WEST VIRGINIA RURAL WATER ASSOCIATION

Every drop counts

Mountain State Water Line

A Publication of the West Virginia Rural Water Association

Winter 2021

In This Issue

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West Virginia Rural Water Association

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Articles and Features

West Virginia Rural Water Association, WVRWA, is a non-profit organization of rural and small publicly owned water and wastewater systems. The vision of the WVRWA is to be the recognized leader and respected voice for water and wastewater systems. The mission or purpose of WVRWA is to provide and promote the highest level of utility service, technical assistance, training, and advocacy for all West Virginia water and wastewater systems.

WVRWA is affiliated with the National Rural Water Association.

By Jason Myers, WVRWA President

President's Message

I'm sure many of you are glad to see 2020 come to an end. It was a very trying year that brought changes to almost every aspect of our lives. It was a struggle; however, we were able to come together and persevere. Although it's likely not a year anyone would want to repeat, I'm sure we can all say that we're stronger for it. 2020 has changed and shaped us as individuals from how we live to how we work. I would like to thank each and every one of you for the great work that you do. As water and wastewater operators, you didn't have the flexibility to work from home, like so many others. You showed up day-in and day-out to continue to provide clean, potable water and sanitary services to everyone across this state. Can you imagine surviving a pandemic without these services? I commend you for your hard work and dedication.

It's an honor for me to serve you as president of WVRWA. I'm a longtime supporter of the association and I've been serving as a board member since 2018. I'm amazed at all the things we've been able to accomplish and overcome over the years. I look forward to working with the WVRWA staff and you, our members, to ensure that we continue to provide you with the services you need. It's my goal to see the association perform at the highest level. We want to advocate and be the voice of the membership, especially regarding PSC rule changes. We'll continue to monitor and address legislative and regulatory issues that affect you. We're working to facilitate COVID-19 vaccinations to the water and wastewater industry as they become available. We're also working on many new programs and benefits that will help meet your needs. If you have any suggestions or questions, please don't hesitate to reach out to the WVRWA staff and/or board members. We're here to assist you.

Once again, I look forward to being your president.

Sincerely,

Jason Myers, BA, CFM ■

WWW.WVRWA.ORG

Online Training Classes

WVRWA has teamed up with SunCoast Learning Systems, Inc. to bring online computer-based water and wastewater training to operators throughout the state. Through WVRWA Online Learning, you now have the freedom to learn from home, the office, or your local library. Training can be accessed directly from your personal computer using your internet connection.

Water and wastewater operators registering for e-Learning courses will have a menu of courses from which to choose. We are constantly adding and updating courseware to reflect changing industry needs and regulations. For more information, you can visit www.wvrwa.org or contact the office at 800-339-4513. Some of the available courses are shown below.

Course	CEH Hours	Approved for	Price
Drinking Water Mathematics	10	Water/WW	$180
Surface Water Treatment	10	Water	$180
Basic Environmental Chemistry	10	Water/WW	$180
Small Water Systems I	5	Water	$100
Chlorinator Systems & Chemical Handling	10	Water/WW	$180
Water Transmission and Distribution	10	Water	$180
Practical Personnel Management	7	Water/WW	$125
Water Utility Calculations	10	Water	$180
Pumps & Motor Maintenance	10	Water/WW	$180

By Todd Grinstead, Executive Director

From Your Executive Director

It is my pleasure to introduce myself to you as your Association's new Executive Director. I have nearly 35 years of experience with the drinking water and wastewater industry. I have served you on the Association's Board of Directors for 9 years, where I served as Secretary/Treasurer, Vice-President, President, and, lastly, the WV representative to the National Rural Water Association Board. I accepted employment as your Executive Director in November 2020. I have really enjoyed working on behalf of the Association's members on various issues, such as important legislation on the state and federal levels, emergency preparedness, and many other topics.

The year 2020 has surely taken all of us by surprise and has forced us to find alternative ways to do business. While some were able to work from home to minimize exposure to the COVID-19 virus, others had to keep on keeping on to ensure others had clean water and properly treated sewage to maintain some sort of normal life. I want to shout out a big "THANK YOU!" to all who put others first and kept their heads down and got the job done! You are all true heros!

Unfortunately, the severity of the COVID-19 virus in our region this past summer forced the cancellation of our 35th Annual Technical Conference at Snowshoe Resort. We are hoping, and believing, the 2021 Conference will be able to happen. Currently, staff is working on the plans and details so we can have a great 2021 Conference. In the event we wouldn't be able have an in-person Conference, we will be poised to launch a modified virtual Conference to allow folks that need CEHs to get a chance to obtain them. ■

By Brian Arthur, 2% HELP Training Specialist

Fundamentals of Solving Math Problems

Here we are between Thanksgiving and Christmas as I write this article. Covid-19 is still going strong, but we have had a few certification classes. One thing that I hear in every class: "I don't understand the math." I have tried to provide some tips that will help you prepare for taking the exam.

One difficulty in operator certification exams appears to be the solving of math problems. Math is to be an aid to the operator in solving everyday operating problems in a water or wastewater system. It deals with the basic math that would be required for an operator to accomplish his or her everyday work.

Solving math problems is not any different than solving any type of problem. It requires practice in manipulation and knowledge of what manipulation to make. Given below is an approach to solving math problems:

- Decide what the problem asks.
- List the information given.
- Decide what units the answer should have.
- Perform the calculations necessary to solve the problem.
- Label the answer and check units.

When doing addition, adding 10 plus 10 and reaching a conclusion of 20 is a simple operation, but adding complex numbers like 13.333 and 0.0033 poses a larger challenge. Follow these basic rules to avoid arriving at incorrect answers when adding complex numbers:

Decimal points and numbers should line up in columns. When this rule is followed correctly, the previous addition problem is easily performed.

Be sure you are not adding apples and oranges. All numbers must represent the same type of units, for example inches, pounds, or feet. So, when adding the length of two pieces of pipe, if one is 32 inches and the other is 3 ½ feet, you must convert to common units. First, divide 32 inches by 12 to convert to 2.66 feet or multiply 3 ½ feet by 12 to convert to 42 inches before adding the numbers.

Write down the numbers that you carry-over when adding.

In summary, addition involves the process of summing up numbers. The order by which numbers are added has no impact on the final answer. All numbers must be in the same units (i.e. gpm, feet, inches, etc.) Subtraction is the reverse operation of addition, but the same general rules apply.

There are several rules to remember in multiplication. The number of decimal places in the answer is equal to the sum of decimal places in the numbers multiplied. Numbers do not have to be apples and apples, they can be apples and oranges. That is why it is important to specify the units that go with the numbers and include them in the answer. For example, four men working three hours each would work: 4 men X 3 hours = 12 man-hours of labor. The multiplication operation can be indicated by several different symbols. The most common is the multiplication sign (X) or times sign, but it can also be indicated by parentheses () or by brackets [] or simply with an asterisk (*). And remember, when solving a problem that uses parentheses or brackets, ALWAYS complete the operations inside the parentheses or brackets before performing other operations. In summary, the order by which numbers are multiplied has no impact on the final answer. To multiply decimal numbers, the answer must contain the total number of decimal places to the right of the decimal as the sum of the decimal places of the two numbers being multiplied. And numbers multiplied by unlike units must show both units in answer (ex. man-hours, foot-lbs). Finally, division is the reverse operation of multiplication and the same general rules apply.

Mathematical equations have to be worked out in a particular order. To correctly solve a math equation, the following order must be used:

- Parenthesis
- Exponential
- Multiplication
- Division
- Addition
- Subtraction

A mnemonic is a phrase or device to help us remember something hard by learning something easy. To re-

member the correct order of math operation, memorize the catchy phrase: "Please Excuse My Dear Aunt Sally". In addition, math problems should always be worked from the left to the right.

And finally, let's discuss reading problems. Most of the problems on the test are reading problems and it is important that we can figure them out. First, read the problem. And, then, underline the given information. Next, circle what is being asked for in the question and draw a picture and label with the given information. Stop and think about what is being asked for and look at the units; many times the units of the item being asked for will tell you how to do the problem. Do not go on until you understand what is being asked and you know how to proceed. When you understand this, select the proper formula. Write down the formula and then start writing down the various information that has been given to you. Finally, solve the formula and ask if the answer is reasonable. If it is not, you should go back and check your work or possibly you are not using the correct formula. The key is to take your time and make sure you understand what is being asked.

I understand that most of us don't like math that much, but I hope that some of this information is helpful. Once you start getting some questions right, it becomes easier and more enjoyable. Have fun, stay safe, and I'll see you in class. ■

By Bertis M. McCarty, Water Circuit Rider

Activated Carbon

Carbon in the raw form is found in many products.

The most interesting one is ***WOOD***. If you remember photosysthesis from biology class, it tells us that leaves pull in carbon dioxide and water. Then, it uses the energy of the sun to convert this into chemical compounds, such as sugars, which feed the tree. As a by-product of that chemical reaction, oxygen is produced and released by the tree. The sugars and water are used by the tree and the carbon is stored for its life cycle, even after it's dried for lumber. Carbon constitutes approximately 50% of the dry mass of wood products from trees.

COCONUT shells are a renewable resource made of high-grade carbon and are ideal for filtration due to their high percentage of micro-pores on their surface, nearly 50 percent more than coal, making it the most promising option for removing a wide variety of particles and pollutants.

PEAT is the precursor to coal. Peat is a soft organic material consisting of partly decayed plant and, in some cases, deposited mineral matter. When peat is placed under high pressure and heat, it becomes coal.

There are four types of ***COAL***

Anthracite: The highest rank of coal. It's a hard, brittle, and black lustrous coal, often referred to as hard coal, containing a high percentage of fixed carbon and a low percentage of volatile matter.

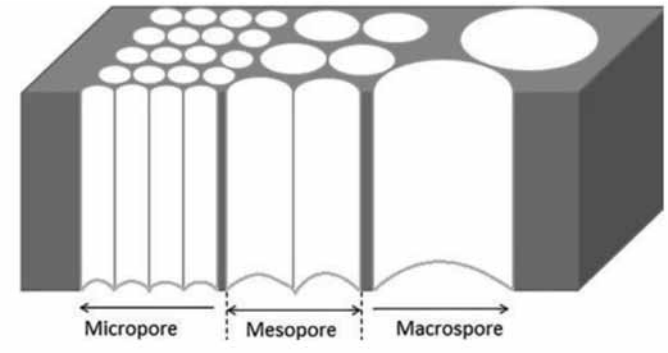
Bituminous: Bituminous coal is a middle rank coal between subbituminous and anthracite. Bituminous usually has a high heating (Btu) value and is the most common type of coal used in electricity generation in the United States. Bituminous coal appears shiny and smooth when you first see it, but look closer and you may see it has layers.

Subbituminous: Subbituminous coal is black in color and dull (not shiny), and has a higher heating value than lignite.

Lignite: Lignite coal, aka brown coal, is the lowest grade coal with the least concentration of carbon. The most common coal used in the water industry is anthracite.

Carbonaceous refers to any organic material that contains a large amount of carbon content.

Activated Carbon (AC) is a graphite-based material with highly developed porous structures, especially in the micro- and meso- ranges.



The structure of AC is imperfect and highly porous over a broad range of pore sizes. The International Union of Applied Chemistry (IUPAC) classification of pores informs us that materials with pore size bigger than 50 nm are macrospores, between 2 and 50 nm are mesopores, and less than 2 nm are mi-

cropores.

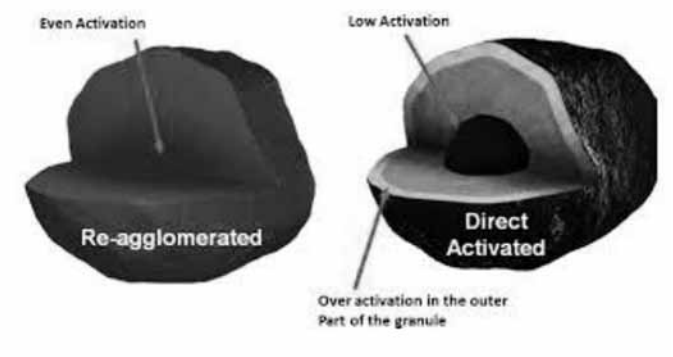
Typical surface area for activated carbon is approximately 1,000 square meters per gram (m2/gm). Think about that surface area of a gram of the Powder Activated Carbon that's used at your water plant. It has the surface area of more than a football field. Different raw materials produce different types of activated carbon, varying in hardness, density, pore and particle sizes, surface areas, extractables, ash, and pH. These differences in properties make certain carbons preferable over others in different applications. The surface area is very important because AC uses adsorption instead of absorption.

Absorption is the process of one material (absorbate) being retained by another (absorbent). The best example I can think of is a sponge absorbing water.

Adsorption is the process that results in the increase of the density of a solute (the adsorbate) in the vicinity of the surface of a substrate (the adsorbent) due to molecular interactions between the adsorbate and the adsorbent. The best example I can think of is putting sand on a piece of tape. It gets stuck to the outside of the tape, therefore adding more density.

The general description of the carbon activation process is below.

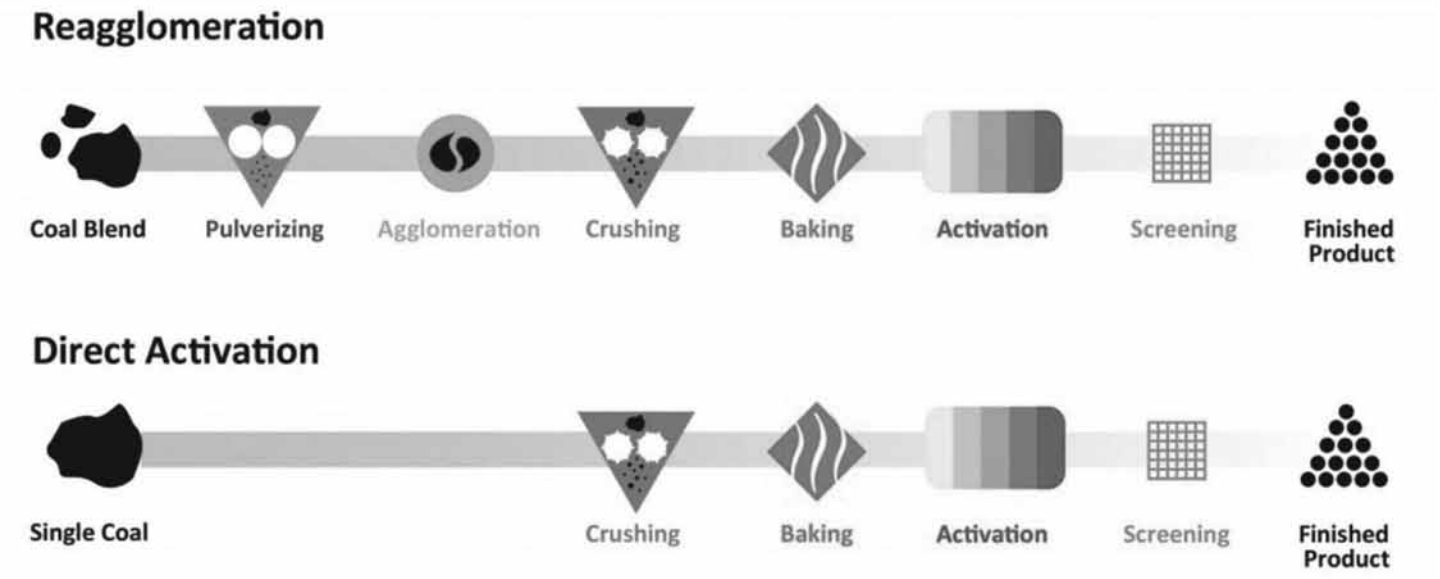
As you can tell from the picture below, Reagglomeration creates a much better product for adsorption.



The two principal mechanisms by which activated carbon removes contaminants from water are adsorption and catalytic reduction. Organics are removed by adsorption and residual disinfectants are removed by catalytic reduction.

Catalytic Reduction is a chemical reaction that involves a transfer of electrons from the activated carbon surface to the residual disinfectant. In other words, activated carbon acts as a reducing agent.

Organic material in public water supplies comes from decaying plant life, which becomes more soluble in water over time and exists as large, high-



molecular weight organic acids (non-polar weak acids). Eventually, smaller molecular weight acids of varying sizes form. Typical organic acid molecules range in molecular weight from a few hundred to tens of thousands.

The size, number, and chemical structure of organic acid molecules depend on a large number of factors, including water pH and temperature. Accordingly, there exists an almost infinite number of organic acids. As a result, removing organics can be difficult.

Factors that decrease solubility and/or increase accessibility to the pores improve the performance of the activated carbon filter. Carbon filter capacity can be roughly estimated at 0. 1 pound of organics per 1 pound of carbon at a flow rate of 1 to 2 gallons per minute per cubic foot (gpm/cu.ft.) and a bed depth of 3 feet.

A couple of factors that affect the performance of activated carbon are:

pH:

Most organics are less soluble and more readily adsorbed at a lower pH. As the pH increases, removal decreases. A rule of thumb is to increase the size of the carbon bed by twenty percent for every pH unit above neutral (7.0).

Contaminant concentration:

The higher the contaminant concentration, the greater the removal capacity of activated carbon. The contaminant molecule is more likely to diffuse into a pore and become adsorbed. The upper limit for contaminants is a few hundred parts per million. Higher contaminant concentration may require more contact time with the activated carbon. Also, the removal of organics is enhanced by the presence of hardness in the water, so whenever possible, place activated carbon units upstream of the ion removal units. This is usually the case anyway since activated carbon is often used upstream of ion exchange or membranes to remove chlorine.

Flow rate:

Generally, the lower the flow rate, the more time the contaminant will have to diffuse into a pore and be adsorbed. Adsorption by activated carbon is almost always improved by a longer contact time. Whenever considering higher flow rates with finer mesh carbons, watch for an increased pressure drop!

Temperature:

Higher water temperatures decrease the solution viscosity and can increase the diffusion rate, thereby increasing adsorption. Higher temperatures can also disrupt the adsorptive bond and slightly decrease adsorption. It depends on the organic compound being removed, but generally, lower temperatures seem to favor adsorption. However, most of WV systems use AC in the hot summer time.

PAC - GAC - AC are all activated carbons we use in the water treatment industry.

What specific kind of carbon and feed rate is very specific for each facility. I hope the information in this article helps you in your water treatment endeavors. ■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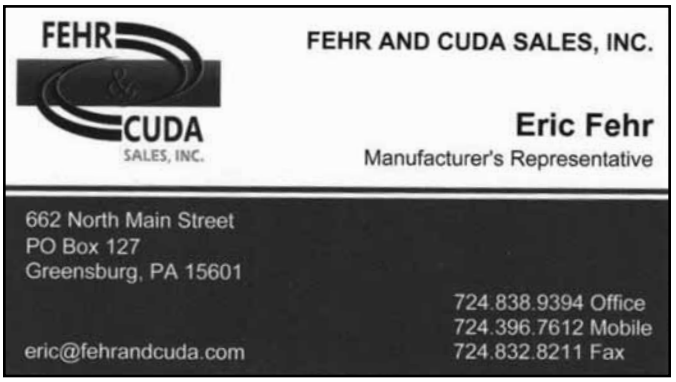
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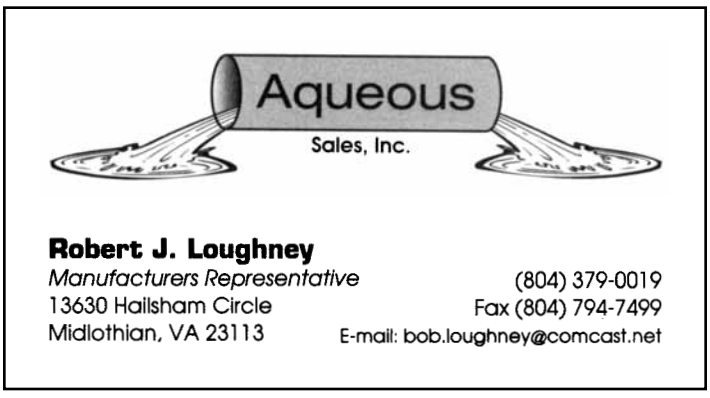
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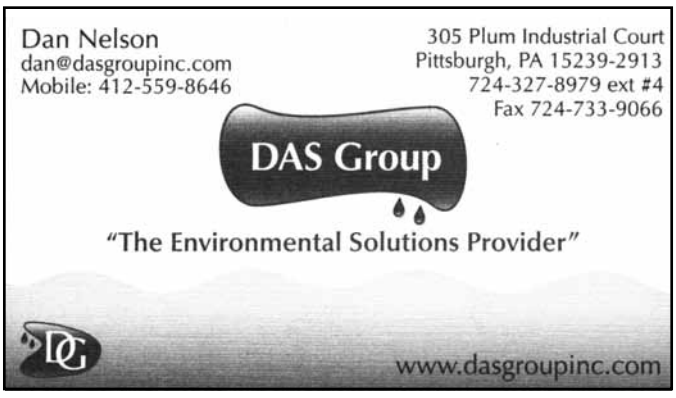
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By Daniel Vestal, Water Circuit Rider

World's Five Largest Treatment Plants

1) James W. Jardine Water Purification Plant, Chicago; capacity of 1.4 billion gallons per day. Designed and built by Chicago's Bureau of Engineering, the plant began operation in 1964. It stands on a man-made, 61-acre peninsula that extends into Lake Michigan. The original 1,100 ft.-long, 180 ft.-wide plant extended from 36 ft. below lake level to 25 ft. above. Water is drawn into the plant from two crib structures two miles offshore and transported through tunnels located almost 200 ft. beneath the lake and ranging in diameter from 10 to 20 ft. Inside the plant, rotating screens catch fish and debris. From there, giant pumps lift the water 25 ft., after which it is chlorinated and activated carbon added to remove objectionable tastes and odors. Next, fluoride is added. Finally, aluminum sulfate, or alum, and one of the very last chemicals added, polyphosphate, is used to coat the inside of Chicago's pipes, preventing the lead in old plumbing from leaching in the water supply. Then, the water is pumped into settling tanks, which eliminates roughly 90% of the particulate matter from the water. Finally, the water is filtered in one of 96 swimming pool sized sand filtration tanks that are filled with a layer of coarse gravel under and upper layer of fine sand; together, these layers effectively filter much of the remaining floc and debris from the water. Construction lasted 13 years and cost $105 million. It supplies about 64% of the city's residents.

2) Guandu Water Treatment Plant, Rio de Janeiro; capacity of 981 million gallons per day. The plant was built in 1955. The raw-water supply for the plant originates in the nearby Paraiba do Sul river Basin, north of the city. Pumped 50 meters (164.04 ft.) uphill, the water is used first to generate hydroelectric power as it flows downhill; next, it flows into the man-made Guandu River and then to the treatment plant. It is a conventional plant that employs chemical coagulation, flocculation, sedimentation, filtration, and disinfection, as well as pH correction. The first phase of construction was done by Empresa Brasileira de Aguas (EBA), and the second phase was constructed by Yamagata Ehgenharia. It has 9 settling basins. It is owned and operated by Companhia Estadual de Agusas e Esgotos (CEDAE) and supplies 9 million people.

3) General San Martin Water Treatment Plant, Buenos Aires, Argentina; capacity of 894 million gallons per day. The plant was designed by the Technical Office of the National Commission for Sanitation Works. The plant includes reserve filters, intake tower, impeller pump buildings, and water lift stations. The most challenging job was the subfluvial tunnel. The plant also features 20 settling basins: 12 of them with static technology of horizontal flow, and 8 of them dynamic of upward flow. The plant opened

in 1913. Of the total population of the province and the city of Buenos Aires, 18 million, the plant supplies 32% of the population. The plant's owner is Agua y Saneamientos Argentioos S.A (AySA).

4) Prospect Water Filtration Plant, Sydney; capacity of 792 million gallons per day. Because it is a high-rate contact filtration plant, it does not contain any settling tanks. For this plant, hydraulic flash mixing was developed at a scale never before attempted. Due to the limited amount of head available, mixing via radial and axial agitators was discounted in preference for a hydraulic mixing arrangement. A jet of the chemical is pumped into the path of a jet of water to disperse the dosed chemical within the process water. Prior to the construction of Prospect, this technology had been implemented only on smaller-scale plants. Prospect supplies 85% of Greater Sydney's drinking water. Greater Sydney now has a total population of just under 5 million, so Prospect is supplying drinking water to around 4 million people each day. On average, it supplies 337 million gallons per day. Prospect Water Group, a joint venture of Australian consultants CMPS&F and Sinclair Knight Mertz is the plant's principal designer. It was built under a 25-year build, own, operate, and transfer (BOOT) contract between Sydney Water Corp. and Prospect Water Partnership. Degremont, is the plant operator. The construction cost was $240 million, and the plant opened in 1996.

5) Guarau Water Treatment Plant, Sao Paulo; capacity of 750 million gallons per day. Serete Engehnaria and James M. Montgomery Consulting Engineers (now known as MWH) designed the plant and built it. The plant began operation in 1973. It receives raw water from the Cantareira system, a complex of six reservoirs in the hill north of the city. The plant uses alum to coagulate and flocculate particles, which are removed by settling and filtration. It has 6 settling basins. Chlorine is added to kill bacteria. The plant's original capacity was 250 million gallons per day, but was later expanded several times to its present scale. When the region is not experiencing drought, the plant supplies 9 million residents of the Sao Paulo metro area. Companhia de Saneamento Basico doEstado de Sao Paulo S.A (Sabesp), a state-owned water and wastewater utility, is the owner and operator.

I know this is a lot of useless information, but I thought it very interesting considering the size of water treatment plants that we all work at. I hope you enjoyed this article.

Pictures and info from Engineering News-Record (www.enr.com) ■

By Jerry Dotson, Sourcewater Specialist

Source Water Protection

During a recent webinar, the presenter mentioned a name that I have not heard in a very long time. The "Love Canal." The Love Canal was a neighborhood in Niagara Falls, New York. It was before the "power grid" that we appreciate today was available to carry electricity nearly anywhere; when housing locations were often relegated by the availability of electrical power. William T. Love had the vision of a state of the art, model community on this tract of land. In order to provide electricity to the community, Mr. Love determined to dig a canal between the upper and lower Niagara Rivers. He believed this would provide a means to generate inexpensive electrical power for the homes and industries that would participate in this dream community. Like many dreams, William Love's model community did not come true.

Left behind was a partially dug canal that eventually became a landfill. At first, it was used for a municipal dump, but, eventually, a company used the site to dispose of several types of toxic waste. This was not done deviously or maliciously. It was no secret that the landfill was there and that it contained toxic chemicals. The proper methods for landfilling toxic waste at that time were probably utilized. It was eventually sealed with a clay cover and that was covered with dirt; and then the site was sold to the local board of education for a dollar. They had already begun plans to build a school on the site.

During construction, the landfill was exposed, and people in charge were made aware of the issues. Some of the plans for the school and appurtenances were changed due to the landfill and the chemicals it contained, but the project continued. The school construction is the most likely culprit for the initial breaching of the containment built to prevent the chemicals from leaching into the surrounding soils.

When the board of education finished the construction of two schools on the site, the remaining property was sold for housing. The company that disposed of the toxins even advised against such a move because of the chemicals located in the dump site. Nonetheless, the adjacent property eventually contained 800 private homes and 240 low-income apartments. The landfill seal was again damaged by the construction of water and sewer lines installed to serve those dwellings; and also by the construction of an expressway. All of this, together with an unusually high amount of rainfall, was the makings of one of the greatest environmental disasters in American history.

Residents of the community suffered miscarriages, birth defects, leukemia, and other horrible diseases because of the disaster. Several things were birthed in the aftermath of the Love Canal Disaster. For the first time in history, an American President committed emergency funds to something other than "natural disaster." Environmental activism was relatively unheard of before the disaster, but came into existence out of necessity from the Love Canal Disaster. Most significantly, the USEPA's Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as the "Superfund" was brought into existence, in great part, because of the Love Canal Disaster and the Valley of the Drums in Kentucky.

Admittedly, most of the harm caused to human beings by the disaster was groundwater seeping into the living spaces of their home and going airborne to cause tremendous health issues suffered by a large portion of the residents. The point of this article and the thing we need to remember is that it is vital that we protect our natural resources. In our industry, water resources are our life bread and our responsibility. Some of our cohorts can tell of the grief, anguish, and expense that comes about when a source of drinking water is contaminated. I am certain that I do not have to stress to you the importance of protecting your source water resources.

My name is Jerry Dotson. I am your new Source Water Specialist. For those who don't know me, I was the General Manager at Union Williams PSD in Wood County for over 20 years. Before that, I worked at South Putnam PSD (now just Putnam), and the City of Ravenswood. I began my career in the water industry as a meter reader for the City of Delray Beach, Florida. I look forward to working with many of you, and if there is anything that I can help you with, please do not hesitate to call me at 304-483-3497 or email jerrydotson@wvrwa.org. ■

By Michael Hersman, Water Circuit Rider

Ten Steps for Handling Water Quality Complaints

1. Be friendly and courteous to the consumer at all times.
2. Assure the consumer that you are pleased that they have gone to the trouble to call about their problem.
3. Ask the consumer to describe the problem.
4. Listen carefully and calmly to the consumer's explanation.
5. Review the explanation of the problem with the consumer.
6. Do not argue with the consumer.
7. Make every effort to give the consumer an immediate, clear, and accurate answer to the problem.
8. If it is necessary to investigate the problem at the consumer's place of business or residence, assure the consumer that the inspection will be scheduled as soon as possible.
9. Do your best to assure the consumer that the problem has been or will be resolved.
10. Obtain the name, address, and telephone number of the consumer for the record and possible required field inspection.

When discussing the problem with the consumer, use language that the consumer can understand. For example, explain what turbidity and other technical terms mean, which may describe the problem. Since it may be a health-related issue, water quality complaints should be taken seriously. Every effort should be made to resolve each complaint. It is not uncommon for the problem to be originating at the consumer's residence. A consumer may complain of low water pressure and it may be found out that someone has closed the shut-off valve on the house water line. Most consumers are embarrassed and apologetic about the trouble they have caused. Assure the consumer that it is a common problem and to call the utility even if they are unsure what the problem is.

The most difficult cases are those in which the utility is not at fault, but the consumer is unconvinced and demands the utility solve the problem. In this situation, no matter how difficult, remain friendly and courteous. Clearly explain the position of the utility and inform the consumer of any regulations that may apply to the situation. Arguments should be avoided at all costs. After a complete investigation, determine what caused the problem. Assure the consumer that the utility is taking steps to correct the problem. In some cases, assuming health or water quality is not involved, it may be necessary to inform the consumer that an administrative decision will have to be made in order to correct the situation. Make no promises to the consumer. If the consumer is considering legal action, tell them with whom such claims should be filed. If these steps are kept in mind at all times, difficulties experienced in dealing with consumers' complaints should be minimal. ■

NATIONAL RURAL WATER ASSOCIATION

NRWA *America's Largest Utility Membership*

NOW IS THE TIME TO ACT

Get Started on Your Water Utility Construction Project

Do you have a Water Utility Construction Project? Now is the time to act! Rates are at an all time low, and with the current pricing being opportunistic and taking action can result in benefits not only for your-self but for the customer as well. Consider the below items that detail positive reasons to act now that you can present to your governing body.

- Interest rates are at an all-time low.
- More project contractors are available, increasing the number of bids, potentially lowering project costs.
- Fuel costs are low, lowering pipe related costs.
- Most material costs for projects are down.
- Shipping costs for many have decreased.
- Road and water projects are easier to schedule due to decreased volume in traffic.
- Low construction costs and available contractors are not guaranteed to last.

USDA

USDA Rural Development is committed to helping improve the economy and quality of life in rural America. Offering loans, grants and loan guarantees are some of the ways Rural Development is supporting rural America.

WEST VIRGINIA RURAL WATER ASSOCIATION

Every drop counts.

By Erin Schmitt, Media Director/Technical Writer for Pittsburg Tank & Tower Group

Water Tank Leaks

Several things can cause a leak – from cracked welds to holes from deterioration. There have even been instances where people have fired shots at water tanks, puncturing the steel and causing it to leak. Water can also seep through the base plate connected to the pipe system, as was the case with a 105-year-old tank.

Leaks can cause everything from water loss to tank loss in the most catastrophic cases. Any water loss is lost revenue for a water system. So, repairing a leak quickly and efficiently can help save money.

Tank owners can do little to guard against something like errant bullets – that's more a job for the police – but the owner/operator can make sure the tank is maintained and repaired in a timely fashion – drastically reducing the chance of the tank deteriorating. If a leak is identified, the best thing an operator can do is contact professionals immediately to address it before the tank deteriorates too much.

Tank operators should do thorough visual checks on tanks' exteriors at least quarterly to determine if there are any obvious signs of damage or weakening, according to NPFA 25 9.2.4.1. Professional inspectors should examine the tank as soon as possible if there are any leaks or rust streaks caused by leaks. The tank should also be repaired immediately.

Leaks happen at inopportune times, though has there ever really been a good time for a water tank to spring a leak? No. However, if a tank begins leaking in the summer, which is usually peak water usage for most systems, it's a bigger hassle since more water is needed to cover the demand. Plus, taking a water tank offline for repairs would limit the water supply.

Tornados, earthquakes, and other natural disasters may cause structural damage to a storage tank. Severe winter storms can freeze a tank and cause it to overflow. For instance, when cold weather causes a tank to freeze, the pressure on the tank changes. When this happens, metal appurtenances in the tank, like a ladder or hooks, can break free and rip a hole through the steel.

Although the weather and Mother Nature can cause leaks, most are the result of a lack of maintenance. Over time, steel will rust as it comes into contact with a mixture of air and water. A water tank has an abundance of water on the inside, and its exterior is exposed to precipitation.

Sometimes, if the tank can't be fixed for a while, the best thing to do is limit the amount of water stored for the time being. For example, keeping about 10,000 gallons in a 100,000-gallon tank can help relieve pressure on the leak.

Corrosion deteriorates the structural integrity of a tank. For the most part, leaks will start small. Sometimes it's so little that it's imperceptible or, if a leak is detected, it's small enough that the tank operator uses a quick fix to patch the leak. Wooden wedges, bolts, and even a broomstick handle have plugged leaks. That acts as a bandage for leaks, but does not resolve the problem. Corrosion products can also help seal leaks.

"Any exterior corrosion, especially where metal loss is apparent, should be evaluated by a professional engineer familiar with the construction of water storage tanks," according to AWWA Manual M42.

Solving the issue requires a professional to patch the hole with new steel, something that costs more money than taking a wooden wedge and jamming it into a hole. Leaks can spring up anywhere, including underneath the tank. If that happens, the best course of action may be to weld a new steel piece over the existing hole. Leaks can be fixed by plugging welds or patching or inserting plates. Which way is best depends on the severity of the leak and what the tank owner desires.

A South Carolina tank without cathodic protection developed several holes throughout the steel. As each hole cropped up, the tank operator would deal with them on an individual basis, treating it with some quick fix or ignoring it altogether. By the time professionals evaluated the tank, a hole on the shelf's top ring had grown so large that an adult man could stick both of his hands through the opening. Three sheets of steel helped fix the hole and restore the steel to its original thickness.

Steel thickness on a steel tank has a wide range. Inspectors should at least have a rough idea of what the steel thickness is before beginning their inspections. If the tank operators have the original drawings for the tank, the inspectors can use those to compare current steel thickness readings against what it was like when built. ■

Affinity Program

NATIONAL RURAL WATER ASSOCIATION
NRWA America's Largest Utility Membership

The Power of Association

Only the National Rural Water Association can bring together this unique Products and Services Portfolio. Systems can choose from website design and customer communications, to several insurance packages including health plans, data breach services, line and leak coverage, background screening as well as our Rural Water Loan Fund.

All Designed to Meet the Needs of Utilities

This NRWA Products and Services Portfolio Toolbox was designed to assist State Associations and their members with up-to-date information and provide exclusive, beneficial products and services at an affordable cost.

You can find additional information on each product or service on the NRWA website, **www.NRWA.org**.

For NRWA assistance, please contact:
Dawn Myers
Products & Services Coordinator
and Corporate Membership
2915 South 13th Street
Duncan, OK 73533
580. 251.9081
dawn@nrwa.org

Bailey Special Risks has partnered with NRWA to provide cyber security insurance to water and wastewater systems. This exclusive program offers Beazley Breach Response, a unique insurance, loss control and risk mitigation service that notifies and protects the customers who have suffered a data breach.

Coverage Highlights

- Data breach notification and credit or identity monitoring services for up to 100,000 affected individuals, with separate coverage limits for third party claims
- Breach response coverage includes forensic and legal assistance, notification costs, credit monitoring services, loss prevention services and identity theft-related fraud resolution
- Crisis management sublimit for public relations and extraordinary notification expenses
- Low per-incident retentions
- Policy also provides a separate $1 million limit of liability for privacy, network security and media claims

Contact your State Association today!

NRWA has created partnerships with the Ford Motor Company and the Chrysler Group to offer special fleet discounts to State Rural Water Associations and their utility system members. Member utilities should contact their State Rural Water Association to access the Rural Water Fleet Program. Vehicles may be purchased at your local dealer or through the national fleet auto group at www.nrwafleet.com.

Program Details

- Limited to Water/Wastewater utilities that are current members of a State RWA
- There is no limit to the number of vehicles that can be purchased under the program
- Incentive pricing is deducted off the factory invoice Fleet vehicles must be in service for a minimum of 12 months or 20,000 miles
- Vehicles must be registered and operated in the 50 United States

Call your State Association today to get your Fleet Identification Number (FIN)

ServLine is a unique insurance program that will cover water lost with no deductible, repair or replace a customer's water and sewer line in a timely fashion. ServLine is a full service program backed by Hanover Insurance Company and is not a warranty program. The difference is warranty programs only provide water line and sewer line repair products and no leak adjustments.

ServLine:

- Designed exclusively for water systems
- Protects your utility against financial water loss
- Protects customers from financial loss
- Offers customized coverage at local level
- Only available to utilities
- No direct marketing to utility customers

Contact your State Association to sign up today!

IRIS is a SaaS (software-as-a-service) created and owned by TechRadium, Inc. TechRadium is a leading provider of high-speed communication services to water districts, educational institutions, corporations, non-profits and government entities worldwide. IRIS – Immediate Response Information System, gives organizations the ability to broadcast information via voice and text to thousands of people simultaneously with its easy-to-use mass notification service, IRIS.

To view features and get started securing your system, visit the Products and Services at **www.nrwa.org**

The Rural Water Loan Fund (RWLF) is a funding program designed to meet the needs of small water and wastewater utilities. The RWLF provides low-cost loans for short-term repair costs, small capital projects, or pre-development costs associated with larger projects.

Eligible Projects

- Planning costs for infrastructure projects
- Replacement equipment, system upgrades, maintenance and small capital projects
- Energy efficiency projects to lower costs and improve system sustainability
- Disaster recovery or other emergency loans are available

Visit **www.nrwa.org**, to find out how you can apply for a loan with reasonable interest rates and no processing fees.

NRWA, in collaboration with Mike Keith Insurance and National Insurance Partners, is pleased to introduce the Lifestyle Health Plans 'Healthy Benefits' program to give NRWA members a comprehensive and affordable health benefits option to meet all of the compliance requirements of ACA.

What makes Healthy Benefits different?

- Level-funded major medical plan designs
- Underwritten by "A" rated carriers
- Premium savings averaging 5-15%
- Integrated wellness incentives
- Up to a $500 deductible credit available to all wellness participants
- Integrated concierge telemedicine, outpatient lab and diabetic supply benefits

To learn more about lifestyle health plans, visit **healthybenefitsnrwa.com** or contact Jeanie Cunningham at (800) 530-5229 or via email at **jeanie@mkeithins.com**

Companies want to hire qualified and talented people to help their business succeed. Having an effective background screening program is an essential step in the process. NRWA teamed up with IntelliCorp to provide members with comprehensive background screening products and solutions at cost-effective rates. IntelliCorp provides validated criminal searches, screening packages, personalized support, training and compliance.

Get started today with no set-up fee!
www.nrwa.org/background-checks

RuralWaterImpact.com and MunicipalImpact.com host beautiful, easy-to-use websites for hundreds of towns and water systems across America. As soon as you sign up, the amazing support team gets to work and launches your new website in just 3 days or less! Then make edits or post alerts yourself anytime you like! Need help? No problem – Support is unlimited!

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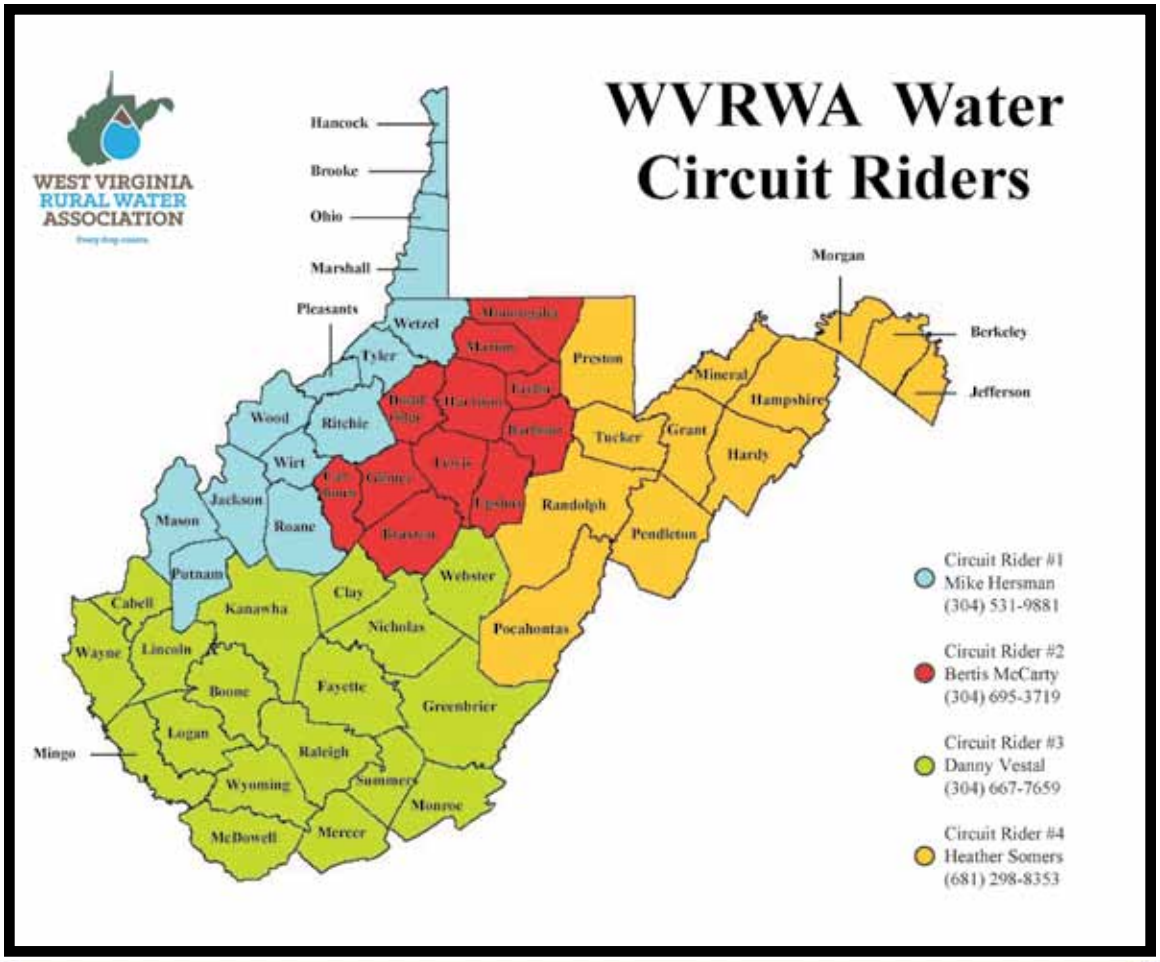
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Circuit Riders
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PH: (304) 201-1689 Fax (304) 201-1694
WW Circuit Rider #1
Jim Johnson
304-704-3830

RURAL WATER Loan FUND

The **NRWA Rural Water Loan Fund** (RWLF) is a funding program specifically designed to meet the unique needs of small water and wastewater utilities. The RWLF provides low-cost loans for short-term repair costs, small capital projects, or pre-development costs associated with larger projects. The RWLF was established through a grant from the USDA/RUS, and repaid funds used to replenish the fund and make new loans.

Reasons to apply

- Reasonable interest rates
- NRWA does not charge administrative or processing fees
- Straightforward application process
- Quick turnaround

Eligible Projects Include

- Pre-development (planning) costs for infrastructure projects
- Replacement equipment, system upgrades, maintenance and small capital projects
- Energy efficiency projects to lower costs and improve sustainability
- Disaster recovery or other emergency loans available

Contact your State Rural Water Association or National Rural Water Association for help with the application process.

For More Information:

Applications, information and forms can be downloaded from the NRWA website, **www.NRWA.org/loans**.

Email applications to:
nrwarwlf@nrwa.org

Or mail to:
Rural Water Loan Funds
2915 South 13th
Duncan, OK 73533

For help, please call 1.800.332.8715 or email nrwarwlf@nrwa.org.

USDA Rural Development

NRWA

National Rural Water Association working in conjunction with US Department of Agriculture/ Rural Development

Recently, WVRWA published its new e-Newsletter, *News Droplets*. *News Droplets* provides information on new programs and benefits, training classes, conference, legislative news, and much more. If you are currently not receiving *News Droplets*, but would like to, please send your name and email address to connect@wvrwa.org to be added to the mailing list.

By Heather Somers, Water Circuit Rider

Deadlines Approaching for Risk and Resilience Assessments

The Safe Drinking Water Act Section 1433 (from the 2002 Bioterrorism Act) was replaced with Section 2013 of America's Water Infrastructure Act (AWIA). Main components of AWIA Section 2013 requires community water systems serving more than 3,300 people to:

- Create or update Risk and Resilience Assessments (RRA) and Emergency Response Plans (ERP)
- Submit certification to EPA by deadlines
- Review and submit RRA and ERP every five years
- Maintain records for five years

Important Deadlines:

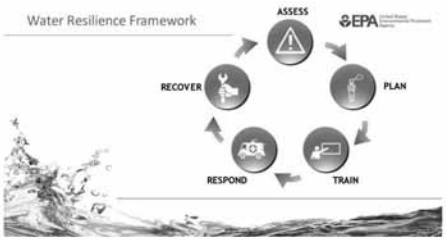
December 31, 2020 for PWS serving 50,000 to 99,999 people

March 31, 2020 for PWS serving 3,301 to 49,999 people

*Updated Emergency Response Plans submitted six months after the Risk and Resilience Assessment

The Risk and Resilience assessment evaluates vulnerabilities, threats, and consequences from potential hazards. Components of this assessment include: natural hazards and malevolent acts, physical infrastructure, monitoring practices, financial systems, chemical storage and handling, operation and maintenance. The assessment may include an evaluation of capital and operational needs for risk and resilience management for the system, but it's not required. In addition, the risk assessment should consider and address risks at any consecutive systems that could impact the water system.

EPA's Five Part Water Resilience Framework



1. Assessing risks: the risks that are most relevant to your utility will determine the planning steps you take.
2. Planning for an emergency: this involves developing and updating emergency response plans, initiating mitigation projects, and taking other key actions to reduce the impact of a future disaster.
3. Training: this can involve training staff on emergency response protocols and conducting exercises to practice coordination at the local, state, and national levels.
4. Emergency response: when a disaster occurs, you must have the right tools available to respond.
5. Recovery: having resources available to restore service as quickly as possible.

There are three tools available from the EPA to assist systems in completing a risk and resilience assessment. Use of these tools are not required by the EPA but by utilizing just ONE of these tools, all Section 2013 requirements will be satisfied.

1. Vulnerability Self Assessment Tool (VSAT) - Used to estimate risks from malevolent threats and natural hazards and to evaluate improvements for increased security and resilience. (https://vsat.epa.gov/vsat/)

2. Baseline Information on Malevolent Acts for Public Water Systems - Used to help systems identify and take steps to reduce the risk that a specific system will experience or deter a threat from occurring. (https://www.epa.gov/waterriskassessment/baseline-information-malevolent-acts-community-water-systems)
3. Small System Risk and Resilience Checklist - Intended for smaller water systems to access risk. (https://www.epa.gov/waterresilience/small-system-risk-and-resilience-assessment-checklist)

Upon completion of the Risk and Resilience Assessments (RRA) and Emergency Response Plans (ERP), utilities must submit a certification to the EPA. This certification does not require the actual plan be submitted, just a certification verifying completion. Each submission must include: utility name, date, and a statement that the utility has completed, reviewed, or revised the assessment. Three options are provided for submittal: regular mail, email, and a user-friendly secure online portal. The online submission portal provides drinking water systems with a receipt of submittal. The RRA and ERP can be self-certified by a designated employee of the utility.

EPA's main goal in amending The Safe Drinking Water Act Section 1433 is returning systems to compliance and protecting public health. West Virginia Rural Water Association is here to assist with any steps of the AWIA regulations, please reach out for further guidance, if needed. ■

JOIN WVRWA

SUDOKU PUZZLE

	9	6			4			8
			1	6		9		5
	5			9	3	1		
9			5					
4	8							9
					2	7	8	
8			3	2				7
	4				8	5	1	
					9		6	

The aim of the canonical puzzle is to enter a numerical digit from 1 through 9 in each cell starting with various digits given in some cells (the "givens"). Each row, column, and region must contain only one instance of each numerical. Completing the puzzle requires patience and logical ability.

Answers can be found on page 38.

DON'T FORGET!!!

SNOWSHOE MOUNTAIN

Mark your calendars for

August 14-18, 2021

To attend the WVRWA 35th Annual Technical Conference

To be held at

Snowshoe Mountain Resort

WEST VIRGINIA RURAL WATER ASSOCIATION

Watch for information and forms to be mailed out in spring 2021

Answers to Soduko Puzzle

1	9	6	2	5	4	3	7	8
3	2	8	1	6	7	9	4	5
7	5	4	8	9	3	1	2	6
9	1	7	5	8	6	2	3	4
4	8	2	7	3	1	6	5	9
6	3	5	9	4	2	7	8	1
8	6	1	3	2	5	4	9	7
2	4	9	6	7	8	5	1	3
5	7	3	4	1	9	8	6	2

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By Jim Johnson, Wastewater Technician

Examining Our Sampling Practices at Our Wastewater Treatment Plants

Sampling is one of the most important jobs we perform at the wastewater treatment facility. It is very easy to do something that will contaminate or change the makeup of our sample, sometimes, without even being aware of it. The result of our analysis can be no better than our sampling. If the wastewater is not sampled correctly, the results are going downhill from that point on. We will attempt to go over some things in this article to make our sampling a little better, which will, in turn, make our test results better. The purpose of sampling is to obtain information on our wastewater. This information will be used either for reporting purposes or to determine adjustments to our wastewater plant to achieve better operational control.

First things first, make sure to use proper safety procedures when collecting your samples. It is very important to make sure we do not catch any diseases when we are sampling at our wastewater facilities. Therefore, make sure to wear respiratory protection when collecting samples. Many of the pathogens and toxins in wastewater are airborne, so this is very important. It is also important to wear gloves for hygienic protection from the waterborne pathogens. It is also very important to wash our hands with soap and as warm water as we can stand as soon as the sample collection is complete.

Special care must be exercised not to contaminate samples. The samples must be correctly stored while they are being held at your facility. If they are awaiting pickup or shipment, they usually must be in a sample refrigerator or on ice at a temperature of 4 degrees centigrade. A chain-of-custody must be filled out and kept with the samples.

When sampling different locations, a new pair of disposable gloves should be worn at each location or tank. Make sure your samples are properly preserved. Most labs will send you a container with the proper preservative already in it. Just make sure not to get the containers mixed up. If you are preserving your own samples, the preservative must be added as soon as possible. Adding the preservative to the container before sample collection is best, if it can be worked out. If using a sampling device to collect your samples, make sure the sampling device does not come in contact with the sampling container at any time. The sampling device must be cleaned prior to beginning the sampling process. Make sure to know how much sample the lab is going to need to do the job so you can be sure to have enough sample.

Assure all sample containers are properly labeled with all necessary information. Most of the time, the container will have a label on it for the sampler to fill out. It will usually ask for information such as your facility name, analysis you want done on the container, the date and time the sample was collected, and who sampled it. The container should also have listed what preservative, if any, was used.

One of the most important aspects of sampling is making sure we collect a representative sample. The sample should be collected in a place where the wastewater is well mixed. Usually, the best place is near the center of the water being sampled. The sample should be collected at a spot about 40-60% of the water depth. The sample should be collected at a point with good turbulence and mixing - do not choose a spot where the water is nearly standing still. If individual samples are collected to make up a larger sample, make sure the smaller samples are well mixed before being transferred to the main

container. Sometimes, the NPDES permit will specify the place where the sample is to be collected; other times, it will just give a type of water to be sampled. Make sure to check your permit to see what is specified.

Influent wastewater samples should be sampled at a spot with high turbulence. This will ensure good mixing. Make sure to sample in a location free from any liquid being returned. Sometimes, the best sampling spot cannot be reached. Effluent samples should be collected at a representative site, if not specified by the NPDES permit. Make sure to choose a site downstream of anything entering the tank.

There are generally two types of samples used for wastewater sampling. They are the grab sample and the composite sample. The grab sample is a sample that one would just go out and collect. The time to collect this sample is not to exceed 15 minutes. It should be representative of the water conditions at the time and place the sample is collected. Composite samples are collected over a time frame. In wastewater, we usually collect one sample each hour for eight hours. Sometimes, your NPDES will give you a different time frame and amount of time between samples. Do the samples as the permit directs. The sample usually must be flow proportional, which means the amount of sample collected depends on the flow at sampling time.

Sampling is a very important part of the analysis process. If your lab results are going to be anywhere near correct, one must get the sampling part correct. Take some time to learn the correct sampling process for any perimeter you must have a result for, as it will make your results more accurate. ■

WWW.WVRWA.ORG

Where is this located in West Virginia?

Last issue's answer:

The Greenbrier in Lewisburg, WV

Recipes to Tempt Your Taste Buds

Pizza Mac & Cheese

Ingredients:

- Kosher salt
- 3 tbsp. unsalted butter
- 1/4 cup tomato paste
- 1 tsp. dried oregano, plus more for garnish
- 3 cups grated mozzarella
- 1 lb. penne
- 3 tbsp. all-purpose flour
- 2 cups whole milk
- 1/2 tsp. crushed red pepper flakes
- 1/4 lb. mini pepperoni slices

Directions:

Preheat oven to 375°. In a large pot of salted boiling water, cook pasta according to package directions until al dente, less 2 minutes.

Meanwhile, in a large cast-iron skillet over medium-high heat, melt butter, whisk in flour, and cook for 1 minute. Add tomato paste and whisk in milk until smooth. Add oregano, red pepper flakes, and 1/2 teaspoon salt and bring to a boil. Simmer for 1 minute on medium heat.

Fold in half the cheese and add drained pasta. Top pasta with remaining cheese and sprinkle pepperoni all over.

Bake until pepperoni is crispy and pasta is bubbling, 10 minutes. Serve immediately.

West Virginia Rural Water Association Cybersecurity Update

West Virginia Rural Water Association here with a quick update regarding cybersecurity and tips on identifying genuine WVRWA communication.

As our industry continues to integrate digital services like email into our daily work, it becomes increasingly important to ensure that we are taking efforts to be as secure as possible when online. Here are some tips to help confirm that online communication you may receive with our name on it is truly coming from us:

- When you receive an email claiming to be sent from West Virginia Rural Water Association staff, check the email address of the sender to determine if it is correct. If it isn't an **@wvrwa.org** email address, it likely isn't from us.

- If you were not expecting any direct communication from us, be especially critical of both the sender's information as well as the content of the email.

- Be particularly careful about the sender's information if you receive communication directly asking you for private information. Feel free to contact us over the phone or through a new email message if you would like confirmation that we reached out to you.

- Be mindful in general when reading an email claiming to be from WVRWA or WVRWA staff. Some inauthentic emails can be convincing, so it is important to take the time to examine the message closely before you respond.

We encourage you to contact us with any questions or information regarding West Virginia Rural Water Association and proper cybersecurity!

By Todd Grinstead, Executive Director

Are You Ready for the Next Decade with Certified Water and Wastewater Operators?

Is an apprenticeship program right for you?

It takes more than 380,000 highly skilled water and wastewater personnel to ensure the public supply of safe drinking water and to protect our lakes, streams, and groundwater in the US. Advancements in water treatment and supply technology have increased the skills and training required of this workforce. Water professionals are ultimately responsible for meeting stringent regulatory standards, replacing aging infrastructure, recruiting and training new operations specialists, and responding to and recovering from disasters.

In addition to increasing professional demands, utilities will soon be forced to replace many of their most experienced employees. **Over the next decade, the water sector is expected to lose between 30 and 50 percent of the workforce to retirement.** Many of these employees have worked at the same utility for the majority of their careers and they will depart with decades of valuable institutional knowledge.

The National Rural Water Association (NRWA) Apprenticeship Program has provided the guidelines to states that lays a firm foundation for the apprentices to thrive upon completion. With little to no-cost, apprentices will attend an approximate 2-year training program through WVRWA. From classroom instruction and on-the-job training, apprentices are provided the tools necessary to be a successful operations specialist in your community. During the apprenticeship program, apprentices will earn-while-they-learn with knowledgeable, passionate people who strive to deliver clean drinking water to their community and treat wastewater before returning it to the environment. This program starts as a job and emerges as a solid and secure career as either a water operations specialist or wastewater operations specialist. This program is open to any qualified existing non-certified employees, along with new hires.

This registered apprenticeship program is a flexible approach to building employees' skills. The objective of an apprenticeship is to help employees learn the hands-on and theoretical aspects of highly skilled occupations.

The apprentices are registered with the U.S. Department of Labor and state apprenticeship agencies that include on-the-job and related learning/training. Employers are offered rewards for skills gains as apprentices move through the program. Apprentices earn a national credential at the successful completion of their program.

Employer benefits: Apprenticeship programs improve the long-term strength of your company by developing the skills of your workforce.

- *Recruiting:* Apprenticeship programs help utilities attract new employees by offering them a well-established career path.
- *Training:* Apprenticeship standardizes training for new and existing employees.
- *Higher productivity:* Well-trained employees are more productive and have fewer work-related injuries.
- *Retention:* The opportunity to earn a recognized occupational credential boosts employee loyalty and morale.

Employees benefit from wage increases that are tied to skill gains, so apprentices make more while learning and advancing their careers. At the completion of the apprenticeship, apprentices receive a national credential from the U.S. department of Labor and state operator certifications.

WVRWA has over 35 years of experience training utility operators in WV. WVRWA & NRWA Apprenticeship program has been recognized nationally as a leader in

the development and implementation of certified water & wastewater utility operators. The related training is classroom and online instruction suitable to operator certification. Training and qualified trainers are provided by the WVRWA

Services received from the Apprenticeship program.

- *Consulting services to help your utility develop and implement the apprenticeship program*
- *Training and support to prepare your higher-skilled operators to serve as mentors to apprentices*
- *A learning management system that tracks the on-job training and related training*
- *Access to apprentice assessments to track progress*
- *Customized training to meet the needs of your utility and operators*

Training /curriculum addressed in the program.

- *Utility safety*
- *Flagger Certification*
- *Distribution Certification*
- *Collection System Certification*
- *Field Maintenance*
- *CPR/First Aid Certification*
- *Operator Specialist Certification*
- *Treatment O&M*
- *Basic Operator Math*
- *Technical Math for Operators*
- *Utility Management Certification*

If you think the Apprenticeship Program is right for you or your system, please contact us at 304-201-1689. ■

We're on the Web!

For the latest information on what WVRWA is up to, follow us on Twitter, Facebook, & Lindedin

- Twitter: WV Rural Water
- Facebook: WV Rural Water Association
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By David Mercer, Wastewater Technician

Process Control Testing

The top five reasons a wastewater treatment plant, WWTP, fails are improper lab procedures, wrong amount of wasting, lack of financial and managerial support, excessive I&I, and, last but definitely not least, no process control strategy. You, as a wastewater treatment plant operator, can control three of the five.

Before we talk about process control testing, we should first decide what the process actually is that needs testing. The process is everything between the influent structure/influent pump station and where the effluent enters the receiving stream. The pumps, motors, blowers, tanks, aerators, mixers, disinfection, de-chlorination, and the microbiology are all part of the process; basically, everything inside the fence, except the lawnmower. Without proper maintenance, the process will fail and part of that maintenance is process control testing. Process control is best described as lab testing, calculations, results evaluation, and statistics. The ES-59 is a form supplied to the WVDEP by the WVBPH and is an invaluable tool to ensure proper wastewater treatment. You can see, at a glance, the status of many parameters essential to the operation of the system. The use of this form isn't required by either entity; however, as an operator, how do you make adjustments to your process if don't have data to know what those changes should be? The ES-59 may not be specifically required, but, if you are continually out of compliance, the WVDEP can use the following from your permit, taken directly from the West Virginia State Code, to issue a Notice of Violation.

Appendix A, section II, number 1 reads "Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the condition of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures….." This means process control and the use of the ES-59 to record the results.

Not only do we want to be good stewards of the environment and to stay on the good side of the law, but we also want to minimize our stress level where possible. Process control testing of your activated sludge, pond, or trickling filter system can give you the knowledge of where your plant is now and data trending can help you know where it's going. The testing shouldn't take much more than an hour a day.

Years ago, there was an EPA and state funded national program up until 2009 where each state provided onsite training to wastewater operators. It was a great program. When the trainers got together, they compared notes. Lack of a process control strategy was the #1 issue with plants!

At present, there are 62 systems on this list and the most common factor to all 62 is the lack of process control testing. When operators don't perform any process control testing receive their monthly compliance testing results, it is like waking up on Christmas morning and opening up the presents. "WOW, I never expected to get that." With ever more stringent effluent limits, the days of "seat of the pants" operating will soon be over, if it's not already. By simply performing, recording, and trending process control testing, you can lessen the chances of non-compliance. Different types of treatment facilities may not require all of the equip-

ment and procedures listed below, and the list isn't by any means all-inclusive, but it's a good start.

Basic equipment needed for process control is:

1. Your eyes, ears, and nose
2. Microscope to observe microbiology in the aeration MLSS
3. Settleometer to determine settling time
4. Sludge Judge
5. Means to test DO, ph, and cl2 to insure compliance with effluent limits; glassware, funnels, filters, vacuum pump, analytical balance, desiccator, and oven to determine MLSS and sludge % solids
6. Ability to test ammonia and alkalinity is also quite important.

There are some cheap alternatives to this list if your plant's lab doesn't have all the equipment or the budget won't allow for the entire list. From your local pool supply or pet store you can get alkalinity, ph and cl2 test strips that will allow you to know if you are in the right ballpark with these parameters.

Process control also consists of using your senses of sight, hearing, and smell. Walk your plant and look, listen, and smell for any changes. This can be the first indication of a problem. Blowers make noise and a change in pitch could indicate a problem; looking at the color of the MLSS in aeration is one example of sight and smell, well it's a sewer plant, but they do have their own odor.

If you haven't been tracking ph, DO, or CL2 residual daily and making adjustments to stay within limits, how do know if you will be in compliance or not on compliance testing day? There are parameters that you, as an operator, don't have the equipment to test, but it is your responsibility to do what you can with what you have.

Microscopic observation can tell you, at a glance, the age of the MLSS in aeration. We have all seen the poster of microbiology wanted dead or alive, use it, it's a tool that will serve you well. It's a small world out there. Get to know your bugs.

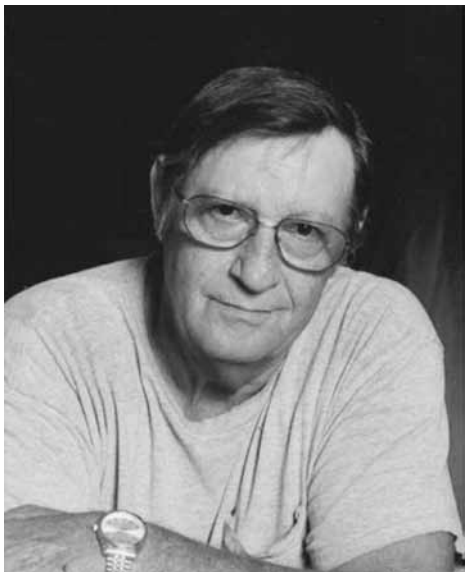
Process control testing may not solve all your compliance issues, but I can guarantee without any reservation, it can't hurt and will, more than likely, drastically help. If you have any compliance questions, please don't hesitate to contact me. ■

Special Interest

Jimmy Paul Rhodes, 65, of Little Birch passed away on Monday, October 12, 2020, at his residence. He was born on September 26, 1955 in Sutton to the late Everette & Marie Wilson Rhodes.

Jimmy dedicated his life to public service as a Class 2 Water Operator and served the public working for Flatwoods-Canoe Run Public Service District for 27 years and Birch River Public Service District for almost 10 years as their General Manager.

He is survived by his wife, Julie Myers Rhodes; sons, Justin Rhodes (Cassandra), Jason Rhodes (Jennifer) all of Sutton; grandchildren, Natalie, Allie, Holien.



Alan Wayne Bowes, 66, of Lewisburg, WV passed away Thursday, November 11, 2020, at his home. Born January 25, 1954 in White Sulphur Springs, WV, he was the son of the late James Clarkson and Sarah Elizabeth Huffman Bowes. Alan was a Class 3 Water Plant Operator and retired in February 2020 with 42 years of public service for the City of Lewisburg Public Works Department.

HONORARY MEMBERS

We would like to give a special thanks to all of our current and former Board Members and Staff who have helped shape WVRWA.

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Mountain Top PSD
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Mt. Zion PSD
Nettie - Leivasy PSD
New Creek Water Assoc.
New Cumberland
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Newburg
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Norton-Harding-Jimtown PSD
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Page-Kincaid PSD
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***Bowles Rice, LLP**
600 Quarrier Street
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Phone: (304) 340-1000
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325 8th Street
Huntington, WV 25701
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Phone: (304) 345-8900
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*****Steptoe & Johnson, PLLC**
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Phone: (304) 353-8181
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Insurance

*****Bill Bailey Insurance Agency, Inc.**
P.O. Box 246
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Phone: (304) 375-4900
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*****Bray & Oakley Insurance Agency, Inc.**
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Phone: (304) 752-6850
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****Hayes Insurance Agency**
202 Union Square
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***USI Insurance Services**
1 Hillcrest Drive East, Suite 300
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***Chapman Technical Group**
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***CME Operations**
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Sutton, WV 26601
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Altoona, PA 16602-4475
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***Potesta & Associates, Inc.**
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***Golden Equipment Co., Inc.**
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***Mid Atlantic Storage Systems, Inc.**
1551 Robinson Road
Washington C.H., OH 43160
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****National Road Utility Supply, Inc.**
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***Neptune Technology Group**
2305 W 18th Street
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***Perma-Patch**
6123 Oakleaf Avenue
Baltimore, MD 21215
Phone: (410) 764-7117
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P.O. Box 913
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Phone: (270) 826-9000
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***John P. Place, Inc.**
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***ProSource Water Products, Ltd.**
14680 Pleasant Valley Road
Chillicothe, OH 45601
Phone: (888) 772-5478
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***Quality Water Services, LLC**
160 John Street
Weston, WV 26452
Phone: (304) 452-9883
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***Service Pump & Supply Co.**
P.O. Box 2097
Huntington, WV 25721
Phone: (304) 429-6731
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***Sewerin**
100 Home Road
Hatboro, PA 19040
Phone: (267) 236-6184
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***Shafer, Troxell & Howe, Inc.**
97C Monocacy Blvd.
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Phone: (301) 682-3390
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***Sherwin-Williams**
450 2nd Street
Saint Albans, WV 25177
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***State Equipment Inc.**
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***Valtronics, Inc.**
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Phone: (304) 273-5356
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St. Albans, WV 25177
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