Tucker ENERGY SERVICES

COMPENSATED NEUTRON

PEL DENSITY LOG MICRO LOG

Company QUAIL OIL & GAS, LC
Well AJ #1-23
Field MORRISON NORTHEAST
County CLARK
State KANSAS
Country USA
API No. 15-025-21577-00-00

File No : TUL-59517
Company : QUAIL OIL & GAS, LC
Well : AJ #1-23
Field : MORRISON NORTHEAST
County : CLARK
State : KANSAS
Country : USA
API No : 15-025-21577-00-00

Location :
860' FNL & 460' FWL
NE SW NW NW

LSD : **Sect :** 23 **Twp :** 32S **Rge :** 21W

Permanent Datum:	GL	**Elevations:**		**Services:**	
Drilling Measured From:	KB	**KB**	1039.00 Ft	CNT	PIT
Log Measured From:	KB	**DF**	1038.00 Ft	LDT	
Above Permanent Datum:	10.00 Ft	**GL**	1029.00 Ft	MLT	

Date	08-15-2014						
Run Number	1						
Depth--Driller	6482.0	Ft					
Depth--Logger	6484.0	Ft					
First Reading	6461.0	Ft					
Last Reading	610.0	Ft					
Casing--Driller	610.0	Ft					
Casing--Logger	610.0	Ft					
Bit Size	7.875	In					
Casing Size	8.625	In					
Hole Fluid Type	CHEM-GEL						
Density	9.4	ppg					
Fluid Loss	11.6	ml/30min					
PH/Viscosity	9.0	60.0 sec/qt					
Sample Source	MEASURED						
RM@Measured Temp.	0.350 @ 70 F						
RMF@Measured Temp	0.300 @ 70 F						
RMC@Measured Temp.	0.400 @ 70 F						
Source RMF/RMC	CALCULATED	CALCULATED					
RM@BHT	0.200 @ 125 F						
Time Circulation Stopped	08-15-2014 4:00 pm						
Max Recorded Temp.	125 F						
Equipment/Base	TRK-126	TULSA					
Recorded By	J. ADAMS						
Witnessed By	A. YOUNG						

Casing Strings

Size (In)	Weight (Lbs)	Bottom (Ft)	Top (Ft)
8.625	23.00	610.00	0.00

Bitsize Intervals

Size (In)	Bottom (Ft)
7.875	6482.00

Run Number	1
Date	08-15-2014
Date/Time On Bottom	08-15-2014 7:30 pm
Depth to Fluid	0.0 Ft
Salinity	4500.000 mg/L
RMF@BHT	0.170 @ 125 F
RMC@BHT	0.230 @ 125 F

Run Number 1

Comments

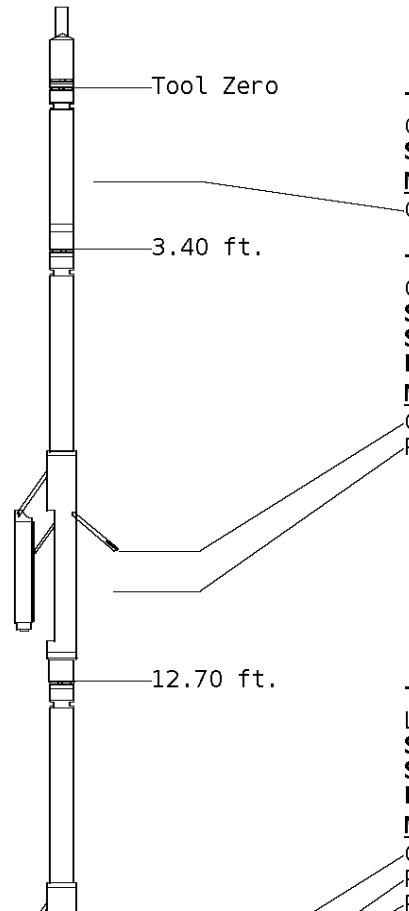
ALL PRESENTATION PER CUSTOMER REQUEST
GRT,CNT,LDT,PIT RUN IN COMBINATION
CALIPERS ORIENTED ON X-Y AXIS
2.71 G/CC USED TO CALCULATE POROSITY
ANNULAR & BOREHOLE VOLUME CALCULATED USING 5.5 PRODUCTION CASING
PHIN IS CALIPER CORRECTED

GRT; GRP,
CNT; PHIN, CLCNIN
LDT; PORL, LCORN, PECLN, LDENN, CLLDIN
MLT; NOR.RF, INV.RF, MSCLPIN.
PIT; ILD, ILM, SPU, SFLAEC, CIRD

OPERATORS;
M. DRUEPPEL
J. THOMAS

Tool String Schematic

Total Tool Length - 53.15 **ft.**
Maximum Outside diameter - 6.00 **in.**
Net Weight in Air - 943.00 **lbs.**



Tool: GRT-B **Length:** 3.40 **ft.** **O.D.** 3.60 **in.**
Gamma Ray Controller
Sonde ID :GRT-BB-107

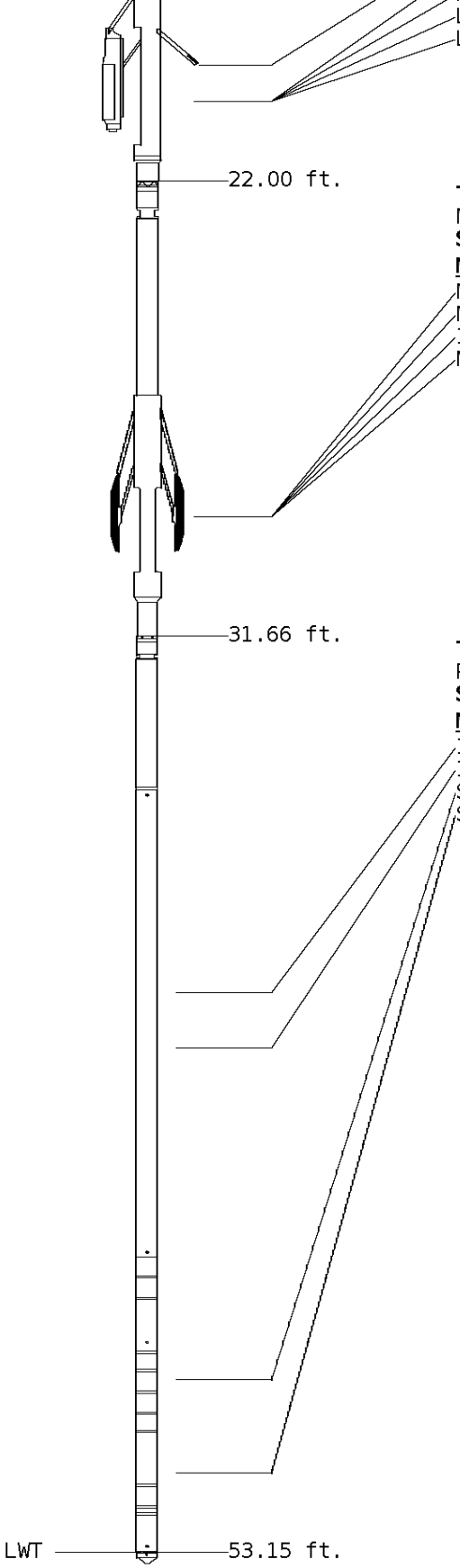
Measure Point	Tool Offset	Stack Offset	Bottom Offset
GRP	2.00	2.00	51.15

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-116-

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLCN	6.00	9.40	43.75
PHIN	6.80	10.20	42.95

Tool: LDT-DA **Length:** 9.30 **ft.** **O.D.** 4.80 **in.**
Litho Density D Pad on NDT-A
Sonde ID :PDT-GA-464
Source ID :2991GW
Pad ID :LDP-DA-067

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLLD	6.00	18.70	34.45
PEL	7.00	19.70	33.45
PES	7.40	20.10	33.05



Measure Point	Tool Offset	Stack Offset	Bottom Offset
LDEN	7.20	19.90	33.25
LCOR	7.20	19.90	33.25

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	29.60	23.55
MSCLP	7.60	29.60	23.55
INV	7.60	29.60	23.55
NOR	7.60	29.60	23.55

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	40.58	12.56
ILM	10.10	41.76	11.39
SFLU	17.49	49.15	4.00
SP	20.60	52.26	0.88

Well File: QUAIL_AJ_1-23_AUG15_MSTK **Scale:** 1:240 **Format:** NLD-240
Segment: V1.D1.S5 AS FINAL MAIN **Acquired:** 2014-08/15 19:43 3.3.0-12594
Reference: 0 **Processed:** 2014-08/15 21:20 3.3.0-12594

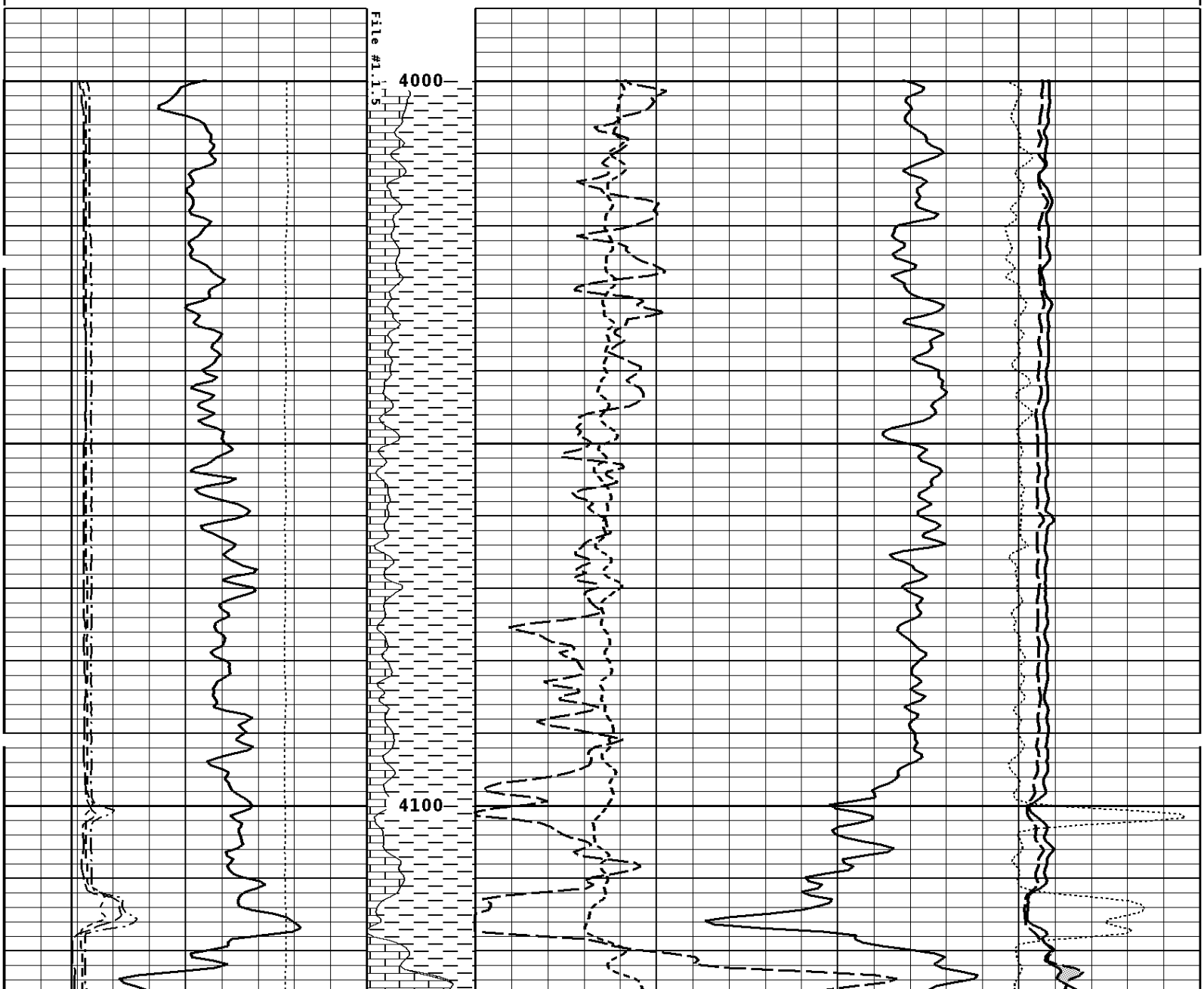
CALIPER MICRO
INCHES (IN)
16 26
6 16

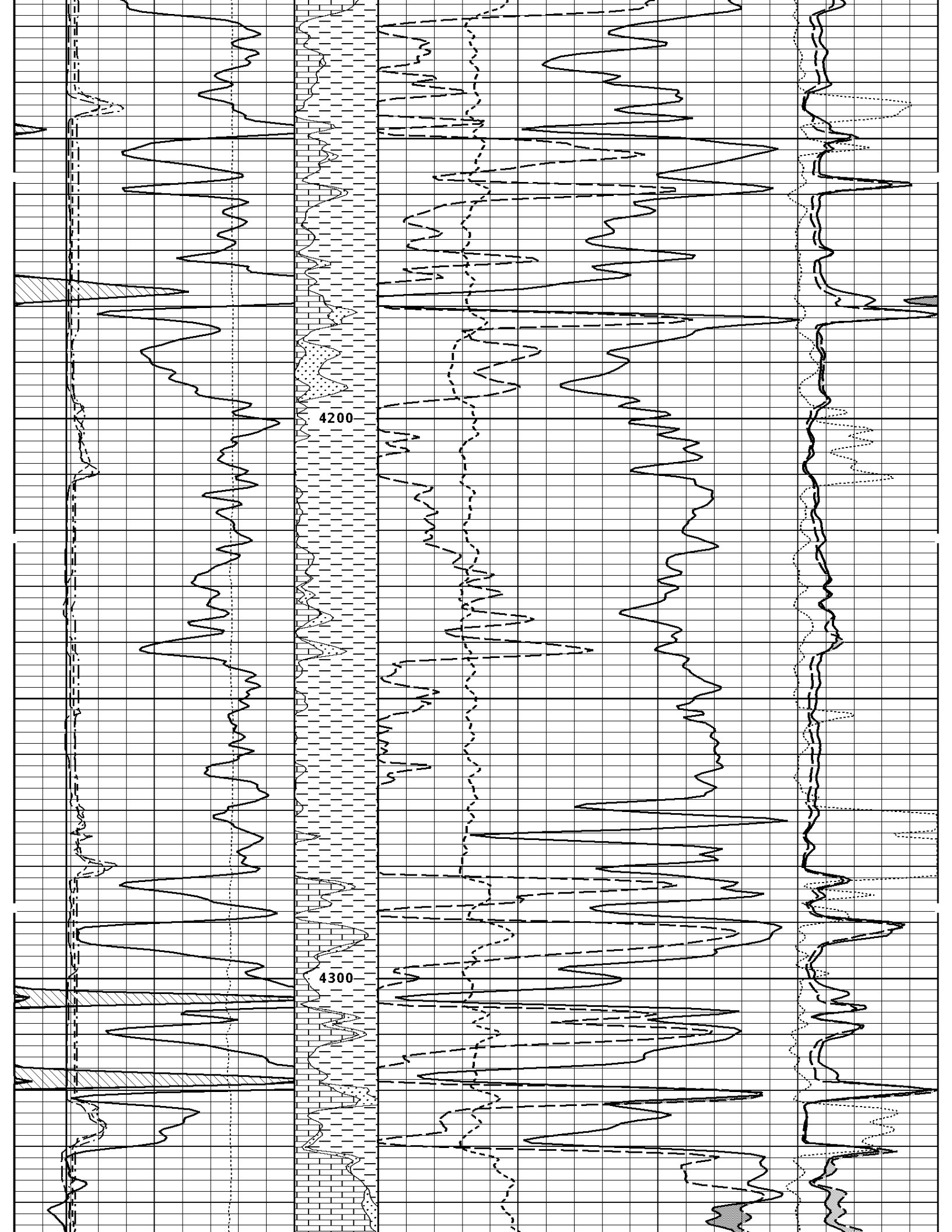
BIT SIZE
INCHES (IN)

NORMAL
OHMM

6 16			0 40
NEUTRON (Y) CALIPER INCHES (IN) 16 26 / 6 16			INVERSE OHMM 0 40
DENSITY (X) CALIPER INCHES (IN) 16 26 / 6 16	Volume Quartz	PE CROSS-SECTION BARNS/ELECTRON 0 10	DENSITY CORRECTION G/CC -0.25 0.25
TENSION LBS 10000 0	Volume Calcite	DENSITY POROSITY (2.71g/cc) PERCENT 70 30 -10 / 30 -10 -50	
GAMMA RAY API UNITS 150 300 / 0 150	Volume Dolo/Shale	NEUTRON POROSITY (LIMESTONE) PERCENT 30 -10	

1:240 MAIN SECTION

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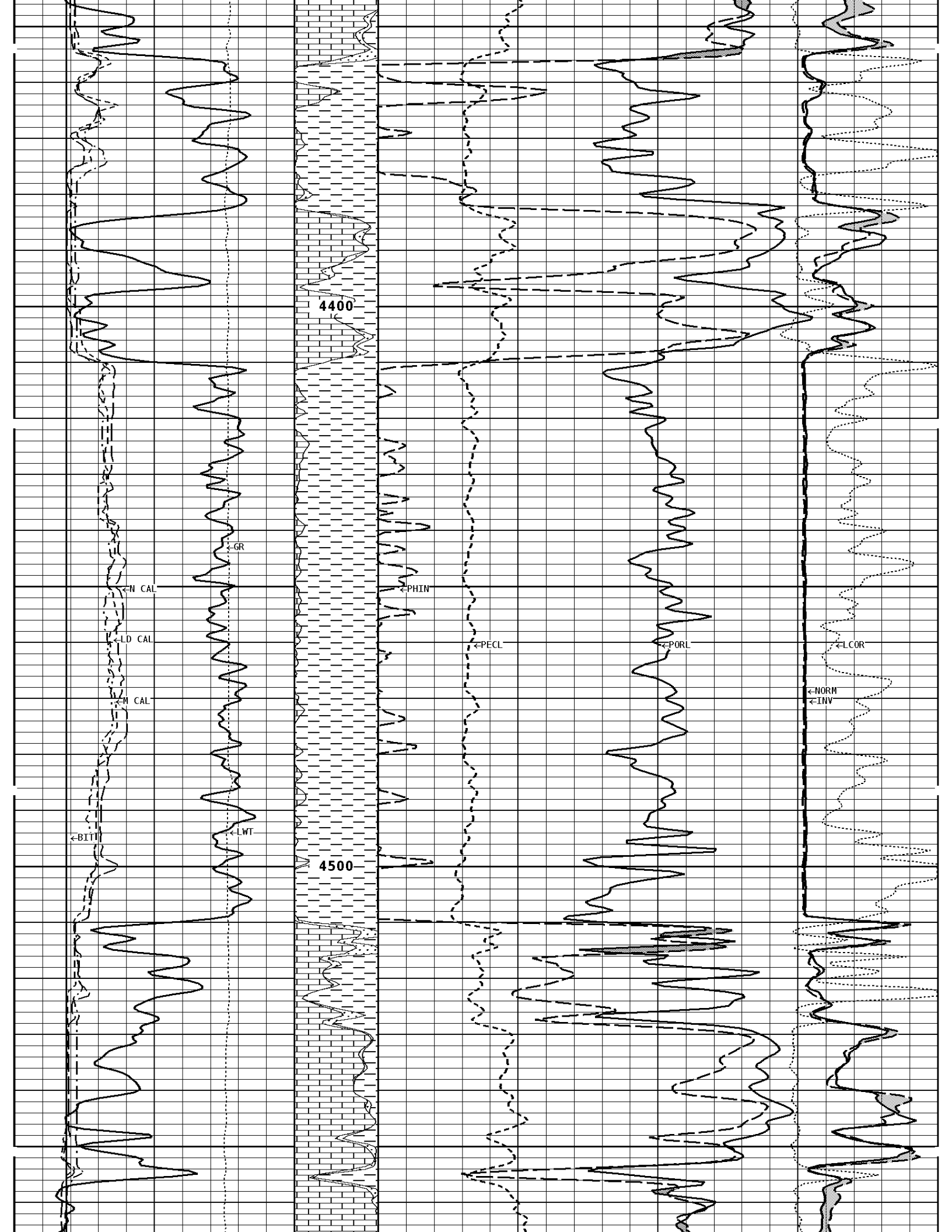
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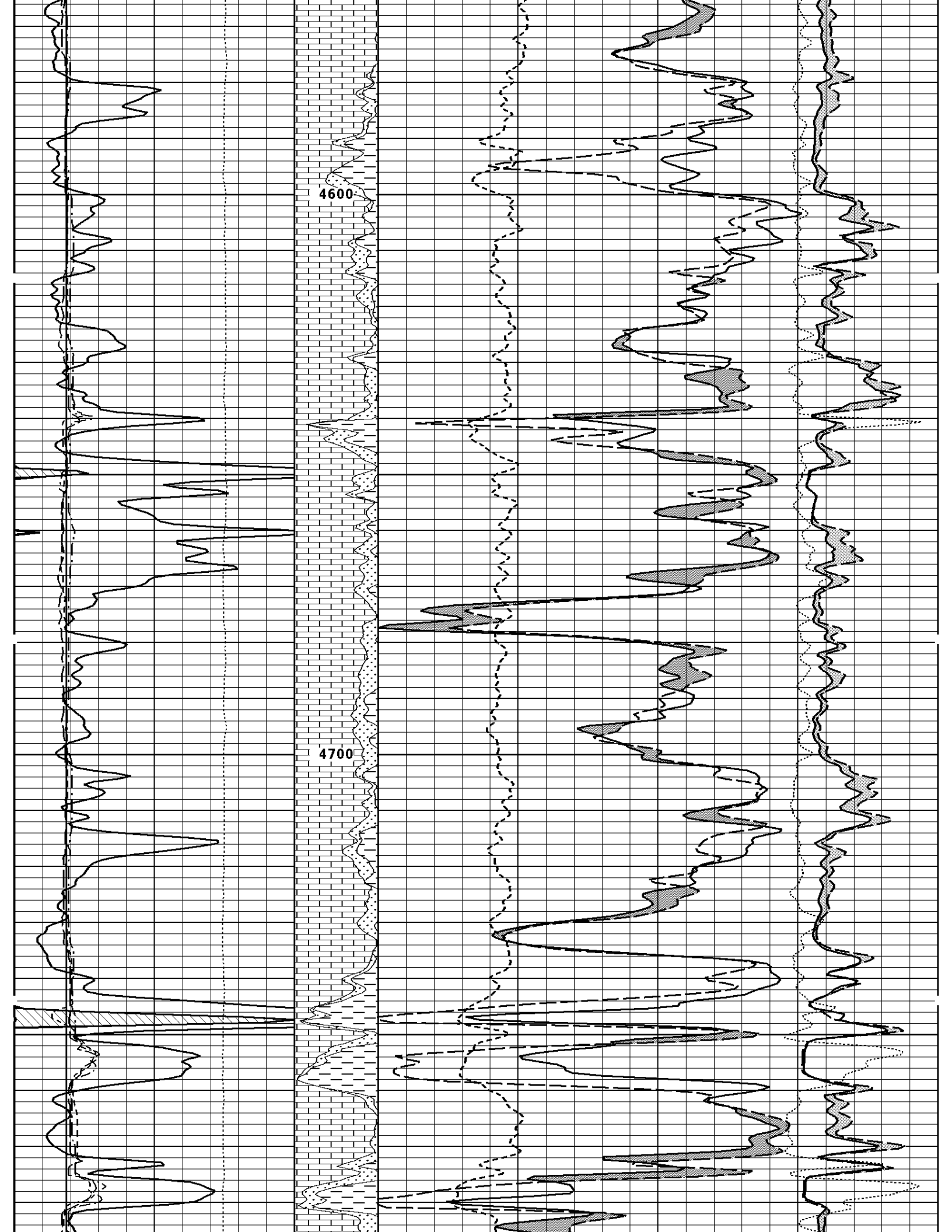
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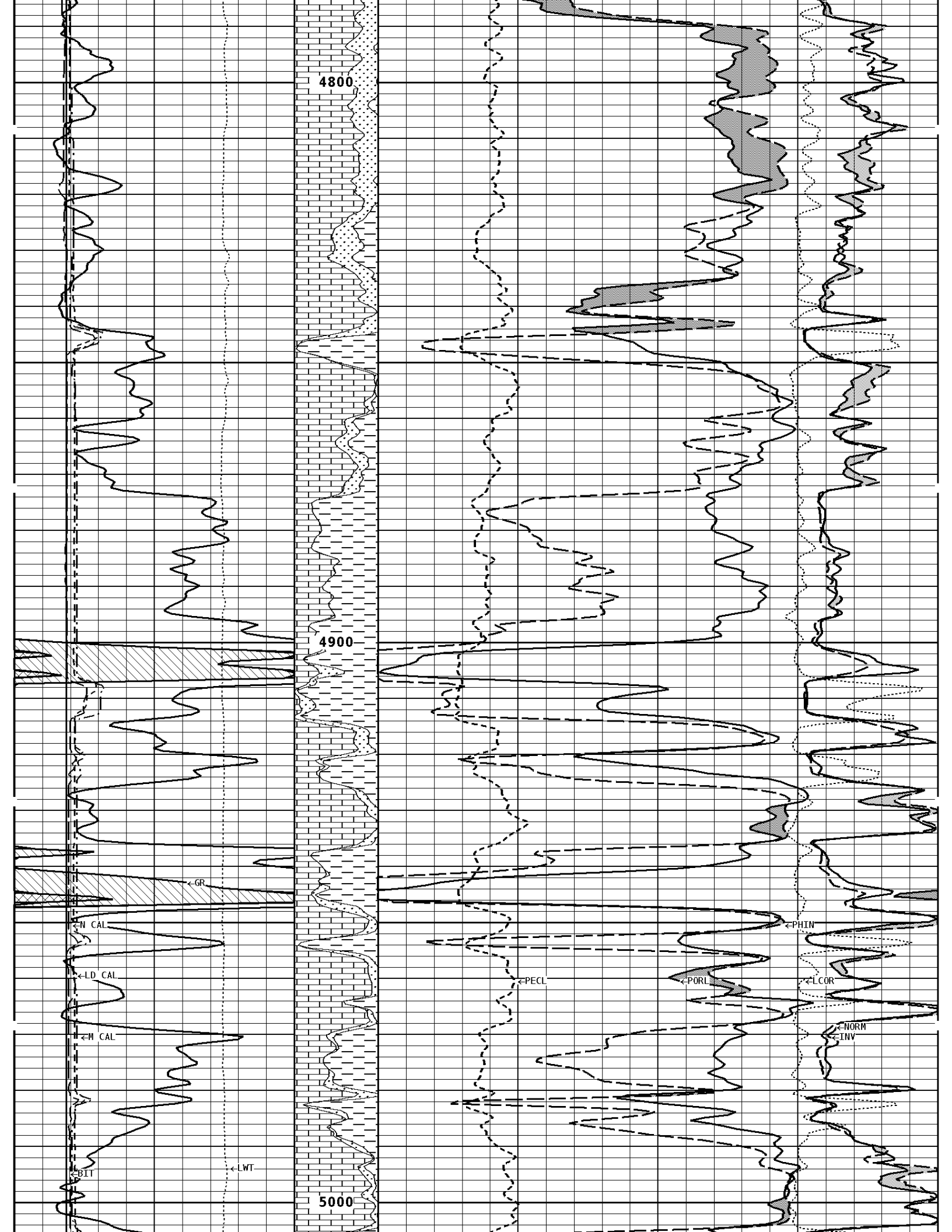
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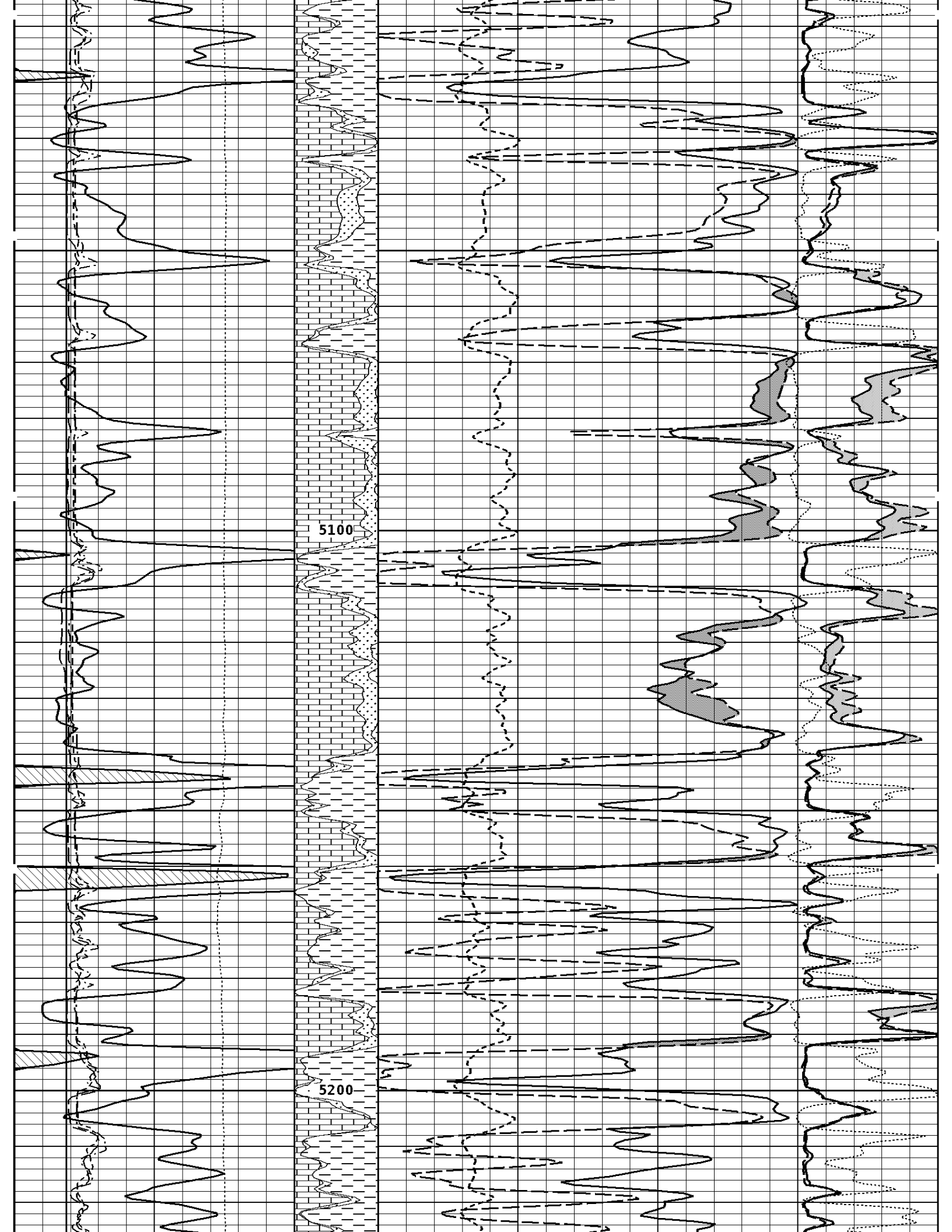
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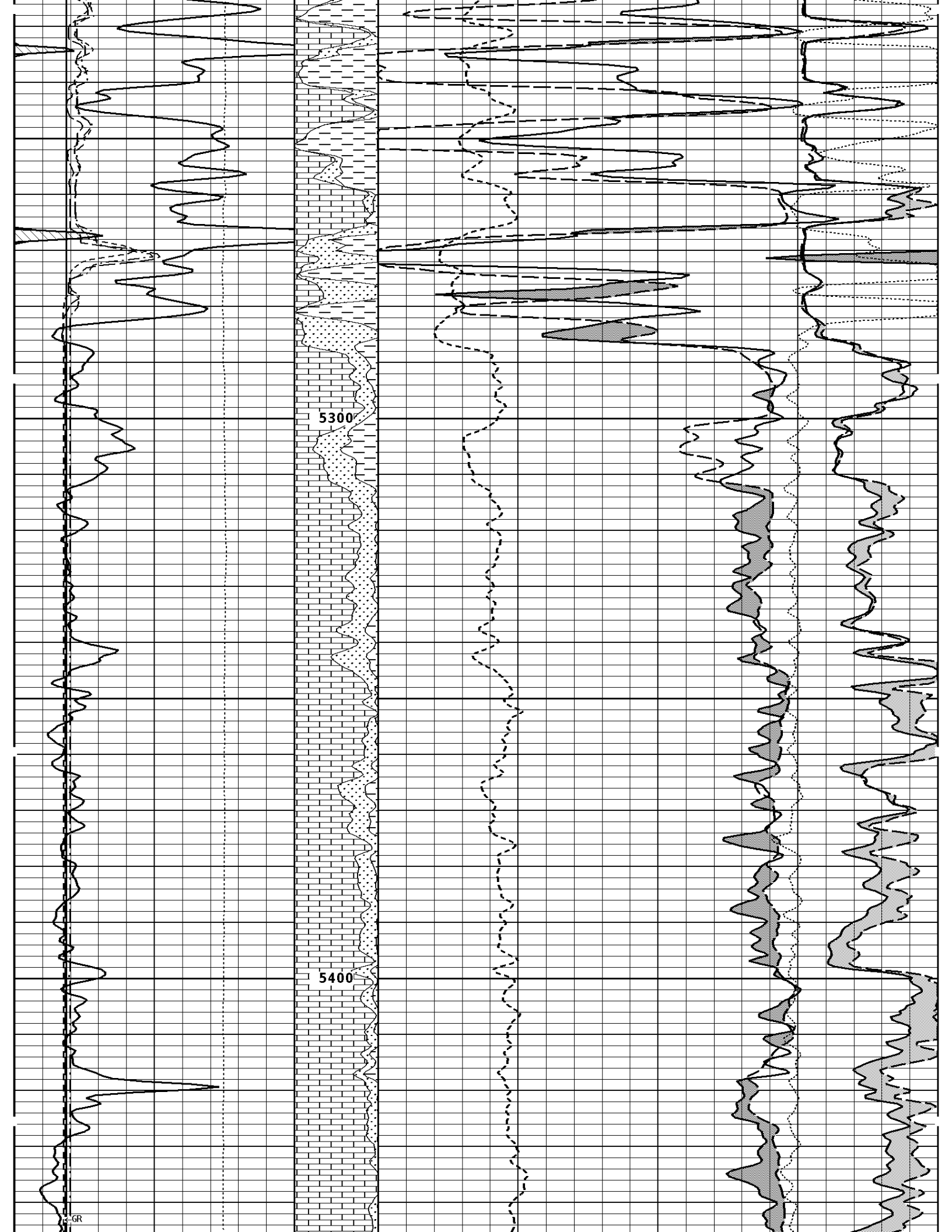
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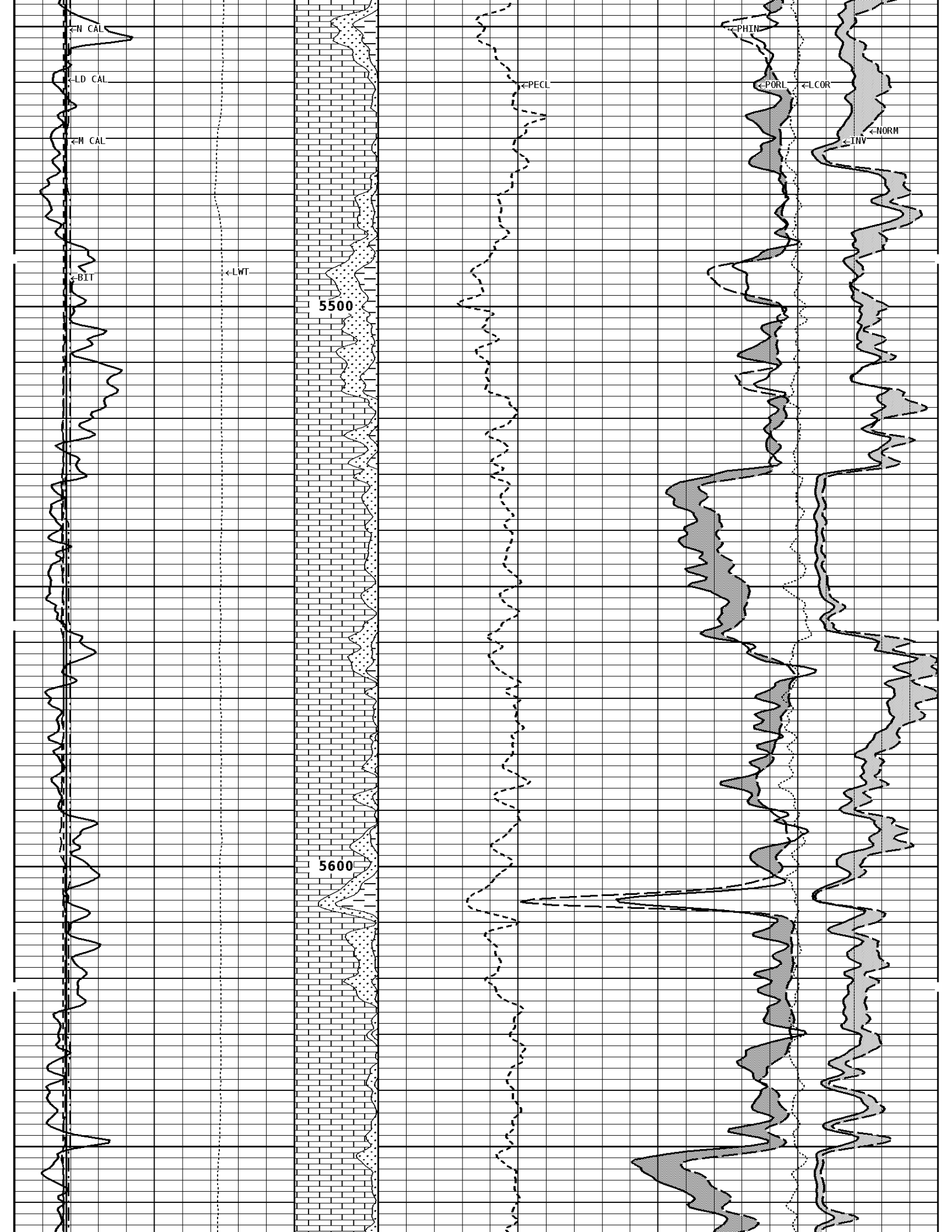
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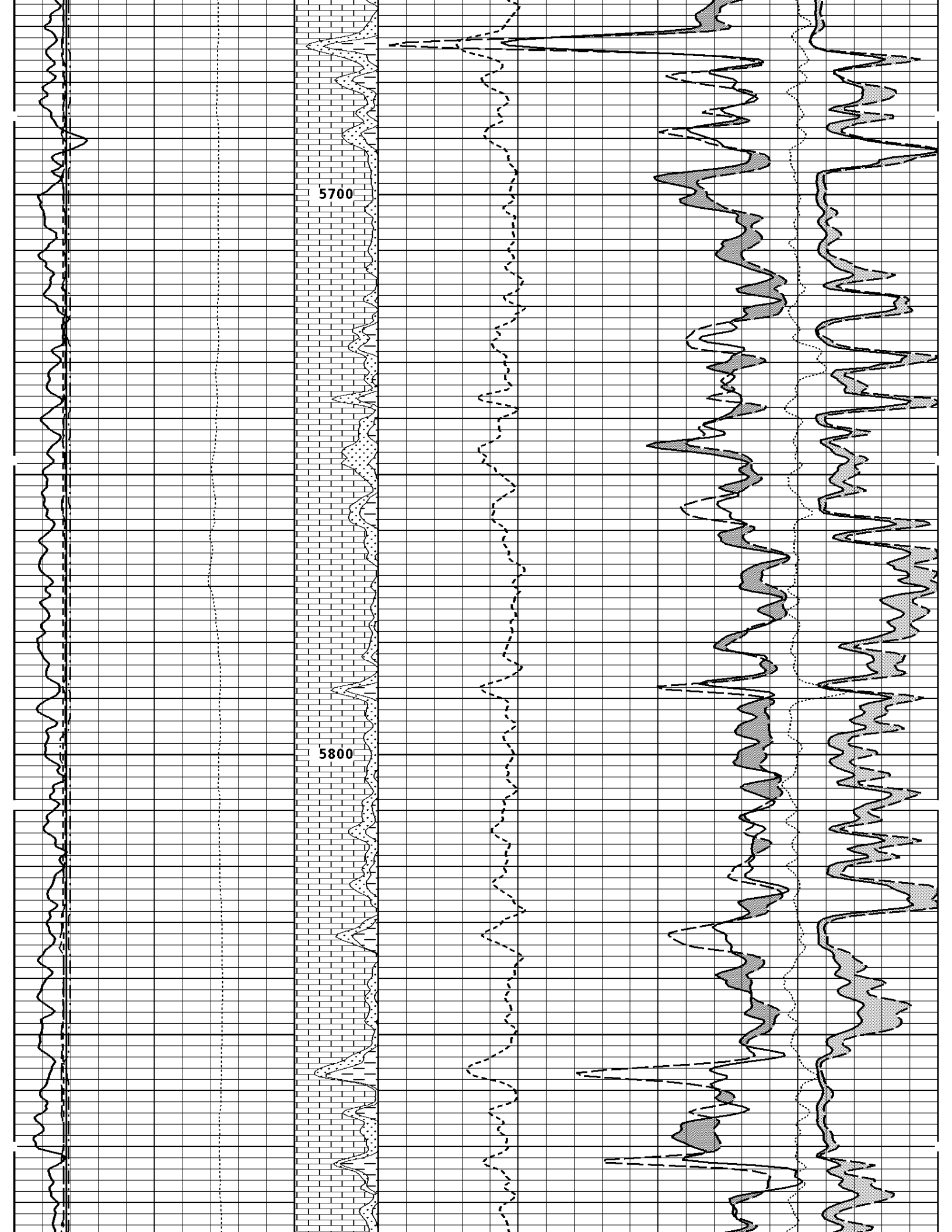
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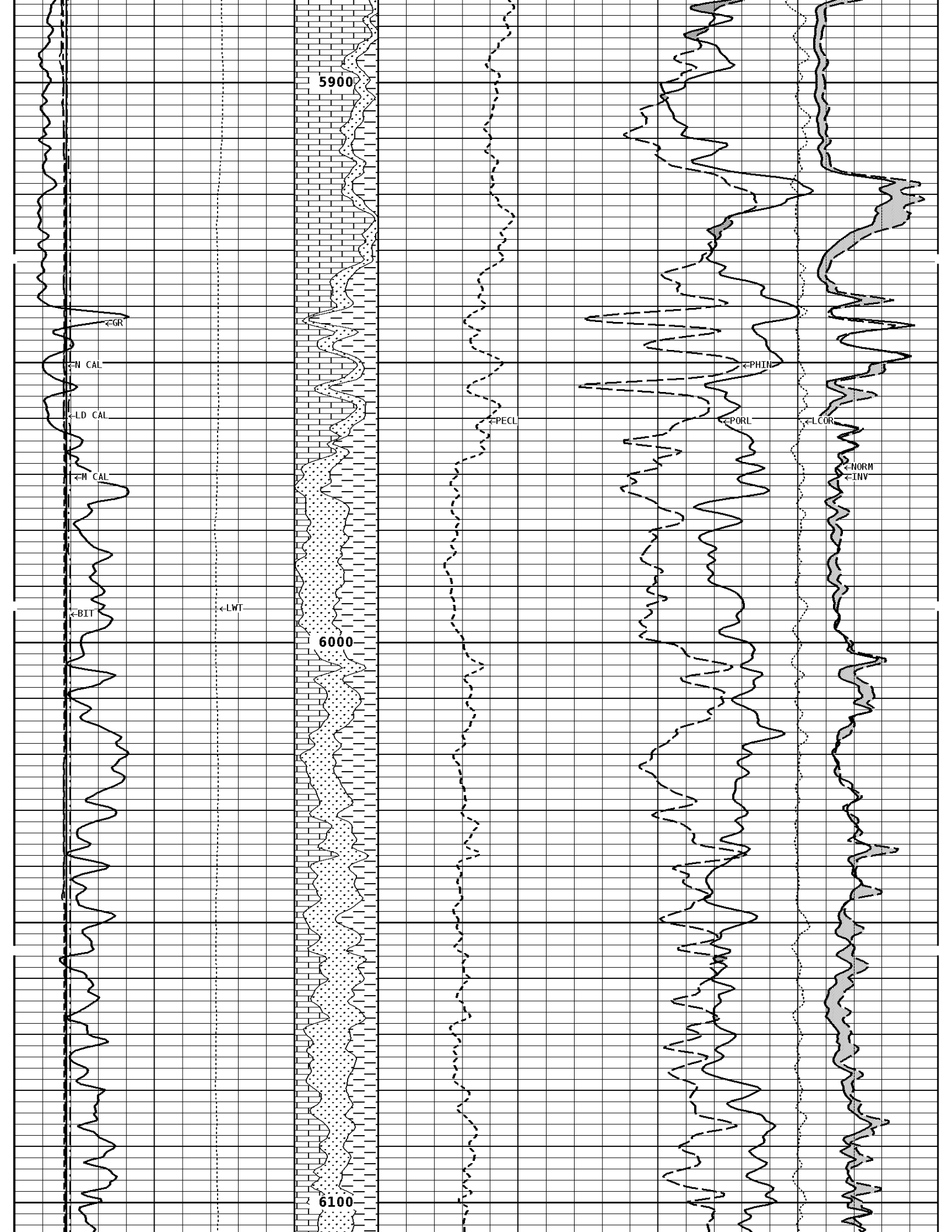
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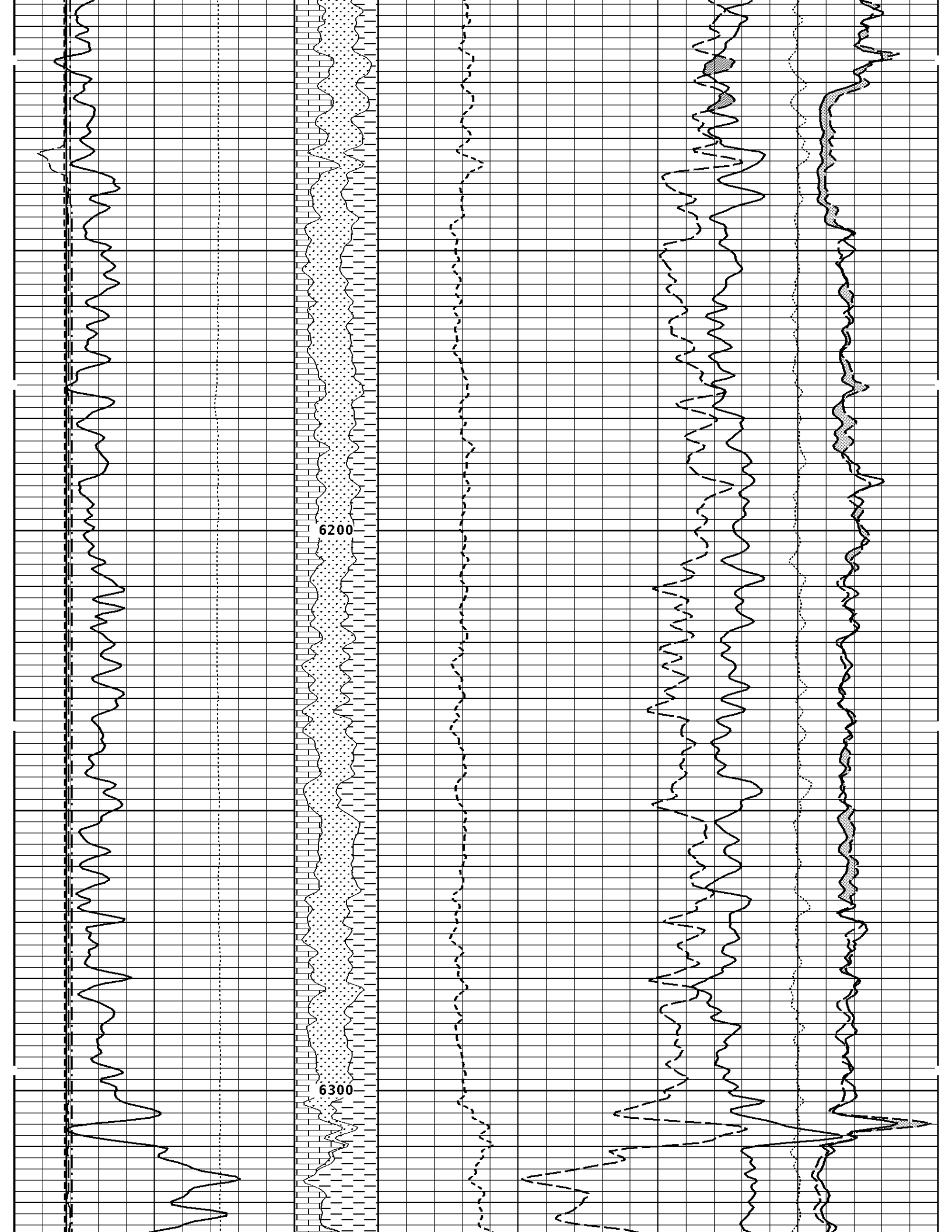
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1:240 MAIN SECTION

GAMMA RAY API UNITS	Volume Dolo/Shale	NEUTRON POROSITY (LIMESTONE) PERCENT
150 300		30 -10
0 150		
TENSION LBS	Volume Calcite	**DENSITY POROSITY (2.71g/cc) PERCENT**
10000 0		70 30
		30 -10
		-10 -50

DENSITY (X) CALIPER INCHES (IN)	Volume Quartz	PE CROSS-SECTION BARNS/ELECTRON	DENSITY CORRECTION G/CC
16 26 / 6 16		0 10	-0.25 0.25

NEUTRON (Y) CALIPER INCHES (IN)	INVERSE OHMM
16 26 / 6 16	0 40

BIT SIZE INCHES (IN)	NORMAL OHMM
6 16	0 40

CALIPER MICRO INCHES (IN)
16 26 / 6 16

*** Borehole Zone Factors ***

Zone 1 99999.0 to 0.0 Feet

Matrix Density	2.71	g/cc
Fluid Density	1.00	g/cc
Formation Matrix	Limestone	
Drill Bit Size	7.875	in
Casing Diameter	5.500	in
Casing Thickness	0.250	in
Casing Correction (PHI N)	Disable	

Well File: QUAIL_AJ_1-23_AUG15_MSTK **Scale:** 1:240 **Format:** NLD-240
Segment: V1.D1.S6 AS FINAL REPEAT **Acquired:** 2014-08/15 19:31 3.3.0-12594
Reference: 0 **Processed:** 2014-08/15 21:20 3.3.0-12594

CALIPER MICRO INCHES (IN)
16 26 / 6 16

BIT SIZE INCHES (IN)	NORMAL OHMM
6 16	0 40

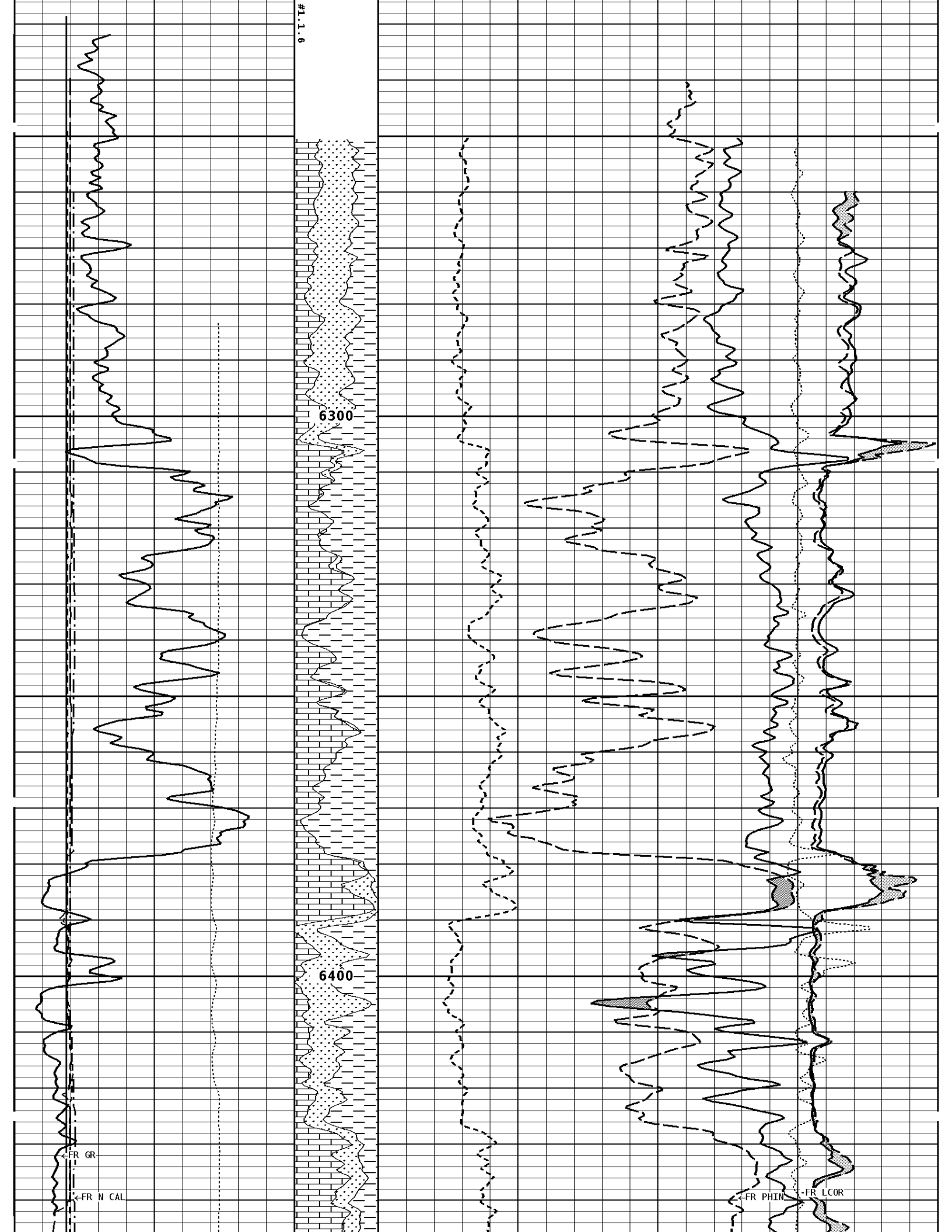
NEUTRON (Y) CALIPER INCHES (IN)	INVERSE OHMM
16 26 / 6 16	0 40

DENSITY (X) CALIPER INCHES (IN)	Volume Quartz	PE CROSS-SECTION BARNS/ELECTRON	DENSITY CORRECTION G/CC
16 26 / 6 16		0 10	-0.25 0.25

TENSION LBS	Volume Calcite	DENSITY POROSITY (2.71g/cc) PERCENT
10000 0		70 30 / 30 -10 / -10 -50

GAMMA RAY API UNITS	Volume Dolo/Shale	NEUTRON POROSITY (LIMESTONE) PERCENT
150 300 / 0 150		30 -10

1:240 REPEAT SECTION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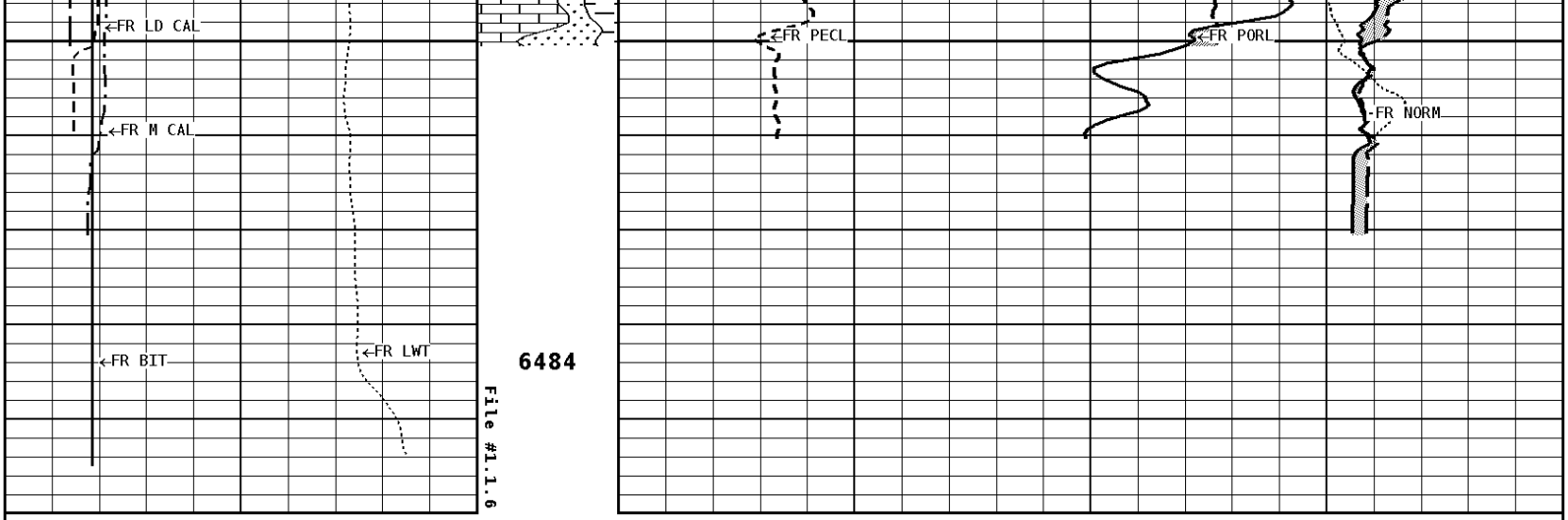
FR N CAL
FR PHIN
FR LCOR



1:240 REPEAT SECTION

GAMMA RAY API UNITS	Volume Dolo/Shale	NEUTRON POROSITY (LIMESTONE) PERCENT
150 300 0 150		30 -10
TENSION LBS	**Volume Calcite**	**DENSITY POROSITY (2.71g/cc) PERCENT**
10000 0		70 30 30 -10 -10 -50
DENSITY (X) CALIPER INCHES (IN)	**Volume Quartz**	**PE CROSS-SECTION BARNS/ELECTRON** / **DENSITY CORRECTION G/CC**
16 26 6 16		0 10 / -0.25 0.25
NEUTRON (Y) CALIPER INCHES (IN)		**INVERSE OHMM**
16 26 6 16		0 40
BIT SIZE INCHES (IN)		**NORMAL OHMM**
6 16		0 40
CALIPER MICRO INCHES (IN)		
16 26 6 16		

*** Borehole Zone Factors ***

Zone 1 99999.0 to 0.0 Feet

Matrix Density	2.71	g/cc
Fluid Density	1.00	g/cc
Formation Matrix	Limestone	
Drill Bit Size	7.875	in
Casing Diameter	5.500	in
Casing Thickness	0.250	in
Casing Correction (PHI N)	Disable	

Well File: QUAIL_AJ_1-23_AUG15_MSTK **Scale:** 1:240 **Format:** LDT-240
Segment: V1.D1.S5 AS FINAL MAIN **Acquired:** 2014-08/15 19:43 3.3.0-12594
Reference: 0 **Processed:** 2014-08/15 21:20 3.3.0-12594

BIT SIZE INCHES (IN)
6 16

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

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

TENSION
LBS
10000 0

GAMMA RAY
API UNITS
150 300
0 150

-BHV AHV-
CU.FT

PE CROSS-SECTION
BARNS/ELECTRON
0 10

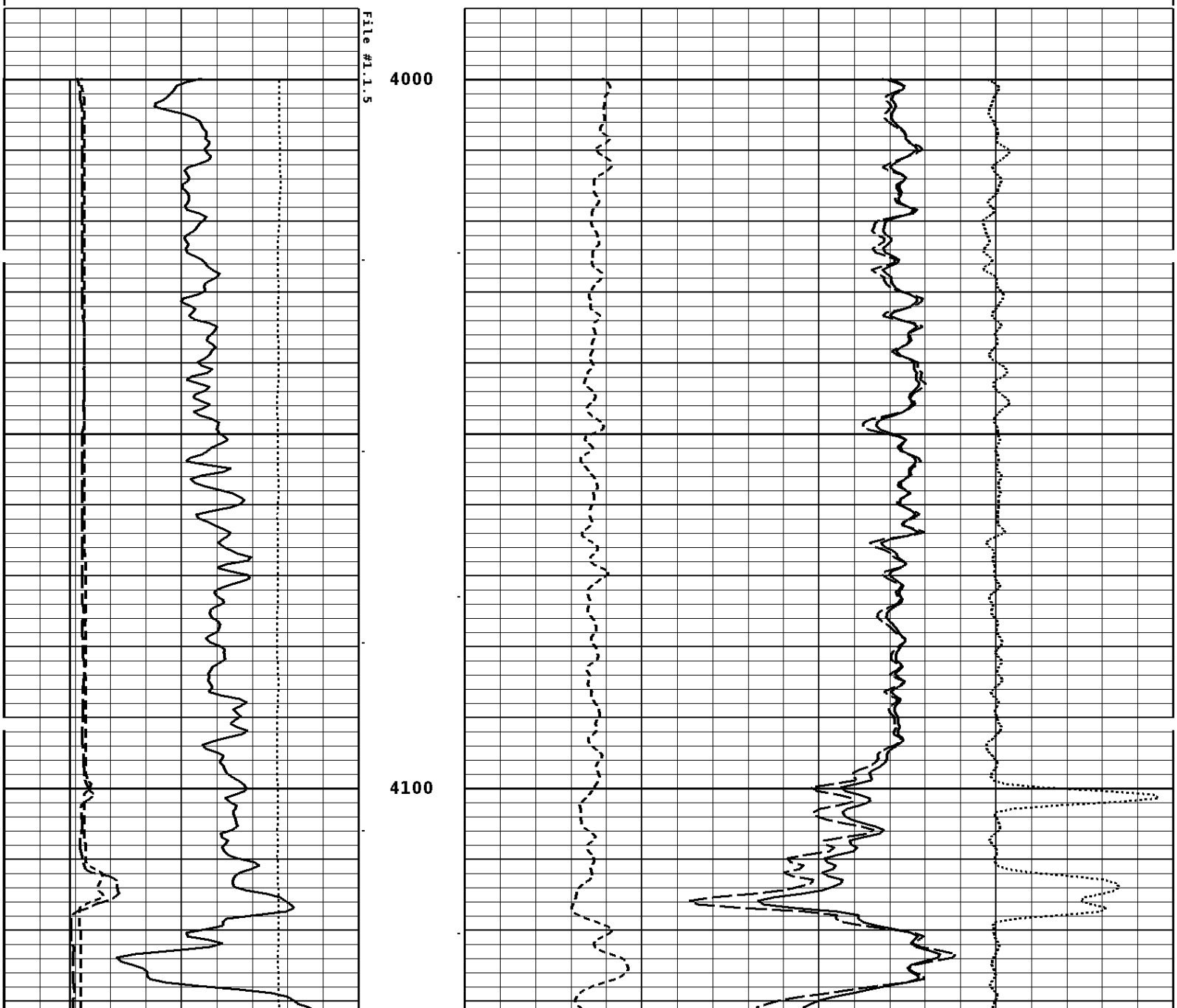
DENSITY CORRECTION
G/CC
-0.25 0.25

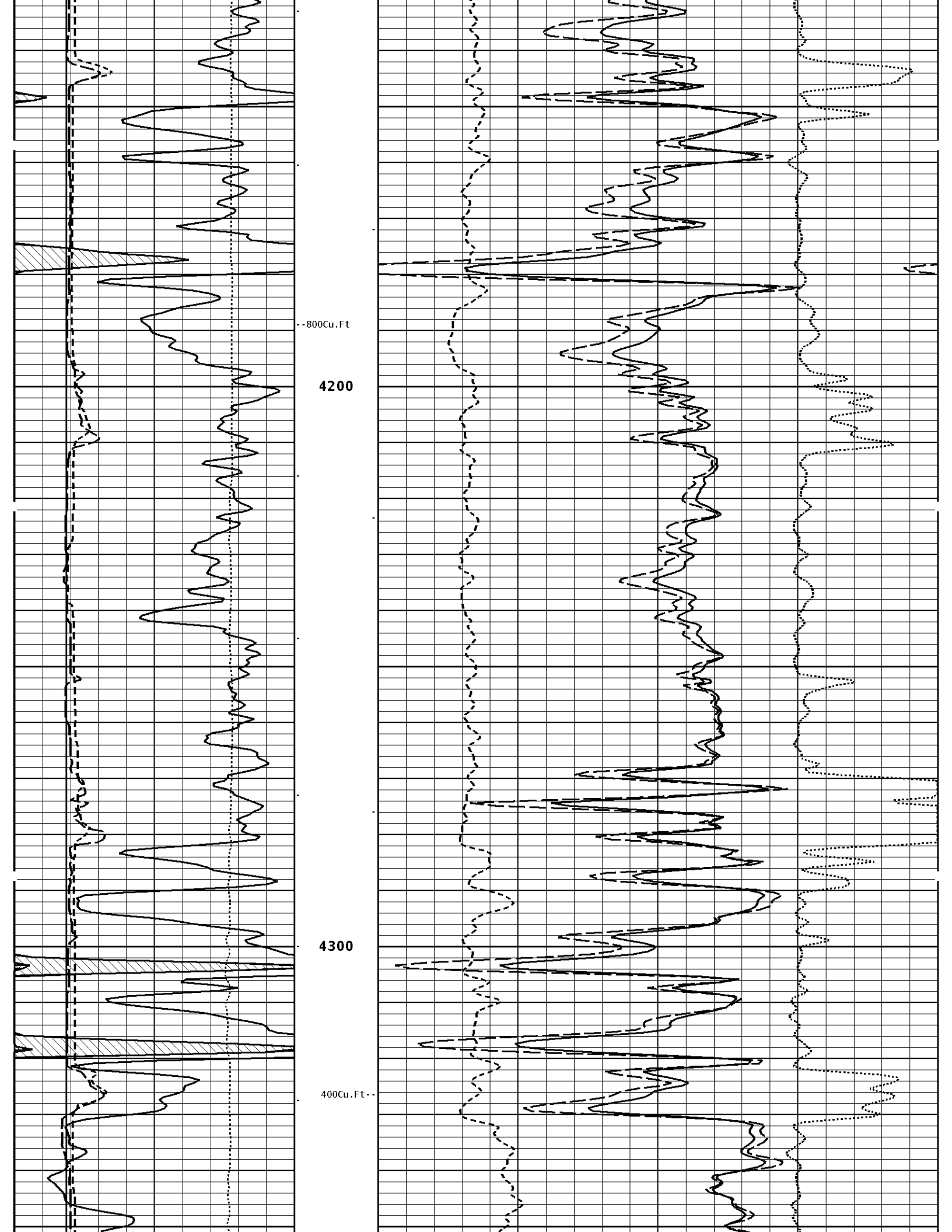
COMPENSATED BULK DENSITY
G/CC
3.0 4.0
2.0 3.0
1.0 2.0

DENSITY POROSITY (2.71g/cc)
PERCENT
70 30
30 -10
-10 -50

1:240 MAIN SECTION

BULK DENSITY

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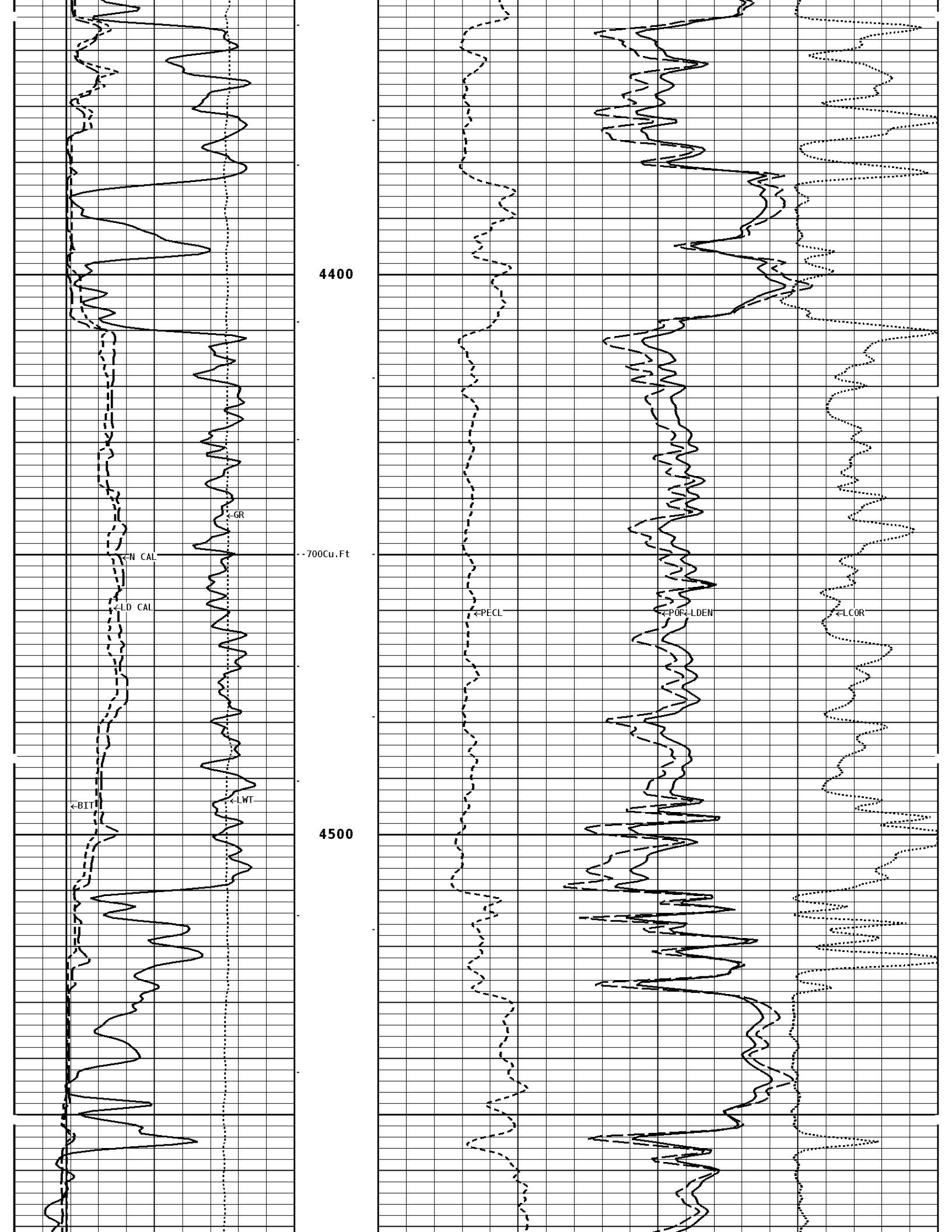
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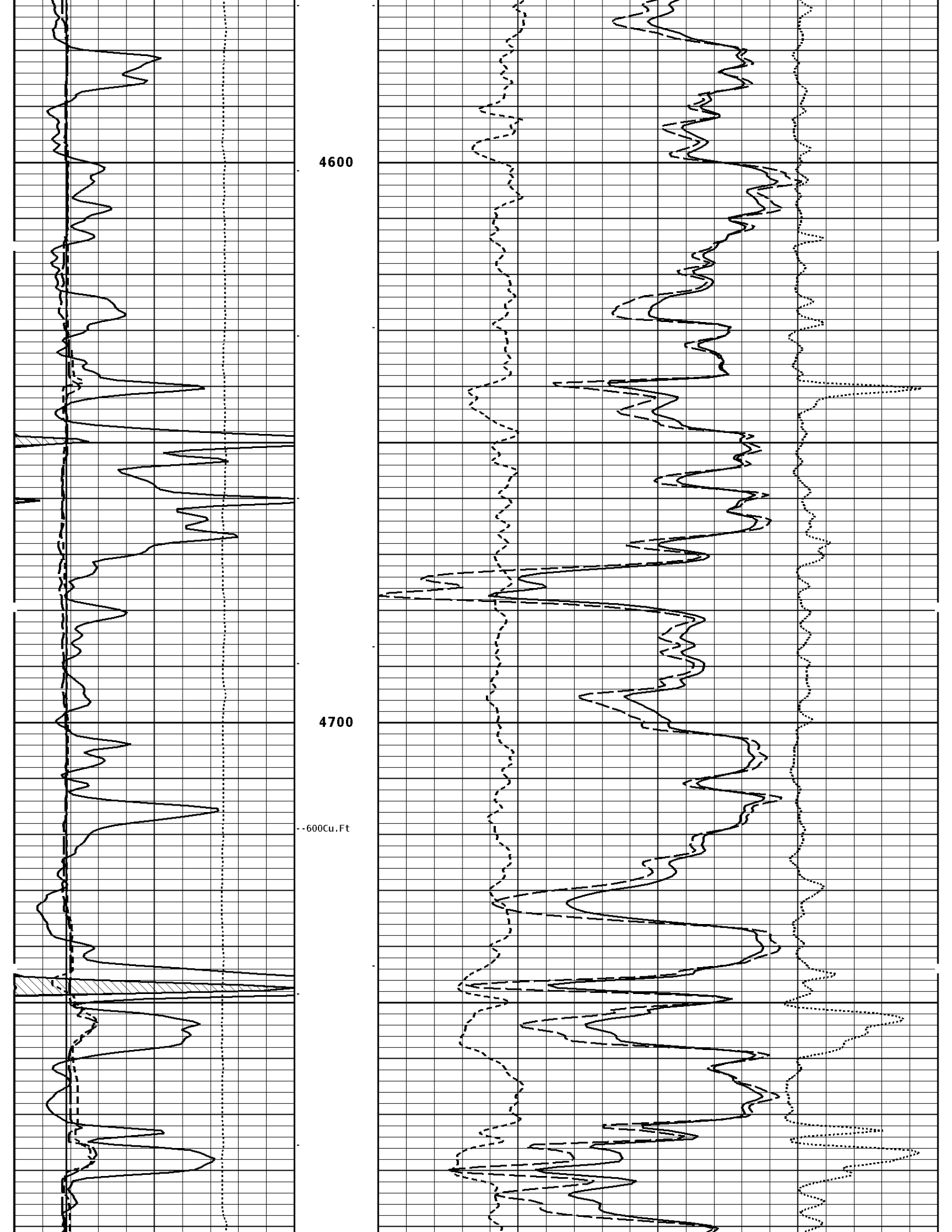
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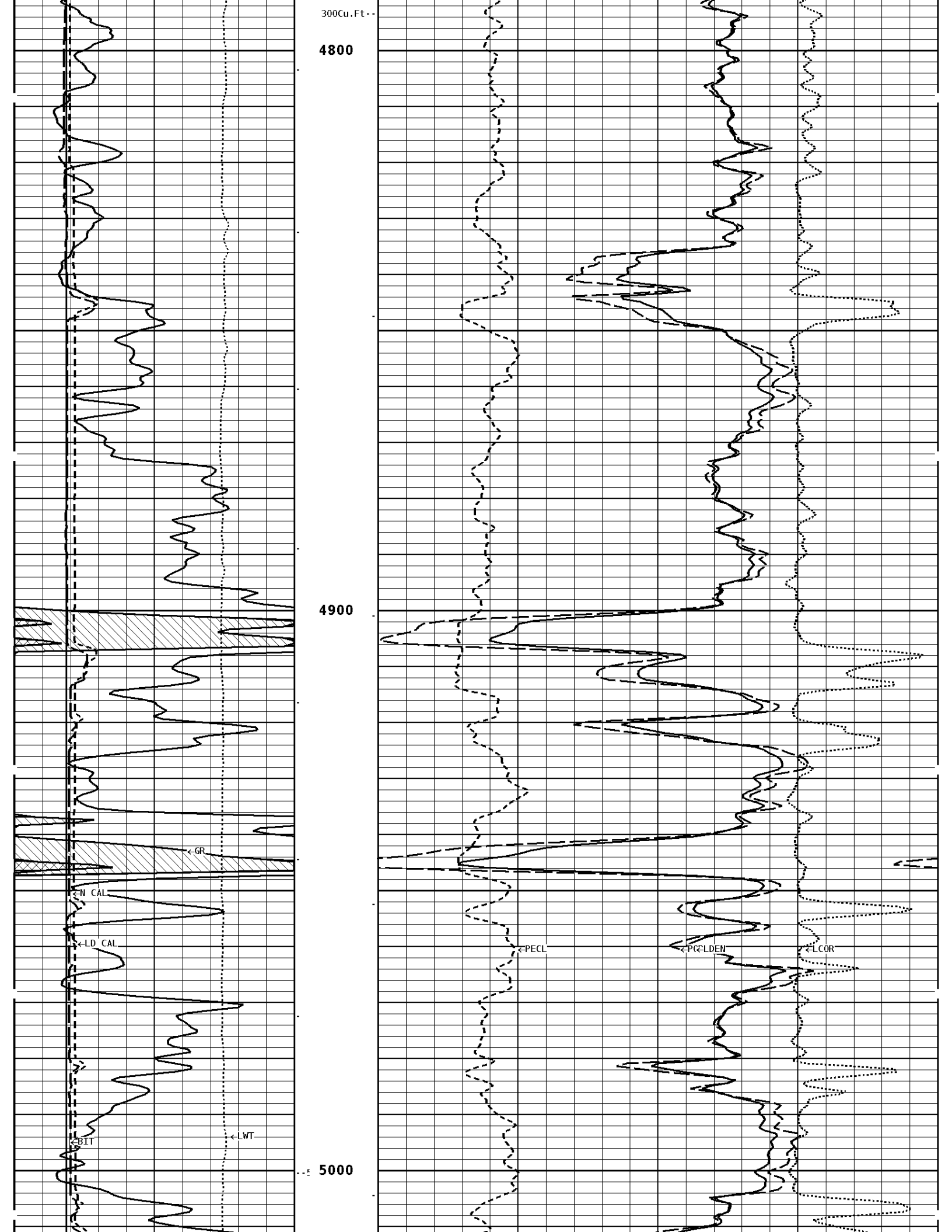
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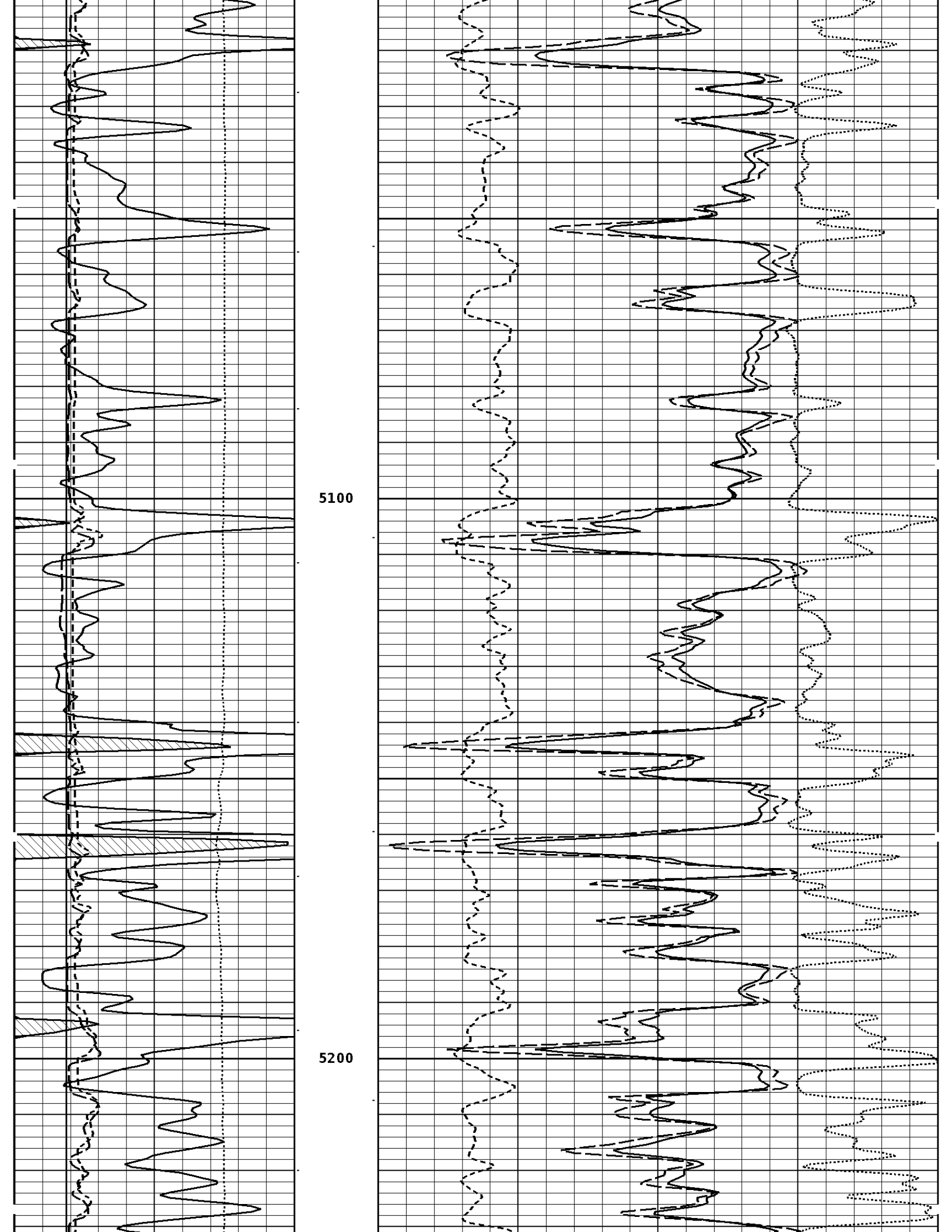
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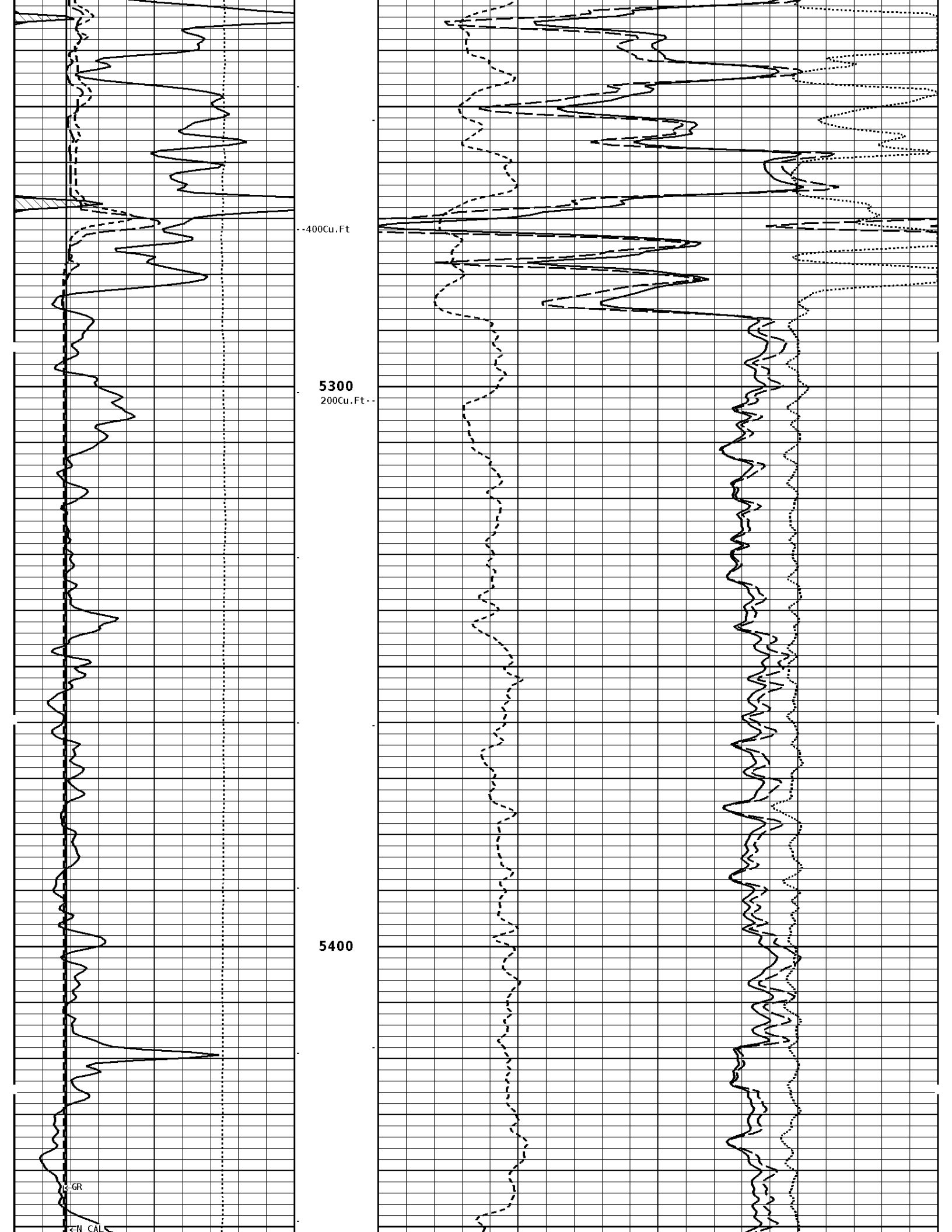
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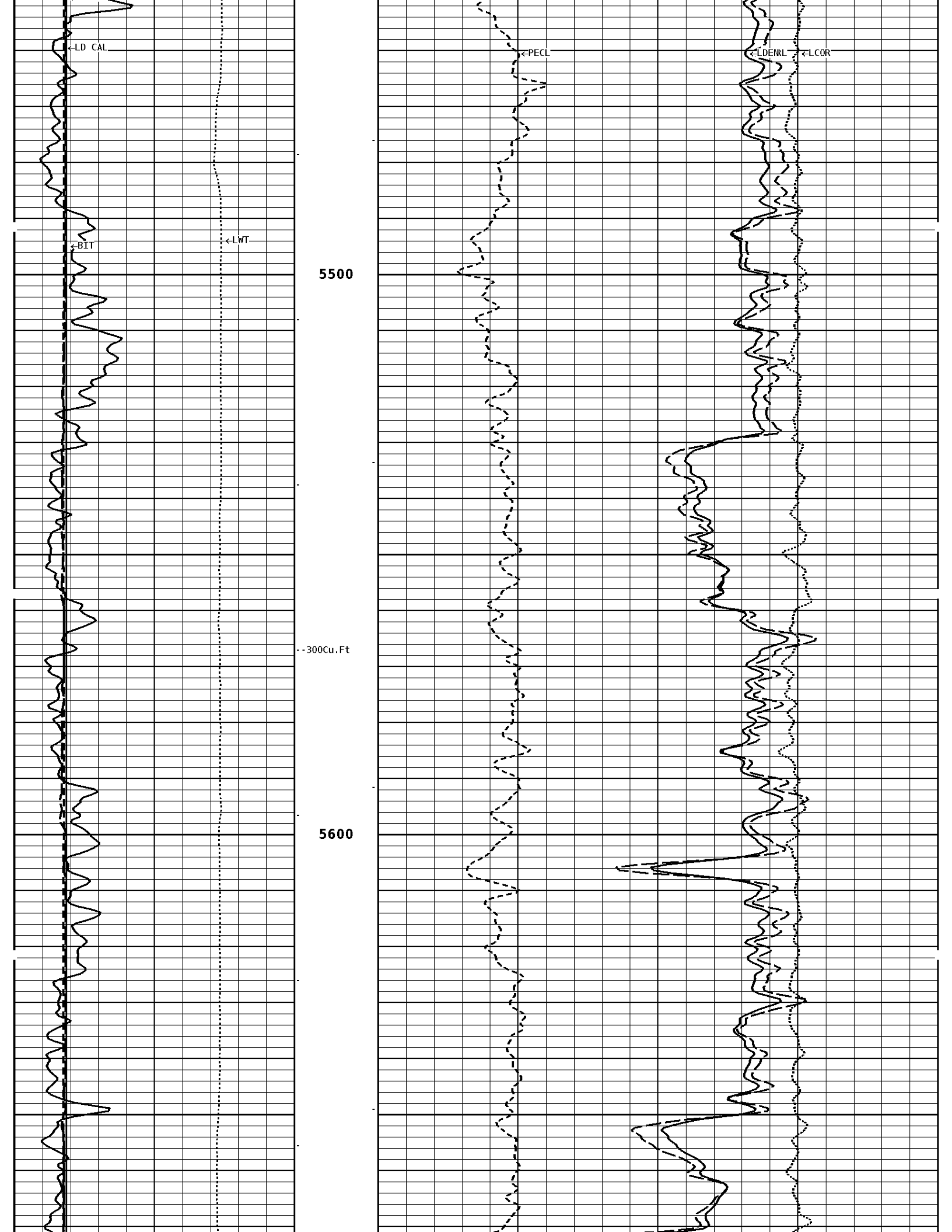
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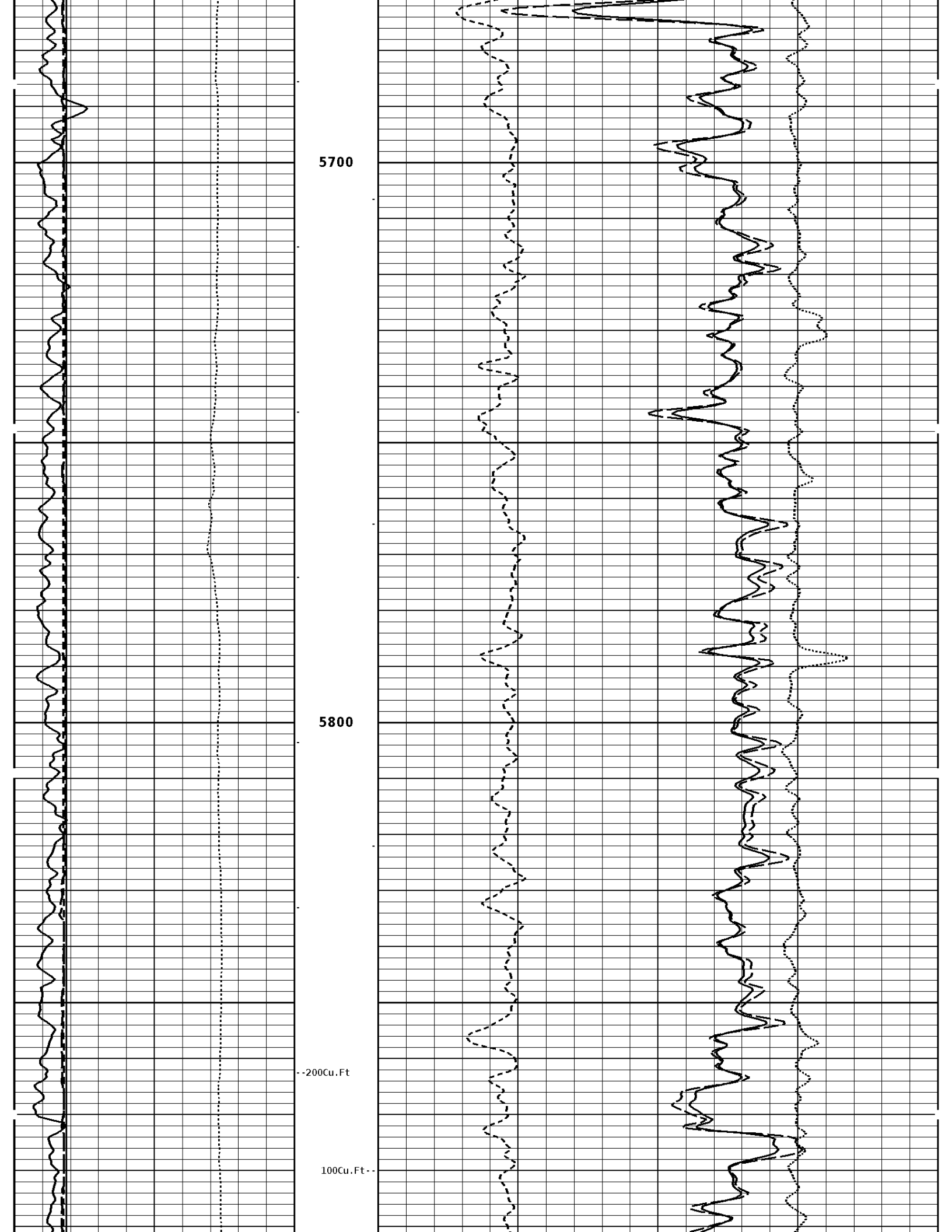
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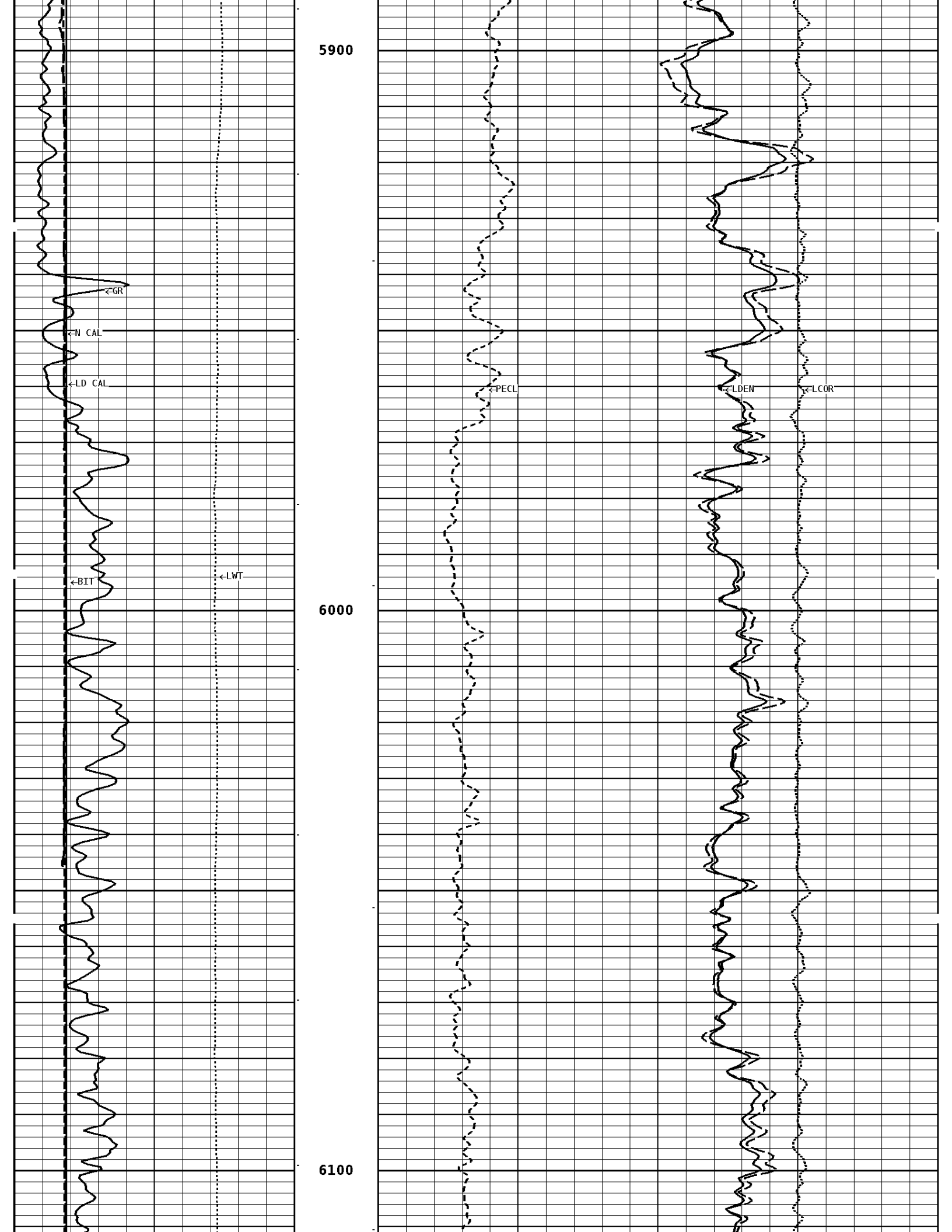
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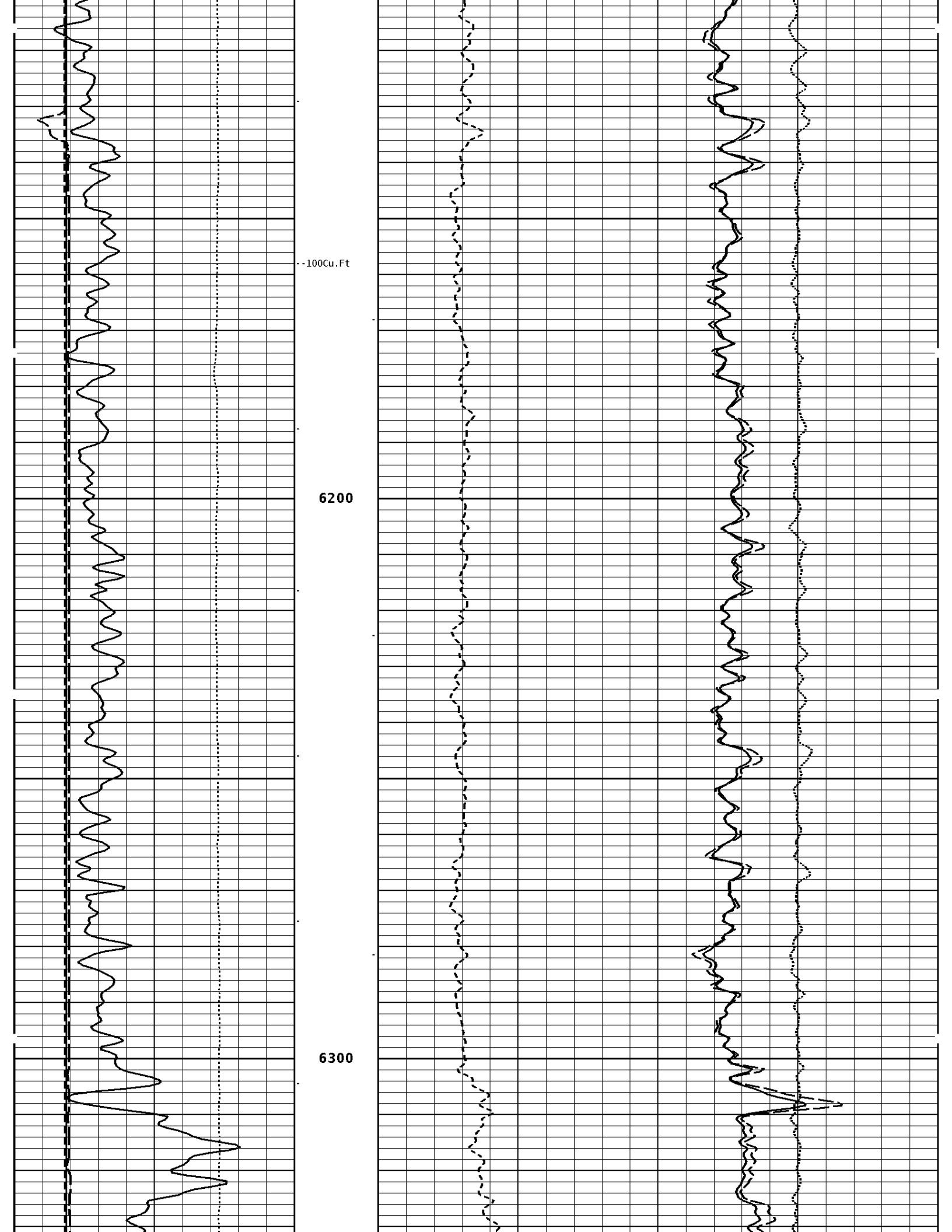
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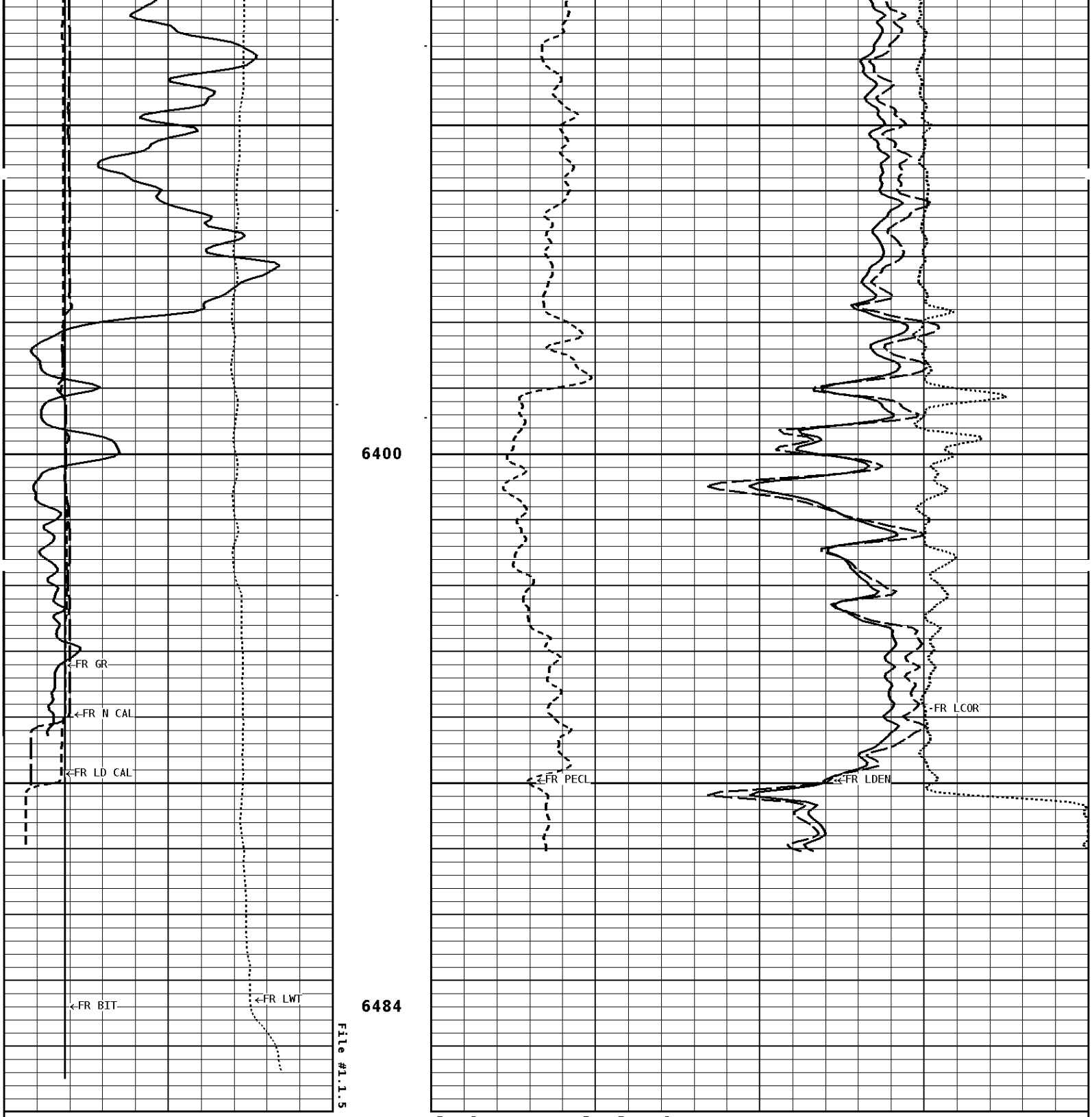

1:240 MAIN SECTION

BULK DENSITY

GAMMA RAY API UNITS	-BHV AHV- CU.FT	DENSITY POROSITY (2.71g/cc) PERCENT
150 — 300 0 — 150		70 — 30 30 — -10 -10 — -50
TENSION LBS		**COMPENSATED BULK DENSITY G/CC**
10000 — 0		3.0 — 4.0 2.0 — 3.0 1.0 — 2.0
DENSITY (X) CALIPER INCHES (IN)		**PE CROSS-SECTION BARNS/ELECTRON** / **DENSITY CORRECTION G/CC**

16	26
6	16

0	10

-0.25	0.25

NEUTRON (Y) CALIPER
INCHES (IN)

16	26
6	16

BIT SIZE
INCHES (IN)

6	16

* Borehole Zone Factors *

Zone 1 99999.0 to 0.0 Feet

Matrix Density	2.71	g/cc
Fluid Density	1.00	g/cc
Formation Matrix	Limestone	
Drill Bit Size	7.875	in
Casing Diameter	5.500	in
Casing Correction (PHI N)	Disable	

* 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
CNT-AA

Performed : 04-AUG-2014 Time : 11:39
Sensor Suite : CALI-BCN ID : NDT-BD-133

	Jig - Measured Ring#1	Jig - Measured Ring#2	Jig - Calibrated Ring#1	Jig - Calibrated Ring#2	Units
CL # 1	9.3	13.8	6.0	12.0	IN.

Performed : 04-Aug-2014 Time : 11:49
Sensor Suite : BHC NEUT ID : CNP-AA-116-
Source ID : N-1045

	Tank Measured	Tank Calibrated	Verification Jig	Units
N/F	3.8438	3.6893	3.6954	
Porosity	22.9	20.5	20.6	%

Shop Calibration
LDT-DA

Performed : 04-AUG-2014 Time : 09:37
Sensor Suite : CALI-LTH ID : PDT-GA-464

	Jig - Measured Ring#1	Jig - Measured Ring#2	Jig - Calibrated Ring#1	Jig - Calibrated Ring#2	Units
CL # 1	7.8	11.2	6.0	12.0	IN.

Performed : 04-Aug-2014 Time : 09:57
Sensor Suite : BHCPELNG ID : LDP-DA-067
Source ID : 2991GW

		Short Space			
	BKGD	Al	Mg	Al+Fe	Units
LSW1	63	1046	1691	691	CPS
LSW2	68	1207	1925	882	CPS
LSW3	241	2775	4479	2374	CPS
LSW4	294	2582	3786	2296	CPS
LSW5	44	74	79	70	CPS
LSW6	59	66	66	66	CPS
LSW7	47	50	51	51	CPS
LSW8	11	14	16	14	CPS
QS	0.122	0.139	0.125	0.133	
PES			2.778	5.967	
SSDN		2.600	1.680		G/CC

			Long Space		
	BKGD	Al	Mg	Al+Fe	Units
LLW1	89	1212	5025	742	CPS
LLW2	101	2059	8176	1531	CPS
LLW3	376	3788	14527	3290	CPS
LLW4	484	1807	5811	1640	CPS
LLW5	52	62	111	61	CPS
LLW6	160	157	149	159	CPS
LLW7	103	98	95	99	CPS
LLW8	3	5	15	5	CPS
QL	0.216	0.229	0.222	0.233	
PEL			2.697	5.458	
LSDN		2.600	1.680		G/CC

Tucker ENERGY SERVICES

Company: QUAIL OIL & GAS, LC

Well: AJ #1-23

Location: 860' FNL & 460' FWL

Logged: 08-15-2014

K.B. Elev: 1039.0 Ft