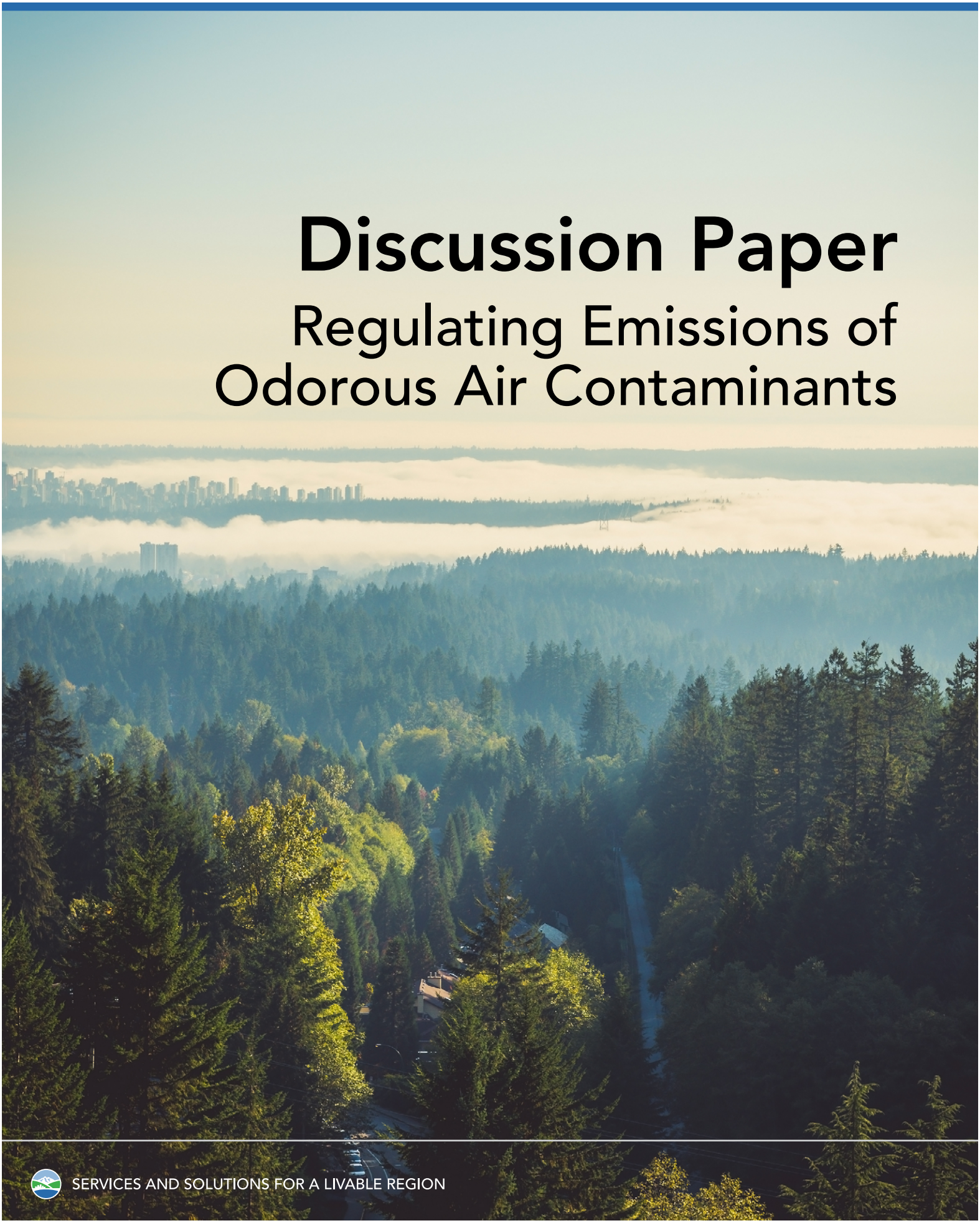
metrovancouver

Discussion Paper

Regulating Emissions of Odorous Air Contaminants



SERVICES AND SOLUTIONS FOR A LIVABLE REGION

INTRODUCTION

Metro Vancouver Regional District (Metro Vancouver) is responsible for managing air quality and regulating the discharge of air contaminants in the region under authority delegated from the provincial government under the British Columbia (BC) *Environmental Management Act*. Metro Vancouver is committed to protecting the environment and managing the discharge of air contaminants, including odorous air contaminants.

In recent years, Metro Vancouver has received a growing number of odour complaints from the public. The potential impacts of emissions of odorous air contaminants range from nuisance and disturbance in residential neighbourhoods, to a health concern or hazard when present at elevated concentrations. For this reason, Metro Vancouver is considering enhancing its strategy for managing the discharge of odorous air contaminants. This discussion paper describes potential options for regulating emissions of odorous air contaminants to support discussions with key stakeholders.

PURPOSE

Metro Vancouver receives more complaints about odorous air contaminants than any other type of air emission. The sources of the odours can be industrial, commercial, agricultural, residential or natural. Identifying industrial or commercial sources of emissions of odorous air contaminants and minimizing impacts on the public are priorities for Metro Vancouver.

This discussion paper provides information about different sources of odorous air contaminants, the potential impacts on surrounding communities, and proposed changes and additional tools that could be used to regulate discharges of air emissions which are odorous air contaminants.

This discussion paper may be of interest to:

- Businesses that discharge odorous air contaminants to the air in Metro Vancouver, as well as associations representing these parties;
- Metro Vancouver air quality permit holders;
- Consultants that provide services related to ambient monitoring, stack testing, air emission dispersion modelling and emission control; and
- Other interested parties affected by the regulatory proposal or by air quality in the Metro Vancouver region.

IDENTIFYING THE PROBLEM

Effects of Odour

Emissions of odorous air contaminants can interfere with many aspects of daily life, particularly if an unpleasant smell is strong and detected often. The characteristics that are considered when assessing the potential impact of an odour are frequency, intensity, duration, offensiveness (unpleasantness), and location, sometimes described by the acronym FIDOL. Different combinations of these factors may have adverse effects on the lives and well-being of people exposed to odorous air contaminants.

Emissions of odorous air contaminants can be complex mixtures of many different chemicals that the human nose can detect at very low concentrations. Even at low levels at which an odour causes a nuisance, a number of physiological responses have been reported in scientific papers, including nausea, eye irritation, headaches, sleep problems and respiratory symptoms[1]. If an offensive odour is persistent, it can affect a person's mood, anxiety and stress levels. In addition, residents are sometimes unable to enjoy their own property and outdoor activities, such as gardening, barbeques and use of outdoor playgrounds. Residents also report having to close their windows and doors during hot weather or being embarrassed when unpleasant odours occur when they are entertaining guests.

Sources of Odorous Air Contaminants

Odours contribute to air quality concerns in the Metro Vancouver region. Common sources of odorous air contaminants include solid and liquid waste management facilities, rendering plants, food and animal feed processing facilities, restaurants, petroleum refineries, manufacturing facilities, and agricultural activities. Emissions of odorous air contaminants can travel long distances, with the frequency and duration of odour detection affected by weather conditions.

In recent years, the prioritization of the diversion of organic waste away from landfills to organics processing facilities has led to increased concerns about odour management. Materials being diverted include waste from landscaping and food waste. The processing of organic waste can provide beneficial results, by breaking down waste into renewable products through composting, or using waste for bioenergy production through anaerobic digestion. However, there are many steps in composting processes that can potentially release odorous air contaminants. Best management practices, emission control works, enclosures and proactive strategies may all be implemented during the design and construction of composting facilities to reduce the generation of odorous air contaminants. For existing facilities, improvements to operating procedures, and/or the introduction of pollution prevention and control works, may all assist in reducing the impacts of emissions of odorous air contaminants.

Terminology

Odour management is a complex issue. It is important to have a common understanding of the tools and approaches that can be used to assess, mitigate and manage odours in the region. To support a common understanding of the terminology used in this document in relation to odour measurement, the following descriptions are provided:

Olfactometry is the measurement of odour by using the human sense of smell.

Odour unit is a unit that refers to the number of times a sample of odorous air contaminant or mixture of odorous air contaminants must be diluted with fresh (uncontaminated) air, in order to reach the point where it is just detectable.

Sensitive receptor is any location at which routine or normal activities occurring at reasonably expected times could result in people experiencing adverse effects due to the discharge of air contaminants, including odorous air contaminants. Sensitive receptors with respect to odorous air contaminants could include but are not limited to schools, hospitals, residences and public parks.

1 Government of Alberta. (2017). Odours and Human Health. Environmental Public Health Science Unit, Health Protection Branch, Public Health and Compliance Division, Alberta Health. Edmonton, Alberta.

WORKING WITHIN THE LEGISLATION

How does Metro Vancouver Regulate Odour?

The *Greater Vancouver Regional District (GVRD) Air Quality Management Bylaw No. 1082, 2008*, as amended (Bylaw 1082) prohibits the discharge of air contaminants by an industry, trade or business unless the discharge is conducted in accordance with a Metro Vancouver emission regulation or air quality permit. The definition of an air contaminant includes a substance that may cause material physical discomfort, injure a person's health or interfere with the normal conduct of business. The release of air contaminants, including odorous air contaminants, has the potential to cause air pollution if present in a way that substantially alters or impairs the usefulness of the environment. Bylaw 1082 prohibits any person from discharging, or allowing or causing the discharge of any air contaminant so as to cause pollution.

Facilities operated by Metro Vancouver and member jurisdictions, including wastewater treatment plants and solid waste facilities, are authorized to emit odorous and other air contaminants under solid waste and liquid waste management plans approved and administered by the province. Metro Vancouver has exempted these facilities from the requirement to obtain an air permit but not from the prohibition against causing pollution. While Metro Vancouver does not regulate these facilities directly, staff work with other orders of government to develop approaches to managing odour responsibly within the region.

Metro Vancouver works proactively with individual industries, trades or business, through the air permitting process, to set limits on the discharge of air contaminants, establish required emissions control works, technologies or best practices, set performance measures, and/or establish monitoring, reporting or modelling requirements. Permits may also address operating procedures.

Currently, Metro Vancouver has only one air quality regulation, the *GVRD Automotive Refinishing Emission Regulation Bylaw No. 1086, 2008*, made under Bylaw 1082, which directly addresses odorous air contaminants. That regulation provides that operators *"…must not discharge air contaminants that.... cause odour beyond the premises on which the automotive refinishing is carried out so as to cause a nuisance."* Beyond this, Metro Vancouver has not yet established regulations to address specific odorous air contaminants that are used across various businesses or trades, nor to address specific odorous air contaminants common to particular business sectors. Metro Vancouver's efforts have been focused on securing permits to address the emissions of the most significant emitters.

Metro Vancouver also expends substantial resources with officers responding to odour complaints by trying to identify the probable source of emissions based on the complainant's description, meteorological data and on-site observations when appropriate. Officers work with the facilities determined as being the probable source to identify and address the cause of impacts on the community. The tools used by Metro Vancouver to manage odour are described in Metro Vancouver's Odour Management Framework.

Finally, in cases where it is clear that the odorous properties of a facility's air emissions are causing air pollution, or health or other material adverse effects, Metro Vancouver is authorized to take action, whether the facility is currently permitted or not. Possible enforcement alternatives may include the issuance of pollution prevention or abatement orders, or prosecution in respect of breaches of bylaws, including a release of air contaminants causing pollution.

Other Jurisdictions

BC does not have a province-wide regulation specific to odour management. Rather, odorous air contaminants may be regulated under various regulations and codes, or under site-specific authorizations such as permits. The province manages odours from composting facilities outside Metro Vancouver's boundaries under the BC *Organic Matter Recycling Regulation* (OMRR). Guideline documents supplement the regulation and are specific to the siting and operation of composting facilities, including the development of odour management plans. The BC Ministry of Environment and Climate Change Strategy is currently reviewing the OMRR to examine opportunities to strengthen the regulation, with consideration to continued protection of human health and the environment.

In different jurisdictions across Canada and internationally, odour issues are addressed through a range of mechanisms, including odour regulations, policies, and guidance documents. Ontario and the cities of Montreal and Boucherville in Quebec use odour concentration guidelines measured in odour units. Manitoba and Saskatchewan use odour units to assess potential impacts from new facilities during the design phase, but not as an enforcement tool to verify compliance when the facility is operating. Most provinces define air contaminant in their legislation, and some provinces explicitly include odour within the definition (Ontario, Quebec, Prince Edward Island, Newfoundland and Labrador). In addition, some BC local governments have odour nuisance laws in place (e.g. City of Courtenay, District of Mission, and West Vancouver).

Other odour management frameworks from across the United States, Europe, Australia, New Zealand, Japan and South Korea describe the approaches taken to address odour management in those jurisdictions.

GUIDING PRINCIPLES

The key objective of Metro Vancouver's Odour Management Framework is to provide an overarching policy structure for managing odorous air contaminants to address pollution or other injurious effects identified through public complaints, site inspections and compliance assessments.

This discussion paper draws upon the guiding principles from the Odour Management Framework:

- Promote sustainability by addressing economic, environmental and social considerations.
- Emphasize prevention and control through best management practices and continuous improvement.
- Encourage accountability by seeking input from communities, business and government.
- Ensure that the costs associated with minimizing the impacts of emissions of odorous air contaminants are covered by those parties responsible for the emissions, while recognizing effective emissions reductions measures through incentive-based regulation.

Metro Vancouver's Odour Management Framework

The Odour Management Framework outlines tools that are available for reducing impacts of odorous air contaminants in the Metro Vancouver region. It takes an approach that is consistent with and draws upon successful elements of Metro Vancouver's approach to managing other air contaminants.

A number of regulatory and non-regulatory approaches are identified in the framework:

- Methods for assessing and measuring emissions of odorous air contaminants;
- Limits on the quantity and nature of odorous air contaminants discharged and in the ambient air (fence line, community), based on the results of emissions assessments;
- Systematic complaint response mechanisms;
- Use of guidelines, developed by Metro Vancouver or adapted from other jurisdictions; and
- Continued community relations and outreach activities.

In the framework, regulatory measures are supported by non-regulatory approaches, sometimes referred to as voluntary initiatives, to help achieve effective reductions of emissions of odorous air contaminants. Having a suite of tools and a range of approaches maximizes flexibility for both Metro Vancouver and permitted facilities in managing emissions of odorous air contaminants.

The policy tools described in the Odour Management Framework represent current practices for managing odorous air contaminants in the Metro Vancouver region. However, gaps have been identified in current odour management practices. Additional tools are needed to enhance Metro Vancouver's existing odorous air contaminant management program and to ensure that these contaminants are managed responsibly and in a way that respects community values and recognizes the value business provides in the region.

POTENTIAL CHANGES

Metro Vancouver is seeking preliminary input from stakeholders representing different perspectives on potential regulatory options to improve the management of odorous air contaminants. These options are not mutually exclusive, meaning one or more could be implemented. The options include the establishment of:

- Outcome-based criteria, that specify outcomes or conditions in the receiving environment that must be achieved to remain in compliance with a permit or regulation;
- Performance-based criteria, that stipulate specific air contaminant emissions limits at the source required to remain in compliance with a permit or regulation;
- Technology requirements, that specify required equipment or control works for odour treatment, or best management practices for new or existing facilities;
- Economic instruments, that provide incentives for reducing emissions and allow administrative costs to be recovered from sources of odorous air contaminants; and
- Bylaw amendments, to enhance and support the regulatory framework for managing emissions of odorous air contaminants so as to avoid air pollution.

Outcome-based Criteria

An outcome-based approach specifies what overall outcome, e.g. what ambient odour concentration limit must be achieved, measured at a specific location, for the total emissions to remain in compliance with a permit or regulation. This approach is not prescriptive about how outcomes should be realized and does not specify technology or equipment that could be used. It offers flexibility for facilities to choose the mitigation method or management practice that will achieve the outcome required.

Outcome-based Criteria in Practice

Facilities in Metro Vancouver that are linked to recurring odour complaints are often required to conduct dispersion modelling to estimate ambient odour concentrations at the facility's fence line and in the community. Dispersion modelling predicts ambient odour concentrations, based on emissions levels, thereby allowing emission limits at the source to be set at a level that minimizes impacts.

Stipulating ambient concentration limits at the fence line could be a permit requirement, based on the results of dispersion modelling. For new facilities, source emission estimates would provide input data for dispersion modelling. On an ongoing basis, periodic source testing would be required, and additional modelling could be required if odour impacts in the community are observed.

This approach is used in Ontario, where the ambient odour concentration limit, generally 1 odour unit based on a 10-minute average concentration at the nearest sensitive receptor, is set through site-specific permits.

Potential changes under consideration include:

Metro Vancouver could establish measurable outcomes as a means of predicting and assessing the impacts of emissions of odorous air contaminants by setting:

- Ambient air quality criteria for odorous air contaminants, used to assess the effects of emissions based on either predictive dispersion modelling during the design phase, odour monitoring during operation, or both. These criteria could help evaluate different control technology options, and assist Metro Vancouver when dealing with complaints.
- Complaint criteria triggered by the number of public complaints linked to facilities determined as the probable source, using standard field observation protocols that define how complaints are verified.
- Criteria for on-site field observations for facilities with high odour potential that have been linked to recurring complaints. Field observations could be triggered by meteorological conditions or form part of routine inspection activities. Officers would assess facilities using standard field observation protocols.

Performance-based Criteria

Odour impacts can be assessed by quantifying air emissions at the source. Metro Vancouver can set limits on the quantity and type of emissions, and establish the means to determine compliance with those limits, including monitoring and reporting. Emission limits may be included as conditions of a permit or in regulations for point sources (e.g. at the point of discharge, such as a stack or vent) to control the release of odorous air contaminants. Similar to outcome-based criteria, this approach is not prescriptive about how emission performance levels should be achieved, and offers flexibility for facilities to choose the control technology, mitigation method, management practice, or process modification that will achieve the performance level required.

Approaches used to set emissions performance levels include specifying a level that would be equivalent to the use of best available control technology, or as noted above, through an approach using ambient air quality outcomes and dispersion modelling. Compliance with performance criteria is normally determined through direct measurement of emissions levels using standard sampling methods, at defined intervals. A similar approach could be applied for odorous air contaminants.

Potential changes under consideration include:

- Set quantitative emission limits in air quality emissions permits or new regulations, to minimize the impacts of emissions of odorous air contaminants. Emission limits, applied in a permit or regulation, would inform the design of new facilities and be enforced during the operational phase of the facility.
- Set quantitative emission limits on individual odorous air contaminants. Emission characterization studies may be necessary to identify the types and concentrations of odorous air contaminants present.
- When it is not practical or possible to characterize or measure emissions of individual odorous air contaminants, such as when an odorous air contaminant mixture is complex (i.e., arising from unique combinations of often hundreds of different odorous air contaminants), a feasible alternative is to establish limits on odour concentration levels of the combination of odorous air contaminant discharges (by referencing a stated "odour unit" limit for the emissions) and to assess compliance with that quantitative limit using the "dynamic olfactometry" methodology.

The methodology outlined in European Standard EN 13725:2003 ("Determination of odour concentration by dynamic olfactometry") is used by other jurisdictions including Ontario, the United Kingdom, the Netherlands and many other countries in the European Union. Odour units, as a unit of measure, are well suited for odorous air contaminants that present in combinations, where it may be difficult or expensive for industry to measure each component air contaminant. Regulating the resulting combination also recognizes the reality that synergistic interactions often occur among the individual component contaminants. Employing this methodology uses panels of at least four trained panel members to detect odour; a benefit of this method is that the human nose is sensitive and able to detect odours at very low concentrations, but the individual component contaminants may not be able to be detected by an analytical instrument, at the same levels. What is measured using this recognized methodology is the concentration of the resulting odorous combination, as opposed to the performance or measure of each contributing air contaminant in isolation.

Technology Requirements

Metro Vancouver has requirements for using control technology and similar approaches that specify the levels of odour treatment control or best management practices required for new or existing facilities. Technology requirements are generally used in both air permits and regulations, however, there are currently no regulations specific to emissions of odorous air contaminants.

Imposing technology requirements is a more prescriptive approach to controlling emissions of odorous air contaminants than the outcome- or performance-based approaches. Technology requirements for odorous air contaminants may include specific conditions for the design, operation, maintenance and management of site infrastructure, or for systems to capture and collect odorous air contaminants (including point and fugitive sources), to direct them to control works or treatment, or equipment for adequate dispersion of emissions. The necessary or most appropriate measures will depend on the process and materials being processed.

Potential changes under consideration include:

- Incorporate best achievable technology requirements into new regulations addressing sector-specific sources of odorous air contaminants.

Economic Instruments

The majority of all air quality complaints received by Metro Vancouver are related to odour. Substantial resources are required to respond to and attempt to resolve complaints about odour. The cost of responding to complaints and verifying compliance with the regulatory requirements put in place to reduce the impacts of odorous air contaminants could follow Metro Vancouver's existing polluter-pay approach. The use of economic instruments would also align with current regulatory practices to promote maximum benefits from reducing emissions by integrating incentives into regulatory mechanisms.

To recover the costs of developing, implementing, and enforcing the regulatory program, Metro Vancouver charges fees for the discharge of many air contaminants, including odorous air contaminants such as total reduced sulphur, ammonia, and volatile organic compounds. New economic instruments could be more broadly applied through charging emission fees for the discharge of odorous air contaminants to encourage emissions reductions.

Potential changes under consideration include:

- Introduce incentives for implementing control technology for facilities that emit odorous air contaminants.
- Apply administrative fees for facilities that are required to conduct dispersion modelling and develop odour management plans, to recover costs of staff time to review.
- Recover costs based on authorized discharge levels of odorous air contaminants.
    - Introduce fees for the discharge of odorous air contaminants, based on the quantity and nature of the odorous air contaminants; additional considerations could include the proximity to sensitive receptors in the receiving environment.
    - Increase existing fees for emissions of total reduced sulphur compounds and ammonia.

Bylaw Definitions

In many other jurisdictions, including provinces across Canada, regulations and bylaws have a definition of air contaminant that includes odour. Metro Vancouver regulates a number of facilities that emit odorous air contaminants. To clarify existing provisions in Bylaw 1082 and *GVRD Air Quality Management Fees Regulation Bylaw No. 1083, 2008* (Bylaw 1083) for managing the impacts of emissions of odorous air contaminants, Metro Vancouver is proposing to add definitions for terms related to odorous air contaminants and update terminology.

Potential changes under consideration include:

- Add definitions to Bylaw 1082 and Bylaw 1083 to clarify provisions for regulating odorous air contaminants.
- Update terminology in Bylaw 1082 and Bylaw 1083 to reflect Metro Vancouver's authority to regulate emissions of odorous air contaminants.

PROVIDING COMMENTS ON THE POTENTIAL REGULATORY INITIATIVES

Metro Vancouver welcomes feedback with respect to any or all of the proposed changes. Metro Vancouver will carefully consider all feedback when considering potential options to enhance the management of emissions of odorous air contaminants in Metro Vancouver.

Metro Vancouver staff and contractors will treat comments received with confidentiality; please note that comments you provide and information that identifies you as the source of those comments may be publicly available if a freedom of information (FOI) request is made under the Freedom of Information and Protection of Privacy Act. If you have any questions or comments regarding the consultation process, call 604-432-6200.

Metro Vancouver invites you to provide feedback by April 27, 2018 to **AQBylaw@metrovancouver.org**. Metro Vancouver will consider all feedback when developing further consultation papers, which would describe proposed expanded approaches for managing emissions of odorous air contaminants. Feedback will be considered until the MVRD Board adopts additional regulatory measures for managing emissions of odorous air contaminants.

Thank you for taking the time to consider and provide input on these potential changes to odour management in Metro Vancouver.

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