Primer for FOG Program Development

Options and Elements to Consider in Developing a FOG Control Program

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Table of Contents

EXECUTIVE SUMMARY

Sanitary sewer overflows (SSOs) are a major concern to wastewater agencies across the United States and can be attributed to many causes, including fats, oils, and grease (FOG), roots, poor conditions of the sewer lines, wet weather flows, or a combination of these sources. It is estimated that more SSOs are caused by FOG than by any other factor, prompting state and local regulating agencies to focus on FOG Control Program development as a key element of potential SSO regulations.

The primary goal of a FOG Control Program is to reduce SSOs and blockages and to protect public health and the environment by minimizing public exposure to unsanitary conditions. By controlling the discharge of FOG to the wastewater collection system, FOG buildup in sewer lines can be lessened, thereby increasing the system's operating efficiency and reducing the number of sewer line blockages and overflows. In addition, an effective FOG Control Program can minimize revenue losses associated with enforcement actions and the impacts of restricting public activities, such as beach closures.

This Primer for FOG Control was developed by IW Consulting Service, LLC (https://iwconsultingservice.com) as a tool for agencies who have determined that commercial wastewater discharge from Food Service Establishments (FSEs) requires regulation through a FOG Control Program. Information contained within is based on the successful experiences of many agencies and FOG control programs throughout the country.

Presented in the Primer are steps to be considered when establishing a FOG Control Program that includes installation and maintenance of interceptors, education of food service establishment operators, development of Best Management Practices (BMPs), and inspection and monitoring of the program participants. The approach involves the following tasks:

- Characterizing FOG sources
- Identifying collection system hotspots
- Determining regulatory requirements
- Identifying municipal agency structure
- Establishing an adequate legal framework
- Identifying funding sources
- Selecting a regulatory approach
- Establishing FOG handling and disposal practices
- Establishing a FSE and grease handler database
- Estimating a budget
- Providing outreach to FSEs
- Developing an inspection and monitoring approach

The guidance provided in the document should be adapted to the unique characteristics of the individual programs under development. Each municipality will need to determine what elements are appropriate to implement based on their individual data reviews. Not all of the steps are required for each program. An agency may selectively implement steps or develop the FOG Control Program in phases.

BACKGROUND AND PURPOSE

Sanitary sewer overflows (SSOs) are an important concern to wastewater agencies throughout the United States and can be attributed to many causes. It is estimated that more SSOs are caused by Fats, Oils, and Grease (FOG) than by any other factor. Because of this, state and local regulating agencies are focusing on FOG control as a key element of potential SSO regulations and Capacity, Management, Operations, and Maintenance (CMOM) requirements.

Background

The "Primer for FOG Program Development" was developed with the help of information from the former Cal FOG group and has been modified and updated with input from the Western States Alliance as well as industry experts throughout the United States. The recommendations are presented as steps to be considered when developing and implementing a FOG Control Program for food service establishments (FSEs). The steps are based on successful experiences in several Pacific Northwest municipalities. The Guide can be used as a reference when developing a new FSE program or when an existing program must be updated or improved.

Purpose and Organization

FOG discharged to the sewer can accumulate along sewer pipe walls coating pipes until wastewater flow through the line is restricted, causing SSOs and blockages. These occurrences may result in property damage, environmental problems in nearby surface waters, and public health hazards. There has been an increased emphasis on preventing SSOs recently, in part because of the pending United States Environmental Protection Agency (U.S.EPA) regulations for sanitary sewers, but also because new collection system requirements are being issued by state and local regulatory authorities. As a result, source control and pretreatment programs have had to reevaluate or establish FOG Control Programs, which may include a FSE program component.

This document is intended to provide guidance in the development and implementation of a program to control FOG discharges from FSEs. The guide will not be appropriate for an agency if their main source of FOG is determined to be from private residences or if the primary cause of ongoing SSOs is root growth, poor collection system maintenance, or poor condition of the collection system. The first step in the recommended process is to characterize the sources of FOG and determine how these sources contribute to SSOs and collection system operations. Identifying the sources of FOG and the causes of SSOs will determine the overall focus that should be selected for a particular FOG Control Program. The recommended steps for establishing a FSE FOG Control Program as follows:

STEP 1 – Characterizing FOG sources. This section involves determining the cause of FOG blockages and the upstream sources of the FOG. Identifying the major sources of FOG will result in a more effective utilization of municipal resources when developing a FOG Control Program.

STEP 2 – Understanding the Regulatory Requirements. This step entails researching regulatory requirements and identifying the legal framework for program development and implementation.

STEP 3 – Establishing Program Administration. This step involves identifying municipal agency structure and potential funding sources.

STEP 4 – Developing the FOG Control Program. This step entails developing the overall FOG Control Program for FSEs; including selection of an approach for regulating the facilities (e.g., permits, incentives, or education), establishing FOG handling and disposal practices, developing a database and establishing an operating budget.

STEP 5 – Providing Outreach. This step involves identification of the appropriate method to educate FSE operators and the public. These activities may entail establishing the outreach focus, arranging of stakeholder meetings, providing BMP information, and circulating educational materials.

STEP 6 – Inspecting Food Service Establishments. This step includes information on developing inspection methods to ensure compliance with regulatory requirements and to establish proper FOG handling and disposal procedures.

STEP 1 – CHARACTERIZING FOG SOURCES

It is important for each agency to fully understand the sources of their FOG problems prior to developing a control program. The agency must determine the location of collection system "hot spots" (areas within the collection system that require frequent maintenance), how these hot spots are related to FOG discharges, and where the FOG originates. Since FOG blockages are a "middle-of-the-pipe" problem, it is necessary to evaluate ongoing collection system maintenance, as well as all potential sources of blockages, to provide a complete and accurate picture of what is contributing to SSOs. This information allows an agency to determine where its resources should be focused to effectively control FOG discharges and reduce overflows and operational problems in a cost-effective manner.

Historical records of collection system maintenance activities should be reviewed to ascertain any useful information on the causes of SSOs and locations of any FOG-related hotspots.

A system for reviewing these records is outlined below:

- Identify any particular problem sites within the collection system based on SSOs, extent of cleaning frequency, odor reports, and any other type of citizen complaints.
- Review collection system operator's notes, especially on the type of materials being removed during cleaning. (If this type of information is not being recorded, institute a standardized policy for data collection based on the following two action items.)
- Introduce standardized forms (cleaning and repair) for recording specific information during maintenance work.
- Distribute log books to keep with the maintenance/inspection vehicles for recording information during drive-by inspections.
- Compile the information and categorize the hot spots by the cause of the operational problems (e.g., roots, FOG, structural issues).
- Produce collection system maps that show the spatial relationships between the hot spots and particular areas of the municipality (e.g., high density or single-family residential areas, business districts, and restaurant districts). Many agencies use Geographic Information Systems (GIS) for mapping and data management that can be frequently updated and contain land use information.
- Rate the severity of each hotspot on the map and use this information to determine correlations between upstream use and FOG-related hotspots.
- Characterize the sources of FOG at each FOG-related hotspot. Depending on the source of the FOG, program resources should be allocated accordingly. For example, if FOG is accumulating downstream of a residential area, resources should be directed towards public education. However, if FOG problems are occurring downstream of restaurants and business districts, program resources should be allocated towards educating FSEs.

STEP 2 – UNDERSTANDING THE REGULATORY REQUIREMENTS

The strategy and approach of a FOG Control Program should be based on the jurisdiction's recognized and agreed-upon goals, developed by program personnel with input from other municipal or regulatory agencies. For example, wastewater treatment agencies want to see improved performance at the treatment plant, collection system operators want to minimize SSOs and sewer cleanings, stormwater agencies want to keep FOG out of the storm drains, and the regulatory authorities want to prevent public health hazards and contamination of local waterways. At the onset of program development, it is imperative that these goals and their timelines are recognized and incorporated into the FOG Control Program. It is wise to include the state approval authority in this process, especially if the FOG Control Program is specified as part of a permit issued to the Publicly Owned Treatment Works (POTW).

Determine Regulatory Requirements

The U.S.EPA has drafted regulations for addressing collection system operations and maintenance and SSO prevention, but formal adoption of the regulations has not yet occurred (40 CFR, Parts 122 and 123, proposed rule). The U.S.EPA does provide guidance in a document titled, *Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems* (https://www3.epa.gov/npdes/pubs/cmom_guide_for_collection_systems.pdf), published in January 2005. If the municipality is not under a permit order from the state approval authority, determine the status of the proposed Federal regulations and consult the local authority before developing a FOG Control Program. The POTW's National Pollutant Discharge Elimination System (NPDES) permit should be reviewed for any provisions related to its collection system and the local health department should be contacted to determine if they have any special operating requirements for the collection systems or food service establishments. Some of the regulations that can potentially affect development of a FOG Control Program are listed in **Table 1**. Additional research may be required to determine the applicability of these regulations to the local municipal agency. However, completion of this research will ensure that all regulatory requirements are addressed prior to development and implementation of a FOG Control Program for FSEs.

Regulation	Enforcement Agency	Document
Collection system maintenance and operational requirements	U.S.EPA	Pending legislation: Capacity, Management, Operations, and Maintenance Requirements (CMOM) *CFR 40, Parts 122 & 123*
General collection system permit	U.S.EPA and the state Approval Authority	Under development for selected regions
Clean Water Act, Basin Plan	U.S.EPA and the state Approval Authority	NPDES permits issued to the local POTW
Local health ordinance	Local health department	Municipal Code
Local sewer ordinance	Local sewerage agency or POTW	Municipal Code

Table 1. Regulatory Requirements that Pertain to Collection System Operation and FOG Control Program Development

Provide Legal Framework

An appropriate legal framework will be necessary to implement the FOG Control Program. Establishing this framework may involve adopting a local sewer use ordinance, amendment of an existing ordinance, or directly permitting the FSEs. When writing or adapting a sewer use ordinance, keep in mind that the document should include clearly defined legal requirements and should be easily enforced. Suggested provisions for a local sewer use ordinance are listed in **Table 2**. These provisions are based on knowledge derived from existing FOG Control Programs and may also be considered when developing a permit-based FOG Control Program.

Level of Authority	Possible Provision	Reason for Inclusion
Water Quality	Prohibit discharges exceeding a maximum FOG concentration	Sets an identifiable standard for the FSEs to achieve. (However, there is currently no technical basis for a FOG limit intended to protect a collection system.)
	Kitchen BMPs (mandatory or optional)	Mechanism to control FOG discharges to the sanitary sewer in addition to installation of grease control equipment.
Equipment Requirements	FSEs must install, operate, and maintain grease control equipment, (e.g., grease interceptors).	Ensures installation and maintenance of FOG control device at food service establishments.
	Approval of the type of grease control equipment to be installed.	Allows the agency to ensure that inappropriate equipment is not installed at an individual site.
	Approval of size and location of grease control equipment.	Ensures that the equipment is sized properly and located where cleaning and inspections can easily take place.
Facility Access/ Inspections	"Right-to-Enter" the facility must be guaranteed for municipal agency inspectors.	Ensures that the regulating agency can inspect the facility.
	Pre-determined inspection frequency (e.g., once a month) and notification procedures.	Informs the FSE operators of the planned inspection schedule.
Control Mechanism	Mandatory participation for the FSEs in a permit program or in a pollution prevention certification program.	Ensures that all FSEs are aware of the program's requirements and are held accountable for compliance.
Enforcement	Establish fines and fees for non-compliance with ordinance provisions.	Notifies the FSEs that the FOG Control Program is important and compulsory.
Equipment Maintenance Program	Maintenance requirements established for FOG control equipment (e.g., monthly inspections and cleaning).	Ensures proper functioning of the FOG control equipment.

	Maintain records of all visual inspections and cleanouts, keep records for a minimum amount of time, and make records available to inspectors upon request.	Allows regulating agency access to all maintenance records to verify proper operation.
	Prohibit discharge and use of chemical or biological agents that could be used to emulsify FOG.	Prevents discharge of harmful chemicals to the sanitary sewer and reduces FOG deposit formation farther along in the sewer system.
Waste Grease Disposal Practices	Require FSEs to contract with managed, licensed, or permitted grease handlers.	Ensures that waste grease is removed by reputable and traceable handlers.
	Participate in voucher programs to track grease disposal methods.	Notifies the FSEs and handlers that stated grease disposal methods and locations will be verified.

Table 2. FOG Control Provisions for a Sewer Use Ordinance

Stakeholder Engagement

If the provisions of the ordinance are perceived as too rigid or too difficult to implement, the ordinance may not be implemented successfully. To minimize this problem, the stakeholders should be involved in ordinance development. Stakeholders may include FSE operators, health department inspectors, city council members, stormwater inspectors, building inspectors, business license division personnel, and collection system/treatment plant operators. The stakeholders may be contacted individually or convened as a group for a "working session" to settle on the details. To minimize the number of attendees, the state Restaurant Association or some other local FSE association, could provide representation and feedback. The sequence outlined in **Table 3** is recommended during the development of a local sewer use ordinance or permit**.**

Sequence	Action
1	Determine whether the existing sewer use ordinance contains provisions for FOG control.
2	Review ordinances and permits from other municipalities.
3	If necessary, create a draft ordinance or amendment and internally identify the negotiable and non-negotiable provisions.
4	Ask for input from the other municipal agencies that may be affected (e.g., health department, stormwater program).
5	Ask for input from the local restaurant association (e.g., ORLA) or other business associations.
6	Obtain a legal review.
7	Conduct a town hall meeting or workshop and invite applicable stakeholders.
8	Issue a public draft for comment (not mandatory for a permit).
9	Adopt the final ordinance or permit.

Table 3. Recommended Sequence for Creating or Adapting

STEP 3 – ESTABLISHING PROGRAM ADMINISTRATION

Administration of a FOG Control Program may be established through a Source Control or Pollution Prevention Program, a Collection System Maintenance Program, or a Health Department Inspection Program. No matter which agency is used to administer the FOG program, there must be communication between departments and sharing of detailed information. Guidelines are presented in the following paragraphs regarding identifying and facilitating inter-departmental interactions. This section also includes a review of the types of funding sources available for a FOG Control Program.

Identify Municipal Agency Structure

Getting to know how the applicable municipal agencies are organized is essential to determining how the FOG Control Program will operate most effectively. Municipal agency operations should be identified and reviewed prior to establishing a line of communication with the appropriate agency officials. As part of that communication, the importance of the FSE control program should be emphasized. For example, damage claims and/or enforcement penalties may be avoided if proper control measures are implemented and enforced.

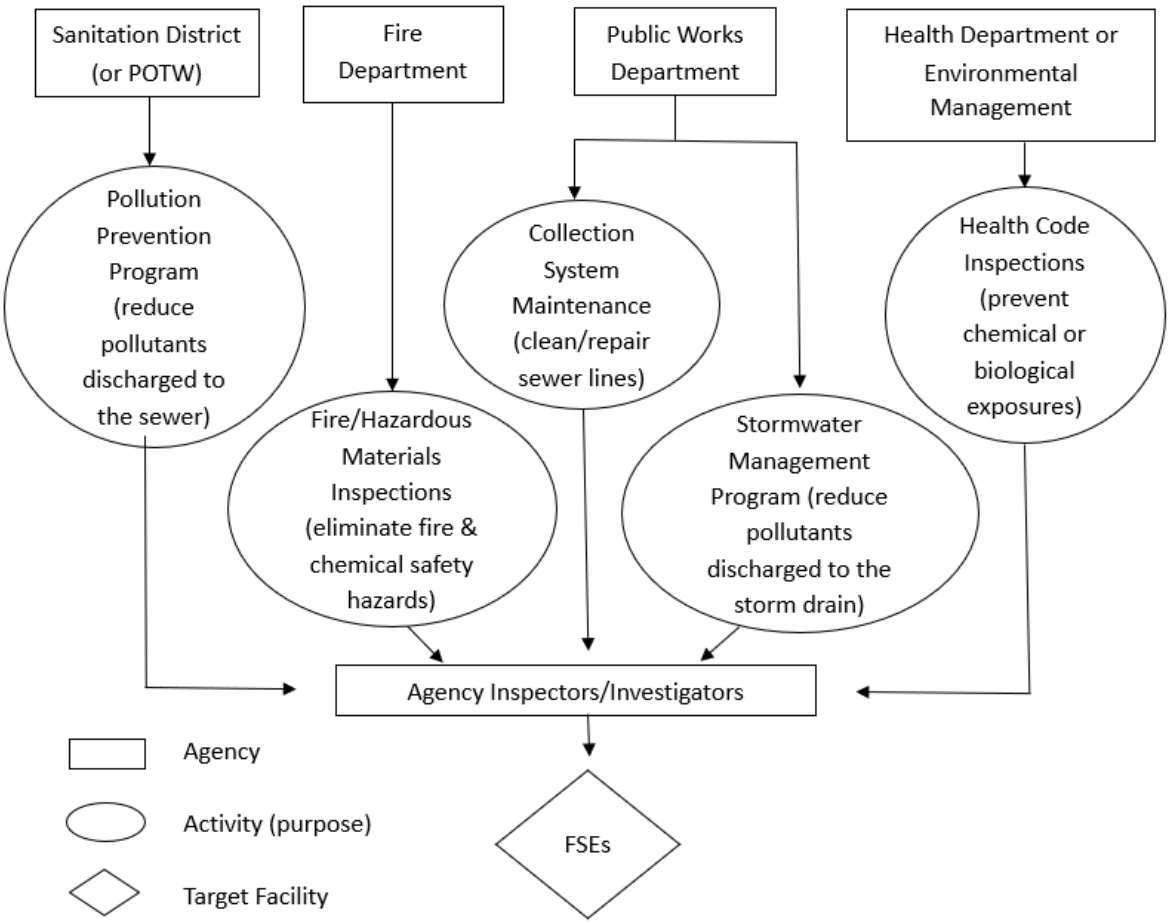

Figure 1. Sample Flowchart Depicting Municipal Agency Interactions with Food

It may be useful to create a flowchart or an organization chart showing the municipal departments and the officials that interact with the FSEs (e.g., fire, health, stormwater, etc.). A sample flowchart has been included as **Figure 1** to show the appropriate level of detail. Each member of the FOG program staff should be familiar with the levels of authority that interface with the FOG Control Program and understand each agency's particular responsibilities. To reduce confusion among the FSE operators; it is best to have one municipal agency launch the FOG Control Program, oversee implementation of the program, evaluate its effectiveness, and coordinate improvements to the program over time.

There are many advantages to working effectively with the different municipal agencies. Plumbing, building and health departments are a source of records to determine operations inside an FSE. Street and traffic personnel can supply information on problem sewer lines when provided with maps of the collection system. Establishing and maintaining good communication with all of the appropriate municipal departments will result in quick reports on sewer problems and provide interim monitoring between facility inspections. Tracking the FOG Control Program efforts and reporting the data to all interested agencies facilitates information sharing and minimizes repetitive contacts with the FSEs.

Identify Funding Sources

Funding Mechanism	Use of Funds	Source of Income	Sample Municipality
Cost Recovery	SSO cleanup expenses	Dischargers assessed cost for removing FOG blockage	City/County of San Francisco, City of Tacoma, WA, Clean Water Services
Permit Fees	FSE Permit Program Administration	FSEs pay an annual permit fee to obtain a discharge permit	City of Springfield, MO, Miami-Dade County, FL, City of Flagstaff, AZ
Sewer Use Fees	FOG Control Program Administration	Sewer use fees paid by all dischargers are distributed to specific programs through a general fund	Napa County Sanitation District, Clean Water Services, Clackamas County WES, City of Portland, OR
Enforcement Actions (fines and penalties)	FOG Control Program Administration	Fines levied against dischargers are used for program implementation	
Grants	FOG Control Program Administration	Proposition 40, administered by the State Water Resources Control Board and the U.S. EPA	City of Cupertino, CA
Pollution Prevention Fee	Administration of Pollution Prevention Program	Monthly fee paid by all commercial dischargers, with a portion allocated to the FOG Control Program	East Bay Municipal Utility District, CA
Contributing Member Agencies	Program Development	Contribution proportional to number of FSEs in the agency's wastewater service area	East Bay Municipal Utility District, CA

Table 4. Sources of Funds to Support Municipal FOG Control Programs Service

Revenue collection, grants, and other funding methods have been used to support FOG Control Programs. Some of the available funding sources are listed in **Table 4**, along with information on where and how these funds are utilized.

STEP 4 – DEVELOPING THE FOG CONTROL PROGRAM

Developing the FOG Control Program will involve selecting a regulatory approach (e.g., educational or enforcement-based), establishing FOG handling and disposal practices, developing FSE and hauler databases, and estimating program costs.

Select a Program Approach

There are several options available for regulating FSEs including education, program administration through an ordinance, permitting, providing incentives, and enforcement. As discussed in **STEP 2**, the specific regulatory requirements must be reviewed as a method to determine the best approach for working within established guidelines. The five broadly classified approaches are described below and should be considered when developing a FOG Control Program.

Educational Approach

In an educational approach, the impetus is to educate the facility operators on the need to prevent FOG discharges to the sanitary sewer. The educational approach should always be employed during the first contact with FSEs. Distributing educational tools (posters, brochures, fact sheets, grease cans, grease scrapers, etc.), holding workshops, and conducting periodic facility assessments are all good starting points for a FOG Control Program.

Ordinance Approach

A local sewer use ordinance may give an agency the authority it needs to develop and implement a FOG Control Program. If legal authority does not exist for FOG control, adaptation of an existing ordinance or creation of a new ordinance may become necessary. **STEP 2** includes a discussion of the applicable FOG control provisions.

Permitting Approach

In a permit-based system, FOG handling permits may be issued to all or some FSEs. The permittees may or may not be assessed a fee for obtaining the permit, depending on available sources of funding for the municipality. Permit requirements may include installation of specific FOG removal equipment, required maintenance frequency, or the implementation of FOG handling BMPs. Permits may also be issued to grease haulers and/or grease recyclers.

Permits are a common regulatory control method because they offer a clear channel of communication to the FSE about their requirements for compliance, as well as a concise, uniform, and legal framework for operation of the FOG Control Program. However, permits do have drawbacks and may not be the best choice for every FOG Control Program or every FSE within that program. Some control programs have thousands of FSEs within their jurisdiction. If a large amount of paperwork is associated with issuing a permit, keeping current permits on numerous FSEs could overwhelm a program, especially considering the number of restaurants that may change ownership or go out of business each year. For this reason, a

FOG Control Program may opt to reserve permits for its largest FSEs or use the permit as a compliance tool for those FSEs that continue to cause blockages or have repeated violations.

Incentive-Based Approach

In an incentive-based program, certifications and/or business awards would be provided to the FSEs that implement proper FOG control measures and follow all program requirements. The program awards and recognition can be a marketing tool for some facilities and thus provide an incentive for compliance. Incentives can easily be tied into one of the approaches listed above, such as education and permitting.

Enforcement Approach

In an enforcement approach, FSEs are fined for FOG discharges or assessed clean-up fees (based on SSO evidence or CCTV records). This approach is typically used in conjunction with education, ordinance, permitting, or an incentive-based program. Enforcement actions are implemented when an FSE has refused or failed to participate in the educational programs or has violated compliance requirements. It is best to develop an enforcement response plan defining an escalating response strategy to violations.

Establish Acceptable FOG Handling and Disposal Practices

Acceptable FOG handling and disposal practices must be developed and written as part of a FOG Control Program. The practices may be part of a sewer use ordinance, permit, BMPs, or informational aspect of the program. Part of this development process should include input by different stakeholders, as discussed in **STEP 5**. General categories of FOG control practices are described below.

Required Types and Sizing of Grease Removal Equipment.

This category of FOG handling and disposal practices is more technical in nature and includes acceptable types/brands of FOG control equipment, allowable types of connections, suitable uses of the equipment, appropriate sizing criteria, and installation of sampling boxes. Equipment sizing is based on either the estimated flowrate through the equipment or the amount of grease to be collected or both. Many municipal ordinances require use of Appendix H of the Uniform Plumbing Code to size grease interceptors. However, these specifications are under review because they tend to result in oversized interceptors. An oversized interceptor is difficult to clean and yields a long detention time. A long detention time can result in the production of hydrogen sulfide gas and sulfuric acid, which combined are odor causing, corrosive, and damaging to grease removal equipment as well as downstream sewer piping. Requiring manhole access to interceptors and installation of a sampling box can be very useful for interceptor inspection and sampling.

Operation and Maintenance of Grease Removal Equipment.

This category of FOG handling and disposal practices includes how to properly operate and maintain grease interceptors. In the past, operational requirements may have included a prohibition on dishwasher or garbage disposal connections to grease control devices. Many of the newer devices have been designed to handle the temperature and loading of these fixtures. Maintenance requirements may include specific cleaning frequencies, effective cleaning methods, and retaining pump-out records for a specified amount of time.

Best Management Practices.

This category of FOG handling and control practices includes activities to keep FOG from being discharged to the sanitary sewer. The specified activities may include dry clean-up methods for FOG spills, scraping plates prior to washing, using baskets in sink drains, prohibiting addition of chemical or biological grease control agents, posting of instructional signs, and general equipment recommendations. BMPs may be an optional or mandatory part of a FOG Control Program.

Grease Storage for Recycling.

This category of FOG handling and disposal practices relates to storing yellow grease for pickup by a recycling (or rendering) company. Proper storage practices include use of a specific type of container, tight-fitting lids, and establishment of secondary containment in case of spills. Contact information for licensed, reputable grease recycling companies in the area should be prepared for distribution to the FSEs.

Allowable FOG Disposal Methods and Locations.

This category of FOG handling and disposal practices includes providing the FSEs with a list of acceptable methods for FOG disposal and identification of the local disposal sites for FOG waste. A list of licensed grease haulers should be established and distributed to FSEs. Instructions for the FSE employees on how to deal with grease haulers and how to verify that the hauler is using appropriate disposal methods may also be included. It may be beneficial to conduct workshops with local haulers to educate and train them on the types of pumping and disposal methods that are acceptable in the municipality.

Each municipality has a different approach for FOG disposal. While all POTWs receive some grease through their collection system, many POTWs do not accept waste grease from waste hauling services. Of the POTWs that take grease from waste haulers, some may only accept FOG waste from facilities located in their service area. Some POTWs accept grease from any location. Others have purchased their own pumping equipment and perform some interceptor cleaning for FSEs in their service area (such as the City of Oxnard, CA). The municipal FOG Control Program must be aware of the methods and locations for FOG disposal in its locale in order to optimize control over the waste stream.

Decanting of water from grease hauler's trucks is another issue that most FOG Control Programs will have to address. Decanting is the practice of allowing the water portion of what has been removed from the interceptor to be returned back into the pretreatment device. This water portion contains solids, may have a low pH, and may have been contaminated from the hauler's previous load. For this reason, decanting by waste haulers should not be allowed unless adequate pretreatment is provided for the returned water and approval from the local control authority has been granted.

Construct Databases

Maintaining accurate records of all activities related to controlling FOG discharges from FSEs is essential to conducting a successful program. In order to facilitate the recordkeeping process and to provide easy access to the compiled information, databases must be created. The three essential types of databases needed are for FSEs, grease handlers, and collection system operation and maintenance (O&M). Each are detailed in the following sections.

Construct an FSE Database.

During development of a FOG Control Program, FSEs in the municipality should be identified and compiled into a database. A list of possible FOG dischargers will be necessary to focus outreach efforts, issue permits, and conduct inspections.

A number of existing records may be utilized to identify the local FSEs. A list of these records is presented in Table 5. However, each agency keeps different types of records and there may be additional databases available. The type of data to be collected and stored for each FSE is listed in Table 6. When reviewing the existing records, keep in mind that any information provided about the FSEs (especially regarding their operational attributes) may become valuable and should be documented for later use.

Organization to Contact	**Available Records**
Municipal Business License Department	List of local business licenses
City/County Storm Water Program	List of NOIs, inspection reports
Local Health Department	Business list/inspection reports
Yellow Pages	Advertisements for local restaurants, listings for cooking schools
Chamber of Commerce	Existing and new business lists
Pretreatment Program	List of permittees
Local Sanitation District or Collection System Agency	Field inspection reports
Building, Utility, and Fire Departments	Field inspection reports

Table 5. Useful Records for Identifying FSEs

Data to be Stored	**Data to be Stored (continued)**
Name of FSE, address, phone number	Interceptor Cleaning Frequency
Property owner, address, phone number	Health Department License Number
Manager's name	Number and type of violations
Contact person's name	Monthly average water use
Number of employees	Monthly wastewater discharge volume (if available)
Type of food served	Link to downstream sewer blockage or SSO
Hours of operation	History of FOG discharges (if reported)
Number of meals served per day	Current FOG disposal method
Peak hours of operation	Name of contracted grease hauler
Seating capacity	Have Vapor hoods? Yes/No
Major equipment checklist: garbage disposal, ice machine, dishwasher	Vapor hood cleaning service (name, contact information)
Grease Removal Equipment: Yes/No, type, capacity (gallons/pounds)	On-site or off-site vapor hood cleaning?
Waste hauling records or invoices	Education materials provided to the FSE (training, posters, brochures)

Table 6. Recommended Data to be Stored for each FSE

The database format should be selected using the expected size, value, and use of the database. If the FOG program database is tracking activities that may be of interest to other municipal agencies, the database format should be compatible with the other operating systems.

To ensure that the database is always up-to-date with new food service establishments or changes in operations at existing facilities, the FOG Control Program should be in frequent contact with other pertinent agencies. This may best be accomplished by putting the FOG program on circulation lists or possibly an automatic email notification system to inform the program personnel when new business licenses are issued, building permits/expansion plans are approved, and health department or storm water program violations noted. All of this information should be added continually to the FSE database in order to anticipate any potential FOG discharge problems.

Construct a Grease Handler Database.

There may be two types of grease handlers encountered in a FOG Control Program. "Grease haulers" clean out grease interceptors at food service establishments and dispose of the collected wastes. They may also be referred to as "brown" grease haulers. The brown grease may be disposed of at a local POTW who accepts grease wastes or at a grease recycling company. Identifying these companies may be accomplished by looking in the Yellow Pages under "grease," compiling a list from contacts with FSEs, and checking disposal records at the local POTW if it accepts grease waste.

"Grease recyclers (or renderers)" typically collect FOG waste from an FSE's tallow or yellow grease bin and recycle the waste into some usable products; such as animal feed supplements, soaps, oils, cosmetics, and biodiesel fuels. Yellow grease is not normally found in the sanitary sewer system as it has a relatively high value and is stored on-site in special containers for collection by the recyclers. Grease recyclers may be found in the Yellow Pages under "rendering companies" or through contact with FSEs.

Information obtained about grease haulers and recyclers doing business in the local area should be compiled into a database. The database format can be the same as used for the FSEs; however, the type of information stored will be different. For example, it may be useful to record information on the vehicles used by grease haulers (VIN, type of equipment, and condition of vehicles), driver names, pumping and delivery schedules, contracted FSEs, and any ongoing disputes or legal actions.

Some type of grease handler identification and tracking should be undertaken by the Fog Control Program.

Develop Collection System O&M Database.

The local Public Works Department (or whichever municipal department operates the collection system) should be contacted to obtain historical data related to FOG blockages and SSOs. (The information acquired during **STEP 1** can be used as a starting point for this database). The locations of the sewer "hot spots" can be overlaid with restaurant locations for GIS mapping and aid in identifying problem food service establishments. Posting a large wall map with a plastic overlay can be an easy method to locate and target these hot spots. Having this map readily available is also an excellent way to communicate with agency directors and politicians. These are the people that provide essential support to a FOG Control Program. An ongoing notification system between the collection system staff and the administrators of the FOG program should be implemented to coordinate investigations of grease-related SSOs and blockages.

Estimate a Program Budget

Based on the selected regulatory approach and the associated program activities, an overall budget for the program can be estimated. The budget estimate should include staff time, materials and equipment costs, inspection costs, analytical costs, and other services that will be provided.

Outreach Program Costs

To estimate a budget for the outreach program, first determine the materials that will be produced and then determine to whom and how the materials will be distributed. (**STEP 5** includes information on selecting an outreach approach and developing related materials.) The initial cost for outreach materials will include design and preparation, but in subsequent years, the outreach costs may only involve production and updating. Once these selections are made, the total costs of the outreach program can be determined by adding up the estimated staff time to conduct workshops and distribute the materials, design/production costs of the materials themselves, and any other costs associated with distributing the materials. It may be helpful to contact other FOG Control Programs and discuss their costs per food service facility per year in order to verify the predicted budget.

Inspection Program Costs

The costs of implementing an inspection program to control FOG discharges will involve significant staff time. The required time may include training, facility inspections, sample collection, review of grease control equipment specifications, FOG discharge investigations, and BMP implementation review. The items to be quantified in order to predict program costs are listed in **Table 7**. However, additional staff costs may be incurred for investigating sewer blockages and reviewing equipment installation plans.

Items of Interest
Inspection Frequency (# of visits per year)
Average time spent at each FSE (hrs/visit)
Number of FSEs per inspector
Activities to be conducted at the FSEs (equipment inspection, education of employees, sewer cleaning, waste sampling, spill cleanup)
Analytical costs (approx. $75/sample for analysis of total grease concentration)
Equipment costs (e.g., vehicle expenses, sewer cleaning equipment, portable pH meter, ice chest for sample transport)

Table 7. Estimating Staff Time and

Database Maintenance Costs

Staff time to maintain all databases must be estimated to determine an overall program budget. Initial database setup will be much more time-consuming than updating facility information during subsequent years. Updating facility information will include posting inspection results, logging correspondence between program staff and the FSEs, and tracking enforcement actions and responses.

STEP 5 – PROVIDING OUTREACH

Educational outreach to all businesses that handle and dispose of FOG (FSEs, grease haulers, grease recyclers) should be the primary focus of a FOG Control Program. Often, the operators of these businesses do not understand the negative effects of their maintenance and disposal practices. Selecting the appropriate messages and determining the best methods for disseminating the messages is a vital step in establishing an effective FOG Control Program.

Establish Outreach Focus

FOG Control Program personnel must establish the focus of the outreach efforts and relate those efforts to the specific goals of the FOG Control Program. The outreach should be directed towards FSE owners, FSE employees, grease haulers, and grease recyclers. Stakeholders of existing FOG programs agree that educating FSE employees and grease handlers on the goals and the requirements of a FOG Control Program are essential to a successful program.

Conduct Stakeholder Meetings

Meetings with restaurant owners, state restaurant associations, grease haulers, grease recyclers, and any municipal agencies that may have overlapping responsibilities with the FOG Control Program should be conducted. These meetings can be used to assess the stakeholders' level of comprehension on FOG issues and to determine an overall program approach. Specific items to discuss include the appropriate type of outreach methods to employ, effective compliance motivations, and appropriate FOG handling and disposal methods.

Prepare Outreach Materials

Outreach materials can be classified as informational or operational. Informational materials may contain the following:

- The impact of grease waste on the sewer system (overflows, increased O&M costs, increased sewer use rates)
- The fundamentals of the FOG Control Program (e.g., why the program is necessary)
- Information on types of grease removal equipment (e.g., grease interceptors)
- Proper grease disposal methods
- The effects of FOG-related sewer line blockages on businesses and the environment (e.g., public health and water quality concerns)
- The value of recycling yellow grease
- Contact information for questions or concerns
- Frequently asked questions

Operational materials may include the following:

- BMPs
- List of certified grease haulers and recyclers

- A list of approved disposal facilities
- Installation and maintenance requirements for grease removal equipment (e.g., grease interceptors)
- Sizing and design specifications for grease removal equipment

Depending on the audience receiving the information, it may be useful to combine the two approaches.

Examples of Outreach Materials

Many different types of outreach materials have been produced for FOG Control Programs. Examples include posters detailing specific BMP handling methods, videos showing BMPs and equipment maintenance procedures, introductory brochures to be distributed at initial inspection, guides for pollution prevention at FSEs, and green business certifications to name a few.

Distribution Methods

Distribution of the outreach materials can occur during inspections, during presentations at industry association meetings, during educational seminars for FSEs, through bill inserts, or on municipal web pages or social media.

STEP 6 – INSPECTING FOOD SERVICE ESTABLISHMENTS

On-site monitoring of FSEs is important in terms of setting up a line of communication with the facility operators and emphasizing the importance of preventing FOG discharges. Inspections are also the best way to ensure compliance with ordinance provisions, permit terms and conditions, and FOG handling and disposal practices.

Determine Inspection Approach

To ensure that a consistent message is delivered to all FSE personnel, an inspection program approach should be developed that is tailored to the goals of the FOG Control Program. Successful FOG program personnel and industry representatives agree that it is important to bear in mind that education of the FSE owners and operators is essential to program success. This can be achieved through a combination of discussion points and distribution of outreach materials. Discussion points during an inspection may include the negative effects of facility shutdowns due to sewer backups, recommendations for more effective FOG removal equipment saving money through water conservation, and avoiding fines for non-compliance.

Train Inspectors

Comprehensive training must be undertaken for the FOG Control Program to ensure a consistent approach during inspections. A notebook containing all of the program documents, enforcement procedures, and outreach information should be prepared and distributed to the inspectors during the training session. It may be useful to include a review test inside the notebook. This test could be self-administered and used by the inspectors to personally assess their comprehension of inspection procedures.

The subject of interpersonal communication should also be addressed as part of the training program. This subject could be covered during a seminar with a contracted speaker or through required viewing of a videotape on communication. A segment of the training program may include a module on adversity training. This type of training is done to prepare new inspectors for difficult exchanges with FSE employees and situations when their authority may be challenged.

Additional training that is applicable for inspectors and program managers on grease removal equipment and FOG control program development and management may be found online at The FOG Training Institute (https://fogtraininginstitute.com). Many states or jurisdictional bodies approve these educational programs for continuing education credits.

Related educational programs based on broader topics such as collection system maintenance and FOG control in residential areas may also be available through occupational associations, such as the California Water Environment Association, Western States Alliance, Southeastern FOG Alliance, AZ Water Association, and the New England Water Pollution Control Commission (NEIWPCC), to name a few.

Conduct Inspections and Sampling

Inspections of all FSEs within the jurisdiction of a FOG Control Program may take years depending on the program goals, number of sites, and inspector staffing. Developing an inspection prioritization plan is vital for determining an effective and functional inspection schedule.

Different priority levels may be assigned to FSEs in order to determine the inspection frequency and/or type of inspection for each FSE. For example, a high priority may be placed on historically noncompliant FSEs or on the FSEs associated with collection system hotspots. Another method of prioritizing the inspection program would be to choose an overall goal, such as establishing a routine maintenance schedule for FSEs with grease interceptors. The inspection frequency would then be determined by the recommended interval between cleanings. Once the priority is determined, an inspection plan (frequency, type of approach, follow-up intervals) should be developed based on available resources and program goals. Sampling of a facility's waste stream ay be warranted for compliance purposes.

Inspection Procedures

Initially, FSE knowledge of the existence of the FOG program and the occurrence of inspections may vary greatly. Prior to initiating inspections, a letter (language-specific if possible) and educational outreach should be sent to the facility operator to introduce the program and inspection process. This letter should be signed by the highest level of authority related to the FOG program and should include contact names and numbers for the facility operators.

During inspections, inspectors should wear photo badges, arrive in an official municipal vehicle, if possible, and carry a copy of the introductory letter in order to clearly identify themselves and clarify the purpose of the inspection. Inspections may be announced or unannounced, depending on the regulatory framework of the agency or the type of relationship maintained between the inspectors and the FSE operators. A list of recommended equipment and paperwork to carry on inspections is presented in **Table 8**. A checklist for areas to inspect and questions to consider during an inspection is presented in **Table 9**. Both tables were developed based on the experiences of FOG Control Program inspectors.

Equipment	**Paperwork**
Maps (County, City, GIS)	Inspection Checklist, FSE File
Manhole Pick	List of Plumbers (with disclaimer)
Hydrogen Sulfide gas detector[1]	
Depth Probe	List of Grease and Oil recyclers
Ratchet Set	Method of Documenting Inspection Results (e.g., PDA or inspection form)
Pipe Wrench (to open cleanouts)	
Mirror (for looking inside manholes and interceptors)	BMP List and Brochures
Cell Phone with Camera	Manufacturer's Drawings (for the type of grease removal device to be inspected)
Steel Toed Shoes	
Gloves/Safety Glasses	
Sample Bottles and Sampling Equipment	Authorized list of grease haulers (with disclaimer)
Fluorescent Safety Vest	

[1]An important safety consideration when performing inspections is measurement of the concentration of atmospheric hydrogen sulfide. Harmful hydrogen sulfide concentrations may exist at grease interceptor access points, collections system manholes, and/or lift stations.

Table 8. Useful Inspection Items Costs for the Inspection Program

Inspection Activities
Request copies of receipts from grease handlers for services completed since the last visit.
Inspect grease removal equipment and cleaning logs to determine if the equipment is being operated and maintained properly.
Inspect connections to the grease trap or interceptor to ensure that only authorized equipment and fixtures discharge to the device.
Check for evidence of illicit dumping such as debris/loose screws in floor drains, missing or altered log entries, use of vegetable sink for washing dishes (vegetable sinks are not usually plumbed to a trap or interceptor).
Spot check for evidence of BMP implementation (scraper for dishes, spill kit, BMP poster, training log, drain screens, grease bins, etc.).
Collect samples for laboratory analysis of FOG concentration, if necessary.
Determine how waste grease is collected from work stoves, deep fat fryers, and grills.
Inspect grease barrels to determine if grease is being stored properly.
Discuss cleaning methods for roof vents and vent hoods. If they have a self-cleaning hood, where does the washwater discharge?
Request copies of receipts detailing pickup dates/volumes collected by grease recyclers.

Table 9. FSE Inspection Checklist

Sampling Procedures

If deemed essential to the FOG Control Program's efforts, the effluent from grease interceptors can be sampled to determine the amount of FOG being discharged to the sewer system. A sample of the equipment effluent best represents the nature of the FSE's discharge. Other sampling options that may prove useful include sampling from the collection system just downstream of a suspected FOG discharger or sampling downstream of a complex of restaurants to determine the combined effects of their FOG discharges.

FOG samples must be collected in a muffled (or solvent washed), 1-Liter wide-mouthed glass container, preserved with hydrochloric acid. The samples must be refrigerated immediately after collection. Do not transfer the sample from one container to another, because FOG clings to the inside of sample containers and the transferred sample will not be representative of the FSE's discharge. The laboratory performing the analysis should provide the appropriate glassware with the preservative already added. The recommended method for analyzing total FOG concentration is EPA Method 1664. The method is not concentration-dependent, so no dilution is necessary, and the detection limit is 5 mg/L. The maximum holding time at 24^{o}C is 28 days. If needed, an additional analysis can be performed on the sample to determine the fraction of the FOG that originates from hydrocarbons.

The pH of the waste stream can also be used as an indicator of problem discharges. This characteristic is often overlooked but easily quantified. Use of a portable pH meter during an inspection or sampling event can identify unsafe atmospheric conditions and prevent deleterious effects on the collection system. It is

not uncommon for grease interceptor discharges to have a pH around 4, which may violate effluent limits specified in the sewer use ordinance.

Follow-up Procedures

After an inspection is performed, the findings should be immediately recorded in an inspection report, along with a determination of compliance standing for the FSE. An inspection summary letter or a copy of the inspection report may be sent to the FSE. If the FSE is in compliance, that determination should be stated. If the FSE is not in compliance, the actions to be taken should be in accordance with a developed enforcement response plan.

Develop Hierarchy of Enforcement Responses

The hierarchy of enforcement responses will be based on the regulatory approach selected by the municipality, the severity of the violations, and provisions of the Sewer Use Ordinance. A typical enforcement hierarchy is depicted in Figure 2. Initial response to a FOG discharge or improper maintenance of grease control equipment may consist of a follow-up inspection, presentation of educational materials, a verbal warning, and a requirement to correct the problems found.

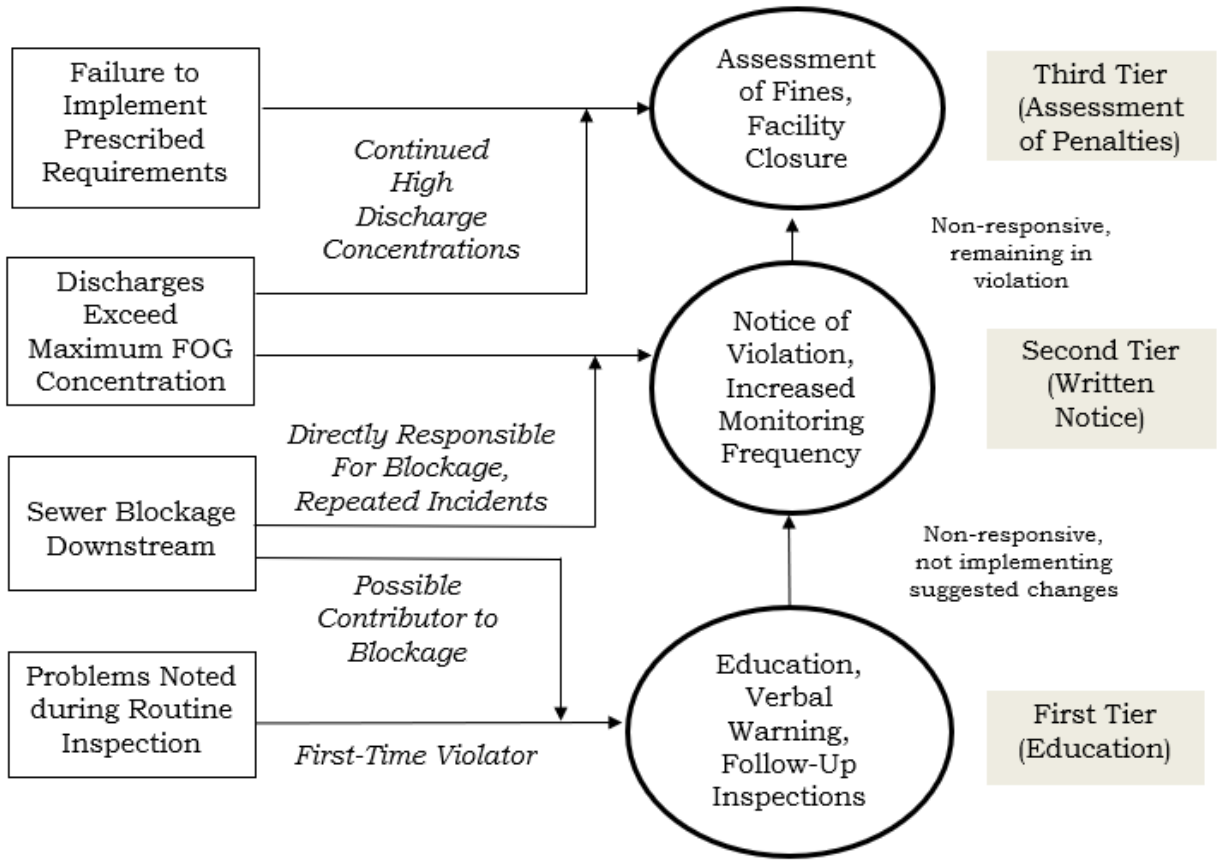

Figure 2. Hierarchy of Possible Enforcement Responses

The second tier of enforcement response may include a Notice of Violation (NOV) or a Notice of Non-compliance which is a written record of the violation and required response. The NOV may include reasons for non-compliance along with required actions, deadlines for compliance, and a notice that a follow-up inspection will occur. These methods might include preparation of a written report to the municipality on how the discharges will be prevented, installation of grease removal equipment, or mandatory attendance at a workshop or a hearing. Periodic monitoring of the facility's discharges may also be instituted. Measuring FOG concentration may allow the municipality to determine if practical changes are occurring at the facility.

Failure to correct the problem by the time limit prescribed in the NOV may result in additional inspections, mandatory equipment installation, or elevation to the third tier of responses, assessment of fines, or facility closure. The procedures for assessing fines and closing a noncompliant facility must be detailed in the sewer use ordinance.