



# CANADIAN Environmental Protection

A Baum Direct Response Publication

## BioStreme achieves odour reduction at Ontario landfill operation

**C**lean Harbours, one of the largest Ontario landfill operators, had problems with strong odours emitted from the leachate collected in two lagoons, symptomatic of the incomplete and improper decomposition of solids.

There are two interconnected lagoons on the landfill site. The existing volume of each is five million litres. The wastewater (rain run-off from the landfill) is pumped into the lagoons as needed and this process is controlled by a pumping system.

More solids are accumulated in the first lagoon because wastewater is pumped by two inlets from landfill to Lagoon 1 and then it flows from Lagoon 1 to Lagoon 2. There are four propeller-type surface aerators—two in each lagoon. Each lagoon is aerated and mixed by the aerators.

The wastewater is pumped 24 hours a day into the incinerator where the water is evaporated. The incinerator burns 100,000 litres per week of the lagoon's water. Forty-five luger buckets of ash from the incinerator is landfilled each week. Each luger bucket is 10 cubic yards. The ash is spread on the landfill and the landfill is then covered by a layer of mixed cement, water and newspaper.

The run-off in the landfill only fills up substantially when the incinerator cannot keep up with rain run-off and the lagoons are full.

### Challenge

Hydrogen sulphide, ammonia and volatile fatty acids are common odours associated with the treatment of industrial wastewater. Odours become a serious problem in the summer because of increasing temperatures. Odour issues not only cause concern with local neighbours and residents of the area but are also a potential cost issue for the facility.

### Previous treatment

Clean Harbours originally applied hydrogen peroxide to treat the leachate for odour. It showed a limited odour removal ability both in the lab analysis and in the lagoons. In addition to its limited effect, hydrogen peroxide is also a hazardous product to work with. It is corrosive to mucous membranes, eyes and skin and causes nose and throat irritation.

### New treatment

The existing biological population in a leachate consists of both aerobes and anaerobes. They have specific nutrient and micronutrient requirements for optimal growth and reproduction, many of which may not be present in the leachate environment. This can often become a rate-limiting variable in the processing of wastes, resulting in decreased operating efficiencies, loading rates and/or undesirable by-products, such as excessive odours, scum formation and solids.

BioStreme is a custom engineered micronutrient formulation that is used for the enhancement and acceleration of existing biological treatment systems. Its proprietary formula is derived from 100% all-natural sources of amino acids, plant extracts and food-grade nutrients, which have been blended to encourage the growth and metabolism of existing and/or introduced bacteria for dramatically improved treatment results and odour control.

The BioStreme Micronutrient Formulation has been specifically developed to enhance growth and reproduction of facultative bacteria through its engineered formulation of optimized essential nutrients thus eliminating the potential rate-limiting variables and associated undesirable by-products.

### Product application

The longstanding leachate environment is very similar to a septic system's environment, emitting various types of off-gases venting from the lagoon (odours). BioStreme rejuvenates the system (as a source of nutrient) by incorporating the growth and gradual strengthening of facultative bacteria in the lagoon. As this excess population devours the overload, the lagoon's functional operation improves until treatment can be diminished and maintained minimally as a preventative measure.

Based on the dimensions and depths of the ponds (5,000,000 litres of leachate) and using BioStreme for leachate treatment, a 60% reduction of odour was expected.

Each lagoon was shocked using BioStreme to achieve 50 ppm concentration in

the pond. To shock each pond, 250 litres of BioStreme concentrate was used. The concentrate was initially diluted 100:1 with water, (this was later revised to approximately 20:1) and spread over the surface of each lagoon. The batch mixer mixed the BioStreme and water and provided the appropriate dilution. Application was done using a mobile water canon with a 1,000 gallon holding tank spraying the mixed solution on the surface. The surface aerators provided accurate mixing. According to the operator, within approximately four to five days, odours were noticeably reduced.

separate tests were done to evaluate both the optimal formulation and application rate for this project. The first test compared BioStreme with BioStreme-Solid Waste and the second test evaluated BioStreme and BioStreme-NTX. Each test used a panel of four odour judges to determine the specific odour



Left: 250 litres of BioStreme concentrate was used to shock each pond.

Bottom Left: Each lagoon was aerated and mixed by two propeller-type surface aerators.

Bottom: Wastewater is pumped into the incinerator 24 hours a day.



Since the level of leachate changed due to the addition of rain run-off to the lagoons, BioStreme was added to encourage growth. An additional 100 to 150 litres per week (with the dilution of approximately 20:1) was required to treat 1,000,000 litres per week of new incoming leachate and the remaining liquid in the lagoons to maintain odour control.

Although the nature of incoming materials to the lagoons was not completely known, Filter Innovations was able to determine the required concentration and necessary dilution rate of BioStreme to control the odour of the lagoons.

A sample of pond leachate from the operator was treated with various BioStreme formulations to evaluate the potential for reduction of odour. Two

rating. Each test is described in detail in the laboratory analysis report. (A full laboratory analysis is available upon request comparing the odour control with different products and concentrations.)

### Conclusion

The application of BioStreme has been extremely effective in achieving odour reduction in the leachate environment at Clean Harbours landfill. According to the landfill manager, odours were completely removed from the first lagoon and noticeably reduced in the second one. Downstream of the lagoons, the odours are virtually non-existent. As a result, Clean Harbours is continuing with the BioStreme program.

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