

COMPENSATED NEUTRON PEL DENSITY MICRO LOG

LSD : **Sect :** 4 **Twp :** 8S **Rge :** 36W

Permanent Datum:		GL	Elevations:		Services:	
Drilling Measured From:	KB		KB	3330.00	Ft	CNT
Log Measured From:	KB		DF	3329.00	Ft	PIT
Above Permanent Datum:	5.00	Ft	GL	3325.00	Ft	MLT
Date	08-06-2019					
Run Number	1					
Depth--Driller	4880.0		Ft			
Depth--Logger	4878.0		Ft			
First Reading	4846.0		Ft			
Last Reading	285.0		Ft			
Casing--Driller	285.0		Ft			
Casing--Logger	285.0		Ft			
Bit Size	7.875		In			
Casing Size	8.625		In			
Hole Fluid Type	WBM					
Density	9.3					
Fluid Loss	8.0					
PH/Viscosity	11.0	59.0				
Sample Source	MEASURED					
RM@Measured Temp.	0.500 @ 70 F					
RMF@Measured Temp	0.400 @ 70 F					
RMCM@Measured Temp.	0.600 @ 70 F					
Source RMF/RMC	CALCULATED	CALCULATED				
RM@BHT	0.290 @ 125 F					
Time Circulation Stopped	08-06-2019 19:30					
Max. Recorded Temp.	125	F				
Equipment/Base	1022	TULSA, OK				
Recorded By	SHELDON TYLER					
Witnessed By	TIM PRIEST					

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	4880.00	8.625	32.00	285.00	0.00

Run Number	1		
Date	08-06-2019		
Date/Time On Bottom	08-06-2019 22:30		
Depth to Fluid	0.0 Ft		
Salinity	5800.000		
RMF@BHT	0.230 @ 125 F		
RMC@BHT	0.350 @ 125 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 3900'

GRT: GRP, GRX

CNT: PHIN, CLCNIN, PHXN

LDT: PORL, LCORN, PECLN, LDENN, PORLLS, CLLDIN, PRXL, PECLX, LDENNX, LCORX

MLT: NOR_RF, INV_RF, MSCLPIN

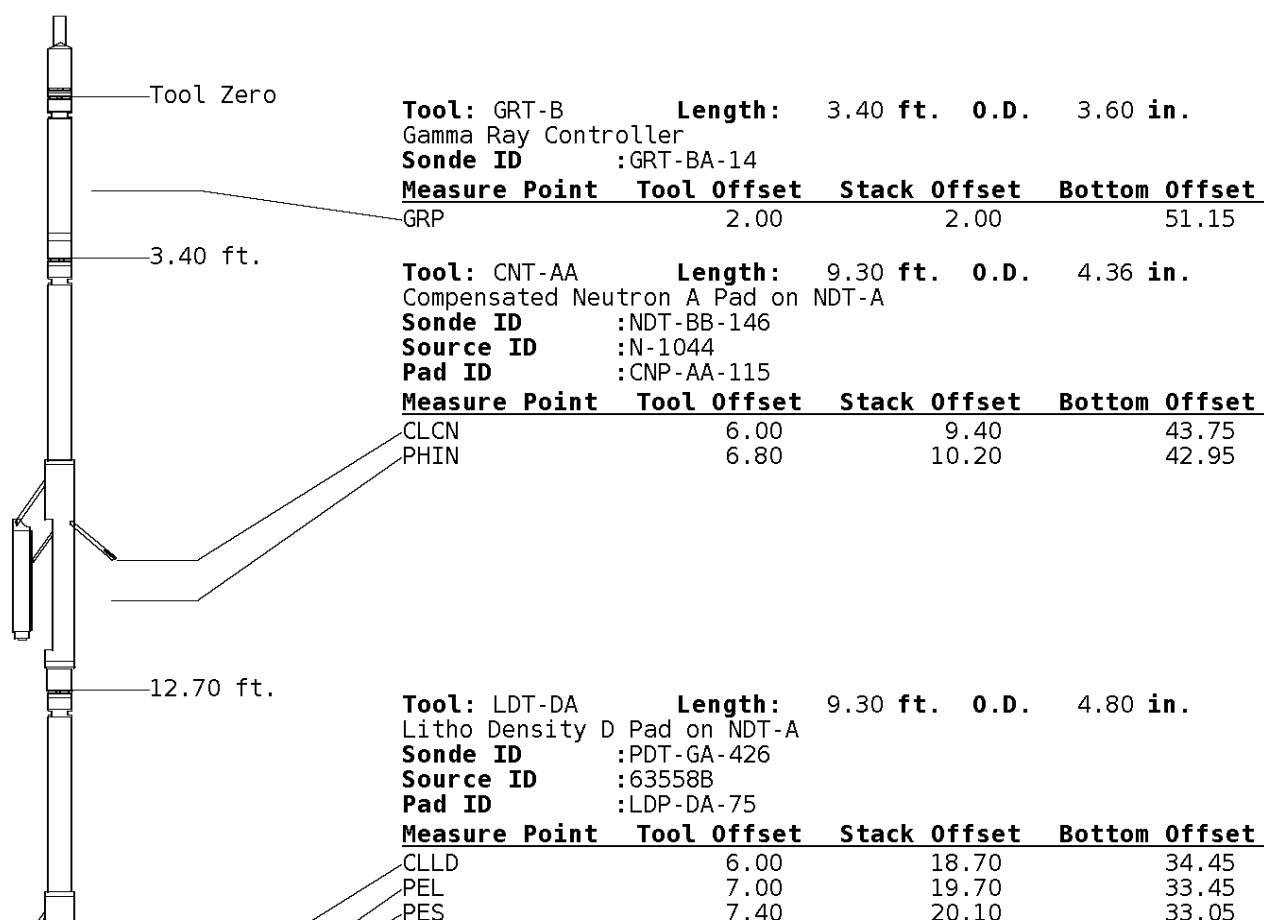
PIT: ILD, ILM, SPU, SFLAEC, CIRD

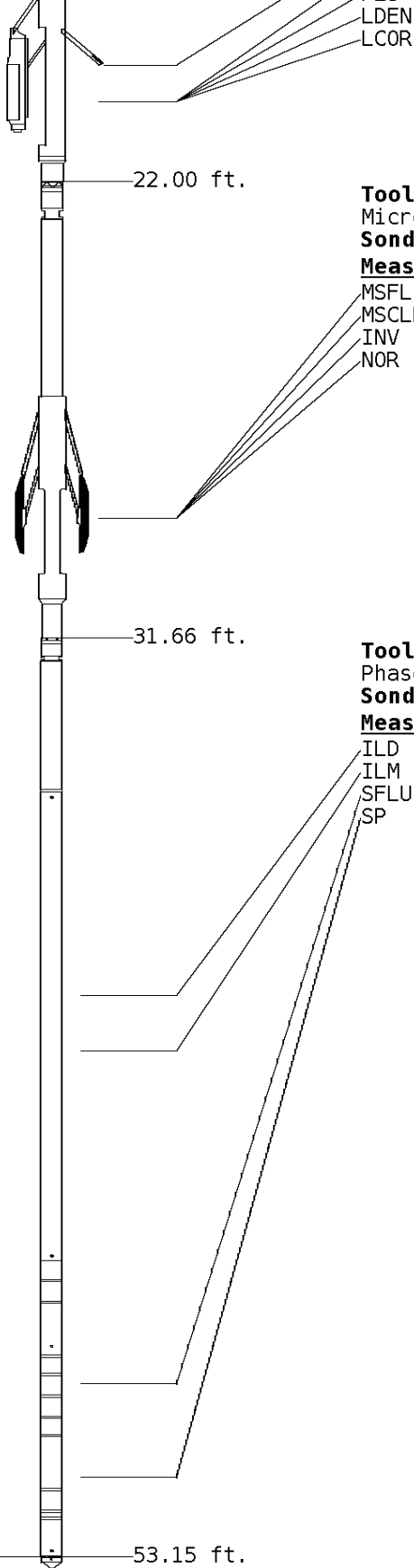
OPERATORS:

K.WARREN

Tool String Schematic

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





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 CRUMRINE 1-4 AUGUST6_MSTK

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

Segment: V1.D1.S5 Reprocess of MAIN

Acquired: 2019-08/06 22:52 3.4.1-13968

Reference: 0

Processed: 2019-08/07 00:05 3.4.1-13968

**CALIPER MICRO
INCHES (IN)**

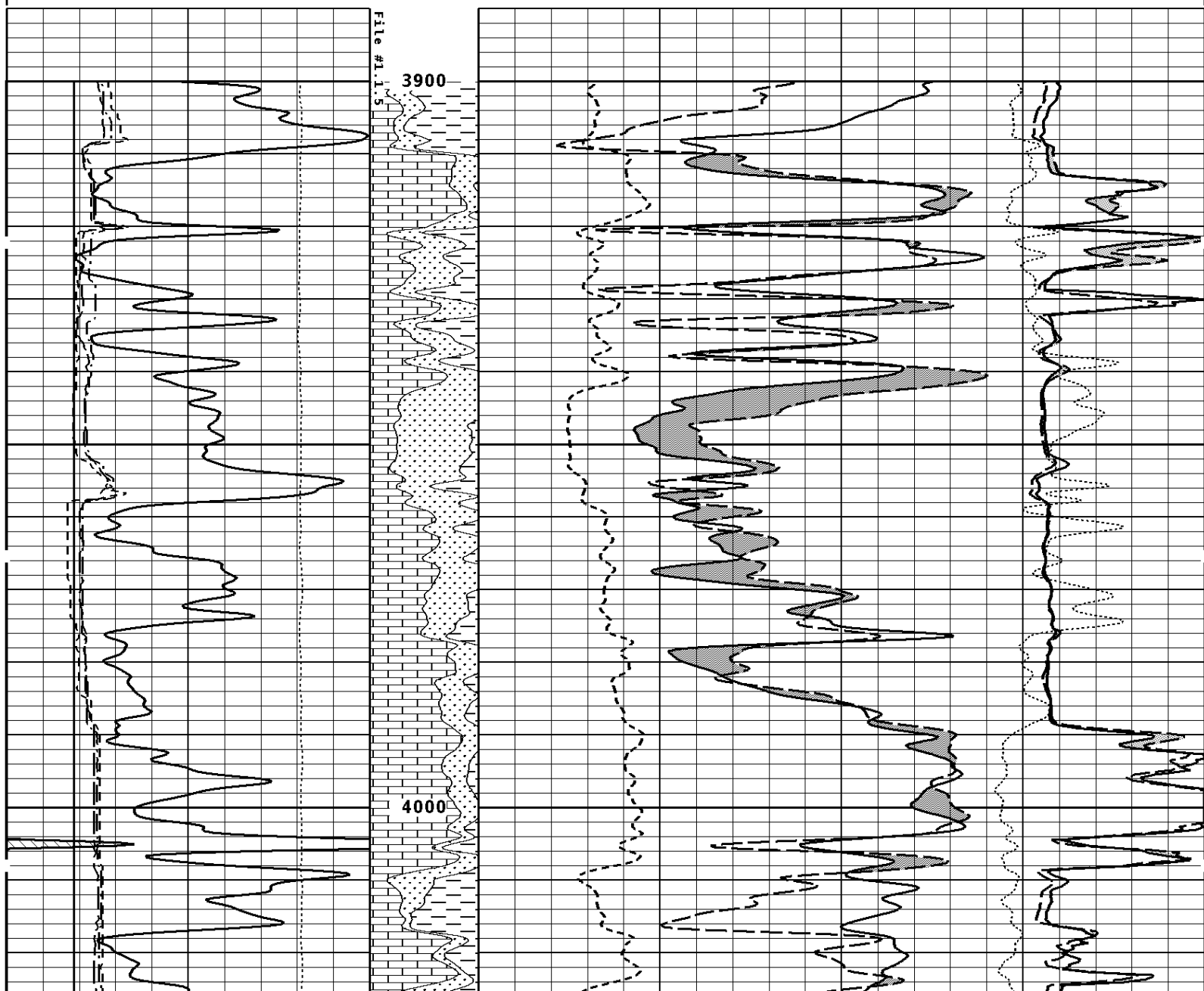
16 26
6 16

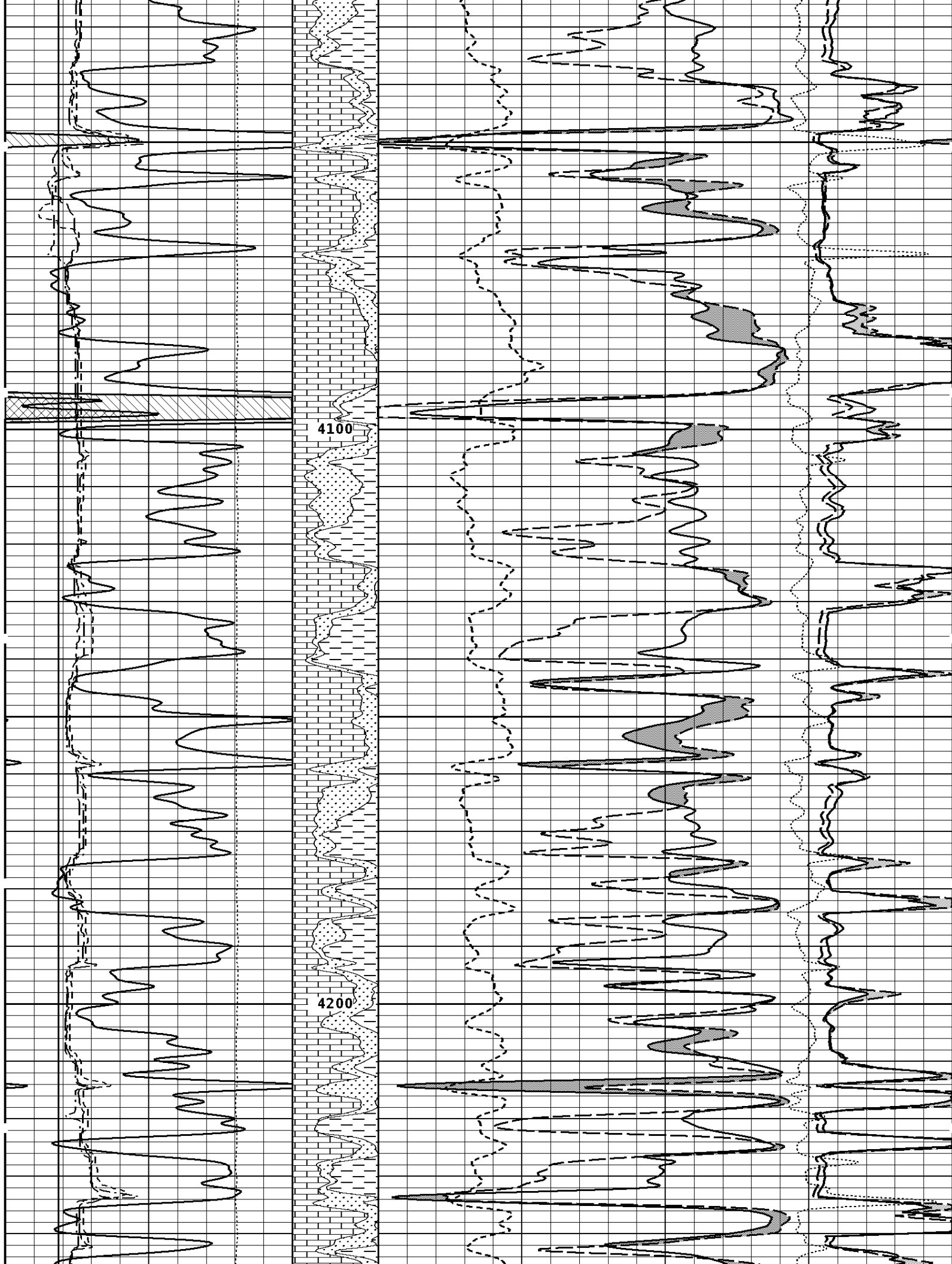
**BIT SIZE
INCHES (IN)**

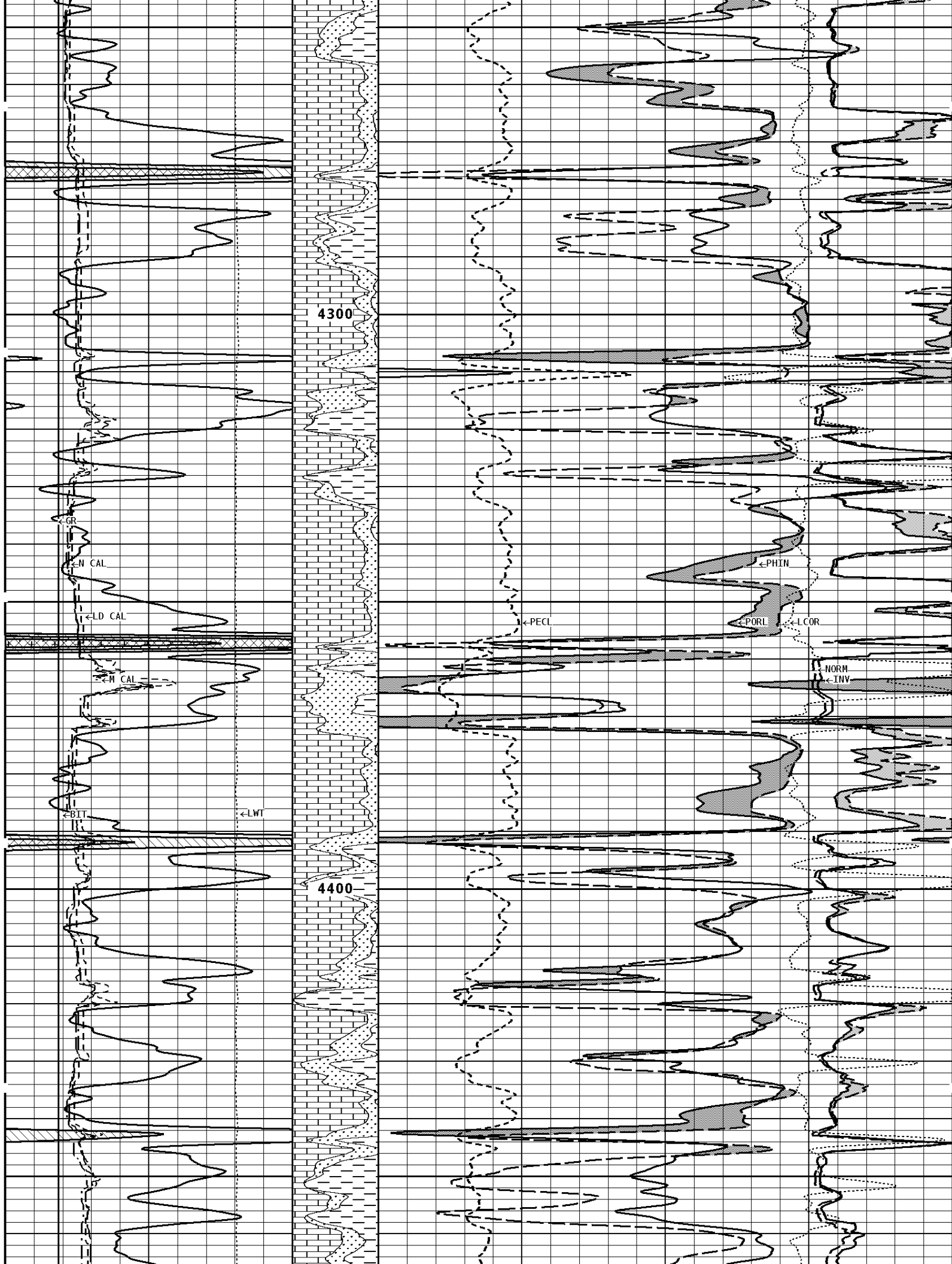
**NORMAL
OHMM**

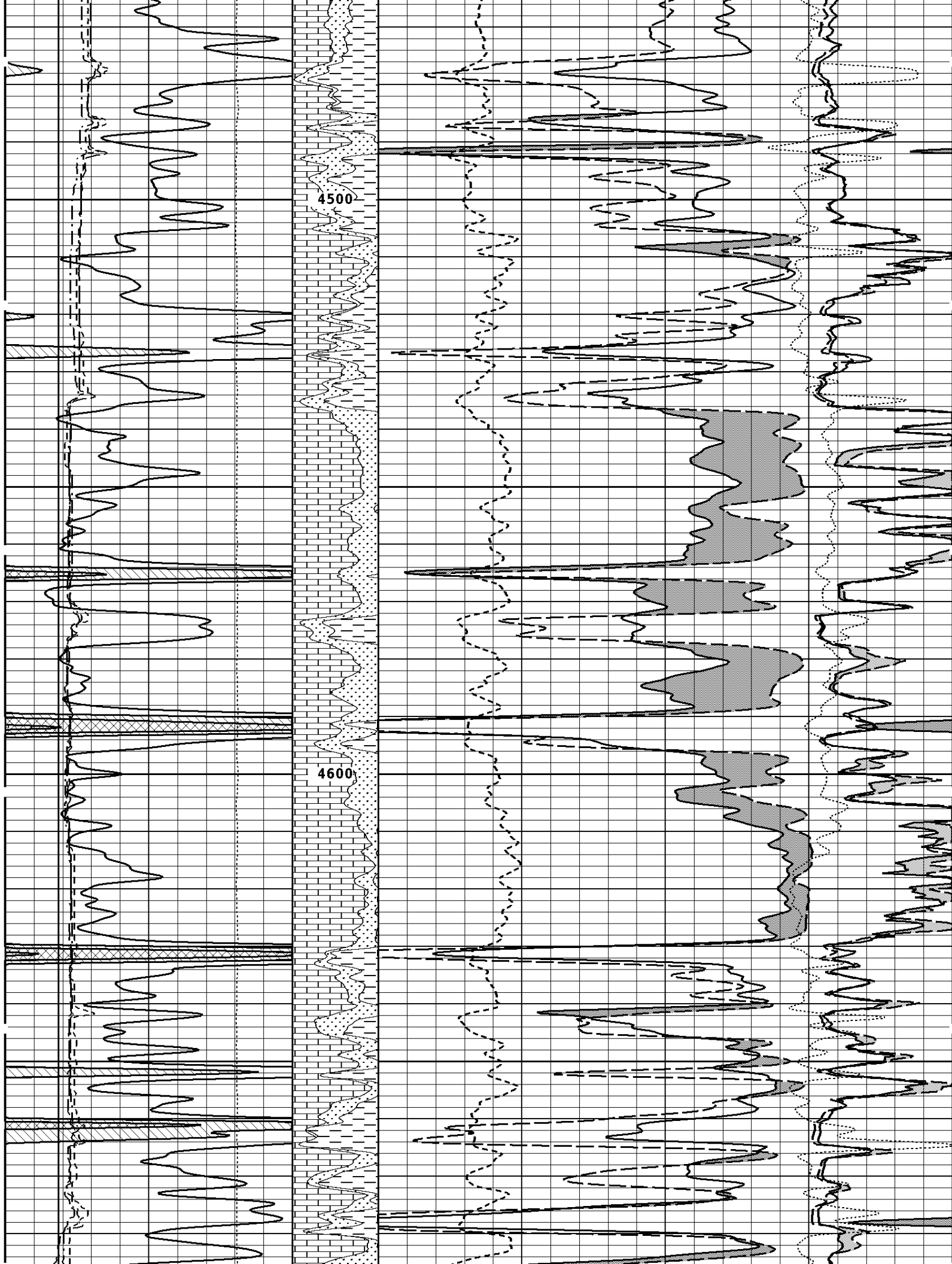
6	16				0	40
NEUTRON (Y) CALIPER INCHES (IN)					INVERSE OHMM	
16	26				0	40
6	16					
DENSITY (X) CALIPER INCHES (IN)		Volume Quartz	PE CROSS-SECTION BARNs/ELECTRON		DENSITY CORRECTION G/CC	
16	26					
6	16		0	10	-0.25	0.25
TENSION LBS		Volume Calcite	DENSITY POROSITY (2.71g/cc) PERCENT			
			70	30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

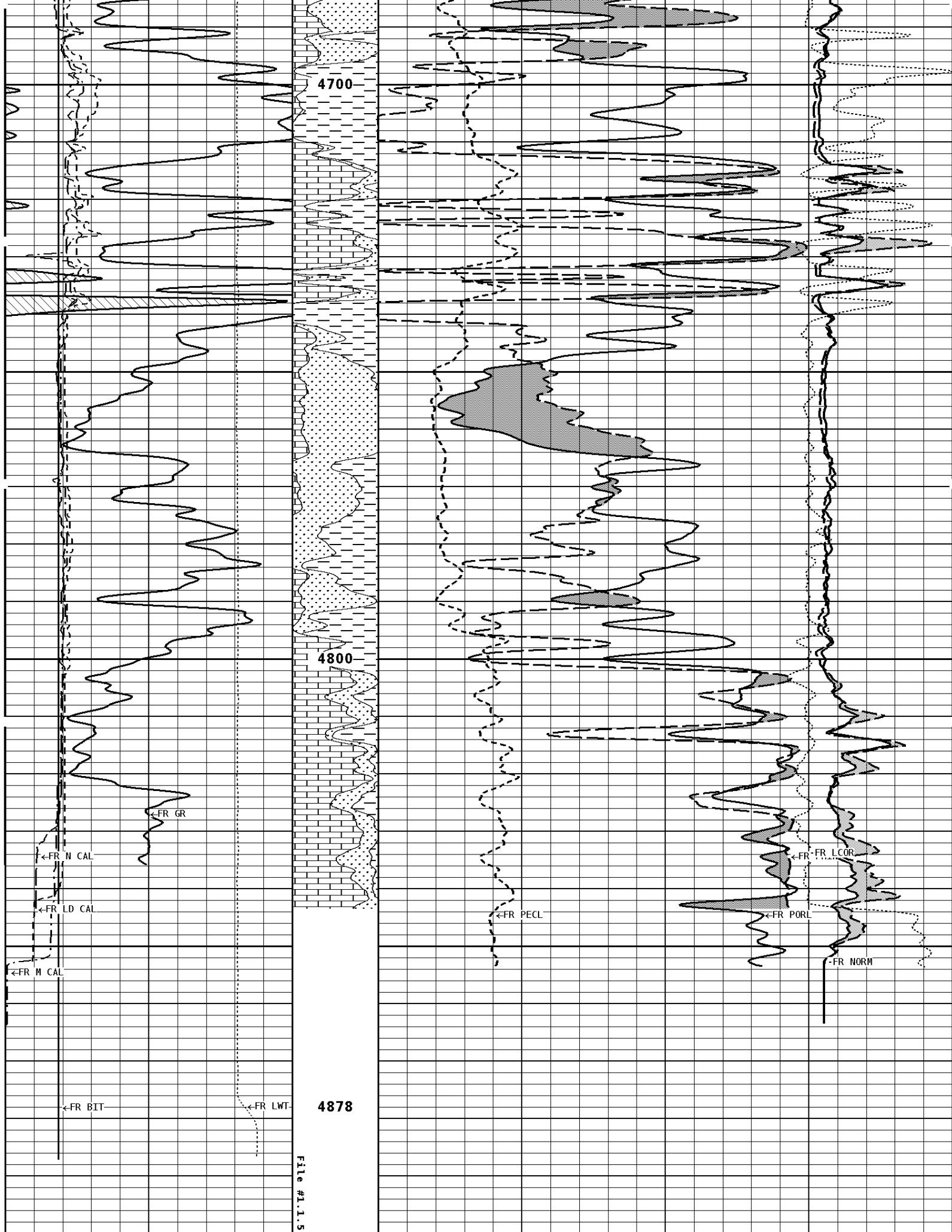
1:240 MAIN SECTION



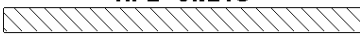
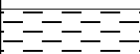
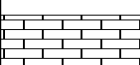








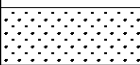
1:240 MAIN SECTION

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

*** Borehole Zone Factors ***

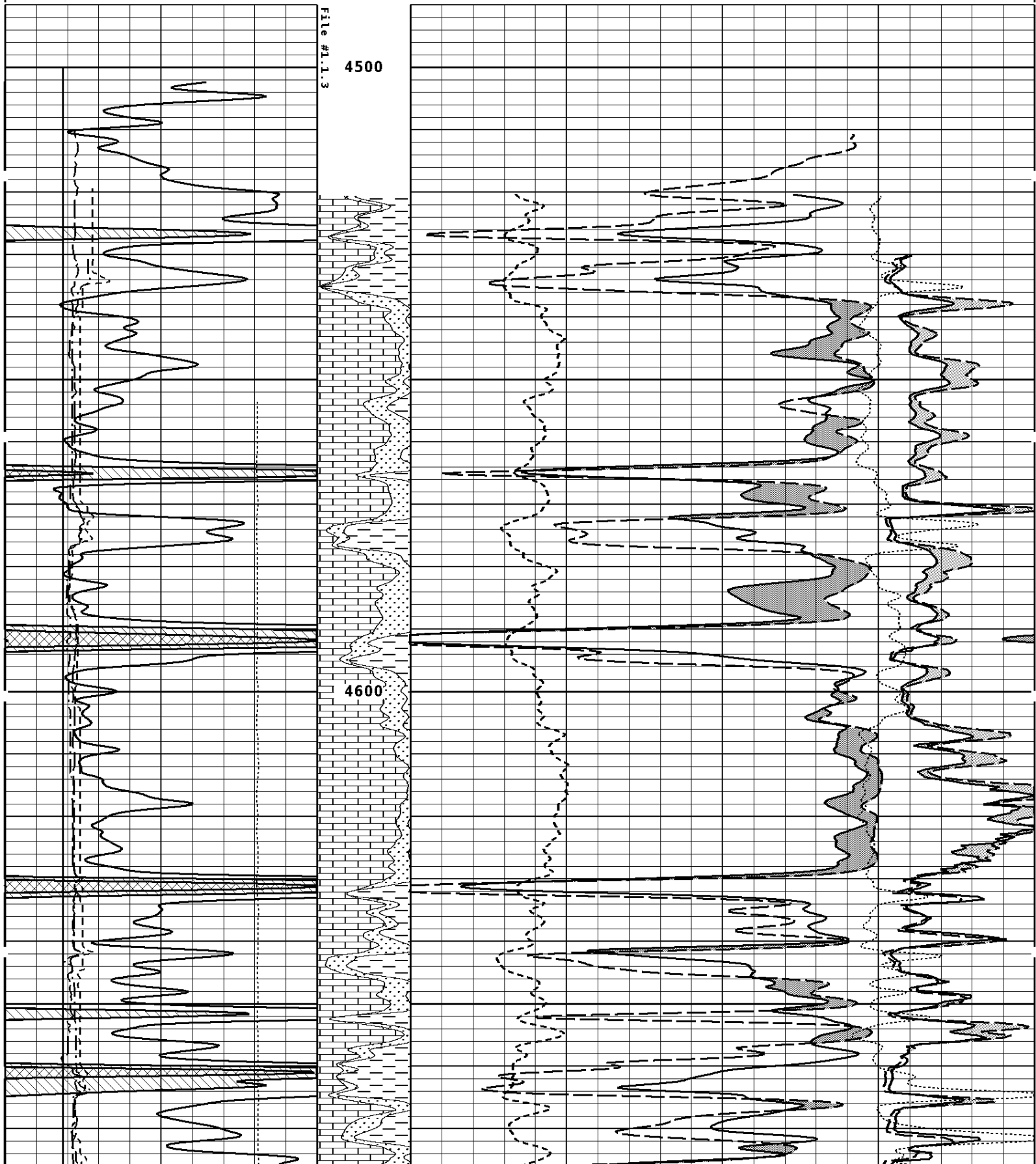
Zone 1 99999.0 to 0.0 Feet		
Matrix Density _____	2.71	g/cc
Fluid Density _____	1.00	g/cc
Formation Matrix _____	Limestone	
Drill Bit Size _____	7.875	in
Casing Diameter _____	5.500	in
Casing Thickness _____	0.250	in
Casing Correction (PHI N) _____	Disable	

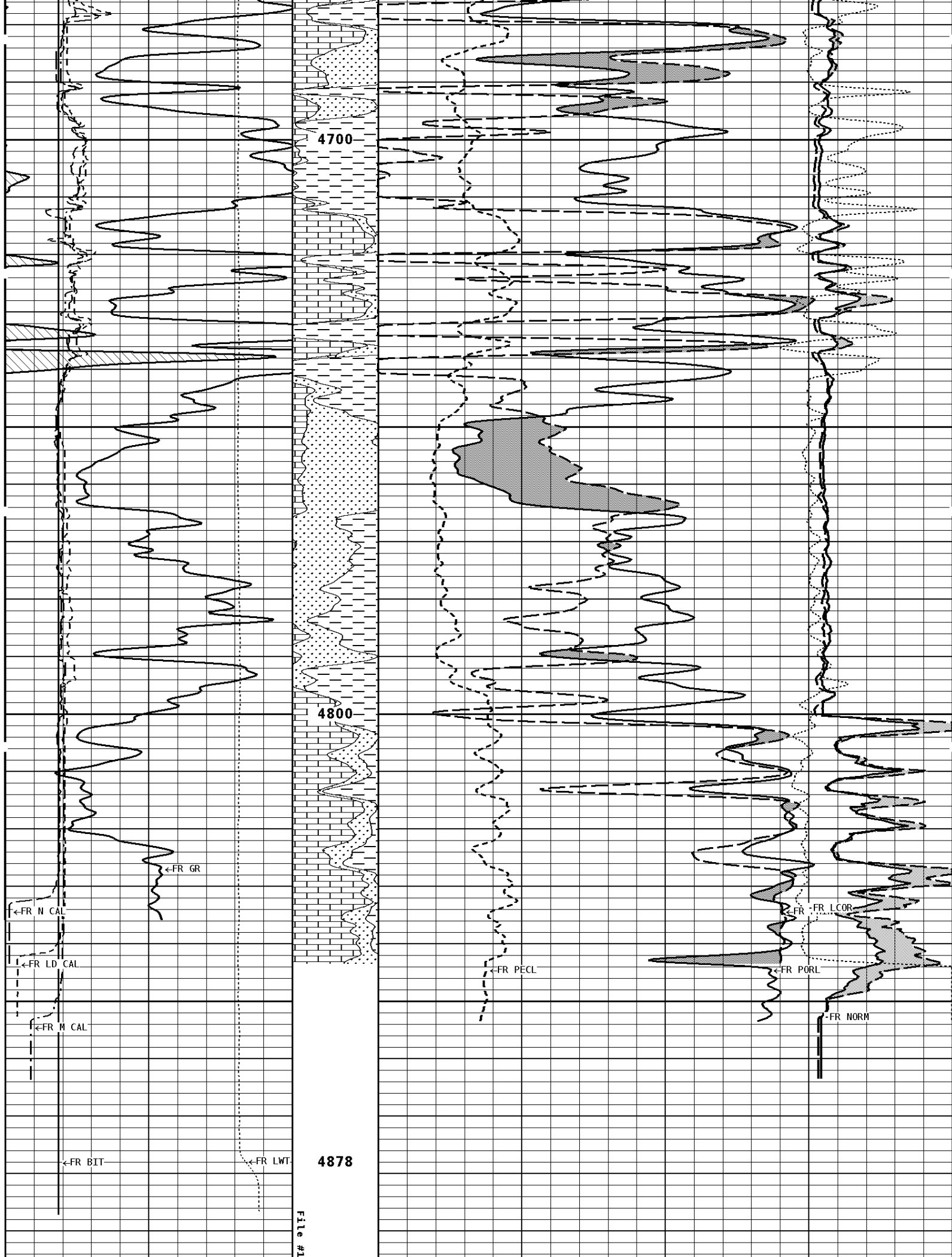
Well File: VAL ENERGY CRUMRINE 1-4 AUGUST6_MSTK	Scale: 1:240	Format: NLD-240
Segment: V1.D1.S3 Reprocess of REPEAT	Acquired: 2019-08/06 22:38 3.4.1-13968	
Reference: 0	Processed: 2019-08/06 22:48 3.4.1-13968	

CALIPER MICRO INCHES (IN) 16 26 6 16				
BIT SIZE INCHES (IN) 6 16				
NEUTRON (Y) CALIPER INCHES (IN) 16 26 6 16				
DENSITY (X) CALIPER INCHES (IN) 16 26 6 16		Volume Quartz  0 10	PE CROSS-SECTION BARNs/ELECTRON ----- 10	DENSITY CORRECTION G/CC ----- -0.25 0.25
TENSION LBS 10000 0		Volume Calcite  70 30 -10	DENSITY POROSITY (2.71g/cc) PERCENT ----- 30 -10 -50	

GAMMA RAY API UNITS 150 0 300 150	Volume DoLo/Shale	NEUTRON POROSITY (LIMESTONE) PERCENT -10 -50
		30 -10

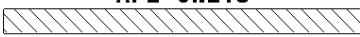
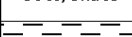
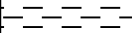
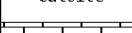
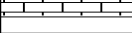
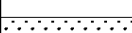
1:240 REPEAT SECTION





File #1.

1:240 REPEAT SECTION

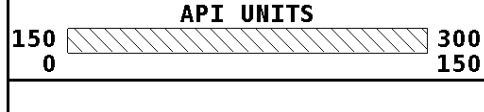
GAMMA RAY API UNITS 150  300 0 150		Volume Dolo/Shale  30  -10	NEUTRON POROSITY (LIMESTONE) PERCENT 30 -10	
TENSION LBS 10000 0		Volume Calcite  70  30  -10	DENSITY POROSITY (2.71g/cc) PERCENT 30 -10 -50	
DENSITY (X) CALIPER INCHES (IN) 16 26 6 16		Volume Quartz  0  10	PE CROSS-SECTION BARNS/ELECTRON 0 10	DENSITY CORRECTION G/CC -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: VAL ENERGY CRUMRINE 1-4 AUGUST6_MSTK	Scale: 1:240	Format: LDT-240
Segment: V1.D1.S5 Reprocess of MAIN	Acquired: 2019-08/06 22:52 3.4.1-13968	
Reference: 0	Processed: 2019-08/07 00:05 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		DENSITY POROSITY (2.71g/cc)	



CU. FT

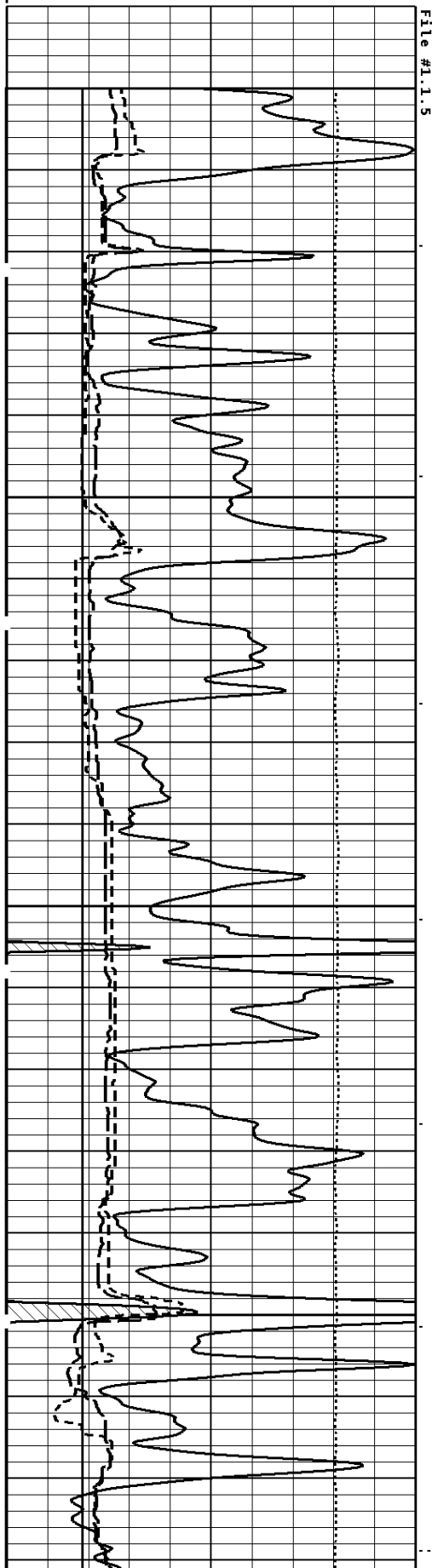
70
30
-10

PERCENT

30
-10
-50

1:240 MAIN SECTION

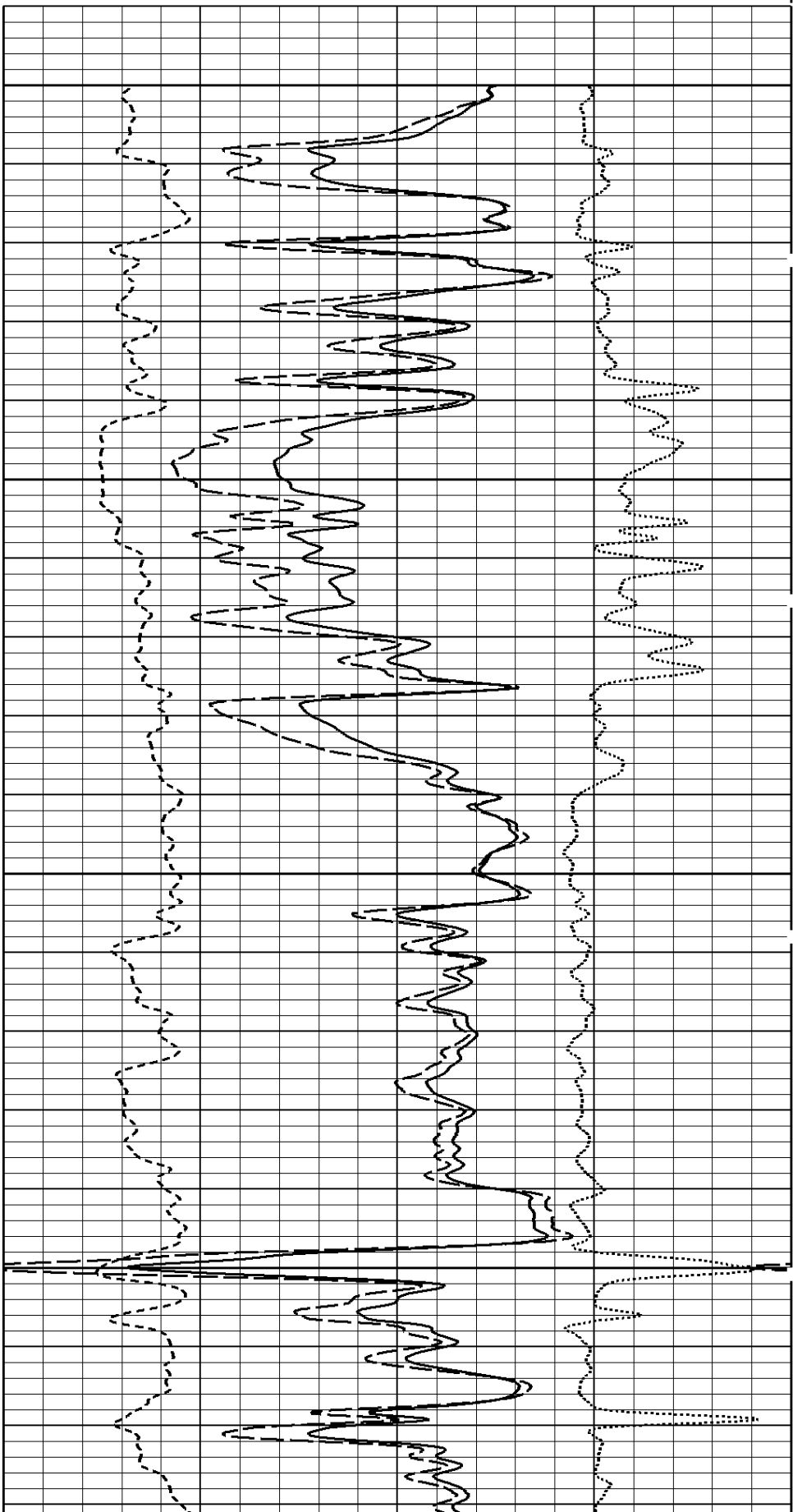
BULK DENSITY

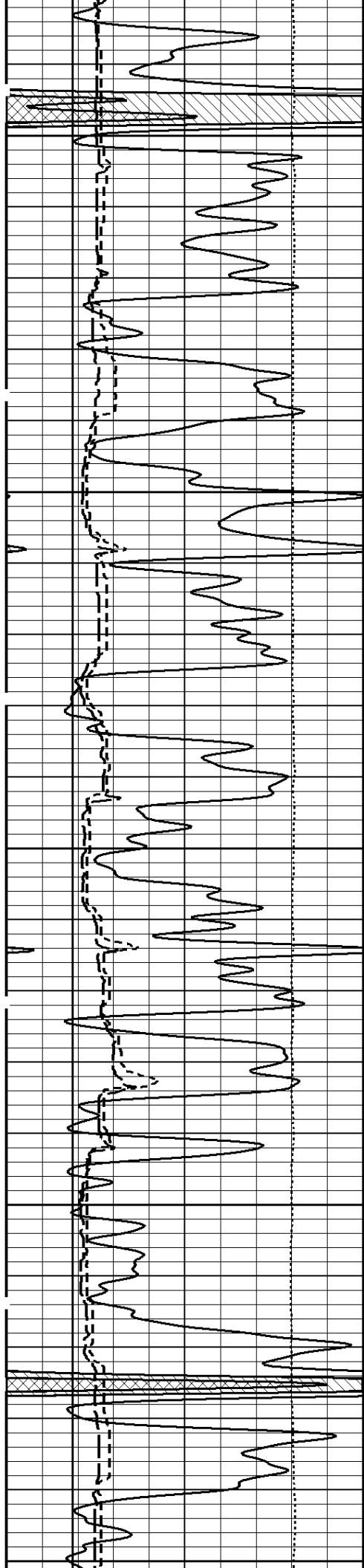


3900

200Cu.Ft--

4000

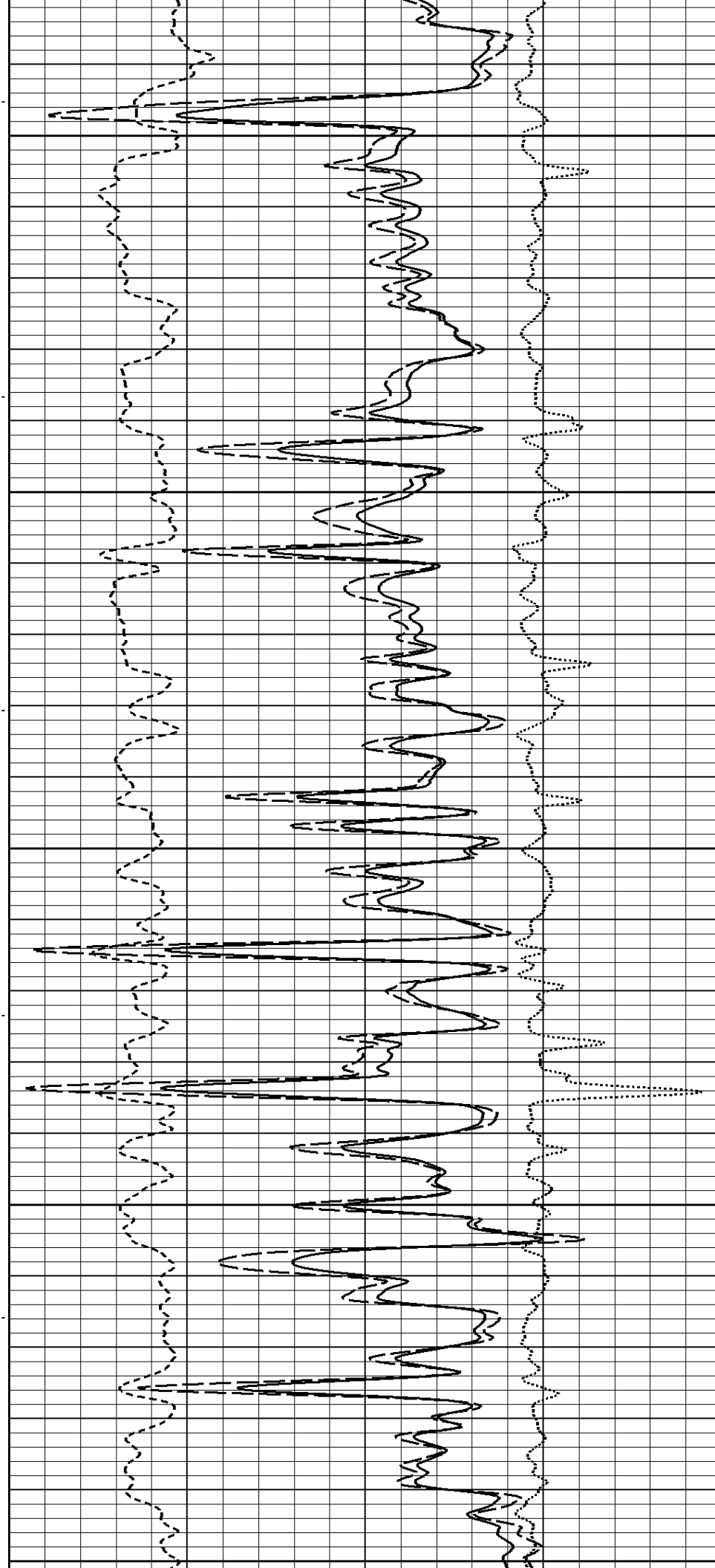


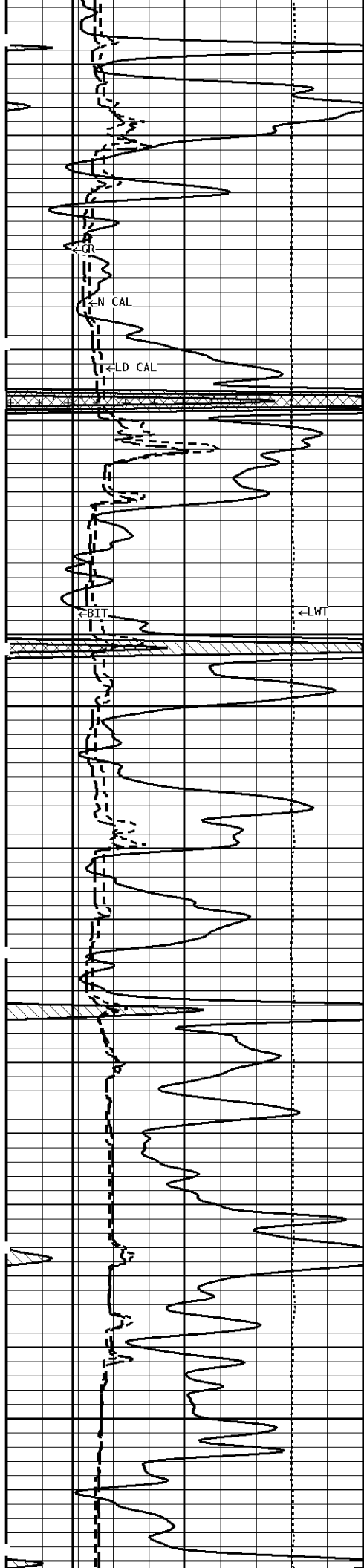


4100

4200

4300



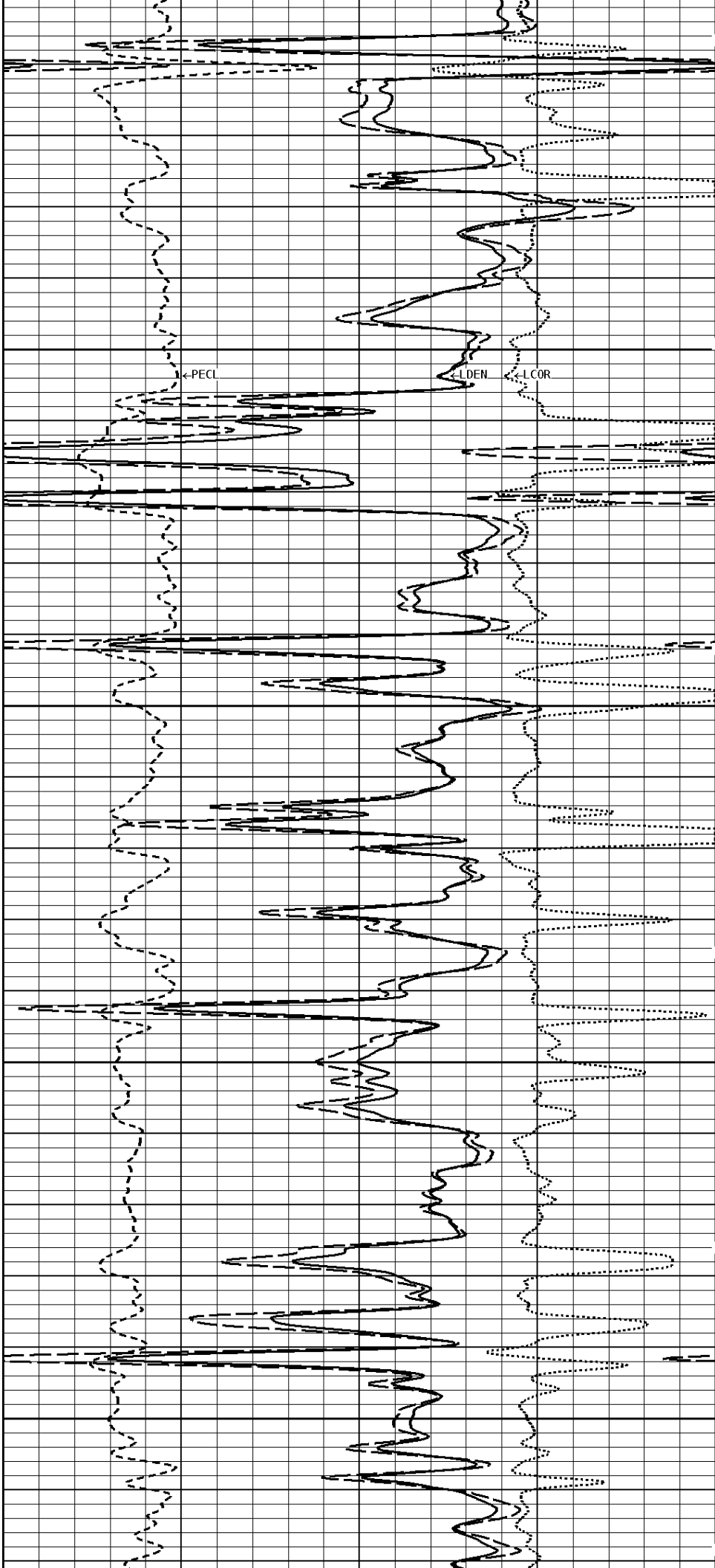


--200Cu.Ft

100Cu.Ft--

4400

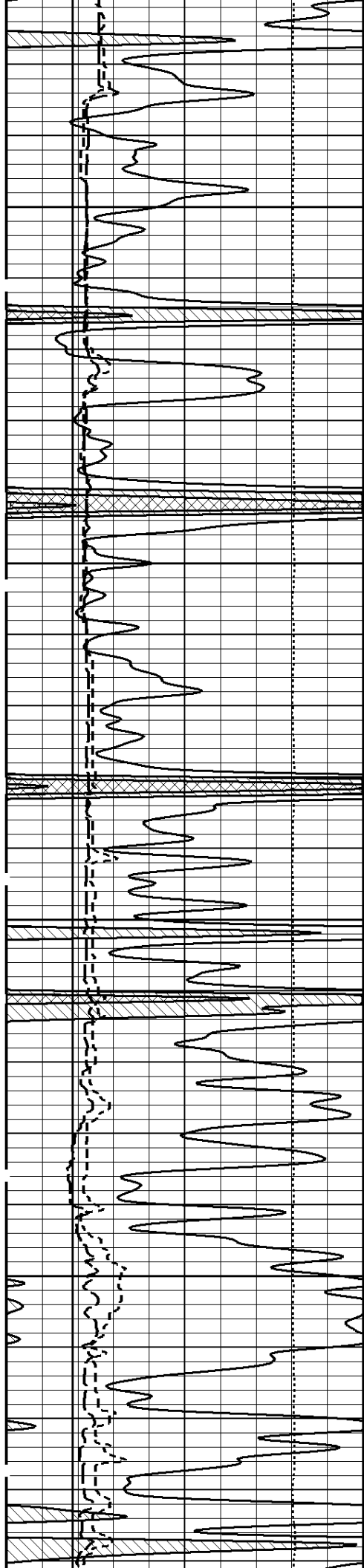
4500



--PECL

--LDEN

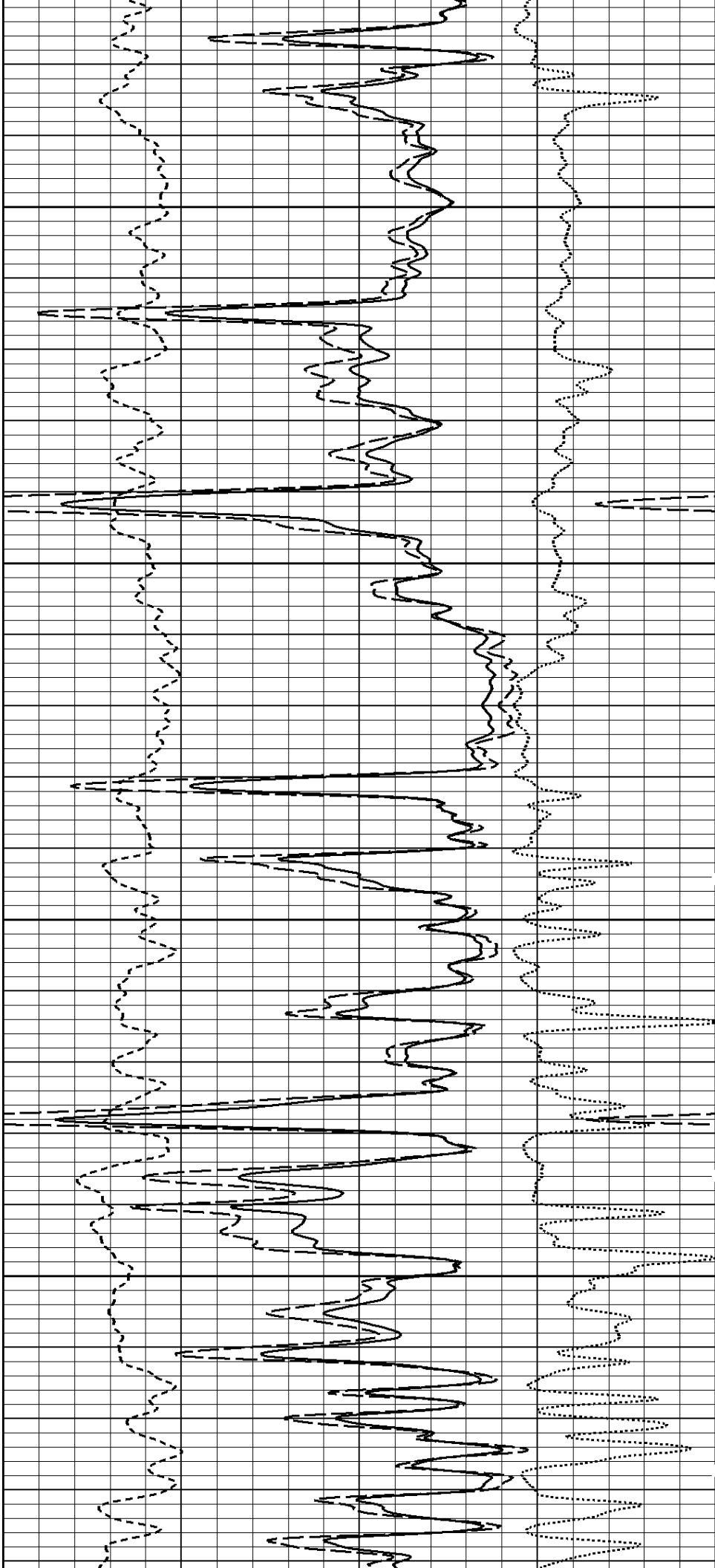
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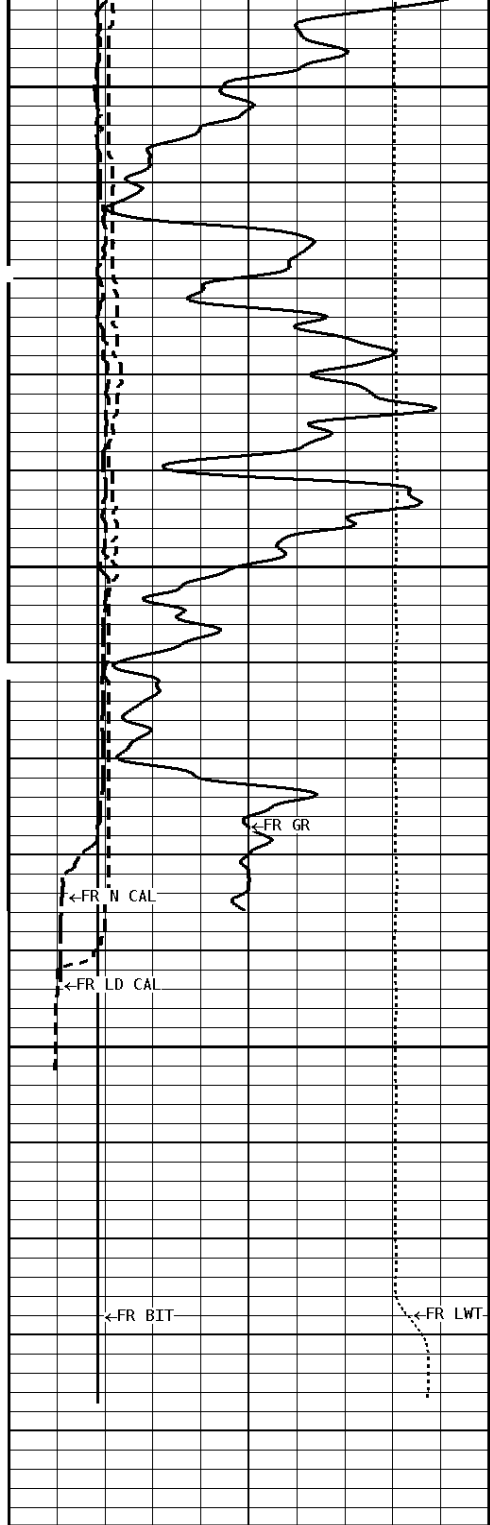


--100Cu.Ft

4600

4700

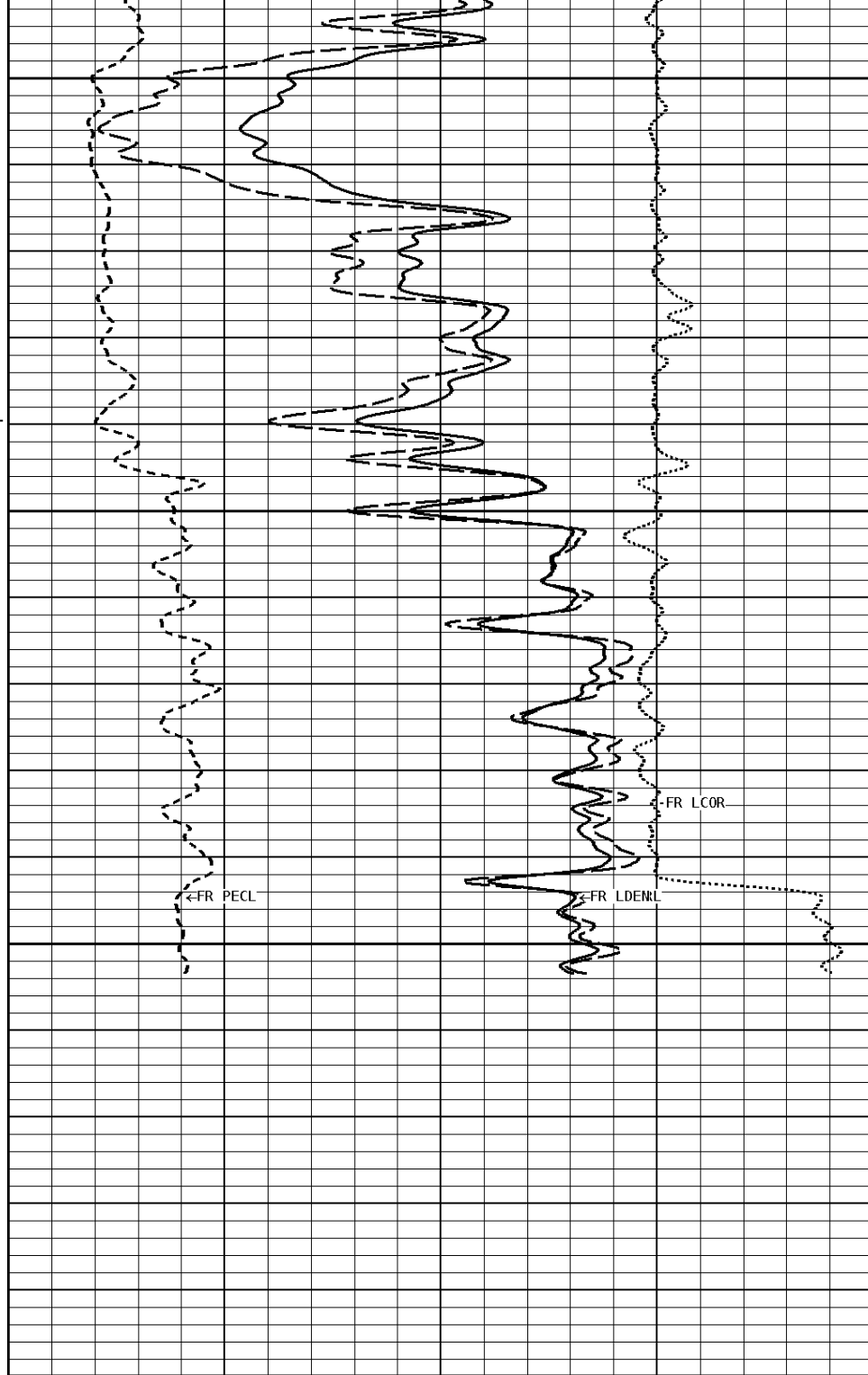




4800

4878

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 -10 30 -10 -50	
TENSION LBS 10000 0		COMPENSATED BULK DENSITY G/CC 3.0 2.0 1.0 4.0 3.0 2.0	
DENSITY (X) CALIPER INCHES (IN) 16 6 26 16		PE CROSS-SECTION BARN/ELECTRON 0 10	DENSITY CORRECTION G/CC -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 : 16-May-2019			Time : 10:26		
Sensor Suite : GR-GR5			ID : GRT-BA-14		
	Measured	Units	Calibrated	Units	
	Background Jig		Jig		
GR	64 323	CPS	160		GRAPI

Shop Calibration CNT-AA					
Performed : 27-JUN-2019			Time : 10:45		
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 : 27-Jun-2019			Time : 10:53		
Sensor Suite : BHC NEUT			ID : CNP-AA-115		
Source ID : N-1044					
	Tank		Verification	Units	
	Measured Calibrated		Jig		
N/F	4.1480 3.6893		3.6897		
Porosity	28.1 20.5		20.5		%

Shop Calibration LDT-DA					
Performed : 27-JUN-2019			Time : 09:45		
Sensor Suite : CALI-LTH			ID : PDT-GA-426		
	Jig - Measured		Jig - Calibrated	Units	
	Ring#1 Ring#2		Ring#1 Ring#2		
CL # 1	7.7 11.2		6.0 12.0		IN.

Performed : 27-Jun-2019			Time : 10:01		
Sensor Suite : BHCPELNG			ID : LDP-DA-75		
Source ID : 63558B					
Short Space					
	BKGD	Al	Mg	Al+Fe	Units
LSW1	53	1182	1909	754	CPS
LSW2	53	1418	2251	1001	CPS
LSW3	203	3216	5208	2698	CPS
LSW4	253	2763	4005	2418	CPS
LSW5	24	47	56	45	CPS
LSW6	69	72	71	72	CPS
LSW7	42	48	46	47	CPS
LSW8	2	4	5	3	CPS
QS	0.250	0.204	0.211	0.216	
PES			2.778	5.967	
SSDN		2.600	1.680		G/CC
Long Space					
	BKGD	Al	Mg	Al+Fe	Units
LSW1	81	1224	4007	720	CPS

LLW1	81	1224	4997	729	CPS
LLW2	91	2364	9269	1682	CPS
LLW3	344	4431	16903	3777	CPS
LLW4	446	2002	6683	1801	CPS
LLW5	50	62	127	59	CPS
LLW6	139	136	130	137	CPS
LLW7	90	87	83	87	CPS
LLW8	3	6	17	6	CPS
QL	0.212	0.220	0.219	0.223	
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
CL # 1	Ring#1	Ring#2	Ring#1	Ring#2	
	6.8	11.2	6.0	12.0	IN.

Performed : 15-MAY-2019 Time : 10:37
Sensor Suite : MSTDA-NI ID : MST-DA-024

	Internal				Internal			
	Zero	Measured Reference	Units		Zero	Calibrated 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				Internal			
	Zero	Measured Reference	Units		Zero	Calibrated 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	



Company: VAL ENERGY, INC
Well: CRUMRINE #1-4
Location: 788' FSL & 1414' FWL
Logged: 08-06-2019
K.B. Elev: 3330.0 Ft