Small Systems
Committee Report

Since our last report, we have had two new members join the Small System Committee. Lori Huntoon from Fehr-Graham & Associates, and Sarah Nunn from Ayres & Associates. Both Lori and Sarah will bring energy and enthusiasm to our already strong, resourceful committee. We are looking to really energize the presence of Small Systems throughout the State and with WWA. Lori has also accepted the role of Vice-Chair and is already providing ideas and great support to the group. I know Sarah is more than willing to get involved, and will also be a great addition to our group.

Our Small Systems Committee has also been busy in formulating plans for the Small System Workshop in Onalaska. This year we will look to change the presentation format and also the location. We will utilize the Municipal Public Works building. Additional sites for workshops are being explored with Platteville and a location in Rock County as the most likely sites. Small Systems is working with Irv Lupee for coordination of the workshop in Platteville.

Tom Krueger, a Small System Committee member, is looking into bringing back an aspect of the Small Systems that used a newsletter as a means of contact and information sharing that worked well in past years. Tom is also exploring the possibility of using the website and links as a means of information sharing for these smaller municipalities around the state to access. We are on the right track with this additional outreach.

Lastly, we will also be providing insight and input to the Annual Conference for the Small System Track. We have been developing topics and presenters to help make the Small System presentations a good contributor to an already successful conference.

Jim Prindle
Committee Chair
City of Onalaska

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Having a comprehensive program, for eliminating and preventing cross-connections, is a major undertaking for both small and large water systems. It eats up large amounts of time and energy for everyone involved; however, inspection agents gain a lot of satisfaction from identifying and eliminating these dangerous connections, and rightly so.

Just today, I reviewed an inspection report from a rural high school that listed 14 high-hazard, unprotected cross-connections. Each one of these was capable of making a lot of people ill. Thanks to the hard work of everyone involved, they were eliminated.

Since hard work has a starting point, keep in mind:

“Beginnings are always messy.” ~John Galsworthy

Then persevere as you put into place all the elements necessary for a successful program.

The following article will shed light on some of the Wisconsin Department of Natural Resources (WDNR) expectations and will offer useful advice when you formulate your strategy. In the process, I will mention a few examples from the City of Onalaska. They have one of the best programs here in Western Wisconsin and have mentored and shared their knowledge with operators across the coulee region as well as the WDNR.

Program History
Wisconsin’s cross-connection control requirements are almost 40 years old ~ 1974. The newest revisions retain some of the early language. Water systems are required to have a “comprehensive control program” for the elimination and prevention of unprotected cross-connections. This includes an ordinance, a written program description, inspection schedule, recordkeeping, and disconnect procedure. The 1992 revision added a 10-year inspection schedule while the 2010 revision clarified inspection schedules and added much needed flexibility.

Have you conducted a thorough inspection of all your service customers twice over the last 20 years?
The latest revision (2010) breaks down service customers into two classes - residential and nonresidential, allows some non-residential customers to be inspected at the same frequency as residential customers (which can now be up to 20 years with a new meter change-out), requires all other

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inspections every 2 years, and added an education component for kitchen and bathroom areas.

Before discussing details, I will briefly mention that in Wisconsin water purveyors have always been responsible for water quality up to the last tap. This can be difficult to understand and explain, but has always been the State’s position. Containment at the service entrance will not substitute for cross-connection inspections throughout the service customer’s property. With this said, there can be significant liability issues if the water were to become contaminated from incorrect plumbing on private property regardless of whether it flows back into the municipal water system. This is a major driver for why you need to be identifying and eliminating cross-connections. The water purveyor needs a well run program for liability protection. Risk is always present so limit your liability by implementing a sound program.

Code Requirements
If you keep in mind that your program must be “comprehensive” for identifying and eliminating unprotected cross-connections, you will have understood the code’s intent. The code spells out the details. You must make a good-faith-effort to find and eliminate all the unprotected cross-connections to your water system and have the documentation to back it up. The inspection itself must be a thorough evaluation of the whole plumbing system... from service entrance to each end use device and flowing tap. If this describes your program, you likely meet requirements.

Figure 3 - Hose on Unprotected Service at the local POTW

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Whether you need planning, design, financing alternatives, preservation strategies, constituent communications or construction services, Mead & Hunt can provide innovative, cost-effective and sustainable solutions for your community.

For all practical purposes, your program will need the following elements:

- Current Ordinance
- Written Plan or Program Description
- Inspection Schedule
- Record System to Track Inspections
- Qualified Inspection Agent(s)
- Inspection Results or Documents
- Enforcement Plan that Includes Shutoff Provisions
- Education Program

While this may seem like a simple list for implementation purposes and template for your written plan, there are many administrative or policy decisions that you and your board, committee or council will need to make.

Policy Decisions
Before tackling the policy decisions, you will likely need to remind folks about the primary objective of your program – identify and eliminate unprotected connections and document it. Don’t get bogged down in all the fine details and lose site of your goal. This should involve your utility board since you will likely be challenged by someone. Let’s discuss some of the policy decisions that must be made up front.
Written Plan

Code requires that each water system submit a written program description or plan to the WDNR. Keep in mind that the Department expects you to be consistent with your plan and it may need to be updated as your program develops. As a template or starting point for your plan, use the list of program elements listed previously. While your plan can be 3” thick, it could also be done succinctly on one page. Either way, it must be clear to an outsider and you must follow it.

The Department wants to know who your inspection agents are and their qualifications, what your inspection frequency will be for various service customer classes, how you plan to document your inspections, who your enforcement agent is, and how you will gain compliance when violations are identified. You also need a tracking or record system so you can demonstrate that each customer has been inspected at the appropriate frequency and violations were corrected in a reasonable time frame. Good filing practices will also save you time when you complete your annual inspection and violation summary report for the WDNR.

If you choose to implement a public education program in lieu of inspecting low hazard areas in kitchens and bathrooms, you will need to describe your education program and attach the brochure(s) or training materials you will be hand-delivering during your inspection as well as mailing every 3 years.

Your program plan may become more complicated if you are using private-party inspection agents for your non-residential customers and municipal staff for the residential customers since additional communication will be necessary from a tracking and enforcement standpoint.

Initial Inspection Notification

Since there are 2,442 certified water operators, 6000 licensed plumbers, and about 6,000,000 people in Wisconsin; chances are weak (~ 0.1%) that your customers will know what a cross-connection is or where it lurks.

The City of Onalaska, with about 6,000 service customers, provides up-front, customer training in the form of a letter and brochure. The utility clerk schedules the inspections for their one full-time, in-house inspector by mailing an initial letter and brochure. About 150 customers are notified at a pop and have a couple weeks to respond by calling during normal business hours to schedule the inspection.

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The City has a 45% success rate with the first letter. The Clerk fills in time slots using a shared calendar that the inspector has access to. Those who do not respond are sent a second notice within 14 days and, if necessary, a third notice within another 14 days. After which, a disconnect letter is sent out giving the customer 7 days to schedule an appointment. Administrative assistance on the front end provides more time for the City’s program coordinator, **Shane Stoner**, to evaluate plumbing.

**Inspection Agent(s)**

There are many questions you will need to answer when it comes to your inspection agent. These relate to liability, expertise, training, manpower, temperament, and a host of other criteria.

Will you train in-house staff to complete the inspections or hire a qualified contractor? Do they have the proper training, time, and temperament for carrying out a successful inspection? Who will be your inspection agent for the more complex plumbing systems which require even more specialized training and experience? Some inspections take several days, even for professional inspectors, given the complexity of the plumbing. Hospitals, breweries, schools, wastewater facilities, power plants, malls, mills and large manufacturing facilities are extremely complex. These should be left to the professionals. If you are considering putting the inspection responsibility on the customer, think again.

The school case I mentioned earlier, with 14 dangerous connections, was completed by a qualified professional company only after an enforcement action was taken by the WDNR. The previous inspection agent, as well as the other individual inspection agents for the other customers, was unqualified. This was obvious since their inspection records had no documentation of observations at the end use devices or the protection method for each of these end uses. No, a plumbing license to install drain fields is not a qualification for completing inspections of complex plumbing systems nor is the advice from a buddy.

![Figure 4 - Complex Plumbing at Dental Facility (W. Anderson)](image)

Many of the larger communities and even some of the smaller ones, delegate all inspection activities to third-party inspection companies. The logic being: 1) unprotected cross-connections in a backflow situation have the capability of injuring or killing customers, 2) it is difficult to train plumbing inspectors and maintain in-house expertise, 3) it is an administratively intense program, 4) and it is not a primary business activity to invest resources into. I have also found cases where local units may be hesitant in identifying plumbing problems that require costly correction. Professional, third party inspection agents have an easier time getting “buy-in” to make these corrections. There are many excellent companies that have sprung up around Wisconsin that have the resources and talent to deliver a quality program and assume responsibility of the results.
If you want to give the high hazard inspection work to your local, licensed plumber; require that they complete the more specialized training for identifying cross-connections at high risk and complex plumbing applications. This is not the same training you may have received from one-day Rural Water Association or Wisconsin Water Association seminars. UW Madison, with Department of Safety and Professional Services (formerly the Department of Commerce), sponsors this training twice a year. It’s 40 hours long and is different than the RPZ tester training. I know two communities, out of the 40 in my area, that have taken this approach. However, these full-time plumbers have the specialized training and do a large number of these inspections to stay fresh. Their companies have designated them as their cross-connection expert. The majority of water systems, though, use third-party inspection companies who specialize in such work. They have the inspection volume to maintain expert, technical staff.

With this said, many operators and municipalities have the capability to complete residential and simpler commercial inspections. Wisconsin Rural Water Association and Wisconsin Water Association provide excellent training on this topic and have several one-day sessions across the state throughout the year. Some communities are even willing to mentor inspectors from other communities as is the case with Onalaska. This works for the WDNR as long as the inspector has been properly trained, has the knowledge and skill to evaluate each end use device for unprotected cross-connections, and knows what the proper protection device is for each application.

Before leaving this subject, it should be stated that in the case of the waterworks operator as inspection agent, he/she must be given the necessary time to complete the inspections and this may include altering their work schedule. Many customers are not home during the day so the inspector may have to complete the inspection during the evening hours. Most communities take advantage of the inspection event to complete other utility work like changing out the water meter. Furthermore, two person teams are used to protect the utility and its staff from frivolous lawsuits.

**Inspection Schedule**

With the 2010 code change, you have some choices available on your inspection frequency. Inspections are now required every 2 years for all commercial, industrial, and public authority customers; however, those that have plumbing similar to what you would find at a typical residential customer, may follow the residential frequency. This determination can only be made after the initial inspection.

Inspection frequency of residential customers is required every 10 years or on a schedule “matching meter replacement”. Most communities have decided to stick to the 10 year schedule; however, there is a growing interest in delivering a program that matches meter replacement. The Wisconsin Public Service Commission (PSC) allows for a 20-year meter change-out program for the smaller water meters (1” or less), if certain criteria are met. If you return at 15 years to change out a faulty meter, you will need to complete a new inspection and document as such. This resets the inspection clock.

**Figure 5 - Homemade Sewer Jetter (W. Anderson)**

It is worthy to note that many communities have decided to remain at a 10-year inspection frequency with the logic being that 20 years is a long time to verify whether there are dangerous cross-connections (i.e. softener discharge lines connected directly to home sewer pipes). Similarly, some communities, with good reason, have decided to retain the 2-year inspection frequency at all commercial customers, even if they are no more complex than a typical residential customer. Finally, other communities have decided to make these a 5 year inspection. This is a decision each community will need to make and describe in their written plan. Any schedule deviating from the interval described in the code will need to be approved by the Department and the interval may only be changed after completion of the initial inspection.

**Public Education Program**

The 2010 code revision has a new provision that allows the inspector to skip bathroom and kitchen areas during residential and commercial inspections. You still have

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to inspect all the other areas but can skip bathrooms and kitchens if you have a public education program.

For utilities that skip bathroom and kitchen areas, you will need to educate the customer or homeowner on what a cross-connection is and how to identify them in these locations so they can be corrected. You must provide the training and educational materials during your inspection as well as provide educational or training materials to them by mail at least once every 3 years.

It is true that customers will ignore the educational materials, for any number of reasons, and this will leave your water system vulnerable. This, as well as the time and expense of delivering an educational program, is one reason that many communities decide to forgo the educational program and inspect these areas themselves during their regular cross-connection inspection. This is a local policy decision that will need to be made and communicated in your written plan.

Post-Inspection Follow-Up and Enforcement Plan
Many communities have astute inspectors, doing exemplary inspections, and document dangerous connections; however, their programs fall apart when it comes to following up on plumbing violations. This can be easy to do given the additional administrative steps involved in gaining compliance. After reviewing hundreds of inspection records over the years, I have found, on many occasions, that violations were not corrected and this is tragic given the local resources invested in the program and the risk to water quality. Some have remained years after the deficiency was noted and many of these were quite dangerous. Community policy-makers need to recognize that violations generate additional work as well as program complications. First, records of the violations need to be kept until resolved. This includes the initial inspection, contact dates to schedule follow-up inspections, and interim and final inspections noting its resolution. Second, you have to make an effort to contact these customers to line up an inspection. Third, these customers may not be ready for a follow-up inspection because they did not understand the violation in the first place. When it comes to the cross-connection control lingo, your customers may not be fluent enough to explain the violation to the plumber. Fourth, you have to have the fortitude to shut the customer off if your good faith efforts to reschedule an inspection are ignored. You have a very important responsibility to all your customers. They are expecting you to identify and get cor-
rection of dangerous connections to your water system and this can be messy when violations are noted.

To reduce your own collateral damage, keep your customer happy, and show the regulatory agency you are implementing a comprehensive program, keep the following points in mind when violations are noted:

- If your board, committee or council approve, you may want to assist the homeowner in correcting the simpler violations during the initial inspection so you do not need to return. Yes, there is always the potential risk of being blamed for messing up their plumbing; however, some of these are so simple to fix it would be a waste of resources to not do otherwise. Many communities have vacuum breakers that they sell to the customer and even assist installation during the inspection. They just add the sale to the next utility bill. Hose bib vacuum breakers are sometimes provided at no cost as part of the utilities public relations campaign to promote the program.

- Provide your customer with a brochure on common violations you noted during the inspection. Onalaska has a one-page brochure on each common, residential deficiency such as softener drains, hose bibs, irrigation, and toilet valves. Onalaska's inspection agent, Shane Stoner, said that "This approach builds confidence not only between the utility and customer but the customer is more confident when speaking with their plumber".

- Have a compliance or enforcement plan in place before the inspection so you can explain to your customer your expectations on correcting deficiencies as well as the time frame you are giving them to make corrections. Many communities in Western Wisconsin, use a 30, 60, 90 day enforcement program. If corrections are not made after multiple notifications, the service is shut off 90 days following the original inspection date. More dangerous connections may need to be shut off immediately. Some communities take the shutoff further by notifying the building inspector who would then deem the building uninhabitable. Regardless, the new code gives you the authority to shut customers down for violations as well as refusing entry for the inspection.

In Onalaska's case, they mail a letter following the initial inspection that describes what needs to be corrected. If the customer does not correct the violation or call back within 30 days to schedule the re-inspection, another letter is sent out. This 30 day process is repeated until the 90 day mark. Then a disconnect letter goes out giving 7 additional days. The utility then makes a personal call 24 hours before the final disconnect. Shane states: "This has only happened once and this customer is still disconnected".

Other communities use an accelerated schedule. The main point is that timely follow-up gets results because it is fresh in everyone's mind and the customer understands that this program is important for protecting all water customers.

- If you are using a third party inspection agent and they note a violation, either the agent or the municipality needs to follow-up in a timely manner and communicate with each other during the enforcement process. I have found on many occasions that either the inspection agent will sit on the inspection results or send them to the municipality who in turn sits on them. There is no problem with the inspection agent completing the initial inspection and making enforcement contacts for follow-up inspections; however, there comes a point when a shutoff is necessary and it's typically the municipality's responsibility. Communication must be timely, well documented, and the final compliance date needs to be retained for future use.

Before leaving this subject, I will reiterate two points on re-inspections. They are mandatory and a final compliance date needs to be documented. This will drive your next scheduled inspection.

Conclusion

There is much more that can be said about delivering a comprehensive program for identifying and eliminating unprotected cross-connections. There are likely other best management practices being used across the state which will hopefully rise to the top. We have very talented operators, inspection agents, and utility managers in Wisconsin and may even be considered national leaders in this area. As this program develops over the next few years, we all hope it becomes less cumbersome and time consuming, while gaining effectiveness. Everyone involved in this program should continue to take pride in their work since it has many seen and unseen consequences for the safety of our community water systems in which we all share.