

UW-developed biosolids technology sets new standards

The Region of Waterloo announced this week it intends to locate its biosolids facility in Cambridge, but that doesn't sit well with Cambridge Mayor Doug Craig.

In addition to opposing the choice of the Cambridge waste management transfer station on Savage Drive as the biosolids site, Craig also doesn't like the proposed biosolids heat-drying technology and is worried citizens will be impacted by the smell or other effects.

For more than a decade, researchers from the University of Waterloo, in collaboration with other top Canadian researchers, have implemented a research and development program on biosolids processing. All strategic options related to disposal of biosolids were reviewed and researched. Facilities were visited on three continents.

The vision was to develop processes to make the University of Waterloo spinoff Lystek International Inc., Cambridge, into a global leader in biosolids management. The objective: to set new standards for health, safety and environmental sustainability for biosolids processing. The result is the emergence of a whole new green manufacturing approach and the production of quality assured products and services.

The U.S. Environmental Protection Agency and the Occupational Safety and Health Administration warn of fire and explosion risks and the negative health impacts on lung function related to dust and particle inhalation from dry biosolids. The Environmental Protection Agency also points to the high levels of nuisance odours generated during heat drying.

The Waterloo team had long-standing experience and knowledge of the serious health and safety risks and has confirmed through research that biosolids heat drying generates intense odours. Our team concluded it made no sense to incur significant additional costs to try to reduce the problems.

So, what was the team's response to the risks associated with dried biosolids? Simple — eliminate both the process and product risks and the major odour problems and go with a liquid product. So first, develop an innovative technology that produces a safe, stable biofertilizer while avoiding the health and fire risks and odour problems. And second, reduce the volume of biosolids requiring off-site disposal by increasing gas production for conversion to green energy.

This technology has been proven in Guelph and St. Marys and is central to Elora's new waste-water treatment plant. Plus, the Lystek system is installed at two regional processing centres that, together, will serve other communities including Ottawa, Orangeville, Peterborough, Toronto and more.

The technology has won multiple awards for innovation and exemplary biosolids management. Key Canadian and U.S. patents have been granted and the product is registered as a fertilizer by the Canadian Food Inspection Agency. Dried products cannot achieve this designation.

The Region of Waterloo's biosolids master plan resulted in the selection of an imported heat drying technology versus the Waterloo-developed process. The master plan incorrectly concluded that the treatment cost of the Lystek process was greater than the heat drying process.

In reality, the Lystek process is \$100 million more economical than heat drying, but in reaching its conclusion, the master plan assigned zero cost for the well-known, high-energy costs of heat drying and did not include \$30 million in financing and other related costs for the heat drying plant.

The master plan "penalized" the Lystek process because it did not provide for alternative disposal options such as landfilling and incineration, cited as benefits of heat drying. But it is globally accepted that the long-term security of our food supply demands that biosolids be recycled into safe biofertilizers for sustainable use in agriculture.

Incineration and landfilling are no longer viewed as preferred options for biosolids disposal. In fact, unlike heat drying, the Lystek process offers various management options. For example:

- It can process and take the market-ready product straight to the farm, where it can be immediately used, with no mixing with chemical fertilizers required;
- It can apply Lystek's biogas process to reduce biosolids requiring transport;
- And it can send the unprocessed biosolids to our processing facility at Dundalk, Ont..

The Environmental Protection Agency has evaluated biosolids heat drying versus other methods. The greatest perceived advantage of heat drying is that transportation requirements are reduced due to the smaller volume of the final product. However, the dried product has a lower density than the liquid product and, therefore, it takes up nearly twice as much space by volume.

And with Lystek's technology, more of the biosolids can be converted to biogas for green energy, further reducing the volume to be transported. Lystek technology addresses the principal advantage of heat drying.

The Environmental Protection Agency also cites a long list of disadvantages of heat drying, none of which apply to the Lystek technology:

- Heat-drying systems are much more complex and have significantly higher capital, operating and maintenance costs.
- Heat-drying processes are notorious for producing nuisance odours.
- Heat-drying processes have much higher energy consumption requirements.
- The dust generated is a fire and explosion hazard, and can negatively affect the health of plant workers and neighbours. And these liabilities remain with the product after it leaves the plant.

The conclusion? The Waterloo technology addresses the principal advantage of heat drying without its disadvantages while setting new industry standards for health and safety, as well as fiscal and environmental responsibility and sustainability.

Owen Ward, founder of Lystek International Inc. and a co-inventor of its technology, is a professor at the University of Waterloo. He is a former president of the Canadian Society of Microbiologists and a former director of the U.S.-based Society of Industrial Microbiology.

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