

**NORTH CAROLINA DEPARTMENT OF HEALTH AND HUMAN SERVICES  
DIVISION OF PUBLIC HEALTH  
ENVIRONMENTAL HEALTH SECTION  
ON-SITE WATER PROTECTION BRANCH**

<b>CONTROLLED DEMONSTRATION WASTEWATER SYSTEM APPROVAL</b>
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CONTROLLED DEMONSTRATION NO: CDWS-2007-01-R1

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For:                            Norweco Singulair Bio-Kinetic with the Hydro-Kinetic Bio-Film Reactor advanced wastewater pretreatment units for 500 gpd, 600 gpd, 750 gpd, 1,000 gpd, 1,250 gpd, and 1,500 gpd Model TNT Systems and the Singulair Green Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor advanced wastewater pretreatment units for 500gpd and 600gpd Model TNT Systems

Approval Date:            March 23, 2007  
                                  March 13, 2015                    Addition of Singulair Green Bio-Kinetic unit and Hydro-Kinetic Bio-Film Reactor

In accordance with General Statute 130A-343, 15A NCAC 18A .1969 and 1970, a proposal by Norweco, Inc., for a revised approval of their subsurface wastewater systems has been reviewed and found to meet the standards of a controlled demonstration system when all of the following conditions are met.

I. General

- A. Scope of this Controlled Demonstration Approval includes:
  - 1. Design, installation, and operation and maintenance guidelines of Norweco Singulair Bio-Kinetic systems to meet TS-I or TS-II effluent standards in accordance with Rule 15A NCAC 18A .1970. Refer to Rule .1970(a) Table VIII – Effluent Quality Standards for Advanced Pretreatment Systems for treatment performance levels.
  - 2. Operation, maintenance and monitoring activities of Norweco Singulair Bio-Kinetic systems and subsurface systems to ensure the treatment performance standards are met.
  - 3. Proposal for evaluation of this controlled demonstration system.
  
- B. This Controlled Demonstration Approval is applicable to domestic strength sewage systems (non-industrial wastewater) utilizing Norweco Singulair Bio-Kinetic systems that have a design flow not exceeding 600 gallons per day.
  
- C. Use of Norweco Singulair Bio-Kinetic systems for facilities with an influent waste strength that exceeds domestic septic tank quality effluent standards pursuant to Rule 15A NCAC 18A .1970(b)

may be proposed by Norweco, Inc. and a North Carolina Professional Engineer to the Department for review and approval on a case-by-case basis, prior to permitting by the local health department (LHD). The system design must include the proposed raw wastewater strength (BOD<sub>5</sub>, COD, TN, TSS, fats, oils and grease, etc.), the expected organic loading rate (in pounds of BOD), and hydraulic loading rate on the pretreatment system, and the calculations, references, and any other needed information to support the proposed design.

- D. In addition, any site utilizing these systems shall have sufficient alkalinity to perform the proper amount of nitrification. The influent also shall not have a pH, or toxins that significantly inhibit microbial growth.
- F. This controlled demonstration is initially limited to 15 systems. Up to 10 additional systems may also be considered after five systems have at least two consecutive quarters of performance compliant with applicable standards. The intent of this Controlled Demonstration is to gain field experience sufficient to qualify this system for Innovative Approval, pursuant to Rule .1969(g).
- G. Use of Norweco Singulair Bio-Kinetic systems that have a design flow exceeding 3,000 gallons per day may be permitted after approval by the Department on a case-by-case basis in accordance with the Large Systems State Review/Approval Process (Rule 15A NCAC 18A.1938).

## II. System Description

The Norweco Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor advanced wastewater pretreatment units Model TNT systems consist of a three compartment tank with the first compartment as a pretreatment tank, the second compartment as an extended aeration tank, and the third compartment as a final clarification tank. The Bio-Kinetic system is installed in the third compartment. The third compartment also includes a flow equalization device installed at the tank outlet end. The Norweco Hydro-Kinetic Bio-Film Reactor follows the Bio-Kinetic unit. The Hydro-Kinetic Bio-Film Reactor is in a high density polyethylene (HDPE) tank. For units with a design flow greater than 750 gpd, two Hydro-Kinetic Bio-Film Reactors are installed following the Bio-Kinetic unit and the flow is split between the two reactors. The Norweco Singulair Green Bio-Kinetic Model TNT system is a three compartment polyethylene (plastic) tank. Both systems are equivalent in terms of performance. For TS-II systems, the selected disinfection device shall be installed after the Hydro-Kinetic Bio-Film Reactor.

## III. Siting Criteria

- A. Sites may be used for the initial installation of a Controlled Demonstration system when they meet the requirements of this Section and the criteria for a conventional, modified, alternative, approved innovative or accepted wastewater system. The site shall have a repair area of sufficient size to install such a system and the Manufacturer agrees to provide another approved system if the Controlled Demonstration system fails to perform properly. Exceptions to the repair area requirement are as set forth in Rule .1969(f)(3) and (4).
- B. Controlled Demonstration pretreatment systems may also be used as a repair to an existing malfunctioning system when there are no other approved or accepted repair options and when designed by NC Professional Engineer.
- C. The Norweco Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor systems and associated

drainfields shall be sited and sized in accordance with Rule .1970 for TS-II systems. Drip irrigation systems used with Norweco Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor systems shall be sited and sized in accordance with the manufacturer specific drip approval.

IV. System Sizing

The system sizing criteria shall be based upon the long term acceptance rate specified in the appropriate portion of the rules or the Innovative and Experimental system approval for the type of ground absorption system to be used.

V. Special Site Evaluation

A special site evaluation may be required based on the proposed ground absorption system. Refer to manufacturer specific drip approvals and Rule .1970(p).

VI. Design Criteria

- A. The Norweco Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT systems shall be designed in accordance with the following criteria.
- B. Prior to the approval of any individual system under the Controlled Demonstration approval, the manufacturer of all proposed tanks must be identified and tank construction details must be State approved as typically required for generically approved Residential Wastewater Treatment units.
  - 1. Buoyancy calculations shall be completed by a NC Professional Engineer on sites where a soil wetness condition is present within five feet of the top of the ground surface. The Professional Engineer shall make appropriate design modifications as needed.
  - 2. The following limitations on design flow are applicable:

System Model	Design Flow Limit
Singulair TNT-500	500 gpd
Singulair TNT-600	600 gpd
Singulair TNT-750	750 gpd
Singulair TNT-1000	1,000 gpd
Singulair TNT-1250	1,250 gpd
Singulair TNT-1500	1,500 gpd
Singulair Green TNT-500	500 gpd
Singulair Green TNT-600	600 gpd

- 3. For TS-II systems, a Norweco UV disinfection unit or a Blue Crystal disinfection tablet feeder and Bio-Max dechlorination tablet feeder shall be provided.
- 4. A Norweco Hydro-Kinetic Bio-Film Reactor will be installed following the Singulair Bio-Kinetic TNT systems for both TS-I and TS-II models. For TS-II systems, the Hydro-Kinetic Bio-Film Reactor will be installed before the selected disinfection method.
- 5. An example of the pretreatment layout is provided in Attachment A. See the RWTS approvals for RWTS-71 thru RWTS-74 for additional details.
- 6. Effluent samples shall be collected from the outlet end of the disinfection unit or a tap on the drainfield force main. The tap should be located before the spin filter for drip systems. The preferred location of the tap is in the pump tank discharge/riser assembly. Sample collection shall not commence until at least 30 seconds of continuous discharge through the sampling tap has been

- completed.
7. Influent samples shall be taken from the influent pipe to the treatment system.
  8. Each system shall incorporate a system for flow monitoring into its design. This shall be accomplished either by using a Norweco-provided tipping distribution box in the gravity-flow effluent line or in conjunction with the dosing system for drip or other pressurized dispersal systems. When used for flow monitoring, the tipping distribution box shall include a manufacturer-provided counter and data logger capable of recording the daily flow from the tipper counts for at least the last 30 days.
  9. The drainfield dosing tank shall be a state-approved tank sized in accordance with Rule .1952(c).
  10. Effluent from Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT systems may be conveyed to a gravity distribution nitrification field, or to a dosing tank for a pressure-dosed nitrification field, LPP field, drip irrigation drainfield, or any other drainfield type.
  11. All Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system installations shall include the Service Pro remote monitoring system and the Service Pro Control Center. Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system installations that include an effluent pumping station to a pressure manifold or LPP drainfield will be supplied with a Norweco ISC Service Pro control center that combines the controls and alarms for the Singulair aerator and effluent drainfield pump into one NEMA 4X enclosure. This control center shall provide for the flow monitoring capability required by Rule .1970(k)(3). When using a drip system, the flow monitoring capability shall be provided by the separate drip system control panel or the Norweco tipping distribution box.
  12. The Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT System tanks shall not be placed in driveways, parking areas, or areas subject to vehicular traffic.
- B. Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT systems shall be designed by a Norweco certified designer or North Carolina Professional Engineer.

## VII. Installation and Testing

- A. A preconstruction conference shall be required to be attended by the system designer, engineer (if required), Norweco licensed distributor, Norweco certified installer, and local health department (LHD) prior to beginning construction of the Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system.
- B. The Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system shall be located in compliance with the horizontal setback requirements of Rule .1950(a) and Rule .1970 and shall be located to prevent surface/subsurface water inflow/infiltration. The drainfield horizontal setback requirements are in accordance with Rule .1970 for a TS-I or TS-II systems
- C. All Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT systems shall be installed according to directions provided by Norweco. Additionally, all Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system and components used with, but not manufactured by Norweco, Inc. shall be installed in accordance with all applicable regulations and manufacturer instructions.
- D. All individuals/companies installing Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system shall be in possession of all necessary permits and licenses before attempting any portion of a new or repair installation. The company/individual must be a Level IV installer and Norweco certified.

- E. Watertightness of the tanks and any dosing tanks shall be demonstrated by either a 24-hour water leakage test or a vacuum test conducted at the installation site. A water level change of 1/2 inch or more over 24 hours, or visual observation of leakage shall be cause for failure of the watertightness test.
- F. Prior to Operation Permit issuance, the Norweco certified system installer and the engineer or designer of record shall conduct an inspection/start-up of the Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system and all associated system components. The LHD personnel and the ORC will attend and observe the inspection/start-up. An acceptance letter from the installer and engineer/designer shall be provided to the LHD prior to issuance of the operation permit.
- G. Specified site preparation steps and construction specifications for the ground absorption system shall be strictly adhered to, including specified depth of trenches in relation to site limiting conditions, cover material specifications (if needed), trench installation method, etc.

#### VIII. Operation, Maintenance, Monitoring, and Reporting

- A. Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system shall be classified, at a minimum, as a Type Vc system in accordance with Table V(a) of Rule .1961(b). Management and inspection shall be in accordance with Rules .1961 and .1970.
- B. All Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system require an operation and maintenance agreement between the system owner and Norweco, Inc., its authorized representative, or with a manufacturer authorized certified operator as per Rule .1970. The system shall be inspected by a Grade II biological wastewater treatment operator who is also a certified subsurface operator. The certified operator shall be either an employee of Norweco or authorized in writing by Norweco to operate and maintain the system. The operator must have proper equipment and training to access and program the control panels on site.
- C. All Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT systems shall be operated and maintained according to the latest version of Norweco's O&M manual.
- D. At each Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system inspection the ORC shall, at a minimum, observe, monitor, and record the following:
  - 1. Proper operation of system aerator, noting any unusual sounds or physical appearance.
  - 2. Air flowrate for the system aerator.
  - 3. Solids level in the aeration chamber.
  - 4. Clarity of effluent.
  - 5. Watertightness of tanks, risers, and pipe connections at the tanks.
  - 6. Cleaning, if needed, of the Bio-Kinetic filtration system.
  - 7. Operation of pumps, floats, valves, electrical controls, and alarms.
  - 8. Drainfield pump delivery rate (drawdown test), determination of the average pump run time, and drainfield dosing volume.
  - 9. Any structural damage, accessibility issues, adequate ventilation, excess odors, ponding of effluent, insect infestations, vegetative growth over the drainfield, or surfacing of effluent on the drainfield area.
  - 10. Samples of Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system influent and effluent as required.

11. Logging all work performed on the Service Pro website.

E. The ORC shall also conduct other additional observations, measurements, monitoring, and maintenances activities as specified in the Operation Permit and as recommended by the manufacturer.

F. Sampling

1. All sampling shall be done in accordance with Rule .1970(n)(3) and (5).
2. All systems shall be tested for effluent CBOD<sub>5</sub>, TSS, NH<sub>4</sub>-N, and fecal coliforms. Systems specified to meet TS-II shall also sample the effluent for TN. Influent shall be tested for BOD<sub>5</sub> and TKN.
3. Influent samples shall be taken from the influent pipe to the treatment system.
4. Effluent samples shall be collected from the outlet end of the disinfection unit or a tap on the drainfield force main.

G. Notification and Performance of Maintenance and Repairs

1. The ORC shall alert Norweco, the LHD, and the system owner within 48 hours of needed maintenance or repair activities including but not limited to landscaping, tank sealing, tank pumping, pipe or control system repairs, media replacement, and/or adjustments to any other system component.
2. The ORC shall notify the system owner, Norweco, and the LHD whenever the pump delivery rate efficiency and/or average pump run times are not within 25% of initial measurements conducted prior to system start-up.
3. System troubleshooting and needed maintenance shall be provided to maintain the pump delivery rate and average pump run time within 25% of initial measurements conducted during system start-up.
4. The compartments will be pumped as needed upon recommendation of the ORC and in accordance with the Norweco system Operation and Maintenance instructions. However, at a minimum, the septic tank will be pumped whenever the solids level exceeds 25% of the tank's total liquid working capacity or the scum layer is more than four inches thick.
5. The tanks shall be pumped by a properly permitted septage management firm, and the septage handled in accordance with 15A NCAC 13B .0800.
6. All maintenance activities shall be logged and recorded in the ORC reports provided to the LHD.

H. Reporting

1. The ORC shall provide a completed written report to the system owner, Norweco, and the LHD within 30 days of each inspection. At a minimum this report shall specify:
  - a. The date and time of inspection,
  - b. System operating conditions measured and observed according to VIII.D and VIII.E,
  - c. Results from any laboratory analysis of any influent and effluent samples,
  - d. Maintenance activities performed since the last inspection report,
  - e. An assessment of overall system performance,
  - f. A list of any improvements or maintenance needed,
  - g. A determination of whether the system is malfunctioning, and the specific nature of the malfunction, and
  - h. Any changes made in system settings based on recommendations of the manufacturer.
2. Proposal for Evaluation and Reporting
  - a. The manufacturer shall maintain a contract for evaluation of the performance of the controlled demonstration wastewater system with an independent third party laboratory, consultant, or

other entity that has expertise in the evaluation of wastewater system and that is approved by the Department. The third party shall review the site-specific sampling and flow-monitoring protocol, collect and analyze the ORC inspection reports, sampling and monitoring data, and prepare Semi-Annual Reports summarizing all data for all the sites. These reports are due by January 31 and July 31 of each year, and shall include all data gathered through December 31 and June 30 of the previous six-month period, respectively. These reports shall provide information to the Department based upon the monitoring data and observations made from the Controlled Demonstration systems installed pursuant to this Approval. This should include an assessment of system performance in relation to the established treatment performance standards; an assessment of physical and chemical properties of the materials used to construct the system, in terms of strength, durability, and chemical resistance to loads and conditions experienced; recommended areas of applicability for the system; and any conditions and limitations related to the use of the system.

- b. Upon completion of the research and testing protocol, prior to Norweco completing any application to the Department for reclassification of the Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system as an Innovative System, and within a maximum of five years of the effective date of the first Controlled Demonstration System Operation Permit (CDSOP) issued pursuant to this approval, the approved third party shall prepare a Final Report to the Department that includes the results from all of the systems installed during the Controlled Demonstration, including sampling results, flow-monitoring information, ORC reports, etc., and provide recommendations on future use of the system. The Final Report shall be in electronic format and may be published on the On-Site Water Protection Branch's website without confidentiality. The contents of the interim and final reports shall not be altered from the original document without approval from Norweco.
- c. The research and testing protocol that has been agreed to is as follows:
  - A minimum of 50 complete data sets shall be collected from a minimum of 15 sites.
  - A complete data set includes the following information: influent BOD and TKN, effluent CBOD, TSS, NH<sub>4</sub>-N, TN, and fecal coliforms.
  - There must be at least 30 days between samples pulled from any one site.
  - Samples shall be collected from all sites. A site may be excluded if justification is provided that it is unsuitable as a test site. The samples from that site must be provided but will not be used as part of the data evaluation.
  - Each site shall produce a minimum of two sample sets collected over at least a 12 month period.
  - The samples will be pulled during a scheduled visit by the ORC.
  - A copy of the sample results will be provided to the On-Site Wastewater Branch after the analyses.

#### IX. Responsibilities and Permitting Procedures

- A. Prior to the installation of a Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system at a site, the owner or owner's agent shall fill out an application at the LHD for the proposed use of this system. The LHD shall issue an Improvement Permit or Authorization to Construct or amend a previously issued Authorization to Construct allowing for the use of a Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system.
- B. The Improvement Permit and Authorization to Construct shall contain all conditions the site approval is based upon, including the proposed use of the Innovative system. The Operation Permit will

include all conditions specified in the Improvement Permit and the Authorization to Construct.

- C. When a special site evaluation is required pursuant to Rule .1970(p)(1) or a drip approval, an evaluation and written, sealed report from a Licensed Soil Scientist regarding the site shall be provided to the LHD. The report shall contain the information as specified in Rule .1970(p)(2) and "Requirements for Submittals of Soil Reports and Pretreatment and/or Dispersal System Designs". The LHD may request the assistance of their Regional Soil Scientist in evaluating this report prior to permit issuance.
- D. The Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system shall be designed by one of the following: a Norweco, Inc. authorized designer or a North Carolina Professional Engineer.
- E. Prior to issuance of an Authorization to Construct for an Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system, a design submittal prepared by an authorized designer or a North Carolina Professional Engineer shall be submitted for review and approval by the LHD. The design submittal shall include the information required in "Requirements for Submittals of Soil Reports and Pretreatment and/or Dispersal System Designs".
- F. It is recommended that local authorized environmental health practitioners attend a design training session offered by the manufacturer/authorized representative prior to permitting the system. Also, at the request of the LHD, a Regional Engineer will review the design.
- G. A Norweco certified installer and engineer or company certified designer shall certify in writing that the Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system was installed in accordance with the approved design prior to Operation Permit issuance.
- H. A North Carolina Professional Engineer shall certify in writing that a system required to be designed by an engineer was installed in accordance with the approved plans and specifications prior to Operation Permit issuance.
- I. For sites required to be evaluated by a Licensed Soil Scientist or Professional Geologist (see Section V and IX.C), the health department may specify as a condition on the Improvement Permit and Authorization to Construct that a Licensed Soil Scientist or Professional Geologist oversee critical phases of the drainfield installation and certify in writing that the installation was in accordance with their specified site/installation requirements prior to the Operation Permit issuance.
- J. The ORC shall be present during the final inspection of the system prior to the issuance of the operation permit. The ORC shall be certified both as a NC Subsurface Operator and an authorized Norweco system operator.

X. Repair of Systems

The provisions of 15A NCAC 18A .1961(l) shall govern the use of the Singulair Bio-Kinetic with Hydro-Kinetic Bio-Film Reactor TNT system for repairs to existing malfunctioning wastewater systems.

Approved By: \_\_\_\_\_ Date: \_\_\_\_\_



Label is 4.75" long by 1.5" tall.

**NON-TYPICAL SEPTIC SYSTEM  
SINGULAIR CONTROLLED  
DEMONSTRATION.  
GRADE II WW OPERATOR REQUIRED.**

CDWS-2007-01-R1

March 13, 2015

Page 10 of 12



## 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. 20<sup>th</sup> 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 settleable 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.

## 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.
- 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.

### 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.

### 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.

**PROGRESS THROUGH**

***norweco***  
www.norweco.com

**SERVICE SINCE 1906**