HALLIBURTON | Sperry Drilling

SLIM PHASE 4
DGR Dual Gamma Ray

Powered by INSITE™

1 : 240

Country : **USA**
Field : **Wattenberg**
Location : **Lat: 40° 10' 35.12" North**
Long: 104° 43' 41.82" West
Well : **USA FED 29C-36HZ**
Company : **Anadarko**
Rig : **Ensign 132**

Company : **Anadarko**
Rig : **Ensign 132**
Well : **USA FED 29C-36HZ**
Field : **Wattenberg**
Country : **USA**
API Number : **05123368480000**

LOCATION
Latitude : **40° 10' 35.12" North**
Longitude : **104° 43' 41.82" West**
UTM Easting = **3,215,637.018 ft**
UTM Northing = **1,308,052.116 ft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level**
Elevation : **5003.00 ft**
Log Measured From : **Drill Floor** **13.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

MD LOG

Elev. KB **N/A**
DF **5016.00 ft**
GL **5003.00 ft**
WD **N/A**

Depth Logged : **7,775.00 ft** To **11,955.00 ft**
Date Logged : **13-Jul-13** To **23-Jul-13**
Total Depth MD : **11,955.00 ft** TVD : **7,418.16 ft**
Spud Date : **15-Jul-13**

Unit No. : **11210429** Job No. : **CA-XX-0900382959**

Plot Type : **Final**
Plot Date : **08-Aug-13**

Run No.	Borehole Record (MD) Size	From	To
0400	6.125 in	7,775.00 ft	11,955.00 ft

Run No.	Borehole Record (MD) Size	From	To

Casing Record (MD)

Size	Weight	From	To
9.625 in	36.00 lbpf	SURFACE	936.00 ft
7.000 in	27.00 lbpf	SURFACE	7,765.00 ft

WELL INFORMATION

MWD Run Number	400																										
Date run completed	23-Jul-13																										
Rig Bit Number	0400																										
Bit Size (in)	6.125																										
Tool Nominal OD (in)	4.750																										
Log Start Depth (MD, ft)	7,775.00																										
Log End Depth (MD, ft)	11,955.00																										
Drill or Wipe	Drill																										
Drill/Wipe Start Date and Time	21-Jul-13 16:30																										
Drill/Wipe End Date and Time	23-Jul-13 01:00																										
Min Inc (deg) @ Depth (MD, ft)	88.08 @ 8,451.00																										
Max Inc (deg) @ Depth (MD, ft)	91.61 @ 11,905.00																										
Bit TFA(in2) / Bit Type	.92 / PDC																										
Flow Rate (gpm)	275.00																										
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A																										
Fluid Type	Fresh Water Gel																										
Density (ppg) / Viscosity (spqt)	9.82 / 38.00																										
Filtrate CL (ppm)	800.00																										
pH / Fluid Loss (mptm)	8.80 / 6																										
PV (cP) / YP (lhf2)	13 / 11.00																										
% Solids / % Sand	9.8 / 1.00																										
% 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																										
Max Tool Temp (degF) / Source	240.23 / HCIM																										
Rm @ Max Tool Temp (degF)	N/A @ 240.23																										
Lead MWD Engineer	Matt Busche																										
Customer Representative	Terry Bradshaw																										

SENSOR INFORMATION

Downhole Processor Information

Tool Type	HCIM				
Software Version	88.56				
Sub Serial Number	90368385				
Insert Serial Number	11709656				
Date and Time Initialized	21-Jul-13 08:20				
Date and Time Read	23-Jul-13 22:06				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	48.06				
Software Version	6.21				
Sub Serial Number	11991621				
Sonde Serial Number	11297584				
Sensor ID Number	N/A				
Toolface Offset (deg)	25.71				

Gamma Ray Sensor Information

Tool Type	DGR				
Distance From Bit (ft)	70.07				
Recorded Sample Period (sec)	8				
Software Version	N/A				
Sub Serial Number	90368385				
Insert/Sonde Serial Number	272793				

Resistivity Sensor Information

Tool Type	Slim P4				
Distance From Bit (ft)	63.08				
Recorded Sample Period (sec)	12				
Software Version	5.55				
Sub Serial Number	156401				
Receiver Insert Serial Number	11265049				
Transmitter Insert Serial Number	270966				
Receiver Orientation	Up				

Pulser Controller Sensor Information

Tool Type	PCM				
Software Version	8.17				
PIC Software Version					
Sub/HOC Serial Number	11635653				
Insert/Probe/Module SN	11227549				
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				
Boot Strap Version					

DDSr-DGR Sensor Information

Tool Type	DDSr-DGR				
Distance From Bit (ft)	72.99				
Recorded Sample Period (sec)	12				
Software Version	10.88				

Sub Serial Number	90368385				
Insert Serial Number	11270393				
Sensor ID Number	6258				

REMARKS

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

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

3. Critical annular velocities have been calculated using the "Power Law" model for water based fluids and the "Bingha Plastic" model for syntheic and oil based fluids.

4. All data presented is recorded (memory) data unless otherwise stated.
   ROPA is realtime data

5. Enviromental parameters used to process the data are as follows:
   Hole Diameter: 6.13 inches
   Mud Weight: 8.5-10.2 ppg
   KCl Concentration: 0%
   Mud Resistivity: 10 ohmm

6. The following smoothing parameters have been applied to the data:
   ROPA: 0.5 ft interval, 1.2 ft coercion distance, 3 ft gap fill
   RXXP: 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
   DGRCC: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill

7. Insite Version 7.4.2

WARRANTY

HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

Anadarko
USA Fed 29C-36HZ
Ensign 132
Weld County, CO

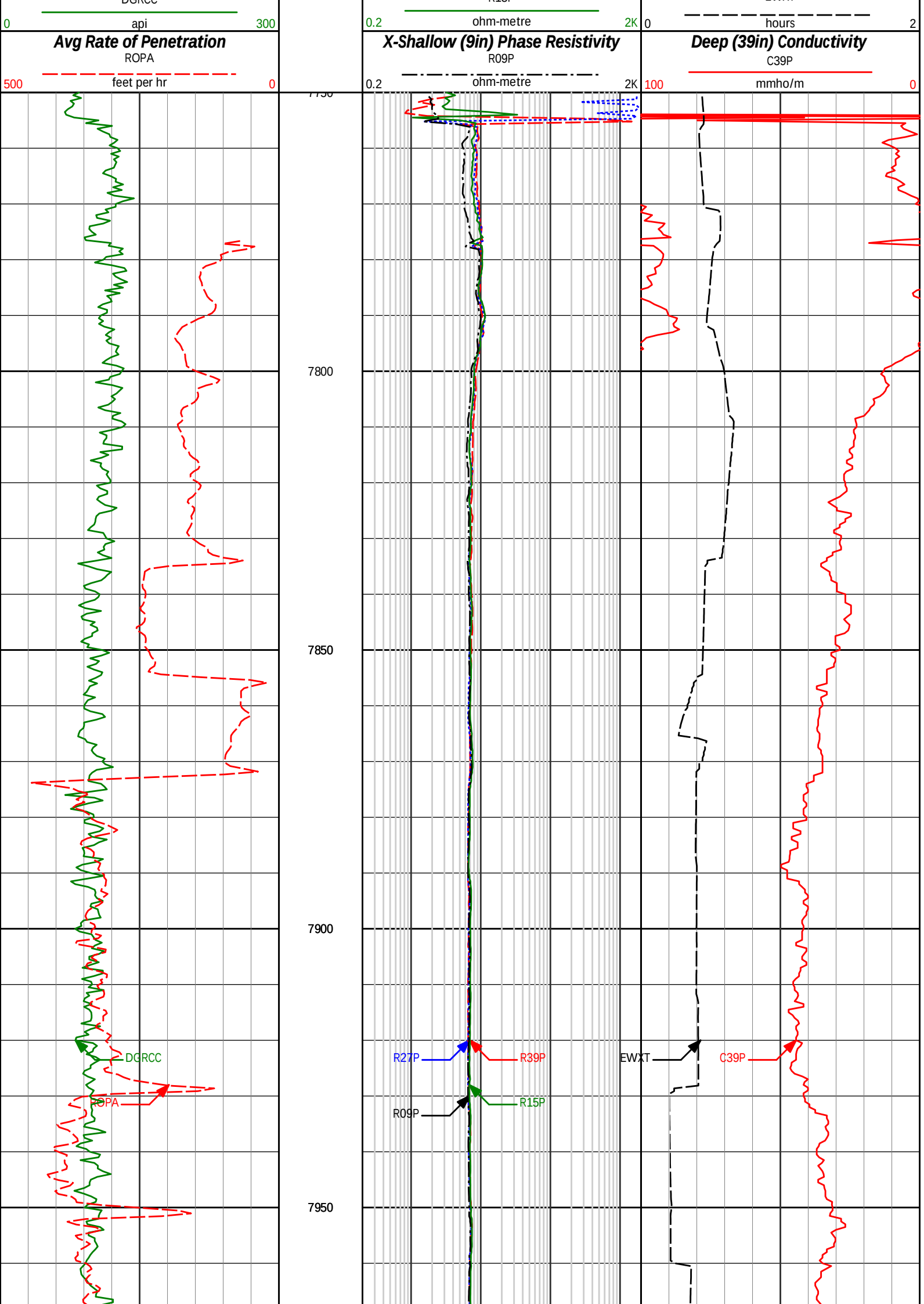
Deep (39in) Phase Resistivity
R39P
0.2 ohm-metre 2K

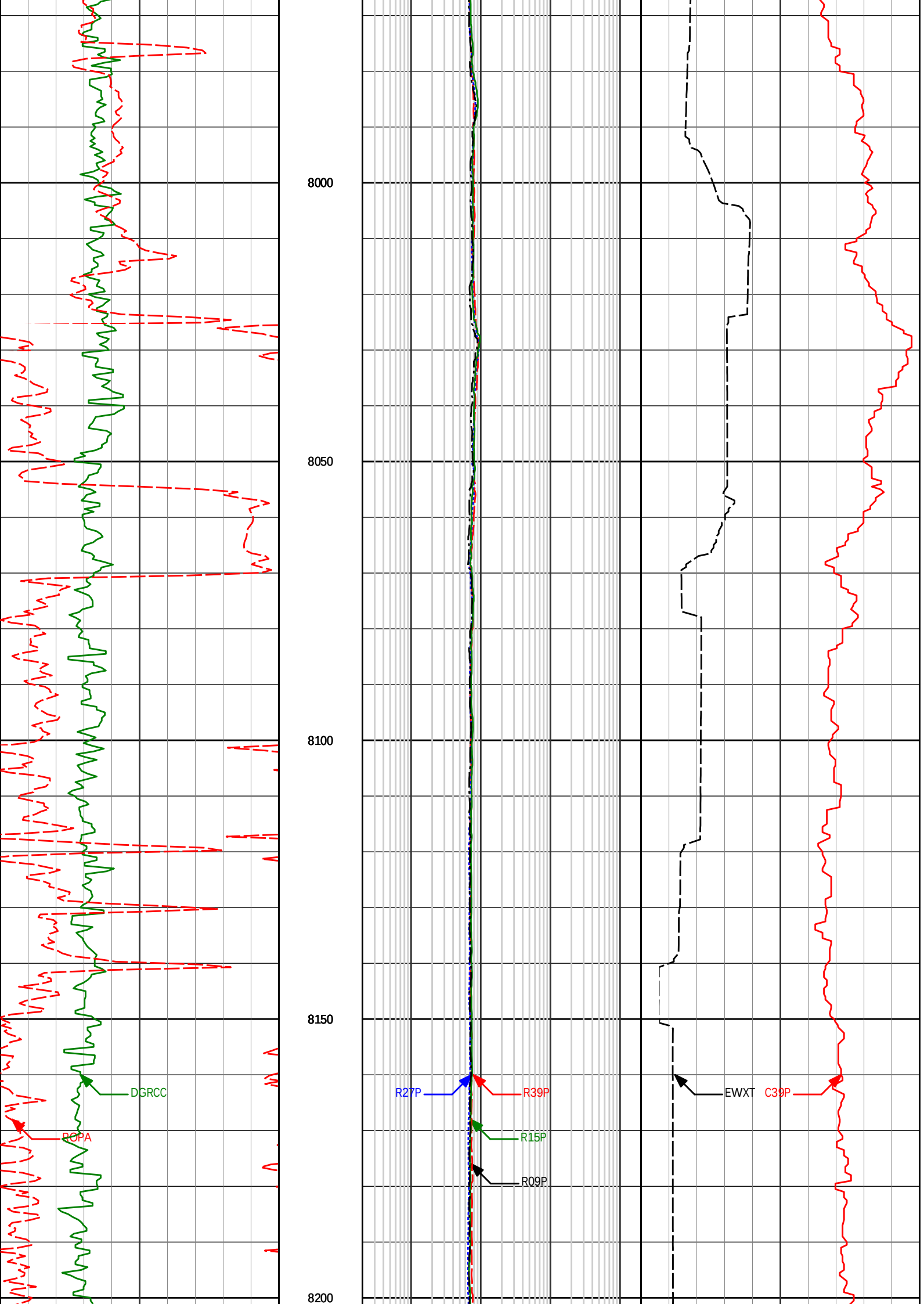
Medium (27in) Phase Resistivity
R27P
0.2 ohm-metre 2K

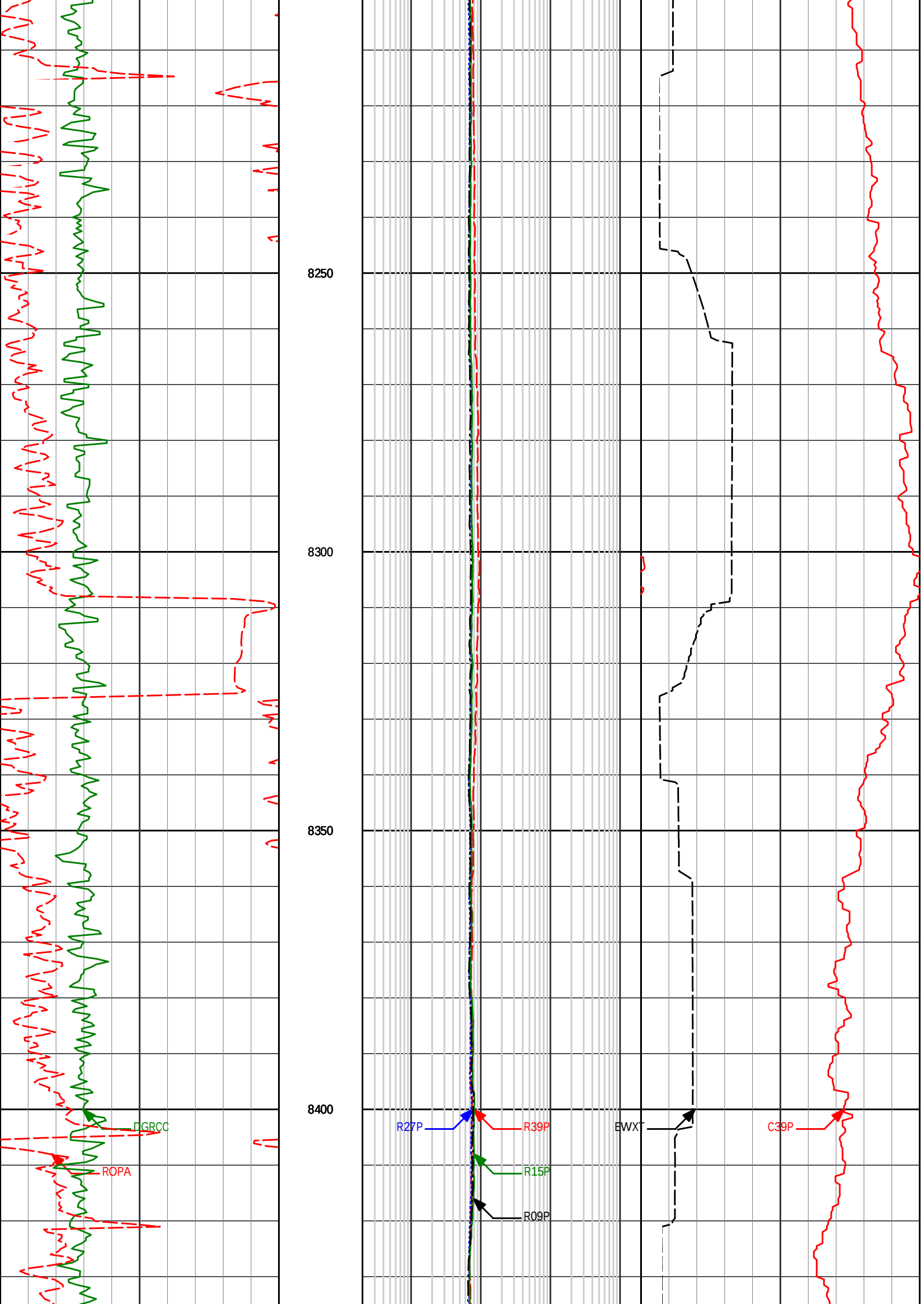
Gamma Ray Combined BCorr
DGRCC

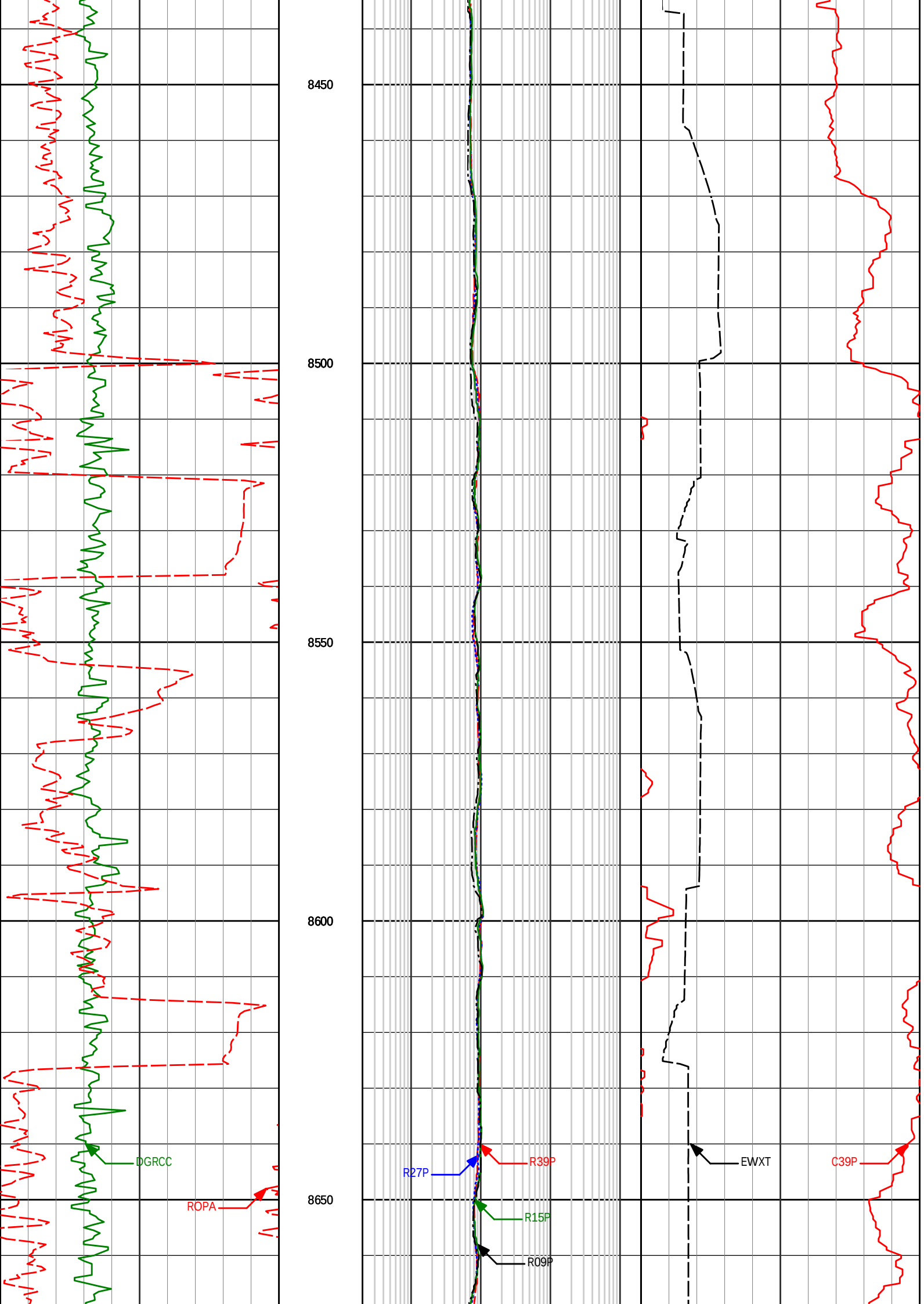
Shallow (15in) Phase Resistivity
R15P

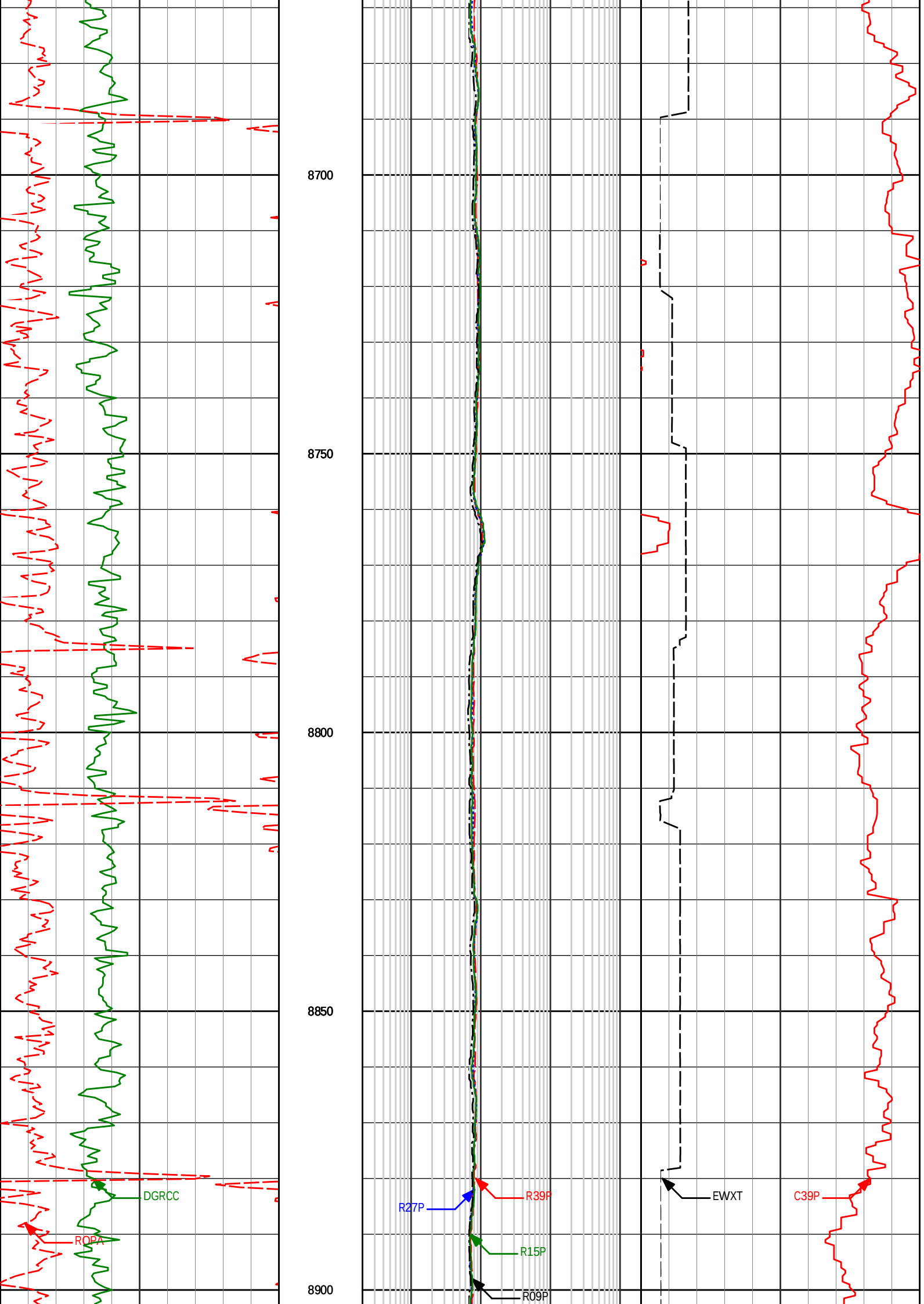
EWR Formation Exposure Time
EWXT

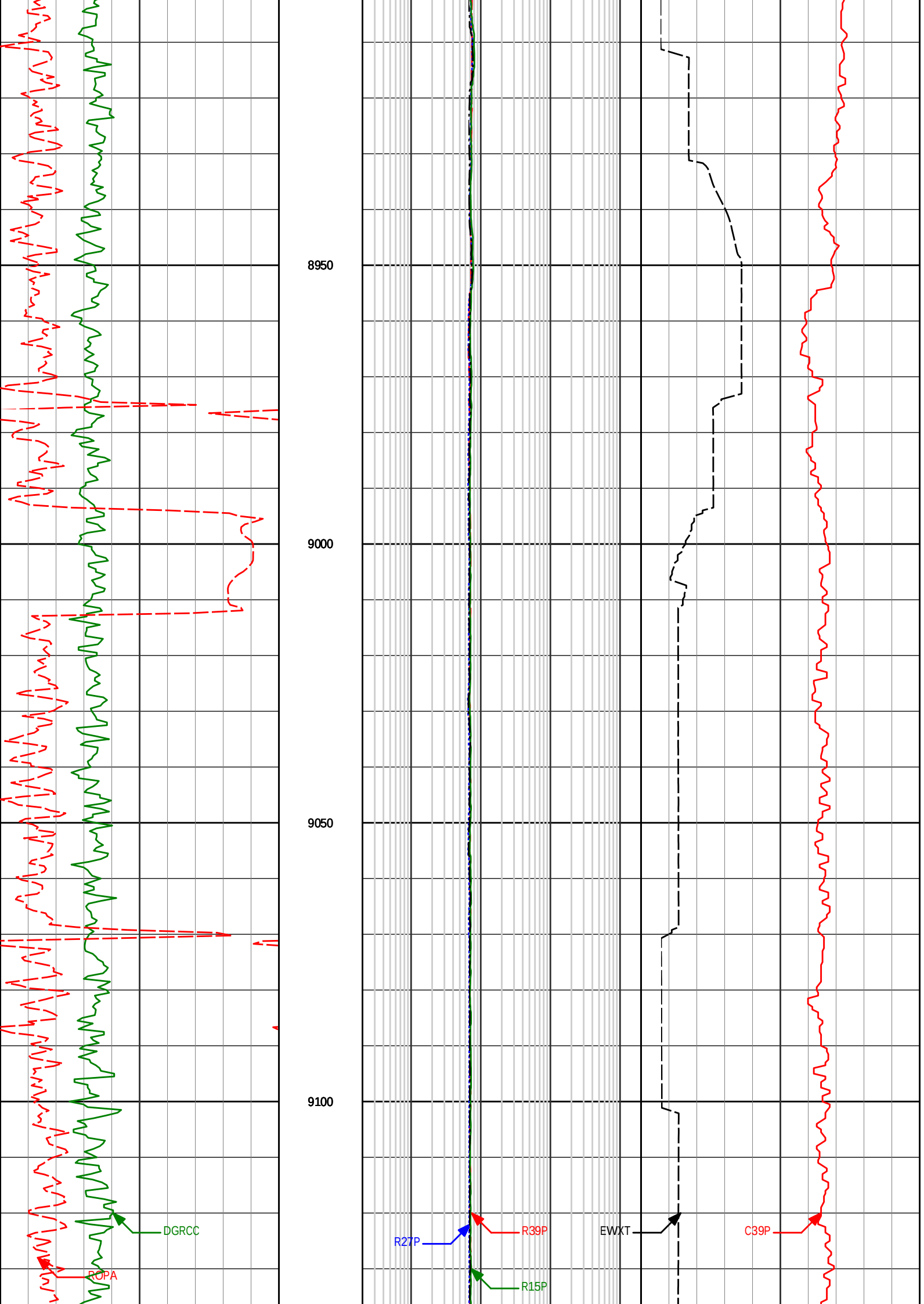

DGRCC
0
api
300
Avg Rate of Penetration
ROPA
500
feet per hr
0
0.2
ohm-metre
2K
X-Shallow (9in) Phase Resistivity
R09P
0.2
ohm-metre
2K
0
hours
2
Deep (39in) Conductivity
C39P
100
mmho/m
0
7800
7850
7900
7950
DGRCC
ROPA
R27P
R39P
R09P
R15P
EWXT
C39P

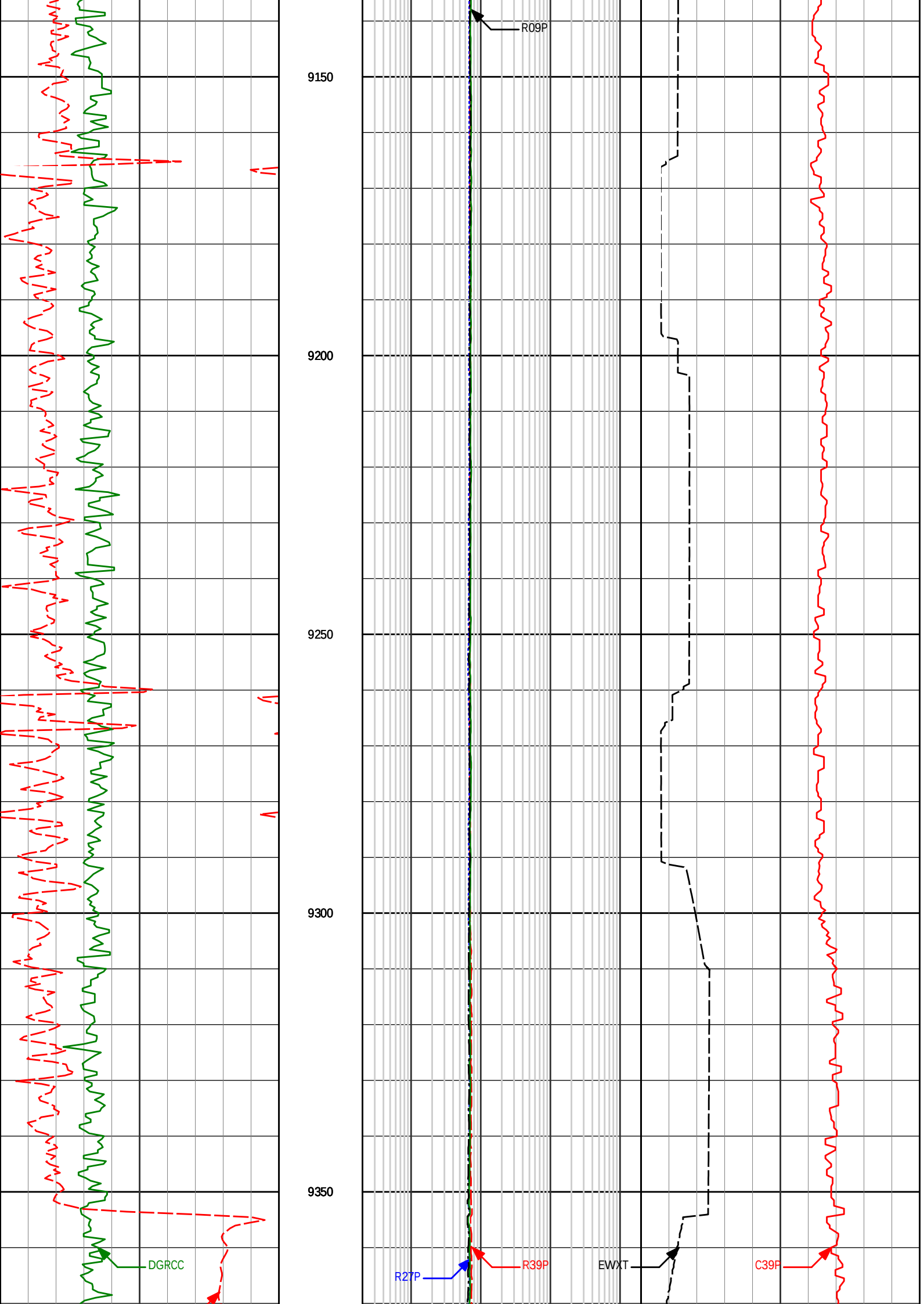

8000
8050
8100
8150
8200
DGRCC
ROPA
R27P
R39P
R15P
R09P
EWXT
C39P

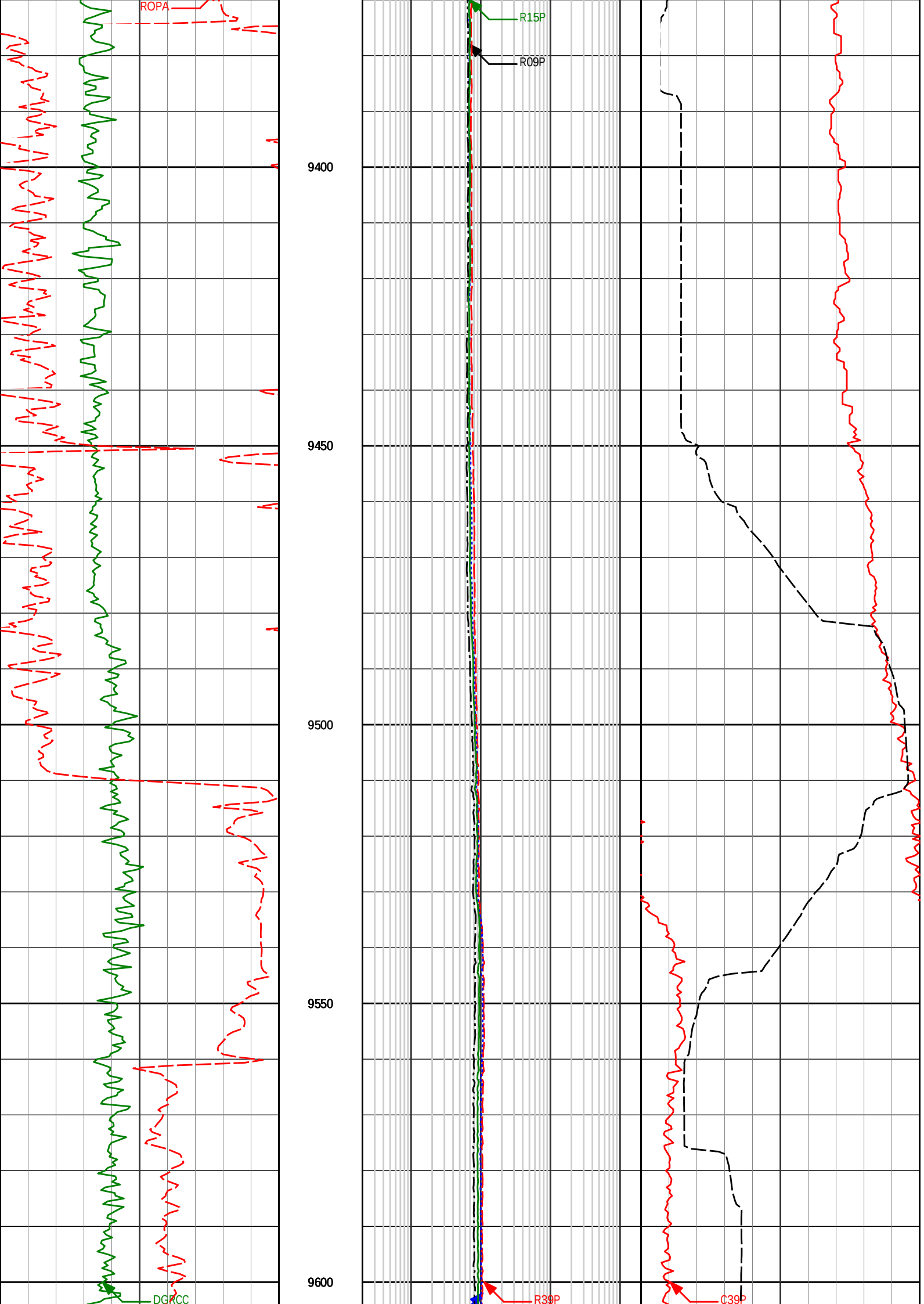

8250
8300
8350
8400
DGRCC
ROPA
R27P
R39P
R15P
R09P
EWXT
C39P

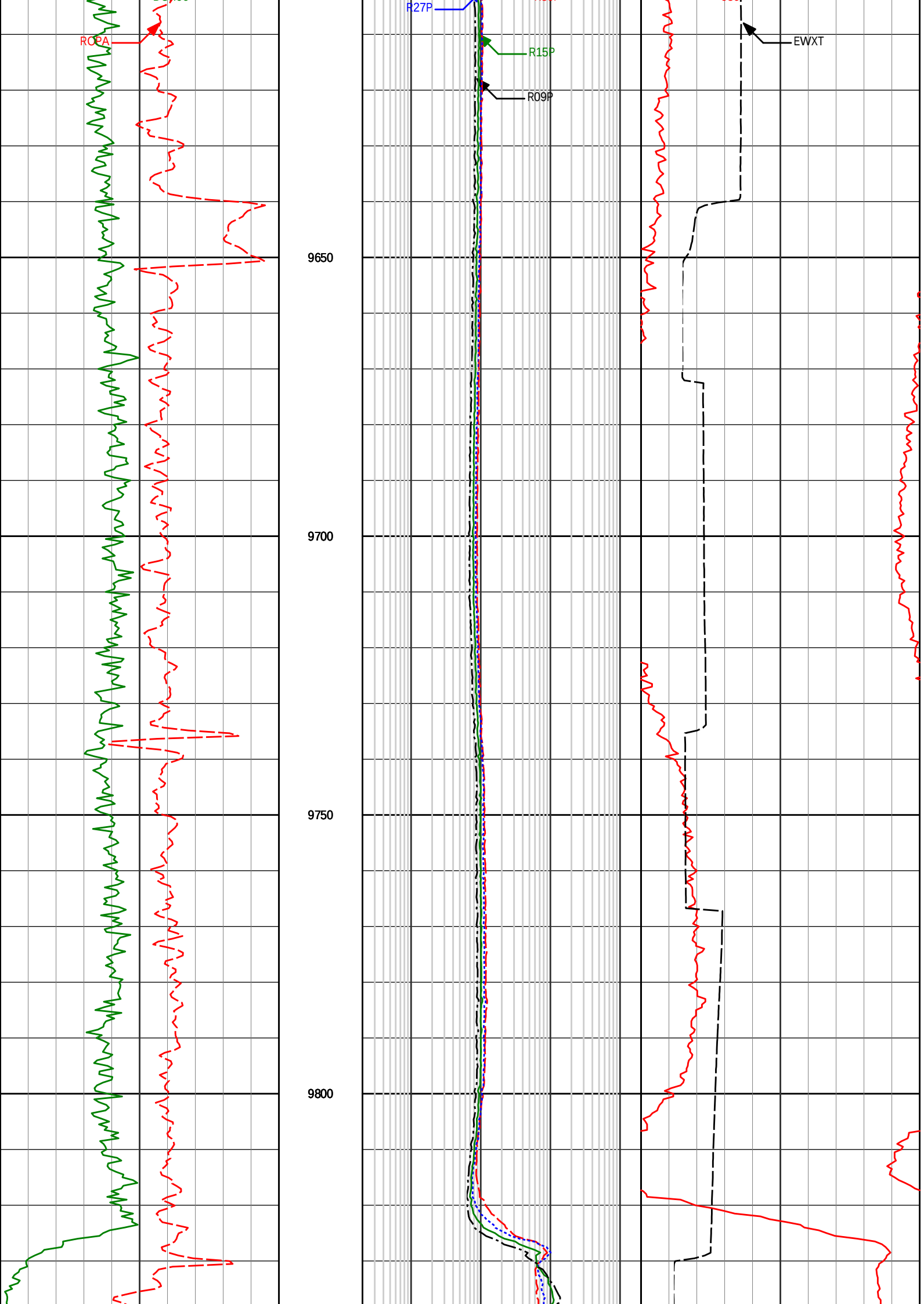

8450
8500
8550
8600
8650
DGRCC
ROPA
R27P
R39P
R15P
R09P
EWXT
C39P

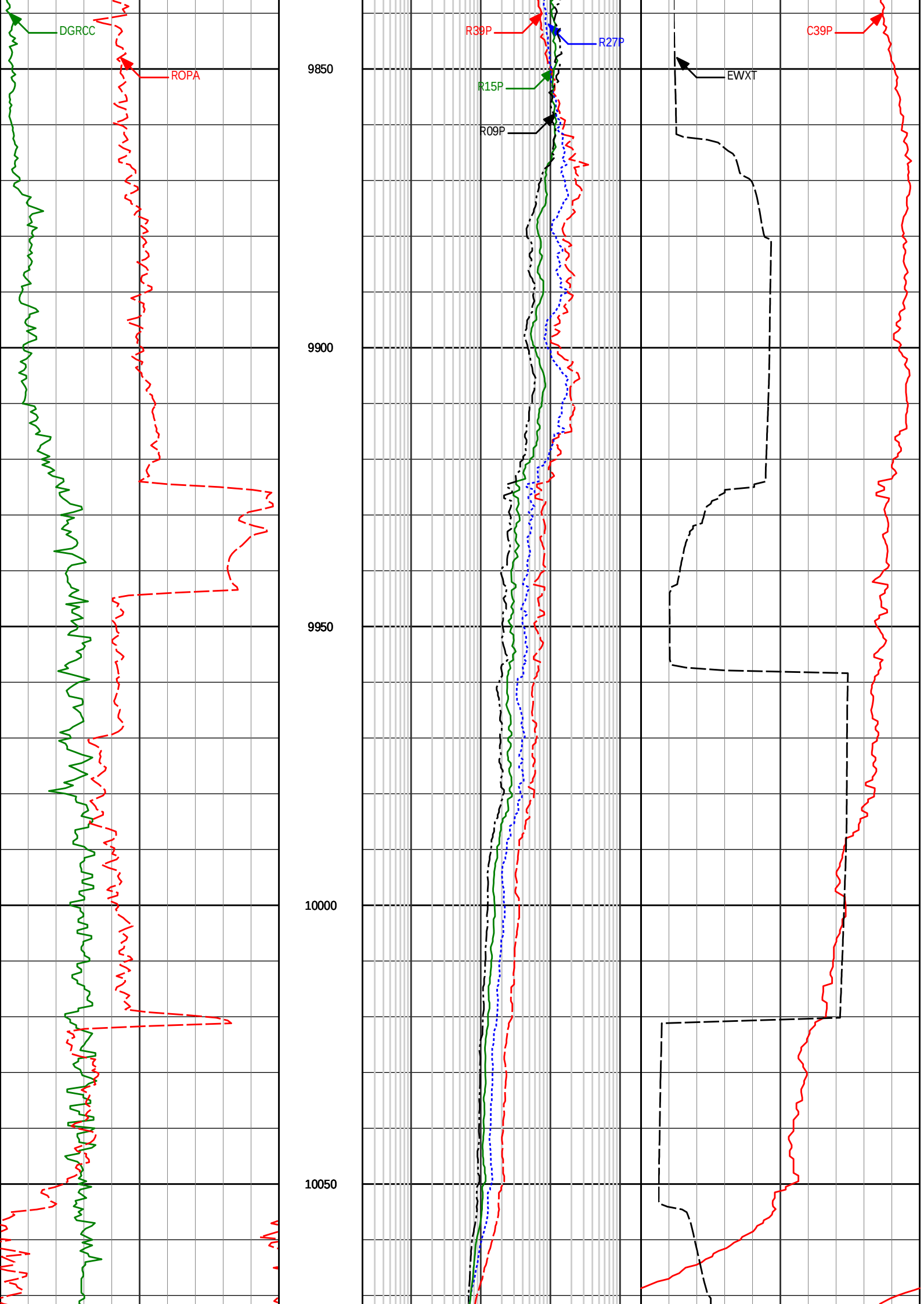

8700
8750
8800
8850
8900
DGRCC
ROPA
R27P
R39P
R15P
R09P
EWXT
C39P

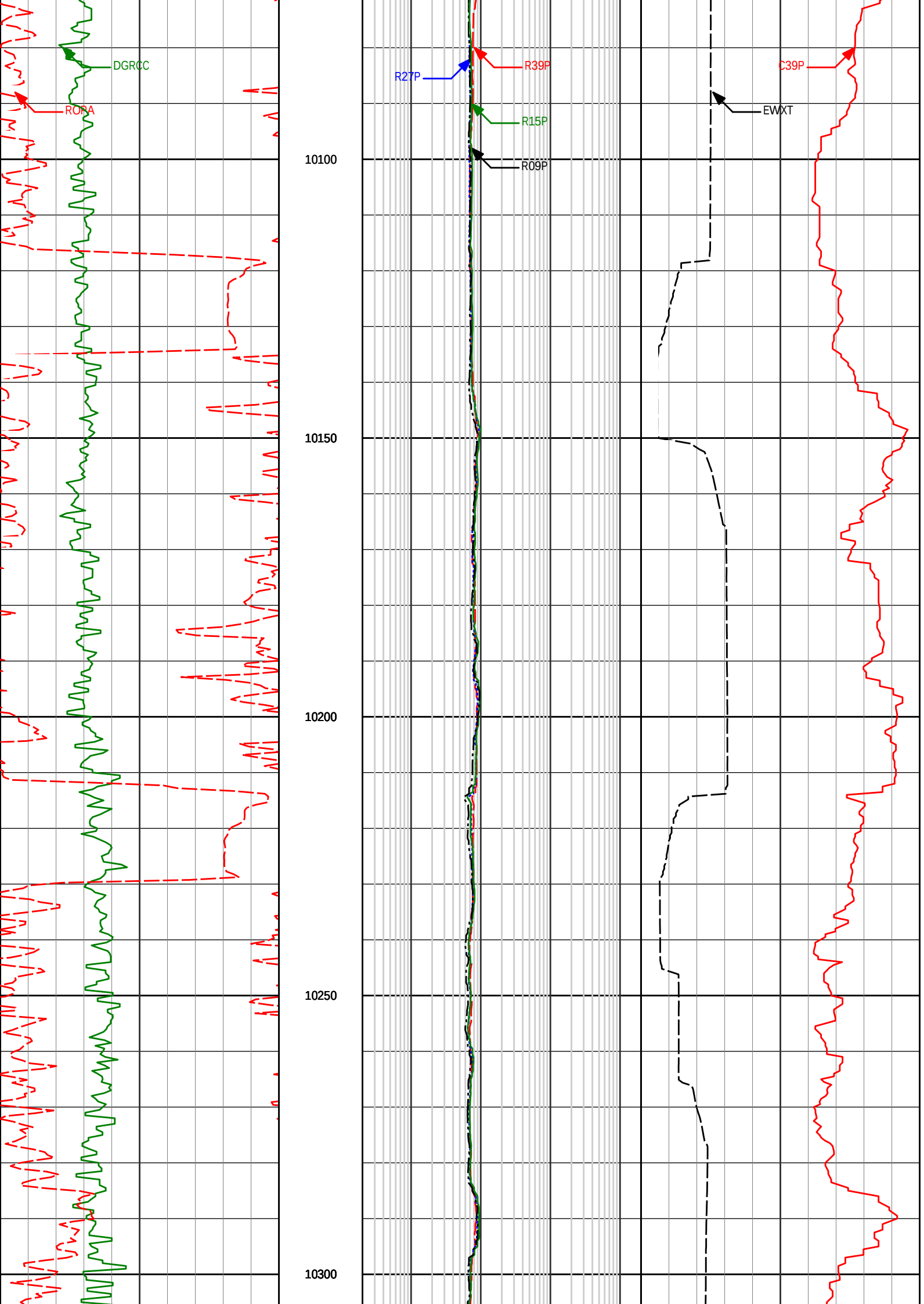

8950
9000
9050
9100
DGRCC
ROPA
R27P
R39P
R15P
EWXT
C39P

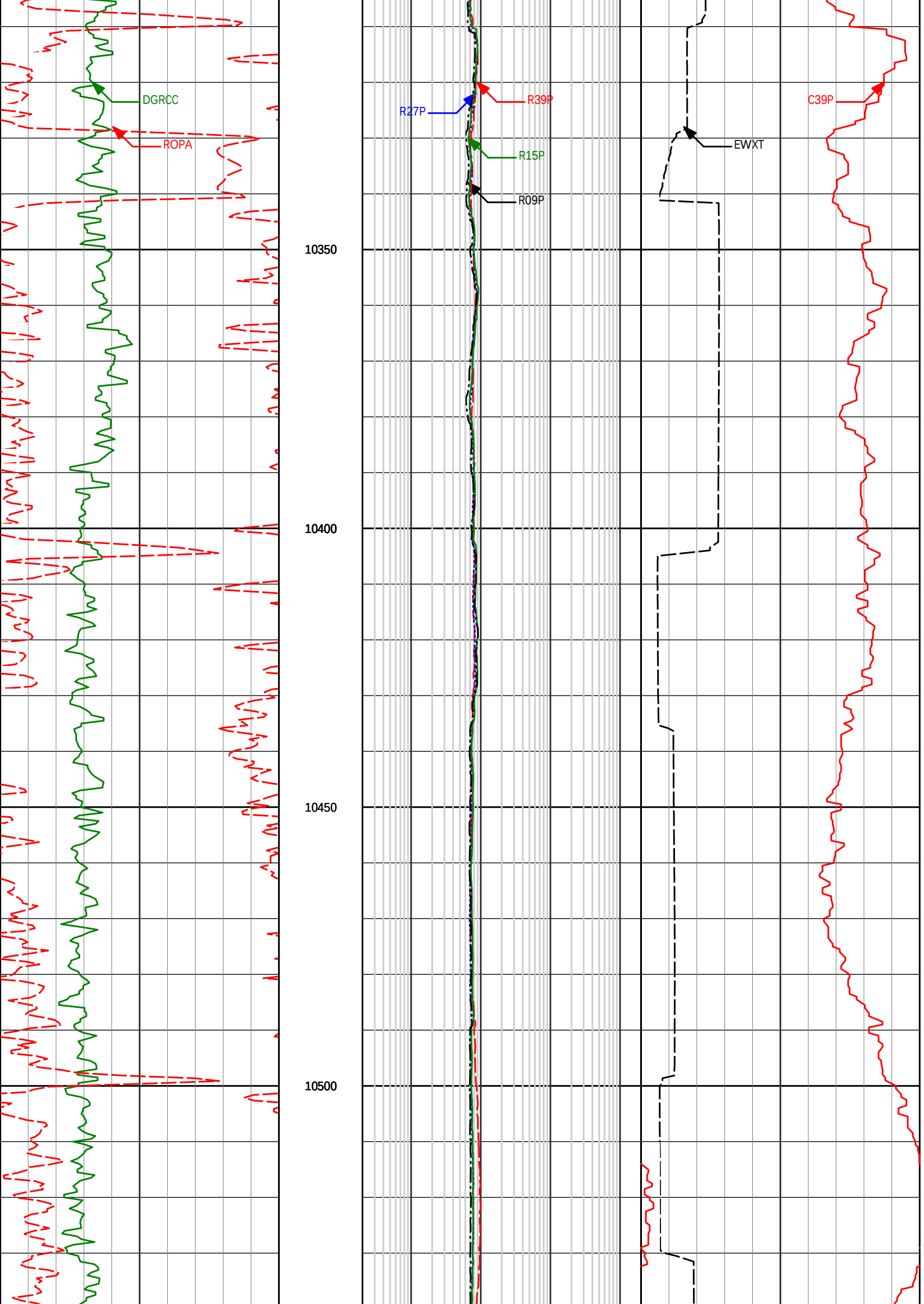

R09P
9150
9200
9250
9300
9350
DGRCC
R27P
R39P
EWXT
C39P

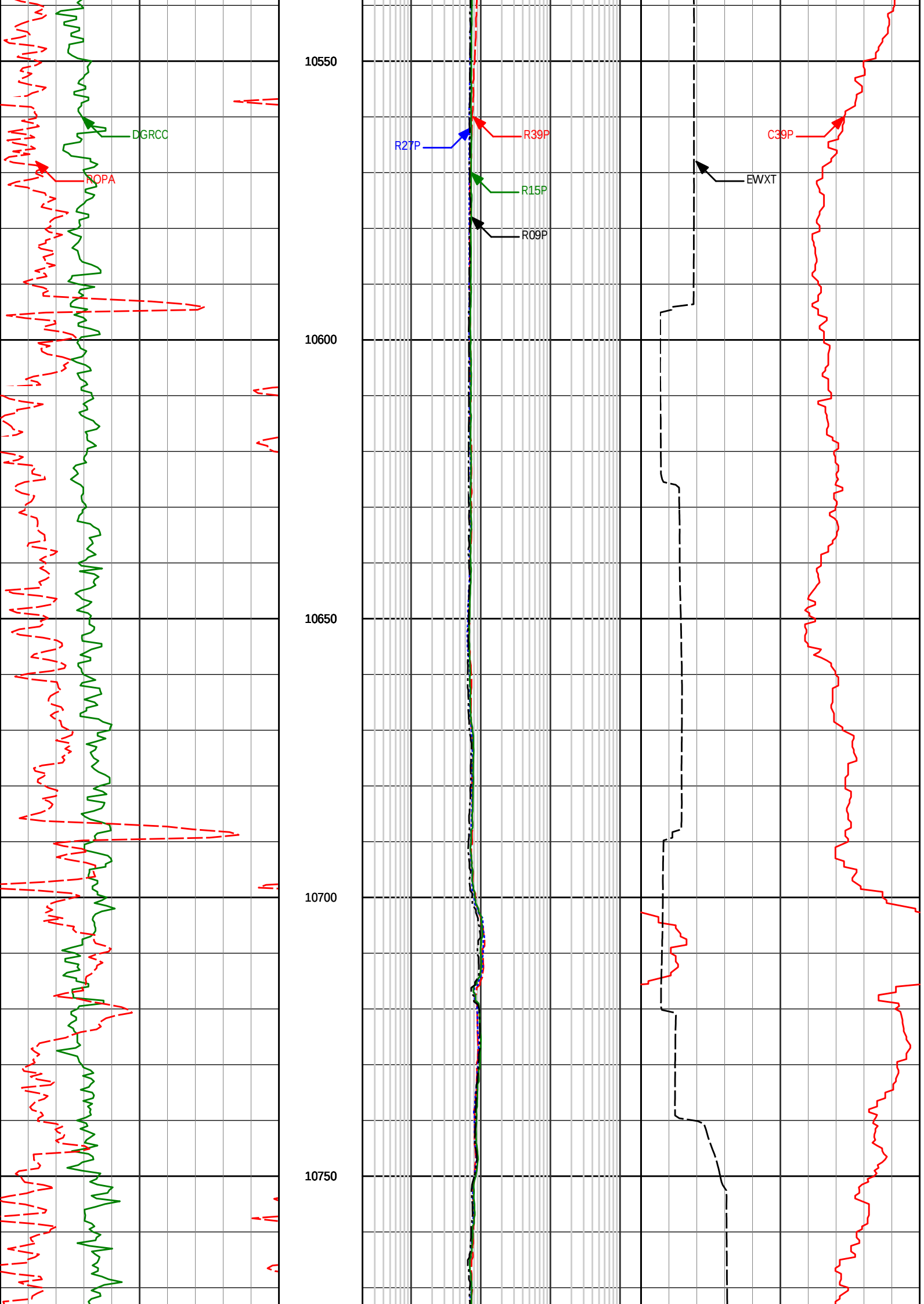

ROPA
R15P
R09P
9400
9450
9500
9550
9600
DGRCC
R39P
C39P

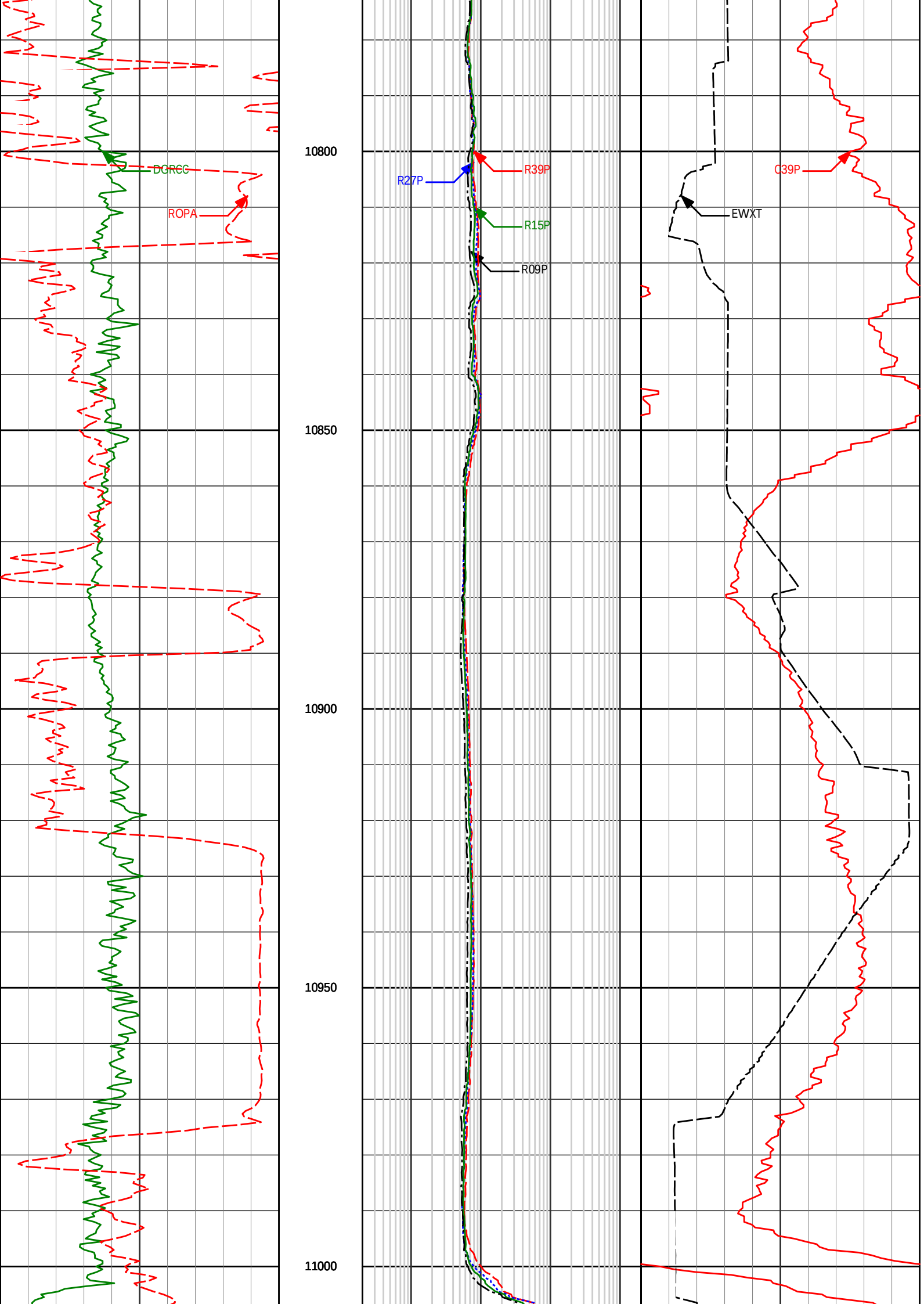

R27P
R15P
R09P
EWXT
9650
9700
9750
9800

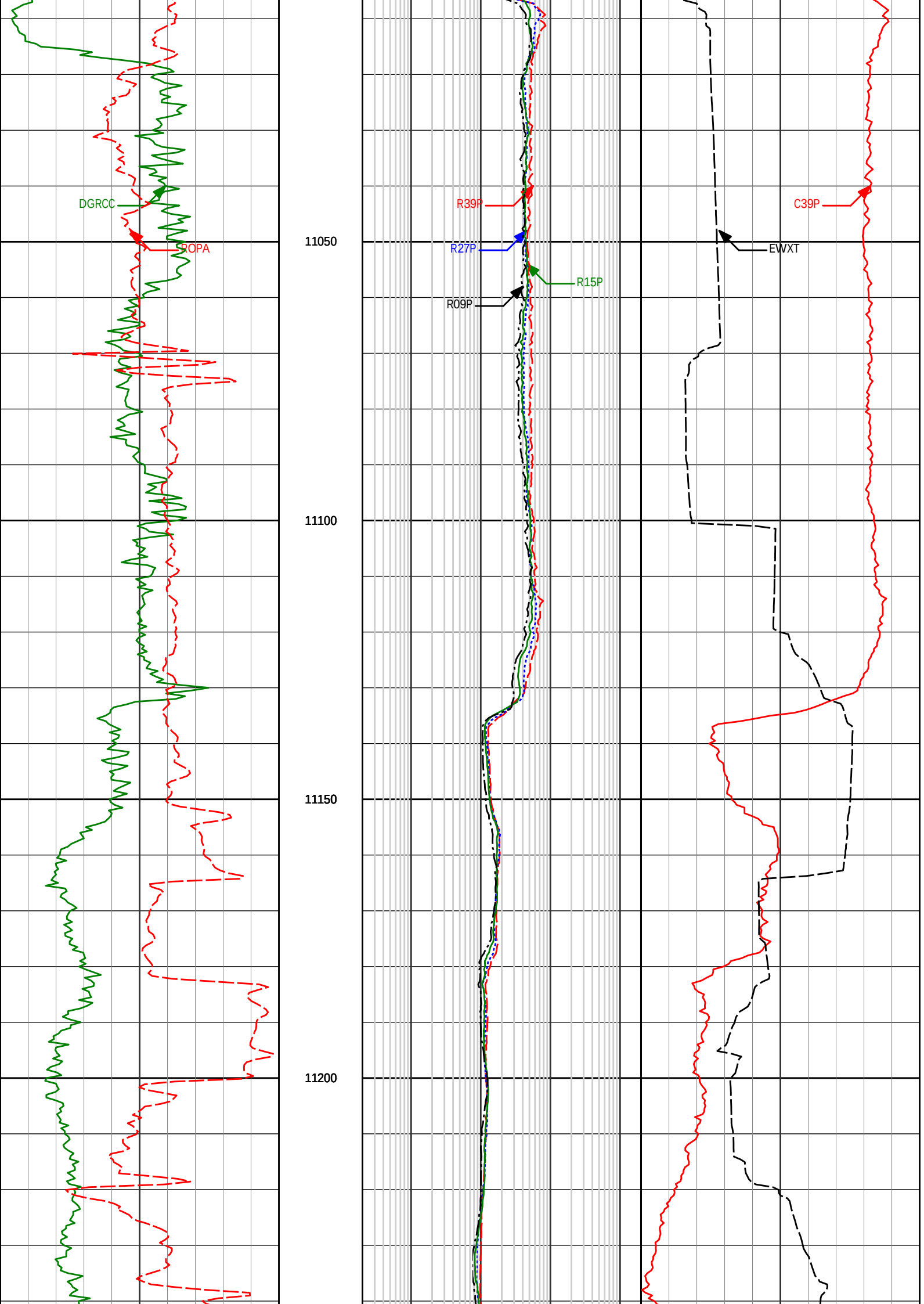

DGRCC
ROPA
R39P
R27P
R15P
R09P
EWXT
C39P
9850
9900
9950
10000
10050

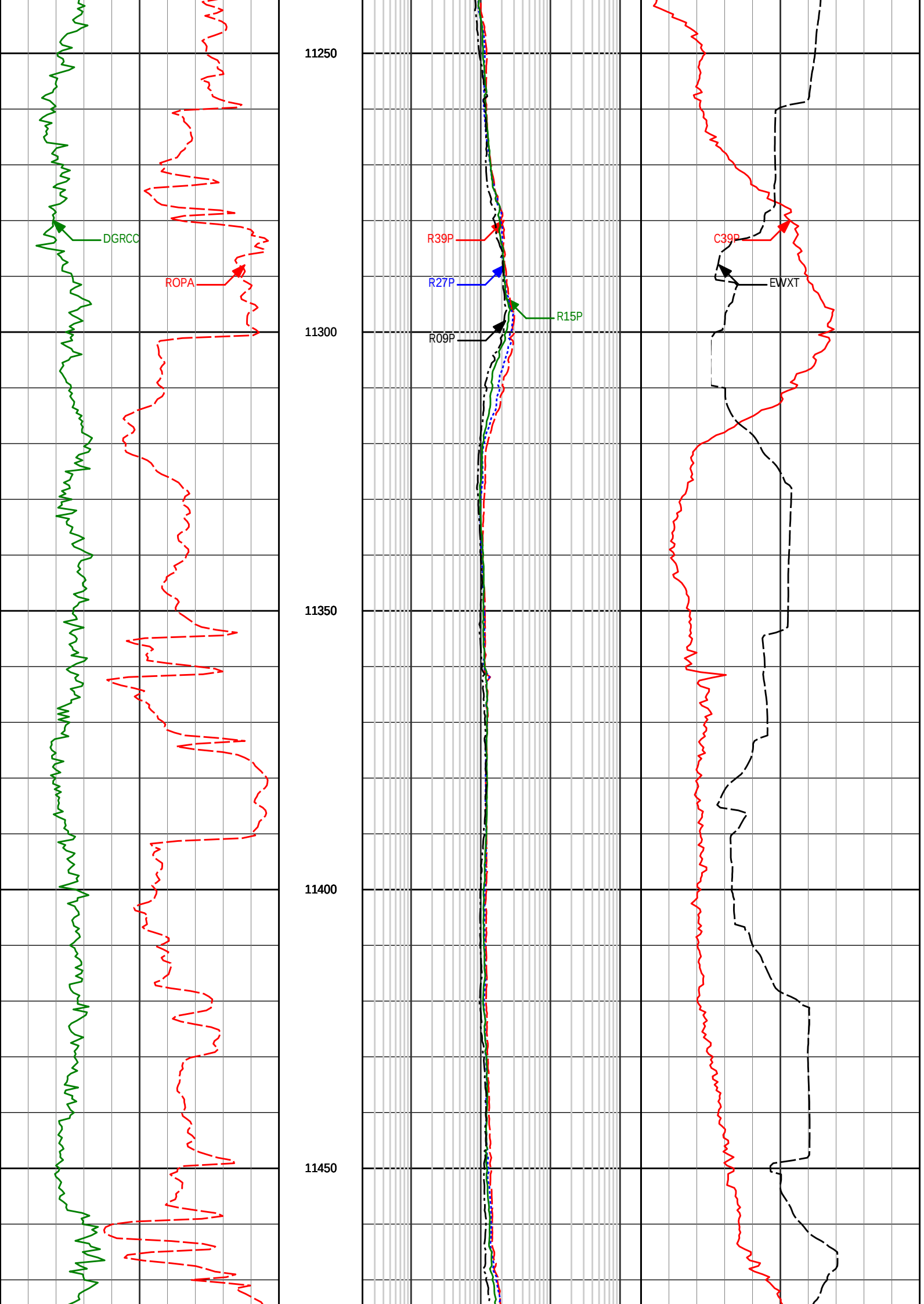

DGRCC
ROPA
R27P
R39P
R15P
R09P
C39P
EWXT
10100
10150
10200
10250
10300

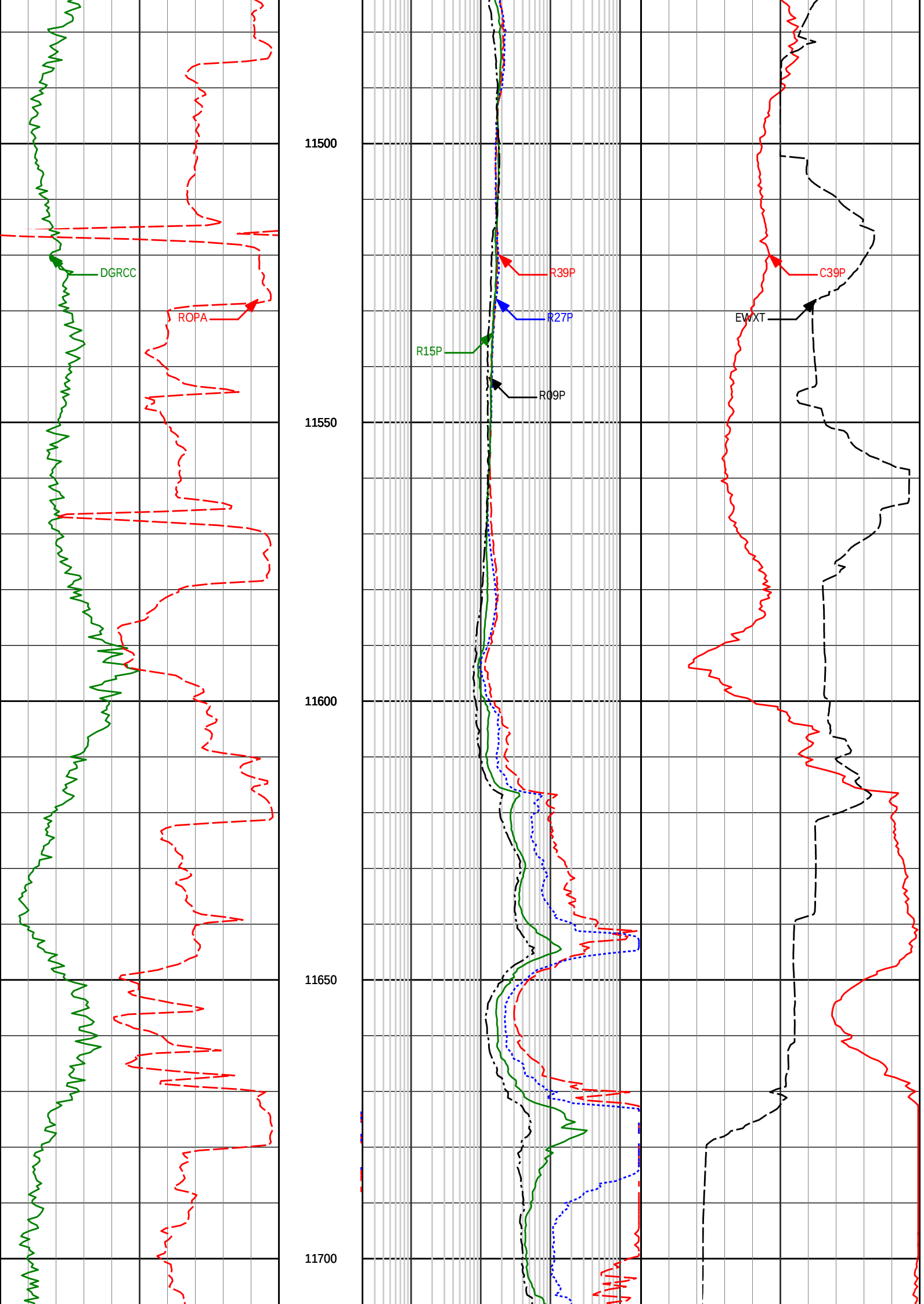

DGRCC
ROPA
R27P
R39P
R15P
R09P
EWXT
C39P
10350
10400
10450
10500

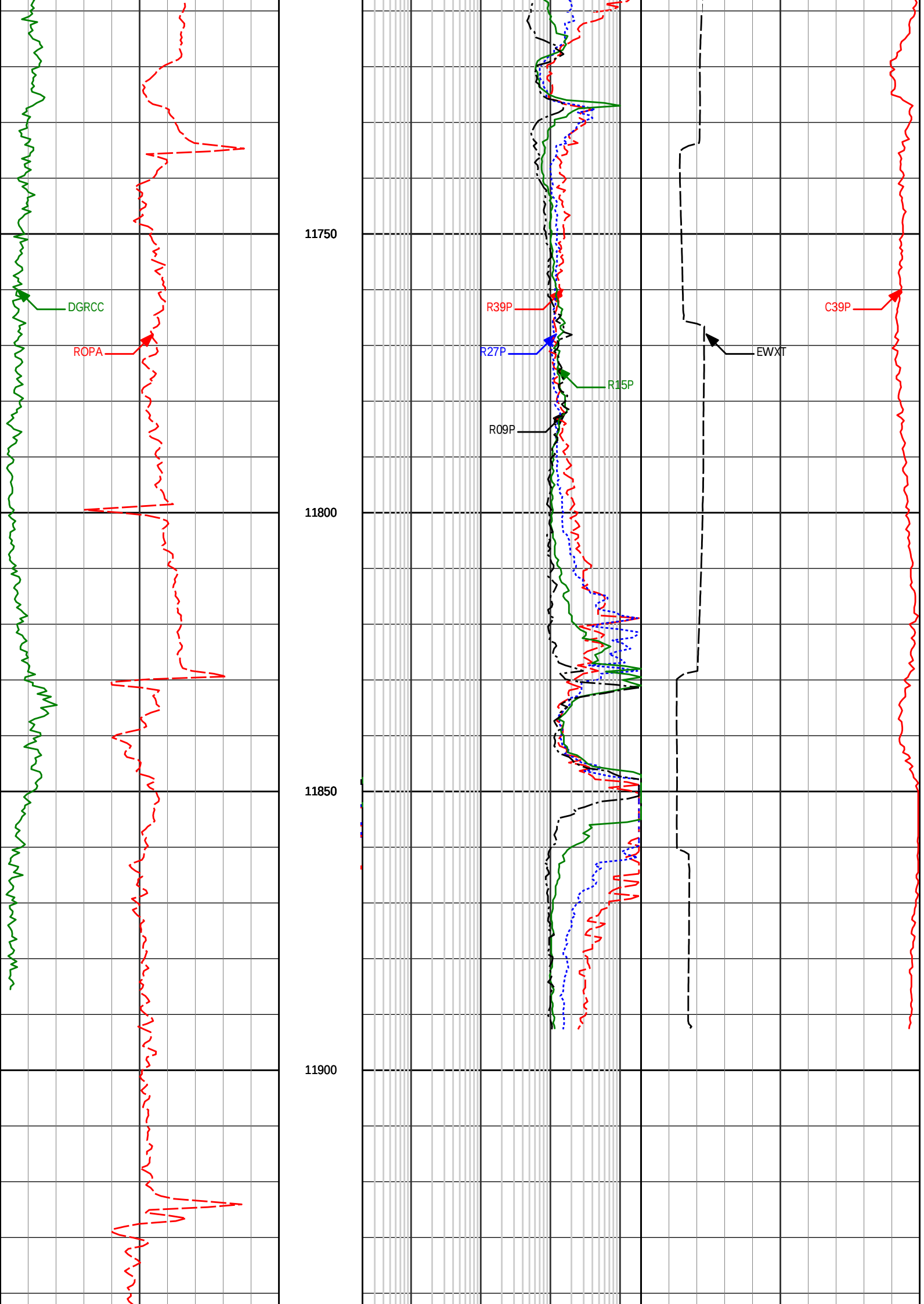

10550
10600
10650
10700
10750
DGRCC
ROPA
R27P
R39P
R15P
R09P
EWXT
C39P

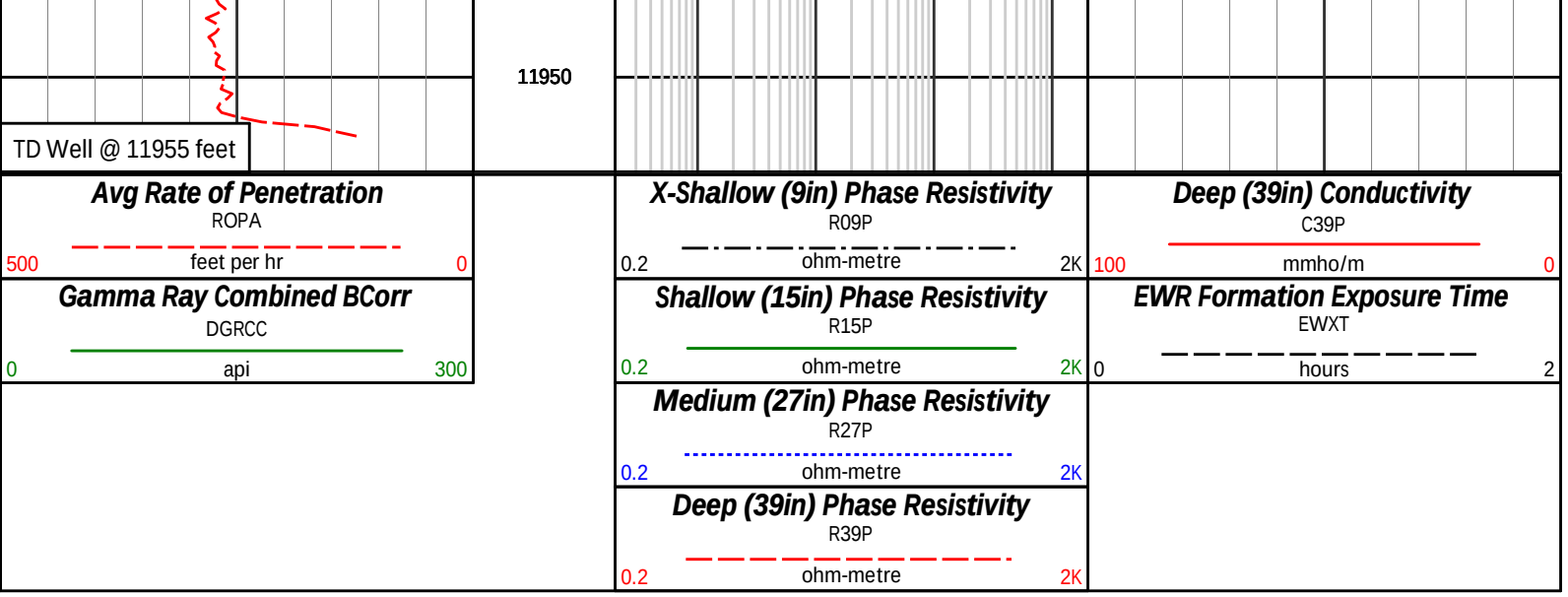

DGRCC
ROPA
10800
10850
10900
10950
11000
R27P
R39P
R15P
R09P
C39P
EWXT


DGRCC
ROPA
R39P
R27P
R15P
R09P
C39P
EWXT
11050
11100
11150
11200


11250
11300
11350
11400
11450
DGRCC
ROPA
R39P
R27P
R09P
R15P
C39P
EWXT


11500
11550
11600
11650
11700
DGRCC
ROPA
R39P
R27P
R15P
R09P
C39P
EWXT


11750
11800
11850
11900
DGRCC
ROPA
R39P
R27P
R15P
R09P
C39P
EWXT



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko
USA FED 29C-36HZ
Wattenberg
Weld Colorado
USA
CA-XX-0900382959
Surveys are IFR Corrected

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
323.00	0.57	322.08	322.99	1.27 N	0.99 W	1.29	0.18
415.00	0.34	342.83	414.99	1.89 N	1.35 W	1.92	0.30
507.00	0.28	11.05	506.99	2.37 N	1.39 W	2.40	0.18
601.00	0.14	11.21	600.99	2.71 N	1.32 W	2.74	0.15
725.00	0.62	347.68	724.99	3.51 N	1.43 W	3.54	0.40
818.00	0.66	322.34	817.98	4.43 N	1.87 W	4.47	0.30
891.00	0.70	320.53	890.98	5.11 N	2.41 W	5.15	0.06
975.00	0.84	312.21	974.97	5.92 N	3.19 W	5.98	0.21
1249.00	1.21	312.68	1248.92	9.23 N	6.81 W	9.37	0.14
1341.00	3.11	275.36	1340.86	10.12 N	10.00 W	10.32	2.47
1432.00	4.65	255.86	1431.65	9.45 N	16.04 W	9.78	2.21
1524.00	6.65	242.65	1523.20	6.09 N	24.39 W	6.59	2.58
1616.00	7.84	230.04	1614.47	0.39 S	33.93 W	0.31	2.15
1708.00	8.86	219.98	1705.50	9.85 S	43.29 W	-8.95	1.93
1799.00	9.77	207.49	1795.31	22.07 S	51.36 W	-21.00	2.43
1891.00	11.21	209.58	1885.77	36.77 S	59.38 W	-35.53	1.62
1986.00	11.35	209.07	1978.93	52.97 S	68.48 W	-51.54	0.18
2081.00	11.03	208.76	2072.13	69.11 S	77.39 W	-67.49	0.34
2176.00	10.59	209.39	2165.44	84.68 S	86.05 W	-82.88	0.48
2271.00	10.05	209.93	2258.91	99.47 S	94.47 W	-97.49	0.58
2366.00	11.23	209.92	2352.27	114.68 S	103.22 W	-112.51	1.24
2556.00	9.06	212.22	2539.29	143.37 S	120.43 W	-140.84	1.16
2651.00	10.54	207.51	2632.90	157.41 S	128.43 W	-154.70	1.77
2746.00	9.16	209.29	2726.50	171.71 S	136.14 W	-168.84	1.49
2842.00	10.74	210.38	2821.05	186.09 S	144.40 W	-183.05	1.66
2937.00	10.74	212.42	2914.39	201.20 S	153.63 W	-197.96	0.40
3032.00	10.80	212.55	3007.72	216.17 S	163.16 W	-212.74	0.07
3127.00	10.65	212.76	3101.06	231.06 S	172.70 W	-227.42	0.16
3222.00	10.51	214.31	3194.44	245.60 S	182.33 W	-241.76	0.33
3317.00	9.35	213.18	3288.02	259.21 S	191.44 W	-255.18	1.24
3412.00	10.41	208.97	3381.61	273.18 S	199.82 W	-268.97	1.35
3508.00	9.61	210.67	3476.15	287.66 S	208.11 W	-283.28	0.89
3698.00	9.78	207.72	3663.43	315.59 S	223.71 W	-310.87	0.28
3793.00	8.46	208.58	3757.23	328.87 S	230.80 W	-324.00	1.40
3888.00	9.93	210.03	3851.01	342.10 S	238.25 W	-337.07	1.57
3983.00	8.78	210.49	3944.74	355.44 S	246.02 W	-350.25	1.21

4078.00	9.67	206.31	4038.51	368.84 S	253.24 W	-363.50	1.17
4173.00	10.58	210.46	4132.03	383.51 S	261.20 W	-378.00	1.23
4269.00	10.95	210.40	4226.34	398.97 S	270.28 W	-393.27	0.39
4364.00	10.61	212.39	4319.67	414.14 S	279.53 W	-408.24	0.53
4459.00	9.28	212.11	4413.24	428.01 S	288.29 W	-421.93	1.40
4554.00	10.58	208.96	4506.81	442.13 S	296.58 W	-435.87	1.48
4649.00	10.47	209.48	4600.22	457.27 S	305.05 W	-450.84	0.15
4744.00	9.46	210.14	4693.78	471.54 S	313.22 W	-464.93	1.07
4839.00	10.30	207.98	4787.37	485.79 S	321.13 W	-479.02	0.97
4934.00	9.92	208.87	4880.90	500.46 S	329.06 W	-493.52	0.43
5030.00	9.06	208.79	4975.58	514.32 S	336.69 W	-507.22	0.90
5125.00	9.54	200.45	5069.34	528.26 S	343.05 W	-521.02	1.50
5220.00	8.40	200.80	5163.17	542.12 S	348.26 W	-534.77	1.20
5315.00	7.54	202.46	5257.26	554.37 S	353.11 W	-546.91	0.94
5410.00	6.40	206.13	5351.55	564.88 S	357.82 W	-557.33	1.29
5505.00	4.42	204.66	5446.12	572.96 S	361.68 W	-565.33	2.09
5600.00	2.57	199.62	5540.94	578.30 S	363.92 W	-570.61	1.97
5695.00	0.48	160.74	5635.91	580.68 S	364.51 W	-572.98	2.33
5790.00	0.10	151.52	5730.90	581.13 S	364.34 W	-573.44	0.40
5885.00	0.10	134.93	5825.90	581.26 S	364.24 W	-573.57	0.03
5980.00	0.11	135.87	5920.90	581.38 S	364.12 W	-573.70	0.01
6076.00	0.37	153.44	6016.90	581.73 S	363.91 W	-574.04	0.28
6171.00	0.58	123.94	6111.90	582.27 S	363.38 W	-574.60	0.33
6266.00	0.59	129.26	6206.90	582.85 S	362.60 W	-575.19	0.06
6361.00	0.68	126.50	6301.89	583.49 S	361.77 W	-575.85	0.10
6456.00	0.78	159.14	6396.88	584.43 S	361.08 W	-576.81	0.44
6551.00	1.02	151.75	6491.87	585.78 S	360.45 W	-578.17	0.28
6646.00	0.89	148.18	6586.86	587.15 S	359.66 W	-579.56	0.15
6741.00	0.71	151.42	6681.85	588.30 S	358.99 W	-580.71	0.20
6836.00	0.68	145.77	6776.84	589.28 S	358.40 W	-581.71	0.08
6888.00	0.83	20.32	6828.84	589.18 S	358.09 W	-581.62	2.58
6931.00	3.63	8.78	6871.80	587.54 S	357.78 W	-579.99	6.56
6973.00	7.10	2.26	6913.61	583.63 S	357.47 W	-576.08	8.38
7026.00	13.29	355.59	6965.75	574.28 S	357.81 W	-566.72	11.87
7074.00	17.13	355.24	7012.06	561.73 S	358.82 W	-554.15	8.00
7122.00	20.46	357.07	7057.50	546.30 S	359.84 W	-538.71	7.04
7170.00	23.21	0.76	7102.05	528.46 S	360.14 W	-520.87	6.40
7217.00	26.70	0.40	7144.66	508.64 S	359.94 W	-501.05	7.43
7265.00	31.86	358.83	7186.51	485.17 S	360.13 W	-477.59	10.87
7312.00	36.83	358.47	7225.30	458.67 S	360.76 W	-451.08	10.58
7360.00	41.93	358.54	7262.39	428.24 S	361.55 W	-420.63	10.63
7407.00	47.76	357.25	7295.70	395.13 S	362.79 W	-387.51	12.55
7455.00	54.04	356.37	7325.96	357.96 S	364.87 W	-350.30	13.16
7502.00	59.09	359.24	7351.85	318.78 S	366.34 W	-311.11	11.89
7550.00	63.94	2.89	7374.74	276.62 S	365.53 W	-268.97	12.11
7598.00	70.32	3.22	7393.39	232.48 S	363.17 W	-224.89	13.31
7630.00	75.39	2.52	7402.82	201.95 S	361.64 W	-194.40	15.98
7661.00	79.31	0.85	7409.61	171.73 S	360.76 W	-164.20	13.69
7693.00	83.33	0.92	7414.44	140.10 S	360.27 W	-132.59	12.56
7732.00	88.30	1.06	7417.28	101.23 S	359.60 W	-93.74	12.75
7786.00	89.63	0.50	7418.26	47.24 S	358.86 W	-39.78	2.67
7881.00	91.05	1.31	7417.69	47.74 N	357.36 W	55.15	1.72
7976.00	90.87	1.31	7416.10	142.70 N	355.19 W	150.05	0.19
8071.00	91.30	359.39	7414.30	237.68 N	354.61 W	244.99	2.07
8166.00	91.30	358.37	7412.15	332.64 N	356.46 W	339.97	1.07
8261.00	90.99	357.30	7410.25	427.55 N	360.05 W	434.93	1.17
8356.00	89.07	358.33	7410.20	522.47 N	363.67 W	529.91	2.29
8451.00	88.08	356.75	7412.56	617.35 N	367.75 W	624.86	1.96
8546.00	89.57	358.14	7414.51	712.23 N	371.98 W	719.81	2.14
8641.00	90.06	0.32	7414.82	807.22 N	373.26 W	814.80	2.35
8736.00	89.81	359.86	7414.92	902.22 N	373.11 W	909.77	0.55
8831.00	89.26	359.12	7415.70	997.21 N	373.96 W	1004.76	0.97
8927.00	88.64	358.50	7417.46	1093.17 N	375.95 W	1100.74	0.91
9022.00	90.43	357.16	7418.23	1188.09 N	379.55 W	1195.72	2.35
9117.00	90.62	356.98	7417.36	1282.97 N	384.40 W	1290.67	0.28
9212.00	90.19	356.91	7416.68	1377.83 N	389.47 W	1385.62	0.46
9307.00	89.94	356.44	7416.58	1472.67 N	394.98 W	1480.55	0.56
9402.00	90.31	358.33	7416.37	1567.56 N	399.31 W	1575.52	2.03
9497.00	90.00	357.10	7416.11	1662.49 N	403.10 W	1670.50	1.34
9592.00	91.11	357.63	7415.19	1757.38 N	407.47 W	1765.46	1.29
9687.00	90.56	358.93	7413.81	1852.32 N	410.32 W	1860.45	1.49
9782.00	89.69	358.70	7413.60	1947.30 N	412.28 W	1955.45	0.95
9877.00	89.26	358.45	7414.47	2042.27 N	414.64 W	2050.44	0.52
9973.00	90.56	358.19	7414.62	2138.23 N	417.46 W	2146.44	1.38
10068.00	88.83	355.33	7415.13	2233.06 N	422.83 W	2241.36	3.52
10163.00	88.64	356.74	7417.22	2327.81 N	429.39 W	2336.22	1.50

10163.00	88.64	356.74	7417.22	2327.81 N	429.39 W	2336.22	1.50
10258.00	90.38	358.66	7418.04	2422.72 N	433.21 W	2431.19	2.73
10353.00	91.11	1.50	7416.80	2517.70 N	433.07 W	2526.15	3.09
10448.00	90.74	1.41	7415.27	2612.66 N	430.66 W	2621.04	0.40
10543.00	90.43	359.89	7414.30	2707.64 N	429.58 W	2715.98	1.63
10733.00	89.01	357.57	7415.23	2897.58 N	433.79 W	2905.96	1.43
10828.00	89.38	358.14	7416.56	2992.50 N	437.35 W	3000.94	0.72
10923.00	89.26	357.87	7417.69	3087.44 N	440.66 W	3095.92	0.31
11018.00	89.01	357.18	7419.12	3182.34 N	444.76 W	3190.89	0.77
11113.00	88.70	355.60	7421.02	3277.12 N	450.74 W	3285.78	1.69
11208.00	89.51	355.31	7422.51	3371.81 N	458.27 W	3380.60	0.91
11303.00	90.12	355.67	7422.81	3466.52 N	465.74 W	3475.44	0.75
11399.00	90.62	356.28	7422.19	3562.28 N	472.48 W	3571.32	0.82
11494.00	90.68	357.62	7421.11	3657.14 N	477.53 W	3666.26	1.41
11589.00	90.56	359.92	7420.09	3752.10 N	479.57 W	3761.25	2.42
11684.00	90.93	1.64	7418.85	3847.08 N	478.28 W	3856.18	1.85
11779.00	90.93	1.28	7417.31	3942.04 N	475.86 W	3951.07	0.38
11905.00	91.61	0.86	7414.52	4067.98 N	473.50 W	4076.94	0.63
11955.00	91.61	0.86	7413.11	4117.96 N	472.75 W	4126.89	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 358.81 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.57 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11955.00 FEET
IS 4145.01 FEET ALONG 353.45 DEGREES (TRUE)

Tie in @ Surface
Final Survey is a Straightline Projection to Bit

Date Printed:08 August 2013