

## STANDARD OPERATING PROCEDURES FOR SAMPLING

Correct sampling of water is paramount for obtaining accurate numbers to report on the Discharge Monitoring Reports (DMRs) and for operation of the waste treatment facility. Without accurate numbers the facility cannot be operated to the best of its ability. Bad sampling can cause plant operational problems and can cause the facility to have violations that may cause fines or an enforcement action. Poor sampling may cause the facility to pay for an upgrade that is not necessary, or not construct an upgrade when one is necessary to keep the facility producing clean water. Poor sampling can also cause operational adjustments that are not needed or that can harm the plant processes.

What is a good sample? A good sample is one that is representative of the water and/or wastewater in that location. The operator uses the results of sampling to adjust the processes to be optimized for treatment of the water it is receiving.

### HOW TO TAKE A GOOD SAMPLE

Locate a sample point that is representative of the liquid you want to sample, making sure the location is safe and easy to access. Refer to your discharge permit to ensure your sample locations are representative of what is required in the permit.

The influent sample must include all waters entering the plant from the collection system but before side streams are introduced. Sometimes it is a wetwell for the lift station; sometimes it is the actual flow channel just as it enters the plant. The sample point may be in a manhole on the influent line to the plant. The influent sample can be either a grab sample or a composite sample. If the sample is a grab sample, the sample is dipped one time and then the bottles are filled from that dip. If a composite sample is required, it should be collected over a 24-hour period. The reason the sample is a 24-hour composite is that the flow changes during the day and you may miss the high loading times or only get the high loading times of discharge into the facility. The discharge permit allows a composite sample to be collected that is a minimum of four (4) aliquot samples taken at least two (2) hours apart but to not exceed the 24-hours. An aliquot of the sample collected (a portion of the total volume collected) is used for each sample analysis. These should be kept at or below 6°C until all aliquots are collected. Once the composite sample is complete, mix well, and pour into the laboratory sample bottles without touching the inside of the bottles. The samples poured into the laboratory bottles should not have large chunks of material and should be poured from a well-mixed composite sample. Read the definitions in the permit for each type of sample.

Effluent samples should be collected at the last point of control by the facility. The permit will designate a location for the effluent sample. The sample is usually collected as the water falls over a weir or at the end of a flume. The sample in a mechanical plant is usually a 24-hour composite, while lagoons are usually a grab sample. The lagoon samples have a minimum

number of days to mix. A grab sample may be authorized as a representative of the water being discharged.

Operational samples should be collected between unit processes and from return (recycle, side stream) flows. These samples indicate to the operator how each unit process is performing i.e. Is it doing what it is designed to do? For example: Is there excess grit being passed down stream? Are solids being settled out in the primary clarifier? Is total phosphorus increasing after the anaerobic zone? Is ammonia being removed in the aeration basin?, etc. Sample results will indicate to the operator what loading the next unit process is receiving. This information will allow the operator to make changes to treat the water to the best of the ability of the system.

Each type of analysis has a standard volume that is used in the analysis, a unique method of preservation, a specified time allowed to be held/stored before the sample is invalid, and type of container to be used (glass/plastic). See Attachment A. Samples can only be preserved for a specific amount of time before the sample becomes invalid. When the samples are shipped to a lab at a location other than being immediately analyzed by the facility, the samples must arrive at the laboratory at a temperature of 6°C or less but not frozen. Any temperature above the 6°C and the samples are invalid and must be resampled.

Make sure the Chain-of-Custody form is completed. This document is required to prove who handled the samples and when. The Chain-of-Custody must have the name of the facility, who took the sample, who receives the results, telephone number, and email address. The Chain-Of-Custody must also list each sample, sample type (water, wastewater, solid, etc.), the analysis required, date and time of the sample. The Chain-of-Custody must be signed by the sampler, and when it is given to the next person in the Chain-of-Custody, it must be signed as accepted from the person handing over the samples. Each person that handles the samples must record that they received the samples with their signature, time and date; and they are required to keep a copy of the Chain-of-Custody. If the sample is shipped, the shipper (UPS/FEDEX) does not have to sign the Chain-of-Custody. The cooler that is used for shipping will be sealed and contain the samples, ice, and the Chain-of-Custody document in a plastic bag. The laboratory will also sign the Chain-of-Custody when they receive it from the shipper. When the samples get to the lab, the temperature of the samples should be obtained by the lab and recorded on the Chain-of-Custody. The Chain-of-Custody should also record if the samples are shipped and received with ice. The lab will send you a copy of the results and the Chain-of-Custody. All pages of the laboratory report must be maintained for a minimum of three (3) years by the facility.

If there are any questions about sample collection or preserving the samples, contact the laboratory, DEQ personnel or Montana Rural Water Wastewater Circuit Rider.