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Integrated Pollution Control Licensing

Batneec Guidance Note For The Waste Sector

(Revision 1 - May 1996)

This document does not purport to be and should not be considered a legal interpretation of the provisions and requirements of the E.P.A. Act, 1992.

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Environmental Protection Agency

ESTABLISHED
The Environmental Protection Agency Act, 1992, was enacted on 23 April, 1992 and under this legislation the Agency was formally established on 26 July, 1993.

RESPONSIBILITIES
The Agency has a wide range of statutory duties and powers under the Act. The main responsibilities of the Agency include the following:

- the licensing and regulation of large/complex industrial and other processes with significant polluting potential, on the basis of integrated pollution control (IPC) and the application of best available technologies for this purpose;

- the monitoring of environmental quality, including the establishment of databases to which the public will have access, and the publication of periodic reports on the state of the environment;

- advising public authorities in respect of environmental functions and assisting local authorities in the performance of their environmental protection functions;

- the promotion of environmentally sound practices through, for example, the encouragement of the use of environmental audits, the establishment of an eco-labelling scheme, the setting of environmental quality objectives and the issuing of codes of practice on matters affecting the environment;

- the promotion and co-ordination of environmental research; and

- generally overseeing the performance by local authorities of their statutory environmental protection functions.

STATUS
The Agency is an independent public body. Its sponsor in Government is the Department of the Environment. Independence is assured through the selection procedures for the Director General and Directors and the freedom, as provided in the legislation, to act on its own initiative. The assignment, under the legislation, of direct responsibility for a wide range of functions underpins this independence. Under the legislation, it is a specific offence to attempt to influence the Agency, or anyone acting on its behalf, in an improper manner.

ORGANISATION
The Agency's headquarters are located in Wexford and it operates five regional inspectorates, located in Dublin, Cork, Kilkenny, Castlebar and Monaghan.

MANAGEMENT
The Agency is managed by a full-time Executive Board consisting of a Director General and four Directors. The Executive Board is appointed by the Government following detailed procedures laid down in the Act.

ADVISORY COMMITTEE
The Agency is assisted by an Advisory Committee of twelve members. The members are appointed by the Minister for the Environment and are selected mainly from those nominated by organisations with an interest in environmental and developmental matters. The Committee has been given a wide range of advisory functions under the Act, both in relation to the Agency and to the Minister.

Contents

1. INTRODUCTION

This Guidance Note is one of a series issued by the Environmental Protection Agency and is designed to provide guidance to those applying for integrated pollution control licences under the EPA Act. It should also be read in conjunction with *Application Guidance Notes*, available under separate cover.

It should be noted at the outset that noise is not included within the scope of this work and guidance on this parameter has been issued separately.

This Guidance Note is comprised of six main sections and appendices. Following this introduction, Section 2 contains a general note on the interpretation of BATNEEC. The industrial activity covered by the terms of this note is given in Section 3. In Section 4, the technologies to control emissions are tabulated and in Section 5 the specific emission limit values (ELVs) are given. The last section contains comments on compliance monitoring requirements.

Appendices include Appendix 1 which gives the main sources of emissions, and the principal releases from such sources; Appendix 2 which gives a table of toxic equivalence factors; Appendix 3 which details the principal references used in drafting of this Guidance Note and Appendix 4 which gives details of other IPC publications.

All applicants for Integrated Pollution Control licences, in the sector covered by this note, should carefully examine the information laid down in this Guidance Note, and should use this information to assist in the making of a satisfactory application for an Integrated Pollution Control licence to the Agency. It should be clearly understood that achieving the emission limit values does not, by itself, meet the overall requirements in relation to IPC. In addition to meeting such values the applicant will also be required to demonstrate that waste minimisation is a priority objective and to put in place particular abatement measures to reduce overall mass emissions and pollutant load where this is necessary to protect the ambient environment.

The technologies and the associated emission limit values (ELVs) identified in this Guidance Note are, at the time of writing, regarded as representing BATNEEC for new activities. BATNEEC is not a static quality and will change as technologies, environmental factors and costs alter with the passage of time. The Agency may amend or

update the guidance contained in this note should such amendments seem appropriate. The information contained in this Guidance Note is intended to be used only as a tool to assist in determining the BATNEEC for an operation in this sector and should not be taken to be a definitive authority on the BATNEEC for this sector. This Note should not be considered as a legal document.

2. INTERPRETATION OF BATNEEC

BATNEEC means '*the best available technology not entailing excessive costs'*. The technology in question should be **Best** at preventing pollution and **Available** in the sense that it is procurable by the industry concerned. **Technology** itself is taken as the techniques and the use of the techniques, including training and maintenance etc. **NEEC** addresses the balance between environmental benefit and financial expense.

The objective of the Best Available Technology Not Entailing Excessive Costs (BATNEEC) Guidelines is to provide a list of technologies which will be used by the EPA to determine BATNEEC for a scheduled activity. The BATNEEC identified in this Guidance Note is used as a basis for setting emission limit values. It is intended to update these guidelines as required in order to incorporate technological advances as they occur.

In the identification of BATNEEC, emphasis is placed on pollution prevention techniques, including cleaner technologies and waste minimisation, rather than end-of pipe treatment.

Technologies identified in the BATNEEC guidelines are considered to be current best practice for the purposes of setting emission limit values. These technologies are representative of a wide range of currently employed technologies appropriate to particular circumstances. However, the guidance issued in this note in respect of the use of any technology, technique or standard does not preclude the use of any other similar technology, technique or standard which may achieve the same emission. The entire range would not necessarily be appropriate in specific cases. The specific choice depends on a wide range of circumstances but the crucial factor is that the selected regime achieves BATNEEC. In applying BATNEEC, Environmental Quality Objectives (EQOs) must be respected where set. Measures such as in-plant changes, raw material substitution, process recycling and improved material handling and storage practices, may also be employed to effect reductions in emissions. As well as providing for the installation of equipment and the operation of procedures for the reduction of possible emissions, BATNEEC will also necessitate the adoption of an on-going programme of environmental management and control, which will focus on continuing improvements aimed at prevention, elimination and/or progressive reduction of emissions.

As described in the EPA Act of 1992, BATNEEC will be used to prevent, eliminate or, where that is not practicable, limit, abate, or reduce an emission from an activity which is listed in the first schedule to the Act. The use of BATNEEC is construed in the Act to mean the provision and proper maintenance, operation, use and supervision of facilities which are the most suitable for the purposes.

In determining BATNEEC for an activity, regard shall be had to :

- the current state of technical knowledge;

- the requirements of environmental protection;

- the application of measures for these purposes, which do not entail excessive costs, having regard to the risk of significant environmental pollution which, in the opinion of the agency, exists.

For existing facilities, additional regard shall be had to :

- the nature, extent and effect of the emission concerned;

- the nature and age of the existing facilities connected with the activity and the period during which the facilities are likely to be used or to continue in operation, and

- the costs which would be incurred in improving or replacing these existing facilities in relation to the economic situation of activities of the class concerned.

The technologies and the associated emission limit values (ELVs) identified in this Guidance Note are regarded as representing BATNEEC for a *new* activity. However, it is also generally envisaged that *existing* facilities will progress towards attainment of similar emission limit values, but the specific ELV requirements and associated time frames will be identified on a case by case basis when the licence application is being processed. Furthermore, for *all* facilities, additional and more stringent requirements may be specified on a site-specific basis whenever environmental protection so requires. Hence the BATNEEC guidelines are not the sole basis on which licence emission limit values are to be set, since information from other sources will also be considered, including site-specific environmental and technical data, plant financial data and other relevant information.

3. SECTOR COVERED BY THIS GUIDANCE NOTE

This Guidance Note covers SECTOR 11 of the activities specified in the First Schedule to the EPA Act, 1992. These are:

11.1 The incineration of hazardous waste.

11.2 The incineration of hospital waste.

11.3 The incineration of waste other than that mentioned in 11.1 and 11.2 in plants with a capacity exceeding 1 tonne per hour.

11.4 The use of heat for the manufacture of fuel from waste.

4. CONTROL TECHNOLOGIES

4.1 Introduction

As explained in Section 2, this Guidance Note identifies BATNEEC, but obviously does so in the absence of site-specific information. Accordingly, it represents the requirements expected of any new activity covered by the Note, but does not exclude additional requirements which may form part of the granting of a licence for a specific site.

The approach to be used in selecting BATNEEC is based on the following hierarchy:

- Incineration/Waste Fuel process design and selection to **eliminate** emissions that pose environmental problems.

- **Substitution** e.g. of fuels by environmentally less harmful ones.

- Demonstration of waste **minimisation** by means of process control, inventory control and end-of-pipe technologies etc.

The existing, or possible, measures for reduction and control of emissions are described in this section. These range from relatively simple containment measures to sophisticated recovery and end-of-pipe technologies and include:

(i) Load Minimisation
(ii) Containment
(iii) Recovery/recycle
(iv) Emission reduction
(v) Waste treatment & disposal.

The technical feasibility of the measures listed below has been demonstrated by various sources. Used singly or in combination, these measures represent BATNEEC solutions when implemented in the appropriate circumstances. The circumstances depend on plant scale, chemicals used, nature of the products made, number of different products produced, degree of plant integration etc. A summary of the treatments for various emissions is given at the end of this section. Note that where flammable / explosive dusts or vapours are handled, safety procedures (acceptable to the Health and Safety Authority) should be adopted and nothing in this note should be construed as advice to the contrary.

4.2 Load Minimisation:

Incineration:

- Screening/filtering of liquid wastes where appropriate.
- Uncontaminated fuel supply for support burners.
- Wastes should not be introduced to the incinerator before the optimum temperature is reached in the final combustion chamber.
- The waste charging system should be interlocked with the temperature monitoring and control system to prevent waste additions, should the operating temperature fall below the required limits.
- Rapid quenching of waste gases should be incorporated into incinerator design, where appropriate.
- Minimum operating temperature (as measured at inner wall of combusion chamber) of 850^{o}C.
- Minimum residence time of two seconds at the operating temperature.
- Minimum oxygen content of 6% v/v (except when the furnace is fuelled with liquid hazardous waste only or with a mixture of gaseous substances and powdered solids from a thermal pretreatment of hazardous waste under oxygen deficiency, and when the gaseous part provides more than 50% of the entire heat released, the oxygen content after the last injection of combustion air shall amount to at least 3% v/v).
- Minimum operating temperature for hospital waste is 1100^{o}C.
- Minimum operating temperature for waste with >1% organochlorine substances is 1100^{o}C.
- Gas cooling, quenching (possible heat recovery).
- Dry equipment cleaning and dry vacuum systems, where feasible.

Waste Derived Fuel:

- Screening to remove grit, dust and putrescible material.
- Inventory control.
- Avoid undue delays in processing material.
- Segregation and prescreening of material into similar streams prior to arrival on-site.
- Dry equipment cleaning and dry vacuum systems, where feasible.

4.3 Containment of Emissions:

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and on site constraints.)

Incineration:

- Enclosure of materials (excluding bulk liquids), storage, handling, processing and transfer within a suitable building.
- Minimisation of tank filling losses by, e.g., vapour return systems.
- Vent collection and ducting from tank farms to central abatement systems.
- Mimimisation of tank breathing losses by pressure vacuum valves, isolation and/or tanks painted white.
- Overground pipelines and transfer lines.
- Floating roofs on bulk storage tanks.
- Incinerator chamber design to withstand pressure surges.
- Storage of delivered materials pending detailed analysis.
- Check system to avoid mixing incompatible materials, where required.
- Bunding of all stored materials with separate bunding for incompatibles.
- Overfilling protection on bulk storage tanks.
- Prevention of rain ingress, wind entrainment etc. for stored materials.
- Inventory control.

Waste Derived Fuel:

- Enclosure of materials (excluding bulk liquids), storage, handling, processing and transfer within a suitable building.
- Bunding of tanks.
- All material handling under cover.
- Check system to avoid blending inappropriate wastes.
- Prevention of rain ingress, wind entrainment etc. for stored materials.
- Separation of cooling waters, storm waters and process effluent of different origins in order to permit appropraite treatment options.

4.4 Technologies for recovery and recycling:

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and on site constraints.)

- Interceptor tanks at each process building.
- Separation and reuse in another industry.
- Gas cooling, quenching (possibly heat recovery).

4.5 Technologies for treating air emissions:

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and on site constraints.)

(*Symbols in brackets explained in Table 4.1 below)*

Incineration:

- Scrubbers (T1).
- Filters (T2).
- Biofilters (T3).
- Cyclones(T4).
- Wet electrostatic precipitators (T5).
- Thermal conditioning of plume (T6).
- Combined bag filters, lime and activated carbon injection (T7).

Waste Derived Fuel:

- Wet scrubbing (T1).
- Filters (T2).
- Odour control by frequent cleaning and disinfection (e.g. 1-2 times/day) (T8).
- Biofiltration (specialised plant) (T3).
- Afterburners (minimum 850^{o}C, 6% O_2 v/v) (T9).

Table 4.1 Technologies to treat Air Emissions.

Emission	Technologies
Particulates	T2, T4, T5, T7, T9
Sulphur and compounds	T1, T3, T7
Nitrogen and compounds	T3
Halogens and compounds	T1, T7
Metals, metalloids and compounds	T2, T4, T5, T7
Organic compounds	T1, T3, T7, T9
Phosphorus and compounds	T1, T7
Odours	T1, T3, T8, T9
Water vapour	T6

4.6 Technologies for treating water emissions:

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and on site constraints.)

Incineration:

- Filtration /Coagulation/Precipitation (Heavy metals).
- pH Correction / neutralisation (Acids & alkalis).

Waste Derived Fuel:

- Precipitation (Heavy metals).
- pH Correction / neutralisation (Acids & alkalis).
- Coagulation / flocculation / precipitation (Dissolved & colloidal solids and heavy metals).
- Settlement / filtration / floatation (Solids removal).
- Activated sludge (Organic treatment for BOD removal).
- Extended aeration (Organic treatment for BOD removal).
- Activated Carbon polishing (Trace organic removal).
- Resin beds (Dissolved solids).
- Phosphate removal.

4.7 Technologies for the treatment and disposal of wastes:

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and on site constraints.)

Incineration:

- Waste encapsulation.
- Reuse in downstream processing.
- Vitrification of waste.
- Engineered landfill of wastes.

Waste Derived Fuel:

- Engineered landfill of wastes.

5. EMISSION LIMIT VALUES

5.1 Reference Conditions

5.1.1 Incineration Processes

The reference conditions for concentrations of substances in emissions to air from contained sources are:

Temperature 273 K (0^0C),Pressure 101.3 kPa (1 atmosphere), Oxygen 11% v/v, (except for waste oil incineration, 3% v/v), Dry Gas.

These units and reference conditions may not be suitable for continuous monitoring methods and may, subject to licence, be converted for day-to-day control purposes, into values more suitable for the available instrumentation.

5.1.2 Waste Derived Fuel

The reference conditions for concentrations of substances in emissions to air from contained sources are:

Temperature 273 K (0^0C), Pressure 101.3 kPa (1 atmosphere), no correction for oxygen or water content.

These units and reference conditions may not be suitable for continuous monitoring methods and may, subject to licence, be converted for day-to-day control purposes, into values more suitable for the available instrumentation.

5.2 Interpretation of Compliance

5.2.1 Air emissions

5.2.1.1 Hazardous and Clinical Waste Incineration

For **continuously monitored** emissions, the following will be required for compliance with measurements based on 30 minute mean values (unless otherwise stated):

(i) No 30 minute mean measurements shall exceed the 30 minute emission limit values in Table 5.1.

(ii) All daily mean values shall be less than the daily emission concentration limits in Table 5.1

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Where **periodic monitoring** is used to check compliance, all samples should meet the consent conditions.

5.2.1.2 Animal Carcass and Other Incineration

For continuous monitoring, 95% of the 24-hour rolling average values shall comply with the Emission Limit Values, and no hourly result shall exceed 1.5 times the Emission Limit Value.

5.2.2 Emissions to waters

The limit values for discharges to water are based on 24 hour flow proportional composite samples taken over a representative production period.

5.3 Releases to Air

5.3.1 Incineration processes

Carbon Monoxide

The concentration of carbon monoxide after the last injection of combustion air should not exceed the following levels:

(a) 50 mg/m^3 of combustion gas determined as a daily average value;

(b) 100 mg/m^3 of combustion gas determined as an hourly average value;

(c) 150 mg/m^3 of combustion gas of at least 95% of all measurements determined as 10 minute average values taken in any 24 hour period.

Other Emission Limits

For all new plant the following concentration limits apply to release from contained sources:

Table 5.1. Emission limit values for releases to air

	Hazardous & Clinical Waste Incineration		Animal Carcass Incineration	Other Incineration
Averaging Period	**30 min.**	**Daily**	**Hourly**	**Hourly**
Volatile organic compounds (excluding particulate matter) expressed as total organic carbon	20 mg/m^3	10 mg/m^3	-	20mg/m^3
Total particulate matter	30 mg/m^3	10 mg/m^3	100 mg/m^3	30 mg/m^3
Hydrogen chloride	60 mg/m^3	10 mg/m^3	30 mg/m^3	30 mg/m^3
Hydrogen fluoride	4 mg/m^3	1 mg/m^3	-	2 mg/m^3
Sulphur dioxide	200 mg/m^3	50 mg/m^3	300 mg/m^3	300 mg/m^3
Dioxins* (6-8 hours samples)	-	0.1 ng/m^3	0.1 ng/m^3	0.1 ng/m^3

Note: Achievement of ELV concentration by the introduction of dilution air is not permitted

For the following metals and their compounds, including the gaseous and vapour forms of the metal, expressed as the metal, the following limits apply to all Incineration Processes (sampling period between 0.5 and 8 hours)

	mg/m^3
Cadmium, thallium taken together	0.05
Mercury	0.05
Antimony, arsenic, chromium, cobalt, copper, lead, manganese, nickel, tin and vanadium, taken together	0.5

Dioxins The emission of polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) should be reduced as far as possible. The aim should be to achieve a guide TEQ value of 0.1 ng/ m^3. For hazardous waste incineration, subject to the EC establishing harmonised measurement methods by the 01/07/96, this guide value becomes an emission limit value from the 01/01/97.

* Toxic Equivalent (TEQ) - see Appendix 2.

Odours Emissions from the process should not give rise to any nuisance odour detectable outside the boundary where the process is carried on.

Smoke For all plant, emissions during normal operation, including start-up and shut-down and within 5 minutes of start-up from cold, should be free from visible smoke.

5.3.2 Waste Derived Fuel Processes

For all new plant the following concentration limits apply to releases from contained sources:

Total particulate matter 50 mg/m^3

For the following metals and their compounds, including the gaseous and vapour forms of the metal, expressed as the metal, the following limits apply:

	mg/m^3
Arsenic, chromium, copper, lead, manganese, nickel and tin, taken together	1.0
Cadmium	0.1
Mercury	0.1

Odour Emissions from the process should not give rise to any nuisance odour detectable outside the boundary where the process is carried on.

5.4 Releases to Water

Effluent load should be minimised by recovery of materials wherever practicable. The use of lower quality water may be possible for some parts of the process rather than fresh water.

Excluding uncontaminated stormwaters, all releases to waters are subject to a licence from the Agency. However, any discharge to sewer, will also require the consent of the local authority or sewerage undertaker. BATNEEC to minimise the release of substances will generally include minimisation at source and either specific treatment of contaminated waste streams to remove particular substances or co-treatment of the mixed effluent or both.

Tables 5.2 and 5.3 contain the identified emission limit values.

Table 5.2 - Emission Limit Values for all Sectors*

Constituent Group or Parameter	Limit Value	Notes
pH	6 - 9	2
BOD (mg/1)	25	2
Number of Toxicity Units	5	1
Total Nitrogen (as N) **	>80% removal or 15 mg/l	2 ,3
Total Phosphorus (as P)**	>80% removal or 2 mg/l	2,3
Total Ammonia (mg/1 as N)	10	2
Oils, Fats & Grease (mg/1)	10	2
Phenols (mg/l)	1.0	2
Cyanide (mg/l as CN)	0.2	2
Mercury (mg/1)	0.05	2
Tin (mg/l)	2.0	2
Lead (mg/l)***	0.5	2
Chromium (mg/l as Cr VI)	0.1	2
Chromium (mg/l as total Cr)***	0.5	2
Cadmium (mg/l)	0.05	2
Zinc (mg/l)***	0.5	2
Copper (mg/l)***	0.5	2
Fish Tainting	No Tainting	
Mineral Oil (mg/l) Interceptors	20.0	2
MineralOil (mg/l)Biological Treatment	1.0	2

* All values refer to daily averages, except where otherwise stated to the contrary, and except for pH which refers to continuous values. Limits apply to effluent prior to dilution by uncontaminated streams, e.g. stormwater, cooling water, etc.

** Only applicable to waters subject to eutrophication. One or both limits may apply depending on the sensitivity of the receiving waters.

*** Where the sum of the loads of these metals is <200 g/day prior to treatment, the respective emission limit value may be increased by a factor of four - in justified cases.

Table 5.3 - Additional Emmision Limit Values for Incineration Processes

Substance	Spot Sample	Monthly* Sample	Notes
Organic solvents other than alcohols mg/l	-	0.1 (monthly mean)	2
Organohalogens (as Cl) mg/l	-	0.1 (monthly mean)	2
Dieldrin ng/l	100	50	2
Gamma-hexachlorocyclohexane ng/l	100	100	2
Polychlorinated biphenyls ng/l	100	50	2
Trifuralin ng/l	50	50	2
Hexachlorobenzene ng/l	400	300	2
Hexachlorobutadiene ng/l	50	50	2
Trichlorobenzene ng/l	50	50	2
Dichlorvos ng/l	50	50	2
Fenitrothion ng/l	100	50	2
Simazine ng/l	400	300	2
Atrazine ng/l	400	300	2
Pentachlorophenol and its compounds ng/l	500	300	2
Tributyltin compounds ng/l	200	100	2
Triphenyltin compounds ng/l	200	100	2

***** Flow weighted automatic seven day sample

Notes for Tables 5.2 and 5.3:

1. Toxicity unit (TU) = 100/x hour E(L)C 50 in percentage vol/vol, where x is defined by the test procedure. The toxicity of the process effluent to at least two appropriate aquatic species shall be determined.

2. Consent conditions for these parameters for discharge to municipal treatment plants can be established with the Licensing Authority, and different values may apply.

3. Removal means reduction in relation to influent load. Total Nitrogen means the sum of Kjeldahl Nitrogen, Nitrate N and Nitrite N.

6. COMPLIANCE MONITORING

6.1 Process Parameters

For all incineration processes, the following process parameters should be continuously monitored:

(a) temperature at the inner wall and outlet of the combustion chamber(s);

(b) flue gas temperature before and after any plant where cooling in the range 450-200 ^{o}C takes place; and

(c) carbon monoxide and oxygen concentration together with flue gas temperature prior to discharge (in those cases where significant variations can occur, pressure and water content will also need to be monitored as deemed to be necessary by the Agency).

The temperature at the point of exit of gases from the final combustion chamber should be continuously monitored and continuously recorded. Audible and visual alarms should be triggered when the temperature at the point of exit from the final combustion chamber falls below the minimum, as specified in Section 4.2 above.

6.2 Air Emissions

Preference should be given to continuous on-line real-time instrumental monitoring where available. Departures from this requirement and the frequency of intermittent monitoring should be justified by the operator (more frequent or additional methods of monitoring are likely to be required during periods of abnormal operations such as plant start-up and shut-down).

If the applicant can satisfy the Agency that the emissions of any pollutant will be minimal, for example, due to its absence from the feedstock, then monitoring and regular measurement may not be required for that pollutant.

Table 6.1 - Monitoring Schedule for Releases to Air *

	Hazardous & Clinical Waste Incineration	**Carcass Incineration**	**Sewage Sludge Incineration**	**Municipal & Other Waste Incineration**	**Fuel from Waste**
Continuous					
(to be recorded	Particulates	Particulates	Particulates	Particulates	Particulates
during	CO	CO	CO	CO	
operating	HCl			HCl	
hours only. This includes	Total VOC				
start up and	SO_2				
shut down)	HF (unless treatment for HCl makes this unnecessary)				
Spot					
a) Quarterly	Metals #	Metals	Metals	Metals	
		HCl	HCl	HF	
		SO_2	VOC	VOC	
			SO_2	SO_2	
			HF		
b) 2/annum	Dioxins				
c) 1/annum		Dioxins	Dioxins	Dioxins	Metals
Performance Tests for New Facilities	All Parameters (incl.residence time and process parameters) (Plus Dioxins once every 3 months for first year)	All Parameters (incl. Process)	All Parameters (incl. Process)	All Parameters (incl. Process)	All Parameters (incl. Process)

Mandatory test burns shall be carried out on all incinerators to ensure proper operation and emissions controls. Monitoring shall be carried out during such test burns, in accordance with the monitoring schedule as shown at Table 6.1. above.

* For hazardous waste incineration, continuous monitoring is not necessary for any parameter where the I.P.C. Licence permits incineration only of those wastes which cannot cause average values of these pollutants higher than 10% of the relevant ELVs in Table 5.1

\# Once every two months during the first year of operation for hazardous waste incineration.

6.3 Waste Water Discharges

1. Daily monitoring of flow and volume, continuous monitoring of pH. Intermittent monitoring of other relevant parameters. The frequency of sampling/monitoring will take account of the nature, magnitude and variability of the emissions, and the reliability of the control technologies.

2. Monitoring of influent and effluent from the waste water treatment plant to provide early warning of any unusual loads, or to highlight operational difficulties.

3. The potential for the final effluent to have tainting and toxic effects should be assessed and, if necessary, measured by established laboratory techniques.

4. Periodic biodegradability checks, where appropriate, on effluents to municipal waste treatment plants, both prior to process start-up and thereafter taking account of the nature, magnitude and variability of the emissions, and the reliability of the control technologies.

6.4 Solid Waste Monitoring

1. The recording in a register of the type, quantity, relevant dates and manner of disposal of all wastes.

2. Leachate testing of sludges and other material, as appropriate, being sent for landfilling.

APPENDIX 1

SOURCES AND EMISSIONS

1. Introduction

In this section, the major sources of emissions to air and water are identified, as are the principal sources of waste from the sector. It should be borne in mind that the identified list of sources is not all encompassing, nor will every plant falling within an individual sector have every one of the emissions which are associated with the sector as a whole.

1.1 Incineration Processes

At all stages of the incineration process, from waste receipt and storage onwards, material leaves the system as solid, liquid or gaseous waste streams. These waste streams may be an incidental part of the process, or else they may be accidental or unavoidable, in which latter case they are classified as Fugitive Emissions.

1.2 Processes Using Heat for the Manufacture of Fuel from Waste

The waste used to produce fuel consists of the combustible fraction of domestic waste, commercial and trade waste plus other wastes which, because of their nature or composition, are similar to domestic waste. In its simplest form, Waste Derived Fuel (WDF) manufacture involves the shredding and screening of waste to produce a loose combustible fuel or floc. When the floc is subsequently dried by the application of heat then the process falls within the scope of this Note. (It can also subsequently be pelletised).

2. Sources of Emission to Air from:

(Symbols refer to Table A1)

2.1 Incineration Process

2.1.1 Fugitive and Unscheduled Emissions:

- Particulate matter and odours during handling of feedstock, fly ash and bottom ash.

- Fugitive emissions from seals, doors and ducting etc.

- VOC losses during storage, filling and emptying of bulk solvent tanks and drums.

- Relief valve discharges, bursting disk discharge.

- Venting of storage tank blanket gases.

2.1.2 Process Emissions

- Combustion processes (pollutants intrinsic to the fuel, products of incomplete combustion and materials present in the waste).(S1)

2.2 Waste Derived Fuel Process

2.2.1 Fugitive Emissions

- Particulate matter and odours during handling and separation of feedstock, and processing of product.

- Fugitive emissions from seals, doors and ducting etc.

2.2.2 Process Emissions

- Combustion processes (pollutants intrinsic to the fuel and materials present in the waste).(S2)

3. Sources of Emission to Water from:

3.1 Spills and Diffuse Sources etc.

- Solvent tank leaks.

- Spillages.

- Bund drainage.

- Leakages from flanges, pumps, seals, valve glands etc.

3.1.1 Incineration Processes

- Dewatering of feedstock.
- Surface water drainage.
- Water from quenching gases, ash and other materials.
- Liquid effluent from gas treatment plant.
- Laboratory effluent.
- Wash-down water.

3.1.2 Waste Derived Fuel Processes

- Dewatering of feedstock.
- Surface water drainage.
- Liquid effluent from gas treatment plant etc.

4. Sources of waste from:

(Symbols refer to Table A2)

4.1 Incineration Processes

- Dust and ash from the incineration process and gas treatment systems.(W1)
- Hydraulic systems.(W2)

4.2 Waste Derived Fuel Processes

- Dust and ash from the production process and gas treatment systems. (W1)
- Filtered or settled sludges from effluent treatment.(W3)
- Screenings.(W4)

5. Releases

5.1 Releases to Air

Table A1 below summorises releases to air

Table A1 - Summary of Sources & Emissions to Air

(*Symbols refer to Section 2 of this Appendix)*

S1	Particulates Sulphur and compounds Nitrogen and compounds Halogen and compounds Oxide of Carbon Metals, metalloids and compounds Organic compounds (including unburned feedstock) as well as certain products of incomplete combustion such as dioxins /dibenzofurans etc.) Phosphorus and compounds Water Vapour
S2	Particulates, Metals, metalloids and compounds Odours

5.2 Incineration Process

5.2.1 Releases to Water

- Metals and their compounds (e.g. Mercury, Cadmium etc.).
- Polychlorinated biphenyls (PCBs).
- Dioxins/dibenzofurans.
- Organic compounds.
- Other substances, dependent upon the waste being incinerated.

5.2.2 Waste-derived Fuel Processes:

- Metals and their compounds (e.g. Mercury, Cadmium etc.).
- Organic compounds.
- Salts.

5.3 Other Releases

Table A2 below summarises other releases

Table A2 - Other Releases

(*Symbols refer to Section 4 of this Appendix)*

W1	Halogens and compounds Metals, metalloids and compounds Polychlorinated aromatic compounds
W2	Waste Oils
W3	Material collected in abatement systems
W4	Batteries, chemicals, etc.

APPENDIX 2

Toxic Equivalents

For the determination of the TEQ value stated as a release limit the mass concentrations of the following dioxins and furans have to be multiplied with their equivalence factors before summing.

	Equivalence Factor
2,3,7,8-Tetrachlorodibenzodioxin (TCDD)	1
1,2,3,7,8-Pentachlorodibenzodioxin	0.5
1,2,3,4,7,8-Hexachlorodibenzodioxin (HxCDD)	0.1
1,2,3,7,8,9-Hexachlorodibenzodioxin (HxCDD)	0.1
1,2,3,6,7,8-Hexachlorodibenzodioxin (HxCDD)	0.1
1,2,3,4,6,7,8-Heptachlorodibenzodioxin (HpCDD)	0.01
Octachlorodibenzodioxin (OCDD)	0.001
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.5
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.05
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01
Octachlorodibenzofuran (OCDF)	0.001

APPENDIX 3

PRINCIPAL REFERENCES

1. E.C.

1.1 Council Directive of 8 June 1989 on the prevention of air pollution from new municipal waste incineration plants (89/369/EEC).

1.2 Council Directive of 21 June 1989 on the reduction of air pollution from existing municipal waste incineration plants (89/429/EEC).

1.3 Council Directive of 18 March 1991 amending Directive 75/662/EEC.

1.4 Council Directive of 12 December 1991 on Hazardous Waste (91/689/EEC).

1.5 Council Directive of 15 July 1975 on Waste (75/662/EEC).

1.6 Council Directive of 20 March 1978 on Toxic and Dangerous Waste (78/319/EEC).

1.7 Council Directive of 16 December 1994 on the Incineration of Hazardous Waste (94/67/EC).

1.8 Proposal for a Council Directive amending Directive 91/689/EEC on Hazardous Waste (21/Sept/1993).

1.9 Technical Note on Best Available Technologies not Entailing Excessive Costs for Hazardous Waste Incineration (EC 1990).

2. U.K. H.M.I.P. Chief Inspector's Guidance to Inspectors

2.1 Industry Sector Guidance Note IPR 5 (Waste Disposal Industry Sector).

2.2 Industry Sector Guidance Note IPR 5.1 (Waste Disposal and Recycling - Merchant and In-house Chemical Waste Incineration).

2.3 Industry Sector Guidance Note IPR 5.2 (Waste Disposal and Recycling - Clinical Waste Incineration).

2.4 Industry Sector Guidance Note IPR 5.3 (Waste Disposal and Recycling - Municipal Waste).

2.5 Industry Sector Guidance Note IPR 5.4 (Waste Disposal and Recycling - Animal Carcass).

2.6 Industry Sector Guidance Note IPR 5.6 (Waste Disposal and Recycling - Making Solid Fuel from Waste).

2.7 Industry Sector Guidance Note IPR 5.11 (Waste Disposal and Recycling - Sewage Sludge Incineration).

3. U.K. Department of the Environment

3.1 Secretary of State's Guidance PG 5/1(92) (Clinical Waste Incineration Processes under 1 tonne an hour).

4. Germany

4.1 T.A. Luft (1986)
(Section 3.3. 8. 1.1).

4.2 17 BImSchV.

5. Ireland

5.1 Environmental Protection Agency Act, 1992.

5.2 Local Government (Water Pollution) Acts, 1977 and 1990.

5.3 Air Pollution Act, 1987.

6. U.S. E.P.A.

6.1 Standards of Performance for Incinerators
(40 CFR Ch. 1 - Subpart E, 1992).

6.2 Standards of Performance for Municipal Waste Combustors
(40 CFR Ch. 1 - Subpart Ea, 1992).

6.3 Emission Guidelines and Compliance Times for Municipal Waste Combustors
(40 CFR Ch. 1 - Subpart Ca, 1992).

Appendix 4

I.P.C. Licensing Information Leaflets - Published by the Environmental Protection Agency

LC1 Integrated Pollution Control Licensing - Guide to Implementation and Enforcement in Ireland

LC2 Integrated Pollution Control - Summary of Licensing Procedures

LC3 Environmental Protection Agency - Summary of its Structures, Power sand Functions

LC4 Integrated Pollution Control(IPC) Licensing Fees

LC5 Environmental Protection Agency Act, 1992 (Noise) Regulations, 1994

LC6 BATNEEC Guidance Note for the Chemical Sector