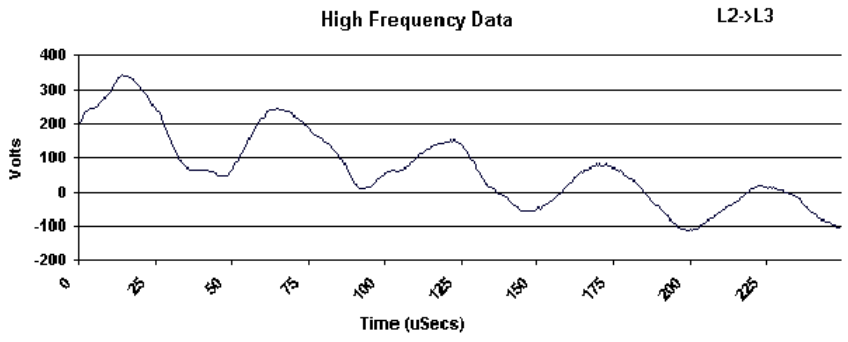
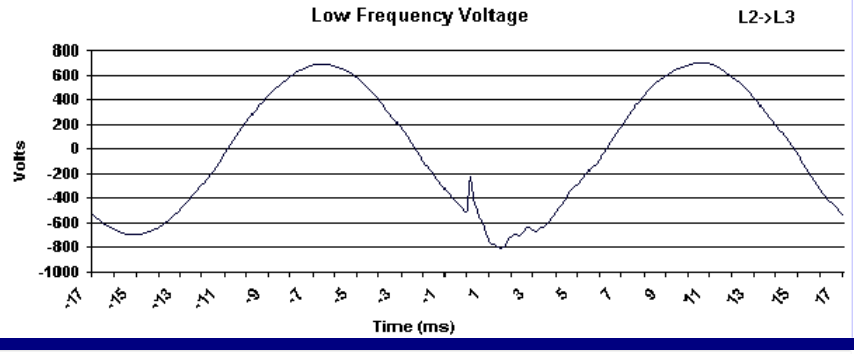
PQS-05: Identifying Utility Switching Impulses

Rx Monitoring Services
Power Quality Snapshot

How do you identify utility switching or power factor correction capacitor caused impulses?





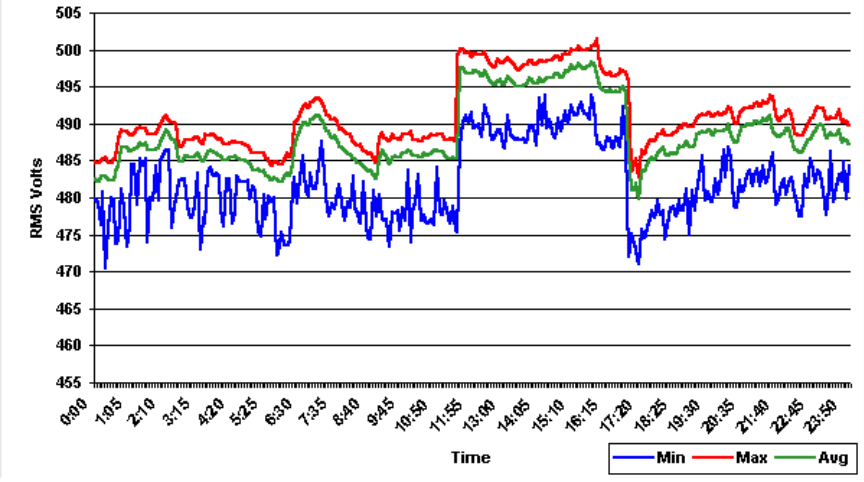
Initial Problem

Utility Switching with Power Factor Capacitors can cause impulses that can be troublesome. The low frequency content of the impulses often defies correction through clamping technologies or filtering. Multiple zero-crossings and overvoltages can damage or disrupt equipment.

In many cases, such impulses occur at the same time every day – a significant clue. But in other cases, the capacitors are not switched by a timer, and so occur at different times.

Here, an impulse is captured at 11:32 a.m. that might be related to Power Factor Capacitor Switching.

But how can be tell for sure?



Date and Time	MIN Voltage	MAX Voltage	AVG Voltage
Nov 11, 01 11:22:29	478.945	487.996	485.513
Nov 11, 01 11:27:29	475.732	487.665	485.190
Nov 11, 01 11:32:29	475.355	499.277	485.511
Nov 11, 01 11:37:29	487.327	500.064	497.544
Nov 11, 01 11:42:29	490.216	500.217	497.534

Supporting Information

Utility switching of grids and power factor correction capacitors often have an impact on the RMS voltage level.

A review of the RMS Voltage chart shows a very clear jump in voltage levels near noon on the day of the impulse. Unlike an added load (which can also cause large subtractive impulses) the RMS voltage actually increases at the time of the impulse.

Closer scrutiny of the actual data shows that the voltage changes right at 11:32 a.m. – with the MAX Voltage jumping at 11:32 and the AVG Voltage changing at the next reading (11:37 a.m.)

Diagnosis: Utility switching! Don't go looking for a problem inside the building – its out on the pole!