STEP energy services

COMPENSATED NEUTRON

MICRO PEL DENSITY LOG

Company CASILLAS PETROLEUM CORP
Well HAMKER #20-3
Field LETTE
County HASKELL
State KANSAS
Country USA
API No. 15-081-22204-00-00

File No : HAYS-70387
Company : CASILLAS PETROLEUM CORP
Well : HAMKER #20-3
Field : LETTE
County : HASKELL
State : KANSAS
Country : USA
API No : 15-081-22204-00-00

Location :
1420' FSL & 660' FWL
S/2 S/2 NW SW

LSD : **Sect :** 20 **Twp :** 30S **Rge :** 31W

Permanent Datum:	GL	**Elevations:**		**Services:**	
Drilling Measured From:	KB	**KB**	2858.00 Ft	CNT	CST
Log Measured From:	KB	**DF**	2857.00 Ft	LDT	PIT
Above Permanent Datum:	0.00 Ft	**GL**	2846.00 Ft	MLT	

Date	12-07-2019			
Run Number	1			
Depth--Driller	5721.0 Ft			
Depth--Logger	5716.0 Ft			
First Reading	5683.0 Ft			
Last Reading	4500.0 Ft			
Casing--Driller	1823.0 Ft			
Casing--Logger	1826.0 Ft			
Bit Size	7.875 In			
Casing Size	8.625 In			
Hole Fluid Type	WBM			
Density	9.3			
Fluid Loss	4.6			
PH/Viscosity	11.0	57.0		
Sample Source	MEASURED			
RM@Measured Temp.	2.000 @ 60 F			
RMF@Measured Temp	0.850 @ 60 F			
RMC@Measured Temp.	1.150 @ 60 F			
Source RMF/RMC	CALCULATED	CALCULATED		
RM@BHT	1.000 @ 125 F			
Time Circulation Stopped	12-07-2019 03:00			
Max Recorded Temp.	125 F			
Equipment/Base	TRK-137	HAYS		
Recorded By	B.BAILEY			
Witnessed By	DAVID			

Bitsize Intervals

Size (In)	Bottom (Ft)
7.875	5721.00

Casing Strings

Size (In)	Weight (Lbs)	Bottom (Ft)	Top (Ft)
8.625	32.00	1832.00	0.00

Run Number	1	
Date	12-07-2019	
Date/Time On Bottom	12-07-2019 09:45	
Depth to Fluid	0.0 Ft	
Salinity	0.000	
RMF@BHT	0.850 @ 125 F	
RMC@BHT	1.150 @ 125 F	

Run Number 1

Comments

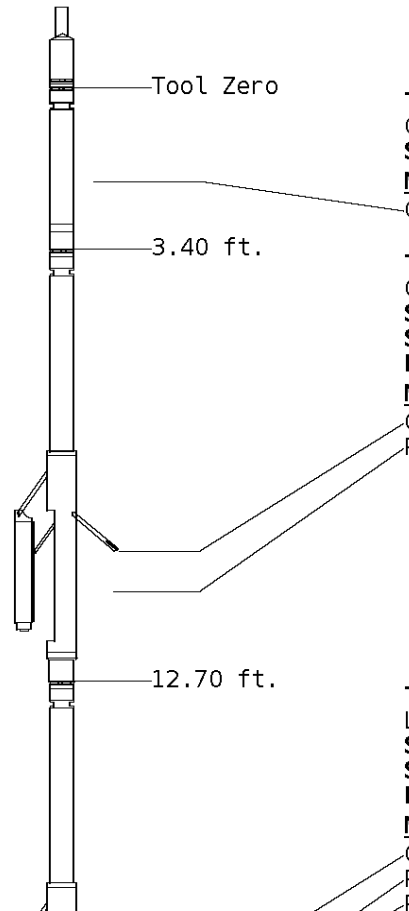
ALL PRESENTATIONS AS PER CUSTOMER REQUEST
GRT, CNT, LDT, MLT, CST, AND PIT RUN IN COMBINATION
CALIPERS ORIENTED ON X-Y AXIS
2.71 G/CC USED TO CALCULATE POROSITY
ANNULAR HOLE VOLUME CALCULATED USING 5.50" PRODUCTION CASING
PHIN IS CALIPER CORRECTED

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:

Tool String Schematic

Total Tool Length - 68.31 **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-013

Measure Point	Tool Offset	Stack Offset	Bottom Offset
GRP	2.00	2.00	66.31

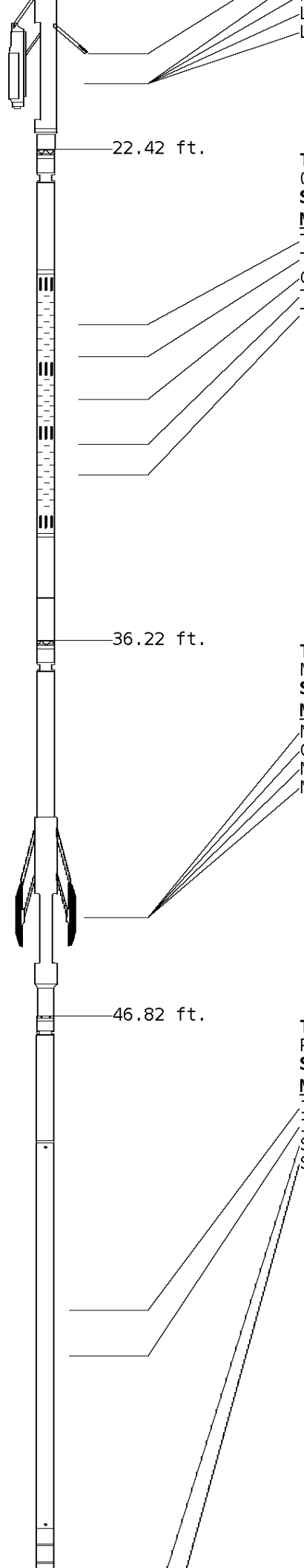
Tool: CNT-AA **Length:** 9.30 **ft.** **O.D.** 4.36 **in.**
Compensated Neutron A Pad on NDT-A
Sonde ID :NDT-AF-411
Source ID :N-1104
Pad ID :CNP-AD-037

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLCN	6.00	9.40	58.91
PHIN	6.80	10.20	58.11

Tool: LDT-DF **Length:** 9.72 **ft.** **O.D.** 4.80 **in.**
Litho Density D Pad on NDT-F
Sonde ID :NDT-FA-404
Source ID :1637GW
Pad ID :LDP-DA-062

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLLD	6.42	19.12	49.19
PEL	7.42	20.12	48.19
PES	7.82	20.52	47.79

LDEN	7.62	20.32	47.99
LCOR	7.62	20.32	47.99



22.42 ft.

Tool: CST-AD **Length:** 13.80 **ft.** **O.D.** 3.60 **in.**
Open Hole Sonic
Sonde ID :CST-AB-24

Measure Point	Tool Offset	Stack Offset	Bottom Offset
TT1	4.80	27.22	41.09
TT3	5.80	28.22	40.09
CDT	7.30	29.72	38.59
TT4	8.80	31.22	37.09
TT2	9.80	32.22	36.09

36.22 ft.

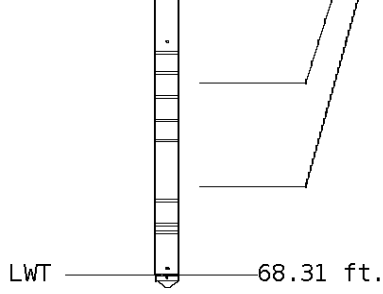
Tool: MLT-AB **Length:** 10.60 **ft.** **O.D.** 6.00 **in.**
Micro Log Tool
Sonde ID :MLT-012

Measure Point	Tool Offset	Stack Offset	Bottom Offset
MSFL	8.90	45.12	23.19
CLMR	7.60	43.82	24.49
MSFN	8.90	45.12	23.19
MSFI	8.90	45.12	23.19

46.82 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	55.74	12.56
ILM	10.10	56.92	11.39
SFLU	17.49	64.31	4.00
SP	20.60	67.42	0.88



Well File: casillas_hamker_20-3_dec-7-2019_qst **Scale:** 1:240 **Format:** NLD-240
Segment: V1.D1.S6 mn **Acquired:** 2019-12/07 11:10 3.4.1-13972
Reference: 0 **Processed:** 2019-12/07 11:10 3.4.1-13972

CALIPER MICRO
INCHES (IN)
16 — 26
6 — 16

BIT SIZE
INCHES (IN)
6 — 16

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

NORMAL
OHMM
0 — 40

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

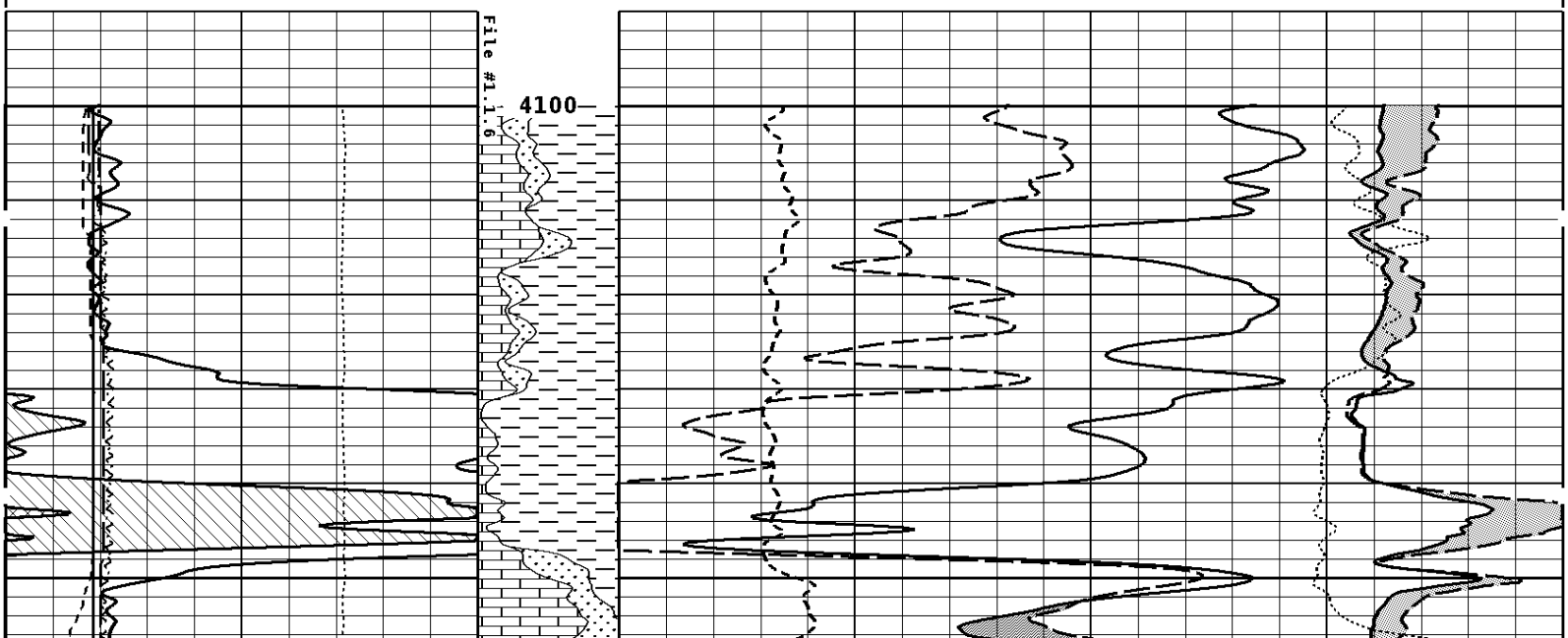
DENSITY POROSITY (2.71g/cc)
PERCENT
70 — 30
30 — -10
-10 — -50

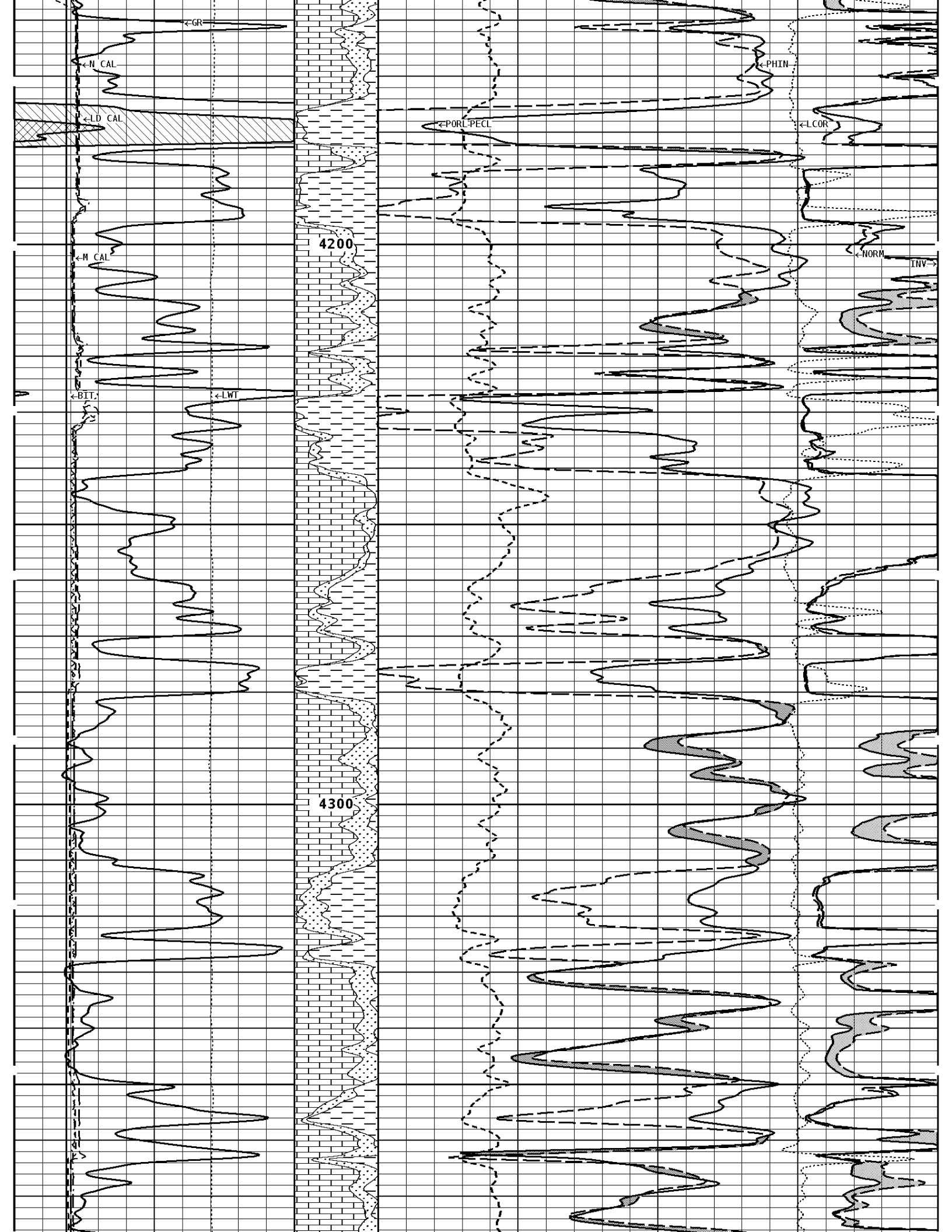
GAMMA RAY
API UNITS
150 — 300
0 — 150

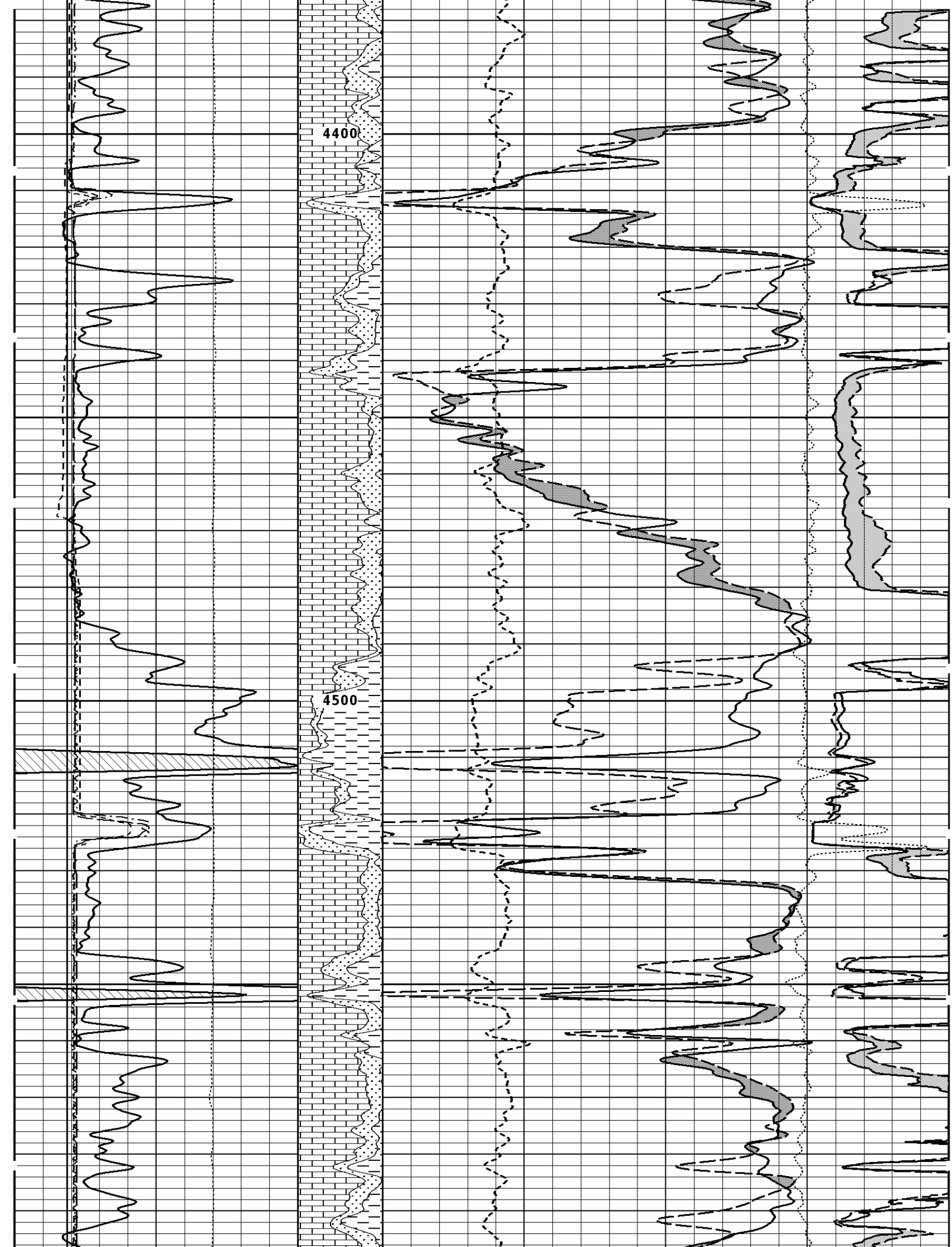
Volume
Dolo/Shale

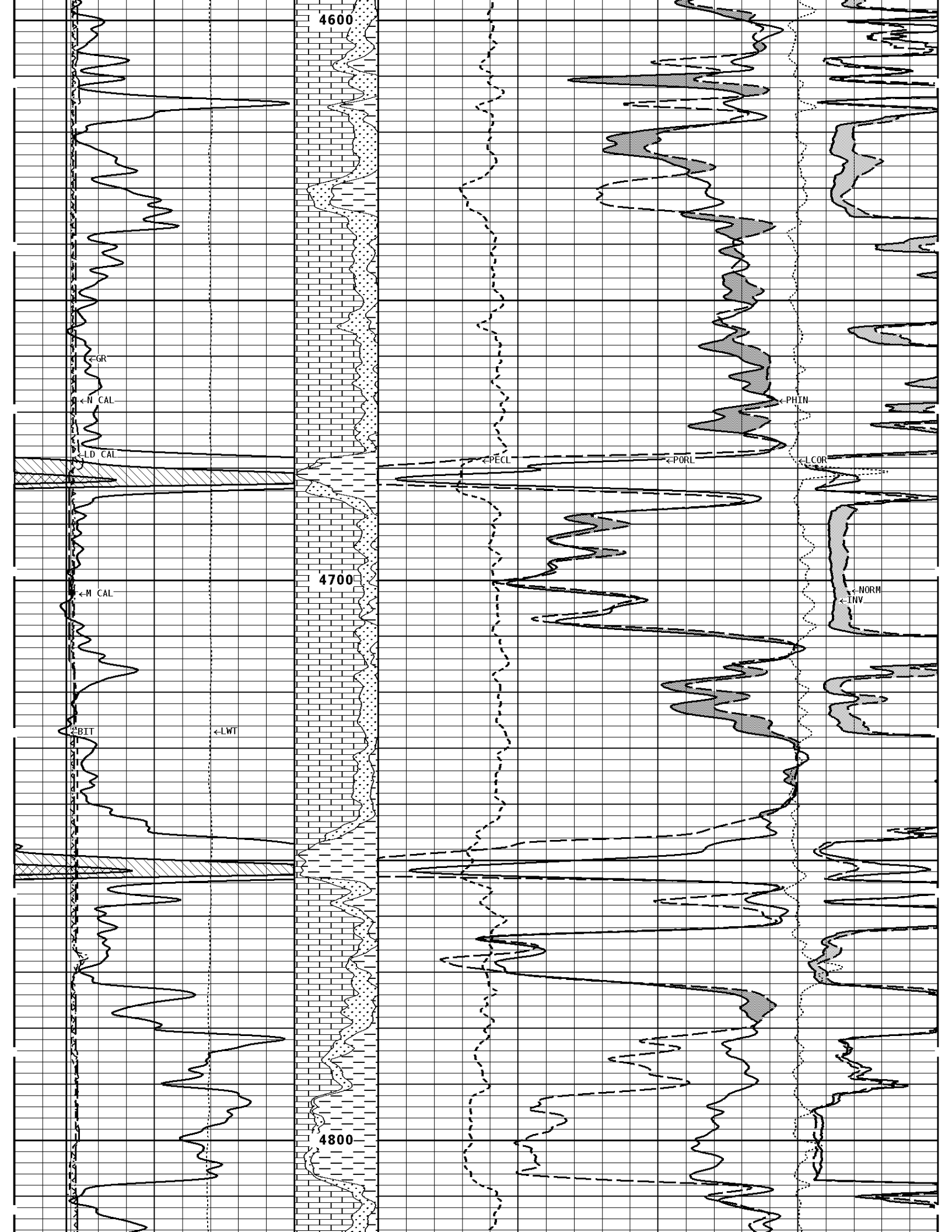
NEUTRON POROSITY (LIMESTONE)
PERCENT
30 — -10

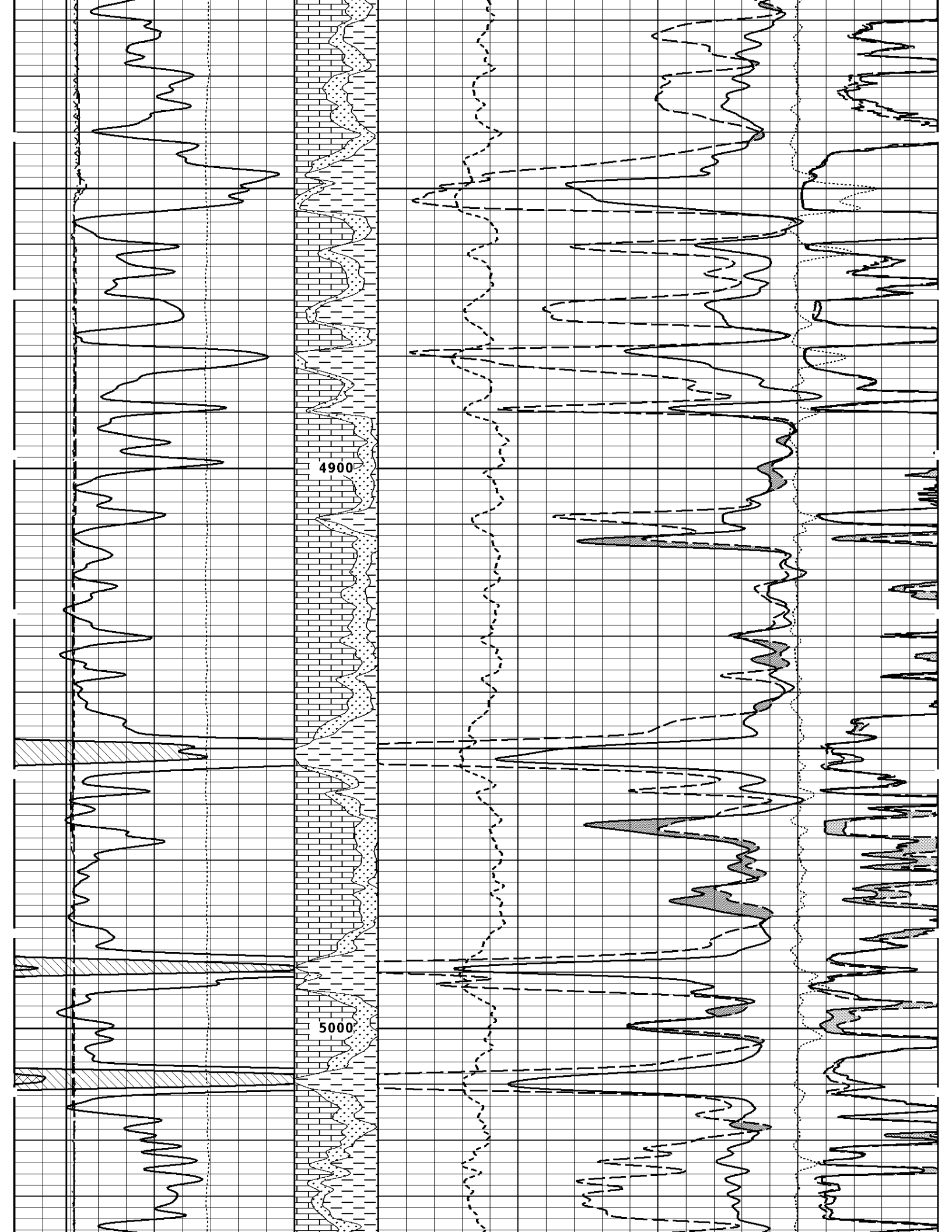
1:240 MAIN SECTION

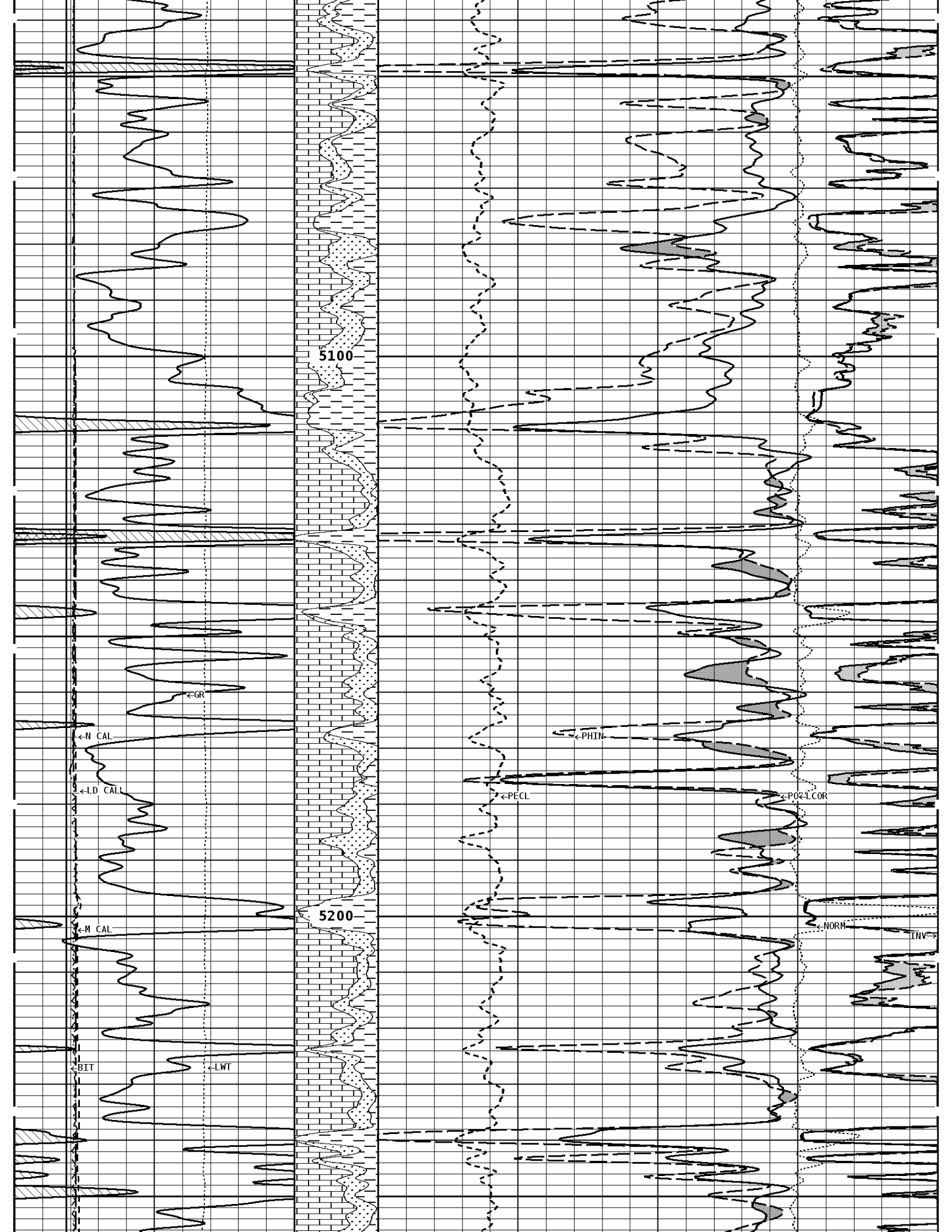


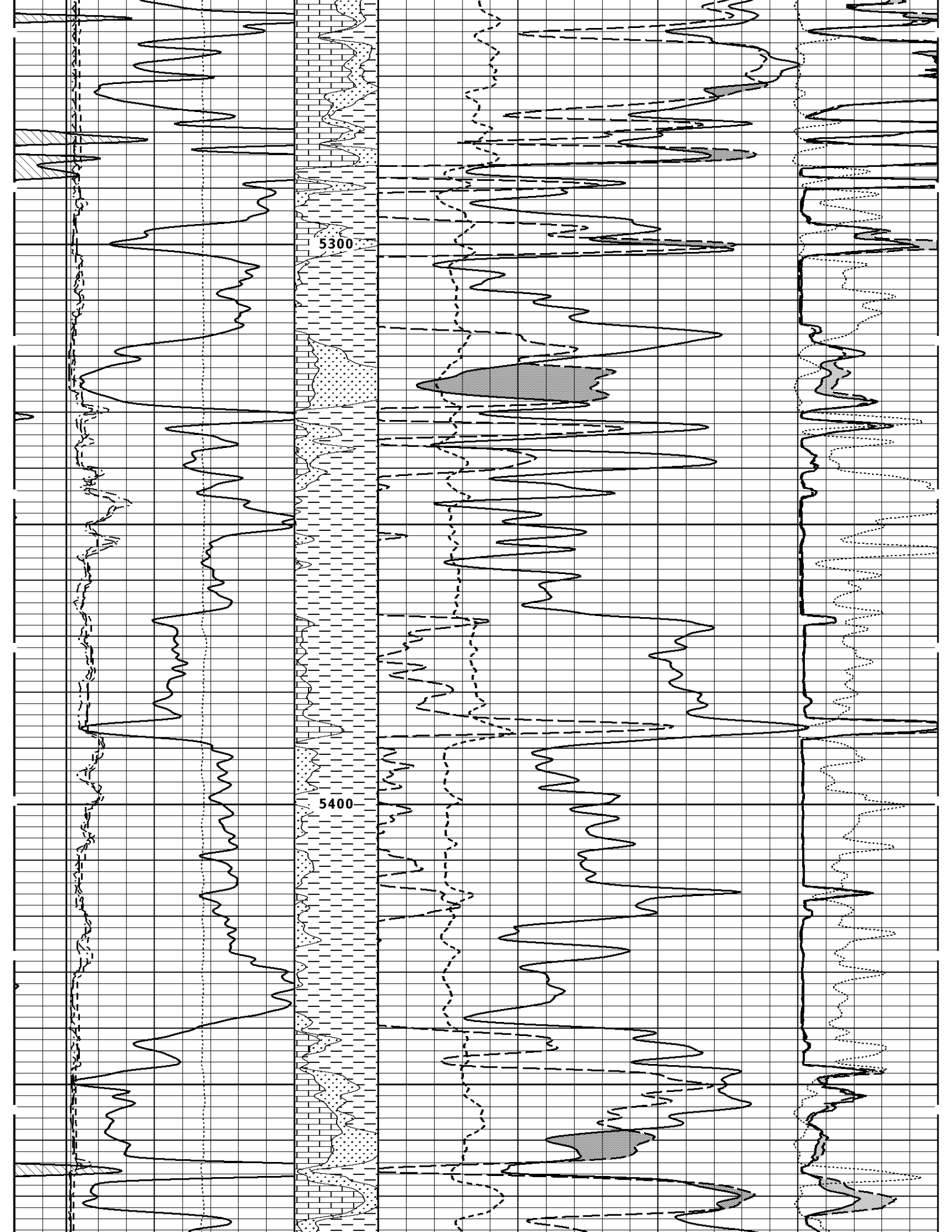

GR
N_CAL
LD_CAL
M_CAL
BIT
LWT
4200
4300
PORL-PECL
PHIN
LCOR
NORM
INV

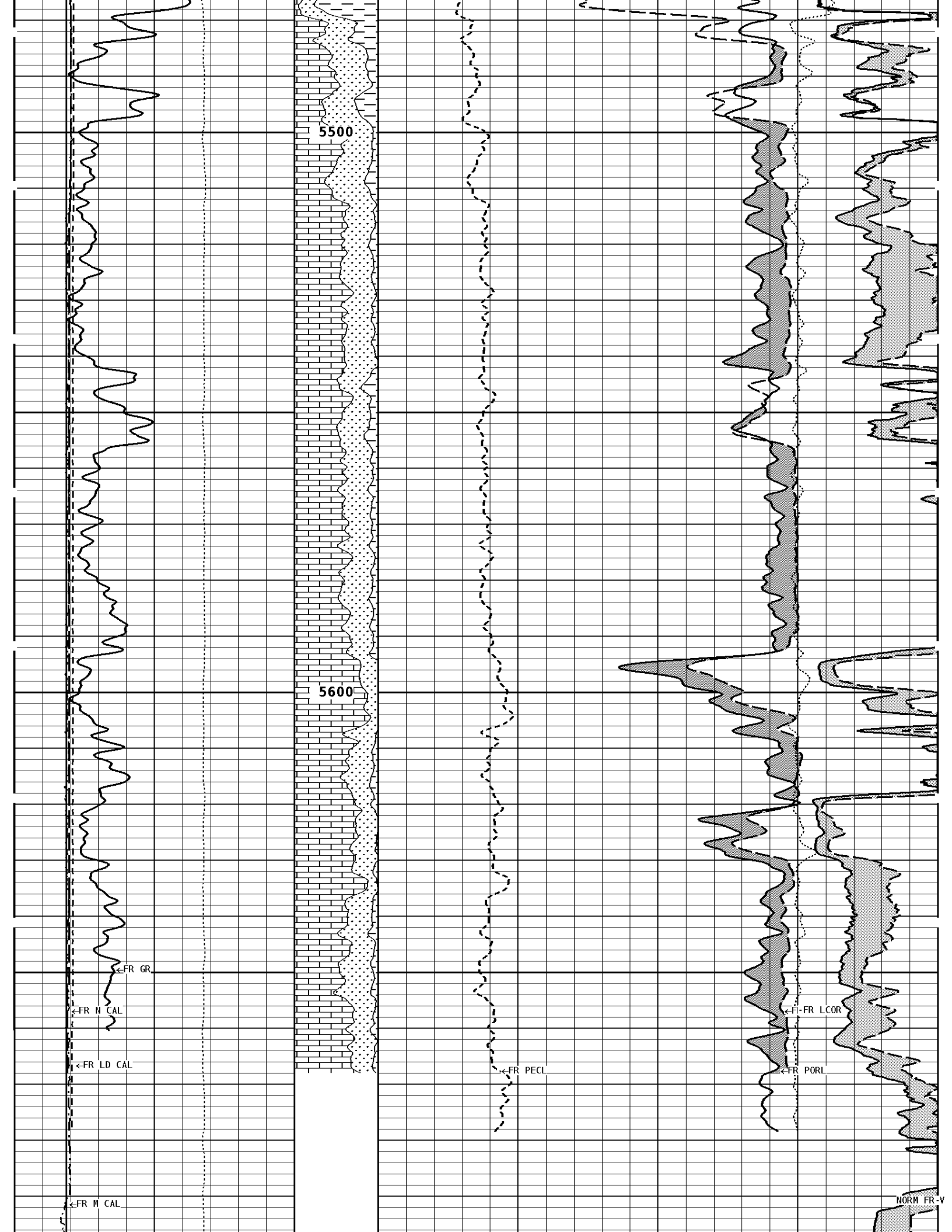

4400
4500

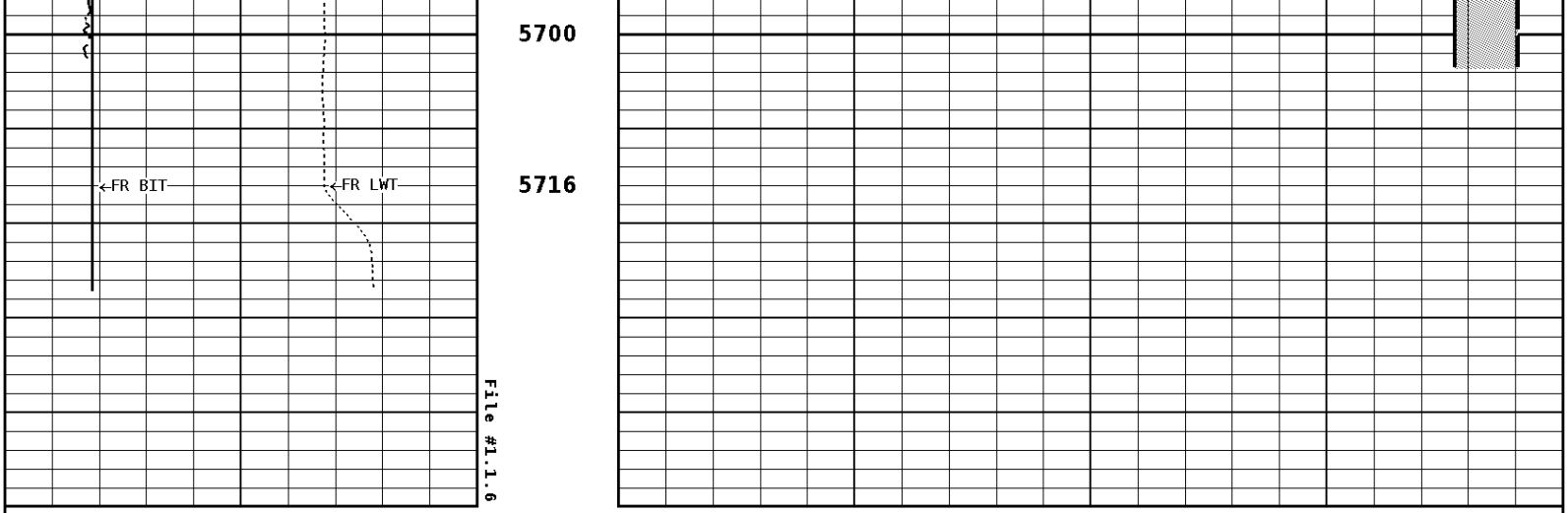

4600
GR
N CAL
LD CAL
PECL
PORL
PHIN
LCOR
4700
M CAL
NORM
INV
BIT
LWT
4800


4900
5000


5100
5200
←GR
←N CAL
←LD CALL
←M CAL
←BIT
←LWT
←PHIN
←PECL
←POZ-LCOR
←NORM
INV→


5300
5400


5500
5600
←FR GR
←FR N CAL
←FR LD CAL
←FR M CAL
←FR PECL
←FI-FR LCOR
←FR PORL
NORM FR-V



1:240 MAIN 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: casillas_hamker_20-3_dec-7-2019_qst **Scale:** 1:240 **Format:** NLD-240
Segment: V1.D1.S5 Reprocess REPEAT **Acquired:** 2019-12/07 10:48 3.4.1-13972
Reference: 0 **Processed:** 2019-12/07 11:08 3.4.1-13972

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

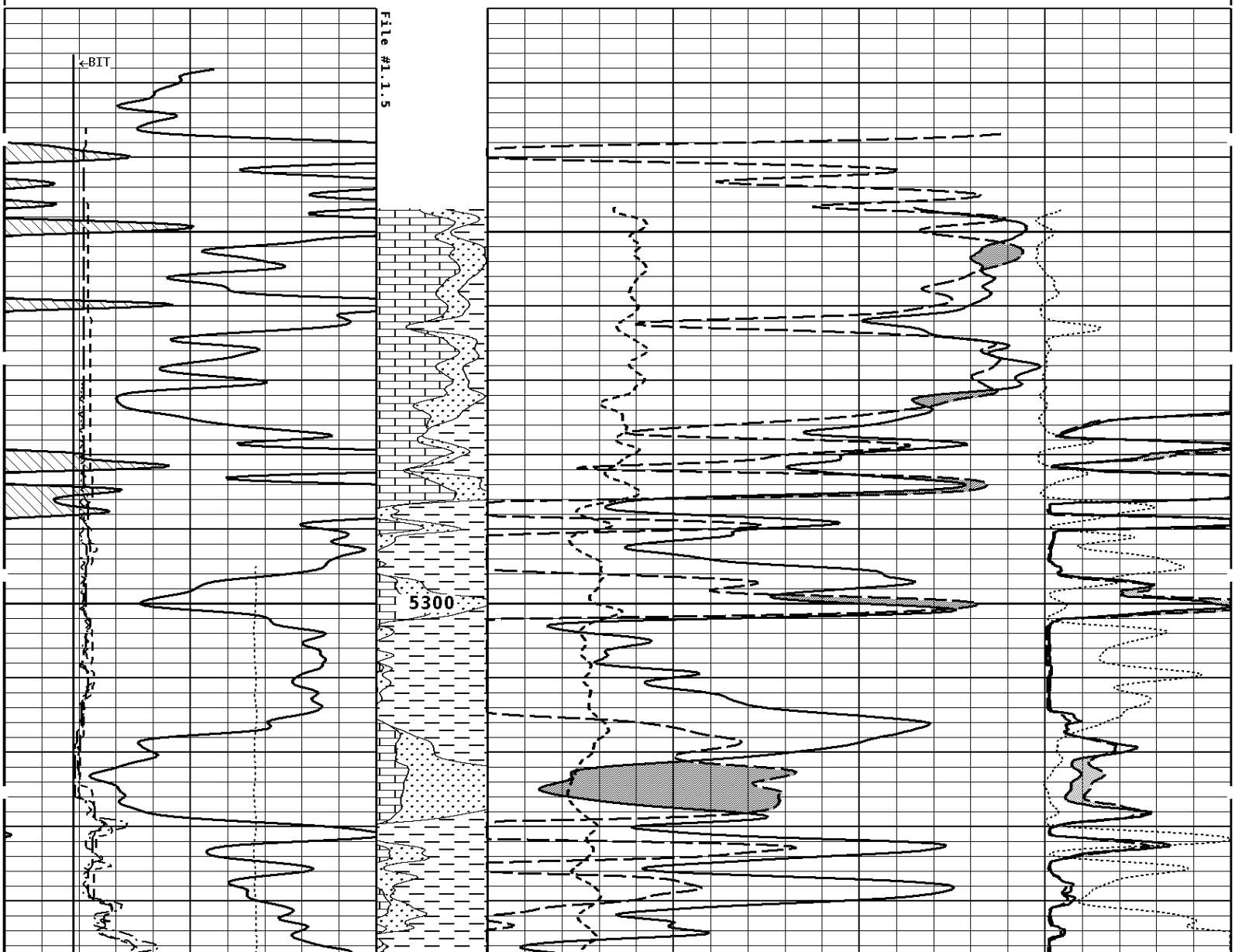
DENSITY POROSITY (2.71g/cc)
PERCENT
70 30
30 -10
-10 -50

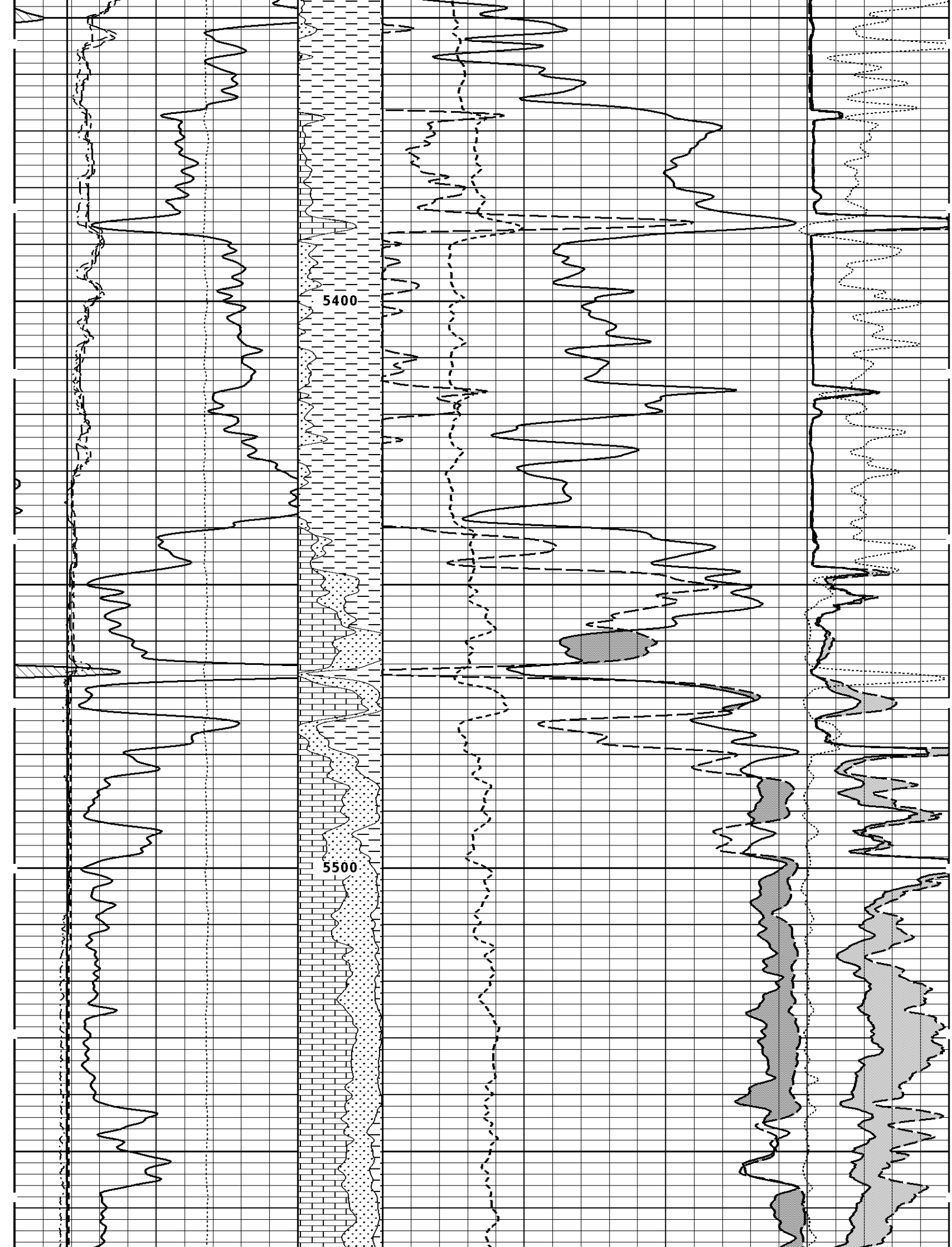
GAMMA RAY
API UNITS
150 300
0 150

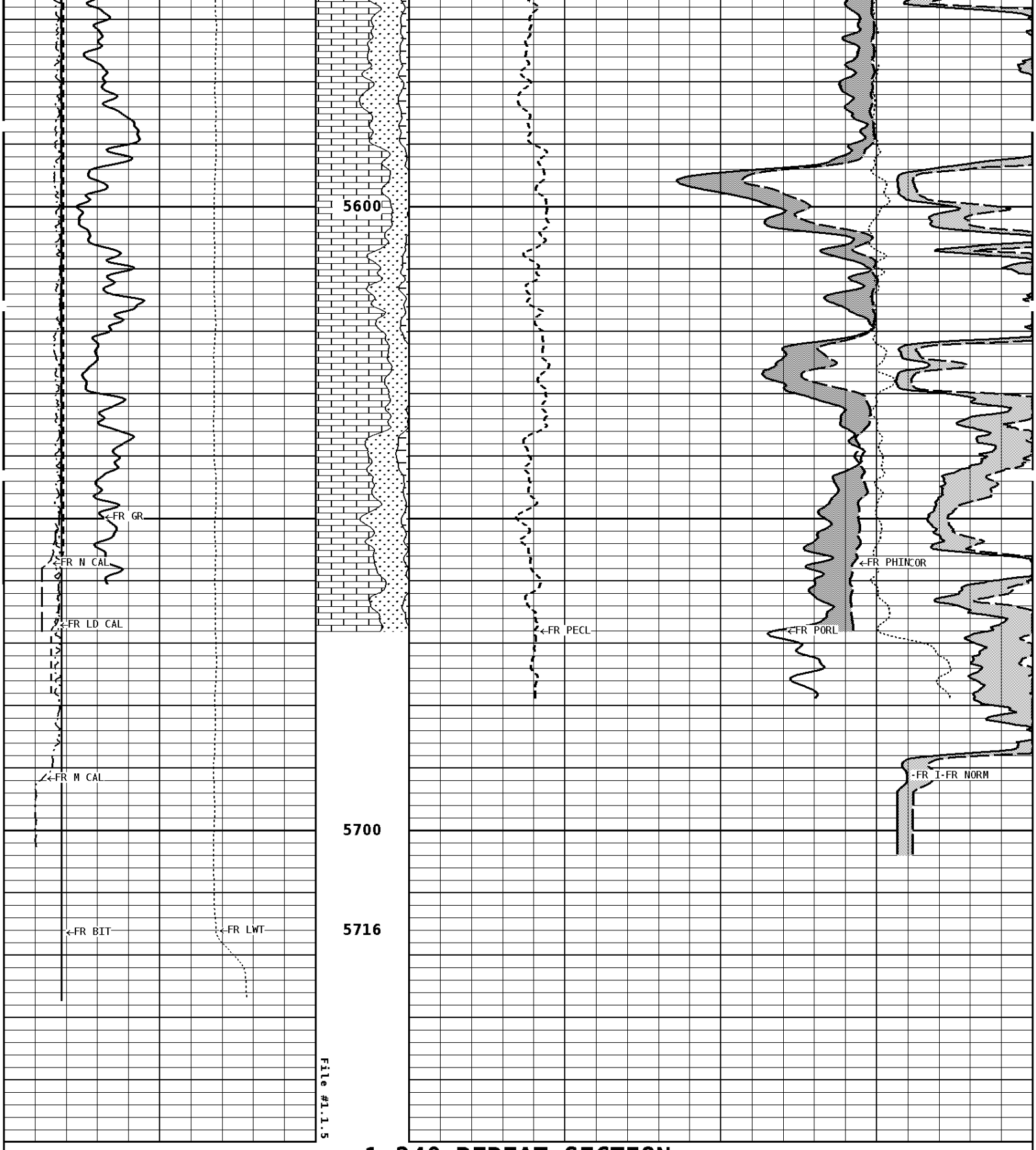
Volume
Dolo/Shale

NEUTRON POROSITY (LIMESTONE)
PERCENT
30 -10

1:240 REPEAT SECTION




5400
5500



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 / -10 ... 30 / -10 / -50

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

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

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

CALIPER MICRO INCHES (IN)
16 / 6 ... 26 / 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: casillas_hamker_20-3_dec-7-2019_qst **Scale:** 1:240 **Format:** LDT-240
Segment: V1.D1.S6 mn **Acquired:** 2019-12/07 11:10 3.4.1-13972
Reference: 0 **Processed:** 2019-12/07 11:10 3.4.1-13972

BIT SIZE INCHES (IN)
6 ... 16

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

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

TENSION LBS	COMPENSATED BULK DENSITY G/CC
10000 ... 0	3.0 / 2.0 / 1.0 ... 4.0 / 3.0 / 2.0

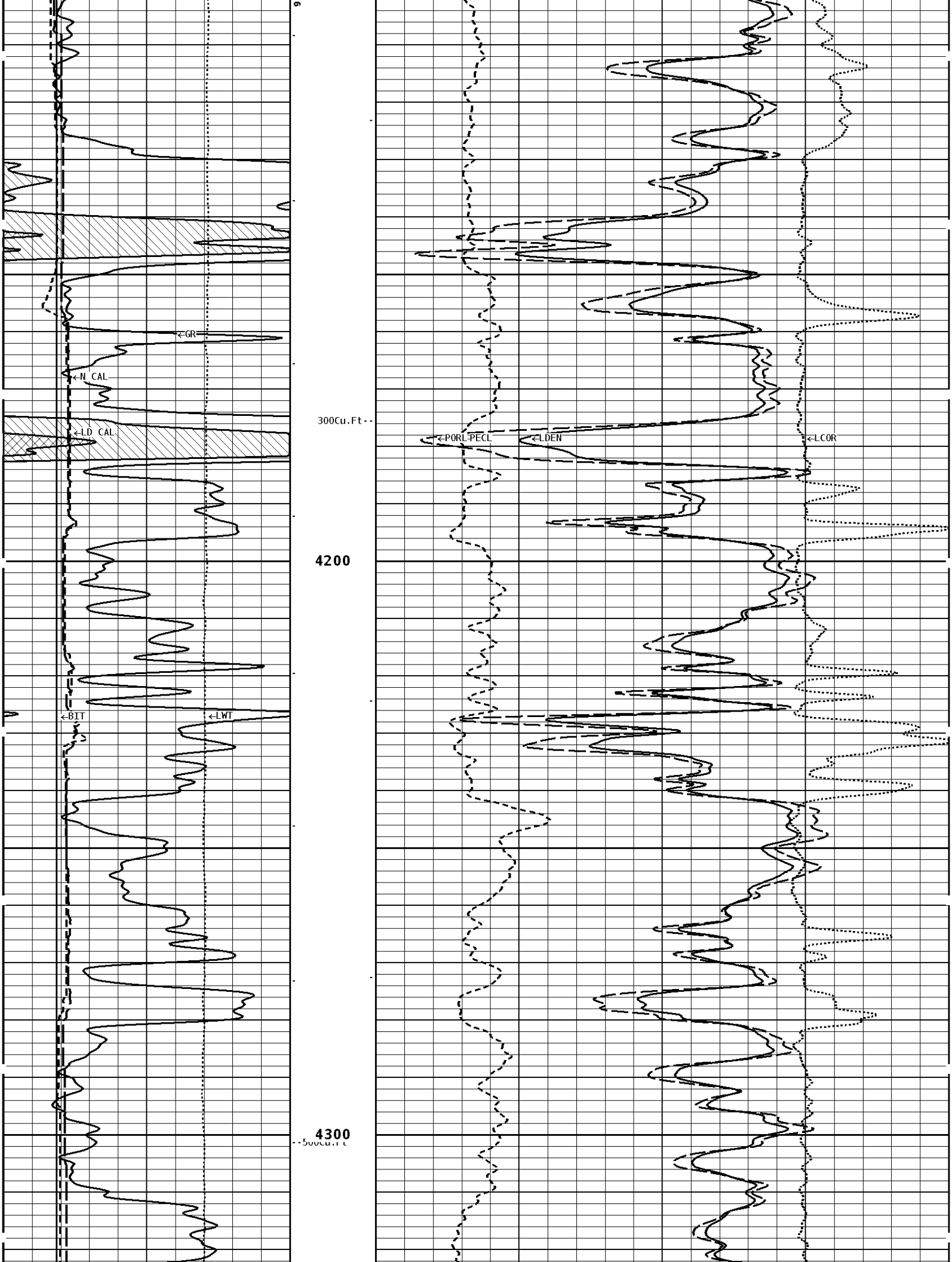
GAMMA RAY API UNITS	-BHV AHV- CU.FT	DENSITY POROSITY (2.71g/cc) PERCENT
150 / 0 ... 300 / 150		70 / 30 / -10 ... 30 / -10 / -50

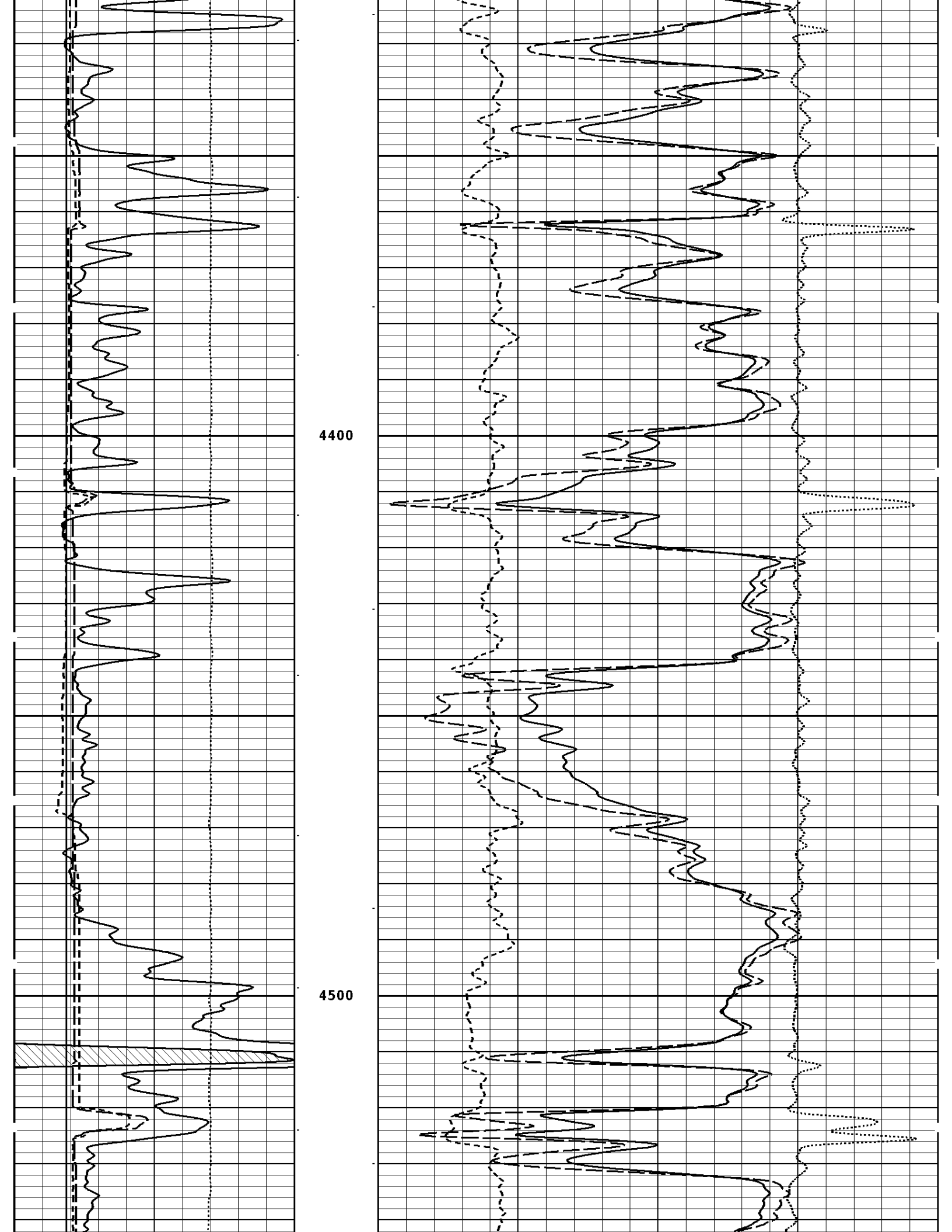
1:240 MAIN SECTION

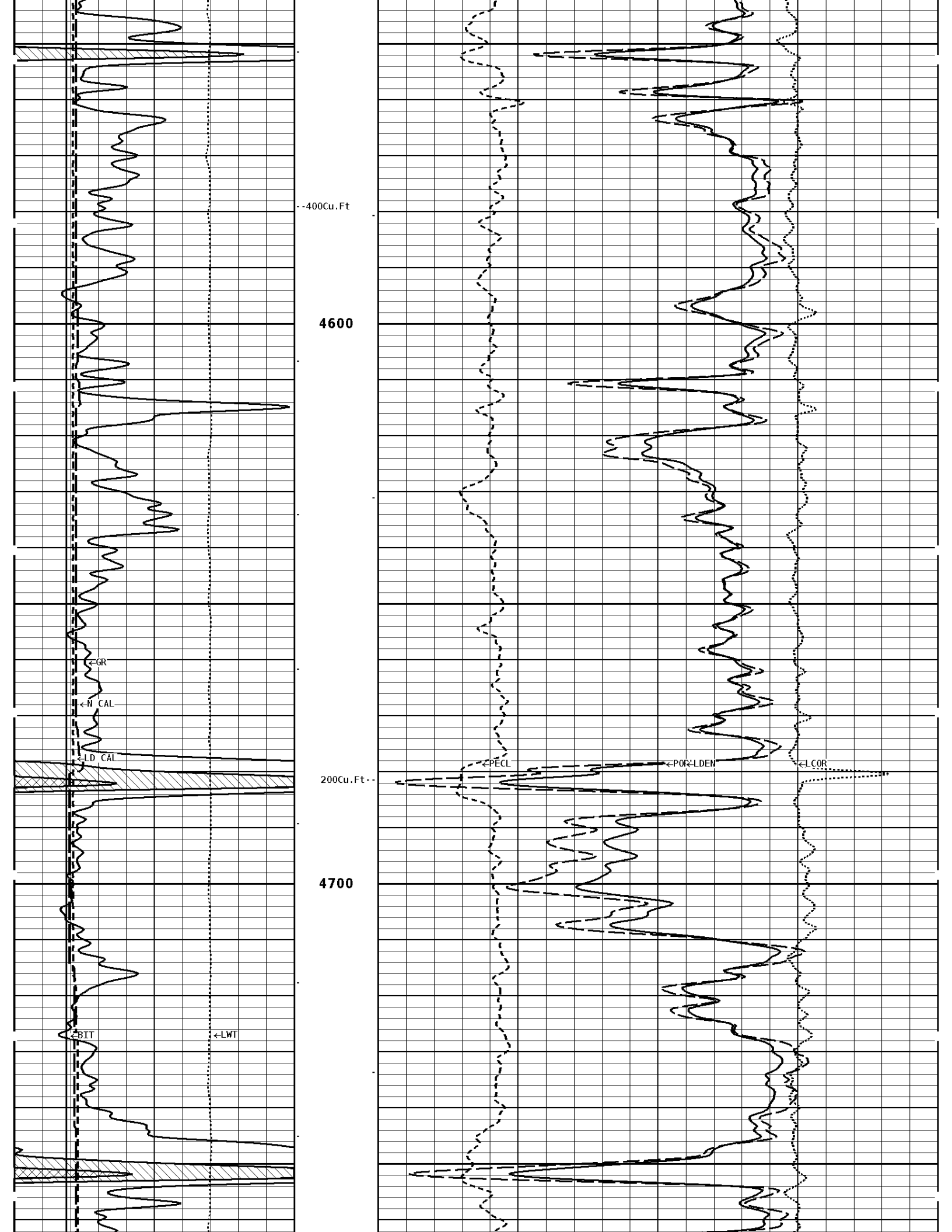
BULK DENSITY

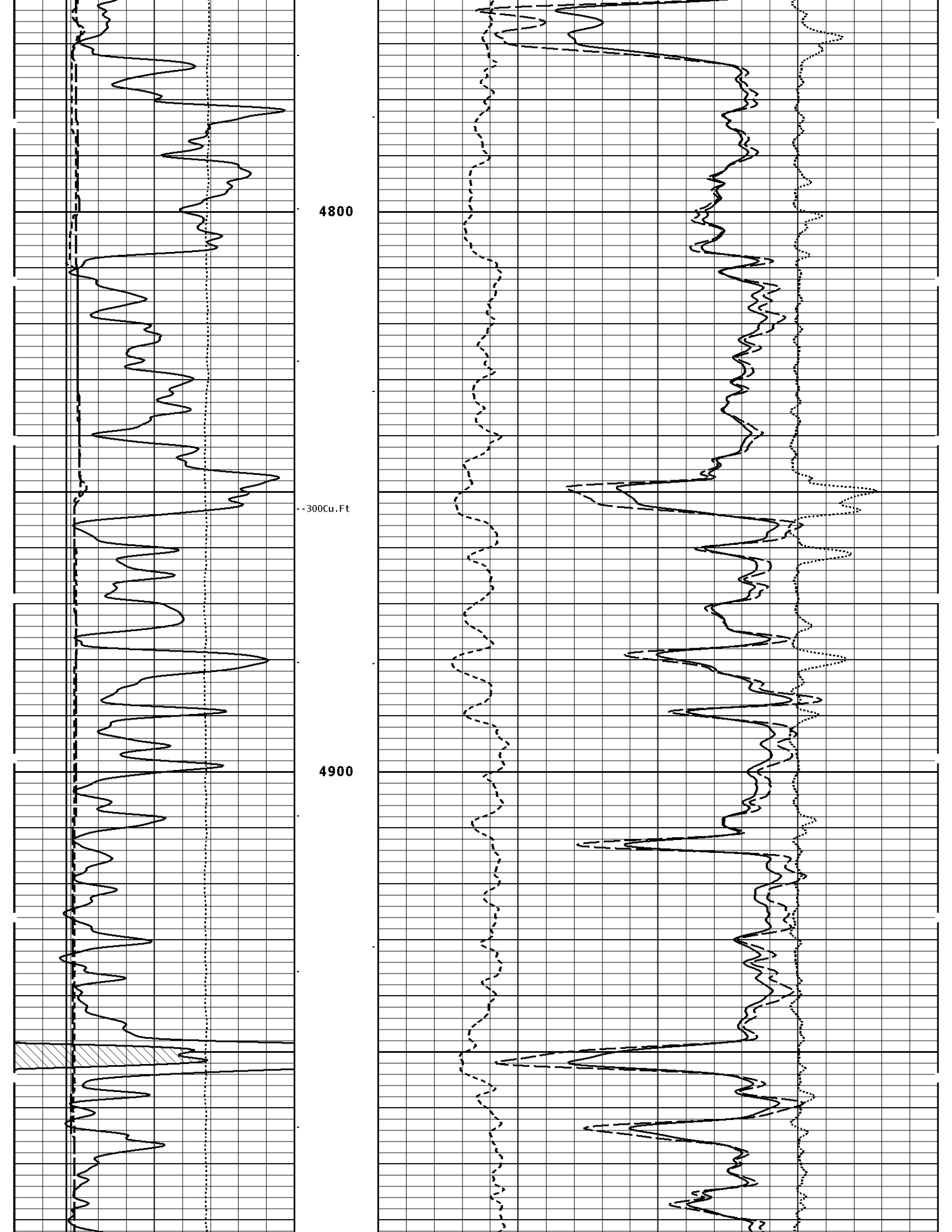
File #1.1.

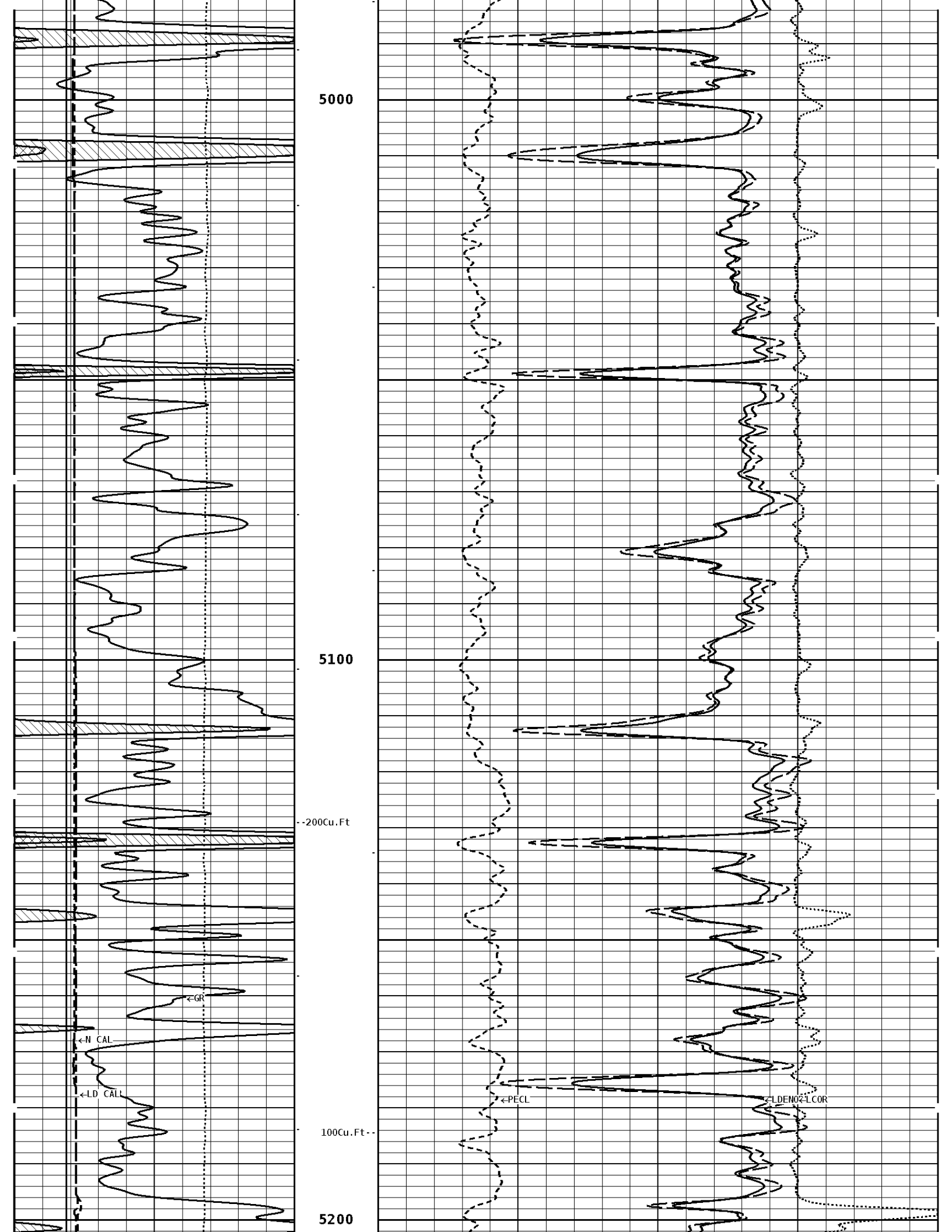
4100

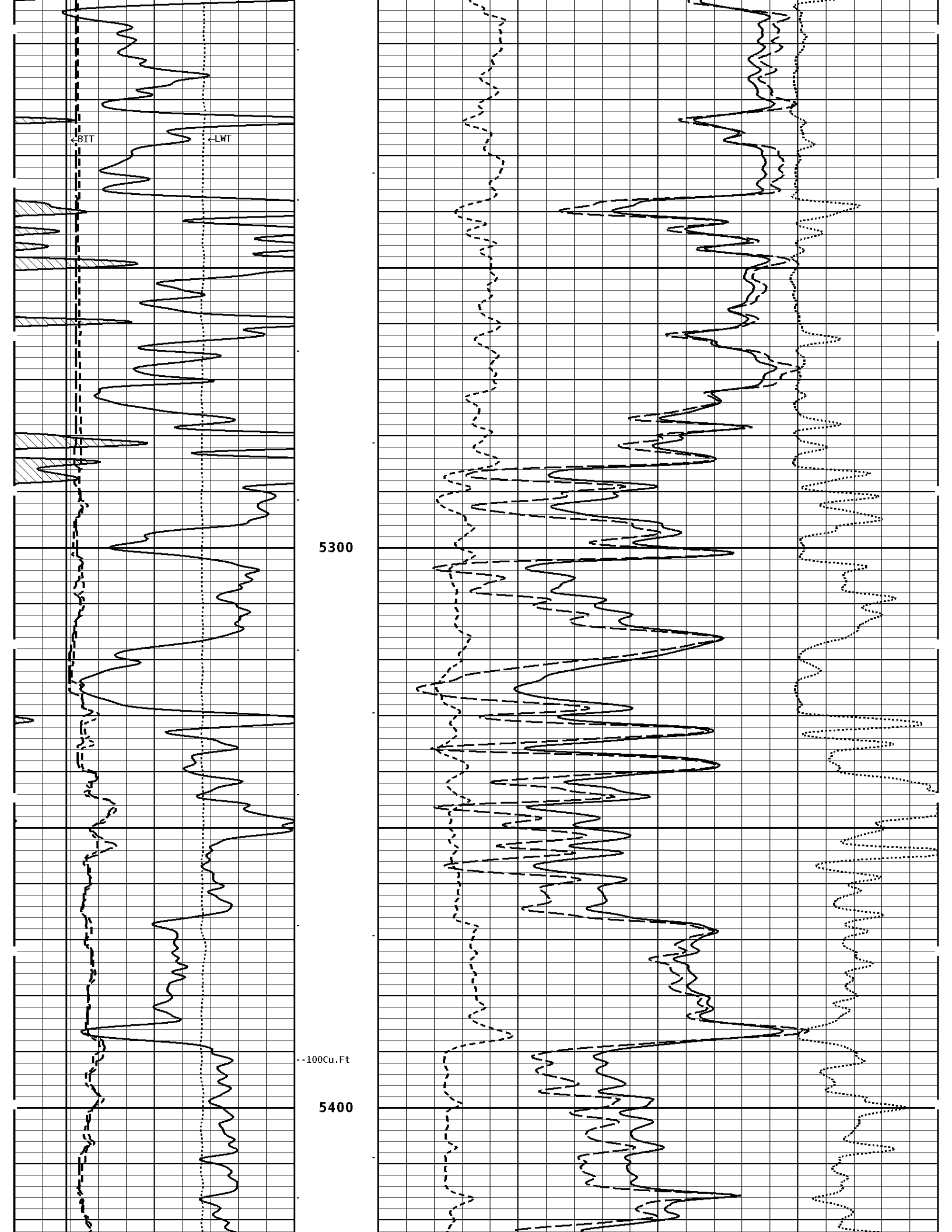

←GR
←N_CAL
←LD_CAL
300Cu.Ft--
←PORL_PECL
←LDEN
←LCOR
4200
←BIT
←LWT
4300

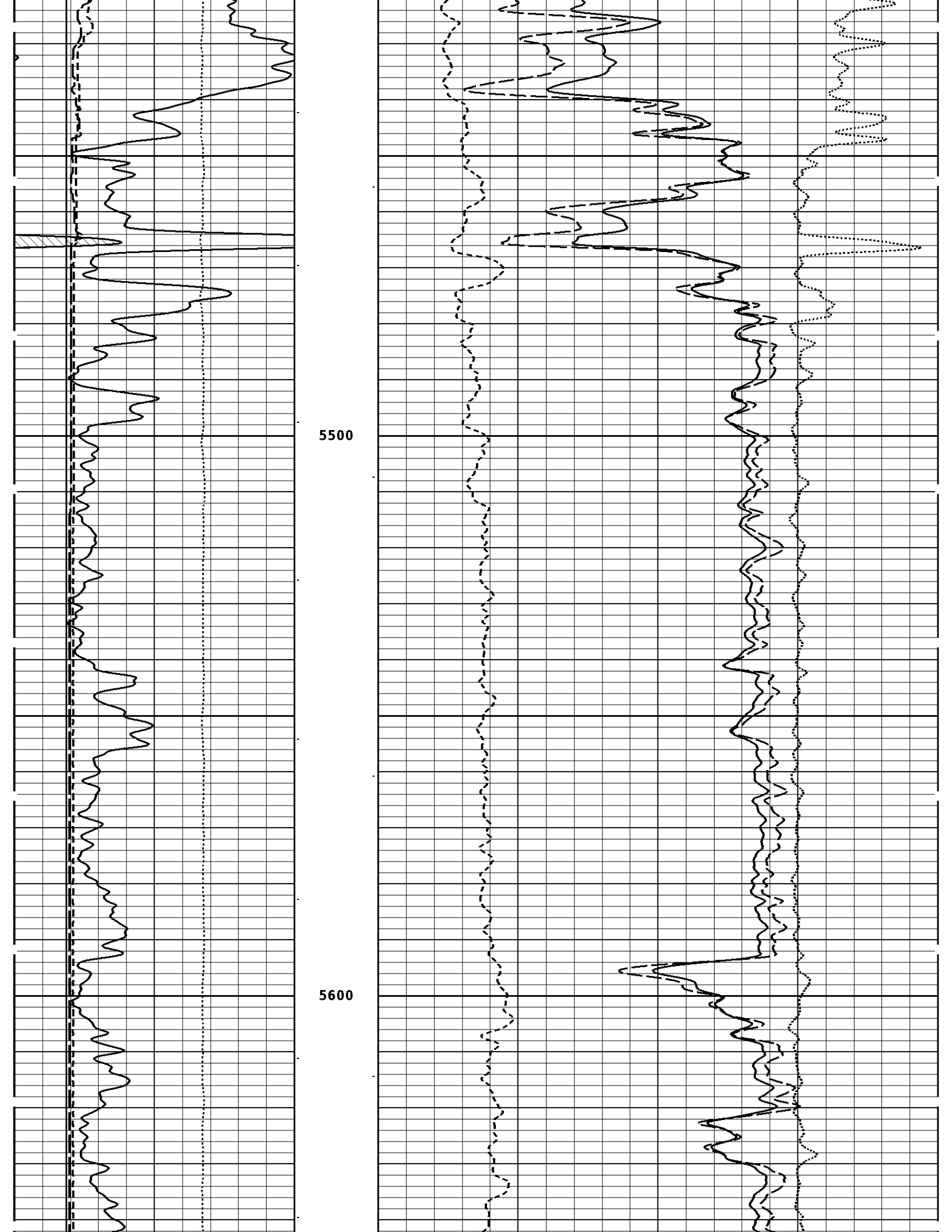

4400
4500

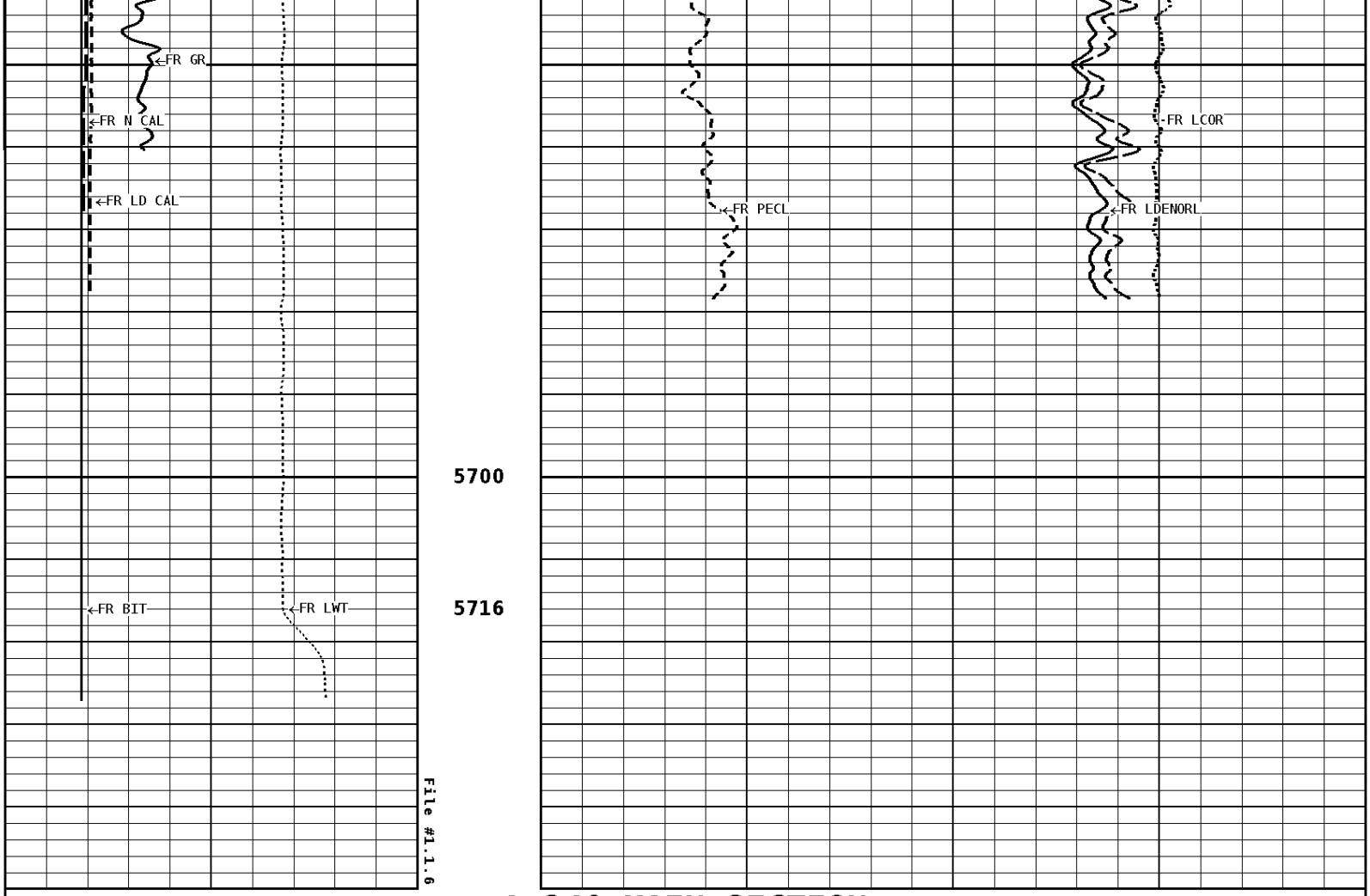

--400Cu.Ft
4600
←GR
←N_CAL
←LD_CAL
←PECL
←POR_LDEN
←LCOR
200Cu.Ft--
4700
←BIT
←LWT


4800
--300Cu.Ft
4900


5000
5100
5200
--200Cu.Ft
100Cu.Ft--
←GR
←N CAL
←LD CALL
←PECL
←LDEN02-LCOR


←BIT
←LWT
5300
--100Cu.Ft
5400


5500
5600



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	

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 : 04-Jun-2019 Time : 09:53
Sensor Suite : GR-GR5 ID : GRT-BB-013

	Measured Background	Measured Jig	Units	Calibrated Jig	Units
GR	44	314	CPS	160	GRAPI

Shop Calibration
CNT-AA

Performed : 03-Jun-2019 Time : 11:01
Sensor Suite : CALI-BCN ID : NDT-AF-411

	Jig - Measured Ring#1	Jig - Measured Ring#2	Jig - Calibrated Ring#1	Jig - Calibrated Ring#2	Units
CL # 1	7.5	12.5	6.0	12.0	IN.

Performed : 08-AUG-2019 Time : 16:18
Sensor Suite : BHC NEUT ID : CNP-AD-037
Source ID : N-1104

	Tank Measured	Tank Calibrated	Verification Jig	Units
N/F	3.7594	3.6893	3.6944	
Porosity	21.6	20.5	20.6	%

Shop Calibration
LDT-DF

Performed : 03-Jun-2019 Time : 14:53
Sensor Suite : CALI-LTH ID : NDT-FA-404

	Jig - Measured Ring#1	Jig - Measured Ring#2	Jig - Calibrated Ring#1	Jig - Calibrated Ring#2	Units
CL # 1	8.3	13.2	6.0	12.0	IN.

Performed : 03-Dec-2019 Time : 19:18
Sensor Suite : BHCPELNG ID : LDP-DA-062
Source ID : 1637GW

Short Space

	BKGD	Al	Mg	Al+Fe	Units
LSW1	59	994	1604	617	CPS
LSW2	58	1159	1848	809	CPS
LSW3	218	2640	4281	2191	CPS
LSW4	272	2262	3264	1957	CPS
LSW5	26	44	49	42	CPS
LSW6	76	80	79	79	CPS
LSW7	48	52	54	51	CPS
LSW8	1	3	4	3	CPS
QS	0.224	0.208	0.191	0.214	
PES			2.778	5.967	
SSDN		2.600	1.680		G/CC

Long Space

	BKGD	Al	Mg	Al+Fe	Units
LLW1	89	1139	4703	663	CPS
LLW2	98	2033	7985	1435	CPS
LLW3	372	3656	13901	3102	CPS
LLW4	483	1704	5322	1526	CPS
LLW5	54	65	108	65	CPS
LLW6	152	153	144	154	CPS
LLW7	99	102	99	102	CPS
LLW8	4	6	16	6	CPS
QL	0.210	0.200	0.185	0.199	
PEL			2.697	5.458	
LSDN		2.600	1.680		G/CC

energy services	K.B. Elev: 2858.0 Ft