STEP energy services

COMPENSATED NEUTRON

PEL DENSITY LOG

Company	BEREXCO LLC
Well	HINES UNIT #27X
Field	FAIRPORT
County	RUSSELL
State	KANSAS
Country	USA
API No.	15-167-24098-0000

File No : TUL-70413
Company : BEREXCO LLC
Well : HINES UNIT #27X
Field : FAIRPORT
County : RUSSELL
State : KANSAS
Country : USA
API No : 15-167-24098-0000

Location :
2010' FSL & 1320' FEL
S/2 N/2 N/2 SE

LSD : **Sect :** 17 **Twp :** 11S **Rge :** 15W

Permanent Datum:	GL	**Elevations:**		**Services:**	
Drilling Measured From:	KB	**KB**	1876.00 Ft	CNT	PIT
Log Measured From:	KB	**DF**	1875.00 Ft	LDT	
Above Permanent Datum:	6.00 Ft	**GL**	1870.00 Ft	MLT	

Date	12-11-2019						
Run Number	1						
Depth--Driller	3525.0	Ft					
Depth--Logger	3524.0	Ft					
First Reading	3492.0	Ft					
Last Reading	265.0	Ft					
Casing--Driller	265.0	Ft					
Casing--Logger	265.0	Ft					
Bit Size	7.875	In					
Casing Size	8.625	In					
Hole Fluid Type	WBM						
Density	9.0						
Fluid Loss	8.0						
PH/Viscosity	9.0	63.0					
Sample Source	MEASURED						
RM@Measured Temp.	2.000	@ 50 F					
RMF@Measured Temp	1.600	@ 50 F					
RMC@Measured Temp.	2.400	@ 50 F					
Source RMF/RMC	CALCULATED	CALCULATED					
RM@BHT	0.960	@ 111 F					
Time Circulation Stopped							
Max Recorded Temp.	111	F					
Equipment/Base	1022	TULSA, OK					
Recorded By	SHELDON TYLER						
Witnessed By	JERRY SMITH						

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 intepretations, conversions or recommendations as aforesaid.

Bitsize Intervals

Size (In)	Bottom (Ft)
7.875	3525.00

Casing Strings

Size (In)	Weight (Lbs)	Bottom (Ft)	Top (Ft)
8.625	32.00	265.00	0.00

Run Number	1	
Date	12-11-2019	
Date/Time On Bottom		
Depth to Fluid	0.0 Ft	
Salinity	3800.000	
RMF@BHT	0.770 @ 111 F	
RMC@BHT	1.150 @ 111 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

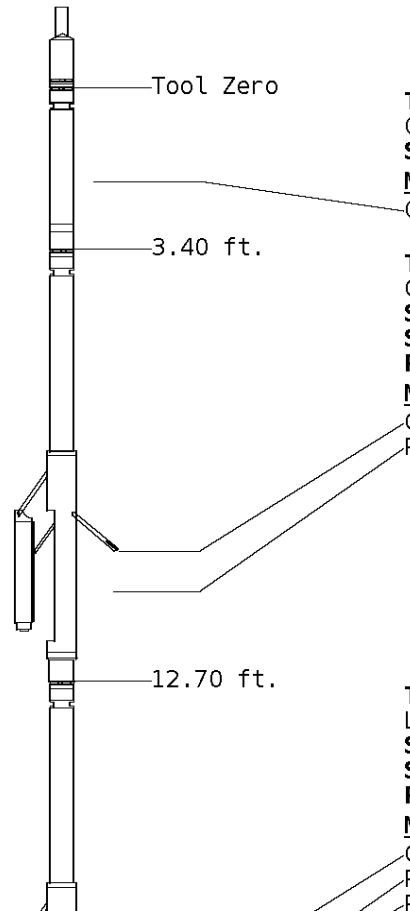
CUSTOMER REQUESTED REPEAT PULLED TO 3100'
CUSTOMER REQUESTED DETAIL PULLED TO 2300'

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.**



Tool: GRT-B **Length:** 3.40 **ft.** **O.D.** 3.60 **in.**
Gamma Ray Controller
Sonde ID :GRT-BA-14

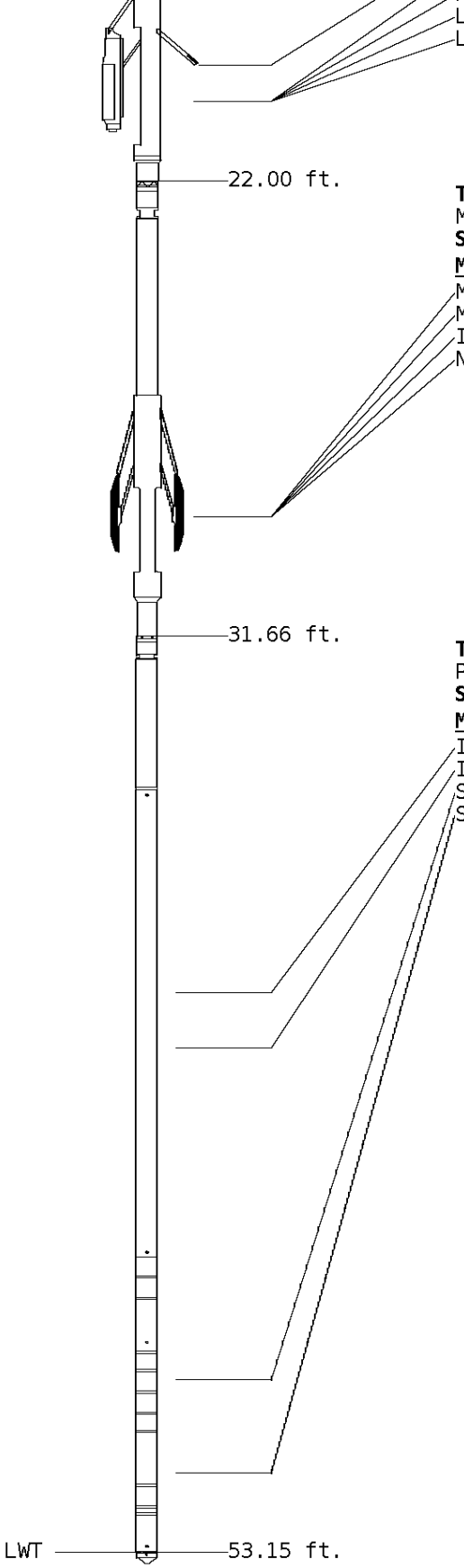
Measure Point	Tool Offset	Stack Offset	Bottom Offset
GRP	2.00	2.00	51.15

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-AE-003
Source ID :63558B
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-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: BEREXCO_HINES_27X_DEC11_MSTK **Scale:** 1:240 **Format:** NLD-240
Segment: V1.D1.S5 Reprocess MAIN **Acquired:** 2019-12/12 01:40 3.4.1-13968
Reference: 0 **Processed:** 2019-12/12 02:53 3.4.1-13968

BIT SIZE
INCHES (IN)

6 **16**

NEUTRON (Y) CALIPER
INCHES (IN)

16 **26**

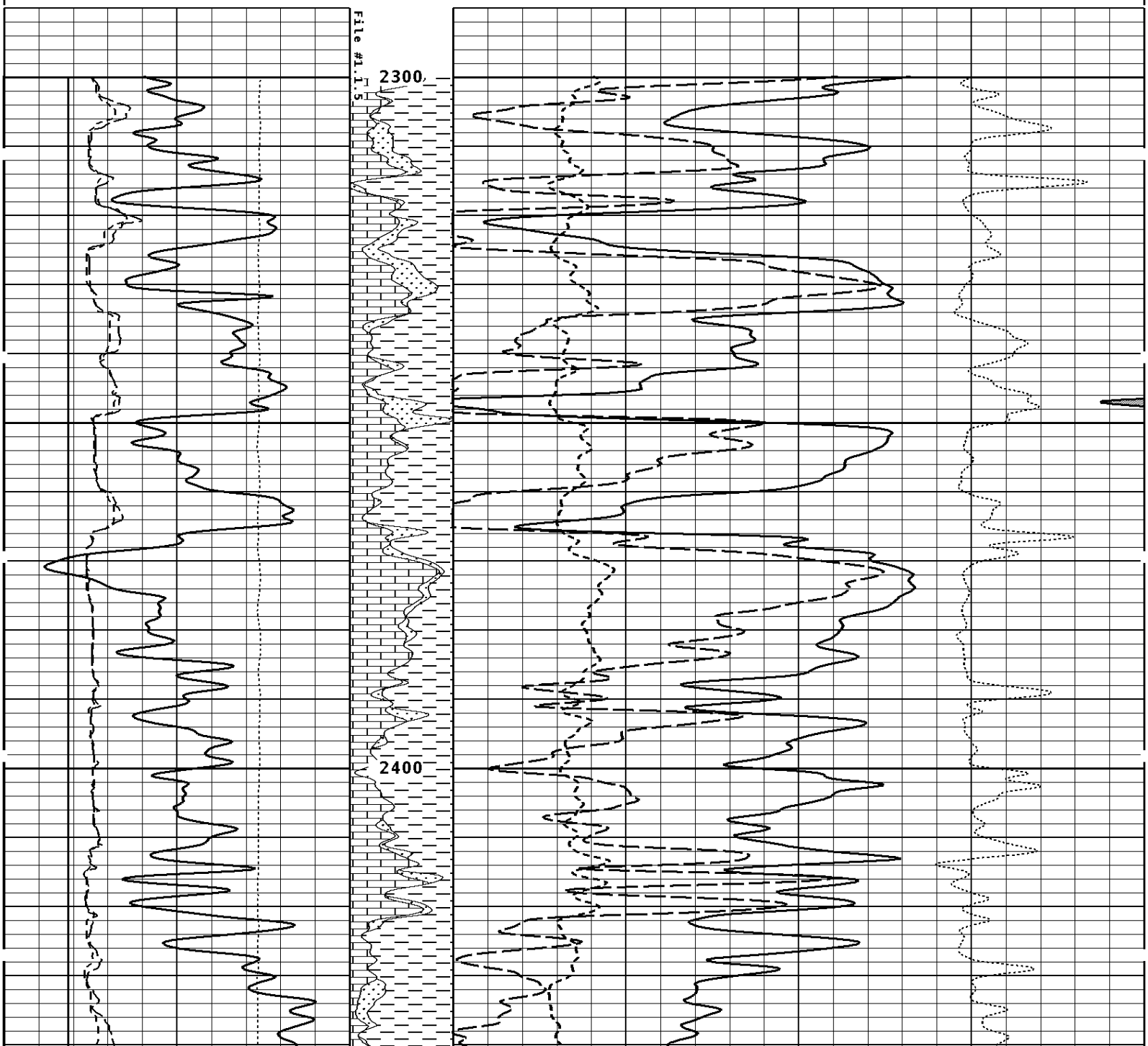
16 26
6 16

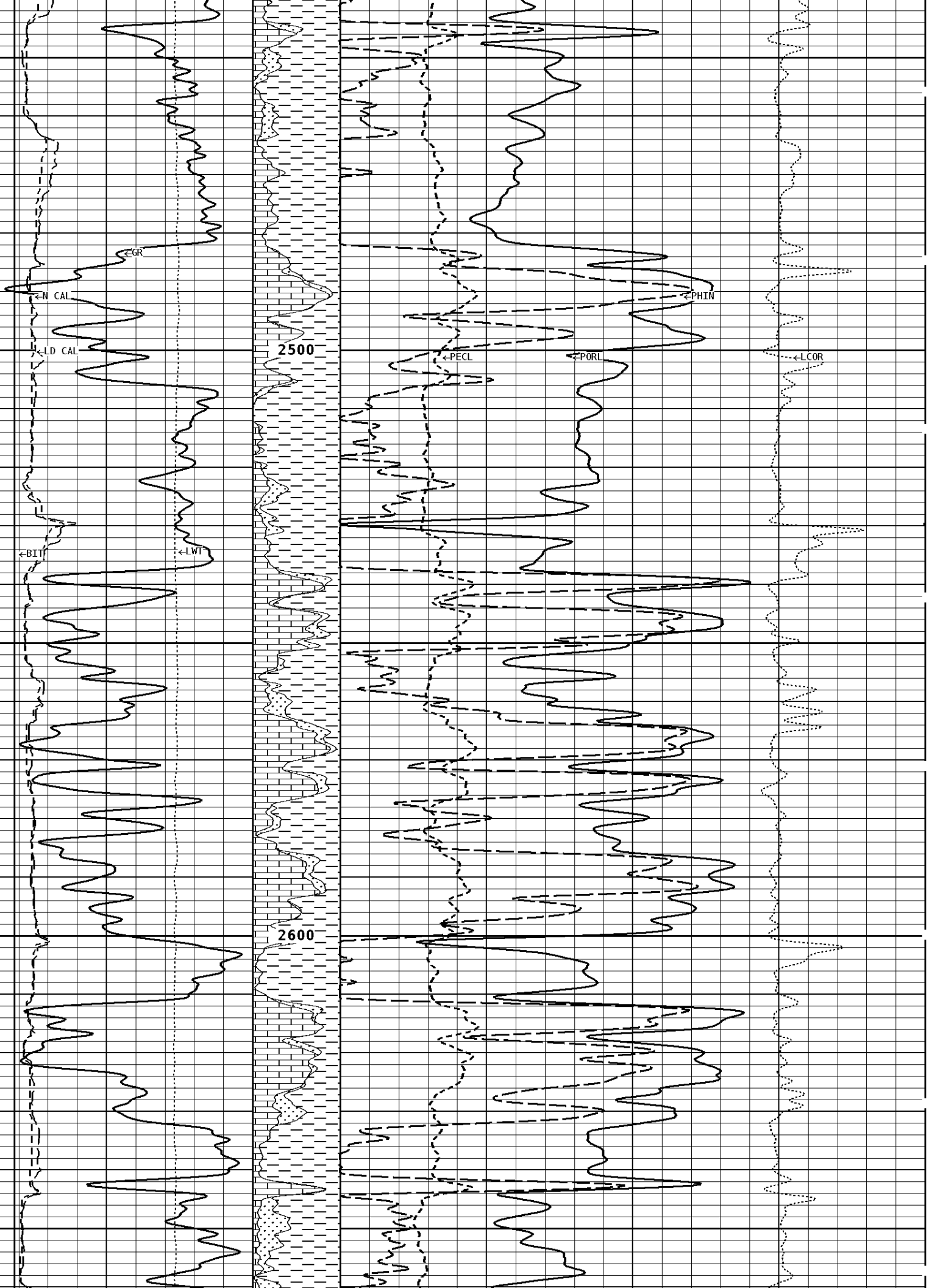
DENSITY (X) CALIPER INCHES (IN)	Volume Quartz	PE CROSS-SECTION BARNS/ELECTRON	DENSITY CORRECTION G/CC
16 26 6 16		0 10	-0.25 0.25

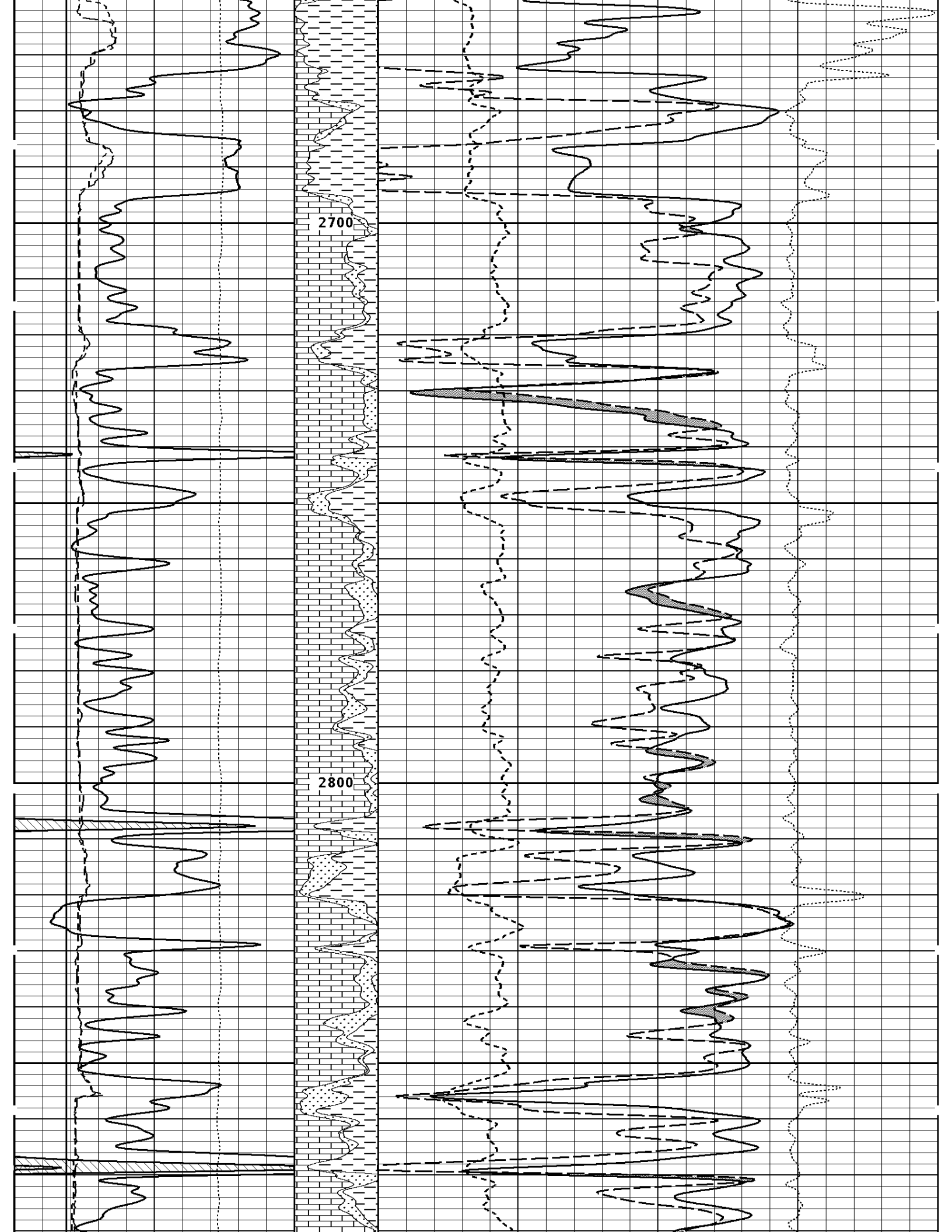
TENSION LBS	Volume Calcite	DENSITY POROSITY (2.71g/cc) PERCENT
10000 0		70 30 30 -10 -10 -50

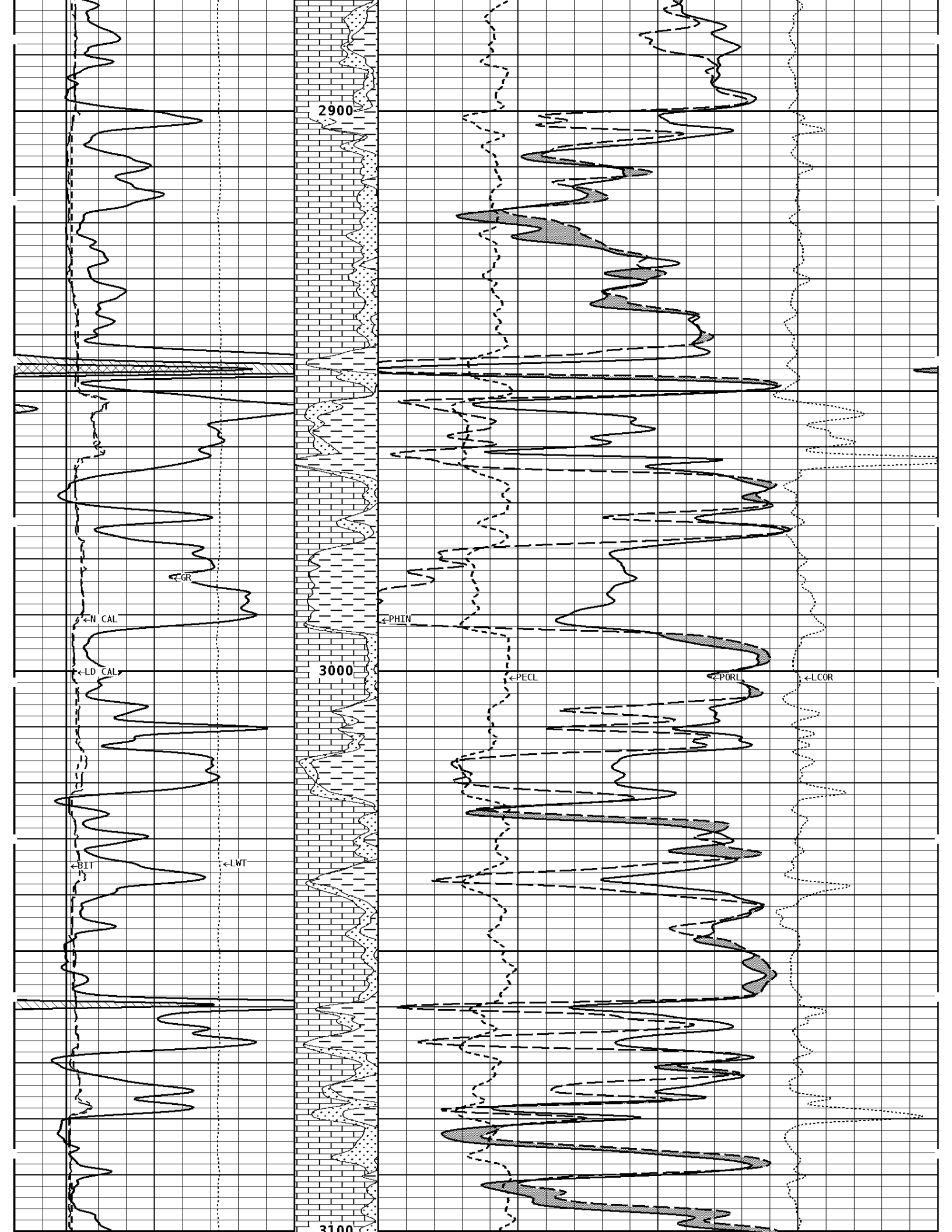
GAMMA RAY API UNITS	Volume Dolo/Shale	NEUTRON POROSITY (LIMESTONE) PERCENT
150 300 0 150		30 -10

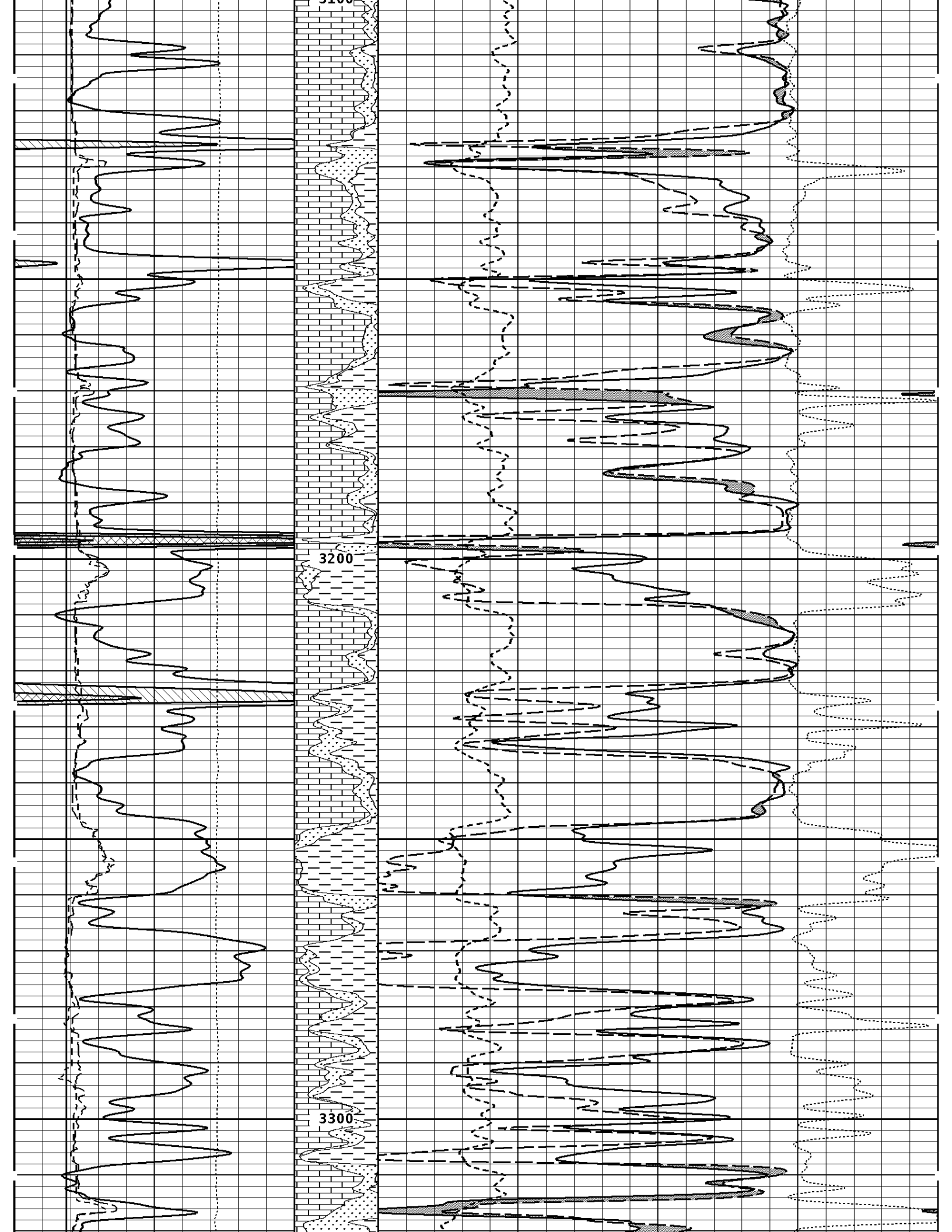
1:240 MAIN SECTION

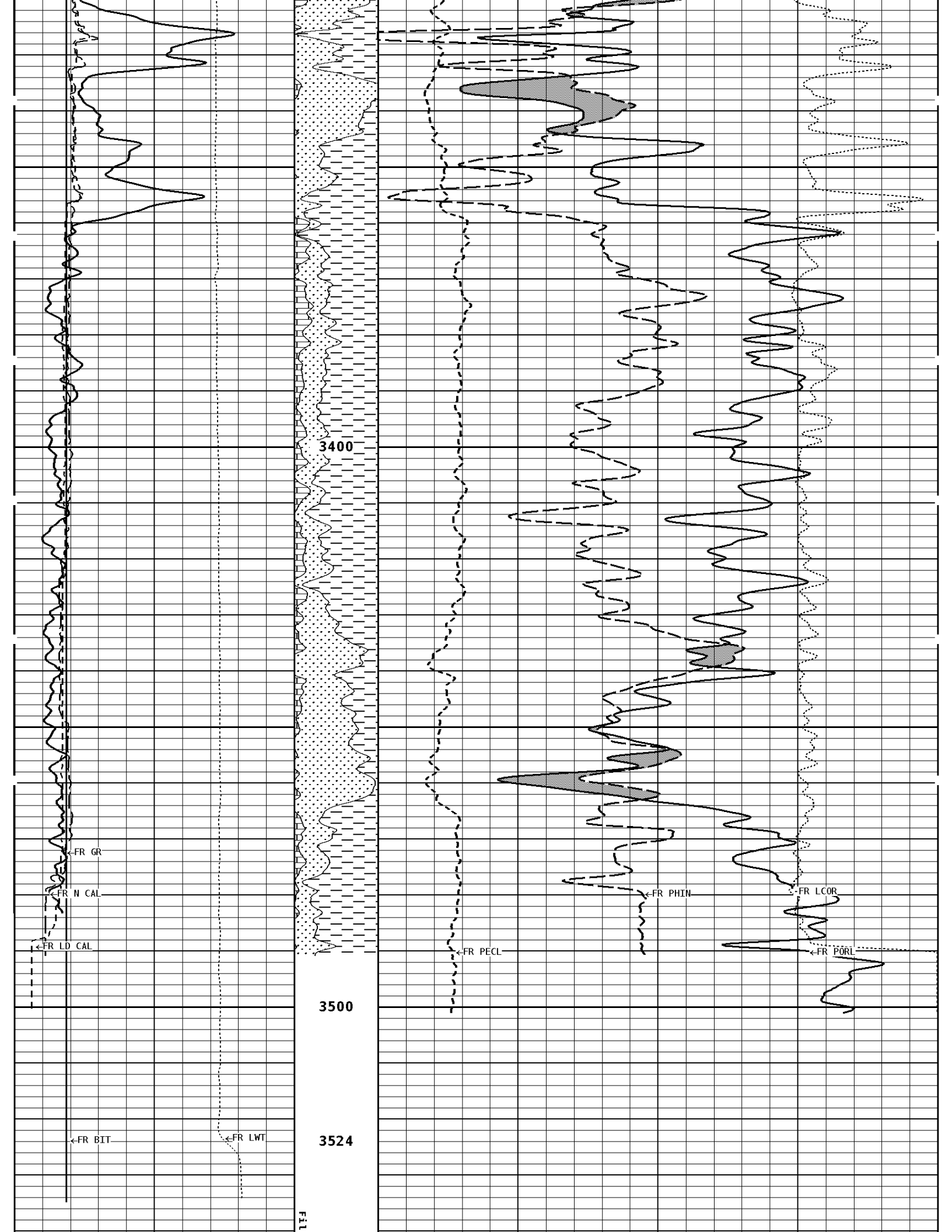


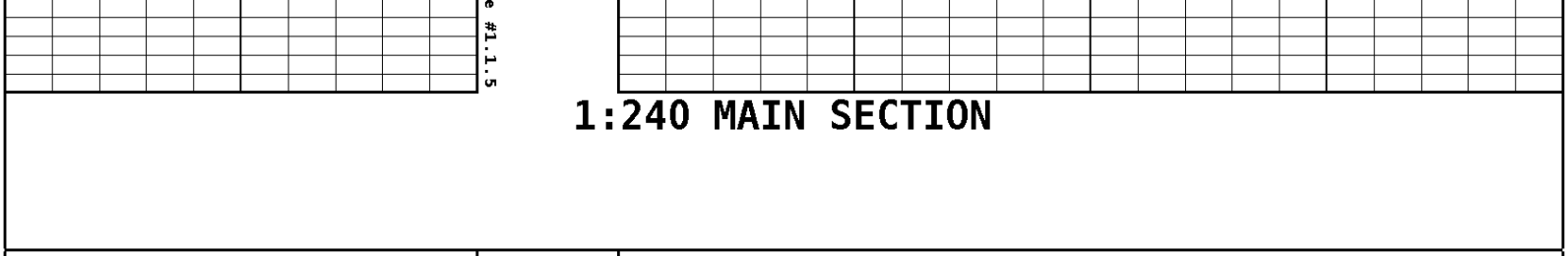

GR
N CAL
LD CAL
BIT
LWT
2500
PECL
PORL
PHIN
LCOR
2600


2700
2800


2900
3000
3100
GR
N CAL
LD CAL
BIT
LWT
PHIN
PECL
PORL
LCOR


3200
3300


3400
3500
3524
FR GR
FR N CAL
FR LD CAL
FR BIT
FR LWT
FR PECL
FR PHIN
FR LCOR
FR PORL

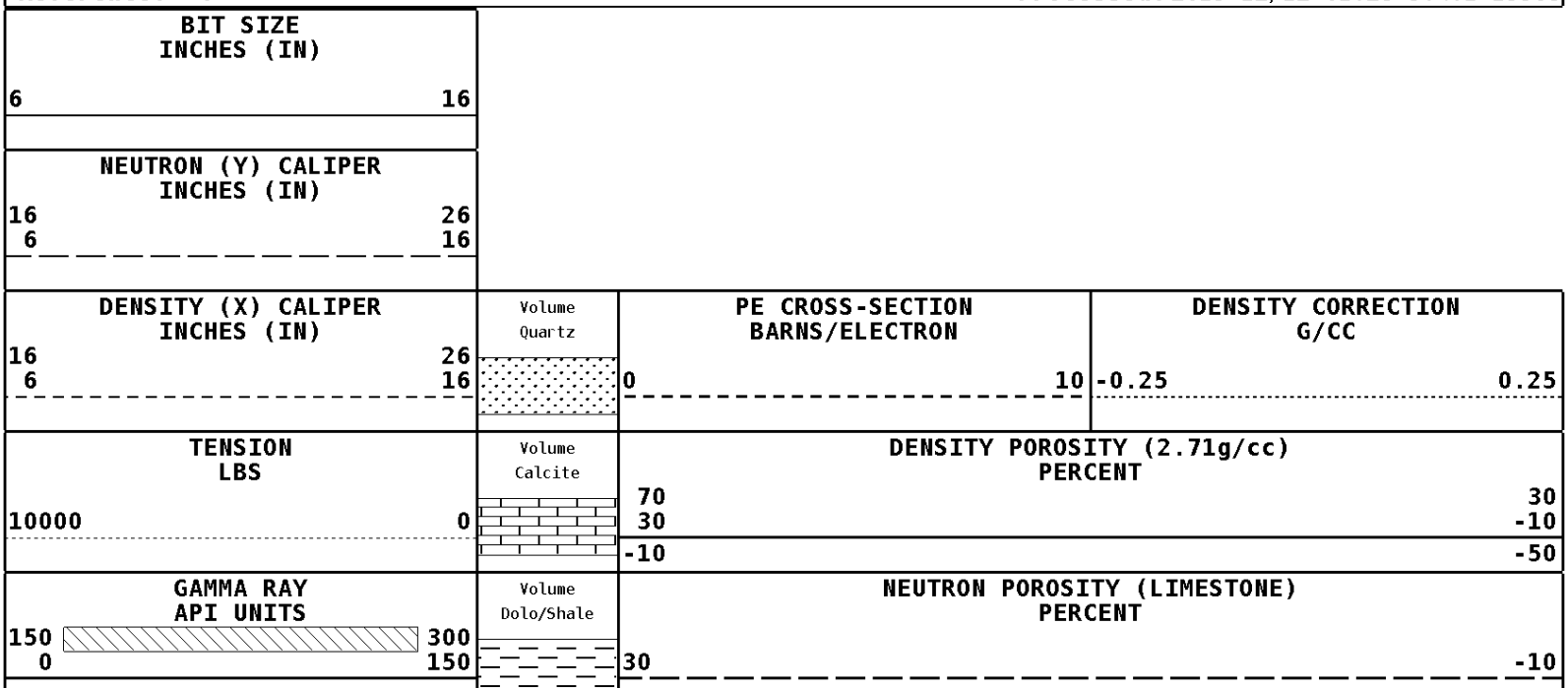


*** Borehole Zone Factors ***

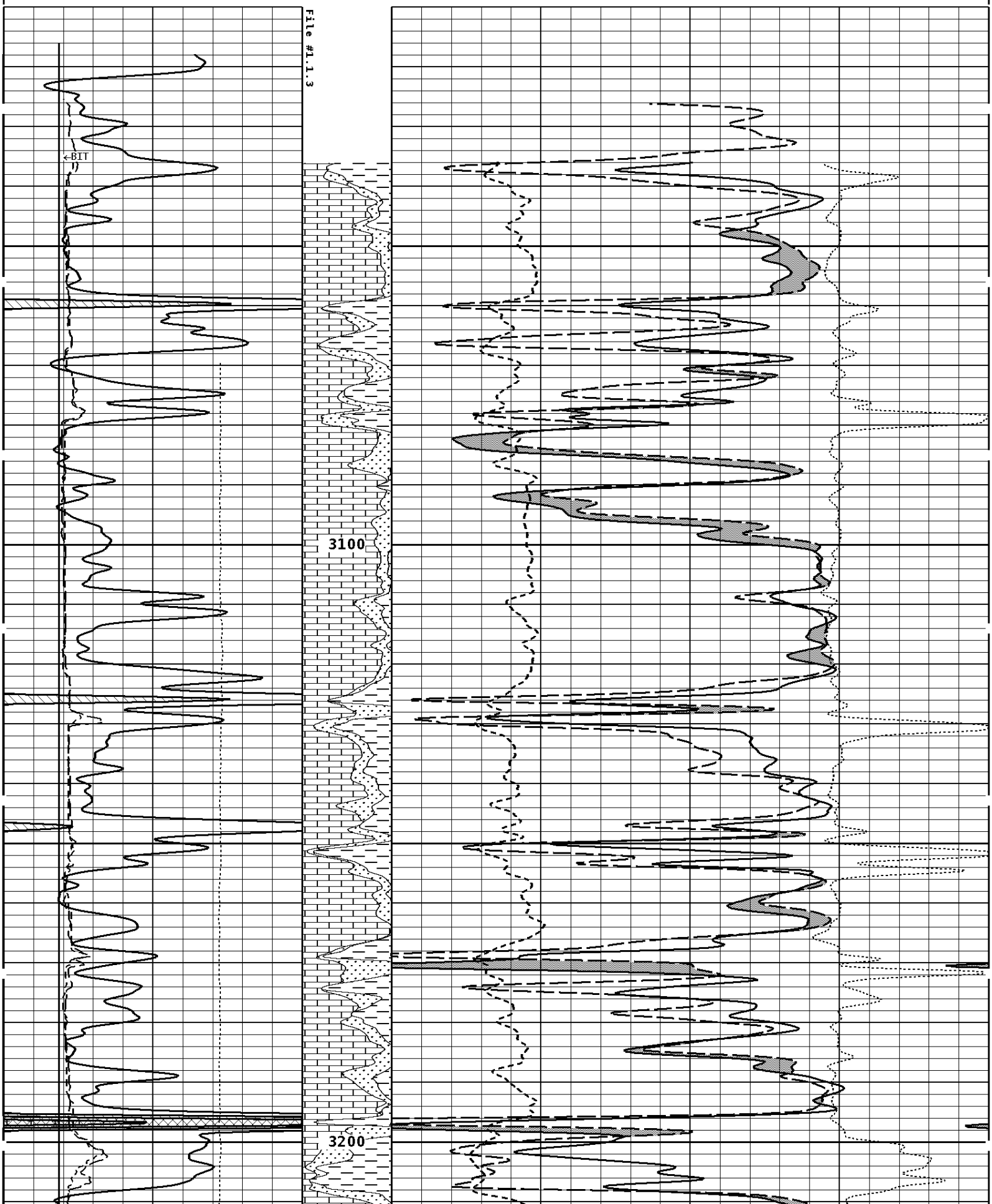
Zone 1 99999.0 to 0.0 Feet

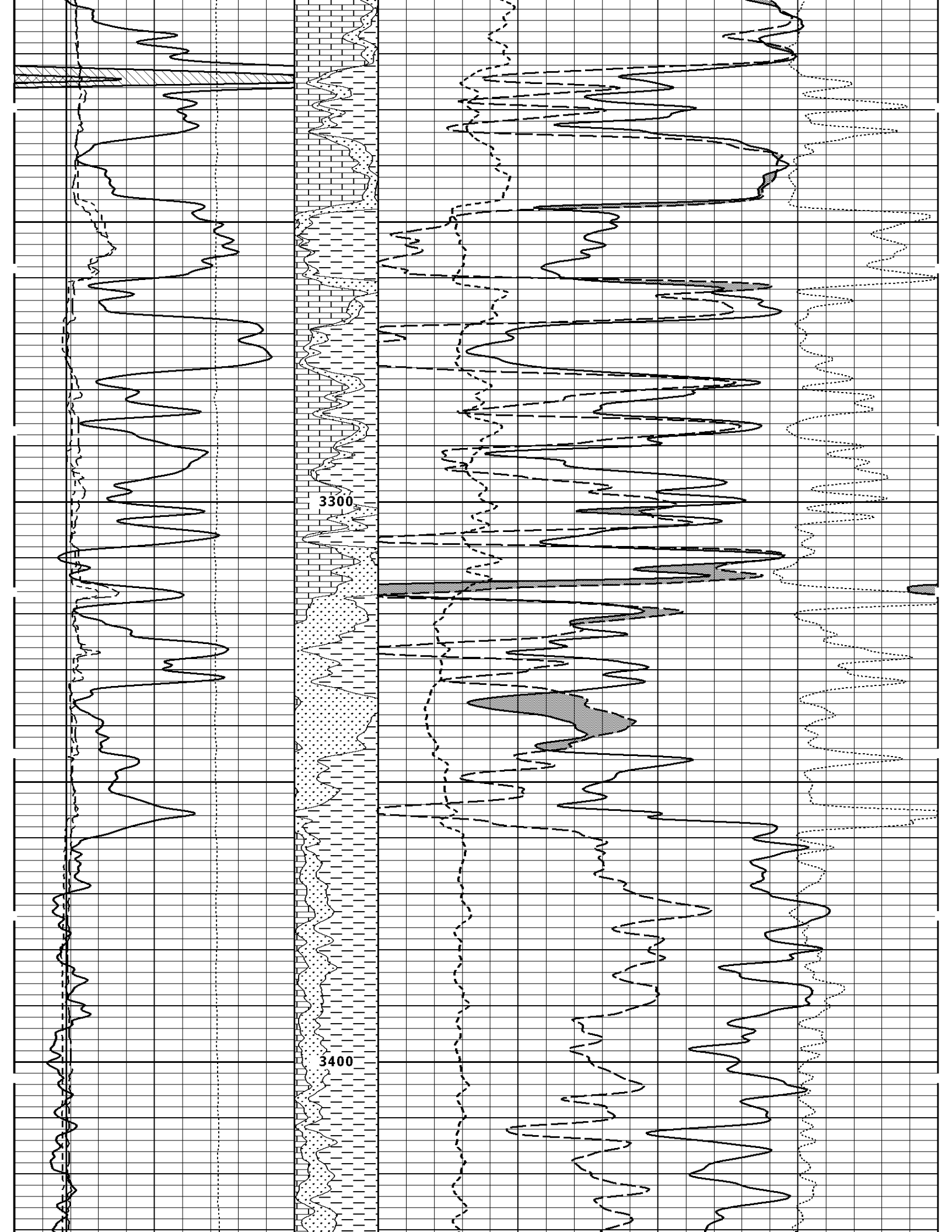
Matrix Density	2.71	g/cc
Fluid Density	1.00	g/cc
Formation Matrix	Limestone	
Drill Bit Size	7.875	in
Casing Diameter	5.500	in
Casing Thickness	0.250	in
Casing Correction (PHI N)	Disable	

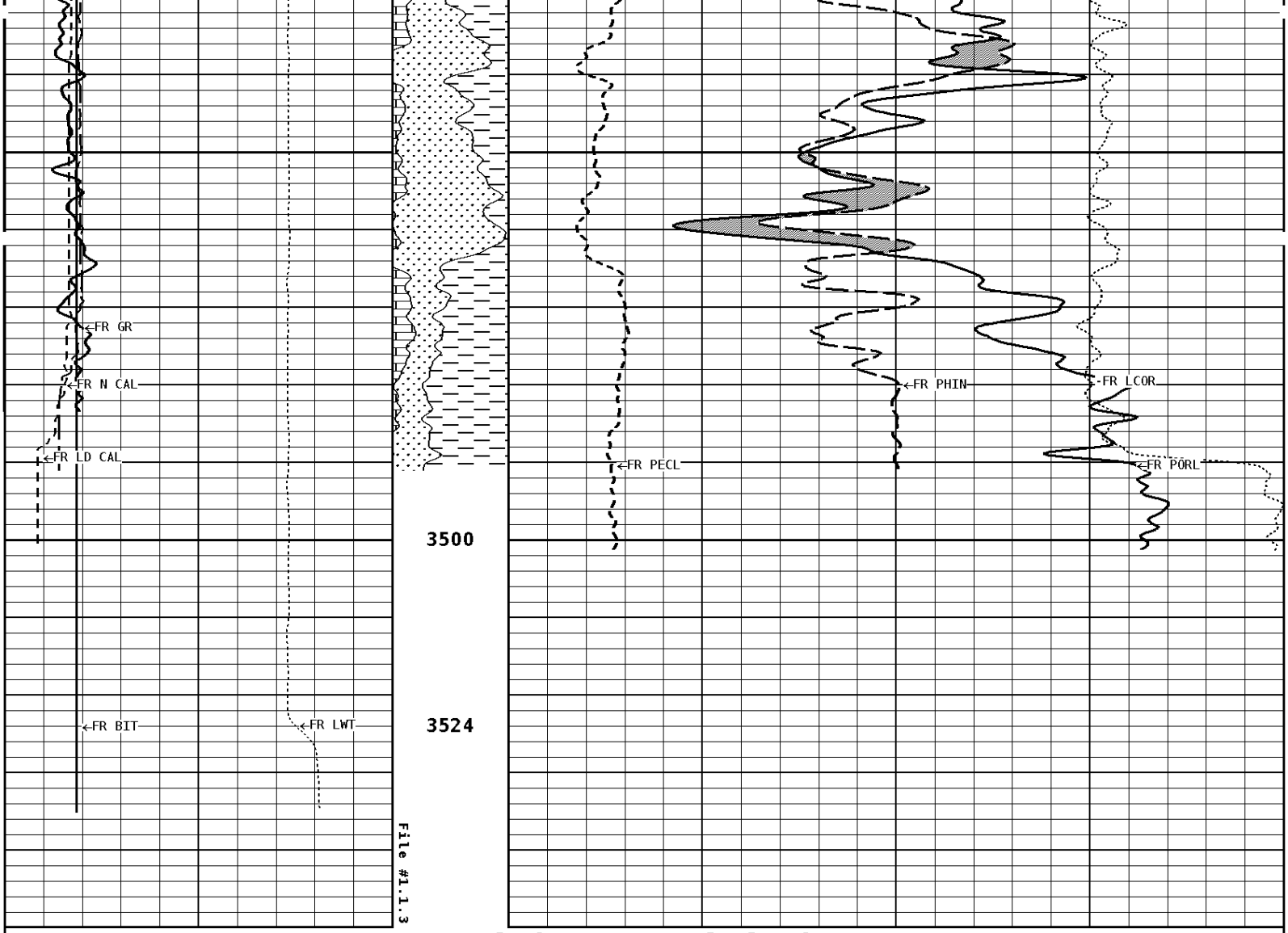
Well File: BEREXCO_HINES_27X_DEC11_MSTK **Scale:** 1:240 **Format:** NLD-240
Segment: V1.D1.S3 Reprocess REPEAT **Acquired:** 2019-12-12 01:07 3.4.1-13968
Reference: 0 **Processed:** 2019-12-12 01:28 3.4.1-13968



1:240 REPEAT SECTION




3300
3400



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 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)
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 Thickness	0.250	in
Casing Correction (PHI N)	Disable	

Well File: BEREXCO_HINES_27X_DEC11_MSTK **Scale:** 1:240 **Format:** LDT-240
Segment: V1.D1.S5 Reprocess MAIN **Acquired:** 2019-12/12 01:40 3.4.1-13968
Reference: 0 **Processed:** 2019-12/12 02:53 3.4.1-13968

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

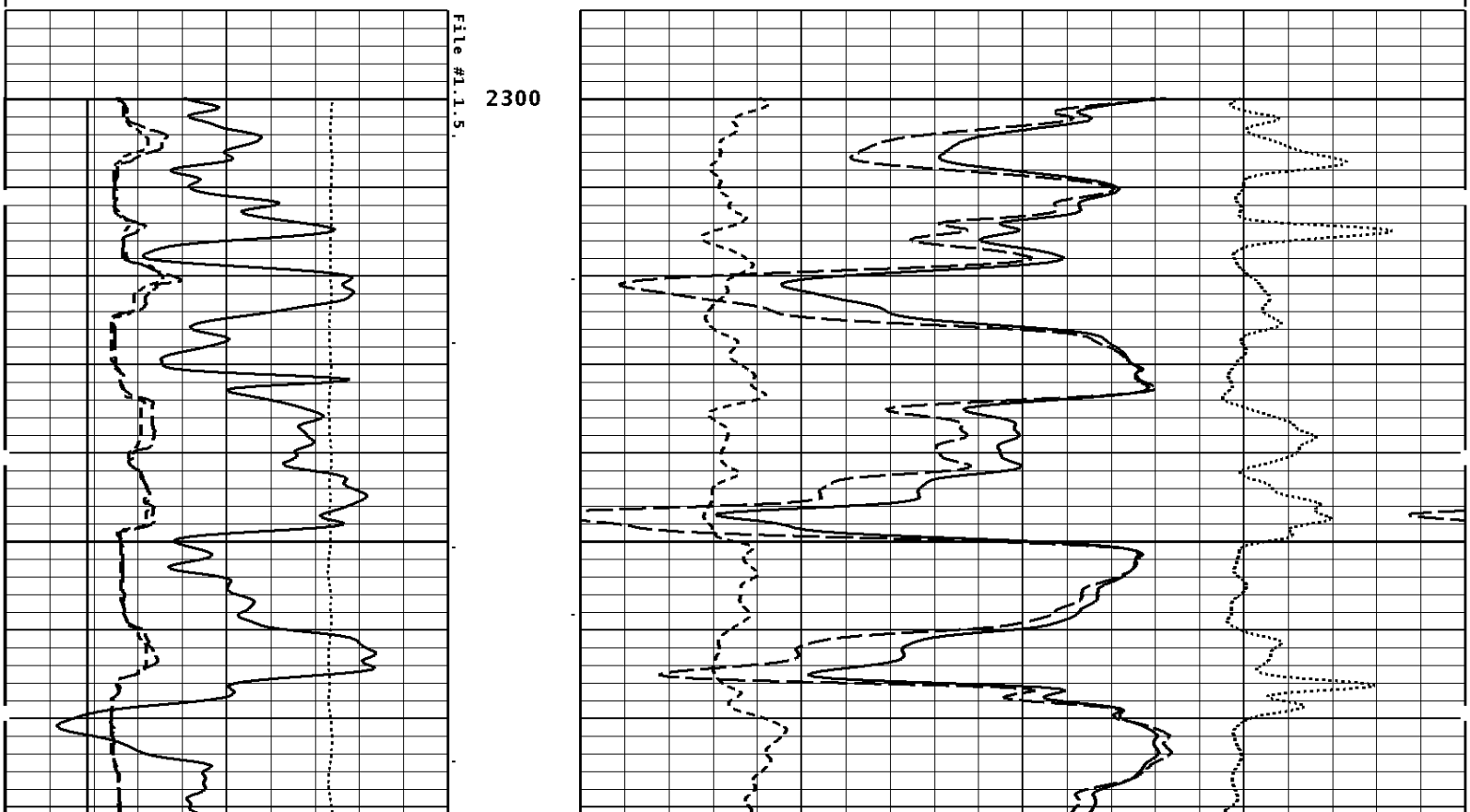
COMPENSATED BULK DENSITY
G/CC
3.0 — 4.0
2.0 — 3.0
1.0 — 2.0

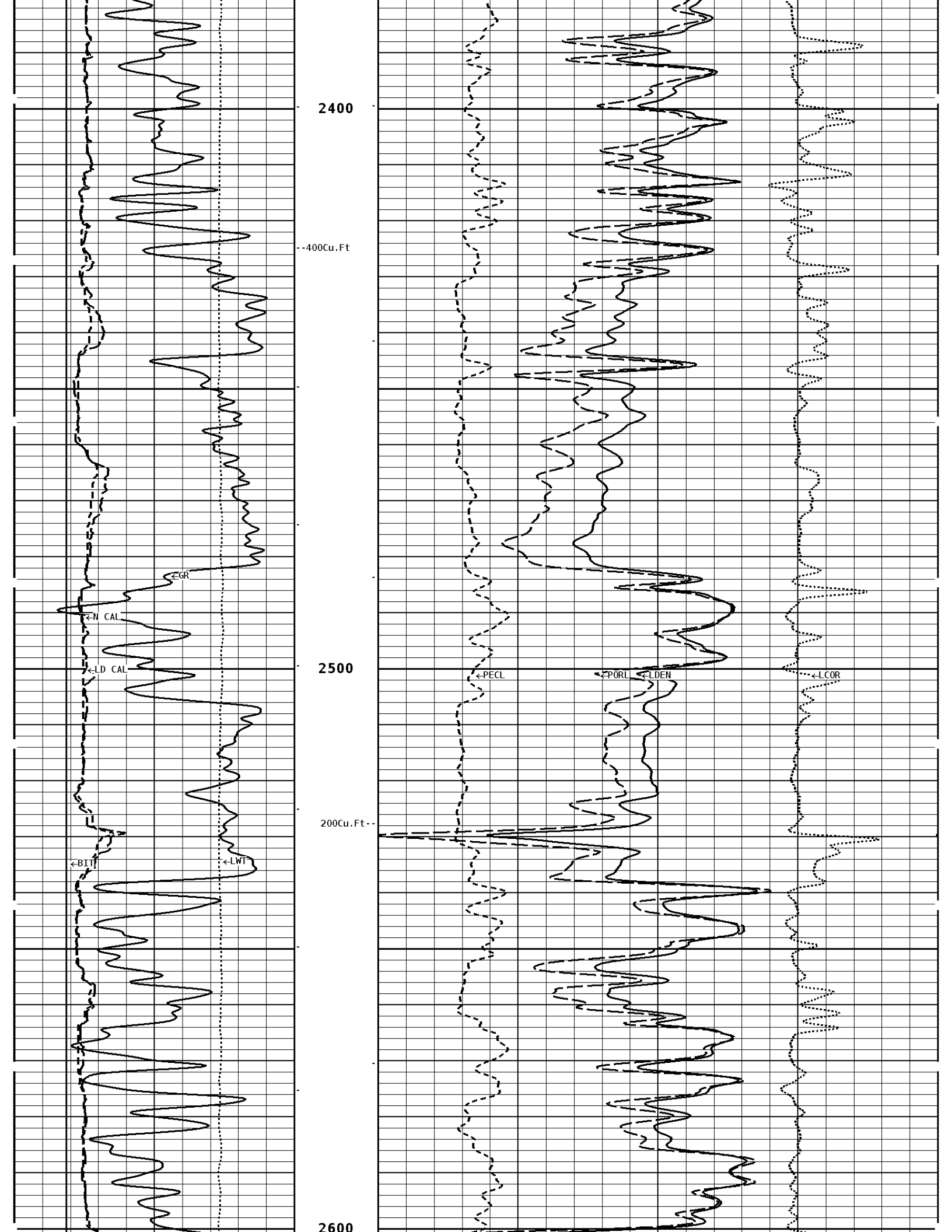
GAMMA RAY
API UNITS
150 — 300
0 — 150

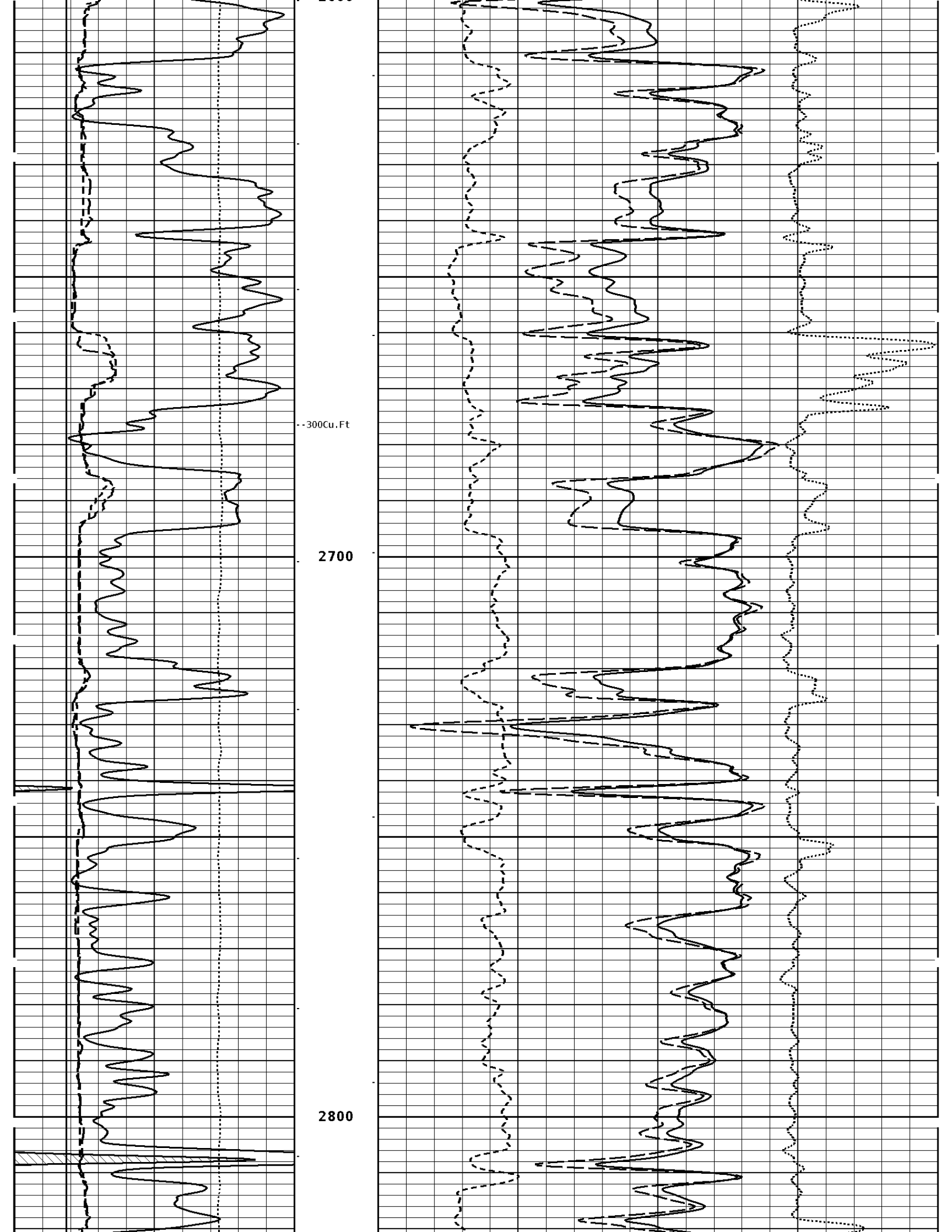
-BHV AHV-
CU.FT

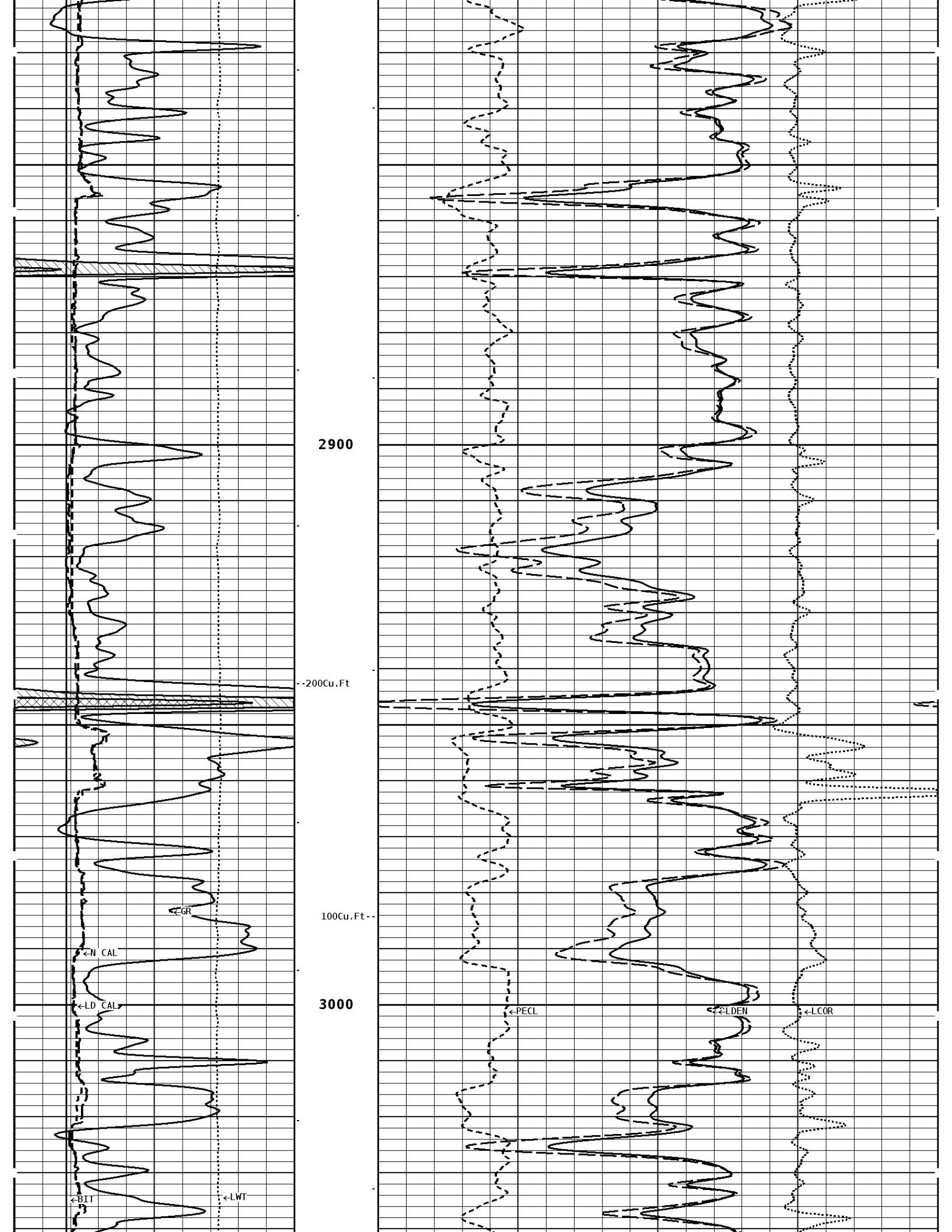
DENSITY POROSITY (2.71g/cc)
PERCENT
70 — 30
30 — -10
-10 — -50

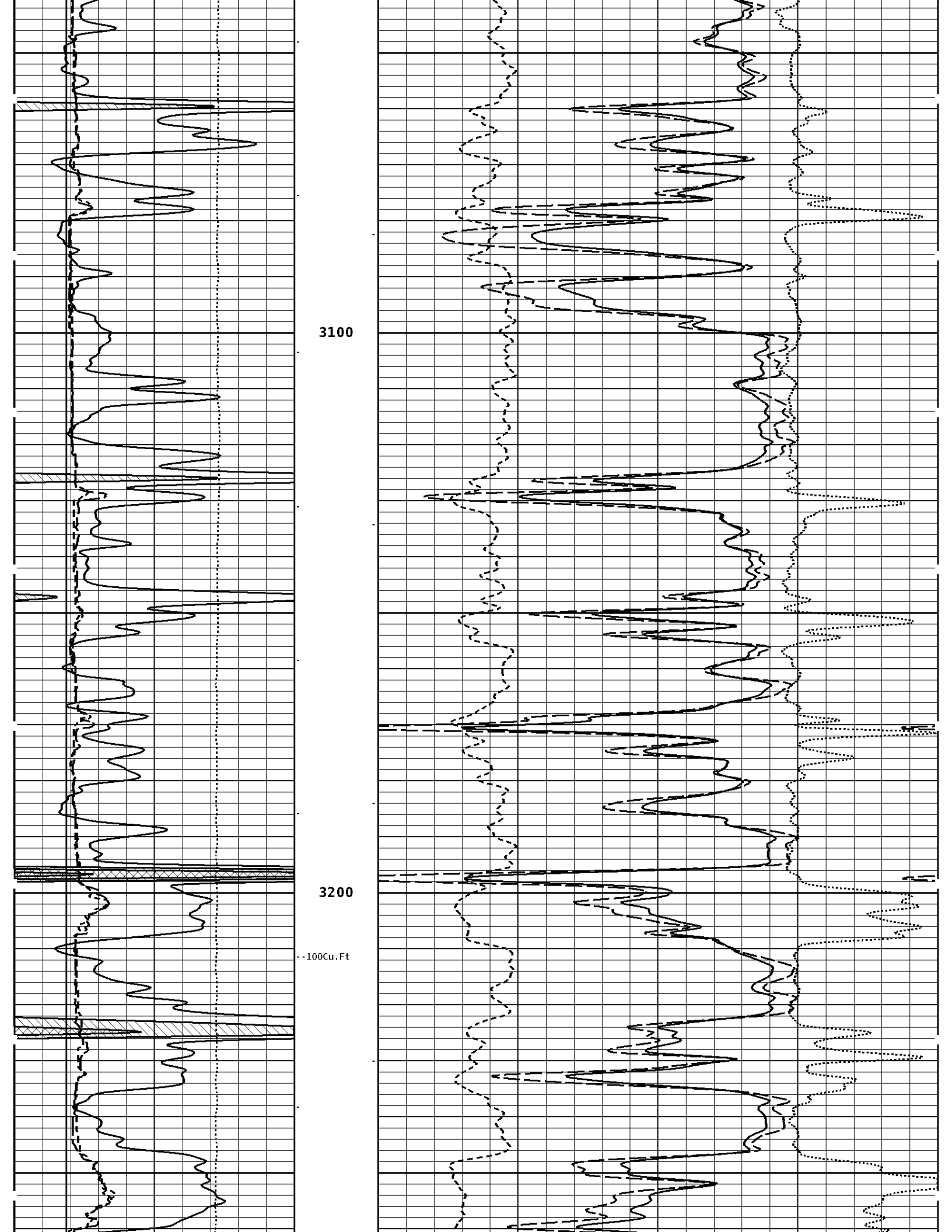
1:240 MAIN SECTION
BULK DENSITY

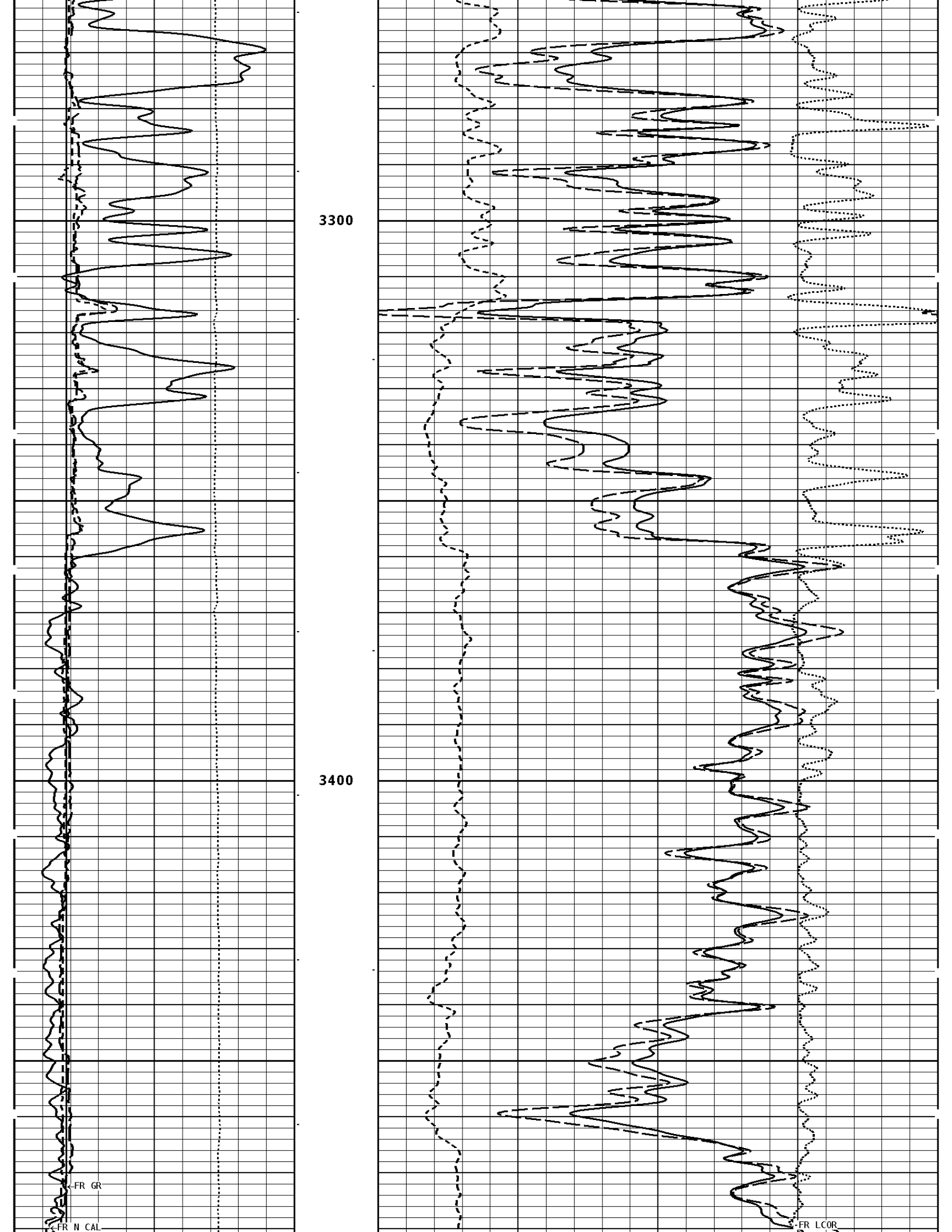


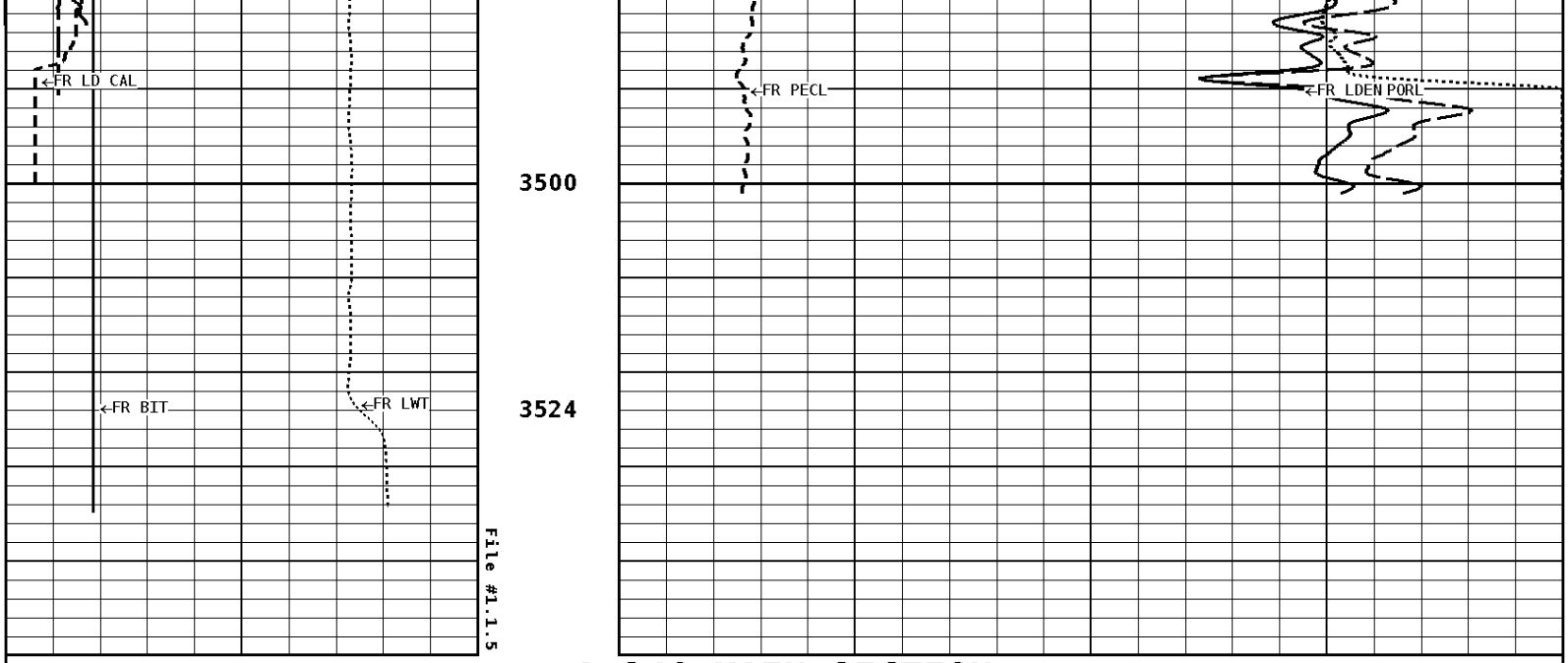

2400
--400Cu.Ft
←GR
←N CAL
←LD CAL
2500
←PECL
←PORL
←LDEN
←LCOR
200Cu.Ft--
←BIT
←LWT
2600


300Cu.Ft
2700
2800


2900
--200Cu.Ft
100Cu.Ft--
←GR
←N CAL
←LD CAL
3000
←PECL
←LDEN
←LCOR
←BIT
←LWT


3100
3200
--100Cu.Ft


3300
3400
FR GR
FR N CAL
FR LCOR



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 : 01-NOV-2019 Time : 10:40
Sensor Suite : GR-GR5 ID : GRT-BA-14

	Measured	Units	Calibrated	Units
Background		cts		cts

	Background	Jig		Jig	
GR	64	323	CPS	160	GRAPI

Shop Calibration
CNT-AA

Performed : 03-DEC-2019 Time : 11:33
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.

Performed : 03-Dec-2019 Time : 11:39
Sensor Suite : BHC NEUT ID : CNP-AA-115
Source ID : N-1044

	Tank		Verification	Units
	Measured	Calibrated	Jig	
N/F	4.1393	3.6893	3.6925	
Porosity	28.0	20.5	20.5	%

Shop Calibration
LDT-DA

Performed : 03-DEC-2019 Time : 10:18
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.

Performed : 03-Dec-2019 Time : 10:54
Sensor Suite : BHCPELNG ID : LDP-DA-50
Source ID : 63558B

Short Space

	BKGD	Al	Mg	Al+Fe	Units
LSW1	63	1147	1838	747	CPS
LSW2	66	1389	2195	998	CPS
LSW3	248	3272	5264	2766	CPS
LSW4	307	2979	4276	2607	CPS
LSW5	28	55	64	54	CPS
LSW6	81	87	88	87	CPS
LSW7	52	57	56	57	CPS
LSW8	2	4	6	4	CPS
QS	0.220	0.208	0.225	0.205	
PES			2.778	5.967	
SSDN		2.600	1.680		G/CC

Long Space

	BKGD	Al	Mg	Al+Fe	Units
LLW1	90	1296	5278	791	CPS
LLW2	99	2332	9117	1702	CPS
LLW3	383	4320	16398	3702	CPS
LLW4	497	2030	6610	1824	CPS
LLW5	58	70	131	67	CPS
LLW6	151	147	139	147	CPS
LLW7	102	97	94	98	CPS
LLW8	5	7	20	7	CPS
QL	0.194	0.204	0.189	0.199	
PEL			2.697	5.458	
LSDN		2.600	1.680		G/CC

STEP energy services

Company: BEREXCO LLC
Well: HINES UNIT #27X
Location: 2010' FSL & 1320' FEL
Logged: 12-11-2019
K.B. Elev: 1876.0 Ft