

**PCD-C Pressure Case Directional
DGR Dual Gamma Ray**



1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	200				
Date run completed	30-Jun-13				
Rig Bit Number	0200				
Bit Size (in)	6.125				
Tool Nominal OD (in)	4.750				
Log Start Depth (MD, ft)	8,109.00				
Log End Depth (MD, ft)	12,283.00				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	27-Jun-13 20:55				
Drill/Wipe End Date and Time	30-Jun-13 07:20				
Min Inc (deg) @ Depth (MD, ft)	83.68 @ 10,077.00				
Max Inc (deg) @ Depth (MD, ft)	92.78 @ 11,779.00				
Bit TFA(in2) / Bit Type	.61 / PDC				
Flow Rate (gpm)	275.00				
Max AV (fpm) / CV (fpm) @ MWD	364.0 / 438.0				
Fluid Type	Fresh Water Gel				
Density (ppg) / Viscosity (spqt)	9.50 / 39.00				
Filtrate CL (ppm)	1,300.00				
pH / Fluid Loss (mptm)	9.00 / 0				
PV (cP) / YP (lbf2)	13 / 13.00				
% Solids / % Sand	6 / .5				
% Oil / Oil:Water Ratio	N/A / N/A				
Rm @ Measured Temp (degF)	N/A @ N/A				
Rmf @ Measured Temp (degF)	N/A @ N/A				
Rmc @ Measured Temp (degF)	N/A @ N/A				
Min Temp (degF) / Max Temp (degF)	24.00 / 110.00				

Max Tool Temp (degF) / Source	240.23 / HCIM				
Rm @ Max Tool Temp (degF)	N/A @ 240.23				
Lead MWD Engineer	Ryan White				
Customer Representative	Travis Kruckenburg				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	HCIM				
Software Version	88.56				
Sub Serial Number	11644870				
Insert Serial Number	11603780				
Date and Time Initialized	27-Jun-13 12:01				
Date and Time Read	01-Jan-70 00:00				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	48.43				
Software Version	6.21				
Sub Serial Number	11069033				
Sonde Serial Number	11297493				
Sensor ID Number	N/A				
Toolface Offset (deg)	158.40				

Gamma Ray Sensor Information

Tool Type	DGR				
Distance From Bit (ft)	68.52				
Recorded Sample Period (sec)	8				
Software Version	N/A				
Sub Serial Number	11644870				
Insert/Sonde Serial Number	11714244				

Resistivity Sensor Information

Tool Type	Slim P4				
Distance From Bit (ft)	61.32				
Recorded Sample Period (sec)	6				
Software Version	5.55				
Sub Serial Number	192661				
Receiver Insert Serial Number	270968				
Transmitter Insert Serial Number	10917715				
Receiver Orientation	Down				

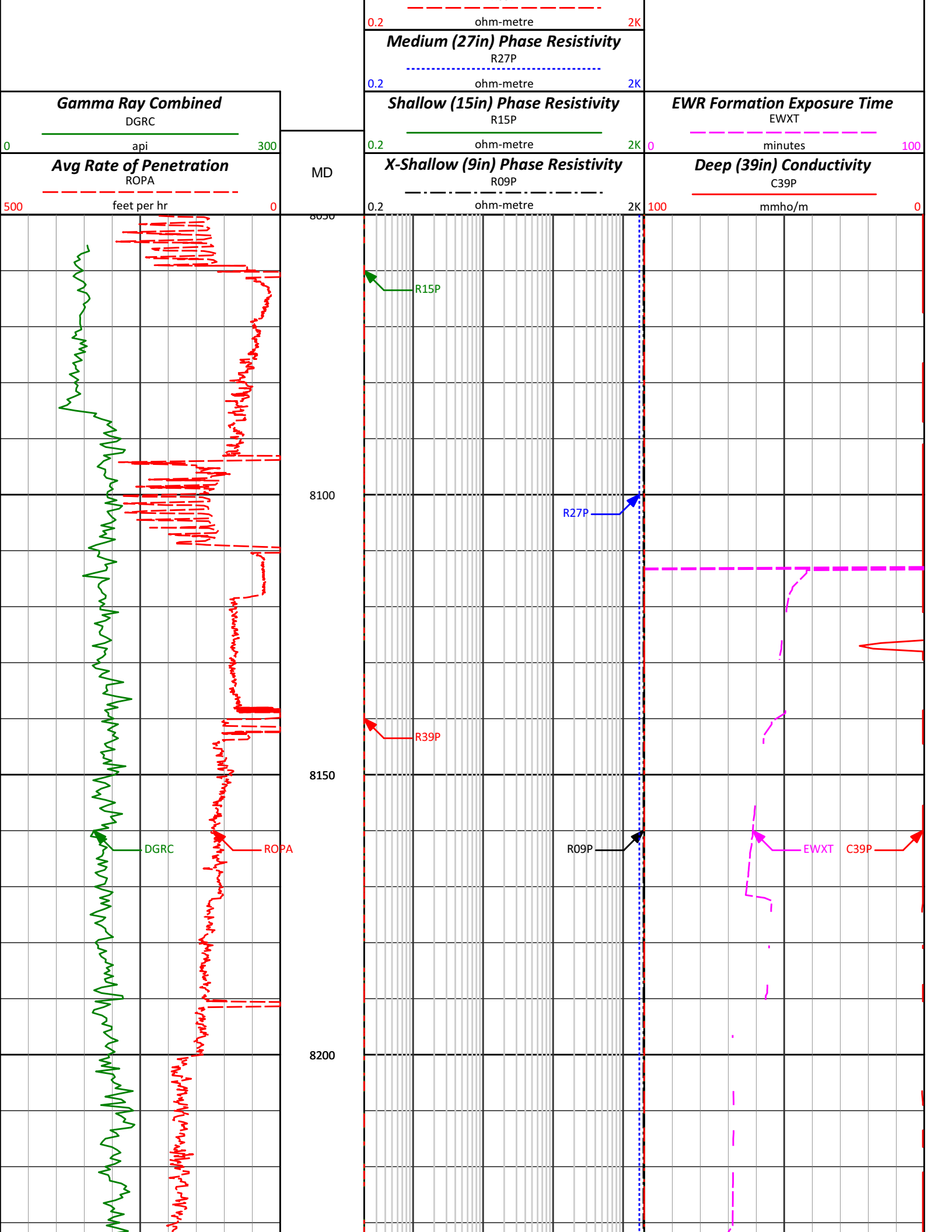
Pulser Controller Sensor Information

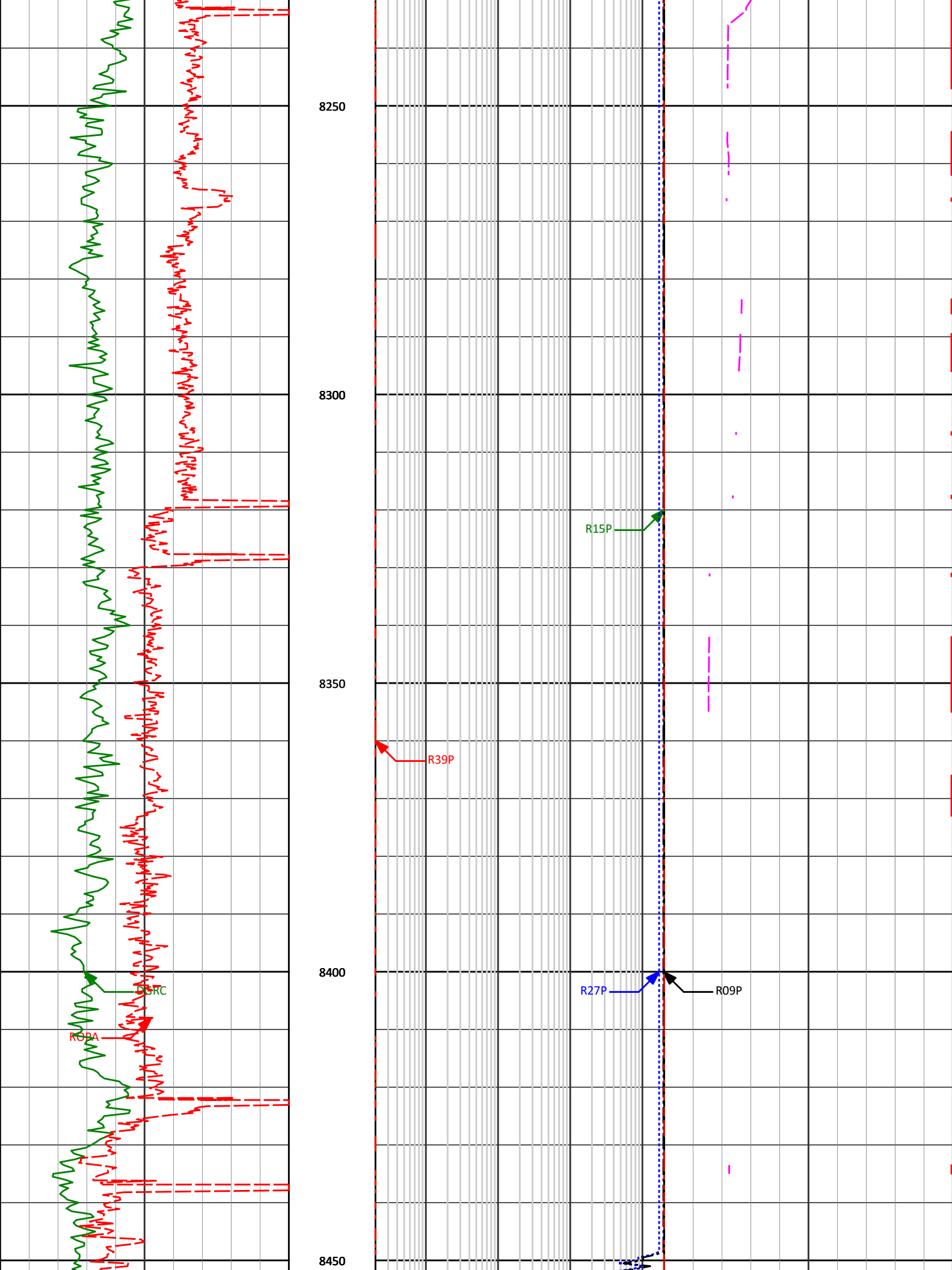
Tool Type	PCM				
Software Version	8.17				
PIC Software Version					
Sub/HOC Serial Number	11644599				
Insert/Probe/Module SN	11145604				
Battery Serial Number	N/A				
Valve Insert SN	N/A				
DC Insert Serial Number	N/A				
Choke Size (32nd)	N/A				
Driver Current (amps)	N/A				
Driver SMI Current (amps)	N/A				

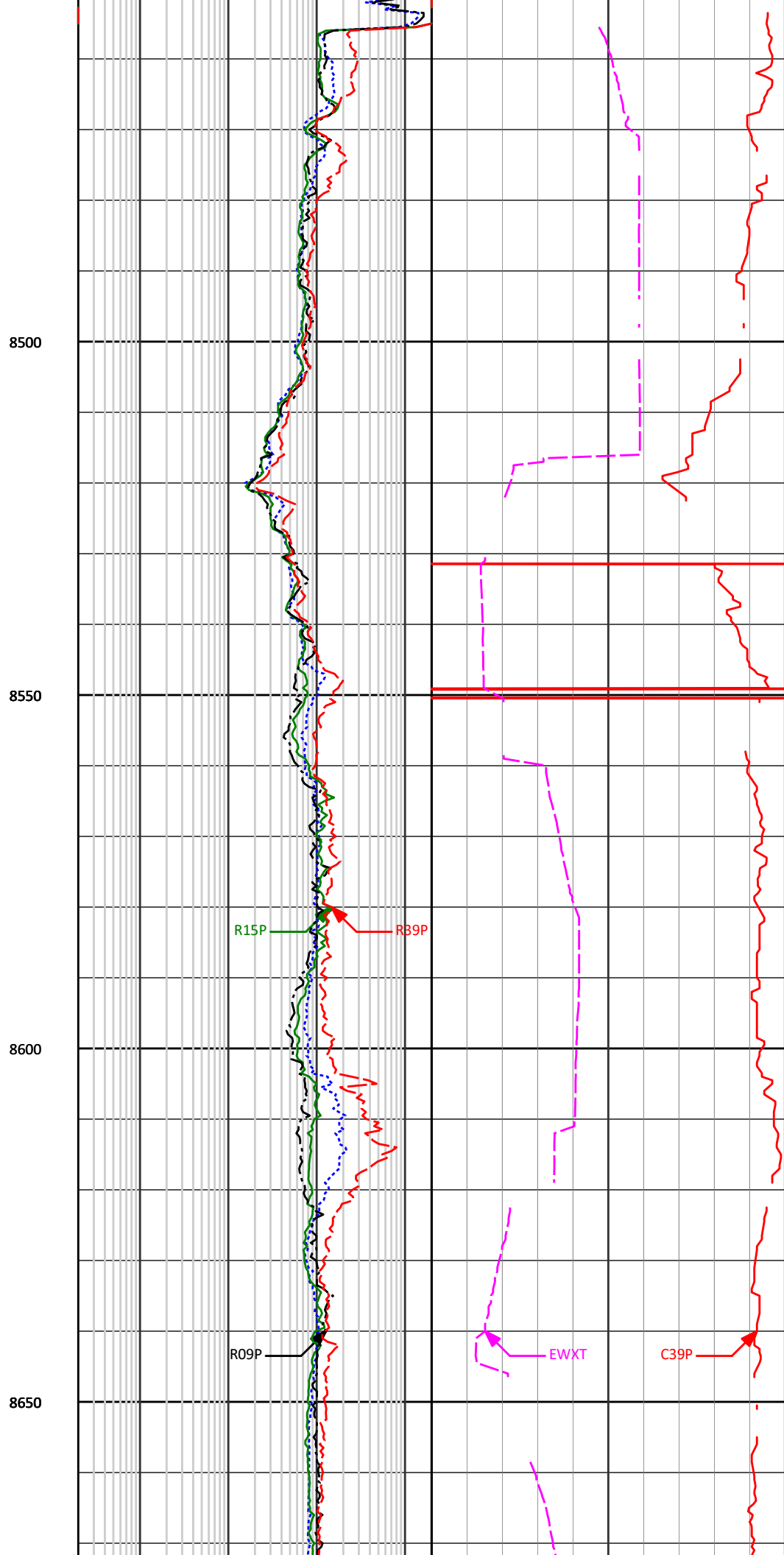
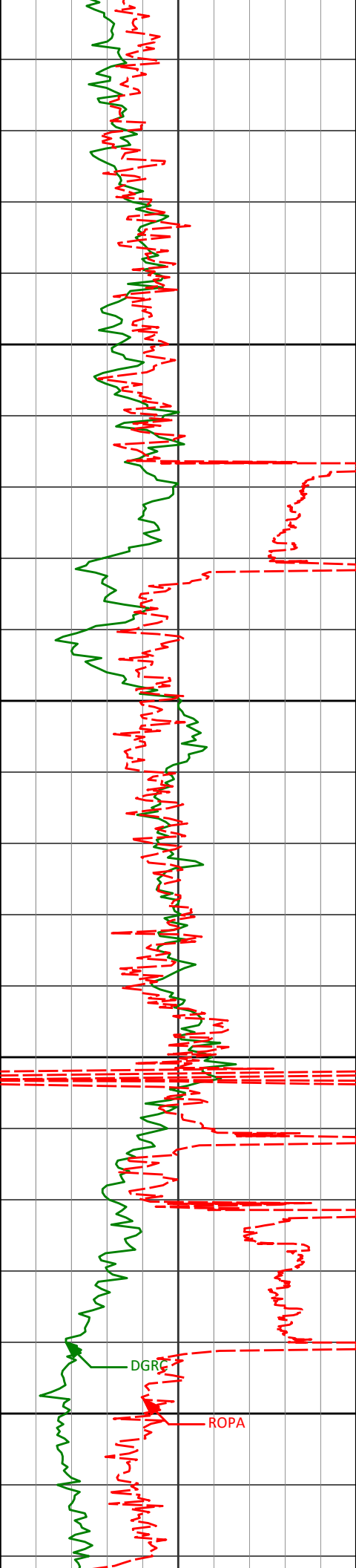
REMARKS					
<p>1. All depths are measured bit depths referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.</p> <p>2. No depth corrections have been made for pipe stretch or compression.</p> <p>3. All data presented is recorded data unless otherwise specified</p> <p>4. The following smoothing parameters have been applied to the data:</p> <p>Slim-Phase 4 (Electromagnetic Wave Resistivity):</p> <p>Interval Resolution: 0.5ft Interval Distance: 0.6ft Gap Fill: 3.0ft</p> <p>DGR (Corrected Gamma Ray):</p> <p>Interval Resolution: 0.5 ft Interval Distance: 0.6 ft Gap Fill: 3.0 ft</p> <p>ROPA (Average Rate of Penetration):</p> <p>Interval Resolution: 0.5 ft Interval Distance: 1.2 ft Gap Fill : 3.0 ft</p> <p>5. INSITE version 7.4.1</p> <p>6. There is no Recorded Resistivity data after 9,720' MD due to errors with the Resistivity sensor.</p>					

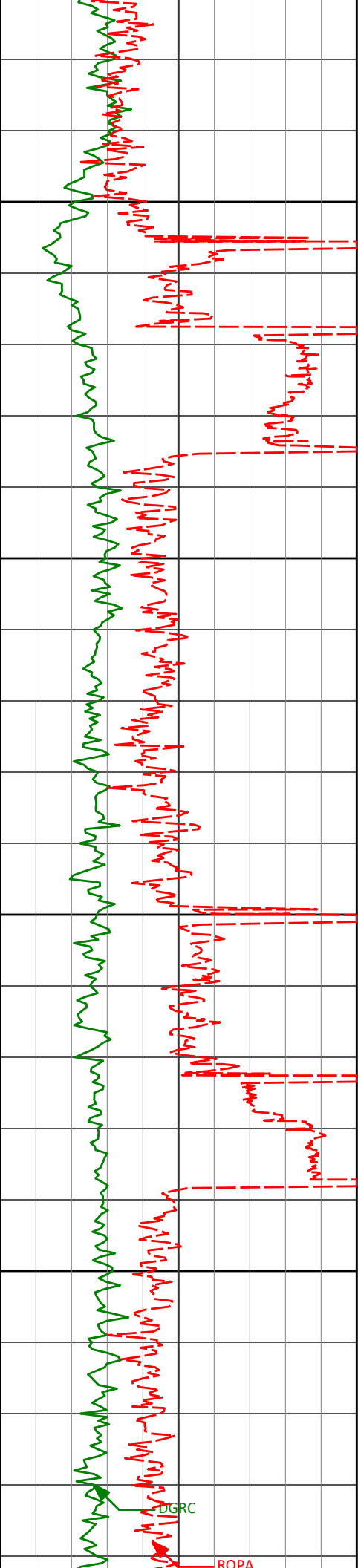
WARRANTY					
<p>HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY OTHER THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION AND PRODUCTION OPERATION. HALLIBURTON MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HALLIBURTON BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HALLIBURTON.</p>					

<p>HALLIBURTON</p> <p>Sperry Drilling Services</p> <p>MD Detail Log 1:240</p>					
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8700

R27P

8750

8800

R89P

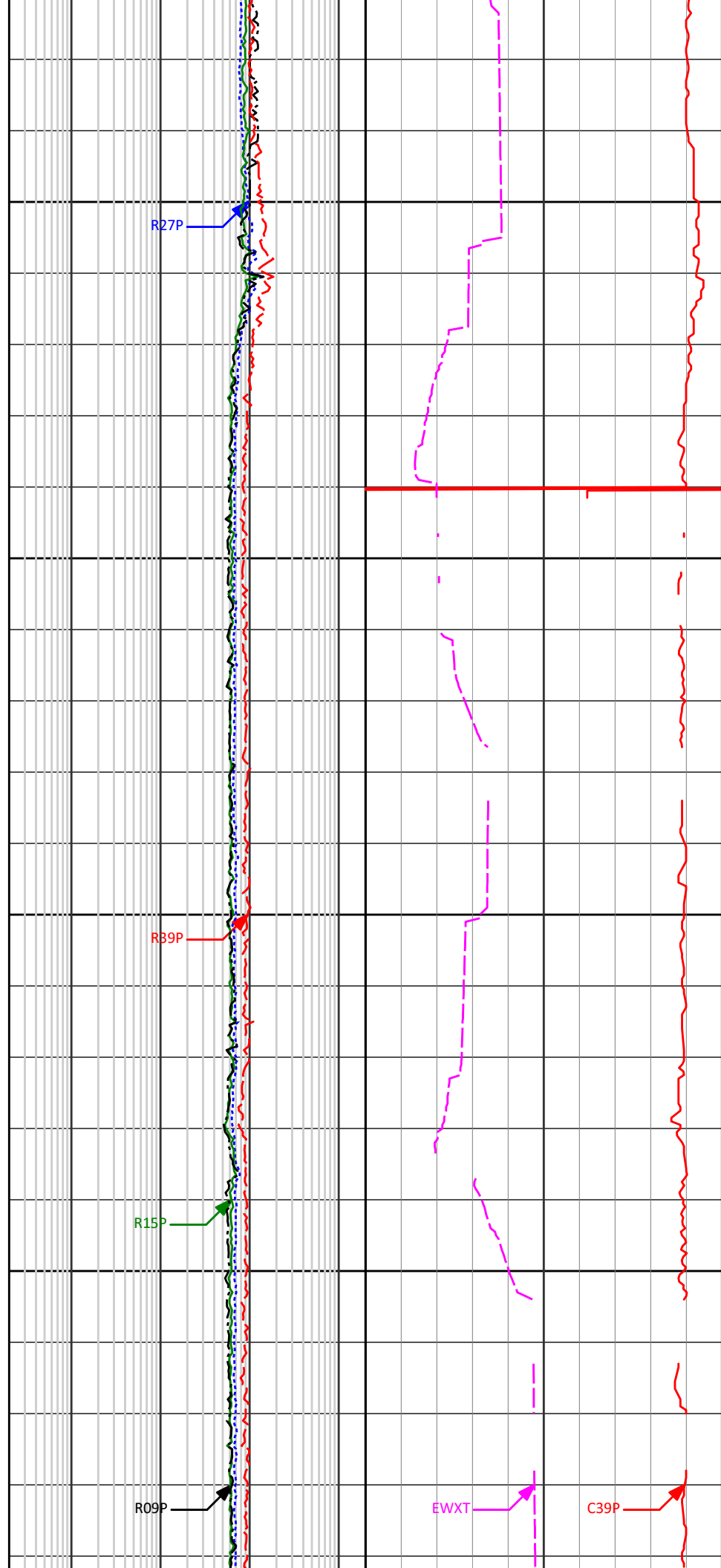
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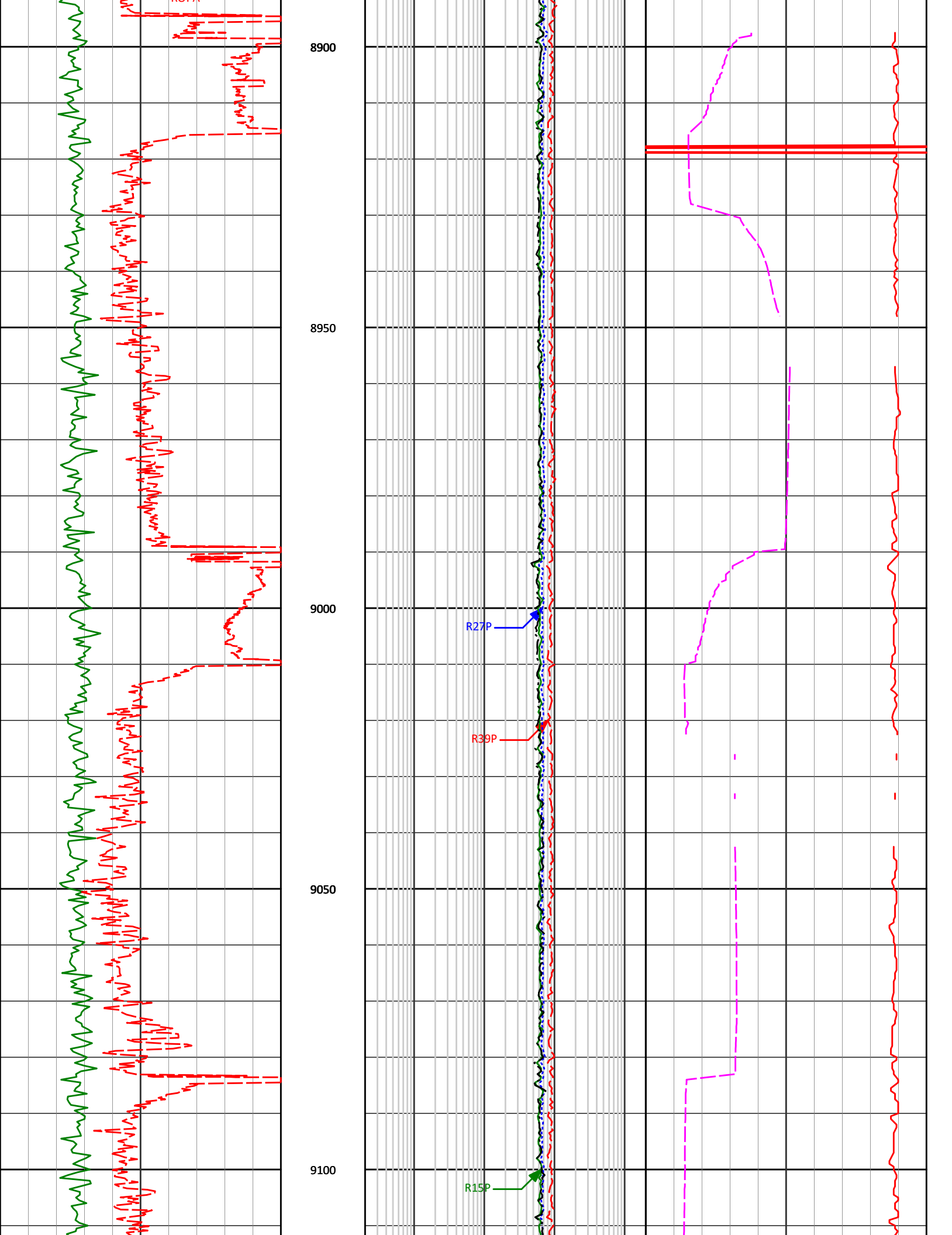
R15P

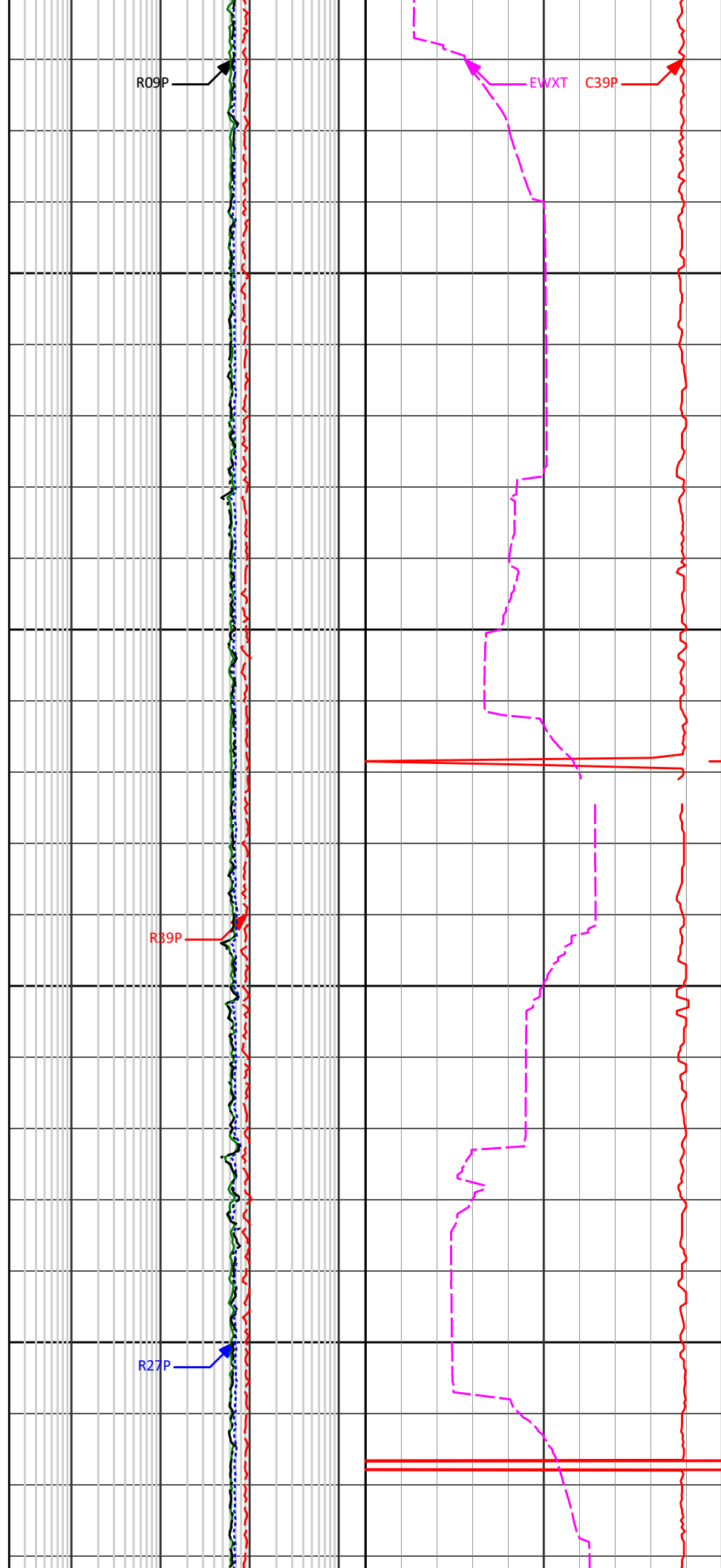
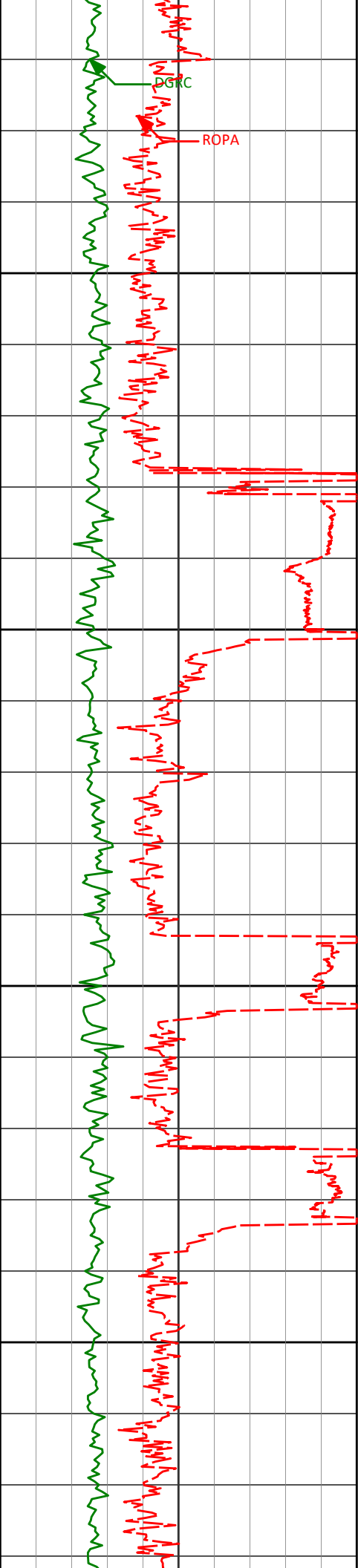
R09P

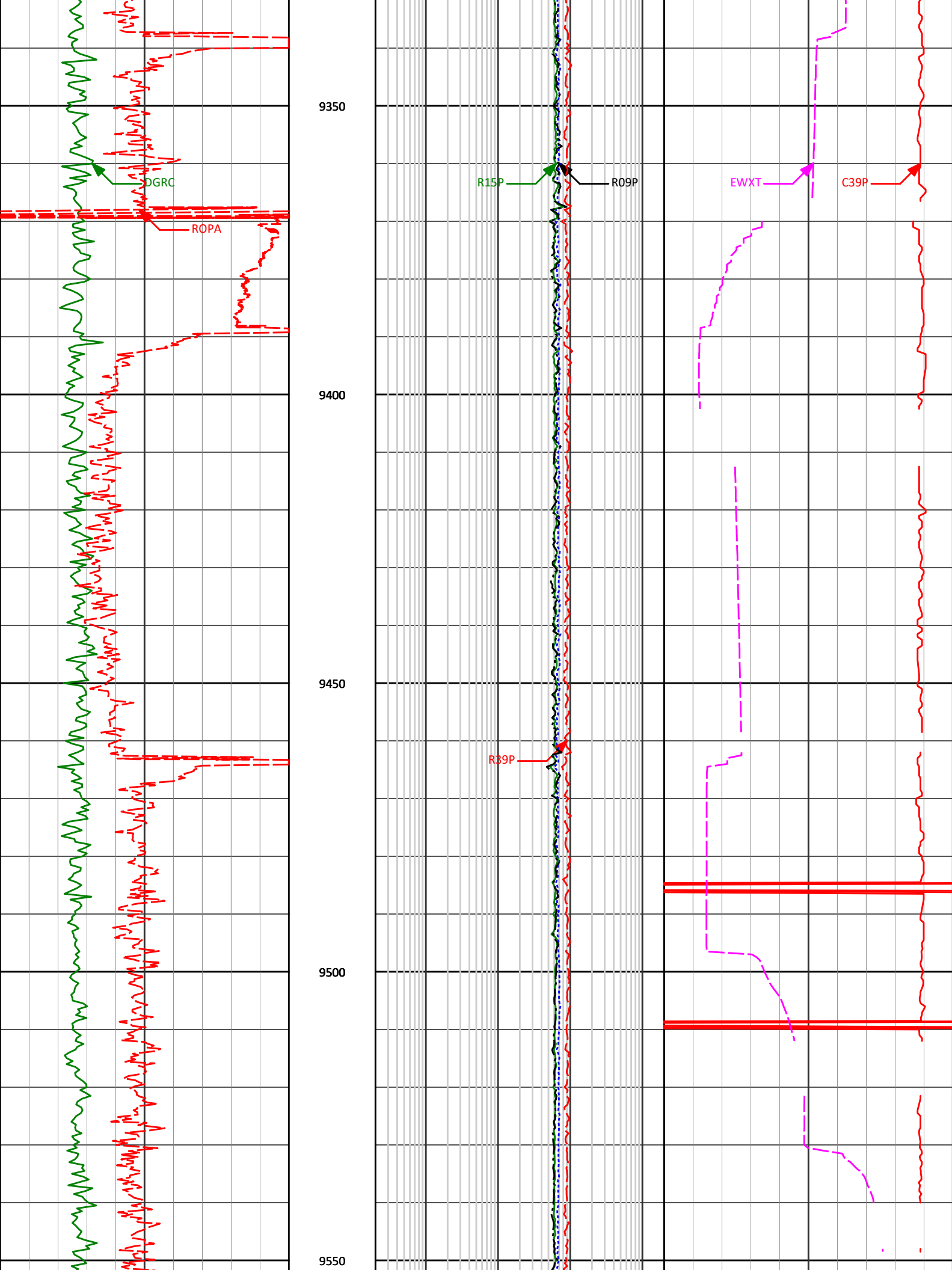
EGRC

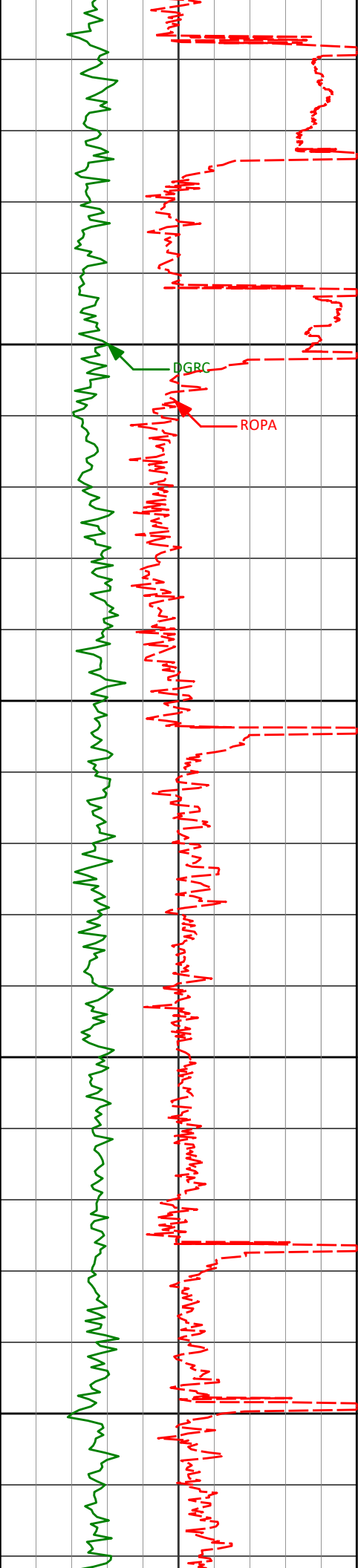
ROPA









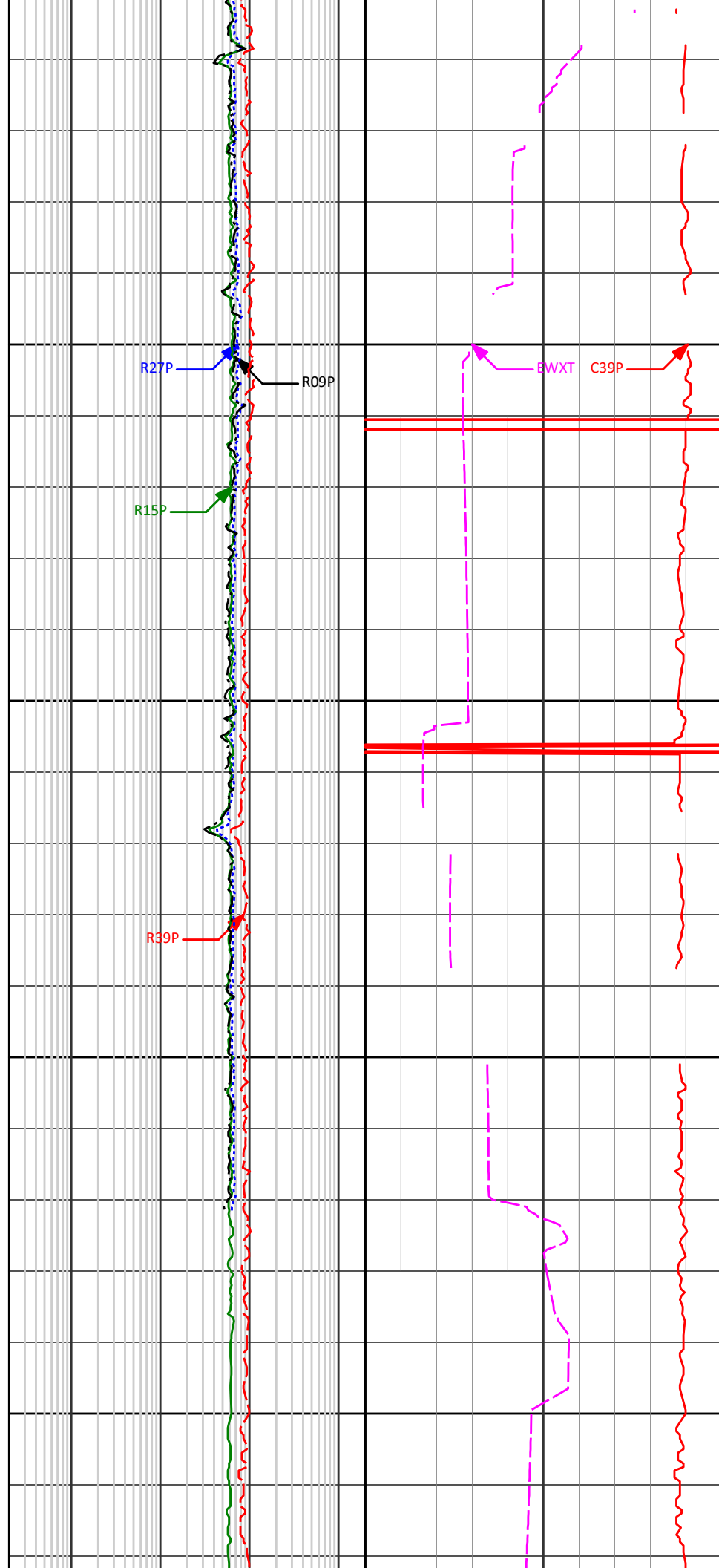


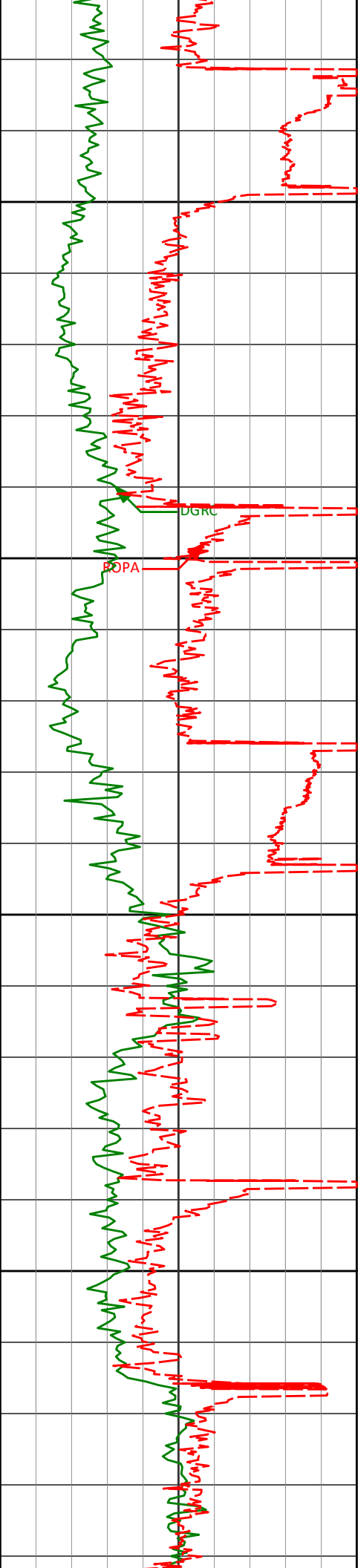
9600

9650

9700

9750



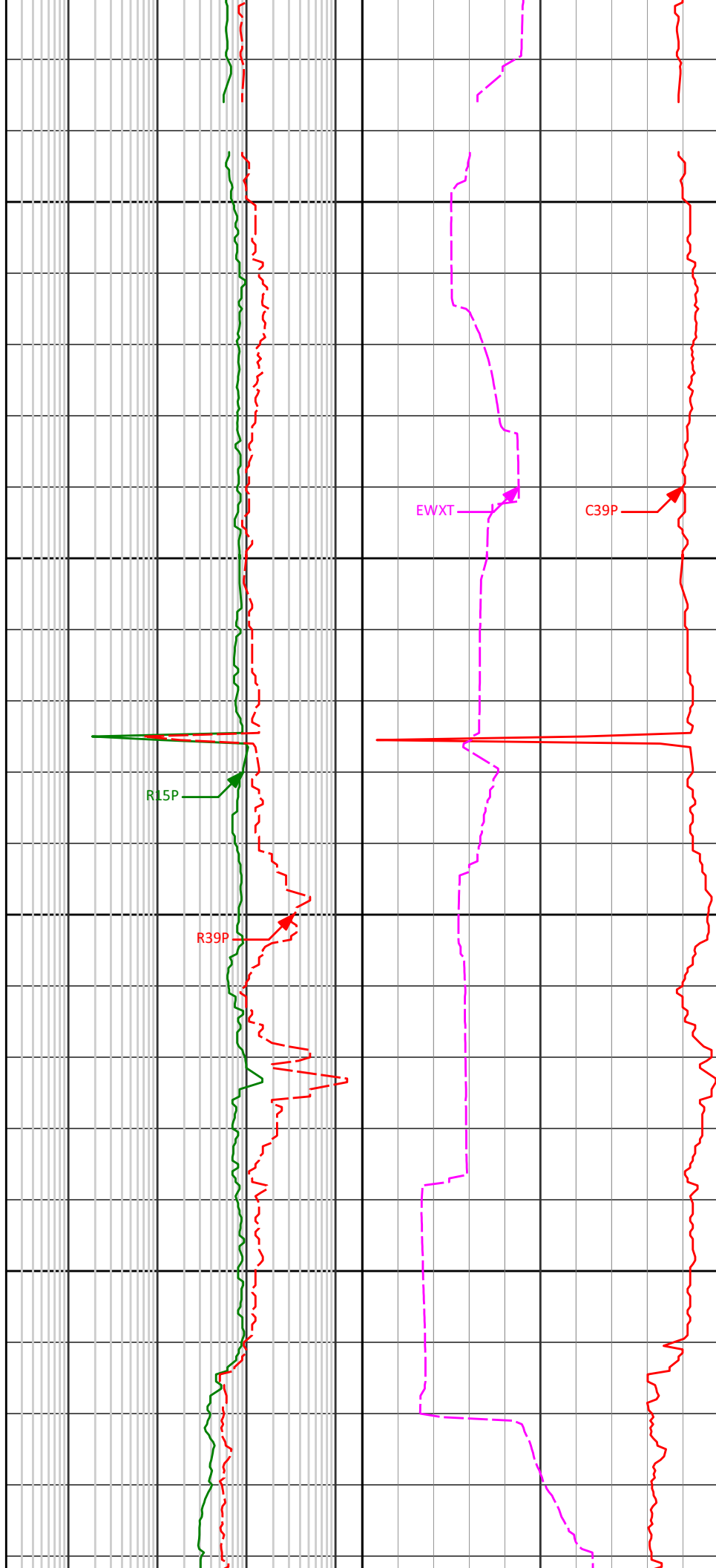


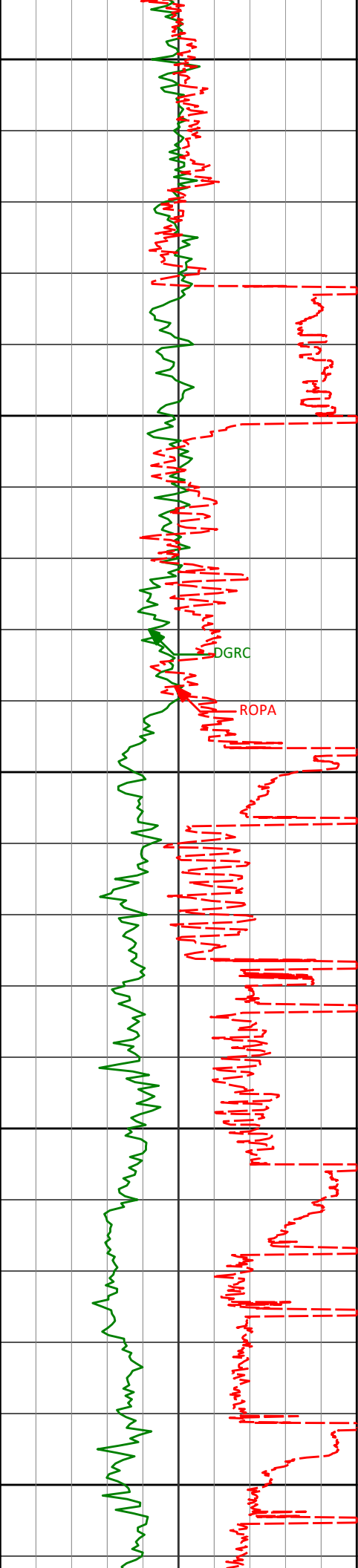
9800

9850

9900

9950





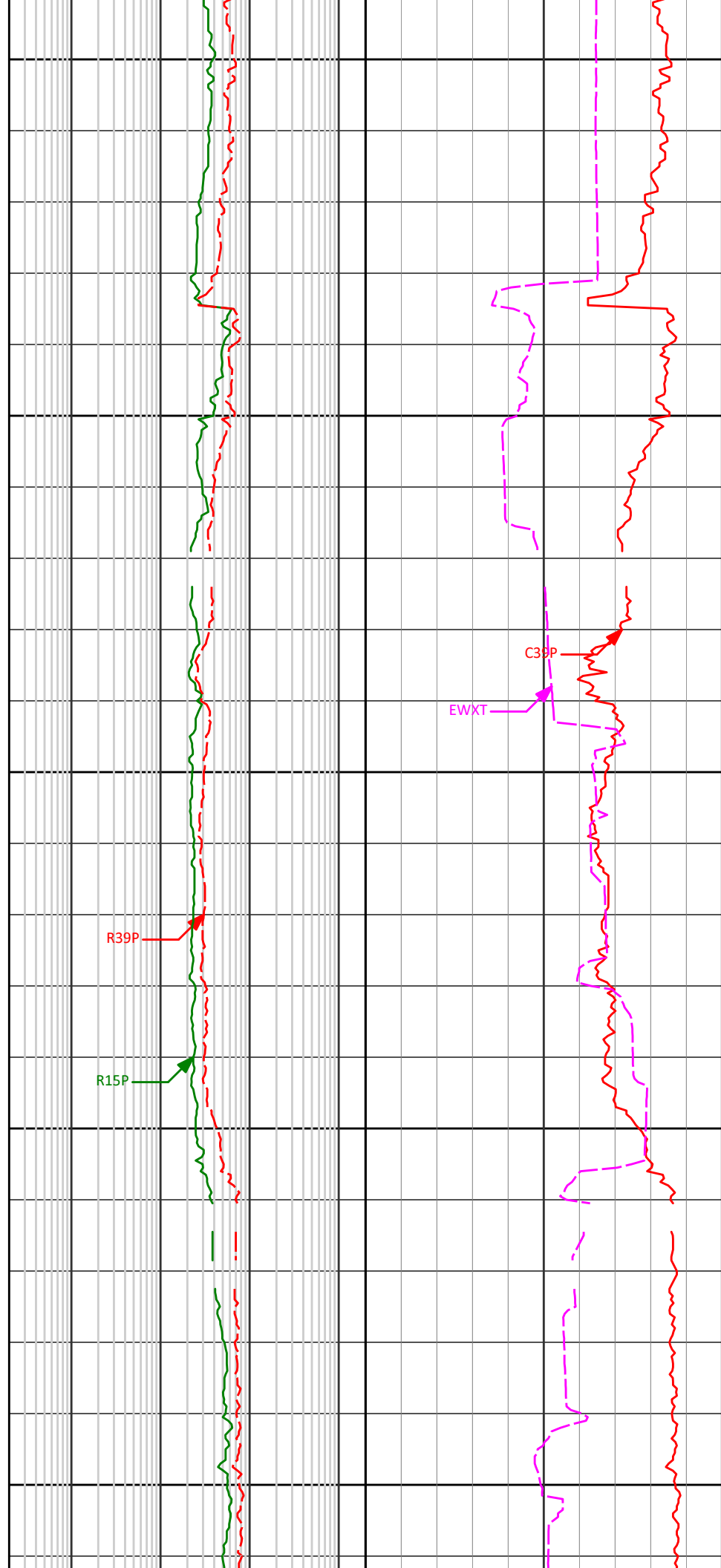
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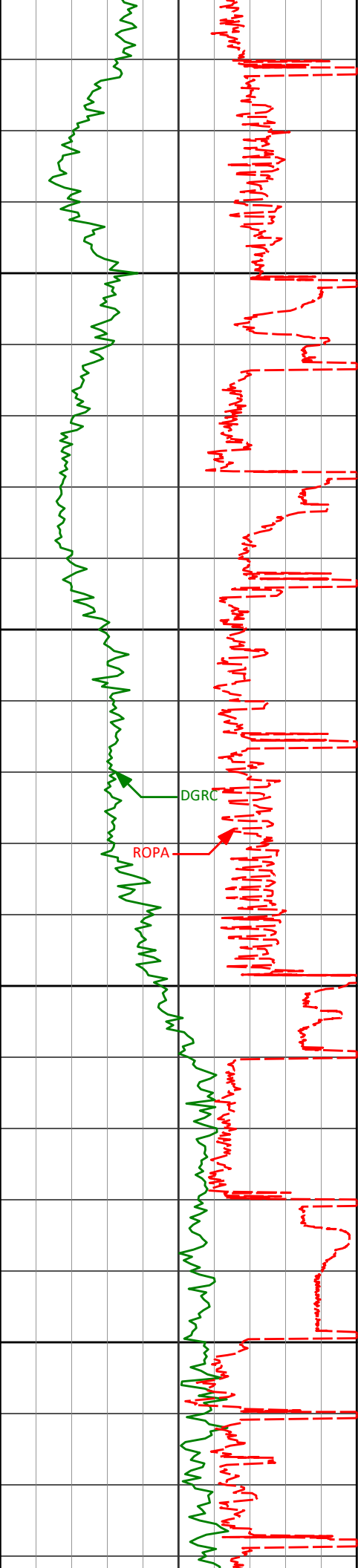
10050

10100

10150

10200



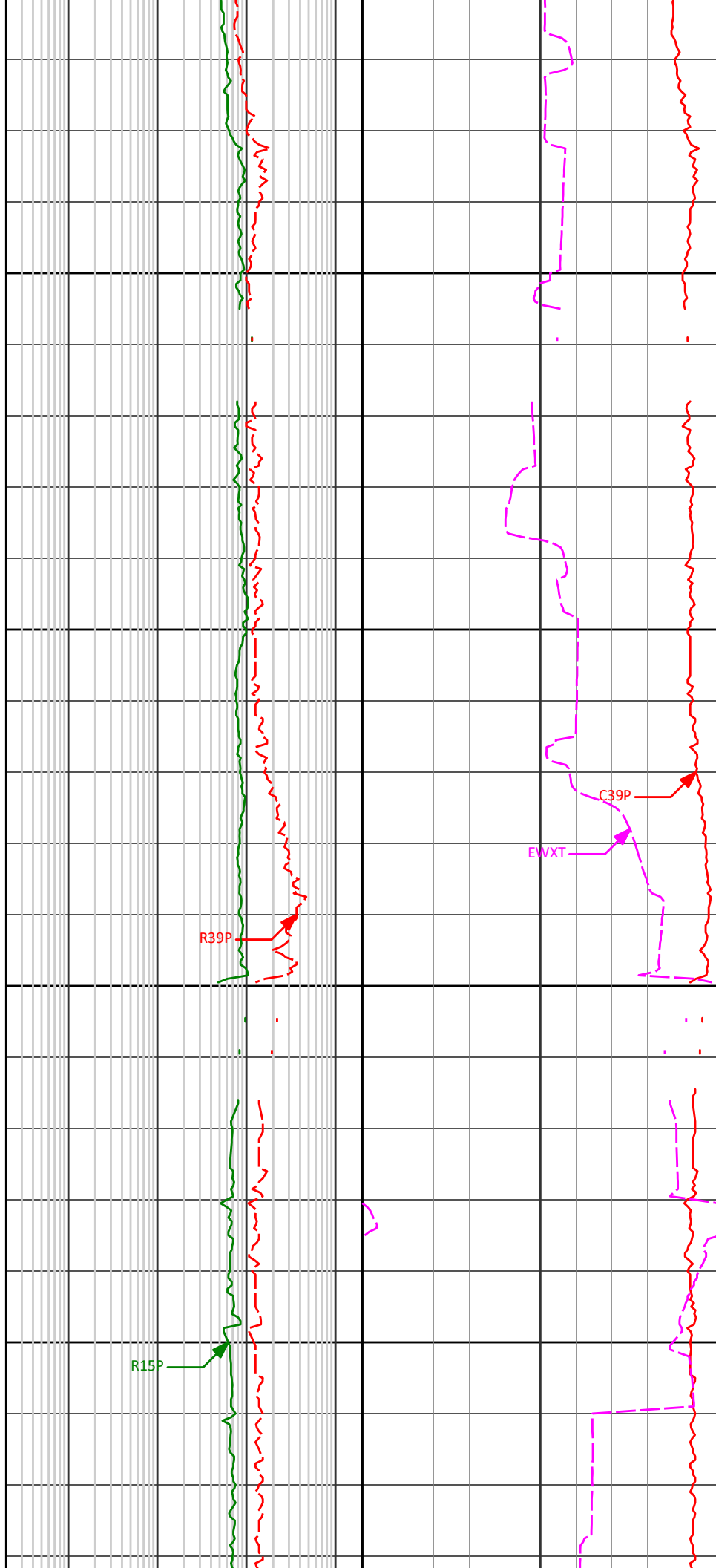


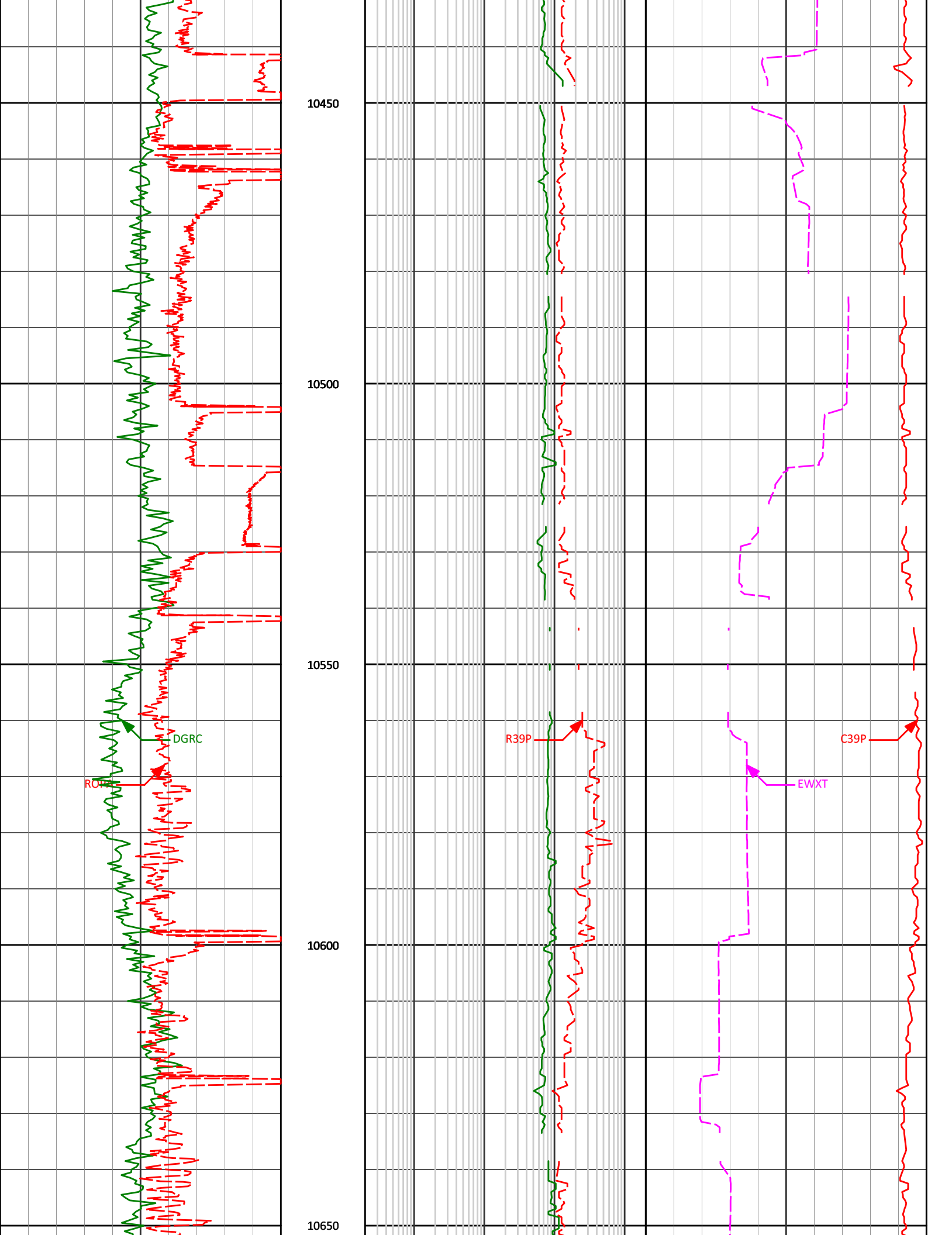
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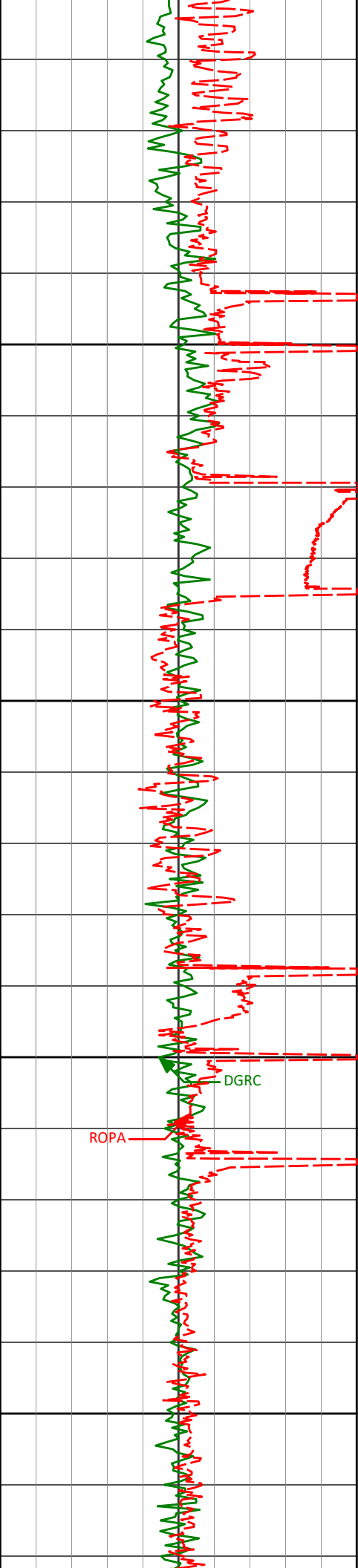
10300

10350

10400





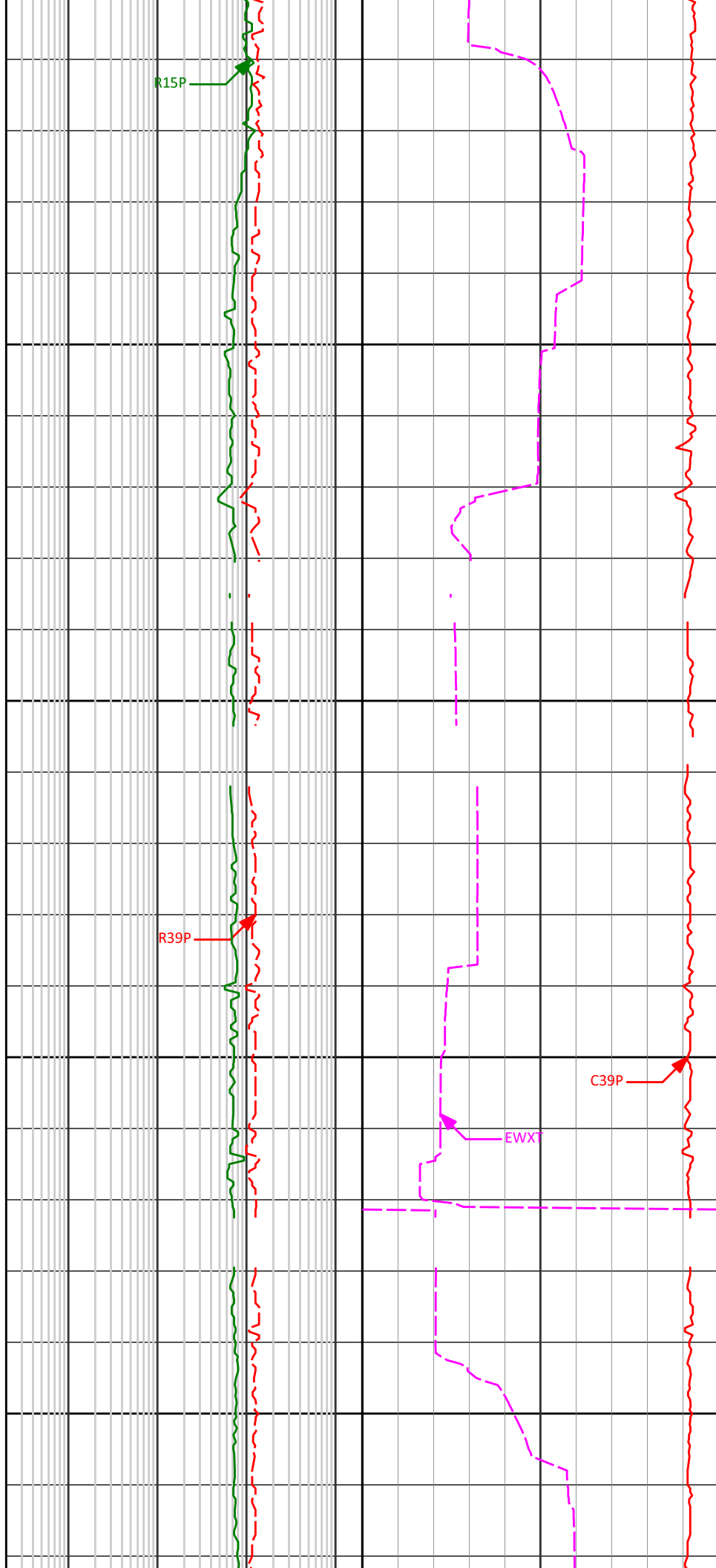


10700

10750

10800

10850

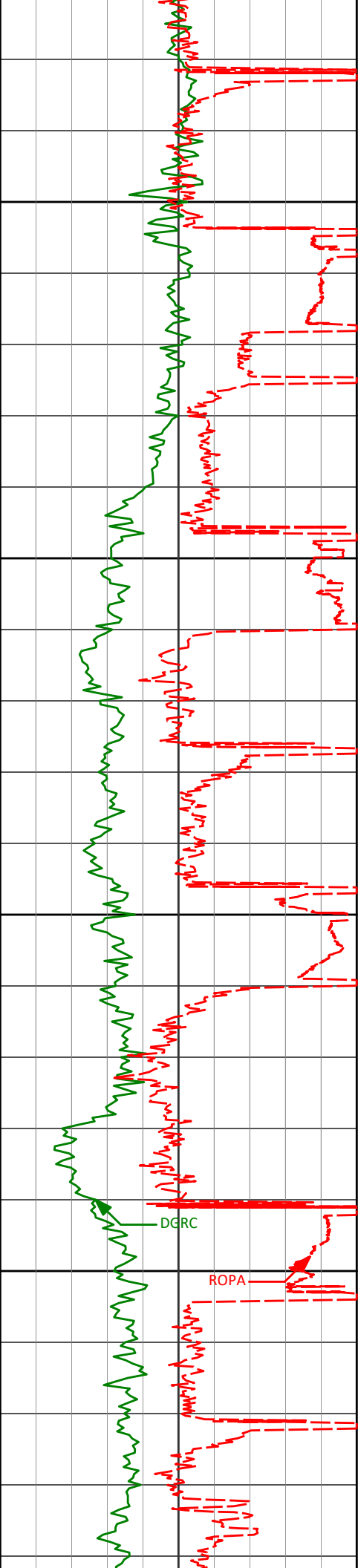


R15P

R39P

C39P

EWXT

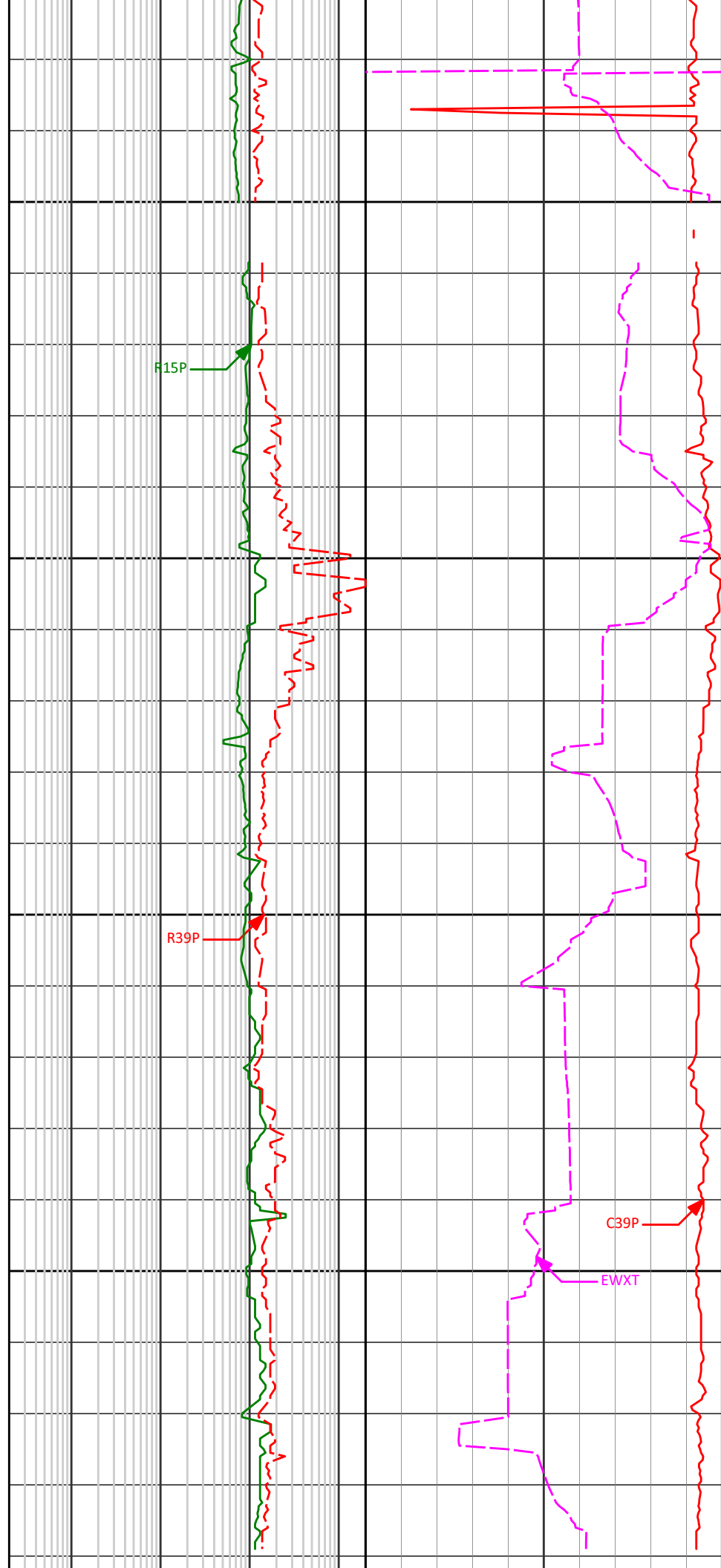


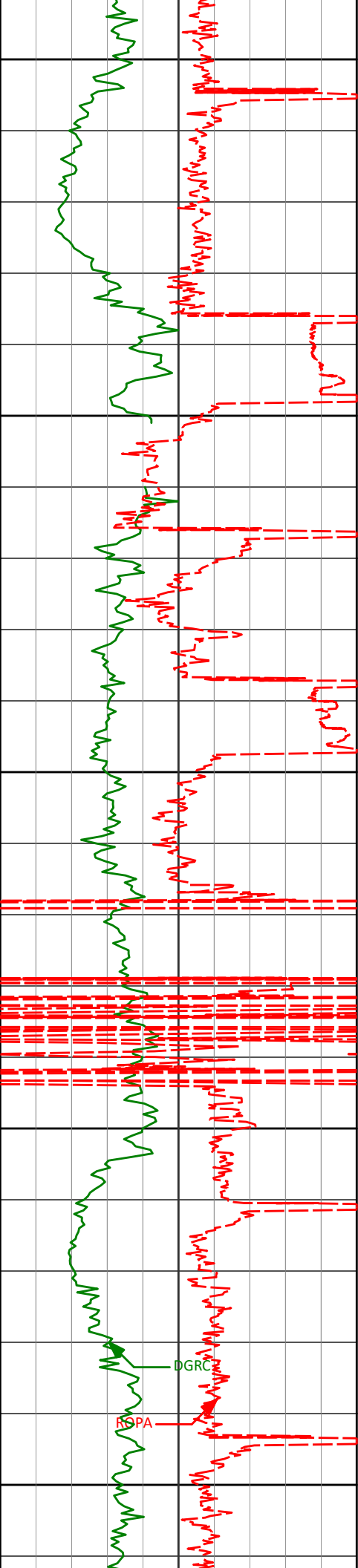
10900

10950

11000

11050





11100

11150

11200

11250

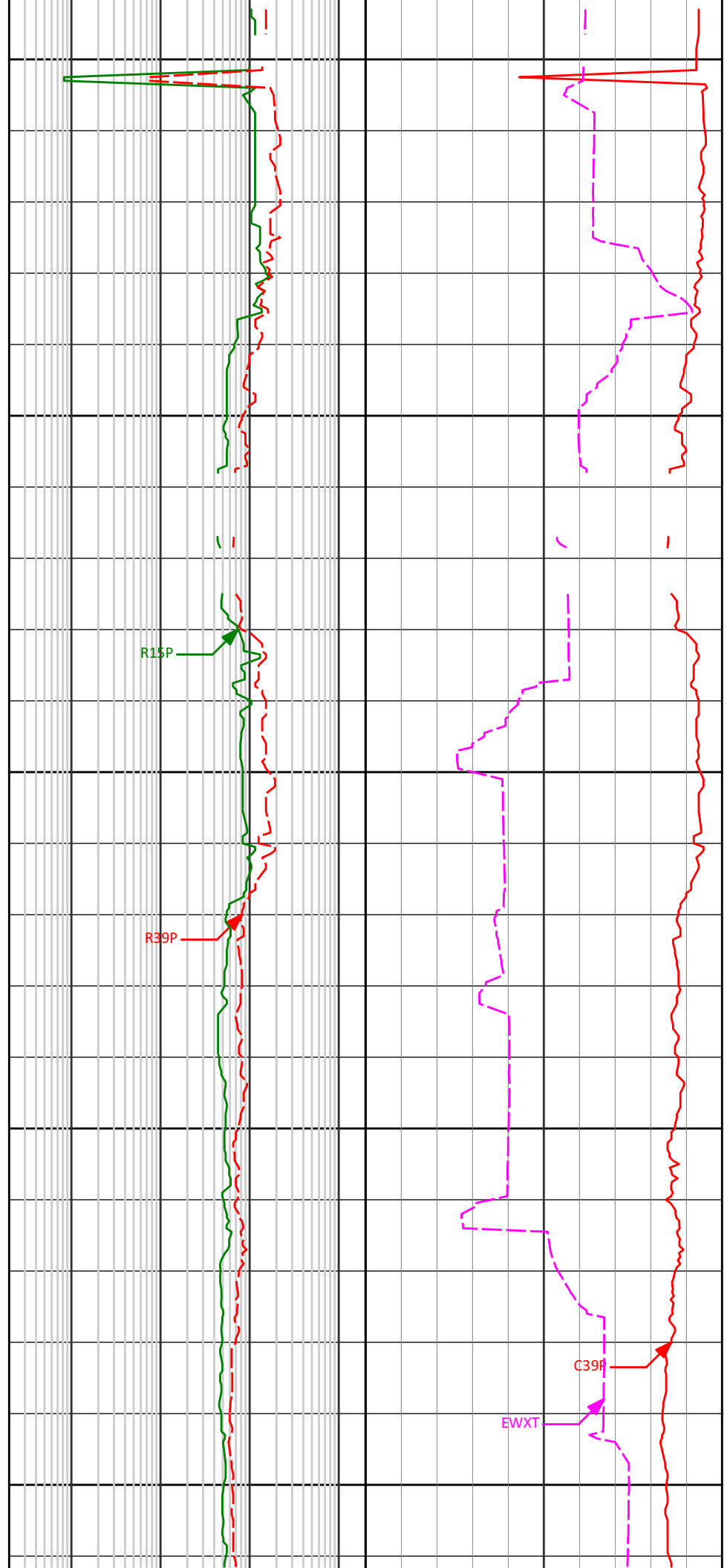
11300

R15P

R39P

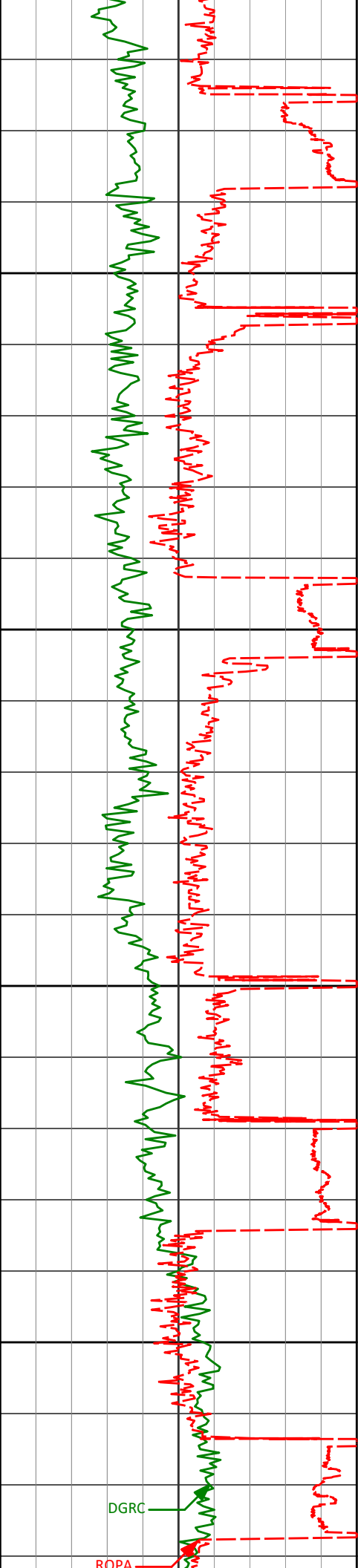
DGRC

RSPA



C39P

EWXT



11350

11400

11450

11500

DGRC

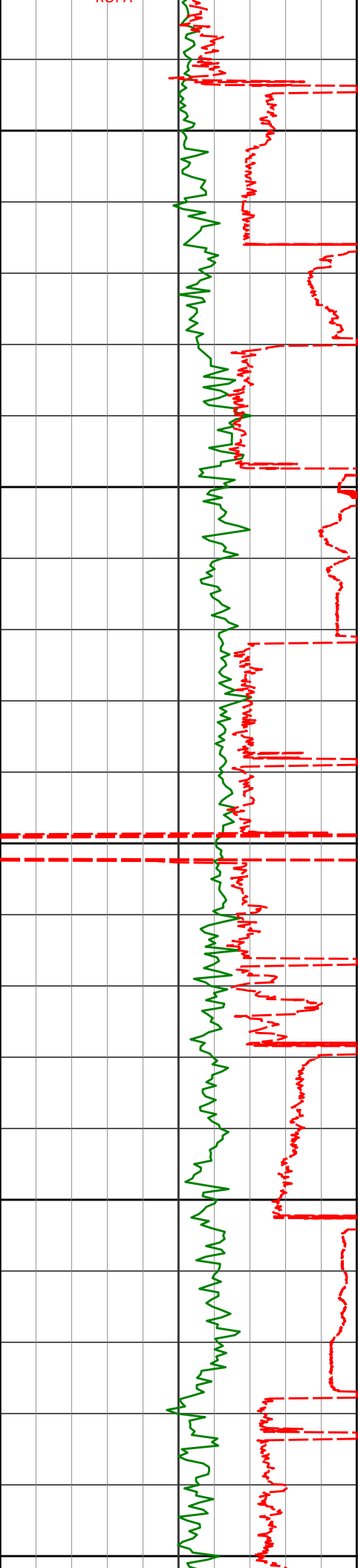
ROPA

R15P

R39P

C39P

FWXT



11550

11600

11650

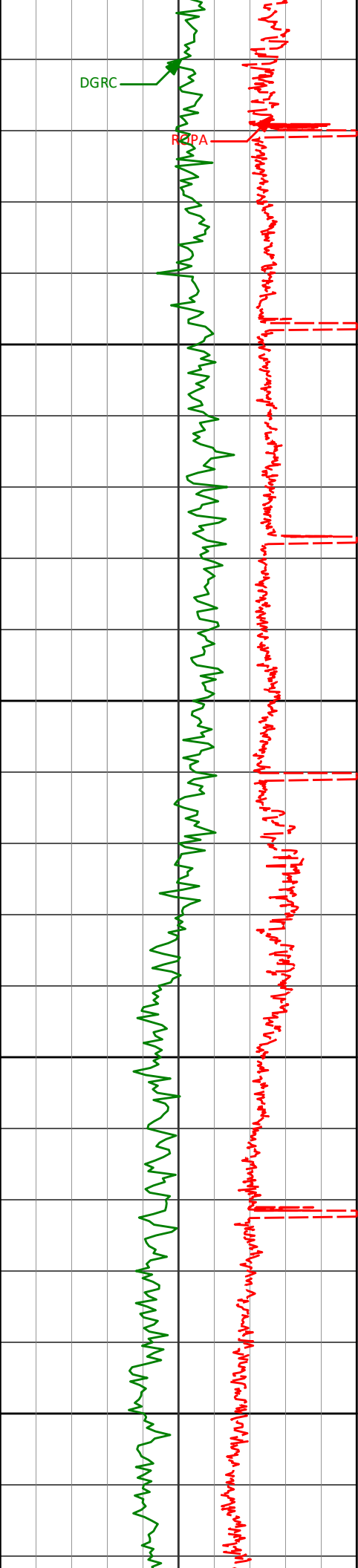
11700

11750

R39P

R15P



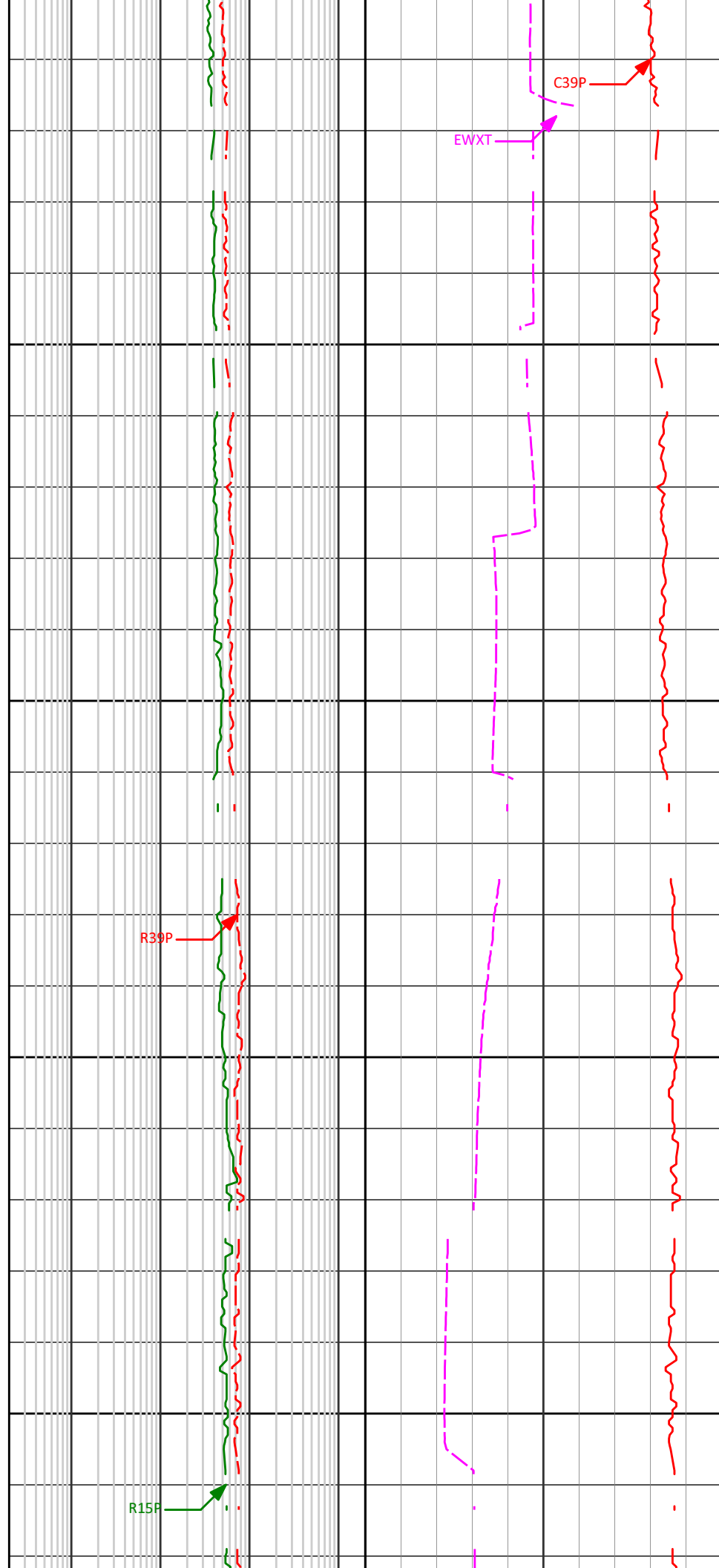


11800

11850

11900

11950

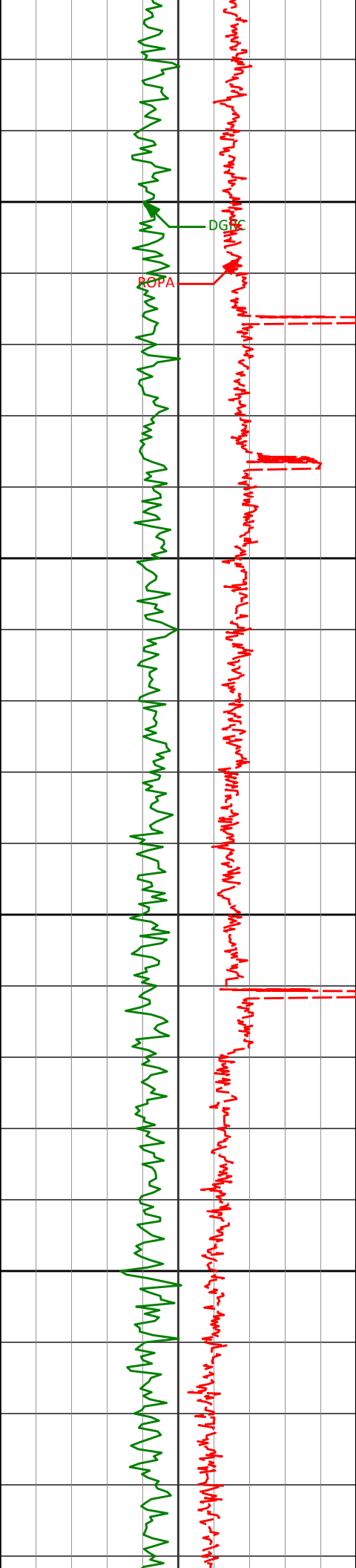


R39P

EWXT

C39P

R15P

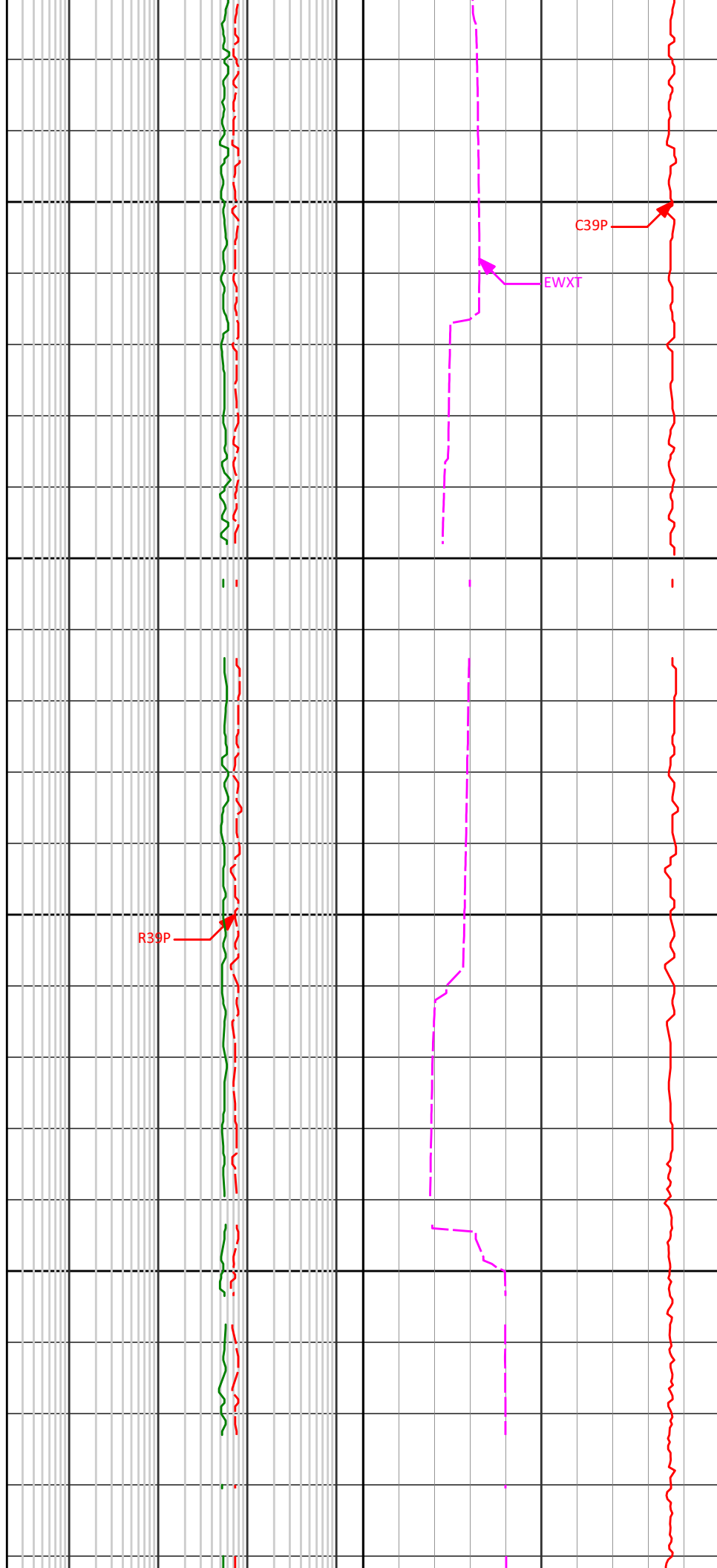


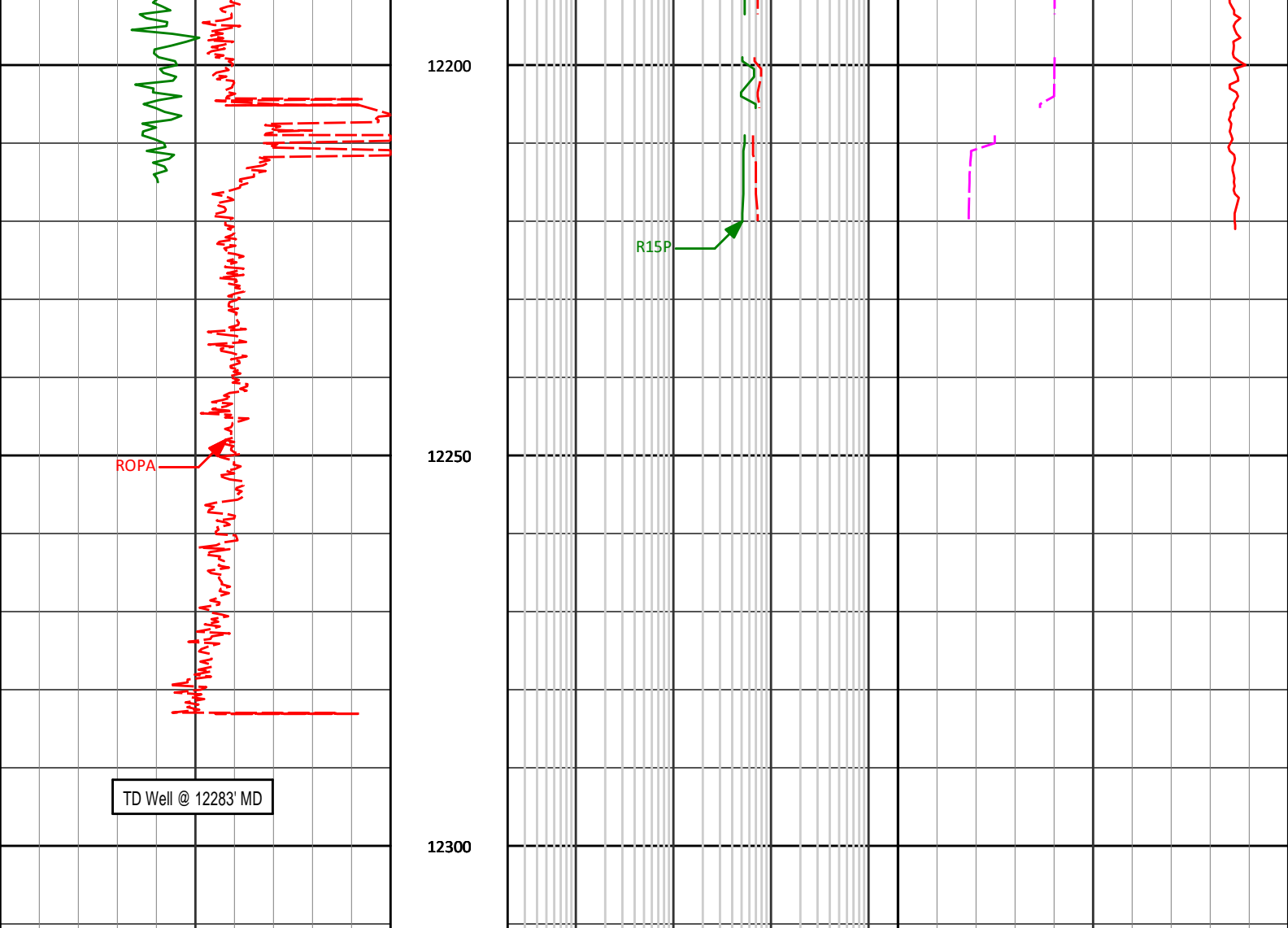
12000

12050

12100

12150



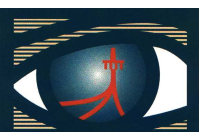


Avg Rate of Penetration ROPA <div> <div></div> <div>500</div> <div>feet per hr</div> <div>0</div> </div>	MD	X-Shallow (9in) Phase Resistivity R09P <div> <div></div> <div>0.2</div> <div>ohm-metre</div> <div>2K</div> </div>	Deep (39in) Conductivity C39P <div> <div></div> <div>100</div> <div>mmho/m</div> <div>0</div> </div>
		Shallow (15in) Phase Resistivity R15P <div> <div></div> <div>0.2</div> <div>ohm-metre</div> <div>2K</div> </div>	EWR Formation Exposure Time EWXT <div> <div></div> <div>0</div> <div>minutes</div> <div>100</div> </div>
		Medium (27in) Phase Resistivity R27P <div> <div></div> <div>0.2</div> <div>ohm-metre</div> <div>2K</div> </div>	
		39in Phase Resistivity BC R39P <div> <div></div> <div>0.2</div> <div>ohm-metre</div> <div>2K</div> </div>	
Gamma Ray Combined DGRC <div> <div></div> <div>0</div> <div>api</div> <div>300</div> </div>			

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Sperry Drilling Services

MD Detail Log 1:240



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DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp.
Turkey Springs 3N-14hZ
Wattenburg
Weld Colorado
USA
CA-XX-0900382956

<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>
1010.00	0.13	173.81	1009.99	2.52 N	3.46 W	2.43	TIE-IN
1100.00	0.17	272.98	1099.99	2.43 N	3.58 W	2.33	0.26
1192.00	0.35	296.38	1191.99	2.56 N	3.97 W	2.45	0.22
1284.00	0.43	302.99	1283.99	2.87 N	4.51 W	2.75	0.10
1376.00	0.22	338.41	1375.99	3.22 N	4.87 W	3.09	0.31
1468.00	0.21	289.07	1467.98	3.44 N	5.09 W	3.30	0.20
1560.00	2.07	301.69	1559.96	4.37 N	6.66 W	4.19	2.03
1652.00	4.71	329.92	1651.80	8.51 N	9.97 W	8.24	3.31
1744.00	4.68	326.36	1743.49	14.91 N	13.94 W	14.52	0.32
1836.00	7.24	316.82	1834.99	22.26 N	19.99 W	21.71	2.97
1928.00	9.31	318.60	1926.02	32.07 N	28.88 W	31.28	2.27
2020.00	9.30	318.42	2016.81	43.21 N	38.74 W	42.15	0.03
2112.00	10.92	315.83	2107.38	55.02 N	49.74 W	53.66	1.83
2204.00	13.65	307.05	2197.28	67.82 N	64.48 W	66.05	3.59
2296.00	15.25	305.71	2286.36	81.42 N	82.97 W	79.15	1.78
2388.00	16.06	298.79	2374.96	94.61 N	103.95 W	91.77	2.21
2480.00	17.31	294.84	2463.08	106.49 N	127.53 W	103.01	1.83
2572.00	17.60	291.15	2550.85	117.26 N	152.92 W	113.08	1.24
2667.00	16.16	291.31	2641.76	127.25 N	178.63 W	122.37	1.52
2761.00	17.56	290.91	2731.71	137.06 N	204.07 W	131.49	1.49
2856.00	17.04	289.48	2822.42	146.82 N	230.58 W	140.53	0.71
2950.00	17.44	287.48	2912.19	155.65 N	257.00 W	148.64	0.76
3045.00	17.06	286.48	3002.92	163.87 N	283.94 W	156.13	0.51
3139.00	19.10	288.44	3092.27	172.65 N	311.75 W	164.16	2.26
3234.00	19.44	288.81	3181.95	182.67 N	341.46 W	173.36	0.38
3328.00	19.53	288.67	3270.57	192.74 N	371.16 W	182.63	0.11
3423.00	19.28	288.24	3360.17	202.73 N	401.09 W	191.81	0.30
3518.00	17.62	292.30	3450.29	213.10 N	429.30 W	201.41	2.21
3612.00	16.66	289.82	3540.11	223.06 N	455.14 W	210.67	1.28
3707.00	17.89	295.10	3630.83	233.87 N	481.16 W	220.77	2.10
3802.00	16.99	294.05	3721.47	245.72 N	507.05 W	231.91	1.00
3896.00	17.52	299.81	3811.24	258.35 N	531.87 W	243.87	1.90
3991.00	18.30	300.14	3901.64	272.95 N	557.18 W	257.78	0.83
4085.00	17.19	299.27	3991.16	287.15 N	582.06 W	271.30	1.21
4180.00	15.54	295.77	4082.31	299.55 N	605.77 W	283.05	2.02
4274.00	14.16	304.37	4173.18	311.52 N	626.60 W	294.45	2.76
4369.00	16.97	303.43	4264.69	325.72 N	647.77 W	308.07	2.97
4464.00	18.48	301.30	4355.18	341.18 N	672.20 W	322.87	1.73
4558.00	21.33	299.95	4443.55	357.45 N	699.75 W	338.40	3.07
4653.00	19.98	299.92	4532.45	374.18 N	728.79 W	354.33	1.42
4747.00	21.55	296.08	4620.34	389.78 N	758.22 W	369.13	2.21
4842.00	20.67	294.74	4708.97	404.47 N	789.12 W	382.97	1.06
4936.00	19.41	294.99	4797.27	418.01 N	818.34 W	395.72	1.34
5031.00	18.15	294.54	4887.21	430.82 N	846.11 W	407.78	1.34
5126.00	20.33	291.34	4976.90	442.98 N	874.95 W	419.15	2.55
5220.00	20.19	291.94	5065.09	454.98 N	905.20 W	430.33	0.27
5315.00	18.90	291.97	5154.61	466.86 N	934.68 W	441.41	1.36
5409.00	17.74	292.06	5243.85	477.93 N	962.07 W	451.74	1.23
5504.00	16.47	291.25	5334.64	488.25 N	988.04 W	461.35	1.36
5598.00	15.66	290.27	5424.97	497.48 N	1012.36 W	469.91	0.91
5693.00	14.99	290.31	5516.59	506.18 N	1035.91 W	477.98	0.71
5787.00	13.12	289.52	5607.77	513.97 N	1057.37 W	485.18	2.00
5882.00	13.94	293.55	5700.14	522.14 N	1078.02 W	492.79	1.31
5976.00	13.17	291.48	5791.52	530.59 N	1098.37 W	500.68	0.97
6071.00	11.61	290.46	5884.31	537.89 N	1117.39 W	507.47	1.66
6166.00	13.20	294.03	5977.09	545.65 N	1136.26 W	514.72	1.86
6260.00	11.55	291.48	6068.90	553.47 N	1154.82 W	522.03	1.85
6355.00	9.36	286.63	6162.32	559.16 N	1171.07 W	527.28	2.48
6449.00	7.61	286.08	6255.29	563.08 N	1184.38 W	530.83	1.86

6544.00	6.36	286.46	6349.58	566.31 N	1195.47 W	533.77	1.32
6638.00	5.09	279.28	6443.11	568.46 N	1204.58 W	535.67	1.55
6733.00	3.79	292.25	6537.83	570.33 N	1211.64 W	537.34	1.72
6828.00	3.23	336.64	6632.66	573.97 N	1215.61 W	540.88	2.84
6875.00	7.10	4.70	6679.47	578.08 N	1215.90 W	544.98	9.60
6922.00	12.53	2.16	6725.77	586.08 N	1215.47 W	552.99	11.59
6969.00	16.99	1.48	6771.20	598.05 N	1215.10 W	564.96	9.50
7017.00	21.00	1.81	6816.58	613.66 N	1214.65 W	580.58	8.36
7064.00	21.64	0.23	6860.36	630.74 N	1214.35 W	597.66	1.83
7112.00	24.76	1.45	6904.48	649.65 N	1214.06 W	616.57	6.58
7159.00	24.56	0.52	6947.19	669.25 N	1213.72 W	636.18	0.93
7206.00	29.17	1.75	6989.11	690.48 N	1213.28 W	657.41	9.88
7253.00	28.83	0.52	7030.21	713.26 N	1212.83 W	680.19	1.46
7301.00	35.30	359.90	7070.87	738.73 N	1212.75 W	705.65	13.50
7348.00	37.63	1.01	7108.67	766.66 N	1212.52 W	733.58	5.15
7395.00	39.90	1.95	7145.31	796.07 N	1211.75 W	763.01	4.99
7442.00	42.61	2.76	7180.64	827.04 N	1210.47 W	793.99	5.88
7490.00	45.56	2.75	7215.12	860.39 N	1208.87 W	827.38	6.15
7537.00	48.25	2.06	7247.23	894.68 N	1207.43 W	861.69	5.82
7585.00	52.50	1.22	7277.83	931.62 N	1206.38 W	898.65	8.96
7632.00	56.37	1.65	7305.16	969.84 N	1205.42 W	936.88	8.27
7679.00	58.16	2.20	7330.58	1009.35 N	1204.09 W	976.41	3.93
7726.00	60.26	2.92	7354.63	1049.68 N	1202.28 W	1016.77	4.66
7774.00	63.06	4.36	7377.42	1091.84 N	1199.60 W	1058.99	6.40
7821.00	65.67	5.02	7397.75	1134.06 N	1196.13 W	1101.29	5.70
7868.00	69.75	2.82	7415.58	1177.44 N	1193.17 W	1144.73	9.70
7915.00	74.51	1.34	7430.00	1222.13 N	1191.55 W	1189.45	10.56
7963.00	77.98	0.78	7441.41	1268.73 N	1190.69 W	1236.06	7.32
8010.00	81.26	1.43	7449.87	1314.95 N	1189.80 W	1282.29	7.11
8058.00	86.12	0.99	7455.15	1362.63 N	1188.79 W	1329.98	10.17
8185.00	89.57	359.55	7459.92	1489.52 N	1188.20 W	1456.84	2.94
8280.00	89.32	0.24	7460.84	1584.52 N	1188.37 W	1551.79	0.77
8374.00	90.56	358.97	7460.94	1678.51 N	1189.02 W	1645.73	1.89
8469.00	92.04	358.60	7458.79	1773.46 N	1191.03 W	1740.59	1.61
8564.00	92.16	359.56	7455.31	1868.38 N	1192.56 W	1835.44	1.02
8658.00	91.11	0.17	7452.62	1962.34 N	1192.78 W	1929.36	1.29
8753.00	89.38	0.58	7452.22	2057.34 N	1192.16 W	2024.34	1.87
8847.00	89.51	359.00	7453.13	2151.33 N	1192.50 W	2118.28	1.69
8942.00	89.13	0.43	7454.25	2246.32 N	1192.98 W	2213.23	1.56
9036.00	89.07	0.82	7455.73	2340.30 N	1191.95 W	2307.20	0.42
9131.00	89.81	358.42	7456.66	2435.29 N	1192.58 W	2402.14	2.64
9226.00	90.00	0.06	7456.82	2530.27 N	1193.84 W	2497.06	1.74
9320.00	90.25	1.60	7456.61	2624.26 N	1192.48 W	2591.05	1.66
9415.00	90.56	3.83	7455.94	2719.15 N	1187.98 W	2686.02	2.37
9509.00	90.49	0.45	7455.08	2813.06 N	1184.47 W	2779.99	3.60
9604.00	90.56	3.87	7454.21	2907.98 N	1180.89 W	2874.97	3.60
9698.00	90.74	2.20	7453.14	3001.84 N	1175.91 W	2968.93	1.79
9793.00	88.76	1.51	7453.56	3096.78 N	1172.84 W	3063.92	2.21
9888.00	88.08	2.83	7456.18	3191.67 N	1169.24 W	3158.88	1.56
9982.00	85.74	1.37	7461.24	3285.46 N	1165.80 W	3252.73	2.93
10077.00	83.68	0.25	7470.00	3380.04 N	1164.46 W	3347.31	2.47
10171.00	84.93	0.51	7479.33	3473.58 N	1163.84 W	3440.82	1.36
10266.00	86.66	1.84	7486.30	3568.29 N	1161.90 W	3535.56	2.29
10360.00	88.95	2.43	7489.90	3662.15 N	1158.40 W	3629.48	2.52
10455.00	89.01	2.54	7491.59	3757.05 N	1154.28 W	3724.45	0.13
10549.00	91.11	3.92	7491.49	3850.89 N	1148.99 W	3818.40	2.67
10644.00	88.70	3.05	7491.65	3945.71 N	1143.21 W	3913.34	2.70
10738.00	90.19	6.77	7492.56	4039.34 N	1135.17 W	4007.16	4.26
10833.00	91.24	9.63	7491.37	4133.35 N	1121.62 W	4101.50	3.21
10928.00	91.91	9.70	7488.76	4226.97 N	1105.68 W	4195.51	0.71
11022.00	88.64	6.28	7488.31	4320.03 N	1092.62 W	4288.89	5.03
11117.00	90.87	4.84	7488.72	4414.57 N	1083.41 W	4383.65	2.79
11211.00	88.33	1.80	7489.37	4508.39 N	1077.97 W	4477.58	4.21
11306.00	86.85	0.18	7493.37	4603.29 N	1076.33 W	4572.49	2.31
11401.00	86.60	1.98	7498.79	4698.11 N	1074.54 W	4667.33	1.91
11495.00	86.66	2.18	7504.32	4791.89 N	1071.14 W	4761.16	0.22
11590.00	88.27	2.44	7508.52	4886.71 N	1067.31 W	4856.06	1.72
11684.00	90.00	1.31	7509.94	4980.65 N	1064.23 W	4950.04	2.20
11779.00	92.78	1.16	7507.64	5075.59 N	1062.19 W	5045.00	2.93
11874.00	92.41	0.04	7503.33	5170.48 N	1061.19 W	5139.89	1.24
11968.00	92.29	0.88	7499.48	5264.40 N	1060.44 W	5233.79	0.90

12063.00	91.67	359.47	7496.20	5359.34 N	1060.15 W	5328.70	1.62
12158.00	90.80	359.58	7494.15	5454.31 N	1060.94 W	5423.62	0.92
12233.00	89.94	0.89	7493.67	5529.31 N	1060.63 W	5498.60	2.09
12283.00	89.94	0.89	7493.72	5579.30 N	1059.85 W	5548.59	0.00

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 1.55 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.59 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12283.00 FEET
IS 5679.08 FEET ALONG 349.24 DEGREES (TRUE)**

Final survey is a projection to bit.

Date Printed:04 July 2013