

Odor Control: working in your neighborhood to protect public health and the environment

The Woonsocket Regional Wastewater Commission (WRWC) protects public health and the environment by treating 8 to 10 million gallons of wastewater every day. Being a good neighbor by controlling odors is a part of the normal operation of every treatment facility.

In 1988, the City contracted Synagro Inc. to operate the solid handling part of the plant including the operation of the plant incinerator

In 1999, the City contracted Veolia Water to operate the facility. Synagro and Veolia continuously monitor for odor releases and we respond in the following ways:

- Add chemicals at certain points in the plant.
- Install odor scrubbers using either wet chemicals or activated carbon in high-odor areas.
- Continually explore solutions to odor issues.
- Respond immediately to citizen complaints.

The Odor Hotline is staffed to answer all calls, 24 hours a day, seven days a week. By RI State law all operators at Synagro and Veolia must be Certified Wastewater Treatment Plant Operators; they continuously monitor the treatment process and are trained to respond quickly to odor-processing problems.

How to Report an Odor Complaint

Try to locate the location of the odor and report it immediately by either:

Calling the Odor Hot line at **401-356-1469**. This is the recommended method for immediate investigation by the staff.

Report the odor as soon as possible. Give the location of the odor and the time it occurred. This information will help the staff responding to locate the odor and take corrective measures to eliminate it.

Call the Odor Hotline at 401-356-1469

How Odor Calls Are Handled

A dedicated incoming telephone line is installed at the facility so surrounding neighbors can inform Synagro and Woonsocket WWTF of disturbing odors that may possibly be originating and migrating from the facility. All odor complaints are handled by answering machine for the purpose of recording all complaints so plant managers at both Synagro and Veolia can review and analyze the complaints at later time. Calls are received at the Synagro process control room. In the control room, answering machines record the caller's complaint and contact information. Additionally, immediately upon receiving a call on the Odor Hotline, the Synagro SCADA system identifies the incoming call and permanently logs it onto the computer. Odor Complaint protocol requires immediate acknowledgement and action. A plant wide

investigation is initiated by both Synagro and WWTF personnel looking for causes and/or any sources of odors. When identified, the problem is addressed as quickly as possible. An odor complaint form is filled out for each call received so that a written record can be retained and possible patterns can be identified.

What We Do With the Information

All odor complaints will be logged and reviewed.

Investigations will continue in any instance where an odor cannot be quickly identified.

A log of telephone calls is kept and reported to The City of Woonsocket as well as the Woonsocket City Council on monthly basis

What Is Wastewater?

Wastewater is liquid waste that originates at industries, households, commercial enterprises, schools, hospitals and infiltration. Wastewater is a gray liquid that is more than 99% water and less than 1% solid. Most of the liquid originates from drinking, cooking, bathing, flushing or industrial processes while the solids originate from food and human wastes.

Where Do Wastewater Odors Come From?

Naturally occurring bacteria play a major role in the food digestion process. In the digestive system, bacteria help break food down into chemicals that the body needs for energy and cell production. Not all of the food is used however, and some portion exists as human waste. Some bacteria will also exit with the waste. The bacteria will then continue the digestive process in the sewer pipes and treatment plant until all the food is either used up, or physically removed from the wastewater. A by-product of the bacterial digestion process is gas. These gases often have “objectionable” odors.

How Does the Plant Control Odors?

ODOR CONTROL EQUIPMENT INSTALLED BY SYNAGRO TECHNOLOGIES, INC.

The odor control system consists of equipment, procedures, a dedicated telephone hotline, testing instruments, and Supervisory Control and Data Acquisition (SCADA) integration. The Liquid Sludge Receiving Building, the Fluid Bed Combustor (FBC) Building, the Dewatering Building, the MHF Building, the laboratory and the blend tanks all have odor control equipment as described in the following.

Incinerator and Dewatering Buildings Wet Scrubber

The FBC Building, solids storage and receiving building, and the dewatering process area have centrifugal blowers that remove odorous air from these locations. The discharge of both of these blowers is connected to the inlet of a wet packed odor scrubber. Inside the wet packed odor scrubber is a reservoir of potable service water and hypochlorite. Fifteen percent (15%) hypochlorite solution is stored in the facility. This solution is pumped from the bottom of the reservoir to spray heads located below the demister. Potable water is constantly being added to this batch solution, six gallons every minute, with the



excess water removed through an overflow tube. The untreated air stream is forced through the bottom of the scrubber, up through the packing, and exhausts through the top of the scrubber to atmosphere. This facilitates the stripping of hydrogen sulfide (H_2S) from the air stream as it passes through the hypochlorite solution that is cascading through the packing. The hypochlorite solution is metered in to the scrubber as needed. A pH controller limits the amount added based on the pH of the batch solution. The oxidation reduction potential (ORP) of the batch solution is only measured, and is not used as a controlling point. This equipment creates a negative pressure environment inside the incinerator and the dewatering process areas, thus providing an air exchange into the building. To maximize the system's effectiveness, all doors and windows must be closed. Air leaving the building is treated through

scrubber. This prevents odors from migrating to outside areas.

Subsequent to the construction of the new FBC Building, duct work was installed from solids cake receiving building to the inlet air of the FBC. This increases the negative pressure in the odorous areas of the dewatering and solids storage building reducing the likelihood of odorous air leaving the facility.

Blend Tank Wet Scrubber



The on-site testing laboratory, the Liquid Receiving Building, and the blend tank are connected to the inlet side of a separate wet packed odor scrubber. The blend tank is equipped with a fiberglass-domed cover to minimize the migration of odors from the tanks. The discharge of the wet packed odor scrubber is connected to the inlet of a centrifugal blower. The outlet of this blower exhausts to the atmosphere. Inside the wet packed odor scrubber is a reservoir of potable water and hypochlorite. Fifteen percent (15%) hypochlorite solution is stored on site. This solution is pumped from the bottom of the reservoir to spray heads located below the demister. One gallon per minute of potable water is constantly added to this batch solution with the excess being removed through an overflow tube. The untreated air stream is pulled through the

bottom of the scrubber, up through the packing, into the blower and exhausts to the atmosphere. This facilitates the stripping of hydrogen sulfide (H_2S) from the air stream as it passes through the hypochlorite solution that is cascading through the packing. The hypochlorite solution is metered in as needed by a pH controller, based on reading the pH level in the batch solution. The oxidation reduction potential (ORP) of the batch solution is only measured, and is not used as a controlling point. This equipment creates a negative pressure environment inside the blend tanks, letting only air into the tanks. To maximize the

system's effectiveness, all access ports must be closed, with the exception of brief opening in the square man way for tank level viewing. All air leaving the tanks is treated through scrubber. This process prevents odors from migrating to the surrounding area.

Synergy's dewatering operator performs inspection's (rounds) every hour, 24/7/365. As part these hourly rounds he/she monitors various plant equipment including odor control equipment. Inspection of each odor scrubber includes equipment performance, bleach consumption and inventory, pH and ORP. This information is recorded and kept on file in the plant. If inspection reveals any non-conforming conditions, the operator is required to immediately identify the problem and make necessary repairs, or contact plant maintenance personnel for assistance as needed.

Procedures to Control Odors for Truck Offloading

Liquid sludge tankers and cake sludge dump trucks are received into the plant and offloaded in separate buildings. Each building is under constant negative pressure as air flows from the interior of the building through an odor scrubber before releasing into the environment.

Upon the trucks arrival, it is positioned to enter into the respective building. The automatic roll-up door is then opened and the truck is backed in. The building loses negative pressure while the door is open. The door is then immediately closed while the sludge is being offloaded to minimize the amount of time the building pressure will be equalized. When the truck is empty, the under carriage is inspected and cleaned to insure that any odorous material that may be on the equipment is washed away within the building. Only when the equipment is cleaned, then the door opened and the truck exits. The door is then immediately closed to restore negative pressure inside the building.



LIQUID SLUDGE OFF LOAD BUILDING



CAKE OFF LOAD BUILDING

ODOR CONTROL EQUIPMENT INSTALLED BY CITY AT THE PLANT

AMBI AIR SCRUBBER



Figure 1 - Administration Building AMBI Scrubber



Figure 2 - AMBI make-up water system

The AMBI Air Scrubber is standard wet down-flow water over media with the airflow being counter-current up through the media with mist eliminators in the riser stack. The air scrubber pulls potentially odor causing compounds from the plant drain area in the plant headworks. It is the typical stack design that utilizes water and a sodium hypochlorite solution to purify the air. The odorous air enters the unit near the bottom and is drawn up through a media of hollow plastic octagonal disks. A bleach solution is sprayed from a header near the top of the unit. As the air passes up through the media, the water solution falling down “washes” the air. The pollutants are removed from the air and fall into a sump which is then discharged to the headworks. Both pH and ORP are monitored continuously by the plant SCADA system to ensure proper operation of the scrubber. In 2013, modifications were made to the scrubber. A make-up water system was added to provide a steady flow of water to the scrubber solution allowing a greater odor reducing capacity. Additionally, a Plexiglas panel was installed to allow the operator to view the media and water flow.



Figure 3 - AMBI inspection port and media

CARBON AIR SCRUBBER



Figure 4 - Primary and Grit Tank Carbon Scrubber

The Carbon Air Scrubber is an air scrubber that pulls potentially odorous compounds from both Primary Clarifiers and both covered Grit Chambers. The air scrubber uses granular activated carbon to purify the air. Activated carbon is an excellent media for capture of organic compounds, which are the main cause of odors. The air enters the scrubber and as the air flows through the carbon, the organic odor compounds are adsorbed onto the carbon. The carbon requires replacement and proper disposal after it has become saturated with odors. The frequency of carbon change-out depends on the amount of odors entering the unit and requires testing.

ODOR CONTROL EQUIPMENT INSTALLED BY VEOLIA WATER AT THE PLANT

DUPLEX AIR SCRUBBER



The Duplex Air Scrubber removes hydrogen sulfide and other sewer odor causing compounds from the air stream of the Centrate Pumping Station, via mass transfer to an aqueous solution. Mass transfer is accomplished via counter-current contact of the air stream with aqueous solution on random packing material in the scrubbing towers. The system consists of two modular stages mounted on a skid, each configured to eliminate short circuiting of the air stream and to provide intimate contact with chemical solution for removal of hydrogen sulfide and other sewer odor causing compounds. System appurtenances include, but are not limited to, blower, control system, recirculation pumps, and chemical storage tanks. Both pH and ORP are monitored continuously by the plant SCADA to insure proper operation of the scrubber