Prioritizing Alarm Responses For Better Workforce Management

While the laws of physics and chemistry have not changed, the ways that water and wastewater treatment plants (WTPs/WWTPs) are being forced to deal with them over the past few decades certainly have. This ranges from increased focus on disinfection byproducts (DBPs), to tighter turbidity standards for charting *Cryptosporidium* removal, to emerging challenges with harmful algal blooms (HABs) and per- and polyfluoroalkyl substances (PFASs). Even when plant throughput volume stays the same, the demands on plant operations personnel continue to increase. Here's how evolving toward better workforce management processes can help.

Develop Step-By-Step Consistency For Improved Process Control

Keeping pace with changing utility requirements requires tweaking the workforce management approach to maximize operator effectiveness. That includes being disciplined enough to satisfy evolving standards, yet flexible enough to adapt control system operation and alarm management practices for improved productivity. Adopting the right strategy can satisfy the most pressing concerns facing water and wastewater utilities:

- **Do More With Less.** Whatever the seniority of the workforce, most industries are being pressured to accomplish more with smaller staffs. Intelligent systematic workforce management solutions help organizations wring greater productivity from limited resources.
- **Preserve Institutional Knowledge.** Even as expectations for WTP and WWTP resources spiral higher than ever, utilities are expressing new concerns about "brain drain" caused by inevitable workforce transitions. An accelerating retirement rate among experienced, but aging, baby boomers is being exacerbated by recruitment challenges and higher than normal turnover among their millennial replacements. Either way, it is compounding the loss of institutional knowledge.

Formulating a sound alarm management philosophy and strategy is a good way to ward off brain drain. Do that by codifying alarm situations and prescriptive instructions based on past experience of the utility's most experienced operators before they retire — identifying what to look for, what to do first, second, etc. Organize that information and make it readily available and understandable to on-duty staff using a methodical display that is easy to follow regardless of operator experience level.

- **Optimize Operator Effectiveness.** Minimizing

superfluous alarms and using intelligent graphic design helps operators be more situationally aware and can make them more effective by improving their ability to differentiate between causal alarms and reactionary alarms.

- **Provide Digital Benchmarks.** Systematizing processes, then prioritizing reactions to potential alarm events, provides a common frame of reference among all operators — regardless of seniority, past experience, or the rarity of the incident occurring.

- **Attract The Next Generation Of Operator Talent.** Leading-edge control systems can help utilities compete for talented up-and-coming engineers who might otherwise be lured away by the technology of the IT marketplace. Plant-operators-in-training coming directly from school or from another area of industry are more likely to be attracted by automation systems using intuitive human-machine interfaces (HMIs) and are more likely to be more productive when using them.

Elevate The Operator Interface

From the earliest distributed control system (DCS) panels to today's supervisory control and data acquisition (SCADA) systems, user displays have reflected the increasing complexity of the systems they controlled. They went from simple indicator lights, to monochrome digital data screens, to colorful — almost lifelike — pump, valve, tank, and pipeline animations. The ability to assign an alarm to every discrete signal eventually led to an explosion of color and motion that could easily distract or overwhelm a plant operator.

Today's ergonomically designed alarm management HMIs with high-performance graphics (Figure 1) are engineered to prioritize the most critical factors. Selective and deliberate use of color reduces operator stress and focuses on the most crucial alarms and control loops. Equally important, enlisting the help of a knowledgeable control system supplier to review the logic behind better workforce management solutions can reveal new and better approaches and outcomes.

Figure 1. Intuitive HMIs, prioritized alarm displays, and remote access features make it easier for water utility operators to address the most critical control situations in real time.

Prioritize New Solutions Out Of Potential Chaos

When things go wrong in highly automated plants, they tend to go wrong in a big way. Having dozens of alarms going off at once — with each demanding equal priority — is no solution; it can actually exacerbate the problem. Such worst-case scenarios make it all the more important for an operator to be able to zero in on the most critical factors first, and then work through secondary alarms after the higher priority issues are addressed.

- **Program Better Responses Based On A Better Alarm Philosophy.** Having an open dialog with operators about the real reasons behind alarm priorities and designated responses creates the opportunity to refocus on today's operating parameters. This can manifest itself in a cleaner alarm strategy for DCS or SCADA system HMIs and promote greater consistency among operators at all experience levels (Figure 2).

  Developing a comprehensive alarm philosophy document based on the collective knowledge of the most senior operators creates better opportunities for less tenured operators to benefit from that experience. Evaluating complex historical scenarios makes it easier to reduce cascading "alarm storms," prioritize alarm events according to degree of criticality, and spell out the appropriate response protocol for each one.

  Using a qualified control system vendor to facilitate such discussions among experienced system operators can help to augment their experiences with industry best-practice expertise.

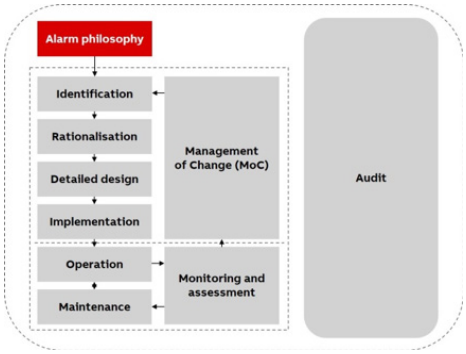

Figure 2. Good alarm lifecycle management starts with a sound philosophy that prioritizes alarm hierarchies and establishes a process for continuous review and improvement.

- **Enhance Alarm Management With Remote Monitoring.** As part of larger process and alarm management solutions, remote monitoring and management capabilities enable evolving situations to be controlled from multiple locations — another corporate site, a third-party contract service, or at both such locations collaboratively. That enables experienced parties at multiple external locations to be up to speed on an evolving plant upset condition in the event they need to share their expertise with less-experienced onsite personnel. ■