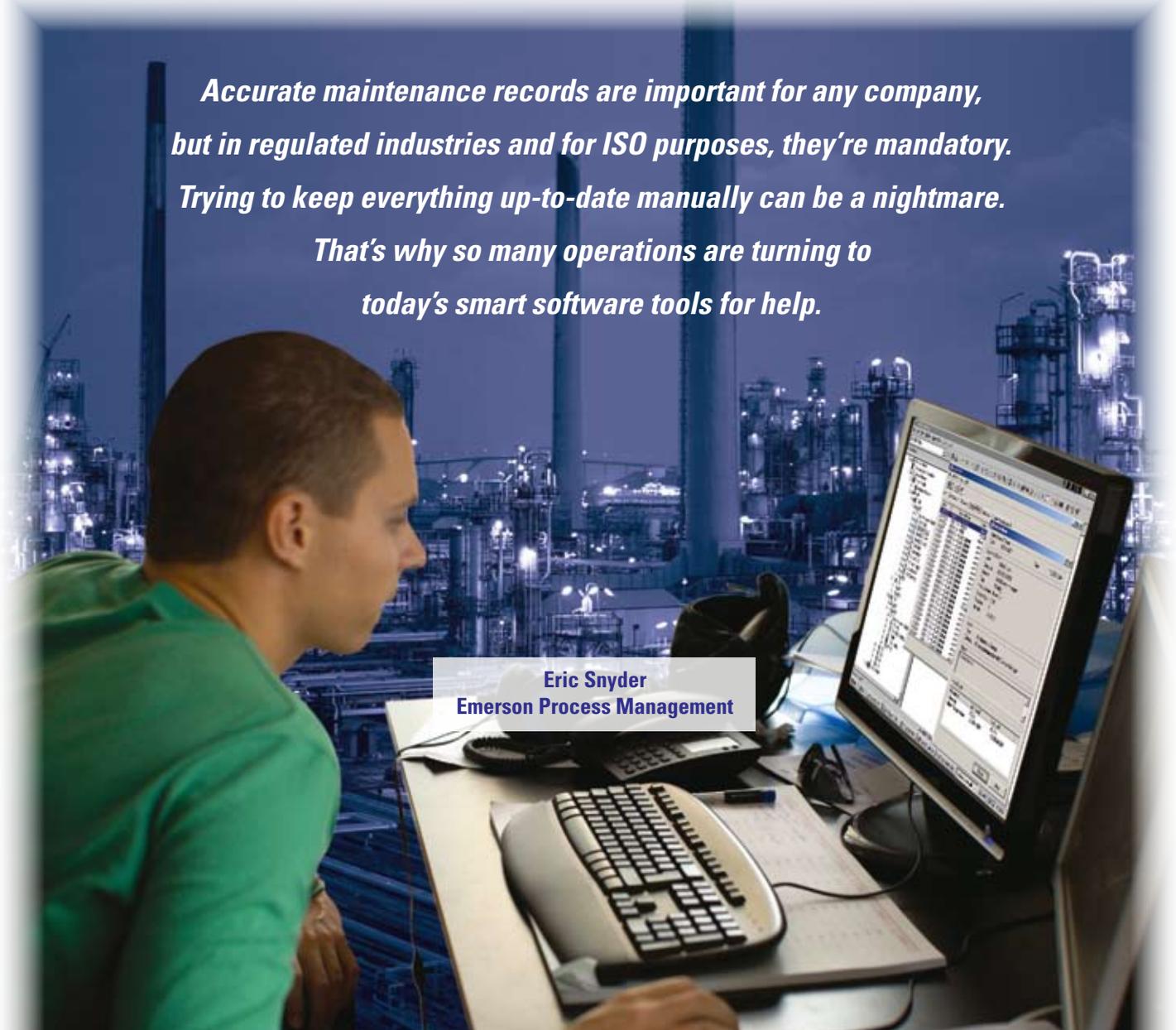**PROCESS IMPROVEMENTS**

Saving Time & Money By Automating Maintenance Documentation

Accurate maintenance records are important for any company, but in regulated industries and for ISO purposes, they're mandatory. Trying to keep everything up-to-date manually can be a nightmare. That's why so many operations are turning to today's smart software tools for help.

Eric Snyder
Emerson Process Management

The vast amount of diagnostic data produced by today's smart field devices can be a very important source for accurate documentation of maintenance activities. But the sheer volume and complexity of such information can be daunting and difficult for maintenance personnel to manage. What's needed is an effective means of compiling and organizing the data for day-to-day utilization by your staff, while preserving and recording significant events for future reference. That's the successful approach two Iowa chemical operations are taking these days.

For example, at the big Monsanto herbicide plant in Muscatine, Joel Holmes, site tactical reliability engineer, not only copes with large amounts of field-generated data, he turns that information to his advantage in a number of ways. For example, he has begun to utilize the Alert Messenger™ application with Emerson's AMS® Suite: Intelligent Device Manager predictive maintenance software, to filter field device "alerts" and auto-generate e-mail messages to responsible individuals in the plant maintenance group. In this way, the most important issues are identified and handled quickly without individual technicians spending a lot of time each week reviewing accumulated alerts within the alert monitor list.

"My ultimate goal," Holmes says, "is to fully integrate these alerts with our SAP computerized maintenance management system to generate work orders as needed. That will give us true automation from the time a field device begins to show signs of reduced performance until a work order is printed out in the maintenance department and a technician is dispatched to the scene. We're working toward that solution right now!"

A big bang for the buck

Holmes cites a predictive maintenance program aimed at critical control valves as another area where field-generated data is providing a "big bang for the buck." This program is fully installed in a loop-intensive, continuous process where it is very important to maintain optimum performance on some 30 critical control valves.

"We take a hard look at valve travel deviation and drive signal alerts by examining the diagnostics produced by digital valve controllers (DVCs) attached to these valves," Holmes explains. "If a valve travel deviation exceeds five percent for five seconds, an AMS alert is activated, and we initiate an SAP maintenance work order to execute our control valve PM procedure. A field evaluation of the control valve is conducted followed by a series of scans and tests, citing "as found/as left" findings. These results can then be compared to benchmark valve performance results from when the valve assembly was last serviced or newly installed. In this way, we can confirm whether the valve has significant issues with packing leaks, increased travel friction, worn seat or trim, etc. Or, maybe the DVC simply needs to be calibrated due to normal valve wear."

According to Holmes, potential problems are often identified and corrective action can be taken before operators are aware that anything is amiss. In addition to the assurance that these critical valves are delivering top performance, benefits of this program include increased plant availability and lower maintenance costs because most faults are caught before they can evolve into problems requiring major repairs and/or costly process interruptions and downtime.

Maintenance histories

When field data are properly acquired and managed, the documents needed to verify the accuracy and periodic calibration of field instruments can be produced very easily. Such documentation is essential in highly critical processes like pharmaceutical production, to verify the accuracy of device measurements, show that plant effluents meet environmental standards, or support ISO applications.

Equipment history cards have long been used to keep maintenance personnel informed about field devices—*but maintaining these histories manually is difficult and time-consuming*. There's always pressure to do something else; handwritten entries can be impossible for another person to read; and errors are common.

Still, maintaining accurate records is a high priority in most maintenance departments, and technology can help. With the development of open communication protocols, the information accumulated by smart field devices can be captured by asset management software. It's no longer necessary for technicians to carry handheld communicators or laptops into the plant to evaluate the condition of instruments, some of which are quite inaccessible or in hazardous areas, to be followed by manually documenting test results and current device status.

With this online tool, technicians can obtain up-to-date information on any device without ever leaving the instrument shop, and they never have to make manual entries back into a system.

An application like the AMS Device Manager compiles a database of every smart instrument used for process control, including its design parameters, original configuration, maintenance history and current operating condition. With this online tool, technicians can obtain up-to-date information on any device without ever leaving the instrument shop—*and they never have to make manual entries back into a system*. Every event is recognized and recorded, whether initiated by a technician or caused by an external force such as an equipment breakdown or power failure.

Audit trails

To generate documents based on the total history of a device or group of devices in the system, end-users can call upon an application like the AMS Device Manager Audit Trail. This capability works in the background to automatically create a history of past device performance and changes that have occurred. Since all records are date- and time-stamped, users can easily determine when and by whom a particular device was changed or tested, including "as found/as left" notations. With this information in a database that cannot be edited, it should never be necessary for technicians to spend time searching for historical information on a device. Since events can also be recorded manually, users can document unusual occurrences affecting the entire plant, such as a lightning strike or power outage, or individual events like device inspections.

Users can refer to recorded alerts to identify any devices that have been problematic over time and what corrective steps may have been taken previously. Automated documentation provides a seamless record of events in a given production area, including communication failures, device malfunctions and process variables that are out of range. Armed with this information, maintenance personnel are better equipped to understand and resolve nagging repetitive issues to improve the process.

One Audit Trail user, Jody Minor, E&I reliability specialist at LyondellBasell's Clinton, IA, plant says: "If there is an issue, or if we are experiencing a rash of issues, we can go back into the records and get a sense of what's been going on over time. You can search by a specific device or by location. For example, if I have a transmitter that failed and needs to be replaced, I can see the whole history for that device, or I can look at the history of the location. Checking the location lets me look for a trend indicating a problem beyond a failed device. The instrument may need to be reconfigured or re-ranged. In this way, Audit Trail can actually contribute to improving the process."

Keeping track of device configuration changes is a key function. The tabular format enables users to review all configuration changes or focus on specific events. When it is necessary to reconfigure a device, everything done to that device in the past can be viewed, enabling the technician to install new parameters if necessary. The configuration records can also be used to help meet process safety requirements. A report showing the calibration history of any given device or group of devices can be printed at the same time.

Device comparisons are also possible with the Audit Trail capability. Users can compare the current configuration and operating status of any two devices in the database. Or, they can go back and review the past parameters in effect at a previous time. Such comparisons can be useful in determining devices that may not be performing at a desired level and finding out why. As always, easy access to device status information saves time.

"I frequently use Audit Trail when questions are brought to me about the reliability of a device or how a control is working," Minor says. "If an operator has a question about the operation of a given device, I can check it out very quickly from my office. Even if an alert has not been raised, I can learn if the device's performance is lagging and often

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determine what's wrong. This is very helpful and saves a lot of walk-ing and climbing in a big plant."

Other resources

Two other features broaden the utility of the Audit Trail application. The Drawing and Notes feature launches a blank MS Word or Excel file where users can embed links to Webpages, photos and other documentation. It also allows them to type in their own notes so others can use them during troubleshooting. The Generic Application Launcher feature also can be used to link/launch into an existing database of historical data, such as calibration data that was recorded at an earlier time.

Use of an automated document generator like Audit Trail allows maintenance supervisors to customize their own accurate, up-to-date documents. Depending on the size of your plant, this can save hundreds of man hours that can be put to effective use elsewhere. In many cases, documentation time is cut in half, explaining why there are more than 3000 Audit Trail users worldwide. Still, the flexibility of this appli-cation gives maintenance managers the ability to customize documents to reflect exactly what they need to report. **MT**

Eric Snyder is a business development manager for Emerson Process Management, focusing on Plant Asset Management products and services for North America.