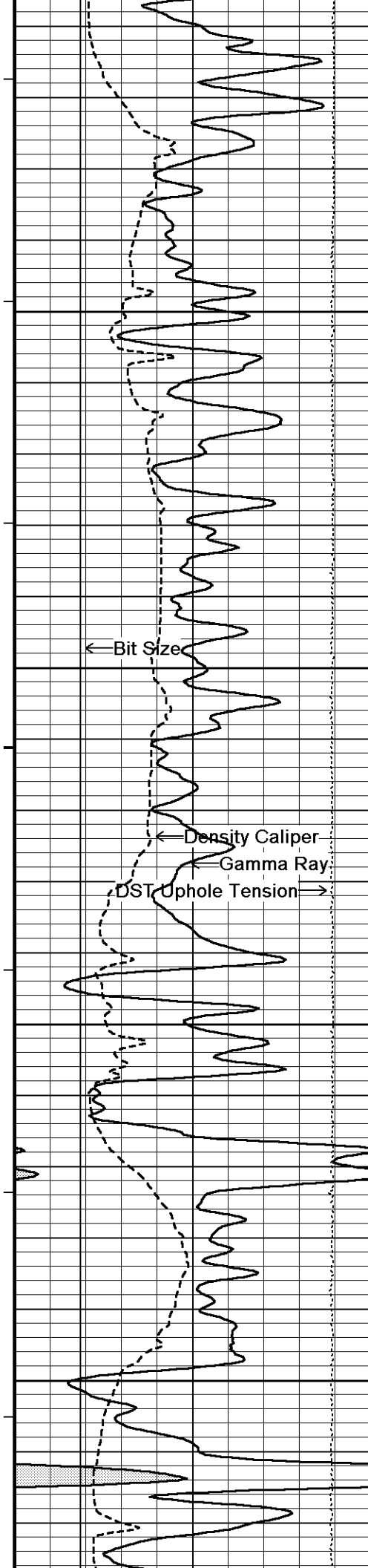
100°

3050

101°

3100





101°

3150

101°

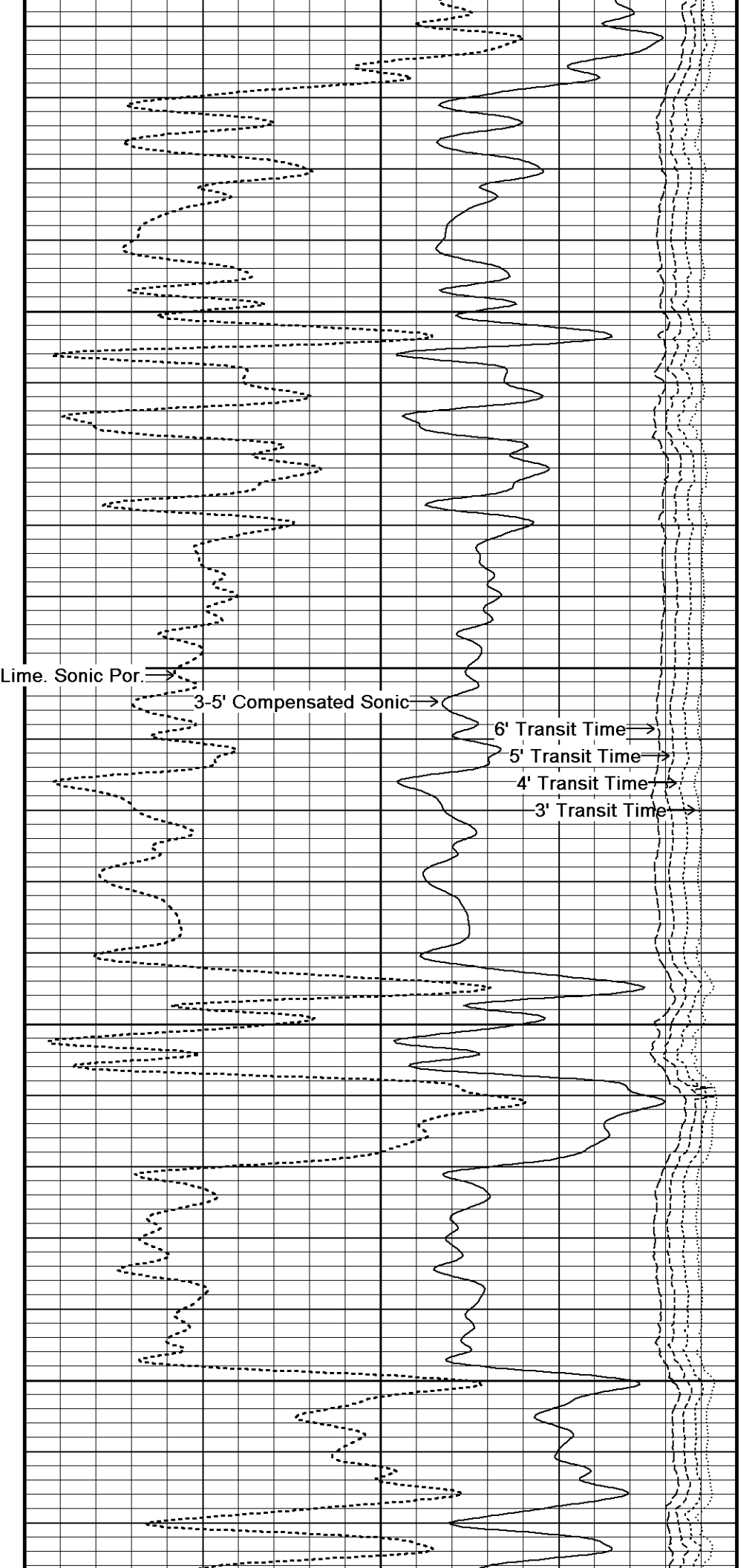
3200

101°

3250

102°

3300



Lime. Sonic Por.

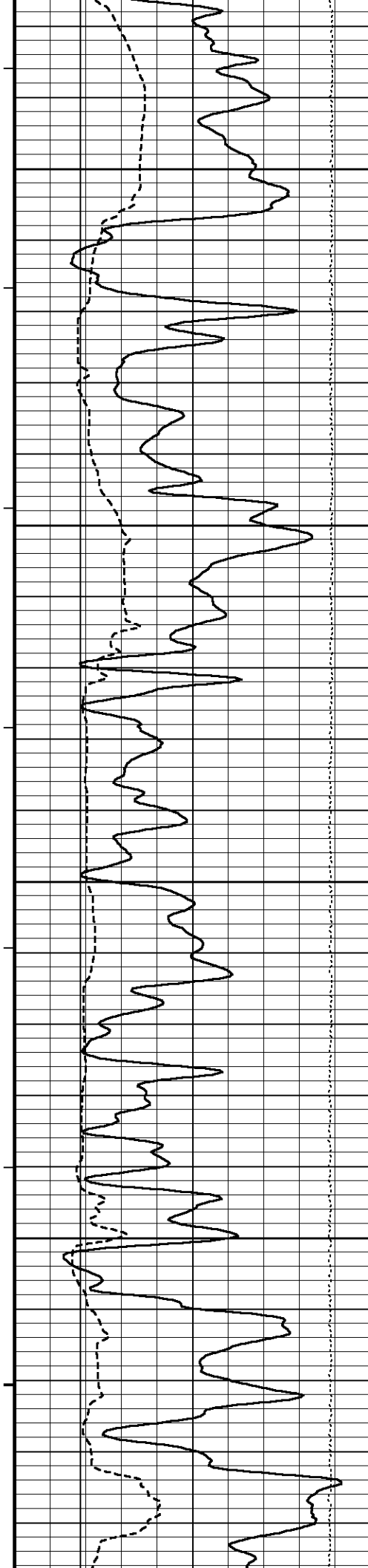
3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time



102°

3350

102°

3400

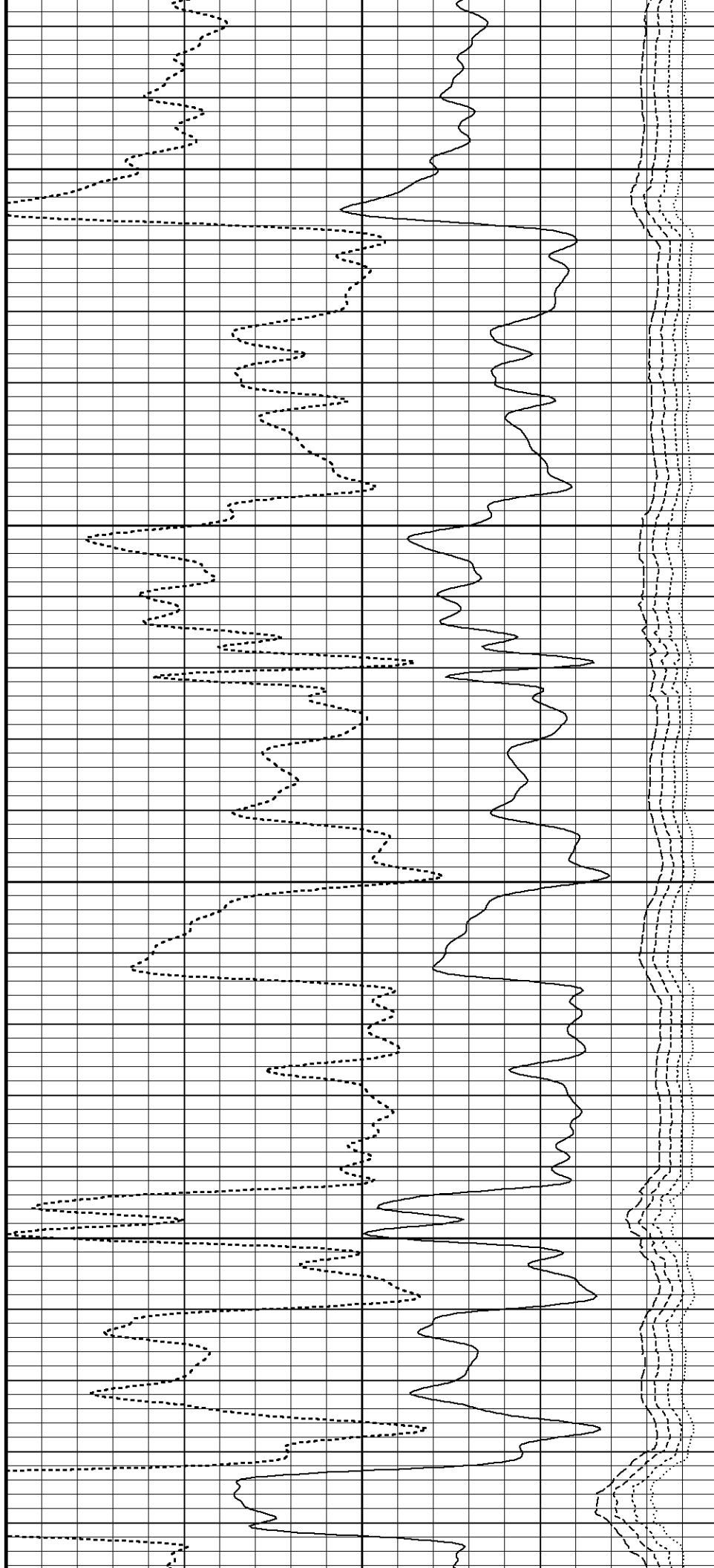
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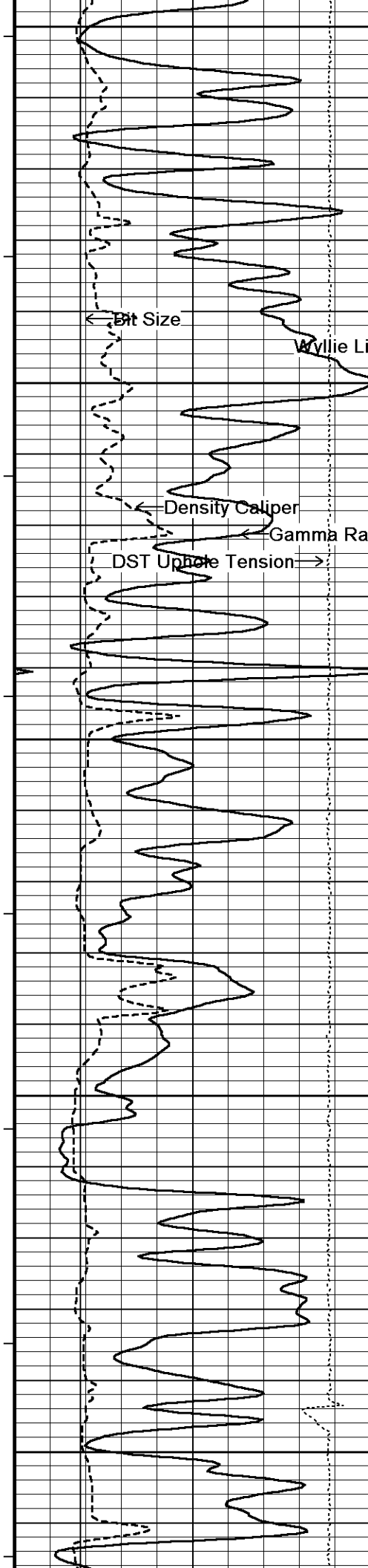
3450

103°

3500

103°





3550

103°

3600

104°

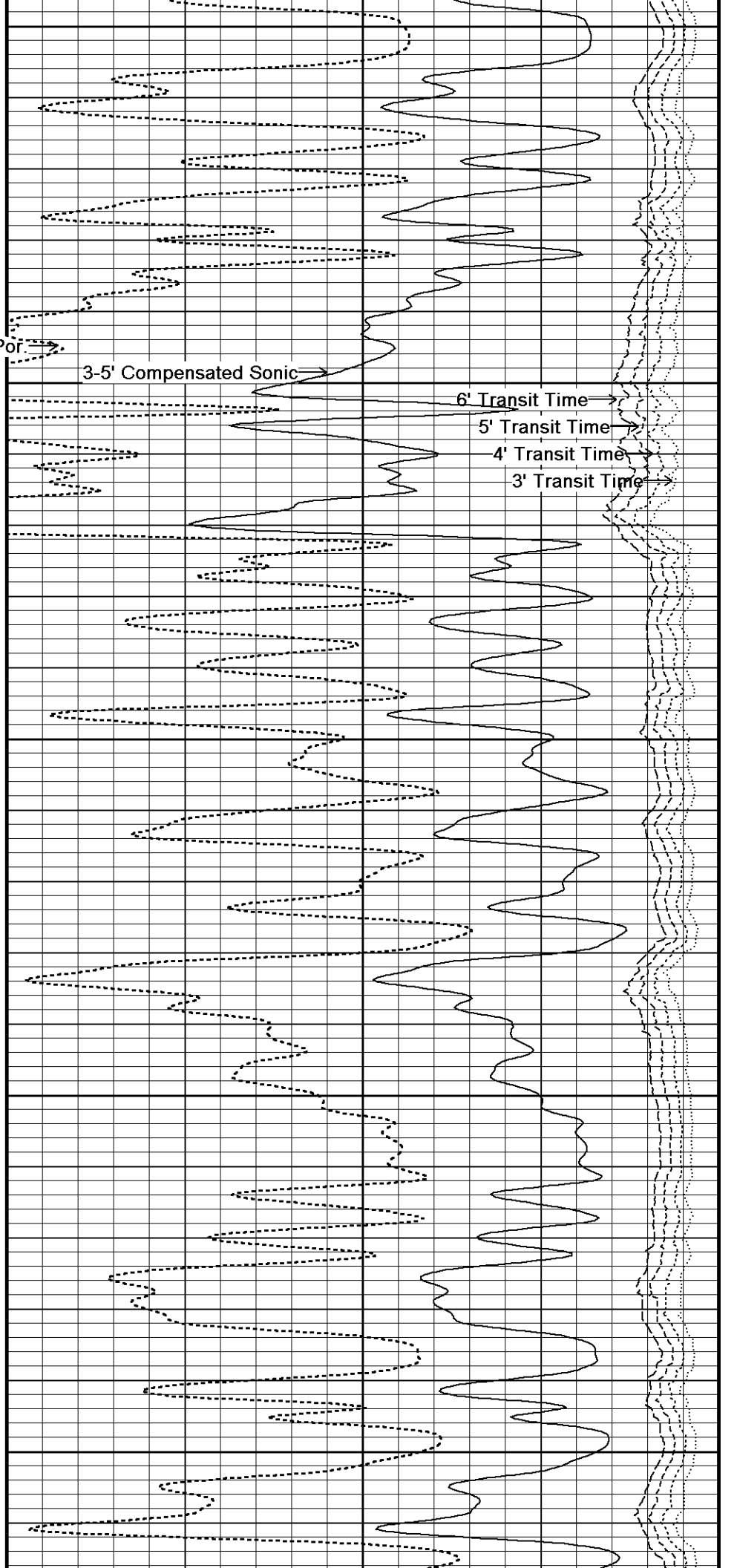
3650

104°

3700

104°

3750



103°

3600

104°

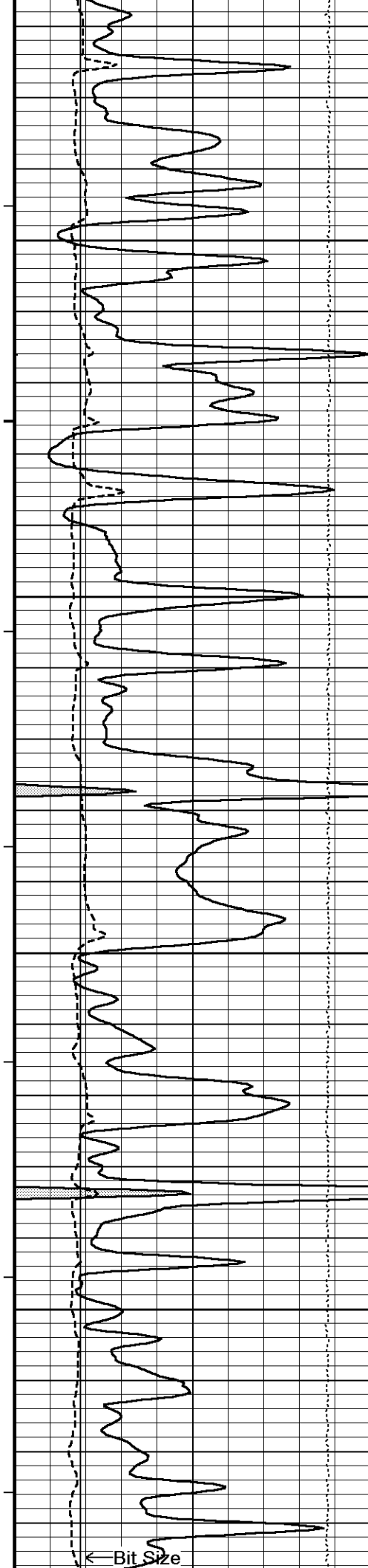
3650

104°

3700

104°

3750



105°

3800

105°

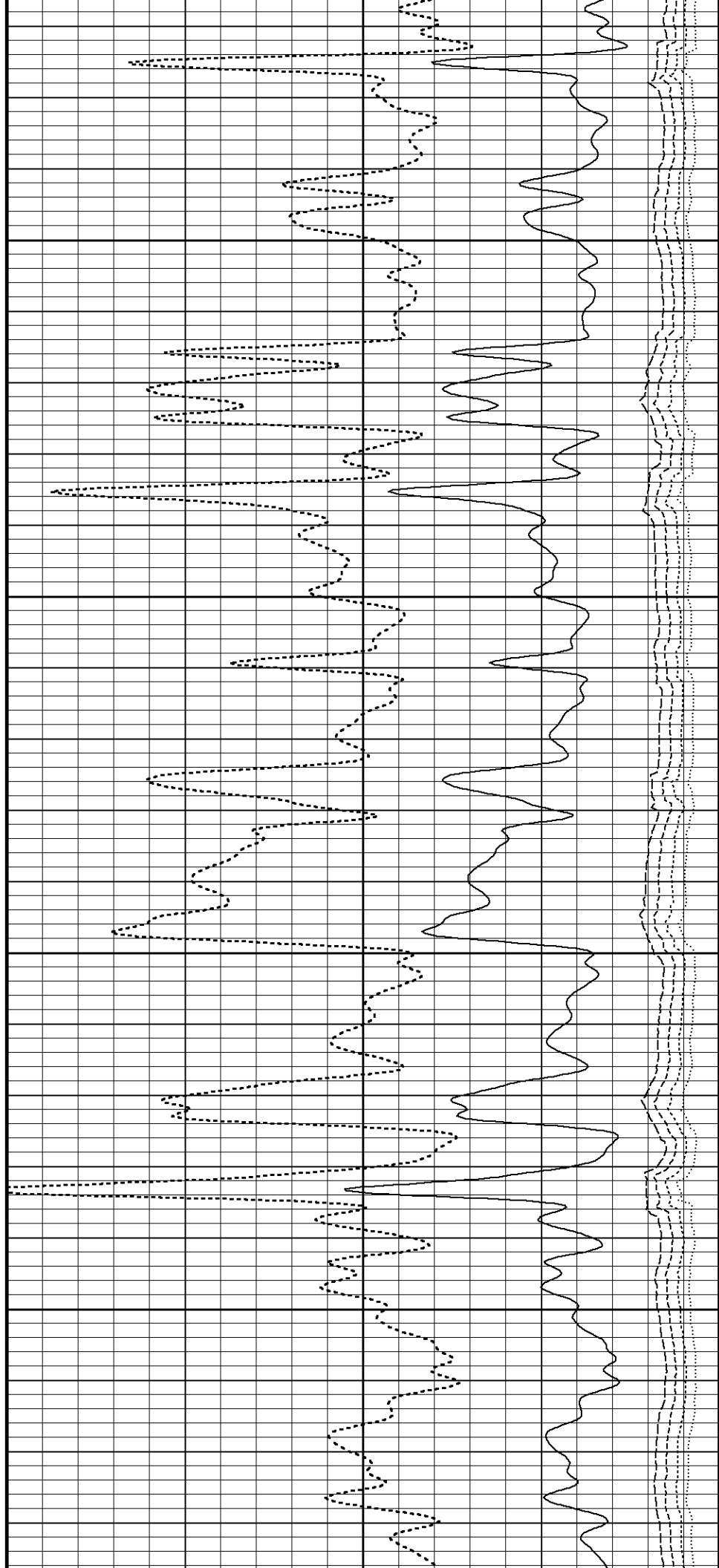
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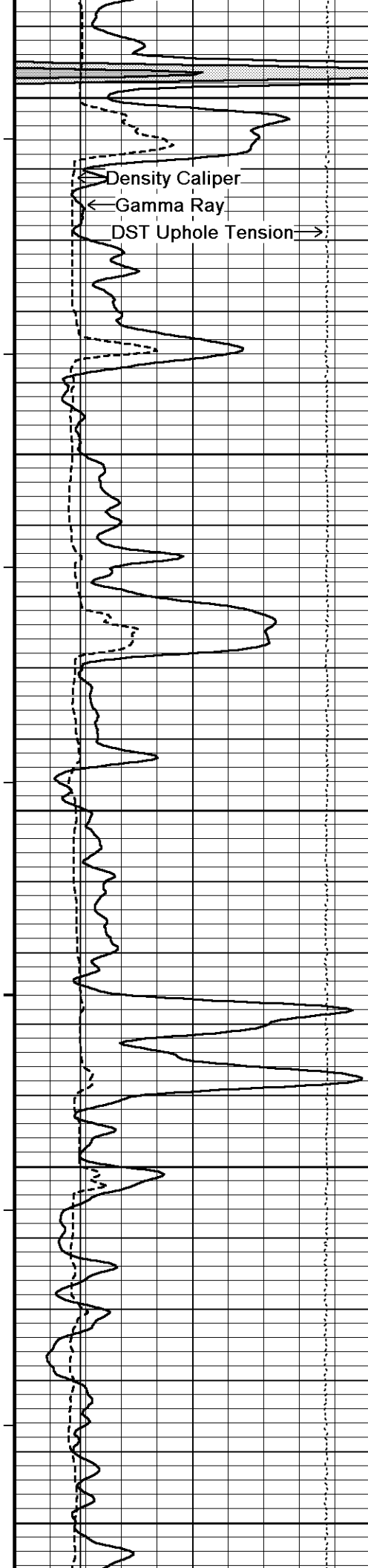
105°

3900

105°

3950





105°

4000

106°

4050

106°

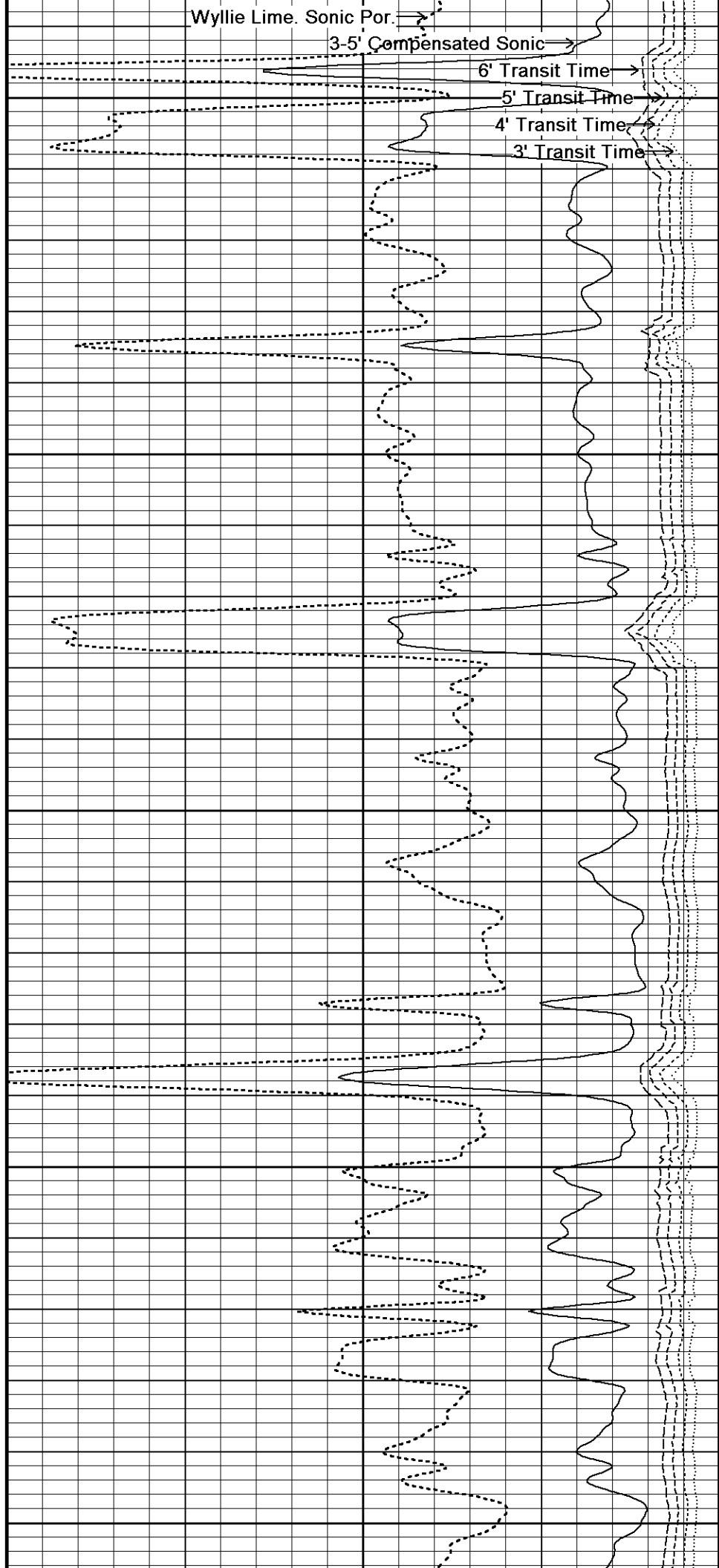
4100

106°

4150

107°

4200



Wyllie Lime. Sonic Por.

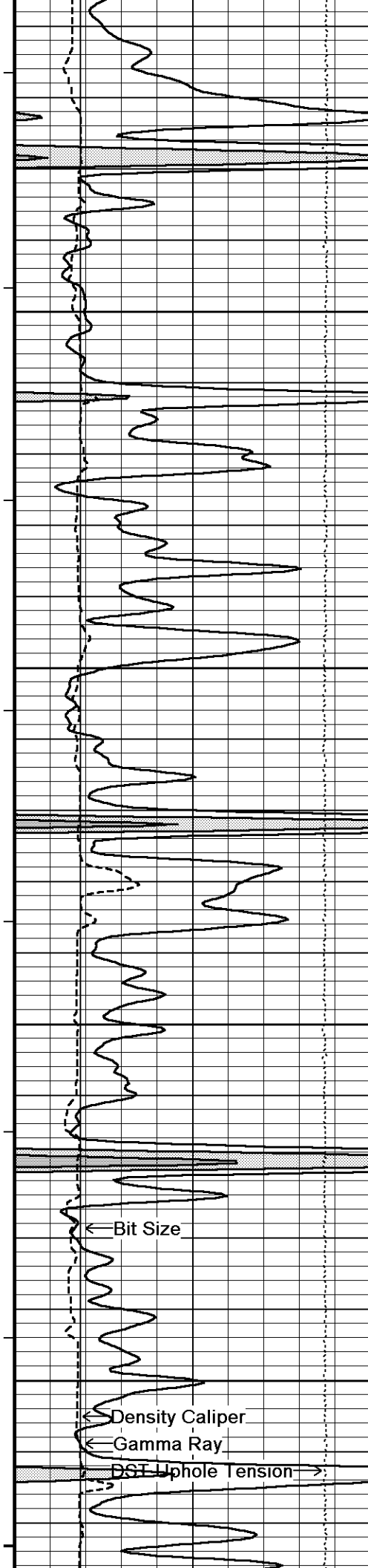
3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time



107°

4250

108°

4300

108°

4350

108°

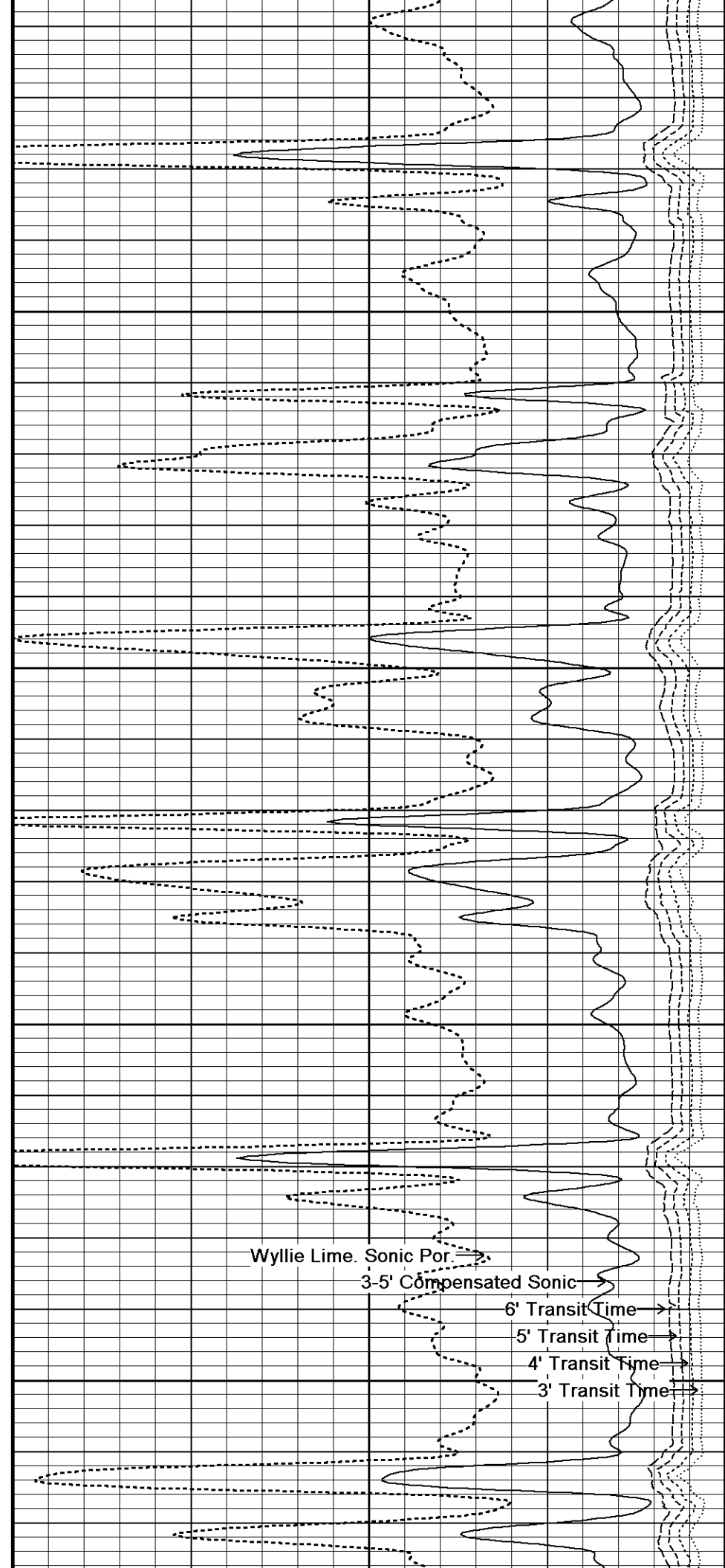
4400

Bit Size

Density Caliper

Gamma Ray

DST/Uphole Tension



Wyllie Lime. Sonic Por.

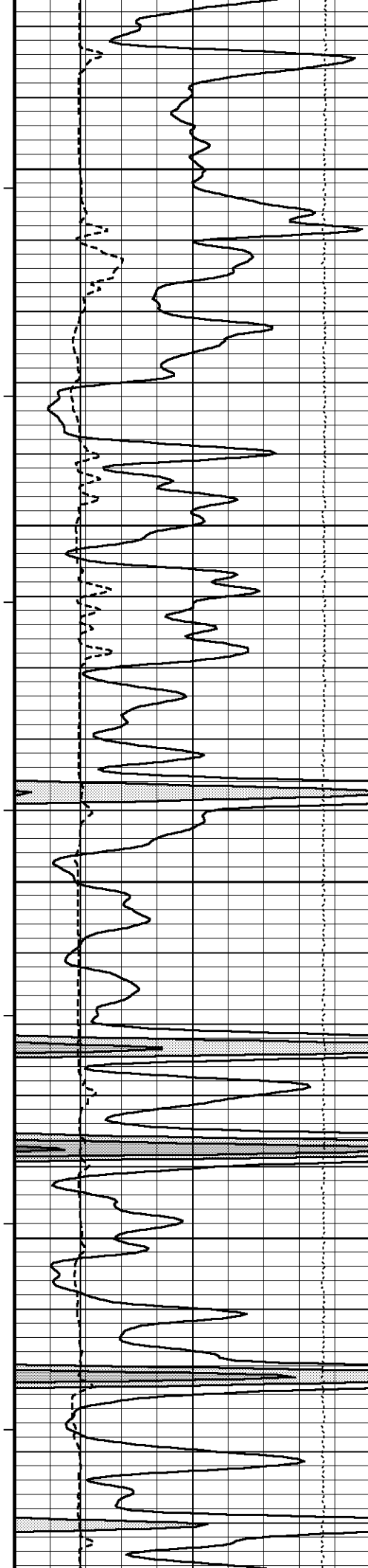
3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time



107°

4450

107°

4500

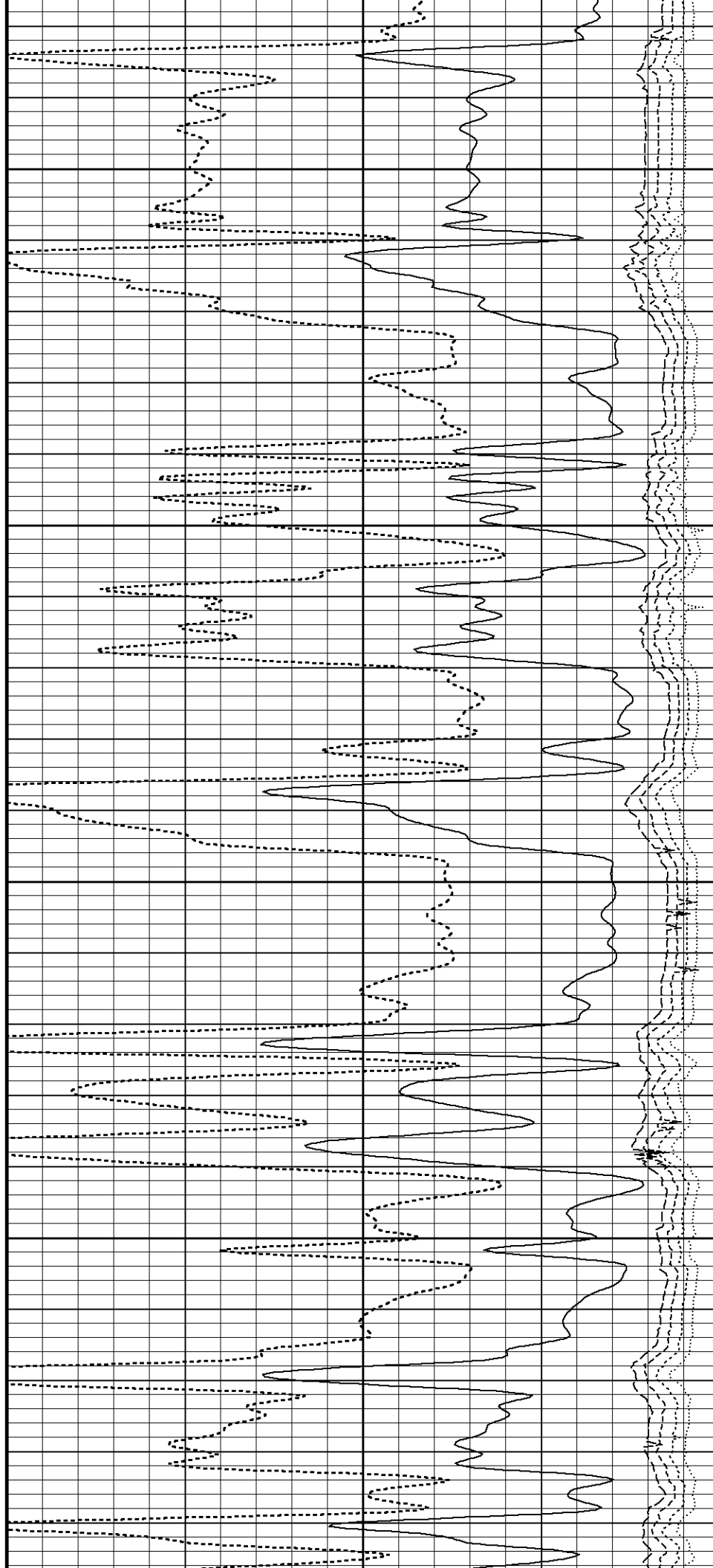
108°

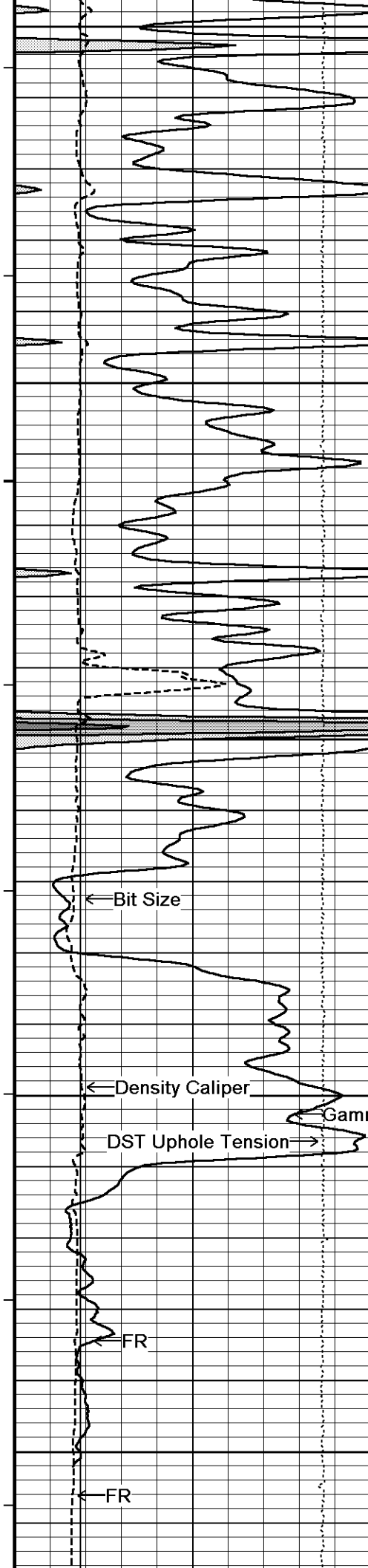
4550

109°

4600

110°





4650

111°

4700

112°

4750

112°

4800

110°

4850

Wyllie Lime. Sonic Por. →

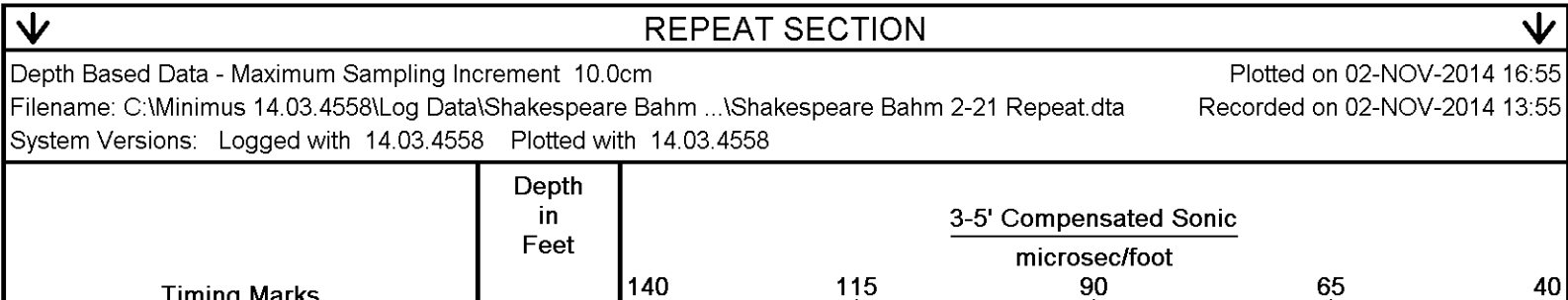
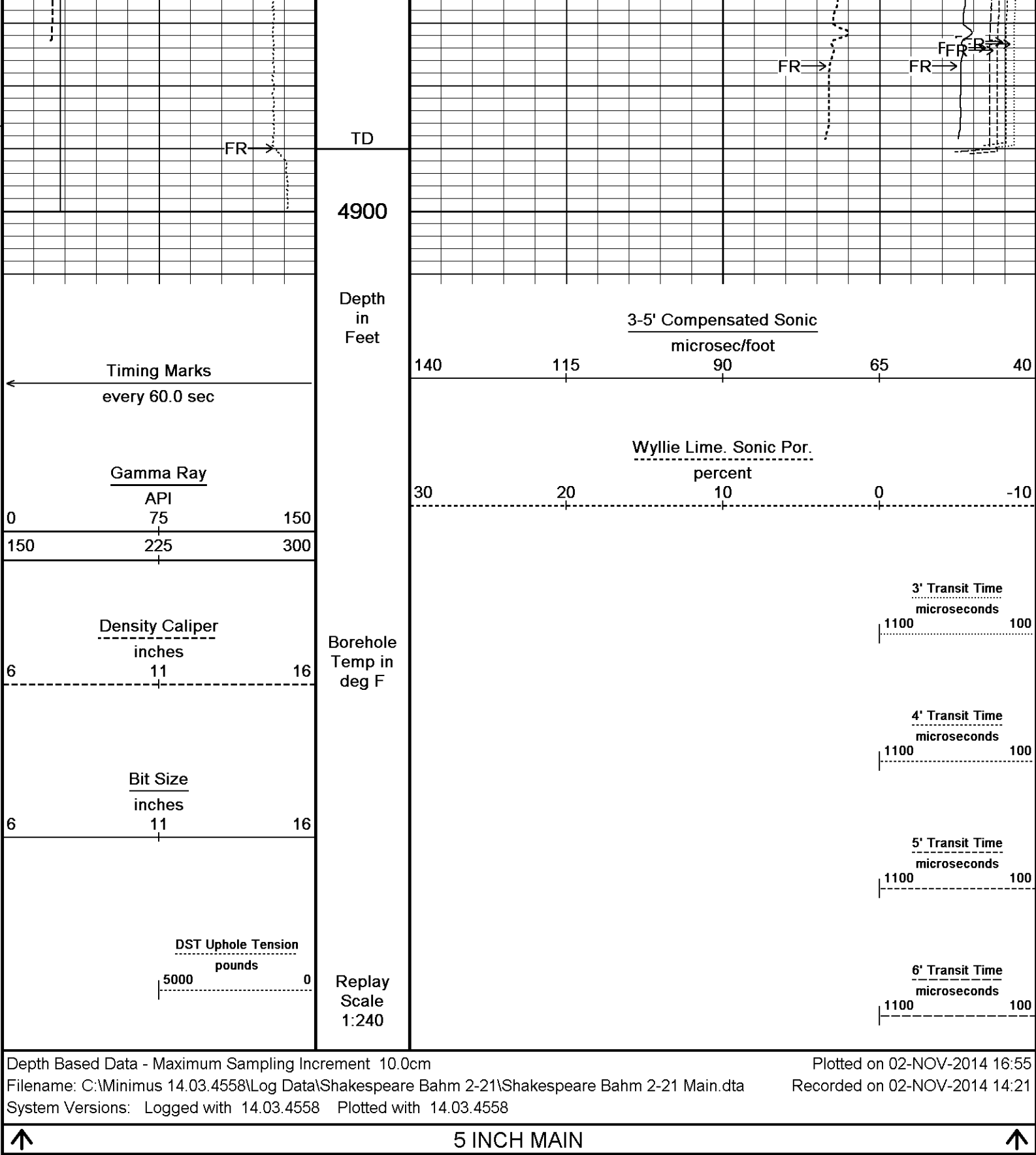
3-5' Compensated Sonic →

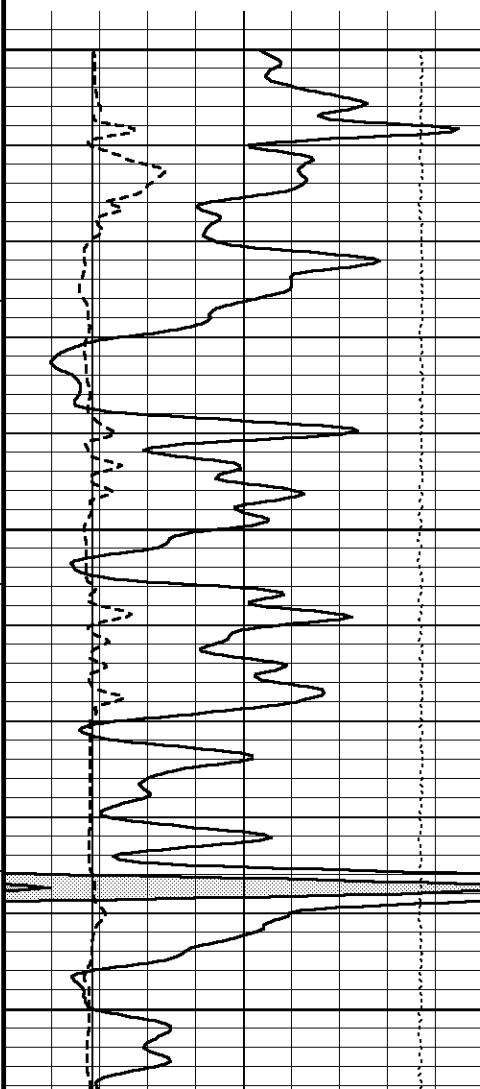
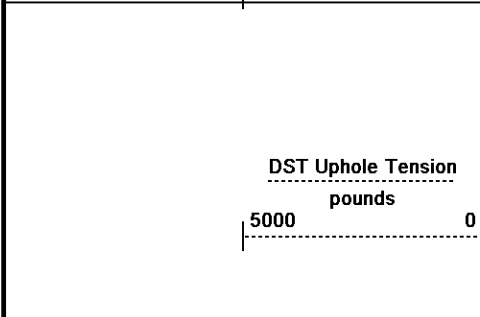
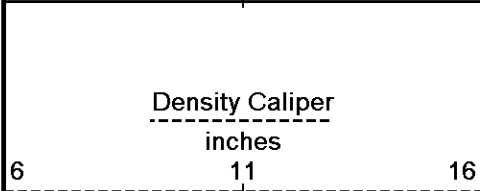
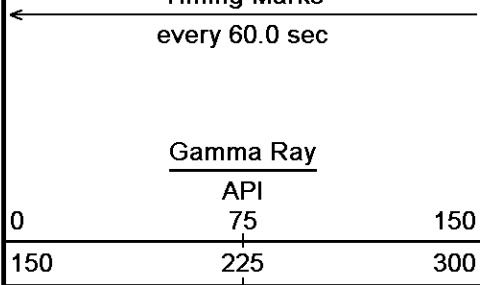
6' Transit Time →

5' Transit Time →

4' Transit Time →

3' Transit Time →





Borehole
Temp in
deg F

Replay
Scale
1:240

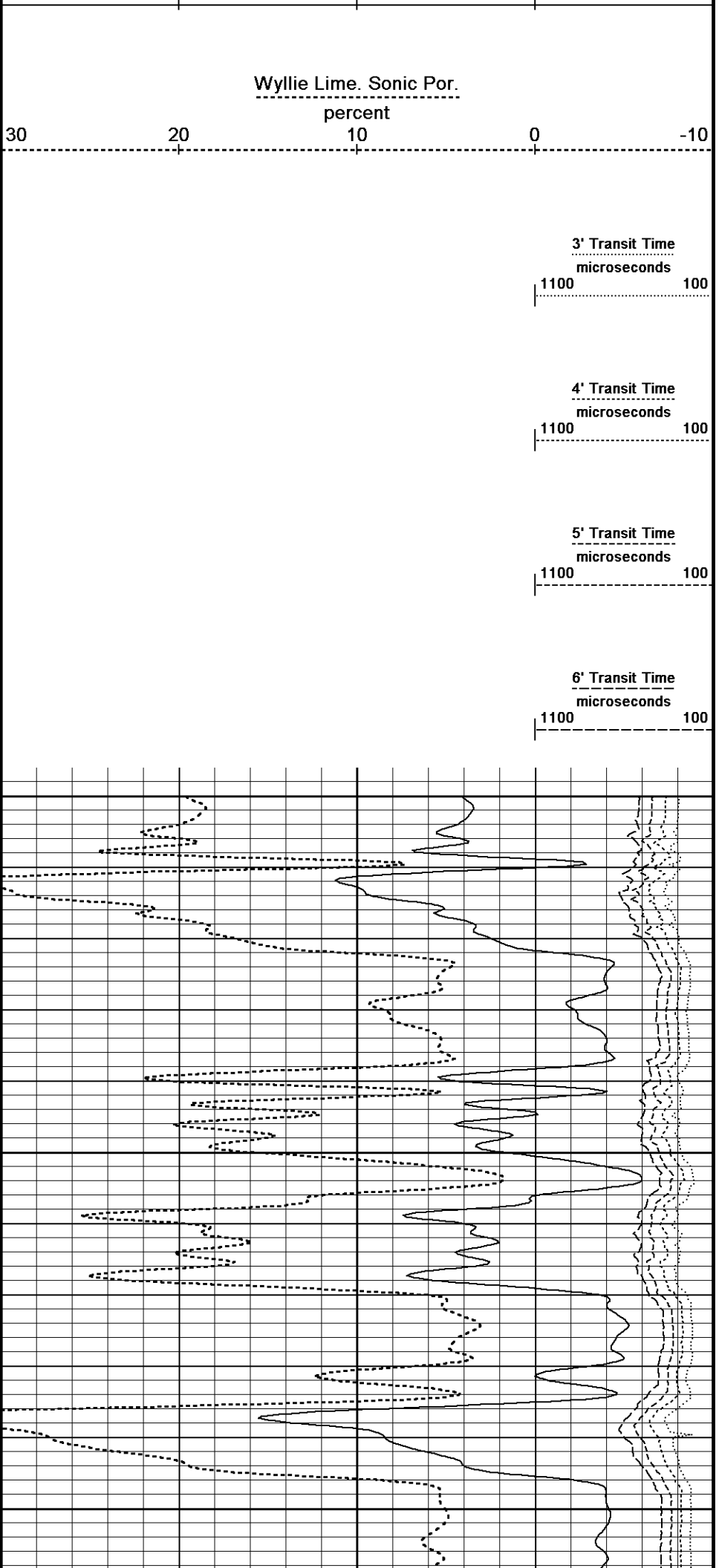
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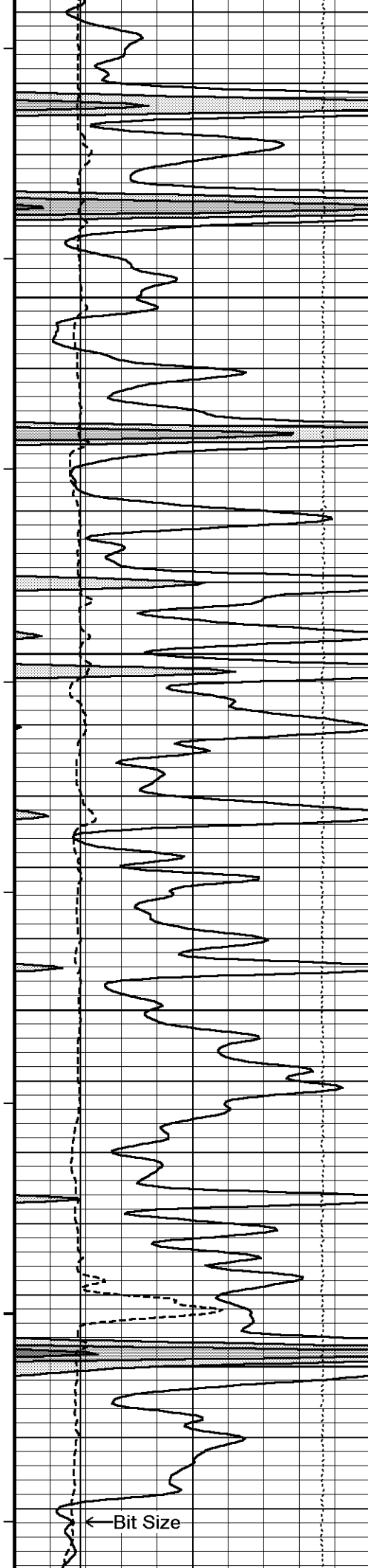
107°

4500

108°

4550





108°

4600

109°

4650

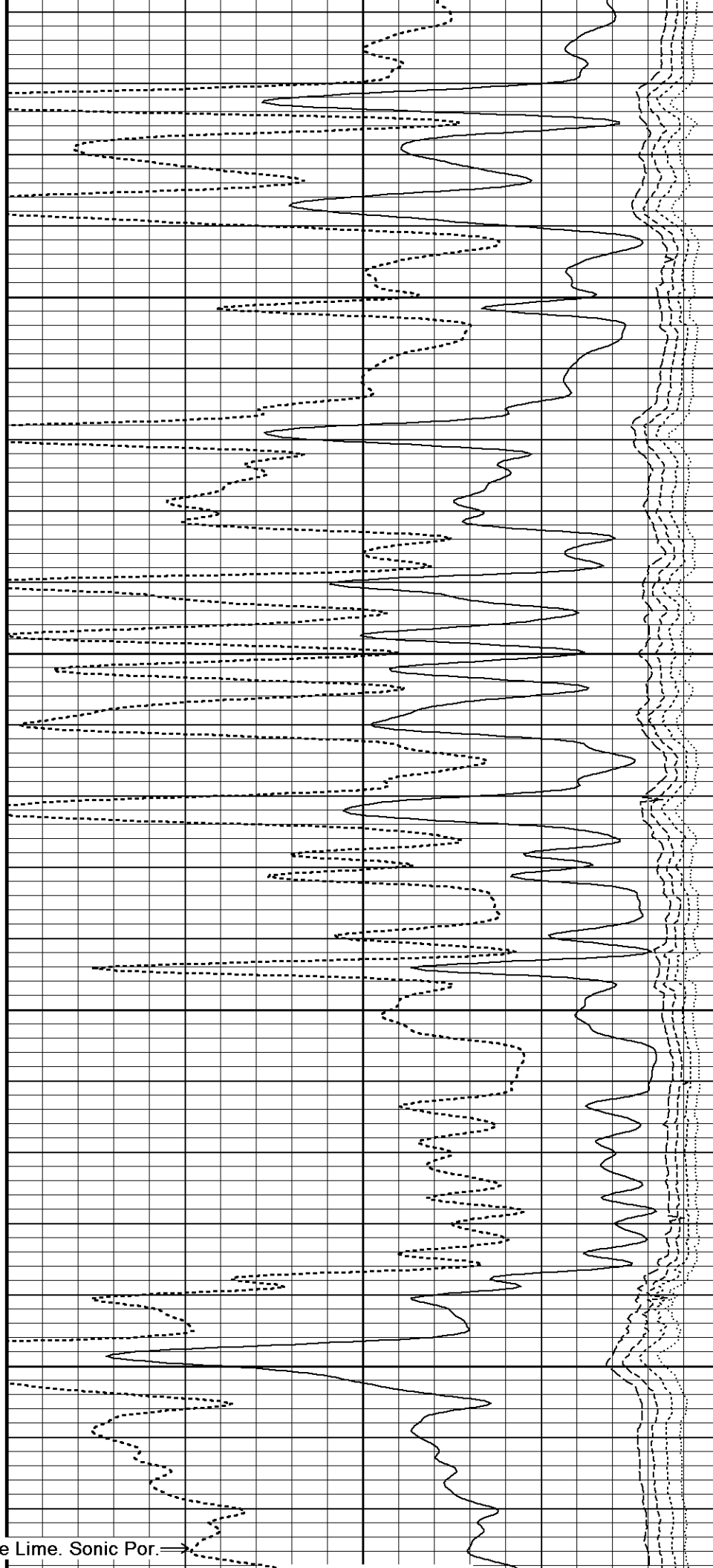
110°

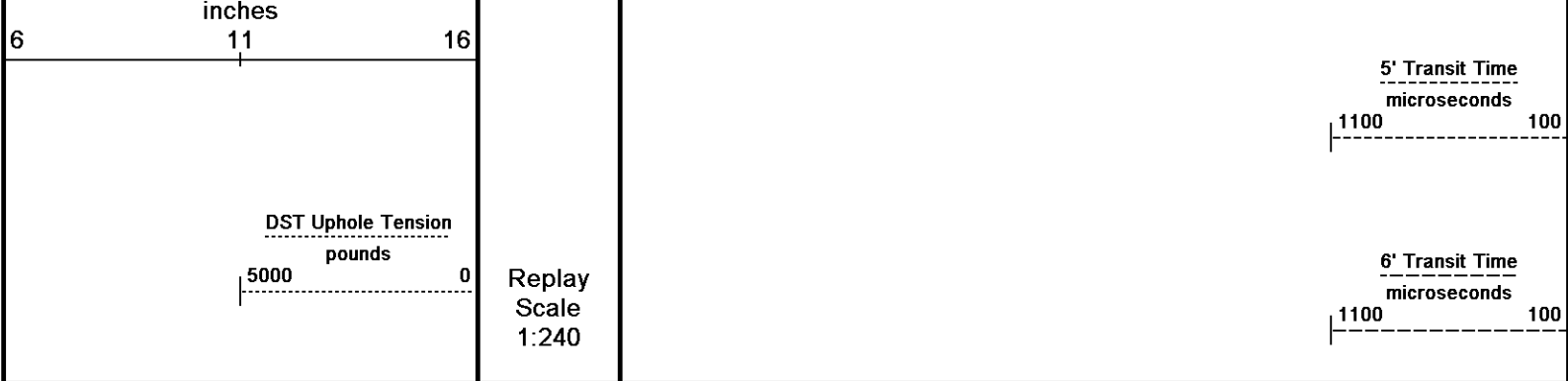
4700

111°

4750

Wyllie Lime. Sonic Por. →





Depth Based Data - Maximum Sampling Increment 10.0cm
 Filename: C:\Minimus 14.03.4558\Log Data\Shakespeare Bahm ...\Shakespeare Bahm 2-21 Repeat.dta
 System Versions: Logged with 14.03.4558 Plotted with 14.03.4558

Plotted on 02-NOV-2014 16:55
 Recorded on 02-NOV-2014 13:55

↑
REPEAT SECTION
↑

BEFORE SURVEY CALIBRATION

C:\Minimus 14.03.4558\Log Data\Shakespeare Bahm 2-21\Shakespeare Bahm 2-21 Main.dta

General Constants All 000			Last Edited on 02-NOV-2014,13:30		
General Parameters					
Mud Resistivity	0.425		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	None				
Rwa Parameters					
Porosity used	Crossplot Porosity				
Resistivity used	Array Ind. One Res Rt				
RWA Constant A	0.610				
RWA Constant M	2.150				
SW/APOR Tool Source	0.000				

Gamma Calibration MCG-D.K 469			Field Calibration on 28-OCT-2014 13:39		
	Measured		Calibrated (API)		
Background	68		45		
Calibrator (Gross)	1149		770		
Calibrator (Net)	1082		725		

Gamma Calibration Tolerances MCG-D.K 469		
Ratio	1.492	1.40 1.475 1.55 Counts/API

Gamma Constants MCG-D.K 469			Last Edited on 02-NOV-2014,12:42		
Gamma Calibrator Number	GRC038				
GRC-M Calibrator Jig in Use?	NO				
Inactive Background Jig in Use?	NO				
Mud Density	1.10	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 12-MAY-2014,02:16		
	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 13-JUL-2014,14:53
Pre-filter Length	11

Sonic Constants MSS-A.A 126			Last Edited on 02-NOV-2014,09:34		
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)	N/A		
N/A	N/A	N/A		N/A	
N/A	N/A	N/A		N/A	
N/A	N/A	N/A		N/A	
N/A	N/A	N/A		N/A	
N/A	N/A	N/A		N/A	
Full Waveform Parameters					
Use 3' Waveform to derive TR	N/A				
Use 4' Waveform to derive TR	N/A				
Use 5' Waveform to derive TR	N/A				
Use 6' Waveform to derive TR	N/A				
3' Waveform Discriminator Level	N/A	mV			
4' Waveform Discriminator Level	N/A	mV			
5' Waveform Discriminator Level	N/A	mV			
6' Waveform Discriminator Level	N/A	mV			
3' Waveform Filter	N/A				
4' Waveform Filter	N/A				
5' Waveform Filter	N/A				
6' Waveform Filter	N/A				
Semblance Level	N/A				
Semblance Window Width	N/A	micro-sec			
Sonic 1 Despiker	N/A	N/A			
Sonic 2 Despiker	N/A	N/A			

Caliper Calibration MPD-C.A 216	Base Calibration on 24-OCT-2014 11:23
	Field Calibration on 02-NOV-2014 09:42

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	18960	3.99
2	28807	5.98

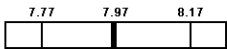
3	38852	7.97
4	48518	9.86
5	59792	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)
7.95

Actual Caliper (in)
7.97

Caliper Calibration Tolerances MPD-C.A 216

Short Arm Field Cal. 7.95  in

DOWNHOLE EQUIPMENT

C:\Minimus 14.03.4558\Log Data\Shakespeare Bahm 2-21\Shakespeare Bahm 2-21 Main.dta

3/8" Triple Cone Cable Head (MCB C A)

MCB-C.A 234 LG: 1.58 ft WT: 15.4 lb OD: 2.240 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 152 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: 2.449 in

Compact Focussed Electric

MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

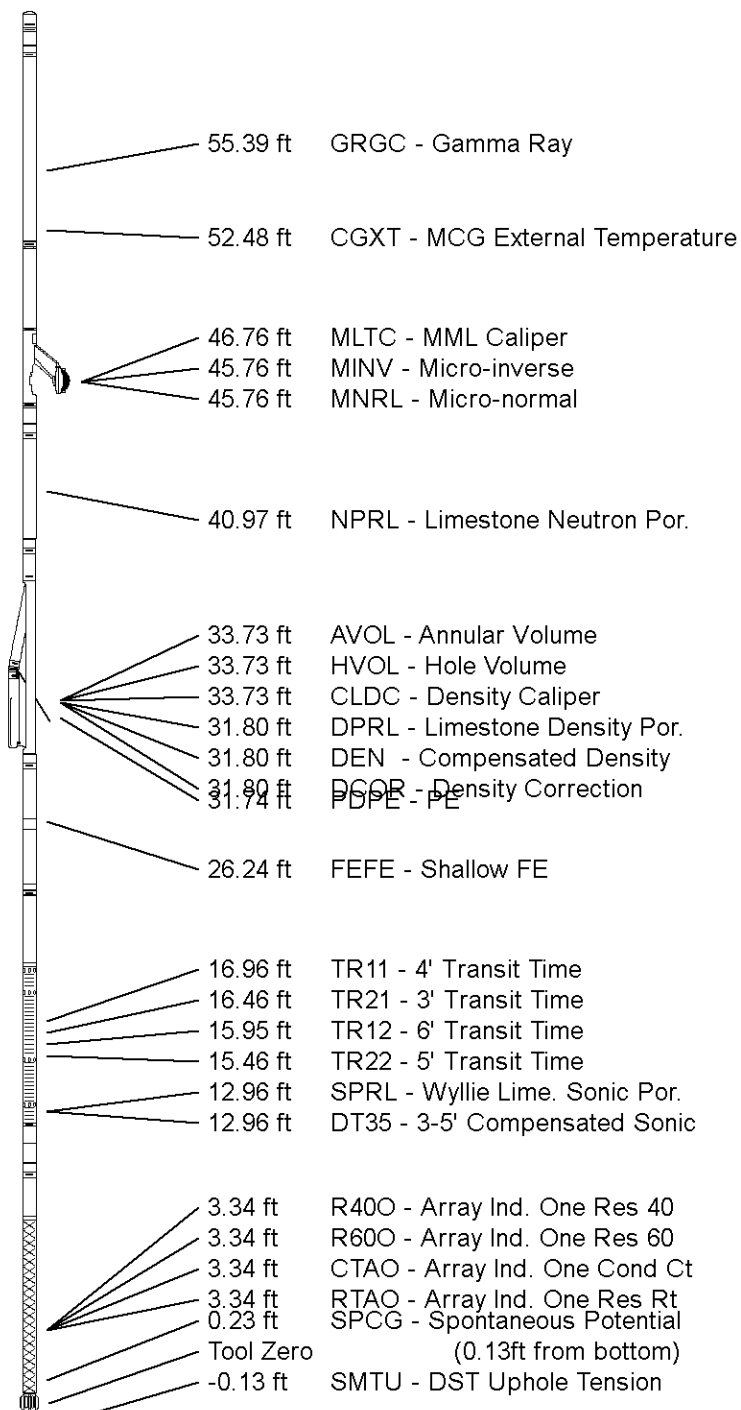
Compact Sonic

MSS-A.A 126 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction

MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 62.25 ft Weight: 471.8 lb



COMPANY

SHAKESPEARE OIL CO., INC.

WELL	BAHM 2-21
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3145.00	feet	First Reading	4877.04	feet
Elevation Drill Floor	3143.00	feet	Depth Driller	4890.00	feet
Elevation Ground Level	3135.00	feet	Depth Logger	4890.00	feet



Weatherford®

COMPENSATED SONIC
WITH INTEGRATED TRANSIT TIME