Fats, Oils, and Grease (FOG) Training

Tuesday, August 29th and Thursday, August 31st 2023

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

gram is made possible cooperative agreement EPA.

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Engineer by training
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SOUTHWEST ENVIRONMENTAL FINANCE CENTER

About Us

The Environmental Finance Center Network (EFCN) is a university-based organization promoting innovative and sustainable environmental solutions while bolstering efforts to manage costs.

EFCN
environmental finance center network

Building TMF Capacity for Small Systems

Our Building Technical, Managerial, and Financial Capacity Programs for Small Water and Wastewater Systems provide free training and technical assistance across every state, territory, and tribal nations. Technical assistance is available on a first-come, first-served basis.

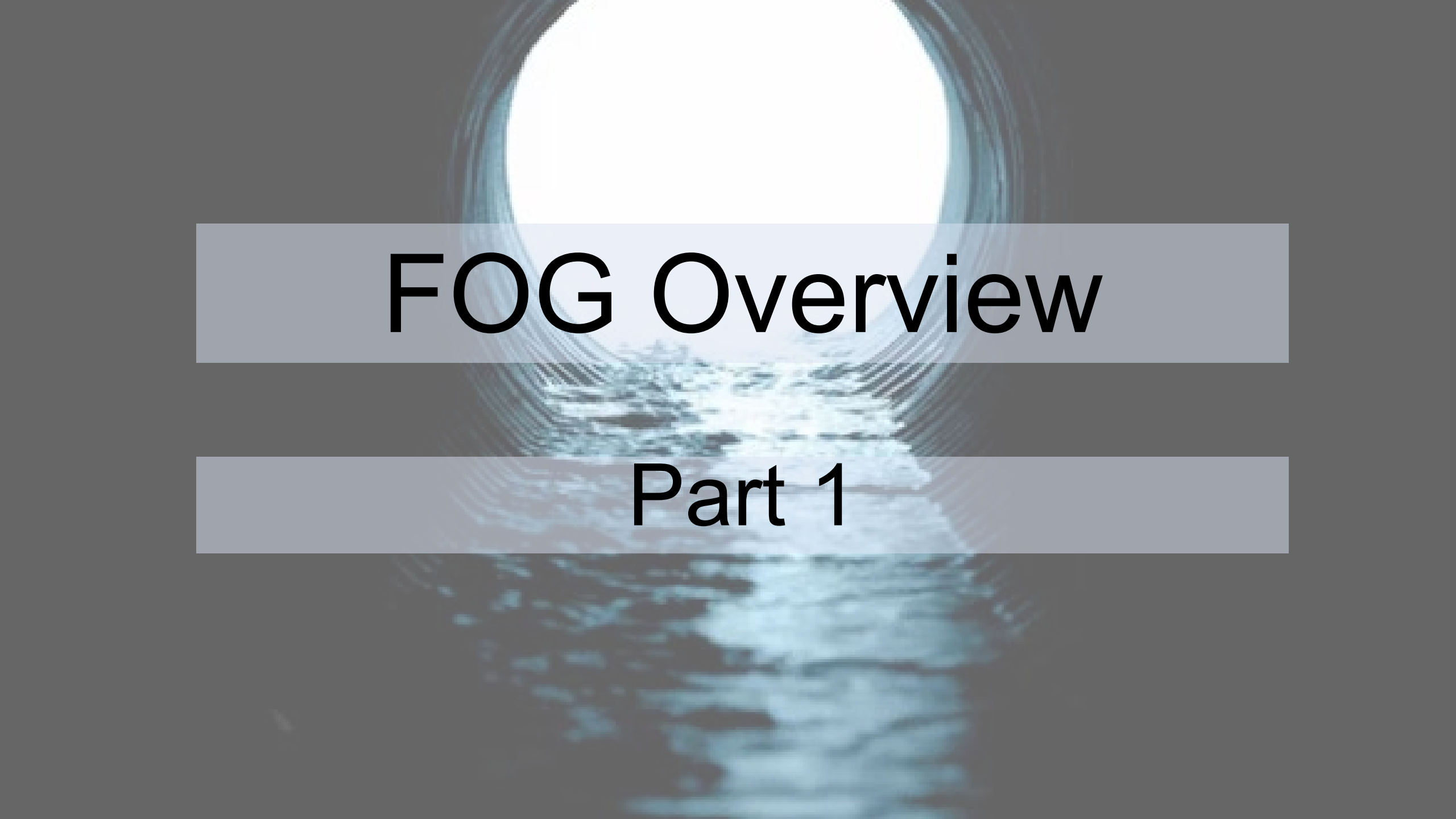
Your name and organization

Your role

Share your experience with FOGs

Have you ever had to clean them out? Have you ever had to deal with an overflow?


Q & A: Ask questions as we go



FOG Overview

Part 1

What is FOG?

F.O.G = Fats, Oils, and Grease

FOG comes from food byproducts entering the collection system.

FOGs are typically liquids that solidify as they cool.

FOG builds up in the collection system and can contribute to blockages.

FOG is everywhere!

FOG is produced when preparing, cooking, and eating food

FOG is also produced by auto repair shops, car washes, industrial launders and others

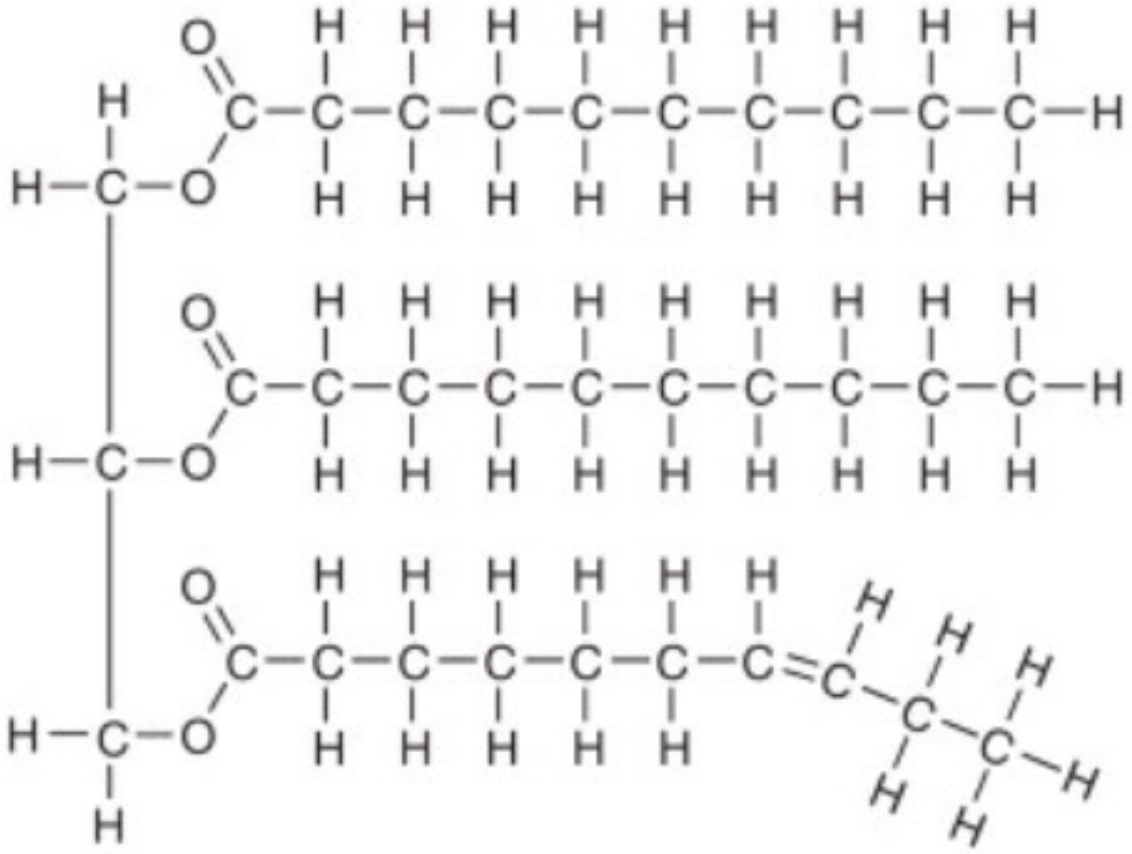
FOG enters the sewer system when dirty dishes are cleaned

What is FOG?

FOGs = Lipids

Lipids are composed of triglycerides

- Hydrophobic = “water fearing”
- Insoluble
- Specific Gravity < H_2O



Foods in order of fat

Peanut Butter
Turkey
Tofu
Bread
Apples
Kale
Plant Based Patties

Peanut Butter

How much fat is in peanut butter?

16 g per serving

Turkey

How much fat is in turkey?

2.1 g per serving

Tofu

Does tofu have fat?

6 g per serving

Bread

How much fat is in bread?

1 g per serving

Apple

Do apples have fat?

0.3 g per serving

Kale

Does kale have fat?

0.6 g per serving

Plant Based Pattie

Do plant based patties have fat?

14 g per serving

Foods in order of fat

Apples = 0.3 g

Kale = 0.6 g

Bread = 1 g

Turkey = 2.1 g

Tofu = 6 g

Plant Based Patties = 14 g

Peanut Butter = 16 g

Domestic and FSE FOG

FSE = Food Service Establishment

Domestic FOG is difficult to regulate and requires effective outreach and education

FOGs enter the collection system due to improper disposal practices:

Pouring FOG down the drain

Washing dishes with excess food

Not using drain screens

FSEs have excess FOG on their floors, use detergents, large scale washers

Industrial FOG

Industrial FOG is the same as other types.

Less FOG produced than FSEs and sometimes domestic

Rarely utilize individual plate ware and utensils

Majority of FOG produced from cleaning machinery and equipment such as industrial sized mixers, fryers, ovens, and conveyors

Large scale spills are a concern

Why is FOG a problem?

Pipe Blockages

Sewer Sanitary Overflows (SSO)

Collection System Damage

Wastewater Treatment Plant Problems (WWTP)

Pipe Blockages

FOG solidifies in pipes and combines with debris to form blockages

Build-up leads to pipe blockages

Blockages cause sewer backups, overflows, and costly maintenance

Sanitary Sewer Overflows (SSO)

- SSOs are a direct result of pipe blockages
- An SSO is the unintentional discharge of sewage or partially treated wastewater into the environment or to nearby buildings
- Approximately 138,000 SSOs occur annually in the U.S. due to deposits of FOG
- FOG deposits are responsible for 50-75% of SSOs

SSO issues

Public Health Risk

Causes property damages

Environmental Issues

Violations of Environmental Regulations

Utilities are Responsible for SSOs

Collection System Damage

Pipe and Infrastructure Damage

Changes the chemistry of the wastewater leading to corrosion

- pH is lowered leading to acidic conditions

Pump and Equipment Failure

FOG and Wastewater Treatment Plants

Causes Equipment Damage

Increases Energy Consumption

Compliance and Environmental Concerns

Reduces Treatment Efficiency

- Foaming

FOG Program Components

Part 2

FOG Program components

What makes a successful FOG program?

- FOG pretreatment program
- Clear FOG program goals
- Effective installation and maintenance
- Collection system monitoring and inspection
- Domestic FOG education and outreach

FOG Pretreatment Program

GOAL: protect collection system and WWTP before contaminants can be introduced

Program will need to:

- Creates regulatory framework
- Identify and categorize FOG contributors
- Mandate grease interceptor/traps requirements
- Implement inspection and monitoring program
- Record keeping and reporting

Installation

Who will ensure proper installation and sizing requirements?

- Assign someone to be responsible for reviewing new installs
- Proposed trap must meet minimum requirements set by Authority
- You have a vested interest in knowing what will be installed

Collection System Monitoring

- Create an inspections checklist, implement FOG producer inspection schedule
- Implement collection system monitoring procedures
- Create SSO response procedures – should be in your Emergency Response Plan

	Food Service Inspection Checklist for Fats, Oil and Grease	√
1	The establishment has implemented a training program to ensure that the BMPs are followed.	
2	"No Grease" signs are posted in appropriate locations.	
3	The establishment recycles waste cooking oil and keeps a record of this.	
4	The dishwashing temperature is not greater than 160° F if using a mechanical dishwasher or not greater than 70° F if using a 3-sink chemical dishwashing system.	
5	The establishment "dry wipes" pots, pans, and dishware prior to dishwashing	
6	Food waste is disposed of by recycling or solid waste removal and is not discharged to the grease traps or interceptors.	
7	Grease trap(s) is cleaned regularly and is documented.	
8	Grease interceptor does not contain greater than 1/3 the depth in grease accumulation or greater than ¼ the depth in sediment accumulation.	
9	Grease interceptor is cleaned and maintained regularly and is documented on a maintenance log.	
10	Outdoor grease and oil storage containers are covered and do not show signs of overflowing.	
11	Dumpsters and grease/oil storage containers are located as far away as possible from storm drains.	
12	Absorbent pads or other materials (not free flowing material such as cat litter) are used to clean up any spills or leakages that could reach the storm drain.	
13	Catch basins show no signs of grease or oil.	
14	The roof shows no signs of grease and oil from the exhaust system.	
15	Exhaust system filters are cleaned regularly, which is documented by cleaning records.	

NOTES:	

Effective Infrastructure and Maintenance

- Grease Interceptors/ Traps
- Grease pumpers/pump truck
- Collection system cleaning and monitoring equipment
- Record keeping system

Grease Trap/Interceptor Cleaning Record Verification Log

Facility/Restaurant Name::

Address:

Service Company Used:

Date/Time	Cleaned By	Witnessed By	Measured/Estimated Volume Removed	Waste Disposal Location/Method	Comments

Date of Service:	FOG Removal Contractor:
Location:	Type of Grease Control Device (Circle): Trap Interceptor
Trap/Interceptor Capacity: Gallons	Pumping Schedule:

Grease Interceptor			Grease Trap		
***Please inspect grease control device and check appropriate response provided.*					
	Yes	No		Yes	No
Inlet T is functioning as designed			Baffles functioning as designed		
Crossover T is functioning as designed			Flow Restrictor is functioning as designed		
Effluent T is functioning as designed			Grease in inspection port		
Baffle is functioning as designed			Lid and other components functioning		
Manhole frame and ring in good condition			Foreign material in trap		
Grease and Solids in Sample Box					
Foreign material in interceptor					

***Provide information for second (clarifier) stage of interceptor below.*	***Provide information for second (clarifier) stage of grease trap below.*
Total Liquid Depth in Interceptor (inches):	Total Liquid Depth in Trap (inches):
Depth of Grease (inches):	Depth of Grease (inches):
Depth of Solids (inches):	Depth of Solids (inches):

Obstacles

Grease interceptors cost thousands of dollars not including installation

Maintenance represents new responsibilities

FSEs are known for high turnover

Communication difficulties

Maintenance Obstacles

- Grease interceptors require special cleaning equipment
- Grease interceptor contents must be properly disposed of
- Grease interceptors must be properly installed
- Professionals may have limited access to grease interceptor devices and other supplies

Ongoing Efforts for the Program

- Provide outreach and education
- Enforce regulations
- Collaborate and consult with local stakeholders
- Keep up with regulatory developments and new industry standards

Domestic FOG Education and Outreach

Most important aspect of FOG outreach

Communicates impact and how to prevent

Should include list of BMPs

Should be catered to the particular community

Community Obstacles

- Lack of awareness and education
- Lack of support
- Resistance to change

FOG Regulations

Part 3

EPA Regulations

Clean Water Act (CWA) of 1972

- Includes Stormwater regulations

National Pretreatment Program

- 40 CFR 403
- Best Management Practices (BMP)

Current State, City, or Municipal

National Pollution Discharge Elimination System (NPDES) permits

- May set analytical limit for FOG concentrations in your discharge

Violations may result in the EPA enforcing a Capacity, Management, Operations, and Maintenance (CMOM) program

- Strategy for addressing FOG

Plumbing Code

Plumbing codes ensure safe and proper design, installation, and maintenance of plumbing systems.

- Uniform Plumping Code (IAPMO)
- National Plumbing Code (BOCA)
- International Plumbing Code (ICC)

Your Regulations

What type of FOG regulations exist in your community?

Who enforces these rules?

Are these regulations reasonable?

What are these regulations based on?

FOG Ordinance

Part 4

FOG Ordinance

- Also known as a FOG policy
- Provides written authority to administer FOG program
- Legal document designed to outline FOG requirements for Food Service Establishments (FSEs) and other relevant entities.
- May work in conjunction with other sewer ordinances
- Acts as reassurance to public that FOG mitigation is a priority

Components of a FOG Ordinance

Introduction/ Purpose

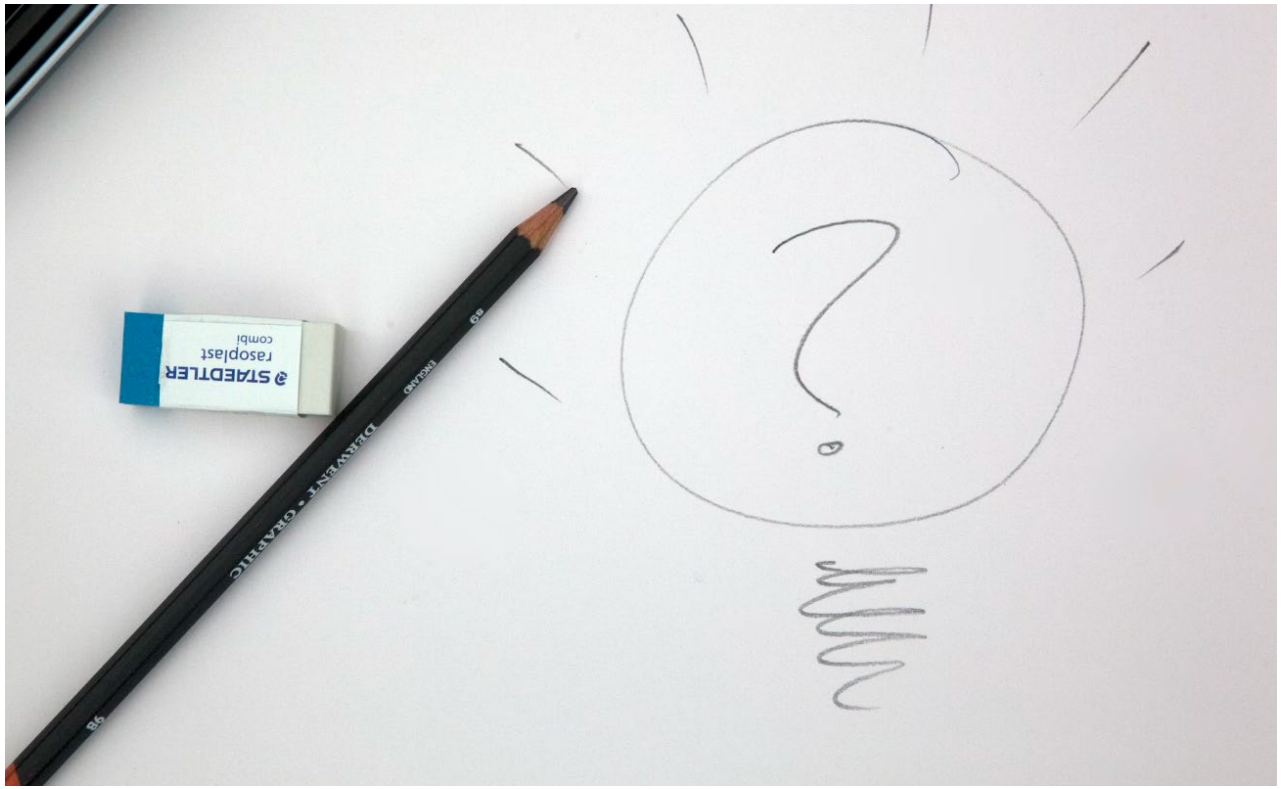
Define/Identify Stakeholders

Program Procedures/Details

- Grease Installation, Maintenance, Record Keeping, and Inspection
- Cleaner Requirements
- Violations/penalties

Introduction/ Purpose

- Decide on objectives and goals of FOG policy
- Outline specific desired outcomes and path to achieving those outcomes
- Authority (state name) – establishes legitimacy and enforceability



Identify Stakeholder's

Common Stakeholder's:

- FSEs
- Sewer Authority
- Waste Haulers
- Local Government
- Domestic Households
- Food Manufacturers

Program Procedures/Details

- Outlines specific steps and procedures the sewer authority will take to administer a FOG Ordinance
- Procedure for managing FOG producer database
- Outlines requirements (e.g. minimum sizing requirements, minimum maintenance intervals)
- Enforcement

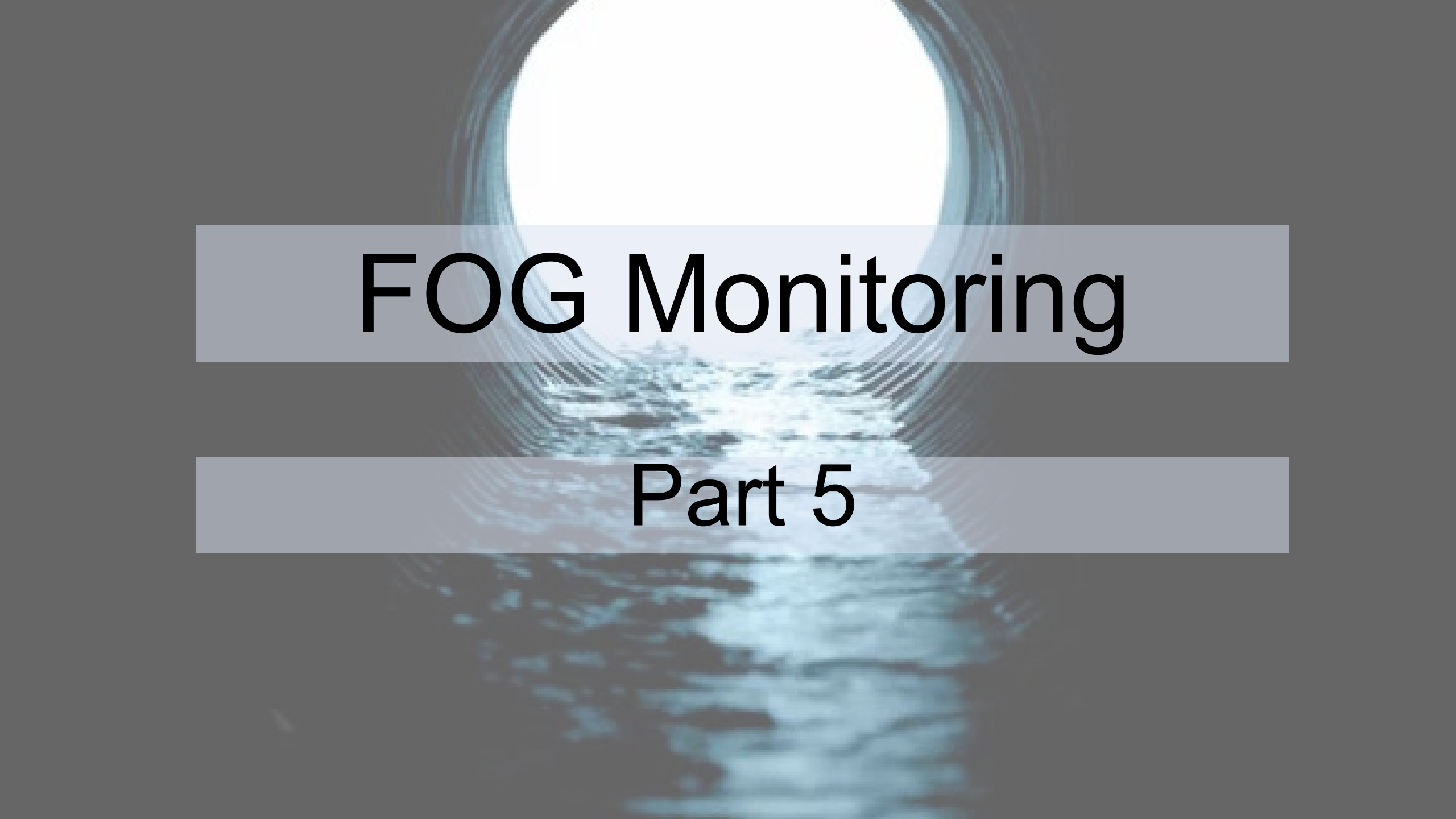
Provides Specifics about Installation, Maintenance, Record Keeping, and Inspection

Outlines guidelines for FSEs to meet the following ordinance requirements:

- Grease trap specifications
- Grease interceptor installation and maintenance
- Record-keeping
- Reporting requirements
- Best management practices

Grease Interceptor Cleaning Requirements

- Includes cleaning requirements for both grease interceptor owners and cleaners
- Establishes cleaning frequency requirements
- Recommends frequent inspections
- Provides guidelines for proper grease removal and disposal
- Record or manifest requirements



FOG Monitoring

Part 5

Monitoring Components

- FOG producer database
- Inspections
- Inspection documentation
- Sample and analysis
- Continued outreach

FOG Producer Database

- Should include detailed information about the FOG producer
- Should indicate compliance status, and last inspection and cleaning dates
- Should track history of violations
- Unique identification number
- Variety of online and offline options

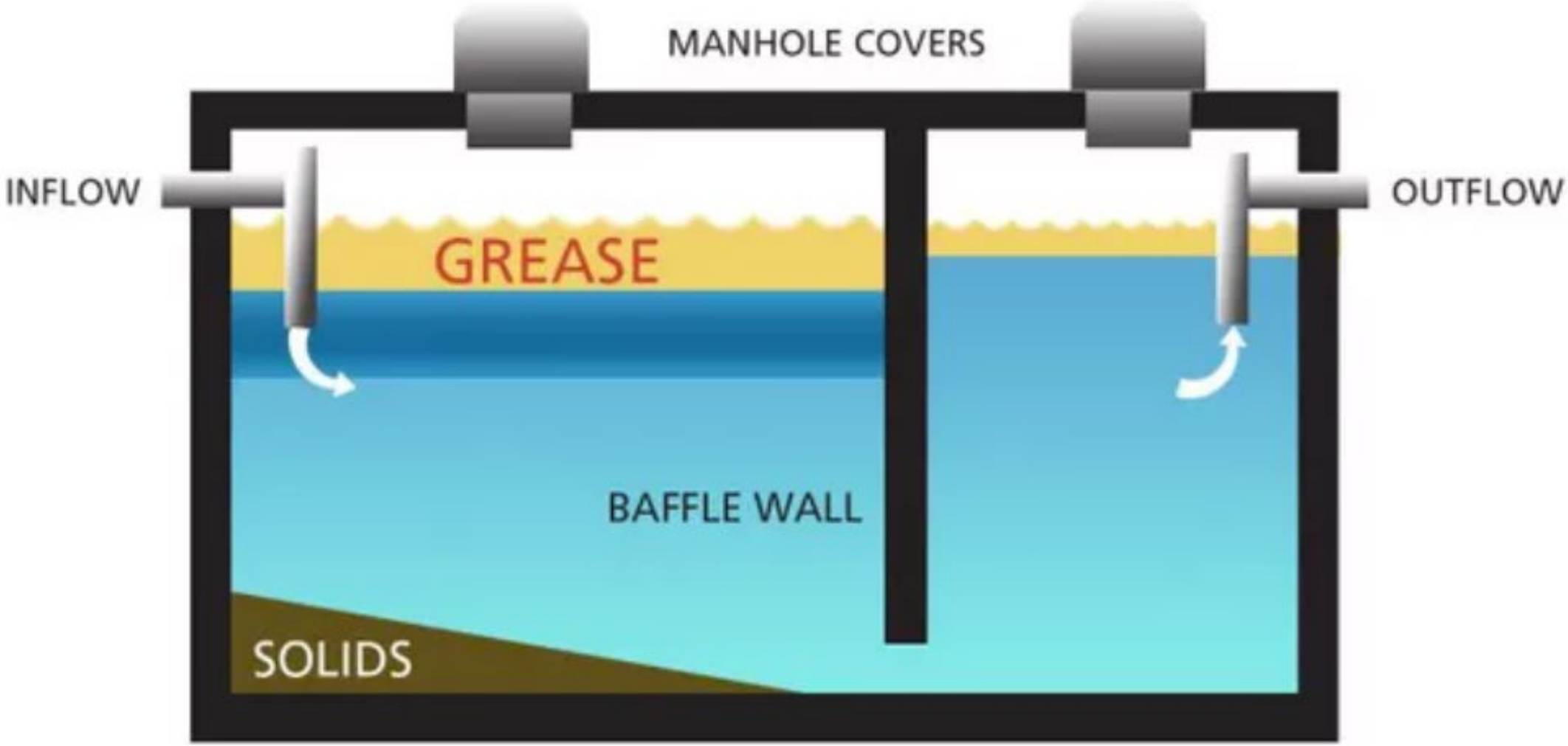
Inspections

Should include visual inspection to verify all components are present and in working order

- May include dye test

Scheduled vs random inspections

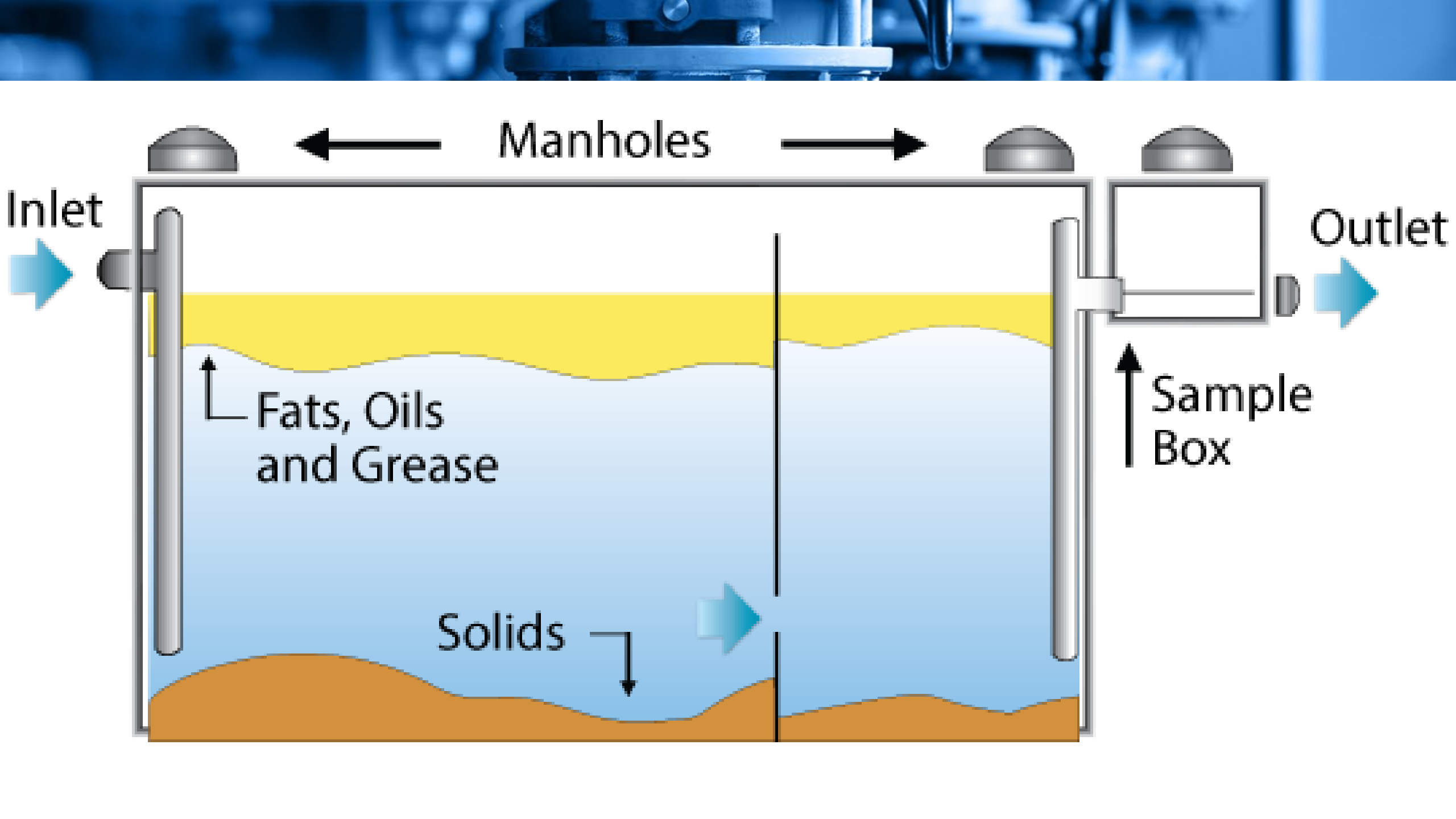
May be conducted by sewer authority staff, grease interceptor cleaners, or other parties.



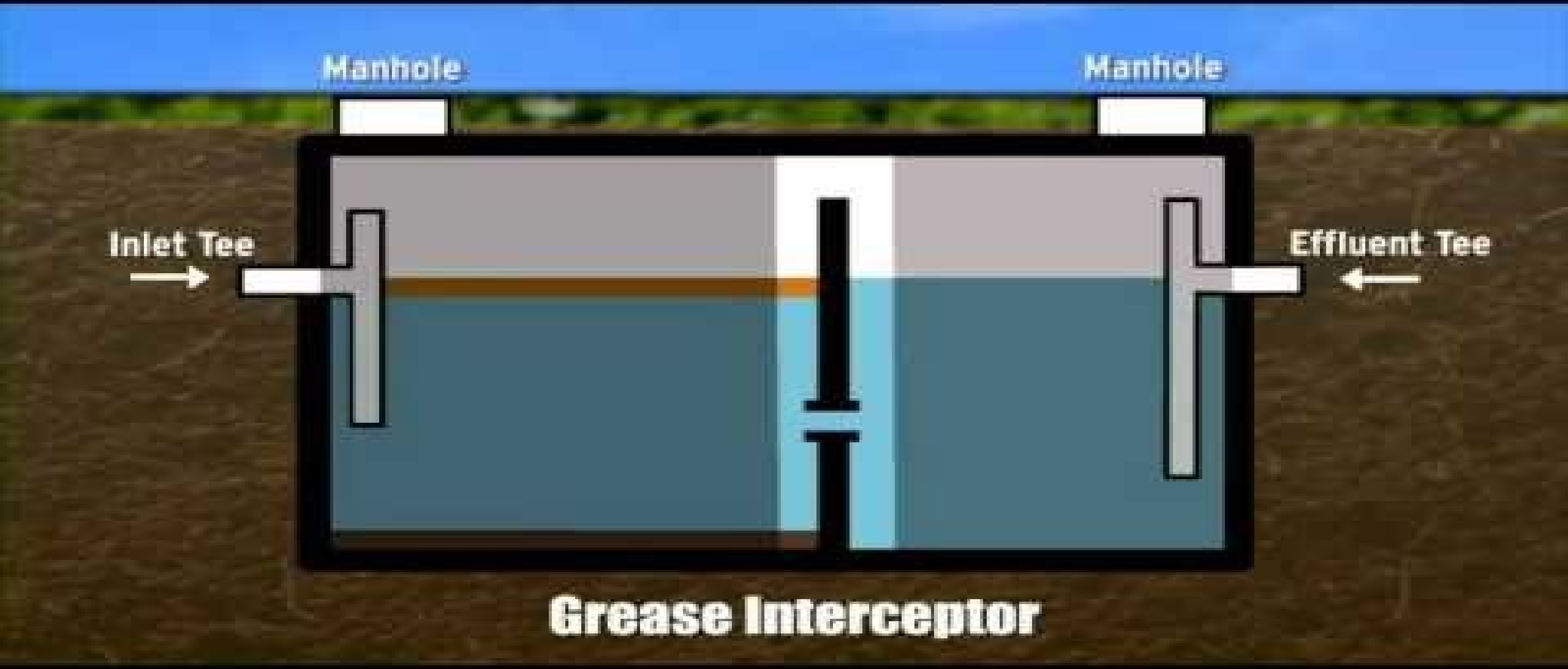
GREASE INTERCEPTOR

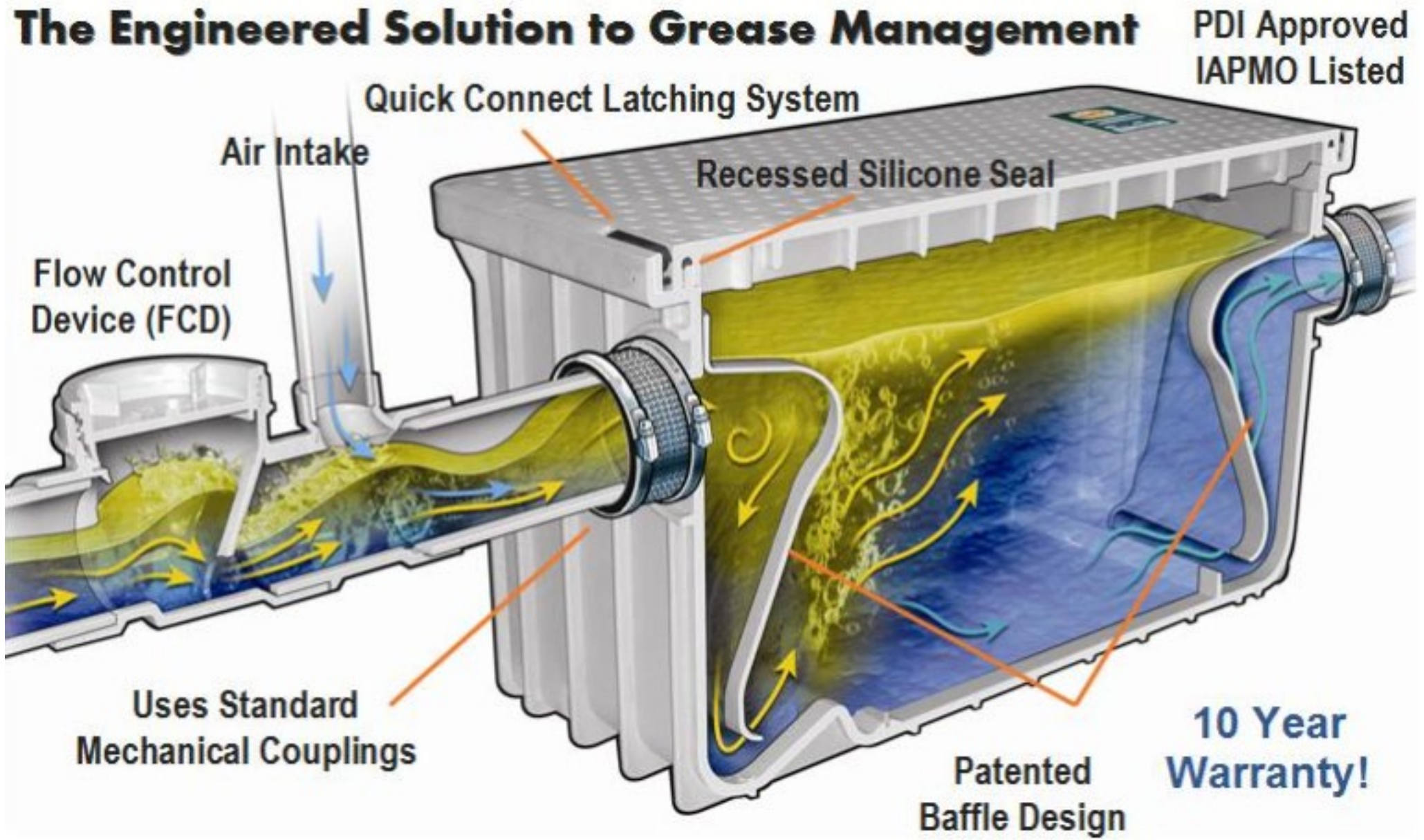
Parts of a grease trap

- Inlet Pipe
- Flow Control Device
- Baffles
- Grease Separation Chamber
- Solids Settlement Chamber
- Grease Outlet
- Effluent Outlet
- Venting System
- Access Port
- Sampling Port


Manholes
Inlet
Outlet
Fats, Oils
and Grease
Sample
Box
Solids

VIDEO: https://www.youtube.com/watch?v=g4l3TzlRdI8 skip to 4:22




The Engineered Solution to Grease Management
PDI Approved
IAPMO Listed
Quick Connect Latching System
Air Intake
Recessed Silicone Seal
Flow Control
Device (FCD)
Uses Standard
Mechanical Couplings
Patented
Baffle Design
10 Year
Warranty!

VIDEO: https://www.youtube.com/watch?v=aeUE7Iu50og

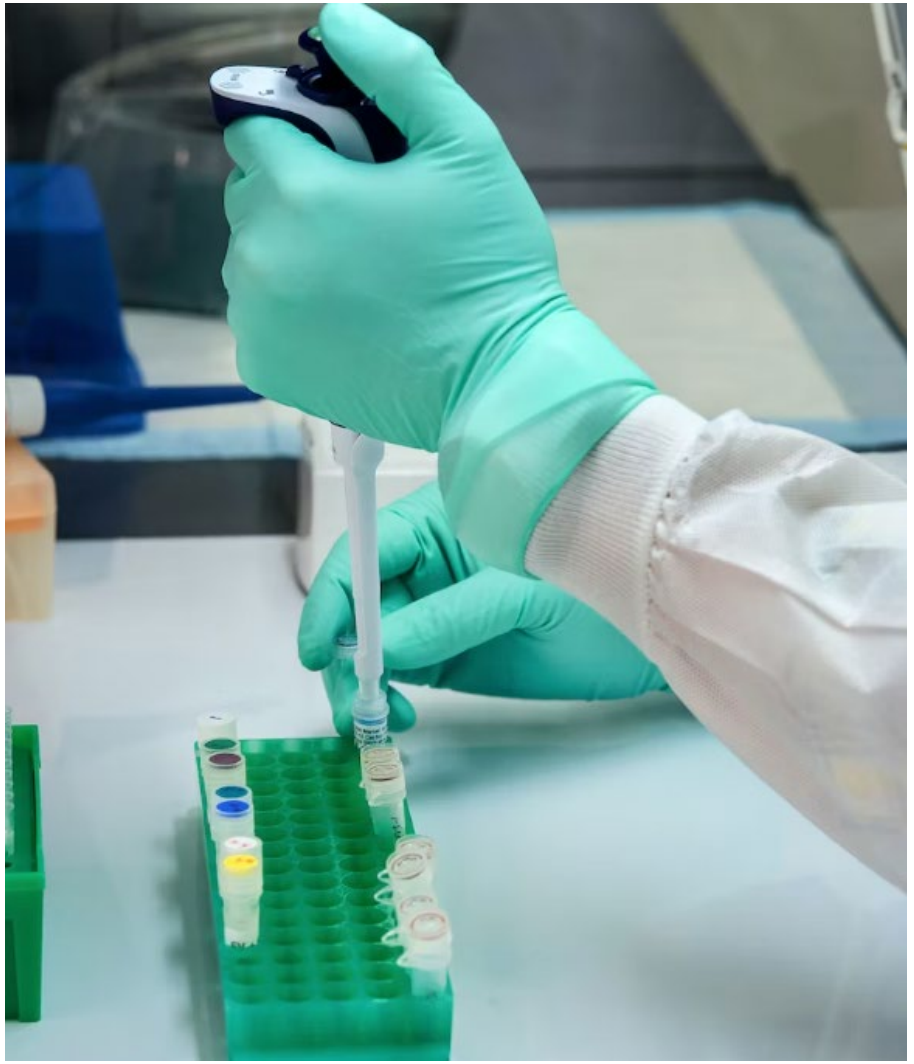
VIDEO: https://www.youtube.com/watch?v=AxK3rAC4YGc

Inspection Documentation

- Proof of cleaning and proper disposal
- Maintenance documentation
- Cleaning and inspection logs
- FOG discharge permits

Sample and Analysis

- Regular analysis can be par of ensuring compliance
- FOG ordinance can set a discharge limit
- But may requires extensive manpower and resources and the FOG analysis can be unreliable



Continued Outreach

- Outreach should focus on reinforcing BMP education
- Inspectors should carry pamphlets with BMP lists, FOG requirements, and diagrams of grease interceptor components
- Questions about inspections can be incorporated into inspection form

FOG Policy Enforcement

Part 6

Enforcement Components

- Violations
- Penalties
- Corrective actions

Violations would be issued after an inspection

The inspection sheet can often act as the initial violation notification

Violations should be followed up with official notices through post

Opportunity to educate rather than enforce

EXAMPLE

Tier 1	Tier 2	Tier 3
Failure to maintain cleaning, maintenance, and disposal logs Failure to register grease control device	Grease control device opening obstructed Failure to repair equipment	Failure to contain, clean up, abate, remove, or dispose of unlawfully discharged substances

Penalties

Penalties can be uniform or determined by the severity of the violation and its potential impact on the system

Penalties can be reinforced with a fee schedule, which may simplify things

Fee Schedule

A fee schedule outlines the monetary penalty for each type of violation

It indicates when fees will be assessed and how frequently

It indicates when fees escalate

Corrective Actions

- This should be the responsibility of the FSE
- Balance between letting them pay the fine and following up should be found
- Many authorities allow fines to be applied to corrective action
- Correcting behavior to protect the system and environment is the preferred outcome

Collection System Operations and Maintenance

Part 7

Collection System FOG Monitoring Components

- Sewer Inspections (CCTV)
- Flow Monitors
- Cleaning and Maintenance Schedules
- Sanitary Sewer Overflows (SSO)

Close Circuit Television Video (CCTV)

High-resolution camera with a powerful light is moved through a pipe and used to inspect the interior

Manholes and other entry points used as access point

Interior footage sent to monitoring device for analysis

Reporting system should indicate the severity of defects

Flow Monitoring

- Can identify FOG issues based on abnormal flow patterns
- FOG reduces hydraulic performance of collection systems
- Flows should be continuously monitored when using this method

Cleaning and FOG Related Maintenance Schedules

- Regularly scheduled inspections and maintenance prevent FOG related SSOs
- Schedules should be details and issues should be documented
- Maintenance should be preventative
- High-pressure water jetting is effective at cleaning
- WWTP should be notified of cleaning events

SSO Clean-Up

Sewer authority should develop an emergency response plan for SSOs

Emergency Response Plan should include:

- Trigger Criteria
- Response Team
- Notification Protocol
- Clean-Up Plan
- Documentation and Reporting
- Public Communication

Food Service Establishments

Part 8

FSE FOG Requirements

- Grease interceptor/ trap installation
- Grease interceptor pumping and maintenance
- Best management practices
- Documentation

Grease Interceptor Installation

FSEs should consider the following when installing a grease interceptor:

- Location
- Accessibility
- Sizing and Capacity
- Materials and Construction
- Grease Interceptor Attachments

Grease Interceptor Pumping and Maintenance

- Establish inspection schedule
- Scheduled frequent grease interceptor pumping
- Verify correct pumping
- Identify and correct grease interceptor issues promptly

FSE Best Management Practices

Scraping plates

Dry wiping

No-Nos

- Hot water flushing
- Detergents and chemical digesters (enzymes)
- Garbage disposal
- Attaching floor drains and mop sinks to the grease interceptor

FSE Documentation

Manifests

- Determined amount of time
- Provided by pumper
- Ensures proper disposal

Maintenance Records

- Ensure proper maintenance
- Protects FSE against questionable repairs

Domestic FOG

Part 9

Domestic FOG Components

Should focus on outreach and education

- Explains what FOG is
- How it enters the collection system
- Why it is a problem
- How it can be prevented (what role they play)

Activity

Cultural Considerations

- Appeal to cultural values
- Utilize cultural symbols if appropriate
- Cultural Food


PROTECT
YOUR PIPES
Rx
WIPES
FLOSS
COTTON BALLS
MEDICATIONS
MEDICINA
WIPES
TOALLAS HUMEDAS
GREASE
GRASA

VIDEO: https://www.youtube.com/watch?v=7-ZFadu-s-g

VIDEO: https://www.youtube.com/watch?v=6T3Emt_UAHc

Disposal Resources

- Glass Jars or Metal Containers
- Plastic Jars if cooled
- Special containers are available form many online vendors
  - Often include liners


Questions?

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