Water Tap

Washington's Drinking Water Newsletter

SPRING 2020

Washington drinking water professionals help each other weather the COVID-19 crisis

By Nancy Feagin, PE, Surface Water Program Engineering Specialist

March 6 headline: *Purchasing limits on some items as panic buying creates long lines, supply shortages*. Household bleach, which many small public water systems use for drinking water disinfection, was unavailable or in limited supply. For one rural water system, this meant they could only purchase a one-week supply at a time. A call for help went out and within days a satellite management agency, two cities, and three public utility districts stepped forward.

Faced with rising risk of widespread illness from COVID-19, drinking water professionals started planning for supply disruptions and staffing shortages. Putting their emergency response plans in motion, they checked in with regular suppliers; identified alternate sources for critical materials and supplies; reached out to mutual aid partners, and identified backup staffing options. Utilities with in-house drinking water labs explored how to accept outside samples if area commercial labs closed.

The Washington Water Plant Operators Facebook page created by Paul Meyer urged its members to be prepared and posted words of encouragement: "Thank you utility workers nationwide for keeping our receiving waters healthy, and our drinking water safe. You all are unbelievably essential during this virus crisis."

At the Office of Drinking Water, questions started coming in. What happens if we cannot access a routine sample location? What do we do if our lab shuts down? Should we halt water shut-offs? How can we prepare our facility to be operated by an outside operator? We posted answers on our Drinking Water webpage. As of this writing, we have guidance for:

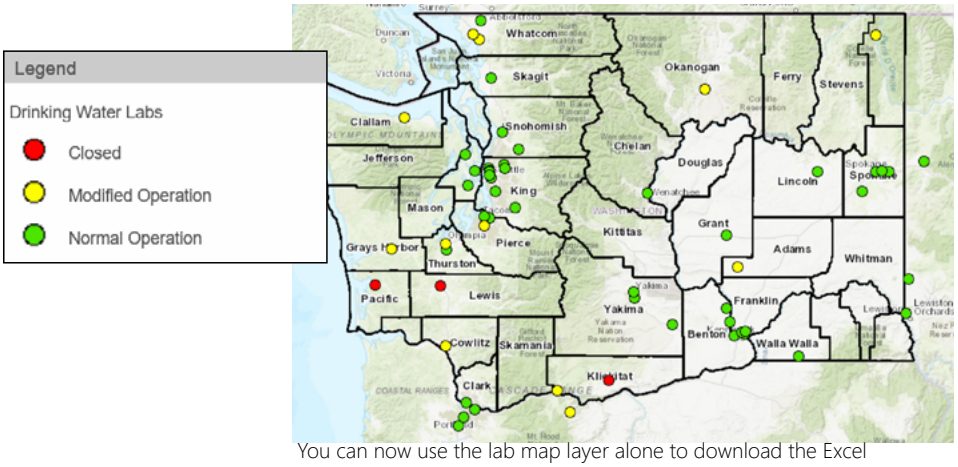
- Continuity of Operations Plans.
- Critical and Essential Infrastructure.
- Distribution System Monitoring.
- Suspension of Water Shutoffs and Expanded Customer Assistance Programs.
- Water Treatment Plant Staffing Continuity.
- Water treatment Plant Supply Chain Continuity.

Water Operator Return to Work

We included links to valuable outside resources. As concerns grew about drinking water lab capacity, we added a layer to our source water protection (SWAP) map to show water quality monitoring lab status: open, modified hours, or closed. We are committed to providing you the answers you need, especially during this challenging time.

For more information

Washington State Department of Health 2019 Novel Coronavirus Outbreak (COVID-19) webpage at doh.wa.gov/Emergencies/Coronavirus.



You can now use the lab map layer alone to download the Excel spreadsheet. Our lab resources webpage explains how it works.

Director's Column

HELLO TO EVERYONE who shares our mission of ensuring safe and reliable water for everyone in Washington!

That mission was emphasized this past year. As I've mentioned before, drinking water continues to be highlighted as people recognize how critical your work is. The response to the COVID-19 pandemic focused the spotlight on our work and forced us to re-examine the definition of "critical infrastructure."

If you met me, or you know a little about me through these notes, you may realize I'm an optimist. I look at the challenges we are facing with hope that you are safe and well, with belief that we'll work through this together, and with an eye on the future. We are using this current world event as an opportunity to learn new ways to stay in communication, build relationships with neighbors and neighboring utilities, and prepare to help one another.

I hear amazing stories about dedicated drinking water operators. Some maintain complete isolation at treatment facilities to ensure continued services to their communities. Some utilities work together on plans to learn and cover each other's water system needs in case their staff get ill. Many share information on resources and materials.

These are hard times, but plans and relationships we build now can benefit us well into the future. While it is unfortunate that crisis is what often stimulates the human condition to address risk and plan for the future, it is also when we get to see people at their best, as I know so many of you are!

Hang in there as we get through this together. Contact us if you have challenges or problems you need help working through. We are here first and foremost as public health working for our communities.

Mike

DRINKING WATER STATE REVOLVING FUND 2020 FUNDING AND APPLICATION CYCLES

Consolidation Feasibility Study Grants: August 3-31
Water Main Replacement Loan: August 3-31
Construction Loan: October 1 through November 30
Emergency Loans: Applications accepted year-round.

Please visit doh.wa.gov/DWSRF for fact sheets and information on all of these funding offerings.

Water System Planning Guidebook Summary

WE ARE MAKING final edits to our updated *Water System Planning Guidebook*. The guidebook includes up-to-date, useful, and comprehensive guidance to help water system owners, operators, engineers, and consultants prepare water system plans. It builds on information included in our recently released fourth edition *Water System Design Manual* (WSDM).

We released the updated guidebook to more than 1,000 stakeholders and interested parties for a 90-day review, with comments closing December 11, 2019. We received more than 100 comments from 17 individuals. Now we're reviewing those comments and clarifying accordingly. We expect to release the completed guidebook midyear 2020.

Revisions include updates driven by the Municipal Water Law and other regulatory changes.

Here is a summary of the elements and updates included in the Water System Planning Guidebook:

Chapters 1–10 include a stated objective, a list of chapter topics, and a publications reference list. We use Planning Tip dialogue boxes to highlight useful information.

Water system plans assist water systems in developing and demonstrating strong technical, managerial, and financial capacity. To that end, we included elements of technical capacity in chapters 2, 3 and 6; managerial capacity in chapters 1, 4, 5, 7 and 10; and financial capacity in chapters 8 and 9.

Where available, the Guidebook refers to, or links to, other publications, such as the *Water System Design Manual* and the *Water Use Efficiency Guidebook,* rather than duplicating information.

Chapter 1: Description of the Water System discusses Duty to Serve, and Local Government and Watershed Plan Consistency.

Chapter 2: Basic Planning Data includes distribution system leakage, water supply information, and interties.

Chapter 3: System Inventory and Analysis aligns with the 4th edition WSDM and includes the topics of Asset Management and Capacity Analysis.

Chapter 4: Water Use Efficiency Program identifies requirements of the Water Use Efficiency Program, a result from the 2003 Municipal Water Law.

Chapter 5: Source Water Protection clarifies and updates Source Water Protection requirements.

Chapter 6: Operations and Maintenance Program covers updates to the Coliform Monitoring Program, which incorporate Revised Total Coliform Rule requirements.

Chapter 7: Distribution Facilities Design and Construction Standards aligns with the 4th edition WSDM.

Chapter 8: Capital Improvement Program expanded to include the subject of Value Planning.

Chapter 9: Financial Program expanded to assist in identifying the costs of providing water service and to address water rates evaluation.

Chapter 10: Miscellaneous Documents includes recent resources, links, and a section on SEPA.

HEAVY SNOW, 9-DAY POWER OUTAGE, CLOSED ROADS, A BROKEN GENERATOR....

How the Town of Skykomish Succeeded

By Susan Welland, WTP03, WDM3, Gray & Osborne, Inc., Consulting Engineers to the Town of Skykomish

On FRIDAY, January 10, 2020, a "modified arctic front" dropped down from British Columbia bringing a massive snow event to Western Washington. While most of Western Washington saw snowfall and the perils that come with it, a small town located 60 miles northeast of Seattle received the worst of it.

Skykomish, located on Highway 2 near Stevens Pass, is used to dealing with snow. And, David Childs, Public Works director, is used to keeping the water and wastewater systems running and keeping the roads plowed. But, the amount of snow that fell in a short amount of time on that day left the town and Childs struggling to keep up.

Saturday, the town and surrounding area lost power. Unfortunately, the main generator was not functioning and only one portable generator was available to power the town's lift stations and well pump house, which fed a 200,000-gallon storage tank. That generator became stuck at the lift station site and couldn't be moved to the well house location because of the continued snowfall.

Throughout the weekend, I made unsuccessful attempts to locate a second generator that could be brought to the town and moved to the well pump house. All the businesses within reasonable range that rented generators were closed, and nearby towns did not have anything available that would work.

Then, early on Monday morning, Department of Transportation (WSDOT) closed Highway 2 for a 32-mile stretch, citing ongoing hazards from heavy snow atop tall trees—and cutting off all access. This closure trapped the residents of Skykomish, along with hundreds of travelers.

In addition to this combination of events, an overnight water system break on Tuesday caused the storage tank to drain, and the distribution system lost pressure. A loss of system pressure can introduce disease-causing organisms into the water system. I notified the Office of Drinking Water immediately; and, on Wednesday, developed a "boil water advisory." The town distributed the notice by hand to Skokomish residents.

There was good news on Thursday, January 16. WSDOT reopened the highway. There was a simultaneous massive effort by neighboring communities, who brought a large caravan of 4x4 trucks filled with donated food and other supplies to help the residents that had been cut off.

With the highway open, Childs located a suitable generator. And with the help of Councilman Todd Burner, he obtained and installed it at the well-pump house, and filled the tank.

David Childs prepares to flush a hydrant buried in snow.

To lift the boil water advisory, the town was required to disinfect the system, flush it, and then test for coliform bacteria. However, the power was still out. Gusty winds continued to challenge utility workers who struggled to restore power.

The town's drinking water is not chlorinated, and the storage tank was a mile up a hill and completely inaccessible. The only option for chlorinating the system was installing a temporary chlorine injection system at the well pump house.

That's when Mike Peterson, water system operator for the Town of Woodland, stepped in. Woodland, located 225 miles south, recently installed new chemical metering pumps and had surplus LMI* diaphragm pumps available. Woodland was not only eager to lend them to the Town of Skykomish, but included all the necessary tubing, extra injection fittings, and spare parts. I made an emergency trip to Woodland to collect this equipment, as well as various iron pipefittings, a dozen bottles of household bleach, and a day tank.

Childs and I installed the equipment on Friday, drew the storage tank down by flushing, and then refilled it while injecting it with chlorine to bring the tank residual to around 3.0 mg/L. We re-flushed the system at several locations in the furthest points of the system and tested the chlorine residuals to ensure complete disinfection.

That day, power was restored to the town. Childs flushed the system again to remove the chlorinated water on Monday. And, on Wednesday, January 22, I collected distribution samples and delivered them to the certified laboratory.

The next day, Skykomish received satisfactory results for all of the tests, and the town lifted the boil water advisory.

**Liquid Metronics Incorporated.*

A CASE STUDY

Peristaltic Pumps Allowing Chemical Overfeed

By Nick Fitzgerald, Environmental Engineer

Water treatment facility operators regularly use peristaltic chemical feed pumps because they are simple and they require low maintenance. By design, peristaltic pumps include a siphon prevention function, which the pump rollers achieve when they pinch the tubing chemicals flow through.

However, as one Washington water treatment facility recently discovered, this capacity can be defeated given the wrong circumstances. In this situation, the water system's pump roller cover detached and the tubing rolled out of the pump head, creating unrestricted passage from the chemical day tank directly to the finished water clearwell.

Because the feed line was already full of sodium hypochlorite and the day tank was elevated in relation to the injection point, perfect conditions existed for a siphon. In short time, 35 gallons of concentrated sodium hypochlorite flowed freely into the finished water. And (of course), this all occurred late on a Friday afternoon. Fortunately, the distribution system tanks were full and the plant shut down just after the incident.

The operator also decided to stop by the plant one last time before going home for the weekend, noticed the empty tank, and averted what could have been a much bigger incident.

This case study highlights four important facts.

1. Peristaltic pumps cease to have any antisiphon capabilities if the tubing dislodges from the pump head.
2. Overfeed protection, such as backpressure and antisiphon valves or elevating injection points above day tanks, is extremely important.
3. Operators need to inspect chemical feed pumps regularly and replace pump components when they notice compromising wear or damage.
4. Daily site visits are a critical part of water treatment plant monitoring.

Drinking Water Needs Assessment

By Nancy Feagin, P.E., Surface Water Program Engineering Specialist

Every four years, Congress requires the U.S. Environmental Protection Agency (EPA) to assess the 20-year forecasted capital improvement needs of public water systems. EPA bases the assessment on the results of surveys: we survey non-tribal medium and large community systems, and EPA surveys all tribal, small community, and not for profit noncommunity water systems. Although the process was delayed for one year, it is moving ahead in 2020.

Our goal is to collect information from participating utilities in the most efficient and least disruptive way possible. When EPA releases the final survey, expected in June 2020, we will work with the selected utilities and let them know what information we need from them and our schedule for completing the work.

EPA selected 56 of Washington's community water systems to participate in the 2020 Needs Assessment. The selected systems include all 12 large utilities with a population over 100,000 and a statistical sampling of 44 medium-sized utilities (3,300 to 100,000 population). EPA will complete a separate nationwide survey of small systems (population less than 3,300), including about 32 in Washington.

Based on 2015 Needs Assessment data, EPA calculated the capital improvement needs of Washington's Group A public water systems through the year 2035, at $11.7 billion. EPA's final report to Congress for 2015, Drinking Water Infrastructure Needs Survey and Assessment, contains more information.

Washington's water utilities need access to as many Drinking Water State Revolving Fund (DWSRF) dollars as possible to help meet their capital investment needs. In the last DWSRF loan cycle, we were able to fund about half of the loan amount requested.

Successfully identifying every allowable 20-year capital expenditure maximizes loan funds available to water utilities over the next four-years, and beyond.

We use a portion of our annual DWSRF capitalization grant to fund our operations. Each year we may "set aside" part of our annual capitalization grant to meet the public health goals of the Safe Drinking Water Act. These funds give us flexibility to respond to the changing needs of water utilities. We've used this money to:

- Develop statewide source water protection mapping and data storage capabilities.
- Fund our source water protection, preconstruction, and consolidation or feasibility study grant programs.
- Pay third-party technical assistance contractors.
- Fund our treatment optimization program.
- Pay the salaries of certain staff and buy certain equipment.
- Support local health jurisdictions working on our behalf (subsidize the cost of sanitary surveys, technical assistance, special purpose investigations, emergency response).

Disinfecting Well Probes

By Steve Deem, P.E., Environmental Engineer

Measuring well water levels is an important part of managing groundwater resources. All Group A water systems using groundwater wells must monitor static water levels on a seasonal basis, including low- and high-demand periods, to show the source continues to meet system demand (WAC 246-290-415(10)). Monitoring water levels provides early indication of declining aquifers or decreasing well efficiencies. When measuring water levels with a portable well tape or level probe, it is important not to introduce microbial contaminants. Inspect and clean your well probes and tapes before and after each use.

How to disinfect well probes. This applies to public-supply and domestic wells. If you have the manufacturer's instructions for disinfecting your specific well probe, use it. If not, use the procedure below.

What you'll need: Your well's last recorded water-level measurement, 1 clean spray bottle, 2 clean 5-gallon buckets, and 1 clean plastic sheet.

1. Determine how much measuring cable to disinfect. Get the most recent water-level measurement from your well and add 10 feet. If the last recorded measurement was 55 feet below ground surface, disinfect at least 65 feet of cable.
2. Spread clean plastic sheeting on the surface where you will clean the probe and spray it with bleach solution (Step 3). The sheet keeps any part of the probe from contacting the ground or other potential contamination.
3. Put 3 gallons of potable water into the first 5-gallon bucket and add 2 teaspoons of 6 percent household bleach. Fill the spray bottle and spray the plastic sheet.
4. Put 3 gallons of distilled water into the second 5-gallon bucket. If distilled is unavailable, use potable water.
5. Put measuring cable into first bucket for disinfection. Let sit for 2 minutes.
6. Remove probe from disinfection bucket and place into distilled water bucket. This removes residual chlorine from the cable, minimizing corrosion of measuring probe, and avoids introducing chlorine into the well. Allow cable to sit for 2 minutes.
7. Rewind probe onto reel. It is now ready to be used.
8. Repeat this procedure when you're finished taking measurements.
9. Place disinfected well probe into a clean secure container for transport.

Routine batch chlorination

By Steve Deem, P.E., Environmental Engineer

Routine batch chlorination is poor operational practice and not allowed under state rules. Instead of continuous disinfection, some water system operators add chlorine for routine or sporadic maintenance—monthly, quarterly, or annually. Their reasons range from preventing coliform growth to cleaning distribution pipes.

Chlorine disinfection using sodium hypochlorite (bleach) or calcium hypochlorite is an effective and widely practiced water treatment process.

When used inappropriately, chlorine can be dangerous. That's why operators must precisely control and closely monitor the process.

- Calculate correct chlorine dose and account for chlorine demands.
- Measure actual chlorine residuals throughout distribution system using an approved device and proper measuring technique.
- Continue measuring residuals until all free and total chlorine is gone from the distribution system.
- Document all chemical amounts added and chlorine residuals measured.

Batch chlorination often involves operators dumping estimated volumes of chlorine and flushing—without using controls.

The case against batch chlorination

It can erode public trust in drinking water, whether routine or sporadic.

Batch chlorination can mask or hide microbial contamination leading to inaccurate routine coliform sample results. After the chlorine dissipates, microbial contamination can return. Water systems should **never** batch chlorinate immediately before collecting routine coliform samples.

Batch chlorination can create potential health risks. Unknown chlorine levels, or resulting disinfection byproducts, can create hazards for customers with special medical conditions or hazards for pets (fish) resulting in economic and emotional loss.

Batch chlorination can disrupt particles and sediment in the distribution system, affect protective scale on premises plumbing that may release metals like lead, and cause dirty water that may affect laundry.

Well-operated water systems with protected, high quality source water that implement best management distribution and storage practices, should not need to batch chlorinate their systems to avoid positive coliform samples or to respond to customer complaints. Instead, identify the root cause of water quality problems and solve that specific problem instead of hiding the issue with batch chlorination.

Conditions or events when batch chlorination may be appropriate and is allowed. Batch chlorination is only appropriate as one of several steps in response to these abnormal conditions.

- Pressure loss event.
- Backflow or backsiphonage incident
- Tank cleaning.
- Confirmed bacteriological contamination.
- Water main break: Type 3 or 4 classification.
- System repairs when the system is "open" as part of the repair that may result in low or no pressure.
- Flooding or other catastrophic event.

Any modification to water quality in a drinking water supply is a significant action. Water systems must always notify customers and should always consult our nearest regional office when they anticipate using batch disinfection for any reason.

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Drought Update

By Sheryl L. Howe, L.G., Hydrogeologist

We monitor snowpack throughout the winter and communicate conditions to our stakeholders, so they can better plan for potential water shortages, if necessary. Last year, low snowpack and an early spring runoff resulted in drought declarations in 27 basins in the state.

In November and December 2019, there was little mountain snow because warm temperatures resulted in a good portion of the precipitation falling as rain. This January, however, there were huge gains in mountain snowpack due to above normal precipitation for the entire state. By the end of the month, basins across the state ranged from 70 to 118 percent of the 30-year normal in snow water equivalent.

Water systems that rely on surface water reservoirs to supply water to their customers will benefit from improved snowpack.

The most recent U.S. Drought Monitor shows abnormally dry conditions throughout much of the Olympic Peninsula. Very low March precipitation resulted in a narrow band designated as severe drought east of the Cascades extending from the Columbia River to the Canadian border. Our forecast shows a strong indication of warmer than normal temperatures for June through August, while there is no clear signal for precipitation.

We will continue to monitor conditions across the state and update stakeholders as appropriate.