



## CASE STUDY

# Powerside Custom-Designs Medium Voltage Filter After Power Quality Engineering Study

### The Challenge

*This project builds on the findings from Part I of the case study [“Powerside Digs Deep to Optimize Power Quality at Remote Mine Site.”](#)*

Operating in an isolated environment with high electrical demands, a major mining organization’s site needed to meet rigorous power factor and harmonic compliance requirements for utility interconnection.

To address the issue, the mining company engaged Powerside to fully assess, model and simulate the site’s power quality conditions. Our [Engineering Services](#) study of the mine’s operational system uncovered a highly complex power profile shaped by both environmental and infrastructure constraints, including:

- A 230 kV transmission line feeding two substations at 13.8 kV and 34.5 kV
- Limited foundation space
- Tight, vertical service shaft access
- A requirement of rugged, outdoor-rated equipment for both substation and underground installation

The challenge demanded Powerside dig deeper, beyond identifying the issue, to take the site’s specific power quality data and build a precise correction solution.

### Challenge

Low power factor, harmonic distortion in remote environment

### Project Type

Power quality engineering services

### Diagnostic Tools

Power factor analysis, harmonic simulations, power system modeling

## The Solution

With the results of the engineering study in hand, Powerside designed a custom iteration of our line of [PowerMVar Medium Voltage \(MV\) Filter Banks](#) — metal-enclosed capacitor and harmonic filter banks built to increase system capacity and improve performance of essential equipment.

### The solution was a Multi-Stage C-Type High Pass Filter, a passive filter designed to:

- Target and mitigate high frequency (HF) harmonic distortion
- Significantly reduce losses at the fundamental frequency

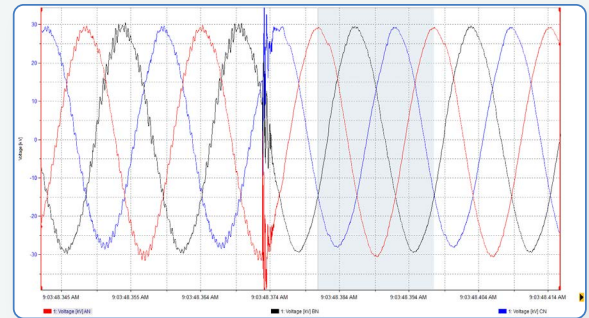
### Further, the system was purpose-built to meet the site's strict performance requirements:

- Maintain a power factor of at least 0.92 under all operating scenarios
- Reduce harmonic distortion to acceptable utility-defined limits

**This level of specificity is where many capacitor- and filter-bank manufacturers fall short.** While others would likely provide a prepackaged, boxed filter to attempt to solve the issue, Powerside offers the in-house expertise to engineer a precise solution. Through the comprehensive findings of our [Power Quality Engineering Services](#) study, we knew exactly what to compensate for and how to build the ideal fix.

## The Results

The impact was immediate and measurable. The custom 34.5 kV C-Type High Pass Filter successfully dampened voltage distortion across the system (Figure 1), eliminating the risk of continued harmonic resonance and stabilizing power factor at both substations.



**Figure 1:** Harmonic distortion and voltage fluctuation levels before (left side) and after (right side) Powerside installed the custom C-Type High Pass Filter.

**By combining power quality-focused engineering analysis with the ability to design and build a custom solution, Powerside helped the mine site gain a cleaner, more stable power profile aligned with operational, architectural and regulatory requirements.**

Learn more about how Powerside can customize an MV filter bank for your precise power quality needs, from fixed to automatic configurations, single or multi-step stages and beyond.

## [Discover PowerMVar Filter Banks](#)