# H2Oregoin Winter 2021 Vol.43, No.1

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> Publication of Oregon Association of Water Utilities Read H2Oregon online at www.oawu.net

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H2Oregon is the official publication of the Oregon Association of Water Utilities, and is published quarterly for distribution to representatives of rural and municipal suppliers. Issues are mailed free of charge to member and nonmember rural water/wastewater associations. Articles and photos are encouraged with payment in complimentary copies.

H2Oregon is published for the Oregon Association of Water Utilities by

**Mt. Angel Publishing, Inc.** 135 N. Main St., Mt. Angel, OR 97362 503-845-9499 fax: 503-845-9202 www.mtangelpub.com

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OAWU's mission is to provide service, support and solutions for Oregon water & wastewater utilities to meet the challenges of today & tomorrow.

# Adapting Forward

#### by Jason Green, Executive Director

One of the many life lessons passed on to me from my father was to have a plan. A goal. Know where you are, where you are going, and how you're going to do it along the way. Without a plan or goal, we just float along with the tide with no real direction, care or concern, nor with any measurements or accountability. All we face is consequences of choices mostly being poor. I found early on that there is still a problem in following a plan and that is change. We can plan and plan and even have maybe plans and what if plans and maybe cover some, but usually something unexpected is thrown at us and



then a dose of common sense, knowledge of the situation and how to best adapt and implement the change is generally the best. Some of us don't do this so well. We like structure and consistency. We maybe cringe or dig our heels in and do not like nor want to embrace change. Sometimes, we don't have a choice in the matter.

This year your Association faced numerous changes and had to adapt all the while attempting to carry out our usual goals of providing technical assistance, formal training, and representation with the many services OAWU offers right along with the many changes, sometime daily requirements, to deal with COVID. You too. Everyone had to make it happen. We really didn't see this coming and emergency preparedness somewhat worked, but it wasn't like our typical disaster. It changed how most of us all did business and required us to adapt. For OAWU, how do we provide a training class when we can't meet or only have 8 people in a classroom? What about providing assistance in the field when, at some facilities, we could not set foot? We adapted and you did too, and you should be proud of making things work. New and sometimes, better things came out of it. I still don't like it, but virtual classes, even though so many more meetings now, virtual classes and meetings are something new and different and maybe good too.

To add to the mix, many fires that ripped at our hearts, tested and in some cases, really hurt some of our communities and friends there. Horrible events. Wonderful, brave stories. Some so very sad. Adapting, rebuilding, making it work. That's what you do! That's what we do!

Back home at the Association, we have had a number of changes this past year. Mixed emotions, successes and of course, adapting to change. It happens. We are appreciative and thankful and continue to move forward having learned and benefitted from leaders and friends who serve on the board of directors or staff members. One of the many fond board members, having put many year on the board and in several positions such as OAWU Board President and NRWA National Director, Mark Kerns officially retired and resigned from the board. Mark will be sorely missed.

Continued



#### Adapting Forward continued

On the staff level, our in-house jokester specialist and most seriously, expert wastewater and treatment operator and manager, Jeff Crowther, has officially stepped out of the mix when the Association lost one of the two Wastewater Circuit Rider positions. Both as a friend on staff and professional level, Jeff left some mighty big tracks around here and he too will be sorely missed. Maybe we might be able to get him to a conference or two yet and feed him in exchange for taking up our space.

Regarding the OAWU Board of Directors, 2020 also brought two new board members filling vacancies. The Board of Directors and Nominating Committee maintains a list of interested candidates from various areas in Oregon and with various backgrounds. They update this list to keep current. The process is by appointment when a vacancy occurs, but eventually, depending upon the board position and region and year, all positions come up for election rotating through every three years. The new board members added were Konrad Dimmitt, Public Works Director from the City of Lafayette and Joel Gehrett, PE, General Manager from Deschutes Valley Water District. We welcome and look forward to your service and leadership. Change. It happens. Expect it. Plan for it. When the plan doesn't work, embrace it and adapt and make that work. That's what you do. That's what OAWU does. Best wishes to you. •





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# Hindsight is 2020

#### by Scott Berry, Operations Manager

As this year winds haltingly to a close, I find myself looking back at the events of the past year and taking stock of the issues that have affected us in Oregon, across the country, and worldwide. In the Fall of 2019, I don't think any of us were expecting the coming year to be quite so fraught with destruction, discord, and disease. While researching information for this article; I did a quick Google search and landed at the Wikipedia site. Under the heading of "2020" I found entries for devastating brushfires in Australia, civil wars, terroristic attacks, volcanic eruptions, impeachment trials, outbreak of disease and political bonds broken.

And that was only January.

If we continue reading the entries for the rest of the year; we wiled about governments collapsing, stock market crashes, more civil wars around the world, lockdowns, lawlessness and destruction that seemed to be allowed because it was deemed politically acceptable, and possible evidence that we are not alone in the universe.

That was the bad news.

Don't get discouraged! There is some good news as well.

Here in Oregon, we faced some tough challenges for sure, but there were some very notable positives that came out of those challenges.

There is a group of people, just regular people, citizens, neighbors, that have been credited for saving the town of Molalla from burning down. This "Redneck Fire Crew" was made up of local people volunteering their time and resources to help their community. One community member was quoted as saying "In general, this was just some damn good-hearted men and women who saw there was a job that needed to get done and they did it."

There are numerous stories of water districts and municipalities offering any personnel and resources they had at their disposal to help the communities affected by the fires. There are numerous stories of people who had lost their homes and all their possessions giving what little they had left to help their neighbor. There are stories about people like Matias Mendez and his crew at the City of Phoenix who made the tough call to evacuate in place and are credited with saving critical infrastructure when the fast-moving fire burned right around them.

Yes, there is a lot of negative these days, but we don't have to look too hard to find some bright spots in an otherwise dismal news day. For my part, I will continue to look for ways in which I can positively affect the lives of my family, my community, my state, and my country.







#### by Keith Bedell, Wastewater Technician

What types of pumps do you have in your system?

There are two main types of pumps, dynamic pumps and positive displacement pumps or PD pumps. "Dynamic pumps are a type of velocity pump in which kinetic energy is added to the fluid by increasing the flow velocity. This increase in energy is converted to a gain in potential energy (pressure) when the velocity is reduced prior to or as the flow exits the pump into the discharge pipe."<sup>1</sup> "A positive displacement pump moves a fluid by repeatedly enclosing a fixed volume and moving it mechanically through the system. The pumping action is cyclic and can be driven by pistons, screws, gears, rollers, diaphragms, or vanes."<sup>2</sup>

Dynamic pumps are centrifugal in nature with the fluid entering the volute and being discharged by the impeller at an increased velocity and pressure. They have a vertical shaft turbine which is used to lift water from a wetwell or drilled well, deep in the ground, depending on the depth and volume there can be 1 to multiple impellers or bowls on the pump. Horizontal centrifugal pumps are used to boost pressure or fill reservoirs. Submersibles are used in wastewater lift stations to move the sewage from a low spot to a higher point and are a single unit design with everything built into one housing. Submersibles can also be used in wells with the motor and pump as one unit connected to a pipe which discharges at the surface into a distribution system or reservoir.

Positive displacement pumps are used for chemicals, hazardous materials, or high viscosity liquids such as thickened sludge. Types of PD pumps are: diaphragm, peristaltic, gear, lobe and piston driven. A specific volume of fluid is moved each time the pump cycles, in a piston pump each stroke drives the same volume of fluid and with the peristaltic pump each rotation of the rollers on the tube drives the same volume of fluid. These pumps are easily adjusted for different volumes of liquid as needed by slowing down the motor speed or with shortening the stroke on the diaphragm pump, or with the peristaltic pump changing the tubing size. Now that we have figured out what pumps we have in our systems, are we doing the required maintenance, or do we just wait until they fail? Check the fluids and grease in larger pumps and motors, is the amp draw within the manufacture's specifications? On the chemical feed pumps do we have the spare parts available and on hand for when it fails, usually at the worst possible moment and in the middle of the night. Hopefully this will help us to thinking of our Operation & Maintenance program and how it is doing.

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### Season to Amend

#### by Tim Tice, Projects Manager

Growing up and gaining responsibility, parents provide daily chores for several reasons. As we get older, daily chores are modified to match a level of responsibility. The weather is changing and approaching fast, and there is a time to presume we have plenty of time. This time of the year is usually spent in preparation of the home for winter. From cleaning the gutters, the stove pipe, covering the hose bibs and draining the sprinkler system to stacking wood in the shed. Is there ever enough time?

Rhythmically, in a broader sense, we follow the seasons which dictate what tasks we attempt to accomplish and prepare for in the upcoming months. A task completed yet rarely revisited is the Operation and Maintenance (O&M) manual and the updates that are a requirement of the rule every five years [333-061-0065(4)(a)].

Subsection (5) details the documents and records portion of the rule requiring the water supplier at "community" water systems to retain specific files. Those files are:

- Complete current as-built plans
- Operating manuals general operation of each phase of water system (source, treatment, etc.)
- Data showing production capabilities of each source and system components

The list goes on to include an additional ten items that are required to be referenced in the O&M manual, this is something that we will be amending in the O&M class we present a couple times annually. So, what better time as the outside work begins to slow, to begin developing a list of tasks to complete through the winter months. One item on the list for this winter should be updating the O&M manual.

Having many conversations about O&M manuals and standard operating procedures (SOPs), I see that the most valuable section of an O&M manual would be that of the daily tasks. What is routine for us and our crew? Taken from EPA's website here is a list of daily tasks, this is not all inclusive, but a good staring point. See https://www.epa.gov/sites/production/files/documents/om\_checklisttasks.pdf.

A fantastic approach to developing a daily task list is to pause a moment and write down what we do each day, then consider the tasks that are repeated. This becomes our new updated version of the O&M manual. Maybe another time we should discuss management styles and operations, but for now, how many operators write a daily journal? This can be a useful tool in developing the daily tasks list.

Once a daily task list is deemed complete, as an operator, we should consider developing SOPs for each task in a way that a new operator can follow it and complete the daily chores. If someone is familiar with system operations, then our written SOP should allow them to perform the task. The SOP section will require more time than developing a simple list, but from classroom discussions I have discovered that most people new to a system wished they had some SOPs handed to them when they first started.

The opposite normally holds true, as it is often stated, "I was here for two weeks, and most of that time was interrupted with emergencies—I didn't receive much training!"

Whatever level of thoroughness we believe the O&M manual has, consider an annual review. If the water system employs more than one, assign SOP writing to co-workers, using their knowledge for a more precise document, review as a group and move forward. There is a bundle of information needed for a complete O&M manual and each document is unique. Routine review will only improve the document. This winter, let's renovate the O&M manual along with the SOPs that accompany it. *The best that life has to offer!* 



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# Mag Meters

#### by Bob Waller, Water Circuit Rider

In a system I worked at we had, electromagnetic flow meters, better known as mag meters. During my time as an operator, I had many opportunities to question whether the flow through these mysterious meters as accurate. We had several mag meters in our system and were required to calibrate our telemetry flow totalizer annually as part of our permit. When the company showed up to perform the calibration, my question was "how do we know the flow totals an accurate?" Apparently, I was not the only one with this type of question. From time to time, we get questions from operators about the accuracy of mag meters in their system. Well here we are, with the opportunity to write articles in the OAWU's quarterly magazine and I decided to do some research on electromagnetic flow meters. In this article I will be covering things like how mag meters work, how they are calibrated, what can cause them to go out of calibration, and ways we can verify our flows in-house.

#### How they work:

Mag meters measure flow by the electromagnetic principal. Magnetic flowmeters use Faraday's Law of Electromagnetic Induction. Two coils are located inside the mag meter housing and outside the flow tube; when powered, a magnetic field is generated over the cross-section of the tube. Two electrodes are installed at right angles to the coils. The lining on the inside of the tube prohibits short circuiting between the conductive liquid and the metallic tube. If there is no flow through the tube no electricity is generated but when liquid starts to move, the magnetic field in the tube separates the positively and negatively charged particles and they collect on the opposite sides of the flow tube walls. Now an electrical charge is formed and is transferred to the electrodes. The faster the liquid moves through the tube the more electricity is generated. This voltage is directly proportional to the flow velocity in the pipeline. With this information together with the known tube cross-section, a flow volume can be calculated into GPM, CFS or other desired units.

#### How are they calibrated:

Mag meters are not necessarily calibrated, it is more of a validation. Using field validation tools, many manufacturers will run electrical validation on the sensors. Using this method, they will say the unit is electrically sound, therefore the unit is good. Some meters use "M" Verify, which is an electrical validation tool that tests the integrity of the flow tube. There are several companies that specialize in calibration of mag meters and will set up on-site, although this can be quite expensive. Some systems will buy a specialized mag meter called a "Golden Meter." This is just a mag meter used only to verify the on-line mag meters. They may use this meter to verify many meters in the system, then send the Golden Meter to the manufacture to be recalibrated. This method may cost more upfront but can be cost effective in the long run



and if the system requires accuracy, an operator can verify any time there is a question. By using this method, we can keep the process going and calibrate in-house.

### What can cause mag meters to go out of calibration:

Mag meters are very resilient and don't go out of calibration very often; they either work or they don't. It is possible to have electrical corruption, also known as noise or grounding shorts, so most manufactures want mag meters grounded even if connected to PVC piping. Corrosion on contacts may be another area or material like grease or sludge build up on the inside of the flow



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tube which can interfere with proper current flow. This would be common in wastewater applications. The most common problem is the button pushers. Someone may get in and alter a calibration factor and/or a pipe size. The inside diameter of a mag meter is a critical part of the flow calculation and if any of the information is altered, well, as they say, "garbage in, garbage out."

When a manufacturer sells a mag meter they need to know the exact ID of the pipe where we plan to install the mag meter. They need to know the type of liquid in the pipe; keep in mind the liquid must be conductive.

Mag meters can carry chemicals, sewage, potable water, and many other types of material. Mag meters are obstruction-less and very dependable.







# System Maintenance

#### by Jeff Crowther, Workforce Development

It has been a while since I have really addressed my own system maintenance. But with prodding from my Board of Directors (which is my wife and children) I schedule a doctor's appointment for the dreaded physical. I know that it is good to evaluate our current situation as we age to protect ourselves from stress and system neglect. We assume everything is good, but there is always room for improvement. To put it simply I was told to cut down on the bad fats, oils and grease or FOG as we, in the industry, refer to it.

If you think about it the way we treat the sewer collection system, it is very similar. We tend to ignore the collection system until there are problems. The problem could be collection of fats, oils and grease (FOG) in a wetwell that causes the pumps or pump controls to fail. It may even be more serious and cause a sewer mainline blockage which can result in a backup or even a spill. These situations result in a cost to the agency in added staff time, paperwork, or bad publicity. Our goal should be to reduce the introduction of FOG into our public collection system to ensure these situations don't occur.

The best way to prevent problems with our collection system is at the source. Personally, I have been directed to reduce my intake of donuts and fast food. It should be noted that I will be reducing my FOG intake, not eliminating it. As I age, food is one of the few joys left in life.

For our publicly owned sewer system, we should also reduce our FOG as much as possible. The best way to accomplish this is at the source. Agencies should have the following in place:

A sewer use ordinance that gives the agency the authority to inspect and implement BMPs to control FOG discharges. The ordinance should also have the ability to require grease removal devices installed if the BMPs do not work and FOG discharge inhibits flows downstream.

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- During new construction, work with the local planning department and county/state plumbing officials to ensure that the appropriate and adequate grease collection equipment is installed to protect the agency's sewer system.
- The ordinance should also provide for cost recovery for damages and cleaning of the sewer caused by a specific discharger. Cost recovery may be difficult if the damages cannot be traced back to a specific source.
- If possible, have a business license program implemented. This will help identify potential sources of FOG. Don't forget that it is not only restaurants that may have issues. You should also look at schools, retirement homes, and coffee shops, to mention a few.
- Have a program to assist business owners in monitoring the pumpers when cleaning their traps and interceptors. Make sure that the business owner is getting what he paid

for, the units should be cleaned and inspected noting any repairs that may be required.

• No matter how large or small our agency, the key element in reducing FOG in the sewer system is inspection and education.

It is best to have an ongoing maintenance and inspection program that can identify problem areas so corrective action can be taken prior to a late night sewer overflow. This may include measures such as cleaning a residential line with a belly regularly until permanent corrective action can be taken.

Whether it is in our own private system or the public system, the reduction of FOG is the beginning of a long and happy life. By reducing the FOG, we can add to the longevity of the system with reduced costs and maintenance.



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# Resilience

#### by Hans Schroeder, Circuit Rider

Oh, what a year 2020 was! We have all heard the stories from our parents, grandparents, great grandparents about the great depression, polio, measles, and malaria pandemics. However, in our day and age we never thought we would have to live thru one ourselves. For some of us it changed our world completely and turned it totally upside down, losing our jobs, falling behind on our mortgage, utility, or bills in general. In many ways though 2020 was a year of teaching the main points I want to focus on the positive things it taught us like resilience, grit, determination, and strength.

It taught us resilience. What is resilience? Resilience is a word meaning to adapt to overcome what is thrown at us. Many of us grew a garden for the first time in our lives or went and bought chickens to learn to live off, what God knows, we can provide for ourselves. It may have been a short-term thing that you decided was better left to the people that know what they are doing. Some of us decided this is pretty fun I think I will try it again next year or taught our children or grandchildren something that we did as youngsters with our parents or grandparents. It also taught us to be better neighbors to share some things that were hard to find. Who would have known that toilet paper or cleansing wipes would have been something we had to barter for in 2020! We are Americans, we just take for granted that we can always go to the store for that one or two items we need, until we can't!

It taught us grit! Grit is something we must dig deep in our soul for, instead of giving up, we decide we can do this. We couldn't leave our houses for six weeks and then it could only be one person to get the essentials we needed. To many, that was so depressing; our kids or grandkids couldn't go to school anymore. We couldn't go to work; we were expected to stay home and do our work. Plus, many of us were also to become our kid's teachers when even the school didn't figure out how we were supposed to accomplish this. It took grit, not to just lay down and say forget it, there is no way I can do this! We overcame it summer, came and we had to figure out how to entertain ourselves and our kids without being able to go on vacation, the park, the swimming pool, or restaurants. We all became a little better cooks rather than running to get fast food or go to a sit down restaurant. We had to start playing card games, board games, build obstacle courses at home rather to send our kids to the playgrounds or swimming pools for entertainment. We all learned to dig down deep to get down to the true grit of ourselves and say we can overcome anything.

Determination is the thing that helps us push through the obstacles in our way. There were so many obstacles in 2020 that if we didn't have that determination, we would end up curled in a ball fearing everything. I am not saying that didn't happen to some people in America, I have some friends and family that are so scared about everything that has happened, they are afraid to leave their houses, they live in constant fear, their self-determination vanished. Most people, especially in our industry, were considered essential employees; determination helped them get through their day whether it be at work or home to accomplish things in their daily lives and push through the many struggles.

It taught us strength, Lord did it teach us strength. It taught us physical strength. Many of us were home doing that big, long honey do list that we just hadn't seemed to be able to get to in years! Including home improvement projects, cleaning out our houses, shops, barns! Getting rid of things, we no longer felt were important to us, but could probably help other people. It taught us spiritual strength. We could no longer go to our places of worship and have fellowship, it taught us the strength to dig deep into our bibles and get God's guidance directly through the source. Many of us learned how to zoom into church worship services or find someone on TV that would inspire us, that would fill our spiritual strength that we all needed through this very trying year.

Although 2020 may not have been what we envisioned, I think the year taught us some very important lessons. Get back to our roots, to our family, to God, to doing things together, that the little things are important. It also taught us technology can be a curse just as it can be a blessing. Many of us didn't lose everything because through technology we could still work from home, we could order our groceries and just have them brought out to our car. It also taught us to put down the technology and do things together as a family to build those memories for we may never have another chance to do today over again. So here is looking forward to a great 2021 and God Bless.



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# **Trying Times**

#### by Donna Bernt, Administrative/Financial Assistant

Here we all are, wishing the coronavirus was gone, and then we get hit with another life-changing occurrence.

We did not think the fires would get so close to where all of us live. They start in the forests, right??

Lightning strikes, people are careless with fires, or someone drops a cigarette.

I have not seen smoke like this in Oregon's western cities, or the coast in a long time. It is everywhere.

I remember when Mt. St. Helens erupted, and the ash was everywhere, just like it is now.

So many people are left homeless, losing their homes and everything they have. There are not enough places for the homeless we usually have in Salem, but now, our neighbors, our family and friends are trying to find places to stay or find everyday supplies to get them just through the day.

We learn quickly that life has changed. We might be without power, the fire could be at our door, but we might also find that our neighbor or a complete stranger will help us get to safety, give us water and food, help find a place to stay, and if nothing else, listen to us talk about what just happened.

When I thought I would have to leave my home, I thought of my sister and a friend that have nowhere to go, other than my house, but my son and daughter in-law came to the rescue and invited all three of us to their house. In times like this, it does not matter what troubles we had with a person, they put that aside and open the door. Then, my son got notice that they might have to evacuate. Luckily, we were able to stay at my house. Things can change in just a minute of time.

In all this we learn that people are more important than things, no matter what. I did not care what was in the house, as long as we all got to safety. I had my bag and a picture of my kids, 2 cases of water and 2 other people to take with me.

When the smoke cleared after a great rainfall, I was thankful. Never wanted rain as much as I did that week. We might complain about the weather, but we were all scared when it came to fire, with the uncertainty of tomorrow at our doorstep.

Hopefully in the New Year, we will have good air, a vaccine for the virus, plenty of necessary household supplies, and jobs. Take care everyone!



### Advancements in Satellite Communications Will Soon Change Small Rural Cities

#### By Rick Patton, Advanced Control Systems

While small rural cities have long been a refuge for their residents from the hustle and bustle of the big city, there are changes coming in satellite communications that will bring high speed internet connectivity to small towns. While the rural residents might, at first glance, believe this to be undesirable, there may be a silver lining.

**Positives of being in a rural city** Being a representative for a Supervisory Control and Data Acquisition (SCADA) engineering and controls firm, I have enjoyed many opportunities to travel to and conduct business with rural cities. I have looked forward to getting out of the range of cellular and internet services and kick it down a notch or two. I enjoy the culture, friendliness, quiet and room to stretch.

**Challenges in a rural city** Being remote can pose challenges. There are ever increasing motivations for young people to be enticed by the big city's promise of opportunity and prosperity. In rural Cities without high-speed internet, it is difficult if not impossible to obtain an education beyond a high school diploma. Once a college graduate, connectivity is also required to work from home.

It can also be costly and slow to get internet, computer, SCADA, controls or virtually any other type of technical support services due to trip charges and scheduling latencies from service providers.

**Enter satellite communications** In 2015 plans were announced to develop and deploy a low earth orbit (LEO) communication satellite network that would provide high speed internet capability to unserved and underserved areas with speed and affordability comparable to hard-wired urban services. Multiple orbital "shells" will be located at various altitudes with an FCC mandated 2200 satellites deployed by 2025 and full deployment of 12,000 satellites by 2030. As of the date of this publication there are about 500 satellites deployed. Long range estimates indicate the possibility of up to 42,000 satellites being deployed in multi-orbital LOE shells.



1584 satellites in 72 shells at 22 per shell

Why is this happening? Access to high-speed internet is becoming increasingly essential to daily life as more applications and activities move online. This has become particularly apparent during the coronavirus (COVID-19) pandemic, as employers in some sectors transitioned many of their workers to telecommuting and schools migrated their students to distance learning.

There are rural areas unable to access high-speed internet referred to as the "digital divide." Federal agencies such as the FCC, the NTIA and the USDA have directives to bridge the digital divide in small rural cities. Grant and loan programs have been created and States are also developing their own broadband programs and initiatives. "High speed internet...is a necessity, not an amenity..." as stated by Secretary Sonny Perdue of the USDA. The USDA made available \$600 million, \$200 million and \$550 million in grants and loans for rural broadband expansion in 2018, 2019 and 2020 respectively.



Falcon 9 Spacecraft Deploying 60 LEO Satellites

What does it mean for the rural city? With reliable high-speed internet, rural cities will change. Whether the change is good or bad, I'll let the reader be the one to decide. I'll just list a few things that come to mind.

On one hand...

- Native youth can obtain a secondary education through distance learning and have an option of making a career in their hometown utilizing internet telecommuting.
- Internet cloud hosted services can make it inexpensive and convenient to get internet, computer, SCADA and controls technical support and services due to remote internet access and software as a services (SaaS) solutions.
- Enhanced connectivity options through services like FaceTime and Zoom can enable meetings with employers and clients, as well as keeping in touch with family and friends.



Cloud-hosted SaaS SCADA controls on computers and mobile applications

#### On the other hand...

The possibility exists that small city populations could grow due to urban-to-rural migration. Currently, such a trend has not begun in the United States, but there are some indications that the pendulum may start swinging in that direction, albeit slowly. Migration from California, Texas, etc. into Boise, Idaho comes to mind. With the advent of high-speed communications in small towns, there may be professionals who will opt to leave the hectic, expensive big city for the quiet and affordable rural country life.

#### About Advanced Control Systems

ACS is celebrating its 28th year providing process automation and SCADA system integration solutions to Asotin County PUD, City of Payette, City of Nez Perce,



and scores of other municipalities, agencies, and manufacturers. ACS is the developer of CarefreeSCADA<sup>™</sup>, a cloud-hosted SCADA application. For information on cloud-hosted SCADA, contact Rick Patton at rick@ advancedcontrol.com, or go to http://advancedcontrol.com/carefree.



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### Municipalities' Duty to Water Users Home and Away

As we wrote in the Spring 2020 issue of *H2Oregon*, municipal entities in Oregon are able to provide water outside the limits of their typical jurisdiction under Oregon Revised Statute ("ORS") 540.510(3)(a). This allows cities to sell excess water in bulk to users or wholesalers outside their boundaries. For example, the Portland Water Bureau has contracts with 19 wholesale clients, including other cities, private companies, and water districts (https://www.portlandoregon.gov/water/article/124010).

Cities generally owe certain kinds of duties to water users within city limits, including maintaining infrastructure, ensuring adequate water quality, and funding obligations. See *Richards v. City of Portland*, 121 Or 340 (1927). Some of these duties do not apply to bulk water sales to nonresident entities, like water associations, drinking water districts, individual landowners, or other cities. This raises the question: what is a city's duty to out-of-jurisdiction buyers compared to its duty to its own residents?

#### **Duty of Water Delivery**

Generally, cities have a duty to supply water to the places of use described in their water use right permit or certificate. As cities grow, the city limits expand, and Oregon law provides municipalities may provide water to lands to which a water use right is not appurtenant. ORS 540.510(3)(A)-(C). This statute allows a city to use water outside a designated place of use if the water use continues to be used for municipal purposes and would not interfere with or impair prior vested water rights, which includes surplus water sales to nonresident entities. Here, "municipal water use" includes domestic, industrial, commercial, and some types of irrigation [Oregon Administrative Rule ("OAR") 690-300-0010(29)].

For sales of surplus water, a city's delivery duties are determined by the terms of the city code and the terms of the individual contract. In Richards et al. v. City of Portland et al., the Oregon Supreme Court identified that a city has the authority to dispose of surplus water as long as the officials do not "barter away that which is in the nature of a public trust." Since the system "was constructed primarily to serve those who paid for it," the city cannot be compelled to provide water to purchasers at the expense of its own residents. Therefore, while a city may sell surplus water, its duty to deliver water to its residents takes precedent to its duties under water delivery contracts. Similarly, the court in Yamhill Elec. Co. v. McMinnville found a city cannot be compelled to provide water to nonresidents and must not do so at the expense of providing water to its own residents [130 Or 309 (1929), cert den 280 U.S. 531 (1930)].

#### **Duties of Water Quality**

A city may also be required to maintain water quality for surplus water sold outside its service boundary just like its duties to its own residents. According to the Oregon Health Authority ("OHA"), water providers must "take reasonable actions to assure that water delivered to *water users* does not exceed maximum contaminant levels, to assure that water system facilities are free of public health hazards, and to assure that water system operation and maintenance are performed" OAR 333-061-0025 (emphasis added).

Because the OHA rules are not specific as to whether the "water user" is a city resident or surplus water purchaser, this duty might not be assignable in the water delivery agreement. Therefore, a municipality's duties related to water quality appear to apply equally to resident and nonresident customers.

#### **Duties to Maintain Infrastructure**

The duty to deliver water, maintain infrastructure, and fund improvements for city residents derives from the city's fiduciary relationship to its taxpayers. Within city limits, the city is often the primary water provider and has a duty to maintain its own infrastructure as part of providing the service and its fiduciary duties to its residents.

In contrast, the duty to deliver water and maintain infrastructure outside the city limits is established by the terms of the contract with the nonresident entities. For example, In Aspgren v. City of Columbia City, 34 Or.App 991 (1978), the city entered into a contract with landowners outside its jurisdiction to exchange installation of a water line for a property to site a reservoir. The agreements and recorded deeds included the right to receive water from the new water line, but the agreements were silent as to repair and replacement costs. The city installed the pipelines and occasionally provided some maintenance of the lines outside the city limits. Over time, the pipeline fell into complete disrepair. These nonresident customers sued the city to require them to repair the lines, but the court found the city's contractual obligations did not require the city to repair the water lines and their fiduciary obligations effectively ended at the edge of city limits.

Schroeder Law Offices, P.C., was founded by Laura A. Schroeder and represents water-rights clients in six western states and consults internationally. This article was drafted with the assistance of Jakob Wiley and Drew Hancherick. You can read more about this topic and other water rights issues at Schroeder Law Offices' Water Law Blog, http://water-law.com/home/blog/.

# 2021 TRAINING & EVENTS

February 23Math for OperatorsSalem0.4 Water/WastewaterFebruary 23Preparing for a W System Survey & WW System InspectionSalem0.3 Water/WastewaterFebruary 23Understanding Requirements for WMCPSalem0.6 Water/WastewaterFebruary 24Confined Space & Job Site SafetySalem0.6 Water/Wastewater/OnsiteMarch 1Effective Utility ManagementSunriver0.6 Water/WastewaterMarch 1Emerging Contaminants PFOS WorkshopSunriver0.3 Water/WastewaterMarch 1Cross Connection Specialist UpdateSunriver0.6 Water/WastewaterMarch 1-543rd Annual Management & Technical ConferenceSunriver3.0 Water/WastewaterMarch 17Water & Wastewater Treatment/Collections Certification ReviewSalem0.4 Water/WastewaterApril 6-7Water Treatment, Water Distribution Certification ReviewSalem1.4 Water/0.5 Wastewater/OnsiteApril 6Understanding Requirements for WMCPSalem0.6 WaterApril 6Understanding Requirements for WMCPSalem0.3 Water/Wastewater/OnsiteApril 7Lock Out Tag Out Safe OperationsSalem0.3 Water/Wastewater/OnsiteApril 7Confined Space & Job Site SafetySalem0.3 Water/Wastewater/OnsiteApril 7Confined Space & Job Site SafetySalem0.3 Water/Wastewater/Onsite	ТВА ТВА ТВА ТВА ТВА ТВА ТВА ТВА	Fee Fee Fee Fee FREE FREE Fee Fee
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Levels 1–4 Water Operator Exams

Trained and certified operators are necessary to ensure that the systems are managed in a manner that fully protects public health and the environment. The OARs for certification stipulate that the qualifying experience for applicants for certification as a water treatment plant operator must attain at least half the required operating experience at a public water purification plant that uses complex filtration technology and is not more than one classification lower than the level of certification they are seeking. In other words, if you have only worked for a Class 2 treatment plant, we allow you to apply for a Level 3 certification but not a Level 4 certification. If you move on to a Class 3 plant, then you must have ½ the qualifying experience (at the Level 3 juant) before allowing to apply for a Level 4 certification. For additional information, please visit http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/OperatorCertification/Levels1-4/Pages/exams.aspx

Drinking Water Data Online https://yourwater.oregon.gov

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https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/Pages/index.aspx

Training class dates, class topic and/or locations may be subject to change as needed.

For more information on any class by OAWU, please contact the office at 503-837-1212, office@oawu.net or visit www.oawu.net.



# Post-Wildfire VOC Sampling Guidance

#### Oregon Drinking Water Services • September 2020

When a wildfire happens, in special circumstances, water system piping and infrastructure may be contaminated with benzene and other volatile organic chemicals (VOCs). This type of contamination appears to occur when several factors line up:

- Depressurization coupled with open or burned water lines.
- Entry of smoke into open water lines.
- Heating and burning of plastics and synthetic distribution materials.
- Timing of the above factors

If contamination is suspected, water systems should immediately unidirectionally flush their water lines as soon as possible. Unidirectional flushing is where flushing begins at the source (well, treatment plants, etc.) and is flushed downstream through the distribution system "chasing" the bad water out with good water to the ends of the distribution system and out any dead-end lines. Multiple cycles or continual unidirectional flushing is strongly encouraged.

Customers should also be advised to flush their household plumbing in a similar "unidirectional" manner, including all sinks, outside hose bibs/faucets, and showers (VOC's can be dispersed in the air during showering).

There is generally no way to tell where contamination occurs without performing VOC testing. Each situation is unique and should be evaluated individually. If water systems are faced with direct impact from wildfires, consider the following four scenarios to determine how to respond:

#### Structure loss (or physical damage) with depressuriza-

**tion:** This unique situation requires extra caution. Water systems experiencing this may be at risk of VOC contamination and should immediately unidirectionally flush their water system when repressurizing and refilling water lines (to limit potential contaminant migration). A Do Not Drink- Do Not Boil notice should be issued until repeated sampling indicates that the system is free of contaminants. The system should sample for coliform bacteria, and disinfectant residual. In addition, VOC testing using <u>Method 524.2</u> is highly recommended.

Structure loss (or physical damage) with pressure

**maintained:** Damage to water system components could cause localized contamination. Physically damaged system components should be immediately isolated and replaced (when possible); unidirectionally flushed (multiple cycles preferred); and assessed on a case by case basis as to whether VOC sampling should be performed.

#### No structure loss (or physical damage) with depressur-

**ization:** Contaminants could have entered empty water lines through tanks, cross-connections, or unidentified leaks (ex. smoke, ash, auxiliary water supplies, groundwater contaminants, etc.). The system should issue a boil water advisory and immediately unidirectionally flush upon repressurization (multiple cycles preferred), assess the system, and perform necessary water quality sampling, including coliform bacteria, disinfectant residual and physical parameters such as pH and temperature. Customers should be advised to flush their household plumbing once results show an absence of coliforms.

No structure loss (or physical damage) with pressure maintained: If normal operations were maintained and no physical damage occurred, it is unlikely the water system was contaminated. If the water system was unattended for some period (e.g., under evacuation), it may be advisable to collect baseline water quality samples (coliform bacteria, disinfectant residual, physical parameters) – these samples could help to identify any unanticipated problems.

**Note:** Even without pressure loss, if there is physical damage to any water system components, the water system may wish to sample for VOCs. Experimental data has shown that heating and burning of plastics can contribute to VOC contamination. Pipelines or water system components that are heated or physically damaged by fire should be removed and replaced as soon as possible, however, consider the need to meet fire flows and/or consult with the local fire department when scheduling repairs. Unidirectional flushing is encouraged as much as possible in all circumstances.

**Sampling:** If contamination is possible, design a representative sampling plan to perform an initial investigation. Water mains, appurtenances, and service lines should be evaluated. When depressurization occurs, service lines serving destroyed structures should be either sampled for VOCs (until determined to be free of contaminants) or replaced. The sampling plan should be adjusted as results come in.

**Conducting VOC Sampling:** VOC sampling following a wildfire requires a specialized method of VOC sampling. It takes time for contaminants to desorb from the pipes and dissolve back into water, so a period of stagnation (no movement or flow of water) is needed. Experimental data shows that 72 hours is the optimal stagnation time; however, 24 or 48 hours may be used as an initial indicator. Community systems serving less than 3,300 people that are not able to fund these analytical costs may be able to utilize the Oregon DEQ lab for this testing at no cost. Contact your drinking water regulator to inquire about lab support. Instructions for Specialized VOC Sampling: Use an Environmental Laboratory Accreditation Program-certified laboratory for VOC analysis (Method 524.2). If water is chlorinated, discuss with the laboratory using a dechlorinating agent (ascorbic acid preferred). Perform at least one round of unidirectional flushing prior to collecting samples. Stagnate water for an appropriate amount of time. When collecting a screening sample to determine if VOC contamination has entered the distribution system, flush the sample point for a few minutes until the water becomes cold or reaches a steady temperature prior to collecting the sample so that it represents water from the distribution system piping. When collecting a sample to determine if an individual service line is contaminated with VOCs, flush enough water to avoid sampling fittings, gaskets, etc. by discarding at least 1 cup of water prior to collecting the sample. Take care to fill the vial using a low flow of water, and do not to overfill the sample vial, so chemicals inside the vial don't spill out.

For technical assistance or any questions related to post-fire impacts or operations, contact your drinking water regulator or Drinking Water Services phone duty at 971-673-0405.

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Oregon Association of Water Utilities

### Maintaining Your Well After Wildfire

This handout identifies a number of issues that may occur with water well systems following a wildfire and provides a list of contacts and resources.

#### **Electrical Hazards**

Exposed electrical wiring to the well poses a significant safety hazard due to the potential for electric shock.

There is the potential for an electrical short to the metal casing or other infrastructure at the wellhead.

Fix damaged or exposed wires and other electrical issues prior to restoring power to the site, attempting well repair, or touching the well or wiring. Contact a licensed contractor authorized to work on water pumps or electrical to inspect or repair the wires. Flag the area at a safe distance as a warning to others until repairs are made.

#### **Dug Wells: Falling and Drowning Hazards**

Wells that are dug into the ground (instead of drilled) tend to be old and landowners may be unaware that such a well exists on their property. Well covers can be damaged by fire. People and animals can become trapped or injured by walking on a weakened well cover that collapses, or by accidentally falling into an uncovered well. Some dug wells also contain water and may be a drowning hazard.

The Oregon Water Resources Department (OWRD) can provide technical assistance to help abandon dug wells to prevent safety hazards and groundwater contamination. If the well is still in use, inspect and replace the well cover if damaged. Until the cover is repaired, place barricades around it to prevent animals and people from falling in.

Similarly, if you discover what appears to be a sinkhole or an open hole, barricade the area around it, as it may be a dug well. Do not push debris into the hole, as this can lead to groundwater contamination. Contact your local OWRD well inspector as soon as possible.

#### **Drilled Wells and Water System Damage**

Some drilled wells may be damaged by wildfire. For example, most domestic wells have steel casing that rises at least one-foot above land surface. Within the well, PVC liners, a sanitary seal with rubber gasket, or PVC pipes may be melted or damaged. Outside of the well casing is the well seal. The seal may be damaged by the fire and could allow surface contaminants to flow into the groundwater. Well houses, pipes, pressure tanks, and storage tanks should also be inspected for damage.

If a well was burned or damaged by fire, contact an Oregon licensed well constructor or licensed contractor authorized to work on water pumps to assess the damage.

Water wells drilled since 1996 have stainless steel ID labels attached to the well casing. If the label is not attached, re-attach it to the well casing using a steel band. If the label cannot be read, request a new label from OWRD.

#### Water Treatment Damage

Water treatment systems such as filters, tanks, and treatment systems may be damaged. Contact a water treatment professional to inspect and repair the system.

#### **Contaminants and Water Testing**

Chemicals can get into the water if the well, piping or water system is damaged, or if chemicals and contaminants from above ground seep into the ground and into the groundwater. In some instances, chemicals may also be a problem when a system is depressurized. Dug wells that are uncovered may also be contaminated with debris or ash. Visit the Oregon Health Authority's website for more information on potential contaminants: https://go.usa.gov/xGueZ.

It is recommended that you have your water tested before use. Contact a water treatment professional, licensed contractor authorized to work on water pumps, or licensed well constructor to investigate treatment options. In addition, if you use water from a dug well, have a professional clean out your well before use.

> Oregon Water Resources Department <u>www.oregon.gov/OWRD</u>



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# QUIZ CORNER

- If the chlorine demand is 4.5 mg/l and 1.5 mg/l residual is 1. required, how many pounds of chlorine are needed for a flow of 7.5 MGD?
  - A. 375 pounds B. 414 pounds
    - C. 554 pounds

D. 673 pounds

- 2. A wastewater treatment plant has a spray field that is 10 acres. The plant's permit states that only 3 inches of water can be applied to the field. There are 43,560 square feet per acre. How many gallons can be applied to the spray field?
  - A. 621,118 gallons
  - C. 757,472 gallons B. 670,225 gallons D. 814,560 gallons
- 3. What is a rotameter?
  - A. A device to measure liquid or gas flow rate
  - B. A device to measure axial tilt on a pump shaft
  - C. A device to measure pump windings
  - D. None of the above
- 4. What is the disinfection condition when all the chlorine demand is satisfied?
  - A. Break point
- C. Chloramines

D. Pollution prevention

- B. Non-demand D. Total residual
- The State Revolving Fund is not designed to fund: 5.
  - A. Infrastructure
  - improvements B. Facility replacement
  - C. Rate analysis

- 6. The Red Flag Rule:
  - Requires utilities to report any hazardous chemicals kept A. on job sites.
  - B. Requires utilities to develop an identity theft protection program.
  - C. Establishes a warning system for hazardous spills that may contaminate drinking water supplies
  - D. Requires utilities to implement a watershed protection program.
- 7. What percent of the earth's water is fresh water? A. 15% C. 10%
  - B. Almost 20% D. Less than 5%
- Diameter of a Pipe in inches times itself and then divided 8. by 24.5 will give you gallons per foot in that size of a pipe? A. True B. False
- 9. A water tank can stratify because warm water is less dense than cold water and so can remain on top unless it is forced to mix. A. True B. False
- 10. The chlorine demand of your raw water is 3.8 mg/L. If you treat 755,000 gallons of this water with 35 pounds of chlorine gas, what will the chlorine residual be? A. 5.5 mg/L C. 2.5 mg/L
  - B. 1.75 mg/L D. 9.3 mg/L

WRNERS: 1-V' 2-D' 3-V' 4-D' 2-D' 9-D' 2-D' 8-V' 3-V' 10-B

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Phone:			
Contact Person:			
Number of Hook-up	s:		
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Type of System:			
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