

TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION

A Vertiv Case Study



ABOUT THE COMPANY

Tri-State Generation and Transmission Association (Tri-State) is a wholesale electric power supplier owned by the 44 electric cooperatives that it serves.

Founded in 1952, the company generates and transports electricity to its member systems throughout a 200,000 square-mile service territory across the following states:

- Colorado
- Nebraska
- New Mexico
- Wyoming

Tri-State strives to provide a reliable, cost-based supply of electricity and serves more than 1.5 million consumers. Headquartered in Westminster, Colo., more than 1,500 people are employed by Tri-State throughout its four-state service area.

Background

Tri-State is committed to protecting consumers by providing affordable power while investing in innovation for years to come. It is in this vein that Tri-State started working with Vertiv™ Services. In fact, the association first partnered with Vertiv's Electrical Reliability Services in 2004. Relay testing revealed a number of issues and outright failures among its inherited, aged relays. The relay testing reports provided the necessary data to justify an extensive relay upgrade project.

Case Summary

Location: Four Colorado power generation stations, including Rifle, Craig, Nucla and the J.M. Shafer station located near Fort Lupton.

Services: The Vertiv team provided a turnkey upgrade solution that included the coordination of all activities such as managing on-site engineers, contractors and technicians, and serving as a liaison to Schweitzer Engineering Laboratories (SEL) in order to source electrical panels. Additionally, it was responsible for the physical execution of the relay upgrade with services related to design and engineering, relay logic and setting, installation, and commissioning and startup.

Critical Need: When servicing power systems or making changes to the infrastructure, time is always of the essence. The work needed to be completed in a very short time frame with little room for error. Tri-State couldn't afford to not have these relays in place protecting transformers, generators and breakers, the company's largest capital investment.

Results:

- Improved asset protection and reliability
- Enhanced communication capabilities and better event recording
- Easier regulatory reporting
- Simplified calibration for a reduction in overall maintenance costs

“Just having the latest and greatest in relay technology with the correct logic settings gives us added confidence in our protection scheme. The improved control and coordination reduces our risk of extended outages affecting a larger portion of our system when there is an event.”

– DAVE READIO, TRI-STATE GENERATION ENGINEER

Solutions

The Rifle Power Plant inherited equipment from another facility, including many relays that were beginning to fail and were well beyond 20 years old. To ensure reliable operation at its generating station and substation, Tri-State turned to Vertiv, a trusted service provider, for relay testing.

The services team quickly discovered a number of issues with several of the aged relays. A detailed report of these findings and recommendations for strengthening the infrastructure at the Rifle facility was provided to Tri-State’s corporate engineering department. The primary recommendation was for Tri-State to upgrade their relay system to microprocessor-based relays, which provide improved functionality and control, enhanced communication capabilities, and improved reliability and event recording. Tri-State agreed with the recommendations and initiated an upgrade project to replace its existing relays with new microprocessor SEL relays.

Having already performed testing for several Tri-State facilities, the services team was very familiar with what needed to be done and had extensive experience working with SEL, Tri-State’s preferred relay manufacturer.

A turnkey relay upgrade solution was designed specifically to Tri-State’s needs regarding reliability, cost, time and functionality. The project plan included relay system design; purchase and construction of panels; removal of existing relays and wiring; installation and wiring of new relays; calculation of relay settings;

development of relay logic; event/SER configuration; and commissioning, testing and startup of all newly installed relays. This included relays for primary and backup generator protection, transformer protection relays, line protection and substation interface relays, SEL-2032 communications processor, and two new interface auxiliary relays for the distributed control system alarm points.

After plan approval, the project team focused on bringing together the best technical talent to design, build, install, and test the new relays. This team drew on its thorough knowledge of electric power systems and its field experience to ensure Tri-State’s protection scheme was stable and operating as efficiently as possible throughout the entire process.

Tri-State’s new relays not only minimized downtime, but saved the organization time and money. On the three units at Tri-State’s Craig plant, 44 relays were reduced to six. One technician at the Craig station used to spend two weeks on relay testing which can now be completed in two or three days.

Overall, the Vertiv team completed the project on time and on budget without any major issues. The relay upgrade provided better communication that made addressing the escalating NERC reporting requirements significantly easier, while the refined coordination helped to ensure the safe and reliable operation of Tri-State’s most expensive generating assets.

“We have worked with Vertiv's Electrical Reliability Services for many years utilizing their expertise in relay testing, so turning to them to manage our relay upgrades was only logical,” Readio said. “They were able to pull together just the right resources to meet our specific needs, and have allowed us to continue providing our member systems with affordable power.”