Tucker ENERGY SERVICES

COMPENSATED NEUTRON

PEL DENSITY MICRO LOG

Company CHIEFTAIN OIL COMPANY INC.
Well DIEL #6
Field ROUNDUP SOUTH
County BARBER
State KANSAS
Country USA
API No. 15-00724245

File No : TUL-58479
Company : CHIEFTAIN OIL COMPANY INC.
Well : DIEL #6
Field : ROUNDUP SOUTH
County : BARBER
State : KANSAS
Country : USA
API No : 15-00724245

Location :
3058' FSL & 2996' FEL
NW SE SE NW

LSD : **Sect :** 3 **Twp :** 34S **Rge :** 11W

Permanent Datum:	GL	**Elevations:**		**Services:**	
Drilling Measured From:	KB	**KB**	1362.00 Ft	CNT	PIT
Log Measured From:	KB	**DF**	1361.00 Ft	LDT	
Above Permanent Datum:	10.00 Ft	**GL**	1352.00 Ft	MLT	

Date	10-21-2014			
Run Number	1			
Depth--Driller	5165.0 Ft			
Depth--Logger	5166.0 Ft			
First Reading	5143.0 Ft			
Last Reading	333.0 Ft			
Casing--Driller	329.0 Ft			
Casing--Logger	333.0 Ft			
Bit Size	7.875 In			
Casing Size	13.375 In			
Hole Fluid Type	WBM			
Density	9.3			
Fluid Loss	8.0			
PH/Viscosity	10.0	59.0		
Sample Source	MEASURED			
RM@Measured Temp.	0.900 @ 70 F			
RMF@Measured Temp	0.770 @ 70 F			
RMC@Measured Temp.	1.090 @ 70 F			
Source RMF/RMC	CALCULATED	CALCULATED		
RM@BHT	0.510 @ 130 F			
Time Circulation Stopped	10-21-2014 7:30 pm			
Max Recorded Temp.	133 F			
Equipment/Base	T-126	TULSA		
Recorded By	S.K. DAVIS			
Witnessed By	D. BARKER			

Casing Strings

Size (In)	Weight (Lbs)	Bottom (Ft)	Top (Ft)
13.375	24.00	333.00	0.00

Bitsize Intervals

Size (In)	Bottom (Ft)
7.875	5166.00

Run Number	1
Date	10-21-2014
Date/Time On Bottom	10-22-2014 12:45 am
Depth to Fluid	0.0 Ft
Salinity	6000.000
RMF@BHT	0.430 @ 130 F
RMC@BHT	0.580 @ 130 F

Run Number 1

Comments

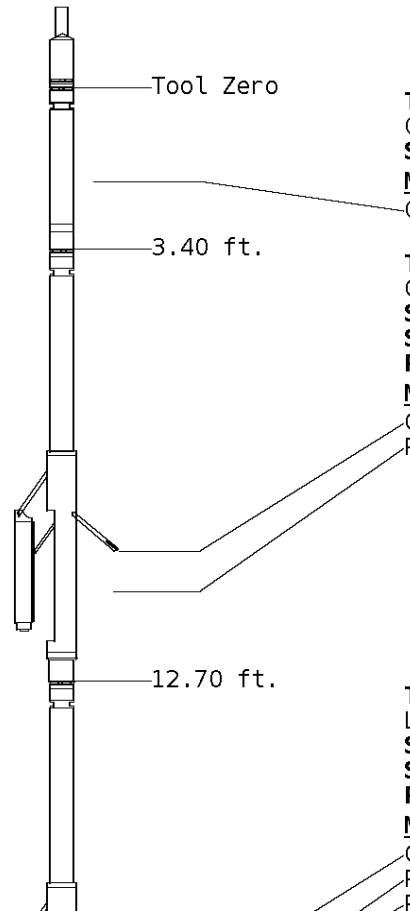
ALL PRESENTATION PER CUSTOMER REQUEST
GRT,CNT,LDT,PIT RUN IN COMBINATION
CALIPERS ORIENTED ON X-Y AXIS
2.71 G/CC USED TO CALCULATE POROSITY
ANNULAR & BOREHOLE VOLUME CALCULATED USING 5.5 PRODUCTION CASING
PHIN IS CALIPER CORRECTED
DETAIL IS PRESENTED FROM TD TO 3400'
SALT/ANHYDRITE SECTION 1750' TO 1050' & 650' TO 530'
MLT CUT OFF AT 4418' NO REPEAT PER CUSTOMER REQUEST

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
C. GONZALES

Tool String Schematic

Total Tool Length - 53.57 **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

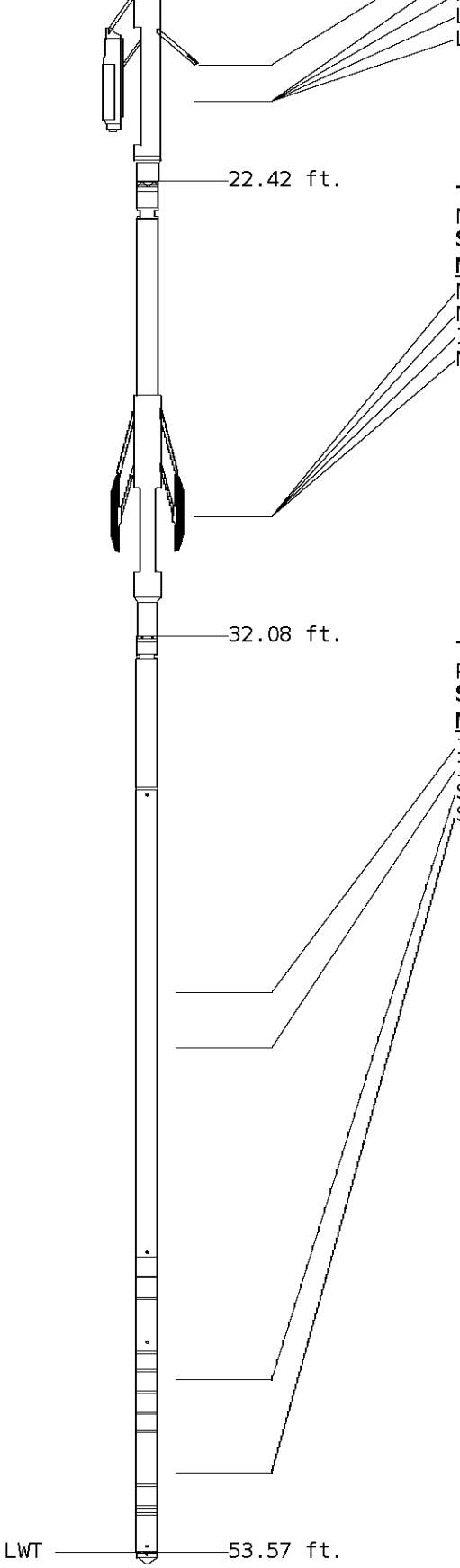
Measure Point	Tool Offset	Stack Offset	Bottom Offset
GRP	2.00	2.00	51.57

Tool: CNT-AA **Length:** 9.30 **ft.** **O.D.** 4.36 **in.**
Compensated Neutron A Pad on NDT-A
Sonde ID :NDT-BB-103
Source ID :N-1045
Pad ID :CNP-AA-116-

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLCN	6.00	9.40	44.17
PHIN	6.80	10.20	43.37

Tool: LDT-DF **Length:** 9.72 **ft.** **O.D.** 4.80 **in.**
Litho Density D Pad on NDT-F
Sonde ID :PDT-GA-464
Source ID :2991GW
Pad ID :LDP-DA-067

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLLD	6.42	19.12	34.45
PEL	7.42	20.12	33.45
PES	7.82	20.52	33.05



LDEN	7.62	20.32	33.25
LCOR	7.62	20.32	33.25

Tool: MST-DA **Length:** 9.66 **ft.** **O.D.** 6.00 **in.**
Micro Spherically Focused (IC)
Sonde ID :MST-DA-26

Measure Point	Tool Offset	Stack Offset	Bottom Offset
MSFL	7.60	30.02	23.55
MSCLP	7.60	30.02	23.55
INV	7.60	30.02	23.55
NOR	7.60	30.02	23.55

Tool: PIT-CA **Length:** 21.49 **ft.** **O.D.** 3.62 **in.**
Phased Dual Induction w/ RM & D
Sonde ID :PIT-CA-075

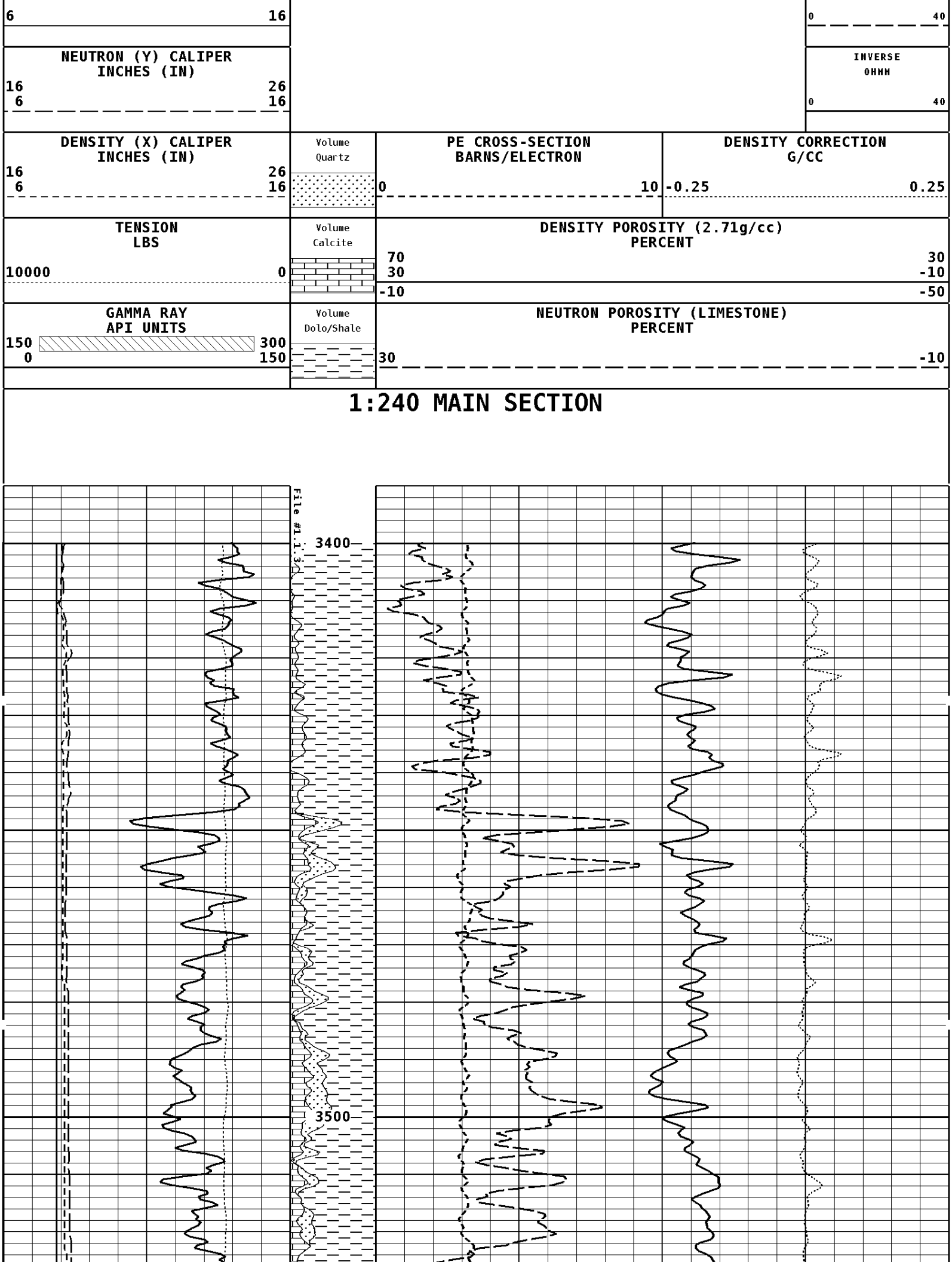
Measure Point	Tool Offset	Stack Offset	Bottom Offset
ILD	8.92	41.00	12.56
ILM	10.10	42.18	11.39
SFLU	17.49	49.57	4.00
SP	20.60	52.68	0.88

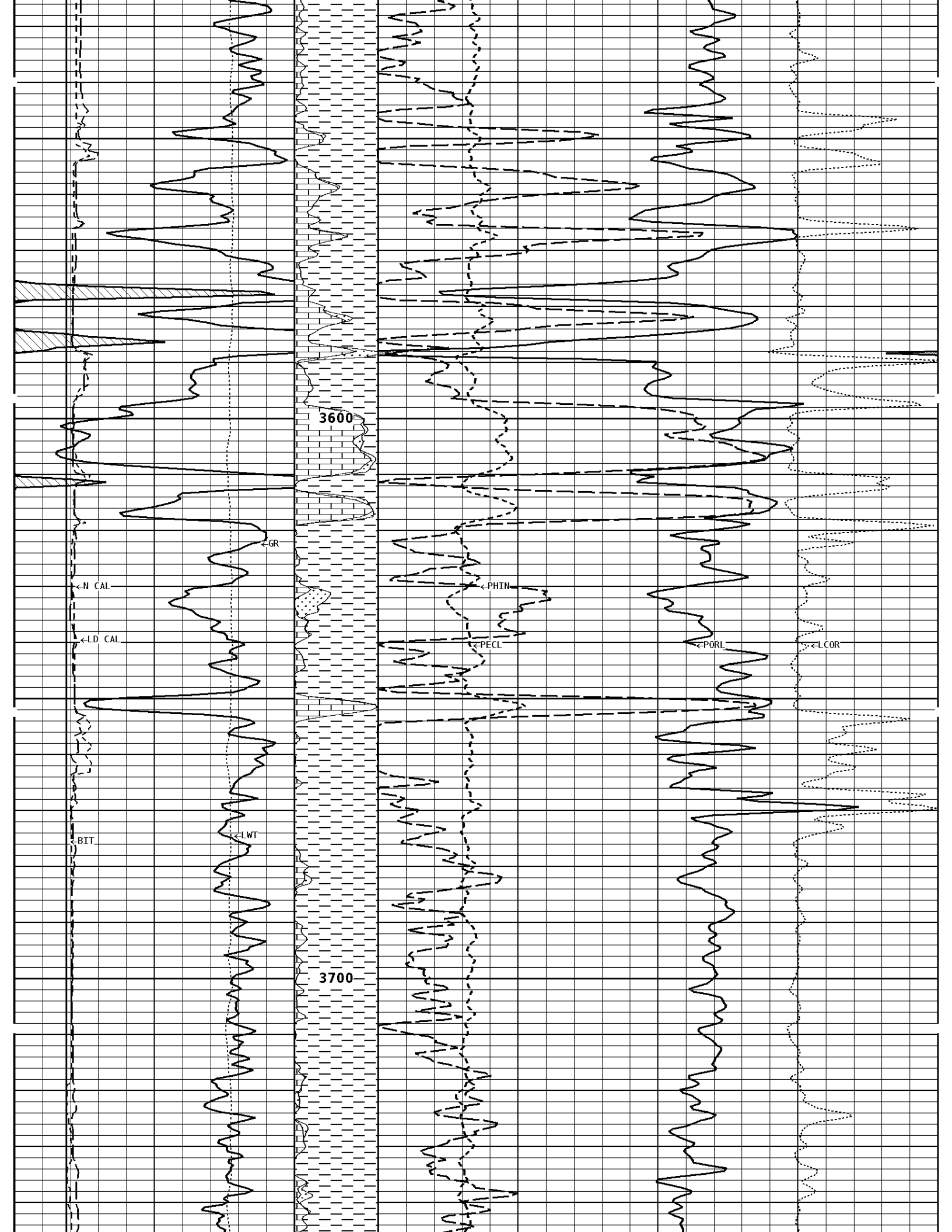
Well File: chief-die-6-mstk-oct-21 **Scale:** 1:240 **Format:** NLD-240
Segment: V1.D1.S3 MN **Acquired:** 2014-10/22 00:32 3.3.0-12702
Reference: 0 **Processed:** 2014-10/22 01:55 3.3.0-12702

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
File #1.1.3
3400
3500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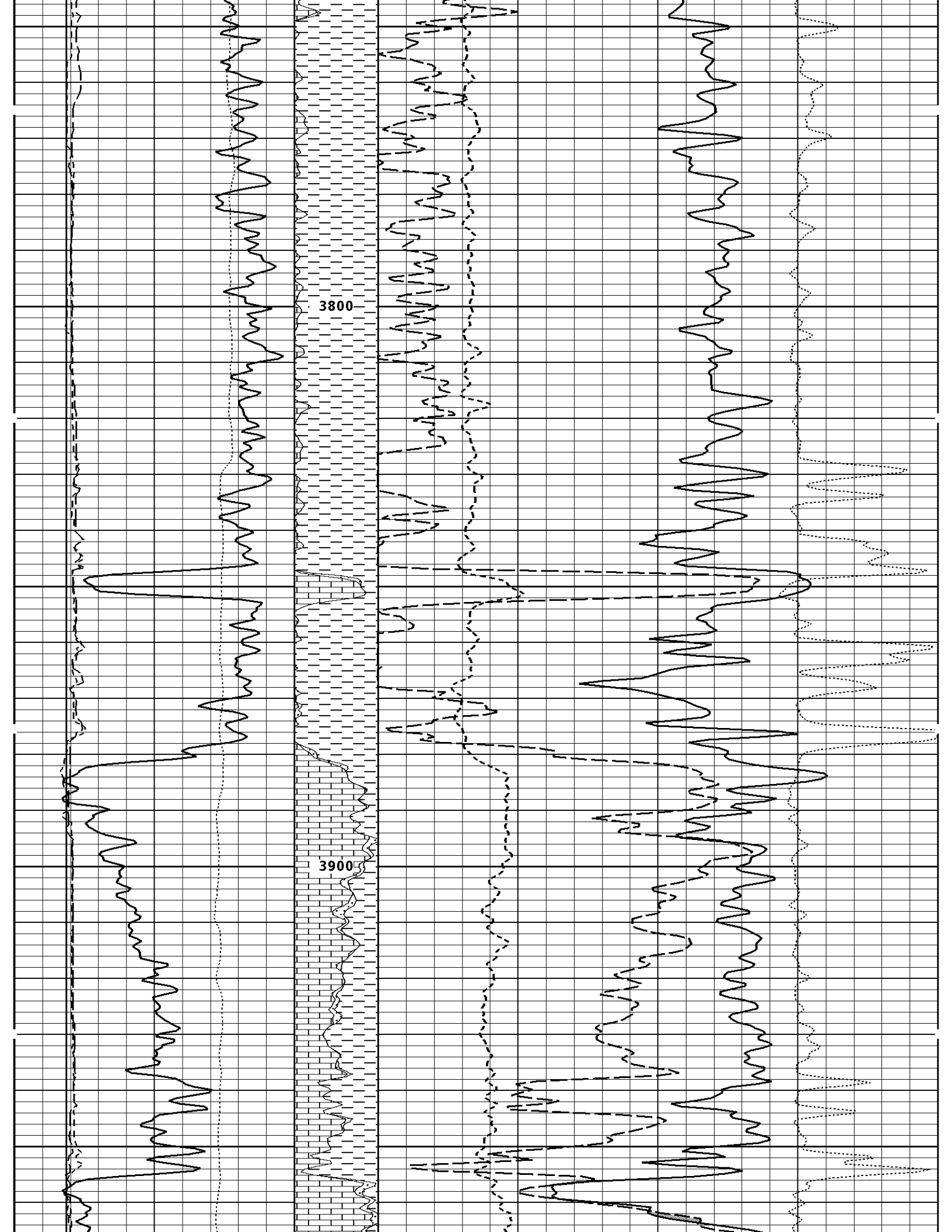
LD CAL
PHIN
PECL
PORL
LCOR
BIT
LWT
3700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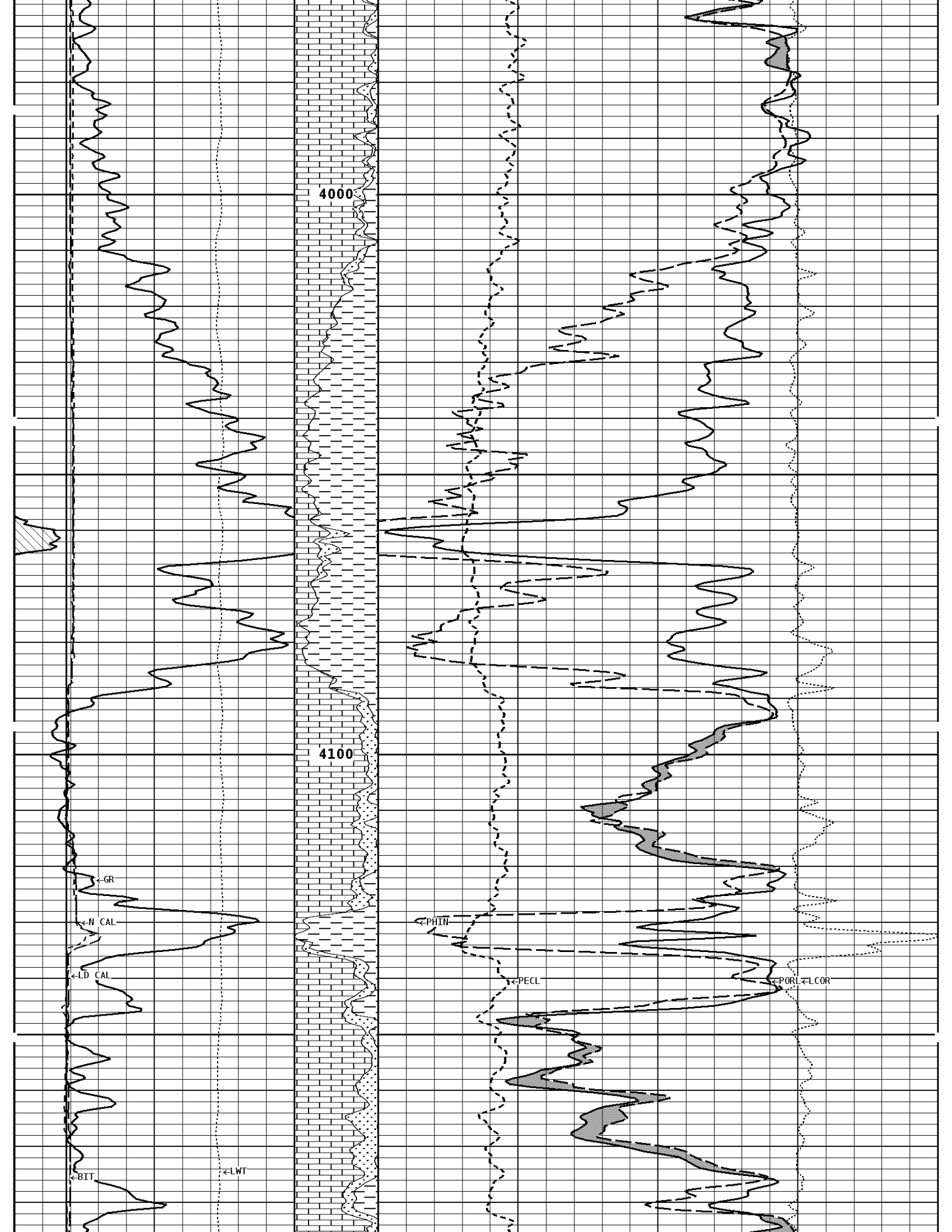
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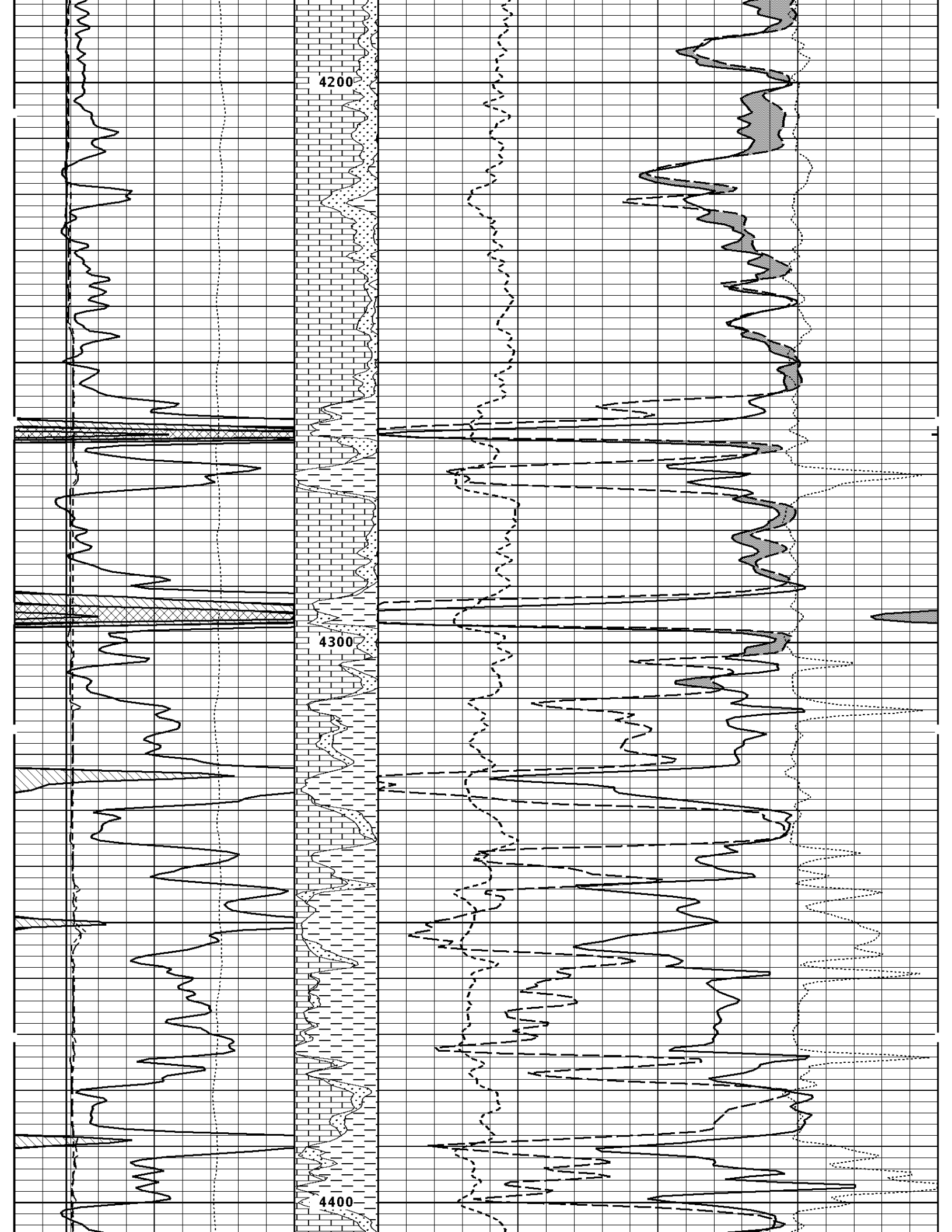
←PORL
←LCOR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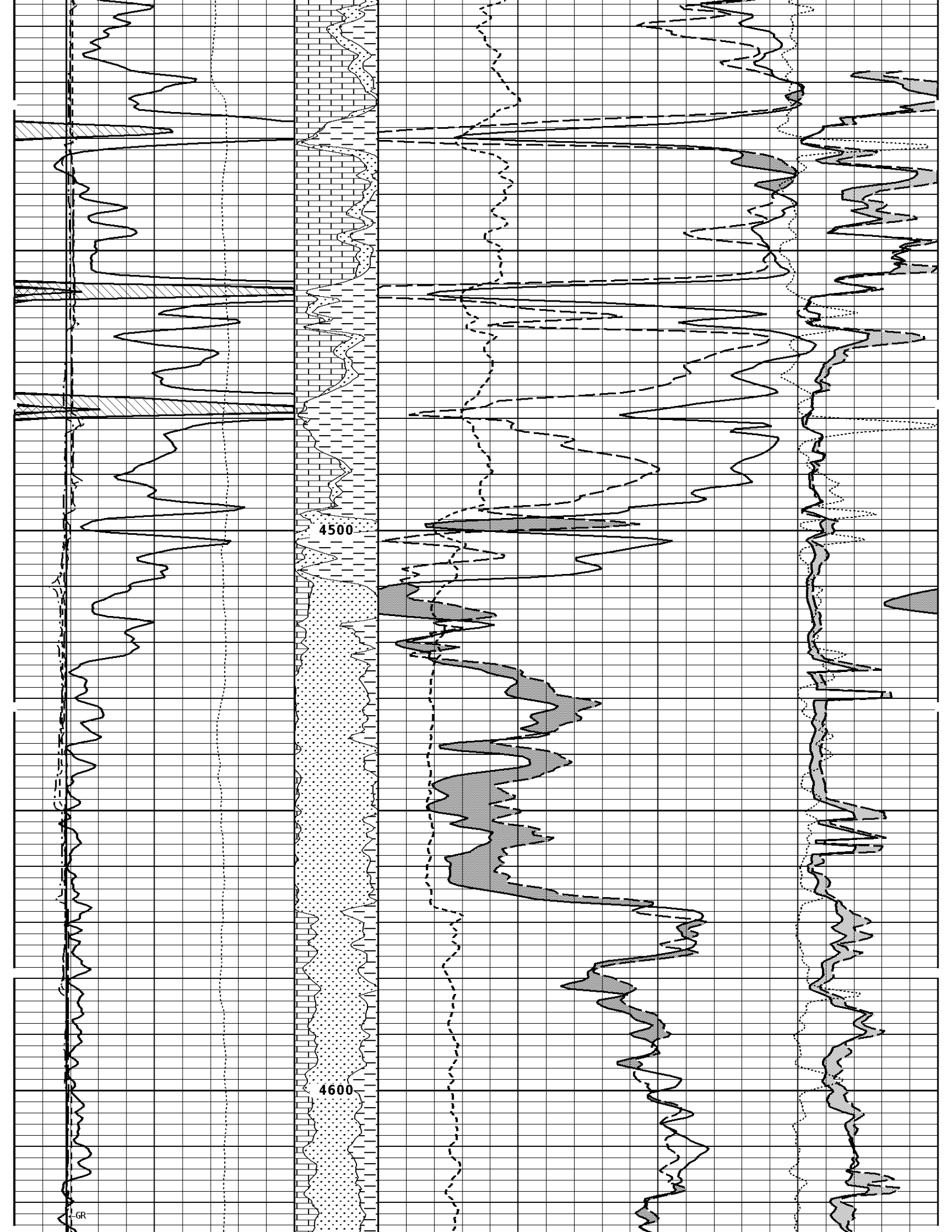
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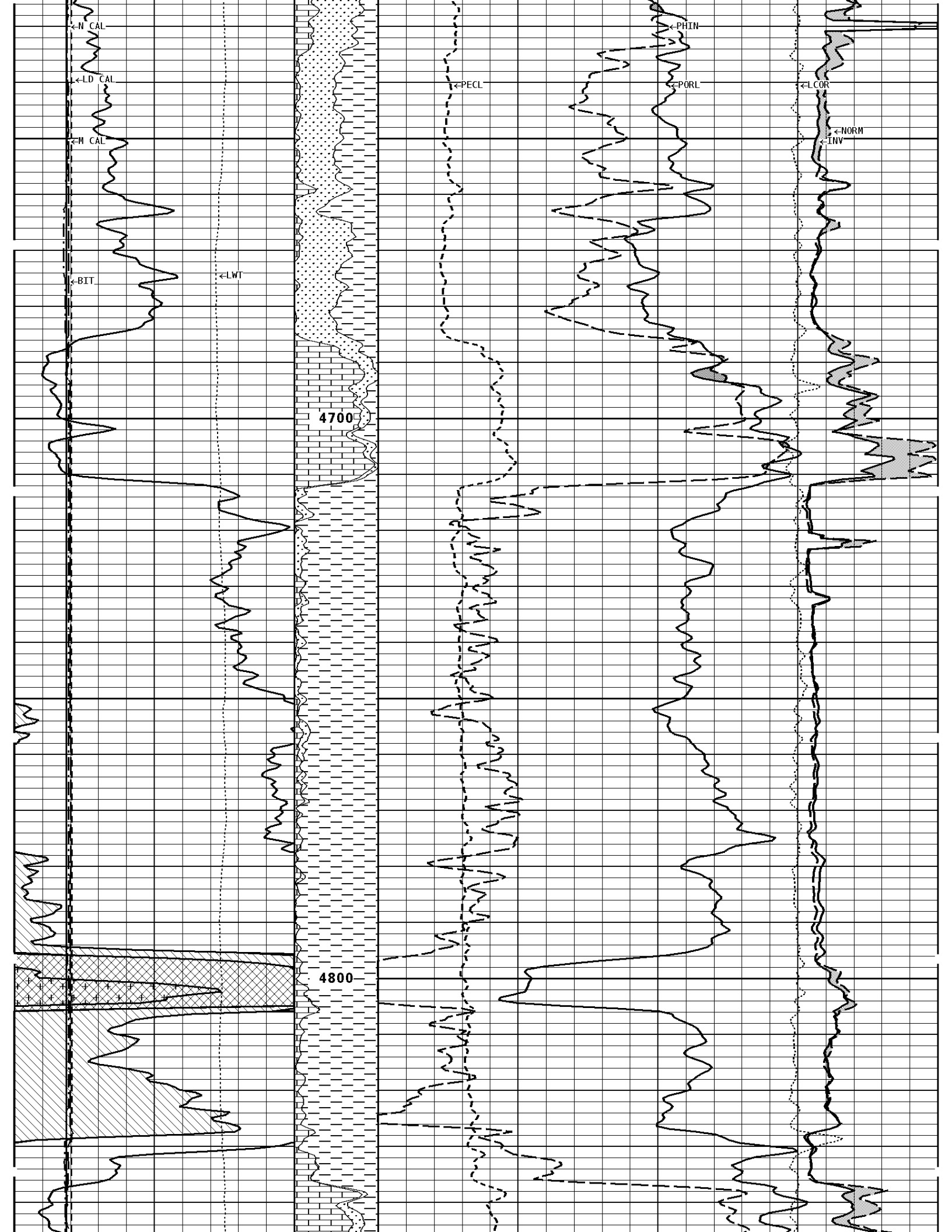
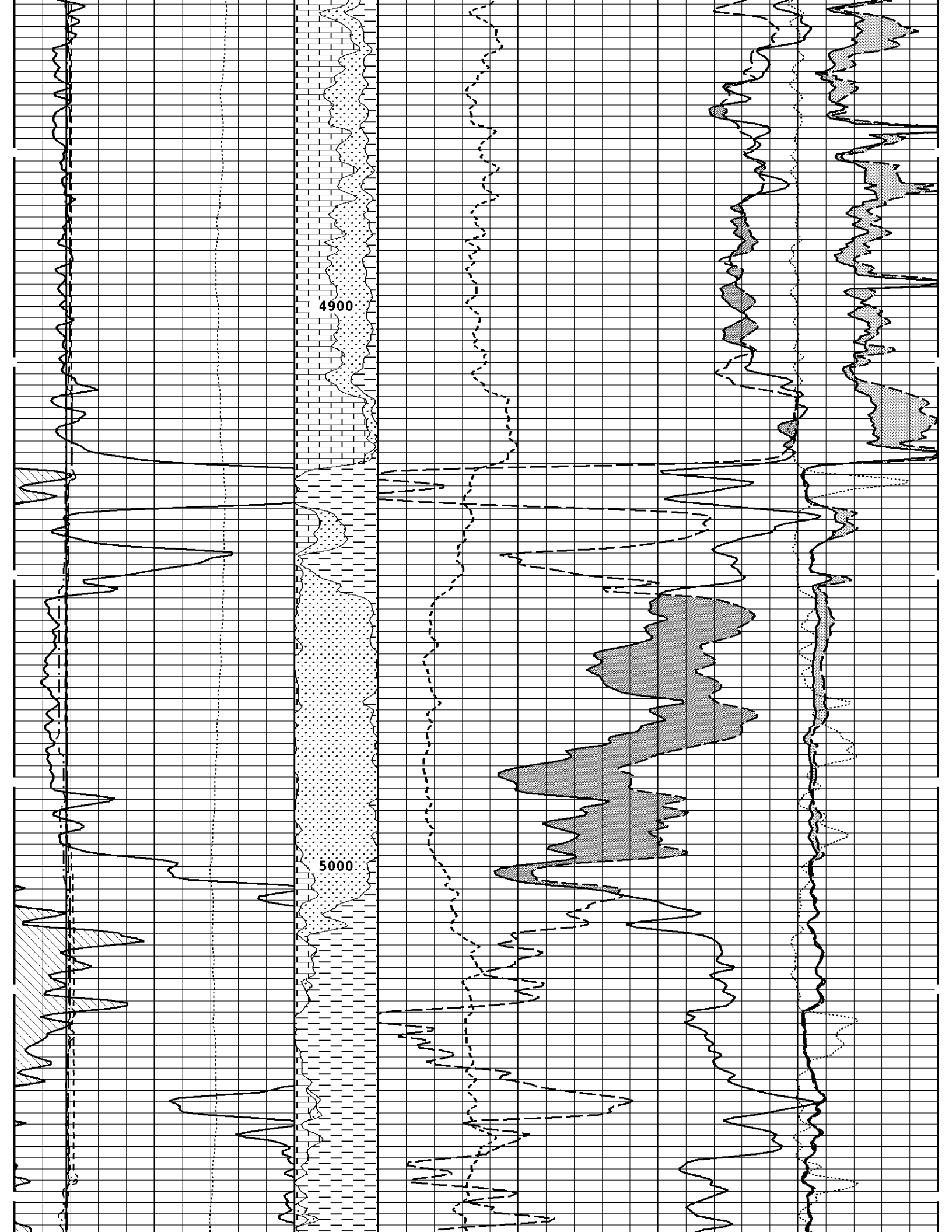
4600
GR


N CAL
LD CAL
M CAL
BIT
LWT
PECL
PHIN
PORL
LCOR
NORM
INV
4700
4800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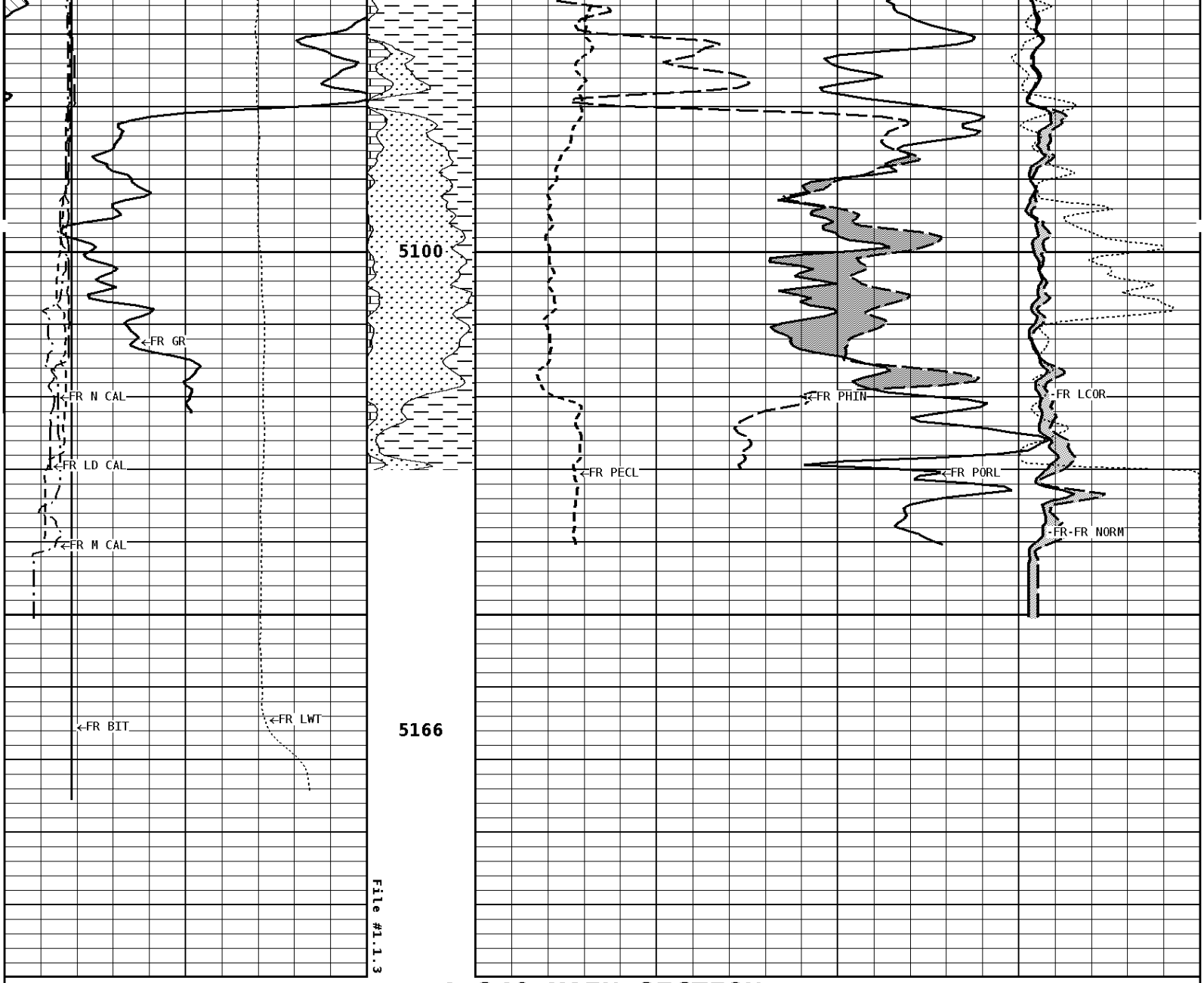


1:240 MAIN SECTION

GAMMA RAY **API UNITS** 150 — 300 0 — 150	Volume Dolo/Shale	**NEUTRON POROSITY (LIMESTONE)** **PERCENT** 30 — -10
TENSION **LBS** 10000 — 0	Volume Calcite	**DENSITY POROSITY (2.71g/cc)** **PERCENT** 70 — 30 30 — -10 -10 — -50
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
NEUTRON (Y) CALIPER **INCHES (IN)** 16 — 26 6 — 16		**INVERSE** **OHMM** 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: chief-die-6-mstk-oct-21 **Scale:** 1:240 **Format:** LDT-240
Segment: V1.D1.S3 MN **Acquired:** 2014-10/22 00:32 3.3.0-12702
Reference: 0 **Processed:** 2014-10/22 01:55 3.3.0-12702

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

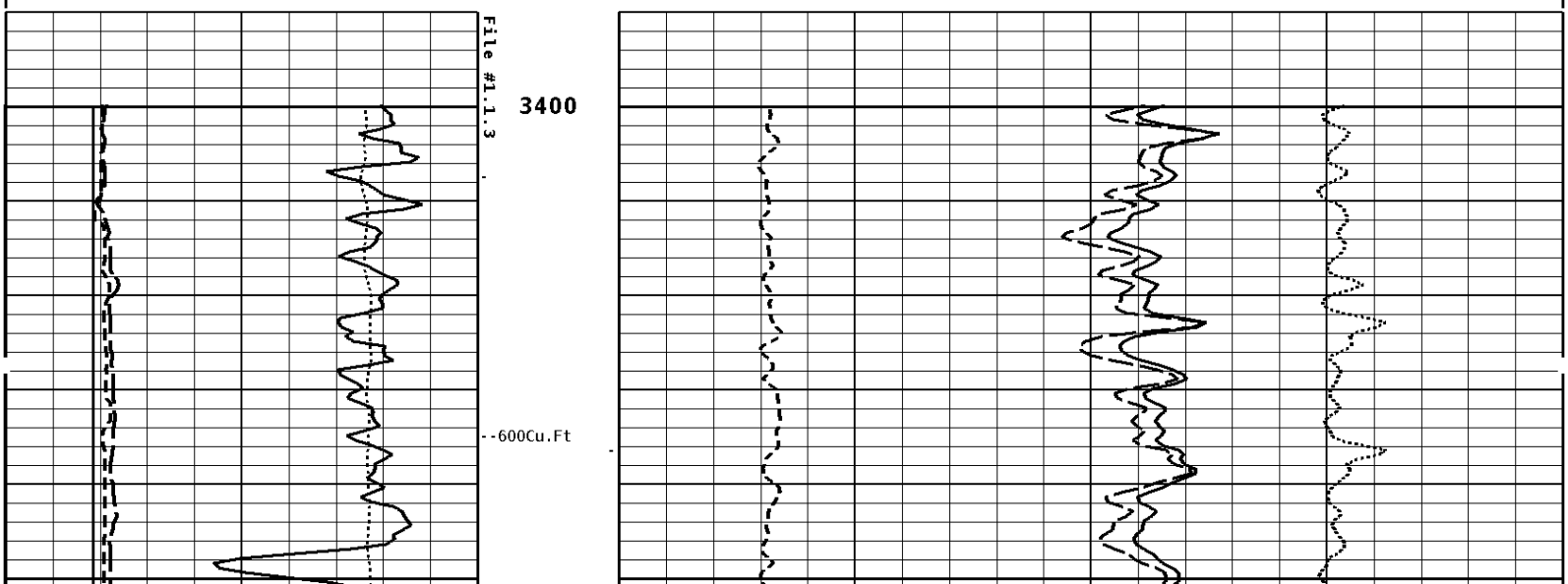
3.0	4.0
2.0	3.0
1.0	2.0

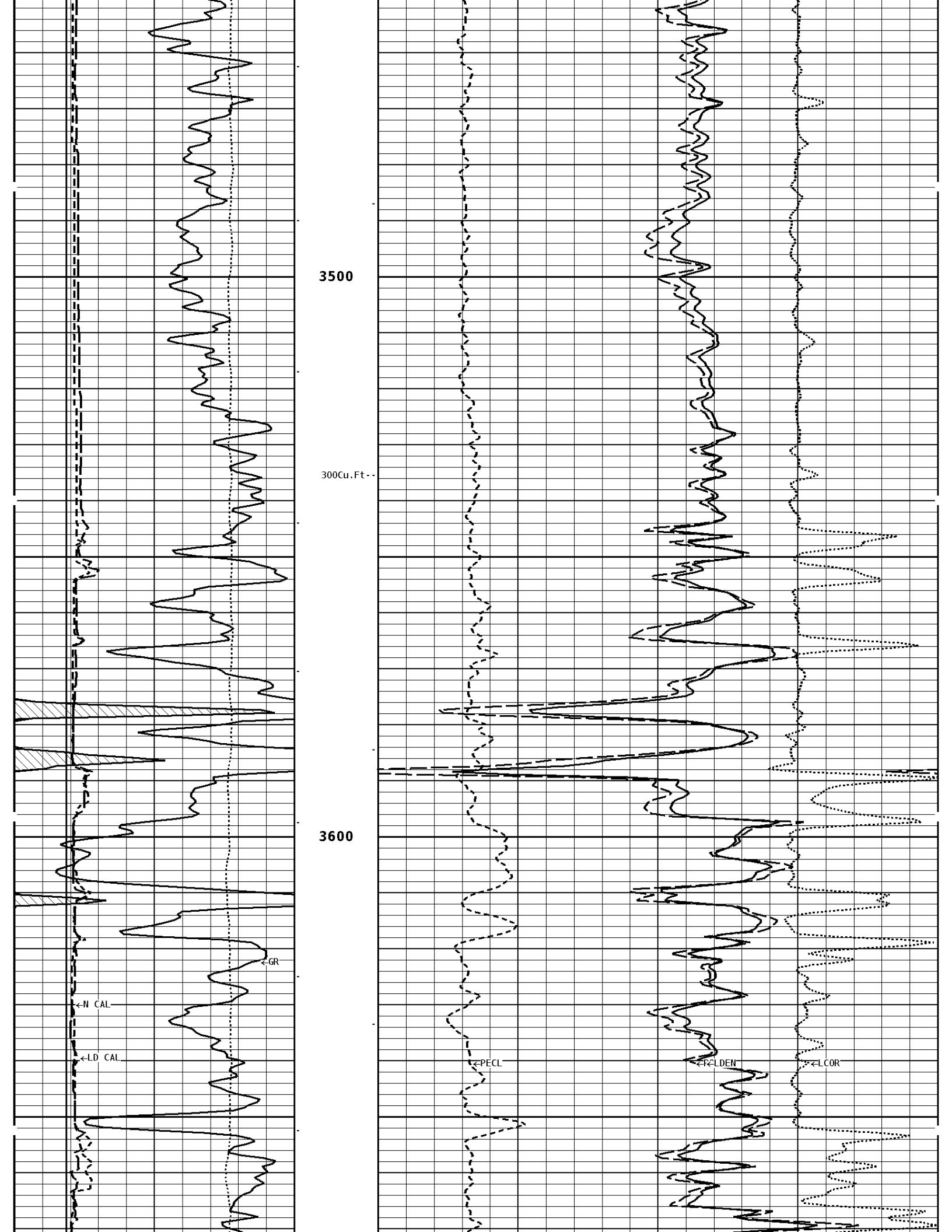
DENSITY POROSITY (2.71g/cc)
PERCENT

70	30
30	-10
-10	-50

1:240 MAIN SECTION

BULK DENSITY

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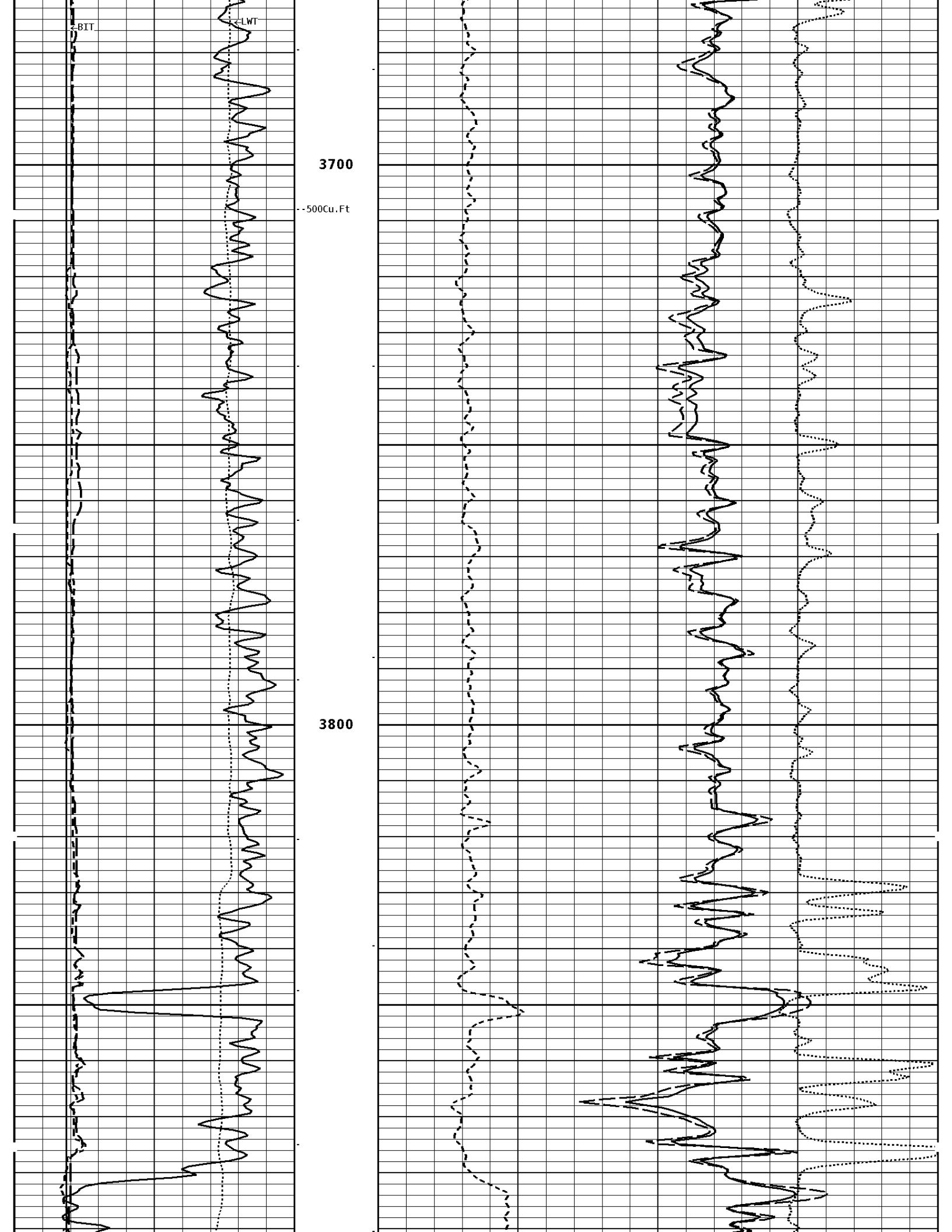
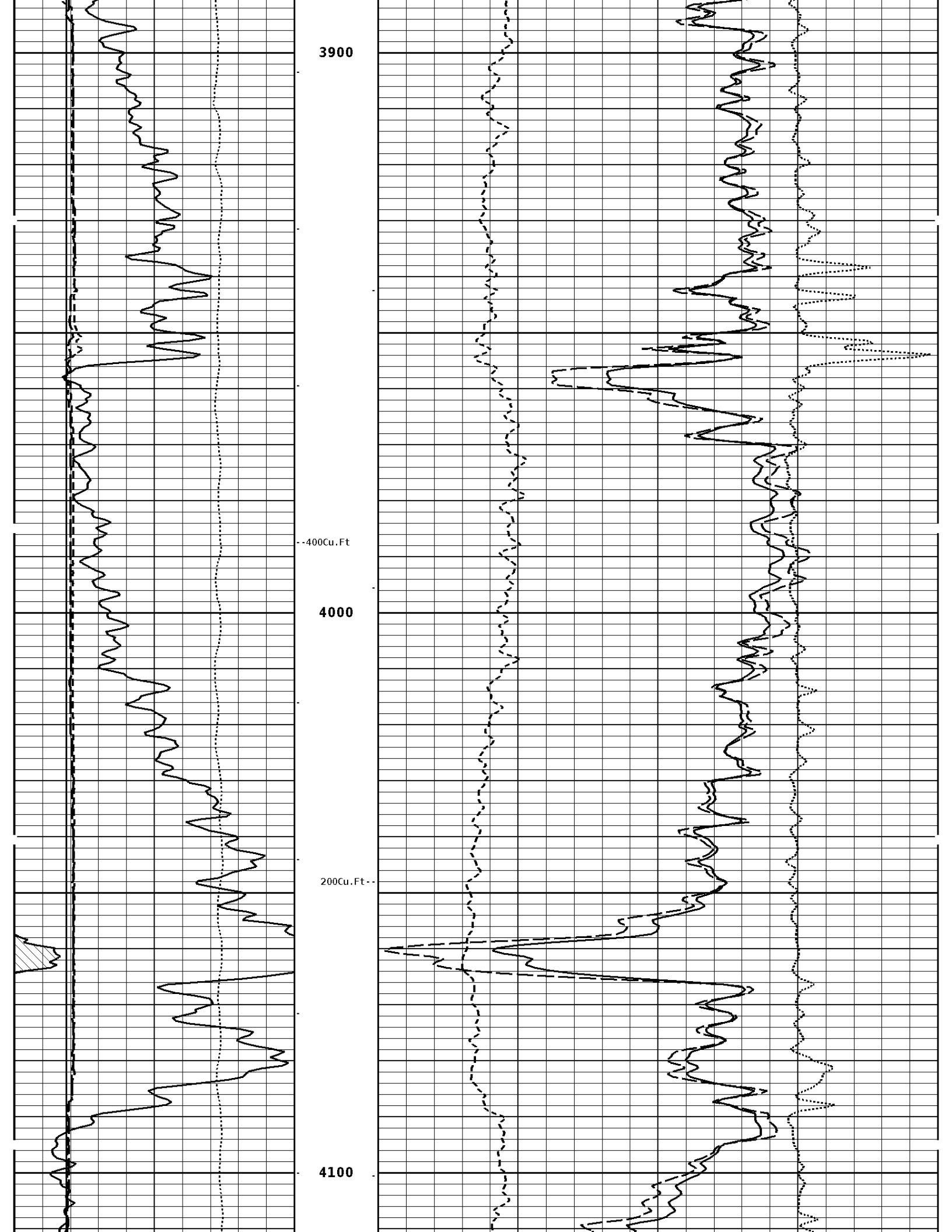
300Cu.Ft
3600
GR
N CAL
LD CAL
PECL
LDEN
LCOR


BIT
LWT
3700
500Cu.Ft
3800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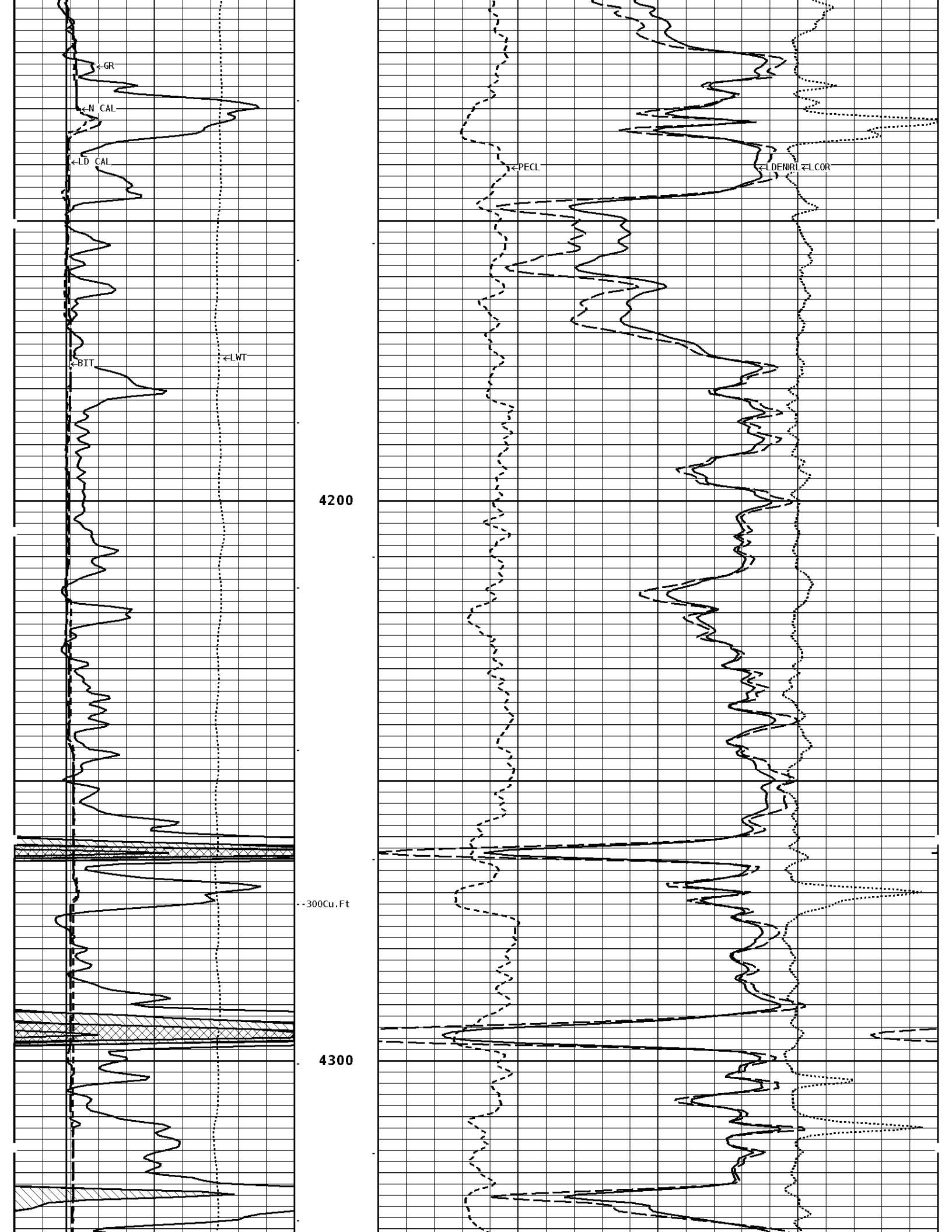
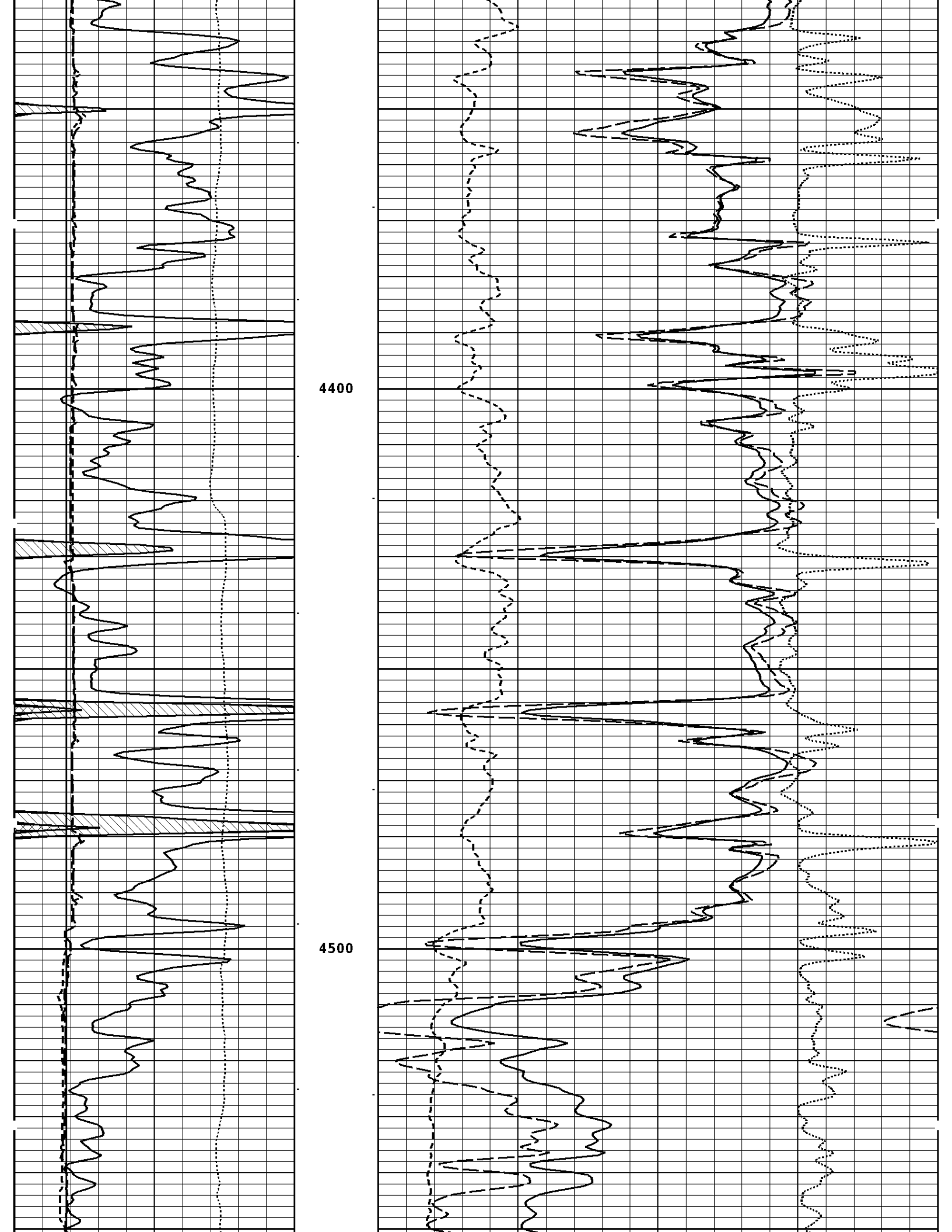
4000
200Cu.Ft--
4100


GR
N CAL
LD CAL
BIT
LWT
PECL
LDENRL
LCOR
4200
300Cu.Ft
4300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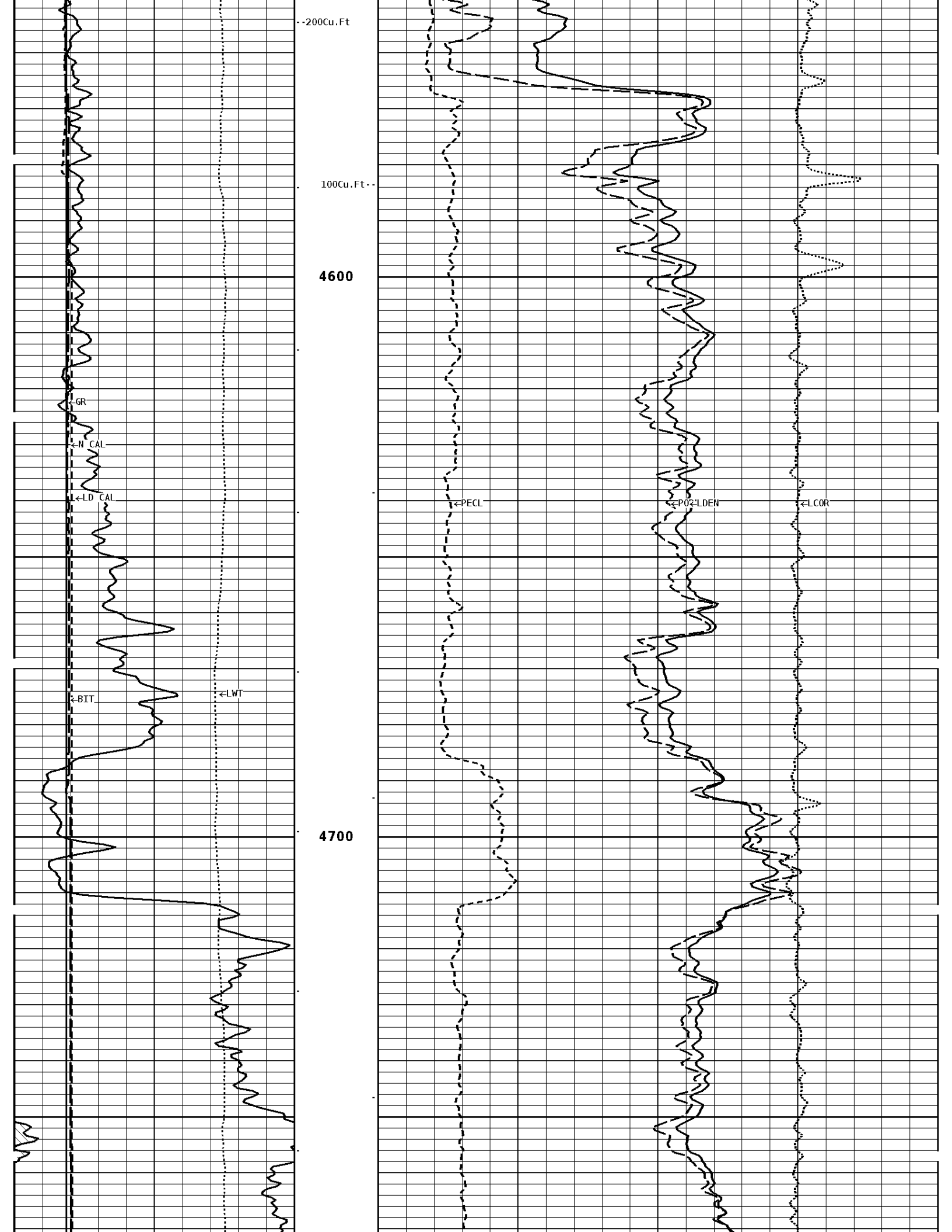
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100Cu.Ft--
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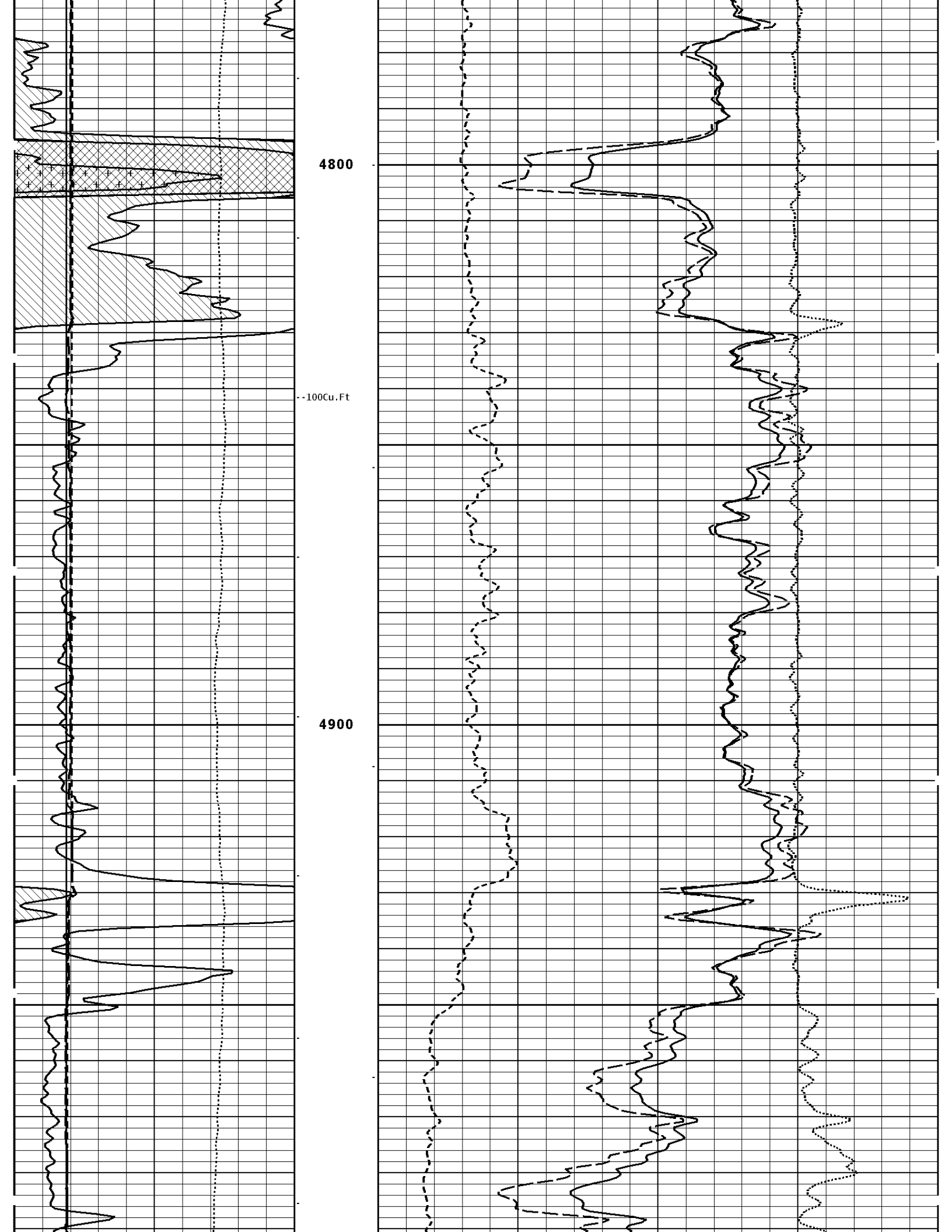
←N_CAL
←LD_CAL
←BIT
←LWT
←PECL
←PO2LDEN
←LCOR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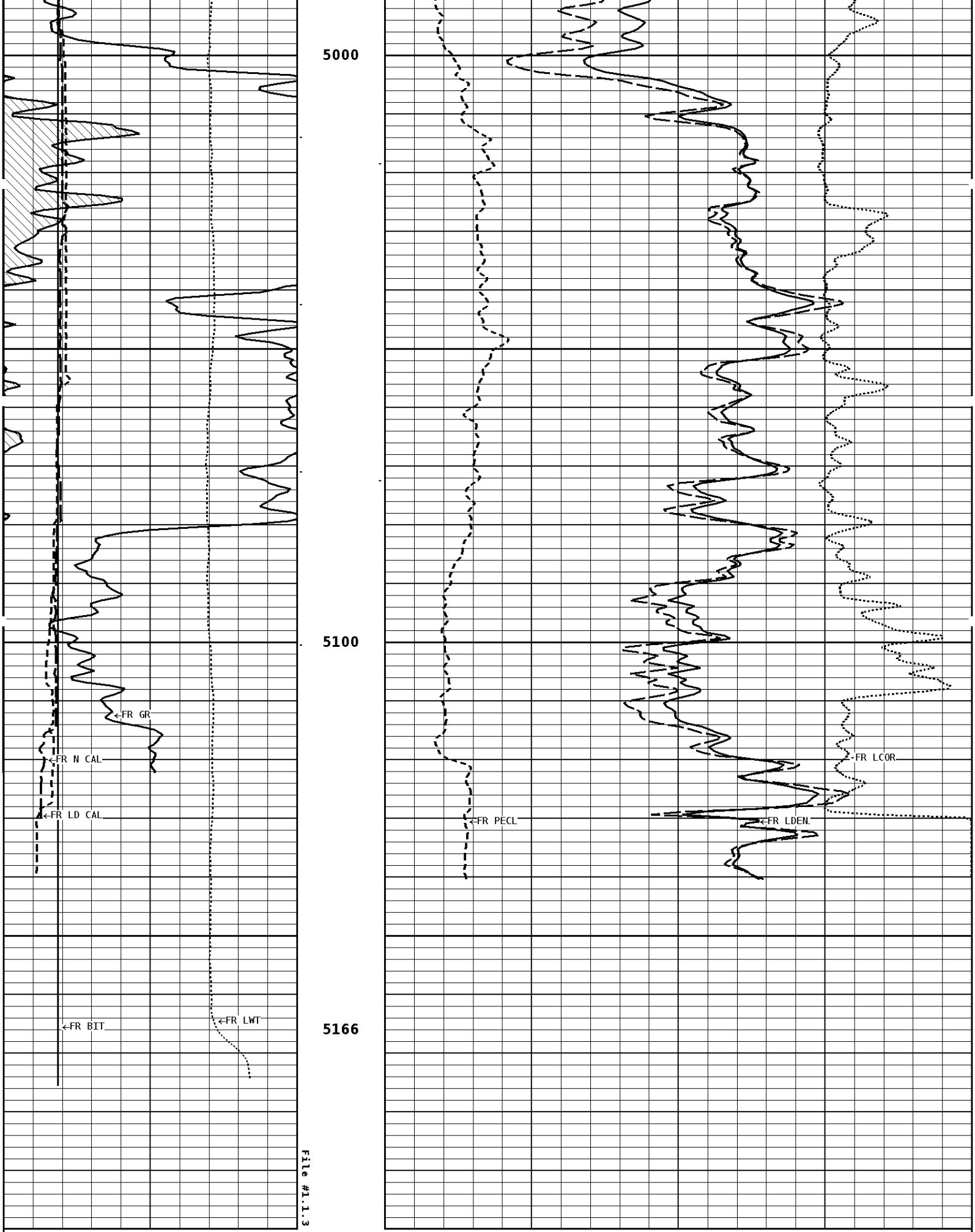

1:240 MAIN SECTION

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 : 22-SEP-2014 Time : 10:50
Sensor Suite : CALI-BCN ID : NDT-BB-103

	Jig - Measured Ring#1	Jig - Measured Ring#2	Jig - Calibrated Ring#1	Jig - Calibrated Ring#2	Units
CL # 1	9.1	14.0	6.0	12.0	IN.

Performed : 22-Sep-2014 Time : 10:07
Sensor Suite : BHC NEUT ID : CNP-AA-116-
Source ID : N-1045

	Tank Measured	Tank Calibrated	Verification Jig	Units
N/F	3.8497	3.6893	3.6848	
Porosity	23.0	20.5	20.4	%

Shop Calibration
LDT-DF

Performed : 07-OCT-2014 Time : 10:30
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	11.3	6.0	12.0	IN.

Performed : 07-Oct-2014 Time : 10:22

Sensor Suite : BHCPELNG ID : LDP-DA-067
Source ID : 2991GW

Short Space

	BKGD	Al	Mg	Al+Fe	Units
LSW1	61	1039	1684	682	CPS
LSW2	66	1212	1927	876	CPS
LSW3	240	2777	4476	2364	CPS
LSW4	295	2602	3774	2281	CPS
LSW5	43	75	80	71	CPS
LSW6	58	65	66	65	CPS
LSW7	47	50	51	51	CPS
LSW8	12	15	16	14	CPS
QS	0.109	0.127	0.125	0.124	
PES			2.778	5.967	
SSDN		2.600	1.680		G/CC

Long Space

	BKGD	Al	Mg	Al+Fe	Units
LLW1	121	1212	4993	733	CPS
LLW2	153	2069	8151	1518	CPS
LLW3	482	3799	14491	3281	CPS
LLW4	520	1813	5803	1634	CPS
LLW5	59	63	111	60	CPS
LLW6	166	155	148	158	CPS
LLW7	105	98	96	98	CPS
LLW8	3	6	16	5	CPS
QL	0.228	0.223	0.215	0.234	
PEL			2.697	5.458	
LSDN		2.600	1.680		G/CC

Shop Calibration
MST-DA

Performed : 16-OCT-2014 Time : 07:59
Sensor Suite : CALI-MSN ID : MST-DA-26

	Jig - Measured		Jig - Calibrated		Units
	Ring#1	Ring#2	Ring#1	Ring#2	
CL # 1	7.1	11.2	6.0	12.0	IN.

Performed : 10-Sep-2014 Time : 10:01
Sensor Suite : MSTDA-NI ID : MST-DA-26

Internal

	Measured			Calibrated		
	Zero	Reference	Units	Zero	Reference	Units
INV-V	79.0	29879.9		0.00	1546.00	MV
NOR-V	0.0	29958.1		0.00	1546.00	MV
IN-C	0.0	30310.3		0.00	15.46	UA
INV-R					32.34	OHMM
NOR-R					55.11	OHMM

Performed : 10-Sep-2014 Time : 10:03
Sensor Suite : MSTDAMSF ID : MST-DA-26

Internal

	Measured			Calibrated		
	Zero	Reference	Units	Zero	Reference	Units
MSFC	24.0	58325.0		0.00	1522.00	UA
MSFB	32761.0	61949.3		0.00	1522.00	MA
MOM1	0.0	56443.2		0.00	1522.00	MV
MSFRA					43.30	OHMM

Tucker ENERGY SERVICES

Company: CHIEFTAIN OIL COMPANY INC.
Well: DIEL #6
Location: 3058' FSL & 2996' FEL
Logged: 10-21-2014
K.B. Elev: 1362.0 Ft