

Modernization of Black Start Units Drastically Increases Reliability While Saving Over \$110,000 Annually

RESULTS

- Increased unit reliability by eliminating failed startups and unit trips caused by obsolete equipment
- Reduced startup time by 80% from 20 to 4 minutes
- Doubled compressed air pressure used for more frequent unit starts from 240 to 480 psi
- Saves over \$110,000 annually in O&M costs through improved operational efficiency and reduced maintenance



APPLICATION

Two 36-megawatt dual-fuel aeroderivative Pratt & Whitney FT4 Twin Pac black start units

CHALLENGE

Black start resources must be able to quickly start and reliably operate when called upon to support the grid after a major system collapse or system-wide blackout.

Reliability of the utility's aeroderivative black start units is critical to ensuring that power is restored to a major U.S. city and surrounding region when there is a partial or total shutdown of the electricity transmission system.

Frequent failed starts and trips due to equipment obsolescence were drastically reducing unit reliability and placing the utility's black start capability in jeopardy.

Modernization of the aging electrical, mechanical and automation systems was needed to ensure the units are ready to restore electricity to the grid if outside electrical supplies are not available.

“Keeping the lights on for our customers is our top priority. A reliable black start system is a critical part of our emergency preparedness plan.”

Emerson's Ovation™ gas turbine control system has drastically improved the reliability of our black start units.

This new system is a vital tool for powering up our fleet of generators to support the energy needs of a major U.S. city and its surrounding region after a partial or full blackout event.”

Operations & Maintenance Manager



SOLUTION

To address significant reliability issues, the utility selected Emerson to install a turn-key modernization solution for their two dual-fuel aeroderivative Pratt & Whitney FT4 Twin Pac black start units. In doing so they realized numerous benefits, including drastically increasing the units' reliability, enabling faster and more frequent unit starts and providing annual O&M cost savings. As part of the project, Emerson and the utility closely collaborated on the project management, design, installation and commissioning of a new Ovation™ gas turbine control solution.

Emerson converted the original aeroderivative turbine controls to maintain adherence with the turbine OEM operating specifications. Logic enhancements were added to accommodate new equipment and capabilities for improved system performance. Additional project scope included upgrades to the fuel forwarding systems, generator protection panels, electrical switchgear, air compressor skids, turbine condition monitoring, battery charging system, and field instrumentation.

Before the project, turbine vibrations were causing most of the unit startup failures and trips. The stand-alone vibration monitoring system was not dependable and required a vibration specialist to review data and determine the root cause of an issue. Plant personnel had no insight into developing faults until it was too late.

Integrating condition monitoring and protection into the gas turbine controls using the Ovation Machinery Health™ Monitor and Ovation Machine Works software provides early detection of developing faults well in advance of a costly breakdown. The integrated solution increased confidence in the vibration data, enabling the plant personnel to focus on other tasks.

Process insights for both units are now available at any time from anywhere with Ovation enterprise data solutions (EDS). This new functionality enables the utility's corporate and plant personnel to remotely monitor unit operations in near-real-time or view historical process graphics, control diagrams, alarm lists and trends.

Modernization of the aging electrical, mechanical and automation systems with a comprehensive, integrated Ovation gas turbine control system eliminated obsolescence issues which increased reliability, reduced startup time by 80% and saves the utility \$110,000 annually in O&M costs.

The plant staff is now armed with greater visibility into unit operations so that they can more quickly identify and resolve issues before they escalate. The utility can confidently rely on the black start units to quickly and reliably startup when called upon to support the grid after a major system collapse or system-wide blackout.