Facilitator — Aug./Sept. 2012

Be a Grease Guru

Bob Cole

Work toward best practices for your restaurant's FOG procedures

Restaurant and foodservice kitchens produce a lot of grease, which makes its way into drain lines from innumerable sinks, dishwashers and cooking equipment. If the grease is not removed, it will congeal in the sewer or in the on-site septic system, causing blockages and back-ups.

In the United States, sewers back up an estimated 400,000 times annually, and municipal sewers overflow on 40,000 occasions. The U.S. Environmental Protection Agency has determined that sewer pipe blockages are the leading cause of sewer overflows, and grease is the primary cause of sewer blockages. Even if accumulated FOG does not escalate into blockages and sanitary sewer overflows, it can disrupt wastewater utility operations and increase operations and maintenance requirements.

For these reasons, nearly all municipalities require commercial kitchen operations to install an interceptor device to collect the grease before it enters the sewer. Additionally, local wastewater collection system communities have set up inspection programs to ensure these grease traps and/or interceptors are being maintained on a routine basis.

If you are like most foodservice providers, your local regulator has told you that you need something between your restaurant kitchen and the water treatment plant that allows your kitchen's drains to empty into a settling tank or grease interceptor. Most municipalities have varying regulations in place that protect their water treatment plants from the introduction of substances that could affect their operation, such as grease and sludge.

How Does it Work?
In urban and suburban areas where people are packed closer together and where there is significantly more wastewater to treat, communities will construct a sewer system that collects wastewater and takes it to a wastewater treatment facility.

In the ideal case, a sewer system is completely gravity-powered, like in a septic system. Pipes from each house or building flow to a sewer main that runs down the middle of the street. The sewer main might be 3 to 5 feet in diameter. Periodically, a vertical pipe will run up from the main to the surface, where it is covered by a manhole cover. Manholes allow access to the main for maintenance purposes.

The sewer mains flow into progressively larger pipes until they reach the wastewater treatment plant. In order to help gravity do its job, the wastewater treatment plant is usually located in a low-lying area, and sewer mains will often follow creekbeds and streambeds to the plant.

Normally, the lay of the land does not completely cooperate, and gravity cannot do all the work. In these cases, the sewer system will include a grinder-pump or a lift station to move the wastewater over a hill.

Once the water reaches the wastewater treatment plant, it goes through one, two or three stages of treatment (depending on the sophistication of the plant).

The first stage, known as primary treatment, does the same thing a septic tank does. It allows the solids to settle out of the water and the scum to rise. The system then collects the solids for disposal, either in a landfill or an incinerator.

Primary treatment is very simple. It involves a screen followed by a set of pools or ponds that let the water sit so that the solids can settle out.

Primary treatment might remove half of the solids, organic materials and bacteria from the water. If the plant does no more than primary treatment, then the water is chlorinated to kill the remaining bacteria and discharged.

The second stage, known as secondary treatment, removes organic materials and nutrients. This is done with the help of bacteria. The water flows to large, aerated tanks where bacteria consume everything they can.

The wastewater then flows to settling tanks where the bacteria settle out. Secondary treatment might remove 90 percent of all solids and organic materials from the wastewater, shown on right.

The third stage, known as tertiary treatment, varies depending on the community and the composition of the wastewater. Typically, this stage will use chemicals to remove phosphorous and nitrogen from the water but may also include filter beds and other types of treatment. Chlorine added to the water kills any remaining bacteria, and the water is discharged (Figures 7 and 8).

Municipalities will ask foodservice operators to assist them in this process by doing what is called pre-treatment. The process occurs before the effluent reaches the sewer lines and may require an interceptor connected to the kitchen drain to capture grease and solids from the building. Your interceptor acts similar to the primary treatment plant and allows the separation of grease and sludge from the water.

How Big?
There is no national standard for sizing your grease interceptors. Some restaurants base it on restaurant type (e.g., QSR or casual dining); others base it on number of seats or on the number of sinks. Some allow it to be internal, while others require multiple exterior tanks in a series. As you expand into a market, your contractor, architect or consultant will need to pull municipalities' codes to determine the appropriate size.

How Often?
How often also falls into a local jurisdiction determination. Here are samples of local regulations:

City 1: All grease traps must be emptied and cleaned every January, April, July and October or more often, if necessary, to prevent the introduction of wastewater containing more than 100 mg/l of fats, grease and/or oils into the city's sanitary sewer system.

City 2: All traps, separators or both shall be cleaned by a licensed liquid waste hauler as often as necessary to maintain at least 50 percent of the retention capacity.

In City 1, you would need to pump four times a year and use a method to poll a sampling of the particles in the tank to determine that you are within the limits. Assume you had a single 2,000-gallon tank and are paying $0.20 per gallon to pump. This equals a cost of $1,600 per year plus the cost of taking the sampling of the levels.

City 2 may have the same interceptor size requirement, but conceivably you could pump once every eight months, depending on your daily grease and sludge build-up. The average annual cost is less than $400.

The historic approach to maintenance has been a calendar preventive approach. Municipalities generally don't have the manpower to investigate every situation and resort to solving an overflow or high FOG situation by requiring all the restaurants on the feeder line to pump more frequently. This drives up the cost to the restaurant operation unnecessarily. Regulators are open to other alternatives as long as it solves their problem.

How to Reduce Costs?

There are many methods, technologies and products to help reduce costs in municipalities that provide a longer pump schedule. These include the following:

Best management practices:
• Installing drain covers in kitchen floors. Debris that moves through the drain lines to your interceptor will not only fill it up faster, but also can become lodged in pipes and create a possible back-up.
• Scraping food products into the garbage before washing. Any solids that get washed off in sinks and make their way into your tank will contribute to a faster fill up and may not get broken down until it moves downstream toward the treatment plant.
• Awareness. Educate the kitchen staff about items that can cause unnecessary expense. This can help bring the outliers back into best practices.

• Line jetting. Despite your best intentions, lateral pipes can periodically become clogged and will need to be power jetted to remove blockages. A planned approach added to best practices can protect against costly backups and ensure proper operation of the tank.
• Identify outliers. Drive best practices by having key performance indicators or data to identify outliers that are needlessly increasing operating costs.
• Outsource. Bring in outside partners to help manage this process and use best-in-class business scope. Consolidated pricing and invoicing can also help drive down costs. Products:
• Enzymes/bacteria. Similar to what treatment plants use to “eat” the grease/sludge, these products can be used in smaller doses in kitchen drains and added directly into the traps to reduce the grease and sludge in the trap.
• Citrus products. Natural citrus products also have the ability to “eat” or dissolve the amount of grease and sludge in the interceptors. Again, the municipality must be in favor of this product and the pH level needs to be evaluated with your interceptor manufacturer to ensure compatibility.
• Quality pump-outs: When a pump-out of your tank is required, either by regulation and/or by need, make sure your pumper completely pumps out the tank. Poor or partial pump-outs leave grease/sludge in the tank, which will not only cause the tank to fill up quicker, but could add to odor problems if left too long.

Technology:
• Sensors. Monitoring technology has expanded beyond energy management systems and now can provide “eyes and ears” inside tanks to help determine when the levels are at regulated requirements and need to be pumped, without the need to guess or lift the manhole cover to test.
• Score-carding. Sensors are also able to identify when a pump-out occurred and if it was a poor or partial pump-out.
• Overflow. Sensors can provide advance notification of a possible overflow so appropriate action can be taken prior to a costly event occurring.

Keeping a Watchful Eye
In conclusion, despite this being a regulated area of your operation, there still exist many opportunities to reduce cost, manage closer and be a good corporate neighbor to your local municipalities.

More and more municipalities are open to ways that can reduce costs to the businesses operating in their jurisdiction as long as they do not negatively impact the pre-treatment plants or cause unnecessary back-ups. Do not overlook something just because you are being told there is nothing you can do about it.

View All Articles