Northern Territory Environment Protection Authority

GUIDELINE FOR DISPOSAL OF WASTE BY INCINERATION

November 2013
Version 2.0

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1 Introduction and Background

1.1 Purpose

This guideline aims to provide an understanding of the NT EPA's expectations on the information requirements and acceptable practices applicable to regulation of waste incineration in the Northern Territory. In addition the Guidelines provide a standard terminology and define the legislative framework underpinning the approval and regulation of waste incinerators in the Northern Territory. This guideline incorporates International and Australian requirements for the incineration of clinical and related waste and Australian Quarantine facilities. They adopt the Biohazard Waste Industry of Australia and New Zealand Industry Code of Practice for the Management of Clinical and Related Wastes, and define incinerator capacity in terms of the proposed annual throughput, and the maximum possible hourly waste processing rate. Limits are provided to regulate solid, liquid and gaseous wastes from proposed or upgraded incinerators. A 500 m separation distance is proposed between emission sources and sensitive land uses such as land zoned Residential. The guidelines specify the use of multiple-chamber incinerators, and specific operating and monitoring requirements. Compliance with these guidelines will enable:

- Uniformity in the operation and regulation of waste incineration facilities within the Northern Territory; and
- Environmental Protection to an acceptable Government standard.

This document is a guide only and the proponent is responsible for complying with all laws that relate to the proposed activity. In the event of any inconsistency between the guidelines and relevant legislation, the legislation will take precedence.

An appendix to this guideline listing the requirements for small medical incinerators at remote sites is under development in cooperation with the Department of Health.

1.2 Limitations

This guideline should be read in conjunction with the Biohazard Waste Industry (BWI) Code of Practice (2010).

The operational, equipment design and environmental standards surrounding the thermal destruction, by incineration of clinical, medical, pharmaceutical and general/municipal wastes have been reviewed in developing guideline.

This guideline document does not address the incineration or thermal destruction of the following waste types:

- Radioactive
- Asbestos
- Industrial chemical wastes including, but not limited to:
  - Mercury
  - Cyanide
  - Azide
  - Formalin
  - Gluteraldehyde
  - Polychlorinated Biphenyls (PCB's)
  - Polychlorinated dibenzodioxins and dibenzofurans (dioxins and furans)

- Pesticides including, but not limited to:
  - Dichlorodiphenyltrichloroethane (DDT)
  - Dieldrin

The Northern Territory Environment Protection Authority (NT EPA) has prepared this document in good faith, exercising all due care and attention, but no representation or warranty, express or implied, is made as to the relevance, completeness or fitness for purpose of this document in respect of any particular user's circumstances. Users of this document should satisfy themselves concerning its application to their situation and, where necessary, seek expert advice.

2 Definitions

A list of definitions pertaining to this guideline and the Industry Code of Practice (BWI 2010) is provided in Table 1.

Table 1 Definitions

Term	Definition	Source
Air Pollution	The presence of material/substance in air which may be harmful to either the natural or human environment, which includes any material present in sufficient concentrations for a sufficient time and under certain circumstances to interfere significantly with the comfort, health and welfare of persons, or with the full use and enjoyment of property.	*Compendium of Solid Waste Management Terms and Definitions, 5:1991 and Australian/New Zealand Standard Waste Management Glossary of Terms.*
Air Pollution Controls	Equipment used to lower or eliminate emissions to the environment as part of engineered controls on emission sources.	
Air Quality Standards	The level of pollutants by law that cannot be exceeded during a specified time in a defined area.	*Compendium of Solid Waste Management Terms and Definitions, 5:1991 and Australian/New Zealand Standard Waste Management Glossary of Terms.*
Anatomical Waste	Limbs, organs, placenta, pathological specimens, biopsy specimens and body tissue taken during laboratory testing, surgery or autopsy and/or resulting from investigation or treatment of a patient. It does not include corpses.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Animal Waste	Tissue arising from the whole or any part of an animal or excreta taken or collected during surgery or laboratory research or testing.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Autoclave	A vessel designed to sterilise materials by exposing them to steam under pressure.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Biochemical Oxygen Demand (BOD)	A measure of the amount of oxygen used by microorganisms to breakdown organic waste materials in water.	*Compendium of Solid Waste (BOD) Management Terms and Definitions, 10:1991 and Australian/New Zealand Standard Waste Management Glossary of Terms.*
Biohazardous Waste	For the purpose of this document, refer to definition of Clinical and Related Wastes.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June*

Term	Definition	Source
		2010, Biohazard Waste Industry of Australia and New Zealand.
Body Parts	Refer to definition of Anatomical Waste. In New Zealand – Human or Animal body parts, tissue and/or organs, inclusive of foetuses and placentae.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Body Substance Isolation	Emphasizes avoiding contact with all moist and potentially infectious body substances except sweat even if blood is not present. Shares some features with Universal Precautions. Weak on infections transmitted by large droplets or by contact with dry surfaces. Does not emphasize the need for special ventilation to contain airborne infections. Hand washing after glove removal is not specified in the absence of visible soiling.	Siegel JD, Thinehart E, Jackson M, Chiarello L and the Healthcare Infection Control Practices Advisory Committee, 2007, Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings.
Bunding	A secure wall, ridge or depression of sufficient integrity to completely contain liquid within, or run-off from, waste stored within its confines.	AS/NZS: 3816:1998 *Management of Clinical and Related Wastes* and NZS4303:2002 *Management of Healthcare Waste in New Zealand*.
Carbon Monoxide (CO)	A colourless, poisonous gas that has a faint metallic odour and taste. Produced during incomplete thermal degradation or microbial decomposition of organic base materials when the oxygen supply is limited; intentionally produced during some pyrolysis processes.	*Compendium of Solid Waste Management Terms and Definitions, 15:1991* and *Australian/New Zealand Standard Waste Management Glossary of Terms.*
Chemical Oxygen Demand (COD)	Measure of the oxygen equivalent of the organic matter in a sample of sewage, liquid waste, leachate or polluted water that is susceptible to oxidation by a strong chemical oxidant.	*Compendium of Solid Waste Management Terms and Definitions, 16:1991* and *Australian/New Zealand Standard Waste Management Glossary of Terms.*
Chemical Waste	Chemical waste generated by the use of chemicals in medical, veterinary and laboratory procedures. Chemical wastes in this category include, but are not limited to, mercury, cyanide, azide, formalin and gluteraldehyde. Chemical wastes also include photochemical wastes.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Clinical and Related Waste (also referred to as Biohazardous Waste)	Clinical waste arises from, but is not limited to, medical, nursing, home healthcare, dental, veterinary, laboratory, pharmaceutical, teaching, podiatry, tattooing, body piercing, brothels, emergency services, blood banks, mortuary, crime/trauma scene remediation and other similar practices and/or any activity prescribed by a relevant regulatory authority. It also includes commercial practices/activities that manage what would be considered clinical waste as described in BWI (2010, Section 2.1). Related wastes are defined as wastes within the waste stream which constitute, or are contaminated with, cytotoxic drugs, chemicals or pharmaceuticals.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Collection	The act of removing accumulated waste from the generating source.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Container	This refers to any rigid walled receptacle designed for clinical and related waste (or other wastes) to be deposited into it. Retractable syringes are not considered sharps containers in their own right.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Contingency Plan	A document setting out an organised, planned and co-ordinated course of action to be followed in case of	*USEPA Glossary of Terms and*

Term	Definition	Source
	fire, explosion or other accident that releases toxic chemicals or hazardous wastes which threaten human health or the natural environment.	*Acronym List, 5:1988.*
Controlled Waste	Healthcare waste that is recognisable as coming from a healthcare facility which: May be contaminated or soiled with potentially infectious human or animal body fluids which shall not be expressible under compaction; or Is not infectious but may be considered culturally or aesthetically offensive.	NZS4304:2002 *Management of Healthcare Waste.*
Cytotoxic Waste	Material, which is, or may be, contaminated with a cytotoxic drug during the preparation, transport or administration of cytotoxic therapy.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Dioxins	Dibenzo-p-dioxins and dibenzofurans chlorinated in the 2, 3, 7 and 8 positions and containing 4, 5, 6 or 7 chlorine atoms. It is expressed as 2, 3, 7, 8-tetrachloro- dibenzo-p-dioxin equivalents using an acceptable Australian regulatory toxicity rating.	*Air Resources Board, Dioxins Airborne Toxic Control Measure for Medical Waste Incinerators, California Environmental Protection Agency. 1998*
Disinfect	To destroy pathogens but not necessarily all microbial life.	*Compendium of Solid Waste Management Terms and Definitions, 23:1991* and *Australian/New Zealand Standard Waste Management Glossary of Terms.*
Effluent	Treated or untreated liquid waste that flows out of a treatment plant sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.	*USEPA Glossary of Terms and Acronym List. 6:1988.*
Emergency	A situation created by an accidental release or spill of hazardous chemicals or infectious material, which poses a threat to the safety of workers, residents, environment or property.	*USEPA Glossary of Terms and Acronym List, 7:1988.*
Employees	In this document refers to the following: Those who generate clinical and related waste in the course of their duties; Those who collect and move and/or transport the waste; Those who handle the waste and/or operate or maintain equipment at the treatment/disposal facility; and Reception and administrative staff of any organisation conducting activities under points a, b and c.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
NT EPA	Northern Territory Environment Protection Authority	
Equivalent Aerodynamic Diameter	Diameter of a unit density sphere having the same gravitational settling velocity as the particle in question.	
Exposure Limits	The amount of pollutant present in a particular environment (i.e. human, natural) that represents a potential health threat to the living organisms in that environment.	*USEPA Glossary of Terms and Acronym List, 7:1988.*
General Waste	Any waste (excluding recyclable materials), not classified as being within any of the categories of the clinical and related waste streams.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Generators	You are a generator of clinical and related waste if you generate any waste materials that are defined in Section 2 of the Industry Code of Practice (BWI, 2010). In particular, you are considered to be a generator if you are subject to relevant legislation in	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry*

Term	Definition	Source
	your jurisdiction in regards to the management of clinical and related waste and/or providing services on a professional basis that result in the production of what has been defined as clinical and related waste. Examples of generators include: a. Hospitals and their associated departments; b. Clinics operated by physicians and dentists, dialysis centres, drug treatment centres, maternity clinics, thrombosis clinics and community health centres; c. Healthcare facilities such as nursing homes; d. Support services such as blood banks, pharmacies, medical/teaching centres, mortuaries, laundries and laboratories (clinical, pathology, haematology, chemistry and research including veterinary and genetic); e. Other clinical and related waste generators as specified by each jurisdiction (e.g. brothels, body piercing organisations, professional home healthcare organisations); and f. Professionals providing home healthcare, or homecare patients generating clinical or related waste.	*of Australia and New Zealand.*
Health Industry Wastes	All types of wastes (clinical, related, controlled, hazardous and general) arising from medical, nursing, dental, veterinary, pharmaceutical, or similar practices and wastes generated in hospitals or other facilities during the investigation or treatment of patients or in research projects.	*NH&MRC Guidelines,* March: 1999.
Healthcare Facilities	Generators of clinical and related waste such as hospital, medical, nursing, dental, pharmaceutical, or similar practices.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Infectious Waste	Substances known to or reasonably expected to contain pathogens.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Jurisdiction	Refers to any area such as a Commonwealth, National, State, Territory or Local Government, which is responsible for specific legislation that may impact on the management of clinical and related waste.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Landfill	A waste facility used for the purpose of disposing of waste to land.	*DEC NSW Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes, 115:1999.*
Leachate	Liquid that has percolated through a material mass and has dissolved or suspended microbial constituents in the liquid emanating from it.	*Compendium of Solid Waste Management Terms and Definitions, 41:1991* and *Australian/New Zealand Standard Waste Management Glossary of Terms.*
Liquid Wastes	Any waste material that is determined to contain “free liquids” – liquids that readily separate from the solid portion of waste under ambient temperature and pressure.	*Compendium of Solid Waste Management Terms and Definitions, 41:1991* and *Australian/New Zealand Standard Waste Management Glossary of Terms.*
Medical Facility	Medical, dental and veterinary offices, clinics and hospitals, skilled nursing facilities, research facilities,	*Air Resources Board, Dioxins Airborne Toxic Control Measure*

Term	Definition	Source
	research laboratories, clinical laboratories, all licensed and unlicensed medical facilities, clinics and hospitals, surgery centres, diagnostic laboratories and other providers of health care.	*for Medical Waste Incinerators, California Environmental Protection Agency.1998.*
Microwave Treatment	The application of microwave energy via microwave units, to achieve disinfection temperatures.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Monitoring	Periodic or continuous surveillance or testing to determine the level of compliance with statutory requirements and/or pollutant levels in various media or in humans, animals, and other living things.	*USEPA Glossary of Terms and Acronym List, 11:1988* and *Australian/New Zealand Standard Waste Management Glossary of Terms.*
Non-combustibles	The components of a material which remain after combustion of all combustible matter; these include inert materials such as glass, dirt, sand and wholly oxidised metals.	*Compendium of Solid Waste Management Terms and Definitions, 47:1991* and *Australian/New Zealand Standard Waste Management Glossary of Terms.*
Offsite Facility	A clinical and related waste treatment, storage or disposal facility that is located away from the generating site.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Onsite Facility	A clinical and related waste treatment, storage or disposal facility that is located on the generating site.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Oxides of Nitrogen, NOx	Product of combustion from transportation and stationary sources and major contributor to the formation of ozone on the troposphere and acid deposition. Also a gaseous mixture of NO; NO_2; and/or N_2O.	*USEPA Glossary of Terms and Acronym List, 13:1988.*
Pathology Waste	Includes pathological specimens, biopsy specimens and tissue taken during surgery or autopsy.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Pharmaceutical Waste	Consists of pharmaceutical (drug, remedy/medicinal substance) or other chemical substance specified in the Poisons List under the *Poisons and Therapeutic Goods Act 1996 (NSW).* Pharmaceutical waste, excluding cytotoxics, may arise from expired or discarded pharmaceuticals, those no longer required by patients or departments and waste materials/substances generated during the manufacture and administration of pharmaceuticals. This can also include recreational pharmaceuticals, i.e. recreational drugs.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
PM_{10}	Particles with an Equivalent Aerodynamic Diameter of up to 10 µm.	
$PM_{2.5}$	Particles with an Equivalent Aerodynamic Diameter of up to 2.5 µm.	
POPs	Persistent Organic Pollutants	
Recyclables	Those materials that can be segregated from the waste stream for processing into a useful material.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*

Term	Definition	Source
Residual Wastes	Those materials (solid or liquid) which still require disposal after the completion of a treatment or resource recovery activity, (e.g. slag and liquid effluents following a pyrolysis operation, plus the discards from front-end separation systems).	*Compendium of Solid Waste Management Terms and Definitions, 57:1991* and *Australian/New Zealand Standard Waste Management Glossary of Terms.*
Resource Recovery	A process that recovers value from the waste stream in the form of material or energy.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Sanitary Landfill	A landfill that provides for an engineered method of disposing of solid waste on land in a manner that protects the environment (e.g. by spreading the waste in thin layers; compacting it to the smallest practical volume, and covering it with soil by the end of each working day; constructing barriers to infiltration and evacuating the gases produced).	*NZS4304:2002 Management of Healthcare Waste.*
Sanitised	To clean so that there are no pathogens present.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Secure	In relation to containers, this means that the container is positioned in such a manner that prevents the container from overturning during transit. This could also refer to ensuring that all lids of any containers are closed so that any waste material located in the containers is impeded from spilling out. Secured in this sense does not refer to leak proof. In relation to storage areas, this refers to ensuring that there is a mechanism that does not allow any unauthorised person to enter the storage area.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Segregation	Separation of the various waste components, at the point of generation, into their relevant waste stream categories for subsequent containment, transportation and disposal.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Sensitive Receptor	Sensitive Receptor means: (a) a dwelling, mobile home or caravan park, residential marina or other residential premises; or (b) a motel, hotel or hostel; or (c) a kindergarten, school, university or other educational institution; or (d) a medical centre or hospital; or (e) a protected area; or (f) a public park or gardens.	
Sewer	Underground pipes that carry off only domestic or industrial wastes, not stormwater.	*USEPA Glossary of Terms and Acronym List, 16:1988.*
Shall	Refers to a mandatory requirement.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Should	Refers to a recommended requirement.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Standard Precautions	A group of infection prevention practices that apply to all patients, regardless of suspected or confirmed diagnosis or presumed infection status. Standard Precautions is a combination and expansion of Universal Precautions and Body Substance Isolation.	Siegel JD, Thinehart E, Jackson M, Chiarello L and the Healthcare Infection Control Practices Advisory Committee, 2007, Guideline for Isolation

Term	Definition	Source
	Standard Precautions is based on the principle that all blood, body fluids, secretions, excretions except sweat, non-intact skin and mucous membranes may contain transmissible infectious agents. Standard Precautions includes hand hygiene and depending on the anticipated exposure, use of gloves, gown, mask, eye protection, or face shield. Also equipment or items in the patient environment likely to have been contaminated with infectious fluids must be handled in a manner to prevent transmission of infectious agents, (e.g. wear gloves for handling, contain heavily soiled equipment, properly clean and disinfect or sterilise reusable equipment before use on another patient).	Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings.
Sterilisation	The complete elimination or destruction of all forms of microbial life, including highly resistant bacterial endospores.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
Stockholm Convention	Stockholm Convention on Persistent Organic Pollutants is a global treaty (United Nations Environment Programme) to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have adverse effects to human health or to the environment.	
Transfer Station	A facility where unwanted materials can be taken for subsequent transport to recycling operations or landfill.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*
TSP	Particles with an Equivalent Aerodynamic Diameter of up to 80 µm.	
Uncontrolled Emissions	The emission rate of the incinerator to the control equipment, measured from the flue at a location downstream of the last combustion chamber and before the control equipment.	
Universal Precautions	Developed in response to the HIV/AIDS epidemic. Dictate application of Blood and Body Fluid precautions to all patients, regardless of infection status. Do not apply to faeces, nasal secretions, sputum, sweat, tears, urine, or vomitus unless contaminated by visible blood. Personal protective equipment to protect healthcare workers from mucous membrane exposures. Hand washing recommended immediately after glove removal. Specific recommendations for handling needles and other sharp devices.	Siegel JD, Thinehart E, Jackson M, Chiarello L and the Healthcare Infection Control Practices Advisory Committee, 2007, Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings.
US EPA	United States Environmental Protection Agency	
Waste Minimisation	The application of activities such as waste avoidance, reduction, reuse and recycling to minimise the amount of waste that requires disposal.	*Australian and New Zealand Standard Waste Management Glossary of Terms.*
Waste Segregation	The process of keeping individual waste types apart during handling, storage (interim storage), and transport and to assist resource recovery and ensure appropriate designated treatment and/or disposal methods are utilised.	*Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010, Biohazard Waste Industry of Australia and New Zealand.*

3 Legislative Framework

3.1 International

3.1.1 Stockholm Convention

The Stockholm Convention on Persistent Organic Pollutants is a global treaty (United Nations Environment Programme) to protect human health and the environment from chemicals that remain intact in the environment for long periods (persistent), become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have adverse effects to human health or to the environment. Exposure to Persistent Organic Pollutants (POPs) can lead to serious health effects including certain cancers, birth defects, dysfunctional immune and reproductive systems, greater susceptibility to disease and even diminished intelligence. Given their long range transport, no one government acting alone can protect its citizens or its environment from POPs. In response to this global problem, the Stockholm Convention, which was adopted in 2001 and entered into force in 2004, requires signatory and ratifying parties to take measures to eliminate or reduce the release of POPs into the environment. The Convention is administered by the United Nations Environment Programme and is based in Geneva, Switzerland.

Australia ratified the Stockholm Convention (2001) on 20 May 2004. All Australian States and Territories must comply with its requirements.

3.2 Commonwealth Legislation and Guidelines

3.2.1 National Environment Protection Measures (Implementation) Act 1998

Under the *National Environment Protection Measures (Implementation) Act 1998*, the National Environmental Protection Council (NEPC) was established to set national environmental goals and standards for Australia through the development of National Environment Protection Measures (NEPMs). The NEPC is part of the Standing Council on Environment and Water (SCEW).

Section 14(1) of the NEPC Act prescribes that NEPMs may relate to any one or more of the following:

- ambient air quality
- ambient marine, estuarine and fresh water quality
- the protection of amenity in relation to noise
- general guidelines for the assessment of site contamination
- environmental impacts associated with hazardous wastes
- the re-use and recycling of used materials.

The National Pollutant Inventory (NPI) NEPM is implemented by the Commonwealth Government through administrative arrangements with state and territory jurisdictions. The NPI NEPM program is implemented in the Northern Territory through an Environmental Protection Order (EPO) established under the *Waste Management and Pollution Control Act*. In the Northern Territory some NEPMS are used as standards and guidelines without implementation with an EPO.

Facility operators are likely to be required to provide annual reports to the NPI database. The reporting requirement is dependent on triggering threshold limits of emitted substances (some 93 different chemicals). The NPI NEPM is designed to produce publicly available web-based information on the amounts of certain toxic substances that are emitted to the air, land and water.

The Air NEPM, which was made in June 1998, provides uniform national ambient air quality standards for population centres exceeding 25,000 people. Standards were initially provided for carbon monoxide; nitrogen dioxide; photochemical oxidants (as ozone); sulfur dioxide; lead; and particles as (PM_{10}). In 2003, the Air NEPM was varied to provide a reporting standard for $PM_{2.5}$.

The Air NEPM requires jurisdictions to develop monitoring plans, and establish performance monitoring stations to monitor contaminants of concern. The NT EPA has established ambient air quality monitoring stations in the Darwin Region to monitor Sulphur Dioxide, Oxides of Nitrogen, Ozone, Carbon Monoxide, PM_{10} and $PM_{2.5}$ particle concentrations.

The Air Toxics NEPM was established in April 2004, under subsection 14(1) of the *National Environment Protection Council (Northern Territory) Act 1994.* The aim of the NEPM is to gather information across Australia to improve the understanding of population exposure, and to inform the development of national standards for Air Toxics. The NEPM therefore stipulates ambient monitoring, using standard methodologies, in places where the risk of exposure to elevated air toxics levels is high.

Monitoring results are assessed against Monitoring Investigation Levels (MILs) for Benzene; Formaldehyde; Benzo (a) pyrene [used as a marker for Polycyclic Aromatic Hydrocarbons]; Toluene; and Xylenes (as the total of ortho, meta and para isomers). Where MILs are exceeded the cause of the exceedance must be investigated. Monitoring results are reported on an annual basis.

The operation of incinerators within the Northern Territory will need to be consistent with the outcomes of a protected environment as defined by the various NEPM's. These guidelines are designed to provide guidance on how to achieve this outcome.

3.3 Northern Territory Legislation and Guidelines

3.3.1 *Waste Management and Pollution Control Act*

The purpose of the *Waste Management and Pollution Control Act* (WMPCA) is to protect the environment through objectives and approvals, encouraging effective and responsible waste management and reduction and response to pollution resulting in material or serious environmental harm. The WMPCA facilitates the implementation of NEPMs made under the *National Environment Protection Council (Northern Territory) Act 1994*, and incorporates environmental compliance plans and audits.

Section 12 of the WMPCA requires a person conducting an activity that causes or is likely to cause pollution resulting in environmental harm, or generates waste, to take all reasonable and practical measures to prevent or minimise the pollution or environmental harm, or reduce the amount of waste.

Section 14 of the WMPCA establishes a process for notifying the NT EPA (the administrating agency for the WMPCA) about incidents causing, or threatening to cause pollution. Any other legal obligations to report malfunctions must be complied with even if the NT EPA is notified of the relevant incident.

Construction and operation of a plant for the incineration of listed waste may require an environment protection approval and licence under the WMPCA. Schedule 2 of the WMPCA requires an environment protection approval for construction (Part 1, Section 2) and a licence for ongoing operation (Part 2, Section 2) of premises for the treatment or disposal of listed wastes on a fee for service or commercial basis. Listed wastes are defined in Schedule 2 of the *Waste Management and Pollution Control (Administration) Regulations.* Section 31 deals with the application for approvals and licences.

Under the WMPCA it is an offence to cause an environmental nuisance. Noise or odour adversely affecting the amenity of an area may be considered environmental nuisance.

3.3.2 *Waste Management and Pollution Control (Administration) Regulations*

These regulations deal with administrative issues such as fees for licensing and approvals and payment of "on the spot fines". Schedule 2 to the regulations establishes the listed wastes that are subject to environment approval/licensing requirements.

3.3.3 Work Health and Safety (National Uniform Legislation) Act 2011

The main object of the *Work Health and Safety (National Uniform Legislation) Act 2011* is to provide for a balanced and nationally consistent framework to secure the health and safety of workers and workplaces by, amongst other means, protecting workers and other persons against harm to their health, safety and welfare through the elimination or minimisation of risks arising from work or from specified types of substances or plant.

3.3.4 Planning Act

In areas zoned under the NT Planning Scheme any incinerator must be located in land zoned as General Industry (Zone GI). Utilities (U) or Development (DV). An application for planning approval will not be accepted if the land has any other zoning specification. This includes land that is zoned Residential and is yet to be developed. There is no restriction on location of incinerators on unzoned lands, other than constraints indicated in these guidelines.

3.3.5 Environmental Assessment Act

The object of the *Environmental Assessment Act* (EA Act) is to the greatest extent practicable ensure each matter affecting the environment is fully examined and taken into account in, and in relation to:

- the formulation of proposals
- the carrying out of works and other projects
- the negotiation, operation and enforcement of agreements and arrangements (including agreements and arrangements with, and with authorities of, the Commonwealth, the States and other Territories)
- the making of, or the participation in the making of, decisions and recommendations
- the incurring of expenditure

All proposals for waste incinerator development and operation require referral to the NT EPA under this Act. At the discretion of the NT EPA, proposed facilities for incineration of hazardous and medical waste may then require assessment under the EA Act at the level of Public Environmental Report or Environmental Impact

Statement. These steps must be undertaken prior to seeking any required licence/approval under the *Waste Management and Pollution Control Act*, or construction or operation of such a facility.

3.3.6 Public and Environmental Health Act

The object of the Public and Environmental Health Act is to:

- protect and promote the health of individuals and communities in the Territory;
- provide a flexible capacity to protect the health of particular individuals and communities in the Territory from emerging environmental conditions, or public and environmental health issues, that may impact on their health and wellbeing;
- enable special action to be taken to protect the health of particular individuals and communities in the Territory who are at public health risk or facing particular health problems;
- improve the public and environmental health outcomes of all Territorians in partnership with individuals and the community; and
- monitor, assess and control environmental conditions, factors and agents, facilities and equipment and activities, services and products that impact on or may impact on public and environmental health.

3.3.7 Other

Additional NT legislation that may apply to incineration of hazardous and clinical waste activities are:

Conservation, Cultural & Heritage

- *Northern Territory Aboriginal Sacred Sites Act*
- *Territory Parks and Wildlife Conservation Act*
- *Heritage Act*

Land Use

- *Aboriginal Land Act*
- *Aboriginal Land Rights (Northern Territory) Act 1976 (Cth)*
- *Native Title Act 1993 (Cth)*
- *Crown Lands Act*
- *Soil Conservation and Land Utilisation Act*

Industry

- *Fisheries Act*
- *Mining Management Act* - provide for the authorisation of mining activities, the management of mining sites, the protection of the environment on mining sites, the provision of economic and social benefits to communities affected by mining activities.

Water Quality & Biodiversity

- *Water Act*
- *Marine Pollution Act*
- *Biological Control Act*
- *Territory Parks and Wildlife Conservation Act*
- *Fisheries Act*

4 Industry Code of Practice

The Biohazard Waste Industry (BWI) of Australia and New Zealand, a division of the Waste Management Association of Australia (WMAA), has produced an Industry Code of Practice for the Management of Clinical and Related Wastes, 6th Edition, June 2010 (BWI, 2010).

This Code of Practice provides guidance material for the management of the disposal of biohazardous material. All of the significant commercial operators of biohazardous waste disposal in Australia are signatories to the Code of Practice and are listed as members of the BWI (BWI, 2010, Appendix 5).

It is recommended that any operators of an incinerator in the Northern Territory comply with the BWI (2010), or any revision. Any commercial operations should be, or should intend on becoming, members of the BWI and therefore signatories of the Industry Code of Practice.

5 Minimum Requirements

Guideline emission limits for incinerators in the Northern Territory are set out below, on the basis of achieving best practicable level of control of contaminants. Some variation in a small number of parameters may be acceptable for small incinerators at remote locations and operated for less than nine hours per week. This is subject to written agreement with the NT EPA, and the following minimum requirements being met in all cases:

- Two chambers
- A minimum temperature of 850ºC in the primary chamber
- Air supply to achieve efficient combustion of all wastes
- A minimum retention time of 2 seconds.
- No impingement of stack exhaust gases onto building or sensitive sites.

Open burning in drums or pits is unacceptable.

6 Waste Residuals

6.1 Solid Residuals

Solid residuals from an incinerator consist of fly ash, particulates from any pollution reduction equipment and solid residuals from the primary combustion chamber (bottom ash). The residuals from the primary chamber generally consist of unburnt material and metallic or glass objects that do not oxidise at the temperatures experienced in the primary combustion chamber.

Solid residuals should be disposed of in an appropriate landfill facility that complies with the requirements of the NT EPA, as per the requirements of the WMPCA and the industry code of practice BWI (2010) guidance within section 10.

Specific procedures should be developed with regards to the handling of solid residuals, as per the industry code of practice BWI (2010) guidance of section 10.

Unburnt objects may be re-introduced into the primary chamber. Appropriate handling procedures should be developed to accommodate this practice.

6.2 Liquid Residuals (Effluent)

The capture and disposal of liquid residuals from the operation of an incinerator must be assessed.

Liquid residuals can result from spillage, leakage from the incinerator, or from wet scrubbing of pollutants from the exhaust gas stream.

Appropriate bunds and liquid residual capture systems should be installed, subject to the environmental approval process.

An assessment of stormwater run-off should be undertaken, as per the industry Code of Practice BWI (2010) guidance of section 10.2.

All liquid residuals should be captured and treated and disposed of appropriately to prevent pollution and the migration of contaminants offsite to the requirements of the NT EPA. This will require appropriate monitoring prior to release, as detailed in section 12.1.

7 Noise

The ambient noise design criteria used for incineration facilities must be sufficient to prevent potential environmental nuisance.

8 Air Quality

8.1 Emission Limits

The design and operation of an incinerator needs to follow the principles of the waste hierarchy – avoid, reduce, reuse, recycle, recover, treat, dispose. Elimination and avoidance are the primary control mechanisms so that the thermal destruction is conducted efficiently and the generation of particles (as fly ash) and dioxins/furans, in particular, are minimised to best practice requirements.

Emission control equipment (see section 10.7, below), is required to minimise the impact to the environment and control pollution loads that cannot be dealt with higher in the waste hierarchy. The entire system is required to demonstrate both in design and post commissioning testing, that the emission limits in this section are achieved.

A summary of the allowable in-stack concentrations for numerous substances is provided in Table 2.

Table 2 Summary of Allowable Exhaust Gas Emission Concentrations

Substance	Emission Limit (mg/m^3)	Stack Testing Requirements	Source
Particles (as TSP)	50	Dry, 7 % O_2	SEPP(AQM) (2001) POEO (2010, Group 5) POEO (2010, Group 6)
Hydrogen chloride	100	Dry, 7 % O_2	POEO (2010)
Fluoride compounds (as HF)	50	Dry, 7 % O_2	POEO (2010)
Sulphur dioxide (as SO_2)	150	Dry, 11 % O_2	POEO sulphuric acid plants (2010) World Bank (1999) US EPA high value (2009)
Sulphuric acid or sulphur trioxide (as SO_3)	100	Dry, 7 % O_2	SEPP(AQM) (2001) Average of SEPP and POEO POEO (2010, Group 6)
Arsenic	0.5	Dry, 11 % O_2	SEPP(AQM) (2001) Average of SEPP and World Bank EU (2000)
Cadmium	0.2	Dry, 7 % O_2	SEPP(AQM) (2001) Average of SEPP and POEO POEO (2010, Group 6)
Chromium (III)	0.5	Dry, 11 % O_2	EU (2000)
Chromium (VI)	0.5	Dry, 11 % O_2	EU (2000)
Copper	0.5	Dry, 11 % O_2	EU (2000)
Lead	0.5	Dry, 11 % O_2	EU (2000)
Manganese	0.5	Dry, 11 % O_2	EU (2000)
Mercury	0.05	Dry, 11 % O_2	EU (2000)

Substance	Emission Limit (mg/m³)	Stack Testing Requirements	Source
Nickel	0.5	Dry, 11 % O_2	SEPP(AQM) (2001) Average of SEPP and EU EU (2000)
Antimony	0.5	Dry, 11 % O_2	SEPP(AQM) (2001) Average of SEPP and World Bank World Bank (1999)
Cobalt	0.5	Dry, 11 % O_2	EU (2000)
Thallium	0.05	Dry, 11 % O_2	EU (2000)
Vanadium	0.5	Dry, 11 % O_2	EU (2000)
NOx (as NO_2)	350	Dry, 7 % O_2	POEO (2010)
Dioxins/furans	0.1 ng/m³	Dry, 11 % O_2 Measured as TEQ (Toxicity Equivalence)	Stockholm Convention on Persistent Organic Pollutants (2001)

8.2 Air Quality Design Criteria

The ambient air quality design criteria used in gaining approval for a facility must comply with NT EPA requirements.

It is recommended that for the purposes of this guideline, the proponents apply the Victorian (State Environment Protection Policy (SEPP), 2001).

8.3 Air Quality Modelling

The ambient air quality dispersion modelling methods used for the environmental approval must comply with accepted industry guidance to the satisfaction of the Northern Territory regulatory process. It is recommended that the Victorian (SEPP, 2001) be applied.

9 Amenity Buffer Distances

Good “in-house” pollution controls can assist in managing routine emissions to meet environment protection policy and licence requirements, and dispersion to achieve ground level concentration (GLC) design criteria at or beyond the site boundary. With good pollution control technology and practice, there may still be unintended or accidental emissions which must be anticipated and allowed for.

While it is an objective of this guidance that such emissions should be eliminated, it is recognised that even “state-of-the-art” technology, is not always capable of achieving this goal without fail. Equipment failure, accidents and abnormal weather conditions are among the causes which can lead to emissions affecting the amenity of properties beyond the boundaries of the facility. Unlike controlled, routine emissions, these “residual air emissions”, such as odour, are often intermittent or episodic in occurrence and may occur at or near ground level. Provision of an adequate buffer distance allows the residual emissions to dissipate without adverse impacts on sensitive land uses.

Buffer distances are a means of reducing the effects of residual emissions and are not an alternative to source control. The NT EPA is not condoning uncontrolled off-site pollutant concentrations in contravention of environmental air quality requirements. The NT EPA acknowledges that under the circumstances described above, environmental objectives might not always be met. Consequently, for short periods of time, some beneficial uses might not be protected in the vicinity of an off-site sensitive receptor.

Responsible planning should take account of realistic, not just ideal, conditions. Subsequent remedial action to alleviate off-site effects, either within or beyond the buffer distance, will be required if residual emission episodes occur at a sensitive land use or facility located on a site within an inadequate buffer distance. Such action may require costly, high technology solutions, which may not be economically feasible or fully effective. It is therefore important that an adequate buffer distance is defined within this guideline.

It is recommended that a radial buffer distance of 500 m between an incinerator and sensitive land uses be applied to a facility with active operations. Violation of the approved buffer distance following construction may result in cancellation of approvals.

A small buffer may be applicable with small clinical incinerators, used only occasionally subject to written approval from the NT EPA.

9.1 Buffer Distance Calculation

Buffer distances are normally defined as a uniform radial distance from the boundary of any facility premises or, when there are significant internal buffers, from the envelope of potential upset condition sources. This is a default position that does not take into account the specifics of the local meteorology, which can be influenced by large scale synoptic weather patterns and local terrain features.

The owner, operator or any third party directly affected by an incinerator, can request a variation to any radial buffer determination. This request should be based on an appropriate risk assessment of local meteorology effects on the dispersion of any upset emissions, and is subject to determination by the NT EPA.

10 Equipment

10.1 Overview

The disposal of clinical waste should only be undertaken within a Multiple-Chamber Incinerator, and as part of a system where there is

- Appropriate handling and storage of waste prior to disposal;
- Suitable preparation of waste for incineration;
- A primary combustion chamber;
- A secondary combustion chamber;
- Flue gas temperature reduction equipment;
- Air Pollution Control (APC) equipment; and
- Atmospheric discharge.

The design of the incinerator for capacity categories 2 and 3 should take into consideration the design principles detailed in EU (2000, Article 6, pp.96-97).

10.2 Handling and Storage

The guidelines described in the BWI (2010) Code of Practice, particularly Section 7, should be adhered to as best as practicable. These measures shall be implemented for incinerators with capacity categories 2 and 3.

10.3 Waste Preparation

The following aspects with regards to waste preparation prior to loading the incinerator should be examined, in no particular order of priority:

- Calorific value of waste feed;
- Homogenisation of waste feed;
- Waste type – solid or liquid;
- Occupational Health and Safety; and
- Potential spills and emergency stoppage.

The application of a shredder, mixing device and auger feed unit may be considered by the proponent of an incinerator as a method to address the above parameters. Specific incinerator loading requirements should be considered on a case-by-case basis.

10.4 Primary Chamber

The primary chamber must be maintained at an average temperature of no less than 850 degrees Celsius.

Such temperatures are required to provide adequate temperatures for the waste to oxidise to an extent considered acceptable.

Provision for the control of the primary chamber temperature shall be implemented. This may include the use of auxiliary burners.

10.5 Secondary Chamber

10.5.1 Temperature

The secondary chamber must be maintained at an average temperature of no less than 1100 degrees Celsius ± 100 degrees Celsius.

Provision for the control of the secondary chamber temperature shall be implemented. This may include the use of auxiliary burners.

10.5.2 Residence Time

For small incinerators

The design of the secondary chamber must provide for a residence time for combustion gas of at least one (1) second.

For large incinerators

The design of the secondary chamber must provide for a residence time for combustion gas of at least two (2) seconds, as per EU (2000) guidance.

The residence time can be calculated using the following equation:

$$Residence\ Time = \frac{V}{Q_c}$$

Where:

- V is the volume of the incinerator, as expressed in cubic metres, from the point in the incinerator where the maximum temperature has been reached until the point where the temperature has dropped to 1000 degrees Celsius.
- Q_c is the effective combustion gas flow through volume V, as expressed in actual cubic metres per second, which is determined with an approved testing method or by another appropriate calculation methodology.

It must be proved to the NT EPA that the secondary chamber design prevents “short circuiting” of the combusting gases so that any parcel of gas does not have a residence time of less than that required at a temperature greater than 1000 degrees Celsius.

These temperature and residence times are required to make certain that all hazardous substances have oxidised to the greatest extent practicable.

10.6 Flue Gas Temperature Reduction Equipment

An appropriately designed flue gas temperature reduction device should be installed after the secondary combustion chamber. This device must lower the temperature of the gas exiting the secondary chamber from 1100 degrees Celsius to 200 degrees Celsius within as short a time period as possible.

Rapid cooling or quenching of the flue gas minimises the de novo synthesis of dioxins.

10.6.1 Energy Recovery

Depending on the capacity of the incinerator and the method used for quenching the flue gases, energy can be recovered and used for other purposes. Such purposes can include pre-heating fresh air for the primary and secondary chambers, enhancement of stack emission dispersion, or the generation of electricity through the application of a waste-to-energy system.

10.7 Air Pollution Controls

Incinerator operation must only occur when approved control equipment is installed and used in a manner approved by the NT EPA.

All operators of the incinerator and pollution control equipment shall have appropriate training. No person shall operate the incinerator unless temperatures and all other conditions are at operating set points with suitable interlocks before feed is introduced.

10.7.1 Fly Ash

Operation of a waste incinerator must only occur when the bottom ash, fly ash and scrubber residuals are handled and stored in a manner that prevents entrainment into ambient air.

10.7.2 Particles

Emitted particles to the atmosphere through the exhaust stack must comply with the following criterion:

- The particle emissions have been reduced by 99 per cent or more of the uncontrolled emissions.

This criterion applies to all incinerators.

10.7.3 Dioxins

The “International Toxic Equivalent” (I-TEQ) scheme for dioxins weights the toxicity of the less toxic compounds as fractions of the toxicity of the most toxic Tetrachlor Dibenzo Dioxin (TCDD). A more recent version of the ‘Toxic Equivalent’ (TEQ) defined by the World Health Organization is 10% higher than I-TEQ, however the Stockholm Convention uses I-TEQ. Dioxins as ‘Toxic Equivalent’ (TEQ) emitted to the atmosphere through the exhaust stack must comply with the following criterion:

- The dioxin emissions have been reduced to a concentration of less than 0.1 ng/m^3 (I-TEQ). This is required by the Stockholm Convention on Persistent Organic Pollutants (2001) of which Australia is a ratified signatory as of 20 May 2004.

This criterion applies to all incinerators.

10.8 Liquid Effluent

The treated effluent, created by such processes as wet scrubbing or rapid quenching as part of any pollution control equipment, must comply with all NT EPA requirements. In particular the Stockholm Convention requirements for dioxins/furans, which stipulate a concentration less than 0.1 ng I-TEQ per litre, should be complied with (UNEP, 2007, p.65).

10.9 Exhaust Discharge to Atmosphere

Exhaust gas from the air pollution control device(s) should be discharged to the atmosphere via a vertical stack or stacks.

10.9.1 Stack Height

The stack should be 3 m higher than the top of any building within 100 m of the incinerator. In addition, the design ground level concentrations for all parameters listed in the Victorian EPA SEPP (Air Quality Management) shall be met at ground level, at all air-conditioning intakes, and at all nearby balconies and windows, calculated using the Victorian EPA AUSPLUME modelling package, and conservative estimates of meteorological conditions.

10.9.2 Emissions Velocity

The stack efflux velocity should be 10 m/s or more during all operational hours of waste incineration for adequate plume dispersion so that stack tip downwash is minimised.

11 Monitoring

11.1 Commissioning

Following the installation or modification of an incinerator it is expected that a commissioning period will be required to demonstrate that the incinerator is operating in accordance with its design criteria and that emission criterion are being met.

Where an environment protection approval is required under the *Waste Management and Pollution Control Act* the NT EPA will be include approval conditions that require the owner or operator to demonstrate that emission criteria are being met prior to issuing an environment protection licence for the incinerator. Where an incinerator is not subject to the requirements of a scheduled activity under the *Waste Management and Pollution Control Act* but subject to the another approvals process (for example requirements under the *Planning Act*) the NT EPA will recommend similar conditions be included.

11.2 Stack Testing

The owner or operator of an incinerator should conduct regular stack testing to National Association of Testing Authorities (NATA) standards, using a qualified laboratory and Approved Methods. The recommended testing schedule is based on the incinerator capacity rating, and is summarised in Table 3.

Table 3 Incinerator Stack Testing Guidelines

Initial Testing Requirements		Subsequent Testing Requirements
12	Three monthly stack tests until three consecutive tests demonstrate compliance	Annual stack tests or as per NT EPA discretion.

For purposes of determining compliance with sections 10.7.2 and 10.7.3 of this guideline, emissions should be sampled during emission testing initially from the flue at a location downstream of the last combustion chamber, but prior to the control equipment, and followed quickly thereafter at the stack sampling port.

The NT EPA may require additional information regarding the composition of the waste.

Emission stack testing should be conducted at the maximum waste firing capacity (± 10 per cent) allowed by the NT EPA.

A copy of all emission test results conducted for purposes of demonstrating compliance with Environmental Regulations must be provided to the NT EPA within 30 days after the testing has been completed, and such test results should be made publicly available on the owner / operator website.

12.1 Effluent

All treated effluent from the incineration facility released into the environment shall be monitored at the same initial testing and subsequent testing intervals required for air emissions monitoring, as defined in Table 3.

12.2 Record Keeping

The owner or operator of a listed waste incinerator should maintain the following:

- A continuous data recording system which, for each day of operation, provides the:
  - primary and secondary combustion chamber temperatures;
  - in-stack carbon monoxide concentration;
  - key operating parameters of the air pollution control equipment, as specified by the NT EPA; and
  - hourly waste charging rates;
- For small clinical incinerators in remote locations, a copy of the performance of the incinerator guaranteed by the manufacturer shall be supplied;
- Maintenance records for the incinerator, control equipment, and monitoring equipment, and calibration records for the monitoring equipment; and
- Equipment for determining and recording the mass of waste charged to the incinerator.

Operational records of carbon monoxide emissions are required so that the level of complete combustion can be assessed. High carbon monoxide emissions are the result of incomplete combustion, which can act as an early indicator for other potentially high emissions.

Carbon monoxide is generally considered to be an airborne pollutant which easily complies with its ground level criterion. The 8-hour average criterion is generally never exceeded from a well-controlled combustion process. Therefore, the major interest is in combustion efficiency.

12.3 Malfunction

Any exceedance of the emission limit in Table 2, malfunction, or upset condition on the incinerator, the air pollution control equipment, or the continuous data recording system shall be reported to the NT EPA within 24 hours of occurrence.

Back-up power generation is mandatory for category 2 and 3 facilities for refrigeration purposes in the case of power loss.

13 Education and Training

13.1 Employee Education

All operators should implement employee education and training programs consistent with the BWI (2010) Code of Practice Section 12.

13.2 Training

No person shall operate an incinerator unless each individual who operates or maintains the incinerator obtains appropriate education and training as detailed in the BWI (2010) Code of Practice Section 12.

13.3 Work Safe

All Occupational Health and Safety requirements for the Northern Territory should be complied with at all times.

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