



# REMOTE DISCONNECT FOR WATER

Lessons Learned After Five Years in the Market

**White Paper**

## BACKGROUND

In 2012 Mueller introduced the first remote disconnect meter for the water industry. Mueller Systems' 420 RDM addressed many pain points felt by water utilities across the globe. For decades, utilities struggled with the high operational costs of disconnecting and reconnecting water services, with many mentioning disconnect/reconnect as their number one service order request. Utilities are forced to deal with several impediments to the disconnect/reconnect process, including:

- cars parked over meter pits to avoid shut-offs;
- backyard meters that may be inaccessible;
- broken curb stops or other customer-side plumbing concerns

In addition to high costs, the manual disconnect/reconnect of water services presents a host of customer service issues and employee safety concerns to the utility.

Before the introduction of Mueller's 420RDM, remote disconnect was used in the electric metering industry for at least 15 years. Early adoption of AMI and the convenience of endless, on-demand electricity made remote disconnect an easy choice for implementation for electric utilities. But despite sharing the same needs as electric utilities and many additional drivers for adoption, water utilities had to wait for the technology to catch up to their market segment. The technological challenge for water was very clear: lack of constant electricity. In order to implement remote disconnect for water, utilities required on-demand two-way communications to the meter, and technology capable of working in a water meter setting for twenty years. Both requirements needed efficient use of batteries and robust, long-range communications technologies. Mueller Systems pioneered and led the industry in both of these areas.

In 2009 Mueller Systems released the first true two-way AMI system for water: Mi.Net. Unlike other so-called AMI systems at the time, Mi.Net was designed for full two-way on-demand access for command and control of meters and sensors. At that time, "two-way" networks were essentially only two-way in the sense that every meter in the system could maintain time synchronization. However, the network could not guarantee on-demand, two-way access to every meter around the clock. Mueller's Mi.Net system was built from the ground up around on-demand command and requests of each individual meter, which is key for remote connect/disconnect. Much of the value of remote disconnect is lost if you cannot ensure valve closures or openings within seconds of the request being made.

While true two-way communication is key for the network side of remote disconnect, reliable long-term operational life is key to the metering side. Mueller's 420 RDM was designed from the first blueprint drawings to offer trustworthy operation over twenty years.

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### OPERATION

The 420 RDM utilizes a proven positive displacement metering technology using a nutating disc measurement chamber along with a pilot/diaphragm valve, all within the traditional AWWA 7.5" lay length for 5/8" and 5/8" x 3/4" water meters. This design allows for easy installation with no plumbing alterations or meter box changes.

Mueller has an extensive record with water valves of all types, and our engineers performed an intensive search of all valve technologies including ball, gate, and butterfly valves. Given the primary requirements of reliable service and long battery life, the choice for Mueller's engineers was easy: the pilot/diaphragm design is far more efficient and robust than any other available valve configuration. This design has been tested and proven for years in millions of irrigation system applications.

Mueller's pilot-operated diaphragm valve design utilizes system water pressure to allow or stop the flow of water in the meter. When the valve is commanded to actuate, a small solenoid plunger moves, using a tiny amount of mechanical energy, to create a pressure differential by closing or opening the pilot path. This either builds or relieves pressure on top of the diaphragm, causing it to open or close the flow of water. The nature of this design offers two huge advantages over other valves: low power requirements and a very robust design.



Mueller's robust design for the 420 RDM utilizes a true on/off valve. Early in the development process of the 420 RDM, Mueller offered what we described as "life-sustaining flow." It was thought that utilities would desire a valve "state" that allowed a small flow of water for particular customers or applications to avoid a negative perception in the media. We approached the market with the life-sustaining option, but utilities rejected this design for a multitude of reasons. Of those reasons, utilities made two strong points. The first point was that utilities' current business processes involve total disconnection of service (as has been the case for decades), and the move from total disconnection to partial disconnection (life-sustaining flow) opens a Pandora's box of

headaches and potential liabilities for the utility. The second point was that ¼ gpm to 2 gpm still allows the utility customer to use water at a level that doesn't give them a strong impetus to pay their bill. For instance, the average low-flow showerhead uses less than 2 gpm, meaning customers on a "trickle" state could still take showers and flush toilets. This results in more and more bad debt and past-due accounts for utilities, the very situation they were hoping to avoid. By completely disconnecting service, utilities can maintain their current business processes and provide the necessary motivation for delinquent accounts, all while gaining the efficiencies desired from a remote service disconnect or reconnect.

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Based on feedback from utilities who have deployed disconnect meters, Mueller has developed an improved strategy for those situations where a utility's customer needs access to water to avoid loss of life or negative media: we call it "compassionate scheduling." Thanks to a valve design that requires little power and can be operated thousands of times with little to no impact on battery life, we can allow utilities to schedule water service to come on for only a specific hour or period throughout the day. Utilities can turn water on or off as they desire or schedule those certain periods automatically. For example, utilities can provide water to a customer who has specific, special needs, while still providing the necessary motivation for payment as well as limiting the amount of debt customers can ring up while "disconnected".

### ADDRESSING UTILITY PAIN POINTS

The most obvious use of remote disconnect technology is to shut off and restore water service to customers for non-payment. For decades, non-payment has demanded a lot of resources in terms of utility personnel. Typically, the utility would go through a complete billing cycle, and customers who failed to pay the previous cycle would be notified manually (by mail or phone call) with the utility offering a "grace period" to allow the customers time to pay. After the grace period expired, the utility would then process numerous, cumbersome work orders

and then send utility personnel into the field to perform a manual shut-off. Ideally, the customer would soon pay their delinquent bill, prompting the utility to again send out personnel to the customer's home to quickly restore service.

It is self-evident that remote disconnect/reconnect makes sense to eliminate sending utility personnel into the field via "truck roll." Many utilities disconnect an average of 5-10% of their customers each year. If we imagine an average utility of 20,000 customers, that amounts to 1,000 to 2,000 disconnect/reconnects each year. Utilities conservatively assume their average "truck roll" costs \$50 - \$75, and using these conservative numbers, we can safely estimate that implementing remote disconnect easily saves our example utility \$100,000 to \$300,000 per year.

Utilizing Mueller's Mi.Host software, utilities can schedule bulk shutoffs in a way that is convenient for handling the customer service implications of dealing with non-payment. Additionally, the Mi.Host software can quickly reconnect service while the customer is on the phone. Mueller's "wake-on-demand" two-way functionality ensures the disconnect/reconnect command gets to the meter immediately, and the command's receipt is immediately verified. This ensures the utility can offer the highest level of customer service available. Mi.Host software also features alerts that are specific to the RDM such as: "flow after disconnect"

to detect the unlikely event of a tamper to bypass the valve; and "high flow following a connect." "High flow following a connect" is a handy backup tool to supplement the utility's business standard operating procedures.

Additionally, there are many situations beyond non-payment where remote disconnect is an ideal addition to the customer service team's toolkit. Another pain point for customer service is frequent turnover of customers. The average percentage of households who rent versus own is about 35%, and in some large cities that number is closer to 50%. University towns have large amounts of move-ins and move-outs, while any utilities in the Deep South and Southwest have "snowbird" populations or "Halloween-to-Easter" residents. Mi.Net and remote disconnect helps utilities to eliminate truck rolls in these instances as well.

Customer service is also enhanced through remote disconnect. When alarms or alerts come in via the Mi.Net system, indicating an unexpected excess of flows at certain properties or areas, service representatives at the utilities can follow up with owners to determine the source: is the usage valid or is the usage due to a large leak? This can be valuable in several scenarios, such as when vacationing homeowners are unaware a pipe has burst; in this case, the utility can shut off service to save precious water resources, avoid large water bills, and minimize property damage.



An additional customer service benefit is protection of the public. With remote disconnect, the utility can proactively enforce “Do Not Use” orders during a potential contamination event. For instance, if a backflow event has been identified in the system, the Mi.Net system can quickly disconnect all RDMs to reduce the chance of injury or death due to contaminants reaching the utility’s customers.

With fewer crews and vehicles making routine disconnects and reconnects, utility resources can be redirected elsewhere where maintenance or other work is needed. This ultimately keeps employees out of any situation where they may encounter risks including unknown states of plumbing, unruly customers, or dangerous neighborhoods. This decreases overall risk to their safety, which is always the foremost concern of the utility.

## REMOTE DISCONNECT FOR AMR/MOBILE

For those utilities who want the benefit of smart utility infrastructure but are not quite ready to make the jump, Mueller also offers the RDM Mobile option. This tool allows for the utility to remotely connect/disconnect the 420 RDM from the street, eliminating the need to gain access to the meter box to make the connection/disconnection. This can be done as part of a larger AMR system, or can be installed as a targeted deployment.

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### SUMMARY

Mueller has led the water industry into the remote disconnect age of metering. With the implementation of remote disconnect, our customers have discovered several new benefits beyond just dealing with customer non-payment. Remote disconnect is a proven technology that shows a clear return on investment. It has proven to be a platform that can grow as utilities find more ways to leverage the technology to support the critical job of providing clean, reliable water service to their customers.

### CONTACT US FOR CONSULTATION

Mueller's sales representatives have the most experience in tailoring solutions to your utility's requirements. Visit [muellersystems.com](http://muellersystems.com) or contact your local Mueller representative to schedule an ROI consultation to review how we can meet your needs.

### ABOUT MUELLER

Mueller (NYSE:MWA) is a leading manufacturer and marketer of products and services used in the transmission, distribution and measurement of water in North America. Our broad product and service portfolio includes engineered valves, fire hydrants, metering products and systems, leak detection and pipe condition assessment. We help municipalities increase operational efficiencies, improve customer service and prioritize capital spending.

*For more information about Mueller or to view our full line of water products, please visit [muellerwaterproducts.com](http://muellerwaterproducts.com) or call customer service at 1-800-323-8584.*

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