



Cutting Grease

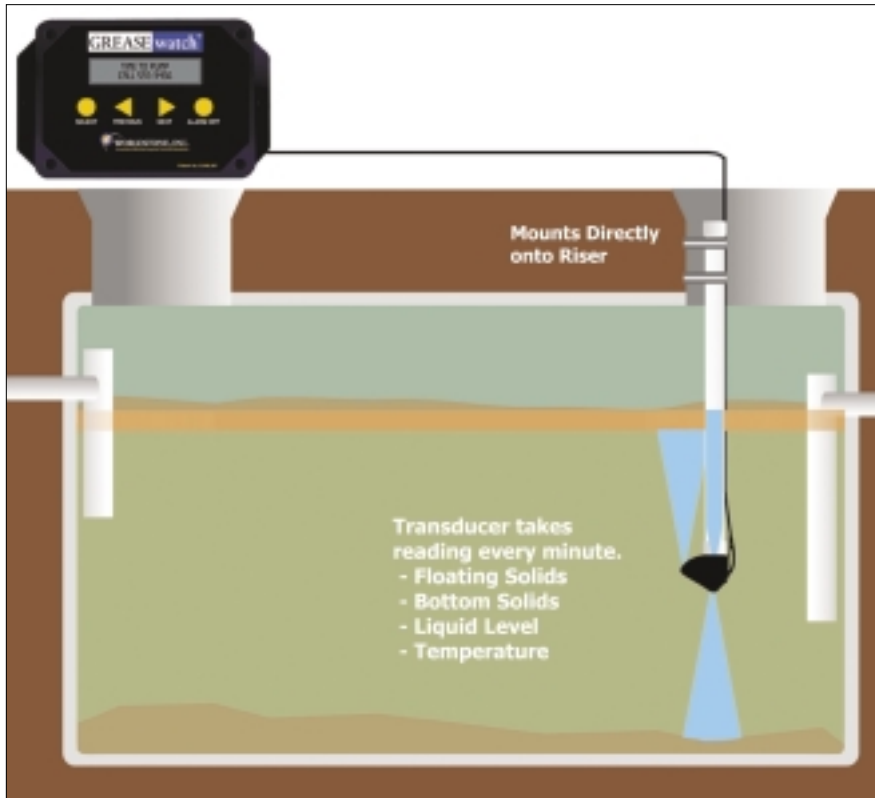
With Ongoing Monitoring and Maintenance

By James M. Russell

Grease is clogging sewers nationwide, creating a costly mess to clean up and a dilemma for officials and regulators. Recently, the Wall Street Journal reported that 75 percent of the sewer systems in the United States work at only half capacity because of grease clogs. The cost of keeping sewers open, a cost borne by taxpayers at a local level, is \$25 billion per year. The increase in grease in sewer lines is a direct result of the phenomenal growth in dual-income households who choose to eat out or take-out rather than cook at home.

According to the National Restaurant Association's 2001 Industry Forecast, total restaurant-industry sales have grown every year for the past 10 years and are projected to reach a record \$399 billion in 2001. This growth, combined with the chronic problems of measuring grease to sewer spillage, will continue to plague our sewer systems. Industrial areas also are facing grease clogs in their main sewer lines due to various industry activities, such as meat production and packing.

Grease clogs in a sewer line decrease the flow through the lines and compromise system performance. According to



Electronic monitoring systems constantly analyze tank performance to recognize the correct timing for pump-out maintenance.

Wayne Sobieralski of the California State Water Resources Control Board, “The number one cause of sewer overflows in Southern California is grease blockages.”

In Boston, a 300-foot grease ball with a 36-inch diameter clogged the sewer line under the famous Faneuil Hall area. Across the country and around the world, cities and towns are struggling to manage the growing grease problem.

Current Regulations Are Difficult to Enforce

No matter if you live in a rural area that relies on septic systems or in a city with sewers, regulators are responsible for overseeing local establishments that are major contributors to the grease problem. The primary challenge for these regulators is to develop programs and solutions that are effective. This means that they will ensure and document compliance with codes. Solutions looked at by municipalities include mandatory pumping cycles, monitoring and fines for offenders. Many areas also have reduced the amount of time between mandatory

pumping cycles. Voluntary inspections every 30 days are required in some communities, but they are hard to enforce and infrequently done. Many cities are rewriting their codes to require the use of new technology as it becomes available.

One thing is for certain, given the magnitude and cost of the problem, cities are cracking down. Boston’s current grease trap regulations call for mandatory pump-outs every 90 days. New regulations in Atlanta impose fines of up to \$1,000 per day and a mandatory 60 days imprisonment for violation of the local code.

In California (anticipating more stringent EPA regulations), state, regional and local teams are collaborating to implement a comprehensive program to optimize capacity, management, operations and maintenance (CMOM) of all collection systems.

In St. Petersburg, Fla., a new ordinance is being written that provides an incentive for proactive oil and grease management. Restaurants will be required to pump their tanks every 30 days if they

have a garbage disposal and every 60 days if they do not have a garbage disposal attached to their tanks. This is unless they receive a waiver from the city showing that they are maintaining proper tank levels. In addition, the city may advocate continuous monitoring at each location to provide immediate and historical data on tank and trap performance and maintenance.

Perspectives on the Problem

Regulators

The outside grease trap/grease interceptor system of wastewater treatment has been in use for more than 50 years. Historically, studies consistently have shown that periodic grease tank inspections are a vital part of proper system maintenance programs, but how frequently should tanks be inspected and pumped?

Manual inspections are costly and time consuming. Inspection requires locating the tank, removing the access cover and then inserting a “sludge judge” or crude measuring device into the tank. The measurement of the sludge, grease and liquid levels relative to the outlet tee allows them to calculate the thickness of the solids. This method is costly and time consuming, not to mention messy, smelly and, in many cases, dangerous. It also is difficult to manage on a consistent basis due to the shortage of inspectors and the growing number of businesses and facilities that must be checked. Given the costs, manpower and the sheer volume of inspections required to ensure compliance, control of the grease problem by inspection is impractical.

For example, there are 10,000 restaurants in Los Angeles and a staff of 17 enforcement personnel. It takes the enforcement team two to three years to inspect every facility. However, mandatory pumping is not a viable long-term solution either.

Service Providers

Some service providers do not properly pump tanks and traps when called in for service. In some instances, grease and solids actually have been introduced into the tanks by the pumper. As

the cost to dispose of grease continues to rise due to the elimination of land application processes and the refusal of more and more treatment plants to process trap grease, the price to dispose of grease is driven up. In many cases, pumpers are forced to travel great distances to find a facility that will process the grease. Pumpers looking to cut cost and dispose of less may skim the top grease and leave bottom solids.

Restaurants

Although pumpers may be responsible for some of the grease problem, they are not responsible for restaurants and facilities that are out of compliance because they just do not service their tanks and traps or because they do not comply with best waste disposal practices. These food service facilities are responsible for staying within guidelines and pay fines for violations.

Cost Effective, Real-Time Monitoring and Control

Good waste disposal practices implemented at each food service facility are a necessary part of controlling the accumulation of grease and sludge. They are necessary but not sufficient. In order to ensure compliance at an acceptable cost, new solutions also must incorporate two critical elements.

- Continuous monitoring and tracking of regulatory compliance at the tank level.
- Online access to real-time data about tank status from the desktop for regulators, service providers and owners.

Recent developments in micro-processor-based ultrasonic technology specifically designed for septic tanks and grease traps have made it possible to continuously monitor the grease, sludge, liquid level and temperature in tanks. The monitors utilize an ultrasonic transducer mounted on a pipe suspended in the middle of the effluent (normally at the outlet end of the tank). The acoustic beams in the transducer monitor to the top of the sludge, to the bottom of the grease and to the liquid level in the pipe



Restaurants are responsible for staying within grease guidelines and pay fines for violations.

mounted in the tank. The pipe acts as a stilling well, maintaining the liquid level of the tank.

Using these measurements and some preset tank dimensions, the positioning and thickness of the solids and level of the liquid within the tank can be calculated. The data recorded by the monitor is digitally fed back to a control unit mounted in the customer's building.

Data are presented to the user at his desk in a format that is easy to understand. Programmable settings allow the service provider or the regulator to set when the tank should be pumped based on the actual amount of solids in the tank. At any time, owners can push a button to find out how close the tank is to its next pumping based on the percentage of total allowable solids, top solids or bottom solids in the tank. Status of the liquid level in the tank in inches as well as a high or low relative to its "normal level" also can be accessed at any at time via a button on the control unit. A tank temperature gauge also is available that is important with grease traps and in very cold climates. Critical solids and liquid levels can be programmed into the system triggering a buzzer when exceeded. This information is kept in digital memory for 20 years, serving as a historical record of changes in the tank over time to document tank performance and routine maintenance.

Perspectives on the Solution

A tank monitoring solution based on this new technology can save money and headaches for everyone involved in the process. Regulators have a powerful tool to keep people in compliance and prevent overflows at less cost.

As the cost of pumping grease escalates, food service facilities will welcome improved management systems that will keep them in compliance with local and state ordinances, and that will keep service costs down. Currently, many providers charge a monthly tank fee and remove not only the grease, but effluent as well. Monitoring becomes a tool for business owners to ensure that their service provider is properly managing their tank or trap.

Finally, for service providers, the monitoring solution enhances the value and profitability of service contracts. In many cases, service providers will be in a position to pump less, yet make more. Pumping is done when it is needed. When the tank is pumped correctly, it is possible to wait longer before the next pumping. Less pumping for the existing customer base frees up pump trucks and personnel to expand the business without additional expense. For customers who always wait too long to pump, the monitoring solution is proof that they should pump more often. This makes the service provider's job easier and increases service revenue.



Manual measuring of sludge, grease and liquid levels is too costly and time consuming to do on a regular basis.

Case Studies

Electronic monitoring systems have been installed in numerous food service facilities nationwide from theme parks and prisons to restaurant chains and hospitals. These businesses, with ultrasonic monitoring systems for septic tanks and grease traps, are constantly analyzing tank performance to help prevent solids from exiting their system and to recognize the correct timing for pump out maintenance. In the case of septic systems, regular maintenance of the septic tank also prevents failure of the drain field due to clogging. Proper maintenance also protects surface and ground water from nutrients, pathogens and other contaminants by preventing backups and overflows. In environmentally sensitive areas, septic monitors are helping to protect groundwater by preventing tank failures and disposal of harmful bacteria into recreational lakes, streams, ponds and oceans. In every case, owners and managers can control their system, saving money by pumping when needed. A monitoring system also gives them the peace of mind that their system is

working properly, and they are staying within the guidelines set by state and local regulations. For the grease traps and tanks connected to sewer lines, monitoring is done similarly to determine the correct time to pump, protecting the establishment from backups and the sewer system from costly clogs.

At Children's Hospital in St. Petersburg, Fla., following a number of compliance problems with their grease disposal system, a monitoring system was installed in their grease trap on the recommendation of the St. Petersburg Department of Public Works. They now call their pumper when the tank reaches the recommended solids levels and are no longer having regulatory problems and facing the risk of a system failure. By pumping when needed, they have documented savings in both time and money. They also have the added benefit of being able to document tank performance for regulators and inspectors as needed.

A popular seafood restaurant in Provincetown, Mass., was pumping two grease traps and their septic tank on a

weekly basis on the recommendation of their pumper. Even with this level of pumping, during peak periods the grease trap was almost backing up into the parking lot. Yearly tallies for these services were more than \$20,000. After installing a grease monitor, it was discovered that pumping on a weekly basis was not proper, too much service was being provided at some times and not enough at peak others.

Another restaurant manager converted to the concept of ongoing monitoring was skeptical at first. However, he knew that something needed to be done after the restaurant had caused a two-mile backup on the city sewer system six months earlier. One hour after a monitor was installed, it showed that the tank contained almost 70 percent solids and a pumper immediately was called to pump out the tank. Following the initial pumping, the monitor still showed a 25 percent solids level, and the pumper was called back to service the tank a second time, this time at no charge. After that incident, the restaurant owner realized that not only could the monitor keep him out of regulatory trouble, but also it enabled him to know whether or not his tank was being properly serviced.

The Georgia State Prison System has facilities in urban and rural areas. In all cases they have moved to ongoing tank and trap monitoring in an effort to save money on service and to eliminate the risk of problems. So far, they have 25 monitors installed and they have contracted to deploy additional monitors at all 58 Georgia prison locations.

Keys

The primary challenge for the regulators is to develop programs and solutions that are effective that will ensure and document compliance with codes. The problem of grease in wastewater is not going to go away. In fact, it will continue to rise as more development reaches every corner of our country. Management rather than cleanup must be the approach to protect the environment and taxpayer funds needed for other services. New technology and solutions have been developed and are now available to provide real data on tank levels, perform-

ance and regulatory compliance. Cities and towns are beginning to change the focus of their efforts from catching offenders to preventing problems from occurring. Regulators in Florida, Hawaii, California, Idaho, Kansas, North Carolina and Massachusetts are looking at ways to use or require the installation of monitors as an alternative to mandatory pumping and manual inspections.

Catching the situation before an actual back up occurs averts health risks and serious damage to the system. Tank leaks also can be detected through below normal liquid level readings. Everyone (the designer, installer, owner, service provider, inspector, regulator, equipment manufacturers and the environment) wins when problems are detected and rectified before they get out of control.

With more than one million commercial tanks in the United States and an estimated 28 million residential septic systems, the need for proper management has never been greater. New regulation regarding onsite septic systems and commercial grease traps is driving the need for technology that ensures effective maintenance and regulatory compliance.

Ultrasonic tank monitoring solutions provide the means to manage existing and new tank systems using actual real-time and historical data. Monitors allow the owner of the tank or trap and the regulating officer to see what is going on in the tank at any given time and to manage their waste disposal practices. The enforcement team can keep people in compliance and avoid overflows at lower cost. For routine maintenance of the septic tank or grease trap, the monitor becomes the arbiter for when to pump. The service provider is no longer questioned by the owner for trying to pump too often and the inspector is no longer questioned for enforcing rules on when to pump based on a time schedule that the owner feels is not necessary. The result is that tanks or traps that really need to get pumped will get pumped more often when a septic tank or grease trap monitor is installed. The difference is that now the owner will have an intuitive understanding of why servicing is needed. Even with automatic monitoring systems in place,

owner awareness, managed maintenance and regulatory oversight are important to ensure the future of improved wastewater treatment and the environment.

About the Author:

James M. Russell is founder and president of Worldstone, Inc., Sandwich, Mass., where he has more than 20 years of experience in the electronics industry with an emphasis on developing products for emerging markets. He holds a patent in transducer monitoring of

separation tanks and a BS in Electrical Engineering Technology from Wentworth Institute of Technology.

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