

WELL INFORMATION

MWD Run Number	125				
Date run completed	10-Aug-16				
Rig Bit Number	2				
Bit Size (in)	8.500				
Tool Nominal OD (in)	6.750				
Log Start Depth (MD, ft)	1943				
Log End Depth (MD, ft)	5495				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	10-Aug-16 15:42:56				
Drill/Wipe End Date and Time	10-Aug-16 15:42:56				
Min Inc (deg) @ Depth (MD, ft)	0.34 @ 2027				
Max Inc (deg) @ Depth (MD, ft)	11.07 @ 2689				
Bit TFA(in2) / Bit Type	1.24 / PDC				
Flow Rate (gpm)	591.91				
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A				
Fluid Type	Diesel Mud Base				
Density (ppg) / Viscosity (spqt)	9.70 / 61.00				
Filtrate CL (ppm)	35000				
pH / Fluid Loss (mptm)	N/A / 14				
PV (cP) / YP (lbf2)	19 / 9.0				
% Solids / % Sand	10.2 / 0				
% Oil / Oil:Water Ratio	61 / 75:25				
Rm @ Measured Temp (degF)	N/A @ N/A				
Rmf @ Measured Temp (degF)	N/A @ N/A				
Rmc @ Measured Temp (degF)	N/A @ N/A				
Max Tool Temp (degF) @ Depth (MD, ft)	450.70 @ 2027				

Max Tool Temp (degF) / Source	153.79 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ 153.79				
Lead MWD Engineer	Adam Sampson				
Customer Representative	Johnny Sanchez				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	HCIM				
Software Version	88.58				
Sub Serial Number	11853437				
Insert Serial Number	N/A				
Date and Time Initialized	11-Aug-16 07:51				
Date and Time Read	12-Aug-16 09:44				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	63				
Software Version	6.33				
Sub Serial Number	11341339				
Sonde Serial Number	11478012				
Sensor ID Number	N/A				
Toolface Offset (deg)	169.60				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	56.32				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11341339				
Insert/Sonde Serial Number	11293366				

Resistivity Sensor Information

Tool Type	EWR-P4				
Distance From Bit (ft)	140.49				
Recorded Sample Period (sec)	6				
Software Version	1.50				
Sub Serial Number	11853437				
Receiver Insert Serial Number	11068887				
Transmitter Insert Serial Number	11254788				
Receiver Orientation	Down				

REMARKS

1. All depths are calibrated to driller's pipe tally and are measured depths, measured from the rig 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. The following smoothing parameters have been applied to the data:
Rate of Penetration is realtime data
5. The following smoothing parameters have been applied to the data:
Detail Log 1:240 (5"):
RORA: 0.5 ft interval, 1.2 ft correction distance, 3 ft gap fill

ROPA: 0.5 ft interval, 1.2 ft coercion distance, 3 ft gap fill
PGRC: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill
R09P: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill
R15P: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill
R27P: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill
R39P: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill
C39P: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill
EWXT: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill

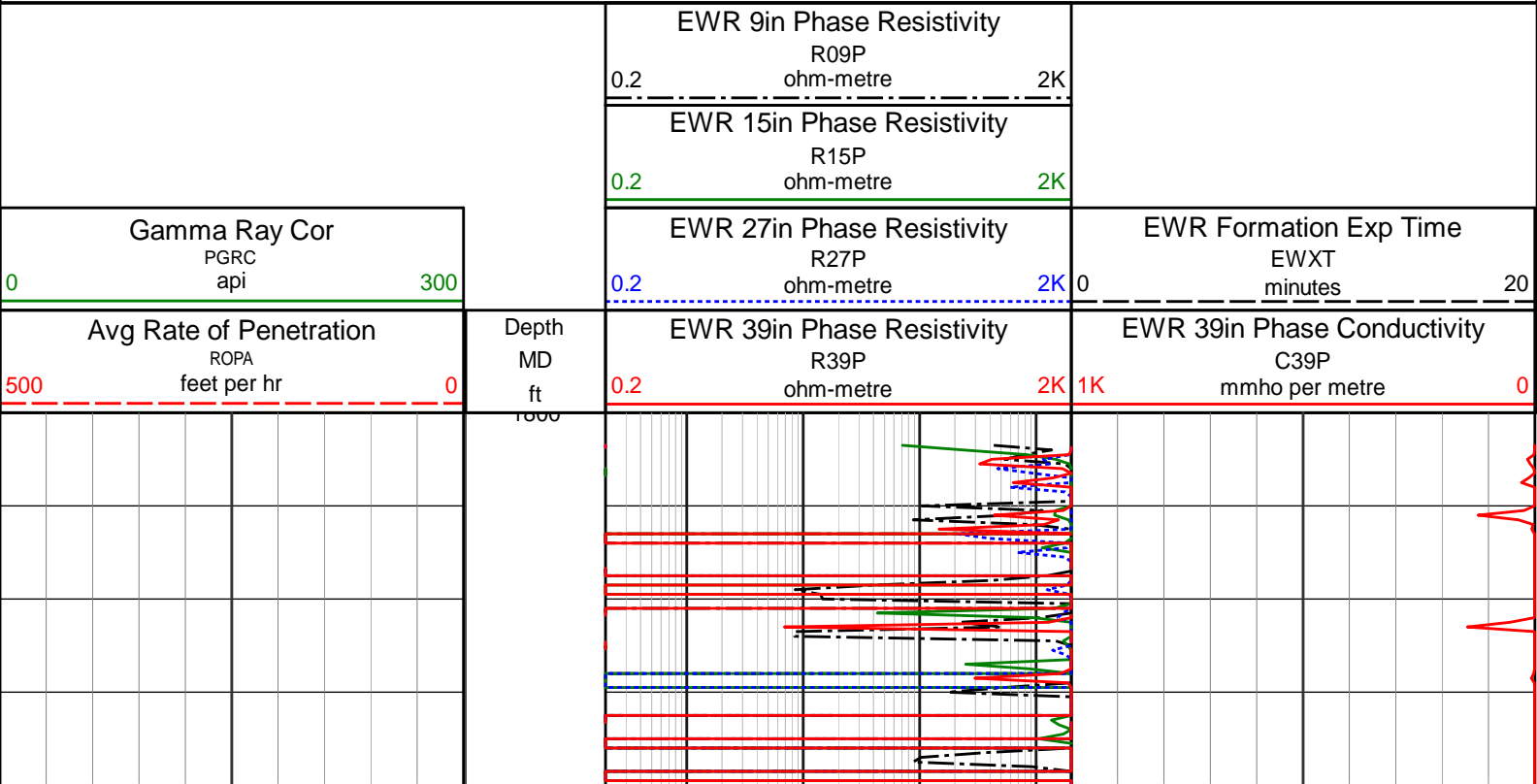
5. Surveys corrected by Surcon starting at 2027 ft.

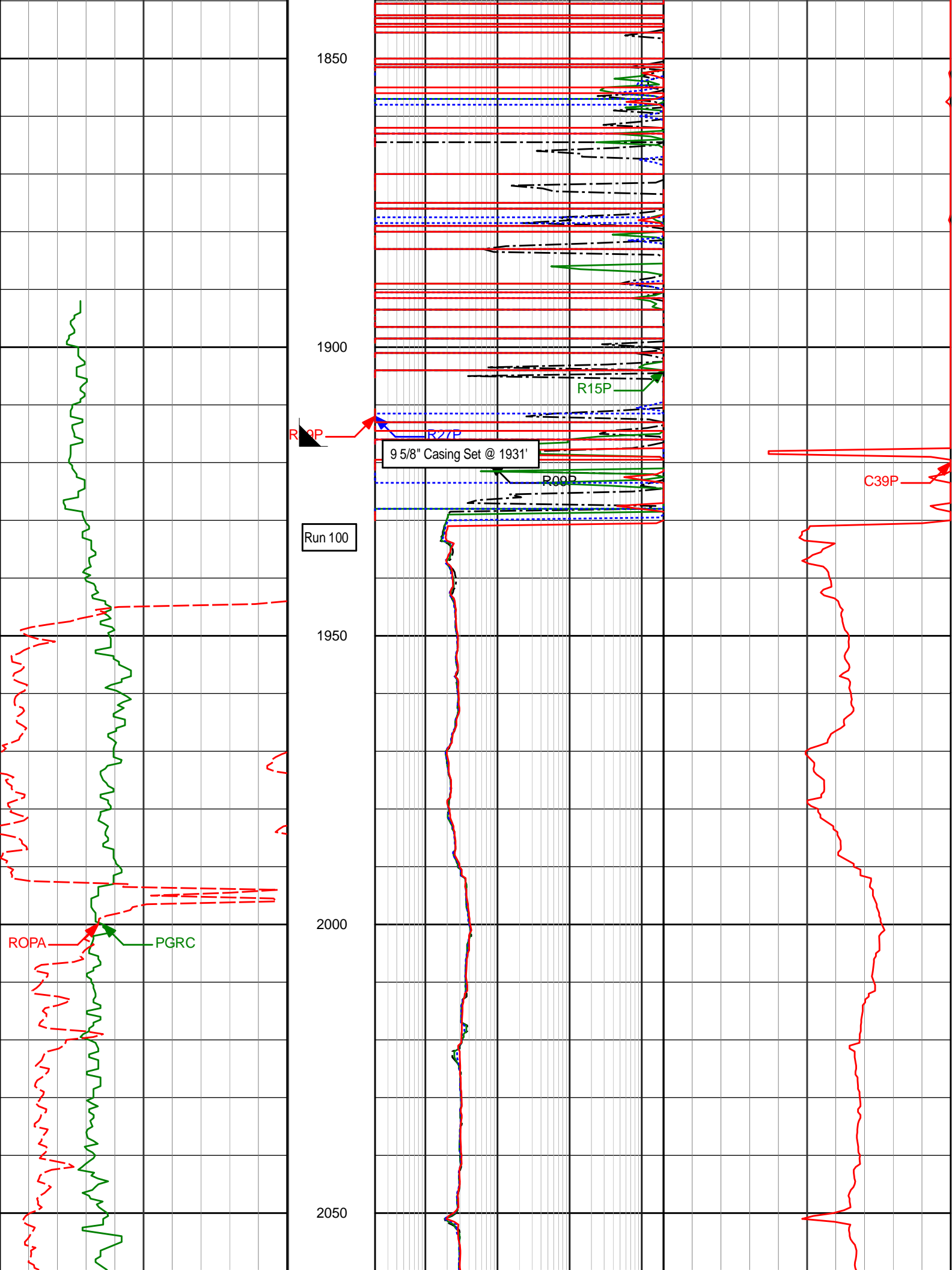
6. InSite Version 8.4.1

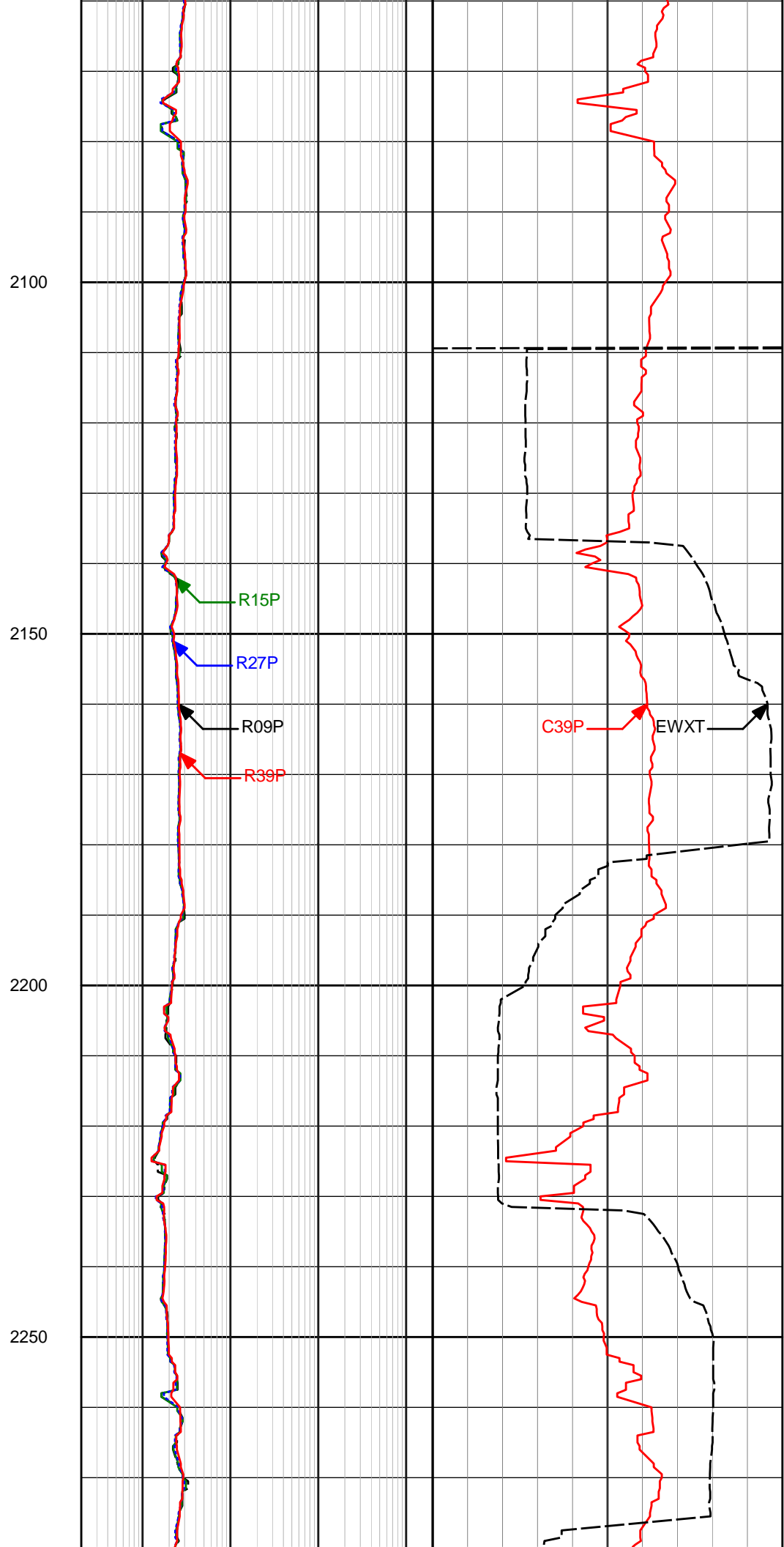
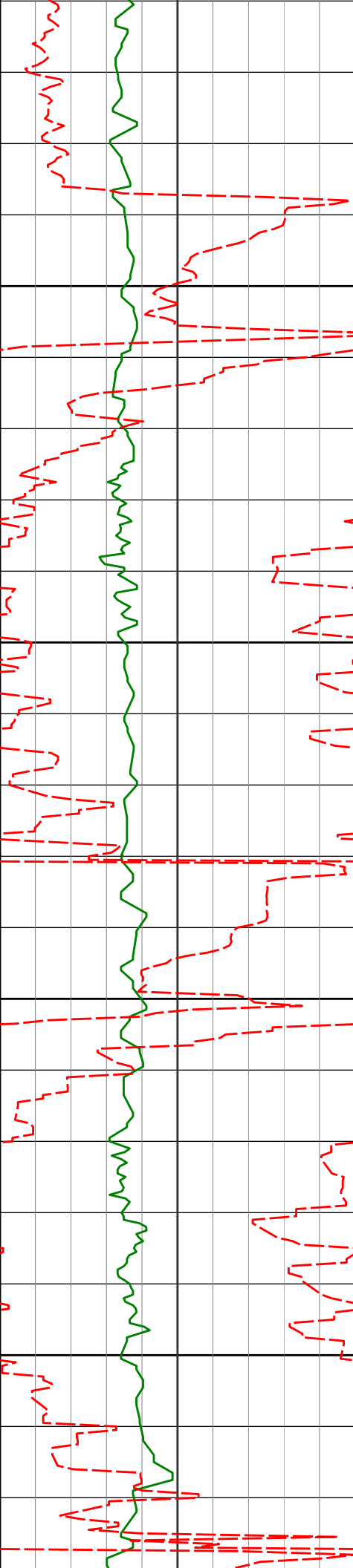
WARRANTY

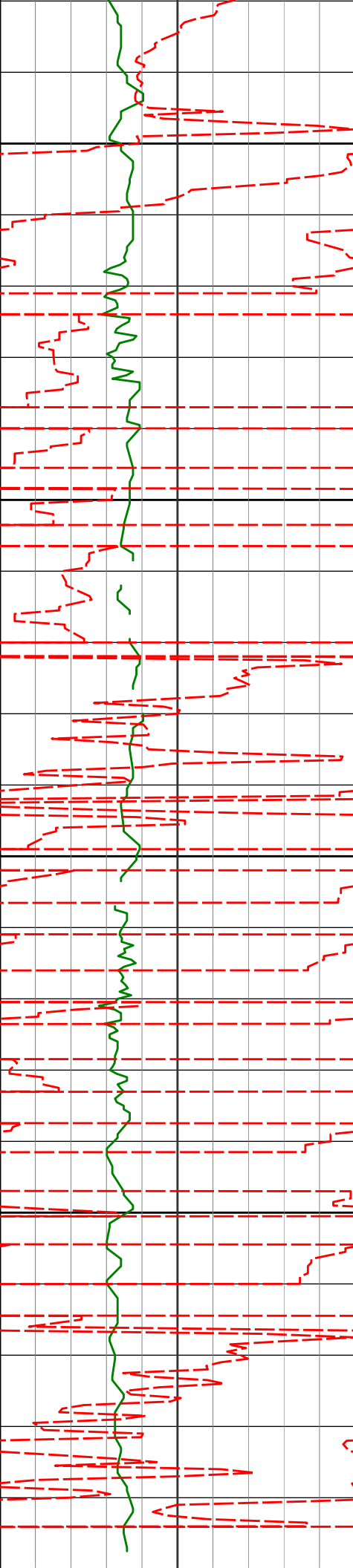
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MD Detail Log 1:240 Scale









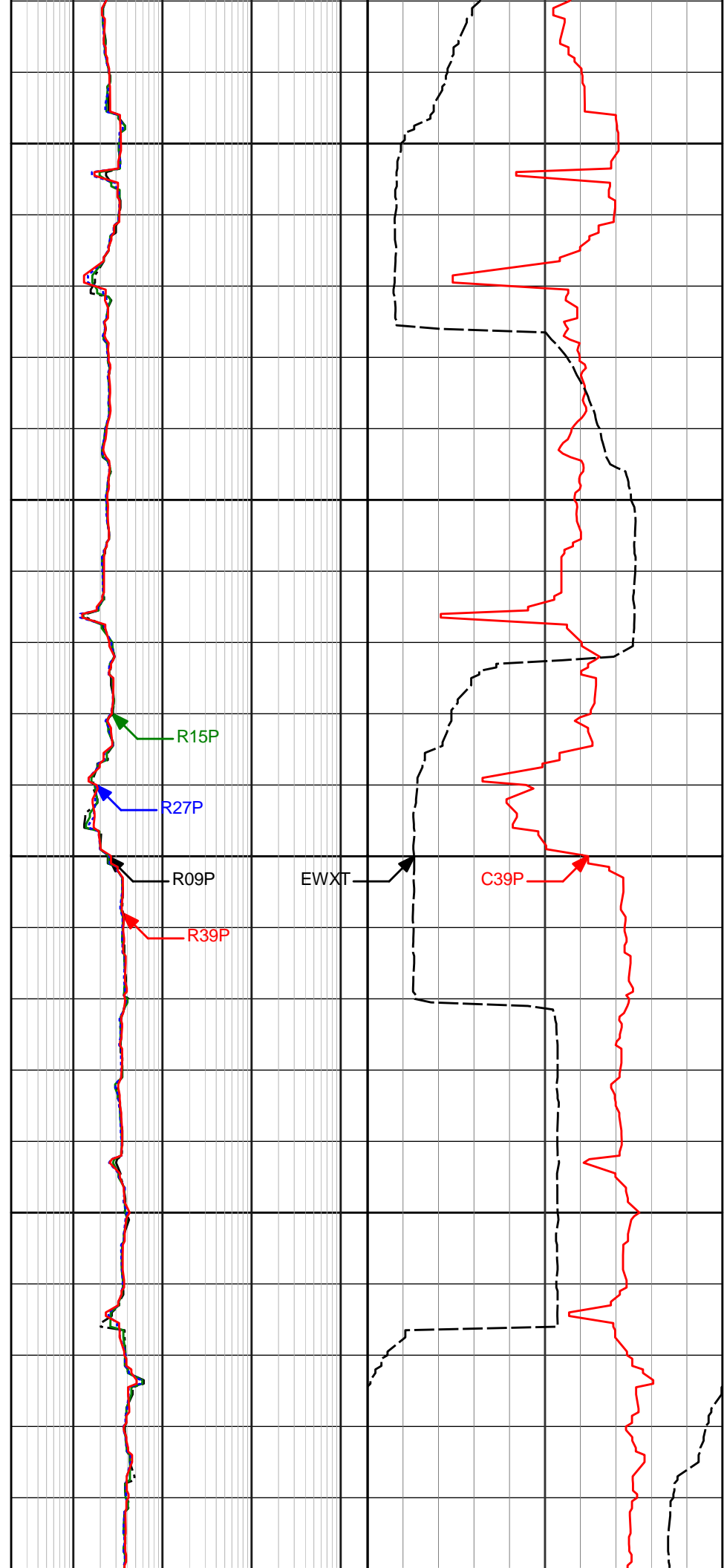
2300

2350

2400

2450

2500



R15P

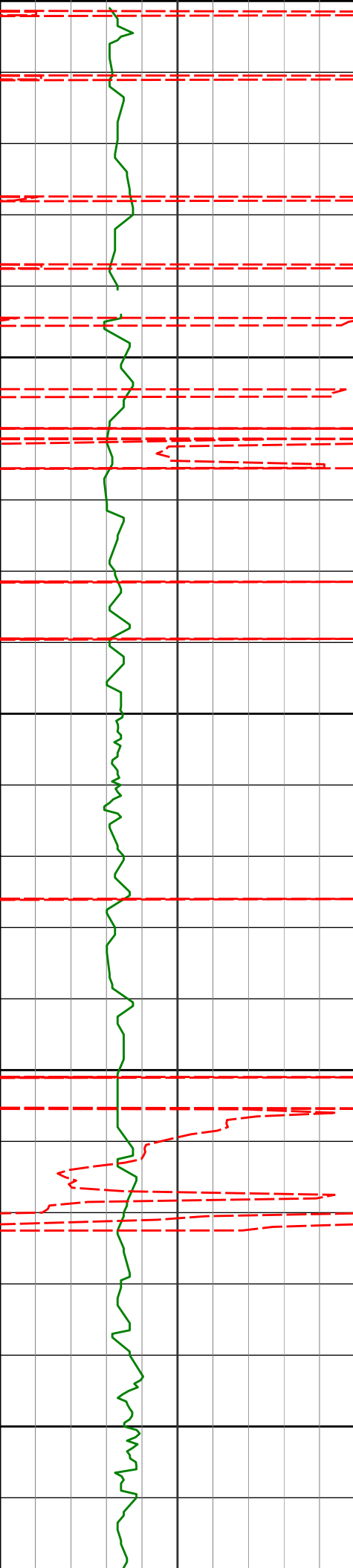
R27P

R09P

R39P

EWXT

C39P



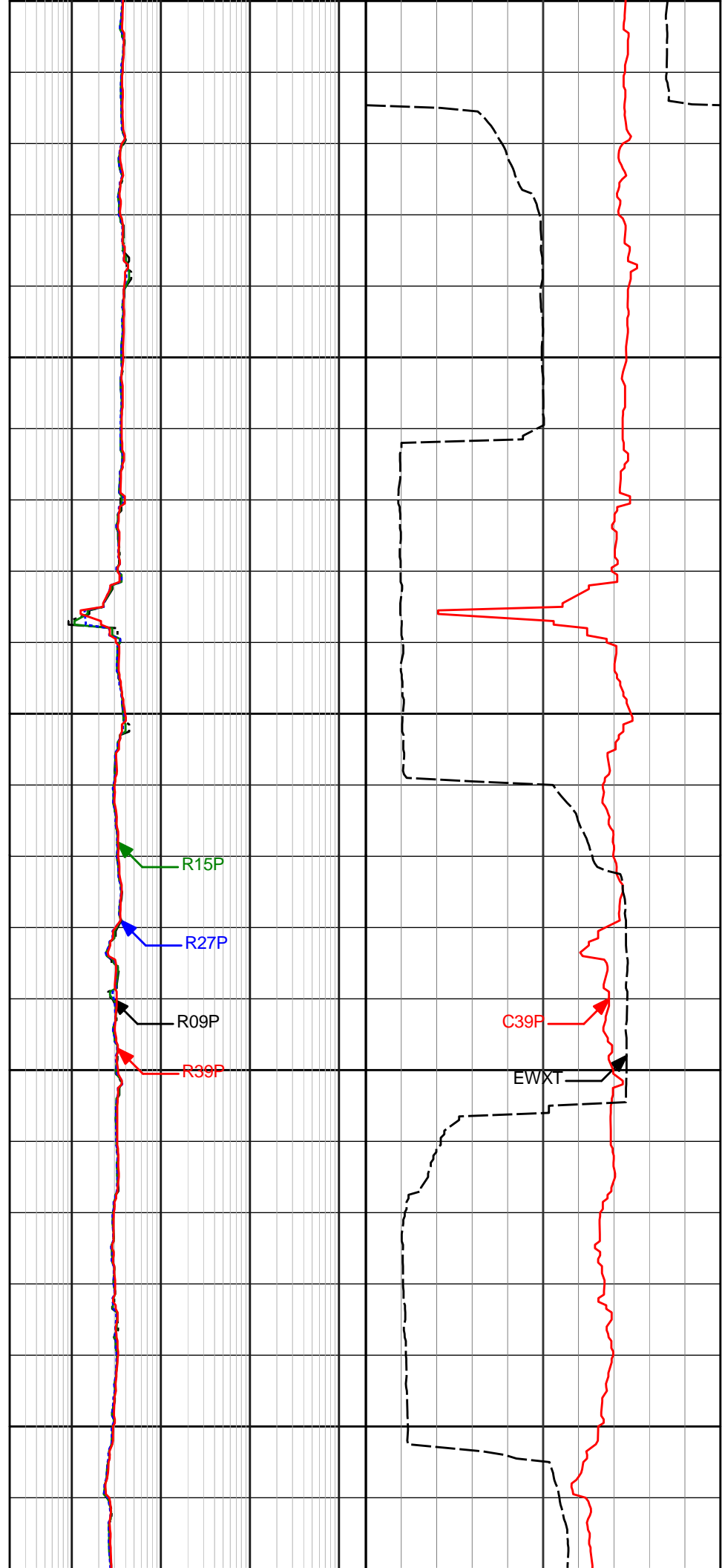
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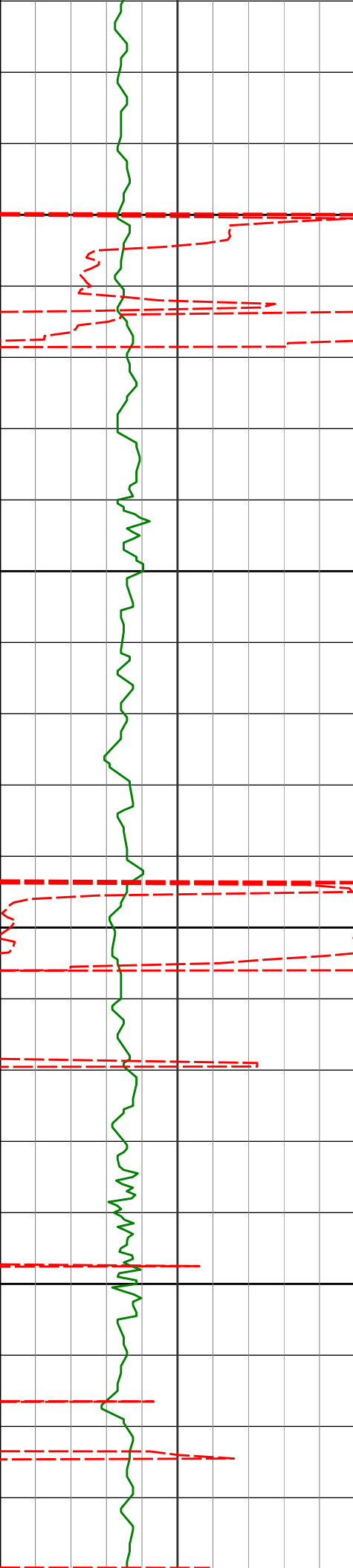
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2600

2650

2700



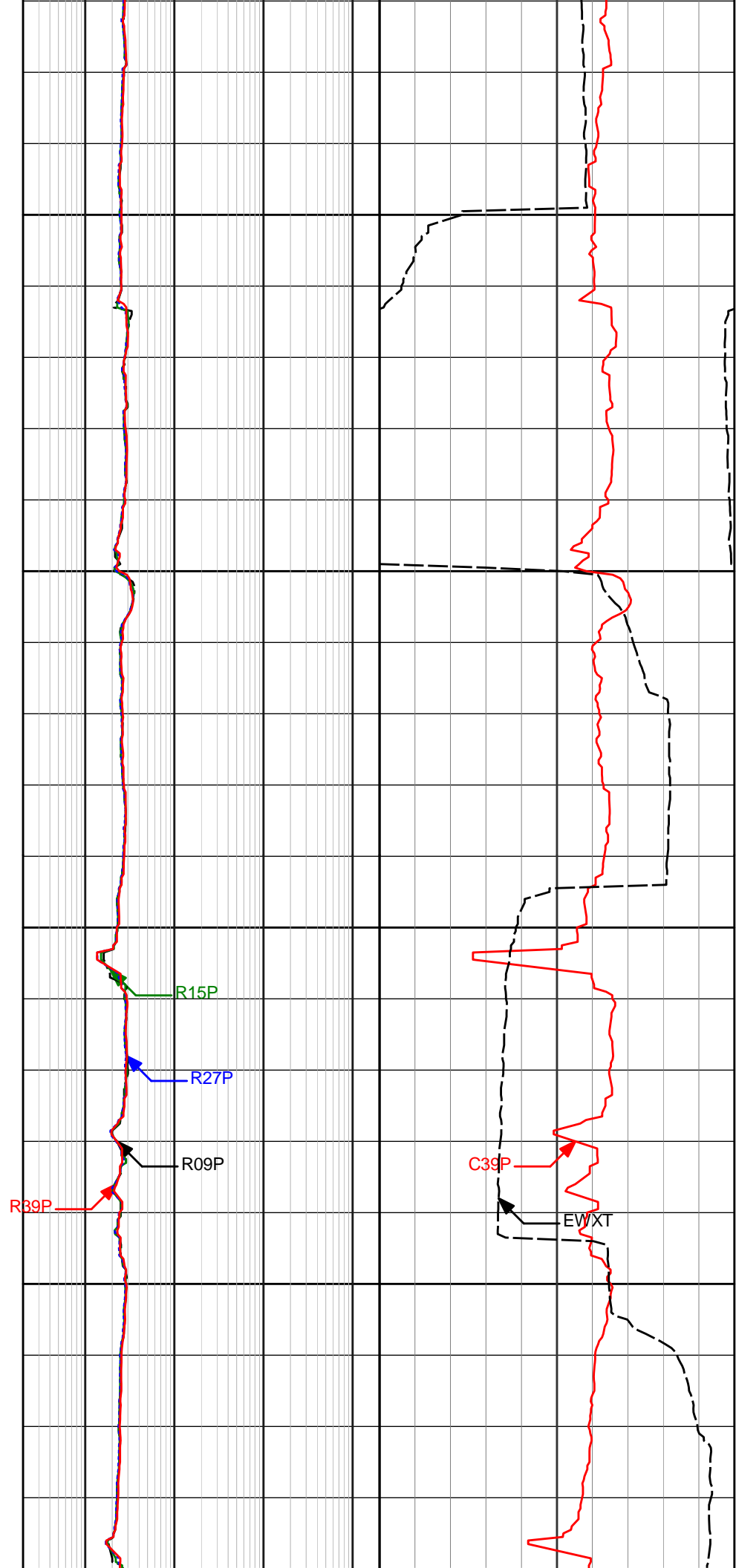


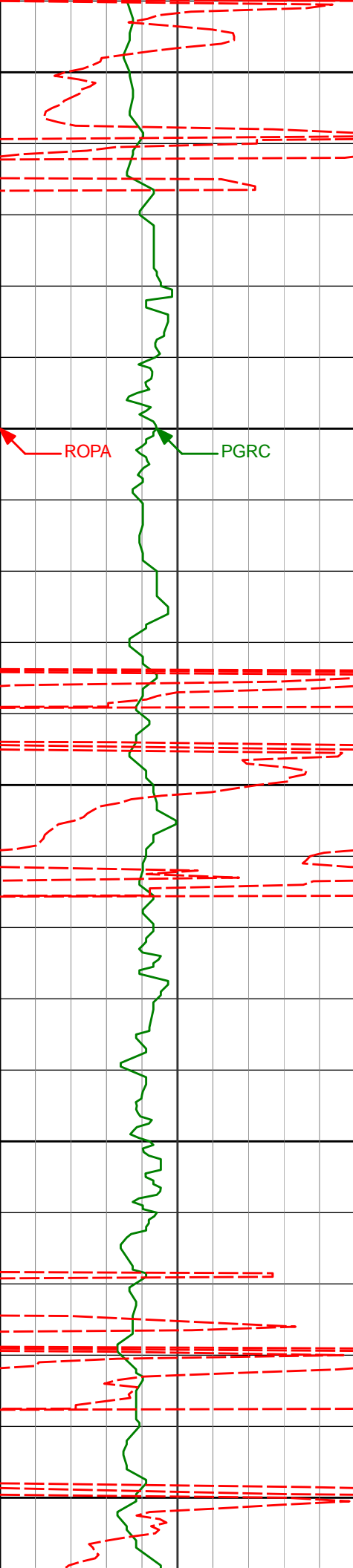
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2800

2850

2900





2950

3000

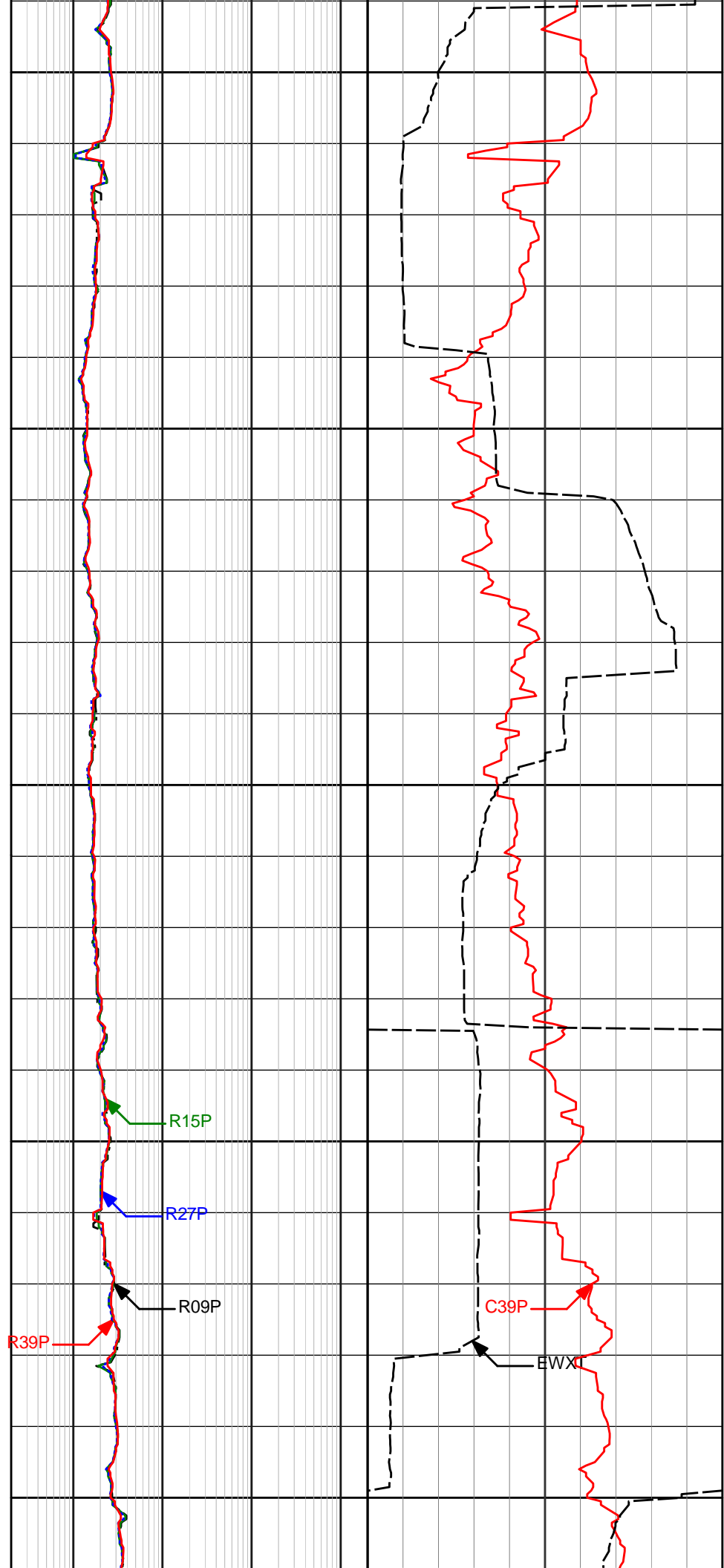
3050

3100

3150

ROPA

PGRC



R15P

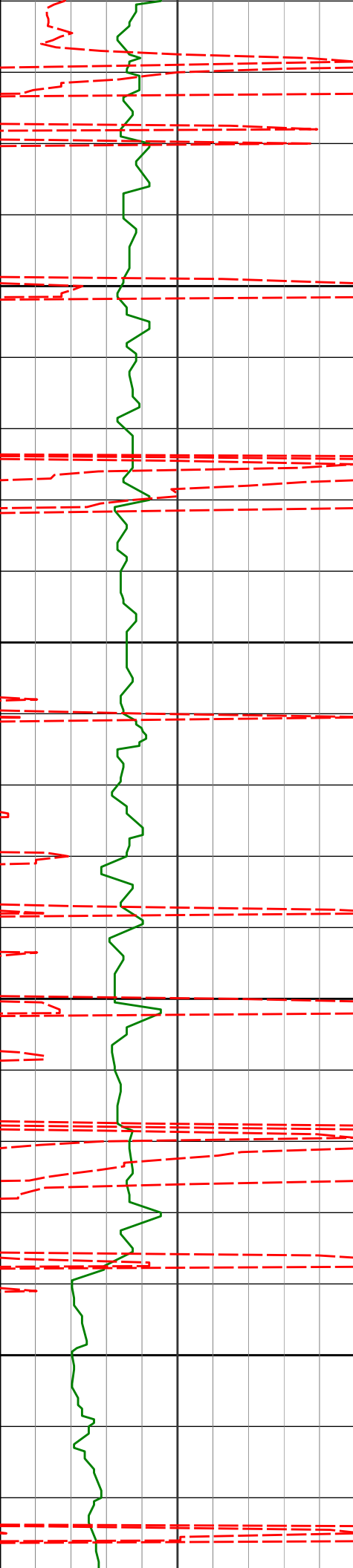
R27P

R09P

R39P

C39P

EWX

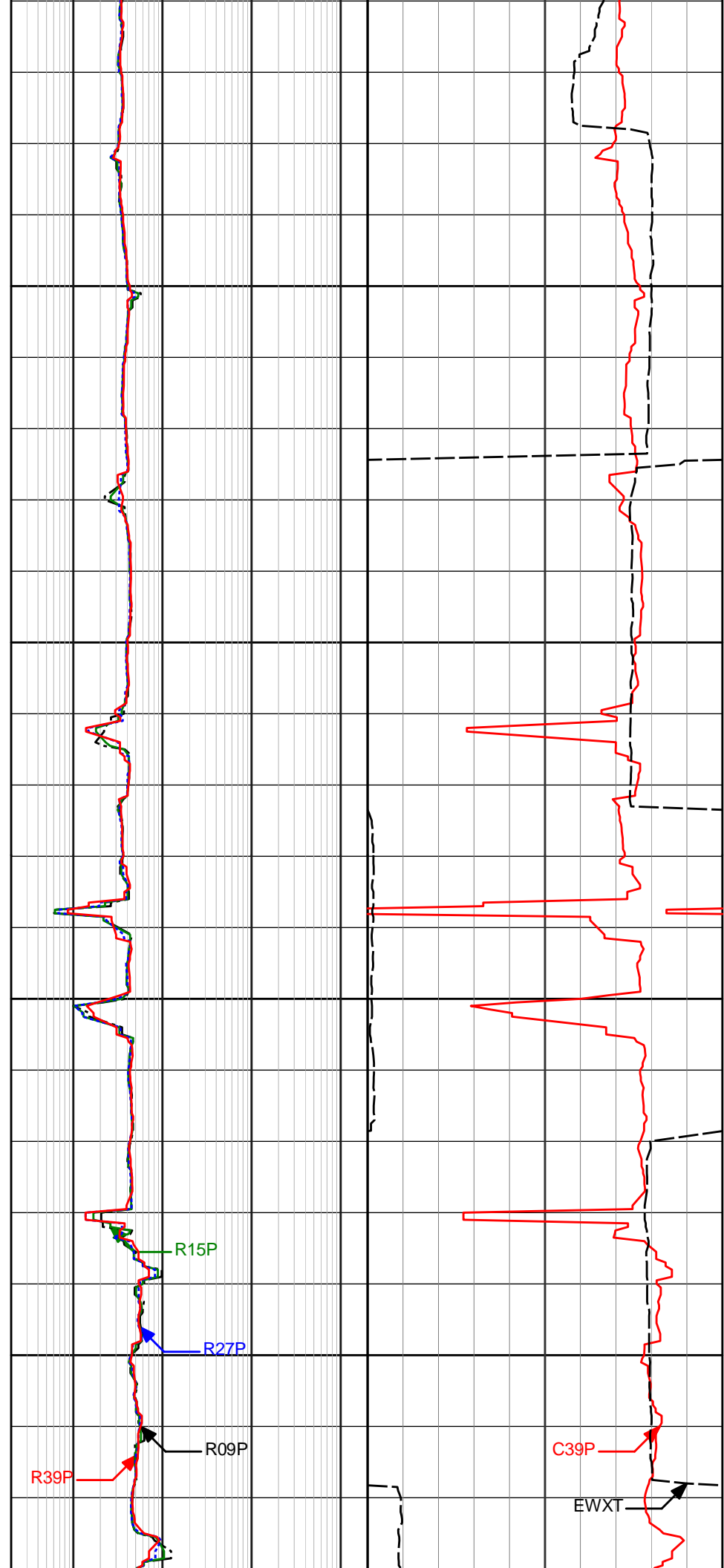


3200

3250

3300

3350



R39P

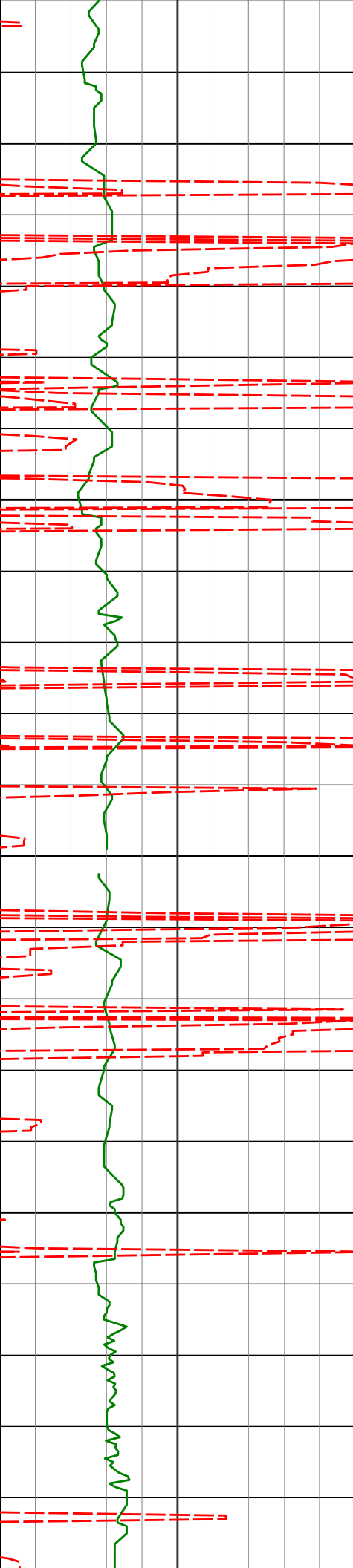
R09P

R15P

R27P

C39P

EWXT



3400

3450

3500

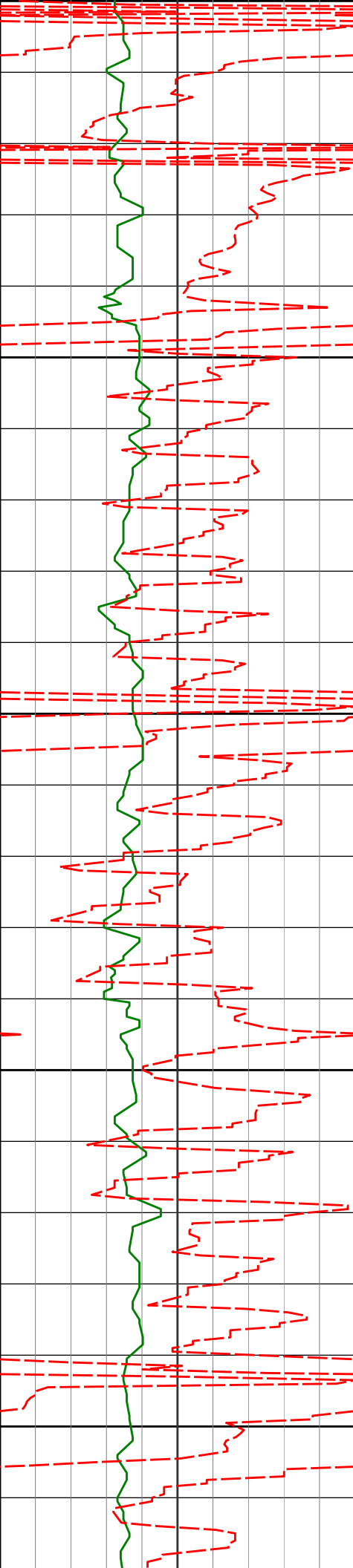
3550

3600



R15P

R27P



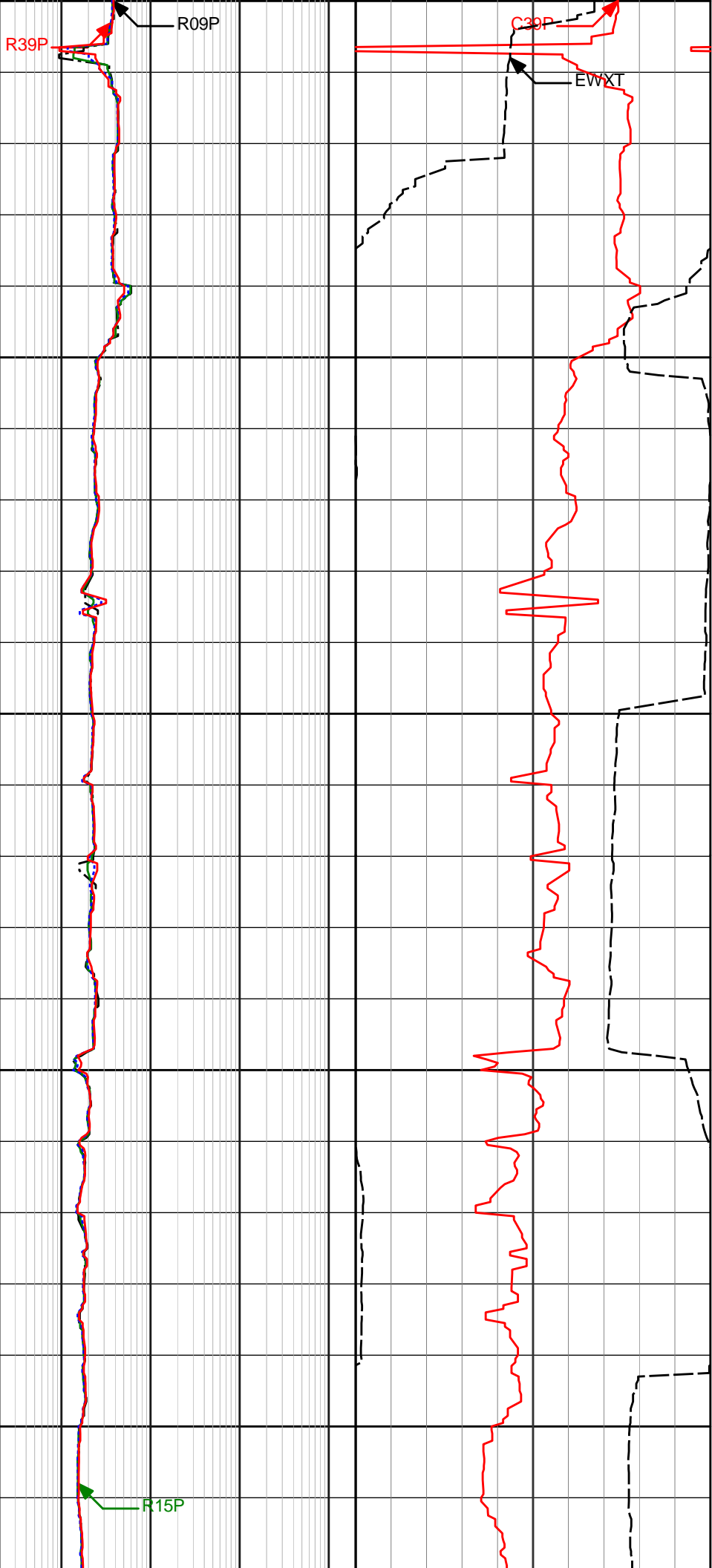
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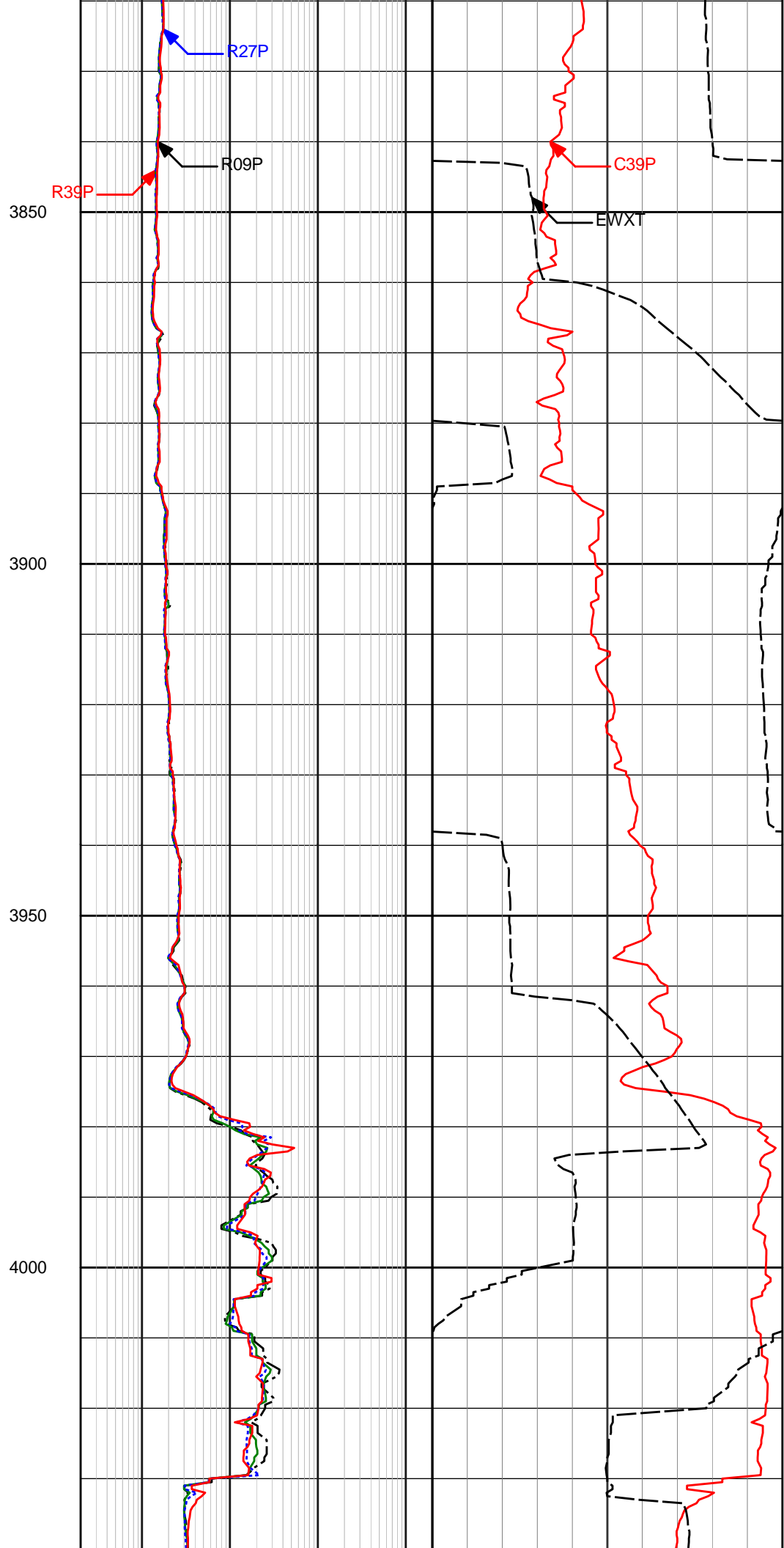
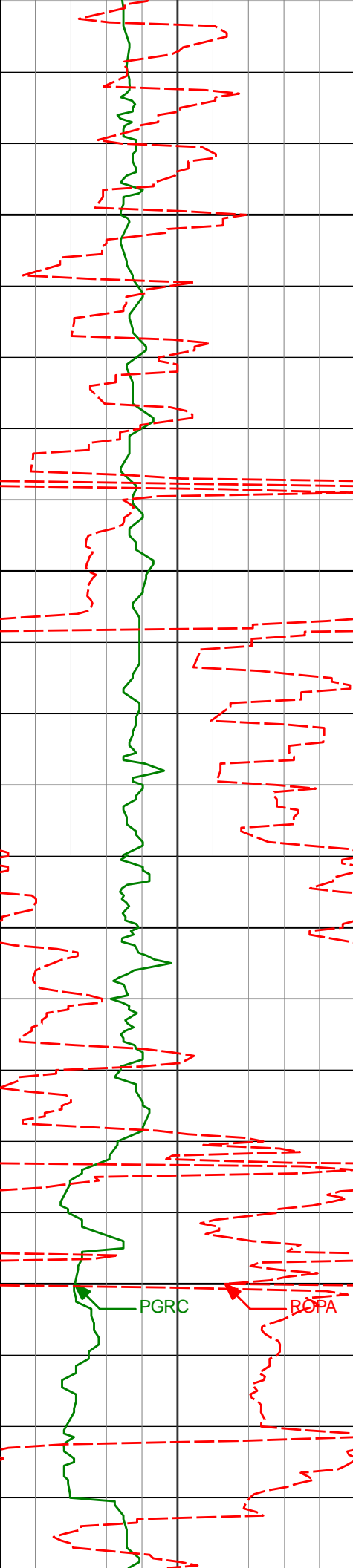
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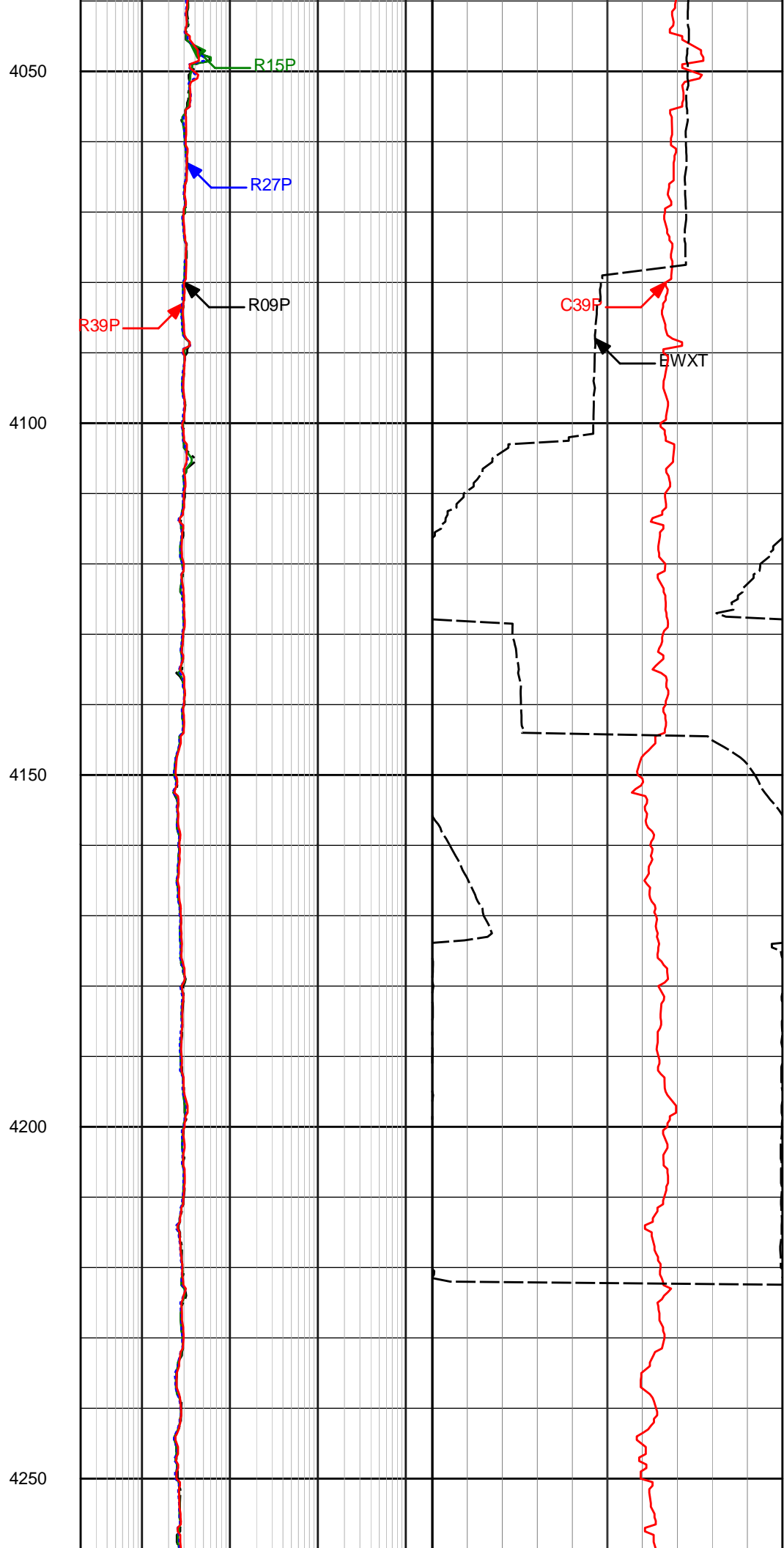
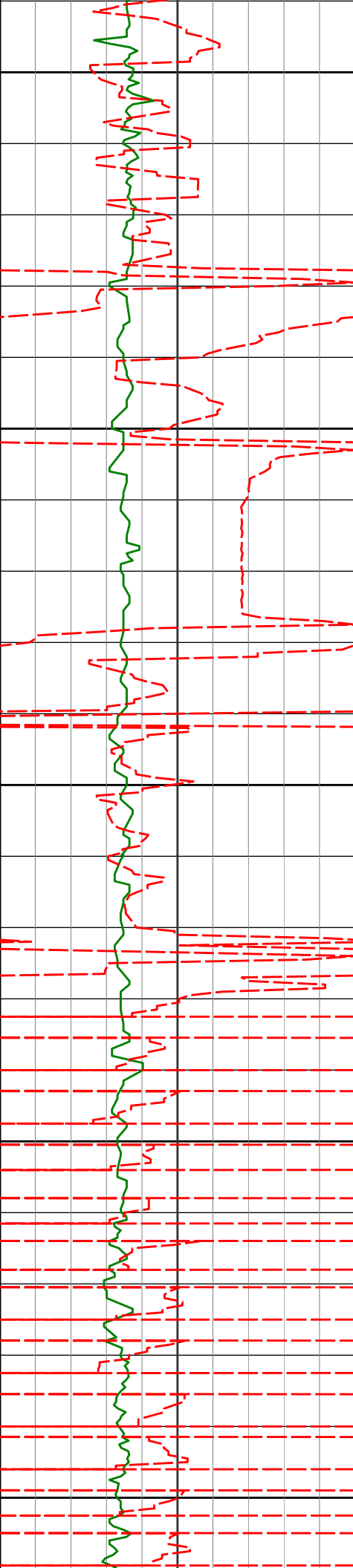
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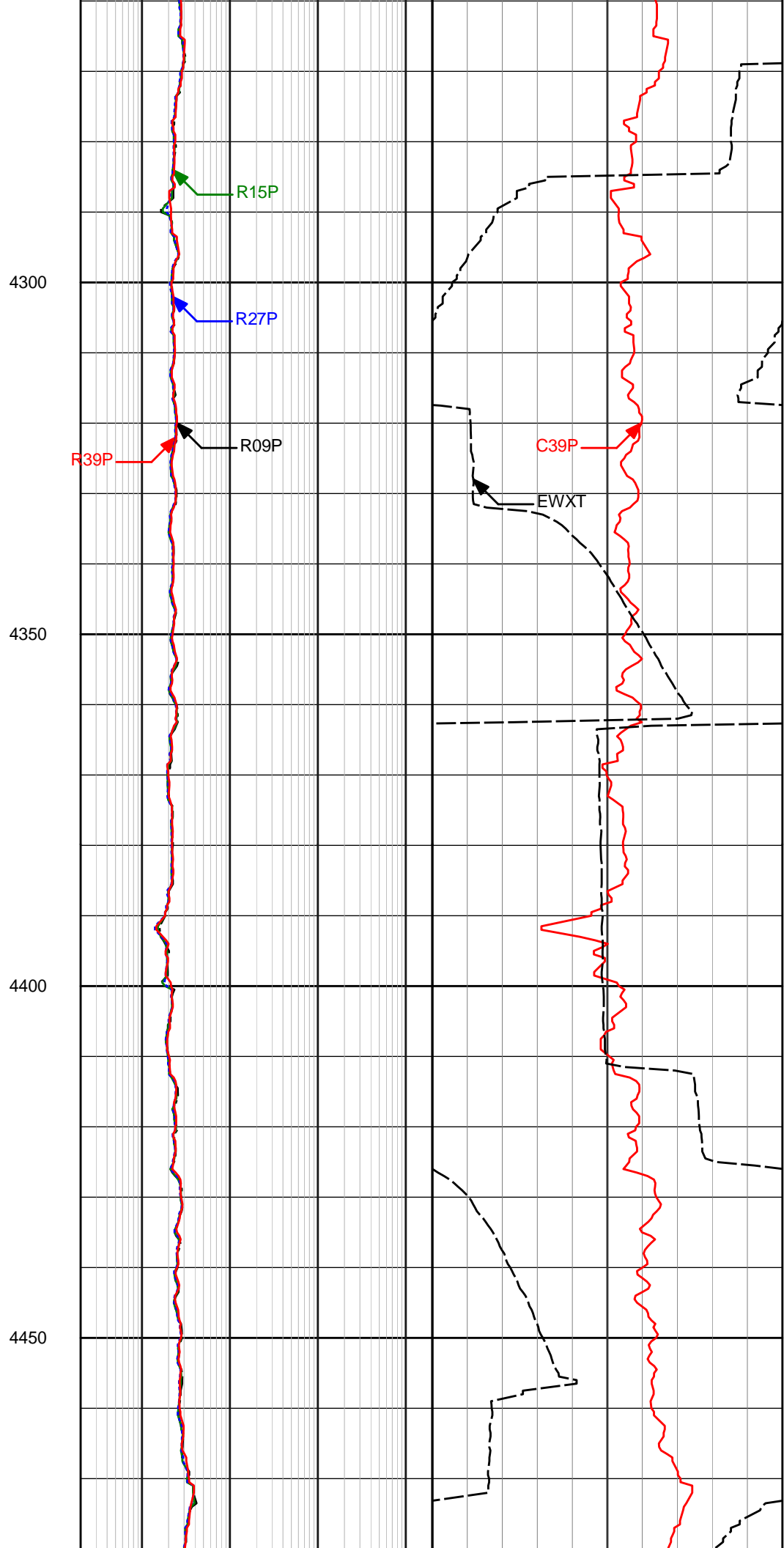
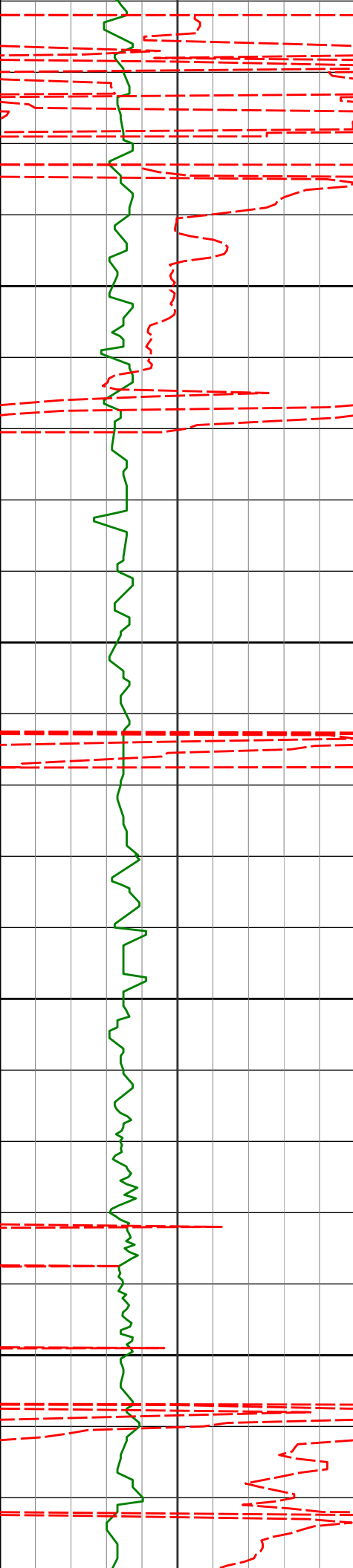
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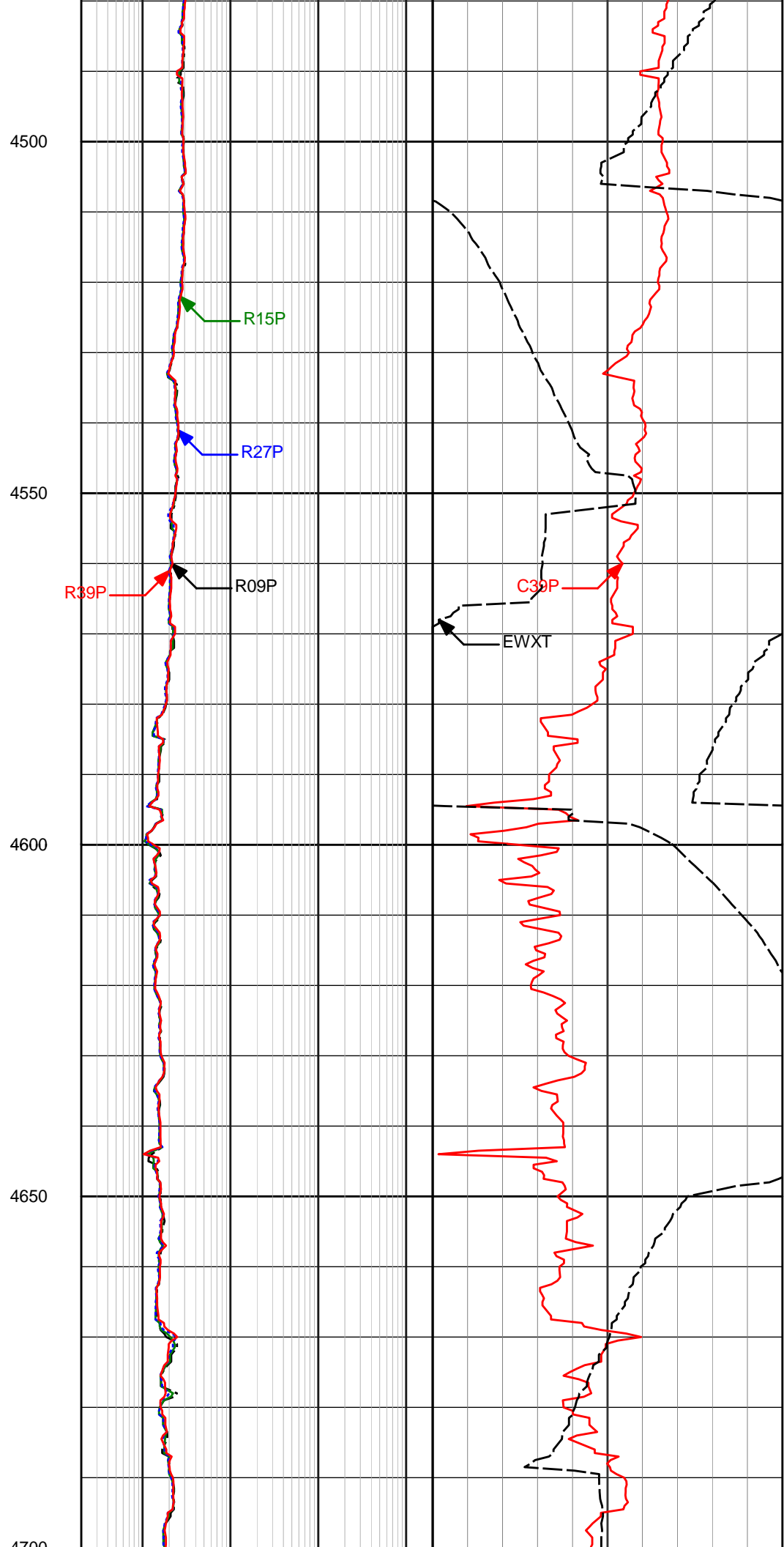
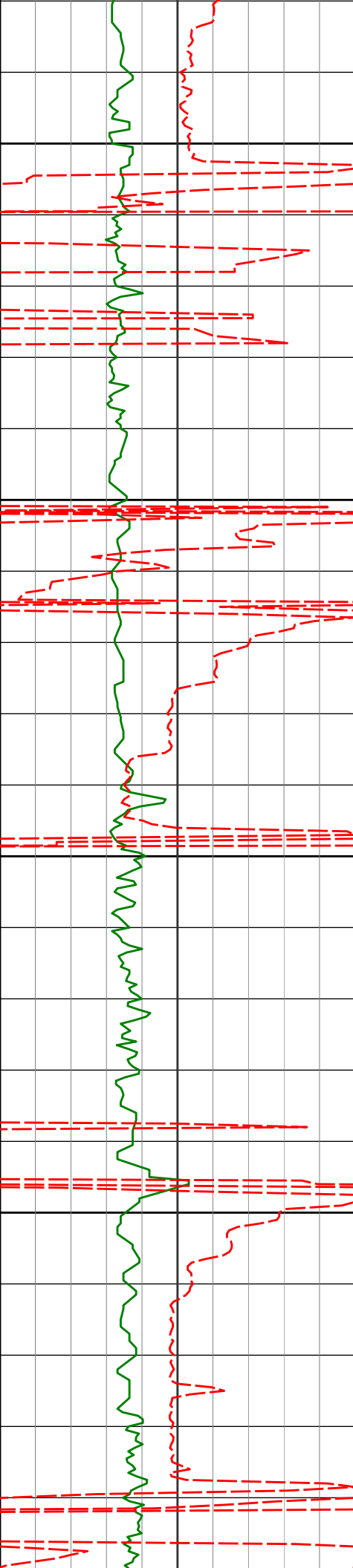
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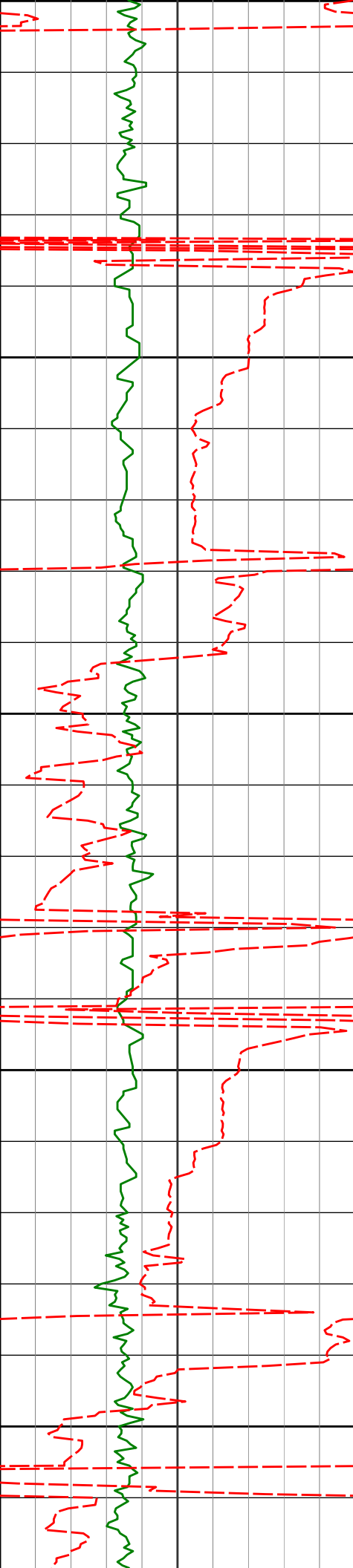




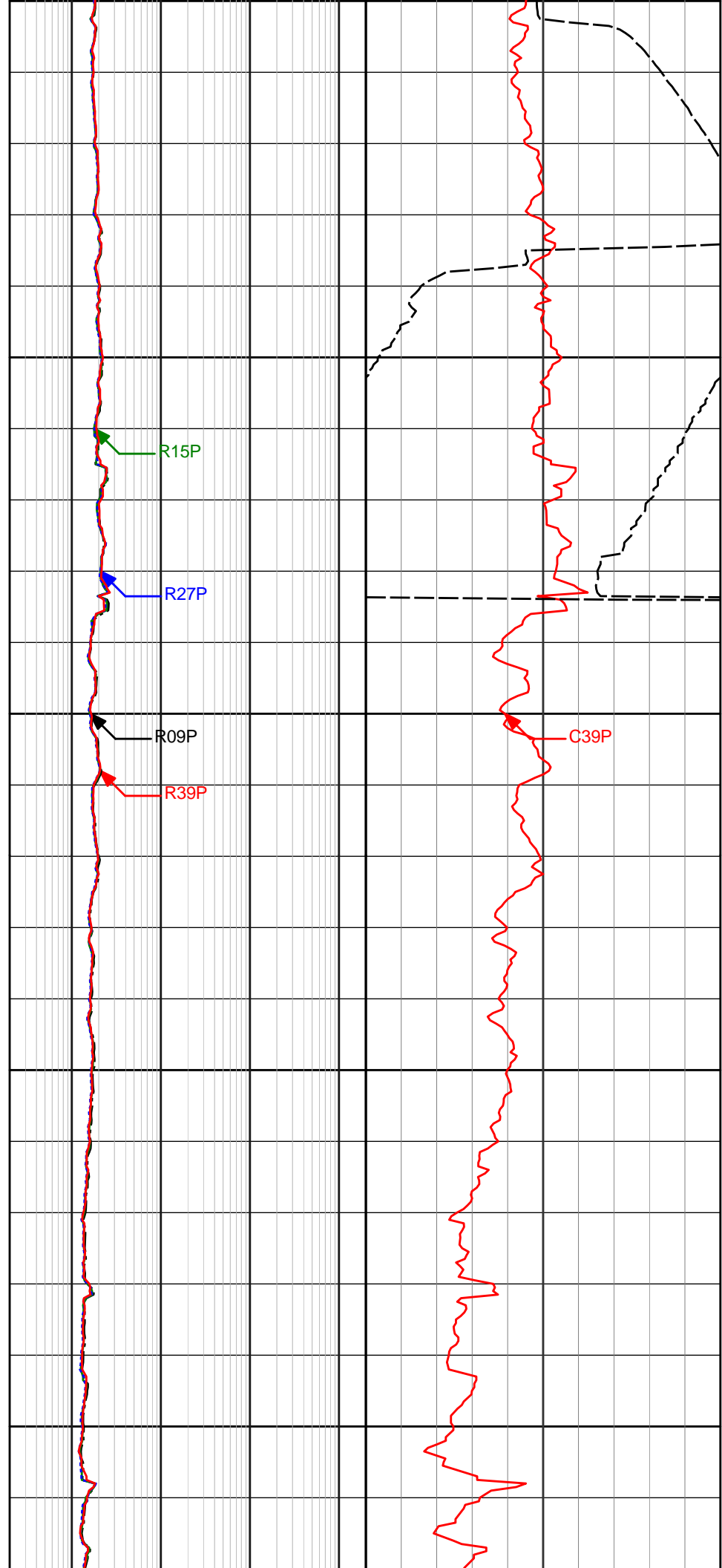


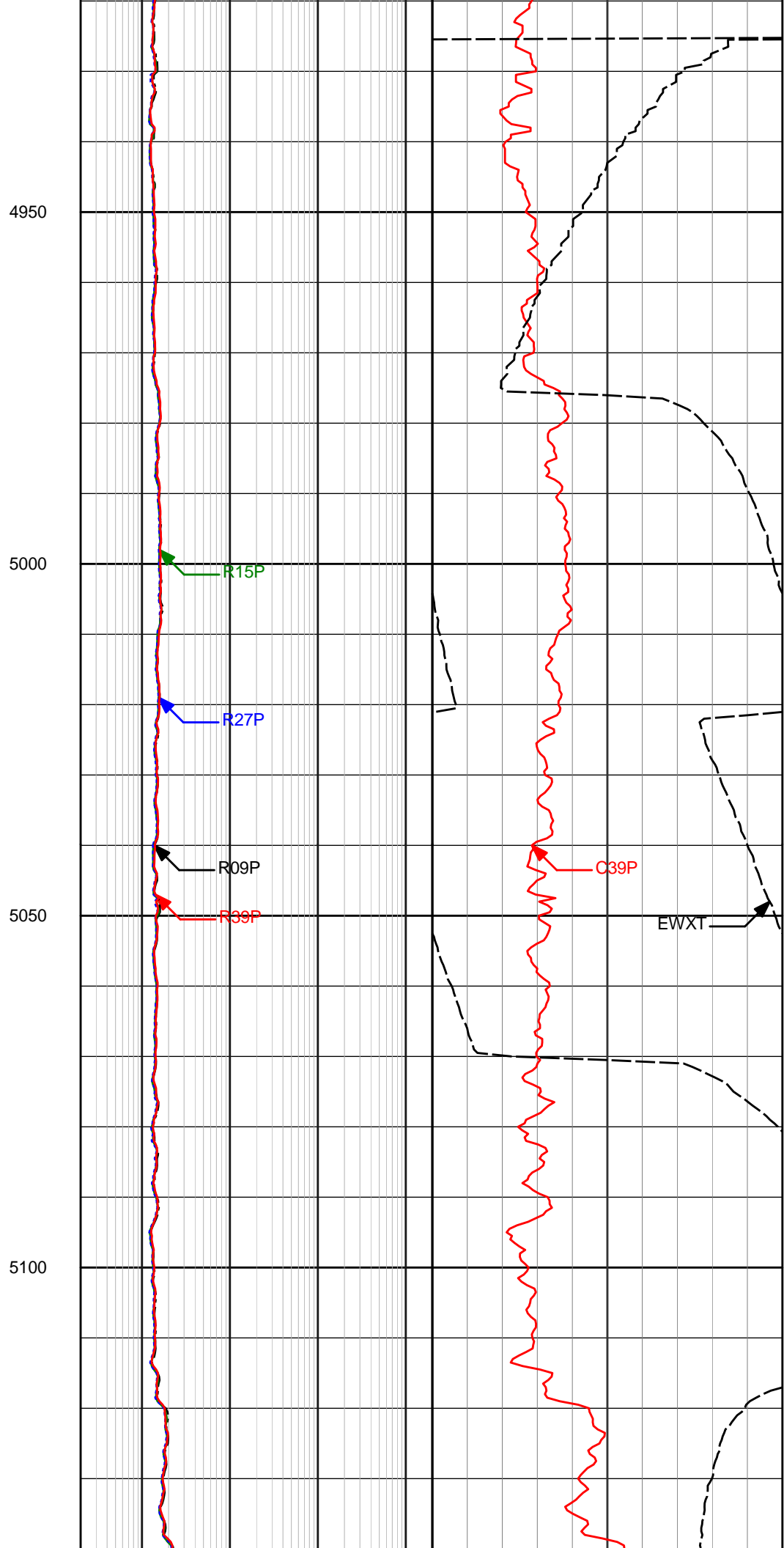
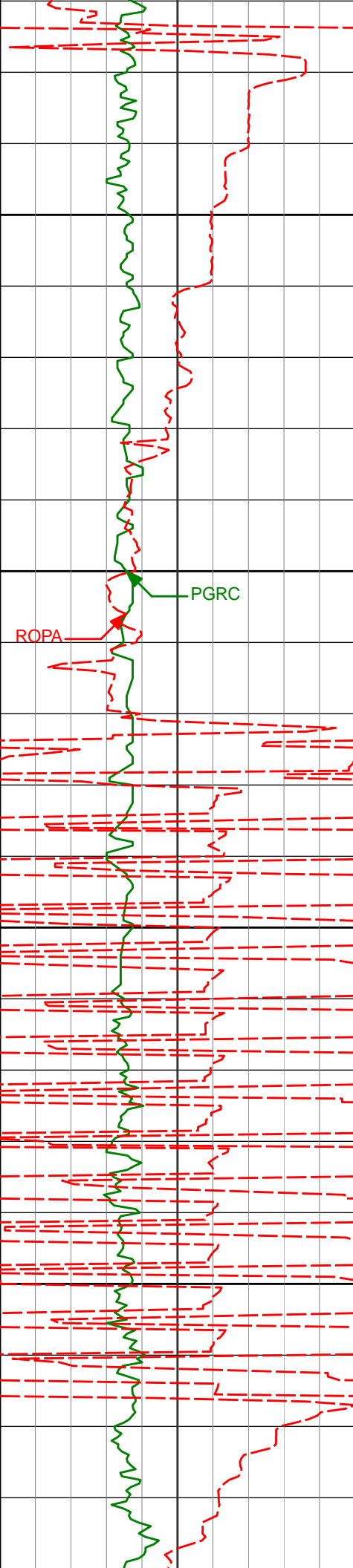


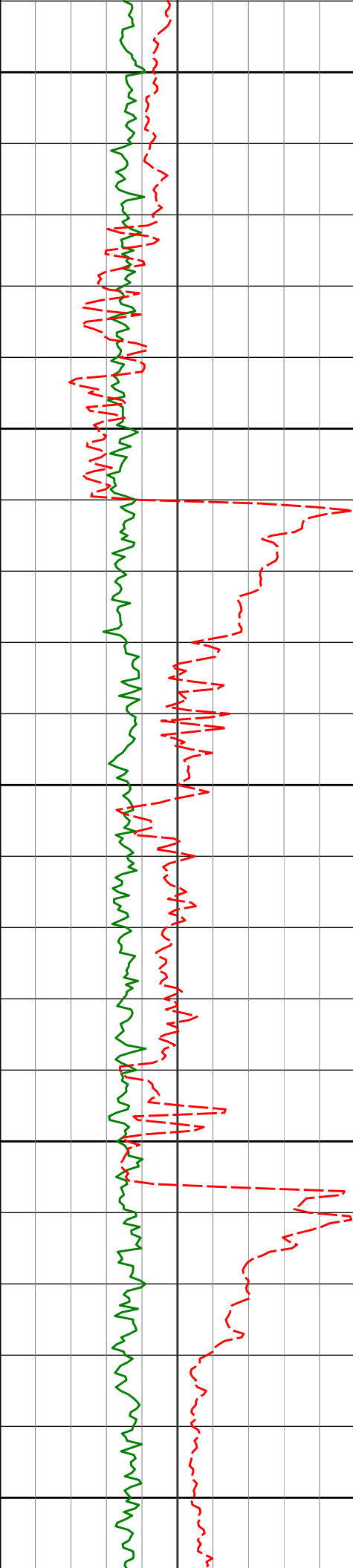




4700
4750
4800
4850
4900







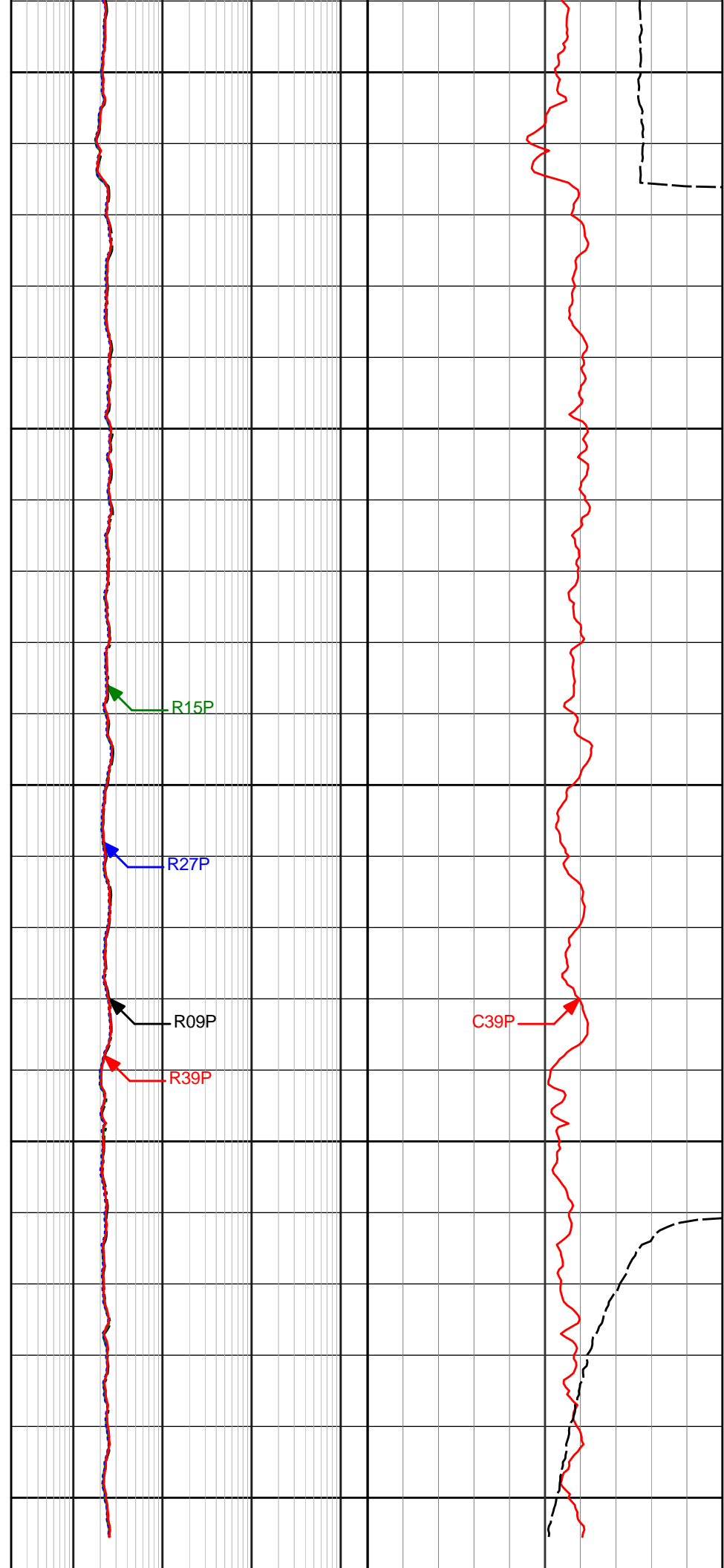
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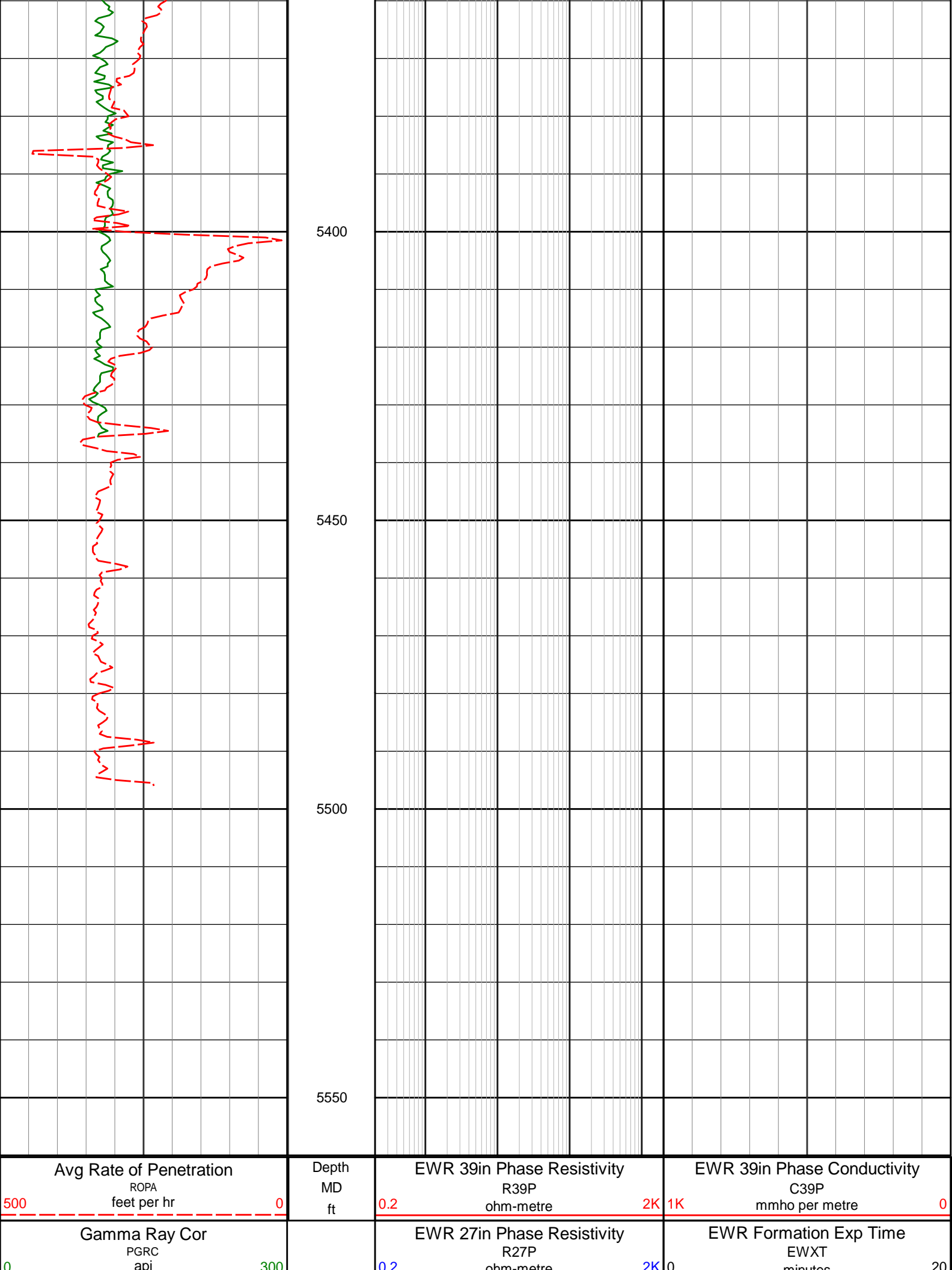
5200

5250

5300

5350





	ohm-metre	minutes	20
EWR 15in Phase Resistivity			
0.2	R15P ohm-metre	2K	
EWR 9in Phase Resistivity			
0.2	R09P ohm-metre	2K	

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DIRECTIONAL SURVEY REPORT

Noble Energy
Reagan LD06-685
Wattenburg
Weld Colorado
USA
CA-XX-0903470908

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
78.00	0.16	150.07	78.00	0.09 S	0.05 E	-0.06	0.21
177.00	0.34	172.89	177.00	0.51 S	0.16 E	-0.17	0.20
271.00	0.34	148.71	271.00	1.02 S	0.34 E	-0.35	0.15
366.00	0.18	127.36	366.00	1.35 S	0.60 E	-0.62	0.19
460.00	0.48	222.40	460.00	1.73 S	0.46 E	-0.48	0.56
555.00	0.11	119.02	554.99	2.07 S	0.27 E	-0.29	0.54
650.00	0.01	288.83	649.99	2.11 S	0.34 E	-0.36	0.13
744.00	0.13	271.90	743.99	2.11 S	0.22 E	-0.25	0.13
839.00	0.20	331.29	838.99	1.96 S	0.04 E	-0.06	0.18
934.00	0.10	334.97	933.99	1.74 S	0.08 W	0.06	0.11
1028.00	0.13	49.44	1027.99	1.59 S	0.03 W	0.01	0.15
1123.00	0.15	21.81	1122.99	1.41 S	0.10 E	-0.11	0.07
1217.00	0.13	8.04	1216.99	1.19 S	0.16 E	-0.17	0.04
1311.00	0.19	79.96	1310.99	1.05 S	0.33 E	-0.34	0.21
1406.00	0.19	91.06	1405.99	1.03 S	0.64 E	-0.65	0.04
1501.00	0.21	221.88	1500.99	1.16 S	0.68 E	-0.69	0.38
1595.00	0.05	103.35	1594.99	1.30 S	0.60 E	-0.62	0.25
1689.00	0.76	154.26	1688.99	1.87 S	0.92 E	-0.94	0.78
1784.00	0.60	162.04	1783.98	2.91 S	1.34 E	-1.38	0.19
1879.00	0.19	134.31	1878.98	3.50 S	1.61 E	-1.65	0.46
1905.00	0.15	107.28	1904.98	3.54 S	1.67 E	-1.71	0.34
2027.00	0.35	131.29	2026.98	3.83 S	2.10 E	-2.15	0.18
2122.00	2.73	86.85	2121.94	3.89 S	4.57 E	-4.62	2.62
2216.00	4.17	66.57	2215.77	2.41 S	9.94 E	-9.97	1.98
2310.00	6.72	69.25	2309.34	0.90 N	18.22 E	-18.21	2.73
2405.00	8.04	69.85	2403.55	5.16 N	29.66 E	-29.59	1.39
2500.00	10.02	67.92	2497.37	10.56 N	43.56 E	-43.43	2.11
2594.00	9.61	66.99	2589.99	16.70 N	58.36 E	-58.16	0.47
2689.00	11.07	64.25	2683.45	23.76 N	73.87 E	-73.59	1.62
2784.00	12.27	63.44	2776.48	32.23 N	91.11 E	-90.73	1.27
2878.00	11.50	62.91	2868.46	40.97 N	108.39 E	-107.91	0.82
2973.00	12.28	58.25	2961.43	50.60 N	125.42 E	-124.82	1.30
3067.00	12.46	62.07	3053.25	60.61 N	142.88 E	-142.16	0.89
3162.00	14.70	66.32	3145.58	70.26 N	162.98 E	-162.15	2.58
3257.00	15.68	67.34	3237.26	80.04 N	185.87 E	-184.92	1.07
3446.00	14.41	66.94	3419.78	99.10 N	231.09 E	-229.91	0.68
3540.00	13.78	65.72	3510.95	108.28 N	252.06 E	-250.77	0.74
3635.00	15.60	66.72	3602.84	117.98 N	274.10 E	-272.71	1.94
3824.00	15.42	69.92	3784.96	136.66 N	321.06 E	-319.44	0.46
3918.00	12.99	70.98	3876.08	144.39 N	342.78 E	-341.07	2.60
4013.00	12.58	68.78	3968.72	151.62 N	362.52 E	-360.72	0.67
4109.00	13.48	69.20	4062.25	159.37 N	382.73 E	-380.84	0.95
4202.00	13.68	68.49	4152.65	167.25 N	403.09 E	-401.11	0.28
4297.00	13.79	66.55	4244.93	175.88 N	423.93 E	-421.84	0.50
4391.00	12.52	65.91	4336.47	184.49 N	443.51 E	-441.32	1.35
4486.00	12.61	67.33	4429.19	192.70 N	462.48 E	-460.20	0.34
4581.00	12.58	67.99	4521.90	200.57 N	481.64 E	-479.27	0.16

4676.00	11.94	62.29	4614.74	209.02 N	499.94 E	-497.46	1.44
4770.00	12.36	54.73	4706.64	219.35 N	516.77 E	-514.17	1.75
4865.00	11.97	58.05	4799.51	230.44 N	533.43 E	-530.69	0.84
4960.00	12.39	61.77	4892.37	240.47 N	550.76 E	-547.91	0.94
5054.00	11.87	68.12	4984.28	248.84 N	568.62 E	-565.67	1.52
5149.00	8.12	53.24	5077.83	256.50 N	583.07 E	-580.03	4.76
5243.00	10.04	30.20	5170.68	267.57 N	592.52 E	-589.35	4.33
5338.00	10.81	8.75	5264.15	283.53 N	598.04 E	-594.69	4.14
5432.00	10.63	344.69	5356.55	300.62 N	597.09 E	-593.54	4.73

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 270.67 DEGREES (GRID)
A TOTAL CORRECTION OF 6.91 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 5432.00 FEET
IS 668.50 FEET ALONG 63.28 DEGREES (GRID)**

**Surveys from 0' to 1905' are 3rd-Party Gyro surveys.
Surveys corrected by Surcon starting at 2027' ft.**