Advanced Solutions

Success Story

Equipment Condition Monitor Reduces Maintenance Costs And Improves Planning And Equipment Availability For AmerenUE

Challenge
Unplanned and forced outages create a loss in total power generation availability for a typical generation facility. Management at the AmerenUE Labadie plant were looking for a solution that would enable them to monitor critical parameters around key equipment and detect abnormalities that are early indicators of impending equipment failure and unplanned downtime.

Solution
With Equipment Condition Monitor, personnel at the Labadie plant were able to use existing real-time and historical data systems, statistical tools and engineering knowledge to transform huge volumes of process data into actionable information to predict and prevent turbine failures. They also improved their ability to focus and plan maintenance.

Equipment Condition Monitor is Powered by Matrikon, which represents vendor neutrality. This product works with third-party control systems and applications.

Advantage
- Reduced forced outages and unplanned downtime
- Extended intervals between planned maintenance of major assets
- Reduced maintenance costs
- Improved availability of generating units

The Need for Continuous Equipment Monitoring
Forced outages account for a 5% loss in total power generation availability for a typical generation facility, negatively impacting profitability through lost productivity and escalating maintenance and equipment replacement costs. Thus the relatively small proportion of time lost to unplanned outages might translate into 5 to 10% of annual revenue and 30 to 40% of annual profits.

Plant management at Labadie were looking for a solution that would enable them to monitor critical parameters around key equipment and detect abnormalities that are early indicators of impending equipment failure and unplanned downtime. The required technology would also automatically alert relevant personnel to the state of the equipment and pinpoint the cause of the deviation in behavior.

Deriving Value from Oceans of Data
AmerenUE implemented Equipment Condition Monitor, an advanced analysis tool, to continuously monitor the turbines in one of their generating units. With Equipment Condition Monitor, personnel at the Labadie plant were able to use existing real-time and historical data systems, statistical tools and engineering knowledge to transform huge volumes of process data into actionable information to predict and prevent turbine failures, as well as improving their ability to focus and plan maintenance.

Plant staff also used Equipment Condition Monitor to collect, clean and analyze a year’s worth of historical data for 4,000 variables, from which statistical models are constructed to predict the values of key variables during normal operations. These predicted values are sent to the process historian for continuous comparison with the actual values, while 30 critical parameters can be monitored live by operators using the web-based visualization portal, Operational Insight.

Pinpointing the Potential for Equipment Failure
The value of Equipment Condition Monitor is its ability to predict equipment failure. It was proven following a minor outage on the #2 Unit. After the unit was restarted, operators were notified that there was a 5°F temperature offset from the predicted value. Model output indicated a change in the #5 bearing characteristics during the outage.
Following a subsequent outage, Equipment Condition Monitor notified staff that the temperature offset had increased to 10°F. A job request was then issued to look into the problem but before the planned maintenance could be carried out, the bearing wiped, three weeks after Equipment Condition Monitor had initially detected problems with the bearing. This minor incident demonstrated its ability to accurately detect the symptoms that foretell equipment problems well in advance of resulting damage or outages.

Based on the initial successes achieved with Equipment Condition Monitor, AmerenUE is planning to implement the application on other units at the Labadie plant before rolling it out to their other facilities to:

- reduce forced outages and unplanned downtime
- extend intervals between planned maintenance of major assets
- reduce maintenance costs
- improve the availability of generating units

About AmerenUE
AmerenUE is a medium-sized power electric utility based in the American Midwest. Ameren's Labadie power plant is their largest coal-fired facility and boasts four 630-MW generators.