SMART LIQUID ANALYZERS NEED SMART SYSTEMS TO MAXIMIZE BENEFITS

No modern power plant can compete in today's competitive environment without online liquid analyzers. The highly precise detail provided by currently available liquid analysis technology can significantly reduce operating costs and enhance asset value. But the full value of smart analyzer capabilities can only be realized when used with state-of-the-art asset management solutions.

Hundreds of liquid analytical measurements must be taken in a modern steam cycle plant. In a four-unit plant, for example, there can be more than 200 measuring points, including redundancy and backup systems. Liquid analytical systems monitor and control the chemistry of the steam cycle and makeup water processes, including reverse osmosis and ion exchange systems, cooling water, condensate return, and boiler feedwater.

"FAULTS" CAN HAVE MULTIPLE CAUSES

Example: Impedance fault (i.e., cracked glass electrode)

100

Fault alarm setting

A true catastrophic failure

10

Impedance, MΩ

Time

1

An incorrect alarm setting...nothing is wrong, but there is still a fault condition

Fault conditions can have multiple causes and may not indicate a real problem. If the low-alarm for glass impedance is set correctly at 10 MΩ, a fault condition is very likely to be a true catastrophic failure. But if the low-alarm was set incorrectly, at 70 MΩ for example, there is the possibility nothing is wrong with the glass. Illustration courtesy of Emerson Process Management.

They also aid with flow accelerated corrosion detection, pH, conductivity, cation conductivity, passage/rejection ratios, dissolved oxygen, chlorine, ozone, silica, sodium, phosphate and other elements. Additional measurement equipment includes combustion analyzers and pressure, temperature and flow transmitters.

The cost to the U.S. power industry resulting from unbalanced or out-of-control water chemistry in the steam cycle runs in the billions of dollars in lost availability and higher O&M costs, according to Brian LaBelle, manager of industry marketing for Rosemount Analytical, Liquid Division of Emerson Process Management. Yet globally, the power market for liquid analytical equipment comes to only about $800 to $700 million. That seems low, based upon the savings these measurements can produce, he says.

The best liquid analytical systems reduce start-up time, lower maintenance and operating costs, reduce process variability, save costs related to safety and regulatory compliance, reduce downtime and increase availability. They also make it easy for operators to distinguish between failures with true catastrophic significance and incorrect alarm settings generating erroneous fault conditions.

The full value of smart analyzer capabilities can only be realized when used in combination with asset management systems such as AMS Suite Intelligent Device Manager, says LaBelle. He suggests incorporating such capability, ultimately enabled by FOUNDATION Fieldbus digital communications, during the planning stages of a new power plant construction project to maximize all savings potential, including the configuration of instruments at start-up. "One major benefit is the ability to configure all intelligent devices in a Windows environment from the PC in a control room instead of walking around the plant to where each instrument is physically installed," he says.

Once the plant is up and running, operational benefits of such advanced automation abound, especially taken in light of staff reductions common in today's power industry. "There are so many instruments and so many potentials for chemistry imbalance," says LaBelle. "Proper diagnosis, such as that facilitated by AMS Suite Intelligent Device Manager, allow operators to easily determine the significance and cause of alarms."

For example, a measured value may have simply exceeded a set point that was incorrect to start with. "On the other hand, you may really have a problem. If you're not sure, you have embedded Device Help information to help you judge the severity of a fault, assess which corrective actions are necessary, and prepare for a trip to the analyzer if necessary. This could prevent the need to shut down the process to replace a sensor, thereby avoiding unnecessary downtime and increasing the general availability of the asset." (see figure)

AMS Suite Intelligent Device Manager also has an imbedded maintenance/event log, Audit Trail, that can help modify the maintenance schedule by analyzing trends drawn from the event log, says LaBelle. "As an example, you may learn from examining the data that you are calibrating your pH system more often than necessary, so you can make an informed decision to extend the interval between calibrations thereby reducing your effort."

Another advantage: Since many instruments have similar setup requirements, it is helpful to be able to cut and paste a template from one tag number to the next as you configure each instrument. It saves a lot of time on set-up, reduces errors and helps identify problems. "So there's front end set-up configuration savings available for either a new plant or where there's a significant instrumentation upgrade on an existing plant," says LaBelle. [23]