How to Take a Routine Bac-T Sample

Midwest Assistance Program

Why Take a Water Sample?

A water system operator's first priority is to provide safe drinking water to the public that system is serving. The easiest way to insure that the water is safe for consumption is through bacteriological testing. A good bacteriological testing program will accomplish three things:

1) Prevent the spread of water borne diseases.
2) Limits the liability exposure for the water system
3) Helps identify system problems

Water testing may appear to be rather unimportant and boring. This is far from the truth, water testing is extremely important. If sampling is done correctly, it will prevent illness or even death. IT'S ALSO THE LAW.

The Montana Department of Environmental Quality (MDEQ) and the Environmental Protection Agency (EPA) require that all public water supply systems sample the water that is provided to the public on a regular basis.

When to Sample

As mentioned above, MDEQ and EPA require that all public water supply systems sample their water on a regular basis- for bacteriological growth. The number of samples that are required each month is determined of the population served.

Regardless of the size of the system, there are certain general principles that should be applied.

1) It is best to take the samples at the same time each month.
2) Select a time that is early in the month. (First two weeks)
3) Select a sampling day early in the week. (Monday, Tuesday, and Wednesday)

Why take the sample the same time each month? This will assist in long-term planning and insure that enough time is allotted to perform the sampling properly. It will also help other operators keep your sampling schedule up-to-date in case you are not available to take the sample.

Why select a time that is early in the month? This will ensure the operator enough time to resample if a sampling error occurred or a bad sample was detected. The operator would have time to be notified by the laboratory and ship a new sample or samples for testing. Sampling is recommended within the first two weeks of a month.

Why select a day early in the week? This will insure that the sample, when shipped, will arrive at the laboratory during the mid part of the week. If a sample were shipped later in the week it may arrive during the weekend when there may not be anyone to

begin the analysis. Samples must begin the analysis process within 30 hours of being collected. Samples over 30 hours old cannot be used for compliance purposes.

Shipping the Sample to the Laboratory

Talk with your local postmaster when determining the best way to send the sample to the laboratory. In some small communities the public mail service may not be fast enough. Ensure that the sample will reach the laboratory within 30 hours from time of collection. It is also important to know when the mail leaves the post office. An operator may not want to collect the sample at 8:00 in the morning if the mail does not leave the post office until 4:30 in the afternoon. Private shipping services may be an effective alternative.

It may be best for the system operator to personally deliver the samples to the laboratory or to the nearest shipping service that will ensure 30-hour delivery to the laboratory.

Where to Sample

The Coliform Rule requires that each water supply system develop and follow a written sampling site plan. Each plan must specifically identify sampling points throughout the distribution system. Sampling plans must be approved by the regulatory agency and it will be necessary to check with your regulatory agency to determine if any additional information is needed before submitting the plan.

The owner or operator of the water system prepares the sample site plan. The plans are simple maps that show in detail the water source, treatment, storage, distribution system and pressure zones. The site plans are used to identify where the routine and repeat samples will be collected. Specified numbers are assigned to each site and used on the monitoring report forms sent in with water samples.

Most sampling sites are rotated across every three months. This ensures that the entire distribution system is being monitored on a rotating basis. Each sampling site should be marked on the map. The address and which months' sampling occurs should be labeled on the map. If repeat samples are necessary, the sample sites should also be marked on the map and labeled repeat sample locations. Also on the map the system should have three alternative sampling sites, in case of emergencies.

Example 1:

> **If a water system were required to submit one (1) bacteriological sample per month, the sample site plan would have a total of three (3) routine sampling sites indicated by a number and repeat sample sites for all three sampling sites. There would also be three (3) alternative sampling sites labeled on the site plan.**

Example 2:

If a water system is required to submit three bacteriological samples a month, the site plan would have a total of nine routine sampling sites indicated by a number and repeat sample sites for all nine sampling sites. There would also be three alternate sampling sites labeled on the site plan.

Sampling site plans are extremely helpful when discussing monitoring results with the regulatory agency, identifying monitoring problem areas, and conducting sanitary surveys and other inspections.

The Sampling Site

Distribution System-Wide Selection

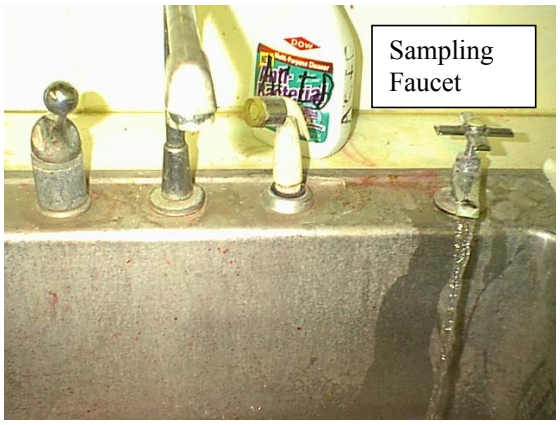
Sampling locations should be chosen to systematically cover the entire distribution system. Trouble spots, such as dead ends or low flow areas, **SHOULD NOT** be avoided. This can reveal localized contamination.

Outdoor Faucets

Outdoor faucets should not be used because of the possibility of contamination on the surface and interior of the faucets. Frost-freeze hydrants should not be used either. The chance of contamination is **greatly** increased by the elements of Mother Nature, animals, children and dust coming into contact with the faucets.

If a sample must be taken from an outdoor faucet, use extreme caution. Avoid dust, splashing, rain, snow and other sources of contamination. The faucet should be disinfected and flushed for a period of time to ensure disinfectant has been removed.

Indoor Faucets



Indoor faucets in a clean area are the best sites for sampling. Make sure the faucet is not connected to a water softener, in-line filtration units, or hot water heater. These types of connections would not supply the water that is representative of the water in the distributions system. Avoid sampling from faucets that have swiveling heads, faucets with the hot and cold water under the same valve, or faucets with leaking valves.

Systems should be disinfected after repairs or new plumbing has been installed prior to collecting bacterial samples. Samples may not be collected from a disinfected system until 72 hours have elapsed since the disinfectant was flushed from the system.

Some circumstances may require that the water system install a separate faucet that would be used only for water sampling needs.

Other Types of Faucets

Mixing Faucets (faucets where hot and cold water come through same tap) should not be used because water passing through the "hot" waterside may not be representative of the water in the distribution system. Water in the hot water tank is more likely to grow bacteria because the warm water may promote growth.

Threaded taps should be avoided as a sampling site. Bacteria can grow in the grooves of the threads. NEVER take a sample from taps that are clearly contaminated (scum or build-up around tap and base of faucet).

Avoid collecting samples from the following faucets:

1) Faucets supplying dishwater in cafes, coffee shops and other eating establishments are higher-than-usual possibilities for bacterial growth.

2) Swing spouts - bacteria can grow where the faucet pivots.

3) Faucets positioned close to the bottom of the sink or the ground.

4) Leaky faucets or faucets that allow water to seep around the valve stem.

These types of faucets can introduce contamination into the sample.

It is becoming extremely difficult to locate faucets that are not of the types mentioned above. A representative sample may be taken from some of the types mentioned above, if a good sampling technique is used. Remember that if one is used, your chances of contamination are greatly increased.

The Sample Container

Most laboratories supply sterilized and chemically pretreated containers to be used in taking a water sample, along with an approved mailing carton, forms and a cold pack to keep samples cool.

The container should have a wide mouth and capacity of at least 125-ml. Use only containers that have been supplied or approved by the laboratory that will be conducting the water testing.

The caps used on a sample container must be sterilized just as the containers are. Always examine sample containers when they are received from the laboratory. If any of the caps are loose, off or cracked discard damaged containers and call the laboratory for additional sample containers.

Use only sample containers that were recently sent to the water system. Containers that have been stored for a period of time could have increased chances of being contaminated.

Be sure that all sample containers have labels. Each container should have a label to write the date, time, location, samplers' name, water systems name and PWSID. Also ensure that the necessary forms are sent from the laboratory to ensure proper analysis of the sample.

Disinfecting the Sampling Site

Sometimes it is necessary to disinfect the sample site before the sample is taken. The preferred disinfection techniques is wiping the surface of the fixture with bleach or spraying bleach onto and into the faucet opening. Allow bleach to air dry before flushing the faucet. Remember when using bleach, ensure that the fixture has adequate time to flush. Any residual from the bleach will give an invalid sample result.

Heat is another recommended disinfecting process. The sampling fixture can be heated with a torch to disinfect it. This technique may remove any local contamination so that the operator may get a representative sample of the water in the distribution. If heating or flaming the fixture is done, remember that this may create a fire hazard. Also, the heat from this process could melt any plastic fixtures, mar the finish of the fixture, or damage the valves and seats. If this happens the utility department may be liable for damages.

Water Sampling Procedure

Step 1

Remove any attachments on the faucet. Look for aeration devices, hoses, water purification devices and screens.

Step 2

Turn on the water and allow it to run in a steady stream for 5 to 6 minutes. This will ensure that the line is flushed sufficiently to get a representative sample of the water from the distribution system. Additional time might be needed if the water tap is located a long distant from the main distribution line.
ALWAYS SAMPLE THE COLD WATER, NEVER SAMPLE HOT WATER

Step 3 (USE EXTREME CAUTION)

After the lines have been flushed, open the container. *(The use of latex gloves will reduce the chance of contamination from the sampler.)*

Do not set the container cap down! Hold it with fingers away from the edge and away from splashing water. DO NOT hold the lid upside down.

Do not rinse the container, and do not allow the container to overfill. This may wash out any de-chlorinating agent provided by the lab. If this happens, discard the container and take a new sample using a fresh container.

Step 4

Grasp the container near the bottom (see picture above). NEVER touch the inside of the cap and the container.

Quickly position the container under the flowing stream of water. Ensure that the water stream is maintaining a constant stream. Also, be sure water from the outside of the faucet is not dripping into the bottle during collection. DO NOT allow the container or cap to touch the faucet or tap.

Step 5

Fill the container to the neck or indicated fill line. This will ensure that the proper amount of water has been collected. 100 ml is the minimum the laboratory must have to conduct a test. DO NOT over fill the container. Never allow container to overflow!

Step 6

Affix the cap on the container as soon as it is filled and removed from the flow. Check to make sure that your container is properly sealed, as the sample will leak if not properly sealed.

Step 7

Turn off water and re-attach any fixtures or attachments that were removed.

Step 8

Using a waterproof ink pen, label the sample container. The label should have the date and time when sample was taken, location of sample site and sampler's name and PWS number. Some samples also need to have the chlorine residual and any preservatives that were added to sample.

Complete the required sampling forms and chain of custody forms that the laboratory sent with the sample containers. These sampling forms require a public water supply identification number, the time and date the sample was taken, the location, sample container size, the samplers name, address and telephone number. Plus the results of any field-testing completed on the sample, such as pH, chlorine residual and temperature. The sampling forms must indicate what type of testing (monthly Bac-T, VOC's, Lead and Copper.) is need for each sample container. Take note of anything unusual about the sample (strong odors or color) and write it down on the form, also.

Step 9

Place the filled container, cold pack and completed forms into the shipping container that the laboratory sent.

Make sure your address and the laboratory's address is correctly labeled on the shipping container.

Remember that samples must begin the analysis process, at the laboratory, within 30 hours from the sampling collection time.

Step 10

CLEAN THE SAMPLING SITE!

It's important to leave the sampling site clean for reducing contamination of future samples and maintaining good public relations with your customers.

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