

# STEP

## energy services

**BOREHOLE COMPENSATED  
SONIC LOG**

**Company:** BEREXCO, LLC.  
**Well:** LEMKE 'A' #3  
**Field:** WAKEENEY  
**Country:** TREGO  
**State:** KANSAS  
**Country:** USA  
**API No.:** 15-195-23101-00-00

**File No.:** HAYS-70631  
**Company:** BEREXCO, LLC.  
**Well:** LEMKE 'A' #3  
**Field:** WAKEENEY  
**Country:** TREGO  
**State:** KANSAS  
**Country:** USA  
**API No.:** 15-195-23101-00-00

**Location:**  
 330' FSL & 1320' FWL  
 S2 S2 SW

**LSD:**                      **Sect:** 15                      **Twp:** 11S                      **Rge:** 23W

<b>Permanent Datum:</b>	GL	<b>Elevations:</b>	Ft	<b>Services:</b>	CNP	MLT
<b>Drilling Measured From:</b>	KB	<b>KB</b>	2271.00	<b>LDP</b>		<b>PIT</b>
<b>Log Measured From:</b>	KB	<b>DF</b>	2270.00	<b>CST</b>		
<b>Above Permanent Datum:</b>	7.00 Ft	<b>GL</b>	2264.00			
<b>Date:</b>	03-16-2020					
<b>Run Number</b>	1					
<b>Depth--Driller</b>	4075.0 Ft					
<b>Depth--Logger</b>	4076.0 Ft					
<b>First Reading</b>	4045.0 Ft					
<b>Last Reading</b>	263.0 Ft					
<b>Casing--Driller</b>	263.0 Ft					
<b>Casing--Logger</b>	263.0 Ft					
<b>Bit Size</b>	7.875 In					
<b>Casing Size</b>	8.625 In					
<b>Hole Fluid Type</b>	CHEMICAL					
<b>Density</b>	9.3					
<b>Fluid Loss</b>	7.6					
<b>PH/Viscosity</b>	9.5		50.0			
<b>Sample Source</b>	MEASURED					
<b>RM@Measured Temp.</b>	1.000 @ 79 F					
<b>RMF@Measured Temp</b>	0.850 @ 79 F					
<b>RMG@Measured Temp.</b>	1.150 @ 79 F					
<b>Source RMF/RMC</b>	CALCULATED/CALCULATED					
<b>RM@BHT</b>	0.680 @ 123 F					
<b>Time Circulation Stopped</b>	03-16-2020 12:00					
<b>Max Recorded Temp.</b>	123 F					
<b>Equipment/Base</b>	TRK137		HAYS			
<b>Recorded By</b>	B.BAILEY					
<b>Witnessed By</b>	JERRY SMITH					

The customer is hereby warned that by providing the log data herein, STEP Energy Services does not agree to provide any interpretation of log data, conversion of log data to physical rock parameters or recommendations. STEP Energy Services does not guarantee or warrant either expressly or impliedly, the accuracy of any interpretation of log data, conversion of log data to physical rock parameters or recommendations which may be given by STEP Energy Services personnel. Any interpretation, conversion or recommendation is not part of the consideration for the agreement between the parties and is not part of any part of the charge by STEP Energy Services for its services. Any user of the log data is warned that said user is not entitled to rely on interpretations, conversions or recommendations as aforesaid.

Bitsize Intervals		Casing Strings			
Size (In)	Bottom (Ft)	Size (In)	Weight (Lbs)	Bottom (Ft)	Top (Ft)
7.875	4075.00	8.625	17.00	263.00	0.00

<b>Run Number</b>	1	
<b>Date</b>	03-16-2020	
<b>Date/Time On Bottom</b>	03-16-2020 17:15	
<b>Depth to Fluid</b>	0.0	Ft
<b>Salinity</b>	3000.000	
<b>RMF@BHT</b>	0.680	@ 123 F
<b>RMC@BHT</b>	0.780	@ 123 F

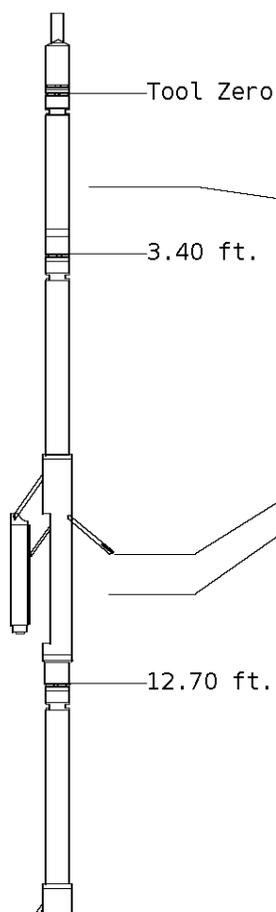
ALL PRESENTATIONS AS PER CUSTOMER REQUEST  
 GRT, CNT, LDT, CST, MLT AND PIT RUN IN COMBINATION  
 CALIPERS ORIENTED ON X-Y AXIS  
 2.71 G/CC USED TO CALCULATE POROSITY  
 ANNULAR HOLE VOLUME CALCULATED USING 5.5" PRODUCTION CASING  
 PHIN IS CALIPER CORRECTED

GRT: GRP  
 CNT: PHIN, CLCNIN,  
 LDT: PORL, LCORN, PECLN, LDENN, PORLLS, CLLDIN  
 CST: PORS, CDTF, TTIPF, TT2PF, TT3PF, TT4PF, ITT  
 MLT: NOR\_RF, INV\_RF, MSCLPIN  
 PIT: ILD, ILM, SPU, SFLAEC, CIRD

OPERATORS:  
 D. RAGSDALE  
 J. VAUGHN  
 D.LEGLEITER

### Tool String Schematic

**Total Tool Length** - 66.95 ft.  
**Maximum Outside diameter** - 6.00 in.  
**Net Weight in Air** - 1171.00 lbs.



**Tool:** GRT-B      **Length:** 3.40 ft.    **O.D.** 3.60 in.  
 Gamma Ray Controller

**Sonde ID** :GRT-BC-038

Measure Point	Tool Offset	Stack Offset	Bottom Offset
GRP	2.00	2.00	64.95

**Tool:** CNT-AA      **Length:** 9.30 ft.    **O.D.** 4.36 in.  
 Compensated Neutron A Pad on NDT-A

**Sonde ID** :NDT-AF-411

**Source ID** :N-1104

**Pad ID** :CNP-AE-41

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLCN	6.00	9.40	57.55
PHIN	6.80	10.20	56.75

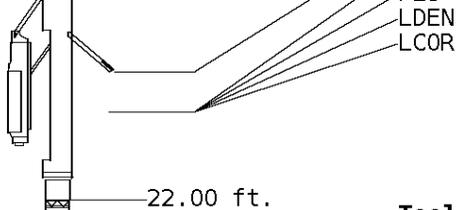
**Tool:** LDT-DA      **Length:** 9.30 ft.    **O.D.** 4.80 in.  
 Litho Density D Pad on NDT-A

**Sonde ID** :NDT-FA-404

**Source ID** :1637GW

**Pad ID** :LDP-DA-062

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLLD	6.00	18.70	48.25
PEL	7.00	19.70	47.25
PES	7.40	20.10	46.85

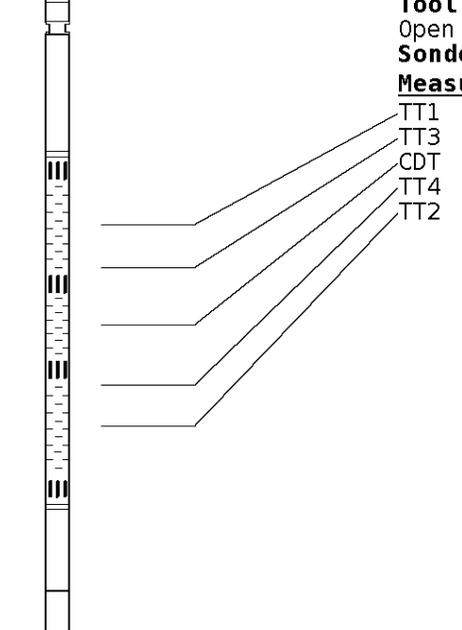


7.20 19.90 47.05  
7.20 19.90 47.05

22.00 ft.

**Tool:** CST-AD      **Length:** 13.80 ft.   **O.D.** 3.60 in.  
Open Hole Sonic  
**Sonde ID** :CST-AB-21

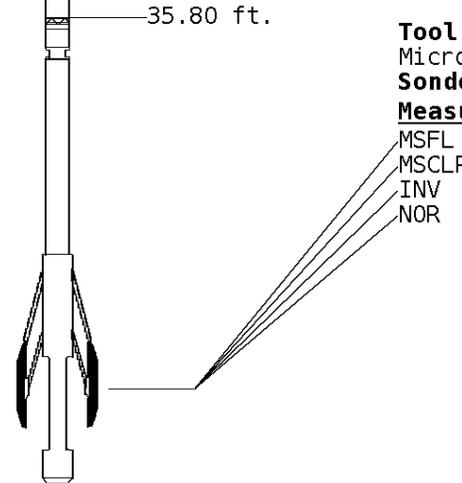
Measure Point	Tool Offset	Stack Offset	Bottom Offset
TT1	4.80	26.80	40.15
TT3	5.80	27.80	39.15
CDT	7.30	29.30	37.65
TT4	8.80	30.80	36.15
TT2	9.80	31.80	35.15



35.80 ft.

**Tool:** MST-DA      **Length:** 9.66 ft.   **O.D.** 6.00 in.  
Micro Spherically Focused (IC)  
**Sonde ID** :MST-DA-13

Measure Point	Tool Offset	Stack Offset	Bottom Offset
MSFL	7.60	43.40	23.55
MSCLP	7.60	43.40	23.55
INV	7.60	43.40	23.55
NOR	7.60	43.40	23.55



45.46 ft.

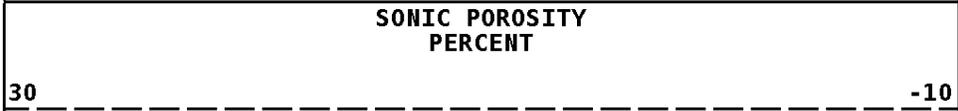
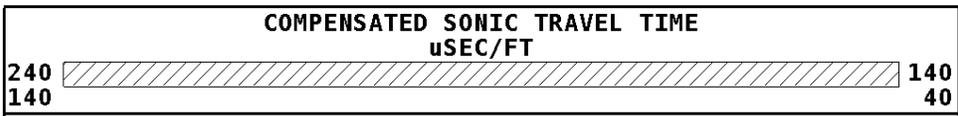
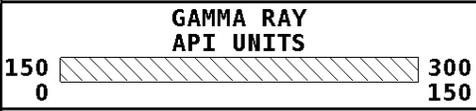
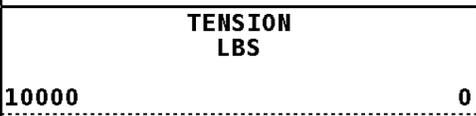
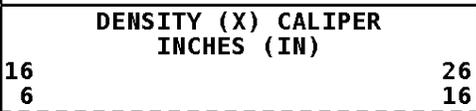
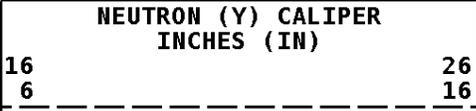
**Tool:** PIT-CA      **Length:** 21.49 ft.   **O.D.** 3.62 in.  
Phased Dual Induction w/ RM & D  
**Sonde ID** :PIT-AC-043

Measure Point	Tool Offset	Stack Offset	Bottom Offset
ILD	8.92	54.38	12.56
ILM	10.10	55.56	11.39
SFLU	17.49	62.95	4.00
SP	20.60	66.06	0.88

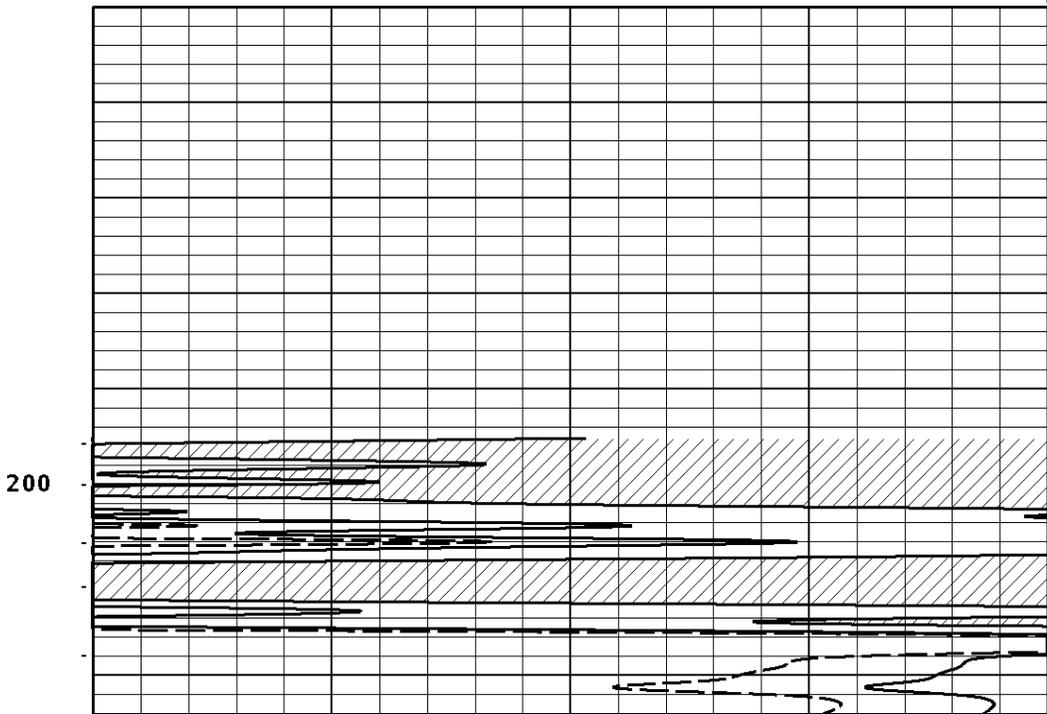
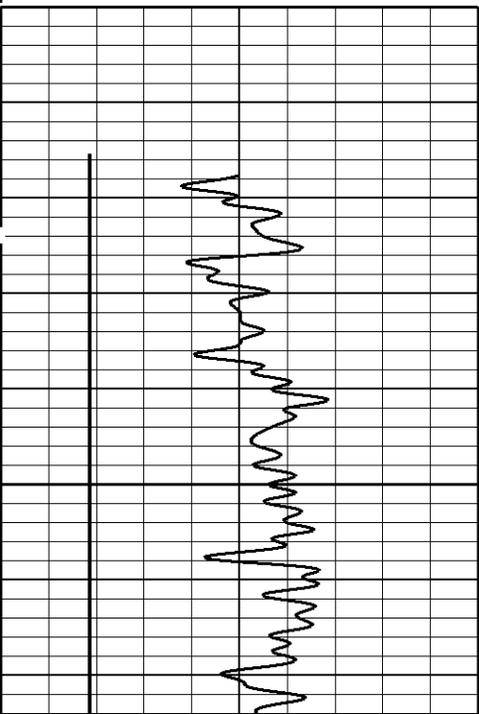
LWT 66.95 ft.

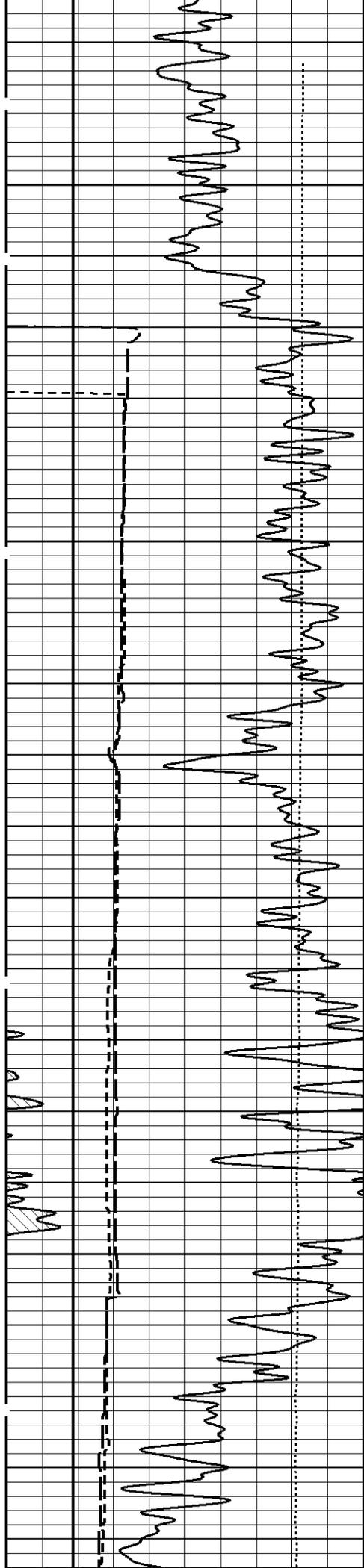
Well File: Berexco Lemke A 3 Mar16 Quint  
 Segment: V1.D1.S6 Reprocess MAIN  
 Reference: 0

Scale: 1:240 Format: CST-240  
 Acquired: 2020-03/16 18:22 3.4.1-13972  
 Processed: 2020-03/16 19:59 3.4.1-13972



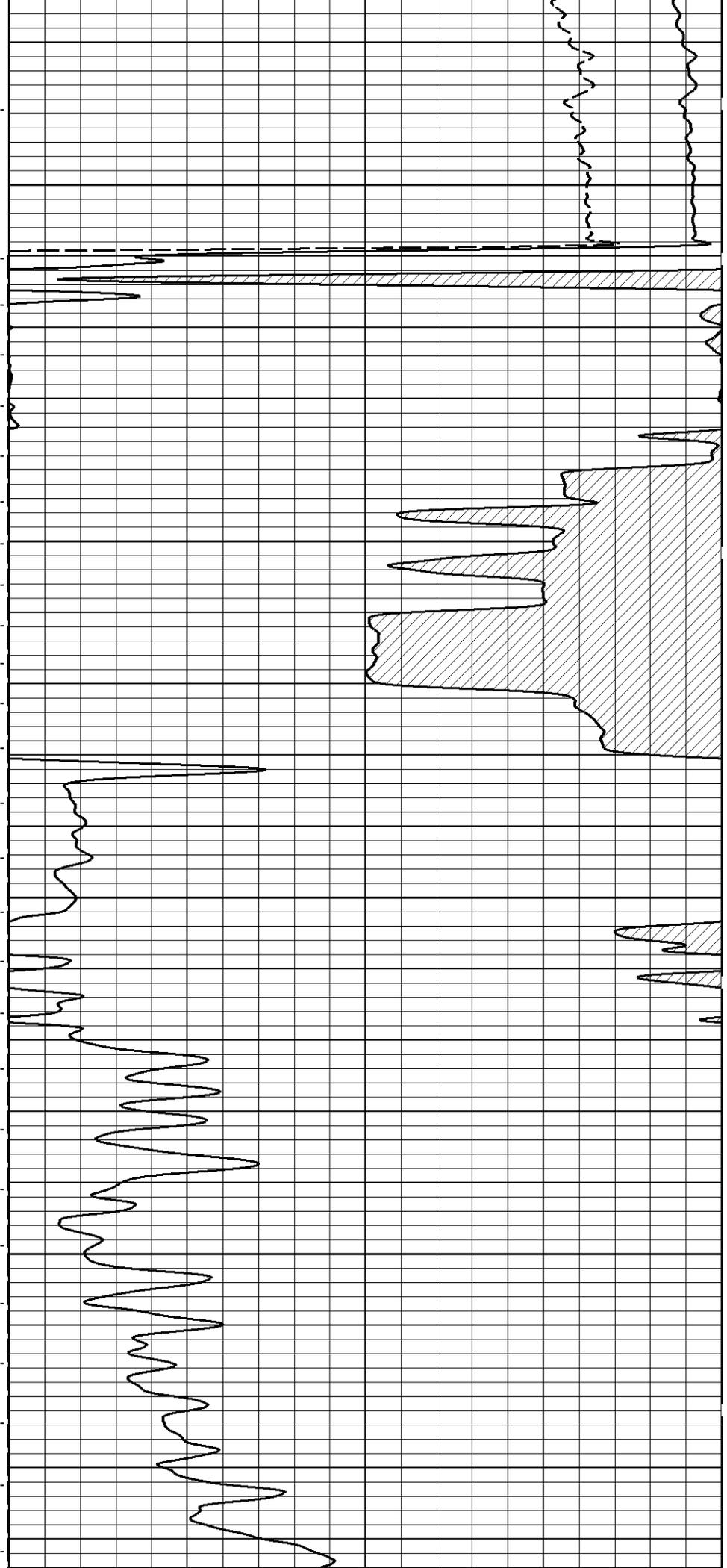
1:240 MAIN SECTION

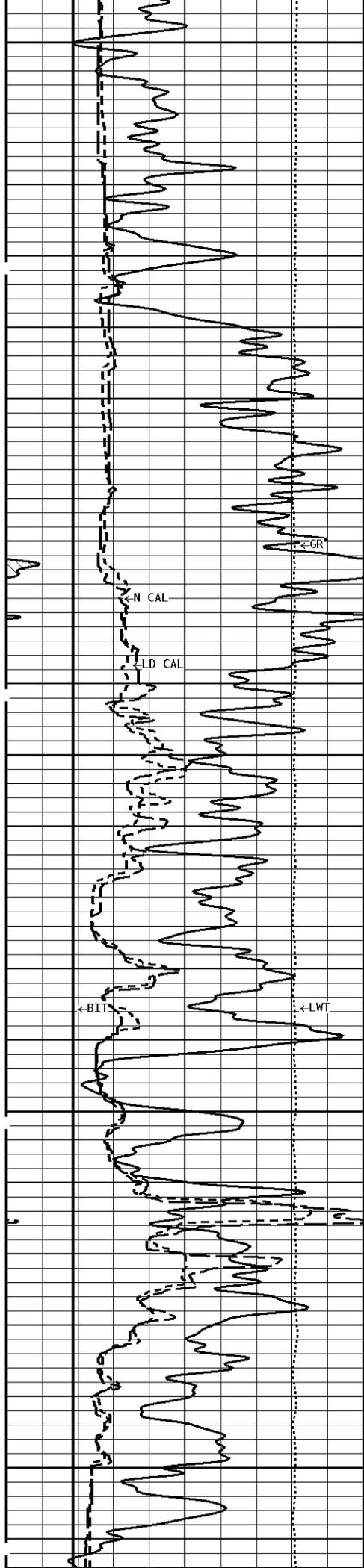




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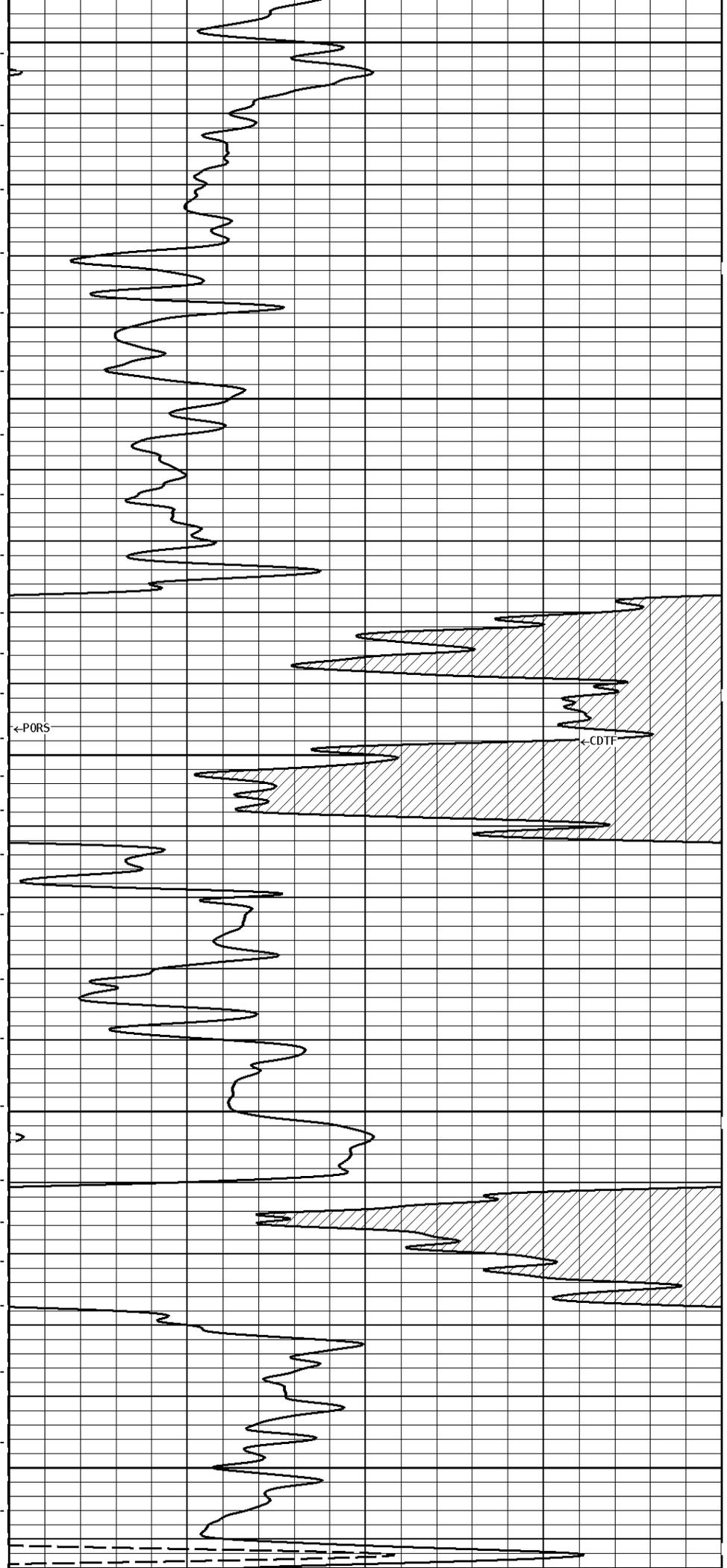
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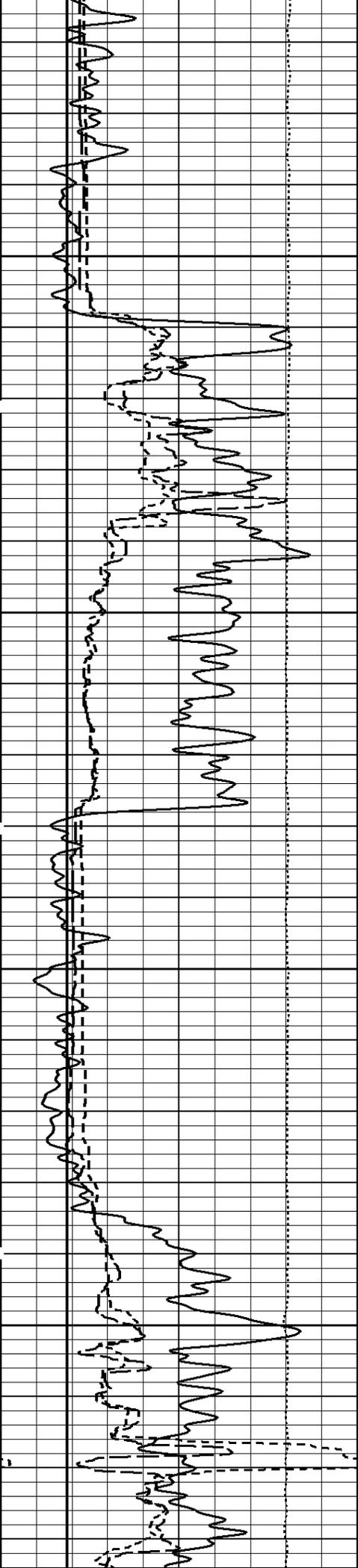




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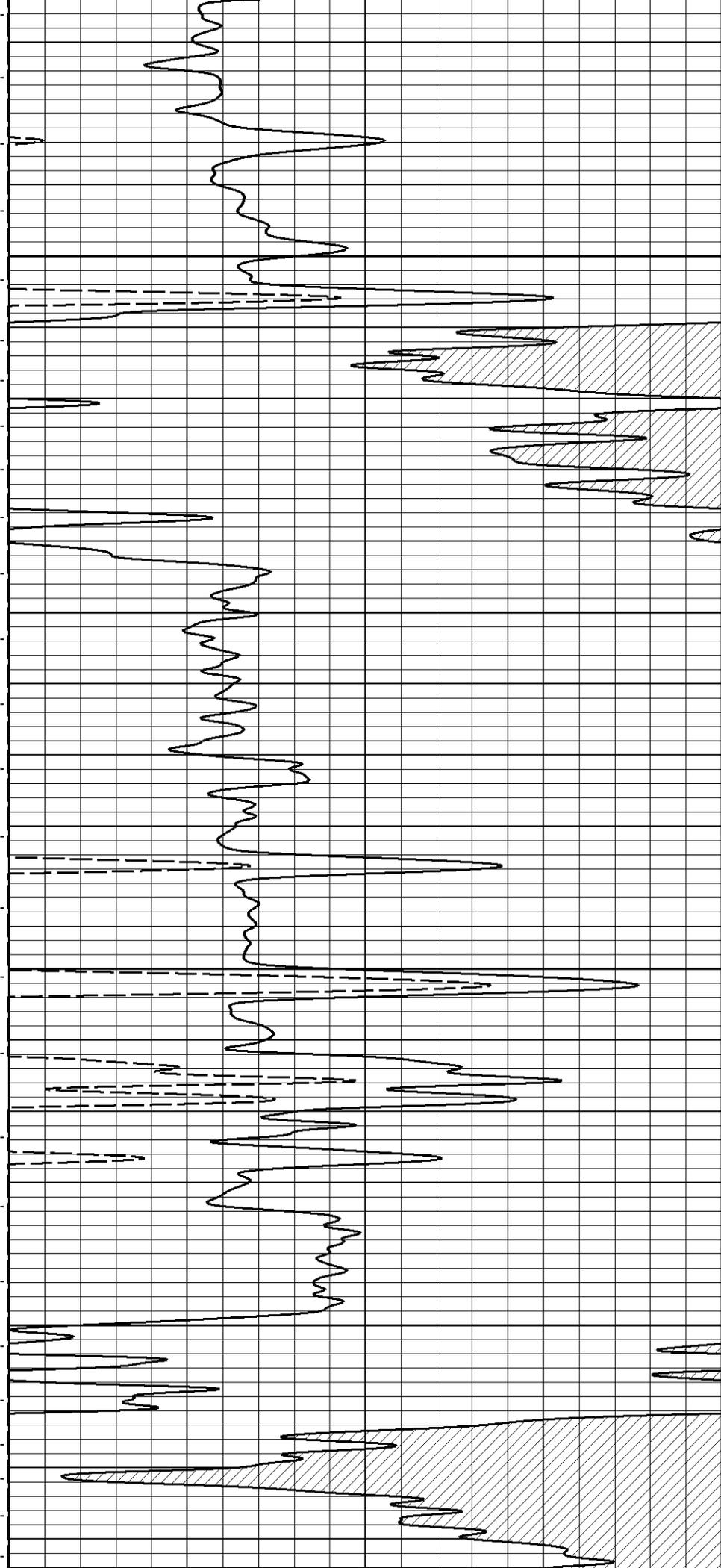
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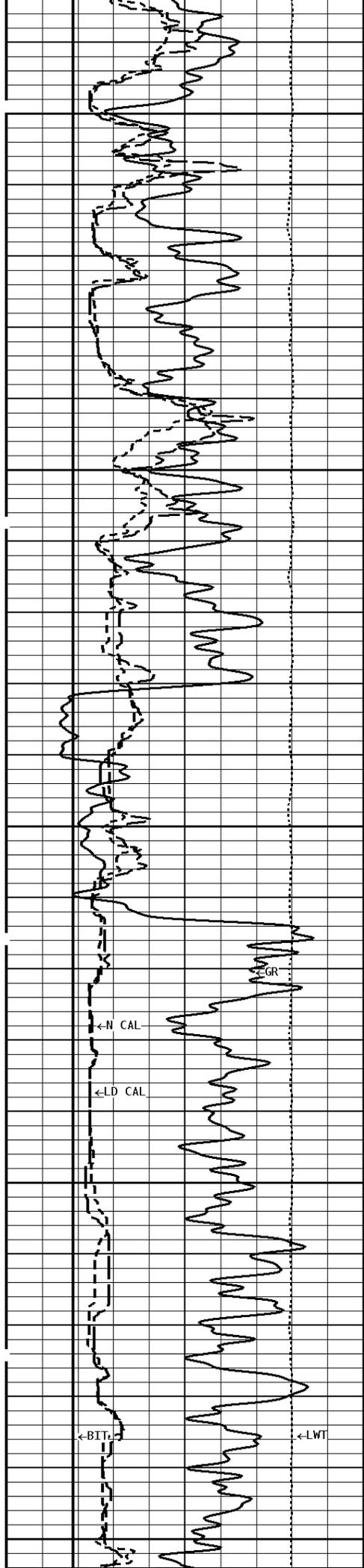




700

800

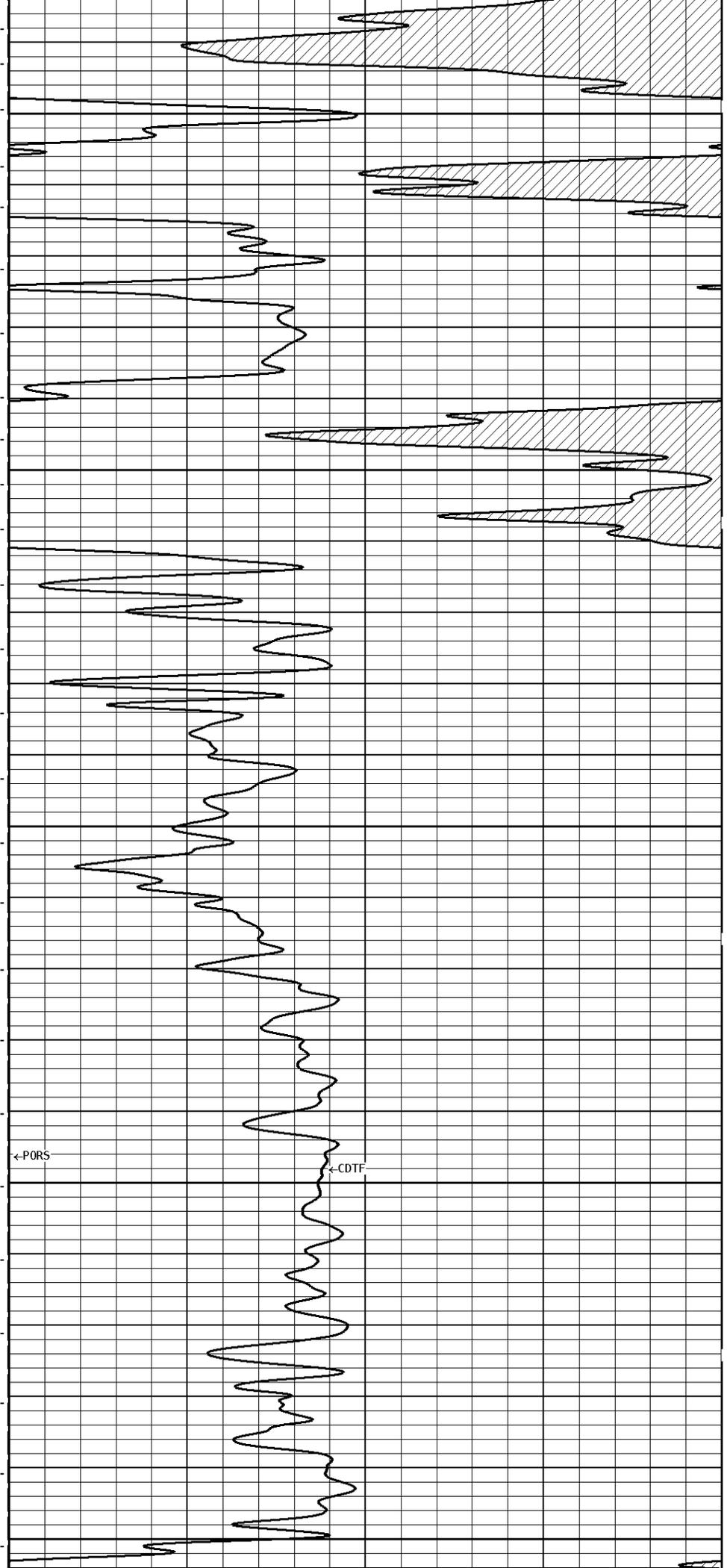


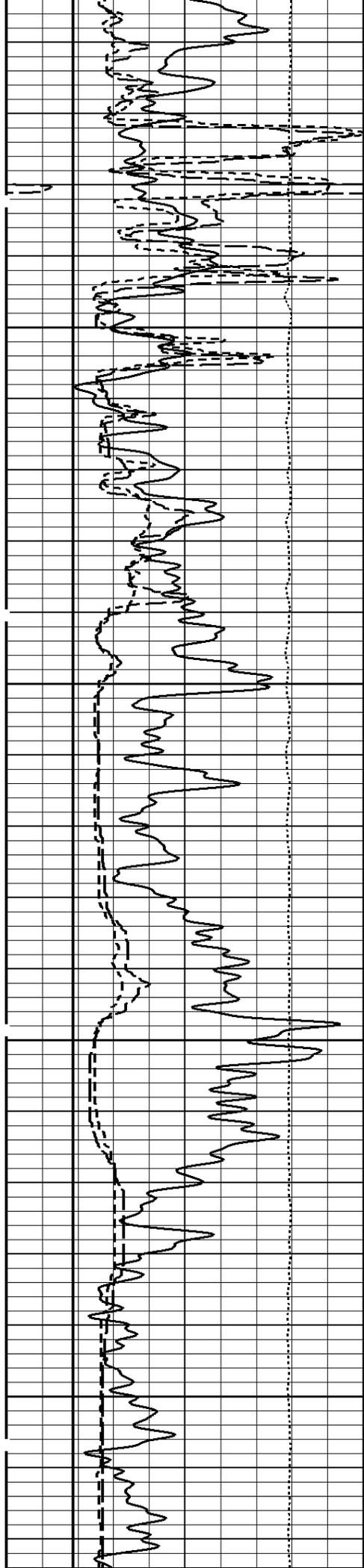


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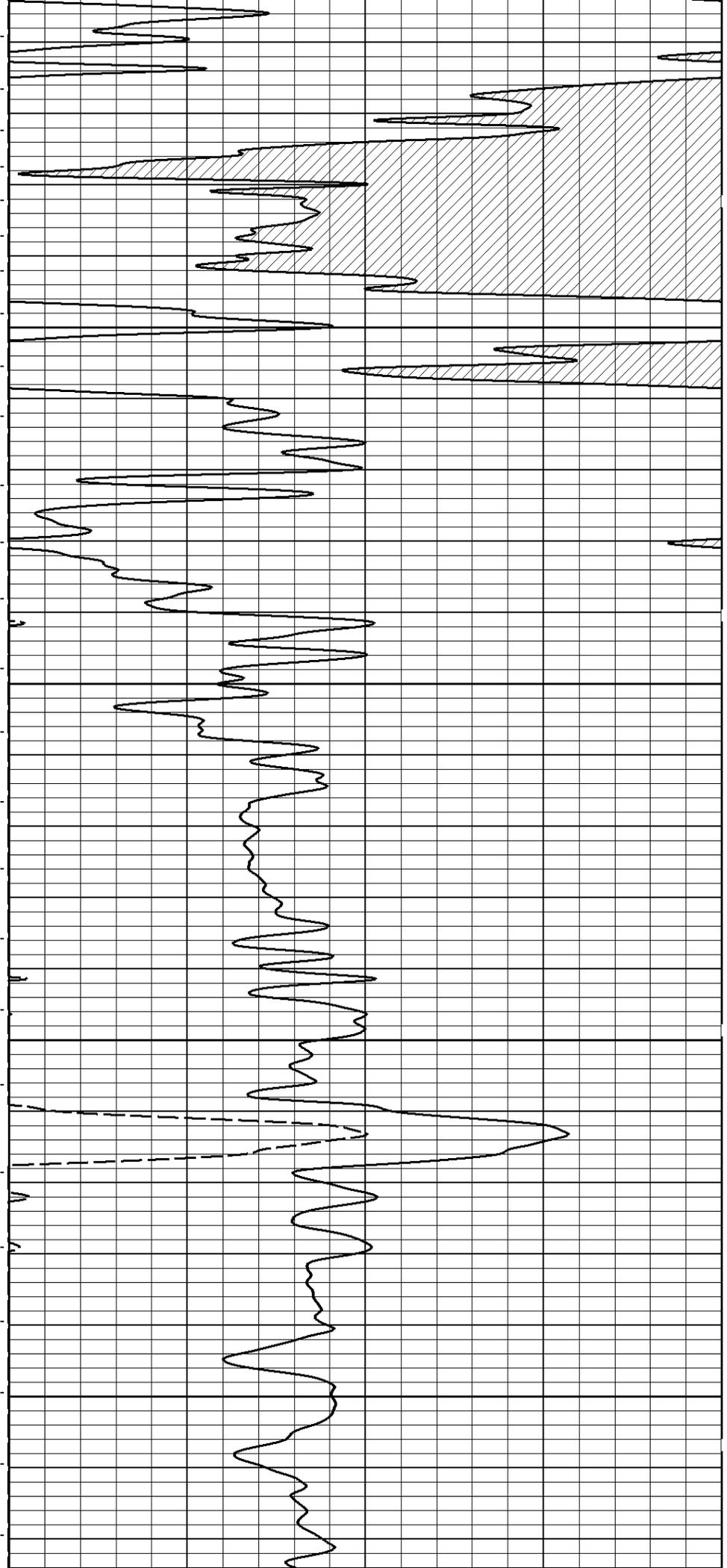
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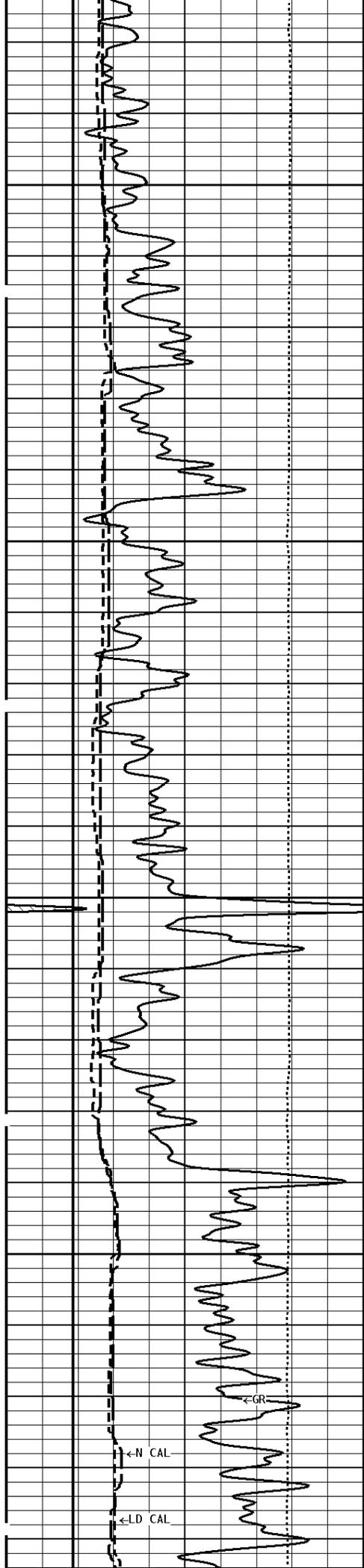




1200

1300





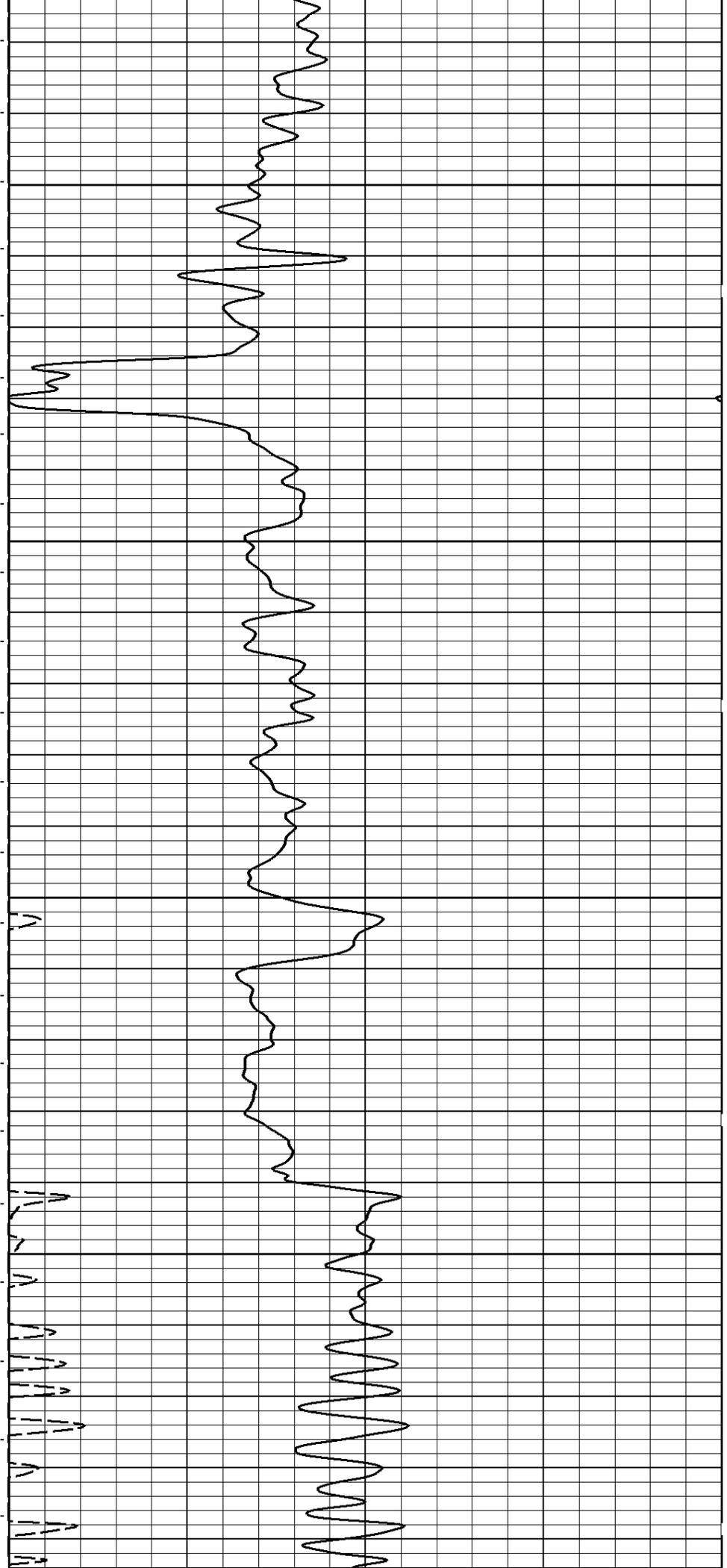
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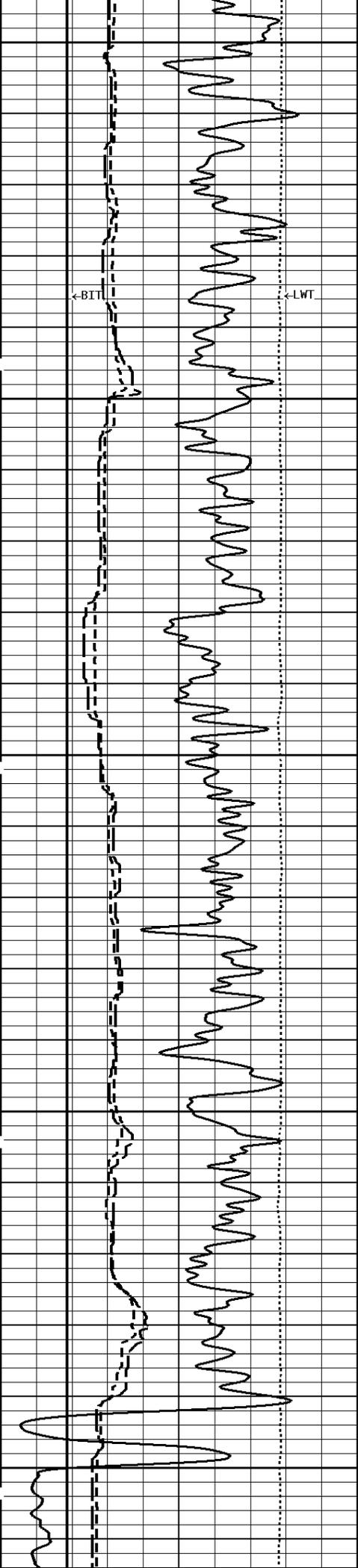
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←N CAL

←LD CAL

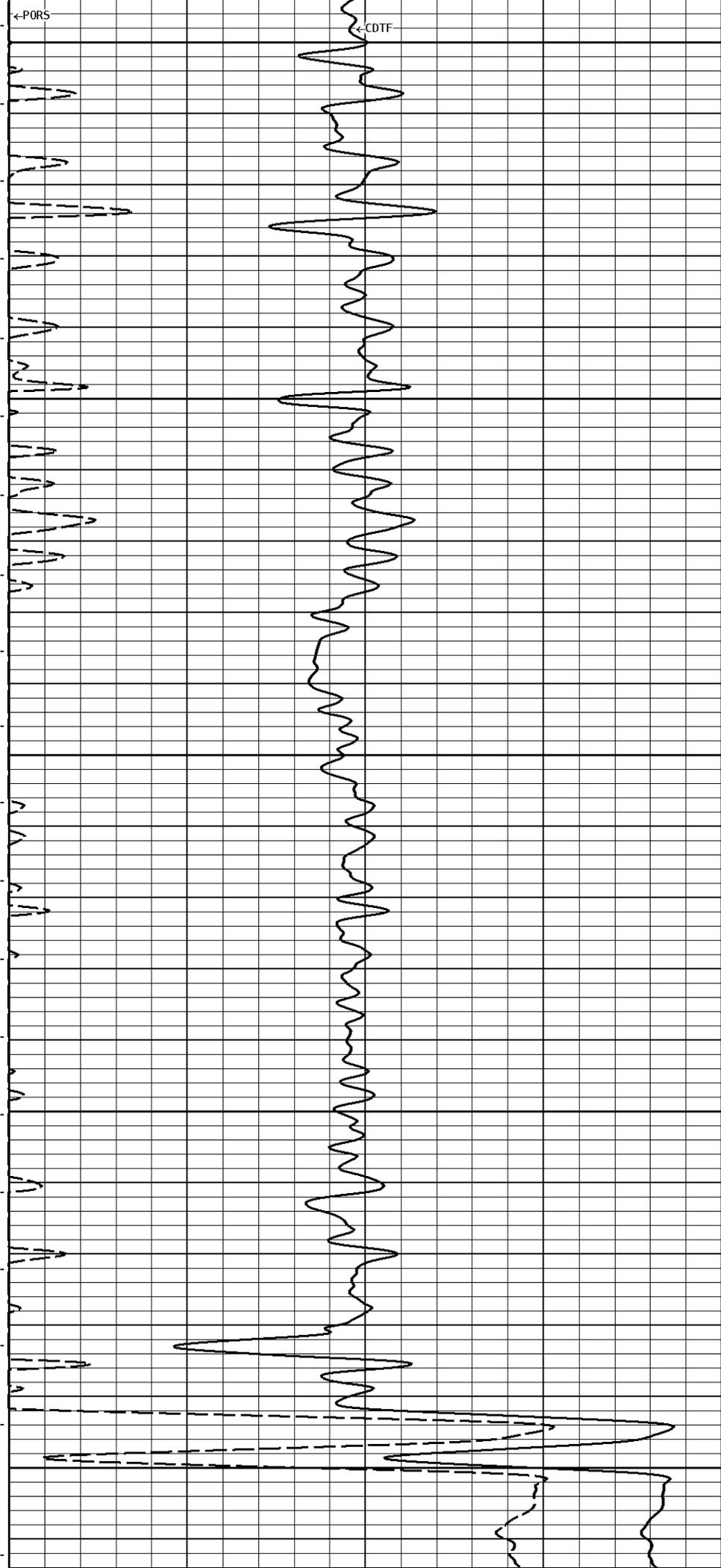
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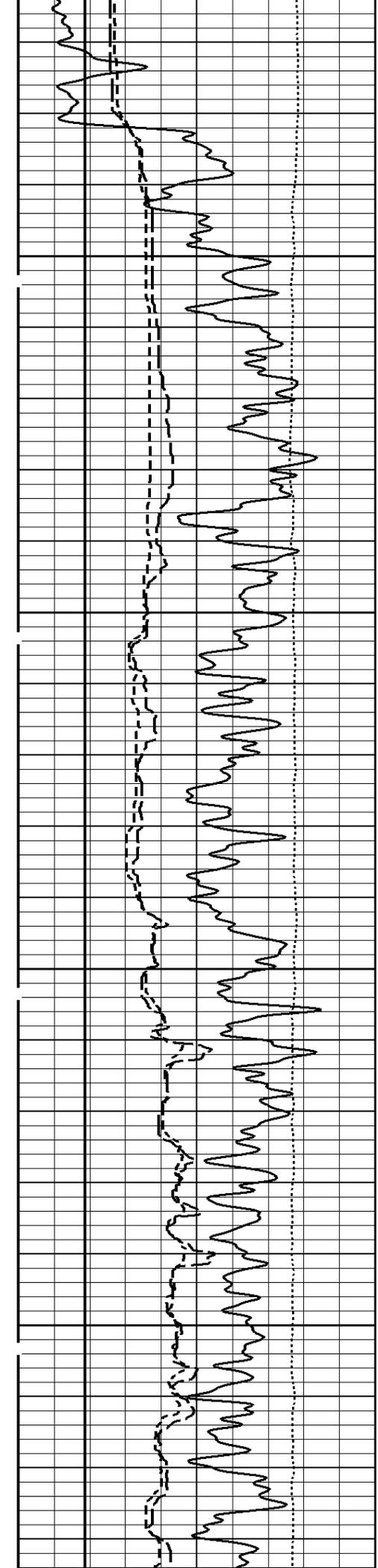




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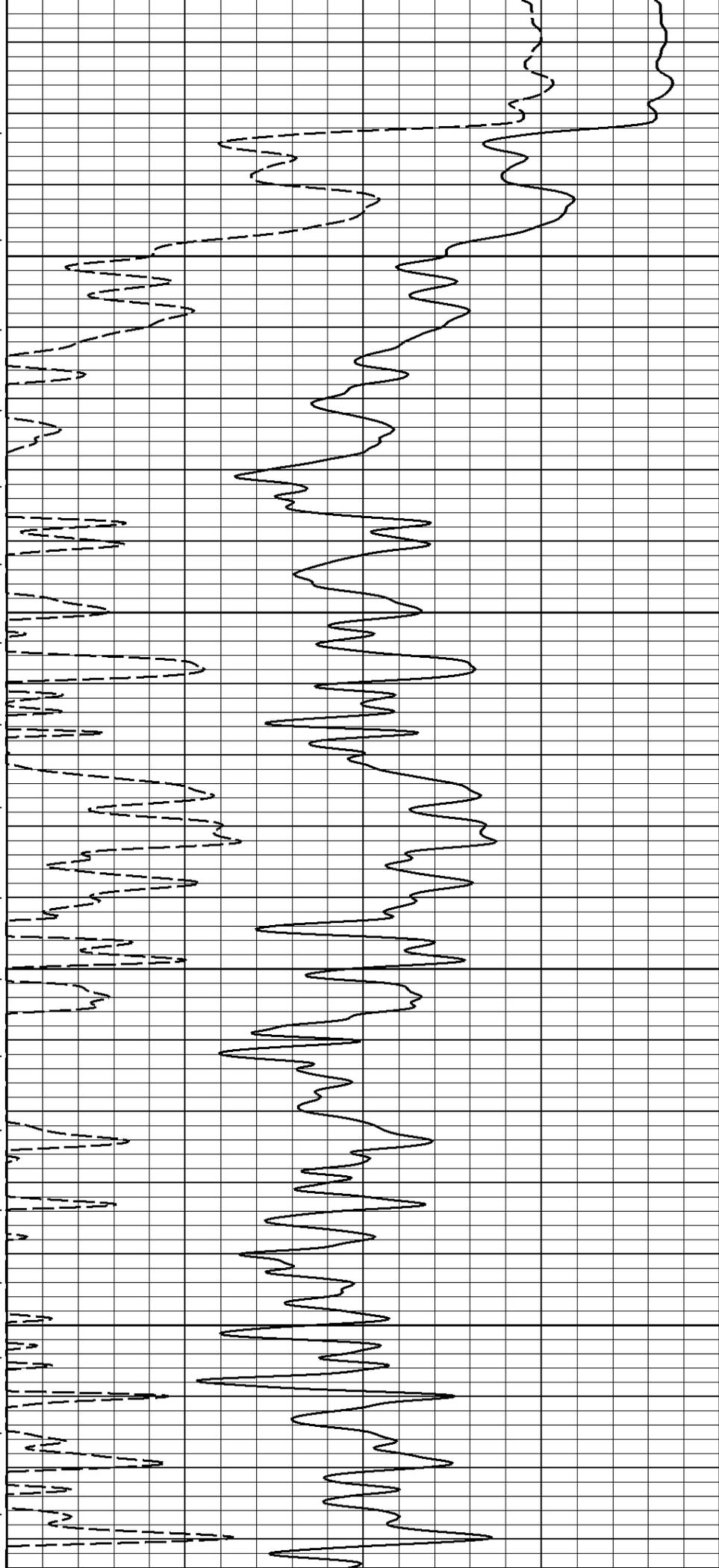
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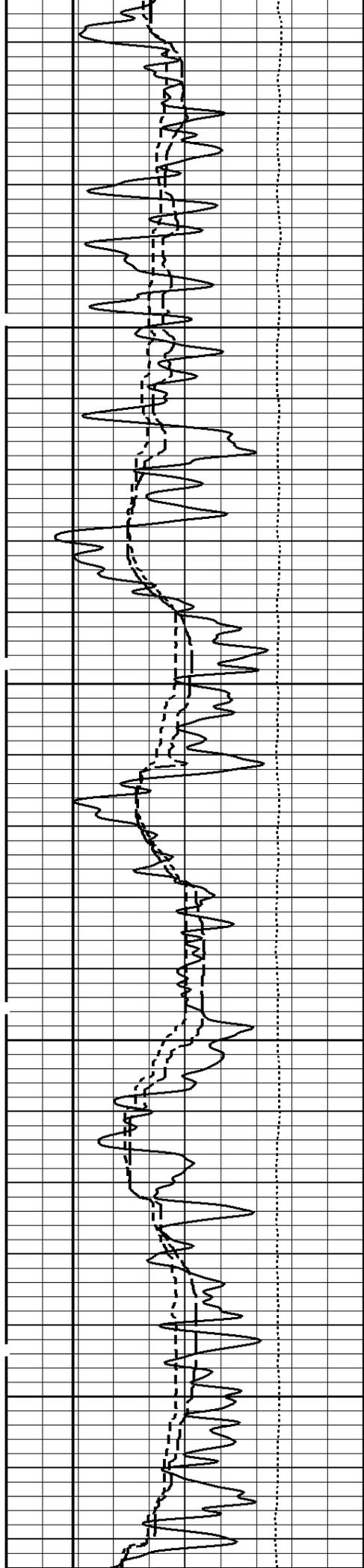


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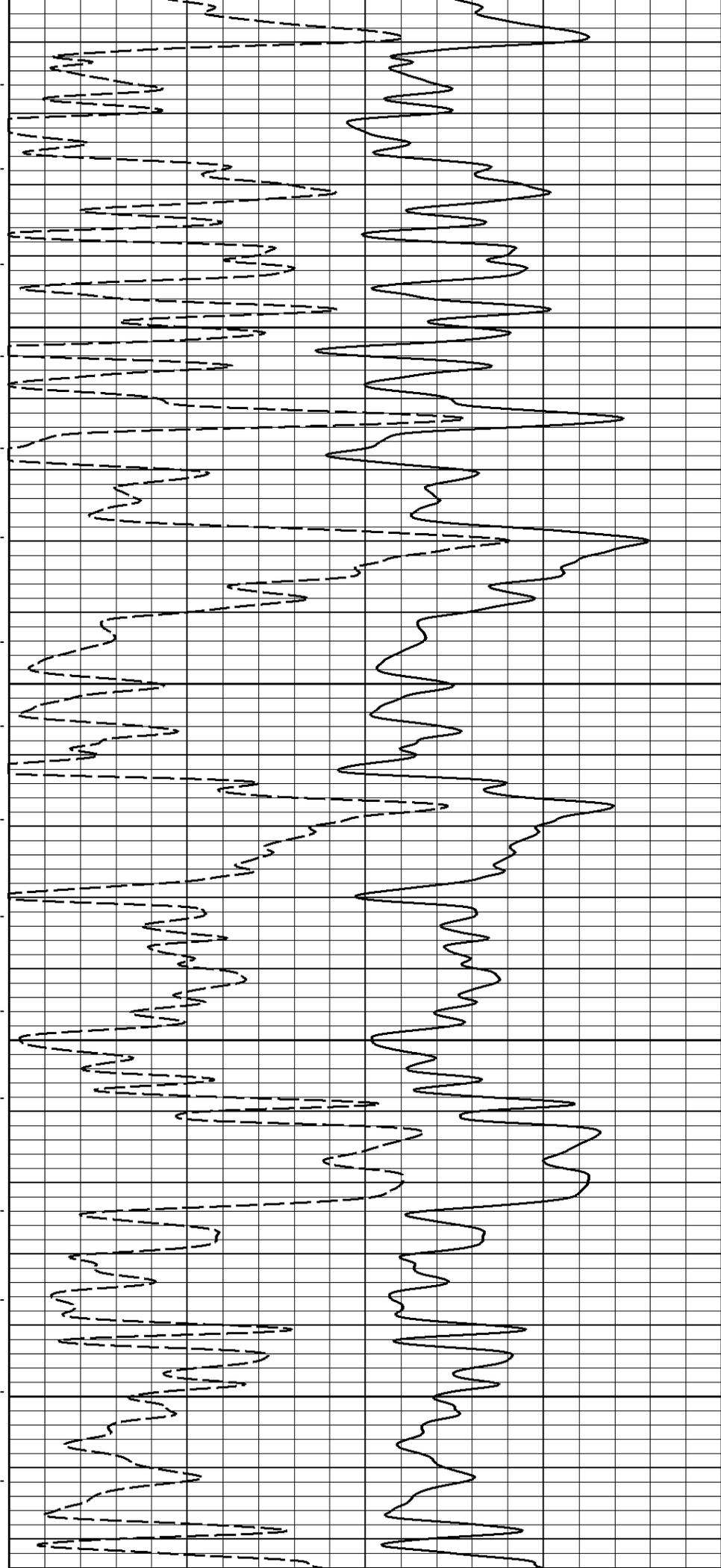


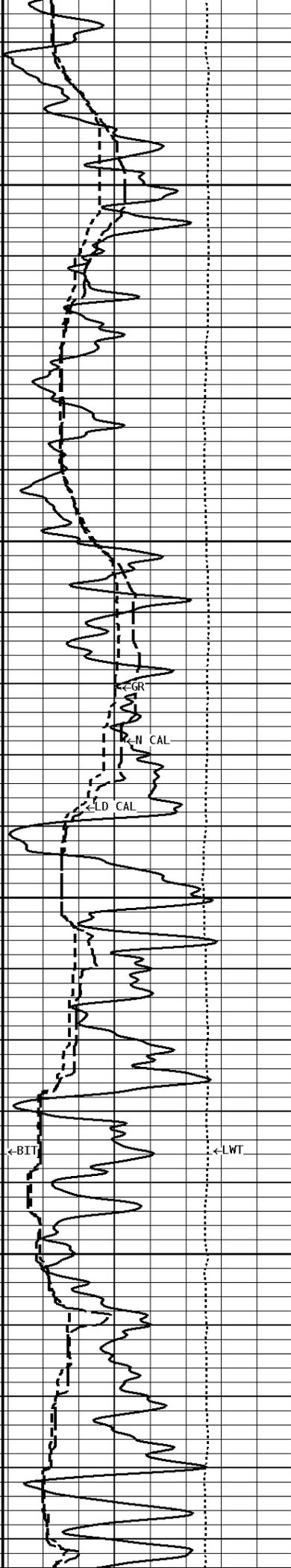




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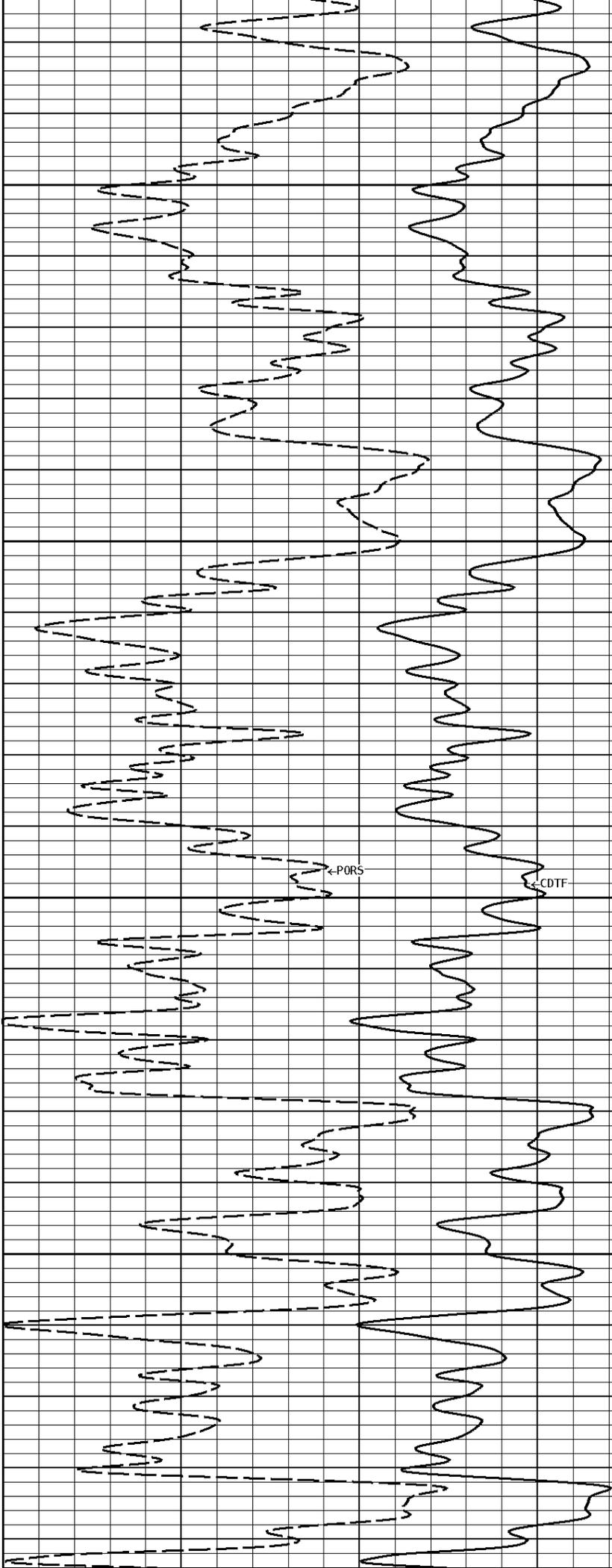
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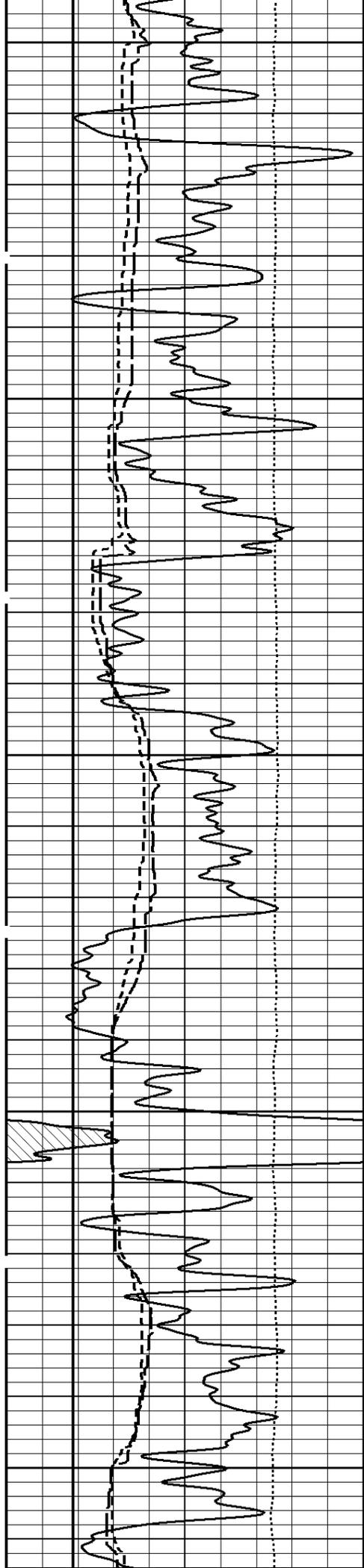




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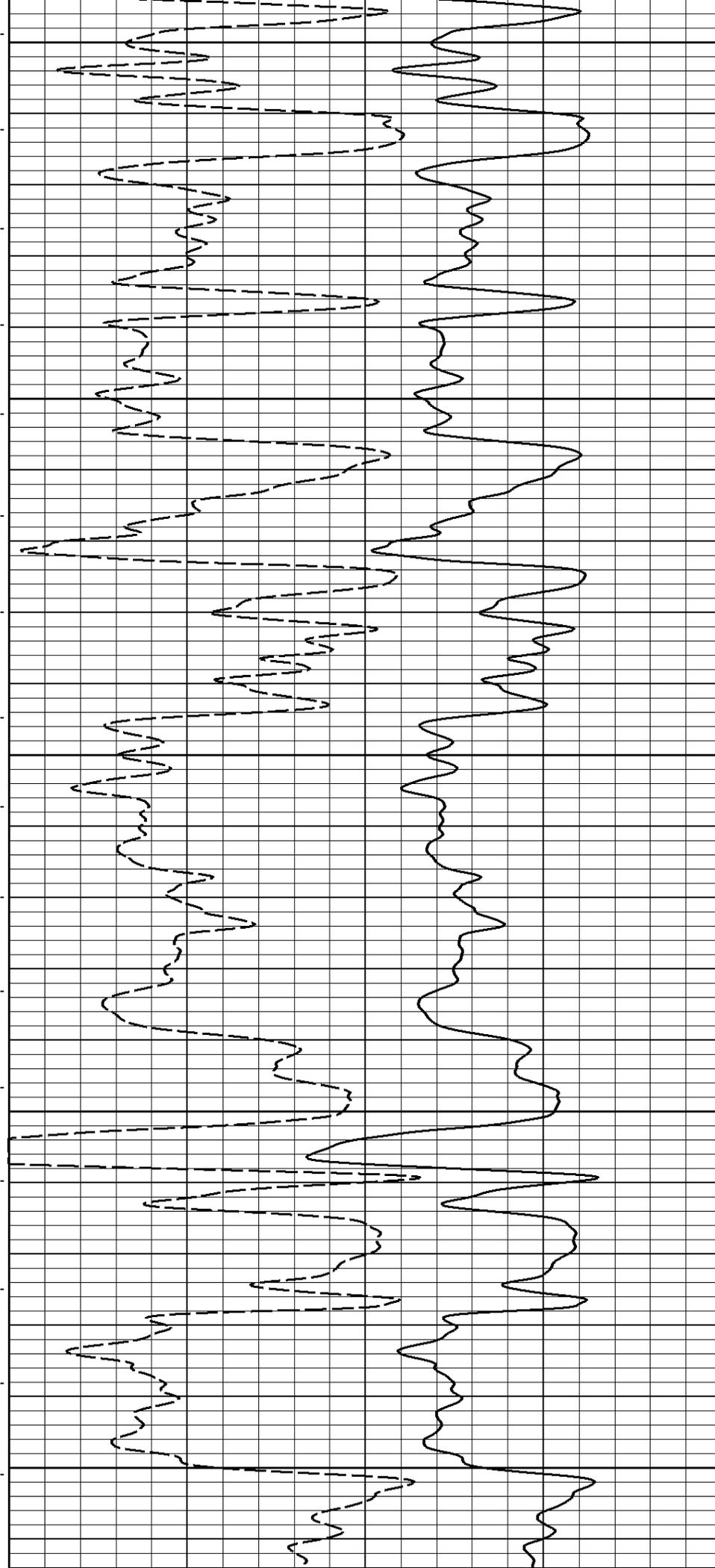
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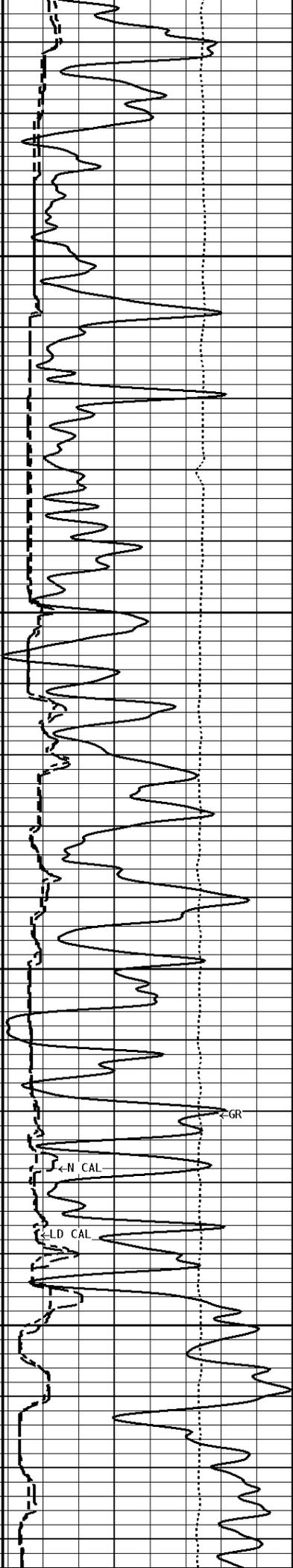
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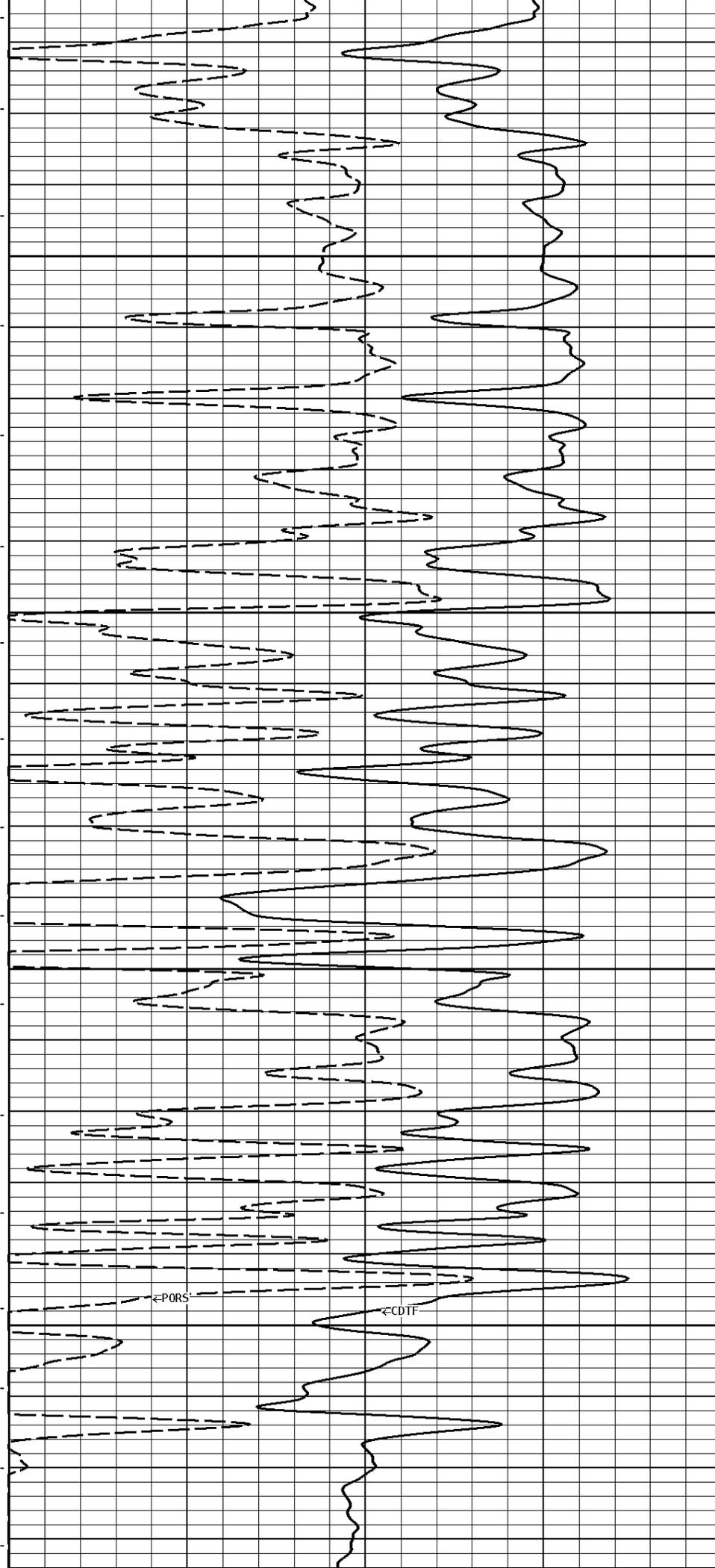


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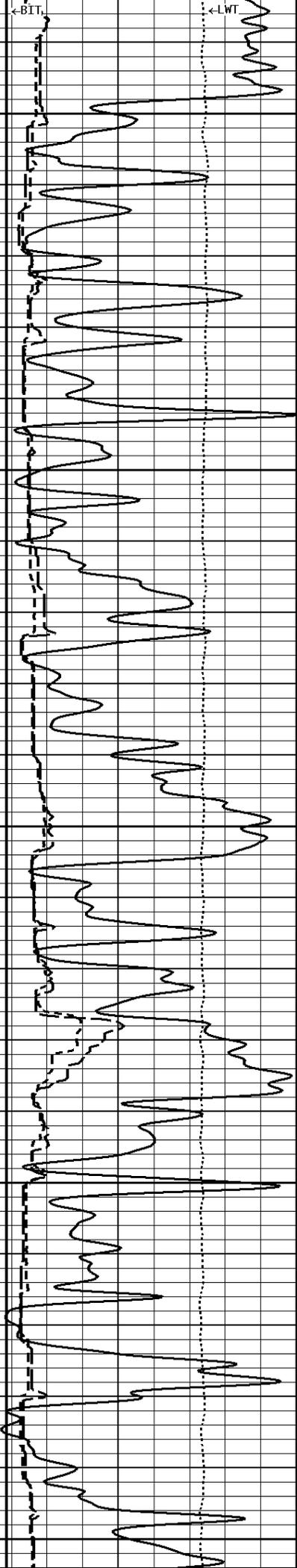
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← GR  
← N CAL  
← LD CAL



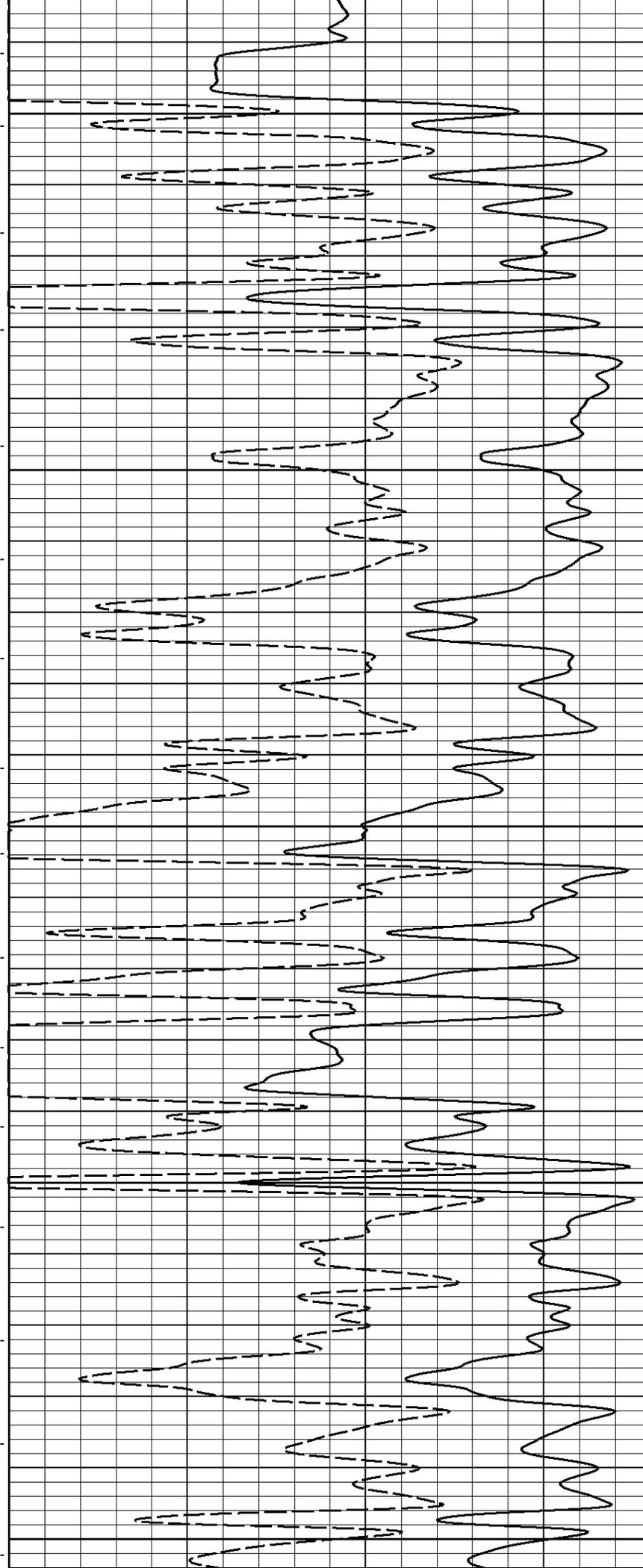
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← CDTF

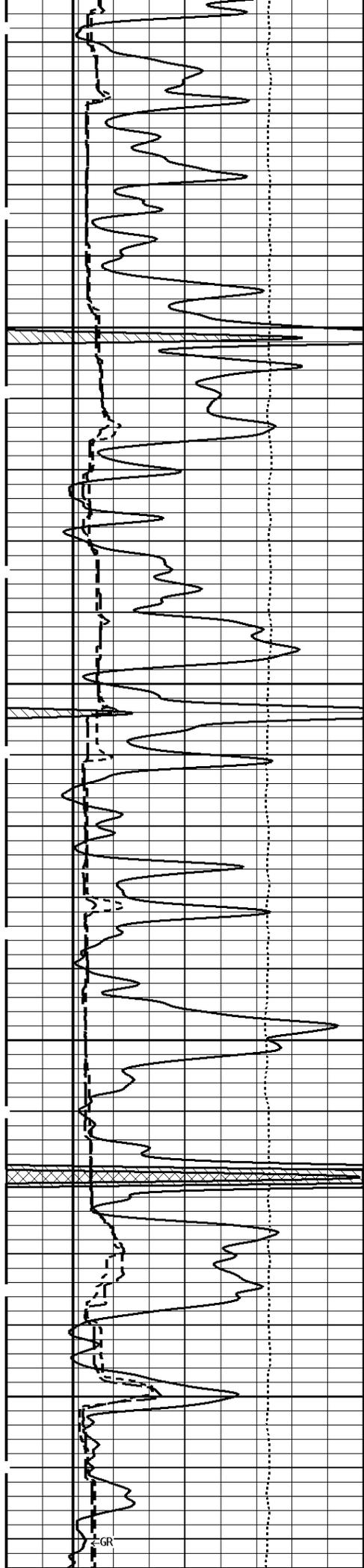


3100

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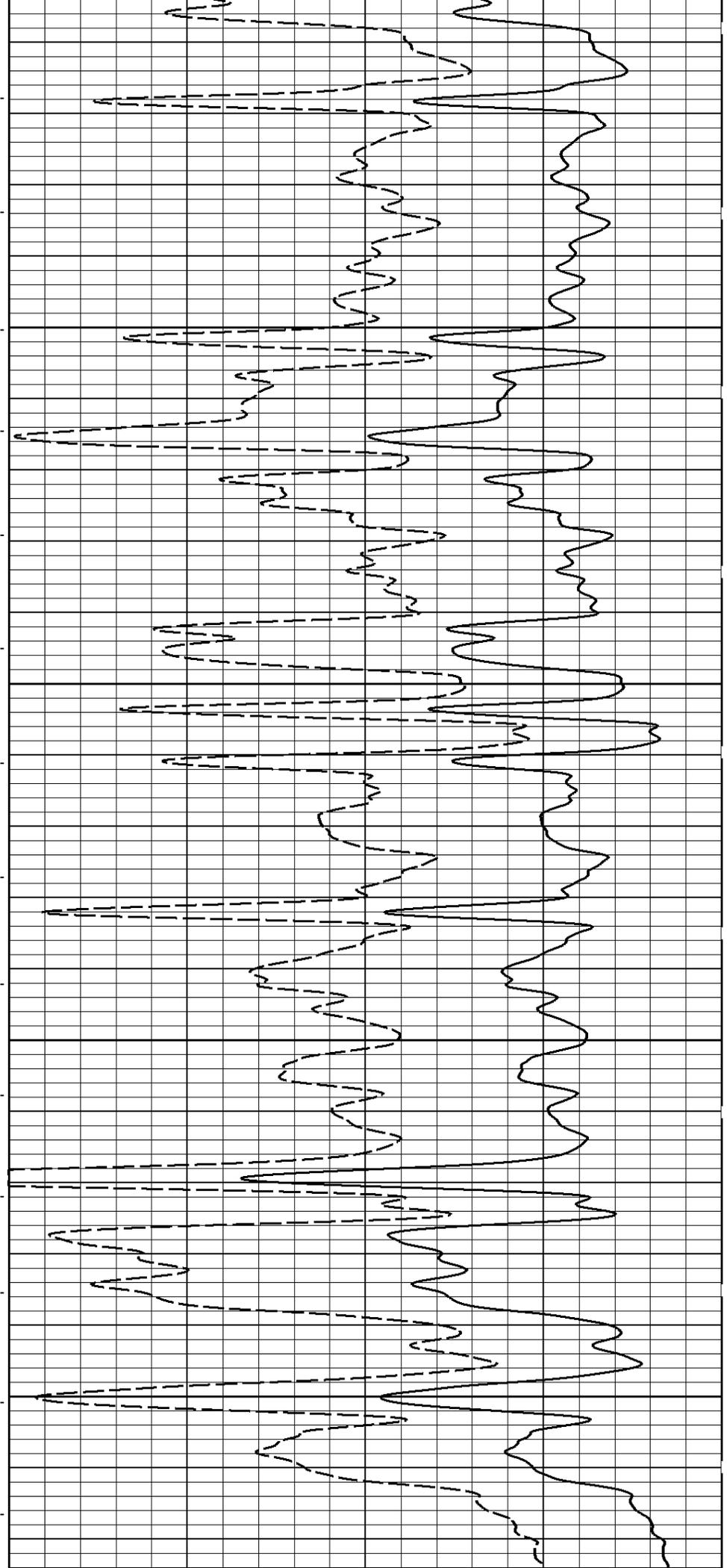
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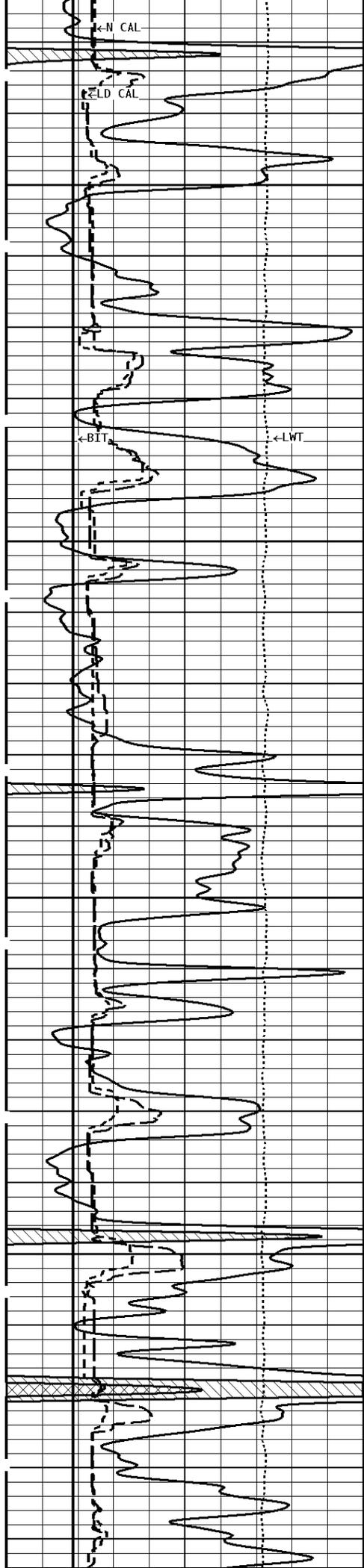




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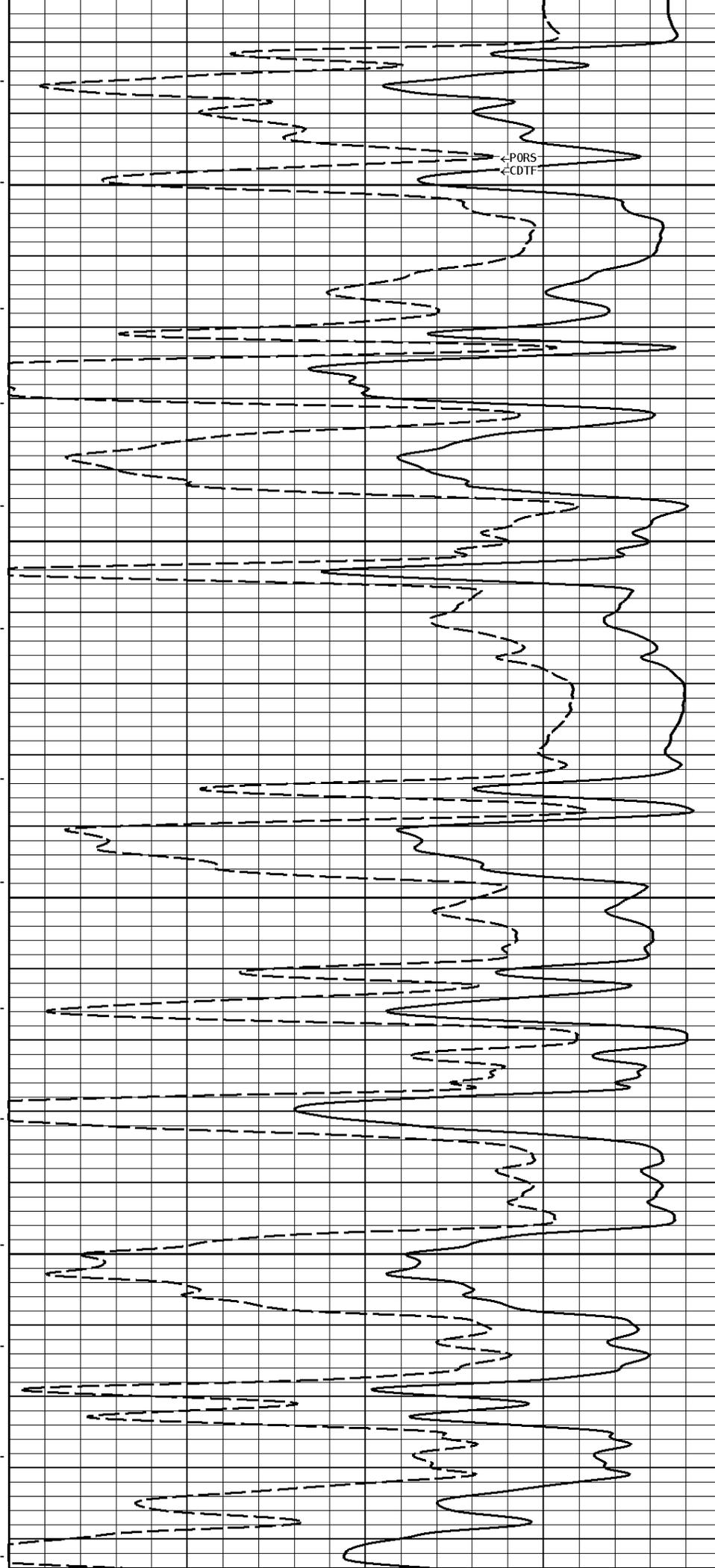
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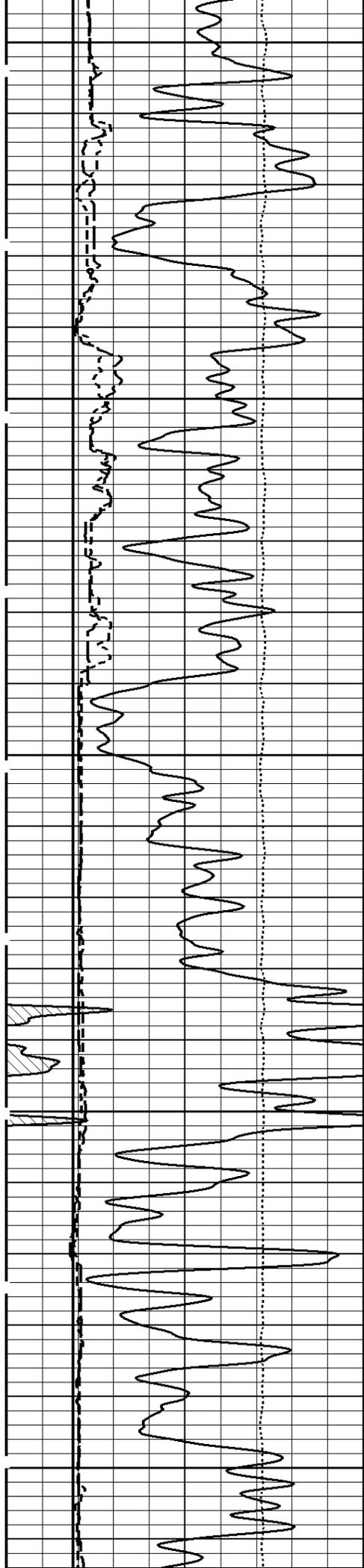




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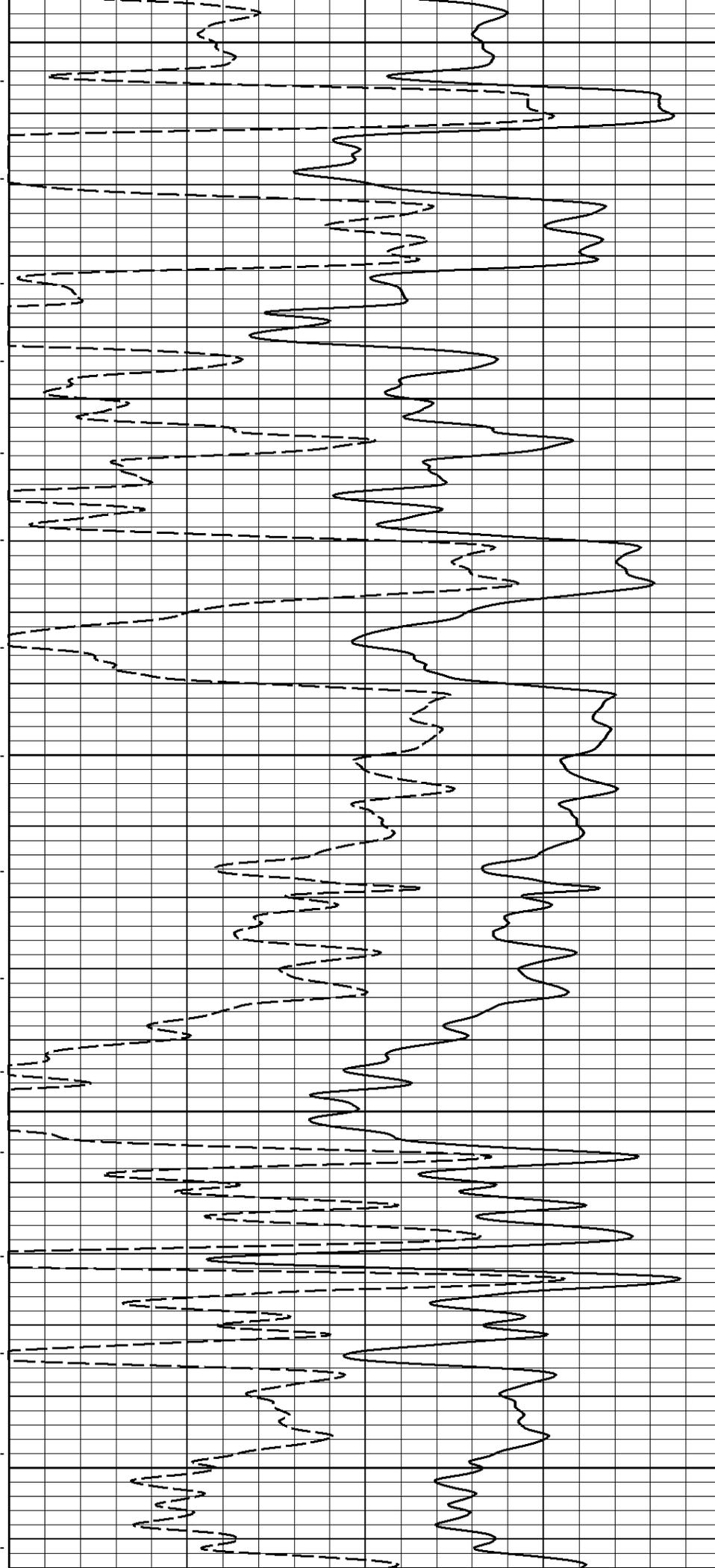
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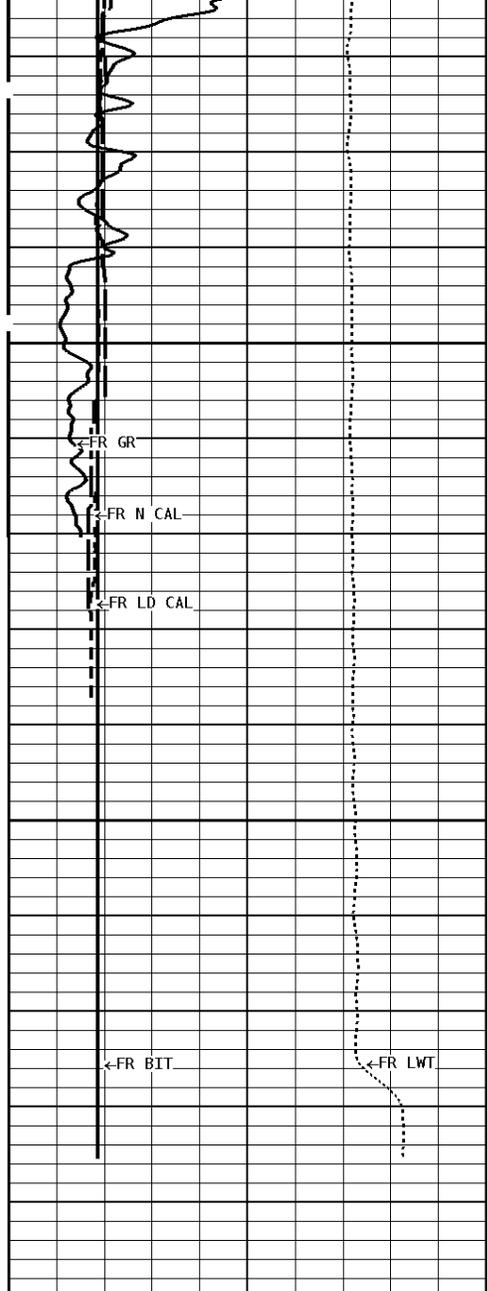




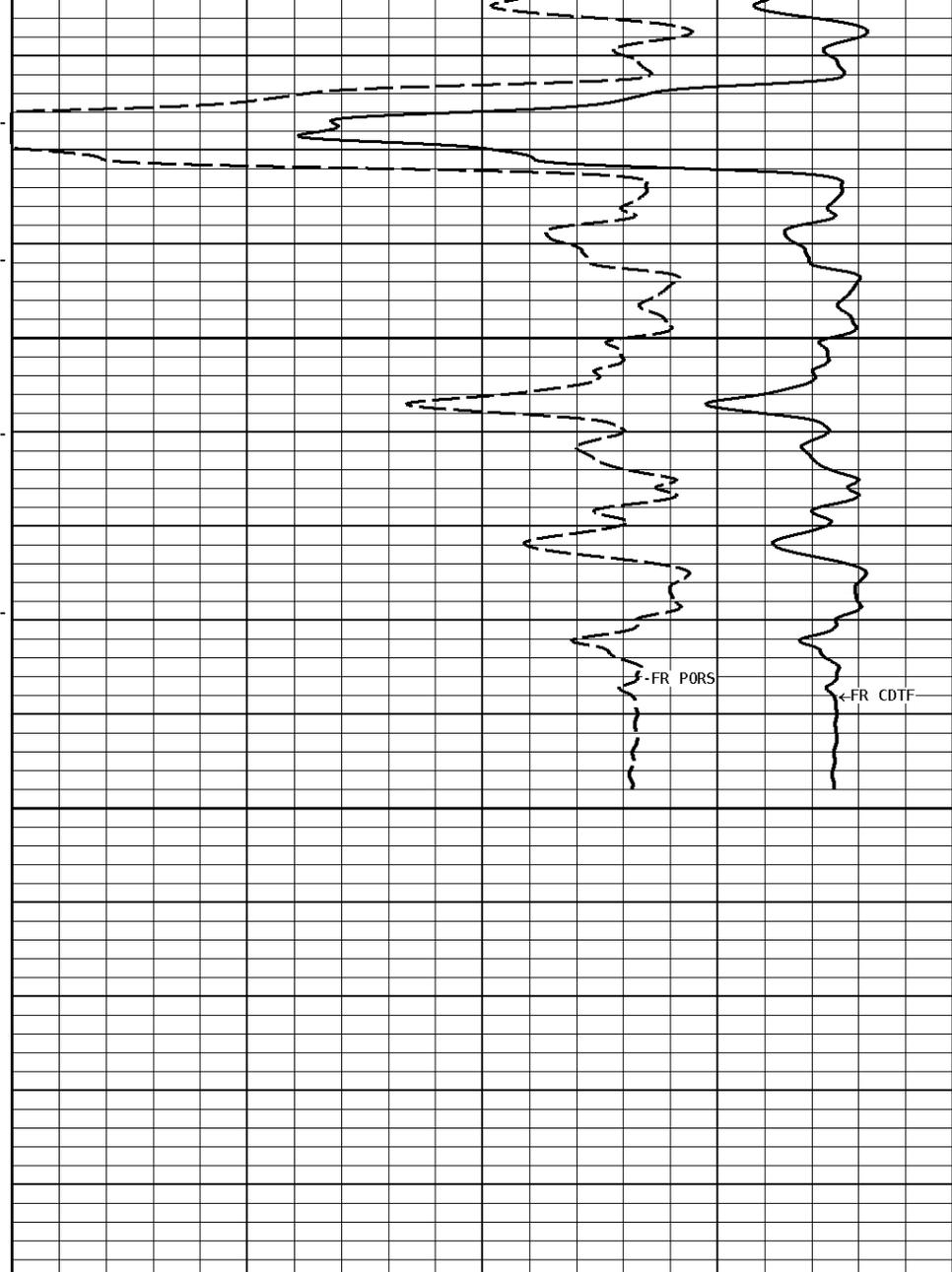
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3900





File #1.1.6

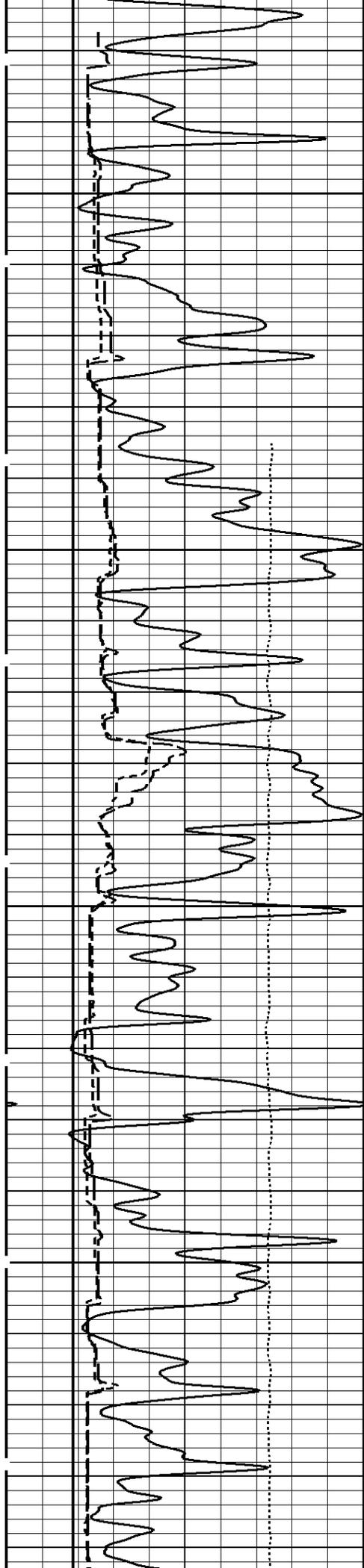


**1:240 MAIN SECTION**

<b>GAMMA RAY API UNITS</b>	
150 0	300 150
<b>TENSION LBS</b>	
10000	0
<b>BIT SIZE INCHES (IN)</b>	
6	16
<b>DENSITY (X) CALIPER INCHES (IN)</b>	
16 6	26 16

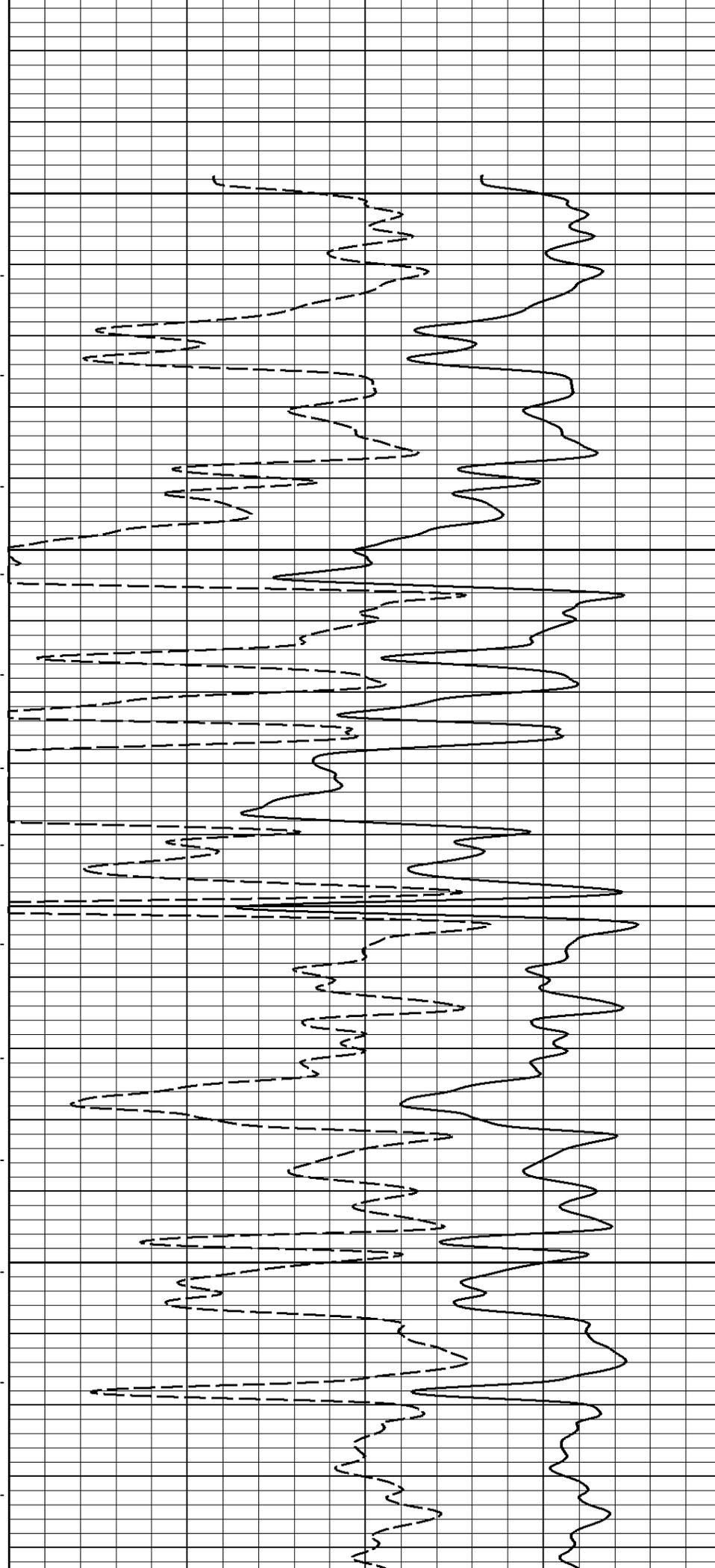
<b>SONIC POROSITY PERCENT</b>	
30	-10
<b>COMPENSATED SONIC TRAVEL TIME uSEC/FT</b>	
240 140	140 40

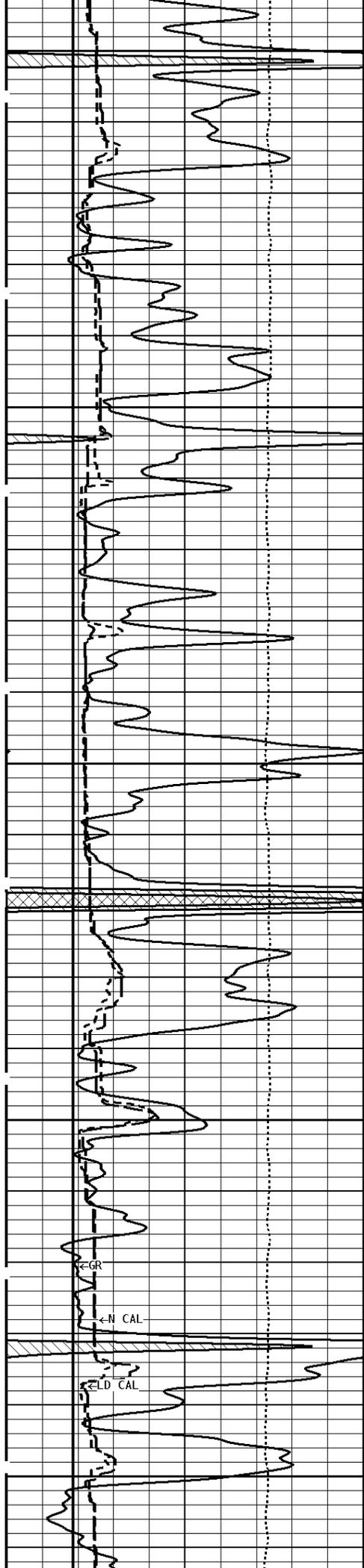




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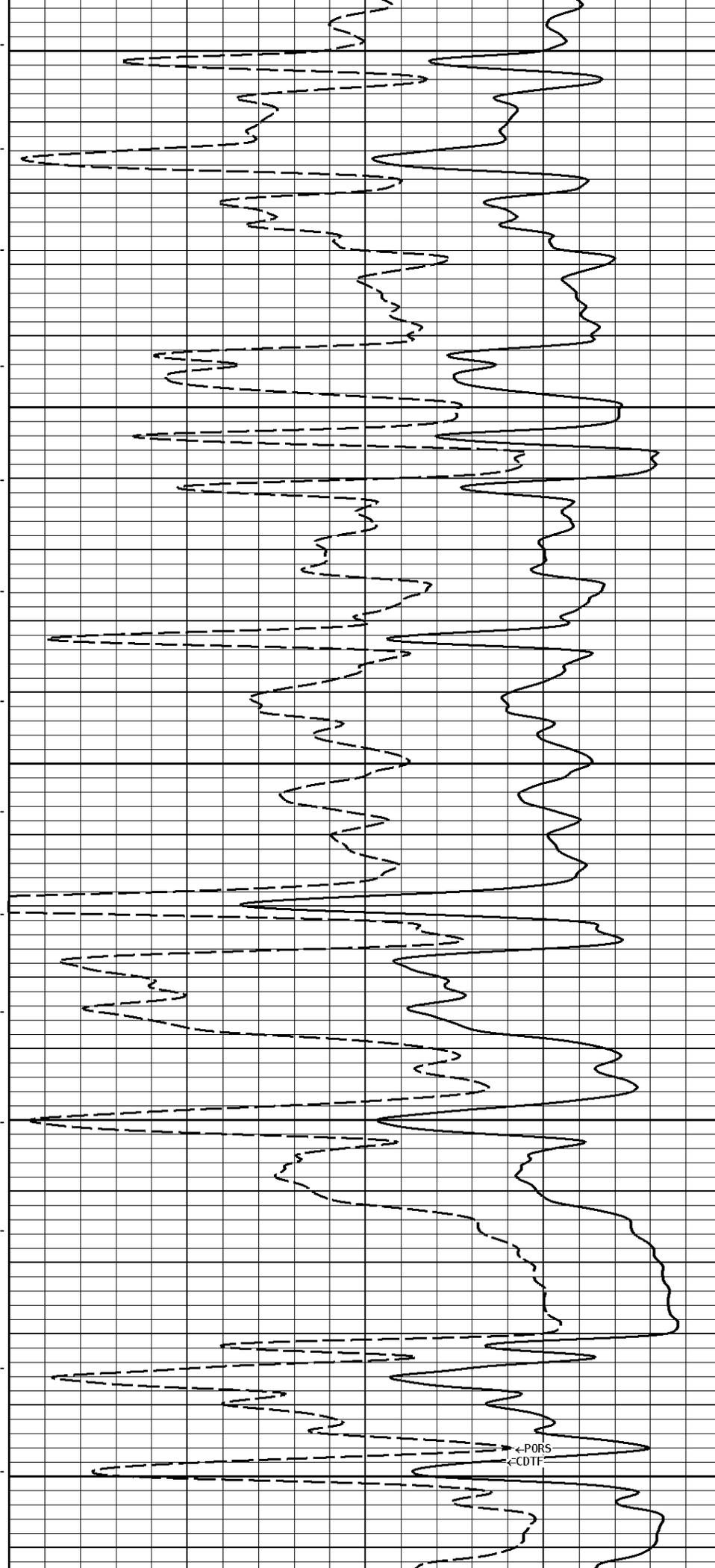
3300





3400

3500



← GR

← N CAL

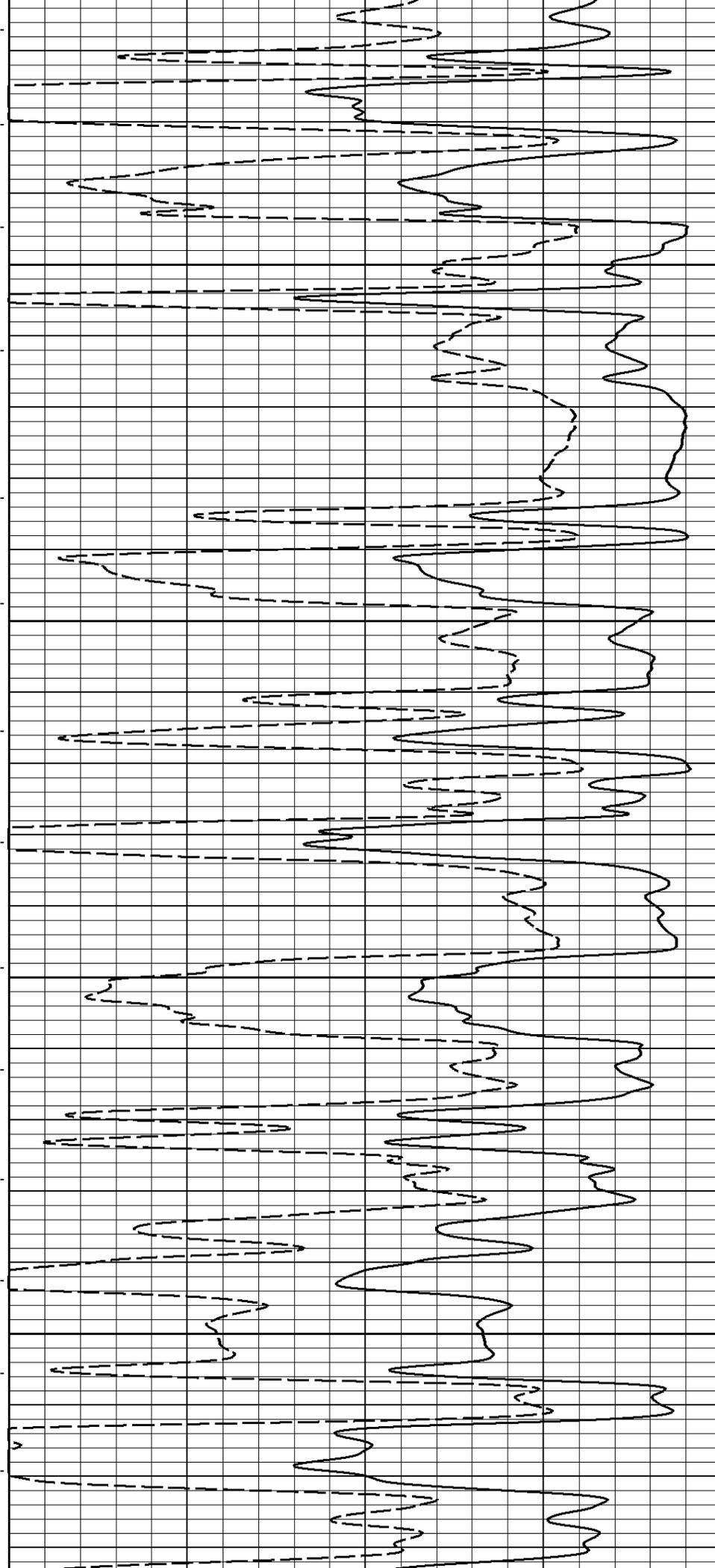
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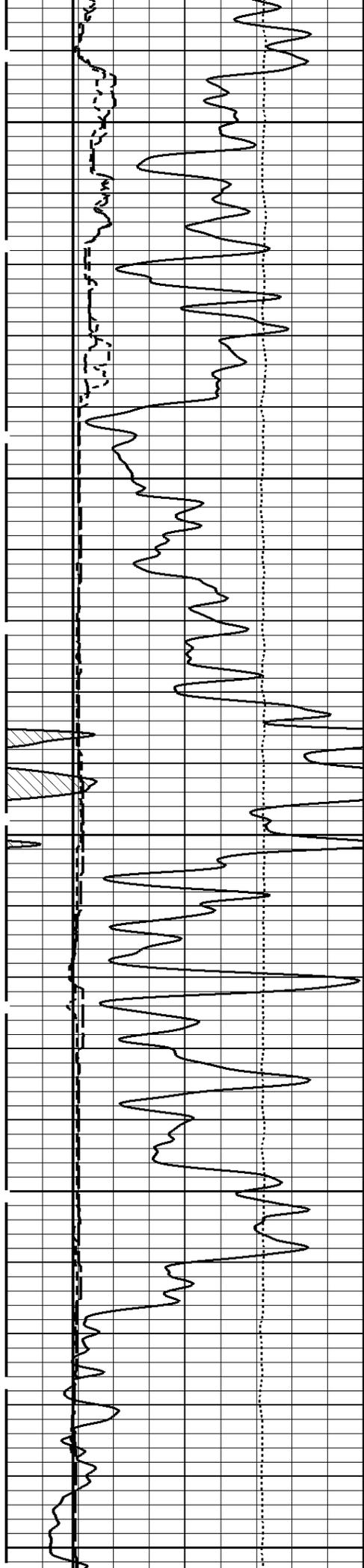
← PORS  
← CDTE



3600

3700

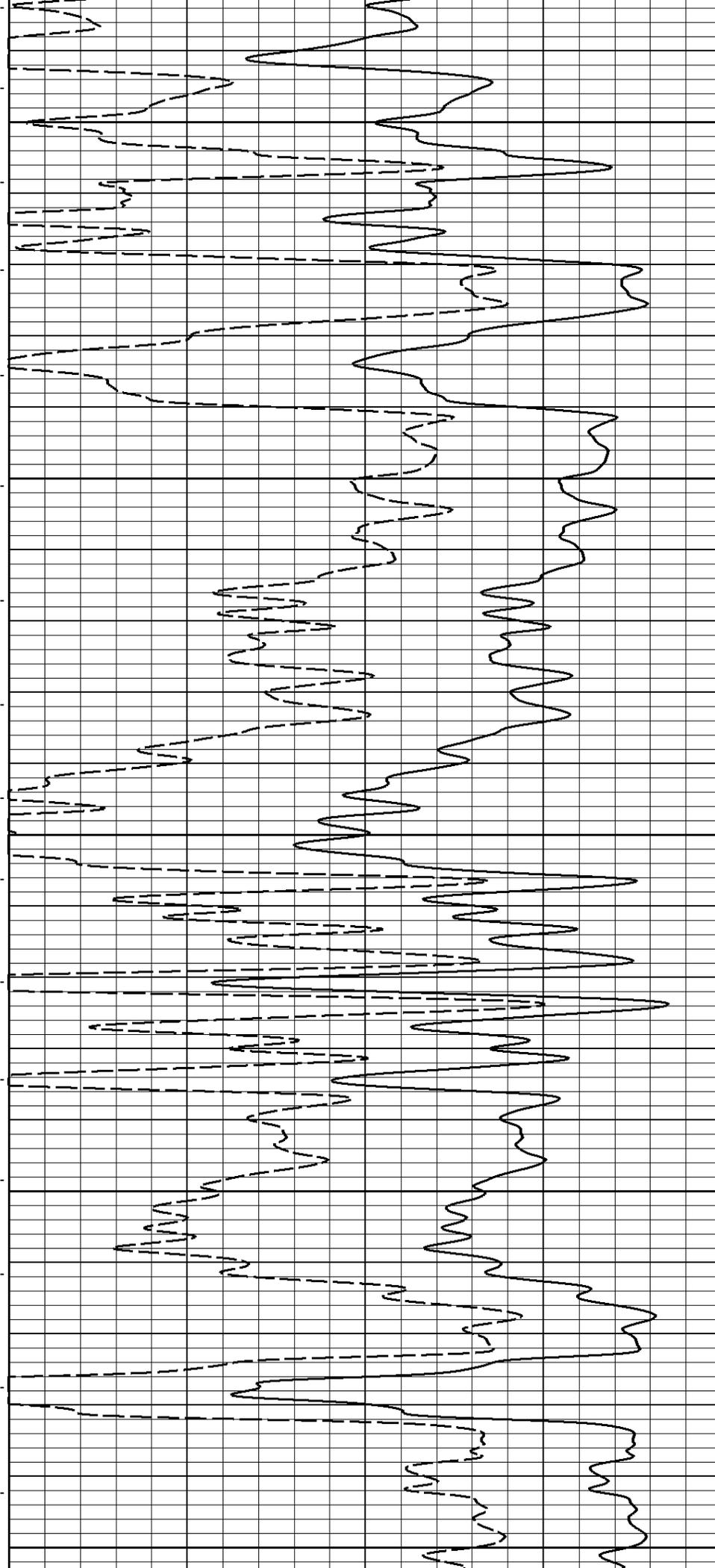


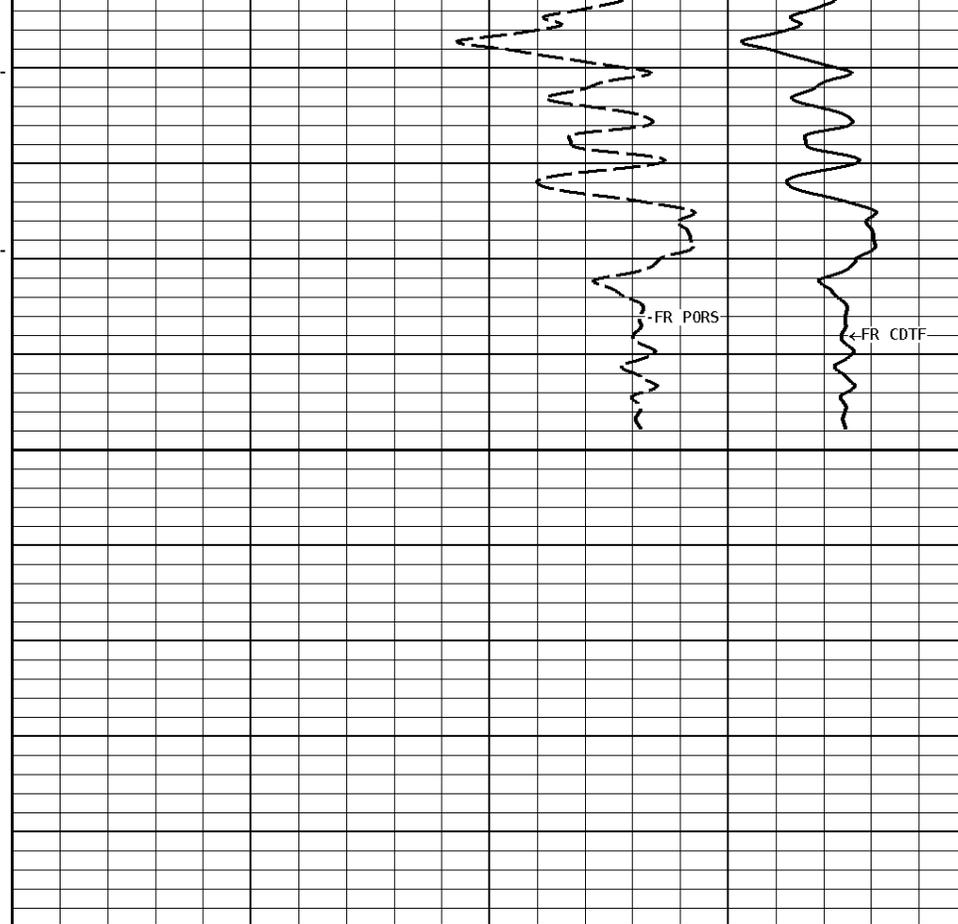
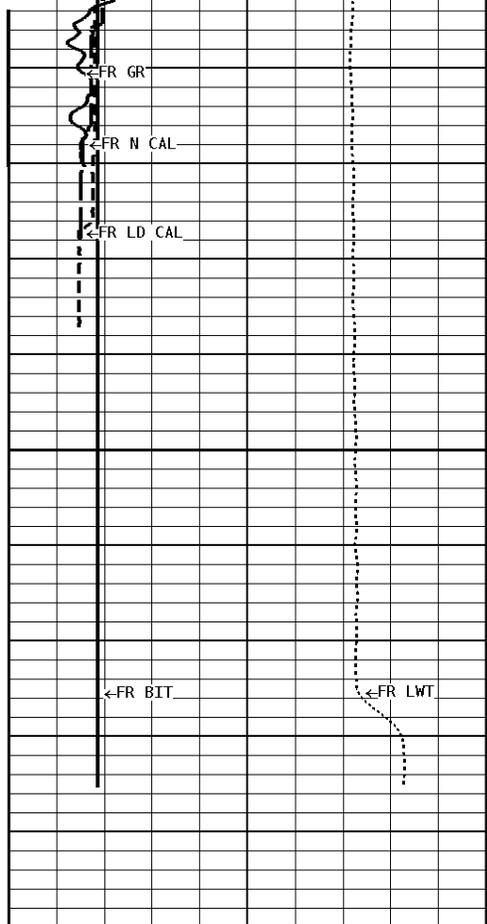


3800

3900

4000





**1:240 REPEAT SECTION**

<b>GAMMA RAY API UNITS</b>	
150 0	300 150
<b>TENSION LBS</b>	
10000	0
<b>BIT SIZE INCHES (IN)</b>	
6	16
<b>DENSITY (X) CALIPER INCHES (IN)</b>	
16 6	26 16
<b>NEUTRON (Y) CALIPER INCHES (IN)</b>	
16 6	26 16

<b>SONIC POROSITY PERCENT</b>	
30	-10
<b>COMPENSATED SONIC TRAVEL TIME uSEC/FT</b>	
240 140	140 40

**\* Borehole Zone Factors \***

<b>Zone 1</b>	<b>99999.0 to</b>	<b>0.0 Feet</b>
Matrix Transit Time _____	47.5	us/ft
Fluid Transit Time _____	189.0	us/ft

**\* Calibration Summary \***

<b>Shop Calibration</b>					
<b>GRT-B</b>					
Performed : 24-JUN-2019			Time : 12:20		
Sensor Suite : GR-GR5			ID : GRT-BC-038		
	Measured	Units	Calibrated	Units	
GR	Background	Jig	Jig	GRAPI	
	36	266	160		
		CPS			
<b>Shop Calibration</b>					
<b>CST-AD</b>					
Performed : 09-FEB-2020			Time : 05:45		
Sensor Suite : SON-ANA			ID : CST-AB-21		
	Measured	Transit Time	Calibrated	Units	
T/R Pair					
T1R1	205.0		208.5	uS	
T2R2	205.0		208.5	uS	
T1R2	326.3		322.5	uS	
T2R1	326.3		322.5	uS	
	Measured	Amplitude	Calibrated	Units	
T/R Pair					
T1R1	90.00		90.00	mV	
T2R2	90.00		90.00	mV	
T1R2	78.00		78.00	mV	
T2R1	78.00		78.00	mV	