



## CASE STUDY

# Powerside Digs Deep to Optimize Power Quality at Remote Mine Site

### The Challenge

When a major mining organization broke ground on a new mine in a remote region of North America, the location's isolated environment and strenuous electrical demands created inefficient and costly power issues. Powered by a 230 kV transmission line feeding into a 34.5 kV distribution system, the mining site experienced high levels of harmonic distortion and low power factor—generating utility noncompliance fees and high operational costs.

**Installation of a medium-voltage harmonic filter was necessary to correct for harmonic resonance and power factor. However, the needs and location of the mine made integration no easy task:**

- Limited foundation space
- Tight, vertical service shaft access
- Outdoor-rated equipment required

The company's engineering, procurement and construction (EPC) partner needed an electrical engineering specialist who could complement their broader design responsibilities. With targeted, high-impact power quality expertise, from modeling and diagnostics to system design and implementation, Powerside plugged in to help.

### 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

Exclusively focused on power quality, Powerside's Engineering Services team worked in close collaboration with the EPC team to assess, model and optimize the mine's operational system.

**Powerside used advanced power factor analysis, harmonic simulations and power system modeling to analyze a range of:**

- Load conditions
- Short-circuit scenarios
- System configurations

**All to develop a solution that would perform reliably under real-world conditions.**

With a thorough understanding of the mining project's technical context and its power quality challenges, our team designed and supplied a custom solution that included metal-enclosed, multistage C-type harmonic filters. These filters were specifically engineered to prevent power factor from dropping below 0.92 under any operational scenario and to reduce harmonic distortion to acceptable utility levels.

Crucially, the detailed simulations that Powerside provided accounted for various system behaviors and fault conditions, giving the end customer and EPC confidence in the reliability and resilience of the solution.


## The Results

The tailored solution not only met, but exceeded performance expectations. Thanks to thorough system simulations and a carefully engineered filter configuration, the mine project owner and EPC:

- **Achieved and sustained a power factor of  $\geq 0.98$  at both the 34.5 kV and 13.8 kV buses**
- **Reduced harmonic distortion to meet and maintain utility compliance standards**
- **Eliminated risk of harmonic resonance across all modeled scenarios**

Installation challenges tied to the remote site and vertical shaft access were fully accounted for in the equipment design, supporting the EPC's broader system design without disruption.

Now, the EPC team can confidently move forward with the broader system layout knowing the power quality component is optimized, scalable and well-integrated. Perhaps most importantly, the collaboration with Powerside's Engineering Services team gave the mine owner long-term confidence not just in today's operational performance, but in the power system's ability to adapt and scale with future site expansion.



Learn more about how our Engineering Services can plug in and help optimize the power quality of your next project, no matter the complexity.

[powerside.com/engineering-services](https://powerside.com/engineering-services)