

12th Annual
April 3–5, 2011

Deerhurst Resort, Huntsville, Ontario

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Conference Edition

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The opinions expressed in this newsletter by contributing authors are not necessarily the opinions of OOWA's Board of Directors or the Association.

Ontario Onsite
Wastewater Association

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Green Machines by Angelo Mikrogianakis, Goslyn Environmental Systems

In North America approximately twenty-five per cent of the population relies on septic systems. These septic systems come in various sizes and applications. The most common septic systems are those for use in residential and commercial applications. Commercial type septic systems are larger in scale and tend to be much more problematic than the residential septic systems. This is primarily due to the nature of the effluent and the volume of discharge. The major culprits are found in the kitchen area, fixtures and appliances discharging high grease content combined with food solids. If not treated properly, effluent discharge from a commercial kitchen will eventually cause irreversible damage to both your septic system and the environment.

The main issues concerning waste water discharge with commercial kitchen are the high levels of COD, BOD, TSS and FOG content in their wastewater. In municipal settings, companies can pay a surcharge to discharge high TSS and BOD. With grease, they have to comply with the bylaw's 150 mg/L discharge requirement. In rural areas where septic systems are commonly installed, owners do not have the option to pay the

municipality a surcharge to treat the effluent, they must take extra precautions on their own in order to reduce the high levels of COD, BOD, TSS and FOG content in their wastewater.

Commercial Septic Systems are common in restaurants, golf courses, trailer parks, and resort properties located in rural areas. In most jurisdictions preventative maintenance of these systems is required by law, yet often not enforced. Those who ignore the requirement will eventually be faced with extremely costly repairs when grease and solids escape the tank and destroy the clarified liquid effluent disposal means. A properly maintained system, on the other hand, can last for decades and possibly a lifetime.

Biological Oxygen Demand (BOD) is a measurement relating to the amount of oxygen in water to support life. Waste water with organic materials (food solids, restaurant grease) serves as food for aquatic micro-organisms. The micro-organisms feed on organic materials. Micro-organisms multiply consuming increasing oxygen quantities. When oxygen levels in water drop, fish and other aquatic life will not survive. Eliminating

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photo: stock.xchng — Felipe Daniel Reis

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restaurant grease from entering the septic will vastly improve the BOD levels of your septic bed.

Total Suspended Solids (TSS) is solid organic and inorganic materials that suspend in water. The materials include natural, industrial, and commercial wastes. In a restaurant or commercial cooking facilities, food solids as well as fat, oil, and grease heavily contribute to TSS counts. Implementing a best environmental and kitchen practices strategy will

significantly reduce the TSS count. Scrape all solids into a garbage or organic bin. Do not use your sinks as garbage disposal units to dispose of food solids.

Chemical Oxygen Demand (Cod) is the measure of the oxygen reducing capabilities of wastewater due to chemical reactions. Wastewater with inorganic material (such as chemicals from household cleaners and detergents) can cause chemical reactions that absorb

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Ontario Onsite
Wastewater Association

Join OOWA

If you know someone that works in this industry — encourage them to join the **Ontario OnSite Wastewater Association**. The onsite industry is at the front line of environmental protection. Only as a team can we build the profile and recognition throughout Ontario this industry deserves. The on-site industry is composed of a diverse group of professionals including:

- Installers
- Suppliers
- Regulators
- Sewage Haulers
- Designers
- Researchers
- Engineers
- Academics

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Ontario Drinking Water Stewardship Program

Protect our water. Get funding to upgrade or inspect your septic system. July 2009

Is it time to upgrade or inspect your septic system? You may be eligible for funding to upgrade or inspect your septic system if you live near a municipal well or water intake. The Ontario Drinking Water Stewardship Program will cover up to 80 per cent of the cost of an eligible project, to a maximum of \$7,000. If you install an advanced septic system, the program will increase coverage to a maximum of \$15,000.

Why are old or faulty septic systems a problem?

Septic systems that are not regularly inspected or poorly maintained can be a significant pathway for contaminants to enter drinking water. Regularly inspecting and properly upgrading your septic system benefits you and protects your municipality's drinking water.

How do I know there is a problem with my septic system?

The seven key signs of problems with septic systems are:

- a backed-up or slow moving toilet or drain
- foul odours
- an overflow of sewage around your septic system
- unusually thick grass and tree roots growing in or around the septic system and surrounding ground is soggy and soft
- dosing pumps run constantly or do not run at all
- well water tests indicate high levels of nitrates, bacteria, or other contaminants
- large amounts of algae growth in or around nearby lakes or ponds.

Am I eligible for funding?

Yes, if your property is within or extends into the following eligible areas:

- 100-metre radius of a municipal wellhead
- 200-metre radius of a surface water intake
- the approved two-year time-of-travel around a municipal wellhead or the approved intake protection zone-one (IPZ-1) around a surface water intake.

What projects are funded?

- replacing/repairing septic tanks and/or leaching beds
- replacing holding tanks
- pumping/inspection of septic tanks
- adding plumbing connections
- transferring wastewater to septic tanks and/or leaching beds through plumbing connections/pump
- connecting to a municipal sewer line and decommissioning the existing septic system (These are two separate projects but funding for connections cannot be received unless the existing septic system has been decommissioned).

What costs can I recover?

- fees for required permits and approvals for eligible projects
- purchased materials and supplies
- contract labour
- professional fees and technical support
- fees for related design, inspection and construction
- fees to connect to a municipal sewer line

How can I apply for this funding and learn more?

Property owners can contact their local conservation authority to learn more and apply for funding at:

www.conservationontario.on.ca/find/index.html.

If you are a registered farmer, you can contact your Ontario Soil and Crop Improvement Association representative. Information is available at: www.ontariosoilandcrop.org. You can learn more about the *Clean Water Act* at: www.ontario.ca/cleanwater.

This article is for your information only. For compliance purposes, you should always refer to the *Clean Water Act* or related regulations.

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oxygen. If large quantities of these chemicals enter wastewater, chemical reactions occur which consume large amounts of oxygen. If the oxygen level in the water drops too much, fish and other aquatic life may not survive. To reduce the high level of CODs in your septic tank, operators must refrain from using commercial type emulsifiers and traditional type cleaning agents such as those which are chlorine or ammonia based. These cleaning agents will significantly increase the rate of CODs in your septic system. Increased levels of COD draw out the much needed oxygen in your septic system.

Drainage of fats, oils, and grease (FOG) will cause blockages to both the inlet drains as well as the septic system, not allowing it to filter properly. The combination of FOG and food solids are difficult to degrade and thus also creating rank odours. FOG should never drain into a septic system, installing the proper equipment at the source of discharge and following best kitchen practices will greatly assist to prolong the life of your septic system.

The environmental and health issues stemming from septic sewage overflows may pose serious environmental concerns, such as land and still water contamination. The costs to rectify these issues can be staggering, the commercial facility is held accountable to take proper measures to rectify these problems immediately to minimize the environmental damage.

One must be aware that over and above the associated costs of having to repair or replace the septic system, the operator also faces risk of paying out municipal surcharges for land clean up, risk of fines, cost of still water cleanup, septic clean pump out or even having to replace the septic system are very costly.

When a septic system has to be dug up or repaired, in most instances it requires an interruption or shut down in business. This too is an unforeseen cost for not taking precautions and properly maintaining the septic system.

What are the major culprits which discharge FOG?

All commercial kitchens are equipped with appliances and fixtures which discharge FOG. Dish washers, pre-rinse sinks, compartment sinks, combi-ovens, rotisserie ovens, hood vents, soup kettles are all culprits which discharge high FOG content. If FOG is left untreated to flow directly into a septic system, there will be both environmental and health consequences downstream from these fixtures and appliances. Commercial kitchens

- *Some interesting facts:*
 - Commercial Kitchens include
 - QSR / Fast food restaurants: 93% of FOG enters the sewage / waste water system through the 3 compartment sink

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- Sewage overflow
- Health hazards
- Property damage
- Environmental damage
- EXPENSIVE repairs

How do I know if my system is failing?

The warning signs of a failing system are:

- Sewage surfacing over the drain field.
- Lush, green growth or soggy areas over the drain field.
- Slow or backed up drains, toilets or sinks.
- Sewage odours around the property.
- Poor well water test results indicating high levels of BOD, TSS and FOG

Effective methods to treat FOG & Solids

- *Traditional grease traps ... but conventional thinking is being challenged ...*
 - This technology has been in practice for over 100 years
 - By-product = Brown Grease turning into sludge
 - Average efficiency rating 50% FOG removal
 - Operator operational costs are high
 - Equipment maintained by external vendor
- *Grease Removal Devices (GRDs) new innovative technology*
 - By-product – YELLOW GREASE
 - Average efficiency rating up 99% FOG removal
 - Capture majority of Food Solids
 - Much more efficient to reducing levels of BOD, TSS & FOG
 - Minimal Operational Costs
 - Equipment maintained internally

GRDs Green Grease Machines

The green revolution has finally made its way to the back of the kitchen. For restaurant owners this means not only a commitment to help preserve the environment, but also the immediate impact of operational and maintenance cost saving benefits.

The new and innovative standard now replacing the passive style grease trap is to install a grease recovery device (GRD) upstream of a commercial septic system.

Grease Recovery Devices (GRD) offer innovative and new technology to replacing old grease traps. GDRs work on the premise of capturing all food solids and removing fats, oil and grease (FOG) right at the source. The end result is that only grey water enters the restaurants drains thereby greatly reducing the risk of any further issues with regards to sewer back ups and clogged drains. These devices have been tested and proven to work. The most common brands include Big Dipper, Goslyn and JR Smith.

GDR's produce immediate Operational and Maintenance Cost Savings benefits

Upon the installation of a GDR, costly grease trap pumpouts are no longer required, the need for costly enzymes or other biological agents are eliminated, drains will continue to remain clear from grease and food solids build up, thereby eliminating drains to be power washed, cleaned and snaked. Gerdy greatly reduce any risk of land contamination stemming from poor grease management issues, thereby saving costly environmental clean ups.

Risk of business down time and property damage due to drain back ups is also greatly reduced with a GDR.

Commitment to Best Environmental Kitchen Practices for Responsible Grease Management

GDRs require operators into forced management of this new system, thereby promoting best kitchen and environmental practices. On average these devices require to be maintained no more than two minutes per day. This simple procedure becomes part of the daily operating procedure.

Responsible Grease Management requires food service operators to change their current practices of having the sludge pumped out of their grease trap and hauled away to a landfill site. The captured FOG from GDRs is re used and Recycling of Fats, Oil, Grease (FOG) for a number of applications.

These green grease machines all have developed a method of oil/water separation which actively removes the FOG from the waste water stream and directs it into a container from which it may collected for other useful applications. Almost 99% of the FOG is captured. The captured FOG is then emptied by the operator into the bin which stores the fryer oil. This oil is hauled away and reused for various applications such as biodiesel, cosmetics and animal feed.

By taking part in these initiatives operators are practicing good stewardship. There is a practical use for the collected by-product, which now does not have to be designated to landfill.

The Biodiesel created from this recovered oil, significantly reduces greenhouse gases, particulate matter, or soot, carbon monoxide, and sulfur dioxide in air emissions. Produced from renewable resources, such as waste cooking oil or soybean oil, biodiesel reduces dependence on limited energy resources and foreign oil.

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SHARK Series GRINDER PUMPS

Specially designed for demanding residential, commercial and municipal applications, the Zoeller SHARK offers an exclusive, reverse-direction cycle that dramatically retards jamming.

The SHARK reverse-action grinder:

- Exclusive non-jamming, non-clogging technology.
- Doubled blade life (cuts both forward and backward).
- Lower operating temperature for extended pump life (finned, oil-filled, Class F windings).
- Interchangeable with other rail systems.
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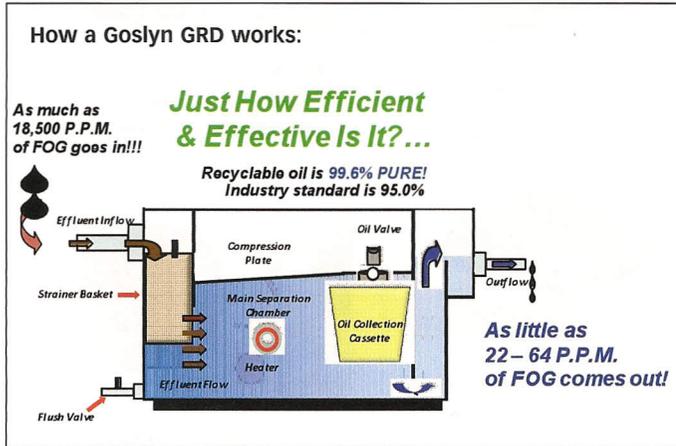
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Construction

Most GDRs are constructed from stainless steel. They will not rust or rot out as steel grease traps have a tendency to do. The major players in the GDR business include JR Smith, Grease Guardian, Big Dipper and Goslyn. Most GDRs such as the Big Dipper GDR come equipped with mechanized conveyors, or skimming devices to remove the FOG, while the Goslyn GDR is the only GDR with the capability to remove FOG from the wastewater using only heat and hydrostatic pressure. All these devices are engineered for durability, dependability, and the utmost reliability. Provided operators maintain their GDR properly, they will not malfunction, leak, or discharge grease to the drain. Food Solids are separated and trapped in this innovative grease recovery device.



Food Solids and Grease Recovery Stages

1: Food Solids

Strainer Basket

Effluent or dishwater enters the Goslyn grease trap. Food particles are collected in the food solids strainer basket. The Goslyn strainer basket traps all food solids. The effluent passes under the first baffle plate and into the separation chambers. The food solid strainer basket was designed for quick and easy emptying.



2: Grease Separation Chamber

The grease separation chamber was engineered to allow the water to separate from the fats, oils, and greases (FOG) before it passes under the final baffle and over the weir to the outlet. (see chart)

3: Oil Outlet Valve

The final weir creates a hydrostatic pressure that forces the FOG up the oil valve and into the cassette. When all of the FOG have been discharged, a floating ball seals the valve. When there is further accumulation of FOG, the ball will again drop allowing the discharge into the oil / grease cassette. (see chart)

4: Fat Oil Grease (FOG) Cassette

The discharged fats, oils, and greases are collected in the FOG cassette strategically connected to the front of the Goslyn. The recovered grease in the cassette is clearly visible. Maintenance involves emptying the grease into your waste vegetable oil (WVO) bin when required. The waste yellow grease is never "out of site, out of mind."

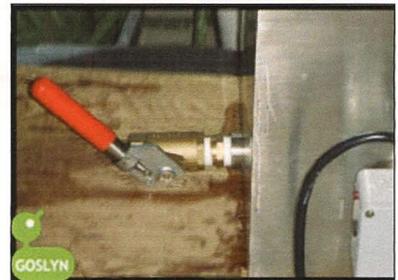


5: Immersion Heater

The effluent or dishwater is warmed up to 104 degrees fahrenheit (40 degrees Celsius) to prevent animal fat from solidifying. Goslyn uses a Standard CSA Approved Electrical Plug. (110 Volt, 1000 watts, 9 Amps)

6: Manual Flush Valve

Settled silts, typically coffee grounds, are discharged through the manually controlled valve. The flush valve is another unique design feature of the Goslyn. The flush valve discharges food solids too fine to be trapped by the strainer basket. The flush valve is an innovative feature to grease trap technology. Food Solids and food particles never go down the drain.



The green movement is not a trend it is here to stay; this is a new way of doing business for restaurants. More than ever today, restaurant owners have many options available to them, not only to significantly reduce operational costs but also the waste and pollution going into the environment. In these difficult times smart operators are looking at innovation and technology as key drivers in their strategy to cut both fixed and variable operational and maintenance costs.

Ontario Rural Wastewater Centre Workshops



Advanced Design of On-Site Sewage Treatment Systems — March 23, 2011
Arkell Demonstration Facility, Guelph: \$240 + HST

Inspection and Evaluation of On-site Wastewater Systems — April 27, 2011
Arkell Demonstration Facility, Guelph: \$240 + HST

Soils 101 — Evaluation of Soils for On-Site Technologies — postponed — May 10, 2011
Arkell Demonstration Facility, Guelph: \$290+ HST