

## **Lafèche Environmental Inc.**

Serving Eastern Ontario, Lafèche Environmental Incorporated (LEI) is recognized as a uniquely innovative and advanced waste management company. By combining cutting-edge technology with their vision of a cleaner future, Lafèche is working to provide long-term waste disposal solutions today and a sustainable legacy for tomorrow.

The first stage of their waste management strategy is a state-of-the-art landfill site known as the Lafèche Environmental BioReactor in Moose Creek, Ontario which transforms waste into energy.

In 2007 LEI constructed a Waste Water Treatment Facility that treats all leachate on site. Beginning in 2008, LEI, began to extract methane gas from the landfill which is resulting in the construction of a 2 Mw electric power generator, supplying green power into the Ontario grid. LEI also initiated construction of a 40,000 tonnes Compost Facility which consists of a 6 channel enclosed facility using state of the art design and operations. The legacy they hope to leave for the future is a clean, stable and sustainable environment.

During the period leading to the selection of their Moose Creek site, André Lafèche and his then-partner, BFI, undertook a number of environmental impact studies. The aim of the studies was to ensure that development of the Lafèche Environmental BioReactor would realistically provide a long-term, sustainable solution to the growing garbage dilemma in Eastern Ontario. Moreover, these studies helped them to confirm that indeed Moose Creek was the optimal location for a development of this type. These studies included the development of an Environmental Assessment Process and completion of a Public Consultation Process. Only once they had obtained all provincial approvals and were satisfied that the site was the best possible choice did they begin development and construction of the landfill and diversion facility.

### **Emerging Technologies at Lafèche Environmental**

Lafèche Environmental is currently financing studies with four separate universities to expand the boundaries of environmental science and practice. Financial contributions to these institutions amount to approximately \$50,000 per year.

The first is a study at the **University of Ottawa** to determine the effectiveness of the peat filters used in the leachate treatment system.

The second study conducted by the **University of Maine** is investigating the hydrological conductivity of tire shreds under-weight in the drainage layer in the place of stone. Under this study, tire shreds are already being permitted by the Ministry of the Environment in the berm at the perimeter of the first section of the BioReactor.

Partnering with Lafèche Environmental, the **University of Western Ontario** is conducting a study that examines how long tire shreds will last as a drainage material without clogging. Based on the results of this study, Lafèche Environmental has formed a new business, Tresept Lafèche Inc. This new company is focused on recycling scrap tires and producing shredded rubber chips for civil engineering applications. Fully sanctioned by the Ministry of the Environment, Tresept Lafèche Inc. holds a Certificate of Approval allowing for the processing of 3,500,000 tires per year. This represents more than one quarter of all scrap tires generated in Ontario annually and makes us the largest processing facility in the province. Tresept Lafèche Inc. represents Eastern Ontario's first legal, environmentally responsible tire recycling facility. Together with dealers, haulers, and municipalities we are striving to provide a cost-effective alternative to illegal dumping, stockpiling, and trans-border disposal.

Finally, Lafèche Environmental is also funding a study by researchers at the Rural Wastewater Centre at the University of Guelph's Alfred College. We have also made our site available to the college's students and researchers, allowing them to sample from, and test the effectiveness of, our leachate treatment and containment system.

The Centre's goal is to develop and promote sustainable wastewater treatment systems for rural communities and industries. Our participation allows them to gain valuable data and information, as well as real world experience that can be applied to other projects in the future.

### **Other Initiatives**

Sustainable waste management is just one of many emerging technologies in which Lafèche Environmental has invested. We will soon begin harvesting methane from our BioReactor - a project that we estimate will yield enough power to run at least 1,000 homes for more than 50 years. We are also working on plans to bring recycling construction and demolition waste, and recycling contaminated soil for reuse.

### **BioReactor**

*Lafèche Environmental's BioReactor puts waste to work*

By combining the natural containment properties of clay with cutting-edge technology and a strong vision of a cleaner, more sustainable future, Lafèche Environmental's BioReactor is changing the way we think about waste.

The premise of the state-of-the-art landfill site known as the BioReactor is to view waste as a valuable asset. Proceeding from that premise, the BioReactor is designed to contain all waste - and waste water - on site, and to treat the waste to ensure it continues to provide benefits to society for decades to come.

When waste arrives at Lafèche Environmental, it is laid inside of an impermeable, natural clay bowl that is lined with high-tech fabric and drainage stone. As the waste deteriorates, the resulting wastewater, known as leachate, is contained by the clay and lining and flows into a large sump in the middle of the bowl.

The leachate is then separated into two streams. One part is re-circulated into the waste bed from which it came. The rest is pumped from the sump into a complex treatment system.

### **Accelerating decomposition**

Re-circulating the leachate encourages an accelerated anaerobic reaction within the waste. Microbes, the microscopic "bugs" that break down the waste, act much faster in an anaerobic environment. By re-circulating the leachate, the BioReactor can accelerate the decomposition of waste by as much as 15 - 20 years.

This means that waste can break down nearly three times as quickly in the BioReactor as in a traditional landfill, where decomposition takes an average of 50 years.

### **Reaping the benefits**

Once a cell, or section, of the BioReactor is filled with waste, it is covered with a soil cap. As the waste decomposes, methane gas is created and held under the cap. When it is present in sufficient quantities, the methane can be captured and used to generate electricity - and not just a little electricity, either.

Over its lifetime, we believe the BioReactor will produce enough methane to power at least 1,000 homes for more than 50 years. In addition to its environmental value, this makes the BioReactor a tremendous economic asset for the area.

We expect to begin harvesting methane in fall of 2006.

### **Long-term thinking**

The long-term plan for the BioReactor is to further capture heat and carbon dioxide, the two byproducts created in the generation of electricity from methane. They will be used to warm greenhouses erected on the site and to provide them with an enriched carbon dioxide atmosphere to enhance plant growth.

Once the anaerobic cycle is complete, it may also be possible to recover soil and recyclables. This will empty out the BioReactor's cells, leaving them available to take in fresh waste.

By managing the BioReactor in this way, we will be able to continue the cycle of putting waste to work for many decades - perhaps for as much as 100 years.

Lafèche Environmental has conducted research with two universities to study the sustainability of using tire shreds to replace stones in the BioReactor's drainage layer. With the successful completion of the study, Lafèche Environmental has been fully sanctioned by the Ministry of the Environment, and holds a Certificate of Approval allowing for the processing of 3,500,000 tires per year. This represents more than one quarter of all scrap tires generated in Ontario annually and makes us the largest processing facility in the province. This project will allow us to conserve a huge amount of stone - approximately 15,000 tons per year - and further reduce our environmental footprint.

### **Environmental Trust**

At Lafèche Environmental, we believe in corporate responsibility. We also believe in putting our money where our mouths are.

That's why we started the Lafèche Environmental Trust, to which we contribute one dollar for every ton of waste deposited at our facility. These funds are then invested to preserve and manage wetlands in Eastern Ontario.



Our mission is to collect \$1.5 million, and become a key contributor to the acquisition for conservation of the Alfred Bog, the largest and highest-quality bog ecosystem in Southern Ontario.

For more information on the Alfred Bog and the efforts to conserve its unique and nationally significant ecosystem, please visit the [Nature Conservancy of Canada](#).

### **Water Conservation**

In a traditional landfill, the treatment and containment of wastewater, also known as leachate, is a considerable challenge.

At the Lafèche Environmental BioReactor, this challenge has been met by containing all leachate on site and putting it to work in the service of a cleaner, more sustainable environment.

As waste deteriorates in the BioReactor, the leachate is separated into two streams



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The remainder is pumped into a complex treatment system, where it passes through a large peat filter that pulls off heavy metals and other contaminants. This "scrubbed" leachate runs into a scientifically designed area known as a subsurface wetland. Here, the leachate flows through an underground gravel bed, and the roots of

surface plants feed on remaining nutrients. Finally, the leachate enters a four-celled surface wetland where aquatic plants absorb any remaining contaminants.

Once it exits this surface wetland, the treated water is stored in a lagoon and used to irrigate nearby woodlots.