

Tucker
ENERGY SERVICES

COMPENSATED NEUTRON
PEL DENSITY MICRO LOG

Company VAL ENERGY, LLC Well EASTMAN UNIT V 1-16 OWWO Field FROG HOLLOW County COWLEY State KANSAS Country USA API No. 15-035-23740-00-01		File No : TUL-61371 Company : VAL ENERGY, LLC Well : EASTMAN UNIT V 1-16 OWWO Field : FROG HOLLOW County : COWLEY State : KANSAS Country : USA API No : 15-035-23740-00-01	
Location : 2640' FSL & 2310' FEL W/2 W/2 E2		LSD : Sect : 16 Twp : 32S Rge : 5E	
Permanent Datum:	GL	Elevations:	Services:
Drilling Measured From:	KB	KB 1345.00	CNT
Log Measured From:	KB	DF 1344.00	PIT
Above Permanent Datum:	9.00 Ft	GL 1336.00	LDT
Date	11-28-2018		MST
Run Number	0		
Depth--Driller	3703.0	Ft	
Depth--Logger	3700.0	Ft	
First Reading	3676.0	Ft	
Last Reading	219.0	Ft	
Casing--Driller	219.0	Ft	
Casing--Logger	219.0	Ft	
Bit Size	7.875	In	
Casing Size	8.625	In	
Hole Fluid Type	WBM		
Density	8.6		
Fluid Loss	12.8		
PH/Viscosity	10.0	60.0	
Sample Source	MEASURED		
RM@Measured Temp.	0.300 @ 83 F		
RMF@Measured Temp	0.260 @ 83 F		
RMG@Measured Temp.	0.350 @ 83 F		
Source RMF/RMC	CALCULATED/CALCULATED		
RM@BHT	0.240 @ 105 F		
Time Circulation Stopped	11-27-2018 11:00 pm		
Max Recorded Temp.	105 F		
Equipment/Base	TRK-126 TULSA		
Recorded By	B.BAILEY		
Witnessed By	J.GUICK		

The customer is hereby warned that by providing the log data herein, T. E. S. does not agree to provide any interpretation of log data, conversion of log data to physical rock parameters or recommendations. T. E. S. does not guarantee or warrant either expressly or impliedly, the accuracy of any interpretation of log data, conversion of log data to physical rock parameters or recommendations which may be given by T. E. S. personnel. Any interpretation, conversion or recommendation is not part of the consideration for the agreement between the parties and is not part of any part of the charge by T. E. S. for its services. Any user of the log data is warned that said user is not entitled to rely on interpretations, conversions or recommendations as aforesaid.

Bitsize Intervals		Casing Strings			
Size (In)	Bottom (Ft)	Size (In)	Weight (Lbs)	Bottom (Ft)	Top (Ft)
7.875	3703.00	8.625	17.00	219.00	0.00

Run Number	0	
Date	11-28-2018	
Date/Time On Bottom	11-28-2018 2:26 am	
Depth to Fluid	0.0 Ft	
Salinity	0.000	
RMF@BHT	0.200 @ 105 F	
RMC@BHT	0.280 @ 105 F	

Run Number 0

Comments

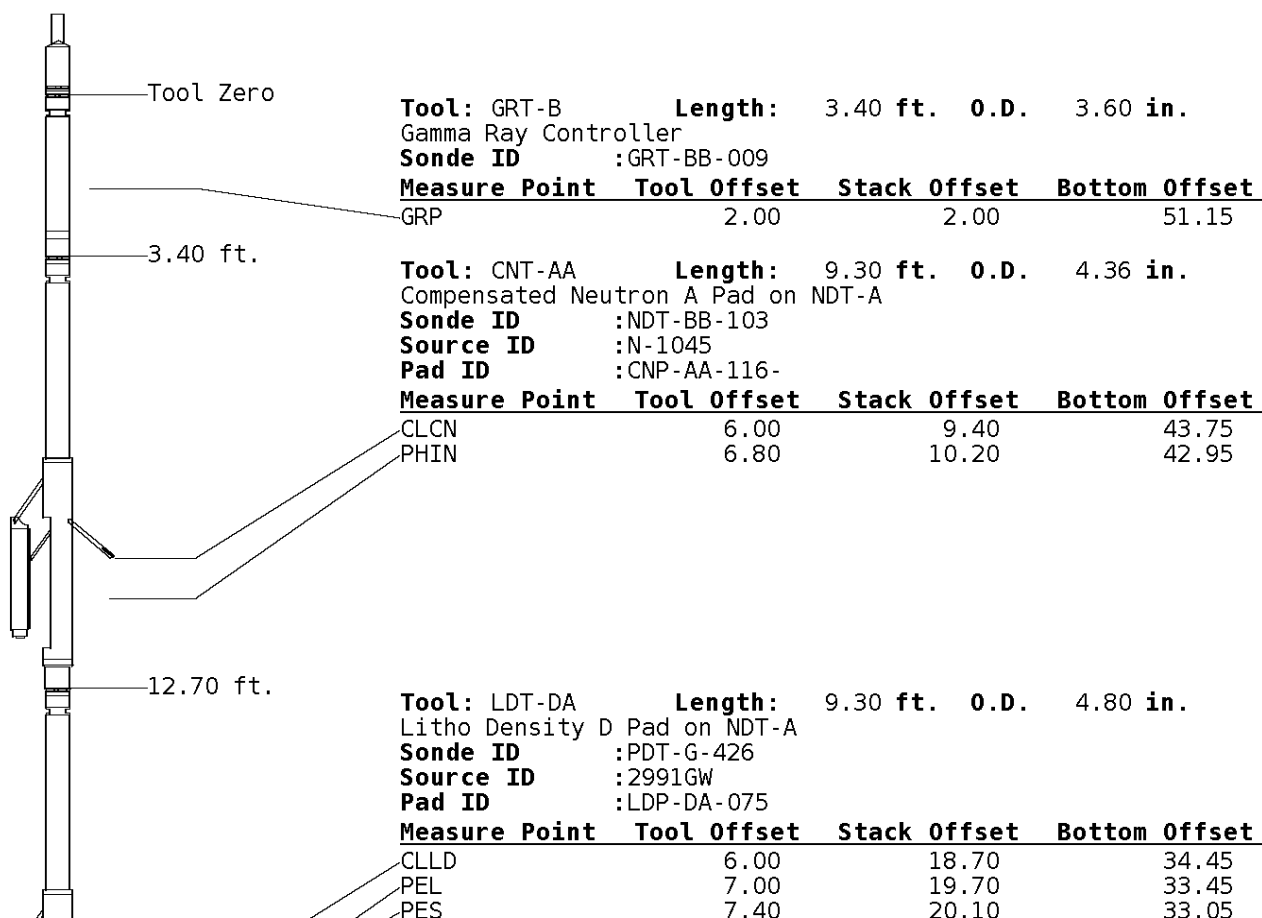
ALL PRESENTATION PER CUSTOMER REQUEST
 GRT,CNT,LDT,MLT,PIT RUN IN COMBINATION
 CALIPERS ORIENTED ON X-Y AXIS
 2.71 G/CC USED TO CALCULATE POROSITY
 ANNULAR & BOREHOLE VOLUME CALCULATED USING 5.5 PRODUCTION CASING
 PHIN IS CALIPER CORRECTED
 DETAIL IS PRESENTED FROM TD TO SCG

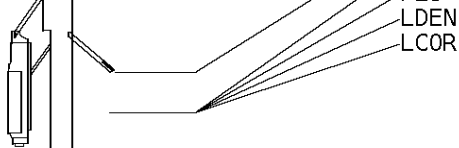
GRT; GRP
 CNT; PHIN, CLCNIN
 LDT; PORL, LCORN, PECLN, LDENN, CLLDIN
 MLT; NOR_RF, INV_RF, MSCLPIN.
 PIT; ILD, ILM, SPU, SFLAEC, CIRD

OPERATORS;
 K.WARREN

Tool String Schematic

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

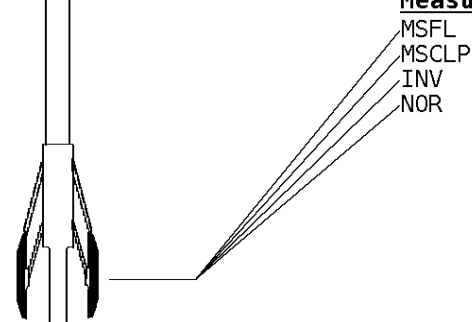




7.20	19.90	33.25
7.20	19.90	33.25

Tool: MST-DA **Length:** 9.66 ft. **O.D.** 6.00 in.
 Micro Spherically Focused (IC,D)
Sonde ID :MST-DA-28

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-AC-043

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

LWT — 53.15 ft.

Well File: val eastman 1-16owwo_nov27_mst

Scale: 1:240 **Format:** NLD-240

Segment: V1.D1.S4 MAIN

Acquired: 2018-11/28 02:34 3.4.0-13756

Reference: 0

Processed: 2018-11/28 03:45 3.4.0-13756

**CALIPER MICRO
INCHES (IN)**

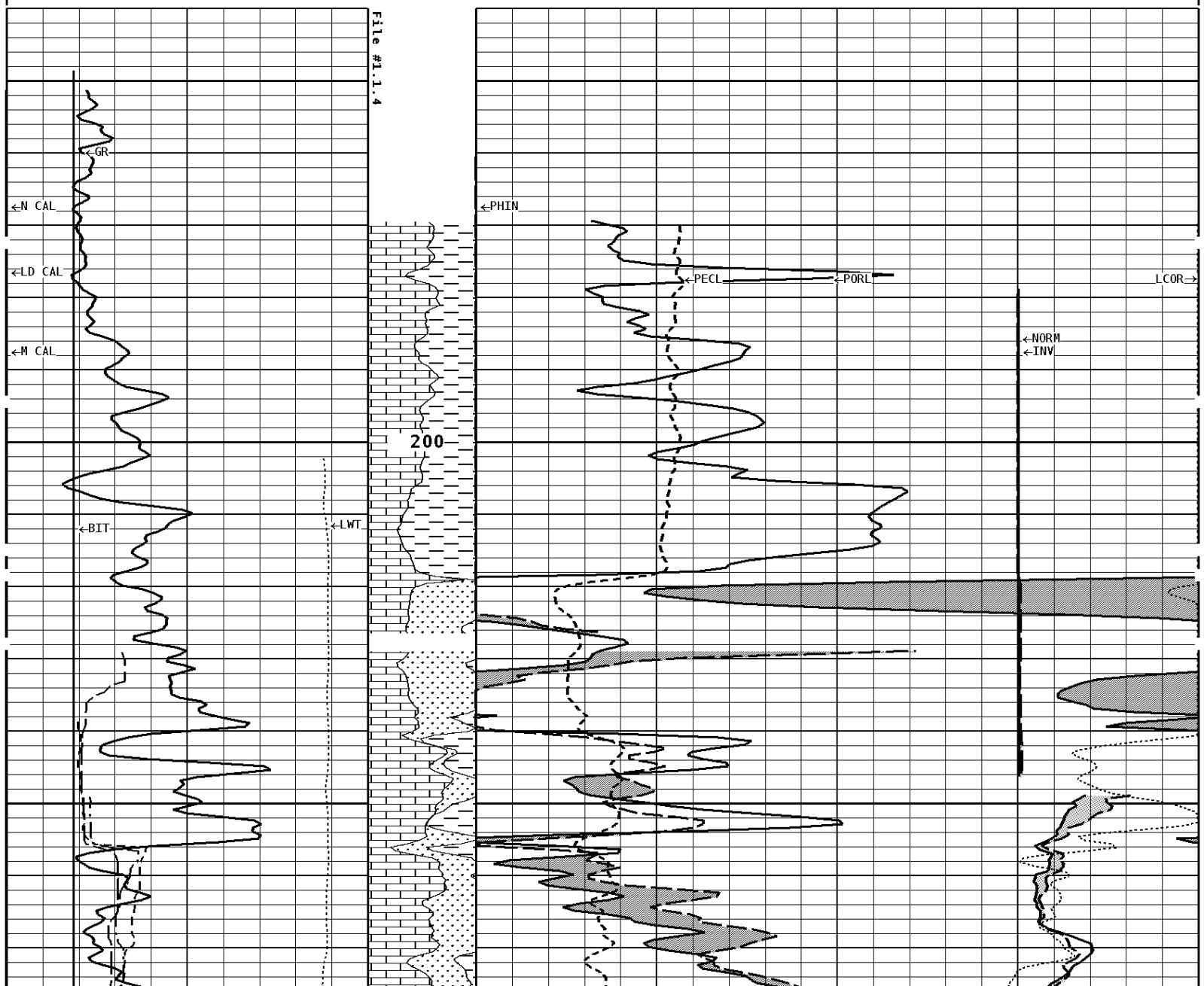
16	26
6	16

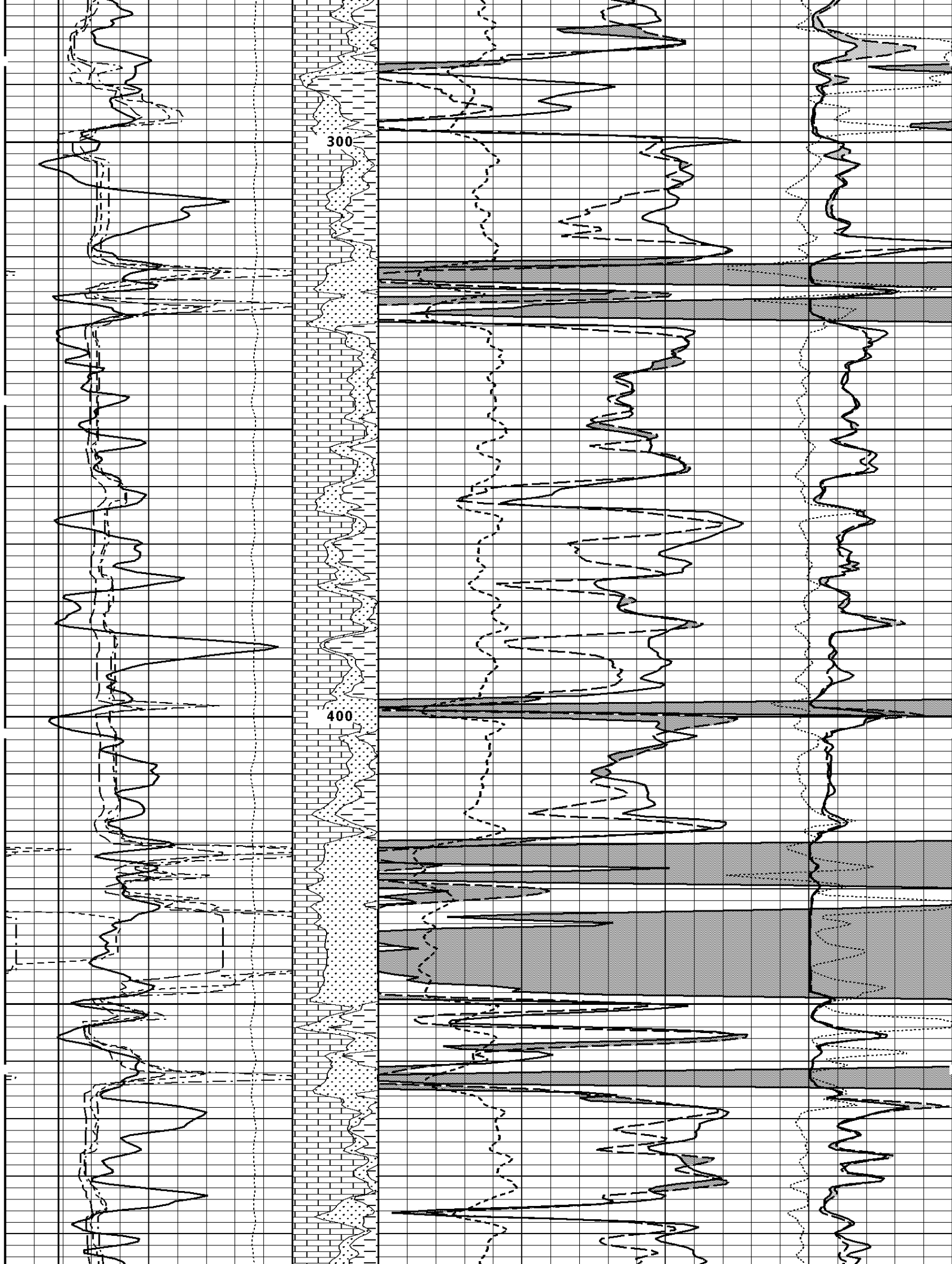
**BIT SIZE
INCHES (IN)**

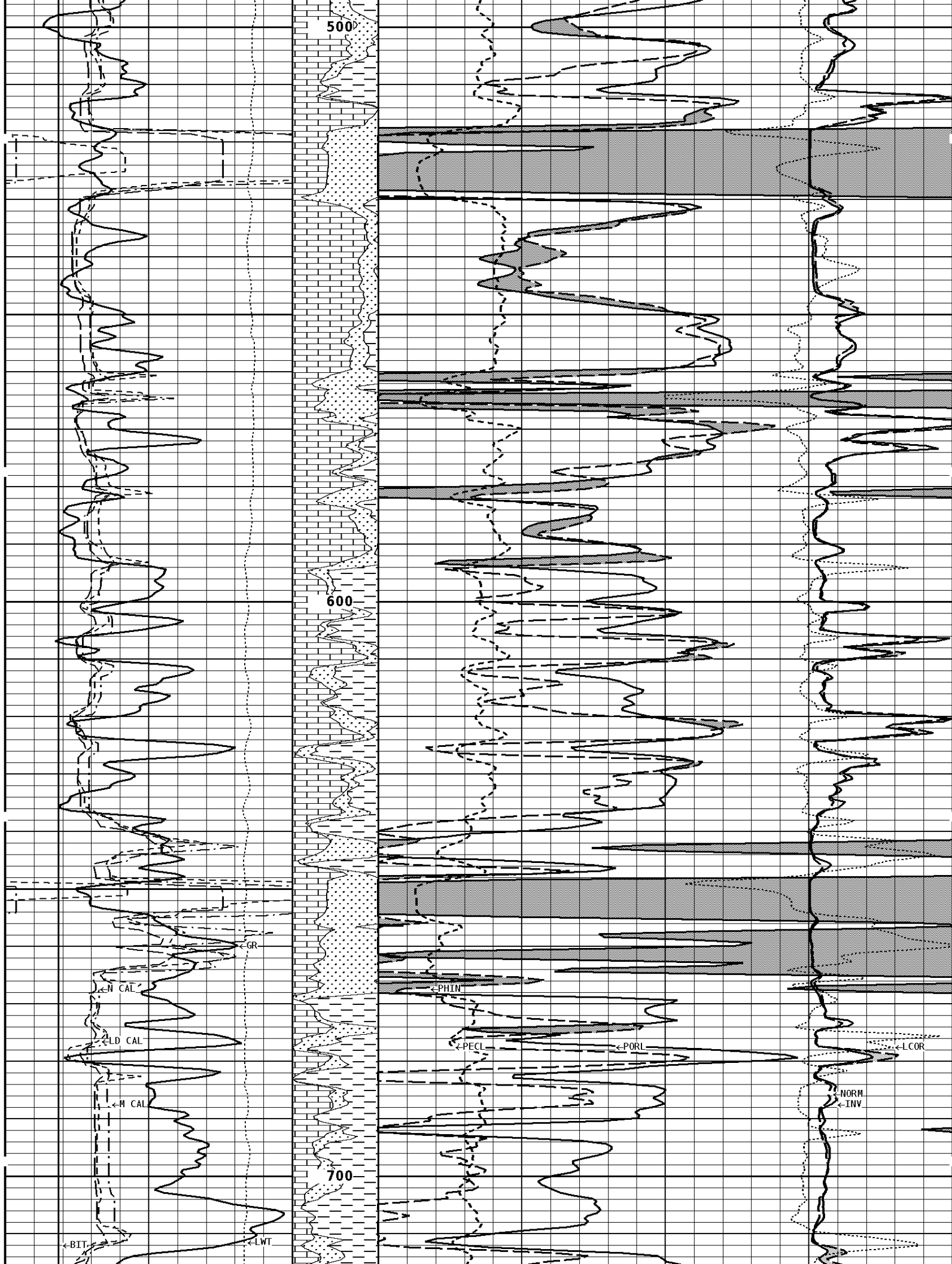
**NORMAL
OHMM**

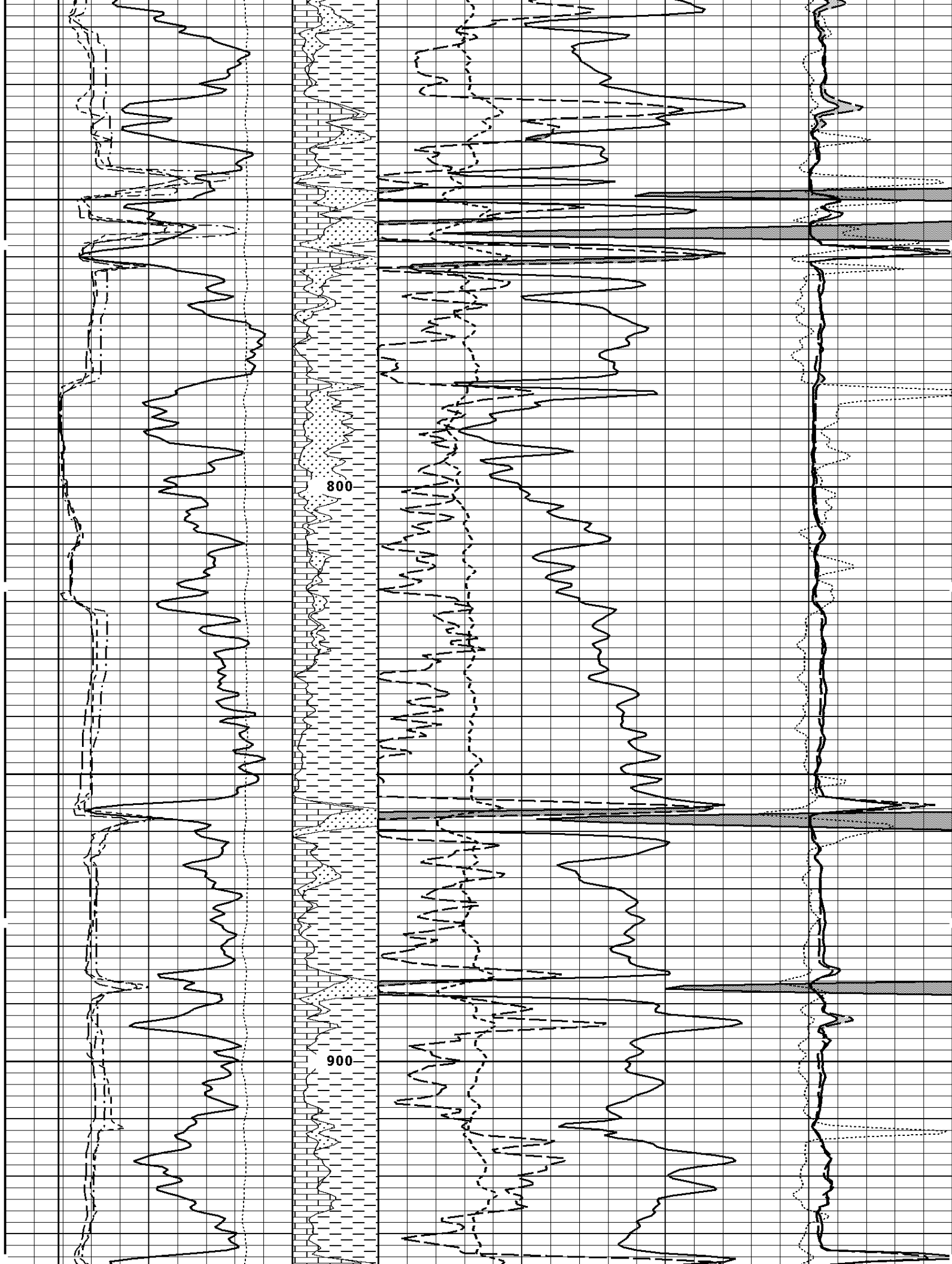
6	16			0	40
NEUTRON (Y) CALIPER INCHES (IN)				INVERSE OHMM	
16	26			0	40
6	16				
DENSITY (X) CALIPER INCHES (IN)		Volume Quartz	PE CROSS-SECTION BARNs/ELECTRON	DENSITY CORRECTION G/CC	
16	26		0	10	-0.25
6	16				0.25
TENSION LBS		Volume Calcite	DENSITY POROSITY (2.71g/cc) PERCENT		
10000	0		70		30
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

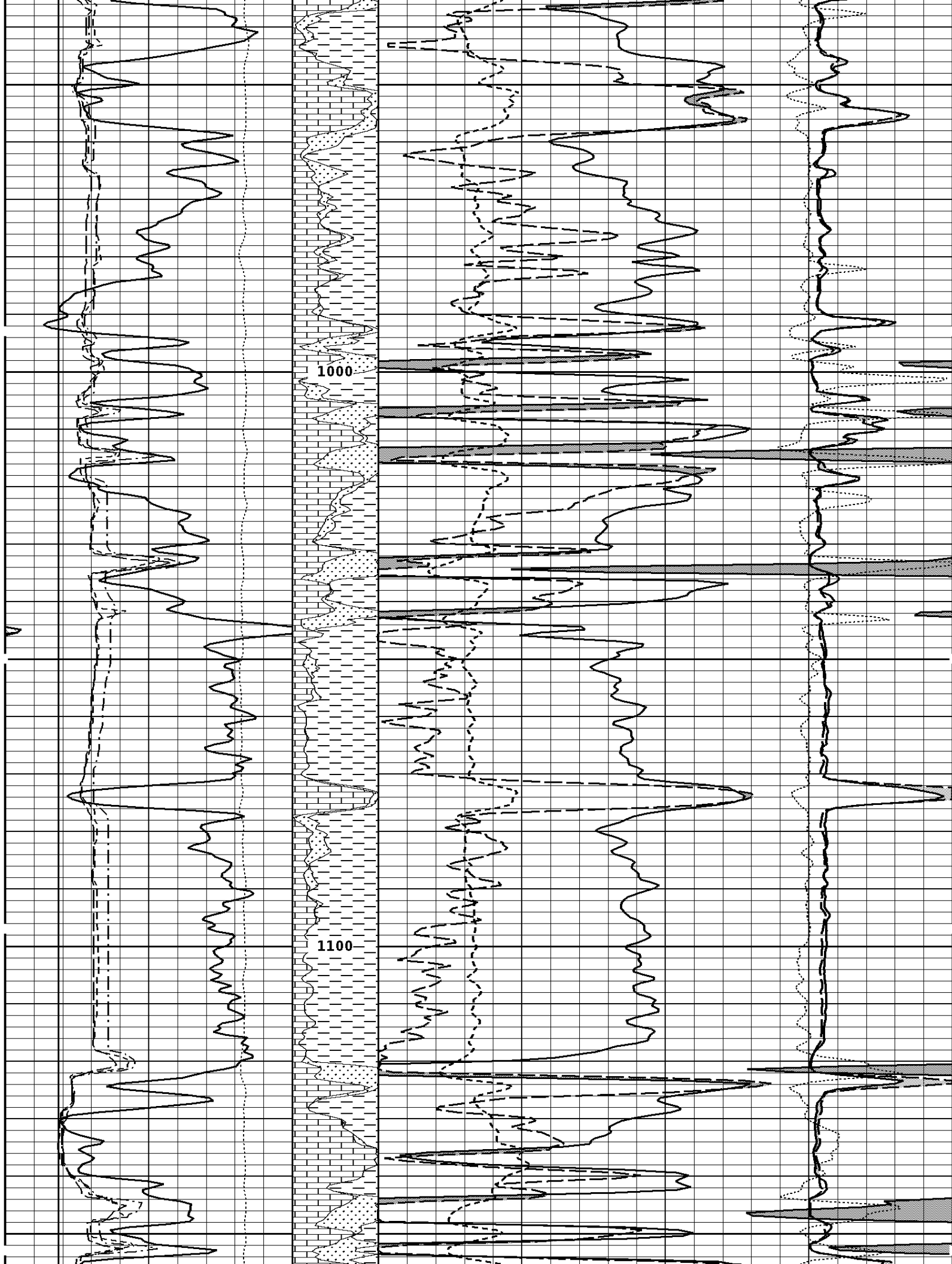
1:240 MAIN SECTION

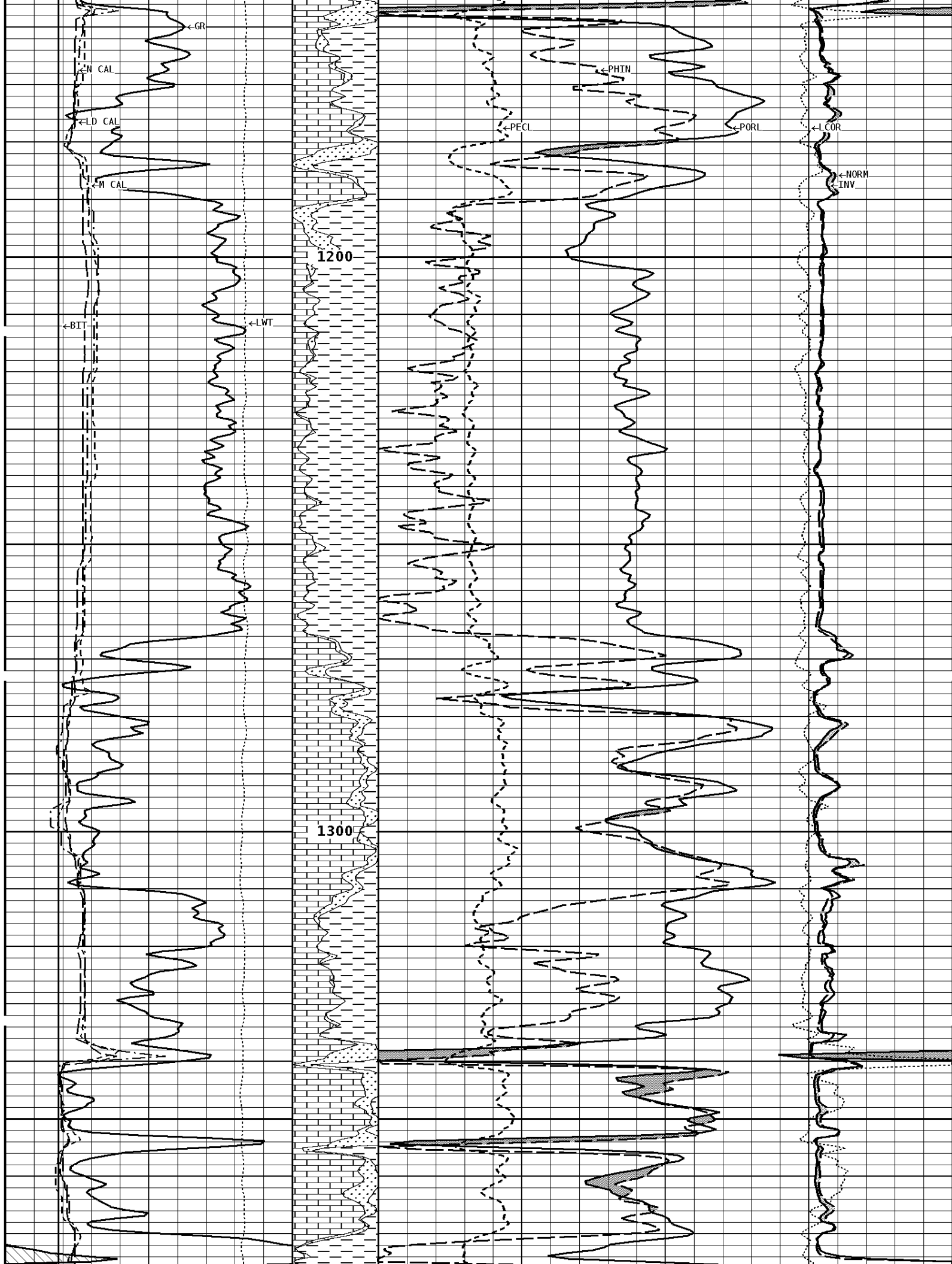


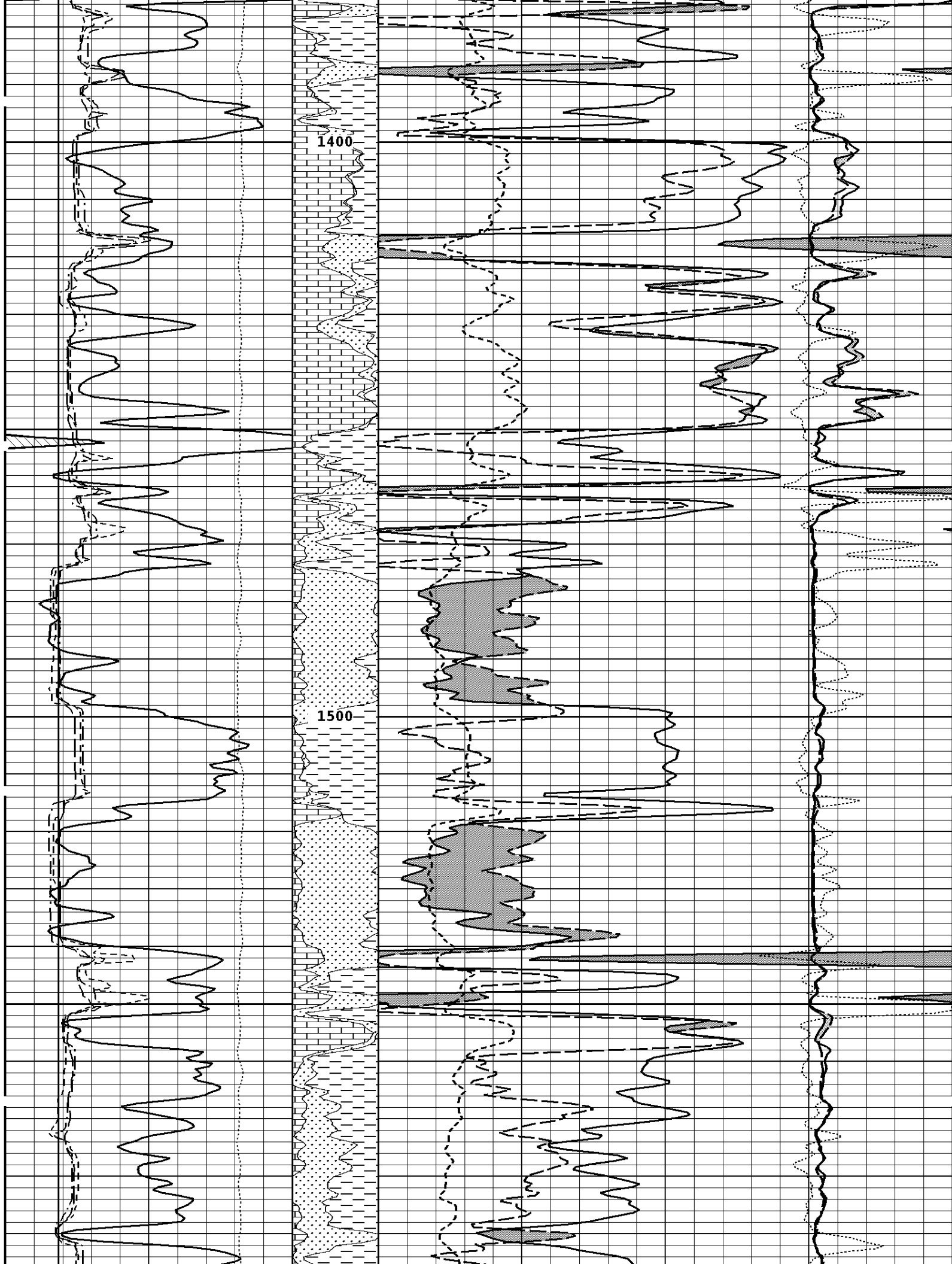


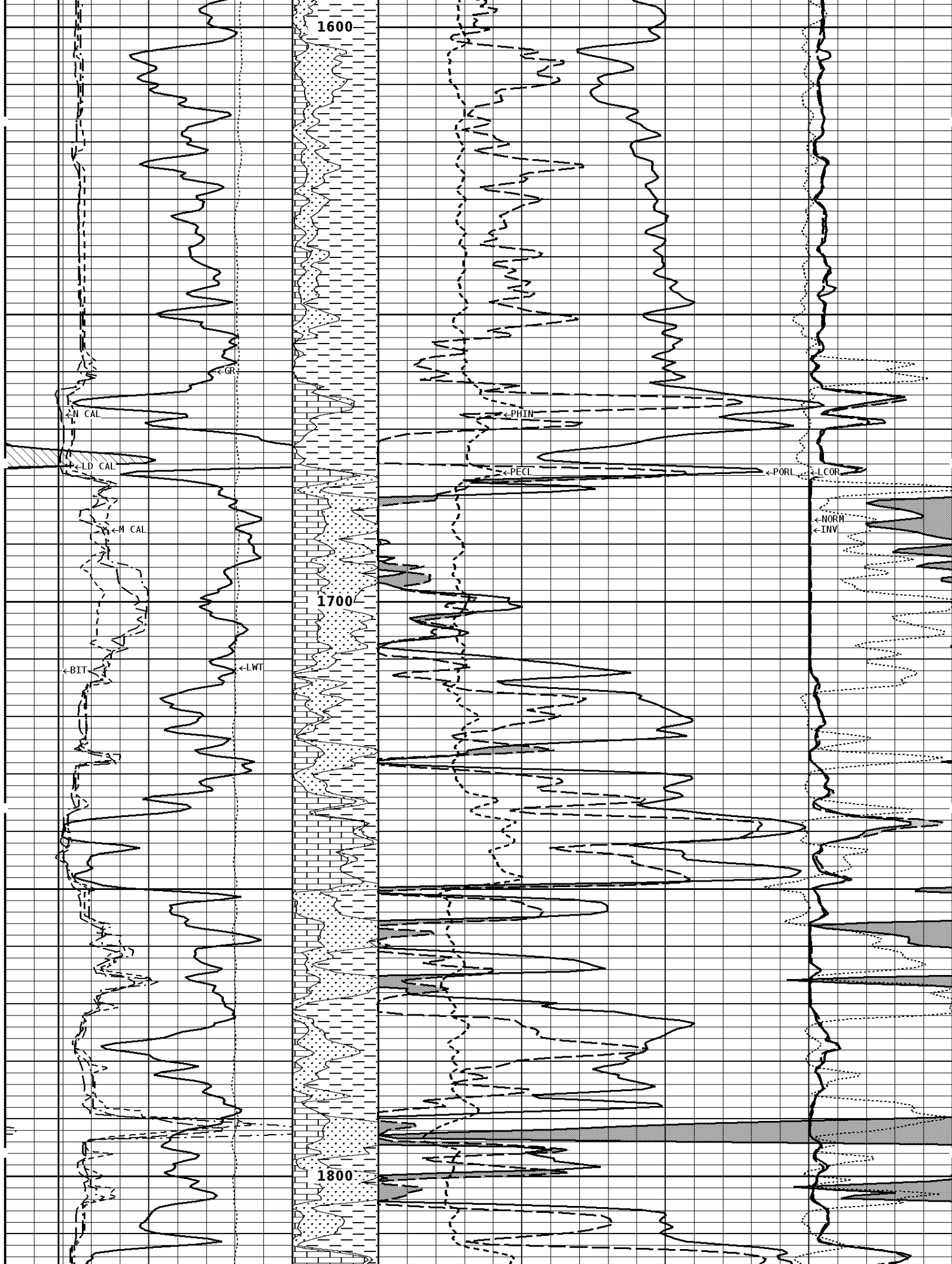












1600

1700

1800

GR

N CAL

LD CAL

M CAL

BIT

LWT

PHIN

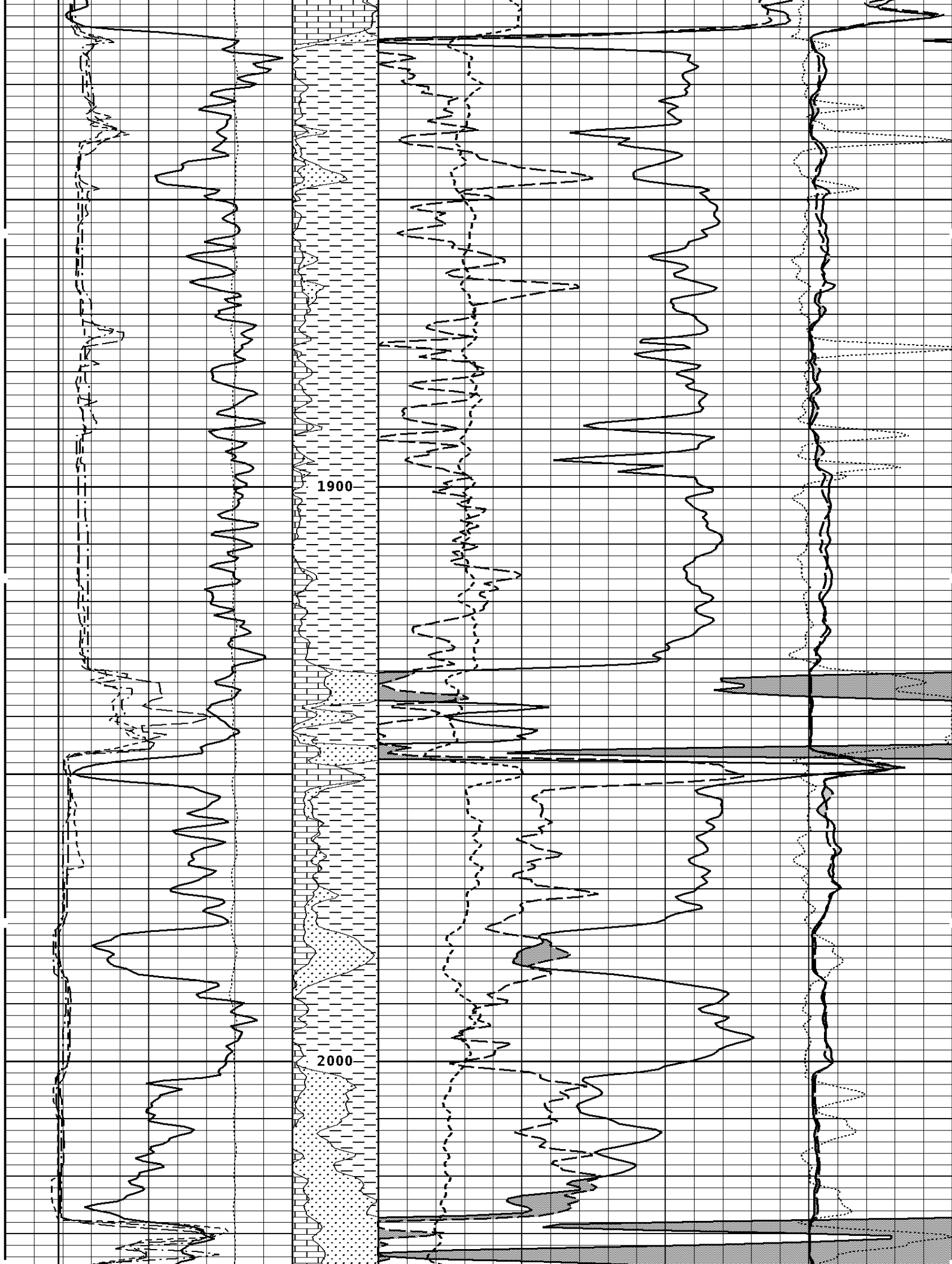
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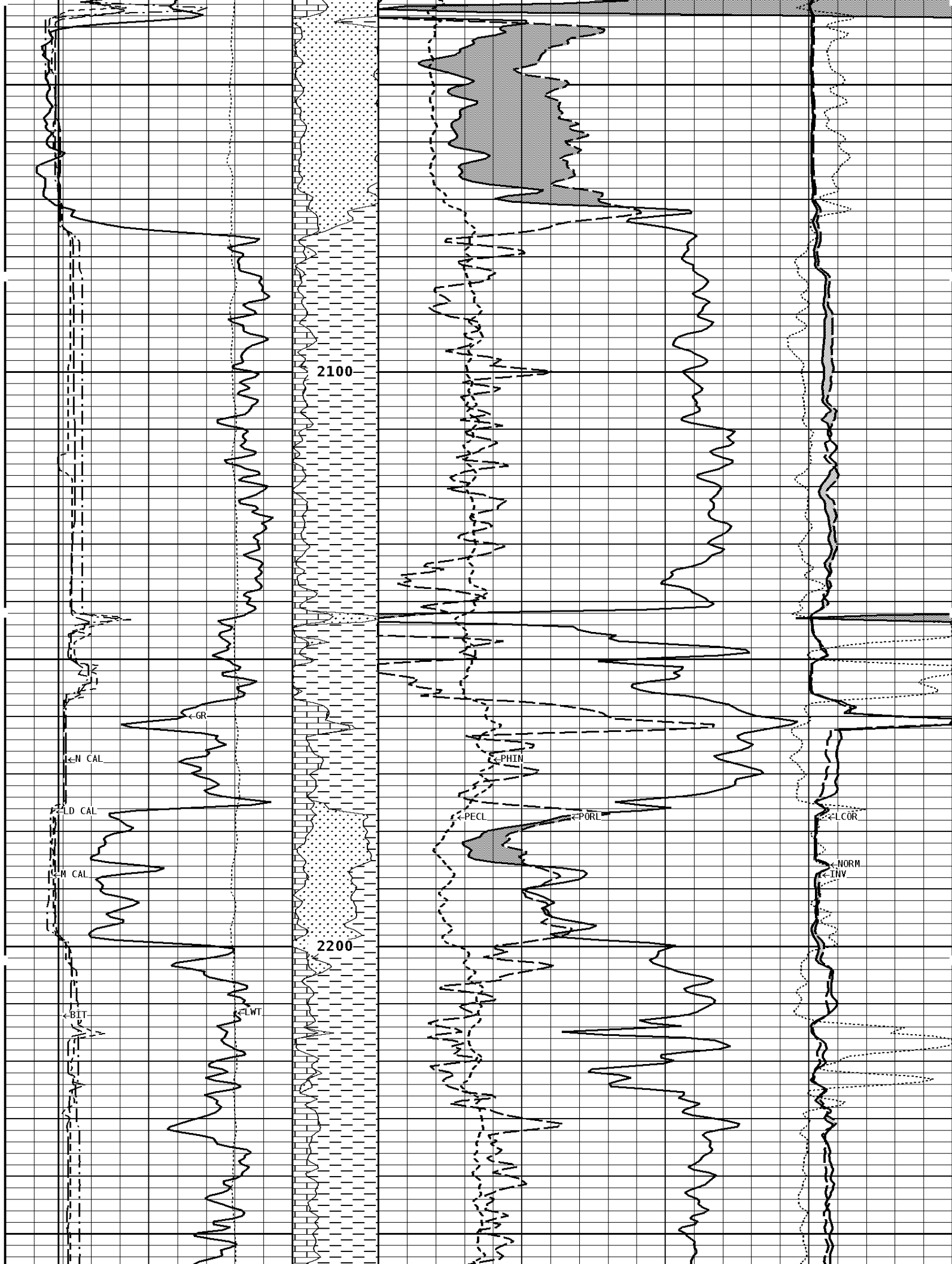
PORL

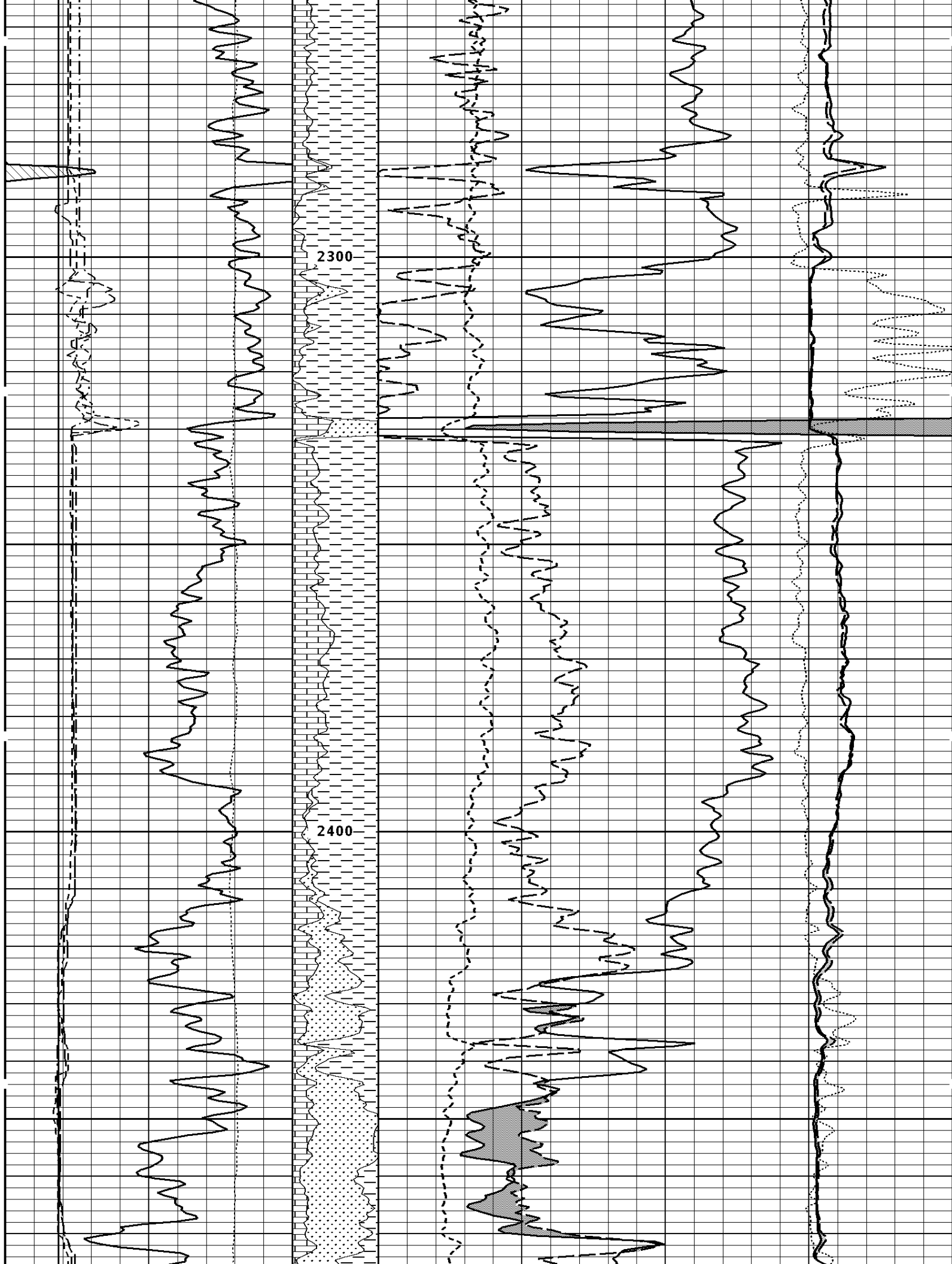
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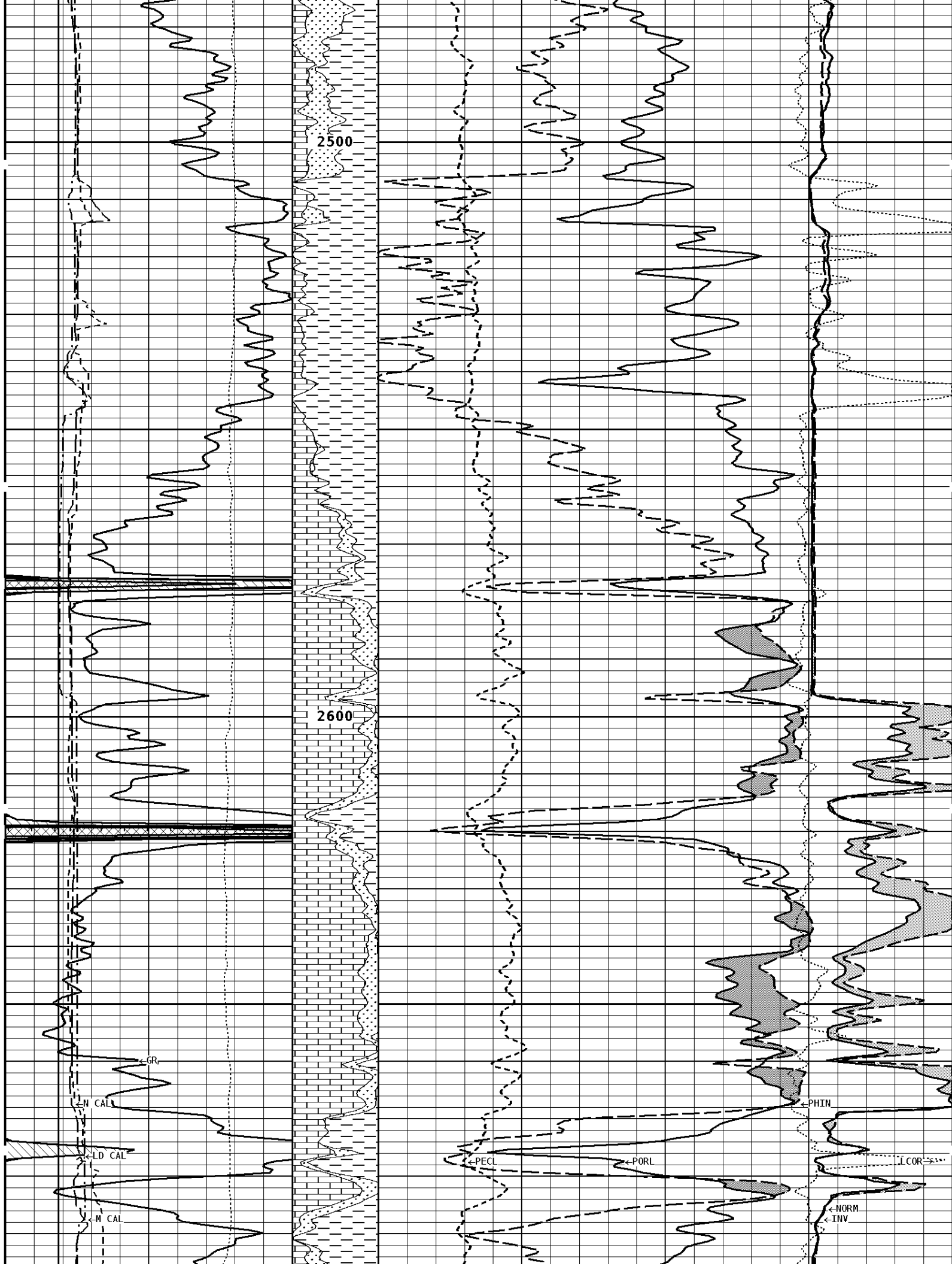
NORM

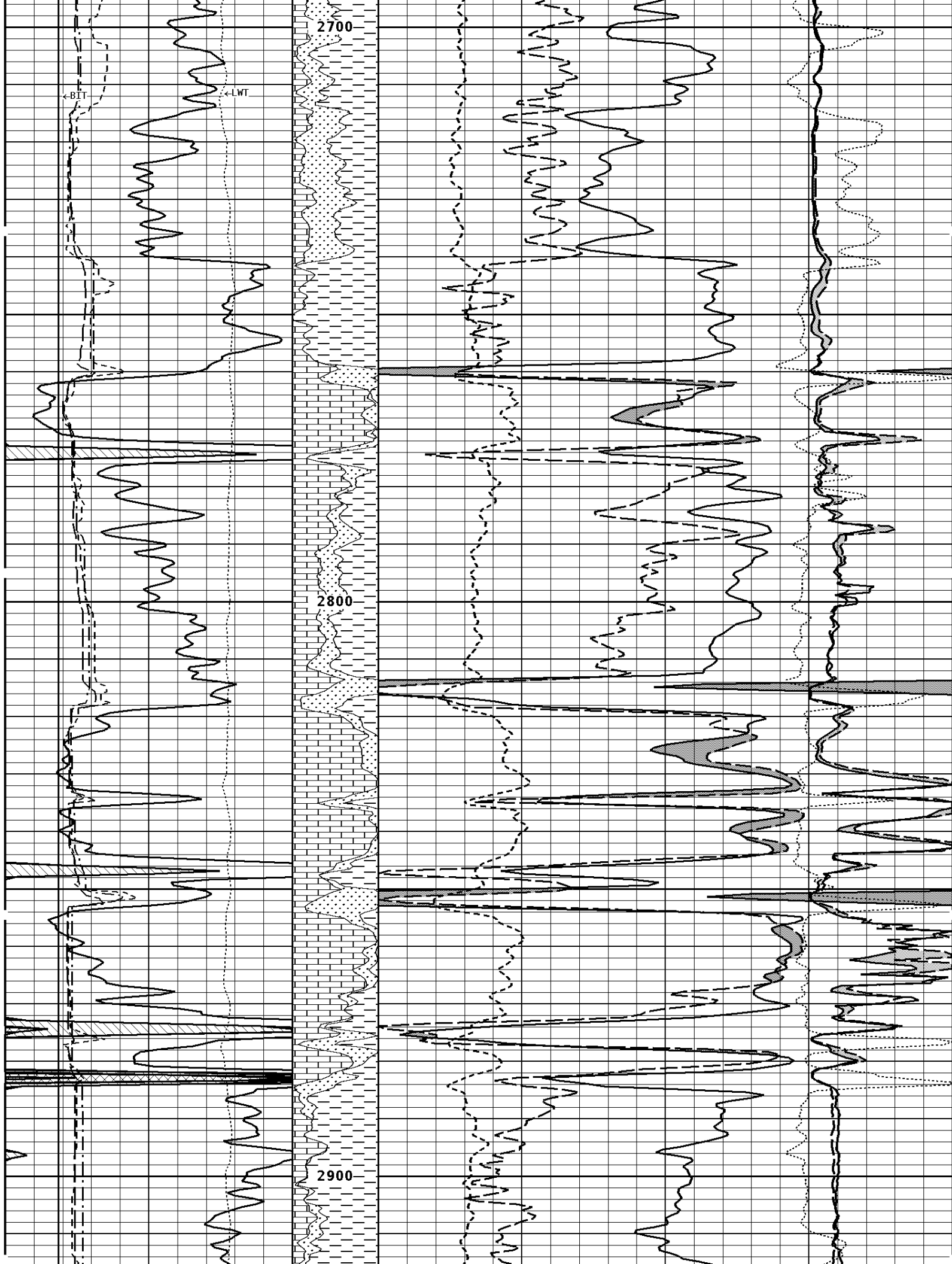
INV

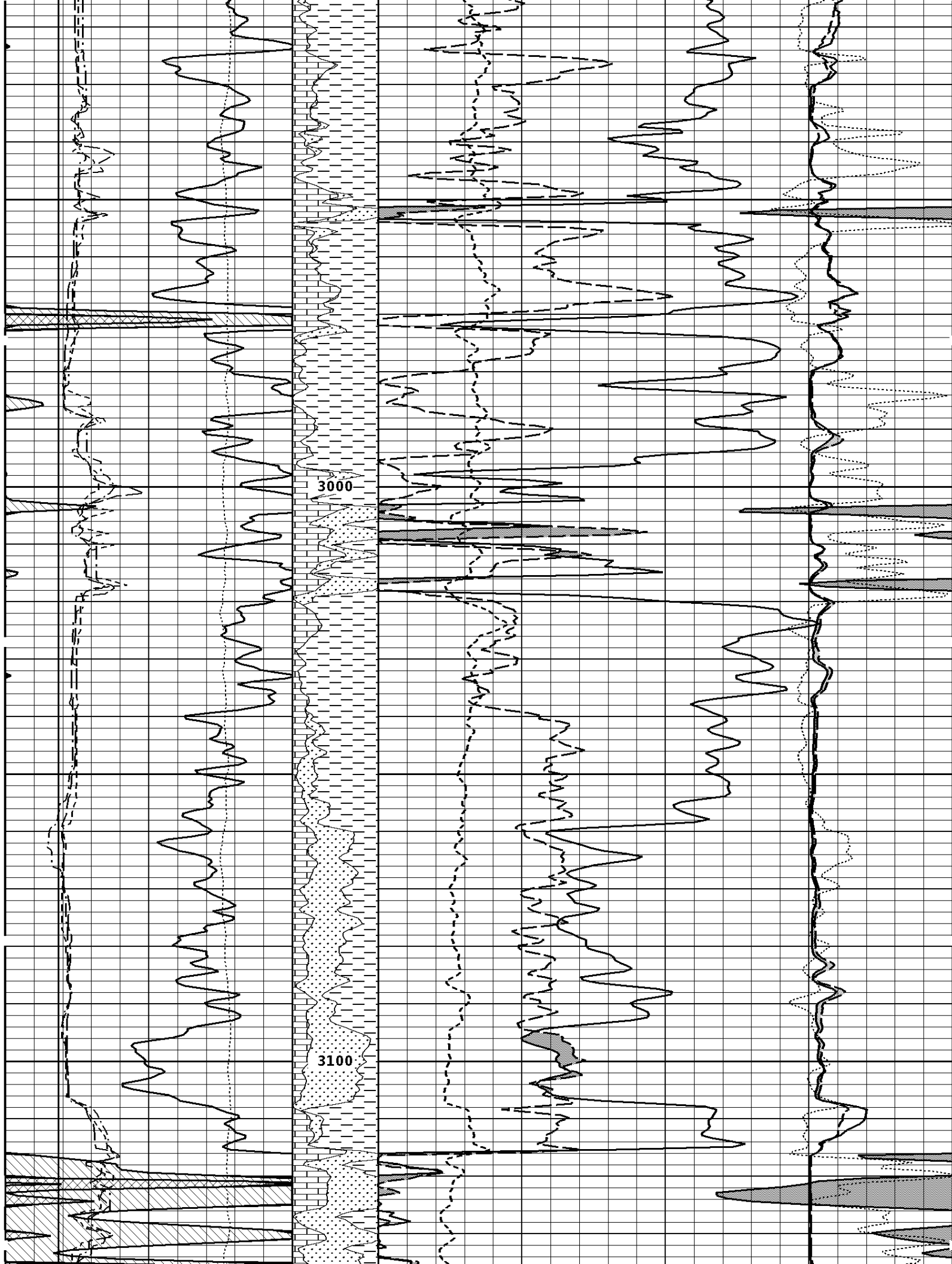


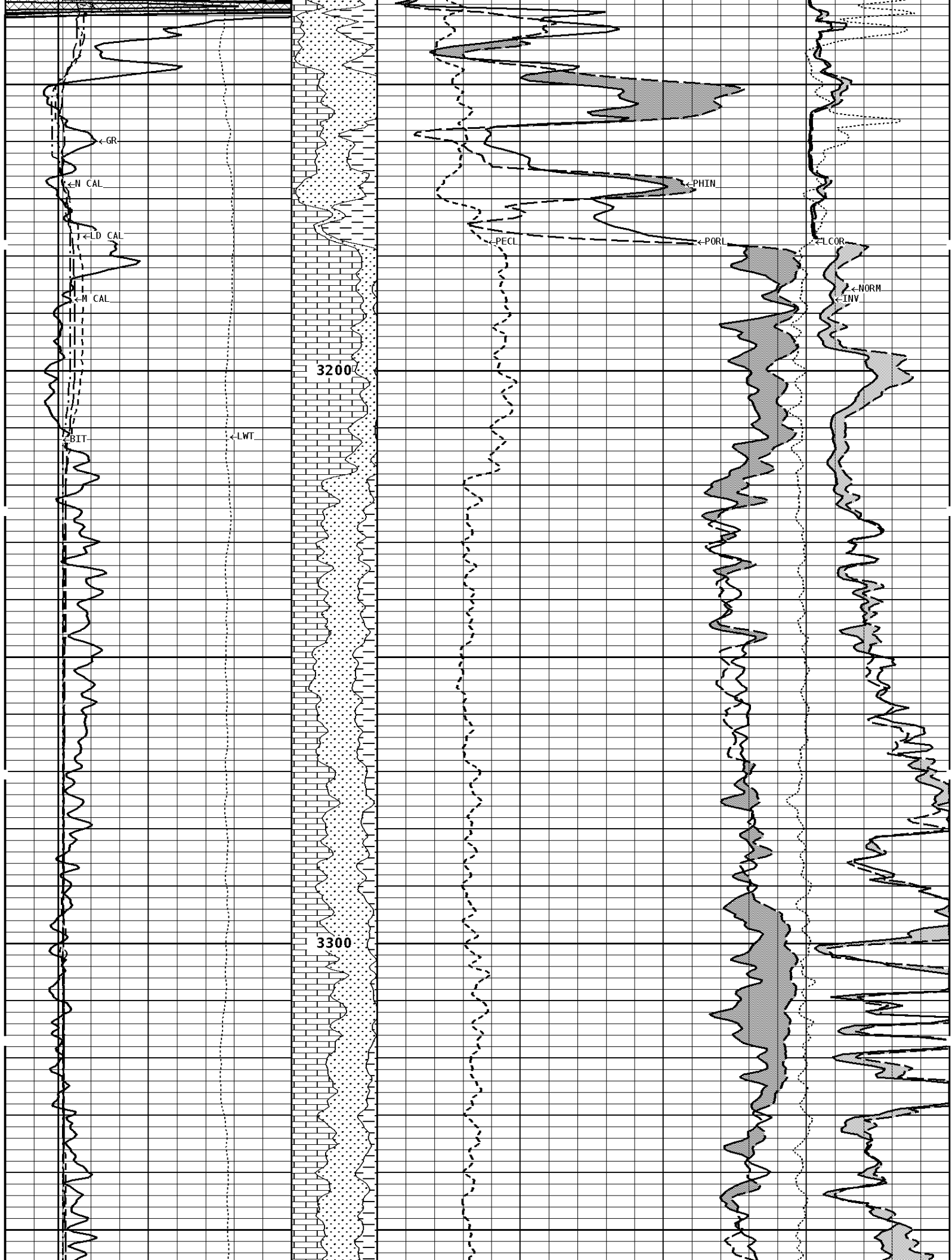


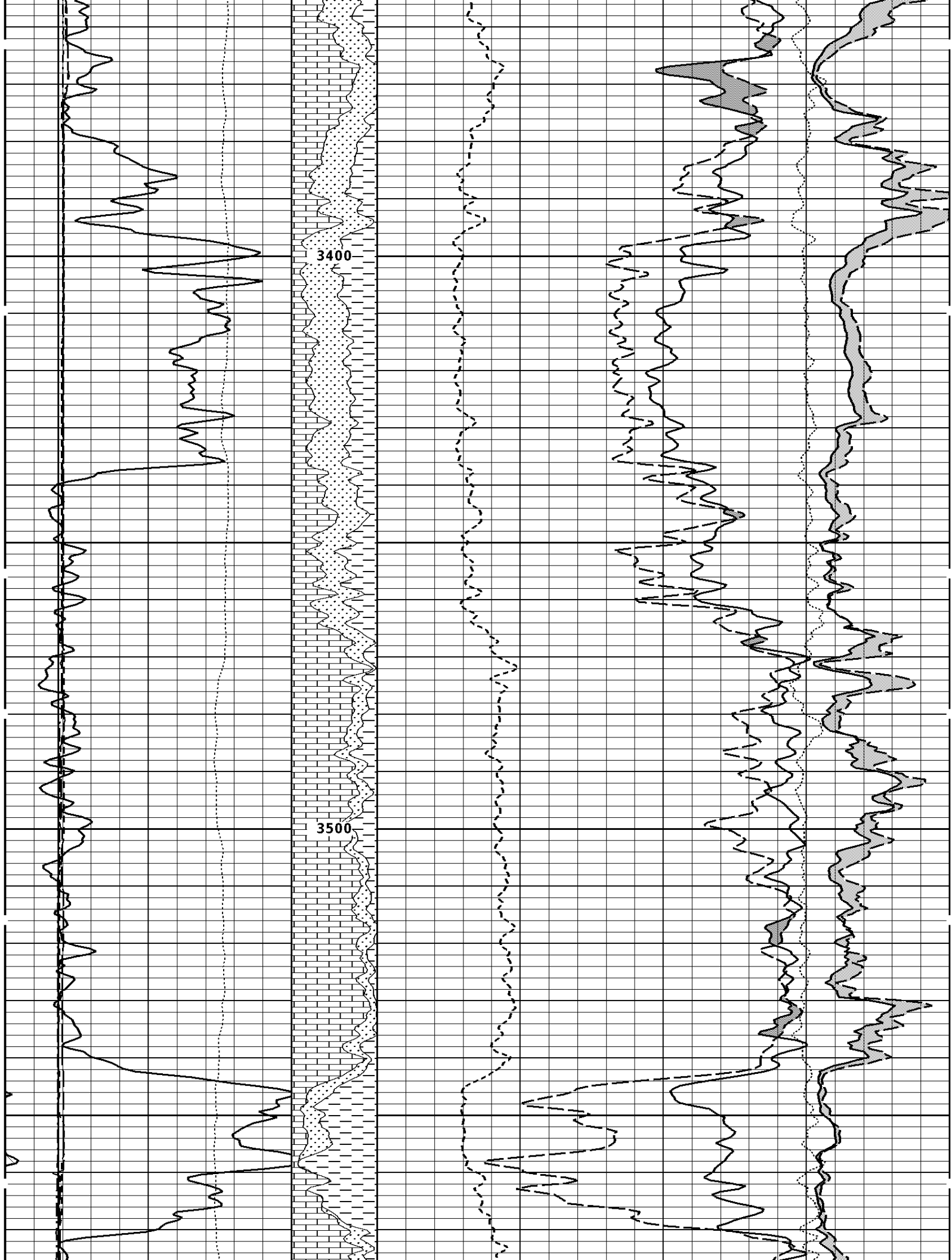


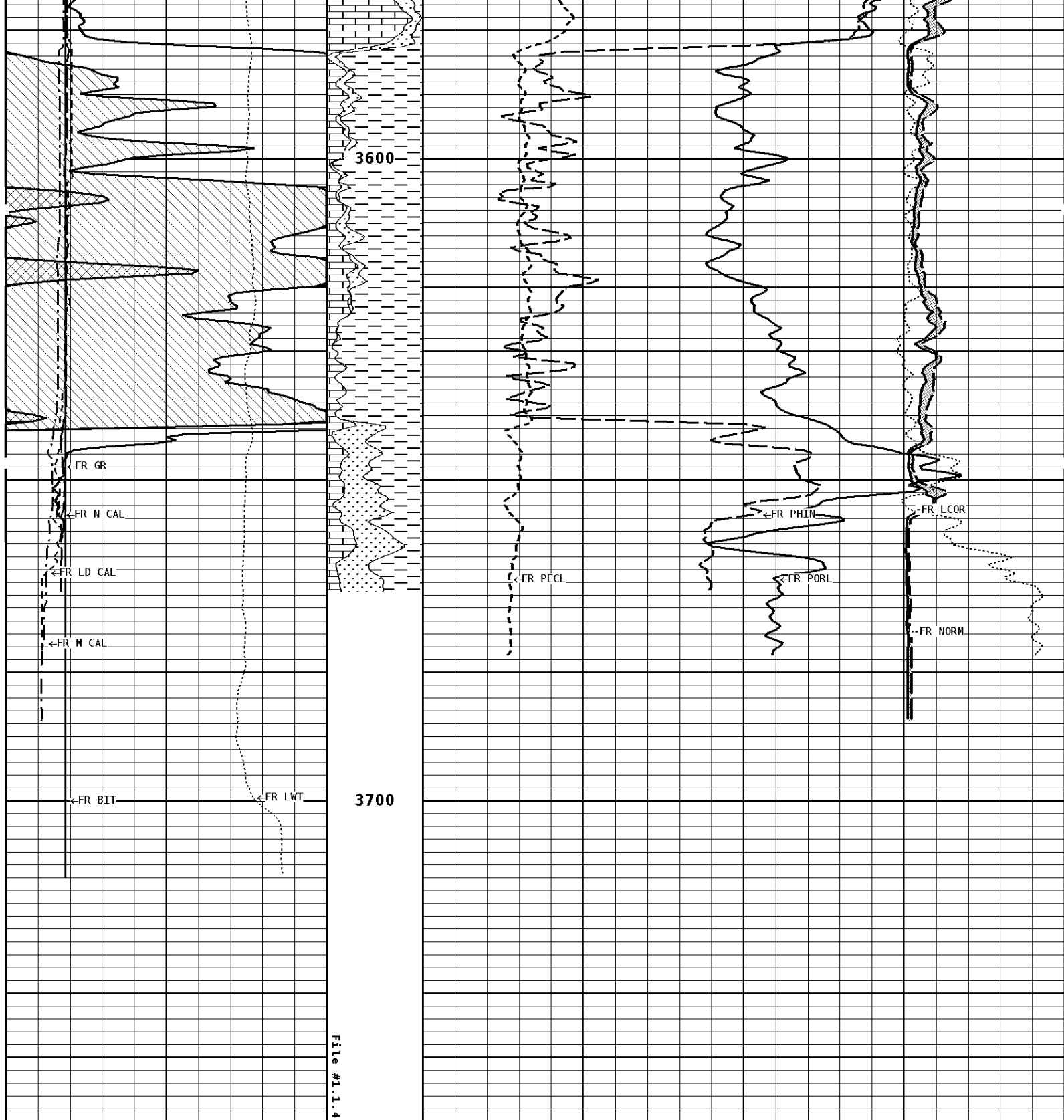












1:240 MAIN SECTION

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 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	

*** Calibration Summary ***

Shop Calibration GRT-B					
Performed : 01-OCT-2018			Time : 10:33		
Sensor Suite : GR-GR5			ID : GRT-BB-009		
	Measured	Units	Calibrated	Units	
GR	Background	Jig	Jig		
	58	336	160	GRAP1	

Shop Calibration CNT-AA					
Performed : 21-Nov-2018			Time : 10:33		
Sensor Suite : BHC NEUT			ID : CNP-AA-116-		
Source ID : N-1045					
	Tank	Verification	Units		
	Measured	Calibrated	Jig		
N/F	3.8301	3.6893	3.6919		
Porosity	22.7	20.5	20.5	%	

Shop Calibration LDT-DA					
Performed : 21-Nov-2018			Time : 12:00		
Sensor Suite : BHCPELNG			ID : LDP-DA-075		
Source ID : 2991GW					
Short Space					
	BKGD	Al	Mg	Al+Fe	Units
LSW1	51	937	1536	606	CPS
LSW2	54	1136	1803	798	CPS
LSW3	209	2578	4184	2179	CPS
LSW4	253	2266	3286	1982	CPS
LSW5	23	44	48	40	CPS
LSW6	68	71	74	72	CPS
LSW7	45	46	47	47	CPS
LSW8	1	3	4	3	CPS
QS	0.207	0.215	0.219	0.210	
PES			2.778	5.967	
SSDN		2.600	1.680		G/CC
Long Space					
	BKGD	Al	Mg	Al+Fe	Units
LLW1	84	993	4104	605	CPS
LLW2	93	1907	7679	1363	CPS

LLW3	352	3617	13956	3111	CPS
LLW4	447	1715	5548	1556	CPS
LLW5	51	59	106	59	CPS
LLW6	143	140	130	140	CPS
LLW7	91	90	85	90	CPS
LLW8	3	6	14	5	CPS
QL	0.222	0.220	0.210	0.219	
PEL			2.697	5.458	
LSDN		2.600	1.680		G/CC

**Shop Calibration
MST-DA**

Performed : 21-NOV-2018 Time : 12:15
Sensor Suite : CALI-MSN ID : MST-DA-28

	Jig - Measured		Jig - Calibrated		Units
	Ring#1	Ring#2	Ring#1	Ring#2	
CL # 1	7.5	11.8	6.0	12.0	IN.

Performed : 21-Nov-2018 Time : 12:16
Sensor Suite : MSTDA-NI ID : MST-DA-28

		Internal				
		Measured		Calibrated		
	Zero	Reference	Units	Zero	Reference	Units
INV-V	220.0	30274.6		0.00	1546.00	MV
NOR-V	158.0	30096.2		0.00	1546.00	MV
IN-C	153.5	30427.6		0.00	15.46	UA
INV-R				32.34		OHMM
NOR-R				55.11		OHMM



Tucker
ENERGY SERVICES

Company: VAL ENERGY, LLC
Well: EASTMAN UNIT V 1-16 OWWO
Location: 2640' FSL & 2310' FEL
Logged: 11-28-2018
K.B. Elev: 1345.0 Ft

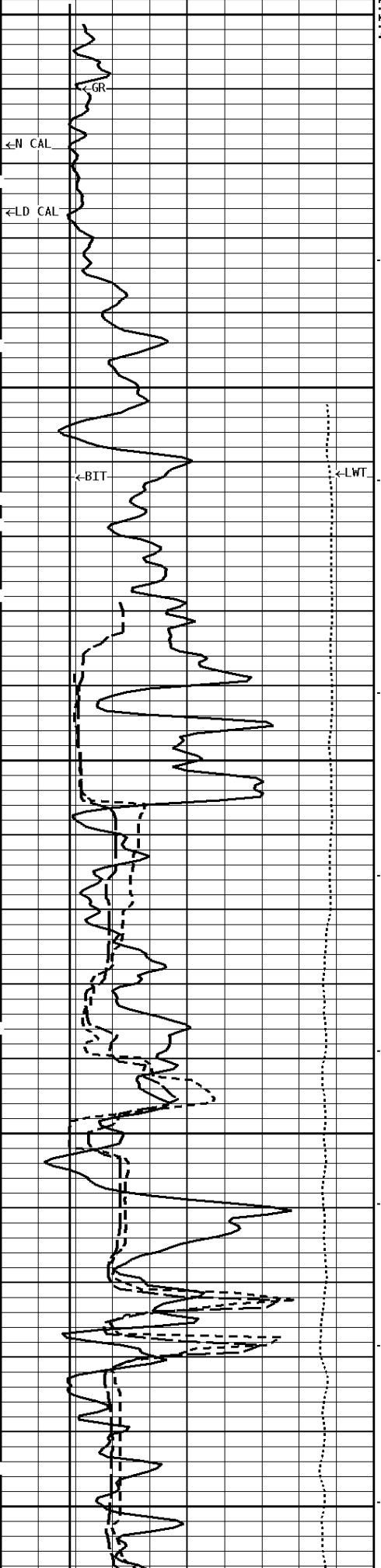
Well File: val eastman 1-16owwo_nov27_mst
Segment: V1.D1.S4 MAIN
Reference: 0

Scale: 1:240 Format: LDT-240
Acquired: 2018-11/28 02:34 3.4.0-13756
Processed: 2018-11/28 03:45 3.4.0-13756

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		

PE CROSS-SECTION BARNs/ELECTRON		DENSITY CORRECTION G/CC	
0	10	-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

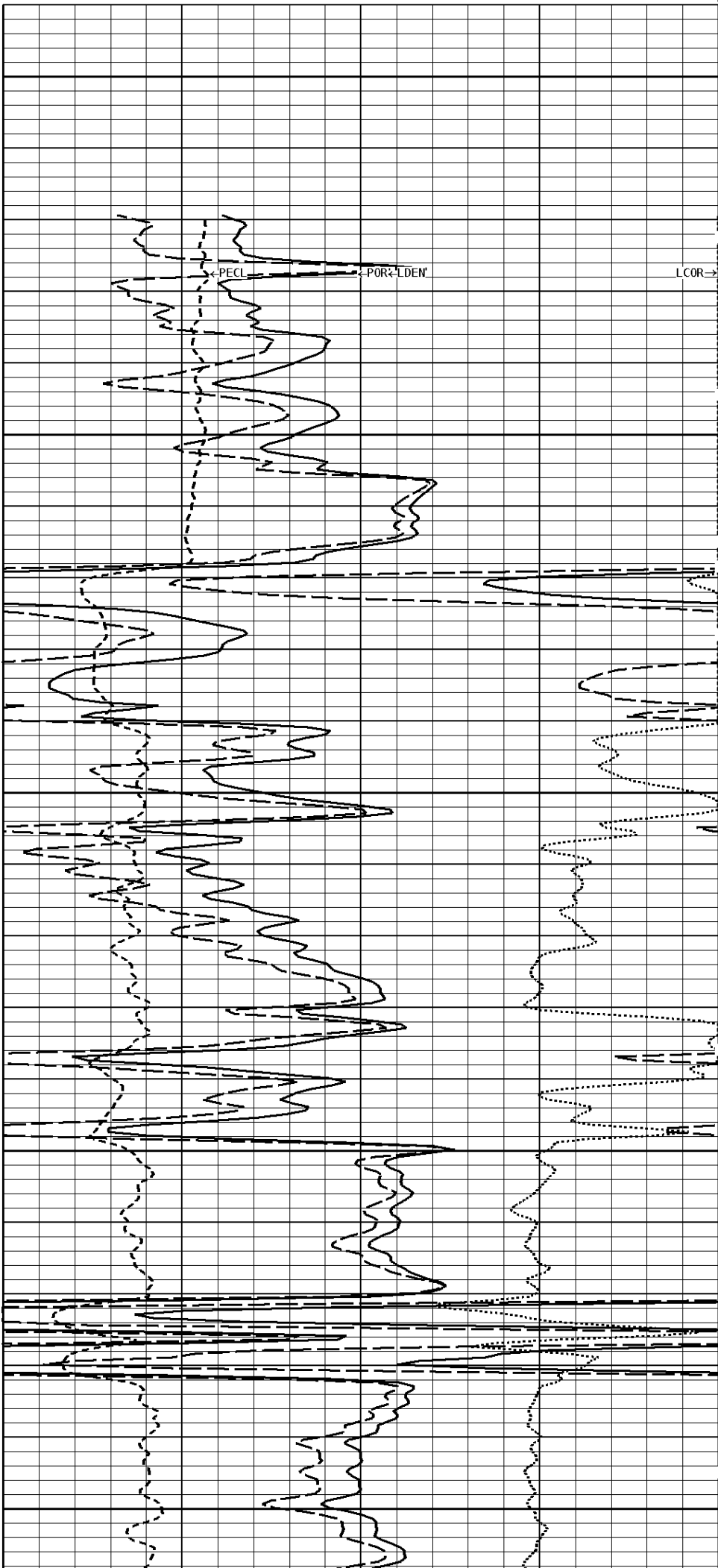
1:240 MAIN SECTION
BULK DENSITY

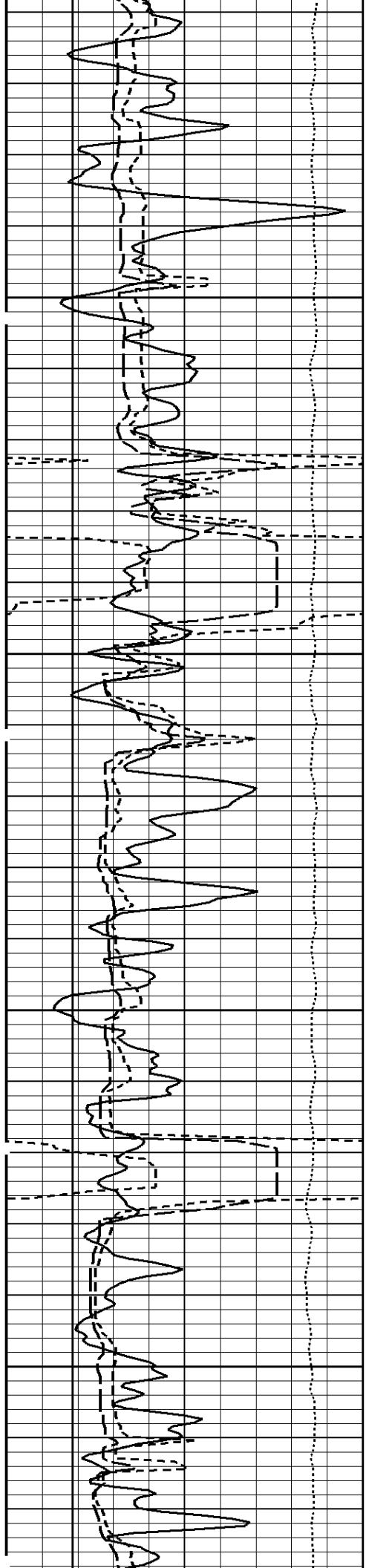


200

--1400Cu.Ft

300



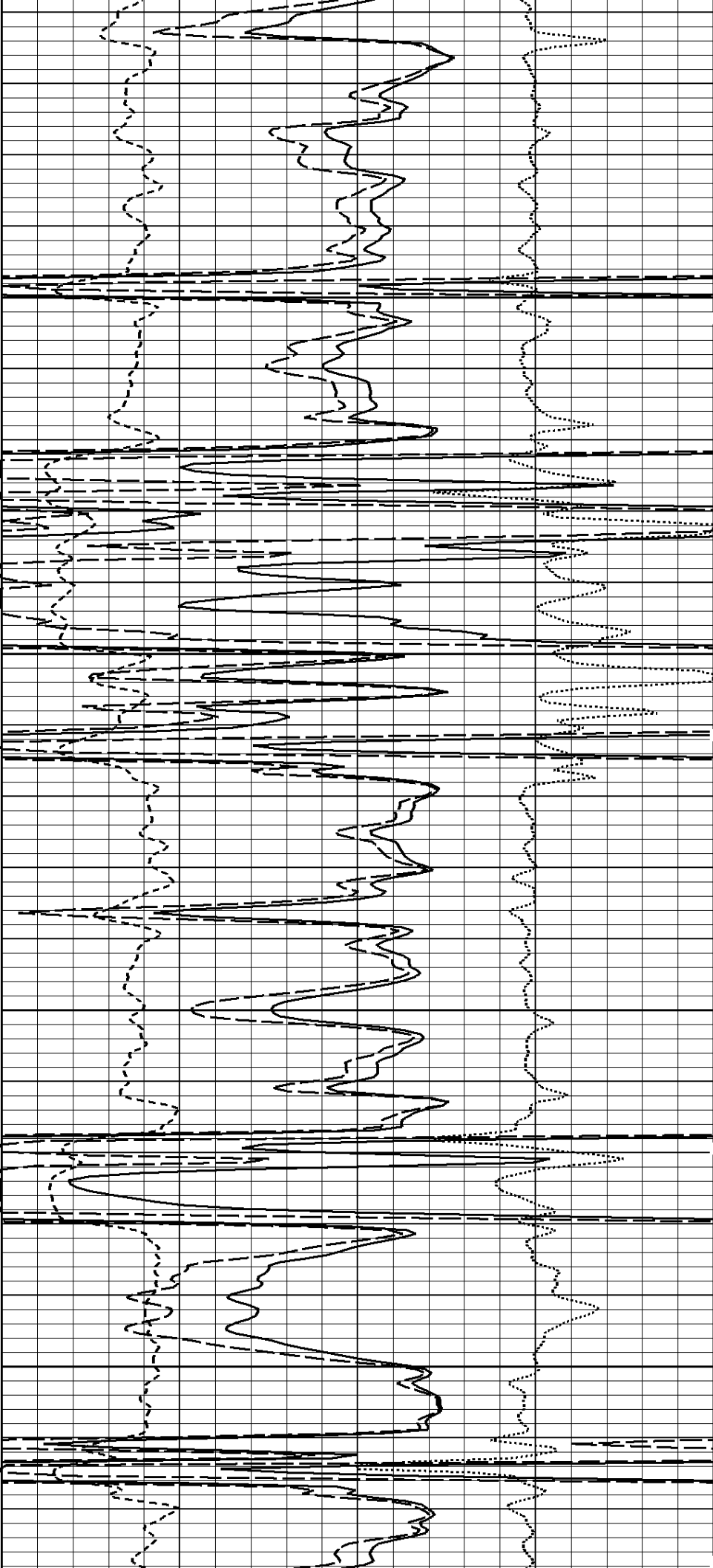


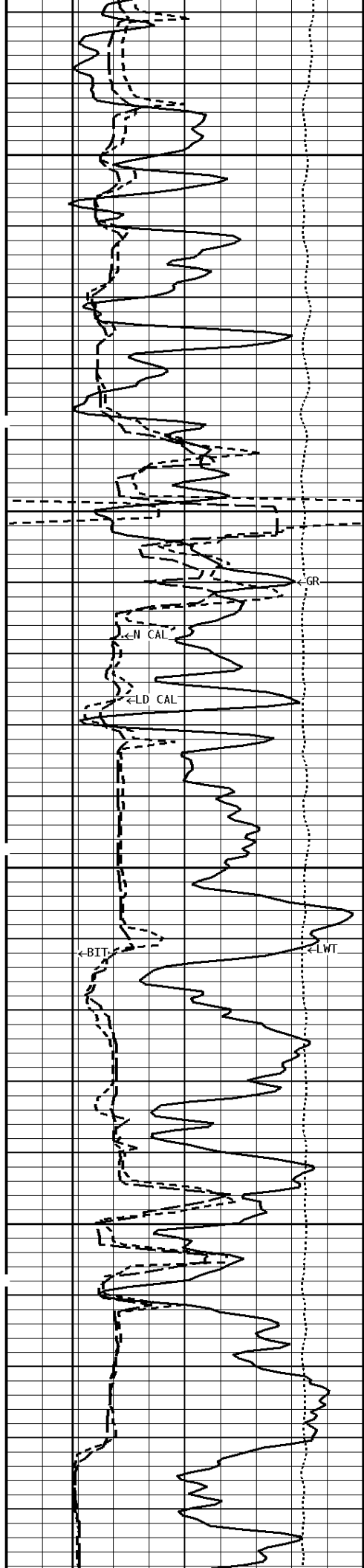
400

800Cu.Ft--

--1300Cu.Ft

500



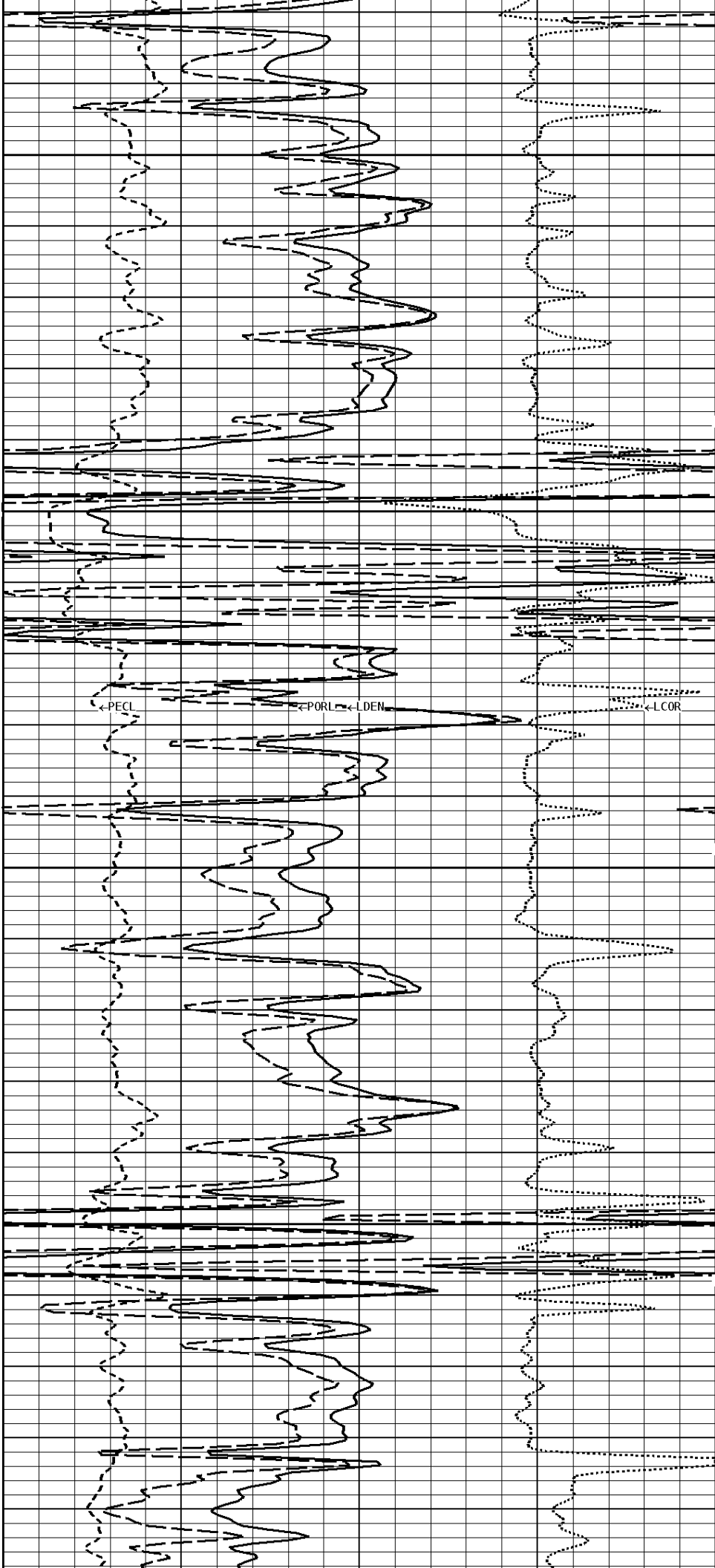


600

1200Cu.Ft

700Cu.Ft

700



PECL

PORL

LDEN

L COR

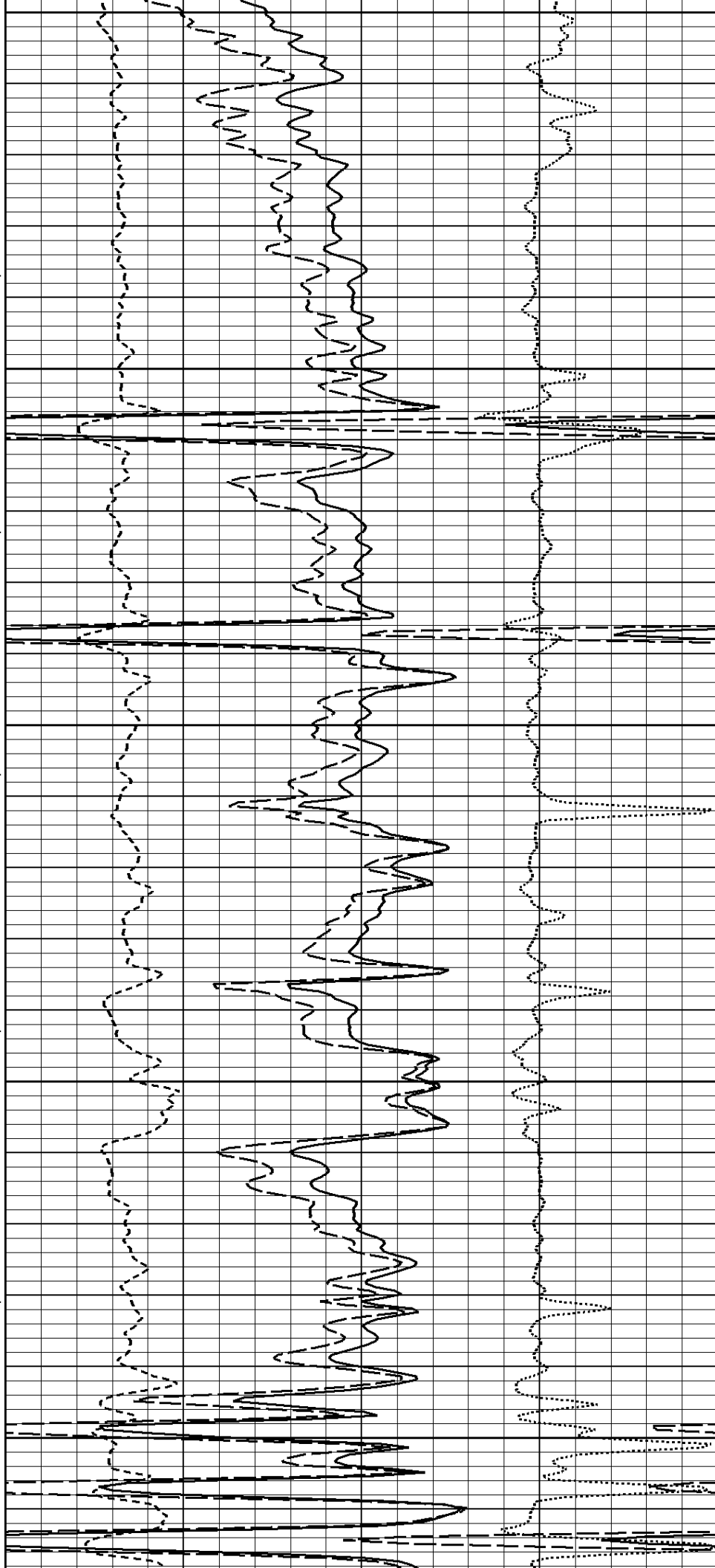
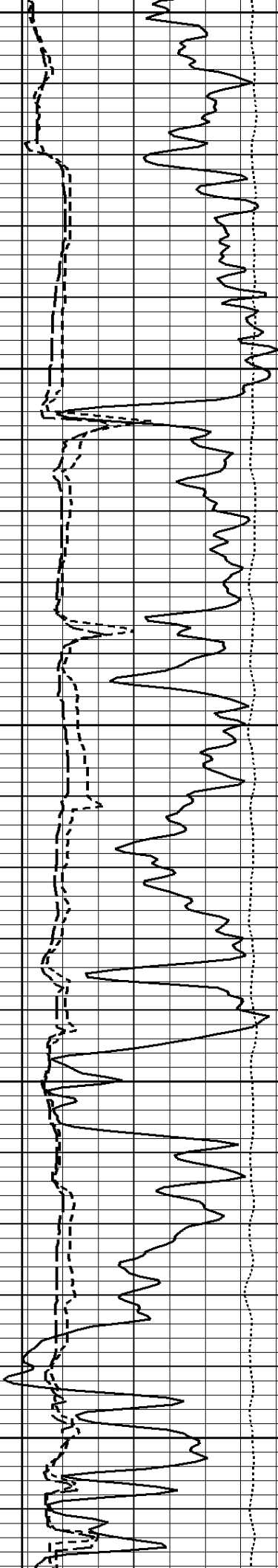
800

--1100Cu.Ft

900

1000

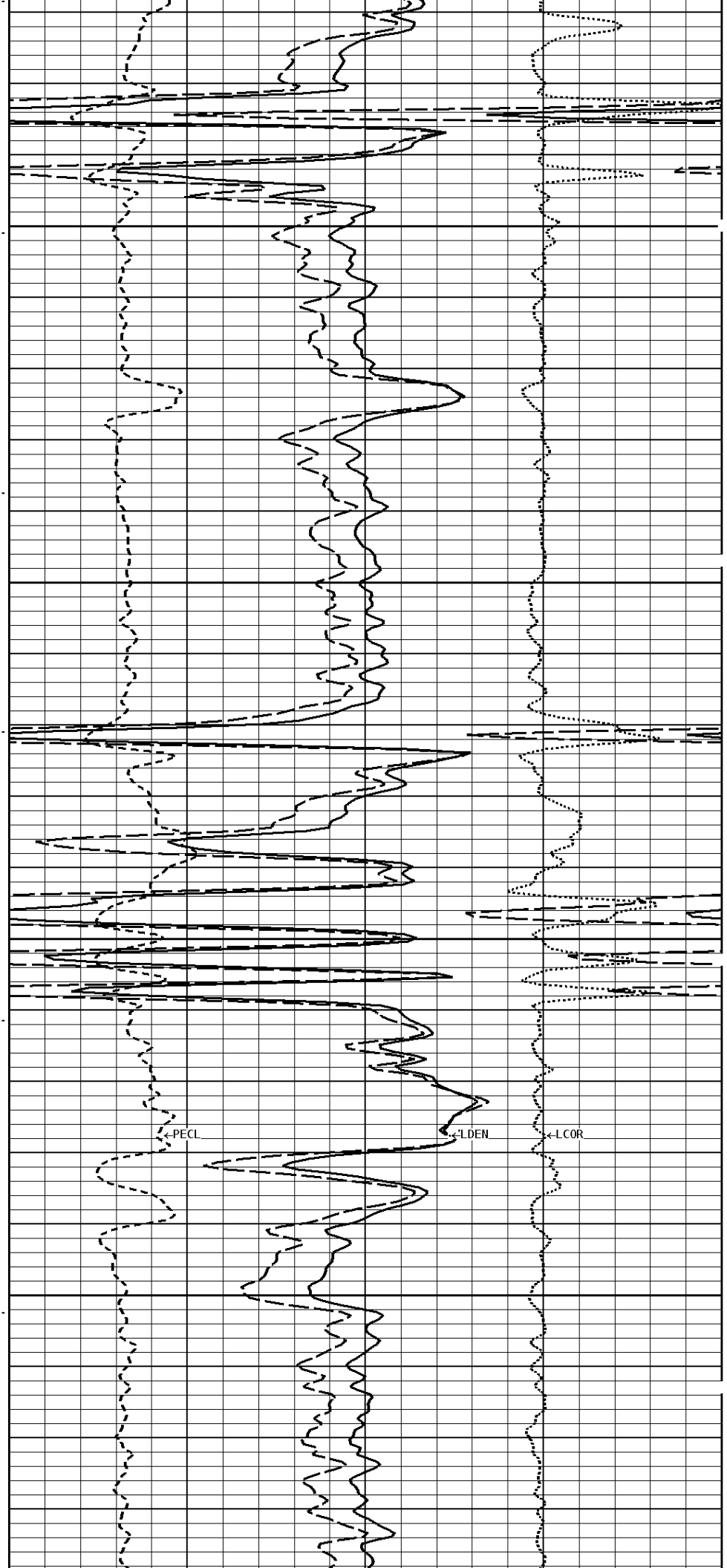
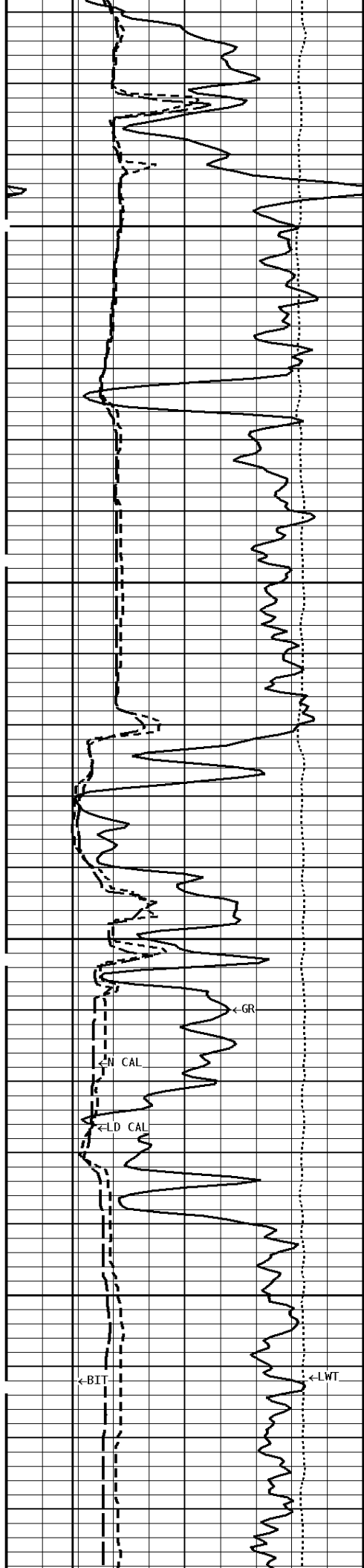
6000Cu.Ft

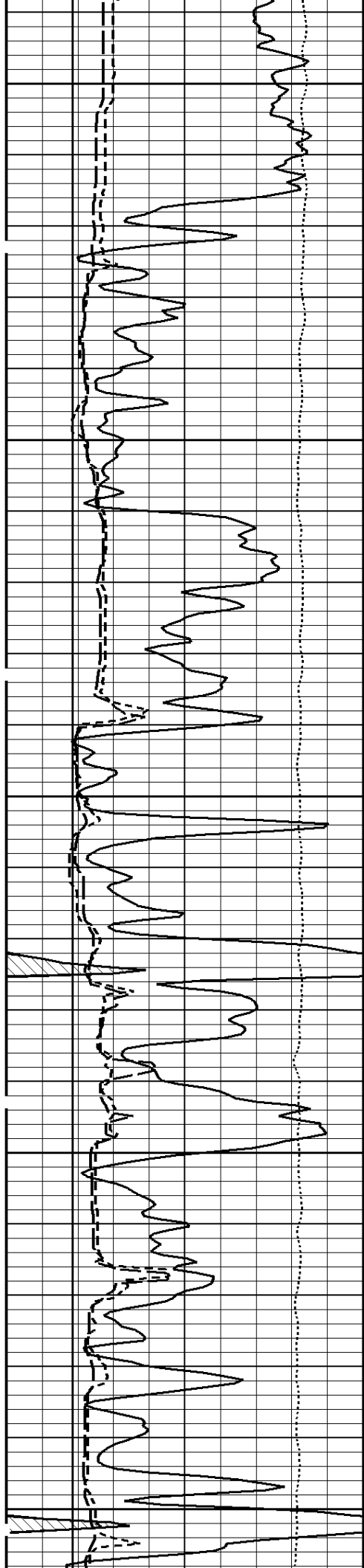


8000 Cu Ft

1000 Cu Ft

1200



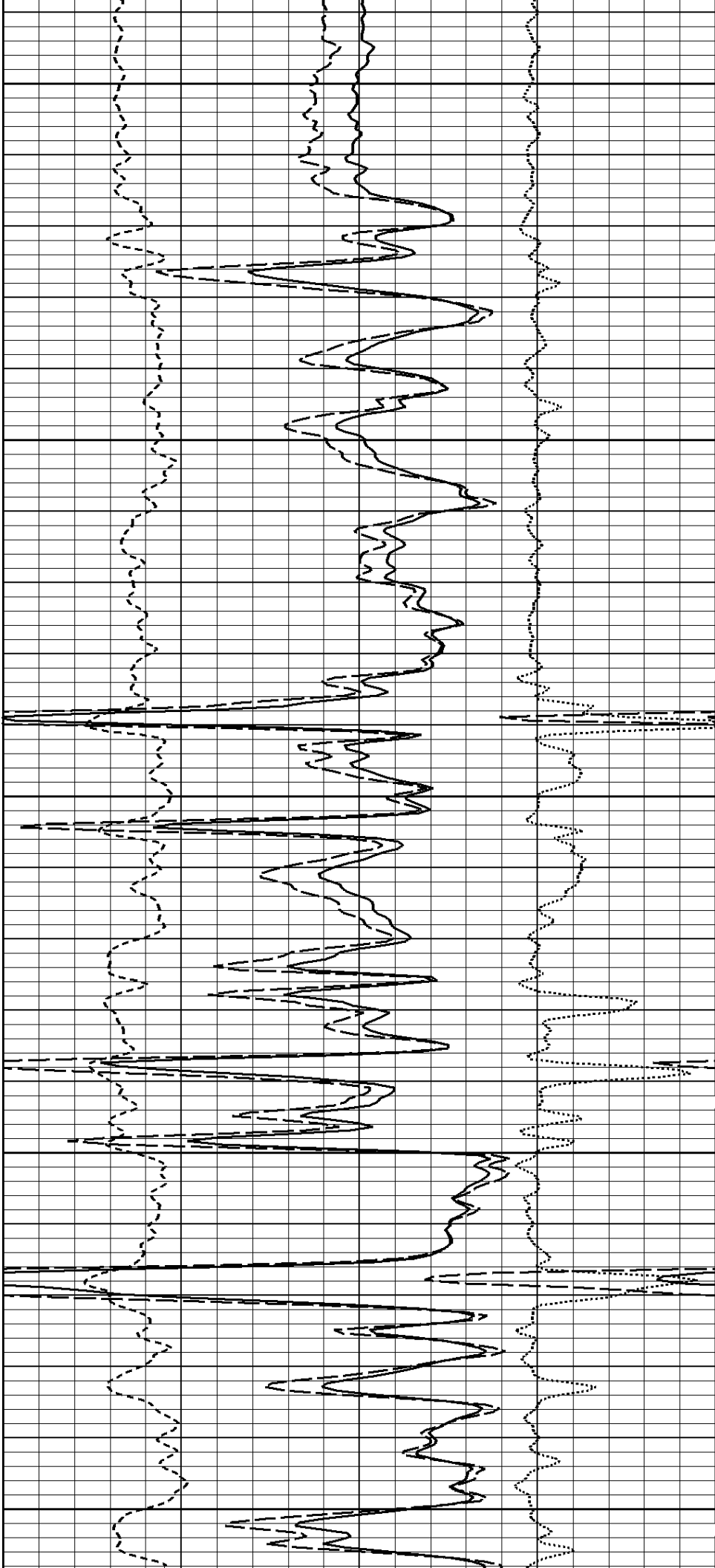


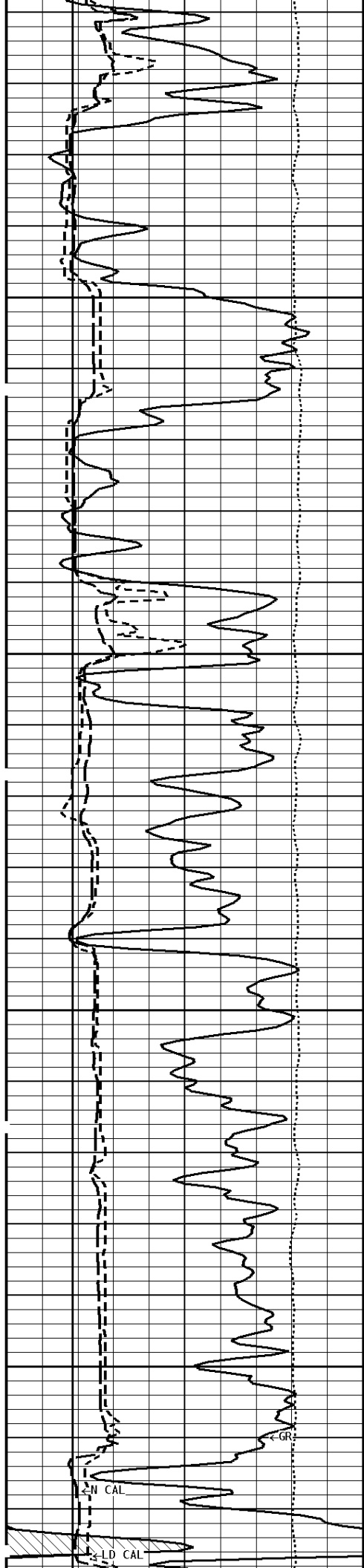
1300

--900Cu.Ft--

1400

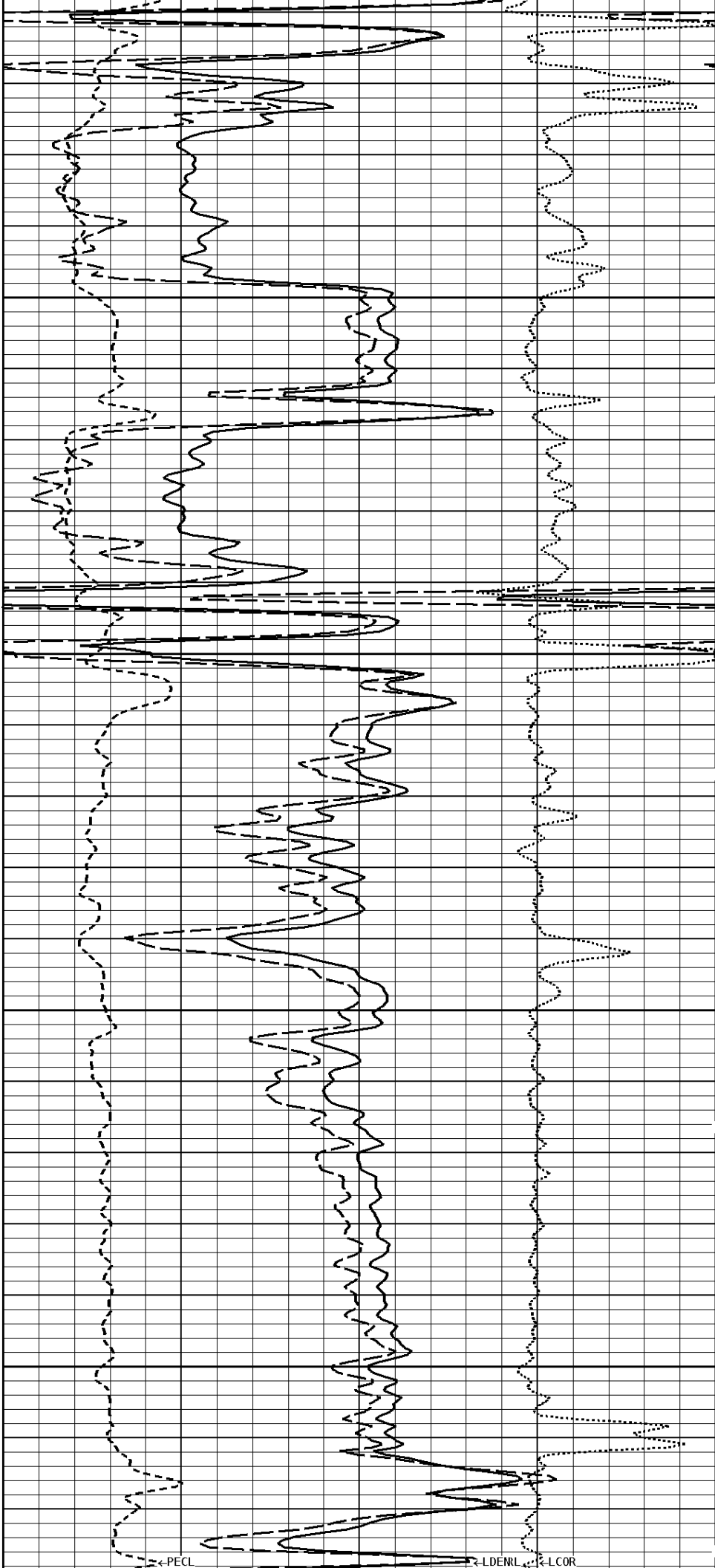
500Cu.Ft--

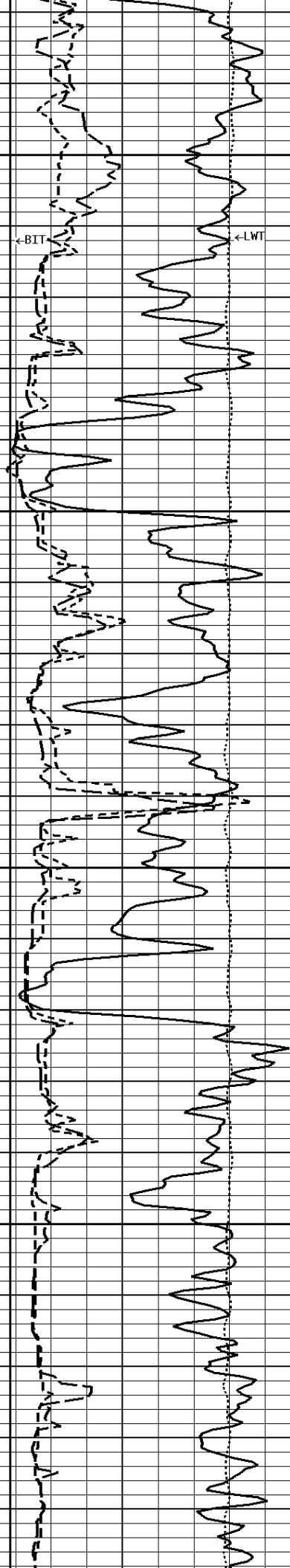




1500

1600



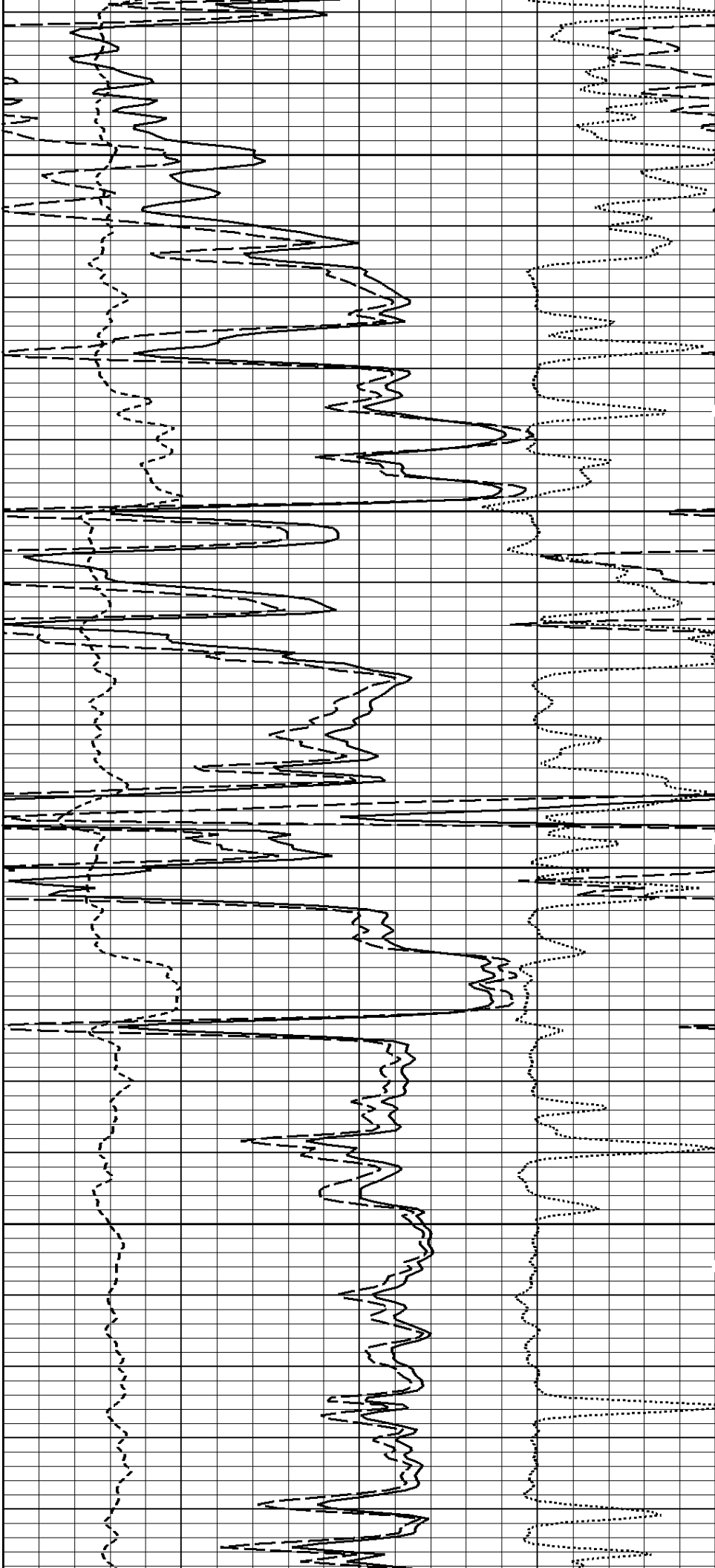


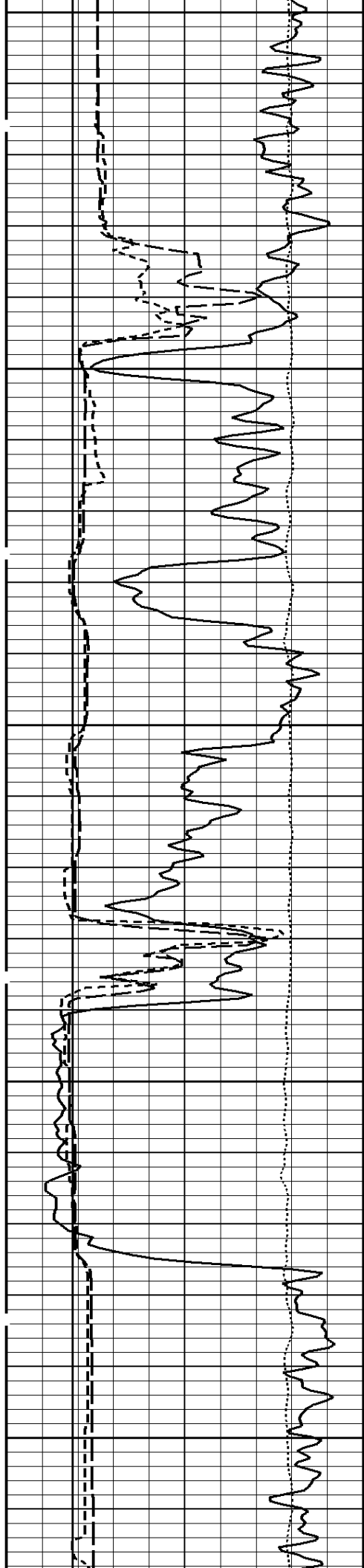
1700

1800

400Cu.Ft.

--700Cu.Ft



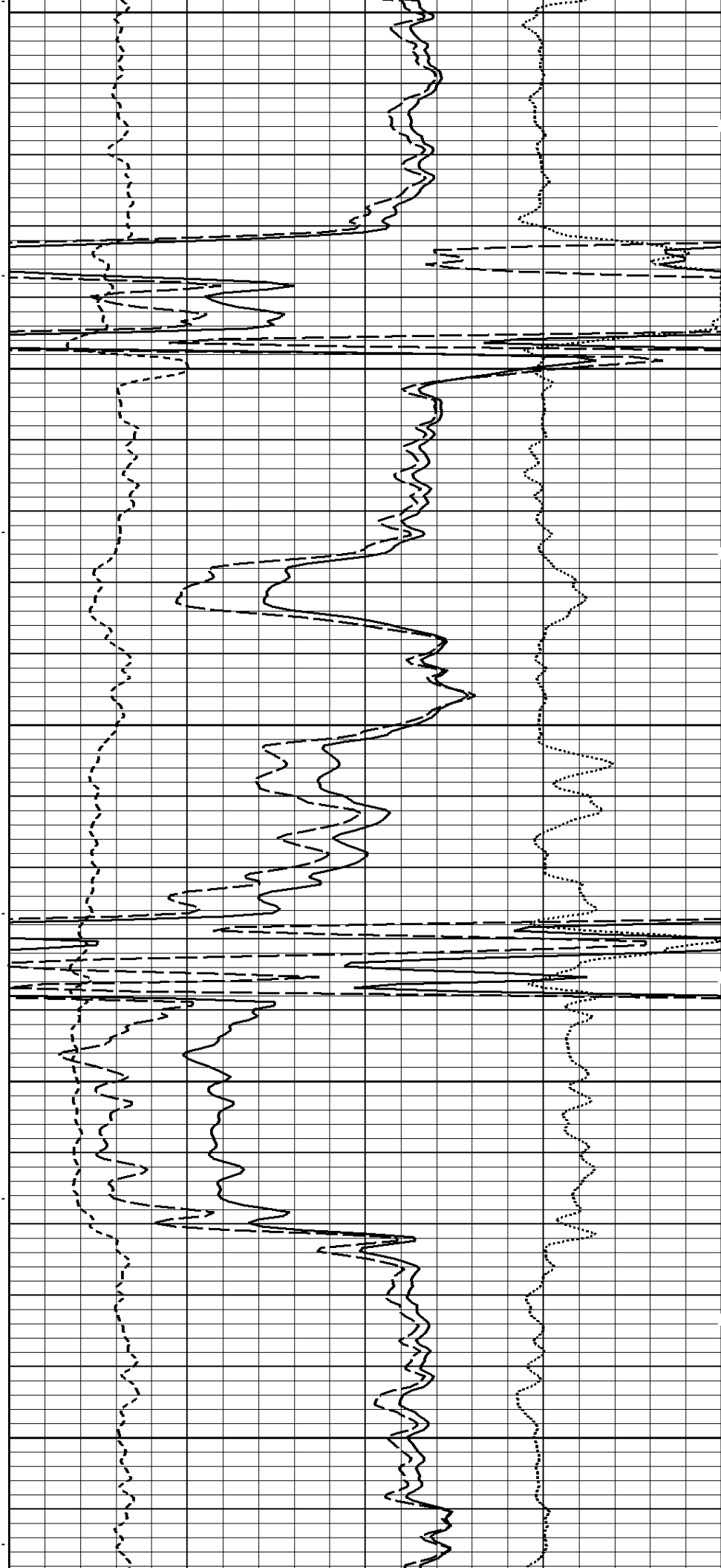


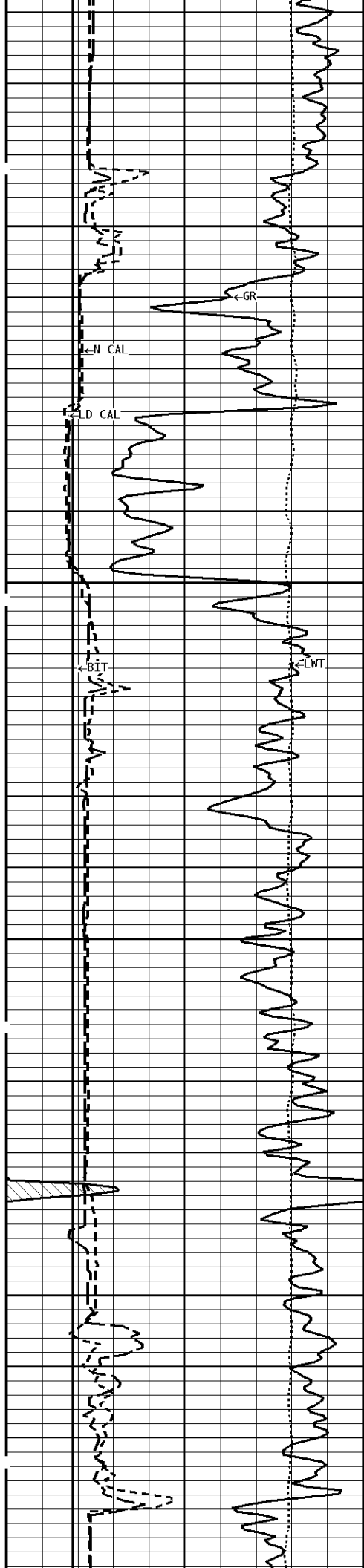
1900

2000

-600Cu.Ft

2100

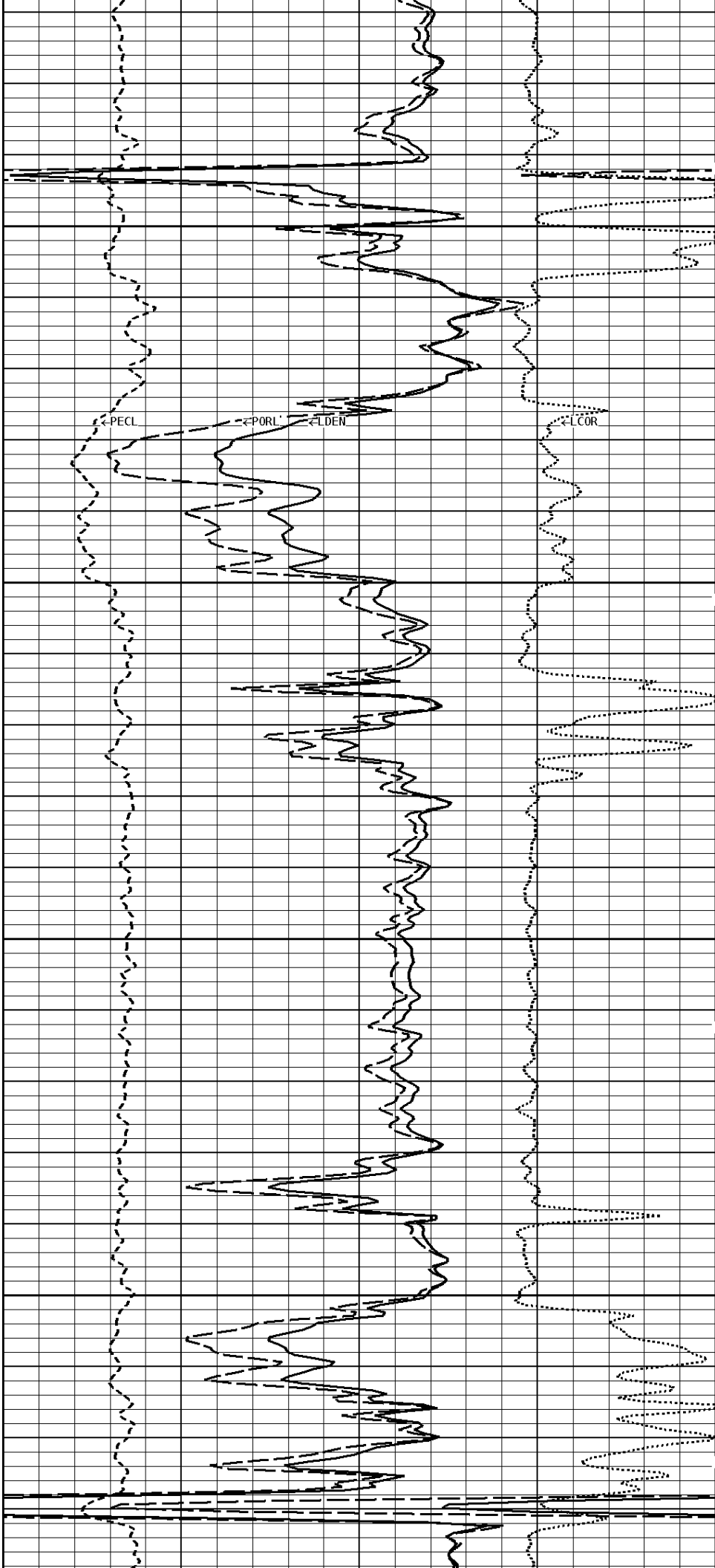




2200

300Cu.Ft..

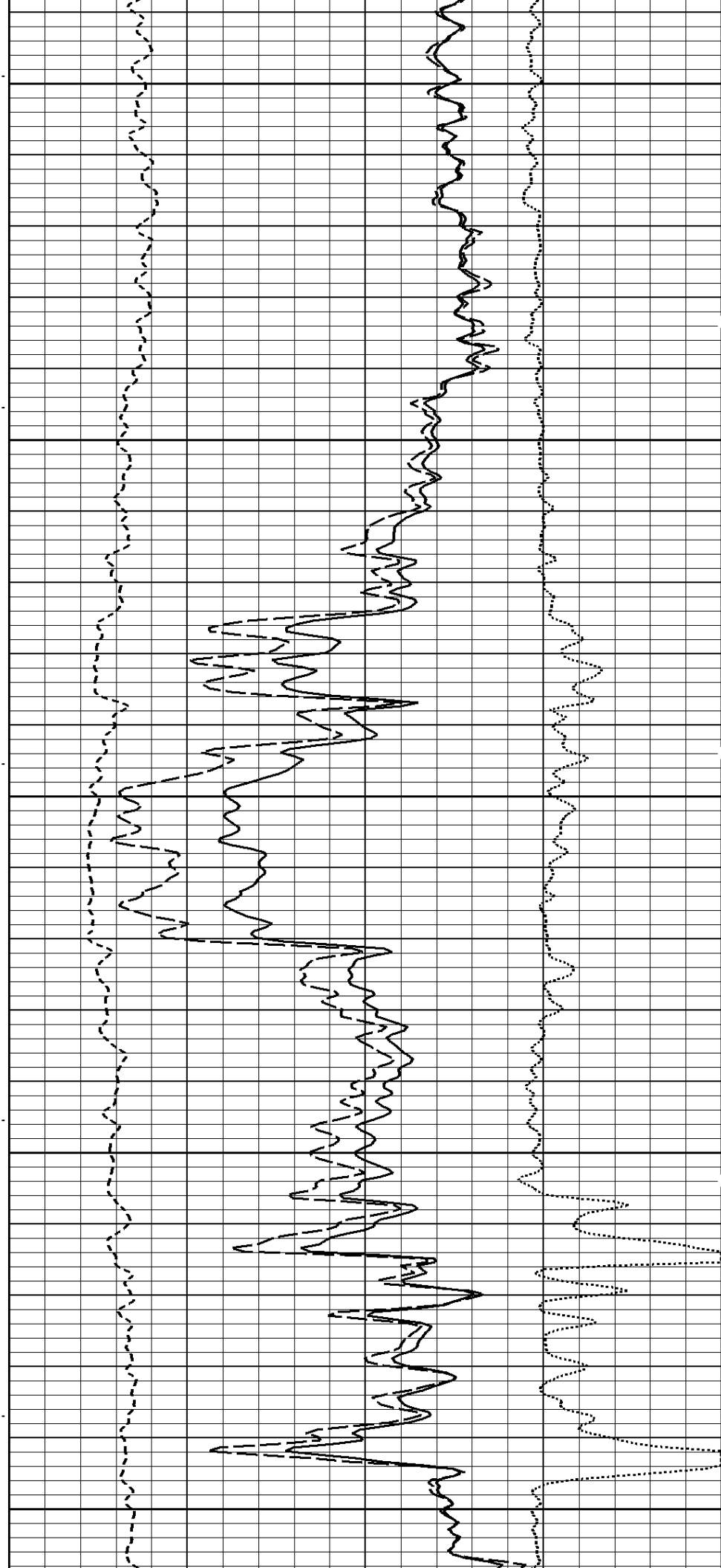
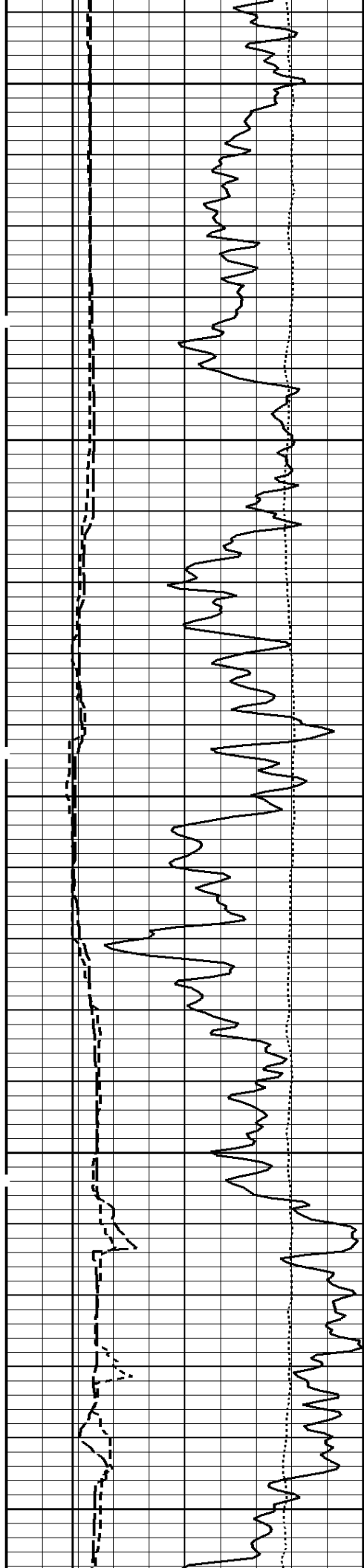
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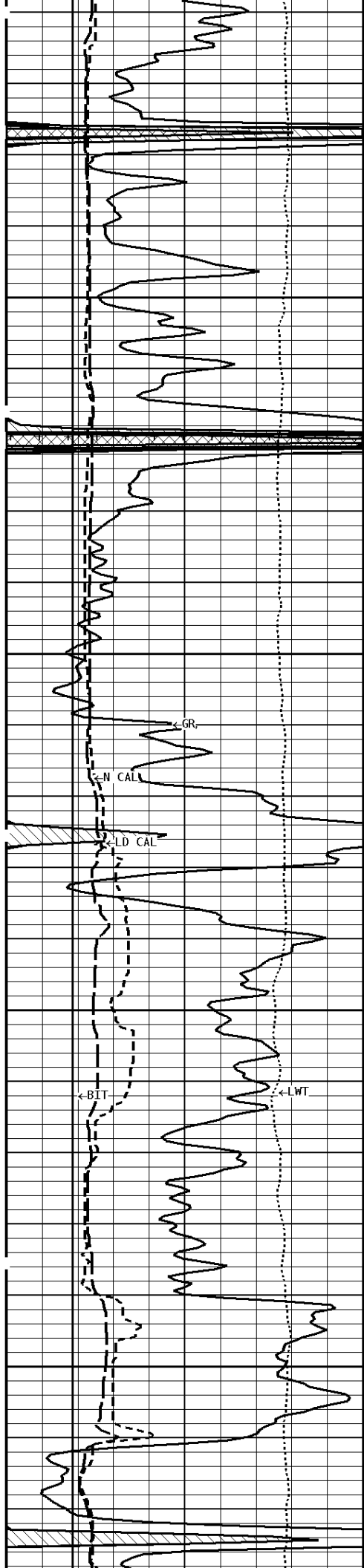


--500Cu.Ft

2400

2500



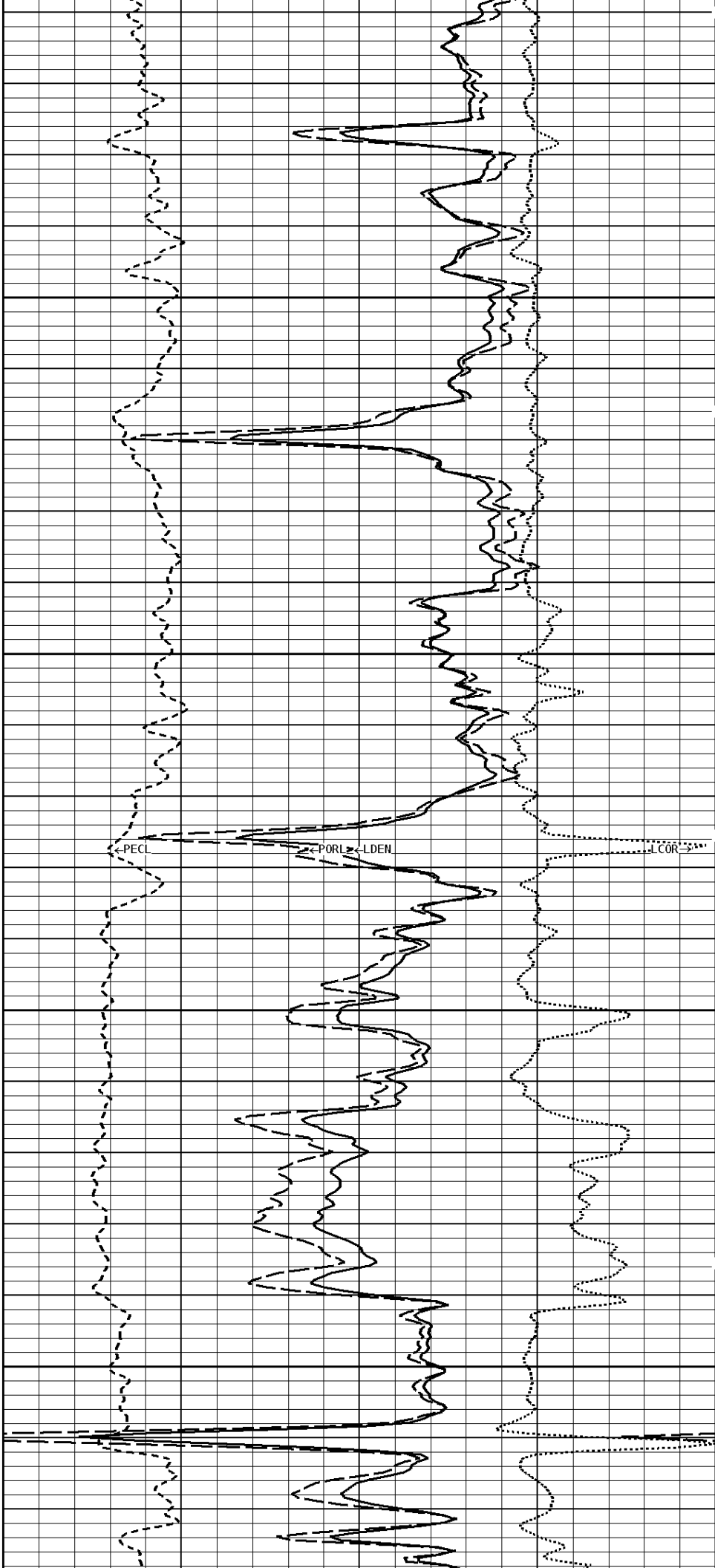


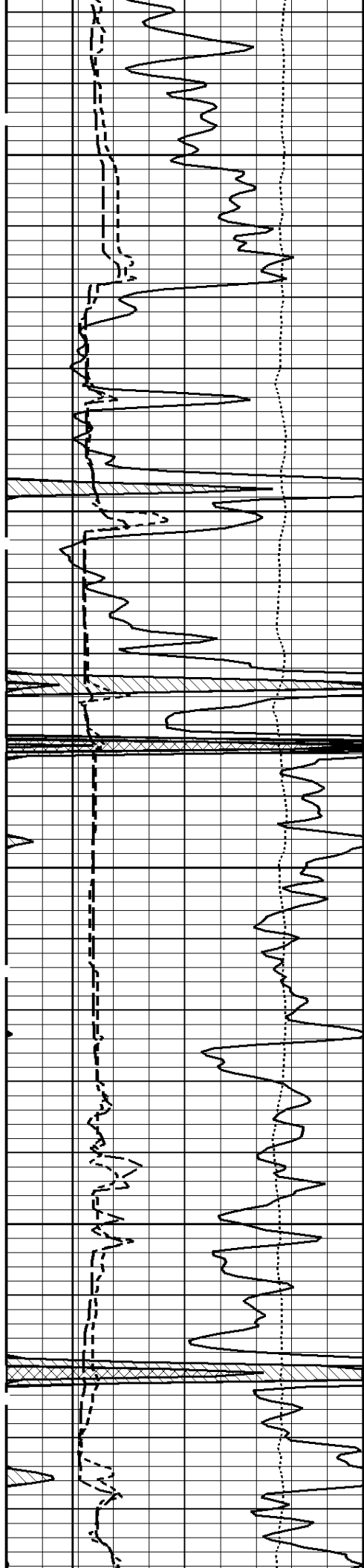
2600

--400Cu.Ft--

2700

200Cu.Ft--

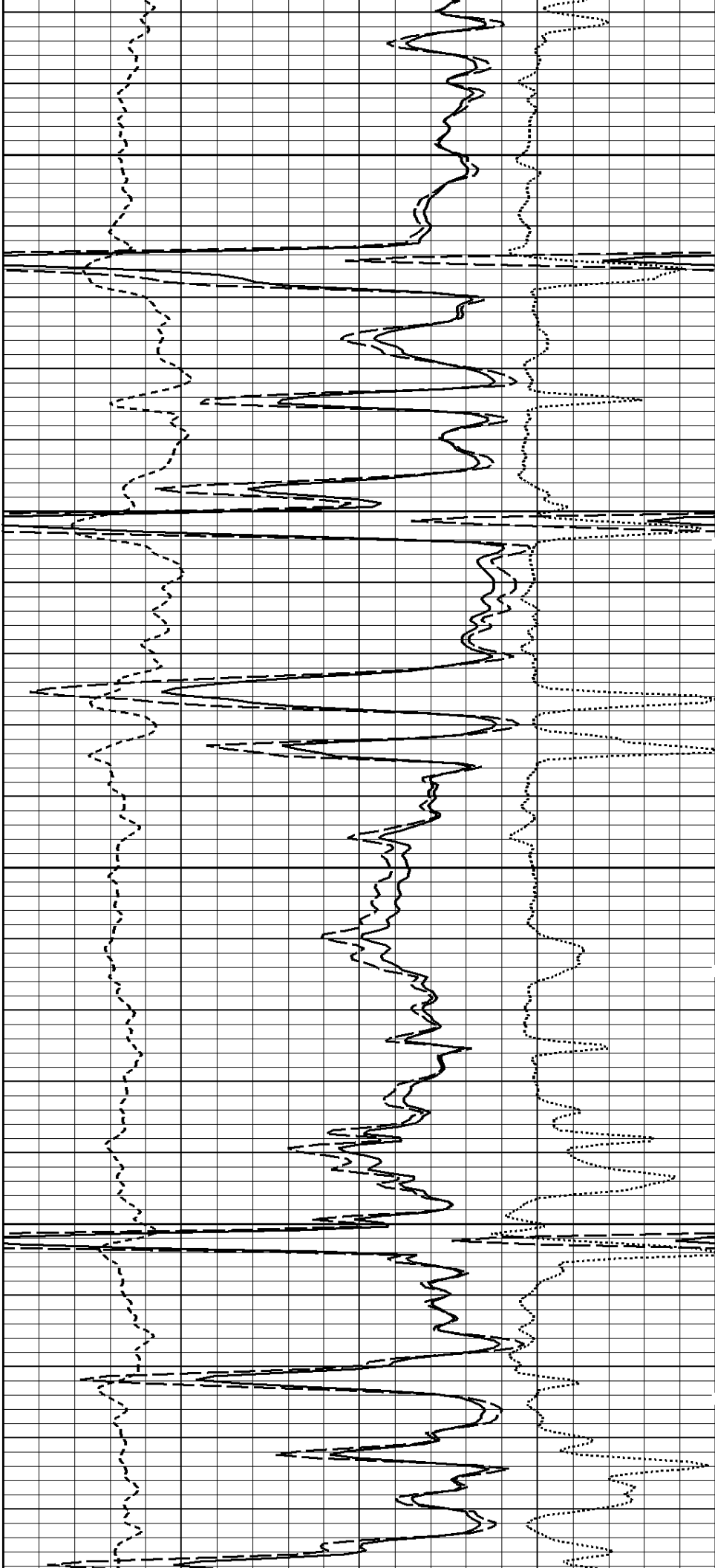


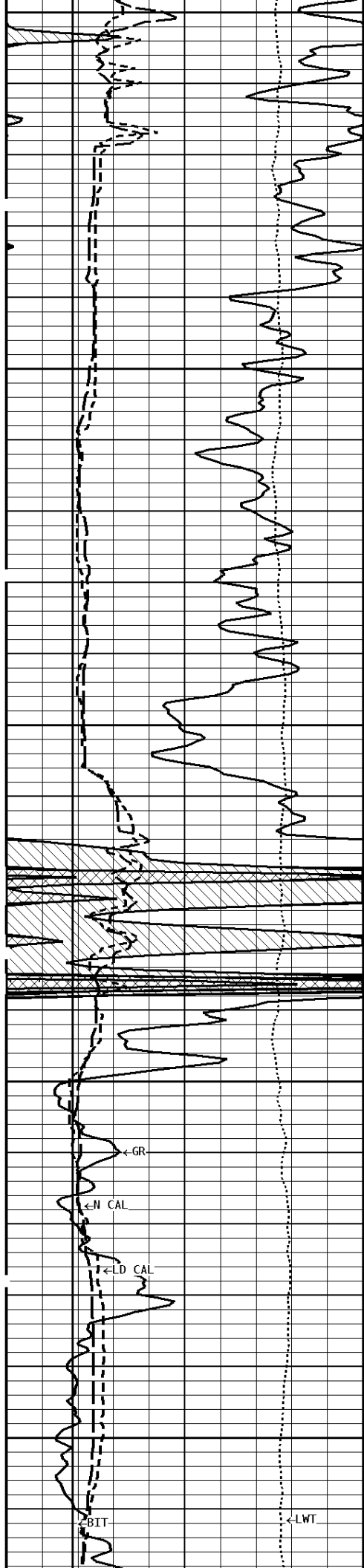


2800

--300Cu.Ft

2900





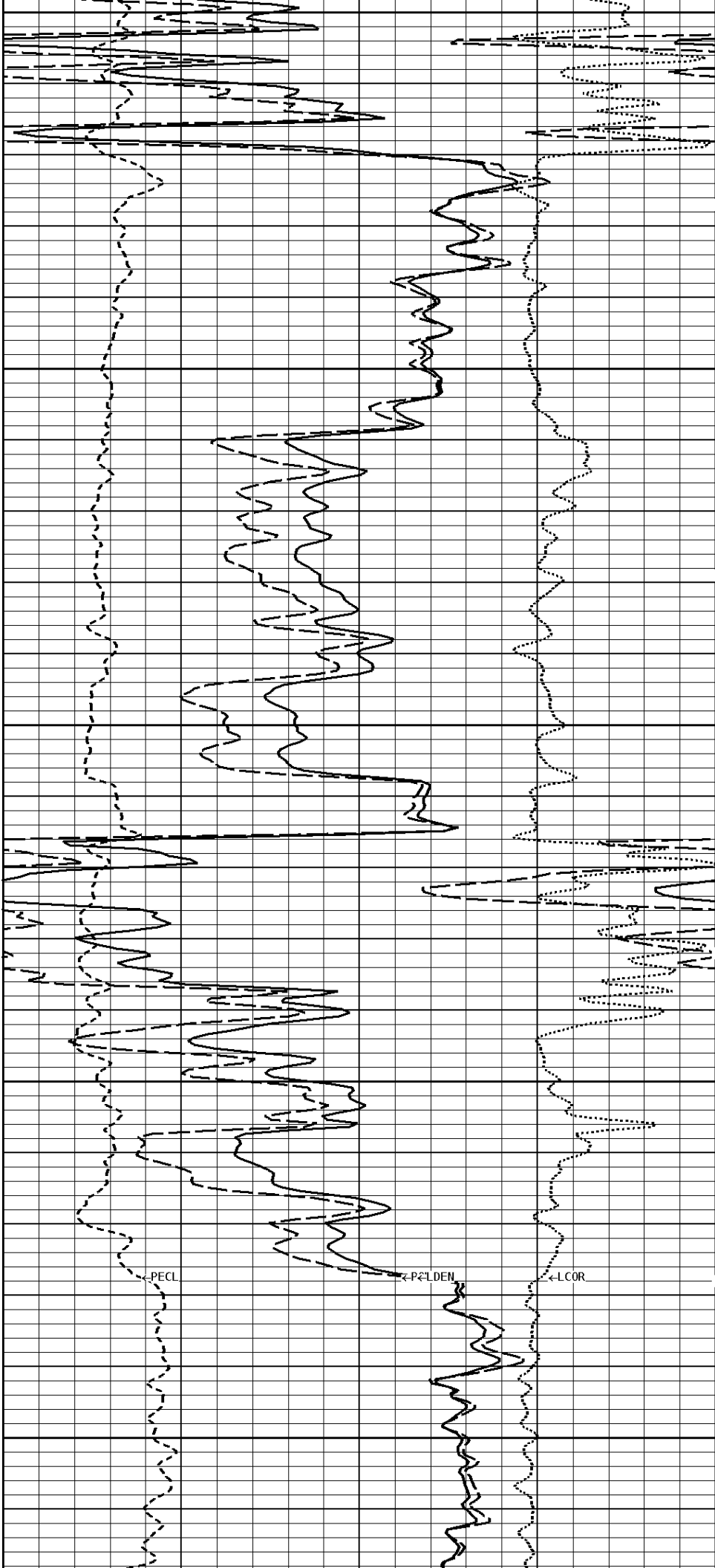
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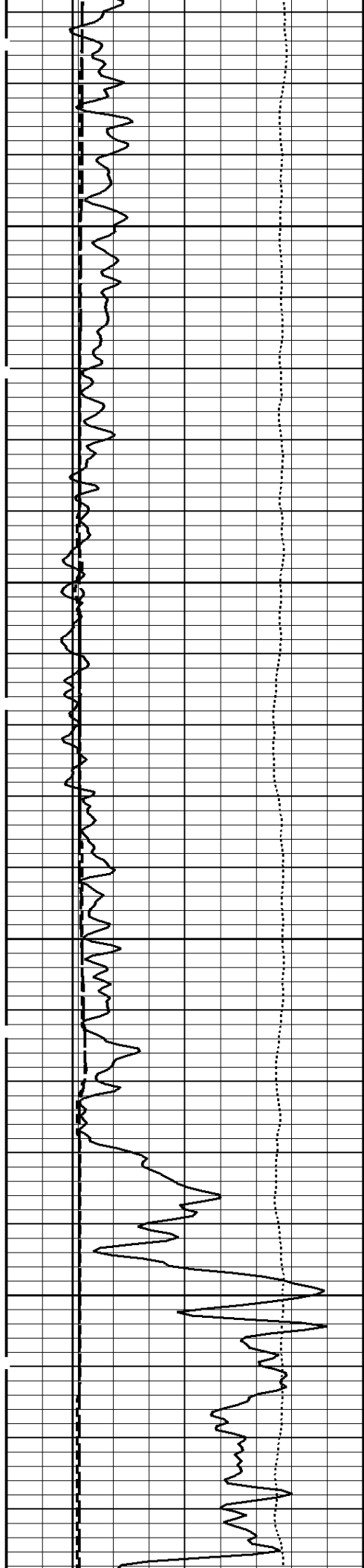
3100

--200Cu.Ft

100Cu.Ft--

3200

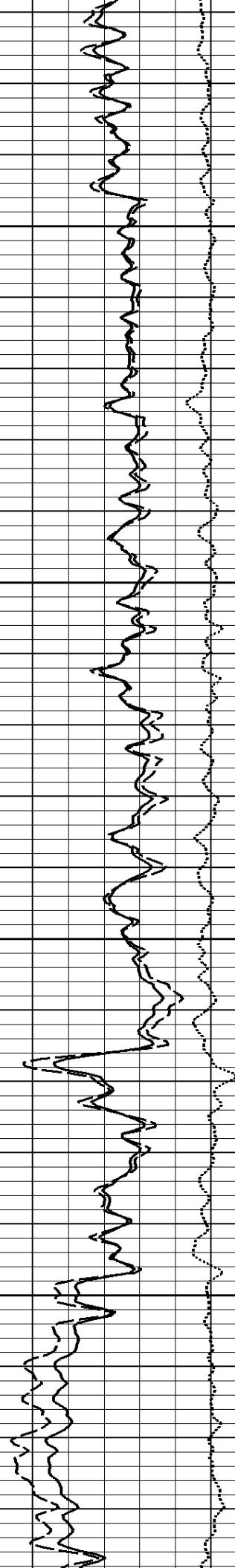
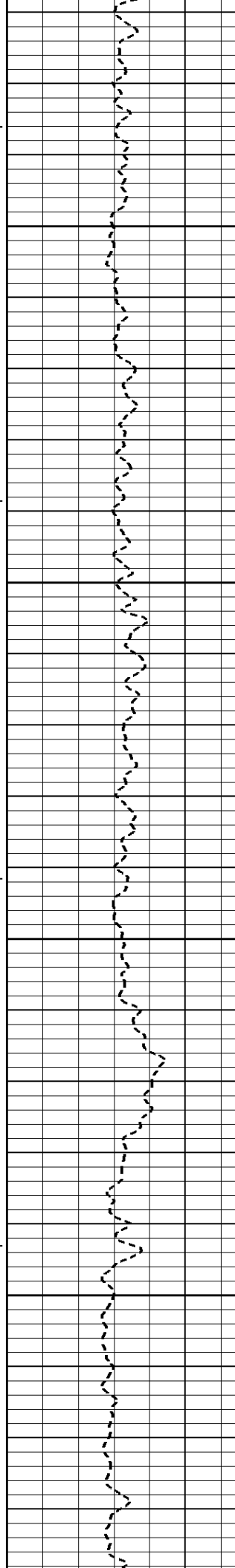




3300

--100Cu.Ft

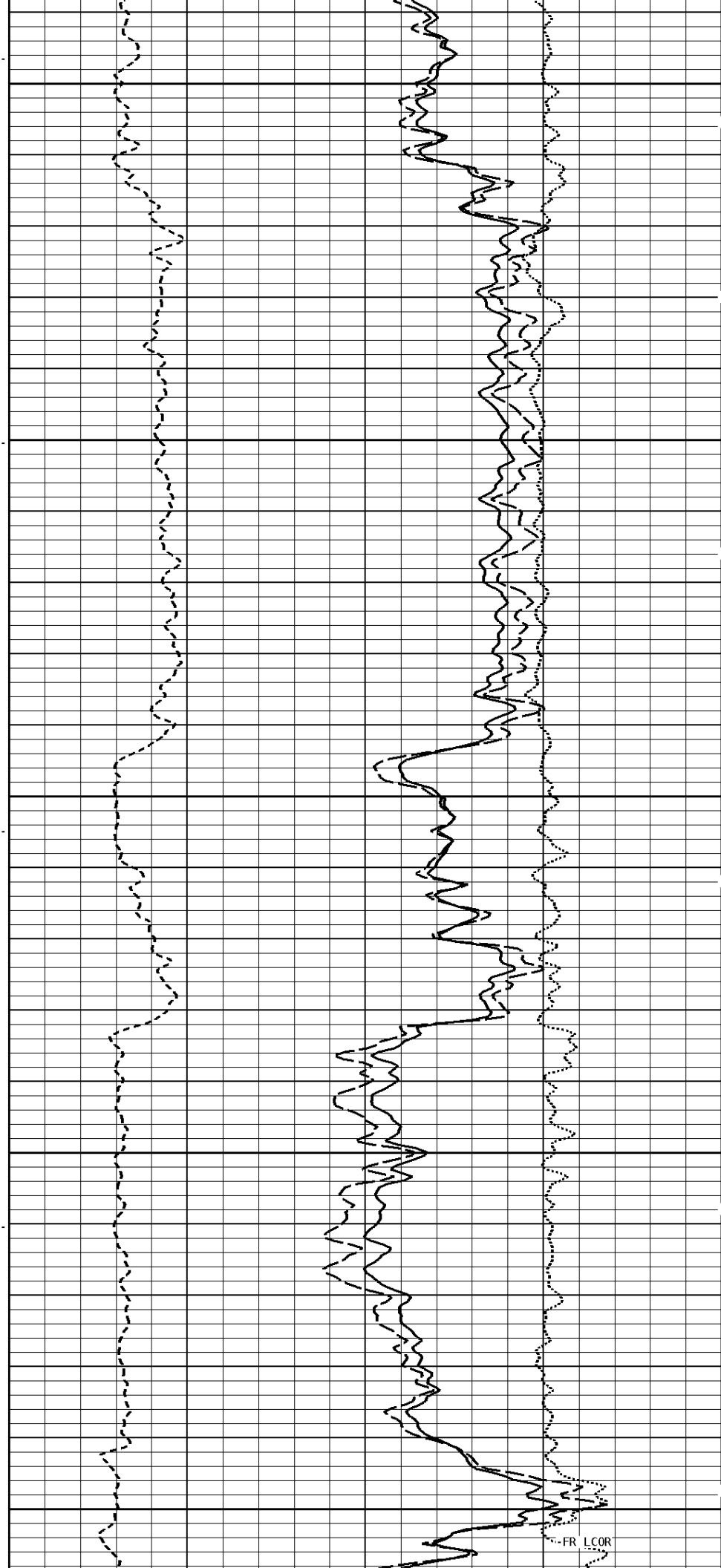
3400



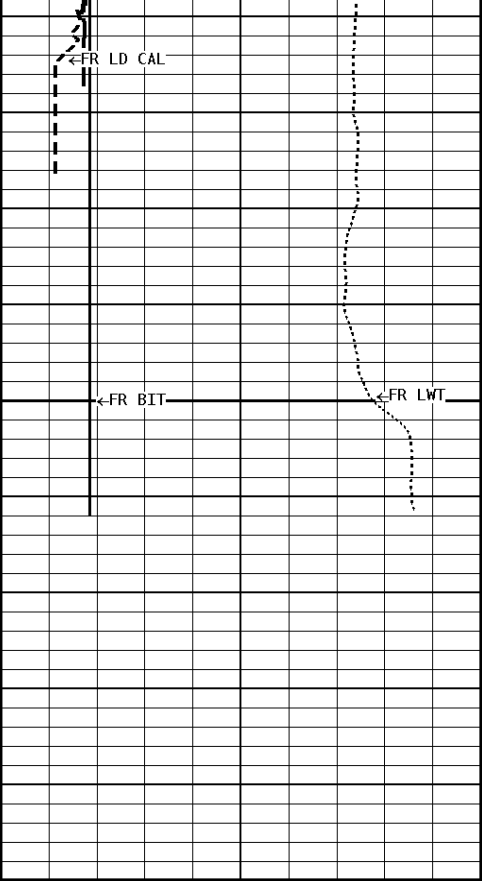


3500

3600

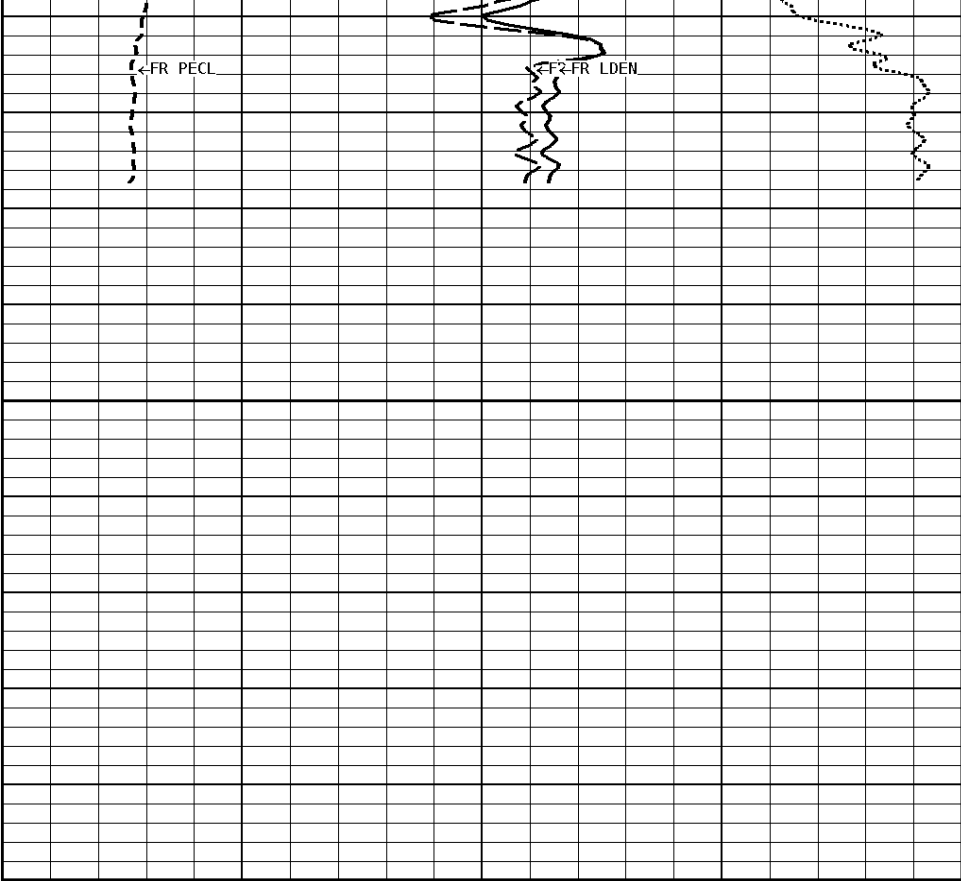


FR L COR



3700

File #1.1.4



1:240 MAIN SECTION BULK DENSITY

GAMMA RAY API UNITS		- BHV AHV - CU. FT	DENSITY POROSITY (2.71g/cc) PERCENT	
150 0	300 150		70 30	30 -10
			-10	-50
TENSION LBS			COMPENSATED BULK DENSITY G/CC	
10000	0		3.0 2.0	4.0 3.0
			1.0	2.0
DENSITY (X) CALIPER INCHES (IN)			PE CROSS-SECTION BARNs/ELECTRON	
16 6	26 16		DENSITY CORRECTION G/CC	
			0	10 -0.25 0.25
NEUTRON (Y) CALIPER INCHES (IN)				
16 6	26 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	

Shop Calibration GRT-B											
Performed : 01-OCT-2018			Time : 10:33								
Sensor Suite : GR-GR5			ID : GRT-BB-009								
	Measured	Units	Calibrated	Units							
	Background	Jig	Jig								
GR	58	336	160		GRAPI						
	CPS										
Shop Calibration CNT-AA											
Performed : 01-OCT-2018			Time : 12:46								
Sensor Suite : CALI-BCN			ID : NDT-BB-103								
	Jig - Measured	Jig - Calibrated	Units								
	Ring#1 Ring#2	Ring#1 Ring#2									
CL # 1	9.1	16.0	6.0	12.0			IN.				
Performed : 21-Nov-2018			Time : 10:33								
Sensor Suite : BHC NEUT			ID : CNP-AA-116-								
Source ID : N-1045											
	Tank	Verification	Units								
	Measured	Calibrated	Jig								
N/F	3.8301	3.6893	3.6919								
Porosity	22.7	20.5	20.5	%							
Shop Calibration LDT-DA											
Performed : 11-MAR-2015			Time : 16:09								
Sensor Suite : CALI-LTH			ID : PDT-G-426								
	Jig - Measured	Jig - Calibrated	Units								
	Ring#1 Ring#2	Ring#1 Ring#2									
CL # 1	7.6	11.5	6.0	12.0			IN.				
Performed : 21-Nov-2018			Time : 12:00								
Sensor Suite : BHCPELNG			ID : LDP-DA-075								
Source ID : 2991GW											
	Short Space										
	BKGD	Al	Mg	Al+Fe	Units						
LSW1	51	937	1536	606	CPS						
LSW2	54	1136	1803	798	CPS						
LSW3	209	2578	4184	2179	CPS						
LSW4	253	2266	3286	1982	CPS						
LSW5	23	44	48	40	CPS						
LSW6	68	71	74	72	CPS						
LSW7	45	46	47	47	CPS						
LSW8	1	3	4	3	CPS						
QS	0.207	0.215	0.219	0.210							
PES			2.778	5.967							
SSDN		2.600	1.680		G/CC						
	Long Space										
	BKGD	Al	Mg	Al+Fe	Units						
LLW1	84	993	4104	605	CPS						
LLW2	93	1907	7679	1363	CPS						
LLW3	352	3617	13956	3111	CPS						
LLW4	447	1715	5548	1556	CPS						
LLW5	51	59	106	59	CPS						
LLW6	143	140	130	140	CPS						
LLW7	91	90	85	90	CPS						
LLW8	3	6	14	5	CPS						
QL	0.222	0.220	0.210	0.219							
PEL			2.697	5.458							
LSDN		2.600	1.680		G/CC						
Shop Calibration MST-DA											
Performed : 21-NOV-2018			Time : 12:15								
Sensor Suite : CALI-MSN			ID : MST-DA-28								
	Jig - Measured	Jig - Calibrated	Units								
	Ring#1 Ring#2	Ring#1 Ring#2									
CL # 1	7.5	11.8	6.0	12.0	IN.						
Performed : 21-Nov-2018			Time : 12:16								
Sensor Suite : MSTDA-NI			ID : MST-DA-28								
	Internal										
	Measured	Calibrated									
	Zone Reference	Zone Reference									
	Units	Units									

	Zero	Reference	Units	Zero	Reference	Units
INV-V	220.0	30274.6		0.00	1546.00	MV
NOR-V	158.0	30096.2		0.00	1546.00	MV
IN-C	153.5	30427.6		0.00	15.46	UA
INV-R					32.34	OHMM
NOR-R					55.11	OHMM
Performed : 21-NOV-2018 Time : 12:17 Sensor Suite : MSTDAMSF ID : MST-DA-28						
			Internal			
	Zero	Measured Reference	Units	Zero	Calibrated Reference	Units
MSFC	16.0	61067.9		0.00	1522.00	UA
MSFB	32763.1	63090.0		0.00	1522.00	MA
MOM1	0.0	60653.7		0.00	1522.00	MV
MSFRA					43.30	OHMM



Tucker
ENERGY SERVICES

Company: VAL ENERGY, LLC
Well: EASTMAN UNIT V 1-16 OWWO
Location: 2640' FSL & 2310' FEL
Logged: 11-28-2018
K.B. Elev: 1345.0 Ft