



Weatherford

**COMPENSATED SONIC
WITH INTEGRATED TRANSIT TIME**

COMPANY	BEREXCO LLC.		
WELL	ELNORA #2-20		
FIELD	WILDCAT		
PROVINCE/COUNTY	FINNEY		
COUNTRY/STATE	U.S.A. / KANSAS		
LOCATION	940' FNL & 1655' FWL		
SEC 20	TWP 26S	RGE 33W	Other Services
Latitude			MPD/MDN
Longitude			MML
API Number	15-055-22288		MAI/MFE
Permanent Datum GL, Elevation 2928 feet			Elevations: feet
Log Measured From KB			KB 2941.00
Drilling Measured From KB			DF 2939.00
			GL 2928.00
Date	04-APR-2014		
Run Number	ONE		
Service Order	3487-83817538		
Depth Driller	5400.00		
Depth Logger	5393.00		
First Reading	5380.00		
Last Reading	1783.00		
Casing Driller	1772.00		
Casing Logger	1783.00		
Bit Size	7.875		
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.20 lb/USg	51.00 CP	
PH / Fluid Loss	9.50	7.60 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	0.48 @ 84.0	ohm-m	
Rmf @ Measured Temp	0.38 @ 84.0	ohm-m	
Rmc @ Measured Temp	0.58 @ 84.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.34 @120.0	ohm-m	
Time Since Circulation	5 HOURS		
Max Recorded Temp	120.00	deg F	
Equipment / Base	13244	LIB	
Recorded By	ADAM SILL		
Witnessed By	IAN BOSMEIJER		
JOB #	LB14-100		

BOREHOLE RECORD			Last Edited: 04-APR-2014 15:44	
Bit Size inches	Depth From feet		Depth To feet	
7.875	1772.00		5400.00	
CASING RECORD				
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1772.00	24.00

REMARKS
- SOFTWARE ISSUE: WLS 13.08.2113.
- 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.
- RUN TWO: SHA, MCG, MIM, MIE RUN IN COMBINATION. - HARDWARE: CENTRALIZER BOWSPRING USED ON MIM. 1.5 INCH STANDOFF USED ON MIE.
- 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: 1789 CU.FT.

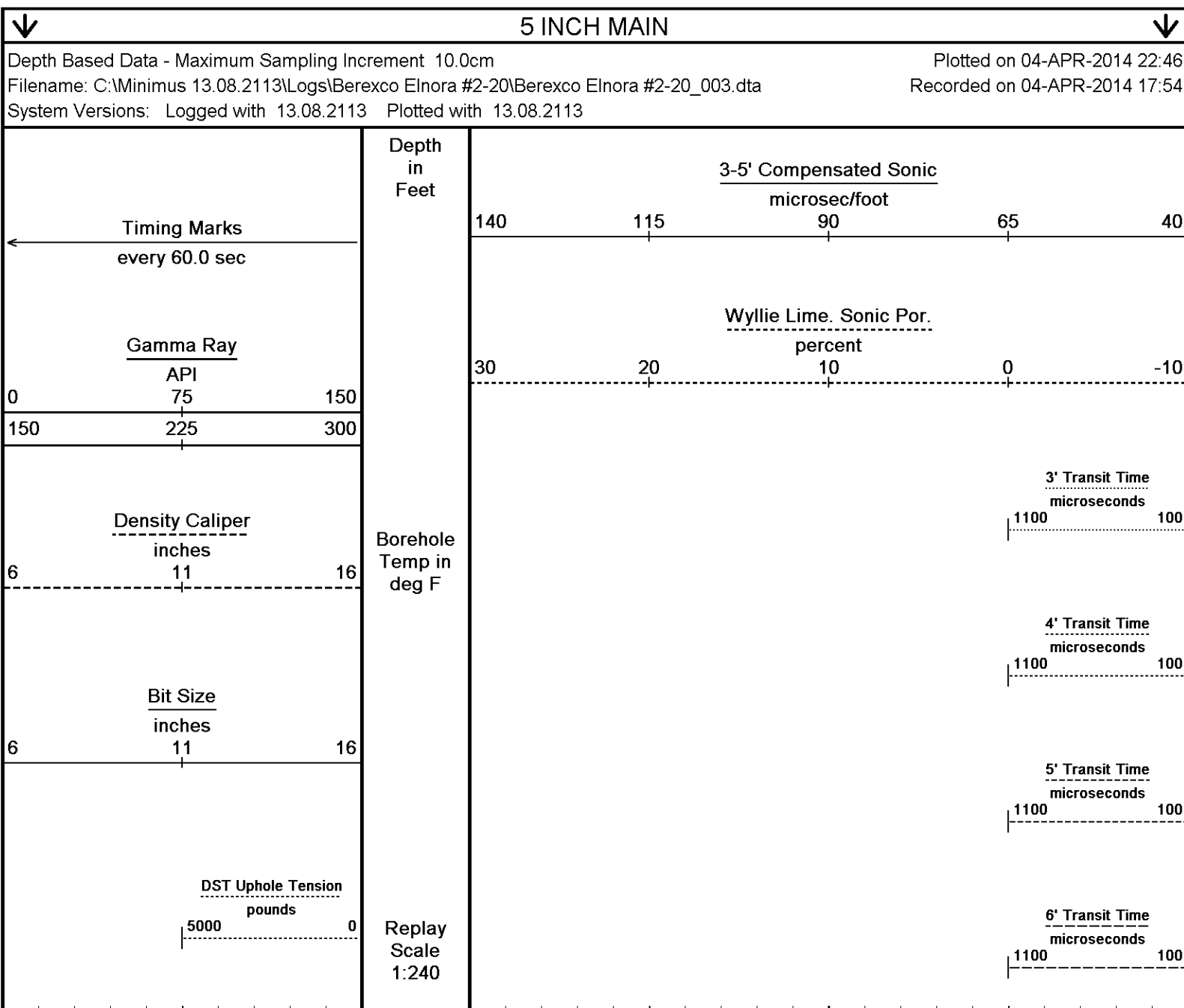
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3800 FEET: 353 CU.FT.

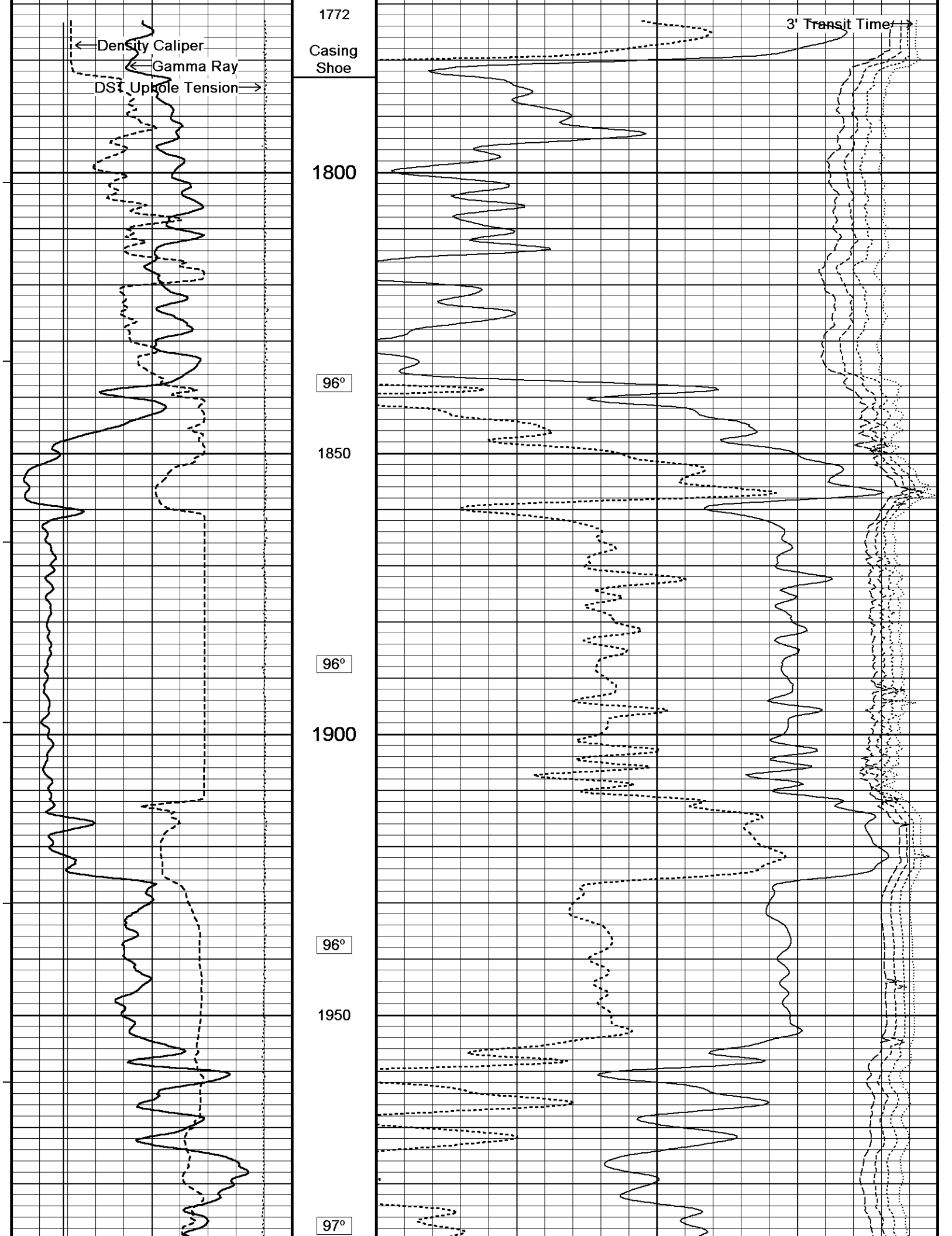
- RIG: BEREDCO #1.

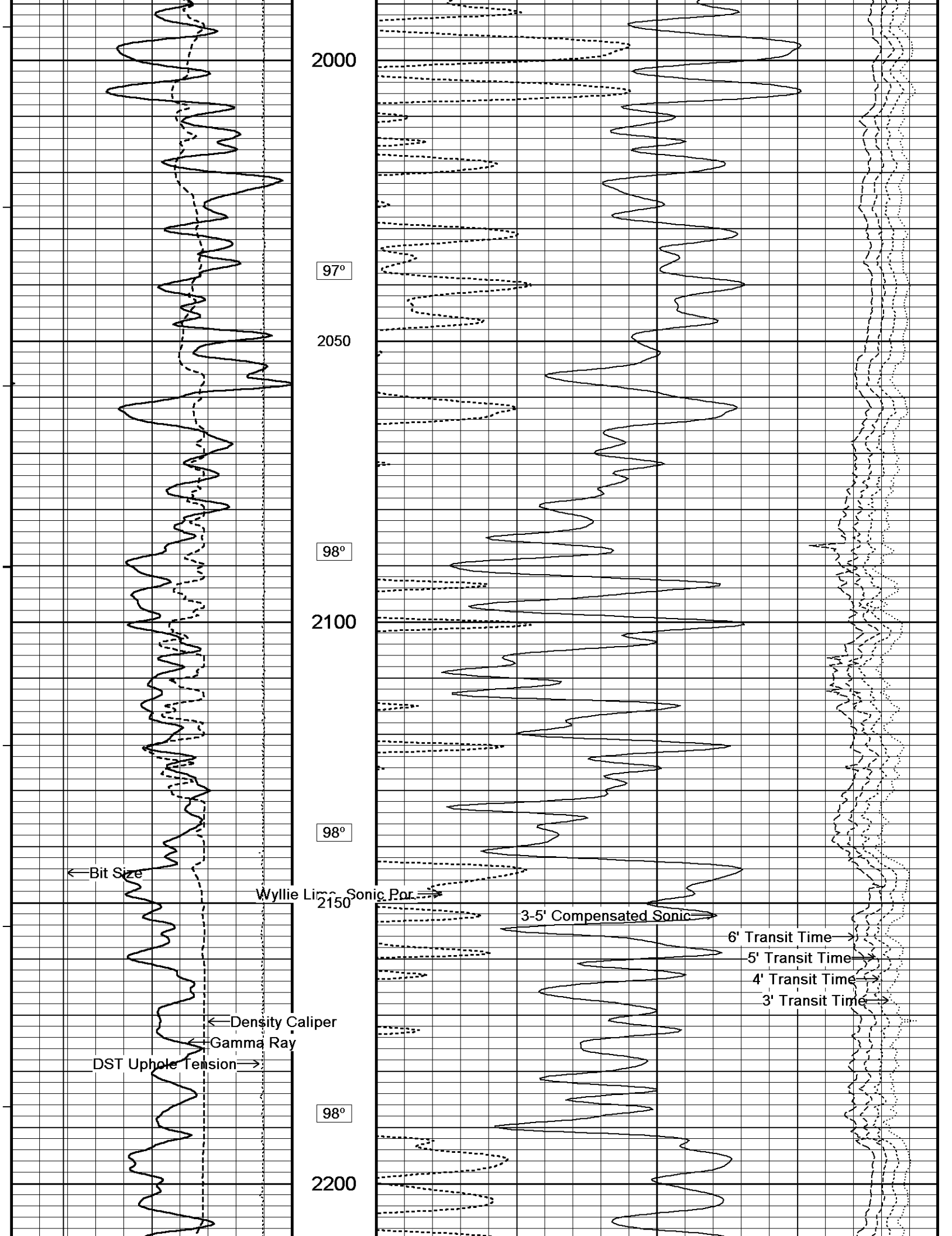
- ENGINEER: A. SILL.

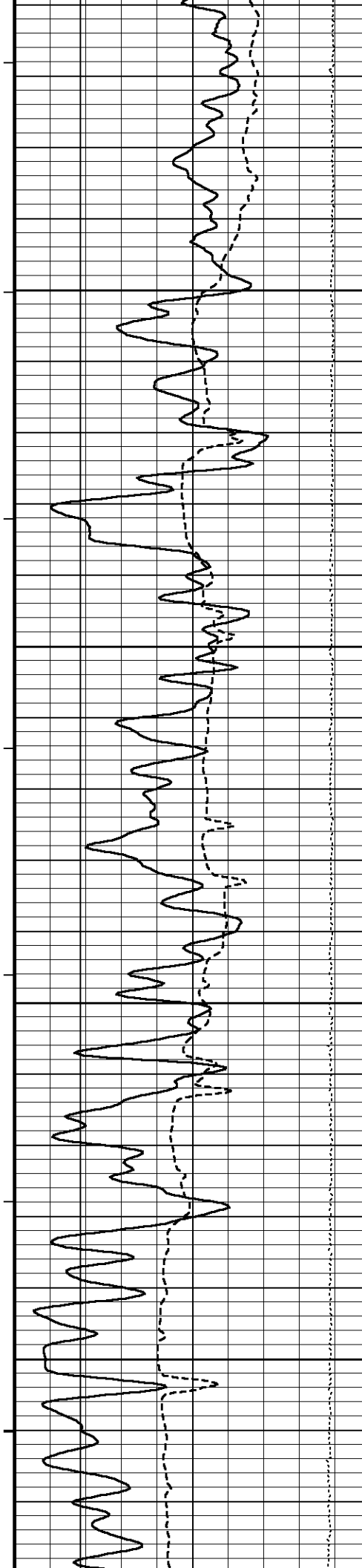
- OPERATOR: J. LaPOINT.

In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.









98°

2250

98°

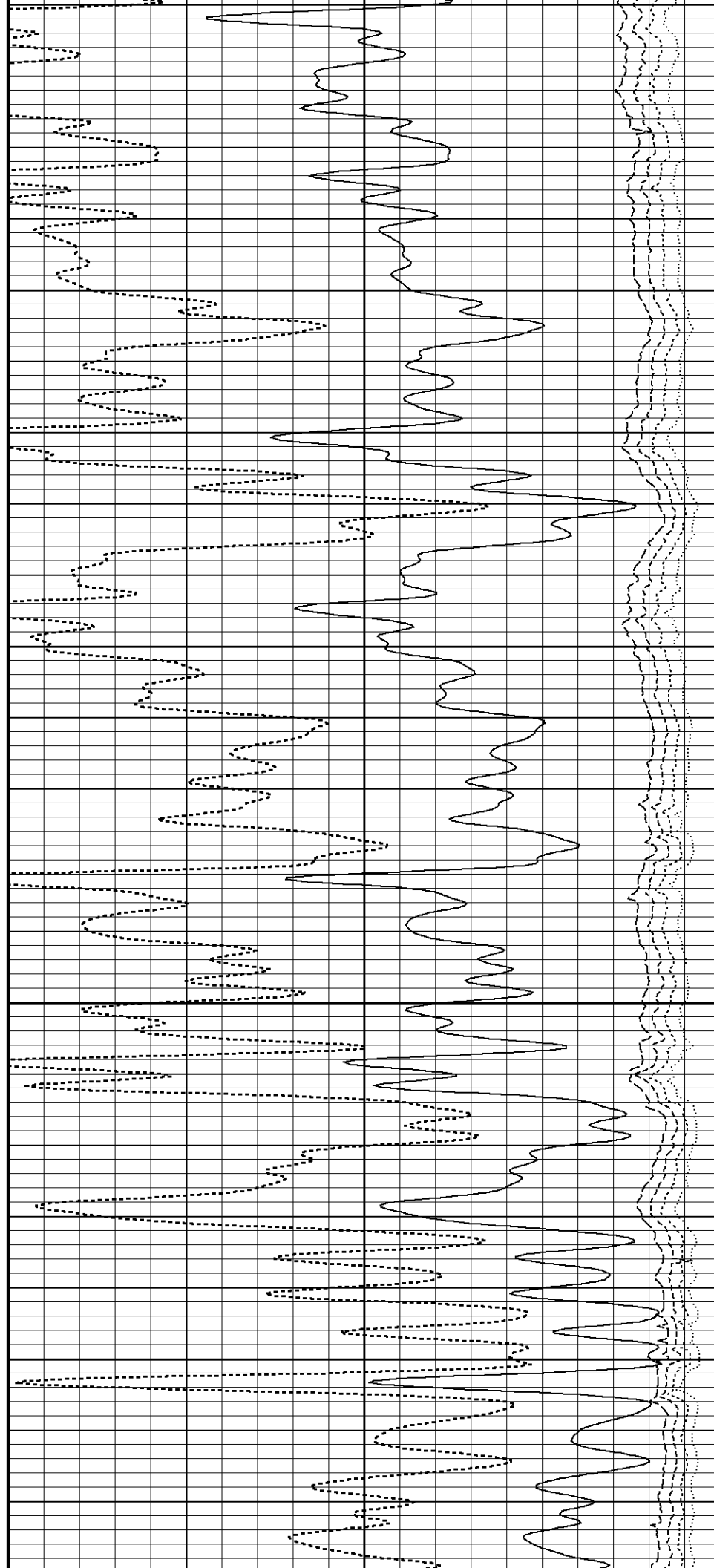
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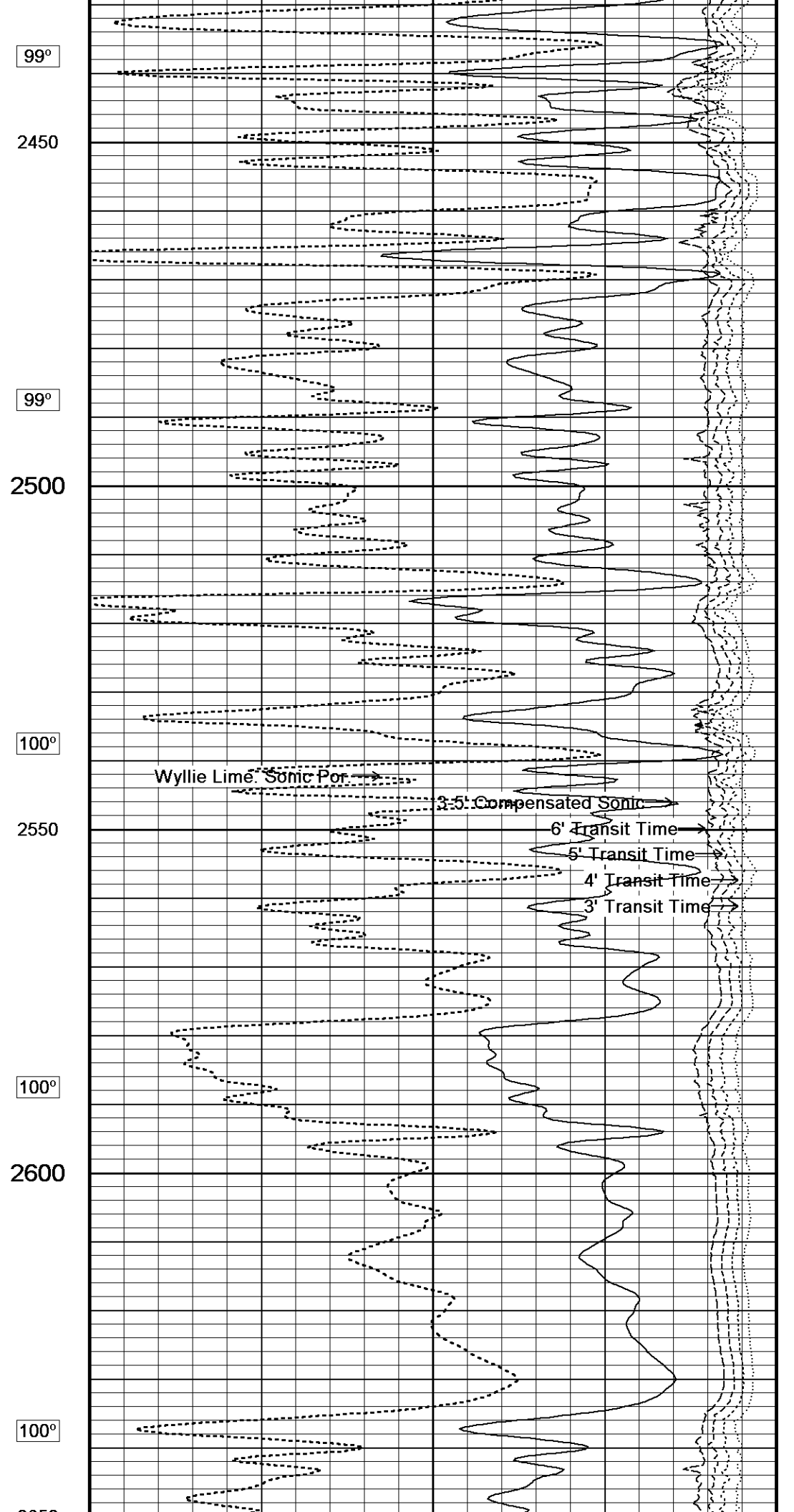
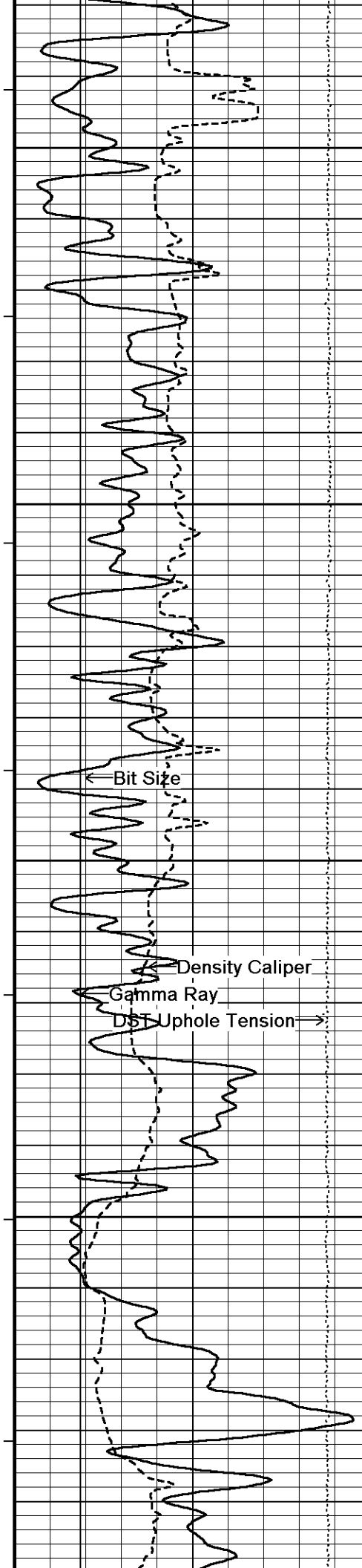
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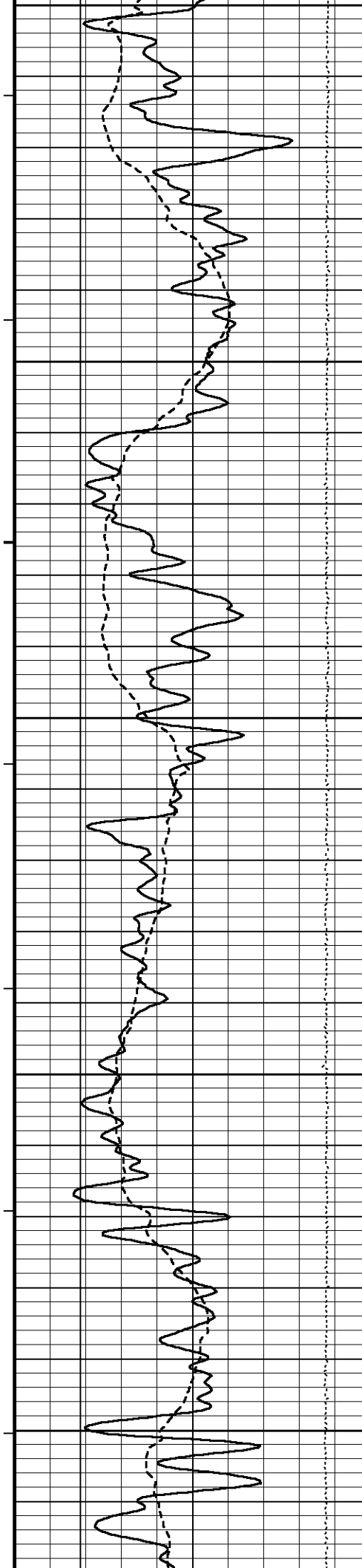
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99°

2400







2650

100°

2700

101°

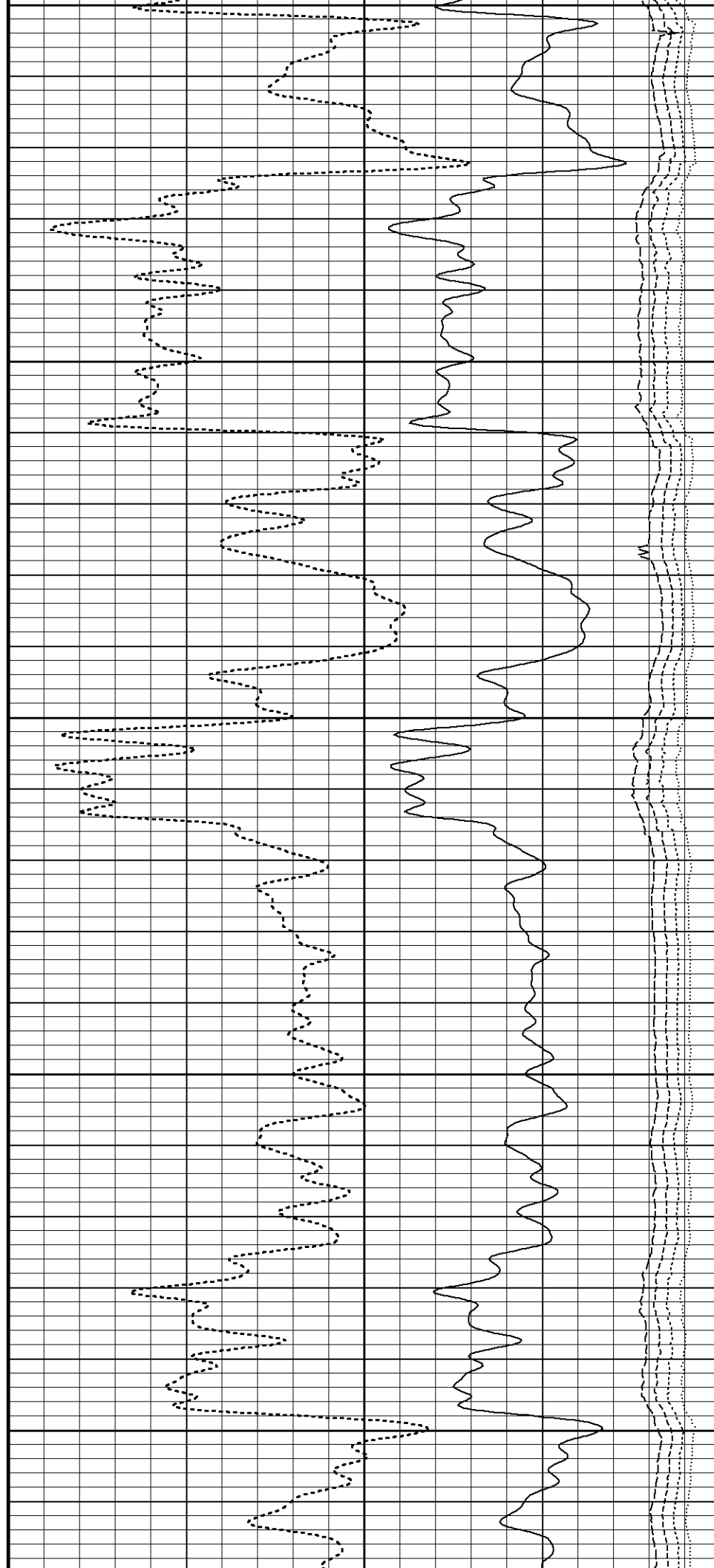
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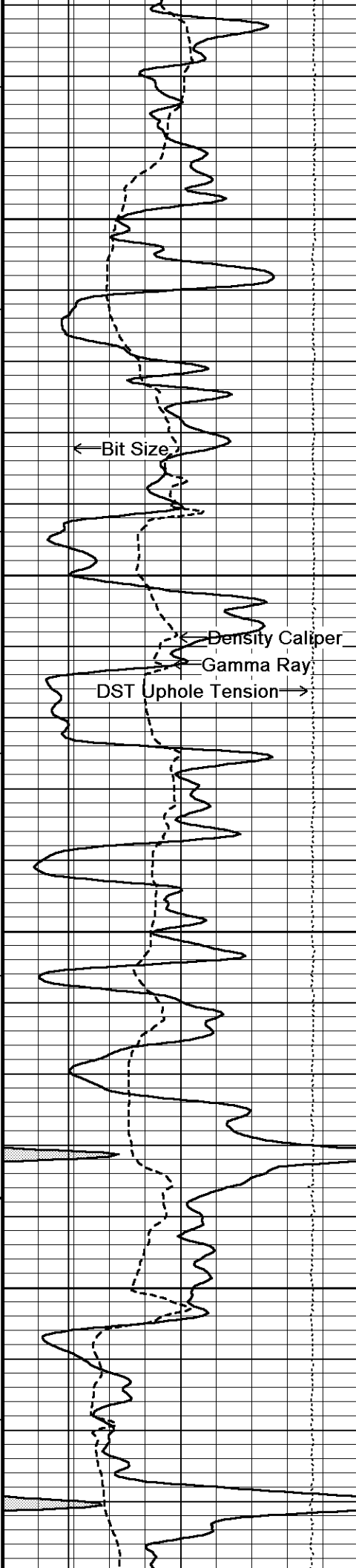
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2800

101°

2850





102°

2900

102°

2950

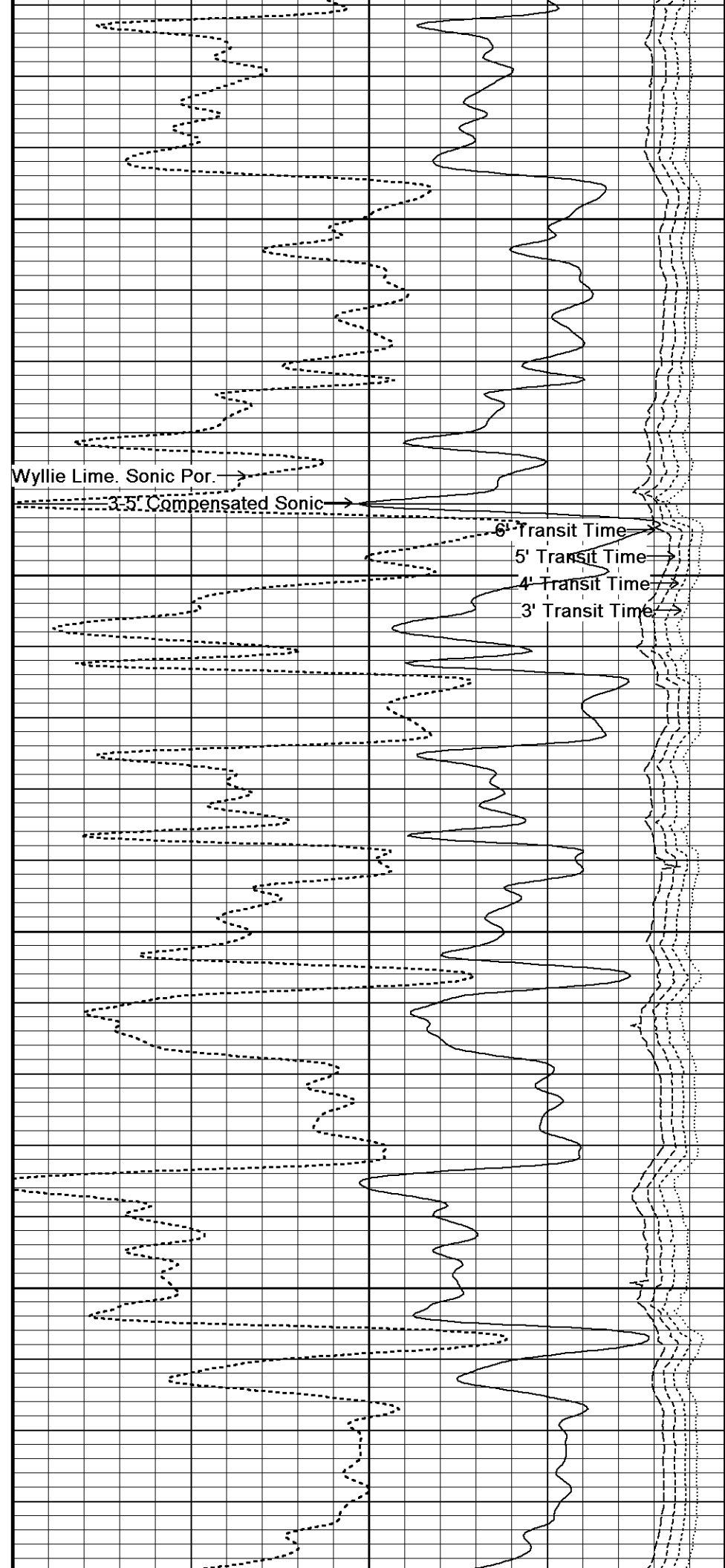
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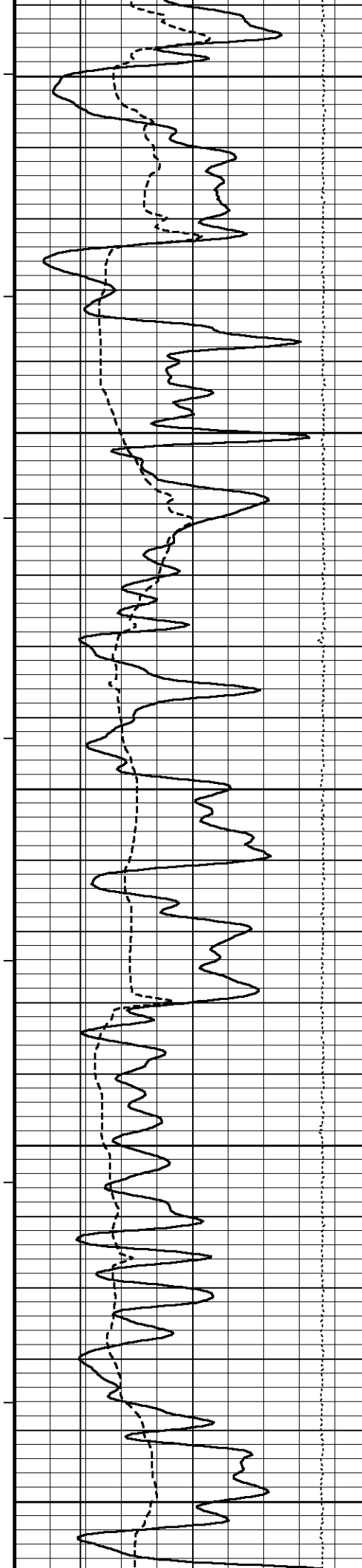
3000

103°

3050

103°





3100

103°

3150

104°

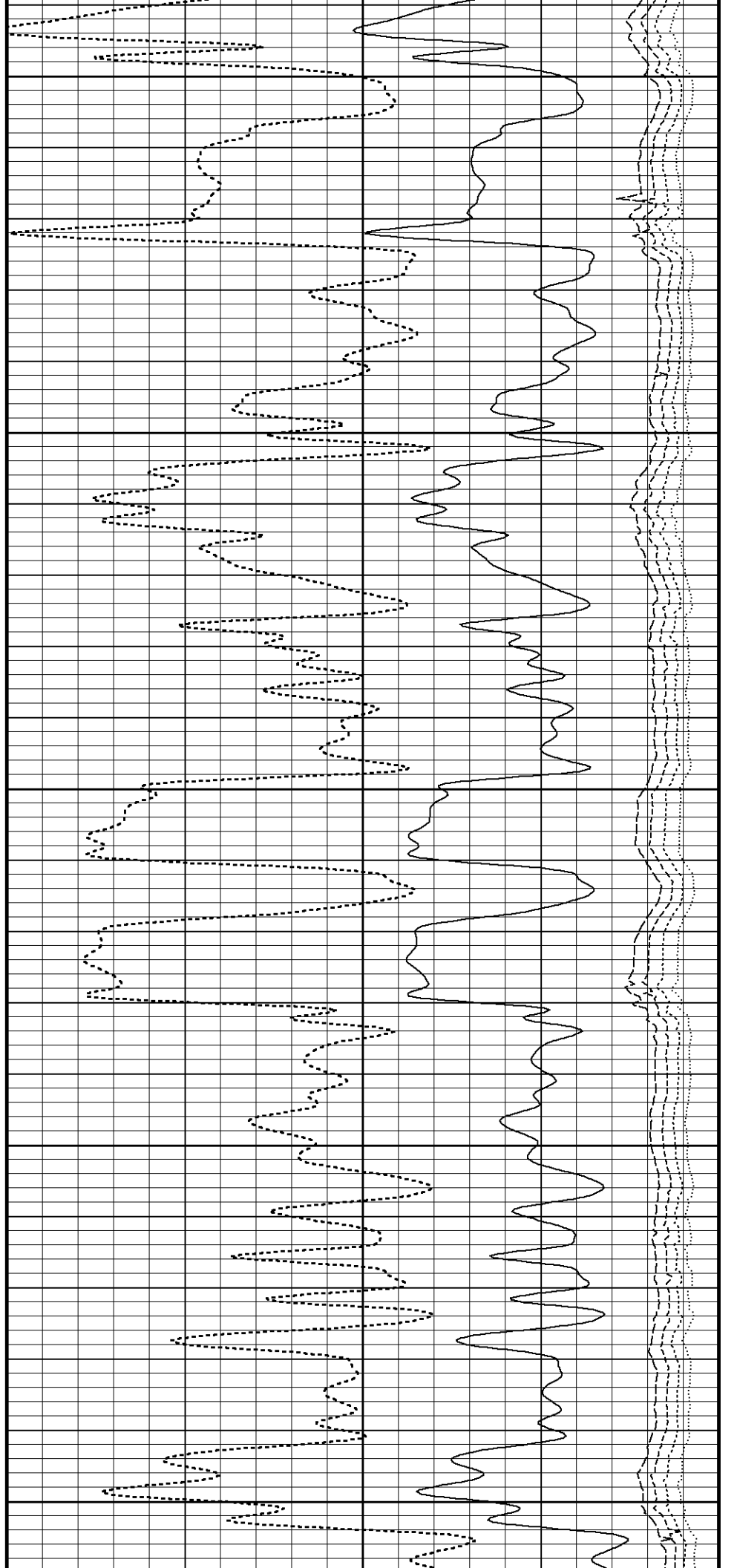
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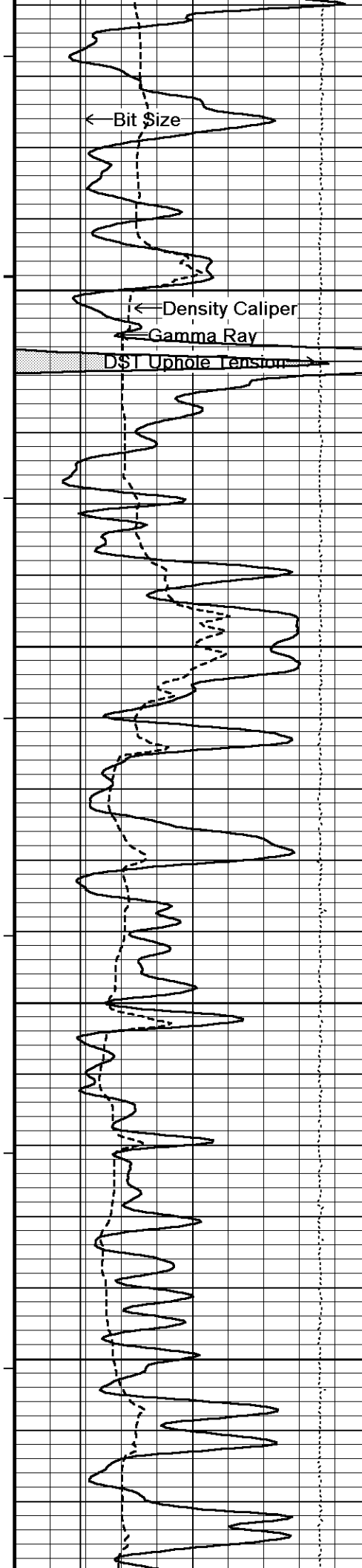
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3250

104°

3300





104°

3350

105°

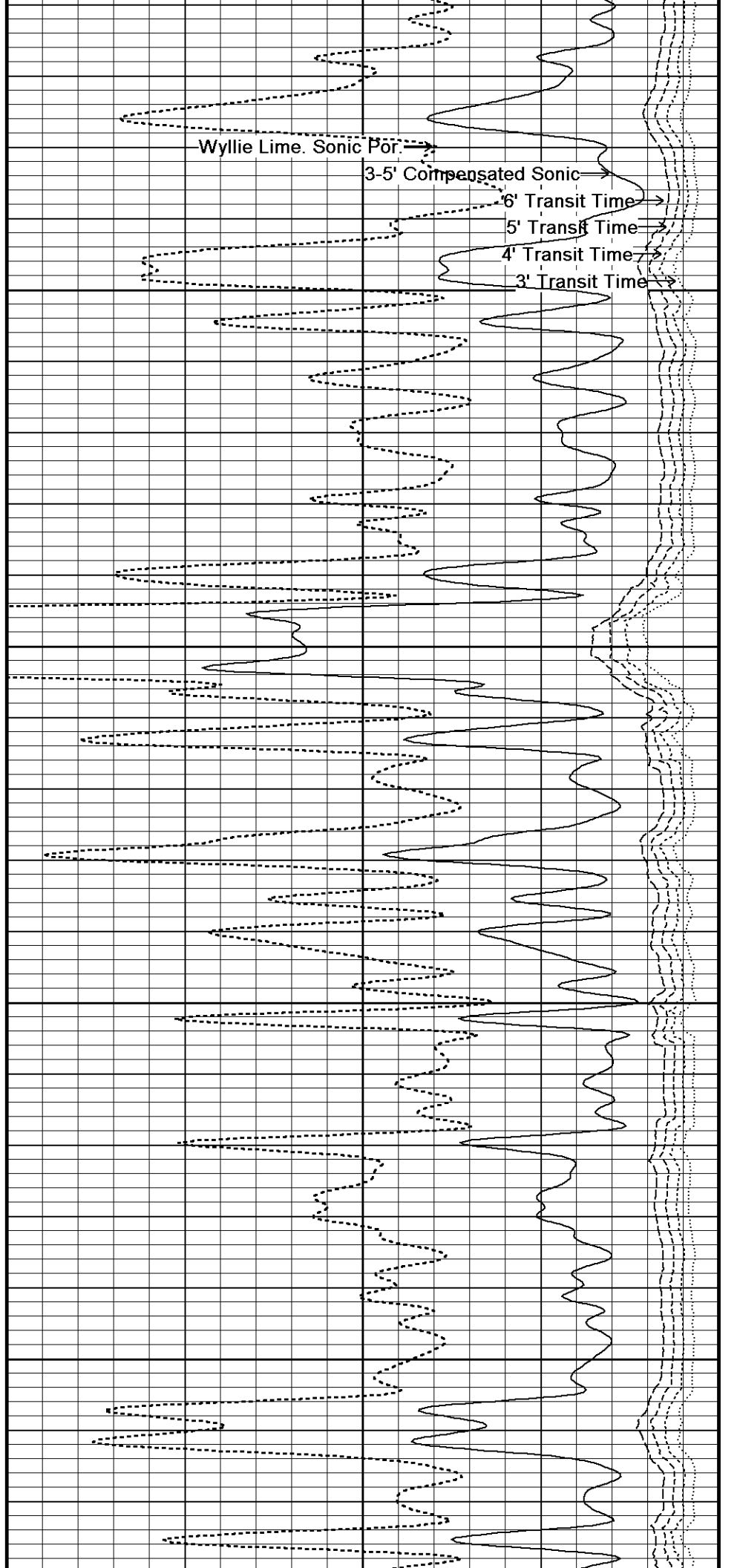
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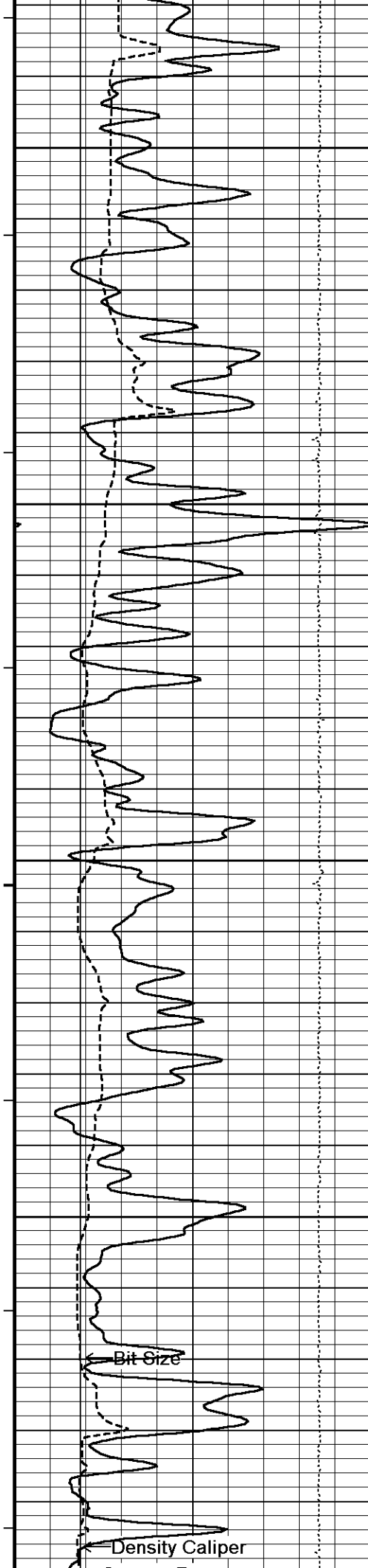
105°

3450

105°

3500





106°

3550

106°

3600

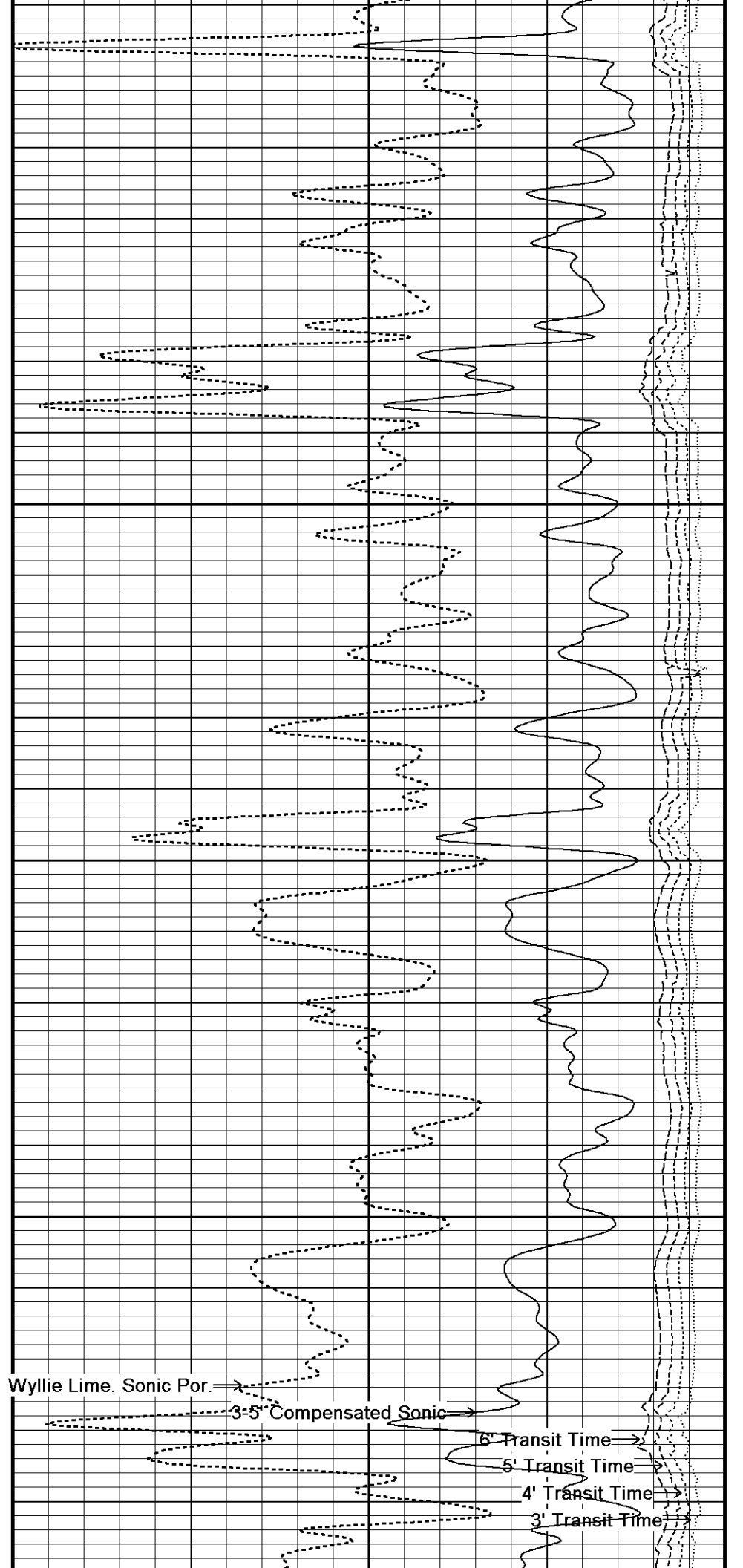
106°

3650

107°

3700

107°



Wyllie Lime. Sonic Por.

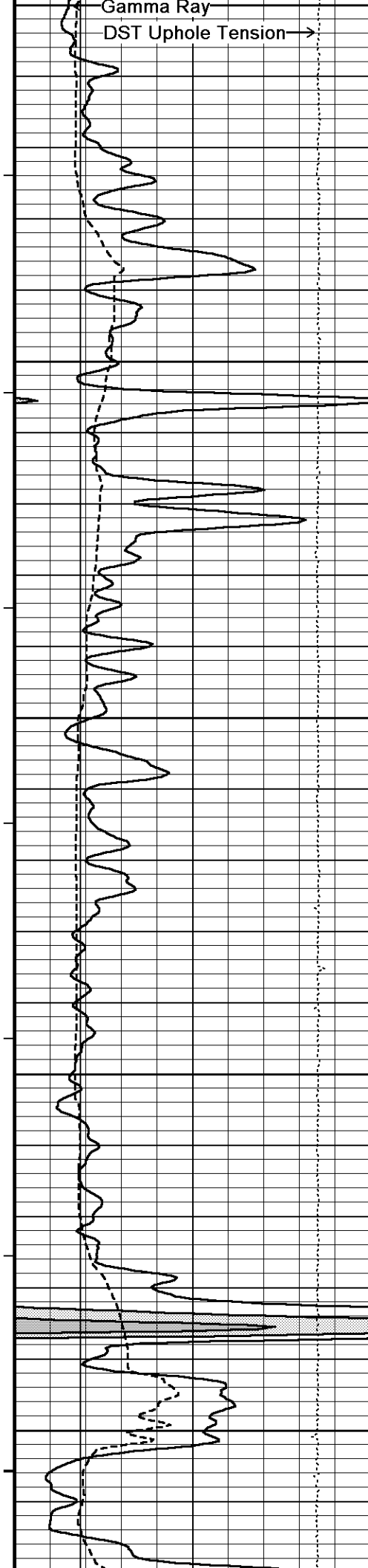
3-5 Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time



3750

107°

3800

107°

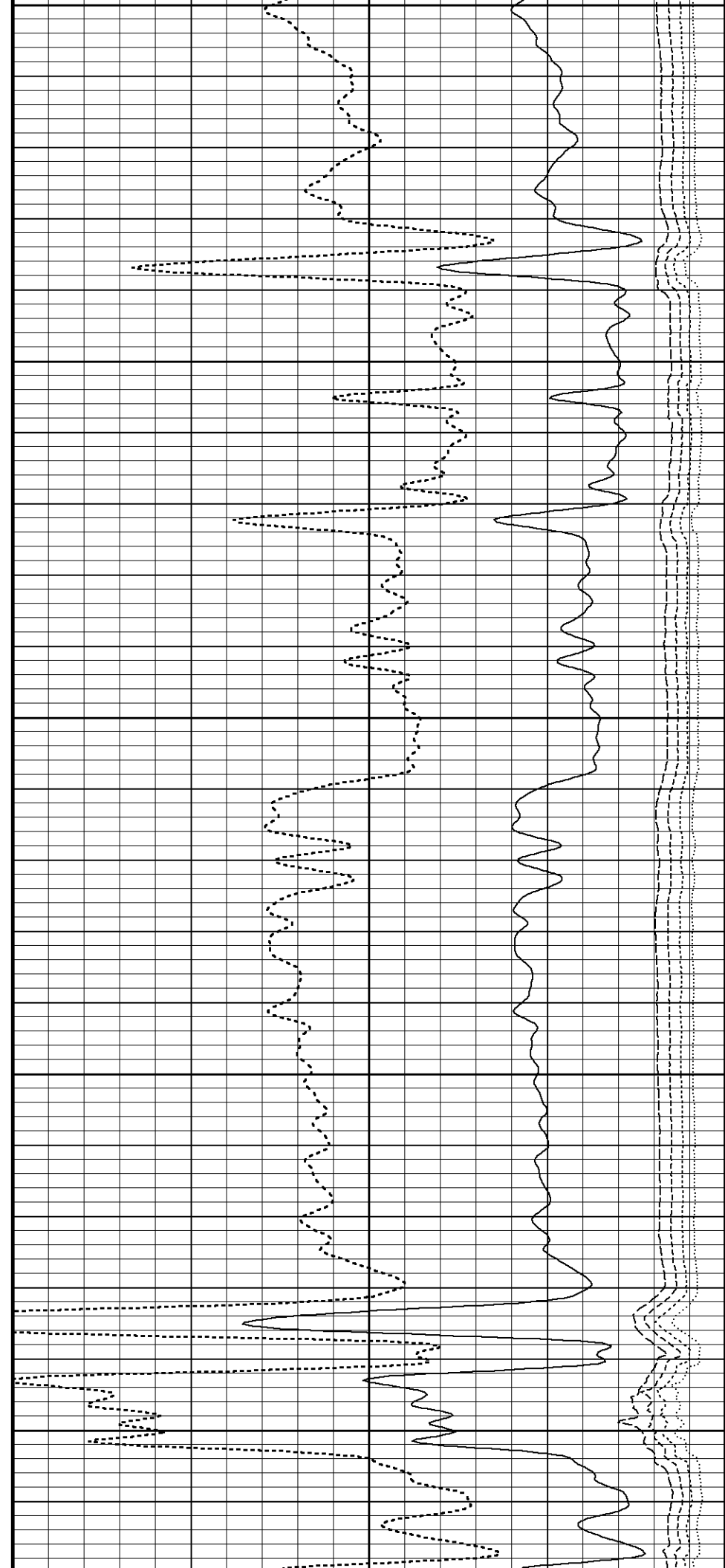
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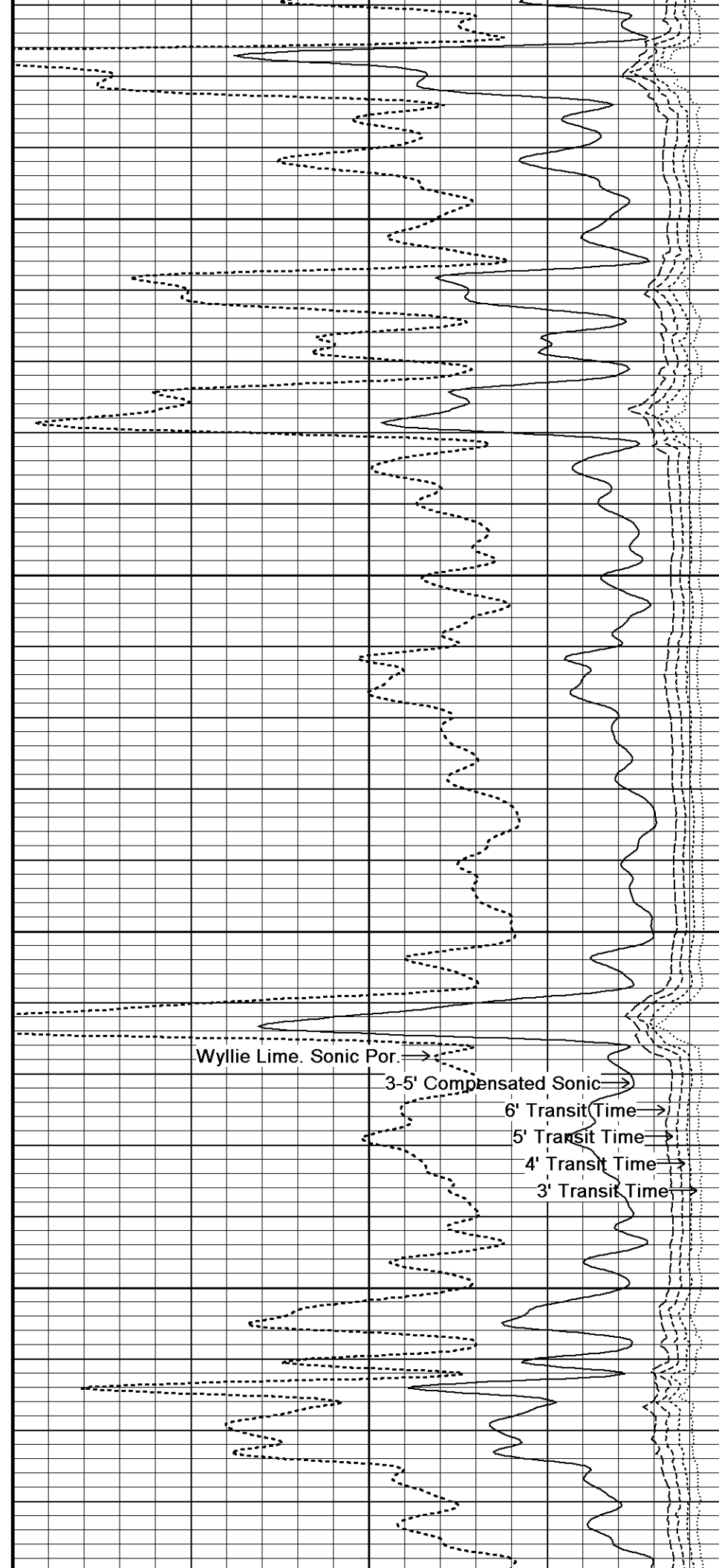
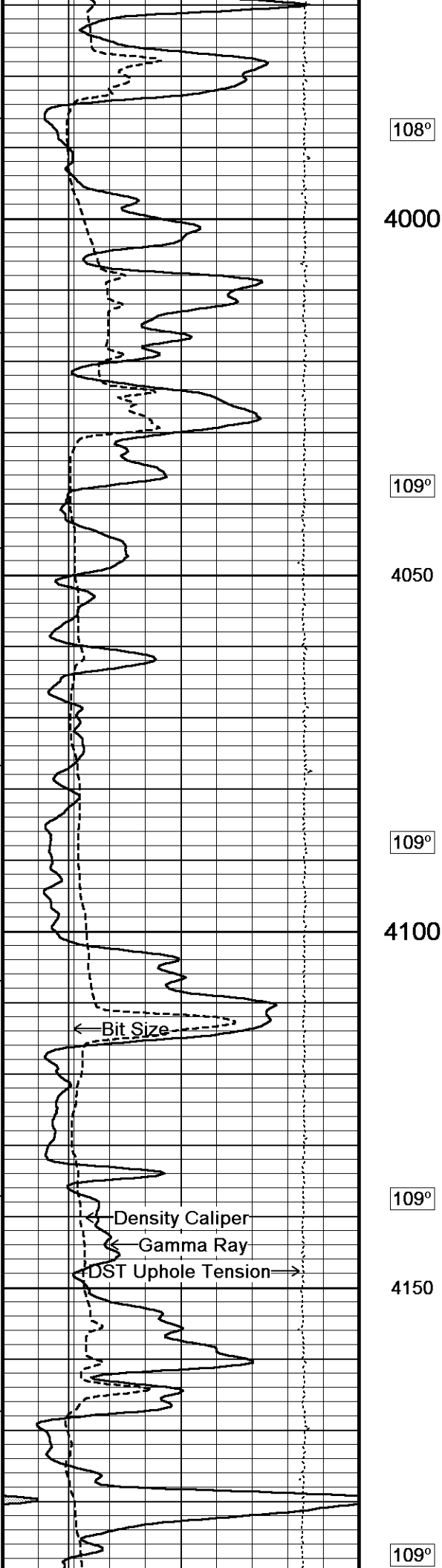
108°

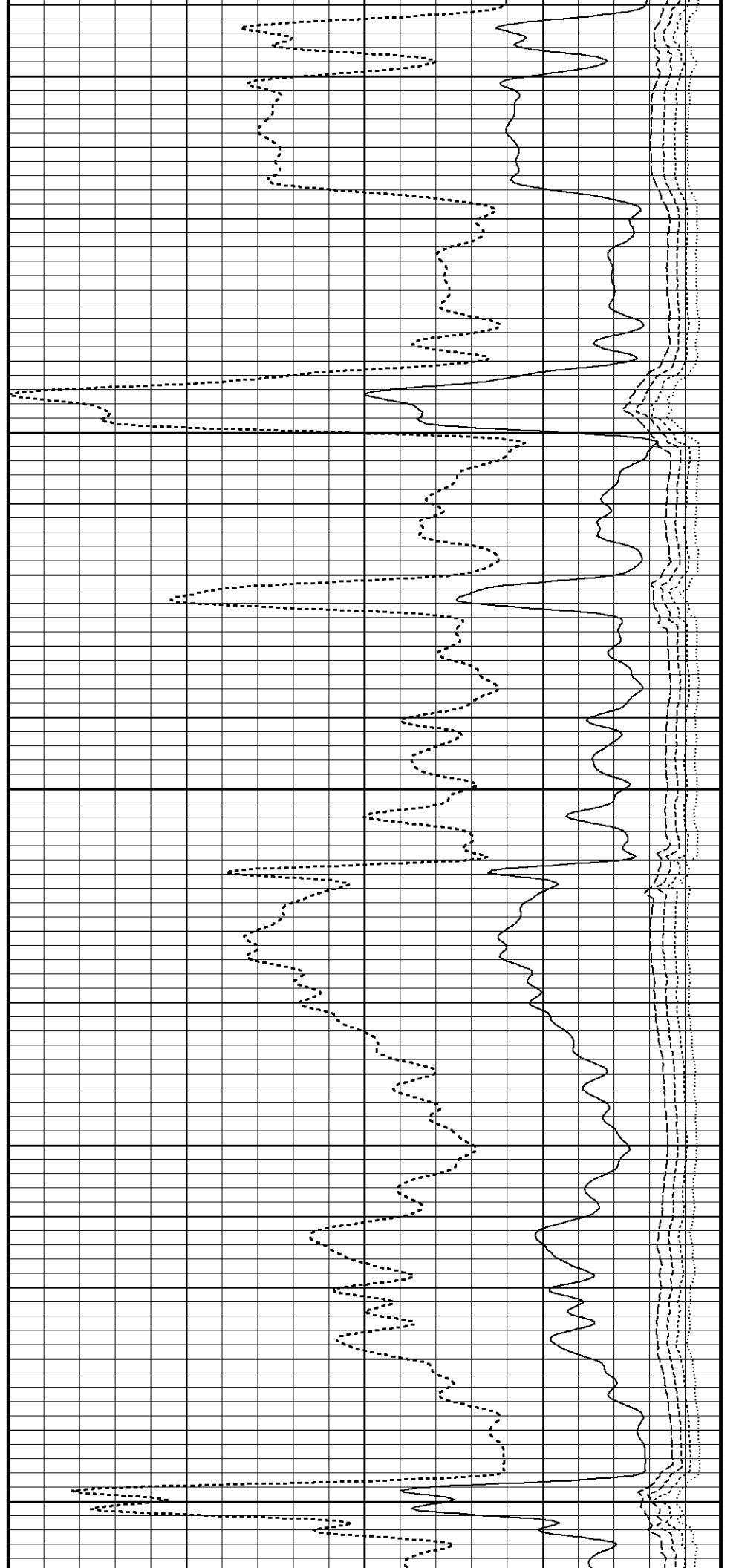
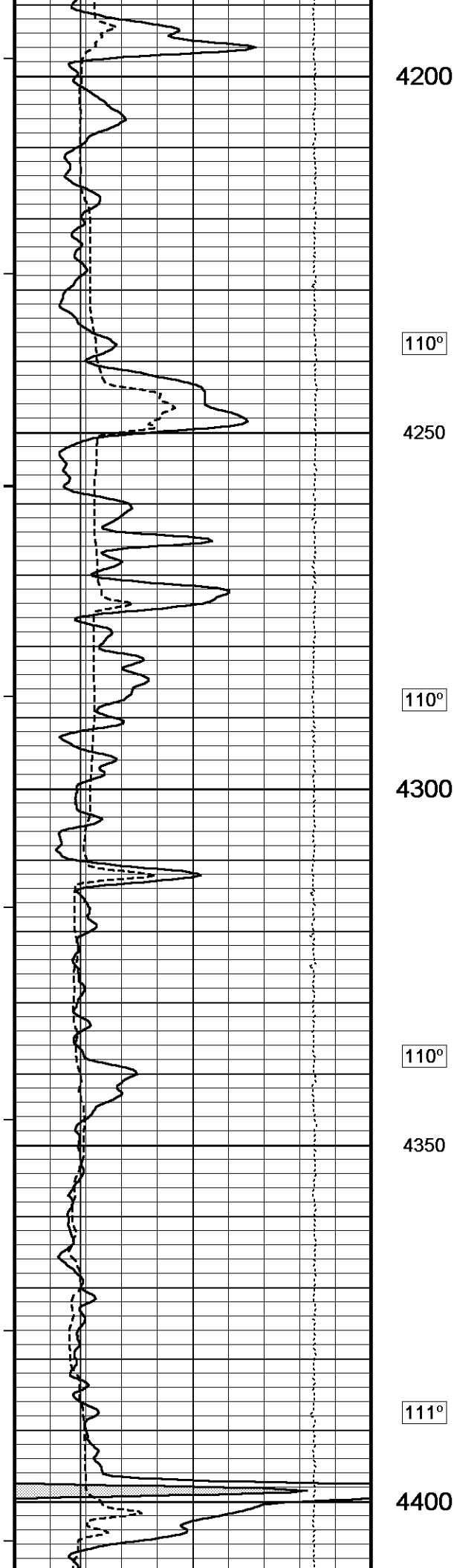
3900

108°

3950







111°

4450

112°

4500

112°

4550

112°

4600

Bit Size

Density Caliper

Gamma Ray

Dist Uphole Tension

Wyllie Lime. Sonic Por.

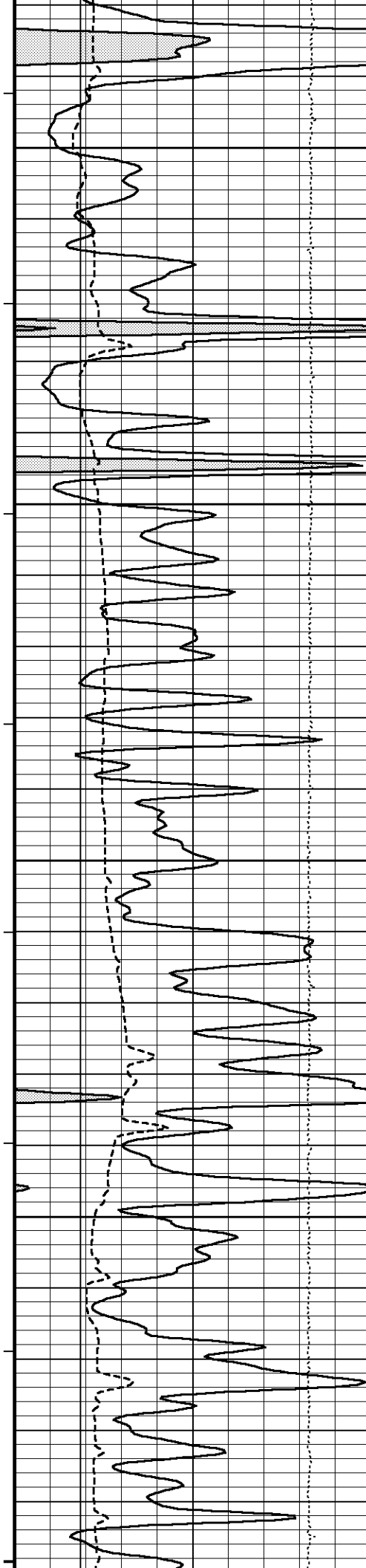
3-5' Compensated Sonic

6' Transit Time

5' Transit Time

4' Transit Time

3' Transit Time



113°

4650

113°

4700

113°

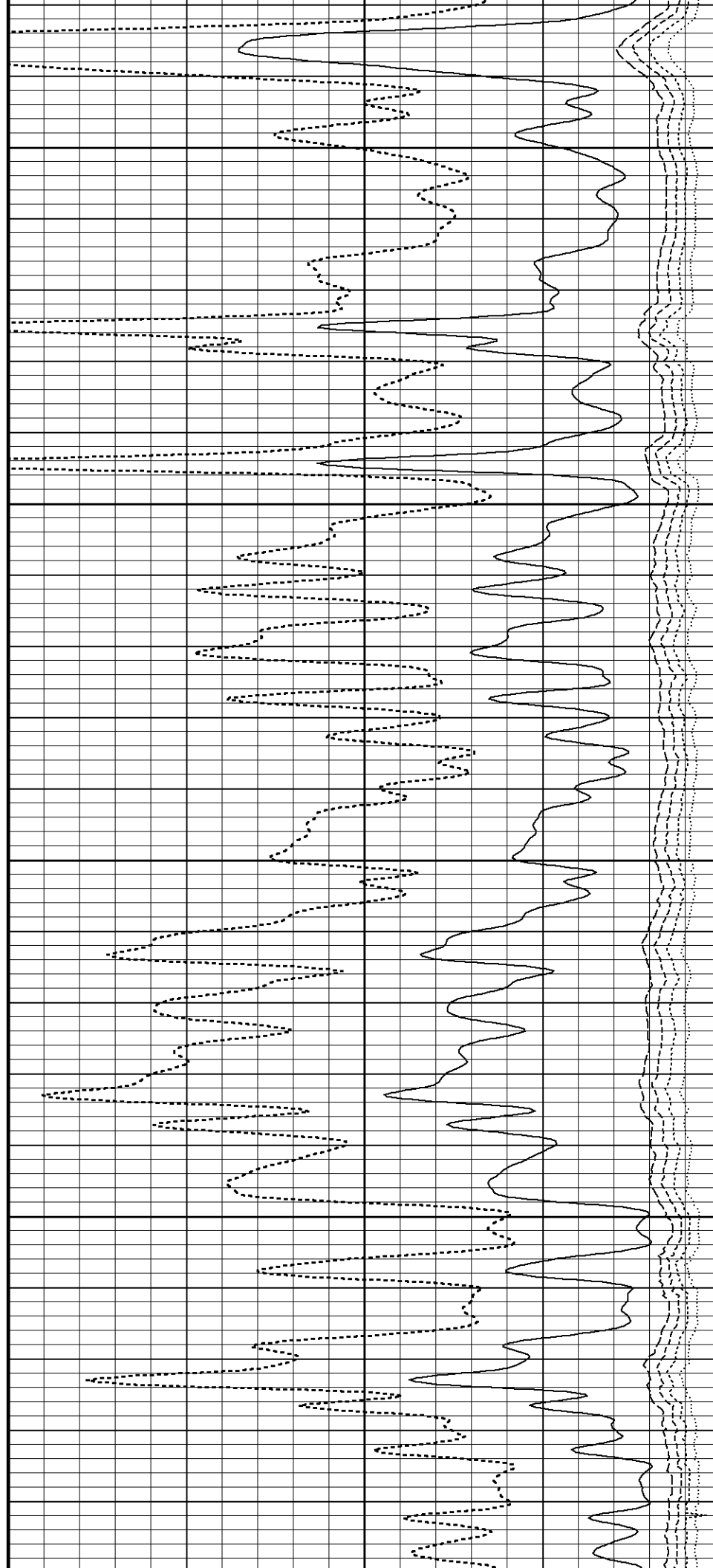
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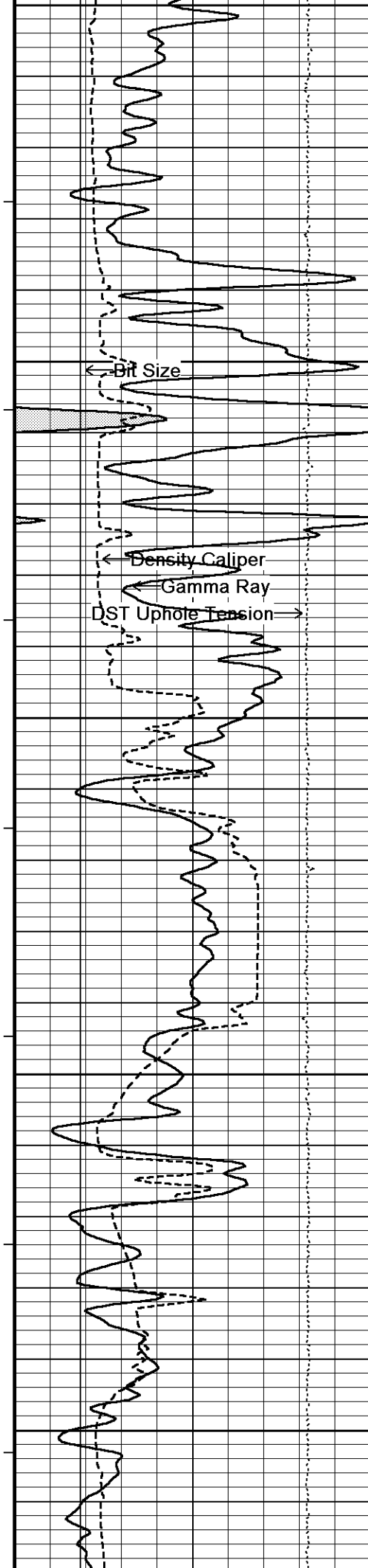
113°

4800

113°

4850





4850

113°

4900

114°

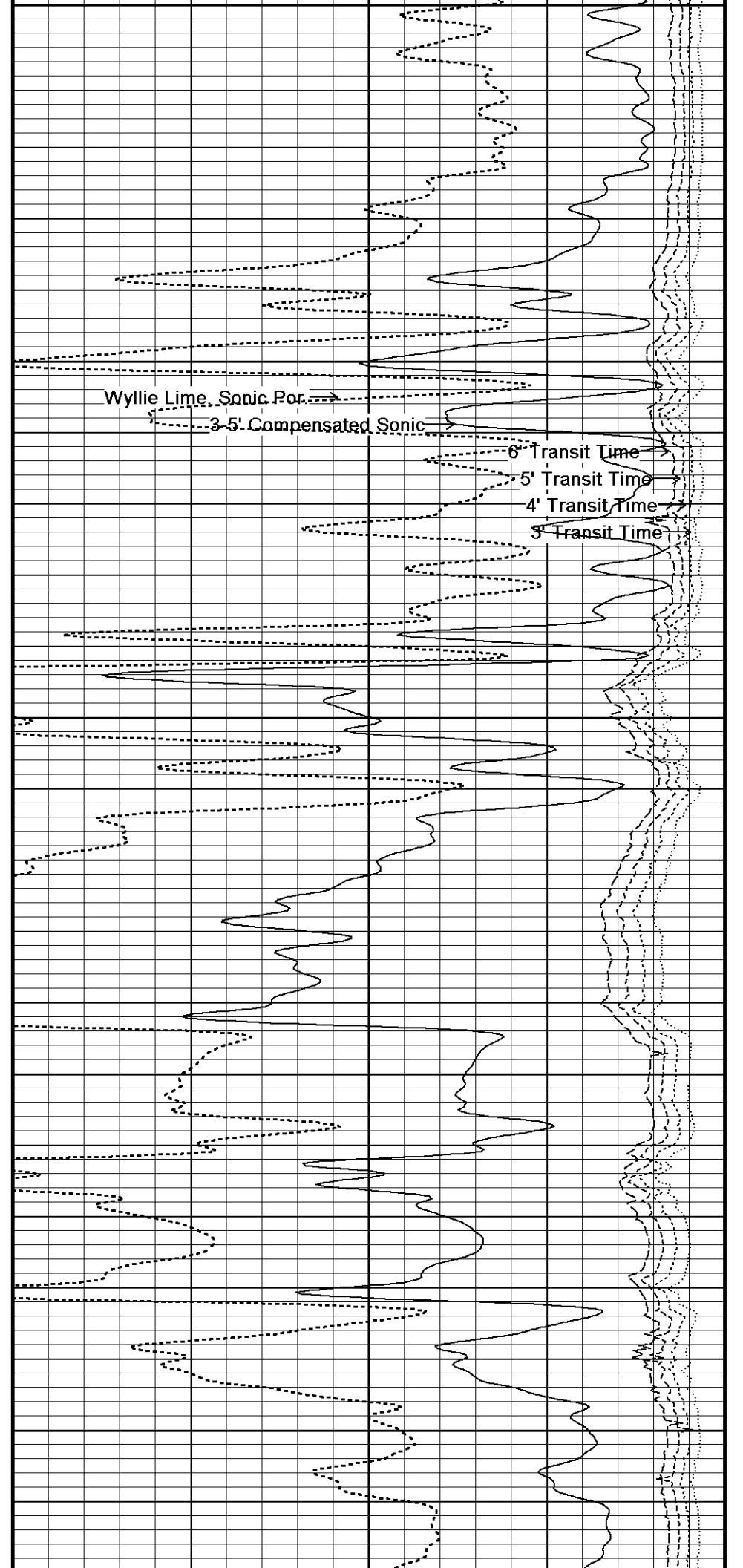
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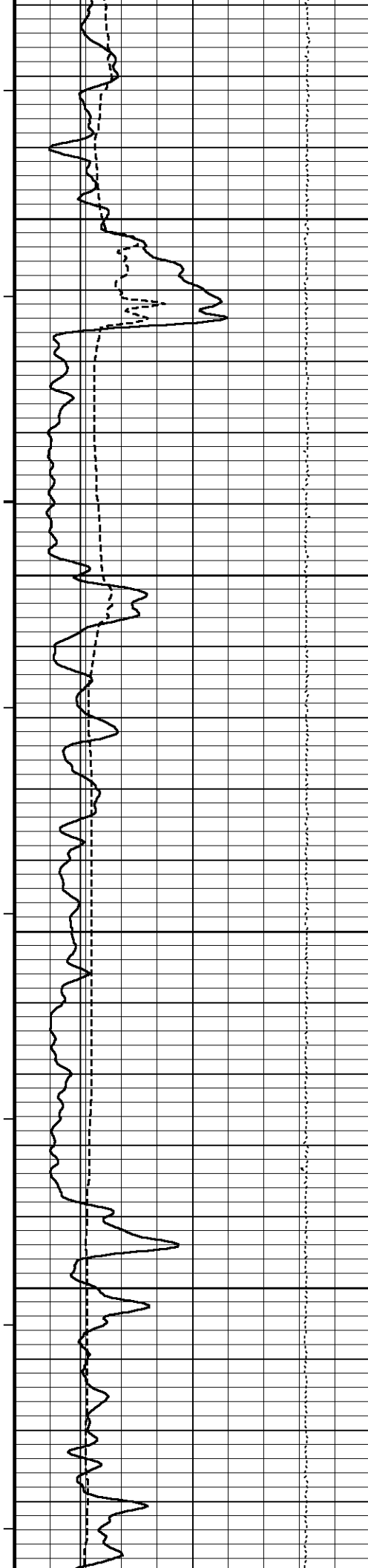
116°

5000

117°

5050





118°

5100

118°

5150

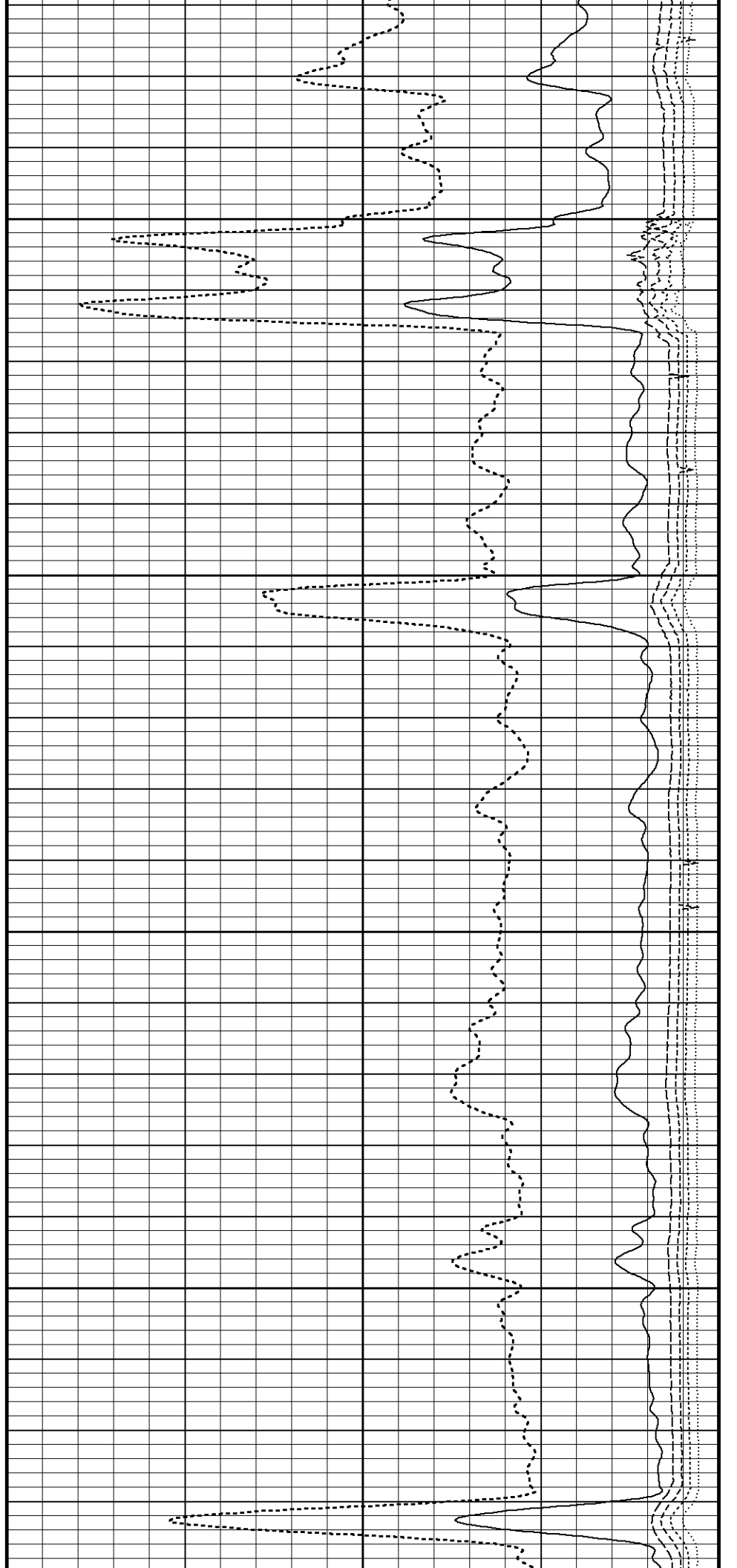
119°

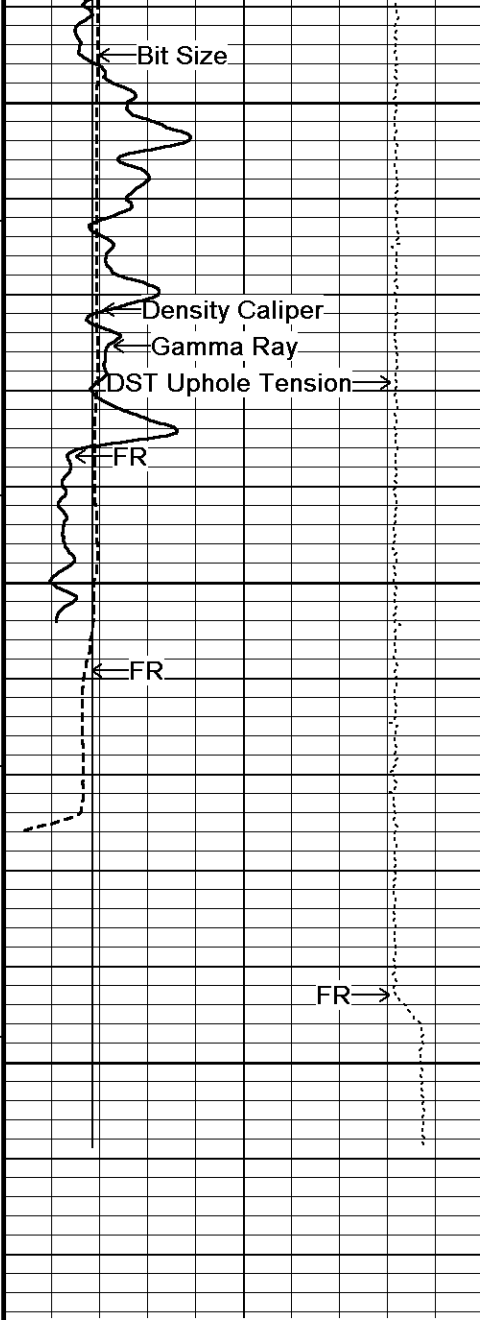
5200

120°

5250

119°





5300

117°

5350

5400

5424

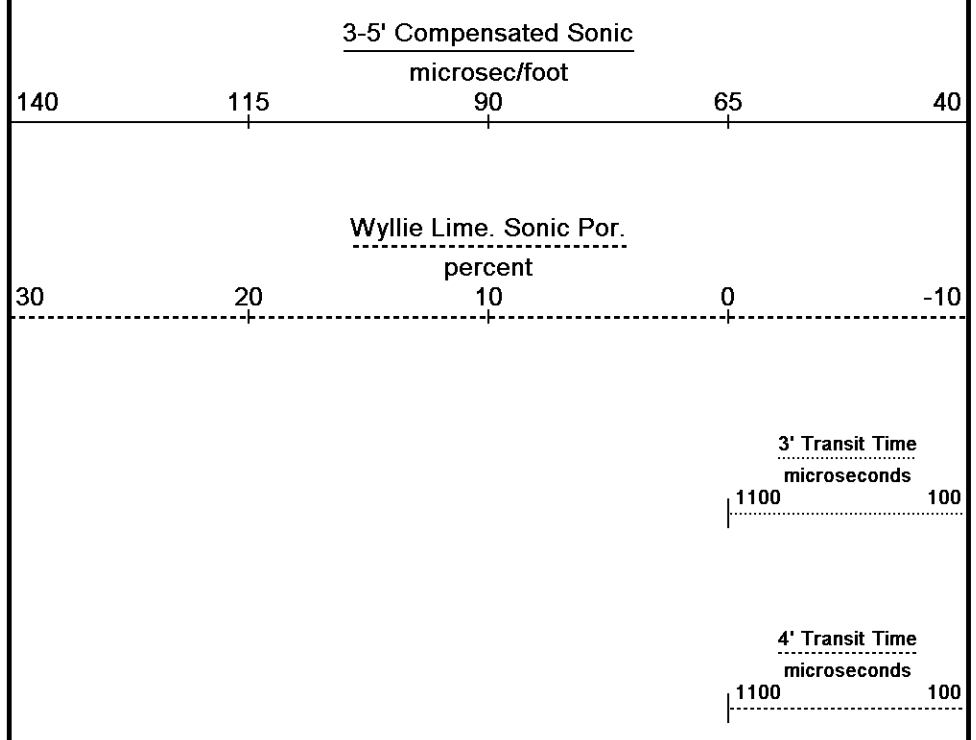
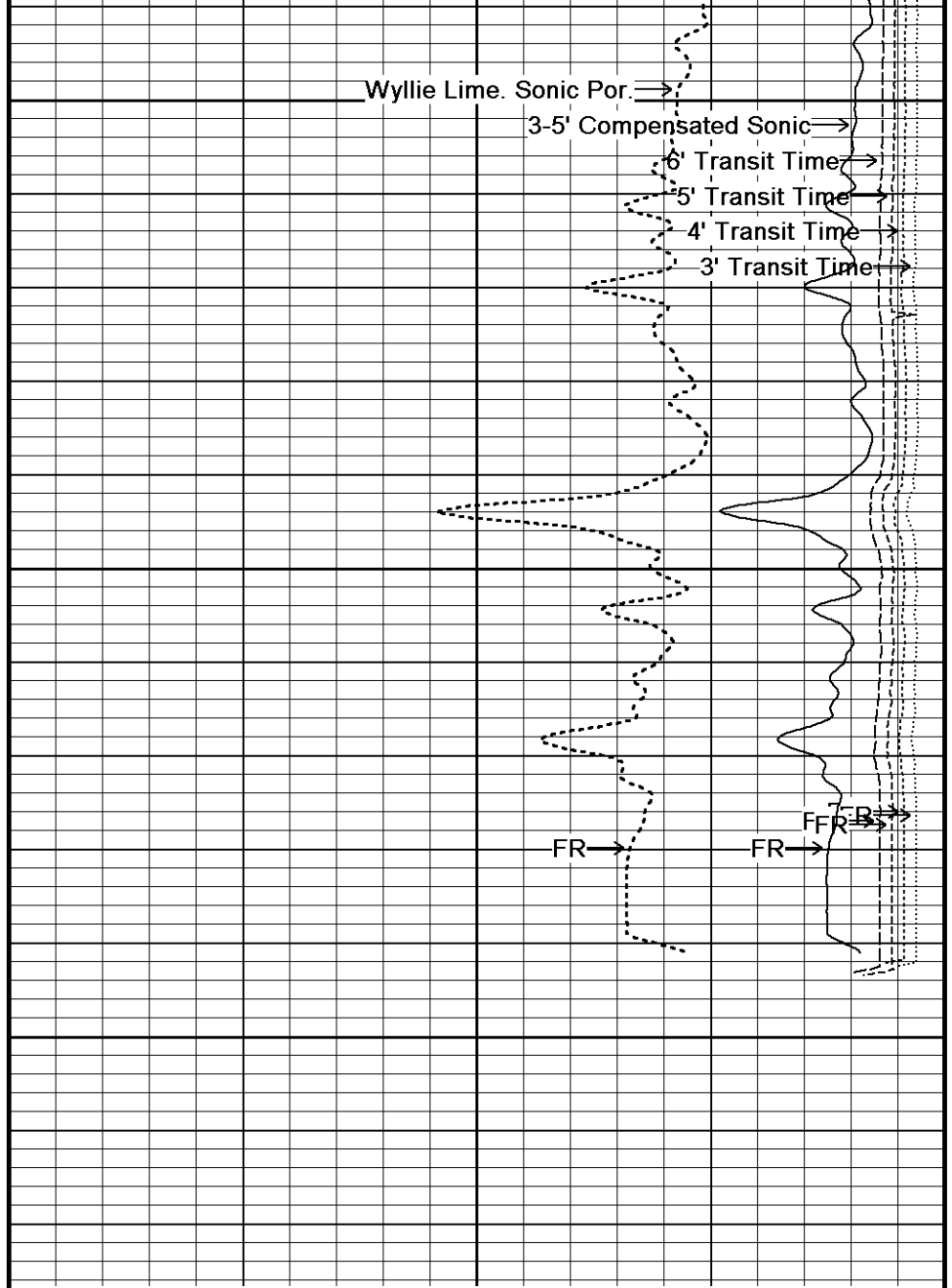
Depth
in
Feet

Timing Marks
every 60.0 sec

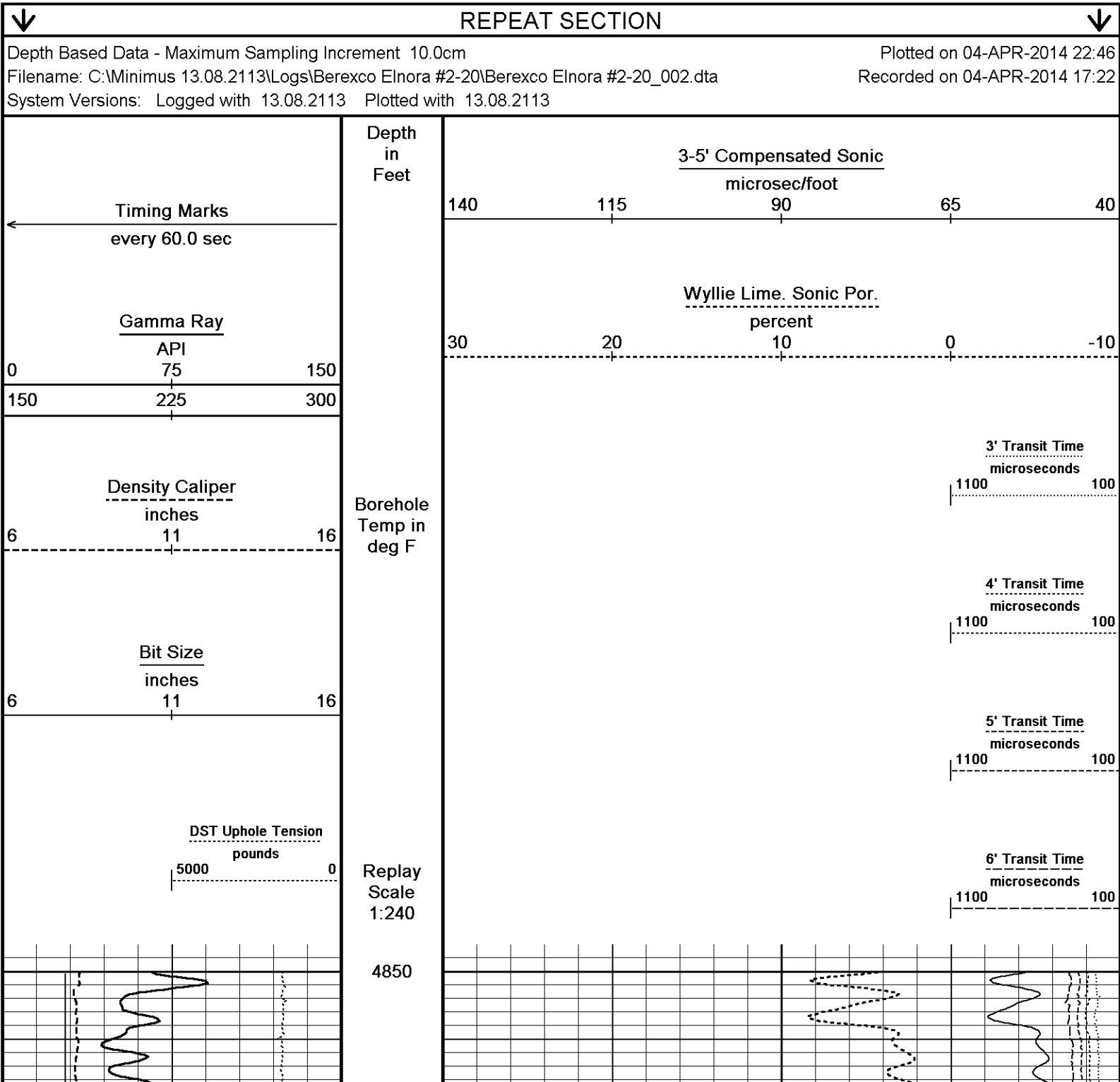
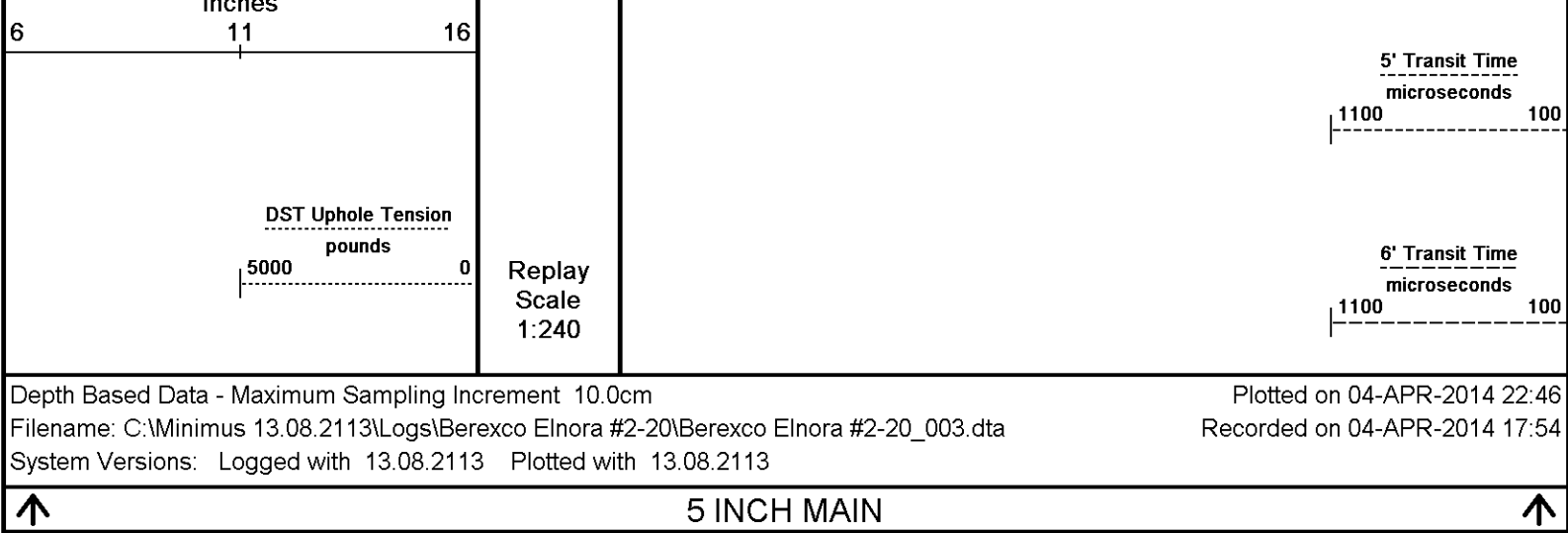
Gamma Ray
API
0 75 150
150 225 300

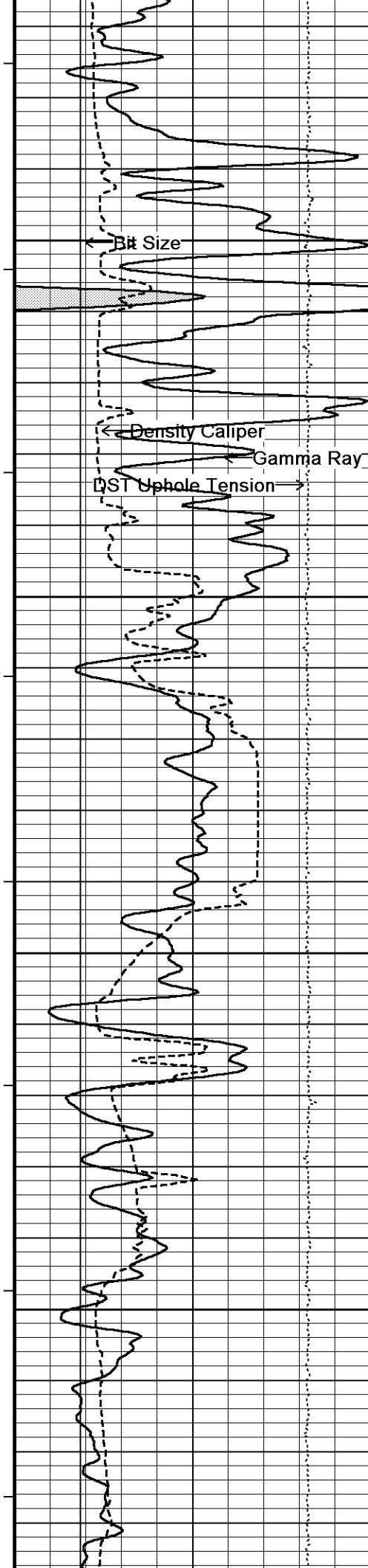
Density Caliper
inches
6 11 16

Bit Size
inches



Borehole
Temp in
deg F





113°

4900

113°

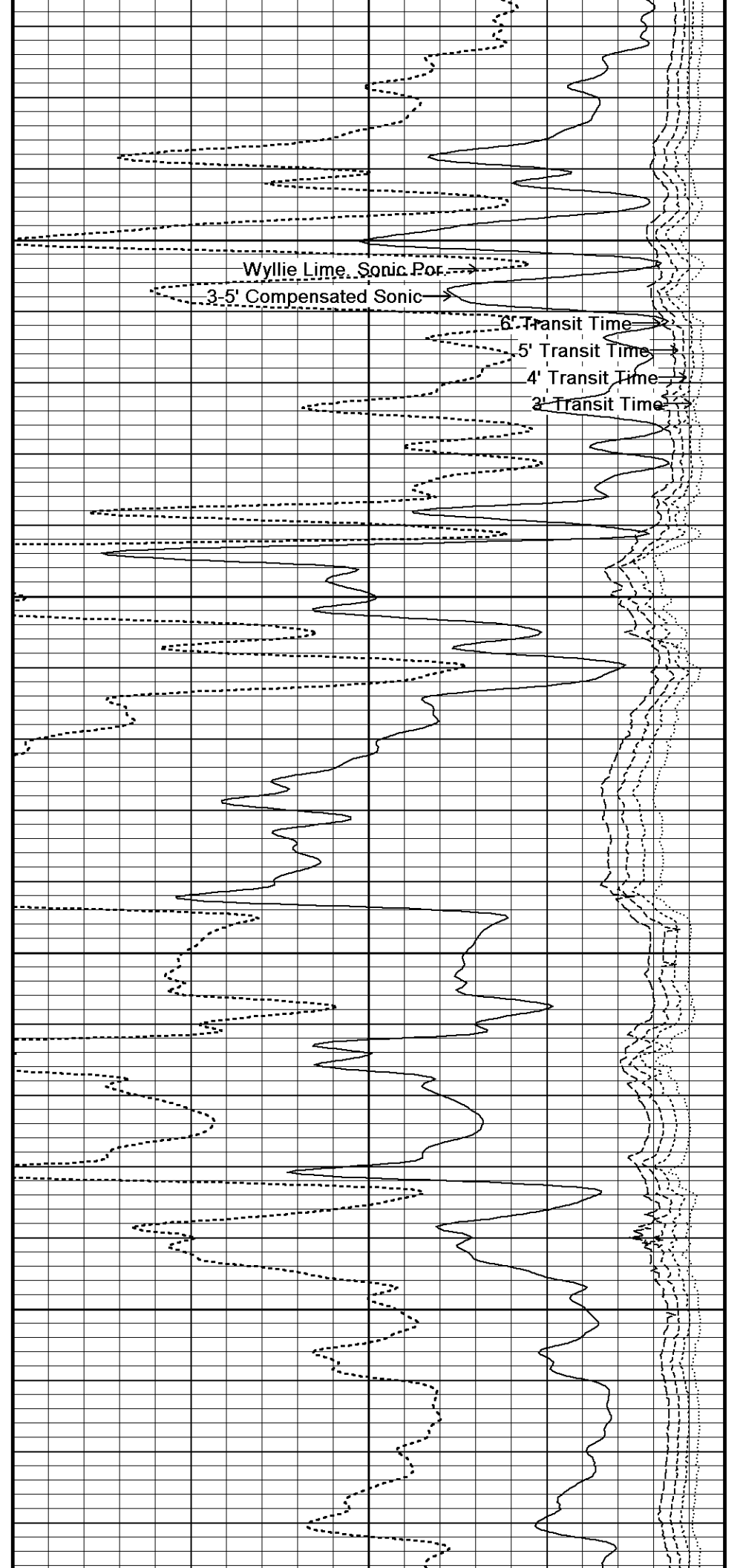
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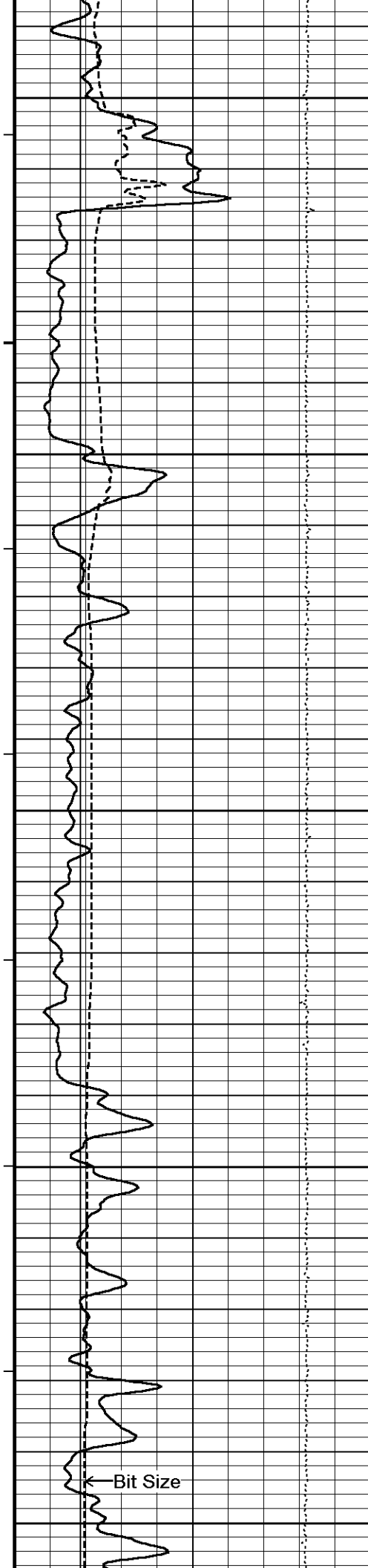
115°

5000

116°

5050





117°

5100

118°

5150

118°

5200

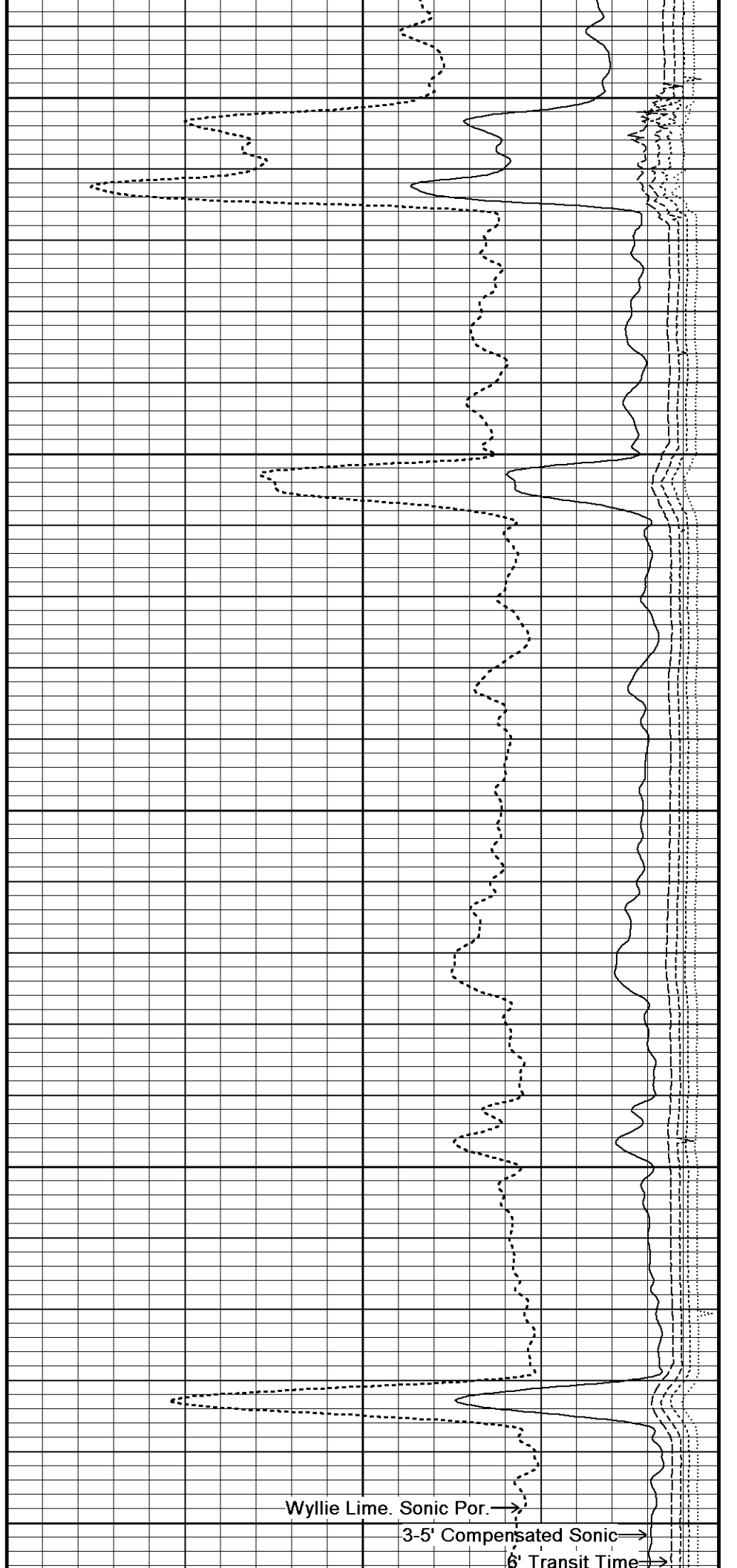
119°

5250

117°

5300

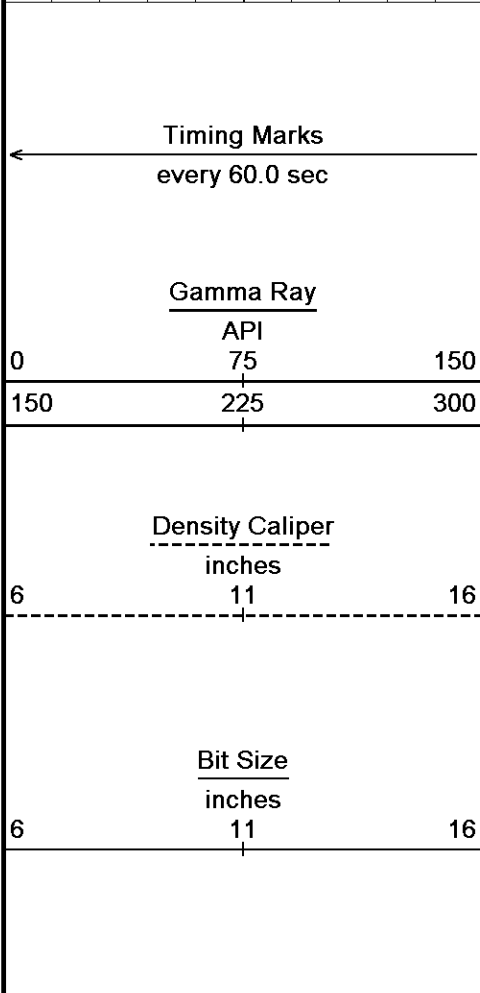
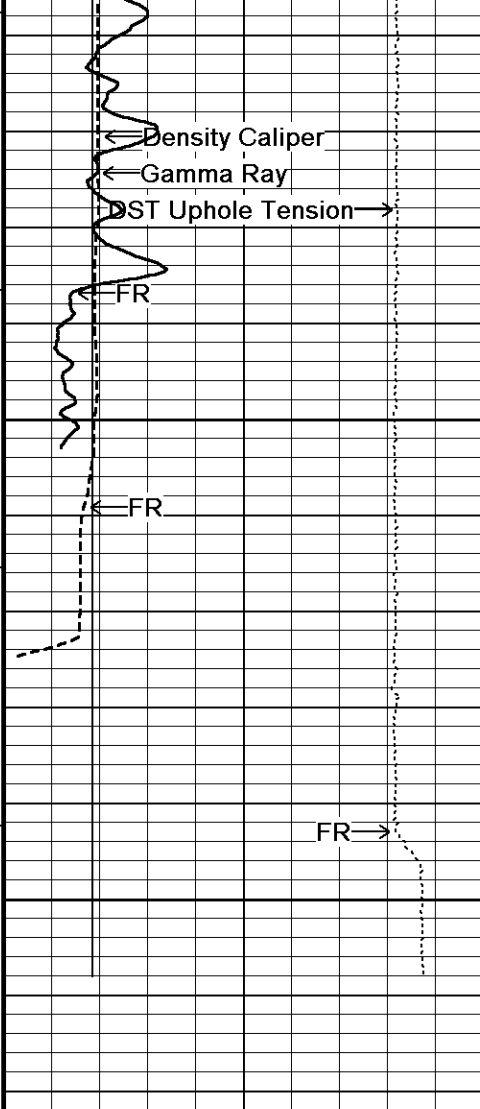
Bit Size



Wyllie Lime. Sonic Por. →

3-5' Compensated Sonic →

6' Transit Time →



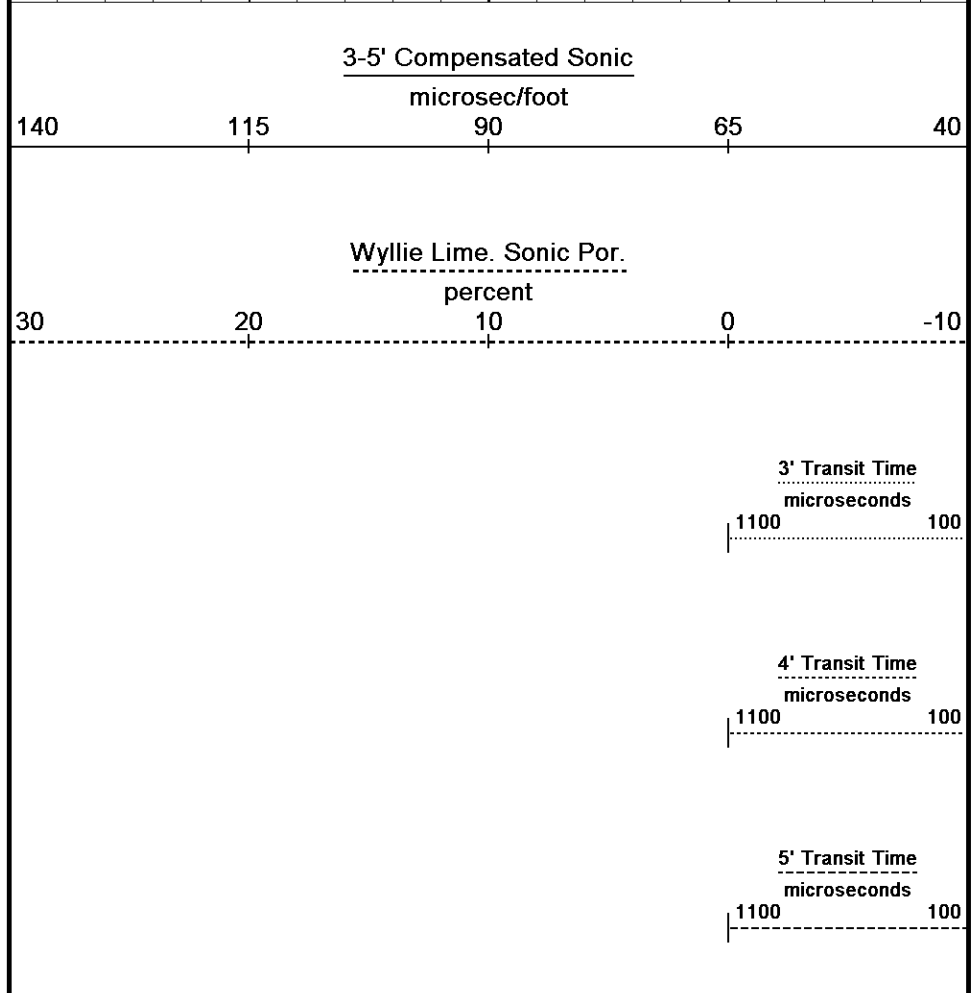
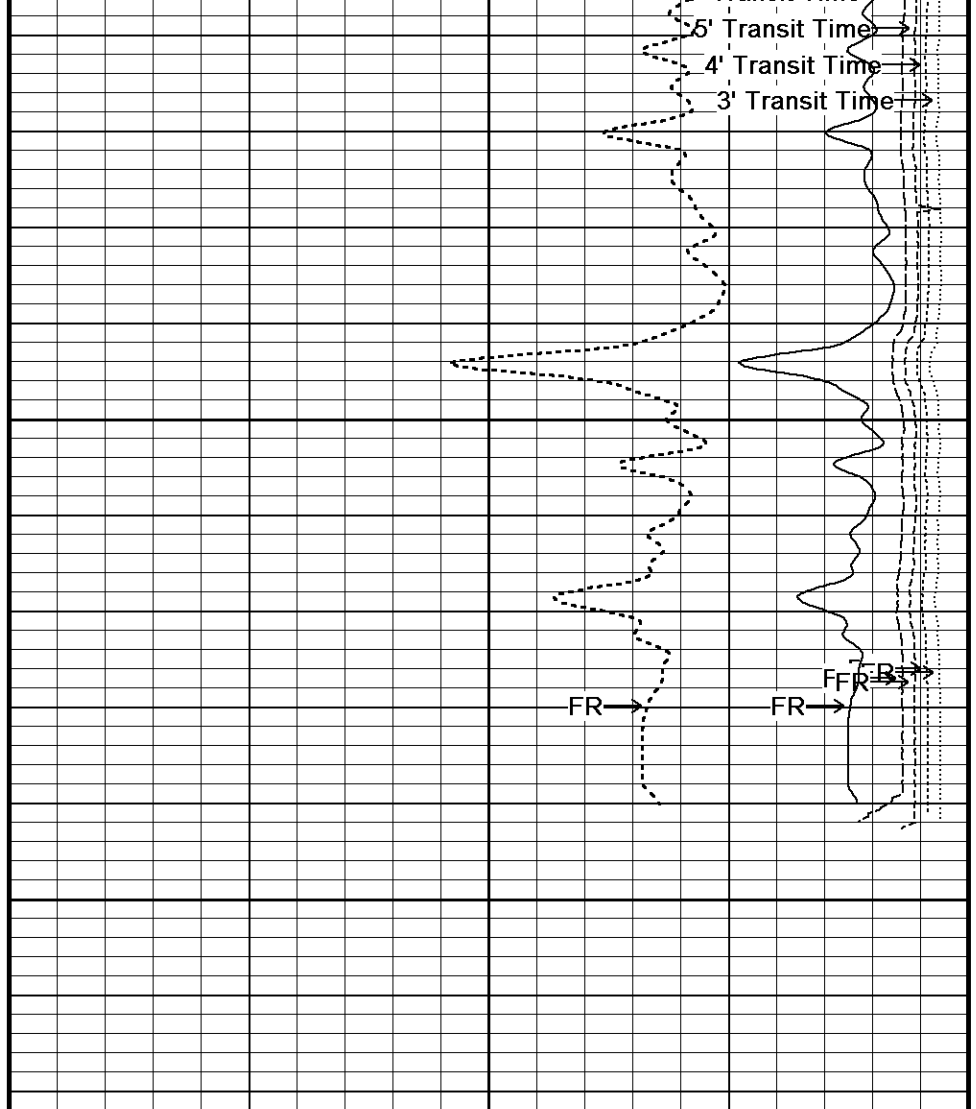
115°

5350

5400

5420
Depth
in
Feet

Borehole
Temp in
deg F



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 04-APR-2014 22:46
 Filename: C:\Minimus 13.08.2113\Logs\Berexco Elnora #2-20\Berexco Elnora #2-20_002.dta
 Recorded on 04-APR-2014 17:22
 System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION

C:\Minimus 13.08.2113\Logs\Berexco Elnora #2-20\Berexco Elnora #2-20_003.dta

General Constants All 000

Last Edited on 04-APR-2014,16:49

General Parameters

Mud Resistivity	0.480	ohm-metres
Mud Resistivity Temperature	84.000	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	Base Density Porosity
Resistivity used	Array Ind. One Res Rt
RWA Constant A	0.610
RWA Constant M	2.150
SW/APOR Tool Source	0.000

Down-hole Tension Calibration SMS 0

Field Calibration on 18-MAR-2014 09:04

Reading No	Measured	Calibrated (lbs)
1	15374.81	0.00
2	15847.36	399.00

Gamma Calibration MCG-C 150

Field Calibration on 04-APR-2014 11:36

	Measured	Calibrated (API)
Background	70	48
Calibrator (Gross)	1142	773
Calibrator (Net)	1071	725

Gamma Constants MCG-C 150

Last Edited on 04-APR-2014,15:46

Gamma Calibrator Number	GRC038	
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	%

SP Calibration MCG-C 150

Field Calibration on 10-MAR-2014 13:42

	Measured	Calibrated (mV)
Reference 1	99.9	99.0
Reference 2	-97.7	-98.8

High Resolution Temperature Calibration MCG-C 150

Field Calibration on 08-MAR-2014,10:59

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	75.00	75.00

Pre-filter Length	11
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Caliper Calibration MMR-C.A 248

Base Calibration on 24-MAR-2014 11:12

Field Calibration on 01-APR-2014 09:23

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13253	5.96
2	16528	7.97
3	19726	9.95
4	23473	11.91
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.00	7.97

Micro Normal and Micro Inverse Calibration MMR-C.A 248

Base Calibration on 24-MAR-2014 11:03

Field Check on 01-APR-2014 09:24

Base Calibration

Channel	Resistor 1	Measured		Calibrated (ohm-m)	
		Resistor 2	Resistor 1	Resistor 2	
Micro Normal	10.1	49.8	5.1	25.6	
Micro Inverse	9.9	49.5	3.4	16.9	

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	93.6	93.6
Micro Inverse	62.2	62.2

Micro Normal and Micro Inverse Constants MMR-C.A 248

Last Edited on 23-JAN-2014,17:04

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	

Neutron Calibration MDN-B.J 387

Base Calibration on 21-JAN-2014 13:56

Field Check on 04-APR-2014 11:42

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2848	86	3714	110
Ratio	32.942		33.764	

Field Calibrator at Base

Calibrated (cps)
1737 2564
Ratio
0.677

Field Check

Calibrated (cps)
1718 2552
Ratio
0.674

Neutron Constants MDN-B.J 387

Last Edited on 04-APR-2014,15:46

Neutron Source Id	P58125B
Neutron Jig Number	5824NE
Epithermal Neutron	
Caliper Source for Processing	Density Caliper
Stand-off	0.00 inches
Mud Density	1.00 gm/cc
Limestone Sigma	7.10 cu
Sandstone Sigma	4.26 cu
Dolomite Sigma	4.70 cu
Formation Pressure Source	None
Formation Pressure	N/A kpsi
Temperature Source	Constant Value
Temperature	68.00 degrees F
Mud Salinity	0.00 kppm
Salinity Correction	Not Applied
Formation Fluid Salinity Source	None

Formation Fluid Salinity	N/A	kppm			
Barite Mud Correction	Not Applied				
FE Calibration MFE-A.A 55		Base Calibration on 24-MAR-2014 10:21 Field Check on 04-APR-2014 11:19			
Base Calibration					
	Measured	Calibrated (ohm-m)			
Reference 1	0.0	0.0			
Reference 2	951.2	126.8			
Base Check		281.7			
Field Check		281.6			
FE Constants MFE-A.A 55		Last Edited on 04-APR-2014,15:45			
Running Mode	No Sleeve				
MFE K Factor	0.1268				
Caliper Source for FE correction	Density Caliper				
Caliper Value for FE correction	N/A	inches			
Rm Source for FE correction	Temperature Corr				
Temp. for Rm Corr.	MCG External Temperature				
Stand-off	0.5	inches			
Sonic Constants MSS-A.A 73		Last Edited on 04-APR-2014,15:45			
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		
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

Induction Calibration MAI-A.A 5

Base Calibration on 21-JAN-2014,09:50

Field Check on 03-APR-2014 14:51

Base Calibration

Test Loop Calibration

Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	16.3	470.8	9.3	966.2
2	5.6	376.1	7.6	821.4
3	2.6	266.1	5.2	566.0
4	1.6	130.0	2.6	279.2

Array Temperature 71.1 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	13.7	3863.6	13.6	3863.5
2	31.5	3592.9	31.4	3592.8
3	29.7	2973.4	29.7	2973.5
4	20.8	2127.8	20.8	2127.8
Deep	18.3	1913.7	18.4	1913.7
Medium	43.0	3863.9	43.0	3864.1
Shallow	46.8	5375.4	46.7	5375.3

Array Temperature 47.7 47.5 Deg F

Induction Constants MAI-A.A 5

Last Edited on 04-APR-2014,15:45

Induction Model		RtAP-WBM	
Caliper for Borehole Corr.		Density Caliper	
Hole Size for Borehole Correction		N/A	inches
Tool Centred		No	
Stand-off Type		Fins	
Stand-off		0.50	inches
Number of Fins on Stand-off		8.0000	
Stand-off Fin Angle		45.00	degrees
Stand-off Fin Width		0.5000	inches
Borehole Corr. Rm Source		Temperature Corr	
Temp. for Rm Corr.	MCG	External Temperature	
Squasher Start		0.0020	mhos/metre
Squasher Offset		N/A	mhos/metre
Borehole Normalisation			
DRM1	0.0000	DRC1	0.0000
DRM2	0.0000	DRC2	0.0000
MRM1	0.0000	MRC1	0.0000
MRM2	0.0000	MRC2	0.0000
SRM1	0.0000	SRC1	0.0000
SRM2	0.0000	SRC2	0.0000
Calibration Site Corrections			
Channel 1		0.00	mmhos/metre
Channel 2		0.00	mmhos/metre
Channel 3		0.00	mmhos/metre
Channel 4		0.00	mmhos/metre

Apparent Porosity and Water Saturation Constants

Archie Constant (A)	1.00	
Cementation Exponent (M)	2.00	
Saturation Exponent (N)	2.00	
Saturation of Water for Apor	100.00	percent
Resistivity of Water for Apor and Sw	0.05	ohm-m

Resistivity of Mud Filtrate for Sw	0.00	ohm-m
Source for Rt	0.00	
Source for Rxo	0.00	
High Resolution Temperature Calibration MAI-A.A 5		
	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	75.00	75.00
High Resolution Temperature Constants MAI-A.A 5		
Pre-filter Length	11	
Caliper Calibration MPD-D.A 480		
Base Calibration		Base Calibration on 02-APR-2014 14:28
Field Calibration		Field Calibration on 02-APR-2014 14:29
Reading No	Measured	Calibrator Size (in)
1	17565	3.99
2	27501	5.98
3	37544	7.97
4	47406	9.86
5	58484	11.92
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	7.94	7.97
Photo Density Calibration MPD-D.A 480		
Base Calibration		Base Calibration on 02-APR-2014 14:48
Field Check		Field Check on 02-APR-2014 14:55
Density Calibration		
Base Calibration	Measured	Calibrated (sdu)
	Near	Far
Background	1280	1474
Reference 1	56490	26296
Reference 2	23070	2655
Field Check at Base		
	1280.1	1473.9
Field Check		
	1276.2	1470.6
PE Calibration		
Base Calibration	Measured	Calibrated
	WS	Ratio
Background	244	1141
Reference 1	23700	56281
Reference 2	6865	22924
Field Check at Base		
	243.9	1141.4
Field Check		
	239.9	1140.2
Density Constants MPD-D.A 480		
Last Edited on 04-APR-2014,15:46		
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	1.10	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)

2.71

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

Depth (m)

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Logs\Berexco Elnora #2-20\Berexco Elnora #2-20_003.dta

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

Compact Comms Gamma
MCG-C 150 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity
MMR-C.A 248 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron
MDN-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

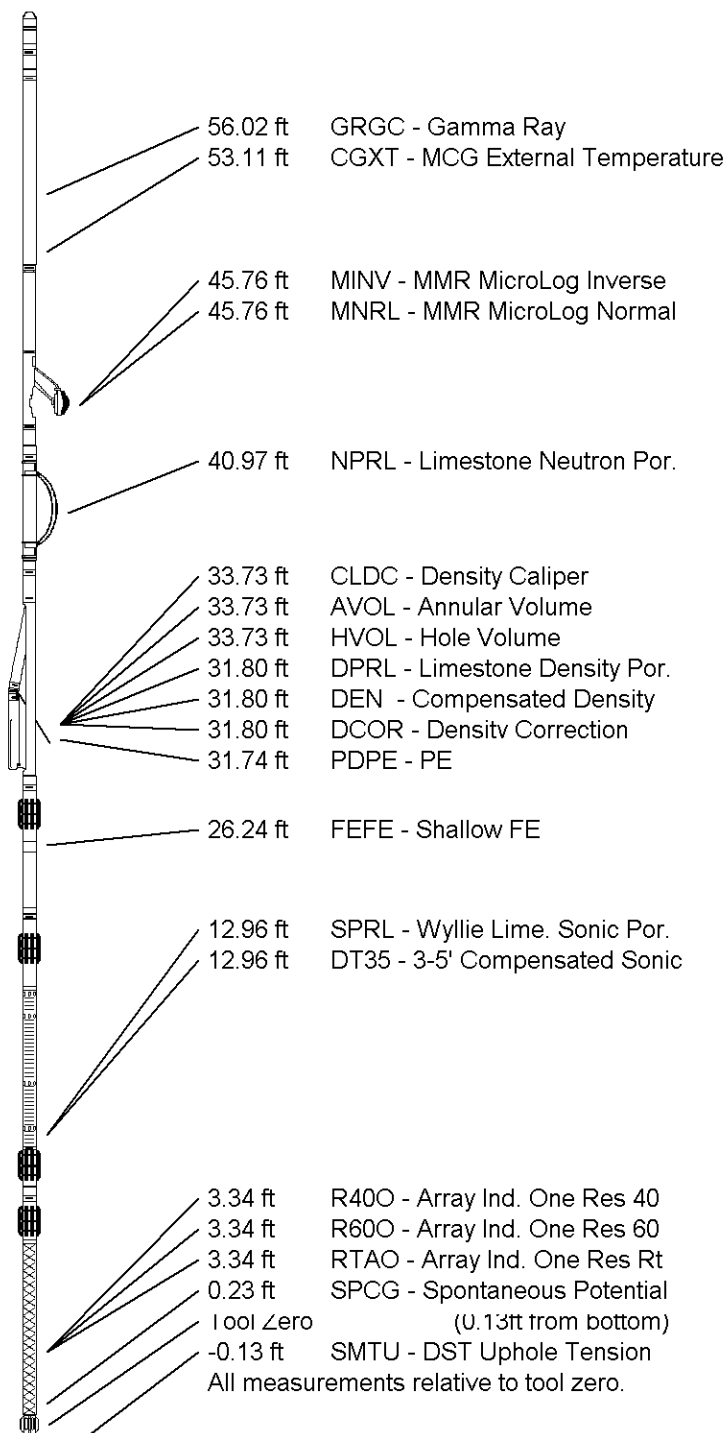
Compact Density/Caliper
MPD-D.A 480 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic
MSS-A.A 73 LG: 12.52 ft WT: 72.8 lb OD: 2.240 in

Compact Induction
MAI-A.A 5 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 63.70 ft Weight: 480.6 lb



COMPANY
WELL
FIELD

BEREXCO LLC.
ELNORA #2-20
WILDCAT

FIELD			WILDCAT		
PROVINCE/COUNTY			FINNEY		
COUNTRY/STATE			U.S.A. / KANSAS		
Elevation Kelly Bushing	2941.00	feet	First Reading	5380.00	feet
Elevation Drill Floor	2939.00	feet	Depth Driller	5400.00	feet
Elevation Ground Level	2928.00	feet	Depth Logger	5393.00	feet



Weatherford®

COMPENSATED SONIC
WITH INTEGRATED TRANSIT TIME