Brainstorm: Remote Monitoring

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The Food Manufacturing Brainstorm features industry experts sharing their perspectives on issues critical to the overall food industry marketplace. In this issue, we ask: *What is the most important factor food manufacturers should consider when implementing a remote monitoring system in their facilities?*

Ed Orvidas, Strategic Account Manager, Culligan International

In the food and beverage industry, water is used in nearly every stage of production. Manufacturers rely on it to clean and sanitize equipment; it can be used for raw product preparation and it's often incorporated into the finished product. Because of its significance in the manufacturing process, even the slightest disruption to water quality can affect plant performance and even the taste, texture and odor of the final product. For this reason, continuously monitoring water treatment equipment performance and maintenance needs with electronic applications delivers significant advantages.

Minimizing risk and reducing process downtime is a significant factor to the success of today's food and beverage manufacturers. Electronic monitoring applications and advanced remote and telemetry options can help avoid system failure, reduce potential production delays and decrease overall operating costs. All the while ensuring high quality water is continuously flowing through the plant.

With regard to water quality, food and beverage manufacturers have specific parameters they must meet in order to ensure product quality and system efficiency. For example, pH and conductivity levels play an important role in food and beverage processing. High water pH levels can result from changes in incoming municipally treated water to the plant or contamination from an over feed of pretreatment chemicals or cleaning agents which can lead to decreased water equipment efficiency and flavor issues.

Similarly, water with high levels of specific ions such as sodium and chloride will increase the conductivity of the water and can lead to corrosion of water treatment equipment or impact the production of low sodium labeled products. Constant monitoring of important water parameters like pH, specific dissolved ions and conductivity measurement can ensure the reliable performance of water treatment equipment and that products are safe for consumption.

Matt Chang, Vice President of Sales & Marketing, Hench Control, Energy Management Systems

There are three major categories that food manufacturers should focus on with regard to remote monitoring systems: security and safety, accessibility and functionality. The integrity of their product is paramount and the type of refrigerant to maintain the integrity of the processing and storage of that product is just as important.

Remote monitoring should be accessible anywhere — be it at home, on the road or through a smart phone — so that one can safely and securely monitor the levels and readings of the operation. When implementing remote monitoring systems, food manufacturers should consider that technology exists to make it possible to control operations — not simply monitor them remotely. This entails turning equipment on or off, changing set points or acknowledging alarms. Remote monitoring is a great tool, but it only serves half the purpose if one cannot take action as well.

Hench Control has implemented a technical support center which not only monitors our customer operations but also backs up all alarms, so there is redundancy and a second set of eyes watching the system. We also back up all data offsite in case that data is lost at the plant for whatever reason. And most importantly, we generate a weekly report with findings and recommendations on how to further optimize the operations while maximizing the possible energy savings.

From a liability standpoint technicians should not make any direct changes to a customer’s system unless they are authorized to ahead of time. Instead a weekly report can provide insight and transparency on how the system is running and how it can be improved, a valuable management tool to measure performance and track bottom line results. Hench Control’s report shows efficiency levels, horse power

usage, kWh usage, CO2 usage, total dollars saved and quantified saving opportunities. This information provides a granular level to not only monitor the system remotely but also to control the system and know specifically how to maintain the system at its most optimum level indefinitely.

John Kadinger, Program Manager, Key Technology

The single most important factor a food processor should consider when implementing a remote monitoring system in their facility is IT security.

The two most common ways to set up remote monitoring are to open a port on the firewall or to establish virtual private network (VPN) access for the remote user. Typically, IT personnel don’t like either approach because they can expose the entire network to the outside.

A secondary consideration is ease of implementation. There is usually a trade-off between security and ease of implementation with more secure methods typically being more difficult to achieve.

The system Key Technology has implemented uses the same protocols that are used for online banking. The communication between our equipment inside the customer’s network and the remote user (one of our technicians) is established from inside the customer’s plant. There are no changes to the firewall; it utilizes the same standard ports and the same network security infrastructure that already exist.

Setting up the system requires two simple steps. We connect the equipment to the customer’s network and configure the agent (software that resides on the equipment) to communicate with a single Enterprise Server outside the network.

After that, if we wish to establish communication, we put out a request on the

enterprise server, and the agent picks up that request and takes action to initiate a secure connection.

Jay Simon, Vice President, One Plus Corp.

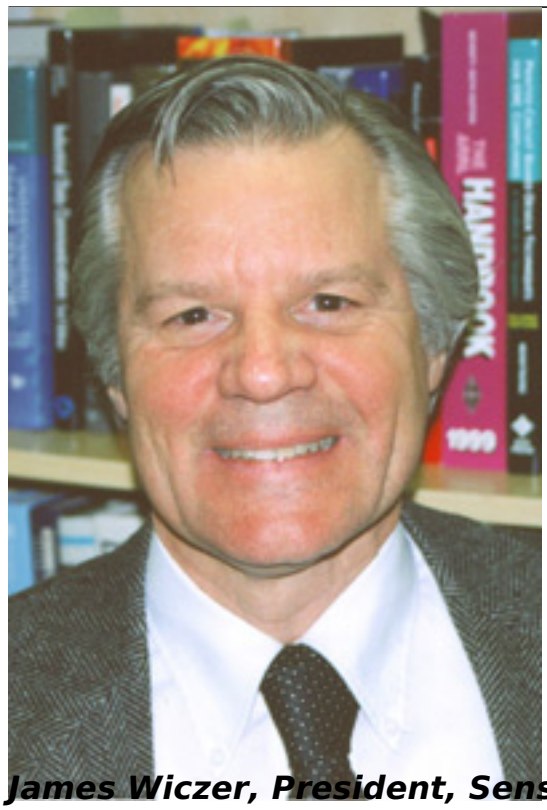
A remote monitoring system should be judged based on length of time to payback, whether new personnel training is needed and whether its addition makes life easier for the plant.

Using technology to monitor the waste stream generated by the plant is relatively new but can be at least as important as process control monitoring. If compactor containers are picked up by the waste hauler too early, the containers are only partially filled, and the company will pay for unnecessary pickups. This can increase waste removal costs by 30 to 50 percent. A hauler pickup that is too late can cause sanitation problems, encourage vermin and even cause a production line to shut down. Monitoring contributes to a cleaner plant environment. Wet food trash can be another problem, creating an overweight problem for the hauler.

Without remote monitoring, most compactor containers are picked up on a scheduled basis (for example, every other day) or when the customer “guesses” the container is full. Both of these approaches can be costly, because they promote unnecessary trips by the hauler.

The patented remote monitoring systems that One Plus has developed monitor the actual fullness level of large industrial waste compactors. When the monitor determines that the container is full, it automatically sends a wireless pickup request email to the hauler and designated employees. Users can even view fullness level status and management reports via the internet. Company employee involvement in waste removal is eliminated.

By reducing waste hauling truck traffic, monitoring the waste stream also provides noise and environmental benefits. Waste hauling trucks are among the most inefficient vehicles on the road, with diesel fuel economies of under three miles per gallon. And even worse, they pollute the air and ultimately the water.



James Wiczer, President, Sensor Synergy

Remote monitoring often entails connecting an electronic sensor or series of sensors to electronic equipment. Most food processing equipment has built-in sensors that enable programmable logic controllers and other control systems to implement food processing automation. These sensors should never be used for other purposes, like remote monitoring. Even slight changes in the electrical parameters, due to another electrical connection to one of the control sensors, may cause distorted sensor measurements in the control loop. A previously safe process may no longer function as designed.

For many, a good return on investment (ROI) may be the most important consideration for remote monitoring solutions. Often, real-time remote monitoring of energy-use for a process or specific piece of equipment can generate significant energy savings with a three-to-six month ROI. Real-time monitoring systems can provide plant personnel with much needed insight into the details of how energy is being used in their facility. In many instances, significant savings can be achieved from relatively low-cost and simple scheduling modifications or minor equipment rearrangements. Plant managers may discover that an older piece of equipment is significantly less expensive to operate than a newer, more feature-rich model, or the opposite may be true.

Ease of installation is another important consideration when selecting a remote monitoring system. An overly complex installation can transform remote monitoring into an economically infeasible burden.

The results of the monitoring system should be automatically delivered to management in a manner that is easy to understand. Out-of-normal conditions should be automatically detected by the remote monitoring system, followed by automated text or SMS messages to the appropriate individuals.

Dave McCarthy, President, MaxiCore, Inc.

From the perspective of plant automation and ensuring the remote monitoring system does what it’s designed to do, the answer in a word is "planning."

Remote monitoring often means different things to different people at a stand-alone facility or a company that operates multiple facilities. Given the increasing popularity of remote monitoring and the promise it holds for food plants, it’s imperative to pinpoint core user requirements that essentially define what each user wants the system to accomplish.

It starts by categorizing system users. One common category is plant maintenance, which focuses primarily on individual equipment production and uptime. Another group of stakeholders is comprised of plant supervisors and managers charged with plant production. A third category for some includes decision-makers at the corporate level who take responsibility for the performance of multiple plants across the enterprise.

Regardless of the user category, it’s important to think of each user as a customer. That’s because a key part of planning is to clearly determine what each customer wants the system to communicate — in real time. At the maintenance level, requirements are typically device-centric. Maintenance customers want to know all there is to know about equipment performance in order to keep it up and running at all times, or quickly fix it if it goes down. Plant managers want information about everything, including things like Overall Equipment Efficiency (OEE) and whether

product is being delivered on time and orders are being met. Corporate decision-makers will typically want the same data as plant managers and more.

There’s also the infrastructure side of things. In other words, the plan needs to define how information is accessed or delivered. For example, will users access information from an office using a laptop, or will the system send alerts to a smart phone? In some cases, a third-party systems integrator might assume responsibility for remote monitoring, which dictates a strong partner relationship so it’s clear what information is conveyed to whom and when.

The potential gains of remote monitoring are significant in terms of operational efficiency, risk reduction and overall plant performance. The most important step is to develop a solid plan with the help of an experienced partner. That way, everyone gets what they need — and the business wins.

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