Ministry of Environment

FACTSHEET
AIR EMISSIONS

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Combustion of Municipal Solid Waste

The purpose of this document is to summarize key information contained in the Ministry's guideline for emissions from Municipal Solid Waste (MSW) combustion.

The rationale behind the guideline is contained in a report that was developed by Stantec for the Ministry of Environment under contract.[1]

What is the guideline for emissions from MSW combustion used for?

The guideline is intended to provide assistance for reviewing Solid Waste Management Plans submitted under the *Environmental Management Act,* assistance to directors for issuing Operational Certificates to local governments or to owners or operators of MSW combustion facilities covered by a Solid Waste Management Plan, and assistance to directors for issuing permits for MSW combustion facilities.[2]

Why combust MSW?

The practice of MSW combustion as a method of waste treatment is being considered by various local governments and private companies. It provides a means to reduce the volume of waste entering landfills, as well as a means to recover energy. The latter, known as Waste to Energy, is an allowable activity under the *Environmental Management Act*.

Who does the guideline for emissions from MSW combustion apply to?

The guideline is intended for facilities carrying out combustion of MSW[3] that has not been processed into refuse derived fuel. The guideline applies to facilities that combust MSW both with and without energy recovery.

The conditions and limits within the guideline apply to mass burn facilities. If other treatment techniques including, but not limited to, gasification, plasma gasification or pyrolysis are contemplated, the same conditions and limits should be applied, as appropriate, along with other parameters that ensure effective operation of the technology.

What air emissions are produced during the combustion of MSW?

Combustion of MSW can be achieved using several technologies, with the most common method being mass burn. Typical air pollutants which may be released to the atmosphere during this process include: particulate matter, carbon monoxide, sulphur dioxide, nitrogen oxides, acidic compounds, metals and organic compounds.

What are the limitations of the guideline?

The guideline is limited to conditions that could be placed in an authorization. It does not take into account various factors that would be evaluated as part of an Environmental Impact Assessment, nor does

[1] Read "Waste to Energy: A Technical Review of Municipal Solid Waste Thermal Treatment Practices" available online (http://www2.gov.bc.ca/gov/DownloadAsset?assetId=16FA7B1CA0D643FE8FE1A17EA30B8FA1&filename=bcmoewteemmissionsrevmar2011.pdf) .

[2] For more information, see Waste Discharge Authorizations (http://www2.gov.bc.ca/gov/topic.page?id=0876E90DA4744A449423D35EB4E09785).

[3] Municipal Solid Waste is defined under Section 23 of the *Environmental Management Act* as (a) refuse that originates from residential, commercial, industrial, demolition, land clearing or construction sources, or (b) refuse specified by a director to be included in a waste management plan.

it limit any additional requirements that may be imposed for a specific facility.

If an impact assessment indicates a potential for continued adverse effects on the environment or human health, more stringent emission limits than the limits listed here may be deemed necessary.

What are the emission limits?

Emission limits for the combustion of MSW are outlined in Table 1. These limits include daily average and several ½ hour average limits.

New Facilities

All new facilities are expected to install operational and emission control technologies that will, at minimum, achieve the conditions required by the Ministry and the emission limits in Table 1.

Existing Facilities

Existing facilities that operate within BC are expected, within two years or less, to submit a plan to the Ministry for achieving the requirements set out in the guideline and a timeline for implementation of the plan. In addition, existing facilities that have been significantly modified[4] may be required to upgrade control technologies to meet more stringent emission limits.

Why are the ½ hour and daily average limits different?

The ½ hour limits are numerically higher than the daily limits to represent maximum allowable discharge concentrations over shorter time periods, whereas the daily averages are lower to account for fluctuations over time.

Why are there two ½ hour particulate matter emission limits?

During normal operation, facilities are required to operate within the limit of

9 mg/m^3 which applies as a 97% rolling operating annual average. The limit of 28 mg/m^3 is to be met at all times and is intended to ensure emissions are maintained at low levels even during extenuating circumstances, such as a temporary disruption in the emission control equipment.

What are the incineration process operating conditions?

Proper incineration process operating conditions are important to ensure adequate combustion and to minimize air emissions. Conditions that pertain to temperature and oxygen concentration are to be set and monitored. Other conditions such as residence time, primary and secondary combustion air supply, and auxiliary burner capacity are to be incorporated in the facility design.

What are the requirements for public access to monitoring data?

MSW combustion facilities should ensure the public have online access to continuous emission monitoring system (CEMS) data and an indication of when CEMS data are not available.

What are the requirements for best management plans?

MSW combustion facilities should provide a best management plan to the Ministry prior to the issuance of an authorization. This plan should be updated regularly and include odour management and waste management contingency considerations. The odour management section should be site specific and incorporate considerations such as neighbouring facilities and residents, ongoing complaint mitigation and design.

Will the guideline be amended?

As other jurisdictions update emission limits for MSW combustion facilities and technologies and techniques improve, the Ministry will update the guideline as appropriate, especially if new MSW combustion facilities are contemplated.

[4] A facility has been significantly modified if it has undergone a physical or operational change resulting in an increase of 10% or more in the volume of discharge or the total amount of any contaminant released to the environment.

Table 1. Emission Limits for Municipal Solid Waste Combustion Facilities in British Columbia

Contaminant	Units	EMISSION LIMITS	
		Daily Average	CEMS ½ Hour Average
Total Particulate Matter (TPM)	mg/m^3 @ 11% O_2	**9**	**9**[(1)], **28**
Carbon Monoxide (CO)	mg/m^3 @ 11% O_2	**50**	**100**
Sulphur Dioxide (SO_2)	mg/m^3 @ 11% O_2	**50**	**190**
Nitrogen Oxides (NO_x as NO_2)	mg/m^3 @ 11% O_2	**190**	**350**
Hydrogen Chloride (HCl)	mg/m^3 @ 11% O_2	**10**	**60**
Hydrogen Fluoride (HF)	mg/m^3 @ 11% O_2	**1**	**4**[(2)]
Total Organic Carbon	mg/m^3 @ 11% O_2	**10**	**20**
Cadmium (Cd)	$\mu g/m^3$ @ 11% O_2	**7**	N.D.
Mercury (Hg)	$\mu g/m^3$ @ 11% O_2	**20**	N.D.
Sum of Lead (Pb), Arsenic (As), Chromium (Cr)	$\mu g/m^3$ @ 11% O_2	**64**	N.D.
Chlorophenols [(3)]	$\mu g/m^3$ @ 11% O_2	**1**	N.D.
Chlorobenzenes [(3)]	$\mu g/m^3$ @ 11% O_2	**1**	N.D.
Polycyclic Aromatic Hydrocarbons [(3)]	$\mu g/m^3$ @ 11% O_2	**5**	N.D.
Polychlorinated Biphenyls [(3)]	$\mu g/m^3$ @ 11% O_2	**1**	N.D.
Total Dioxins and Furans (as PCDD/F TEQ)	ng/m^3 @ 11% O_2	**0.08**	N.D.
Opacity[(4)]	%	N.D.	**5**

NOTES:

Concentration units: Mass per reference cubic metre corrected to 11% oxygen. Reference conditions: 20°C, 101.3 kPa, dry gas
N.D. = Not Defined

(1) 97% of the ½ hour average values over an annual operating rolling average will not exceed 9 mg/Rm^3. The 28 mg/Rm^3 ½ hour average value is never to be exceeded.

(2) This requirement may be omitted at the discretion of the director should treatment stages for HCl demonstrate that the emission limit for HCl is not exceeded.

(3) Proponents may be able to demonstrate that monitoring both Total Organic Carbon and Total Dioxins and Furans could negate the need to monitor Chlorophenols, Chlorobenzenes, Polycyclic Aromatic Hydrocarbons and Polychlorinated Biphenyls.

(4) Opacity will not be required for compliance purposes for facilities utilizing continuous particulate monitoring systems. Opacity monitoring is recommended for operational monitoring purposes. However, opacity monitoring can be used as a temporary surrogate for total particulate monitoring in the event of a particulate monitoring system failure. Under these circumstances, the emission limit of 5% opacity over a ½ hour averaging period should apply.

For more information contact the Environmental Standards Branch at: envprotdiv@victoria1.gov.bc.ca,

or, consult our website to read more about Municipal Solid Waste.

Note: This summary is solely for the convenience of the reader. The current guideline should be consulted for complete information.