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Founded in 1964, Western Nevada Supply has grown successfully over the past four decades by adhering to the philosophy that good service is people-oriented, loyal to its customers and proactive in the community. We’re here to make a positive difference in people’s lives – whether that means supporting local kids and charitable organizations or providing the highest quality service as a one-stop supplier for contractors and builders throughout Nevada and California.
A Note From Our Executive Director:

Bob Foerster, NvRWA Executive Director

Last month, we enjoyed the NvRWA 27th Annual Technical and Training Conference. Chartered in 1990, the Association has grown to make a positive impact on wastewater, drinking water, source water protection planning, and solid waste operations throughout the state. We work to carry out our Mission “To provide knowledge, resources, support, and assistance to our members who serve Nevada communities.” One way we fulfill this mission is through the Annual Conference, where managers, board members and operators from all over Nevada get together with Associate Members to learn about services, materials and equipment that will make systems more effective, efficient and sustainable. Another key to our success is our dedicated staff working to build up capabilities at the small and rural systems. Through these people, funded by State and Federal monies, your systems increase capabilities through problem solving, training, planning, and having a solid support network. Backing all of us has been our Board of Directors, working to support all that we do, and the National Rural Water Association, working to obtain programs and providing member benefits such as the Water University and affiliations with service providers.

We truly appreciate all of your inputs to make Congress aware of how much you value what we do. Please continue to support NvRWA as we work through the 2018 Appropriations process.

Special Thanks to Conference Sponsors: Western Nevada Supply, American A/K, Western Environmental Testing Laboratory WETLAB, Ryan Process, G3 Engineering, and American Leak Detection. Many others provided excellent gifts for the Wednesday raffle, with a special prize of a week-long backflow tester course from B&L Backflow. Please recognize the support we have from the Associate Members. All of the exhibitors and instructors helped make this conference a success.

The Nevada water and wastewater industry is proud of those who were recognized for outstanding achievements in the industry. The 2017 Best Testing Water in Nevada contest winner is Cave Rock / Skyland Water System at Lake Tahoe, run by Douglas County Utilities. For 2017, the Administrative Person of the Year is Krista Souza of Lovelock Meadows Water District. New Operator of the Year, Water went to Chris Murphy, Town of Minden. The New Operator of the Year, Wastewater was awarded to Trevor Lord of Alamo Sewer and Water GID. Both of these gentlemen have come into the industry and made significant contributions to their utilities, and are working up the certification ladder. The Wastewater Operator of the Year is Bruce Ashby, who is doing an outstanding job at the extended aeration plant in Elly. Victor Bitter, Moapa Valley Water District, is NvRWA’s Water Operator of the Year. Mr. Bitter came to Moapa with a depth of experience and is making significant contributions. We are proud to recognize Bob Shirley as Manager of the Year. He took charge of Beauty Water and Sanitation District three years ago, and has made great progress to stabilize the system and move forward. Special Recognition for years of support to NvRWA goes out to recently retired Mike Nevin, who served on the NvRWA Board of Directors from 2013 through 2016, and was Vice President. At the Awards Luncheon, the Public Outreach Chuck the Duck trophy was awarded to Hawthorne Utilities. Congratulations to all!

Wilton Melton, member of the National Rural Water Association Executive Board from North Carolina addressed the group about regulatory and funding work being done at National. The NvRWA is doing a great deal for small utilities all over the country. National Rural Water Association is a consortium of all the state Rural Water Associations. Mr. Melton is involved at the highest levels in regulation development, making sure the small system point of view is heard. A primary function of National has always been working with the US Congress to fund the source water protection and training and technical assistance programs that are carried out by the state associations. In part, this effort takes funding independent of other funding, and I encourage you to look into the Water PAC, and how you can support the PAC.

As a member of the National Rural Water Association, Nevada Rural Water members have access to a variety of deals and services. There are the Ford and Dodge vehicle purchase programs, each offering fleet pricing to member systems. All it takes is a call to the Nevada Rural Water office to get started. The Water University has been around since 2011. As our industry changes, there is a strong need to recognize the individuals who provide leadership to the industry and create a standard for the future. Water University certification programs are designed to recognize the professional educational achievements of individuals and to market their skills to increase the value of today’s water professionals. Water University highly-recommends the use of study material before taking the WU certification examinations, including the purchase of study guides and attendance at WU on-line courses. Examinations cover a wide array of topics in great technical detail. Earn recognition of professional growth and accomplishment through the Water University Utility Management Certification. Look for the link on our web site.

National continues to form partnerships with service companies that can help water systems. Insurance programs are available to help customers avoid costly water bills if their plumbing leaks, and to cover repair costs. This helps systems by avoiding having to be confronted with forgiving leak-driven high use bills and losing income. National is also affiliated with a company offering cyber attack insurance.

This works to cover the cost and work required to protect your customers in case of data breach in your business systems. Nevada members are able to participate in some of these programs. National is always working to find new partnerships. Please contact the Nevada Rural Water office to find out how your system can take advantage of any of these offerings. I also encourage each of you to join the WaterPro online community, where you can take part in the go-to exchange of information on the range of technical, finance and management topics encountered in our industry around the country. That’s http://waterprocommunity.org/
Another Look at Drought – Part I

By Teresa Taylor, Ph.D., Watershed Specialist

At our annual conference two years ago, I offered a class entitled, “After the Drought Comes Flooding.” The course was based on historical records showing that every major period of drought in Nevada has been broken by a period of significant flooding.

The flooding of early 2017 is proving the historical correlation true once again.

Most of us, if asked to define “drought,” would quickly say something like “a long period of time without significant rain or snowfall.” With this response, we are generally describing what is known as meteorological drought. It is primarily the result of extended lack of rain or snowfall, but higher-than-normal temperatures can contribute to the magnitude of a meteorological drought.

Like most natural processes, however, the picture is seldom as simple as it might seem. There are, for example, other significant types of drought. Hydrological drought is when surface and groundwater supplies are insufficient. In terms of quantity, quality, or both. While meteorological drought may (and often is) a contributing factor, hydrological drought does not usually occur at the same time as meteorological drought, and it can also be caused or exacerbated by excessive use of water supplies for agriculture, manufacturing, energy, or some combination of uses.

Agricultural drought occurs when soil moisture levels are reduced to the point where crops, livestock, and other soil functions such as evapotranspiration are adversely impacted. Meteorological and hydrological drought can contribute to agricultural drought, but so can poor soil stewardship.

One of the most famous examples of this is the Dust Bowl of the 1930s. Three separate waves of dust clouds in Texas, New Mexico, and the panhandles of Oklahoma and Texas could support large-scale agriculture. Farmers in this region had conducted deep ploughing techniques, aided and abetted by recent advances in mechanized farming equipment. They did not preserve the native grasses that held the topsoil in place and some farmers even left bare soil during winter months. The amount of erosion was devastating; a single two-day-storm in 1933 deposited 12 million pounds of dust as far away as Chicago!

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In the next article in this series, I’ll discuss more about soils and why what we use to describe the “big picture” that can lead to any number of problems. Here’s just one small example that was brought up during the governor’s drought forum last year. Decisions to curtail grazing on some areas of public lands were based on meteorological drought. However, agricultural drought had not developed in some of those areas, which meant there was actually plenty of forage for livestock. If livestock were not allowed to graze, not only were there economic consequences to stock owners, there was also the increased potential for wildfires from forage left to grow that would normally be grazed, and so on.

In other words, a land use decision based strictly on one definition of drought was inappropriate because it would have been more effectively based on an alternate definition of drought for certain areas and circumstances. It’s a great example of the law of unintended consequences when we don’t (or can’t) see the big picture.

So now let’s turn to the “big picture” of soil. Soil is an incredibly complex material. It is the product of its geologic origin, the hydrology where it occurs, and the biology that exists on and within it. Those three processes (geology, hydrology and biology) are complex topics individually. When coupled together in a system–soil–it is virtually certain that experts within the separate disciplines will look at things quite differently.

Just like relying on only one definition of drought, focusing on only one aspect of soil can lead to decisions, land use practices and economic consequences that were not necessarily intended.

The farmers of the Dust Bowl were actually performing practices that were consistent with beliefs of their time, namely, that a semi-arid region like the panhandles of Oklahoma and Texas could support large-scale agriculture, not realizing that a relatively rainy period in preceding years was not typical for the region, or that turning crop residue would effectively control weeds, not understanding that the soil would lose nutrients and protective cover.

In the years since the Dust Bowl, we’ve come to understand a lot more about soil and how it (and the biology it supports both on and within it) responds to drought. But we are continuing to learn, and new research continues to challenge some of the actions and activities we’ve practiced for many years. Some of this will be addressed in the next article in this series.

The rain we’ve had in Nevada and California this year, while welcome, brings with it challenges related to the response of soils. Our drought-stressed soils are “thirsty” for moisture, yet we’ve seen a lot of the rain simply run off the land, contributing to effects of local flooding.

In the next article in this series, I’ll discuss more about soils and why even the “thinnest” soils may not be able to use most of the water that falls on them.

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[Image 18x130 to 158x254]
[Image 36x484]
[Image 648x398]
[Image 648x408]
[Image 648x419]
[Image 648x430]
The Nitrogen Cycle in Wastewater Treatment

Jon Paul Cobert, Training and Technical Assistance Specialist, Wastewater

Ammonia forms when urease enzymes produced by strains of bacteria such as Escherichia coli, Hafnia elegi Moller, Unle available uye Skepsh, Sporosacina pasturei (Migue) Cheater, (formerly Bacillus pasteurii), some Bacillus amylopolysaccharides and others, contact urea and uric acid from animal urine and water. Ammonia is also introduced when proteins and other biomolecules in wastewater treatment plants are degraded by bacterial enzymes, first to amino acids and then to ammonia. Since molecular oxygen is involved in the reaction of these strains, they are termed "Obligate Aerobes". These autotrophic microbes efficiently use the energy gained from oxidizing ammonia to fix carbon. This activity gives these bacteria a dual ecological role - recycling nitrogen and fixing carbon into organic compounds. Carbon fixation by this method is not very efficient, because the fixation of one mole of carbon requires the oxidation of 35 moles of ammonia to nitrite and 100 moles of nitrite to nitrate. This is why Ammonia uses so much oxygen to accomplish this reaction! Nitrifiers are fragile microorganisms which are sensitive to acid. As a result of the fact that they are inefficient at oxidizing ammonia during oxidation of ammonia and nitrite. If a large source of nitrogen is dumped into the environment, these organisms can potentially kill themselves by metabolizing it to nitric acid, unless pH is buffered with limestone or other slow-dissolving sources of alkalinity. Since they are also strict aerobes, nitrifiers can be killed if the introduction of wastes leads to excessive growth of other species that deplete oxygen. This is why DO levels of two to three ppm of oxygen are required when degradation of ammonia is desired. This can only be accomplished with efficient mechanical aeration equipment at some considerable expense!

Every year, 300 billion Kg, less than one millionth of the total available nitrogen worldwide is recycled biologically. Nitrogen released in an uncontrolled manner can have adverse environmental impacts, such as elevated levels of nitrate in food and water, which may constitute a health hazard to both humans and animals. Excessive N applied to the soil then produces an accumulation of nitrate in plants, and can lead to undesirable levels of nitrate in potable water. In polluted watersheds, excess organic wastes stimulate bacterial growth, which consumes oxygen. Since artificial aeration is not added to supplement oxygen levels, the dissolved oxygen in the water becomes depleted, causing the fish to die, followed by death of the lower forms, including protozoa. When oxygen completely disappears, the water becomes septic, acquires a black color and supports only anaerobic bacteria, which produce odors and toxic gases. Treating waste in lagoons, waste pits and digesters, one of the point sources for excess nutrient runoff, the responsible waste generator can reduce or eliminate these negative impacts. Good management practices keep systems and lakes in a naturally balanced state, as various good anaerobic bacteria and algae release oxygen during their metabolism, which increases the dissolved oxygen level in the waterbody, and maintain its ability to support normal aquatic inhabitants. We also keep our drinking water systems in usable and responsive treated condition!

Discussion of the Nitrogen Cycle Diagram

The below diagram depicts the overall nitrogen cycle in nature. Processes of interest in wastewater treatment are Nitrification, the conversion of ammonia-nitrogen to nitrite and then to nitrate ions, and the subsequent removal of nitrogen from the system by reducing these ions, releasing atmospheric nitrogen gas.

In the first step of the Nitrification stage, the biochemical reaction of Nitrosomonas spp is:

$$\text{Hydroxylamine} + \text{Nitric acid} = \text{Nitrohydroxylamine}$$

Next is a direct oxidation step, as follows:

$$\text{Nitrohydroxylamine} + \text{Oxygen} = \text{Nitrate ions}$$

Sixty-six kilocalories of energy are liberated per gram atom of ammonia oxidized. The bacteria use this energy in their metabolism.

The second step, biochemical reaction of Nitrobacter is a very simple reaction, involving the cytochrome system as follows:

$$\text{NO}_2^- + \text{H}_2\text{O} + 2\text{cytF}^+\text{E}^- \rightarrow \text{NO}_3^- + 2\text{cytF}^+\text{E}^- + 2\text{H}^+$$

Then the cytochrome biocatalyst cytF3 is regenerated by:

$$4\text{cytF}^+\text{E}^- + 4\text{H}^+ + \text{O}_2 \rightarrow 4\text{cytF}^+\text{E}^- + 2\text{H}_2\text{O}$$

Eighteen kcal of energy is liberated per gram atom of nitrite oxidized to nitrate.

This whole nitrification process removes electrons from a hydrated nitrite ion. Both Nitrosomonas and Nitrobacter perform within a pH range of 6.8 to 8.5, optimal pH is 8.2 to 8.3. Warmer temperatures (above 60°F) also enhance nitrification. The size and type of system, and degree of ammonia present, all influence quantity of organisms and rate of treatment!

Although there are a number of different strains which will perform nitrification, the rate of formation for Nitrosomonas is typically 1,000 to 30,000 mgN/day/g dry weight cells, and for Nitrobacter is 5,000 to 70,000 mgN/day/g dry weight cells, which is so much higher than the formation rates of the other strains capable of nitrification, that these are the most useful strains. Other bacterial strains perform nitrification by forming hydroxylamine, amine oxides (R3N-O) or nitro- compounds (4-N-NO or 4-NH-NO containing compounds).

Recently, it has been discovered that certain sulfide oxidizing, denitrifying bacteria, such as Paracoccus pantotrophus and our own Bacillus mojavensi AMH 118, are also capable of heterotrophic ammonia oxidation to nitrite. These bacteria do NOT replace true nitrifiers, but can augment performance which inhibit the use of true nitrifiers, due to lower oxygen level, acidic pH range or levels of BOD and COD above 200 mg/L. Denitrification is the reduction of nitrate to nitrite, then to nitrous oxide or nitrogen gas. Denitrification is normally performed under anaerobic conditions, which is comparable to anaerobic conditions except for the presence of nitrate and/or nitrite. In natural ponds and lakes, this condition is found only in the bottom layers and muds, but in wastewater, the condition can be created by addition of wastewater that formerly contained ammonia, following nitrification, as described above. Denitrifying bacteria, deprived of oxygen, will strip the oxygen from the nitrate ion, essentially reversing the fixation steps of the nitrogen cycle.

For each 1 mg/L of nitrate reduced to nitrogen gas, the system will recover 3.5 mg/L of alkalinity, which is a less than perfect offset to the alkalinity needed to buffer acid produced during nitrification. Note that if ammonia-nitrogen is oxidized to nitrate-nitrogen and released into the environment, rapid algae bloom might result, as nitrate is the form readily taken up by plants for growth. Subsequent algae die-off will produce anoxic conditions in the water body. It is important to understand how the nitrogen cycle functions and how it is put to use in wastewater treatment. The nitrifying and denitrifying bacteria are naturally present in the environment. By controlling the process to provide the right conditions of dissolved oxygen, pH and alkalinity, the operation can nitrify ammonia nitrogen. Then if design provides for anaerobic conditions, nitrogen gas will bubble out of the system.

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2017 NvRWA Awards for Excellence

Rob Shirley
Manager of the Year
Beatty Water & Sanitation District

Victor Bitter
Water Operator of the Year
Moapa Valley Water District

Chris Murphy
New Water Operator of the Year
Town of Minden

Trevor Laird
New Wastewater Operator of the Year
Alamo Sewer and Water GID

2017 Best Tasting Water in Nevada
Cave Rock/Skyland Water System

Best Customer Service Chuck the Duck Award
Hawthorne Utilities

Award Recipients Not Pictured

Krista Souza
Administrative Staff Person of the Year
Lovelock Meadows Water District

Bruce Ashby
Wastewater Operator of the Year
City of Ely Water and Sewer Department

2017 NvRWA Conference Highlights

Guest Speaker
Julie Anderson
aka The Brain Lady

Conference Keynote Speaker
Wilmer Melton
National Rural Water Association Board Member

Chuck the Duck just loves our Exhibitors

WaterPak Raffle Winner
Joe Davis
of Moapa Valley Water District

Recognition for Service to NvRWA
Michael Nevin
Storey County Utilities

Water Contest Judge
Cindy Turiczek of PUCN
carefully examines a water entry

Best Customer Service
Chuck the Duck Award
Hawthorne Utilities

Vendor Raffle Winner
Dennis Southfield
of the City of Fallon

Award Recipients Not Pictured

Water Logged  |  Spring 2016
Disinfection of Water Storage Facilities

Ryan Kolda, NVWA Circuit Rider

With the introduction of the Revised Total Coliform Rule operators can do well by being pro-active when a coliform present sample has occurred. Before a situation reaches an assessment level, system operators should perform an investigation of their own. A tour of the system may yield clues and suspicions can be confirmed by collecting “not for compliance” coliform samples. An issue can be narrowed down to a certain part of the system such as dead ends, cross-connections, or even the system storage tank.

So what would need to be done if the system experienced a coliform positive sample and the issue was traced back to the water storage tank? First the cause must be determined and corrected. On tanks, you might find items such as vent screening, unsecure access hatch, sediment, etc. In some cases it is simply a matter of water age and unusual event caused more than the normal draw to be taken from the tank pulling old water into the distribution system. Once the cause has been corrected, the tank is secure, and the interior is free of foreign material the tank will need to be disinfected.

Standard practice for disinfecting a storage tank uses AWWA Standard C652-02. This AWWA Standard describes three methods used to disinfect water storage facilities. We will focus on C652-02 chlorination method 1 since this does not involve confined space entry as with method 2 and the overall procedure is about 6 hours shorter than that of method 3. Further we will focus only on the use of sodium hypochlorite as it is the disinfectant that most rural Nevada operators have on hand and are experienced with. When working with chemicals always review the Material Safety Sheet (MS3) and use appropriate personal protective equipment (PPE) and precautions.

The goal of the method is to fill the storage tank to the overflow level with highly chlorinated water, let it hold for at least 24 hours with a free chlorine residual of at least 10 mg/L. After disinfection is complete, the water must be held for no less than 24 hours. After the minimum 24 hour period has elapsed the operator must verify the free chlorine residual was maintained at a minimum of 10 mg/L. After that the residual chlorine level of the water must be brought to that of normal operation. This can be done by partially or fully draining the tank and refilling with low chlorinated or unchlorinated water. When discharging highly chlorinated water, be sure to conform to discharge guidelines and dechlorinate the water if needed. If the disinfectant residual has fallen to below 10 mg/L, something is presenting chlorine demand. Stop and correct this, then again begin the disinfection procedure.

Once the chlorine residual of normal operation has been reached the tank must be sampled to determine the disinfection procedure was successful. Once this has been completed the storage tank can be brought back into service, working with your agency Facility Manager. Hopefully this information will save some operators a lot of trouble in the future. If you ever need assistance in a procedure such as this, or to write a standard operating procedure into your O&M manual, don’t hesitate to ask for assistance from the Nevada Rural Water Association.
Field Disinfection
Aaron Hughes, Training and Technical Assistance Specialists, Drinking Water

In this article, the topic is extraordinary disinfection, that is different from the normal practice of continuous disinfection to maintain a target residual disinfectant concentration. For many water operators, there will be times in their careers when they will have to use field disinfection methods when they install or repair water service lines and mains, or if they have discovered that their system has been compromised through vandalism or other situations they could not control. In some cases, when a water system is compromised, the water operators will find that they may be facing multiple failures at the same time. When these conditions exist, it is important for water operators to have a good understanding that field disinfection must occur since inadequate field disinfection can cause a waterborne disease outbreak somewhere in their system. Water operators should also know how to properly perform a field disinfection before they have a problem, and not be learning how while they are having a problem.

When water operators install a new water main, or after a repair, if the main has lost positive pressure and been dewatered, there is a high potential that the water main may have been contaminated even if all the necessary precautions were taken. When performing installations or repairs of water mains, a water operator should be familiar with the American Water Works Association Standard "For Disinfection of Water Mains" C651-05. The C651-05 standard provides tables and instructions in measuring amount of chlorine needed and best operational practices. The industry typically uses one of these three forms of chlorine: chlorine gas, sodium hypochlorite (liquid bleach solution), and calcium hypochlorite (granular or tablet). The C651-05 standard covers all three types of chlorine and a few options for different field disinfection methods.

In the best case scenario, when operators are installing water mains, a field disinfection plan has been made and implemented. In the best case scenario, the operator knows the pipe being put in the trench cannot be flushed until its completely connected. In this case, depending on the size and length of the water main, chlorine tablets, calculated to dose at between a 25 to 50 mg/L, are placed in each section with an NSF approved adhesive to the top inside of the main. The water main is then filled slowly as to not wash the tablets away, then left for at least 24 hours to achieve adequate disinfection. While the main is being super chlorinated, chlorine residuals should be taken to ensure it is maintaining the 25 to 50 mg/L residual throughout. Analysis methods for measuring high residuals is another article!

Also, during this time, the water operator would be conducting a pressure test of the main. While the main is being filled, the water operator should follow all applicable NACs when bringing a new water main online to the system. This includes disinfection and pressure testing, to check for leakage prior to accepting or bringing the new water main online.

If the water main was filled too quickly, the tablets could be washed away to the ends of the main. To see that this has not occurred, the water operator should take residuals at different locations for the entire length of the new water main to make sure the super chlorination is occurring evenly. After 24 hours, if there was no excessive demand in the section being disinfected, the residual chlorine should be at least 10 mg/L or more throughout the length of the new water main. If the residual is not 10 mg/L or more, this indicates that there is a large amount of chlorine demand in the line; it should be flushed via dechlorination, and again disinfected, this time using a dosing method, since the original tablets are gone.

Once the new water main has met the 10 mg/L or above standard, the water operator would flush the super chlorinated water from the main while dechlorinating the water as they flushed to meet their discharge permit requirements. The operator then would take two samples to test for total coliform bacteria, 24 hours apart. After the lab reports absent results for total coliform, the operator then could put the newly installed water main into service if it has met all of its other requirements, such as its pressure test.

At some time in their careers, water operators will have main breaks in their water systems. If the water main can be worked on while still under pressure, there is a reduced risk of contamination and disinfection may not be required. However, if pressure is lost and the main is dewatered, then disinfection must occur. NVRWA considers continuous pressure to be a condition where pressure remains above 20 psi, atmospheric pressure being around 14.7 psi. You should also consider the reality that there is not normally a calibrated recording pressure gauge mounted at the site of a break, making it difficult to document maintained pressure.

In the worst case scenario, a major main break, with loss of positive pressure, and section of main completely dewatered, the water operator will be going in many directions at once. The water operator will be assessing location, main type and size, number of valves needed to isolate the break, number of customers who would lose service since they would also need to be isolated from the main, and many other factors ranging from time of day to equipment and parts needed.

This is a Public Notification condition, requiring an advisory boil water notice. The water operator may have to rely on administrative staff and possibly Board members, for emergency customer notification of the affected area or call on neighboring systems to provide assistance. County Emergency Services might need to be called upon. The appropriate regulatory agency should get a telephone call, and can help with public notification language and methods.

Once the water operator is at the location of the main break, and is ready to start the repair, the water operator must begin to minimize contamination in the exposed trench area around the main by spraying with a sodium hypochlorite solution in the trench. The interior of the pipes and all fittings should be swabbed with a 1 % sodium hypochlorite solution. After repair, the AWWA C651-92 Standard indicates the best operational practices for disinfecting a water main that has lost positive pressure and been dewatered as the "continuous feed method" (Kern, p.234).

The continuous feed method is where the operator doses the main to 100 mg/L while filling the main to produce a "slug" or column of water within the main to coat all the interior of the main for the entire length affected. The water operator would then maintain three hours of contact time at 100 mg/L. While the slug was moving through the affected main, the water operator would attempt to disinfest fittings, valves, and hydrants by operating them, to ensure those parts of the system were disinfected. After the main has been disinfected, the water operator would then flush out and dechlorinate the water main until the residual in the mains was 'return to normal' condition, measuring the same as what is normally practiced. The water operator would then collect the two samples for total coliform bacteriological analysis 24 hours apart and then, once the lab reports that total coliform results are 'absent', consult with the regulatory oversight agency to return the water main to service. The emergency boil water notification would then be lifted.

The water operator would normally be in close contact with the regulatory agency for support and direction. In situations like this, the water operator will need to document the emergency main break and repair since it is not a usual operational and maintenance activity. A timely follow-up report to the regulatory agency is required. If a water system would like technical assistance with developing standard operating procedures or schedule training on field disinfection, please contact the Nevada Rural Water Association office.

References:
NAC 445A.6726 Disinfection of facility for collection, treatment or distribution of water, (NRS 445A.680). Before a supplier of water initially uses a facility for the collection, treatment or distribution of water, the facility must be disinfected in accordance with American Water Works Association Standards C651, C652, C653 and C624.
NAC 445A.6720 Duties after loss of pressure in distribution system, (NRS 445A.680) Except as otherwise authorized by the Division, if any part of a distribution system loses all pressure, the supplier of water shall, before placing that part of the distribution system back into service:
1. Inform the customers of the public water system within the affected portion of its area of service of the need to boil their water before consumption.
2. Collect, on 2 or more consecutive days, samples of water from that part of the distribution system which indicate that the presence of any coliform bacteria complies with primary standards.
NAC 445A.6727 Requirements after cleaning or repair of water main, (NRS 445A.680)
1. Except as otherwise provided in subsection 2, after a water main is cleaned or repaired, and before the water main is placed back into service:
(a) The water main must be disinfected in accordance with American Water Works Association Standard C651, as adapted by reference in NAC 445A.6665 (the American Water Works Association Standards, as those standards existed on July 1, 2014). The disposal of any spent chlorine solutions must be coordinated with the Bureau of Water Pollution Control of the Division.
(b) An analysis of the water main which indicates that it meets primary standards for coliform bacteria must be obtained and reported to the Division or the appropriate district board of health.
2. Compliance with subsection 1 is not required if a water main is kept full of water under continuous pressure while it is being repaired.
NRWA Works for You

Dan Tamowski, NRWA Circuit Rider

Once in a while it is good to see what our national organization is doing for us in D.C. Below are excerpts from National Board member Michael McNulty testimony delivered to the U.S. Senate Committee on ENVIRONMENT AND PUBLIC WORKS FEBRUARY 8, 2017

Good Morning Chairman Barrasso and Members of the Committee. My name is Mike McNulty, and I am the general manager of the Putnam Public Service District (PSD) which is a state chartered drinking water and wastewater utility just outside of Charleston, West Virginia.

I am representing all small and rural community water and wastewater supplies today through my association with both the West Virginia and National Rural Water Associations. Our member communities have the very important public responsibility of complying with all applicable regulations and for supplying the public with safe drinking water and sanitation every second of every day. Most all water supplies in the U.S. are small; 94% of the country’s 51,651 drinking water supplies serve communities with fewer than 10,000 persons, and 80% of the country’s 16,255 wastewater supplies serve fewer than 10,000 persons.

This committee is very important to rural and small town America; every federal dollar that has been granted to the state revolving funds was authorized by this committee.

Also, every federal regulation under the Safe Drinking Water or the Clean Water Act was likewise authorized by this committee. At the national level, there are over 50 million water and wastewater systems that have allowed for elimination of millions of questionable septic tanks, cesspools, straight pipes, or worse.

This rural water infrastructure development has been the engine of economic development and agricultural technology advances in rural communities, and it has provided for dramatic improvements to the environment and public health.

President Trump has made improving the country’s infrastructure, including water and wastewater, a priority. We are grateful for that.

My main point here today is to tell you that if rural and small town America is not specifically targeted in the legislation that would authorize and fund a new water infrastructure initiatives, the funding will by-pass rural America and be absorbed by large metropolitan water developments due the following two reasons:

1) Small community water infrastructure projects are more difficult to fund because they are smaller in scale – meaning numerous, very complicated applications have to be completed and approved compared to one large project. This is compounded by the reality that small communities lack the administrative expertise to complete the necessary application process – and perhaps the political appeal of some large cities.

2) Due to lack of economies of scale and lower median household incomes in rural America, water infrastructure is often less affordable (i.e. a much greater cost per household). This means that a water infrastructure project poses a greater financial risk compared to the metropolitan project and, very importantly, requires some portion of a grant, not just a loan, to make the project feasible. The higher the percentage of grants required to make a project work results in less money repaid to the infrastructure funding agency and a correlating diminution of the corpus fund.

To make sure any water infrastructure initiative helps rural and small town America, we urge Congress to consider the following six policy principles - and two observations - based on their merit:

First, local communities have an obligation to pay for their water infrastructure and the federal government should only subsidize water infrastructure when the local community can’t afford and there is a compelling federal interest such as public health, compliance or economic development. Some federal programs like the U.S. Department of Agriculture water infrastructure program contain this needs-based criterion. USDA calls this the “credit elsewhere” criterion. The state revolving loans achieve this principal objective by requiring that federal subsidies be targeted to the communities most in need based on their economic challenges combined with the public health necessity of the project. One of our concerns with the new Water Infrastructure Finance and Innovation Act (WIFIA) is that it lacks any needs-based targeting, credit elsewhere means-testing, or focus on improving public health or compliance.

Second, all U.S. Environmental Protection Agency (EPA) water funding programs should be primarily dedicated to compliance with EPA’s federal mandates or standards. Currently, the Safe Drinking Water Act and Clean Water Act are creating a tremendous financial burden on small and rural communities. The funds provided by Congress, however, are not consistently applied to the communities that are experiencing the greatest burden as a result of federal compliance. Much of the current and most acute unfunded mandate burden is a result of the EPA’s implementation of their Total Maximum Daily Load (TMDL) program that is causing reductions in wastewater nutrient permit limitations and costing expensive wastewater treatment plant upgrades. These communities should be a priority in targeting all EPA wastewater funding subsidies. Next year, the City of Casper, Wyoming could be facing a potential $50 million dollar cost to keep the city’s wastewater treatment plant in compliance with the TMDL on the North Platte River. Federal compliance cost for the EPA drinking water rules, many for naturally occurring elements in groundwater, can be a million dollars in communities with fewer than a thousand people.

Third, a small percentage of water funding programs should be set-aside for technical assistance and assistance in complete the applications for water infrastructure funding. Small communities often lack the technical and administrative resources to achieve compliance and complete the necessary applications to access the federal funding programs. Providing these small communities with shared technical resources allows small communities access to technical resources that large commonalities have and are needed to operate and maintain water infrastructure, comply with standards in the most economical way, and obtain assistance in applying for state revolving loan funds. Often, this assistance saves thousands of dollars for the community and keeps the systems in long-term compliance with EPA rules. Our recent letter to EPA Administrator designee Scott Pruitt explains this concept in detail.

Fourth, regarding privatization of water infrastructure and public-private partnerships, NRWA has not opposed water supply privatization in principle. However, corporate water (profit generating companies or companies paying profits to shareholders/investors) should not be eligible for federal taxpayer subsidies. Private companies argue that they have to comply with the same regulations. However, the distinction in mission between public and private is the core principle that should be considered. Public water utilities were and are created to provide for public welfare (the reason why public water continues to expand to underserved and non-profitable populations). Any federal subsidy that is provided to a corporate water utility can’t be separated from subsidizing that company’s profits.

NRWA Works for You

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Fifth, allow infrastructure funds some ability to provide grants—not just loans. Commonly, low-income communities do not have the ability to pay back a loan, even with very low interest rates, and require some portion of grant or principal forgiveness funding to make a project affordable to the ratepayers.

Sixth, a minimum portion of the funds should be set-aside for small and rural communities. This ensures that any infrastructure program must set-up a process for dealing with small and rural communities. Once established, local pressures and priorities will determine the actual portion directed to small systems which we expect will often be greater than the minimum prescribed.

Every four years, EPA works with states and community water systems to estimate the drinking water state revolving fund-eligible needs of community drinking water systems by state. In 2011, EPA published their fifth national assessment of public water system infrastructure needs and it showed a total twenty-year capital improvement need of $384.2 billion. This estimate represents infrastructure projects necessary from January 1, 2011, through December 31, 2030 for water systems to continue to provide safe drinking water to the public.
What is a Sanitary Survey?

Rick Norris, NevWA Training Assistance Specialist

Nevada Rural Water Association has a contract with the Nevada Department of Environmental Protection’s Bureau of Safe Drinking Water, BSDW, to investigate and classify potential public water systems across Nevada. That work has been my primary responsibility since I started working for Nevada Rural Water Association just over a year ago. If a new public water system is found, that system will have to go through many steps to become permitted by the state. The permitting process works to ensure that public water systems are doing everything they can to provide safe drinking water to the consumer.

Sanitary surveys are one of the ways systems are evaluated to ensure the drinking water they supply to the consumer is safe to drink. The definition of a sanitary survey in the Nevada Administrative Code 445A.6635 is: “Sanitary Survey” means an on-site evaluation of a public water system to determine whether the water sources, facilities, equipment, processes, administration, operation and maintenance of the system are adequate for the production and distribution of safe and reliable drinking water. This definition was adopted by the State of Nevada directly from language in Title 40 Code of Federal Regulations 40CFR, passed by the U.S. Congress. Now that is a mouth full to say and understand, but what is clear from that definition is the sanitary survey is a very thorough evaluation of the entire water system.

The next item in the definition is facilities. Facilities include pump stations, well houses, treatment buildings, storage reservoirs, vaults, and even maintenance shops. These structures would be inspected for things like construction standards, rodent infestation, and the storage of potential contaminants. Simple things like the cleanliness of a building may be noted during the survey.

Equipment is also in the sanitary survey definition. The use of certain tools for the work performed on drinking water apparatus should be dedicated for that particular use or a method of disinfecting the equipment should be employed to prevent cross contamination of the drinking water. All equipment to be used for work on the drinking water system is subject to inspection during a sanitary survey.

Sanitary surveys will examine processes in use by the water system. Processes could include treatment techniques or disinfection. Other processes include plans for water quality sampling. The processes used by each system will vary and will be determined by factors such as water quality of the source water. Whatever the processes that are in place for a water system will be evaluated for their effectiveness.

Public water system administration is another part of a sanitary survey. Systems are evaluated for financial capability, operational capabilities, and managerial capabilities. This important part of a sanitary survey is one of the most difficult and often forgotten elements. Smaller water systems often are administered by boards made up of volunteers. Training for these board members is crucial to having a well-run water system.

The operation and maintenance of a water system is a very large piece of a sanitary survey. Depending on the classification of the water system, a certified operator may be required to perform work in the system. Regardless of whether a system needs a certified operator all systems need detailed manuals to be used as guides for the operation and maintenance of the system. These manuals will be evaluated as part of the sanitary survey.

The last part of the sanitary survey definition we will examine is adequate for the production and distribution of safe and reliable drinking water. This amounts to the goal of the sanitary survey. The sanitary survey checks to see if all of the elements are in-place and working properly to provide that safe and reliable drinking water.

Every public water system should have essentially the same goal in mind. Providing a safe and reliable product to consumers is what water systems are for. Therefore, a sanitary survey should not be looked upon as a way for the regulatory agency to impose hardship on a particular public water system. The sanitary survey should be an opportunity for the public water system to evaluate and confirm the commitment to provide the best water to its customers.

Sanitary Surveys are performed on a periodic basis based on the size and complexity of the public water system. Generally, a groundwater system will have a sanitary survey every three years and a surface water system will be surveyed every year. The survey is conducted by Bureau of Safe Drinking Water public health professionals called Facility Managers, or in Washoe and Clark Counties, by professionals from the County Health Division. There are almost 600 public water systems in the state and around ten facility managers. For small systems, sanitary surveys are typically completed in a day. Once the survey is completed the facility manager creates a sanitary survey results letter, which is usually mailed to the system within less than thirty days. The results letter identifies and describes any deficiencies that were noted during the survey.

Once the letter is received, the system is obligated to communicate back to the agency acknowledging receipt of the letter and to explain how and when each of the deficiencies will be addressed, or has already been addressed. Some items might require a great deal of time to address, and the system needs to propose a time frame. Once the timeline is agreed by the agency, the public water system will work expeditiously address the deficiencies noted in the results letter, while keeping the agency informed of progress. For each deficiency, the loop is closed when the item is corrected, documentation showing and describing the work is sent in, and the agency accepts the corrections. This process will take some effort and can take considerable amount of time depending on the deficiency. Remember that the goal is public health protection, once deficiencies threatening that goal are identified, their correction becomes your priority.

Again, the ultimate goal of every public water system should be to provide safe drinking water to the public. With that in mind, the sanitary survey becomes a process to improve the water system, and a tool to be used to reach the ultimate goal.

As part of our capacity development work, Nevada Rural Water Association staff is available to go through a sanitary survey exercise with you and your staff at no cost. Learning what to look for and fixing items as they arise will keep everyone focused on the public health goal.
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