



Weatherford

COMPOSITE LOG

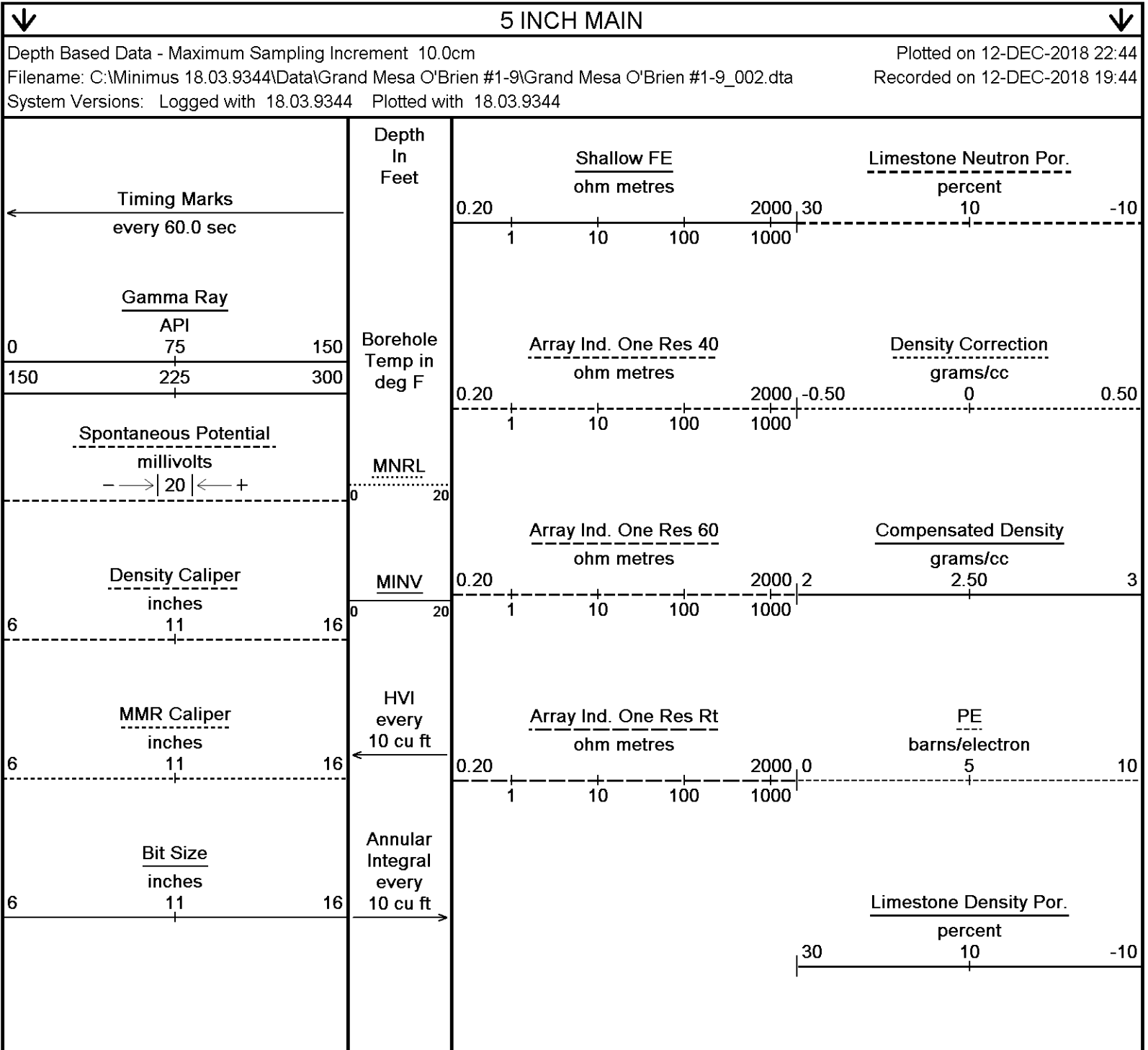
COMPANY	GRAND MESA OPERATING COMPANY		
WELL	OBRIEN #1-9		
FIELD	WILDCAT		
PROVINCE/COUNTY LANE			
COUNTRY/STATE	U.S.A. / KANSAS		
LOCATION	2225' FSL & 2305' FEL		
SEC 9	TWP 16S	RGE 29W	Other Services
Latitude			
Longitude			
API Number	15-101-22619		
Permanent Datum GL, Elevation 2656 feet			
Log Measured From KB, 5.00 feet above Permanent Datum			
Drilling Measured From KB			
Date	12-DEC-2018		
Run Number	ONE		
Service Order	4558-231823318		
Depth Driller	4520.00	feet	Elevations: KB 2661.00
Depth Logger	4521.00	feet	DF 2659.00
First Reading	4518.00	feet	GL 2656.00
Last Reading	219.00	feet	
Casing Driller	219.00	feet	
Casing Logger	219.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.30 lb/USg	52.00 CP	
PH / Fluid Loss	10.00	7.20 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	1.27 @ 75.0	ohm-m	
Rmf @ Measured Temp	1.02 @ 75.0	ohm-m	
Rmc @ Measured Temp	1.52 @ 75.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.81 @117.0	ohm-m	
Time Since Circulation	4 HOURS		
Max Recorded Temp	117.00	deg F	
Equipment / Base	13096	LIB	
Recorded By	ADAM SILL		
Witnessed By	GARET DINKEL		

BOREHOLE RECORD					Last Edited: 12-DEC-2018 16:55
Bit Size inches		Depth From feet		Depth To feet	
7.875		219.00		4520.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
SURFACE	8.625	0.00	219.00	24.00	

REMARKS
- SOFTWARE ISSUE: WLS 18.03.9344.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION. - HARDWARE: DUAL BOWSPRING USED ON MDN. 0.5 INCH STANDOFF USED ON MFE. TWO 0.5 INCH STANDOFFS USED ON MSS. 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 1802 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING: 1096 CU.FT.

- RIG: WW DRILLING #2.
- ENGINEER: A. SILL.
- OPERATOR: B. TOVAR, B. COPELAND.

In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.



DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240

208

Casing
Shoe

1800

250

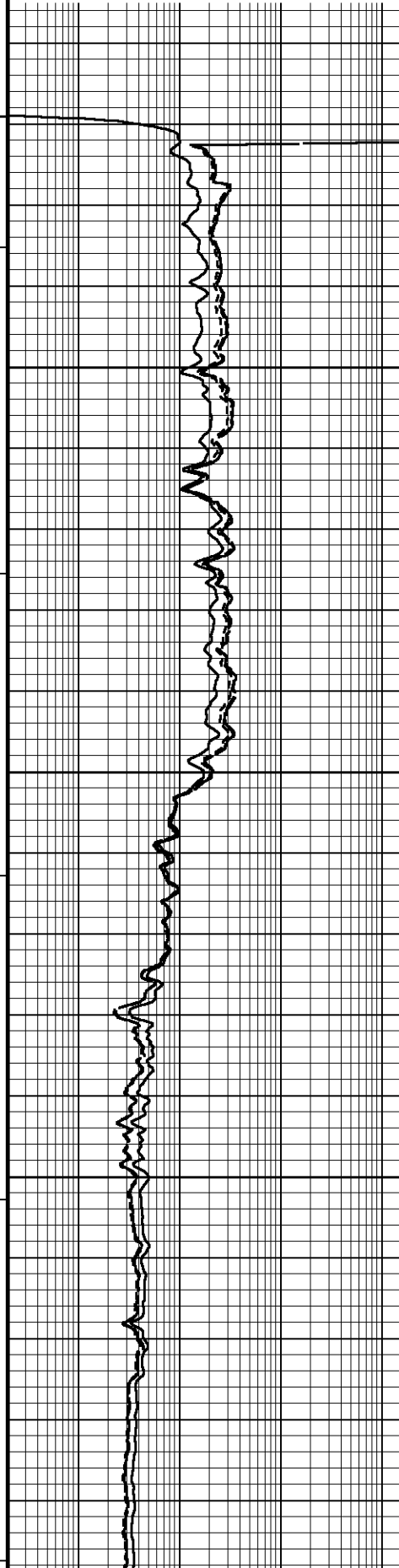
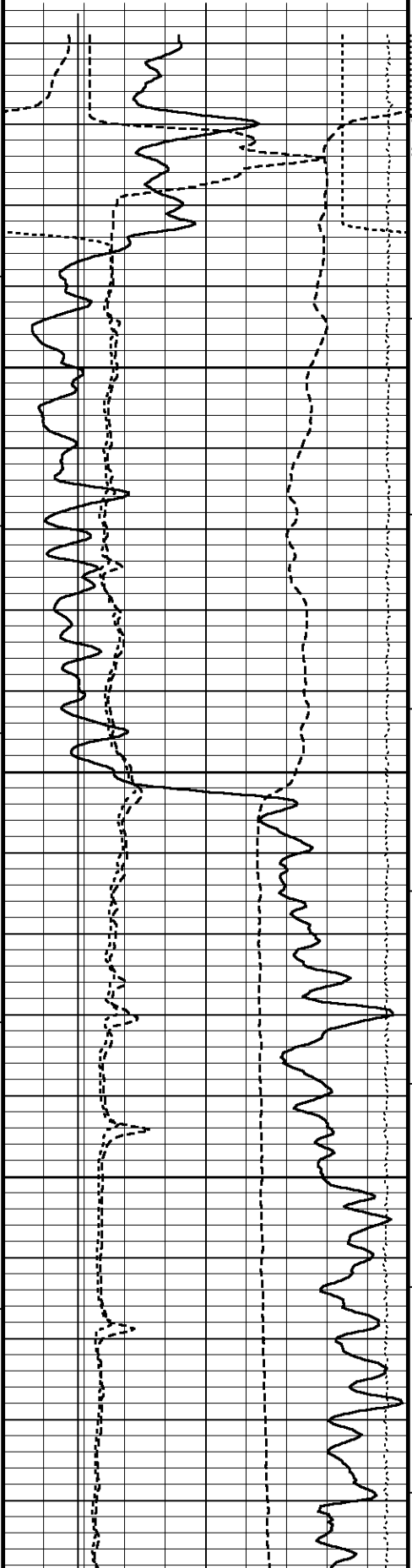
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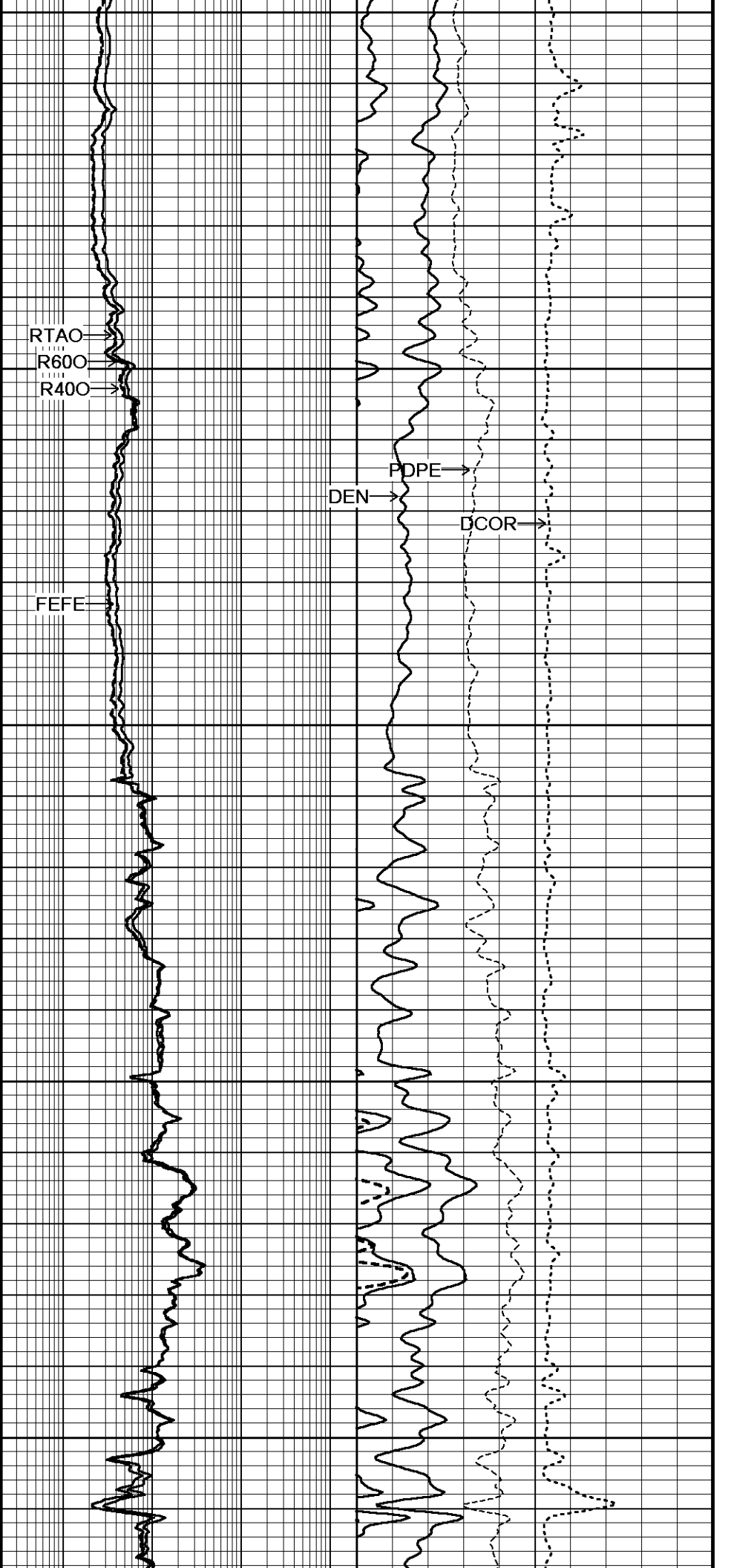
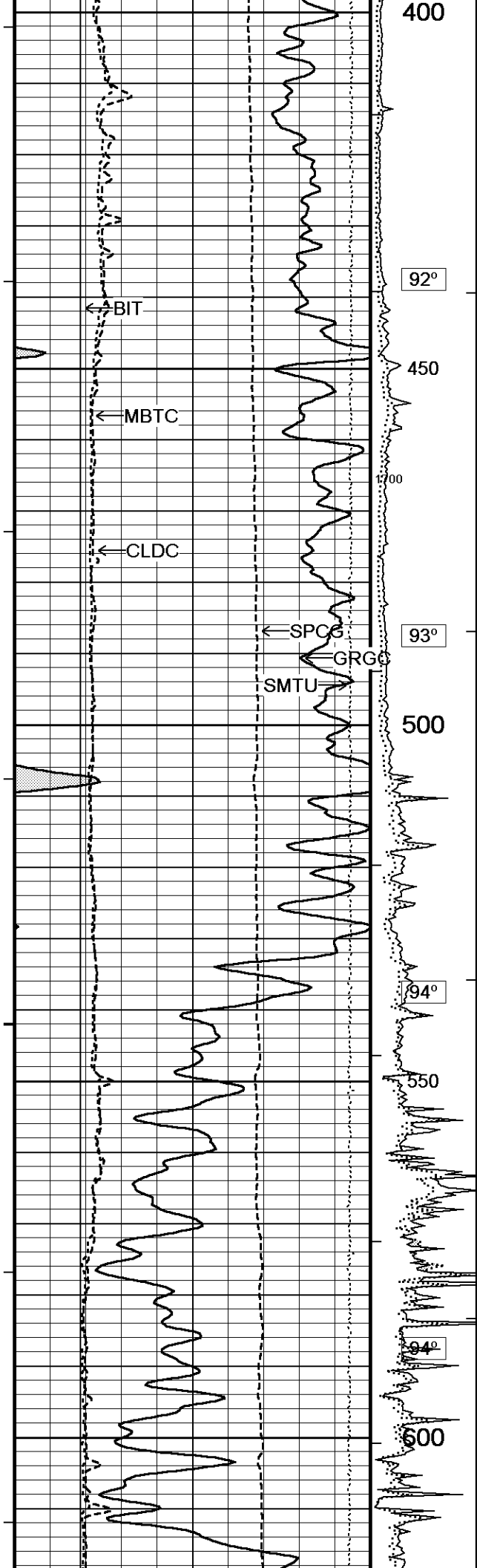
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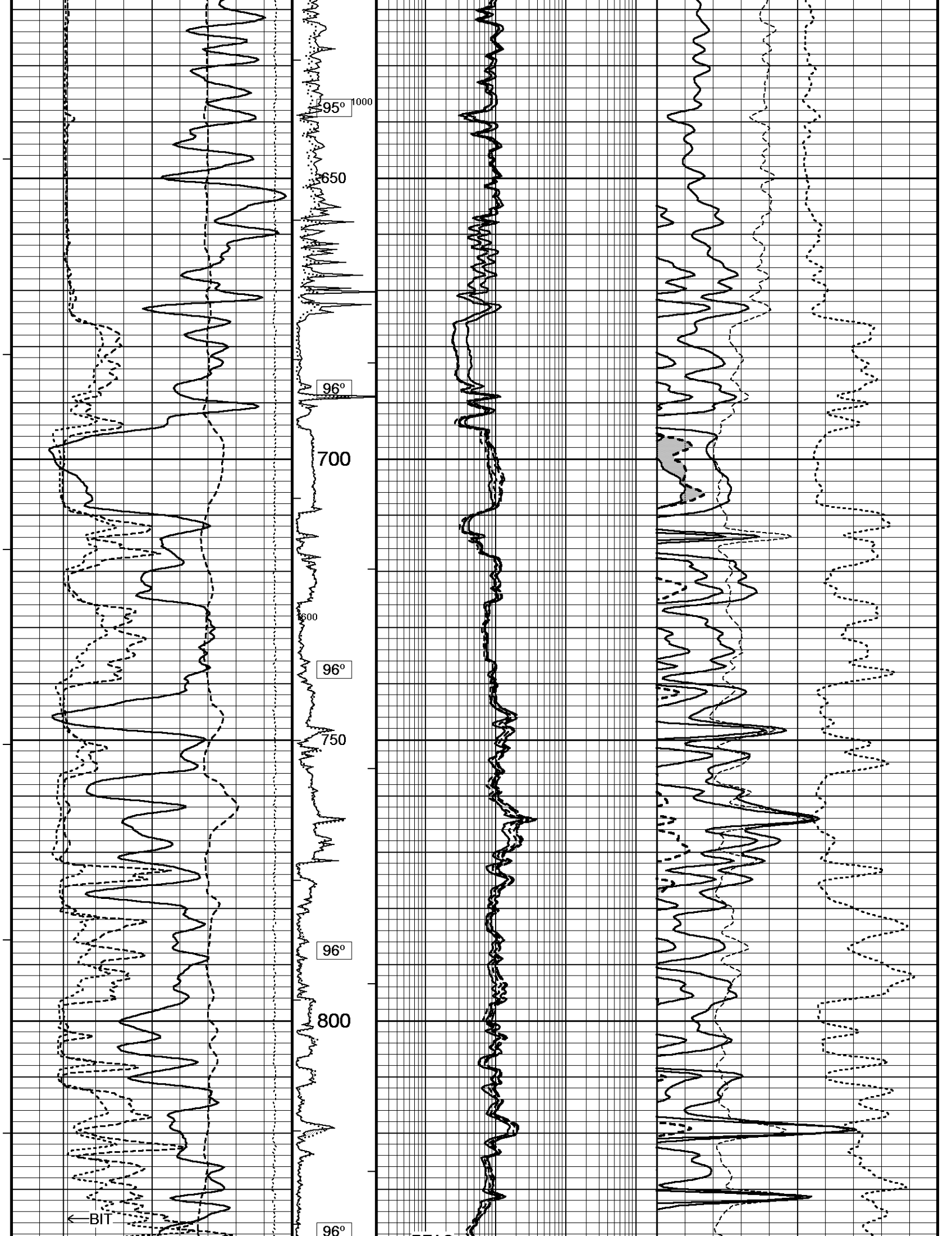
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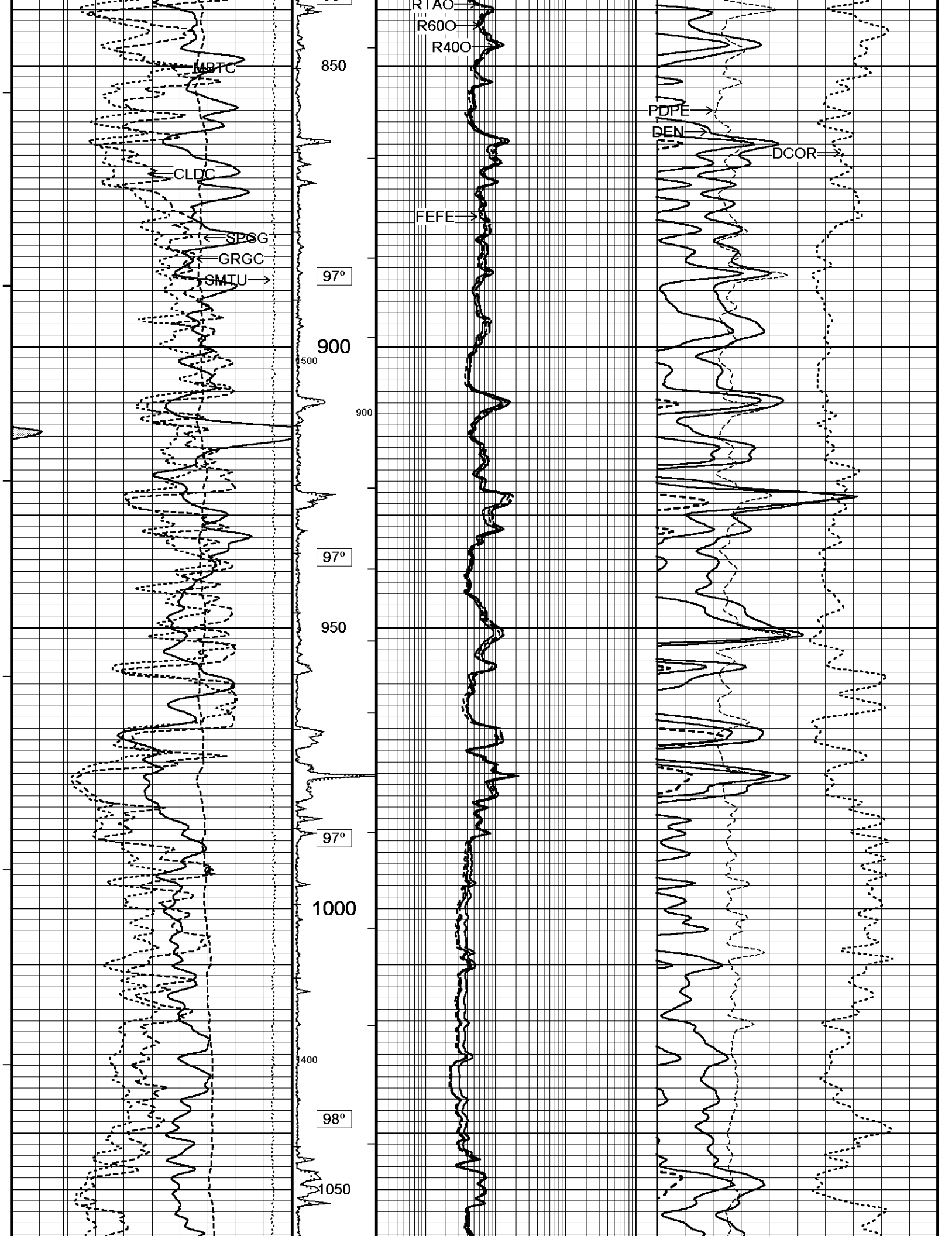
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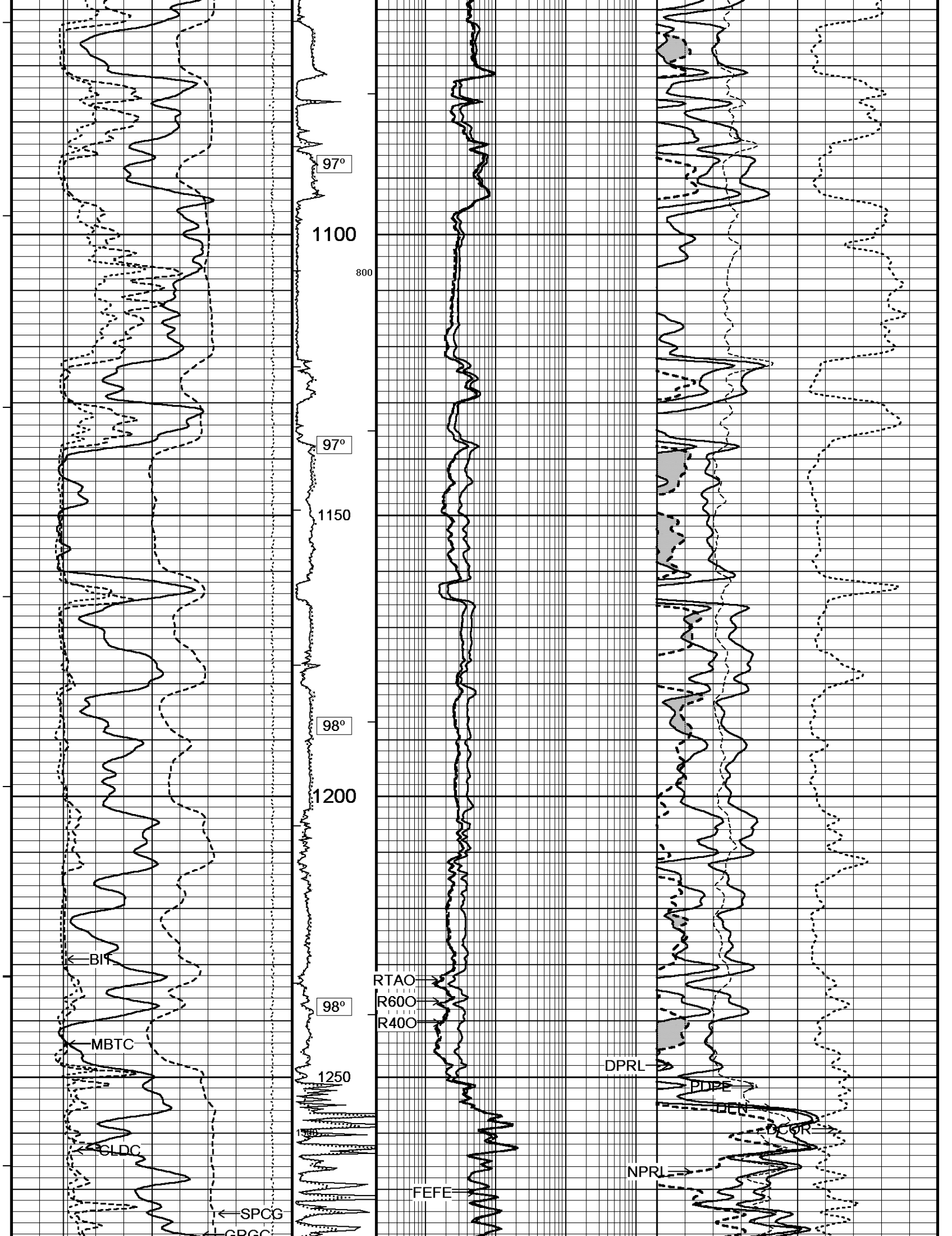
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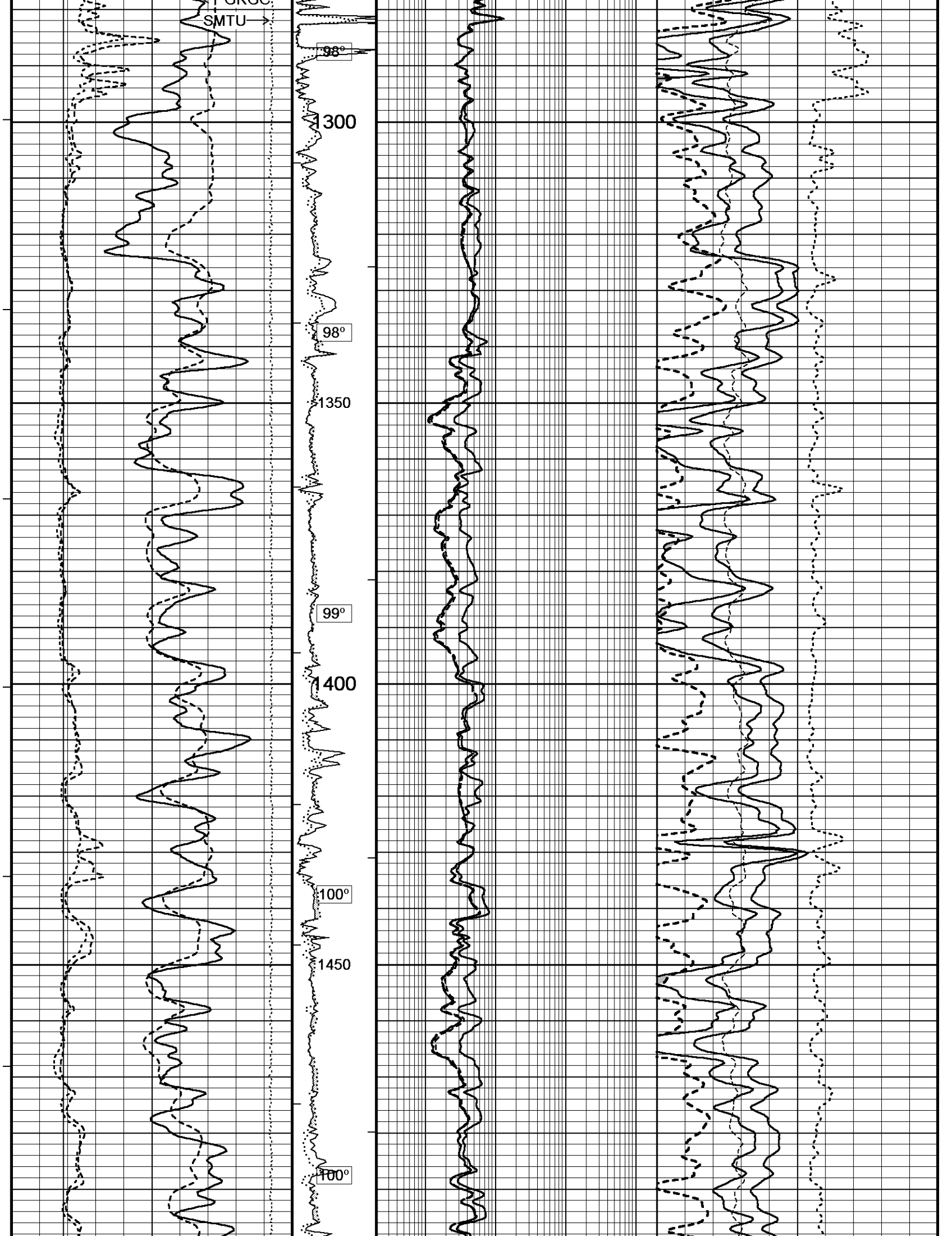


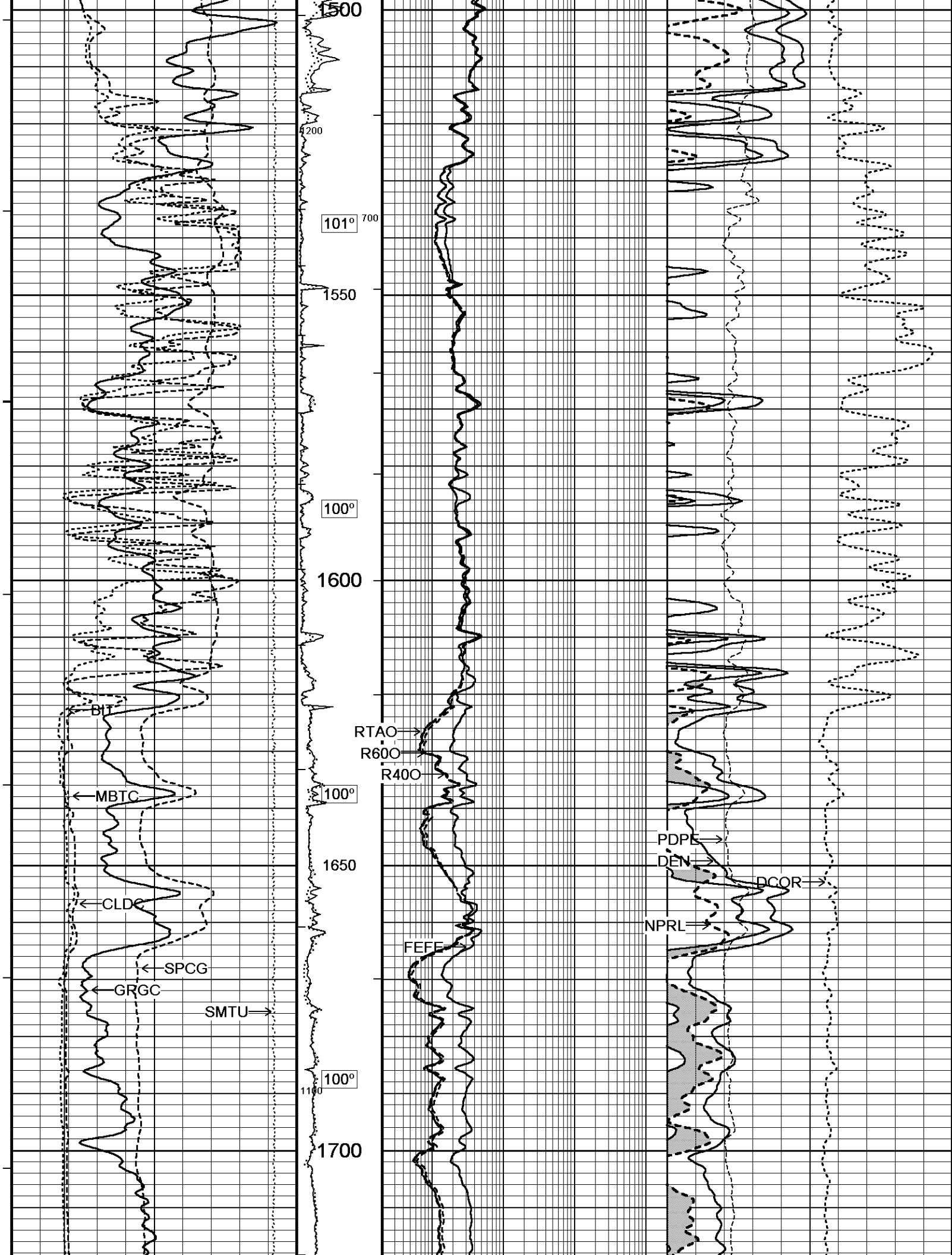


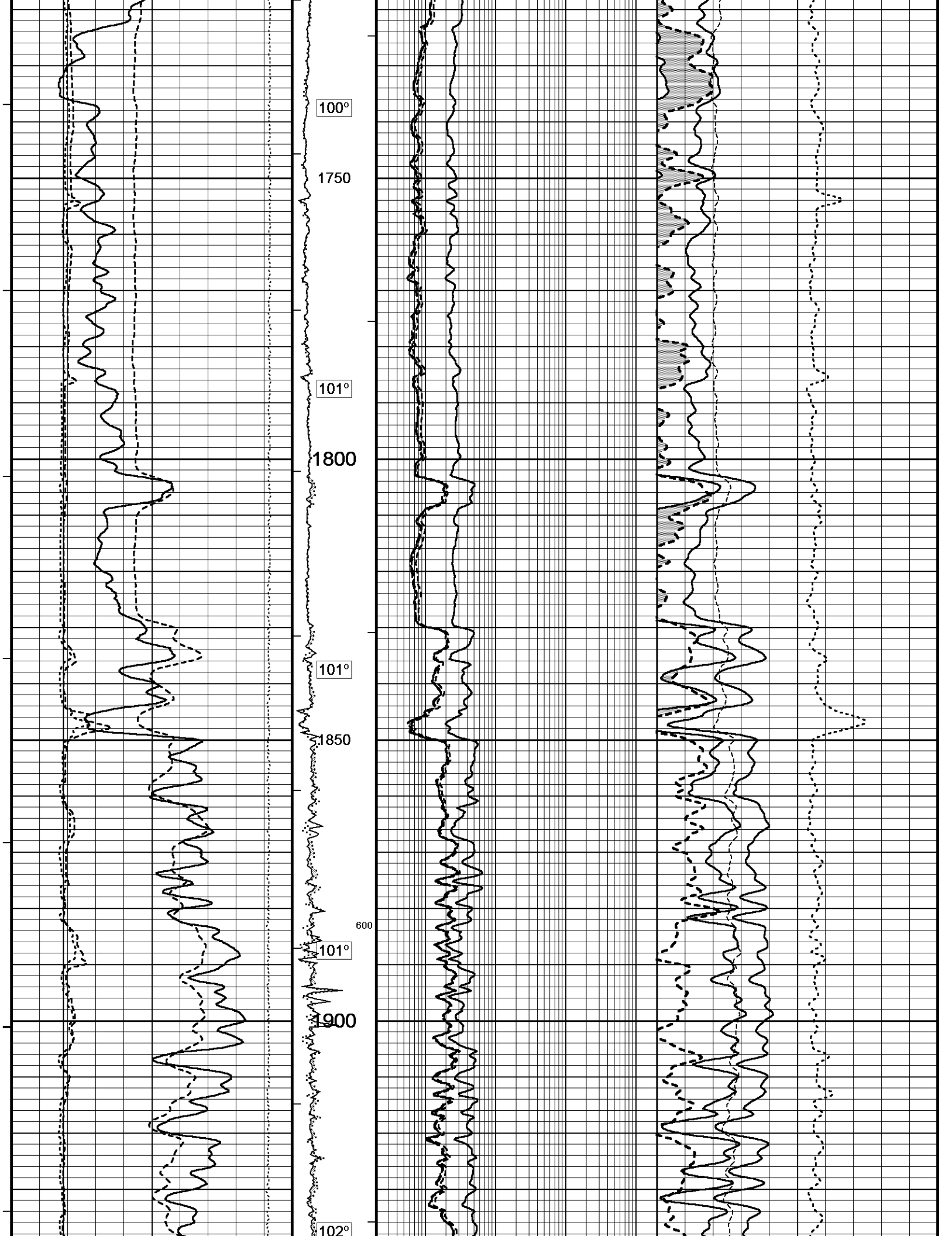


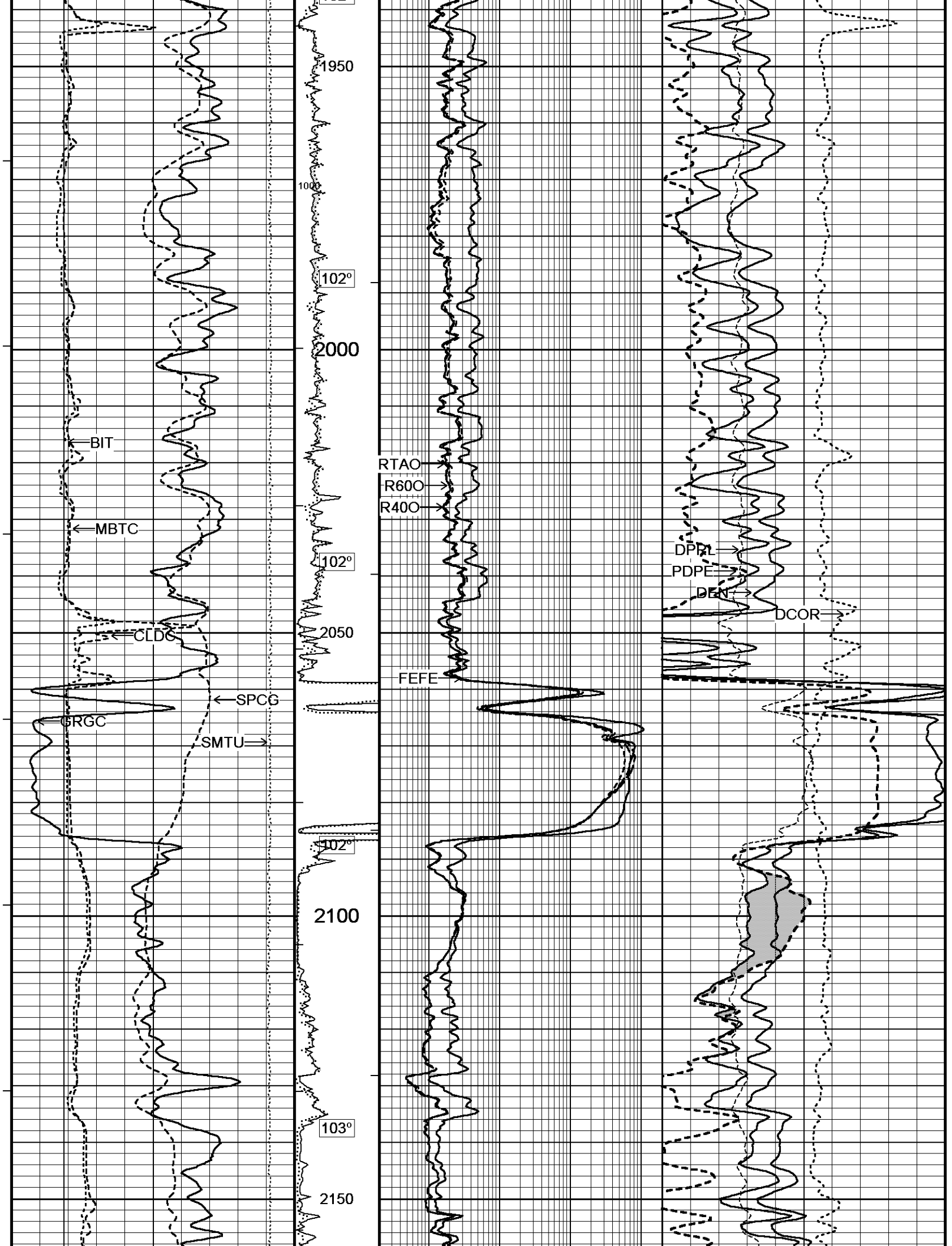


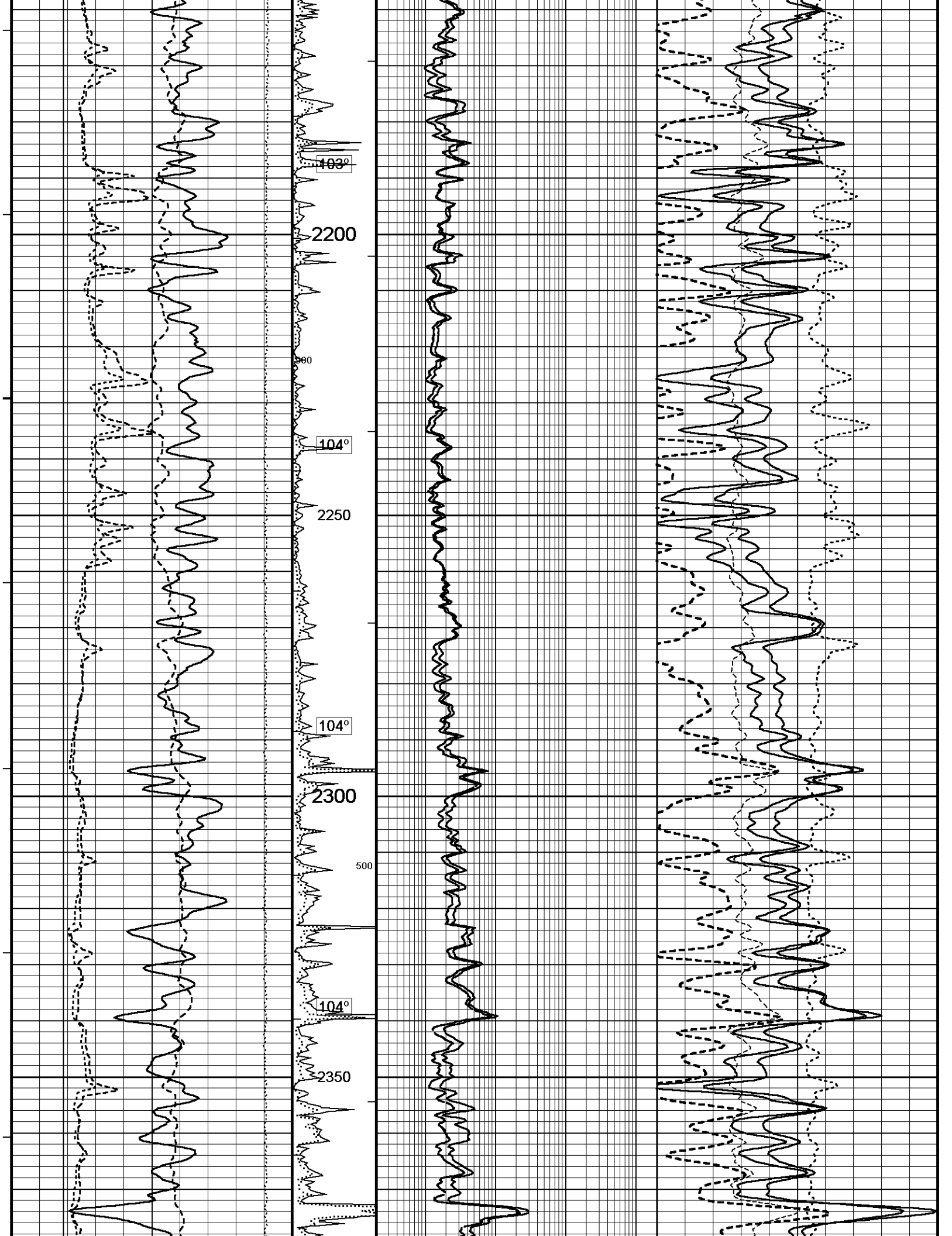


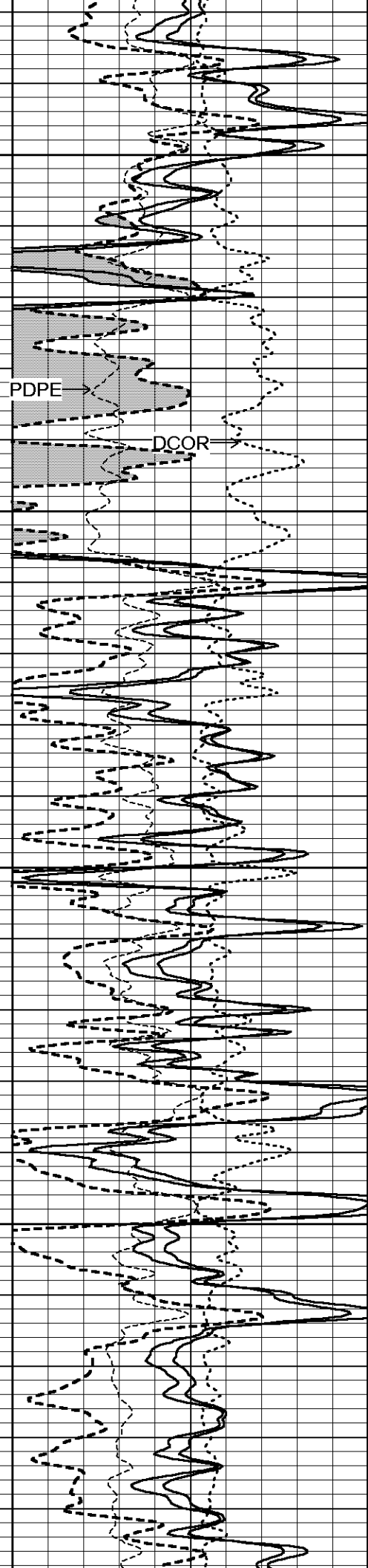
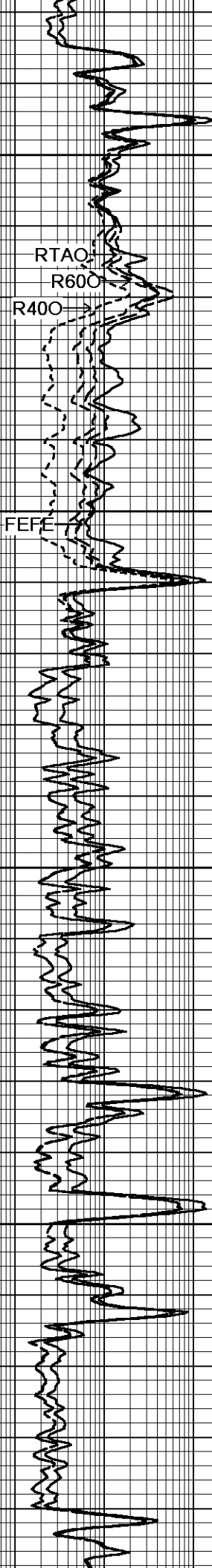
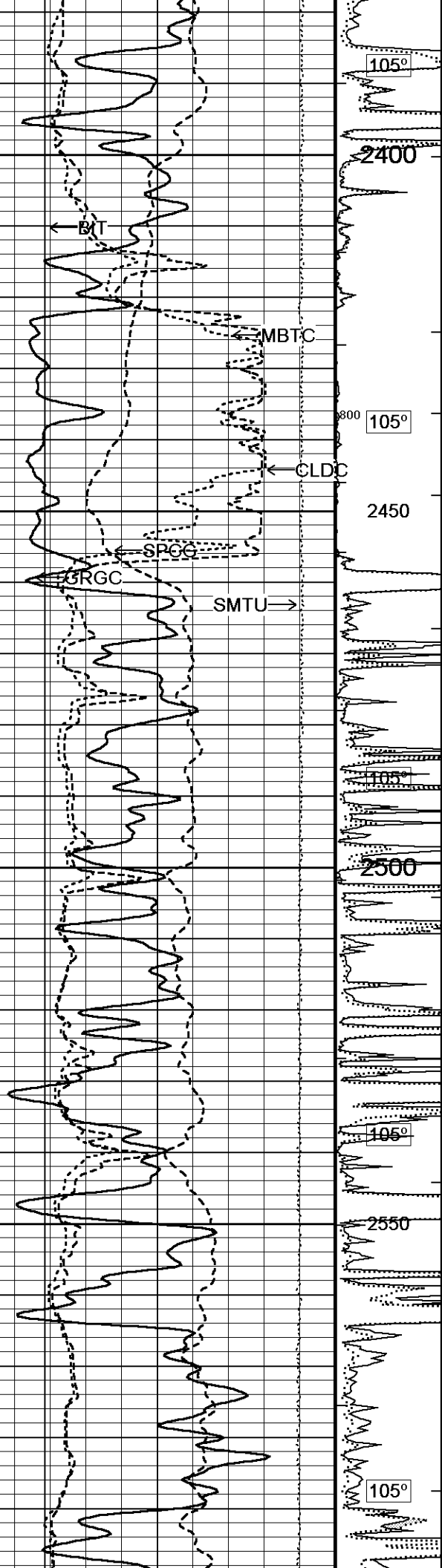


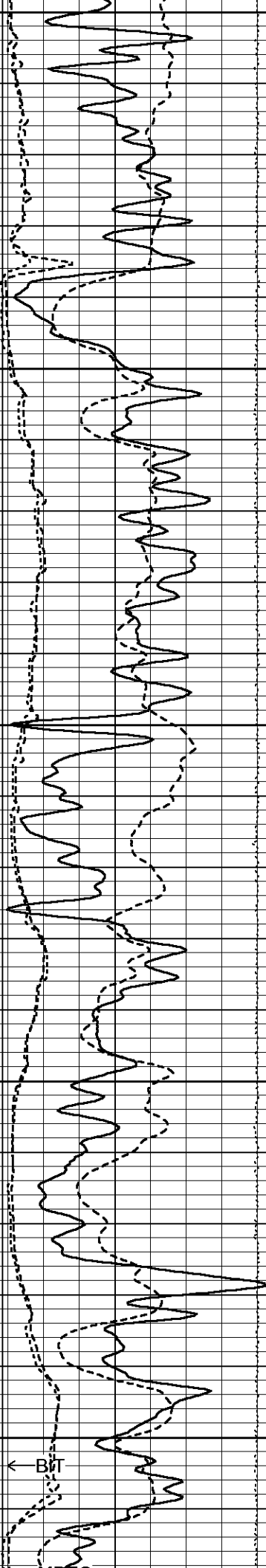
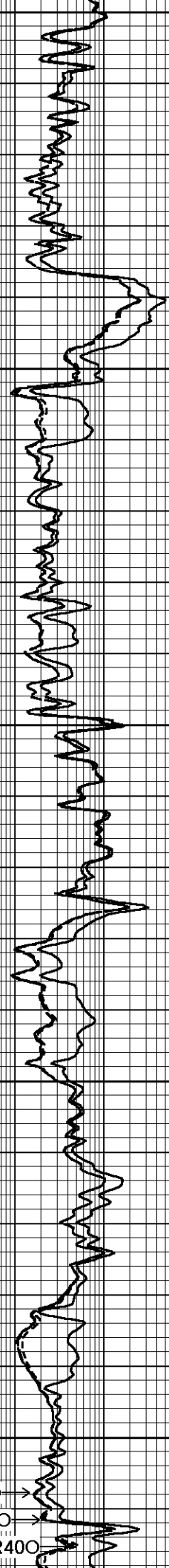
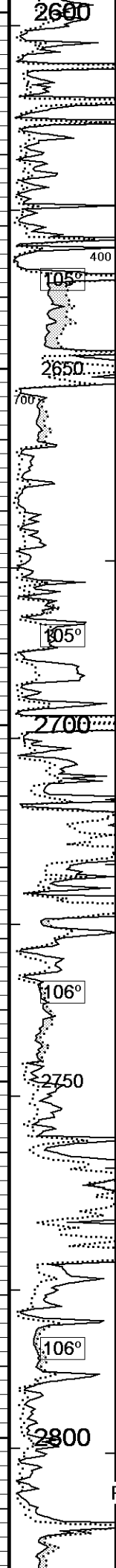
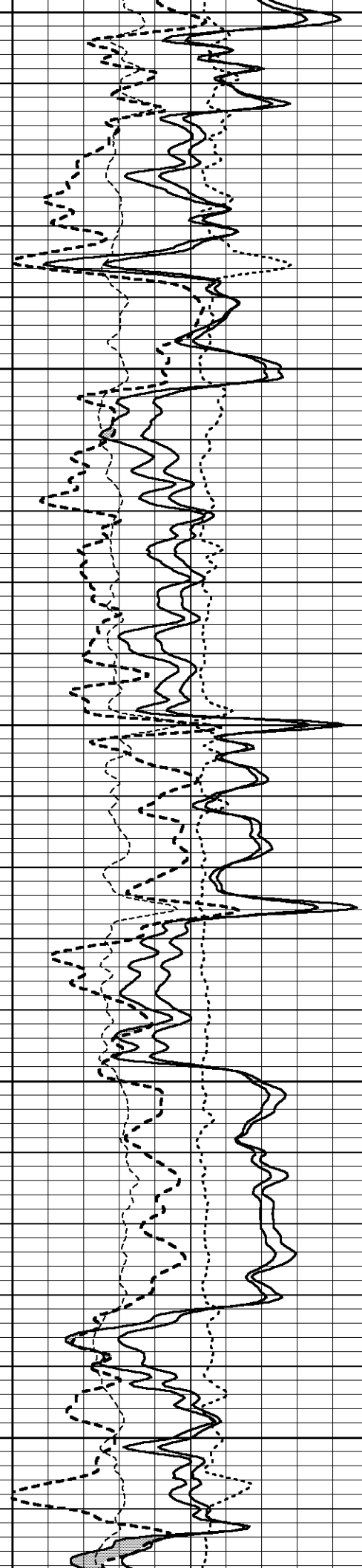




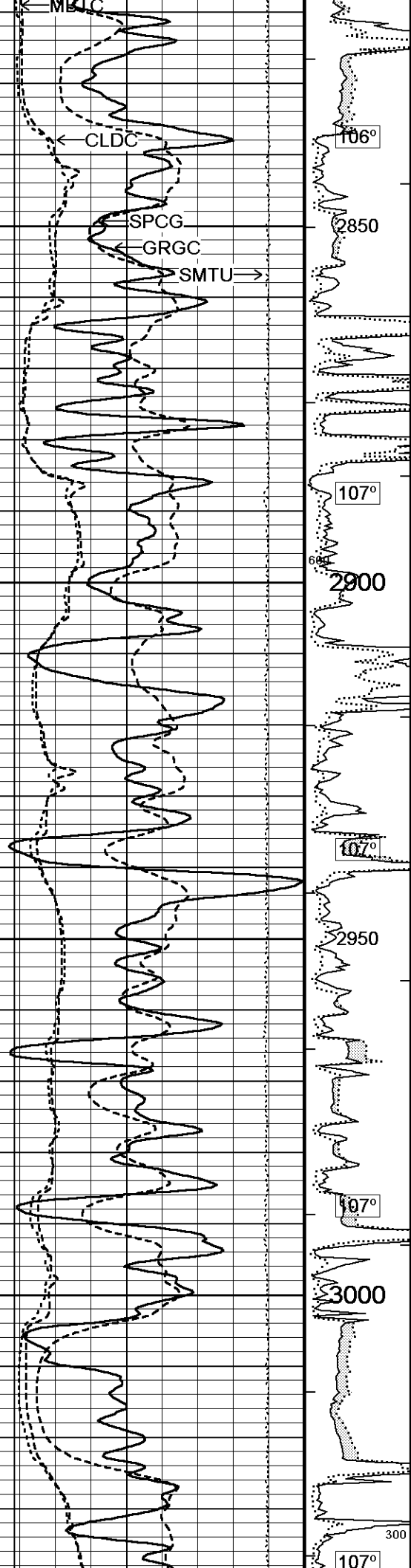




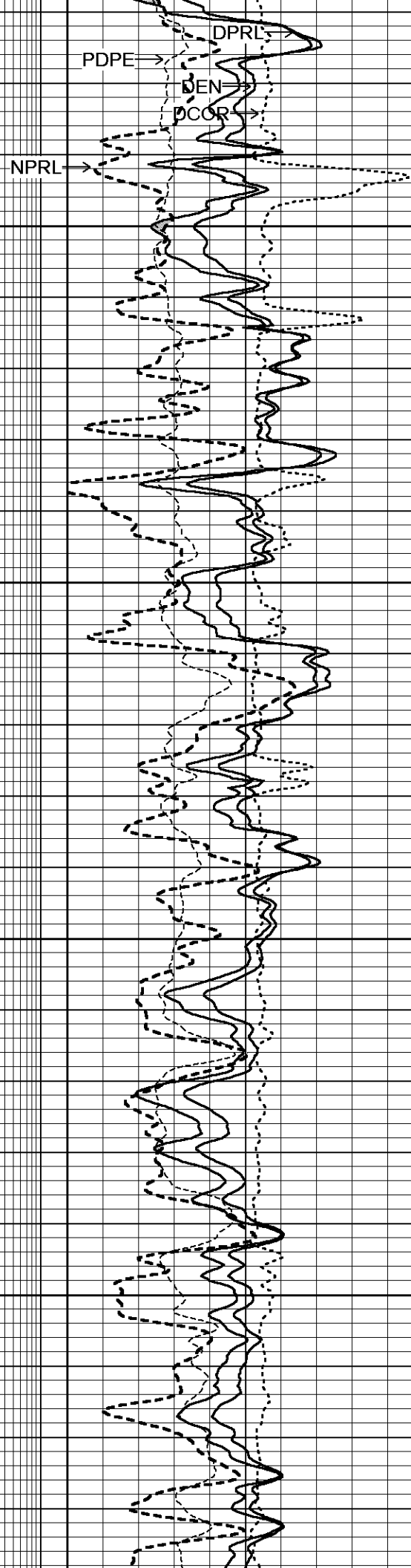


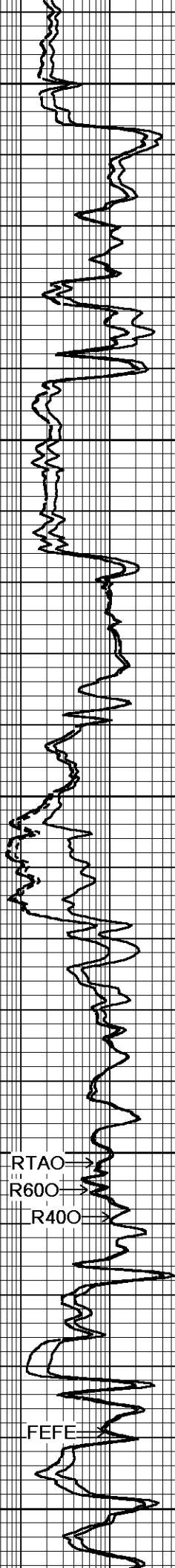
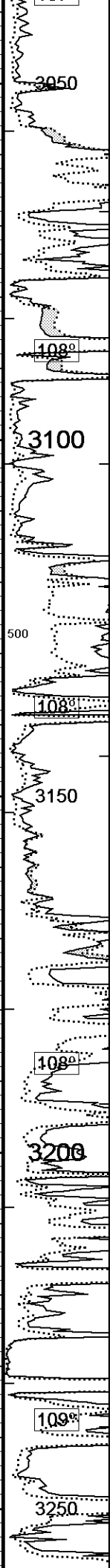
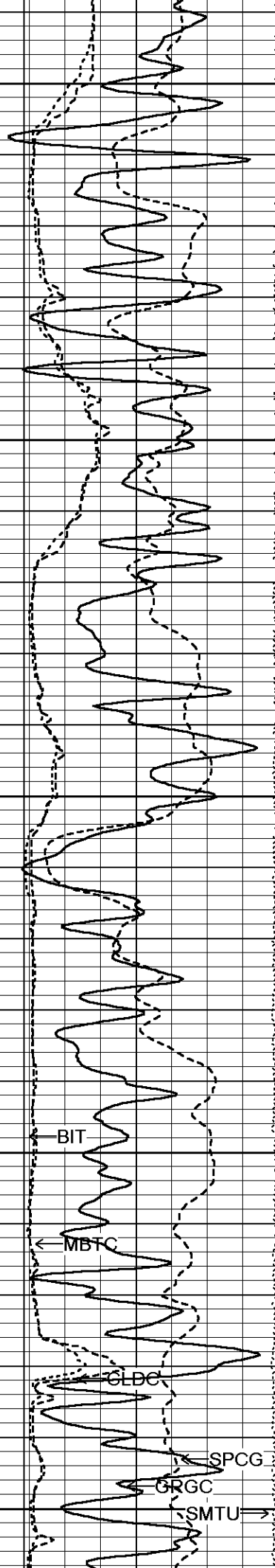


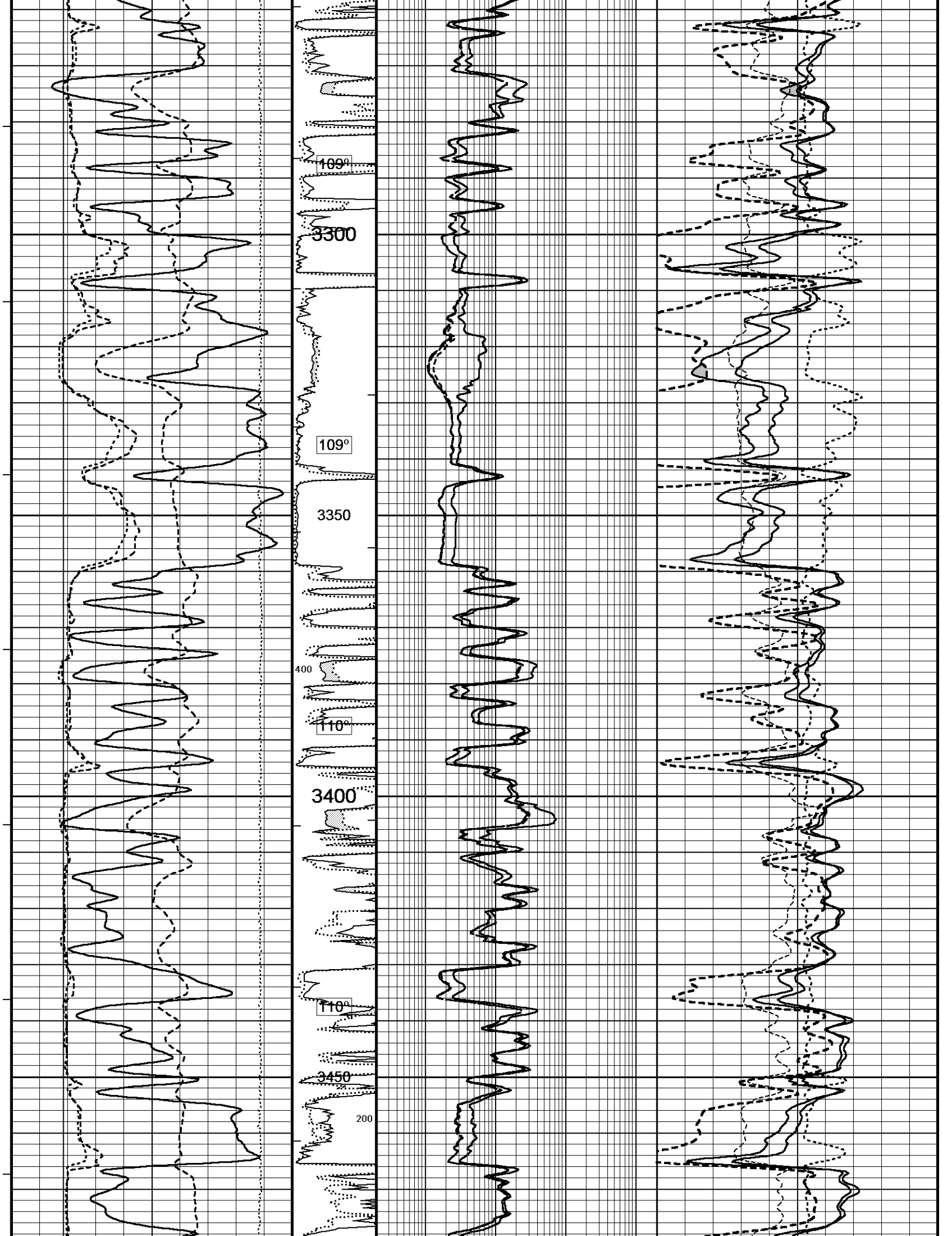
RTAO →
R600 ×
R400

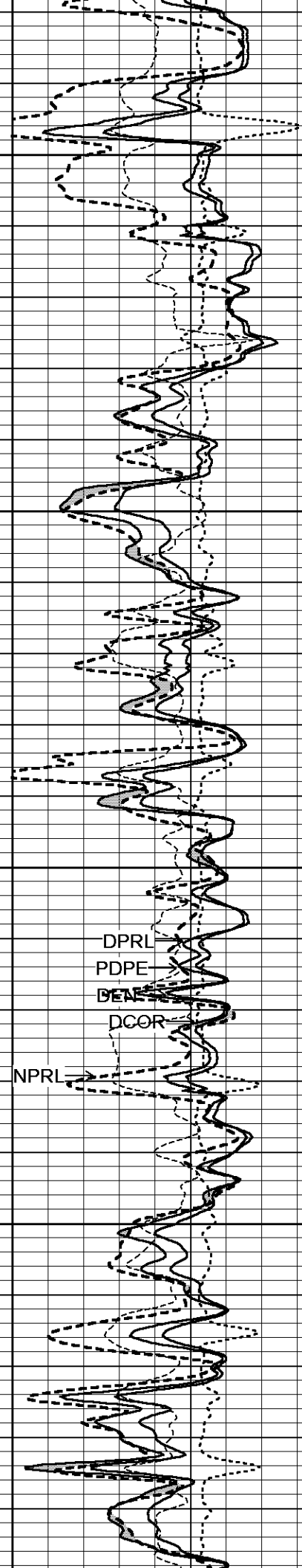
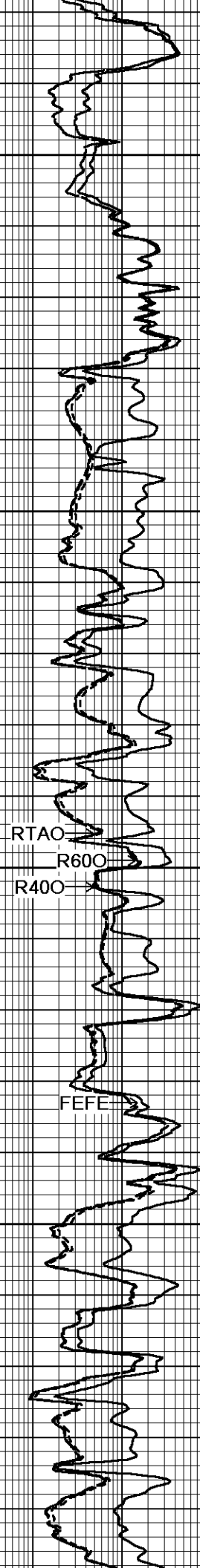
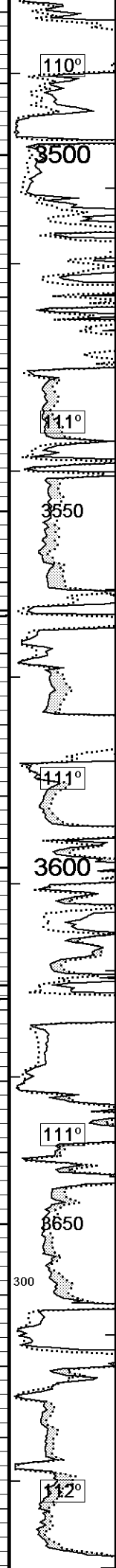
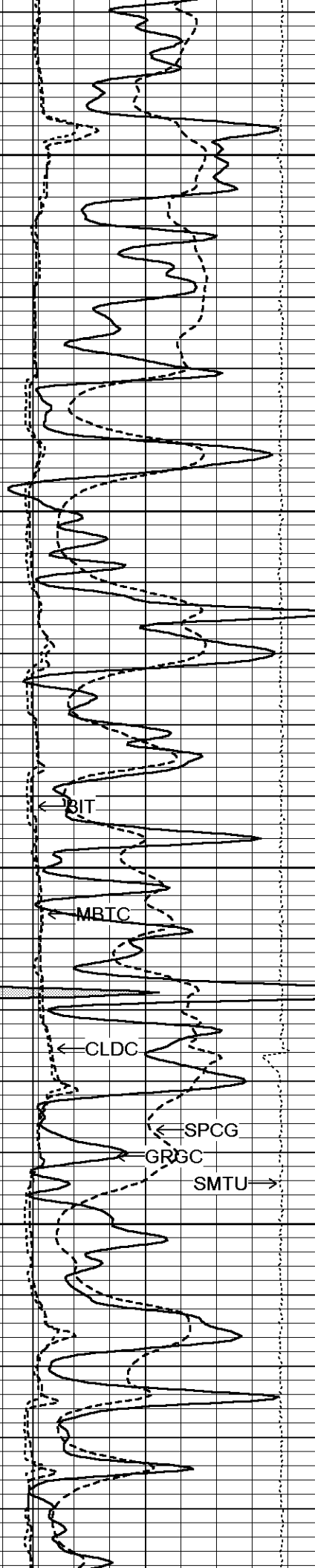


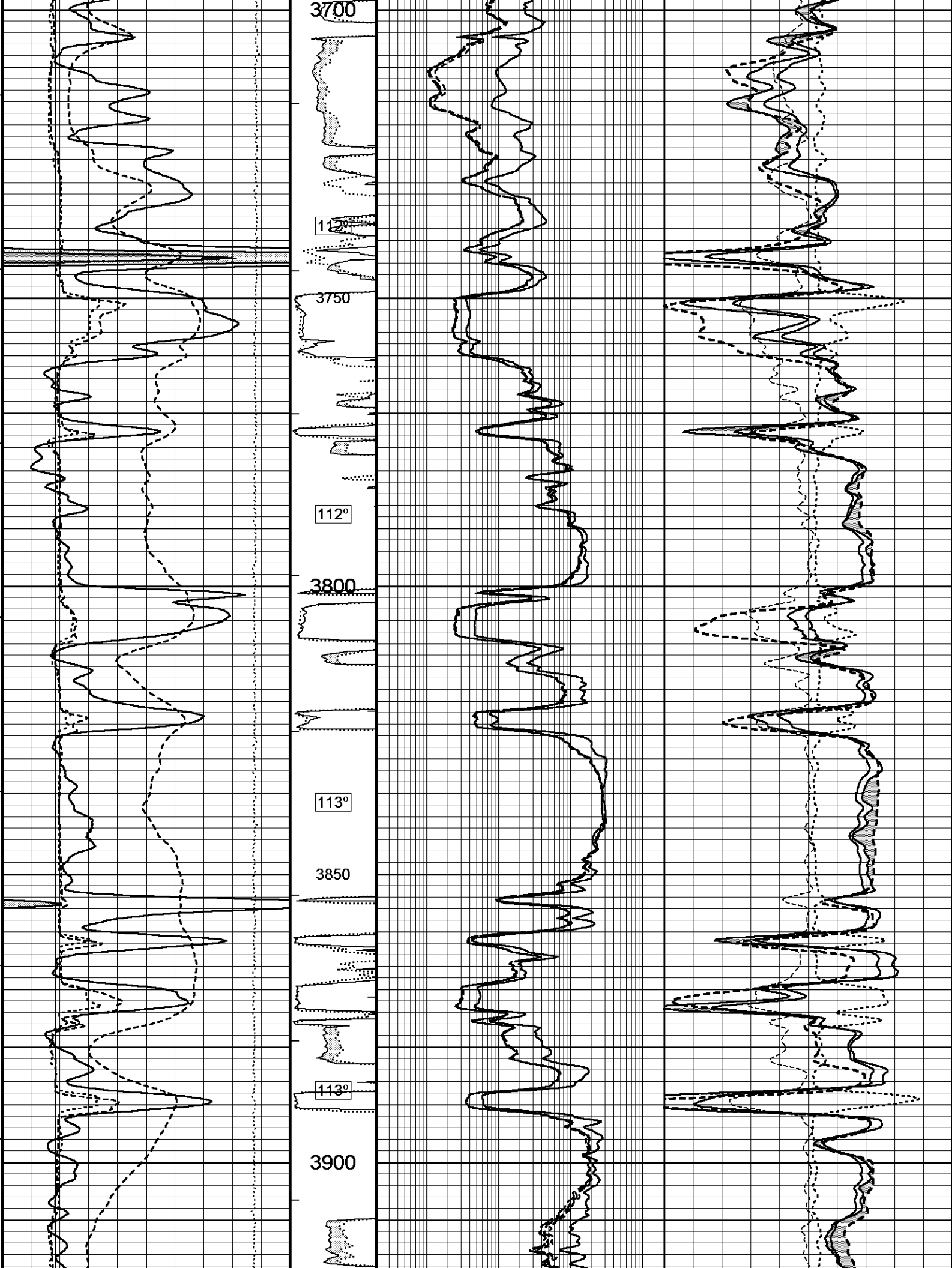
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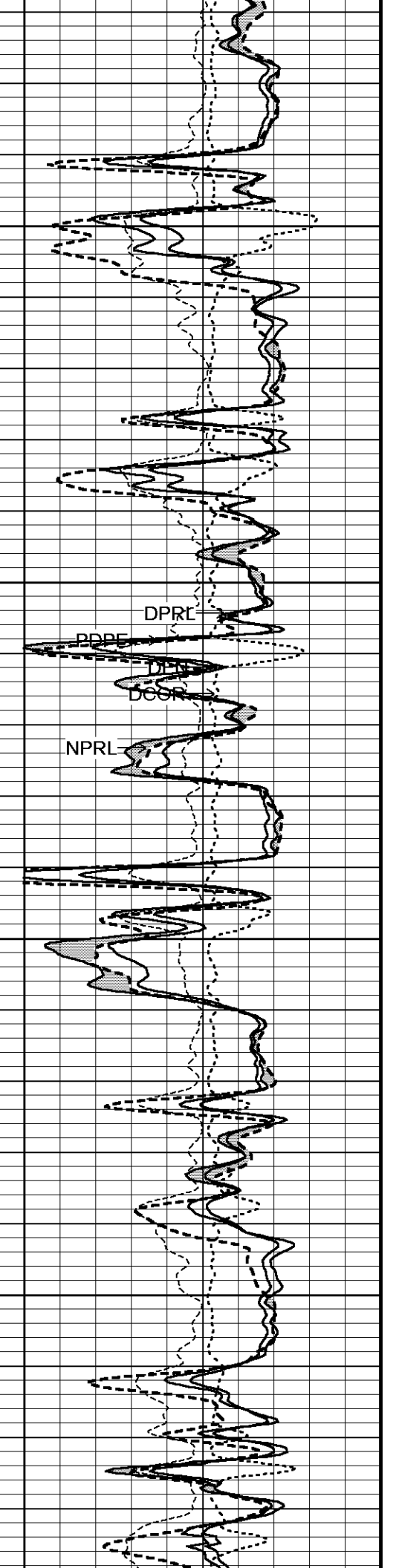
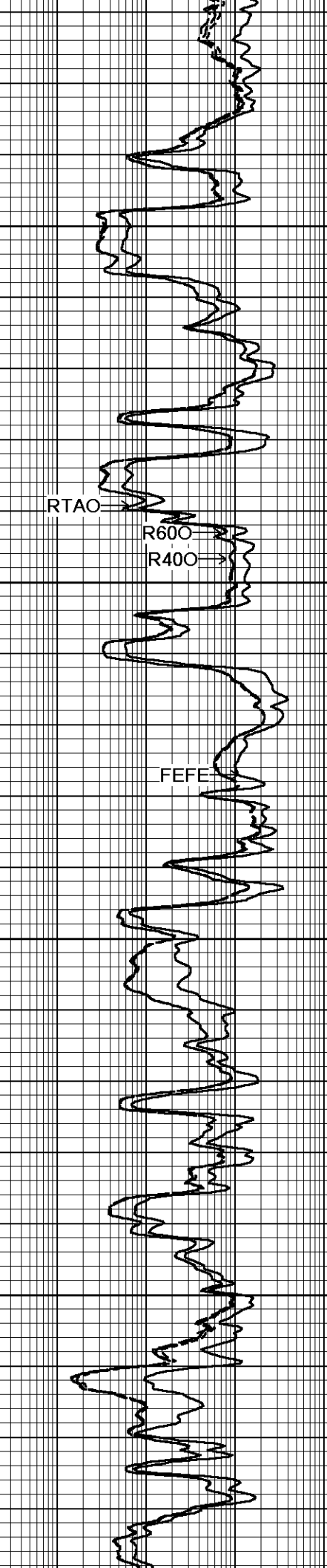
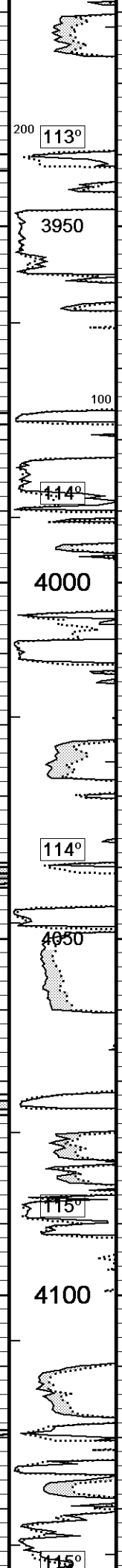
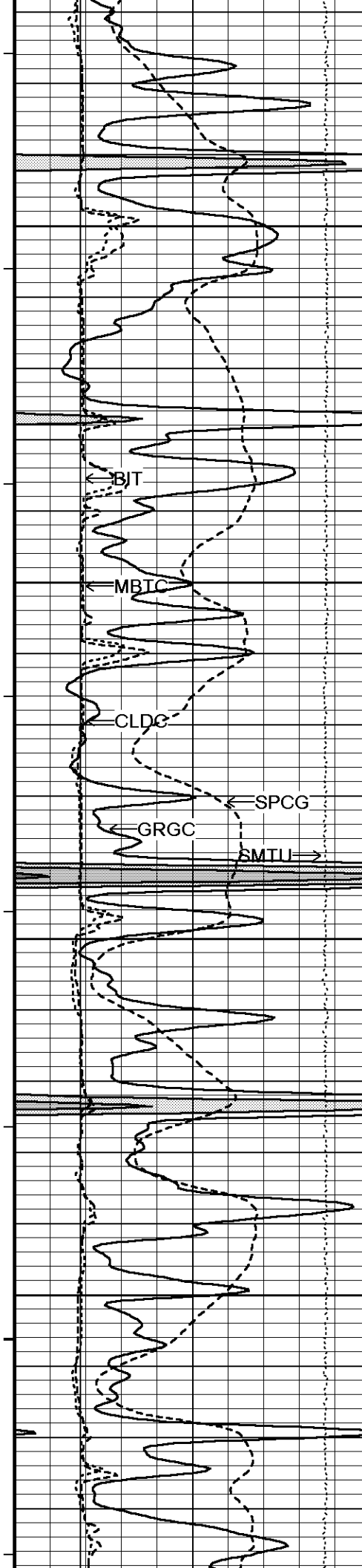


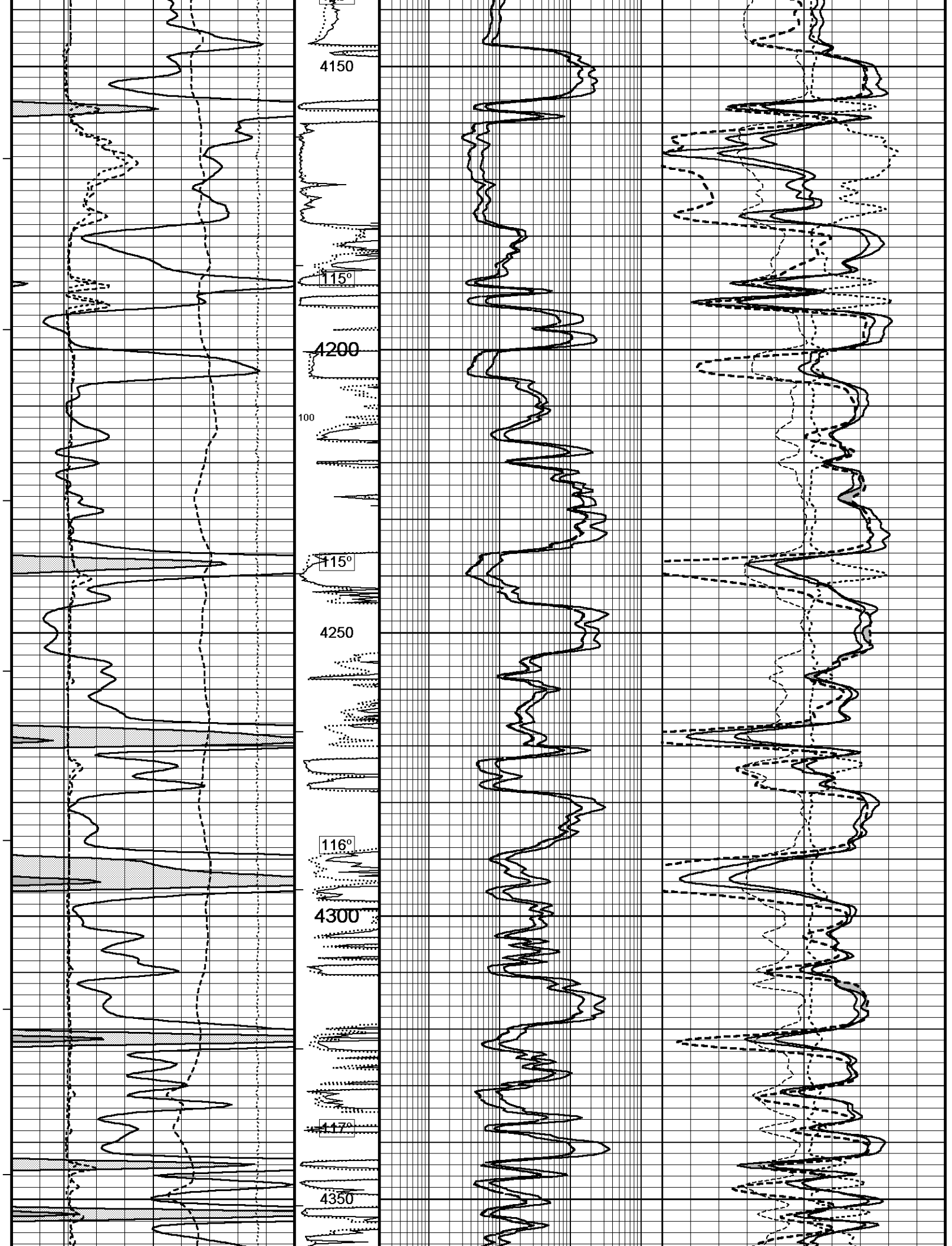


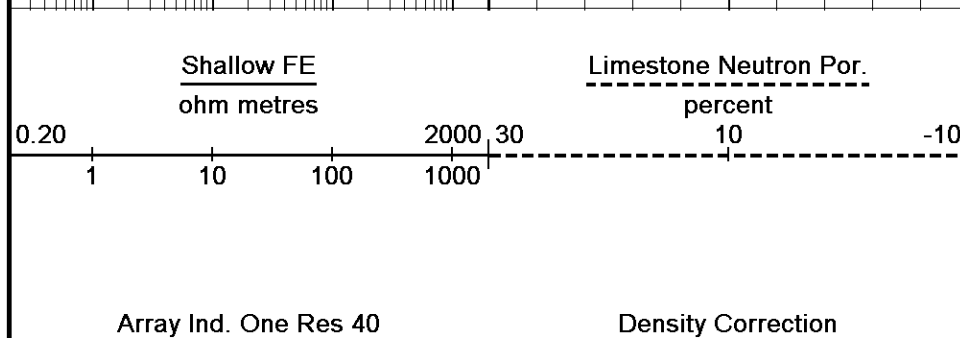
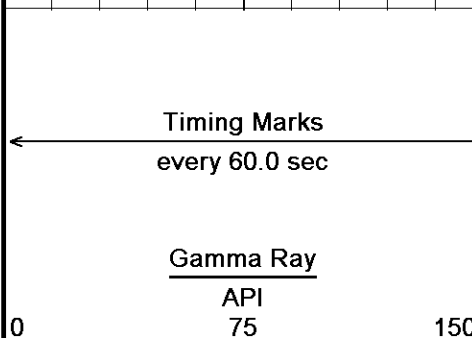
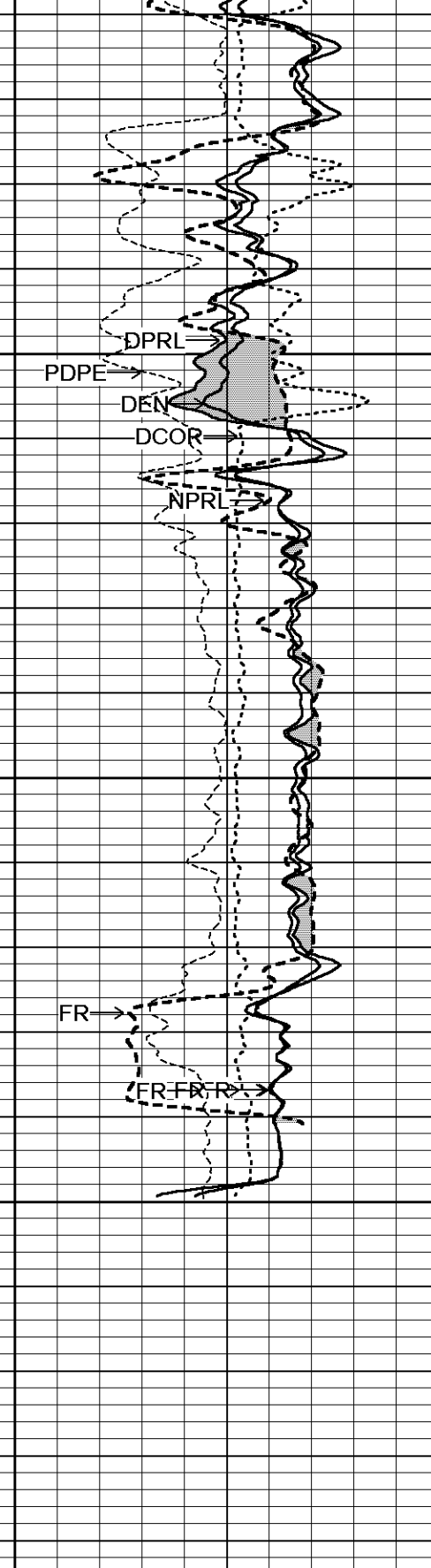
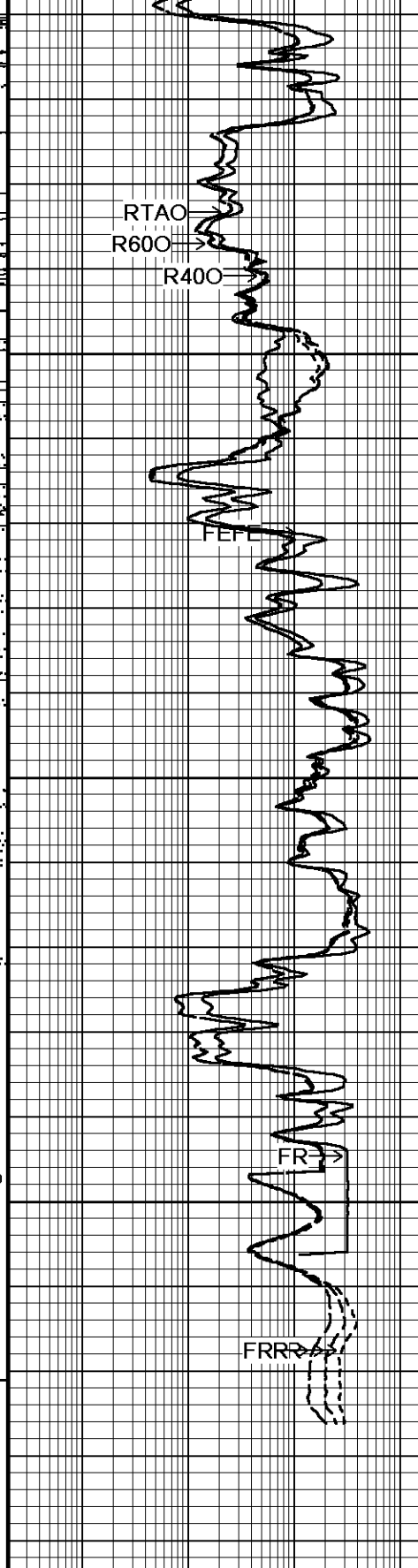
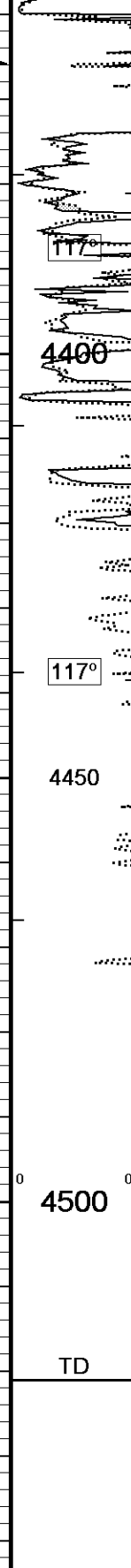
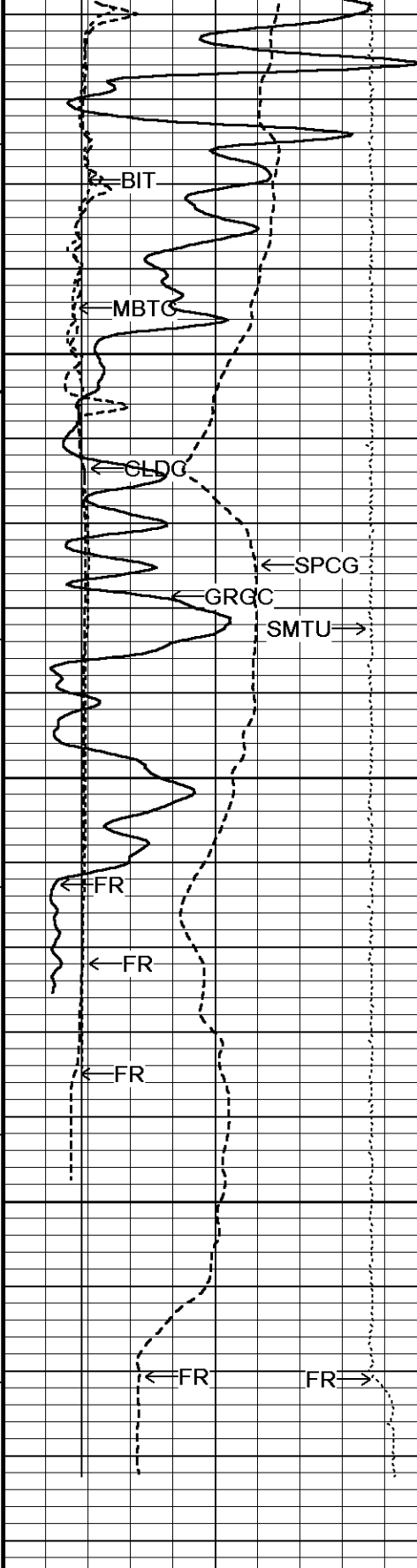








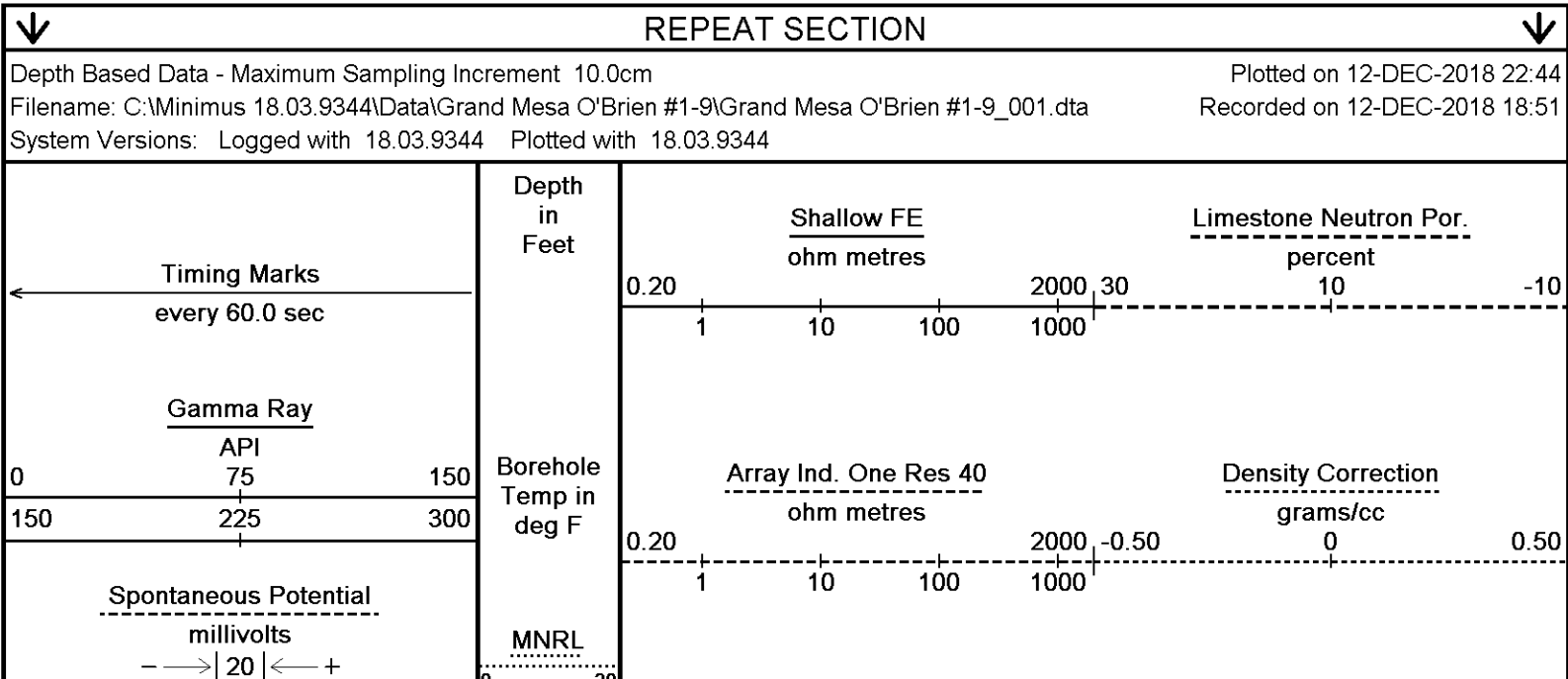
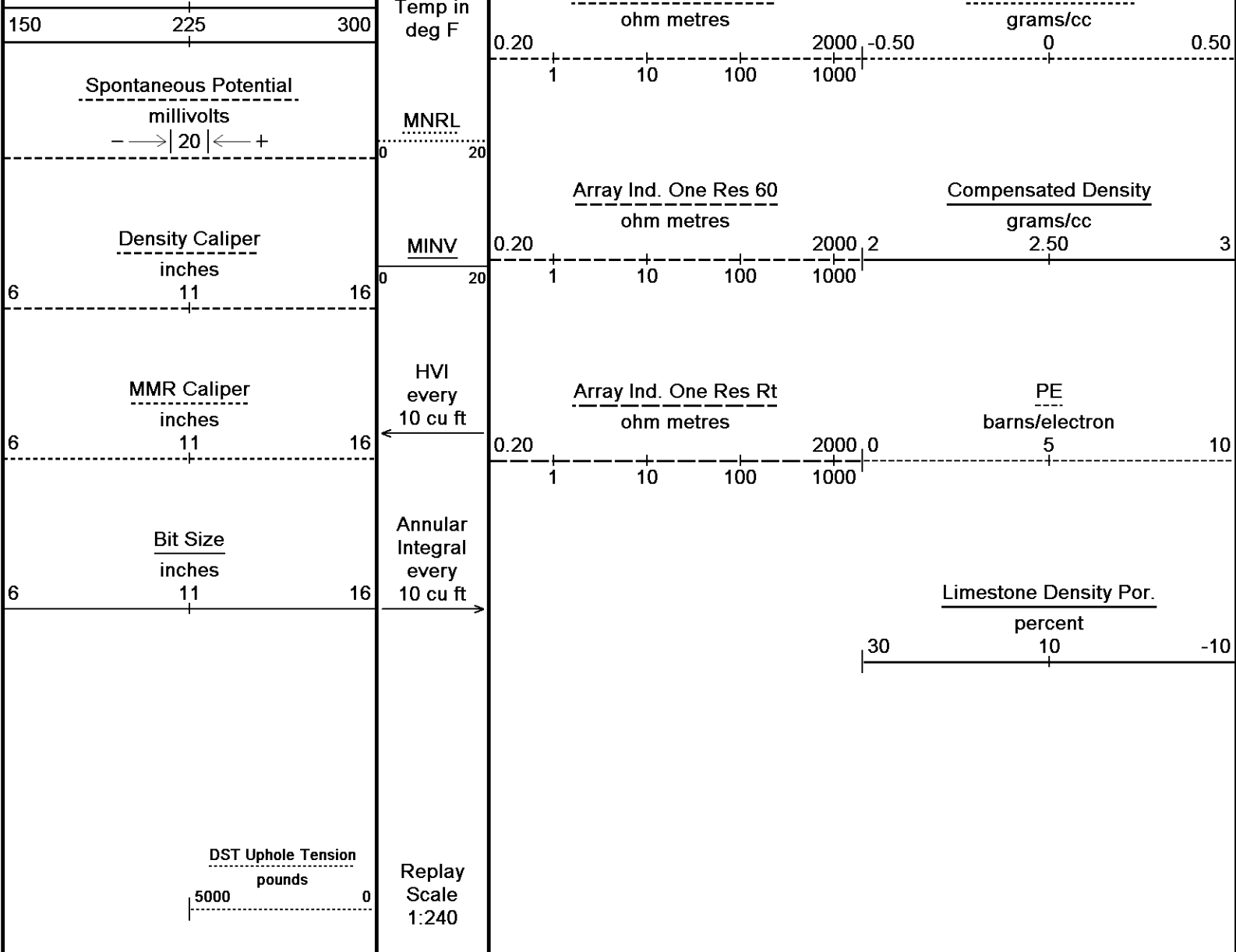


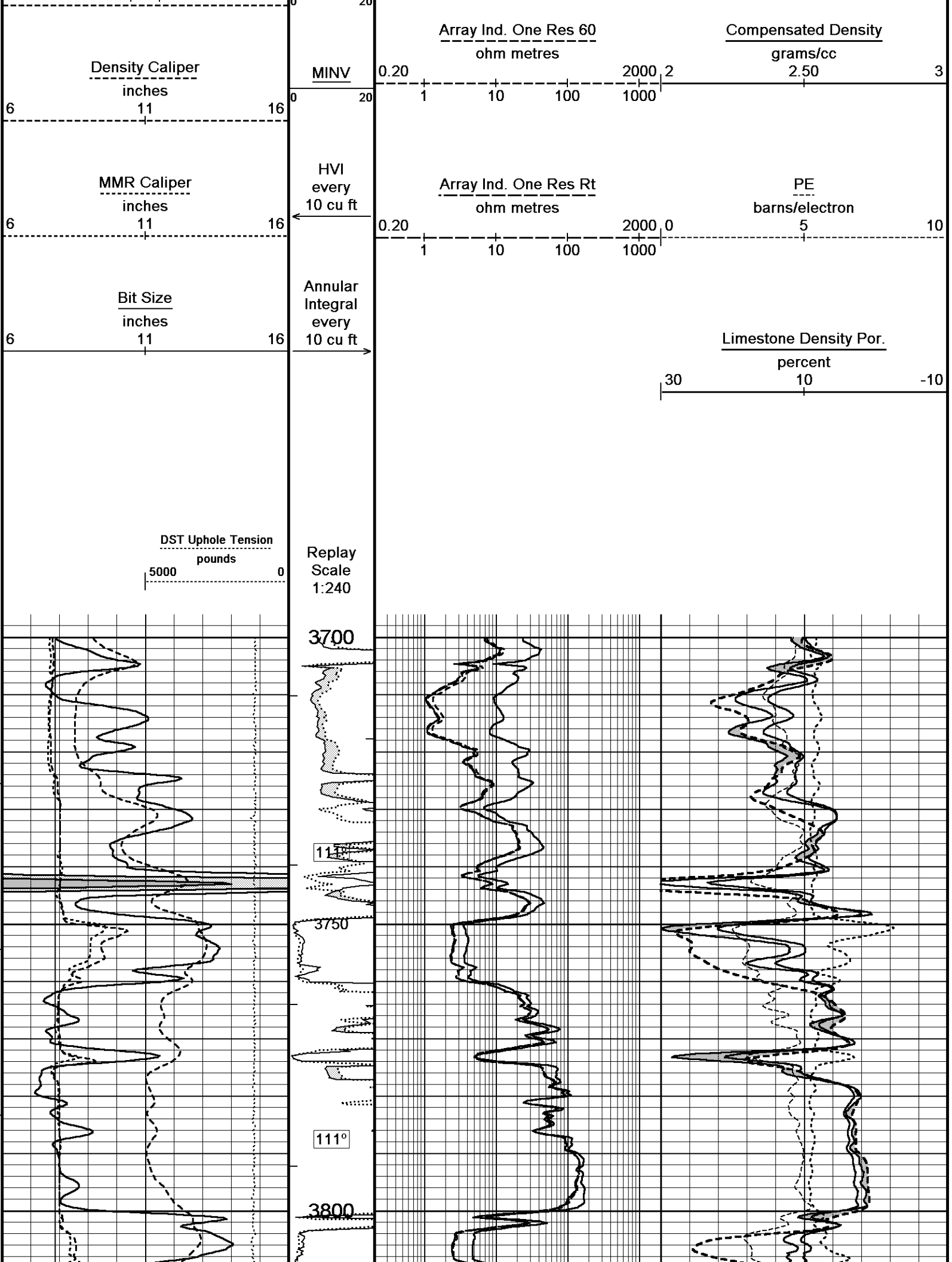


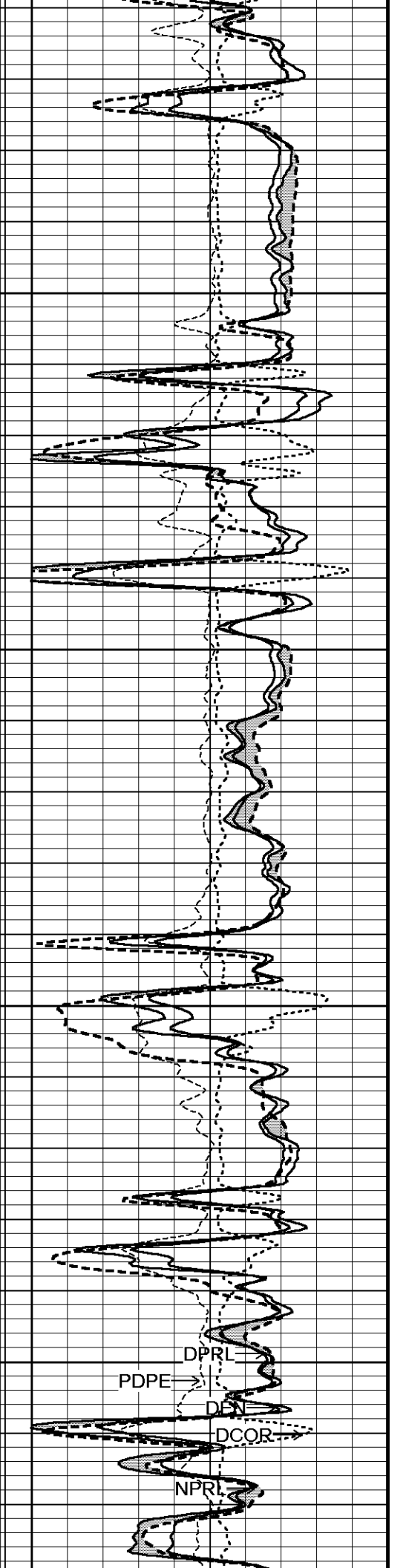
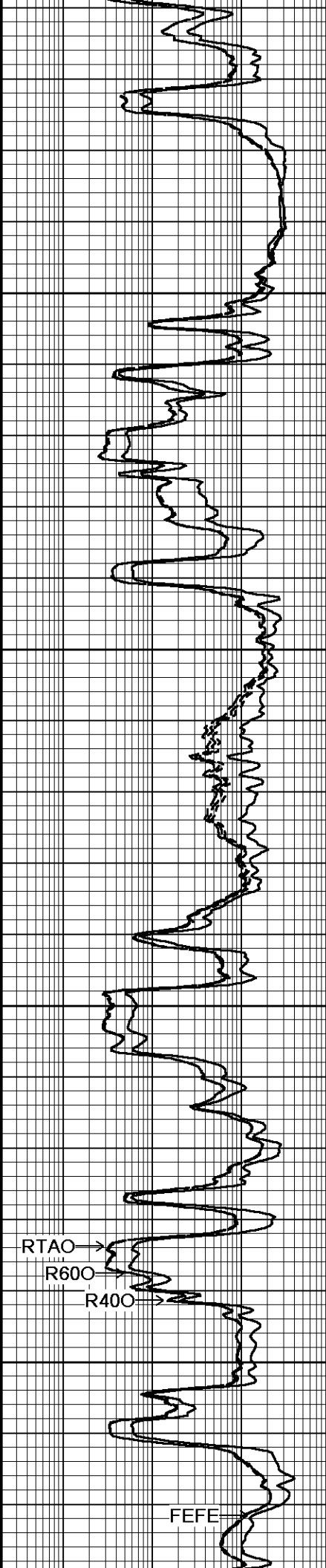
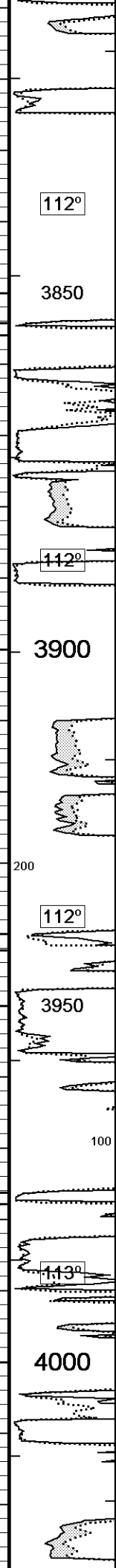
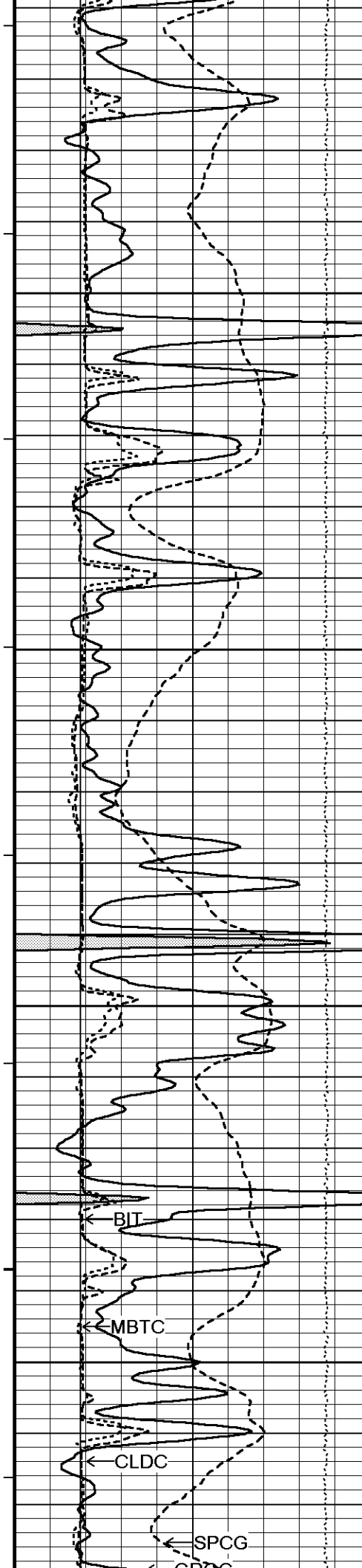
Borehole

Array Ind. One Res 40

Density Correction







SMTU →

113°

4050

113°

4100

113°

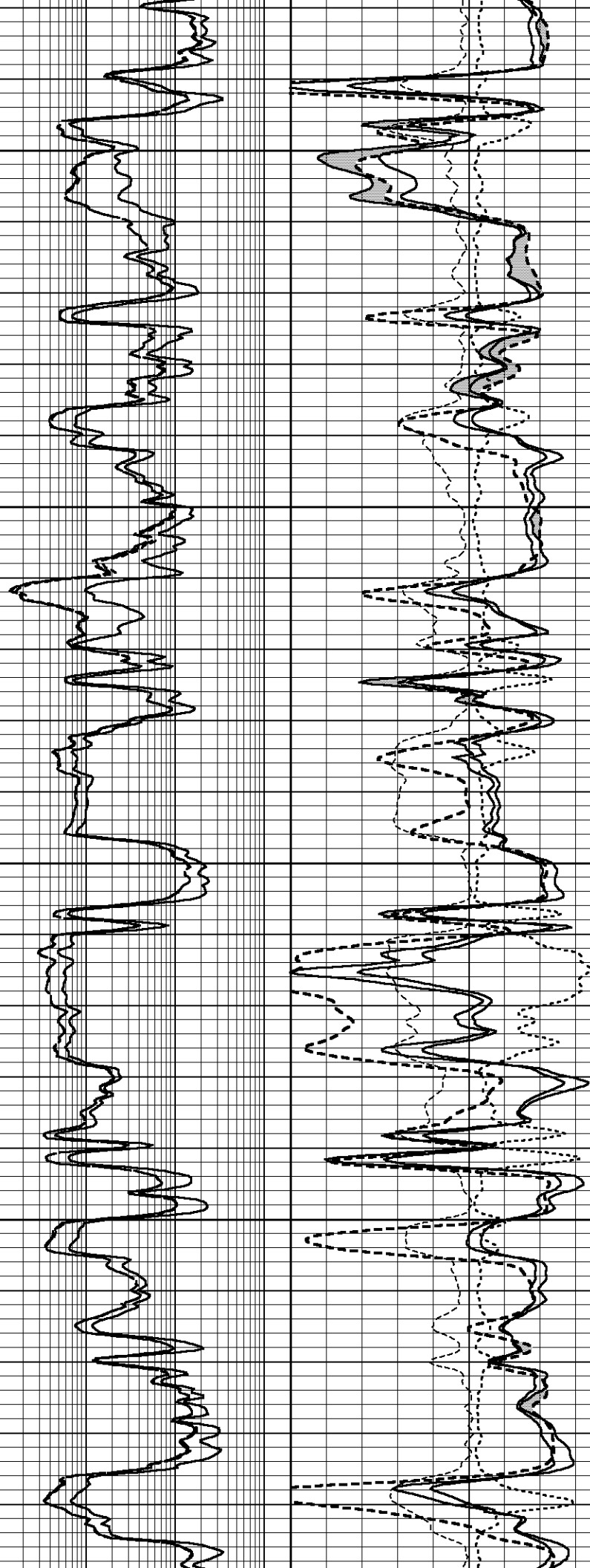
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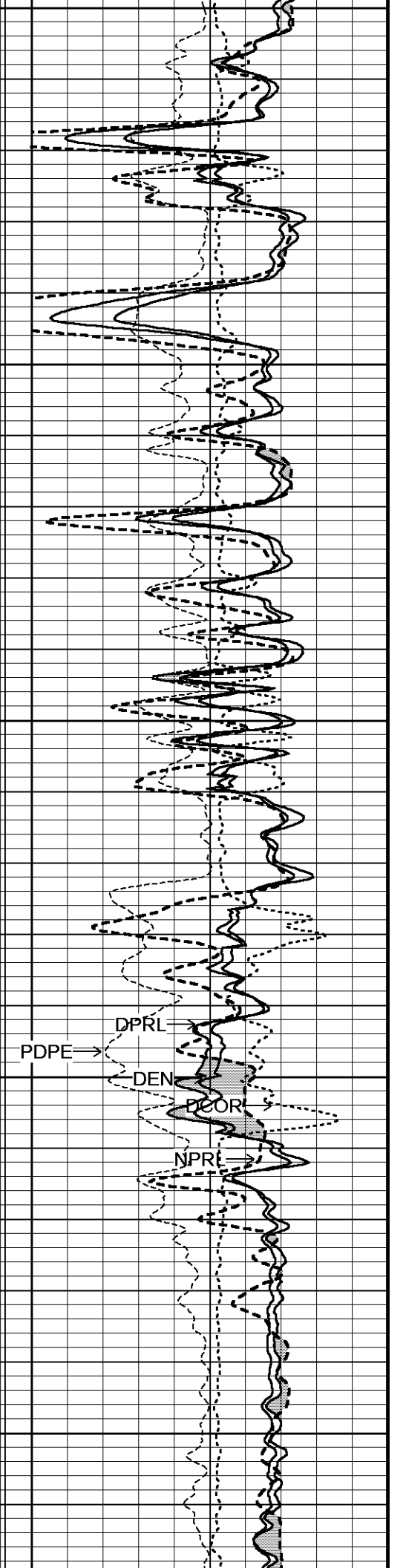
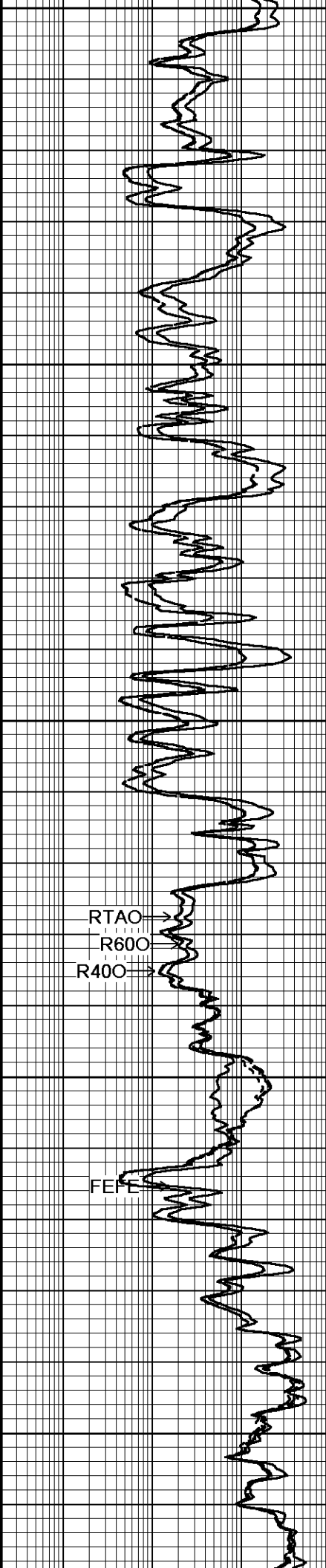
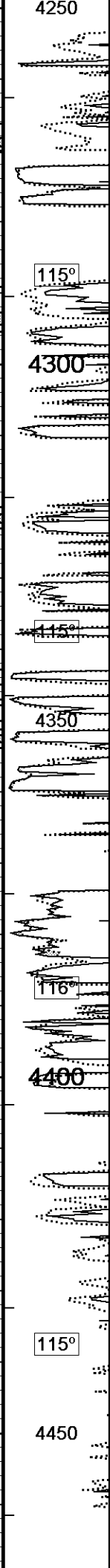
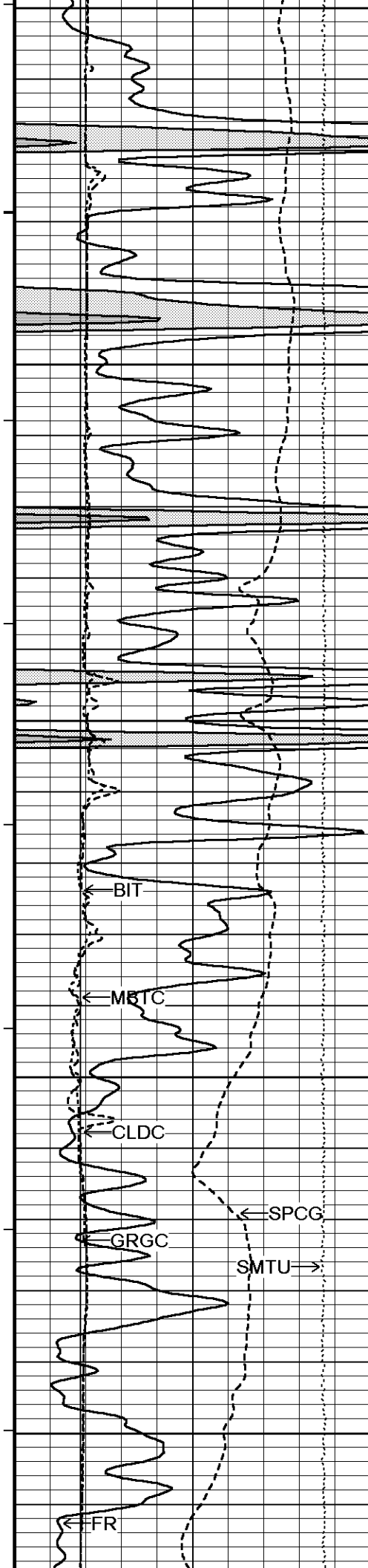
114°

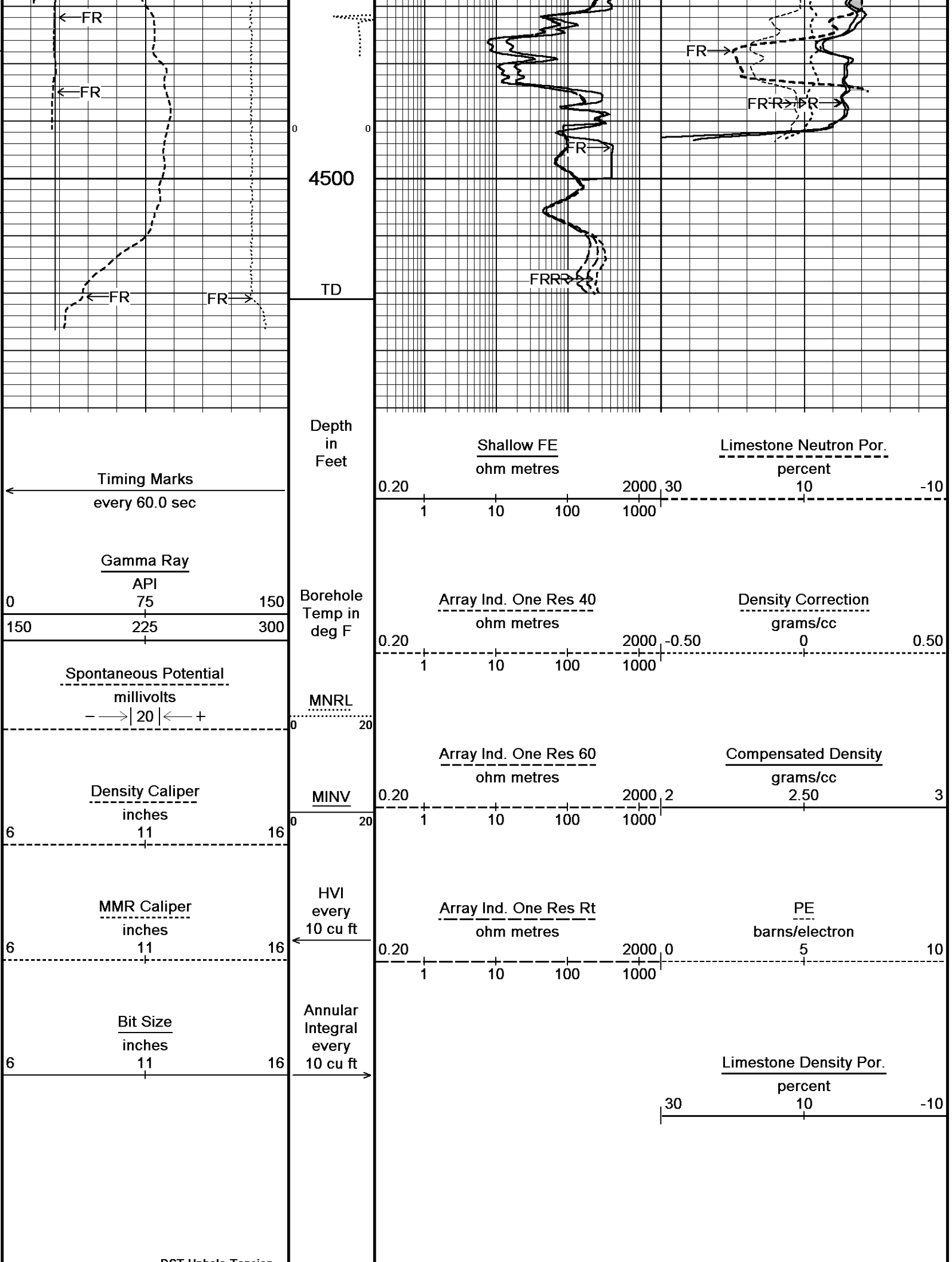
4200

100

114°







↑

REPEAT SECTION

↑

BEFORE SURVEY CALIBRATION

C:\Minimus 18.03.9344\Data\Grand Mesa O'Brien #1-9\Grand Mesa O'Brien #1-9_001.dta

General Constants All 000

General Parameters

Mud Resistivity
1.270
ohm-metres

Mud Resistivity Temperature
75.000
degrees F

Water Level
0.000
feet

Borehole Fluid Processing
Wet Hole

Hole/Annular Volume and Differential Caliper Parameters

HVOL Method
Single Caliper

HVOL Caliper 1
Density Caliper

HVOL Caliper 2
N/A

Annular Volume Diameter
5.500
inches

Caliper for Differential Caliper
Density Caliper

Rwa Parameters

Porosity used
Crossplot Porosity

Resistivity used
Array Ind. Two Res Rt

RWA Constant A
0.620

RWA Constant M
2.150

SW/APOR Tool Source
0.000

High Resolution Temperature Calibration MCG-D.K 443

Measured

Calibrated(Deg F)

Lower
50.00
50.00

Upper
212.00
212.00

Field Calibration on 12-OCT-2018,05:20

High Resolution Temperature Constants MCG-D.K 443

Pre-filter Length
11

Field Calibration on 12-OCT-2018,05:20

Gamma Calibration MCG-D.K 443

Measured

Calibrated (API)

Background
103
72

Calibrator (Gross)
759
528

Calibrator (Net)
656
456

Field Calibration on 10-DEC-2018 18:45

Gamma Calibration Tolerances MCG-D.K 443

Ratio
1.439

1.40
1.475
1.55

Counts/API

Gamma Constants MCG-D.K 443

Gamma Calibrator Number
MCGGRCC141

GRC-M Calibrator Jig in Use?
NO

Inactive Background Jig in Use?
NO

Mud Density
1.12
gm/cc

Caliper Source for Processing
Density Caliper

Tool Position
Eccentred

Potassium Equivalence
Chloride

K Mud Concentration
0.00
%

Field Calibration on 12-DEC-2018,16:59

Micro Normal and Micro Inverse Calibration MMR-B.A 91

Resistor 1 (ohm)
10.0

Resistor 2 (ohm)
50.0

Base Calibration on 04-DEC-2018 12:12

Field Check on 10-DEC-2018 18:31

Base Calibration

		Measured	Calibrated (ohm-m)	
Micro Normal	10.4	49.9	5.1	25.6
Micro Inverse	9.9	49.4	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	93.9	93.9
Micro Inverse	62.3	62.3

Micro Normal & Micro Inverse Calibration Tolerance MMR-B.A 91

Micro Normal Res. 1	10.4		ohm	Micro Normal Res. 2	49.9		ohm
Micro Inverse Res. 1	9.9		ohm	Micro Inverse Res. 2	49.4		ohm
Micro Normal Base Check	93.9		ohm-m				
Micro Inverse Base Check	62.3		ohm-m				
Micro Normal Field Check	93.9		ohm-m				
Micro Inverse Field Check	62.3		ohm-m				

Micro Normal and Micro Inverse Constants MMR-B.A 91

Last Edited on 13-APR-2018,05:04

Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159
Micro Normal K Factor	0.5110
Micro Inverse K Factor	0.3380
Standoff Offset	0.0000 inches

Caliper Calibration MMR-B.A 91

Base Calibration on 04-DEC-2018 12:06
Field Calibration on 10-DEC-2018 18:30

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	14099	5.98
2	17485	7.97
3	20790	9.86
4	24525	11.92
5	0	0.00
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	7.97	7.97

Caliper Calibration Tolerances MMR-B.A 91

Short Arm Field Cal.	7.97		in
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Neutron Calibration MDN-B.A 292

Base Calibration on 04-DEC-2018,13:14
Field Check on 10-DEC-2018 18:51

Base Calibration		
	Measured	Calibrated (cps)
	Near Far	Near Far
Ratio	2910 91	3714 110
	31.871	33.764
Field Calibrator at Base		Calibrated (cps)
Ratio		2207 3209
		0.688
Field Check		Calibrated (cps)
Ratio		2173 3158
		0.688

Neutron Calibration Tolerances MDN-B.A 292

Ratio	31.871	
Base Check	0.688	

Neutron Constants MDN-B.A 292

Last Edited on 12-DEC-2018,16:59

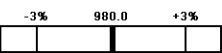
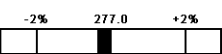
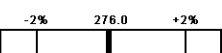
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Neutron Jig Number	NJ5736	
Air Hole Processing	Legacy	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	N/A	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-B.J 352

Base Calibration on 04-DEC-2018 11:51
Field Check on 10-DEC-2018 18:20

	Resistor 1 (ohm)	Resistor 2 (ohm)
	0.0	1000.0
Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	982.1	126.8
Base Check		276.0
Field Check		275.6

FE Calibration Tolerances MFE-B.J 352

Reference 2	982.1		ohm
Base Check	276.0		ohm-m
Field Check	275.6		ohm-m

FE Constants MFE-B.J 352

Last Edited on 12-DEC-2018,16:58

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Borehole Correction Constants		
Sonde Position	0.5	inches
Hole Size Source	Density Caliper	
Hole Size Constant Value	N/A	inches
Rm Source	Global Value: Temperature Corrected	
Temp. for Rm Corr.	MCG External Temperature	

Induction Calibration MAI-B.J 390

Factory Loop Calibration 10-DEC-2018 18:16
Field Check on 10-DEC-2018 18:19

Factory Loop Calibration							
High Conductivity Reference Resistor	3.3	ohm					
Low Conductivity Reference Resistor	333.3	ohm					
	Measured Signal (unitless)		Reference Conductivity (mmho/m)			Calibration	
Array	Low	High	Low	High	Gain	Offset	
1 (near)	16.8	458.6	9.3	966.2	2.166	-27.2	
2	6.3	377.7	7.6	821.4	2.191	-6.2	
3	3.8	258.6	5.2	566.0	2.200	-3.0	
4 (far)	1.9	132.3	2.6	279.2	2.121	-1.4	
Array Temperature	77.9		Deg F				

Tool Checks

Array	Factory Reference (mmho/m)		Before Survey (mmho/m)	
	Low	High	Low	High
1 (near)	12.1	3958.5	12.1	3958.4
2	28.9	3562.3	29.0	3562.1
3	27.1	3060.6	27.1	3060.6
4 (far)	19.1	2087.5	19.1	2087.5
Array Temperature		63.5	63.6	Deg F

Induction Check Tolerances MAI-B.J 390

Low Array 1	12.1	10.6 12.1 13.6	mmho/m	High Array 1	3958.4	-0.5% 3958.5 +0.5%	mmho/m
Low Array 2	29.0	27.4 28.9 30.4	mmho/m	High Array 2	3562.1	-0.5% 3562.3 +0.5%	mmho/m
Low Array 3	27.1	25.6 27.1 28.6	mmho/m	High Array 3	3060.6	-0.5% 3060.6 +0.5%	mmho/m
Low Array 4	19.1	17.6 19.1 20.6	mmho/m	High Array 4	2087.5	-0.5% 2087.5 +0.5%	mmho/m

Induction Constants MAI-B.J 390

Last Edited on 12-DEC-2018,16:58

Induction Model		RtAP-WBM	
Borehole Correction Constants			
Tool Centred		No	
Hole Size Source		Density Caliper	
Hole Size Constant Value		N/A	inches
Stand-off Type		Fins	
Stand-off		0.50	inches
Number of Fins on Stand-off		8.0000	
Stand-off Fin Angle		45.00	degrees
Stand-off Fin Width		0.5000	inches
Rm Source	Global Value: Constant Temperature		
Temp. for Rm Corr.		N/A	
Borehole Correction Method		Default	
Squasher Start		0.0020	mhos/metre
Squasher Offset		N/A	mhos/metre
Borehole Normalisation			
DRM1	0.0000	DRC1	0.0000
DRM2	0.0000	DRC2	0.0000
MRM1	0.0000	MRC1	0.0000
MRM2	0.0000	MRC2	0.0000
SRM1	0.0000	SRC1	0.0000
SRM2	0.0000	SRC2	0.0000
Calibration Site Corrections			
Channel 1		0.00	mmhos/metre
Channel 2		0.00	mmhos/metre
Channel 3		0.00	mmhos/metre
Channel 4		0.00	mmhos/metre
Symmetrised Receiver Gains			
Receiver 1		1.00	
Receiver 2		1.00	
Receiver 3		1.00	
Receiver 4		1.00	
Apparent Porosity and Water Saturation Constants			
Archie Constant (A)		1.00	
Cementation Exponent (M)		2.00	
Saturation Exponent (N)		2.00	
Saturation of Water for Apor		100.00	percent
Resistivity of Water for Apor and Sw		0.05	ohm-m
Resistivity of Mud Filtrate for Sw		0.00	ohm-m
Source for Rt		0.00	
Source for Rxo		0.00	

Caliper Calibration MPD-C.A 216

Base Calibration on 04-DEC-2018 12:24

Field Calibration on 10-DEC-2018 18:22

Base Calibration

Base Calibration		Measured	Calibrator Size (in)
Reading No			
1		15599	3.99
2		24289	5.98
3		32989	7.97
4		41250	9.86
5		50464	11.92
6		N/A	N/A
Field Calibration			
	Measured Caliper (in)	Actual Caliper (in)	
	7.99	7.97	

Caliper Calibration Tolerances MPD-C.A 216			
Long Arm Field Cal.	7.99	7.57 7.97 8.37	in

Photo Density Calibration MPD-C.A 216				Base Calibration on 04-DEC-2018 12:43	
				Field Check on 10-DEC-2018 18:28	
Density Calibration					
Base Calibration		Measured		Calibrated (sdu)	
		Near	Far	Near	Far
	Background	996	1188		
	Reference 1	49174	23910	59556	30836
	Reference 2	19716	2252	24941	2541
Field Check at Base					
		996.3	1187.9		
Field Check					
		998.9	1196.1		
PE Calibration					
Base Calibration		Measured		Calibrated	
	WS	WH	Ratio	Ratio	
	Background	183	895		
	Reference 1	20502	49024	0.422	0.371
	Reference 2	5636	19607	0.291	0.272
Field Check at Base					
		182.6	895.4		
Field Check					
		184.9	897.0		

Photo Density Calibration Tolerances MPD-C.A 216					
Near Density Ratio	2.57	-5% 2.52 +5%	Far Density Ratio	21.36	-5% 21.00 +5%
PE Calibration	0.122	0.089 0.110 0.131			
Near Den. Field Check	998.9	-3% 996.3 +3%	Far Den. Field Check	1196.1	-3% 1187.9 +3%
PE WS Field Check	184.9	-6% 182.6 +6%	PE WH Field Check	897.0	-6% 895.4 +6%

Density Constants MPD-C.A 216		Last Edited on 12-DEC-2018,16:59	
Density Source Id	P50557B		
Nylon Calibrator Number	DNCE695		
Aluminium Calibrator Number	DACD698		
Density Shoe Profile	8 inch		
Caliper Source for Processing	Density Caliper		
PE Correction to Density	Not Applied		
Mud Density	1.12	gm/cc	
Mud Density Type			
Mud Filtrate Density	1.00	gm/cc	
Dry Hole Mud Filtrate Density	1.00	gm/cc	
DNCT	0.00	gm/cc	
CRCT	0.00	gm/cc	
Density Z/A Correction	Hybrid		
Precision Enhanced Density Processing	Applied		
Matrix Density (gm/cc)	Depth (ft)		

Matrix Density (gm/cc)	Depth (ft)
2.71	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

DOWNHOLE EQUIPMENT

C:\Minimus 18.03.9344\Data\Grand Mesa O'Brien #1-9\Grand Mesa O'Brien #1-9_001.dta

Cablehead, 11 pin
CBH-CB 264 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Swivel Head Adaptor
SHA-J.B 595 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

Compact Comms Gamma
MCG-D.K 443 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity
MMR-B.A 91 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron
MDN-B.A 292 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.913 in

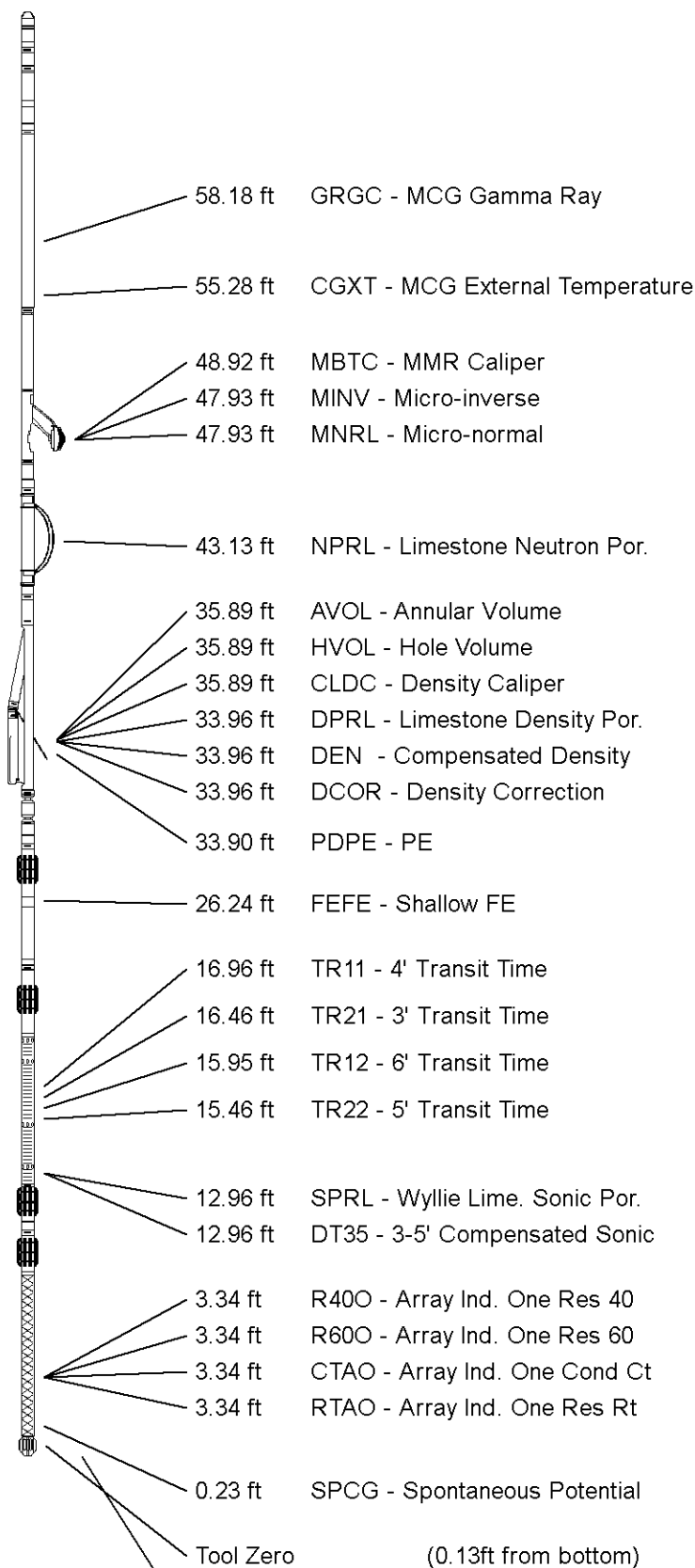
Compact Knuckle Joint
SKJ-D.A 167 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic
MSS-C.K 319 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction
MAI-B.J 390 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 68.16 ft Weight: 526.9 lb



-0.13 ft SMTU - DST Uphole Tension

All measurements relative to tool zero.

COMPANY	GRAND MESA OPERATING COMPANY
WELL	OBRIEN #1-9
FIELD	WILDCAT
PROVINCE/COUNTY	LANE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2661	feet	First Reading	4518.00	feet
Elevation Drill Floor	2659	feet	Depth Driller	4520.00	feet
Elevation Ground Level	2656	feet	Depth Logger	4521.00	feet



COMPOSITE LOG

Weatherford®