SEL

Customer Highlight

RED DOG MINE

SEL POWERMAX® blackout mitigation solutions for mining operations

Islanded power systems prioritize stability and resiliency over tripping selectivity to avoid widespread blackouts and ensure power can be fully restored after breakers trip. POWERMAX Power Management and Control System solutions offer features like load shedding, generation control, and load management to mitigate blackouts and other electric system events.

Customer problem

After experiencing three separate blackout incidents within one year, Red Dog Mine, a remote mine in Northwest Alaska, decided to improve their blackout mitigation as part of a larger electrical system improvement. Their existing solid-state protection equipment provided minimal data after a trip—only targets with no time tagging—making it impossible to find a definitive root cause after an event. An improved protection system was needed to clear faults with as much of the system surviving as possible and to provide information as needed to assist in the quick restoration.

Solution

Engineers designed a POWERMAX generation control and load-shedding system to maintain voltage and frequency stability. They also designed a reliable and secure protection system and SCADA control system for implementing a bus preservation scheme that allowed systems to operate as separate islands. The POWERMAX system interfaced directly with interconnected protective relays to control generators and for load shedding. Electromagnetic power system transient simulations were used to demonstrate how the system would operate with a generation control system, load-shedding system, and protective-relaying bus preservation scheme. The system was also tested for faults at different locations to ensure system operation and stability following a disturbance.

Results

Red Dog Mine typically uses six generators to carry their load, up to 30 MW. When the mine experienced an overcurrent event, the POWERMAX system properly isolated and shut down one generator, temporarily reducing production loads. The mine saw a 2 percent reduction in throughput until full power was restored, but it remained operational otherwise with full visibility of the operating parameters. Operators noted that the cost of a total blackout—including damaged equipment and lost production—would have exceeded the cost of the POWERMAX system.

About SEL

SEL is a 100 percent employee-owned company that specializes in creating digital products and systems that protect, control, and automate power systems around the world. This technology mitigates blackouts and improves power system reliability and safety at a reduced cost. Headquartered in Pullman, Washington, SEL has manufactured products in the United States since 1984 and serves customers worldwide.

Cybersecurity philosophy

We build layers of defense and maintain the integrity of each layer's purpose—in other words, we apply the right technology at the right layer. We believe simpler products are easier to defend and that the safety of the power system and availability of the protection and control devices come first.

Reliability

SEL products are designed and manufactured for the world's most challenging environments, exceeding all industry standards for temperature, shock, and electric stress.

Our products have a mean time between returns for repair (MTBR) of more than 250 years, based on observed field performance. This means that if you have 250 SEL products installed in your systems, you can expect to have less than one unscheduled removal from service per year for any reason, whether it's a defect or an external factor such as overvoltage, overcurrent, wildlife damage, or environmental exposure.

Warranty

SEL backs our products and commitments with a ten-year warranty, no-charge diagnostic and repair services, local support, and a variety of test procedures and certifications.

Support

SEL support teams are stationed in regional offices around the globe and staffed with application engineers who are experts in our products and in power system applications. We offer free, 24/7 emergency technical support for the life of your SEL products, even if they're outside of our ten-year warranty.

Contact us

To learn more about partnering with SEL Engineering Services, contact **esinfo@selinc.com**.