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Bacteria Sampling at Hydrants using hydrant sampler

April 1, 2020

Outside sampling locations like hydrants that are open to the atmosphere, dust and animals may be subject to higher levels of contamination than inside sampling taps. **As such, outside sampling sites, like hydrants, are not generally recommended for bacteria sampling.** Public Water Suppliers (PWS) are encouraged to plan ahead, review their sampling plans, identify a larger pool of more appropriate sampling locations, and discuss their revised sampling plans with their MassDEP regional Drinking Water Program.

If during the COVID-19 emergency, a PWS has no other choice but to use a hydrant as a bacteria sampling location, the PWS should use a hydrant sampler tool to collect samples in a controlled and safe manner and follow all bacteria-sample collection procedures, including wearing gloves. See EPA's "Quick Guide to Drinking Water Sample Collection" at https://www.epa.gov/sites/production/files/2015-11/documents/drinking_water_sample_collection.pdf.

Dry-barrel hydrants are the most common type of hydrant. In a dry-barrel hydrant, the vertical portion of the hydrant (barrel) is empty of water (dry). The upper section remains dry until the main valve is opened by means of a long stem that extends up through the top (bonnet) of the hydrant. They are designed to be operated with their valves fully open. Tools such as the hydrant sampler are designed to allow the hydrant valve to be fully open while collecting samples in a controlled, safe manner. See EPA's Hydrant Sampler Procedure, Parts List and video for instructions including pictures. https://www.epa.gov/sdwa/hydrant-sampler-procedure-and-parts-lists.

Before sampling, the PWS must take the following actions:

- Obtain all necessary permissions to access and open the hydrant.
- Ensure that the hydrant and the sampling equipment are clean and disinfected prior to use. It is also recommended that the sampling equipment be disinfected after each hydrant is sampled, when more than one hydrant is being sampled. Follow proper contact time for disinfectant.

- Take field measurements for temperature, chlorine residual, pH or other such measurements and compare them to historical results for that area to ascertain that the water is representative of the distribution system before collecting the sample. If the field measurement results are not typical, flush the hydrant more and retest until satisfied that the location is representative of the distribution system.
- Thoroughly flush to be sure stagnant water is evacuated. Collect and review temperature results throughout flushing to determine when the water is representative of the main.

When collecting the sample(s), the sample collector must pay attention to the following:

- Ensure the sample bottle or cap does not touch the hydrant. Please note that it will require time and practice to get a “pencil-thickness” flow from a hydrant.
- If it is raining, provide an umbrella or other protective device over the sampling location to ensure that rain does not enter the sample bottle or sample after the rain event. All samples do not have to be taken on the same day.
- Do not sample from a low-lying point that results in splash-back from the ground surface. This could contaminate the bottle and sample.

Evaluation and special sample for hydrants

MassDEP will allow a PWS to inspect, clean, flush, and sample a hydrant to evaluate its potential use as an alternate RTCR sampling site without that result being considered for compliance. The hydrant must be assigned a new sample location number that ends in E (e.g. 015E) and the initial sample labeled a Special Sample on the chain of custody submitted to the laboratory. All Special Samples must be reported to MassDEP and will not be considered for compliance - even if they are clean. Once a PWS considers a hydrant to be an acceptable sampling location, then compliance samples, using the same new location number but labeled Routine Sample, can be collected. **The first Routine Sample must be collected no earlier than 24 hours after the Special Sample used to evaluate the hydrant.**

Bacteria results at a hydrant

Please be aware that, during Routine Sampling, if a PWS collects bacteria samples at an outside hydrant and receives a positive result, the PWS will be required to perform repeat samples at suitable sites and include the repeat samples in determining whether an assessment has been triggered. After taking such repeat samples, in extenuating circumstances MassDEP may consider a sample invalidation request in accordance with Drinking Water Regulations 310 CMR 22.05(3):

(3) Invalidation of Total Coliform Samples. A total coliform-positive sample invalidated under 310 CMR 22.05(3) does not count towards meeting the minimum monitoring requirements of 310 CMR 22.05(1).

(a) A Supplier of Water may request that a total coliform-positive sample be invalidated, subject to Department approval. Any such request shall satisfy the conditions of 310 CMR 22.05(3)(a)1. through 3.

1. The laboratory establishes that improper sample analysis caused the total coliform-positive result.

2. The Supplier of Water demonstrates, on the basis of the results of repeat samples collected as required by 310 CMR 22.05(2)(a) through (d), that the total coliform-positive sample resulted from a domestic or other non-Distribution System plumbing problem. No sample shall be invalidated on the basis of repeat sample results unless all repeat sample(s) collected at the same tap as the original total coliform-positive sample are also total coliform-positive, and all repeat samples collected at a location other than the original tap are total coliform-negative (e.g., no total coliform-positive sample shall be invalidated on the basis of repeat samples if all the repeat samples are total coliform-negative, or if the Public Water System has only one service connection).

3. The Department has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition which does not reflect water quality in the Distribution System. In this case, the Supplier of Water must still collect all repeat samples required under 310 CMR 22.05(2)(a) through (d), and use them to determine if a coliform Treatment Technique trigger in 310 CMR 22.05(4) has been exceeded. To invalidate a total coliform-positive sample under 310 CMR 22.05(3)(a)3., the decision and supporting rationale must be documented in writing, and approved and signed by the supervisor of the Department official who recommended the decision. The Department must make this document available to EPA and the public. The written documentation must state the specific cause of the total coliform-positive sample, and what action the Supplier of Water has taken, or will take, to correct this problem. **The Department may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.**

(b) A laboratory must invalidate a total coliform sample (unless total coliform are detected) if the sample produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined (e.g., the Multiple-tube Fermentation Technique), produces a turbid culture in the absence of an acid reaction in the Presence-Absence (P-A) Coliform Test, or exhibits confluent growth or produces colonies Too Numerous to Count with an analytical

method using a membrane filter (e.g., Membrane Filter Technique). If a laboratory invalidates a sample because of such interference, the Supplier of Water must collect another sample from the same location as the original sample within 24 hours of being notified of the interference problem, and have it analyzed for the presence of total coliforms. The Supplier of Water must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. The Department may waive the 24-hour time limit on a case-by-case basis.

For questions, please contact your regional MassDEP Drinking Water Program contact or email program.director-dwp@mass.gov.