Tucker ENERGY SERVICES

COMPENSATED NEUTRON

PEL DENSITY MICRO LOG

Company LACHENMAYR OIL LLC
Well GOODRICH #L-1
Field GOODRICH
County SEDGWICK
State KANSAS
Country USA
API No. 15-173-21038-0000

File No : TUL-60398
Company : LACHENMAYR OIL LLC
Well : GOODRICH #L-1
Field : GOODRICH
County : SEDGWICK
State : KANSAS
Country : USA
API No : 15-173-21038-0000

Location :
2265' FNL & 995' FWL
SE SW NW

LSD : **Sect :** 16 **Twp :** 25S **Rge :** 1E

Permanent Datum:	GL	**Elevations:**		**Services:**	
Drilling Measured From:	KB	**KB** 1436.00	Ft	CNT	MLT
Log Measured From:	KB	**DF** 1435.00	Ft	LDT	PIT
Above Permanent Datum:	10.00 Ft	**GL** 1426.00	Ft	CST	

Date	05-20-2015			
Run Number	1			
Depth--Driller	3413.0 Ft			
Depth--Logger	3413.0 Ft			
First Reading	3413.0 Ft			
Last Reading	212.0 Ft			
Casing--Driller	212.0 Ft			
Casing--Logger	212.0 Ft			
Bit Size	7.875 In			
Casing Size	8.625 In			
Hole Fluid Type	CHEM-GEL			
Density	9.5			
Fluid Loss	7.2			
PH/Viscosity	10.0	54.0		
Sample Source	MEASURED			
RM@Measured Temp.	2.000 @ 60 F			
RMF@Measured Temp	1.600 @ 60 F			
RMC@Measured Temp.	2.400 @ 60 F			
Source RMF/RMC	CALCULATED	CALCULATED		
RM@BHT	1.140 @ 110 F			
Time Circulation Stopped				
Max Recorded Temp.	110 F			
Equipment/Base	1022	TULSA		
Recorded By	SHELDON TYLER / AMOUR	DJAHO		
Witnessed By	TYLER SANDERS			

Casing Strings

Size (In)	Weight (Lbs)	Bottom (Ft)	Top (Ft)
8.625	32.00	212.00	0.00

Bitsize Intervals

Size (In)	Bottom (Ft)
7.875	3413.00

Run Number	1
Date	05-20-2015
Date/Time On Bottom	
Depth to Fluid	0.0 Ft
Salinity	1900.000
RMF@BHT	0.910 @ 110 F
RMC@BHT	1.370 @ 110 F

Run Number 1

Comments

ALL PRESENTATIONS AS PER CUSTOMER REQUEST
GRT, CNT, LDT, CST, 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

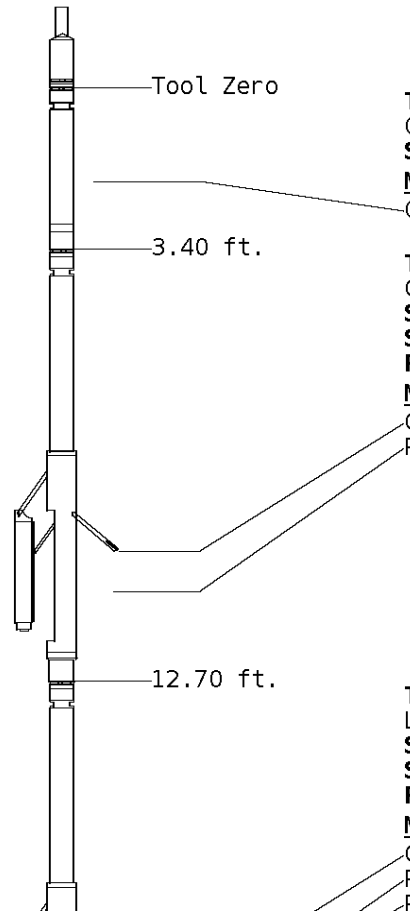
CUSTOMER REQUESTED DETAIL PULLED TO 1900'
2ND RUN TO GET GAMMA RAY CLOSER TO BOTTOM

GRT: GRP, GRX
CST: PORS, CDTF, TTIPF, TT2PF, TT3PF, TT4PF, ITT
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: +3
B.BROWN
J.OFFEIGHU

Tool String Schematic

Total Tool Length - 66.95 **ft.**
Maximum Outside diameter - 6.00 **in.**
Net Weight in Air - 1171.00 **lbs.**



Tool: GRT-B **Length:** 3.40 **ft.** **O.D.** 3.60 **in.**
Gamma Ray Controller
Sonde ID :GRT-BA-121

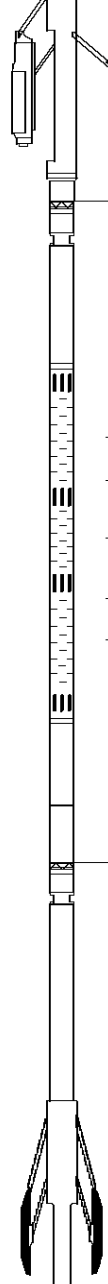
Measure Point	Tool Offset	Stack Offset	Bottom Offset
GRP	2.00	2.00	64.95

Tool: CNT-AA **Length:** 9.30 **ft.** **O.D.** 4.36 **in.**
Compensated Neutron A Pad on NDT-A
Sonde ID :NDT-BB-115
Source ID :N-1044
Pad ID :CNP-AA-101

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLCN	6.00	9.40	57.55
PHIN	6.80	10.20	56.75

Tool: LDT-DA **Length:** 9.30 **ft.** **O.D.** 4.80 **in.**
Litho Density D Pad on NDT-A
Sonde ID :PDT-GA-426
Source ID :CSV-587
Pad ID :LDP-DA-50

Measure Point	Tool Offset	Stack Offset	Bottom Offset
CLLD	6.00	18.70	48.25
PEL	7.00	19.70	47.25
PES	7.40	20.10	46.85



LDEN	7.20	19.90	47.05
LCOR	7.20	19.90	47.05

22.00 ft.

Tool: CST-AD **Length:** 13.80 **ft.** **O.D.** 3.60 **in.**
Open Hole Sonic
Sonde ID :CST-AB-012

Measure Point	Tool Offset	Stack Offset	Bottom Offset
TT1	4.80	26.80	40.15
TT3	5.80	27.80	39.15
CDT	7.30	29.30	37.65
TT4	8.80	30.80	36.15
TT2	9.80	31.80	35.15

35.80 ft.

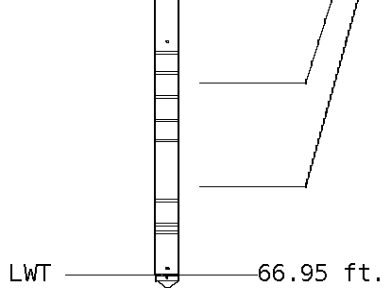
Tool: MST-DA **Length:** 9.66 **ft.** **O.D.** 6.00 **in.**
Micro Spherically Focused (IC)
Sonde ID :MLT-DA-21

Measure Point	Tool Offset	Stack Offset	Bottom Offset
MSFL	7.60	43.40	23.55
MSCLP	7.60	43.40	23.55
INV	7.60	43.40	23.55
NOR	7.60	43.40	23.55

45.46 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	54.38	12.56
ILM	10.10	55.56	11.39
SFLU	17.49	62.95	4.00
SP	20.60	66.06	0.88



Well File: LACHENMAYR_GOODRICH_L-1_MAY20_QUINT
Segment: V1.D3.S2 DS FINAL MAIN
Reference: 0

Scale: 1:240 **Format:** NLD-240
Acquired: 2015-05/20 22:35 3.4.0-13487
Processed: 2015-05/21 00:57 3.4.0-13487

CALIPER MICRO
INCHES (IN)
16 — 26
6 — 16

BIT SIZE
INCHES (IN)
6 — 16

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

NORMAL
OHMM
0 — 40

INVERSE
OHMM
0 — 40

DENSITY (X) CALIPER
INCHES (IN)
16 — 26
6 — 16

Volume
Quartz

PE CROSS-SECTION
BARNS/ELECTRON
0 — 10

DENSITY CORRECTION
G/CC
-0.25 — 0.25

TENSION
LBS
10000 — 0

Volume
Calcite

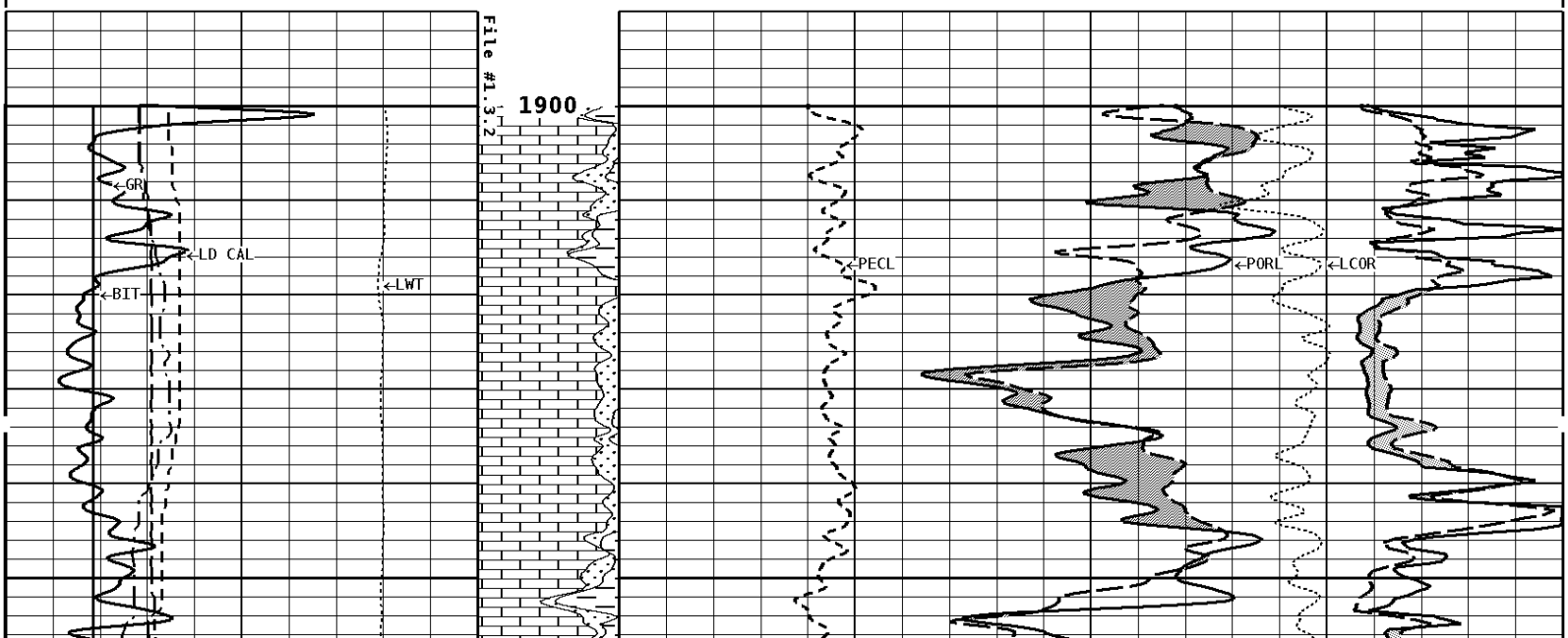
DENSITY POROSITY (2.71g/cc)
PERCENT
70 — 30
30 — -10
-10 — -50

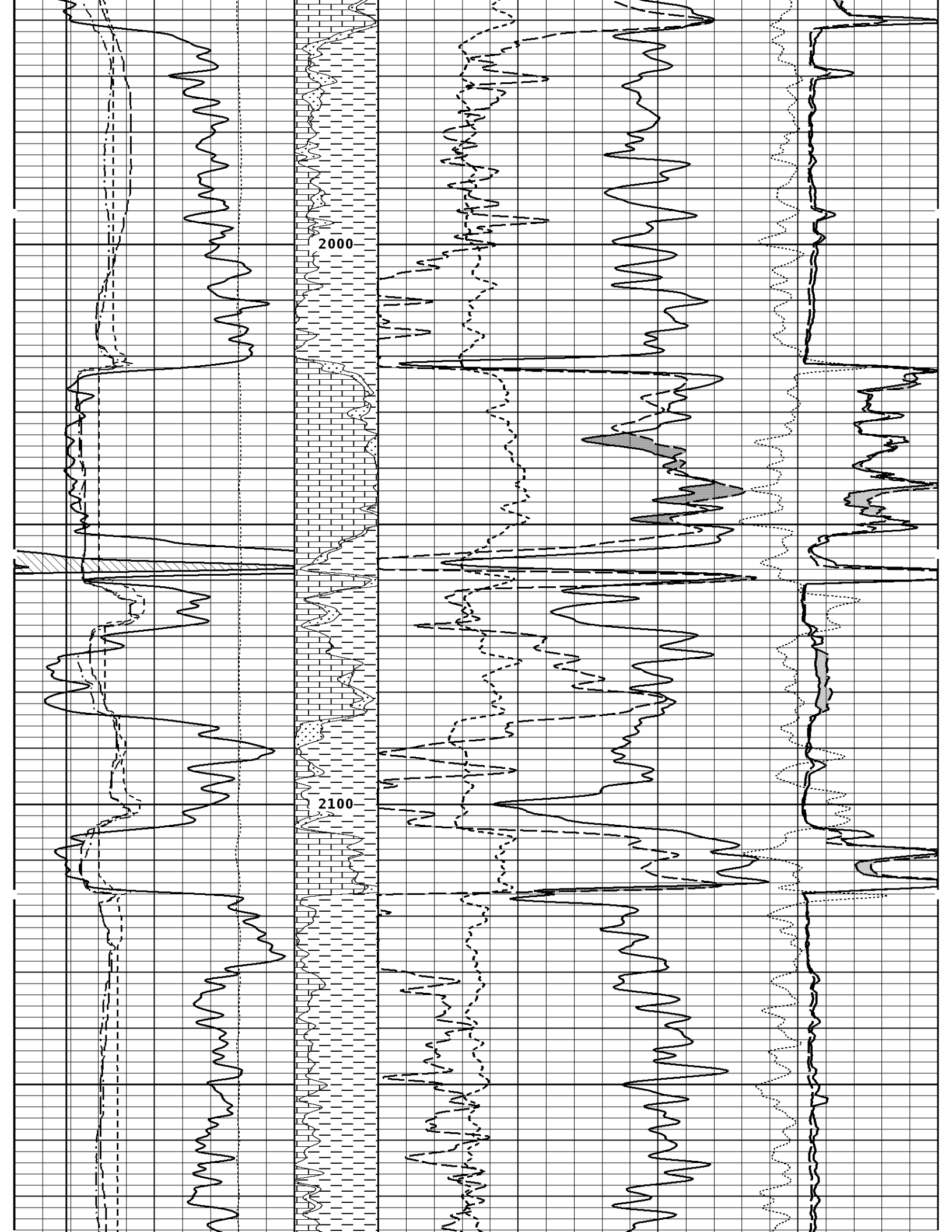
GAMMA RAY
API UNITS
150 — 300
0 — 150

Volume
Dolo/Shale

NEUTRON POROSITY (LIMESTONE)
PERCENT
30 — -10

1:240 MAIN SECTION

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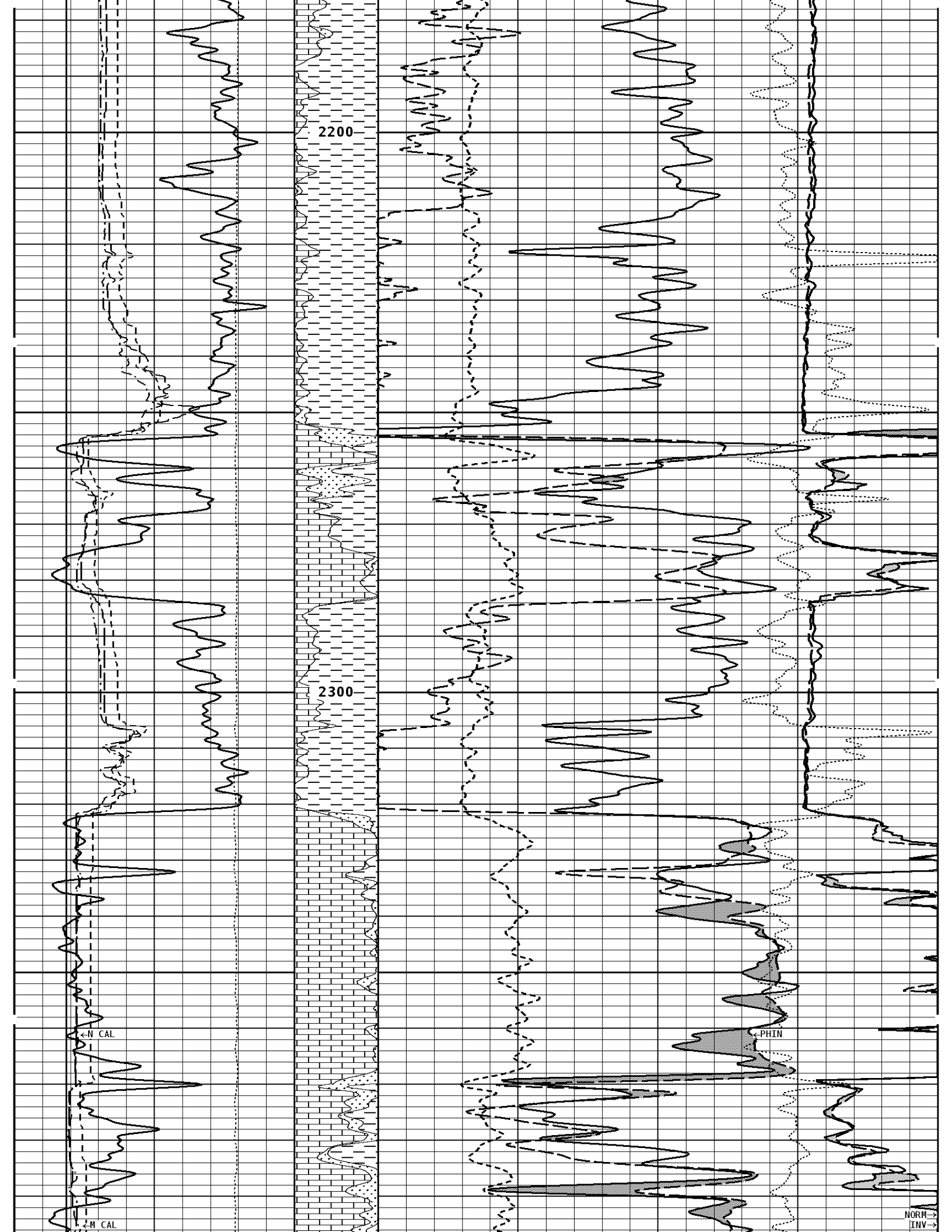
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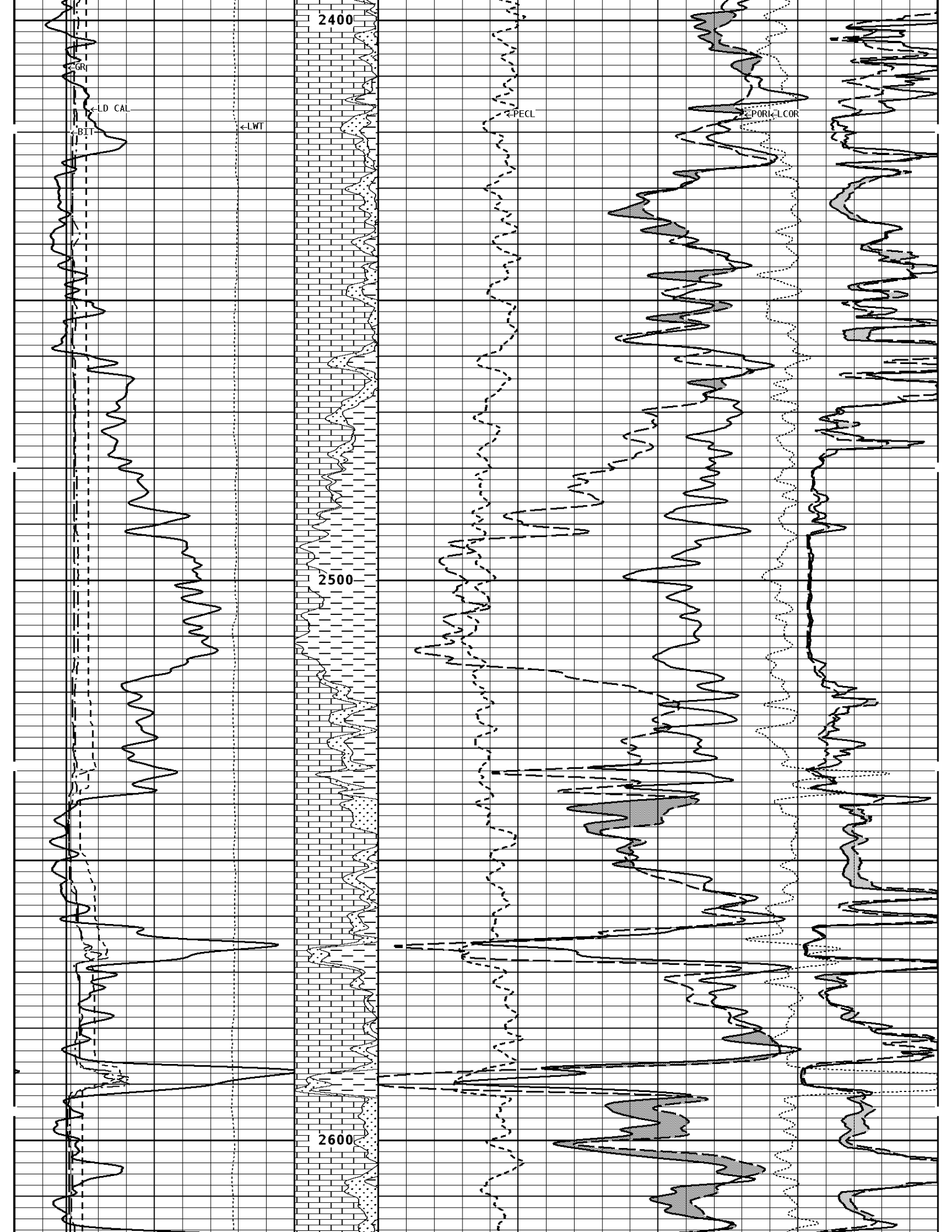
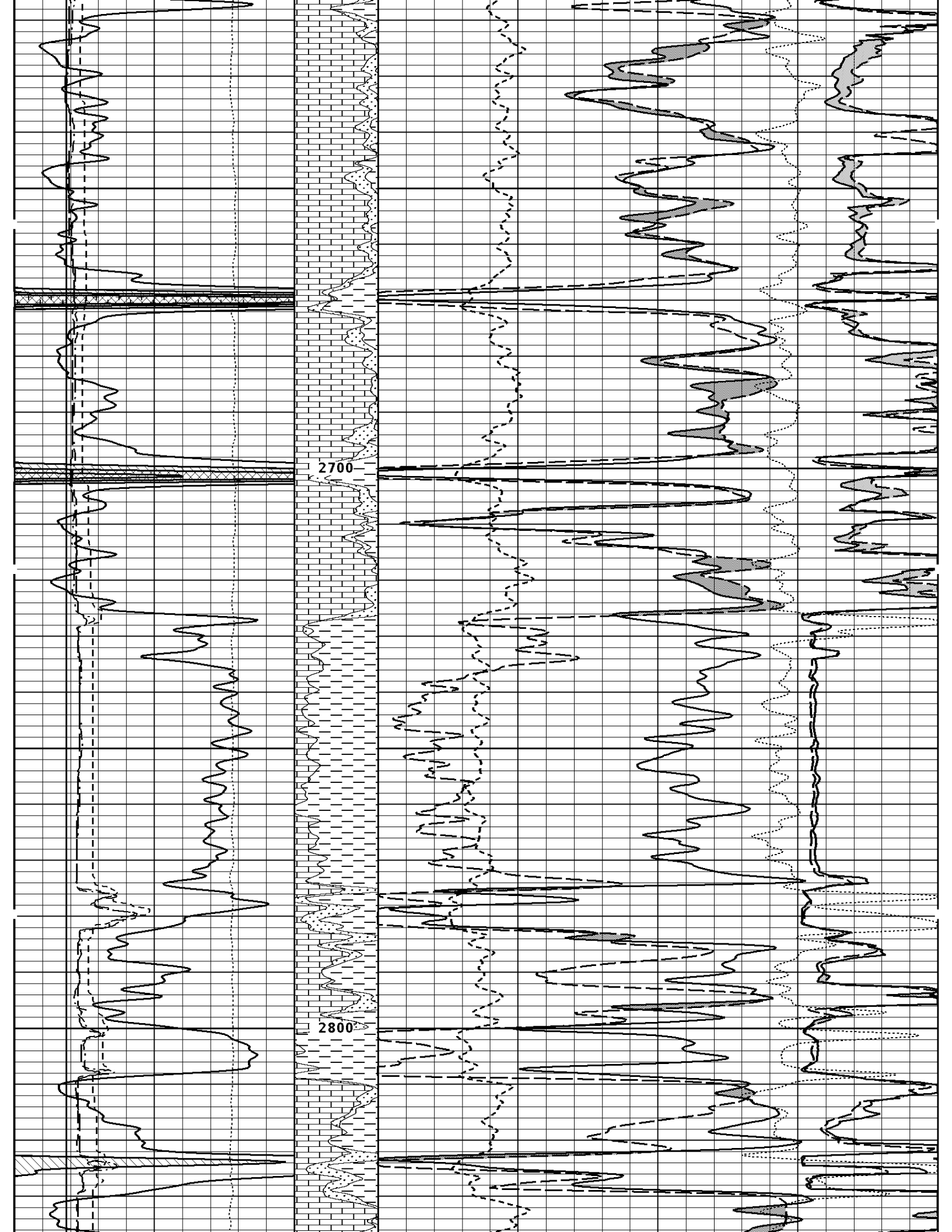
2300
←N CAL
←M CAL
←PHIN
NORM→
INV→


2400
GR
LD CAL
BIT
LWT
PECL
PORI
LCOR
2500
2600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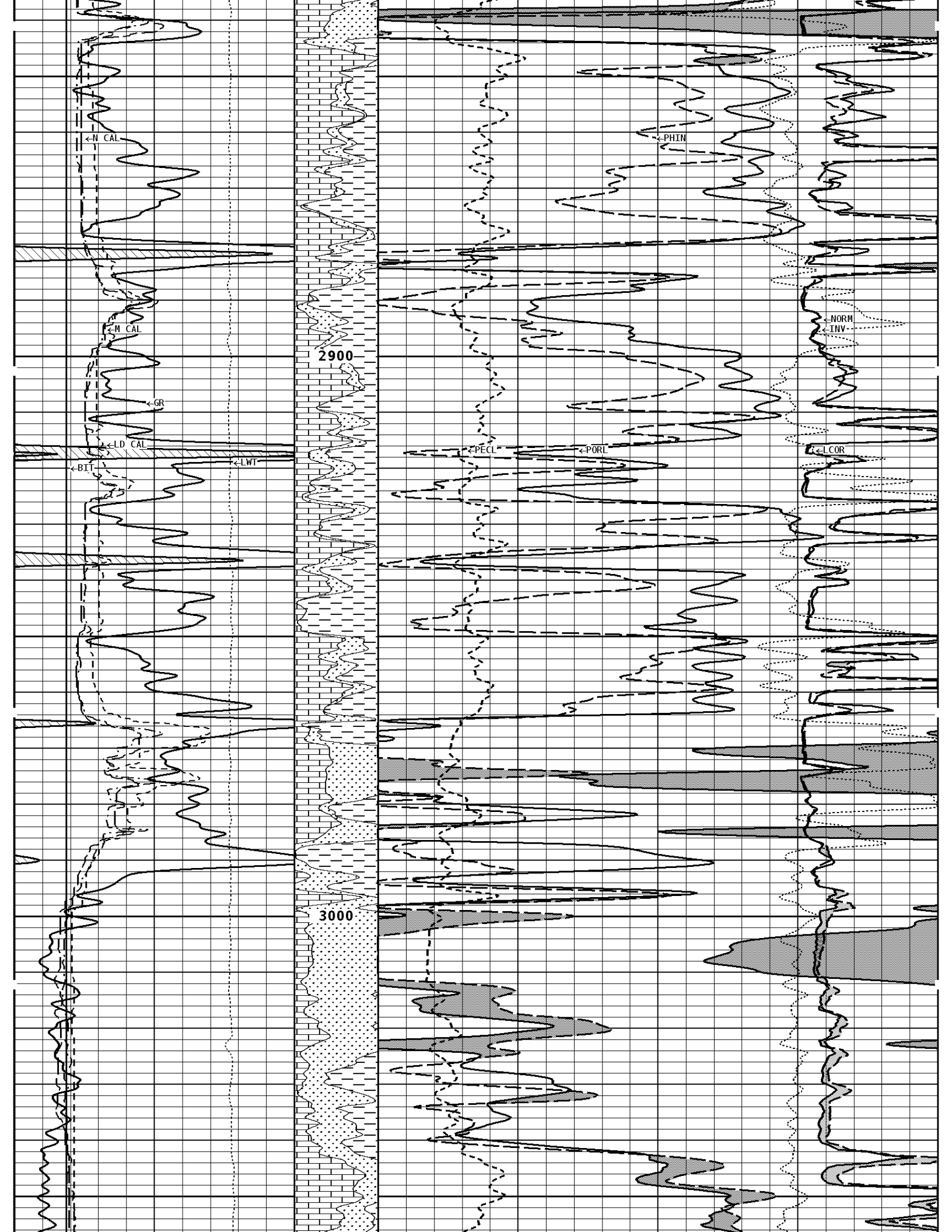
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2900
3000
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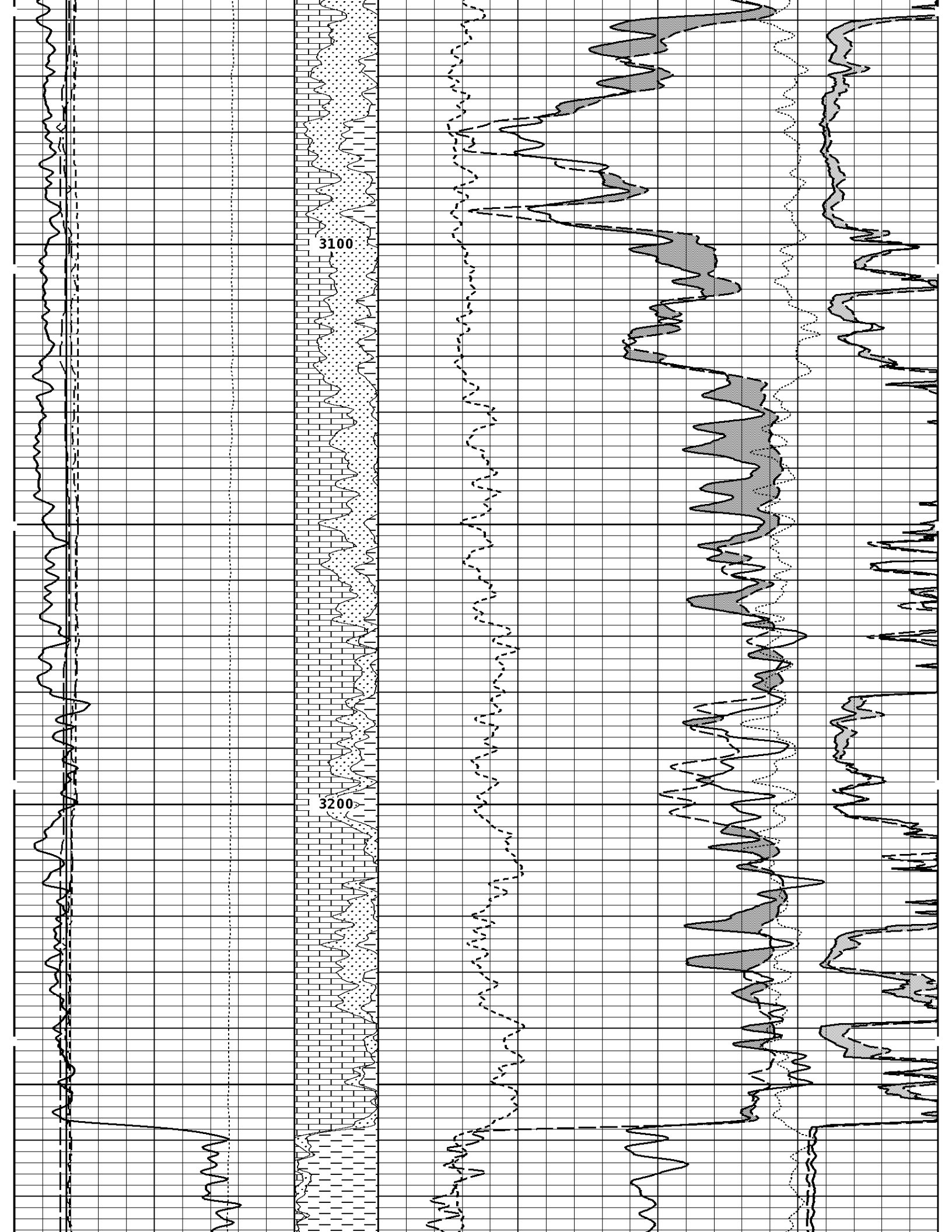
←PORL
←LCOR


3100
3200

1:240 MAIN 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 BARNS/ELECTRON	DENSITY CORRECTION G/CC
16 26 6 16		0 10	-0.25 0.25

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

BIT SIZE INCHES (IN)	NORMAL OHMM
6 16	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: LACHENMAYR_GOODRICH_L-1_MAY20_QUINT **Scale:** 1:240 **Format:** NLD-240
Segment: V1.D1.S6 DS FINAL REPEAT **Acquired:** 2015-05-20 22:13 3.4.0-13487
Reference: 0 **Processed:** 2015-05-20 22:13 3.4.0-13487

CALIPER MICRO INCHES (IN)
16 26 6 16

BIT SIZE INCHES (IN)	NORMAL OHMM
6 16	0 40

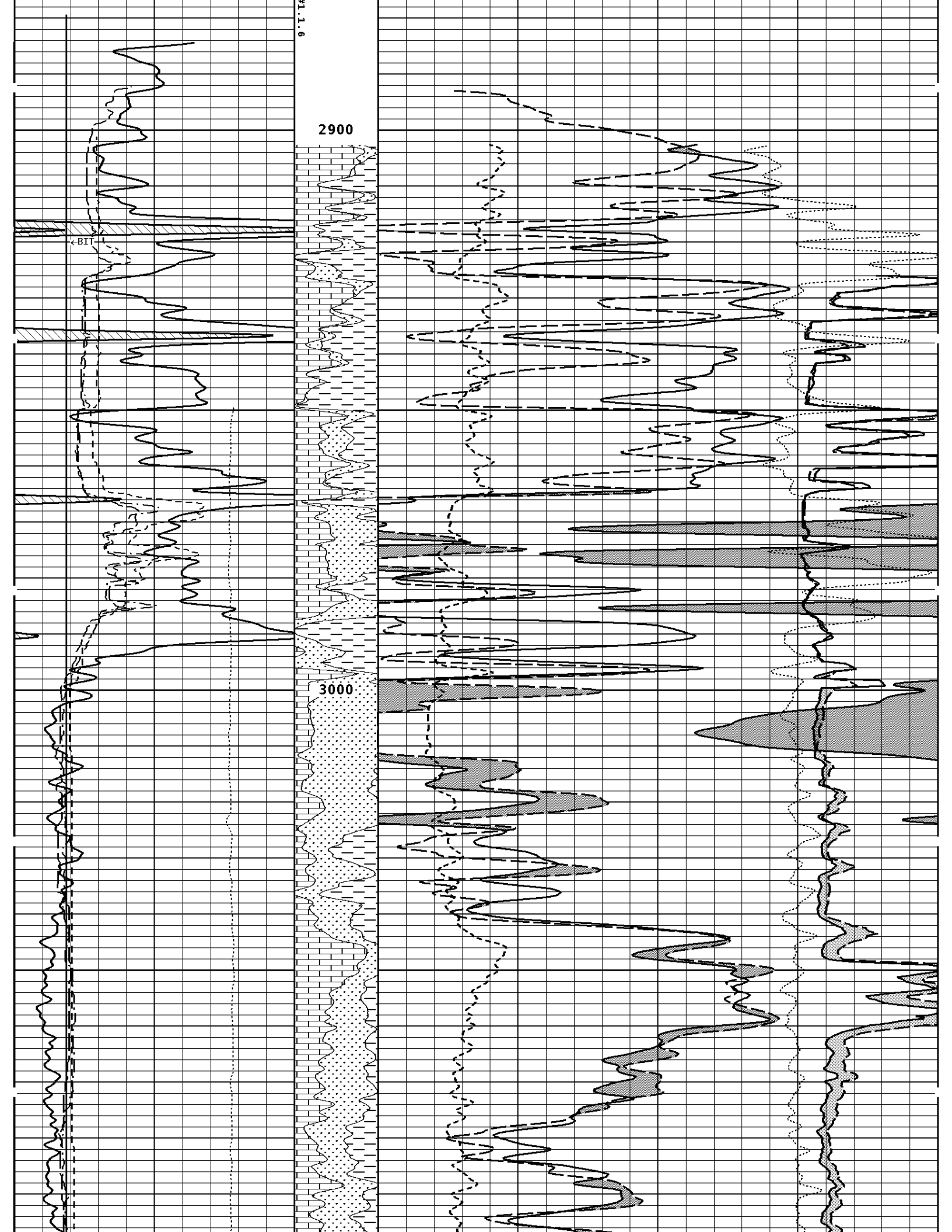
NEUTRON (Y) CALIPER INCHES (IN)	INVERSE OHMM
16 26 6 16	0 40

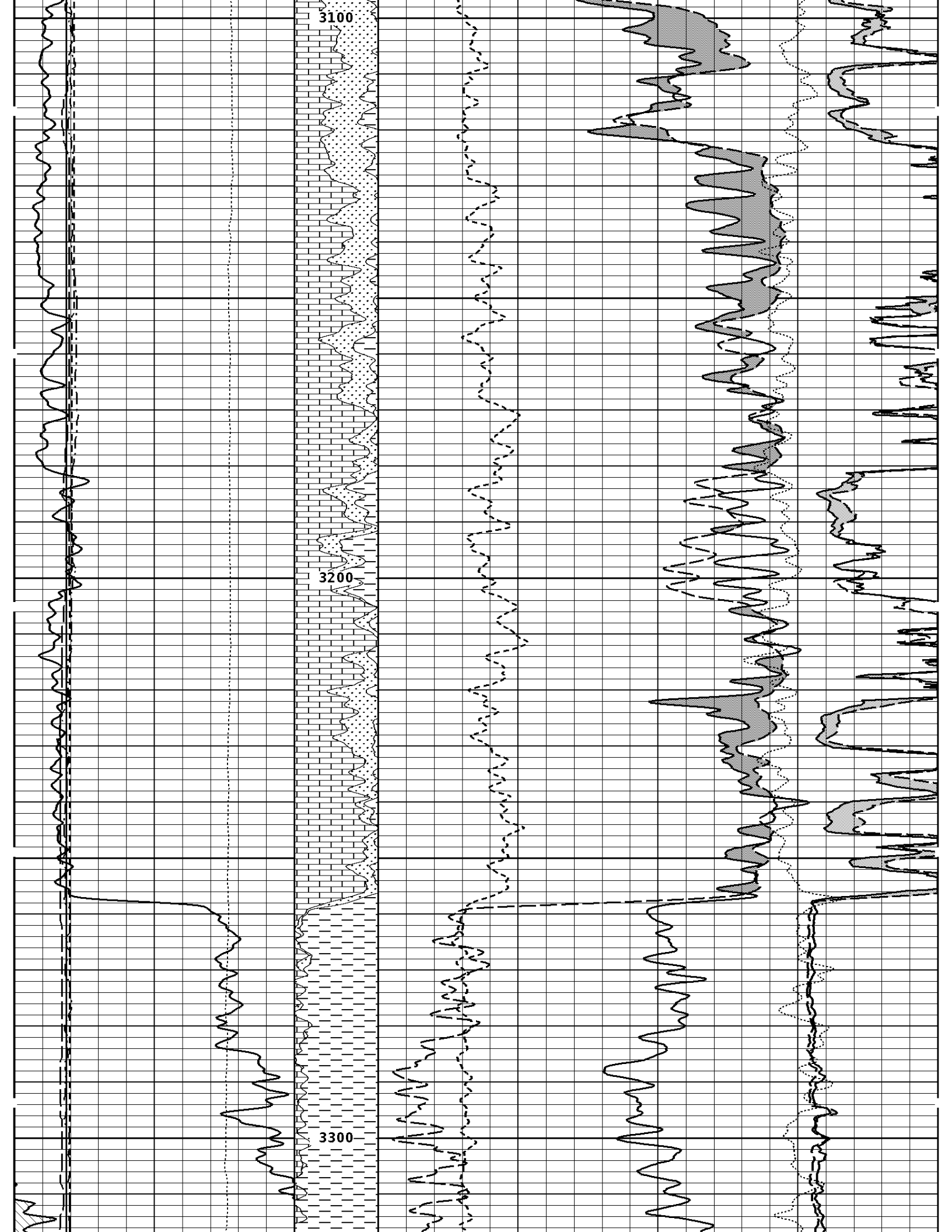
DENSITY (X) CALIPER INCHES (IN)	Volume Quartz	PE CROSS-SECTION BARNS/ELECTRON	DENSITY CORRECTION G/CC
16 26 6 16		0 10	-0.25 0.25

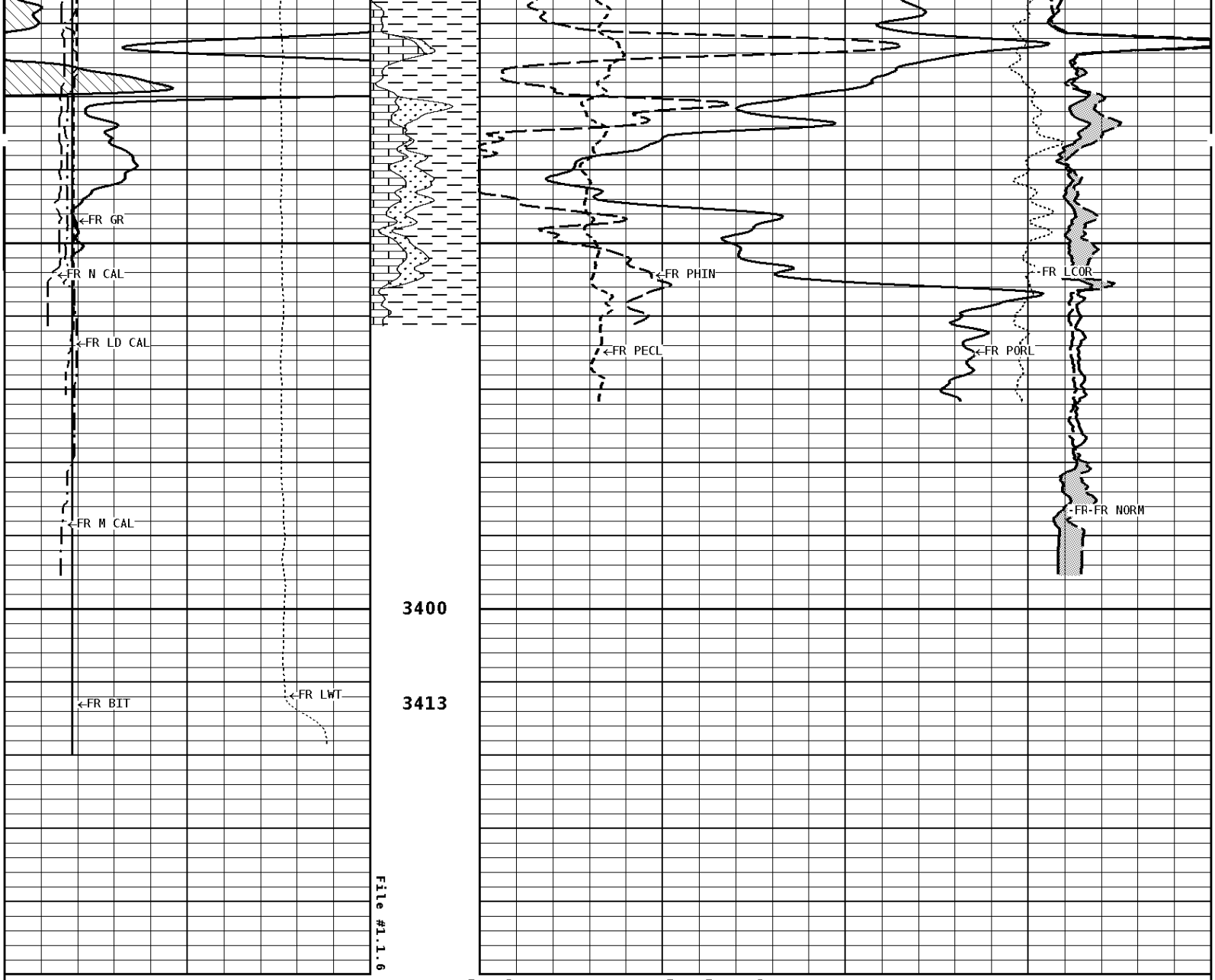
TENSION LBS	Volume Calcite	DENSITY POROSITY (2.71g/cc) PERCENT
10000 0		70 30 30 -10 -10 -50

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

1:240 REPEAT SECTION


BIT
2900
3000


3100
3200
3300



1:240 REPEAT SECTION

GAMMA RAY **API UNITS** 150 — 300 0 — 150	Volume Dolo/Shale	**NEUTRON POROSITY (LIMESTONE)** **PERCENT** 30 — -10
TENSION **LBS** 10000 — 0	Volume Calcite	**DENSITY POROSITY (2.71g/cc)** **PERCENT** 70 — 30 30 — -10 -10 — -50
DENSITY (X) CALIPER **INCHES (IN)** 16 — 26 6 — 16	Volume Quartz	**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: LACHENMAYR_GOODRICH_L-1_MAY20_QUINT **Scale:** 1:240 **Format:** LDT-240
Segment: V1.D3.S2 DS FINAL MAIN **Acquired:** 2015-05-20 22:35 3.4.0-13487
Reference: 0 **Processed:** 2015-05-21 00:57 3.4.0-13487

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		DENSITY CORRECTION G/CC	
0	10	-0.25	0.25

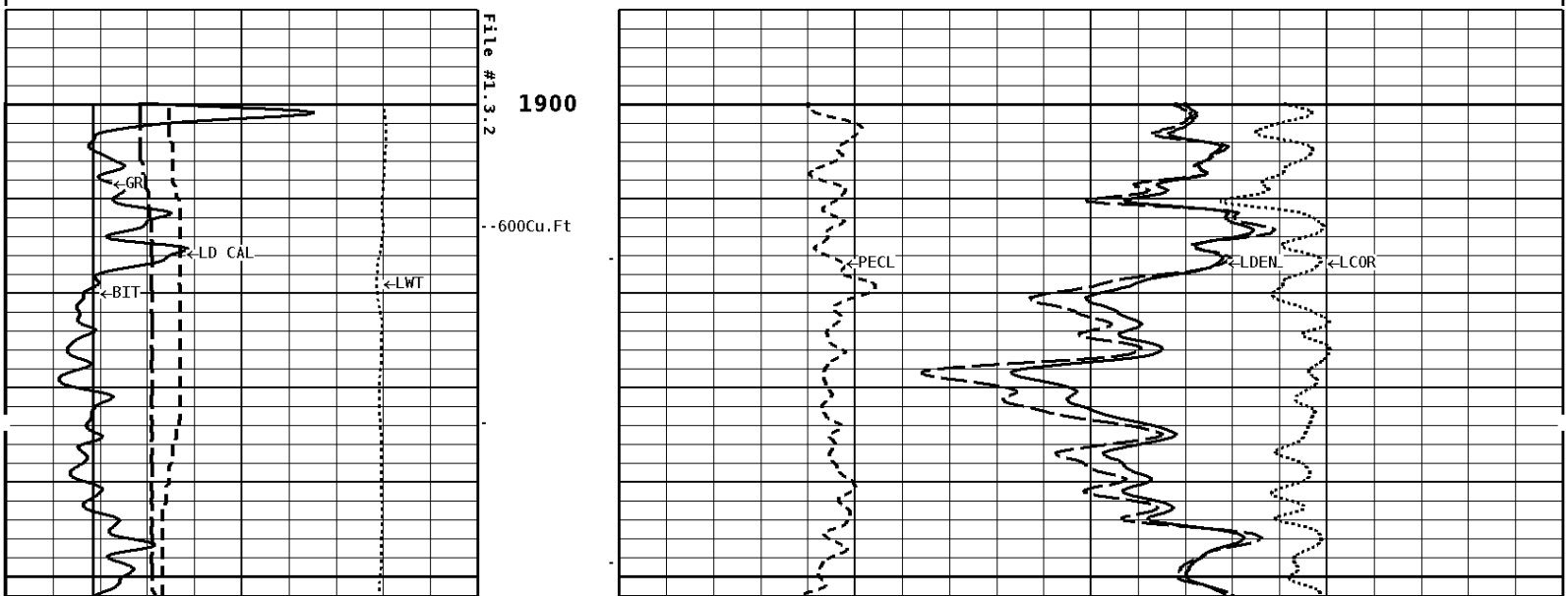
TENSION LBS	
10000	0

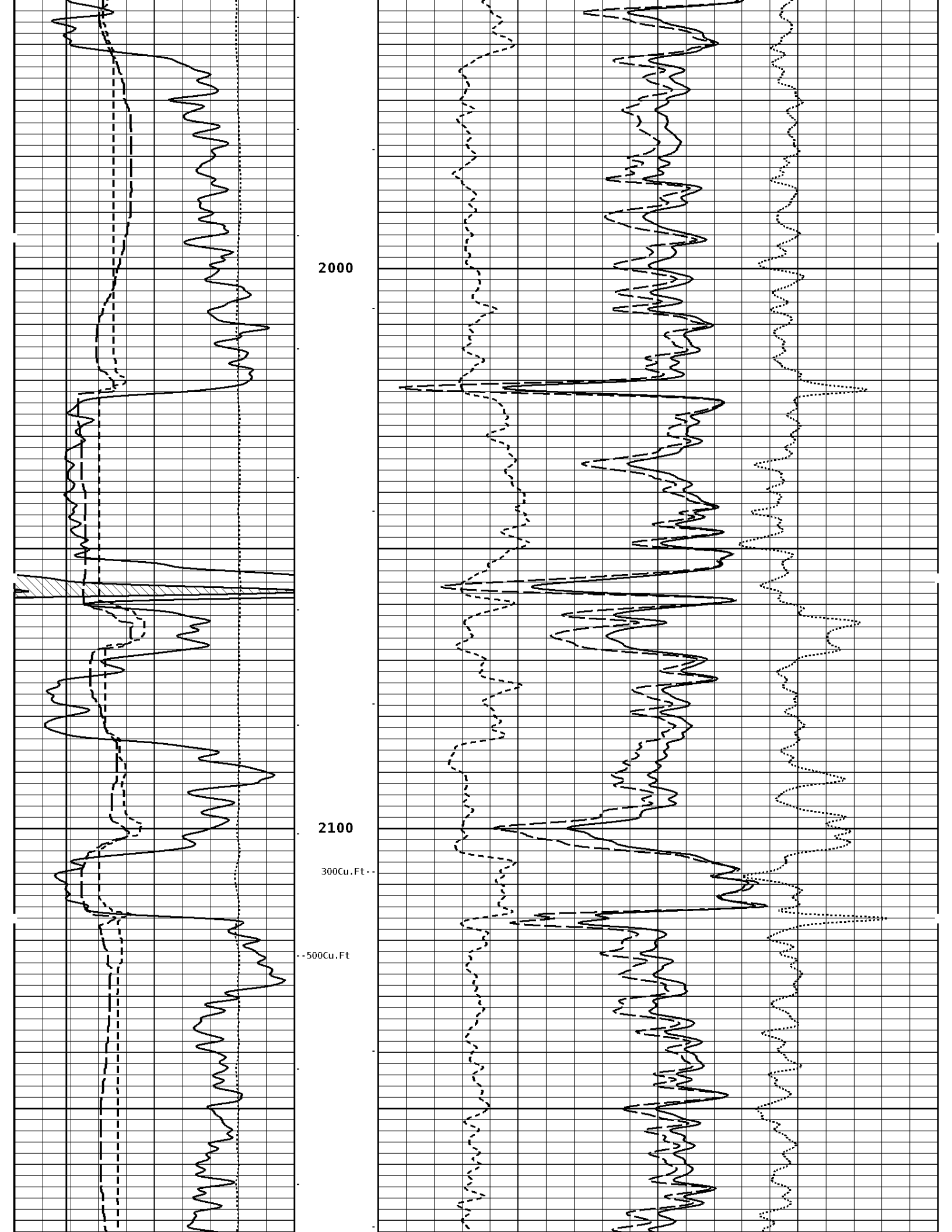
COMPENSATED BULK DENSITY G/CC	
3.0	4.0
2.0	3.0
1.0	2.0

GAMMA RAY API UNITS		-BHV AHV- CU.FT	DENSITY POROSITY (2.71g/cc) PERCENT	
150	300		70	30
0	150		30	-10
			-10	-50

1:240 MAIN SECTION

BULK DENSITY

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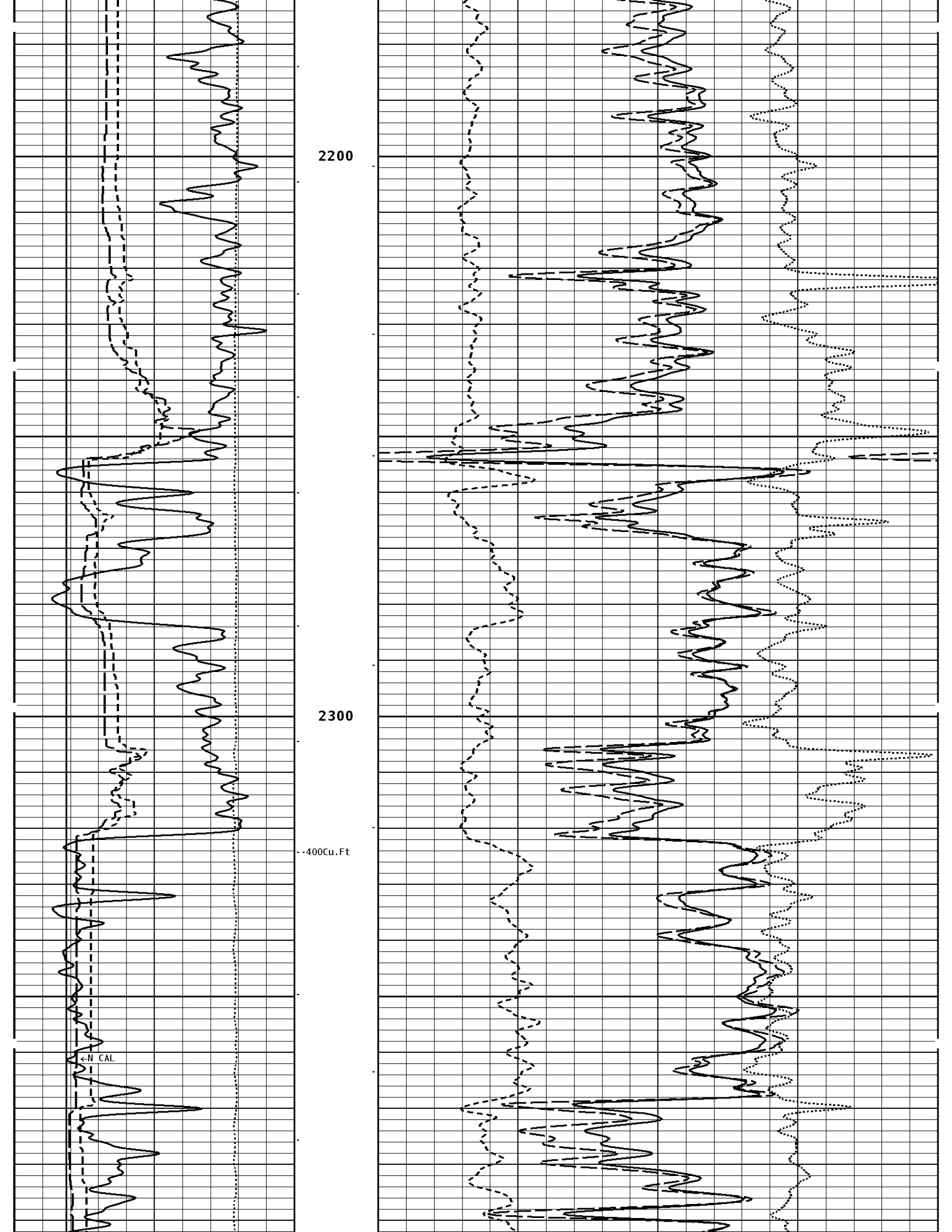
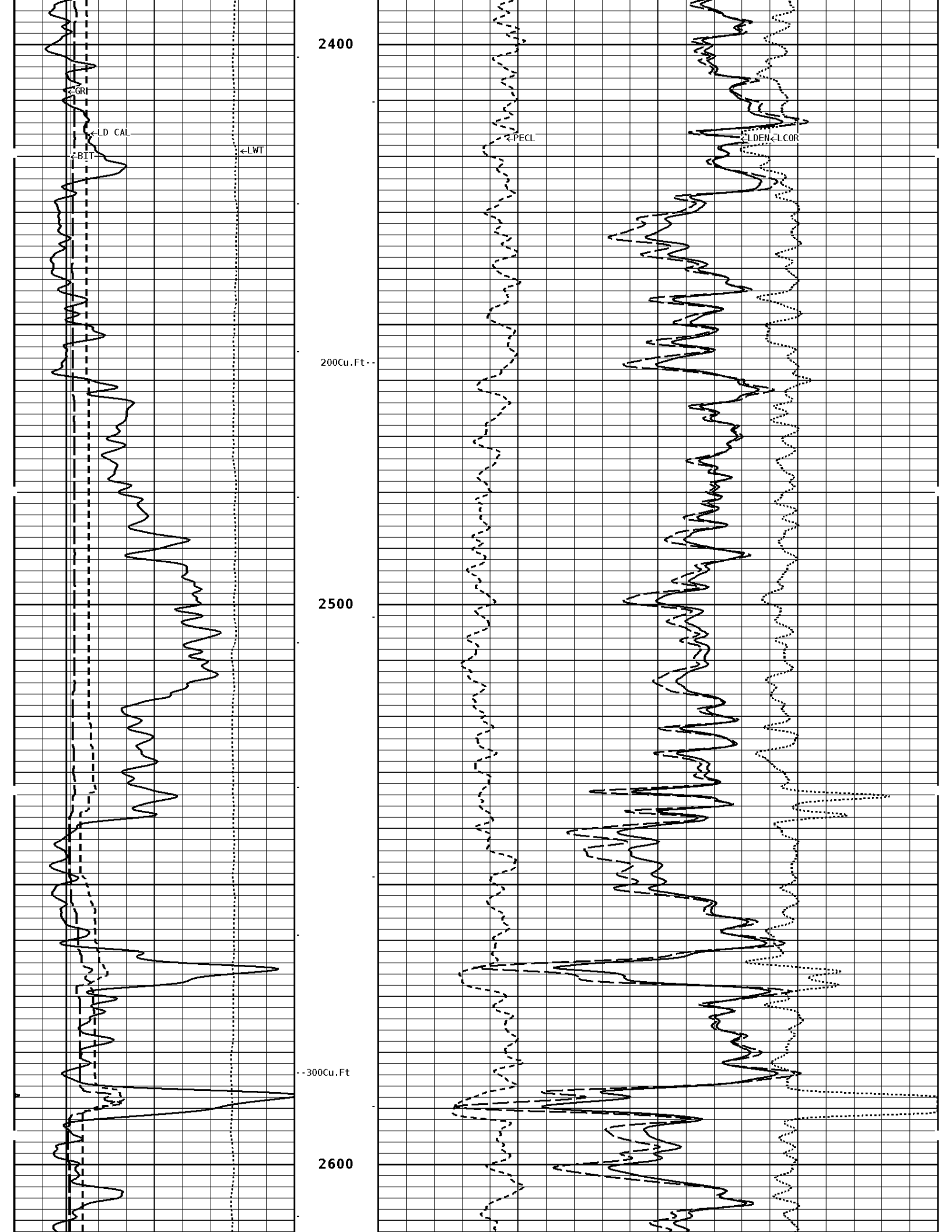
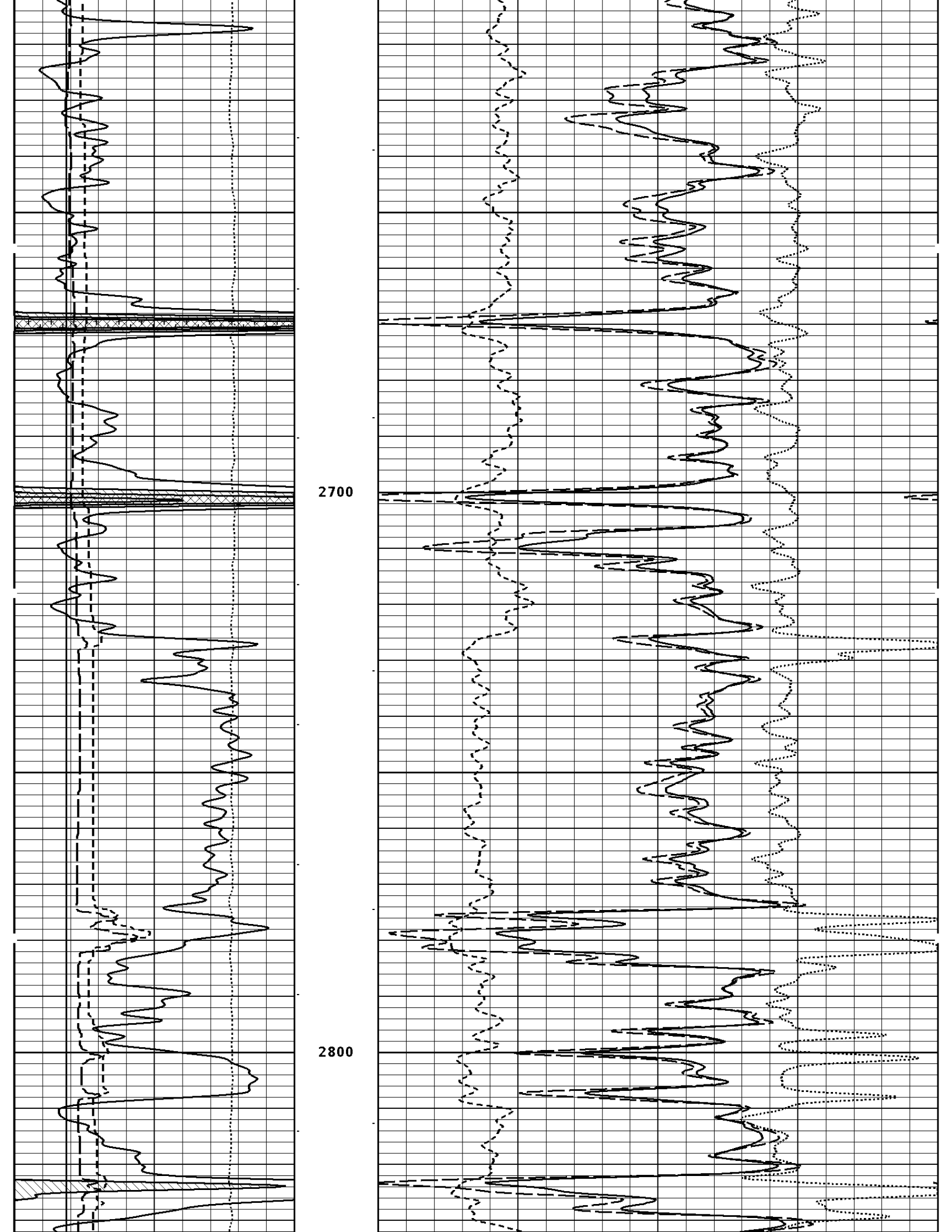
2100
300Cu.Ft--
--500Cu.Ft


2200
2300
--400Cu.Ft
←N CAL


2400
GRI
LD CAL
BIT
LWT
PECL
LDEN
LCOR
200Cu.Ft
2500
300Cu.Ft
2600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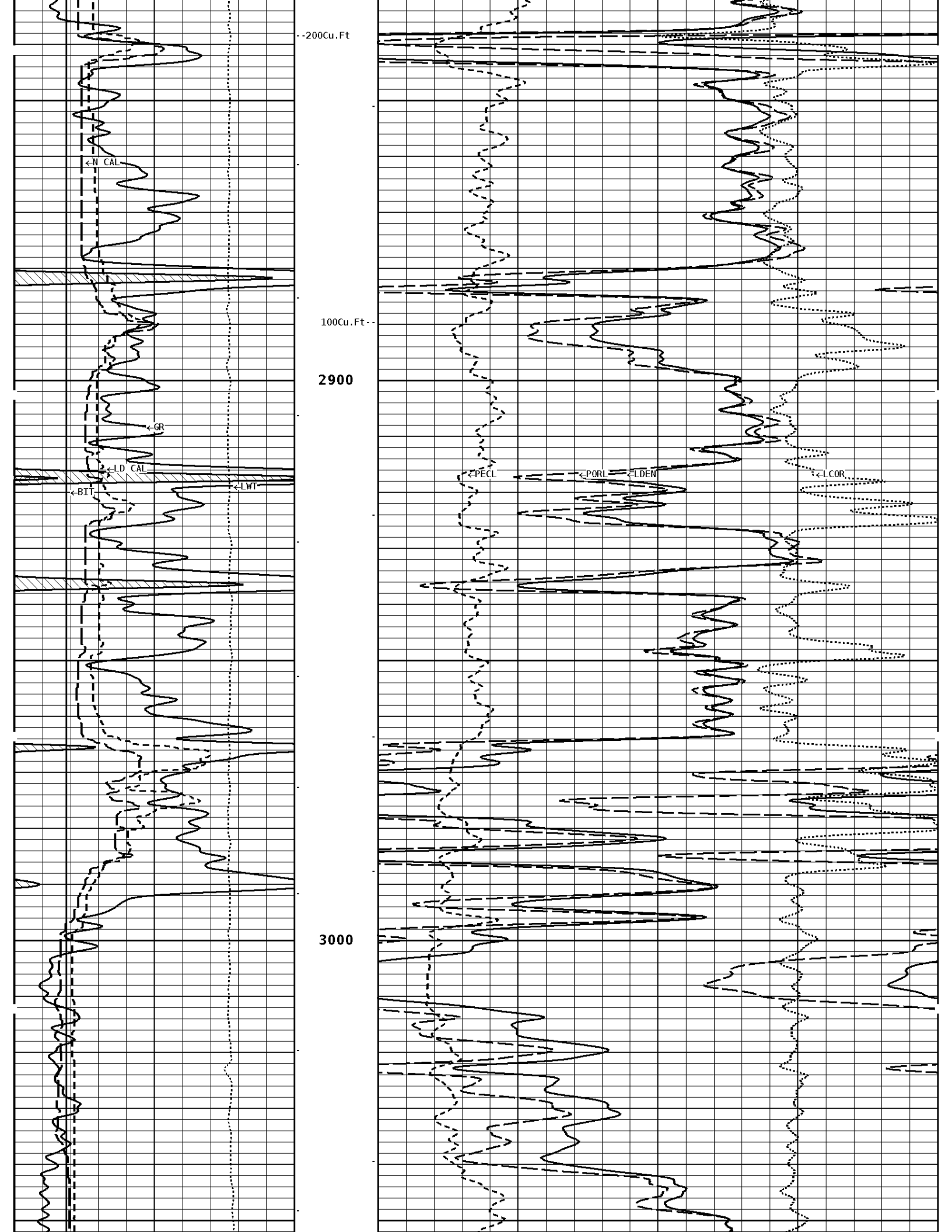
200Cu.Ft
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100Cu.Ft
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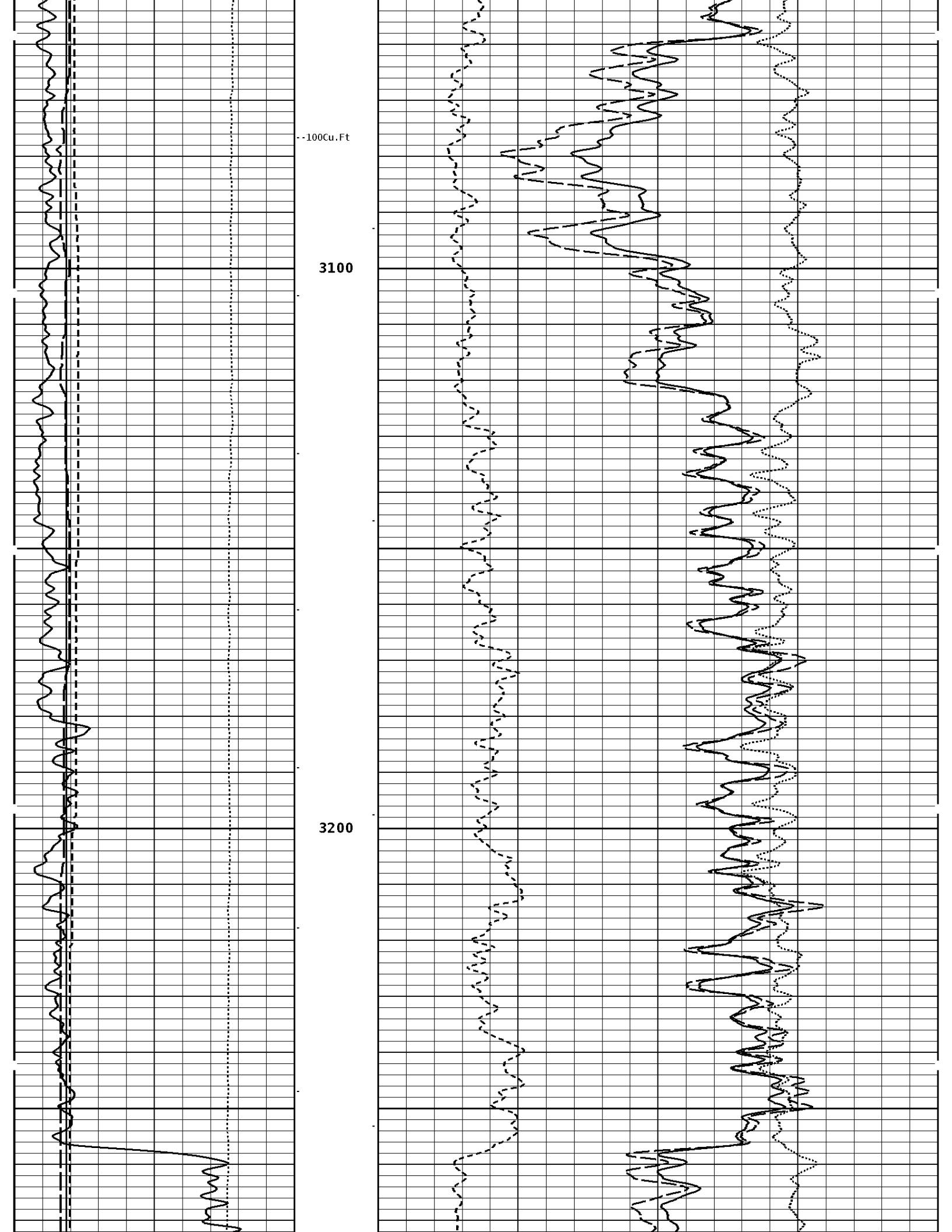
GR
LD CAL
BIT
LWT
PECL
PORL
LDEN
LCOR
3000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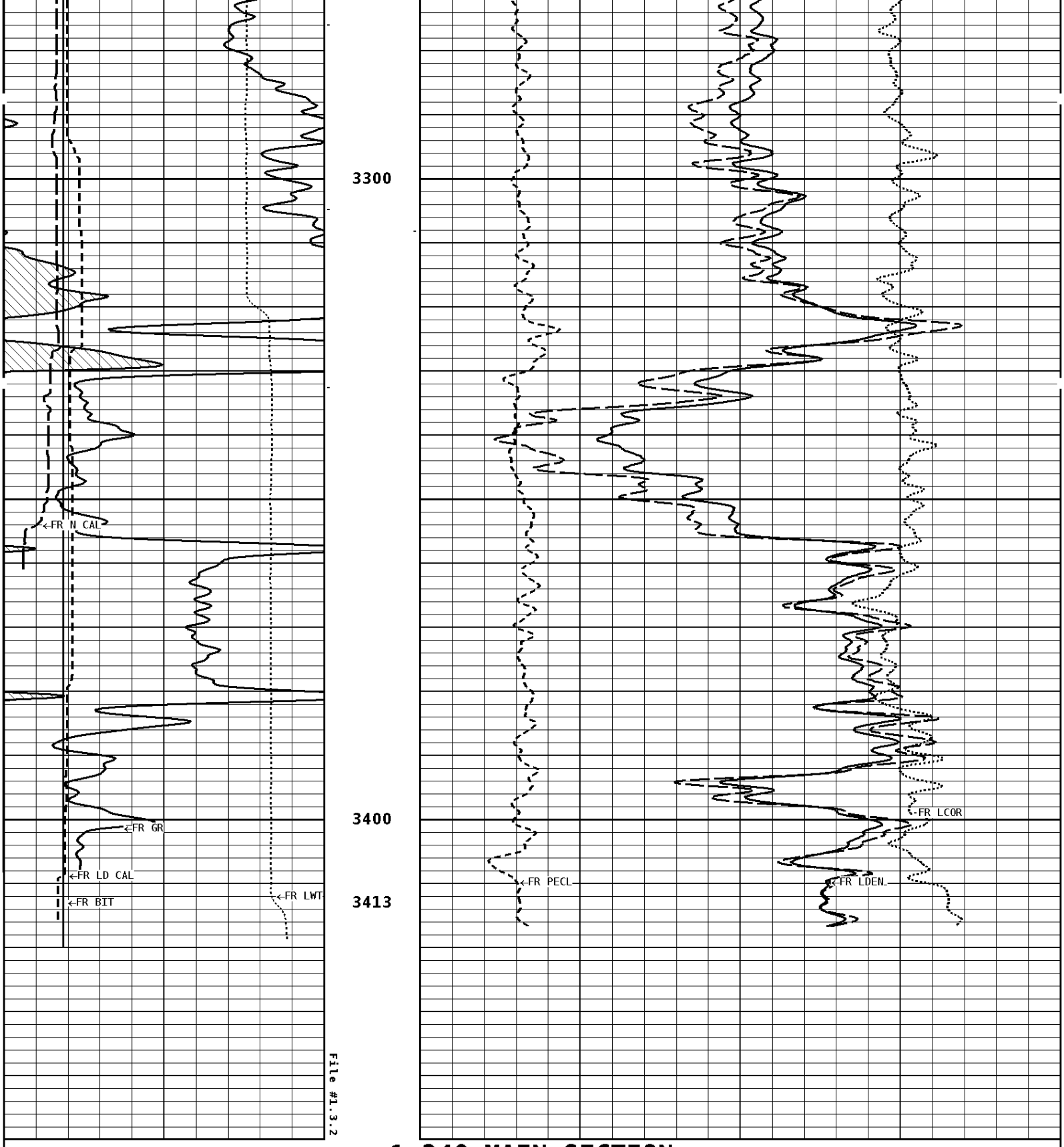
3100
3200



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

DENSITY (X) CALIPER INCHES (IN)	
16	26
6	16

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

BIT SIZE INCHES (IN)	
6	16

1.0	2.0

PE CROSS-SECTION BARNS/ELECTRON		DENSITY CORRECTION G/CC	
0	10	-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 : 19-May-2015 Time : 11:16
Sensor Suite : GR-GR5 ID : GRT-BA-121

	Measured Background	Measured Jig	Units	Calibrated Jig	Units
GR	43	343	CPS	175	GRAPI

Shop Calibration CNT-AA

Performed : 19-MAY-2015 Time : 10:41
Sensor Suite : CALI-BCN ID : NDT-BB-115

	Jig - Measured Ring#1	Jig - Measured Ring#2	Jig - Calibrated Ring#1	Jig - Calibrated Ring#2	Units
CL # 1	9.4	14.0	6.0	12.0	IN.

Performed : 19-May-2015 Time : 10:47
Sensor Suite : BHC NEUT ID : CNP-AA-101
Source ID : N-1044

	Tank Measured	Tank Calibrated	Verification Jig	Units
N/F	3.4541	3.6893	3.7093	
Porosity	17.1	20.5	20.8	%

Shop Calibration LDT-DA

Performed : 19-MAY-2015 Time : 09:26
Sensor Suite : CALI-LTH ID : PDT-GA-426

	Jig - Measured Ring#1	Jig - Measured Ring#2	Jig - Calibrated Ring#1	Jig - Calibrated Ring#2	Units
CL # 1	7.5	11.2	6.0	12.0	IN.

Performed : 19-May-2015 Time : 09:46
Sensor Suite : BHCPELNG ID : LDP-DA-50
Source ID : CSV-587

	Short Space BKGD	Short Space Al	Short Space Mg	Short Space Al+Fe	Units
LSW1	70	473	763	325	CPS
LSW2	76	540	849	408	CPS
LSW3	276	1293	2013	1138	CPS
LSW4	336	1227	1690	1121	CPS
LSW5	32	39	41	38	CPS
LSW6	93	94	94	92	CPS
LSW7	58	58	56	60	CPS

LSW8	1	2	3	2	CPS
QS	0.235	0.240	0.250	0.215	
PES			2.778	5.967	
SSDN		2.600	1.680		G/CC

Long Space

	BKGD	Al	Mg	Al+Fe	Units
LLW1	103	559	2349	370	CPS
LLW2	113	881	3591	677	CPS
LLW3	421	1725	6245	1539	CPS
LLW4	543	1046	2588	985	CPS
LLW5	64	67	80	67	CPS
LLW6	166	164	162	165	CPS
LLW7	112	109	106	111	CPS
LLW8	5	6	10	6	CPS
QL	0.194	0.204	0.208	0.193	
PEL			2.697	5.458	
LSDN		2.600	1.680		G/CC

Tucker ENERGY SERVICES

Company: LACHENMAYR OIL LLC

Well: GOODRICH #L-1

Location: 2265' FNL & 995' FWL

Logged: 05-20-2015

K.B. Elev: 1436.0 Ft