Tucker ENERGY SERVICES

BOREHOLE COMPENSATED SONIC LOG

Company LANGSTON D.S.
Well REIF A & B #31-3
Field MARY IDA
County RICE
State KANSAS
Country USA
API No. 15-159-22781

File No : TUL-59596
Company : LANGSTON D.S.
Well : REIF A & B #31-3
Field : MARY IDA
County : RICE
State : KANSAS
Country : USA
API No : 15-159-22781

Location :
825' FSL & 2970' FEL
S2 NE SE SW

LSD : **Sect :** 31 **Twp :** 18S **Rge :** 10W

Permanent Datum:	GL	**Elevations:**		**Services:**	
Drilling Measured From:	KB	**KB**	1765.00 Ft	CNT	CST
Log Measured From:	KB	**DF**	1764.00 Ft	LDT	PIT
Above Permanent Datum:	9.00 Ft	**GL**	1756.00 Ft	MLT	

Date	05-20-2014						
Run Number	1						
Depth--Driller	3470.0	Ft					
Depth--Logger	3470.0	Ft					
First Reading	3447.0	Ft					
Last Reading	486.0	Ft					
Casing--Driller	486.0	Ft					
Casing--Logger	486.0	Ft					
Bit Size	7.875	In					
Casing Size	8.625	In					
Hole Fluid Type	WBM						
Density	9.3						
Fluid Loss	8.8						
PH/Viscosity	11.0	58.0					
Sample Source	MEASURED						
RM@Measured Temp.	0.500 @ 80 F						
RMF@Measured Temp	0.430 @ 80 F						
RMC@Measured Temp.	0.580 @ 80 F						
Source RMF/RMC	CALCULATED	CALCULATED					
RM@BHT	0.360 @ 115 F						
Time Circulation Stopped	05-20-2014 1:30 pm						
Max Recorded Temp.	117 F						
Equipment/Base	T-123	TULSA					
Recorded By	S. DAVIS						
Witnessed By	D. LANGSTON						

Casing Strings

Size (In)	Weight (Lbs)	Bottom (Ft)	Top (Ft)
8.625	24.00	486.00	0.00

Bitsize Intervals

Size (In)	Bottom (Ft)
7.875	3470.00

Run Number	1		
Date	05-20-2014		
Date/Time On Bottom	05-20-2014 4:15 pm		
Depth to Fluid	0.0 Ft		
Salinity	8800.000		
RMF@BHT	0.300 @ 115 F		
RMC@BHT	0.410 @ 115 F		

Run Number 1

Comments

ALL PRESENTATIONS AS PER CUSTOMER REQUEST
GRT, CNT, LDT, MLT, CST, AND PIT RUN IN COMBINATION
CALIPERS ORIENTED ON X-Y AXIS
2.71 G/CC USED TO CALCULATE POROSITY
ANNULAR HOLE VOLUME CALCULATED USING 5.50" PRODUCTION CASING
PHIN IS CALIPER CORRECTED
DETAIL SECTION FROM TD TO 2600'
ANHYDRATE SECTION FROM 1350' TO 950'

GRT: GRP.
CNT: PHIN, CLCNIN.
LDT: PORL, LCORN, PECLN, LDENN, CLLDIN.
MLT: NOR_RF, INV_RF, MSCLPIN.
CST: PORS, ITT, CDTF, TT1, TT2, TT3, TT4.
PIT: ILD, ILM, SFLAEC, CIRD, SPU

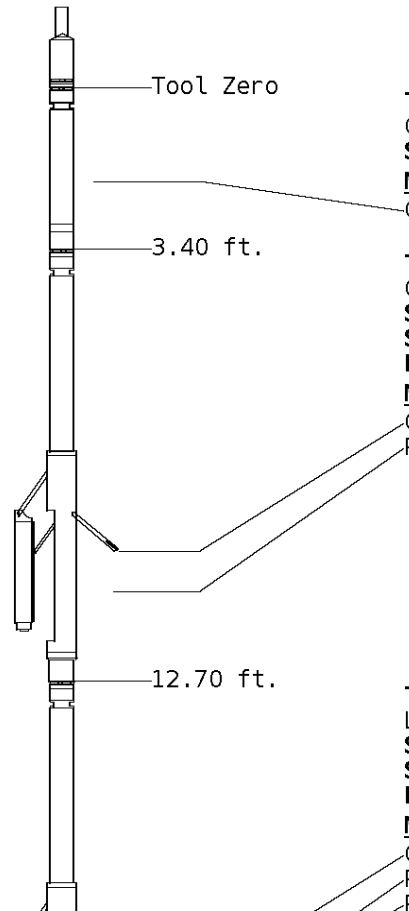
OPERATORS:

C. GONZALES

J. THOMAS

Tool String Schematic

Total Tool Length - 67.37 **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-BB-107

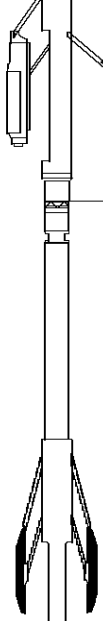
Measure Point	Tool Offset	Stack Offset	Bottom Offset
GRP	2.00	2.00	65.37

Tool: CNT-AA **Length:** 9.30 **ft.** **O.D.** 4.36 **in.**
Compensated Neutron A Pad on NDT-A
Sonde ID :NDT-BD-133
Source ID :N-1045
Pad ID :CNP-AA-024

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLCN	6.00	9.40	57.97
PHIN	6.80	10.20	57.17

Tool: LDT-DF **Length:** 9.72 **ft.** **O.D.** 4.80 **in.**
Litho Density D Pad on NDT-F
Sonde ID :PDT-GA-466
Source ID :2991GW
Pad ID :LDP-DA-065

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLLD	6.42	19.12	48.25
PEL	7.42	20.12	47.25
PES	7.82	20.52	46.85



LDEN	7.62	20.32	47.05
LCOR	7.62	20.32	47.05

22.42 ft.

Tool: MST-DA **Length:** 9.66 **ft.** **O.D.** 6.00 **in.**
Micro Spherically Focused (IC)
Sonde ID :MST-DA-057

Measure Point	Tool Offset	Stack Offset	Bottom Offset
MSFL	7.60	30.02	37.35
MSCLP	7.60	30.02	37.35
INV	7.60	30.02	37.35
NOR	7.60	30.02	37.35

32.08 ft.

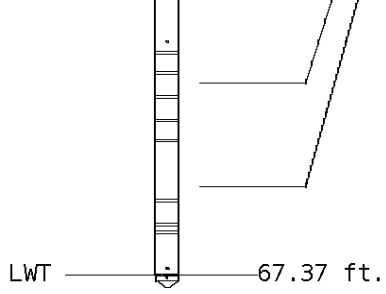
Tool: CST-AD **Length:** 13.80 **ft.** **O.D.** 3.60 **in.**
Open Hole Sonic
Sonde ID :CST-AB-25

Measure Point	Tool Offset	Stack Offset	Bottom Offset
TT1	4.80	36.88	30.49
TT3	5.80	37.88	29.49
CDT	7.30	39.38	27.99
TT4	8.80	40.88	26.49
TT2	9.80	41.88	25.49

45.88 ft.

Tool: PIT-CA **Length:** 21.49 **ft.** **O.D.** 3.62 **in.**
Phased Dual Induction w/ RM & D
Sonde ID :PIT-AB-005

Measure Point	Tool Offset	Stack Offset	Bottom Offset
ILD	8.92	54.80	12.56
ILM	10.10	55.98	11.39
SFLU	17.49	63.37	4.00
SP	20.60	66.48	0.88



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Segment: V1.D1.S6 MAIN **Acquired:** 2014-05/20 16:23 3.3.0-12594
Reference: 0 **Processed:** 2014-05/20 17:54 3.3.0-12594

TT4 uSEC
950 — 50

NEUTRON (Y) CALIPER INCHES (IN)
16 — 26
6 — 16

TT3 uSEC
950 — 50

DENSITY (X) CALIPER INCHES (IN)
16 — 26
6 — 16

TT2 uSEC
950 — 50

BIT SIZE INCHES (IN)
6 — 16

TT1 uSEC
950 — 50

TENSION LBS
10000 — 0

COMPENSATED SONIC TRAVEL TIME uSEC/FT
240 — 140
140 — 40

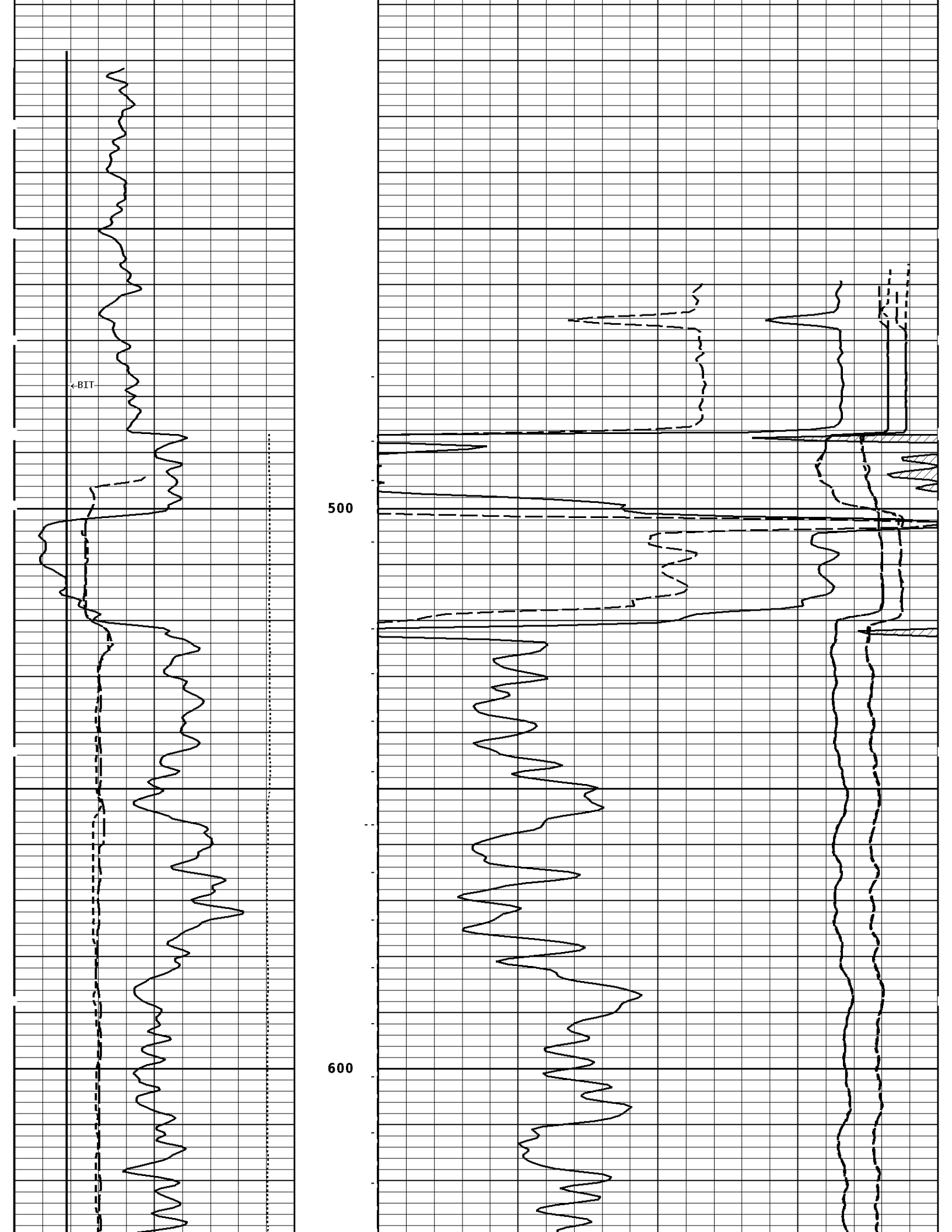
GAMMA RAY API UNITS
150 — 300
0 — 150

SONIC POROSITY PERCENT
30 — -10

1:240 MAIN SECTION

File #1.1.6

400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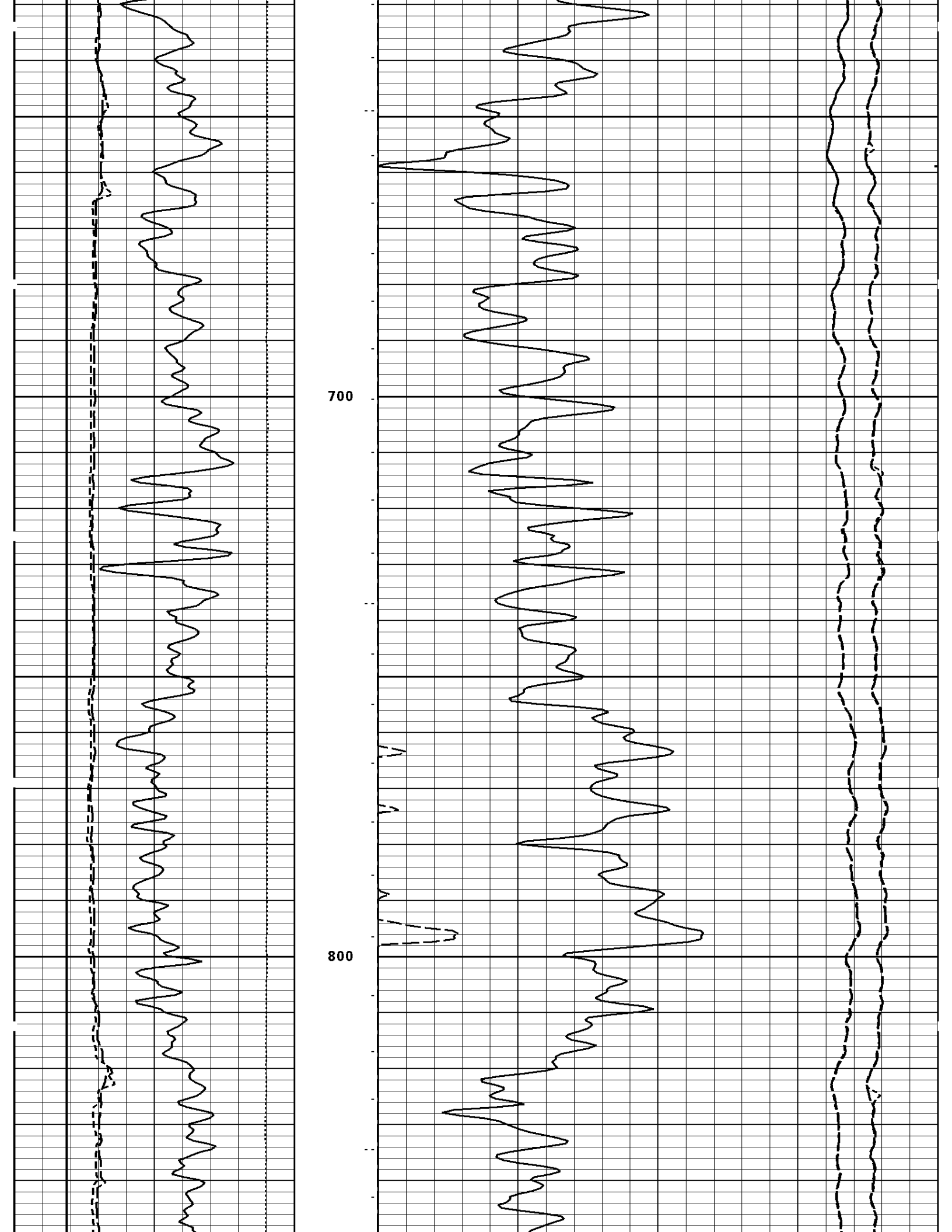
600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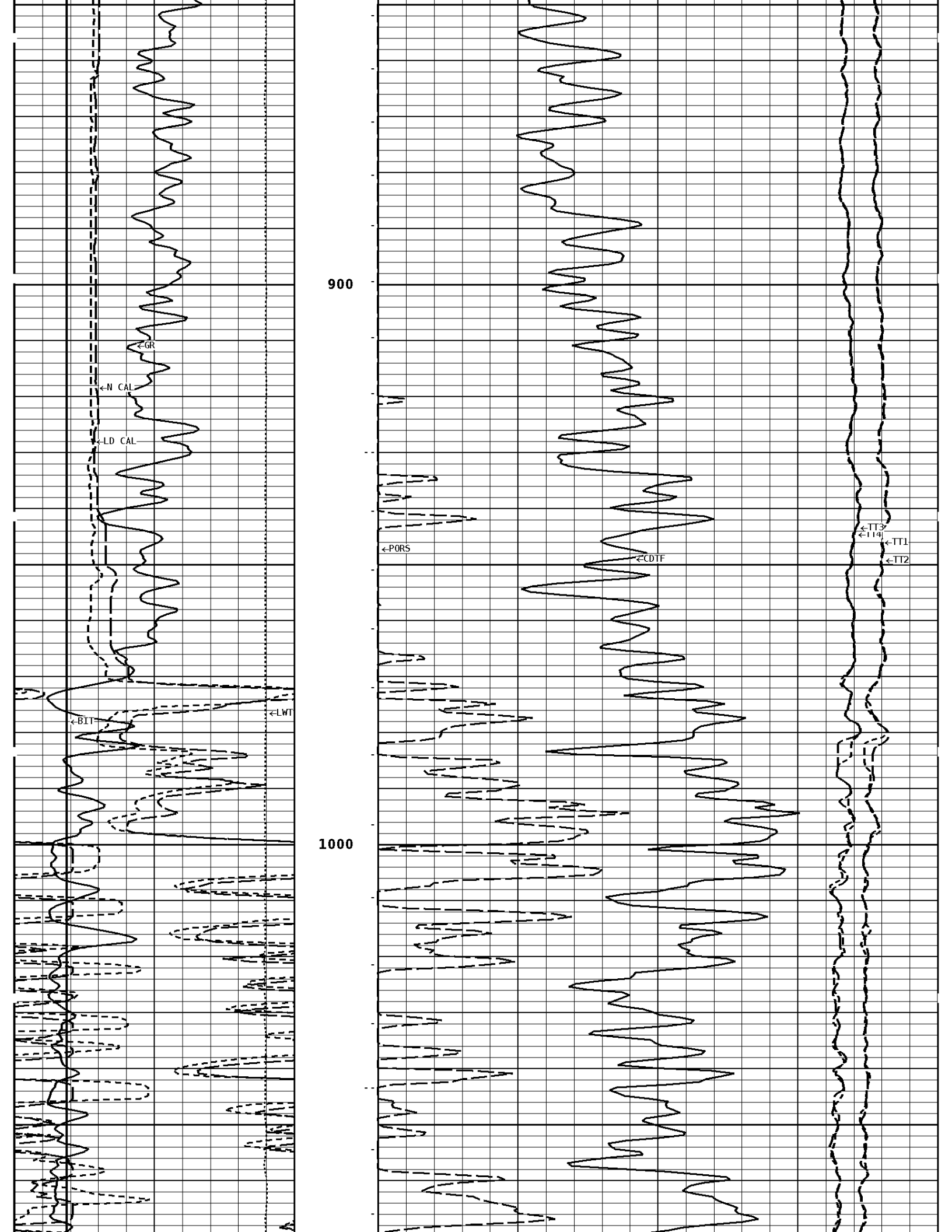
800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←GR
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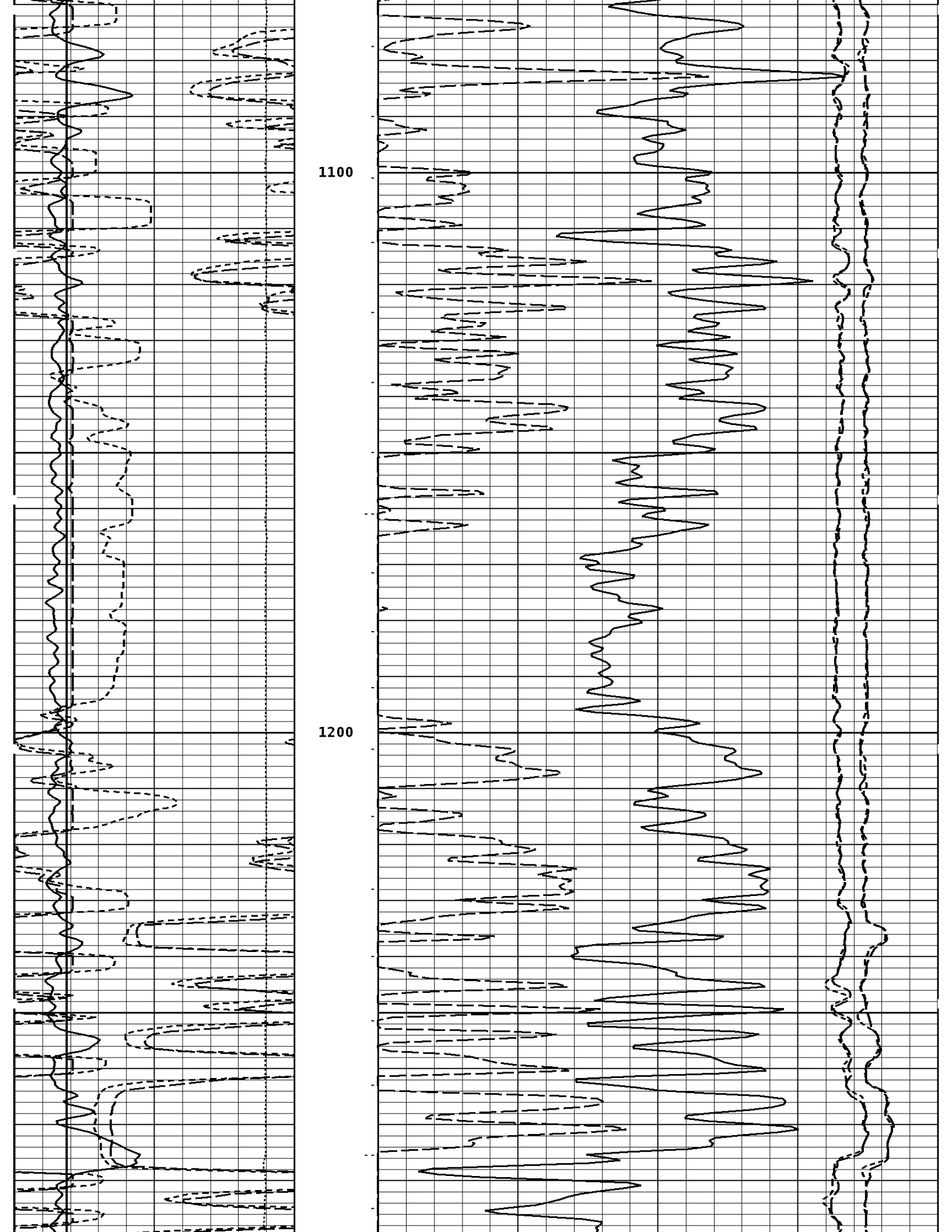
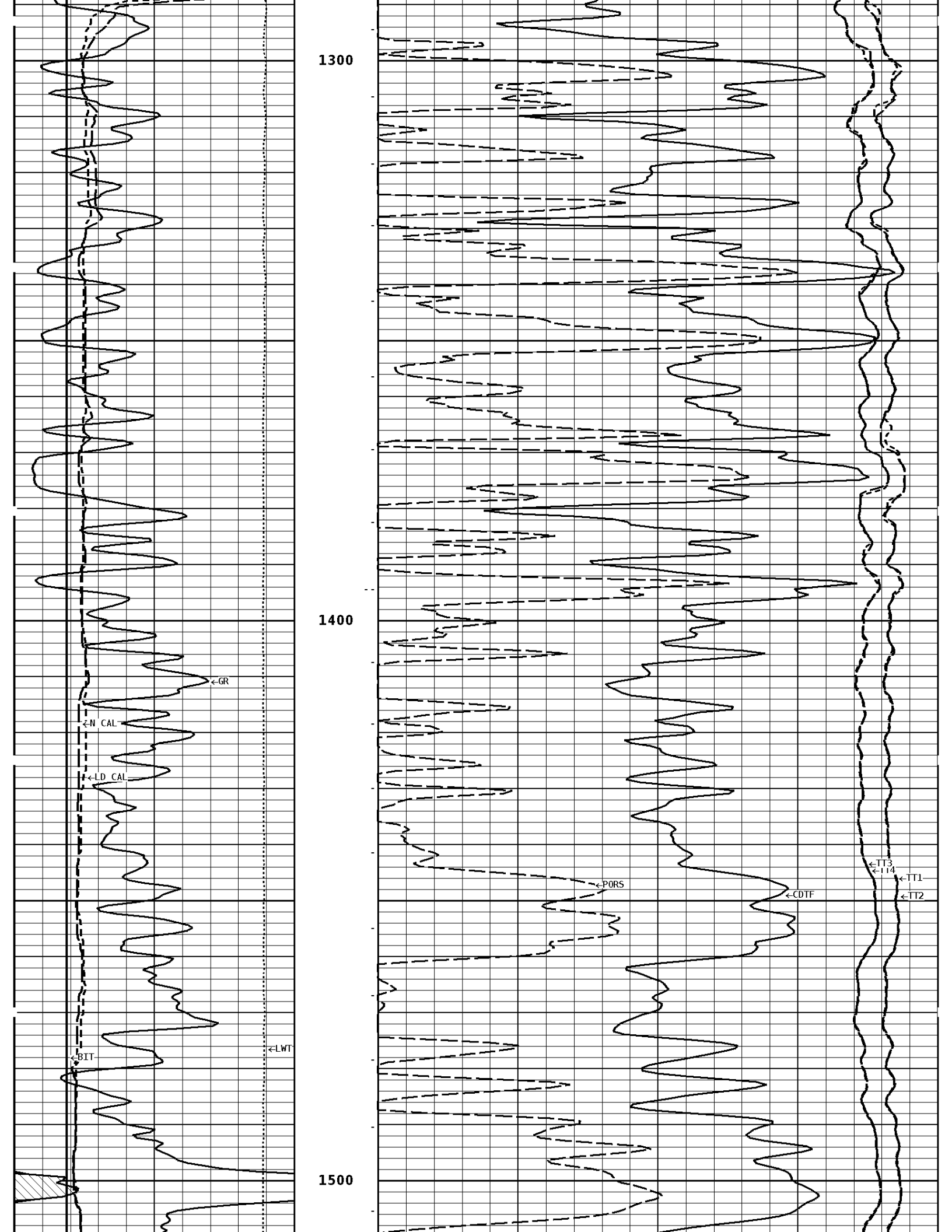
←LD CAL
←BIT
←LWT
←PORS
←CDTF
←TT3
←TT4
←TT1
←TT2


1100
1200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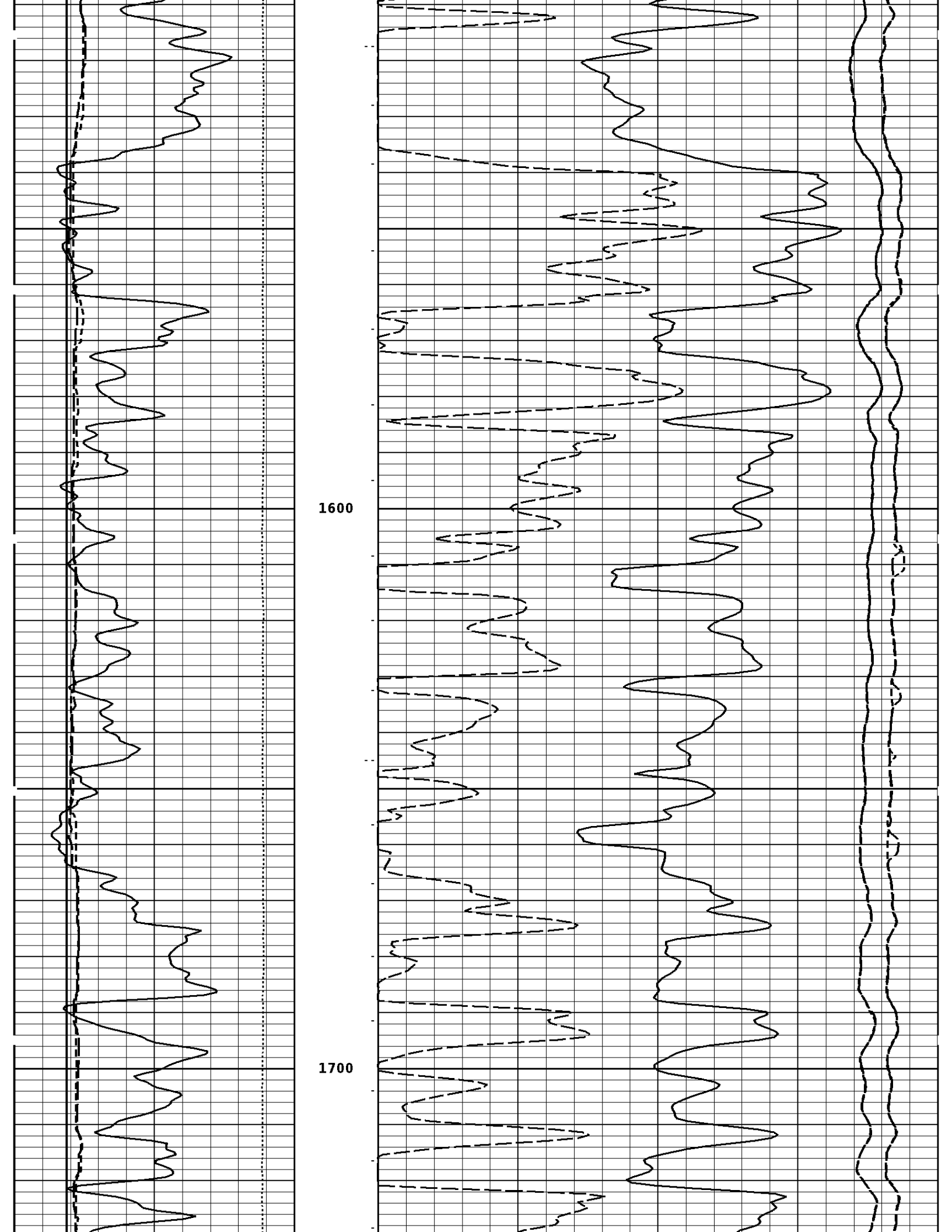
1400
1500
←GR
←N CAL
←LD CAL
←BIT
←LWT
←PORS
←CDTF
←TT3
←TT4
←TT1
←TT2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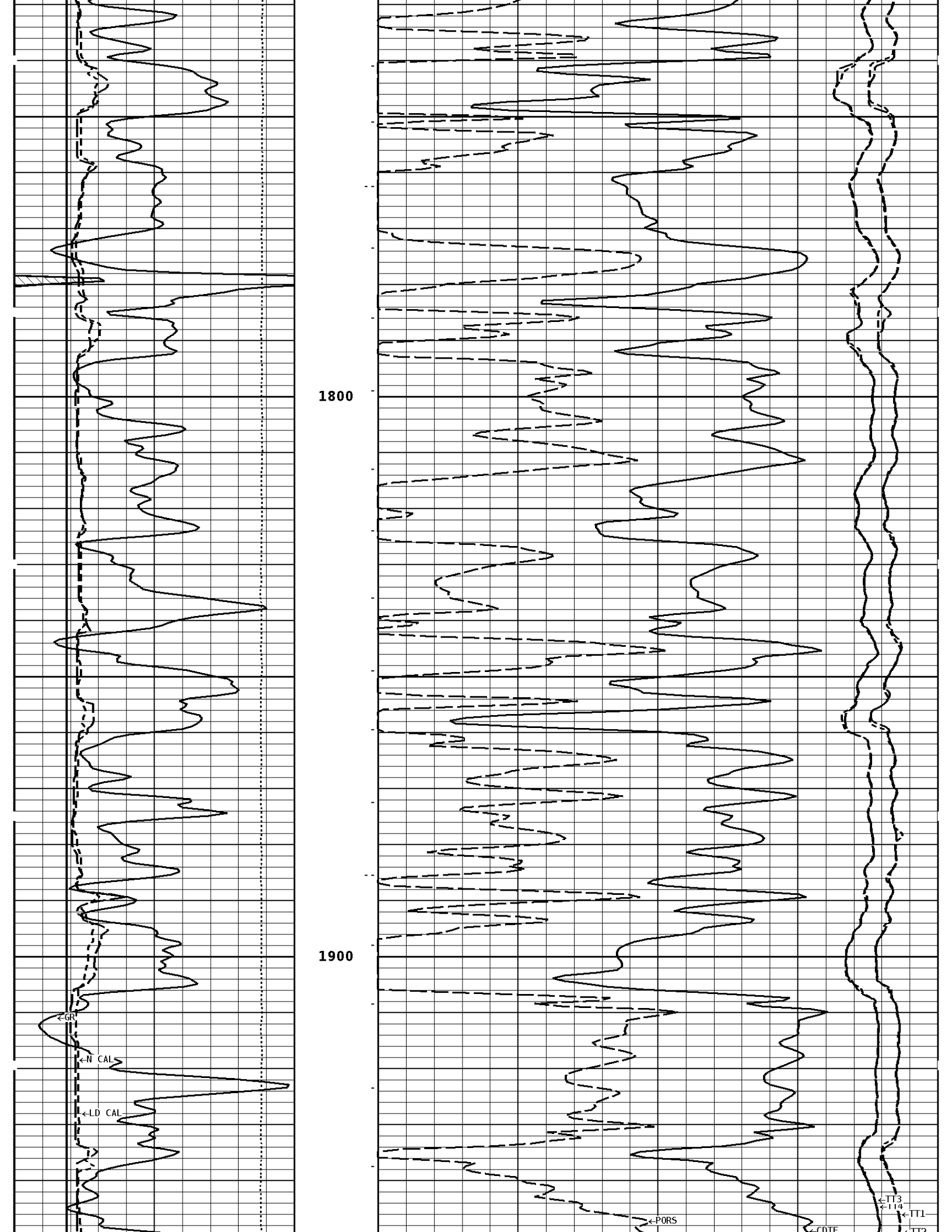
1700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1900
←GR
←N CAL
←LD CAL
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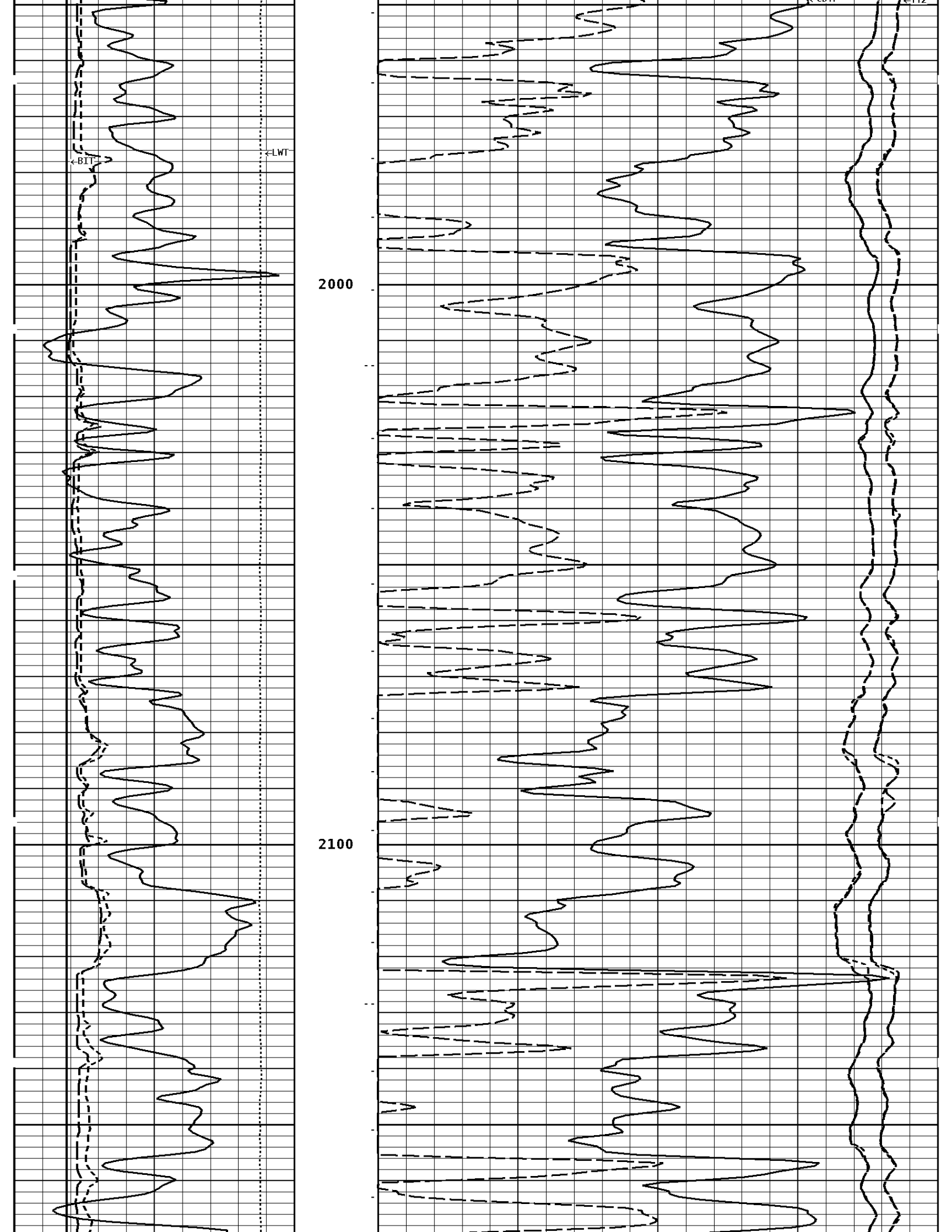
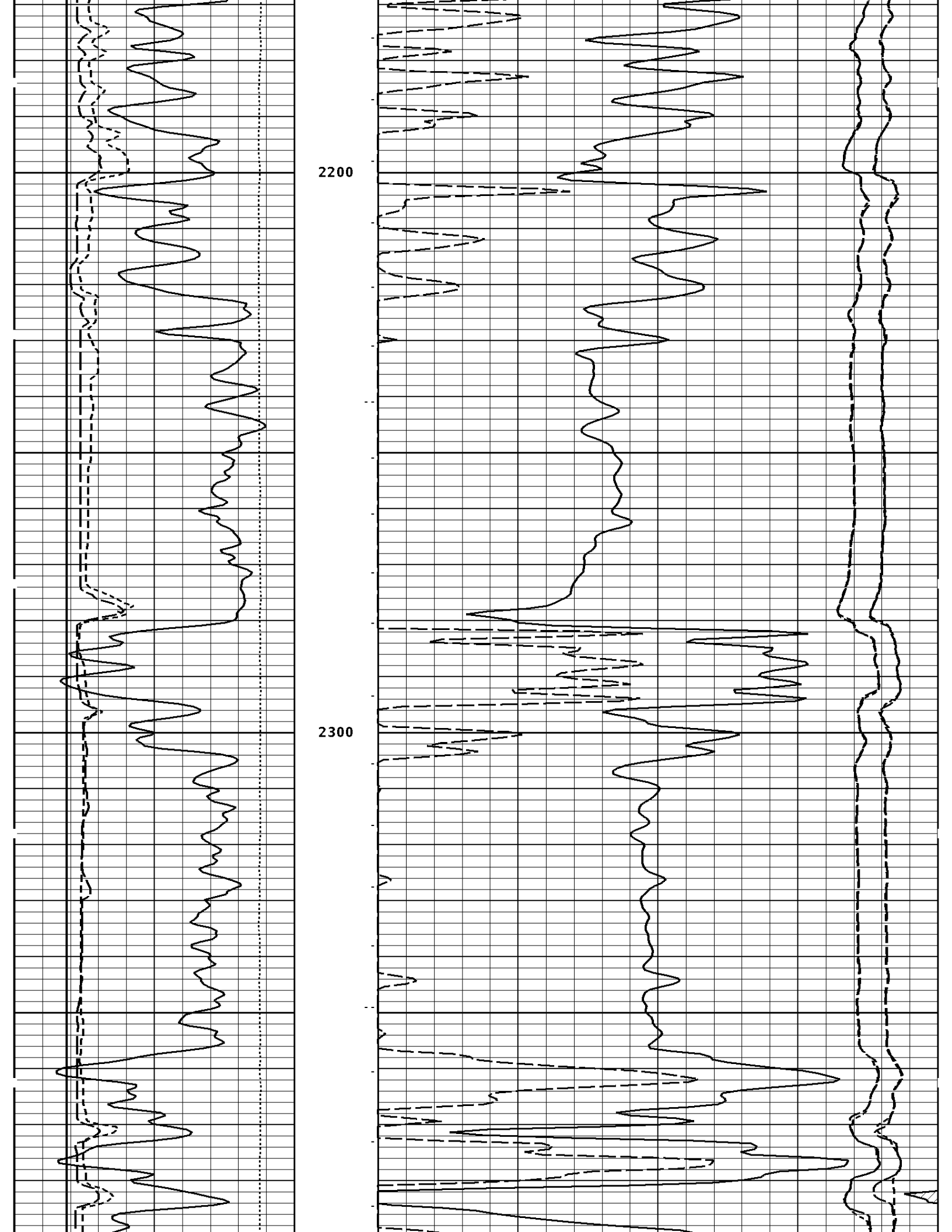
←TT4
←TT1
←TT2
←PORS
←CDTE


←BIT
←LWT
2000
2100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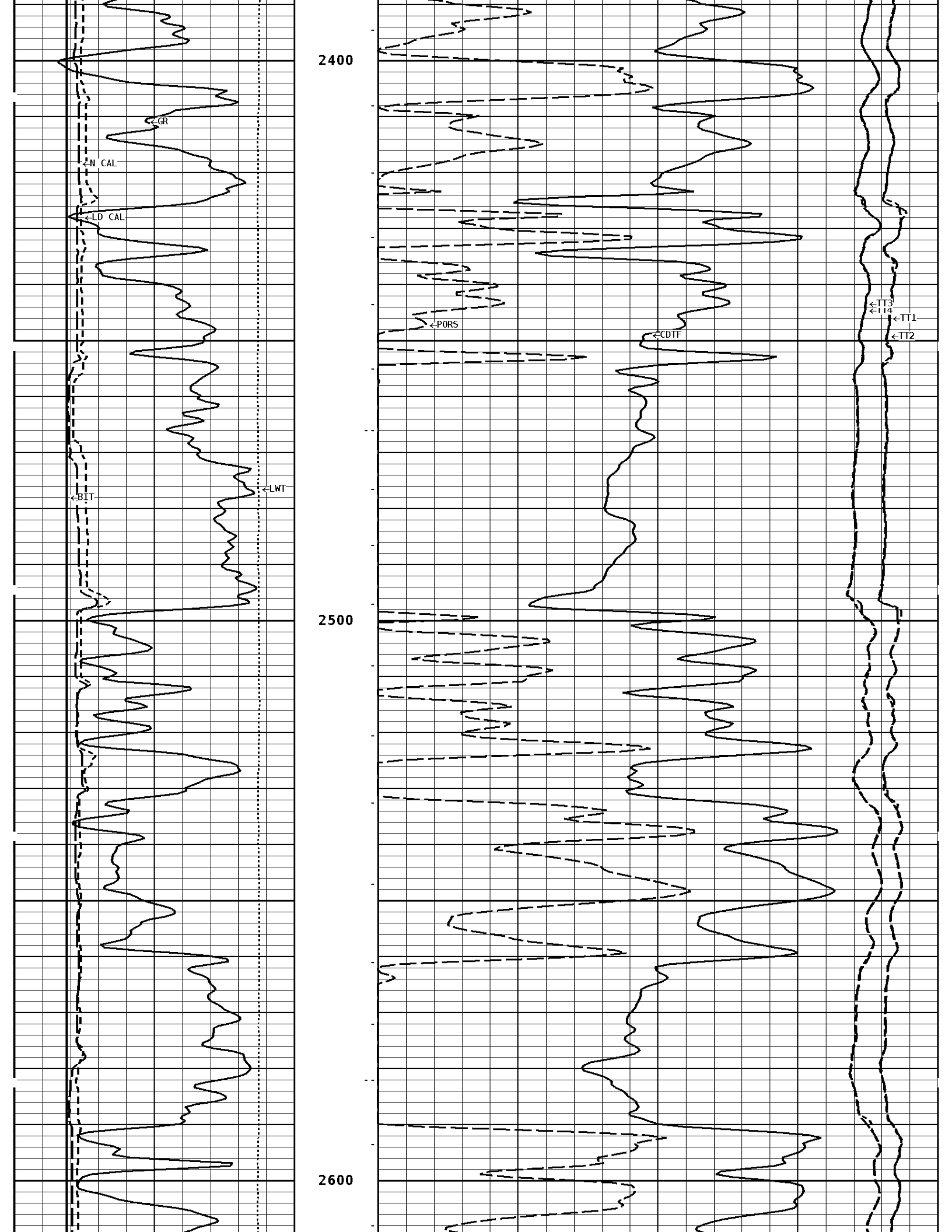
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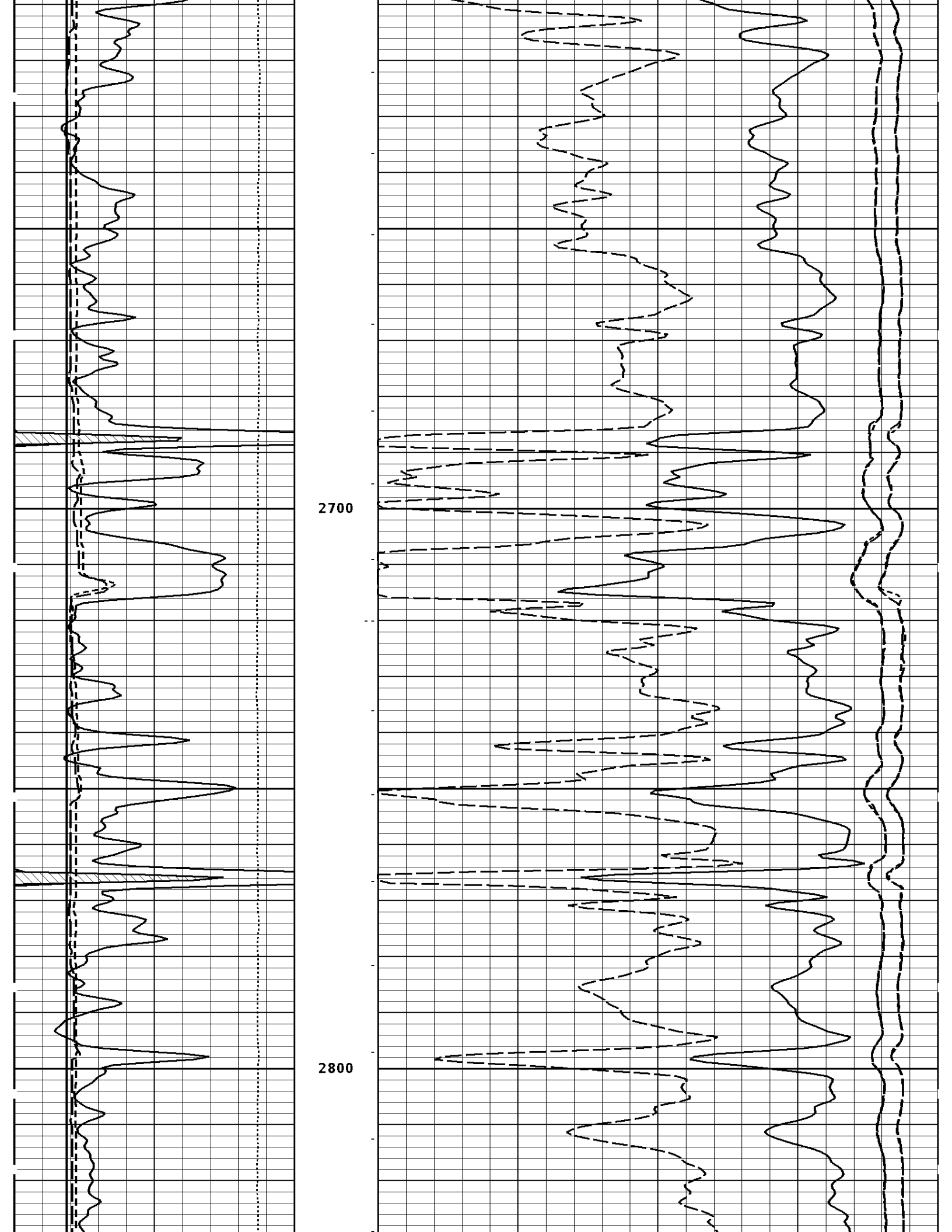
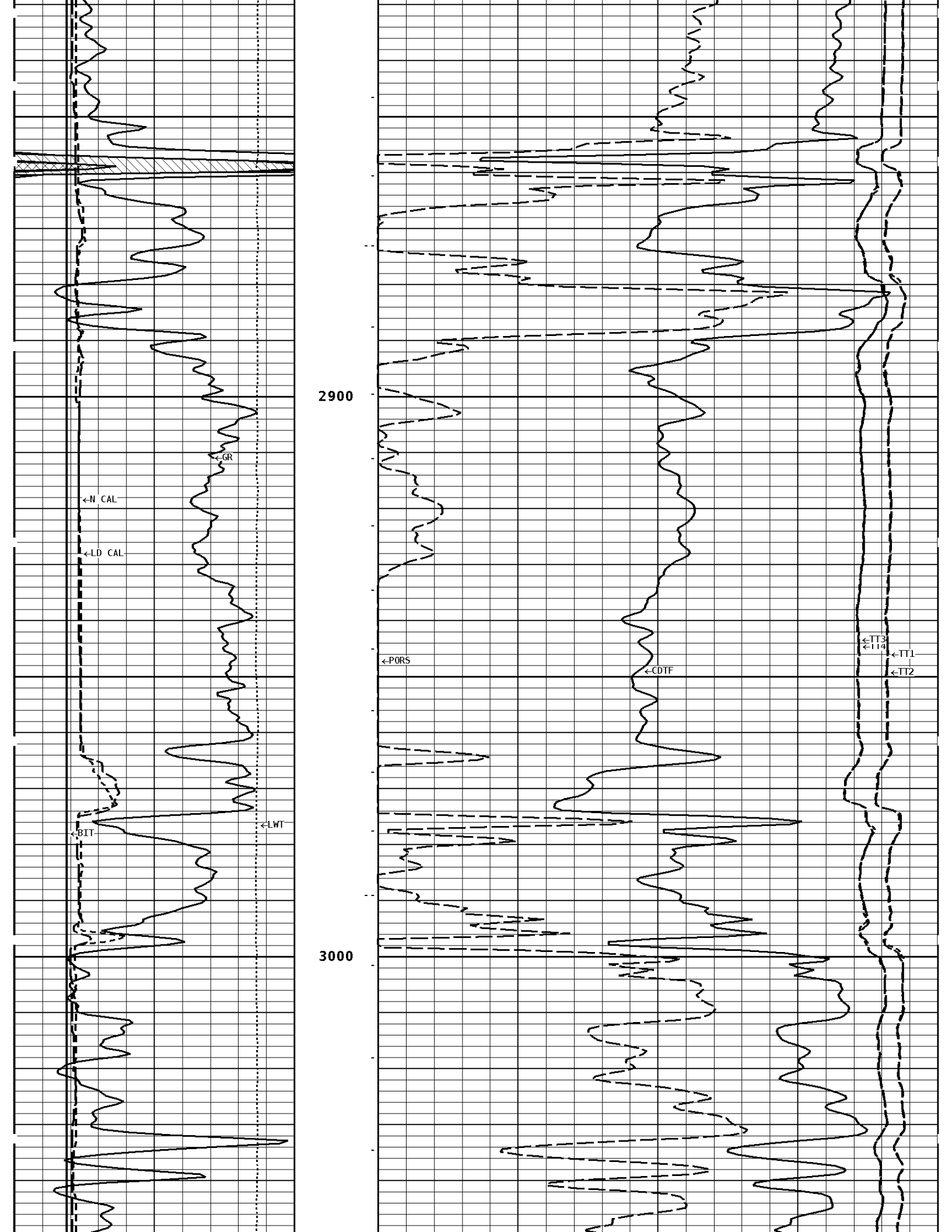
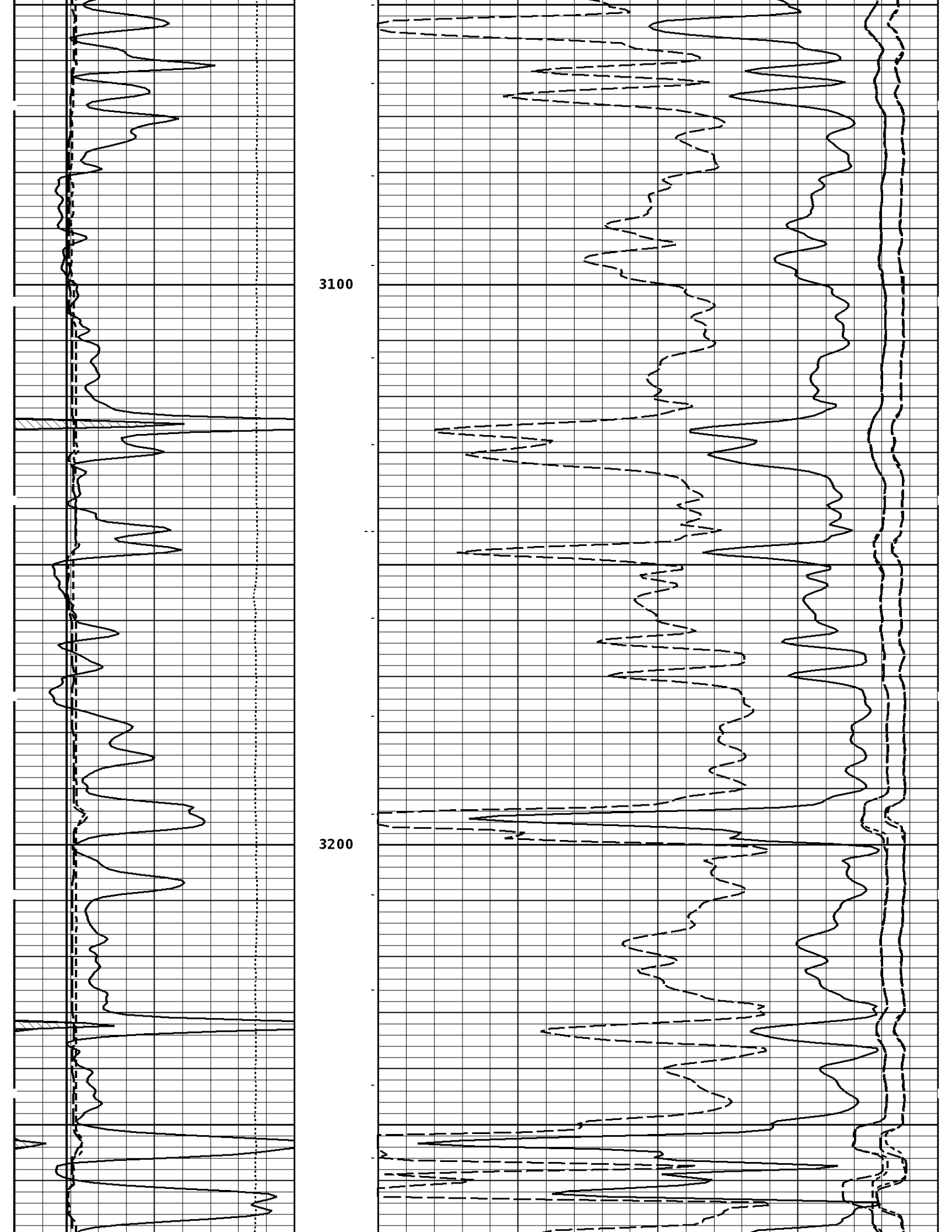
GR
N CAL
LD CAL
BIT
LWT
PORS
CDTF
TT3
TT4
TT1
TT2
2500
2600


2700
2800


2900
3000
←GR
←N CAL
←LD CAL
←BIT
←LWT
←PORS
←CDTF
←TT3
←TT4
←TT1
←TT2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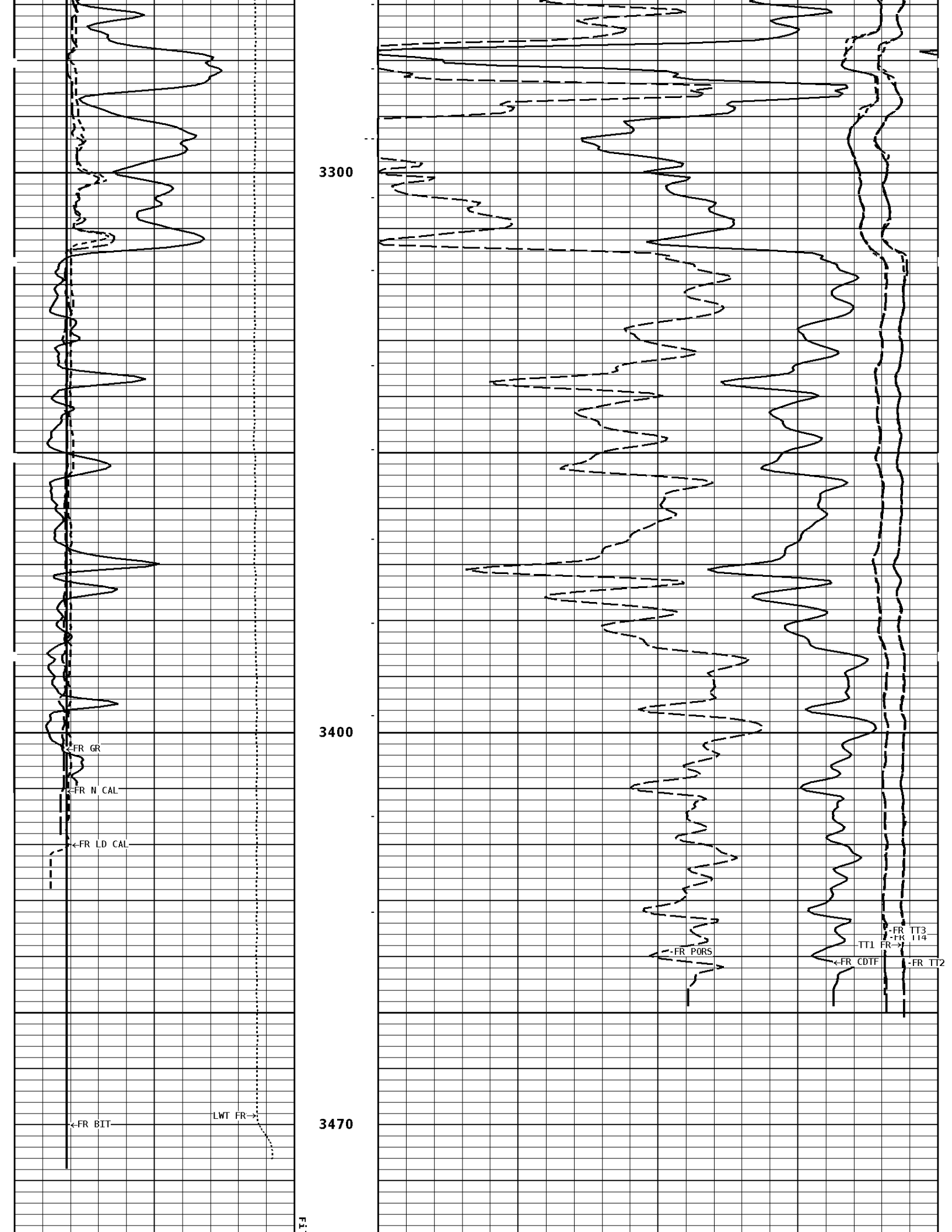
3200


3300
3400
3470
←FR GR
←FR N CAL
←FR LD CAL
←FR BIT
LWT FR→
-FR PORS
-FR TT3
-FR TT4
TT1 FR→
←FR CDTF
-FR TT2

1:240 MAIN SECTION

GAMMA RAY
API UNITS
150 — 300
0 — 150

SONIC POROSITY
PERCENT
30 — -10

TENSION
LBS
10000 — 0

COMPENSATED SONIC TRAVEL TIME
uSEC/FT
240 — 140
140 — 40

BIT SIZE
INCHES (IN)
6 — 16

TT1
uSEC
950 — 50

DENSITY (X) CALIPER
INCHES (IN)
16 — 26
6 — 16

TT2
uSEC
950 — 50

NEUTRON (Y) CALIPER
INCHES (IN)
16 — 26
6 — 16

TT3
uSEC
950 — 50

TT4
uSEC
950 — 50

*** Borehole Zone Factors ***

Zone 1	99999.0 to 0.0 Feet	
Matrix Transit Time	47.5	us/ft
Fluid Transit Time	189.0	us/ft

Well File: lang-reif-31-3-quint-may-20 **Scale:** 1:240 **Format:** CST-240
Segment: V1.D1.S4 RP **Acquired:** 2014-05-20 16:09 3.3.0-12594
Reference: 0 **Processed:** 2014-05-20 17:54 3.3.0-12594

TT4
uSEC
950 — 50

NEUTRON (Y) CALIPER
INCHES (IN)
16 — 26
6 — 16

TT3
uSEC
950 — 50

DENSITY (X) CALIPER
INCHES (IN)
16 — 26
6 — 16

TT2
uSEC
950 — 50

BIT SIZE
INCHES (IN)
6 — 16

TT1
uSEC
950 — 50

TENSION
LBS

COMPENSATED SONIC TRAVEL TIME

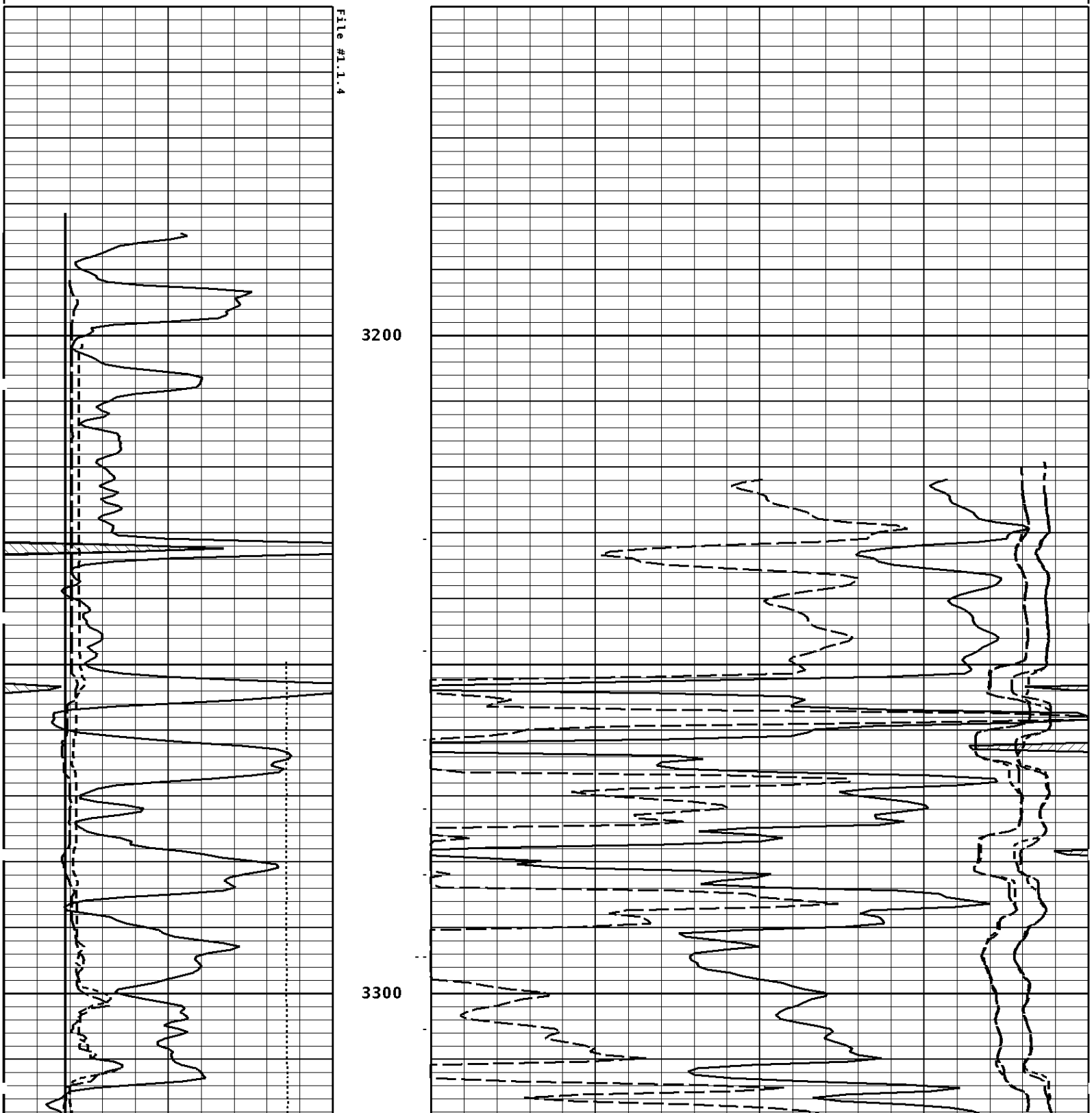
TENSION
LBS
10000 0

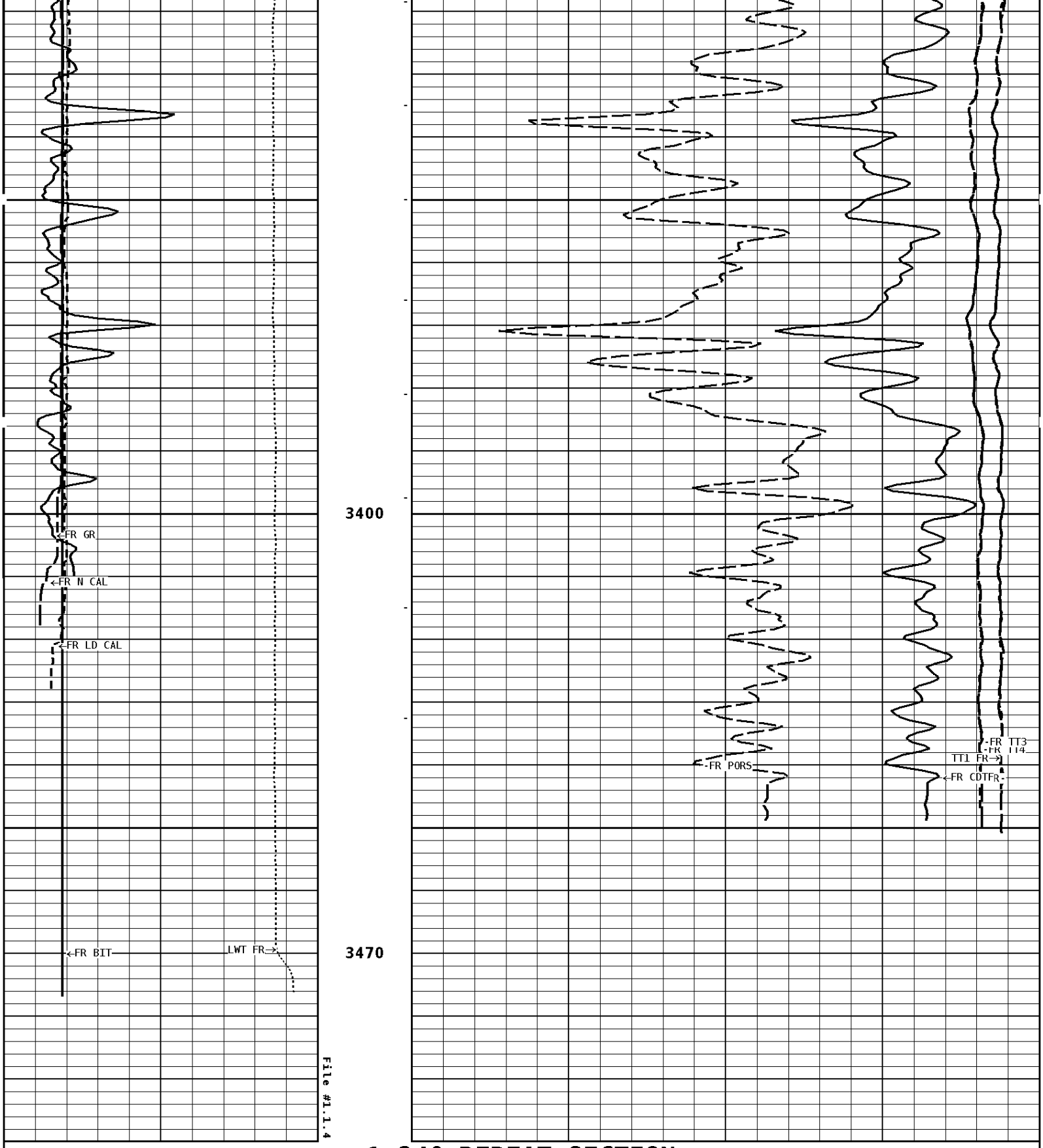
COMPENSATED SONIC TRAVEL TIME
uSEC/FT
240 140
140 40

GAMMA RAY
API UNITS
150 300
0 150

SONIC POROSITY
PERCENT
30 -10

1:240 REPEAT SECTION





1:240 REPEAT SECTION

GAMMA RAY API UNITS		SONIC POROSITY PERCENT
150	300	30
0	150	-10

TENSION
LBS

10000 0

BIT SIZE
INCHES (IN)

6 16

DENSITY (X) CALIPER
INCHES (IN)

16 26
6 16

NEUTRON (Y) CALIPER
INCHES (IN)

16 26
6 16

COMPENSATED SONIC TRAVEL TIME
uSEC/FT

240 140
140 40

TT1
uSEC

950 50

TT2
uSEC

950 50

TT3
uSEC

950 50

TT4
uSEC

950 50

* Borehole Zone Factors *

Zone 1 99999.0 to 0.0 Feet

Matrix Transit Time	47.5	us/ft
Fluid Transit Time	189.0	us/ft

* Calibration Summary *

Shop Calibration
GRT-B

Performed : 21-APR-2014 Time : 11:21
Sensor Suite : GR-GR5 ID : GRT-BB-107

	Measured Background	Measured Jig	Units	Calibrated Jig	Units
GR	75	381	CPS	175	GRAPI

Shop Calibration
CST-AD

Performed : 07-DEC-2013 Time : 22:54
Sensor Suite : SON-ANA ID : CST-AB-25

Transit Time

T/R Pair	Measured	Calibrated	Units
T1R1	208.5	208.5	uS
T2R2	208.5	208.5	uS
T1R2	322.5	322.5	uS
T2R1	322.5	322.5	uS

Amplitude

T/R Pair	Measured	Calibrated	Units
T1R1	90.00	90.00	mV
T2R2	90.00	90.00	mV
T1R2	78.00	78.00	mV
T2R1	78.00	78.00	mV