



1 : 240

Country : USA						
Field : Niobrara						
Location : Lat: 39° 42' 46.94" North Long: 104° 30' 34.19" West						
Well : Youngberg 10-11-1H						
Company : ConocoPhillips						
Rig : H&P 280						
LOCATION		Latitude : 39° 42' 46.94" North Longitude : 104° 30' 34.19" West				
		UTM Easting = 3,278,652.867 ft UTM Northing = 1,686,122.815 ft				
		Other Services				
Permanent Datum : Ground Level		Elevation : 5673.00 ft				
Log Measured From : Drill Floor		24.00 ft Above Permanent Datum				
Drilling Measured From : Drill Floor		MD LOG				
Depth Logged : 1,968.00 ft To 16,539.00 ft		Unit No. : 11703717				
Date Logged : 10-Sep-13 To 03-Oct-13		Job No. :CA-XX-0900647295				
Total Depth MD : 16,539.00 ft TVD : 7,529.00 ft		Plot Type : Field				
Spud Date : 09-Sep-13		Plot Date : 05-Oct-13				
Run No.	Borehole Record (MD)		Run No.	Borehole Record (MD)		
	Size	From		To	Size	From
2	8.750 in	1,958.00 ft				
3	8.750 in	5,228.00 ft				
4	6.000 in	7,816.00 ft				
5	6.000 in	7,948.00 ft				
6	6.000 in	14,564.00 ft				
7	6.000 in	14,564.00 ft				
8	6.000 in	16,027.00 ft				
9	6.000 in	16,027.00 ft				

WELL INFORMATION

MWD Run Number	400	500	600	700	
Date run completed	27-Sep-13	28-Sep-13	01-Oct-13	02-Oct-13	
Rig Bit Number	5	6	7	8	
Bit Size (in)	6.000	6.000	6.000	6.000	
Tool Nominal OD (in)	4.750	4.750	4.750	4.750	
Log Start Depth (MD, ft)	7,948.00	14,564.00	14,564.00	16,027.00	
Log End Depth (MD, ft)	14,564.00	14,564.00	16,027.00	16,027.00	
Drill or Wipe	Drill and Wipe	Drill	Drill	Drill	
Drill/Wipe Start Date and Time	20-Sep-13 06:47	26-Sep-13 22:56	29-Sep-13 08:51	01-Oct-13 12:56	
Drill/Wipe End Date and Time	26-Sep-13 18:05	26-Sep-13 22:56	30-Sep-13 23:30	01-Oct-13 12:56	
Min Inc (deg) @ Depth (MD, ft)	87.04 @ 10,753.00	0 @ 0	88.52 @ 14,582.00	0 @ 0	
Max Inc (deg) @ Depth (MD, ft)	91.05 @ 12,968.00	0 @ 0	91.17 @ 14,867.00	0 @ 0	
Bit TFA(in2) / Bit Type	.98 / PDC	.98 / PDC	.98 / PDC	.98 / PDC	
Flow Rate (gpm)	270.00	270.00	268.48	270.00	
Max AV (fpm) / CV (fpm) @ MWD	327.0 / 456.0	327.0 / 456.0	327.0 / 456.0	350.0 / 375.0	
Fluid Type	Polymer	Polymer	Polymer	Fresh Water Gel	
Density (ppg) / Viscosity (spqt)	9.27 / 42.00	9.38 / 43.00	9.35 / 40.00	9.20 / 40.00	
Filtrate CL (ppm)	2,300.00	2,300.00	2,700.00	2,600.00	
pH / Fluid Loss (mptm)	7.80 / 4	7.60 / 3	8.40 / 0	8.40 / 0	
PV (cP) / YP (lhf2)	14 / 14.00	15 / 16.00	15 / 13.00	15 / 13.00	
% Solids / % Sand	5.20 / 0.25	6.20 / 0.25	6.20 / 0.25	6.7 / 0.25	
% Oil / Oil:Water Ratio	3.50 /	N/A / N/A	N/A / N/A	N/A / N/A	
Rm @ Measured Temp (degF)	1.600 @ 72.00	1.600 @ 72.00	1.600 @ 72.00	1.610 @ 71.00	
Rmf @ Measured Temp (degF)	1.600 @ 68.00	1.600 @ 68.00	1.600 @ 68.00	1.610 @ 68.00	
Rmc @ Measured Temp (degF)	1.600 @ 71.00	1.600 @ 71.00	1.600 @ 71.00	1.600 @ 71.00	
M @ Measured Temp (degF)	2.200 @ 71.00	2.200 @ 71.00	2.200 @ 71.00	2.200 @ 71.00	

Max Tool Temp (degF) / Source	236.71 / HCIM	231.40 / PCM	243.76 / HCIM	204.94 / HCIM	
Rm @ Max Tool Temp (degF)	.5176 @ 236.71	.5292 @ 231.40	.5031 @ 243.76	.5914 @ 204.94	
Lead MWD Engineer	Christopher Befort	Christopher Befort	Christopher Befort	Christopher Befort	
Customer Representative	Clint Goen	Clint Goen	Clint Goen	Richard Perez	

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	HCIM	HCIM	HCIM	HCIM	
Software Version	88.56	88.56	88.56	88.56	
Sub Serial Number	11425887	90373281	11425887	11862964	
Insert Serial Number	11754867	11324296	11754867	11324296	
Date and Time Initialized	19-Sep-13 23:04	27-Sep-13 12:17	28-Sep-13 21:38	01-Oct-13 17:35	
Date and Time Read	27-Sep-13 04:54	28-Sep-13 18:20	01-Oct-13 10:15	02-Oct-13 04:35	
ECMB SW Version	generic 1.1.1 Linux 2.6.23.1	generic 1.1.1 Linux 2.6.23.1	N/A	N/A	

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	59.48	59.18	59.92	61.00	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11627568	11991621	11627568	11627569	
Sonde Serial Number	12177550	11638570	12177550	12177550	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	158.08	303.12	339.12	99.48	

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	50.95	50.31	50.93	50.20	
Recorded Sample Period (sec)	20	15	15	10	
Software Version	8.15	8.15	8.15	8.15	
Sub Serial Number	11542793	11626952	11542793	11542793	
Insert/Sonde Serial Number	11681020	11680918	11681020	11681020	

### Density Sensor Information

Tool Type	ALD	ALD	ALD		
Distance From Bit (ft)	111.64	112.75	113.46		
Recorded Sample Period (sec)	8	8	8		
Software Version	3.04	3.04	3.04		
Sub Serial Number	11753031	11433528	11753031		
Insert Serial Number	10909603	88128	10909603		
Sensor ID Number	2	32767			
Source Serial Number	50160B	39383B	50160B		
Pin Orientation	Down	Down	Down		
Stabilizer Blade O.D. (in)	5.75	5.75	5.75		
DPA Offset	125.85	184.56	195.25		

### Pressure Sensor Information

Tool Type	PWD	PWD	PWD	PWD	
Distance From Bit (ft)	126.98	127.95	128.80	113.78	
Recorded Sample Period (sec)	1	1	1	1	
Software Version	4.12	4.12	4.12	4.12	
Collar Serial Number	11331212	0	11331212	11331212	
Insert Serial Number	11665309	0	11665309	11665309	

### Pulser Controller Sensor Information

Processor Sensor Information					
Tool Type	PCM	PCM	PCM	PCM	
Software Version	8.17	8.17	8.17	8.17	
PIC Software Version	N/A	N/A	N/A	N/A	
Sub/HOC Serial Number	11163199	11426049	11633645	11163199	
Insert/Probe/Module SN	11680772	11680801		11400845	
Battery Serial Number	N/A	N/A	N/A	N/A	
Valve Insert SN	N/A	N/A	N/A	N/A	
DC Insert Serial Number	N/A	N/A	N/A	N/A	
Choke Size (32nd)	N/A	N/A	N/A	N/A	
Driver Current (amps)	N/A	N/A	N/A	N/A	
Driver SMI Current (amps)	N/A	N/A	N/A	N/A	
Boot Strap Version	N/A	N/A	N/A	N/A	

AFR Sensor Information					
Tool Type	AFR	AFR	AFR	AFR	
Tool ID	4035	4037	4035	4034	
Distance From Bit (ft)	101.93	103.04	103.75	103.09	
Software Version	40.35	40.35	40.35	40.35	
Recorded Sample Period (sec)	0	0	0	0	
Tool Size	4.75"	4.75"	4.75"	4.75"	
Stabilizer Size (in)	5.90	5.90	5.78	5.78	
Button Blade Size (in)	5.79	5.79	5.67	5.67	
Collar S/N					
Insert S/N	00-50-C2-23-F8-	00-50-C2-23-F7-	00-50-C2-23-F8-	00-50-C2-23-F8-	
Shallow K Factor					
Medium K Factor					
Deep K Factor					
RAB K Factor					
Date & Time Initialized	19-Sep-13 23:04	27-Sep-13 12:17	28-Sep-13 21:38	01-Oct-13 17:35	
Date & Time Read					

DDSr-HCIM Sensor Information					
Tool Type	DDSr-HCIM	DDSr-HCIM	DDSr-HCIM	DDSr-HCIM	
Distance From Bit (ft)	0	0	0	0	
Recorded Sample Period (sec)	12	12	12	8	
Software Version	20.87	20.87	20.87	20.87	
Sub Serial Number	11425887		90375827	11862964	
Insert Serial Number	12116291	11592537	12032226	270736	
Sensor ID Number	9971	8135	9971	6585	

ADR SENSOR INFORMATION					
Tool Type	ADR	ADR	ADR	ADR	
Tool Orientation	Deep Receiver Down	Deep Receiver Down	Deep Receiver Down	Deep Receiver Down	
Distance From SWRO to Bit (ft)	83.57	84.65	85.39	84.71	
Recorded Sample Period (sec)	10	10	10	10	
Tool SAP	11425890	11138629	11425890	11275905	
Receiver Insert SAP	11494003	11520696	11494003	11324296	
Transmitter Insert SAP	11911880	11557188	11911880	11661596	
Antenna Collar SAP	11425890	11138629	11425890	11275905	
App Firmware Version	415	415	415	415	
Processor Board FirmWare Version	306	306	306	306	
Processor FPGA FirmWare Version	4	4	4	4	
Transmitter PIC SW Version	1,025	1,025	1,025	1,025	
Tool Size	4.75"	4.75"	4.75"	4.75"	
Processor SIDS No.	281475276960553	18446744073709551615	281475276960553	281475276964646	
Processor PCB Rev.	0	0	0	0	

Receiver Board Upper SIDS No.	16607023626346726	16607023626649716	16607023626346726	16607023626211554	
Receiver Board Upper PCB Rev.	0	0	0	0	
Receiver Board Lower SIDS No.	16607023626187859	16607023626662491	16607023626187859	16607023626215284	
Receiver Board Lower PCB Rev.	0	0	0	0	
Receiver Board Deep SIDS No.	16607023626346179	16607023626288623	16607023626346179	16607023626216721	
Receiver Board Deep PCB Rev.	0	0	0	0	
Receiver Insert SIDS No.	11258999110155558	11258999086719578	11258999110155558	11258999094197754	
Transmitter Insert SIDS No.	4503634027976693	4503634022050133	4503634027976693	4503634013587499	
Antenna Collar SIDS No.	12666373982990077	0	12666373982990077	12666373982987984	

## REMARKS

1. All depths are calibrated to the driller's pipe tally and are measured from the drill floor.

2. No depth corrections have been made for pipe stretch or compression.

3. All data presented is recorded (memory data) unless otherwise stated.

4. Environmental parameters used to process gamma ray and density are as follows:

Hole Size: 6"  
Matrix Density: 2.66 g/cc  
Mud Density: 9.25 to 9.45 ppg

5. Average Comp Density ALD data is presented.

6. The following smoothing parameters have been applied to the data:

ROP: 0.5 ft interval, 1.2 ft coercion distance  
All other curves: 0.5 ft interval, 0.6 ft coercion distance

7. Run 500 Failed AFR and flat line pulse.

8. Run 600 ADR failed to respond from 15509' to 15603'

9. Run 700 Pulse flat lined.

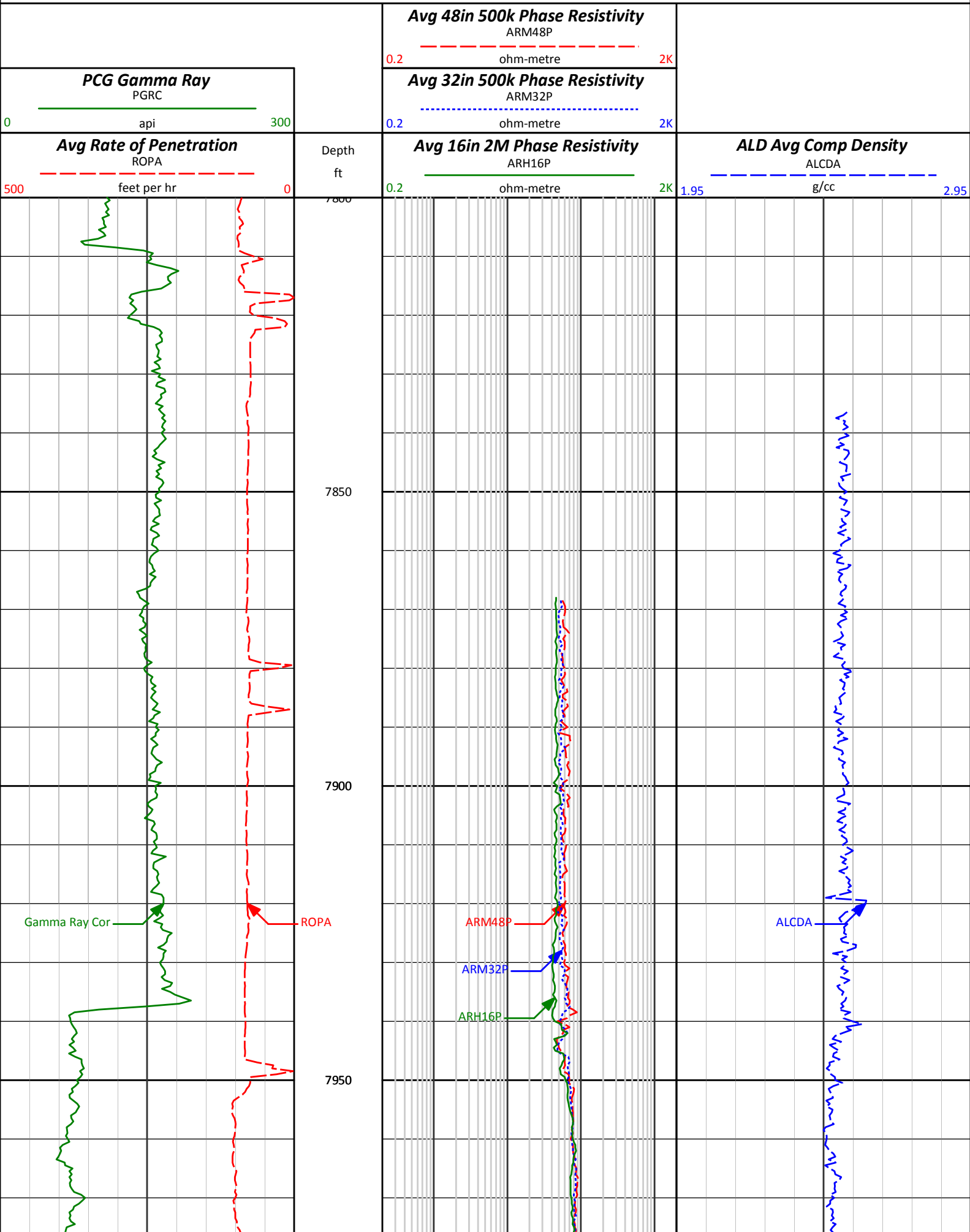
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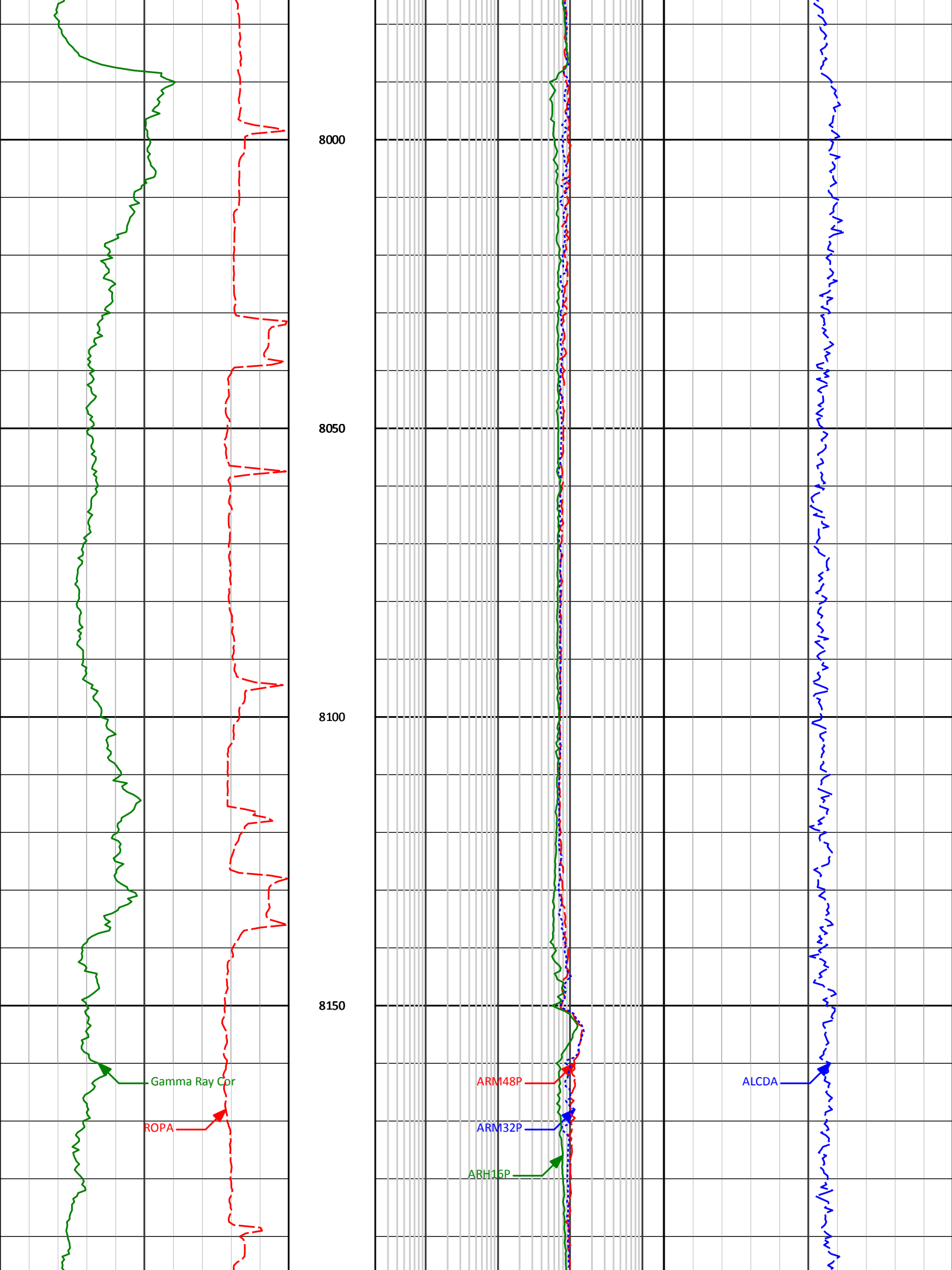
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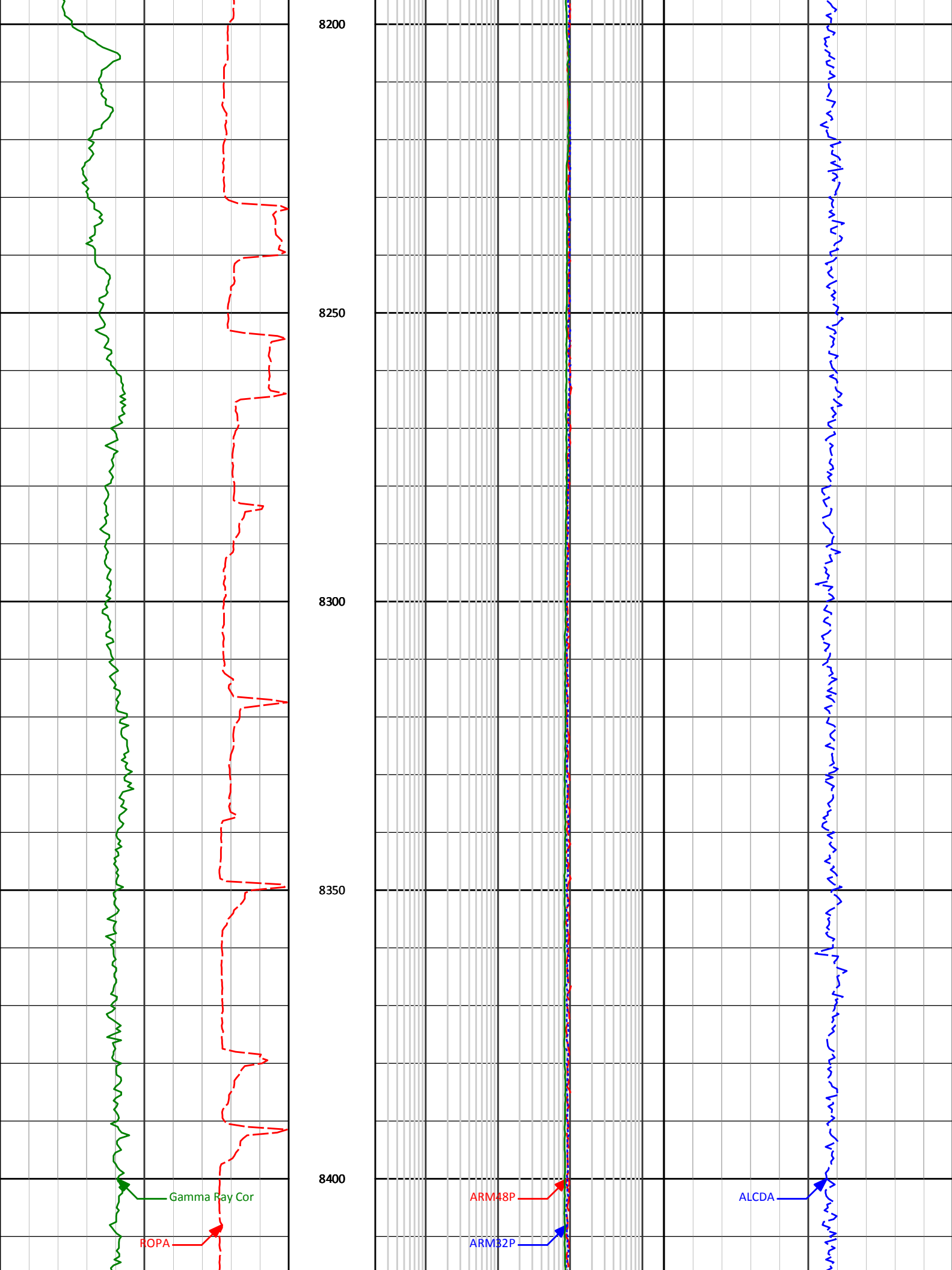
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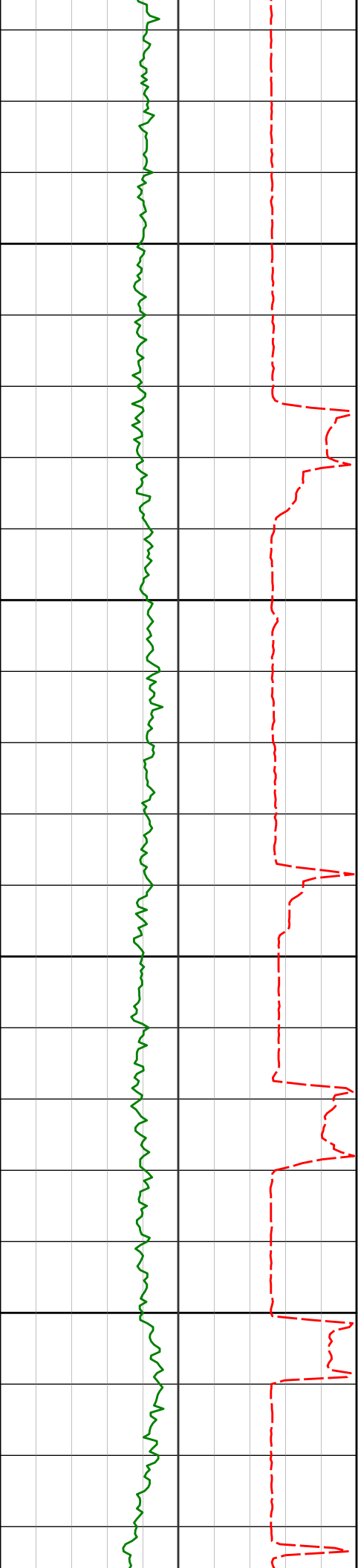
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Company  
Well







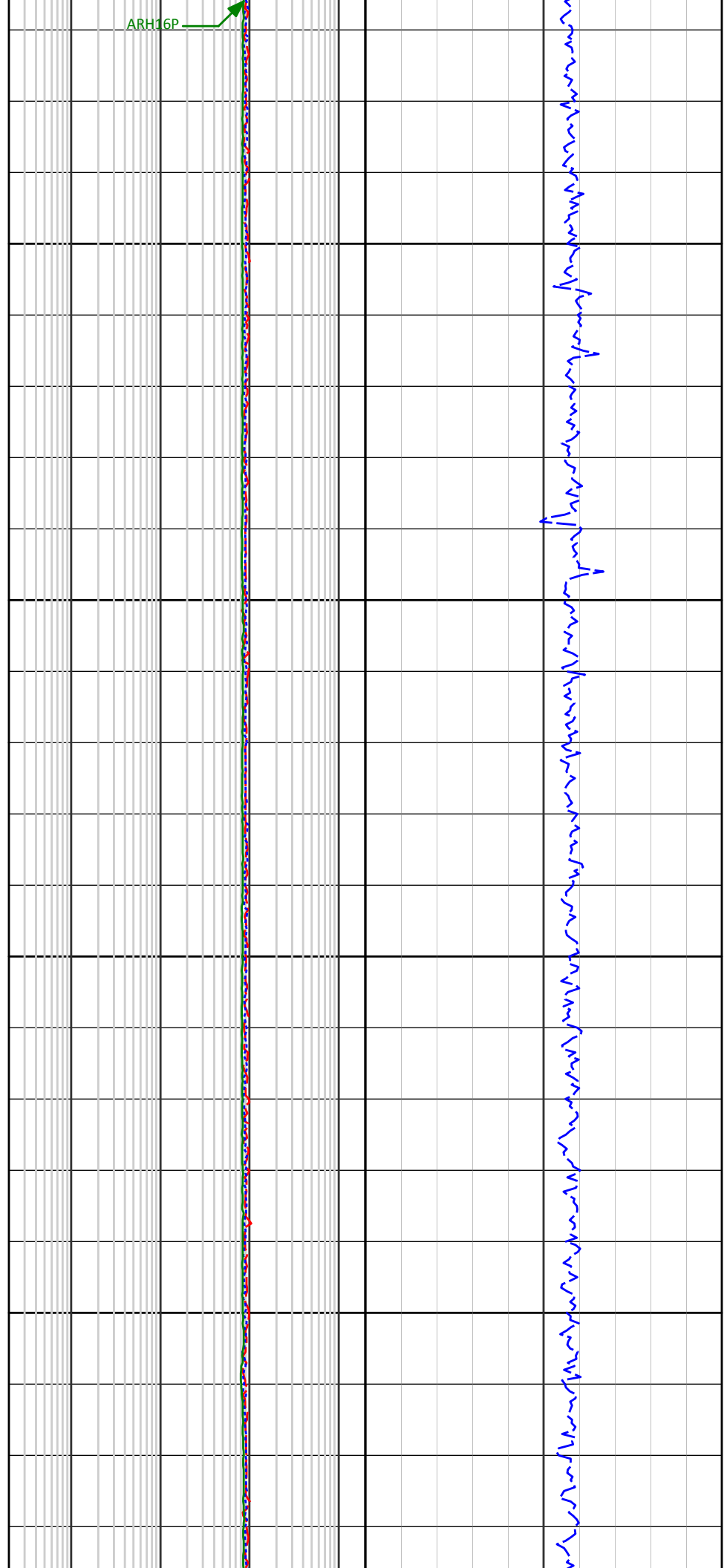


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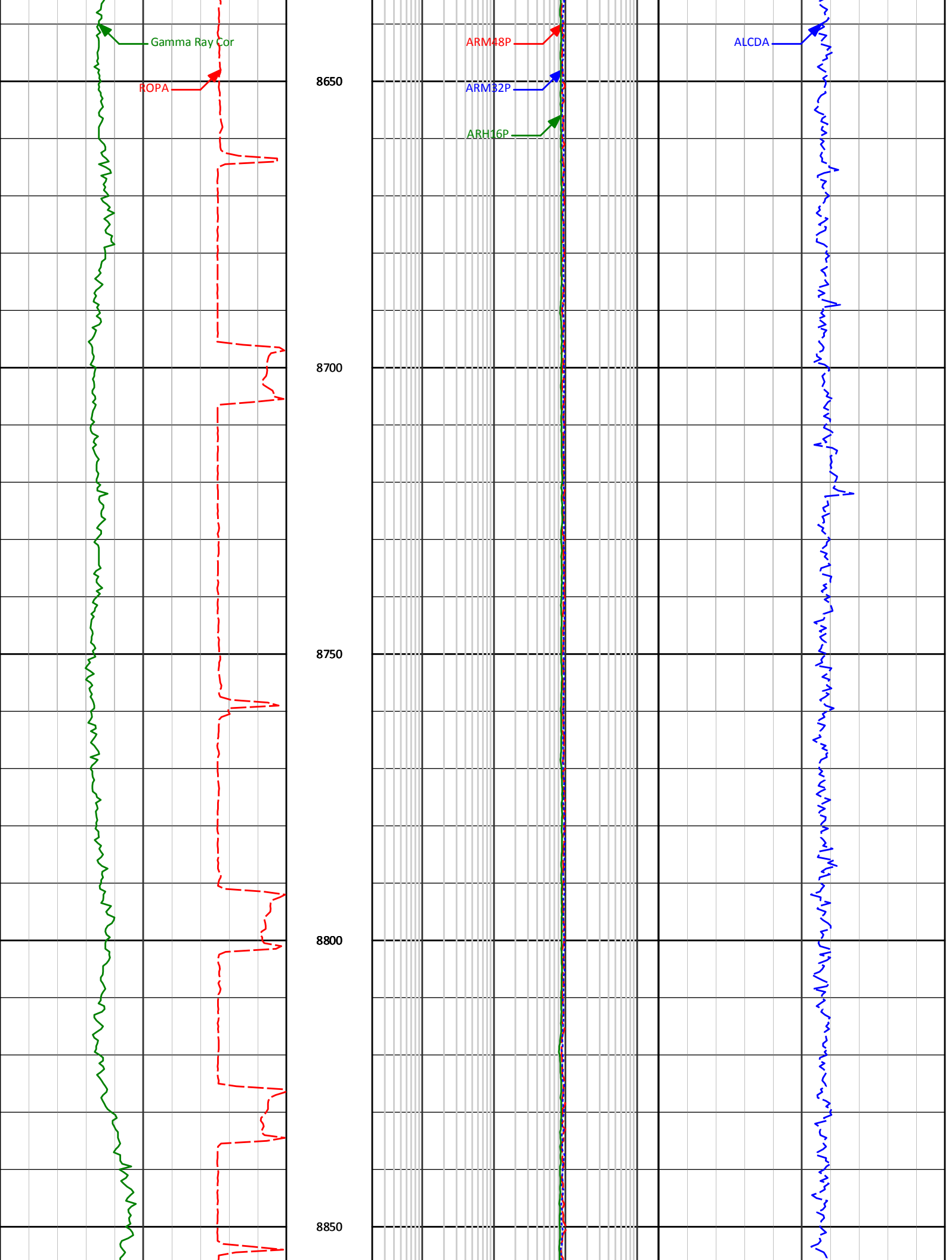
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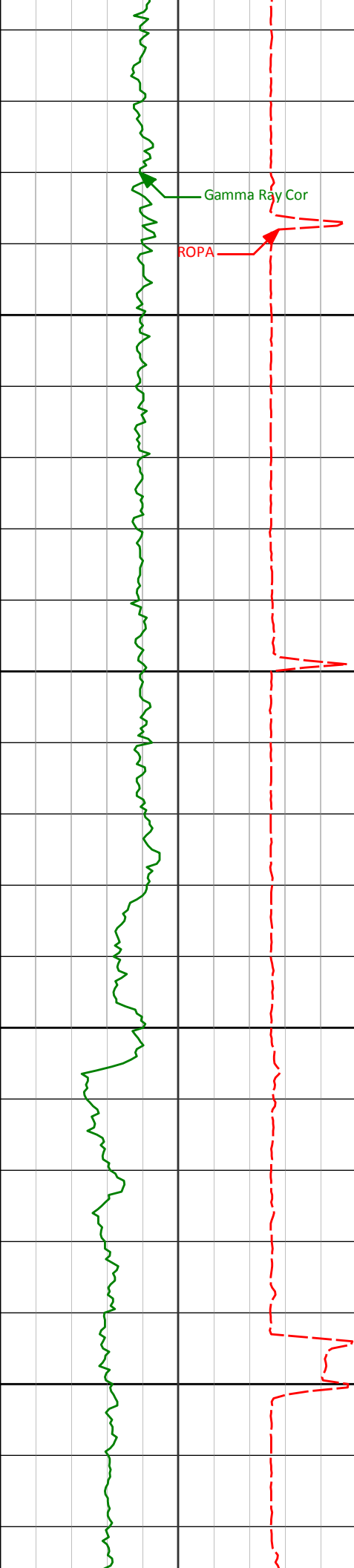
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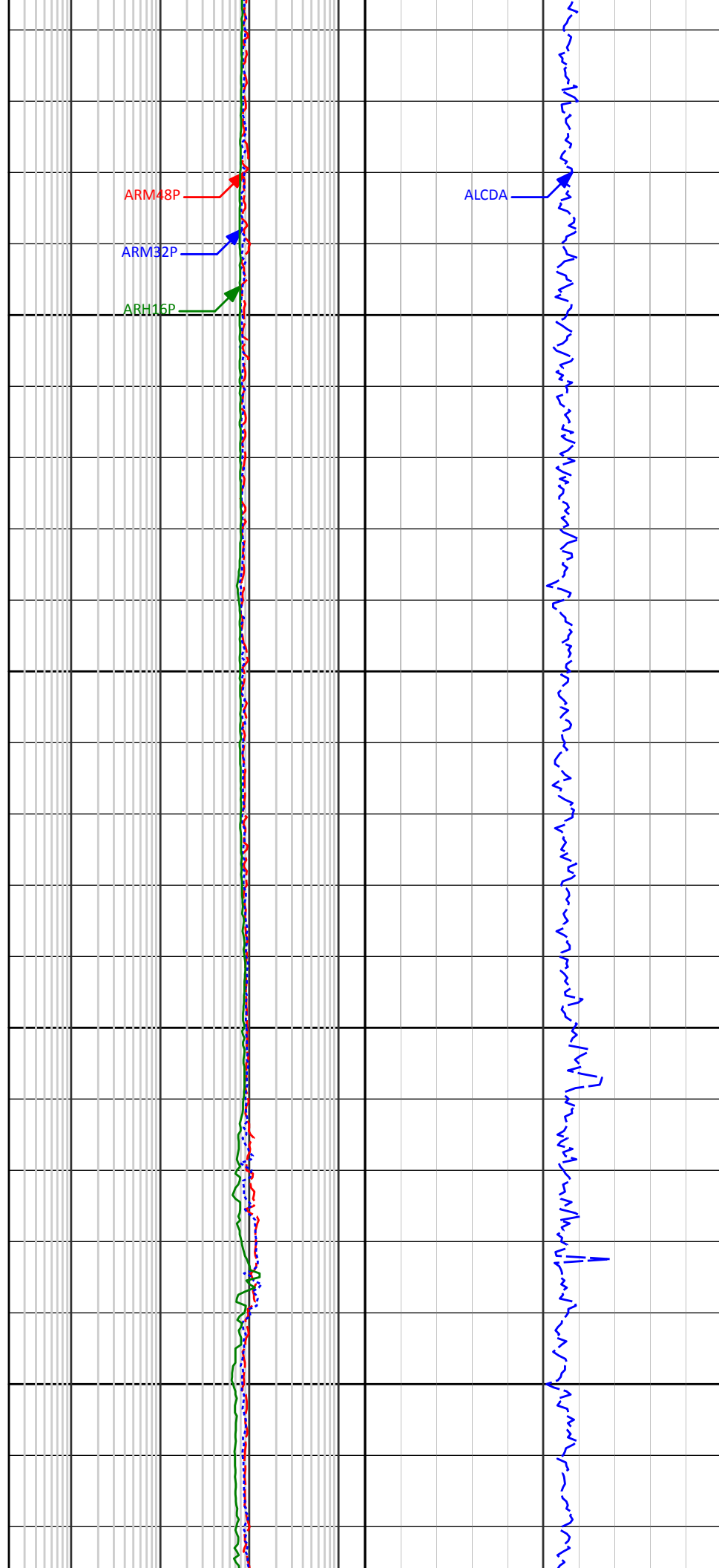


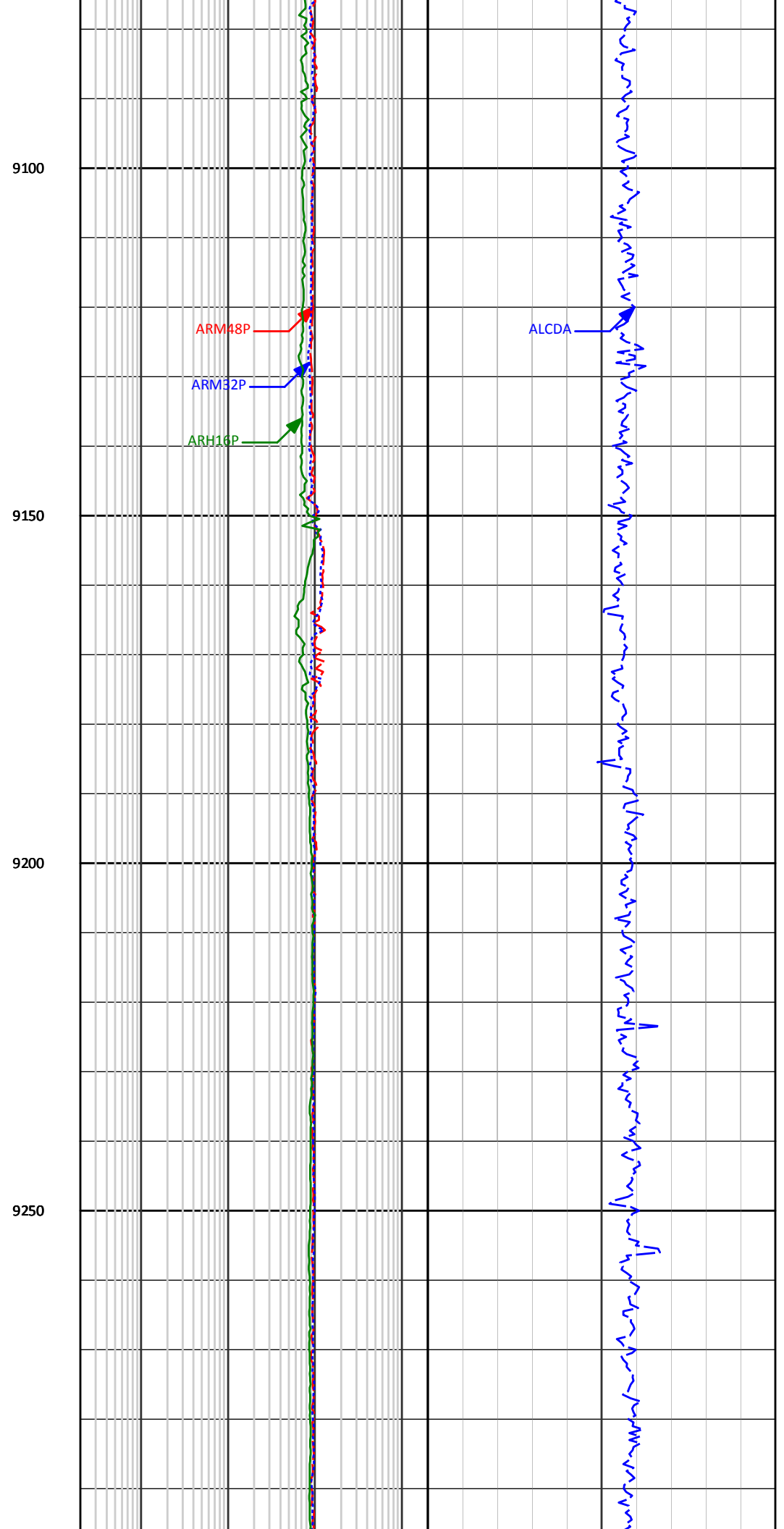
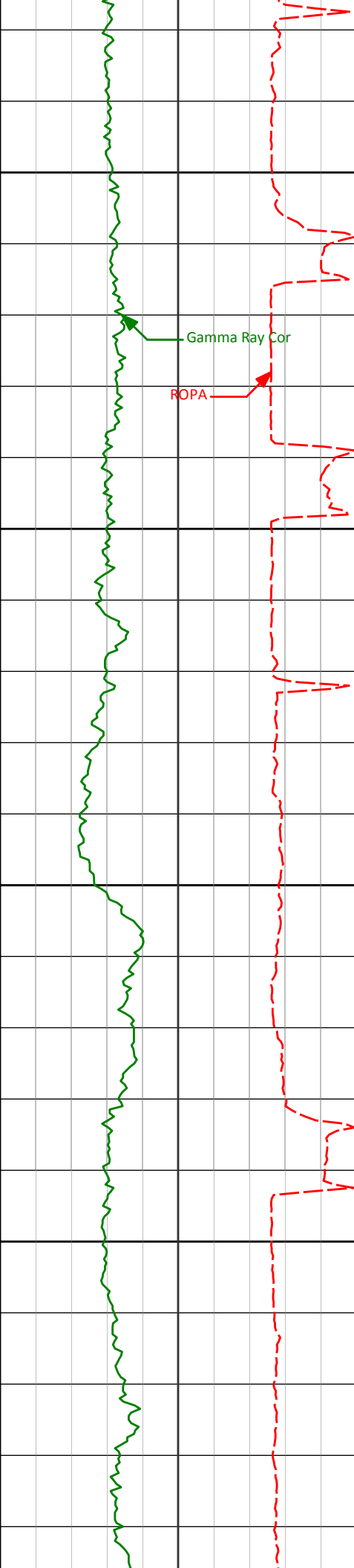
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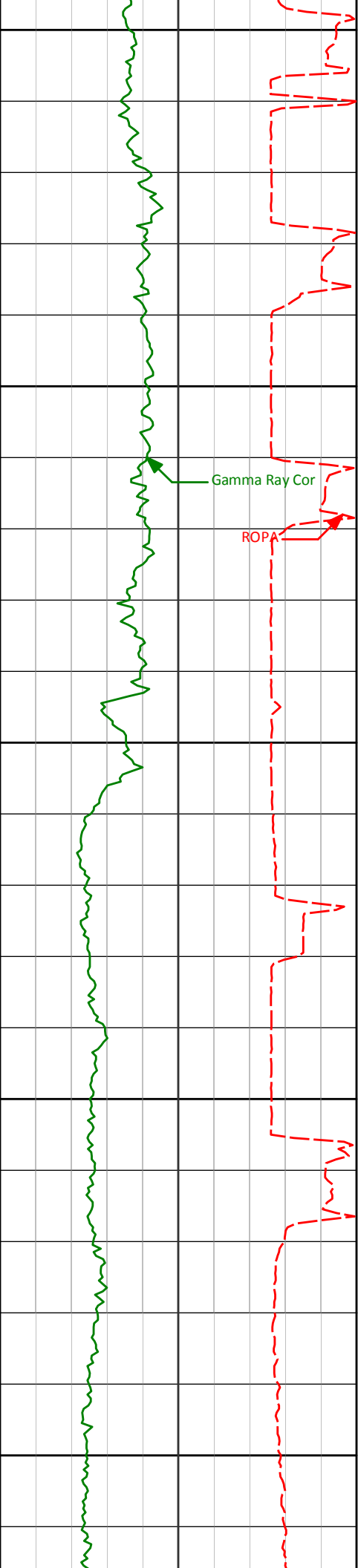
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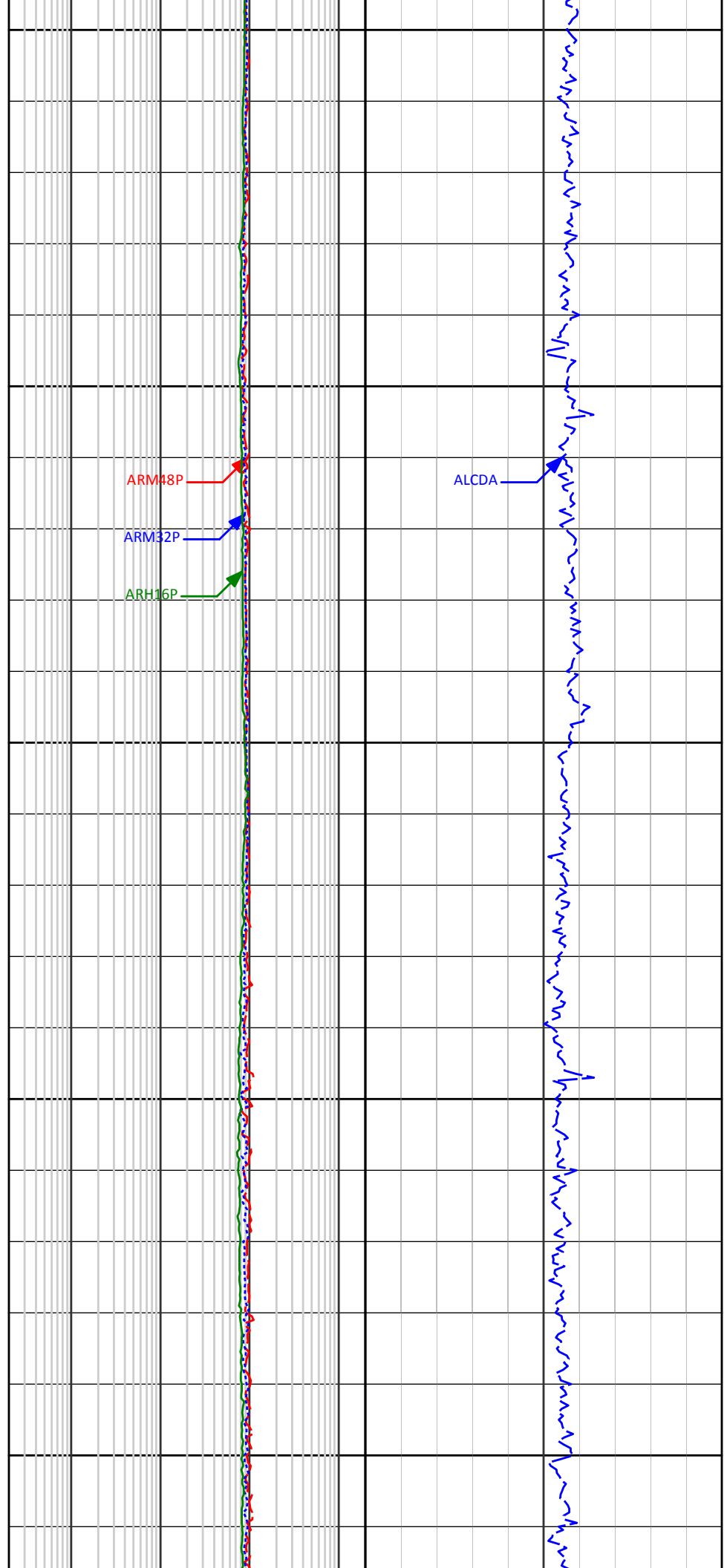
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Gamma Ray Cor

ROPA

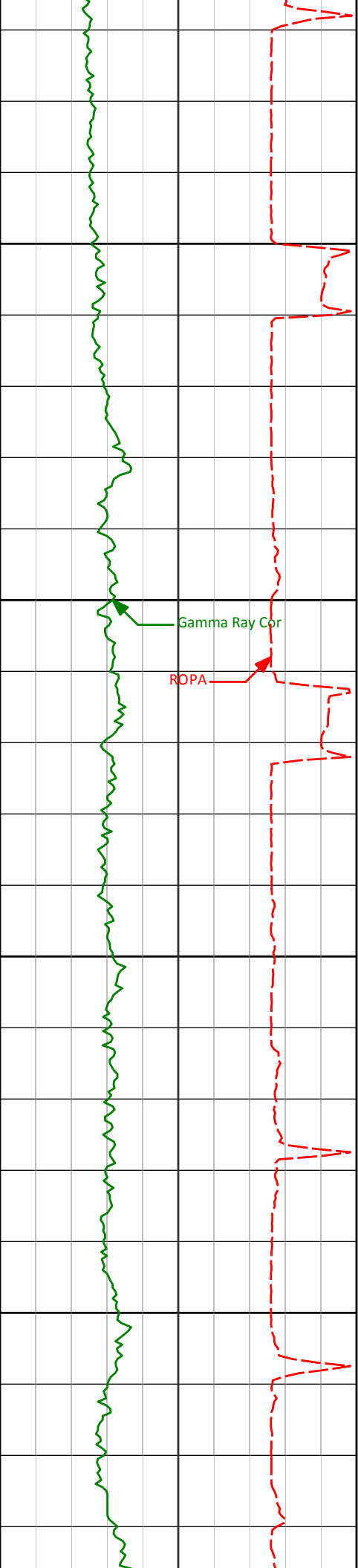


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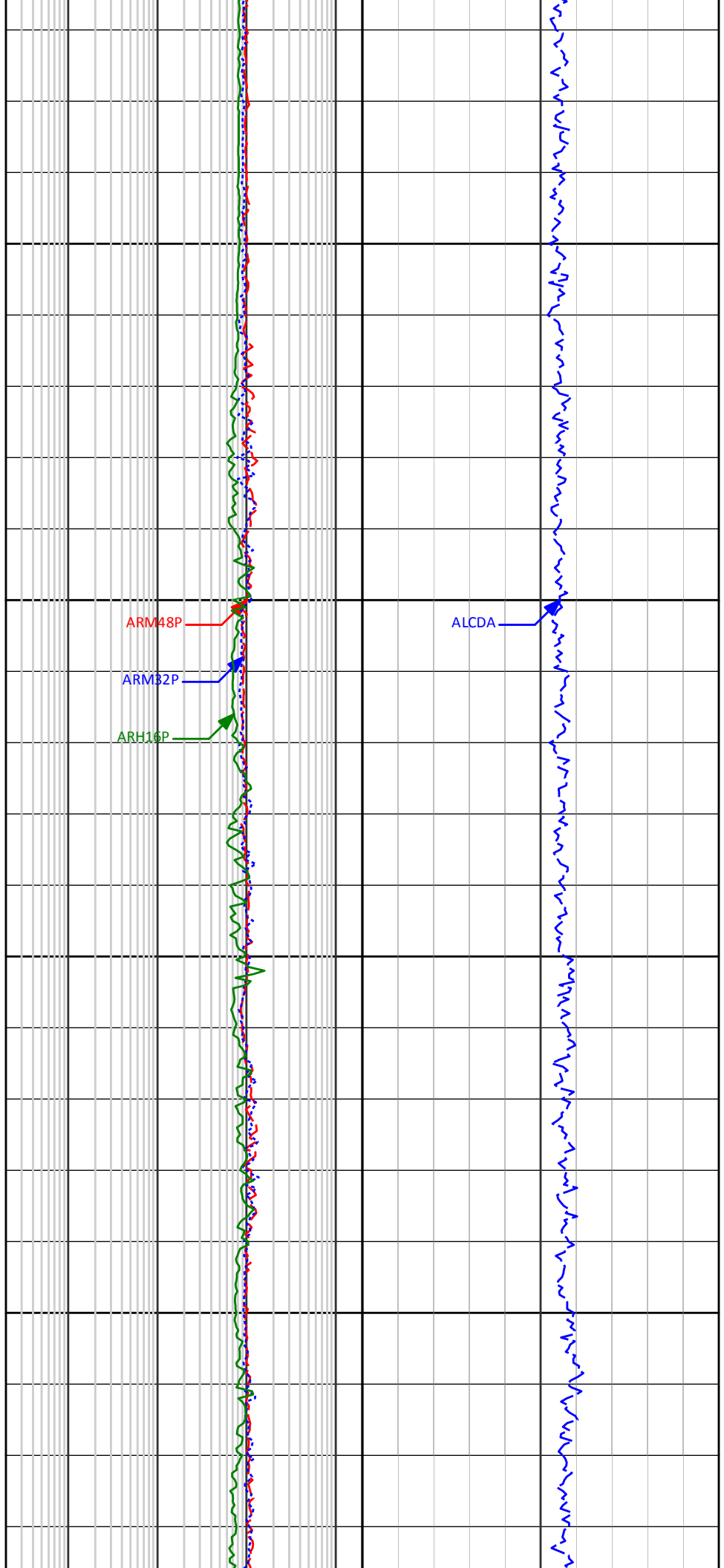


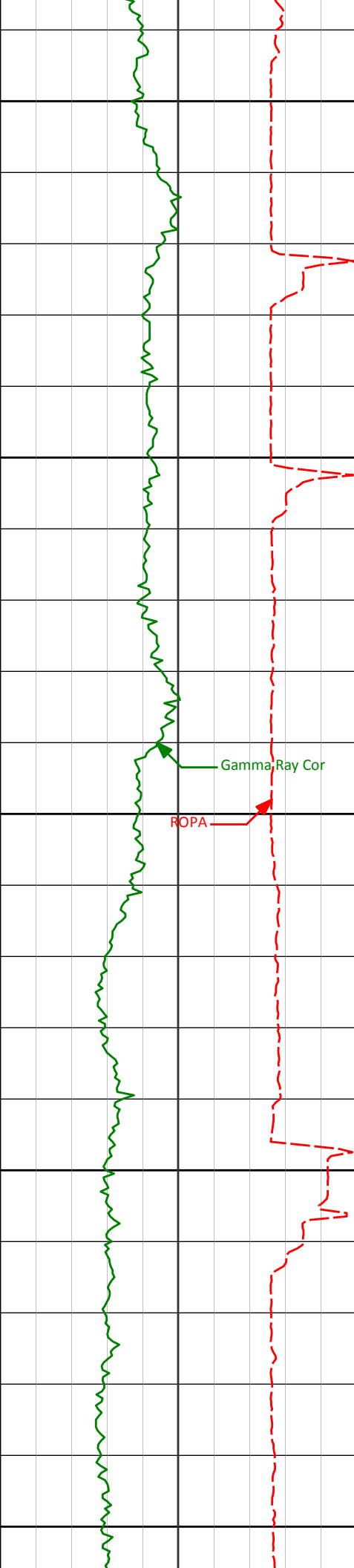
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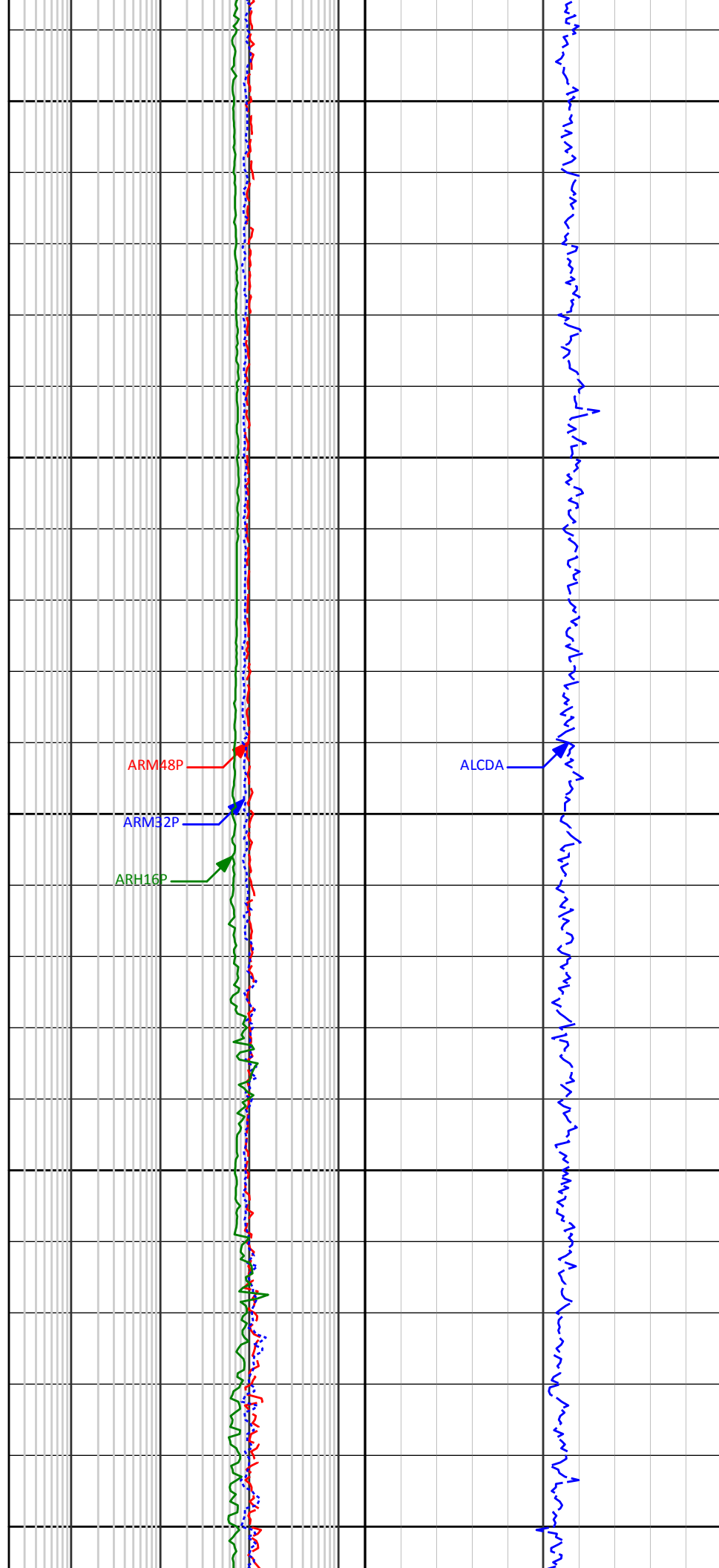
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Gamma Ray Cor

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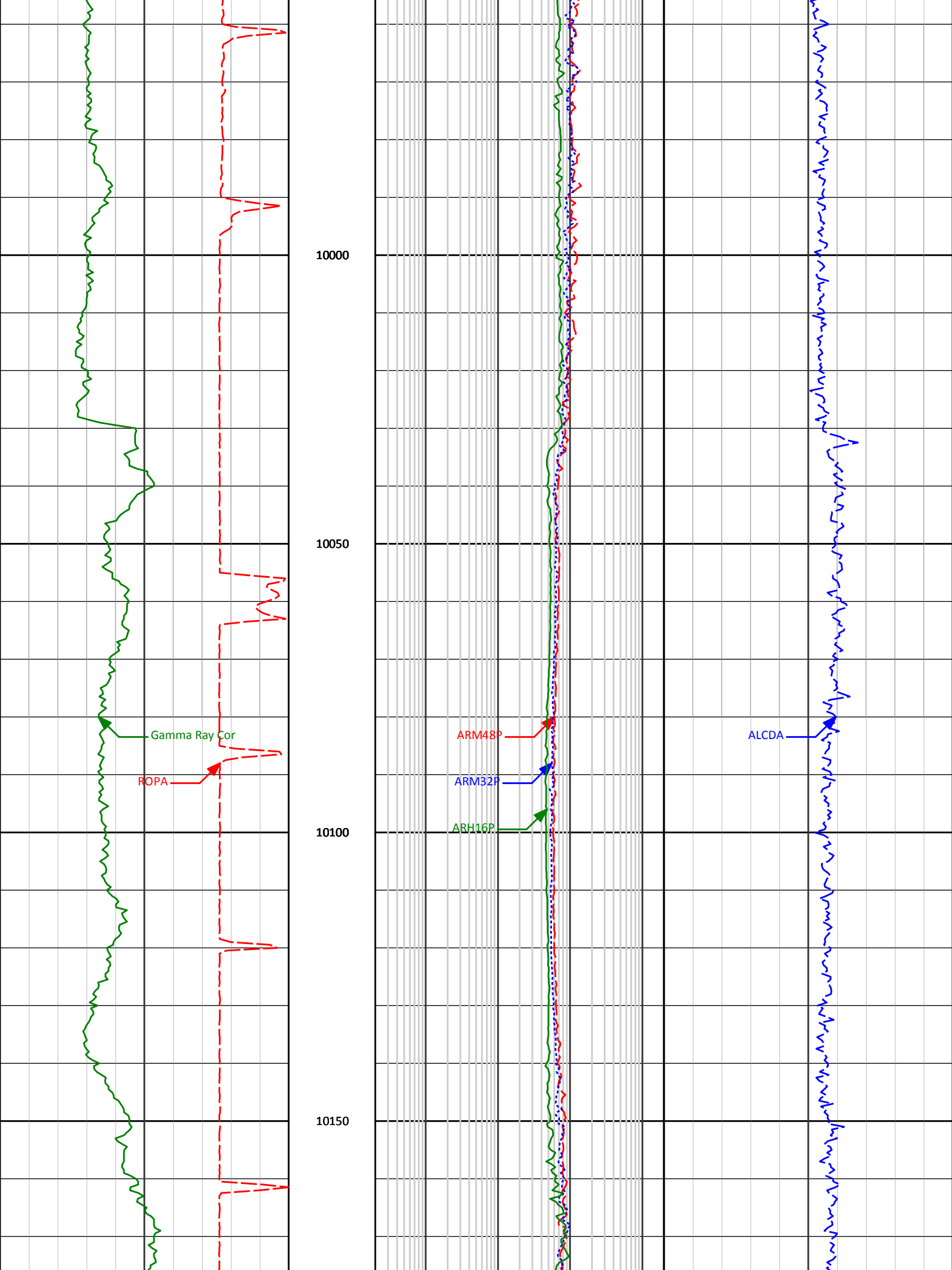


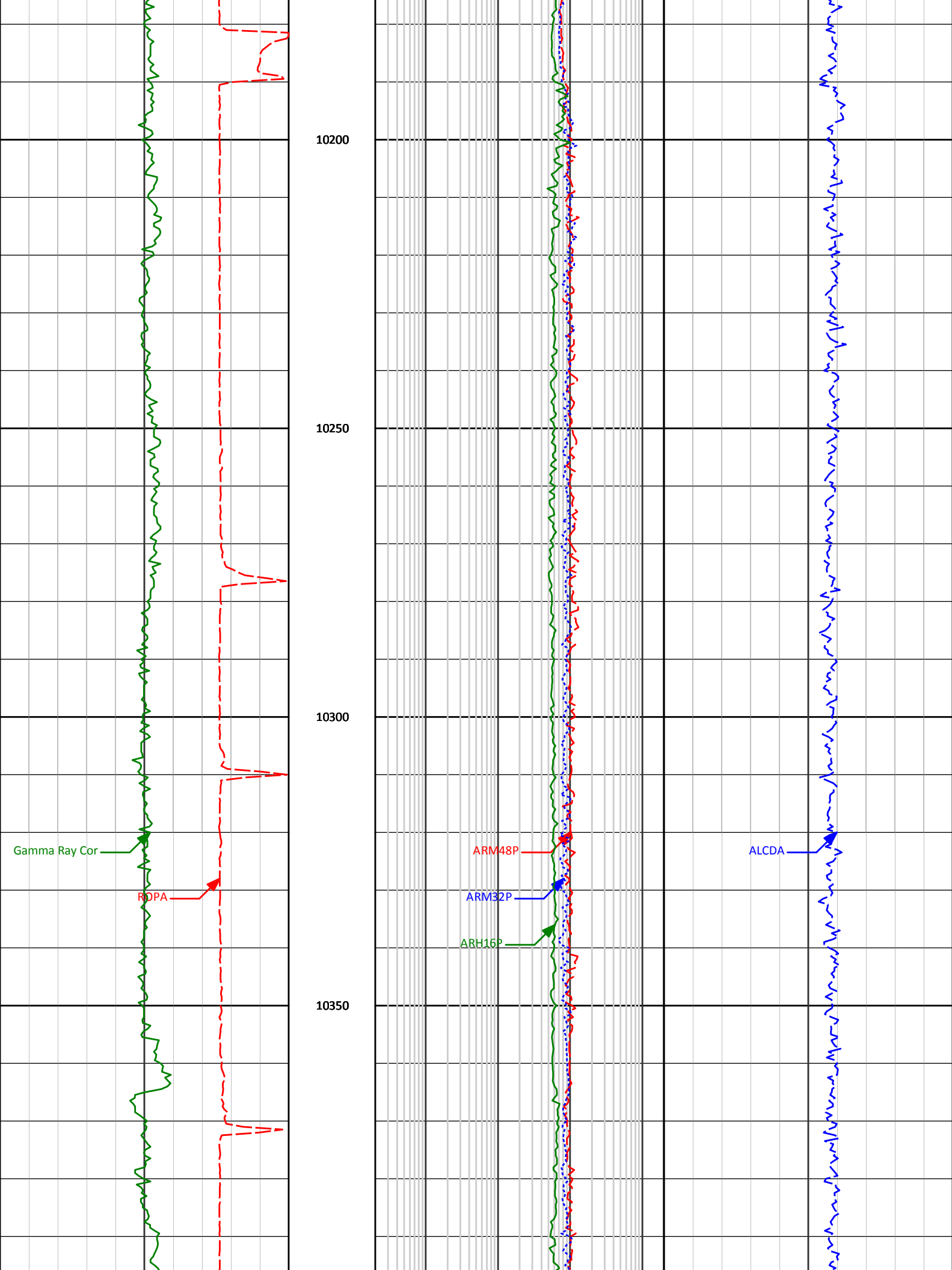
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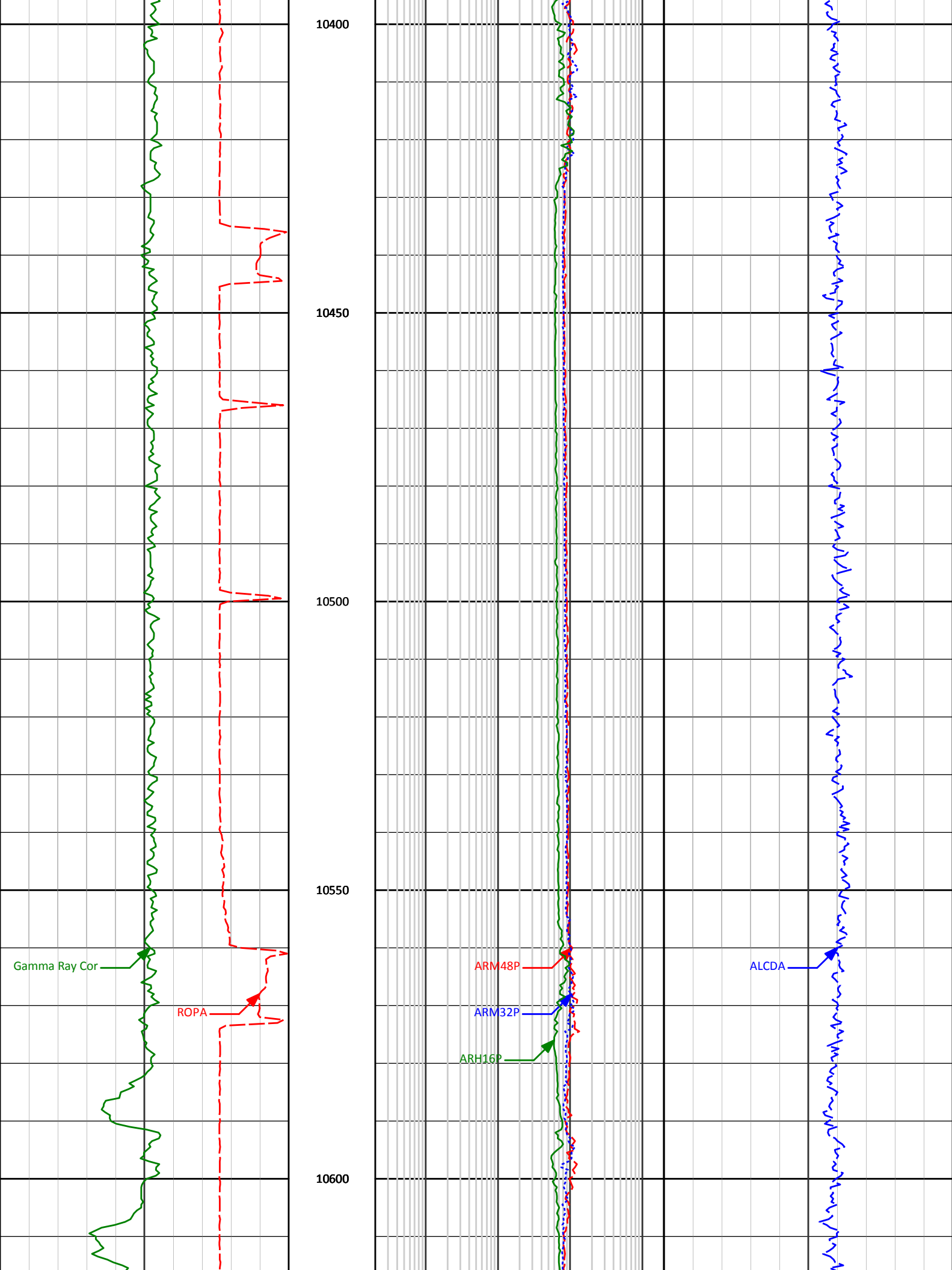
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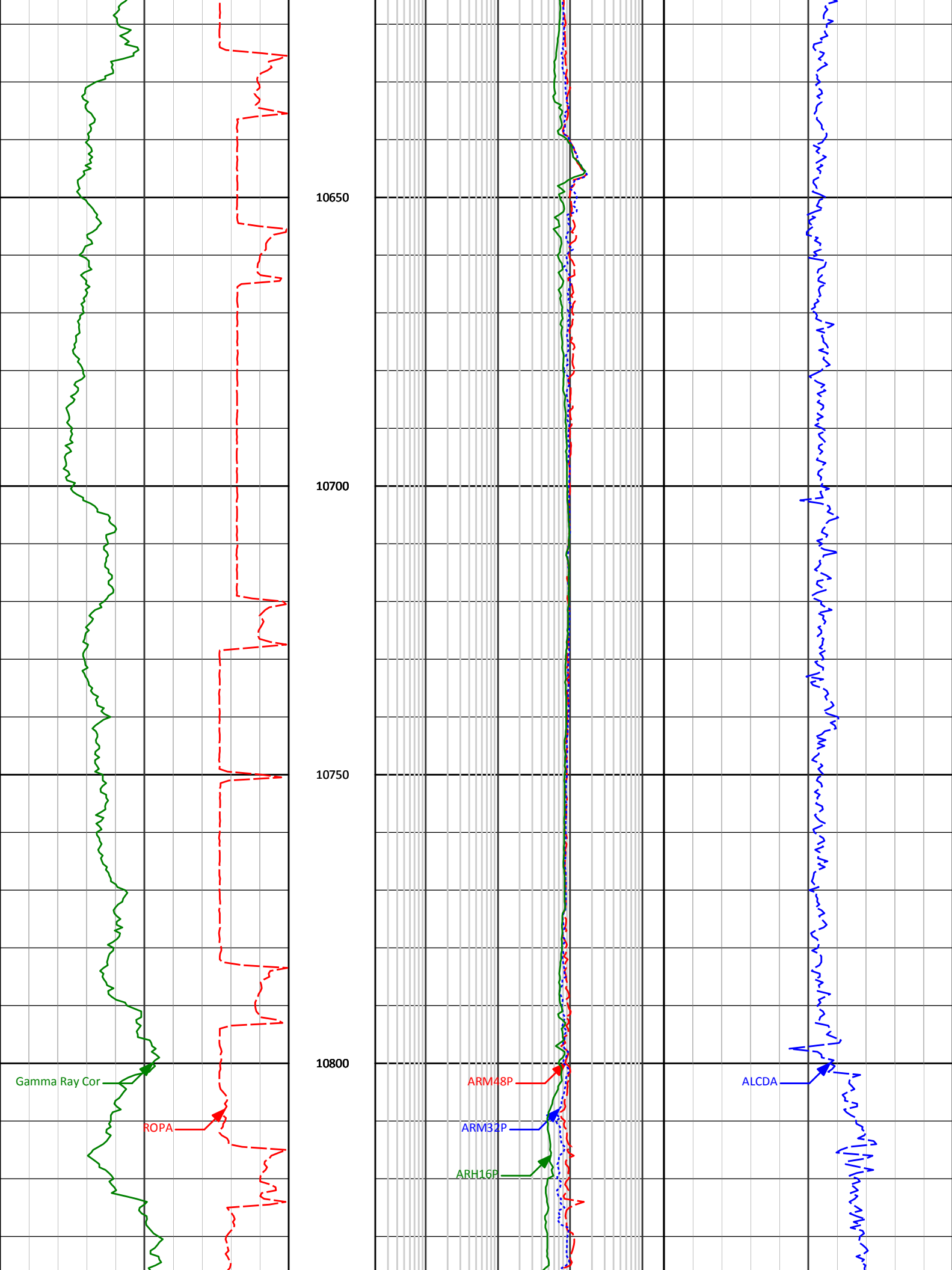
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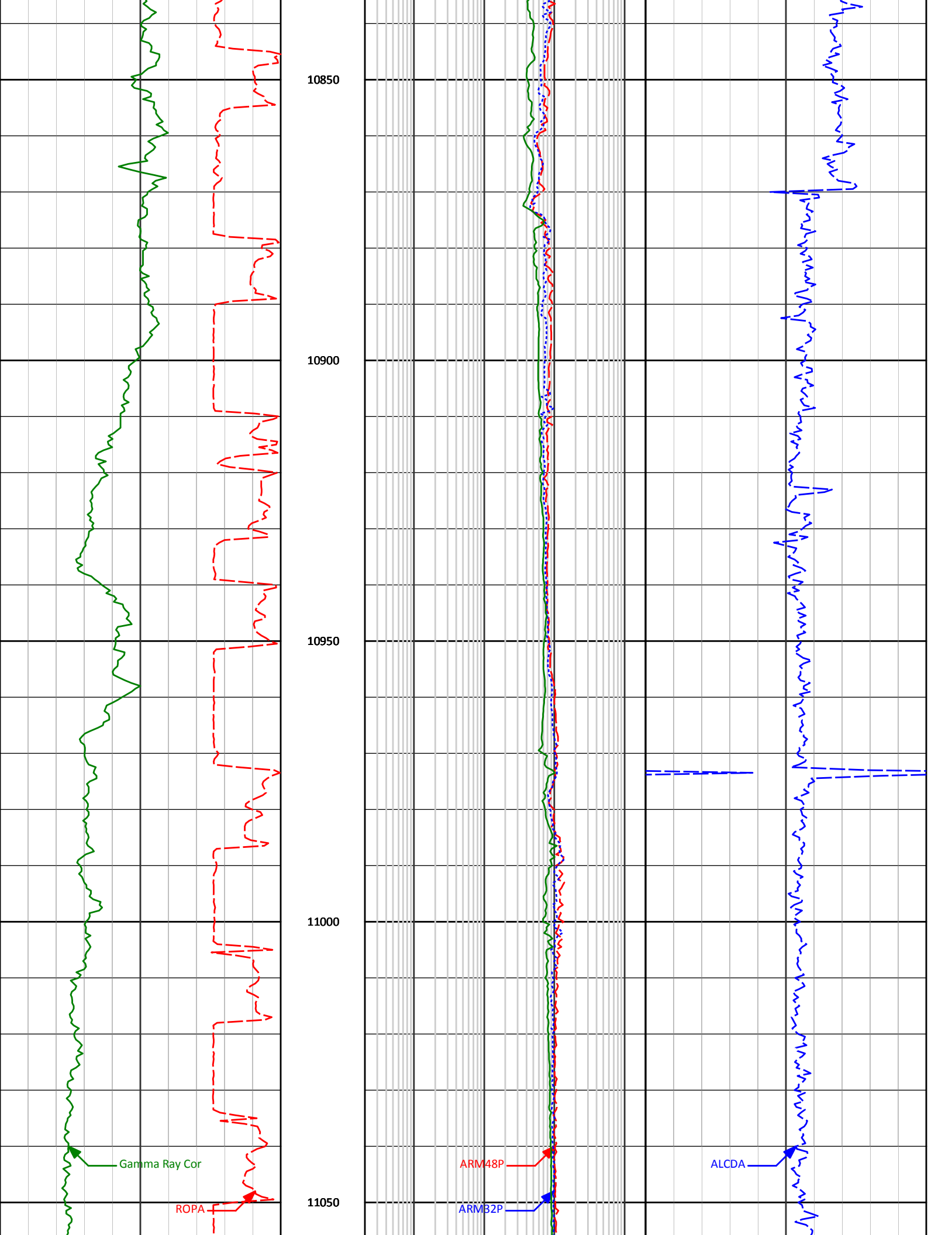


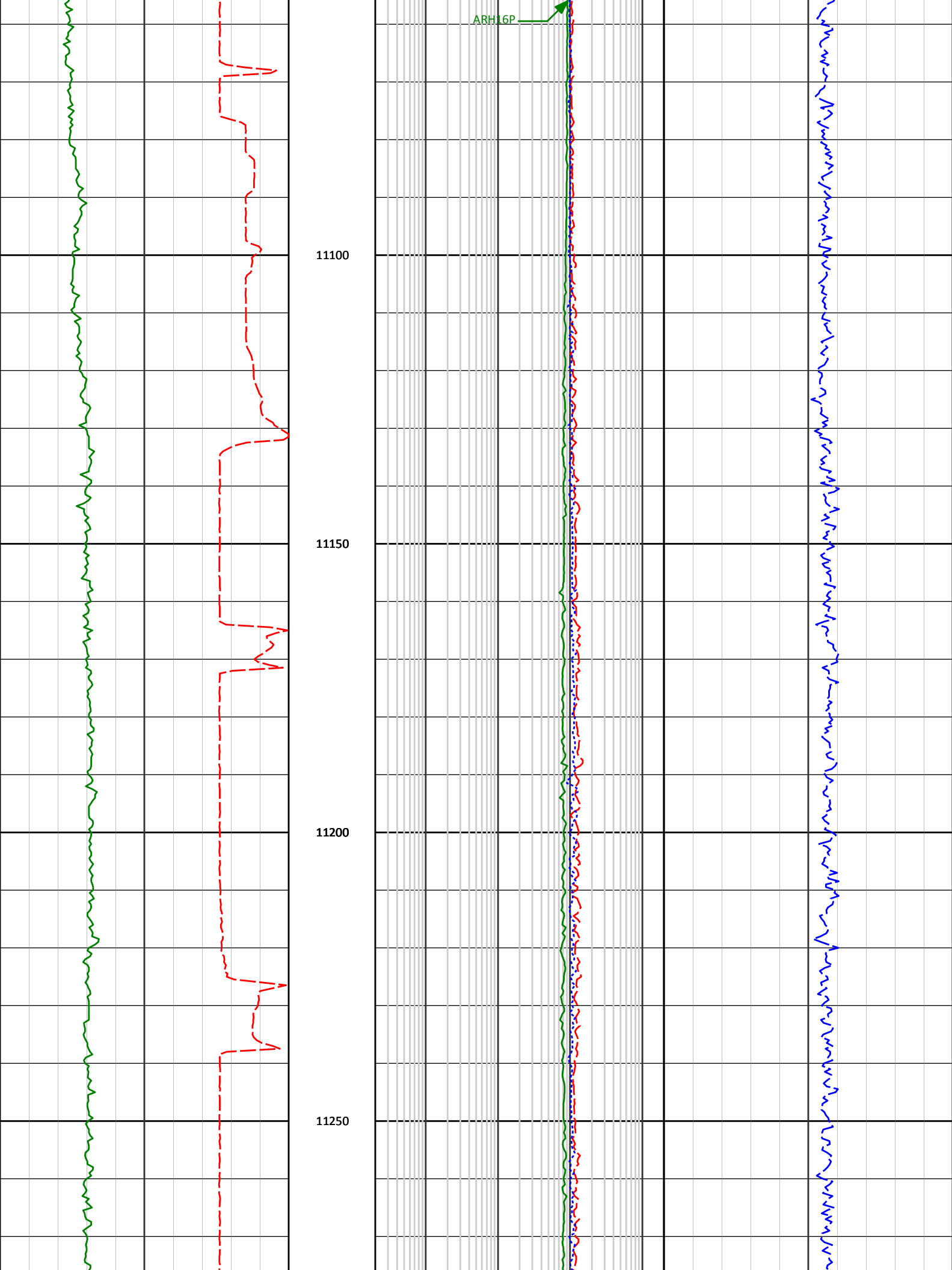


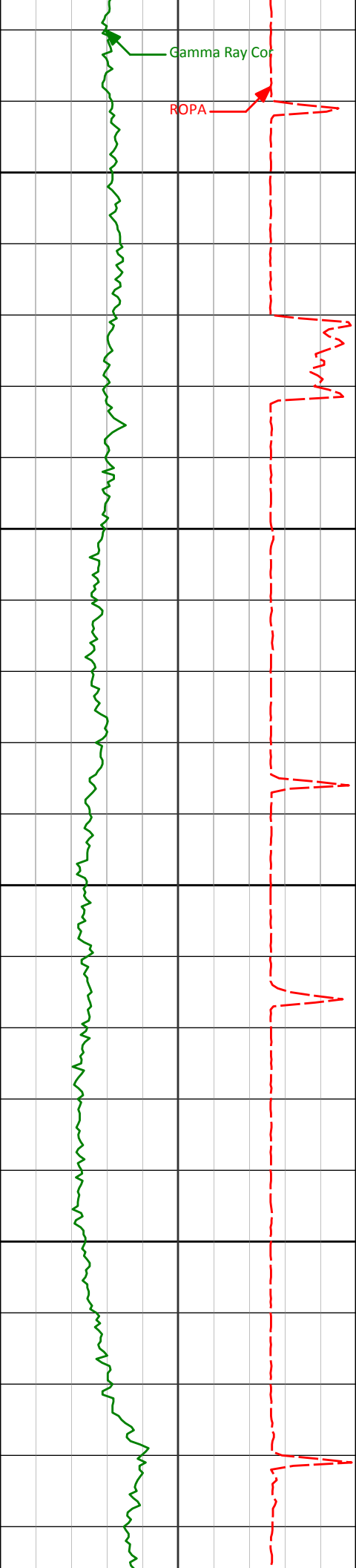










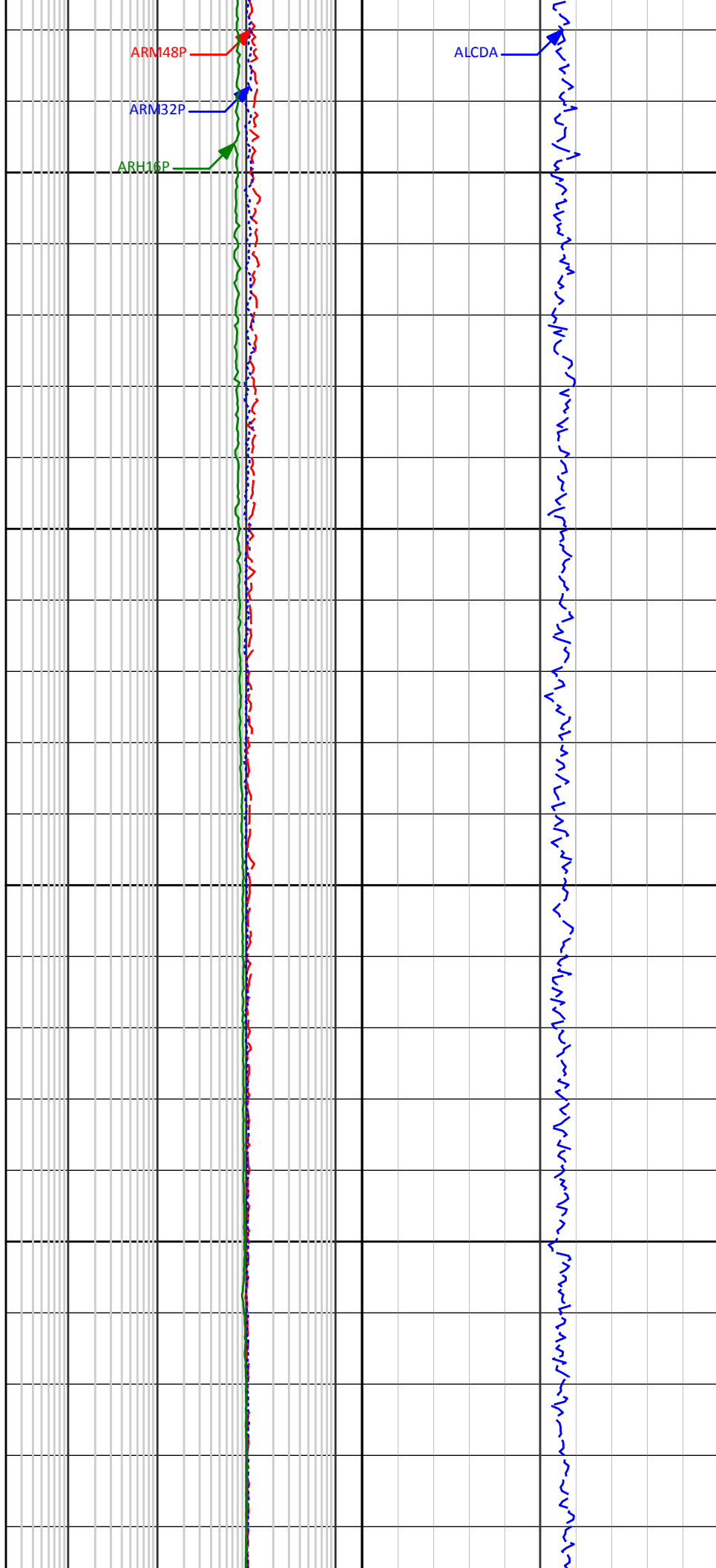


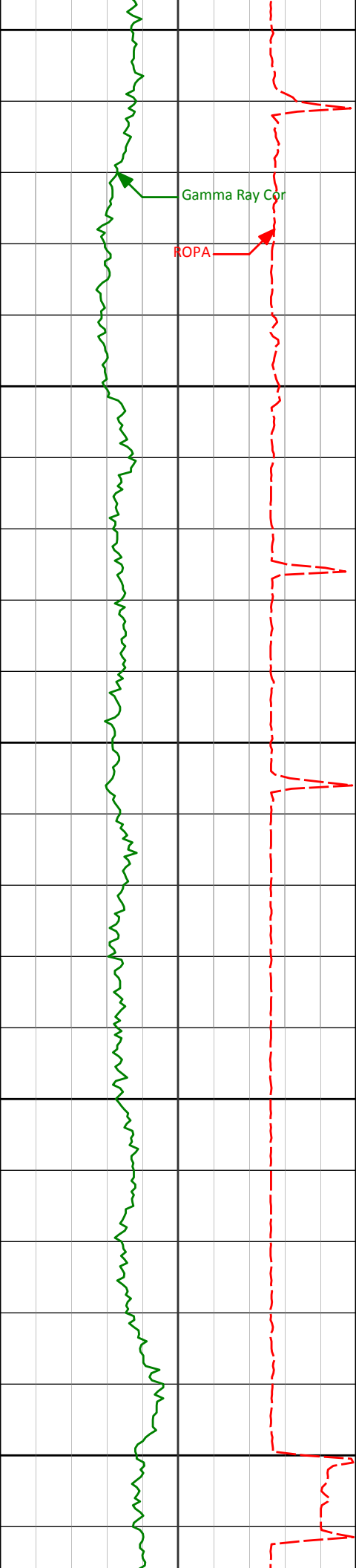
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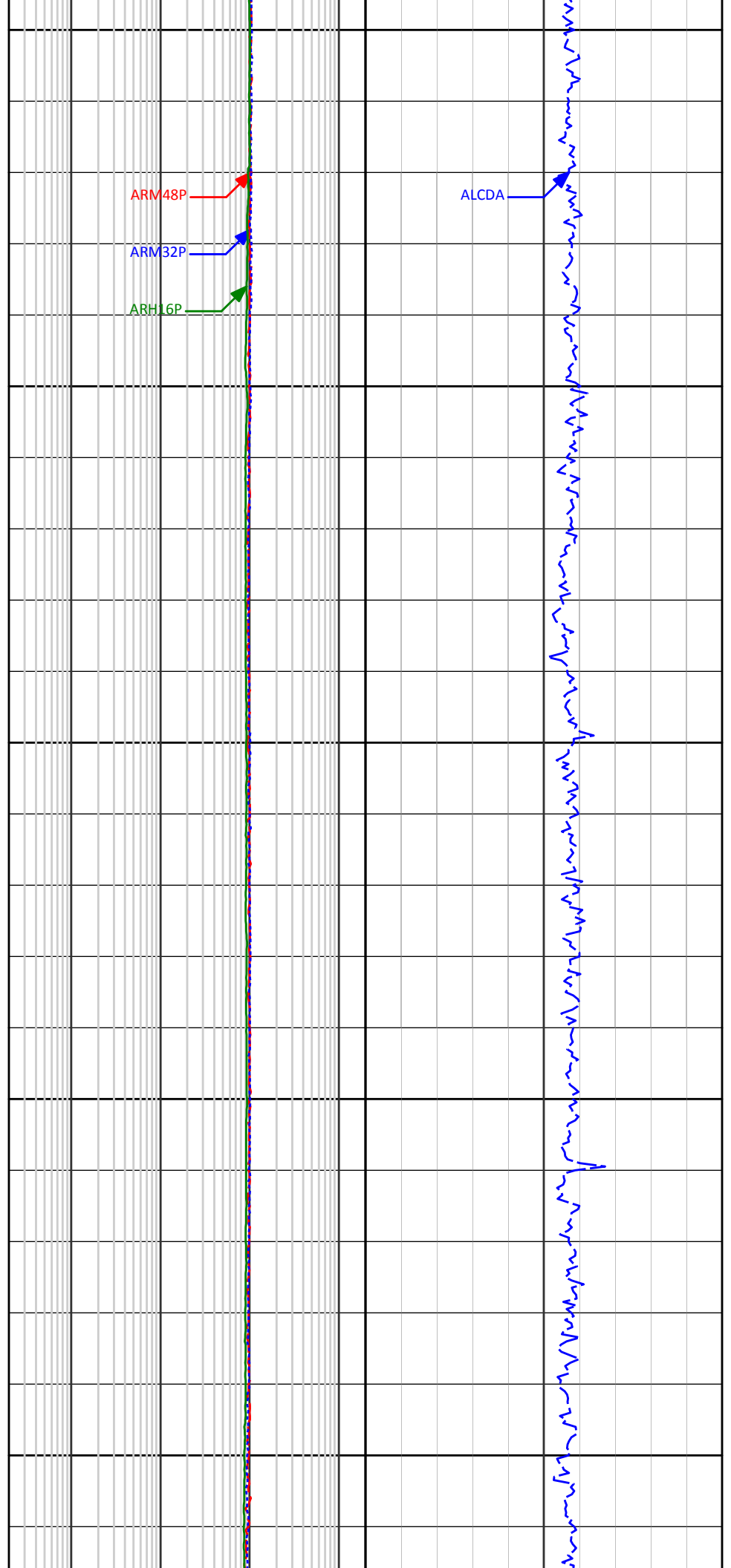
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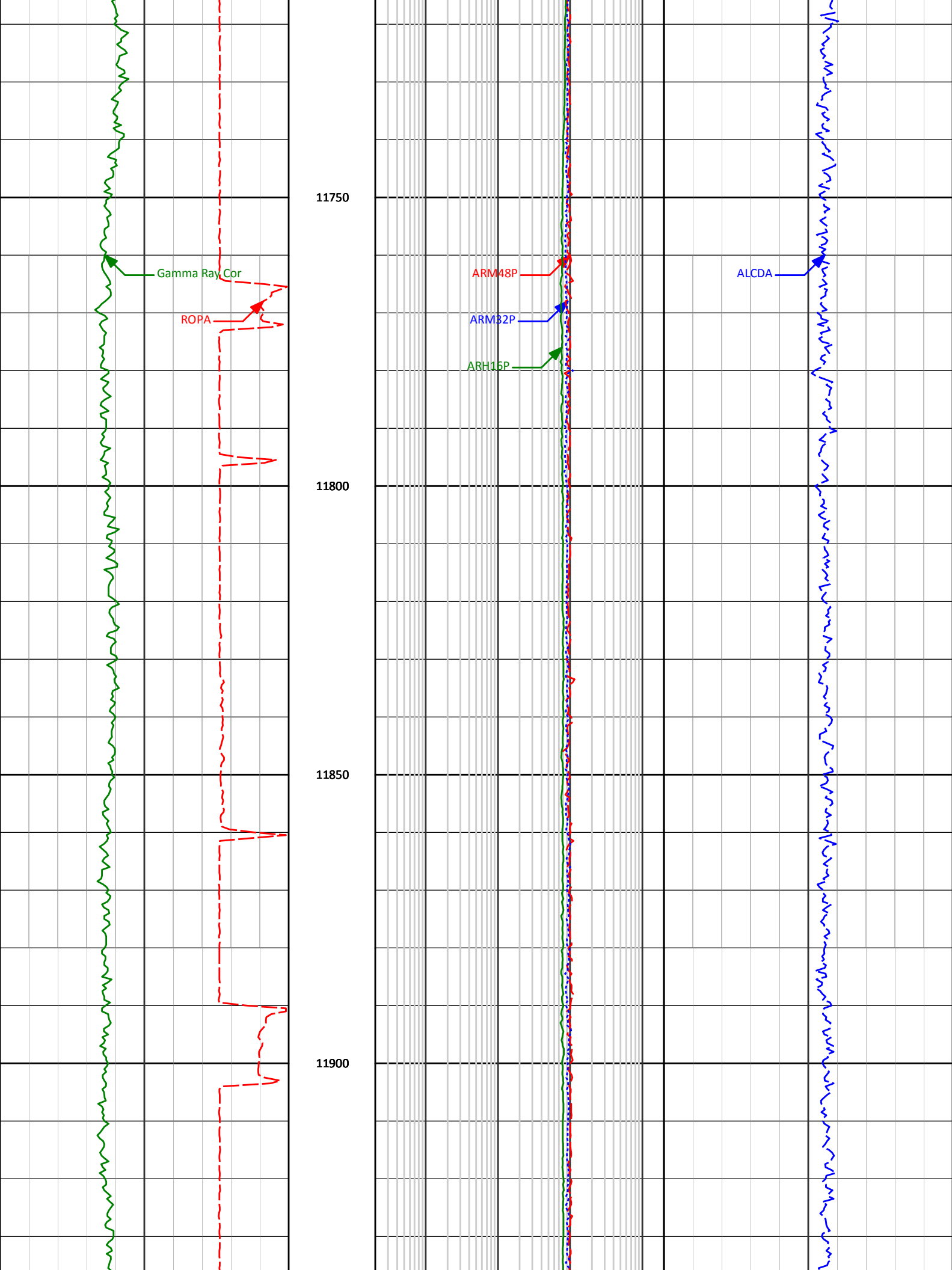
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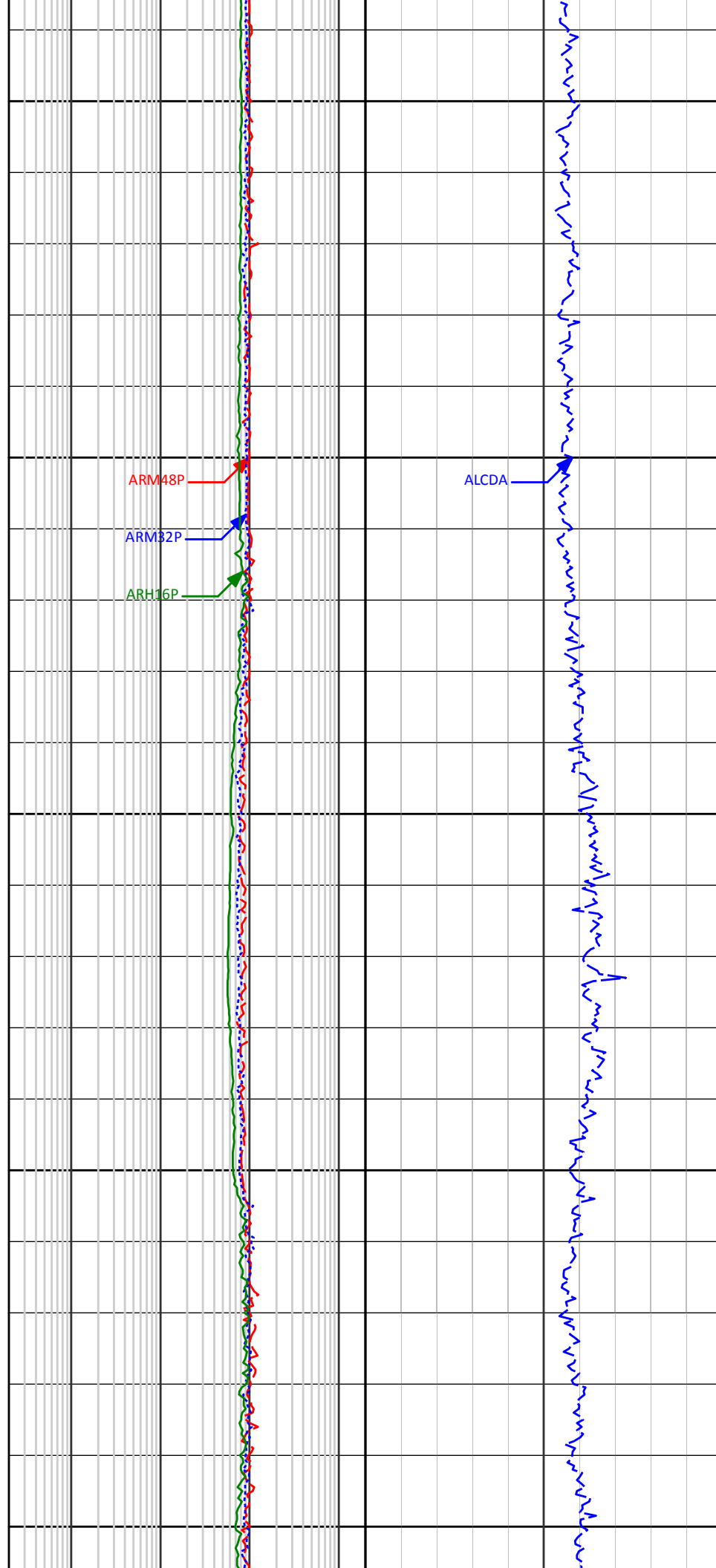
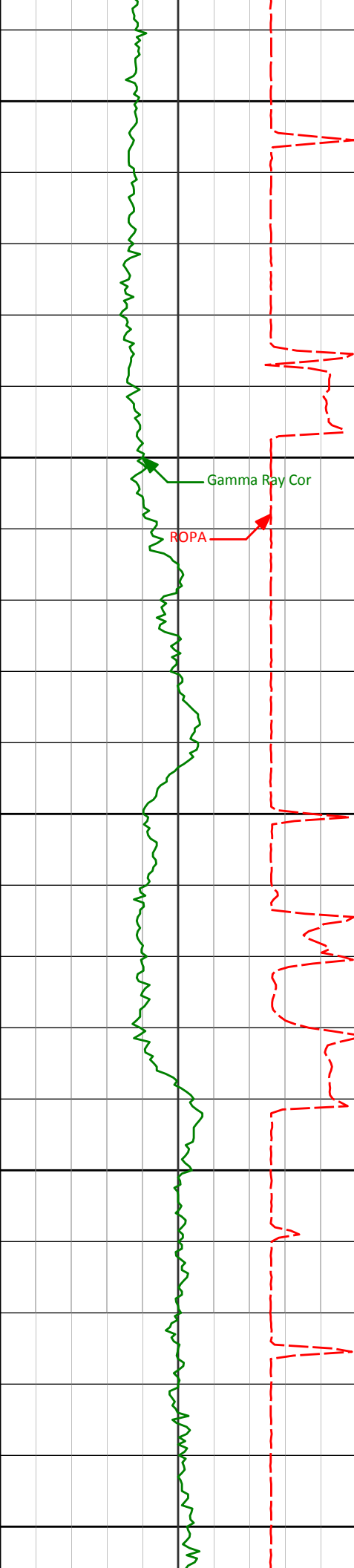
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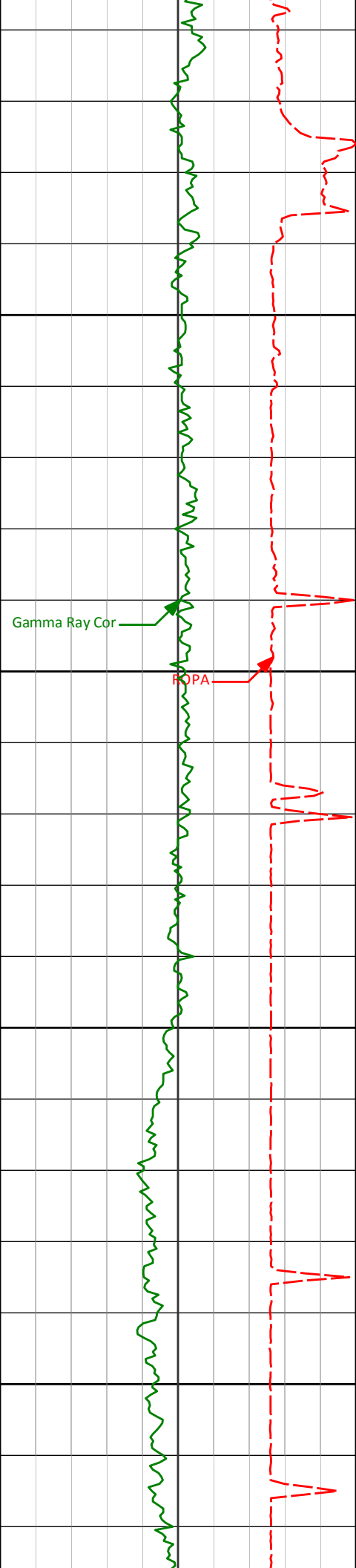
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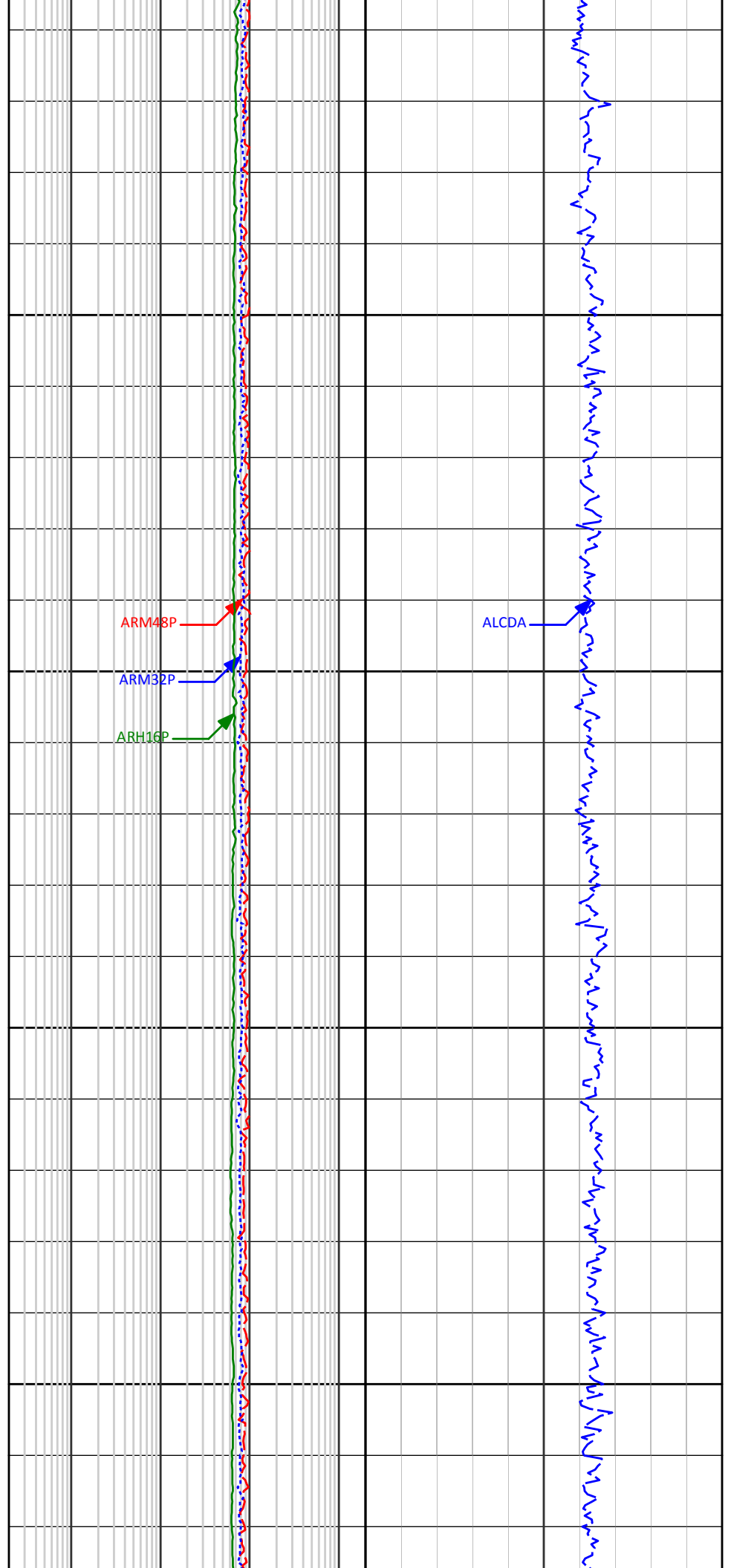


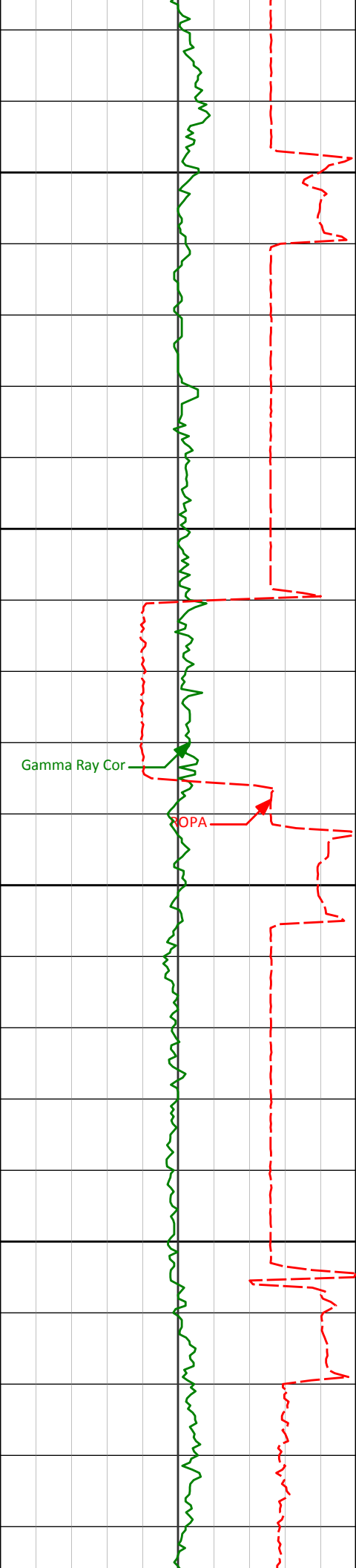
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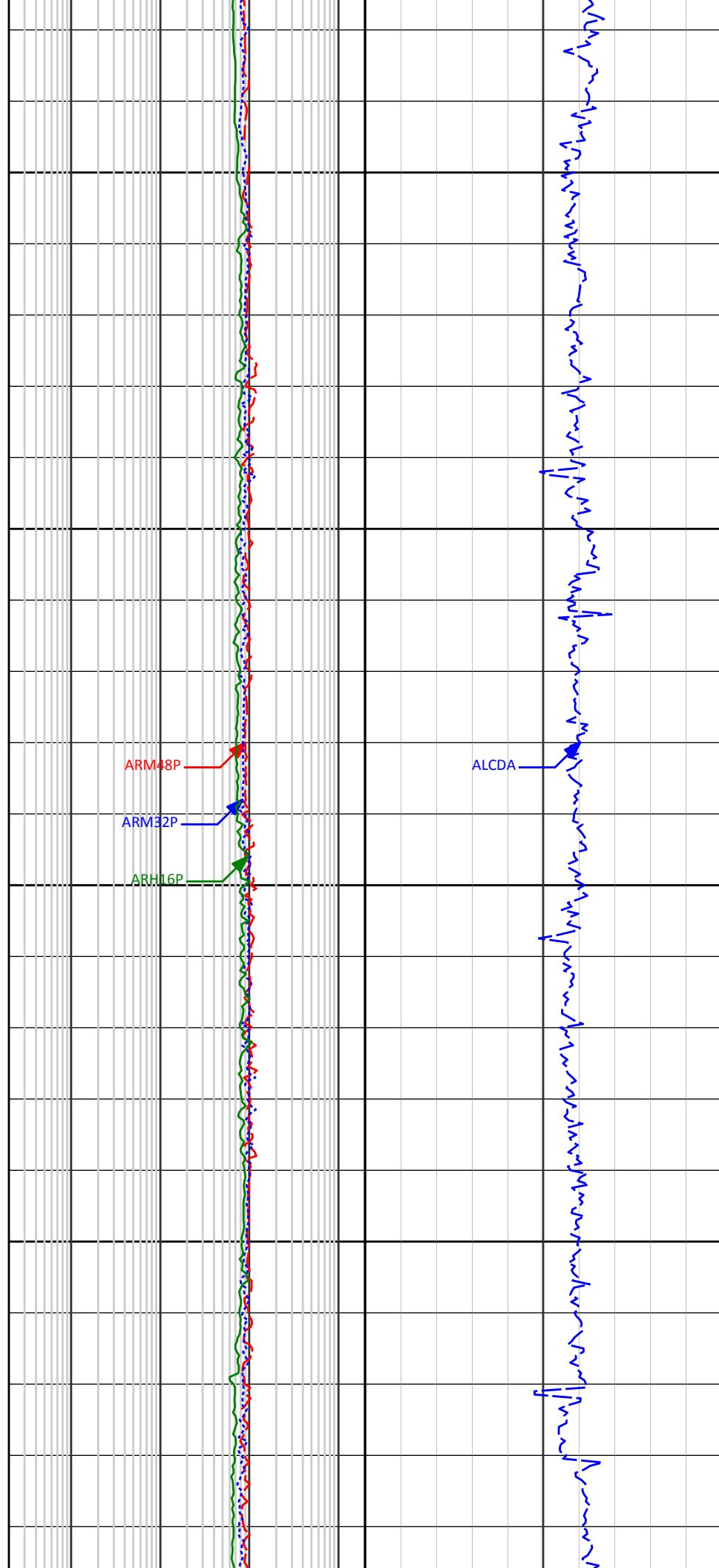
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Gamma Ray Cor

SOPA

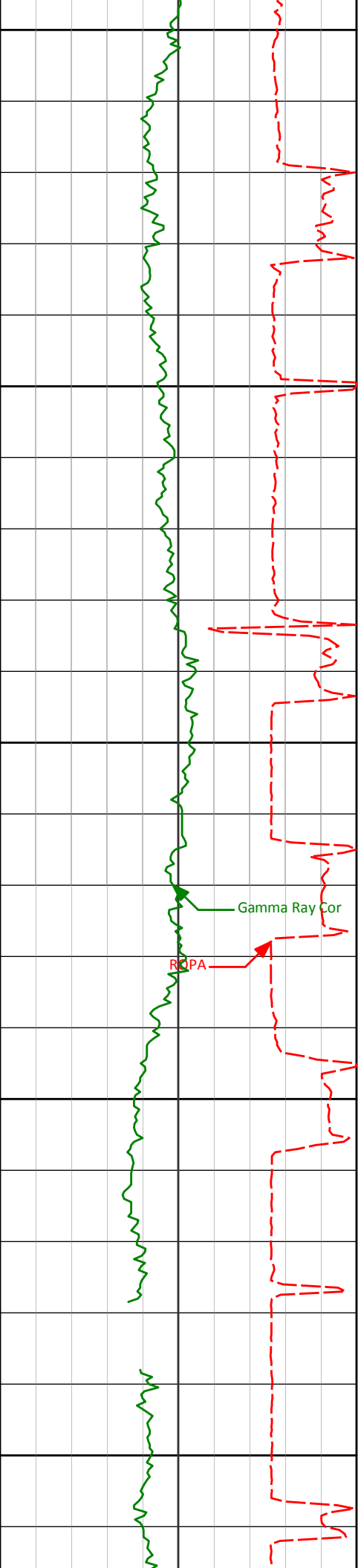


ARM48P

ARM32P

ARM16P

ALCDA



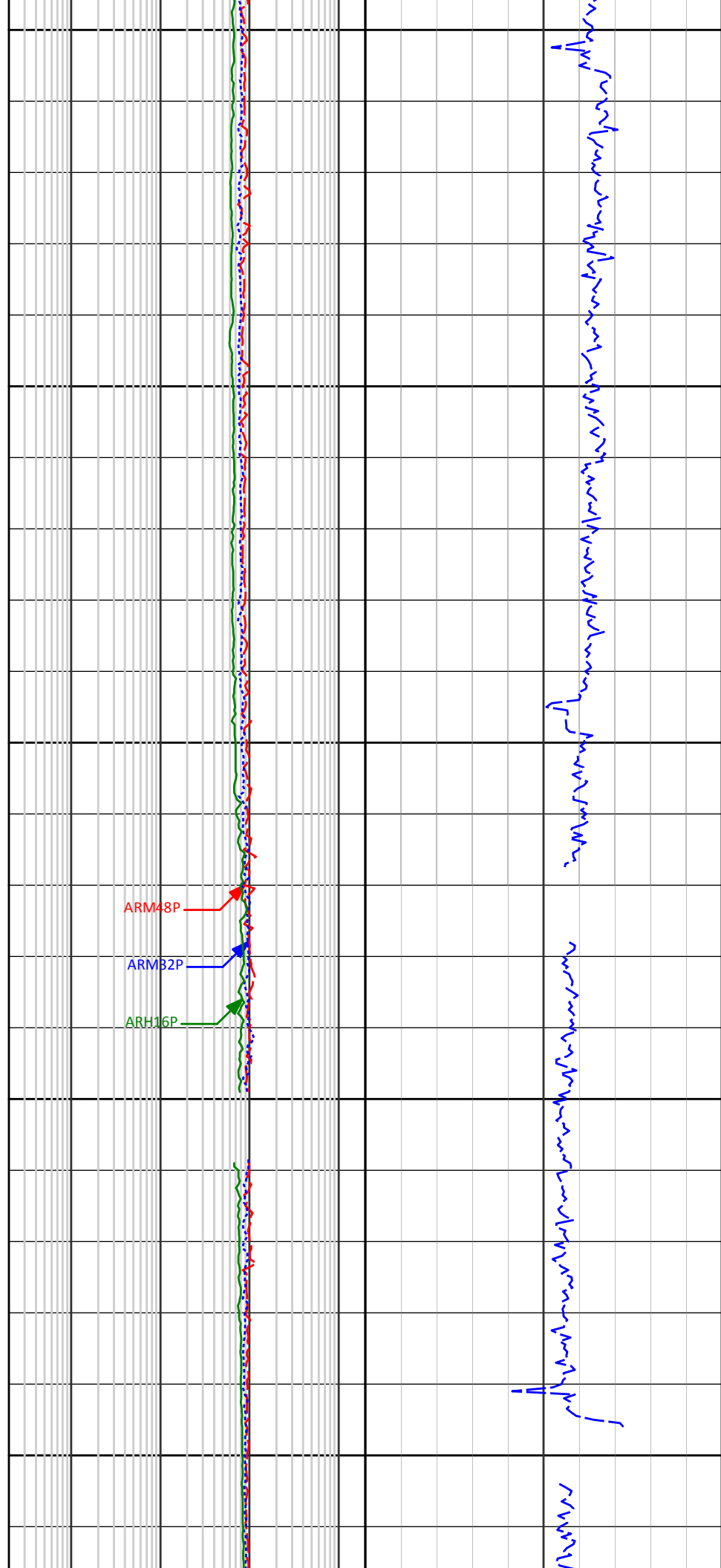
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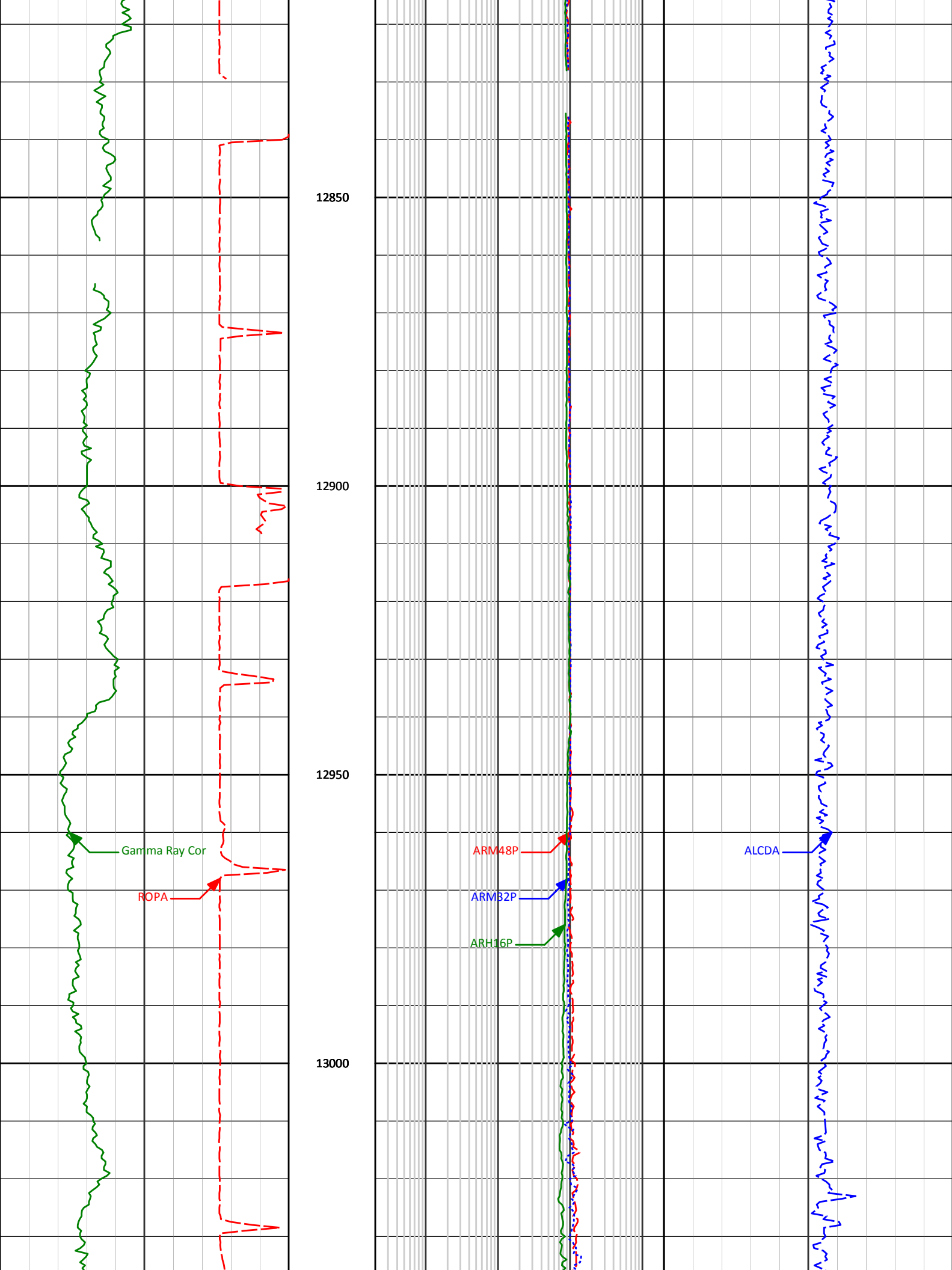
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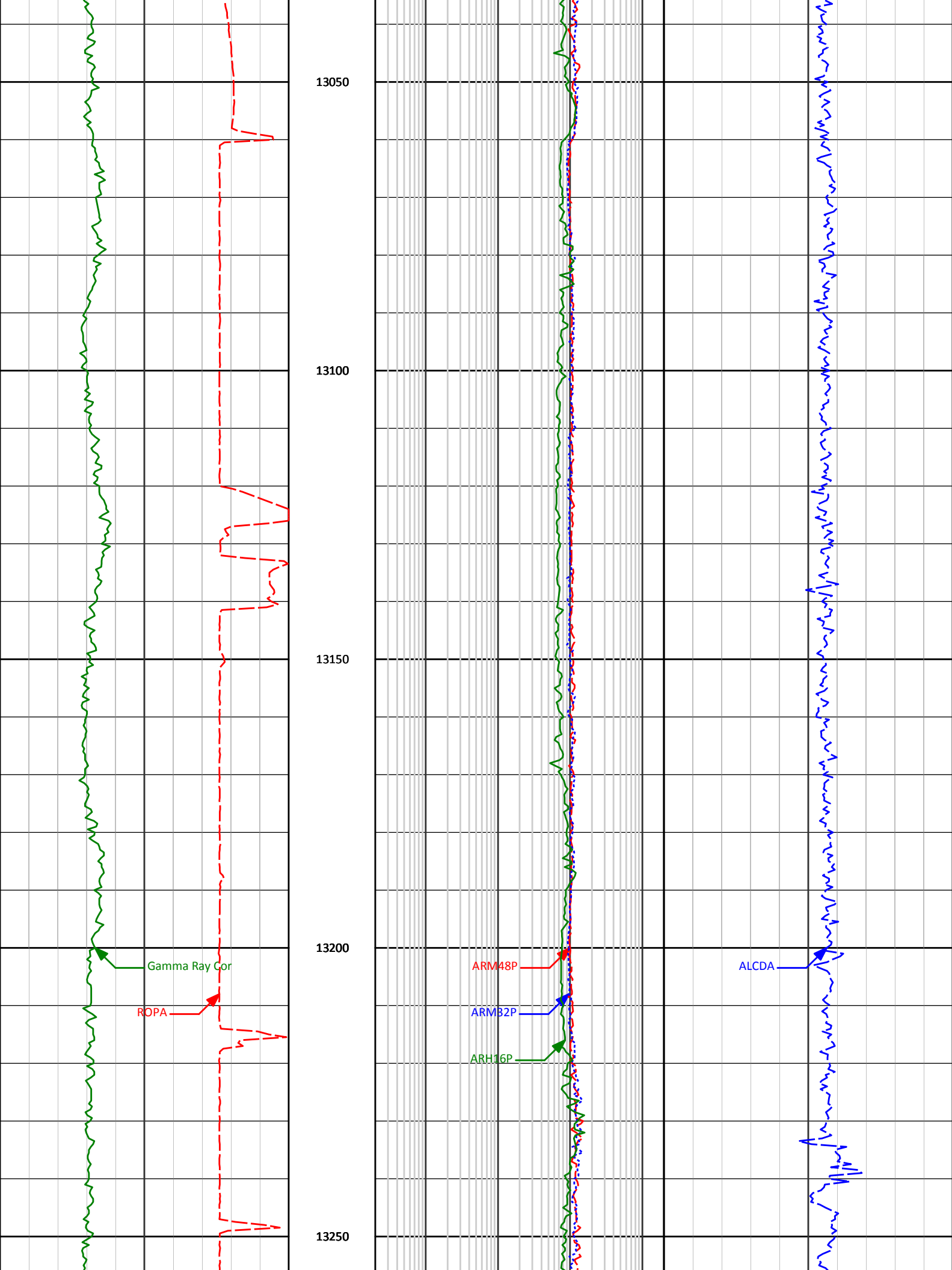
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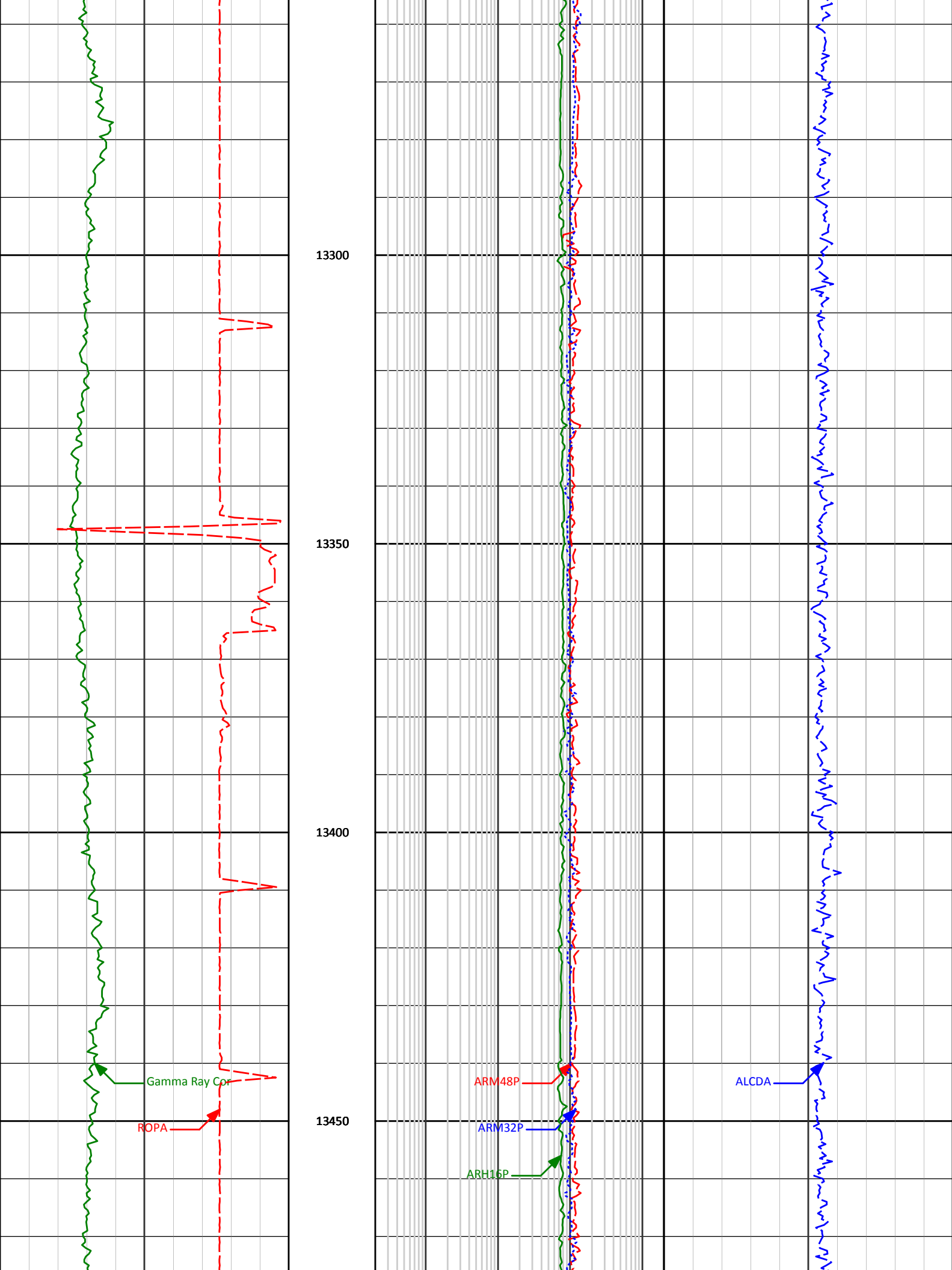
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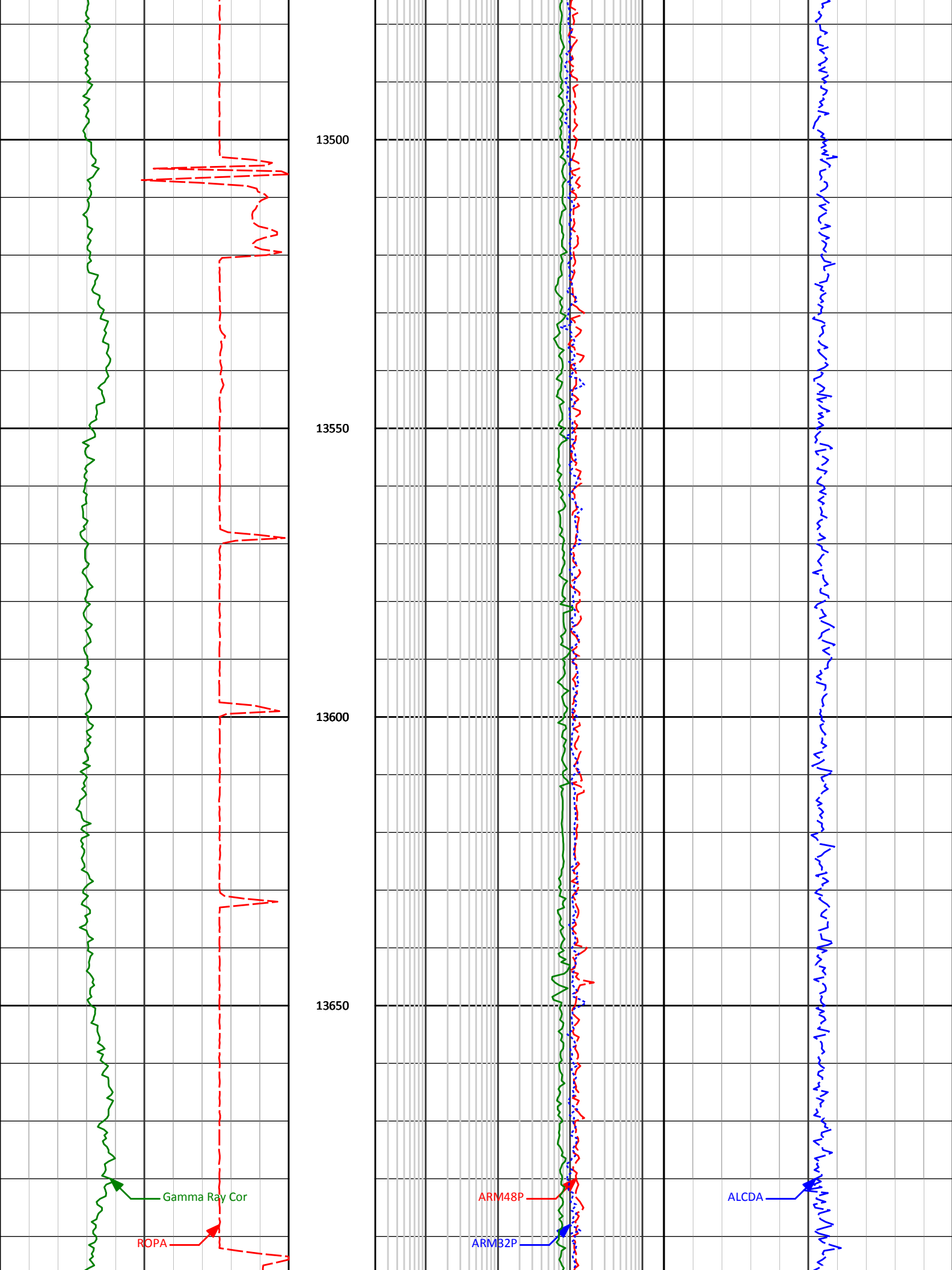
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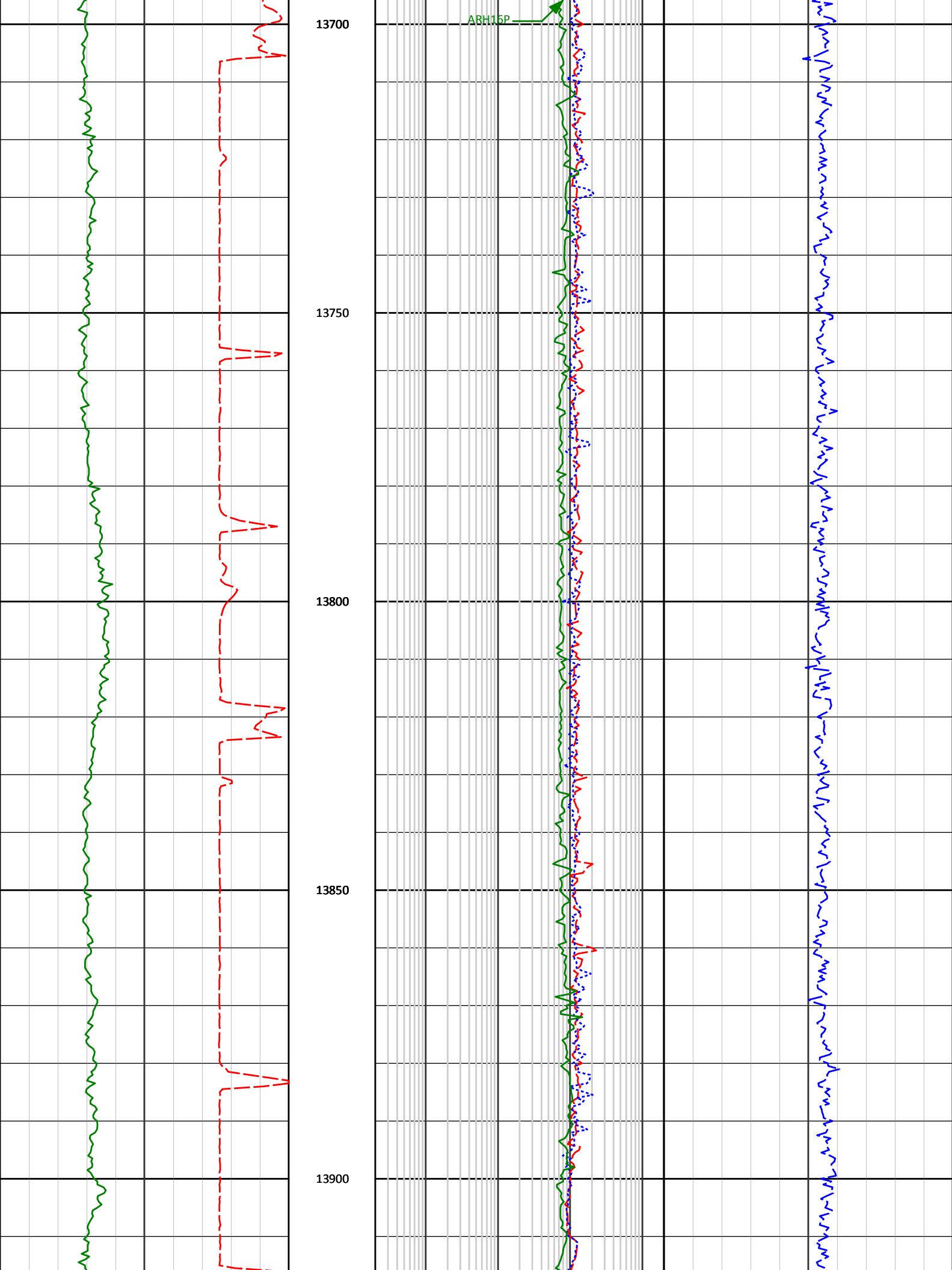




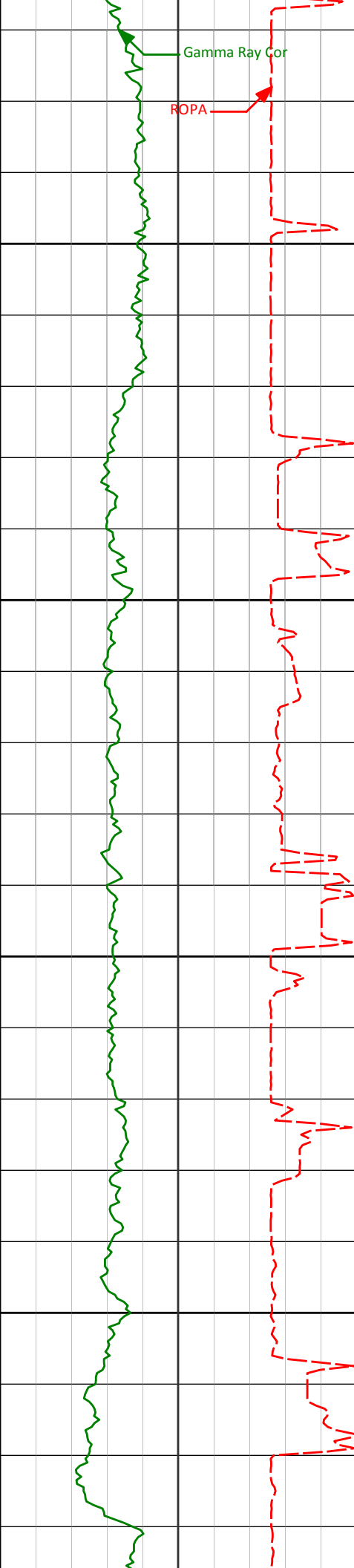










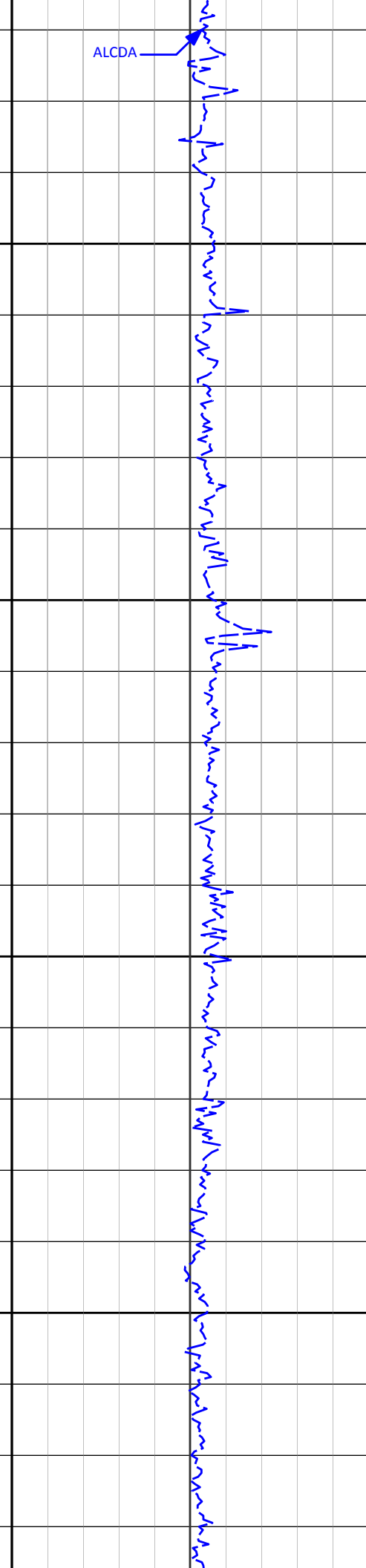
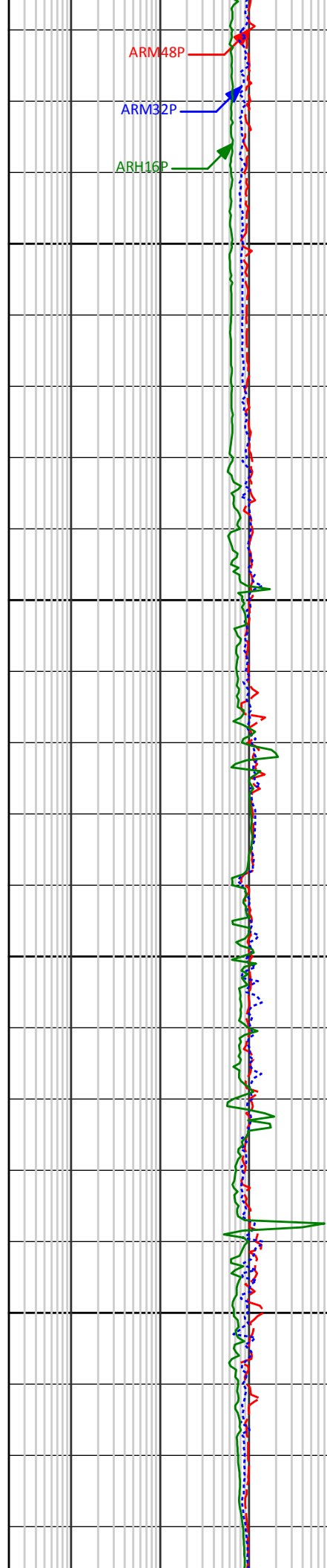


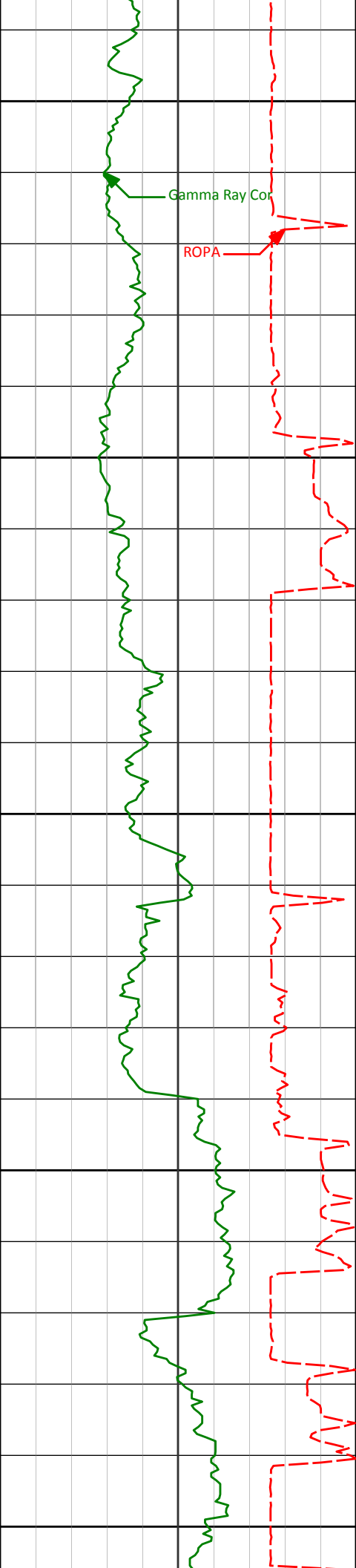
13950

14000

14050

14100





14150

Gamma Ray Cor

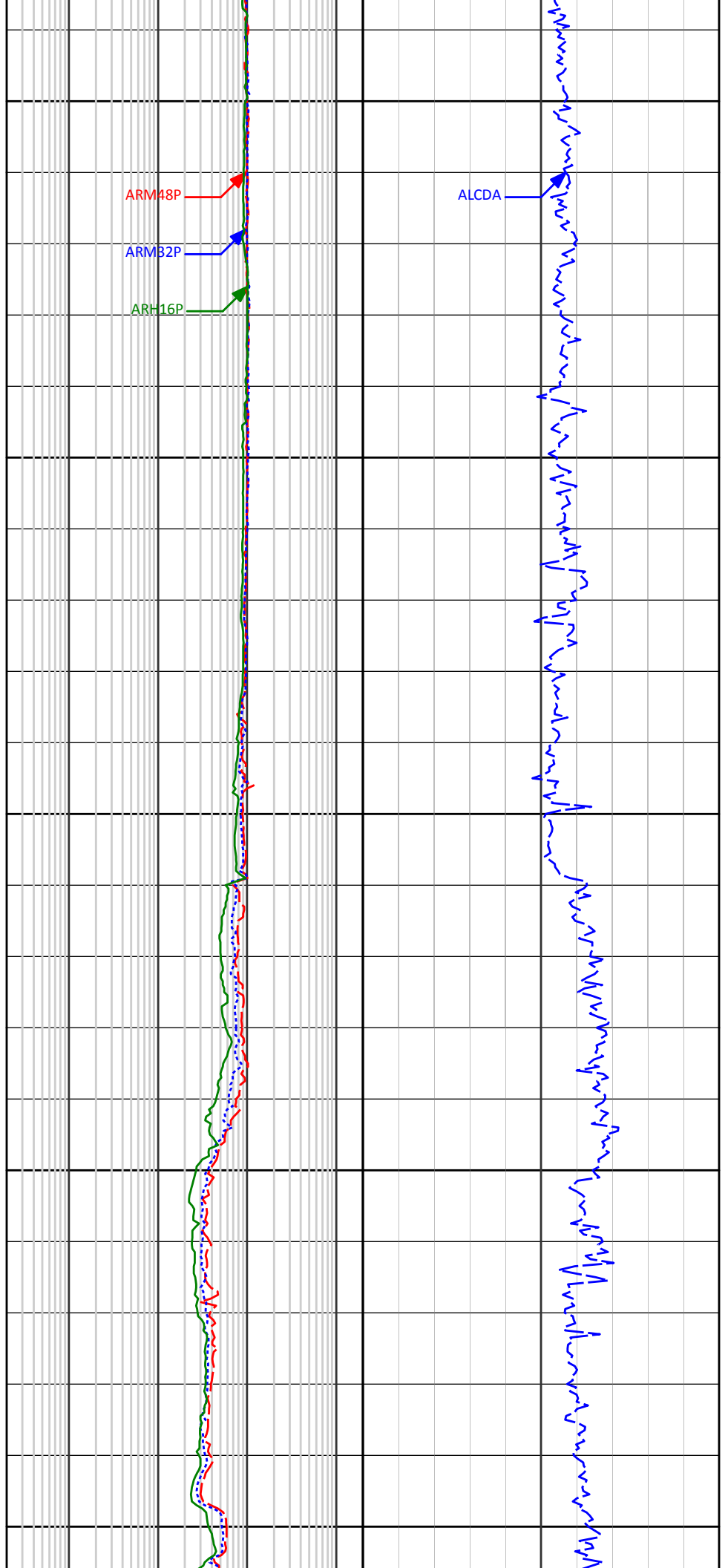
ROPA

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14250

14300

14350

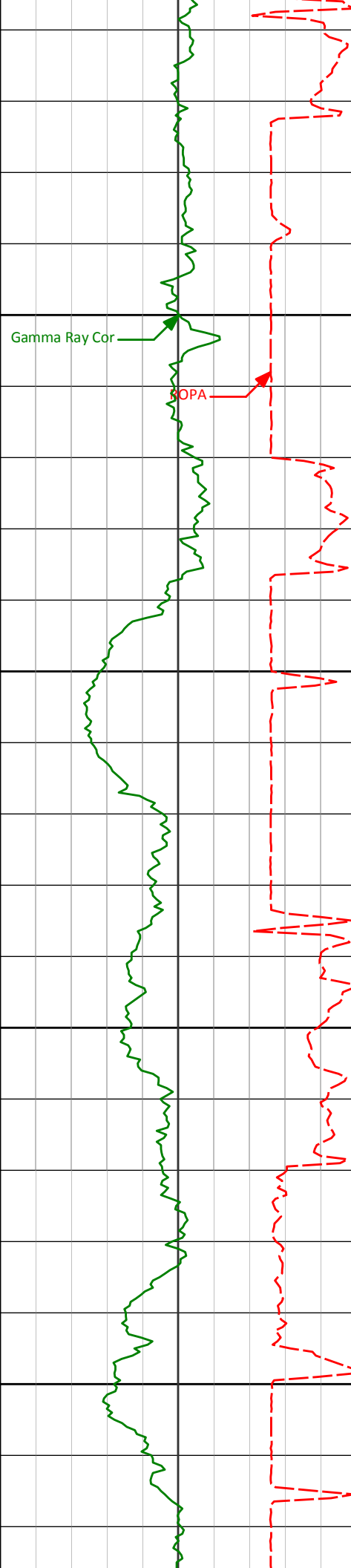


ARM48P

ARM32P

ARH16P

ALCDA

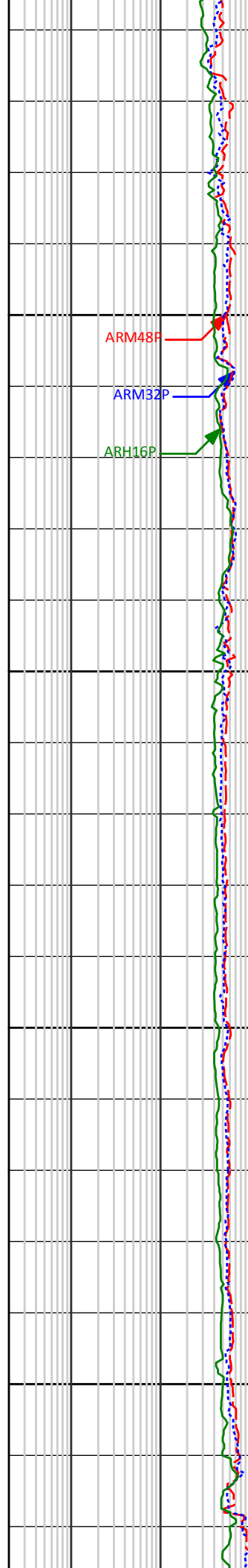


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14450

14500

14550

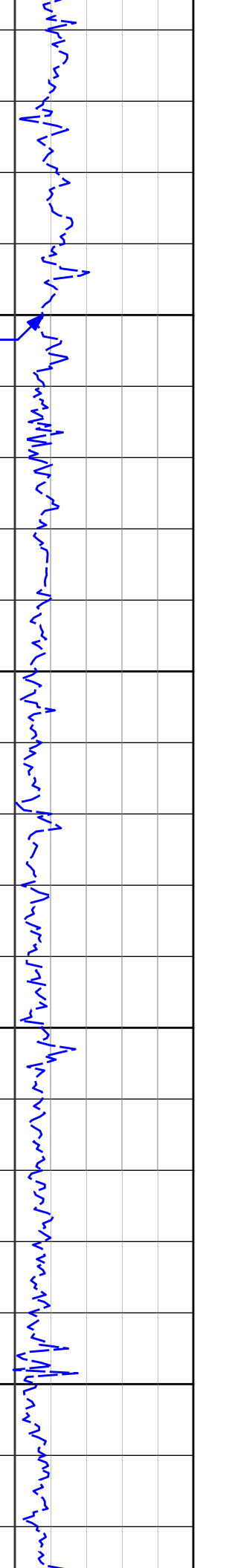


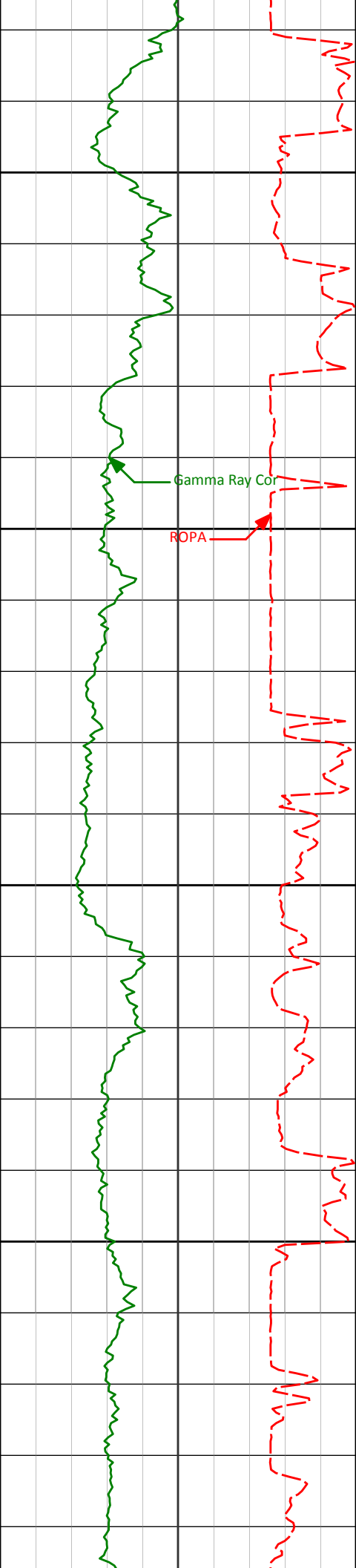
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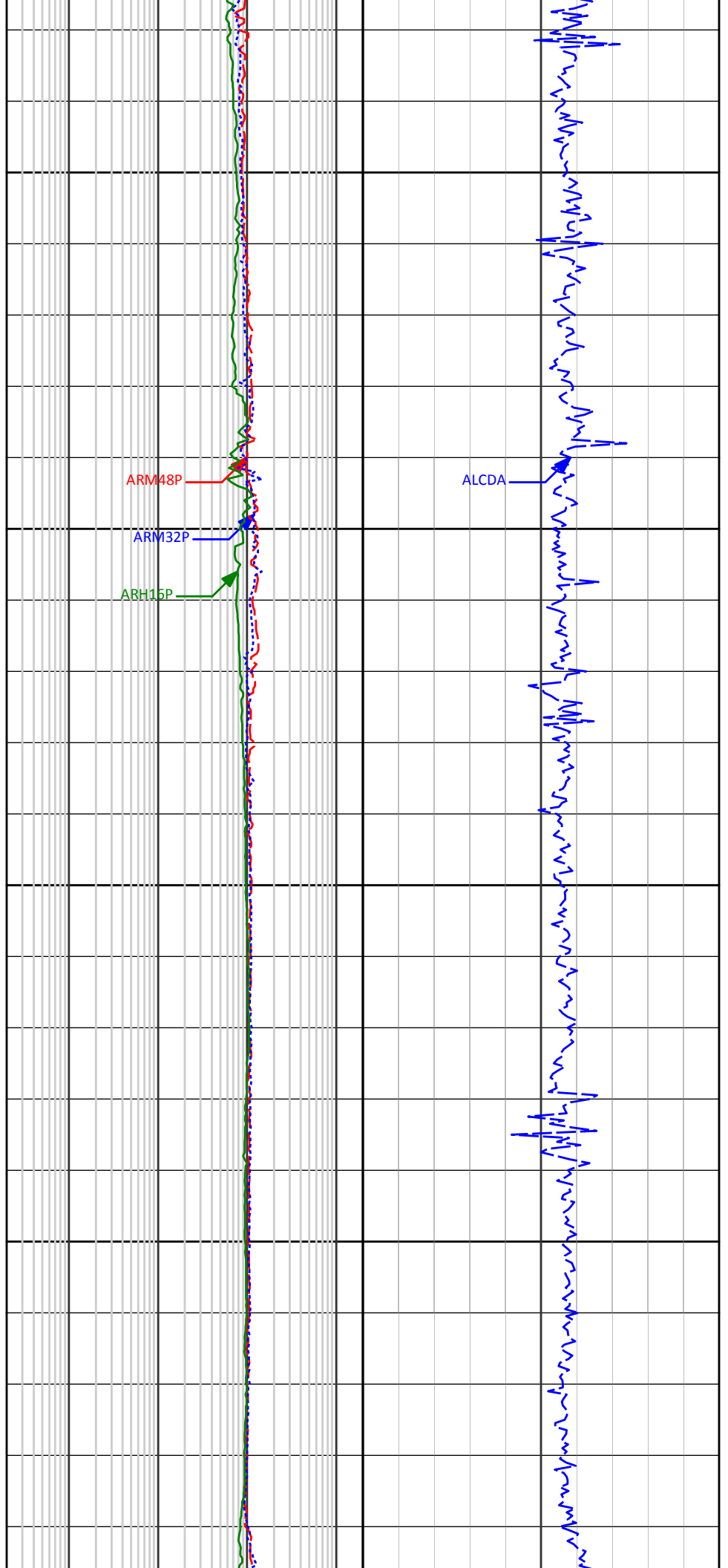


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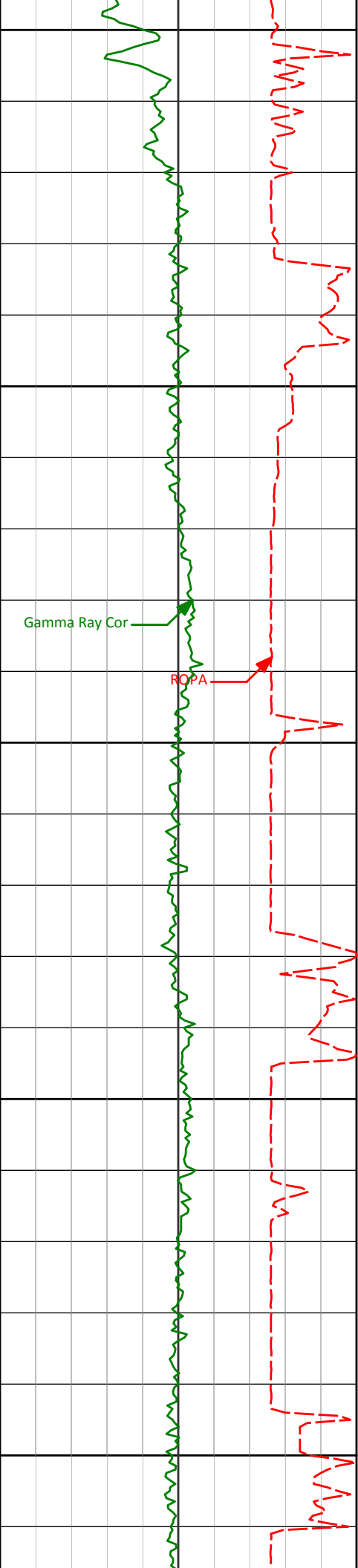
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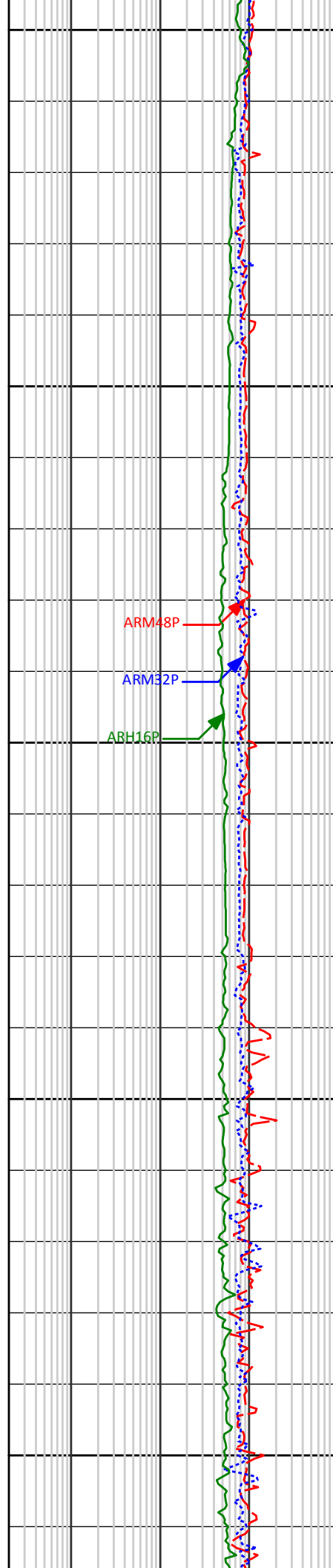
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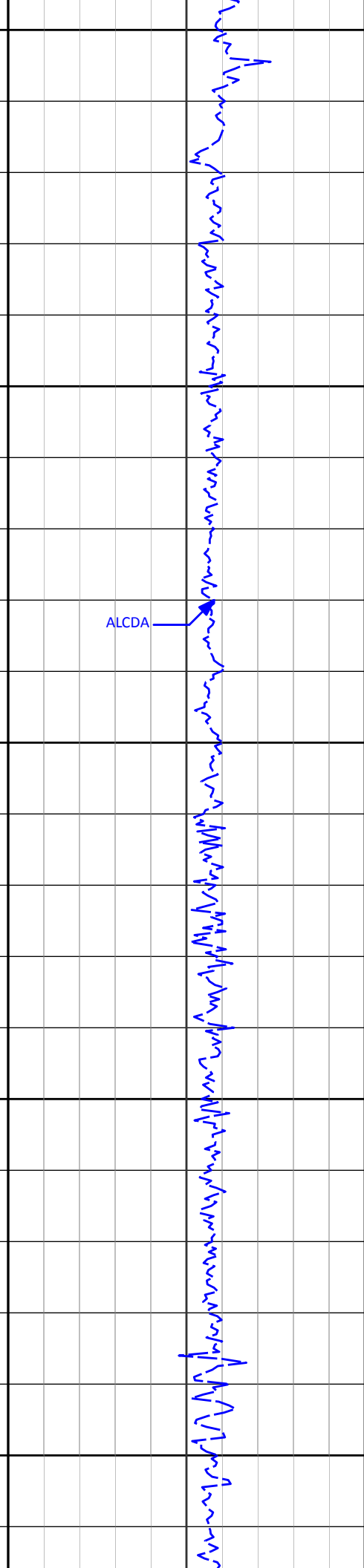
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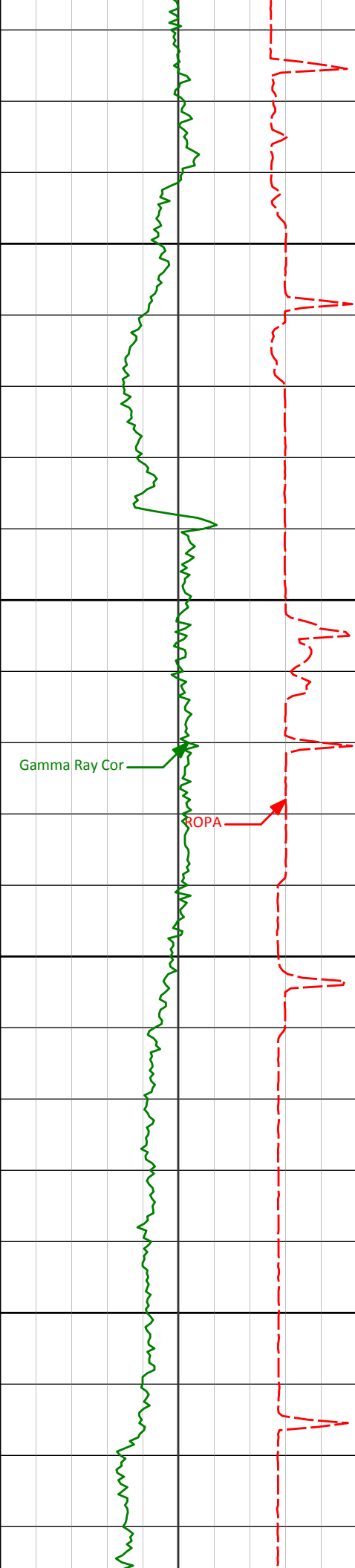
ARM48P

ARM32P

ABH16P



ALCDA

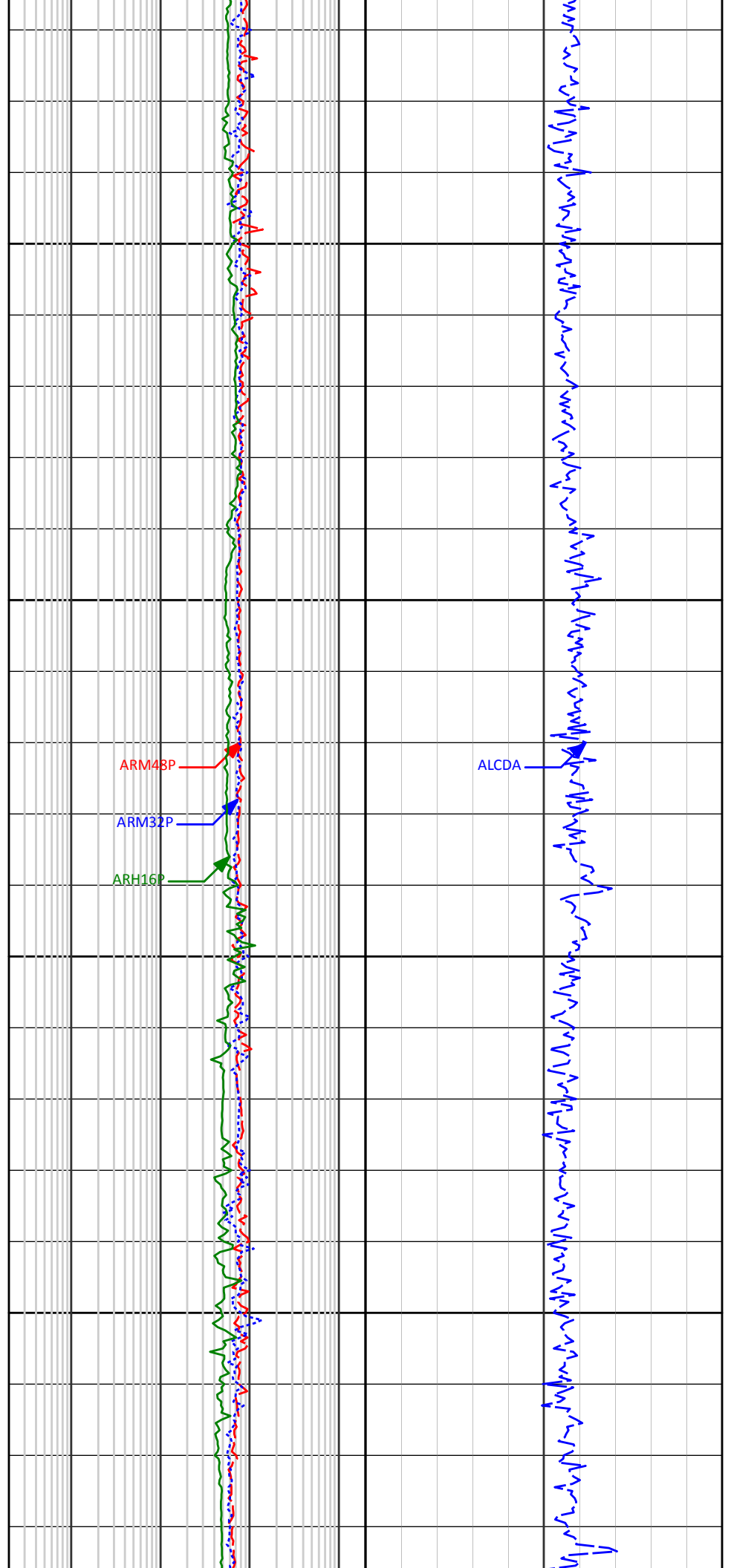


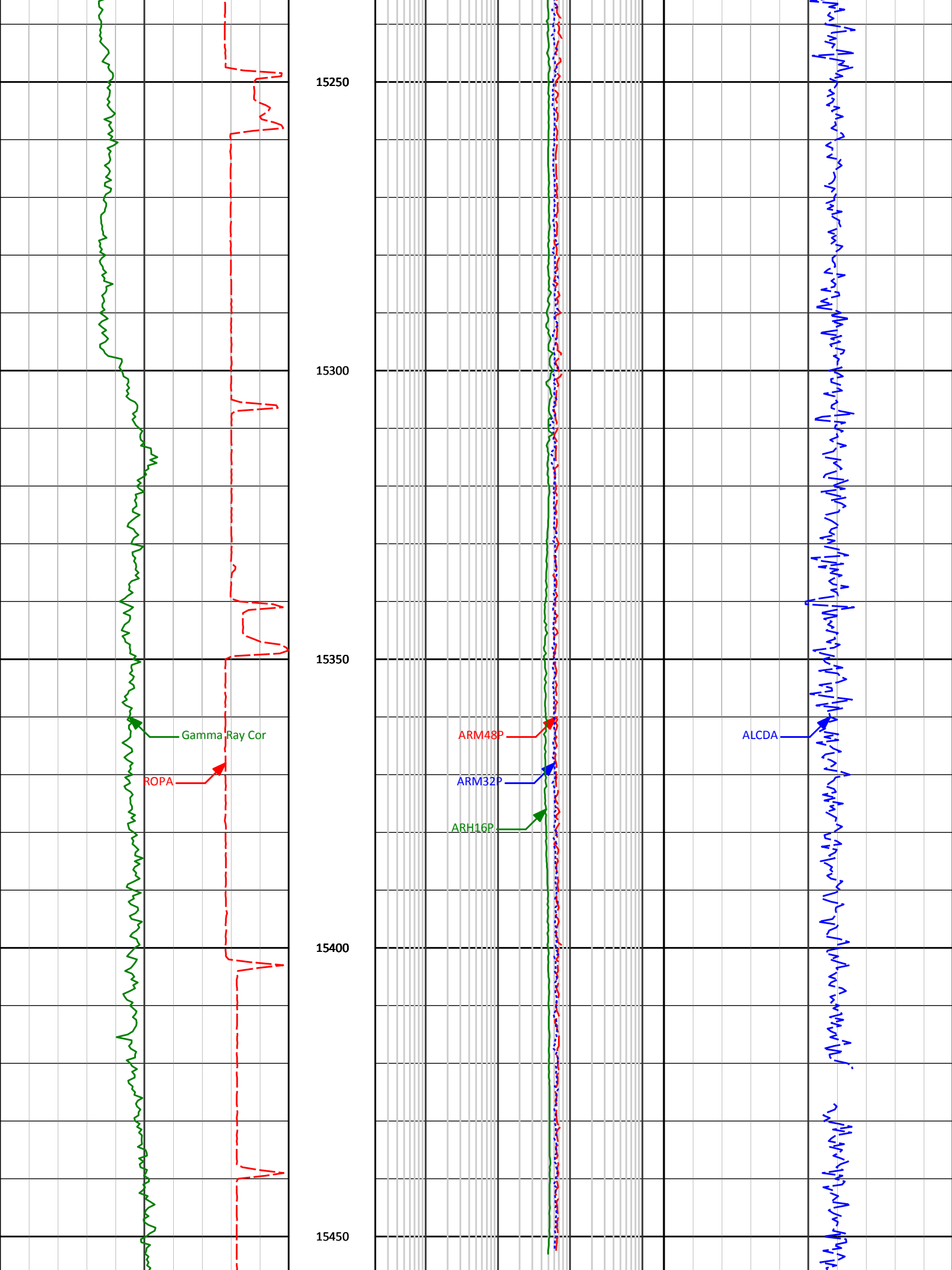
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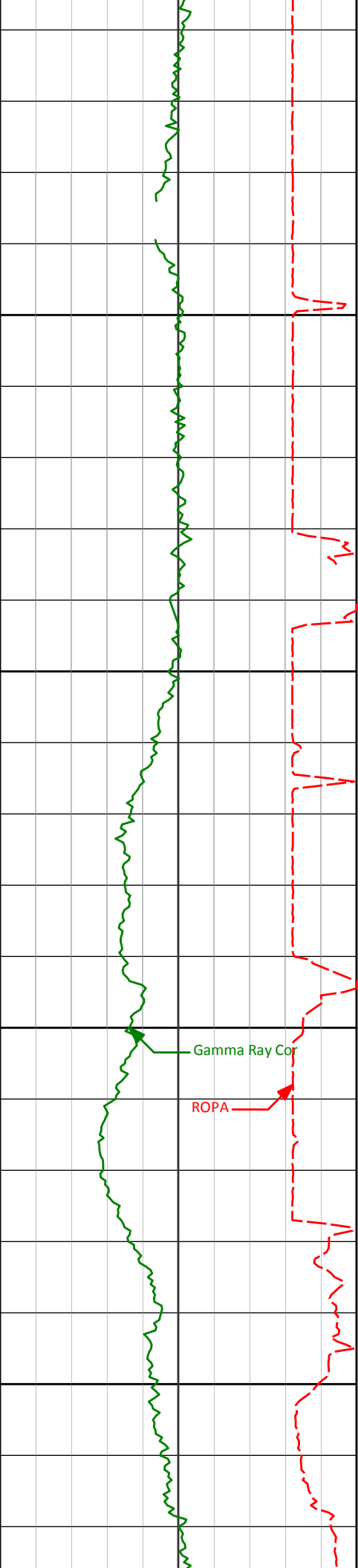
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15500

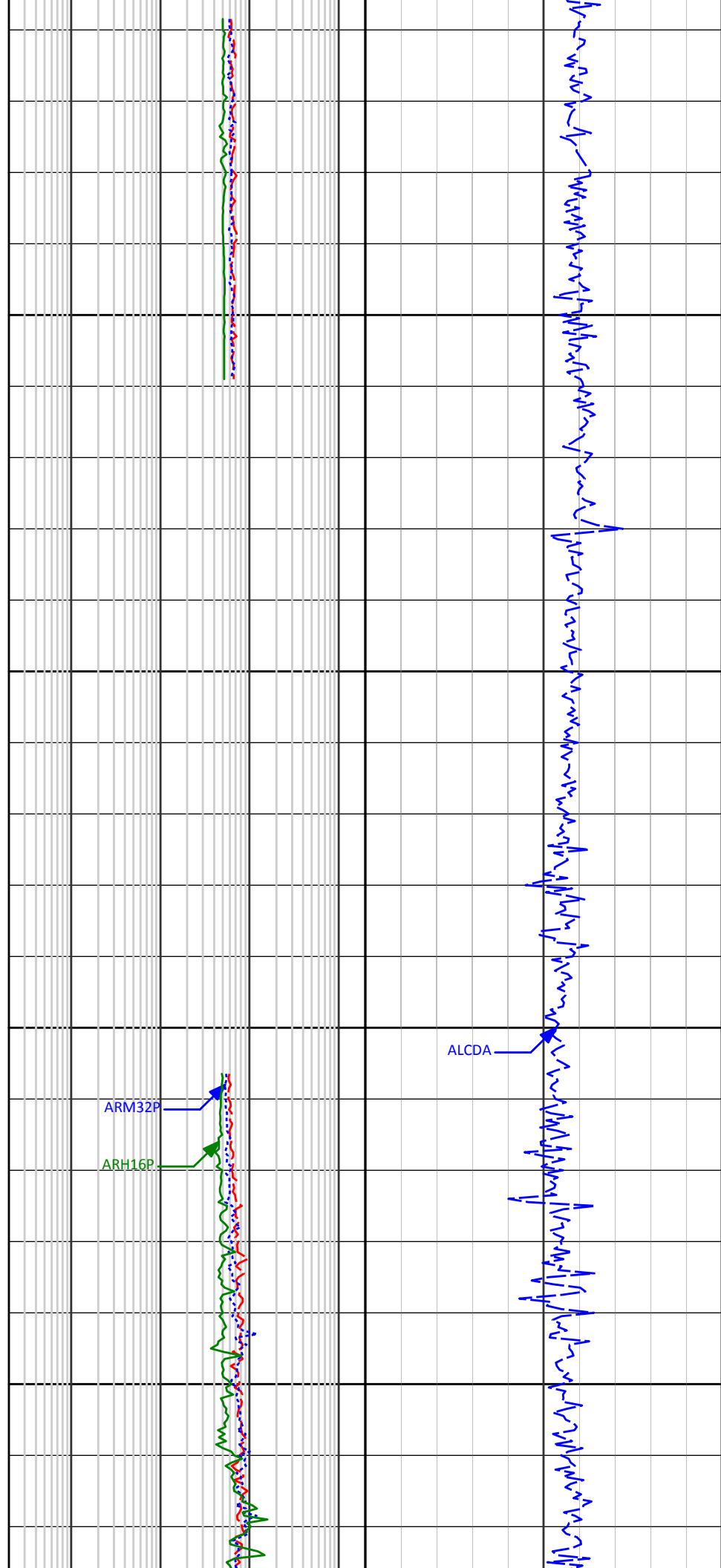
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Gamma Ray Cor

ROPA

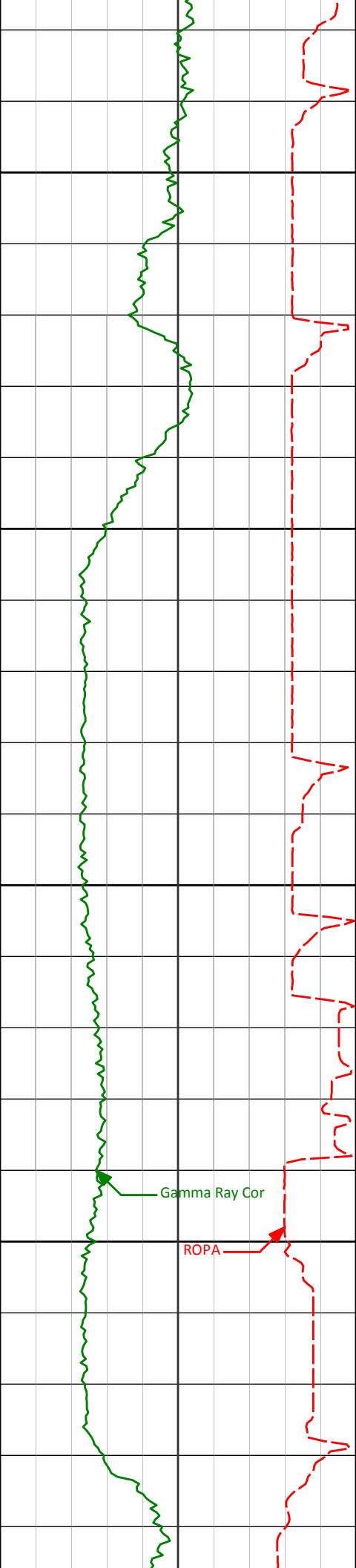


ARM32P

ARM16P

ALCDA



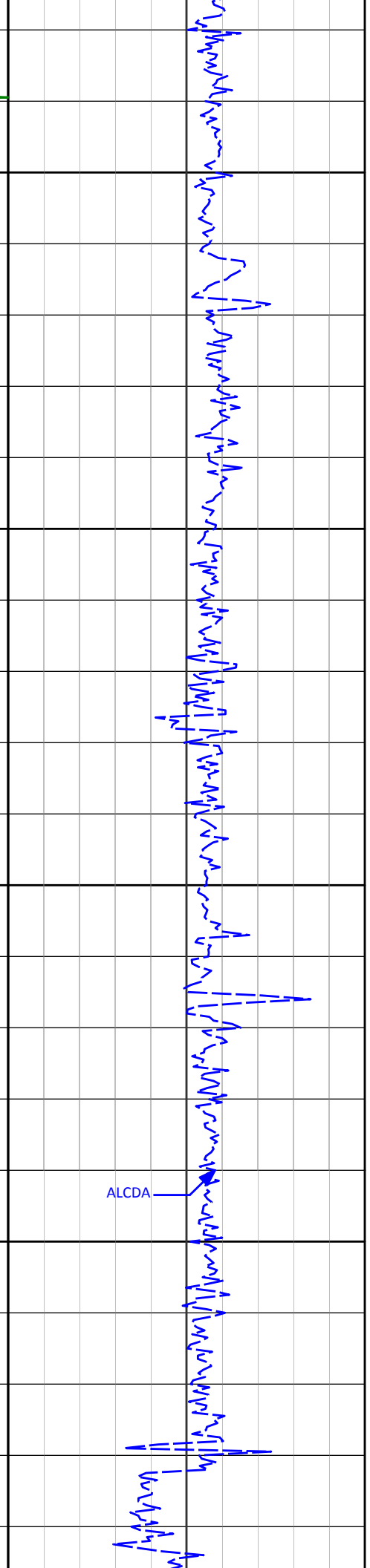
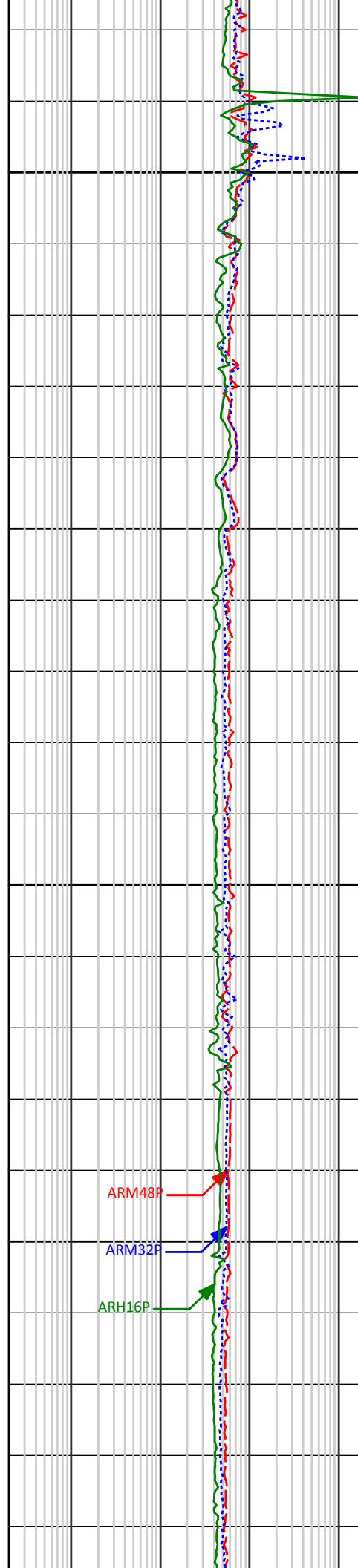


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15850

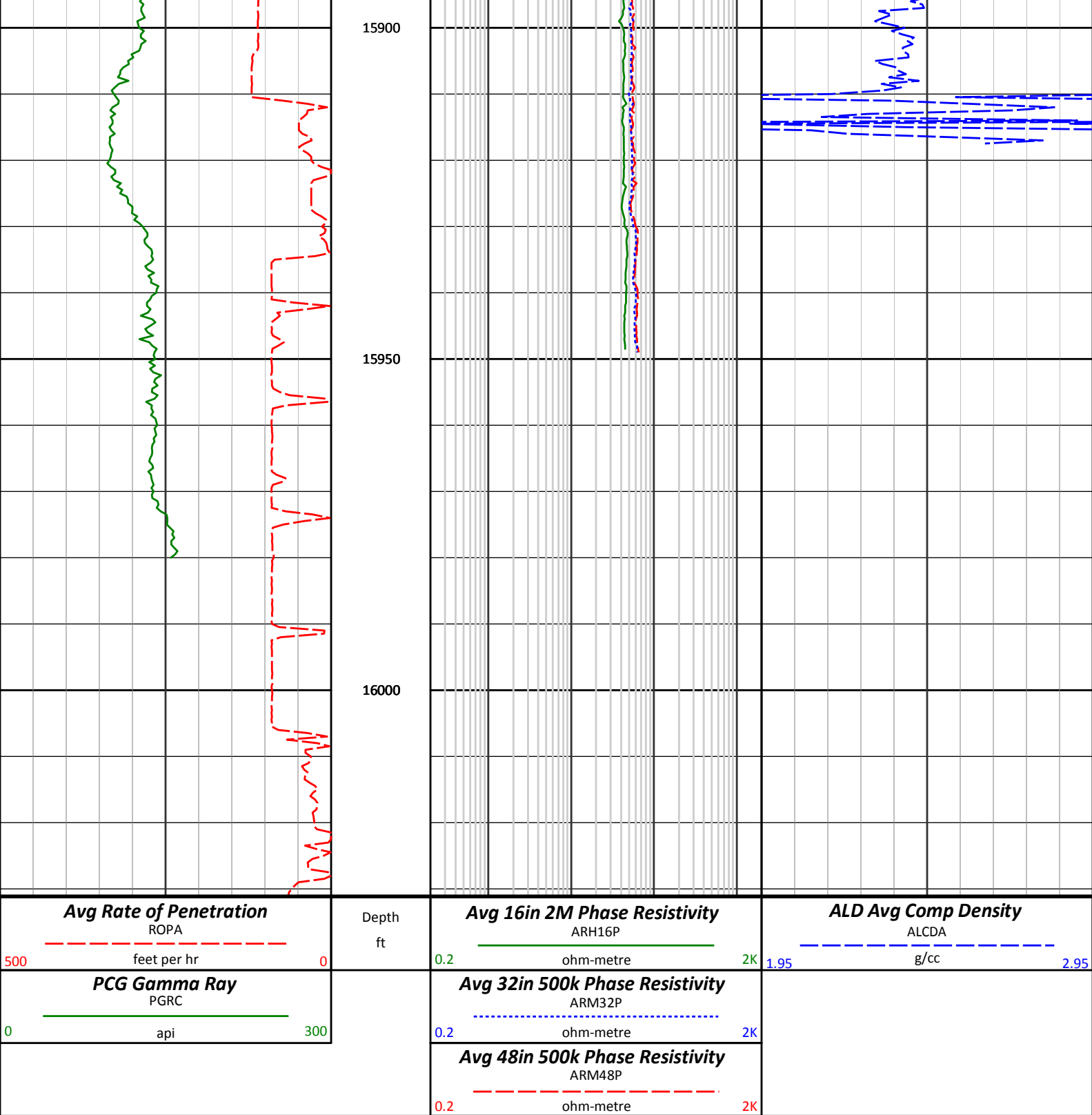


ARM48P

ARM32P

ARH16P

ALCDA



**HALLIBURTON**

**DIRECTIONAL SURVEY REPORT**

**ConocoPhillips  
Youngberg 10-11-1H  
Niobrara  
Arapahoe Colorado  
USA  
CA-XX-0900647295**

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
-----------------------------	--------------------------	------------------------	-----------------------------	--------------------	---------------------	-------------------------------	-----------------------

	(feet)	(degrees)	(degrees)	(feet)	(feet)	(feet)	(feet)	(deg/100ft)
	0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
	98.89	0.45	255.05	98.89	0.10 S	0.38 W	0.36	0.46
	194.54	0.59	251.66	194.54	0.35 S	1.21 W	1.16	0.15
	287.42	0.59	249.83	287.41	0.67 S	2.11 W	2.02	0.02
	380.95	0.60	248.70	380.94	1.01 S	3.02 W	2.88	0.02
	472.45	0.58	247.79	472.43	1.36 S	3.89 W	3.71	0.02
	564.36	0.53	241.77	564.34	1.74 S	4.70 W	4.47	0.08
	656.21	0.53	242.88	656.18	2.13 S	5.45 W	5.17	0.01
	748.46	0.58	255.35	748.43	2.44 S	6.28 W	5.96	0.14
	840.38	0.66	235.55	840.34	2.86 S	7.17 W	6.79	0.25
	932.65	0.71	230.99	932.61	3.52 S	8.05 W	7.59	0.08
	1024.96	0.72	222.96	1024.91	4.31 S	8.89 W	8.33	0.11
	1117.24	0.78	220.29	1117.18	5.21 S	9.69 W	9.03	0.08
	1209.55	0.83	217.50	1209.48	6.22 S	10.50 W	9.72	0.07
	1301.49	0.86	214.11	1301.41	7.32 S	11.30 W	10.38	0.06
	1393.41	0.90	213.49	1393.32	8.49 S	12.08 W	11.02	0.04
	1484.97	0.93	210.78	1484.87	9.73 S	12.86 W	11.65	0.06
	1576.82	0.90	205.54	1576.71	11.02 S	13.55 W	12.19	0.10
	1669.04	0.86	196.77	1668.92	12.34 S	14.06 W	12.55	0.15
	1760.88	0.88	194.00	1760.75	13.68 S	14.43 W	12.76	0.05
	1852.76	0.95	196.34	1852.61	15.10 S	14.82 W	12.98	0.09
	1947.45	1.01	197.60	1947.29	16.65 S	15.29 W	13.27	0.07
	2024.00	0.74	182.58	2023.83	17.79 S	15.52 W	13.36	0.46
	2119.00	0.82	186.03	2118.82	19.08 S	15.62 W	13.31	0.10
	2214.00	0.91	175.36	2213.81	20.51 S	15.63 W	13.16	0.19
	2309.00	0.86	179.80	2308.80	21.98 S	15.56 W	12.93	0.09
	2404.00	0.56	124.82	2403.79	22.95 S	15.18 W	12.44	0.74
	2499.00	1.11	74.23	2498.78	22.97 S	13.92 W	11.18	0.92
	2593.00	1.14	73.12	2592.77	22.45 S	12.14 W	9.48	0.04
	2688.00	1.33	69.13	2687.74	21.78 S	10.21 W	7.63	0.22
	2783.00	1.41	67.91	2782.72	20.95 S	8.09 W	5.63	0.09
	2878.00	1.52	72.62	2877.69	20.13 S	5.81 W	3.45	0.17
	2973.00	1.54	71.38	2972.65	19.35 S	3.40 W	1.14	0.04
	3068.00	1.33	73.17	3067.62	18.62 S	1.13 W	-1.02	0.24
	3163.00	1.25	82.92	3162.60	18.17 S	0.95 E	-3.04	0.24
	3258.00	1.25	83.02	3257.58	17.92 S	3.01 E	-5.05	0.00
	3353.00	1.33	86.20	3352.55	17.72 S	5.14 E	-7.15	0.12
	3448.00	1.28	80.65	3447.53	17.47 S	7.29 E	-9.26	0.14
	3543.00	1.00	96.11	3542.51	17.39 S	9.16 E	-11.11	0.44
	3638.00	0.50	345.13	3637.50	17.08 S	9.88 E	-11.78	1.33
	3733.00	1.05	330.49	3732.49	15.92 S	9.34 E	-11.12	0.61
	3828.00	1.25	327.93	3827.48	14.29 S	8.36 E	-9.96	0.21
	3923.00	0.25	110.09	3922.47	13.48 S	8.01 E	-9.51	1.53
	4017.00	0.69	115.29	4016.47	13.80 S	8.72 E	-10.25	0.47
	4112.00	0.74	101.39	4111.46	14.16 S	9.84 E	-11.41	0.19
	4207.00	0.56	285.22	4206.46	14.16 S	10.00 E	-11.57	1.37
	4302.00	0.74	310.71	4301.45	13.64 S	9.09 E	-10.60	0.36
	4397.00	0.58	8.90	4396.44	12.76 S	8.69 E	-10.11	0.69
	4492.00	0.67	21.35	4491.44	11.77 S	8.97 E	-10.27	0.17
	4587.00	1.00	10.11	4586.43	10.43 S	9.32 E	-10.46	0.39
	4682.00	0.39	6.37	4681.42	9.29 S	9.50 E	-10.51	0.65
	4777.00	0.20	313.07	4776.42	8.86 S	9.42 E	-10.38	0.33
	4872.00	0.58	256.00	4871.42	8.86 S	8.83 E	-9.79	0.53
	4967.00	0.33	261.38	4966.41	9.02 S	8.09 E	-9.08	0.27
	5062.00	0.50	256.75	5061.41	9.16 S	7.42 E	-8.42	0.18
	5157.00	0.31	235.53	5156.41	9.40 S	6.80 E	-7.84	0.25
	5251.00	0.19	191.75	5250.41	9.69 S	6.55 E	-7.63	0.24
	5346.00	0.25	226.50	5345.41	9.99 S	6.37 E	-7.48	0.15
	5441.00	0.22	277.31	5440.41	10.10 S	6.04 E	-7.17	0.21
	5536.00	0.31	340.70	5535.41	9.84 S	5.78 E	-6.87	0.30
	5631.00	0.64	340.75	5630.40	9.10 S	5.52 E	-6.53	0.35
	5726.00	0.20	27.58	5725.40	8.45 S	5.42 E	-6.35	0.55
	5821.00	0.14	34.39	5820.40	8.21 S	5.56 E	-6.47	0.06
	5916.00	0.36	38.58	5915.40	7.89 S	5.81 E	-6.68	0.23
	6011.00	0.36	29.13	6010.40	7.39 S	6.14 E	-6.95	0.06
	6106.00	0.17	34.46	6105.40	7.01 S	6.37 E	-7.13	0.20
	6201.00	0.64	63.64	6200.39	6.66 S	6.92 E	-7.64	0.52
	6296.00	0.77	42.33	6295.39	5.95 S	7.82 E	-8.46	0.31
	6391.00	0.72	350.30	6390.38	4.89 S	8.15 E	-8.66	0.69
	6486.00	0.47	347.20	6485.37	3.92 S	7.97 E	-8.37	0.27
	6581.00	0.19	5.39	6580.37	3.39 S	7.90 E	-8.23	0.32
	6676.00	0.22	8.11	6675.37	3.05 S	7.94 E	-8.23	0.04
	6771.00	0.31	9.55	6770.37	2.61 S	8.01 E	-8.25	0.10
	6834.00	1.16	297.83	6833.37	2.14 S	7.47 E	-7.67	1.75

6866.00	5.15	281.20	6865.31	1.71 S	5.77 E	-5.93	12.68
6897.00	8.37	284.90	6896.09	0.86 S	2.22 E	-2.31	10.47
6929.00	11.35	284.71	6927.62	0.54 N	3.07 W	3.11	9.29
6961.00	14.21	281.76	6958.82	2.14 N	9.96 W	10.14	9.18
6992.00	17.07	279.37	6988.67	3.65 N	18.18 W	18.48	9.46
7024.00	19.29	276.38	7019.07	5.01 N	28.07 W	28.46	7.53
7056.00	21.41	273.90	7049.07	5.99 N	39.15 W	39.58	7.13
7087.00	23.97	271.81	7077.67	6.57 N	51.09 W	51.51	8.66
7119.00	26.85	271.68	7106.57	6.99 N	64.81 W	65.19	9.02
7150.00	29.57	272.09	7133.89	7.48 N	79.46 W	79.79	8.79
7182.00	31.96	274.11	7161.38	8.37 N	95.80 W	96.12	8.14
7214.00	34.21	275.26	7188.19	9.80 N	113.21 W	113.58	7.30
7245.00	36.28	276.63	7213.51	11.66 N	131.00 W	131.47	7.15
7277.00	39.70	278.02	7238.73	14.18 N	150.53 W	151.16	11.01
7309.00	42.95	277.85	7262.75	17.10 N	171.45 W	172.28	10.18
7340.00	45.51	277.47	7284.97	19.98 N	192.88 W	193.90	8.28
7372.00	48.16	276.41	7306.86	22.79 N	216.05 W	217.24	8.63
7404.00	51.37	276.15	7327.52	25.46 N	240.33 W	241.66	10.06
7435.00	55.01	276.00	7346.10	28.09 N	265.00 W	266.47	11.74
7467.00	58.62	276.11	7363.61	30.91 N	291.63 W	293.25	11.28
7499.00	62.10	276.04	7379.43	33.86 N	319.28 W	321.05	10.89
7530.00	65.49	276.41	7393.12	36.87 N	346.93 W	348.86	11.00
7562.00	68.76	276.89	7405.56	40.29 N	376.21 W	378.34	10.31
7593.00	71.67	277.08	7416.05	43.83 N	405.16 W	407.51	9.40
7625.00	74.04	277.17	7425.48	47.63 N	435.50 W	438.09	7.40
7657.00	76.60	277.65	7433.59	51.62 N	466.19 W	469.03	8.13
7688.00	79.56	277.73	7440.00	55.67 N	496.25 W	499.36	9.56
7720.00	83.31	277.32	7444.76	59.82 N	527.61 W	530.99	11.79
7759.00	87.77	277.05	7447.80	64.68 N	566.18 W	569.86	11.48
7887.00	89.81	278.95	7450.49	82.49 N	692.89 W	697.78	2.18
7937.00	90.00	278.94	7450.57	90.26 N	742.28 W	747.74	0.37
7969.00	89.75	278.72	7450.64	95.17 N	773.91 W	779.72	1.03
8032.00	89.38	278.21	7451.11	104.44 N	836.22 W	842.68	1.00
8064.00	89.51	278.05	7451.42	108.96 N	867.89 W	874.67	0.62
8127.00	89.38	277.77	7452.03	117.63 N	930.29 W	937.65	0.49
8159.00	89.14	277.46	7452.45	121.87 N	962.01 W	969.64	1.23
8190.00	89.14	277.45	7452.92	125.89 N	992.74 W	1000.64	0.03
8222.00	89.07	277.50	7453.42	130.06 N	1024.47 W	1032.63	0.24
8253.00	89.63	276.30	7453.77	133.78 N	1055.24 W	1063.63	4.26
8285.00	90.12	276.23	7453.83	137.27 N	1087.05 W	1095.63	1.56
8317.00	90.62	276.30	7453.63	140.76 N	1118.86 W	1127.62	1.56
8412.00	89.57	275.56	7453.47	150.58 N	1213.35 W	1222.61	1.35
8475.00	89.75	275.08	7453.85	156.43 N	1276.07 W	1285.60	0.82
8507.00	89.38	274.67	7454.09	159.15 N	1307.96 W	1317.58	1.73
8601.00	89.75	274.22	7454.80	166.43 N	1401.67 W	1411.51	0.62
8696.00	89.94	274.71	7455.05	173.83 N	1496.38 W	1506.44	0.56
8791.00	88.95	275.52	7455.97	182.30 N	1591.00 W	1601.40	1.34
8886.00	89.81	275.94	7457.00	191.79 N	1685.51 W	1696.39	1.01
8981.00	90.25	276.25	7456.95	201.88 N	1779.98 W	1791.38	0.56
9076.00	90.43	277.03	7456.38	212.86 N	1874.34 W	1886.38	0.84
9171.00	87.47	276.57	7458.13	224.10 N	1968.64 W	1981.35	3.16
9266.00	88.02	276.91	7461.86	235.25 N	2062.91 W	2076.28	0.69
9298.00	88.27	276.88	7462.90	239.08 N	2094.66 W	2108.26	0.78
9393.00	89.75	276.43	7464.53	250.09 N	2189.01 W	2203.24	1.63
9456.00	89.94	276.15	7464.70	256.99 N	2251.63 W	2266.24	0.53
9487.00	89.75	275.98	7464.79	260.27 N	2282.45 W	2297.24	0.82
9551.00	89.75	275.62	7465.06	266.73 N	2346.13 W	2361.23	0.56
9614.00	90.37	275.91	7465.00	273.06 N	2408.81 W	2424.23	1.08
9646.00	90.68	276.20	7464.70	276.43 N	2440.63 W	2456.22	1.33
9709.00	90.49	276.29	7464.06	283.28 N	2503.25 W	2519.22	0.33
9741.00	90.37	276.35	7463.82	286.80 N	2535.06 W	2551.22	0.43
9836.00	89.26	276.23	7464.12	297.21 N	2629.48 W	2646.21	1.18
9899.00	89.38	276.45	7464.87	304.17 N	2692.09 W	2709.21	0.40
9931.00	89.69	276.63	7465.13	307.82 N	2723.88 W	2741.21	1.10
9994.00	89.94	277.03	7465.33	315.30 N	2786.43 W	2804.21	0.75
10025.00	90.12	277.02	7465.31	319.09 N	2817.20 W	2835.20	0.60
10120.00	89.07	277.67	7465.98	331.24 N	2911.42 W	2930.19	1.30
10215.00	89.32	277.53	7467.31	343.80 N	3005.57 W	3025.17	0.30
10310.00	89.51	277.44	7468.29	356.17 N	3099.76 W	3120.15	0.22
10405.00	90.19	277.78	7468.54	368.75 N	3193.92 W	3215.14	0.80
10500.00	89.69	278.40	7468.64	382.11 N	3287.98 W	3310.11	0.83
10595.00	89.57	279.52	7469.26	396.91 N	3381.82 W	3405.02	1.19
10690.00	87.04	279.22	7472.07	412.36 N	3475.50 W	3499.87	2.68
10753.00	87.04	279.13	7475.33	422.39 N	3537.61 W	3562.72	0.14

10785.00	87.16	278.79	7476.95	427.37 N	3569.18 W	3594.65	1.13
10817.00	87.53	278.32	7478.43	432.12 N	3600.79 W	3626.60	1.86
10848.00	87.78	278.20	7479.70	436.57 N	3631.44 W	3657.56	0.88
10880.00	87.71	277.68	7480.96	440.99 N	3663.11 W	3689.53	1.63
10912.00	87.71	277.34	7482.24	445.17 N	3694.81 W	3721.50	1.08
10943.00	88.27	276.50	7483.33	448.90 N	3725.57 W	3752.48	3.25
10975.00	88.52	276.38	7484.22	452.49 N	3757.35 W	3784.46	0.86
11006.00	89.20	276.02	7484.84	455.84 N	3788.16 W	3815.46	2.48
11101.00	90.93	275.97	7484.74	465.76 N	3882.64 W	3910.45	1.82
11165.00	90.99	276.20	7483.67	472.55 N	3946.27 W	3974.44	0.38
11260.00	89.57	275.83	7483.21	482.50 N	4040.74 W	4069.43	1.55
11355.00	88.27	275.81	7485.00	492.13 N	4135.24 W	4164.40	1.37
11449.00	88.33	276.04	7487.78	501.83 N	4228.69 W	4258.35	0.24
11544.00	88.33	276.11	7490.55	511.88 N	4323.12 W	4353.31	0.08
11639.00	88.09	276.45	7493.52	522.27 N	4417.50 W	4448.26	0.44
11734.00	88.70	276.29	7496.18	532.81 N	4511.88 W	4543.22	0.67
11798.00	88.89	275.99	7497.53	539.66 N	4575.50 W	4607.20	0.55
11829.00	88.39	276.01	7498.26	542.90 N	4606.32 W	4638.19	1.60
11924.00	89.57	275.90	7499.95	552.75 N	4700.79 W	4733.17	1.24
12019.00	88.21	276.28	7501.80	562.83 N	4795.23 W	4828.14	1.49
12114.00	88.64	276.40	7504.41	573.31 N	4889.62 W	4923.11	0.47
12177.00	88.83	276.66	7505.80	580.47 N	4952.19 W	4986.09	0.52
12209.00	89.01	276.83	7506.40	584.23 N	4983.96 W	5018.09	0.78
12272.00	88.83	276.83	7507.59	591.72 N	5046.51 W	5081.07	0.29
12304.00	88.89	276.90	7508.23	595.54 N	5078.27 W	5113.07	0.29
12335.00	89.14	277.03	7508.76	599.30 N	5109.04 W	5144.06	0.90
12398.00	89.38	276.72	7509.58	606.84 N	5171.58 W	5207.06	0.63
12493.00	89.44	278.36	7510.55	619.30 N	5265.75 W	5302.04	1.73
12588.00	88.27	276.79	7512.44	631.81 N	5359.90 W	5397.00	2.06
12620.00	88.83	276.47	7513.26	635.51 N	5391.67 W	5428.99	2.01
12683.00	89.51	276.13	7514.17	642.42 N	5454.29 W	5491.98	1.21
12747.00	90.25	275.46	7514.31	648.88 N	5517.96 W	5555.97	1.55
12778.00	90.43	275.17	7514.13	651.75 N	5548.82 W	5586.96	1.12
12810.00	90.86	275.31	7513.77	654.68 N	5580.69 W	5618.95	1.41
12842.00	90.80	275.52	7513.30	657.69 N	5612.54 W	5650.94	0.67
12873.00	90.68	275.58	7512.90	660.69 N	5643.39 W	5681.93	0.45
12968.00	91.05	275.72	7511.47	670.04 N	5737.92 W	5776.91	0.42
13000.00	90.80	275.60	7510.95	673.20 N	5769.76 W	5808.90	0.85
13063.00	90.86	275.64	7510.04	679.37 N	5832.45 W	5871.88	0.12
13158.00	88.21	275.68	7510.80	688.73 N	5926.98 W	5966.86	2.80
13253.00	88.09	275.72	7513.88	698.16 N	6021.46 W	6061.80	0.14
13284.00	88.08	275.82	7514.91	701.28 N	6052.28 W	6092.78	0.30
13347.00	88.64	275.69	7516.71	707.59 N	6114.94 W	6155.74	0.91
13442.00	88.70	275.48	7518.92	716.83 N	6209.47 W	6250.70	0.23
13537.00	90.06	276.08	7519.94	726.40 N	6303.97 W	6345.68	1.57
13632.00	89.20	275.84	7520.55	736.26 N	6398.46 W	6440.68	0.95
13727.00	90.19	276.27	7521.07	746.28 N	6492.92 W	6535.67	1.14
13822.00	90.62	276.57	7520.40	756.91 N	6587.33 W	6630.66	0.55
13917.00	90.12	276.57	7519.79	767.78 N	6681.70 W	6725.66	0.52
14012.00	89.75	277.22	7519.89	779.18 N	6776.01 W	6820.66	0.79
14107.00	88.46	278.00	7521.37	791.77 N	6870.16 W	6915.63	1.59
14202.00	88.27	278.62	7524.09	805.50 N	6964.12 W	7010.55	0.68
14297.00	87.90	279.02	7527.26	820.06 N	7057.95 W	7105.43	0.57
14360.00	88.27	278.55	7529.36	829.67 N	7120.17 W	7168.35	0.95
14423.00	88.21	278.32	7531.30	838.91 N	7182.46 W	7231.29	0.38
14486.00	88.08	277.93	7533.34	847.80 N	7244.80 W	7294.23	0.64
14551.00	88.33	276.92	7535.37	856.20 N	7309.22 W	7359.19	1.60
14582.00	88.52	276.74	7536.22	859.88 N	7339.99 W	7390.18	0.82
14677.00	89.38	276.54	7537.96	870.86 N	7434.33 W	7485.16	0.93
14772.00	90.12	276.24	7538.37	881.43 N	7528.74 W	7580.16	0.84
14867.00	91.17	276.90	7537.29	892.30 N	7623.11 W	7675.15	1.31
14962.00	91.17	276.19	7535.35	903.13 N	7717.47 W	7770.13	0.74
15057.00	90.93	276.49	7533.61	913.62 N	7811.88 W	7865.12	0.41
15089.00	90.62	276.66	7533.18	917.28 N	7843.66 W	7897.11	1.10
15152.00	90.43	276.94	7532.60	924.74 N	7906.22 W	7960.11	0.53
15247.00	90.62	276.58	7531.73	935.91 N	8000.55 W	8055.10	0.43
15342.00	90.68	276.71	7530.65	946.91 N	8094.91 W	8150.10	0.16
15437.00	90.62	276.66	7529.58	957.97 N	8189.26 W	8245.09	0.09
15468.00	90.31	276.57	7529.33	961.54 N	8220.05 W	8276.09	1.03
15532.00	89.32	276.66	7529.54	968.91 N	8283.62 W	8340.09	1.55
15626.00	89.07	276.80	7530.85	979.93 N	8376.96 W	8434.08	0.30
15721.00	89.57	276.96	7531.98	991.31 N	8471.27 W	8529.07	0.55
15816.00	89.69	277.26	7532.59	1003.07 N	8565.54 W	8624.07	0.34
15911.00	89.14	276.49	7533.56	1014.44 N	8659.85 W	8719.06	1.00
16006.00	89.35	276.64	7534.82	1023.64 N	8754.39 W	8814.03	1.96

16000.00	89.53	274.84	7534.82	1023.84 N	8734.33 W	8814.03	1.30
16101.00	90.71	274.60	7534.76	1031.29 N	8849.08 W	8908.97	1.43
16164.00	91.54	275.06	7533.53	1036.60 N	8911.84 W	8971.93	1.51
16259.00	90.61	275.02	7531.74	1044.94 N	9006.46 W	9066.87	0.98
16323.00	90.18	274.78	7531.29	1050.41 N	9070.22 W	9130.84	0.77
16386.00	90.40	274.88	7530.97	1055.71 N	9133.00 W	9193.81	0.38
16473.00	90.77	275.10	7530.08	1063.28 N	9219.66 W	9280.77	0.50
16539.00	91.10	275.35	7529.00	1069.29 N	9285.38 W	9346.74	0.63

CALCULATION BASED ON MINIMUM CURVATURE METHOD  
 SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT  
 TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT  
 VERTICAL SECTION RELATIVE TO WELL HEAD  
 VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 276.62 DEGREES (TRUE)  
 A TOTAL CORRECTION OF 8.41 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED  
 HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
 HORIZONTAL DISPLACEMENT(CLOSURE) AT 16539.00 FEET  
 IS 9346.75 FEET ALONG 276.57 DEGREES (TRUE)