

**Tucker**  
WIRELINE SERVICES

**DUAL INDUCTION  
RESISTIVITY LOG**

File No : TUL-57618  
 Company : LAYNE ENERGY OPERATING, LLC.  
 Well : FUQUA #9-36  
 Field :  
 Country : ELK  
 State : KANSAS  
 Country : USA  
 API No : 15-049-22559

Company LAYNE ENERGY OPERATING, L  
 Well FUQUA #9-36  
 Field ELK  
 Country KANSAS  
 State USA  
 Country USA  
 API No. 15-049-22559

Location :  
 1852 FSL & 13201 FEL  
 N2 S2 N2 SE

LSD : Sect : 36 Twp : 28 Rge : 9E

Permanent Datum: GL Elevations: KB 1212.00 Ft SGT  
 Drilling Measured From: KB 1212.00 Ft CNT  
 Log Measured From: GL DF 1211.00 Ft PIT  
 Above Permanent Datum: 0.00 Ft GL 1201.00 Ft LDT

Date	02-24-2012	
Run Number	1	
Depth--Driller	2636.0	Ft
Depth--Logger	2631.0	Ft
First Reading	2630.0	Ft
Last Reading	40.0	Ft
Casing--Driller	40.0	Ft
Casing--Logger	40.0	Ft
Bit Size	7.875	In
Casing Size	8.625	In
Hole Fluid Type	WBM	
Density	9.0 LBS/GAL	
Fluid Loss	0.0 CC	
PH/Viscosity	0.0 60.0 SEC	
Sample Source	MEASURED	
RM@Measured Temp.	2.800	@ 60 F
RMF@Measured Temp	2.380	@ 60 F
RMC@Measured Temp.	3.220	@ 60 F
Source RMF/RMC	CALCULATED/CALCULATED	
RM@BHT	1.470 @ 120 F	
Time Circulation Stopped		
Max Recorded Temp.	120	F
Equipment/Base	123	TULSA
Recorded By	S. DAVIS	
Witnessed By	M. MURPHY / J. MCCLAIN / J. BURRIS	

The customer is hereby warned that by providing the log data herein, T. W. S. does not agree to provide any interpretation of log data, conversion of log data to physical rock parameters or recommendations. T. W. 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. W. 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. W. 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)
7.875	2642.00	8.625	20.00	40.00

Run Number	1	
Date	02-24-2012	
Date/Time On Bottom	02-24-2012 12:00	
Depth to Fluid	0.0	Ft
Salinity	0.000	PPM
RMF@BHT	1.250	@ 120 F
RMC@BHT	1.690	@ 120 F

Run Number 1

Comments

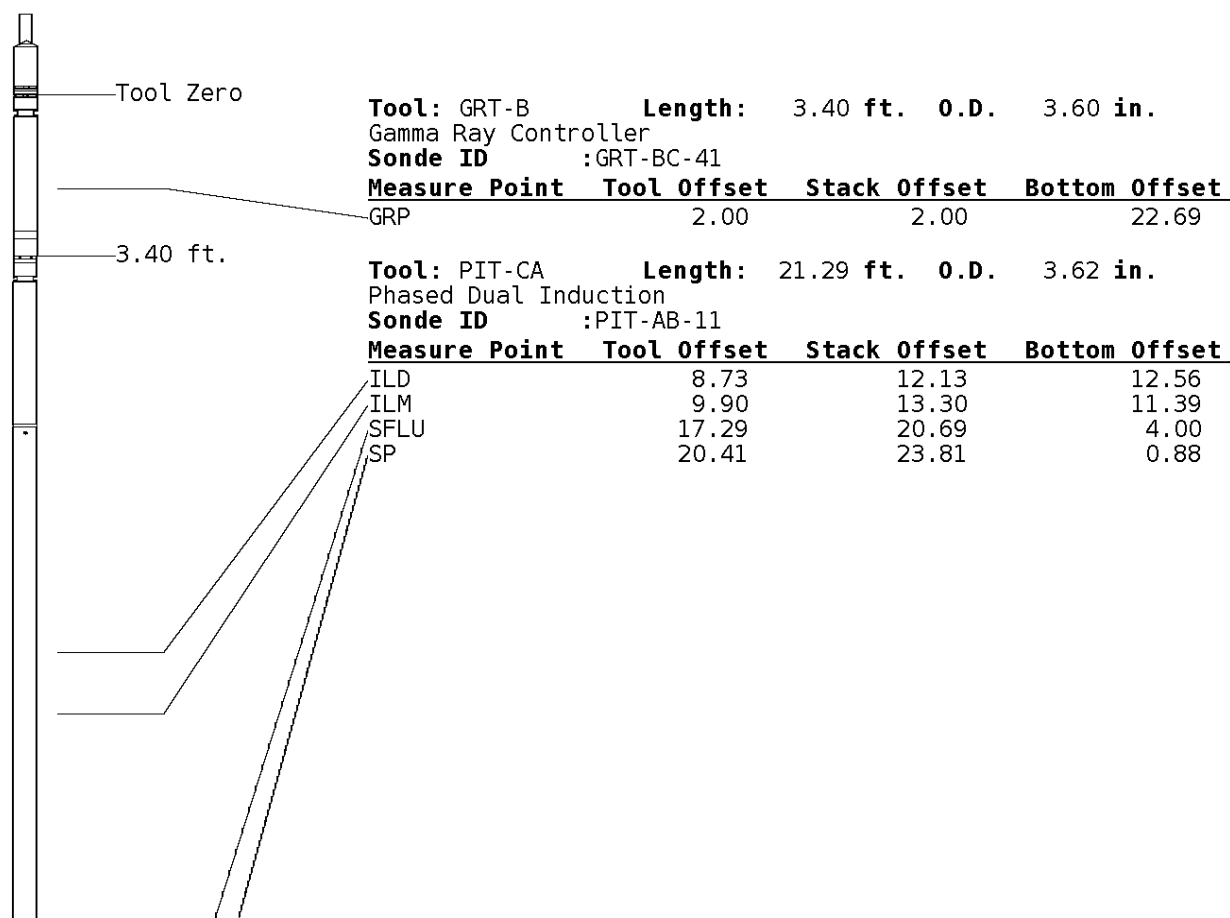
ALL PRESENTATIONS AS PER CUSTOMER REQUEST.  
 SGT, CNT, LDT, MLT, AND PIT RUN IN SPLIT RUNS  
 CALIPERS ORIENTED ON X-Y AXIS.  
 2.71 & 2.68 G/CC USED TO CALCULATED POROSITY.  
 ANNULAR HOLE VOLUME CALCULATED USING 5.5" PRODUCTION CASING.  
 HIRES & SGT PRESENTED FROM TD TO 2200'  
 MISS. RW 0.12

SGT: GRP, UFGRP, S-KK, S-UK, S-TK,  
 CNT: PHIN, CLCNIN.  
 LDT: PORL, LCORN, PECLN, LDENN, PORLLS, CLLDIN.  
 MLT: NOR\_RF, INV\_RF, MSCLPIN.  
 PIT: ILD, ILM, SPU, SFLAEC.

OPERATORS:  
 A. WARREN  
 N. LOYD  
 B. STEVENS

### Tool String Schematic

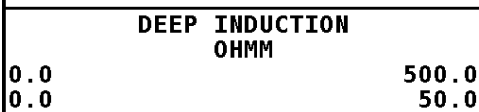
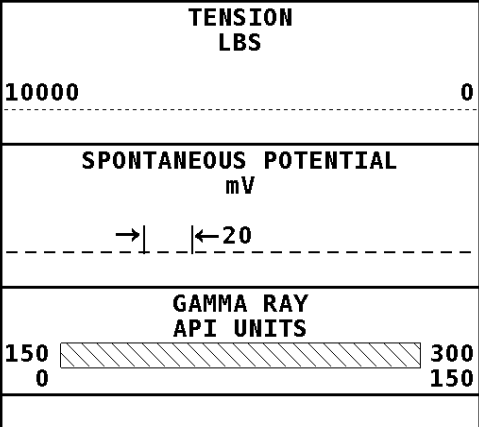
**Total Tool Length** - 24.69 ft.  
**Maximum Outside diameter** - 3.62 in.  
**Net Weight in Air** - 288.00 lbs.



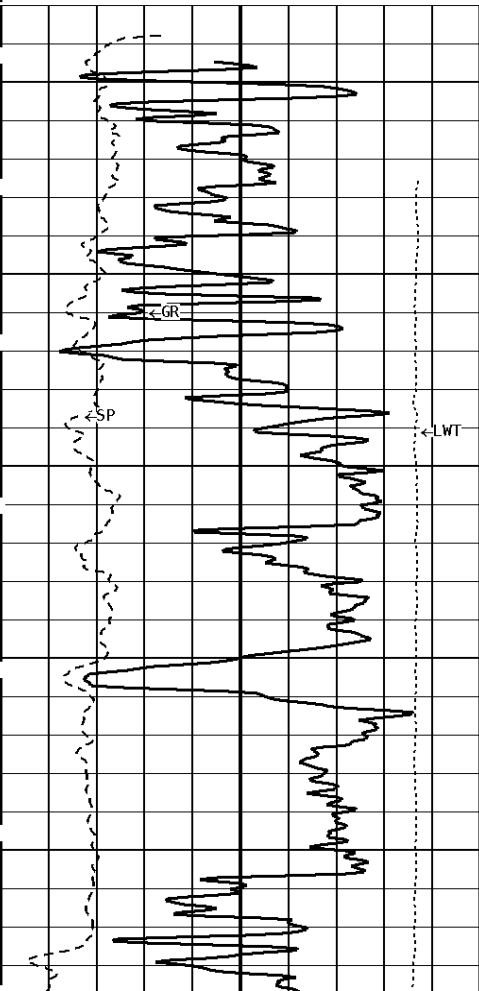
LWT 24.69 ft.

Well File: lan fuq 9-36 feb 24 mstk  
 Segment: V1.D5.S1 MAIN  
 Reference: 0

Scale: 1:600  
 Acquired: Not Available  
 Processed: Not Available

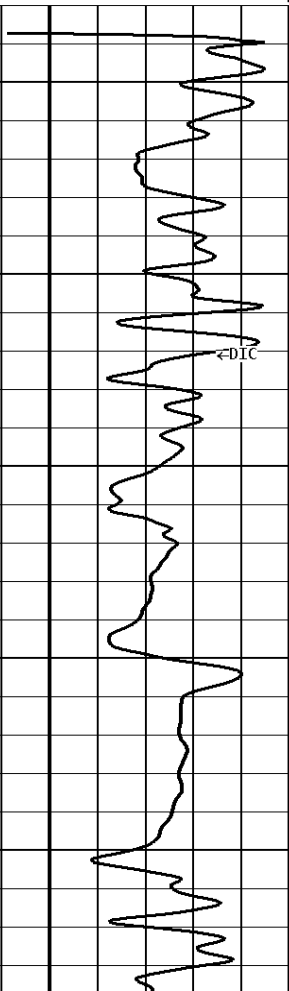
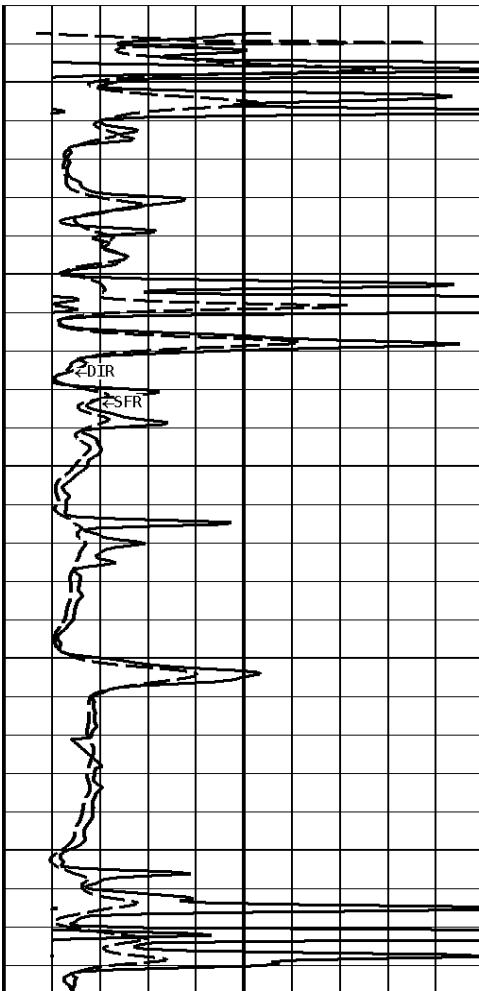


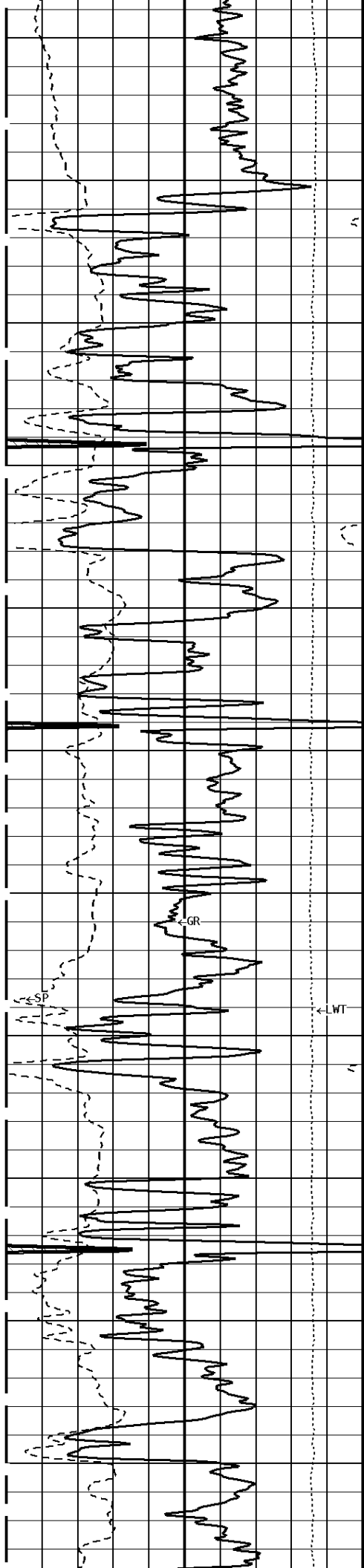
**1:600 SECTION**



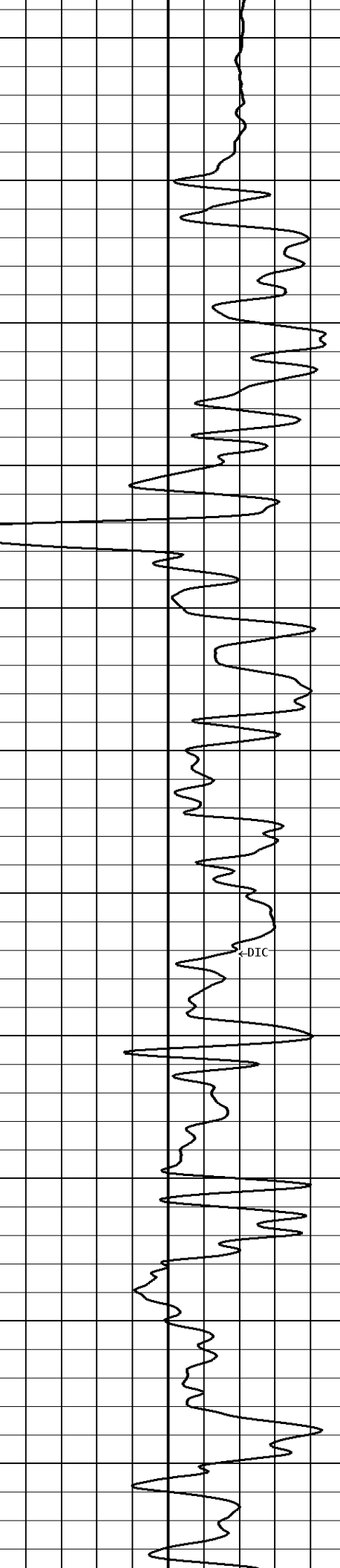
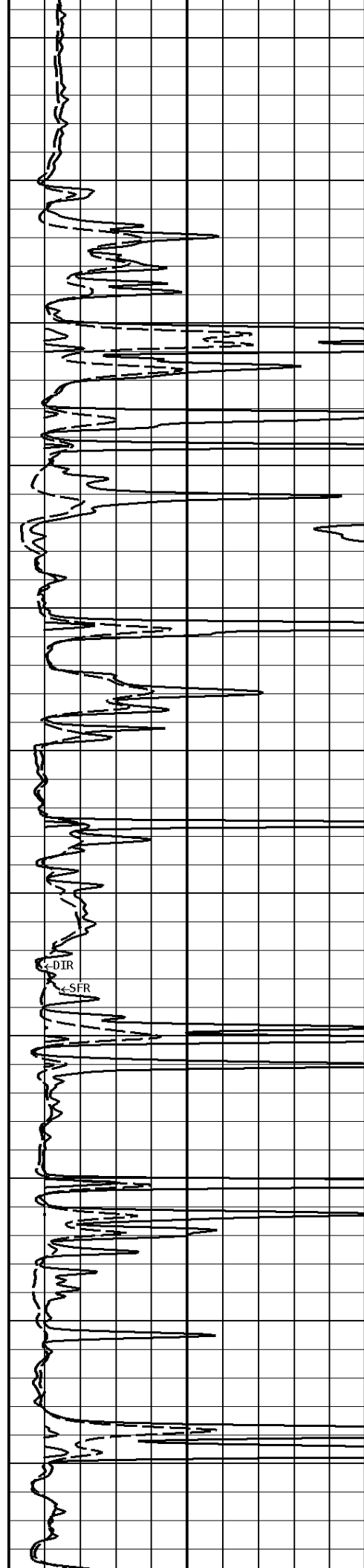
100

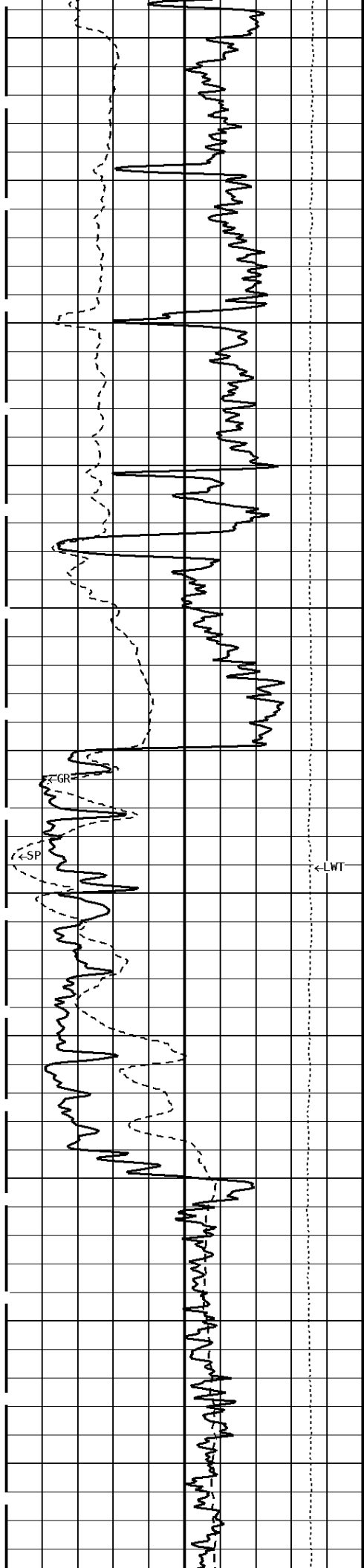
200



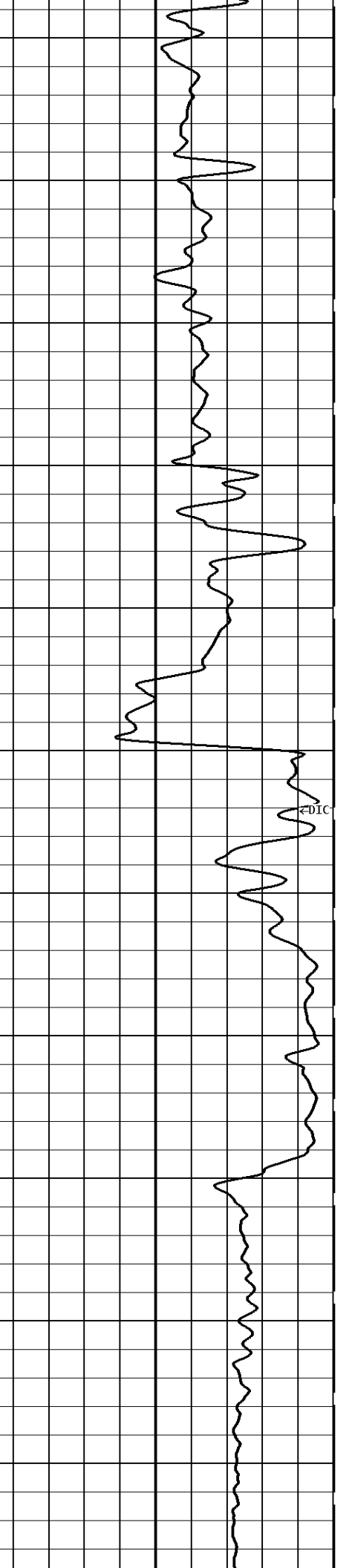
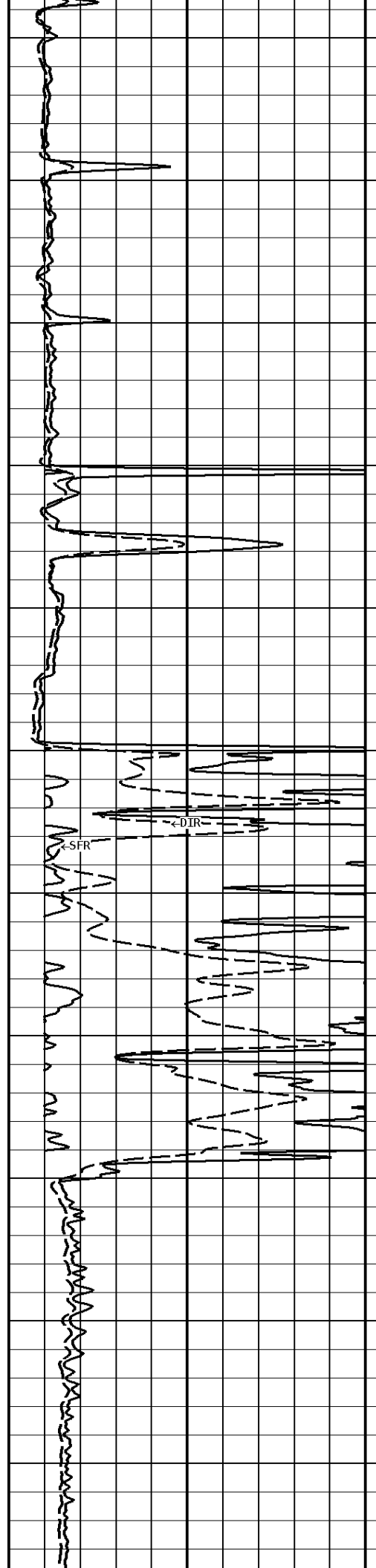


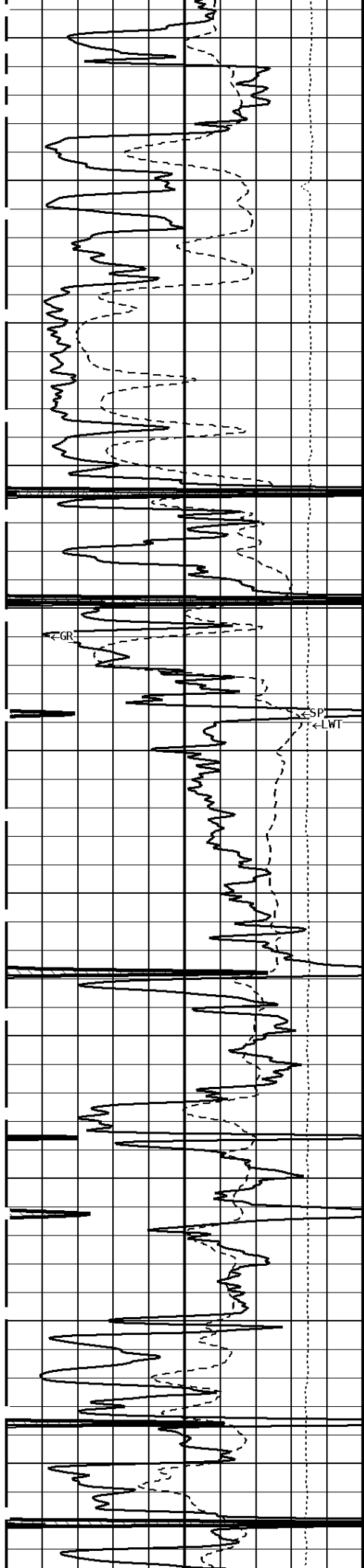
300  
400  
500  
600  
700  
800





900  
1000  
1100  
1200  
1300





1400

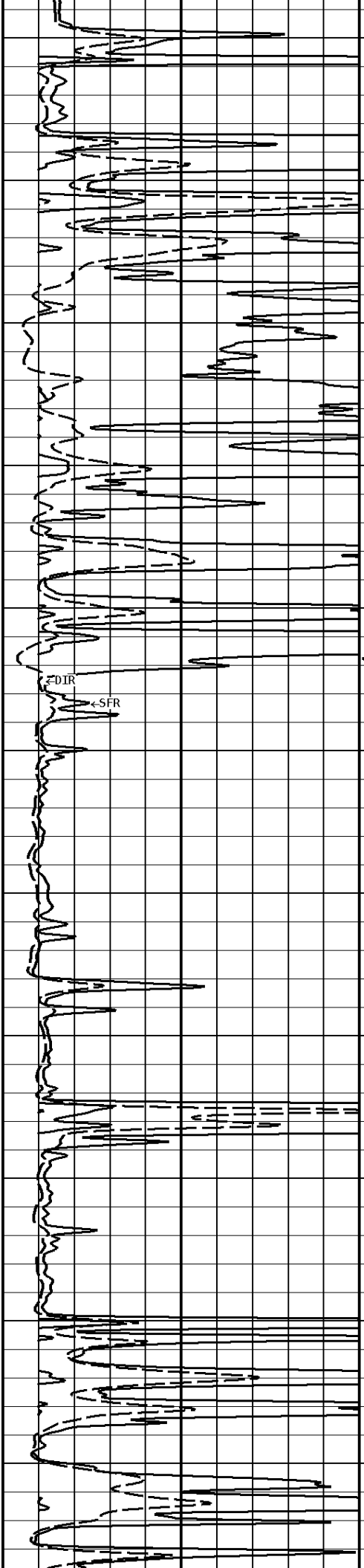
1500

1600

1700

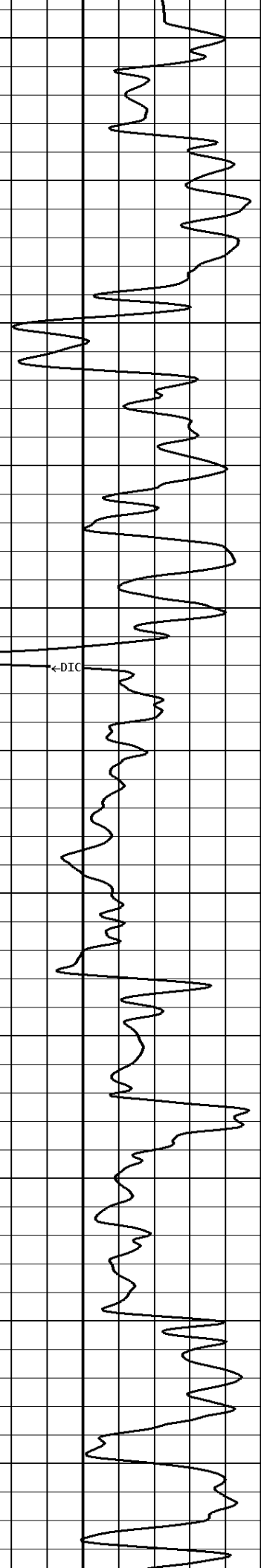
1800

1900

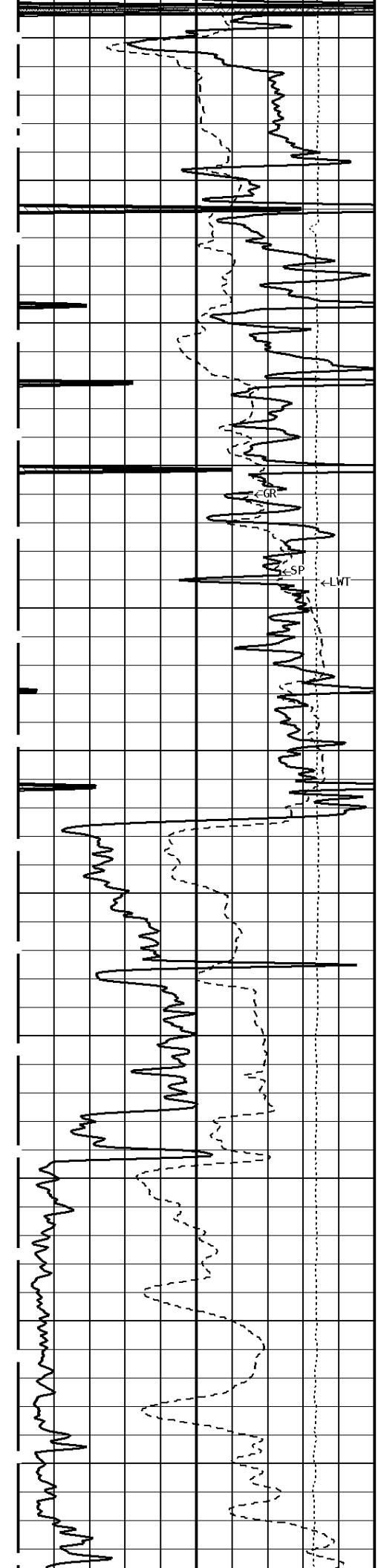


←DIR

←SFR



←DIC



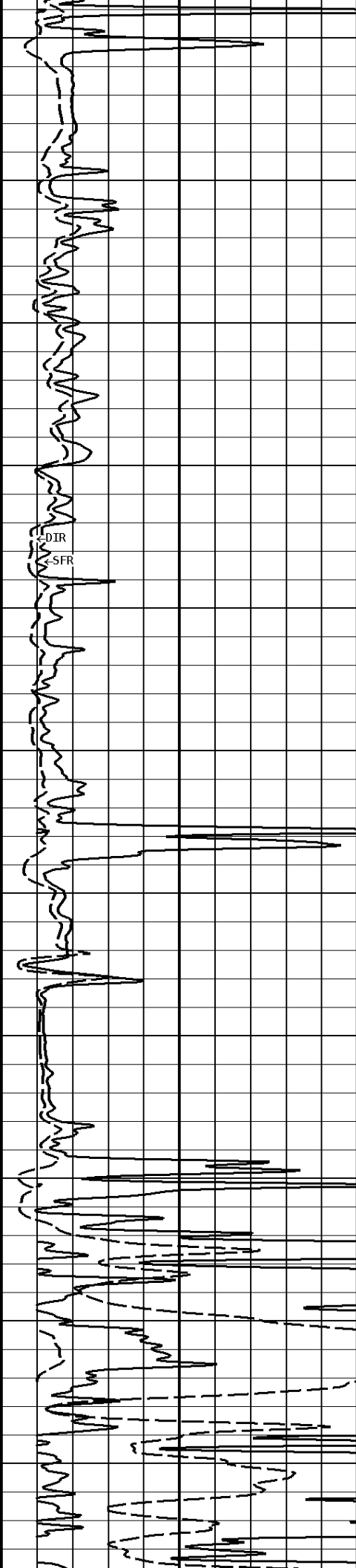
2000

2100

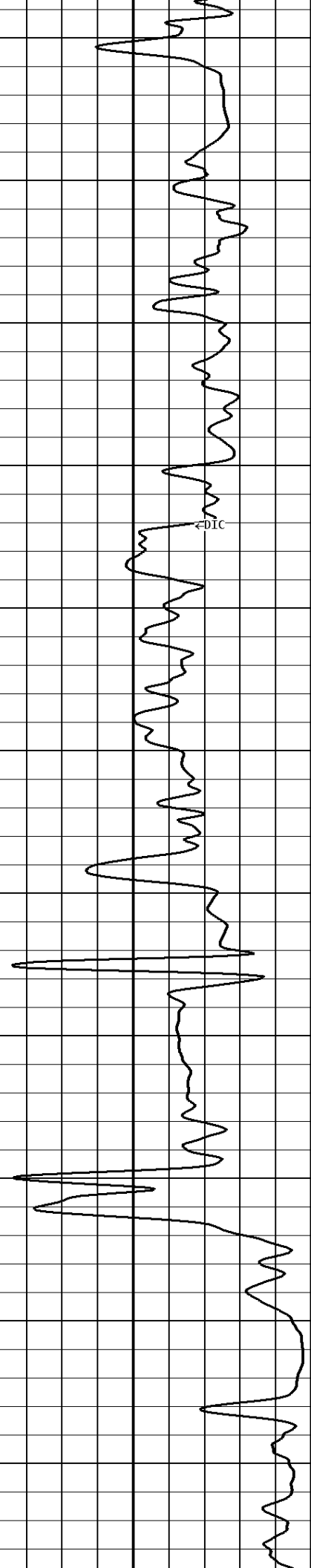
2200

2300

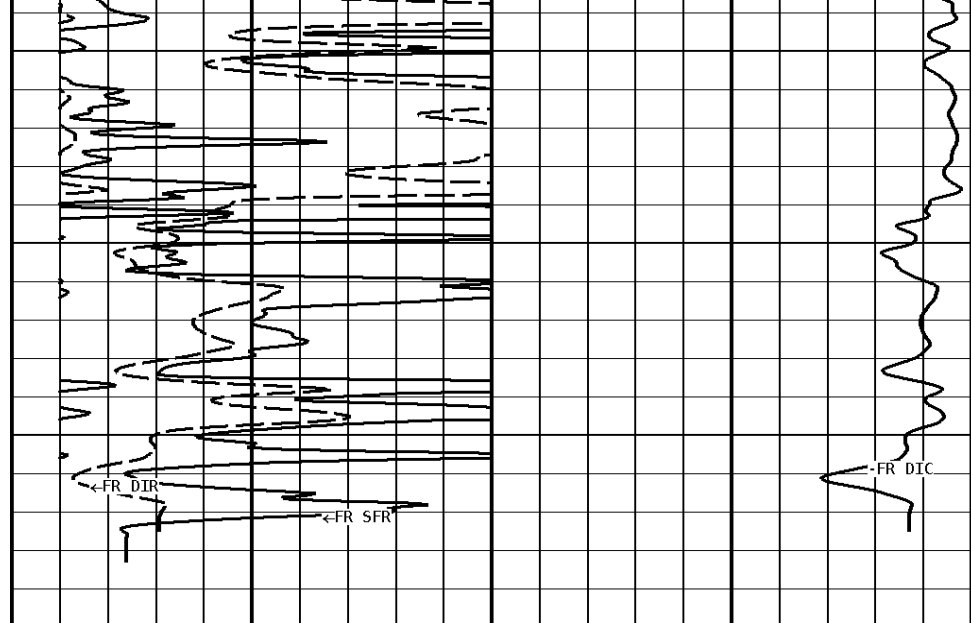
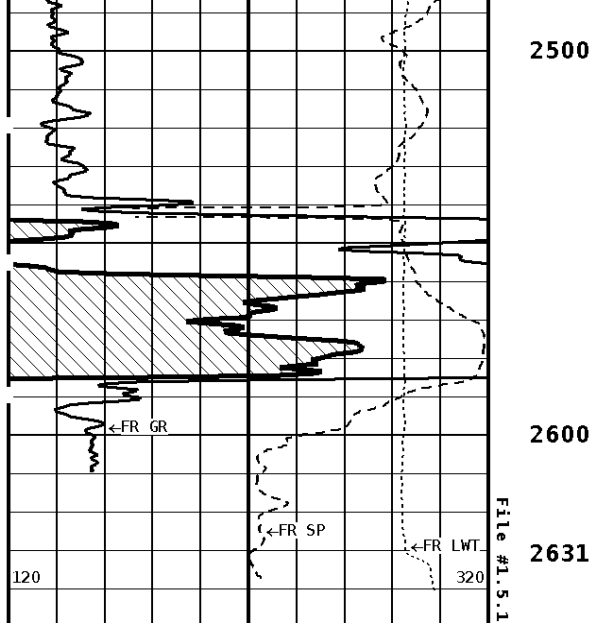
2400



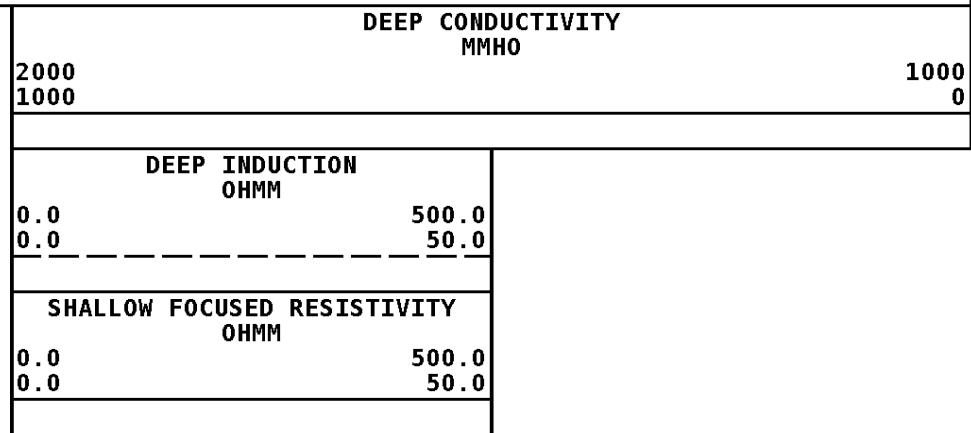
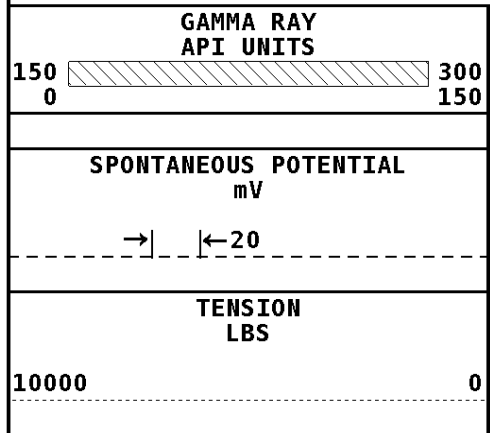
←DIR  
←SFR



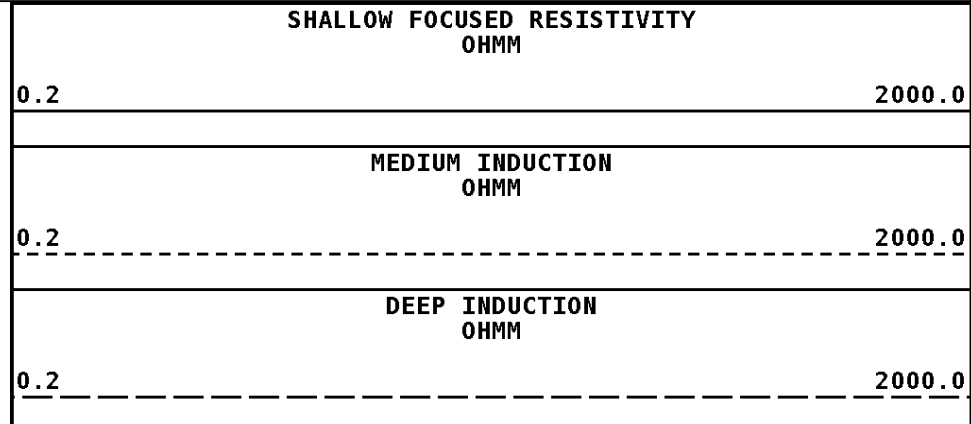
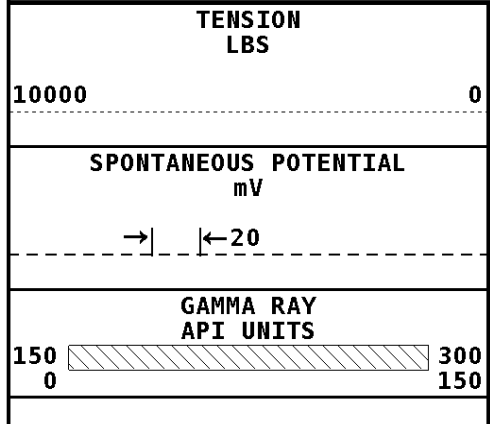
←DIC



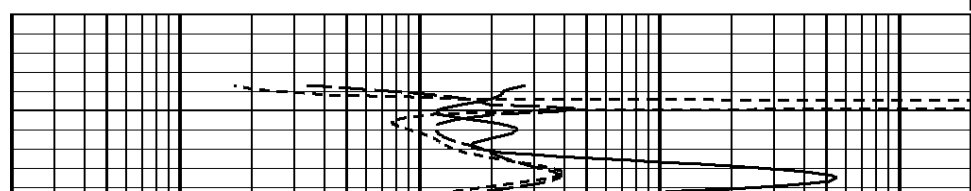
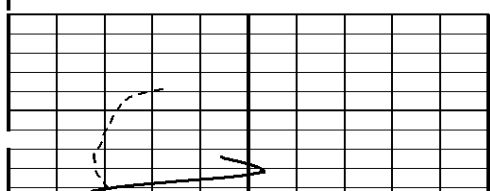
**1:600 SECTION**



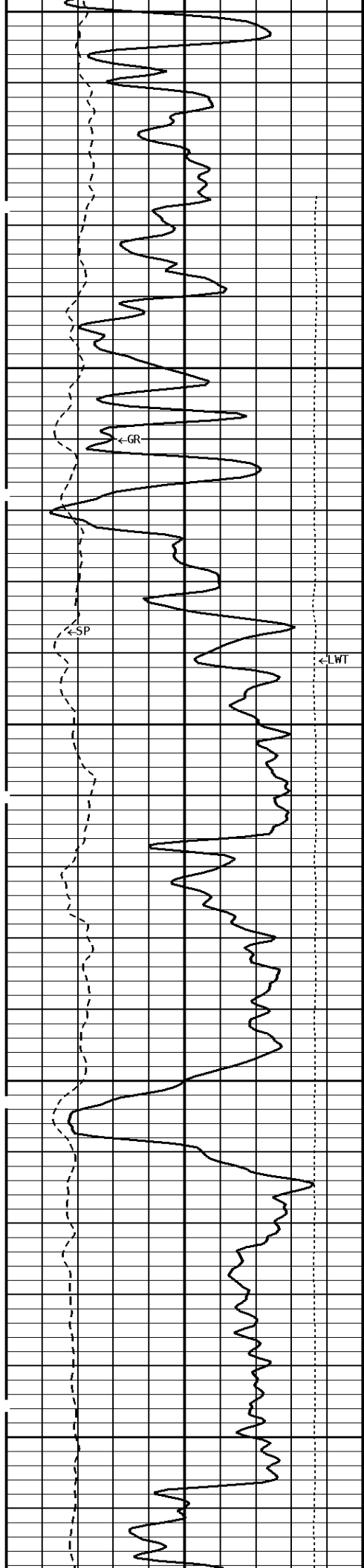
Well File: lan fuq 9-36 feb 24\_msk Scale: 1:240  
 Segment: V1.D5.S1 MAIN Acquired: Not Available  
 Reference: 0 Processed: Not Available



**1:240 MAIN SECTION**

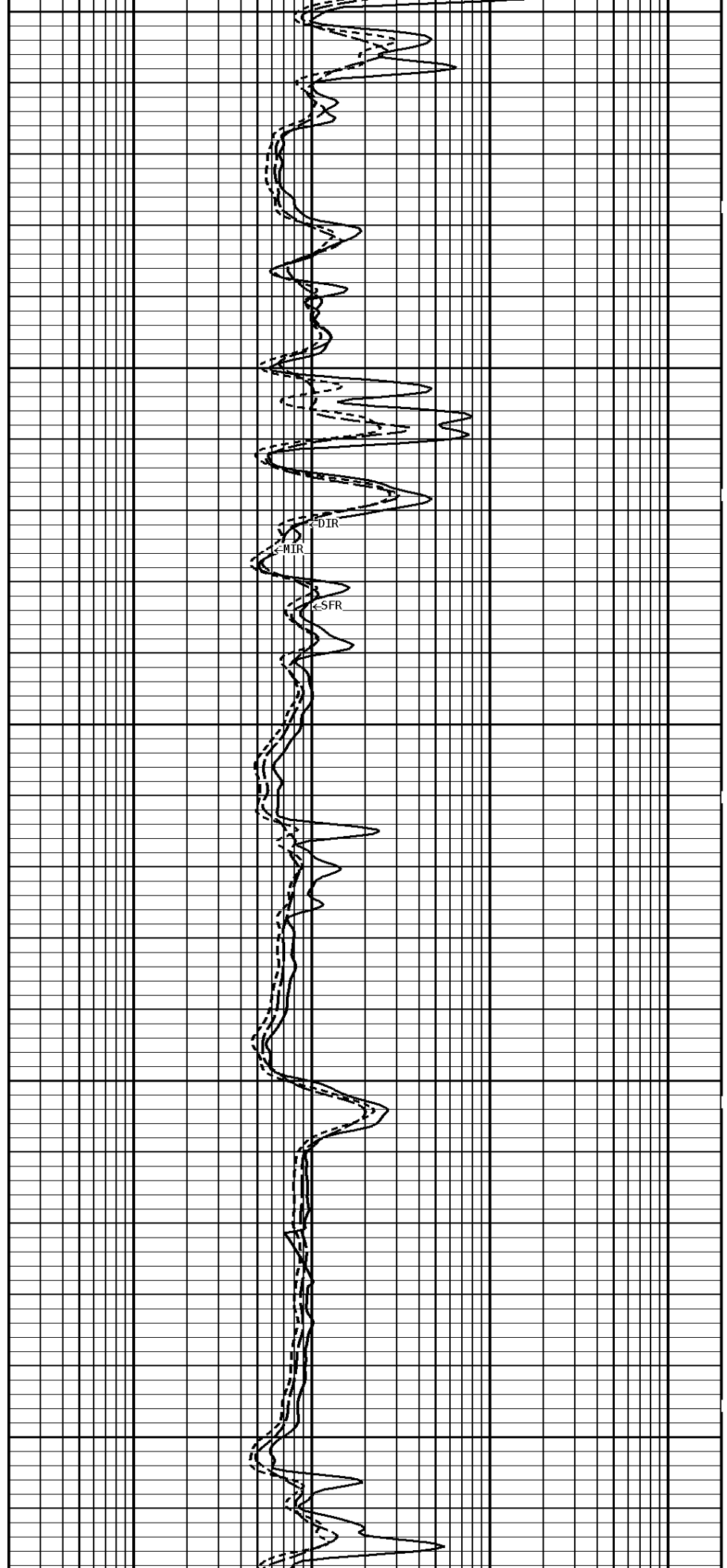


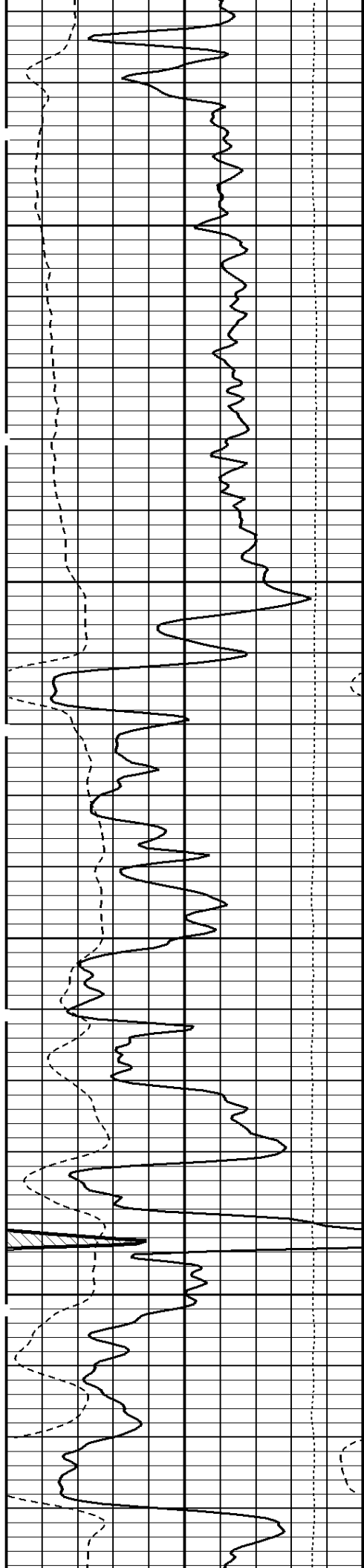




100

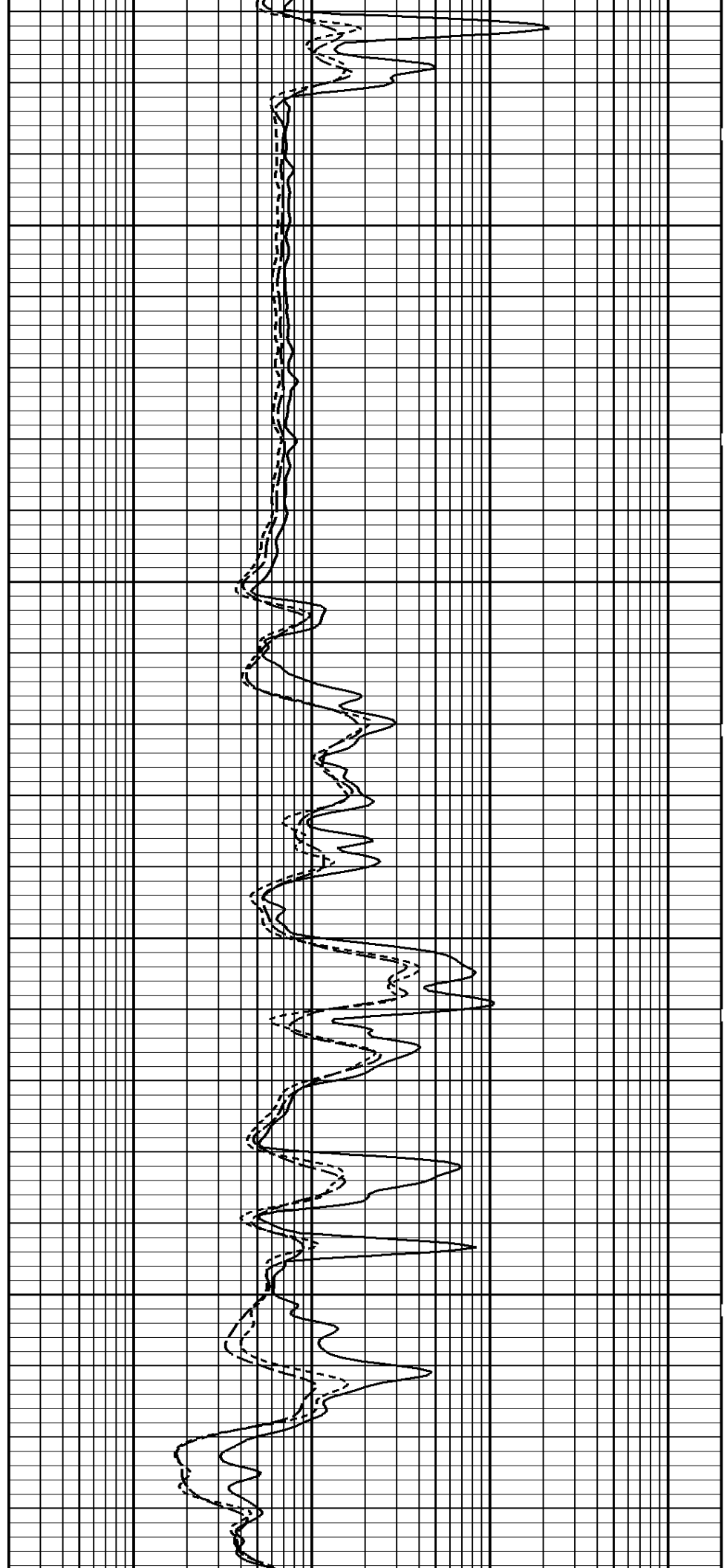
200

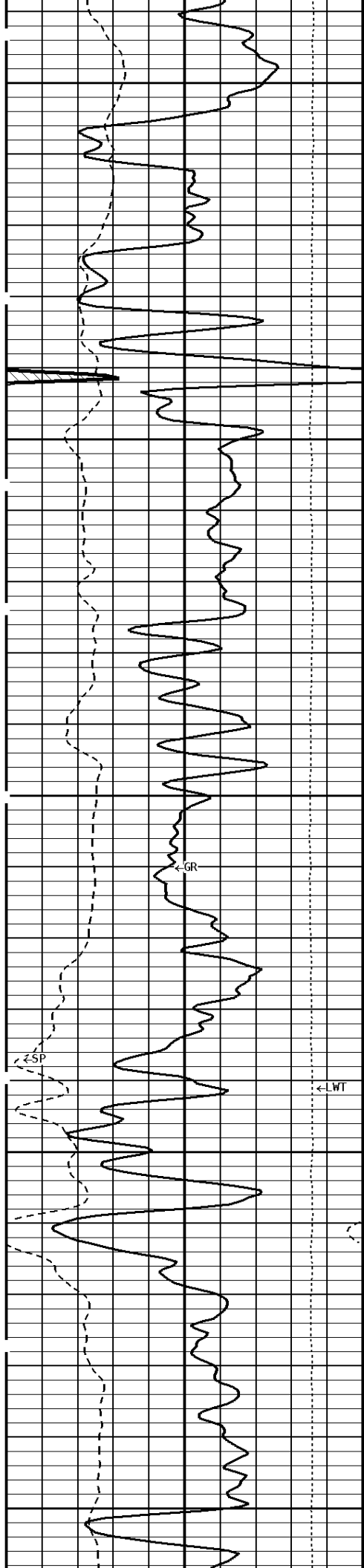




300

400

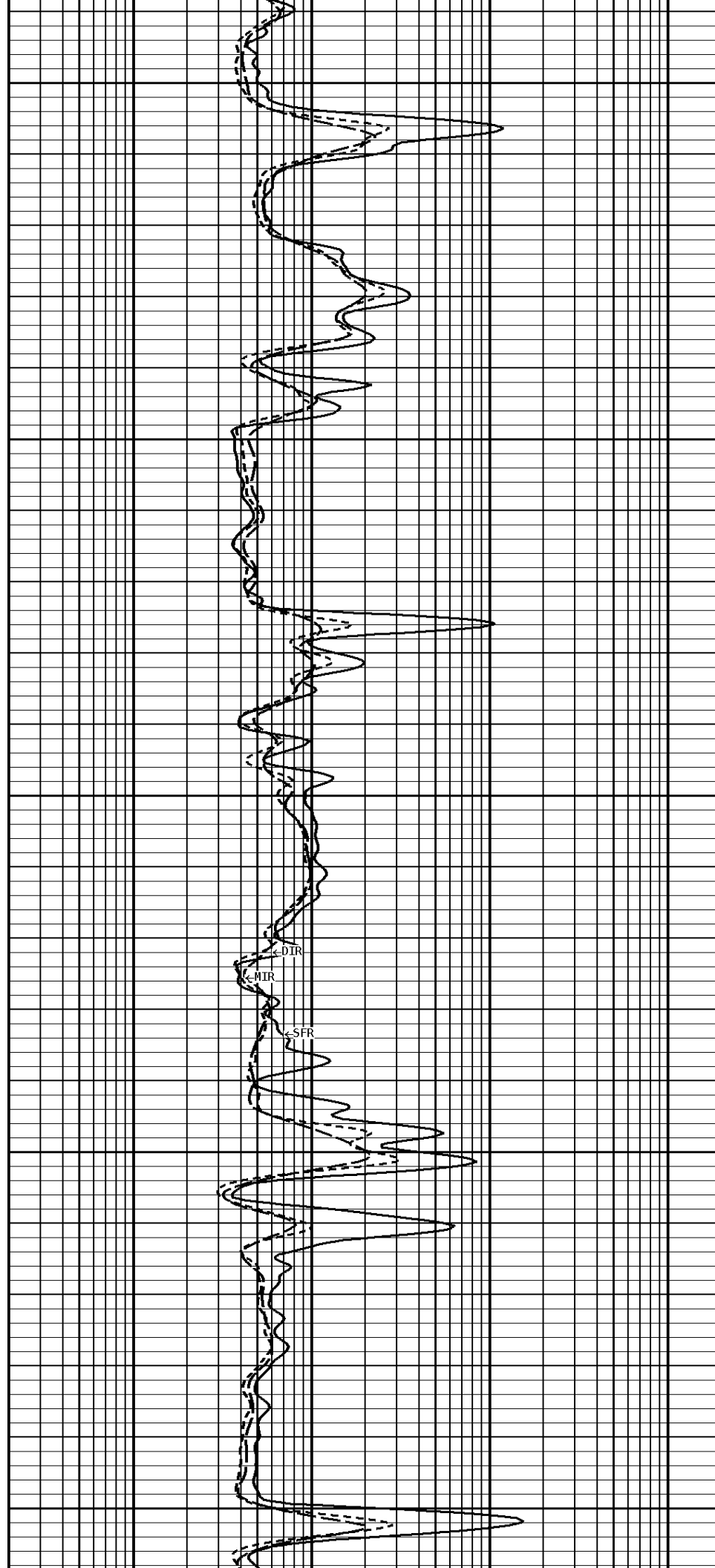


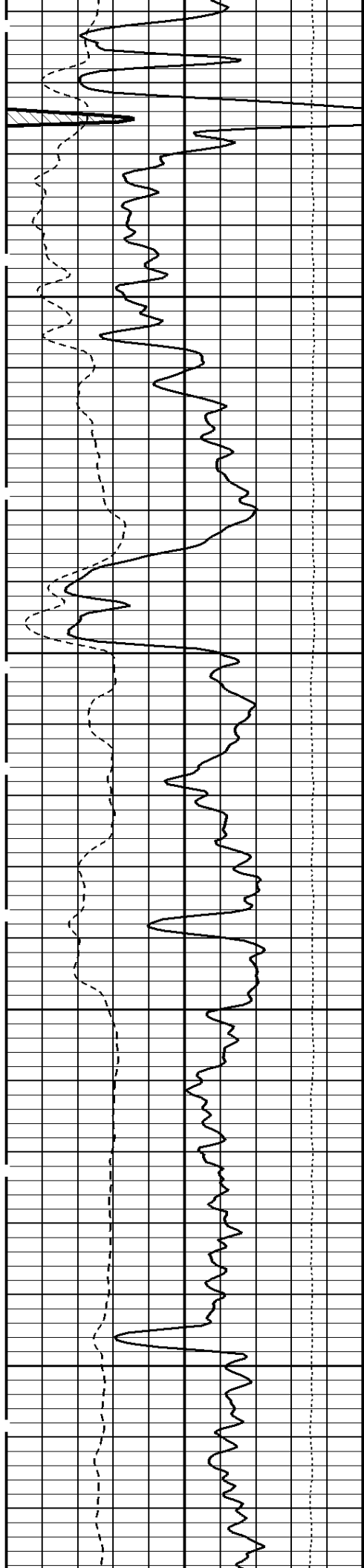


500

600

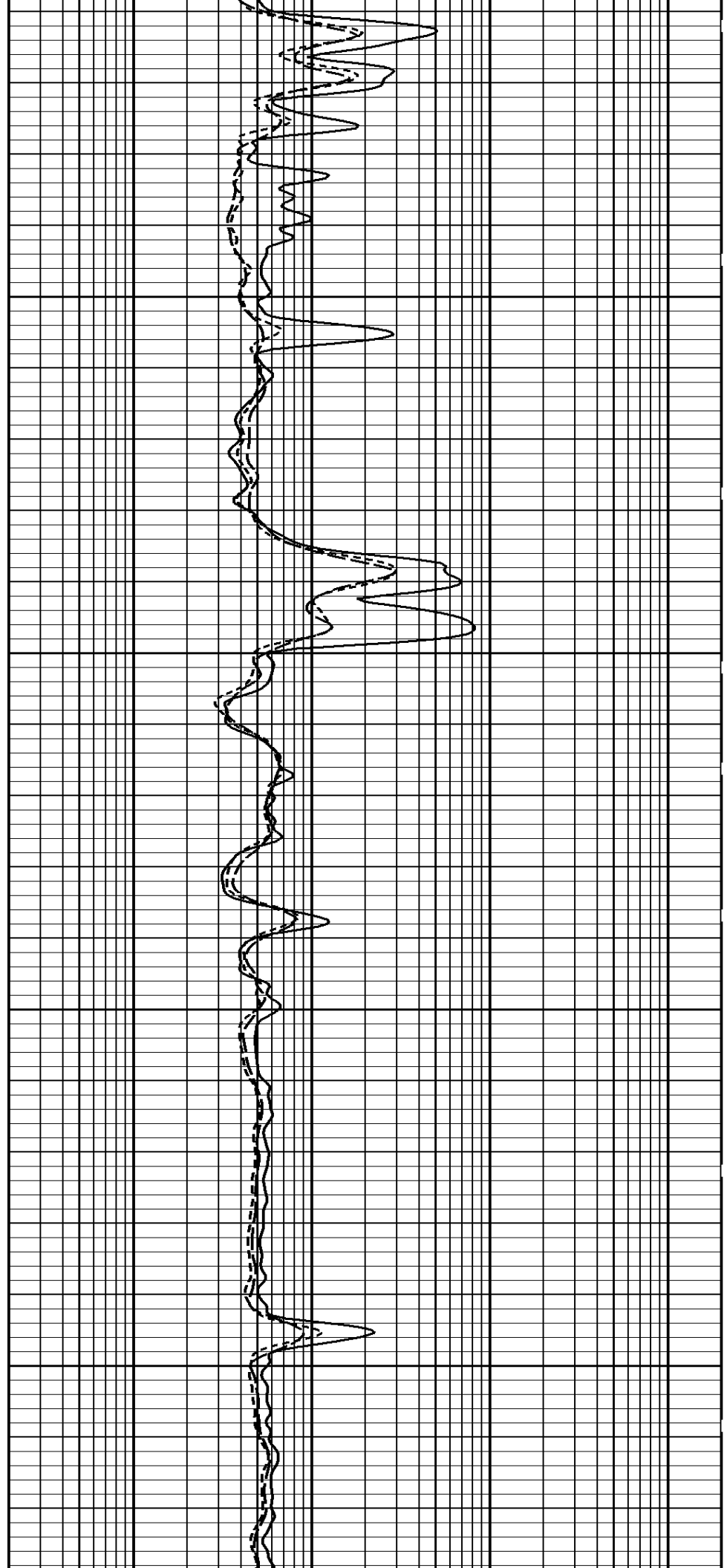
700

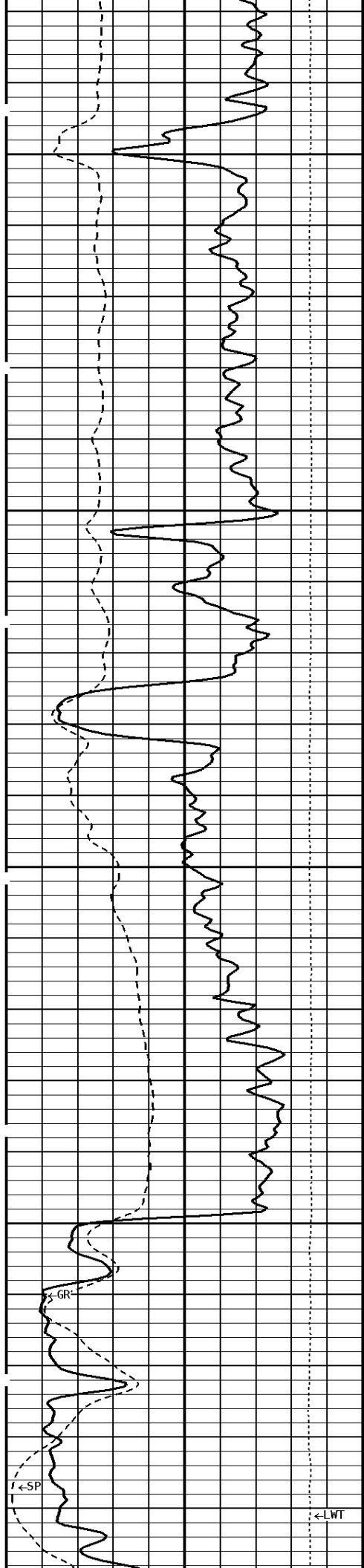




800

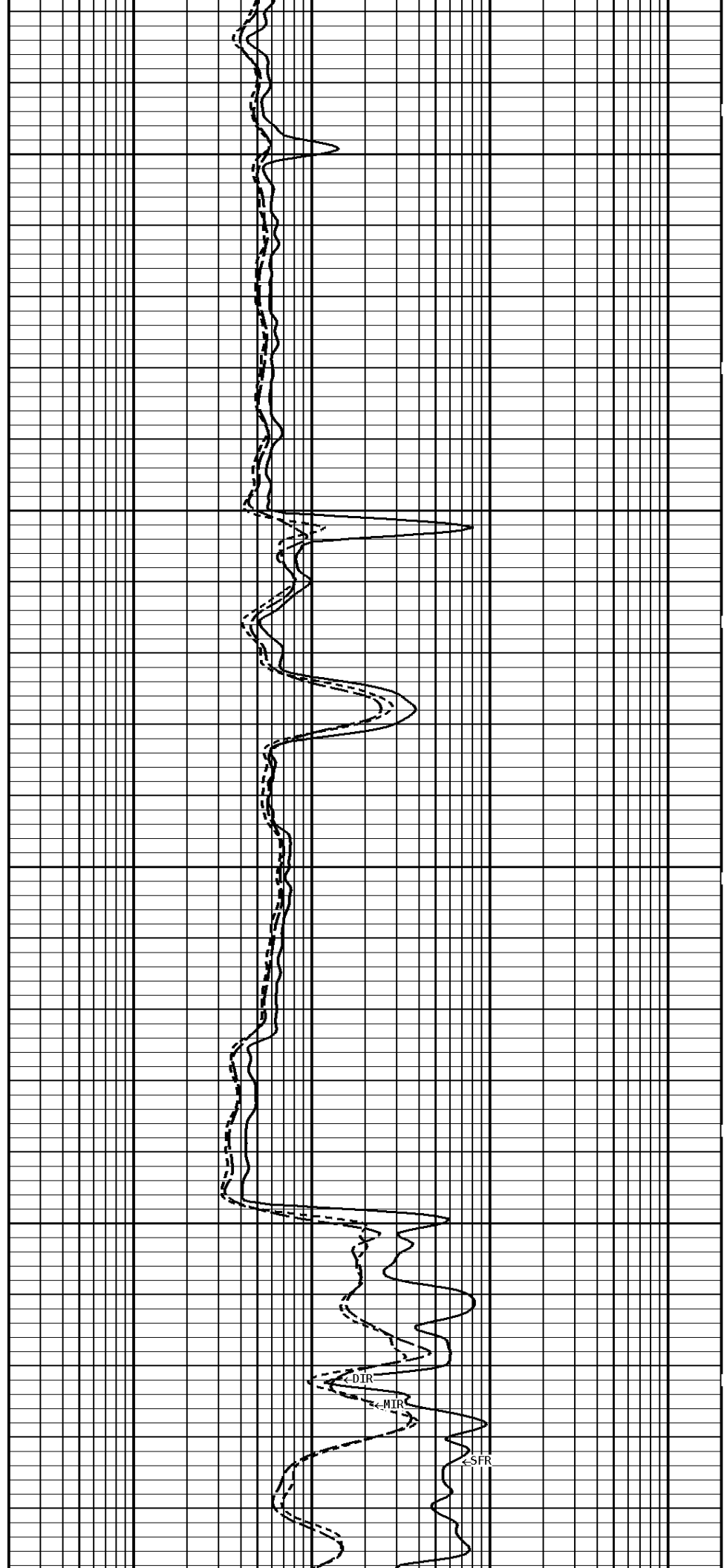
900





1000

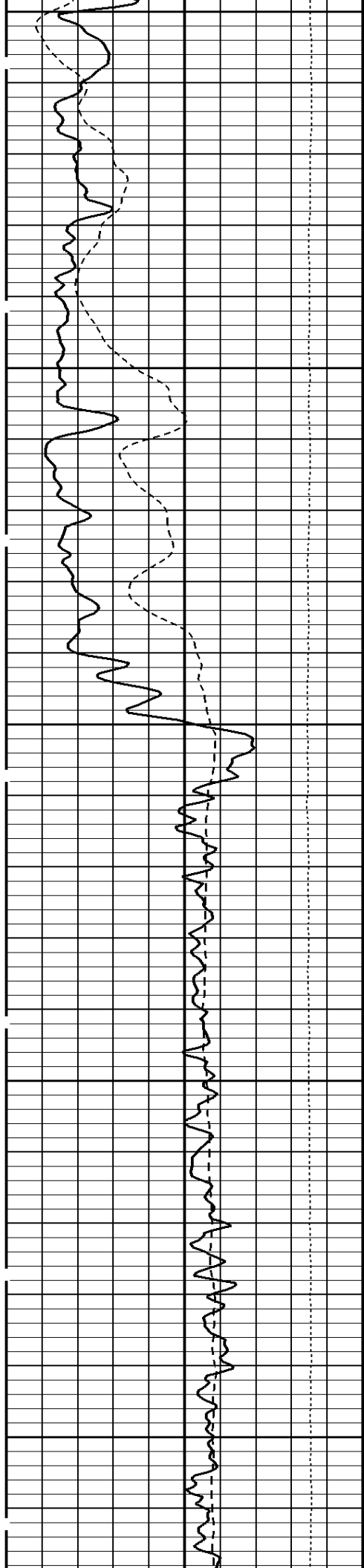
1100



DIR

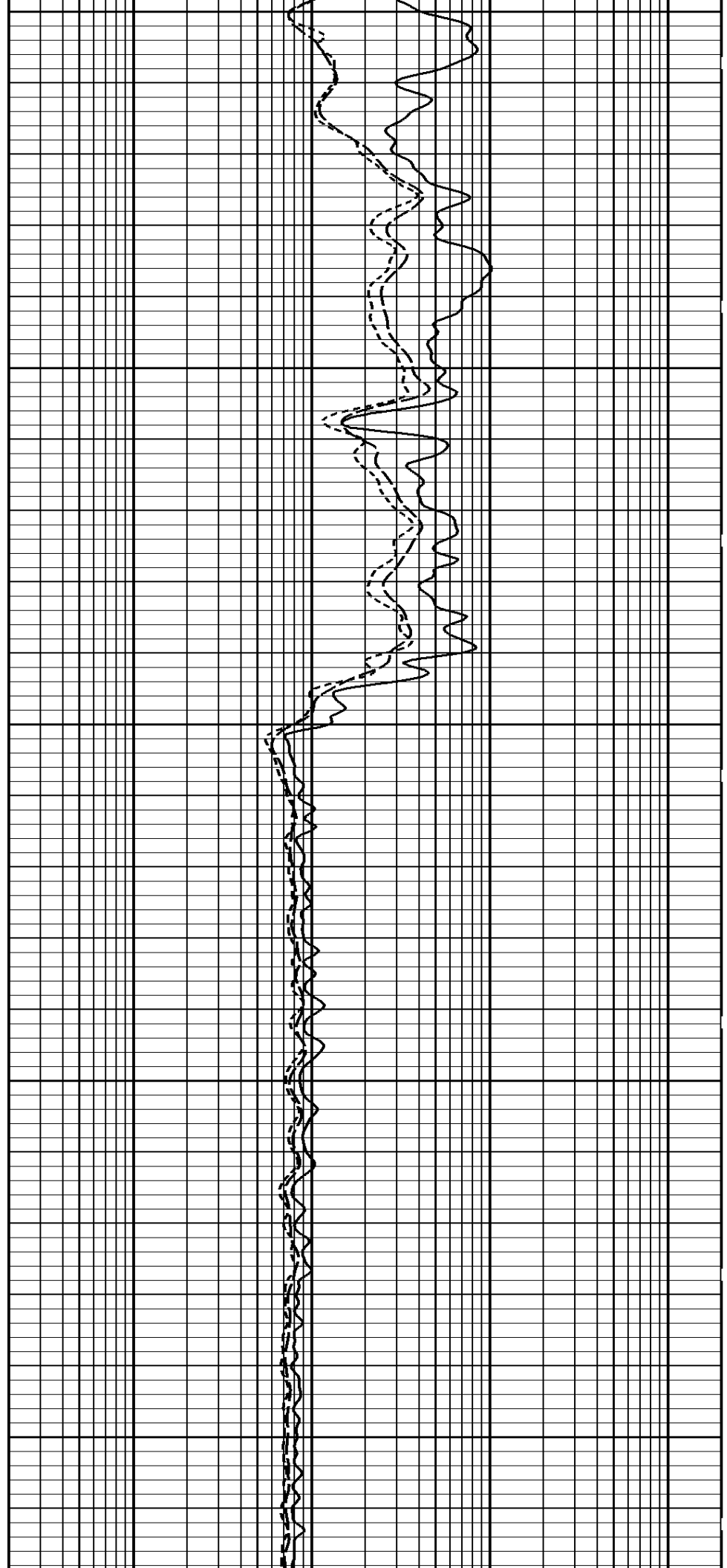
MIR

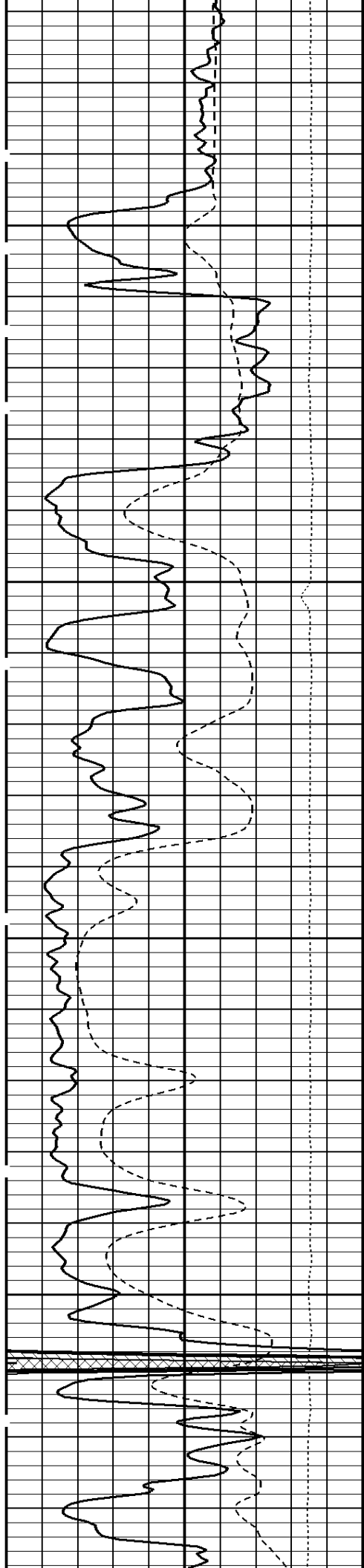
SFR



1200

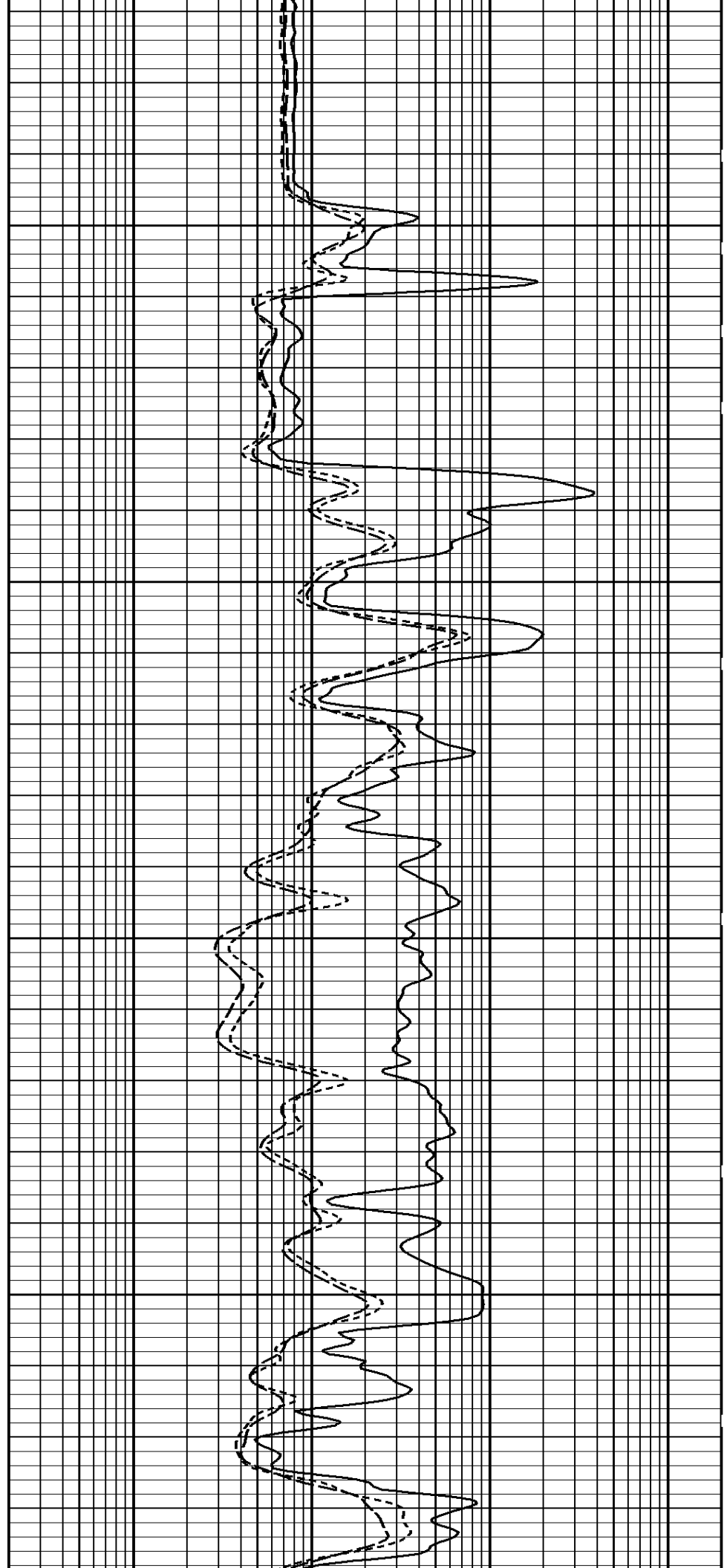
1300

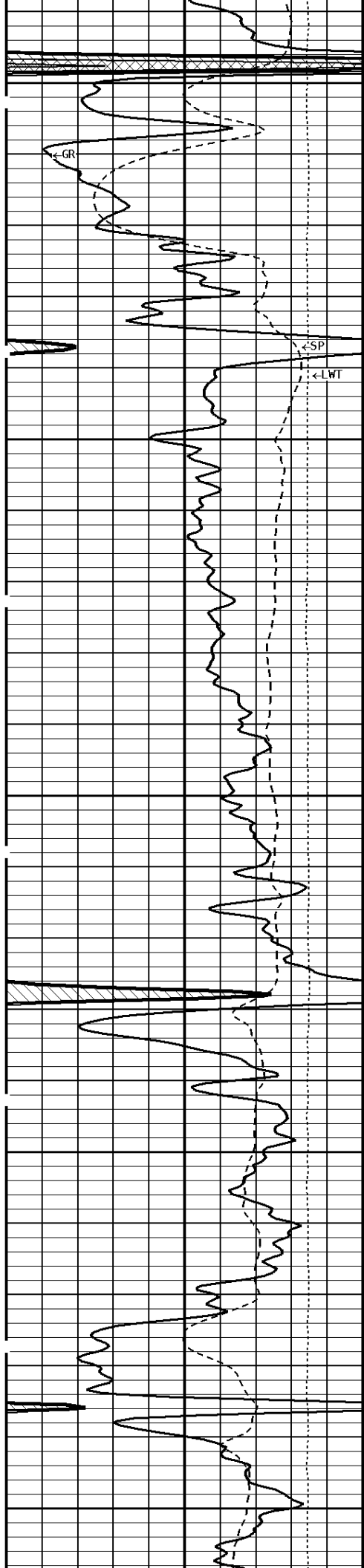




1400

1500

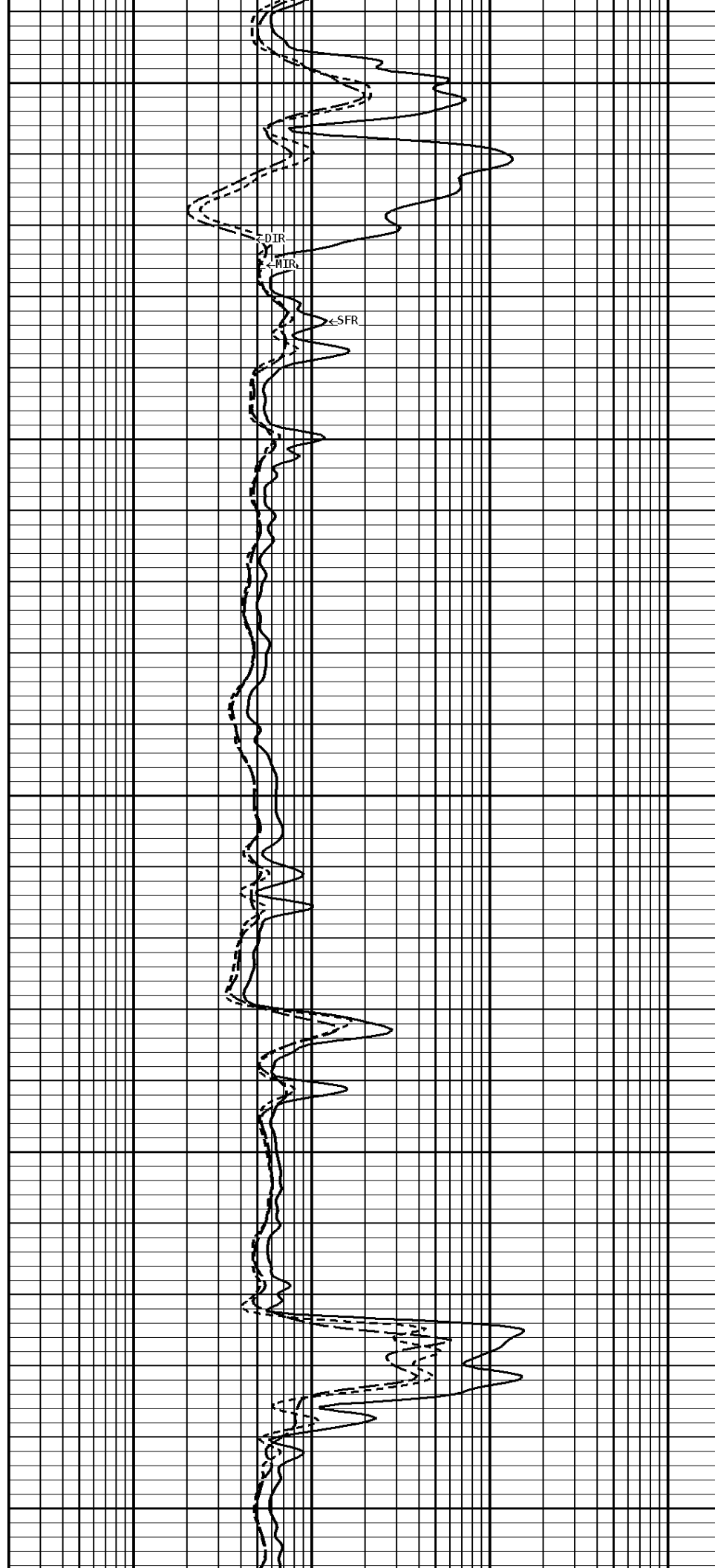




1600

1700

1800

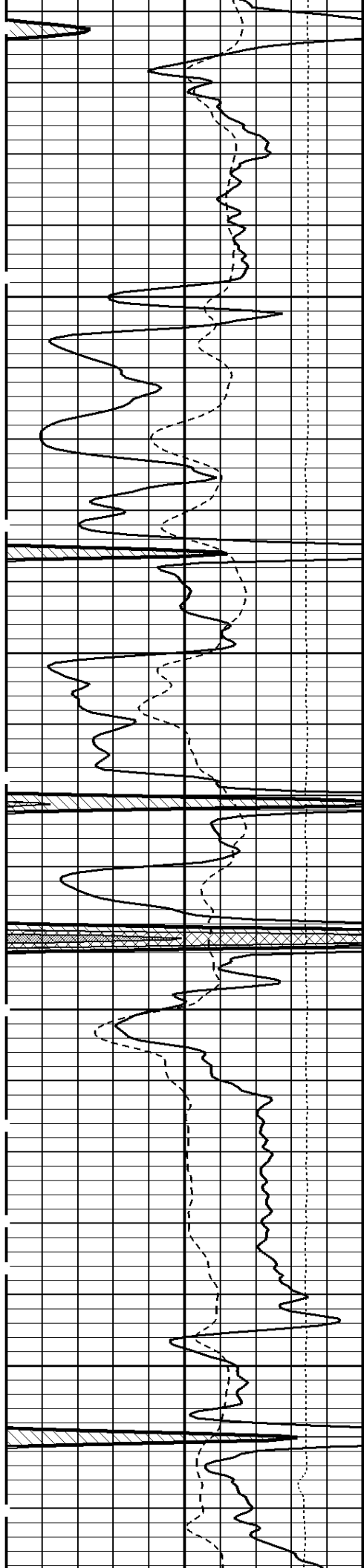


DIR

RTR

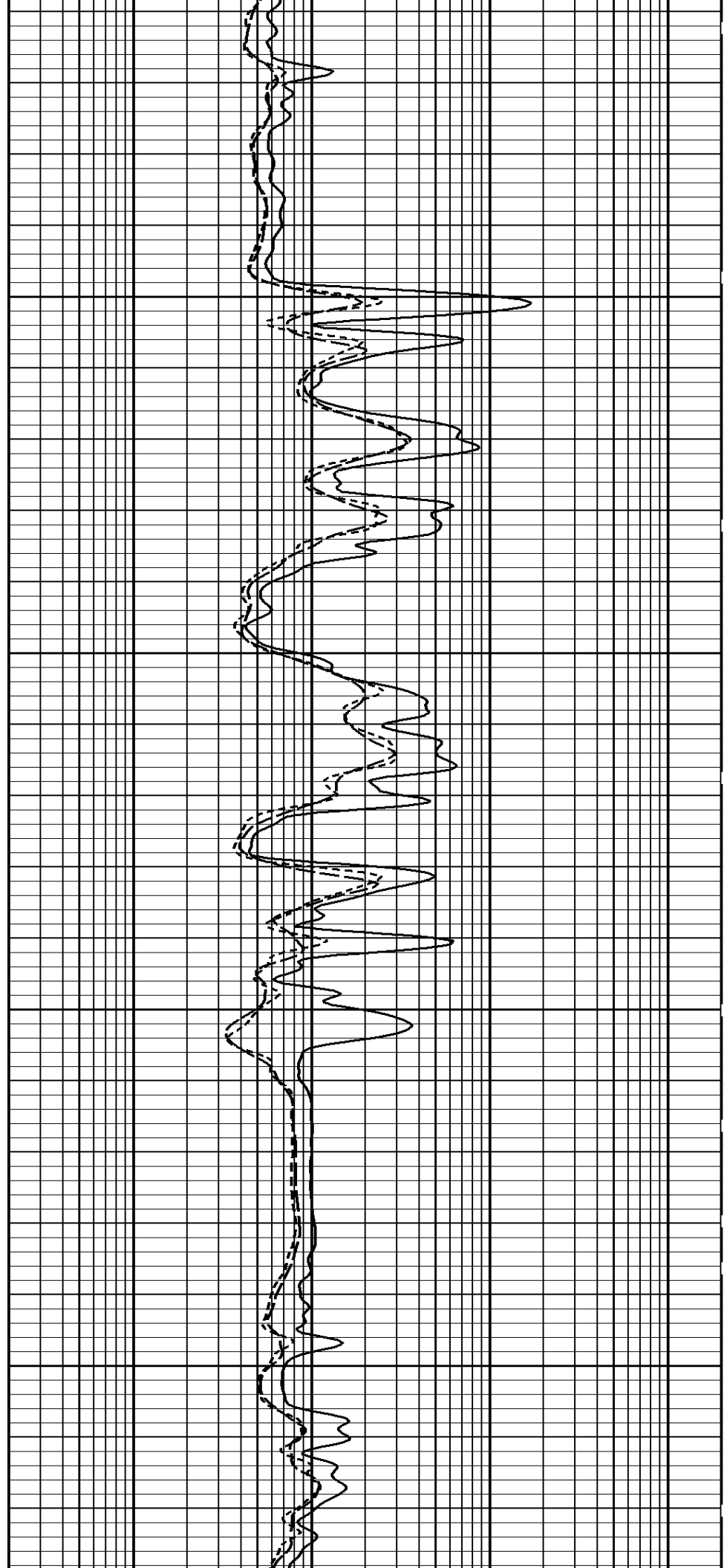
SFR

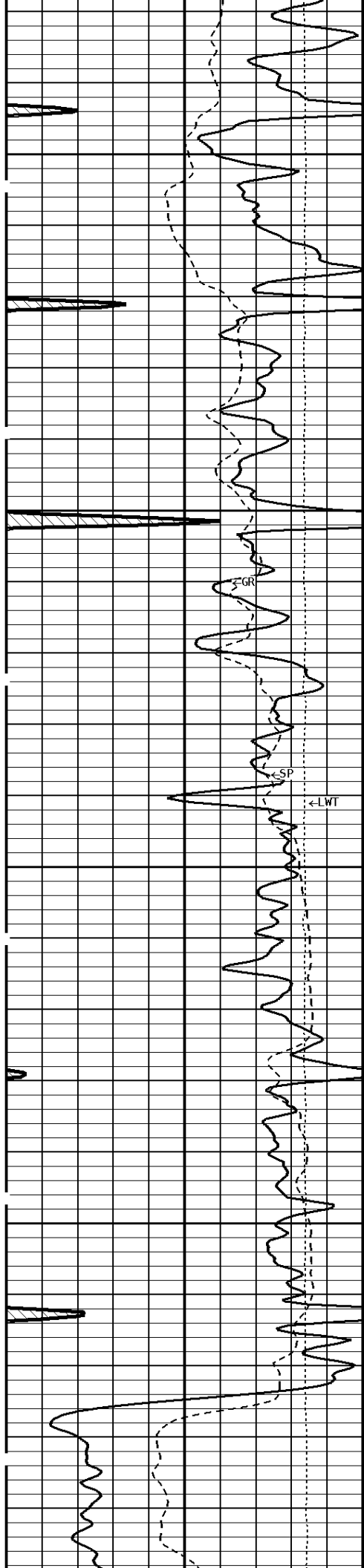




1900

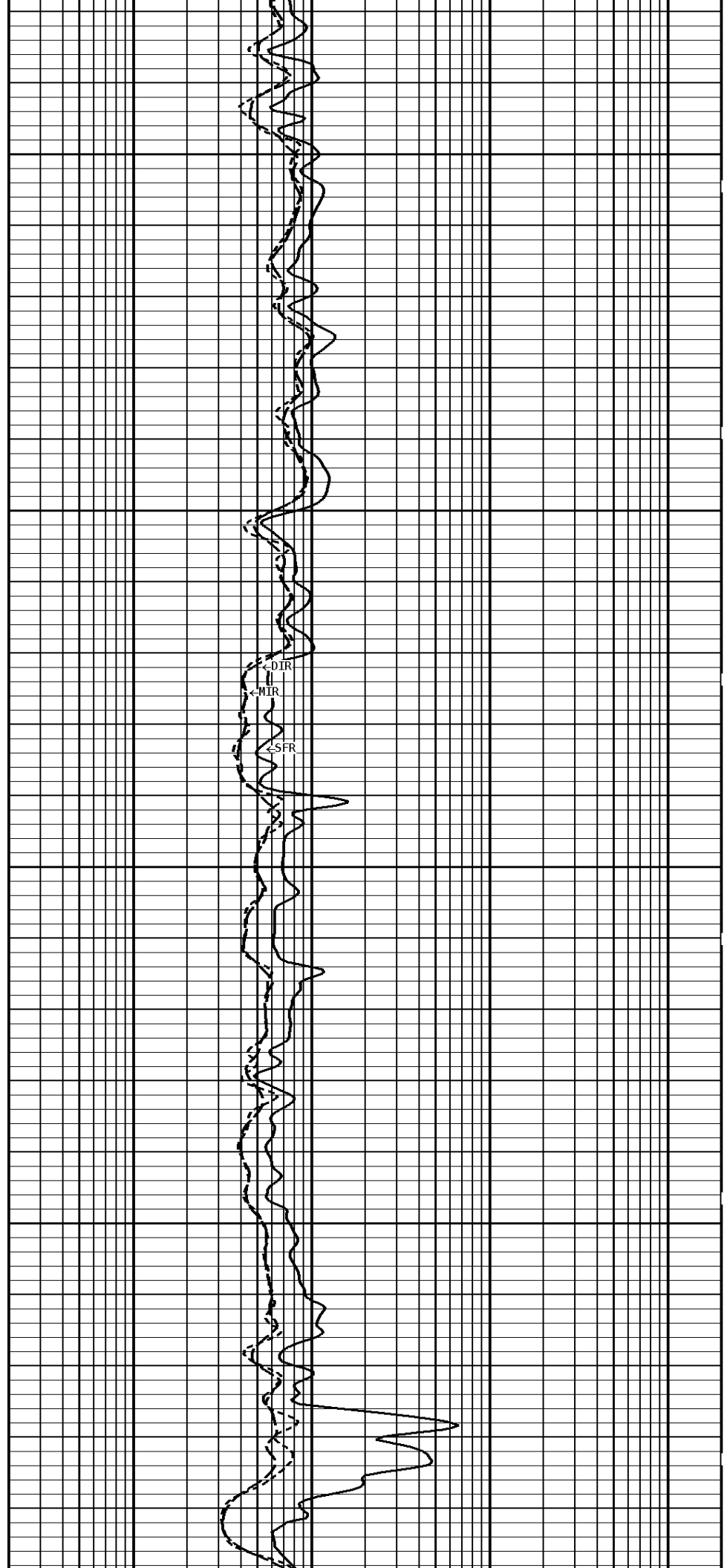
2000

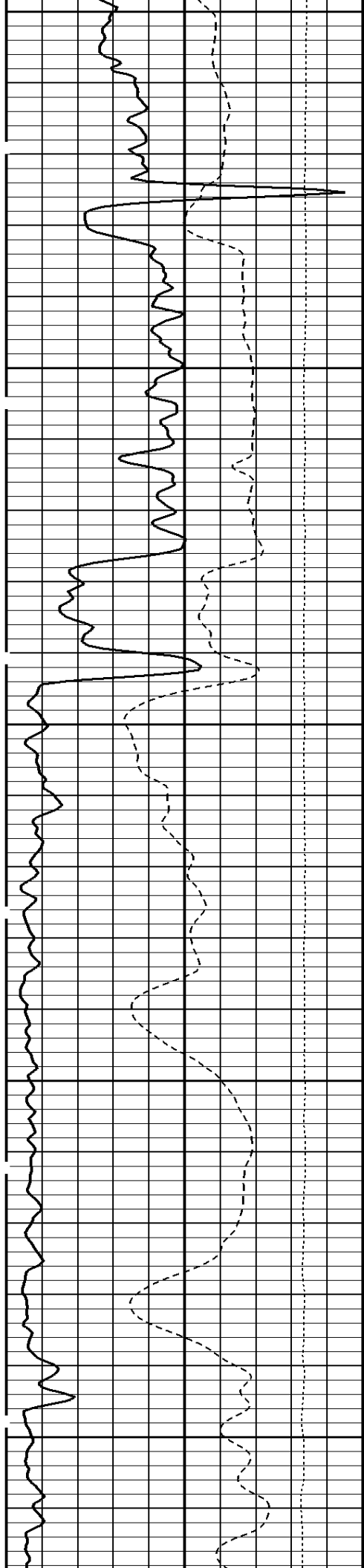




2100

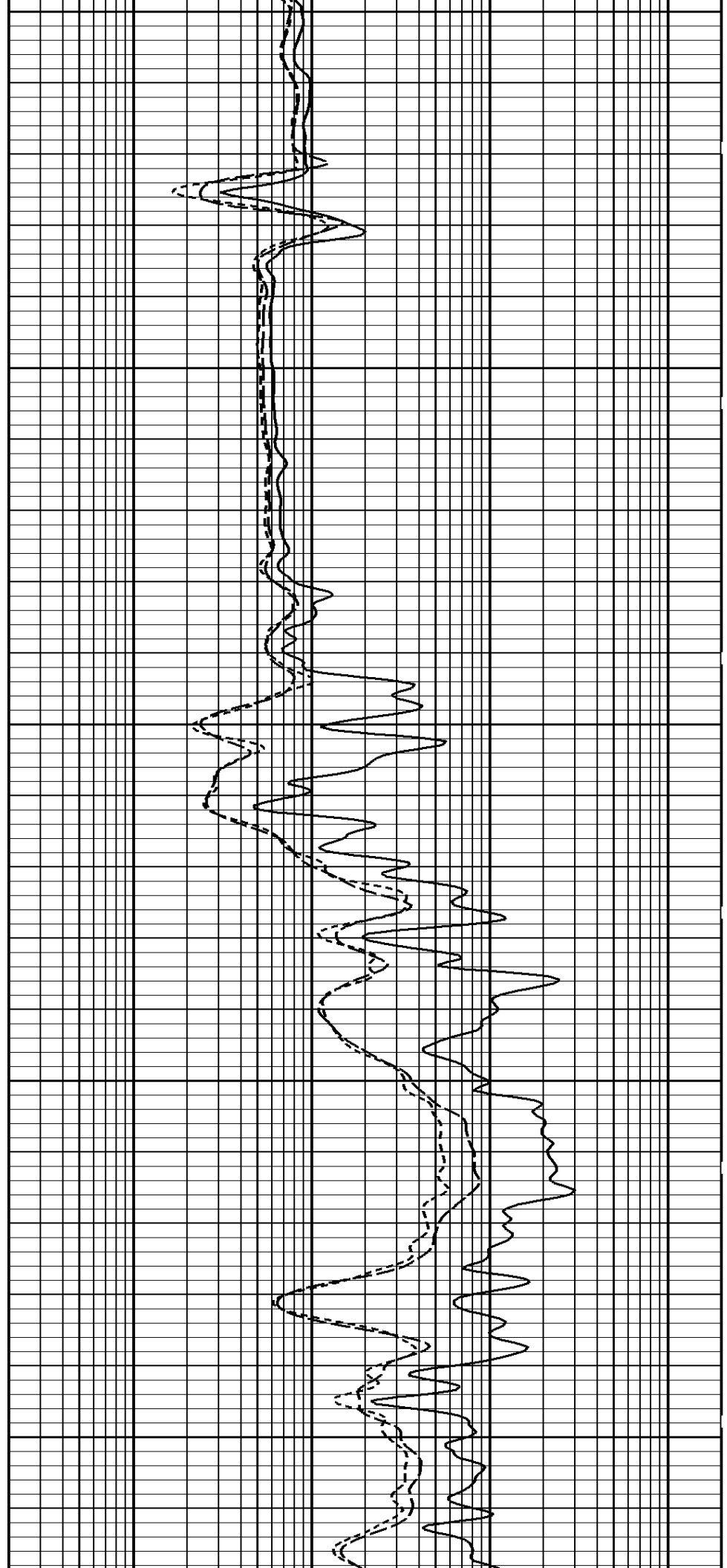
2200

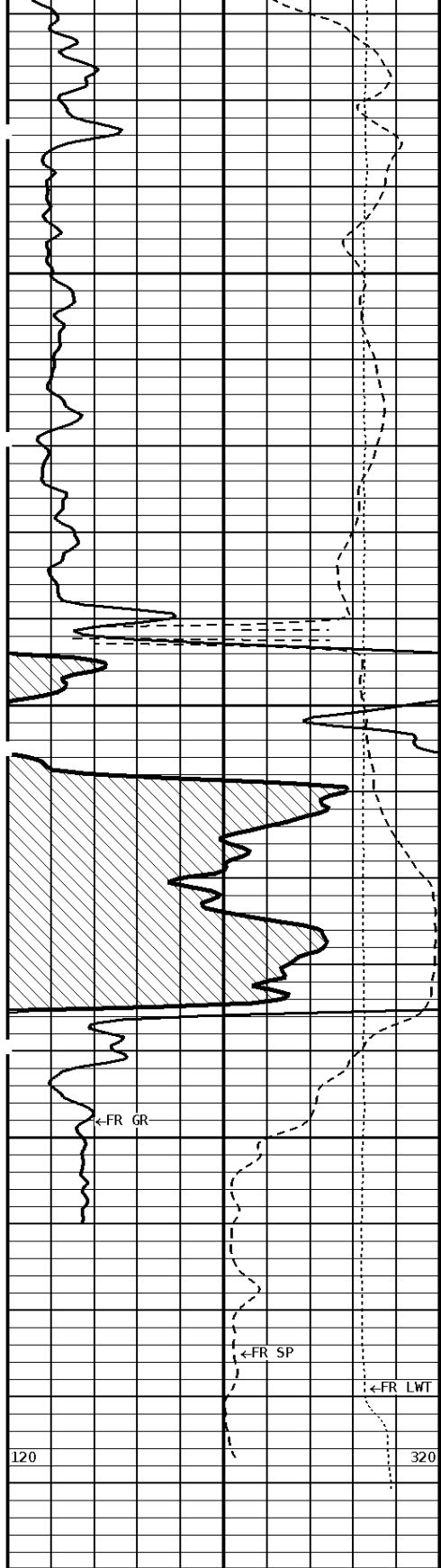




2300

2400



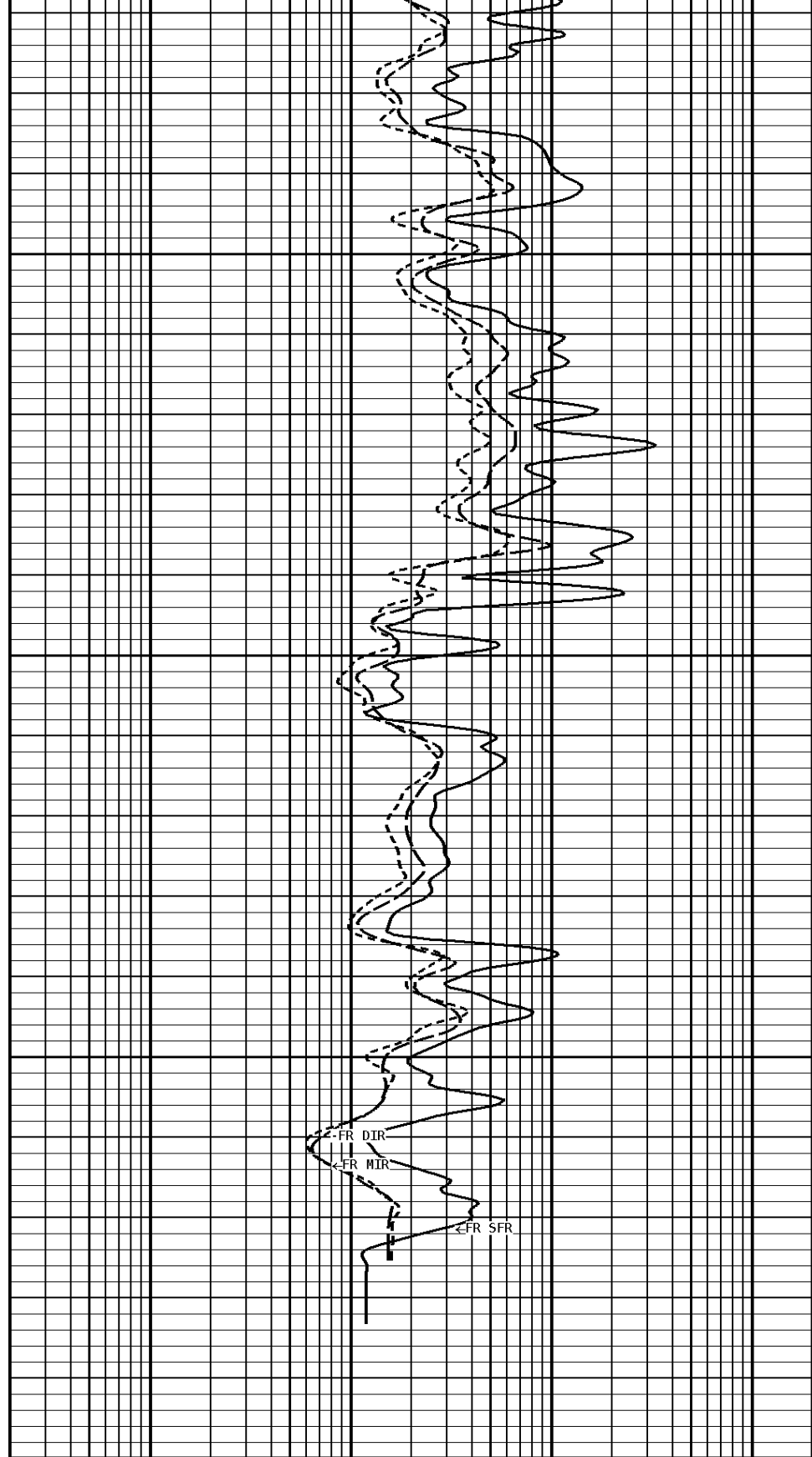


2500

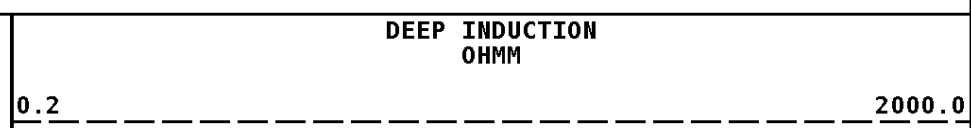
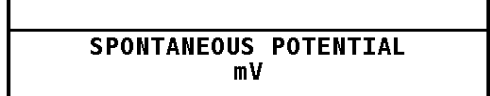
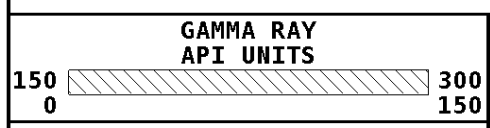
2600

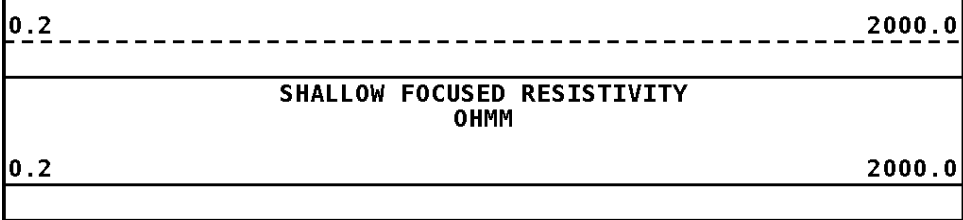
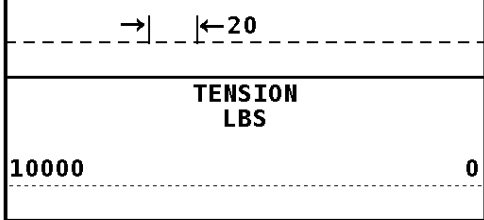
2631

File #1.5.1

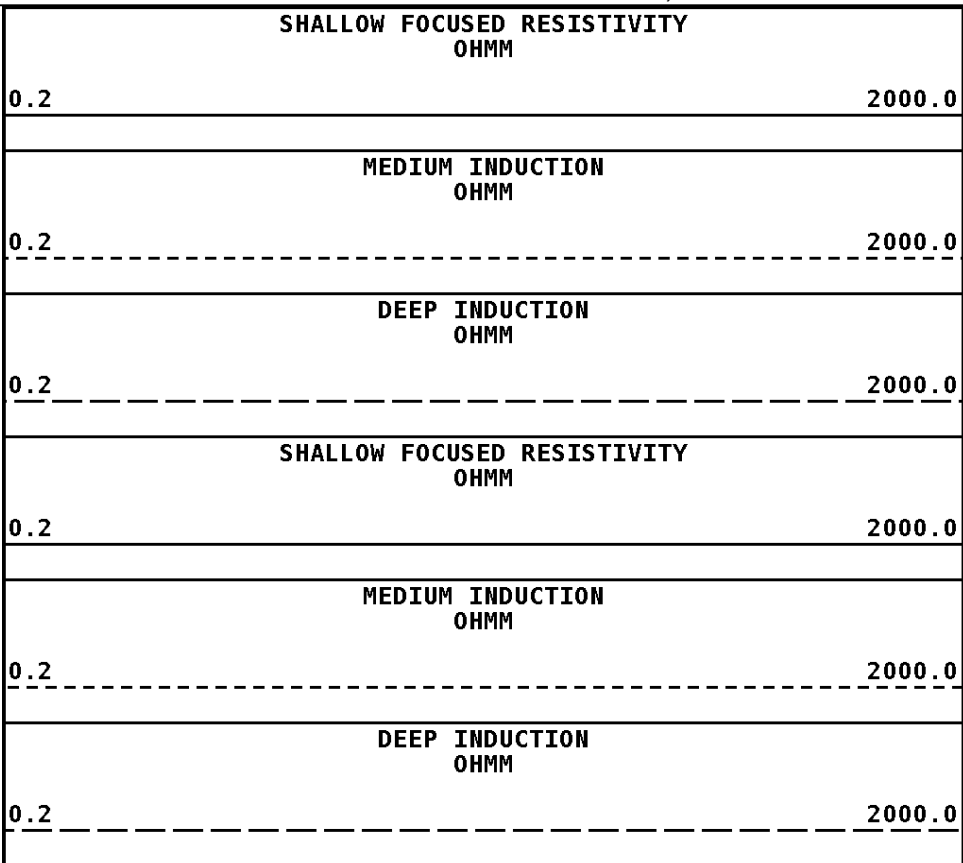
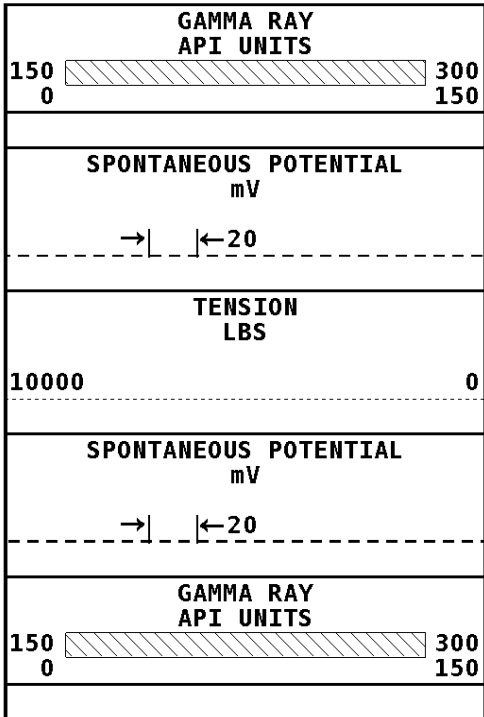


**1:240 MAIN SECTION**

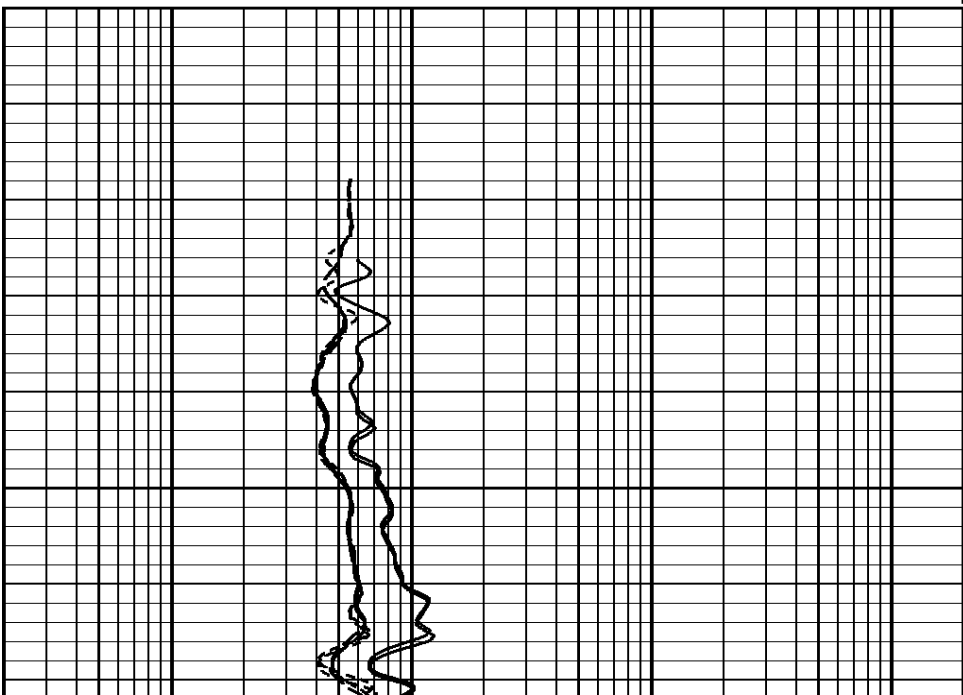
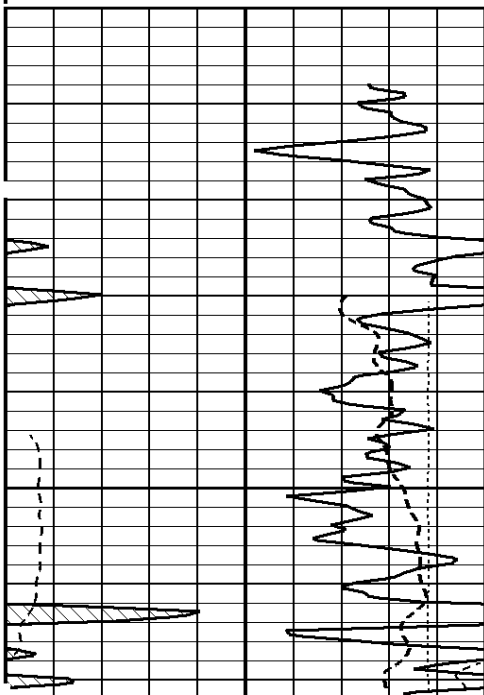




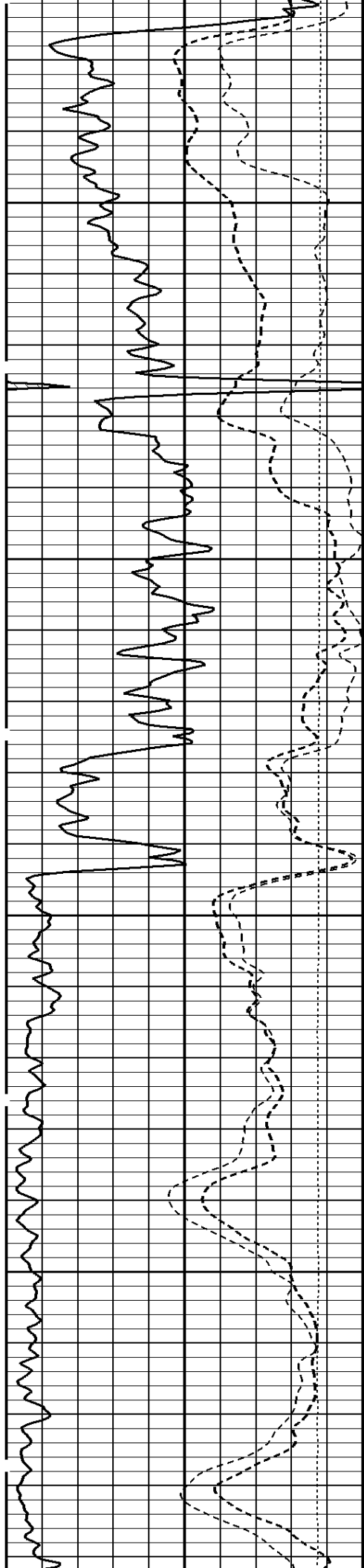
**Well File:** lan fuq 9-36 feb 24 mstk **Scale:** 1:240  
**Segment:** V1.D2.S7 RP-DIL-2 **Acquired:** 2012-02/24 13:21 3.2.0-10367  
**Reference:** 0 **Processed:** 2012-02/24 17:26 3.2.0-10367  
**Segment:** V1.D2.S6 RP-DIL-1 **Acquired:** 2012-02/24 13:05 3.2.0-10367  
**Reference:** -1 **Processed:** 2012-02/24 17:26 3.2.0-10367



**1:240 REPEAT 1/2 SECTION**

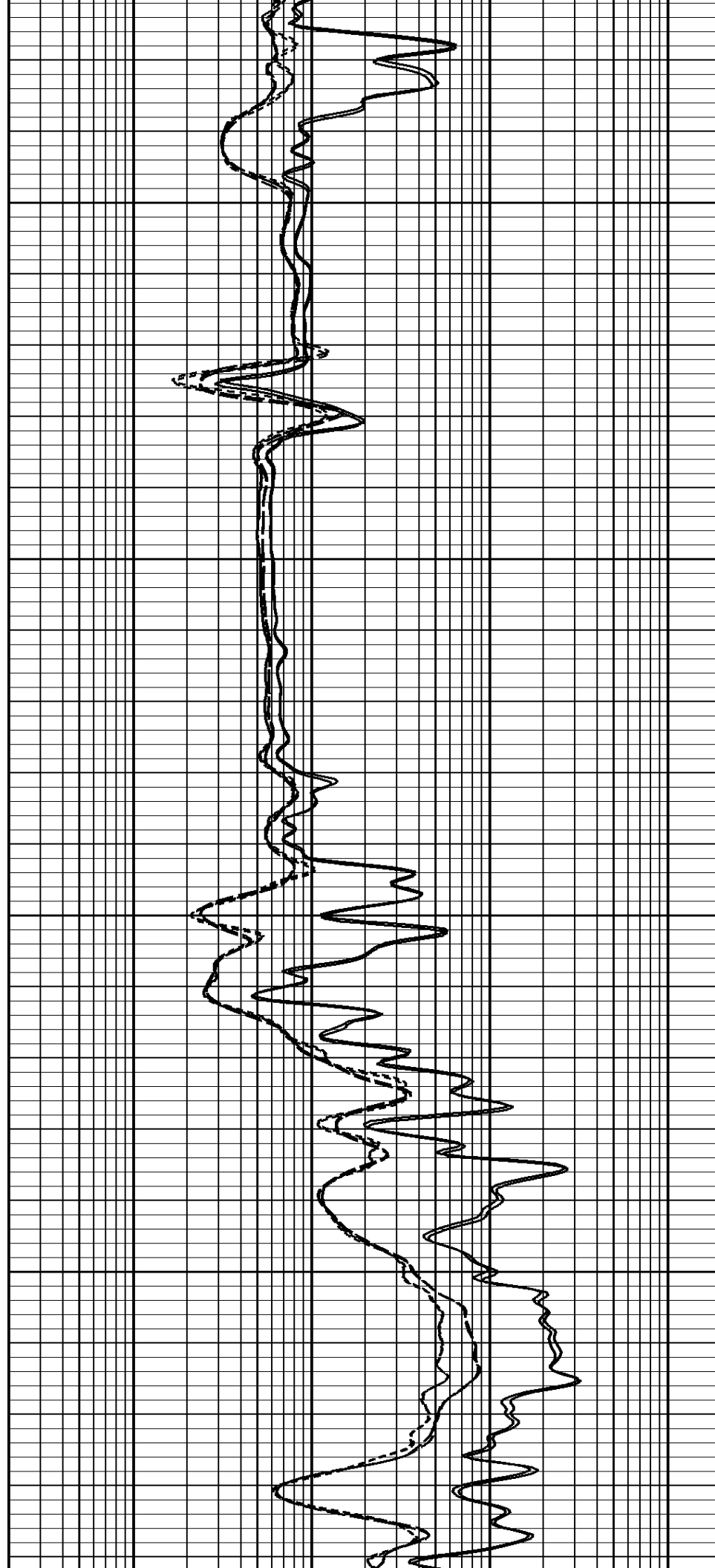


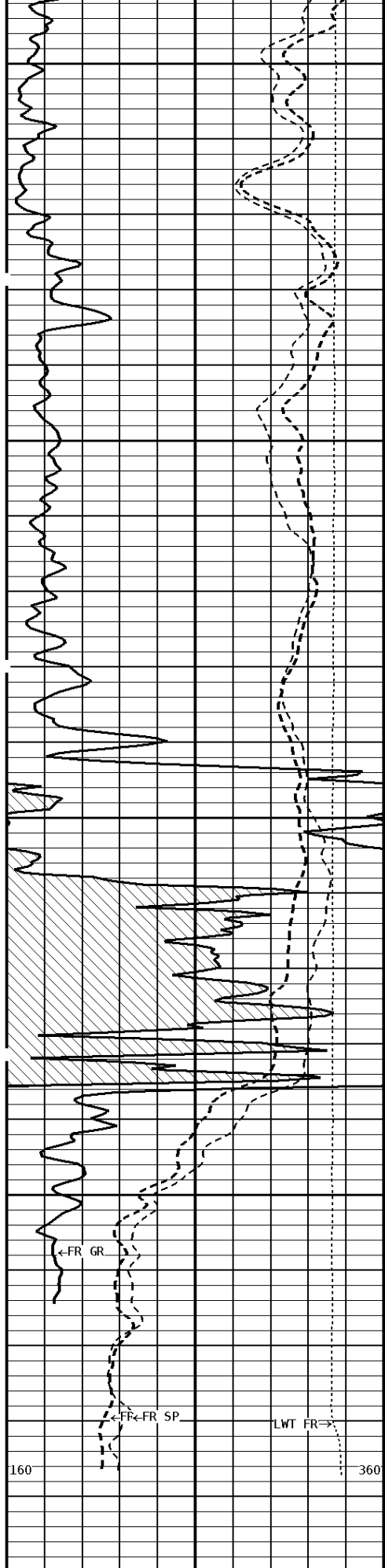
2200



2300

2400



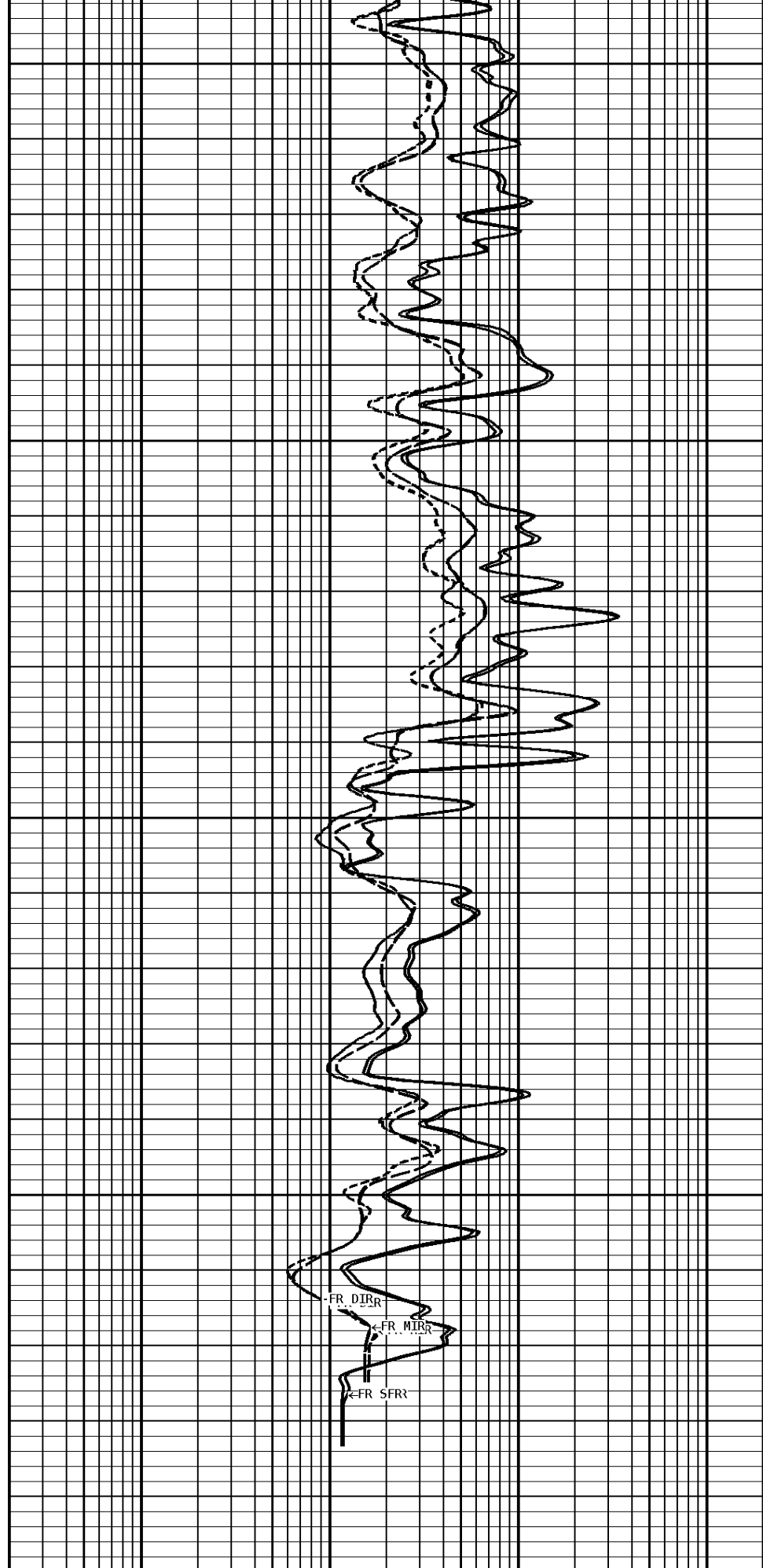


2500

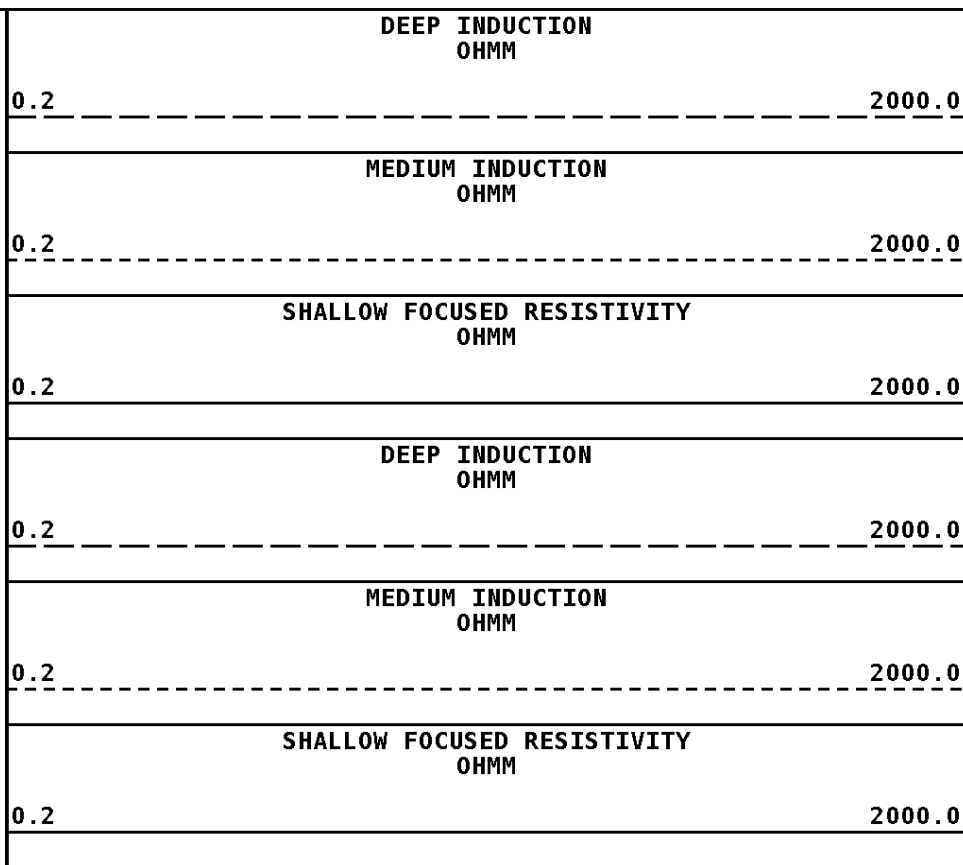
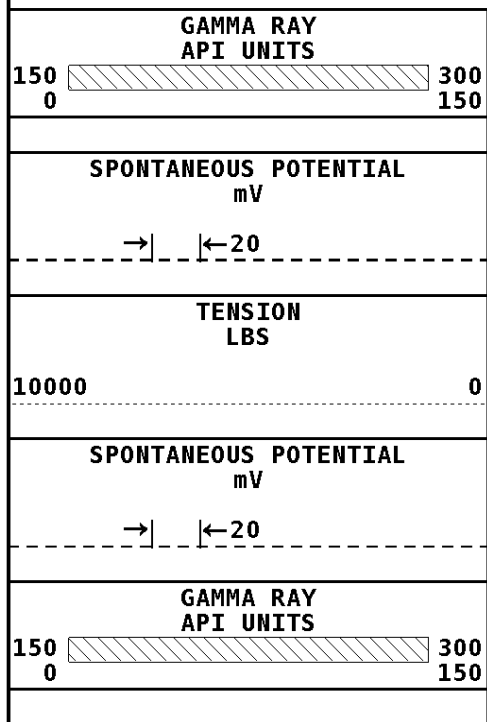
2600

2631

File #1.2.7



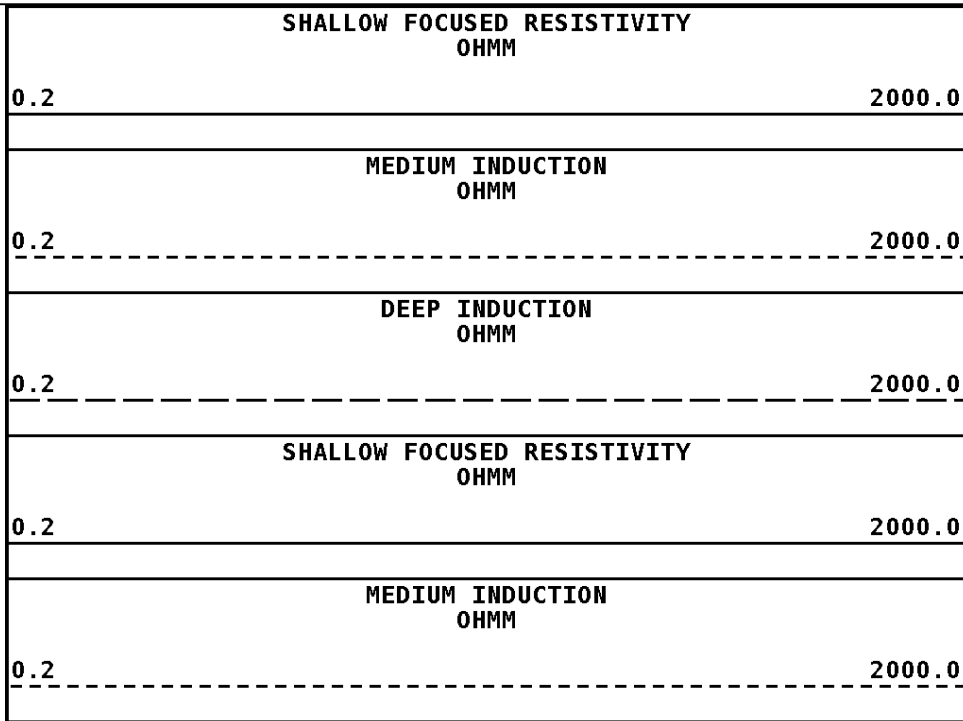
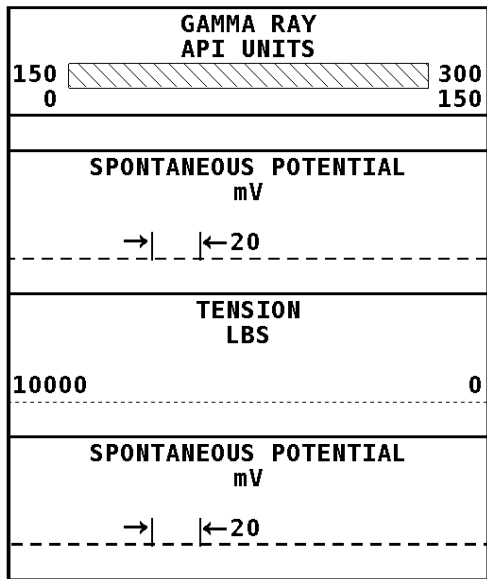
1:240 REPEAT 1/2 SECTION



**\* Borehole Zone Factors \***

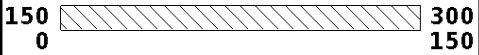
Zone 1 99999.0 to 0.0 Feet		
Drill Bit Size	_____	7.875 in
BHT Depth	_____	2631.000 ft
Borehole Temperature	_____	114.0 degF
Temperature Gradient	_____	1.00 DFHF
Resistivity Of Mud	_____	2.800 ohm/m
Resistivity Of Mud Temperature	_____	60.00 degF

<b>Well File:</b> lan_fuq_9-36_feb_24_mstk	<b>Scale:</b> 1:240
<b>Segment:</b> V1.D2.S7 RP-DIL-2	<b>Acquired:</b> 2012-02/24 13:21 3.2.0-10367
<b>Reference:</b> 0	<b>Processed:</b> 2012-02/24 17:26 3.2.0-10367
<b>Segment:</b> V1.D5.S1 MAIN	<b>Acquired:</b> Not Available
<b>Reference:</b> -1	<b>Processed:</b> Not Available





GAMMA RAY  
API UNITS

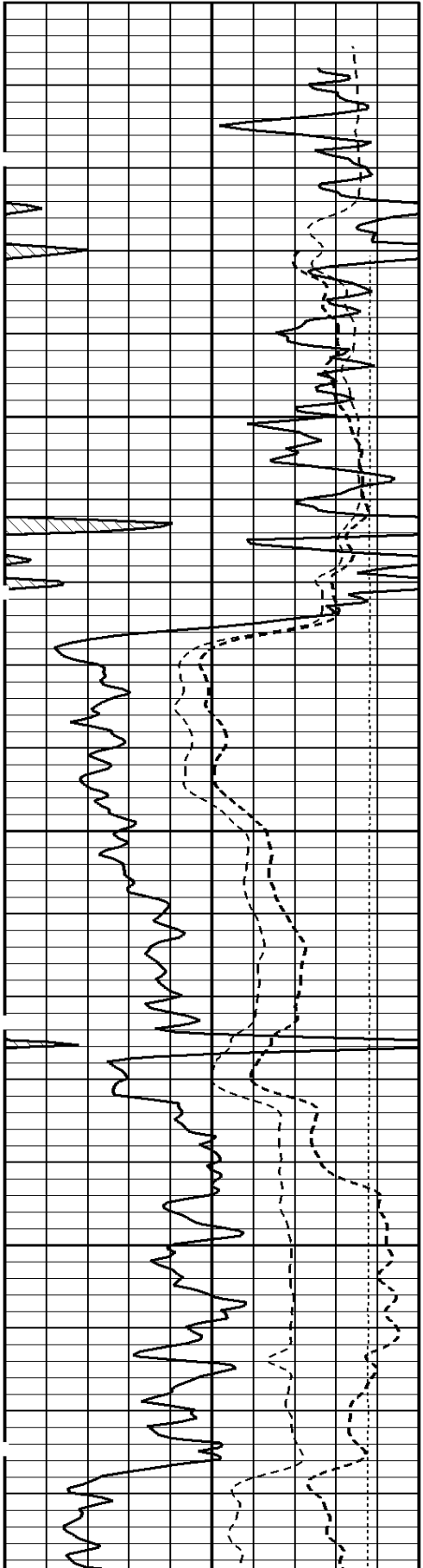


DEEP INDUCTION  
OHMM

0.2

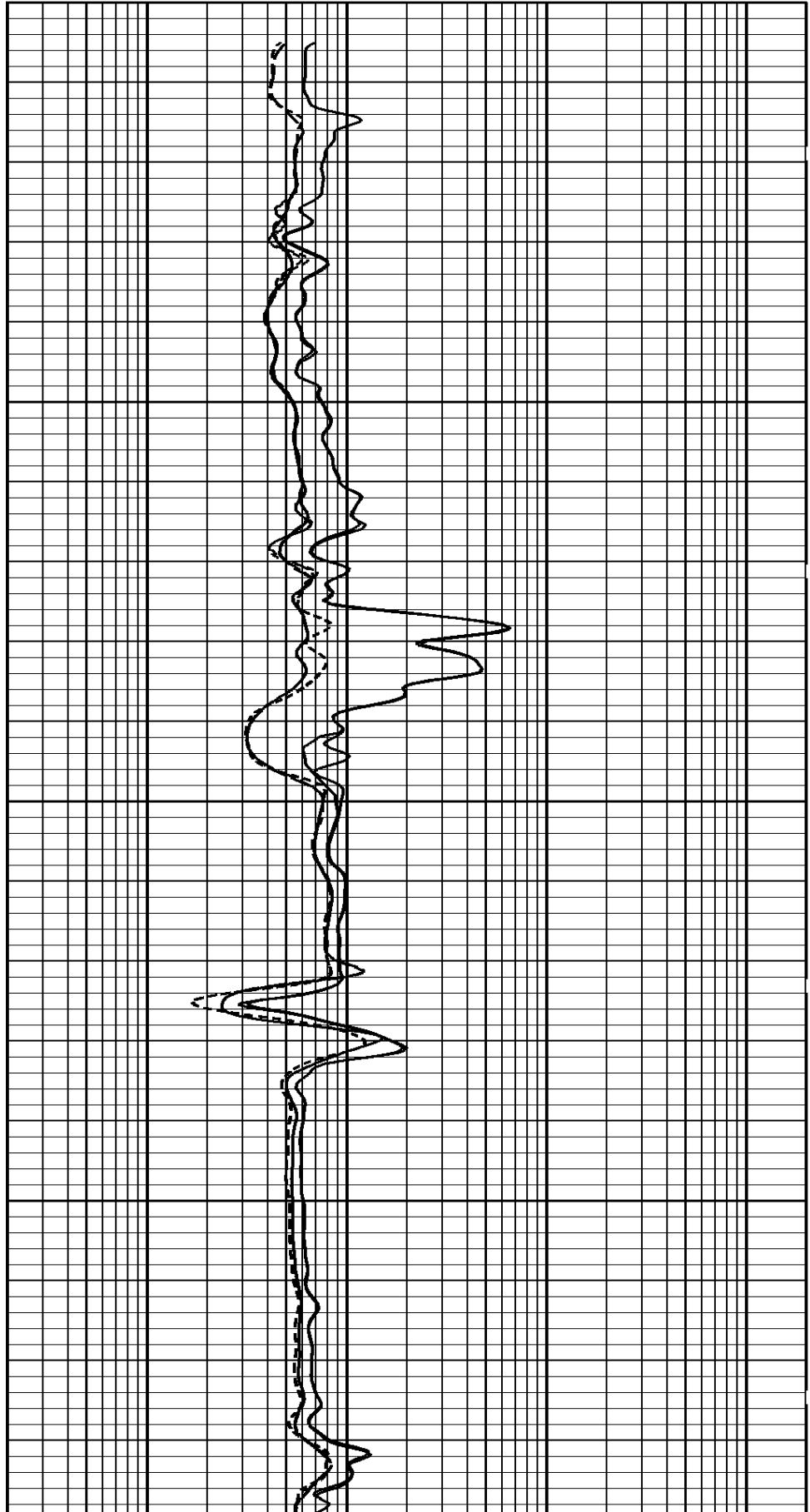
2000.0

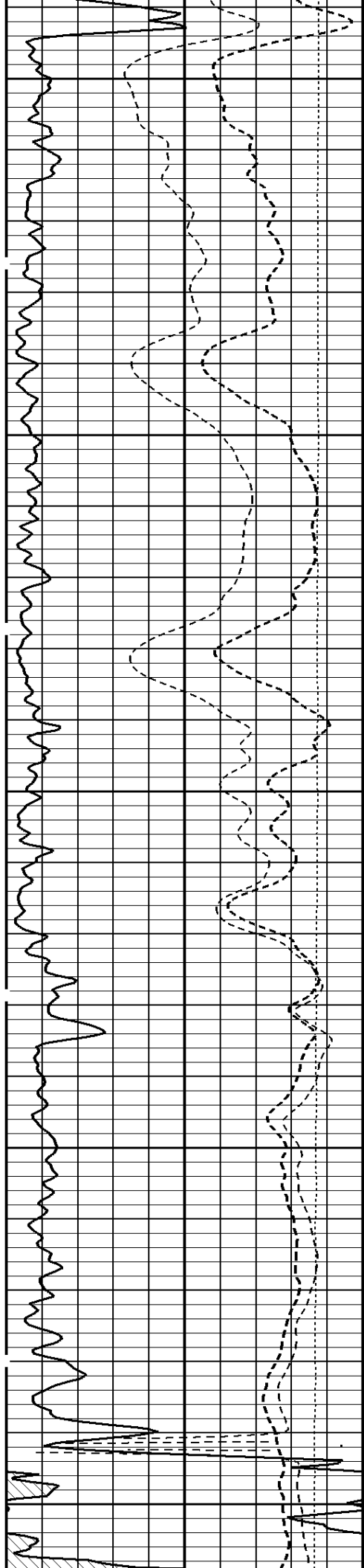
### 1:240 REPEAT 2/MN SECTION



2200

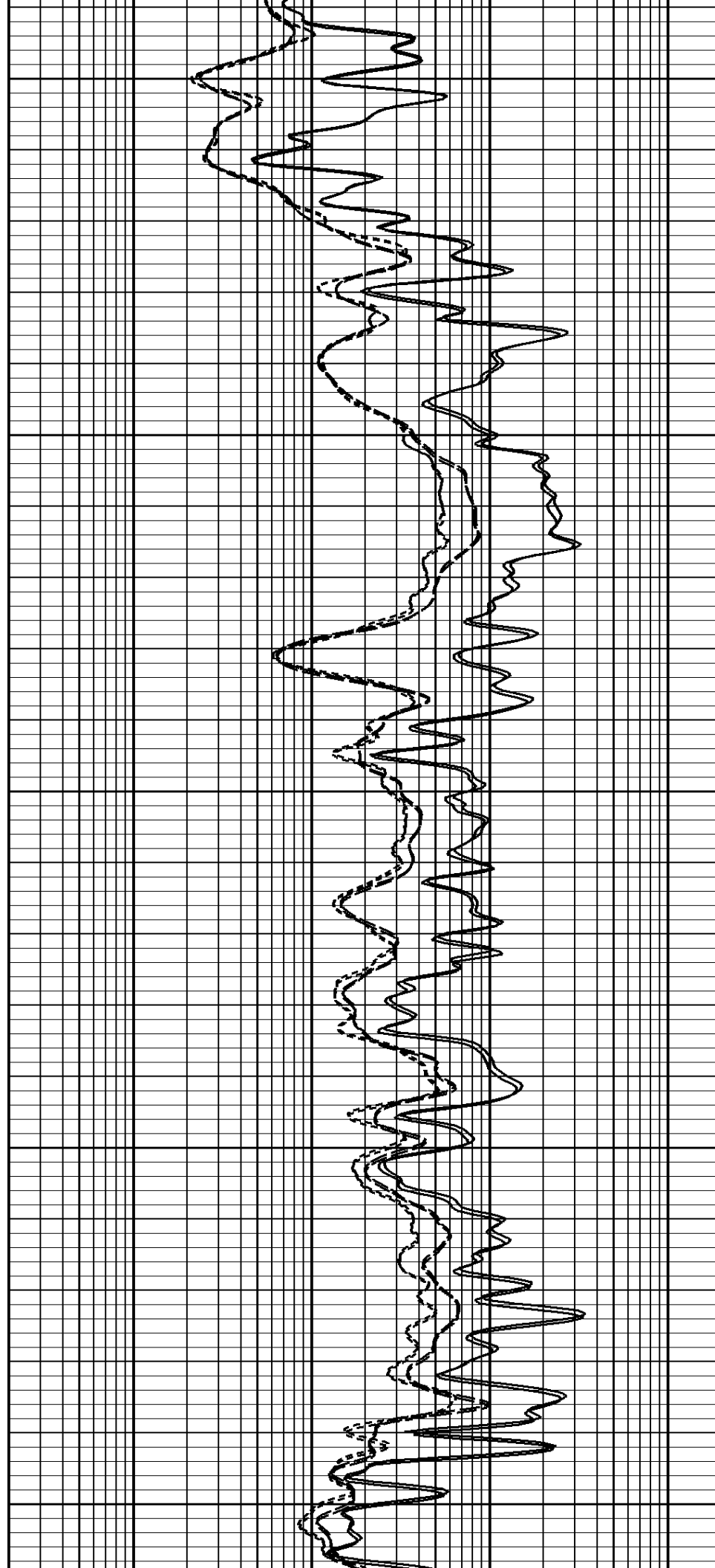
2300

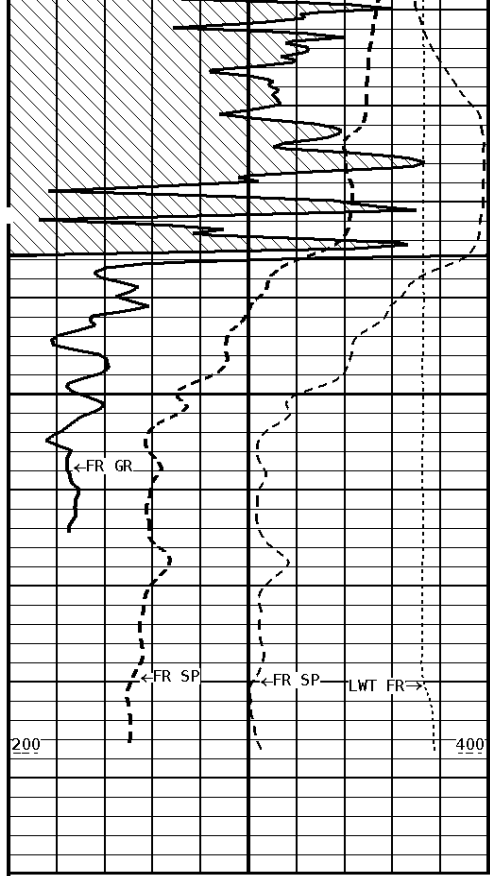




2400

2500

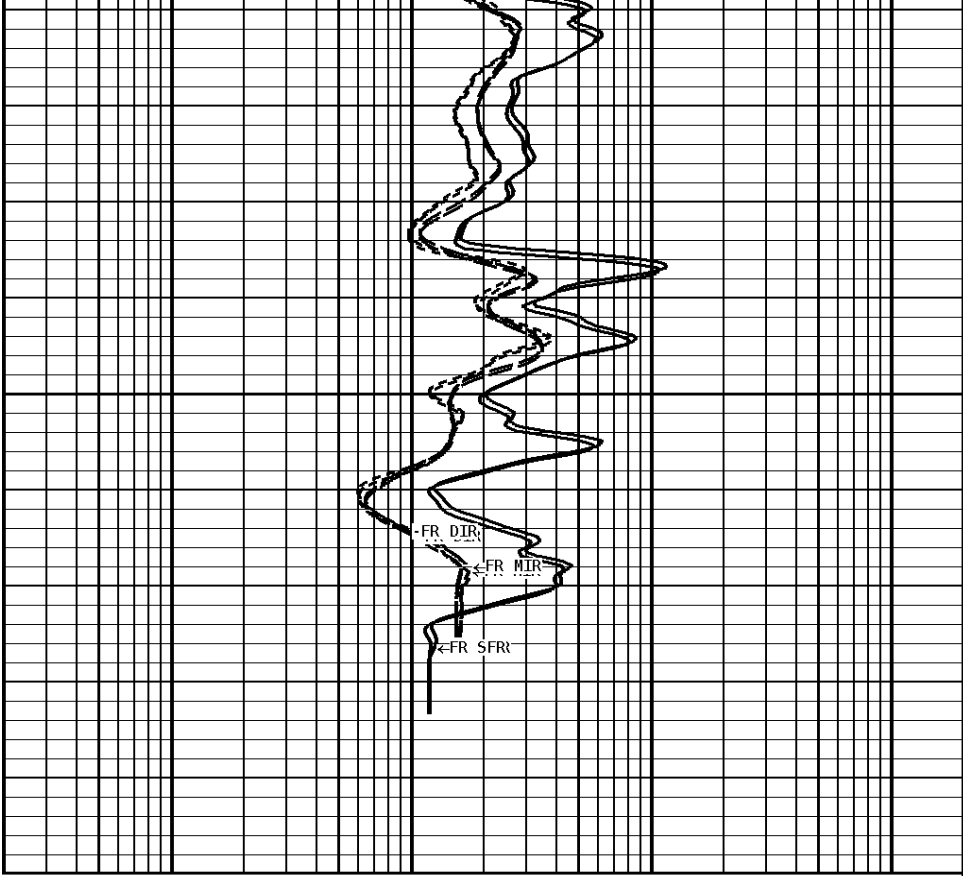




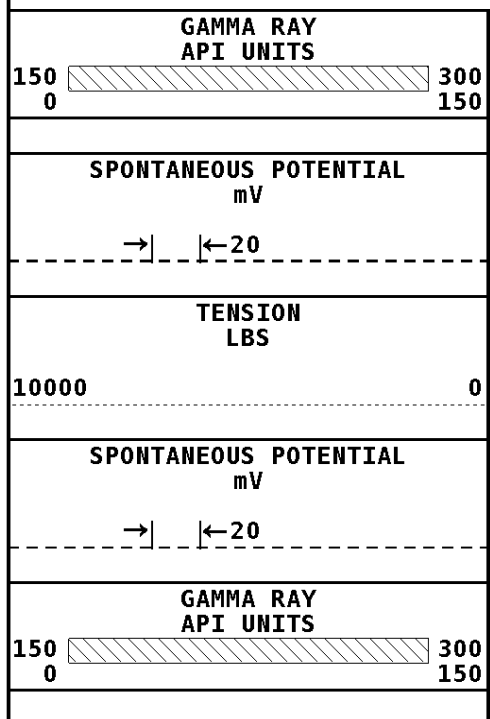
2600

2631

File #1.2.7



**1:240 REPEAT 2/MN SECTION**



<b>DEEP INDUCTION OHMM</b>	
0.2	2000.0
<b>MEDIUM INDUCTION OHMM</b>	
0.2	2000.0
<b>SHALLOW FOCUSED RESISTIVITY OHMM</b>	
0.2	2000.0
<b>DEEP INDUCTION OHMM</b>	
0.2	2000.0
<b>MEDIUM INDUCTION OHMM</b>	
0.2	2000.0
<b>SHALLOW FOCUSED RESISTIVITY OHMM</b>	
0.2	2000.0

**\* Borehole Zone Factors \***

<b>Zone 1 99999.0 to 0.0 Feet</b>		
Drill Bit Size	7.875	in
BHT Depth	2631.000	ft
Borehole Temperature	114.0	degF
Temperature Gradient	1.22	degF/ft

Temperature Gradient	1.00	DFFF
Resistivity Of Mud	2.800	ohm/m
Resistivity Of Mud Temperature	60.00	degF

**\* Calibration Summary \***

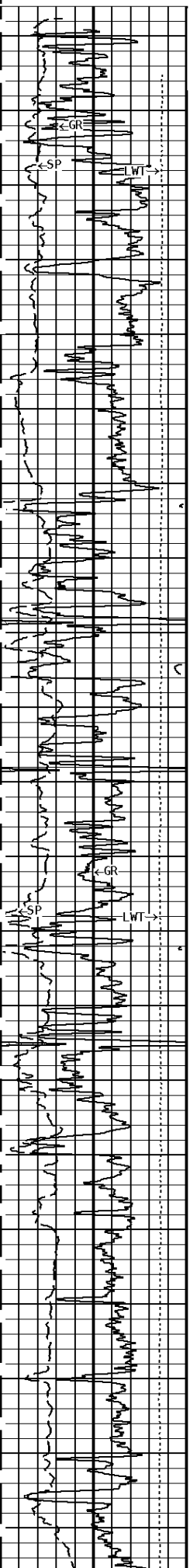
Shop Calibration					
GRT-B					
Performed : 04-APR-2011			Time : 19:28		
Sensor Suite : GR-GR5			ID : GRT-BC-41		
	Measured	Units	Calibrated	Units	
GR	Background Jig	CPS	Jig	GRAPI	
	46	346	175		
Shop Calibration					
PIT-CA					
Performed : 07-Jan-2010			Time : 12:41		
Sensor Suite : P-IND-T			ID : PIT-AB-11		
	Measured		Calibrated		Units
	R	X	R	X	
Air	131400	130011	-0.6	-0.3	MMHOS
Zero	131067	131070	0.0	0.0	MMHOS
Reference	251544	249500	5000.0	5000.0	MMHOS
Loop	152263	173981	2721.6	990.2	MMHOS
Sonde Error			-7.4	32.4	MMHOS
Cond			5000.0	5000.0	MMHOS
	Medium		Deep		
	Measured		Calibrated		Units
	R	X	R	X	
Air	128222	132558	-0.2	0.2	MMHOS
Zero	131085	131074	0.0	0.0	MMHOS
Reference	235985	234469	2000.0	2000.0	MMHOS
Loop	149351	177288	1267.9	462.6	MMHOS
Sonde Error			10.8	35.3	MMHOS
Cond			2000.0	2000.0	MMHOS
	Temperature				Units
	Measured		Calibrated		
	Low	High	Low	High	
	16980.0	56920.0	70.0	350.0	DEGF
Performed : 07-Jan-2010			Time : 12:31		
Sensor Suite : SFL			ID : PIT-AB-11		
	Measured		Calibrated		Units
	Zero	Reference	Zero	Reference	
Im	32760.0	49643.7	0.0	7028.0	uA
Ib	32775.0	48852.1	0.0	1750.0	mA
MOM1	32818.0	57231.3	0.0	175.0	mV
Equivalent SFL				43.97	OHMM
Performed : 07-Jan-2010			Time : 12:22		
Sensor Suite : P-SP			ID : PIT-AB-11		
	Measured		Calibrated		Units
	Zero	Reference	Zero	Reference	
	32794.0	58946.2	0.0	1000.0	mV

<b>Well File:</b> lan_fuq_9-36_feb_24_mstk	<b>Scale:</b> 1:1200
<b>Segment:</b> V1.D5.S1 MAIN	<b>Acquired:</b> Not Available
<b>Reference:</b> 0	<b>Processed:</b> Not Available

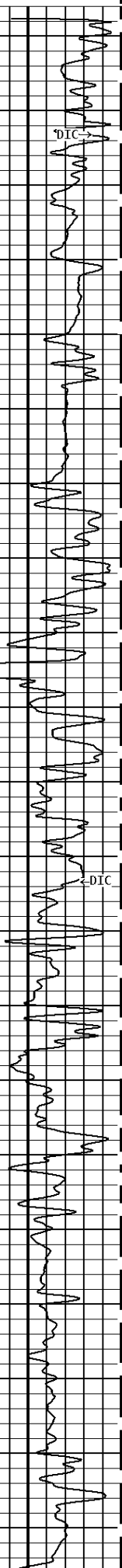
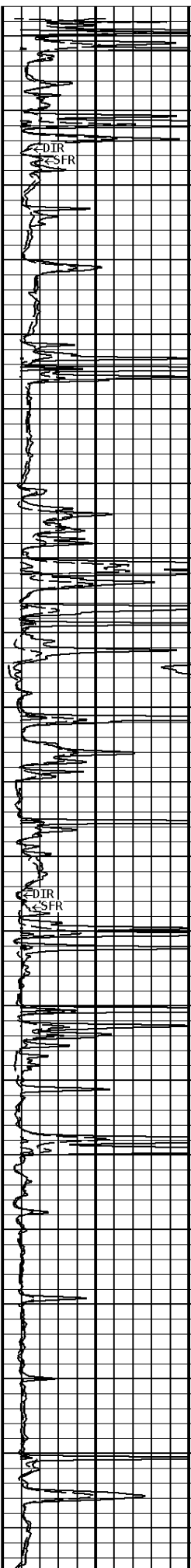
<b>TENSION</b> LBS	<b>DEEP INDUCTION</b> OHMM
10000 0	0.0 500.0 0.0 50.0
<b>SPONTANEOUS POTENTIAL</b> mV	<b>SHALLOW FOCUSED</b> OHMM
→   ← 20	0.0 500.0 0.0 50.0
<b>GAMMA RAY</b> API UNITS	<b>DEEP CONDUCTIVITY</b> MHMO
150 0 300 150	2000 1000 1000 0

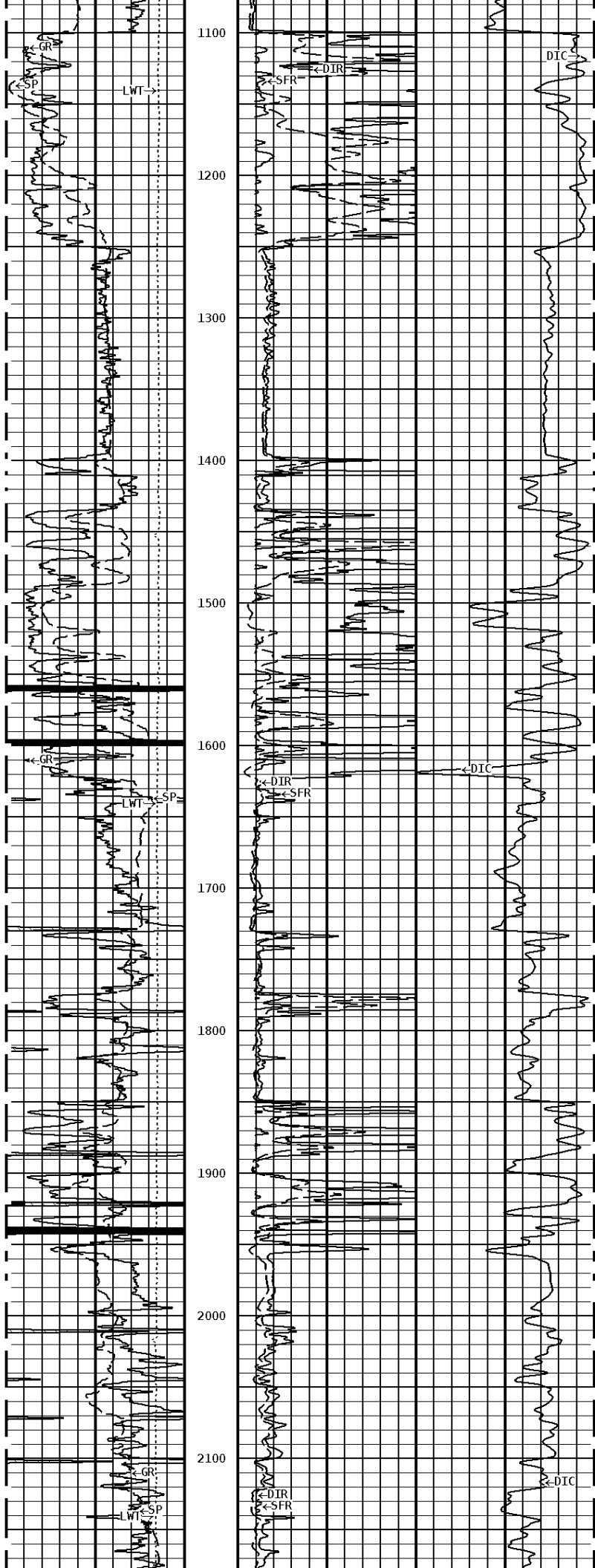
**1:1200 MAIN SECTION**

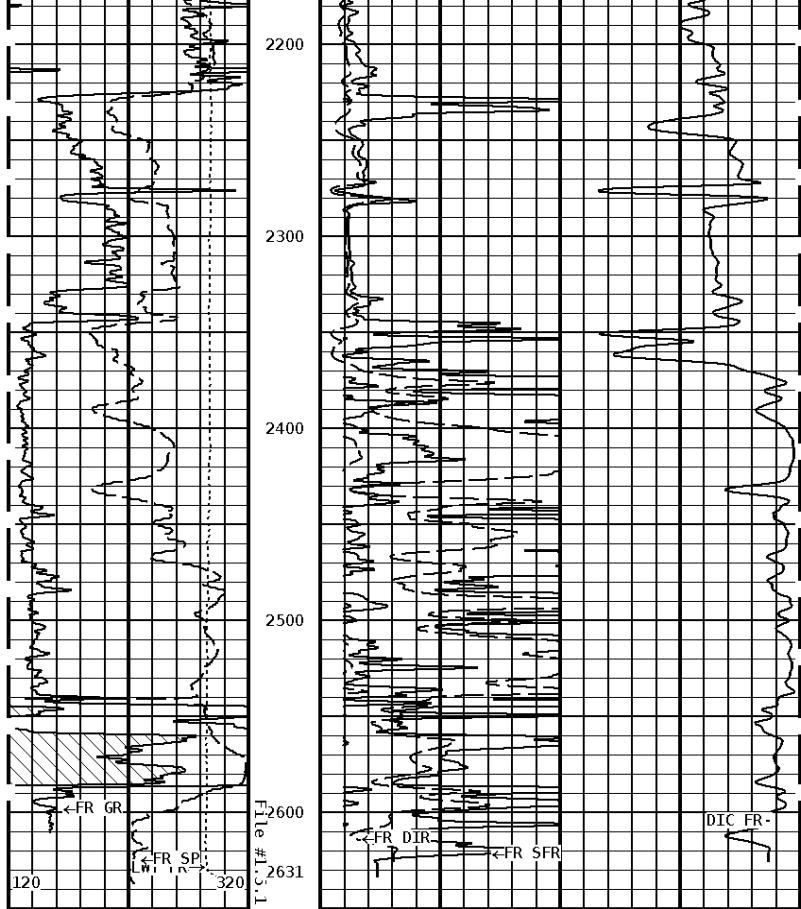
File #1.5.1



100  
200  
300  
400  
500  
600  
700  
800  
900  
1000







<b>GAMMA RAY</b> <b>API UNITS</b>	
150	300
0	150
<b>SPONTANEOUS POTENTIAL</b> <b>mV</b>	
→	←20
<b>TENSION</b> <b>LBS</b>	
10000	0

<b>DEEP CONDUCTIVITY</b> <b>MMHO</b>	
2000	1000
1000	0
<b>SHALLOW FOCUSED</b> <b>OHMM</b>	
0.0	500.0
0.0	50.0
<b>DEEP INDUCTION</b> <b>OHMM</b>	
0.0	500.0
0.0	50.0