Tucker ENERGY SERVICES

COMPENSATED NEUTRON

PEL DENSITY LOG

Company PICKRELL DRILLING CO, INC.
Well COYKENDALL #10
Field SPIVEY-GRABS-BASIL
County KINGMAN
State KANSAS
Country USA
API No. 15-095-22267-00-00

File No : TUL-58233
Company : PICKRELL DRILLING CO, INC.
Well : COYKENDALL #10
Field : SPIVEY-GRABS-BASIL
County : KINGMAN
State : KANSAS
Country : USA
API No : 15-095-22267-00-00

Location :
1980' FSL & 760' FEL
100' W OF NE SE

LSD : **Sect :** 36 **Twp :** 29S **Rge :** 07W

Permanent Datum:	GL		**Elevations:**			**Services:**	
Drilling Measured From:	KB		**KB**	1469.00	Ft	GRT	MLT
Log Measured From:	KB		**DF**	1468.00	Ft	CNT	PIT
Above Permanent Datum:	10.00	Ft	**GL**	1459.00	Ft	LDT	

Date	2013-01-31							
Run Number	1							
Depth--Driller	4220.0	Ft						
Depth--Logger	4218.0	Ft						
First Reading	2185.0	Ft						
Last Reading	2800.0	Ft						
Casing--Driller	223.0	Ft						
Casing--Logger	223.0	Ft						
Bit Size	7.875	In						
Casing Size	8.625	In						
Hole Fluid Type	WBM							
Density	9.2	LBS/GAL						
Fluid Loss	9.0	CC						
PH/Viscosity	10.0	53.0 SEC						
Sample Source	MEASURED							
RM@Measured Temp.	1.100	@ 65 F						
RMF@Measured Temp	0.940	@ 65 F						
RMC@Measured Temp.	1.270	@ 65 F						
Source RMF/RMC	CALCULATED	CALCULATED						
RM@BHT	0.690	@ 108 F						
Time Circulation Stopped								
Max Recorded Temp.	108	F						
Equipment/Base	TRK 123	TULSA						
Recorded By	Z. HICKMAN							
Witnessed By	R. STOLZLE							

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.

Casing Strings

Size (In)	Weight (Lbs)	Bottom (Ft)
8.625	24.00	223.00

Bitsize Intervals

Size (In)	Bottom (Ft)
7.875	4220.00

Run Number	1	
Date	2013-01-31	
Date/Time On Bottom	2013-01-31 16:00	
Depth to Fluid	0.0	Ft
Salinity	0.000	PPM
RMF@BHT	0.580 @ 108	F
RMC@BHT	0.790 @ 108	F

Run Number 1

Comments

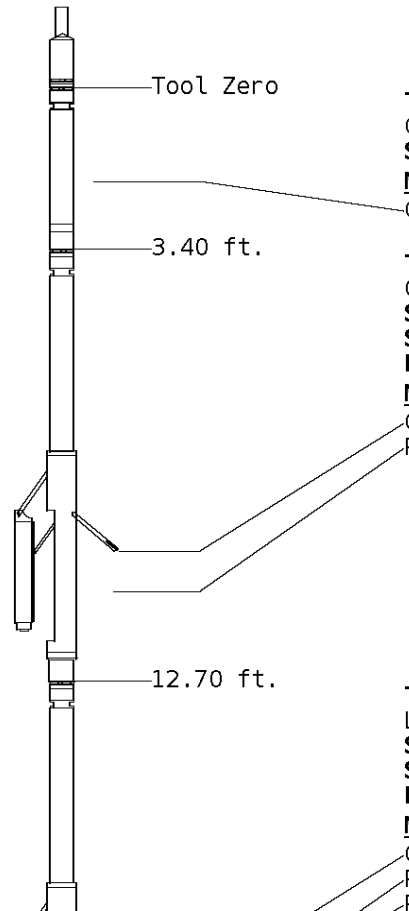
ALL PRESENTATIONS AS PER CUSTOMER REQUEST.
GRT, CNT, LDT, MLT, AND PIT RUN IN COMBINATION.
CALIPERS ORIENTED ON X-Y AXIS.
2.71 G/CC USED TO CALCULATED POROSITY.
ANNULAR HOLE VOLUME CALCULATED USING 5.50" PRODUCTION CASING.
PHIN IS CALIPER CORRECTED
DETAIL PULLED FROM TD TO 2800'

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

OPERATORS:
D. HOPPER
M. RUBY

Tool String Schematic

Total Tool Length - 53.57 **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-BC-41

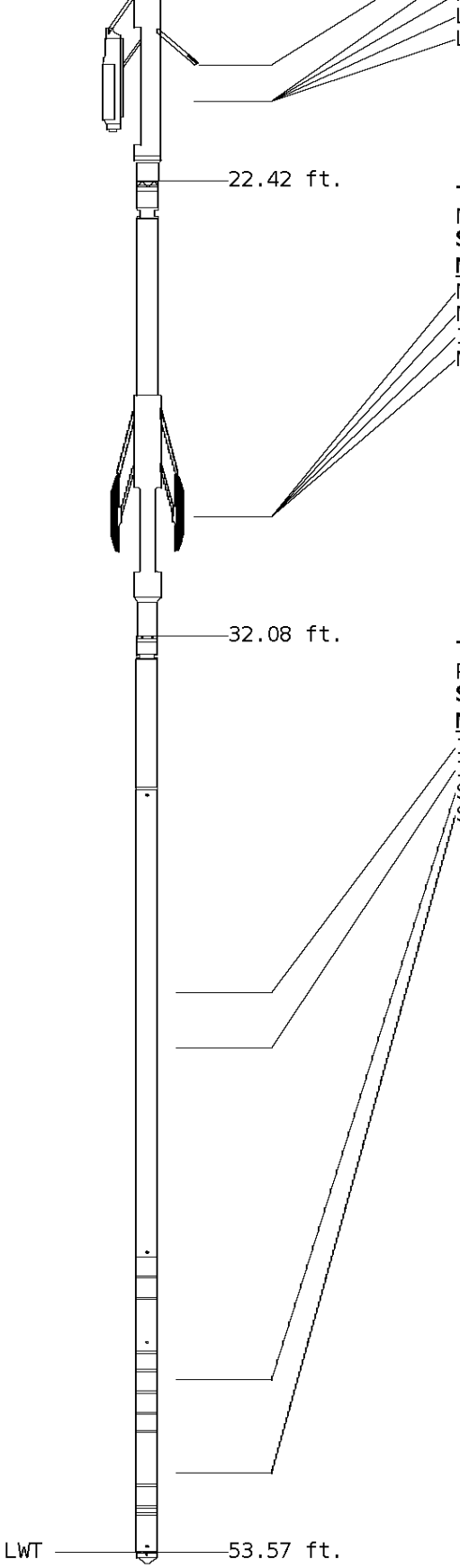
Measure Point	Tool Offset	Stack Offset	Bottom Offset
GRP	2.00	2.00	51.57

Tool: CNT-AA **Length:** 9.30 **ft.** **O.D.** 4.36 **in.**
Compensated Neutron A Pad on NDT-A
Sonde ID :NDT-BD-123
Source ID :N-1045
Pad ID :CNP-AA-024

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLCN	6.00	9.40	44.17
PHIN	6.80	10.20	43.37

Tool: LDT-DF **Length:** 9.72 **ft.** **O.D.** 4.80 **in.**
Litho Density D Pad on NDT-F
Sonde ID :PDT-GA-466
Source ID :2991GW
Pad ID :LDP-DA-066

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLLD	6.42	19.12	34.45
PEL	7.42	20.12	33.45
PES	7.82	20.52	33.05



LDEN	7.62	20.32	33.25
LCOR	7.62	20.32	33.25

Tool: MST-DA **Length:** 9.66 **ft.** **O.D.** 6.00 **in.**
Micro Spherically Focused (IC)
Sonde ID :MST-DA-36

Measure Point	Tool Offset	Stack Offset	Bottom Offset
MSFL	7.60	30.02	23.55
MSCLP	7.60	30.02	23.55
INV	7.60	30.02	23.55
NOR	7.60	30.02	23.55

Tool: PIT-CA **Length:** 21.49 **ft.** **O.D.** 3.62 **in.**
Phased Dual Induction w/ RM & D
Sonde ID :PIT-AB-005

Measure Point	Tool Offset	Stack Offset	Bottom Offset
ILD	8.92	41.00	12.56
ILM	10.10	42.18	11.39
SFLU	17.49	49.57	4.00
SP	20.60	52.68	0.88

Well File: PICK_COY_10_JAN_31_MSTK **Scale:** 1:240
Segment: V1.D1.S5 MAIN **Acquired:** 2013-01/31 16:33 3.2.0-11401
Reference: 0 **Processed:** 2013-01/31 18:01 3.2.0-11401

BIT SIZE
INCHES (IN)

6 **16**

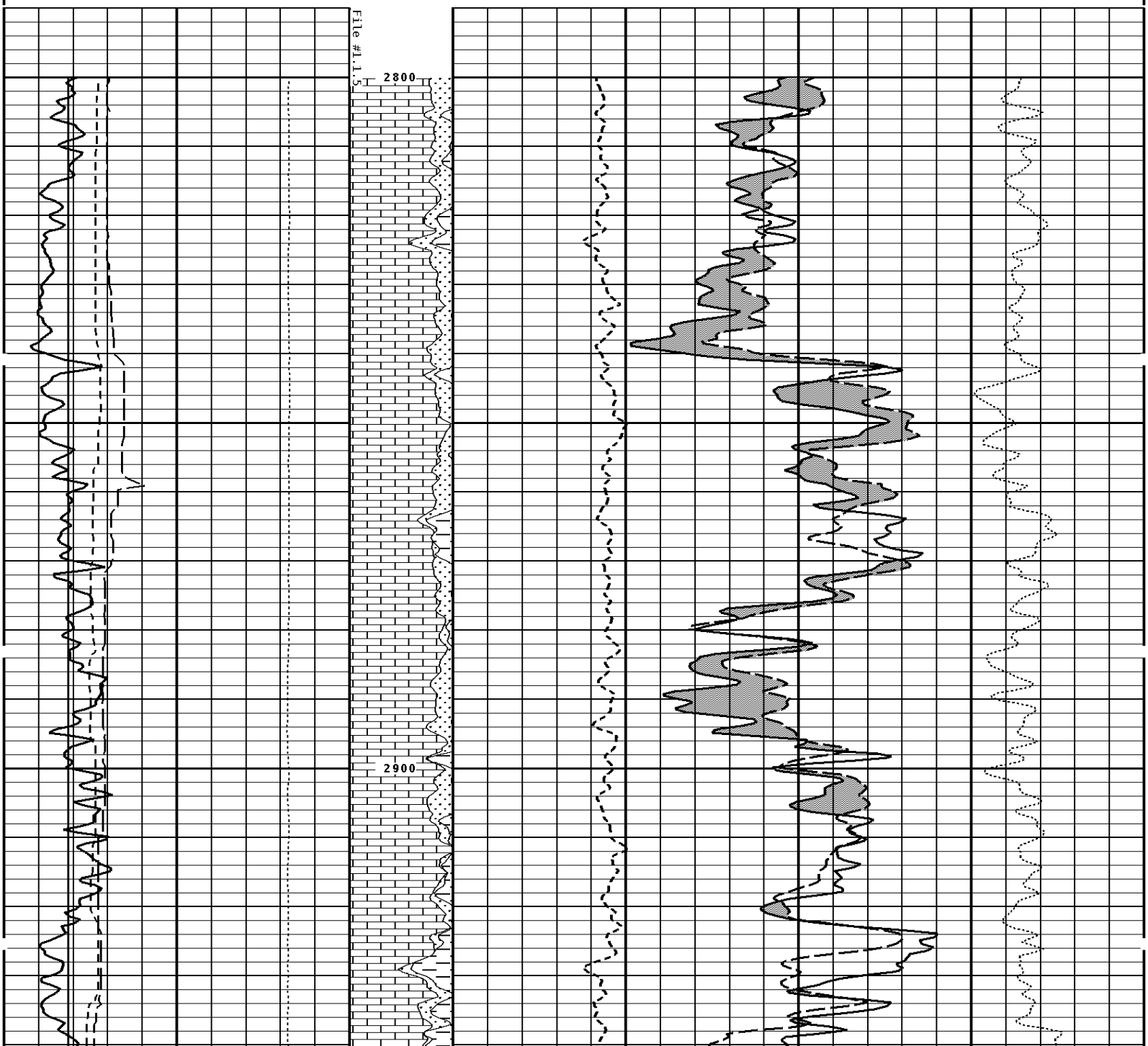
NEUTRON (Y) CALIPER
INCHES (IN)

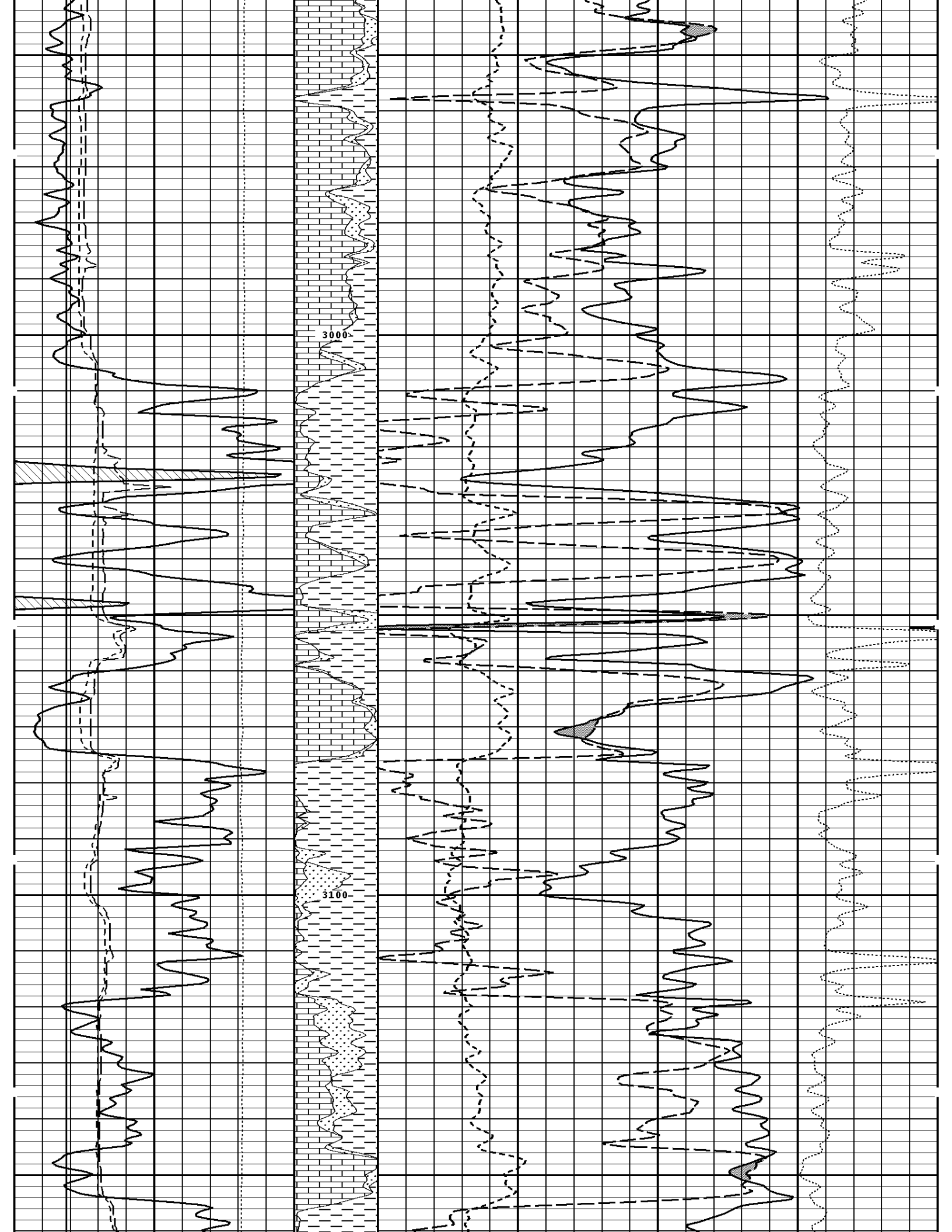
16 **26**

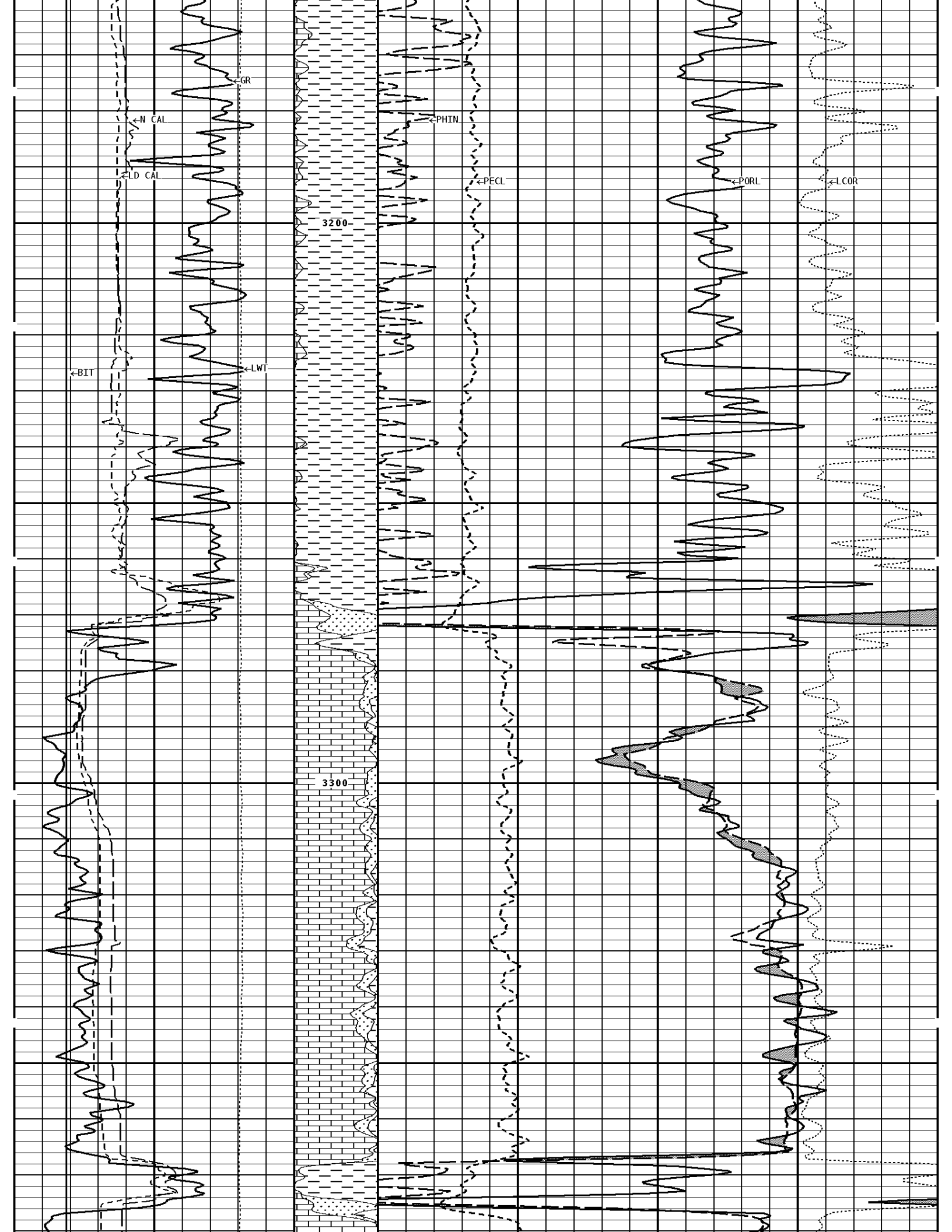
16 26
6 16

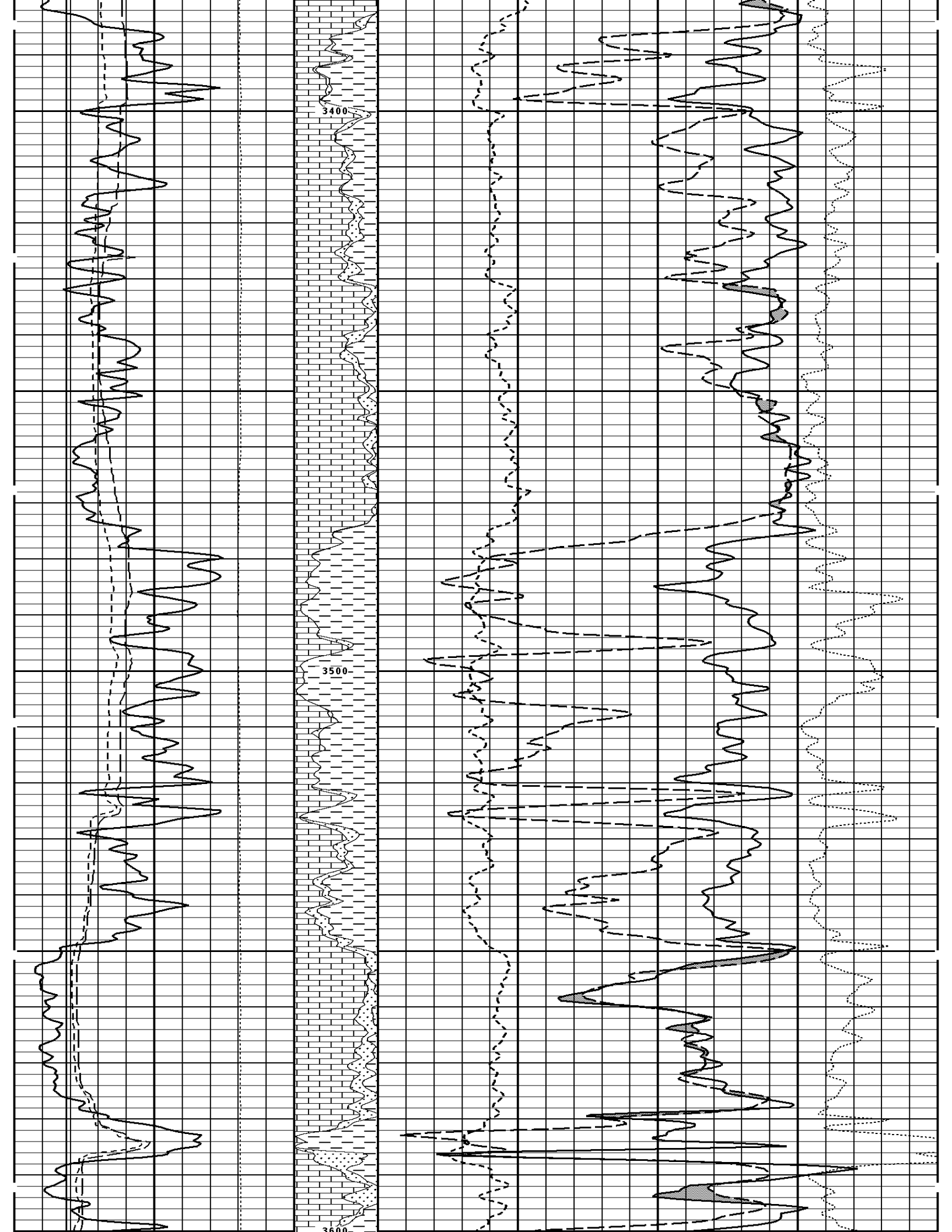
DENSITY (X) CALIPER INCHES (IN)	Volume Quartz	PE CROSS-SECTION BARNS/ELECTRON	DENSITY CORRECTION G/CC
16 26 6 16		0 10	-0.25 0.25
TENSION LBS	Volume Calcite	**DENSITY POROSITY (2.71g/cc) PERCENT**	
10000 0		70 30 30 -10 -10 -50	
GAMMA RAY API UNITS	Volume Dolo/Shale	**NEUTRON POROSITY (LIMESTONE) PERCENT**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

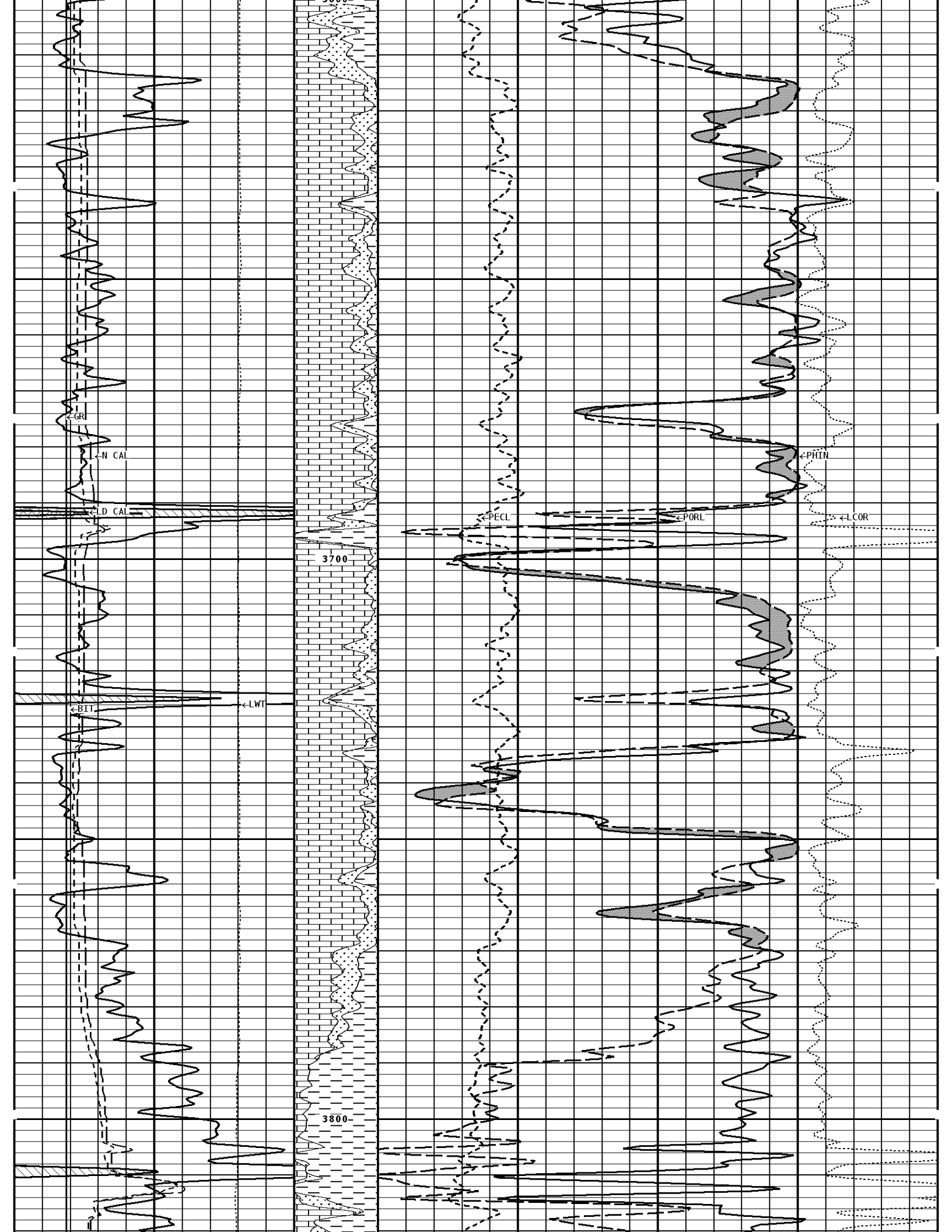
1:240 MAIN SECTION

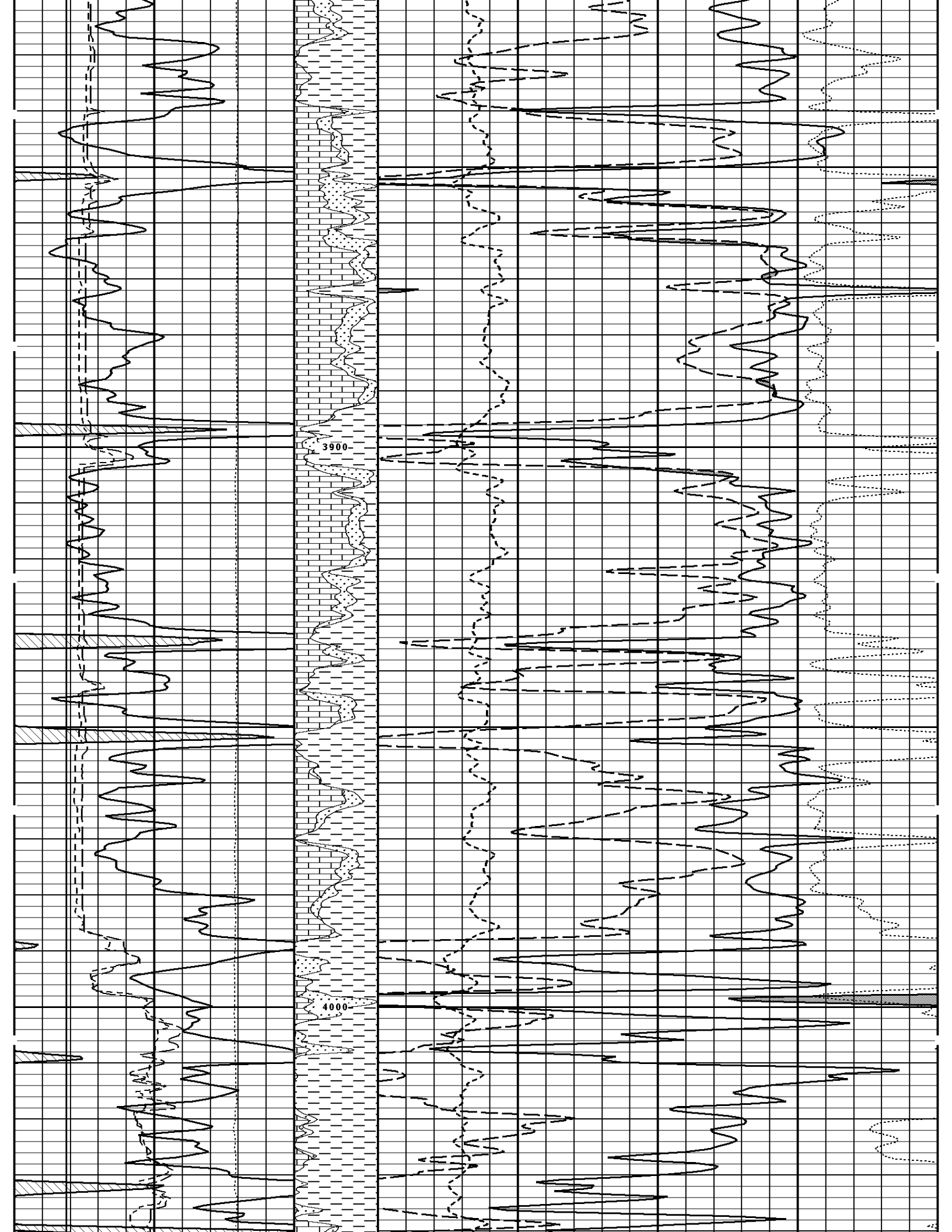


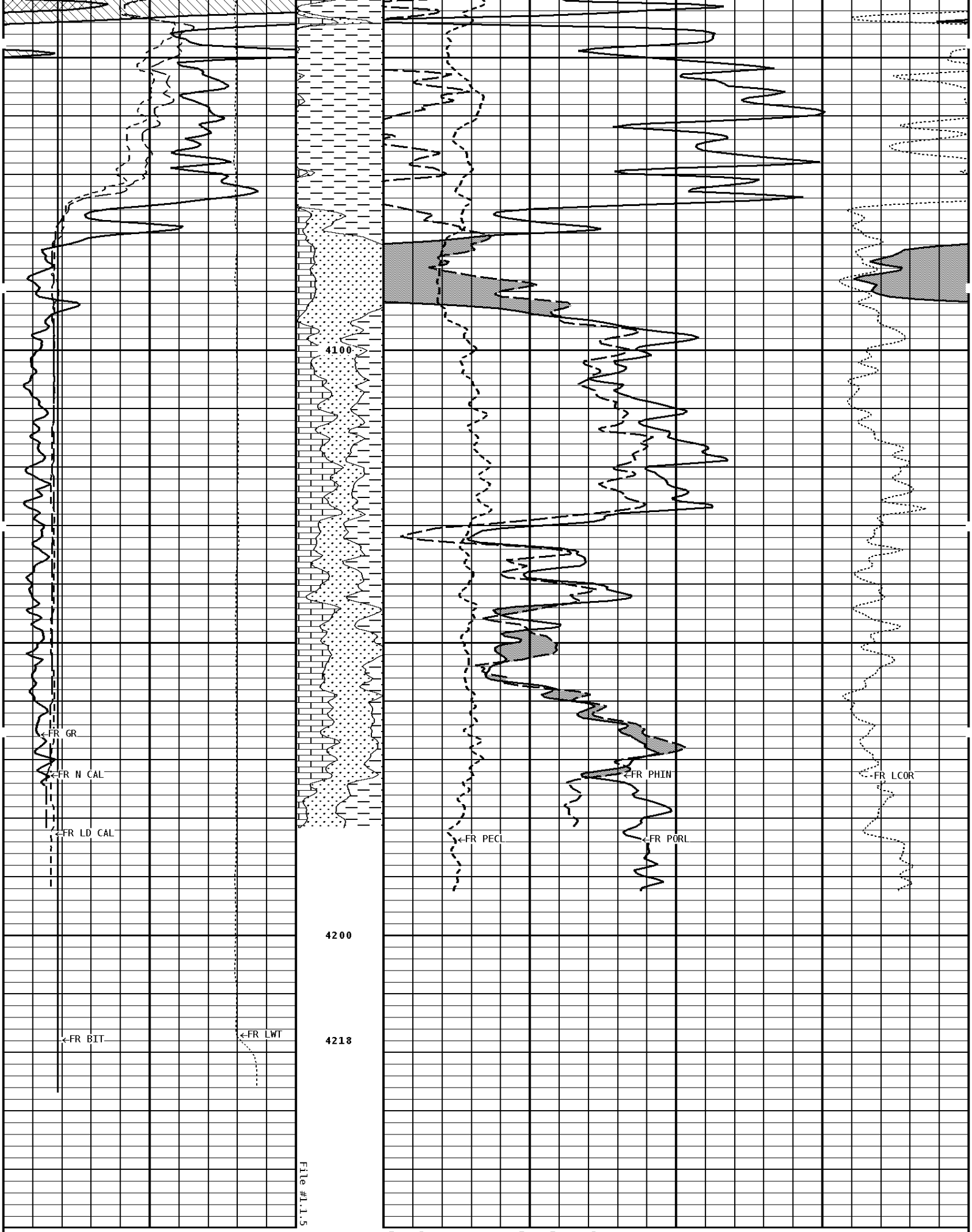

3000
3100


GR
N CAL
LD CAL
BIT
LWT
PHIN
PECL
PORL
LCOR
3200
3300


3400
3500
3600


←GR
←N CAL
←CLD CAL
←BIT
←LWT
3700
3800
←PHIN
←PECL
←PORL
←LCOR


3900
4000



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)
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: PICK_COY_10_JAN_31_MSTK **Scale:** 1:240
Segment: V1.D1.S4 REPEAT **Acquired:** 2013-01/31 16:20 3.2.0-11401
Reference: 0 **Processed:** 2013-01/31 18:01 3.2.0-11401

BIT SIZE INCHES (IN)
6 16

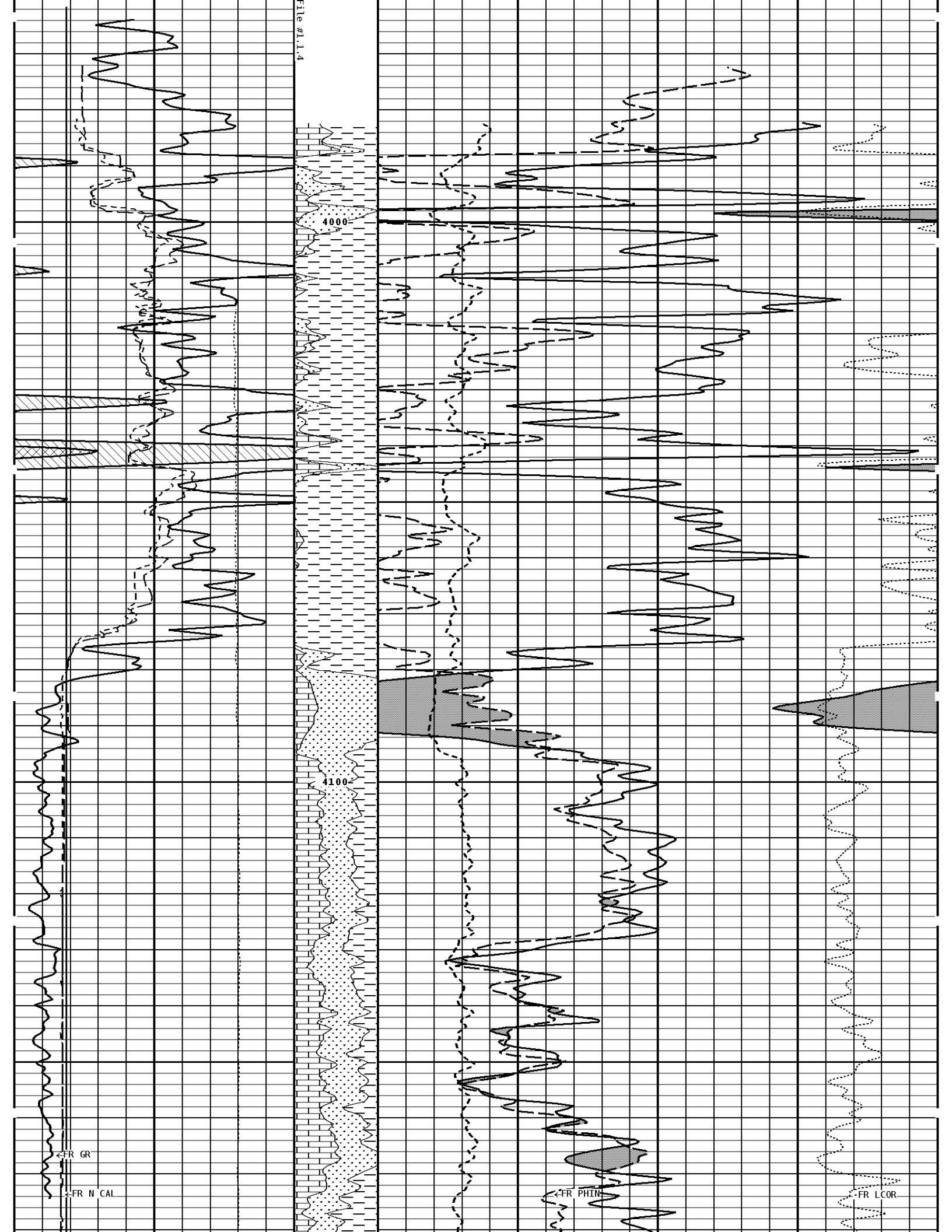
NEUTRON (Y) CALIPER INCHES (IN)
16 26 6 16

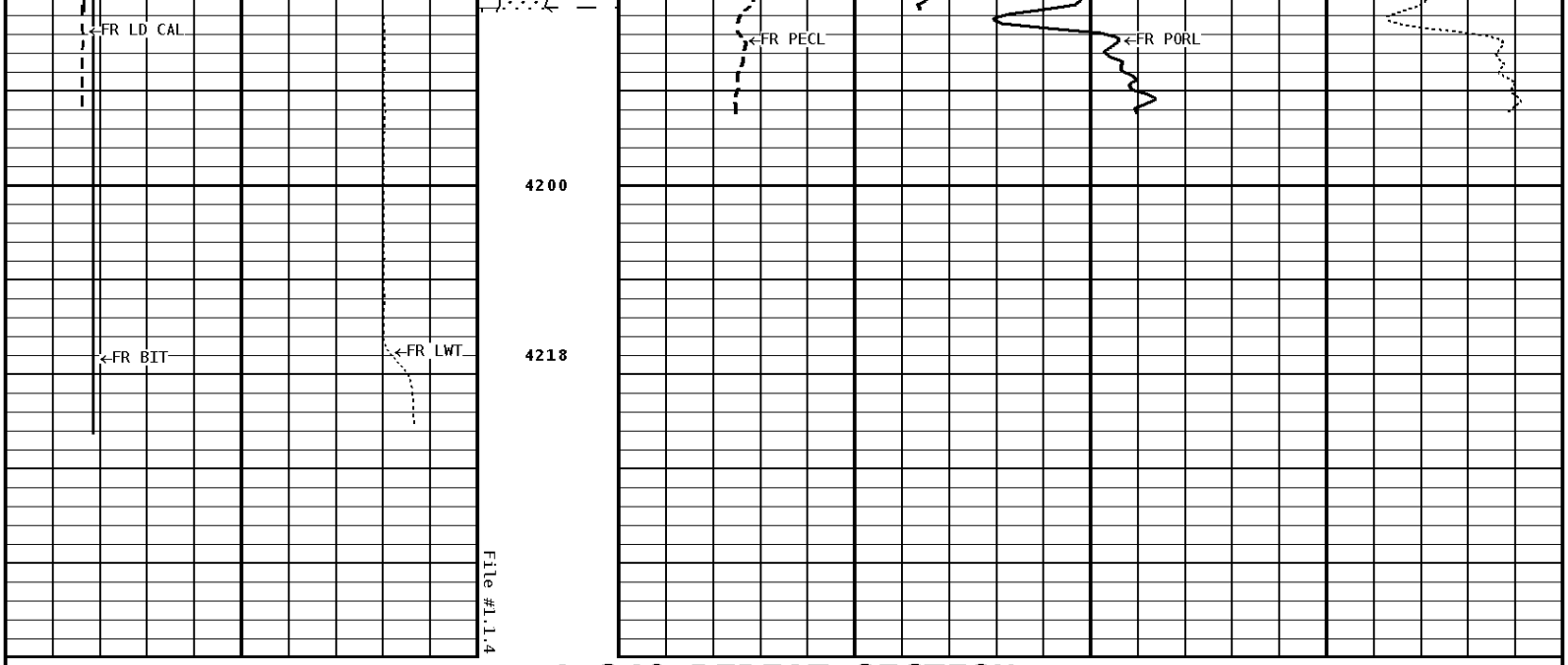
DENSITY (X) CALIPER INCHES (IN)	Volume Quartz	PE CROSS-SECTION BARNS/ELECTRON	DENSITY CORRECTION G/CC
16 26 6 16		0 10	-0.25 0.25

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 REPEAT SECTION


File #1.1.4
4000
4100
←FR GR
←FR N CAL
←FR PHIN
FR LCOR



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: PICK_COY_10_JAN_31_MSTK
Segment: V1.D1.S5 MAIN
Reference: 0

Scale: 1:240
Acquired: 2013-01/31 16:33 3.2.0-11401
Processed: 2013-01/31 18:01 3.2.0-11401

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

-BHV AHV-
CU.FT

PE CROSS-SECTION
BARNS/ELECTRON
0 10

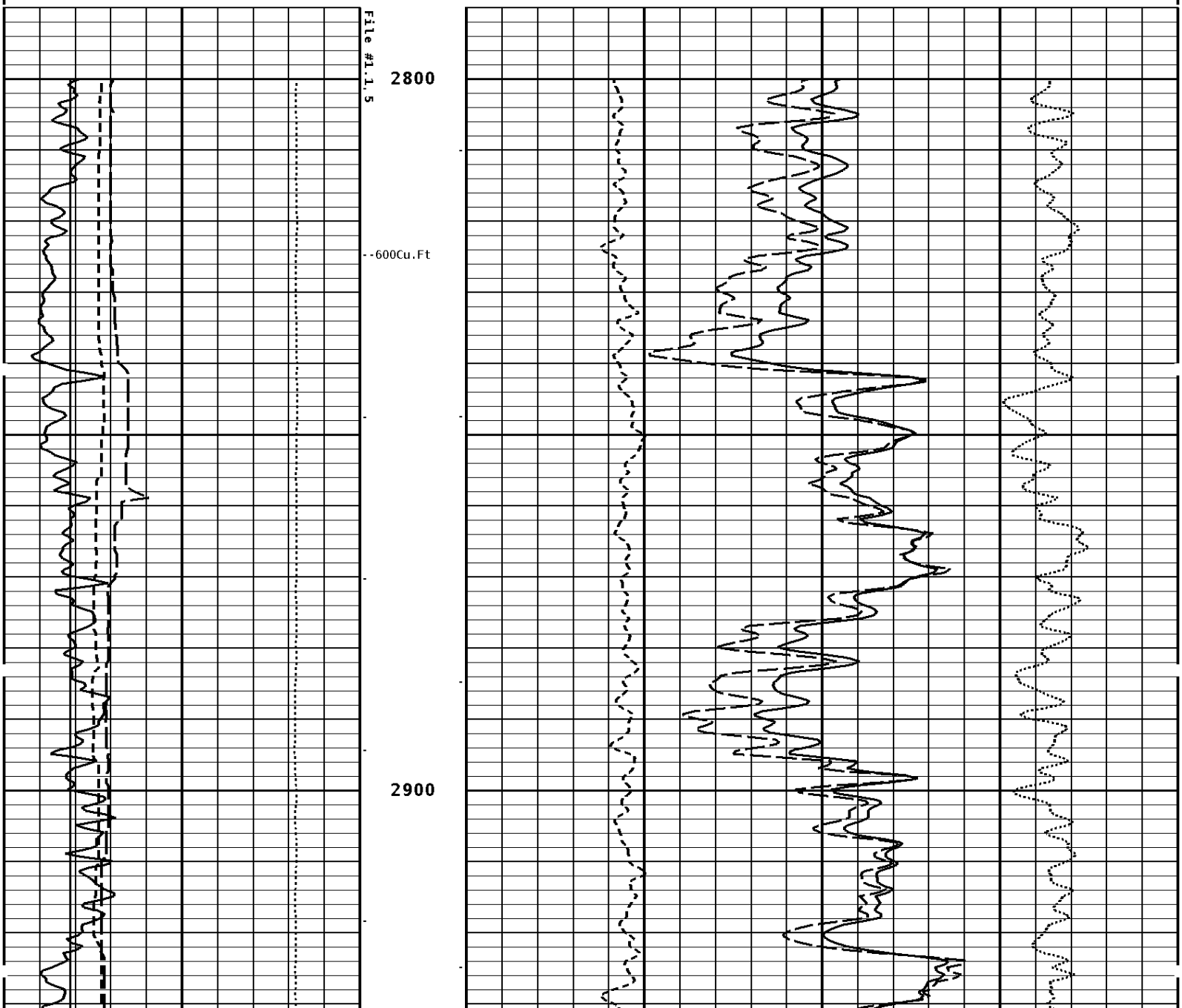
DENSITY CORRECTION
G/CC
-0.25 0.25

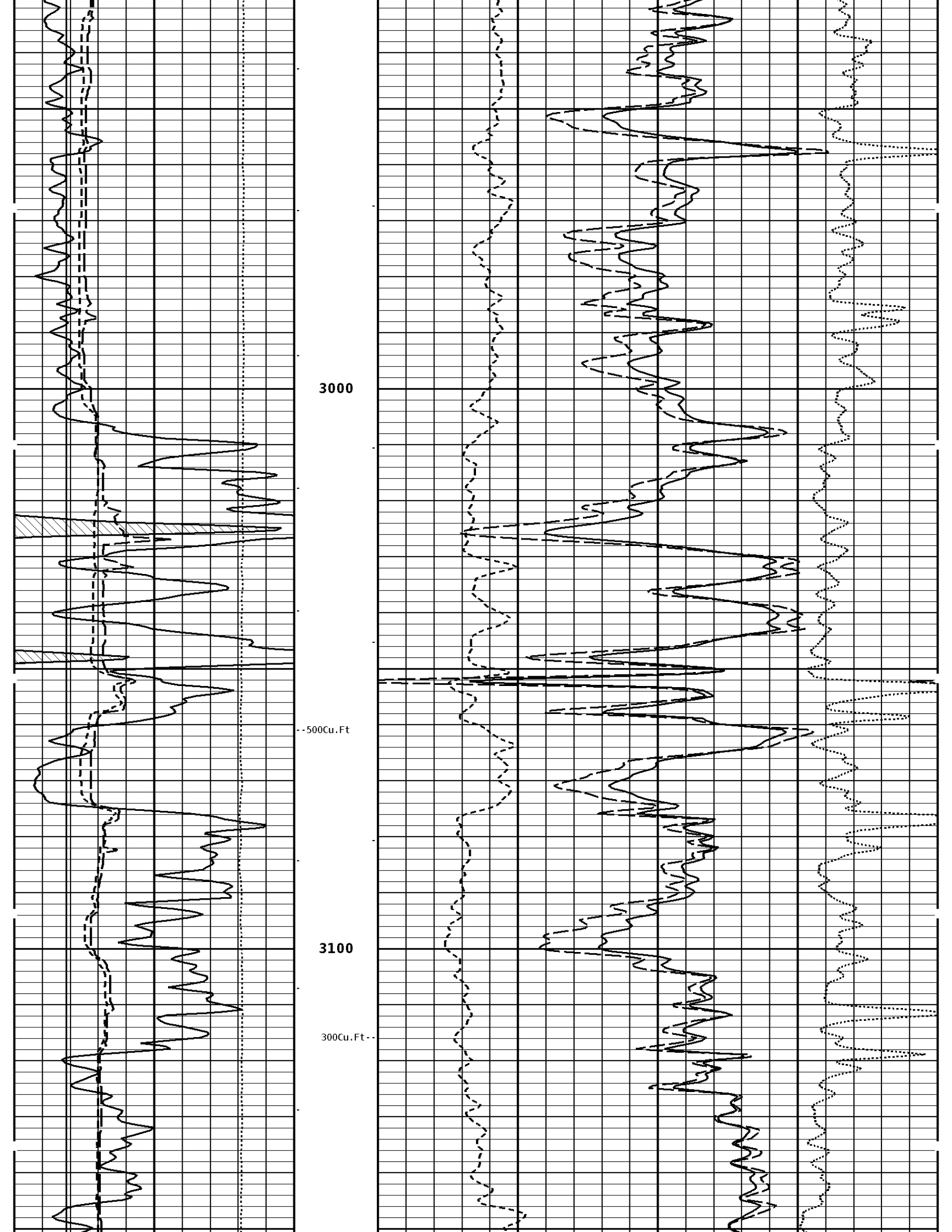
COMPENSATED BULK DENSITY
G/CC
3.0 4.0
2.0 3.0
1.0 2.0

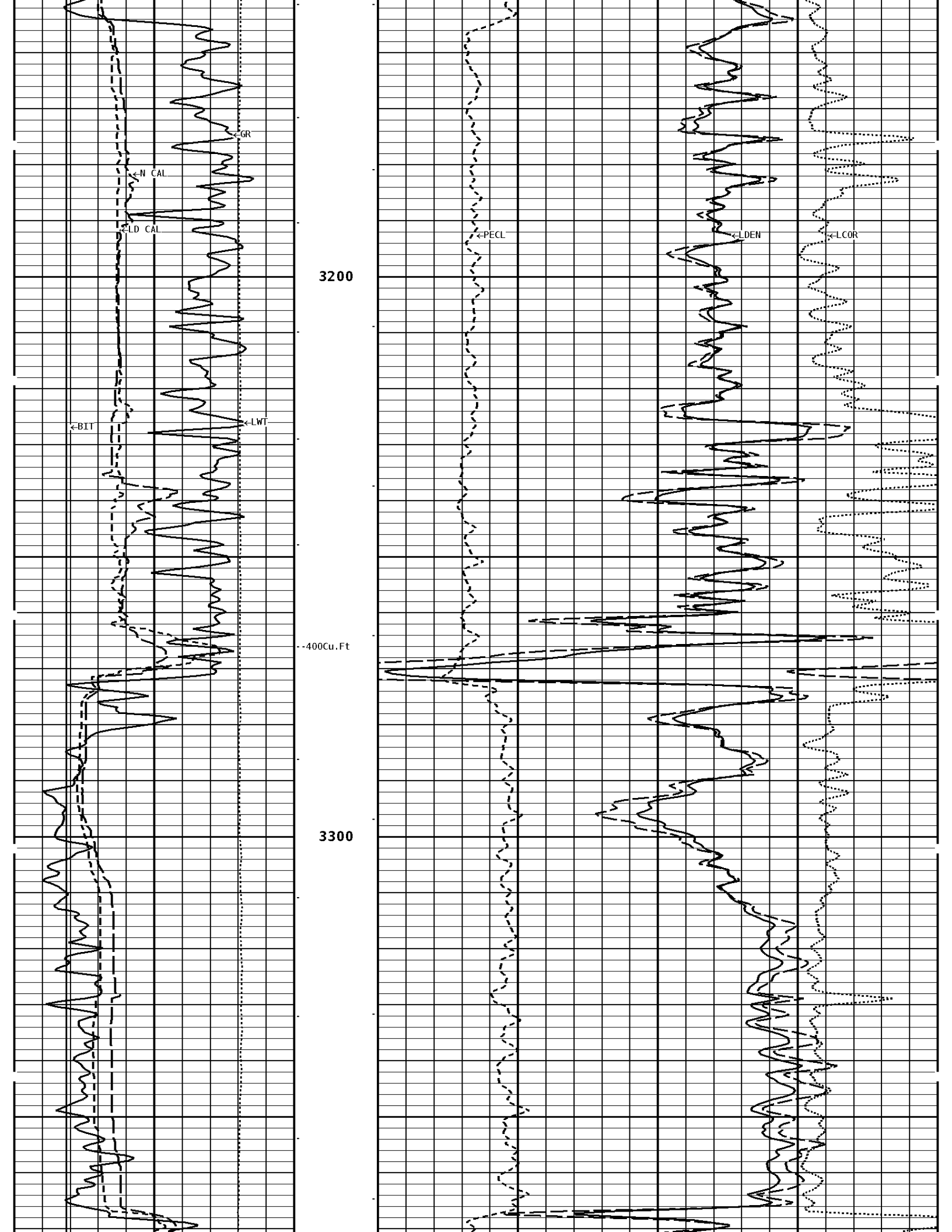
DENSITY POROSITY (2.71g/cc)
PERCENT
70 30
30 -10
-10 -50

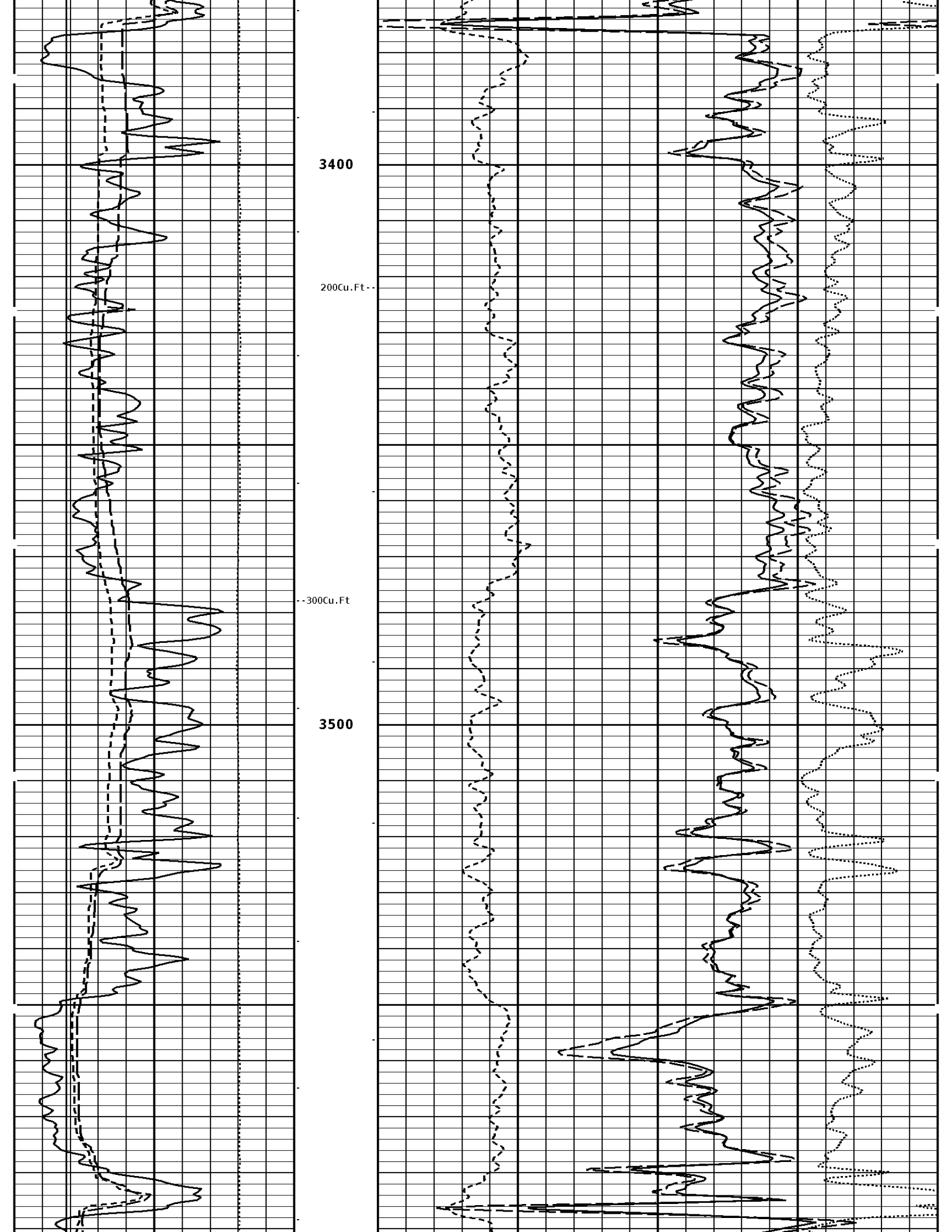
1:240 MAIN SECTION

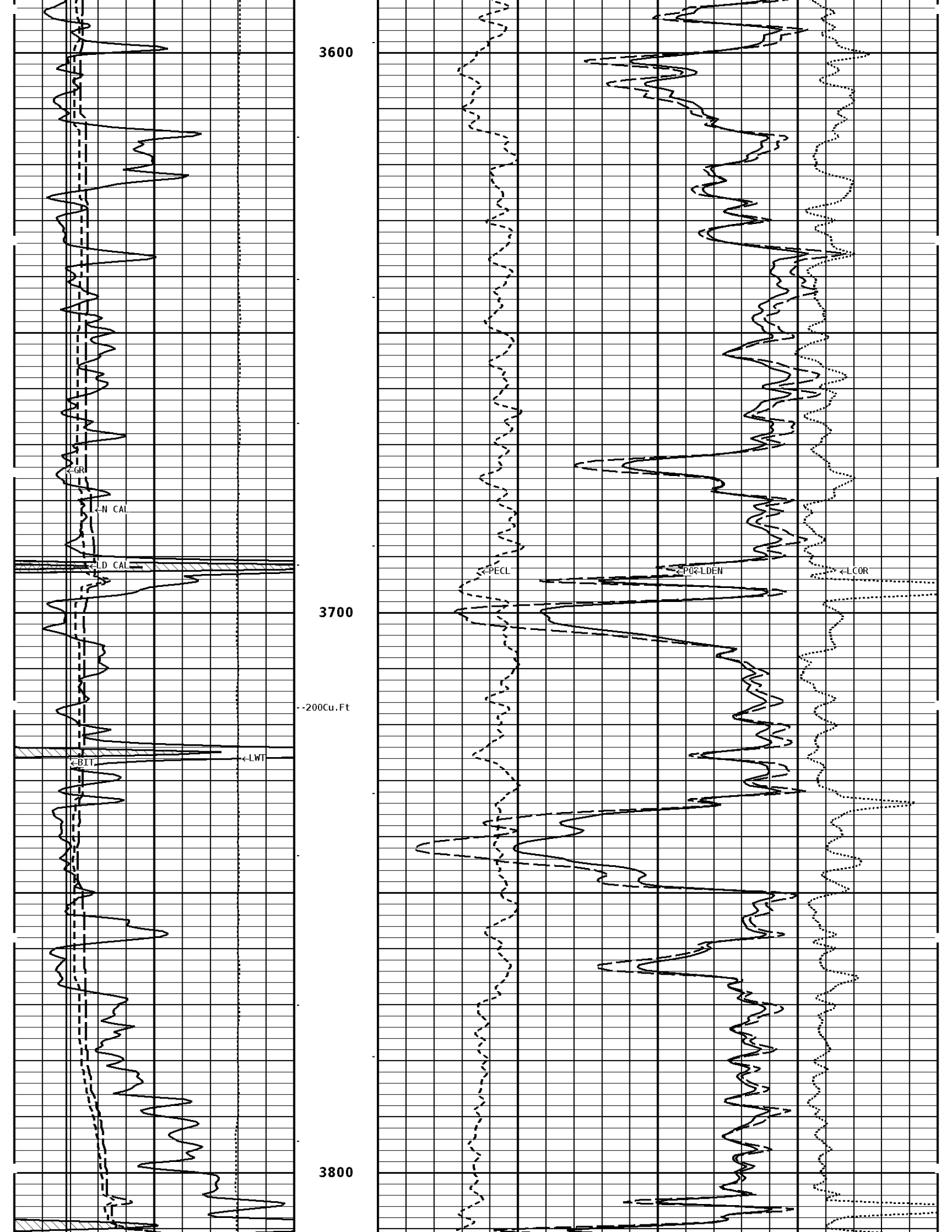
BULK DENSITY

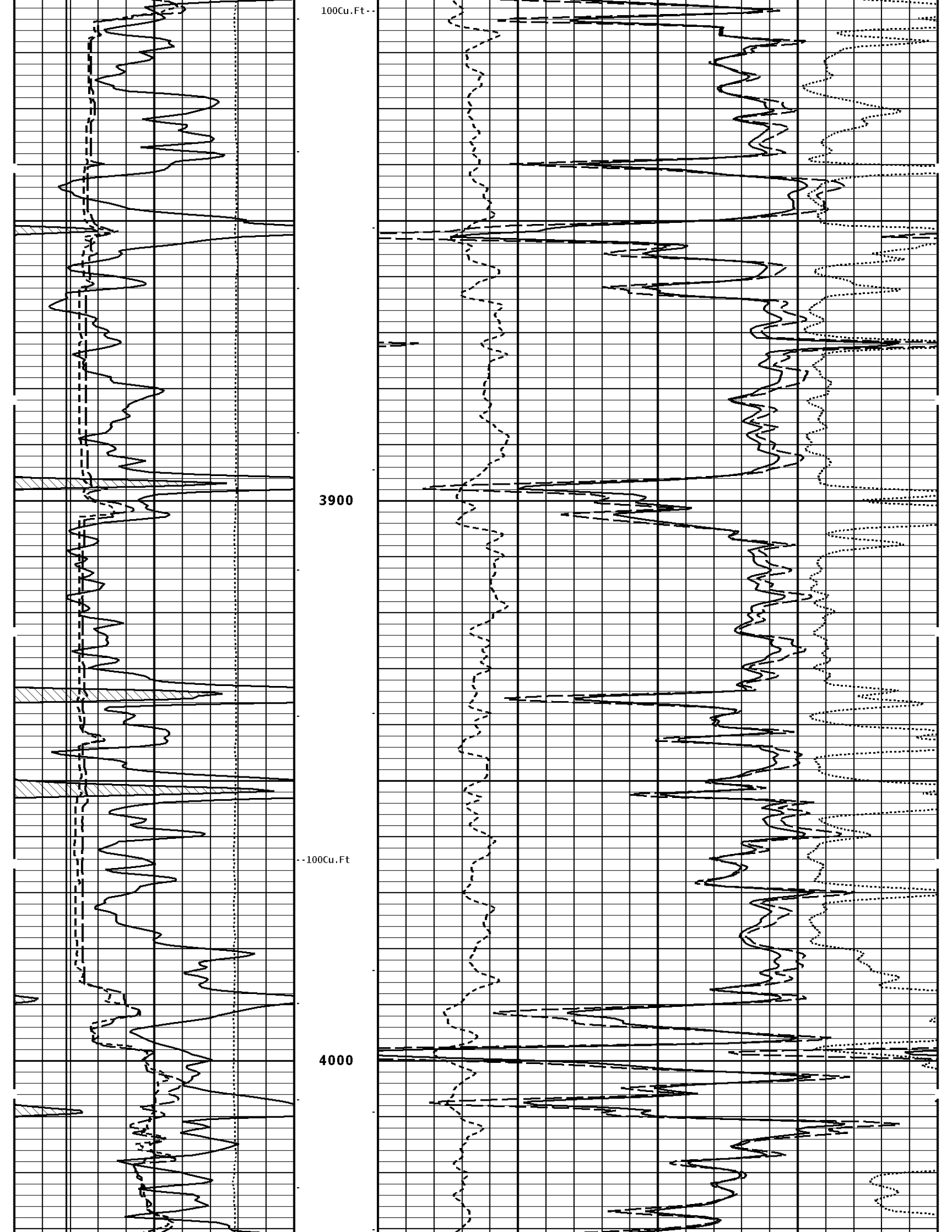


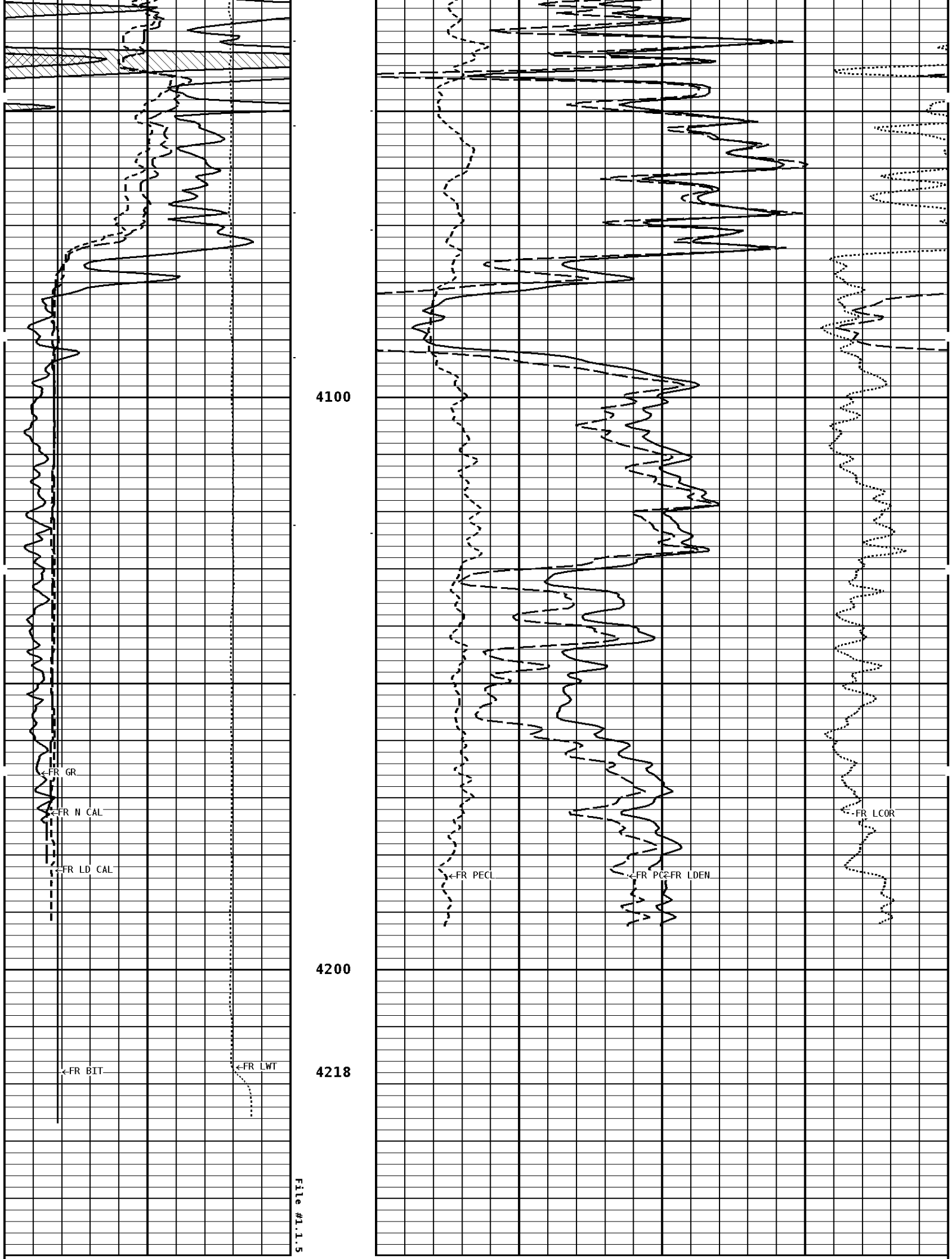

3000
--500Cu.Ft
3100
300Cu.Ft--


GR
N CAL
LD CAL
PECL
LDEN
LCOR
3200
BIT
LWT
400Cu.Ft
3300

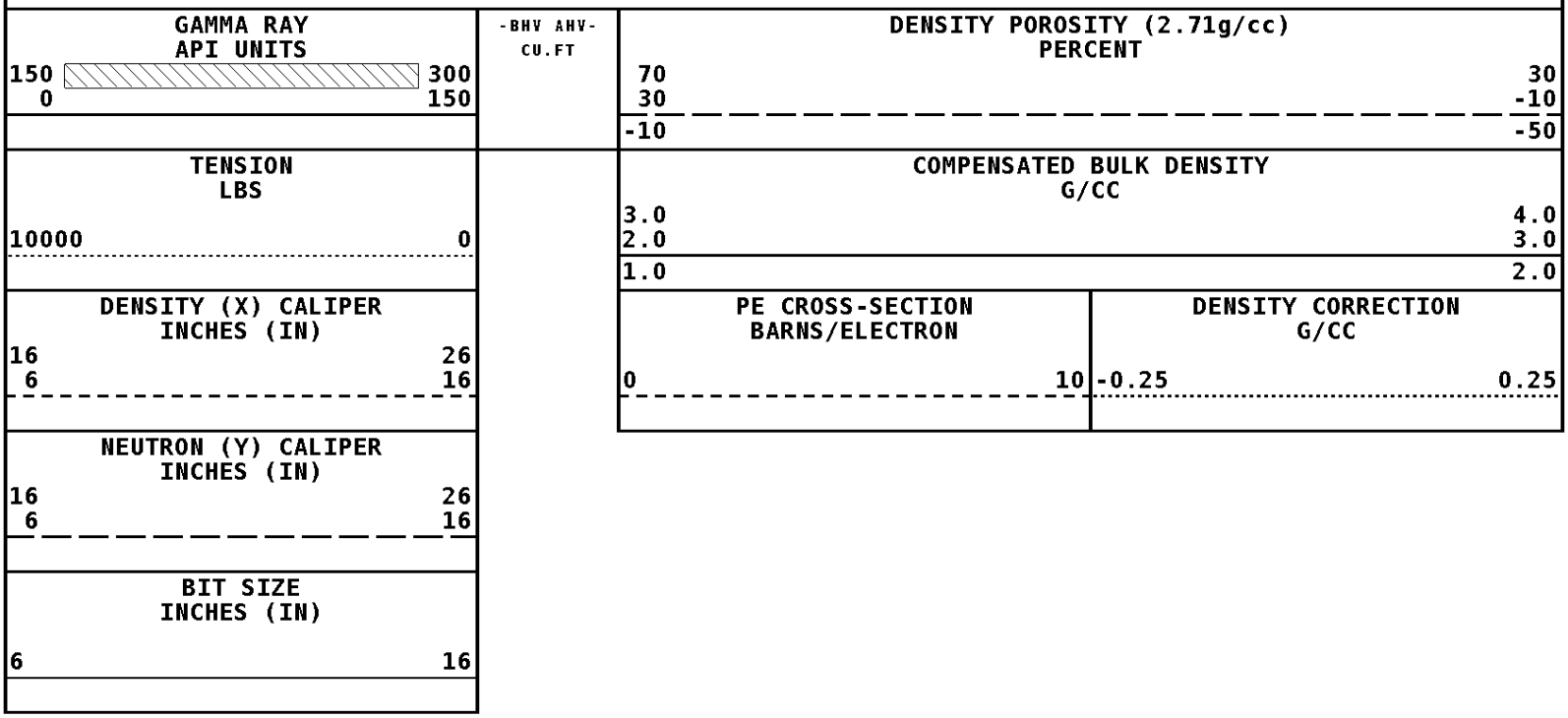

3400
200Cu.Ft--
--300Cu.Ft
3500


3600
GR
N CAL
LD CAL
PECL
PO2LDEN
LCOR
3700
--200Cu.Ft
BIT
LWT
3800


100Cu.Ft
3900
100Cu.Ft
4000


4100
4200
4218
←FR GR
←FR N CAL
←FR LD CAL
←FR BIT
←FR LWT
←FR PECL
←FR PC
←FR LDEN
←FR LCOR
File #1.1.5

1:240 MAIN SECTION
BULK DENSITY



* 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 : 04-SEP-2012 Time : 19:28
Sensor Suite : GR-GR5 ID : GRT-BC-41

	Measured Background	Measured Jig	Units	Calibrated Jig	Units
GR	46	346	CPS	175	GRAPI

Shop Calibration
CNT-AA

Performed : 26-JAN-2012 Time : 10:38
Sensor Suite : CALI-BCN ID : NDT-BD-123

	Jig - Measured Ring#1	Jig - Measured Ring#2	Jig - Calibrated Ring#1	Jig - Calibrated Ring#2	Units
CL # 1	6.6	11.6	6.0	12.0	IN.

Performed : 23-Jan-2013 Time : 10:57
Sensor Suite : BHC NEUT ID : CNP-AA-024
Source ID : N-1045

	Tank Measured	Tank Calibrated	Verification Jig	Units
N/F	3.8958	3.6893	3.6946	
Porosity	23.8	20.5	20.6	%

Shop Calibration
LDT-DF

Performed : 28-Jan-2013 Time : 12:16
Sensor Suite : CALI-LTH ID : PDT-GA-466

	Jig - Measured	Jig - Calibrated	Units

	Ring#1	Ring#2	Ring#1	Ring#2	
CL # 1	6.8	10.2	6.0	12.0	IN.

Performed : 28-Jan-2013 Time : 11:52
Sensor Suite : BHCPELNG ID : LDP-DA-066
Source ID : 2991GW

Short Space

	BKGD	Al	Mg	Al+Fe	Units
LSW1	69	1045	1706	691	CPS
LSW2	69	1215	1955	899	CPS
LSW3	260	2798	4501	2418	CPS
LSW4	324	2623	3742	2340	CPS
LSW5	30	62	68	57	CPS
LSW6	86	91	91	91	CPS
LSW7	54	59	59	59	CPS
LSW8	2	4	6	4	CPS
QS	0.229	0.214	0.219	0.213	
PES			2.778	5.967	
SSDN		2.600	1.680		G/CC

Long Space

	BKGD	Al	Mg	Al+Fe	Units
LLW1	134	1185	4823	727	CPS
LLW2	177	2152	8379	1568	CPS
LLW3	539	3934	14831	3408	CPS
LLW4	584	1936	6099	1761	CPS
LLW5	67	72	133	71	CPS
LLW6	173	169	159	173	CPS
LLW7	114	106	106	108	CPS
LLW8	3	7	18	6	CPS
QL	0.206	0.230	0.203	0.232	
PEL			2.697	5.458	
LSDN		2.600	1.680		G/CC

Tucker ENERGY SERVICES

Company: PICKRELL DRILLING CO, INC.

Well: COYKENDALL #10

Location: 1980' FSL & 760' FEL

Logged: 2013-01-31

K.B. Elev: 1469.0 Ft