

CMOM Made Simple

By John J. Cronley

Ensuring
compliance in
wastewater
collection and
treatment

Capacity, management, operations and maintenance program: Most often, this term is shortened to the familiar acronym CMOM. The ultimate goal of the CMOM process, as it applies to the wastewater treatment industry, is to assure that discharges from treatment facilities are free from pollutants. The framework of the CMOM program allows for periodic reviews of a collection system by the U.S. Environmental Protection Agency (EPA) and state inspectors to assure compliance with the program elements. Typically, any system review would follow an established framework consisting of examining records, interviewing staff and conducting field investigations.

A broad overview of the goals of the CMOM program includes the following:

- Helping communities ensure they have adequate wastewater collection and treatment capacity;
- Assisting communities to better manage, operate and maintain collection systems;
- Assisting operators to effectively investigate capacity-constrained areas of their collection systems;
- Implementing programs designed

to proactively prevent sanitary sewer overflows (SSOs); and

- Establishing procedures to help operators respond effectively to SSO events.

There are several existing federal laws that influence and control both water and wastewater operations. CMOM programs are directed toward storm water, treated wastewater and untreated wastewater discharges. Although CMOM itself is an EPA program—not a regulation—it is an excellent tool to assure that a facility is doing everything that it reasonably can to comply with EPA directives under federal laws, including but not limited to the following:

- The Federal Water Pollution Control Amendments of 1972, more commonly known as the Clean Water Act (CWA), the principal law governing the release of water into all U.S. waterways;
- The Clean Water Act of 1977, which expanded the 1972 CWA to include wastewater operations; and
- The Water Quality Act of 1987, which expanded the National



David Sutton (left, far left photo), pump station technician, and Todd Rollin, utility service worker, on the job at the Gallatin, Tenn., Department of Public Utilities.

Pollution Discharge Elimination System regulations created by the 1972 CWA to cover storm water discharges and clarified standards for effluent treatment originally established by the CWA.

Monitoring lift stations can reduce the potential for spills and violations, but more importantly, it gives operators adequate warning to address minor problems before they become major problems. The timely receipt of alarms and notifications from a typical SCADA system can dramatically reduce the potential for lift station failure, thereby reducing the potential for SSOs, threats to public health and property damage.

Many of the EPA goals established by the CMOM program can be satisfied easily and inexpensively by the procurement and installation of a variety of modern remote terminal units (RTUs), which are reliable and can be installed quickly and activated in any collection system. The ability to receive real-time notifications of potential backups and to respond quickly in an organized, logical manner is enhanced by the operation of a SCADA system.

Pillars of Effective Design

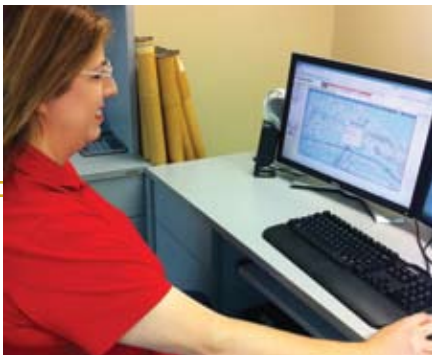
Any well designed system should minimize the risk for service interruptions by monitoring the operation of critical pumps and equipment. Most repairs can be anticipated with timely information, and those that cannot be anticipated can be handled quickly through prompt and efficient notification of responsible personnel. Additionally, a SCADA system can track the efficiency of pumps and other equipment. Inefficient pumps can cause a reduction in the flow rate out of a lift station. That reduction, in turn, can cause a backup and a potential overflow situation. Monitoring the efficiency of pumps enables the operator to repair or replace worn or inefficient equipment before the SSO scenario develops. The implementation of a SCADA system also demonstrates to regulators that best practices are being followed.

Kris Riemann is director of engineering for the city of Gulfport, Miss. He is directly responsible for the planning, budgeting and execution of all capital projects, including water and sewer projects. The Gulfport system is heavily reliant on a Mission Communications SCADA system to keep abreast of all

system functions outside its plants, both in collection and distribution. Riemann worked closely with Mission engineers to develop the Capacity Estimator tool, a standard part of the Web-based software.

“We use the Capacity Estimator to help us determine if capacity is keeping up with development and I&I [inflow and infiltration] within each branch of our collection system, which helps us prevent overflows and overtaking system capacity,” Riemann said. “We follow CMOM recommendations to show compliance with CMOM standards. The EPA recommends that all systems install SCADA, and our installation of this equipment demonstrates that we follow those guidelines. Using our SCADA equipment to collect data and the Mission website tools to evaluate the data helps us to accurately evaluate our capacity and stay in compliance and helps us to make better management decisions.”

Joanne Massony, Kenner, La., project manager for Veolia Water, first installed a SCADA system in 2007. “When we installed the SCADA units, we found that several pumps ran too long because we had some I&I or efficiency issues,” she said. “This led to serious maintenance



A Veolia employee viewing the Web-based software.



Gulfport, Miss., Director of Engineering Robert K. Riemann uses a large, mounted monitor to create a control room atmosphere.

issues. When we had a heavy rain, we discovered that some pumps might run all day. The [new] system helped us to identify the pumps that were running too long and the pumps that were not running efficiently, and that led to quicker and better targeted maintenance.”

An important feature of any properly designed data collection system is that it enables the operator to provide regulators and governing boards or councils hard evidence of shortcomings and successes. Like many collection systems across the country, the Kenner system had been fighting the impact of worsening I&I problems for years. The increased I&I was putting pressure on the system capacity, and putting Kenner in jeopardy of potential violations.

Kenner officials understood that managing the capacity aspect of their CMOM program started with managing I&I issues by collecting and analyzing data to determine the extent to which I&I existed and, if possible, narrowing down the target areas to investigate. The ability to measure and analyze peak flows allowed the city to design and implement a plan to isolate, identify and correct or repair problem areas within its system. A SCADA system streamlined and simplified recordkeeping, making the process of isolating problem areas easier. The data reporting features of the SCADA system allowed operators to track and record data, compare flows over month-to-month or year-to-year periods, track the impact of growth in the system, stay within CMOM guidelines and make plans for worst-case scenarios.

David Kellogg is the assistant superintendent of public utilities for the city of Gallatin, Tenn., Department of Public Utilities. His responsibilities are numerous and include the oversight of pump station maintenance—the second ‘M’ in the CMOM program—on the collection side of the Gallatin utility system. His utility installed Mission cellular SCADA

in 2006, and Kellogg has found the system extremely helpful in operating the utility safely while reducing the potential for reportable spills.

“If we have a really heavy rainfall or a pump outage, we receive an alarm through the SCADA system,” Kellogg said. “We can bring in portable pumps to get the effluent into the outflow pipe and avoid a potential spill situation.”

The system includes an automatic report function that measures pump runtime variance. The system keeps track of all runtimes for each individual pump over the current 30-day time frame. Any runtime that exceeds the calculated statistical variance for the past 30 days is flagged, and Kellogg receives an e-mail notification from his Web-based HMI software.

“The pump runtime variance report alone has helped us prevent numerous potential spills. If any pump runs a lot longer or shorter than it normally does, that’s something I want to know about,” Kellogg said.

Statistical tools, such as measuring runtime variance, can help an operator quickly identify stations in which pumps are working at more or less than their usual level; the automatic notification process initiated by the SCADA system gives ample time to address the problem. The identified stations are obvious targets for immediate routine maintenance, even if the system is not receiving alarm calls for bad pumps or high wet wells. Properly interpreted and acted on, accurate runtime information can prevent many problems before they happen.

Ryan Eastwood came to the Ashland, Ky., system in mid-2009. Shortly after Eastwood extinguished some of the “fires” that had been smoldering before his arrival, he turned his attention to a wastewater collection system that had been neglected due to budget shortfalls. One of his predecessors had installed traditional radio-based SCADA several

years before, but that system was virtually unusable due to the high cost of service and frequent outages. One of Eastwood’s first decisions was to install RTUs at all of his lift stations. Not only has Ashland reduced overflows and repaired problem areas, but it also has been able to reduce operational man-hours, helping to meet both the operations and management aspects of the utility’s CMOM plan.

“We’ve definitely reduced overtime,” Eastwood said. “We spend much less time driving, so we are able to spend more time working. Our new SCADA system is very reliable. I keep myself on the first responder call-out list, and when there is a problem the system always calls me. It is really easy to get information right from the phone or from my computer at home. I can even turn on or off pumps from my smartphone if I have to handle a backup or maintenance issue. Having that level of control is great.”

The design and implementation of the CMOM program is a valuable exercise for every wastewater utility. Finding effective ways to implement the recommendations of the CMOM evaluation process can only help a utility meet its ultimate goal of effectively serving the public. Properly applied, the CMOM guidelines should save most utilities a significant amount of ratepayer money that previously had been lost to system inefficiencies. A cellular-based SCADA system may be a valuable tool to help a utility start up a CMOM program or help keep it on track. **PS**

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