



**Weatherford**<sup>®</sup>

**CML MESSENGER SHUTTLE  
ARRAY INDUCTION  
SHALLOW FOCUSED ELECTRIC LOG**

**COMPANY SANDRIDGE ENERGY**  
**WELL RUBY 3119 2-20H**  
**FIELD SASSY**  
**PROVINCE/COUNTY COMANCHE**  
**COUNTRY/STATE USA / KANSAS**  
**LOCATION NW NE NW NE**  
**200' FNL & 1880' FEL**

SEC	TWP	RGE	Other Services
20	31S	19W	MPD/MDN
API Number	15-033-21661		
Permit Number			
Permanent Datum GL, Elevation	2166 feet		
Log Measured From	KB		
Drilling Measured From	KB		

Elevations:	feet
KB	2186.00
DF	2186.00
GL	2166.00

Date	02-SEP-2012
Run Number	ONE
Depth Driller	9600.00 feet
Depth Logger	9600.00 feet
First Reading	9576.00 feet
Last Reading	5620.00 feet
Casing Driller	5603.00 feet
Casing Logger	5620.00 feet
Bit Size	6.125 inches
Hole Fluid Type	WATER
Density / Viscosity	8.40 lb/USg 26.00 CP
PH / Fluid Loss	10.00 60.00 ml/30Min
Sample Source	FLOWLINE
Rm @ Measured Temp	0.50 @ 90.0 ohm-m
Rmf @ Measured Temp	0.40 @ 90.0 ohm-m
Rmc @ Measured Temp	0.60 @ 90.0 ohm-m
Source Rmf / Rmc	CALC CALC
Rm @ BHT	0.35 @ 133.0 ohm-m
Time Since Circulation	19 HOURS
Max Recorded Temp	133.00 deg F
Equipment Name	COMPACT
Equipment / Base	18077 OKC
Recorded By	GUTHMUELLER
Witnessed By	J HILEMAN
AFEE#	DC12314
	SO# 3536737
	K GENTRY

**BOREHOLE RECORD**

Last Edited: 02-SEP-2012 17:36

Bit Size inches	Depth From feet	Depth To feet
17.500	0.00	280.00
12.250	280.00	1050.00
8.750	1050.00	5603.00
6.125	5603.00	9600.00

**CASING RECORD**

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURF	13.375	0.00	280.00	54.50
INTER	9.625	0.00	1050.00	36.00
INTER	7.000	0.00	5603.00	26.00

**REMARKS**

TOOLS RAN: SRT-069, 400V MBS-159, MCG-476, MMSD159, MDN-391, MPD-394, MFE-363, MAI-427 RAN IN COMBINATION WELL LOGGED USING MESSENGER METHOD OF DEPLOYMENT, AND MEMORY LOGGING SYSTEM

DEPTHS SET BACK TO PIPE STRAP

HARDWARE: MAI: MIS-B 0.5" STANDOFF USED ABOVE MAI, ISA 0.5" STANDOFF USED BELOW MAI.  
MFE: MIS-B 0.5" STANDOFF USED ABOVE MFE,  
MDN: MIS-A DOUBLE BOWSPRING USED ABOVE MDN.  
MPD: 4INCH PROFILE PLATE USED, MIS-A SINGLE BOWSPRING USED BELOW MPD

2.71 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY  
ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST

CALIPER FAILED TO OPEN, LOGS CALCULATED BACK TO BIT SIZE

DRILL PIPE DEPTH DURING DEPLOYMENT: 9500  
 LOGGING TOOL DEPTH AFTER DEPLOYMENT: 9581

SERVICE ORDER # 3536737  
 RIG: LARIAT 45

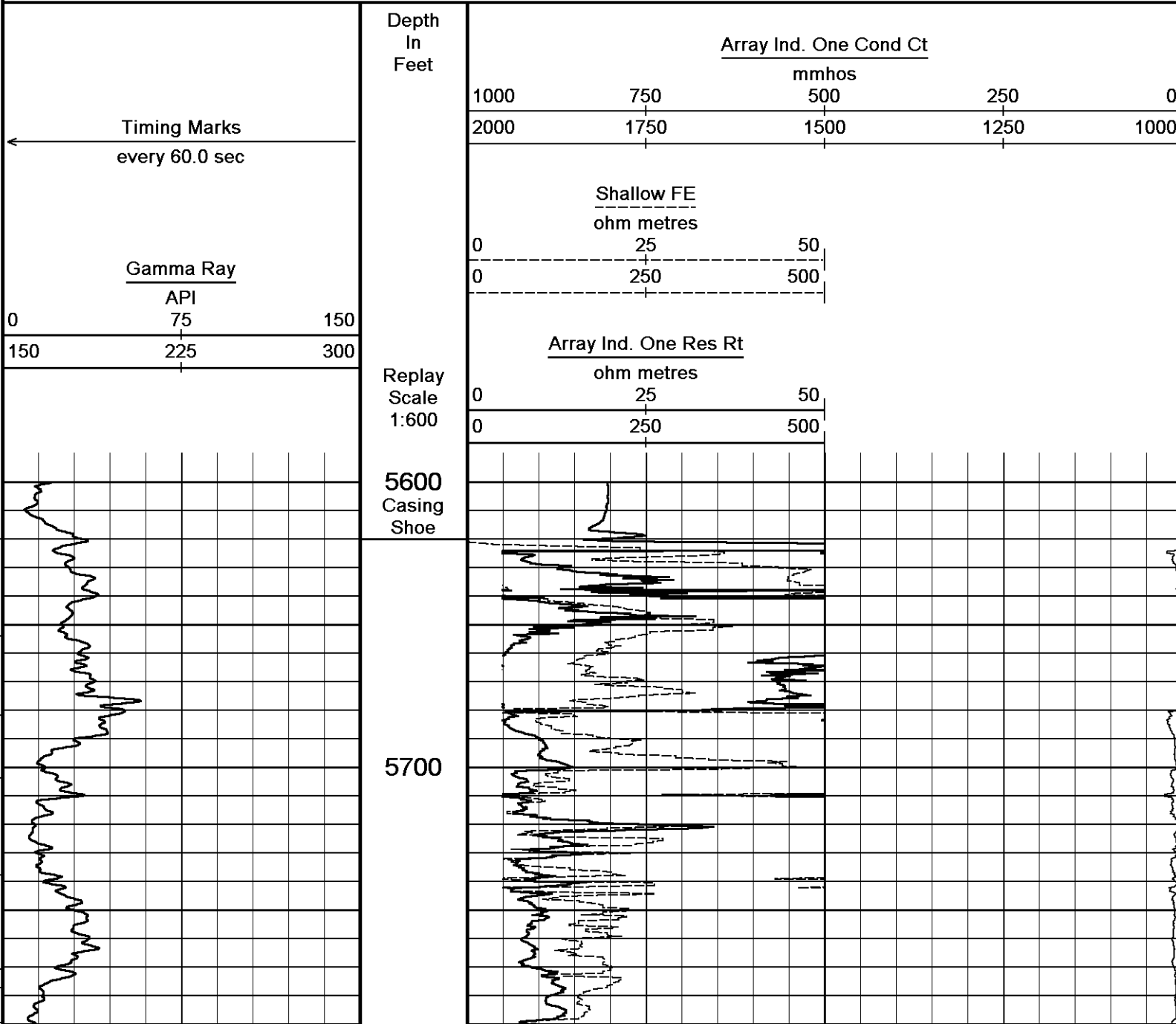
OPERATOR(S): G GARCIA, R CASPARIAN

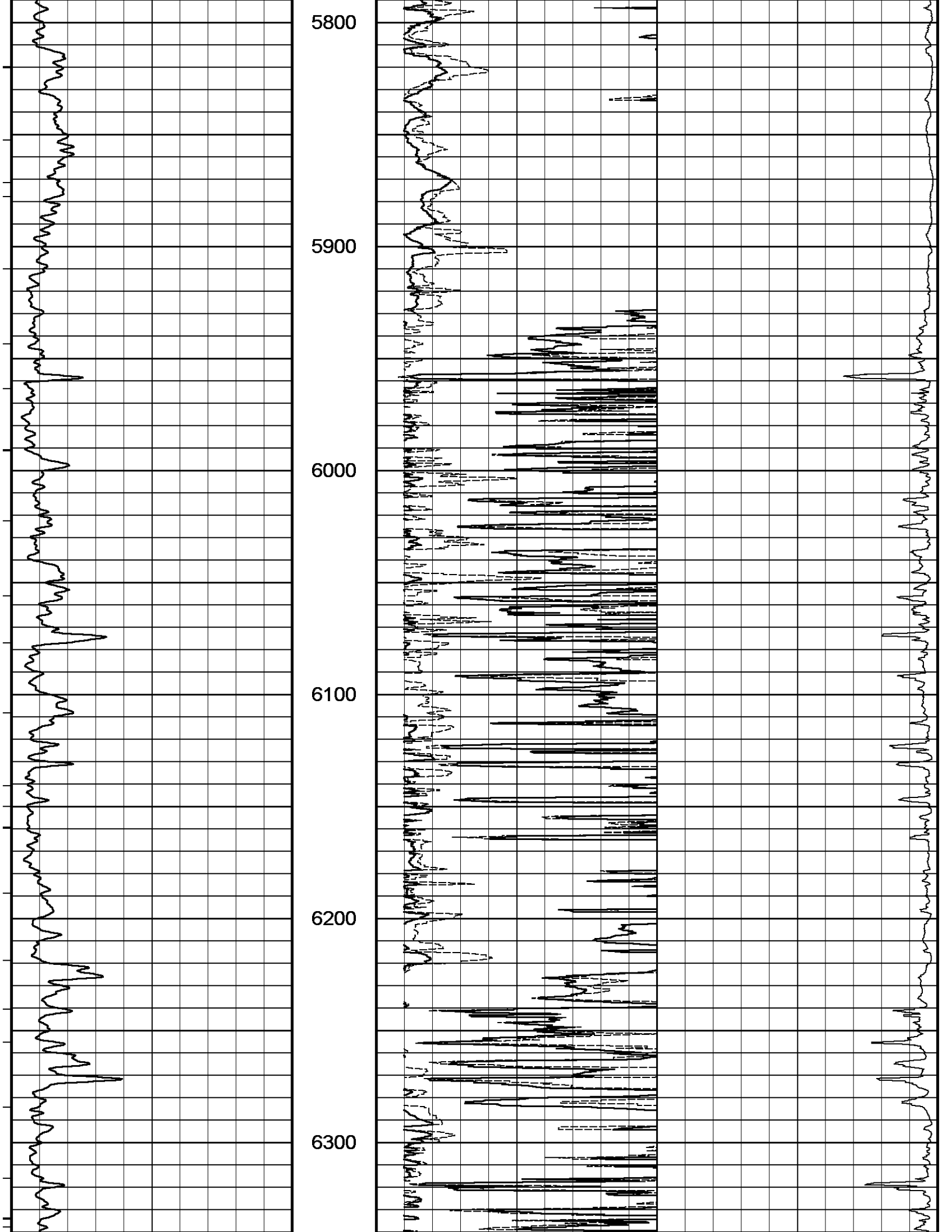
HOLE RUGOSITY MAY AFFECT LOG QUALITY.

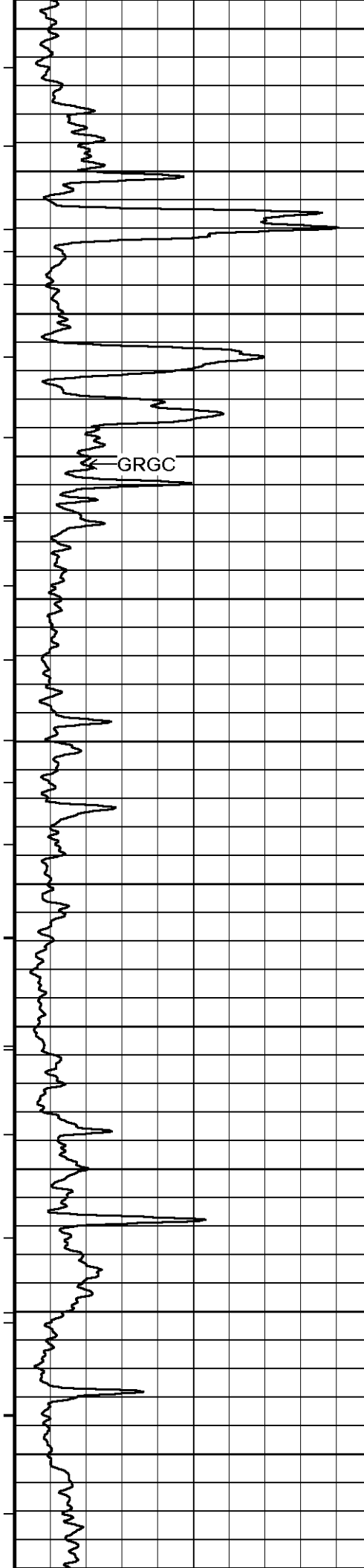
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions in our price schedule.

**2 INCH MAIN LOG**

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 03-SEP-2012 02:17  
 Filename: C:\Data\15033216610100\_Ruby 3119 2-20H\26487RTAP.dta Recorded on 02-SEP-2012 23:43  
 System Versions: Processed with 13.03.7779 Plotted with 13.03.7779







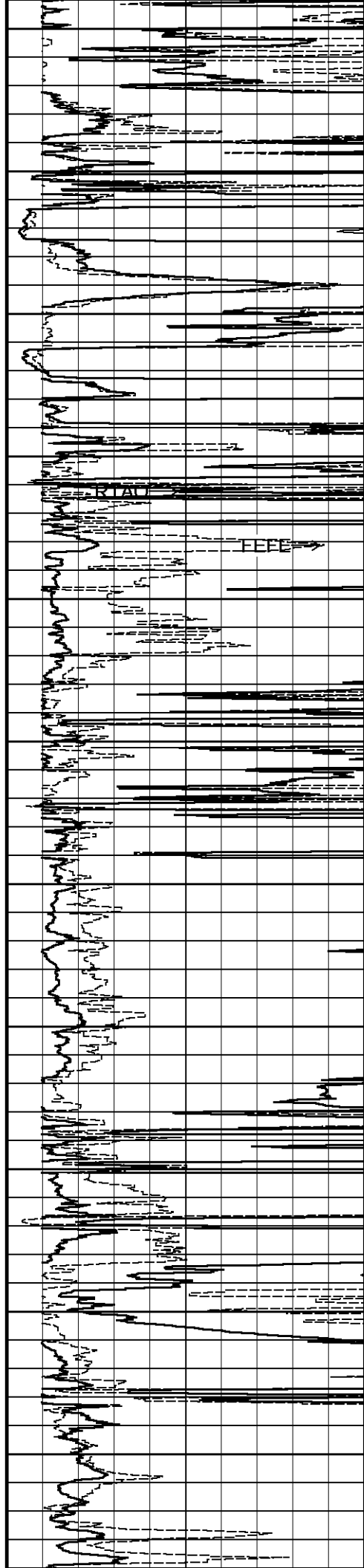
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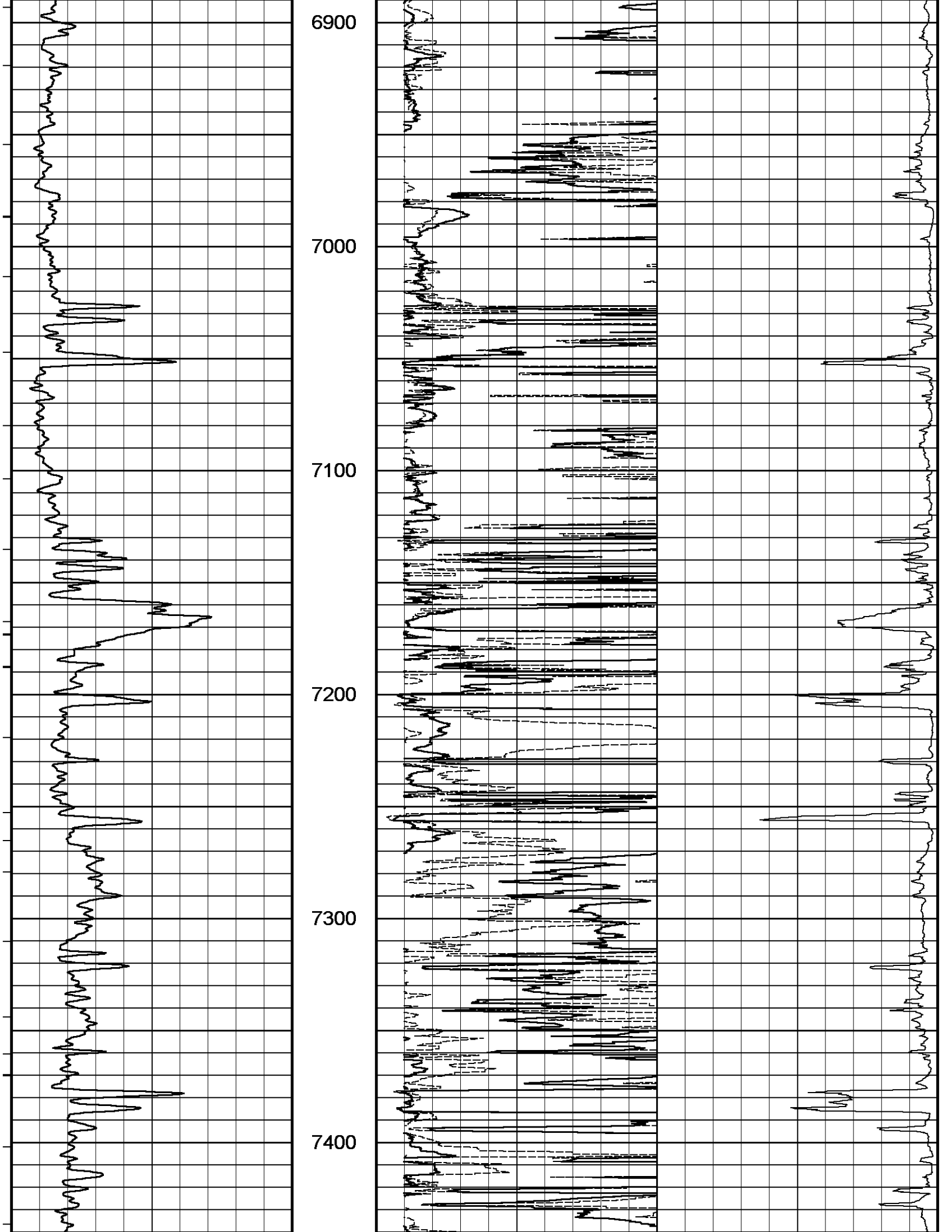
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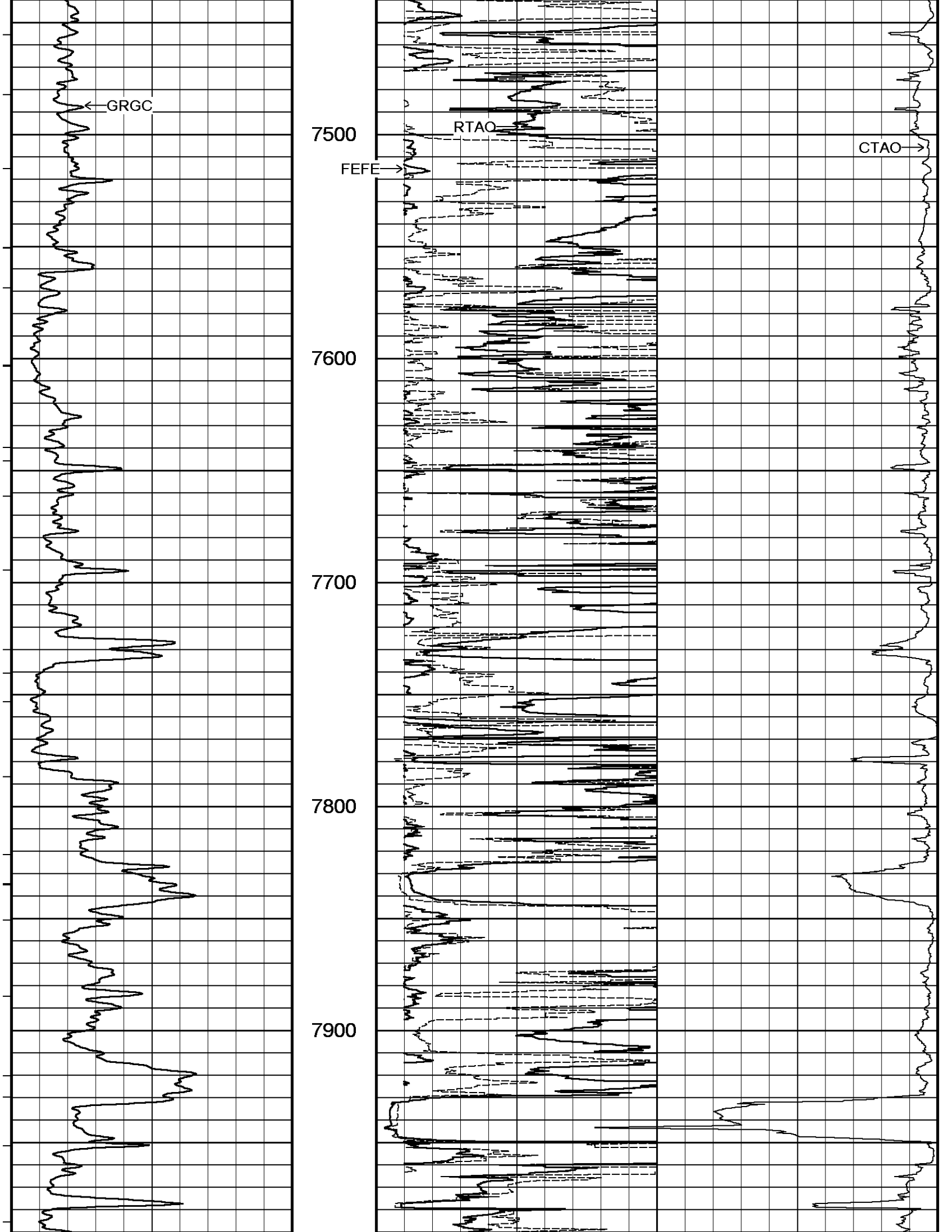
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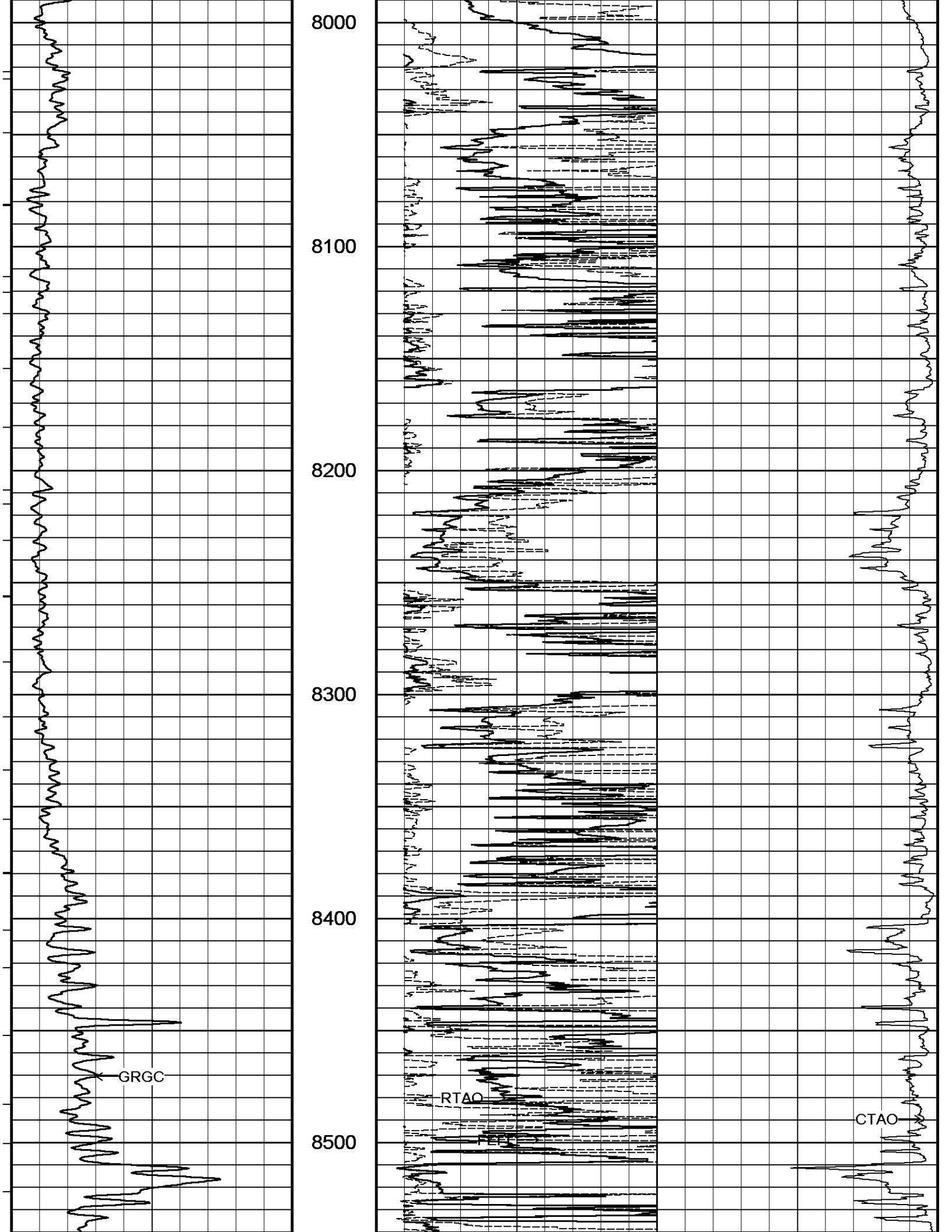
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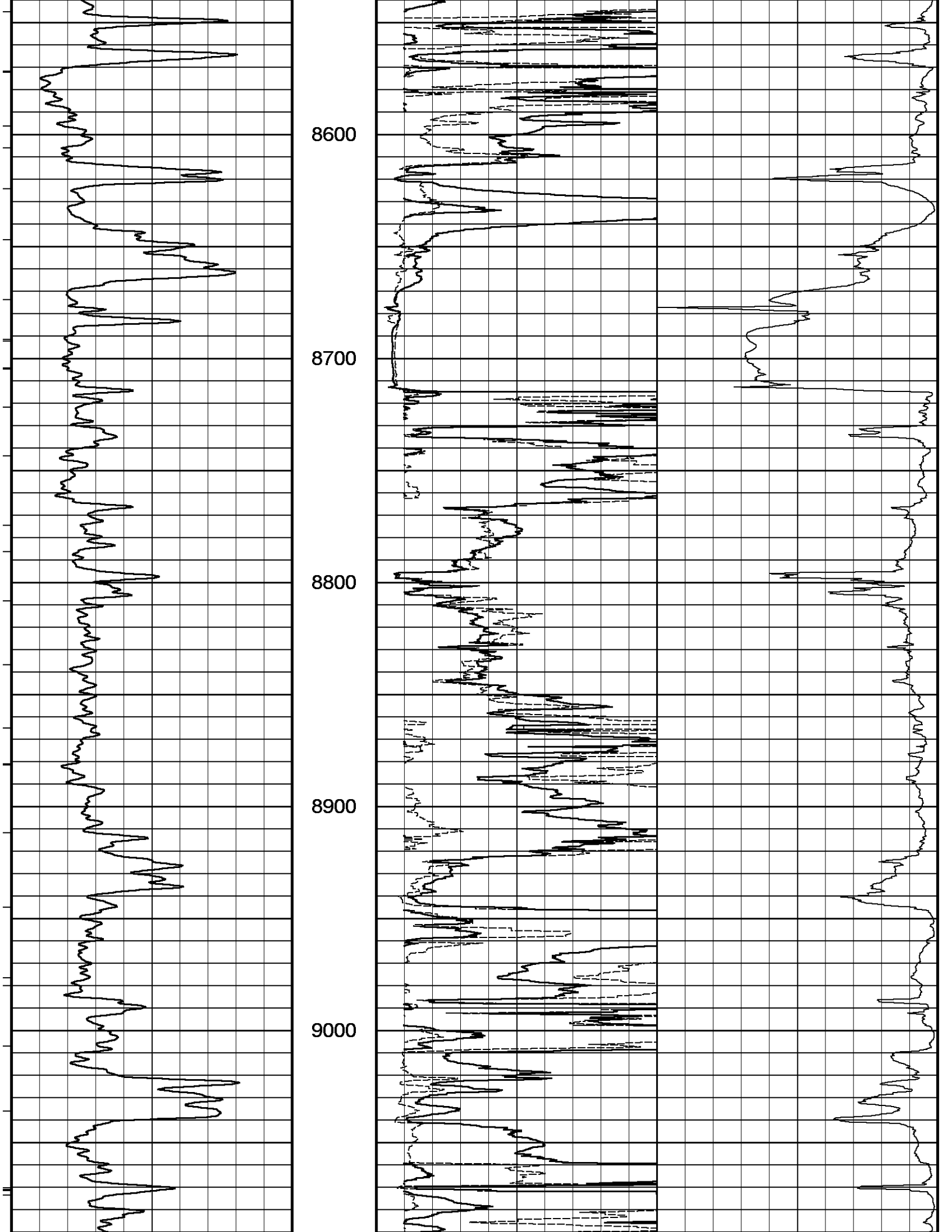


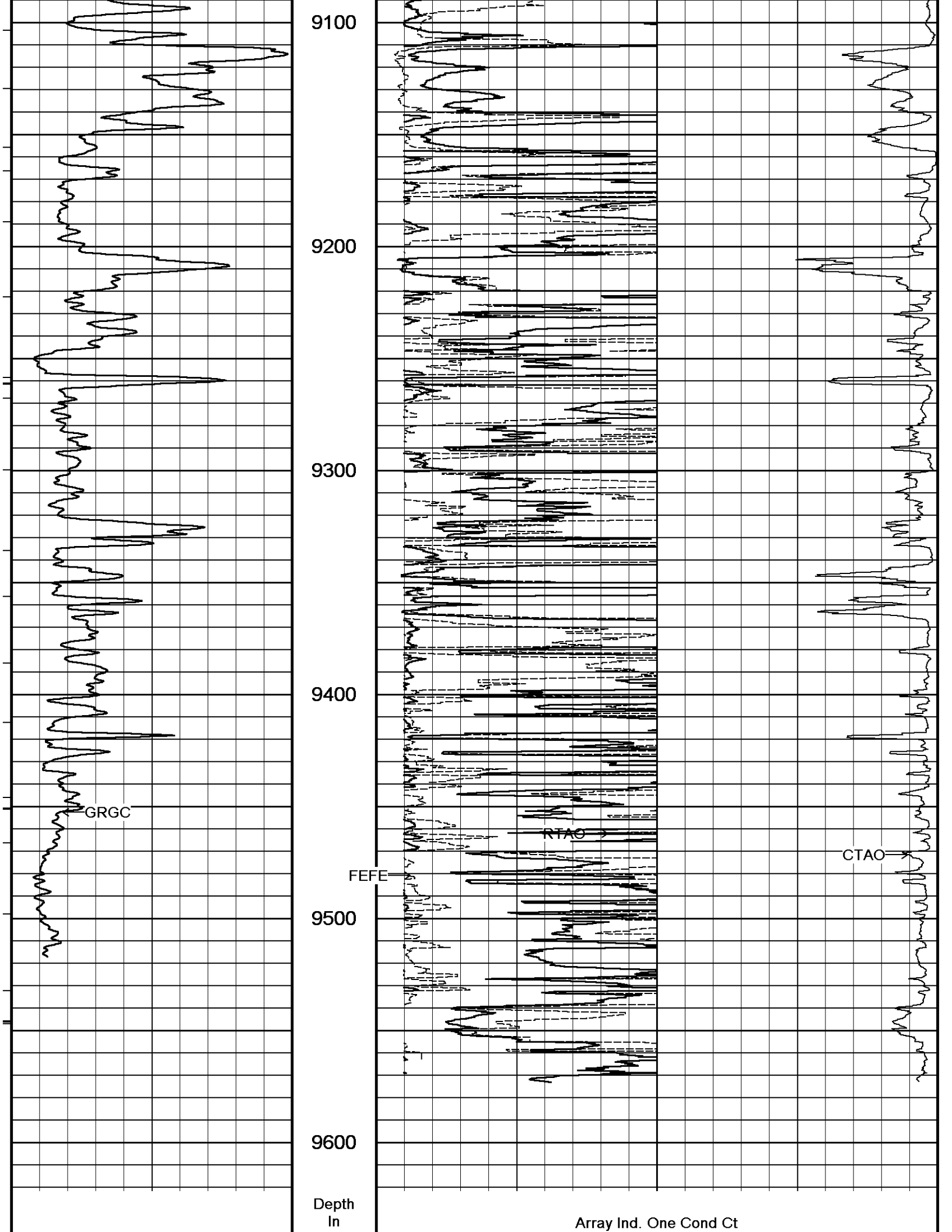
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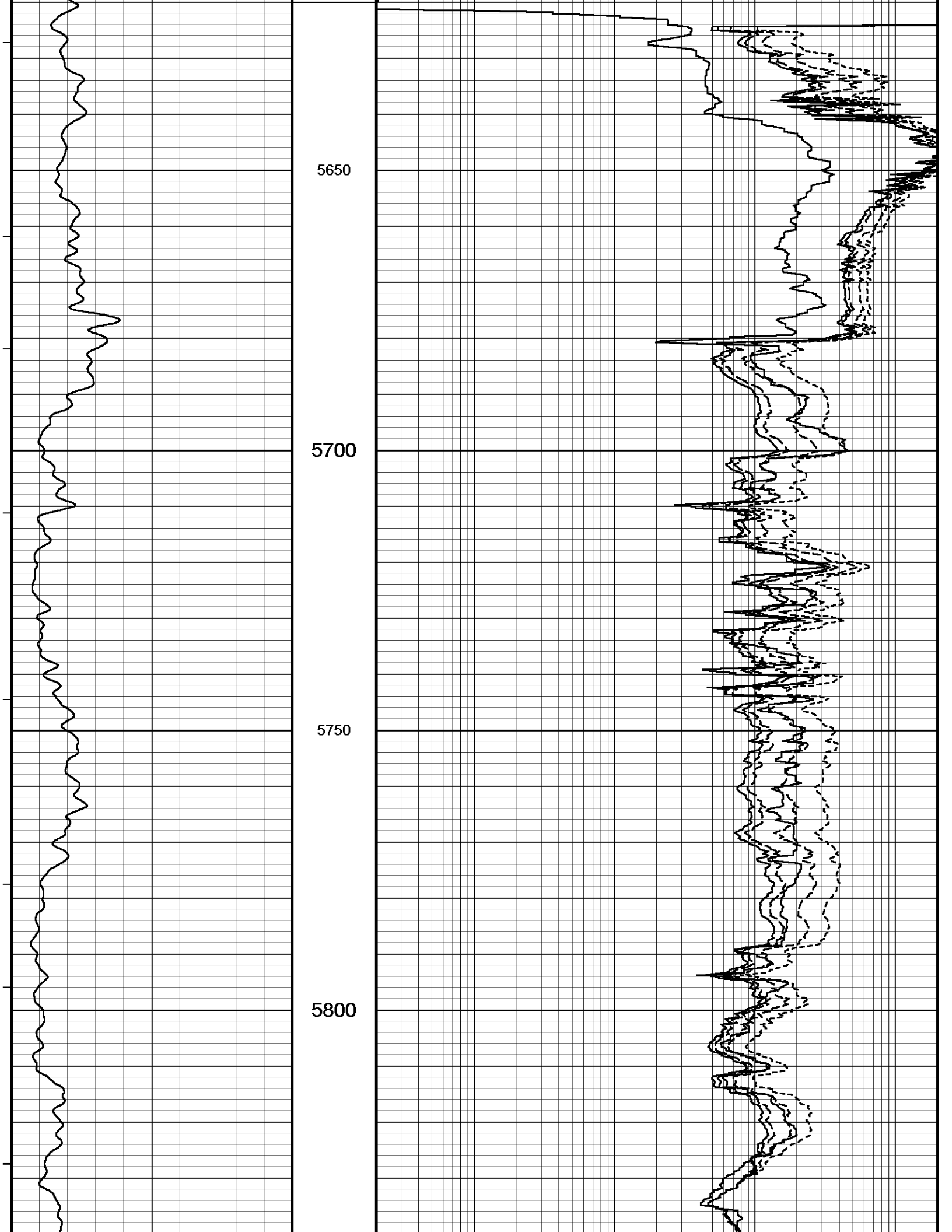


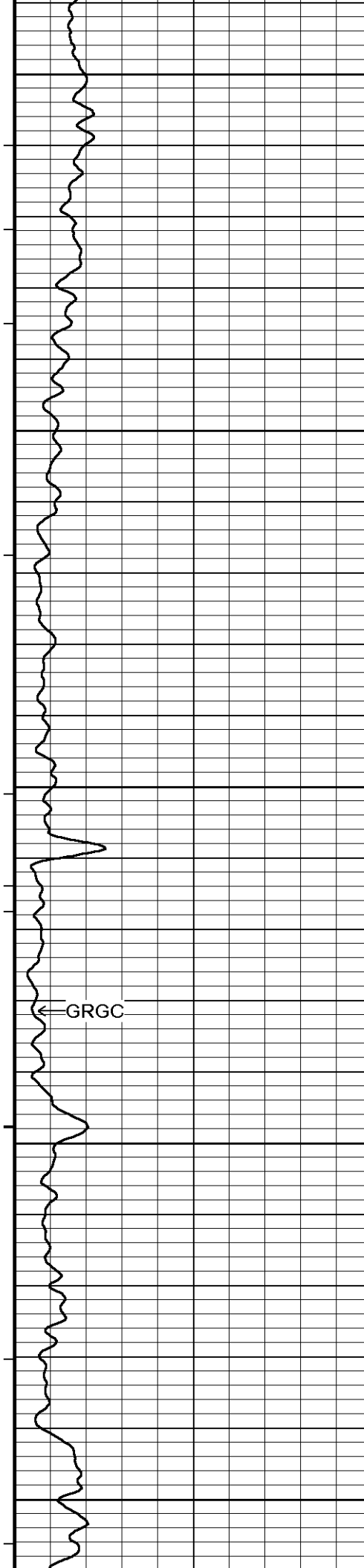












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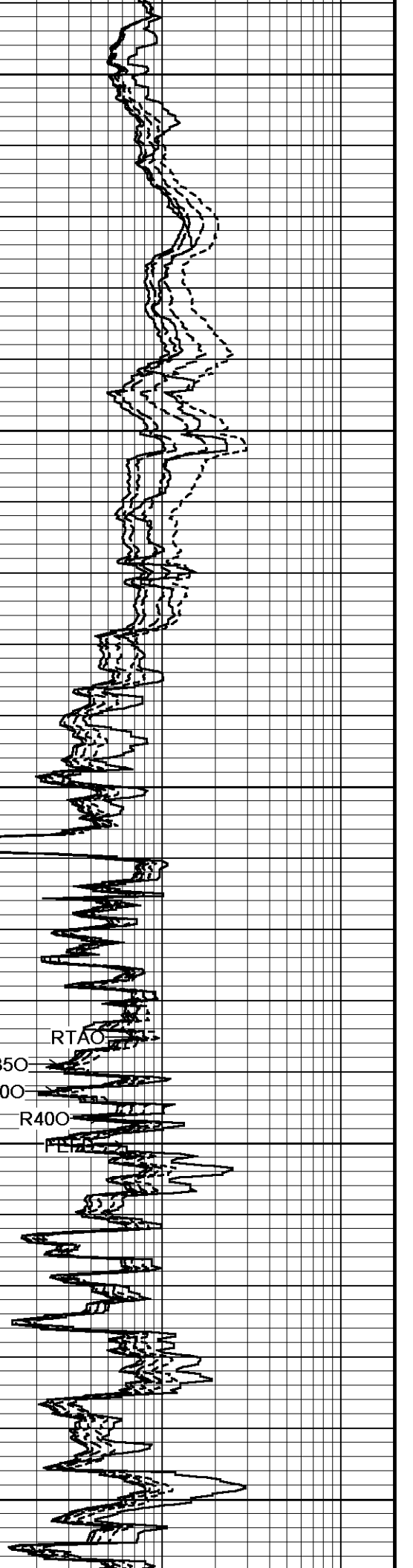
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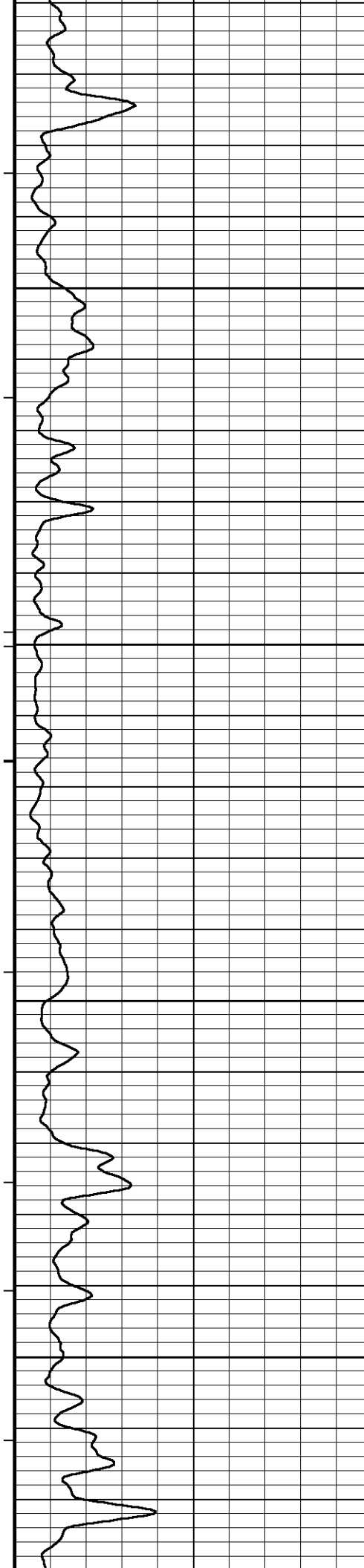
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6000

6050

RTAO  
R850  
R600  
R400  
FLZ



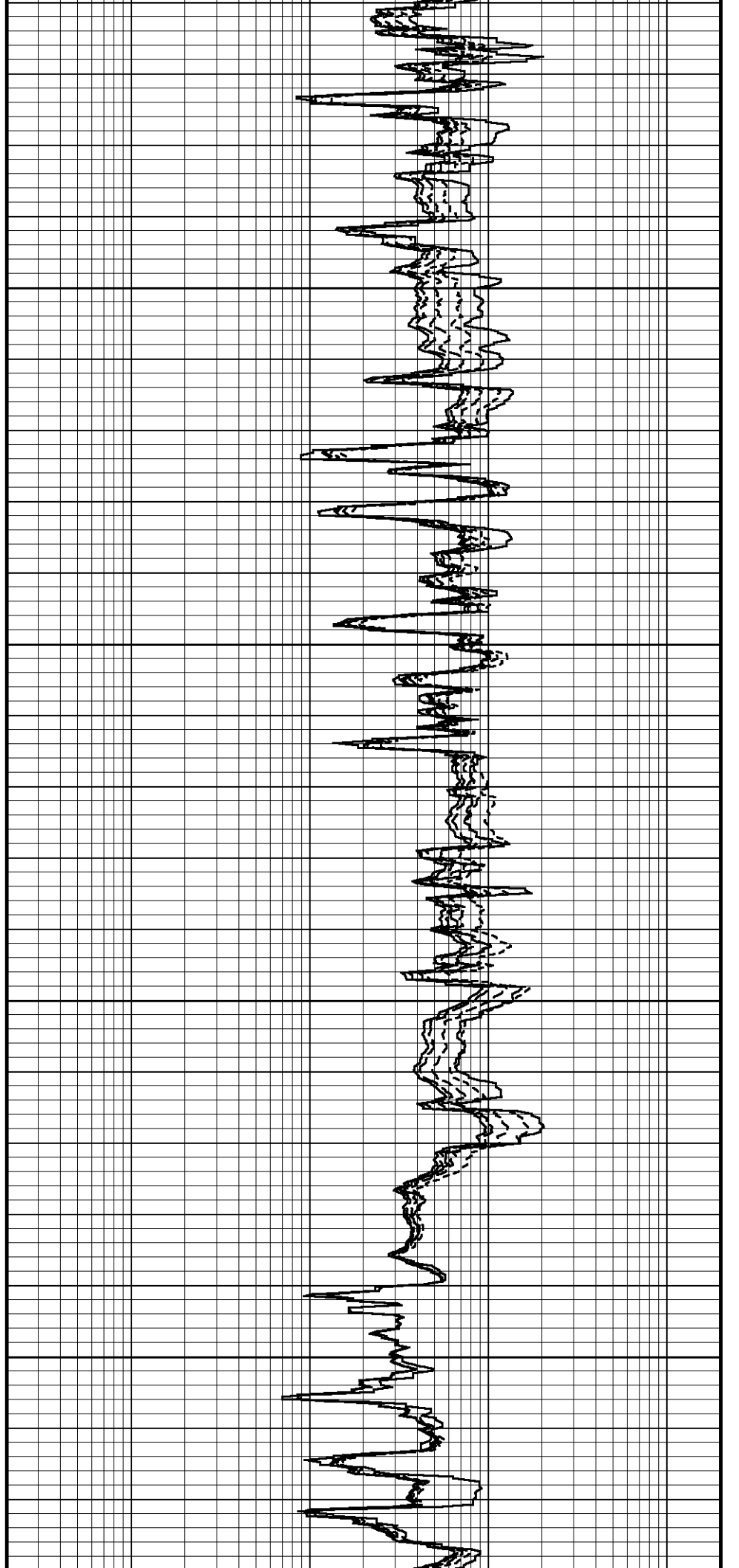


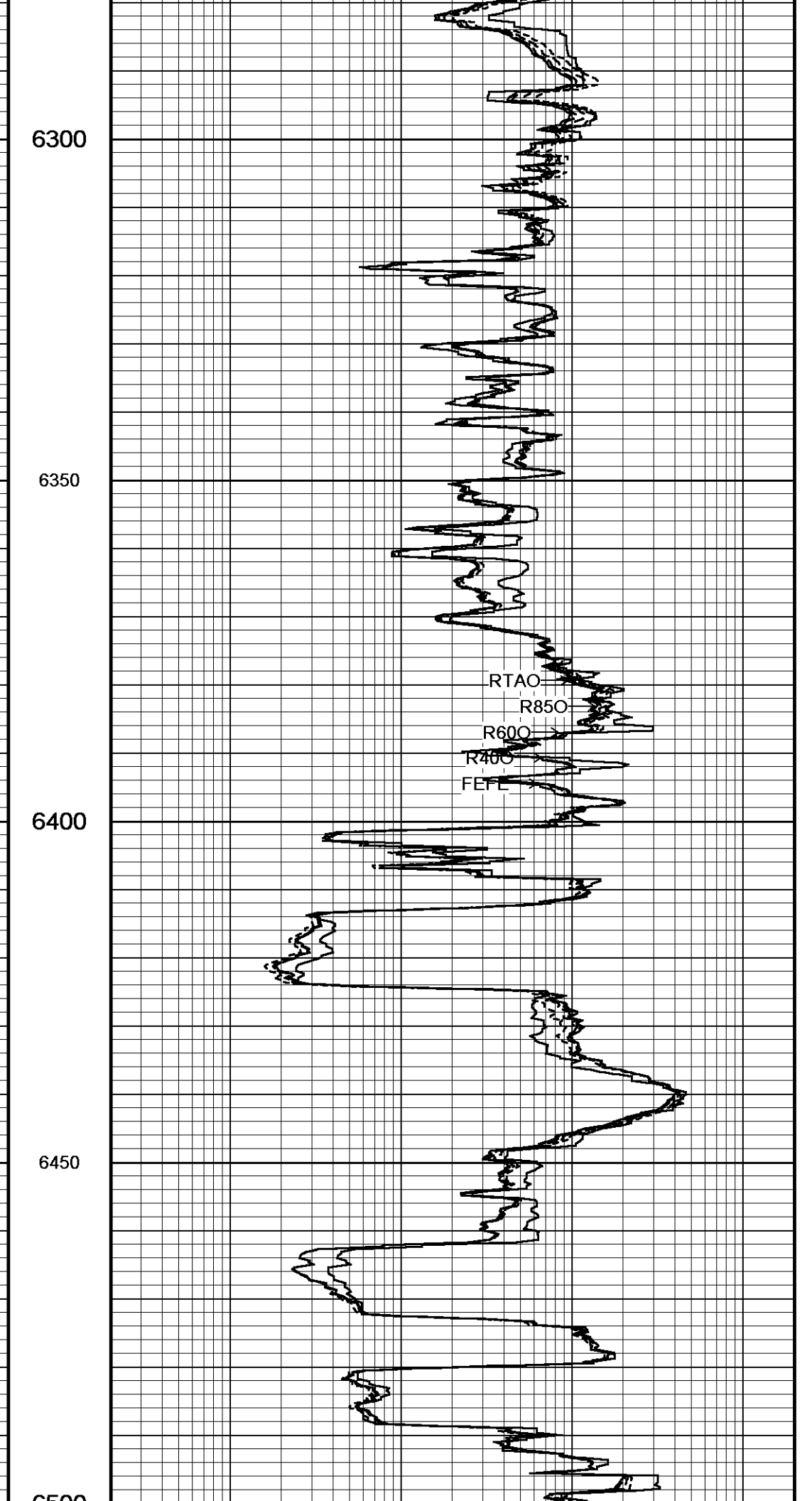
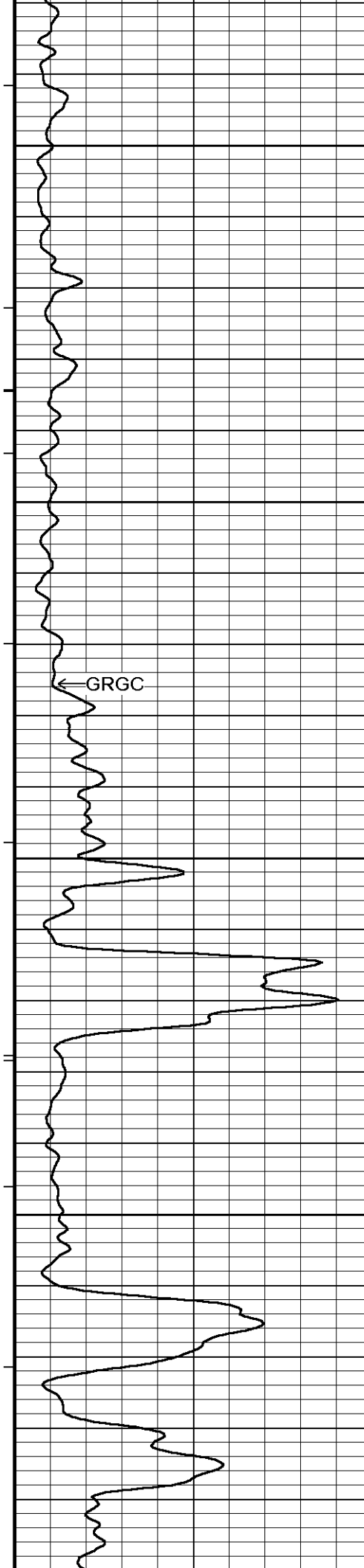
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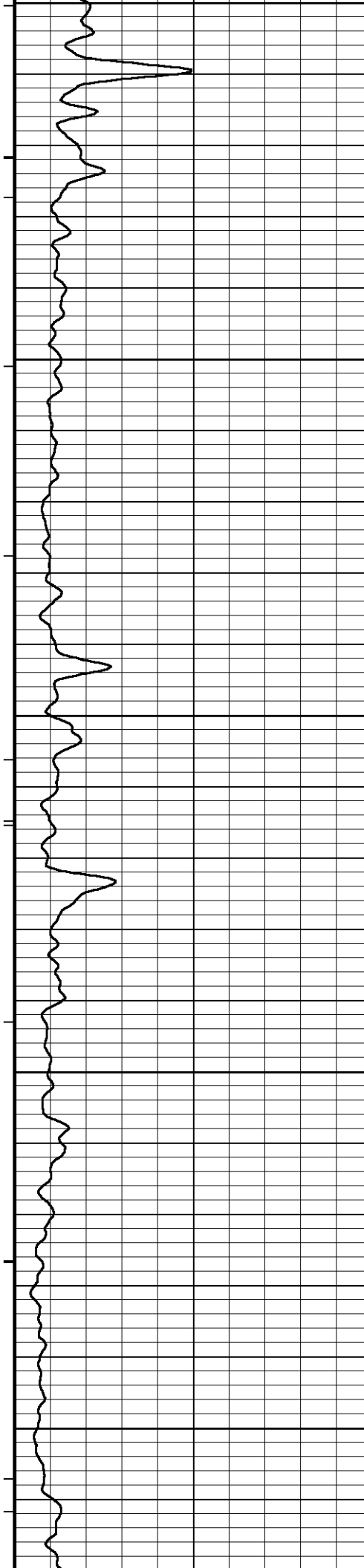
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6200

6250







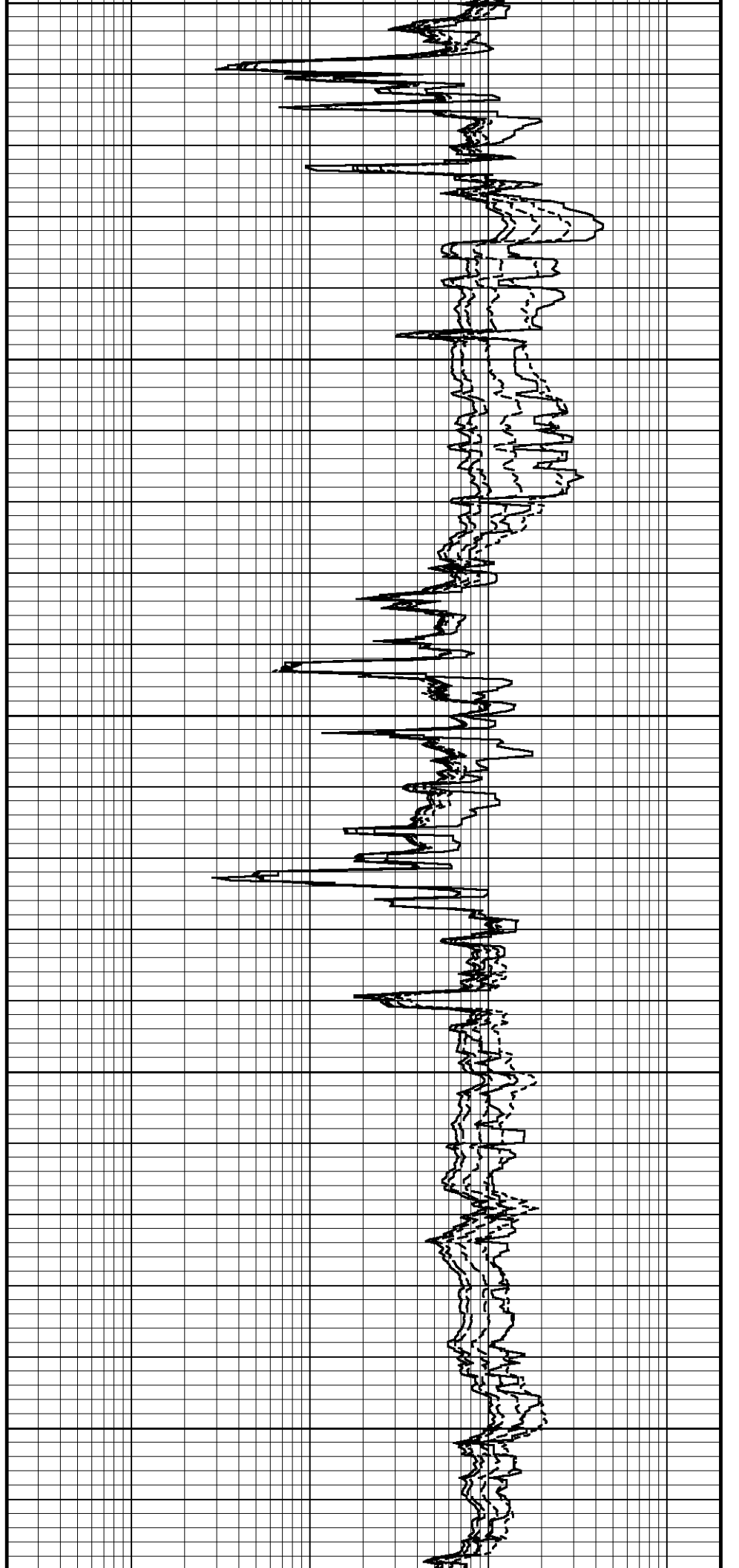
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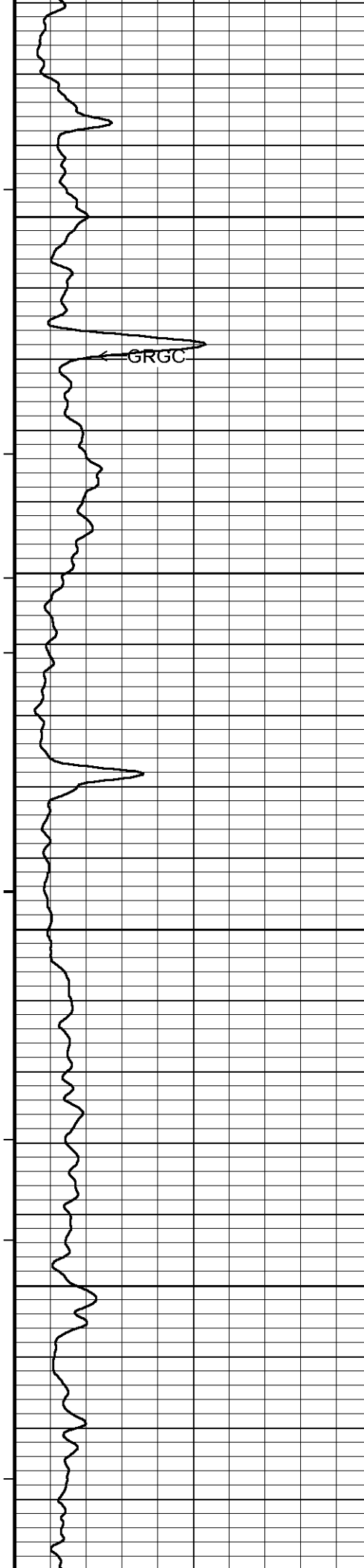
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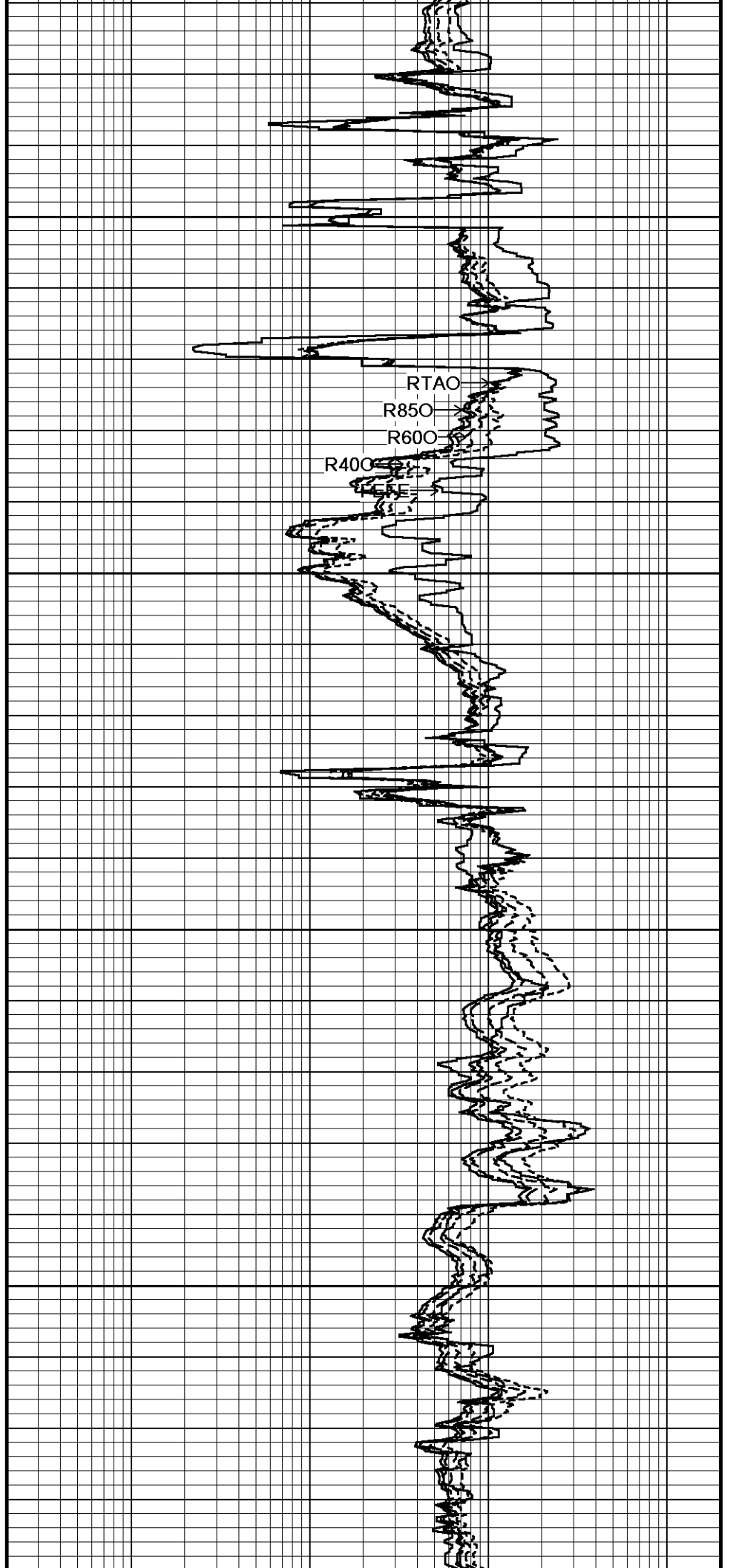


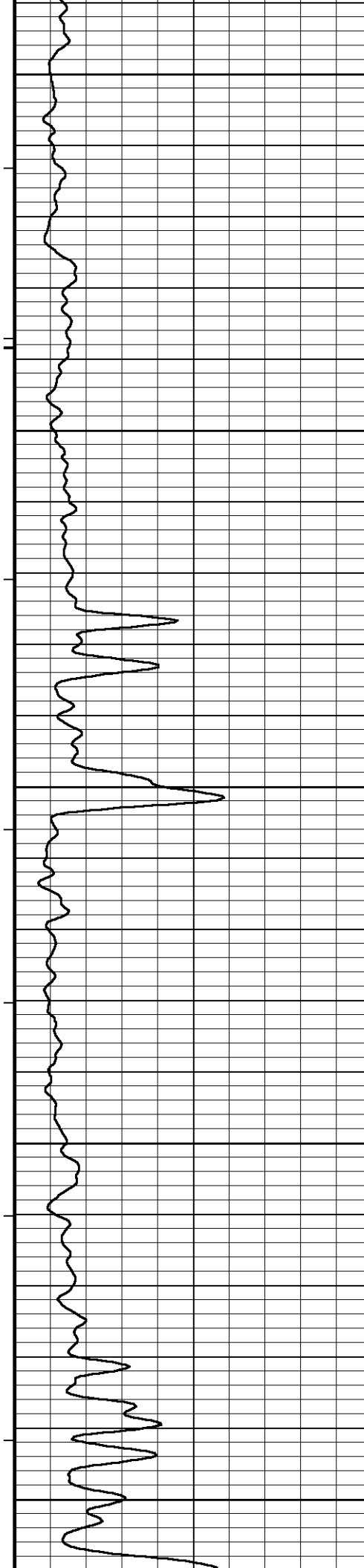
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6900





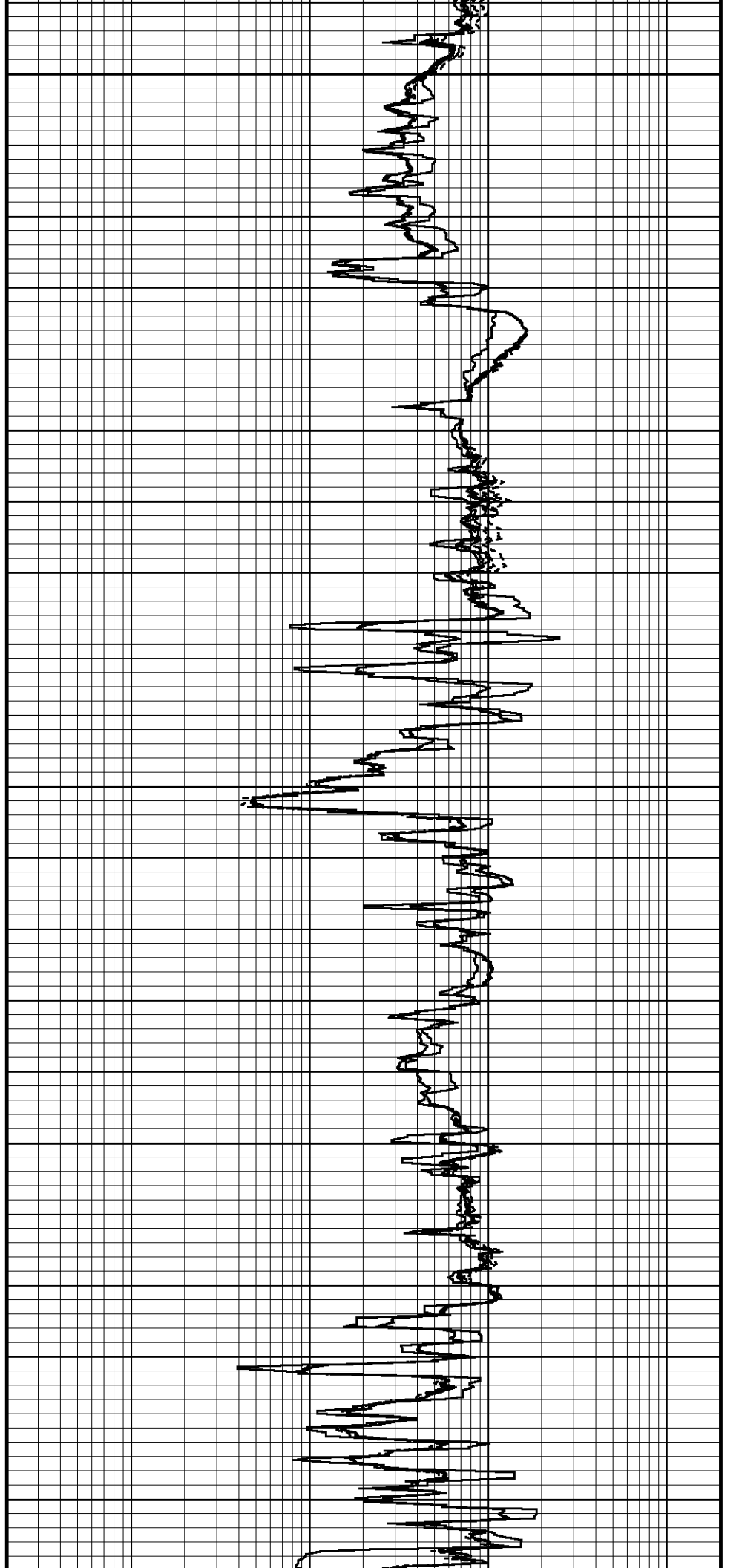
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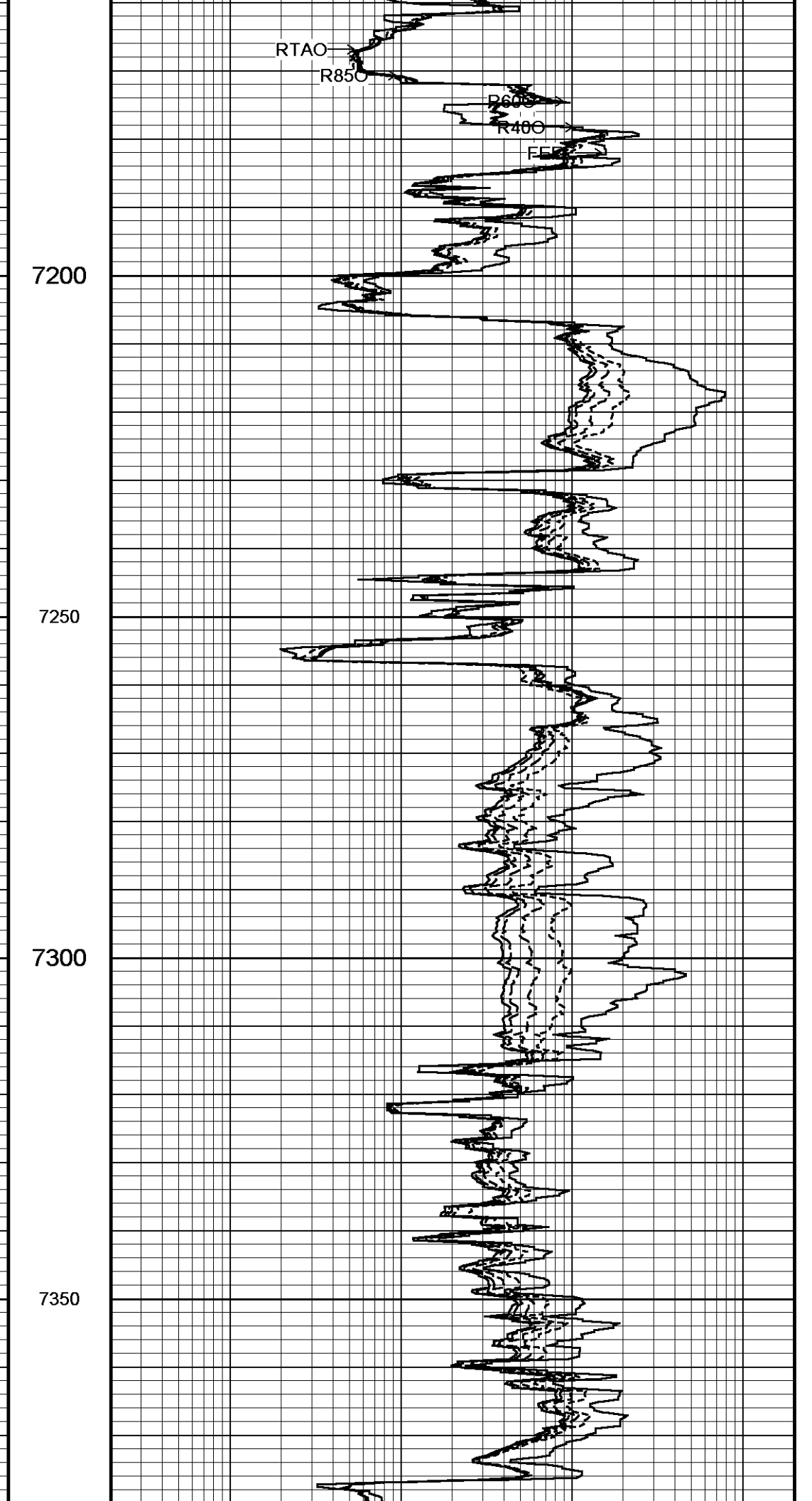
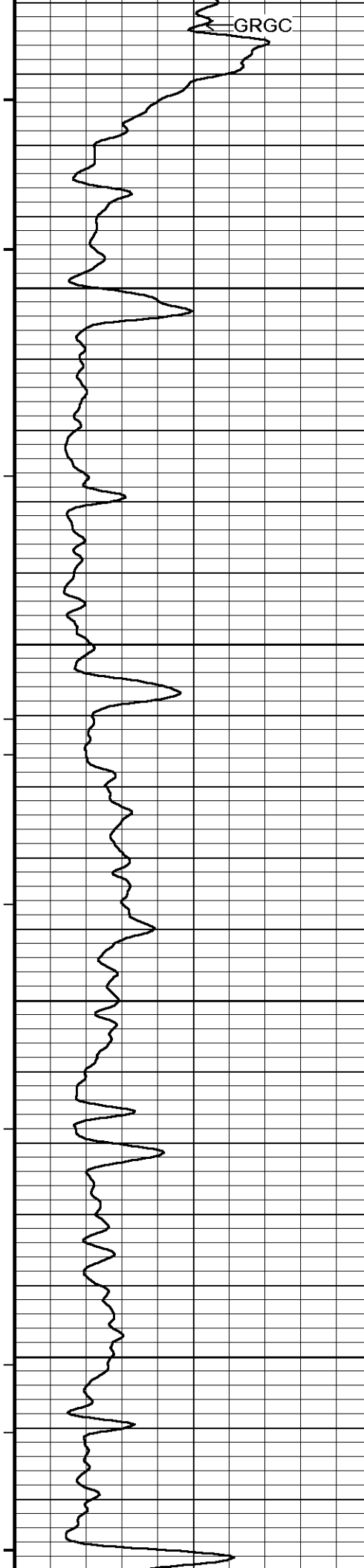
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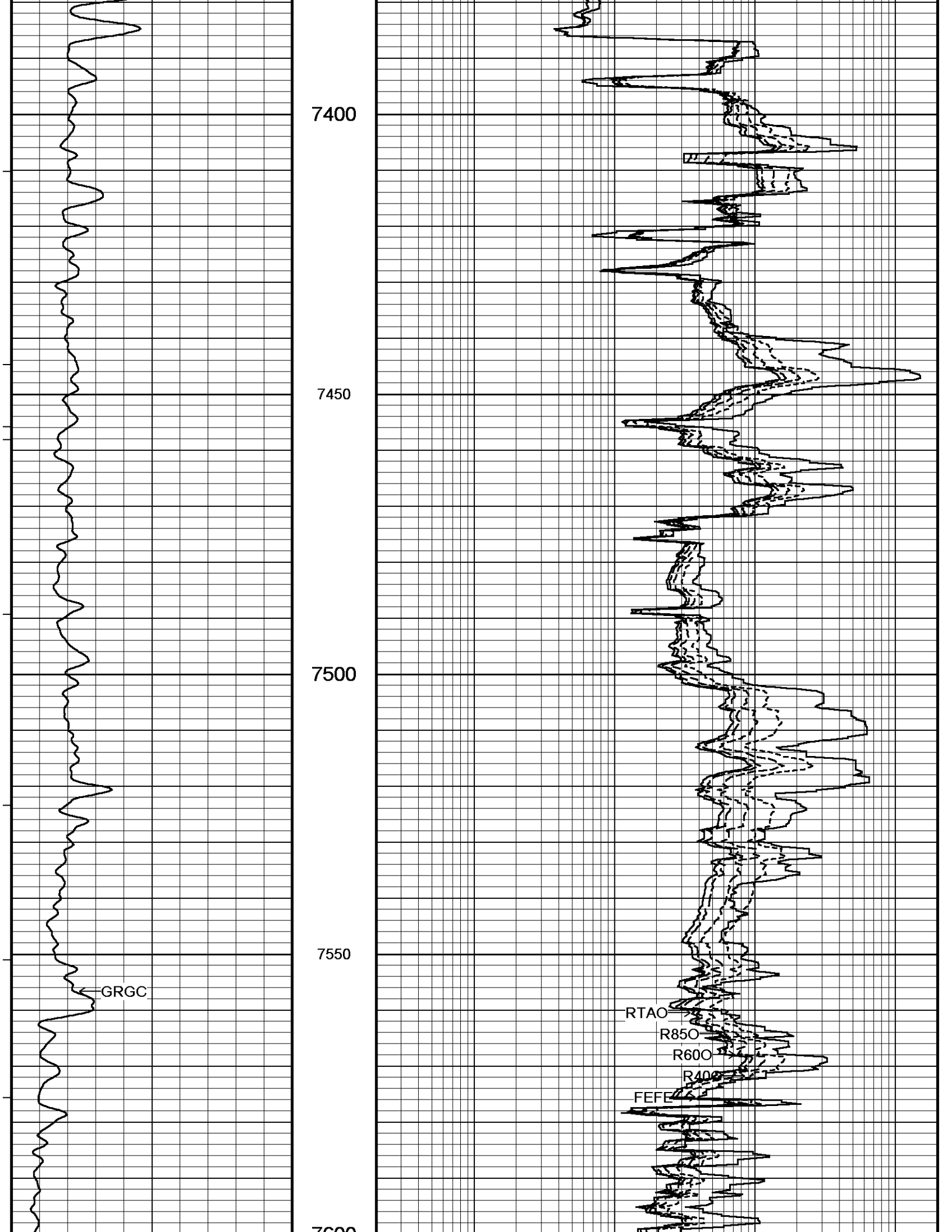
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7100

7150







7400

7450

7500

7550

7600

GRGC

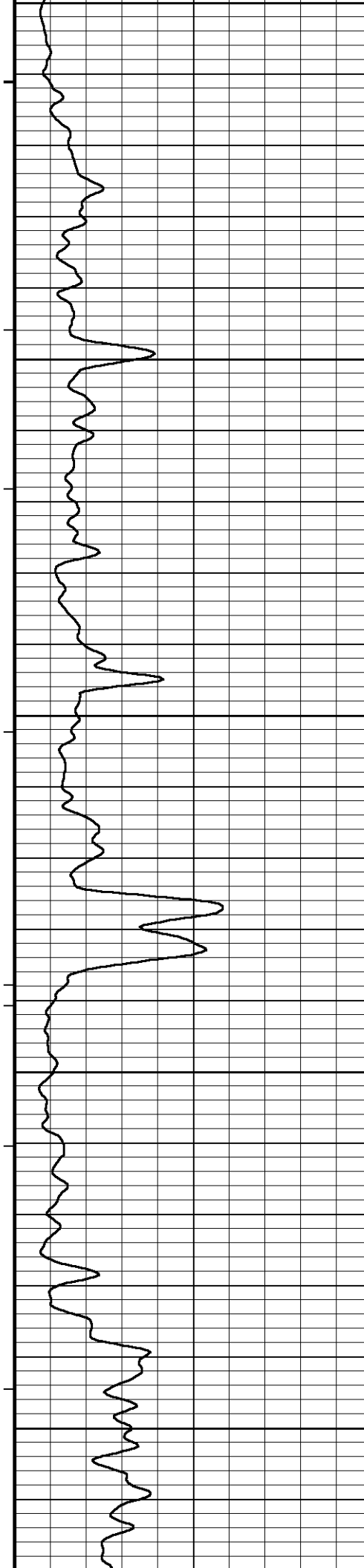
RTAO

R850

R600

R400

FEFE



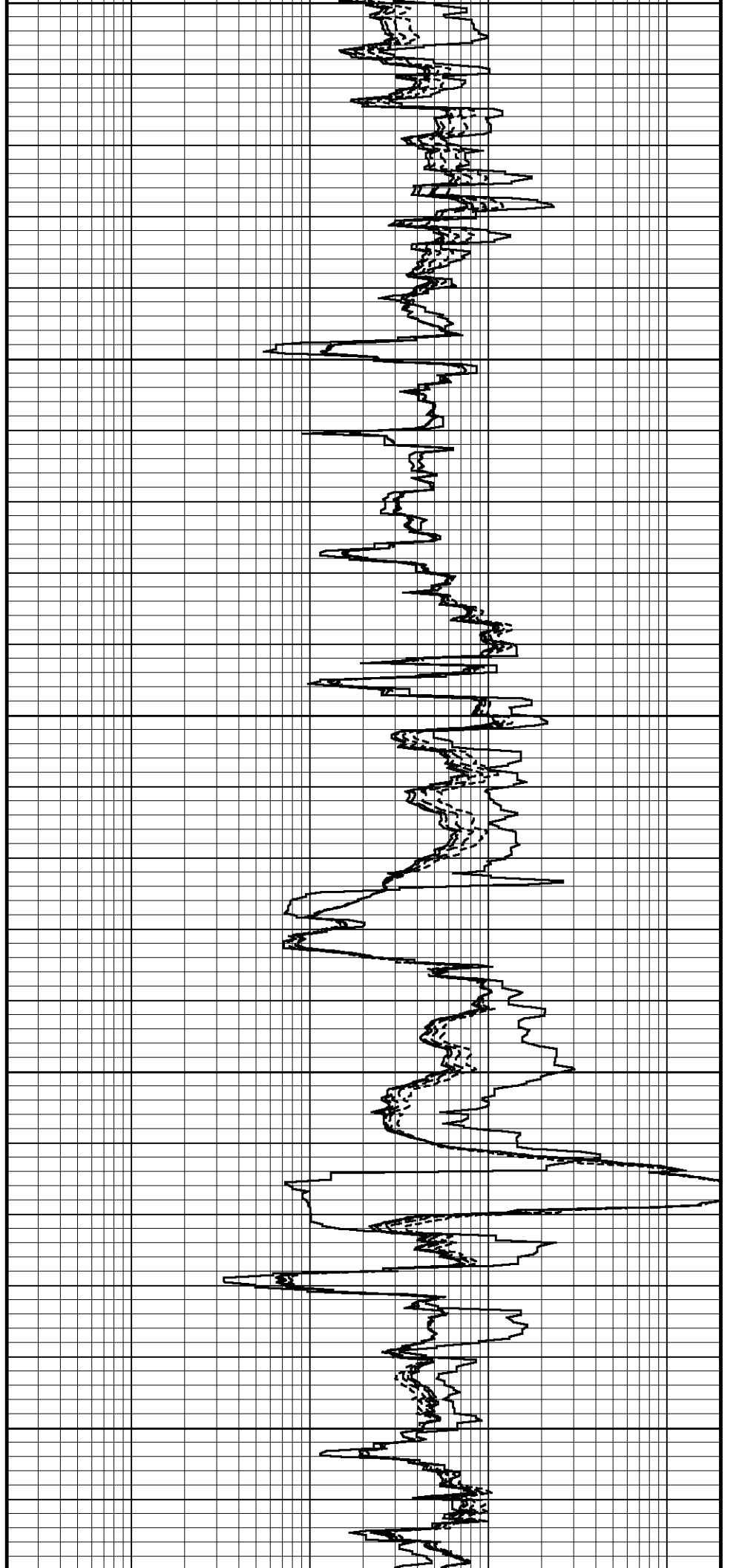
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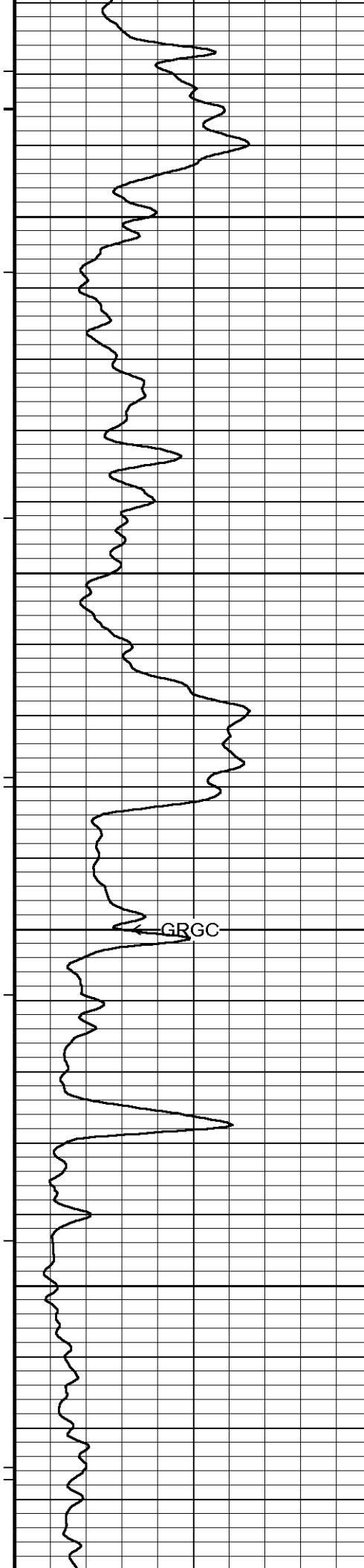
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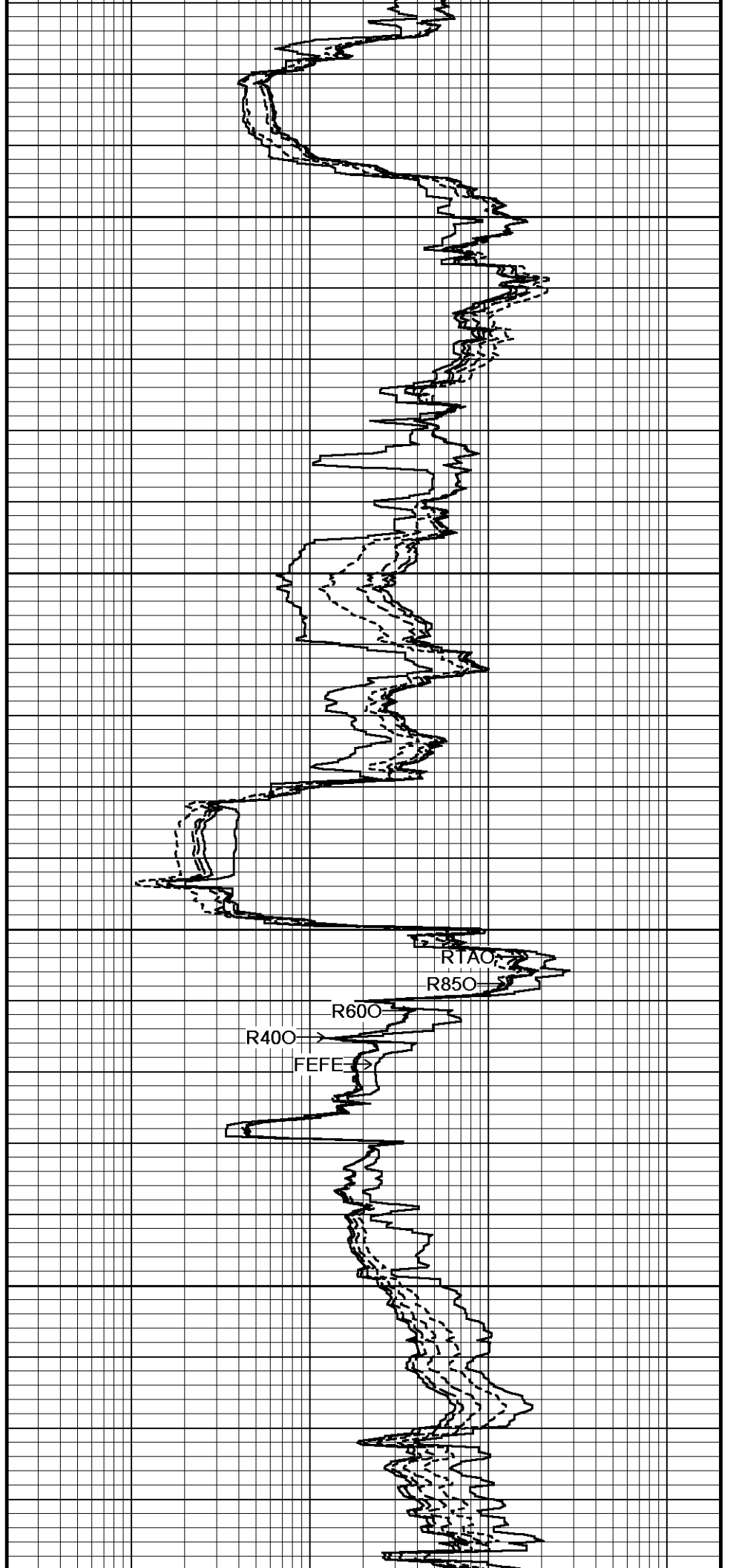
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7900

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8000

GRGC



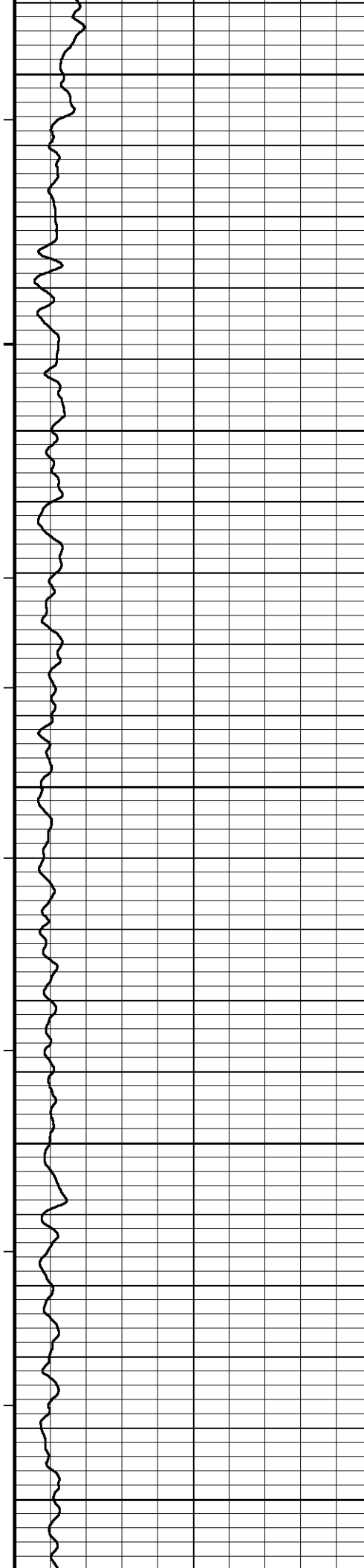
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R600

FEFE

RTAO

R850



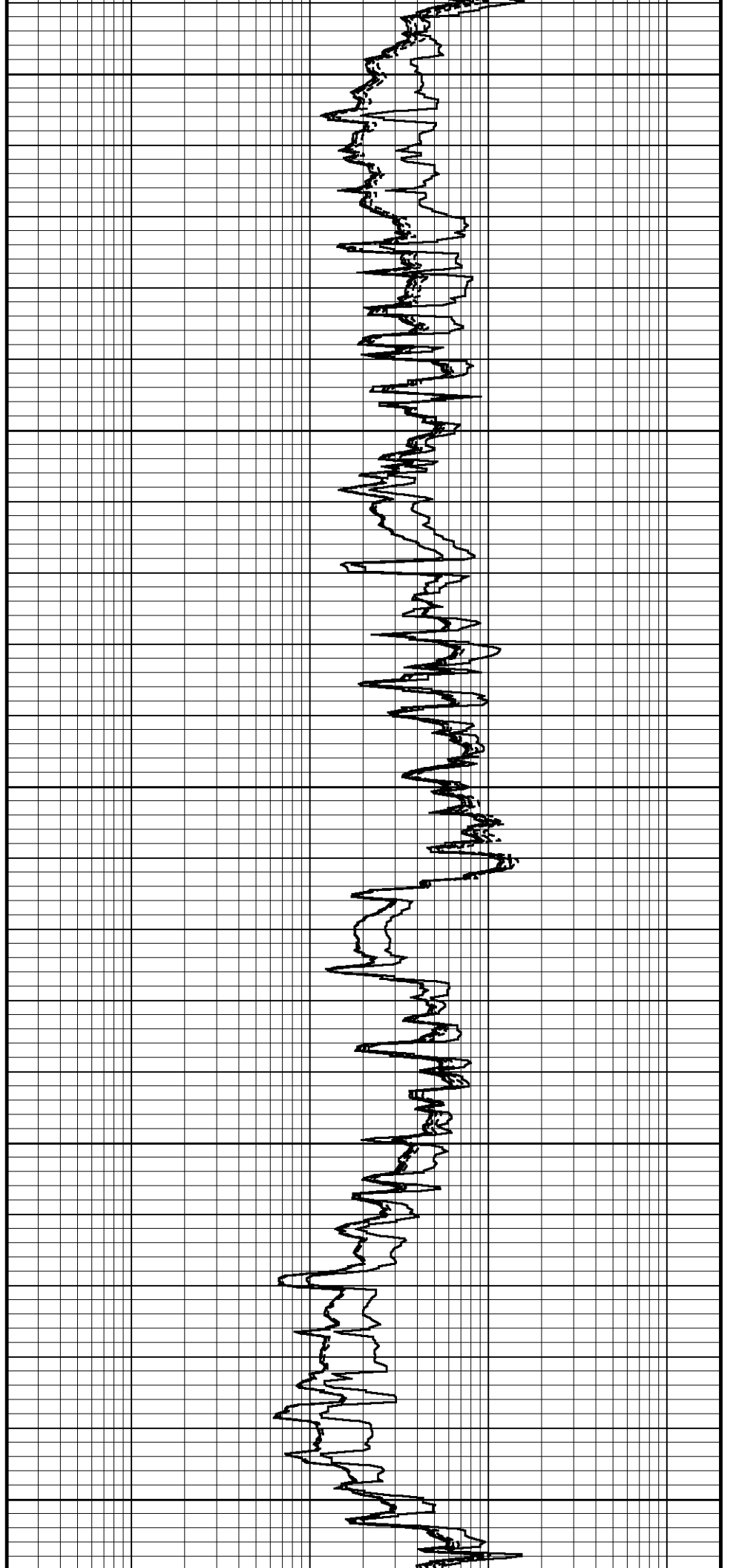
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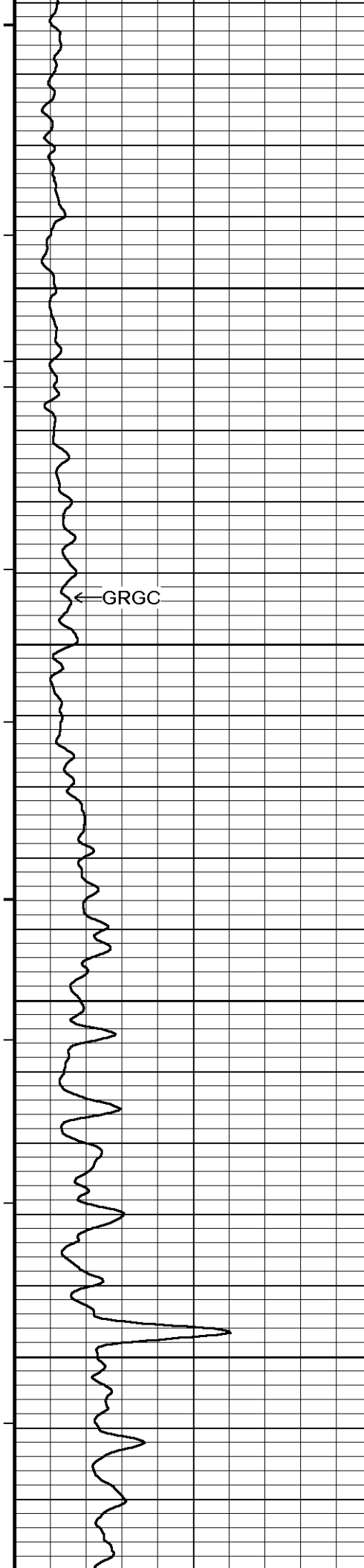
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8150

8200

8250





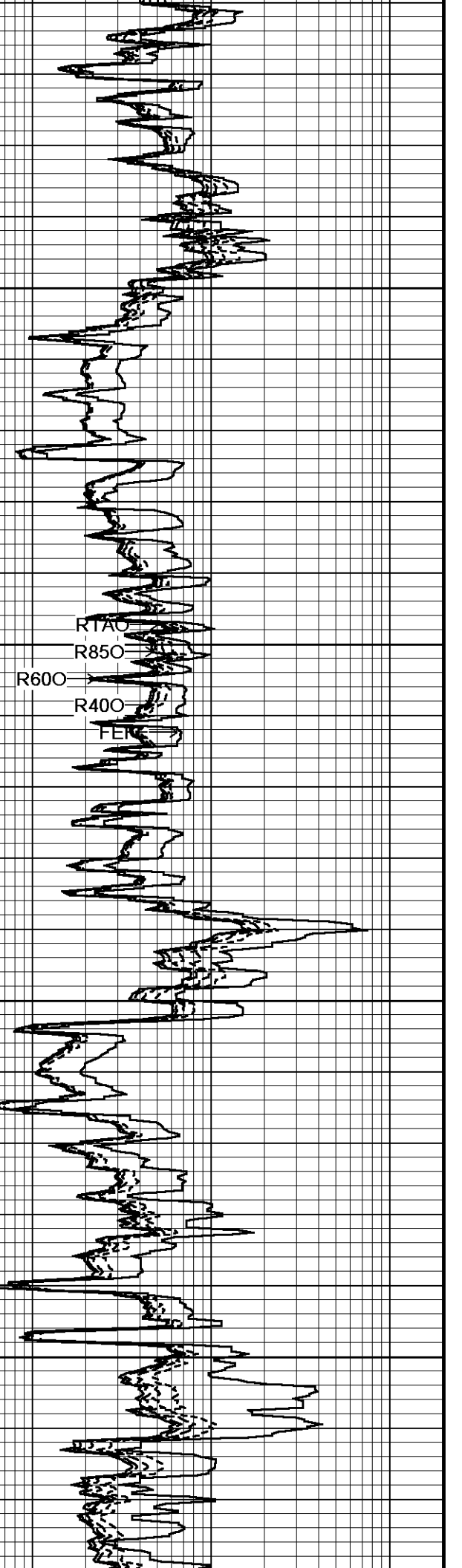
← GRGC

8300

8350

8400

8450



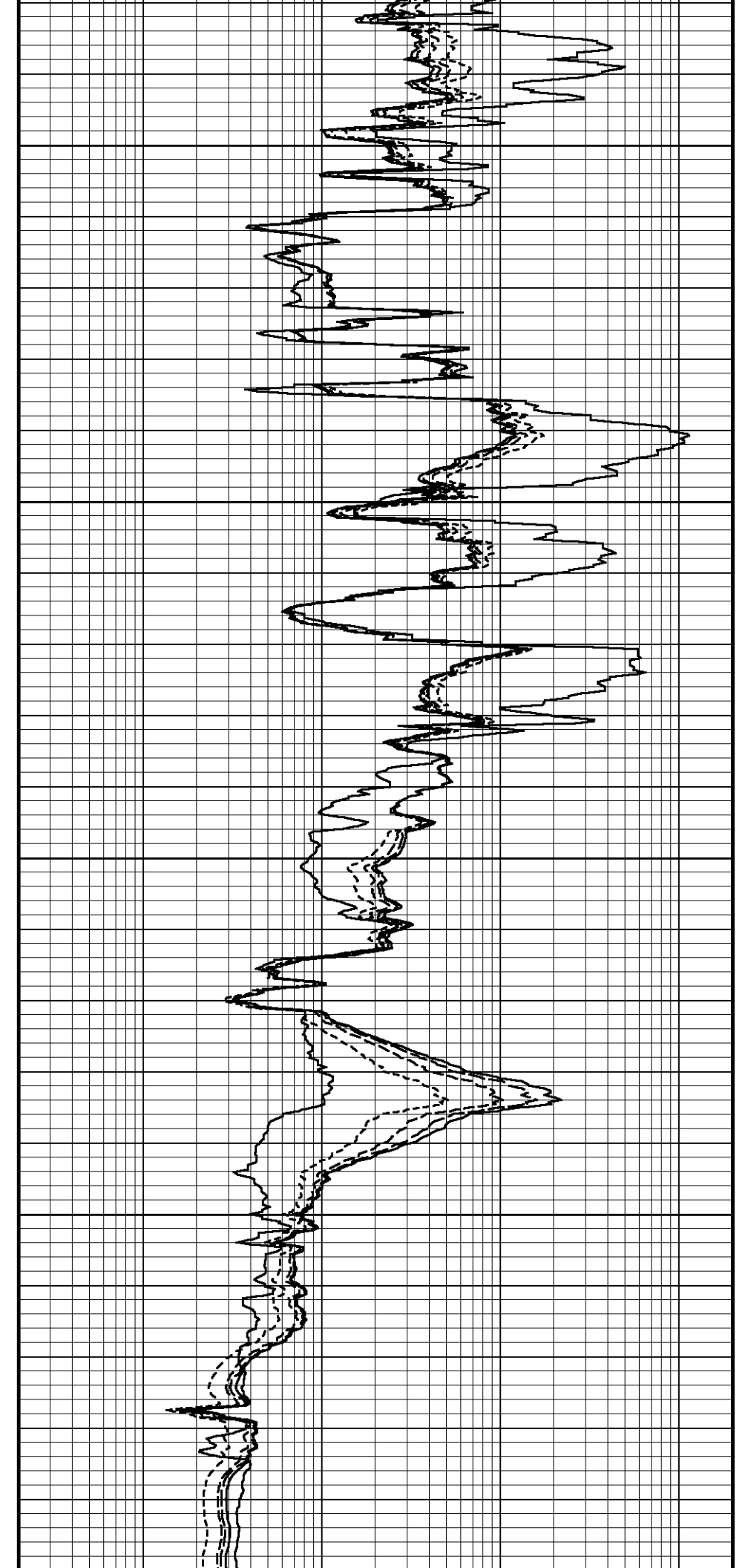
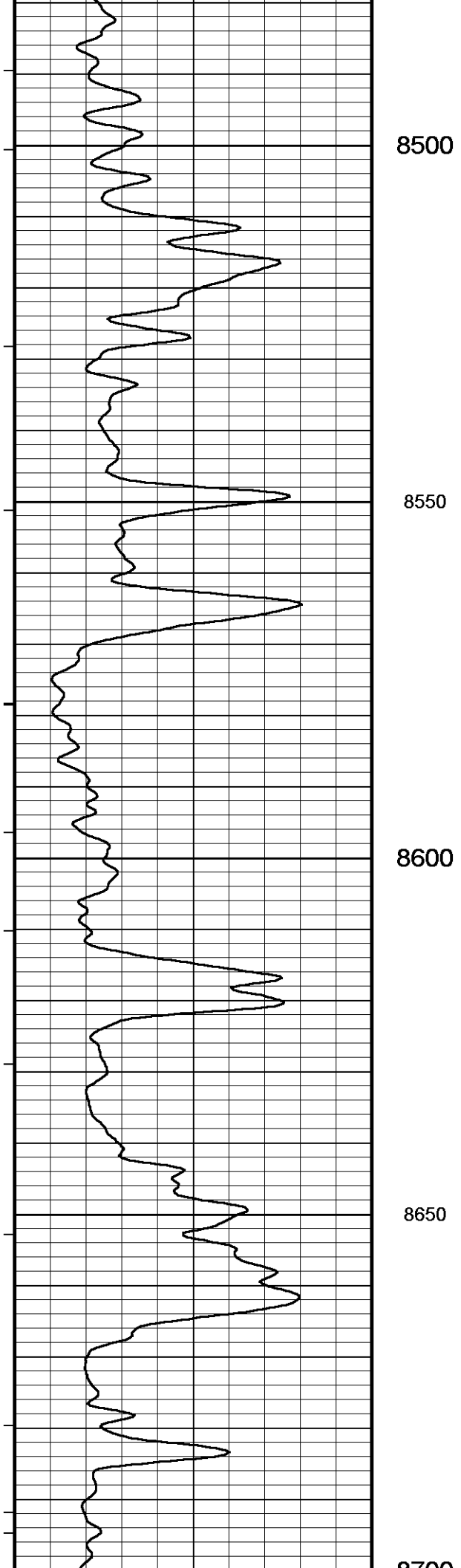
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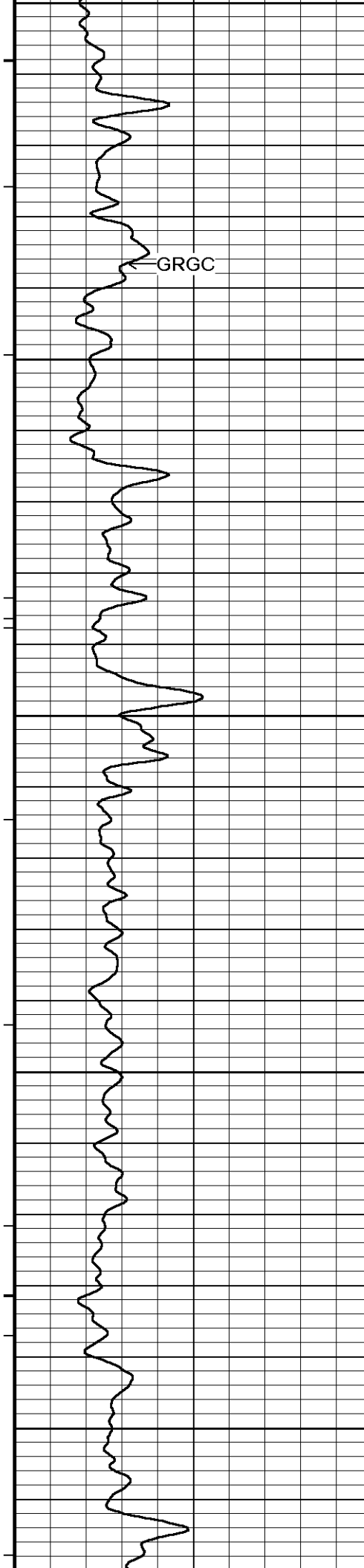
R850

R600

R400

FER





GRGC

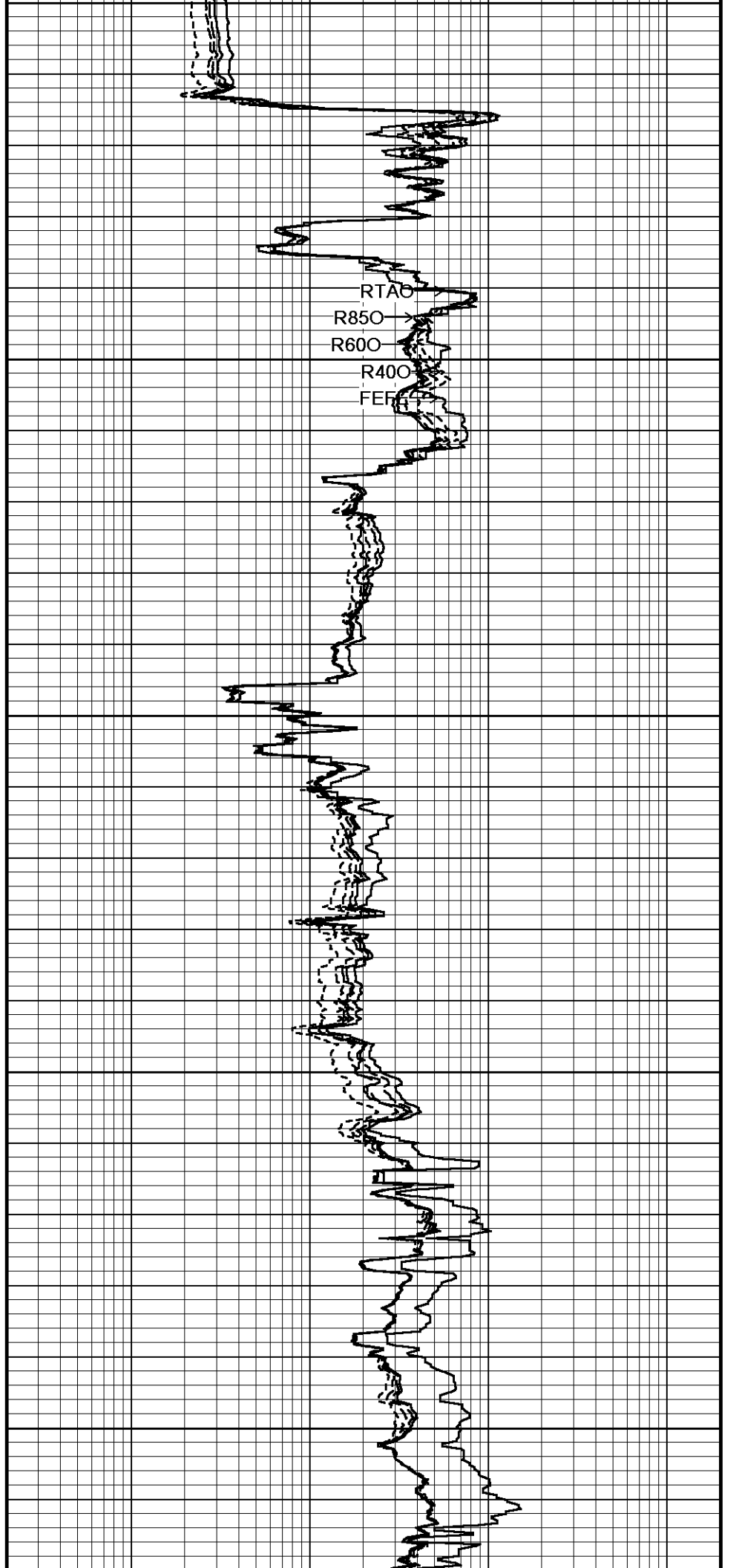
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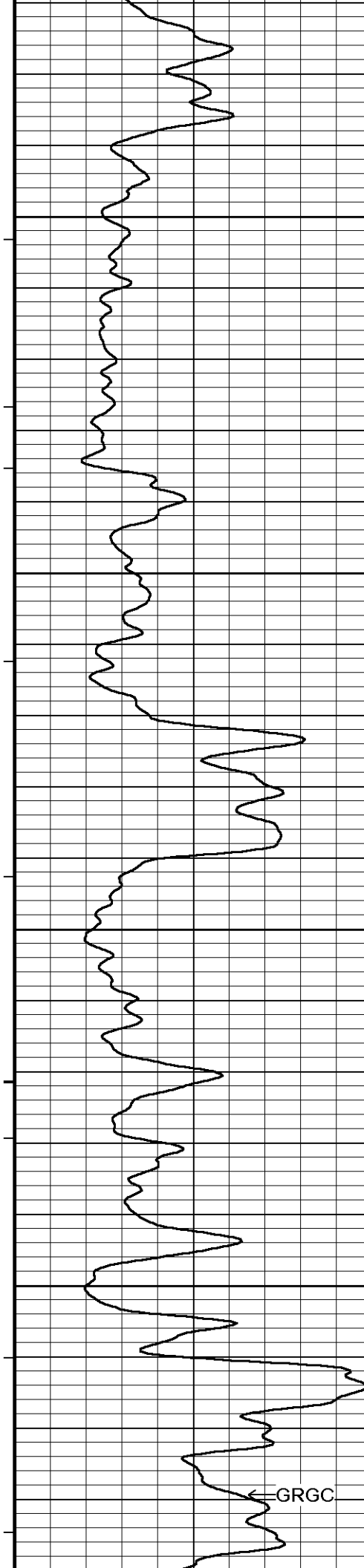
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8850

8900



RTAO  
R850  
R600  
R400  
FER

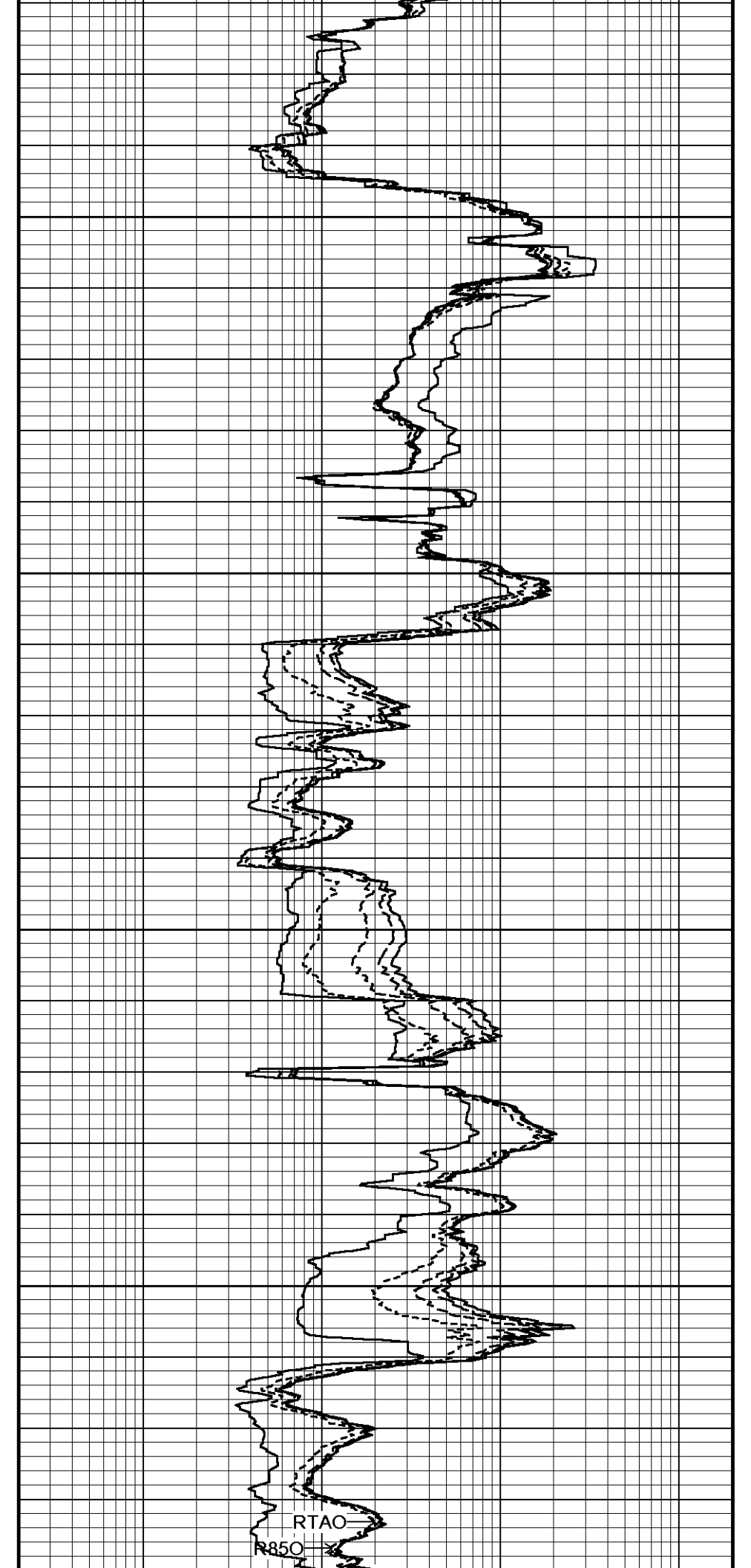


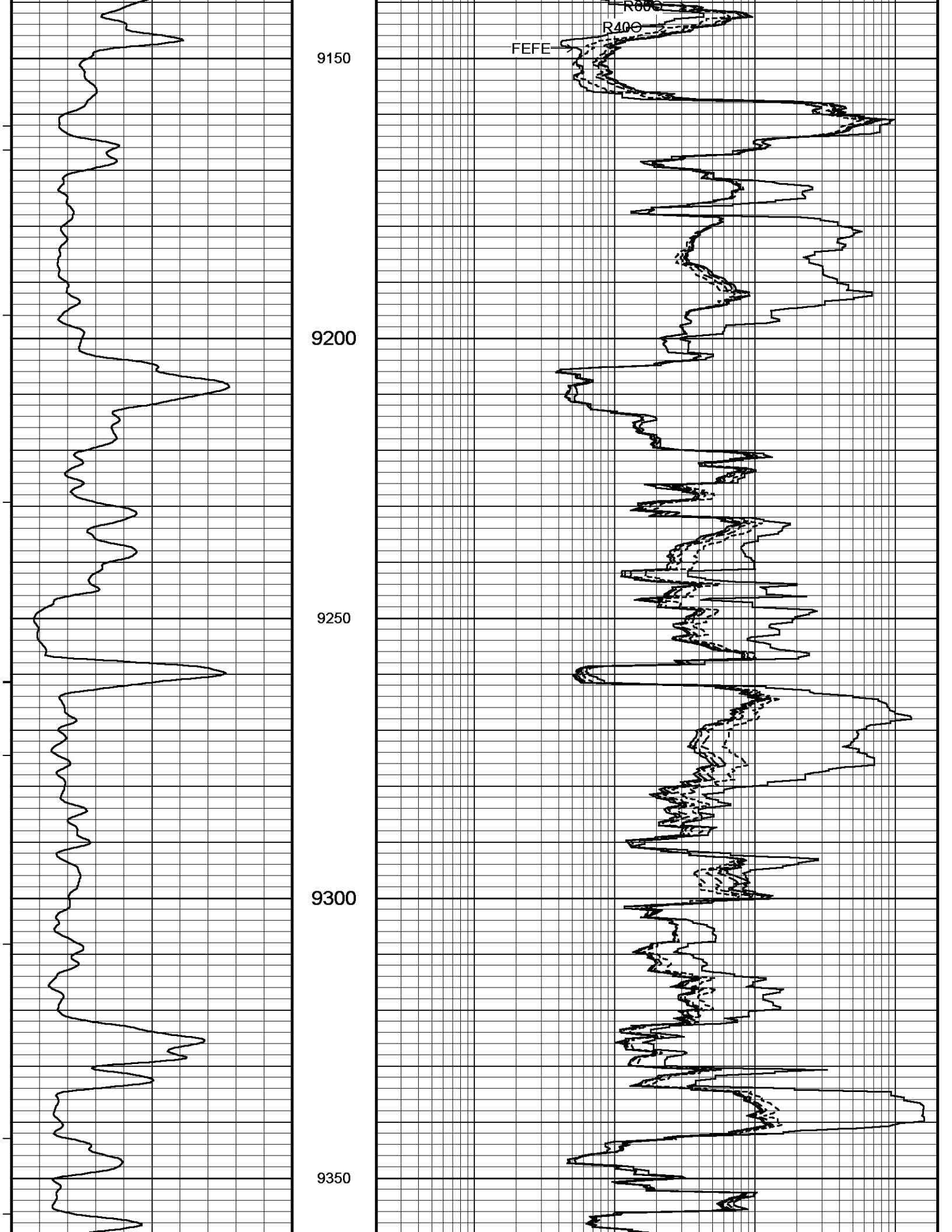
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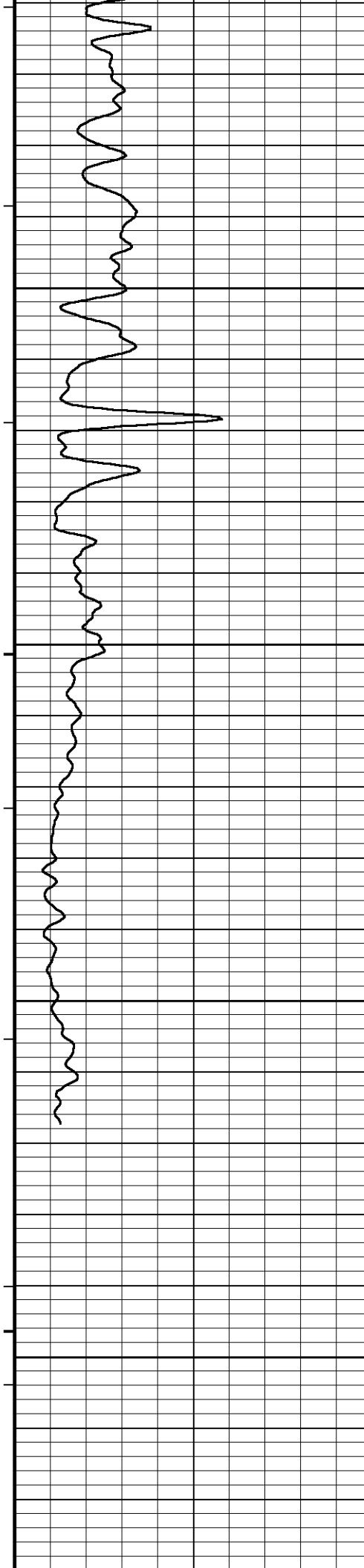
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9100





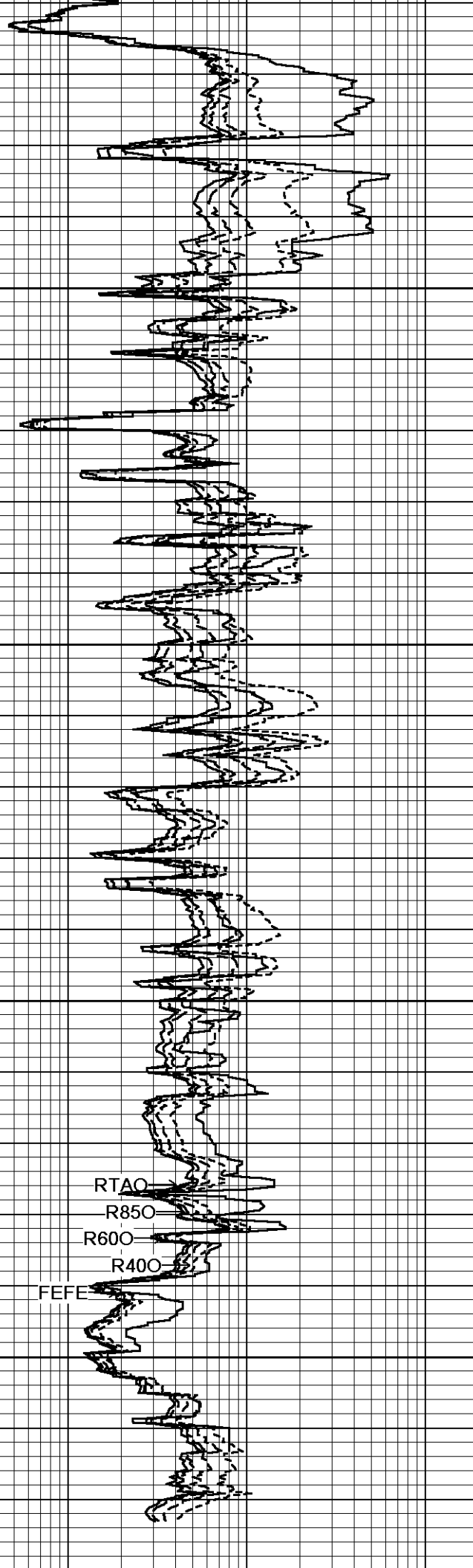


9400

9450

9500

9550



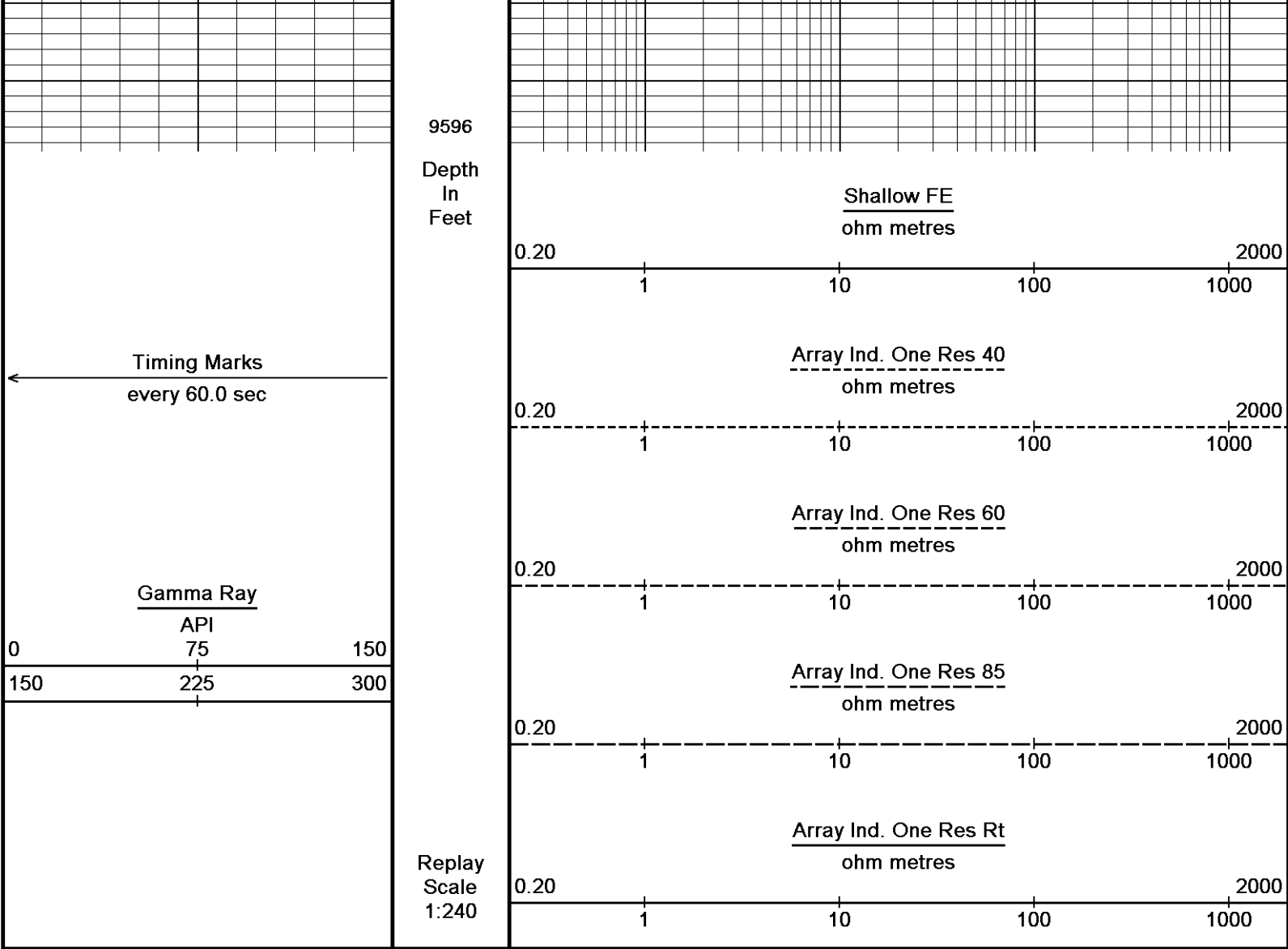
RTAO

R850

R600

R400

FEFE



Depth Based Data - Maximum Sampling Increment 10.0cm  
 Filename: C:\Data\15033216610100\_Ruby 3119 2-20H\26487RTAP.dta  
 System Versions: Processed with 13.03.7779 Plotted with 13.03.7779  
 Plotted on 03-SEP-2012 02:17  
 Recorded on 02-SEP-2012 23:43

↑ 5 INCH MAIN LOG ↑

BEFORE SURVEY CALIBRATION		
C:\Data\15033216610100_Ruby 3119 2-20H\26487RTAP.dta		Last Edited on 03-SEP-2012,00:44
General Constants All 000		
General Parameters		
Mud Resistivity	0.500	ohm-metres
Mud Resistivity Temperature	76.000	degrees F
Water Level	0.000	feet
Density/Neutron Processing	Wet Hole	
Hole/Annular Volume and Differential Caliper Parameters		
HVOL Method	Single Caliper	
HVOL Caliper 1	Bit Size	
HVOL Caliper 2	N/A	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	Density Caliper	
Rwa Parameters		
Porosity used	Base Density Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

## Gamma Calibration MCG-D.K 476

Field Calibration on 01-SEP-2012 23:39

	Measured	Calibrated (API)
Background	40	28
Calibrator (Gross)	1024	724
Calibrator (Net)	984	696

## Gamma Constants MCG-D.K 476

Last Edited on 03-SEP-2012,00:26

Gamma Calibrator Number	036	
Mud Density	1.01	gm/cc
Caliper Source for Processing	Bit Size	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

## SP Calibration MCG-D.K 476

Field Calibration on 01-SEP-2012,23:30

	Measured	Calibrated (mV)
Reference 1	100.0	100.0
Reference 2	-100.0	-100.0

## High Resolution Temperature Calibration MCG-D.K 476

Field Calibration on 01-SEP-2012,23:30

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

## High Resolution Temperature Constants MCG-D.K 476

Last Edited on 01-SEP-2012,23:30

Pre-filter Length	11
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## Neutron Calibration MDN-B.J 391

Base Calibration on 02-FEB-2012 17:34

Field Check on 01-SEP-2012 23:45

Base Calibration					
	Measured		Calibrated (cps)		
	Near	Far	Near	Far	
	3186	96	3714	110	
Ratio	33.156		33.764		
Field Calibrator at Base			Calibrated (cps)		
			2267	3463	
Ratio			0.655		
Field Check			Calibrated (cps)		
			2249	3344	
Ratio			0.673		

## Neutron Constants MDN-B.J 391

Last Edited on 03-SEP-2012,00:26

Neutron Source Id	N1055	
Neutron Jig Number	N639	
Epithermal Neutron	No	
Caliper Source for Processing	Bit Size	
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	1.80	kpsi
Temperature Source	MCG External Temperature	
Temperature	N/A	degrees F
Mud Salinity	3.67	kppm
Salinity Correction	Applied	
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	N/A	kppm
Barite Mud Correction	Not Applied	

## FE Calibration MFE-B.J 363

Base Calibration on 31-AUG-2012 16:00

Field Check on 01-SEP-2012 23:22

Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	970.3	126.8

Reference 2	279.6
Base Check	279.6
Field Check	279.8

FE Constants MFE-B.J 363

Last Edited on 03-SEP-2012,00:25

Running Mode	No Sleeve
MFE K Factor	0.1268
Caliper Source for FE correction	Bit Size
Caliper Value for FE correction	N/A inches
Rm Source for FE correction	Temperature Corr
Temp. for Rm Corr.	MCG External Temperature
Stand-off	0.5 inches

Induction Calibration MAI-B.J 427

Base Calibration on 20-AUG-2012,13:38

Field Check on 01-SEP-2012 23:20

Base Calibration

Test Loop Calibration Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	14.4	434.9	9.3	966.2
2	5.8	355.4	7.6	821.4
3	2.7	244.4	5.2	566.0
4	1.8	129.3	2.6	279.2

Array Temperature 75.0 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			20.0	4139.7
2			32.1	3767.5
3			31.1	3207.7
4			20.0	2121.9
Deep			19.6	2018.6
Medium			45.0	4286.1
Shallow			47.3	5674.6

Array Temperature 91.7 Deg F

Induction Constants MAI-B.J 427

Last Edited on 03-SEP-2012,00:45

Induction Model	RtAP-WBM
Caliper for Borehole Corr.	Bit Size
Hole Size for Borehole Correction	N/A inches
Tool Centred	No
Stand-off Type	Fins
Stand-off	0.00 inches
Number of Fins on Stand-off	6.0000
Stand-off Fin Angle	60.00 degrees
Stand-off Fin Width	0.5000 inches
Borehole Corr. Rm Source	Temperature Corr
Temp. for Rm Corr.	MCG External Temperature
Squasher Start	0.0060 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

Apparent Porosity and Water Saturation Constants

Archie Constant (A)	1.00
Compensation Factor (M)	2.00

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	

### High Resolution Temperature Calibration MAI-B.J 427

Field Calibration on 20-AUG-2012,14:27

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

### High Resolution Temperature Constants MAI-B.J 427

Last Edited on 20-AUG-2012,14:27

Pre-filter Length	11
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### Caliper Calibration MPD-C.J 394

Base Calibration on 31-AUG-2012 14:51

Field Calibration on 01-SEP-2012 23:24

#### Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15552	4.02
2	23792	6.00
3	32160	8.03
4	40750	10.02
5	49488	12.01
6	N/A	N/A

#### Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.95	6.00

### Photo Density Calibration MPD-C.J 394

Base Calibration on 31-AUG-2012 15:26

Field Check on 01-SEP-2012 23:30

#### Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	51997	26047	59869	31110
Reference 2	21749	2530	24557	2522

#### Field Check at Base

1066.4	1315.9
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#### Field Check

1066.2	1317.2
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#### PE Calibration

Base Calibration	WS	Measured		Calibrated
		WH	Ratio	Ratio
Background	191	947		
Reference 1	20679	51819	0.403	0.369
Reference 2	5938	21621	0.278	0.271

#### Field Check at Base

191.2	947.4
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#### Field Check

190.0	948.4
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### Density Constants MPD-C.J 394

Last Edited on 03-SEP-2012,00:40

Density Source Id	236	
Nylon Calibrator Number	633	
Aluminium Calibrator Number	633	
Density Shoe Profile	4 inch	
Caliper Source for Processing	Bit Size	
PE Correction to Density	Not Applied	
Mud Density	1.01	gm/cc
Mud Density Z/A Multiplier	1.11	
Mud Filtrate Density	1.00	gm/cc
Dry Hole Mud Filtrate Density	1.00	gm/cc
DNCT	0.00	gm/cc

DNC1	0.00	gm/cc
CRCT	0.03	gm/cc
Density Z/A Correction	Hybrid	
Matrix density (gm/cc)	Depth (m)	
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	

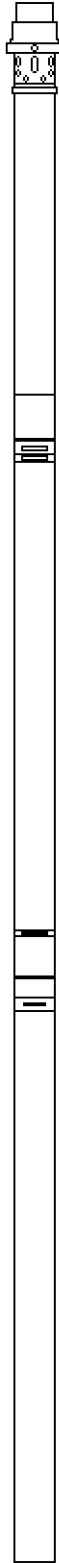
## DOWNHOLE EQUIPMENT

C:\Data\15033216610100\_Ruby 3119 2-20H\26487RTAP.dta

Shuttle Running Tool 3.5" )  
 SRT-A.A 69 LG: 6.62 ft WT: 37.5 lb OD: 2.52 in

MBS-D.A 400v Compact Battery Sub  
 MBS-D.A 147 LG: 7.84 ft WT: 57.3 lb OD: 2.24 in

Compact Comms Gamma  
 MCG-D.K 476 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in



62.63 ft GRGC - Gamma Ray

59.72 ft CGXT - MCG External Temperature

Compact Memory Sub D.A  
MMS-D.A 159 LG: 3.12 ft WT: 30.9 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint  
SKJ-E.B 479 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

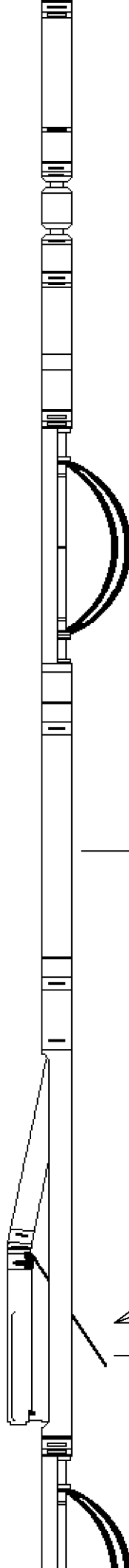
SHA-J.A Compact Swivel Head Adaptor  
SHA-J.A 431 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

MIS-D.A Compact Inline Bowspring sub  
MIS-D.A 310 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

Compact Neutron  
MDN-B.J 391 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper  
MPD-C.J 394 LG: 9.59 ft WT: 90.4 lb OD: 2.24 in

MIS-A.A Compact Inline Bowspring sub  
MIS-A.A 275 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in



42.89 ft NPRL - Limestone Neutron Por.

33.72 ft DCOR - Density Correction  
33.72 ft DEN - Compensated Density  
33.72 ft DPRL - Limestone Density Por.  
33.65 ft PDPE - PE

SHA-J.A Compact Swivel Head Adaptor  
SHA-J.A 434 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

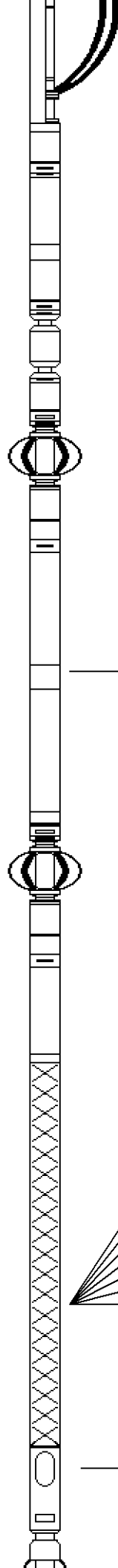
SKJ-E.B Compact Knuckle Joint  
SKJ-E.B 474 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

MIS-E.B Compact Inline Standoff sub  
MIS-E.B 597 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Focussed Electric  
MFE-B.J 363 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

MIS-E.A Compact Inline Standoff sub  
MIS-E.A 337 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Induction  
MAI-B.J 427 LG: 12.52 ft WT: 48.5 lb OD: 2.24 in



15.86 ft FEFE - Shallow FE

3.34 ft CTAO - Array Ind. One Cond Ct  
3.34 ft R200 - Array Ind. One Res 20  
3.34 ft R300 - Array Ind. One Res 30  
3.34 ft R400 - Array Ind. One Res 40  
3.34 ft R600 - Array Ind. One Res 60  
3.34 ft R850 - Array Ind. One Res 85  
3.34 ft RTAO - Array Ind. One Res Rt

Tool Zero (1.84ft from bottom)



Total Length: 84.08 ft Weight: 617.3 lb

All measurements relative to tool zero.

**COMPANY** SANDRIDGE ENERGY  
**WELL** RUBY 3119 2-20H  
**FIELD** SASSY  
**PROVINCE/COUNTY** COMANCHE  
**COUNTRY/STATE** USA / KANSAS

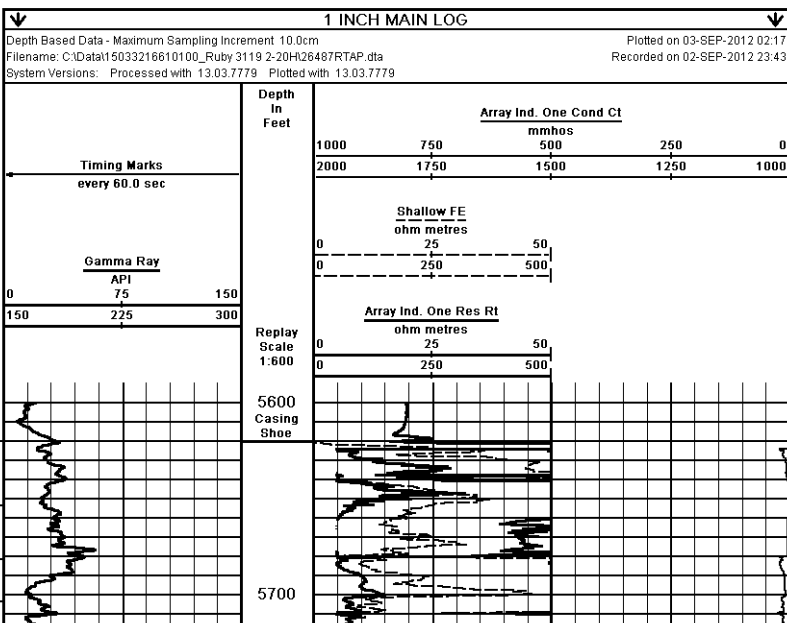
Elevation Kelly Bushing	2186.00	feet	First Reading	9576.00	feet
Elevation Drill Floor	2186.00	feet	Depth Driller	9600.00	feet
Elevation Ground Level	2166.00	feet	Depth Logger	9600.00	feet

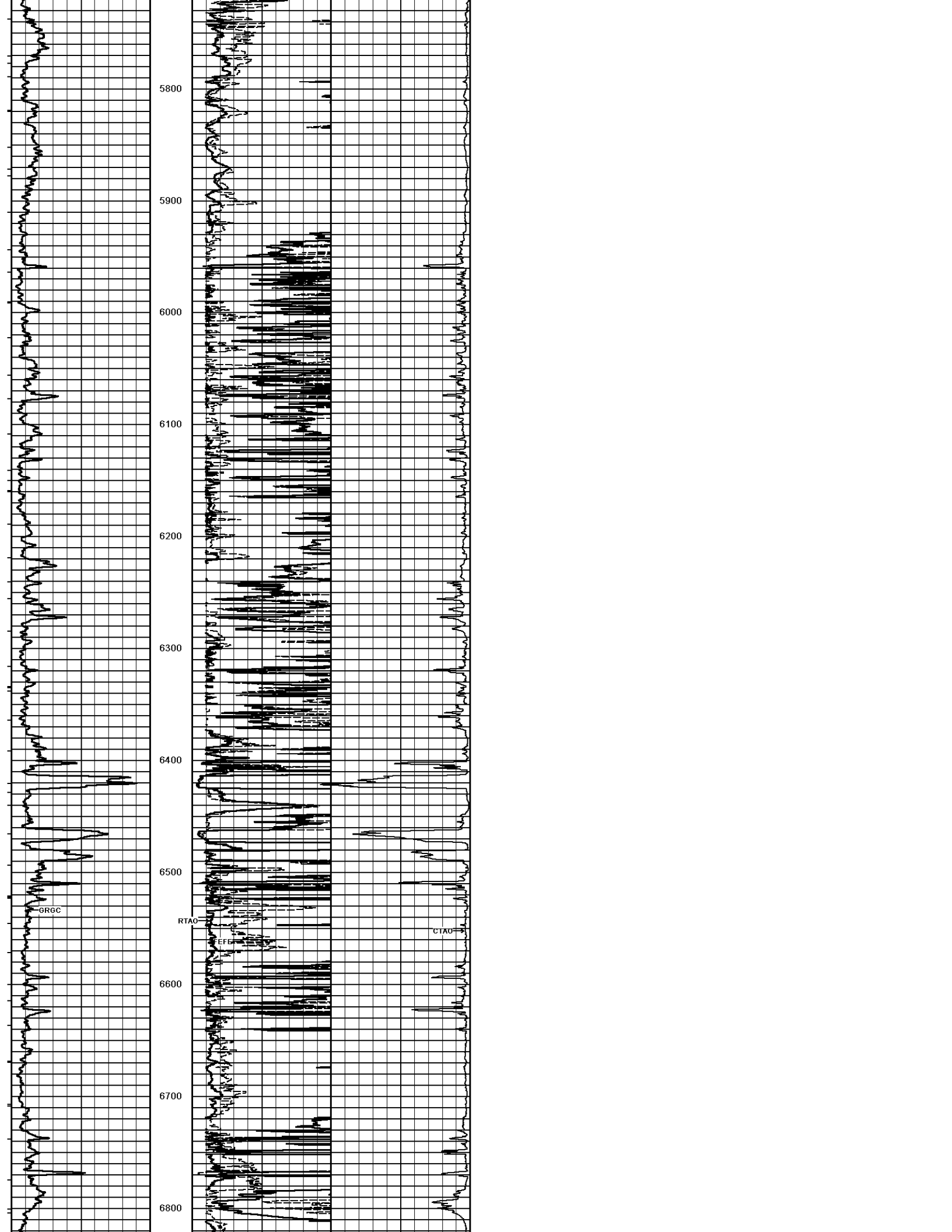


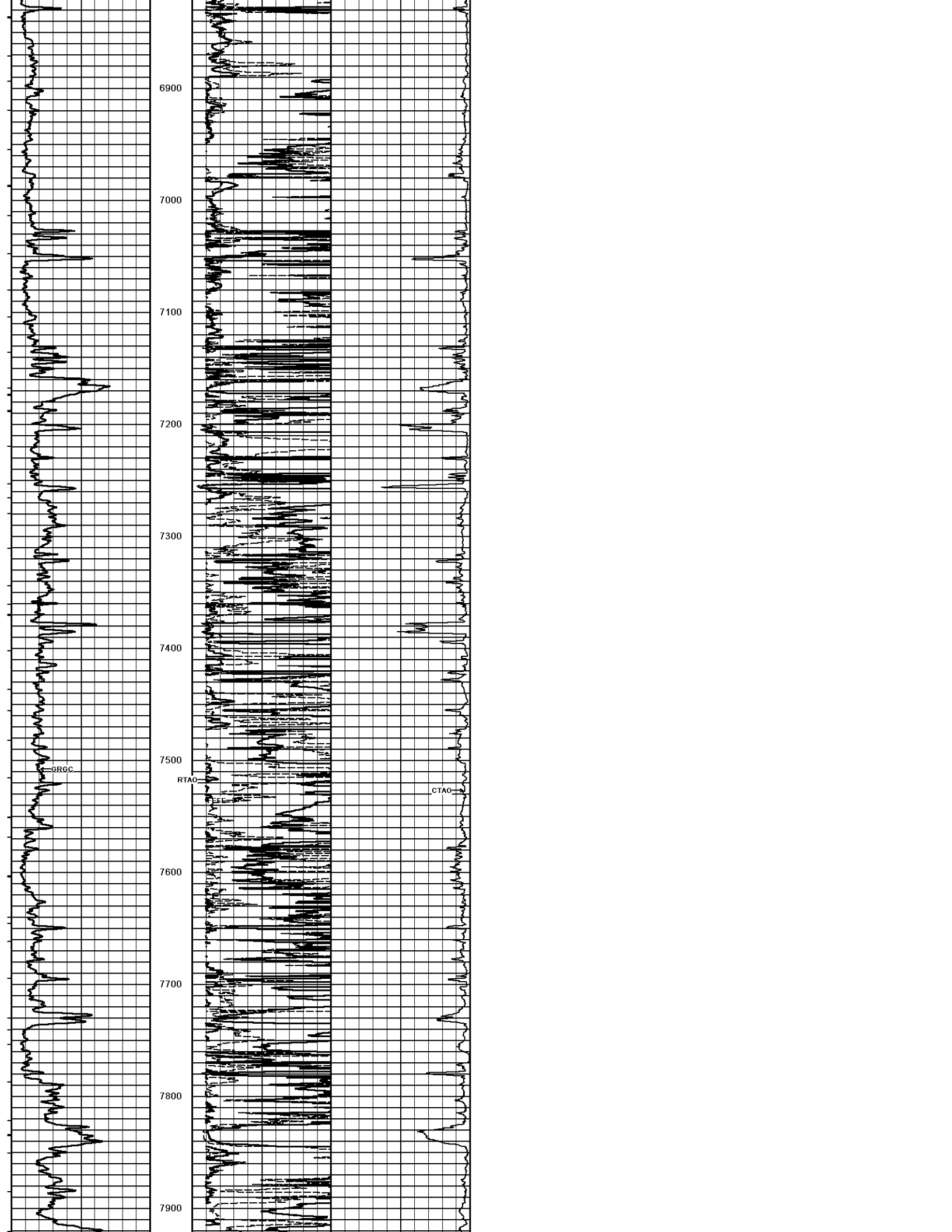
# Weatherford®

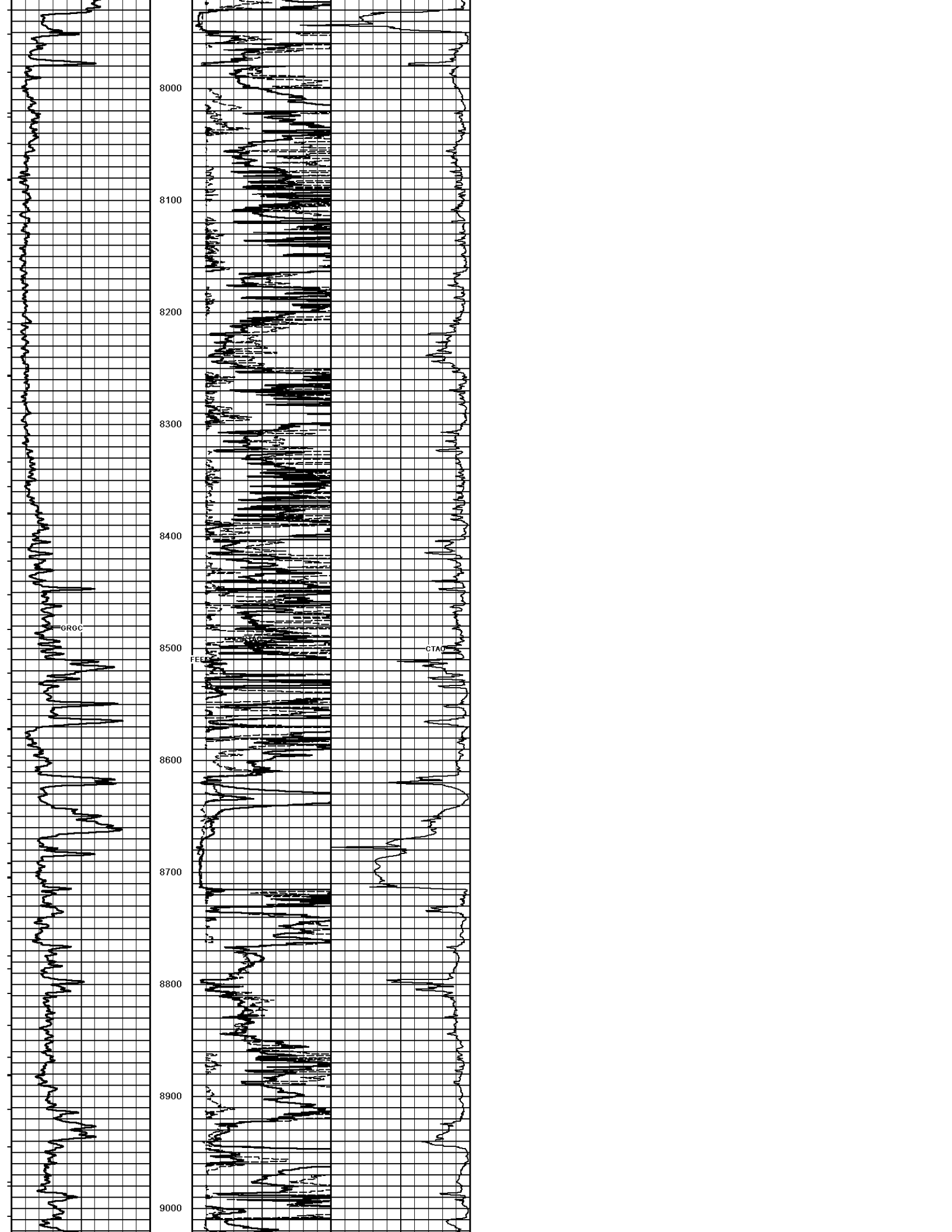
**CML MESSENGER SHUTTLE**  
**ARRAY INDUCTION**  
**SHALLOW FOCUSED ELECTRIC LOG**

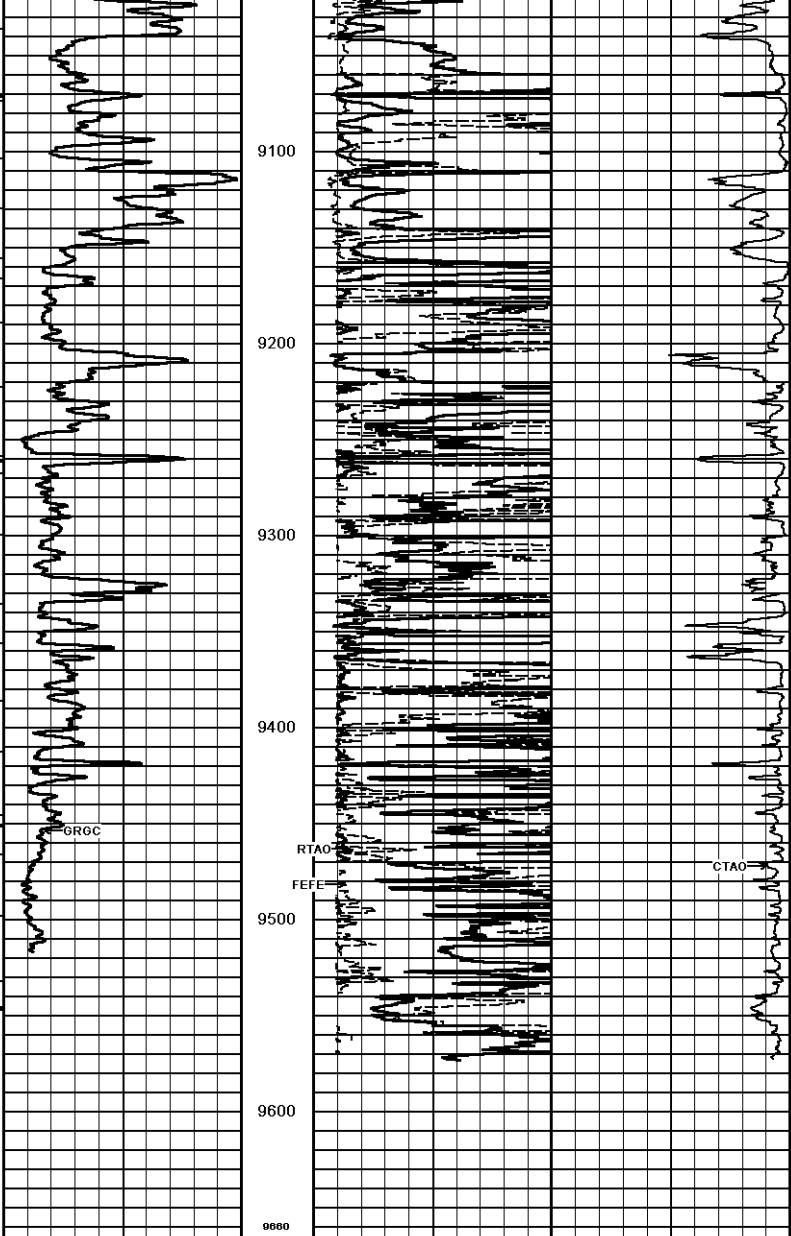
<b>Weatherford</b>		<b>CML MESSENGER SHUTTLE</b>	
		<b>ARRAY INDUCTION</b>	
		<b>SHALLOW FOCUSED ELECTRIC LOG</b>	
COMPANY	SANDRIDGE ENERGY	WELL	RUBY 3119 2-20H
FIELD	SASSY	PROVINCE/COUNTY	COMANCHE
COUNTRY/STATE	USA / KANSAS	LOCATION	NW NE NW NE 200' FNL & 1880' FEL
LOG Type	RSE	Other Services	None
Log Number	15-033-21681	Permit Number	15-033-21681
Permanent Datum	GL, Elevation 2166 feet	Log Measured From	KB
Drilling Measured From	KB	Date	02-SEP-2012
Run Number	ONE	Depth Driller	9600.00 feet
Depth Logger	9600.00 feet	First Reading	9576.00 feet
Casing Driller	5600.00 feet	Casing Logger	5600.00 feet
Bit Size	6.125 inches	Hole Fluid Type	WATER
Density/Viscosity	8.40 100/50	PH/Fluid Loss	10.00 80.00
Sample Source	FLOWLINE	Flowline	mic/0.0m
Flowline	0.50 @ 90.0	Flowline	ohm-in
Flowline	0.40 @ 90.0	Flowline	ohm-in
Flowline	0.60 @ 90.0	Flowline	ohm-in
Flowline	CALC	Flowline	ohm-in
Flowline	0.35 @ 33.0	Flowline	ohm-in
Flowline	1.9 HOURS	Flowline	deg F
Flowline	1.3300	Flowline	COMPACT
Flowline	1.8877	Flowline	OKC
Flowline	DOTHAUELLER	Flowline	
Flowline	J.HILDEMAN	Flowline	
Flowline	SC# 3538737	Flowline	
Flowline		Flowline	K.GENTRY











Timing Marks every 60.0 sec	<u>Array Ind. One Cond Ct</u>				
	1000	750	500	250	0
Gamma Ray API	<u>Shallow FE</u>				
	ohm metres				
0	25				50
150	225				300
Replay Scale 1:600	<u>Array Ind. One Res Rt</u>				
	ohm metres				
0	25				50
150	225				300

Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 03-SEP-2012 02:17  
 Filename: C:\Data\15033216610100\_Ruby 3119 2-20H\26487RTAP.dta  
 Recorded on 02-SEP-2012 23:43  
 System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

↑ 1 INCH MAIN LOG ↑

COMPANY	SANDRIDGE ENERGY				
WELL	RUBY 3119 2-20H				
FIELD	SASSY				
PROVINCE/COUNTY	COMANCHE				
COUNTRY/STATE	USA / KANSAS				
Elevation Kelly Busting	2186.00	feet	First Reading	9576.00	feet
Elevation Drill Floor	2186.00	feet	Depth Driller	9600.00	feet
Elevation Ground Level	2166.00	feet	Depth Logger	9600.00	feet

CML MESSENGER SHUTTLE  
 ARRAY INDUCTION  
 SHALLOW FOCUSED ELECTRIC LOG

