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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.

Member Only Benefits

by Jason Green, Executive Director

Since 1977, your association has been about serving members – in fact, OAWU has a reputation for assisting any water or wastewater utility in Oregon. OAWU's greatest assets are the members and the association staff. The focus has predominately been onsite training and technical assistance, free and for-fee classroom training, annual conferences and legislative representation locally and at the national level by NRWA. Through the dedication and support of the membership and leadership of the board of directors, OAWU has continued to grow in all areas.

OAWU currently has twelve full-time employees and thirteen board member representatives throughout the state. A very successful in-the-field technical assistance and training program, and representation built around dedicated hard work, great member services, trust and genuine personal relationships – OAWU is who the operator and manager turns to today. This growth and support of the association has led to additional opportunities to serve members and the recent office and future training facility purchase in Independence. The association has plans to build a formal classroom and hands-on training facility and expand existing training topics/courses. The training will consist of general operations and specialized topics, and include tracks for the rookie, seasoned veteran and manager. OAWU will continue to offer the valuable free or no-charge training throughout the year.

OAWU was formed by systems, cities and water industry professionals and suppliers for their own benefit – to belong and be a part of a professional association, receive services, training, technical assistance, representation, support, outreach and informational connections with other professionals in the industry, camaraderie and conferences, etc. – these are invaluable benefits. Your continued support and membership of your association is vital – you are key, every system and city member is key to OAWU's success and future.

Through the years, OAWU members have requested services that were beyond our scope of service, or we once thought. As the board of directors and OAWU staff considered these requests, it became a challenge and later a goal to provide the services requested – that is what an association is about! OAWU now provides a number of Expanded Services specifically designed to meet your needs and with very substantial cost savings.

Several examples of OAWU Member Expanded Services are:

- Water and Wastewater Rate Studies
- O & M Manuals and Written Plans
- Wastewater Lagoon Profile Studies
- Water and Wastewater Tracer Studies
- DRC Services and System Operations, Management and Inspections
- Health and Safety Plans, Training and Consulting

Interested in a Rate Study or other service? Contact OAWU for a scope of work and estimate. Visit with a member system and ask about the great level of personal service, follow-up and report or product received. An association knows how to serve their members, it's the value and protection of an association - membership does have great benefits!





Filter Bed Expansion Tips

by Heath Cokeley, Circuit Rider

For my magazine article this month I wanted to share with all of you a very informative article on filter bed expansion tools. Evan Hofeld of the Oregon Health Authority wrote this article and was nice enough to allow me to re-print it in H2Oregon and share it with all of you. I will be building several of these filter bed expansion tools and if you would like to give one a try just call up one of your Oregon Association of Water Utilities Circuit Riders and Scott, Hans or myself will be happy to come out with one of these tools to use on your plant. —Heath

FILTER MEDIA EXPANSION STUDY

The goal of an effective backwash is to expand the media sufficiently (> 20%) in order to flush particulates out of the filter bed so that head loss can be restored to as near to "clean bed" specifications as possible.

You can make a tool that assists in measuring how well the media is expanded during a backwash using the following materials:

- 1 telescoping painter's pole
- 1 snap pin
- 1 flat washer
- 2 O-rings
- 1 5-gallon bucket lid

You will need to drill a hole through the threaded end of the painter's pole for the cotter key and cut the rim of the 5-gallon bucket off as shown in the pictures to the right. A flat edge allows the tool to be held close to the filter wall away from the surface wash arm. See illustrations at right and on facing page.

Conduct the study as follows:

- 1. Turn the filter to be evaluated off.
- 2. Place the bed expansion tool into the filter so that the disk rests directly on top of the media.
- 3. Adjust the top O-ring in place so that it is even with the top of the filter wall (or other reference point) and remove the tool from the filter.
- 4. Begin the backwash sequence
- 5. Towards the end of the high rate backwash, lower the bed expansion tool





Oregon Association of Water Utilities

and Tools

into the water to the point where the disk is just above the churning media (you should only be able to see a slight amount of media occasionally floating over the bucket lid).

- 6. Adjust the bottom O-ring so that it is level with the top of the filter wall.
- Measure the vertical distance (H) between the O-rings as shown in the diagram to the right.
- Determine the expandable media (no gravel) depth using design records or field measurements.
- 9. Calculate the bed expansion using Table 1 on following page or as shown here: H = 7 inches (measured) D = 30 inches (sand & anthrasite depth) % Expansion = 100% * (H/D)
 % Expansion = 100% * (7/30) = 23% Expansion should be 20% or more.
- 10. Conduct this test in multiple parts of the filter to identify "dead zones".

HELPFUL HINTS

Creating the bed expansion tool:

- 1. Consider the durability of the materials you use (e.g., consider purchasing a stainless steel washer and snap pin).
- 2. The telescoping paint pole should capable of extending enough to allow you to safely lower the pole to the top of the resting media and adjust the O-rings as needed.
- Marking the pole at various locations (every 6 inches) using a permanent marker will help when performing the study.
- 4. Using a white bucket lid or disk helps you view the disk better (similar to a secchi disk).



Diagram of Filter Bed Expansion Tool and photo of tool in use.

- 5. White 5-gallon bucket lids (without the buckets) can be purchased at most home improvement stores.
- 6. Purchase extra O-rings as these will begin to crack and can split over time.

Before you begin the test:

- Inspect the pole, bucket lid, snap ring, washer and O-rings before you begin. The O-rings will crack and can split over time. Make certain that nothing will fall off during the test.
- 2. Use of a high power cordless spotlight can help you see the white disk while measuring the expanded bed.
- 3. Use a straight edge extended horizontally from a fixed location to the expansion pole to take your measurements. Use the same fixed location for both the resting and expanded bed measurements.
- 4. Expandable media depth includes depth of GAC, anthracite, sand, and/or high density sand such as garnet. It does not include gravel. A 0.5-inch diameter metal rod can be used to probe the filter bed to the gravel layer while the filter is drained to measure the media depth (works well for filters with gravel support layer), however, you should not probe filters using

that contain fragile structures below the filter media such as plastic filter cones or subsurface air headers. According to Sanks (1978), the optimum backwash occurs at a bed expansion of approximately 40% for sand media and 25% for anthracite. A good target for bed expansion would be 20% for sand and 25% for anthracite, or above 20% for the entire mixed media bed (due to the inability to measure the expansion of the individual media layers) – see Table 1 on page 3.

During the test:

- If a filter is equipped with surface wash, do not try to measure bed expansion while the surface wash arms are moving.
- 2. You should always measure bed expansion during the high-rate wash. It's usually easiest to see the disk during the last few minutes of the high-rate wash (when the water has cleared up a bit).
- Do not collapse your bed expansion pole between the resting and expanded bed measurements. This can significantly affect your measurements.





After the test:

- 1. If bed expansion is less than the target, first examine the condition, type, and depths of the media. The media materials and depths may also have changed from the original specifications. Gently excavate about 6-inches of the top layer or core down to the support gravel in a drained filter and look for the presence of mudballs (see page 4 for more information).
- 2. If results identify that the backwash rate may need to be adjusted upward, use caution when adjusting backwash rates. Gradual ramping is recommended. Be sure the bed is not expanded too much such that media is lost through the backwash troughs.
- 3. Bed expansion will change with temperature changes. Therefore, you should collect bed expansion measurements at least seasonally. Backwash flow rates may need to be seasonally adjusted depending upon the viscosity of the water.
- 4. Measure bed expansion in a few different locations within the filter. Measuring various locations can provide you with a better understanding of the distribution and effectiveness of the backwash. It can also aid in the identification of dead zones in the filters, which can indicate problems with the backwash or underdrain systems.
- 5. Keep track of quarterly bed expansion measurements at various locations for each filter in a spreadsheet for graphing and look for trends (e.g. seasonal fluctuations). Trending raw, settled, and filter effluent turbidity can also reveal the onset of problems and identify areas for improvement. Sudden changes or gradually declining expansion rates or increasing turbidities can signal the onset of problems. For ease of graphing, the bed expansion spreadsheet should be of the form shown at the bottom of the facing page.

ADDRESSING MUDBALLS

Mudball formation can lead to more serious problems if not addressed. The most typical causes of mudball formation are inadequate backwash rates, uneven backwash flow distribution, ineffective surface wash and/or improper chemical dosages, which can lead to floc carry-over and fouling of the filter media. Mudball formation is heightened by the use of polymers such as coagulants or filter aids. Mudballs can usually be detected as they grow to the size of a



pea, although they can grow to as large as 1-2 inches, or bigger. Large mudballs can sink into the filter bed causing the filter to have areas that do not filter ("dead zones"). This causes the remaining areas of the filter to filter more water than the designed rate, which increases the filter's potential for turbidity breakthrough. As the available filter area is increasingly blocked by mudballs, the filter run time will decrease. Continual deposition of mudballs may lead to areas in the filter that have solidified completely. A few simple activities that can be done to address medballs are listed below.

Low-rate backwash straining: While the backwash rate is very low (just enough to fluidize the bed and without the use of sweep arms), use a strainer basket to sieve mudballs out of the reachable media.

Garden rake: Using a common stiff-tined garden rake during filter backwash (after the sweep arms have stopped rotating) can help break up mudballs.



Pressure washing: with the water level in the filter reduced to one or two inches above the surface of the media, pressure washers (80 - 90 psi) may be used to agitate the media and break up mudballs.

The final backwash should be monitored for turbidity to ensure that the filters are sufficiently cleaned prior to being put back into service. It may be necessary to conduct multiple "normal" backwashes or extend the duration of backwash before putting the filter back into service. ♦





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Table 1 can be used to identify the bed expansion in inches that would be anticipated given a target bed percent bed expansion. To use the table, find the depth of expandable media (e.g. sand and anthracite - no gravel) in the far left hand column. Then follow the row across until you get to your target expansion. Follow the column up to see the number of inches you should observe when conducting the study. For example, if you have 30 inches of expandable media and are targeting 30% expansion, you would expect the media to expand about 9 inches (H = 9 inches). The chart can also be used to determine the percent expansion given the depth of expandable media and the measured bed expansion in inches (e.g. given 30 inches of sand and anthracite and measured expansion of H = 6 inches, the percent expansion is 20%).

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Date	Filter 1 - Water Temp (deg C)	Filter 1 - Backwash Rate (gpm/ sq ft)	Filter 1 - North Wall Expansion	Filter 1 - South Wall Expansion	Filter 1 - East Wall Expansion	Filter 1 - West Wall Expansion	Filter 1 I Side W n Averag Expans	- all e sion	Filter 1 - NE Corner Expansion	Filter 1 - NW Corner Expansion	Filter 1 - SE Corner Expansion	Filter 1 - SW Corner Expansion	Filter 1 - Corner Average Expansion
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							- 5%					-Filter 1 - SE	Corner Expansion

Filter 1 - SW Corner Expansion

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epbpe@4bengineering.com	www.4bengineering.com



Certification Review and Filter Endorsement

by Scott Berry, Circuit Rider/ Programs Manager

With the first round of Certification Review classes now over this year, we are beginning our plans for next year's classes. With the State certification exams moving more and more towards a computerized test that can be taken almost any time, we will more than likely be separating our certification review classes to a quarterly schedule. We will continue to offer the classes at several locations around the state.

We are in the planning stage for a new addition to our Certification Review class line-up. We are in the process of planning and formatting a Filtration Endorsement class. The FE certification review class will cover several of the topics we currently speak about in our other classes but will cover them a bit more thoroughly.

If you are taking a Filtration Endorsement test this year, here are some areas you will need to study:

COAGULATION/FLOCCULATION

- Math chemical dosage and solution strength calculations
- Chemistry basic coagulation (pH, alkalinity, colloidal charge neutralization), seasonal changes
- Laboratory procedures equipment, glassware, titrations, sampling protocol
- Jar testing preparation of stock solutions, procedure, evaluation of results
- Coagulants/Flocculants types (alum, polymers, activate silica, bentonite clay, etc.), chemical feed pump O & M, purpose, how to manipulate, health concerns of polymers
- Rapid mix/Flocculation purpose of, process control, types of mixers/flocculators, chemical addition points, flash mix, paddle speeds
- Normal/Abnormal Process Conditions – procedures/response
- Enhanced Coagulation goals, process optimization to achieve

SEDIMENTATION

- Theory process description, process performance considerations, short circuiting
- Basins zones, types, layout, sludge handling/ equipment
- Math detention time, basin weir and surface overflow calculations
- Normal/Abnormal Process Conditions – procedure/response

FILTRATION

- Process description mechanisms, types of filters, filter aid polymers, pilot filters, SCM, particle counters
- Process performance considerations filter media, operation, control systems
- Math calculations for filter & backwash flow, CTs
- Backwashing head loss, media expansion (percent/rate of rise), procedure, filter to waste strategies
- Normal/Abnormal Process Conditions procedures/response
- Filter start up and shutdown procedures, air relief valves
- Process and support equipment operation and maintenance – control valves, flow meters, rate of flow indicators, headloss gauges, turbidimeters/particle counters – interpretation of results
- Filter Media inspection, preventive/corrective maintenance, surface wash, under-drains

PUBLIC HEALTH AND REGULATORY

- Public Health and Compliance why filter, Surface Water Treatment Rule requirements
- Sludge Handling regulatory permit requirement

For more information on the Filter Endorsement, you can contact any of our Circuit Riders. Good luck on your tests!

Small System Operator's Conference November 1-3, 2011 • Florence, Oregon

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December 6-8, 2011 • Hood River, OR







Sampling and Laboratory

by David Branham, Wastewater Technician

When a wastewater operator becomes certified in the State of Oregon, he or she is considered to also be a fully certified laboratory technician. Not so in many other states such as Washington State for example. In these states, the laboratory technician must be certified for each and every test they perform. You may be asking yourself, "what does this mean to me?" Well, simply said, if you are hired to be the wastewater operator of a system, any system in Oregon, you are responsible for all the sampling, laboratory tests, and test results. With that being said let's start this discussion with the importance of sampling.

Obtaining good results will depend to a great extent upon the following factors.

- 1. Ensuring that the sample taken is truly representative of the waste stream.
- 2. Using proper sampling techniques.
- 3. Protecting and preserving the samples until they are analyzed.

Decisions based upon incorrect data may be made if sampling is performed in a careless manner. The basis for any plant monitoring program rests upon information obtained by sampling.

The greatest errors produced in laboratory tests are usually caused by improper sampling, poor preservation, or lack of mixing during compositing and testing.

TYPES OF SAMPLES

The two types of samples collected in treatment plants are known as:

- 1. Grab samples
- 2. Composite samples

Let's take a look at grab samples and see when it is appropriate to use this type of sample. Bear in mind that a grab sample may be preferred over a composite sample when:

- The wastewater to be sampled does not flow on a continuous basis.
- The wastewater characteristics are relatively constant.

- You wish to determine whether or not a composite sample obscures conditions of the waste.
- The wastewater is to be analyzed for dissolved oxygen (DO), coliform, residual chlorine, temperature, and pH. NOTE: Grab samples for these water quality indicators may be collected at set times or specific time intervals.

Most wastewater plants will collect composite samples since the wastewater quality changes from moment to moment and hour to hour. The best results would be obtained by using some sort of continuous sampler-analyzer. For some of the smaller wastewater systems, it is not practical to have an expensive sampler in place. In this case, a fair compromise may be reached by taking samples throughout the day at hourly or two-hour intervals.

When samples are taken, they should be refrigerated immediately to preserve them from continued bacterial decomposition. When all of the samples have been collected for a 24-hour period, the samples from a specific location should be combined or composited together.

To prepare a composite sample, the rate of wastewater flow must be known and each grab sample must then be taken and measured out in direct proportion to the volume of flow at the time. Using this method eliminates the chance of the possibility of what is known as selective sampling.

Large wastewater solids should be excluded from a sample, particularly those greater than one- quarter inch (6mm) in diameter.

PRESERVATION OF SAMPLES

Sample deterioration starts immediately after collection for most wastewaters. The shorter the time that elapses between collection and analysis, the more reliable will be the analytical results. However, in many instances, laboratory analysis cannot be started immediately due to the remoteness of the laboratory or workload.

Oregon Association of Water Utilities

Protocol Part One of a Two-Part Series

INFLUENT SAMPLE SCHEDULE

Parameter	Sample Type	Frequency	Preservation	Holding
рН	Grab	Daily	None	No
Temp.	Grab	Daily	None	No
BOD5	Comp	2/week	Cool 4° C	24 hours
TSS	Comp	2/week	Cool 4° C	7 Days

EFFLUENT SAMPLE SCHEDULE

Parameter	Sample Type	Frequency	Preservation	Holding
рН	Grab	Daily	None	No
BOD5	Comp	2/week	Cool 4° C	24 hours
TSS	Comp	2/week	Cool 4° C	7 Days
Cl2	Grab	Daily	None	No
DO	Grab	1/week	None	No
E Coli	Comp	1/week	35° C	24 hours

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At left is a sample of a laboratory sampling schedule.

These are just examples as every wastewater plant may have its own sampling requirements, but these examples will give you a good starting place.

No matter who it is that pulls the sample, whether it is you, your helper or even the contract lab technician, it is the lead operator's responsibility to see that the samples are pulled from the proper place, at the proper time, and the holding time and preservation are met.

Series two will cover Quality Control in the Wastewater Laboratory. \blacklozenge



Oregon Association of Water Utilities



Drinking Water... from

by Jack Hills, Source Water Specialist

What do you think of drinking water from recycled wastewater? That probably does not sound very appealing to us, who live in the Pacific Northwest. We normally have a great amount of ground water and surface water available to meet our needs, or the potential to acquire rights and develop more water. Have you ever thought of tapping the recycled wastewater as a source of drinking water? Probably like me, you have heard some about it and maybe have seen some articles about it. There are volumes of information about using recycled or reclaimed wastewater. It is not a new topic but as technology changes in the water and wastewater treatment industry, so does the perspective of uses and value to using recycled wastewater.

Non-potable uses of reclaimed water have been used in agriculture and industrial applications for many years. Of course the availability of water and the cost of treatment all are important factors to the effectiveness and necessity of using recycled wastewater. If you want to look at it globally, there are a couple of general statements that are thought provoking and issues to be considered. Some thirty five (35) years ago, a Popular Science article suggested that the word "wastewater" and term "sewage" should be dropped from our vocabulary; that there is no such thing as new water. Nearly all water on the earth's surface has been used and reused in one way or another. In the scheme of the hydrologic cycle, all of our water is "used" water, and re-processed by natural means to a purified and reusable condition. In terms of reclaiming wastewater, that has been going on for years as municipalities discharge their treated effluent from wastewater treatment plants into the streams and rivers only to become the source of water supply for the next downstream city who treats it for drinking water, treats the wastewater and returns it to the river transport system for the next downstream town. So the rivers carry our waste as "transport water" and the treatment plants remove the pollutants from the water to produce "plain water."

Primary treatment of wastewater begins at the plant by removing the large objects by

screening, then removal of sand and gravel in a grit chamber followed by settling out of about half of the suspended solids in sedimentation tanks. Secondary treatment is a sped-up version of a natural purification process where the effluent from the primary treatment is exposed to bacteria that consume the organic matter and absorb some of the nitrogen and phosphorus compounds. The two main forms of secondary treatment are the trickling filter and the activated-sludge process. In the trickling filter, the sewage passes slowly through deep beds of stones on which the bacteria grow. In the activatedsludge process the primary effluent passes slowly through huge tanks that are heavily populated with bacteria where there is a steady flow of air bubbles from the bottom of the tanks to assist the bacteria in doing their job. After this secondary treatment, chlorine is added to kill the bacteria; an efficient plant can produce an effluent that is 99.8 percent pure.

The remaining two tenths of one percent is a costly and complicated amount to remove from the water. The most common of these remaining impurities consist of suspended solids, non-biodegradable organic matter, plant nutrients, inorganic substances, bacteria and viruses. Examples of these are the suspended solids that include particles of dirt and clay which can also harbor bacteria and viruses. There are hundreds of organic industrial chemicals that are harmful and pesticides that are poisonous, and material like DDT that remains in nature a long time and won't degrade on its own. Nitrogen and phosphorus, plant nutrients mainly from detergent and runoff from fertilized fields, are removed because they stimulate algae and aquatic plant growth. Nitrogen in certain forms can be harmful. Trace metals, the inorganic substances, are removed because they can be toxic, having a harmful effect on us. There is no single process that can remove all of these impurities efficiently or at any useful volume. Advanced wastewater treatment can remove these impurities in a process train that handles one or more of the impurities at a time. First the suspended solids are removed

Recycled Wastewater

by coagulation caused by adding a lime mixture. This also removes phosphorus and some of the free-metal particles. The high alkalinity caused by the lime also kills much of the bacteria and viruses. Nitrogen in the highly alkaline effluent becomes ammonia gas. Cascading the effluent over baffles with fans pulling air up through the stream, the ammonia is collected and mixed with sulfuric acid to produce a by-product of fertilizer. Carbon dioxide is then injected into the effluent to lower the alkalinity and soften the water. At this point, the effluent is very clear water and is run through a tri-media filter consisting of layers of sand, crushed coal and garnet sand to remove any remaining suspended solids, some bacteria, viruses and phosphorus. After an injection of chlorine, which will take out remaining nitrogen compounds and kill any remaining bacteria, the effluent flows to large vertical tanks of activated carbon to remove the synthetic organic compounds. The activated carbon adsorbs these organics as well as picks up bacteria and metals.

A couple methods can be used to demineralize or remove dissolved salts, minerals and organics – reverse osmosis or electro dialysis. Reverse osmosis forces water through a plastic membrane that doesn't allow the impurities to pass through. Electro dialysis uses anodes and cathodes to attract the positive and negatively charged ions of the compounds to be drawn through membranes leaving the pure water. Another method to remove the bacteria and organic compounds is ozone treatment where the ozone is absorbed into the water as oxygen, followed by another injection of chlorine to kill any remaining bacteria.

Another challenge to the drinking water treatment process is the discovery of pharmaceuticals and personal care products in our supply waters. Our ability to detect trace amounts of these contaminants in water has made us aware of their presence. Much testing and evaluation continues to determine the health and environmental impact of these chemicals. Treatment







technologies have found that removal can be achieved by advanced oxidation methods, like ozone and ultraviolet or ozone and hydrogen peroxide. Also, membrane filtration and filtration with activated carbon are considered effective.

As you can see, the process to make wastewater potable, following secondary treatment is very complex and expensive. However there are conditions, environmental concerns and situations where this does take place here in our country and around the world to meet very specific demands or requirements. Many uses of reclaimed wastewater are going into

agricultural and industrial uses which help offset the demand for the drinking water being consumed. Also, reclaimed wastewater is being used to recharge aquifers creating an underground storage for drinking water supply.

Another general statement going around is that water is going to become the oil of the 21st century. I hope not. Let's not allow the deterioration or degradation of our water supplies to occur here in our beloved Pacific Northwest by neglecting the signs of potential contaminates to our sources of water. Thus far we generally have ample amounts of source water to access either as surface water

or ground water. We need to take a good look around at our drinking water sources and be aware of what is going on that could potentially contaminate our sources. I'd hate to see the water bill that needs to pay for that complex treatment process just to make clean drinking water out of dirty water.

Most all of the Public Water Systems have a Source Water Assessment on the shelf somewhere. That is the first step towards protecting your source of supply. If you want some help in developing a Source Water Protection Plan, you know where to call, OAWU.

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Roll with the Punches

by Mike Collier, Sourcewater Specialist

Recently, my wife and I had our first child, 28 March 2011. There is no better time than during child birth to realize that we have minimal control over the events in our lives. It is important for mental health and better for our management abilities to accept this.

What do I mean by "we have minimal control over the events in our lives?" Let me explain, if I had control, my wife would not have had a ruptured membrane at 26 weeks (for those that don't know, "full term" is 40 weeks). Thank God this rupture miraculously sealed. Also, if I was in control, 30 minutes after I made the 14 hour drive back from California my wife's water would not have broken (now 5 weeks early). Exhausted from driving all day, I was forced to drive my wife to the hospital, knowing that I would not have a good sleep anytime soon. Finally, if I was in control, during labor my baby's heart rate would not have dropped, forcing the doctors to quickly apply suction and pull the baby out, breaking her collar bone in the process.

Thank God, even though 5 weeks early, Erin Elizabeth was born at 6 lbs and only borderline jaundice. We were all able to come home after 3 days in the hospital. This stressful, exhausting start to my first born's life was not my plan; embracing the things that are not in my control helped me to remain calm and be a supportive husband. It is important to focus on the positive things that are occurring during the unexpected and to roll with the things that may be perceived as bad (the punches of life). It does not help in a situation to become angry and volatile at something that cannot be changed. It would not have changed anything, except maybe negatively, for me to get angry with the doctors, my baby, my wife, or God for the way the birth was occurring.

As time goes by we often get set in our ways and don't like change. If one is rigid and unwilling to adapt and accept change, they will be lost in the shuffle. They will be the one who holds back your business and/or family. Not that all change is good change, but we must be willing to roll with any inevitable negative changes and embrace the changes that will positively affect the future. A good example is computers; they are not a fad, as many were hoping for, they are here to stay. There are plenty of negative impacts due to the computer, but computer use is an inevitable change; so get used to them, take a class on how to use them, and embrace the future.

Let's look at another scenario where we may see uncontrollable changes in our life. I have a friend who is quadriplegic. He was water skiing one day and crashed, breaking his neck. He is now left with limited mobility of his arms and no movement from the chest down. This is definitely not something that he hoped would happen. It was something unexpected and out of his control. There is a lot of bad that goes along with this disability: daily pain, much drug use and side-effects, atrophy, sores that don't heal, being reliant on others, can't regulate his body's temperature, people staring all the time, and much more. However, through this incident he has been able to encourage many others about how one must focus on the good in any situation. He knows how to understand the pain and suffering of others, has a better appreciation for life and his wife, and has more time available to serve others. I am sure he would recommend getting over the things we cannot change, look at the positive impacts, and move on with life.

In the end, you may find great joy with your own version of a healthy, strong, beautiful, baby girl; no matter the uncontrollable struggles that took place for her to get to you. You will find it is worth it in the end and often forget the bad parts of the journey. These negative parts may work to strengthen you as an individual or strengthen your relationship to someone else. Even if the parts you thought were bad don't seem to have any positive change, it is all part of the ride called "life" and will change who you are in ways you might have never thought were possible. ▲





LIFE: An Owner's Manual

by Tim Tice, Projects Manager

With so much going on, juggling multiple schedules both professionally and personally, some tasks get placed on the back burner. One such task is the articles we as an association write for our quarterly magazine. With the deadline three days ago, I decided to go to the vault and share with you some positive thoughts in an article from 2004.

I hope they provoke a pause in thought and or a smile.

Think in shades of gray; act in black and white; dream in color. Don't take success too seriously; every achievement owes something to luck. Work quietly and alone to improve yourself. No one ever confessed a shortcoming to another without lying at least a little. Be different only if you really are; working hard at a show on nonconformity wastes your ingenuity and everyone else's time. your best everyday. It will raise your standards and lift your spirits. **Leave big talk to small people.** Talk mostly of positive things. Every one has complaints, but the world is still full of large wonders and small pleasures. **Encourage other people's dreams. Don't** talk to children in a way intended to amuse adults nearby: you will be communicating with neither. **Small compliments delivered regularly** are more valuable - and more valued - than expensive gifts delivered occasionally. Go out of your way to have a friendly word for an unpopular person. **Remember that any pleasure can be ruined** by overindulgence, including hearing the sound of your own voice. ■ Your success is not dependent on someone else's failure; share what you have learned. Learn to listen. It will gain you a reputation as a brilliant conversationalist. Call someone back before it is your turn. Good manners are like good grooming; once you've formed the habit, you won't notice – but everyone else will.
Remember that there has never been any such thing as an over-night success. Genius without perseverance is wasted. Say "yes" more often. Politeness is difficult to maintain in a context of intimate familiarity. This is the principal value of frequent houseguest. ridiculing other people's clothes or tastes. No quality is more fleeting **than fashions.** It is natural and fitting to be proud of your own accomplishments, but let someone else tell the stories. we resent most are the faults we recognize most readily. how much there is to be learned from someone you can't stand. Don't ask what name a man gives to his god; ask what tolerance he offers his fellow man. in a softened manner.

There it is, words that have been read many times by yours truly, and I am still captivated at the impact and thought they create. The best that life has to offer! \blacklozenge —Mr. OpTIMist

System O&M Manuals Required

Have you completed your state-required Operations & Maintenance Manual?

Oregon Association of Water Utilities has prepared a full day class to assist operators in outlining an operations and maintenance manual per the Oregon Administrative Rule 333-061-0065 which requires each water system to develop an operations and maintenance manual.

This class will assist the water and wastewater system operator in outlining the specific points in developing the draft of the O&M manual. Step by step, each attendee will create their draft as it relates to their utility system during class. The e-file may then be completed back at the system office.

Class cost is \$150, or if you are unable to attend a class you may purchase a thumb drive with e-files for \$150.

To sign up for the August and October classes, or to have a thumb drive mailed to you, contact your Association for further information.



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What Are You Doing For S

by Hans Schroeder, Circuit Rider

In this current economic climate, we are asked to do more with less. There are shortages in revenue which affects budgets, and a qualified work force. We really need to evaluate our work conditions and costs of doing much needed projects. There are many improvements that need to be made within our systems. There have been safety and economic down turns budgeted for, but the work force has been reduced due to budget cuts also. During these difficult times there is the potential for us to become complacent to safety concerns, while trying to complete the improvements. With that said, let's have a brief "refresher" of some points that need to be reviewed before work begins.

Personal Protective Equipment (PPE) must be considered before starting projects. PPE can help eliminate hazards and can prevent or reduce injuries to workers. The Oregon OSHA standards (OAR 437-002-0123 to 437-002-0136) provide minimum safety requirements on how and when workers must use hand, face, head and foot protection. Employees working in areas where there are overhead obstacles or working around heavy equipment, such as backhoes or excavators, need to wear approved hard hats. Loose fitting clothes or jewelry should NOT be worn around moving machinery. ANSI approved eye and face protection needs to be used anytime there is a potential for an injury to the eyes or face, such as operating weed eaters, power washers, chain saws or cut off saws. Protective gloves need to be worn at all times when hands are exposed to possible cuts, abrasions, electrical hazards, extreme heat or blood borne pathogens. Shoes or boots should have proper or adequate soles for the work setting. Slick or worn out soles are not acceptable for work conditions on slopes or where traction is vital to properly complete duties.

Excavations: Before any excavation begins on a project there are a few things to

consider. Thoroughly plan the excavation project. Make sure that utility locates have been called for (811) and that the area has been marked. Keep in mind LOCATES are approximate and safe methods must be used to make the final locate in the field. Identify all other possible hazards such as cave-ins, hazardous atmospheres, underground utilities, moving vehicles and equipment concerning the project. Include a plan to remedy any accidents or unforeseen obstacles. Excavation is one of the most hazardous jobs in construction. Be aware of all surroundings, equipment, vehicles, spotters and fellow employees. In the U.S., cave-ins cause 1,000 injuries annually with over 140 permanent disabilities and 54 deaths. At all times a competent person must be in charge of all excavations. Section 1926.651 of the **OR-OSHA** rules states:

"**Competent** person means one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them."

There may be instances where a Qualified person may be needed.

"Qualified person means one who, by possession of a recognized degree, certificate or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his/her ability to solve or resolve problems relating to the subject matter, the work or the project."

Trenches 4 feet or more in depth must have a fixed means of egress. There must be a slope or ladder no more than 25 feet from where the employee is working. The use of proper sloping or shoring must be used to protect workers in a ditch that is five or more feet deep. The excavated spoils must be at least 2 feet from the edge of the ditch, this includes heavy

Oregon Association of Water Utilities

afety During this Economic Downturn?

equipment also. There must be proper signage, barriers and cones to alert workers and the public of the hazardous area. If the project will take more than one day, there should be a daily site inspection conducted for any possible hazards prior to any work beginning.

A common hazard in multiple day projects with open trenches is water, either ground water or rain. In section 1926.651 (h) (1) of the OR-OSHA rules state:

"Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by a water situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline in conjunction with a protective system."

This means that the competent person needs to be able to decide if the trench is safe to enter. This may include using a pump or multiple pumps to be able to continue work in the trench. If there are pumps near the trench, then there may be an issue with exhaust fumes, noise and vibration from the pump motor.

While this is only a couple of potential concerns that come up on our projects, we should not let our guard down during these challenging times. Safety of workers must still be paramount in our planning and performing of our work tasks. There are many resources available in addition to the services OAWU provide. I have quoted a couple of items from the state safety regulations (OR-OSHA), these standards include many other requirements for our work that have not been mentioned. Aside from what OR-OSHA typically brings to mind (enforcement), there are other services they can be of help with. They have a web site, orosha.org, and free training and consultative services. Also if you are having difficulty interpreting what a particular rule or standard may require, OR-OSHA staff can provide clear interpretations for those rules in question.

Keep in mind that working carefully and having a well planned project will be much safer than no consideration of the safety factor. •



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Team Effort

by Bruce Hemenway, Training Specialist

What is a team? You could say it is a group of people that work together. That would be a good answer, and we could leave it at that. However, I believe that a team and team effort is much more involved than that. First of all, if someone is on a team and they are not dedicated to that team, then that person is not part of the team effort at all. In fact, that person could actually be a hindrance to the team effort of the others.

There are various members that make up a professional football team, all working together for a common goal; to win that next game! Who are the members of a football team? Not just the men on the field. There are various coaches, the scouts, medical & therapy folks, an owner, administration personal, an attorney or two or three or four, a statistician, people that cover media attention, union people, and HR folks as well. Yes, I did mention the big guys on the field. But for sure and for certain, that is not the whole team. They are members of the team that, as we say at OAWU, show and shine. But without the rest of the team, they would not be showing and shining.

I was thinking of Oregon Association of Water Utilities. Who are the members of the OAWU team? Step back before you answer that question. It is not just Jason Green our Executive Director. It's not just Mark Russell

the office manager or Tamra and Donna the office assistants. Also it is not just the circuit riders or the training specialist and not just Tim Tice our Projects Manager. No, and it is not either of our two source water specialists. We are each, only, individual members of the OAWU lineup.

Oregon Association of Water Utilities has over 700 members. Check it out. Go to the back pages in the H2Oregon. They are all listed there. Each one of you, are members of OAWU. And, all part of this team, and team effort. Look at the next page, Individual Members. There is a big list there as well. At the top of the page we list the new members, most always, there are new names listed under the heading in each publication. Welcome New Members.

Thank you, each and every one who's name is among those listed on these pages. Without you, there would not be an association. We do enjoy the team effort. That effort was so obvious at the 2011 Sunriver Conference.

By now, you may be wondering why I have not mentioned the Associate Members. There is a reason. Although it has taken 5 paragraphs to get to this point, the reason for this article is to acknowledge our Associate Members. I want to say "Thank



Oregon Association of Water Utilities



You" Associate Members. Without your team efforts, our conferences would not be what they are. In addition, many of the associate members offer and provide training at OAWU conferences and the free training program offered by OAWU. Have you ever taken notice of the associate members at a conference? They show up, they set up, and then they wait for everyone else to show up. Then, they wait some more. And, they do all this with a big smile on their faces. Sure they are there to sell a product. But, have you ever needed something, dug around until you found that old business card you got a year or so ago from one of them at the Seaside conference? You then gave that vendor a call. Instantly they are eagerly involved with you and your needs. I also know from having many of them teach classes for my training specialist program, these folks are very knowledgeable.

These members are just as much a part of the team as the rest of us. Please don't forget about them as you shop for pieces, parts and supplies for your water and wastewater systems. I would encourage each one of you to consider all the effort that goes into making up a professional football team. Then remember, it takes all of us, together, to make up the OAWU team. ▲

Go Team!





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Kicking Dirt By Roger Prowell, Manager, Chenowith Water PUD

We have all seen a small group of water guys "standing around" a work site engaged in serious conversation about some field issue kicking dirt with their boots. Some kick dirt forward with the toe of the boot, some kick and scrape dirt with the side of their boot and some just paw the ground at random. The purpose of all this dirt kicking is to arrive at a solution to the current problem. It seems like humans just like to kick dirt when they are communicating with other water guys. The same phenomena can be seen in conference/meeting rooms by the "guys in ties" but they call it brainstorming or meetings. They shuffle papers, play with calculators or doddle on a note pad. The purpose is the same, to resolve a problem. It seems like humans have to engage and move the extremities to fully engage the brain.

At Chenowith Water PUD we have adopted "Kicking Dirt" as current and accepted management strategy. Over the past three years, Chenowith has evolved



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in association with State and National Rural Water Associations into a professional, team centered, cohesive unit of water purveyors. Kicking Dirt means that we have a problem with no easy and apparent solution, so we kick dirt until the solution or an idea or concept somehow takes root and flowers into a reasonable pathway. Exactly how this kicking dirt theory works is not well understood nor can it be precisely defined or delineated on hard copy. Perhaps it is a shared energy field on the quantum level.

We have however, established some "ground rules" for kicking dirt. The most important of these is that no idea, no matter if the soil is half baked, crusted over, muddy or dusty will be dismissed without gentlemanly discussion. We have found that often a left field idea can lead to fertile ground. We have realized that respect and a small shovel of humor goes a long way in freeing up the mind to see other ways of looking at the task at hand.

All members of the staff know that asking questions, plowing through the data, digging through the records and Google gardening all help to arrive at a solution. Sometimes finding the solution is like elk hunting, you can spend a lot of time discovering where they are not before you find where they are.

Chenowith Water PUD is currently an amalgamation of three systems, recently linked together by a large scale capital project. One of these small systems experienced Nitrate issues and had to abandon a well. In 2010 we received a fairly high reading (just over 5 mg/L) and this caused the District to explore alternatives to reduce this number.

Our response to this issue was to Kick Dirt. During the course of wearing out boot leather, we discovered that the high sample was taken as a "first draw sample," immediately after the switch to the well was turned on. Someone asked the question, "What would happen if we let the well run for a couple of hours and then sample?" This seemed like a fine idea so we did and the Nitrate number was about 2.5 mg/L, a much better number.

This data suggested that there was a lesson to be learned if we could just kick some more dirt and come up with a solution or at a minimum, a better data set. So we devised a sampling protocol and ran several versions, sampling at different time periods which correlated to different pumping levels. The data clearly showed that the Nitrate numbers rapidly declined quickly after the well was started and the pumping level of water column dropped several feet.

All of this was good news but left the problem of running the well to waste to improve water quality. This well was constructed decades ago when Nitrate issues were not in the forefront of the regulatory world and simply pumped straight into the transmission line to the receiving reservoir. So our task, not a problem, became how do we run this well to waste since it sits in the bottom of a steep canyon and the nearest sanitary sewer is a good mile away. The answer was to Kick Dirt.



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Limited resources demanded that whatever the solution was, it had to be reasonably affordable to the District. All the field staff met on site with our Engineer of Record, who adheres to the kick dirt view, and spent a couple of hours just leveling the loess, landscaping the loam and smoothing the soil. We thought about treatment, pipelines to nowhere, black helicopters, good fairies in the dark of night, running the well 24/7/365 and perhaps, let a cuss word or two slip out. In some ways, it was like a thought party, everybody can have a good time playing with our brains.

There happened to be a creek a few hundred feet away down a very precipitous slope; steep enough to require rope just to look at the creek. We thought... why not run the waste water from the well to the creek in a pipeline? After all, how hard could it be to construct



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OREGON ASSOCIATION OF WATER UTILITIES 2011 TRAINING & EVENTS SCHEDULE

Date	Class Title	Location	CEU Information	ESAC#	Fee/Free
August 10	Developing Your O&M Manual	Salem	0.6 Water/Wastewater	2113	FEE
August 16	Developing Your O&M Manual	Eagle Point	0.6 Water/Wastewater	2113	FEE
August 22-25	Summer Classic XVII	Seaside	1.4 (+) Water/Wastewater	TBA	FEE
September 13-14	Wastewater (WWT/WWC) Certification Review	Salem	1.4 Wastewater/0.5 Water	1711	FEE
September 20	Safe Drinking Water Act Update	Rogue River	0.4 Water	1740	FREE
September 20-22	Water (WT/WD) Certification Review	Bend	1.8 Water/1.2 WW	1596	FEE
September 27-29	Water (WT/WD) Certification Review	Salem	1.8 Water/1.2 WW	1596	FEE
October 10	Developing Your O&M Manual	Baker City	0.6 Water/Wastewater	2113	FEE
October 18	Water Meters by Badger	Bend	0.6 Water	2069	FREE
October 20	Water Meters by Badger	Tillamook	0.6 Water	2069	FREE
October 31	Developing Your O&M Manual	Florence	0.6 Water/Wastewater	2113	FEE
November 1-3	Small System Operator's Conference	Florence	2.0 Water/Wastewater	TBA	FEE
November 16	Control Valves by GC Systems	Rainier	0.7 Water/Wastewater	1741	FREE
December 6-8	13 th Annual End of Year Operator's Conference	Hood River	2.0 Water/Wastewater	TBA	FEE
December 13	Safe Drinking Water Act Update	Tillamook	0.4 Water	1740	FREE
January 12	Control Valves by GC Systems	Salem	0.7 Water/Wastewater	1741	FREE
March 5-9	34 th Annual Management & Technical Conference	Sunriver	2.0 Water/Wastewater	ТВА	FEE

2011 State Water exam dates Application Deadline October 20, 2011 August 15, 2011 For additional water exam information, please visit http://oregon.gov/DHS/ph/dwp/certif.shtml

2011-2012 State Wastewater exam dates Application Deadline March 30, 2012 (Statewide) January 16, 2012 Year round, open schedule

For further wastewater exam information, please visit http://www.deq.state.or.us/wq/opcert/opcert.htm

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

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



Manual "high line" pipe lying

a pipeline over the cliff, through the brush with just hand tools? We kicked some more dirt; our senior field staff guy used to be a logger and devised a logging high line lash up that was rigged to move the pipe down the hill instead of up the hill.

Then our task, not problem, was how to get the high velocity water into the creek with raising turbidity or impacting local fish populations. Kick more dirt. Somehow the concept of spreading the water out longitudinally from a perforated pipe along the riparian area sprouted from the dirt kicking. An agreement and design that met the approval of the ODFW was created and the project was plowed,





Creative pipe laying is sometimes necessary to get the job accomplished

sowed, fertilized and bearing fruit within a few months. The District used existing surplus pipe and for several hundred dollars, a few gallons of sweat and some skilled and creative pipe laying, we had improved water quality for our customers.

During our recent Sanitary Survey, we were proudly showing the Drinking Water Program representative our water quality improvement project and she asked how we came up with the solution that was low cost, effective, local and did not focus on traditional treatment? The answer was of course, *Kicking Dirt*!

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QUIZ CORNER

- 1. What is the Oregon Drinking Water Program currently under?
 - A. DHS
 - B. OHV
 - C. OHA
 - D. Hasn't changed
- 2. On January 11th, 2011, the U.S. Environmental Protection Agency (EPA) issued a press release and guidance for enhanced monitoring of what in drinking water?
 - A. Hexavalent chromium (chromium-6)
 - B. Arsenic
 - C. Dihydrogen Oxide
 - D. Disinfection byproducts (TTHM and HAA5)
- 3. Which one of the following considerations would be least likely to contribute to rising sludge in secondary clarifiers?
 - A. Low MLSS
 - B. Long aeration tank detention time
 - C. Hydraulic loading on clarifier
 - D. Long detention time in clarifier
 - E. Nitrification in the aeration tank

- 4. When using the F/M ratio for computing loading to an activated sludge process, the "F" value can be either:
 - A. MLSS or MLVSS
 - B. BOD or COD
 - C. TOC or DO
 - D. SS or TDS
 - E. SVI or SDI
- 5. How much water does the sun evaporate each day?
 - A. 1 trillion tons
 - B. 19 billion gallons
 - C. 72 trillion gallons
 - D. 220 billion tons
- 6. Both the koala bear and desert rat drink the same amount of water each day. How much water do they drink?
 - A. 2.5 liters
 - B. None, they don't drink water
 - C. 2.5 gallons
 - D. One cup
- 7. Two characteristics of all rocks that affect presence & movement of groundwater:
 - A. shape & porosity
 - B. depth & age
 - C. permeability & porosity
 - D. weight & color

- 8. Some interfering contaminants with the treatment of arsenic are:
 - A. tannic & folic acid
 - B. algae & color
 - C. pH & temperature D. sulfates and TDS
 - D. suitates and IDS
- 9. How much of the Earth's water is fresh?
 - A. 2.5%
 - B. 10%,
 - C. 30.5% D. 52%
- 10. What accounts for the vast majority of world water use?
 - A. Industry
 - B. Farming/Ranching
 - C. Drinking Water
 - D. Electricity Generation

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- 8. HANDS-ON TRAINING! (Your hands, doing the "hands-on"!)
- 7. You might be driving home in a NEW DODGE TRUCK! (You get 25 chances per day with a FULL registration!)
- 6. Latest in Regulatory Requirements! (They keep making 'em, we'll keep you up-to-date!)
- 5. Bourbon Country! (I'll drink to that!)
- 4. CAREER OPPORTUNITY SHOWCASE! (Know someone looking for a career in the water industry? Bring 'em along!)
- 3. Test drive all kinds of equipment! (Think: LARGE boy toys...oh, and lady's toys, too!)
- 2. NETWORKING! (See old friends, make new friends, talk to other utility people!)
- 1. IT'S THE INDUSTRY EVENT YOU WON'T WANT TO MISS!!!! (Seriously!)

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Regular Member Due 1 to 100 5 101 to 500 5 501 to 1,000 5 1,000 and up 5 Maximum dues is 5	s Schedule 575 + 26 cents per hookup 580 + 26 cents per hookup 590 + 26 cents per hookup 5100 + 26 cents per hookup 5890.00
Mail payment to:	DAWU 935 N. Main Street Independence OR 97351
or Submit: VISA DA Maste	rCard AMEX
Card #:	
Expiration Date:	
Name on Card:	
Signature	
B11	

Membership Types

Regular Member

A Regular Member shall be any water or wastewater utility, public or private, engaged in the production, distribution or reclamation of water. A Regular Member shall have one vote.

Annual Dues - See Dues Schedule

Associate Member

An Associate Member shall be any organization individual or corporation, supplying services or equipment to wastewater utilities. An Associate Member shall have one vote. For Associate Member Benefits, please contact OAWU.

Annual Dues \$400.00 per year

Individual Member

An Individual Member shall be an individual involved in the water/wastewater industry or a user of such utilities. The membership is informational in nature and shall be non-voting.

Annual Dues \$75.00 per year

Benefits of Membership

- On-site technical assistance
- Various free training programs
- Discounts on training courses
- Discounts on Annual Conference registration
- Access to on-site training program
- Subscription to quarterly H2Oregon magazine
- Direct mailings in your area about upcoming training courses
- Summaries of legislative issues
- Legislative representation at state and federal level
- Associate Member Services and Products Guide
- Access to technical assistance library
- Access to technical and testing equipment for loan
- Voting rights in Association affairs (Regular & Associate Members)
- Positive contacts with other organizations
- Camaraderie with water and wastewater professionals
- Operator Of Record services
- Job referrals, announcements and searches
- Well testing
- Plan review
- System performance evaluation and options
- Additional programs and services
- Disaster response assistance and planning



WHY AREN'T YOU A MEMBER OF OAWU?

Serving Members Since 1977

- We provide **onsite technical assistance and training**, meaning that we will come to you and help with any problems you may be encountering with water or wastewater.
- We provide water and sewer **rates**, **tracer studies** and **lagoon profiling**. Call OAWU at 503-837-1212 for a bid or estimate. We can save you money!

These are just a few facts about OAWU. The next time you are in need, pick up the phone and call us before hiring outside help. We are here to help. *It's our industry. It's what we do.*

To join or for more information, visit www.oawu.net or call 503-837-1212.

Oregon Association of Water Utilities 935 N. Main Street Independence, Oregon 97351 Phone (503) 837-1212 Fax (503) 837-1213 www.oawu.net

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

water Systems

Vater 8



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