

Helpful Hints for Food Preparation Facilities

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Wastewater discharged from food preparation facilities, such as restaurants, schools, convenience stores, and some large office buildings with cafeterias, generally have two common characteristics. First, high oil and grease levels may result in the sewer becoming clogged with grease, thereby causing a problem for the discharger, as well as for the County. The grease must be removed in order for the sewer to properly function. This is cost to the discharger and to the County. The County Code has a 300 mg/l limitation for animal/vegetable derived oil/grease and a 100 mg/l petroleum derived oil and grease. Both limitations are enforced, including prosecution as a Class I misdemeanor.

Second, the County's Strong Waste Program monitors the discharge for BOD and TSS, biochemical oxygen demand and total suspended solids, respectively. The surcharge program in Henrico County, and numerous jurisdictions throughout the nation and Canada, applies additional "fees", or surcharge, to water and sewer bills for those customers that discharge waste streams greater than domestic concentrations. Our rates are based upon domestic, or residential, usage; therefore, a strong waste customer will pay a greater amount because his wastewater concentrations are greater.

The purpose of this guidance information is to assist you in lowering oil and grease discharges to the sewer, and to lower your strong waste concentrations, thereby minimizing any additional strong waste surcharges. **Whether lowering oil and grease, or BOD/TSS, concentrations, the actions to be taken are often the same.** The following, then, is a simple listing of those areas that should be considered when addressing problems with food preparation discharges.

- Minimizing the amount of food being discharged down the drains in the three compartment sinks and the dishwasher can lower high oil and grease, and BOD/TSS concentrations. Management of people's actions, then, is the first and least costly alternative. Food service personnel should be instructed to put as much of the discarded food material into the solid waste barrels as possible, **and not into the sinks.**
- Use strainers designed for the sinks and dishwashers to capture as much of the solid material as possible. Consider purchasing, or fabricating, strainers with smaller holes to capture more food particles.
- Maintain existing "pretreatment devices", such as **grease traps** and **grease interceptors**, on a frequency that will assure proper function of that device. Inside grease interceptors, generally, cost less, but also capture less, material that you are trying to keep from going down the sewer. Outside grease traps are more costly, initially, but are more efficient in reducing waste.

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Advantages of outside grease traps are numerous compared to an inside interceptor.

1. They provide greater settleability of the solids.
 2. They provide a greater detention time, thereby allowing the temperature of the discharge to be lowered. Grease can collect in the trap and not in the sewer.
 3. They are cleaned less frequently than inside interceptors.
 4. Outside traps should be pumped, not “skimmed”. Pumping rather than skimming can see substantial reduction in wastes.
 5. Provides a “quiescent zone” that enhances biological augmentation to reduce waste.
- Biological augmentation can lower oil/grease and BOD/TSS concentrations significantly, **under the right conditions**. The temperatures of the trap and detention time are important. Temperatures should **generally** not exceed about 110 degrees Fahrenheit. The detention time should be several hours. (One state requires 24 hour detention time.) Previous studies by the County have shown approximately (40) percent reduction in waste by using biological supplements.
 - Garbage grinders contribute an “abundance” of organic material to the sanitary sewer. This translates to very high BOD/TSS concentrations, as well as very high surcharges on water/sewer bills. Historically, when garbage grinders have been removed from the system, the concentrations are lowered by approximately fifty (50) percent.
 - The sewer lateral downstream of the food preparation facility can accumulate deposits of grease and other organic material. A hot discharge may possibly dissolve some of the grease and organic material and transfer that material downstream where it is being monitored. Periodic “jet cleaning” of the lateral, including the grease trap, can keep the line open and free flowing. It also has a tendency to lower the oil/grease and BOD/TSS concentrations.
 - A certain amount of BOD is soluble in water; therefore, it will not be removed from the discharge by mechanical devices. More elaborate methods may need to be employed for further BOD reduction.
 - Make sure that plumbing in the food preparation area does actually go to the interceptor or grease trap. There have been occasions where some floor drains and some sinks bypass the traps/interceptors. This is important when using biological augmentation.
 - Where possible do not locate the drain from a deep fryer next to a floor drain. The temptation is often great to discharge the fryer into the floor drain and not into the rendering barrel.

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Handy Definitions

Biochemical Oxygen Demand (BOD)

The biochemical oxygen demand, generally referred to as BOD, is a measure of the oxygen utilized by bacteria to reduce the organic material contained in wastewater. It is simply an indicator of the organic strength of wastewater. As the strength of wastewater increases greater amounts of energy are required to clean the wastewater. As the strength increases so do the costs to treat it.

Local Limitations

Local limitations are the discharge limitations developed for a specific treatment facility. They are just like categorical standards except that they are developed for only one facility. Like categorical standards they limit the amounts of dissolved metals, such as copper, chromium, lead, zinc, etc., and organic compounds such as benzene, toluene, and ethyl benzene from being discharged into the sewerage system.

Oil and Grease/Animal-Vegetable

The County has two limitations for oil & grease. The animal-vegetable derived oil & grease is more biodegradable than the petroleum based O&G, however, the impact on the sewerage system is greater. Vast amounts of oil & grease are released from food preparation facilities and accumulate in the down stream pipes necessitating the Operations Division to clean them more frequently.

Oil and Grease/Petroleum

The petroleum based oil & grease is not readily biodegradable and is generally toxic in larger quantities. Service stations, garages, and car dealerships are the main sources of this type oil & grease.

pH

pH is defined as the -log of the hydrogen ion concentration. To most of us however pH simply refers to whether a liquid is acidic or basic, sometimes also referred to as caustic. pH is important to us because a low pH, in the range of 2 or 3, will damage concrete pipe and ultimately result in a sewer collapse.

Sewerage System

A sewerage system is the network of pipes and pumping stations leading to a treatment facility. Sewerage and sewage are often used interchangeably, however this is not correct. Sewage is what passes through the sewerage system.

Strong Waste

This is a term applied to the relative strength of a commercial or industrial discharge into the County's sewerage system. If the discharge exceeds 250 mg/l BOD or 275 mg/l TSS it is considered to be a strong waste. By definition, if any commercial or industrial customer exceeds the threshold values that customer is automatically a "strong waste customer."

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Strong Waste Charges

When a customer exceeds the threshold values for BOD and TSS an additional charge is placed on the customer's water and sewer bill. The formula for calculating a strong waste charge is:

$$\begin{aligned} & (\text{Volume of water discharged to sewer}) \times (\text{Measured concentration of BOD} - \\ & \quad \text{BOD threshold}) \times \text{Current Rate} \\ & \quad \text{and} \\ & (\text{Volume of water discharged to sewer}) \times (\text{Measured concentration of TSS} - \text{TSS} \\ & \quad \text{threshold}) \times \text{Current Rate} = \text{\$ applied to bill.} \end{aligned}$$

Total Suspended Solids (TSS)

Total Suspended Solids refers to the combination of settleable solids and nonsettleable solids in wastewater. TSS, like BOD, is an indicator of the relative strength of the liquid. The higher the TSS concentration is the greater is the strength of wastewater. This is significant in the strong waste program where dischargers are surcharged on the strength of their waste.