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Air Pollution Guidelines Applicable to Incinerators at Federal Establishments

Regulations, Codes and Protocols
Report EPS 1-EC-78-5

Environmental Impact Control Directorate
August 1978

ENVIRONMENTAL PROTECTION SERVICE REPORT SERVICES

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AIR POLLUTION GUIDELINES
APPLICABLE TO INCINERATORS
AT FEDERAL ESTABLISHMENTS

Environmental Impact Control Directorate
Environmental Protection Service
Fisheries and Environment Canada

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ABSTRACT

These guidelines set forth emission limits for air pollutants discharged from new and existing incinerators at federal establishments.

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1 PURPOSE OF GUIDELINES

The Cabinet Decision of June 8, 1972, entitled "Control and Abatement of Pollution from Federal Activities - Cleanup and Prevention", calls for the cleanup of existing sources of pollution from federal establishments and for the screening of all new projects initiated by the federal government for potential adverse environmental effects. The purpose of these guidelines is to indicate the air contaminant emission quality that will be applicable to all gases discharged from existing and proposed federal incinerator installations. Use of these guidelines is intended to promote a consistent approach towards the cleanup and prevention of air pollution and ensure that the best practicable control technology is used. In addition, the following guidelines have been prepared to cover other associated areas of environmental concern:

- Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments
- Code of Good Practice for Handling Solid Wastes at Federal Establishments
- Code of Good Practice on Dump Closing or Conversion to Sanitary Landfill at Federal Establishments
- Air Pollution Guidelines Applicable to Boilers at Federal Establishments
- Guidelines for Effluent Quality and Wastewater Treatment at Federal Establishments

2 APPLICATION OF GUIDELINES

These guidelines apply to new and existing incinerator facilities at federal establishments under the direct authority of the federal government, as per Schedules A, B, and C in Appendix III. It is intended to revise and amend these guidelines from time to time in order to reflect new developments in technology and changing circumstances. These guidelines have been developed and are administered by the Environmental Protection Service (EPS), Department of Fisheries and the Environment.

The specific limits outlined herein apply primarily to normal incinerator operating conditions. In the event that a special or unique situation is encountered, contact should be made with the appropriate Regional or District EPS Offices (see Appendix IV).

3 POLICY

It is the policy of the federal government to set and maintain a high national standard in keeping with a role of national leadership in environmental protection with respect to its own activities. Facilities requiring air pollution control are to reflect sound engineering and best practicable technology regardless of location. These facilities should comply with the levels set in this guideline and to the standards of other federal or provincial regulatory agencies. Such an approach is designed to demonstrate leadership on the part of the federal government.

In addition, it is the policy of the federal government to give a high priority to energy conservation, such as the use of heat recovery incinerators, where practicable.

4 EMISSION GUIDELINES

4.1 General

All air contaminant emissions from incinerators at federal establishments should be limited so that their effect on the ambient air does not:

- endanger the health, safety or welfare of persons;
- interfere with normal enjoyment of life or property;
- endanger the health of animal life;
- cause damage to plant life or to property.

At present, most of the controlled air incinerators and multiple chamber incinerators with flue gas treatment will satisfy the above and all of the specific requirements of these guidelines, provided they are designed and operated properly.

In order to ensure that proposed incinerator facilities meet the federal and provincial environmental guidelines, plans and specifications

should be submitted prior to tender to the appropriate Regional or District EPS Office (see Appendix IV) for review.

4.2 Visible Emissions

4.2.1 New Installation. A new installation should be designed and operated so that the opacity of gases emitted into the ambient air does not exceed 5%, as measured in accordance with the method specified in Appendix I (section 1). In order to ensure compliance with this limit, the incinerator should be tested under design conditions in the presence of a Regional EPS Representative within 90 days of start-up.

4.2.2 Existing Installation. The opacity of gases emitted into the ambient air from an existing installation should not exceed 20%, as measured in accordance with the method specified in Appendix I (section 1).

4.2.3 Emission of Heat or Uncombined Water. When the emission of heat or uncombined water is the only reason for failure to meet the requirements of subsections 4.2.1 and 4.2.2, the opacity limits should be considered attained by the incinerator; however, under no circumstances should any emissions impair visibility on a public road, airport runway or railway.

4.3 Particulate Emissions

4.3.1 New Installation. A new installation should be designed and operated in a manner which results in the emission to the ambient air of gases containing particulate matter in concentrations less than or equal to:

- i) 0.75 grams per kilogram (or 1.5 pounds per ton) of solid waste burned for solid waste types A to L inclusive described in Appendix II and the capacity is less than 908 kilograms per hour (or 2000 pounds per hour).
- ii) 1.00 gram per kilogram (or 2.00 pounds per ton) of solid waste burned for solid waste types A to L inclusive described in Appendix II and the capacity is equal to or greater than 908 kilograms per hour (or 2000 pounds per hour).

In order to ensure the compliance of a new installation with these particulate emission limits the owner should provide the Regional EPS Representative, prior to installation, with a written report of the results of a particulate matter emission test as specified in Appendix I (section 4) and conducted on a prototype incinerator similar in design, construction and operation to the proposed incinerator; or, within a period of 90 days commencing at initial start-up, carry out a particulate matter emission test as specified in Appendix I (section 4) in the presence of the Regional EPS Representative and provide him with a written report of the test results.

4.3.2 Existing Installation. The particulate matter emitted into the ambient air from an existing installation should not create a nuisance or air pollution as defined in this guideline. On receiving complaints to this effect, the Regional EPS Representative will contact the facility and request the owner to modify or replace the incinerator and/or the operating procedures to alleviate the source of these complaints.

4.4 Gaseous Emissions

4.4.1 Hydrogen Chloride. The quantity of hydrogen chloride emitted into the ambient air from any incinerator should not exceed 0.85 gram per kilogram (or 1.7 pounds per ton) of solid waste burned.

In order to ensure compliance with this hydrogen chloride limit the incinerator should not be charged with halogenated material, classified as type E in Appendix II, at a rate in excess of one quarter of one percent (0.25%) of the rated capacity of the incinerator for the type of solid waste burned or the incinerator should be equipped with control equipment for reducing the emissions to the above limit.

4.4.2 Sulphur Dioxide. The quantity of sulphur dioxide emitted into the ambient air from any incinerator should not exceed 3.6 grams per kilogram (or 7.2 pounds per ton) of solid waste burned, measured exclusive of the sulphur dioxide concentration from the auxillary fuel.

In order to ensure compliance with this sulphur dioxide limit, the incinerator should not be charged with rubber compounds classified as type F in Appendix II or other wastes containing sulphur at a rate in

excess of twenty percent (20%) of the rated capacity of the incinerator for the type of solid waste burned or the incinerator should be equipped with control equipment for reducing the emissions to the above limit.

5 INCINERATOR STACK HEIGHT REQUIREMENTS

5.1 New Installation

The stack of a new installation should be designed so that the flue gases, containing air contaminants limited to the levels specified in this guideline, are discharged into the ambient air at sufficient height, velocity and temperature so as to cause a one hour impingement concentration no greater than:

- (i) 450 ugms of sulphur dioxide/cubic metre of air
- (ii) 200 ugms of nitrogen dioxide/cubic metre of air
- (iii) 120 ugms of particulates/cubic metre of air

5.2 Existing Installation

The stack of an existing installation should be designed so that the flue gases are discharged into the ambient air at sufficient height, velocity and temperature so as to cause a one hour impingement concentration no greater than:

- (i) 900 ugms of sulphur dioxide/cubic metre of air
- (ii) 400 ugms of nitrogen dioxide/cubic metre of air
- (iii) 240 ugms of particulates/cubic metre of air

5.3 Stack Height Design Method

The stack height design method, to ensure compliance with the one hour impingement concentrations in this section, should be the "Briggs Method" specified in the report entitled "Diffusion Estimated for Small Emissions" and available from the Regional and District EPS Offices (see Appendix IV).

6 EXISTING INSTALLATION BECOMES SUBJECT TO THE LIMITS OF A NEW INSTALLATION

An existing installation should be considered subject to the emission limits of a new installation when the incinerator undergoes a major modification.

For the purposes of this guideline a major modification is defined as one which increases:

- (i) the total emission of air contaminants into the incinerator flue gases beyond the existing average hourly operating levels, and
- (ii) the replacement of components of an existing facility to such an extent that the fixed capital cost of the new components exceeds 50% of the fixed capital cost that would be required to construct a comparable entirely new facility.

7 GLOSSARY

Air Contaminant: a solid, a liquid, a gas or an odour or a combination of any of them that, if emitted into the ambient air, would create or contribute to the creation of air pollution.

Air Pollution: a condition of ambient air, arising wholly or partly from the presence therein of one or more air contaminants, that endangers the health, safety or welfare of persons, that interferes with normal enjoyment of life or property, that endangers the health or animal life or that causes damage to plant life or to property.

Ambient Air: the atmosphere surrounding the earth but does not include the atmosphere within a structure or within any underground space.

Auxillary Fuel: fuel burned to assist with the primary combustion process, for such duties as preheating the incinerator, drying and igniting the solid waste and maintaining adequate combustion of the solid waste when it is not self-supporting.

Controlled Air: calculated amounts of air that are introduced positively into the unit, such as by a fan.

Control Equipment: means any device which separates solid or gaseous material from the flue gas medium in which it is carried.

Federal Establishments: installations in departments under the authority of the federal government as listed in Appendix III.

Flue Gas: the exhaust gases leaving the incinerator via the breeching and the stack.

Impingement Concentration: the concentration of an air contaminant, calculated by the methods referred to in subsection 5.3, at the point where it first contacts a receptor.

Incinerator: an engineered apparatus, and all appurtenances thereto, designed to reduce combustible solid, semi-solid, liquid, or gaseous waste by burning.

Regional EPS Representative: a person designated by the Department of Fisheries and the Environment of which several are listed by region in Appendix IV.

New Installation: an incinerator brought into operation on or after October 1, 1978.

Nuisance: the operation of an incinerator which results in complaints due to flyash, odours or other air contaminant concentrations.

Existing Installation: an incinerator brought into operation before October 1, 1978.

Odour: that property of an emission which stimulates the sense of smell.

Opacity: the degree to which emissions reduce the transmission of light and obscure the view of an object in the background.

Particulate Matter: any material, other than uncombined water, which is suspended in or discharged into the atmosphere as a liquid or solid at standard conditions.

Solid Waste: any discarded or otherwise unwanted solid material predominantly composed of one or more of the materials classified in Appendix II.

Stack: a flue, chimney, conduit or other device constructed for the purpose of conducting gaseous effluents into the ambient air.

Stack Height: the vertical distance measured in metres between the point of discharge of flue gases from a stack into the atmosphere and the elevation of the land thereunder.

Waste Types: shall be as proposed by the Canadian Standards Association, "Types of Wastes for Incinerator" listed in Appendix II.

APPENDIX I

EMISSIONS TESTS

1 VISIBLE EMISSIONS

The opacity should be measured in accordance with the Environment Canada "Standard Reference Method for Source Testing: Measurement of Opacity of Emissions from Stationary Sources" EPS 1-AP-75-2.

2 SULPHUR DIOXIDE EMISSIONS

The sulphur dioxide emission rate should be measured in accordance with the Environment Canada "Standard Reference Methods for Source Testing: Measurement of Emissions of Sulphur Dioxide from Stationary Sources" EPS 1-AP-74-3.

3 GASEOUS CHLORIDES EMISSIONS

The measurement of gaseous chlorides should be by a reliable method such as the "Proposed Test for Inorganic Chloride in the Atmosphere", 1974 Annual Book of ASTM Standards, Part 26, p. 809.

4 PARTICULATE EMISSIONS

The particulate matter emission rate should be measured in accordance with the Environment Canada "Standard Reference Methods for Source Testing: Measurement of Particulates from Stationary Sources". EPS 1-AP-74-1.

4.1 The integrated sample technique of method C should be used for determining the molecular weight. The minimum sampling time should be 60 minutes and the minimum sampling volume should be 0.85 dry cubic metres (or 30 dry cubic feet) at reference conditions.

4.2 The average burning rate of the incinerator should be determined for each repetition of the particulate matter emission test by dividing the weight of waste charged into the incinerator by the time between ignition of the first charge and the completion of combustion of the last charge.

4.3 The particulate matter emissions expressed as grams per kilogram (or as pounds per ton) of waste burned, should be determined for each repetition by dividing the particulate matter emission rate as

determined in subsection (1) by the average burning rate as determined in subsection (2).

4.4 A complete particulate matter emission test should consist of three repetitions of the procedure specified by Appendix I (subsections 4.1, 4.2 and 4.3), and the test result should be the arithmetical average of the three repetitions.

APPENDIX II

TYPES OF SOLID WASTES FOR INCINERATION

<u>Type</u>	<u>Description</u>	<u>Examples</u>
A	Cellulosic solids, up to 15 percent moisture (wet basis)	dry paper cardboard boxes wooden pallets furniture photographic film
B	Cellulosic solids, 10-50 percent moisture (wet basis)	wet paper moist sawdust damp rags or clothing residential refuse bark
C	Cellulosic solids, over 40 percent moisture (wet basis)	fruits & vegetables garden trimmings kitchen wastes
D	Plastics & asphaltic solids non-halogenated	polyethylene containers polystyrene toys asphaltic shingles waxes
E	Plastics & asphaltic solids, halogenated	PVC (polyvinyl chloride) DDT powder
F	Rubber	tires
G	Animal materials	leather hair & wool feathers glue fur
H	Animal & human wastes	manure dried sewage sludge
I	Non-combustible solids	glass cans ashes & sand salt crockery metal objects
J	Pathological materials	hospital dressings disposable bedding & gowns
K	Pathological remains	dead animals parts of human & animals
L	Cadavers, coffin encased	

APPENDIX III

FEDERAL ESTABLISHMENTS

Schedule A

Department of Agriculture
Department of Communications
Department of Consumer and Corporate Affairs
Department of Energy, Mines and Resources
Department of External Affairs
Department of Finance
Department of Fisheries and the Environment
Department of Indian Affairs and Northern Development
Department of Industry, Trade and Commerce
Department of Insurance
Department of Justice
Department of Labour
Department of Employment and Immigration
Department of National Defence
Department of Health and Welfare
Department of Revenue
Post Office Department
Department of Public Works
Department of Regional Economic Expansion
Department of the Secretary of State
Department of Supply and Services
Ministry of Solicitor General
Department of Transport
Treasury Board
Department of Veterans Affairs

Schedule B

Agricultural Stabilization Board
Atomic Energy Control Board
Director of Soldier Settlement
Director, Veteran's Land Act
Economic Council of Canada
Fisheries Prices Support Board
Medical Research Council
Municipal Development and Loan Board
National Museums of Canada
National Research Council of Canada
Science Council of Canada
Unemployment Insurance Commission

Schedule C

Atomic Energy of Canada Limited
Canadian Arsenals Limited
Canadian Commercial Corporation
Canadian Dairy Commission
Canadian Film Development Corporation
Canadian Livestock Feed Board
Canadian Patents and Developments Limited
Canadian Salfish Corporation
Defence Construction (1951) Limited
National Battlefields Commission
National Capital Commission
National Harbours Board
Northern Canada Power Commission
Royal Canadian Mint
Uranium Canada Limited

APPENDIX IV

ENVIRONMENTAL PROTECTION SERVICE*
REGIONAL AND DISTRICT OFFICES

Regional Director General, Atlantic Region
Environmental Protection Service
Department of Fisheries and the Environment
16th Floor, Bank of Montreal Tower
5151 George Street Halifax, N.S. B3J 1M5

Regional Director General, Quebec Region
Environmental Protection Service
Department of Fisheries and the Environment
5th Floor, 2020 University Street
Montreal, Quebec H3A 2A5

Regional Director General, Northwest Region
Environmental Protection Service
Department of Fisheries and the Environment
Room 804, 9942 - 108th Street
Edmonton, Alberta T5K 2J5

Regional Director General, Pacific Region
Environmental Protection Service
Department of Fisheries and the Environment
Kapilano 100, Park Royal
West Vancouver, B.C. V7T 1A2

Regional Director General, Ontario Region
Environmental Protection Service
Department of Fisheries and the Environment
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Director, Newfoundland District Office
Environmental Protection Service
Department of Fisheries and the Environment
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* The abbreviated form used in these guidelines is EPS

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Director, Northwest Territories District Office
Environmental Protection Service
Department of Fisheries and the Environment
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Director, Yukon Territory District Office
Environmental Protection Service
Department of Fisheries and the Environment
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Director, National Capital District Office
Environmental Protection Service
Department of Fisheries and the Environment
Ontario Regional Office
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Director, Saskatchewan District Office
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