

STEP

energy services

COMPENSATED NEUTRON PEL DENSITY MICRO LOG

Company VAL ENERGY, INC. Well SAWYER #2-31 Field WILSON County COWLEY State KANSAS Country USA API No. 15-035-24704-0000		File No : TUL-70310 Company : VAL ENERGY, INC. Well : SAWYER #2-31 Field : WILSON County : COWLEY State : KANSAS Country : USA API No : 15-035-24704-0000	
Location : 1650' FNL & 2800' FEL E/2 NE SE NW		LSD : Sect : 31 Twp : 32S Rge : 6E	
Permanent Datum: Drilling Measured From: Log Measured From: Above Permanent Datum:	GL KB KB 9.00 Ft	Elevations: KB 1293.00 DF 1292.00 GL 1284.00	Services: NLD LDT MLT PIT
Date	06-17-2019		
Run Number	1		
Depth--Driller	3475.0 Ft		
Depth--Logger	3475.0 Ft		
First Reading	3443.0 Ft		
Last Reading	305.0 Ft		
Casing--Driller	305.0 Ft		
Casing--Logger	305.0 Ft		
Bit Size	7.875 In		
Casing Size	8.625 In		
Hole Fluid Type	WBM		
Density	9.1		
Fluid Loss	8.8		
PH/Viscosity	9.5	49.0	
Sample Source	MEASURED		
RM@Measured Temp.	2.000 @ 70 F		
RMF@Measured Temp	1.600 @ 70 F		
RMC@Measured Temp.	2.400 @ 70 F		
Source RMF/RMC	CALCULATED/CALCULATED		
RM@BHT	1.320 @ 110 F		
Time Circulation Stopped	06-17-2019 08:30		
Max Recorded Temp.	110	F	
Equipment/Base	1022	TULSA, OK	
Recorded By	SHELDON TYLER		
Witnessed By	JOE BAKER		

The customer is hereby warned that by providing the log data herein, STEP Energy Services does not agree to provide any interpretation of log data, conversion of log data to physical rock parameters or recommendations. STEP Energy Services 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 STEP Energy Services 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 STEP Energy Services 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	3475.00	8.625	32.00	305.00	0.00

Run Number	1	
Date	06-17-2019	
Date/Time On Bottom	06-17-2019 11:30	
Depth to Fluid	0.0 Ft	
Salinity	1000.000	
RMF@BHT	1.060 @ 110 F	
RMC@BHT	1.580 @ 110 F	

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 1750 & NO REPEAT

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

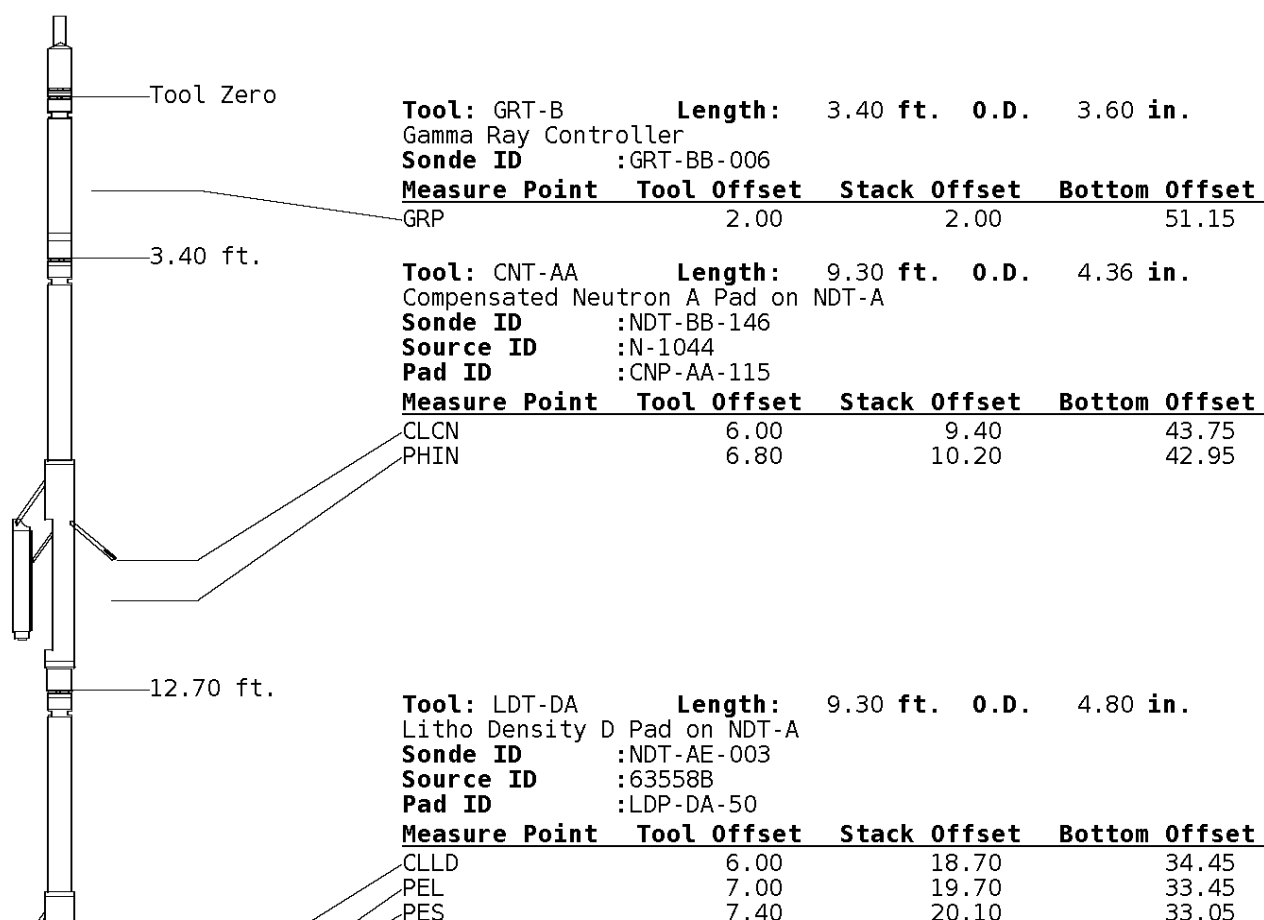
OPERATORS:

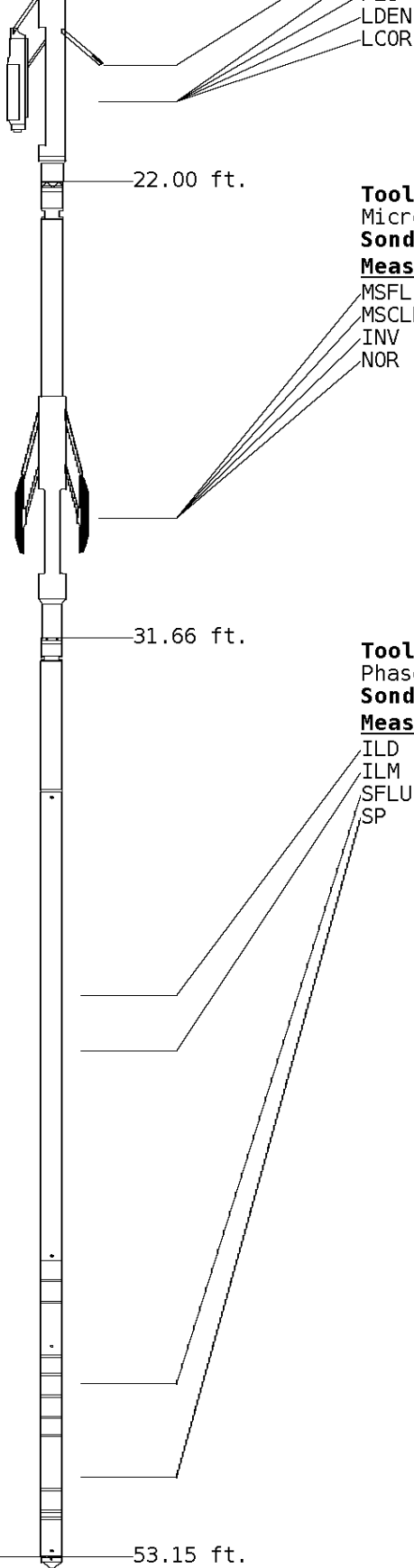
B. BROWN

S. KEELEY

Tool String Schematic

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





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-024

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-069

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: VAL ENERGY SAWYER 2-31_JUNE17_MSTK

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

Segment: V1.D1.S3 Reprocess of MAIN

Acquired: 2019-06/17 11:16 3.4.1-13968

Reference: 0

Processed: 2019-06/17 12:31 3.4.1-13968

**CALIPER MICRO
INCHES (IN)**

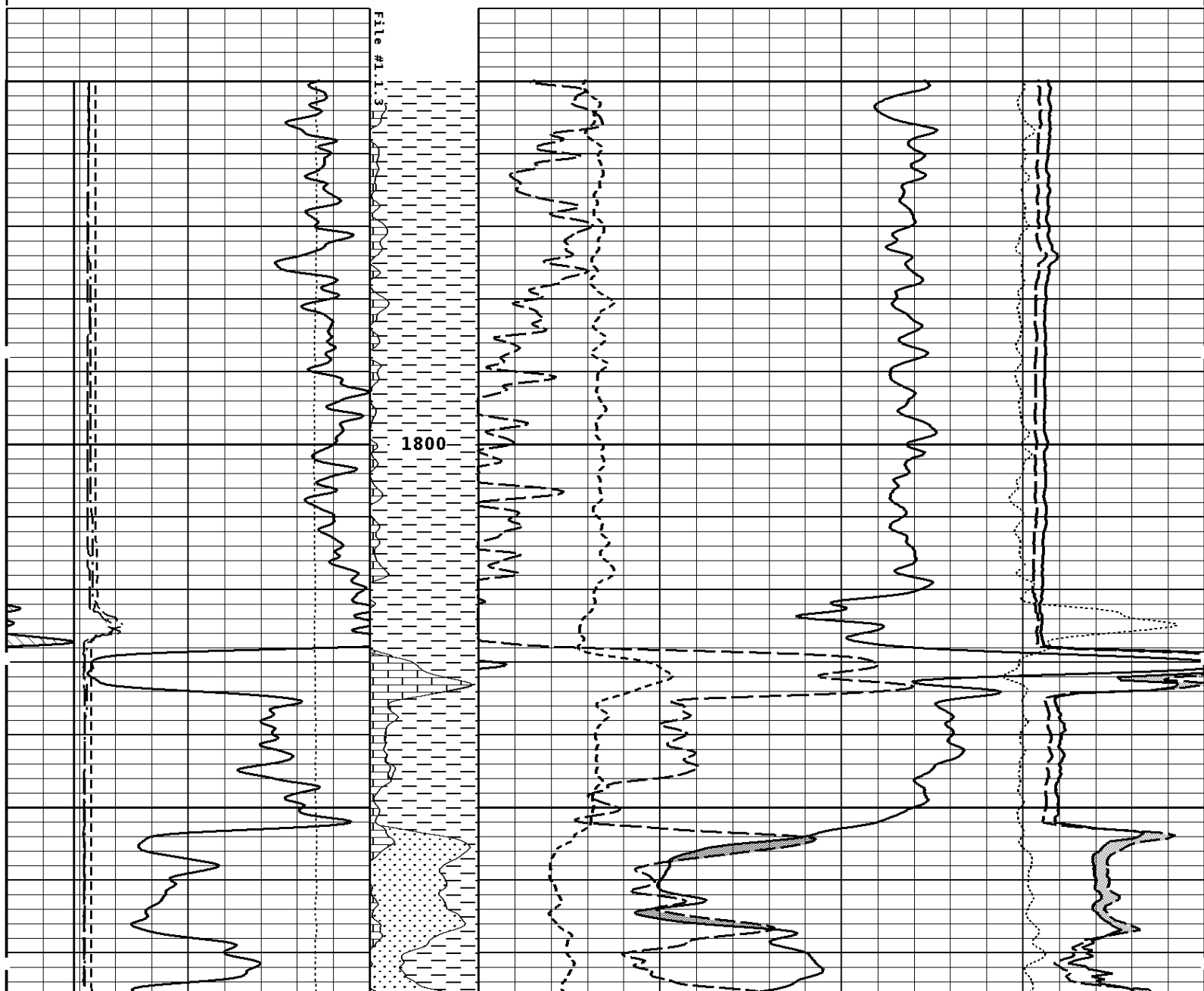
16 26
6 16

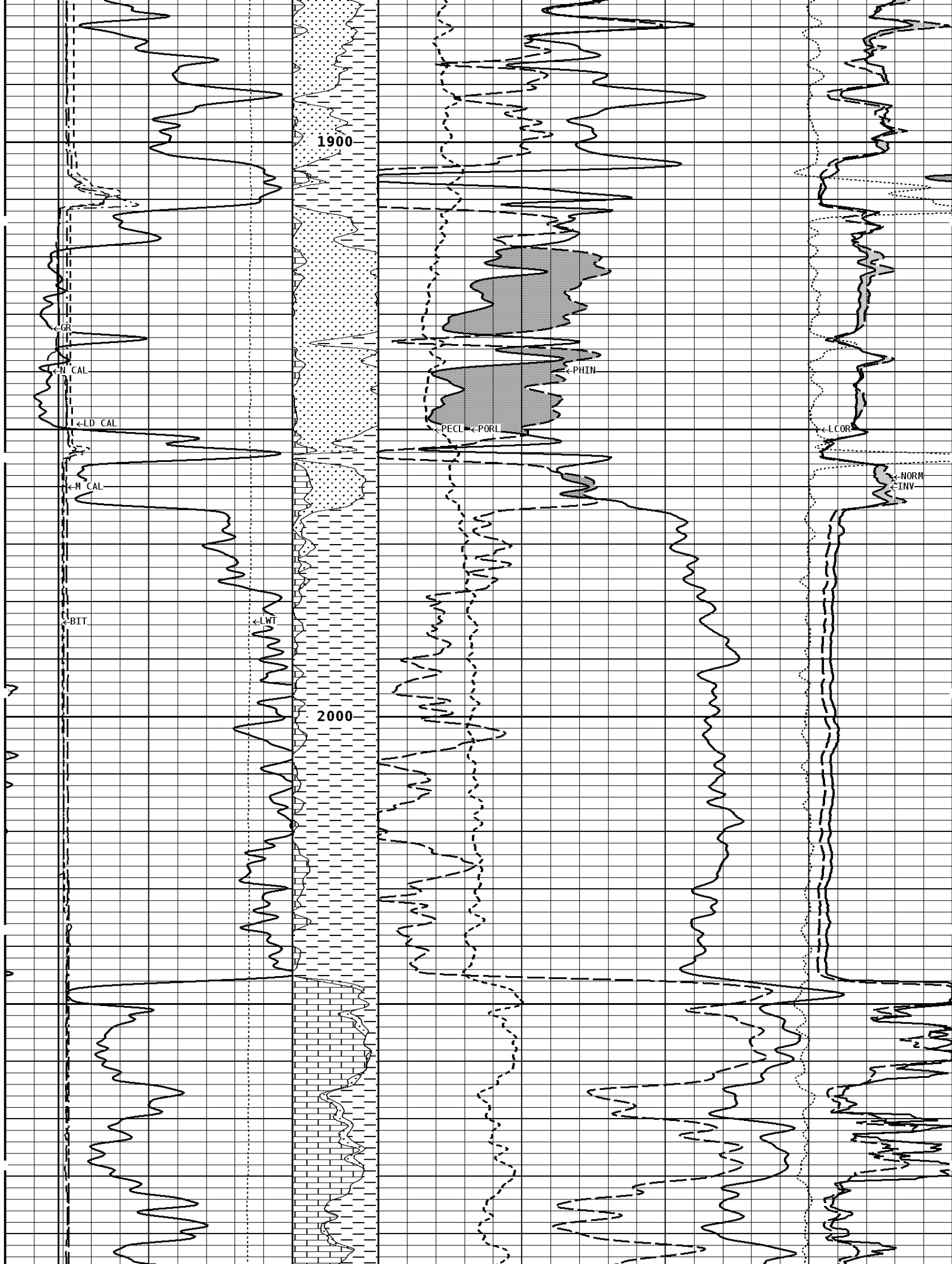
**BIT SIZE
INCHES (IN)**

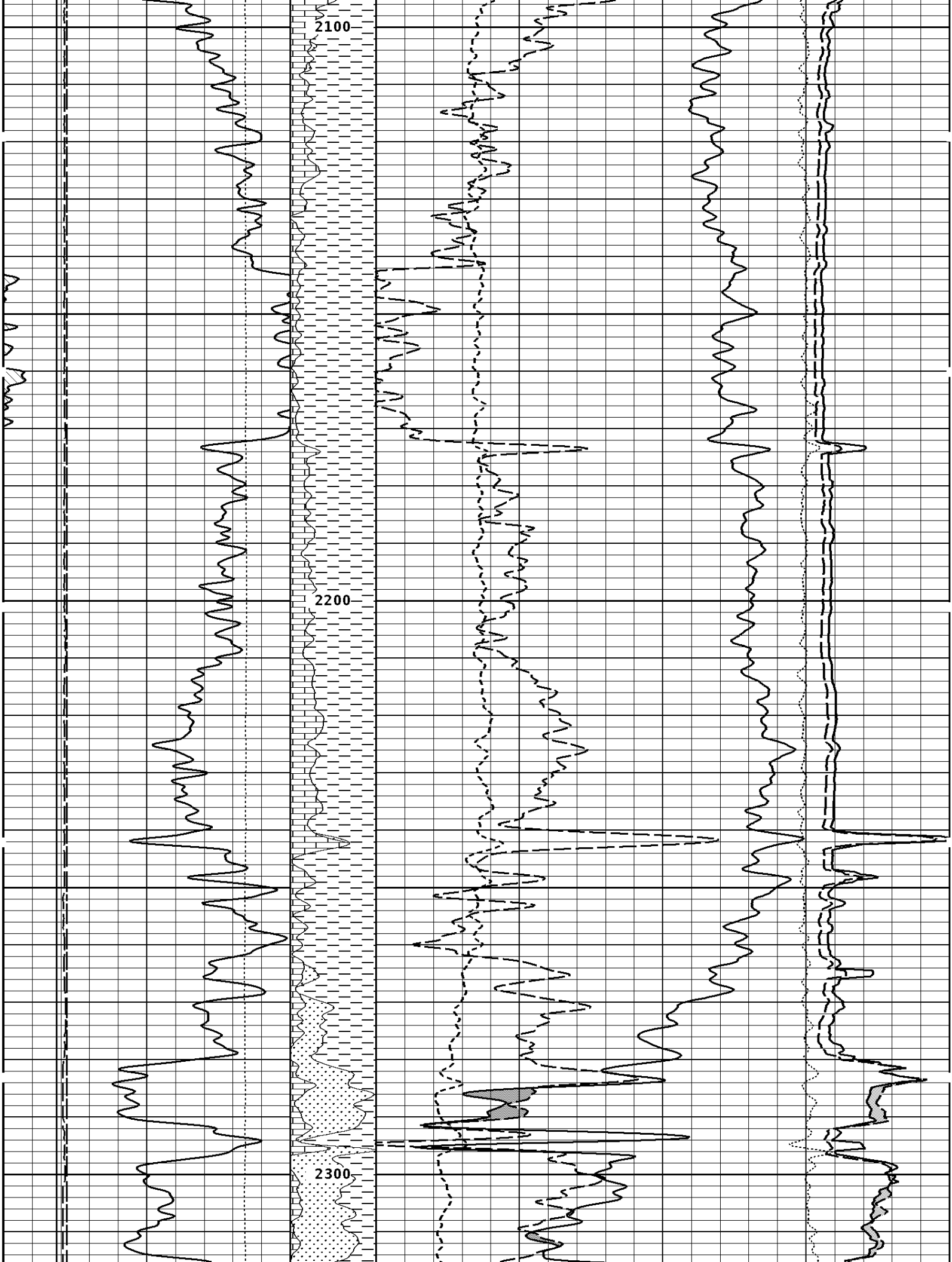
**NORMAL
OHMM**

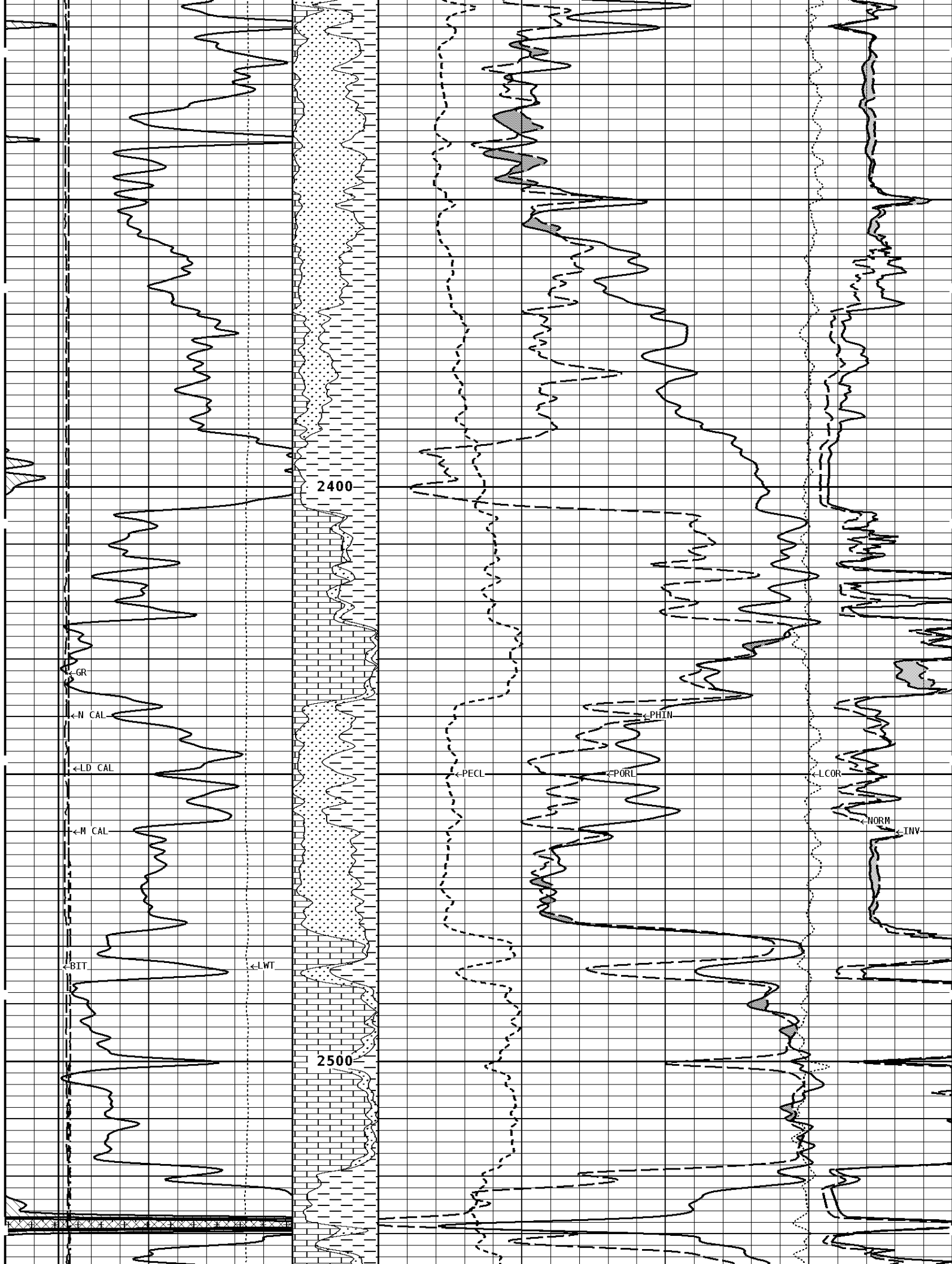
6	16			0	40
NEUTRON (Y) CALIPER INCHES (IN)				INVERSE OHMM	
16	26			0	40
6	16				
DENSITY (X) CALIPER INCHES (IN)		Volume Quartz	PE CROSS-SECTION BARNs/ELECTRON	DENSITY CORRECTION G/CC	
16	26				
6	16		0	10	-0.25 0.25
TENSION LBS		Volume Calcite	DENSITY POROSITY (2.71g/cc) PERCENT		
10000	0		70		30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

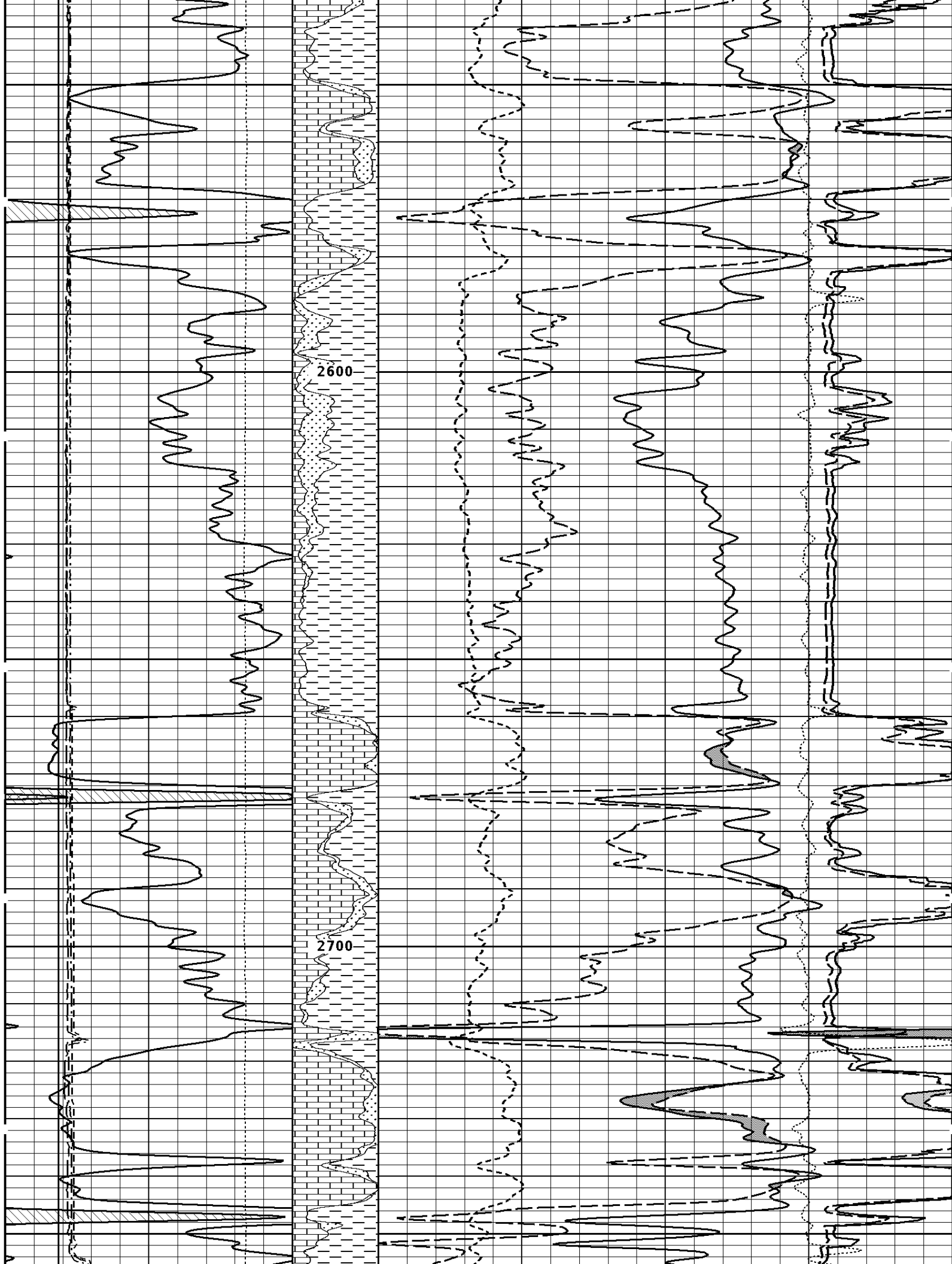
1:240 MAIN SECTION

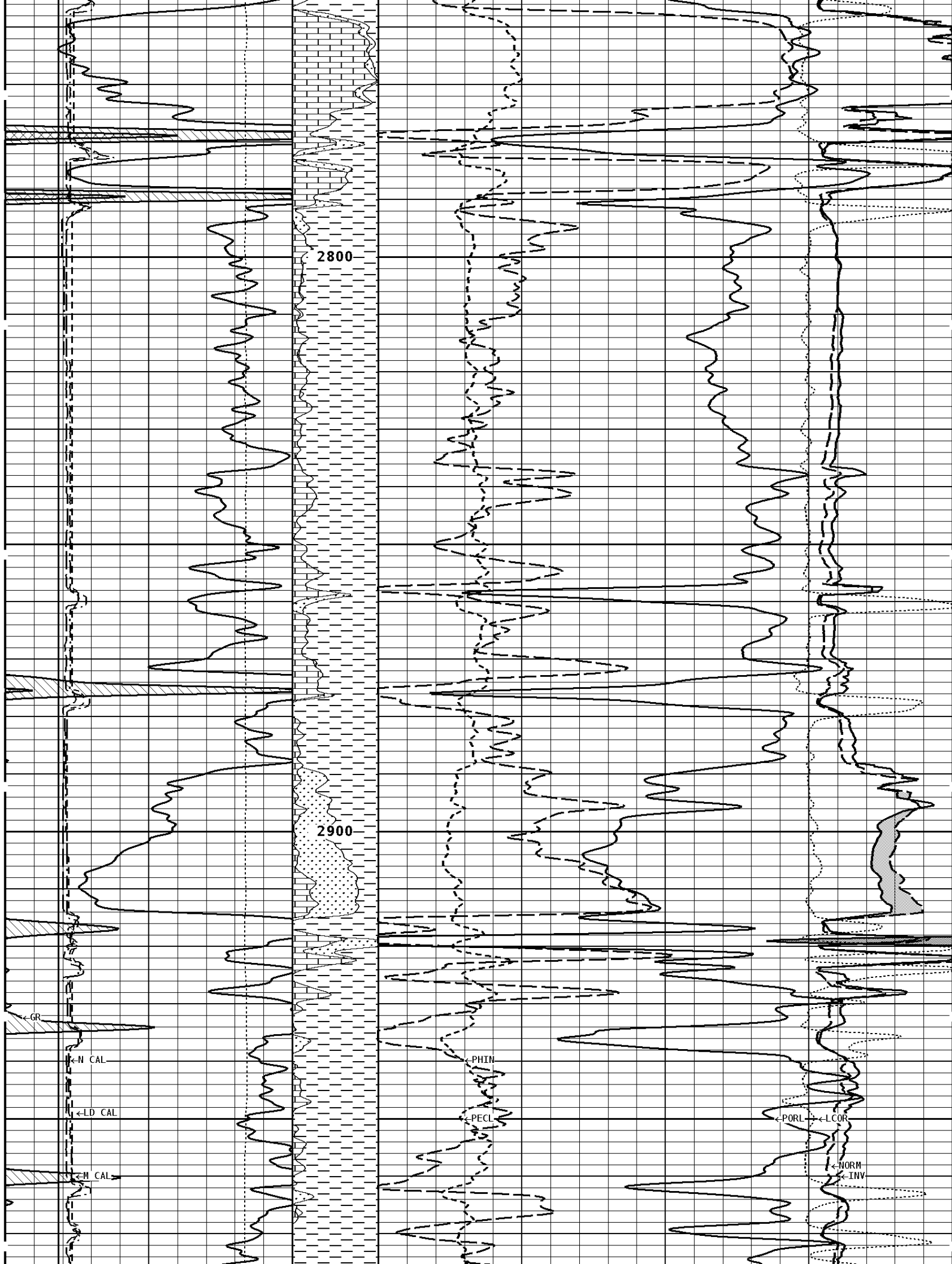


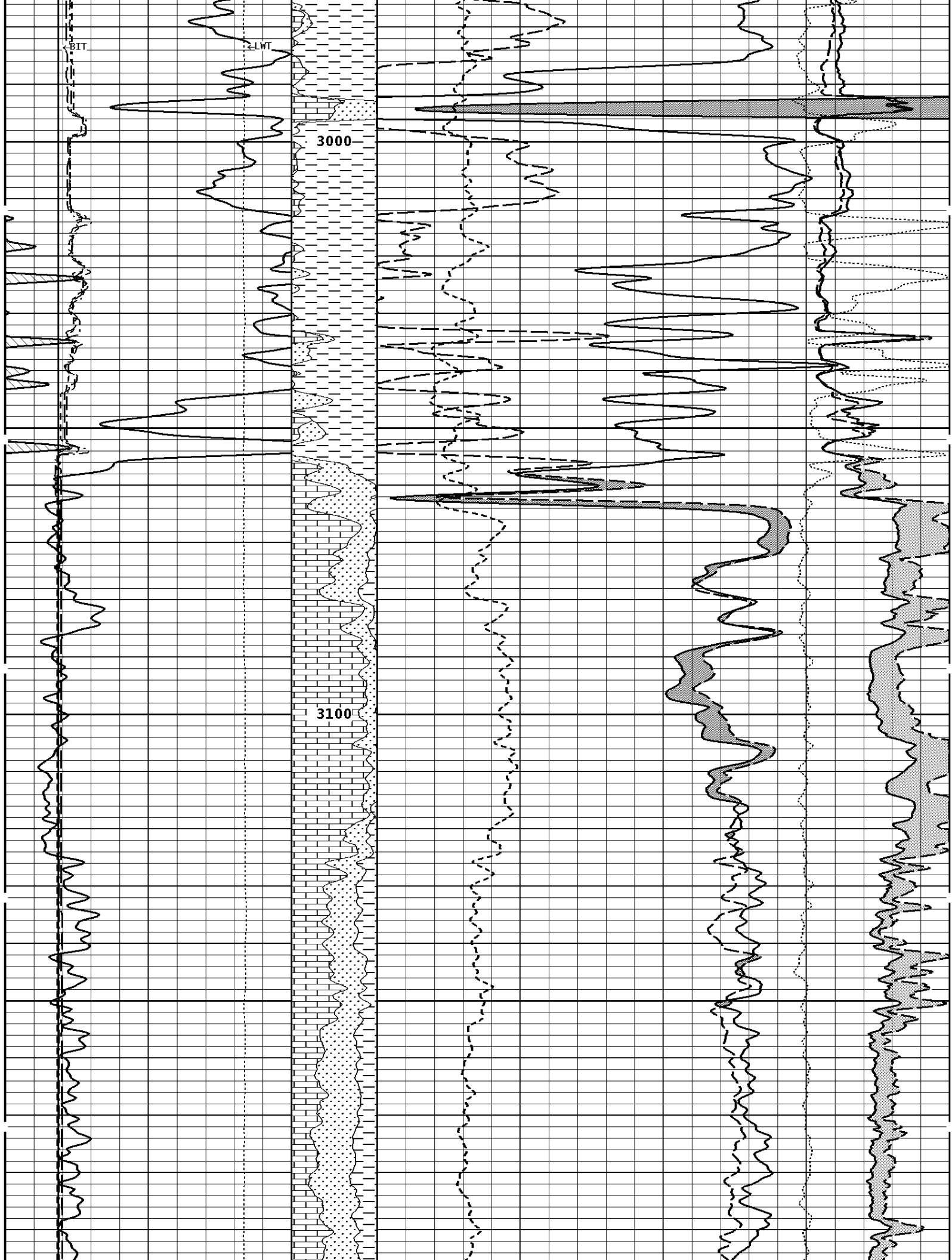


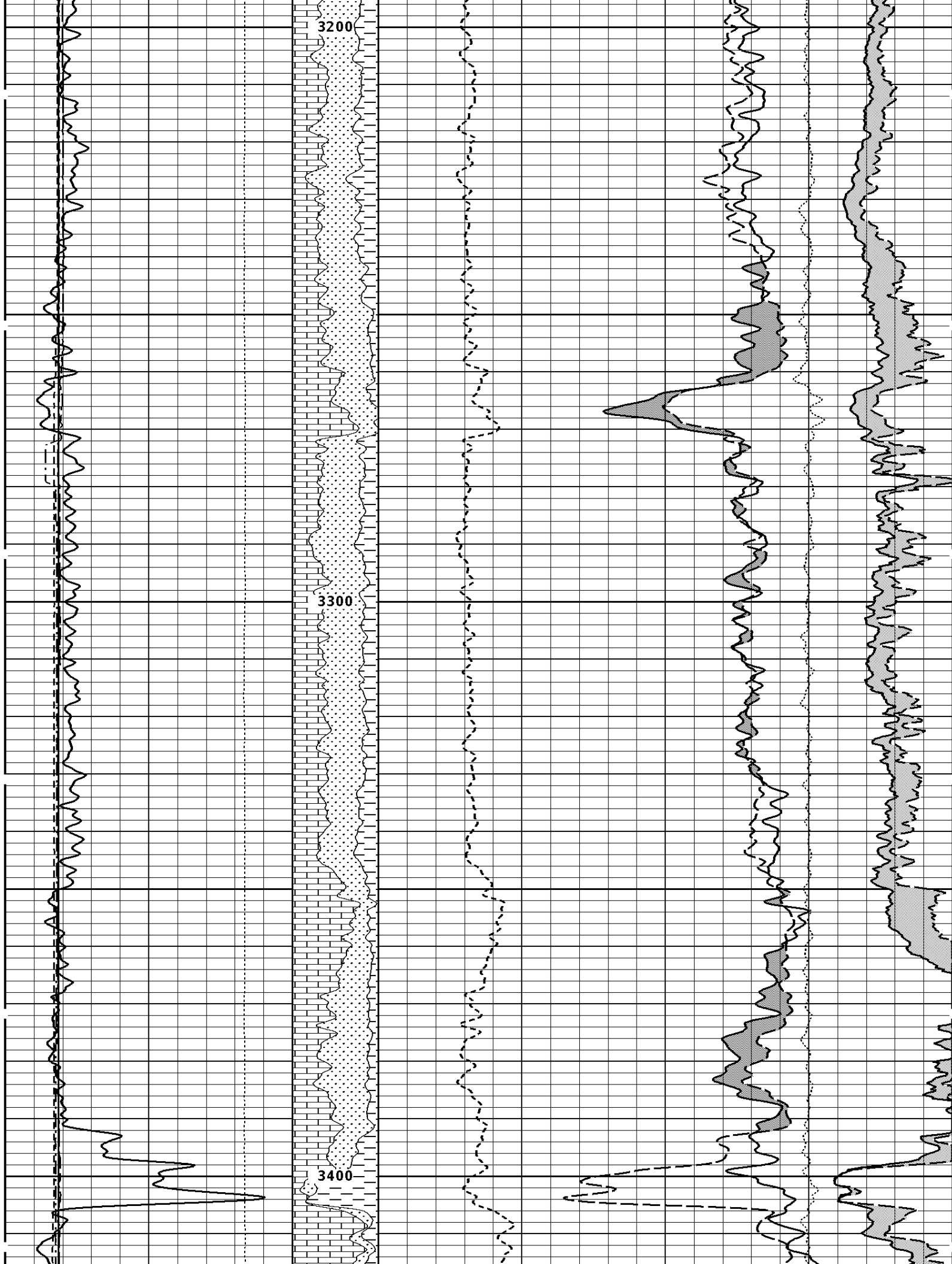


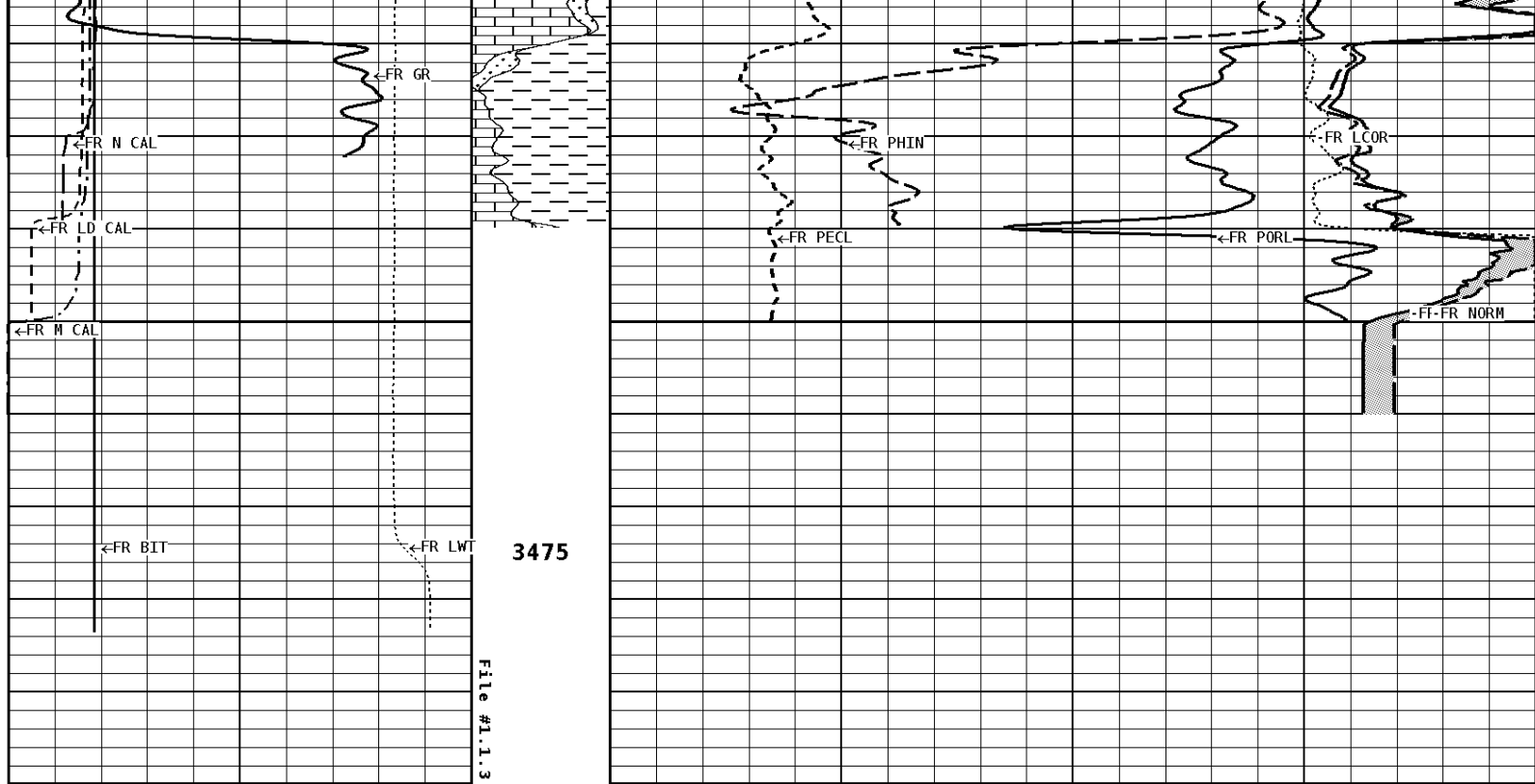












GAMMA RAY API UNITS 150 0 300 150		Volume Dolo/Shale	NEUTRON POROSITY (LIMESTONE) PERCENT 30 -10	
TENSION LBS 10000 0		Volume Calcite	DENSITY POROSITY (2.71g/cc) PERCENT 70 30 -10 -50	
DENSITY (X) CALIPER INCHES (IN) 16 6 26 16		Volume Quartz	PE CROSS-SECTION BARNs/ELECTRON 0 10	DENSITY CORRECTION G/CC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

Well File: VAL ENERGY SAWYER 2-31 JUNE17_MSTK

Scale: 1:240

Format: LDT-240

Segment: V1.D1.S3 Reprocess of MAIN

Acquired: 2019-06/17 11:16 3.4.1-13968

Reference: 0

Processed: 2019-06/17 12:31 3.4.1-13968

BIT SIZE
INCHES (IN)

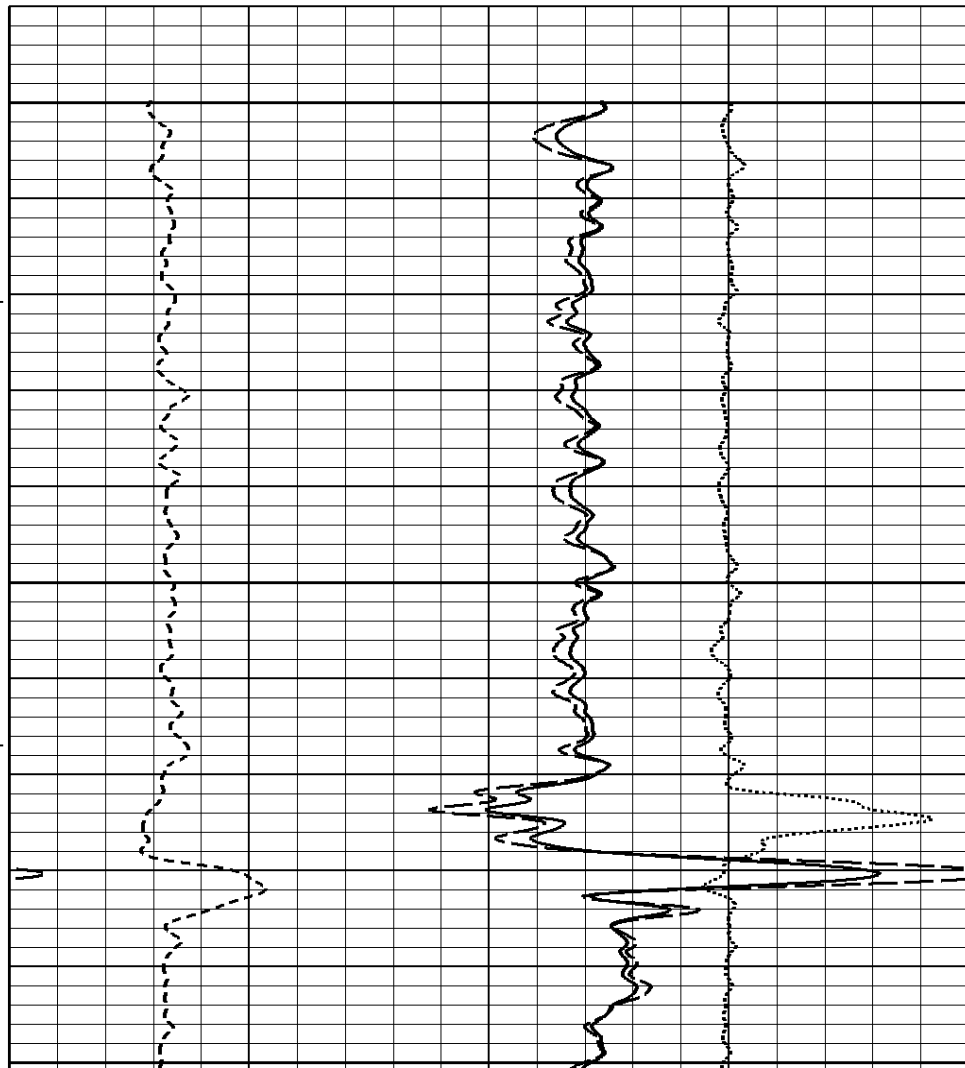
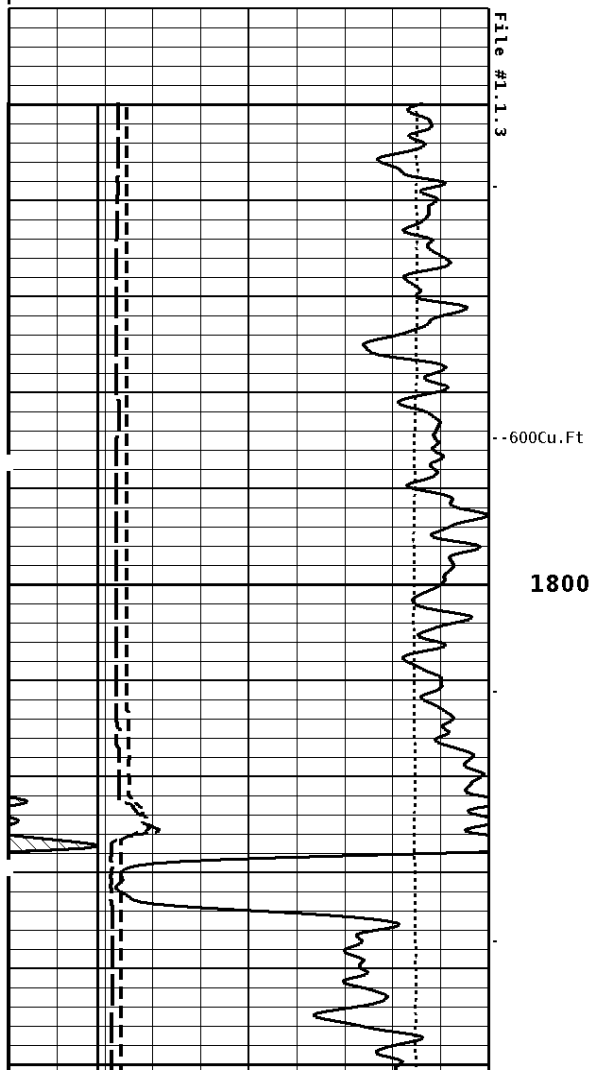
6 16

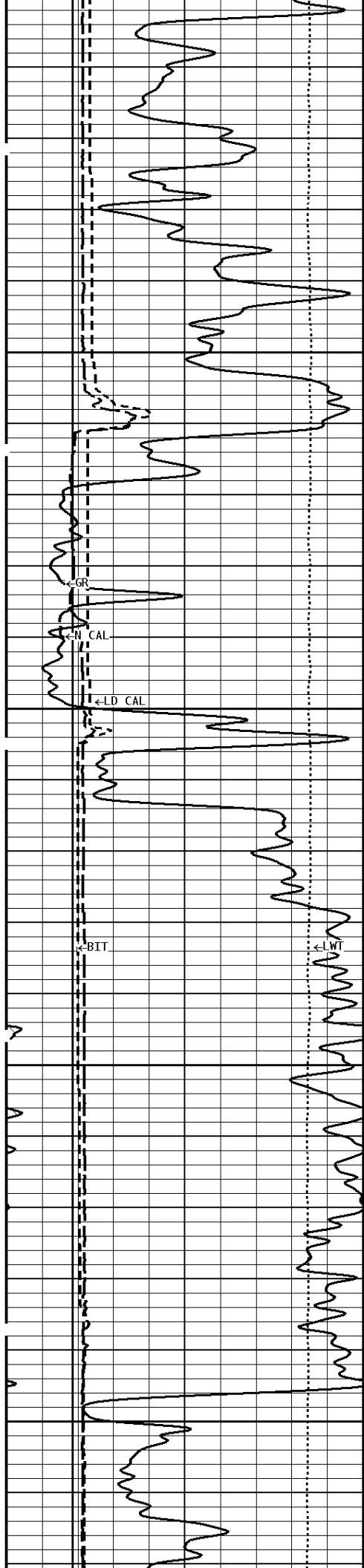
NEUTRON (Y) CALIPER
INCHES (IN)16 26
6 16DENSITY (X) CALIPER
INCHES (IN)16 26
6 16TENSION
LBS

10000 0

GAMMA RAY
API UNITS150 300
0 150- BHV AHV -
CU. FTPE CROSS-SECTION
BARNS/ELECTRON

0 10 -0.25 0.25

DENSITY CORRECTION
G/CCCOMPENSATED BULK DENSITY
G/CC3.0 4.0
2.0 3.0
1.0 2.0DENSITY POROSITY (2.71g/cc)
PERCENT70 30
30 -10
-10 -501:240 MAIN SECTION
BULK DENSITY

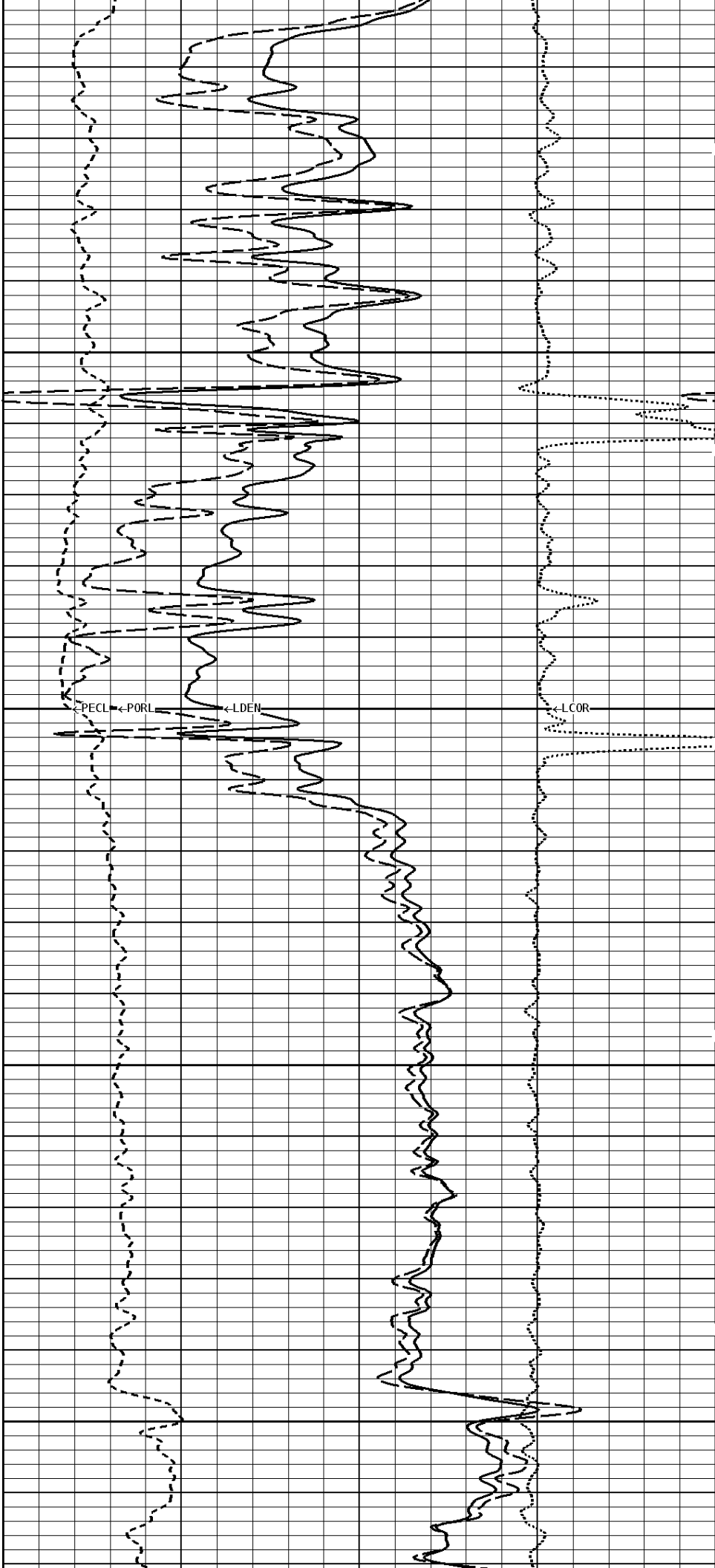


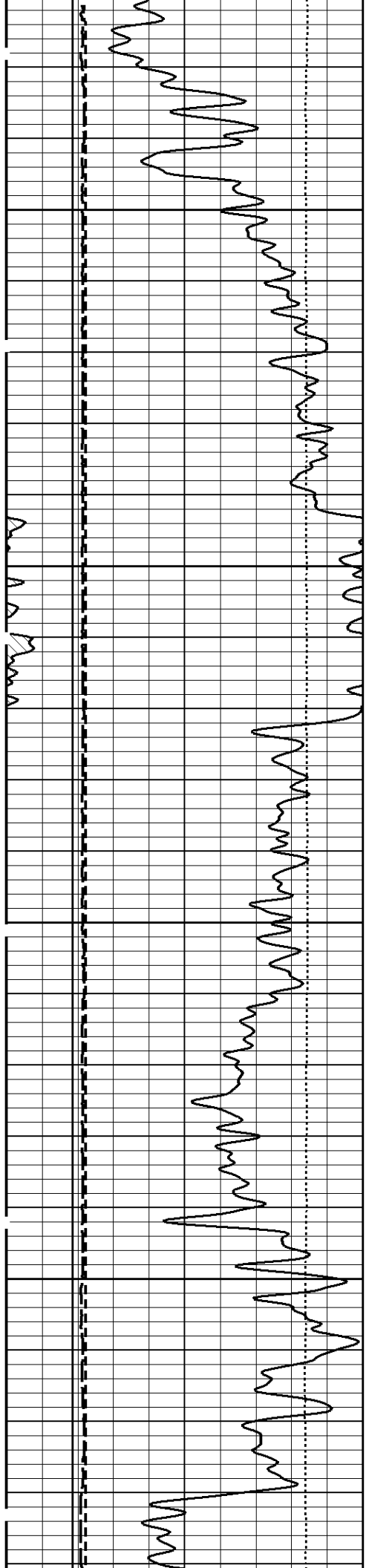
1900

300Cu.Ft--

2000

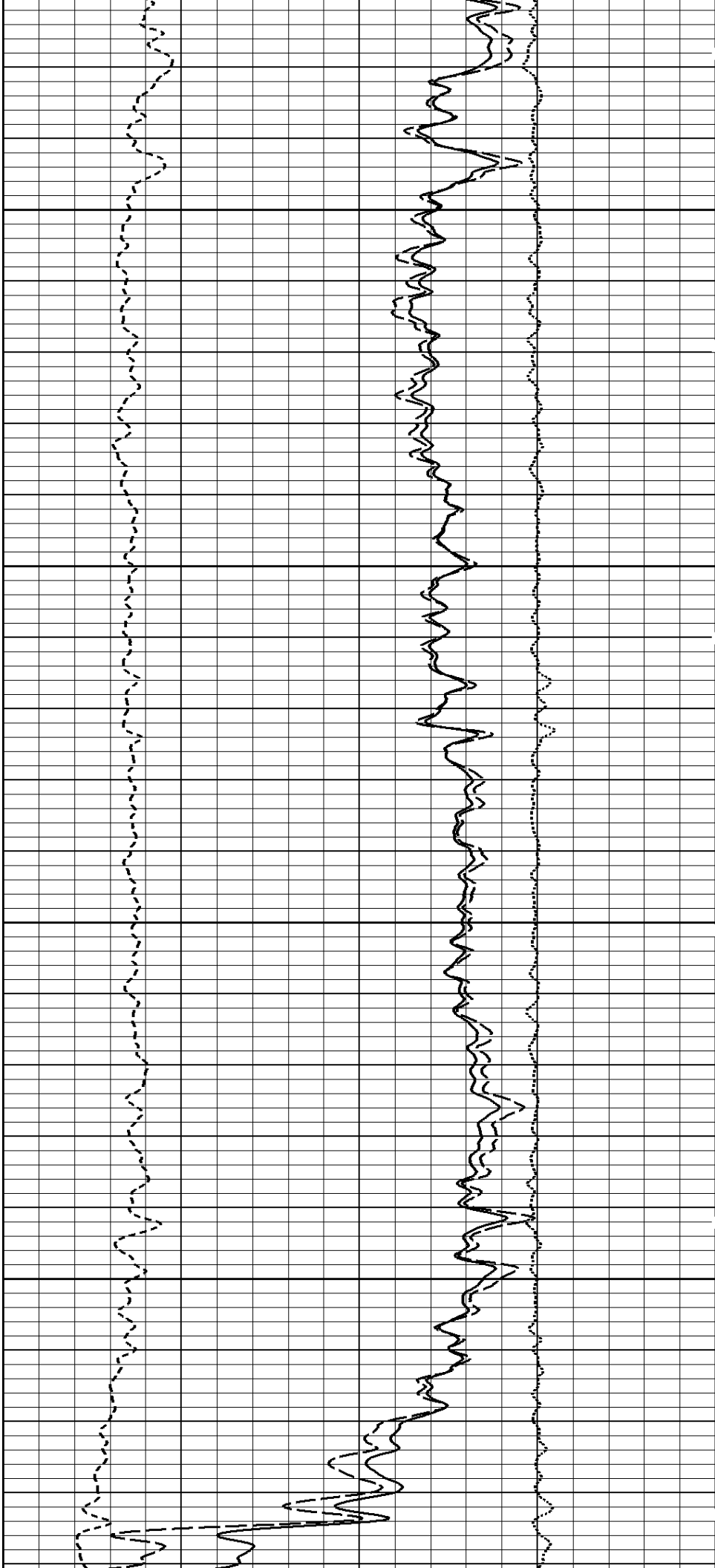
--500Cu.Ft

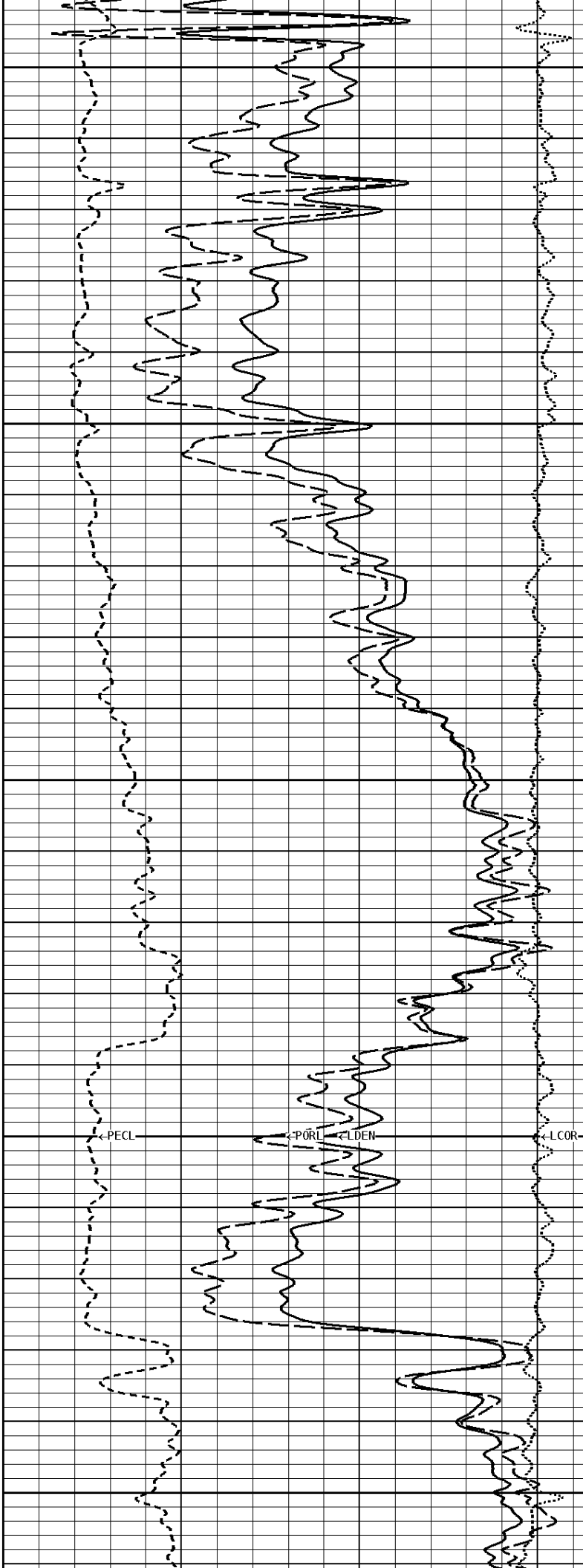
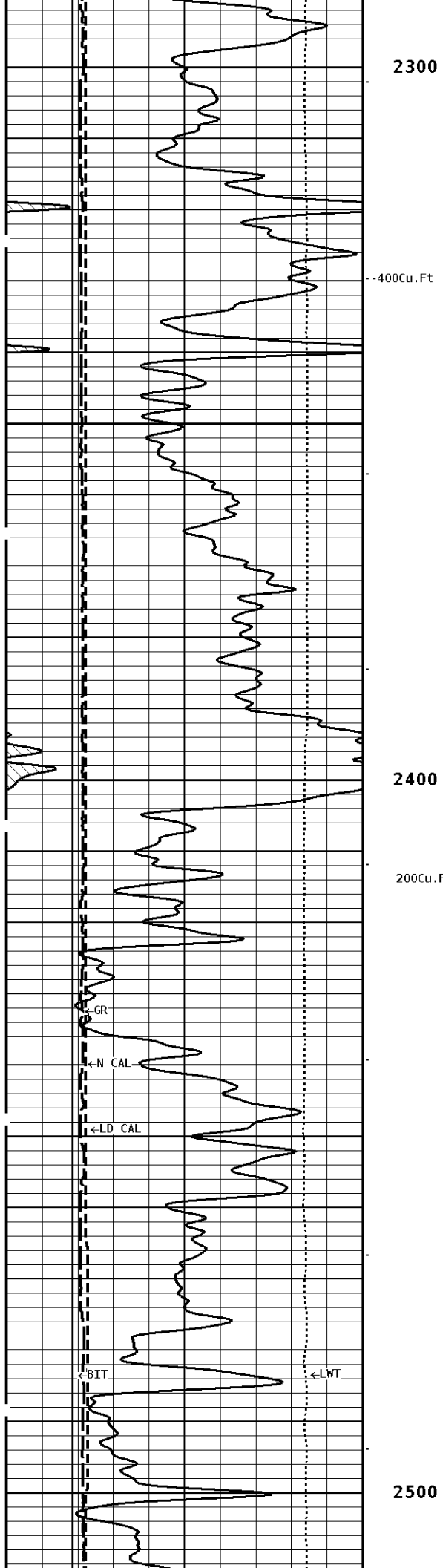


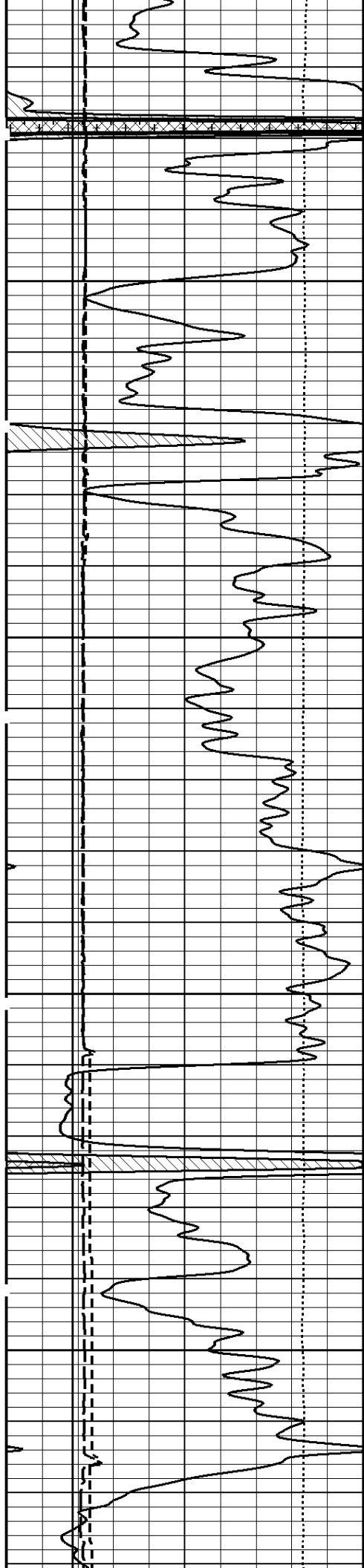


2100

2200

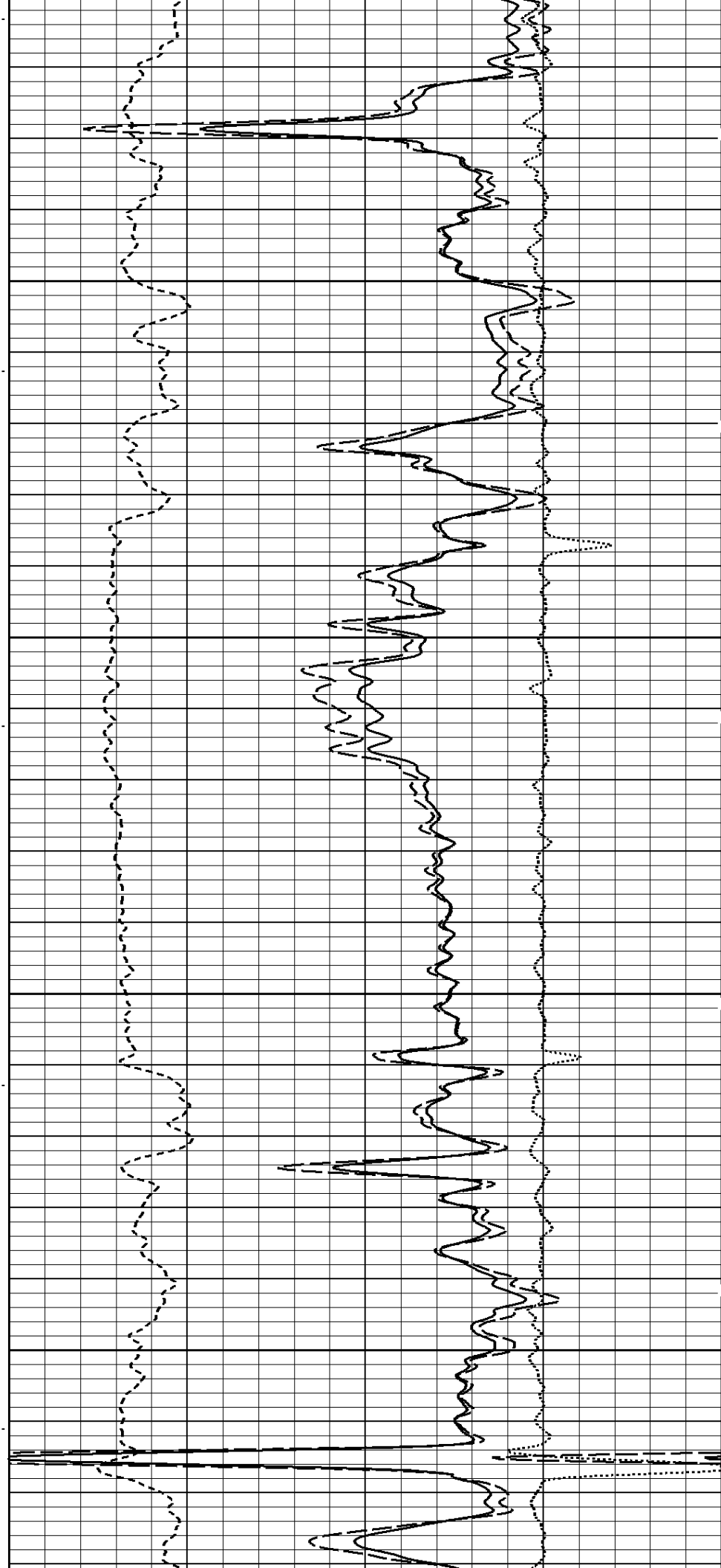


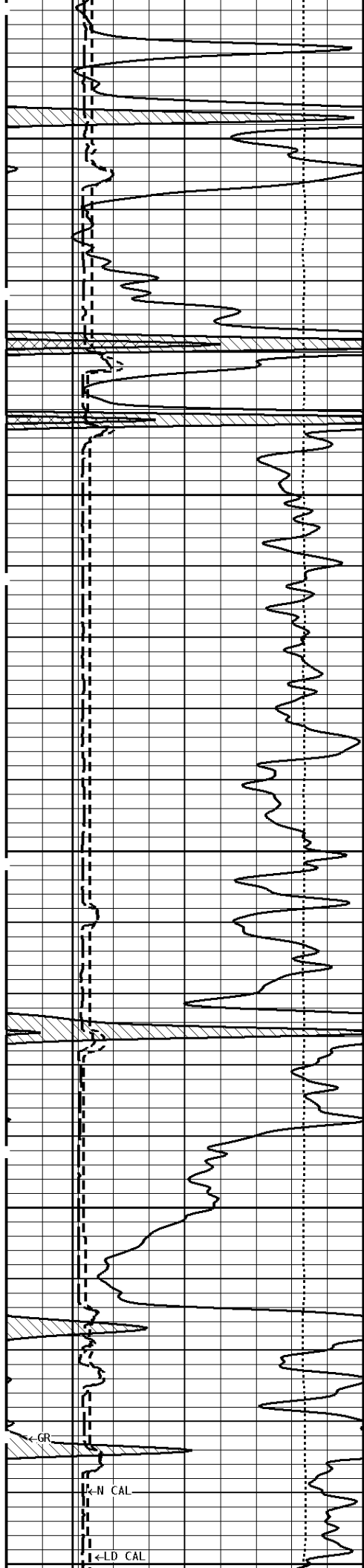




2600
--300Cu.Ft

2700





2800

--200Cu.Ft

2900

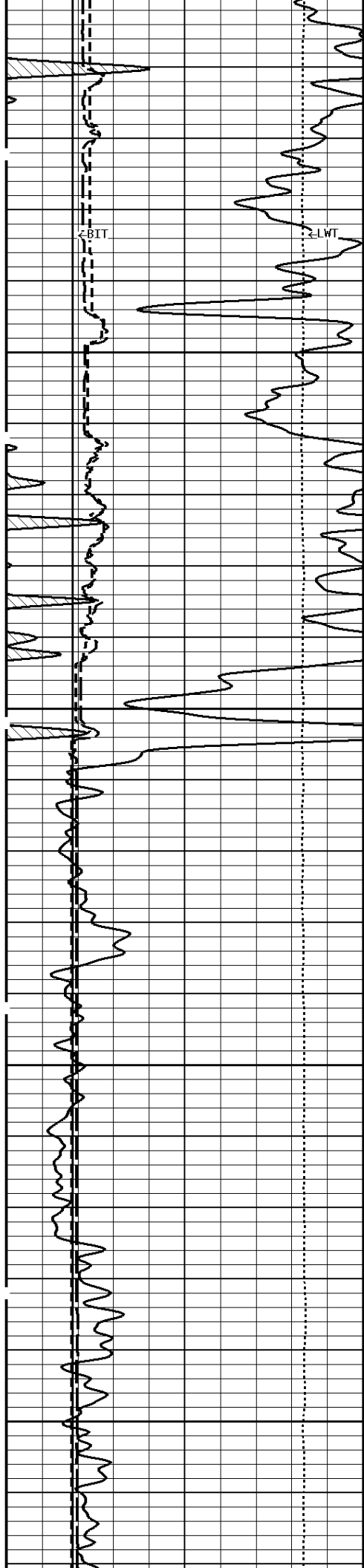
100Cu.Ft--



PECL

LDENRL

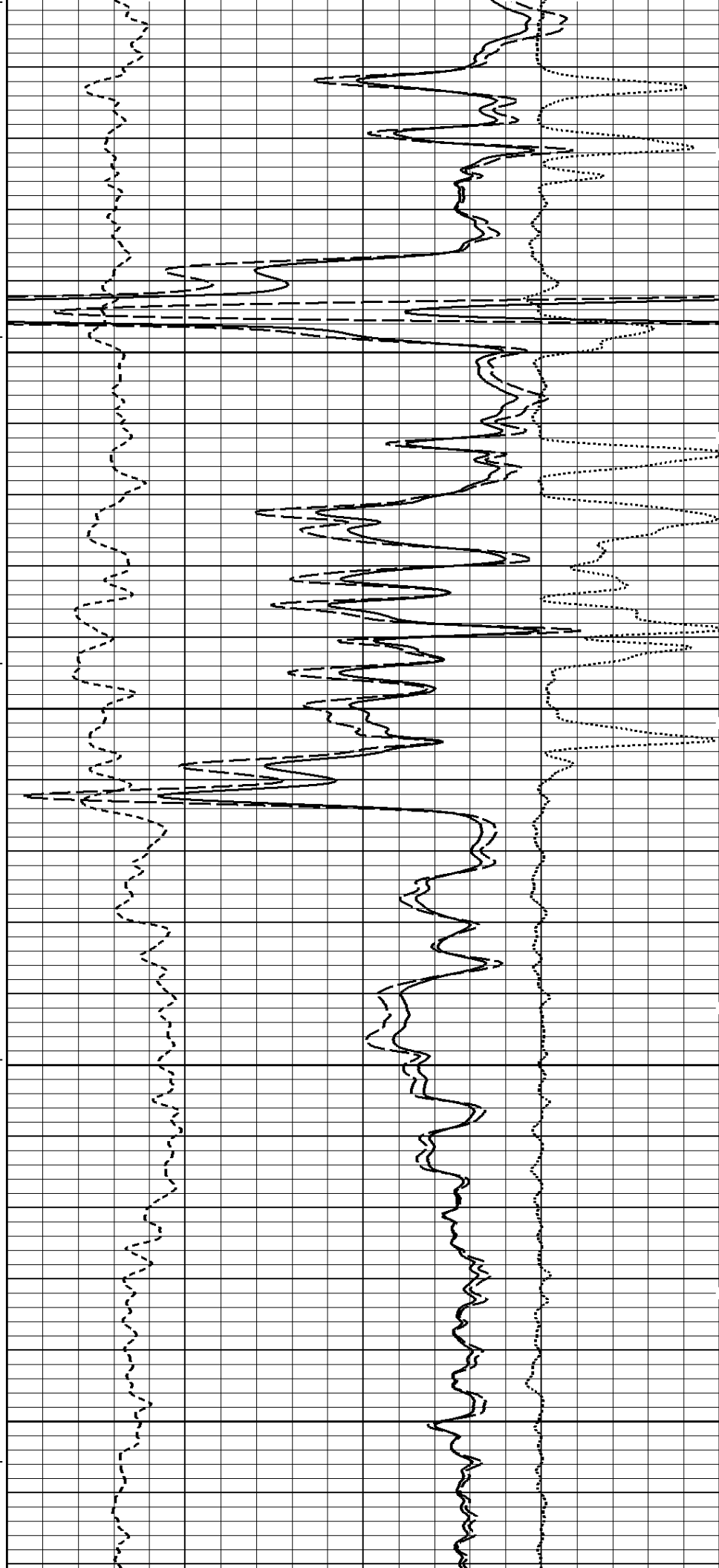
LCOR

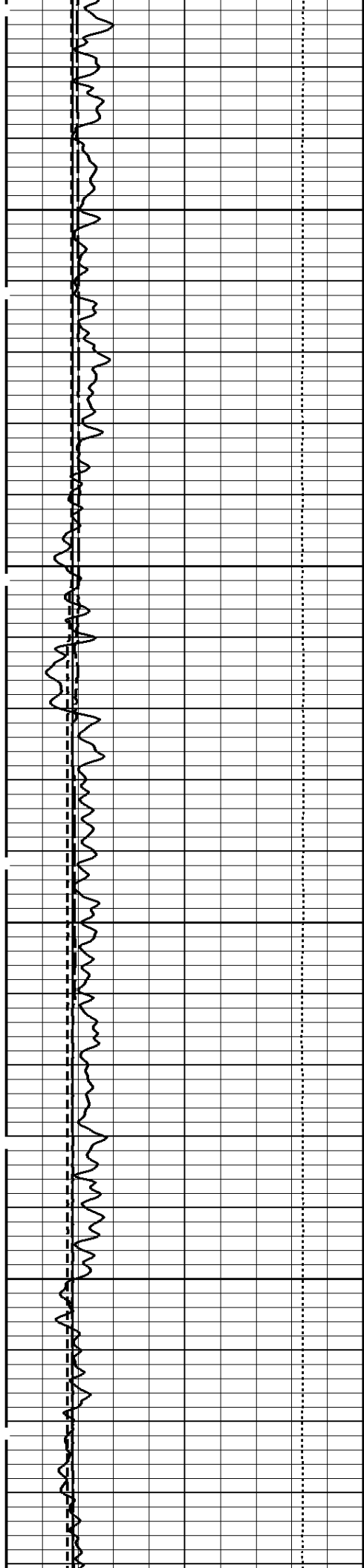


3000

3100

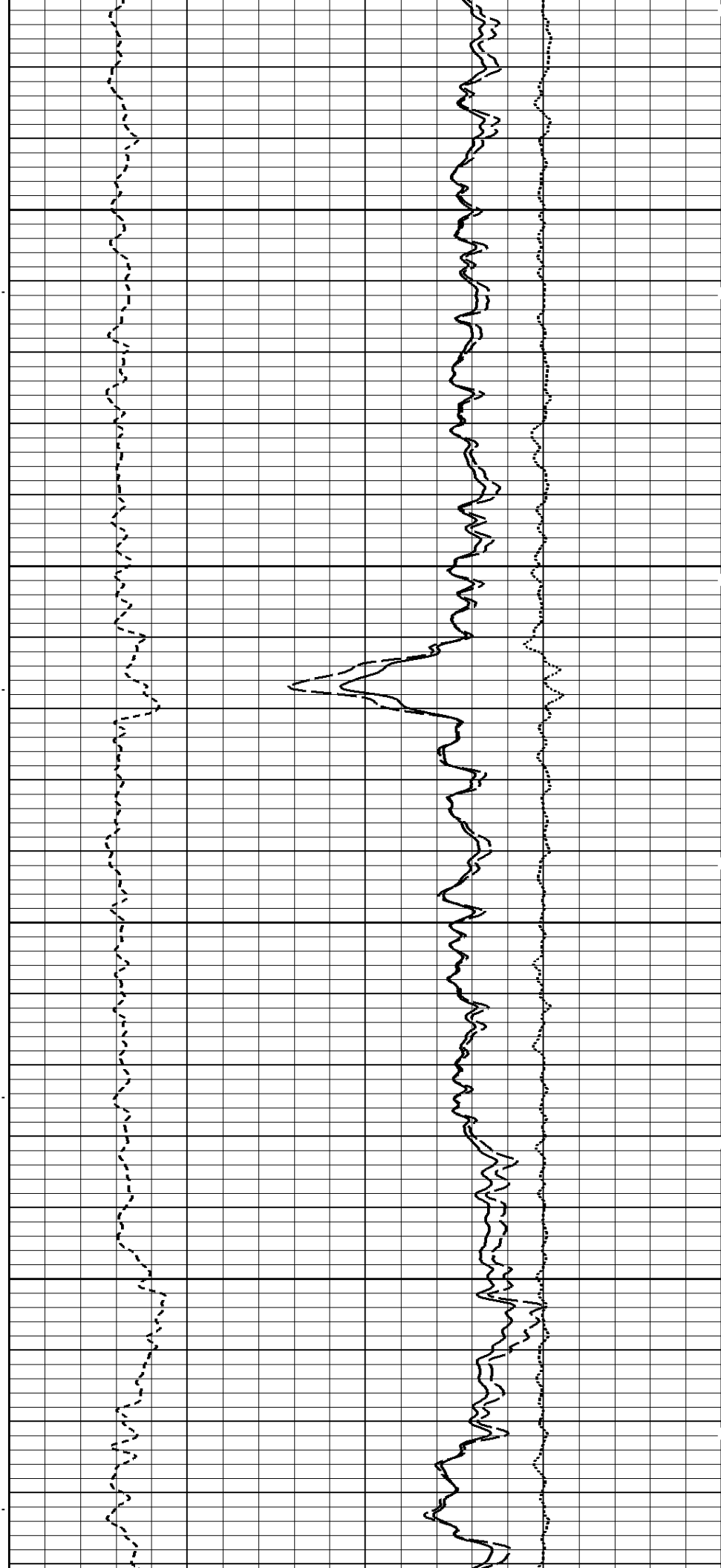
-100Cu.Ft

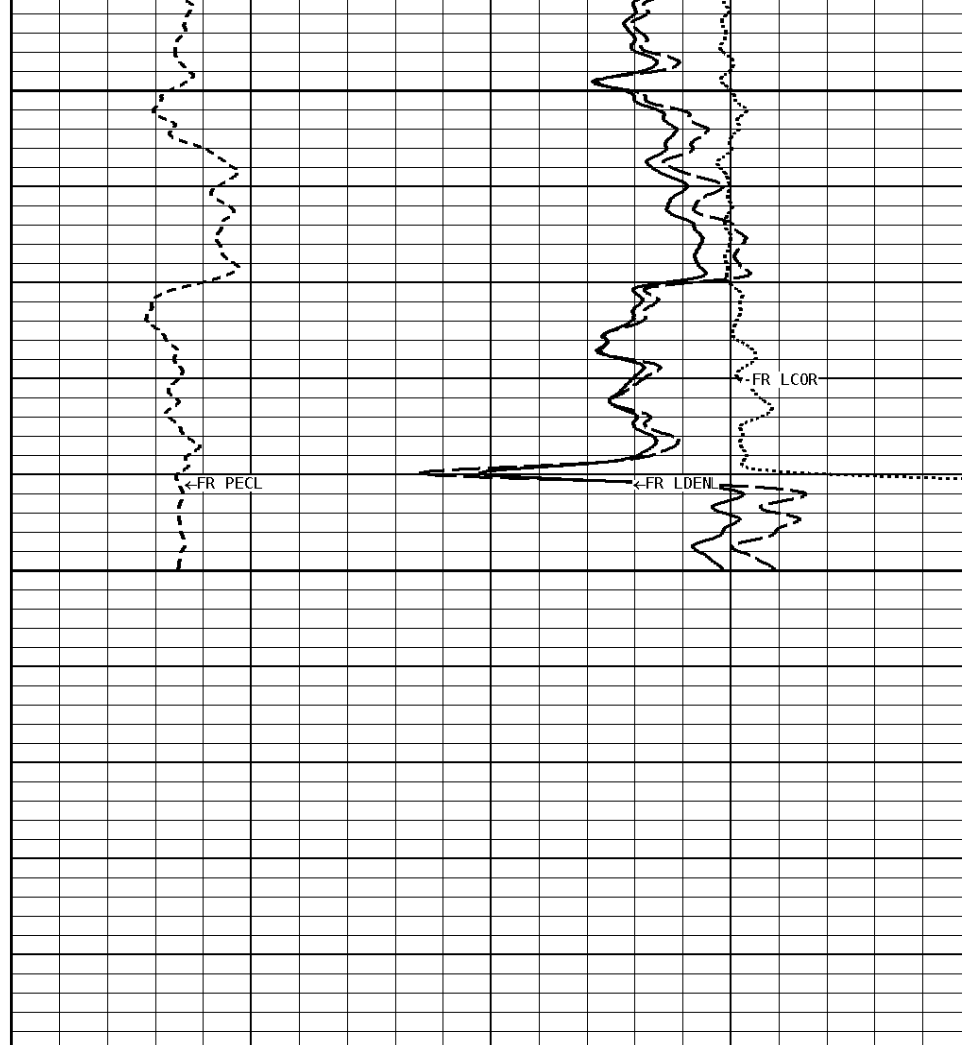
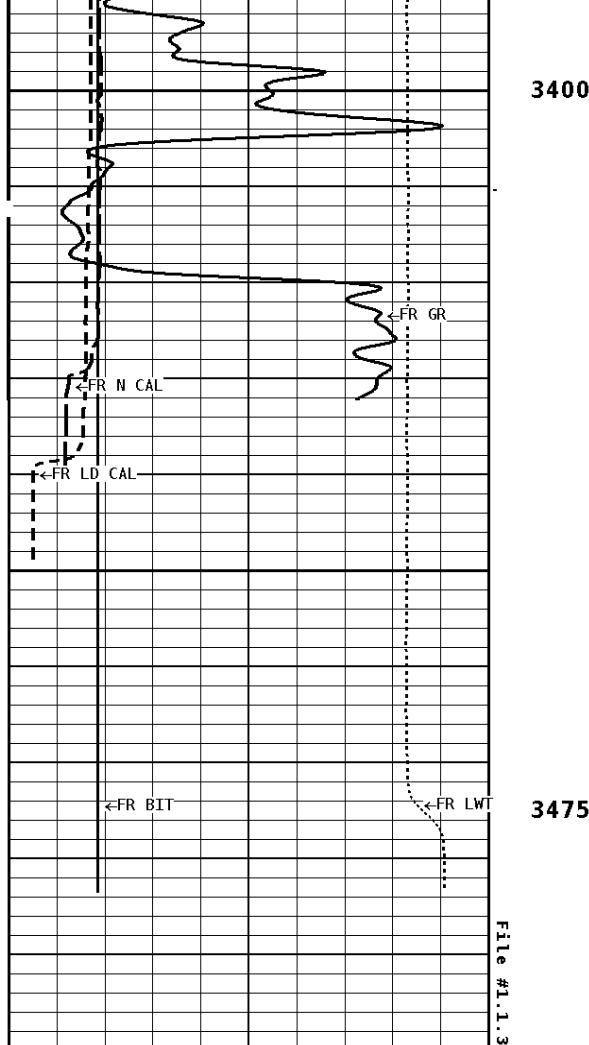




3200

3300





1:240 MAIN SECTION BULK DENSITY

GAMMA RAY API UNITS 150 0 300 150	- BHV AHV - CU. FT	DENSITY POROSITY (2.71g/cc) PERCENT 70 30 30 -10 -10 -50	
TENSION LBS 10000 0		COMPENSATED BULK DENSITY G/CC 3.0 4.0 2.0 3.0 1.0 2.0	
DENSITY (X) CALIPER INCHES (IN) 16 26 6 16		PE CROSS-SECTION BARN/ELECTRON 0 10 -0.25 0.25	DENSITY CORRECTION G/CC
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 : 16-May-2019			Time : 10:48		
Sensor Suite : GR-GR5			ID : GRT-BB-006		
	Measured	Units	Calibrated	Units	
GR	Background	Jig	Jig		
	68	335	160		GRAPI
CPS					
Shop Calibration					
CNT-AA					
Performed : 15-MAY-2019			Time : 10:07		
Sensor Suite : CALI-BCN			ID : NDT-BB-146		
	Jig - Measured		Jig - Calibrated	Units	
	Ring#1	Ring#2	Ring#1	Ring#2	
CL # 1	9.3	14.0	6.0	12.0	IN.
Shop Calibration					
BHC NEUT					
Performed : 15-May-2019			Time : 10:13		
Sensor Suite : BHC NEUT			ID : CNP-AA-115		
Source ID : N-1044					
	Tank		Verification	Units	
	Measured	Calibrated	Jig		
N/F	4.1233	3.6893	3.7005		
Porosity	27.7	20.5	20.7		%
Shop Calibration					
LDT-DA					
Performed : 15-MAY-2019			Time : 09:36		
Sensor Suite : CALI-LTH			ID : NDT-AE-003		
	Jig - Measured		Jig - Calibrated	Units	
	Ring#1	Ring#2	Ring#1	Ring#2	
CL # 1	8.0	12.9	6.0	12.0	IN.
Shop Calibration					
BHCPELNG					
Performed : 15-May-2019			Time : 09:51		
Sensor Suite : BHCPELNG			ID : LDP-DA-50		
Source ID : 63558B					
	Short Space				
	BKGD	Al	Mg	Al+Fe	Units
LSW1	65	1136	1829	757	CPS
LSW2	69	1384	2188	1005	CPS
LSW3	252	3276	5296	2813	CPS
LSW4	314	2962	4299	2641	CPS
LSW5	28	56	64	51	CPS
LSW6	85	88	91	89	CPS
LSW7	52	57	57	57	CPS
LSW8	2	4	5	4	CPS
QS	0.241	0.215	0.232	0.216	
PES			2.778	5.967	
SSDN		2.600	1.680		G/CC
	Long Space				
	BKGD	Al	Mg	Al+Fe	Units
LLW1	93	1315	5321	810	CPS
LLW2	100	2342	9144	1734	CPS
LLW3	386	4324	16490	3785	CPS
LLW4	501	2034	6637	1864	CPS
LLW5	58	70	133	68	CPS
LLW6	158	150	145	150	CPS
LLW7	102	99	95	100	CPS
LLW8	4	8	20	7	CPS
QL	0.216	0.207	0.206	0.198	
PEL			2.697	5.458	
LSDN		2.600	1.680		G/CC
Shop Calibration					
MST-DA					
Performed : 15-MAY-2019			Time : 10:36		
Sensor Suite : CALI-MSN			ID : MST-DA-024		
	Jig - Measured		Jig - Calibrated	Units	
	Ring#1	Ring#2	Ring#1	Ring#2	
CL # 1	7.0	11.3	6.0	12.0	IN.

CE # 1	7.0	11.5	0.0	12.0	IN.	
Performed : 15-MAY-2019			Time : 10:37			
Sensor Suite : MSTDA-NI			ID : MST-DA-024			
Internal						
	Measured			Calibrated		
	Zero	Reference	Units	Zero	Reference	Units
INV-V	0.0	29853.4		0.00	1546.00	MV
NOR-V	0.0	29711.1		0.00	1646.00	MV
IN-C	0.0	58914.6		0.00	15.46	UA
INV-R					32.34	OHMM
NOR-R					58.67	OHMM

Performed : 15-MAY-2019			Time : 10:37			
Sensor Suite : MSTDAMSF			ID : MST-DA-024			
Internal						
	Measured			Calibrated		
	Zero	Reference	Units	Zero	Reference	Units
MSFC	14.5	59121.5		0.00	1522.00	UA
MSFB	32755.1	32817.1		0.00	1522.00	MA
MOM1	1.0	62358.8		0.00	1522.00	MV
MSFRA					43.30	OHMM

STEP
energy services

Company: VAL ENERGY, INC.
Well: SAWYER #2-31
Location: 1650' FNL & 2800' FEL
Logged: 06-17-2019
K.B. Elev: 1293.0 Ft