



Tucker

ENERGY SERVICES

COMPENSATED NEUTRON
PEL DENSITY MICRO LOG

Company MULL DRILLING COMPANY, INC. Well TJADEN "C" #4		File No : TUL 59797 Company : MULL DRILLING COMPANY, INC. Well : TJADEN "C" #4 Field : County : KINGMAN State : KANSAS Country : USA API No : 15-095-22288	
Location : 1980' FSL & 660' FWL NW/4 SW/4		LSD : Sect : 18 Twp : 30S Rge : 7W	
Permanent Datum:	GL	Elevations:	
Drilling Measured From:	KB	KB 1486.00	Ft
Log Measured From:	KB	DF 1485.00	Ft
Above Permanent Datum:	10.00 Ft	GL 1476.00	Ft
Date	09-25-2014		
Run Number	1		
Depth--Driller	4285.0	Ft	
Depth--Logger	4283.0	Ft	
First Reading	4260.0	Ft	
Last Reading	226.0	Ft	
Casing--Driller	223.0	Ft	
Casing--Logger	226.0	Ft	
Bit Size	7.875	In	
Casing Size	8.625	In	
Hole Fluid Type	CHEM GEL		
Density	9.6	lb/gal	
Fluid Loss	10.8		
PH/Viscosity	9.0	55.0 sec/qt	
Sample Source	MEASURED		
RM@Measured Temp.	0.600	@ 65 F	
RMF@Measured Temp	0.480	@ 65 F	
RM@Measured Temp.	0.720	@ 65 F	
Source RMF/RMC	CALCULATED/CALCULATED		
RM@BHT	0.440	@ 125 F	
Time Circulation Stopped	09-25-2014 11:30 pm		
Max Recorded Temp.	125	F	
Equipment/Base	126	TULSA	
Recorded By	S. K. DAVIS / A. S. DIAHO		
Witnessed By			

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	4285.00	8.625	32.00	226.00	0.00

Run Number	1	
Date	09-25-2014	
Date/Time On Bottom	09-26-2014 4:00 am	
Depth to Fluid	0.0 Ft	
Salinity	3000.000 ppm	
RMF@BHT	0.350 @ 125 F	
RMC@BHT	0.520 @ 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
 ANHYDRITE SECTION FROM 1150' TO 800'
 DETAIL SECTION FROM TD TO 2900'

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

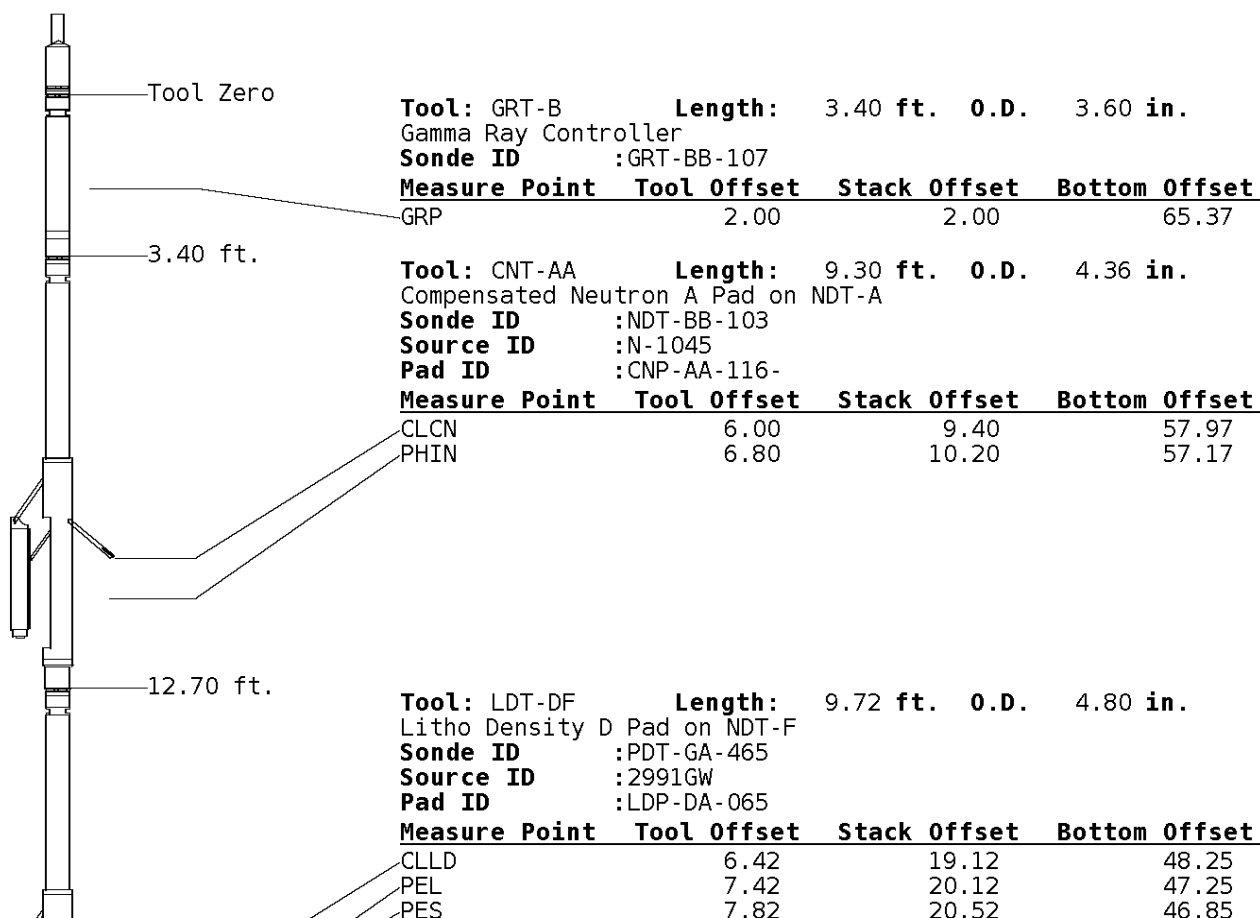
OPERATORS:

C. GONZALES

J OFFEIBGU

Tool String Schematic

Total Tool Length - 67.37 ft.
Maximum Outside diameter - 6.00 in.
Net Weight in Air - 1171.00 lbs.



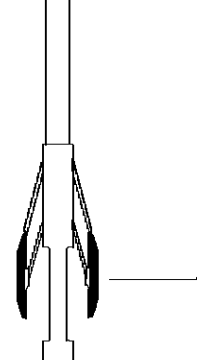


LDEN	7.62	20.32	47.05
LCOR	7.62	20.32	47.05

22.42 ft.

Tool: MST-DA **Length:** 9.66 ft. **O.D.** 6.00 in.
Micro Spherically Focused (IC)
Sonde ID :MST-DA-26

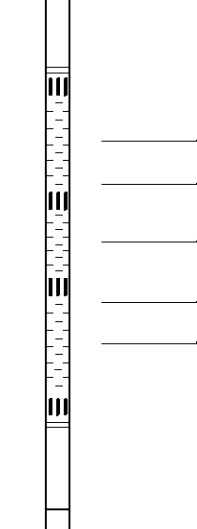
Measure Point	Tool Offset	Stack Offset	Bottom Offset
MSFL	7.60	30.02	37.35
MSCLP	7.60	30.02	37.35
INV	7.60	30.02	37.35
NOR	7.60	30.02	37.35



32.08 ft.

Tool: CST-AD **Length:** 13.80 ft. **O.D.** 3.60 in.
Open Hole Sonic
Sonde ID :CST-AB-25

Measure Point	Tool Offset	Stack Offset	Bottom Offset
TT1	4.80	36.88	30.49
TT3	5.80	37.88	29.49
CDT	7.30	39.38	27.99
TT4	8.80	40.88	26.49
TT2	9.80	41.88	25.49



45.88 ft.

Tool: PIT-CA **Length:** 21.49 ft. **O.D.** 3.62 in.
Phased Dual Induction w/ RM & D
Sonde ID :PIT-CA-075

Measure Point	Tool Offset	Stack Offset	Bottom Offset
ILD	8.92	54.80	12.56
ILM	10.10	55.98	11.39
SFLU	17.49	63.37	4.00
SP	20.60	66.48	0.88

LWT 67.37 ft.

Well File: MULL TJADEN C4 SEPT25 QUINT

Scale: 1:240

Format: NLD-240

Segment: V1.D1.S5 MN

Acquired: 2014-09/26 04:07 3.3.0-12594

Reference: 0

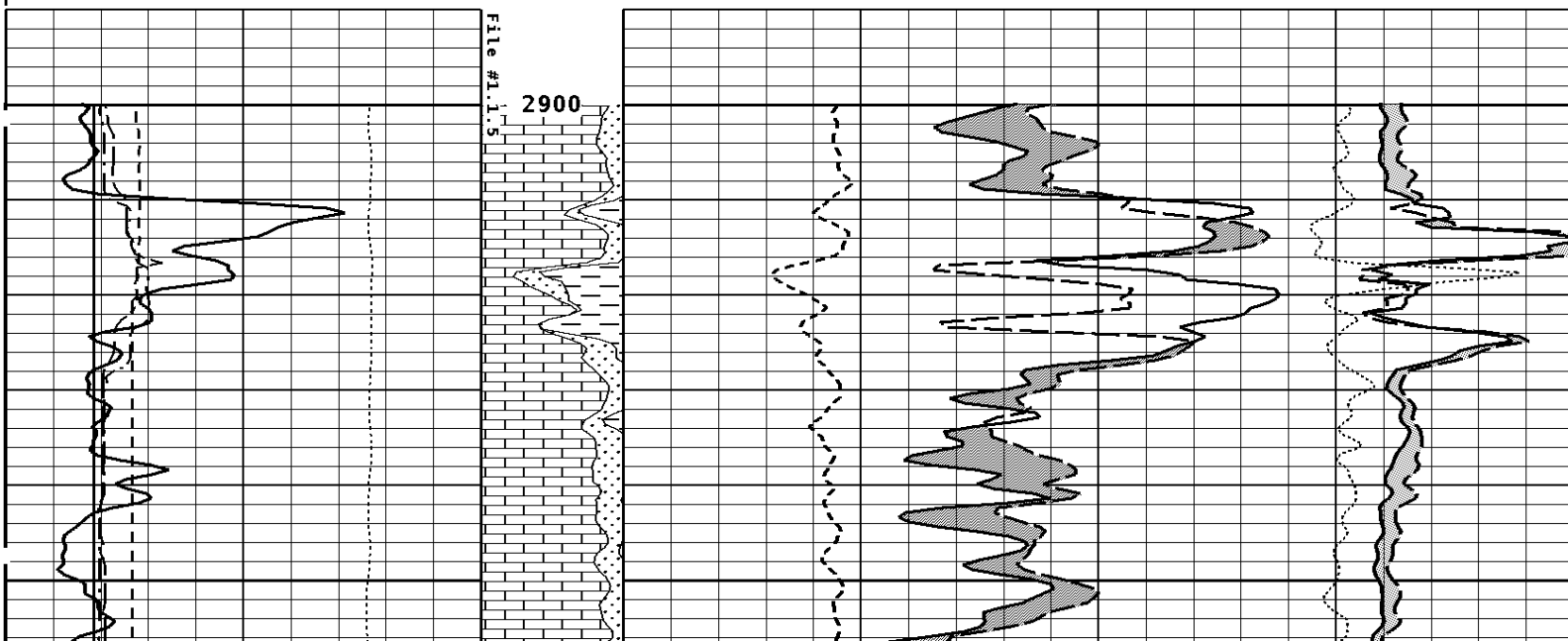
Processed: 2014-09/26 05:50 3.3.0-12594

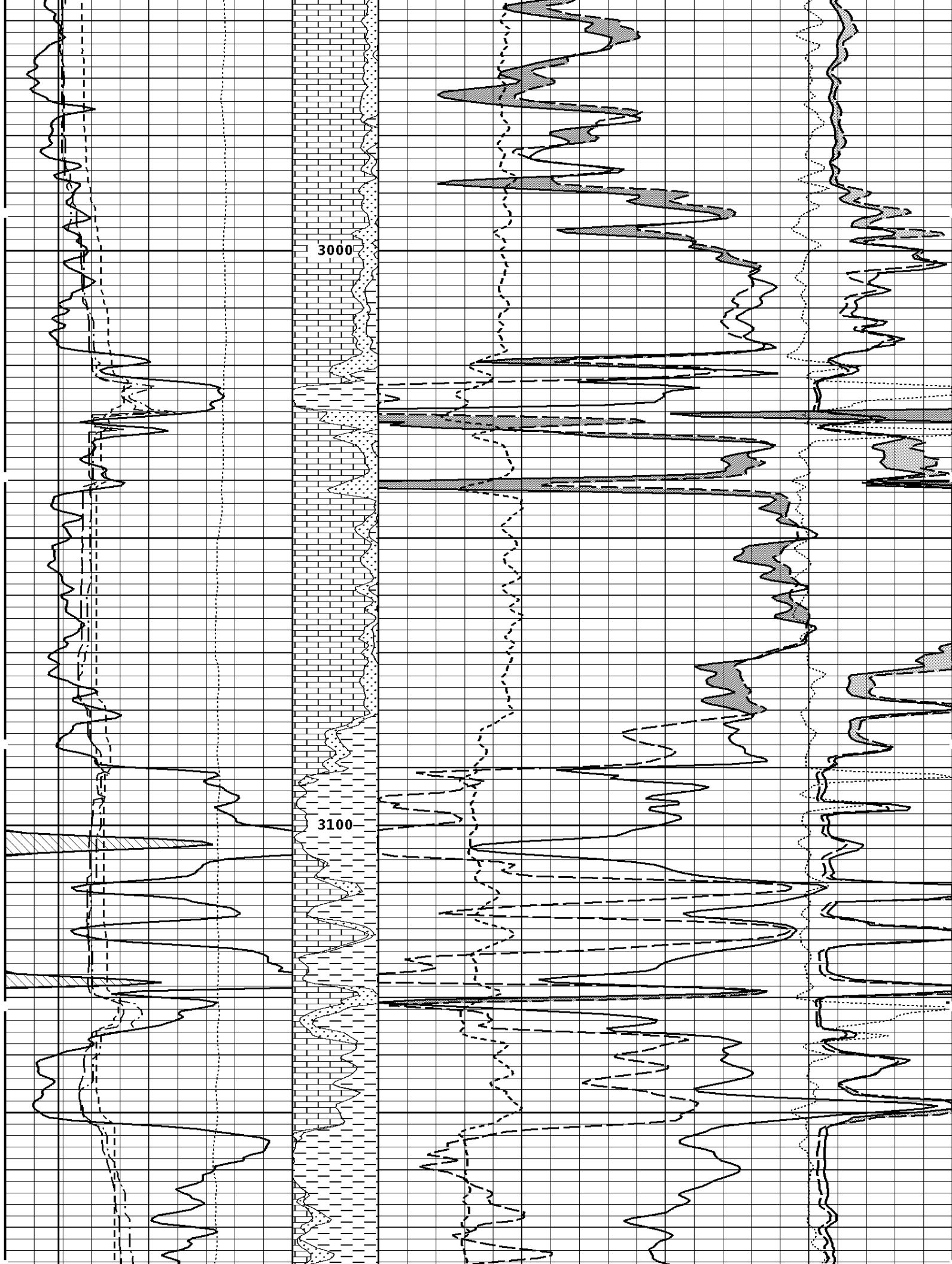
CALIPER MICRO INCHES (IN)					
16	26				
6	16				

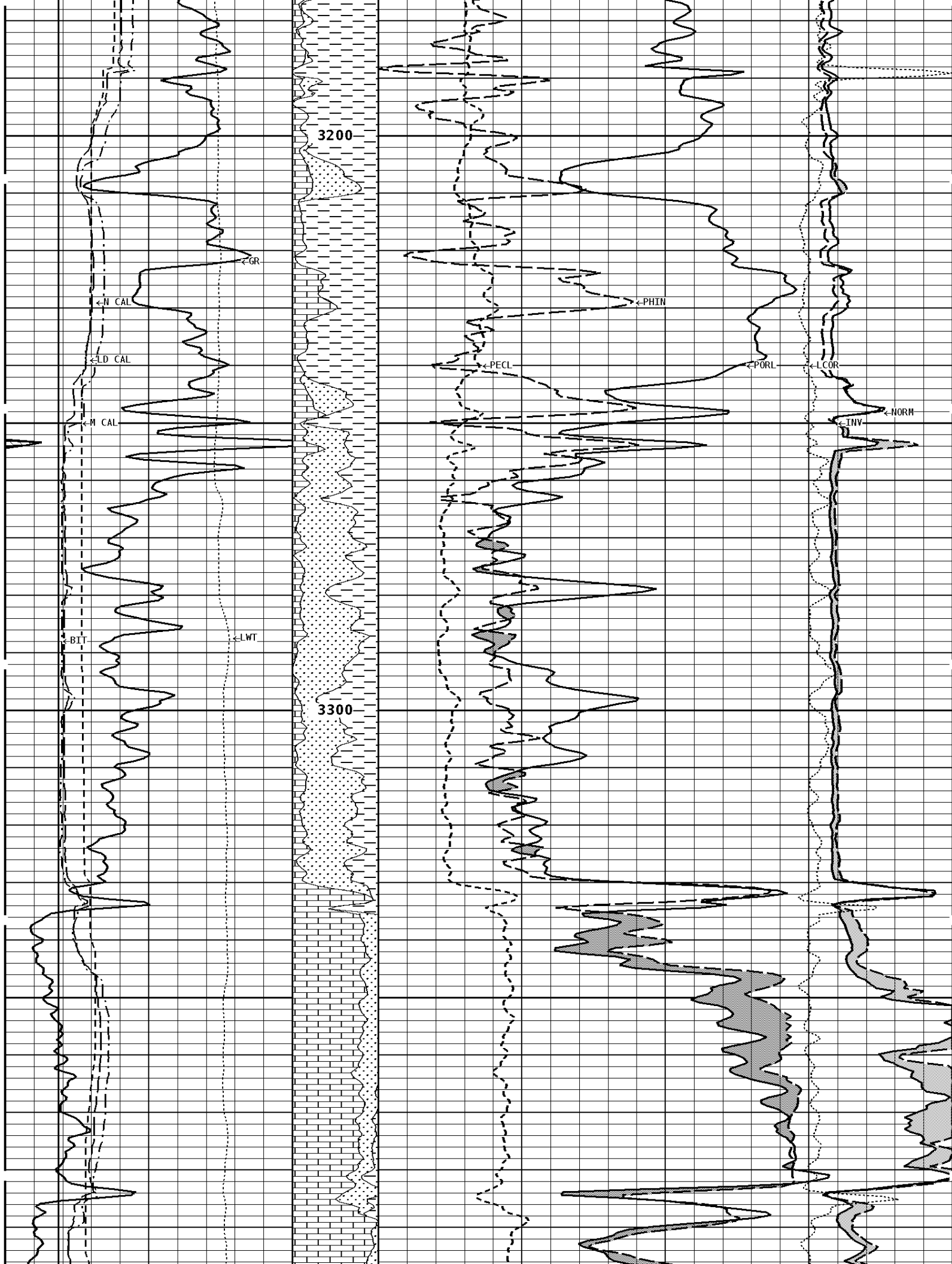
BIT SIZE INCHES (IN)				NORMAL OHMM	
6	16			0 40	
NEUTRON (Y) CALIPER INCHES (IN)				INVERSE OHMM	
16	26			0 40	
6	16				

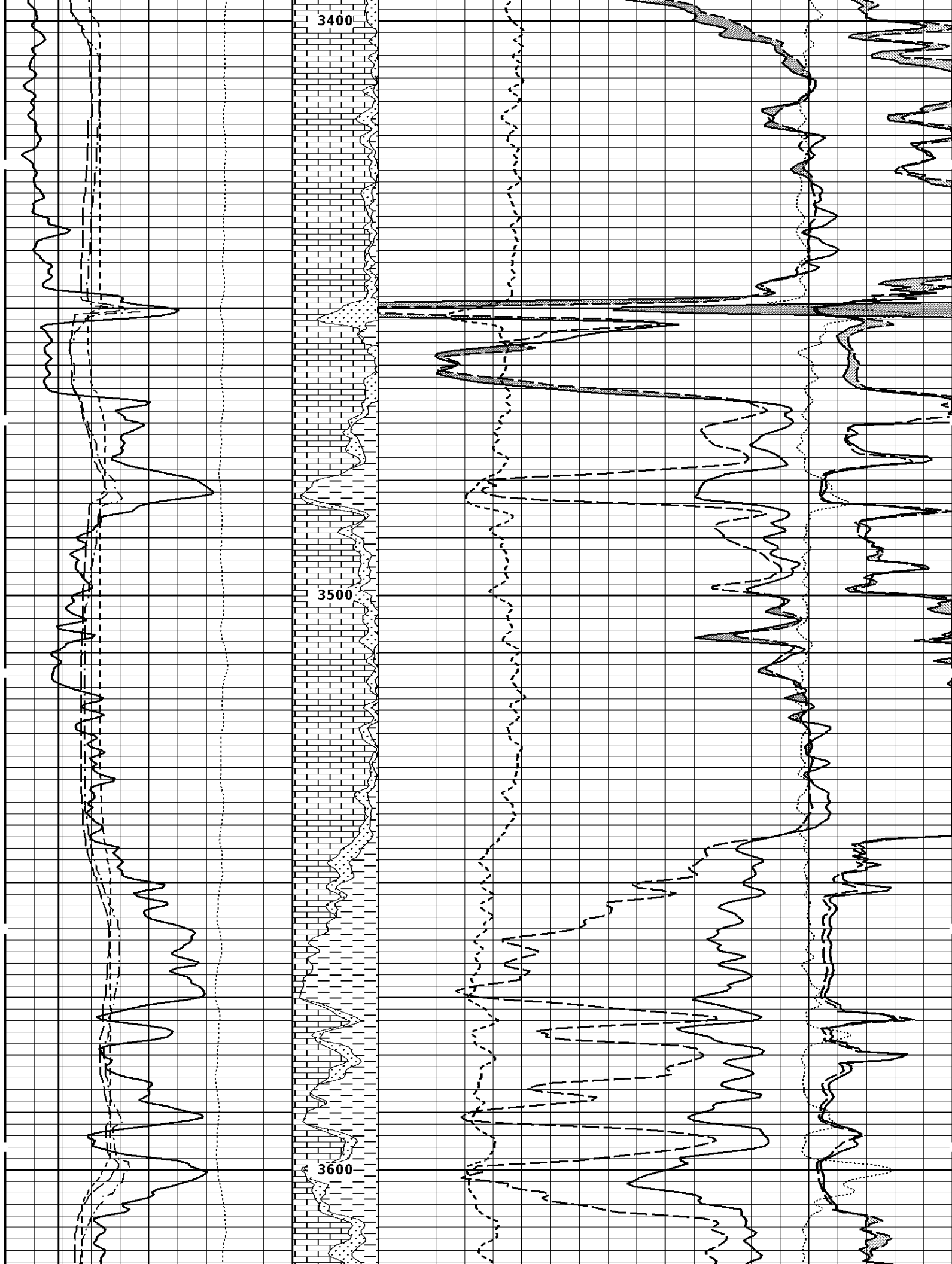
DENSITY (X) CALIPER INCHES (IN)		Volume Quartz	PE CROSS-SECTION BARNS/ELECTRON	DENSITY CORRECTION G/CC	
16	26				
6	16				
-----			0 10	-0.25 0.25	
TENSION LBS		Volume Calcite	DENSITY POROSITY (2.71g/cc) PERCENT		
10000	0		70	30	
			30	-10	
			-10	-50	
GAMMA RAY API UNITS		Volume Dolo/Shale	NEUTRON POROSITY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

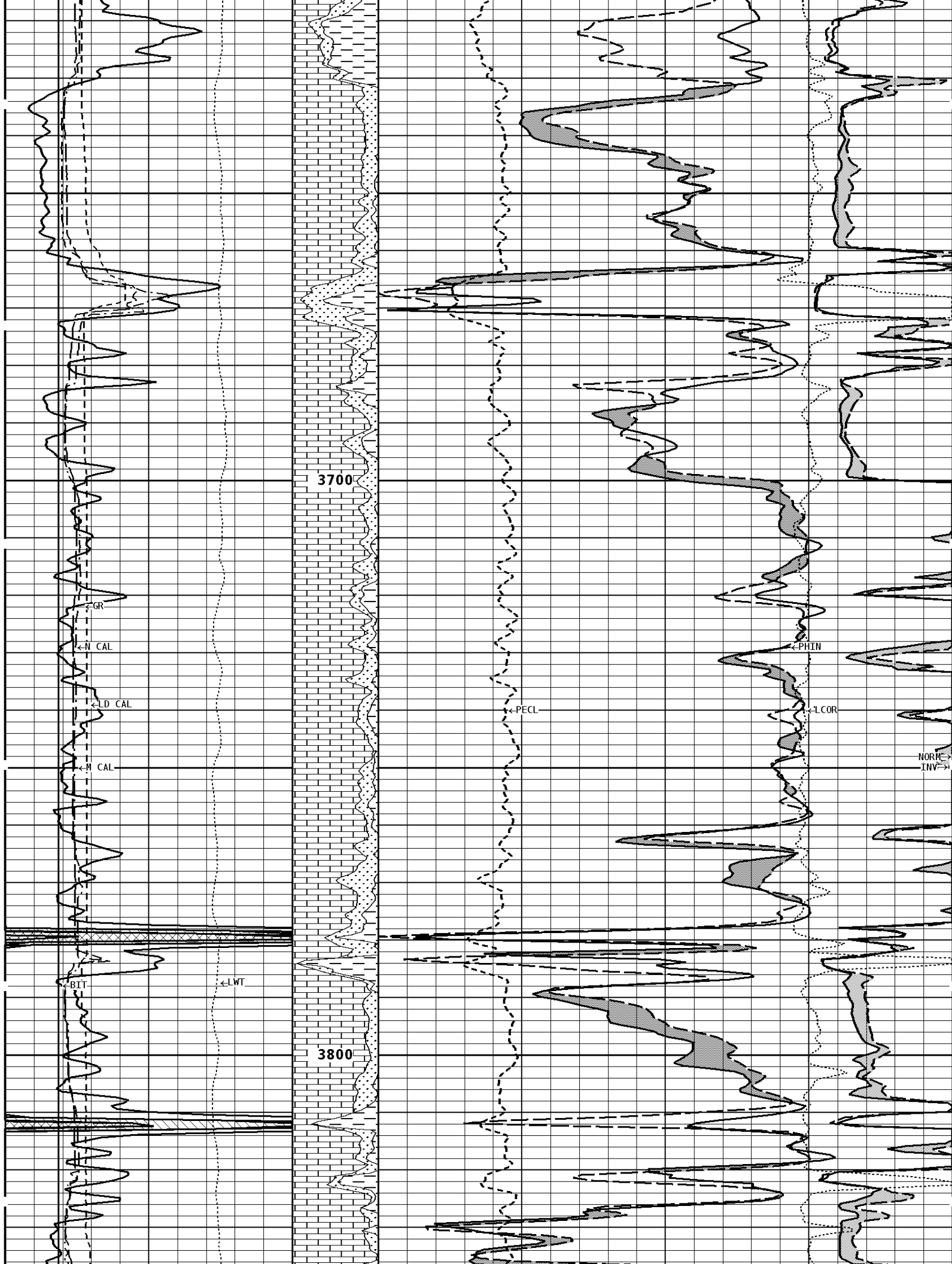
1:240 MAIN SECTION

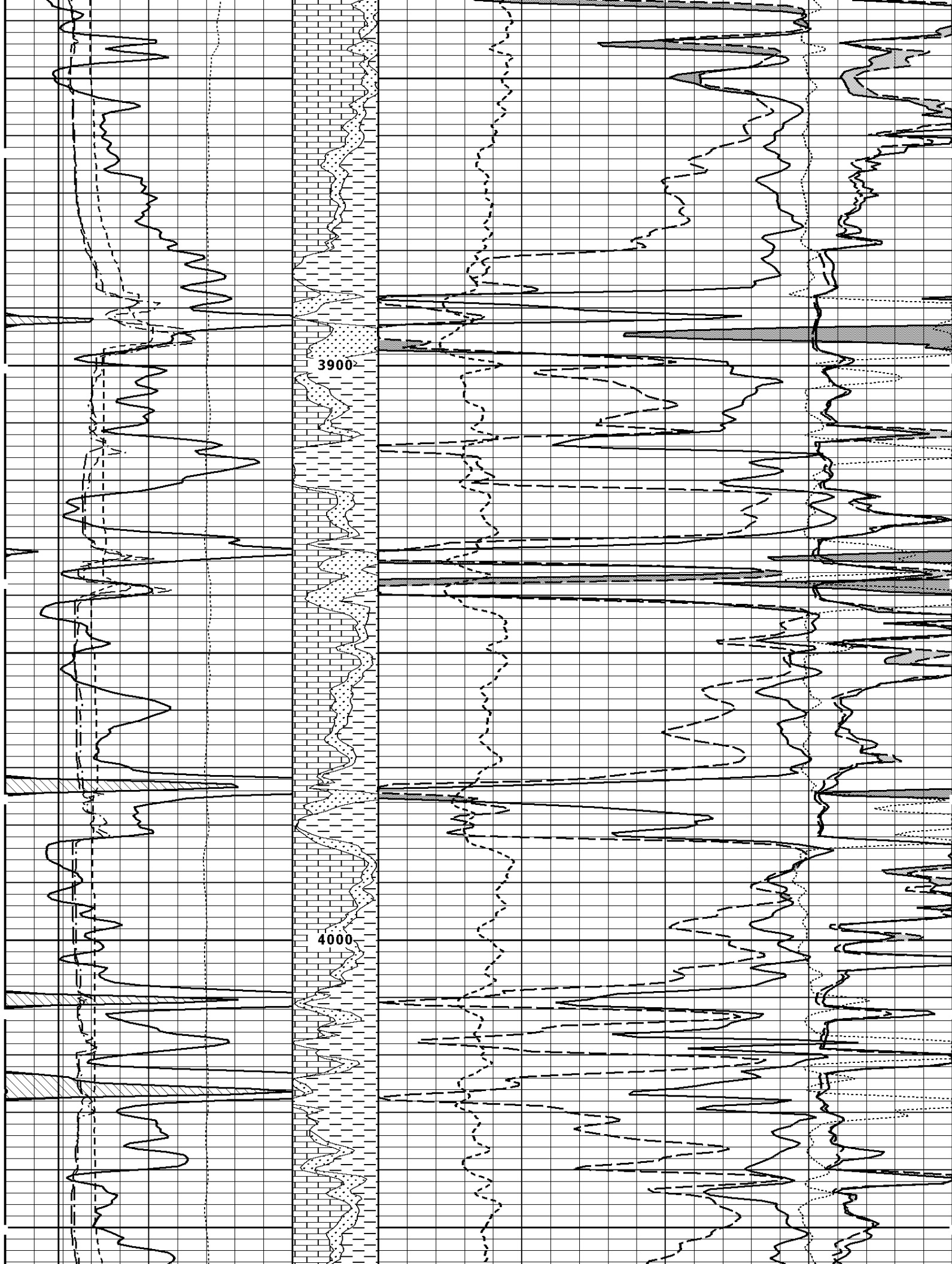


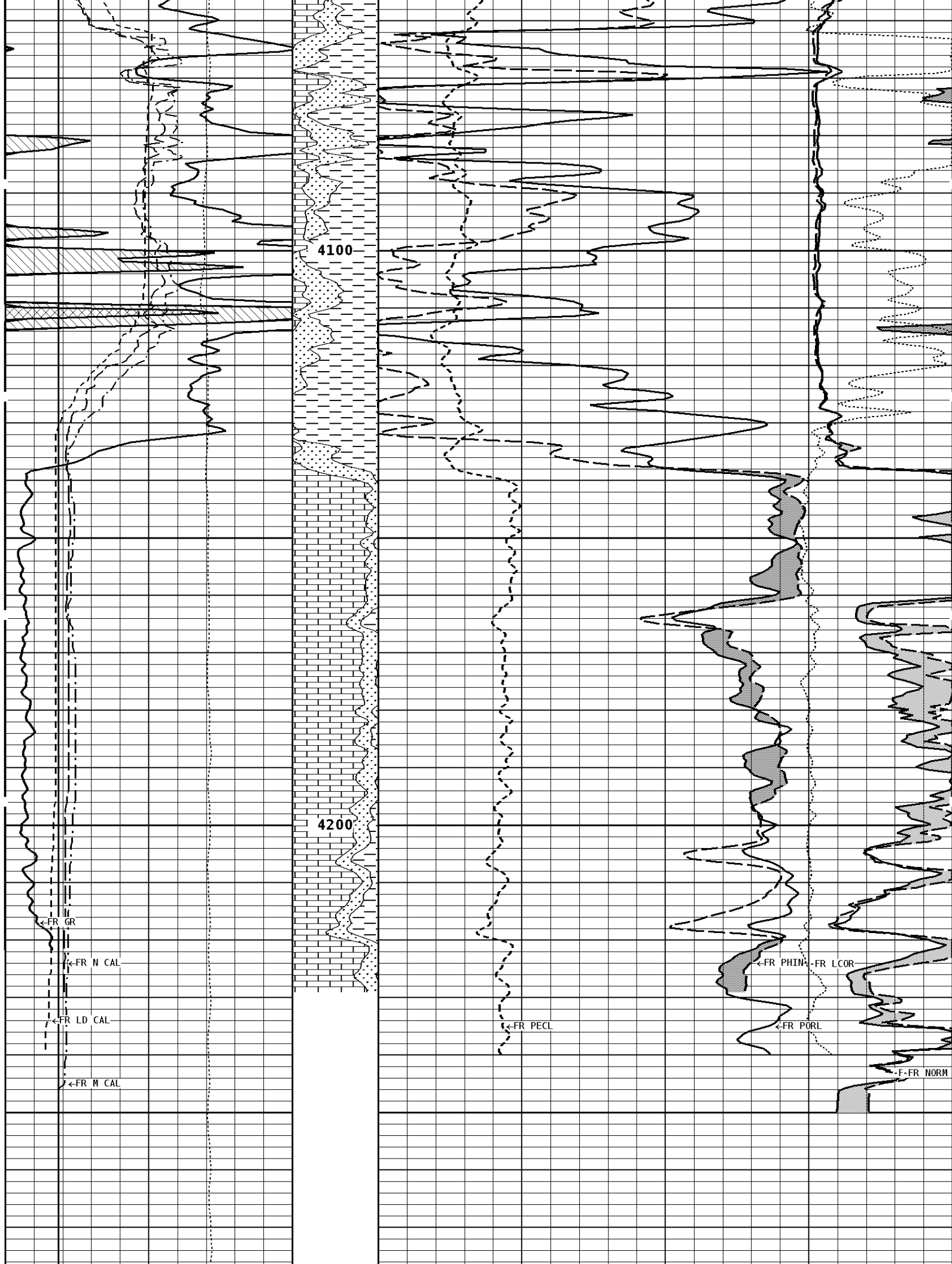


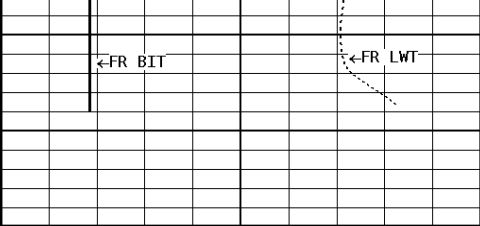












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File #1.1.5

1:240 MAIN SECTION

GAMMA RAY API UNITS		Volume Dolo/Shale	NEUTRON POROSITY (LIMESTONE) PERCENT	
150 0	300 150		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		010	-0.250.25
NEUTRON (Y) CALIPER INCHES (IN)				
16 6	26 16			
BIT SIZE INCHES (IN)				
6	16			
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		

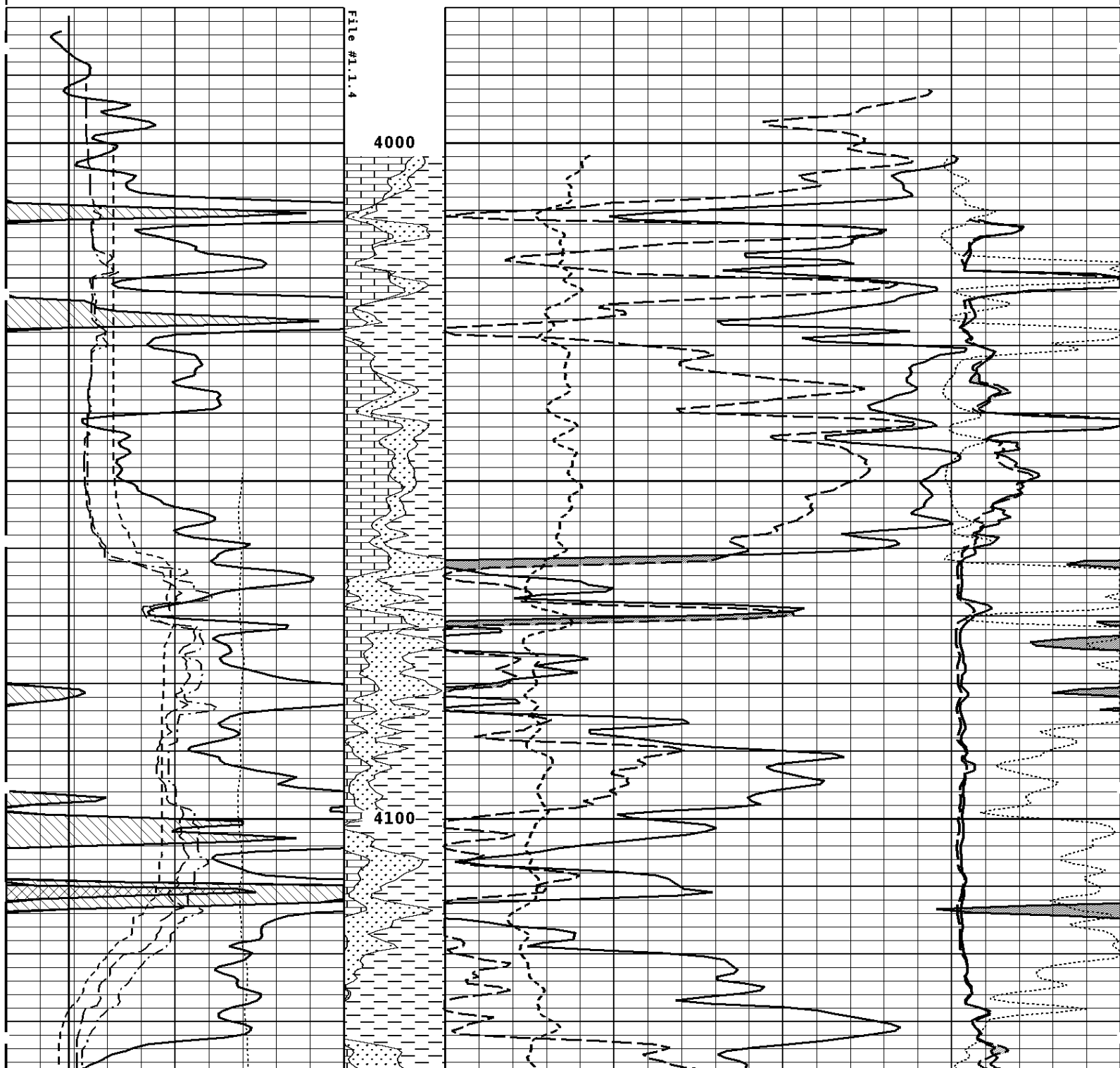
Well File: MULL TJADEN_C4_SEPT25_QUINT	Scale: 1:240	Format: NLD-240
Segment: V1.D1.S4 RP	Acquired: 2014-09/26 03:52 3.3.0-12594	
Reference: 0	Processed: 2014-09/26 05:45 3.3.0-12594	

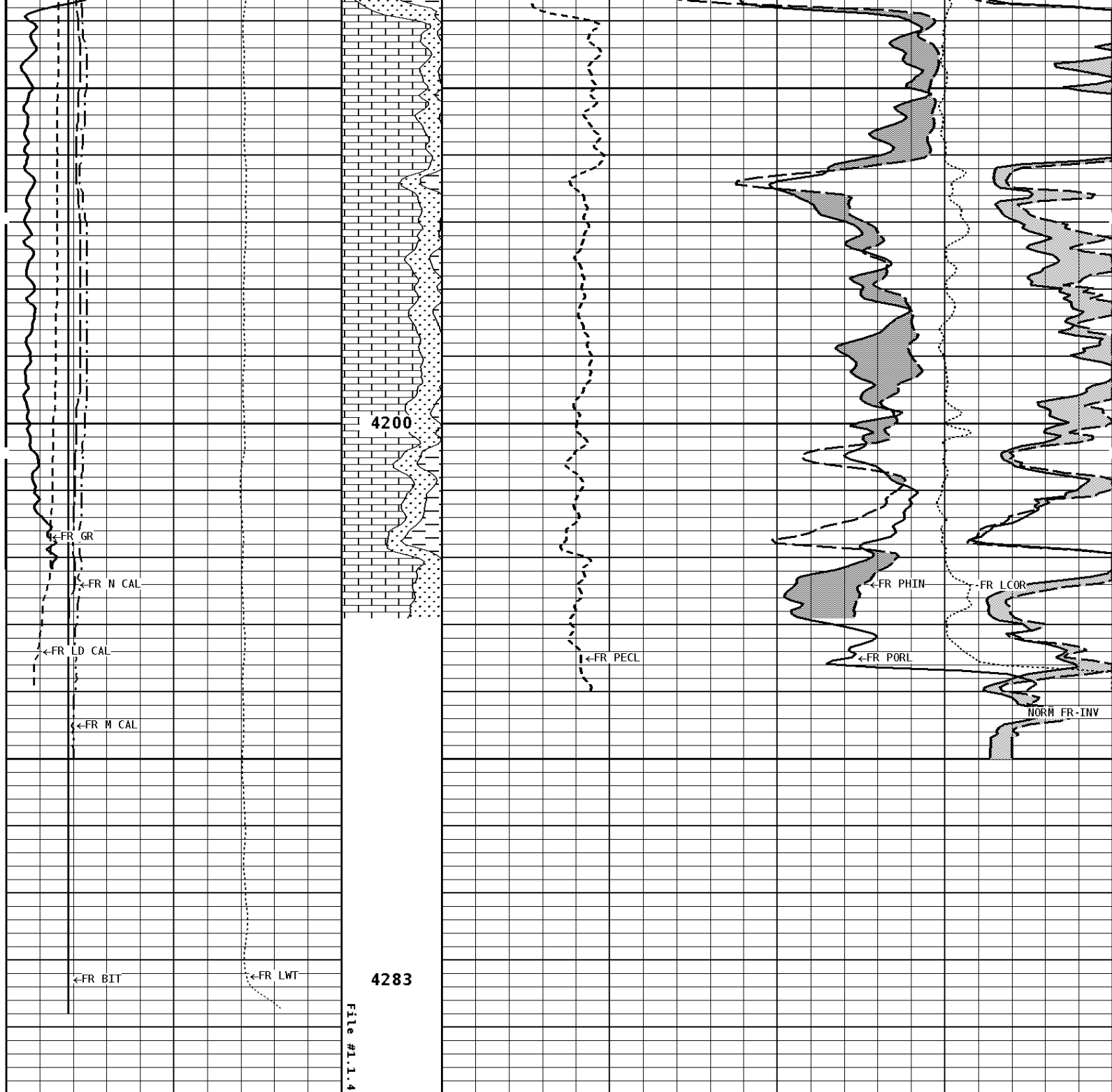
CALIPER MICRO INCHES (IN)			
16 6	26 16		
BIT SIZE INCHES (IN)			
6	16		
NEUTRON (Y) CALIPER INCHES (IN)			
16 6	26 16		

NORMAL OHMM	
0	40
INVERSE OHMM	
0	40

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
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 0	300 150		30			-10

1:240 REPEAT SECTION





1:240 REPEAT 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 BARN/ELECTRON	DENSITY CORRECTION G/CC
16	26			
6	16		10	-0.25
				0.25

NEUTRON (Y) CALIPER INCHES (IN) 16 26 6 16		INVERSE OHMM 0 40
BIT SIZE INCHES (IN) 6 16		NORMAL OHMM 0 40
CALIPER MICRO INCHES (IN) 16 26 6 16		

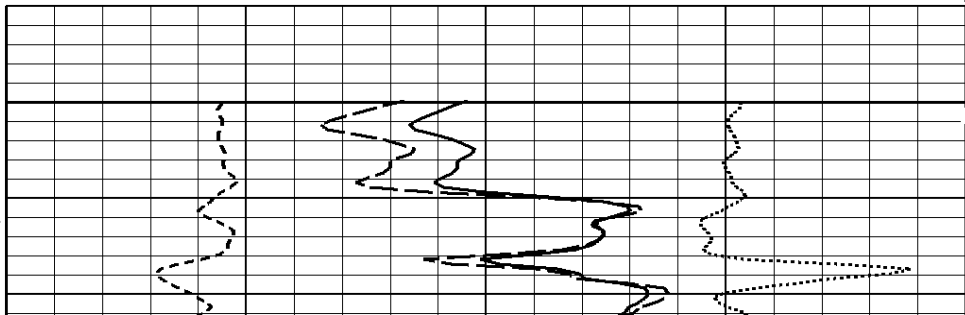
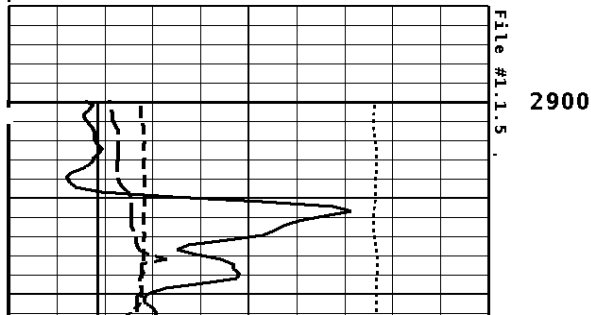
*** Borehole Zone Factors ***

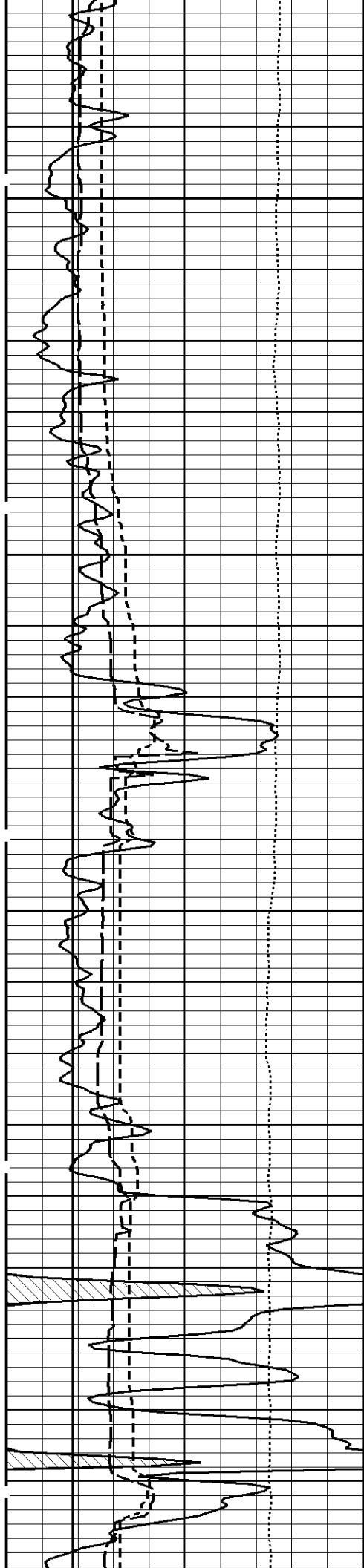
Zone 1 99999.0 to 0.0 Feet
Matrix Density_____ 2.71 g/cc Fluid Density_____ 1.00 g/cc Formation Matrix_____ Limestone Drill Bit Size_____ 7.875 in Casing Diameter_____ 5.500 in Casing Thickness_____ 0.250 in Casing Correction (PHI N)_____ Disable

Well File: MULL TJADEN C4 SEPT25 QUINT	Scale: 1:240	Format: LDT-240
Segment: V1.D1.S5 MN	Acquired: 2014-09/26 04:07 3.3.0-12594	
Reference: 0	Processed: 2014-09/26 05:50 3.3.0-12594	

BIT SIZE INCHES (IN) 6 16					
NEUTRON (Y) CALIPER INCHES (IN) 16 26 6 16					
DENSITY (X) CALIPER INCHES (IN) 16 26 6 16	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">PE CROSS-SECTION BARNS/ELECTRON</th> <th style="width: 50%;">DENSITY CORRECTION G/CC</th> </tr> <tr> <td style="display: flex; justify-content: space-between;"> 0 10 </td> <td style="display: flex; justify-content: space-between;"> -0.25 0.25 </td> </tr> </table>	PE CROSS-SECTION BARNS/ELECTRON	DENSITY CORRECTION G/CC	0 10	-0.25 0.25
PE CROSS-SECTION BARNS/ELECTRON	DENSITY CORRECTION G/CC				
0 10	-0.25 0.25				
TENSION LBS 10000 0	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 100%;">COMPENSATED BULK DENSITY G/CC</th> </tr> <tr> <td style="display: flex; justify-content: space-between;"> 3.0 4.0 </td> </tr> <tr> <td style="display: flex; justify-content: space-between;"> 2.0 3.0 </td> </tr> <tr> <td style="display: flex; justify-content: space-between;"> 1.0 2.0 </td> </tr> </table>	COMPENSATED BULK DENSITY G/CC	3.0 4.0	2.0 3.0	1.0 2.0
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 <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 100%;">DENSITY POROSITY (2.71g/cc) PERCENT</th> </tr> <tr> <td style="display: flex; justify-content: space-between;"> 70 30 </td> </tr> <tr> <td style="display: flex; justify-content: space-between;"> 30 -10 </td> </tr> <tr> <td style="display: flex; justify-content: space-between;"> -10 -50 </td> </tr> </table>	DENSITY POROSITY (2.71g/cc) PERCENT	70 30	30 -10	-10 -50
DENSITY POROSITY (2.71g/cc) PERCENT					
70 30					
30 -10					
-10 -50					

1:240 MAIN SECTION
BULK DENSITY



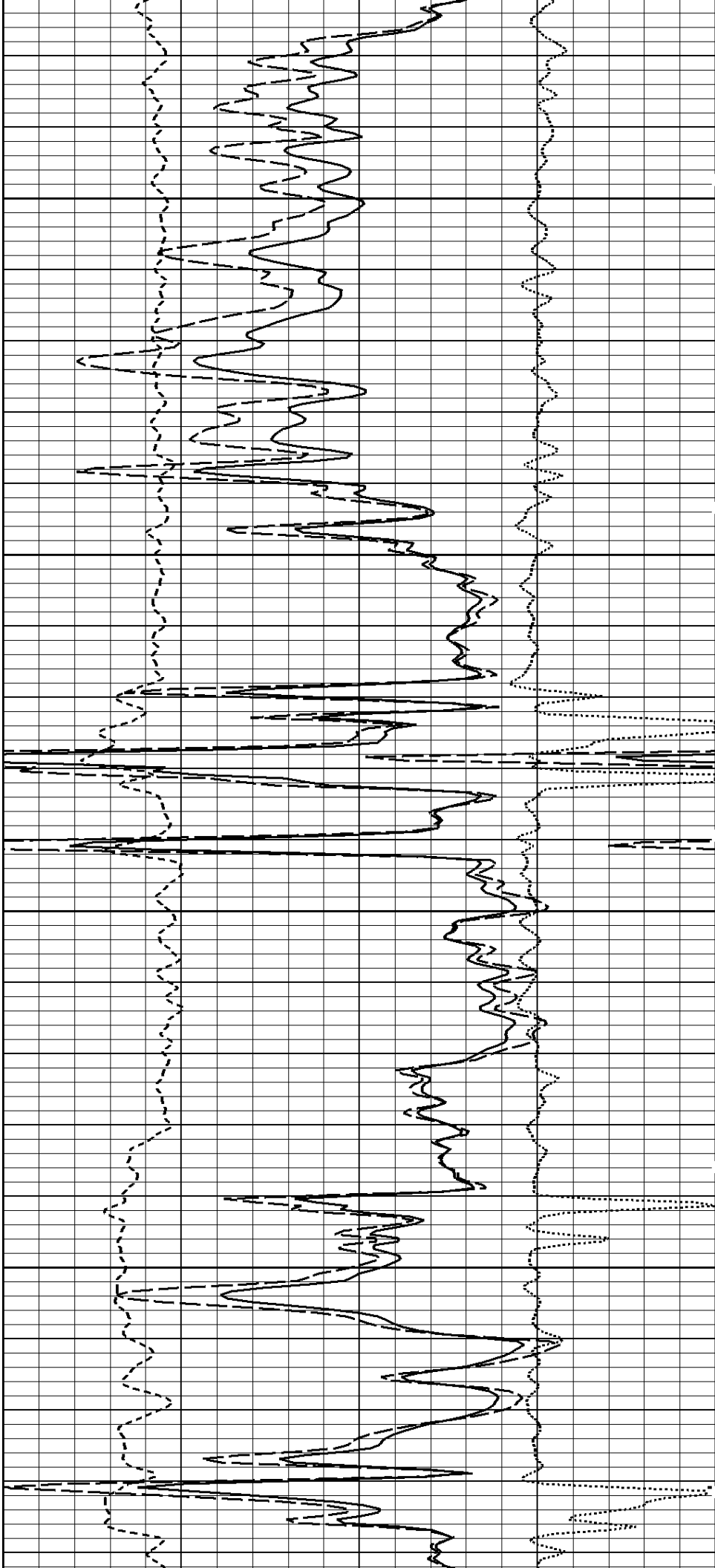


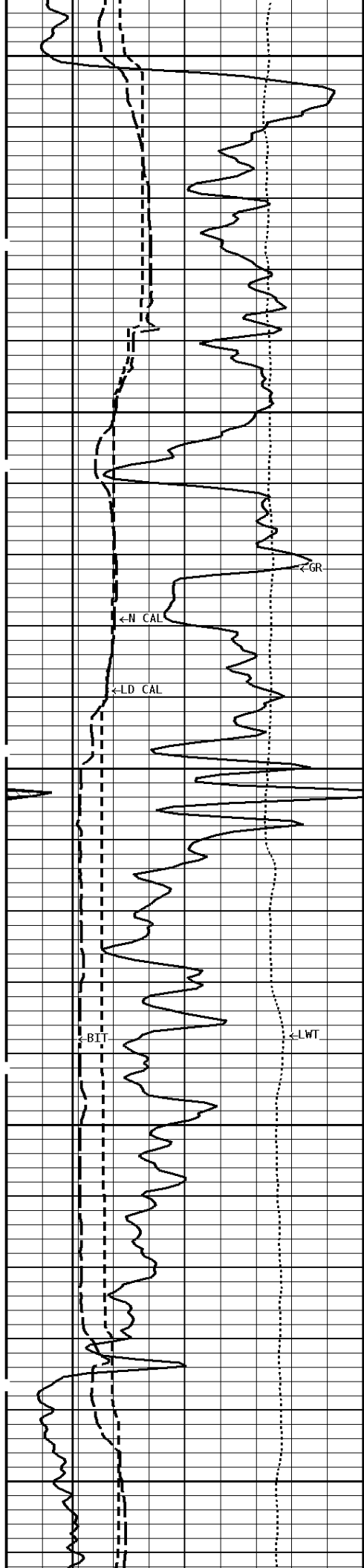
3000

--500Cu.Ft--

3100

300Cu.Ft--

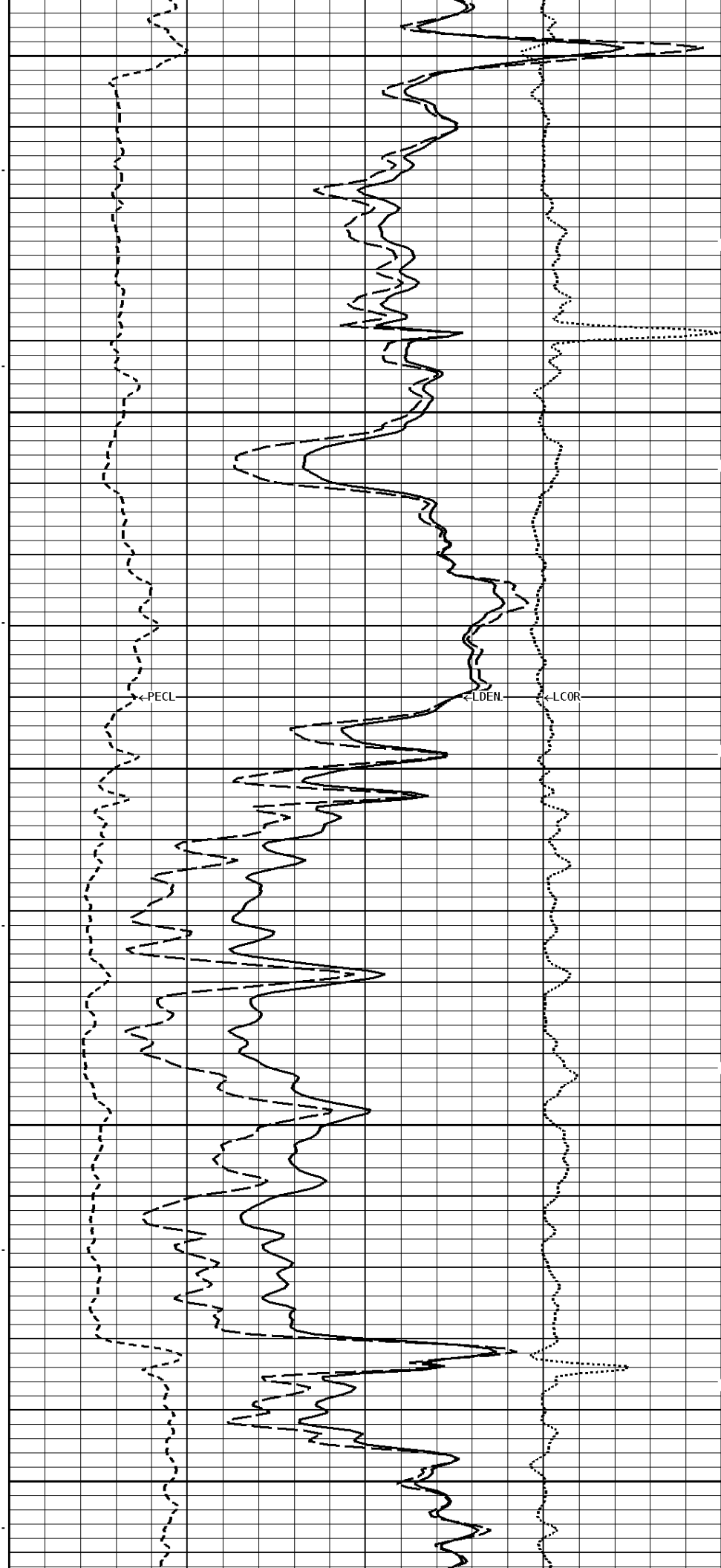


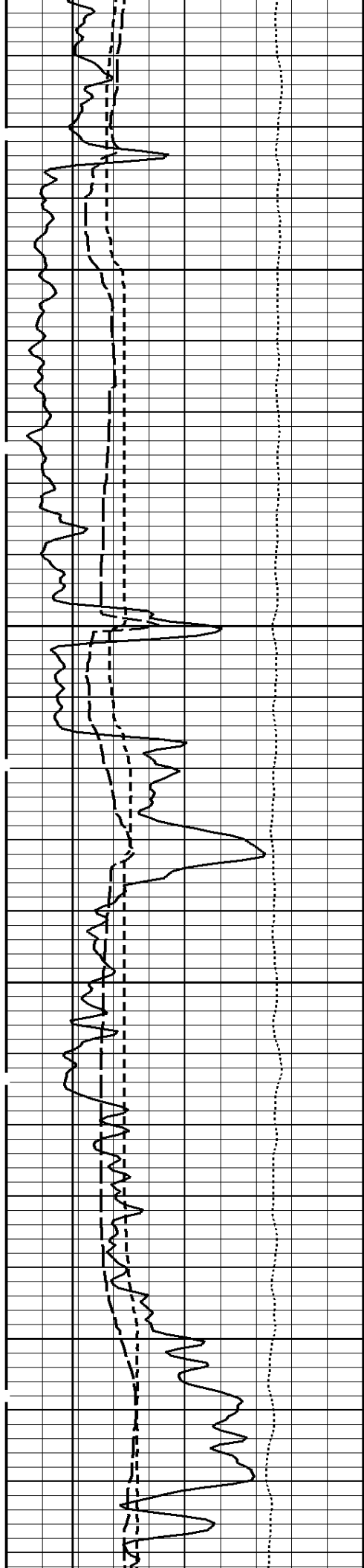


3200

3300

--400Cu.Ft

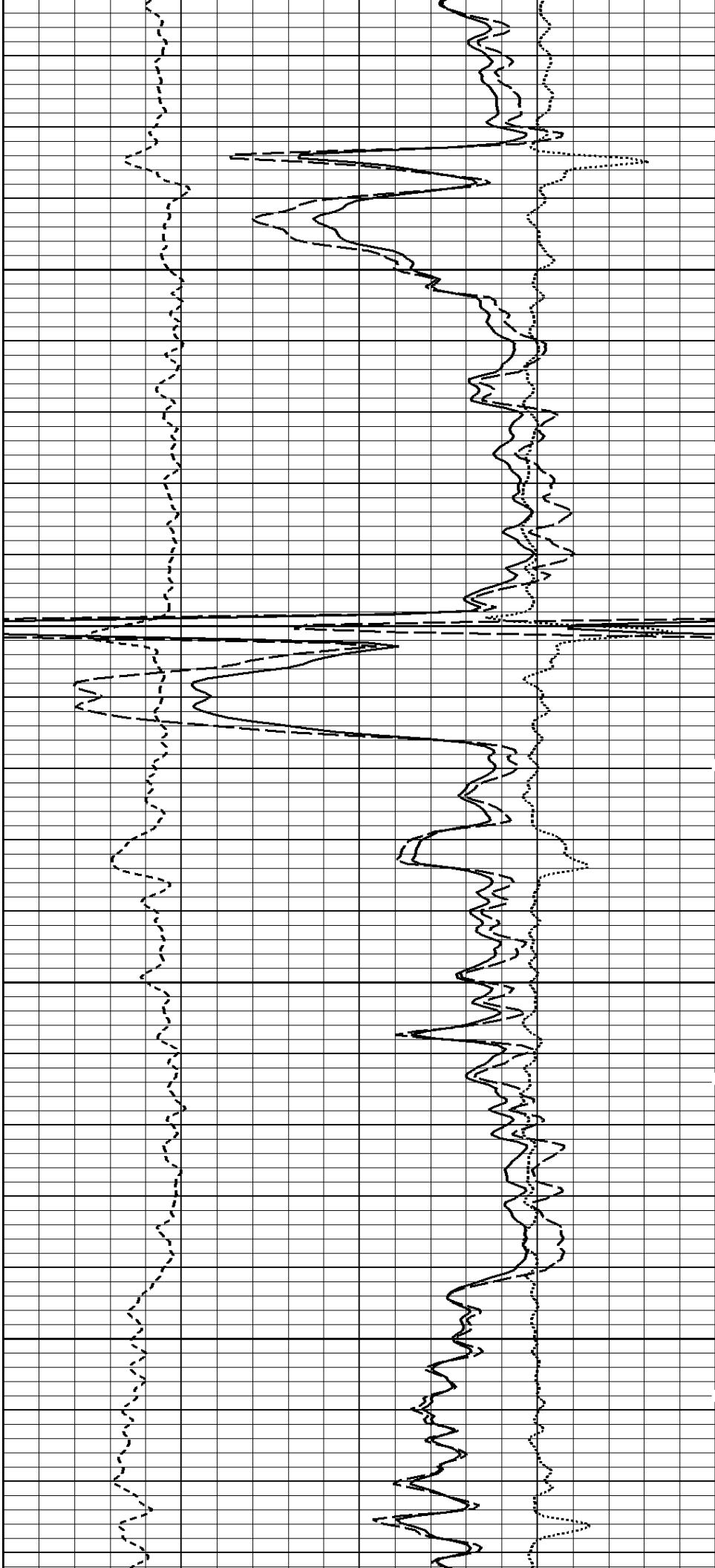


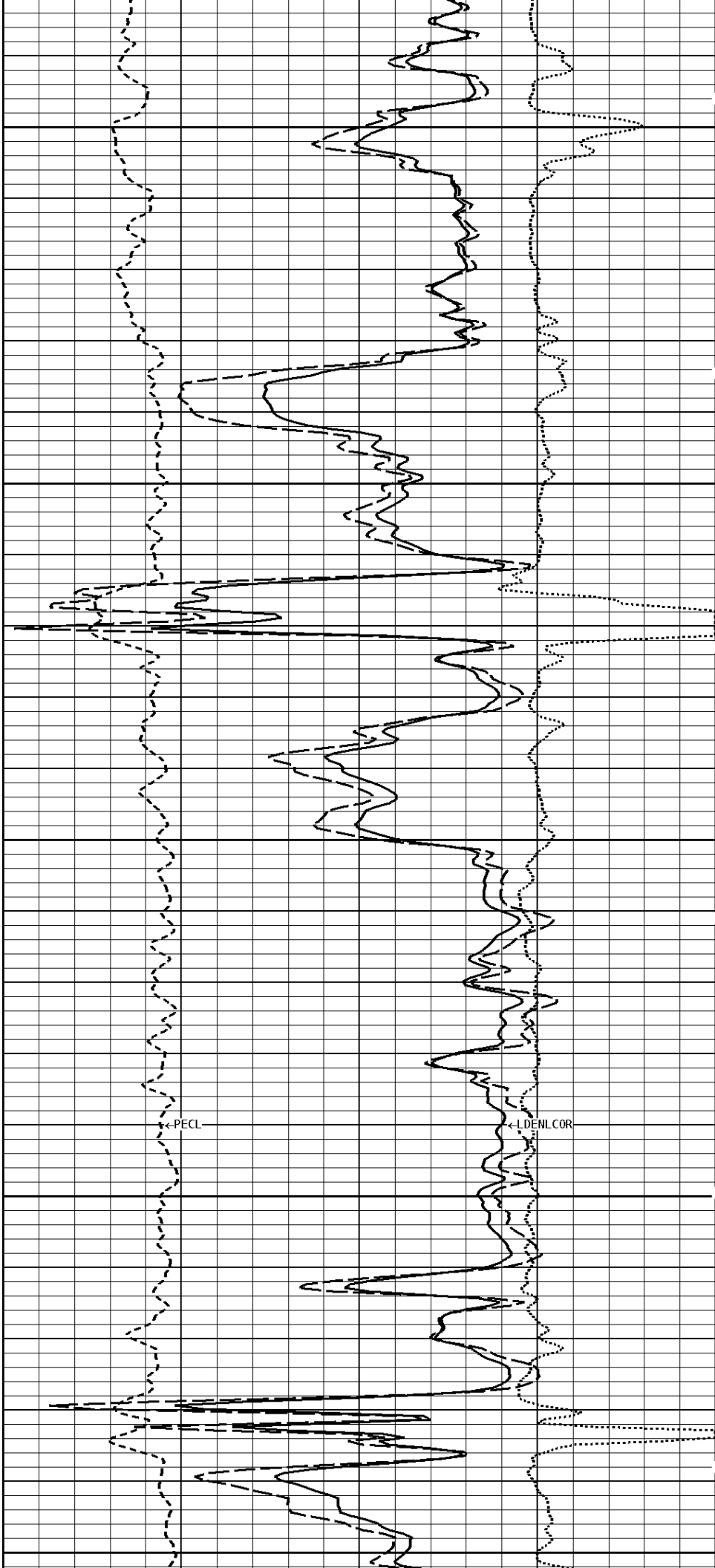
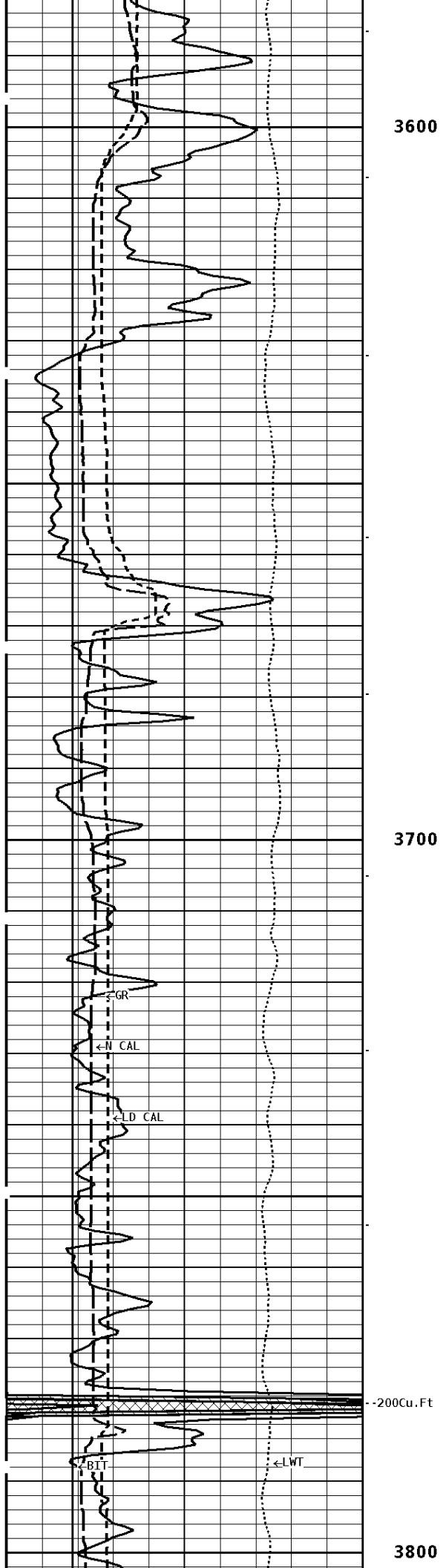


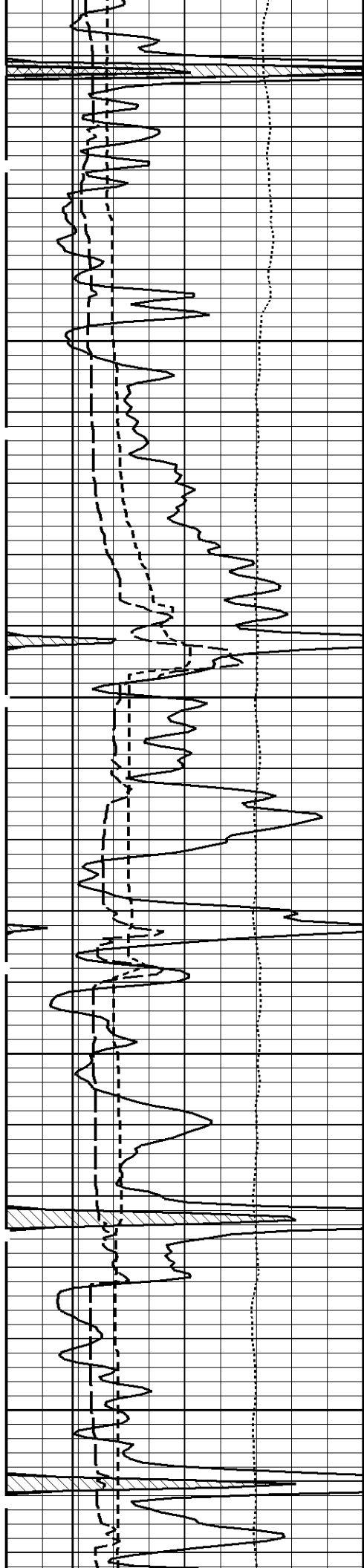
3400

3500Ft..

--300Cu.Ft





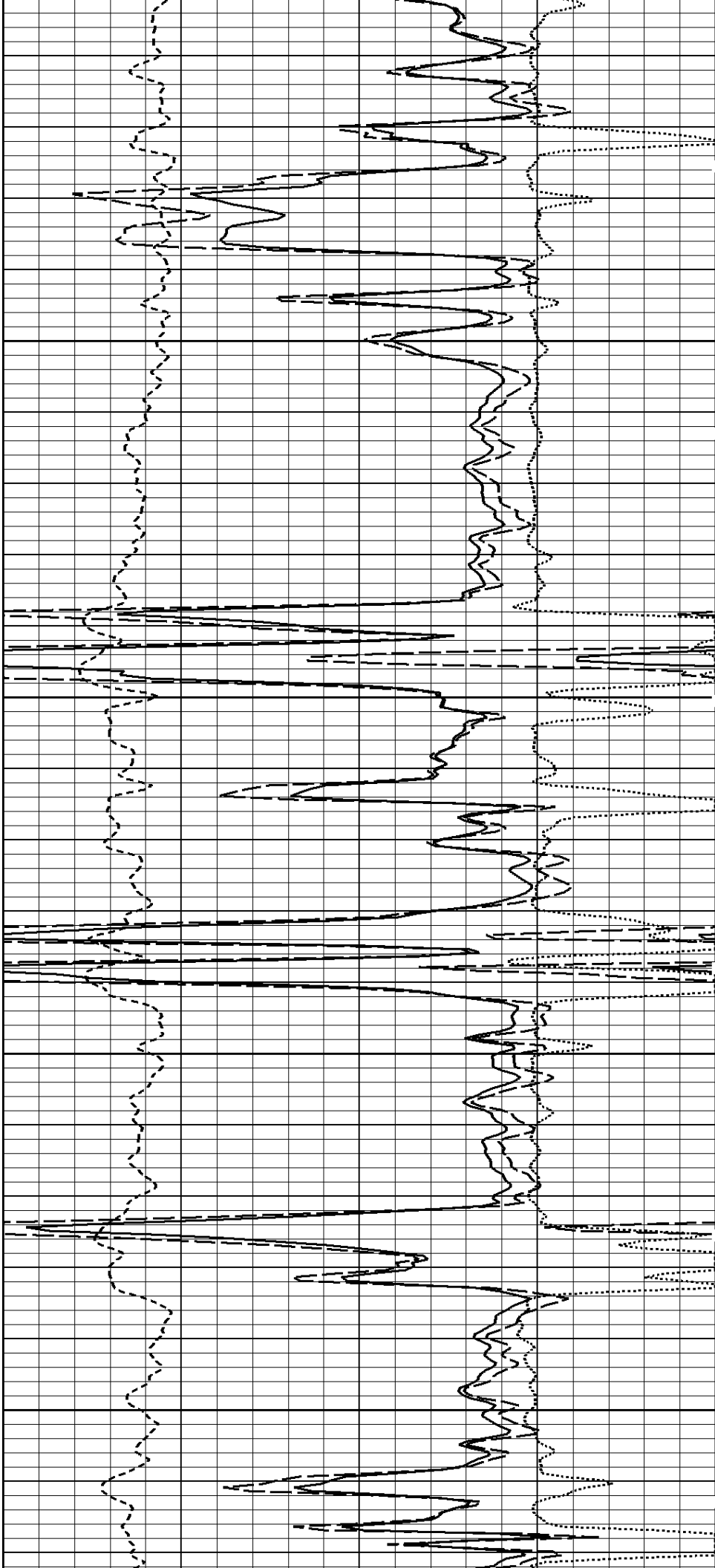


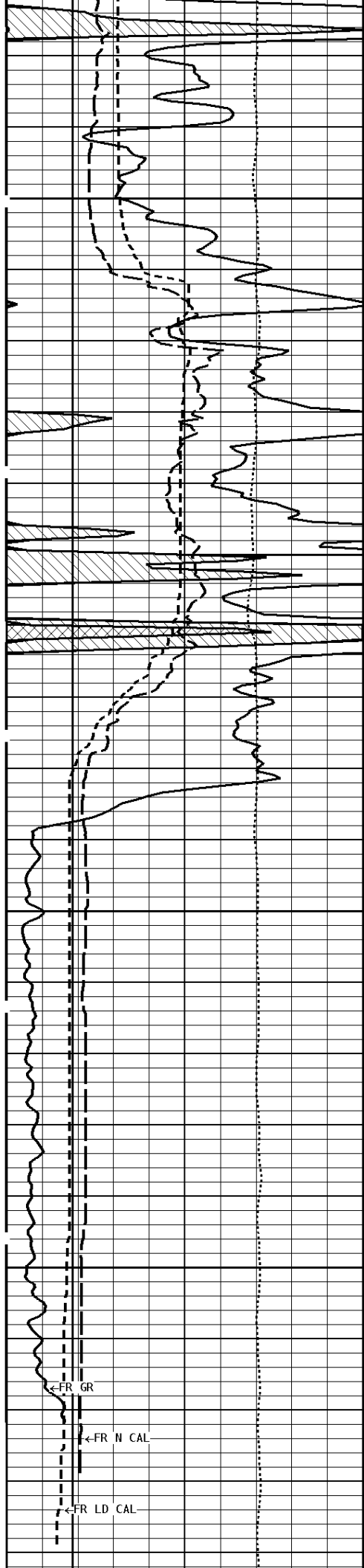
100Cu.Ft--

3900

4000

--100Cu.Ft





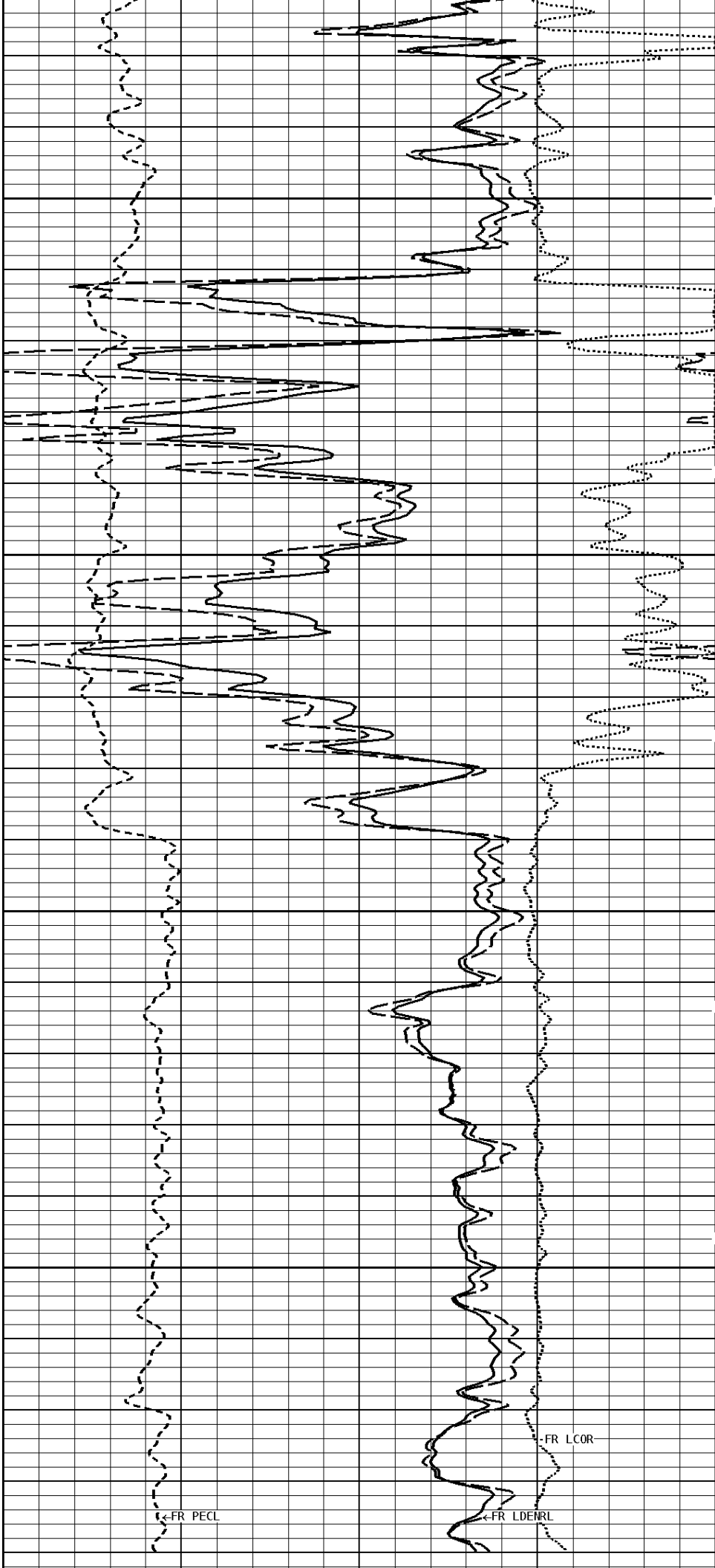
4100

4200

←FR GR

←FR N CAL

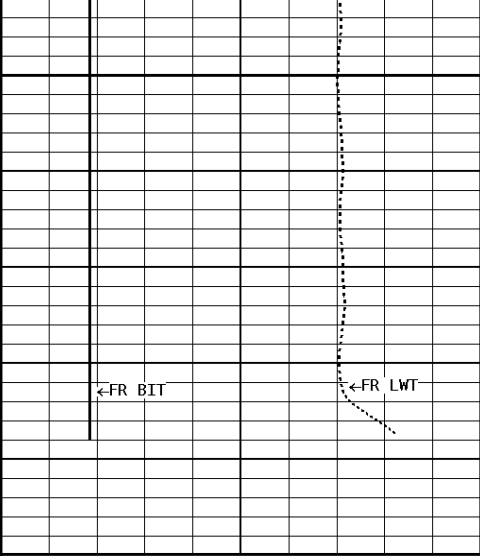
←FR LD CAL



←FR PECL

←FR LCOR

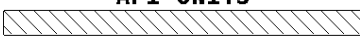
←FR LDENRL



4283

1:240 MAIN SECTION

BULK DENSITY

GAMMA RAY API UNITS 150  300 0 150	
TENSION LBS 10000 0	
DENSITY (X) CALIPER INCHES (IN) 16 26 6 16	
NEUTRON (Y) CALIPER INCHES (IN) 16 26 6 16	
BIT SIZE INCHES (IN) 6 16	

- BHV AHV -
CU. FT

DENSITY POROSITY (2.71g/cc) PERCENT 70 30 30 -10 -10 -50	
COMPENSATED BULK DENSITY G/CC 3.0 4.0 2.0 3.0 1.0 2.0	
PE CROSS-SECTION BARNs/ELECTRON 0 10	DENSITY CORRECTION G/CC -0.25 0.25

* 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 : 21-APR-2014			Time : 11:21		
Sensor Suite : GR-GR5			ID : GRT-BB-107		
	Measured	Units	Calibrated	Units	
	Background	Jig	Jig		
GR	75	381 CPS	175	GRAPI	
Shop Calibration CNT-AA					

Performed : 22-SEP-2014				Time : 10:50	
Sensor Suite : CALI-BCN				ID : NDT-BB-103	
CL # 1	Jig - Measured		Jig - Calibrated		Units
	Ring#1	Ring#2	Ring#1	Ring#2	
	9.1	14.0	6.0	12.0	IN.
Performed : 22-Sep-2014				Time : 10:07	
Sensor Suite : BHC NEUT				ID : CNP-AA-116-	
Source ID : N-1045					
N/F	Tank		Verification		Units
	Measured	Calibrated	Jig		
Porosity	3.8497	3.6893	3.6848		%
	23.0	20.5	20.4		

Shop Calibration					
LDT-DF					
Performed : 04-SEP-2014			Time : 13:21		
Sensor Suite : CALI-LTH			ID : PDT-GA-465		
	Jig - Measured		Jig - Calibrated		Units
	Ring#1	Ring#2	Ring#1	Ring#2	
CL # 1	7.2	10.9	6.0	12.0	IN.
Performed : 04-Sep-2014			Time : 11:38		
Sensor Suite : BHCPELNG			ID : LDP-DA-065		
Source ID : 2991GW					
Short Space					
	BKGD	Al	Mg	Al+Fe	Units
LSW1	68	1135	1823	720	CPS
LSW2	72	1368	2170	957	CPS
LSW3	267	3113	5000	2590	CPS
LSW4	333	2770	4008	2406	CPS
LSW5	31	56	62	51	CPS
LSW6	88	91	89	91	CPS
LSW7	55	59	58	59	CPS
LSW8	1	4	5	4	CPS
QS	0.237	0.209	0.208	0.213	
PES			2.778	5.967	
SSDN		2.600	1.680		G/CC
Long Space					
	BKGD	Al	Mg	Al+Fe	Units
LLW1	133	1332	5445	790	CPS
LLW2	176	2298	8926	1638	CPS
LLW3	533	4103	15396	3472	CPS
LLW4	534	1981	6289	1758	CPS
LLW5	65	73	134	71	CPS
LLW6	156	150	142	151	CPS
LLW7	105	102	95	102	CPS
LLW8	6	9	20	8	CPS
QL	0.192	0.190	0.199	0.192	
PEL			2.697	5.458	
LSDN		2.600	1.680		G/CC

Shop Calibration					
MST-DA					
Performed : 10-Sep-2014			Time : 10:05		
Sensor Suite : CALI-MSN			ID : MST-DA-26		
CL # 1	Jig - Measured		Jig - Calibrated		Units
	Ring#1	Ring#2	Ring#1	Ring#2	
	7.0	11.1	6.0	12.0	IN.
Performed : 10-Sep-2014			Time : 10:01		
Sensor Suite : MSTDA-NI			ID : MST-DA-26		
Internal					
	Measured		Calibrated		
	Zero	Reference	Zero	Reference	Units
INV-V	79.0	29879.9	0.00	1546.00	MV
NOR-V	0.0	29958.1	0.00	1546.00	MV
IN-C	0.0	30310.3	0.00	15.46	UA
INV-R				32.34	OHMM
NOR-R				55.11	OHMM

Performed : 10-Sep-2014			Time : 10:03		
Sensor Suite : MSTDAMSF			ID : MST-DA-26		
Internal					
	Measured			Calibrated	
Zone	Reference	Units	Zone	Reference	Units

	Zero	Reference	Units	Zero	Reference	Units
MSFC	24.0	58325.0		0.00	1522.00	UA
MSFB	32761.0	61949.3		0.00	1522.00	MA
MOM1	0.0	56443.2		0.00	1522.00	MV
MSFRA					43.30	OHMM



Tucker
ENERGY SERVICES

Company: MULL DRILLING COMPANY, INC.

Well: TJADEN "C" #4

Location: 1980' FSL & 660' FWL

Logged: 09-25-2014

K.B. Elev: 1486.0 Ft