



Tucker
ENERGY SERVICES

COMPENSATED NEUTRON
PEL DENSITY MICRO LOG

Company GRAND MESA OPERATING COMPANY
Well RICHARDS #12-5
Field WILDCAT
County COFFEY
State KANSAS
Country USA
API No. 15-031-23855

File No : TUL-59250
Company : GRAND MESA OPERATING COMPANY
Well : RICHARDS #12-5
Field : WILDCAT
County : COFFEY
State : KANSAS
Country : USA
API No : 15-031-23855

Location :
1490' FSL & 2805' FEL
SW SW NW SE

LSD : Sect : Twp : Rge :

Permanent Datum: GL
Drilling Measured From: GL
Log Measured From: GL
Above Permanent Datum: 0.00 Ft
Date: 03-27-2014

Elevations:
KB 0.00 Ft
DF 0.00 Ft
GL 1044.00 Ft

Services:
CNT
LDT
MLT

Run Number	1		
Depth--Driller	1142.0	Ft	
Depth--Logger	1137.0	Ft	
First Reading	1114.0	Ft	
Last Reading	45.0	Ft	
Casing--Driller	45.0	Ft	
Casing--Logger	45.0	Ft	
Bit Size	6.750	In	
Casing Size	8.625	In	
Hole Fluid Type	WBM		
Density	0.0		
Fluid Loss	0.0		
PH/Viscosity	0.0	0.0	
Sample Source	MEASURED		
RMF@Measured Temp.	5.000	@ 50 F	
RMF@Measured Temp	4.250	@ 50 F	
RMF@Measured Temp.	5.750	@ 50 F	
Source RMF/RMC	CALCULATED	CALCULATED	
RM@BHT	3.600	@ 86 F	
Time Circulation Stopped			
Max Recorded Temp.	86	F	
Equipment/Base	T-123	TULSA	
Recorded By	S. DAVIS		
Witnessed By	S. STRIBLING		

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)
6.750	1137.00	8.625	30.00	45.00	0.00

Run Number	1	
Date	03-27-2014	
Date/Time On Bottom	03-27-2014 11:15 am	
Depth to Fluid	0.0 Ft	
Salinity	0.000	
RMF@BHT	3.060 @ 86 F	
RMC@BHT	4.140 @ 86 F	

Run Number 1

Comments

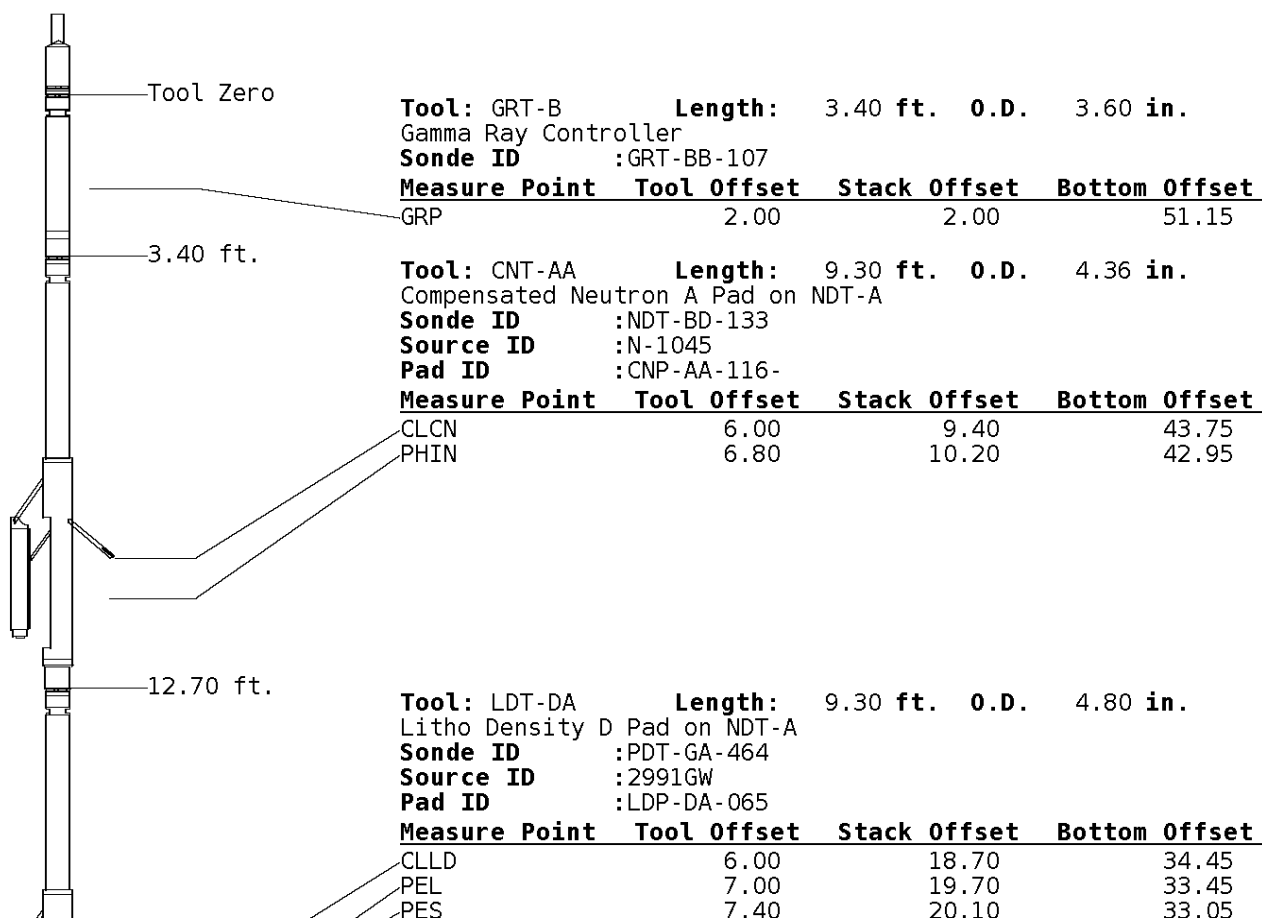
ALL PRESENTATION PER CUSTOMER REQUEST
 GRT,CNT,LDT,PIT RUN IN COMBINATION
 CALIPERS ORIENTED ON X-Y AXIS
 2.71 G/CC USED TO CALCULATE POROSITY
 ANNULAR & BOREHOLE VOLUME CALCULATED USING 2.875 PRODUCTION CASING
 PHIN IS CALIPER CORRECTED

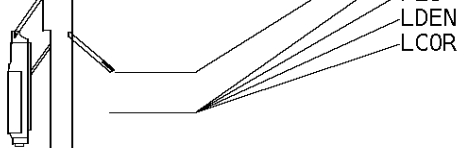
GRT; GRP
 CNT; PHIN, CLCNIN
 LDT; PORL, LCORN, PECLN, LDENN, CLLDIN
 PIT; ILD, ILM, SPU, SFLAEC, CIRD

OPERATORS;
 J. KLINE
 C. GONZALES

Tool String Schematic

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

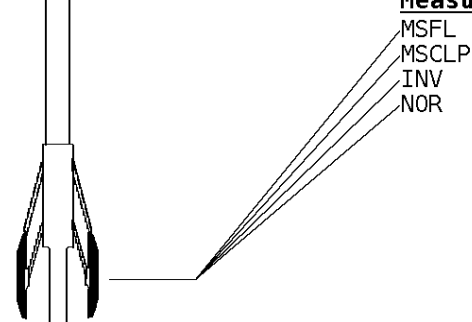




7.20	19.90	33.25
7.20	19.90	33.25

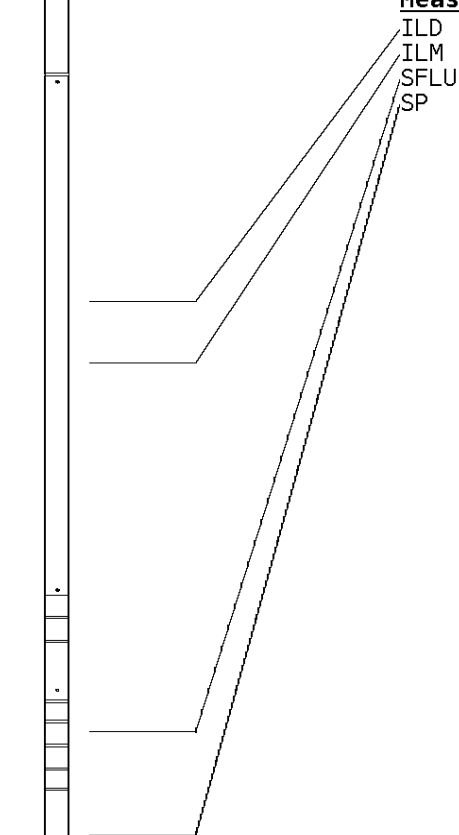
Tool: MST-DA **Length:** 9.66 ft. **O.D.** 6.00 in.
 Micro Spherically Focused (IC)
Sonde ID :MST-DA-057

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-AB-005

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



LWT — 53.15 ft.

Well File: gran-rich-12-5-mstk-mar-27

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

Segment: V1.D1.S5 MN

Acquired: 2014-03/27 11:16 3.3.0-12594

Reference: 0

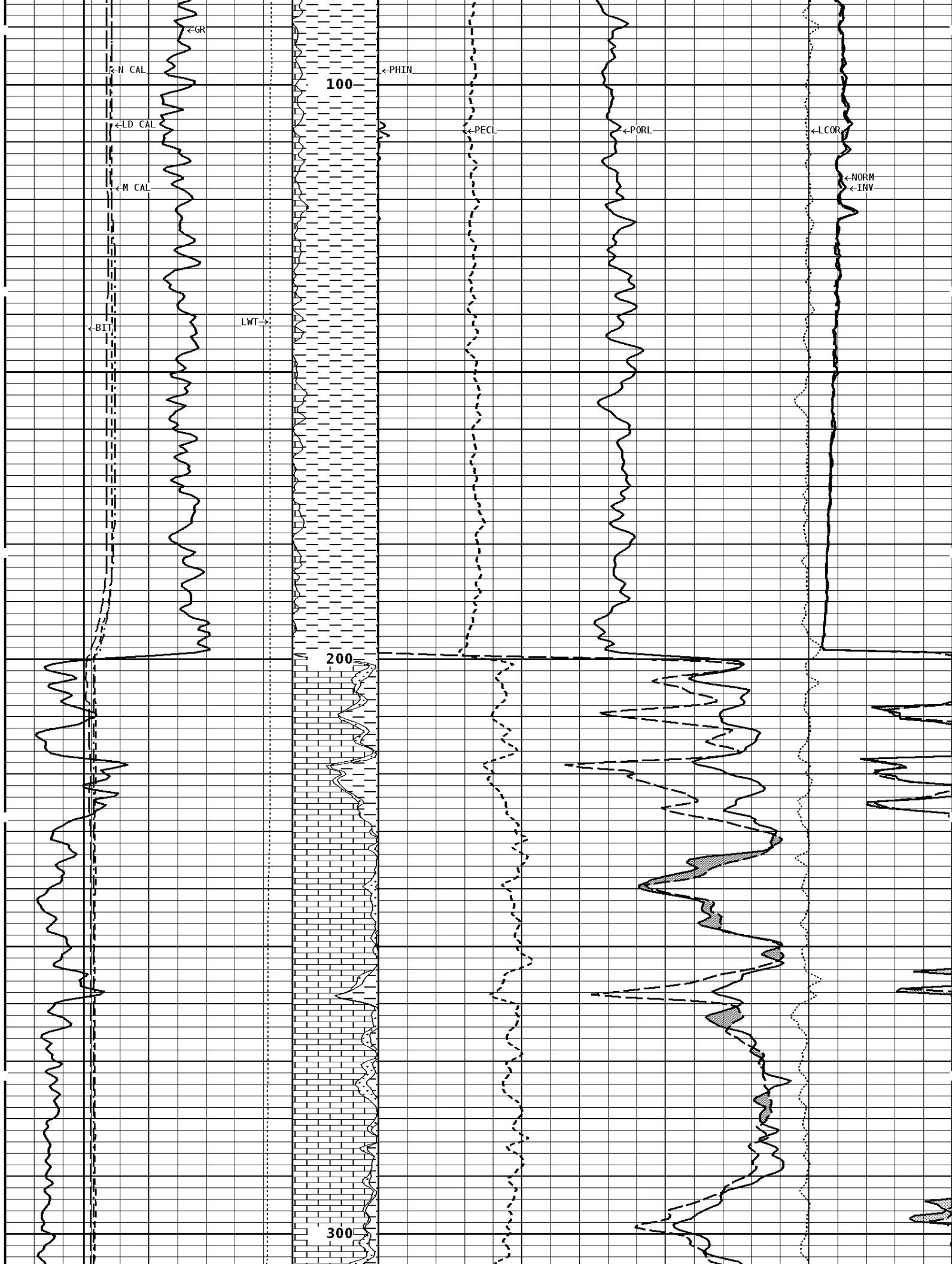
Processed: 2014-03/27 11:47 3.3.0-12594

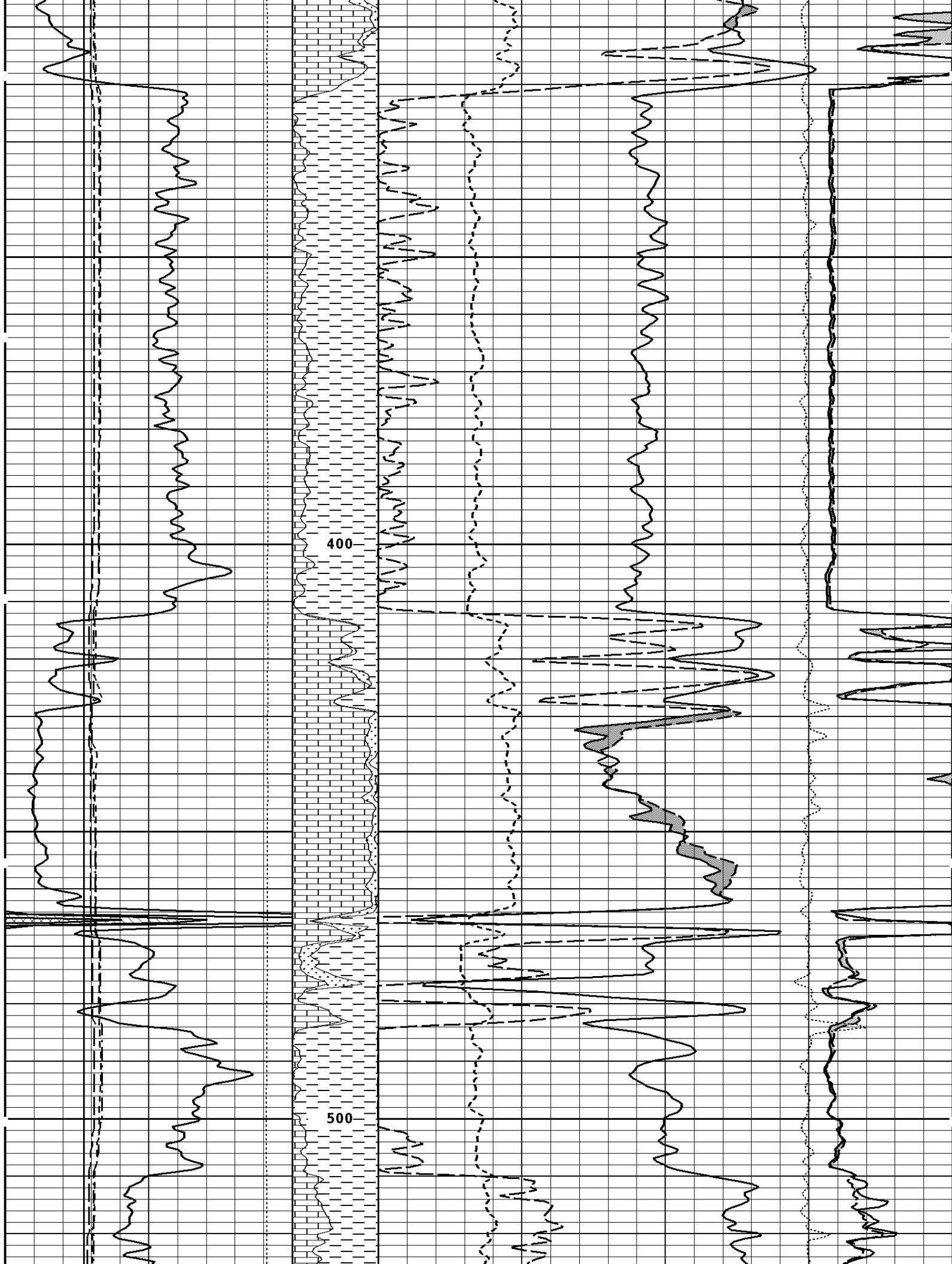
**CALIPER MICRO
INCHES (IN)**

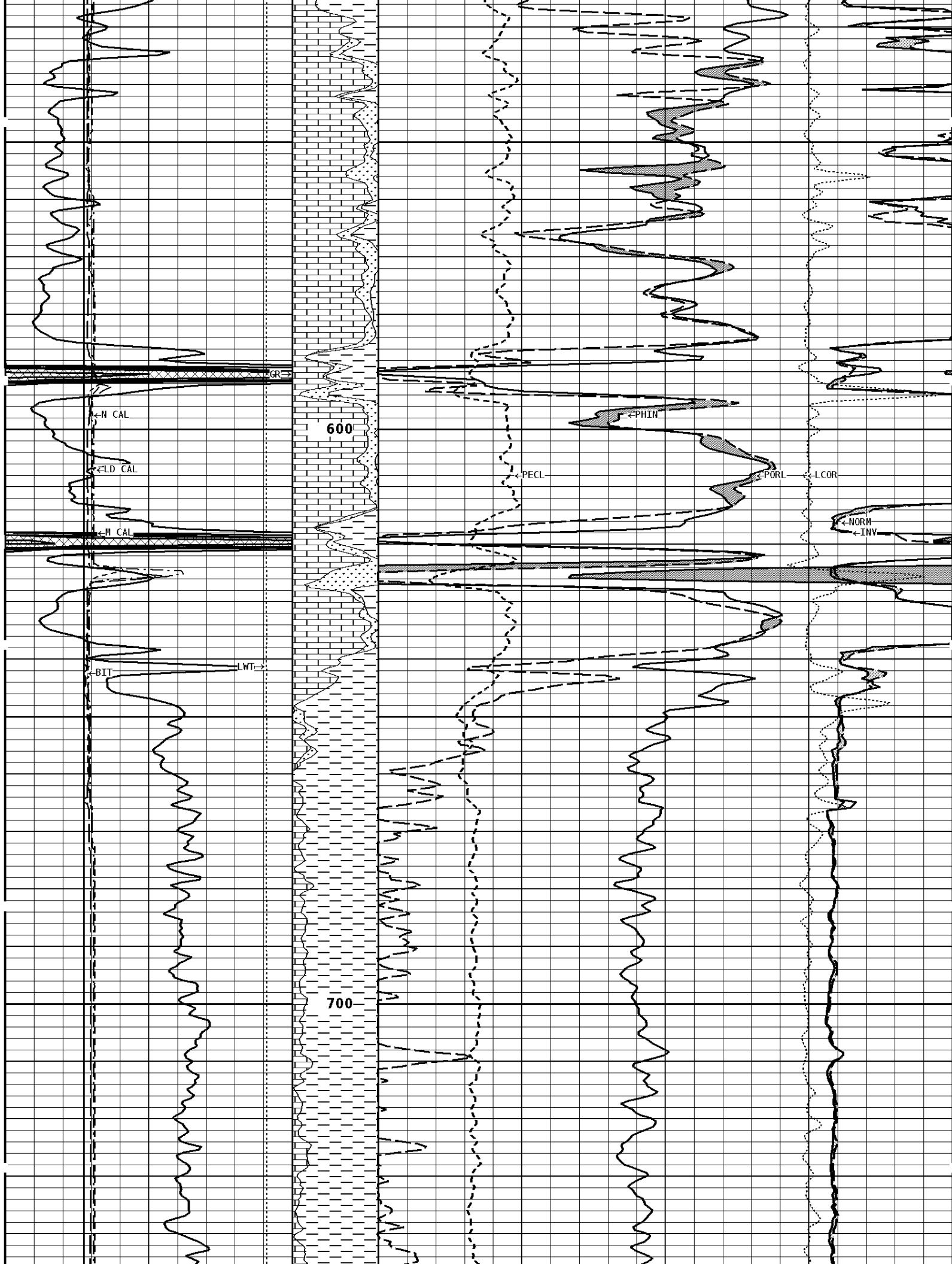
14	24
4	14

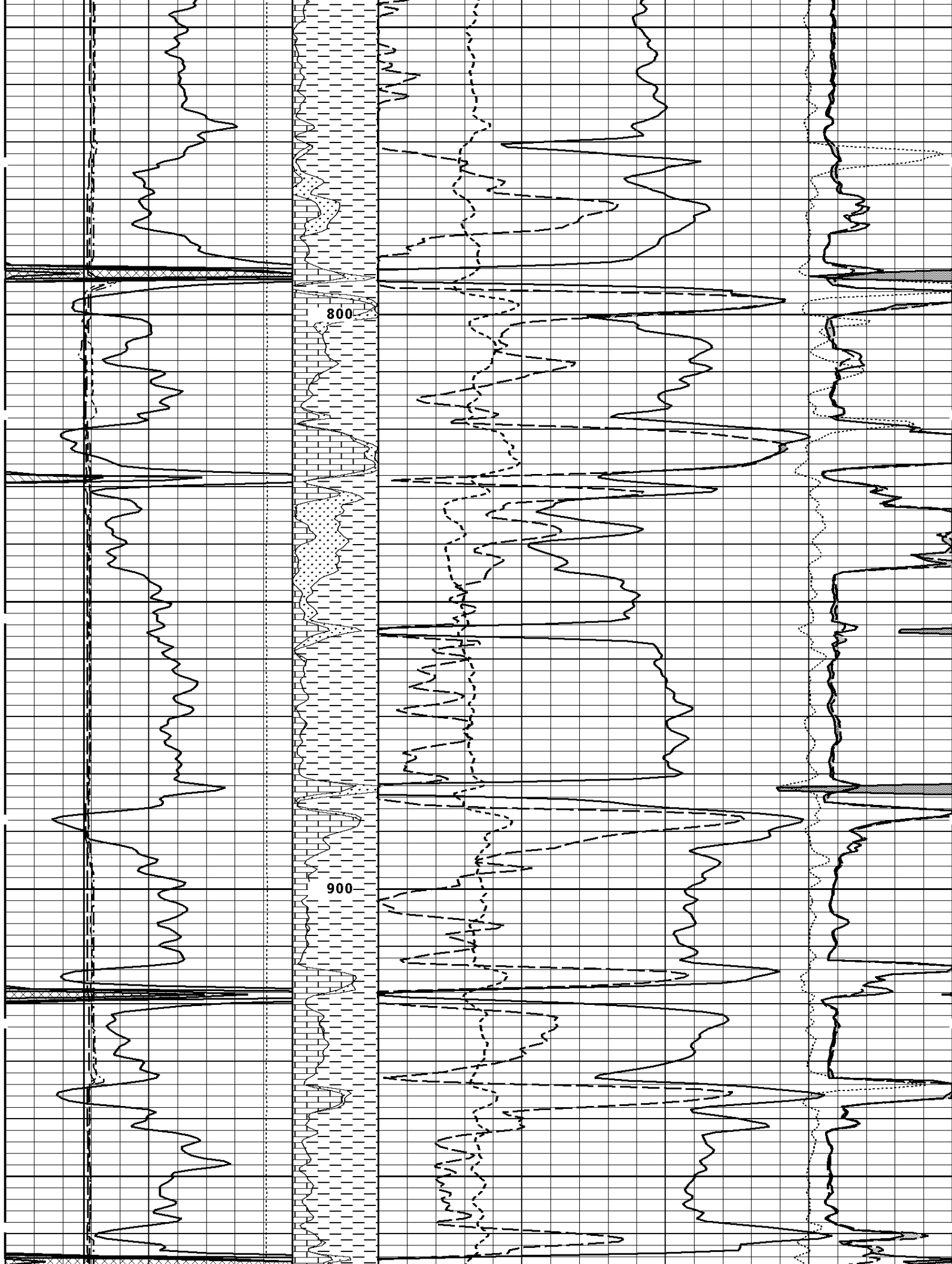
**BIT SIZE
INCHES (IN)**

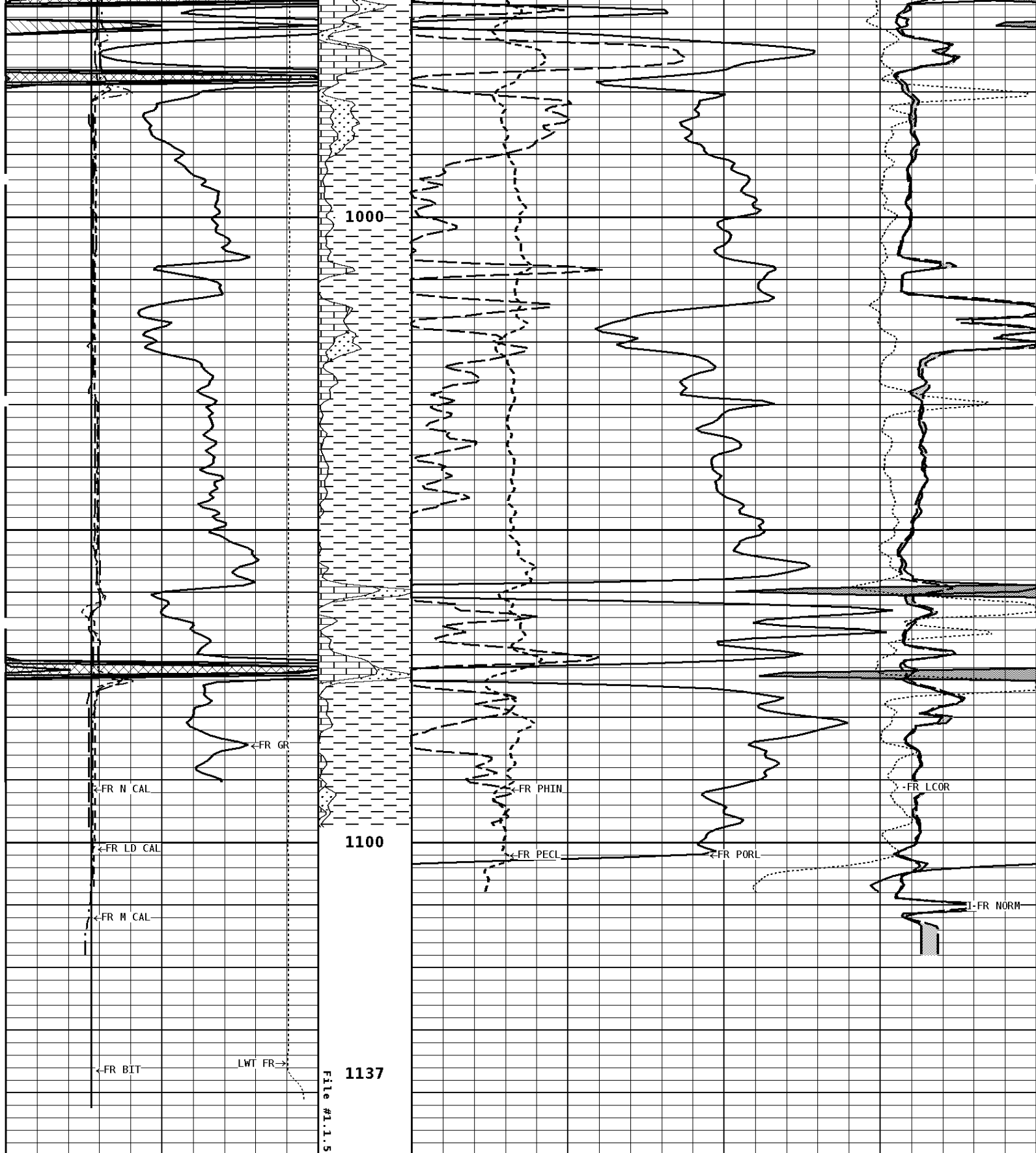
**NORMAL
OHMM**





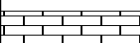
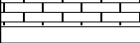
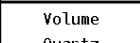
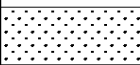






1:240 MAIN SECTION

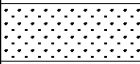
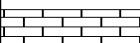
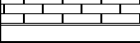
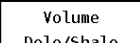
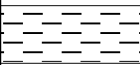
GAMMA RAY API UNITS 200 0 400 200	Volume Dolo/Shale 30	NEUTRON POROSITY (LIMESTONE) PERCENT -10
TENSION	Volume	DENSITY POROSITY (2.71g/cc)

LBS		Calcite		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
14	24				
4	14		0	10	-0.25 0.25
NEUTRON (Y) CALIPER INCHES (IN)					
14	24				
4	14				
BIT SIZE INCHES (IN)					
4	14				
CALIPER MICRO INCHES (IN)					
14	24				
4	14				

*** 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	6.750	in
Casing Diameter	2.875	in
Casing Thickness	0.250	in
Casing Correction (PHI N)	Disable	

Well File: gran-rich-12-5-mstk-mar-27	Scale: 1:240	Format: NLD-240
Segment: V1.D1.S4 RP	Acquired: 2014-03/27 11:02 3.3.0-12594	
Reference: 0	Processed: 2014-03/27 11:47 3.3.0-12594	

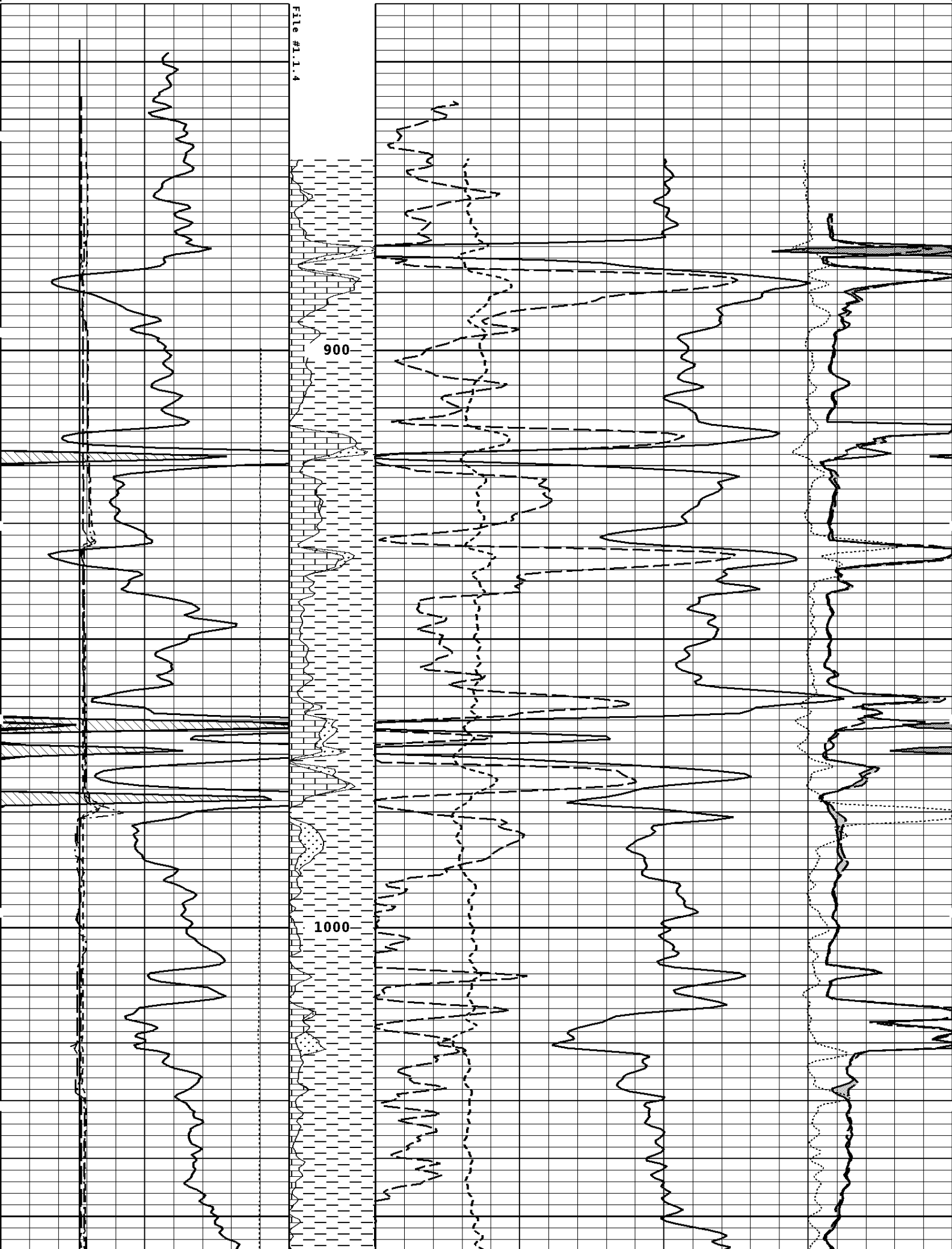
CALIPER MICRO INCHES (IN)					
14	24				
4	14				
BIT SIZE INCHES (IN)					
4	14				
NEUTRON (Y) CALIPER INCHES (IN)					
14	24				
4	14				
DENSITY (X) CALIPER INCHES (IN)		Volume Quartz	PE CROSS-SECTION BARNS/ELECTRON		DENSITY CORRECTION G/CC
14	24				
4	14		0	10	-0.25 0.25
TENSION LBS		Volume Calcite	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		
200	400				
0	200		30		-10

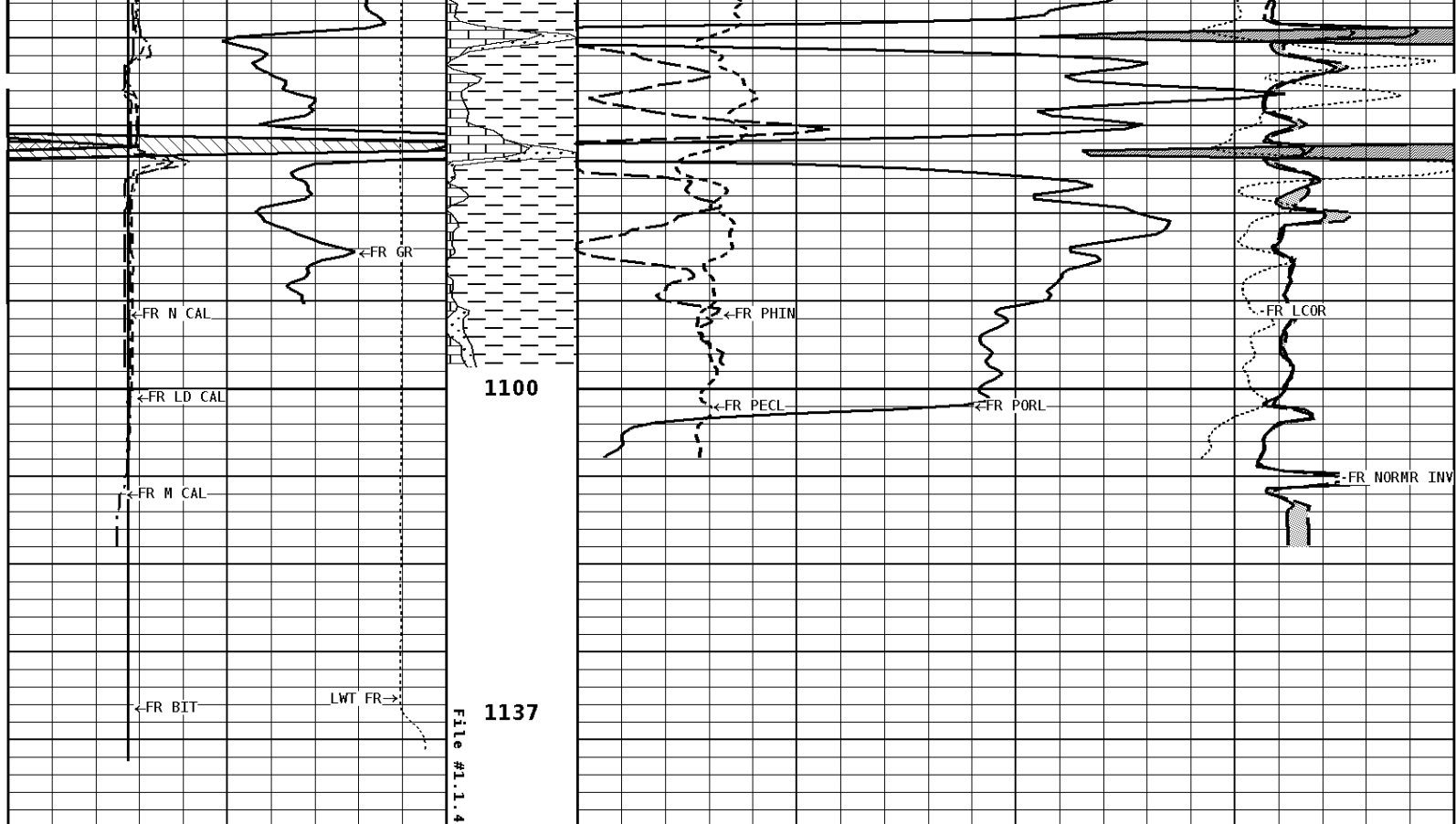
1:240 REPEAT SECTION

File #1.1.4

900

1000





1:240 REPEAT SECTION

GAMMA RAY API UNITS 200 0 400 200		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) 14 4 24 14		Volume Quartz	PE CROSS-SECTION BARNS/ELECTRON 0 10	DENSITY CORRECTION G/CC -0.25 0.25
NEUTRON (Y) CALIPER INCHES (IN) 14 4 24 14		INVERSE OHMM 0 40		
BIT SIZE INCHES (IN) 4 14		NORMAL OHMM 0 40		
CALIPER MICRO INCHES (IN) 14 4 24 14				

* 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	6.750 in
Casing Diameter	2.875 in
Casing Thickness	0.250 in
Casing Correction (PHI N)	Disable

Well File: gran-rich-12-5-mstk-mar-27
Segment: V1.D1.S5 MN
Reference: 0

Scale: 1:240 Format: LDT-240
Acquired: 2014-03/27 11:16 3.3.0-12594
Processed: 2014-03/27 11:47 3.3.0-12594

BIT SIZE
INCHES (IN)

4 14

NEUTRON (Y) CALIPER
INCHES (IN)

14 24
4 14

DENSITY (X) CALIPER
INCHES (IN)

14 24
4 14

TENSION
LBS

10000 0

GAMMA RAY
API UNITS

200 400
0 200

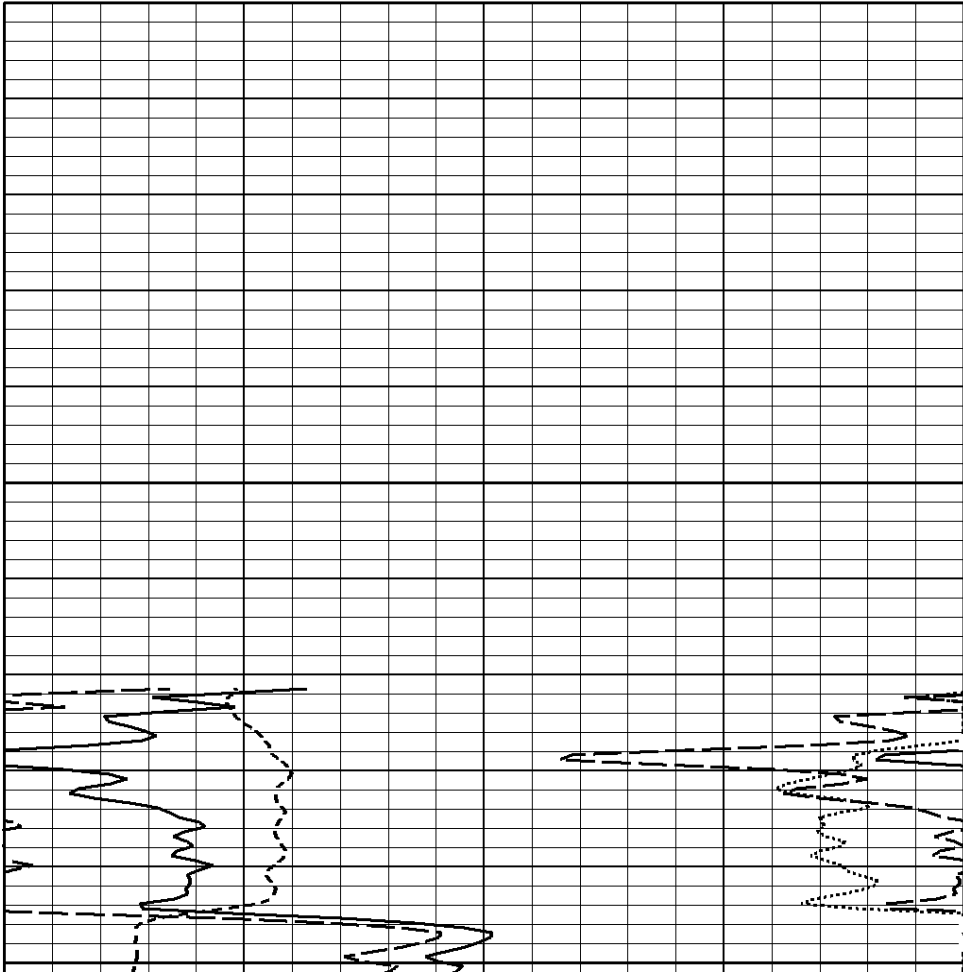
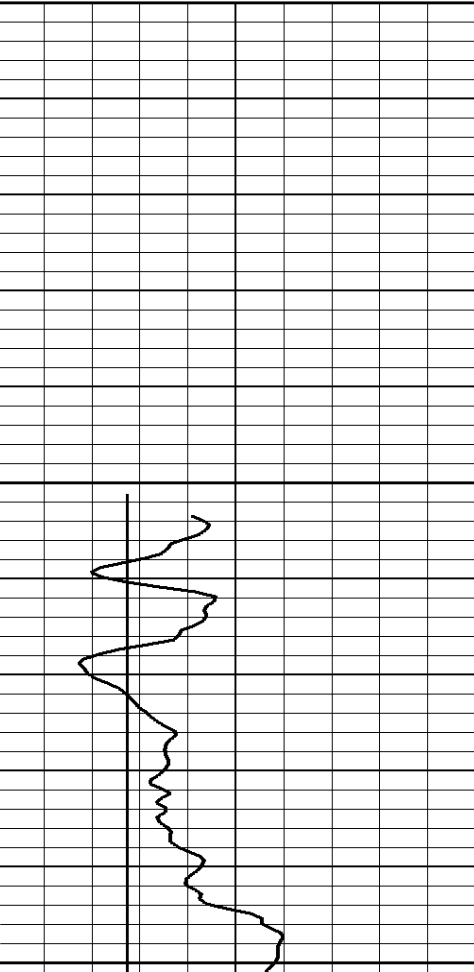
PE CROSS-SECTION BARNs/ELECTRON	DENSITY CORRECTION G/CC
0 10	-0.25 0.25

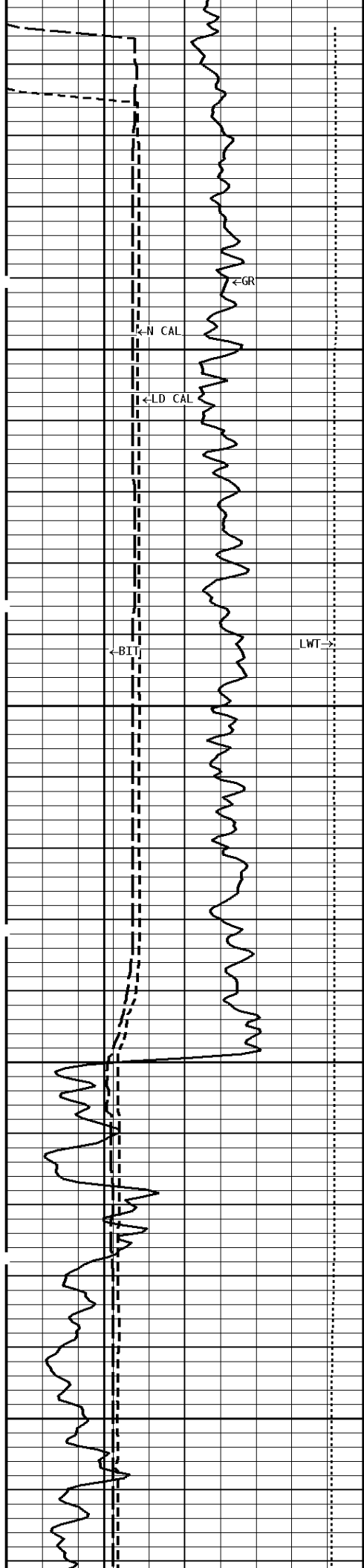
COMPENSATED BULK DENSITY G/CC	
3.0	4.0
2.0	3.0
1.0	2.0

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

1:240 MAIN SECTION

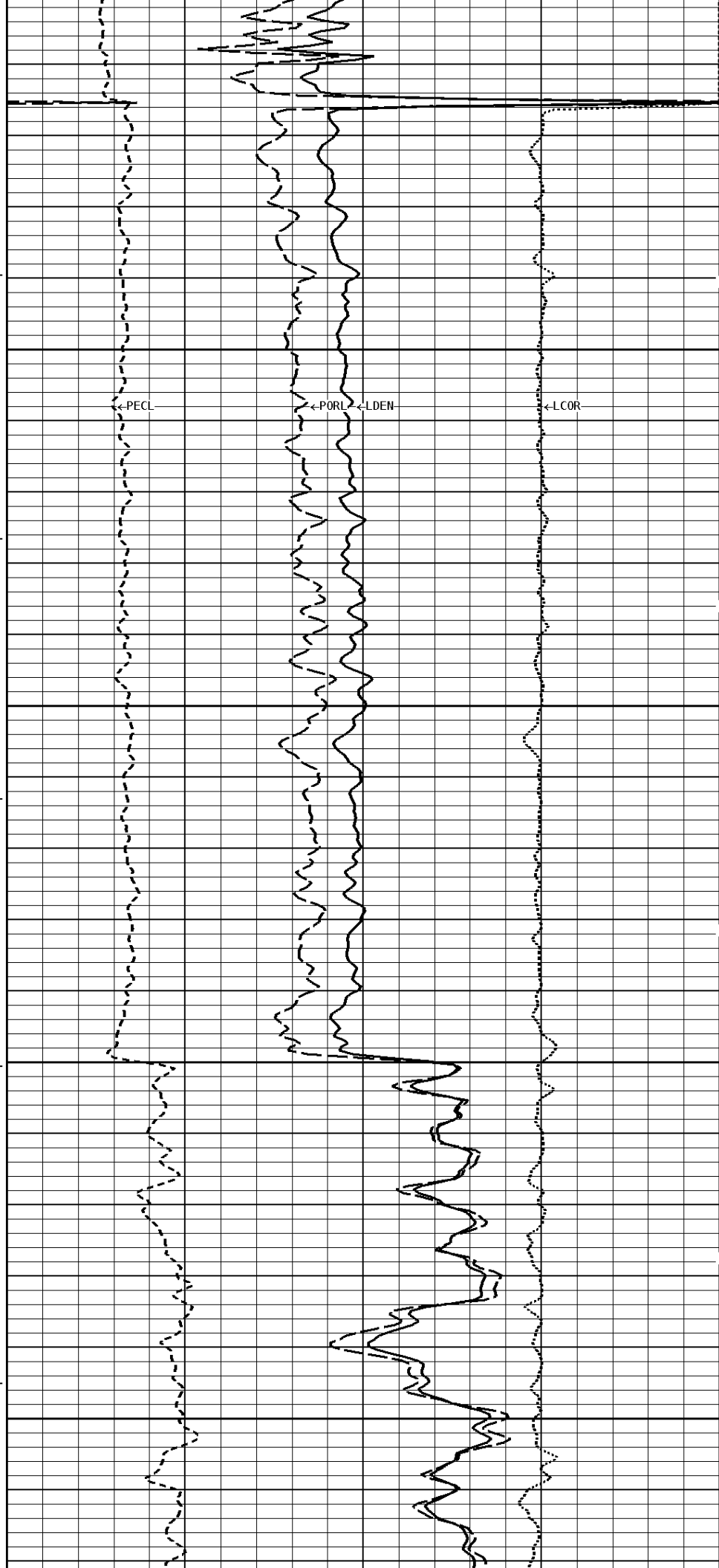
BULK DENSITY

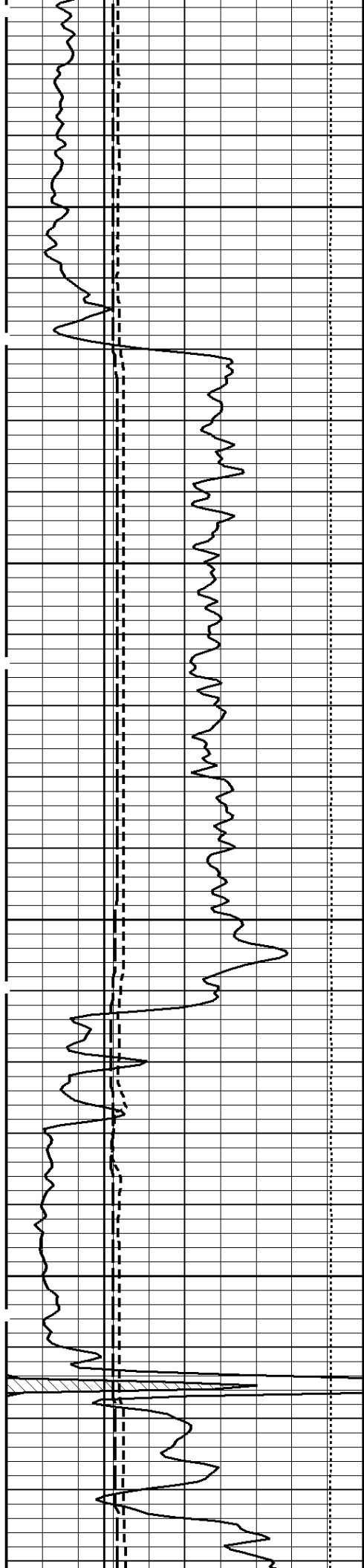




100

200Ft..

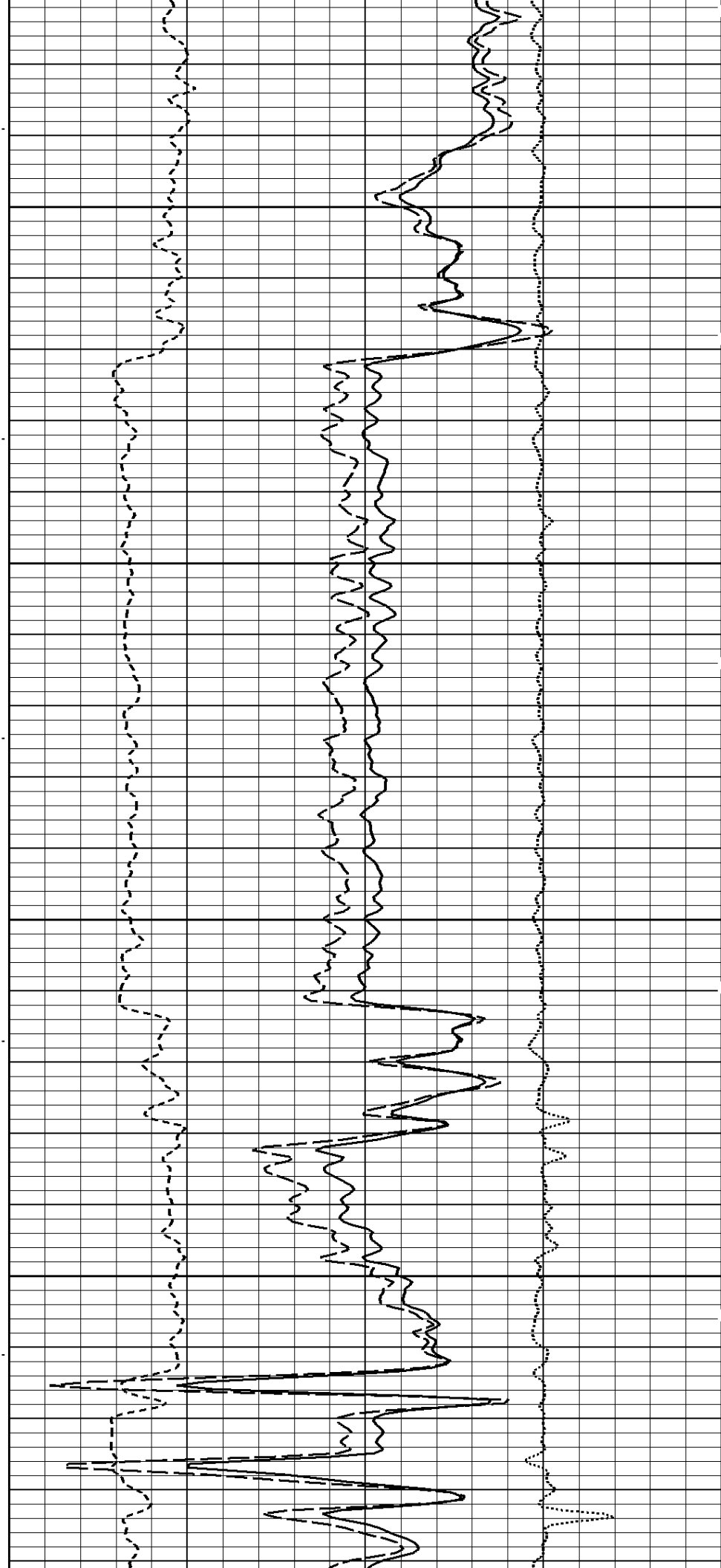


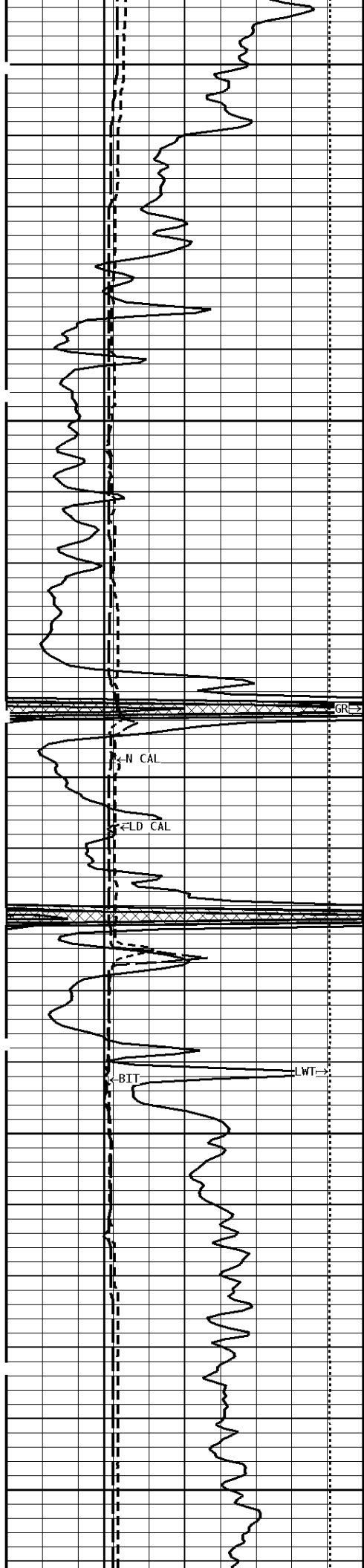


300

--200Cu.Ft

400



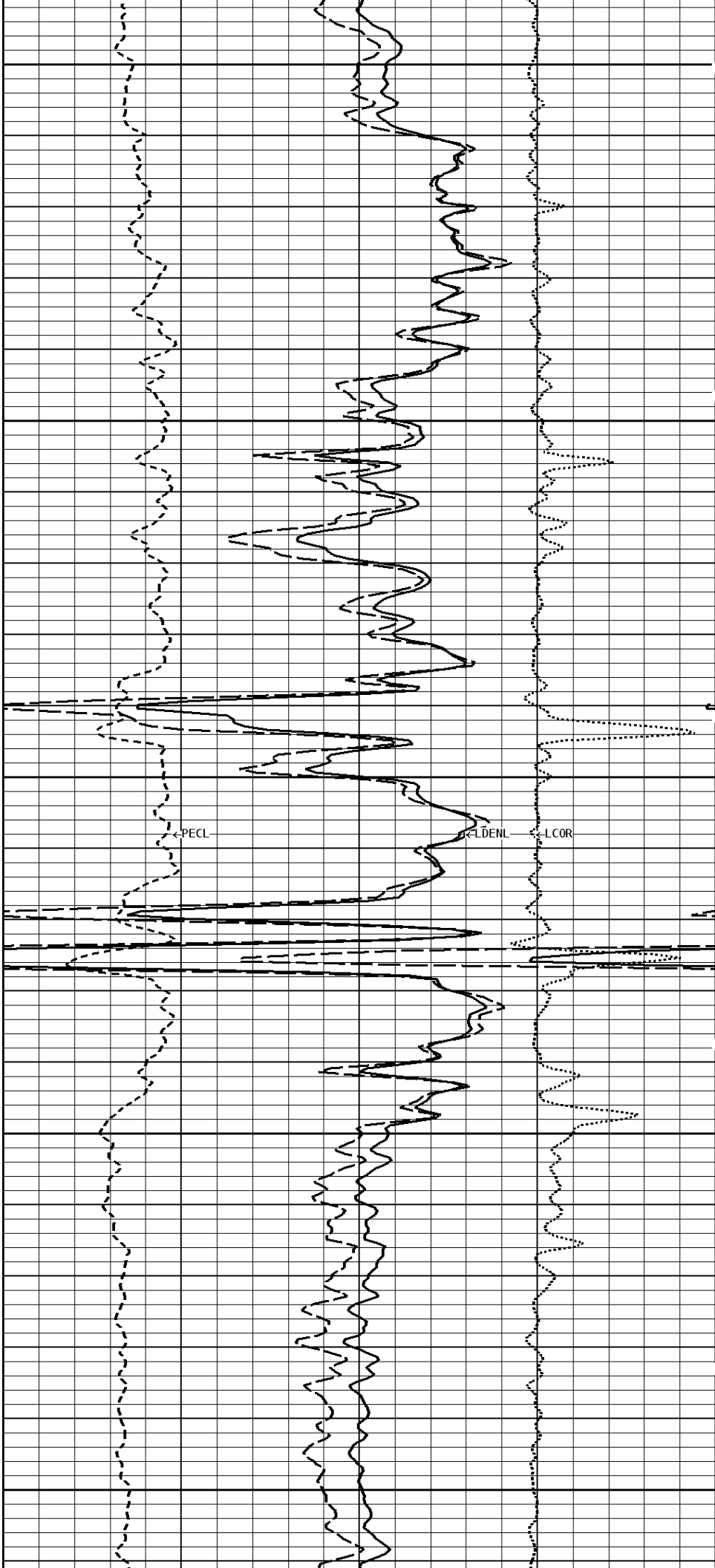


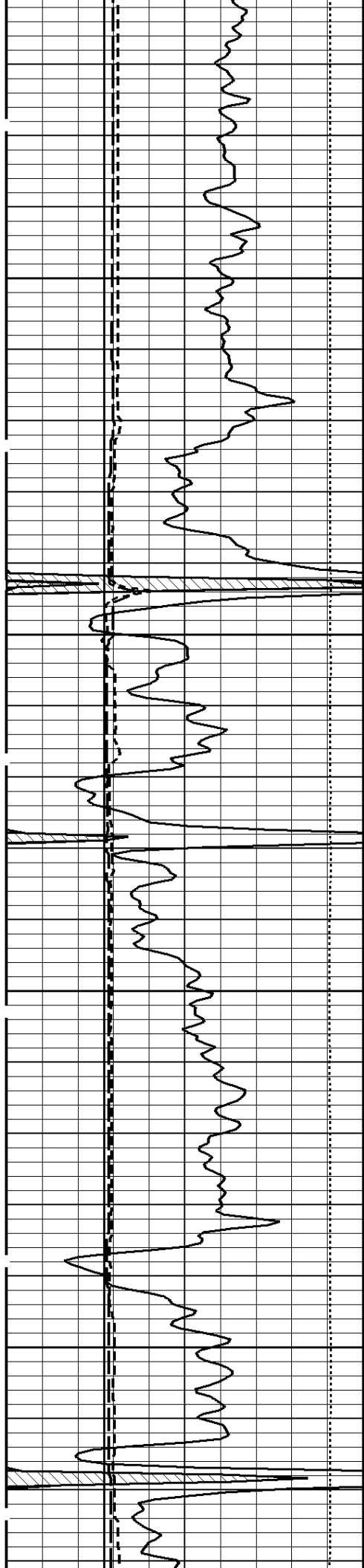
500

600

100Cu.Ft--

700

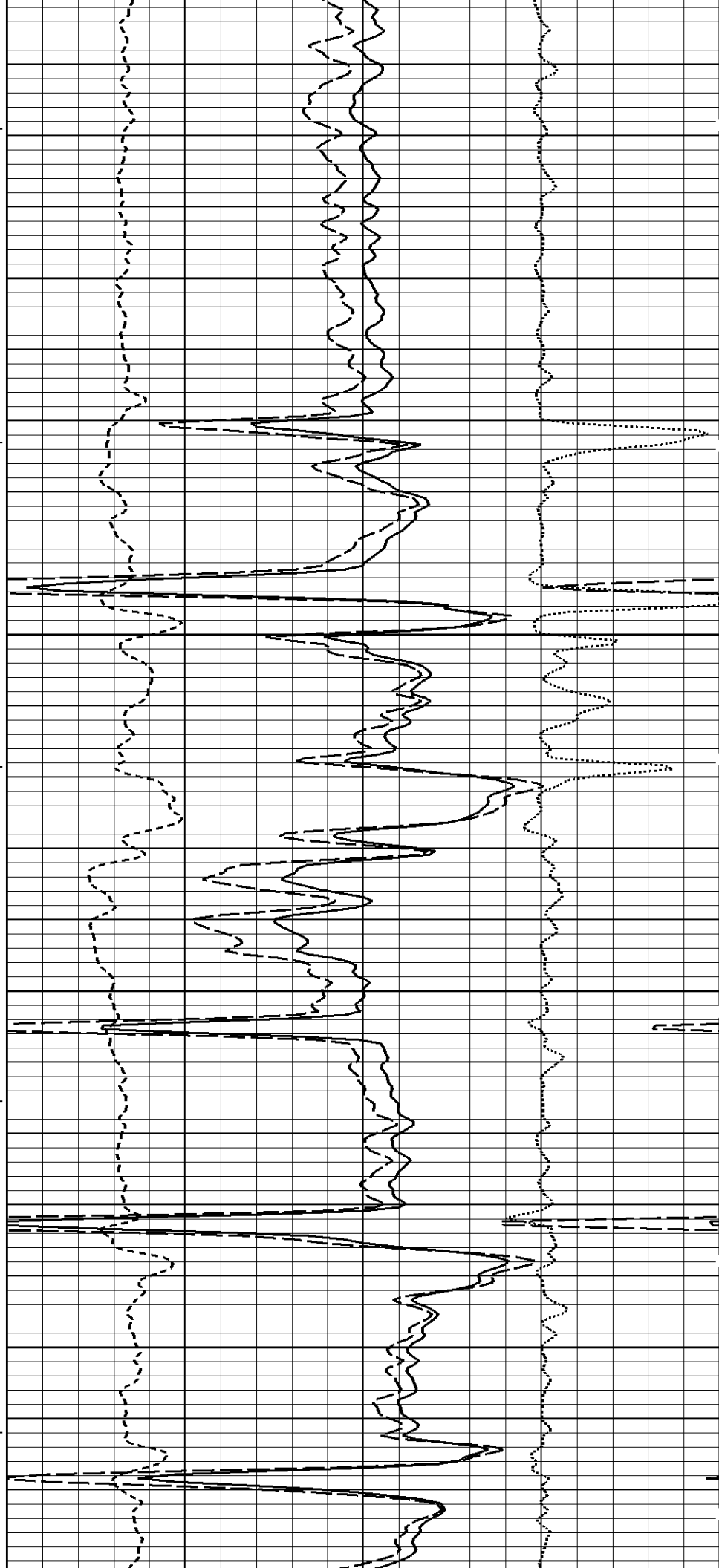


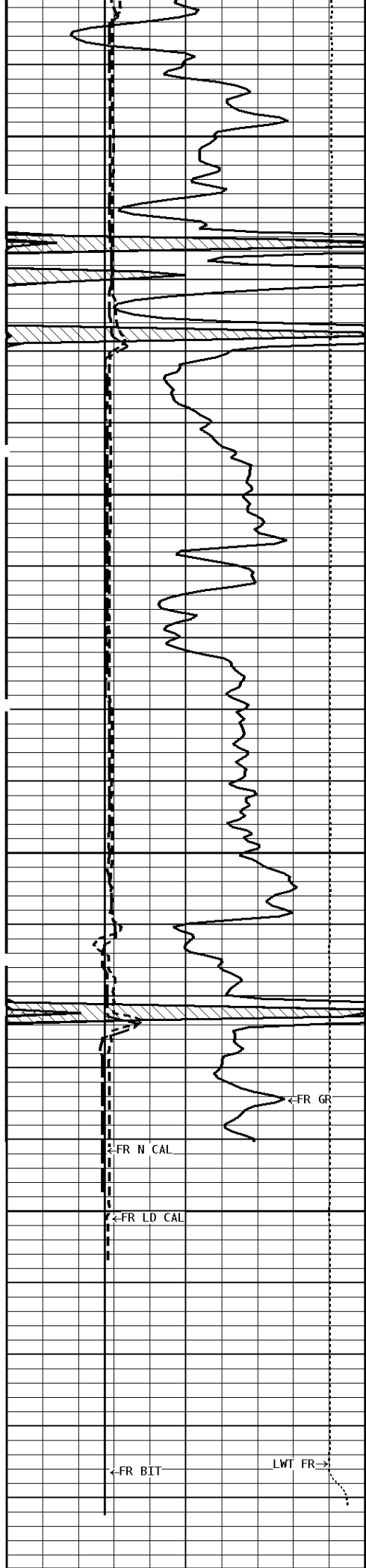


-100Cu.Ft

800

900



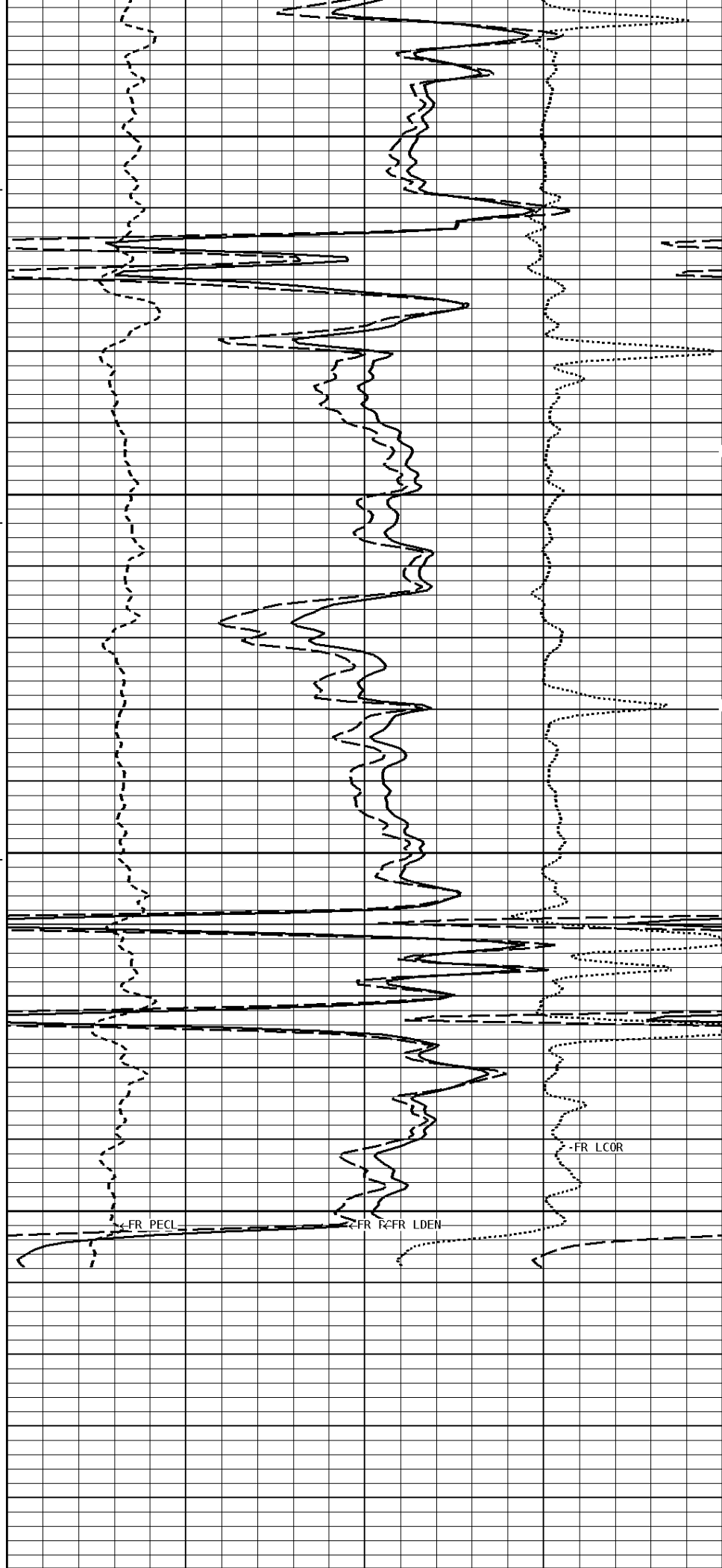


1000

1100

1137

File #1.1.5



1:240 MAIN SECTION

BULK DENSITY

GAMMA RAY API UNITS		- BHV AHV - CU.FT	DENSITY POROSITY (2.71g/cc) PERCENT	
200 0	400 200		70 30 -10	30 -10 -50
TENSION LBS			COMPENSATED BULK DENSITY G/CC	
10000	0		3.0 2.0 1.0	4.0 3.0 2.0
DENSITY (X) CALIPER INCHES (IN)			PE CROSS-SECTION BARNs/ELECTRON	
14 4	24 14		DENSITY CORRECTION G/CC	
			010	-0.250.25
NEUTRON (Y) CALIPER INCHES (IN)				
14 4	24 14			
BIT SIZE INCHES (IN)				
4	14			

* 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	_____	6.750	in
Casing Diameter	_____	2.875	in
Casing Correction (PHI N)	_____	Disable	

* Calibration Summary *

Shop Calibration GRT-B					
Performed : 09-FEB-2014			Time : 12:45		
Sensor Suite : GR-GR5			ID : GRT-BB-107		
	Measured	Units	Calibrated	Units	
GR	Background	Jig	Jig	GRAPI	
	75	381	175		
Shop Calibration CNT-AA					
Performed : 17-MAR-2014			Time : 10:18		
Sensor Suite : CALI-BCN			ID : NDT-BD-133		
	Jig - Measured		Jig - Calibrated	Units	
CL # 1	Ring#1	Ring#2	Ring#1	Ring#2	IN.
	9.1	13.7	6.0	12.0	
Shop Calibration LDT-DA					
Performed : 20-MAR-2014			Time : 09:59		
Sensor Suite : CALI-LTH			ID : PDT-GA-464		
	Tank		Verification	Units	
N/F	Measured	Calibrated	Jig		
Porosity	3.8581	3.6893	3.7020		
	23.2	20.5	20.7	%	

CL # 1	Ring#1 7.7	Ring#2 11.1	Ring#1 6.0	Ring#2 12.0	IN.
Performed : 20-Mar-2014 Time : 09:45 Sensor Suite : BHCPELNG ID : LDP-DA-065 Source ID : 2991GW					
Short Space					
	BKGD	Al	Mg	Al+Fe	Units
LSW1	66	1110	1788	718	CPS
LSW2	71	1359	2147	963	CPS
LSW3	267	3097	4987	2618	CPS
LSW4	319	2752	3982	2406	CPS
LSW5	30	56	62	51	CPS
LSW6	89	92	90	92	CPS
LSW7	55	58	60	58	CPS
LSW8	1	4	5	3	CPS
QS	0.232	0.229	0.199	0.231	
PES			2.778	5.967	
SSDN		2.600	1.680		G/CC
Long Space					
	BKGD	Al	Mg	Al+Fe	Units
LLW1	96	1275	5182	762	CPS
LLW2	104	2248	8733	1620	CPS
LLW3	402	4043	15309	3473	CPS
LLW4	515	1949	6264	1747	CPS
LLW5	62	74	133	70	CPS
LLW6	157	153	144	154	CPS
LLW7	104	101	100	105	CPS
LLW8	5	8	21	8	CPS
QL	0.201	0.204	0.180	0.191	
PEL			2.697	5.458	
LSDN		2.600	1.680		G/CC
Shop Calibration MST-DA					
Performed : 09-FEB-2014 Time : 12:46 Sensor Suite : CALI-MSN ID : MST-DA-057					
	Jig - Measured		Jig - Calibrated		Units
	Ring#1	Ring#2	Ring#1	Ring#2	
CL # 1	7.2	11.6	6.0	12.0	IN.
Performed : 09-FEB-2014 Time : 12:46 Sensor Suite : MSTDA-NI ID : MST-DA-057					
Internal					
	Measured		Calibrated		Units
	Zero	Reference	Zero	Reference	
INV-V	285.8	30438.7	0.00	1536.00	MV
NOR-V	166.4	30373.5	0.00	1636.00	MV
IN-C	165.0	30672.7	0.00	15.46	UA
INV-R				32.14	OHMM
NOR-R				58.31	OHMM
Performed : 09-FEB-2014 Time : 12:46 Sensor Suite : MSTDAMSF ID : MST-DA-057					
Internal					
	Measured		Calibrated		Units
	Zero	Reference	Zero	Reference	
MSFC	18.8	42591.1	0.00	1522.00	UA
MSFB	32763.4	52820.7	0.00	1522.00	MA
MOM1	0.0	42309.3	0.00	1522.00	MV
MSFRA				43.30	OHMM



Company: GRAND MESA OPERATING COMPANY
 Well: RICHARDS #12-5
 Location: 1490' FSL & 2805' FEL
 Logged: 03-27-2014
 K.B. Elev: 0.0 Ft