**Attachment C.**

norweco®

# SINGULAIR® BIO-KINETIC® SYSTEM
# EFFLUENT GRAB SAMPLING
## PROCEDURES AND GUIDELINES

Effluent grab sampling must follow specific procedures and guidelines. Analysis of improperly collected or contaminated effluent samples will result in data that could lead to an incorrect conclusion regarding treatment system operation. Conversely, laboratory analysis of properly collected effluent samples will generate data that can be used to evaluate actual treatment system performance. *"The objective of sampling is to collect a portion of material small enough in volume to be transported conveniently and yet large enough for analytical purposes while still accurately representing the material being sampled."* (*Standard Methods for the Examination of Water and Wastewater.* 20th Ed.)

### SINGULAIR SYSTEM INSTALLATION

The sample collection point should be as close to the discharge of the Singulair system as practical, but upstream of any process that would alter the parameters that are being tested. The primary design consideration for grab sampling is for the effluent flow stream to be free-falling at the point of collection in order to prevent the accumulation of solids that occurs if the sample is withdrawn from a sump. As most pollutants are measured as a concentration (i.e. mg/L), any accumulated solids withdrawn during sampling will result in a false positive reading rather than a true representation of the solids in suspension in the effluent flow.

- During Singulair system installation, the effluent pump chamber should be located as close as possible to the Singulair system outlet to eliminate a long effluent sewer line that can accumulate debris and settlable solids.
- The Singulair system and effluent pump chamber must be installed with the appropriate mounting castings and risers so that access to all chambers is possible from finished grade.
- The bottom of each access opening cover on both the Singulair tank and the pump chamber must be 2" above finished grade to prevent dirt and debris from entering the chamber when the covers are removed.
- The effluent sewer line from the Singulair system must be installed into the pump chamber far enough so that the end of the effluent sewer line is located beneath the pump chamber access opening and is easily accessible from grade. The end of the pipe must be accessible for cleaning and there must be sufficient distance below the bottom of the pipe to allow a free-falling sample to be collected.

### PREPERATION FOR SAMPLING

Personal safety should be the first consideration during any sampling event. The same safety precautions exercised in any area of wastewater treatment should be taken during effluent sample collection. Proper eye protection and disposable gloves should be worn. Always wash hands thoroughly following any sample collection and especially before handling any food. The use of hand sanitizing lotion is recommended.

- A sterilized sample bottle with a sterilized cap supplied by the certified laboratory that will perform the analysis must be provided for each sample to be taken. Normally, only one sample bottle is required for BOD and TSS analysis. However, check with the laboratory conducting the analysis for the minimum sample size required.
- Prior to sample collection, the effluent pipe between the Singulair system and the effluent pump chamber must be cleaned and sterilized. Due to gravity flow conditions, the effluent pipe will rarely flow full of effluent. Typically, effluent flows through only a small section of the bottom of the pipe. The remainder of the pipe above the normal flow line is exposed to all types of environmental factors. Dust, leaves, plant spores, insects and even small animals may have access to a partially full effluent pipe. This foreign material can and routinely does collect in the pipe during low flow/no flow conditions and could be washed into the sample bottle when routine flow is present. For this reason, the interior of the entire length of effluent pipe and the exterior of the pipe in the vicinity of the sampling area should be cleaned and sterilized prior to collection of the sample.
- If possible, the interior of the entire length of pipe between the Singulair system and the effluent pump chamber should be cleaned using a 4"-6" diameter bristled brush. Soap and water or a liquid detergent solution should be used. After cleaning the effluent pipe with the bristled brush, swab the entire length of the interior of the pipe with a 4"-6" diameter sponge and fresh water. After swabbing the pipe, soak the sponge in bleach or peroxide and disinfect the interior of the pipe and the exterior of the pipe in the vicinity of the sampling area.

**Attachment C (cont.)**

# EFFLUENT GRAB SAMPLING (Page 2)

- A Singulair system can be effectively sampled only when there is effluent flow. Due to intermittent residential flow patterns, there may not be effluent flow at the time designated to collect a grab sample. Hydraulic flow may be induced into the Singulair system in order to generate effluent for grab sampling. With the detention time designed into every Singulair system, water flow induced into the system inlet or pretreatment chamber in order to generate effluent will undergo full treatment before reaching the system outlet. Keep in mind that the induced flow must be typical of the incoming flow rate. An excessive surge flow into the Singulair system may create a washout of solids that can be carried into the sample container. This effect will skew certain test results dramatically.

## SAMPLING EQUIPMENT CHECKLIST

- ❑ 4"-6" diameter bristled brush with handle and extensions
- ❑ 4"-6" diameter sponge with handle and extensions
- ❑ Cleaning soap or detergent solution
- ❑ Liquid bleach or peroxide
- ❑ Sterilized sample bottles with sterilized caps
- ❑ Bottle holder with handle and handle extensions
- ❑ Cooler of adequate size to store sample bottles
- ❑ Ice to cover sample bottles stored in cooler

## SAMPLE COLLECTION

Once Singulair system effluent is flowing freely into the pump chamber and the sterilized sample bottle is in position to collect the effluent, carefully place the mouth of the sample bottle directly into the falling stream of effluent and collect the sample. Be careful not to touch the effluent pipe with the mouth of the sample bottle. Fill the bottle nearly to the top. Be careful not to overflow the bottle. Some prepared bottles contain stabilizing agents that will be diluted if the bottle is allowed to overflow. Leave an air space above the sample liquid of approximately 1% to 5% of the container volume to allow for thermal expansion during shipment.

- Under no circumstances should the sample be collected by dipping into the pump chamber or any other sump (such as a distribution box).
- Care must be used when handling an open sample bottle to prevent contamination from environmental factors. Airborne dust, insects, blades of grass or any foreign material coming in contact with the sample bottle or cap other than the free-falling effluent will contaminate the sample. Even a properly collected sample can easily become contaminated if the container is allowed to touch the side of a chamber or access riser or if dirt or other materials are allowed to enter the bottle.
- The volume of sample required for proper analysis varies according to the test performed. Consult with the certified laboratory performing the analysis to determine the exact volume of sample to be collected.
- Once the sample has been collected, carefully remove the bottle from the effluent flow stream. Be sure not to touch the mouth of the bottle against any surface. Cap the bottle with a sterilized cap.
- Carefully label the bottle per the recommendations of the laboratory performing the analysis. As a minimum, the following information should be included:
  - A unique sample identification number
  - The source of the sample collection (i.e. pump chamber influent pipe)
  - The date and time the sample was collected
  - The name of the operator who collected the sample
  - The name and address of the Singulair system owner where the sample was taken
  - Prior to placing the sample in storage, note in the operators' log book the visual appearance and odor of the sample.

## SAMPLE STORAGE AND PRESERVATION

The sample bottle must be delivered to the certified laboratory performing the analysis on the same day the sample was collected. Proper storage and sample preservation is essential during transportation.

- All sample bottles must be stored in a cooler and the bottles must be completely covered with wet ice. Chilling the sample bottle and keeping it chilled during transportation is essential for sample integrity. Sample bottles must be chilled to a temperature of 4° C. There is no danger of over-chilling or freezing the sample.
- Invalid data will result if the sample is held for a longer period of time than guidelines permit. For this reason, sample bottles shall be delivered to the certified laboratory conducting the analysis the same day the sample is collected. Laboratory operating hours, weekend and holiday schedules all need to be considered when planning sample collection.

## SUMMARY

The result of any laboratory analysis can be no better than the sample on which the analysis is performed. Improper sampling means laboratory analysis and data evaluation is a total waste of time, money and resources. The biggest problem is, once the sample is submitted, it is then too late for anyone to determine if proper methods were used during sample collection.