Clearing the FOG

A Florida utility relies on haulers, rather than generators, to reduce the amount of fats, oil, and grease entering its collection system.

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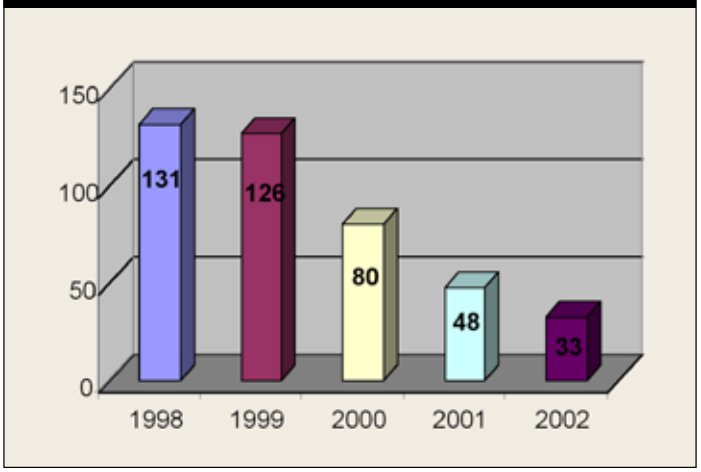
When JEA (Jacksonville, Fla.) set out to reduce sanitary sewer overflows (SSOs) caused by fats, oil, and grease (FOG) in its municipal collection system, the agency understood that an aggressive effort to compel restaurants to comply with its regulations could stretch its resources and impose financial hardships on the regulated community. By developing an innovative approach that relies heavily on the efforts of vendors that remove FOG from restaurants, JEA improved compliance and reduced overflows without increasing fees or enlarging its budget.

Reviewing the Causes of SSOs

Approximately 800,000 residents within an 841-mi^2 (2178-km^2) area of Jacksonville, Fla., are served by a collection system more than 2100 mi (3380 km) long. By the mid-1990s, the city's aging sewer infrastructure was experiencing approximately 150 SSOs and 1200 incidents of collapse per year. After acquiring the city's water and sewer utilities in 1997, JEA implemented an aggressive plan to abate SSOs by upgrading 700 lift stations within a year, rehabilitating an average of 100 mi (160 km) of pipe annually for the next 5 years, and developing regulations to control discharges of FOG. These activities led to a dramatic drop in SSOs during the following 5 years (see Figure 1, p. 106).

In 2002, JEA experienced 33 reportable SSOs, and the agency assembled a team to review data pertaining to SSOs and address overflows related to FOG. The team's analysis indicated that 74% of reportable and nonreportable SSOs from June 2001 to July 2002 resulted from some type of pipe blockage (see Figure 2, p. 107). However, further analysis determined that only 15% of the blockages were related directly to FOG (see Figure 3, p. 108).

Figure 1. Reportable Sanitary Sewer Overflows, 1998–2002



Because this percentage seemed low compared to data reported by other utilities, the team investigated further and developed two explanations. One involved the method by which JEA classified and reported SSOs. For example, if a blockage occurred in a sagging pipe that contained grease, the sag was identified as the cause of the blockage. The second explanation centered on JEA's improvements to the collections system. By that point, JEA had spent 2 years replacing much of its most dilapidated pipe, and the new pipe enabled improved conveyance of wastewater laden with FOG.

With data showing relatively few overflows resulting from FOG, it would be difficult to justify an administratively burdensome program intended to control FOG. Therefore, JEA staff decided that efforts to regulate FOG generators would not rely on traditional "command-and-control" approaches. Instead, a different technique was sought that could achieve high levels of compliance with relatively little effort. Rather than implementing a costly and time-consuming program of permitting and inspecting thousands of restaurants that generate FOG, the agency opted to test an approach in which it partnered with a limited number of vendors, commonly referred to as haulers, that collect and remove FOG from restaurants.

As part of the so-called Preferred Hauler program, the haulers would meet certain performance criteria that JEA monitors continually. Designed so that compliance by the haulers would ensure compliance by the FOG generators, the program enabled JEA to monitor fewer than 15 haulers, rather than having to monitor approximately 2100 restaurants.

Developing the Compliance Program

JEA established the following goals for its program to control FOG: a 50% reduction in SSOs related to FOG within 1 year of implementation, minimal increases in staff or budget, and the smallest possible effect on customers. To achieve these goals, JEA staff evaluated similar programs at other utilities, developed best management practices (BMPs) for FOG generators, and established policy based on the agency's Industrial Pretreatment Regulation.

The regulation contained broad language concerning FOG generators:

- Restaurants or similar facilities determined by JEA must have a grease interceptor.
- Interceptors must be of a type and capacity approved by JEA.
- FOG must be removed at a minimum of every 90 days, or more often as determined by JEA.
- An interceptor's entire contents must be removed at least annually.
- JEA may require compliance reports, as needed, from nonpermitted users.

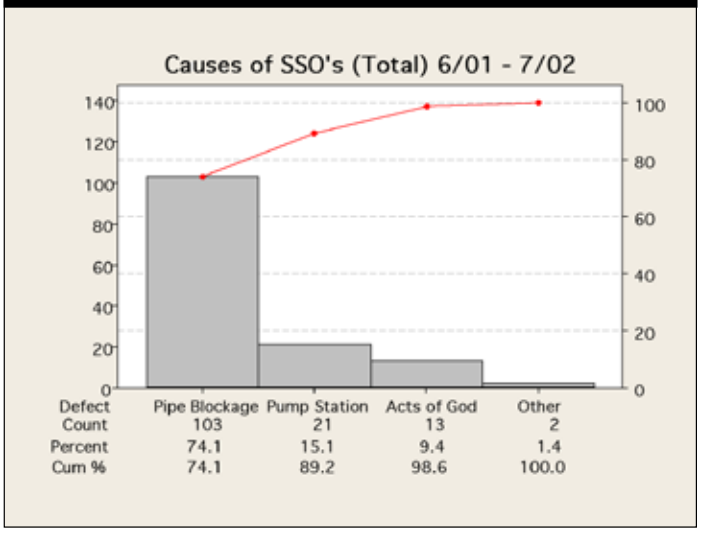
Because the regulation allowed for considerable discretion on JEA's part, more detailed policies had to be established.

For example, JEA determined that all food-service facilities that prepare or serve food must have a properly sized grease interceptor. However, facilities that serve 18 or fewer meals per day or serve only a continental breakfast were exempted. To address the question of what constitutes a properly sized interceptor, JEA turned to the City of Jacksonville. The city's Building Inspection Division issues permits for interceptor installations and uses the Florida Building Code for sizing requirements. To avoid duplicating efforts, JEA entered into a memorandum of understanding with

Noncompliance Rate During Pilot Project

Quarter	Number of reports received in compliance (out of 41 possible reports total)	Rate of noncompliance, %
1	31	24%
2	23	45%
3	35	15%

Figure 2. Causes of Sanitary Sewer Overflows, June 2001–July 2002



the city specifying that the city is responsible for determining and approving capacities of traps and interceptors for FOG generators.

Another policy addressed the question of how often FOG generators must pump out their traps or interceptors. JEA determined that generators would be required to pump out their interceptors more frequently if the agency determined that an interceptor's volume of solids and grease exceeded 25% of its functional volume.

Addressing Hauler Concerns

After establishing these policies, JEA met with haulers that maintain interceptors and dispose of the waste. Haulers expressed concern regarding a requirement to pump out traps completely, indicating that they would prefer to employ what is known as the pump-and-return method, or "partial pump-out." In this approach, an interceptor's entire contents are removed, the liquid portion is separated from the FOG and solids and returned to the interceptor, and only the FOG and solids are taken away for disposal. Additional concerns included the limited number of sites for disposing of FOG, fugitive discharges of FOG by "other haulers," and the need for haulers to have an active role in the program. Furthermore, the haulers informed JEA that few of their customers pumped out their traps or interceptors on a regular basis.

Based on the input from the haulers, JEA decided not to require haulers to perform complete pump-outs. Because Jacksonville has limited options for disposing of FOG, partial pump-outs reduce the burden on disposal sites. Having to haul only the grease and solids helped keep disposal cost down for the generators. Lower disposal costs were seen as a key to ensuring high levels of compliance.

Illicit discharges of FOG by haulers would be addressed through a manifest system. A pump-out report was designed that required haulers to record detailed information on an interceptor's condition before pump-out. These data include interceptor volume; depth of solids, water, and grease; pump-out method; gallons transported; and interceptor condition. The volume of interceptor waste now could be tracked. Depth measurements are used to determine if FOG and solids exceed 25% of an interceptor's volume. If pump-out reports showed an interceptor consistently exceeding this amount, JEA could send the generator a notice to implement BMPs or increase the frequency with which it pumped out its interceptor. The hauler completing the pump-out report, in essence, assumes the role of inspector. For the test program, the pump-out report required signatures from the hauler and a representative of the FOG generator.

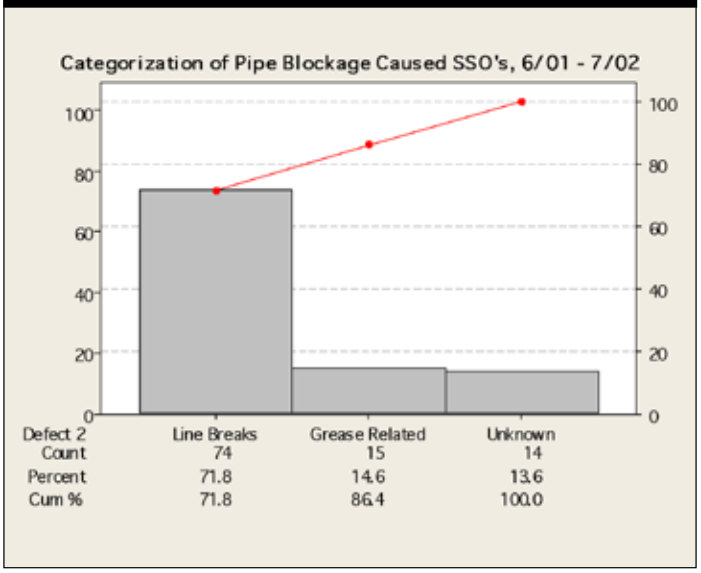
Although some utilities may consider haulers to be part of the problem when it comes to FOG, JEA's Preferred Hauler program made them part of the solution. Initially, preferred haulers would demonstrate to JEA that they could maintain interceptors properly and document via manifest their proper disposal of FOG. In theory, if all generators used preferred haulers, JEA could focus on monitoring a handful of haulers instead of thousands of FOG generators.

Pilot-Testing the Program

Begun in early 2003, the pilot test had two goals: exposing problems in the FOG program before JEA implemented it full time and testing its effectiveness in protecting the collection system. For this purpose, 61 restaurants were chosen to enable JEA to study the accumulation of material in grease interceptors, as well as at manholes immediately downstream.

Forty-one of the pilot facilities were classified as a study group, while the remaining 20 were considered a control group. Restaurants in the study group were used to test the proposed FOG program's elements pertaining to education, interceptor maintenance, self-reporting, and inspections of hauler performance. To this end, representatives of study group facilities attended a training session to receive instructions regarding regulatory requirements and BMPs for managing FOG. As part of the pilot program, restaurants

Figure 3. Categories of Pipe Blockages Caused by SSOs, June 2001–July 2002



were required to have their interceptors pumped out at least quarterly. Haulers, meanwhile, would complete and submit a pump-out report in conjunction with a restaurant representative. To assess hauler performance, JEA inspectors examined interceptors regularly to determine the adequacy of a pump-out and measure levels of grease, water, and solids. In contrast, facilities in the control group were not contacted by JEA and were unaware of the project.

JEA cleaned and vacuumed all manholes immediately downstream of the interceptors used by the study and control groups. The agency then inspected the manholes with closed-circuit television cameras to document their condition. Every 2 weeks, a JEA inspector measured the depth of grease, water, and solids in all external interceptors. Downstream manholes also were inspected and assigned a number relative to the percentage of observed blockage caused by FOG. The pilot project ran for three quarters.

Assessing the Pilot Test's Results

The pilot project successfully reduced FOG buildup in the collection system. However, a few modifications were needed to minimize staffing requirements. The pilot test also verified that an absence of regulatory controls can contribute to an SSO. Although the study group tended to have their interceptors pumped as required, participants experienced difficulties submitting the required pump-out reports (see table, p. 106).

Although the rate of noncompliance initially was a relatively low 24%, it nearly doubled to 45% in the second quarter. JEA contacted the facilities not in compliance and their haulers to determine why they failed to comply. The inquiries revealed that generators had their interceptors serviced but failed to submit the pump-out reports. The haulers indicated that they had completed the reports and left them with the generator representatives to be signed and submitted. During the pilot's third quarter, JEA allowed haulers to submit reports without a generator representative's signature, and the noncompliance rate promptly dropped to 15%. However, the remaining facilities not in compliance all had internal traps that the generators serviced themselves.

The pilot project's other function was to collect data on FOG accumulation in the interceptors and the manholes immediately downstream. Data from the pilot indicated that the volume of FOG in the study group's interceptors ranged from 0 to 5 in. (0 to 127 mm), with a median of 4 in. (102 mm). By contrast, the volume of FOG in the control group's interceptors ranged from 1 to 48 in. (25 mm to 1219 mm), with a median of 8 in. (203 mm).

Accumulations of FOG in downstream manholes were measured by estimating the amount of pipe occupied by grease and assigning it a numerical value from zero to 10, with zero indicating no visible FOG and 10 indicating total blockage. Within the study group, values ranged from zero to a maximum relative measure of 4. On the other hand, the control group's values ranged from no accumulation to near total blockage.

Finalizing the Program

Because of the high rate of noncompliance displayed by FOG generators during the pilot, JEA decided to make the haulers responsible for completing and submitting pump-out reports. Within 2 weeks of receiving a report, JEA would inspect a small percentage of randomly chosen facilities to assess hauler performance. This step would reduce significantly the number of yearly inspections that JEA would need to conduct and enable the agency to monitor the effectiveness of the pump-and-return method. Any deficiencies identified with report submittals or pump-outs would be addressed with the preferred hauler, rather than the generator. Participants in the Preferred Hauler program also would be required to attend an orientation and agree to sign service contracts with customers stipulating no fewer than four pump-outs per year. In terms

of enforcement, JEA would work with haulers initially to ensure that they understood the requirements. However, JEA ultimately could suspend violators from the program.

Facilities using a vendor not participating in the Preferred Hauler program would assume all responsibilities and liabilities. JEA would attempt to inspect these facilities annually. Any discrepancies in interceptor pump-outs or report submittals would be addressed with the generator. Generators that failed to submit reports demonstrating compliance would be inspected by JEA and charged a $100 fee. If an inspection and fee failed to result in compliance, the generator would be given 7 days to resolve the matter, or its water service would be suspended. Assuming generators would welcome an option that placed much of the regulatory burden on haulers, JEA also looked at the program as a way of pressuring poorly performing haulers to adhere to the agency's standards or potentially lose business.

Concerned that they might not endorse this approach, JEA staff met with individual haulers to discuss the program. All were receptive to JEA's approach, as it enabled them to offer their customers another level of service.

To ensure that grease traps were functioning properly, generators had to submit a form initially certifying that their interceptor was operating properly. The form had to be signed by a licensed plumber or a preferred hauler.

During pump-outs, preferred haulers inspect diverters, baffles, and "Ts" and note problems on the pump-out report. If a problem is identified, JEA follows up to ensure the trap was serviced properly.

Generators are not required to obtain permits. JEA determined that reviewing applications and issuing permits would drain resources without providing any more control than was already achievable without permits.

Introducing the Program

In August 2004, JEA introduced the FOG program to the restaurant sector via workshops. Representatives from 38% of Jacksonville's restaurants attended to learn about requirements and BMPs. The Preferred Hauler option was presented as a way to meet program requirements without adding a major administrative burden. The absence of permitting fees and program costs helped convince generators that JEA's only concern was to solve a public health and environmental problem. No organized resistance to the program was raised by restaurants or industry associations.

JEA has succeeded in implementing the program with minimal staffing requirements and no increase in budget. The agency's Industrial Pretreatment Department, which oversees the program, has had to hire only one part-time administrative assistant to handle correspondence and data management. For efforts related to inspections, compliance, and enforcement, JEA relies on 1.5 full-time equivalent employees made available as a result of efficiency improvements in other Industrial Pretreatment program areas.

As anticipated, getting restaurants to participate in the FOG program required significant effort. About 58% of restaurants failed to submit the initial trap certification and pump-out report by the Dec. 31, 2004, deadline. With escalated enforcement, the number has dropped substantially. After JEA issued a notice to restaurants that failed to meet this deadline, the rate of noncompliance dropped to 31%. Restaurants that did not respond to the notice were inspected and charged $100. After 1 year, only 3% of restaurants had failed to comply with the initial requirements.

Currently, the Preferred Hauler program has 13 participants, and JEA has declined participation to only one company. Since JEA began inspecting preferred hauler performance, less than 1% of the pump-out inspections have failed. In fact, JEA conducted 171 inspections of preferred haulers with zero failures during the first 5 months of 2006.

Most importantly, the number of SSOs related to FOG has decreased significantly. During 2001 and 2002, JEA averaged 1.58 FOG-related overflows per month. The agency's goal was to reduce that average by 50%, or to 0.79 FOG-related SSOs per month. From November 2004 through May 2006, JEA experienced an average of 0.68 FOG-related SSOs per month.

By working closely with haulers and conducting focused inspections as part of the Preferred Hauler program, JEA can focus its resources on fewer than 15 haulers instead of approximately 2100 FOG generators. Thanks to such innovative approaches as using haulers to inspect restaurants and fostering competition among haulers to meet the program's standards, JEA has succeeded in reducing FOG-related overflows while minimizing staffing requirements and the regulatory burden on its customers.

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