



1 : 240

Country : USA							
Field : Wattenburg							
Location : Lat: 40° 6' 57.17" North Long: 104° 38' 20.10" West							
Well : Hudson 13C-35HZ							
Company : Anadarko							
Rig : Xtreme 22							
LOCATION							
Latitude : 40° 6' 57.17" North Longitude : 104° 38' 20.10" West							
UTM Easting = 3,240,821.89 ft UTM Northing = 1,286,228.62 ft		Other Services Directional Drilling					
Permanent Datum : Ground Level		Elev. KB 4925.00 ft					
Log Measured From : Kelly Bushing		DF 4926.00 ft					
Drilling Measured From : Kelly Bushing		GL 4909.00 ft					
		WD N/A					
Depth Logged : 7,575.00 ft To 16,845.00 ft		Unit No. : 11610117					
Date Logged : 05-Feb-13 To 15-Feb-13		Job No. : CA-XX-000939822					
Total Depth MD : 16,845.00 ft TVD: 7,183.08 ft		Plot Type : Final					
Spud Date : 31-Jan-13		Plot Date : 15-Feb-13					
Run No.	Borehole Record (MD)		Run No.	Borehole Record (MD)			
	Size	From		To	Size	From	To
	0300	6.125 in		7,575.00 ft	8,702.00 ft		
	0400	6.125 in		8,702.00 ft	15,850.00 ft		
	0500	6.125 in		15,850.00 ft	16,845.00 ft		
	Casing Record (MD)			Casing Record (MD)			
	Size	Weight		From	To		
		SURFACE		SURFACE			
		7,529.00 ft		1,333.00 ft			

MWD Run Number	300	400	500		
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<b>MWD Run Number</b>	300	400	500		
<b>Date run completed</b>	06-Feb-13	12-Feb-13	15-Feb-13		
<b>Rig Bit Number</b>	0300	0400	0500		
<b>Bit Size (in)</b>	6.125	6.125	6.125		
<b>Tool Nominal OD (in)</b>	4.750	4.750	4.750		
<b>Log Start Depth (MD, ft)</b>	7,575.00	8,702.00	15,850.00		
<b>Log End Depth (MD, ft)</b>	8,702.00	15,850.00	16,845.00		
<b>Drill or Wipe</b>	Drill	Drill	Drill		
<b>Drill/Wipe Start Date and Time</b>	05-Feb-13 18:21	06-Feb-13 22:00	11-Feb-13 21:35		
<b>Drill/Wipe End Date and Time</b>	06-Feb-13 06:15	11-Feb-13 20:30	13-Feb-13 18:10		
<b>Min Inc (deg) @ Depth (MD, ft)</b>	88.58 @ 8,222.00	87.71 @ 9,507.00	89.88 @ 15,919.00		
<b>Max Inc (deg) @ Depth (MD, ft)</b>	93.15 @ 7,707.00	92.97 @ 11,021.00	91.24 @ 16,434.00		
<b>Bit TFA(in2) / Bit Type</b>	1.24 / PDC	.75 / PDC	.86 / PDC		
<b>Flow Rate (gpm)</b>	290.17	277.45	278.94		
<b>Max AV (fpm) / CV (fpm) @ MWD</b>	383.0 / 453.1	384.2 / 360.8	468.4 / 342.2		
<b>Fluid Type</b>	Mineral Oil Bas	Mineral Oil Bas	Mineral Oil Bas		
<b>Density (ppg) / Viscosity (spqt)</b>	9.40 / 63.00	9.43 / 50.00	9.80 / 53.00		
<b>Filtrate CL (ppm)</b>	50,000.00	45,000.00	46,000.00		
<b>pH / Fluid Loss (mptm)</b>	N/A / 5	N/A / 7	N/A / 6.8		
<b>PV (cP) / YP (lbf2)</b>	15 / 19.00	13 / 11.00	12 / 10.00		
<b>% Solids / % Sand</b>	8.8 / 0.1	12.00 / 0.50	12.20 / 0.1		
<b>% Oil / Oil:Water Ratio</b>	70 / 77:23	67.00 / 76:24	67.00 / 76:24		
<b>Rm @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A		
<b>Rmf @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A		
<b>Rmc @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A		
<b>Max Tool Temp (deg F) @ S</b>	124.62 / N/A	252.62 / N/A	254.65 / N/A		

Max Tool Temp (degF) / Source	184.30 / HCIM	250.82 / HCIM	254.35 / HCIM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Matt Busche	Matt Busche	Matt Busche		
Customer Representative	Randy Anderson	Randy Anderson	Will Pettijohn		

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	HCIM	HCIM	HCIM		
Software Version	88.47	88.47	88.47		
Sub Serial Number	90351628	90351975	90351628		
Insert Serial Number	11081789	11149260	11081789		
Date and Time Initialized	04-Feb-13 00:00	06-Feb-13 14:53	12-Feb-13 12:24		
Date and Time Read	06-Feb-13 11:14	12-Feb-13 10:15	15-Feb-13 00:13		
ECMB SW Version	N/A	N/A	N/A		

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	49.33	49.97	50.01		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11122424	246322	11122424		
Sonde Serial Number	11478013	11297590	11478013		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	269.50	139.89	175.33		

### Gamma Ray Sensor Information

Tool Type	DGR	DGR	DGR		
Distance From Bit (ft)	71.01	70.33	71.68		
Recorded Sample Period (sec)	12	12	12		
Software Version	N/A	N/A	N/A		
Sub Serial Number	10483822	90351975	10483822		
Insert/Sonde Serial Number	075248	10474322	075248		

### Resistivity Sensor Information

Tool Type	Slim P4	Slim P4	Slim P4		
Distance From Bit (ft)	64.01	63.86	64.68		
Recorded Sample Period (sec)	12	12	12		
Software Version	5.55	5.55	5.55		
Sub Serial Number	90351628	90351975	90351628		
Receiver Insert Serial Number	89759	175817	89759		
Transmitter Insert Serial Number	175830	227654	175830		
Receiver Orientation	Up	Up	Up		

### DDSr-DGR Sensor Information

Tool Type	DDSr-DGR	DDSr-DGR	DDSr-DGR		
Distance From Bit (ft)	73.91	73.26	74.58		
Recorded Sample Period (sec)	12	12	12		
Software Version	10.49	10.49	10.49		
Sub Serial Number	90351628	90351975	90351628		
Insert Serial Number	11472355	062457	11472355		
Sensor ID Number	7236	5703	7236		

## REMARKS

1. All depths are measured depths referenced to the Driller's pipe tally and

1. All depths are measured depths, referenced to the driller's pipe tally and are measured from the Kelly Bushing, unless otherwise specified.

- 2. No depth corrections have been made for pipe stretch or compression.
- 3. Critical annular velocities are calculated using the "Power Law" model for oil and synthetic based fluids.
- 4. Formation exposure time is the time elapsed from when the bit drills a particular depth to when a sensor logs that same depth. Exposure time is presented for the EWR sensor.
- 5. All data presented is recorded data unless otherwise specified.
- 6. The following smoothing parameters have been applied to the data:
  - PGRC (Corrected Gamma Ray):
    - Interval Resolution: 0.5 ft
    - Interval Distance: 0.6 ft
    - Gap Fill: 3.0 ft
  - ROPA (Average Rate of Penetration):
    - Interval Resolution: 0.5 ft
    - Interval Distance: 0.6 ft
    - Gap Fill: 3.0 ft
  - Bore Hole Corrected Resistivity:
    - Interval Resolution: 0.5 ft
    - Interval Distance: 0.6 ft
    - Gap Fill: 3.0 ft

Insite Version 7.4.10

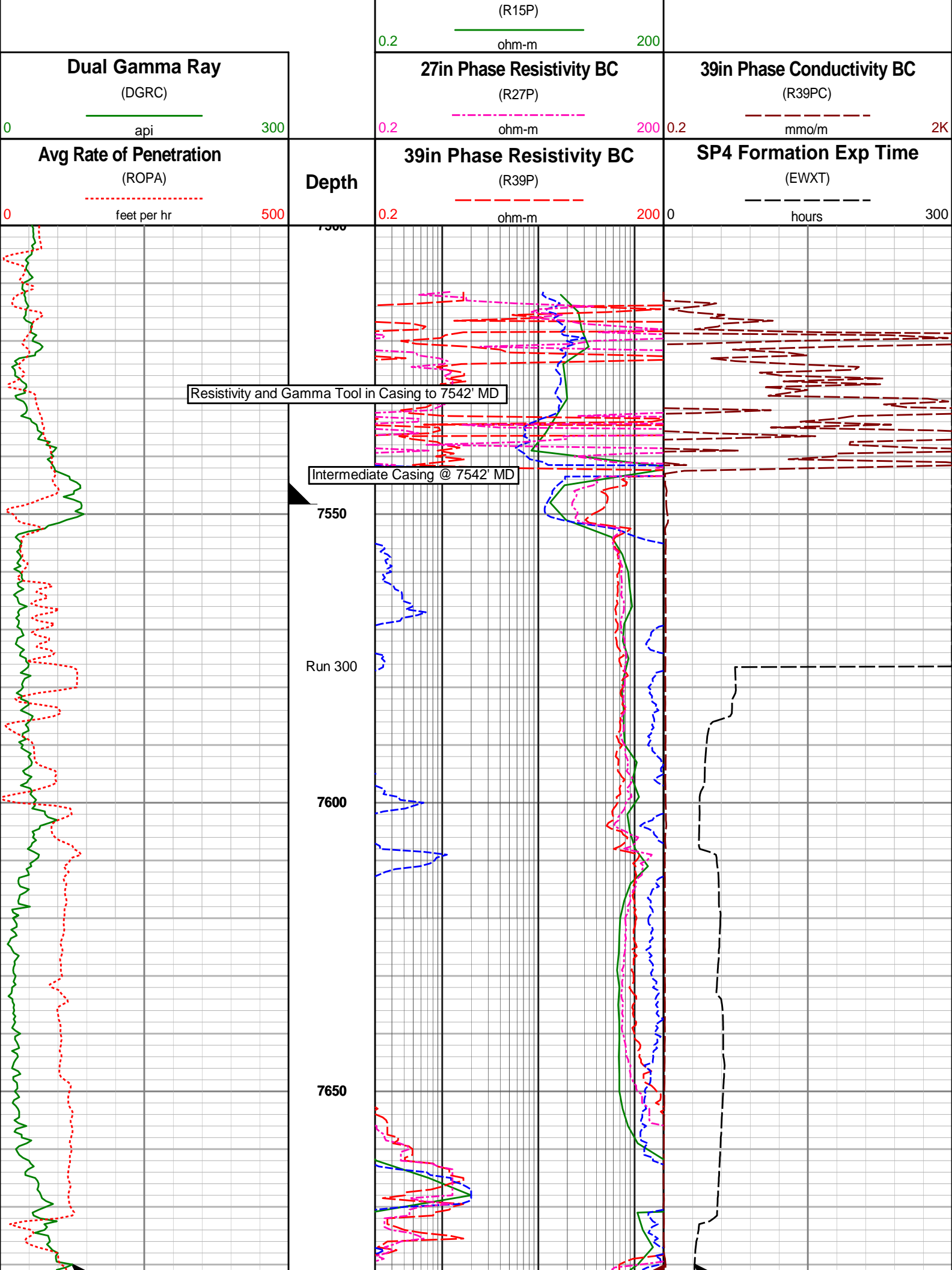
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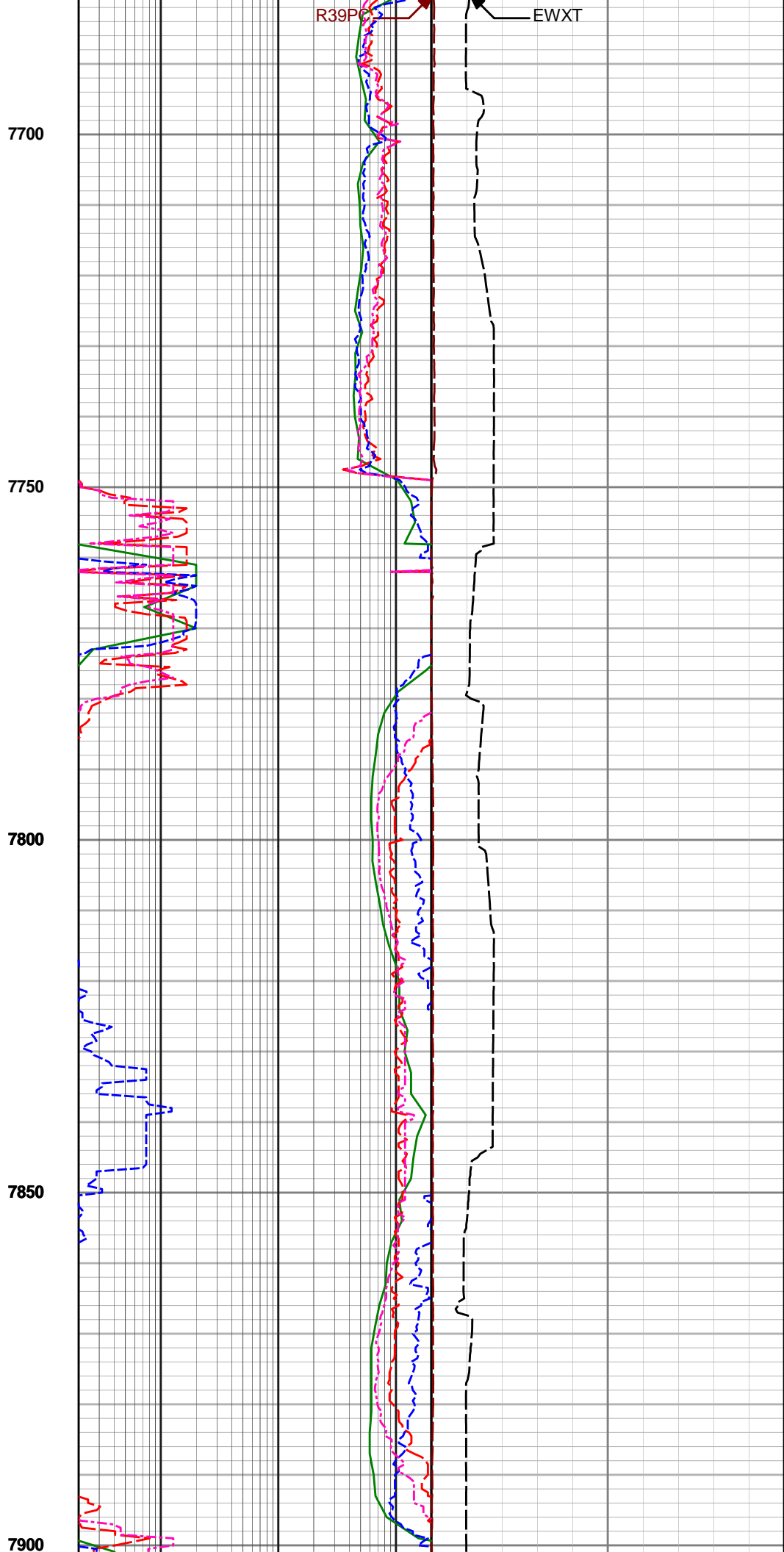
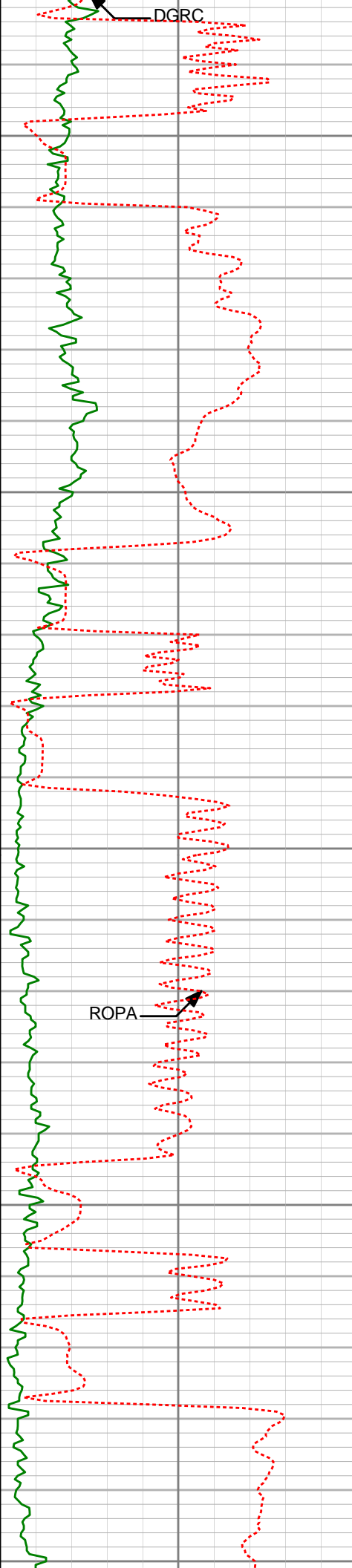
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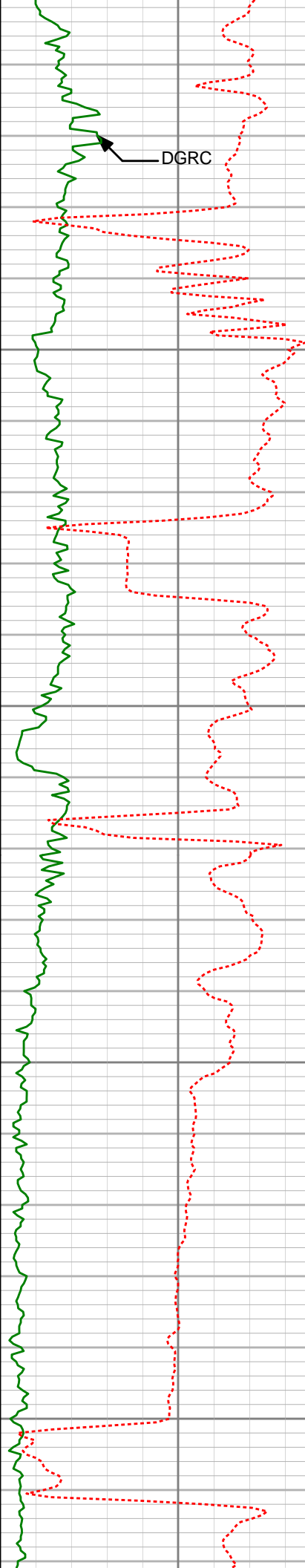
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MD Main Log 1:240

	9in Phase Resistivity BC (R09P) 0.2-----200 ohm-m	
	15in Phase Resistivity BC	





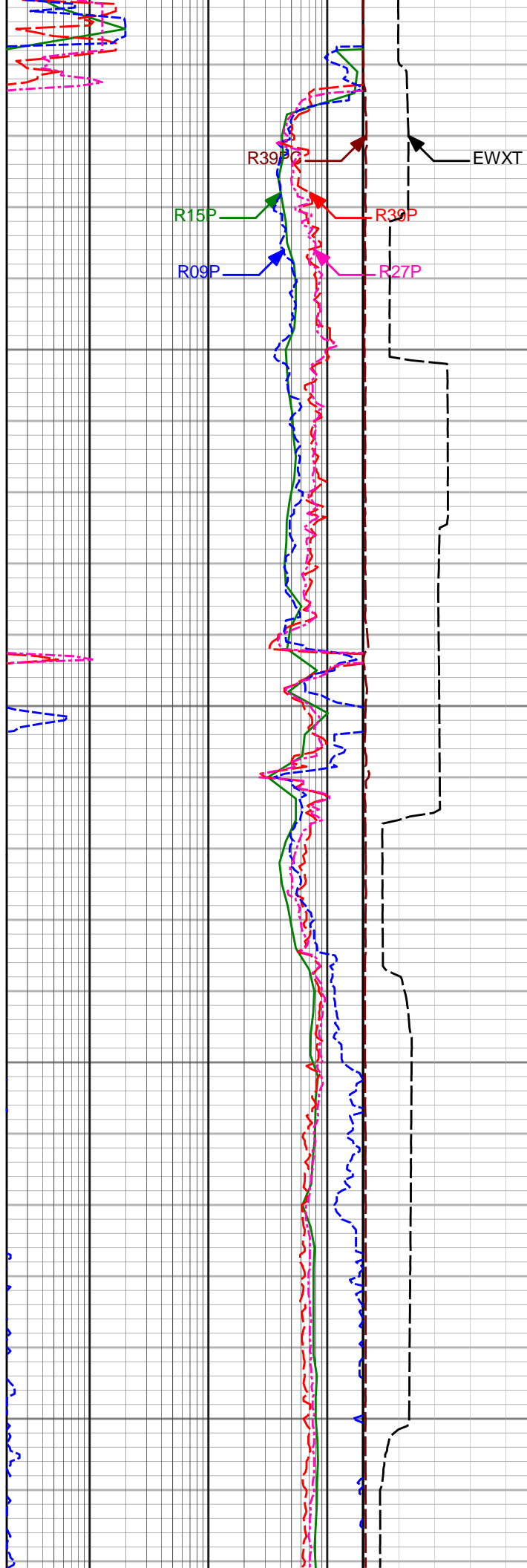


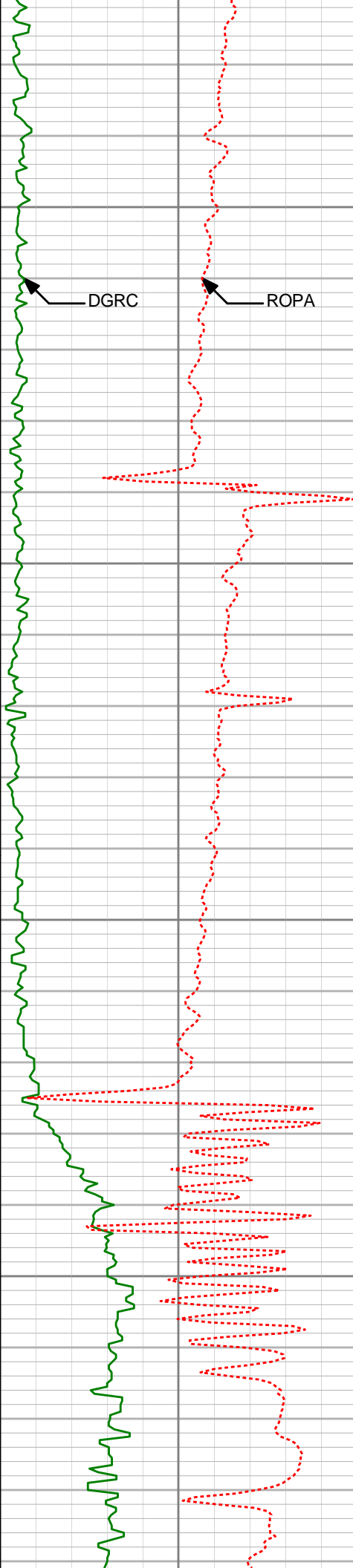
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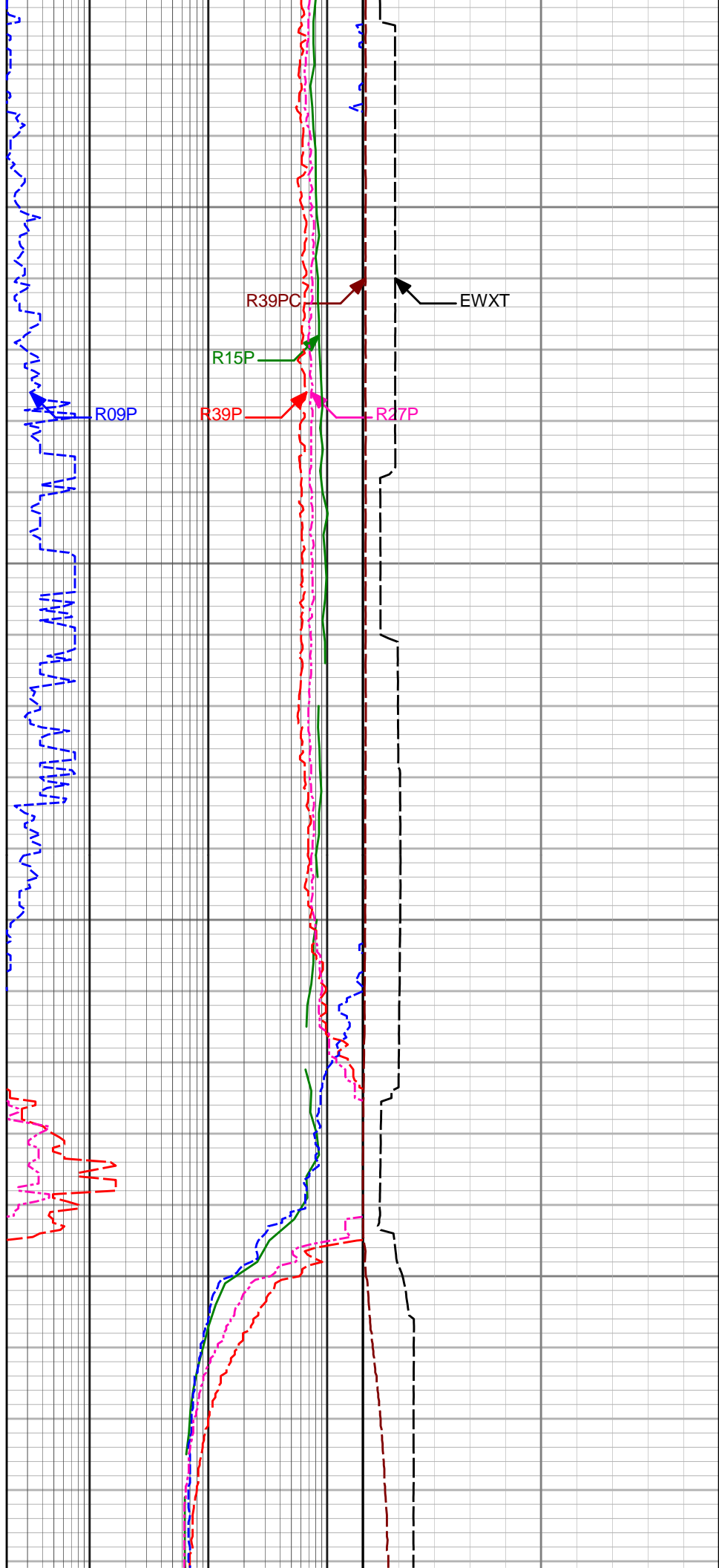
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8250

8300



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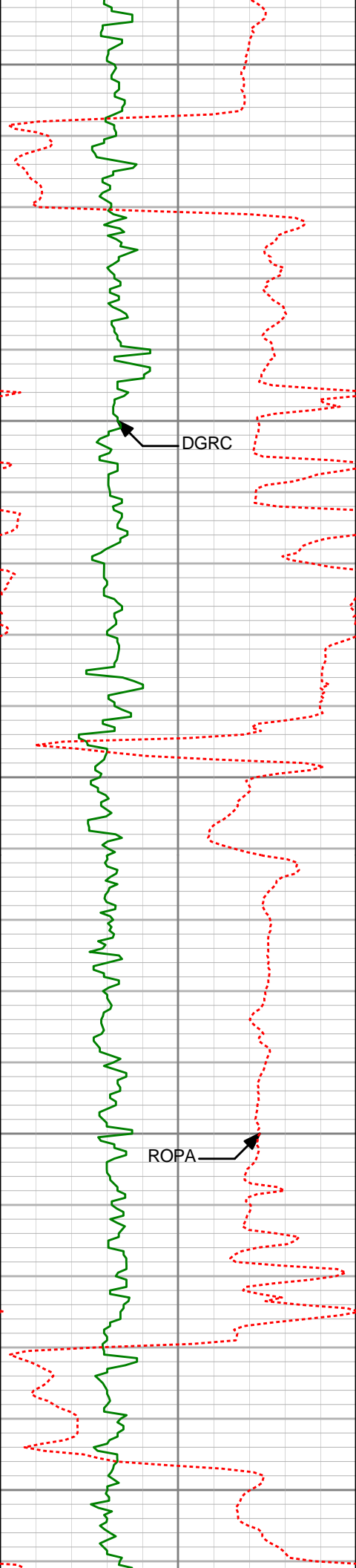
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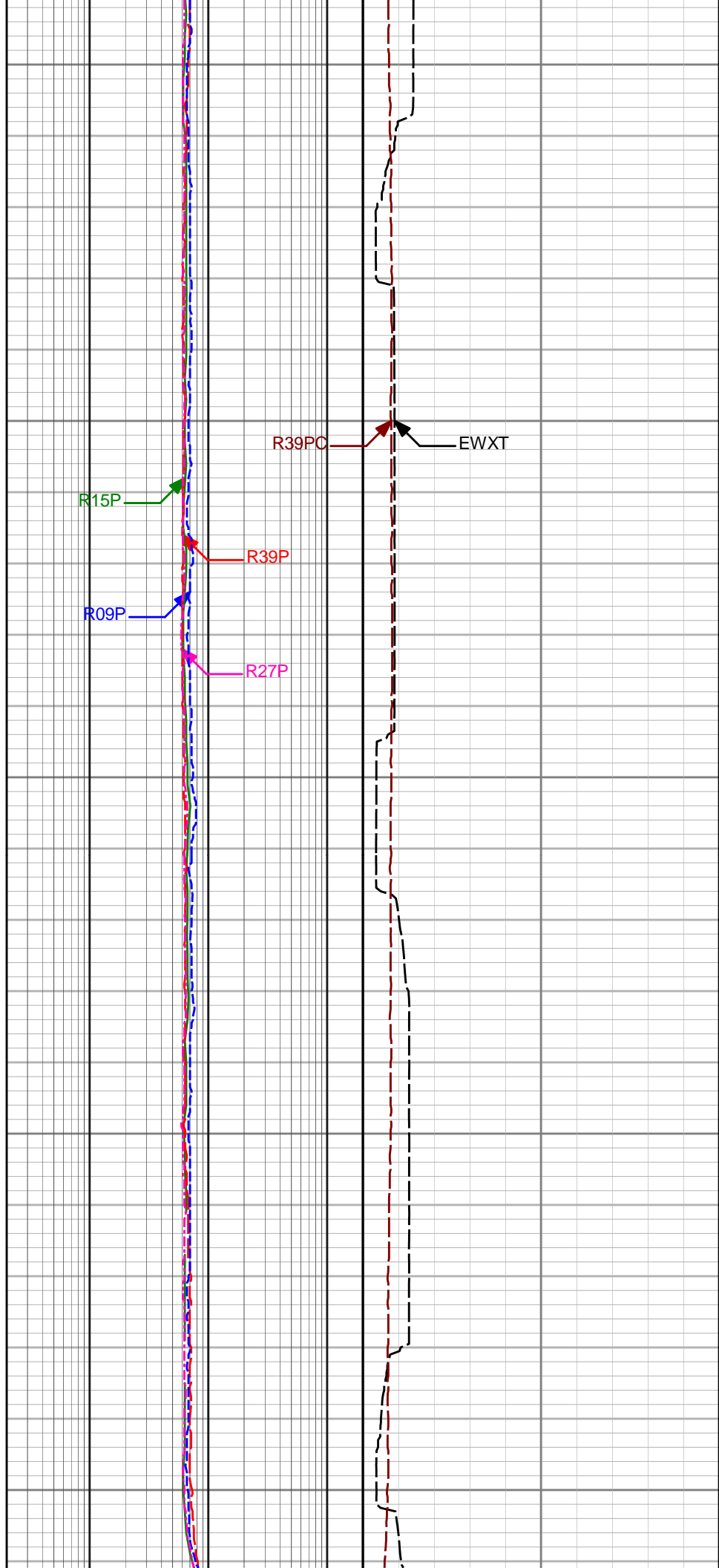
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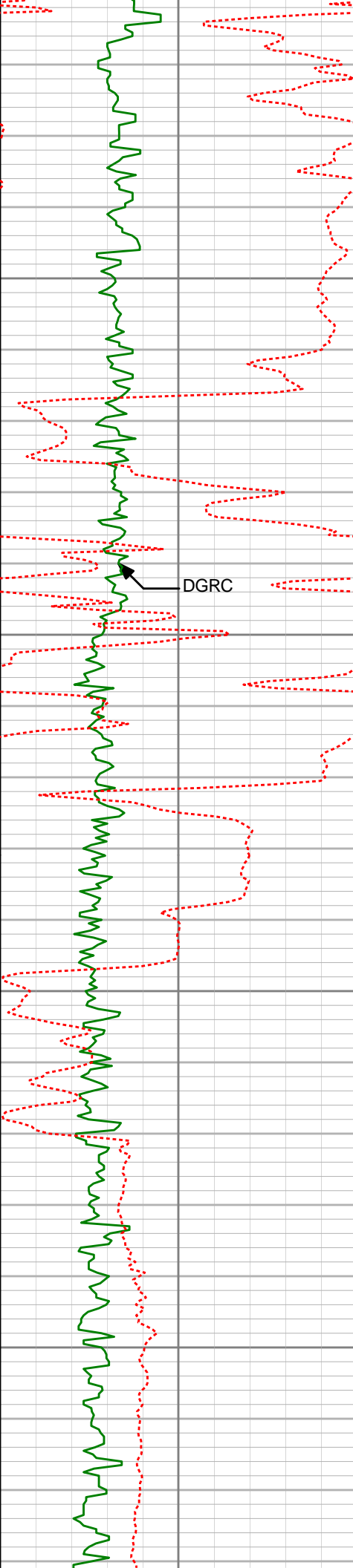
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8700

Run 400

8750

DGRC

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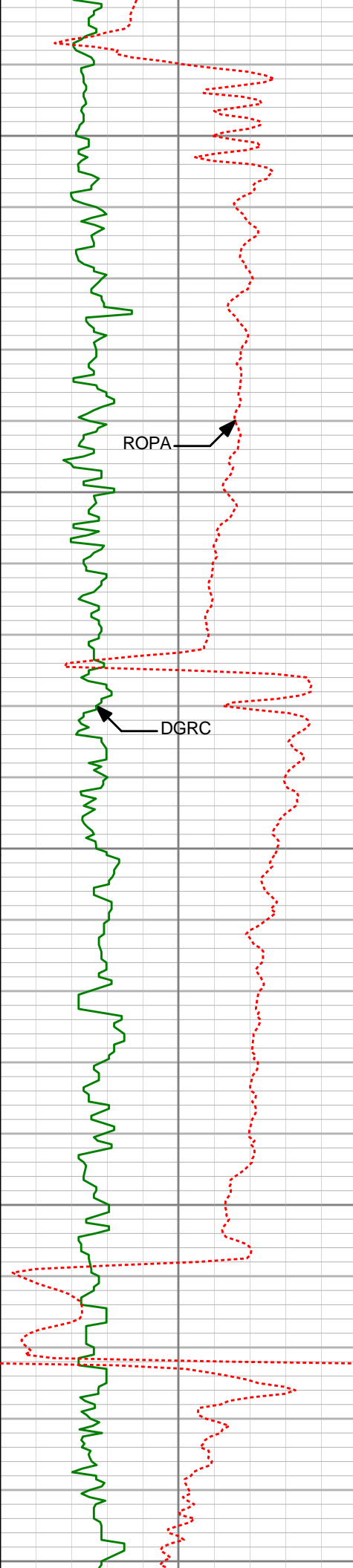
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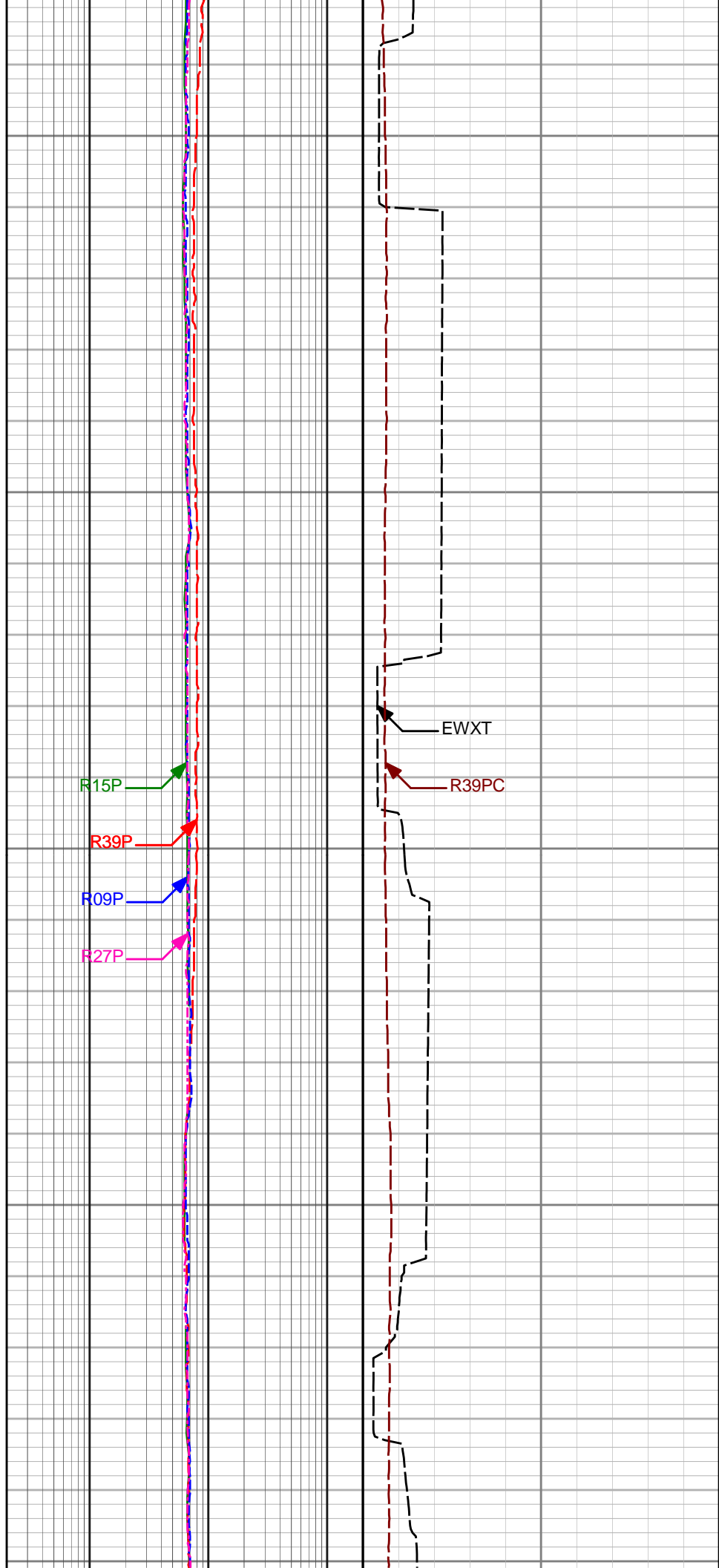
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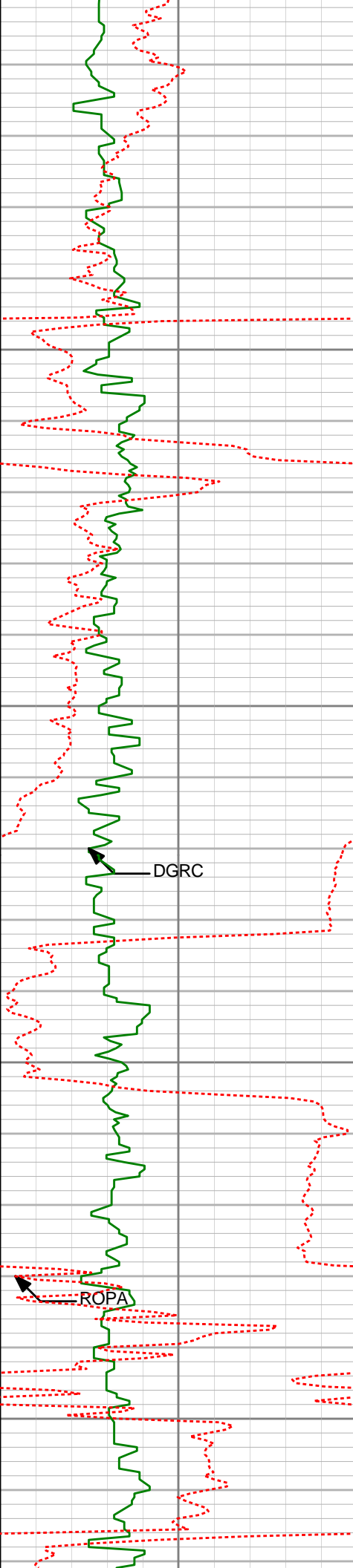
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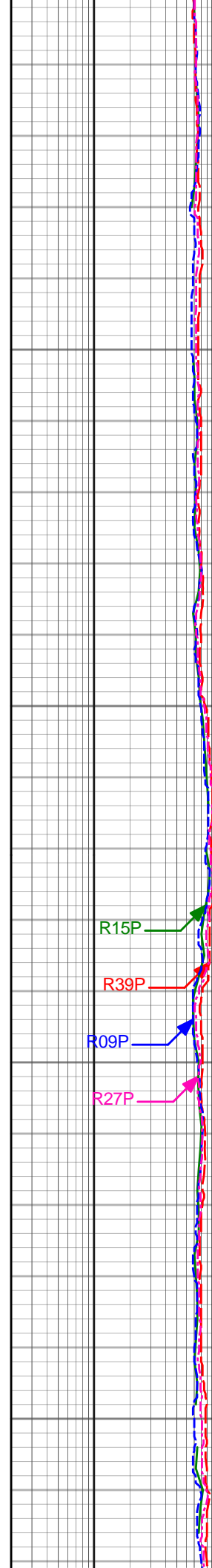


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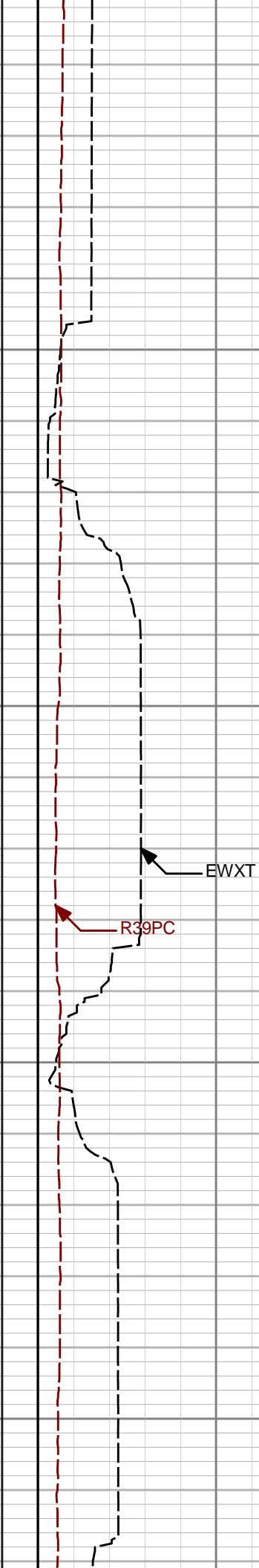


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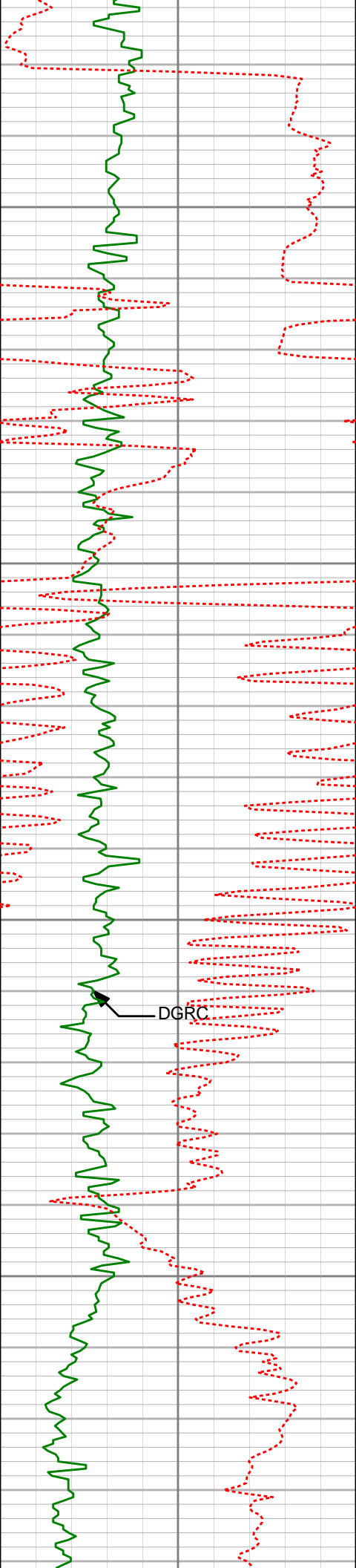
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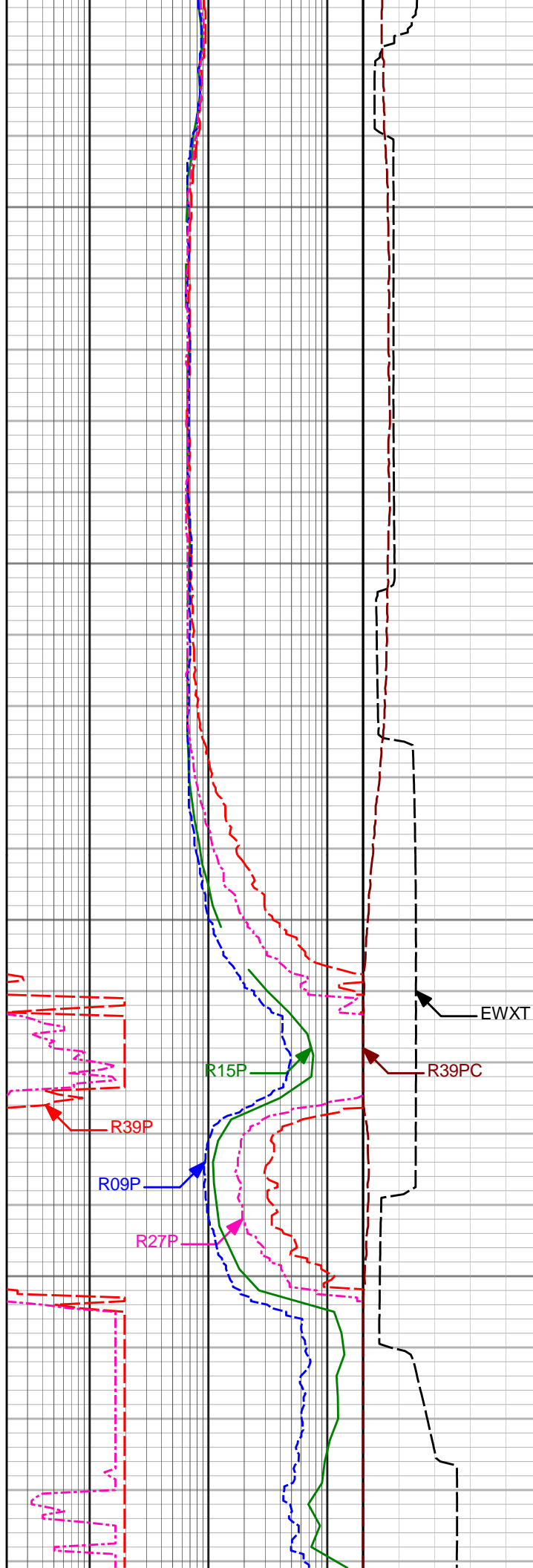
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DGRC

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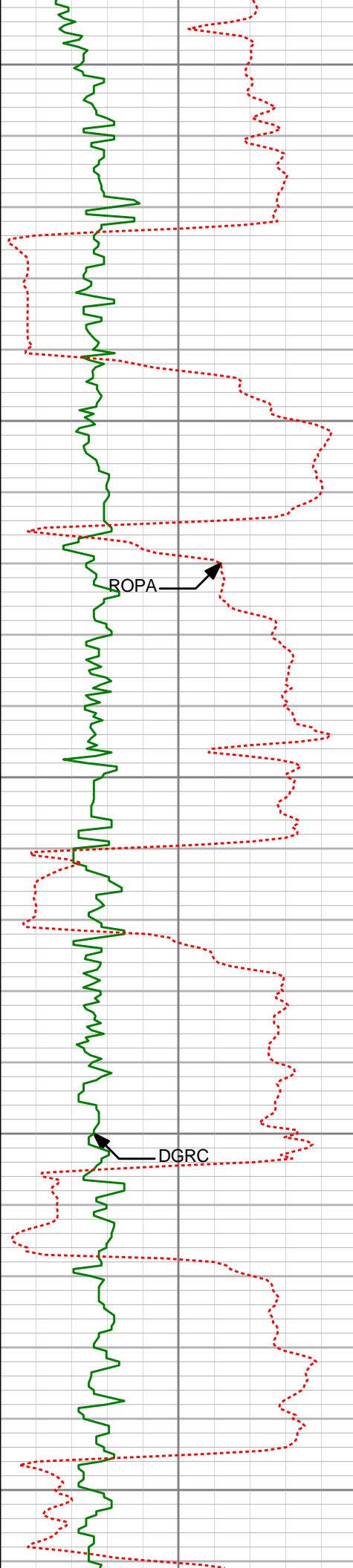
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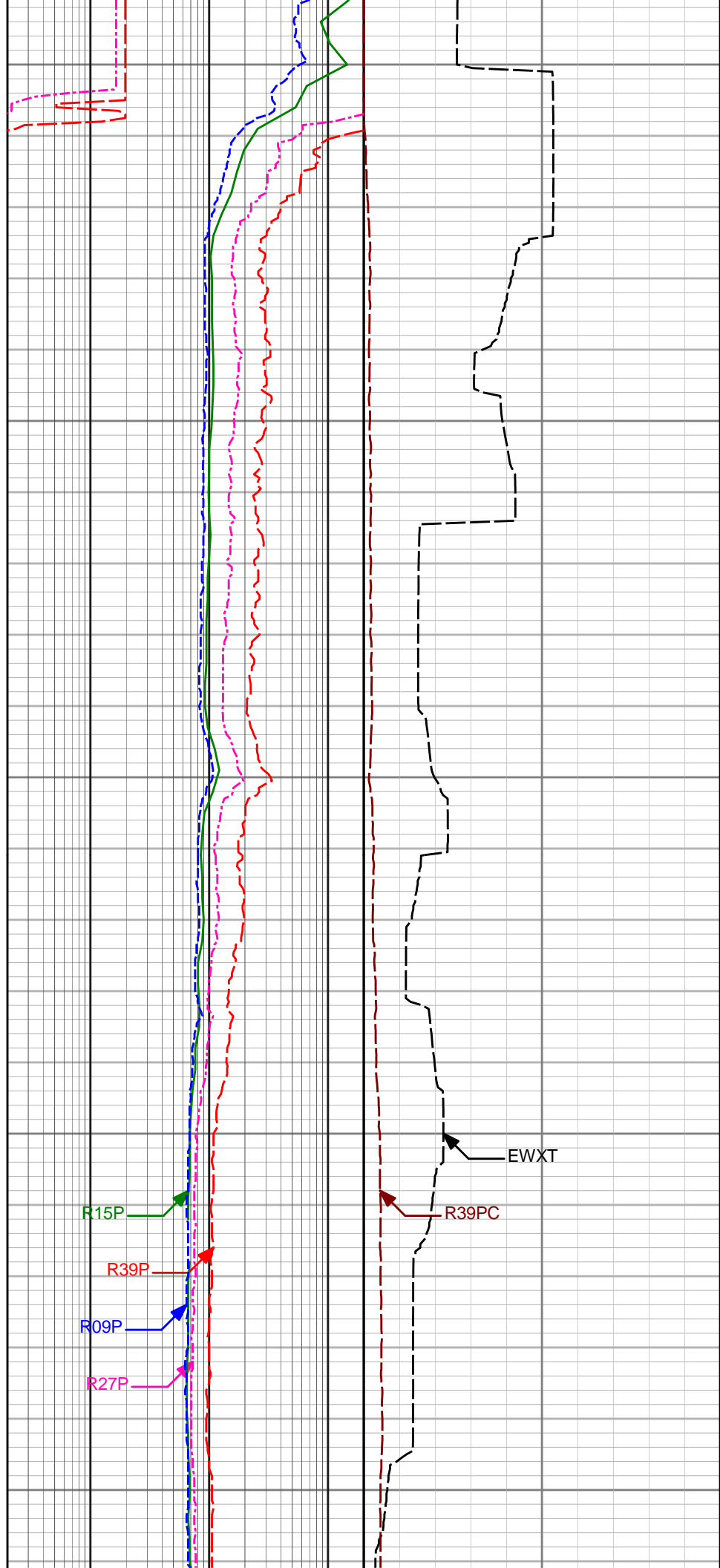
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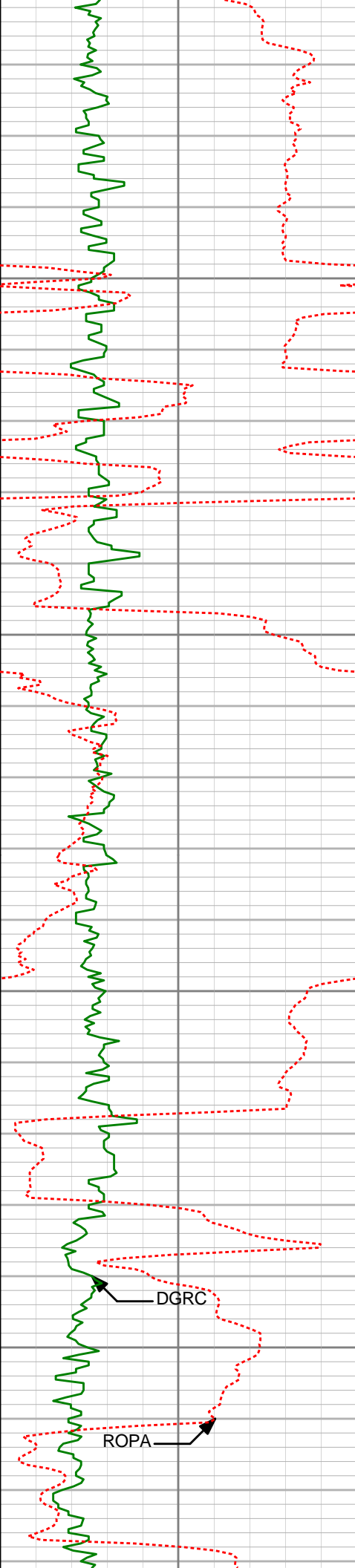
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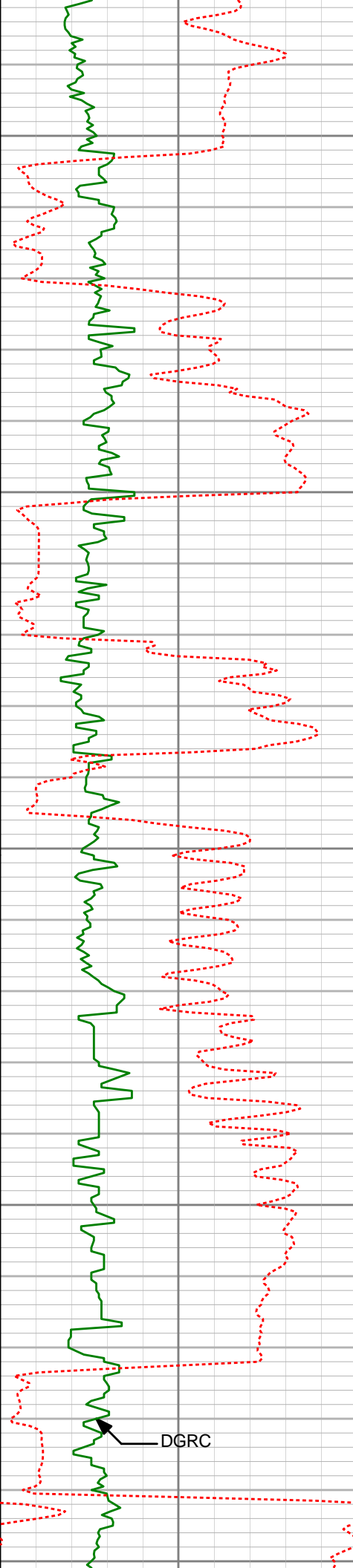
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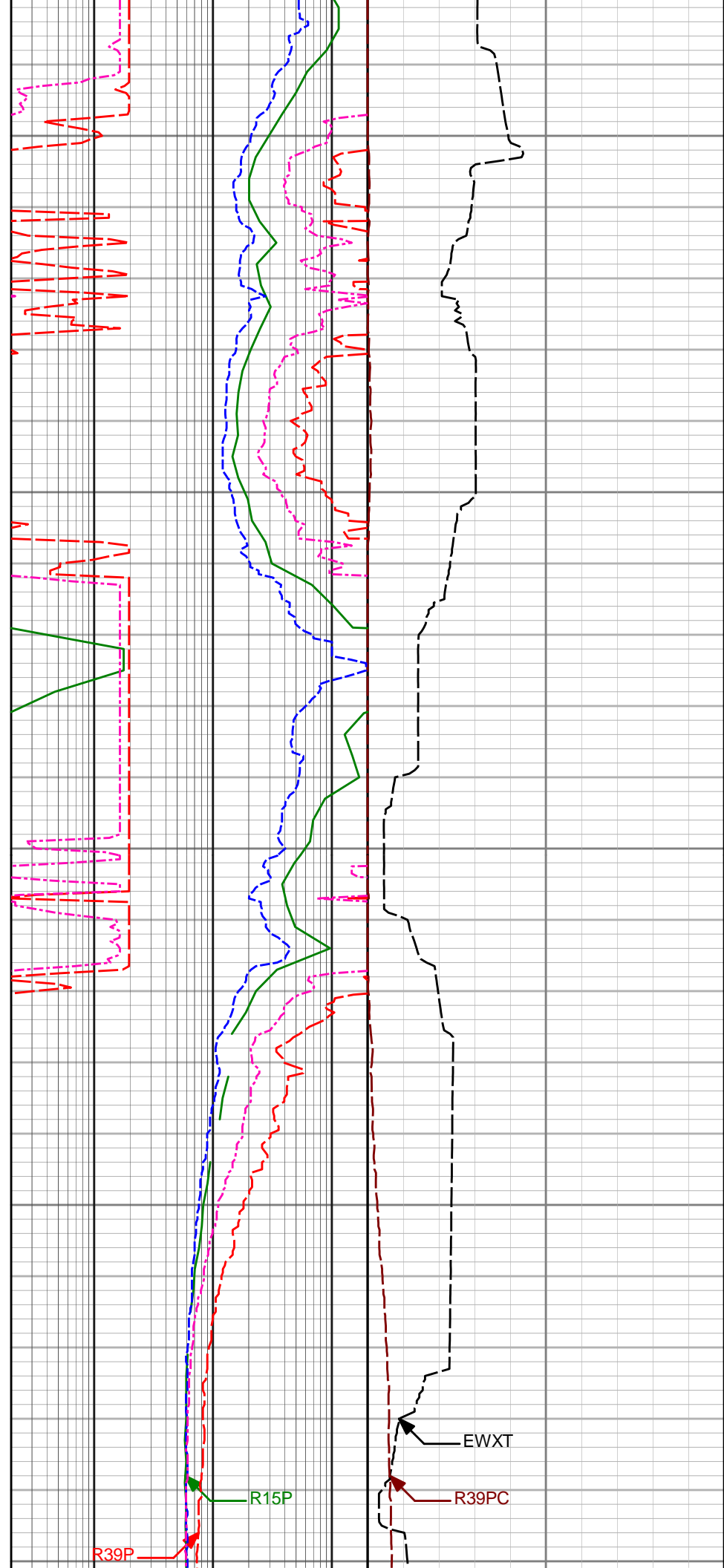
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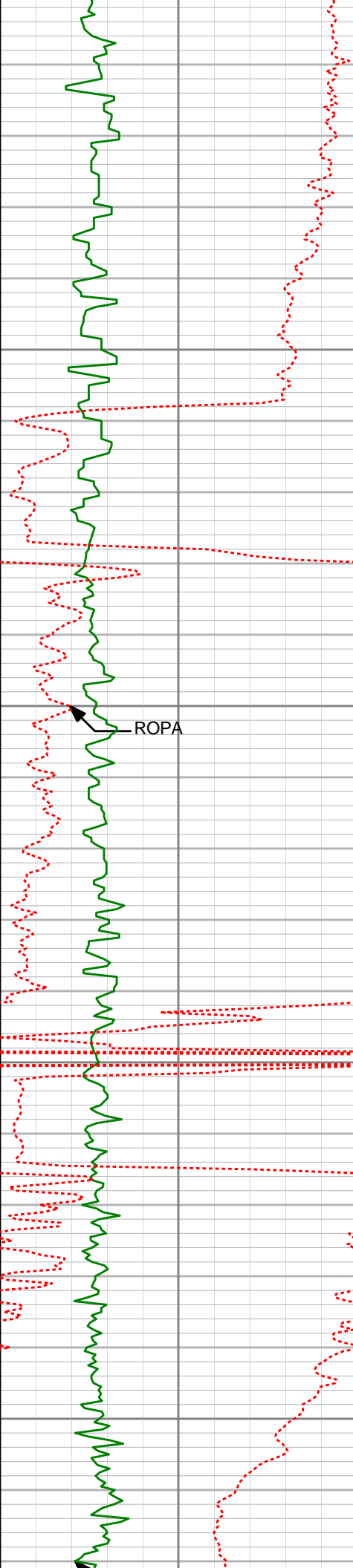


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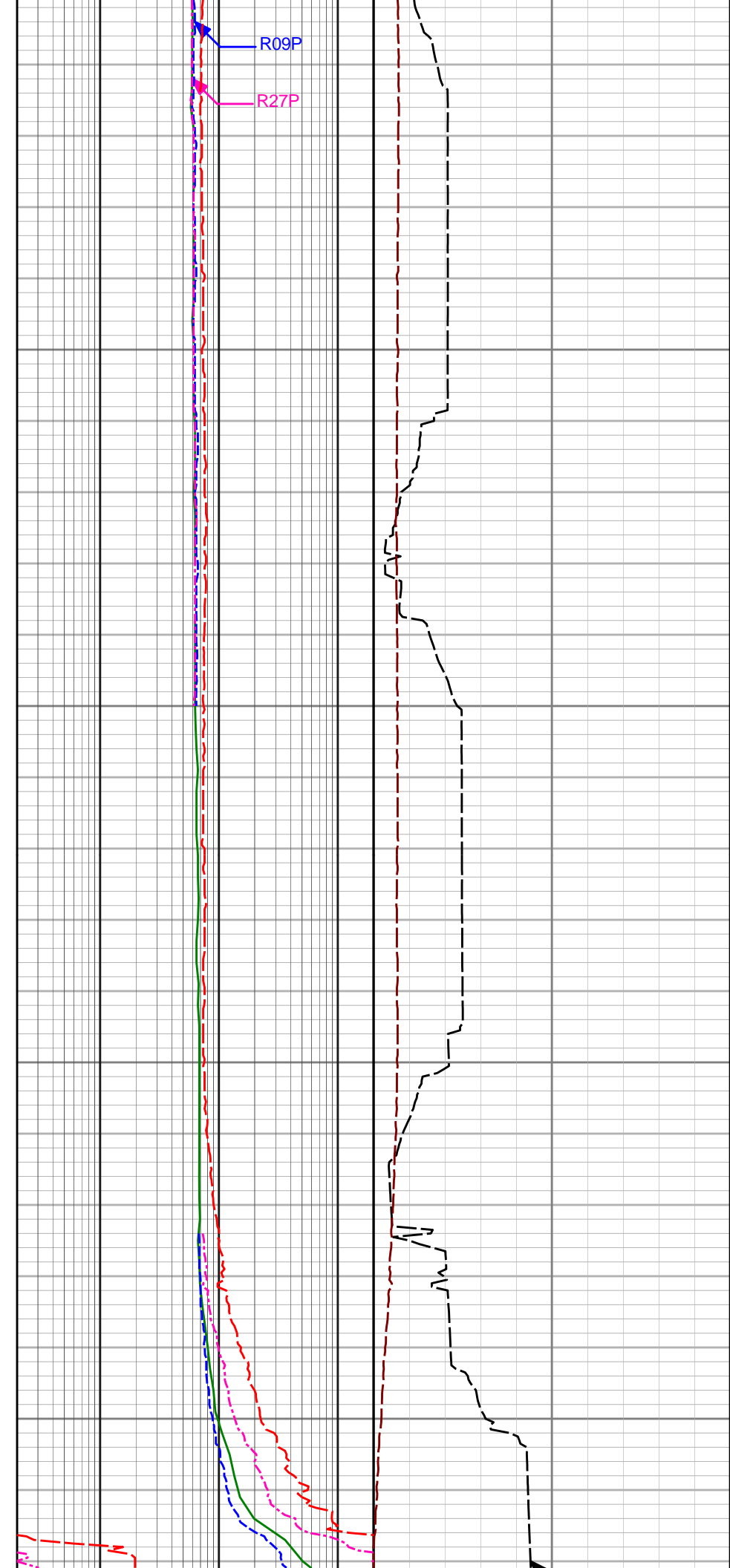


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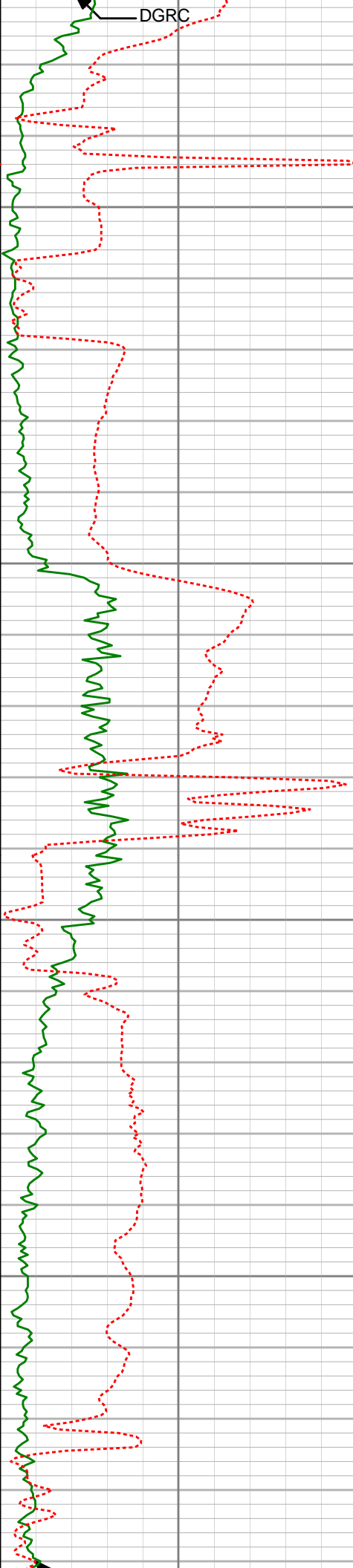
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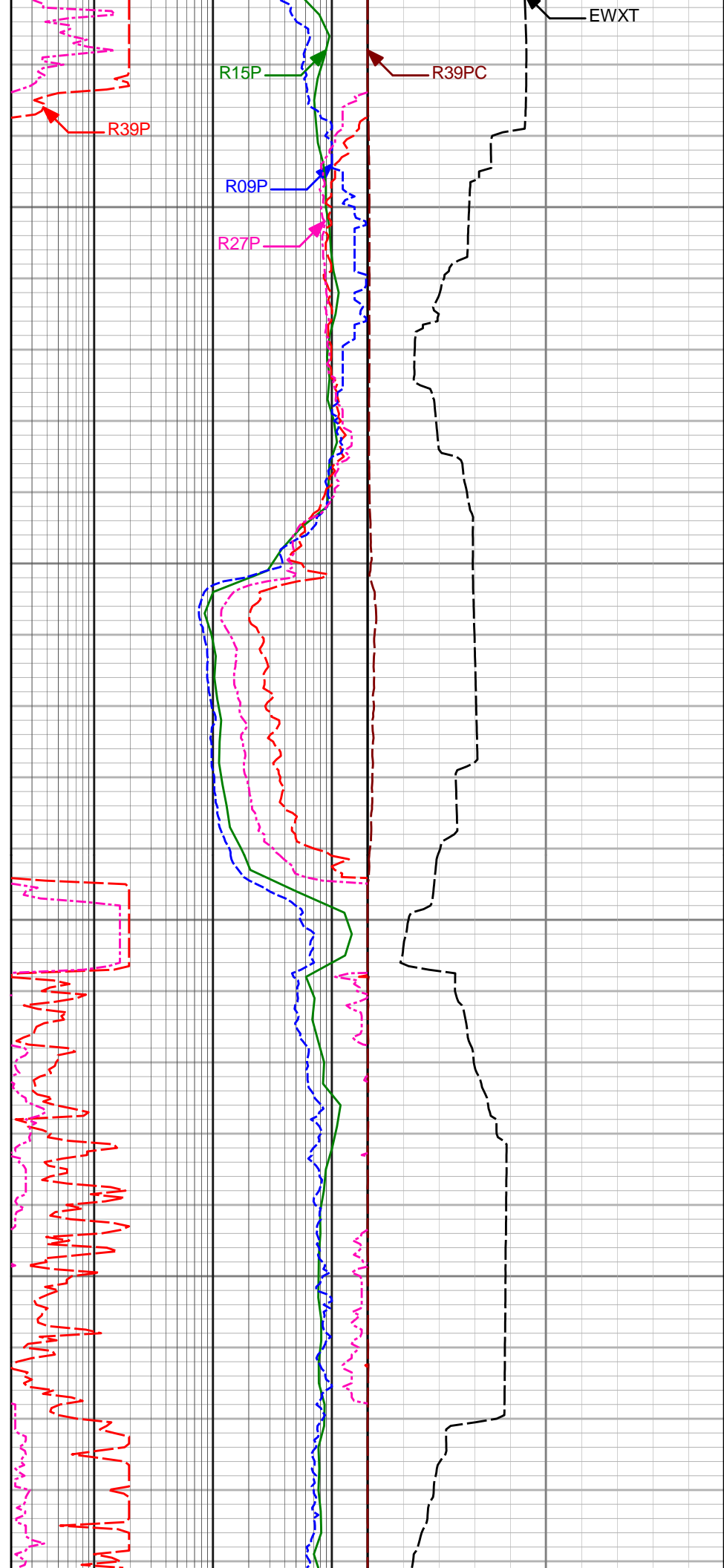


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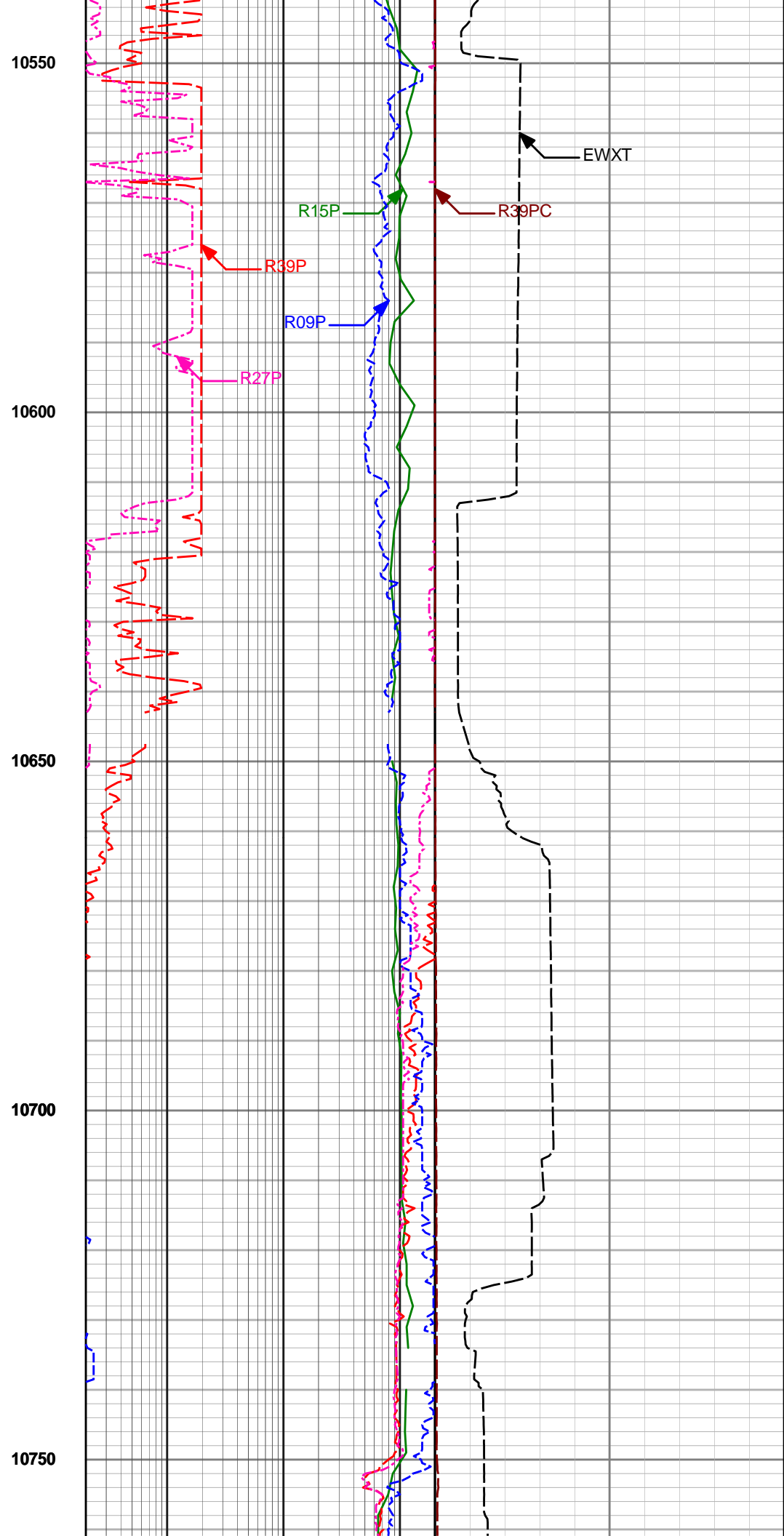
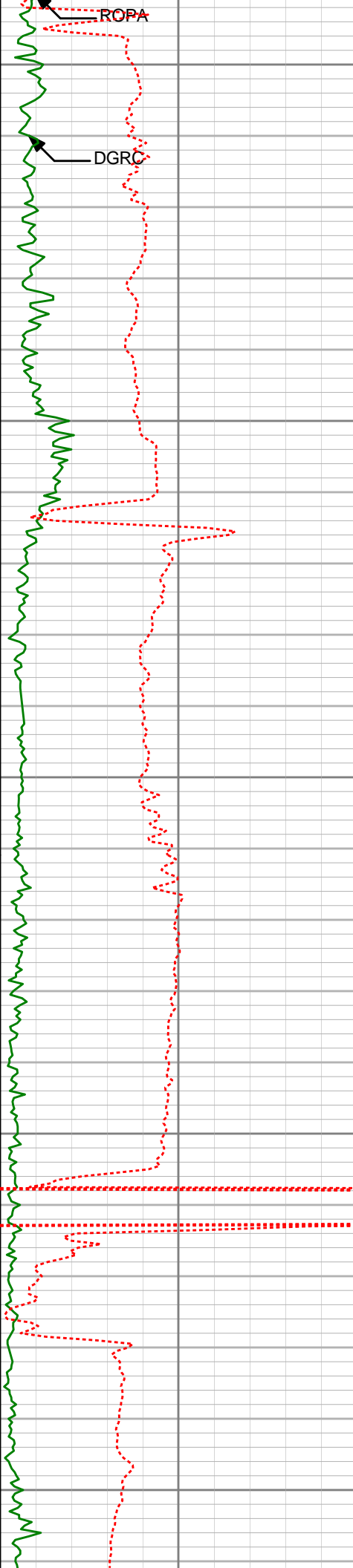
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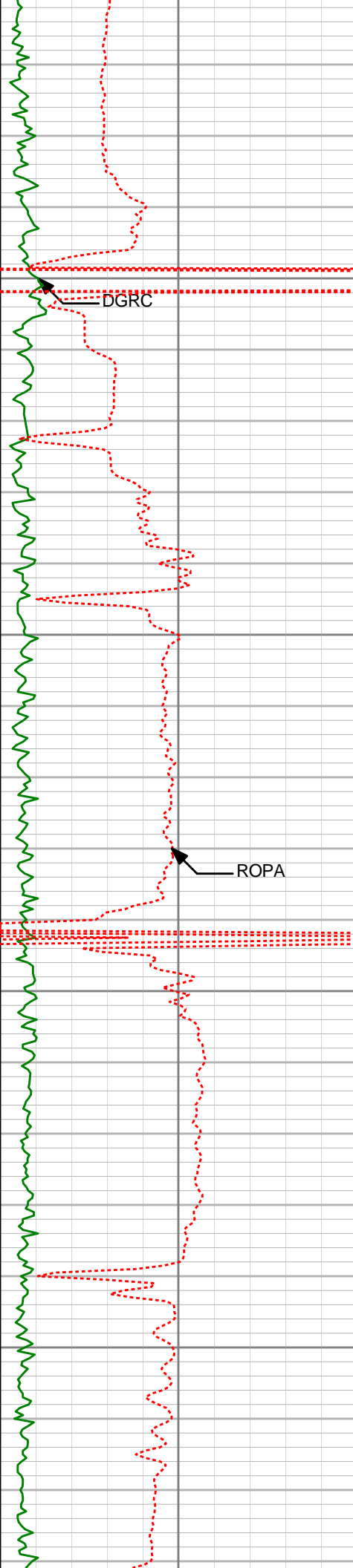
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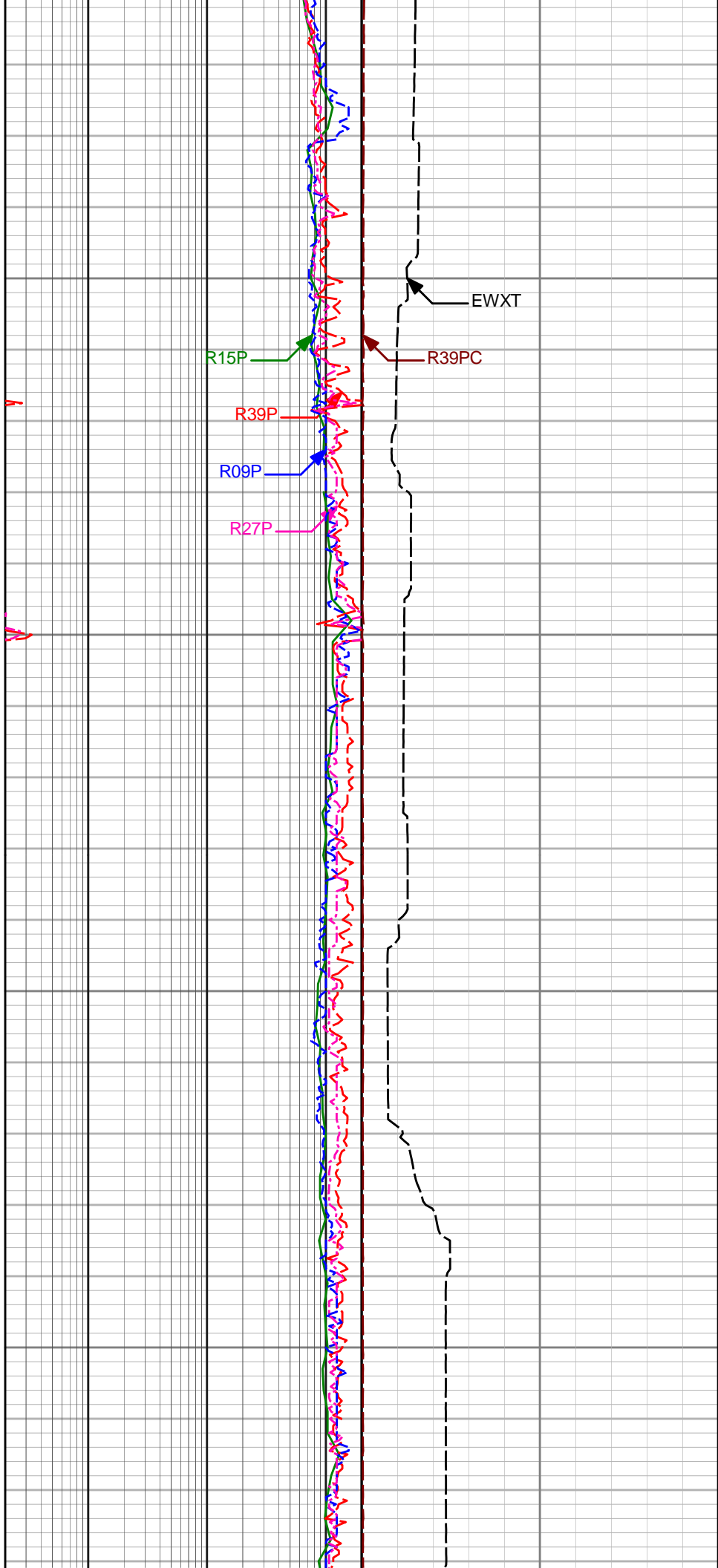


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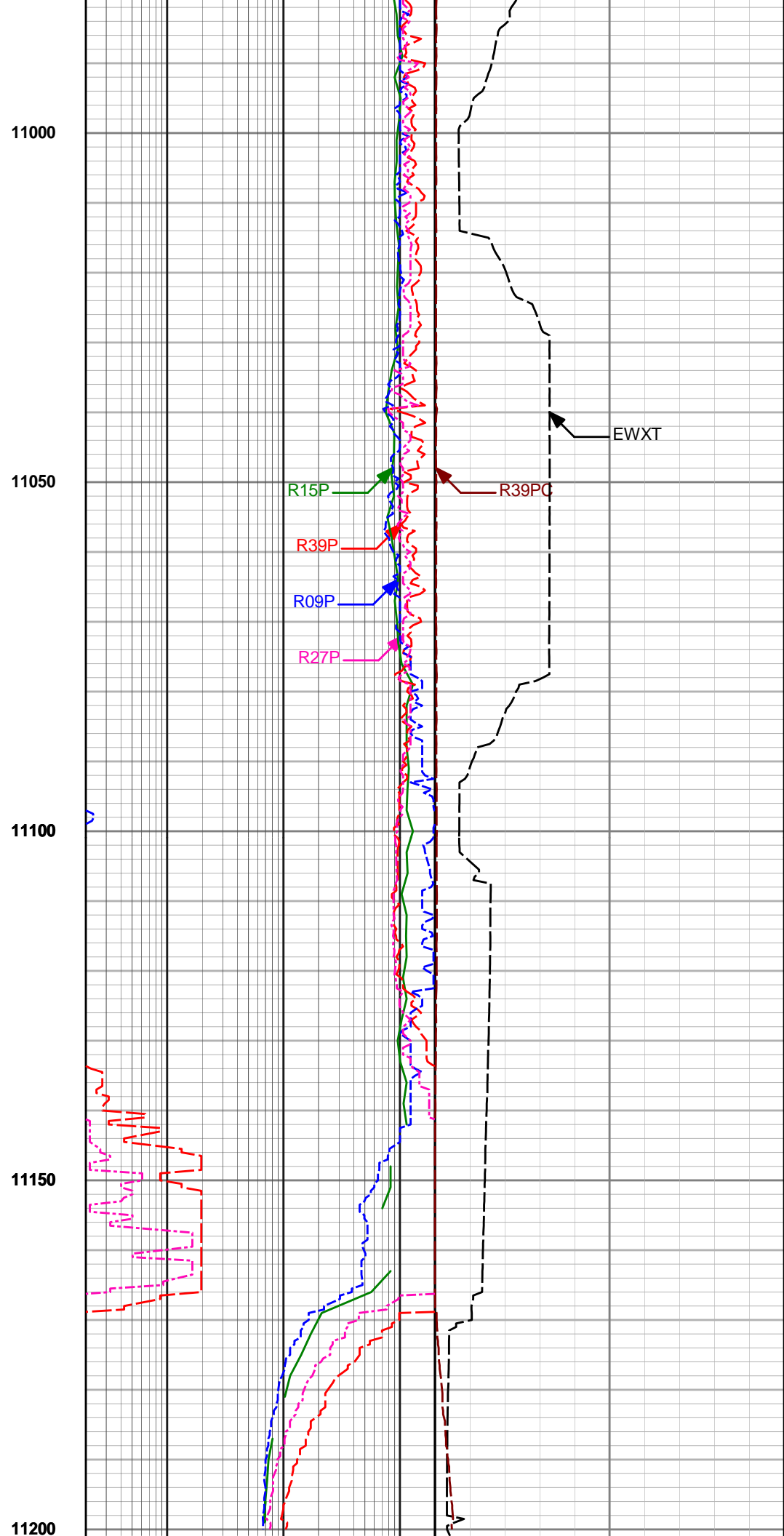
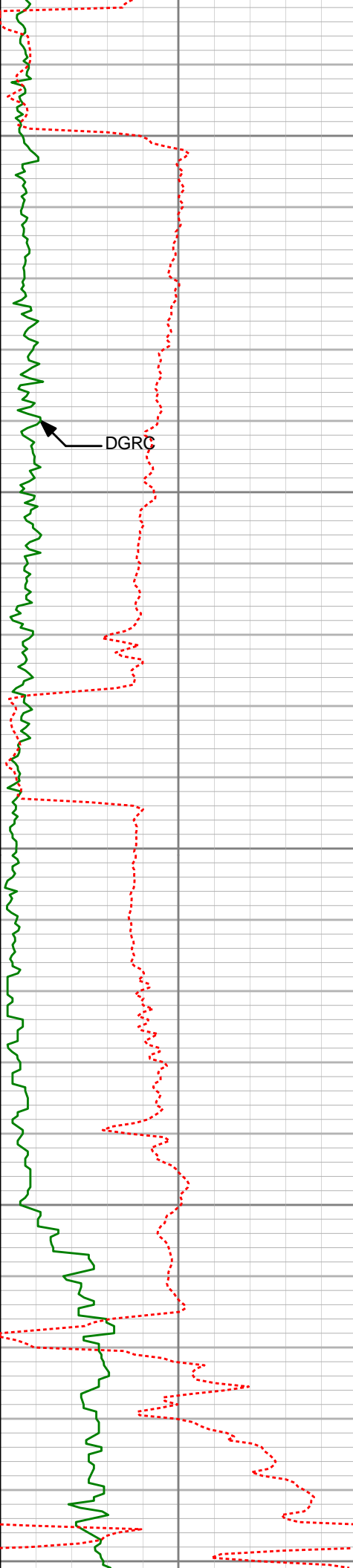
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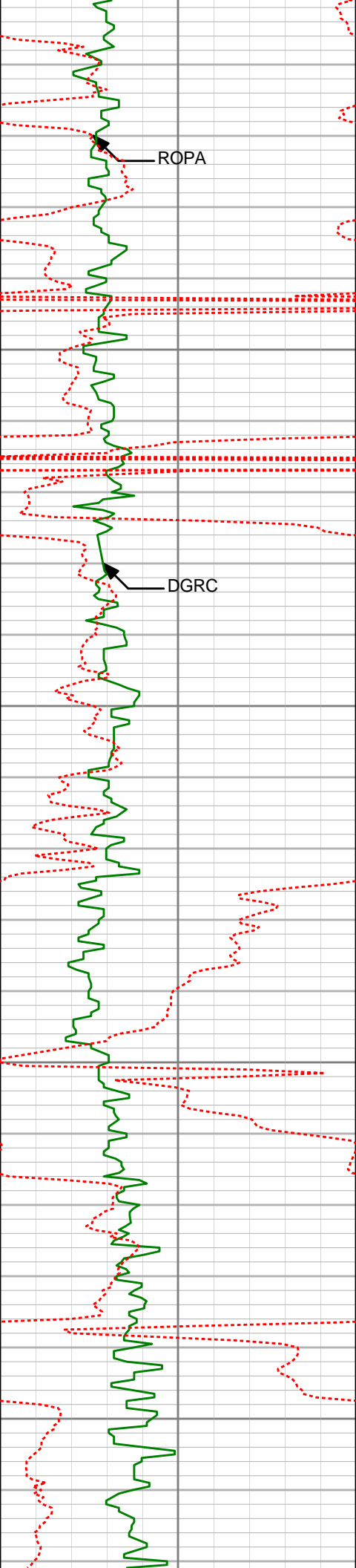
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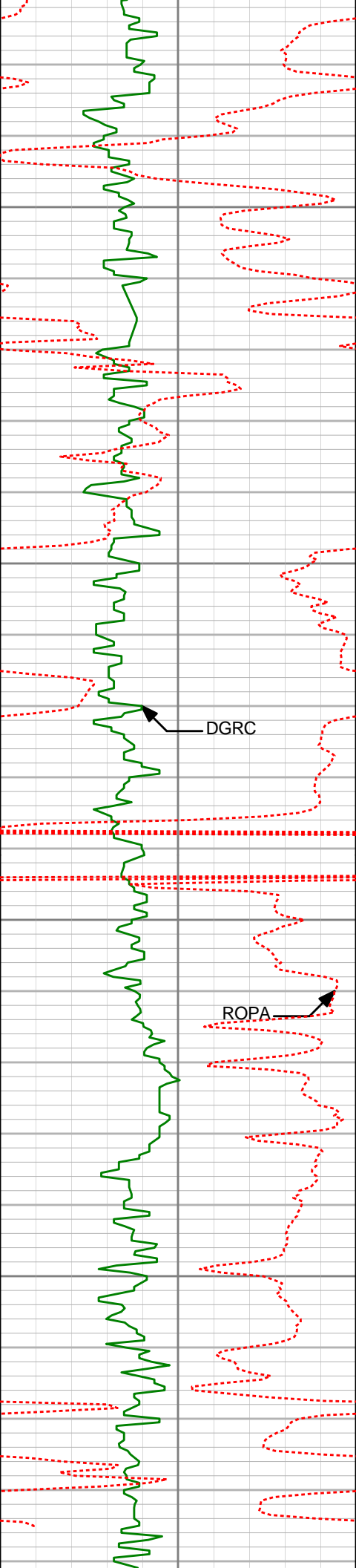
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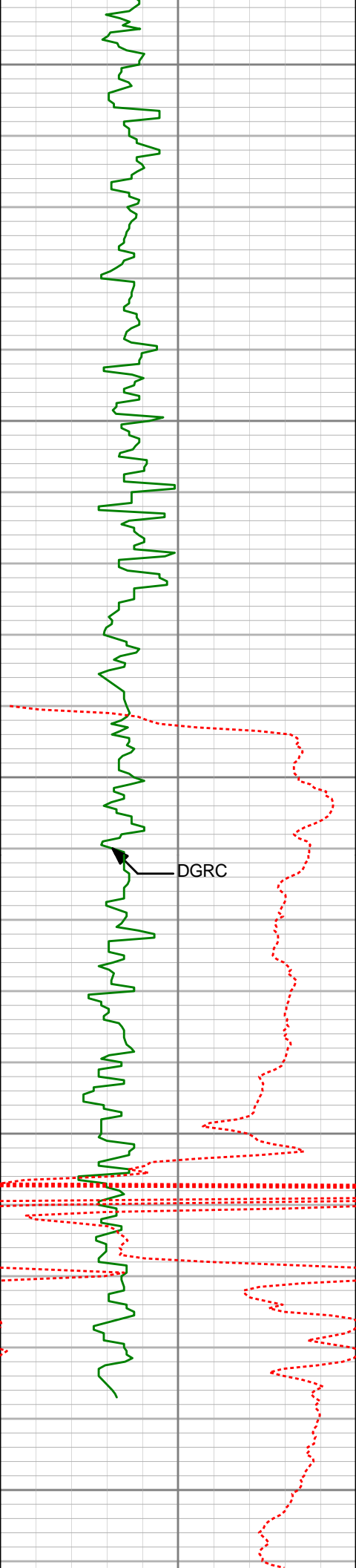
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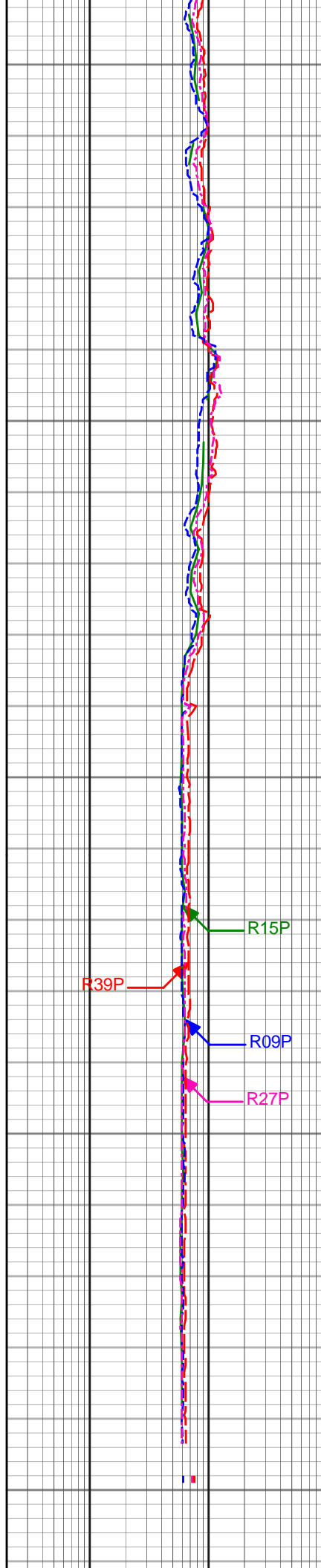
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DGRC



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11700

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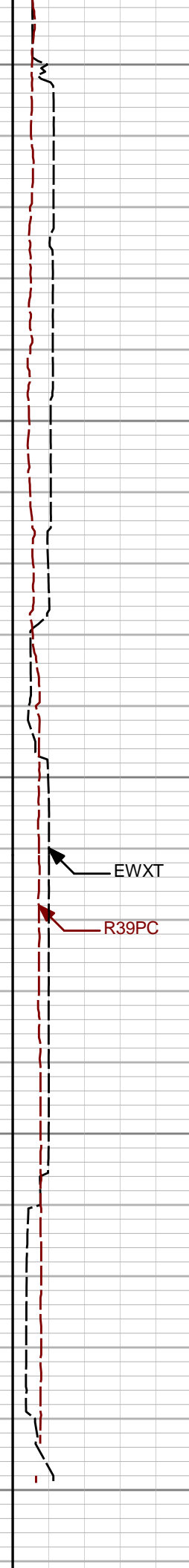
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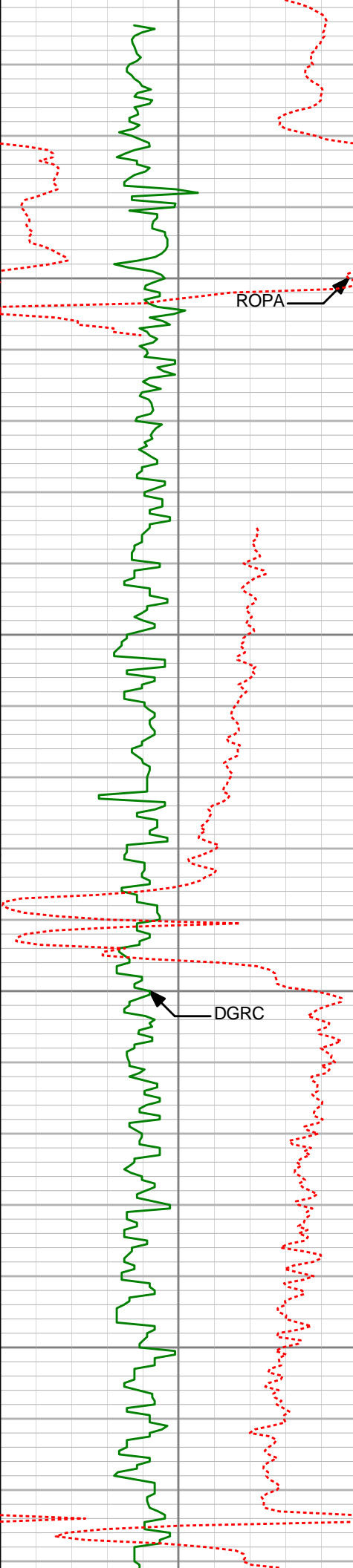
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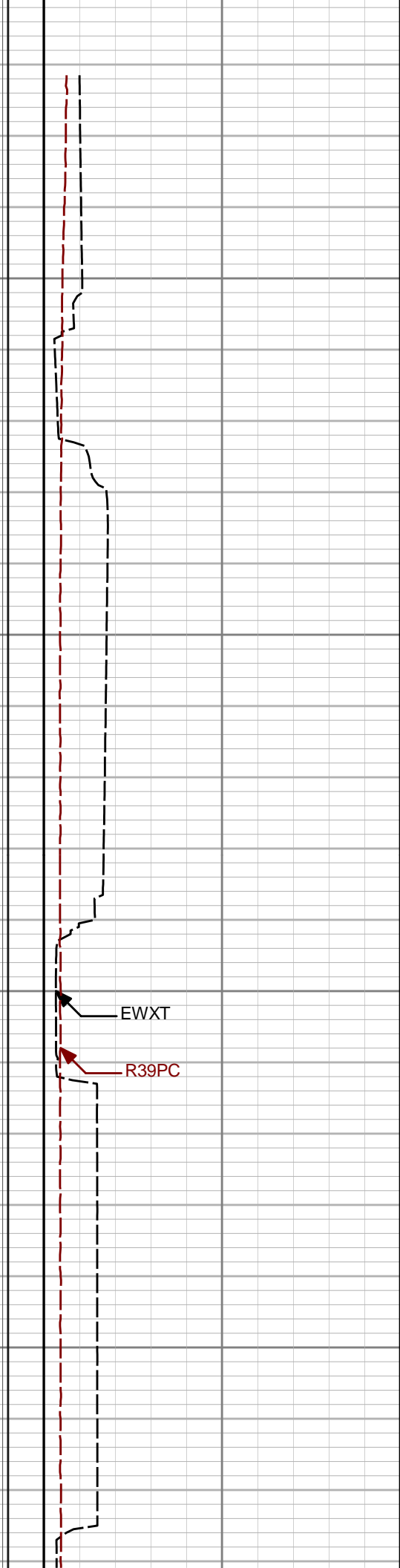
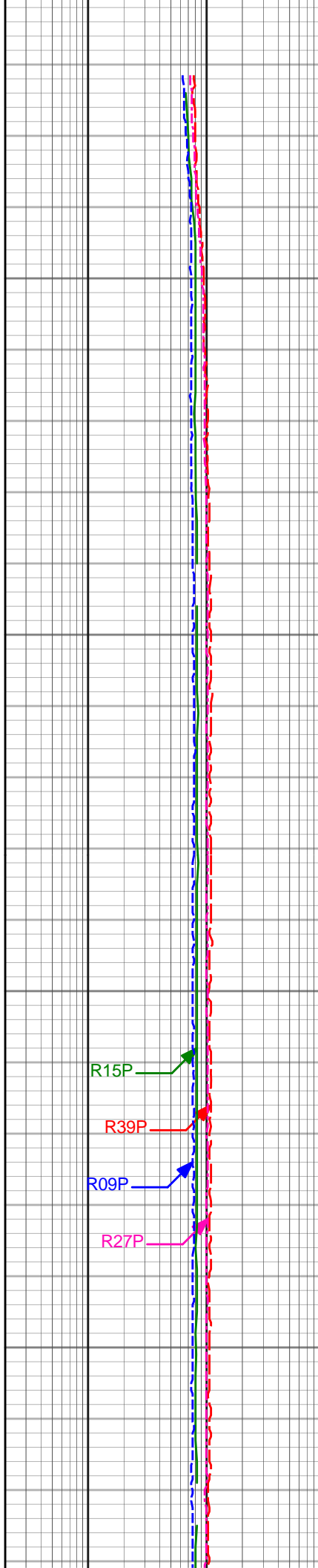


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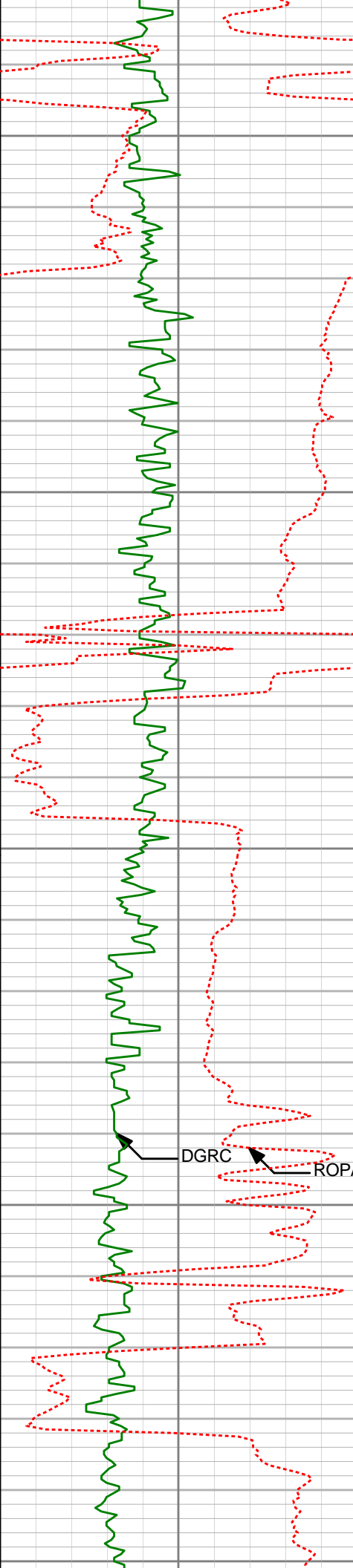
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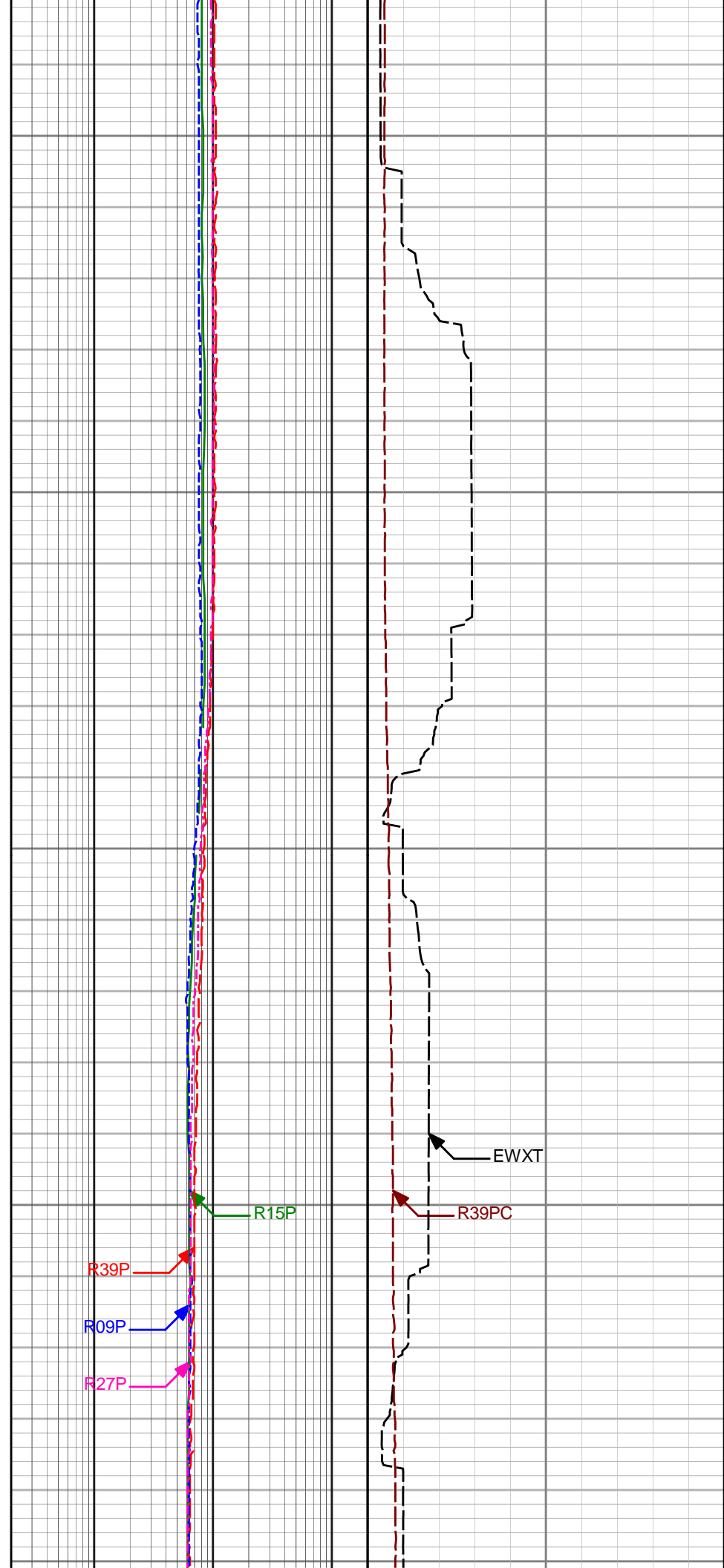
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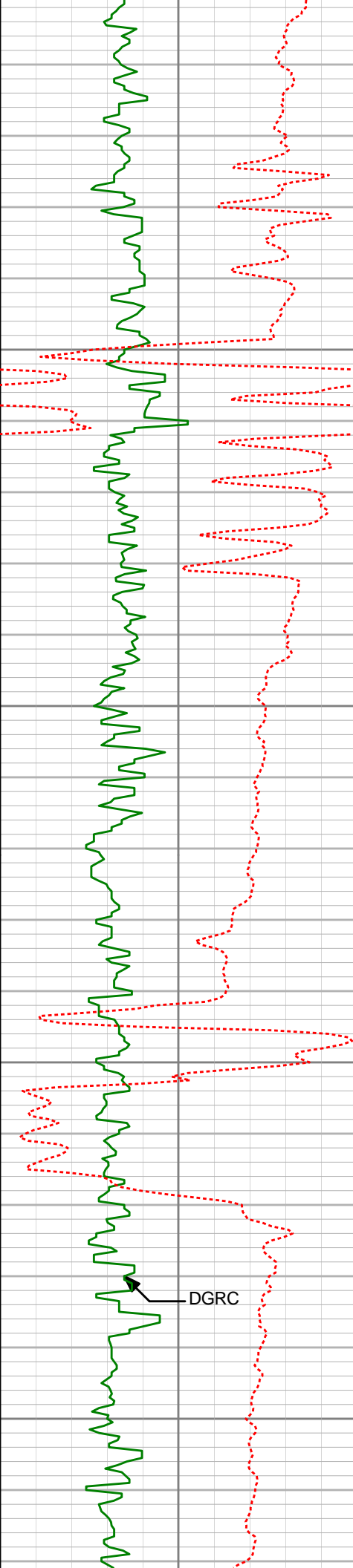
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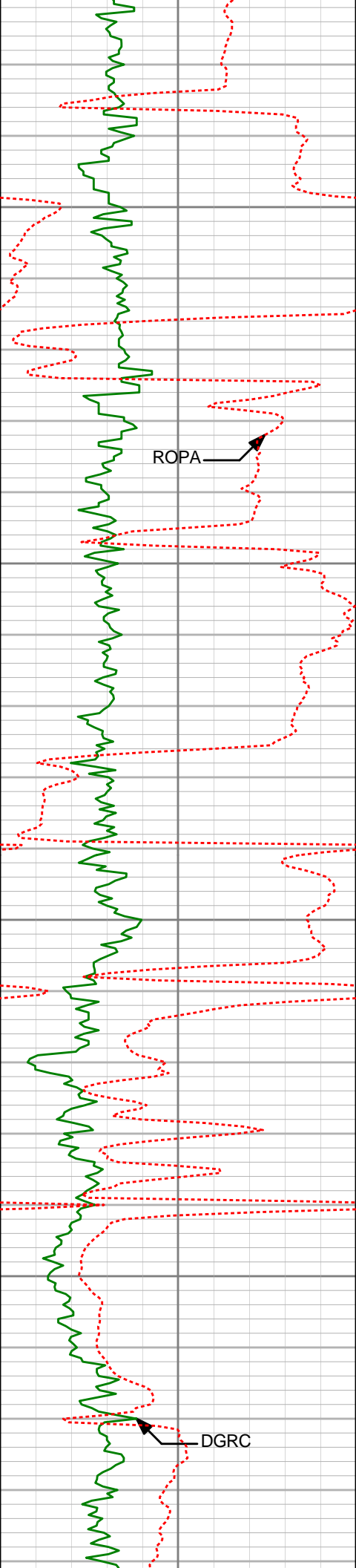
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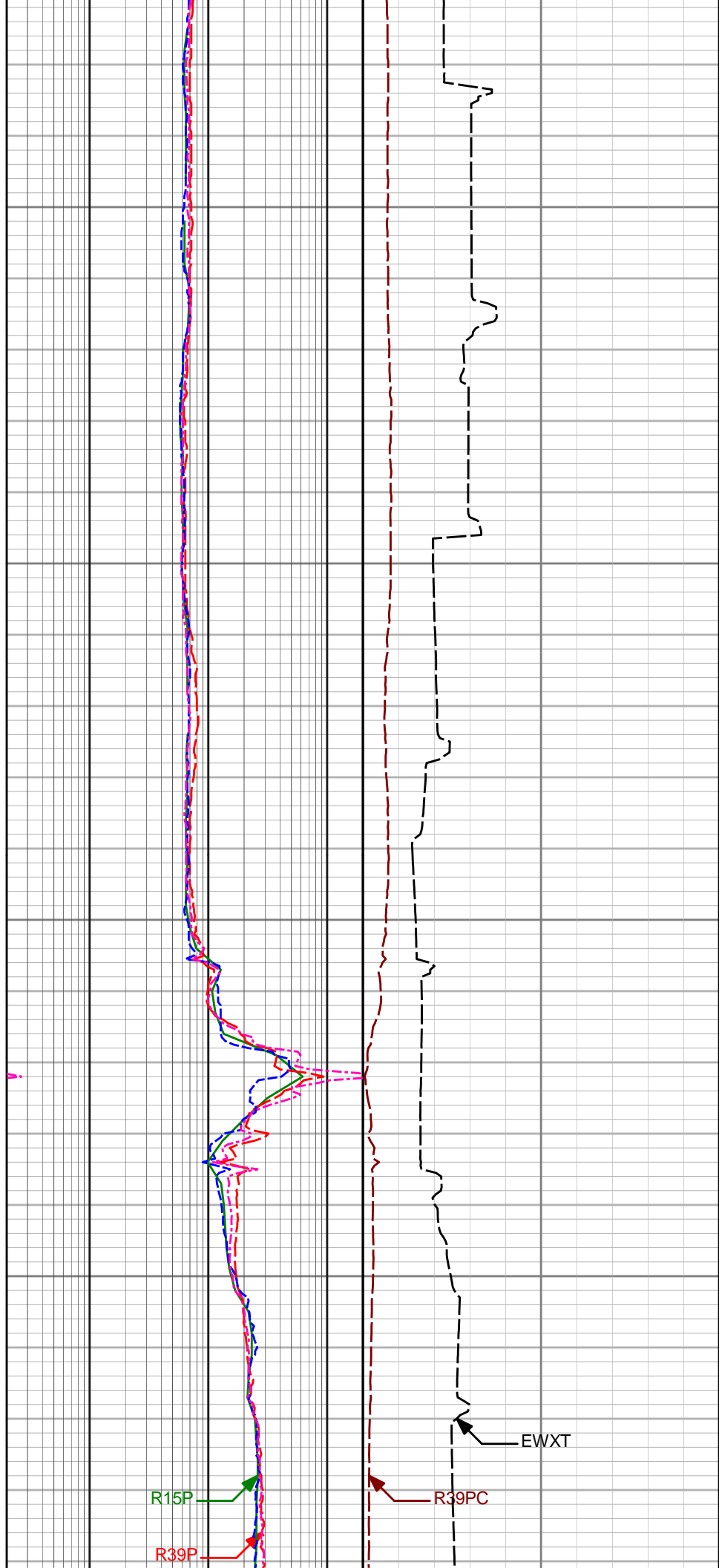
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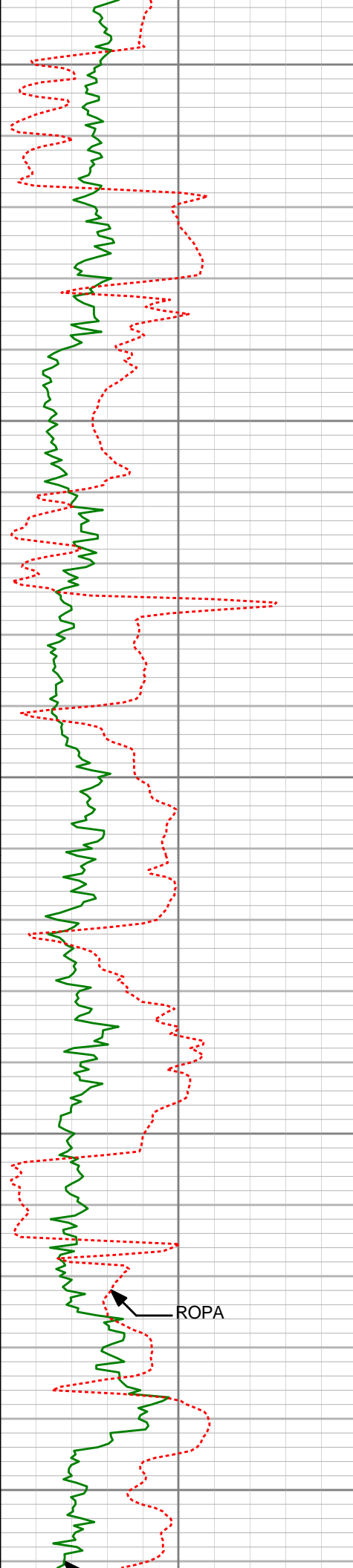


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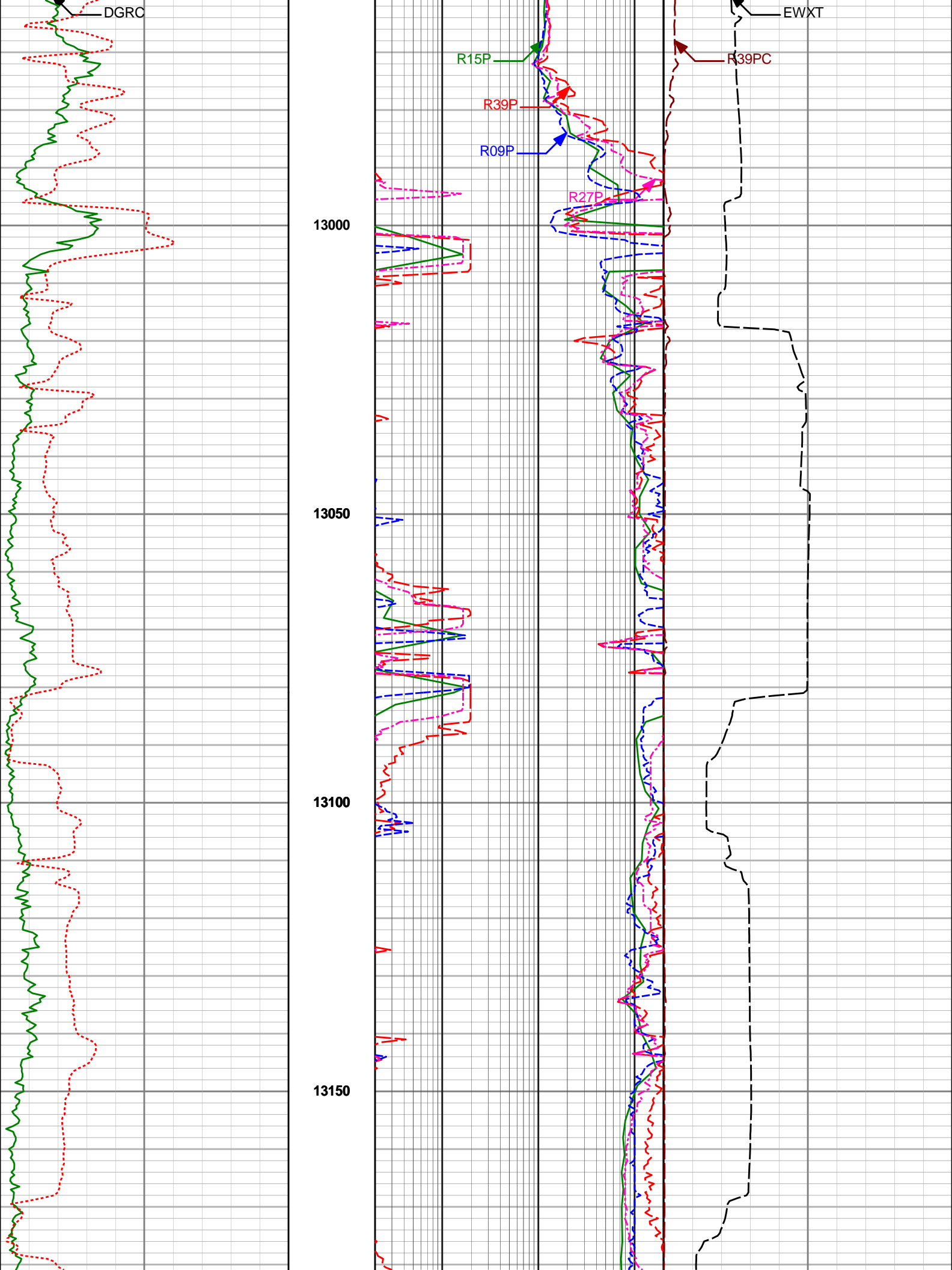
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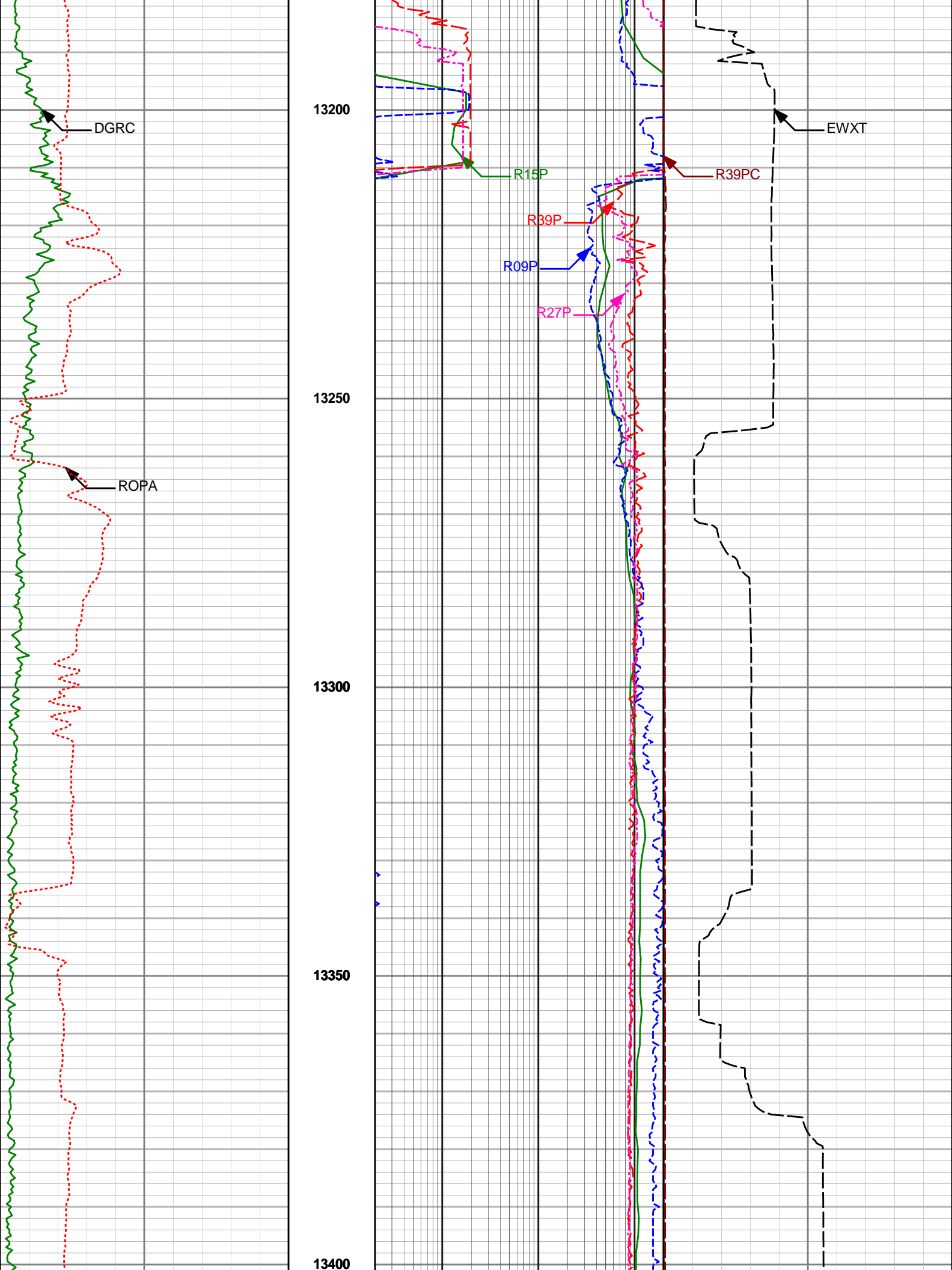
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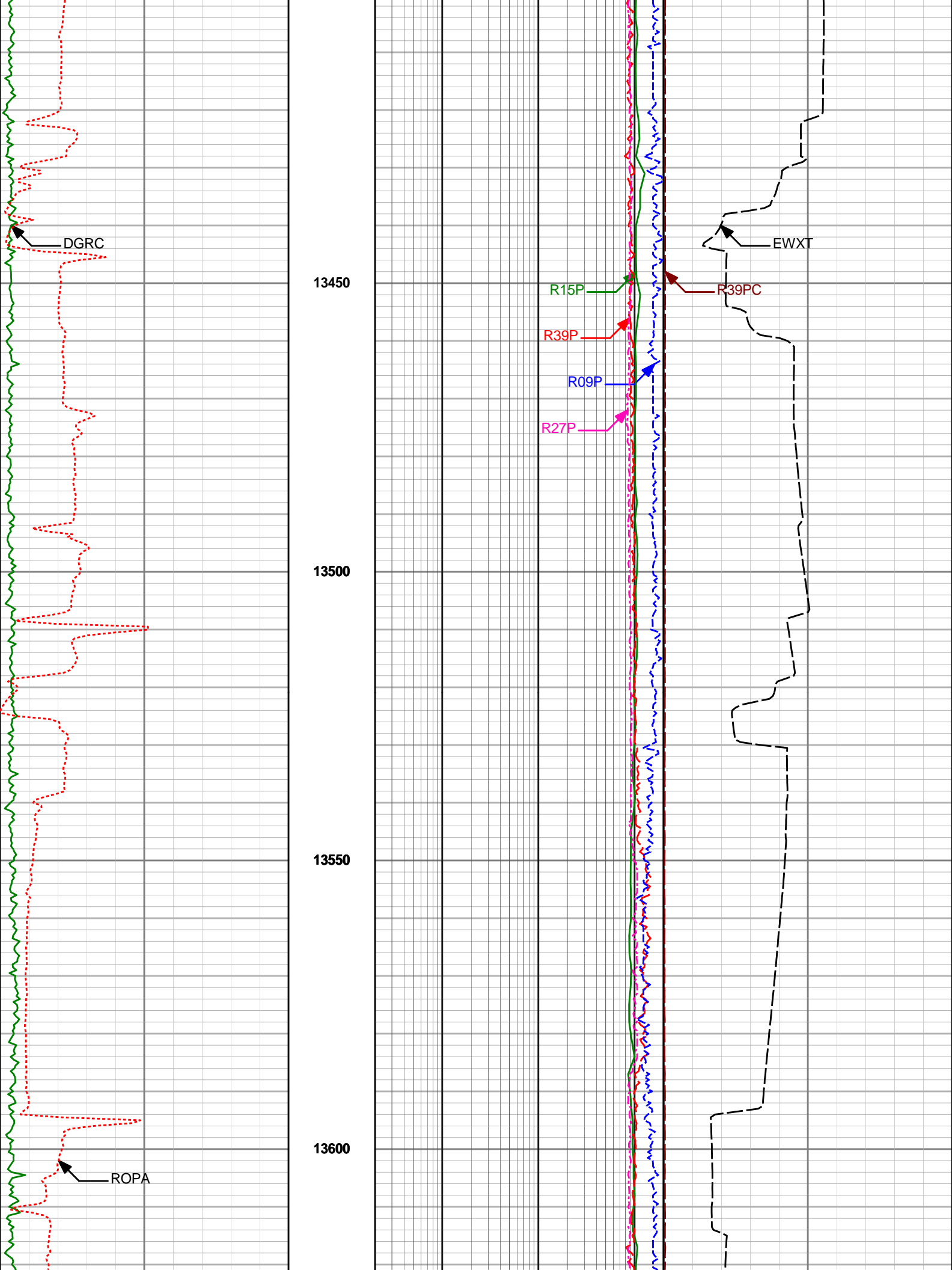
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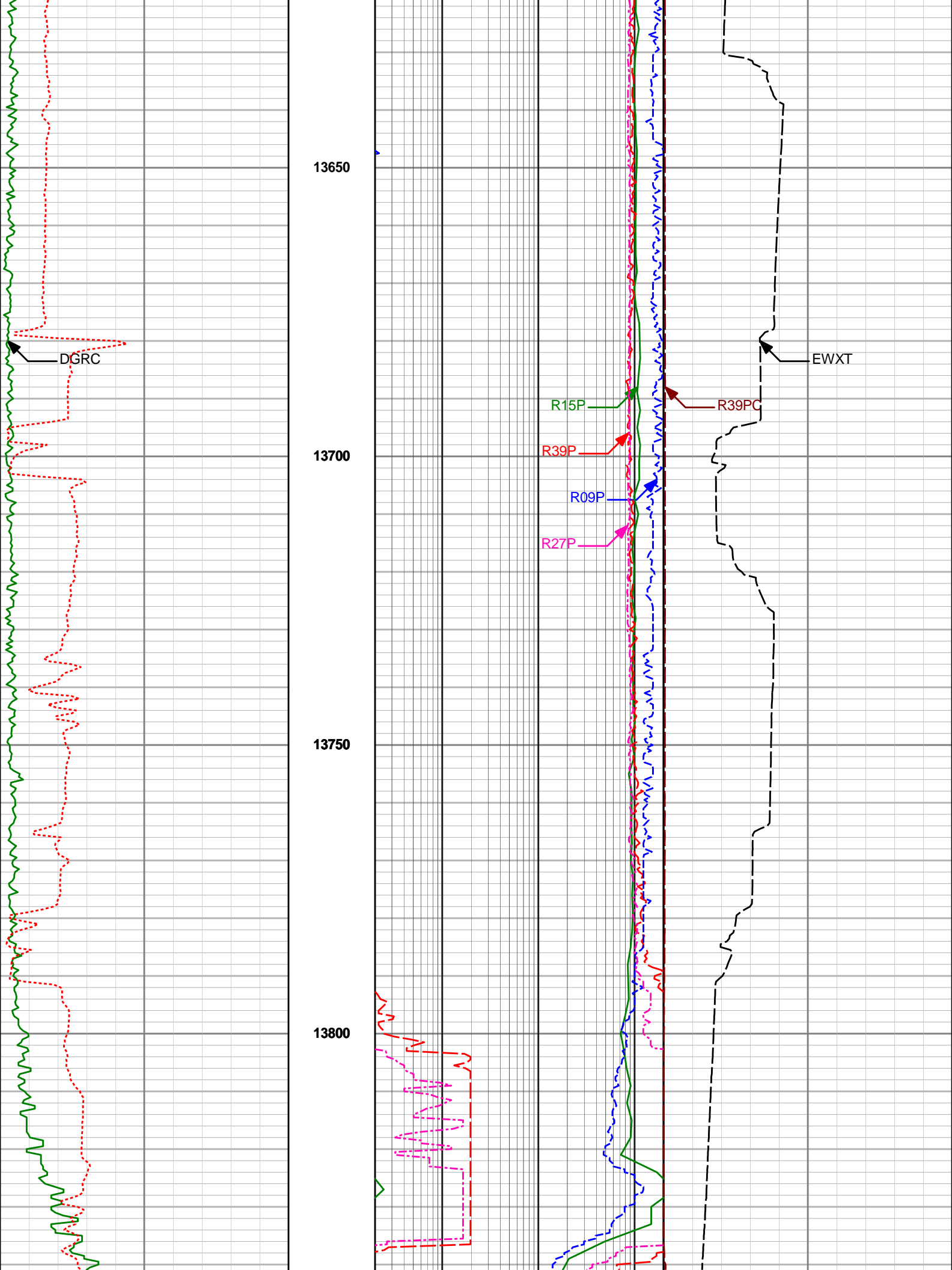
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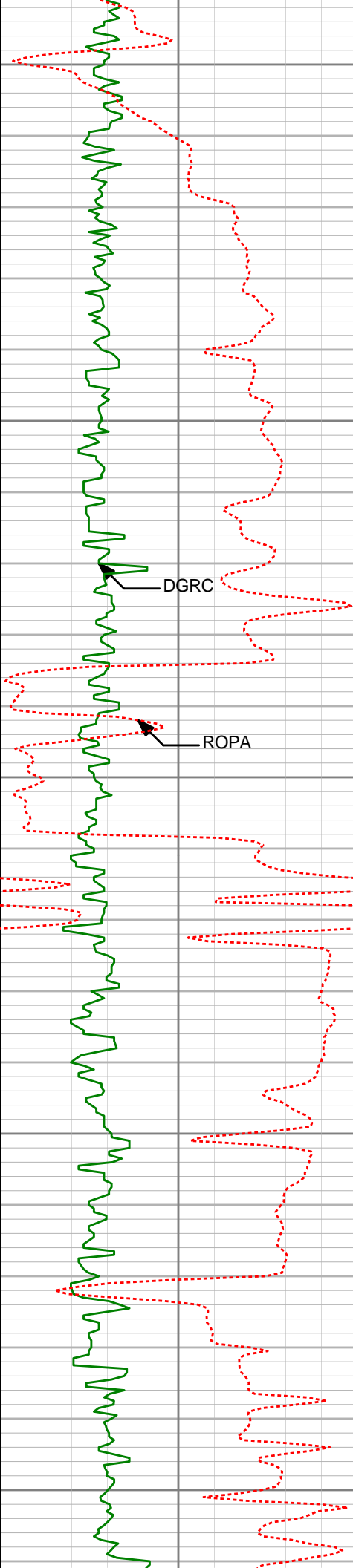












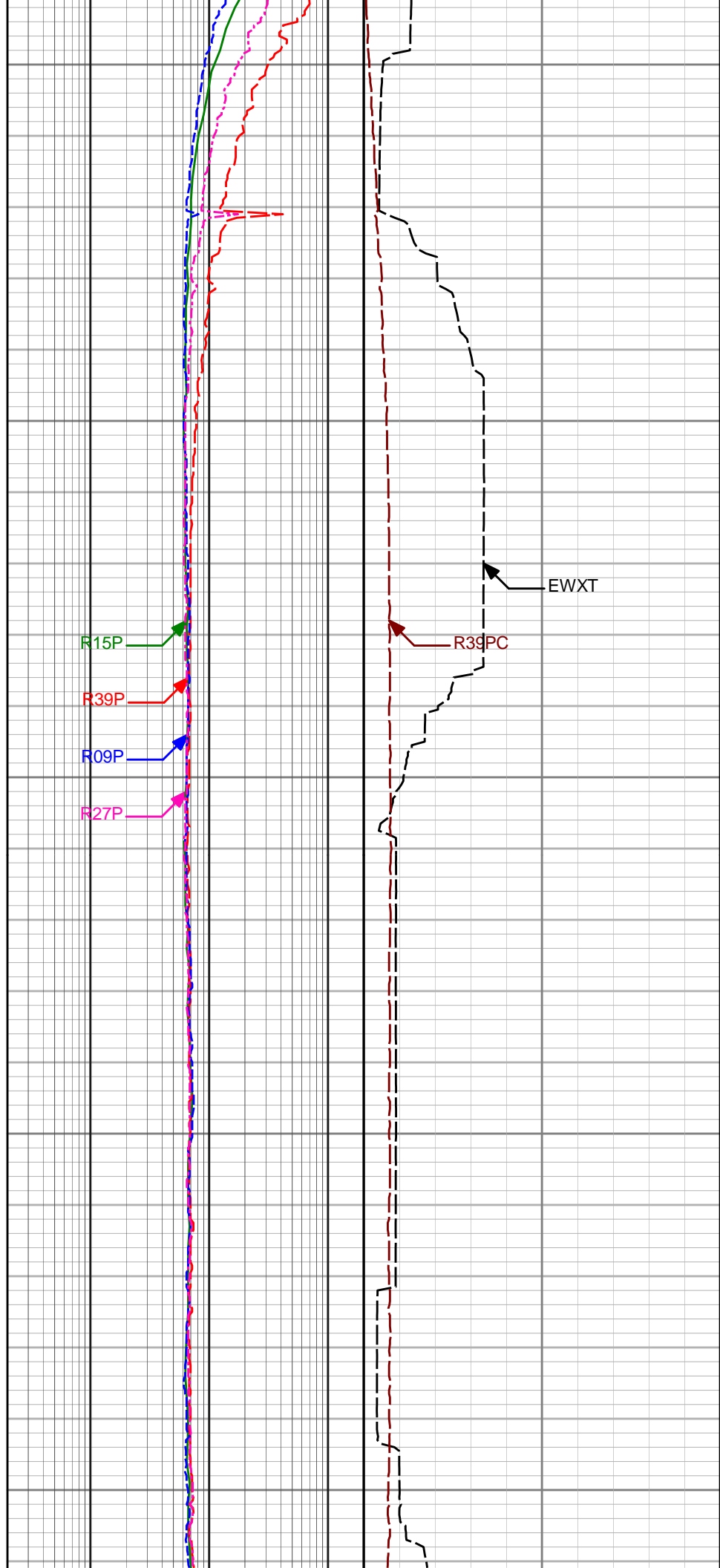
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14050



R15P

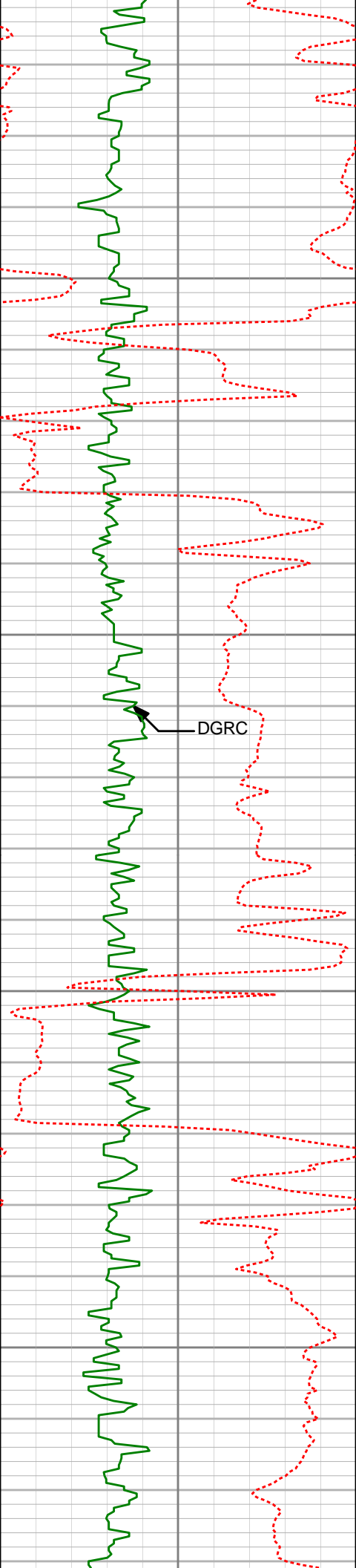
R39P

R09P

R27P

R39PC

EWXT



14100

14150

14200

14250

DGRC

R15P

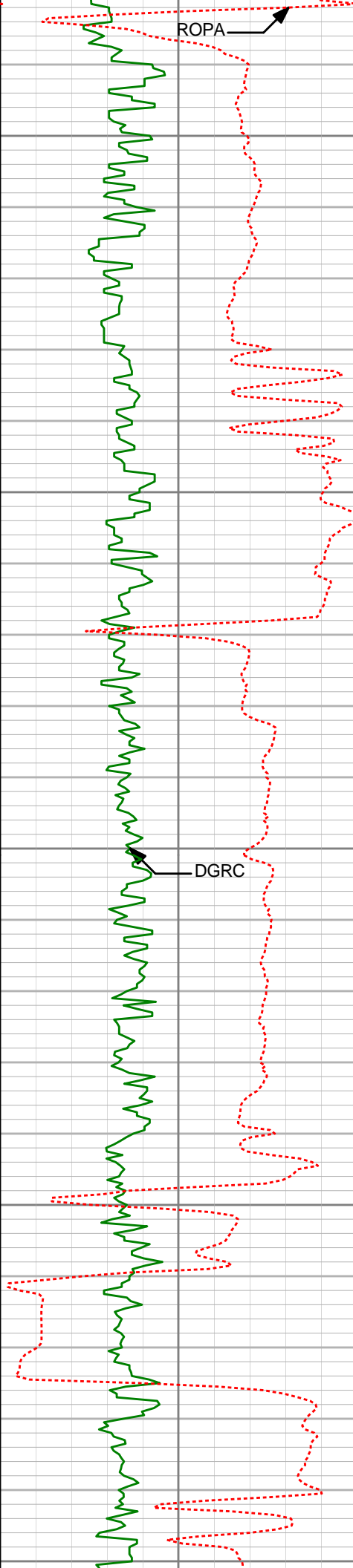
R39P

R09P

R27P

EWXT

R39PC



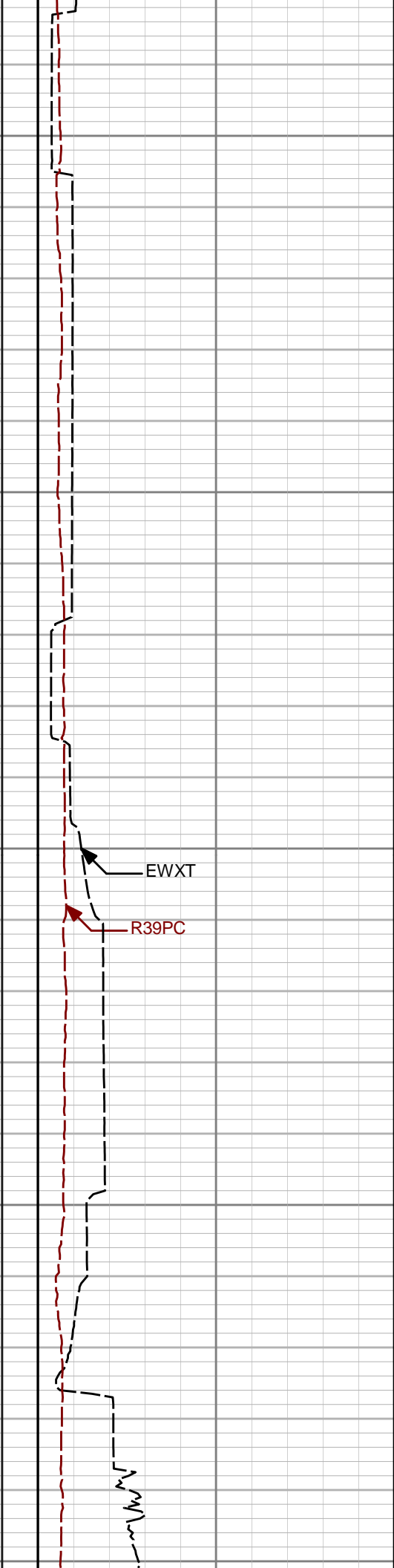
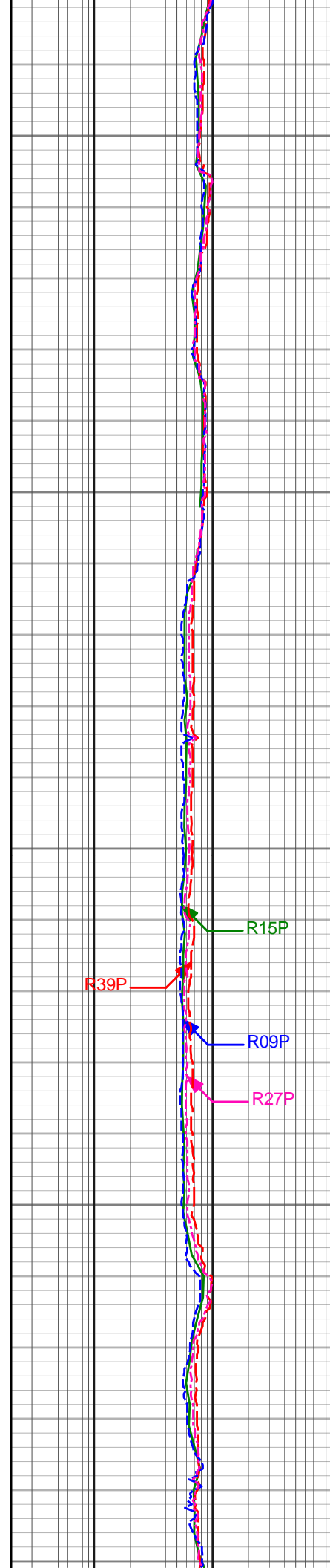
14300

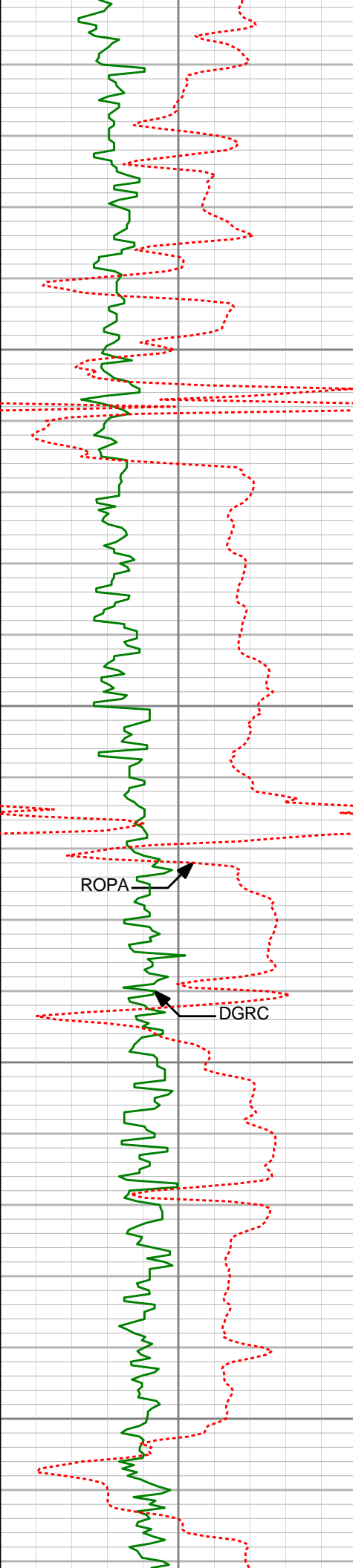
14350

14400

14450

14500





14550

14600

14650

14700

ROPA

DGRC

R15P

R39P

R09P

R27P

EWXT

R39PC



14750

14800

14850

14900

DGRC

R15P

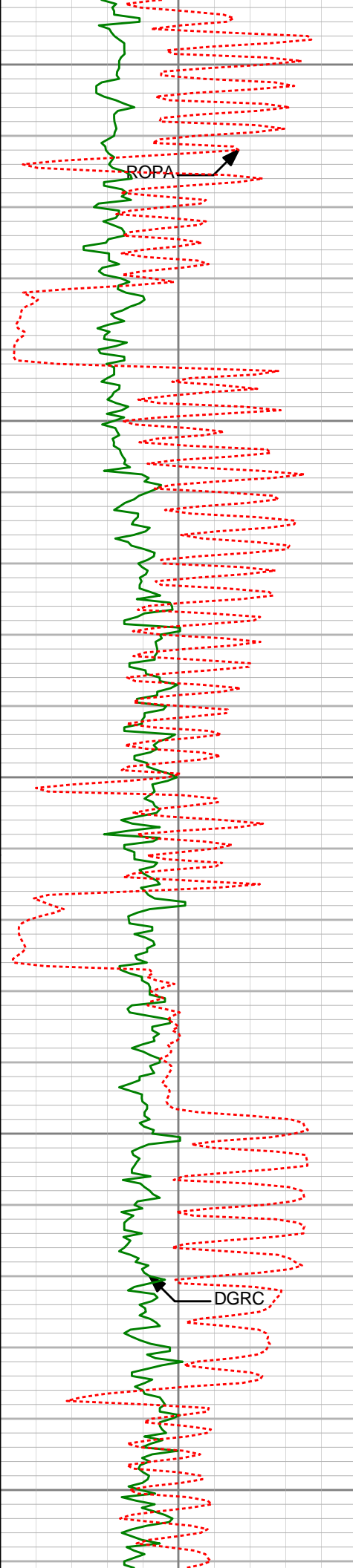
R39P

R09P

R27P

R39PC

EWXT



14950

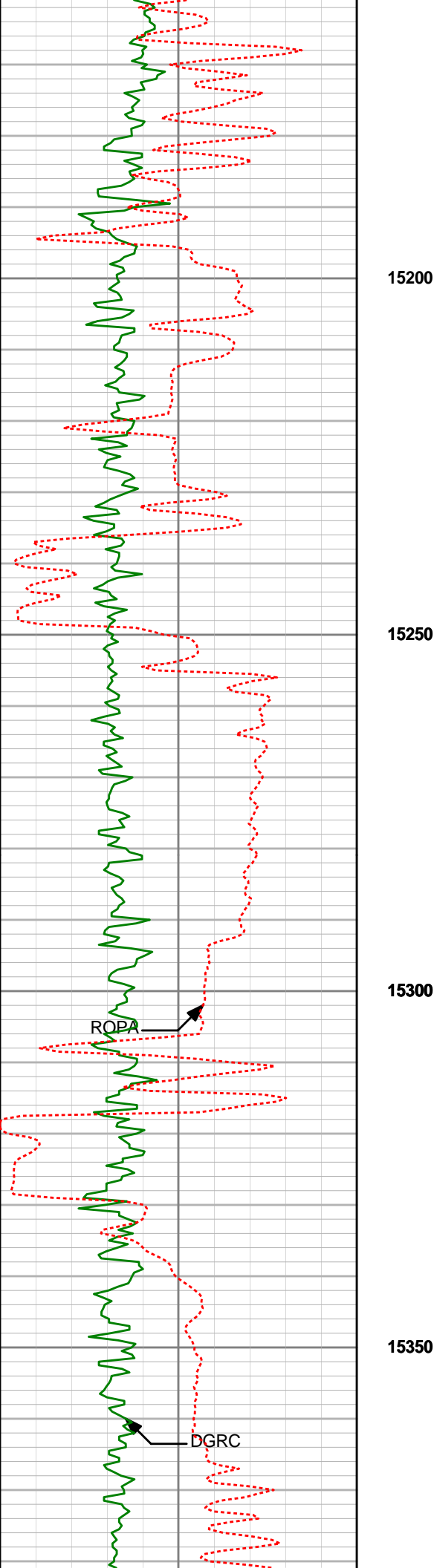
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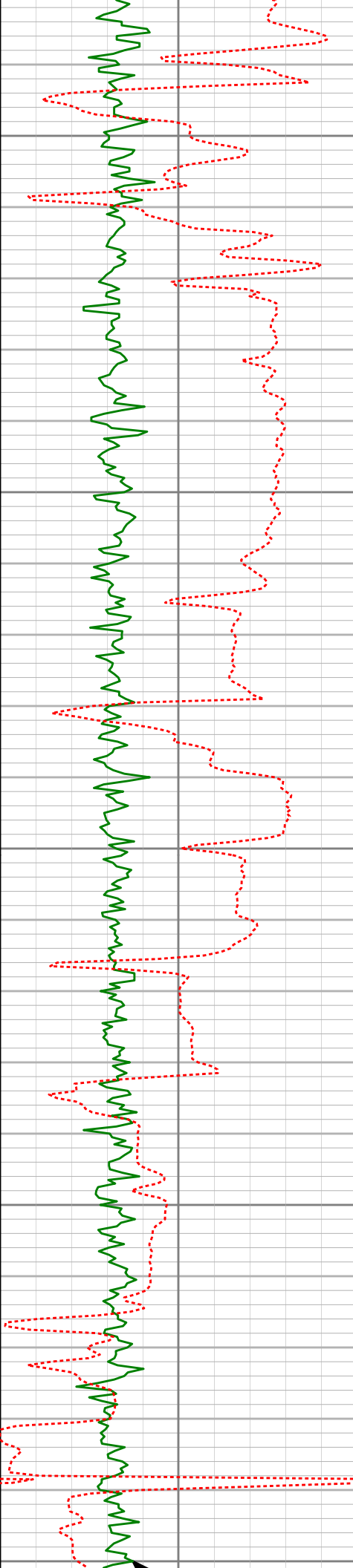
15050

15100

15150







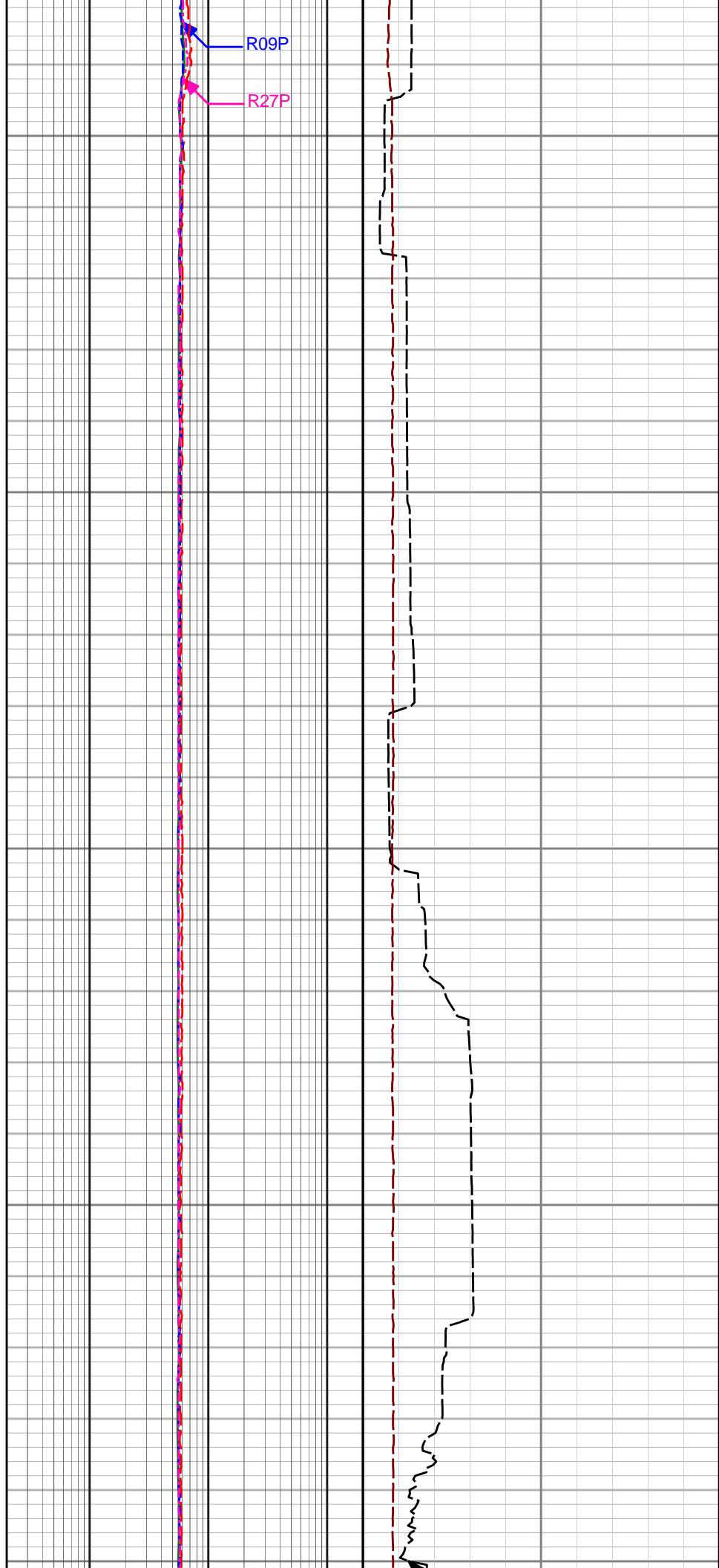
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15450

15500

15550

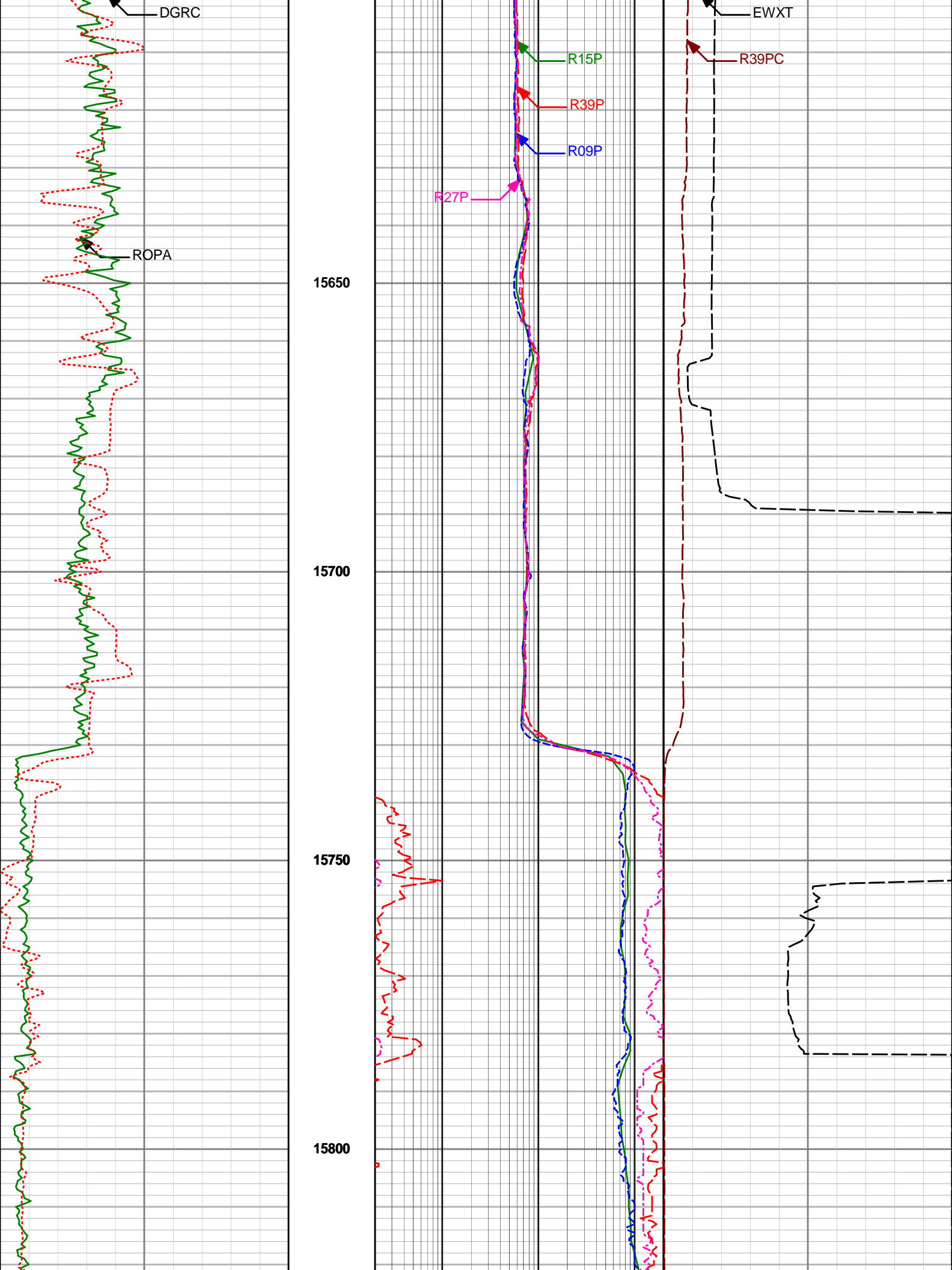
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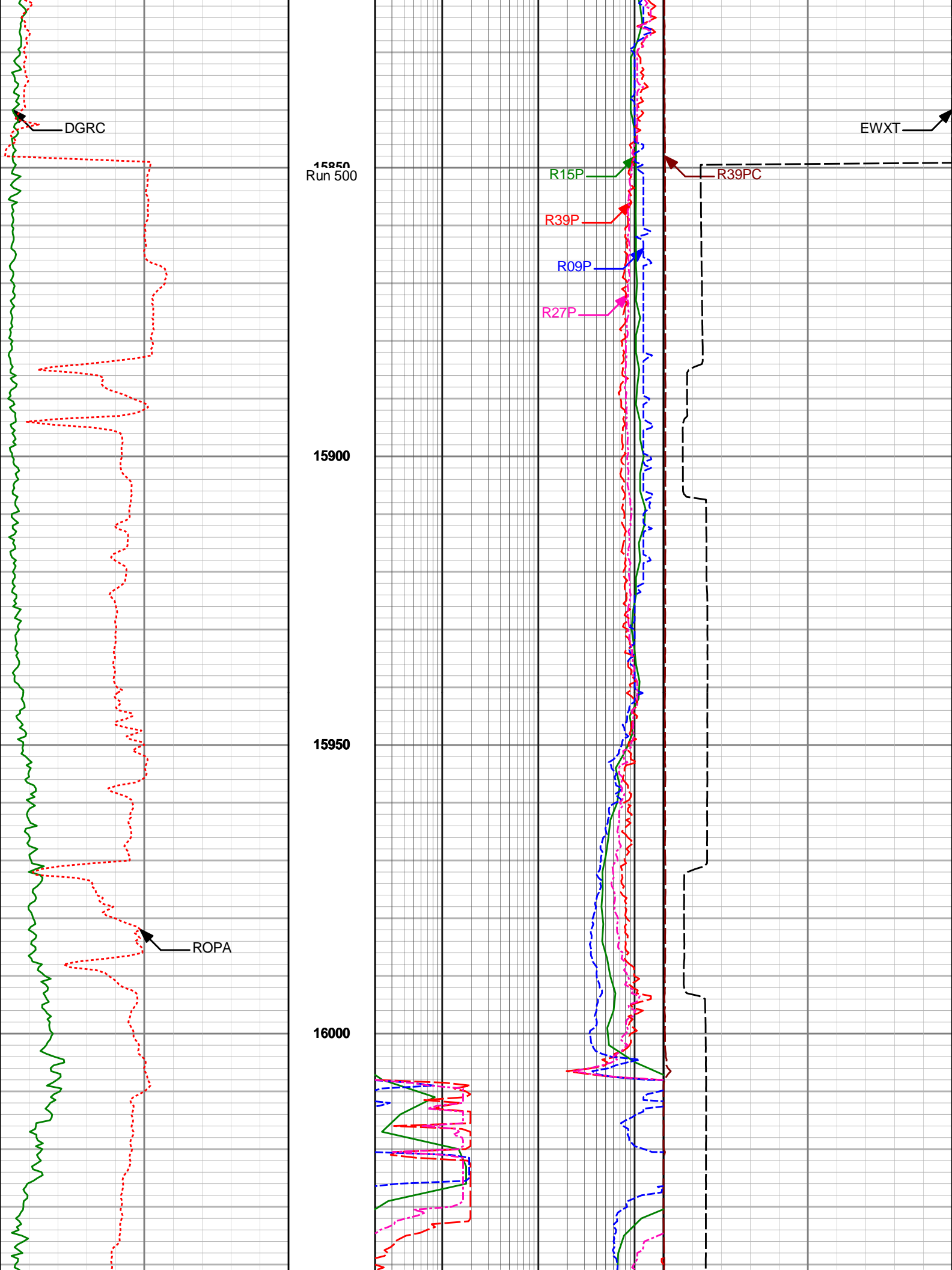


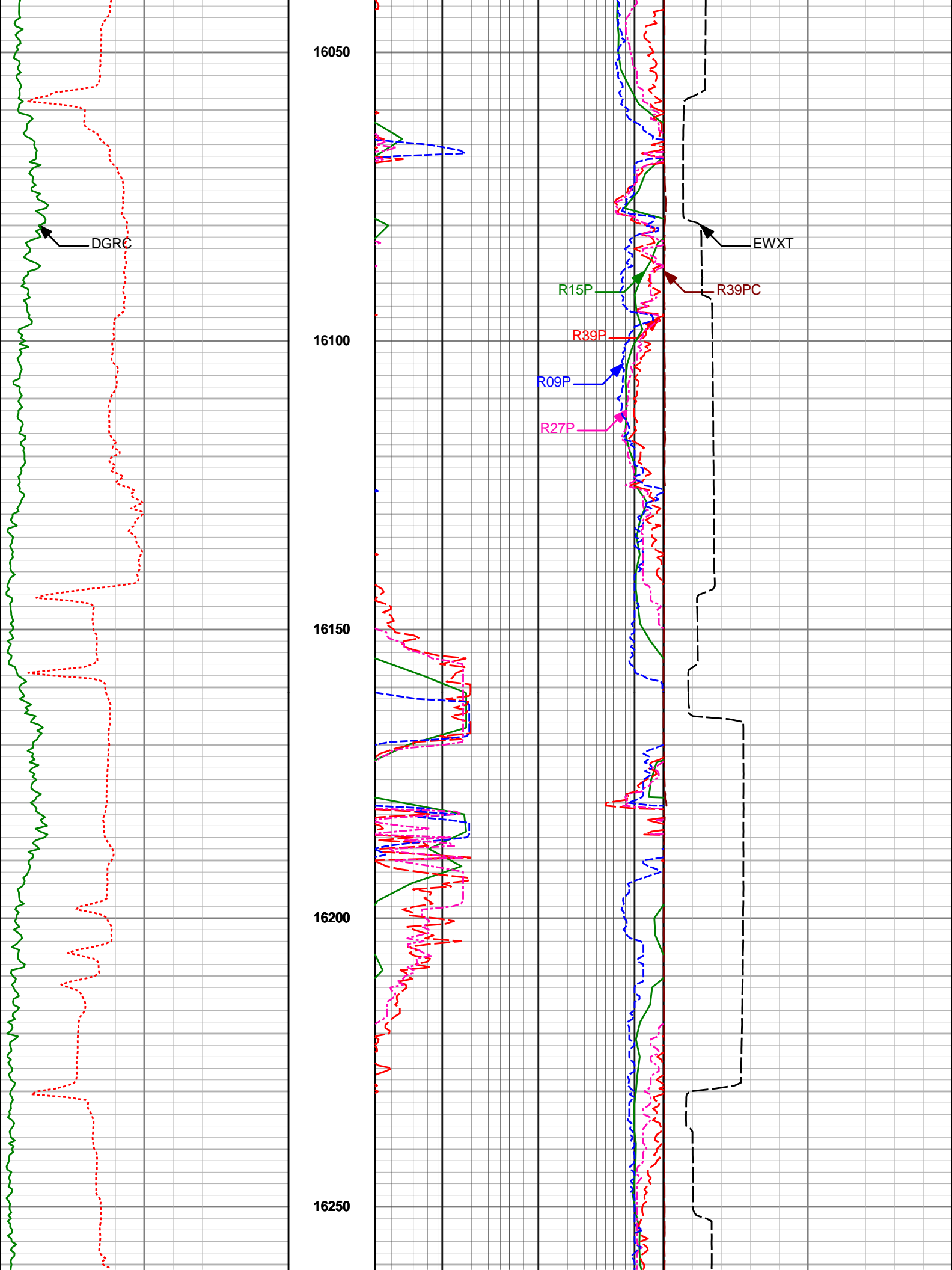
R09P

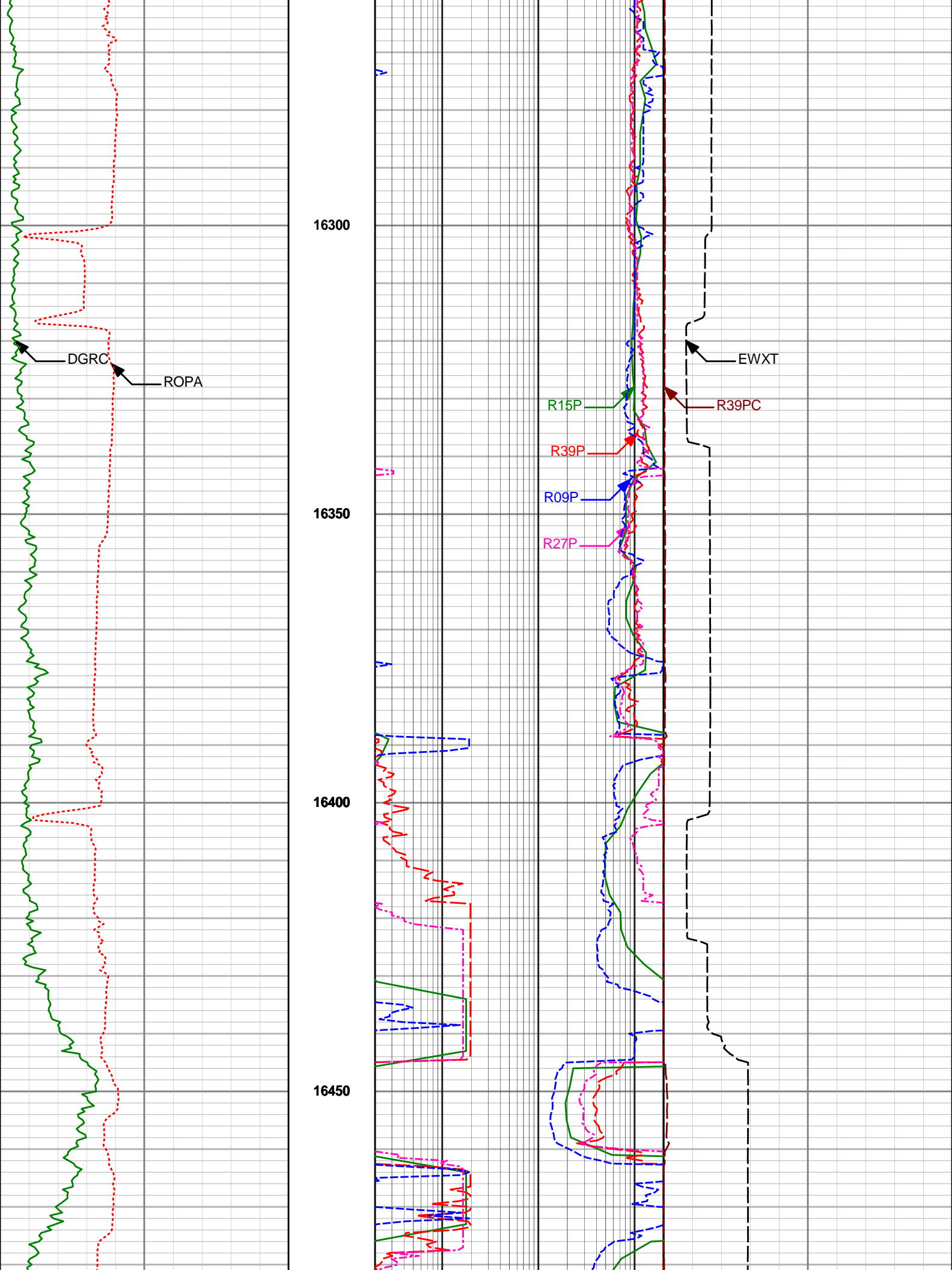
R27P

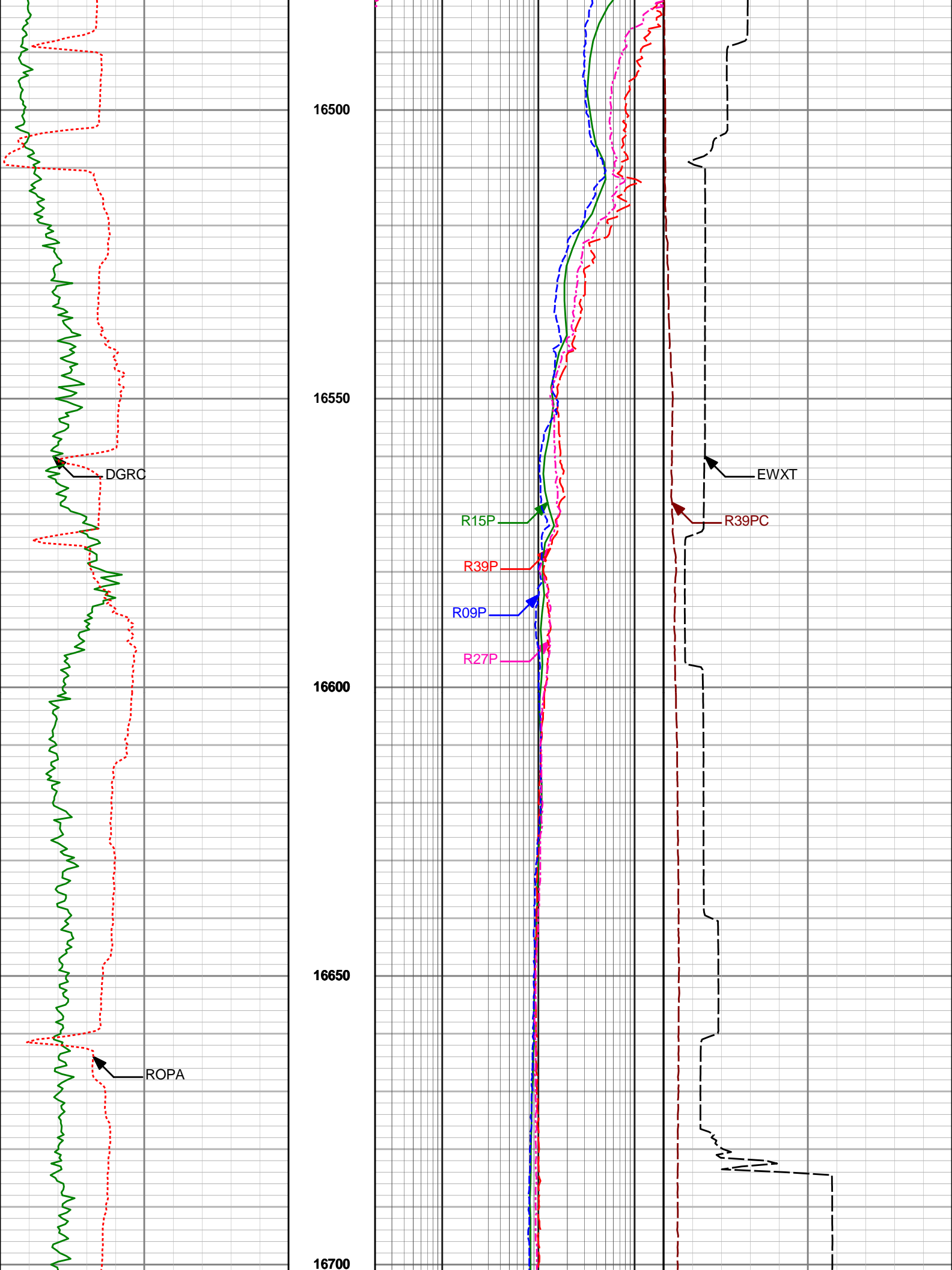


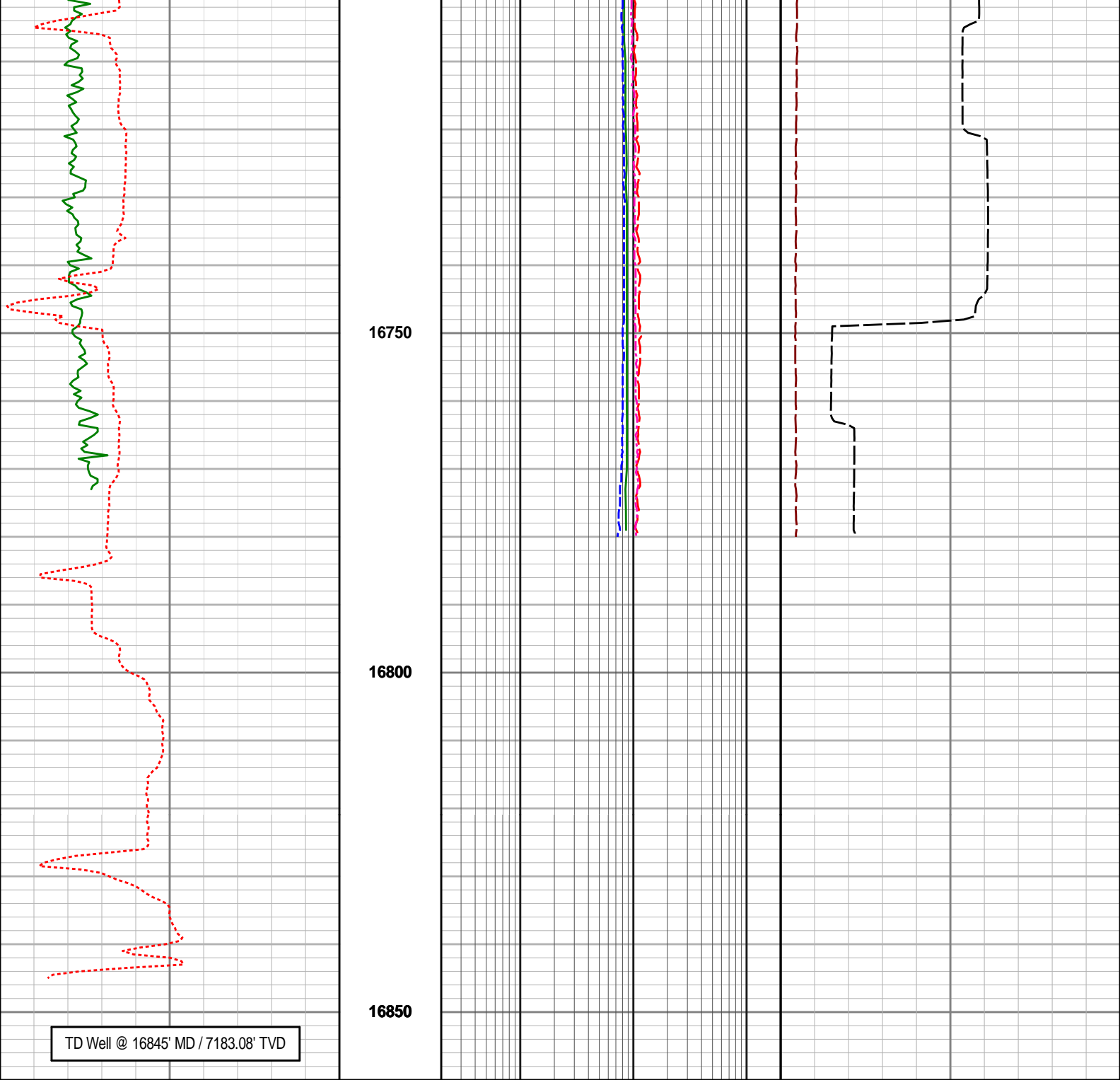












<div><div>Avg Rate of Penetration (ROPA)</div><div><div>0</div><div>500</div></div><div>feet per hr</div></div> <div><div>Dual Gamma Ray (DGRC)</div><div><div>0</div><div>300</div></div><div>api</div></div>	Depth	<div><div>39in Phase Resistivity BC (R39P)</div><div><div>0.2</div><div>200</div></div><div>ohm-m</div></div>	<div><div>SP4 Formation Exp Time (EWXT)</div><div><div>0</div><div>300</div></div><div>hours</div></div>
		<div><div>27in Phase Resistivity BC (R27P)</div><div><div>0.2</div><div>200</div></div><div>ohm-m</div></div>	<div><div>39in Phase Conductivity BC (R39PC)</div><div><div>0.2</div><div>2K</div></div><div>mno/m</div></div>
		<div><div>15in Phase Resistivity BC (R15P)</div><div><div>0.2</div><div>200</div></div><div>ohm-m</div></div>	
		<div><div>9in Phase Resistivity BC (R09P)</div><div><div>0.2</div><div>200</div></div><div>ohm-m</div></div>	



# HALLIBURTON

## DIRECTIONAL SURVEY REPORT

Anadarko  
Hudson 13C-35HZ  
Wattenburg  
Weld Colorado  
USA  
CA-XX-0009939822

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
1276.00	0.26	268.18	1275.95	1.29 N	8.72 W	-1.37	TIE-IN
1350.00	0.37	232.28	1349.95	1.14 N	9.08 W	-1.22	0.30
1442.00	0.33	252.58	1441.95	0.88 N	9.57 W	-0.97	0.14
1717.00	0.18	220.40	1716.94	0.31 N	10.61 W	-0.41	0.07
1989.00	0.18	265.36	1988.94	0.05 S	11.31 W	-0.05	0.05
2263.00	0.77	197.82	2262.93	1.84 S	12.31 W	1.73	0.26
2526.00	0.74	205.26	2525.91	5.07 S	13.58 W	4.95	0.04
2783.00	0.66	187.93	2782.89	8.04 S	14.49 W	7.91	0.09
2954.00	1.14	258.96	2953.87	9.34 S	16.29 W	9.19	0.65
3040.00	3.12	265.93	3039.81	9.67 S	19.46 W	9.49	2.32
3297.00	6.80	270.91	3295.81	9.92 S	41.64 W	9.54	1.44
3382.00	8.73	272.32	3380.02	9.58 S	53.12 W	9.09	2.28
3468.00	9.56	272.72	3464.93	8.98 S	66.77 W	8.36	0.97
3554.00	8.83	271.68	3549.82	8.45 S	80.51 W	7.70	0.88
3640.00	9.18	274.32	3634.76	7.74 S	93.94 W	6.87	0.63
3726.00	7.80	275.05	3719.82	6.71 S	106.60 W	5.72	1.61
3811.00	7.57	273.03	3804.06	5.90 S	117.94 W	4.81	0.42
3897.00	6.75	274.52	3889.39	5.20 S	128.63 W	4.01	0.98
3982.00	6.84	275.94	3973.79	4.29 S	138.64 W	3.00	0.22
4068.00	6.68	277.24	4059.19	3.13 S	148.69 W	1.75	0.25
4153.00	6.47	274.99	4143.63	2.09 S	158.37 W	0.62	0.39
4239.00	5.65	282.64	4229.15	0.74 S	167.32 W	-0.81	1.34
4324.00	3.38	291.87	4313.89	1.11 N	173.73 W	-2.72	2.80
4410.00	1.96	320.40	4399.79	3.19 N	177.02 W	-4.82	2.21
4495.00	1.29	339.73	4484.76	5.21 N	178.28 W	-6.86	1.01
4753.00	0.41	41.32	4742.73	8.64 N	178.67 W	-10.30	0.45
5009.00	2.52	346.15	4998.64	14.79 N	179.41 W	-16.45	0.90
5094.00	1.79	348.52	5083.58	17.91 N	180.12 W	-19.57	0.86
5351.00	1.05	27.78	5340.50	23.93 N	179.82 W	-25.60	0.46
5608.00	1.28	34.09	5597.45	28.41 N	177.10 W	-30.05	0.10
5865.00	1.68	109.80	5854.38	29.52 N	171.95 W	-31.11	0.72
6122.00	0.83	95.00	6111.32	28.08 N	166.55 W	-29.62	0.35
6294.00	0.95	103.04	6283.30	27.65 N	163.93 W	-29.17	0.10
6380.00	1.24	107.11	6369.29	27.22 N	162.35 W	-28.72	0.35
6465.00	1.40	103.10	6454.26	26.71 N	160.45 W	-28.20	0.22
6551.00	1.22	89.43	6540.24	26.48 N	158.51 W	-27.95	0.42
6642.00	2.36	160.03	6631.20	24.73 N	156.90 W	-26.18	2.49
6685.00	8.44	173.29	6673.99	20.76 N	156.23 W	-22.21	14.35
6728.00	12.24	177.84	6716.29	13.07 N	155.68 W	-14.51	9.03
6777.00	14.59	174.37	6763.95	1.74 N	154.88 W	-3.17	5.07
6813.00	19.19	172.29	6798.39	8.65 S	153.64 W	7.22	12.90
6856.00	25.29	178.51	6838.17	24.85 S	152.46 W	23.44	15.18
6899.00	28.52	181.36	6876.52	44.30 S	152.46 W	42.89	8.09
6942.00	31.96	184.51	6913.66	65.92 S	153.60 W	64.49	8.81
6985.00	35.36	184.66	6949.45	89.67 S	155.50 W	88.23	7.90
7028.00	38.71	183.75	6983.77	115.49 S	157.39 W	114.03	7.90
7071.00	42.77	181.69	7016.34	143.52 S	158.70 W	142.04	9.95
7114.00	47.61	179.19	7046.64	174.01 S	158.91 W	172.53	11.97
7156.00	50.73	178.98	7074.10	205.78 S	158.40 W	204.31	7.46
7199.00	53.92	179.87	7100.38	239.81 S	158.06 W	238.34	7.58
7242.00	57.67	181.38	7124.54	275.36 S	158.46 W	273.88	9.21
7285.00	61.95	182.90	7146.16	312.49 S	159.86 W	311.00	10.40
7328.00	67.26	182.80	7164.60	351.27 S	161.79 W	349.76	12.34
7371.00	72.93	182.45	7179.24	391.64 S	163.64 W	390.11	13.21

7414.00	78.25	182.36	7189.94	433.24 S	165.39 W	431.69	12.38
7457.00	81.31	181.63	7197.57	475.53 S	166.86 W	473.96	7.31
7499.00	82.33	178.66	7203.55	517.09 S	166.96 W	515.53	7.40
7526.00	84.47	177.44	7206.65	543.90 S	166.05 W	542.34	9.12
7622.00	89.94	174.87	7211.33	639.52 S	159.61 W	638.02	6.29
7707.00	93.15	177.81	7209.05	724.30 S	154.19 W	722.84	5.12
7793.00	91.24	179.07	7205.76	810.20 S	151.85 W	808.76	2.66
7879.00	89.07	180.36	7205.52	896.19 S	151.43 W	894.75	2.93
7964.00	88.76	180.50	7207.13	981.17 S	152.07 W	979.72	0.40
8050.00	89.57	181.19	7208.38	1067.15 S	153.34 W	1065.69	1.23
8136.00	88.70	181.36	7209.68	1153.12 S	155.25 W	1151.63	1.02
8222.00	88.58	180.72	7211.72	1239.08 S	156.82 W	1237.58	0.76
8308.00	88.89	180.65	7213.62	1325.05 S	157.85 W	1323.54	0.37
8393.00	90.56	179.91	7214.04	1410.05 S	158.27 W	1408.52	2.15
8479.00	91.36	180.22	7212.60	1496.03 S	158.36 W	1494.50	1.00
8565.00	89.81	180.41	7211.72	1582.03 S	158.83 W	1580.49	1.81
8651.00	88.83	179.51	7212.74	1668.02 S	158.76 W	1666.48	1.55
8735.00	89.44	179.18	7214.01	1752.00 S	157.80 W	1750.47	0.83
8821.00	89.44	178.24	7214.85	1837.97 S	155.87 W	1836.45	1.09
8907.00	89.44	177.75	7215.68	1923.92 S	152.86 W	1922.42	0.57
8992.00	89.51	178.04	7216.46	2008.86 S	149.74 W	2007.39	0.35
9078.00	87.90	180.08	7218.41	2094.82 S	148.32 W	2093.35	3.02
9164.00	88.70	178.74	7220.96	2180.77 S	147.44 W	2179.31	1.81
9250.00	89.63	179.77	7222.21	2266.75 S	146.32 W	2265.30	1.61
9335.00	89.81	179.47	7222.62	2351.75 S	145.76 W	2350.30	0.41
9421.00	88.02	178.24	7224.24	2437.71 S	144.04 W	2436.28	2.53
9507.00	87.71	176.73	7227.44	2523.57 S	140.27 W	2522.16	1.79
9593.00	88.27	175.74	7230.46	2609.33 S	134.63 W	2607.97	1.32
9678.00	89.88	177.05	7231.83	2694.14 S	129.28 W	2692.83	2.44
9764.00	90.31	177.08	7231.69	2780.03 S	124.88 W	2778.76	0.50
9850.00	89.32	177.25	7231.97	2865.92 S	120.62 W	2864.69	1.17
9936.00	88.76	178.98	7233.41	2951.86 S	117.80 W	2950.65	2.11
10021.00	88.83	180.34	7235.20	3036.84 S	117.29 W	3035.62	1.60
10107.00	89.44	180.94	7236.49	3122.82 S	118.25 W	3121.60	1.00
10193.00	90.31	179.62	7236.68	3208.82 S	118.67 W	3207.58	1.83
10285.00	92.10	180.03	7234.74	3300.79 S	118.39 W	3299.56	2.00
10376.00	91.61	179.45	7231.80	3391.75 S	117.98 W	3390.51	0.83
10468.00	91.98	181.49	7228.92	3483.69 S	118.73 W	3482.44	2.25
10561.00	91.92	182.57	7225.76	3576.58 S	122.03 W	3575.30	1.16
10653.00	90.74	181.77	7223.63	3668.49 S	125.51 W	3667.17	1.55
10745.00	92.17	181.68	7221.29	3760.41 S	128.28 W	3759.06	1.55
10836.00	91.61	181.02	7218.30	3851.34 S	130.42 W	3849.97	0.95
10929.00	91.36	179.95	7215.89	3944.30 S	131.21 W	3942.92	1.18
11021.00	92.97	181.59	7212.42	4036.22 S	132.44 W	4034.82	2.49
11204.00	88.64	180.59	7209.85	4219.12 S	135.92 W	4217.69	2.43
11296.00	89.63	180.13	7211.24	4311.11 S	136.50 W	4309.66	1.18
11388.00	89.88	179.94	7211.63	4403.11 S	136.55 W	4401.66	0.34
11570.00	90.80	180.52	7210.56	4585.10 S	137.28 W	4583.64	0.60
11753.00	88.70	179.93	7211.35	4768.09 S	138.00 W	4766.61	1.19
11935.00	89.01	179.30	7214.97	4950.05 S	136.78 W	4948.57	0.39
12117.00	89.51	179.41	7217.33	5132.02 S	134.74 W	5130.55	0.28
12299.00	91.24	180.18	7216.15	5314.01 S	134.09 W	5312.54	1.04
12482.00	90.56	180.73	7213.29	5496.98 S	135.55 W	5495.49	0.48
12666.00	88.33	179.65	7215.07	5680.95 S	136.16 W	5679.45	1.35
12757.00	89.26	179.16	7216.99	5771.93 S	135.21 W	5770.43	1.15
12880.00	92.04	178.00	7215.59	5894.87 S	132.16 W	5893.39	2.45
12941.00	90.74	177.87	7214.11	5955.81 S	129.96 W	5954.35	2.14
13027.00	90.31	177.22	7213.32	6041.72 S	126.28 W	6040.30	0.91
13113.00	91.42	177.89	7212.03	6127.63 S	122.61 W	6126.24	1.51
13198.00	91.11	179.08	7210.15	6212.58 S	120.36 W	6211.20	1.45
13284.00	92.29	179.27	7207.60	6298.53 S	119.13 W	6297.16	1.39
13370.00	91.73	180.24	7204.58	6384.48 S	118.77 W	6383.11	1.30
13455.00	90.56	180.03	7202.88	6469.46 S	118.98 W	6468.08	1.40
13540.00	90.56	179.65	7202.06	6554.45 S	118.74 W	6553.08	0.45
13626.00	90.74	179.35	7201.09	6640.45 S	117.99 W	6639.07	0.42
13711.00	90.25	179.58	7200.35	6725.44 S	117.20 W	6724.07	0.65
13797.00	89.44	180.67	7200.58	6811.44 S	117.39 W	6810.06	1.57
13883.00	88.39	179.58	7202.21	6897.42 S	117.58 W	6896.04	1.76
13969.00	89.57	179.61	7203.74	6983.40 S	116.98 W	6982.02	1.37
14054.00	89.63	179.94	7204.34	7068.40 S	116.64 W	7067.02	0.39
14140.00	89.75	179.77	7204.80	7154.40 S	116.42 W	7153.01	0.24
14226.00	90.99	179.60	7204.24	7240.39 S	115.95 W	7239.01	1.45
14312.00	90.56	179.38	7203.09	7326.38 S	115.19 W	7325.00	0.56
14397.00	91.92	179.38	7201.25	7411.35 S	114.27 W	7409.98	1.60



14483.00	91.42	180.30	7198.75	7497.32 S	114.03 W	7495.94	1.21
14654.00	89.57	178.74	7197.27	7668.29 S	112.60 W	7666.92	1.42
14740.00	89.44	178.42	7198.01	7754.26 S	110.46 W	7752.91	0.40
14826.00	89.01	178.43	7199.17	7840.22 S	108.10 W	7838.88	0.50
14928.00	89.81	178.89	7200.22	7942.19 S	105.71 W	7940.87	0.91
14997.00	90.06	177.37	7200.29	8011.15 S	103.46 W	8009.85	2.23
15083.00	91.61	178.65	7199.04	8097.08 S	100.47 W	8095.81	2.33
15169.00	91.98	178.28	7196.35	8183.01 S	98.16 W	8181.75	0.61
15255.00	92.16	179.34	7193.24	8268.93 S	96.38 W	8267.69	1.26
15340.00	90.25	179.21	7191.46	8353.90 S	95.30 W	8352.66	2.26
15426.00	89.88	178.78	7191.36	8439.89 S	93.79 W	8438.66	0.66
15512.00	89.57	179.00	7191.78	8525.87 S	92.13 W	8524.65	0.44
15598.00	89.69	179.10	7192.34	8611.86 S	90.70 W	8610.65	0.18
15683.00	89.38	178.87	7193.02	8696.84 S	89.20 W	8695.64	0.45
15769.00	90.19	179.29	7193.35	8782.83 S	87.81 W	8781.64	1.05
15833.00	89.75	179.70	7193.38	8846.83 S	87.25 W	8845.64	0.94
15919.00	89.88	179.02	7193.66	8932.82 S	86.30 W	8931.64	0.80
16005.00	90.49	180.08	7193.38	9018.81 S	85.62 W	9017.64	1.42
16090.00	90.50	180.49	7192.65	9103.81 S	86.04 W	9102.63	0.48
16176.00	90.93	179.84	7191.58	9189.80 S	86.28 W	9188.61	0.90
16262.00	90.68	179.57	7190.38	9275.79 S	85.83 W	9274.60	0.43
16348.00	90.80	179.58	7189.26	9361.78 S	85.19 W	9360.59	0.15
16434.00	91.24	179.82	7187.73	9447.77 S	84.74 W	9446.58	0.57
16519.00	90.80	179.89	7186.22	9532.75 S	84.52 W	9531.56	0.51
16605.00	90.62	179.79	7185.15	9618.75 S	84.28 W	9617.56	0.24
16691.00	90.37	180.63	7184.41	9704.74 S	84.60 W	9703.54	1.01
16793.00	90.56	180.83	7183.58	9806.73 S	85.89 W	9805.52	0.27
16845.00	90.56	180.83	7183.08	9858.72 S	86.64 W	9857.50	0.01

# **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 179.47 DEGREES (TRUE)  
A TOTAL CORRECTION OF 8.61 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16845.00 FEET  
IS 9859.10 FEET ALONG 180.50 DEGREES (TRUE)**

**Final survey is a straight line projection to the bit.**