Wisconsin water utilities are aware that storage reservoirs must be cleaned and inspected every 5 years. Wisconsin Administrative Code now includes additional language on the type of inspections and notes that an inspection must occur every 5 years, with a drain-down inspection required a minimum of once every ten years, or every other inspection. While this is not a concern for many water systems, there are a few operators that have not been around long enough to have been through a complete drain-down inspection and the thought of draining their storage unit may cause some uneasiness. The following article explains the new requirements and includes a few points to keep in mind while performing drain-down inspections.

The 2010 code revision (section NR810.14 Wis. Adm. Code) kept the reservoir inspection interval at 5 years but now requires complete drain down inspections every 10 years. During the last couple decades, dive inspections became commonplace and owners moved away from drain-down inspections. Based on 20 years of reviewing dive reports, the Department determined that dive inspections cannot meet every cleaning and inspection need.

Dive inspections have many advantages but interpreting their results can be very difficult. All inspections require a fair and thorough assessment and this is not always possible given some of the inherent problems with diving. These include:

- Visual presentation of objects can be poor due to lighting, high turbidity, and sometimes the diver is just too far away from objects to capture their condition
- Difficulty or inability to remove film and stains on walls, roofs, pipes, valves, or other objects to reveal the condition of the surfaces underneath
- Audio quality can be poor in the video record causing the loss of critical information communicated by the diver
- Inability to have an engineer enter the storage unit to make a detailed structural assessment of cracks, spalling, settling problems, rebar damage, or to properly evaluate surface coating issues

Obviously, not all dive reports are poor and complete drain-down type inspections can suffer from some of the same shortcomings. Experience has shown that better visual presentation of the interior is attained when all surfaces have been cleaned, there are no obstructions in front of the camera, and wider camera shots are used to properly place certain objects into their wider context. This is not always possible with dive inspections and results in a poor assessment of a structures condition. In fact, there have been cases where complete drain-down inspections were necessary immediately following a dive inspection to remove film and growth for sanitary and inspection purposes.

The following pictures show how difficult it is to make a good assessment using underwater video footage.

Photo 1. Biofilm/Mucus Layer on Walls/Pipes

Photo 2. Coating Failure

While some of the pictures give a general idea of the reservoir condition, one could not make sweeping assumptions, formulate a quality prognosis, or cut a work order for repairs without closer, detailed observations. Leaving films and sediments in the unit for another 5-year interval is untenable as well. This is where the drain-down inspection comes in.

Reservoir continued on next page
Complete drain down inspections will not be a problem for the vast majority of water systems in Wisconsin. Most of the smaller systems are still using this method given its lower cost. Systems that have relied on dive services for their last few inspections may have veteran employees that are still familiar with the logistics involved in a drain-down.

When planning for a drain-down inspection, keep in mind the following points to minimize down time, ensure the distribution system remains pressurized, reduce pump wear, and ensure some level of fire protection.

- Hire an inspection agent that has experience doing drain-down inspections. Gone are the days when the operator does his own inspection. Professional inspection services are now required by code for reservoirs greater than 10,000 gallons. This is fine with most water operators given confined space and other safety issues, time constraints, logistic concerns, and evaluation expertise. Luckily, you don’t have to go far to find professional inspection agents. We have a few located right here in Wisconsin. If your tank has structural issues (cracking, settling, or surface damage), include your engineer or tank manufacturer in on the inspection. This way you will not have to take it off line again at a later date to get their opinion on condition or repairs.
- Most reservoirs are small enough to allow cleaning and inspection in one day. Once completed, you can fill the reservoir and collect your bacteria sample. This allows you to have storage volume on-hand in the event of an emergency while you are waiting for your bacteria results.
- Some water systems have multiple reservoirs or reservoirs with multiple chambers to provide storage volume or use during the cleaning/inspection process.
- Water systems with multiple wells may already have adequate pumping capacity to meet emergency requirements. Minimum fire flow requirements in Wisconsin is 500 gpm at the hydrants and most pumper trucks pump 1000 to 1500 gpm of water. You may be able to cover fire protection by activating additional well pumps.
- Complete the project during warmer months so the Fire Department can take advantage of nearby streams/lakes/rivers to fill tanker trucks. Most fire departments already have this capability. As a courtesy, you should notify them a few weeks prior to the cleaning process to ensure they can check their pump and tank equipment, work with other nearby Fire Departments to arrange back-up coverage, and even have water in their tanker ready to go.
- Projects may be scheduled in the spring or fall if water use is lower. Similarly, if you have a business that uses a lot of water, you may want to schedule the project during their down time.
- In some cases, you can request water customers minimize water use during the cleaning process or you can schedule your project at night. A few years ago there was a boosted system that began their cleaning project at 1 AM. They relied on their pressure tank to maintain system pressure. They were in, out, and had a functioning reservoir within 8 hours. In this case, you should work with your WDNR representative since you may not have bacteria results back fast enough. In this smaller system, we asked everyone to boil water until we received a safe bacteria sample.
- Some inspection companies now have large vessels
that can be deployed to provide storage during the cleaning process. This may be necessary if you expect additional work on your reservoir that will keep it out of service.

- If your reservoir will be out of water for an extended period of time, you should include additional stakeholders in the planning process. This may include your utility board, engineer, fire department, large water users, as well as the WDNR.

When planning your project, keep additional code requirements in mind:

- The inspection must be completed by a professional inspection agent or registered professional engineer
- Notify WDNR within 48 hours of the date/time of the inspection
- For ground storage reservoirs with concrete covers or where cracks are evident, soak down tests are required to determine whether the unit is leaking (call your WDNR representative to discuss further)

AWWA standards (C652-02) apply and require one of three disinfection methods
- One safe bacteria sample is required if you have at least 0.1 mg/l free chlorine in the reservoir when you receive your bacteria result back from the lab; otherwise, another safe sample is required
- Be sure to take pictures of the vents, vent screens, and hatches during the inspection to show the regulatory agency that they meet code requirements
- Submit copies of the WDNR inspection form and any additional reports, pictures, or videos provided by your inspector to your WDNR representative

While drain-down inspections may be a momentary inconvenience, cleaning and inspection results are likely to be better than that achieved by other methods. Regardless of the type of inspection you are planning, knowing what you want from your inspector and planning ahead is critical for ensuring a safe water supply during the cleaning and inspection process.

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Small Systems Committee Report

Small Systems stayed on a roll for 2011 with the Annual Wisconsin Water Association Conference recently held in Wisconsin Dells. Our goal and mission has been to bring back the Small Systems component that had been a vital aspect of WWA but had in recent years lost identity and presence within the association. May 13th, 2011 we had promoted and presented a “hands on” experience for the operators in a one day training session that resulted in several communities participating. We received very positive feedback from the operators.

Topics and areas of discussion pertinent to small systems continued on to the Annual Conference where sessions specific to these smaller communities offered the following informational presentations on Groundwater Treatment for Small Systems: Arsenic Removal on the 45th Parallel presented by Kelly Olson of HD Supply and Dale Marsh with Robert E. Lee and Associates, Got Nitrates? What is Your Game Plan if the MCL is Reduced From 10 to 3 MG/L presented by Jerry Groth with Baxter-Woodman, and Big Fixes for Little Bucks presented by Ann-Perry Witmer of Crispell-Snyder. All of these dealt with real issues in water quality for small communities that might not have the resources or funds that larger cities have. These were followed by topics on Management/Financial and Public Relations. Practical Approaches to Fund Infrastructure Projects in a Tough Economy was the issue that Kristin Rehg and Carolyn Grieses from Baxter-Woodman presented and Small Systems Public Relations was presented by Angel Gebeau from AECOM. These were all concerns that were applicable to any community, but it was nice to have additional information and direction for the small systems out there.

We also highlighted Small Systems when they could be identified, at the registration check-in with a small ribbon that attached to your name plate indicating you were part of the Small Systems group. We concluded the sessions on Thursday by hosting a Small Systems Reception from 4:00 p.m. - 5:00 p.m. It was nice to have Kevin Richardson and Dave Lewis in attendance as busy as they were, and I thank them for taking time to do so. We also need to thank the vendors who helped sponsor the reception. Sensus, HD Supply, American Flow Control, Process Research Solutions, SEH, and Municipal Well and Pump. And lastly, special thanks to Jill Duchniak for all the help that she has provided in coordinating and helping set up training/workshops/conferences and to Kelly Zylstra for all the wonderful logistics she provides.

In conclusion, we need to congratulate Ann-Perry Witmer for her new role and participation as a Senior Trustee. That results in us losing Ann as the Chair of the Small Systems and the Association gaining the valuable resource we have come to rely on. Good Luck, Ann!

Jim Prindle
Committee Vice Chair
City of Onalaska