

Cease the Grease Program FAQ's

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- *Are there any byproducts of producing biodiesel?*
- *Are there any other uses for the biodiesel besides fuel for vehicles?*
- *How would you convince a city to undertake a program like this?*
- *How much biodiesel can the plant produce and what are the, if any, limitations to production?*

1. What were the reasons Daphne started this project? Environmental? Monetary?

This project evolved over time. We began the Oil Recycling Program more than 2 years ago in an effort to address the many sewer spills we were experiencing caused by grease plugs in the sewer lines around the city. The problem of this is obviously twofold. Our city is situated on a bluff overlooking Mobile Bay and anything that is spilled on the ground can contaminate the Bay either through leaching or simply carried there by rainwater runoff. In addition to the adverse environmental impact of sewer spills, there is also the enormous cost to the Utility in both monetary (the labor, material, and equipment cost of the clean-up itself), time (man-hours expended completing and submitting ADEM reports on sewer spills and opportunity cost – what we can't be doing when we are cleaning up a sewer spill) and reputation (we do not want to be known as the city that tolerates regular sewer spills). When we first began the program, we simply disposed of the oil with a local rendering company the same way a typical restaurant would. We toyed with the idea of doing something positive with the oil and, as luck would have it, one of the vendors who worked with us (Kevin Jones of Earth Clean Technologies) was making biodiesel in his garage at home as a half hobby / half research activity. We offered to allow him to set up a small pilot plant inside our Waste Treatment Facility to see if the oils we were getting from our recycling program were good feedstock for making biodiesel. He did and they were. The rest is history! On a happy side note, Kevin Jones' wife credits us with saving their marriage since moving his biodiesel plant to our facility meant that she got her garage back!

2. What factors cause sewer spills?

In a nutshell, anything that plugs a line or restricts flow in a sewer pipe can cause a sewer spill. The two main culprits for every sewer system are "fats, oil and grease" (or FOGs as they are referred to in the industry) and roots growing into pipes. Root growth is very hard to prevent since roots can grow through even the smallest crack in a pipe and grow exceptionally well in sewer wastewater because of the water source and the nutrients in that water. FOGs are a problem we can readily address. Oil and grease float in water so build-ups generally start at the top and sides of pipes and grow downward. Over time, this grease builds up and blocks the sewer system causing raw sewage overflows and backups. Obviously, raw sewage overflowing into a street or home is a major problem! To address this, Daphne Utilities, like all utility providers spend an enormous amount of money every year cleaning sewer lines of accumulated grease build-up and must keep staff on-call 24 hours a day in case a sewer spill occurs. This increases operations and maintenance costs which ultimately must be passed on to the customer with higher sewer rates. In addition to this, our Wastewater Treatment Plant is easily damaged by oils and grease which can harm the delicate biology of the process and, eventually, this oil and grease can find its way into our effluent which is discharged into the environment.

3. What does the city do about a sewer spill?

"Spill" can mean different things to different people. While wastewater did spill from a manhole, thanks to a quick response from the Daphne Utilities' response team, the quantity was small and did not get beyond the paved surface of the parking lot so no soil or waterway was contaminated. Therefore, this did not classify as a "reportable" spill to ADEM. It still costs us money to clean up and was potentially harmful to the environment but we managed to keep it in check. When a plug in the sewer line has backed up material in a manhole and has begun spilling on the paved area around the manhole. When this happens, Daphne Utilities sends a vacuum truck out to clean the debris from the area and attempt to suck out whatever grease may be plugging the line. Depending on the amount of

spillage and where it occurs, we might have to remove contaminated soil from the area and treat the remaining area with lime to neutralize any harmful effects the sewage may have. As bad as these look, these sewer spills were limited because they occurred in heavily populated areas where people immediately noticed the spill and notified our offices before severe damage ensued. Many times, we are not nearly so “lucky”. Here is a common site in Daphne: a sewer manhole in a very remote location situated in the middle of a drainage way or creek. A sewer spill here could go on for weeks before anyone notices!

4. What programs/initiatives did the city undertake to combat the frequency of sewer spills?

A pretreatment program backed by strong municipal presence helps to eliminate these problems. Requiring restaurants and other food preparation facilities keep grease and oils out of the municipal collection system greatly reduces risk of environmental concerns that are associated with grease. We are at the early stages of our Grease Management Program and getting everyone to comply is in fact a tricky prospect. Ultimately, we have the power to shut off their water service for non-compliance but that is a VERY big stick to hit someone with! We would much rather encourage commercial establishments to find ways to be successful complying. “If you work with us, we WILL work with you.” is our motto in this endeavor.

5. Have the number of spills and the amount of money spent on cleanup decreased since the program was started?

As stated earlier, “spills” are different things to different bodies. ADEM has very specific guidelines on what a spill is in environmental impact terms and, when one happens, we must notify many bodies including the Mayor’s office and the media. Thankfully, we experience only about 2-3 of these per year. We define the term “spill” more broadly to include any overflow or near overflow condition that causes the Utility to dispatch clean-up crews and basically work to keep any reportable spill from occurring. This would include “near misses” where we discovered sewage building up in a manhole and managed to suck it out before it could top the lid and spill on the ground. Broadly speaking, a spill to us is something that makes us spend money to clean up and protect from a potentially reportable sewer spill. In these terms, we have seen a 40% reduction in sewer spills since starting this program only two years ago. It is hard to put a dollar figure on an event that does not occur but basically any “spill” would impact us with clean-up for a crew of about 3-4 persons for almost a full day, miscellaneous equipment including vacuum trucks, work lights, chemicals, soil disposal costs, etc. A relatively small spill that is non-reportable can still easily cost you \$1,000 per occurrence. Add to this the perception of the public who sees us constantly cleaning up small sewer spills throughout the city and you quickly have a customer base that believes that your sewers are not well maintained and that the city as a whole is “dirty”. Not exactly a recipe for success for increasing growth in the community!

6. How did the city get the word out about the program?

We work very hard to get the word out about our recycling programs and we seldom miss an opportunity to give people a reason to help us! By keeping our sewers clean, you are helping to keep the planet clean and everyone can rally around that goal.

We have conducted numerous seminars and meetings with restaurant managers to educate them about their part in this. We attend City Council meetings and talk their about it. We have an educational program we take into area schools to teach children about this subject. They do not need to know too much. “Now when your mother is cooking that fried chicken or French fries, be sure and tell her not to pour that old oil down a drain or toilet.”

7. What special equipment/supplies had to be purchased to start the program and what were the costs?

The oil recycling program was relatively cheap to kick-off. The Recycling Stations (basically plywood boxes) costs about \$100 each to construct. Signage may add another \$15. Oil jugs cost about \$1.20 each and you need quite a few to get started (lots of jugs will go out in the early days before any come back filled with oil). A simply start-up of 6 stations and 250 jugs should run around \$1,000 to begin with. Biodiesel plants can actually be purchased off the internet for a few thousand dollars for a small setup or assembled from spare parts like we did. It would be advisable to have a well established oil recycling program in place before you attempt to use it as the basis for a biodiesel plant program.

8. What has public reaction to the program been like?

The response from our public has been outstanding! We have received numerous awards and recognition from various civic groups for our work in these areas and very favorable press. This is key because everything we are doing in both of these programs is intended to support our basic mission which is to protect the environment and deliver the highest quality sewer services. The more we are in the press, the more we get to tell our story of what we are doing to protect the environment. When people hear this, they want to be involved and take part so they begin oil recycling themselves which in turn helps the sewers even more! Above: The Olde Towne Daphne Association presents Daphne Utilities General Manager Rob McElroy with the Community Spirit Award for the Oil Recycling and Biodiesel Programs which have reduced sewer spills in the historic part of town dramatically.

9. Has the program saved the city money?

The savings to the city has been in several forms. First and foremost, the program clearly has reduced the number of sewer incidents we must respond to which certainly has saved us money. A typical "small" sewer spill that is not "reportable to ADEM still costs the Utility nearly \$1,000 per incident. A reportable sewer spill can easily run several thousand dollars per incident. Secondly, the beneficial environmental impact of a reduction in sewer spills is great but a little harder to quantify. How do you put a dollar figure on what didn't happen? Clearly we have benefited but how do you value the environment? Third, the fuel we have been able to make from the used oil costs us about \$1 per gallon to produce at a time when diesel fuel is running \$2.50 - \$3.00 per gallon. We have made quite a bit of fuel since starting the program and we save about \$1 - \$2 per gallon on each. Add to this the lowering of disposal costs of paying a vendor to dispose of the waste oil we collect. Let's be clear about this: We did not go into the biodiesel realm to save money per se. We began this effort because it was a good story to tell that helps to get people excited about participating in our Oil Recycling Program...which is how we improve our sewers. Everything we do in these programs is intended to improve our sewer system and reduce the cost of operating it.

10. How much oil is collected and at how many sites?

At present, we have about 12 recycle stations located around our city. The program has been running for about two years and we collect between 300 to 600 gallons of used oil per month from residential donations. There are some commercial sites that also contribute their oil to us. We are building at least four more stations to deploy in the coming weeks and

are hoping to see more involvement as more persons become aware of our program's existence.

11. What happens to the oil once it is collected?

We send a worker around the city in a truck twice a week to collect the donated oil and to restock our recycle stations with new or cleaned jugs. The oil is brought to the Wastewater Treatment Plant, strained and poured into a large holding tank. The jugs are then cleaned with very hot water to remove any oil, trash or residue and set aside to dry. These are then redistributed to the Used Oil Recycling Stations during the next collection run. Biodiesel is produced in a batch process...that is, it is produced in a large quantity at one time. Our plant is capable of making 1,000 – 1,500 gallons at a time but we seldom have that much oil collected solely from the residential oil recycling program. When we want to make another batch of fuel, we usually go ask around and get enough used oil from restaurants to make the batch process cost effective.

12. What is done with the biodiesel once it is processed?

We currently have two 1,500 gallon fiberglass tanks on site in which we store the biodiesel. We burn it in our diesel powered trucks and heavy equipment and are experimenting with burning it in our large emergency generator.

13. What kind of vehicles can run on biodiesel?

Any vehicle with a diesel engine can run on biodiesel with no modifications required to the engine. The biodiesel can also be mixed in any ratio with petro-diesel. When you hear of "B-20", this means that 20% of the fuel is biodiesel and 80% is petro-diesel. Likewise, B-50 is 50/50 and B5 is 5% biodiesel.

14. Are there any byproducts of producing biodiesel?

The main byproduct from the biodiesel process is glycerin. It is produced at the rate of about 10% per volume. That is, for every 100 gallons of used cooking oil we process, we get about 90 gallons of biodiesel and about 10 gallons of glycerin. At one point, this glycerin had a decent street value (it is used mainly in the cosmetics and pharmaceutical industries) but, with so many biodiesel plants cropping up around the country, the price has dropped dramatically. It is generally considered to be a waste product now. Above left is the raw glycerin from our process. This is the type of glycerin you get making biodiesel using sodium hydroxide as a catalyst. (If we use potassium hydroxide as a catalyst instead, the glycerin byproduct would be a dark red liquid glycerin that would not solidify as readily.) At Daphne Utilities, we take a portion of this and clean it up very well, mix it with a few other components (scents, colorant, some glitter) and make cute glycerin soaps out of it. This is one of the main marketing items we have now! We give these away by the hundreds at schools and during public gatherings. People are anxious to see what they are and are very interested in where they come from. It is a great way to get people to get interested in oil recycling!

15. Are there any other uses for the biodiesel besides fuel for vehicles?

We can burn it in our generators used for emergency power or as simply an additive to fuel to increase its lubricity (a measure of how slippery a fuel is) which reduces wear on the engine.

16. How would you convince a city to undertake a program like this?

Always keep your mission in plain view and the focus of attention. We are a water and sewer utility. Everything we do needs to further the goals of running a quality sewer system. The Oil Recycling Program can be started with very little cost and will bring benefits to any community. It must be supported with aggressive and smart marketing to get the word out. You **MUST** get people to **WANT** to participate in the program for it to work. People will not get excited about simply helping you save money. They will get excited about doing the same tasks to “save the planet”.

17. How much biodiesel can the plant produce and what are the, if any, limitations to production?

The biodiesel plant we currently have is the 2nd generation of the equipment. We have always used the tag line “Low tech solutions for high tech problems” and it is reflected in our equipment. The first generation plant was constructed from old 55-gal drums and some old water heaters. It worked quite well and we still use components of that plant on occasion. Our present biodiesel plant is fabricated from old propane tanks. It is capable of producing 1,000 gallons of oil in 24 hours. However, remember that we usually only take in a few hundred gallons of used oil in every month. Therefore, we actively solicit oil from nearby restaurants when we need to make oil.