



Weatherford

COMPOSITE LOG

COMPANY			SHAKESPEAR OIL CO., INC.		
WELL			OTTLEY 4-27		
FIELD			SMOKY HILL		
PROVINCE/COUNTY			LOGAN		
COUNTRY/STATE			USA / KANSAS		
LOCATION			NE SW SW NW, 2235' FNL & 520' FWL		
SEC 27	TWP 14S	RGE 32W	Other Services		
Latitude	38.808963764		Elevations: feet KB 2673.00 DF 2671.00 GL 2665.00		
Longitude	-100.871232007				
API Number	15-109-21586				
Permanent Datum GL, Elevation 2665 feet					
Log Measured From KB, 8.00 feet above Permanent Datum					
Drilling Measured From KB					
Date	18-MAR-2019				
Run Number	ONE				
Service Order	17876-240109006				
Depth Driller	4400.00		feet		
Depth Logger	4400.00		feet		
First Reading	4396.66		feet		
Last Reading	264.00		feet		
Casing Driller	264.00		feet		
Casing Logger	264.00		feet		
Bit Size	7.875		inches		
Hole Fluid Type	WBM				
Density / Viscosity	9.10 lb/USg		57.00 sec/qt		
PH / Fluid Loss	10.00		8.80 ml/30Min		
Sample Source	FLOWLINE				
Rm @ Measured Temp	0.53 @ 78.0		ohm-m		
Rmf @ Measured Temp	0.39 @ 78.0		ohm-m		
Rmc @ Measured Temp	0.63 @ 78.0		ohm-m		
Source Rmf / Rmc	CALC		CALC		
Rm @ BHT	0.40 @105.0		ohm-m		
Time Since Circulation	3 HOURS				
Max Recorded Temp	105.00		deg F		
Equipment / Base	13379		ELRENO		
Recorded By	BANDAR BINOSFUR				
Witnessed By	TIM LAUER				

BOREHOLE RECORD

Last Edited: 19-MAR-2019 00:03

Bit Size inches	Depth From feet	Depth To feet
7.875	264.00	4400.00

CASING RECORD

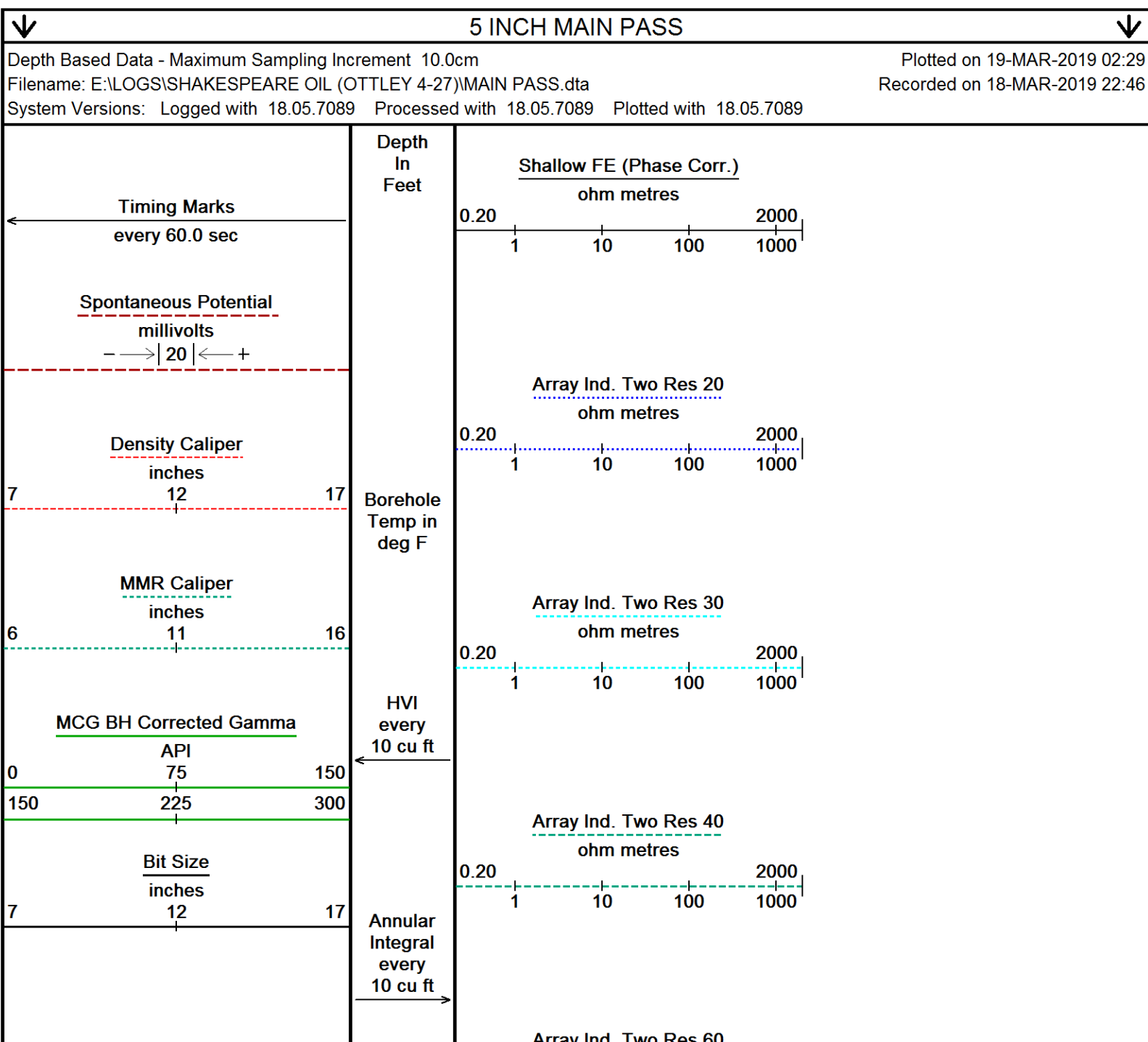
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	264.00	24.00

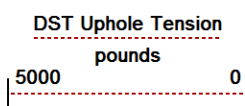
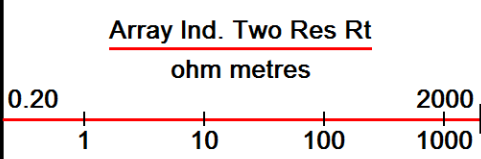
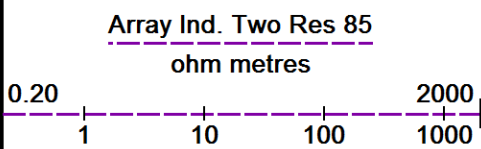
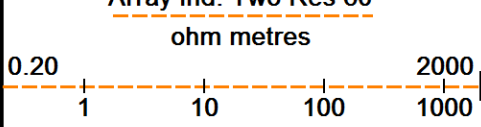
REMARKS

- LOGGING SOFTWARE: 18.05.7089
- TOOLSTRING:
MCB, SHA, MCG, MMR, MDN, MPD, SKJ, MFE, MAI RAN IN COMBINATION.
- HARDWARE USED:
MAI: TOW 0.5 STANDOFFS.
MFE: ONE 0.5 STANDOFF
MDN: DUAL BOWSPRING
MPD: 8 INCH PROFILE PLATE.
- 2.71 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- MAIN PASS :
NEUTRON / DENSITY / MICROLOG = 4400' - 3450' _2200' - 2050'
GAMMA / INDUCTION / CALIPER = 4400' - CASING SHOE
- REPEAT PASS :

- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING = 1980 CU.FT.
 - ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING = 1530 CU.FT.
 - OPERATORS: J. JOHNSON, G. FICA

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.





Replay
Scale
1:240

250

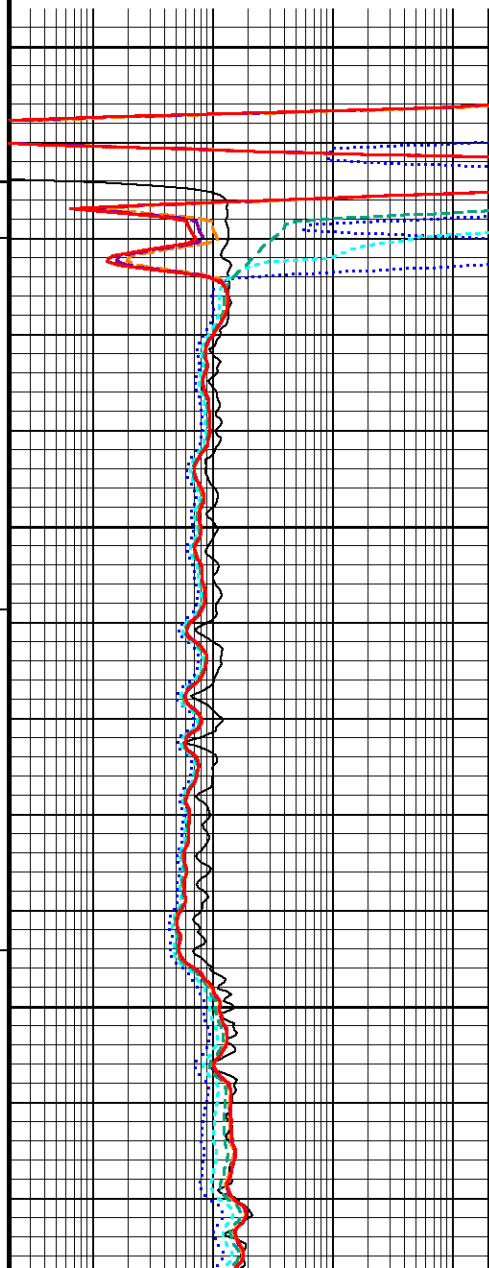
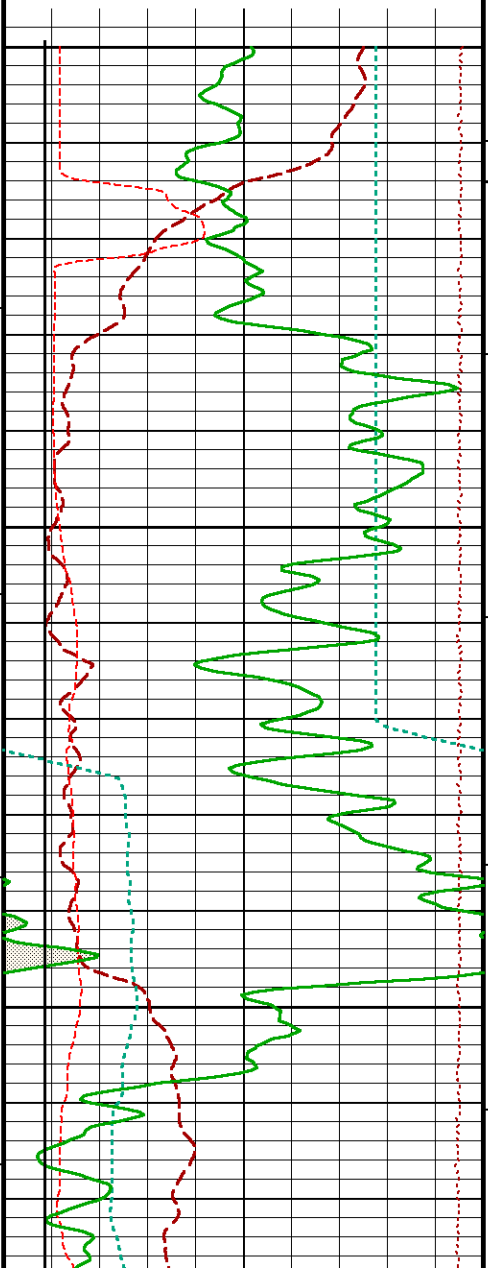
Casing
Shoe

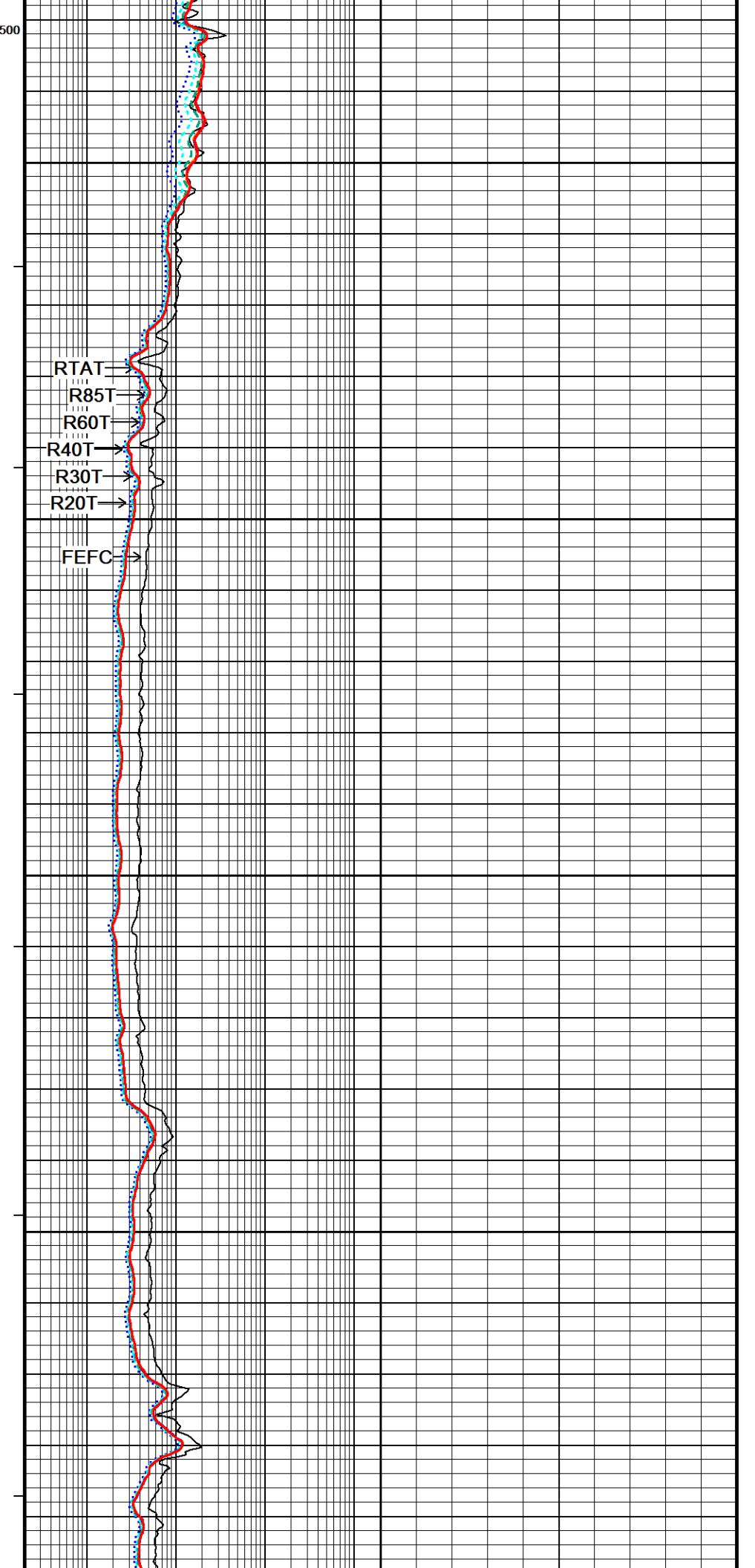
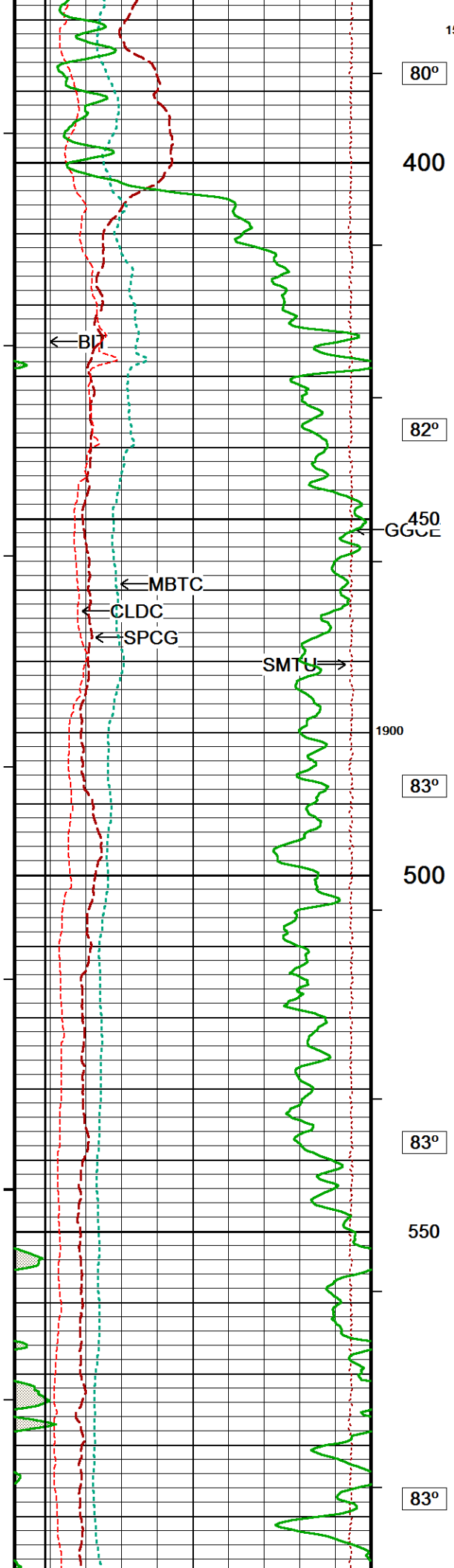
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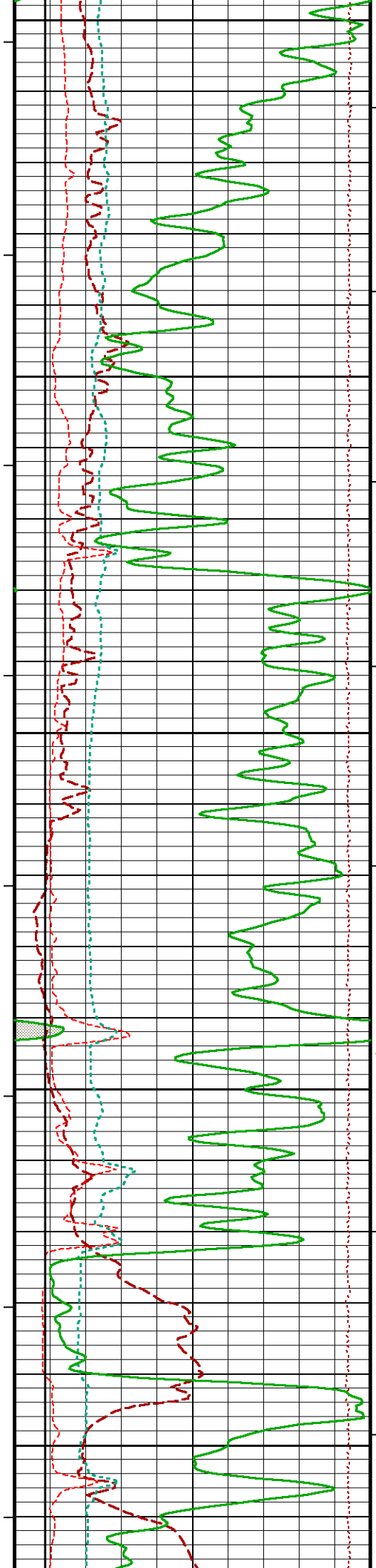
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80°

350







600

83°

650

83°

700

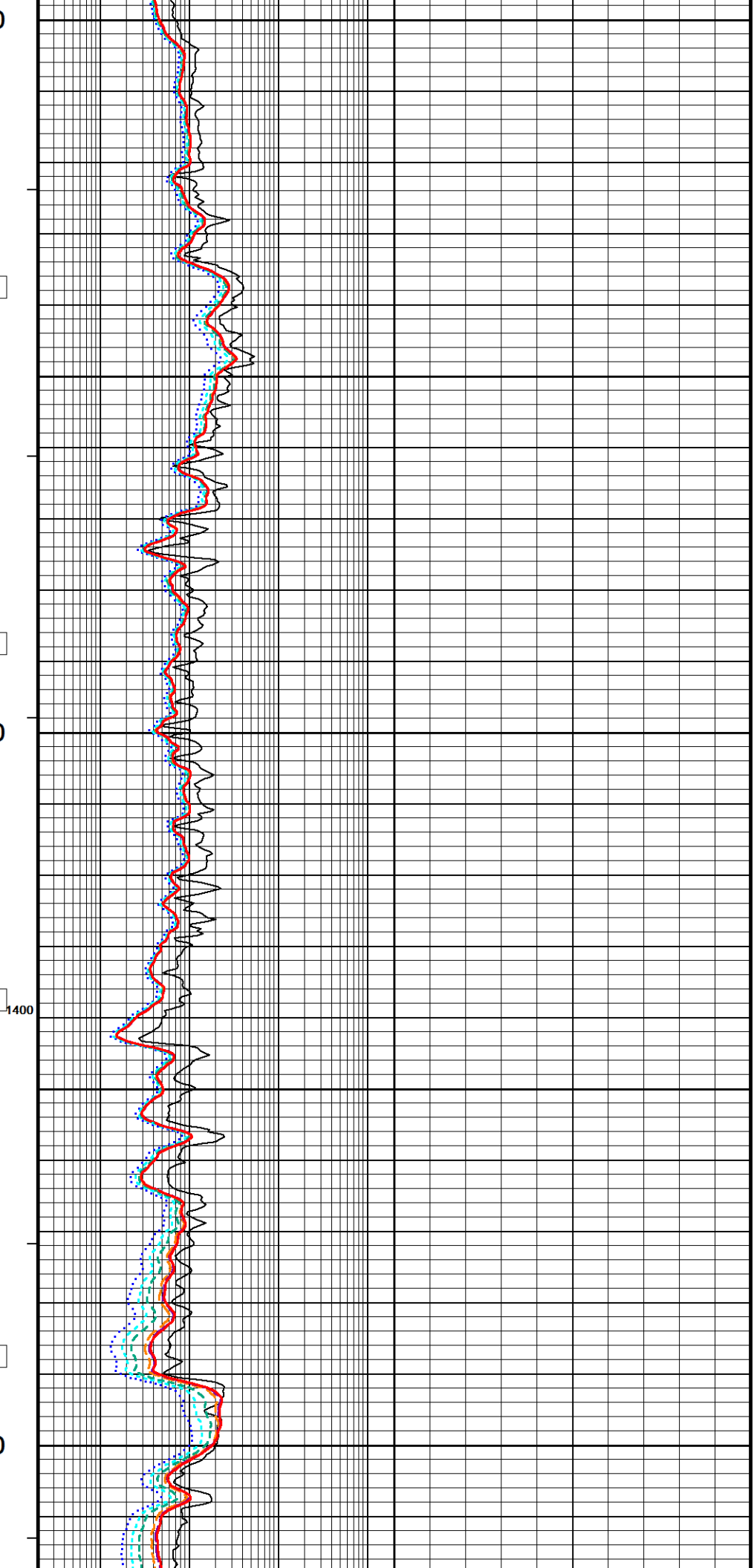
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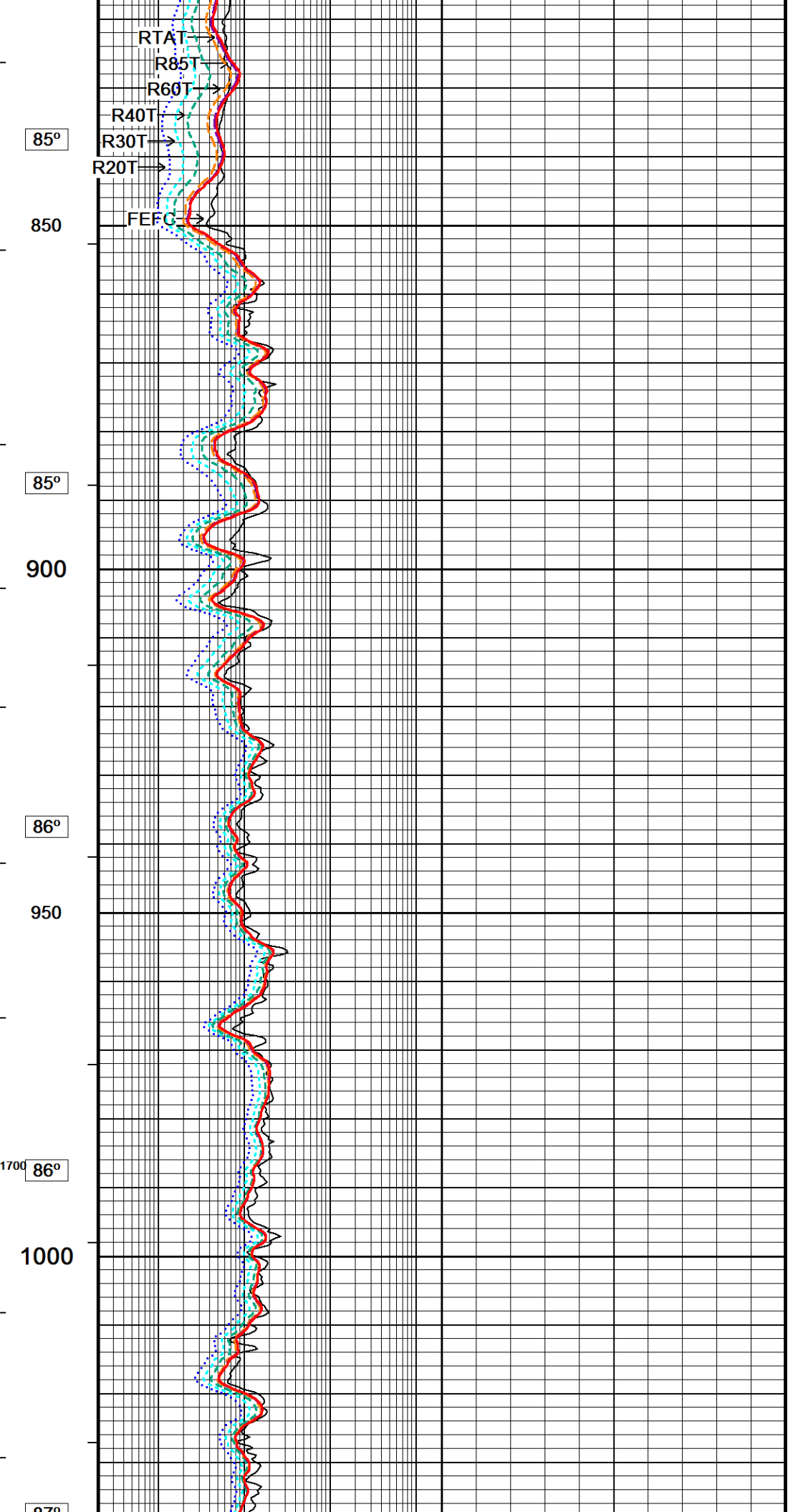
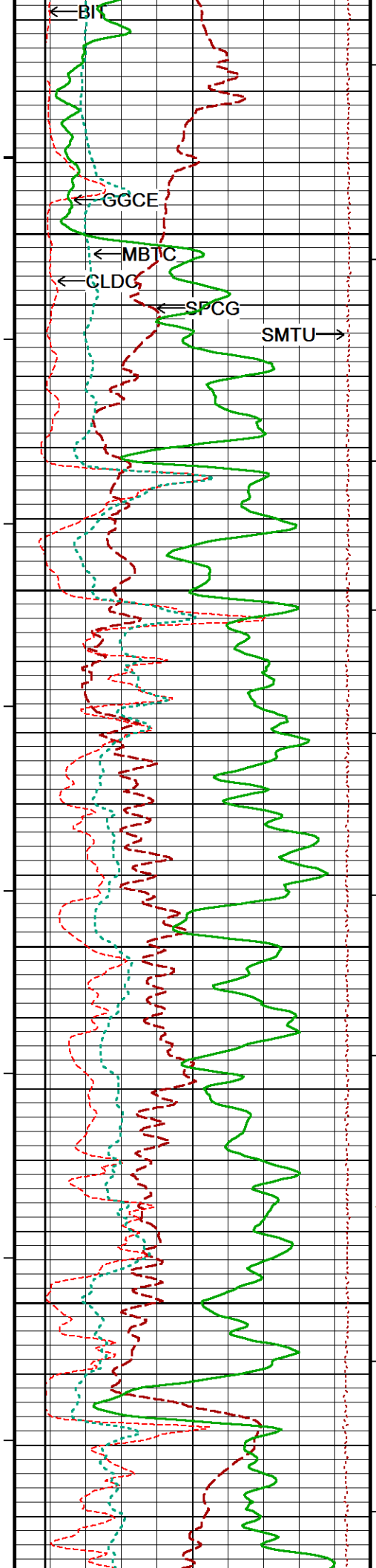
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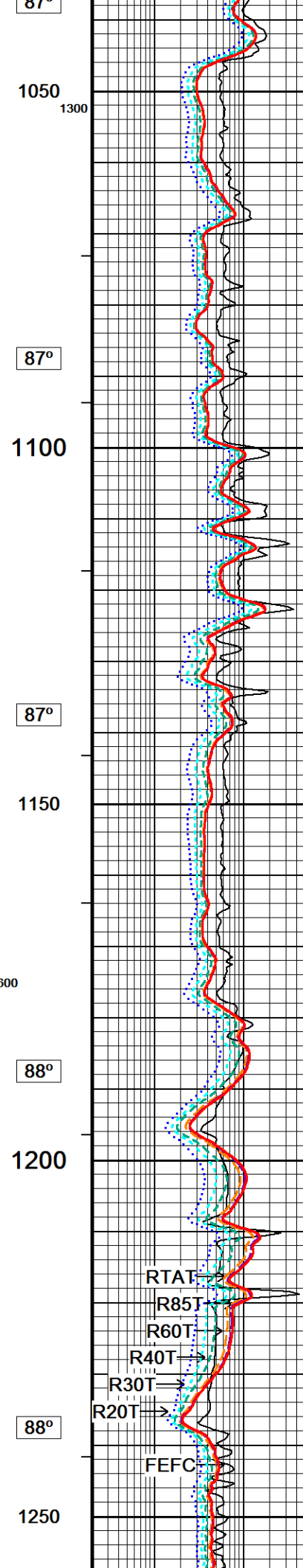
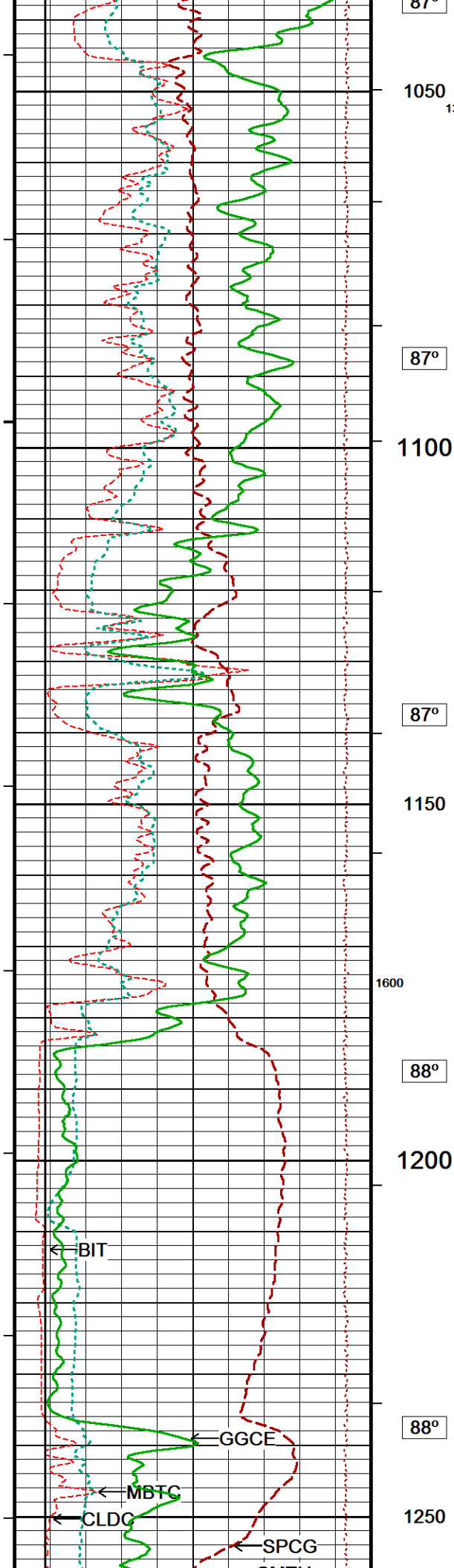
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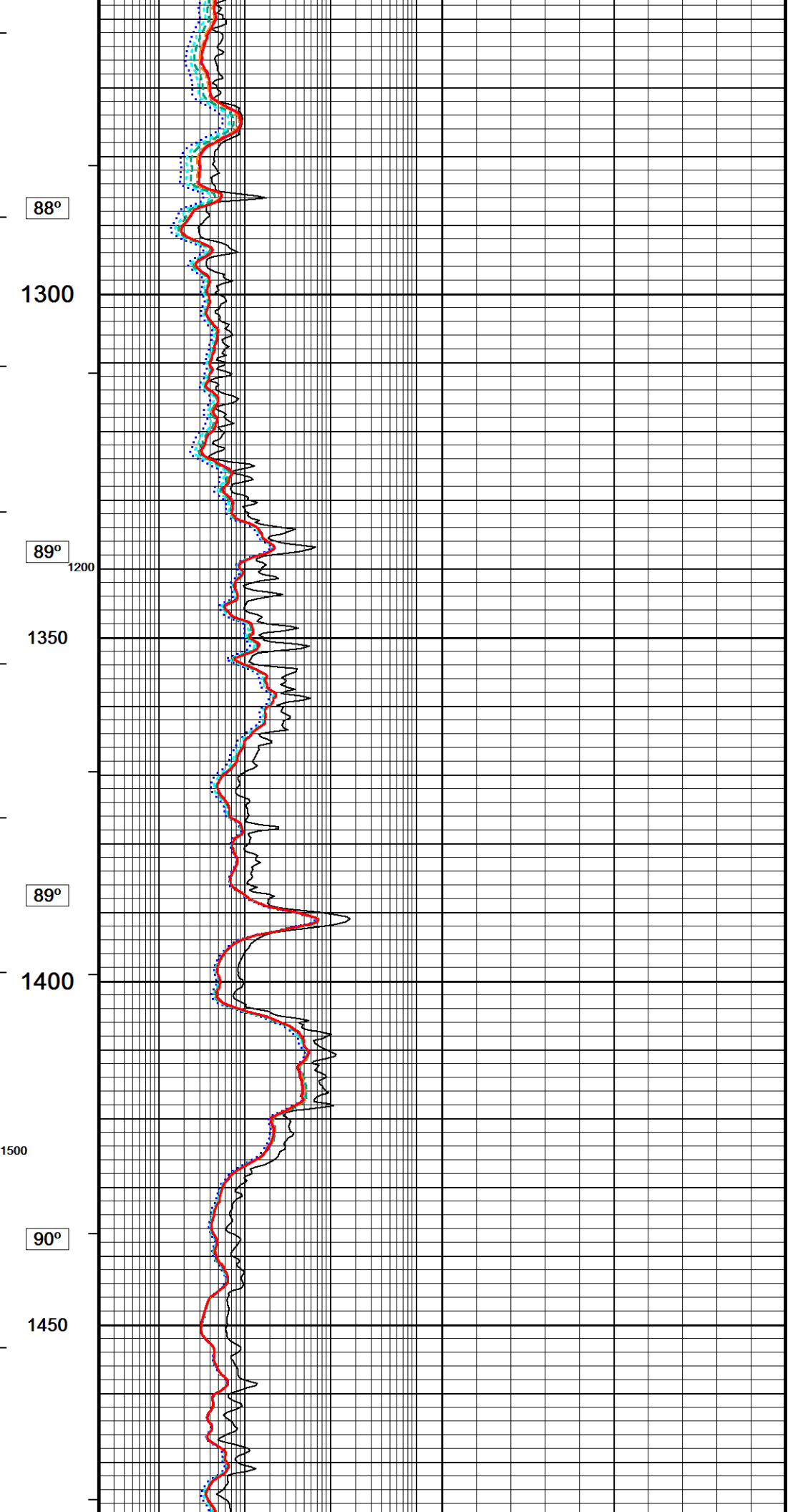
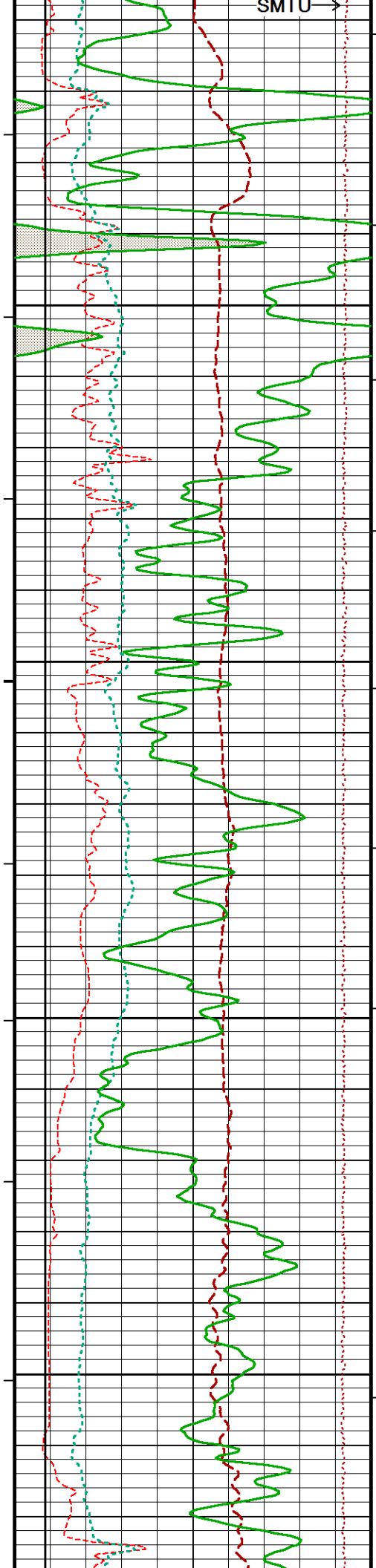
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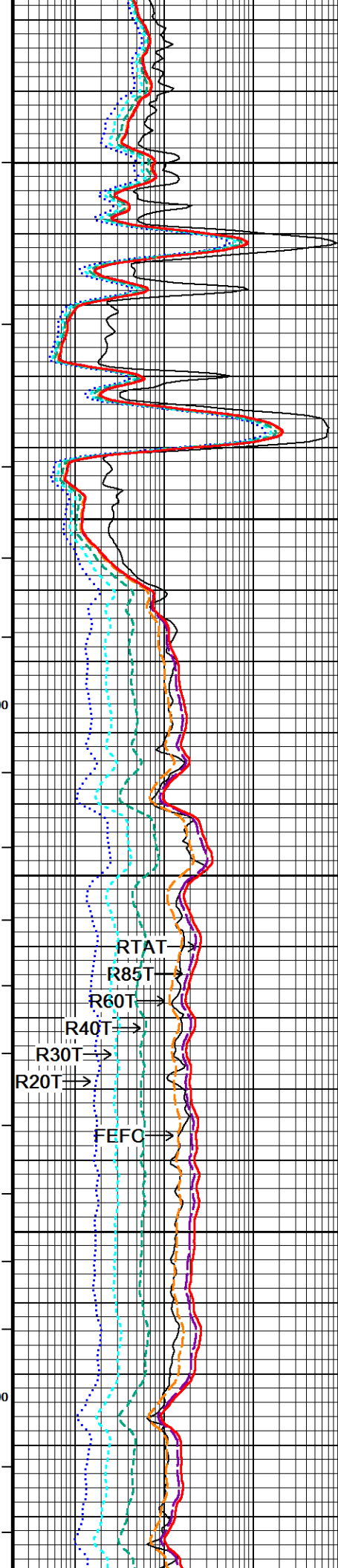
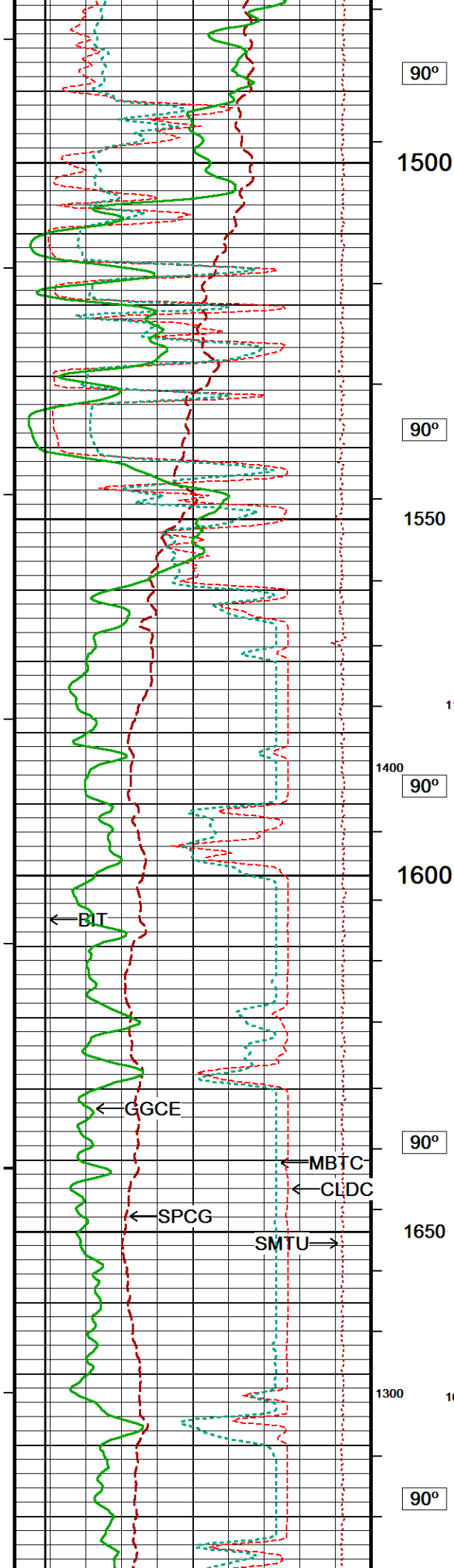
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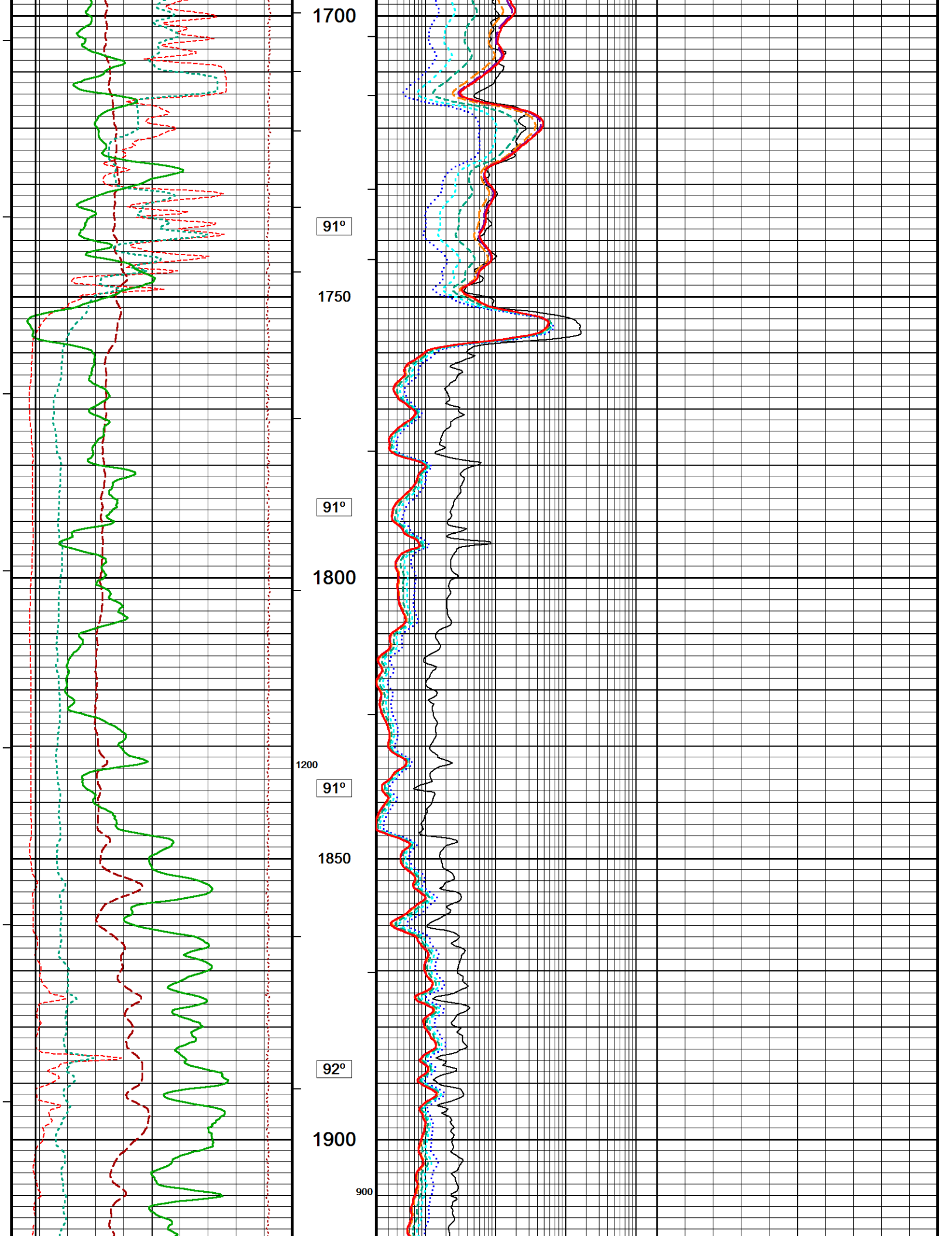


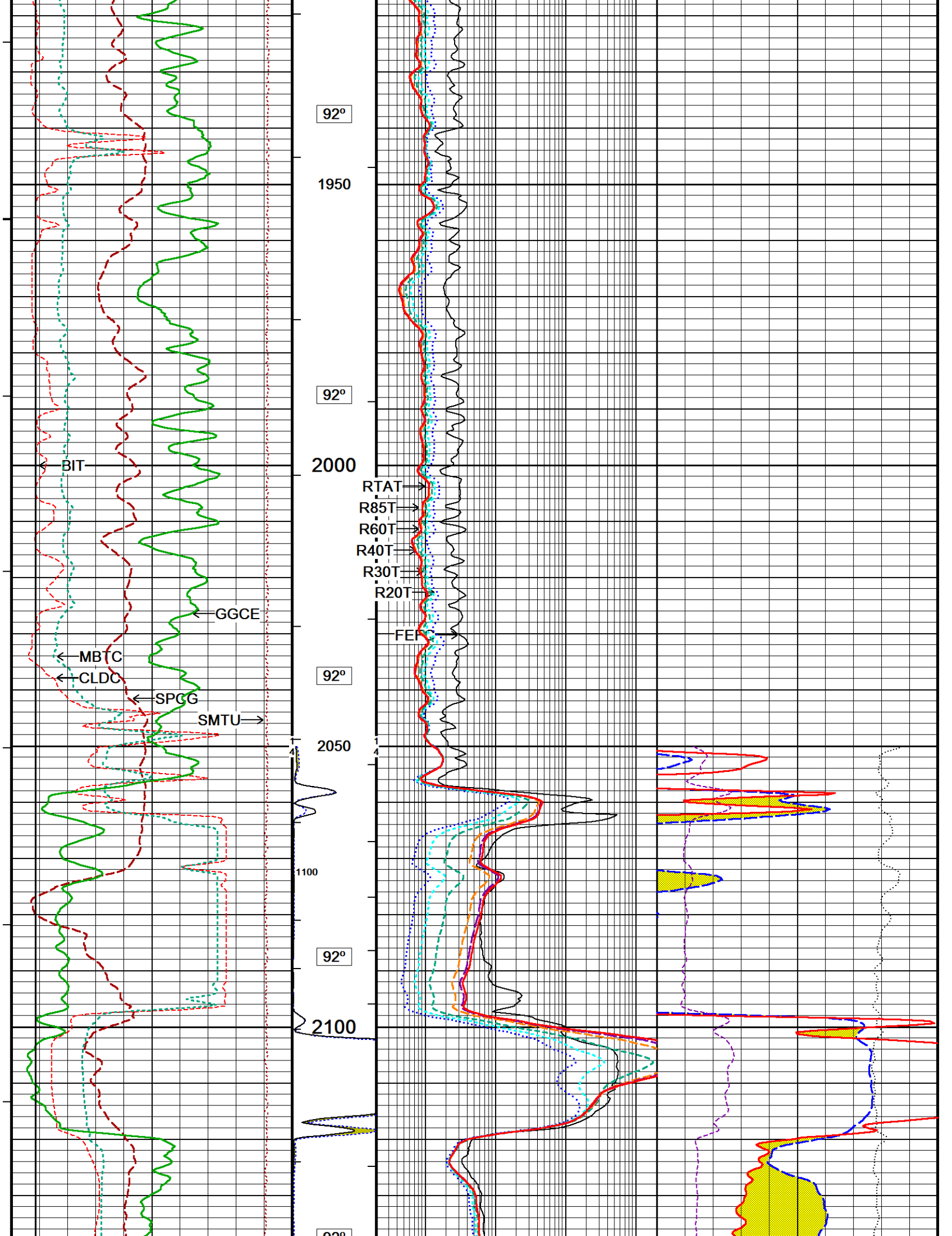


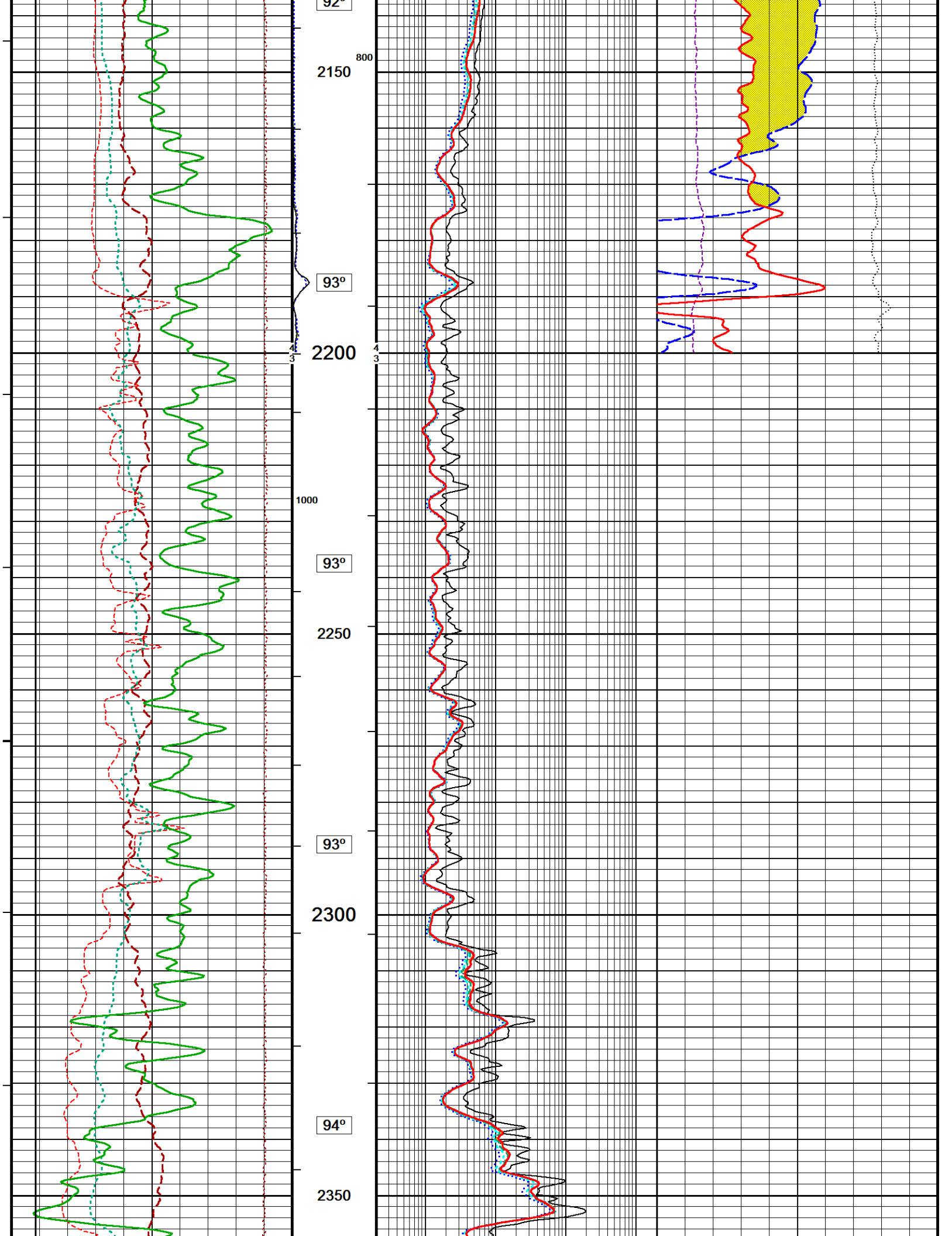


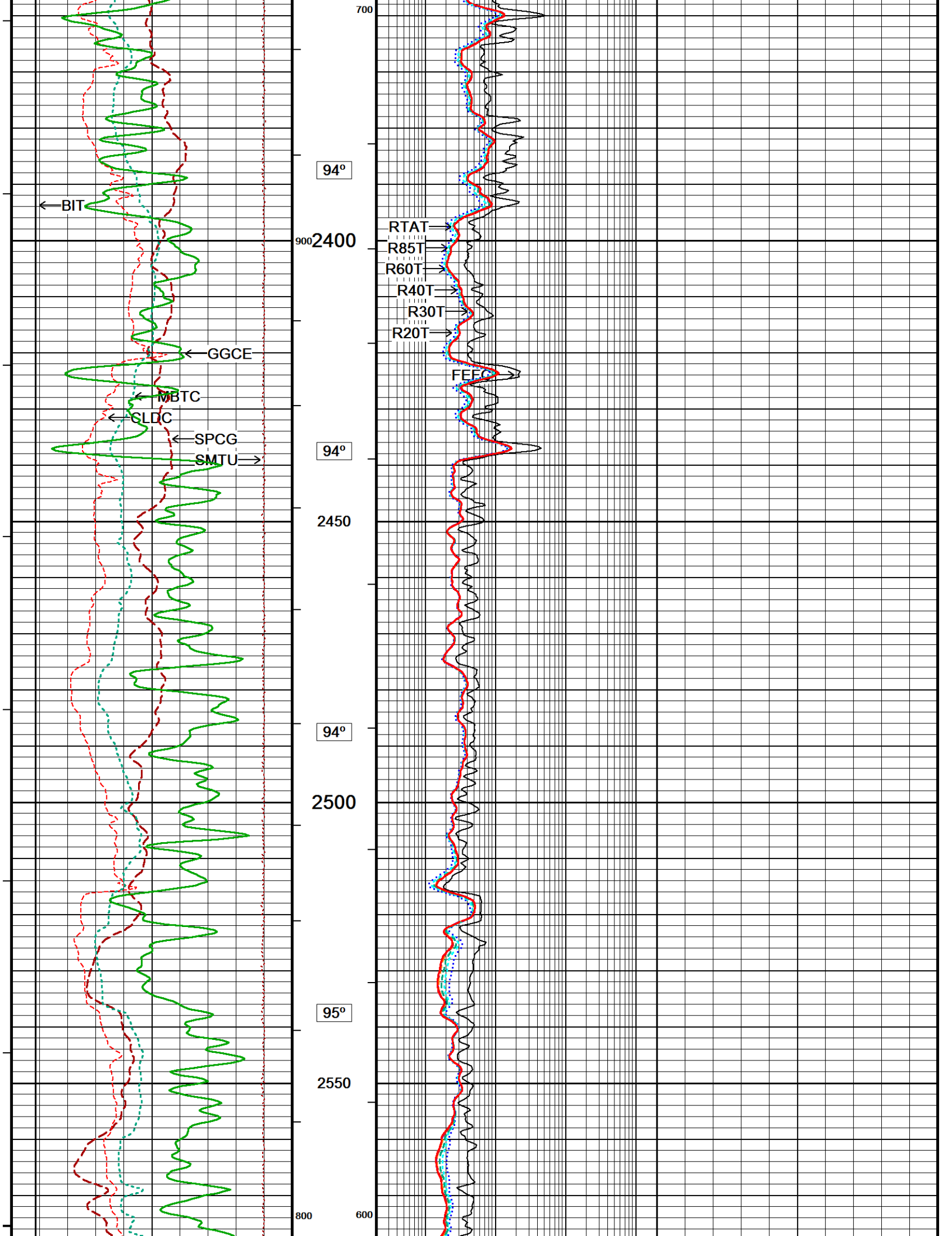


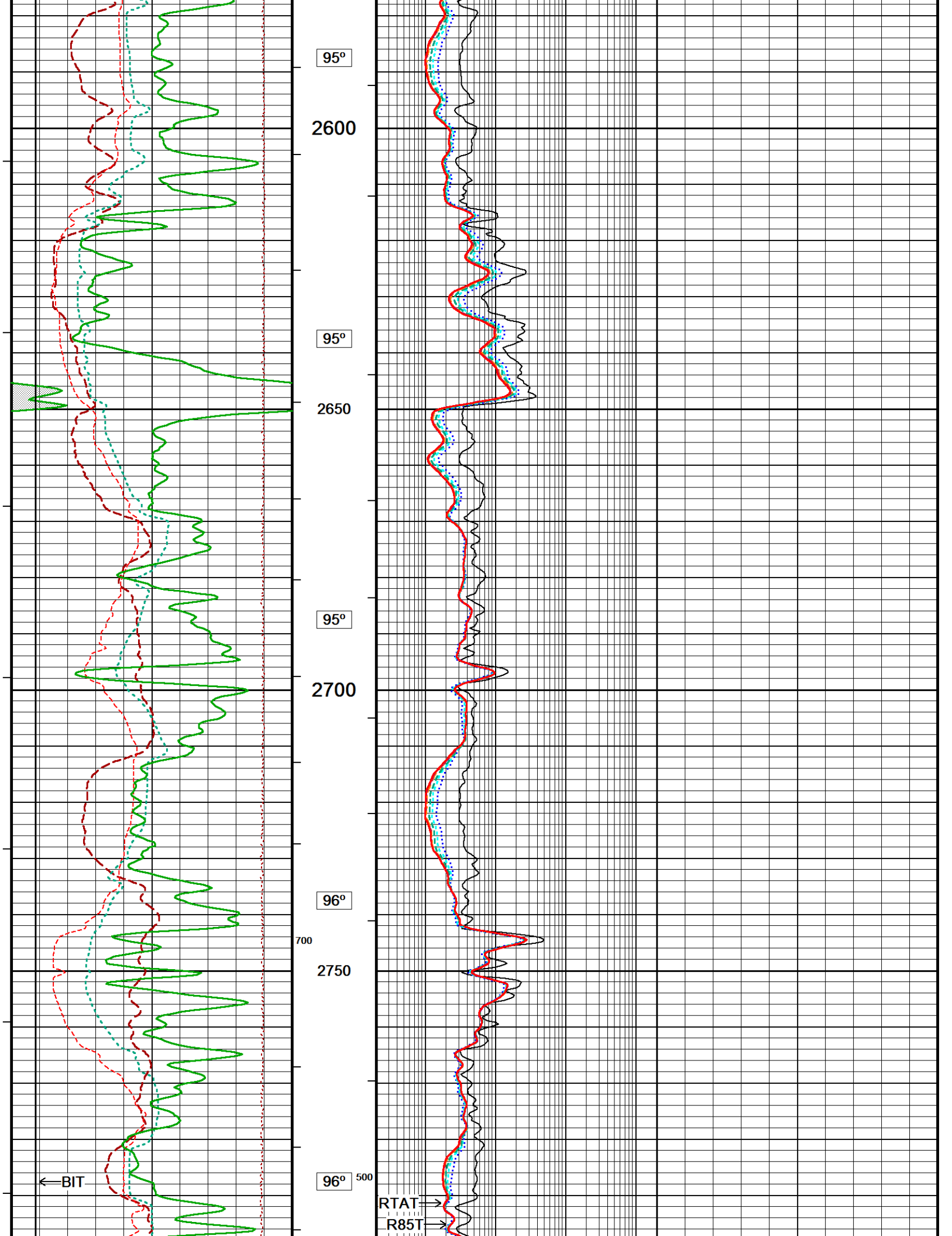


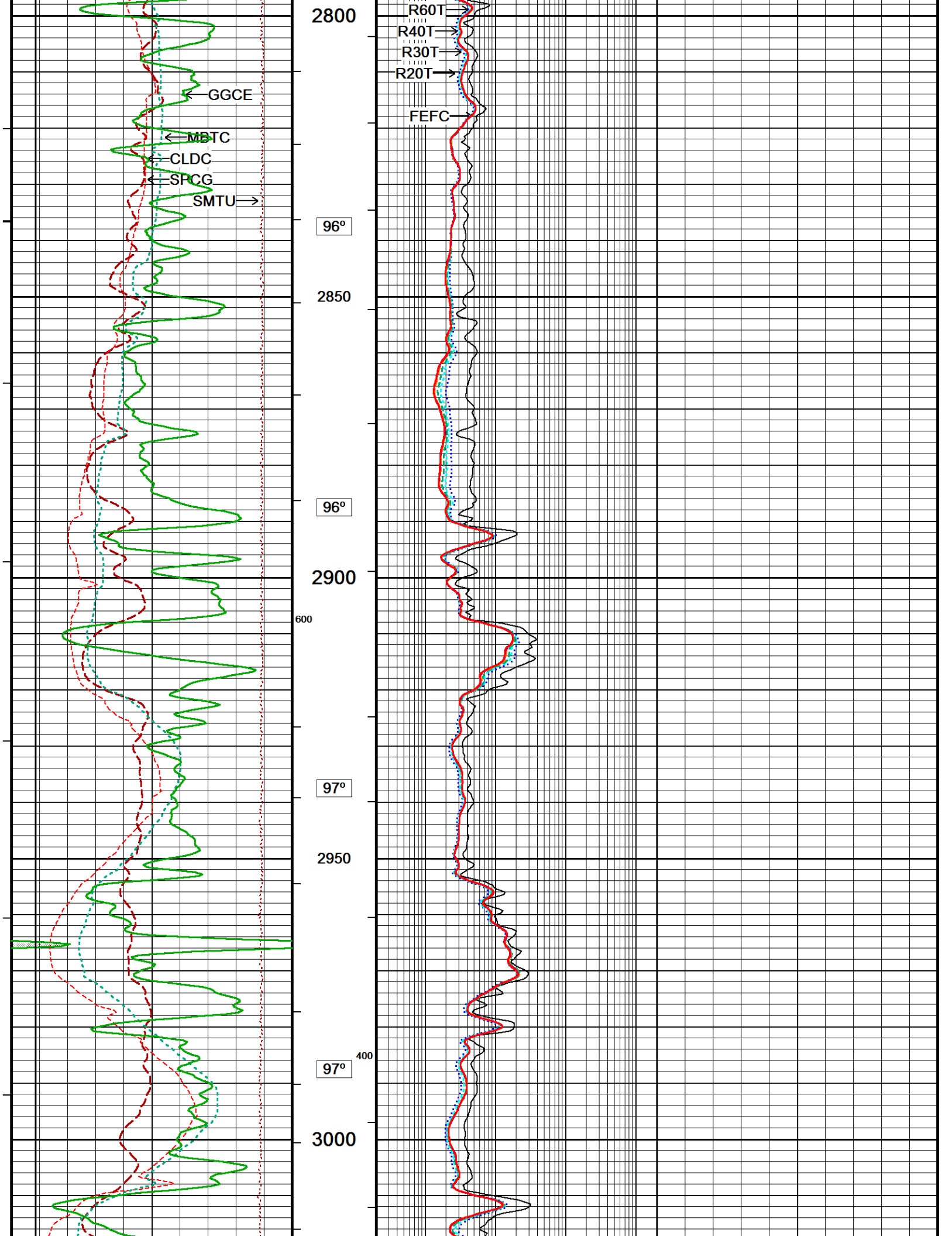


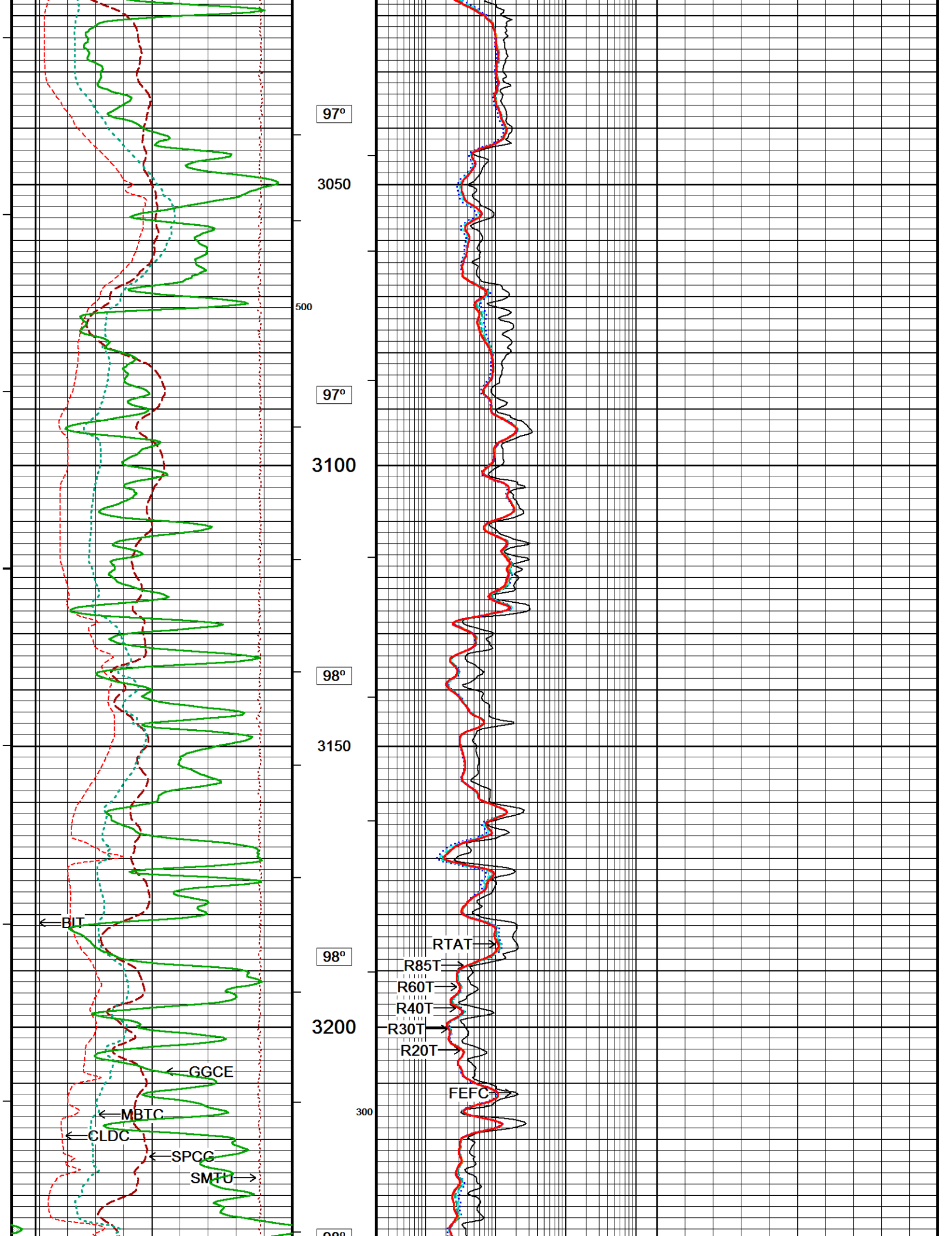


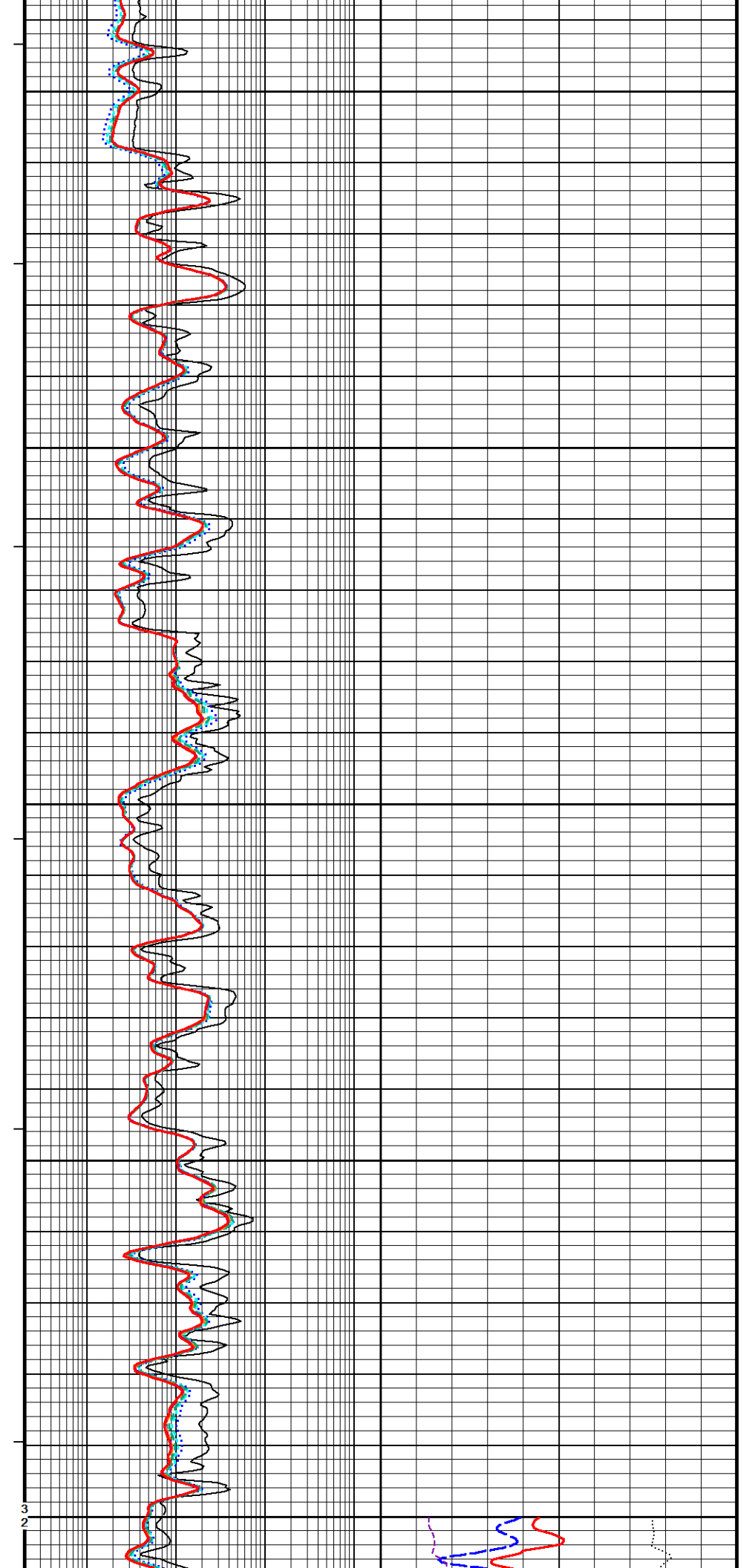
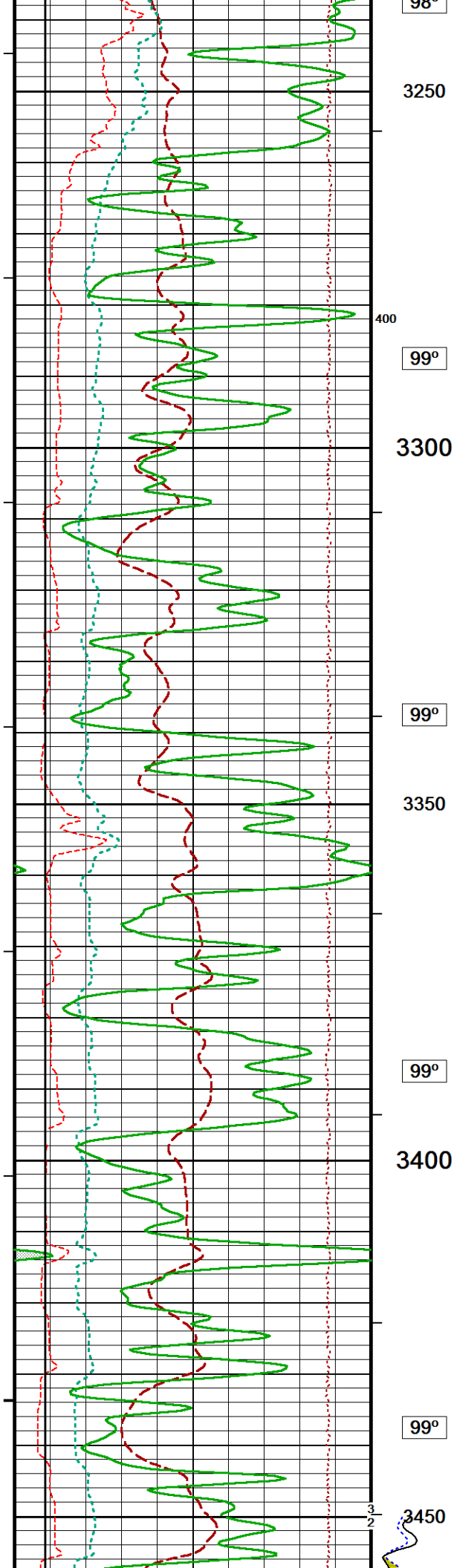


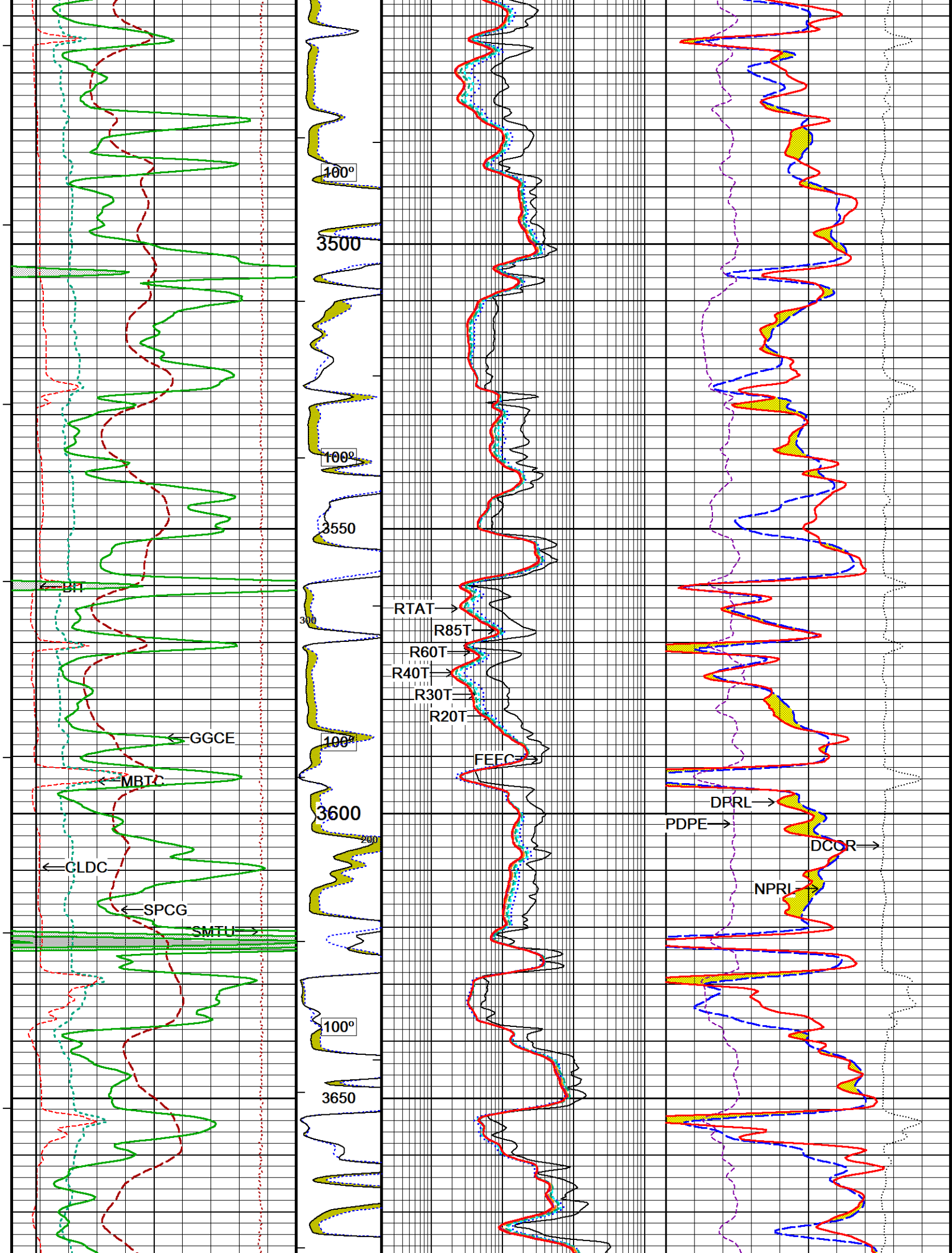


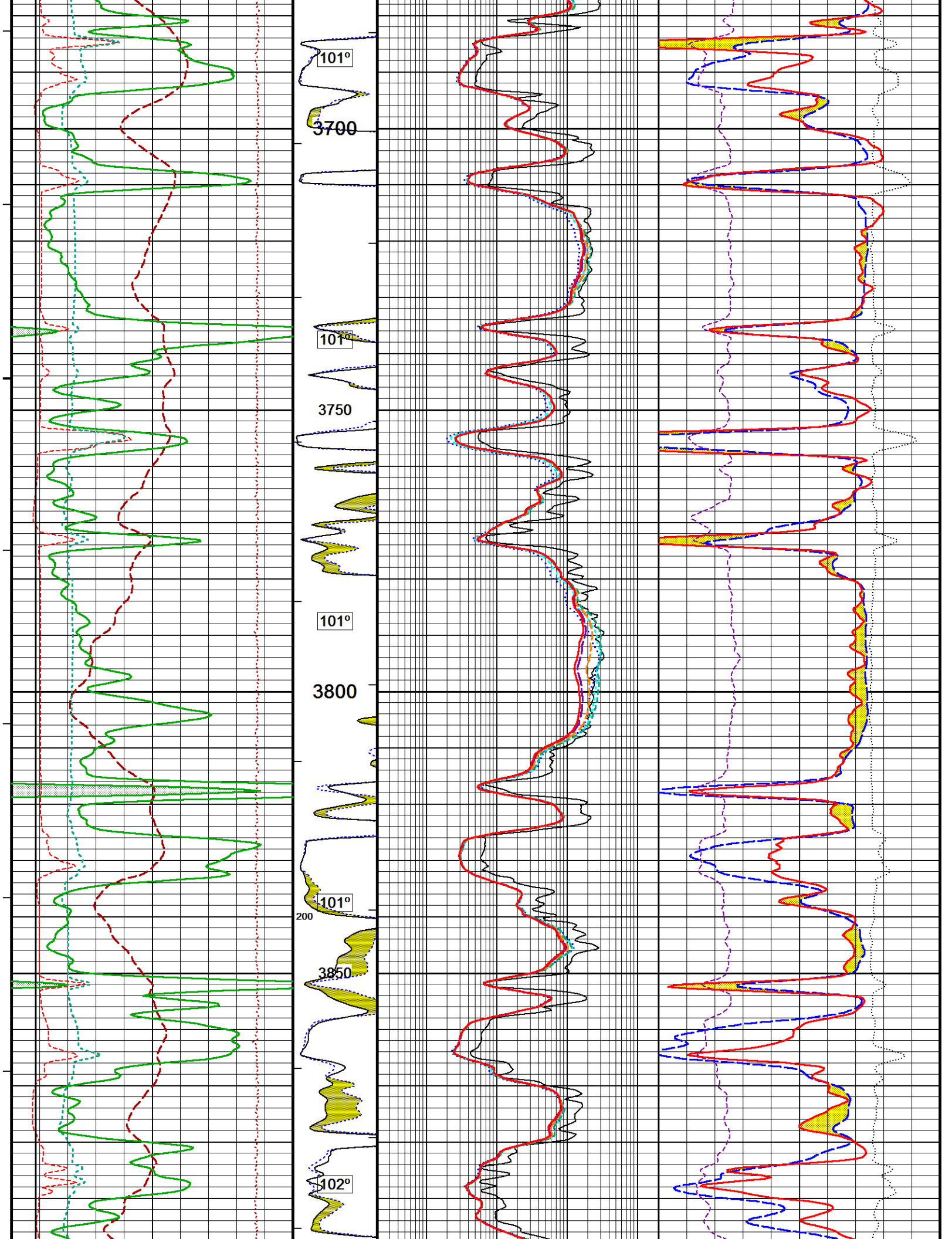


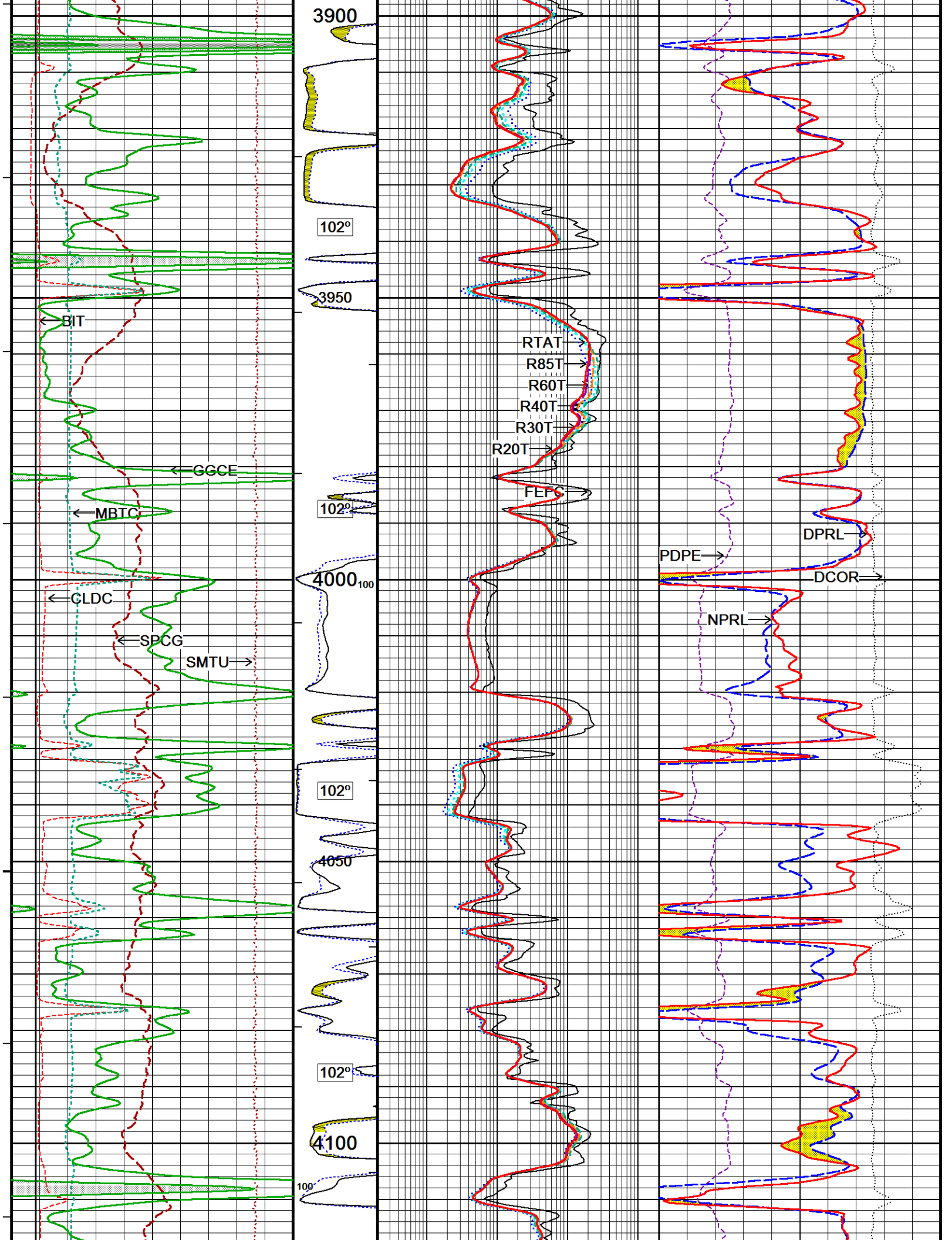


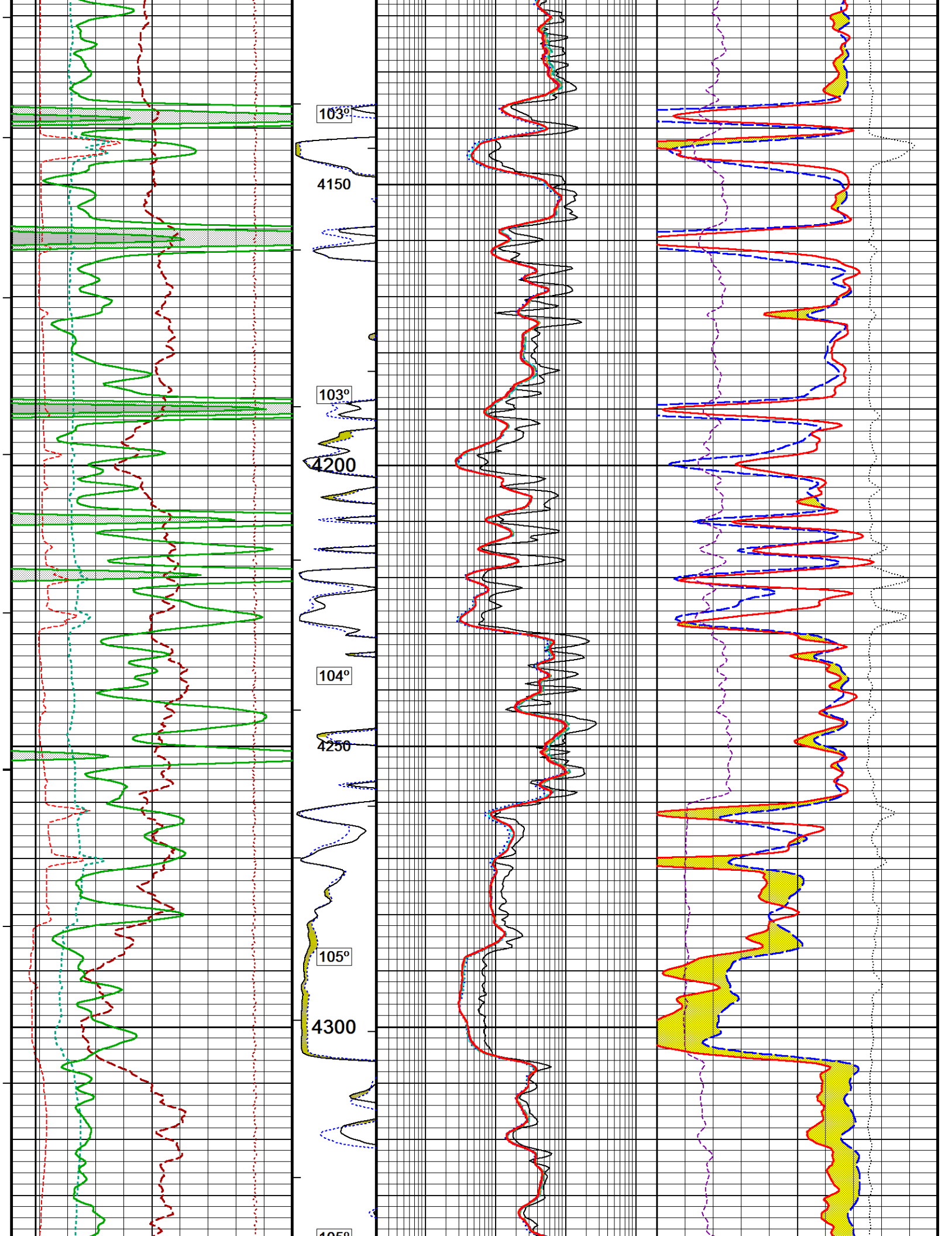


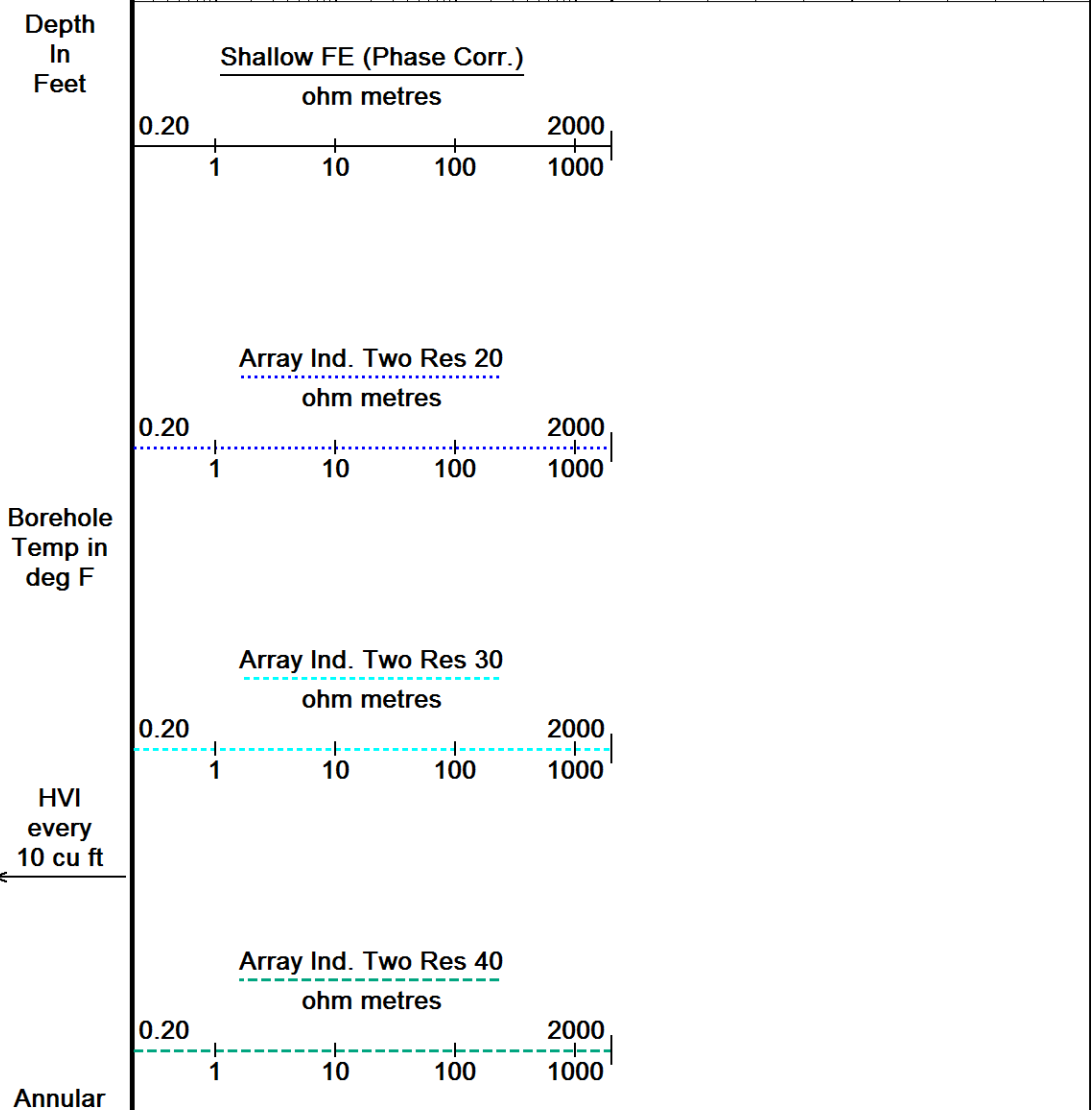
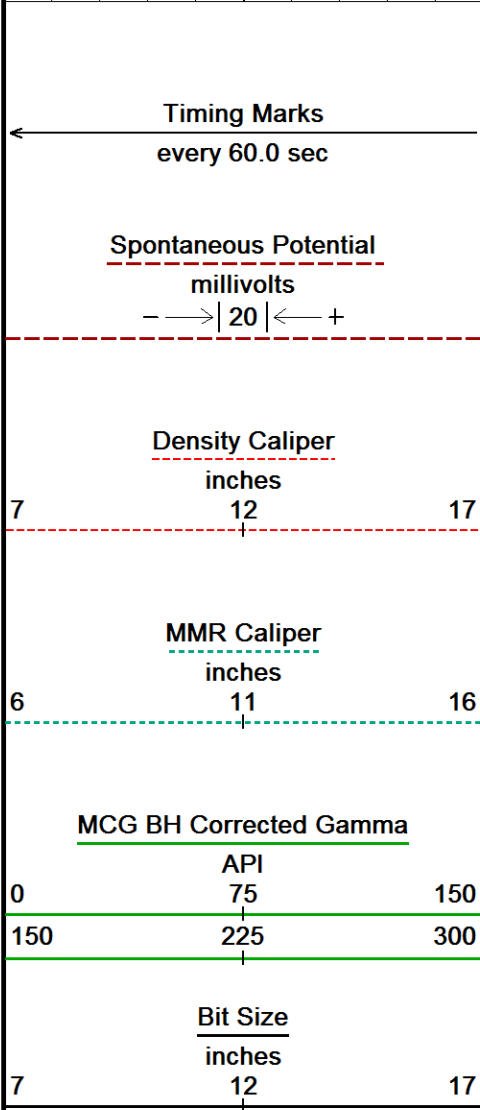
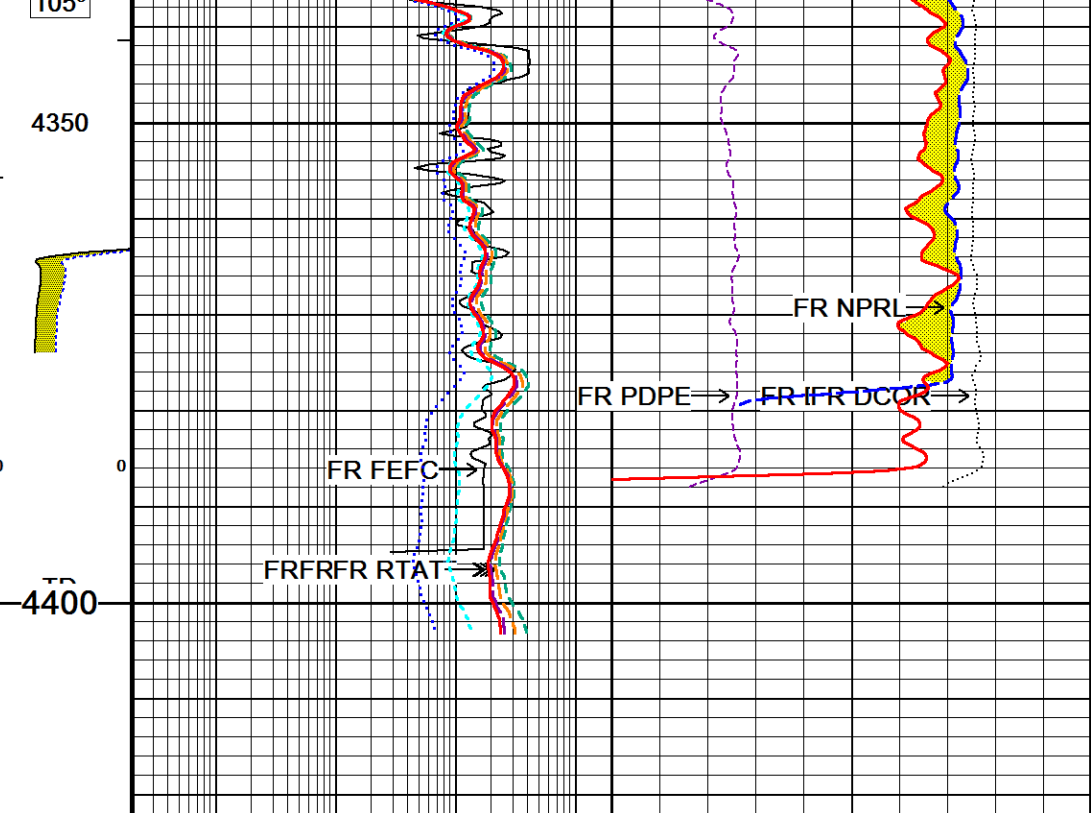
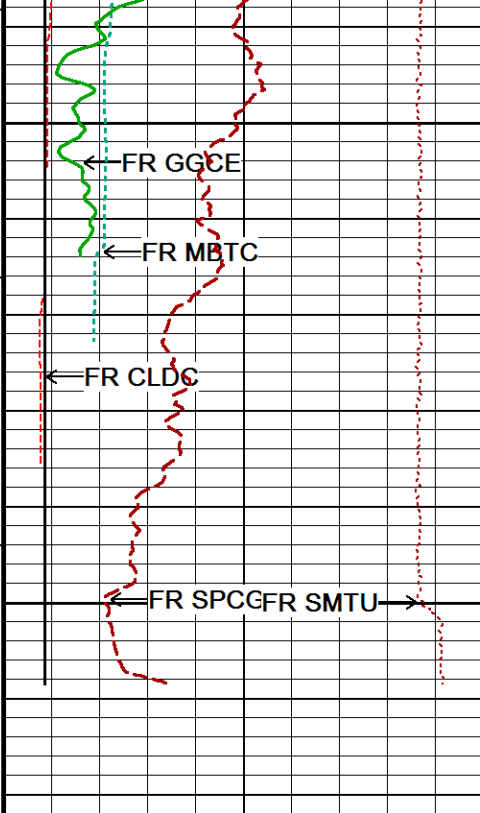


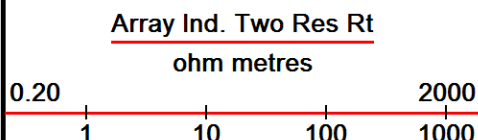






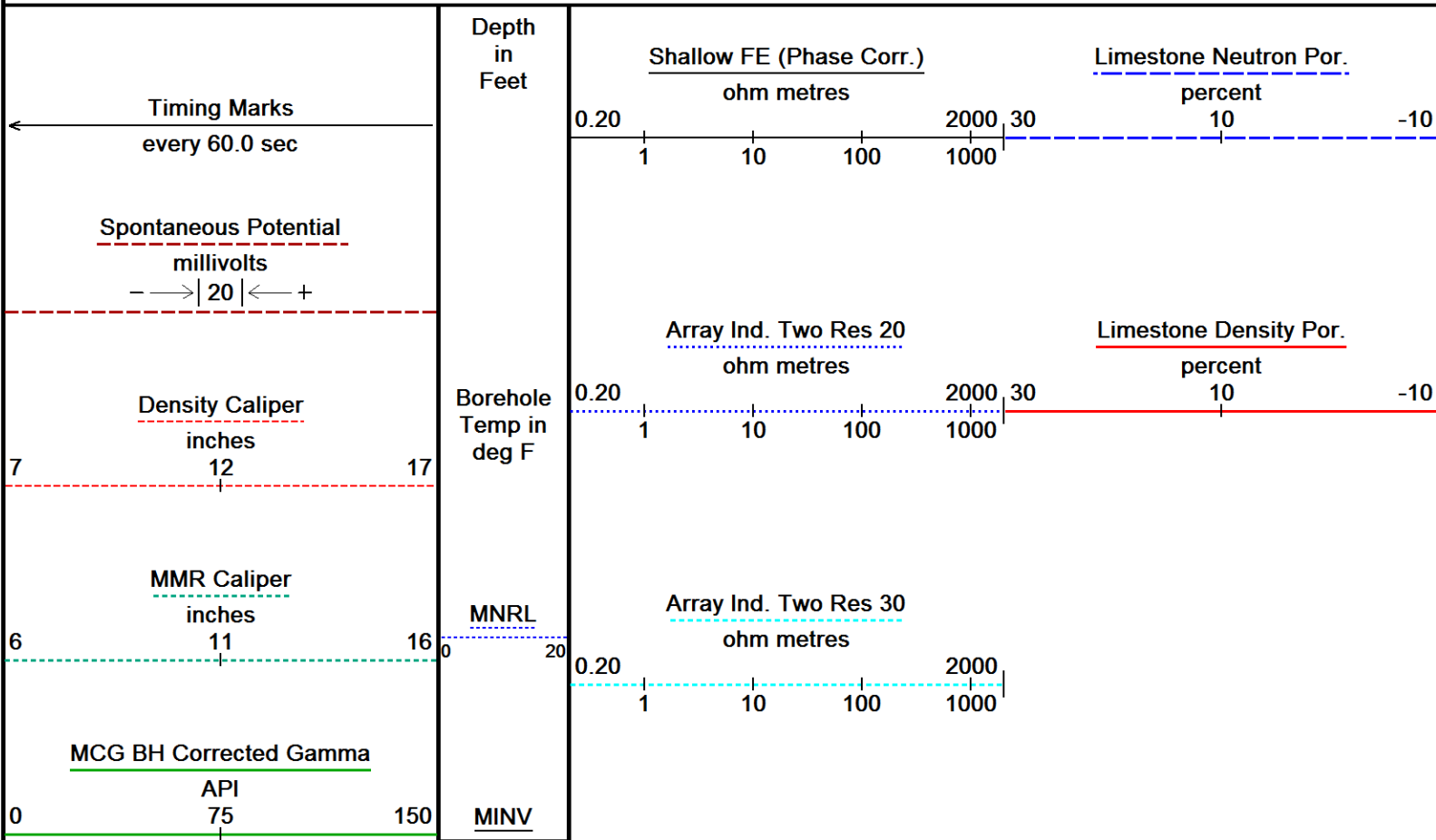


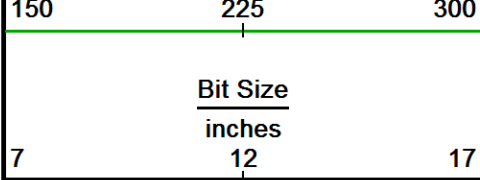




↑ 5 INCH MAIN PASS ↑

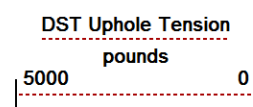
Depth Based Data - Maximum Sampling Increment 10.0cm
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 System Versions: Logged with 18.05.7089 Processed with 18.05.7089 Plotted with 18.05.7089



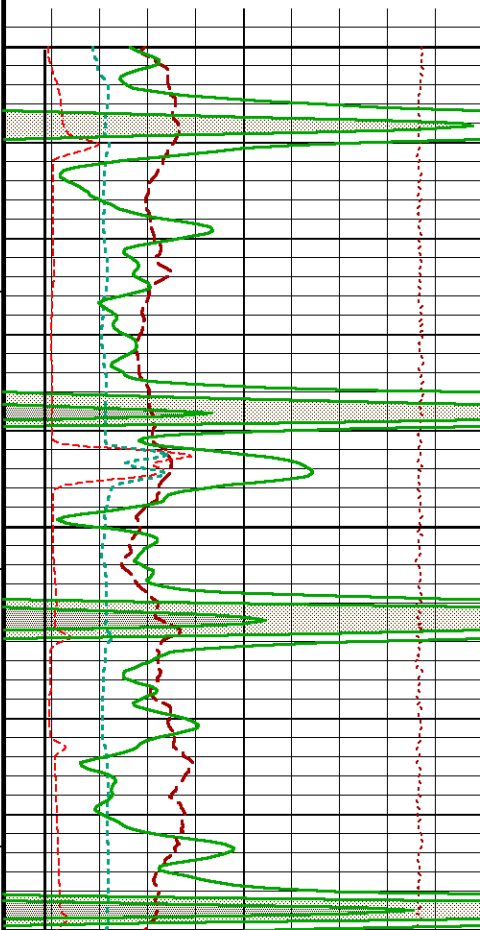


HVI
every
10 cu ft

Annular
Integral
every
10 cu ft



Replay
Scale
1:240

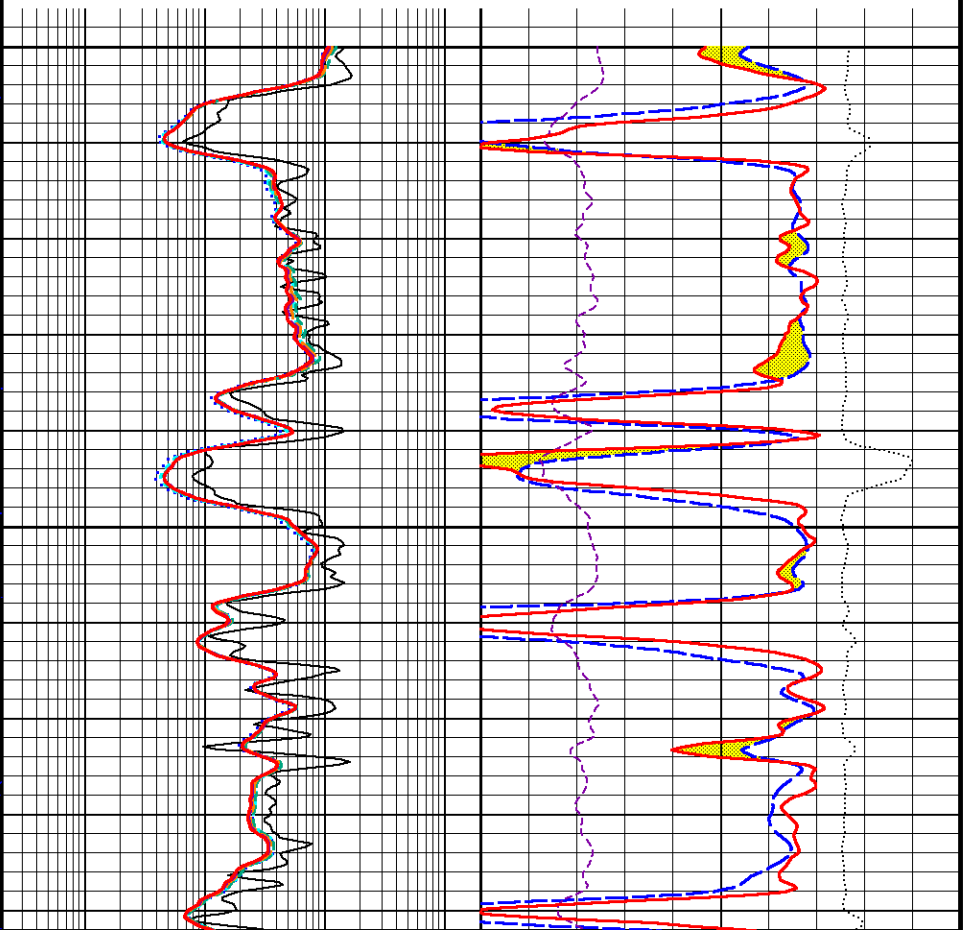
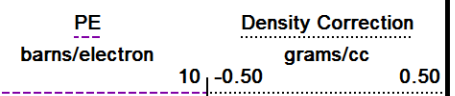
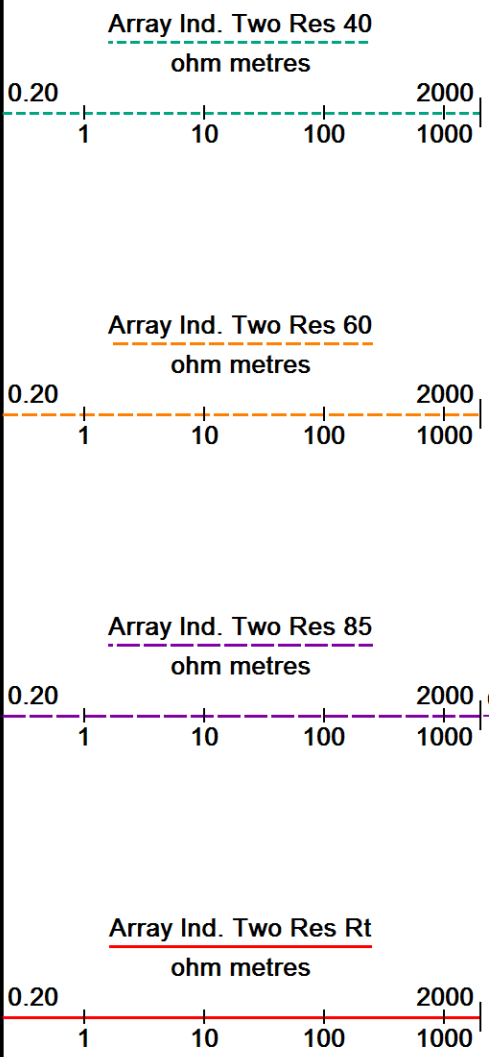


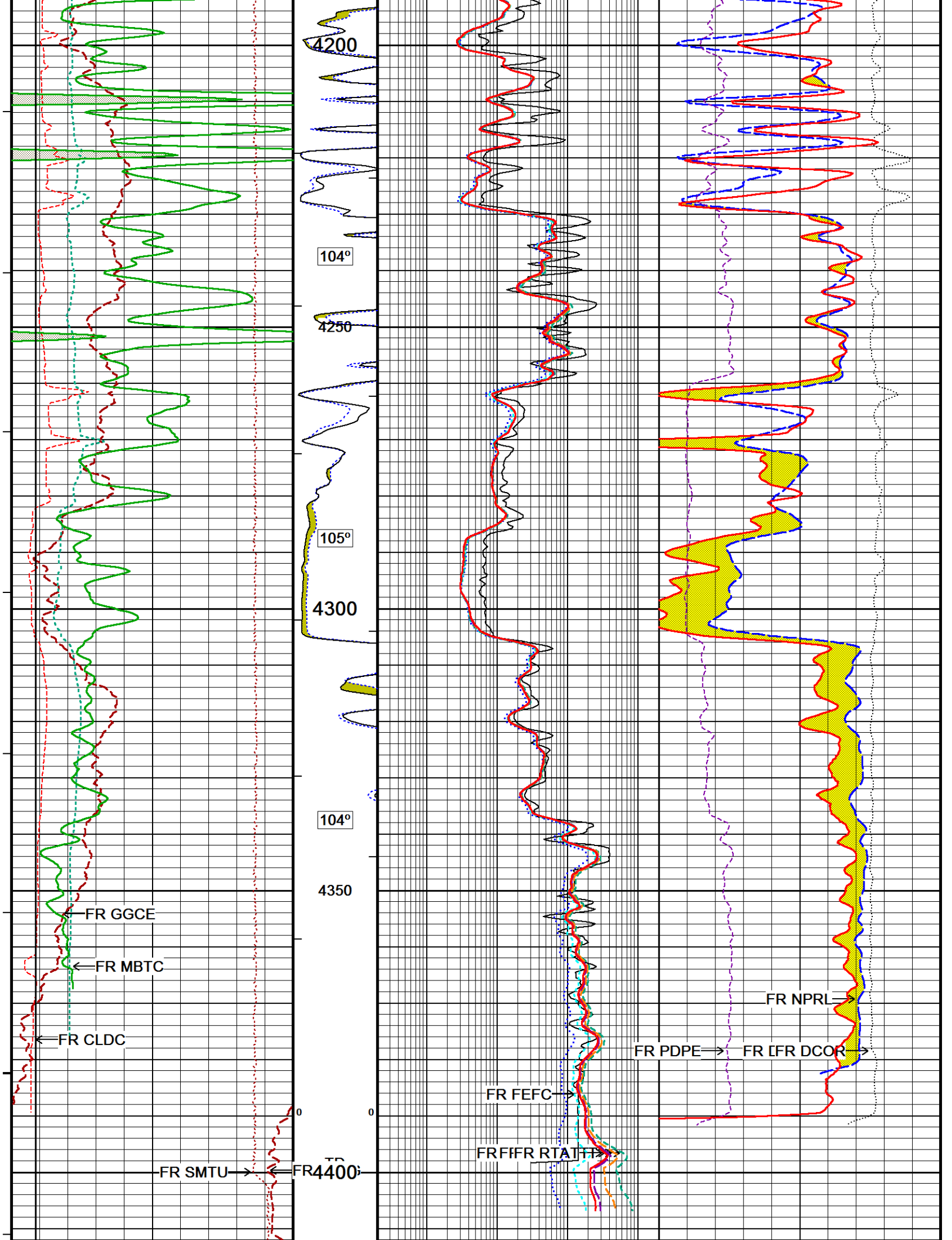
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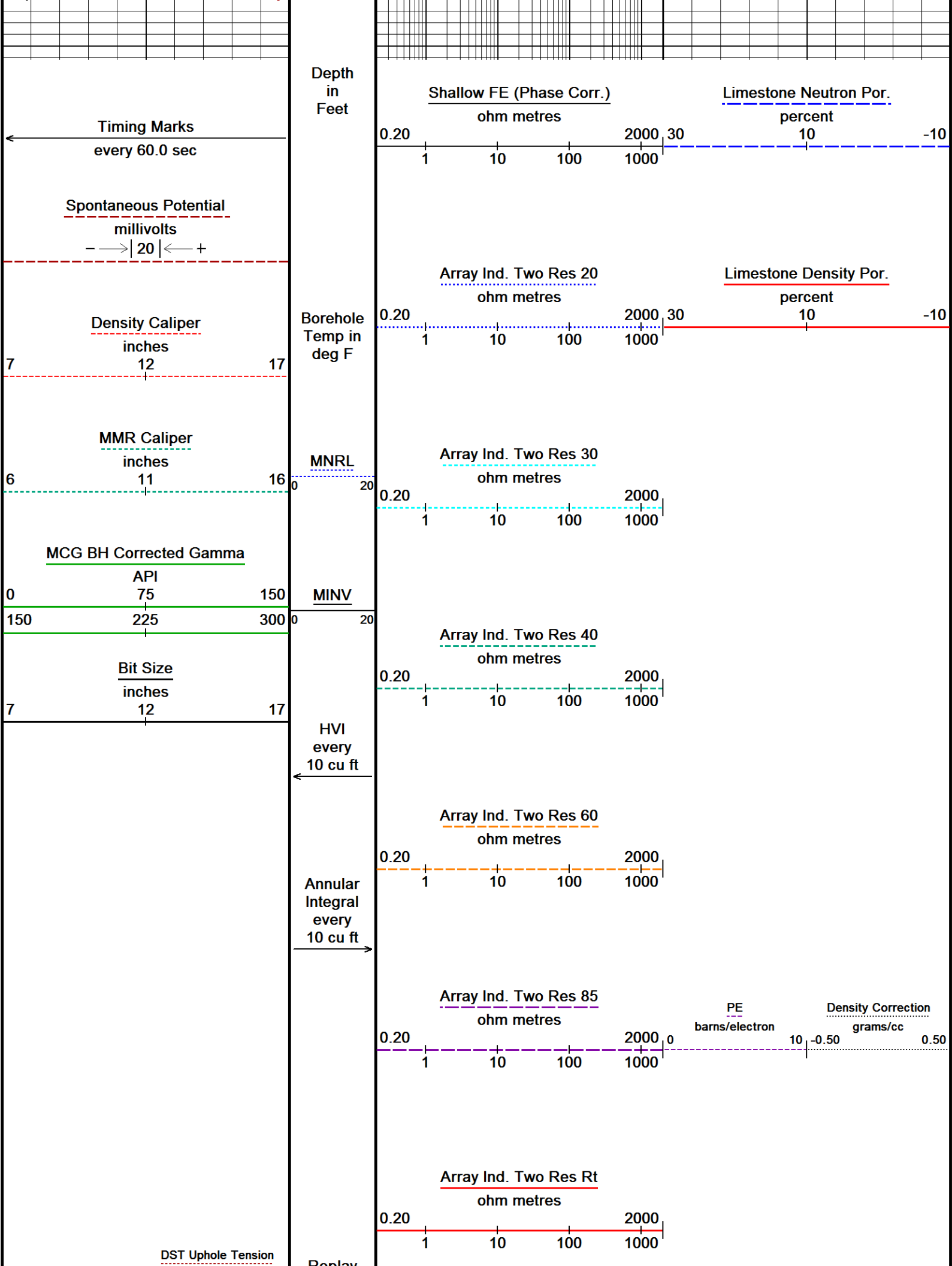
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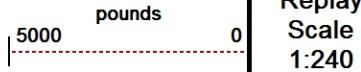
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103°









Depth Based Data - Maximum Sampling Increment 10.0cm
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 System Versions: Logged with 18.05.7089 Processed with 18.05.7089 Plotted with 18.05.7089

↑ 5 INCH REPEAT PASS ↑

BEFORE SURVEY CALIBRATION

E:\LOGS\SHAKESPEARE OIL (OTTLEY 4-27)\MAIN PASS.dta

General Constants All 000

Last Edited on 18-MAR-2019,22:43

General Parameters

Mud Resistivity	0.530	ohm-metres
Mud Resistivity Temperature	78.000	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	4.500	inches
Caliper for Differential Caliper	Density Caliper	

Rwa Parameters

Porosity used	Crossplot Porosity
Resistivity used	Array Ind. One 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 431

Field Calibration on 07-MAR-2019,16:49

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	200.00	200.00

High Resolution Temperature Constants MCG-D.K 431

Last Edited on 07-MAR-2018,11:29

Pre-filter Length 11

Gamma Calibration MCG-D.K 431

Field Calibration on 13-MAR-2019 09:40

	Measured	Calibrated (API)
Background	42	29
Calibrator (Gross)	1864	1289
Calibrator (Net)	1822	1260

Gamma Calibration Tolerances MCG-D.K 431

Ratio 1.446 Counts/API

Gamma Constants MCG-D.K 431

Last Edited on 18-MAR-2019,21:41

Gamma Calibrator Number	046	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.09	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

Caliper Calibration MMR-A 30

Base Calibration on 07-MAR-2019 16:24

Field Calibration on 13-MAR-2019 10:26

Base Calibration Reading No	Measured	Calibrator Size (in)
1	14693	5.96

2	17956	7.99
3	21263	9.86
4	25276	11.88
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.02	7.99

Caliper Calibration Tolerances MMR-A 30

Short Arm Field Cal.	8.02		in
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Micro Normal and Micro Inverse Calibration MMR-A 30

Base Calibration on 07-MAR-2019 16:16
Field Check on 13-MAR-2019 09:43

	Resistor 1 (ohm)	Resistor 2 (ohm)
	10.0	50.0
Base Calibration		
	Measured	Calibrated (ohm-m)
Micro Normal	9.9 49.3	5.1 25.6
Micro Inverse	9.9 49.2	3.4 16.9
Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	94.5	94.5
Micro Inverse	62.6	62.6

Micro Normal & Micro Inverse Calibration Tolerance MMR-A 30

Micro Normal Res. 1	9.9		ohm	Micro Normal Res. 2	49.3		ohm
Micro Inverse Res. 1	9.9		ohm	Micro Inverse Res. 2	49.2		ohm
Micro Normal Base Check	94.5		ohm-m				
Micro Inverse Base Check	62.6		ohm-m				
Micro Normal Field Check	94.5		ohm-m				
Micro Inverse Field Check	62.6		ohm-m				

Micro Normal and Micro Inverse Constants MMR-A 30

Last Edited on 10-JAN-2019,12:10

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

Neutron Calibration MDN-A.B 152

Base Calibration on 15-MAR-2019 10:30
Field Check on 15-MAR-2019 10:50

Base Calibration		
	Measured	Calibrated (cps)
	Near Far	Near Far
	3145 97	3714 110
Ratio	32.546	33.764
Field Calibrator at Base		Calibrated (cps)
		1176 1725
Ratio		0.682
Field Check		Calibrated (cps)
		1179 1730
Ratio		0.681

Neutron Calibration Tolerances MDN-A.B 152

Ratio	32.546	
Base Check	0.682	
Field Check	0.681	

Neutron Source Id	N-1054	
Neutron Jig Number	BLUE	
Air Hole Processing	Modified Ratio	
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	Constant Value	
Formation Pressure	0.00	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	Constant Value	
Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-B.J 359

Base Calibration on 07-MAR-2019 15:04
Field Check on 13-MAR-2019 09:51

	Resistor 1 (ohm)	Resistor 2 (ohm)
	0.0	1000.0
Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	966.6	126.8
Base Check		278.7
Field Check		278.7

FE Calibration Tolerances MFE-B.J 359

Reference 2	966.6	-3% 980.0 +3%	ohm
Base Check	278.7	-2% 277.0 +2%	ohm-m
Field Check	278.7	-2% 278.7 +2%	ohm-m

FE Constants MFE-B.J 359

Last Edited on 18-MAR-2019,21:43

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 375

Factory Loop Calibration 07-MAR-2019 14:53
Field Check on 13-MAR-2019,14:49

Factory Loop Calibration

High Conductivity Reference Resistor	3.3	ohm
Low Conductivity Reference Resistor	333.3	ohm

Array	Measured Signal (unitless)		Reference Conductivity (mmho/m)		Calibration	
	Low	High	Low	High	Gain	Offset
1 (near)	17.2	476.6	9.3	966.2	2.083	-26.5
2	5.9	379.2	7.6	821.4	2.180	-5.4
3	3.1	258.6	5.2	566.0	2.195	-1.5
4 (far)	1.4	132.0	2.6	279.2	2.119	-0.4
Array Temperature	73.2		Deg F			

Tool Checks

Factory Reference (mmho/m)			Before Survey (mmho/m)		
Array	Low	High	Low	High	
1 (near)	10.0	3801.0	11.3	3803.3	
2	28.4	3545.5	29.7	3547.5	
3	27.5	3050.2	28.6	3051.9	
4 (far)	19.4	2083.7	20.6	2084.8	
Array Temperature	62.9		75.2		Deg F

Induction Check Tolerances MAI-B.J 375					
Low Array 1	11.3		mmho/m	High Array 1	3803.3 mmho/m
Low Array 2	29.7		mmho/m	High Array 2	3547.5 mmho/m
Low Array 3	28.6		mmho/m	High Array 3	3051.9 mmho/m
Low Array 4	20.6		mmho/m	High Array 4	2084.8 mmho/m

Induction Constants MAI-B.J 375			Last Edited on 18-MAR-2019,21:43	
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		Pineapple		
Stand-off		0.49 inches		
Number of Fins on Stand-off		5.0000		
Stand-off Fin Angle		72.00 degrees		
Stand-off Fin Width		1.3878 inches		
Rm Source		Global Value: Temperature Corrected		
Temp. for Rm Corr.		MCG External Temperature		
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		

Photo Density Calibration MPD-B 166			Base Calibration on 07-MAR-2019 15:38		
			Field Check on 13-MAR-2019 09:48		
Density Calibration					
Base Calibration	Measured	Calibrated (adu)			

Base Calibration		Measured		Calibrated (Std)	
		Near	Far	Near	Far
Background		1024	1171		
Reference 1		51500	21287	59494	30754
Reference 2		21513	2162	26390	2598
Field Check at Base					
		1023.7	1171.4		
Field Check					
		1018.2	1168.0		
PE Calibration					
Base Calibration		Measured		Calibrated	
	WS	WH	Ratio	Ratio	
Background	184	907			
Reference 1	20198	51320	0.397	0.367	
Reference 2	5900	21387	0.279	0.270	
Field Check at Base					
	183.8	906.6			
Field Check					
	184.1	899.4			

Photo Density Calibration Tolerances MPD-B 166					
Near Density Ratio	2.46			Far Density Ratio	20.31
PE Calibration	0.111				
Near Den. Field Check	1018.2			Far Den. Field Check	1168.0
PE WS Field Check	184.1			PE WH Field Check	899.4

Density Constants MPD-B 166			Last Edited on 18-MAR-2019,21:42		
Density Source Id	P561358B				
Nylon Calibrator Number	766				
Aluminium Calibrator Number	856				
Density Shoe Profile	8 inch				
Caliper Source for Processing	Density Caliper				
PE Correction to Density	Not Applied				
Mud Density	1.09	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)				
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				

Caliper Calibration MPD-B 166			Base Calibration on 07-MAR-2019 15:56 Field Calibration on 13-MAR-2019 10:30		
Base Calibration					
Reading No	Measured	Calibrator Size (in)			
1	13728	3.99			
2	22196	5.96			
3	31024	7.99			
4	39264	9.86			
5	48288	11.88			
6	N/A	N/A			

Field Calibration

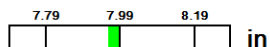
Measured Caliper (in)
7.96

Actual Caliper (in)
7.99

Caliper Calibration Tolerances MPD-B 166

Short Arm Field Cal.

7.96



DOWNHOLE EQUIPMENT

E:\LOGS\SHAKESPEARE OIL (OTTLEY 4-27)\MAIN PASS.dta

Cablehead, 11 pin

CBH-CA 177 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Swivel Head Adaptor

SHA-J.A 450 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

Compact Comms Gamma

MCG-D.K 431 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity

MMR-A 30 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron

MDN-A.B 152 LG: 5.04 ft WT: 50.7 lb OD: 2.240 in

Compact Density/Caliper

MPD-B 166 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Knuckle Joint

SKJ-E.B 474 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

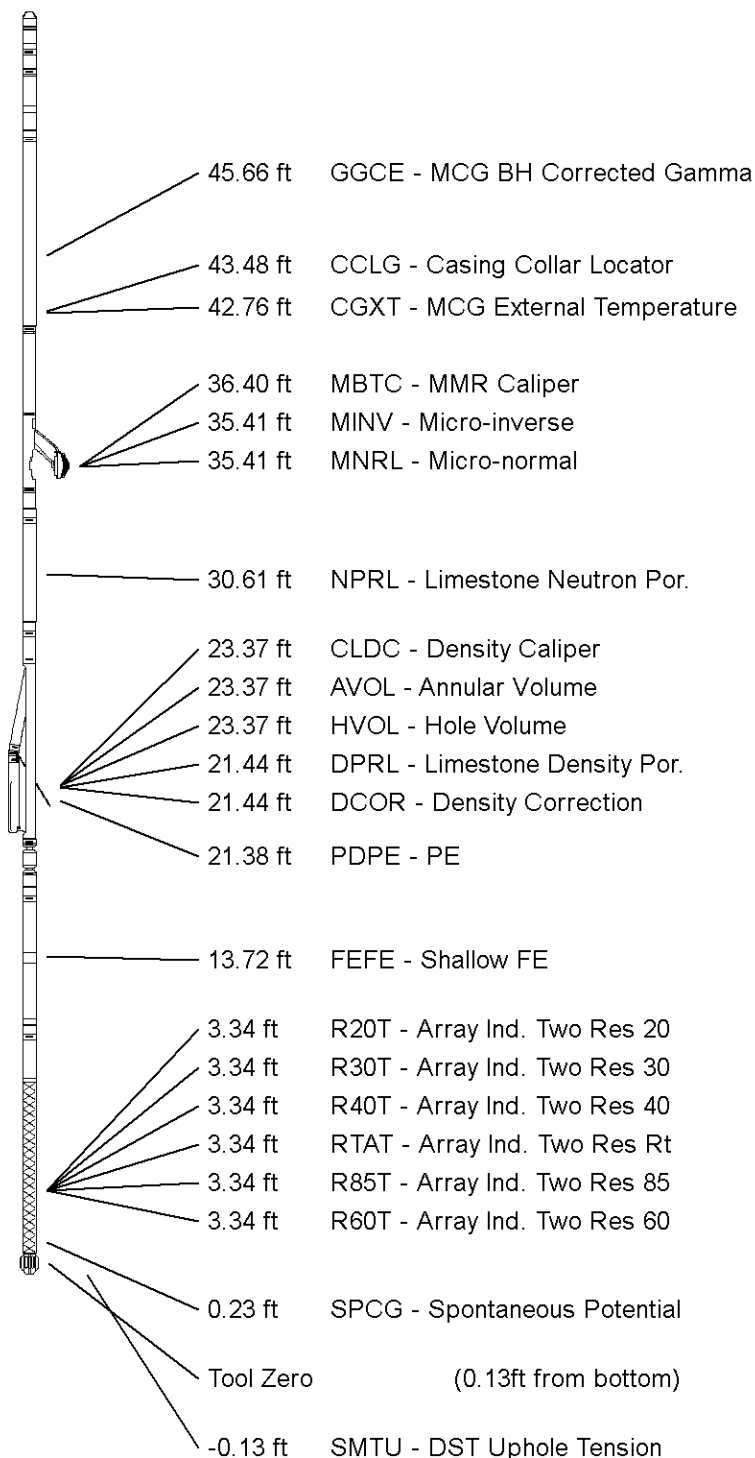
Compact Focussed Electric

MFE-B.J 359 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Induction

MAI-B.J 375 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 55.64 ft Weight: 454.2 lb



All measurements relative to tool zero.

COMPANY

SHAKESPEAR OIL CO., INC.

WELL

OTTLEY 4-27

FIELD	SMOKY HILL
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	USA / KANSAS

Elevation Kelly Bushing	2673	feet	First Reading	4396.66	feet
Elevation Drill Floor	2671	feet	Depth Driller	4400.00	feet
Elevation Ground Level	2665	feet	Depth Logger	4400.00	feet



COMPOSITE LOG

Weatherford®