Emergency Response

DANAMARK watercare
GUIDING WATERCARE INNOVATION

Dealing with Water Quality Emergencies

Natural disasters such as earthquakes, floods and hurricanes cause contamination of municipal water systems over a large area. Following is our recommended procedure for the cleaning of equipment and start-up of systems using Everpure Precoat filters, both for commercial beverage service and for residential installations.

Obeying Boil Water Advisories

Obey them, period. Contamination due to breaks in the mains, general flooding, or damage to the municipal waterworks itself should not be confused with situations in which contamination by protozoan cysts (Cryptosporidium, Giardia) is discovered in a water supply that is believed to be otherwise safe.

Everpure Precoat fine-filters are NSF-Certified for removing such cysts, but not for killing or removing dangerous bacteria and viruses, which must be assumed to be present during the aftermath of a disaster. When a Boil Water Advisory is announced and it is clear that there has been gross contamination and not just a minor incident or suspicion of cysts, Everpure filter users should stop using them and boil their water like everyone else, until the "all clear" is given, plumbing systems have been disinfected, and the old cartridges have been replaced.

Clean-Up

Commercial Systems: When safe water is available again, all water-using equipment should be sanitized with an approved disinfectant, such as diluted chlorine bleach (5.25% sodium hypochlorite). The recommended dosage is 100-200 mg/L chlorine, which is easy to make. Fresh bleach has about 50 mg of chlorine in each mL, or about 500 mg in a capful. Four capfuls or an ounce in a 2 ½ gal. bucket of water makes about 200 mg/L. Add a few drops of cleaning concentrate (dish detergent) to this solution, and use it to clean external surfaces.

Unexposed, interior-plumbing surfaces can be sanitized in place using an Everpure Sanitizing/Flushing Cartridge (p/n 9608-00). This is an empty cartridge which can be filled with any cleaning or sanitizing solution and then be inserted into the filter head. When the flow of water resumes, the disinfectant will be fed into the lines. When a strong chlorine smell is evident at the closest outlet, the flow should be stopped and the sanitizing solution left to soak for at least 30 minutes. Then, the Flushing Cartridge can be removed and fresh filter cartridges installed before rinsing the equipment and returning it to service.

Filter Use

The water problems caused by natural disasters often include high turbidity, even muddy conditions. **As a result, filter cartridges may clog faster and need replacing sooner than usual**, and a great increase in the demand for replacements may persist for weeks or months afterwards. For this reason, we strongly recommend that stores carry a spare set of replacement cartridges, and change their Prefilters as soon as they become saturated.

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Flood Notice

If recent flooding in your area has caused contamination and shutdown of municipal and private water systems over a large area, here is how to manage the cleaning of equipment and startup of beverage service in locations using Everpure Precoat filter systems:

Obeying "Boil Orders": Obey them. Contamination due to flooding is not like contamination with *Cryptosporidium* or *Giardia* cysts. Floods involve bacteria and viruses in addition to parasites, and our Precoat fine-filters are certified only for removing cysts, not bacteria and viruses. Everpure filter users should boil their water like everyone else until the "all clear has been given and the filter cartridges have been replaced.

Cleanup: When safe water is again available, all water-using equipment should be sanitized with an approved disinfectant, such as diluted chlorine bleach (5.25% sodium hypochlorite).The recommended concentration is 100-200 mg/l chlorine, which is easy to make. Fresh bleach has about 50 mg of chlorine in each ml, or about 500 mg in a capful. Four capfuls or an ounce in a 2-1/2 gallon bucket makes about 200 mg/L. This solution should be used to clean exposed surfaces.

Unexposed, interior surfaces can be sanitized with the aid of the Everpure Flushing Cartridge (#9608-00). This is an empty filter cartridge which can be filled with any cleaning or sanitizing solution and then be inserted into the filter head at the site. When water flow is resumed, the cleaning solution will be fed into the plumbing and the equipment. When strong chlorine smell is evident throughout the equipment and in the effluent, the water flow should be stopped and the sanitizing solution left to soak for at least 30 minutes. Finally, the Flushing Cartridge is removed and fresh filter cartridges installed before rinsing out the equipment.

Filter Use: Flooding produces muddy water that is difficult to treat properly, and some waterworks may be unable to maintain their usual level of water clarity once they get going again. Chlorination levels will also probably be higher than usual, so reliable fine-filtration and taste and odor control will be needed even more than ever. However, the more turbid the water, the faster the cartridges will clog and need replacement. For the next few weeks and months extensive areas will be affected by the flood waters, and there may be unusual and unpredictable demand for replacement cartridges. It might be prudent for dealers and managers in the affected areas to increase their inventory of cartridges in anticipation.

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Procedures for Flushing Post Mix Dispensers – After a Boil Order

Equipment to be considered:

Fountain Dispensers, Ice Machines, Juice Machines, and any other beverage machines requiring fresh water such as coffee machines, FCB machines.

Intent:

To flush system with an approved water source sanctioned by city officials.

Special Instructions:

- Remove water filter cartridge(s) and place filtration system on by-pass before flushing.
- Destroy all ice made prior to or during the water advisory.
- Water will split to a valve as it reaches the dispensing system; therefore each valve must be flushed.
- Silt and any other particulate matter may be present in system and it is advised that calibration of valves be checked.
- Any system that is without a new water filter cartridge must not be placed back in service.

If at any time during the sanitation process the effectiveness of the procedures may be in doubt, the procedures should be repeated in their entirety.

Water Circuits

Flush water lines at all sinks, faucets etc. for a minimum of 30 minutes.

Flush at least 50 litres of potable water through the entire fountain dispensing system – plain and carbonated circuits.

Do not connect water line to carbonator until all lines have been flushed.

If there is water filter present, remove and discard filter cartridge(s), then replace with a new filter cartridge(s).

Actuate the fountain dispensing valves. Dispense beverage for one minute.

After one minute taste a drink from each valve.

If the drink tastes OK, you are finished. If there is an off taste from any valve, flush that valve for another minute, then taste a satisfactory taste.

(Courtesy of Coca-Cola Ltd. 2006)

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Emergency Water Disinfection

There are essentially two approaches to the problem of emergency water disinfection: ultra-violet (UV) irradiation combined with fine filtration and chemical treatment combined with fine filtration. Each has its advantages and disadvantages.

UV and Fine Filtration for addressing coliforms, like E. coli

Ultra-violet sterilizers with wavelengths near 254 nm produce resonance effects in the DNA of living cells, which cause breaks and kinks, leading to cell death. UV systems, which supply a minimum dosage of 38,000 uWsec/cm2, are effective against bacteria and viruses (i.e. e.coli). All UV systems must have a minimum 5-micron prefiltration installed in front of the UV.

The main advantage of UV is simplicity. It's all electrical, with no moving parts, and the necessary contact time of about 10 seconds does not take much space. When fine filtration (1 micron absolute or less) and UV are partnered, both parasitic cysts and coliforms are eliminated.

Parasites such as Cryptosporidium and Giardia cysts are not killed by UV, but rather require fine filtration, preferably certified to NSF Standard 53 protocol with a minimum of 3-log, 99.9%, removal. Combining fine filtration with UV sterilization provides significant protection against contamination.

Chemical Disinfection and Fine Filtration

Chemical disinfection requires either high concentrations for a short time or low concentrations for a long time. It is more cost-effective for small systems to feed high levels of chlorine than to provide large contact tanks, so the EPA recommends "superchlorination-dechlorination", in which a large excess of chlorine is used for a short time and then removed or reduced to palatable levels.

If the dechlorinating filter is also a fine-filter certified to remove cysts and other parasites, complete disinfection can be achieved with modest space and equipment. A system comprised of a coarse prefilter, chlorine feeder pump, chlorine solution reservoir, a properly sized retention tank and a bank of 1 micron absolute filters with carbon for dechlorination, will provide disinfected water at the required flow rate. Such a system could be mounted on one pallet. The main disadvantage of such systems is that they require rather careful control by the operator—the chlorinator output must be adjusted in accordance with tests for chlorine residual.