Advanced Maintenance Strategies Enable Major Eastern Power Company to Save $$$

RESULTS

- Saved millions annually by reducing number of scheduled overhauls

- Eliminated or delayed preventive maintenance tasks through predictive practices

- Improved plant reliability

> *"Our preventive maintenance costs are diminishing because so many of those costly intrusive procedures are being eliminated or delayed"*
>
> **Maintenance Manager, Electric Steam Utility**

APPLICATION

New maintenance strategies and practices covering some 41,000 assets were designed and implemented at a 360 MW combined cycle power generating station in the eastern US. Steam generating capacity is 3 million lbs/hr.

CUSTOMER

This power company operates one of the largest and most complex — yet most reliable — electric power systems in the world along with an equally extensive metropolitan steam system.

CHALLENGE

The power plant had a well-developed preventive maintenance (PM) program based on original equipment manufacturer's recommendations modified by the experience of plant personnel over many years. Most mechanical assets received complete overhauls every five years in addition to periodic lubrication and other routine maintenance and visual checks. However, overhauls were performed without regard for the operating condition of the equipment. As a result, many assets not needing such extensive maintenance received the service anyway – simply because the schedule called for it. This practice was not only expensive; it actually increased the risk of damaging machinery that was performing perfectly well before the "repairs" were implemented.

SOLUTION

Following the installation of two new GE frame 7FA gas turbines in 2003, Emerson's Asset Optimization Services group designed a new maintenance strategy to take advantage of evolving predictive maintenance (PdM) technologies supported by condition-based monitoring of key assets. Predictive intelligence is employed in advance of scheduled overhauls to determine what work will be necessary considering the actual condition of the equipment.

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Process Management

The new predictive maintenance strategy was implemented by developing appropriate inputs to Maximo, the plant's computerized maintenance management system, so overhauls on monitored equipment are no longer automatic. If a machine is operating at or near its optimum, the overhaul is delayed until a later date.

Up-to-date diagnostic technologies have also been installed. For example, the CSI 4500 Machinery Health™ Monitor, an online system, now provides a continuous stream of data on both gas turbines and all three gas compressors in the facility. The Emerson team also created schedules for periodic vibration analysis, laser alignment, ultrasonics, and oil analysis based on equipment criticality. Emerson's AMS Suite: Intelligent Device Manager is in general use to obtain predictive diagnostics on thousands of smart field instruments and digital valve controllers.

Asset Optimization Services personnel continue to upgrade the maintenance program by incorporating new capital equipment. At the most recent outage, the first task involved identifying newly installed assets, which were prioritized according to their importance to power generation as well as safety and environmental compliance. Establishing priority ratings is essential in determining the best level of maintenance for each asset. A set of preventive maintenance tasks was also generated, giving maintenance personnel clear instructions on what to do with each new asset and when to do it. Then, load tables were developed for Maximo.

According to John Hill, Project Director for Asset Optimization Services, "Reliability is now a way of life for the Maintenance Group. They have been conservative about making changes and have been reluctant to eliminate the standard 5-year overhaul, but they agree that relying on advanced condition monitoring is the way of the future."

Operating data has been collected for more than five years now, so managers are able to track the results by measuring and comparing Key Performance Indicators (KPIs). They have learned a lot about their equipment and applied that knowledge to operations.

"Our predictive maintenance costs are considerably less where this technology has been embraced."

**Maintenance Manager,
Electric Steam Utility**

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