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Seeing the Complete FOG Picture

FOG (fats, oils, and grease) is a major component of discharges from certain food service establishments. Homes and large food-processing facilities can also be significant contributors of FOG, the leading cause of public sewer system blockages and treatment plant upsets. The resulting sewer backups, access-hole overflows, and wastewater spills in turn lead to contamination and damage to homes, businesses, and the environment. The US Environmental Protection Agency (USEPA) in a report to Congress (2004) stated that "grease from restaurants, homes and industrial sources are the most common cause (47%) of reported blockages." More recent data compiled by USEPA indicated that more than 65% of spills nationwide may be caused by FOG (USEPA, 2009). However, although the need to stop FOG from clogging sewers and treatment plants is certainly an important challenge for local governments and publicly owned treatment works (POTWs), it is just the first step in what should be a comprehensive, cradle-to-grave approach to handling FOG.

Historically, FOG control was not a distinct management activity for POTWs' collection-system operation and maintenance. Collection systems clogged with FOG often went undetected until an overflow actually occurred. Clogs were simply pushed open to reestablish flow, and the FOG flowed in a slug to a treatment plant. As a result, there were severe problems at the plant such as handling FOG, odor from FOG, and clogging of plant equipment. Large amounts of FOG in a treatment plant also increase treatment costs for aerobic treatment processes and stimulate growth of undesirable and harmful filamentous microorganisms in the activated sludge process.

As the adverse effects of FOG in sewer systems have increased over time and utilities have identified FOG as the culprit in the majority of their spills, overflows, and maintenance costs, some local governments have taken action to protect facilities and educate the public about the problems caused by FOG. Grease is especially problematic because when it is hot, it is liquid and stays dissolved in water; however, as grease cools it solidifies, reduces conveyance capacity, and can ultimately block the flow of sewer water. The costs to perform sewer system maintenance associated with keeping sewer systems and wastewater treatment plants (WWTPs) clear of FOG can run in the hundreds of thousands of dollars per year for an average-sized sewer system.

The initial response by local governments on the cutting edge of this nationwide FOG dilemma has been to enact or modify pretreatment ordinances to impose and enforce FOG regulatory controls for food service establishments in an attempt to reduce interferences with WWTP operations. Some efforts have included establishing numeric pretreatment limits and/or requiring best management practices, such as the use and proper maintenance of interceptor or collection devices.

CONTROLLING FOG

Control strategies are a necessary first step in addressing the challenges posed by FOG. A local government should at a minimum have in place a well-written sewer use and pretreatment ordinance that specifically addresses FOG. The ordinance should require methods for the capture of FOG by food service establishments and other significant FOG generators. It should also include fees, fines, or other sources of revenue that will help offset the cost of inspections, pretreatment personnel, and clearing FOG from sewer lines and equipment. Local governments also need to invest in public outreach and education about sources of FOG, the issues with FOG, and the purposes of related ordinances.

The collection of FOG solids and semisolids in an effort to keep FOG out of the sewer system has created a secondary issue: What to do with the collected FOG material? FOG collected in grease traps and interceptors is often sent to landfills for disposal. This method of disposal has fallen into disfavor because it uses valuable landfill space, creates a potential source of groundwater contamination, and fails to take advantage of more environmentally beneficial options for collected FOG such as recycling, conversion to biofuel, or use in generating renewable energy (biogas). Each of these options poses its own unique challenges. Nevertheless, a complete approach to dealing with FOG cannot be limited to simply keeping FOG out of the sewer system.

FOG DISPOSAL AND RECYCLING

Some local governments expend great energy in controlling FOG, but there has been little focus on FOG disposal either nationally or locally. This is a liability for the regulated community. Disposal can be a problem for waste haulers if facilities that accept FOG are limited. This becomes a back-door way to defeat the effectiveness of FOG regulation because without an economical way to dispose of FOG, generators try to pump traps less frequently and waste haulers look for cheaper disposal methods that include illegal dumping.

The disposal of grease separated before entry into the sewer collection system is a major concern in the wastewater industry. What do you do with FOG kept from or removed from the collection system? Grease must be disposed of in an appropriate and environmentally sound manner. Current FOG disposal locations and methods are somewhat uncertain and in many situations unsustainable. If not handled properly, FOG disposal can be a cause of environmental contamination or the spread of disease. Sustainable, nonpolluting disposal options are an important component of any complete FOG control program.

With the current thinking, the solution to dealing with a growing amount of separated FOG solids has been to find a way to recycle or reuse FOG. Environmentally beneficial and cost-effective options for handling collected FOG include use as supplemental fuel, generating methane-rich digester gas, producing biodiesel fuel, and sending FOG to rendering plants to be converted to animal food, cosmetics, soap, and other products.

FOG can be used as a supplemental fuel for municipal solid waste incinerators, sludge incinerators, solid waste burners, and heat recovery systems. This use of FOG provides an incinerator with an inexpensive fuel source and the POTW receives revenue by charging tipping fees for disposal of FOG. Anaerobic digestion is used to treat wastes ranging from high-concentration industrial wastewater to municipal solids. An anaerobic digester breaks down the organic content of the feed stream into methane, carbon dioxide, and water. FOG can be added to the feed stream of an existing digester, resulting in significant revenue benefits. Finally, there has been success in using grease—even brown grease—in the production of biodiesel, but to date such production has been suppressed as economically unprofitable.

Municipalities should continue to educate the public about FOG and continue to remove FOG discharges from collection systems. Local governments should not simply try to avoid FOG altogether, however. The next step for local governments is to instead see FOG as an opportunity rather than only as a problem. An enlightened approach to dealing with FOG is to identify the ways in which a government can generate revenue from the beneficial use of FOG. Such efforts are a good public relations opportunity to enhance the reputation of the wastewater management industry.

FOG FACILITIES

While regulators are encouraging the creation of facilities that can provide these environmentally beneficial processes, state and local regulations and government officials might not be prepared to adequately permit or regulate such facilities or advise operators on the siting, operation, permitting, and regulatory issues that can be involved in building and operating a FOG or rendering plant. This appears to be the third major challenge in a comprehensive plan to address FOG.

USEPA does not have FOG-specific regulations; it addresses FOG in its regulation of sewer systems and treatment works. USEPA makes a priority of ensuring proper capacity, management, operations, and maintenance of collection systems, all of which require specific FOG management plans. USEPA also encourages alternatives to FOG disposal at landfills but has done little other than to establish some education programs and financial grants to develop productive FOG use. Similarly, state agencies don't seem to have identified recycling or productive use of FOG as a regulatory priority. This leaves local governments to implement innovative uses of FOG and, through trial and error, to identify successful approaches in either incorporating FOG plants at public facilities or permitting private FOG plants within their jurisdictions.

In either case, a local government would be well served by updating its land use regulations and implementing coordination among various departments (e.g., zoning, pretreatment, stormwater, and public works) before issuing the first approval for a FOG facility. A FOG dewatering, recycling, or biofuel production facility or other facility that handles FOG will have a number of siting issues. FOG-handling as an industry provides a number of public benefits and also includes aspects that some members of the public will find objectionable. Truck traffic, odor, the potential for spills, and concerns about the facility's effect on property values make the appropriate siting of a FOG-handling facility a potentially complicated issue. Local governments should specifically identify these facilities as requiring attention from all departments in order to ensure that the facilities are located in appropriate commercial- or industrial-zoned districts with sufficient screening or buffers from adjacent uses. The most difficult issue for FOG facilities is the likelihood of off-site odors, which can be minimized but not entirely eliminated. This is an issue with which any local government with a sewage facility located near a retail or residential property is likely familiar. However, with proper coordination and development of local ordinances, FOG facilities can be successfully sited, designed, constructed, and operated.

Seeing the full FOG picture will allow local governments to protect existing sewer systems through appropriate action and develop uses for collected FOG that will be environmentally and economically beneficial to their communities.

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