

Protecting public water supplies from deliberate contamination

By James McGowan

For many, confidence in the safety and security of their drinking water systems changed after the tragic events of September 11, 2001. Established after 9/11, the US Department of Homeland Security (DHS) had the same concerns and quickly made it a priority to reduce any risks of deliberate contamination to drinking water supply systems.

In the United States, roughly 84% of the population receives drinking water from approximately 165,000 public water systems. According to government statistics, there are also at least 16,000 publicly-owned wastewater treatment systems in the US.

Under the *Bioterrorism Act of 2002*, the DHS gave the Environmental Protection Agency (EPA) full responsibility for developing a comprehensive plan to protect and reduce risks to the water sector, which includes community drinking water and wastewater utilities. Through collaboration with public and private water utilities, state governments and national water sector associations, the EPA established vulnerability assessment guidelines to help water utilities evaluate their susceptibility to vandalism and sabotage.

Case Study: Collier County

The Collier County Water Department provides drinking water service to more than 160,000 permanent and approximately 200,000 seasonal customers in the unincorporated areas of the county outside the City of Naples, Florida. The department maintains an entire water system, from pumping the water out of the ground, to delivering it to customers' homes.

The water supply system covers roughly 240 square miles and includes two hybrid water treatment plants, three water storage re-pumping facilities, three well fields and one aquifer storage and recovery well. With 103 wells spread out over a large area, the department operates two raw water booster re-pump stations.

When it conducted its EPA vulnerability assessment in 2002, the department determined that its public water supply system needed security enhancements in



Collier County Water Department.

order to meet the new DHS critical infrastructure guidelines.

After assessing the more immediate risks, Collier's management team considered the most effective way to control access to the well fields and other remote sites. While researching their options, they determined that the CyberLock system of electronic lock cylinders, electronic padlocks, and programmable keys met their requirements.

The department first implemented the CyberLock system in 2004. The system has continued to grow as new wells have been brought on line and facilities expanded. To date, more than 600 electronic locks have been installed.

Five different types of electronic lock cylinders are used in the lock hardware on administrative office doors, re-pump stations, and in the deadbolts on well house doors. There are also electronic padlocks on facility gates and underground sample stations.

Electronic lock system

Collier County uses the electronic lock system to its fullest capability. This includes the software's e-mail warning system, on-demand audit reports, and running the program on laptop computers. The audit reporting ensures that em-

ployees are doing their jobs, water samples are being pulled at the right times and locations, and scheduled security checks are being made throughout the well fields.

"The system's auditing capabilities are of great importance to us," James Price, the department's technical support professional, explains. "The electronic locks and keys audit lock openings, including exceptions such as unauthorized attempts to enter. The system sends us e-mail notifications of denied access, employee access to the facility after hours, and specific door openings at the water treatment plant. It also keeps us informed when someone is accessing a particular area of our facility."

The department has a network of CyberKey authorizer keyports and hubs throughout its facilities. They are installed at entrances to the break rooms, control rooms, supervisor office areas and main entrances. The keyports have a display, PIN keypad and connection for employee keys. Employees receive their access permissions and entry authorization daily by inserting an electronic key in one of the keyports. At the same time, a record of their activities is downloaded

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CyberLock padlock on a gate.

and sent via the hub to network PCs.

“We have contractors that cut the grass around our water treatment plants and wells. We issue an electronic key to each contractor so they can access the main gate. We let them know that any lock they open is being audited so we can confirm their activity while at a Collier County Water Department location. We explain the consequences if they try to access a lock that they are not authorized to open,” says Price.

The department uses electronic bar bell padlocks on its sample stations.



CyberLock padlock on office door lock.

Physical access to the stations is awkward and there is only a very small area to work in. The bar bell padlock is ergonomically designed for this type of application. The underground stations are extremely wet and the bar bells are highly water-resistant. Laboratory employees collect samples from various areas of the water distribution system daily, following a mandatory route they must take for collecting samples.

“The audit report from the electronic padlocks and each lab employee’s key should confirm that the employee is

checking each sample at the location they indicate in their log,” says Price.

Meeting environmental protection regulations

The Florida Department of Environmental Protection is the primary regulatory agency for the Collier County Water Department. “They ensure we meet Homeland Security measures that have been put in place,” Price says. “We have to demonstrate that we are performing at certain levels of security to keep our risks as low as possible. CyberLock provides a system of checks and balances to docu-

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ment that we are staying in compliance and can respond effectively to any decrease in water quality from malevolent actions.”

The water department audits employees who are responsible for carrying out security inspections at pump stations and in the well fields. A pump station can have as many as 10 electronic locks on it. When the employee performs a security check, they use their electronic key to open the locks on all the doors and panels. The audit trail that is downloaded from their key should confirm that they have checked everything at that pump station and it is secure.

Management can run audit reports to make sure employees are inspecting doors on well houses and checking in-ground wells that are in vaults. The vaults can have as many as four electronic locks on them.

Along with the CyberLock system, the department has strengthened its perimeter security system at the two water treatment plants by installing additional CCTV cameras.

The Collier County Water Department

Electronic bar bell padlock.



has made great strides towards meeting the level of threat that faces water utilities today. It has integrated up-to-date security technology, implemented access control processes, educated its employees on the importance of security awareness, and developed sound, cost-effective security procedures. Assessing potential risks and developing ways to manage and reduce

those risks are ongoing. As EPA standards evolve and new security threats emerge, the department is in a strong position to respond quickly and decisively to protect the public's water supply.

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