

Coachella Valley Water District



Fats, Oils, and Grease (FOG) Program

Background

The discharge of fats, oils and grease (FOG) from animal and vegetable sources can create sewer line stoppages that result in sanitary sewer overflows (SSOs). Two main sources of FOG discharges are food service establishments (FSEs) (e.g., restaurants, cafeterias, school, college, and university food services, and commercial kitchens) and residential users. FOG discharges may be a result of poor housekeeping practices at FSEs or poorly informed decisions by residential users. The result is the same: SSOs.

FOG enters the waste-stream in a liquid, semi-liquid or solid state due to its temperature or hydrogenation state.

Two conditions of common fats are saturated and unsaturated. At room temperature, saturated fats are solids while the unsaturated fats are either liquid or semi-solid. Many unsaturated fats are hydrogenated to make the fat solid at room temperatures. The hydrogenation process breaks the double carbon bonds of an unsaturated fat and adds hydrogen molecules in place of the double bond. This hydrogenation process creates a saturated fat. The more hydrogenated a vegetable oil the more solid the oil is at room temperature. Vegetable shortenings that are solid at room temperature are vegetable oils that have been completely hydrogenated.

Examples of animal saturated fats are beef, chicken, and pork. An example of a plant saturated fat is found in avocados. Many forms of these fats are liquefied by increasing the temperature of the fat as in the case of a deep fat fryer. Some are liquefied when exposed to bacteria, biological or chemical enzymes, chemical agents, or solvents.

Fats, oils, and greases all have fatty acid components. Palmitic acid is the most widely occurring saturated fatty acid and is found in beef tallow (32%), lard (30%) and cottonseed oil (21%). Oleic acid is the most widely occurring unsaturated fatty acid and is found in olive oil (83%) and peanut oil (60%).

The discharge of hot or warm FOG to the sewer causes the quickest stoppage problems. The sewer line temperatures typically range from 70-80° Fahrenheit. At this temperature, the hot or warm FOGs cool off, adhere to the interior surfaces of a sewer line, and harden in place. The adhesion sites become sites for additional adhesions much like making a candle. A source discharge of FOG will create a blockage pattern in the sewer line characteristic of the material discharged and the frequency of discharge. The blockage tends to increase in size downstream of the user's lateral connection to the main.

FOG and water are immiscible, and the less dense FOG floats, resulting in accumulations on the upper surfaces of the sewer lines. These deposits are exacerbated by increases in the wastewater level caused by FOG obstructions that restrict sewer flows.

Grease interceptors are gravity separation devices that separate FOG and other solids from the wastewater discharge. The use of biological or chemical agents in grease interceptors to liquefy FOGs prior to discharge is problematic. Bacteria and enzymes act to reduce long chain fatty acids into smaller chain molecules. A bacteriological system needs 24-72 hours to completely aerobically metabolize FOG to carbon dioxide and water. A gravity separation interceptor has from 30 to 120 minutes of detention time. The result of bacterial or enzymatic product usage is a liquefaction or emulsification of the FOG in the interceptor. This liquefied FOG is subsequently discharged to the sewer where further degradation of the FOG by the bacteria or enzyme is interrupted by the dilution of the material and mixing of other material with the FOG/bacteria/emulsifier in the receiving sewage. The liquefied FOG begins to coalesce and adhere to sewer line interior walls, deplete the oxygen content of the wastewater (due to microbes present in wastewater), and create odor problems (due to the depleted oxygen content).

CVWD's FOG program focuses on preventing the discharge of FOGs to the sewer system and educating the FSE community and homeowners about FOG Best Management Practices.

FOG Program Elements

CVWD inspects over 600 FSEs. These sites have grease interceptors ranging in size from 750 to 15,000 gallons. CVWD uses many activities, or elements, to control and prevent the discharge of FOG to its sewer collection system (collection system). These elements include:

1. Public education and outreach
2. Grease interceptor retro fits
3. Site Inspections
4. Collection system cleaning and assessments
5. Collection system and sewer lateral closed circuit television (CCTV) inspection
6. Enforcement actions by the Source Control Section (SCS)
7. Training

Public Education and Outreach

CVWD uses the SCS inspectors as the principle education and outreach method to contact the FSE community and residents. As part of the process of opening an FSE, a person is directed to CVWD during Plan Check. The SCS has the business supply

information about their facility, then determines if, and what size an interceptor is needed. SCS visits the facility during construction to ensure any required interceptor is in place and properly connected. Later, during routine inspections of FSE, the inspector may use the opportunity to inform and educate the owner or manager about the Best Management Practices appropriate to their business. Subject areas could include: storm drainage, product usage and substitution, good housekeeping practices, grease interceptor evaluation, CVWD regulation applicability, and any SCS permit requirements.

CVWD also informs residents about proper disposal methods for FOG. The residents are advised to, “Never pour kitchen grease down the drain. Put it in a container and dispose of it in the trash.” Through bill stuffers and handouts residents are reminded of the importance and value of keeping FOG out of the sewer. The residents are encouraged to contact CVWD for more information and clarification in regard to the FOG program.

Grease Interceptor Retrofits

One of the main compliance tools used by the SCS for FSEs is the required installation of a grease interceptor. For new construction and tenant improvement projects, this action is accomplished through the CVWD’s plan check process. Building permits are not issued if the applicant has not agreed to SCS requirements for the project.

If an existing FSE has been the cause of a sewer line blockage and/or SSO and does not have grease interceptor, then the user is required to install an appropriately sized grease interceptor within 90 days. This may also include the installation of trench drains at the trash enclosure to prevent wastewater discharges from entering the storm drain.

If the existing FSE has a grease interceptor but the device is poorly maintained or is inadequate to treat the type and volume of wastewater from the facility, then the user will be required to replace the existing grease interceptor with one that is adequate for the intended application.

If the FSE is found responsible for a sewer line blockage and/or SSO, then the costs of cleanup and/or repairs necessary to remove the blockage and/or SSO will be invoiced to the facility.

Site Inspections

Inspections of FSEs enable CVWD to learn what sites may be problematic to the area’s collection system. CVWD’s SCS is responsible for inspecting all FSEs within CVWD boundaries at least once per year, with many being inspected more often. An increase in frequency may be dictated by the history of the site, the type of FSE, complaint history, manpower availability, sewer line blockage or SSO history. Records of site inspections are maintained in a data base, providing the SCS with an inspection and enforcement history for each site.

Inspection may reveal if any bacterial, enzymatic, or chemical agents are used to dissolve, emulsify or suspend FOG. The bacterial, enzymatic, or chemical agents may be found in products used for cleaning silverware, pots and pans, drain cleaning, and floor cleaning. Some products are specifically designed as a grease interceptor additive and are used to liquefy FOG in the grease interceptor with the promise that the interceptor will never need pumping. By CVWD standards, a grease interceptor's performance will be negatively impacted once the operational fluid capacity is reduced by 25%. Site inspection also allows evaluation of the grease interceptor for performance and integrity. Performance may be affected by missing sanitary tees, missing or plugged baffle tubes, influent or baffle tube extensions that are too long (Appendix A). The integrity of the interceptor can be affected by anaerobic conditions that generate sulfide gas that causes corrosion of concrete surfaces.

Once the concrete begins to corrode, plumbing connections are compromised and, in some cases, the structural integrity of the interceptor is in question.

The SCS also works closely with the Riverside County Department of Environmental Health to share information gained during restaurant inspections. The SCS inspectors have some knowledge of what constitutes Health and Safety Code restaurant violations. When these violations are observed, a phone call is placed to the Health Department to have the area inspector respond and take appropriate enforcement actions.

Sewer Line Cleaning and Assessments

CVWD maintains approximately 1,107 miles of gravity draining sewer lines and 81 miles of force main lines. The majority of the gravity flow sewer lines are 8 inches in diameter. CVWD's Collections Staff cleans sewer line every day to ensure that the system's operational capacity is realized. The collection system also has 34 sewer lift stations that are inspected on a daily basis to ensure peak performance.

All the attention to line cleaning and pump station performance is focused on system integrity. A 2 inch thick deposit of FOG on the walls of an 8 inch sewer line can lead to an SSO in a very short period of time. CVWD's collection system's scheduled cleaning can prevent SSOs from occurring. In addition to routine cleaning, known problem areas throughout the collection system are given extra attention. These additional cleanings are for sewer lines with a history of excessive roots, grease, solids or all three.

Collections staff prepares written reports for all sewer maintenance activities, including SSOs. These reports provide the details of the condition of the sewer line and any problems that were encountered. When heavy or excessive FOG is found, a report is generated and given to the SCS to investigate.

Sewer and Lateral CCTV Inspections

The most useful tool used by the Collection Staff to evaluate the condition of the sewer system is closed circuit television (CCTV) inspection. CVWD uses internal CCTV

inspection and contracts with outside contractors to evaluate its sewer system. The goal is to maintain a video library of every CVWD sewer line. CCTV inspections are also used to provide information about sewer line blockages. Since these CCTV inspections are recording actual events and conditions, the CCTV records can be used as evidence in an enforcement action. Sewer and lateral CCTV inspections are sufficient for the SCS to bring an enforcement action against a business or company that has caused or has the potential to cause a sewer line blockage and/or SSO.

Enforcement

The discharge of wastewater by a user that causes a sewer line obstruction or blockage is prohibited by the federal Clean Water Act, 40 CFR 403.5(b)(3) and the CVWD's Rules and Regulations Governing Sanitation Service. The SCS is empowered by the Rules and Regulations Governing Sanitation Service to take enforcement actions against any user that causes a sewer line obstruction and/or SSO. In order for the enforcement action(s) to be successful, a firm foundation of court admissible evidence must be obtained. This evidence must be objective and devoid of personal opinions. CCTV evidence can be a critical component of an enforcement action taken against a user for causing a sewer line blockage and/or SSO. In addition to any CCTV evidence, inspections are performed by the SCS at the suspected business to evaluate and investigate the cause(s) of the sewer line blockages and/or SSO. Once all evidence is collected, the information is reviewed and an enforcement strategy is planned. Enforcement is commensurate with the degree of the violation found and follows the procedures and requirements of CVWD's Enforcement Response Plan. If the sewer line debris accumulation has just begun and no SSO or sewer obstruction has occurred, then a correction notice may be issued to improve housekeeping practices and evaluate the business practices that contribute to the discharge of materials that caused the sewer line debris accumulations. If the sewer line accumulations are significant and/or an SSO has occurred, then more severe enforcement actions may be taken. A notice of violation (NOV) may be issued with a compliance schedule to mitigate the conditions that caused the sewer line blockage and/or SSO to occur.

In addition, CVWD or the Riverside County Environmental Health Department may issue a Cease and Desist Order (CDO). The NOV or CDO will require that the discharges causing the sewer line blockage and/or SSO must stop immediately and the user shall take all actions necessary to prevent any future discharges that could cause a sewer line blockage or SSO. A plan of these actions is required to be submitted in writing and the user is held accountable for the correction actions submitted. If the user fails to achieve compliance or is unresponsive to the requirements of the correction orders, then additional civil and/or criminal actions may be taken.

CVWD's Regulations Governing Sanitation Service are being revised to include; "The use of chemicals to dissolve grease is specifically prohibited." After revision the SCS inspection staff will be looking for these products during every FSE inspection. When a prohibited product is discovered, the user will be ordered to immediately stop the use of

the product and have the product removed from the premises. Failure to comply may result in additional enforcement actions, including civil and/or criminal actions.

Training

The SCS inspector's knowledge, skills, and abilities are constantly being challenged and improved. Training of the inspector for FOG issues is critical to insure that the inspector is adequately equipped to respond to FSE inspection and SSO investigation findings. This training includes:

1. Laws and regulations
2. New technology and equipment
3. New pretreatment methodology
4. Inspection practices
5. Safety/traffic control
6. Enforcement actions

CVWD uses a variety of means to train SCS inspectors in these areas. These include:

1. SCS Phase Training
2. Pretreatment Inspection Courses, Cal State Sacramento
3. Specialty conferences and events
4. Special schools and training events
5. Meetings, discussions, and field training with more experienced SCS inspectors

Summary

CVWD's SCS and Collection System Section work closely together to find, investigate, and correct problems caused by the discharge of FOG to the collection system. Preventive rather than reactive sewer cleaning and inspections and SCS inspections are critical to insure the integrity of the collection system. Prompt responses to SSOs are necessary to quickly mitigate the effects of an SSO on the community. Enlisting the services and resources of the County and California Regional Water Quality Control Board enhance the performance of the CVWD's FOG program.

Appendix A
Grease Interceptor Evaluation Form



INSPECTION REPORT

FATS, OILS AND GREASE (FOG) PROGRAM
(SOURCE CONTROL)

Coachella Valley Water District, P.O. Box 1058, Coachella, CA 92236 (760) 398-2651

Name of discharger: _____ Interceptor: _____

Address of discharger: _____

Date of Inspection: _____ Key Nr: _____

Inspector: _____

Process(es)	Inspected	Deficient	Comments:				
Discharging	[] Yes	[] Yes	_____				
Non-discharging	[] Yes	[] Yes	_____				
Raw Materials Storage	[] Yes	[] Yes	_____				
Handling	[] Yes	[] Yes	_____				
Equipment Operation	[] Yes	[] Yes	_____				
Maintenance	[] Yes	[] Yes	_____				
Process area	[] Yes	[] Yes	_____				
Access (sinks, drains)	[] Yes	[] Yes	_____				
Cleaning	[] Yes	[] Yes	_____				
Treatment (Interceptor – Other)	[] Yes	[] Yes	_____				
Size _____ gallons			O ₂ %	LEL%	H ₂ S ppm	Floating	Sludge
Lid _____	Gas detector reads		_____	_____	_____	Layer _____"	_____"
Lid _____	Gas detector reads		_____	_____	_____	Layer _____"	_____"
Lid _____	Gas detector reads		_____	_____	_____	Layer _____"	_____"
Internal plumbing	[] Yes	[] Yes	_____				
Sample Station	[] Yes	[] Yes	_____				
Solid Waste Handling	[] Yes	[] Yes	_____				
Storage	[] Yes	[] Yes	_____				
General Housekeeping	[] Yes	[] Yes	_____				
Hauling Records	[] Yes	[] Yes	_____				

Summary:

Received by: _____		
_____	_____	_____
Printed Name	Signature*	Date

*Signature indicates receipt of copy, not agreement with findings

