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ABSTRACT

NAVIGATING THE COMPLEX LANDSCAPE OF BIOLOGICAL ODOUR CONTROL SOLUTIONS FOR WASTE WATER APPLICATIONS

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Traditional approaches using physical and chemical treatment solutions have been in use for extended periods of time and are generally understood well in terms of their sizing and application. While biological solutions have been applied for several decades now, there is little agreement on how best to apply fixed film or suspended growth biological reactors to addressing specific gaseous phase emissions from waste water processes.

More recently, a number of novel biological processes and microbial immobilization matrices provide a greater variety of approaches to dealing with nuisance odours. To make things even more challenging, a large number of equipment suppliers across the globe often purport to have a “one size fits all” approach to solving critical gaseous phase emissions issues at facilities.

The following paper is intended as a Manual of Best Practices for environmental professionals interested in applying the latest developments in advanced biological odour control techniques. These approaches safeguard economics while ensuring that the highest rates of treatment efficiency can be achieved in a reliable and sustainable manner.

A description of the composition of odours and how they are interpreted by our olfactory system is presented in the context of odour control and emissions abatement at waste water treatment facilities. Specific compounds that contribute to odour have various chemical and physical characteristics which impact the phase transfer and subsequent biological oxidation which has an influence on the selection and performance on the abatement technology selected.

The paper then explores the various biological approaches that are commercially available with emphasis on the fundamental principles that each solution utilizes to maximize treatment efficacy. Type of bioreactor; gas/liquid distribution; microbial immobilization matrices and process optimization will be covered in detail within the context of specific waste water treatment processes.

A couple of case studies with conmensúrate data and graphics will be presented that illustrate the principles outlined in the document. These case studies include:

1. Ashbridge’s Bay, Toronto. At one million cubic metres per day of wastewater treatment, this is one of Canada’s largest facilities. It is also part of a massive

infrastructure investment program to modernize and upgrade odour control equipment. Starting in 2002, when the municipality began exploring alternatives to chemical scrubbers, a comprehensive odour mitigation strategy was employed and multiple advanced biological solutions deployed around the facility from headworks and preliminary treatment to liquid phase treatment and finally to the challenging biosolids handling sections of the plant. Odour mitigation as well as specific contaminant destruction is reviewed in detail for the various sources.

2. City of Elora, Ontario. Innovative biosolids handling processes at this facility provide additional insight into the management of odours at waste water treatment plants. Several odour control systems are reviewed in the context of efficacy across a wide range of contaminants. A detailed investigation of the microbial immobilization matrix is undertaken and insights into the role and function of specific microbial colonies are discussed.

Indicate preference of kind of presentation

- ✙ Oral Communication
- ☐ Poster

Indicate topic of your work for the conference:

- ☐ Policy and associated regulations for odour and air quality.
- ☐ Odour/VOC measurement, monitoring&sensor technologies.
- ☐ Odour/VOC perception, impact, formation and dispersion.
- ☐ GHG emissions particulate matter and industrial emissions.
- ☐ Source characterization and odour/VOC mapping.
- ✙ Odour/VOC abatement, mitigation and neutralization.
- ✙ Odour/VOC from waste water, sewer systems and livestock.
- ☐ Air emissions and sustainable solutions for waste handling
- ☐ Community engagement, social media and citizen action.
- ☐ Other (suggest a new topic):

The scientific committee can examine the kind of presentation and session where authors propose to include their works.