Tucker ENERGY SERVICES

COMPENSATED NEUTRON

PEL DENSITY MICRO LOG

Company CHIEFTAIN OIL CO., INC.
Well DOUGLAS-KENT #5-18
Field RHODES SOUTH
County BARBER
State KANSAS
Country USA
API No. 15-007-24224-0000

File No : TUL-59745
Company : CHIEFTAIN OIL CO., INC.
Well : DOUGLAS-KENT #5-18
Field : RHODES SOUTH
County : BARBER
State : KANSAS
Country : USA
API No : 15-007-24224-0000

Location :
340' FSL & 340' FEL
NW SE SE SE

LSD : **Sect :** 18 **Twp :** 34S **Rge :** 11W

Permanent Datum:	GL	**Elevations:**		**Services:**	
Drilling Measured From:	KB	**KB**	1404.00 Ft	CNT	PIT
Log Measured From:	KB	**DF**	1403.00 Ft	LDT	
Above Permanent Datum:	8.00 Ft	**GL**	1396.00 Ft	MLT	

Date	09-29-2014			
Run Number	1			
Depth--Driller	5229.0 Ft			
Depth--Logger	5234.0 Ft			
First Reading	5211.0 Ft			
Last Reading	302.0 Ft			
Casing--Driller	302.0 Ft			
Casing--Logger	302.0 Ft			
Bit Size	7.875 In			
Casing Size	13.375 In			
Hole Fluid Type	CHEM-GEL			
Density	9.3			
Fluid Loss	8.0			
PH/Viscosity	10.0	54.0		
Sample Source	MEASURED			
RM@Measured Temp.	2.000 @ 75 F			
RMF@Measured Temp	1.600 @ 75 F			
RMC@Measured Temp.	2.400 @ 75 F			
Source RMF/RMC	CALCULATED	CALCULATED		
RM@BHT	1.200 @ 130 F			
Time Circulation Stopped	09-29-2014 10:00 am			
Max Recorded Temp.	130 F			
Equipment/Base	127	TULSA		
Recorded By	SHELDON TYLER			
Witnessed By	DAVID BARKER			

Casing Strings

Size (In)	Weight (Lbs)	Bottom (Ft)	Top (Ft)
13.375	45.00	302.00	0.00

Bitsize Intervals

Size (In)	Bottom (Ft)
7.875	5229.00

Run Number	1
Date	09-29-2014
Date/Time On Bottom	09-29-2014 1:00 pm
Depth to Fluid	0.0 Ft
Salinity	4500.000
RMF@BHT	0.960 @ 130 F
RMC@BHT	1.440 @ 130 F

Run Number 1

Comments

ALL PRESENTATIONS AS PER CUSTOMER REQUEST
GRT, CNT, LDT, 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

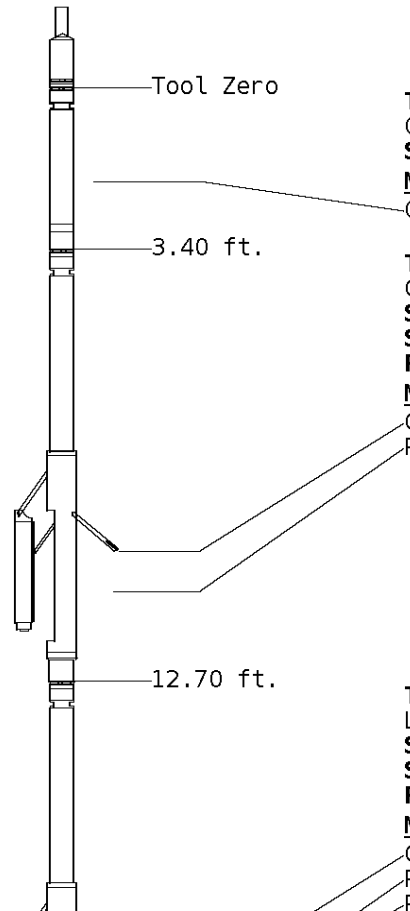
CUSTOMER REQUESTED DETAIL PULLED TO 3400'

GRT: GRP, GRX
CNT: PHIN, CLCNIN, PHXN
LDT: PORL, LCORN, PECLN, LDENN, PORLLS, CLLDIN, PRXL, PECLX, LDENNX, LCORX
MLT: NOR_RF, INV_RF, MSCLPIN
PIT: ILD, ILM, SPU, SFLAEC, CIRD

OPERATORS:+4
J.JOHNSON
B.BROWN

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-006

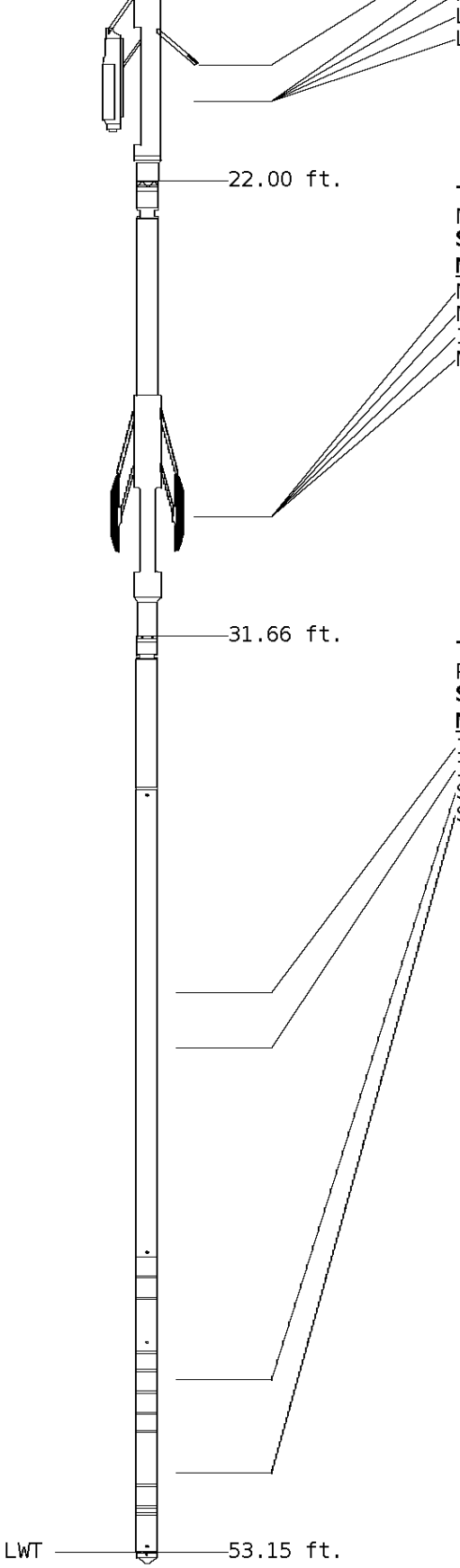
Measure Point	Tool Offset	Stack Offset	Bottom Offset
GRP	2.00	2.00	51.15

Tool: CNT-AA **Length:** 9.30 **ft.** **O.D.** 4.36 **in.**
Compensated Neutron A Pad on NDT-A
Sonde ID :NDT-BB-146
Source ID :N-1044
Pad ID :CNP-AA-115

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 :NDT-AH-152
Source ID :CSV-587
Pad ID :LDP-DA-50

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



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-24

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-CA-062

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: CHIEFTAIN_DOUGLAS_KENT_5-18_SEP29_MSTK **Scale:** 1:240 **Format:** NLD-240
Segment: V1.D1.S6 AS MAIN **Acquired:** 2014-09/29 12:59 3.4.0-13115
Reference: 0 **Processed:** 2014-09/29 14:09 3.4.0-13115

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

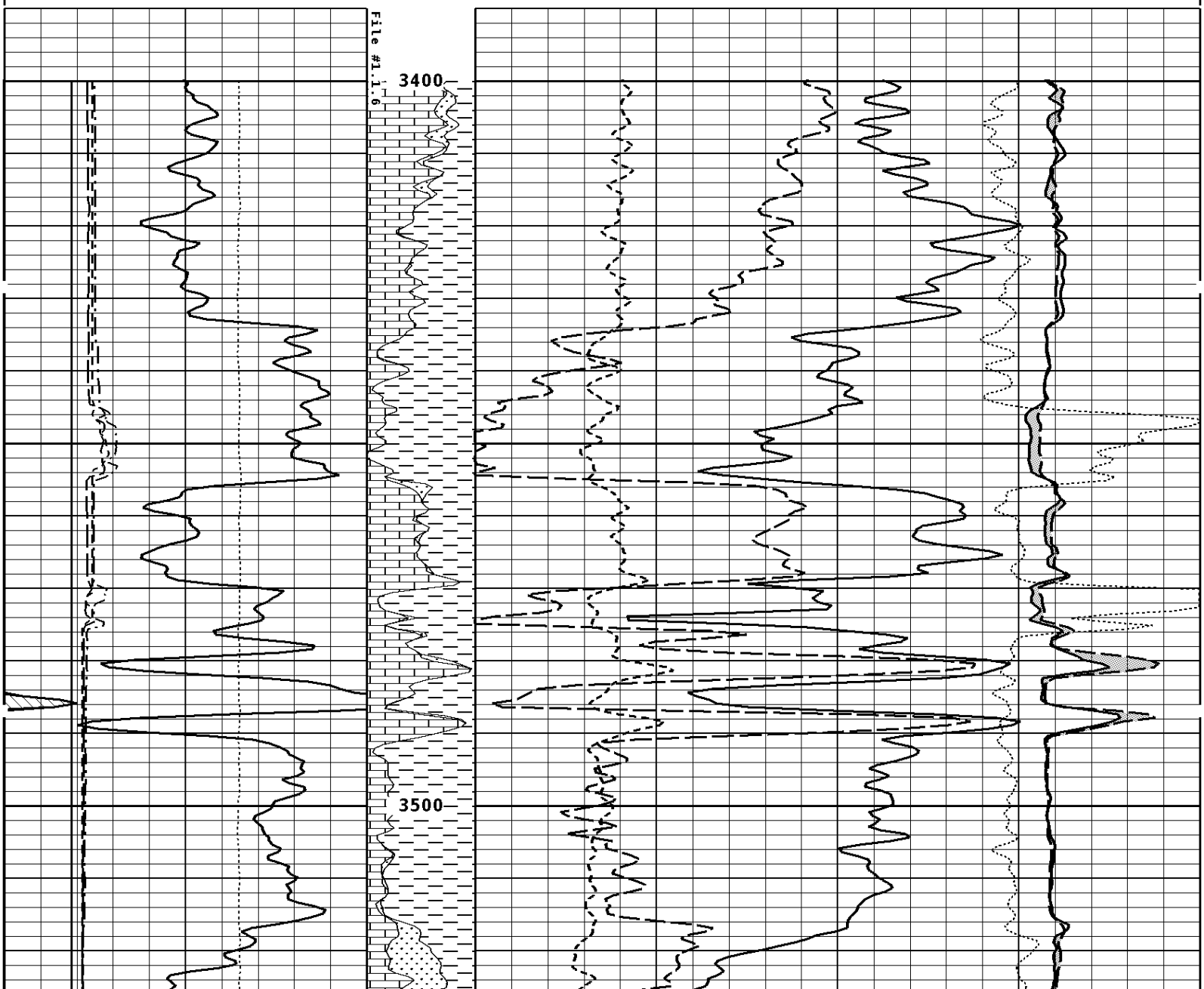
DENSITY POROSITY (2.71g/cc)
PERCENT
70 30
30 -10
-10 -50

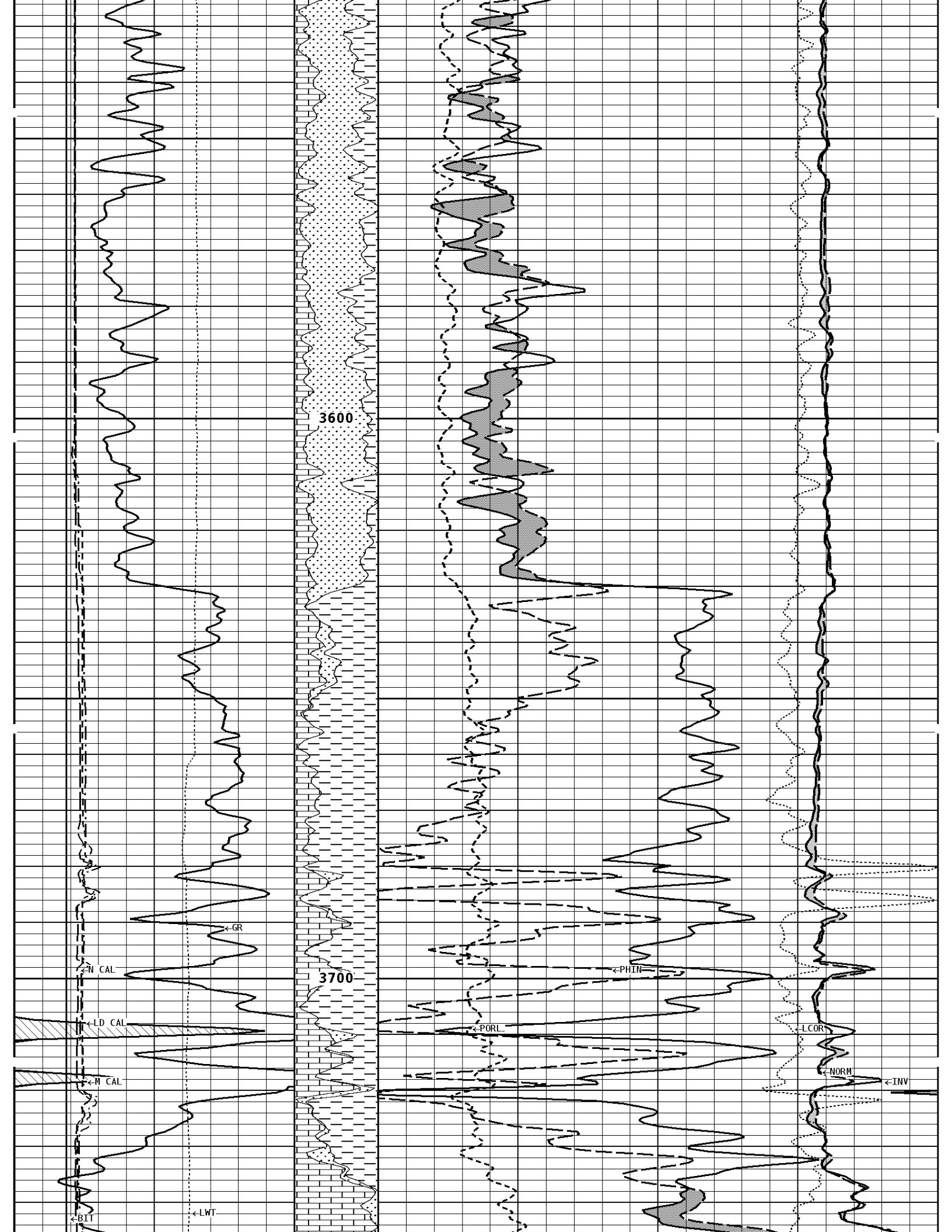
GAMMA RAY
API UNITS
150 300
0 150

Volume
Dolo/Shale

NEUTRON POROSITY (LIMESTONE)
PERCENT
30 -10

1:240 MAIN SECTION

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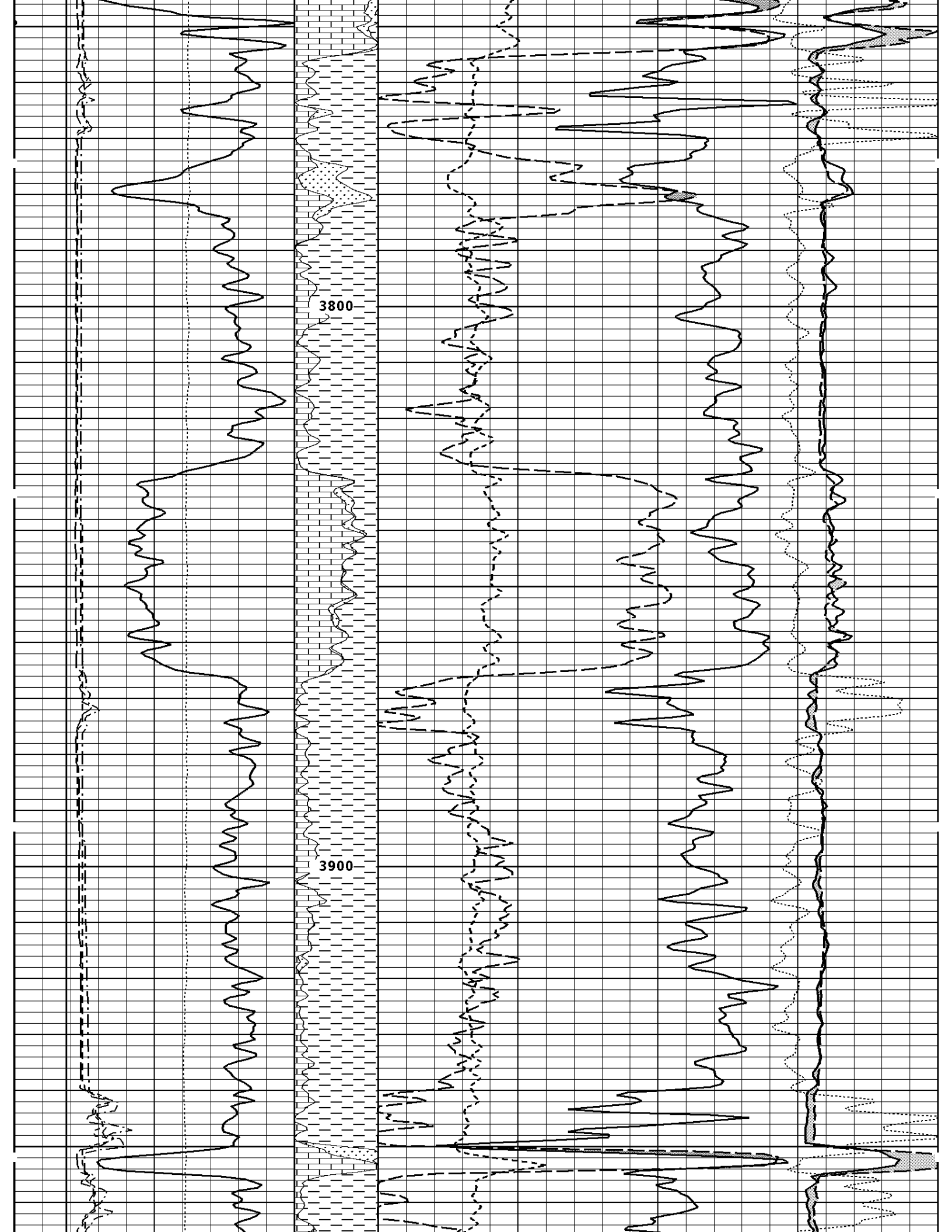
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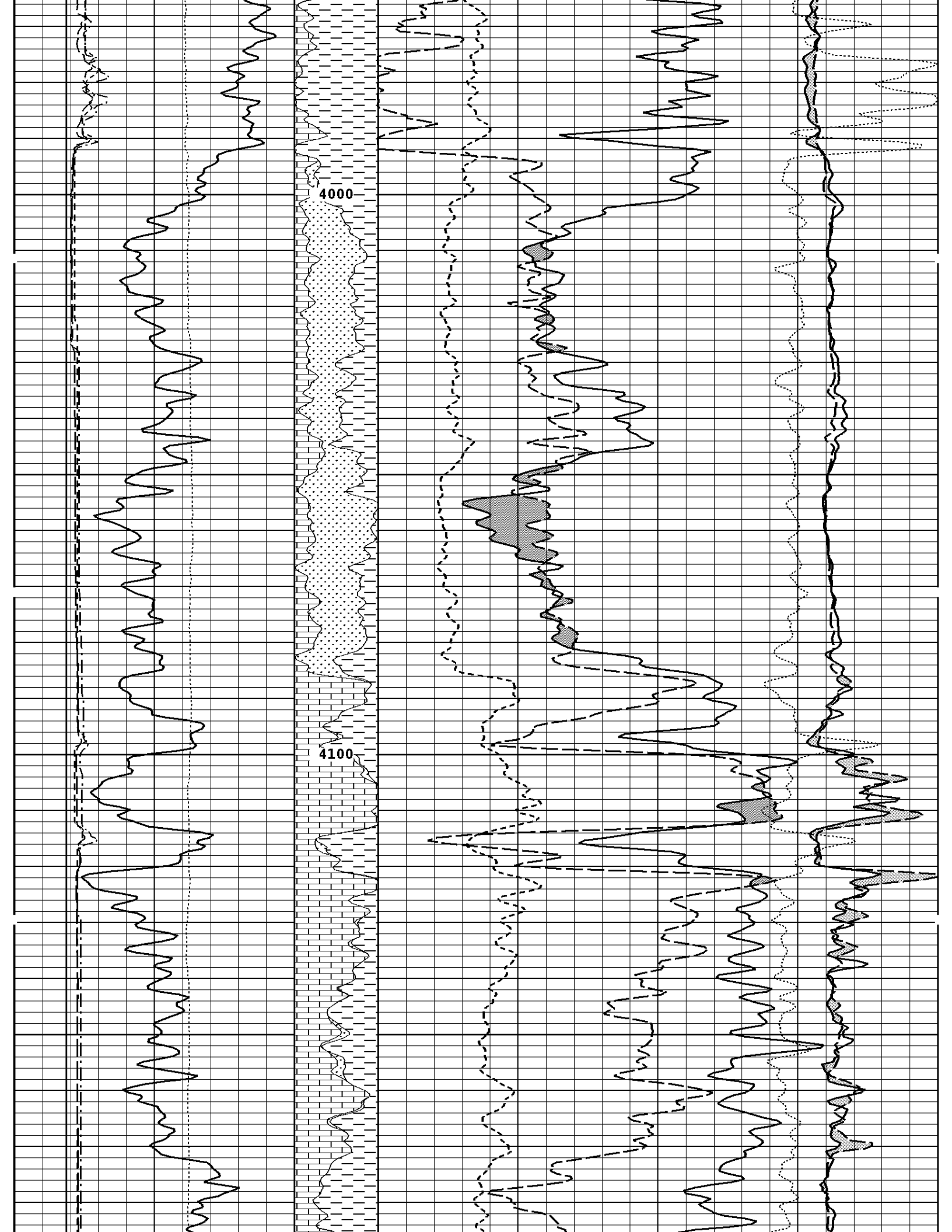
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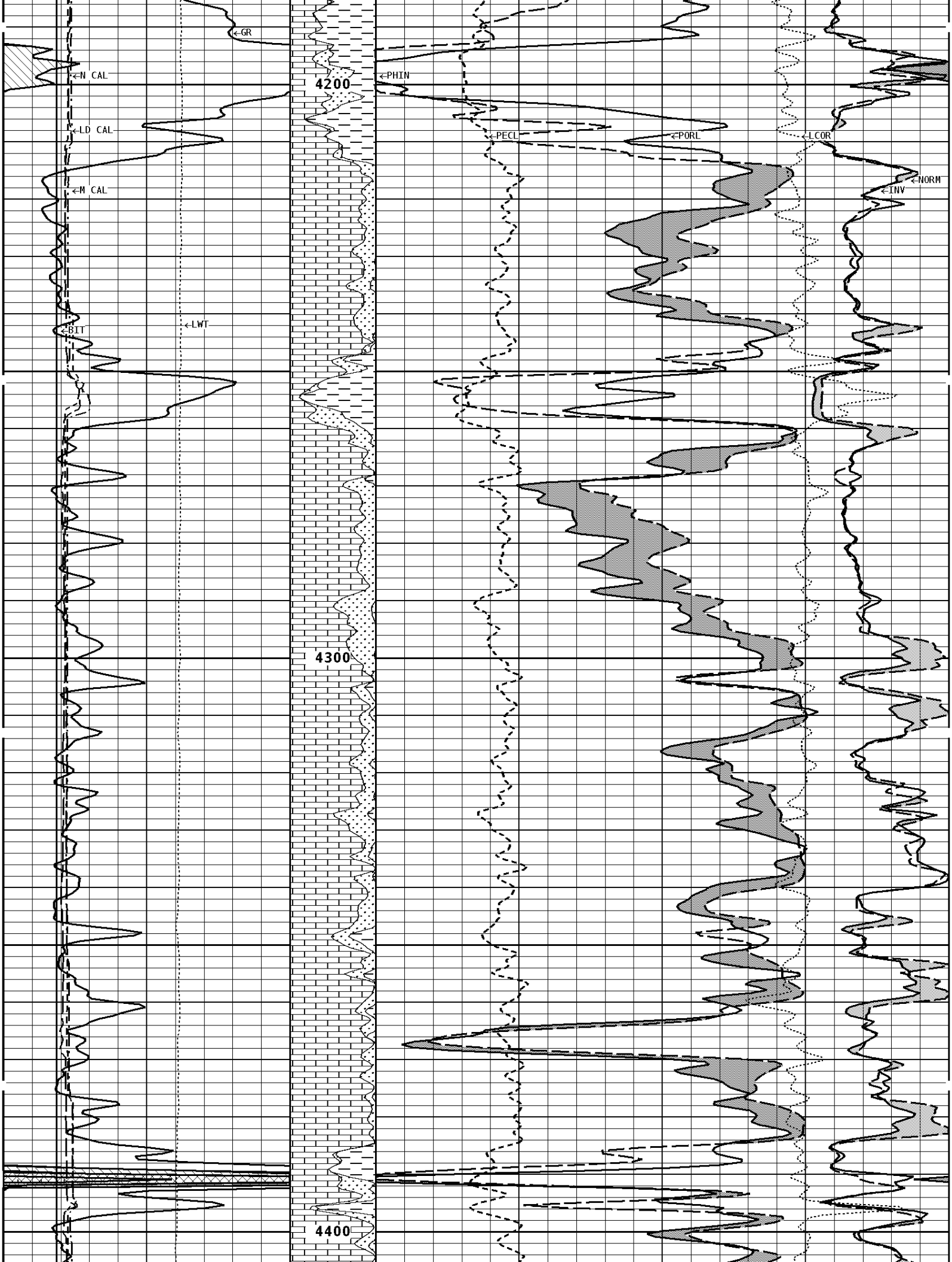
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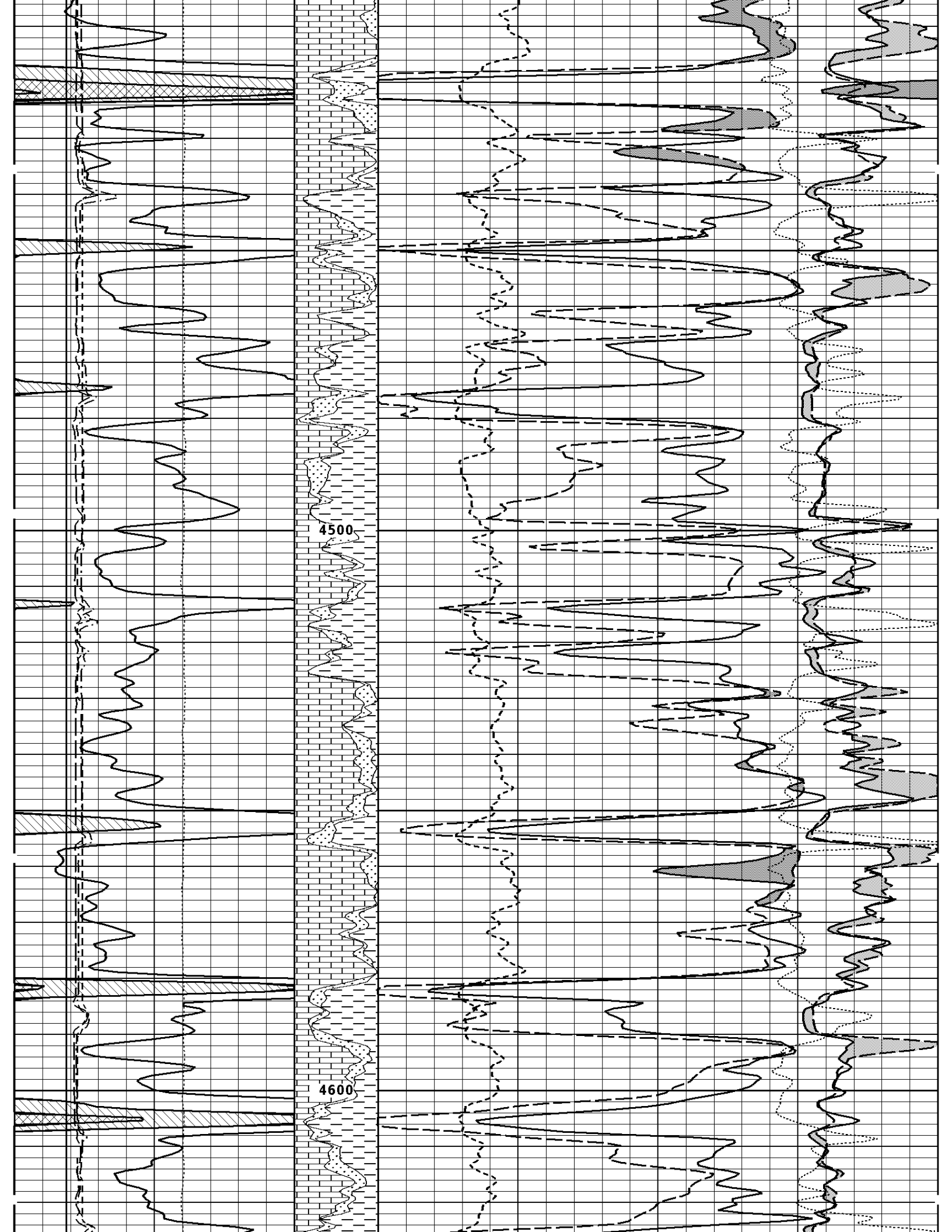
PHIN
PECL
PORL
LCOR
NORM
INV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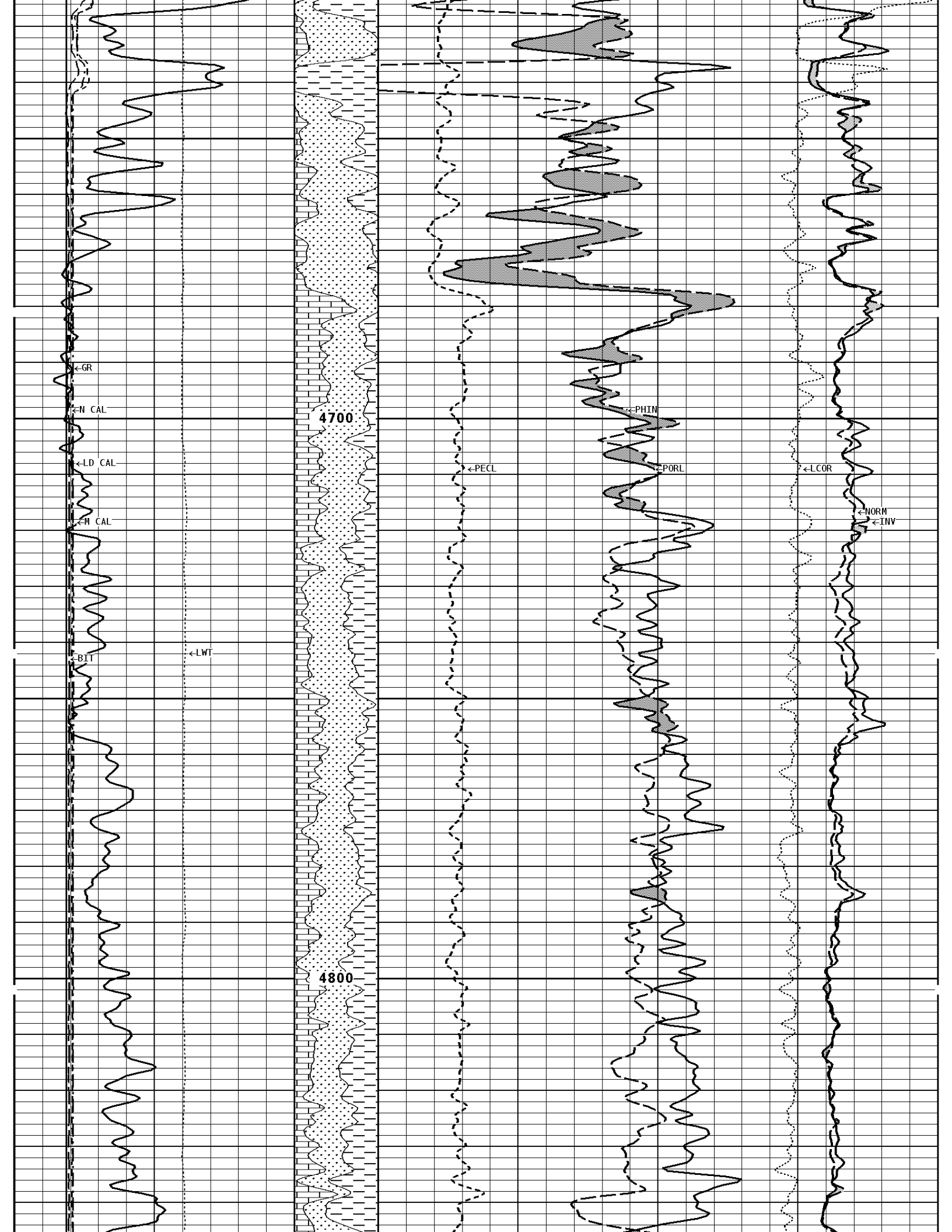
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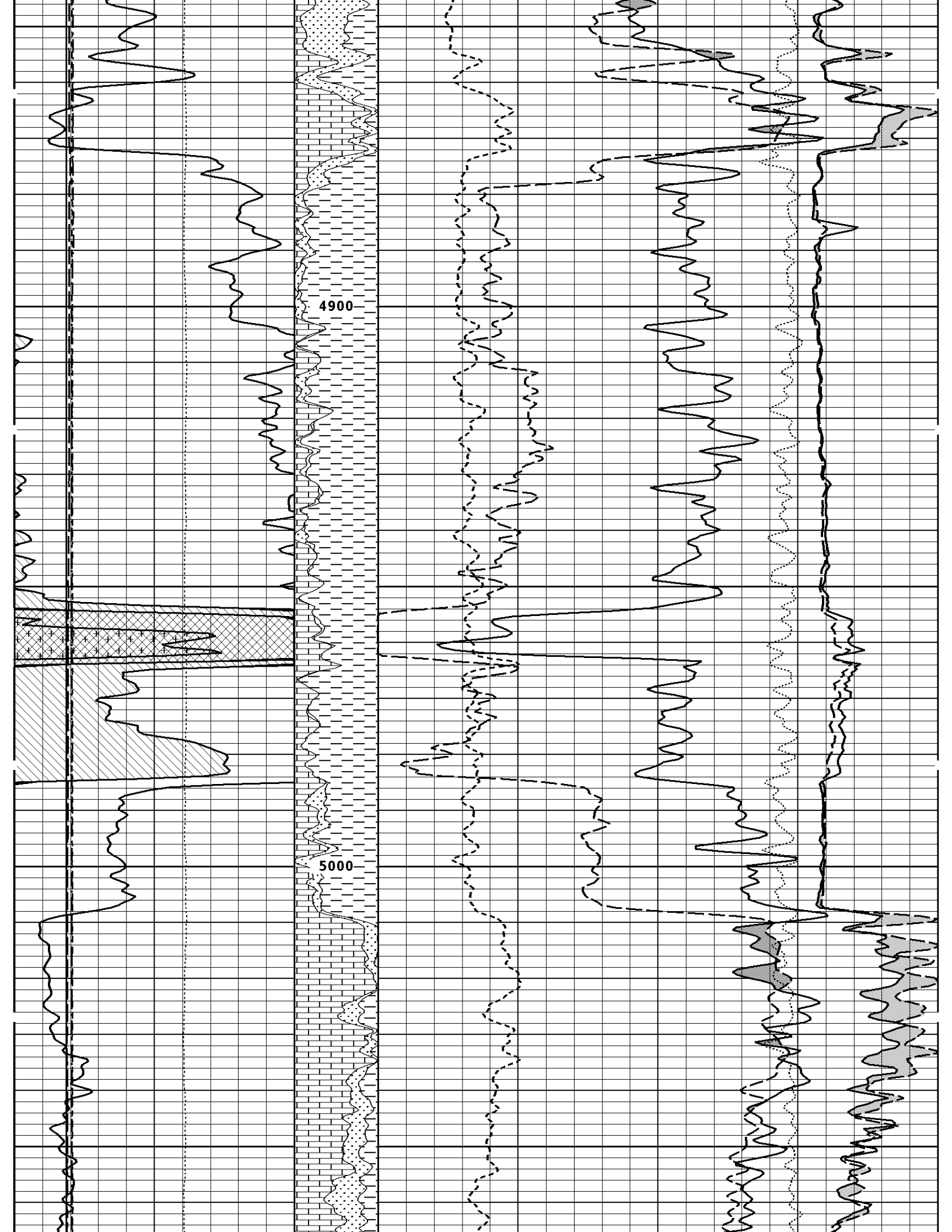
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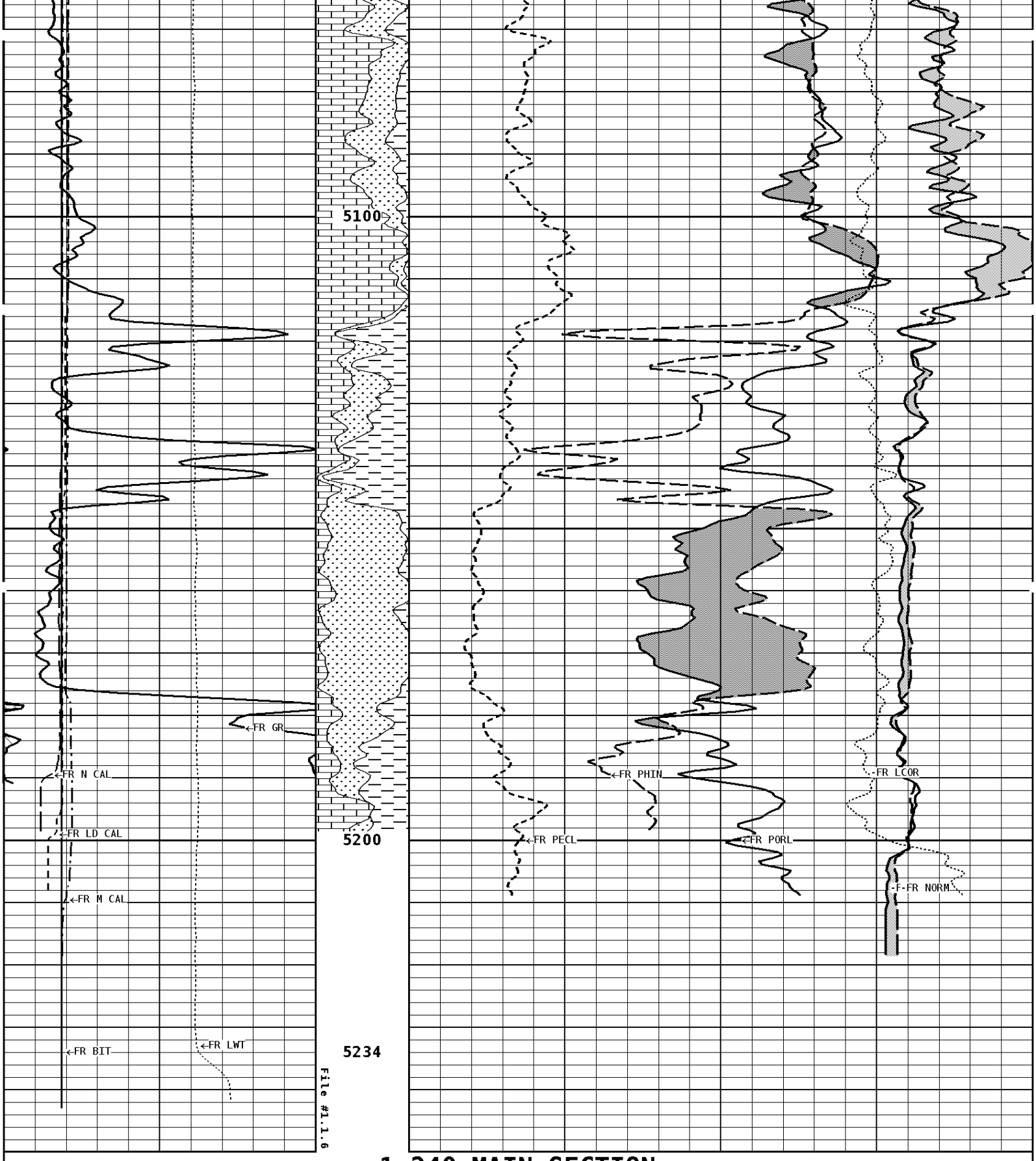


1:240 MAIN SECTION

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

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)
6 16

NORMAL
OHMM
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: CHIEFTAIN_DOUGLAS_KENT_5-18_SEP29_MSTK **Scale:** 1:240 **Format:** NLD-240
Segment: V1.D1.S7 AS REPEAT **Acquired:** 2014-09/29 12:43 3.4.0-13115
Reference: 0 **Processed:** 2014-09/29 14:11 3.4.0-13115

CALIPER MICRO
INCHES (IN)
16 26
6 16

BIT SIZE
INCHES (IN)
6 16

NORMAL
OHMM
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

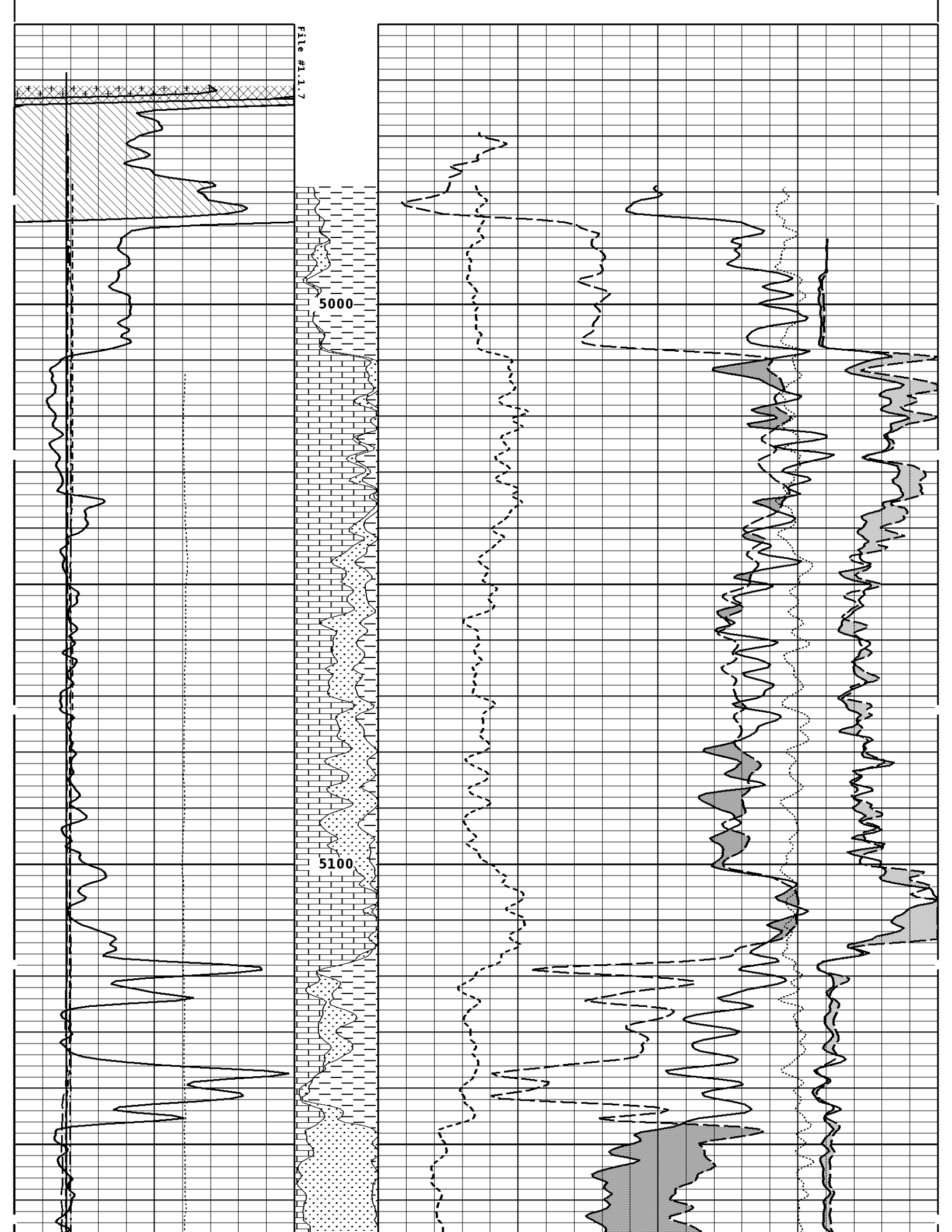
DENSITY POROSITY (2.71g/cc)
PERCENT
70 30
30 -10
-10 -50

GAMMA RAY
API UNITS
150 300
0 150

Volume
Dolo/Shale

NEUTRON POROSITY (LIMESTONE)
PERCENT
30 -10

1:240 REPEAT SECTION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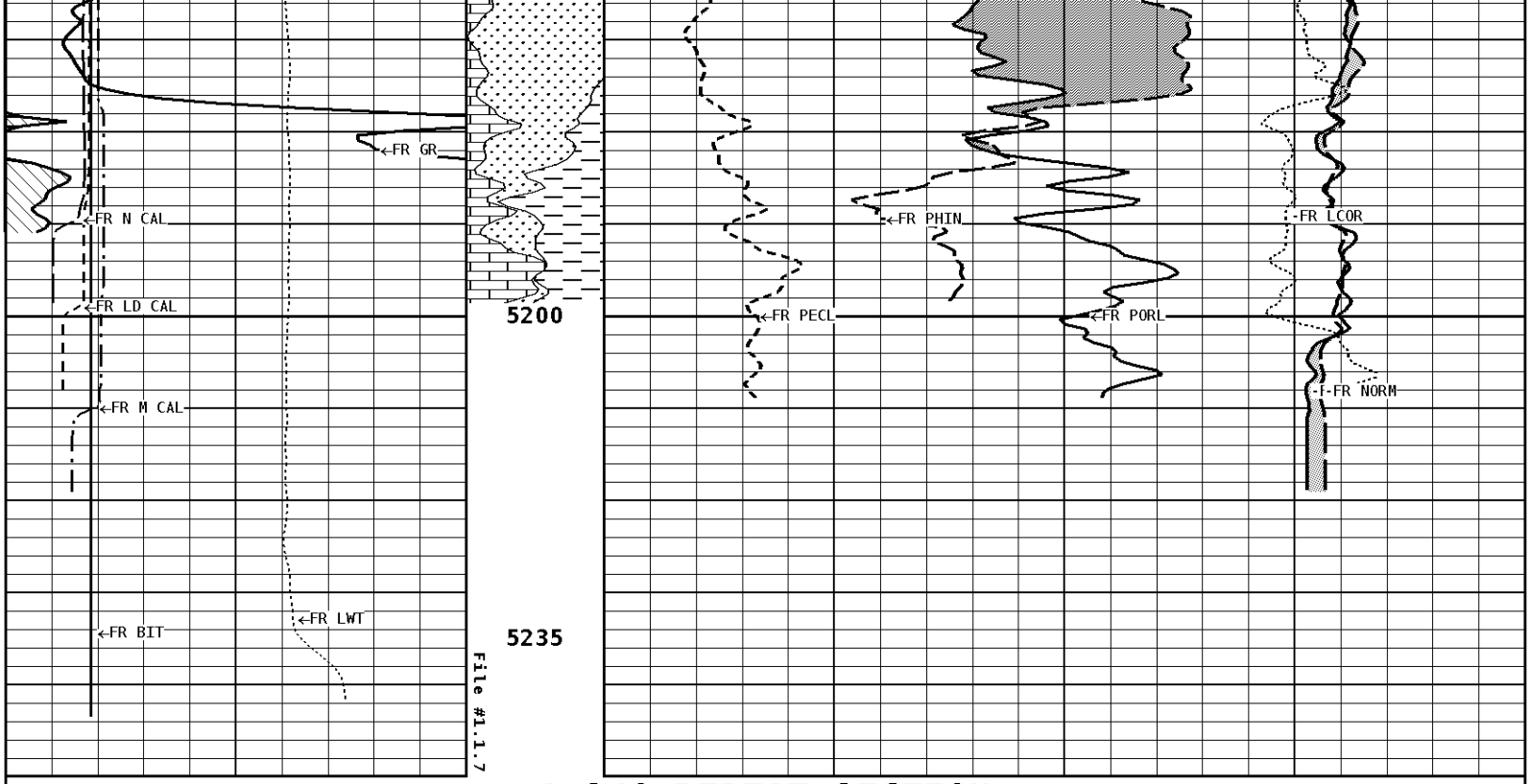


1:240 REPEAT SECTION

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)
6 — 16

NORMAL
OHMM
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:	CHIEFTAIN_DOUGLAS_KENT_5-18_SEP29_MSTK	**Scale:**	1:240 **Format:** LDT-240
Segment:	V1.D1.S6 AS MAIN	**Acquired:**	2014-09/29 12:59 3.4.0-13115
Reference:	0	**Processed:**	2014-09/29 14:09 3.4.0-13115

BIT SIZE
INCHES (IN)

6 — 16

NEUTRON (Y) CALIPER
INCHES (IN)

16 — 26
6 — 16

DENSITY (X) CALIPER
INCHES (IN)

16 — 26
6 — 16

PE CROSS-SECTION
BARNS/ELECTRON

0 — 10

DENSITY CORRECTION
G/CC

-0.25 — 0.25

TENSION
LBS

10000 — 0

COMPENSATED BULK DENSITY
G/CC

3.0 — 4.0
2.0 — 3.0
1.0 — 2.0

GAMMA RAY
API UNITS

150 — 300
0 — 150

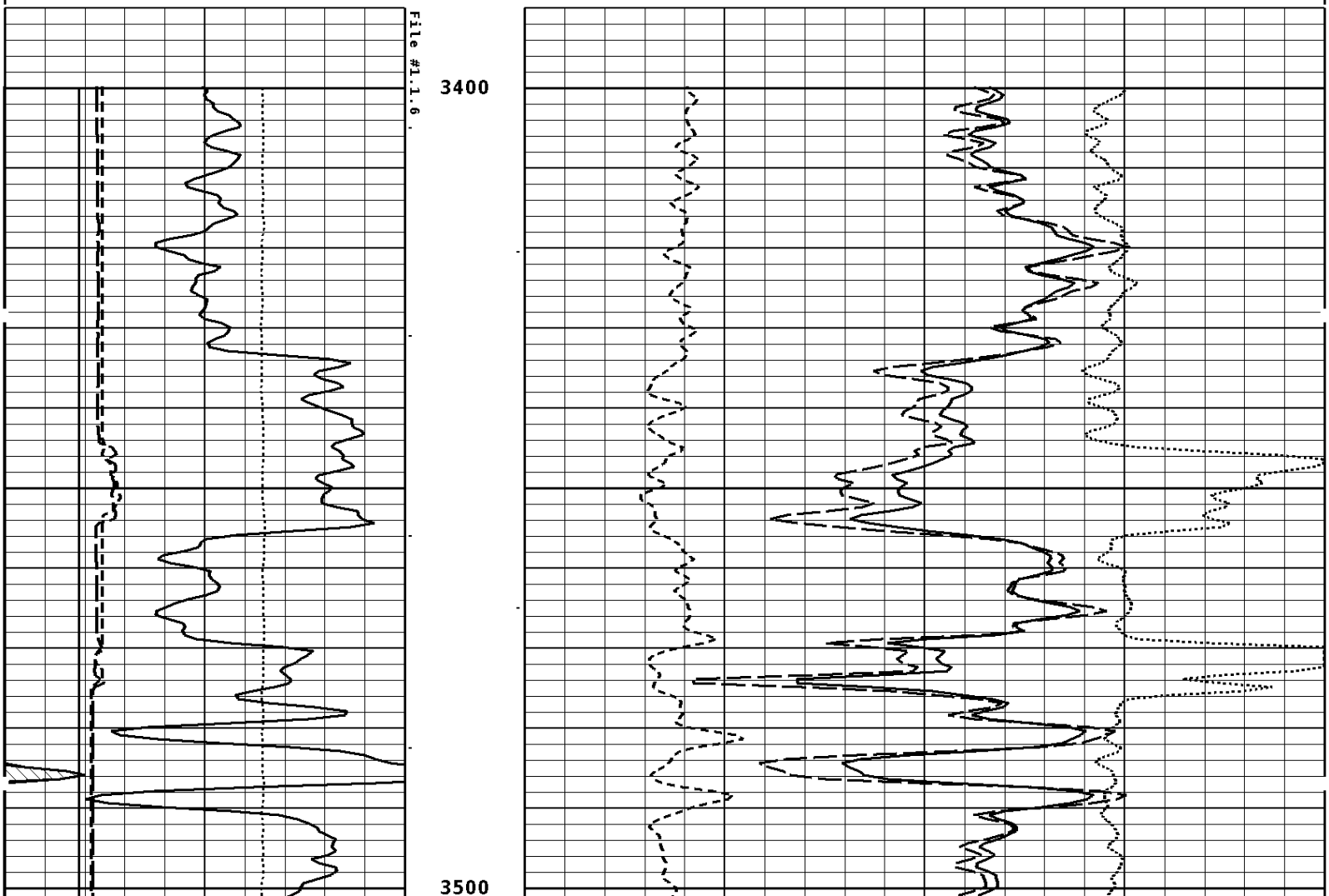
-BHV AHV-
CU.FT

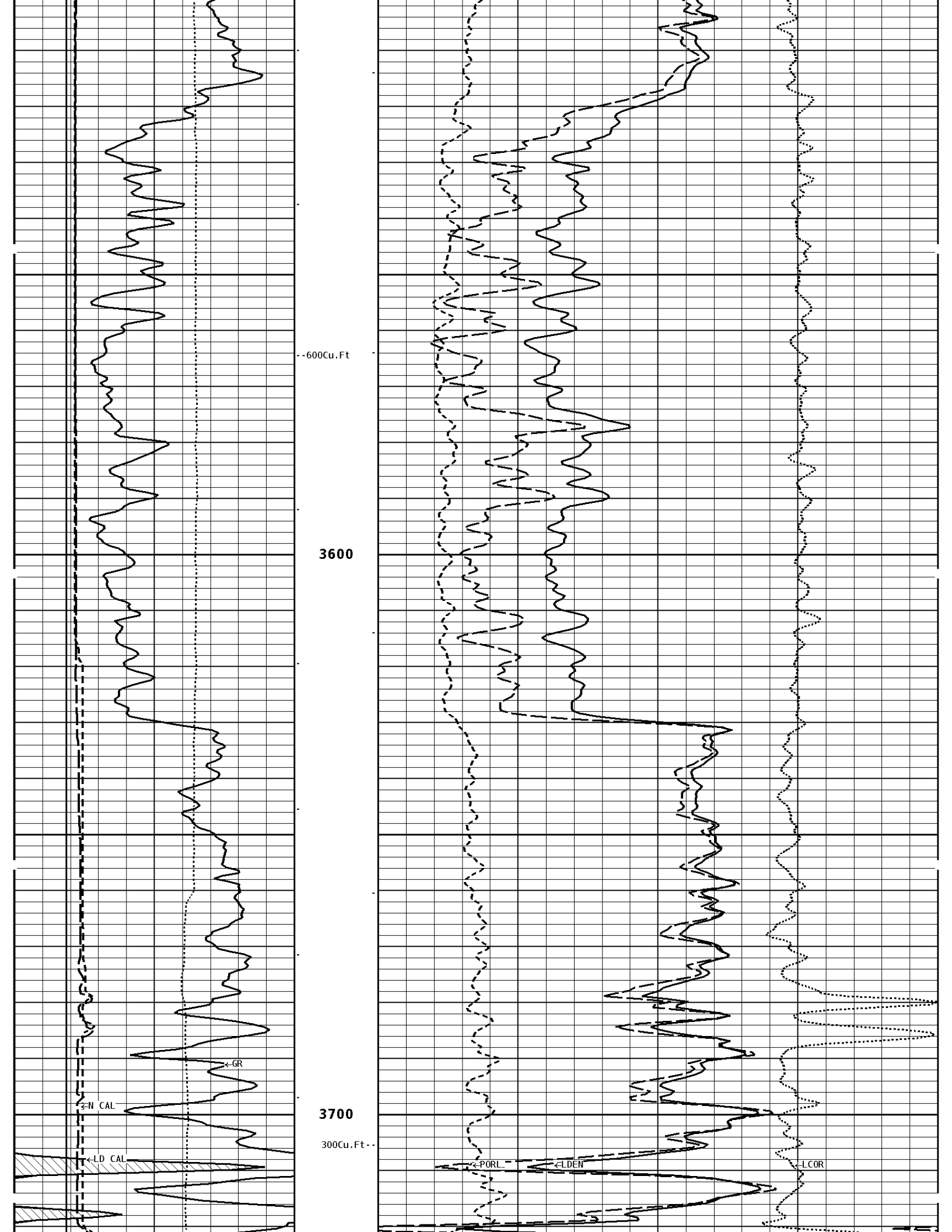
DENSITY POROSITY (2.71g/cc)
PERCENT

70 — 30
30 — -10
-10 — -50

1:240 MAIN SECTION

BULK DENSITY

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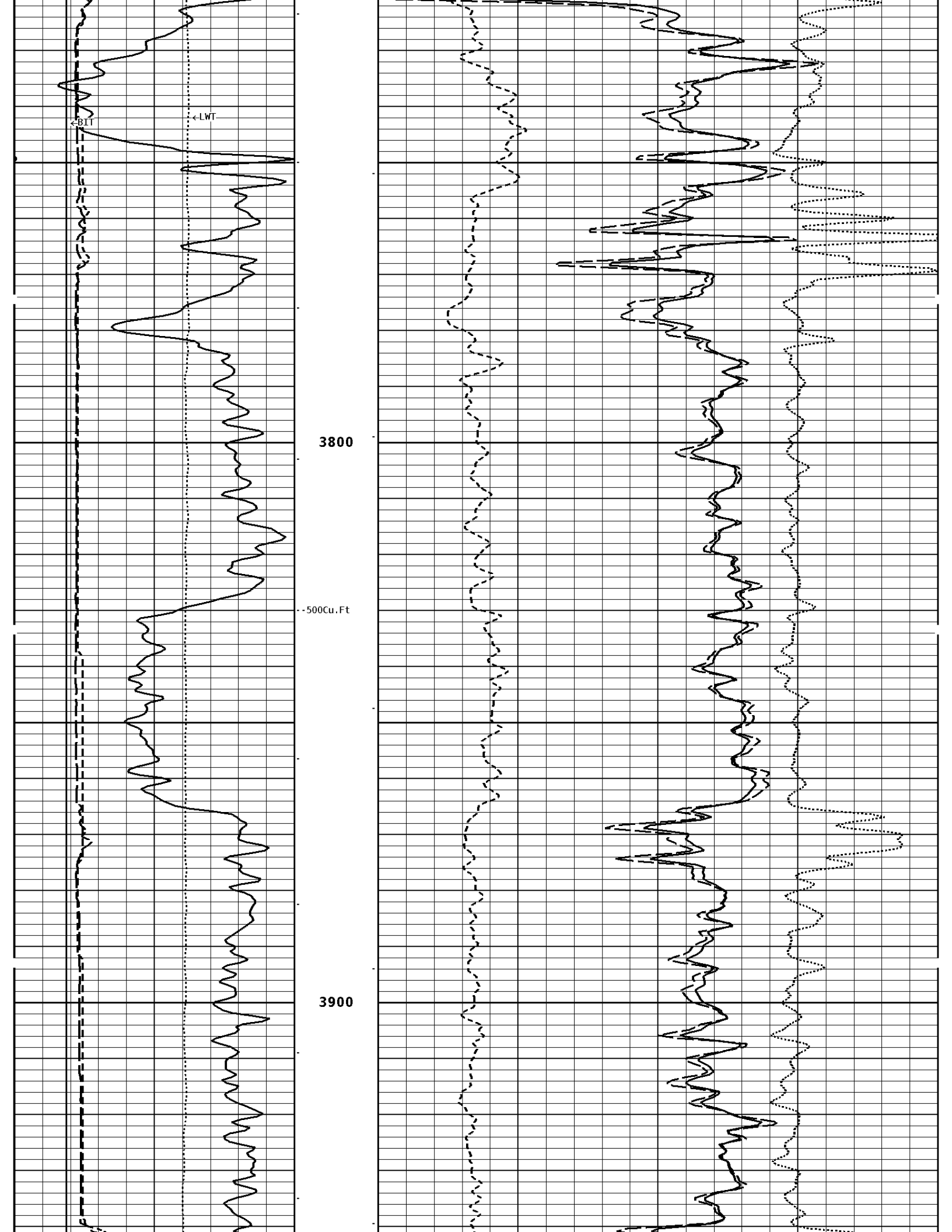
LDEN
LCOR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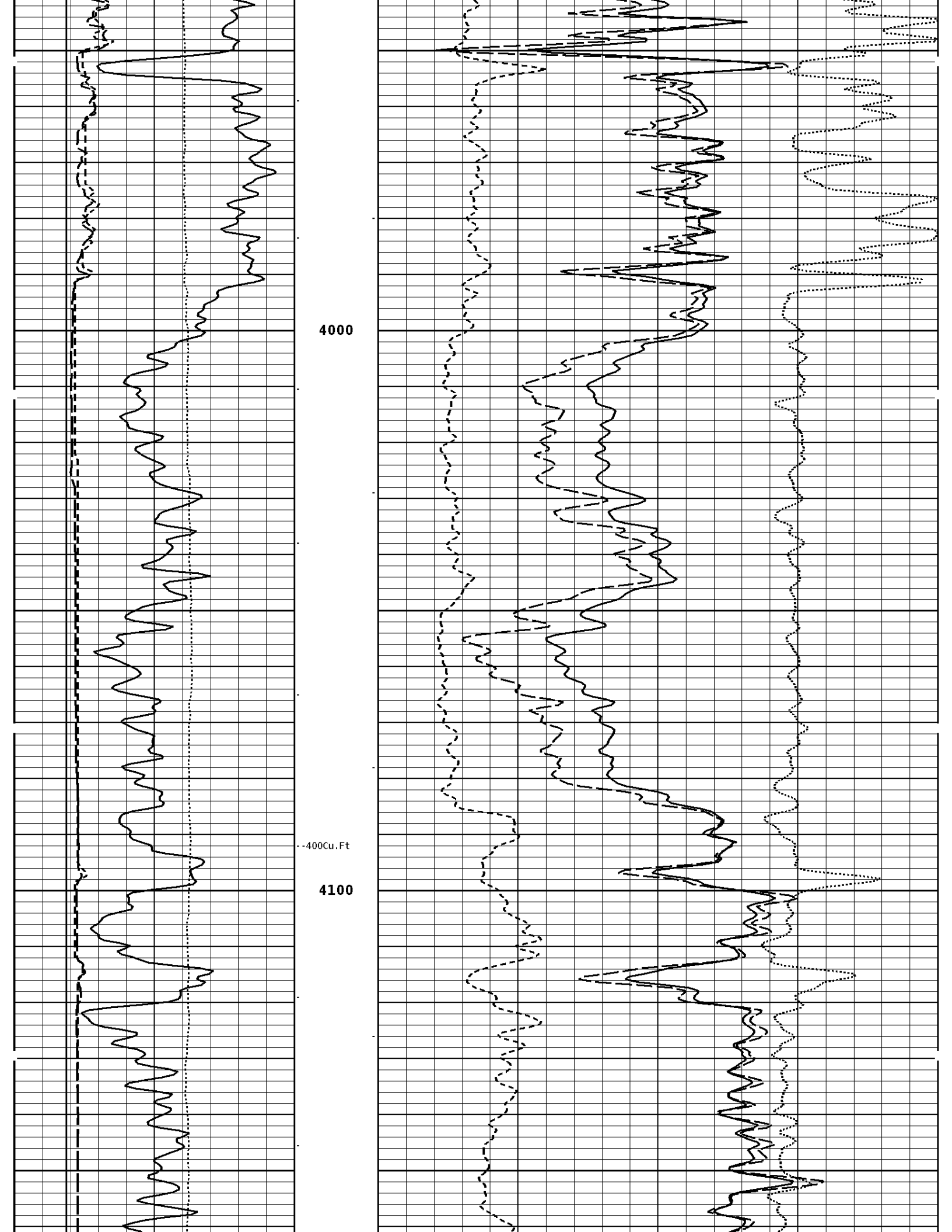
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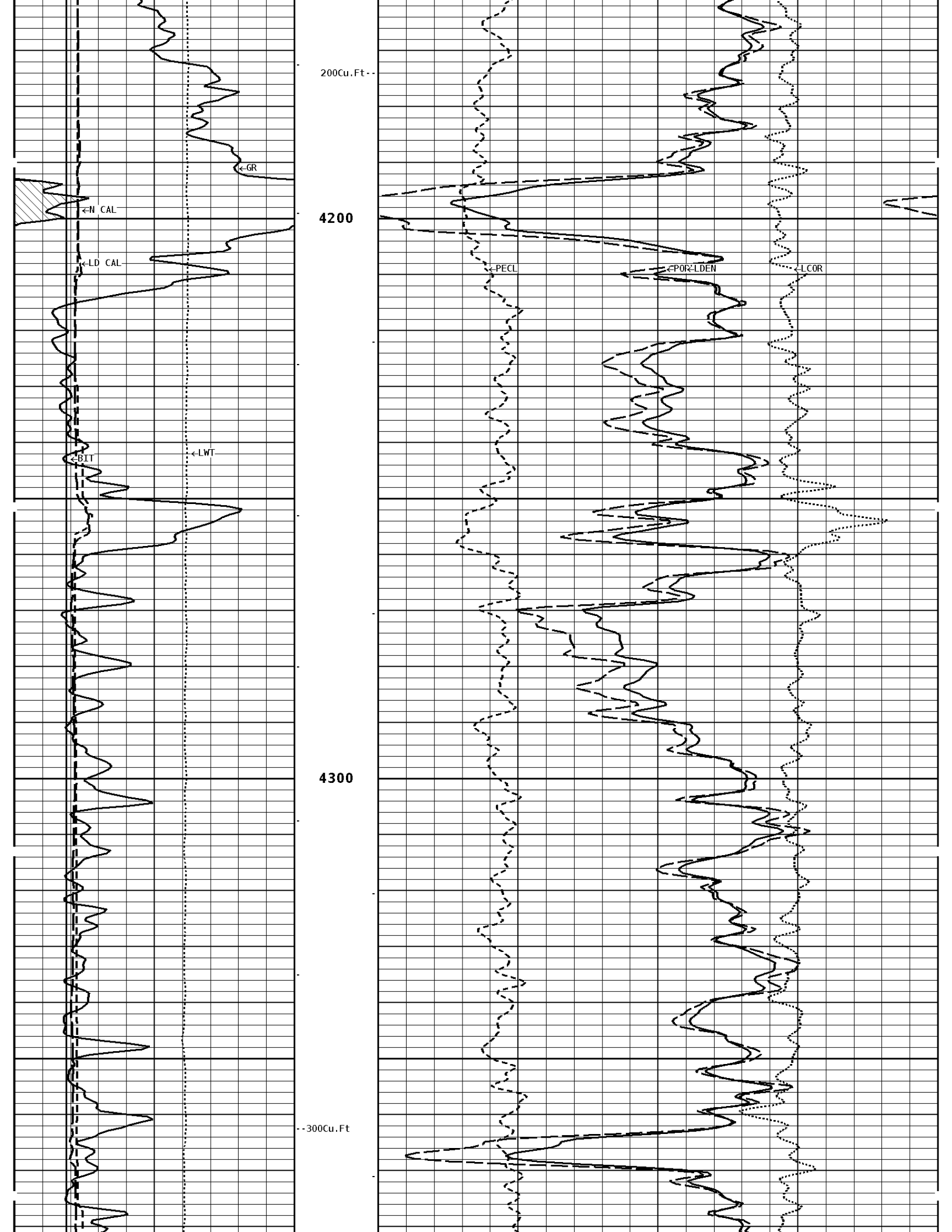
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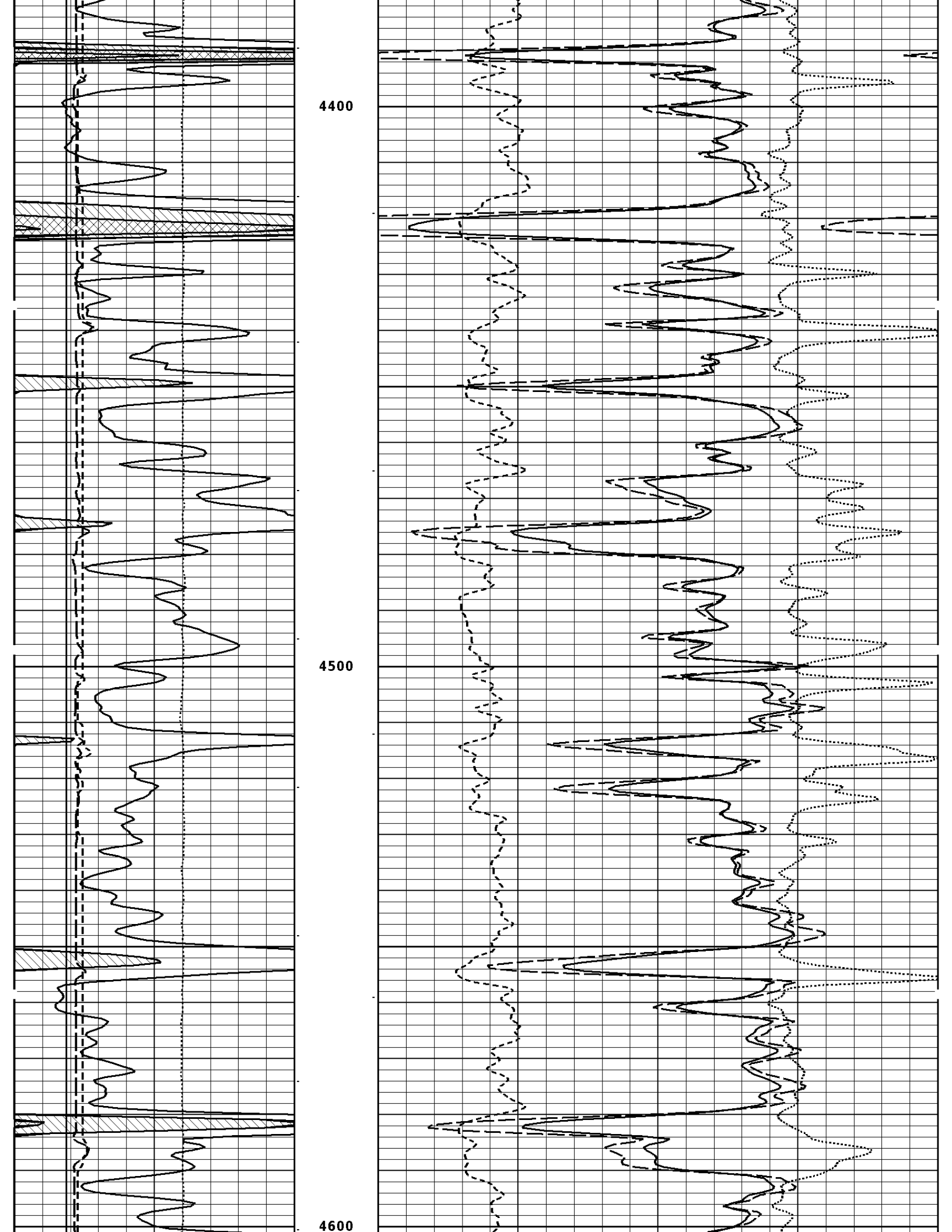
300Cu.Ft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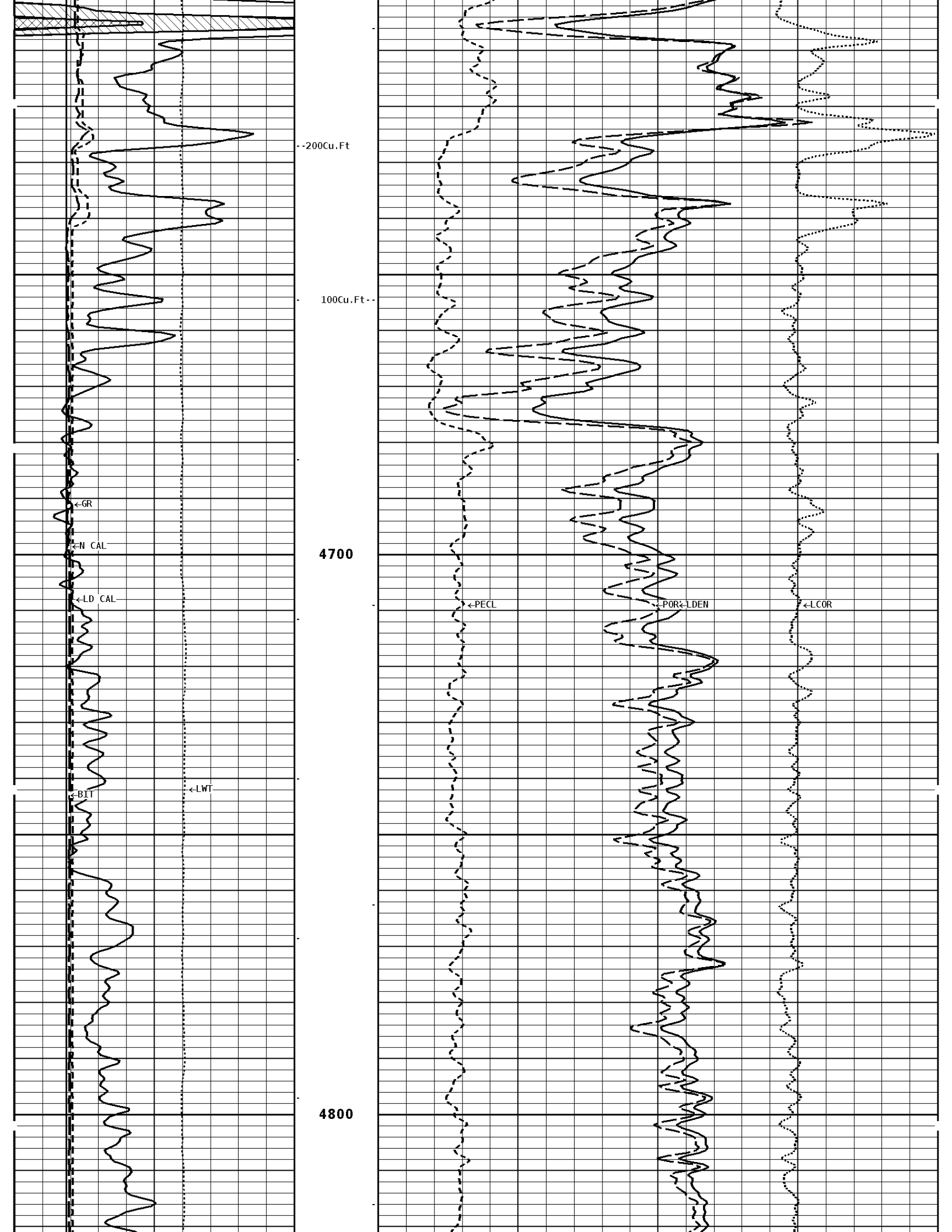
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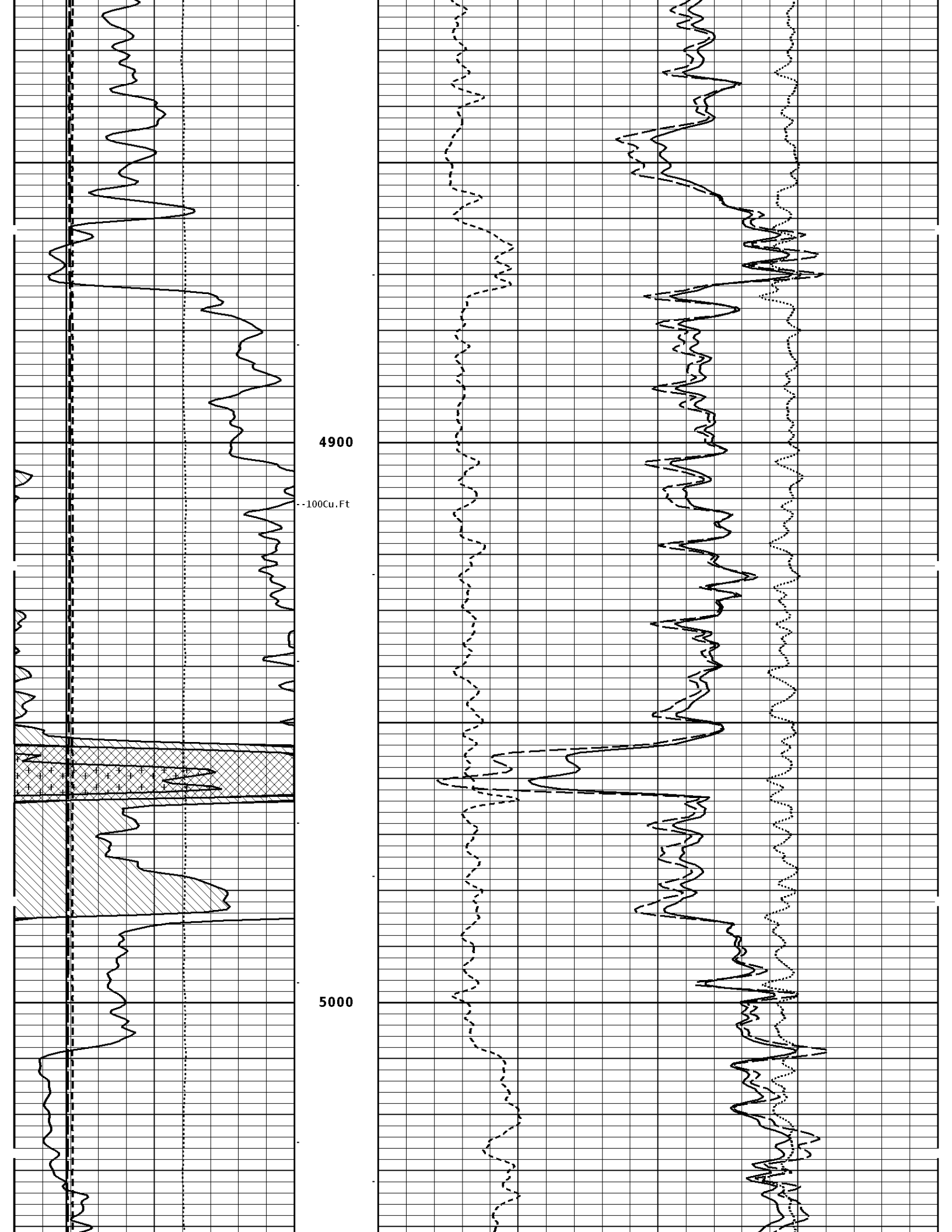
4800
PECL
POR
LDEN
LCOR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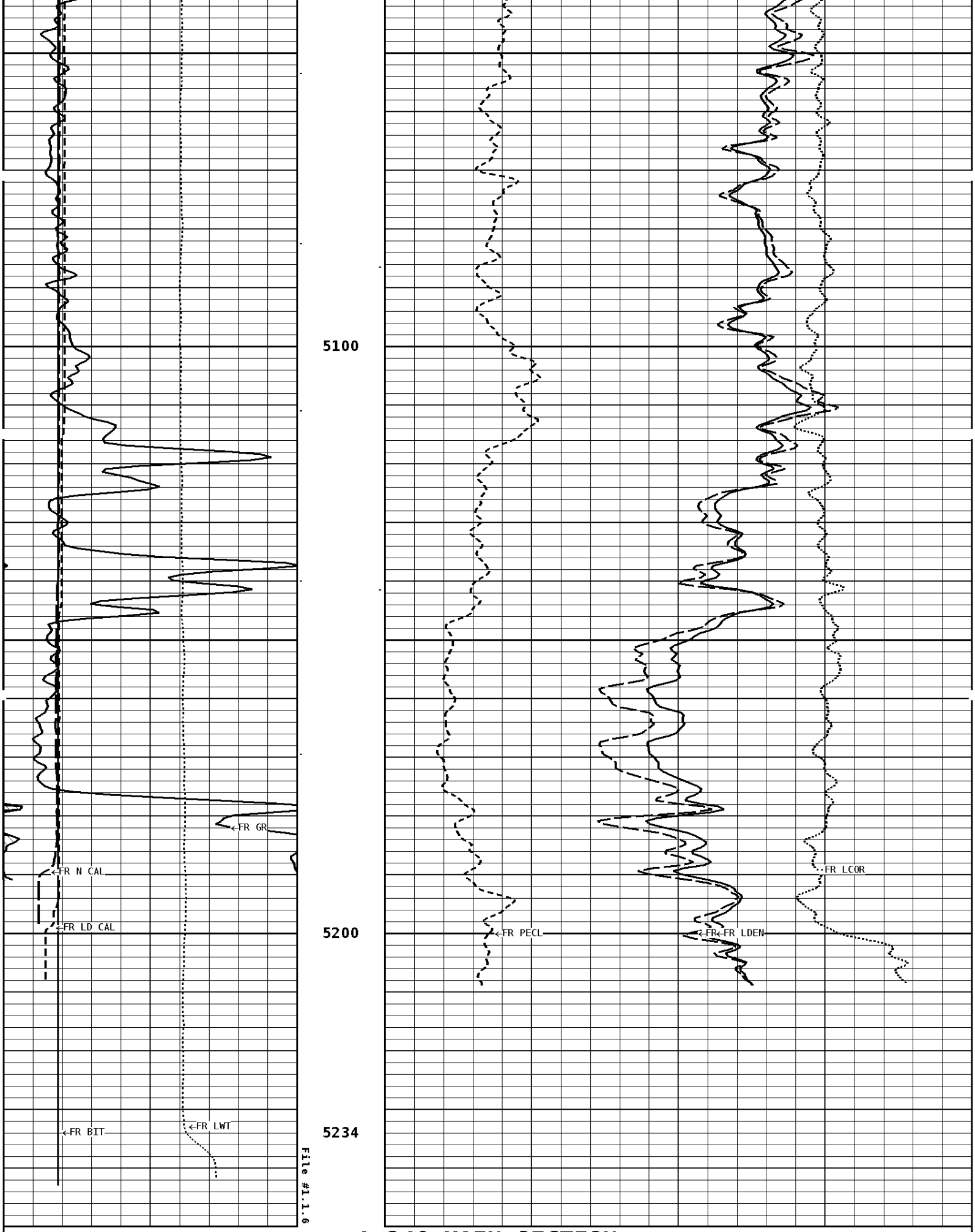

1:240 MAIN SECTION

BULK DENSITY

GAMMA RAY API UNITS	-BHV AHV- CU.FT	DENSITY POROSITY (2.71g/cc) PERCENT
150 300		70 30
0 150		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 : 27-JUN-2014 Time : 09:30
Sensor Suite : GR-GR5 ID : GRT-BB-006

	Measured Background	Measured Jig	Units	Calibrated Jig	Units
GR	62	374	CPS	175	GRAPI

Shop Calibration
CNT-AA

Performed : 22-AUG-2014 Time : 17:15
Sensor Suite : CALI-BCN ID : NDT-BB-146

	Jig - Measured Ring#1	Jig - Measured Ring#2	Jig - Calibrated Ring#1	Jig - Calibrated Ring#2	Units
CL # 1	9.1	13.9	6.0	12.0	IN.

Performed : 22-Aug-2014 Time : 17:14
Sensor Suite : BHC NEUT ID : CNP-AA-115
Source ID : N-1044

	Tank Measured	Tank Calibrated	Verification Jig	Units
N/F	4.0442	3.6893	3.6848	
Porosity	26.3	20.5	20.4	%

Shop Calibration
LDT-DA

Performed : 22-AUG-2014 Time : 16:47
Sensor Suite : CALI-LTH ID : NDT-AH-152

	Jig - Measured Ring#1	Jig - Measured Ring#2	Jig - Calibrated Ring#1	Jig - Calibrated Ring#2	Units
CL # 1	7.4	10.7	6.0	12.0	IN.

Performed : 22-Aug-2014 Time : 16:45

Sensor Suite : BHCPELNG ID : LDP-DA-50
Source ID : CSV-587

Short Space

	BKGD	Al	Mg	Al+Fe	Units
LSW1	71	480	775	324	CPS
LSW2	78	543	862	409	CPS
LSW3	280	1302	2046	1139	CPS
LSW4	342	1239	1712	1114	CPS
LSW5	31	41	41	39	CPS
LSW6	95	95	95	94	CPS
LSW7	58	59	58	60	CPS
LSW8	2	2	3	3	CPS
QS	0.242	0.229	0.245	0.220	
PES			2.778	5.967	
SSDN		2.600	1.680		G/CC

Long Space

	BKGD	Al	Mg	Al+Fe	Units
LLW1	99	571	2372	373	CPS
LLW2	114	888	3642	678	CPS
LLW3	431	1745	6355	1547	CPS
LLW4	549	1062	2629	991	CPS
LLW5	64	69	80	66	CPS
LLW6	173	169	162	169	CPS
LLW7	116	112	108	113	CPS
LLW8	5	6	9	6	CPS
QL	0.196	0.203	0.200	0.197	
PEL			2.697	5.458	
LSDN		2.600	1.680		G/CC

Shop Calibration
MST-DA

Performed : 16-Sep-2014 Time : 09:41
Sensor Suite : CALI-MSN ID : MST-DA-24

	Jig - Measured		Jig - Calibrated		Units
	Ring#1	Ring#2	Ring#1	Ring#2	
CL # 1	7.6	12.0	6.0	12.0	IN.

Performed : 16-SEP-2014 Time : 09:43
Sensor Suite : MSTDA-NI ID : MST-DA-24

Internal

	Measured			Calibrated		
	Zero	Reference	Units	Zero	Reference	Units
INV-V	0.0	29667.2		0.00	1546.00	MV
NOR-V	6.4	29973.2		0.00	1546.00	MV
IN-C	0.0	60289.1		0.00	15.46	UA
INV-R					32.34	OHMM
NOR-R					55.11	OHMM

Performed : 16-Sep-2014 Time : 09:45
Sensor Suite : MSTDAMSF ID : MST-DA-24

Internal

	Measured			Calibrated		
	Zero	Reference	Units	Zero	Reference	Units
MSFC	16.8	42024.8		0.00	1522.00	UA
MSFB	32733.0	54898.6		0.00	1522.00	MA
MOM1	0.3	42962.8		0.00	1522.00	MV
MSFRA					43.30	OHMM

Tucker ENERGY SERVICES

Company: CHIEFTAIN OIL CO., INC.
Well: DOUGLAS-KENT #5-18
Location: 340' FSL & 340' FEL
Logged: 09-29-2014
K.B. Elev: 1404.0 Ft