

# CSI 6500 Machinery Health™ Monitor Meets Need for Turbine Protection at Xcel Energy

## RESULTS

- Provides full API-670 compliant protection
- Generates predictive diagnostics for effective turbine maintenance
- Integrates seamlessly with Ovation® control system
- Ensures superior turbine protection



## APPLICATION

Protection of a coal-fired plant's GE tandem compound four flow reheat steam turbine.

## CUSTOMER

Xcel Energy, headquartered in Minneapolis, Minnesota, is a major U.S. electric and natural gas utility providing energy to more than 3.3 million electric customers and 1.8 million natural gas customers — mainly in upper-Midwest states. Xcel Energy's Pawnee Station in Brush, Colorado, has a generating capacity of 505 MW from a single coal-fired unit. Opened in 1981, Pawnee operates with comprehensive, state-of-the-art Ovation® expert technology for control and monitoring of critical plant processes, including the plant's steam turbine.

## CHALLENGE

OEM protection and original turbine controls for the main steam turbine at Pawnee Station were obsolete and in need of replacement. Rather than accept old technology, the plant opted for a state-of-the-art process automation system and turbine shutdown protection system.

*The CSI 6500 was not only easy to integrate with the Ovation turbine controls, but the more tightly coupled process automation system and machinery health monitor is expected to provide ongoing benefits for the life of the system.*

For more information:  
[www.assetweb.com](http://www.assetweb.com)

### SOLUTION

The CSI 6500 was introduced during the installation of Ovation for turbine control, and Pawnee Station personnel seized the opportunity to obtain a machinery health management solution that promised full and easy integration with Ovation. Even though a contract had been signed to purchase another turbine protection system, that contract was cancelled and the CSI 6500 was ordered.

The CSI 6500 solution was designed for this purpose — retrofit projects where obsolete protection systems are being replaced to include performance monitoring, predictive maintenance based on diagnostics, and smooth integration with the control system. The CSI 6500 system fit neatly with Ovation, making vibration displays immediately available to operators in the control room. It was also fully compatible with existing AMS™ Suite: Machinery Health™ Manager software for detailed analysis of vibration data and predictive responses.

All the traditional Turbine Supervisory Instrumentation (TSI) functions are provided. The main turbine is continually monitored for bearing vibration, thrust bearing wear detection, case expansion, rotor expansion, and differential expansion, as well as phase and eccentricity.

The CSI 6500 was installed by in-house staff, and Emerson personnel were onsite for the faultless startup on the main turbine. This system ran in parallel with the original system for about six months to provide a base for comparison. This solution has been far superior to the protective system built into the turbine controls as related to ease of use and the amount of data produced. The analysis tools are also very good.

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