DEPARTMENT OF THE ENVIRONMENT PLANNING AND ENVIRONMENTAL POLICY GROUP

GUIDANCE ON:

DIRECTIVE 2000/76/EC

ON THE INCINERATION OF WASTE

Edition 3

Department of the
Environment
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Revision of Guidance

This guidance is updated from time to time with new or amended guidance. The Table below is an index to these changes

Date of amendment	Section reference	Nature of amendment

1. CONTENTS

2. EXECUTIVE SUMMARY

2.1 The Waste Incineration Regulations (NI) 2003 S.R. 390/2003 ("the Waste Incineration Regulations") came into force on 29 August 2003. These regulations, along with associated directions to the Chief Inspector of the Northern Ireland Environment Agency (NIEA), transpose the Waste Incineration Directive, 2000/76/EC (the "WID").

2.2 This guidance describes the scope, regulatory and technical requirements of the WID and how they should be interpreted and applied. It explains the main legal provisions, but the precise legal requirements can only be determined by the Courts. The guide is particularly intended for operators of incineration and co-incineration plants, the Chief Inspector, waste producers, statutory consultees and waste mangers, all of whom are affected by the WID.

2.3 The WID applies to incineration and co-incineration plants. A plant will only be an incineration plant or a co-incineration plant if it thermally treats waste as defined in the Waste Framework Directive. Such wastes will include municipal waste, clinical waste, hazardous waste, general waste and waste-derived fuels.

2.4 Plant which comes under the WID is regulated by the NIEA under the Pollution Prevention and Control (Northern Ireland) Regulations 2003.

2.5 There are some important exclusions from the scope of the Directive, including plants burning only animal carcasses or, in many circumstances, vegetable and wood waste.

2.6 The key technical requirements of the WID include;

- Specified operating conditions, including gas temperatures and residence times;
- emission limit values for a range of substance to air and water including dioxins,
- emission monitoring requirements.

2.7 The information provided in this guidance includes:

(a) interpretation of the meaning of: waste, incineration and co-incineration plant,

(b) regulatory requirements of the Directive,

(c) technical aspects of the Directive including operating conditions,

(d) emission limit values for incineration and co-incineration plant, including example calculations for co-incinerators,

(e) monitoring requirements, and

(f) copies of the Regulations and directions to the Chief Inspector.

3. INTRODUCTION TO THE DIRECTIVE

3.1 The Waste Incineration Directive (WID) was published on 28 December 2000 (OJ L 332/91, 28 December 2000).

3.2 The aim of the Directive is to prevent or limit, as far as practicable, negative effects on the environment, in particular pollution by emissions into air, soil, surface and groundwater, and the resulting risks to human health, from the incineration and co-incineration of waste. The Directive seeks to achieve this high level of environmental and human health protection by requiring the setting and maintaining of stringent operational conditions, technical requirements and emission limit values for plants incinerating and co-incinerating waste throughout the European Community.

3.3 The requirements of the WID apply to virtually all waste incineration and co-incineration plants, going beyond the requirements of the 1989 Municipal Waste Incineration (MWI) Directives[1][2] which were repealed in 2005. To increase legal clarity and enforceability, the WID also incorporates the Hazardous Waste Incineration Directive[3] and forms a single text on waste incineration. The WID requirements have been developed to reflect the ability of modern incineration plants to achieve high standards of emission control more cost effectively.

3.4 In Northern Ireland all the plants that the WID applies to are regulated by the Chief Inspector under the Pollution Prevention and Control (Northern Ireland) Regulations 2003, as amended (PPC), which deal with emissions to air, land and water.

3.5 For those installations which are also subject to the IPPC Directive[4], compliance with the WID is not necessarily sufficient to meet IPPC requirements since the latter are more broadly based and involve more stringent emission limit values and conditions.

3.6 The WID is incorporated in a revised Industrial Emissions Directive[5] incorporating IPPC, WID, Solvent Emissions Directive, Large combustion Plant Directive and the Titanium Dioxide Directives. The Industrial Emissions Directive (IED) will be transposed and come into force by 7th of January 2013.

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[1] Directive 89/369/EEC of 8 June 1989 on the prevention of air pollution from new municipal waste incineration plants.
[2] Directive 89/429/EEC of 21 June 1989 on the reduction of air pollution from existing municipal waste-incineration plants.
[3] Directive 94/67/EC of 16 December 1994 on the incineration of hazardous waste.
[4] Directive 2008/1/EC of 15 January 2008 concerning integrated pollution prevention and control
[5] Directive 2010/75/EU of 17 December 2010 concerning Industrial Emissions (IPPC)

About this Guidance

3.7 This guidance is being published to help in particular those operating and regulating incineration and co-incineration plants, but it will also be of interest to others concerned with waste incineration. It describes the scope and the regulatory and technical requirements of the Directive, as it has been transposed in Northern Ireland, and sets out the views of the Department of the Environment on how these requirements should be applied and how particular terms should be interpreted. The guide explains the main legal provisions, but the precise legal requirements can ultimately only be determined by national or European Courts. The Guide has been produced by relevant Departmental officials.

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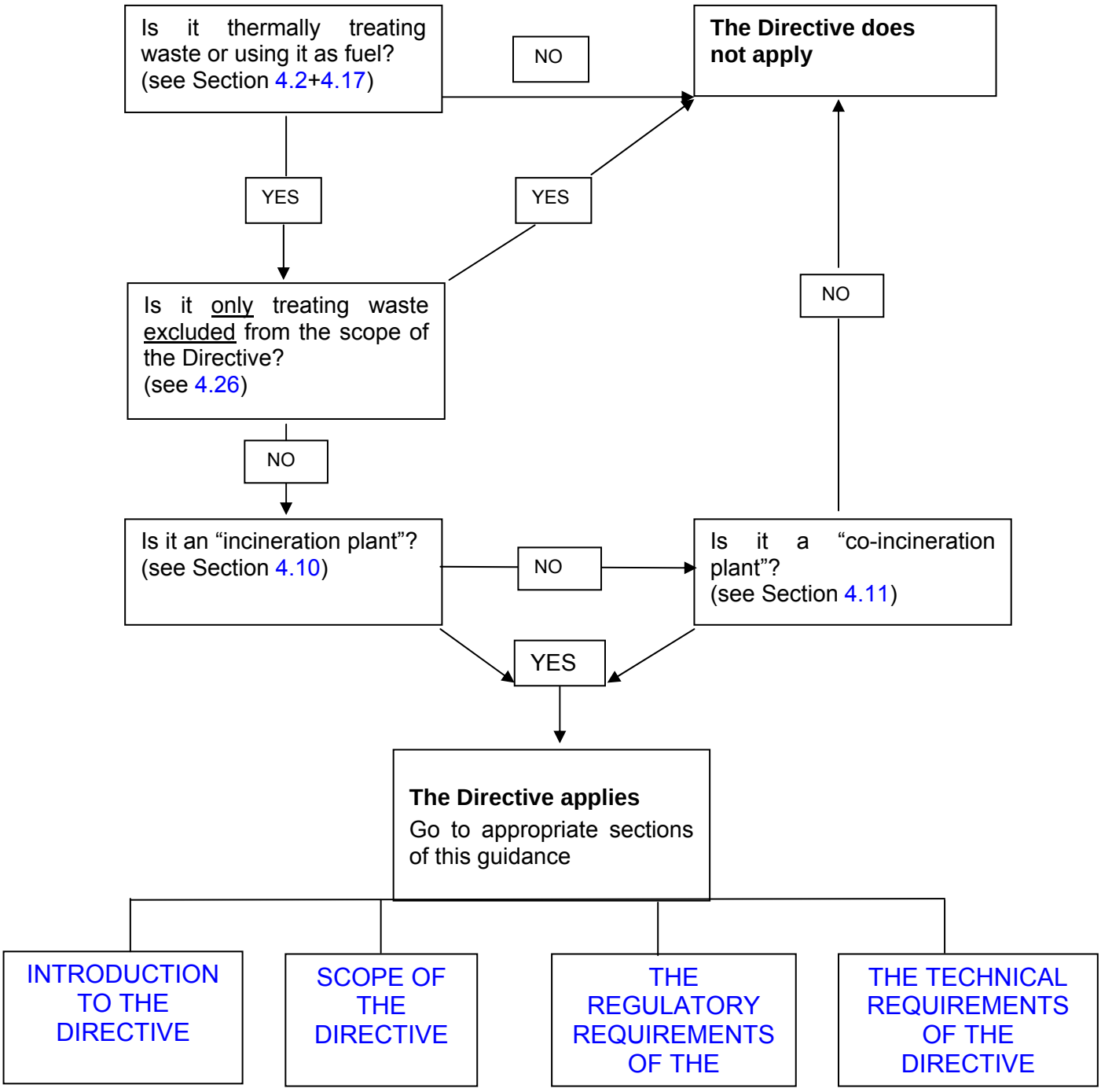
4. SCOPE OF THE DIRECTIVE

4.1 The WID applies to the incineration and co-incineration of both hazardous and non-hazardous waste. The definition of the three terms 'waste', 'incineration plant' and 'co-incineration plant' determine the scope of the Directive. This is discussed in detail below but the following flow chart may help to provide initial screening to determine if the WID applies to a given activity.



Waste

4.2 For the purposes of the WID “waste” means any solid or liquid waste as defined in Article 3(1) of the Waste Framework Directive (2008/98/EC). Article 3(1) reads: "waste means any substance or object which the holder discards or intends or is required to discard."

4.3 The European Court of Justice ("ECJ") has issued several judgments on the interpretation of the definition of waste and the meaning of "discard". ECJ judgments are binding on Member States and their competent authorities. A summary of ECJ judgments on the interpretation of the definition of waste is provided on the Defra website at: http://www.defra.gov.uk/environment/waste/topics/documents/ECJCaseLaw20090209.pdf.

4.4 Where someone – either a business or a private individual - disagrees with the view reached by the Chief Inspector, we can advise only that the business or individual concerned obtains their own legal advice and acts on the basis of that advice.

4.5 A waste material which, by undergoing a recovery process and meeting an end-of-waste test, can be considered a product, and will have ceased to be a waste. The NIEA has published Quality Protocols which set out the point where waste ceases to be a waste. http://www.ni-environment.gov.uk/index/about niea/better_regulation/waste_quality_protocols.htm.

4.6 Where these protocols are complied with, the output of the process will be considered a product and not a waste. Therefore the WID will not apply as it only applies to wastes.

Hazardous Waste

4.7 For the purposes of the WID, “hazardous waste” means a waste included in the European Waste Catalogue (Commission Decision 2000/532/EC, published in OJ L 226, 6.9.2000, p3) and marked there with an asterisk (*).

4.8 However, the requirements of the WID which apply to hazardous waste are disapplied by Article 3(2) to the categories of waste set out below, which are excluded from the definition of "hazardous" waste by the Waste Incineration Regulations. These requirements include those relating to the reception, sampling, analysis and combustion temperatures applying to hazardous waste. "Hazardous waste" for the purposes of the WID means any solid or liquid waste which is hazardous waste as defined in Articles 3(2) and 7 of Directive 2008/98/EC except for—

(a) combustible liquid wastes including waste oils ad defined in Article 3(3) of Directive 2008/98/EC provided that they meet the following criteria—

(i) the mass content of polychlorinated aromatic hydrocarbons, e.g. polychlorinated biphenyls (PCB) or pentachlorinated phenol (PCP) amounts to concentrations no higher than those set out in the relevant Community legislation;

(ii) these wastes are not rendered hazardous by virtue of displaying properties set out in Annex III to Directive 2008/98/EC;

(iii) the net calorific value amounts to at least 30 MJ per kilogramme: and

(b) any combustible liquid wastes which cannot cause, in the flue gas directly resulting from their combustion, emissions other than those from gas oil as defined in Article 2(2) of Council Directive 1999/32/EC relating to a reduction in the sulphur content of certain liquid fuels, as amended by Directive 2005/33/EC or a higher concentration pf emissions than those resulting from the combustion of gas oil as so defined;

4.9 Some wastes (for example, waste oils) will meet these criteria and so will not be subject to the Directive requirements which apply to hazardous waste (these requirements relate to waste delivery and reception, operating temperatures and some time-limited derogations from emission limit values). It should be noted that all other requirements of the WID are to be met in full.

Incineration plant

4.10 The WID defines "incineration plant" as follows:

"Incineration plant means any stationary or mobile technical unit and equipment dedicated to the thermal treatment of waste with or without recovery of the combustion heat generated. This includes the incineration by oxidation of waste as well as other thermal treatment processes such as pyrolysis, gasification or plasma processes insofar as the substances resulting from the treatment are subsequently incinerated."

"This definition covers the site and the entire incineration plant including all incineration lines, waste reception, storage, on site pre-treatment facilities, waste-fuel and air-supply systems, boiler, facilities for the treatment of exhaust gases, on-site facilities for treatment or storage of residues and waste water, stack, devices and systems for controlling incineration operations, recording and monitoring incineration conditions."

Co-incineration plant

4.11 The WID defines "co-incineration plant" as follows:

"Co-incineration plant" means any stationary or mobile plant whose main purpose is the generation of energy or production of material products and:

- which uses wastes as a regular or additional fuel, or
- in which waste is thermally treated for the purpose of disposal."

4.12 If co-incineration takes place in such a way that the main purpose of the plant is not the generation of energy or production of material products but rather the thermal treatment of waste, the plant shall be regarded as an incineration plant."

4.13 As with incineration plant, this definition also covers the site and the entire plant including all co-incineration lines, waste reception, storage, on site pre-treatment facilities, waste-, fuel- and air-supply systems, boiler, facilities for the treatment of exhaust gases, on-site facilities for treatment or storage of residues and waste water, stack devices and systems for controlling incineration operations, recording and monitoring incineration conditions.

Technical Unit

4.14 An important aspect of the WID definition of 'incineration plant' and 'co-incineration plant' is that the 'thermal treatment' must take place in a 'technical unit'. The definition of installation in the PPC Regulations also refers to a technical unit. There is no definition of technical unit in the Regulations or related EC Directives, but the following provides a guide to the Department's interpretation of a technical unit:

Any piece of equipment that has been specifically designed or adapted for combustion of materials will be regarded as falling within the meaning of technical unit.

4.15 This definition will cover virtually all combustion plants, including air curtain destructors. However, it ensures that incineration in bonfires, or open burning etc are not subject to the Regulations. These activities may, nonetheless, be subject to enforcement action under separate legislation if they cause nuisance or safety hazards. Disposal of waste in this way

may also be contrary to duty of care provisions under the Waste and Contaminated Land Order 1997[6]

Thermal Treatment

4.16 Another key element in these definitions is that the activity must involve "thermal treatment of waste".

4.17 "Thermal treatment" includes both incineration/combustion and other treatments, such as gasification and pyrolysis. However, if the activity involves only thermal treatment in its broader sense (as distinct from incineration/combustion), then it will be subject to the WID only "insofar as the substances resulting from the treatment are *subsequently incinerated*" [emphasis added]. This ensures that the WID covers processes such as pyrolysis and gasification, unless their purpose is the manufacture of products with no resulting release of combustion gases. Therefore, if a gasification or pyrolysis plant produces a number of products, one or more of which are subsequently burnt, then the WID applies to the whole plant. In cases where the products are burnt away from the gasification/ pyrolysis plant (remote units), the WID will apply both to the plants initially producing, as well as subsequently using, these products. In a case where the gas produced meets an end of waste test, and the gas in burnt in a different site, the WID will apply only to the plant producing the gas from waste but not the plant burning the waste.

4.18 Pyrolysis and gasification plants that dispose of all their products and residues without incineration (for example by landfill or use as raw materials in other processes) would not be covered by the WID. These operations are themselves closely regulated by the PPC Regulations, the Landfill Regulations (NI) 2003, as amended and the Waste Management Licensing Regulations (NI) 2003.

4.19 Not all processes where waste is subjected to heat fall within the scope of the WID. There is a distinction between the 'thermal treatment' that leads to a process falling within the WID (WID Thermal Treatment) and that which keeps it outside the WID (Non-WID Thermal Treatment). This distinction is summarised in the following text and the Thermal Treatment Diagram

[6] Waste and Contaminated Land (Northern Ireland) Order 1997, (No. 2778 (N.I. 19))

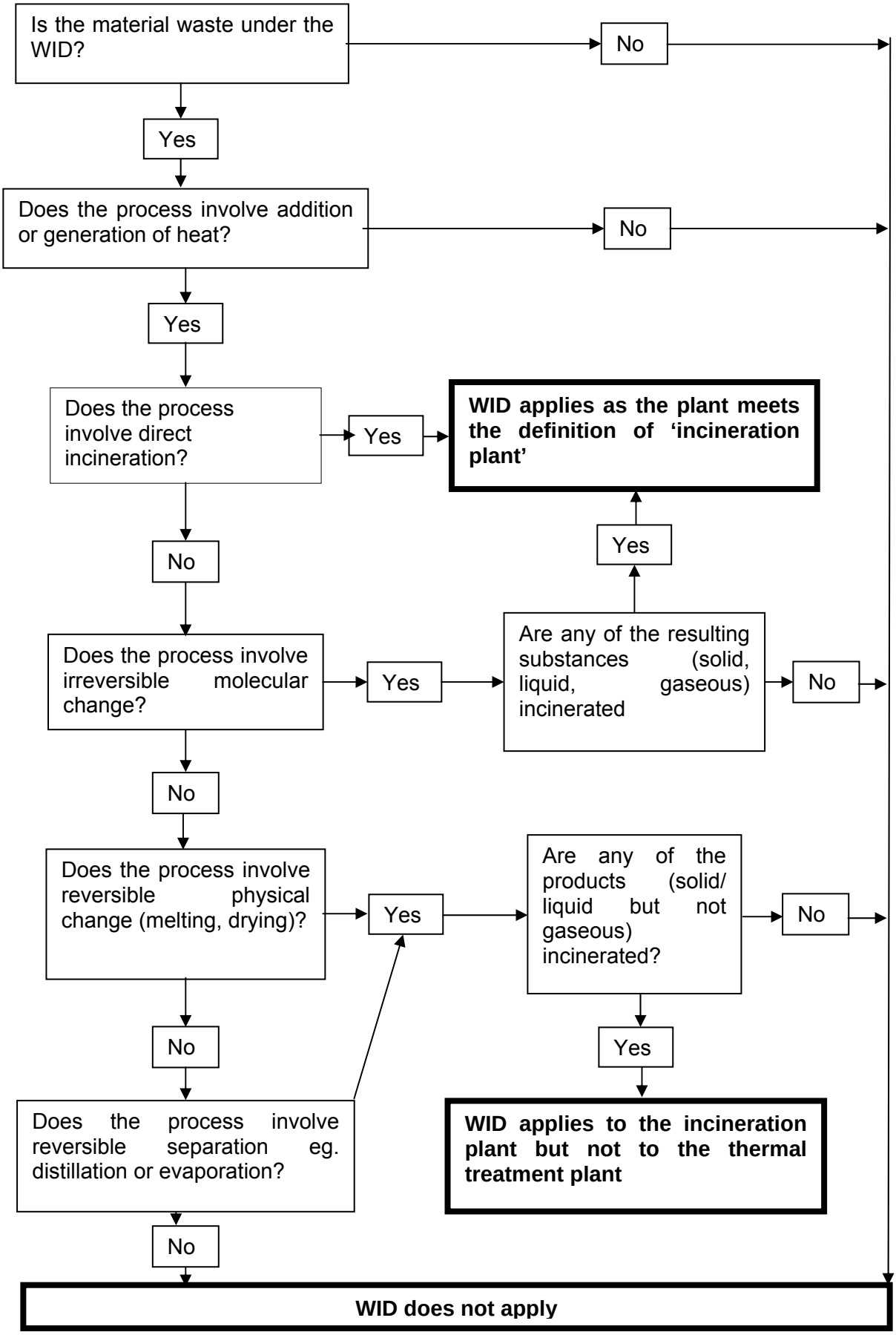
WID Thermal Treatment

4.20 The thermal treatment results in the change to the chemical structure of the original waste, and the change is not reversible. For example, incineration is a thermal treatment in which the carbon and hydrogen present in the original waste gets changed to carbon dioxide and water respectively. Similarly, in pyrolysis and gasification, the molecular structure of the original waste is transformed resulting in substances that are physically and chemically different from the original waste.

Non-WID Thermal Treatment

4.21 This treatment incorporates the application of heat but without a change in the chemical structure of the waste. Moreover, any physical change is reversible, e.g. drying of sewage sludge. Similarly, in the case of distillation of waste, to separate different fractions, heat is applied and different fractions are collected but there is no change in the chemical structure. Another example is heating where phase change occurs, e.g. there is a need to heat waste in storage before it can be shipped. However, there is no chemical change and the waste will go solid again when cooled.

Thermal Treatment Diagram



Plant not covered by the Directive

4.22 Some plants will be excluded from the scope of the WID even though they may involve the thermal treatment of waste. Excluded plants fall into two principal categories. The first covers plants treating only specified wastes; the second covers experimental plants. Such plant does not need to comply with the technical requirements of the WID. Excluded plant with a capacity of 1 tonne or more per hour will be regulated as a Part A installation under the PPC. Excluded plants with a capacity of 50kgs per hour but less than 1 tonne per hour will be regulated as Part C installations under PPC and those with a capacity of less than 50kg per hour will be regulated under the Waste Management Licensing Regime.

4.23 It should be noted that even when an incinerator is deemed to be an excluded plant the activity may still require a PPC permit to operate, and the plant will be subject to BAT consideration. The benchmark for the BAT consideration will be indicated by the requirements and standards within the PPC Regulations. As new techniques become available, or are refined, BAT may require a plant to operate to standards tighter than those in the Regulations. It should also be noted that the requirements of the Regulations only cover part of the BAT assessment. The operator will need to demonstrate BAT across the full range of areas covered by it, as detailed in the PPC Regulations.

4.24 The capacity of an installation will be determined by the NIEA on a case by case basis. The starting point will be the operator's description of the installation, the manufacturer's nameplate capacity, and the operating regime used by the operator.

4.25 Operators should take a view in the first instance whether their plant is excluded or not. The final decision, however on whether a particular installation meets the criteria stipulated in the Regulations and, therefore, whether the plant is an excluded plant, is for the NIEA to take.

Plants treating only specified wastes

4.26 The WID does not apply to plants provided they treat only the wastes specified below. It should be noted that a plant may burn one (or more) of these wastes, alone or in combination with conventional non-waste fuels, and still be excluded from the WID. However, if it uses any <u>other</u> wastes in combination with any of the specified wastes, the exclusion does not apply and the plant will be subject to the WID requirements.

Vegetable waste from agriculture and forestry (Article 2(2)(a)(i))

4.27 Plants treating vegetable waste from agriculture and forestry are excluded from the Directive. This includes vegetable waste from horticulture; it may also include the container in which the plant has been grown.

Vegetable waste from food processing industry (Article 2(2)(a)(ii))

4.28 The meaning of "vegetable waste from the food processing industry" should be taken in a strict sense. It is taken as meaning vegetable waste that is uncontaminated by any product of animal origin.

4.29 With respect to the use of Used Cooking Oil (UCO), the use of oil is relevant in that oil that has been used for cooking vegetables (for example, chip potatoes) remains a vegetable waste whereas oil that has been used for cooking meat or fish ceases to be a vegetable waste (and consequently is not excluded from the WID).

4.30 The food processing industry is taken as including factory and retail outlets. Consequently this interpretation is relevant to "high street fish and chips shops" and, for example bulk, manufacture of potato crisps.

4.31 Oil which may be of animal origin, such as lard or beef dripping, obviously cannot be considered as being "vegetable waste" even if it has been used for cooking vegetables."

4.32 Furthermore the meaning of "food processing industry" should include any activity that "carries out food preparation of any type which changes the nature of the food in question." This will include retail outlets, such as fish and chip shops and restaurants.

4.33 Consequently in order to fall within the terms of Article 2(2)(a)(ii) of the WID the plant must:

- be using vegetable waste (uncontaminated by any products of animal origin);
- the vegetable must be from the food processing industry;
- the energy must be recovered.

Fibrous vegetable waste from pulp-making (Article 2(2)(a)(iii))

4.34 Plants treating fibrous wastes from virgin pulp production and from production of paper from pulp, are excluded from the WID provided this happens on the site of waste generation and the heat generated is recovered. Wastes arising from the production of pulp are excluded only if the pulp production is from virgin materials. However, plants treating fibrous vegetable waste from paper production are exempted whether the pulp used is from virgin or recycled sources.

Wood waste (Article 2(2)(a)(iv))

4.35 Plants treating only wood waste, with the exception of wood waste which may contain halogenated organic compounds or heavy metals as a result of treatment with wood-preservatives or coating, and which includes in

particular such wood waste originating from construction and demolition waste, are excluded from the WID. Wood cannot be taken to include paper and card.

4.36 The Government recognises that some manufacturers producing, for example fibre board, do not use chemicals containing halogens or heavy metals in the manufacturing process. However, if the wood waste used for the manufacture of the fibre board was already contaminated, then the final product may be also contaminated (note: the WID doesn't specify at what point the contamination has to take place), consequently the exclusion might not be applicable. However, this is a question of fact and the onus is on the operator of the incineration / co-incineration plant to demonstrate that the wood waste originally used did not arise from treated wood.

4.37 Some untreated wood products, such as wood pallets, may become unintentionally or accidentally contaminated during their normal use with organic chemicals and / or heavy metals. However, the WID exclusion would still apply because the contamination is not "as a result of treatment with wood preservatives or coating". Operators wishing to take advantage of this exclusion will have to demonstrate to the regulator that the contamination is accidental and not as a result of a treatment process.

4.38 The WID envisages that wood wastes arising from construction or demolition are likely to have been treated and hence covered by the WID. It will be for the operator to demonstrate that this was not the case.

Cork Waste (Article 2(2)(a)(v))

4.39 Plants treating only cork waste are excluded plants. Untreated cork products that become contaminated during normal use are excluded.

Radioactive Waste (Article 2(2)(a)(vi))

4.40 Currently, radioactive waste is either burnt in off-site incinerators (e.g. hazardous waste incinerators or clinical waste incinerators) or in dedicated incinerators at nuclear power stations. As far as the off-site incinerators are concerned, the WID exclusion will not apply, because most of the waste burnt in these plants is non-radioactive. If the operators of incinerators at nuclear power stations wish to be excluded from the WID they will need to prove that all waste streams going to the incinerator are indeed radioactive. If the waste streams are mixed (i.e. some but not all are radioactive), then the exclusion will not apply. In any case, the plants will need a PPC permit and will be subject to BAT (Best Available Techniques) considerations. The Regulators will apply the more stringent of the WID or BAT in imposing limits on non-radioactive emissions e.g. acid gases, dust, heavy metals and dioxins. Separate authorisations under the Radioactive Substances Act 1993 will also be required.

Animal Carcasses (Article 2(2)(a)(vii))

4.41 Incinerators that burn only animal carcasses are excluded from the scope of the WID. For this purpose, the Government considers as being excluded from the WID, incinerators which burn **only**:

(a) animal carcases, including those carcases which have been cut to facilitate incineration at the point of disposal; and/or

(b) unprocessed parts of animal carcases e.g. animal by-products such as SRM etc.

4.42 This means that incineration plants that burn only animal carcasses and or parts of carcasses (as described above) will be considered to be excluded from the WID. This will generally include incinerators on premises such as slaughterhouses, knacker yards, licensed cutting plants, and pet crematoria. But does not include retail premises and distribution depots.

4.43 However, this approach does not extend to any processed animal by-products such as MBM or to products of animal origin such as former foodstuffs or catering waste.

4.44 Animal carcass incinerators that are not approved under the WID require approval under Regulation (EC) No 1069/2009 ("the Animal By-Products Regulation"). Regulation (EC) No 1069/2009 is enforced in Northern Ireland by the Animal By-Products (Enforcement) Regulations (Northern Ireland) 2011 (Statuory Rule 2011 No. 214).

4.45 The relationship between the WID and the Animal By-Products (Enforcement) Regulations (Northern Ireland) 2011 is shown in the diagram on page 26.

Experimental plant

4.46 The WID excludes experimental plants used for research, development and testing in order to improve the incineration process and which treat less than 50 tonnes of waste per year. Therefore, the purpose of the plant has to be for research, development and testing for improving the incineration part of the process – not just the testing of the plant itself. There is also the limitation on the annual throughput of the waste (i.e. 50 tonnes). It will, therefore, more probably apply to test rigs at Universities.

Purpose of plant

4.47 The Government is also aware of plants other than incineration or co-incineration plants which may involve the burning of a small quantity of waste material as part of a process which is not a waste incineration process. These plants may be excluded from the WID by virtue of their purpose.It is not possible to provide a complete list of these plants and it may be necessary for the regulators to consider each process on an individual basis. However, some examples are:

(a) The cleaning of paint from jigs. Although the paint will be burnt off but the purpose of the process is to clean the jig for reuse.

(b) Spent granular activated carbon (for example, as used in some water treatment processes) may be regenerated by heating to remove the adsorbed contaminants. Here, burning of the vapours evolved is for abatement and the process leaves the bulk of the carbon regenerated and ready for further use.

(c) The drying of swarf to make the metal waste suitable for feeding into the furnace. Small amounts of oily contaminants present will be burnt but the purpose of the plant is not the incineration of waste.

(d) The injection of RFO (Recovered Fuel Oil) into a steel furnace to provide carbon for the reduction of iron ore.

(e) The remediation of contaminated soil.

(f) The use of an afterburner for the abatement of emissions from plant which is not an incineration plant.

Note regarding the burning of tallow as fuel

4.48 The 2002 EU Animal By-Products Regulations (ABPR)[7] required that rendered fats (tallow) were not burnt except in an incinerator meeting the requirements of the WID. However, the 2009 EU Animal By-Products Regulations (ABPR)[8]which repeals the 2002 ABPR no longer has this requirement. Therefore tallow will only be subject to the WID if it is considered to be a waste. Operators wishing to burn tallow as a fuel, and not a waste, should consult with the NIEA to ensure that the tallow meets the criteria of an end of waste test.

Note regarding Small Waste Oil Burners

4.49 Previously the Departments position was that Small Waste Oil Burners (SWOB's) were not sufficiently complex to constitute a "technical unit" and therefore did not fall within the WID definition of an incineration plant. The Departments position has changed and SWOB's are now considered to constitute "technical units".

4.50 SWOB's are therefore considered to fall within the scope of the WID because:

- They constitute a "technical unit"
- The process involves the thermal treatment of waste
- Although the scale of the activity is normally small there is no de-minimus threshold within the regulations (this is a direct read-across from the WID)

[7] REGULATION (EC) No 1774/2002 laying down health rules concerning animal by-products not intended for human consumption

[8] REGULATION (EC) No 1069/2009 of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation)

4.51 Operators of small waste oil burners who have a permit under LAPPC (In April 2011 there were currently only 8 SWOBs permitted in Northern Ireland) will have their permits revoked by the district council [by INSERT DATE]. Operators will have a choice of:

(a) Ceasing to operate the SWOB

(b) Operating the SWOB using virgin fuel.

(c) Operating the SWOB using processed fuel oil that has met an end-of-waste test

(d) Operating under a section 5.1 Part A incineration permit.

4.52 In practice the costs of meeting the conditions required by a Part A permit render option 4 economically unfeasible.

4.53 Operating a SWOB without a permit is an offence under Regulation 33 of the PPC Regulations 2003. A person guilty of this offence shall be liable-

(a) on summary conviction, to a fine not exceeding £30,000 or to imprisonment not exceeding six months or to both,

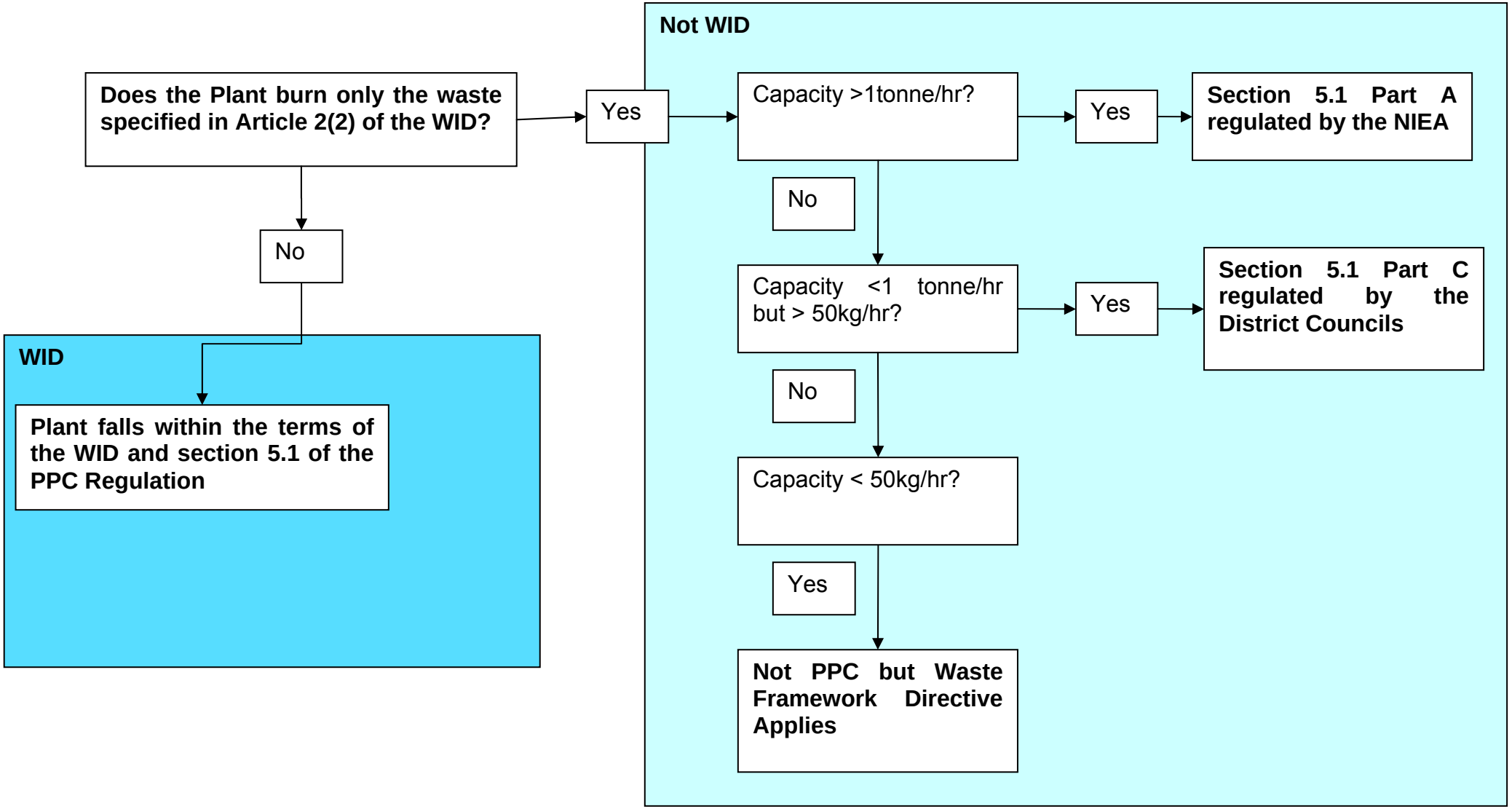
(b) on conviction on indictment, to a fine or to imprisonment for a term not exceeding five years or to both.

Section 5.1 of Schedule 1 to the Pollution Prevention and Control Regulations.

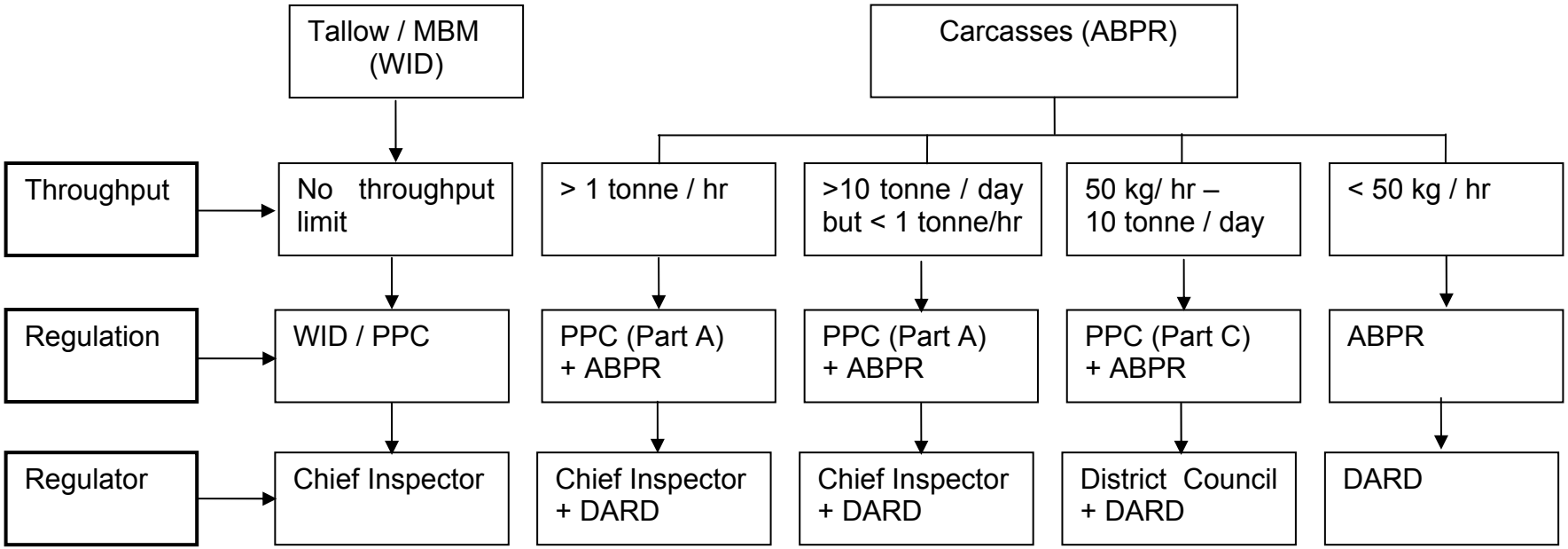
4.54 Operators should be aware that although plant may be excluded from the WID this does not mean that they are also excluded from Section 5.1 (Incineration and Co-incineration of Waste) of Schedule 1 to the Pollution Prevention and Control Regulations (the PPC Regulations) as amended.

4.55 The link between Section 5.1 and the WID is summarised by the diagram on the following page.

The Scope of the WID and Section 5.1 of Part 1 of Schedule 1 to the PPC Regulations as applied to plants burning waste in a technical unit.



Relationship between the Waste Incineration Directive and Animal By-Products Regulations (ABPR)



Note:
For definition of "carcase" see section 4.41
MBM: Tallow (which has not passed an end of waste test) and Meat Bone Meal.
DARD: Department of Agriculture and Rural Development

5. THE REGULATORY REQUIREMENTS OF THE DIRECTIVE

Northern Ireland Transposition

5.1 The Directive is transposed by means of the Waste Incineration Regulations (NI) 2003 (Statutory Rule 2003 No 390), the Pollution Prevention and Control Regulations (NI) 2003 (Statutory Rule 2003 No 46 (as amended), directions to Chief Inspector made under the latter Regulations (page 176). The table in Annex 2 of this guidance identifies the provisions which are being relied upon for the transposition of the Directive in each of these various instruments.

5.2 The WID requires the operators of "incineration plants" and "co-incineration plants", as defined, to apply for a permit to operate. Applications for permits must contain certain specified information. Plants which were "existing" as defined in the WID, were not allowed to operate after 28 December 2005, except under a permit which contains conditions that secure the requirements of the Directive.

5.3 The WID transposition relies principally on the existing permitting requirements of the PPC Regulations. These are amplified to ensure that all incineration and co-incineration (as defined in the Directive) are subject to those Regulations and that applications for permits for those plants include the relevant WID requirements, and are made in accordance with a timetable which ensures that the permits will be in place at the times required by the WID. The permit conditions which are required by the WID are secured by the directions which are given to the Chief Inspector under the Regulations (Annex 2, "PPC direction").

5.4 The Waste Incineration Regulations themselves therefore consist mainly of amendments to the PPC Regulations.

<u>All WID plants are "Part A installations"</u>

5.5 An important aspect of the overall approach is ensuring that all waste incineration plants and co-incineration plants which are subject to the WID become Part A installations under Section 5.1 of Part 1 of Schedule 1 to the PPC regulations. Some important adjustments were made to Section 5.1 of Part 1 of Schedule 1 by the Waste Incineration Regulations (regulation 5(4) inserted a new Section 5.1). The amended section had the effect of transferring incineration and co-incineration plants which were subject to the WID, but which were previously regulated under Part B and Part C (non-IPPC), into Part A of Section 5.1. Any WID activities which were previously not subject to the PPC Regulations at all will also fell into Part A, as a result of the Waste Incineration Regulations.

"Waste incineration installations"

The Waste Incineration Regulations introduce a key definition for the purposes of securing the WID implementation, namely **"waste incineration installation"** which is defined so as to include all incineration plant and co-incineration plant which are subject to the Directive. These are those which fall within Section 5.1 Part A (a)–(e) of Schedule 1, Part 1. A minor adjustment has also been made by the Waste Incineration Regulations to Section 6.8 of Part 1 of Schedule 1 of the PPC Regulations, to ensure that the incineration of animal carcasses falls within Section 5.1 and not Section 6.8 (see regulation 5 (4) (b)). Some co-incineration will fall within other descriptions as well such as co-incinerators in section 3.1 cement manufacturing.

5.6 Section 5.1 of Part 1 to the PPC Regulations is divided into a number of paragraphs. The detailed permitting requirements depend on which paragraph an installation falls. The following table explains the section 5.1 paragraphs.

Section 5.1	**Explanation of Part A activity**
(a) The incineration of hazardous waste in an incineration plant. **WID**	This paragraph does not include the incineration of hazardous waste in an excluded plant (i.e. not an "Incineration Plant" plant covered by the WID). Such plant is covered by Part A (f). This paragraph does not include co-incineration of hazardous waste. This activity is covered by Part A (b). There is no lower capacity threshold for this paragraph.
(b) Unless carried out as part of any other Part A activity, the incineration of hazardous waste in a co-incineration plant. **WID**	This paragraph covers co-incineration plants that were part of an activity that, before the WID regulations were regulated as an installation in another Section of Part 1 of Schedule 1 to the PPC Regulations. There is no lower capacity threshold for this paragraph. Such co-incinerators now need to be regulated as Part A activities and have, therefore, been brought within Part A of Section 5.1.
(c) The incineration of non-hazardous waste in an incineration plant with a capacity of 1 tonne or more per hour. **WID**	This paragraph does not include the incineration of non-hazardous waste in an excluded plant. Such plant is covered by Part A (g) for plant with a capacity of one tonne or more per hour.
(d) The incineration of non-hazardous waste in an incineration plant with a capacity of less than 1 tonne per hour. **WID**	This paragraph does not include the incineration of non-hazardous waste in an excluded plant. Such plant is covered by Part B (a) for plant with a capacity of less than one tonne (but 50 kilogrammes or more) per hour. There is no lower capacity threshold for this paragraph. The incineration of non-hazardous waste in an excluded plant with a capacity of less than 50kg per hour is regulated under the waste management licensing regime. .

(e) Unless carried out as part of any other Part A activity, the incineration of non-hazardous waste in a coincineration plant. **WID**	This paragraph covers co-incineration plants that were part of an activity that, before the WID regulations, were regulated as a Part B activities under any Section of Part 1 of Schedule 1 to the PPC Regulations. There is no lower capacity threshold for this paragraph. Such co-incinerators now need to be regulated as Part A activities and have, therefore, been brought within Part A of Section 5.1.
(f) Unless carried out as part of any other activity in this Part, the incineration of hazardous waste in a plant which is not an incineration plant or a co-incineration plant. **Non-WID**	If the plant does not burn ONLY waste that causes the plant to be classed as excluded plant then the activity is covered by paragraph Part A (a). There is no lower capacity threshold for this paragraph. Plants falling under this paragraph are not waste incineration installations within the meaning of the Waste Incineration Regulations. Such installations must comply with the requirements of the PPC Regulations but are not subject to the requirements set out in Section 6 of this guidance. An example of a plant that may fall within this paragraph is experimental plant used for research, development and testing in order to improve the incineration process and which treat less than 50 tonnes of waste per year.
(g) Unless carried out as part of any other Part A activity, the incineration of non-hazardous waste in a plant which is not an incineration plant or a co-incineration plant.but which has a capacity of one tonne or more per hour. **Non-WID**	If the plant does not burn ONLY waste that causes the plant to be classed as excluded plant then the activity is covered by paragraph Part A (c) for plant with a capacity of one tonne or more per hour. Plants falling within this paragraph are not waste incineration installations within the meaning of the Waste Incineration Regulations. Such installations must comply with the requirements of the PPC Regulations but are not subject to the requirements set out in Section 6 of this guidance.

(h) The incineration other than incidentally in the course of burning landfill gas or solid or liquid waste of any gaseous compound containing halogens in a plant which is not an incineration plant or a co-incineration plant **Non-WID**	As the WID covers only solid and liquid wastes, plants falling within this paragraph are not waste incineration installations within the meaning of the Waste Incineration Regulations. Such installations must comply with the requirements of the PPC Regulations but are not subject to the requirements set out in Section 6 of this guidance.
(i) the incineration of animal carcasses or animal waste in a plant which is not an incineration plant or a co-incineration plant with a capacity of more than 1 tonne per hour but with a capacity of more than 10 tonnes per day of animal carcasses or animal waste or, in aggregate , of both. **Non-WID**	If the plant does not burn ONLY animal carcasses then the plant will be covered by another paragraph under Section 5.1. Please note the 10 tonne threshold that applies to animal carcass incinerators is per day. Plants falling within this paragraph are not waste incineration installations within the meaning of the Waste Incineration Regulations. Such installations must comply with the requirements of the PPC Regulations but are not subject to the requirements set out in Section 6 of this guidance.
(j) Unless carried out as part of any other activity in this part, the incineration of a fuel manufactured from a waste in an appliance with a rated thermal input over 3MW **Non-WID**	This will cover the burning of gaseous wastes which are not covered by the WID. Large landfill gas engines would be an example of such a plant.
Part B activity (a) The incineration of waste in an incineration plant, which is authorised for the incineration of radioactive waste under section 13 of the Radioactive Substances Act 1993. **Non-WID**	Plants which burn ONLY radioactive wastes are excluded from the WID. They are regulated as a result of the Radioactive Substances Act 1993

Part C (a) The incineration of non-hazardous waste in a plant which is not an incineration plant or a co-incineration plant but which has a capacity of 50 kilogrammes or more per hour but less than 1 tonne per hour. **Non-WID**	If the plant does not burn ONLY waste that causes the plant to be classed as excluded plant then the activity is covered by paragraph Part A (d) for plant with a capacity of less than one tonne per hour. If the plant ONLY burns animal carcasses then the activity is covered by this paragraph. The incineration of non-hazardous waste in an excluded plant with a capacity of less than 50kg per hour is regulated under the waste management licensing regime. Plants falling within this paragraph are not waste incineration installations within the meaning of the Waste Incineration Regulations. Such installations must comply with the requirements of the PPC Regulations but are not subject to the requirements set out in Section 6 of this guidance.
(c) The cremation of human remains. **Non-WID**	Plants falling within this paragraph are not waste incineration installations within the meaning of the Waste Incineration Regulations. Such installations must comply with the requirements of the PPC Regulations but are not subject to the requirements set out in Section 6 of this guidance.

The Content of Applications for Waste Incineration Installations

5.7 The information that must be included in a standard application under PPC is well defined in the PPC Regulations. However, the WID requires additional information, which is summarised below. Applicants for WID-compliant authorisations and permits must ensure that their applications contain this information.

5.8 The additional requirements for WID applications are now set out in paragraph 1A of Part 1 of Schedule 4 (Applications for Permits) and Part 1 of Schedule 7 (Variation of Conditions) of the PPC Regulations have been adjusted to refer to these requirements,

5.9 Regulators have developed template application forms for the incinerators and co-incinerators and these should be used where

available. Applications require the following information as a minimum.

(a) Demonstration that the plant is designed equipped and operated to meet the requirements of the WID taking account of the categories of waste to be incinerated.

(b) Plant capacity, categories of waste (according to the European Waste catalogue) to be treated in the plant including their quantities, systems for receiving, storing and handling of waste on site (see Section 6.2 for further details).

(c) The quality (total organic carbon content and/or loss on ignition) and quantity of residues produced, handling and storage of these residues, proposals for minimising/recycling and disposal, and information on the chemical constituents of the residues (for details see 6.3).

(d) Information on temperatures and residence time (including measurement and validation methods), waste feed interlock to stop waste feed when the temperatures are below the permitted levels, provision of auxiliary burners including the description of proposed auxiliary fuel (see 6.13).

(e) In the case of a request for derogation from the temperature or residence time requirements, justification for the proposal and its effect on the quality and quantity of residues produced and the emissions into air of TOC and CO (see 6.21).

(f) Information of the use of heat generated from the process – for example through combined heat and power, generation of process steam or district heating including proposals for future improvements in heat utilisation. (see 6.27).

(g) In the case of abnormal operating condition, how will the dust emissions be controlled to below 150 mg/m3 (see 6.39).

(h) the case of new plants, information on the predicted emissions to air and water and show how the WID emission limits will be complied with at all times (eg. by showing that there are sufficient operating margins between the predicted emissions and the ELVs) (see 6.40 for details of the emission limit requirements). The above requirements will also apply to existing plants which install new abatement plants to meet the WID requirements. In other cases, the applicants will have to show that the existing plant performance is such that the WID emission limits will be met .

(i) Applications for new plants will need to include details of stack height calculations, dispersion calculations and the environmental impact of the emissions from the plant to demonstrate that human health and the environment will be protected. In the case of an

existing plant, unless the emission levels or other variables used in the original dispersion modelling have changed, it would be sufficient to use the original predictions.

(j) The applicants for co-incinerator plants will need to provide the information on the process and their conventional fuels and calculations of the *pro rata* emission limits by using the methods discussed in Section 6.47 and ANNEX 3 – Worked example for determining co-incineration ELVs of this Guidance.

(k) Information on methods and handling of waste waters on the site should be provided to show particularly that storage areas have been designed in a way that will prevent the unauthorised and accidental releases of any polluting substances into air, soil, surface water and ground water (see 6.61).

(l) Applicants will need to provide the details of the monitoring techniques they will employ to meet the requirements of the WID. In particular, they will need to confirm that they will apply the CEN standards where available and, when such standards are not available, they will use ISO or national or international standards (subject to the agreement of the regulator) (see 6.76).

(m) Details of the monitoring points and the monitoring equipment to be used, especially the continuous emission monitors (CEMs) should be provided. Operators also need to show that the CEMs have been suitably calibrated.

(n) The Chief Inspector may require more information than summarised above either through development of template application forms, during pre-application discussions or through written notices after the receipt of the application.

Permit Conditions for Waste Incineration Installations

5.10 The WID technical requirements which must be given effect in permit conditions are transposed mainly by way of directions to the Chief Inspector. The relevant WID requirements are set out in the Schedule to the directions. Apart from some basic interpretative rules, the only changes made to the WID's provisions are an addition to Article 11(2)(c) to ensure that it applies also to "dioxin-like PCBs and PAHs " and a provision to clarify that the exemptions for NOx which are provided by Annex V of the WID are to be applied by the Chief Inspector. Further detail on the technical requirements of the Directive is contained in Chapter 4 of this Guidance.

5.11 Article 23(4) of Council Directive 2008/98/EC states that "It shall be a condition of any permit covering incineration or co-incineration with energy recovery that the recovery of energy takes place with a high level of energy efficiency".

Public Information about Waste Incineration Installations

5.12 The WID requirement for the operators of plants with a nominal capacity of over 2 tonnes to provide annual reports is one which regulators are directed to include in the WID permits. The other WID requirement, for a list of plant with a nominal capacity of less than 2 tonnes to be made available to the public, is reflected in an amendment to Schedule 10 of the PPC Regulations, which adds this list to the existing body of public register information.

5.13 Operators should be aware of the requirements of the amendments made to the IPPC Directive by Public Participation Directive (the "PPD") which came into force on 25 June 2005. These amendments apply to all new and substantially changed IPPC (i.e. Regulations "Part A" installations) and also in cases where the regulator is prompted by significant pollution to propose revision of ELVs in an existing permit.

6. THE TECHNICAL REQUIREMENTS OF THE DIRECTIVE

6.1 The WID imposes stringent requirements on incineration and co-incineration plants falling within its scope. These requirements cover, types of wastes permitted at the plant, their delivery and reception, combustion furnaces, abatement plant, residue handling, monitoring equipment and emission limit values. All these requirements have to be included in the permit. These requirements are discussed below.

Process Requirements - Article 4(3)-(5) and Article 5

Permitted wastes and their delivery and reception

6.2 A waste incineration installation must operate within its design envelope to achieve the operational and abatement standards required by the WID. The type of furnace chosen and the type/size of abatement plant will be influenced by the waste to be burnt (e.g. its calorific value, heterogeneity, moisture etc.). Article 4 of the WID requires that conditions relating to the waste quality are included in the permit and the regulators should set these conditions in line with the following:

(a) An explicit list of the categories of waste permitted at the plant should be included in the permit. These categories should be based on those given in the EWC, particularly the need to use six digit codes and not simple headings or subheadings.

(b) The total waste incineration/co-incineration capacity of the plant should be specified. Note that the WID defines capacity as "the sum of the incineration capacities of the furnaces of which an incineration plant is composed, as specified by the constructor and confirmed by the operator, with due account being taken, in particular, of the calorific value of the waste, expressed as the quantity of waste incinerated per hour". The operators will, therefore, need to indicate the maximum design throughput taking into account the above factors.

(c) Any sampling and measurements relevant to the permitted waste should be included in the permit.

(d) Where the permitted waste is a hazardous waste, the regulators should also specify the quantities of different categories of permitted wastes, their minimum and maximum mass flows, their lowest and highest CV (Calorific Value), and their maximum content of pollutants e.g. PCB, PCP, chlorine, fluorine, sulphur and heavy metals.

(e) Article 5 of the WID requires that operators must take all necessary precautions concerning the delivery and reception of waste in order to prevent or to limit as far as practicable negative effects on the environment, in particular the pollution of air, soil, surface water and groundwater as well as odours and noise.

(f) This requirement not only covers the design of the reception area but also the management of the waste. In addition to this general requirement, the following requirements are also to be met. These, unless stated otherwise, apply to both hazardous and non-hazardous waste.

(g) If possible, the mass of each category of waste should be determined according to the European Waste Catalogue (EWC), prior to accepting the waste at the plant. Waste categories accepted at the plant should be detailed in the application. The operator should make provision to determine the mass of each category by the use of a weighbridge, loading mechanism weigh devices or through calculation. Where categories are mixed prior to delivery, the total mixed weight should be determined and the individual categories estimated and recorded.

(h) Operators should obtain documentary and analytical details of hazardous waste prior to its acceptance in order to comply with any specified restrictions on types that may be accepted. This does not mean that every item has to be sampled but requires an approach proportionate to the risk e.g. a need to have information necessary to evaluate suitability for the intended storage, handling and the incineration process.

(i) For hazardous waste, operators are also required to check statutory documents (consignment notes); take representative samples to verify the waste type and retain samples for at least one month after incineration. Sampling or analysis may be impractical (e.g. laboratory disposals) or inappropriate (e.g. infectious clinical waste). The frequency and scope of sampling/ analysis will be specified by the regulator according to the operator compliance record; taking into account the source of the waste, its variability, composition and the likely hazards that the waste may pose in relation to the process concerned e.g. halogenated organics, heavy metal content, etc.

(j) Exemptions from the above requirements may be granted by the regulator to industrial plants burning their own waste at the place of generation (provided other WID requirements are met). This means that in-house plants, burning their own hazardous or non-hazardous wastes do not need to go to the same lengths (in relation to document checking, sampling and analysis) as those plants accepting waste from other sites. It reflects the fact that operators incinerating their own waste have greater knowledge of the waste streams and that the risks are consequently reduced.

Residues

6.3 Articles 6 and 9 set out the requirements of the WID in respect of incineration and co-incineration plant residues and these are detailed below.

TOC/LOI Content of slag and bottom ashes

6.4 Article 6(1) of the WID requires that all incineration processes must be operated in such a way that Total Organic Carbon (TOC) or Loss on Ignition (LOI) content of the slag and bottom ashes will not be higher than 3% or 5% respectively. Here TOC means carbon associated with an organic molecule and would thus exclude elemental carbon. LOI is a measure of weight loss on ignition and would include both TOC and elemental carbon (it will also include weight loss due to the breaking up of inorganic compound e.g. silicates, carbonates etc). This requirement does not apply to fly ash or APC residues.

6.5 Article 6(4) derogations only apply to operating conditions that the operator can set. The level of TOC/LOI is, in fact, a consequence of these operating conditions. If the Government allowed higher levels of TOC than specified, this would conflict with the requirements of Article 6(4) which states that any derogation should not result in a higher content of organic pollutants. In view of this, the Chief Inspector cannot give any derogations for TOC/LOI.

6.6 Elemental carbon does not count as total organic carbon. The Chief Inspector may set an elemental carbon limit which represents BAT for a particular technology.

Residues- minimise, recycle and dispose

6.7 Compliance with BAT and the 3% TOC limit will generally be used as the technical criteria that demonstrate bottom ash meets the requirement of minimisation. Other factors to be considered include: a waste pre-treatment stage (e.g. shredder / sorter), ensuring that plant throughput is within specified plant rating, grate and furnace design, ash treatment, optimisation of the use of APC reagents and consideration of whether other reagents or reagent recycle could reduce the mass of residues or their harmfulness.

6.8 Opportunities for residue recycling should be adopted where practicable. On site schemes are preferred but not essential. The emphasis should be on recycling the residues. Regulators should require operators to keep records of such recycling and report in accordance with the standard permit conditions.

6.9 Any dusty wastes (including bottom ash) should be handled on-site such that they do not give rise to fugitive dust releases to the

environment by using equipment that conforms to BAT. Guidance may be obtained from the relevant Technical Guidance Notes. Containers are not needed in all circumstances and damp storage may be sufficient for bottom ashes although all new plant would be expected to provide for ash storage within a building and in an area of controlled drainage. Particular attention must be paid to APC residues which should be held in bags or bulk containers. Bottom ash and APC residues should not be mixed together.

6.10 Although the above requirement does not extend beyond the boundary of the installation, the operators have duties beyond the point of the production of residues – for example, Duty of Care with respect to the downstream management of these wastes. They should therefore adopt procedures so as to ensure that wastes are dispatched in a manner that considers downstream factors e.g. is the waste packaged well enough to prevent its release in transit and can it be managed when it reaches the next site?

6.11 The WID also requires that appropriate physical and chemical testing, including the pollution potential of the residues, is carried out prior to determining their disposal or recycling routes. Analysis should be carried out to determine the total soluble fraction and the heavy metals content of this soluble fraction. The level of sampling and testing will be set out in the permit conditions.

Operating conditions

Combustion Requirements

6.12 Combustion requirements for incinerators are set out in Articles 6(1) and 6(3) and those for co-incinerators are set out in Articles 6(2) and 6(3). Derogation from some of these requirements are permitted in some cases by Article 6(4) and these are also discussed in this section.

Temperature/Time Requirements:

6.13 All incinerators and co-incinerators burning waste must be designed, equipped, built and operated in such a way that the gas resulting from the process is raised to a temperature of 850^{o}C for 2 seconds. In the case of hazardous waste with more than 1% of halogenated organic substances, expressed as chlorine, the temperature must be raised to 1100^{o}C. Operators whose plants cannot operate at temperatures at or above 1100^{o}C will, therefore, have to demonstrate that they will not incinerate hazardous wastes with a chlorine content of more than 1%.

6.14 Combustion gas temperature should be measured near the inner wall or another representative point in the combustion chamber as authorised by the regulator. The temperature measurement point

should be located after the last injection of combustion air, including secondary air and re-circulated flue gases where carried out.

6.15 The temperature has to be raised in a controlled and homogeneous fashion. To satisfy this, operators will need to demonstrate that cold spots in the chamber or channelling in the gas flow have been avoided. Computerised fluid dynamics (CFD) modelling will be acceptable as a proof of this.

6.16 The WID also requires that the above temperatures are achieved under the most unfavourable conditions. This is taken to mean the most unfavourable operating conditions i.e. at the edge of the operational process design envelope and requires operators to understand their waste stream and its impact upon their plant. At the design stage, operators will need to take account of waste heterogeneity (e.g. CV, moisture content ranges) and will be required to demonstrate that they have adopted a sufficiently wide process envelope. During operation, operators will need to manage the waste stream such that it does not cause the temperature to fluctuate to the extent that compliance becomes a problem. Management of the waste feedstock would need to include consideration of waste types, their segregation and the need for pre-treatment.

6.17 Temperatures should be maintained during shutdown until all the waste in the combustion chamber has been burnt. Most plants will be able to quote a hearth/grate residence time – this may be used as the minimum time for which temperature should be maintained after the waste feed was stopped. Where waste feeds are sufficiently homogeneous to give rise to steady state emissions it may be possible for operators to make a case for the cross-over point between raw flue gas emissions derived from waste burning and those derived from auxiliary fuel burning to be used as a trigger to commence a controlled temperature reduction.

6.18 At least one automatic auxiliary burner is required for each incineration line in order to maintain the required temperatures. The burners must be linked to an automatic system activated by the output from the sensors checking the 850^0C /1100^0C minimum temperature at the specified location. Auxiliary burners are not required for co-incineration plants and gas engines and/or gas turbines operating on syngas from gasification/ pyrolysis plants.

6.19 Start-up fuels used in the auxiliary burners must not cause higher emissions than those arising from the burning of gas oil (as defined in Article1 (1) of Council Directive 75/716/EEC), liquefied gas or natural gas. For practical purposes this may be determined by comparison of fuel specification with gas oil, and may usually be limited to the pollutants listed in Annex V of the WID for release to air, unless the fuel contains a particular substance of concern.

6.20 Waste feed interlocks are required to prevent waste from being fed to the incinerator/co-incinerator when the required temperature conditions are not reached either at start up or during operation. Waste feed must also be stopped whenever the emission limits are being exceeded owing to problems with the abatement system except under abnormal operating conditions discussed in Section 6.39. It will be necessary for low temperature output signals to be linked to the waste loading mechanism in such a way that it cannot be operated until the relevant condition returns to the permitted level.

Derogation from Operational Parameters

6.21 Article 6(4) allows for certain conditional derogation from operational parameters for certain categories of waste or for certain thermal processes provided other requirements of the Directive are met. This means that it is not a universal derogation for all wastes and for all plants.

6.22 Furnace temperatures and the flue gas residence time are the two parameters that can be derogated provided the plant does not exceed the emission limits and the specific plants satisfy the following conditions. There is no derogation from TOC or the quality of start up fuels.

6.23 Additional conditions to be satisfied if derogation is given for temperature or residence time:

Plant	**Condition to be met**
Incineration plant	No higher quantities or TOC content of residues
Co-incineration plant	Annex V (WID) TOC and CO limits for air must always be met
Bark boilers	TOC for air should not be exceeded

6.24 Note that Annex V ELVs in the WID do not generally apply to co-incinerators but if a derogation is given then the TOC and CO limits of that Annex will apply.

6.25 It is expected that all new plants would have been designed to meet the requirements of the WID and would not need this derogation. It is likely that older plants may not achieve the required residence time. The operators will need to apply for a derogation with a full

justification. It is unlikely that the regulators will grant a derogation from both residence time and operating temperature without a robust justification. In addition to the older plants, the most likely candidates for this derogation are gas turbines and gas engines burning gas from waste gasification and waste pyrolysis.

6.26 All Article 6(4) derogations granted must be notified to the European Commission. Defra compile a triennial report on the implementation of the directive in the UK which includes this information.

Energy Recovery

6.27 Article 6(6) requires that any heat generated by the incineration or the co-incineration process should be recovered as far as practicable. It will, therefore, be necessary for all operators of incineration plants to demonstrate that this condition has been met or explain why it is not possible to recover energy. Guidance on energy recovery techniques is given in PPC technical guidance notes issued by the regulators. In summary, the hierarchy of heat recovery is given below. Under this hierarchy, the least preferred option is option (e) and the best option is a combination of all other four options.

(a) use of waste heat from boiler water cooling system,

(b) use of a boiler for steam generation or electricity generation,

(c) use of exhaust steam for process heating or CHP schemes,

(d) internal heat exchange for primary air heating and/or flue gas reheating,

(e) no heat recovery.

6.28 The revised Waste Framework Directive (2008/98/EC) requires that “it shall be a condition of any permit covering incineration or co-incineration that the recovery of energy takes place with a high level of energy efficiency”.

6.29 Opportunities to maximise the potential for improving heat recovery through the provision of district heating or process steam should be carefully considered, and tie-ins included in the design to enable link up in the future should the opportunity arise. This should be considered at the early planning stage, when sites are being identified for such facilities, to ensure that maximising energy recovery through the use of CHP is included as a factor in the decision.

6.30 The high capital cost, along with operational, maintenance and logistical requirements of electricity generation may not be economical at smaller plants. Comparison with other plants within the same sector provides a good guide to the affordability.

6.31 For incineration plants, waste heat recovery for process heating, electrical generation or plume abatement should be a feature of all new municipal waste incinerators (MWIs), clinical waste incinerators (CWIs) and for many chemical waste incinerators (ChWIs). It is noted however, that when highly chlorinated wastes are being destroyed, for example in merchant ChWIs, the potential for boiler corrosion and the need for rapid quenching may be more important than heat recovery, and that in the smaller plant sizes heat recovery may not be economical.

6.32 Heat recovery is normally limited to process use in sewage sludge incinerators i.e. combustion air, sludge drying and plume reheat. Recovery of heat from drum incinerators and animal remains incinerators (eg. those burning MBM) must be encouraged where there is a practical use for energy (e.g. in associated drum laundry or neighbouring plant).

6.33 Where the waste is suitable it may also be appropriate to consider pyrolysis or gasification and the use of gas turbines to increase electrical energy recovery.

6.34 In all cases it will be necessary to consider pollution control aspects when assessing options for increasing energy recovery. For example, boiler designs must also minimise the potential for dioxin reformation (de novo synthesis) in the 450^0C to 200^0C range. Maximising electrical energy recovery may not be appropriate where some of that energy might be better used to improve the dispersion of wet plumes from wet scrubbers.

Additional Operating Conditions

6.35 The WID requires some additional conditions to be imposed on the incineration and co-incineration plants. These are summarised below.

6.36 Article 6(5) requires that exhaust gas stack heights are calculated in such away that significant ground level concentrations of pollutants are avoided and that relevant Community air quality standards are met. Significance in this context refers to process contribution and has the same meaning as, for example, used in Horizontal Guidance Note H1 for the purposes of environmental assessment. Operators should consult the regulator for the methodology of calculations and the standards to be used.

6.37 Article 6(6) requires that infectious clinical waste should be fed straight into the furnace without first being mixed with other categories

of waste and without direct handling. Such waste should be delivered, stored and transported to the facility in appropriate containers and in such a manner that complies with national guidance on handling and transport of infectious clinical waste. Intermediate storage of infectious clinical waste may be carried out, but only in accordance with the relevant guidance and for the minimum time period possible. Refrigerated storage should be considered.

6.38 The WID also requires that the management of the incineration or co-incineration plant shall be in the hands of a natural person who is competent to manage the plant. Natural person means a real person rather than a company. Competence at existing plant will be demonstrated by means of compliance with permit conditions, level of personnel training, availability of written instructions and the operator's ability to deliver any actions necessary to improve compliance. A prosecution by the regulator for breaches of the authorisation does not necessarily mean that the operator is not competent.

Abnormal Operating Conditions

6.39 Article 6.3 (c) of the WID requires that waste feed should be automatically stopped whenever the continuous measurements required by this Directive show that any emission limit value is exceeded due to disturbances or failures of the purification devices. However, in some cases it may be possible for the operator to undertake quick remedial action to resolve the problem without the necessity of shutting the plant down. Article 13 of the Directive recognises this possibility and allows the regulators to lay down in the permit the maximum permissible periods of any technically unavoidable stoppages, disturbances, or failures of the purification devices or the measurement devices, during which the concentrations in the discharges into the air and the purified waste water of the regulated substances may exceed the prescribed ELVs. This time-limited derogation (amounting to less than 1% of average annual operating time) is conditional on the following requirements being met.

(a) If the plant breakdown is likely to be longer than the permitted time period, plant operations should be reduced or stopped altogether as soon as practicable. This means that if the operator knows that the fault cannot be rectified within the allowable period, he should not wait till the end of this period before initiating shutdown.

(b) The maximum allowable period for any one episode of abatement or monitoring equipment failure (separately or together) must not exceed 4 hours. In addition, the total allowable period in a year must not exceed 60 hours. If, in a given year, the operator has used up his allowance of 60 hours then any further failures will require plant shut down until normal operations can be resumed.

(c) In the case of incineration plants, other requirements that must be met during the abnormal operations include: compliance with the operating conditions above, compliance with ELVs for CO and TOC and that dust emissions remaining below 150 mg/m^3 at all times. In practice this means that the pollutants that can be exceeded during abnormal operations are HCl, SO_2, NO_x and dust (limited to 150 mg/m^3).

Air Emission Limit Values for Incinerators Article - 7

6.40 Article 7(1) requires all incinerators to be designed and operated, as a minimum, to meet the ELVs set out in Annex V of the WID. The following tables and notes summarise the ELVs that must be achieved. Note that reference conditions in the following tables are: Temperature 273 K, pressure 101.3 kPa, 11% oxygen (3% oxygen if burning waste oils), dry gas.

(a) Daily Average Values

Total dust	10 mg/m^3
Gaseous and vaporous organic substances, expressed as total organic carbon	10 mg/m^3
Hydrogen chloride (HCl)	10 mg/m^3
Hydrogen fluoride (HF)	1 mg/m^3
Sulphur dioxide (SO_2)	50 mg/m^3
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2), expressed as nitrogen dioxide for existing incineration plants with a nominal capacity exceeding 6 tonnes per hour or new incineration plants	200 mg/m^3
Nitric oxide (NO) and nitrogen dioxide (NO_2), expressed as nitrogen dioxide for existing incineration plants with a nominal capacity of 6 tonnes per hour or less	400 mg/m^3

(b) Half-hourly Average Values

	(100%) A	**(97%) B**
Total dust	30 mg/m^3	10 mg/m^3
Gaseous and vaporous organic substances, expressed as total organic carbon	20 mg/m^3	10 mg/m^3
Hydrogen chloride (HCl)	60 mg/m^3	10 mg/m^3
Hydrogen fluoride (HF)	4 mg/m^3	2 mg/m^3
Sulphur dioxide (SO_2)	200 mg/m^3	50 mg/m^3
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2), expressed as nitrogen dioxide for existing incineration plants with a nominal capacity exceeding 6 tonnes per hour or new incineration plants	400 mg/m^3	200 mg/m^3

(c) Heavy Metals

The table below shows average values over the sample period of a minimum of 30 minutes and a maximum of 8 hours. These average values cover also gaseous and the vapour forms of the relevant heavy metal emissions as well as their compounds.

Average values for heavy metal emissions

Cadmium and its compounds, expressed as cadmium (Cd)	total 0.05 mg/m^3
Thallium and its compounds, expressed as thallium (Tl)	
Mercury and its compounds, expressed as mercury (Hg)	0.05 mg/m^3
Antimony and its compounds, expressed as antimony (Sb)	total 0.5 mg/m^3
Arsenic and its compounds, expressed as arsenic (As)	
Lead and its compounds, expressed as lead (Pb)	
Chromium and its compounds, expressed as chromium (Cr)	
Cobalt and its compounds, expressed as cobalt (Co)	
Copper and its compounds, expressed as copper (Cu)	
Manganese and its compounds, expressed as manganese (Mn)	
Nickel and its compounds, expressed as nickel (Ni)	
Vanadium and its compounds, expressed as vanadium (V)	

(d) Dioxins

6.41 The WID requires dioxins to be reported using the I-TEQ reporting convention to assess compliance against an emission limit of 0.1ng I-TEQ / Nm^3. The UK's independent health advisory committee, Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT), has adopted the World Health Organisation (WHO) toxicity equivalence factors (TEF) for both dioxins and dioxin-like PCBs in their recent review of Tolerable Daily Intake (TDI) criteria. The Government is of the opinion that, in addition to the requirements of the WID, the WHO-TEF values for both dioxins and dioxin-like PCBs should be specified for monitoring and reporting purposes. This will enable evaluation of exposure to dioxins and dioxin-like PCBs to be made using the revised TDI recommended by COT.

6.42 Regulators will, therefore, set dioxin emission limits using I-TEF (1990) values but with additional monitoring/reporting requirements for dioxins and dioxin-like PCBs using WHO-TEF factors (see table on the next page for these factors).

Equivalence factors for dibenzo-p-dioxins, dibenzofurans and dioxin-like PCBs

6.43 For the determination of the total concentration, the mass concentrations of each congener should be multiplied by the following equivalence factors before summing:

TEF schemes for dioxins, furans and dioxin-like PCBs				
Congener	**I-TEF**	**WHO-TEF**		
	[1990]	Human/ Mammals [2005]	Fish [1997/98]	Birds [1997/98]
Dioxins				
2,3,7,8-TCDD	1	1	1	1
1,2,3,7,8-PeCDD	0.5	1	1	1
1,2,3,4,7,8-HxCDD	0.1	0.1	0.5	0.05
1,2,3,6,7,8-HxCDD	0.1	0.1	0.01	0.01
1,2,3,7,8,9-HxCDD	0.1	0.1	0.01	0.1
1,2,3,4,6,7,8-HpCDD	0.01	0.01	0.001	<0.001
OCDD	0.001	0.0003	-	-
Furans				
2,3,7,8-TCDF	0.1	0.1	0.05	1
1,2,3,7,8-PeCDF	0.05	0.03	0.05	0.1
2,3,4,7,8-PeCDF	0.5	0.3	0.5	1
1,2,3,4,7,8-HxCDF	0.1	0.1	0.1	0.1
1,2,3,7,8,9-HxCDF	0.1	0.1	0.1	0.1
1,2,3,6,7,8-HxCDF	0.1	0.1	0.1	0.1
2,3,4,6,7,8-HxCDF	0.1	0.1	0.1	0.1
1,2,3,4,6,7,8_HpCDF	0.01	0.01	0.01	0.01
1,2,3,4,7,8,9-HpCDF	0.01	0.01	0.01	0.01
OCDF	0.001	0.0003	0.0001	0.0001
Non-ortho PCBs				
3,4,4',5-TCB (81)	-	0.0001	0.0005	0.1
3,3',4,4'-TCB (77)	-	0.0003	0.0001	0.05
3,3',4,4',5 - PeCB (126)	-	0.1	0.005	0.1
3,3',4,4',5,5'-HxCB(169)	-	0.03	0.00005	0.001
Mono-ortho PCBs				
2,3,3',4,4'-PeCB (105)	-	0.00003	<0.000005	0.0001
2,3,4,4',5-PeCB (114)	-	0.00003	<0.000005	0.0001
2,3',4,4',5-PeCB (118)	-	0.00003	<0.000005	0.00001
2',3,4,4',5-PeCB (123)	-	0.00003	<0.000005	0.00001
2,3,3',4,4',5-HxCB (156)	-	0.00003	<0.000005	0.0001
2,3,3',4,4',5'-HxCB (157)	-	0.00003	<0.000005	0.0001
2,3',4,4',5,5'-HxCB (167)	-	0.00003	<0.000005	0.00001
2,3,3',4,4',5,5'-HpCB (189)	-	0.00003	<0.000005	0.00001

Carbon Monoxide

The following emission limit values for carbon monoxide (CO) must not be exceeded (excluding the start-up and shut-down phase):

- 50 milligrams/m^3 of combustion gas determined as daily average value;
- 150 milligrams/m^3 of combustion gas of at least 95% of all measurements determined as 10-minute average values or 100 mg/m3 of combustion gas of all measurements determined as half-hourly average values taken in any 24-hour period.

Exemptions may be authorised by the regulators for incineration plants using fluidised bed technology, provided that the permit foresees an emission limit value for carbon monoxide (CO) of not more than 100 mg/m^3 as a hourly average value.

Polycyclic Aromatic Hydrocarbons (PAHs)

6.44 Article 7(5) allows Member States to set emission limits for other pollutants especially polycyclic aromatic hydrocarbons (PAHs). There is lack of monitoring data on the release of PAHs from incinerators on which to base such limits or even to decide if a limit is required. The Waste Incineration Directions thus require the regulators to impose monitoring requirements in the permits but not to set a limit. Once sufficient data is available, a decision can be made on the future of this requirement.

6.45 The following PAHs should be monitored and results reported on the same frequency as for dioxins and dioxin-like PCBs.

Anthanthrene
Benzo[a]anthracene
Benzo[b]fluoranthene
Benzo[k]fluoranthene
Benzo(b)naph(2,1-d)thiophene
Benzo(c)phenanthrene
Benzo[ghi]perylene,
Benzo[a]pyrene
Cholanthrene
Chrysene
Cyclopenta(c,d)pyrene
Dibenzo[ah]anthracene
Dibenzo[a,i]pyrene
Fluoranthene
Indo[1,2,3-cd]pyrene
Napthalene

6.46 Most of the larger incinerators are likely to require abatement plant for meeting the NO_x limits and Selective Non-catalytic Reduction (SNCR) is the technique commonly used for this purpose. SNCR has a potential to release ammonia and N_2O. Regulators will therefore be asking for monitoring of these pollutants with or without specified limits.

Air ELVs for Co-incinerators

6.47 Article 7(2) requires that co-incineration plant shall be designed, equipped, built and operated in such a way that the emission limit values determined according to or set out in Annex II of the WID are not exceeded in the exhaust gas. However, Annex V ELVs will apply to co-incineration plant where:

(a) the co-incineration (of non-hazardous or hazardous waste) takes place in such a way that the main purpose of the plant is not the production of material products or the generation of energy, but the thermal treatment of waste (Article 3(5)). In this case all of the Directive requirements that apply to incinerators will now apply to this plant because for the purposes of the Directive the plant is considered to be an "incineration plant";

(b) more than 40% of the resulting heat release comes from the incineration of hazardous waste (Article 7(2)). Only the ELVs from Annex V apply. The plant does not become an incineration plant as defined in Article 3(4) and therefore continues only to have to comply with those aspects of the Directive as they relate to co-incinerators; or

(c) when untreated mixed municipal waste is co-incinerated. "Mixed municipal waste" is defined by the WID as 'waste from households as well as commercial, industrial and institutional waste, which because of its nature and composition is similar to waste from households, but excluding fractions indicated in the Annex to Decision 94/3/EC under heading 20 01 that are collected separately at source and excluding the other wastes indicated under heading 20 02 of that Annex'. Here reference to 94/3/EC should be taken to mean the European Waste Catalogue.

6.48 It will be for the operator to prove that he is not using untreated municipal waste. The Government considers that, in this context, "treatment" of mixed municipal waste should be taken to mean "any physical, thermal, chemical or biological process, including sorting, that changes the characteristics of waste in order significantly to enhance its combustion qualities in the co-incineration process in which it is to be used.

Determination of air ELV's for the co-incinerators.

6.49 For this, Annex II of the WID generally applies a mixing rule based on the principle that, in a mixed fuel/waste firing situation, the flue gases generated by the waste meet the ELVs given in Annex V of the WID. Further guidance on actual calculations is provided in Annex 3 of this guidance. Annex II of the WID is reproduced on the following page but some points need to be noted.

(a) Where a total ELV (C) has been specified in Annex II it should be taken as an ELV under the WID.

(b) Annex II specifies limits for some heavy metals and dioxins which apply in full to the co-incineration plants without pro rata.

(c) If the resulting heat release from the incineration of hazardous waste amounts to less than 10% of the total heat released in the plant, V_{waste} must be calculated from a (notional) quantity of waste that, being incinerated, would equal 10% heat release, the total heat release being fixed.

(d) Where Annex II does not specify a total emission limit for a pollutant, it must be calculated by using the mixing rule. C_{proc} values specified in this annex must be used for pro rata calculations.

(e) Where Annex II does not specify a C_{proc} value, then limits in the permit are to be used in the mixing rule formula. In the absence of these, i.e. where the permit does not specify a limit for a pollutant e.g. HCl for a combustion plant, actual measured values should be used.

6.50 Bearing in mind that the ELVs for waste and process fuels may be specified at different oxygen concentrations, the total emission limit calculated by the Annex II formula will require an equivalent oxygen concentration. This oxygen concentration is to be calculated by using the mixing rule and the partial volumes of the flue gases coming from waste and fuels.

6.51 The calculated oxygen levels, as discussed above, will vary with the proportion of waste being burnt. However, the regulators may require that actual emission monitoring data is supplied in a standard form e.g. at 11% oxygen. This can be easily done by using the formula given in Annex VI of the WID as detailed below.

$$E_S = \frac{21 - O_S}{21 - O_M} \times E_M$$

E_S calculated emission concentration at the standard percentage oxygen concentration
E_M measured emission concentration
O_S standard oxygen concentration
O_M measured oxygen concentration

6.52 The limit or guide value for each relevant pollutant and carbon monoxide in the exhaust gas resulting from the co-incineration of waste must be calculated as follows

$$C = \frac{V_{waste} \times C_{waste} + V_{proc} \times C_{proc}}{V_{waste} + V_{proc}}$$

V_{waste}: exhaust gas volume resulting from the incineration of the waste only determined from the waste with the lowest calorific value specified in the permit and standardised at the conditions given in Article 11(7).

If the resulting heat release from the incineration of hazardous waste amounts to less than 10% of the total heat released in the plant, V_{waste} must be calculated from a (notional) quantity of waste that, being incinerated, would equal 10% heat release, the total heat release being fixed.

C_{waste}: emission limit values set for incineration plants in Annex V for the relevant pollutants and carbon monoxide.

V_{proc}: exhaust gas volume resulting from the plant process including the combustion of the authorised fuels normally used in the plant (wastes excluded) determined on the basis of oxygen contents at which the emissions must be standardised as laid down in Community or national regulations. In the absence of these measures, the real oxygen content in the exhaust gas without being thinned by addition of air unnecessary for the process must be used. The standardisation at the other conditions is given in this Directive.

C_{proc}: emission limit values as laid down in the tables in Annex II for certain industrial sectors or in case of the absence of such a table or such values, emission limit values of the relevant pollutants and carbon monoxide in the flue gas of plants which comply with the national laws, regulations and administrative provisions for such plants while burning the normally authorised fuels (wastes excluded). In the absence of these measures the emission limit values laid down in the permit are used. In the absence of such permit values the real mass concentrations are used.

C: total emission limit value and oxygen content as laid down in the tables in Annex II for certain industrial sectors and certain pollutants or in case of the absence of such a table or such values total emission limit values for CO and the relevant pollutants replacing the emission limit values as laid down in specific Annexes of the WID. The total oxygen content to replace the oxygen content for the standardisation is calculated on the basis of the content above respecting partial volumes.

Setting ELVs for cement kilns co-incinerating waste.

6.53 The ELVs, as given in Annex II.I of the WID for cement kilns, are summarised in the table below. There are no half-hourly limits but half-hourly values will be needed to calculate daily average value. With the possible exception of TOC and SO_2, there is no need to apply the Annex II mixing formula when burning non-hazardous waste or hazardous waste below 40% thermal substitution. If the heat input from hazardous waste is greater than 40%, the ELVs given in Section 6.40 (incinerators) apply.

	Directive Requirement	
	Emission Limit (mg/m^3) (*)	**Averaging Period**
Dusts	30	daily
VOCs (as TOC)	10 Note 1	daily
HCl	10	daily
HF	1	daily
SO_2	50 Note 1	daily
NOx (NO and NO_2 expressed as NO_2) for existing plant	800 Note 4	daily
NOx (NO and NO_2 expressed as NO_2) for new plant	500	daily
CO	Set by the Chief Inspector	Note 2
Cd and Tl	Total 0.05	Average values over the sample period of 30 minutes to 8 hours
Hg	0.05	
Sb,As, Pb, Cr, Co, Cu, Mn, Ni and V	Total 0.5	
Dioxins and furans	0.1 ng/m^3 TEQ	CEN method, sample period 6 to 8 hours

***Reference conditions: 273 K, 101.3 kPa, 10% O_2, dry gas.** Note 3

Notes

1. Exemptions can be granted in cases where TOC and SO_2 do not result from the incineration of waste. It will be up to the operator to prove that these pollutants exclusively arise from raw materials. In other cases, the regulators are likely to use the mixing rule for pro rata calculations of these.
2. Daily average ELV to be set based on a site-specific assessment.
3. Note the different standard oxygen content specified in the standard reference conditions, 10% O_2 rather than 11% O_2 specified for incineration plant. This means that the limits for heavy metals and dioxins are tighter than incinerators.
4. Existing plant is plant that had a permit and started to operate before 28/12/04.

Special provisions for combustion plant co-incinerating waste

6.54 This section specifies the process emission limit values that are to be used in the mixing rule formula. Note that the limits are to be based on daily averages - half-hourly values are only needed to calculate the daily average values.

6.55 Annex II of the WID specifies C_{proc} (process emission limit) values for SO_2, NOx, and dust as listed below. These should be used to calculate the total ELV for these pollutants. For other pollutants (such as VOCs, HCl, HF and CO) use process limits (C_{proc}) specified in the permit/national guidance or in the absence of these, the actual measured values.

C_{proc} for solid fuels expressed in mg/Nm^3 (O_2 content 6%):

Pollutants	**< 50 MWth**	**50 to 100 MWth**	**100 to 300 MWth**	**> 300 MWth**
SO_2 General case		850	850 to 200 (linear decrease from 100 to 300 MWth)	200
Indigenous fuels		or rate of desulphurisation > 90%	or rate of desulphurisation > 92%	or rate of desulphurisation > 95%
NO_x		400	300	200
Dust	50	50	30	30

C_{proc} for biomass expressed in mg/Nm^3 (O_2 content 6%):

6.56 Biomass means products consisting of any whole or part of a vegetable matter from agriculture or forestry, which can be used for the purpose of recovering its energy content as well as wastes listed in Article 2(2)(a)(i) to (v) of the WID.

Pollutants	< 50 MWth	50 - 100 MWth	100 - 300 MWth	> 300 MWth
SO_2		200	200	200
NO_x		350	300	300
Dust	50	50	30	30

C_{proc} for liquid fuels expressed in mg/Nm^3 (O_2 content 3%):

Pollutants	< 50 MWth	50 to 100 MWth	100 to 300 MWth	> 300 MWth
SO_2		850	850 to 200 (linear decrease from 100 to 300 MWth)	200
NOx		400	300	200
Dust	50	50	30	30

Total ELV's for heavy metals and dioxins for co-incinerators

6.57 The Directive sets the following emission limit values for certain pollutants which are to be imposed without *pro rata*. Note that these limits are at 6% oxygen even for liquid fuels.

Pollutant	(a) Directive Requirement	
	Emission Limit (mg/Nm$^{3)}$	**Averaging Period**
Cd and Tl	total 0.05	All average values over the sample period 30 minutes to 8 hours
Hg	0.05	
Sb,As, Pb, Cr, Co, Cu, Mn, Ni and V	total 0.5	
Dioxins and furans	0.1 ng/m^3 TEQ	CEN method, sample period 6 to 8 hours

Special provisions for industrial sectors not covered under II.1 or II.2 co-incinerating waste.

6.58 Use Annex II mixing formula to calculate ELVs for SO_2, NOx, dust, VOCs, HCl, and HF, CO, and total Sb +As + Pb + Cr + Co + Cu + Mn + Ni + V (relevant pollutants listed in Annex V of the WID). In addition the following limits apply in full. The WID does not specify reference conditions but it will be reasonable to assume that the limits will apply at 11% oxygen**.**

Pollutant	(a) Directive Requirement	
	Emission Limit, mg/Nm^3	**Averaging Period**

Cd and Tl	total 0.05	All average values over the sample period 30 minutes to 8 hours
Hg	0.05	
Dioxins and Furans	0.1 ng/m^3 TEQ	CEN method, sample period 6 to 8 hours

Other non-specified ELVs

6.59 Article 7(5) allows Member States to set emission limits for other pollutants especially polycyclic aromatic hydrocarbons (PAHs). There is a lack of monitoring data on the release of PAHs from the co-incineration sector on which to base such limits or even to decide if a limit is required. The Waste Incineration Regulations thus require the regulators to impose monitoring requirements in the permits but not set a limit. Once sufficient data is available, a decision can be made on the future of this requirement. The list of PAHs to be monitored and reported is given in Section 6.45.

6.60 Some co-incinerators are likely to require abatement plant for meeting the NO_x limits and SNCR is the technique commonly used for this purpose. SNCR has a potential to release ammonia and N_2O. Regulators will therefore be asking for monitoring of these pollutants with or without specified limits.

Water Emission Limit Values (Article 8)

6.61 The WID requires that the waste water from the cleaning of exhaust gases discharged from an incineration or co-incineration plant shall be subject to a permit granted by the regulators. It further requires that discharges to the aquatic environment of waste water resulting from the cleaning of exhaust gases shall be limited as far as practicable, at least in accordance with the emission limit values set in Annex IV of the WID. There is also a requirement to set operational control parameters at least for pH, temperature and flow.

6.62 There are also some more general requirements in respect of the design and operation of the plant to prevent unauthorised and accidental release of polluting substances into soil, surface water or ground water. This applies to all potential sources of pollution on the site, not just to the releases from air pollution control equipment. If BAT is used this will normally fulfil the WID requirements.

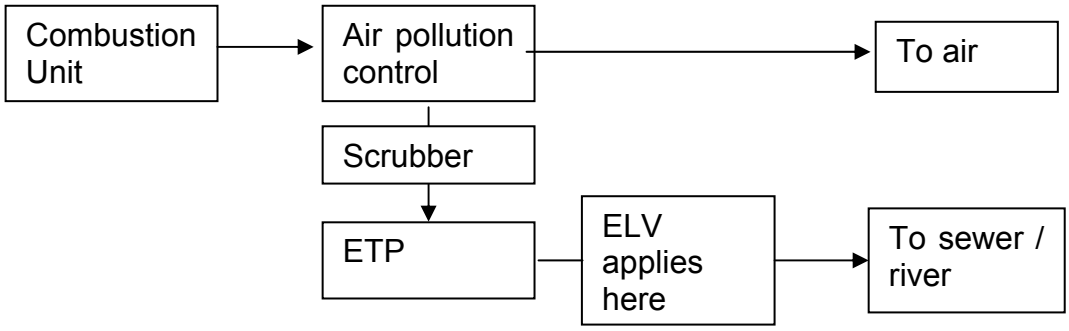
6.63 The WID specifically states that storage capacity shall be provided for contaminated rainwater run-off from the site or for contaminated water arising from “spillage or fire fighting operations.”

6.64 In the context of this requirement, “contaminated rainwater” should also be taken to include all areas where there is reasonable risk of contamination by the installation. This would normally exclude roof

water, access road drainage and office or other ancillary operations. Contamination of rainwater and spillages caused by the storage of feedstock wastes, chemicals, fuels and all residues should be avoided by storage under cover, on suitably impermeable surfaces with contained or controlled drainage.

6.65 A risk assessment process should be used to determine the volume of storage that is required to contain fire water. At new sites it is likely that it will be possible for site drainage to be engineered such that complete containment is provided. This may include, for example, the use of bunding, or the routing of drainage to a holding tank or an on-site effluent treatment plant using an emergency valve.

6.66 Annex IV of the WID lists the emission limit values for discharge of water from air pollution control devices. Where such effluents are discharged (to sewer or controlled water) these limits, and the monitoring and compliance requirements must be included in permits. It is important to note that the operational control parameters of pH, temperature and flow apply to all effluents (including scrubber discharges), whereas the ELVs for suspended solids, metals and dioxins only need to be applied where air pollution control liquors are discharged (alone or in combination with other effluents).



ELV's for discharges of waste water from the cleaning of exhaust gases

Polluting substances	Emission limit values expressed in mass concentrations for unfiltered samples	
1. Total suspended solids as defined by Directive 91/271/EEC	95% 30 mg/l	100% 45 mg/l
2.Mercury and its compounds, expressed as mercury (Hg)	0.03 mg/l	
3.Cadmium and its compounds, expressed as cadmium (Cd)	0.05 mg/l	
4.Thallium and its compounds, expressed as thallium (Tl)	0.05 mg/l	
5.Arsenic and its compounds, expressed as arsenic (As)	0.15 mg/l	
6.Lead and its compounds, expressed as lead (Pb)	0.2 mg/l	
7.Chromium and its compounds, expressed as chromium (Cr)	0.5 mg/l	
8.Copper and its compounds, expressed as copper (Cu)	0.5 mg/l	
9.Nickel and its compounds, expressed as nickel (Ni)	0.5 mg/l	
10.Zinc and its compounds, expressed as Zinc (Zn)	1.5 mg/l	
11. Dioxins and furans, defined as the sum of the individual dioxins and furans I-TEQ	0.3 ng/l	

Where do the ELVs apply?

6.67 The emission limits apply at the point where waste-waters from the cleaning of exhaust gases are discharged from the plant and allow on-site or off-site effluent treatment to be used to achieve the ELVs. Where there is an ETP the ELVs apply at the discharge point from the ETP. Where the ETP receives other inputs ELVs must be *prorata* by volume (see section below on combined effluents).

Off-site ETP:

6.68 BAT is likely to require an on-site effluent treatment plant for the treatment of liquors from air pollution control equipment prior to release from the site (whether to sewer or controlled water). Off-site ETPs dedicated to the treatment of wastewater from incineration or co-incineration are in practice unlikely to be found.

6.69 It is more likely that other effluents will also be received at an off-site ETP (e.g. a sewerage treatment plant). Here ELVs must be *pro rata* by volume (see section below on combined effluents) and compliance determined by means of up-stream and downstream measurements of concentration and flow. Access arrangements are again likely to be an issue.

6.70 Wherever off-site treatment is proposed, the regulator will need to carefully consider the fate of the pollutants discharged from the incineration process. Treatment of a more concentrated effluent stream in a dedicated ETP is more likely to meet BAT requirements than downstream treatment in a plant provided primarily for other purposes (e.g. sewerage treatment plant). For example, heavy metals and dioxins may accumulate in sludge, which may be subsequently re-used for agricultural purposes. Up-stream dedicated treatment would avoid such pollutant transfer.

Common Examples where ELVs do not apply:

6.71 Hard-standing drainage is discharged separately from scrubber liquors (i.e. it only combines after the scrubber liquors have been treated in the ETP) – ELVs will not apply. BAT will.

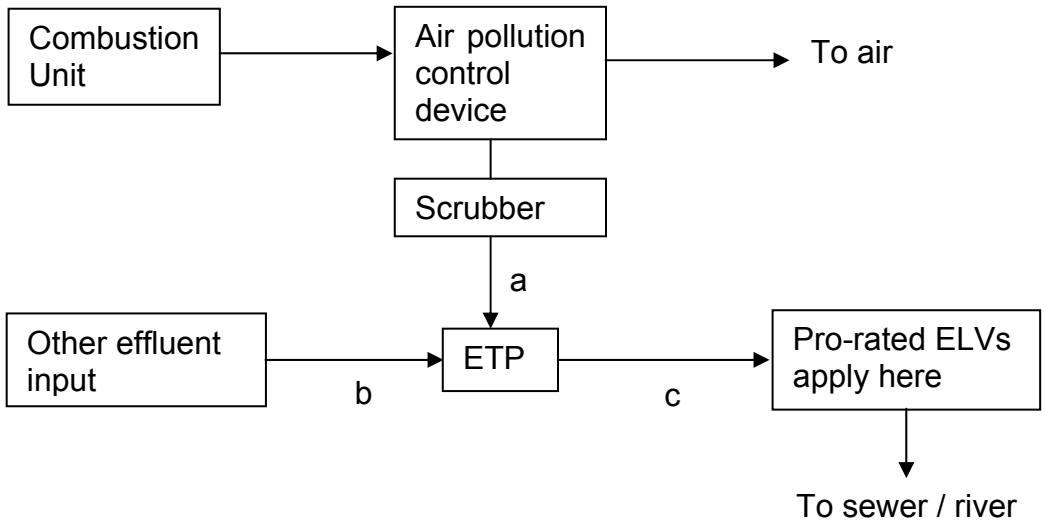
6.72 Boiler blow-down is treated and the effluent re-circulated to an ash quench pit where it is absorbed onto the ash – there is no effluent discharge and there is no requirement for internal ELVs.

Calculating ELVs for Combined Effluents:

6.73 The WID does not allow dilution to be used for the purposes of compliance with the water ELVs. Where effluents are combined it will be necessary to account for any dilution in assessing compliance. This is the case whether the additional diluting effluents are derived from the incineration plant itself or from other sources and applies to on-site or off-site ETP.

6.74 The aim is to assess the concentration of the pollutants listed in Annex IV that are discharged from the site, that are attributable to the cleaning of the exhaust gases.

Combined Effluent Treatment:

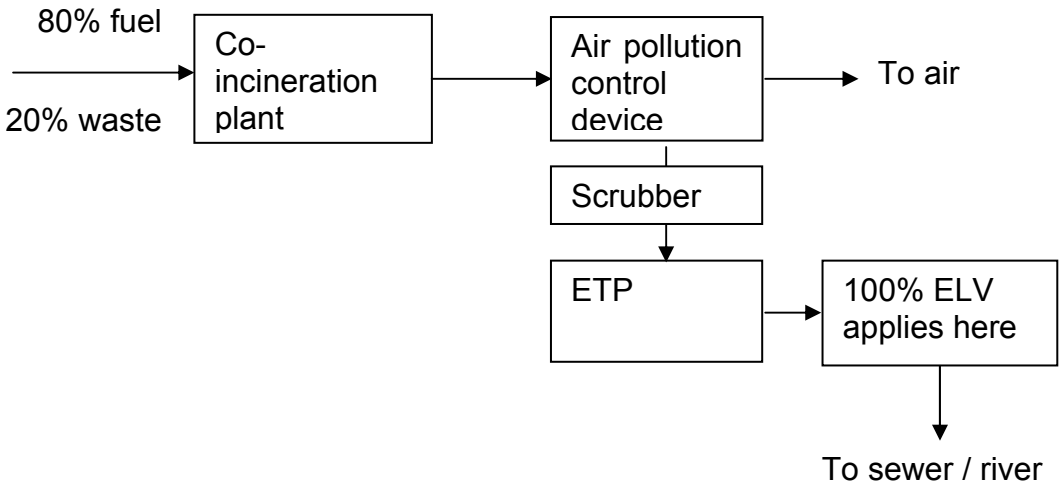


Notes:

1. Points a, b and c relate to sampling points required to assess compliance with ELVs.
2. The same procedure applies to on-site and off-site ETP.
3. In such situations the ELVs still apply after the scrubber effluent has been treated by the ETP, but it is necessary to account for any dilution afforded by the addition of the other effluents. This must be achieved by taking the required measurements at locations a, b and c. Appropriate mass balance calculations should then be used to determine the emission levels in the final wastewater discharge (i.e. from the ETP) that can be attributed to the wastewater arising from the cleaning of exhaust gases.

6.75 Note that the WID does not specify that only those pollutants that arise from the combustion of waste are subject to the ELVs. Where waste is co-incinerated with non-waste fuels, the ELVs will apply to all of the waste water arising from the flue gas treatment system, and not just to that part which is attributable to waste combustion

Co-incineration:



Note:

1. the ELV applies to all of the scrubber liquors, not just the 20% arising from the combustion of waste.
2. Again the pollutant concentrations should be compared with the ELVs after the ETP. Also, were the ETP to take other effluents, it will be necessary for compliance with the Directive ELVs to be assessed as described in the section above on combined effluents.

Monitoring

Requirements for Incinerators and Co- incinerators

6.76 The aim of the Directive is to prevent or to limit negative effects on the environment and the risks to human health. It achieves this by setting stringent operational conditions and technical requirements and through setting ELVs for waste incineration and co-incineration plants. The WID requires that:

(a) the permit can only be granted if the applicant shows that the proposed measurement techniques for emissions to air will comply with the requirements of the WID;

(b) the permit specifies the sampling and measurement procedures to satisfy the obligations imposed;

(c) measurement requirements are laid down in the permit or in the conditions attached to the permit issued by the regulators;

(d) measurement equipment should be installed meaning thereby that temporary equipment is not acceptable (on long term basis);

(e) the location of the sampling or measurement points must be laid down by the regulator, and

(f) the calibration of continuous monitoring equipment and the periodic measurements of the emissions into the air and water must be carried out representatively and according to CEN standards. If CEN standards are not available, ISO standards, national/international standards which can provide data of equivalent scientific quality must be used.

(g) Monitoring requirements are taken to include the substances to be measured, the frequency at which they should be measured and reported, the methods to be used, compliance criteria, calibration methods and the standards to be used.

(h) In addition to the generic requirements listed above and the calibration of monitors discussed later, the main parameters that are to be monitored include: process/operational parameters, releases to air and releases to water.

Monitoring of Process / Operational Parameters

6.77 As well as TOC and LOI, the WID also requires continuous measurements of the following process operation parameters:

(a) temperature near the inner wall or at another representative point of the combustion chamber as authorised by the regulator,

(b) concentration of oxygen,

(c) pressure,

(d) temperature, and

(e) water vapour content of the exhaust gas. The continuous measurement of water vapour is not required if the sampled flue gas is dried before the emissions are analysed.

These requirements can be summarised as below.

Parameter	Monitoring/Measurement Requirement
Mass of each category of waste accepted	According to EWC where possible. Use actual weight where possible
Hazardous waste accepted	Composition, CV, taking samples
TOC/LOI content of slag / bottom ashes	Sampling and analysis as specified in the permit
Flue gases	Continuous measurement of oxygen content, temperature, pressure and water vapour (except where the gas is dried before analysis).
Soluble fraction of Residues	Total soluble fraction and the heavy metal content of this fraction
Residence time and temperatures	Verification of residence time, location of temperature measurement points

Monitoring of Releases to Air

6.78 NO_x (provided that emission limit values are set), total dust, TOC, HCl, HF and SO_2 should be monitored continuously. Regulators may also set frequencies for the monitoring of NH_3 and N_2O.

6.79 Operators should take at least two measurements per year of heavy metals, dioxins and furans, dioxin-like PCBs and PAHs but there should be one measurement at least every three months for the first 12 months of operation. These are the minimum frequencies for periodic measurements. However, the regulators may ask for more frequent sampling and analysis.

Exemptions

6.80 The continuous measurement of HF may be omitted if treatment stages for HCl are used which ensure that the emission limit value for HCl is not being exceeded. This means that two conditions have to be satisfied simultaneously i.e. there has to be an abatement stage for HCl removal and the abated flue gas has to meet HCl emission limits. The assumption here is that any technology that removes HCl from the flue gas will also remove HF. In this case the emissions of HF can be subject to periodic measurements as noted above for dioxins and heavy metals.

6.81 Periodic measurements of HCl, HF and SO_2 instead of continuous measuring may be authorised for incineration or co-incineration plants, if the operator can prove that the emissions of those pollutants can under no circumstances be higher than the prescribed emission limit values. Since these pollutants arise from the constituents of the waste, the operator will have to prove that the concentrations of chlorine, sulphur and fluorine in the waste will under all circumstances

be below a certain level. Regulators will have to ensure that this remains the case and are, therefore, likely to impose frequent sampling and analysis requirements on the waste streams.

Standardisation and Compliance

Standardisation

6.82 The results of the measurements made to verify compliance with the emission limit values are to be standardised at the following conditions and for oxygen according to the formula in Annex VI of the WID:

(a) Temperature 273 K, pressure 101.3 kPa, 11% oxygen, dry gas, in exhaust gas of incineration plants;

(b) Temperature 273 K, pressure 101.3 kPa, 3% oxygen, dry gas, in exhaust gas of incineration of waste oil as defined in Directive 2008/98/EC. Note that this reference condition only applies to waste oils and not to all liquid wastes;

(c) When the wastes are incinerated or co-incinerated in an oxygen-enriched atmosphere, the results of the measurements can be standardised at an oxygen content laid down by the regulator reflecting the special circumstances of the individual case, and

(d) In the case of co-incineration, the results of the measurements should be standardised to a total oxygen content as described in Section 6.51 above.

6.83 When the emissions of pollutants are reduced by exhaust gas treatment in an incineration or co-incineration plant treating hazardous waste, the standardisation with respect to the oxygen contents can only done if the measured oxygen level exceeds the relevant standard oxygen content. For example, if the emission limit is set at 10% oxygen (e.g. for cement plants), standardisation to this value is only allowed if the oxygen level during emission monitoring is higher than 10%. Note that this requirement does not apply to non-hazardous waste.

Compliance

6.84 It is essential that all results are recorded, processed and presented in a fashion that allows a transparent verification of compliance with the operating conditions and emission limit values specified in the permit.

6.85 The WID requires that if the measurements taken show that the ELVs for air or water have been exceeded, the regulator should be informed without delay

6.86 To show that the operator has complied with the ELVs for air, the following criteria would apply:

(a) none of the daily average values exceeds any of the ELVs set out in the Sections on Emission Limit Values for Incinerators and Air Emission Limit Values for co-incinerators above

(b) 97% of the daily average values over the year does not exceed the emission limit value of 50 mg/m^3 CO,

(c) either none of the half-hourly average values exceeds any of the emission limit values set out in column A or, where relevant, 97% of the half-hourly average values over the year do not exceed any of the emission limit values set out in column B (see table for half hourly limits in the Section 6.40). The regulators may be more inclined to apply the limit values in Column A as this gives a better short term picture

(d) none of the average values over the sample period set out for heavy metals and dioxins and furans exceed the emission limit values set out in tables in Section 6.40 (incinerators) and 6.47 (co-incinerators), and

(e) CO emission limit values of 150 milligrams/m^3 of combustion gas of at least 95 % of all measurements determined as 10-minute average values or 100 mg/m^3 of combustion gas of all measurements determined as half-hourly average values taken in any 24-hour period are complied with.

6.87 The above compliance requirements apply at all times when waste is being burnt except under abnormal operating conditions as discussed in Section 6.39. This raises the question whether these requirements also apply during the commissioning of a new plant. The WID does not seem to cover this situation as it always relates to normal plant operations. The Government believes that a strict compliance is not achievable during this period. As such, regulators should require the operator to submit a commissioning plan with an estimate of:

- number of operating hours outside the emission limits;
- anticipated emission levels; and
- environmental impact

6.88 Any breaches should be reported as normal for review by the regulator. Given the breaches are anticipated and that commissioning of the plant is not normal operation there is sufficient mitigation that no enforcement action is required, providing the regulator considers the operator has not been negligent and that the management controls for commissioning are sufficient.

Averages

6.89 The WID specifies limit values averaged over a defined period, e.g. daily, half hourly etc. It also details how these averages are to be calculated.

6.90 The half-hourly and the 10-minute averages should be determined within the effective operating time from the measured values after having subtracted the value of the confidence interval specified in Section 6.95 later. Effective period here does not include start-up or shut-down provided no waste is being burnt. The daily average values are then determined from those validated average values.

6.91 To obtain a valid daily average value no more than five half-hourly average values in any day may be discarded due to malfunction or maintenance of the continuous measurement system. No more than ten daily average values per year shall be discarded due to malfunction or maintenance of the continuous measurement system. Note that values can only be discarded if the operator can confirm that the CEM(s) were under maintenance or malfunctioning. In other words, operators cannot simply discard five highest averages in a day.

Monitoring standards

6.92 The following table summarises monitoring requirements in respect of releases to air. Monitoring standards apply to continuous monitoring, for monitoring systems permanently fixed onto stacks, and to periodic methods, which are used for check monitoring and for calibrating permanent monitoring systems.

6.93 CEN standards should be used in the first instance, but if there are no CEN standards available, then the ISO standards should be used next, followed by national and any other international standards which produce data of an equivalent quality. At the time of writing, CEN is currently producing standards for several determinands, including the following:

- Reference methods for emissions of NOx, SO_2, CO, moisture and oxygen.
- Continuous methods for low levels of dust and mercury.

- Performance specifications and a type-testing scheme for continuous emission monitoring systems of gases and particulates.

The Environment Agency's Technical Guidance Note (TGN), M2, Monitoring of stack emissions to air, contains up-to-date lists of monitoring standards. This TGN is available from the Environment Agency's website at www.environment-agency.gov.uk or directly from www.mcerts.net

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Parameter	Frequency	Method/Specification	WID Ref.
NOx (NO and NO_2 as NO_2)	Continuous (provided emission limits are set)	ISO 10849 [1]	11.2(a) Annex V
	Periodic: extractive, wet chemical method - 2 per year but every 3 months in first year of operation	BS EN 14792[1]	Annex III
CO	Continuous	ISO 12039[1]	11.2(a) Annex V
	Periodic	BS EN 15058	Annex III
Total dust	Continuous	BS ISO 13284-2 and prEN15267-3[1]	11.2(a) Annex V
	Periodic - 2 per year but every 3 months in first year of operation	BS EN 13284-1:	Annex III
VOC (expressed as TOC)	Continuous	BS EN 12619 (low concentrations)[2]	11.2(a) Annex V
	Periodic - 2 per year but every 3 months in first year of operation	BS EN 12619	Annex III
HCl	Continuous or,	MCERTS Performance Standards for CEMs[1]	11.2(a) Annex V
	Periodic - 2 per year but every 3 months in first year of operation (only where raw flue gas cannot exceed ELV)	BS EN1911, parts 1-3	Annex III 11.6

Parameter	Frequency	Method/Specification	WID Ref.
HF	Continuous	MCERTS performance standards for CEMs.	11.2(a) Annexe V
	Periodic - 2 per year but every 3 months in first year of operation (providing treatment stages for HCl ensure ELV for HCl is complied with or where raw flue gas cannot exceed ELV)	ISO 15713 is published.	Annex III 11.4 11.6
SO_2	Continuous	BS 6069-4.4 (ISO 7935)[1]	11.2(a) Annex V
	Periodic	BS EN 14791	Annex III
Hg	Periodic – 2 per year but every 3 months in first year of operation. Average value over sample period of between 30 minutes and 8 hours.	BS EN 13211	11.2(c) 11.7 Annex V Annex III
Cd, Tl, Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V	Periodic – 2 per year but every 3 months in first year of operation. Average value over sample period of between 30 minutes and 8 hours.	BS EN 14385	11.2(c) 11.7 Annex V Annex III
Dioxins and Furans (TEQ as per Annex I of the Directive)	Periodic – 2 per year but one every 3 months in first 12 months of operation. Average value over sample period of between 6 and 8 hours. Determination in accordance with CEN standard.	BS EN 1948 parts 1-3	11.2(c) 11.7 Annex V Annex III Annex II
PAHs and other pollutants	Frequency to be specified at the discretion of the regulator.	ISO 11338, parts 1 and 2	11.2(c)
Combustion chamber gas temperature	Continuous (Temperature measured near the inner wall or agreed representative point)	MCERTS Performance Standards for CEMs	11.2(b)
Exhaust gas oxygen concentration	Continuous Note: Verification of oxygen content required under “most unfavourable conditions” (Article11(3))	ISO 12039[1]	11.2(b) 11.3
	Periodic – whenever other periodic measurements are performed	Using equipment which complies with ISO 12039 within an accredited method[1]	

Parameter	Frequency	Method/Specification	WID Ref.
Exhaust gas pressure	Continuous	MCERTS Performance Standards for CEMs	11.2(b)
Exhaust gas velocity	Continuous	BS ISO 14164[1]	
	Periodic – whenever other forms of periodic monitoring are carried out.	ISO 10780[3]	
Exhaust gas water content.	Continuous (not required if sampled exhaust gas is dried prior to analysis) Extractive	MCERTS Performance Standards for CEMs[1] BS EN 14790	11.2(b) 11.5

Notes:

Note 1: CEN standards are currently being developed and these should be used when published. These standards are in the prEN 15267 series.

Note 2: BS EN 12619 is primarily a reference method although it can also be used for permanent CEMs subject to certain operational requirements. These requirements are being clarified in a new CEN standard, prEN 15267-3 and until this is published, BS EN 12619 applies.

Note 3: ISO 10780 is recommended, unless there is a sound reason to justify the use of BS 1042-2.1

Monitoring Equipment

6.94 The following requirements relate to the monitoring equipment and the relevant standards to be used.

(a) measurement equipment should be installed and techniques used in order to monitor the parameters, conditions and mass concentrations relevant to the incineration or co-incineration process;

(b) CEMs should meet the requirements of applicable international standards and demonstrate that they meet such requirements, i.e be MCERTS certified.

(c) CEMs should also be proven over a suitable range for the process.

(d) the appropriate installation and the functioning of the automated monitoring equipment for emissions into air and water must be subject to at least an annual surveillance test. Calibration has to be carried out using parallel measurements with reference methods at least every three years,

(e) the location of the sampling or measurement points should be specified by the regulator. Operators should refer to the Environment Agency's *TGN M1, Sampling and safety requirements for monitoring stack releases to air*, available from the Environment Agency's website at www.environment-agency.gov.uk.

(f) measurements for the determination of concentrations of air and water polluting substances must be carried out representatively, and

(g) sampling and analysis of all pollutants including dioxins and furans as well as reference measurement methods to calibrate automated measurement systems shall be carried out as given by CEN-standards. If CEN standards are not available, ISO standards, national or international standards, which will ensure the provision of data of an equivalent scientific quality, should be used.

(h) CEMs shall meet the requirements for uncertainty budgets specified in Annex III of the WID. These requirements are explained in the following section.

Uncertainty budgets

6.95 The WID expresses uncertainty budgets and 95% confidence intervals at the ELV. The uncertainty budget can be viewed as an allowable margin of error in the measurement, as a combination of the systematic and random errors. The systematic error is a measure of the accuracy whilst the random error can be seen as a measure of the precision of the measurements.

6.96 The 95% confidence interval encompasses approximately two standard deviations of the measurement either side of the mean average value. This is known as the *expanded uncertainty*, whereas the *standard uncertainty* is one standard deviation.

6.97 For CEMs and at the daily ELV, the values of the 95% confidence intervals of a single measured result must not exceed the following percentages of the emission limit values:

Carbon monoxide	10%
Sulphur dioxide	20%
Nitrogen dioxide	20%
Total dust	30%
Total organic carbon	30%
Hydrogen chloride	40%
Hydrogen fluoride	40%

6.98 In simple terms, the allowable uncertainty budgets are performance specifications for the monitoring systems and they can be converted to absolute values from the specifications in Annex III of the WID. For

example, the table below shows the daily average ELVs for some determinands, and the concomitant allowable uncertainty expressed in as concentrations.

Uncertainty budgets for specific determinands

Determinand	ELV	Uncertainty budget (%)	Uncertainty budget in $mg.m^{-3}$
HCl	10	40%	4 $mg.m^{-3}$
SO_2	50	20%	10 $mg.m^{-3}$
TOC	10	30%	3 $mg.m^{-3}$
NO_2	200	20%	40 $mg.m^{-3}$
Dust	10	30%	3 $mg.m^{-3}$

6.99 Several performance characteristics contribute to the overall uncertainty of the monitoring results, such as the drift, linearity, sensitivity to environmental conditions and cross-sensitivity to other determinands. The operator must demonstrate that the monitoring performed at the installation – for both continuous and periodic measurements – at least meets the uncertainty budgets specified in the WID.

6.100 BS EN ISO 14956, Air quality —Evaluation of the suitability of a measurement procedure by comparison with a required measurement uncertainty, describes a procedure for determining uncertainty of monitoring, whilst EN14181, Quality assurance of AMS, describes a procedure for ensuring that monitoring systems are suitable at the outset and perform sufficiently to continue meeting the uncertainty requirements of the WID. THe EA applies BS ISO 14956 and the related QAL1 requirements of BS EN ISO 14181 through MCERTS for CEMs available at http://www.mcerts.net.

6.101 To assess compliance of monitoring data against an emission limit value, the monitoring data needs to be "corrected" for uncertainty errors. This is achieved by subtracting the above confidence interval from the measured value. The appropriate percentage value needs to be applied to the **measured value** to correct the data. The required steps to be taken are set out below:

Step 1.

$$\text{Measured value} \times \frac{\%\ \text{Confidence Interval}}{100} = \text{measured uncertainty error}$$

Step 2.

Correct the measured result by subtracting the measurement uncertainty error

Measured value – measurement uncertainty error = "corrected" data

Step 3.

Compare the corrected data versus the appropriate emission limit value to assess compliance

Example calculation

Assume:
Measured value for particulates is 13 mg/m^3 hourly average
Confidence interval for particulates is 30%.
ELV for particulates is 10mg/m^3

Following the steps set out above:

1. $13 \times \frac{30}{100}$ = 3.9 mg/m^3 measurement uncertainty error

2. 13 – 3.9 = 9.1 mg/m^3 "corrected" data

3. "corrected data" < ELV therefore the measured value is compliant with the ELV taking into account measurement uncertainty

Monitoring Releases to Water

6.102 Water release limits are discussed in Section 6.61. The WID imposes the following monitoring requirements for these releases.

(a) pH, temperature and flow of the discharge water should be measured continuously,

(b) daily spot sample for measurements of total suspended solids,

(c) regulators may alternatively require measurements of a flow proportional representative sample over a period of 24 hours;

(d) at least monthly measurements of a flow proportional representative sample of the discharge over a period of 24 hours of the heavy metals listed in the ELV table in Section 6.40, and

(e) dioxins and furans should be measured at least every six months; however one measurement at least every three months should be carried out for the first 12 months of operation. Regulators may fix measurement periods for polycyclic aromatic hydrocarbons or other pollutants.

The following table summarises these requirements.

Parameter	**Frequency of sampling**	**Standard/Method**
PH	Continuous	BS 1647-2:1984
Temperature	Continuous	Traceable to national standards
Flow	Continuous	BS 3680 series
Total suspended solids (as defined by 91/271/EEC)	Daily spot sample **or** flow proportional sample over 24-hours	BS EN 872:1996
Hg and its compounds, expressed as Hg.	Monthly flow proportional sample over 24-hours	BS EN 13506:2002
Cd and its compounds, expressed as Cd.	Monthly flow proportional sample over 24-hours	BS ISO/DIS 17294-1, 2
Tl and its compounds, expressed as Tl.	Monthly flow proportional sample over 24-hours	BS ISO/DIS 17294-1, 2
As and its compounds, expressed as As.	Monthly flow proportional sample over 24-hours	BS EN ISO 11969:1996
Pb and its compounds, expressed as Pb.	Monthly flow proportional sample over 24-hours	BS EN ISO 11885:1997
Cr and its compounds, expressed as Cr	Monthly flow proportional sample over 24-hours	BS EN ISO 11885:1997
Cu and its compounds, expressed as Cu.	Monthly flow proportional sample over 24-hours	BS EN ISO 11885:1997
Ni and its compounds, expressed as Ni.	Monthly flow proportional sample over 24-hours	BS EN ISO 11885:1997
Zn and its compounds, expressed as Zn.	Monthly flow proportional sample over 24-hours	BS EN ISO 11885:1997
Dioxins and Furans (TEQ)	Every 6 months, but every 3 months during the first year of operation.	USEPA Method 1613
Other pollutants - PAH	As appropriate based on site specific assessment.	USEPA Method 0610
Other pollutants – Dioxin-like PCBs	As appropriate based on site specific assessment.	USEPA Methods 0680, 1668

Compliance

6.103 The emission limit values (see Section 6.61.) for water will be regarded as being complied with if:

(a) 95% and 100% of the measured values do not exceed the respective emission limit values for suspended solids,

(b) no more than one measurement per year exceeds the emission limit values for heavy metals or, if the regulator requires more than 20 samples per year, no more than 5% of these samples exceed these emission limit values, and

(c) the twice-yearly measurements do not exceed the emission limit value for dioxins and furans.

Disposal of Ash

6.104 Although the WID does not specifically state how ash from incineration plant should be treated, other EU legislation is relevant. Ash which is disposed of to landfill will be required to comply with the Landfill Directive (the "LfD").

6.105 The Landfill Directive (LfD) aims to reduce reliance on landfill as a disposal option, minimise the impacts of landfills on the environment and human health, and ensure consistent standards across the EU. It aims to do this by:

- setting minimum standards for the location, design, construction and operation of landfills
- setting targets for diversion of biodegradable municipal waste from landfill
- controlling the nature of waste accepted for landfill

In Northern Ireland waste going to landfill is controlled under the following Regulations:

Landfill Regulations (Northern Ireland) 2003 SR 496
Landfill (Amendment) Regulations (Northern Ireland) 2004 SR 297
Landfill (Amendment) Regulations (Northern Ireland) 2007 SR 179
Landfill (Amendment No 2) Regulations (Northern Ireland) 2007 SR 258

6.106 Further guidance on the requirements of waste destined for landfill is available from the Environment Agency in the form of the following documents.

1. Waste acceptance at landfills
2. Guidance on sampling and testing of Wastes to meet landfill waste acceptance procedures

ANNEX 1 – The WID and associated Corrigendum

The WID itself can be found at:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:332:0091:0111:EN:PDF

It has not been included in hard copy as part of this guidance to reduce the size of the printed document.
The corrigendum to the Directive is printed below.

THE WASTE INCINERATION DIRECTIVE

32000L0076R(01)

Corrigendum to Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste (OJ L 332 of 28.12.2000)
Official Journal L 145 , 31/05/2001 P. 0052 - 0052
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Corrigendum to Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste
(Official Journal of the European Communities L 332 of 28 December 2000)

On page 95 in Article 3(6):
for: "6. "existing co-incineration or co-incineration plant" means ...",
read: "6. "existing incineration or co-incineration plant" means ...";
and on page 108 in Annex IV in the second column relating to point 11. "Dioxins and furans,...":

for: "0.3 mg/l",
read: "0,3 ng/l".

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ANNEX 2 – Northern Ireland Legislation implementing the WID

STATUTORY RULES OF NORTHERN IRELAND

2003 No. 390

ENVIRONMENTAL PROTECTION

The Waste Incineration Regulations (Northern Ireland) 2003

Made - - - - *29th August 2003*

Coming into operation - *22nd September 2003*

The Department of the Environment, in exercise of the powers conferred upon it by Article 4 of the Environment (Northern Ireland) Order 2002([9]) and of all other powers enabling it in that behalf and having, in accordance with Article 4(4) of that Order, consulted district councils and such bodies or persons appearing to it to be representative of the interests of district councils as it considers appropriate, such bodies and persons appearing to it to be representative of the interests of industry, agriculture and business as it considers appropriate and such other bodies or persons as it considers appropriate, hereby make the following Regulations –

Citation and commencement

1. These Regulations may be cited as the Waste Incineration Regulations (Northern Ireland) 2003 and shall come into operation on 22nd September 2003.

Interpretation

2.—✓. In these Regulations -

"the 1978 Order" means the Pollution Control and Local; Government (Northern Ireland) Order 1978([10])

"the 1997 Order" means the Industrial Pollution Control (Northern Ireland) Order 1997([11]);

"the 2003 Regulations" means the Pollution Prevention and Control Regulations (Northern Ireland) 2003([12]);

"authorisation" means an authorisation granted under Article 6 of the 1997 Order;

"the Directive" means Directive 2000/76/EC on the Incineration of Waste([13]);

([9]) S.I. 2002/3153 (NI 7)
([10]) S.I.1978/1049 (NI 19)
([11]) S.I. 1997/2777 (NI 18)
([12]) SR 2003 No. 46
([13]) OJ l 332, 28.12.2000, p. 91

"disposal licence" means a disposal licence granted under Article 7 of the Pollution Control and Local Government (Northern Ireland) Order 1978([14]);

"existing waste incineration installation" means a waste incineration installation which –

(a) in the case of an installation which is a co-incineration plant, is put into operation before 28th December 2004 subject to a relevant approval; or

(b) in any other case –

(i) is put into operation before 28th December 2003 subject to a relevant approval granted before 28th December 2002; or

(ii) is put into operation before 28th December 2004, subject to a relevant approval granted on the basis of a duly made application submitted before 28th December 2002.

and where an installation becomes authorised as a waste incineration installation for the first time as a result of a modification notice pursuant to Article 9 of the 1978 Order, or a variation notice pursuant to Article 10 or 11 of the 1997 Order or regulation 17 of the 2003 Regulations, references in this definition to a relevant approval shall be construed as references to that modification or variation and not to the original relevant approval, and references to the grant of an approval shall be construed as references to the service of the notice effecting the modification or variation;

"permit" means a permit granted under regulation 10 of the 2003 Regulations;

"planning permission" means planning permission granted under the Planning (Northern Ireland) Order 1991([15]); and

"relevant approval" means any of the following –

(a) an authorisation;

(c) a disposal licence;

(d) a permit; or

(e) planning permission.

(2) Words and expressions, which are defined in the 2003 Regulations and used in these Regulations, shall have the same meaning as in the 2003 Regulations.

Application in relation to waste incineration installations

3.—✓ Subject to paragraph (7), where an existing waste incineration installation is subject on 31st December 2004 to a permit, the operator shall within the period 1st to 28th February 2005 make an application under regulation 17 of the 2003 Regulations for a variation of the conditions of that permit.

(1) Subject to paragraph (7), where an existing waste incineration installation (not being one falling within Section 5.1 of Part 1 of Schedule 1 of the 2003 Regulations), is subject on 31st December 2004 to an authorisation, the operator shall within the period 1st to 28th February 2005 either: -

(a) apply under Article 11 of the 1997 Order for a variation of the conditions of the authorisation; or

(b) make an application for a permit under regulation 10 of the 2003 Regulations.

(2) An application under paragraph (1) or (2) shall contain the information specified in paragraph 1A of Part 1 of Schedule 4 of the 2003 Regulations.

(3) Subject to paragraph (7), where a waste incineration installation would have fallen within paragraph (a), (b)(i) or (b)(ii) of the definition of existing waste incineration installation in

([14]) S.I. 1978/1049 (NI 19)
([15]) S.I.1991/1220 (N.I. 11)

regulation 2 had it been put into operation before the date specified in the applicable paragraph, it shall not thereafter be put into operation unless –

(a) in the case of an installation which is already subject to a permit, the permit is varied pursuant to an application under regulation 17 of the 2003 Regulations; or

(b) in any other case, a permit is granted in relation to the installation.

(4) Where an operator fails to comply with a requirement of this regulation the Chief Inspector shall serve a notice on the operator specifying the period within which he must comply with that requirement.

(5) A notice served under paragraph (5) shall be treated as an enforcement notice served under regulation 24(1) of the 2003 Regulations.

(6) Paragraphs (1), (2) and (4) shall not apply where an operator holds a relevant approval, which contains conditions requiring the operator to meet the requirements of the Directive.

Transitional provisions

4. Part 1 of Schedule 3 to the 2003 Regulations shall apply in relation to any installation or mobile plant which by virtue of these Regulations becomes a Part A installation or Part A mobile plant (but which would otherwise not have been an installation or mobile plant or would have been a Part B or Part C installation or Part B or Part C mobile plant) as if –

(a) in paragraph 4 sub-paragraph (1) were omitted; and

(b) in paragraph 6 –

(i) for the definition of "existing" there were substituted –

""existing" means, in relation to a Part A installation or a Part A mobile plant –

(a) an installation or mobile plant which is put into operation pursuant to a relevant authorisation granted where required, before 28th December 2002; or

(b) an installation or mobile plant, which is put into operation on or after that date if –

(i) its operation was authorised by a relevant authorisation before that date; or

(ii) an application for such authorisation was duly made before that date";"

(ii) in the definition of "new" for "31st October 1999" there were substituted "28th December 2002"; and

(iii) in the definition of "relevant authorisation" for "31st October 1999" (in both places where it occurs) there were substituted "28th December 2002".

Amendments to the 2003 Regulations

5.—✓ The 2003 Regulations have effect subject to the following amendments.

(1) In regulation 2 (interpretation: general) –

(a) in paragraph (2) after the definition of "variation notice" insert –

""waste incineration installation" means that part of an installation or mobile plant in which any of the following activities is carried out –

(i) the incineration of waste falling within Section 5.1 A(a), (b), (c), (d) or (e) of Part 1 of Schedule 1; or

(ii) any activity falling within any Section of that Part of that Schedule which is carried out in a co-incineration plant as defined in Section 5.1 of that Part of that Schedule"; and

(b) after paragraph (2) insert –

"(2A) For the purposes of these Regulations a change in the operation of a waste incineration installation which involves incineration or co-incineration of waste for the first time of hazardous waste shall be treated as a substantial change in operation, and for the

purposes of this paragraph "co-incineration" and "hazardous waste" shall have the meanings given in Section 5.1 of Part 1 of Schedule 1."

(2) In regulation 19 (application to surrender a permit for a Part A installation or Part A mobile plant) –

(a) in paragraph (1), delete "This regulation" and substitute "Subject to paragraph (1A) this regulation"; and

(b) after paragraph (1) insert –

"(1A) This regulation does not apply in relation to that part of any installation or mobile plant where an activity falling within Section 5.1A(d) or (e) of Part 1 of Schedule 1 is carried out."

(3) In regulation 20 (Notification of surrender of a permit for a Part B or Part C installation or Part B or Part C mobile plant) insert –

"(1A) This regulation also applies in relation to that part of any installation or mobile plant where an activity falling within Section 5.1A(d) or (e) of Part 1 of Schedule 1 is carried out."

(4) In Part 1 of Schedule 1 (Activities, Installations and Mobile Plant)

(a) delete Section 5.1 and substitute –

" SECTION 5.1

INCINERATION AND CO-INCINERATION OF WASTE

Part A

(a) The incineration of hazardous waste in an incineration plant.

(b) Unless carried out as part of any other Part A activity, the incineration of hazardous waste in a co-incineration plant.

(c) The incineration of non-hazardous waste in an incineration plant with a capacity of 1 tonne or more per hour.

(d) The incineration of non-hazardous waste in an incineration plant with a capacity of less than 1 tonne per hour.

(e) Unless carried out as part of any other Part A activity, the incineration of non-hazardous waste in a co-incineration plant.

(f) Unless carried out as part of any other activity in this Part, the incineration of hazardous waste in a plant which is not an incineration plant or a co-incineration plant.

(g) Unless carried out as part of any other activity in this Part, the incineration of non-hazardous waste in a plant which is not an incineration plant or a co-incineration plant but which has a capacity of 1 tonne or more per hour.

Part B

(a) The incineration of waste in an incineration plant, which is authorised for the incineration of radioactive waste under section 13 of the Radioactive Substances Act 1993([16]).

Part C

(a) The incineration of non-hazardous waste in a plant which is not an incineration plant or a co-incineration plant but which has a capacity of 50 kilogrammes or more per hour but less than 1 tonne per hour.

(b) The cremation of human remains.

([16]) 1993 c. 12

Interpretation of Section 5.1

In this Section –

"co-incineration" means the use of wastes as a regular or additional fuel in a co-incineration plant or the thermal treatment of waste for the purpose of disposal in a co-incineration plant;

"co-incineration plant" means any stationary or mobile plant whose main purpose is the generation of energy or production of material products and:

(i) which uses wastes as a regular or additional fuel; or

(ii) in which waste is thermally treated for the purpose of disposal.

If co-incineration takes place in such a way that the main purpose of the plant is not the generation of energy or production of material products but rather the thermal treatment of waste, the plant shall be regarded as an incineration plant.

This definition covers the site and the entire plant including all co-incineration lines, waste reception, storage, on site pre-treatment facilities, waste-, fuel-, and air-supply systems, boiler, facilities for the treatment of exhaust gases, on-site facilities for treatment or storage of residues and waste water, stack devices and systems for controlling incineration operations, recording and monitoring incineration conditions; but does not cover co-incineration in excluded plant;

"excluded plant" means-

(a) a plant treating only the following wastes-

(i) vegetable waste from agriculture and forestry;

(ii) vegetable waste from the food processing industry, if the heat generated is recovered;

(iii) fibrous vegetable waste from virgin pulp production and from production of paper from pulp, if it is co-incinerated at the place of production and the hat generated is recovered;

(iv) wood waste with the exception of wood waste which may contain halogenated organic compounds or heavy metals as a result of treatment with wood-preservatives or coating, and which includes in particular such wood waste originating from construction and demolition waste;

(v) cork waste;

(vi) radioactive waste;

(vii) animal carcasses as regulated by Council Directive 90/667/EEC laying down the veterinary rules for the disposal and processing of animal waste, for its placing on the market and for the prevention of pathogens in feedstuffs of animal or fish origin and amending Directive 90/425/EEC([17]); or

(viii) waste resulting from the exploration for, and the exploitation of, oil and gas resources from off-shore installations and incinerated on board the installation; and

(b) an experimental plant used for research, development and testing in order to improve the incineration process and which treat less than 50 tonnes of waste per year.

"hazardous waste" means any solid or liquid waste as defined in Article 1(4) of Council Directive 91/689/EEC on hazardous waste([18]) except for –

([17]) OJ No. L363, 27.12.90, p.51

([18]) OJ No. L377, 31.12.91, p20 amended by Council Directive 94/31/EC (OJ No. L168, 2.7.1994, p28).

(a) combustible liquid wastes including waste oils as defined in Article 1 of Council Directive 75/439/EEC on the disposal of waste oils([19]), provided that they meet the following criteria –

(i) the mass content of polychlorinated aromatic hydrocarbons, for example polychlorinated biphenyls or pentachlorinated phenol amounts to concentrations not higher than those set out in the relevant Community legislation([20]);

(ii) these wastes are not rendered hazardous by virtue of containing other constituents listed in Annex II to Council Directive 91/689/EEC on hazardous waste in quantities or in concentrations which are inconsistent with the achievement of the objectives set out in Article 4 of Council Directive 75/442/EEC on waste([21]); and

(iii) the net calorific value amounts to at least 30 MJ per kilogramme.

(b) any combustible liquid wastes which cannot cause, in the flue gas directly resulting from their combustion, emissions other than those from gasoil as defined in Article 1(1) of Council Directive 93/12/EEC relating to the sulphur content of certain liquid fuels([22]) or a higher concentration of emissions than those resulting from the combustion of gasoil as so defined;

"incineration plant" means any stationary or mobile technical unit and equipment dedicated to the thermal treatment of wastes with or without recovery of the combustion heat generated. This includes the incineration by oxidation of waste as well as other thermal treatment processes such as pyrolysis, gasification or plasma processes in so far as the substances resulting from the treatment are subsequently incinerated.

This definition covers the site and the entire incineration plant including all incineration lines, waste reception, storage, on site pre-treatment facilities, waste-fuel and air-supply systems, boiler, facilities for the treatment of exhaust gases, on-site facilities for treatment or storage of residues and waste water, stack, devices and systems for controlling incineration operations recording and monitoring incineration conditions; but does not cover incineration in an excluded plant;

"non-hazardous waste" means waste, which is not hazardous waste;

"waste" means any solid or liquid waste as defined in Article 1(a) of Council Directive 75/442/EEC on waste."; and

(b) in Part A(c) of Section 6.8 after "animal waste " insert "otherwise than by incineration falling within Section 5.1 of this Part of this Schedule".

(5) In Part 3 of Schedule 1 (Interpretation of "Part A installation" etc.) delete paragraph 17.

(6) In Part 1 of Schedule 3 (Prescribed date and transitional arrangements) –

(a) in the table which follows paragraph 2(2) delete that part of the table which relates to activities falling within Section 5.1 and substitute –

"

Section 5.1 Part A paragraphs (a) –(e)	1st – 28th February 2005
Section 5.1 Part A paragraphs (f) and (g)	1st – 30th September 2005

"

([19]) OJ No. L194, 25.7.75,p23

([20]) See, in particular Council Directive 96/59/EC (OJ No. L243, 24.9.96, p31).

([21]) OJ No. L194, 25/7/75, p39 amended by Council Directives 91/156/EEC (OJ No. L78, 26/3/91, p32) and 91/692/EEC (OJ No. L377, 31.12.91, p48) and Commission Decision 96/350/EC (OJ No. L135, 6.6.96, p32).

([22]) OJ No. L74, 27.3.1993, p81 amended by Council Directive 99/32/EC (OJ No. L121, 11/5/99, p13).

(b) in the definition of "existing" in paragraph 6, in sub-paragraph (a) after "operation", insert "pursuant to a relevant authorisation granted where required,"; and

(c) in the definition of "relevant authorisation" in paragraph 6, after sub-paragraph (b) insert –

"(bb) where the operation of the installation or mobile plant immediately before 31st October 1999 requires a registration under the Alkali Act 1906, a registration under that Act;".

(7) In Part 1 of Schedule 4 (Application for permits) –

(a) In paragraph 1, sub-paragraph (1)(d) after "Part A mobile plant" insert "(but excluding any part of such an application which relates to an activity falling within Section 5.1 Part A(d) or (e) of Part 1 of Schedule 1)";

(b) after paragraph 1 insert –

"**1A.**—(1) Subject to sub-paragraph (2) an application for a permit to operate a waste incineration installation shall in addition contain a description of the measures which are envisaged to guarantee in respect of that installation that –

(a) the plant is designed, equipped and will be operated in such a manner that the requirements of European Parliament Council Directive 2000/76/EC([23]) on the incineration of waste are met, taking into account the categories of waste to be incinerated;

(b) the heat generated during the incineration and co-incineration process is recovered as far as practicable, for example through combined heat and power, the generating of process steam or district heating;

(c) the residues will minimised in their amount and harmfulness and recycled where appropriate;

(d) the disposal of the residues which cannot be prevented, reduced or recycled will be carried out in conformity with national and Community legislation([24]); and

(e) the proposed measurement techniques for emissions into the air comply with Annex III of European Parliament Council Directive 2000/76/EC on the incineration of waste and, as regards water, comply with paragraphs 1 and 2 of that Annex.

(2) sub-paragraph (1) shall not apply in relation to an application which was duly made before 28 December 2002 or in the case of any installation which is a co-incineration plant as defined in Section 5.1 of Part 1 of Schedule 1, before 28 August 2004."

(9) In Part 1 of Schedule 7 (Variation of Conditions), after paragraph 1(f) insert –

"(g) in the case of an application for the variation of the conditions of a permit in respect of a waste incineration installation the information specified in paragraph 1A of Schedule 4, or where such information has previously been included in an application made under these Regulations, a statement of any changes as respects the matters dealt with in paragraph 1A of Schedule 4 which would result if the proposed change in the operation of the installation or mobile plant requiring the variation were made".

(8) In Schedule 10 (Registers) at the end of paragraph 1 insert –

"(aa) a list which identifies all waste incineration installations with a capacity of less than two tonnes per hour and which are the subject of a permit or an authorisation granted under Article 6 of the 1997 Order containing conditions which give effect

([23]) OJ No. L332,28.12.2000, p91

([24]) See, for example, Council Directive 75/442/EEC (on waste) (OJ No. L194, 25.7.75 p.39), as amended by Council Directives 91/156/EEC (OJ No. L78, 26.3.91, p.32) and 91/692/EEC (OJ No. L377, 31.12.91, p48) and Commission Decision 96/350/EC (OJ No. L135, 6.6.96, p32.

to the provisions of European Parliament and Council Directive 2000/76/EC on the incineration of waste".

Sealed with the Official Seal of the Department of the Environment on 29th August 2003

Felix Dillon
A senior officer of the Department of the Environment

(L.S.)

EXPLANATORY NOTE

(This note is not part of the Regulations)

These Regulations implement European Parliament and Council Directive 2000/76/EC of 4th December 2002 on the incineration of waste.

Regulation 3 requires: -

(a) operators to apply for an authorisation or variation of an existing permit either under the 1997 Order or the 2003 Regulations;

(b) applications by operators, of certain existing waste incineration installations (as defined in regulation 2) who do not hold a relevant approval but are subject to a permit on 31 December 2004, must make that application within the period 1st – 28th February 2005. The application, which will be a variation of the conditions of the permit, must be made under regulation 17 of the Pollution Prevention and Control Regulations 2003 (2003 Regulations);

(c) application by operators of certain existing waste incineration installations (as defined in regulation 2) that are subject to an authorisation on 31 December 2004, to make that application within the period 1st –28th February 2003, either under Article 11 of the Industrial Pollution Control Order 1997 (1997 Order) for a variation of the conditions of the authorisation or to make application for a permit under regulation 10 of the 2003 Regulations.

Regulation 4 contains transitional provisions for waste installations, which by virtue of these Regulations becomes a Part A installation or mobile plant.

Regulation 5 makes a number of amendments to the 2003 Regulations. These include a revision of Section 5.1 of Part 1 of Schedule 1 (which describes the waste incineration installations which are subject to the PPC Regulations); amendments to the transitional timetable in Schedule 3 and the requirements in Schedule 4 and 7 which apply to waste incineration installation; and an addition to the list of information in Schedule 10 which is required to be kept on the public register maintained under the Regulations.

POLLUTION PREVENTION AND CONTROL REGULATIONS (NORTHERN IRELAND) 2003

Pollution Prevention and Control (Waste Incineration Directive) Direction (Northern Ireland) 2003

The Department of the Environment in exercise of the powers conferred on it by Regulation 12(15) of the Pollution Prevention and Control Regulations (Northern Ireland) 2003[25], and of all other powers enabling it in that behalf, hereby directs the chief inspector with respect to the carrying out of his functions under those Regulations as follows:

Citation and commencement

1. This direction may be cited as the Pollution Prevention and Control (Waste Incineration Directive) Direction (Northern Ireland) 2003 and shall come into operation on 22nd September 2003.

6.107 Interpretation

2. –(1) In this direction:

"the Directive"[26] means Directive 2000/76/EC on the incineration of waste;

"the 2003 Regulations" means the Pollution Prevention and Control Regulations (Northern Ireland) 2003;

"the chief inspector" means the person appointed as chief inspector by the Department under regulation 8 of the 2003 regulations;

"permit" means a permit granted under regulation 10 of the 2003 regulations; and

"the Waste Incineration Regulations" means the Waste Incineration Regulations (Northern Ireland) 2003.

(2) Words and expressions used in this direction which are defined in the 2003 Regulations or the Waste Incineration Regulations shall have the same meaning in this direction as in the relevant Regulations.

Conditions in permits

3. — (1) The chief inspector shall, subject to sub-paragraph (2), include in any permit relating to a waste incineration installation such conditions as he considers necessary to give effect to the provisions of the Directive set out in the Schedule to this direction, having regard to the objectives of Article 1 of the Directive.

[25] SR 2003 No. 46
[26] OJ L 332, 28.12.2000, p. 91

(2) Sub-paragraph (1) shall not apply to any permit relating to an existing waste incineration installation until 28 December 2005 unless the chief inspector and the operator agree that it should apply sooner.

SCHEDULE

1. Subject to paragraph 2, for the purposes of Article 3(1) of this direction, the provisions of the Directive are as follows:

(a) Article 4(3) to 4(5);
(b) Article 5;
(c) Article 6;
(d) Article 7(1) to (4);
(e) Article 8(1) to (7);
(f) Article 9;
(g) Article 10;
(h) Article 11 but excluding Article 11(1), 11(7)(f) and 11(13) and Article 11(2)(c) shall be read as if there were added after the word “furans” the words “dioxin-like polychlorinated biphenyls and poly-cyclic aromatic hydrocarbons”;
(i) That part of Article 12(2) which relates to the provision of annual reports by the operator;
(j) Article 13; and
(k) Annexes I to VI save that the references in Annex V to exemptions which ‘may’ be authorised by the competent authority shall be construed as references to exemptions which ‘shall’ be so authorised.

2. The following provisions apply for the purposes of interpreting the provisions of the Directive referred to in paragraph 1 of this Schedule:

(a) References in those Articles to the "competent authorities" shall be construed as references to the chief inspector within the meaning of the 2003 Regulations; and

(b) Words and expressions used in those Articles shall have the meaning given to them in the Directive except for the term "operator" which shall have the meaning given to that term in the 2003 Regulations.

Signed by authority of the Department of the Environment

Felix Dillon
Deputy Secretary
Department of the Environment

29th August 2003

Transposition Table : Waste Incineration Directive 2000/76/EC

The WID is transposed by means of the Waste Incineration Regulations (Northern Ireland) 2003 (S.R.2003/390), the Pollution Prevention and Control Regulations (Northern Ireland) 2003 (S.R. 2003/46), and directions to the chief inspector made under the latter Regulations. The Table below identifies the provisions which are being relied upon for transposition of the Directive in each of these various instruments.

The WID requires the operators of "incineration plants" and "co-incineration plants", as defined in the WID, to possess a permit to operate. Applications for permits must contain certain specified information.

The Directive transposition relies principally on the existing permitting requirements of the Pollution Prevention and Control Regulations (Northern Ireland) 2003. These are amplified to ensure that all incineration and co-incineration (as defined in the WID) are subject to those Regulations and that applications for permits for those plants include the relevant WID requirements, and are made in accordance with a timetable which ensures that the permits will be in place at the times required by the WID. The permit conditions which are required by the WID are secured by the direction which is given to the chief inspector under the Regulations (referred to in the table below as the PPC Direction). The Waste incineration Regulations themselves therefore consist mainly of amendments to the 2003 Regulations.

Waste Incineration Directive Reference	Directive provision	Reference in Waste Incineration Regulations or Directions	Reference in Pollution Prevention Control Regulations
Article 1	Sets out the objectives of the Directive, which are to prevent or limit as far as practicable negative effects on the environment from incineration.	PPC Direction , Paragraph 3 ;	-
Article 2	Describes the plant which are excluded from the scope of the Directive .	Regulation 5(a)	-
Article 3 (1)	Provides a definition of "waste".	Regulation 5(a)	-
Article 3 (2)	Provides a definition of "hazardous waste" .	Regulation 5(a)	-
Article 3 (4)	Provides a definition of "incineration plant" .	Regulation 5(a)	-
Article 3 (5)	Provides a definition of "co-incineration plant" .	Regulation5(a)	-
Article 3 (6)	Provides a definition of "existing" incineration / co-incineration plant .	Regulation 2(1)	-

Waste Incineration Directive Reference	Directive provision	Reference in Waste Incineration Regulations or Directions	Reference in Pollution Prevention Control Regulations
Article 3 (7)	Provides a definition of “nominal capacity” .	Paragraph 2(b) of the Schedule to the Directions	-
Article 3 (8)	Provides a definition of “emission” .	-	Regulation 2(2)
Article 3 (9)	Provides a definition of “emission limit values”.	-	Regulation 2(2)
Article 3 (10)	Provides a definition of “dioxins and furans”.	Paragraph 2(b) of the Schedule to the Directions	-
Article 3 (11)	Provides a definition of "operator" .	-	Regulation 2(2)
Article 3 (12)	Provides a definition of "permit".	-	Regulation 2(2)
Article 3 (13)	Provides a definition of “residue”.	Paragraph 2(b) of the Schedule to the Directions	-
Article 4 (1)	Requires all incineration and co-incineration plant to have a permit .	Regulation 3	Regulation 9
Article 4 (2) /(3)	Prescribes the content of applications for permits.	Regulation 8	Regulation10 -
Article 4 (4)/(5)	Prescribes the content of permit conditions.	PPC Direction, Paragraph 3;	-
Article 4 (6)	Power for Member States to require categories of waste to be stated in co-incineration permits .	-	Regulation 12
Article 4 (7)	Requirement for permit reviews to be carried out periodically.	-	Regulation 15
Article 4 (8)	Requires certain changes to incineration and co-incineration plant to be treated as “substantial”.	Regulation 5(2)(b)	-
Article 4 (9)	Requires action to be taken by the chief inspector to enforce compliance with permit conditions.	-	Regulation 21
Article 5	Requirements as to the delivery and reception of waste .	PPC Direction, Paragraph 3;	-
Article 6	Requirements as to operating conditions.	PPC Direction, Paragraph 3;	-

Waste Incineration Directive Reference	Directive provision	Reference in Waste Incineration Regulations or Directions	Reference in Pollution Prevention Control Regulations
Article 7 (1) – (4)	Requirements as to emission limit values to air .	PPC Direction, Paragraph 3;	-
Article 7 (5)	Power for Member States to set additional ELVs .	-	(See note 1, below)
Article 8 (1)-(7)	Requirements as to water discharges .	PPC Direction, Paragraph 3;	-
Article 8 (8)	Power for Member States to set additional ELVs .	-	(See note 1, below)
Article 9	Requirements as to residues .	PPC Direction, Paragraph 3;	-
Article 10	Requirements as to monitoring .	PPC Direction, Paragraph 3;	-
Article 11	Requirements as to measurements.	PPC Direction, Paragraph 3;	-
Article 12 (1)	Requirement for public consultation on permit applications.	-	Regulation 30 and Schedule 10
Article 12(2) first part	Requirement for annual reports for plant operating at over 2 tonnes per hour .	PPC Direction, Paragraph 3;	-
Article 12 (2) second part	Requirement for lists of plant operating at under 2 tonnes per hour to be made available to the public.	Regulation 10	-
Article 13	Requirements concerning abnormal operation.	PPC Direction, Paragraph 3;	-
[Article 14]	Provisions for review of the Directive (see note 2, below).	-	-
[Article 15]	Provisions for reporting about the implementation of the Directive (see note 2, below).	-	-
[Article 16]	Provisions for the adaptation of the Directive (see note 2, below).	-	-
[Article 17]	Provision for a regulatory	-	-

Waste Incineration Directive Reference	Directive provision	Reference in Waste Incineration Regulations or Directions	Reference in Pollution Prevention Control Regulations
	committee to assist the Commission (see note 2, below).		
Article 18	Repeals of various directives .	PPC Direction, Paragraph 3;	-
Article 19	Requirement for appropriate penalties to be put in place .	Regulation 3(5) & (6)	Regulation 33
Article 20	Transitional provisions .	Regulation 4	-
Article 21	Requirement for implementation of the Directive	Relevant Regulations and Directions Made	Amendments created by relevant Regulations and Directions Made
[Article 22]	Entry into force of the Directive (see note 3, below).	-	-
[Article 23]	Addressees (see note 3, below).	-	-

NOTES

1. The Pollution Prevention and Control Regulations (Northern Ireland) 2003 contain powers by which the department of the Environment may direct the chief inspector to include certain conditions in permits and thus set ELVs for pollutants.

2. This Article places an obligation on the European Commission and so does not require transposition

3. This Article concerns the coming into force of the Directive and so does not require transposition.

ANNEX 3 – Worked example for determining co-incineration ELVs

This Annex shows how the mixing rule formula of Annex II of the WID is to be used. The emission limit values set in the Directive are discussed in Section 6.49 of the main Guidance which should be read in conjunction with the following sections. These calculations are for illustrative purpose only as it is for the operator to provide the data and the calculations.
The WID requires that the emission limit values "C", for co-incinerators should be as set out in Annex II or, where no values are set, should be calculated using the following mixing rule formula.

$$C = \frac{V_{waste} \times C_{waste} + V_{proc} \times C_{proc}}{V_{waste} + V_{proc}}$$

In other words:

C as set in Annex II, if no set value, then calculate

C_{proc} as set in Annex II but where no C_{proc} values are set, permit values or, in the absence of those, actual measured values should be used.

C_{waste} use Annex V values

The following table shows where these values are set or need to be calculated.

Pollutant	Cement Plants		Combustion Plants		Biomass Plants		Other Plants	
	C	C_{proc}	C	C_{proc}	C	C_{proc}	C	C_{proc}
Dust	✓		Calculate	✓	calculate	✓	calculate	
HCl	✓		Calculate		calculate		calculate	
HF	✓		Calculate		calculate		calculate	
NO_x	✓		Calculate	✓	calculate	✓	calculate	
SO_2	calculate		Calculate	✓	calculate	✓	calculate	
Cd + Tl	✓		✓		✓		✓	
Hg	✓		✓		✓		✓	
Other metals *	✓		✓		✓		calculate	
Dioxins	✓		✓		✓		✓	
CO	Calculate**		Calculate		calculate		calculate	

* Sb + As + Pb + Cr + Co + Cu + Mn + Ni +V

** Exemptions may be given where these do not result from the incineration of waste.

✓ Indicates the respective value is given in Annex II of the WID.

Please note that the "C" and C Cproc values in the Annex II are at different oxygen concentrations and you will need to use the above mixing rule formula to calculate the oxygen concentration for the calculated "C" value

Variables to be calculated

Two variables that need to be determined before the C value can be calculated are V_{proc} and V_{waste}. To do this you need to have a compositional analysis of waste and fuel for the parameters listed in the following table. Note that the values in this table are for illustrative purposes only and you should use that actual analysis of the waste and fossil fuel for calculations
Fuel analysis used in the calculations (dry ash-free basis)

Typical fuel analysis (dry ash-free basis)

% Component	Coal (NCB Ref 802)	Tyres	SLF	HFO/RFO
Carbon	82	88.21	66.7	85.4
Hydrogen	5.3	7.73	8	11.4
Nitrogen	1.7	0.62	5.3	0.1
Sulphur	1.0	1.95	1.3	2.8
Oxygen	10	1.49	18.7	0.3
CV (Gross), MJ/kg	33.75	32.44	21	42.9

There are three steps for the calculation of the flue gas volume generated by the waste and the fuel:

1. calculate the stoichiometric volume of oxygen (and hence air) needed for combustion.
2. calculate the flue gas produced (air from 1 above plus flue gases as per the combustion reactions given below.
3. Convert the flue gas volume from 2 above (which is at stoichiometric conditions) to desired oxygen levels.

Combustion reactions

$C + O_2 \rightarrow CO_2$

Assuming CO2 to behave as an ideal gas
44kg CO2 will have a volume of 22.41m3 at STP
(where STP are 273.15K and 101.3kPa respectively)

12kgC +(2*16)kgO -> 22.41 m^3 CO_2

Just considering the carbon component

12kg C after reacting with oxygen will produce 22.41 m^3 CO_2
1 kg C after reacting with oxygen will produce 1.867 m^3 CO_2
1kg C will react with 1.867m3 O_2

$2H + ½ O_2 \rightarrow H_2O$
2 kg H -> 22.41 m^3 H_2O
1kg H -> 11.205 m^3 H_2O
1 kg H -> Reacts with 5.602 m^3 O_2

$N + O_2 \rightarrow NO_2$
14 kg N -> 22.41 m^3 NO_2
1kg N -> 1.601 m^3 NO_2
1 kg N -> Reacts with 1.601 m^3 O_2

$S + O_2 \rightarrow SO_2$
32.1kg S -> 22.41 m^3 SO_2

Atomic/Molecular Weights
C = 12
H = 1
N = 14
S = 32.1
O = 16
CO_2 = 44
H_2O = 18
NO_2 = 46
SO_2 = 64.1
O_2 = 32

1 kg S -> 0.698 m^3 SO_2
1 kg S Reacts with 0.689 m^3 O_2

Assume:
a) All nitrogen in the fuel is oxidised.
b) All S content in fuels is converted to SO_2
c) All constituents of the combustion gases behave as an ideal gas.
d) Molar volume of ideal gas is 22.41 m^3/kg mole at 273.15 K and 101.3kPa
e) Air is 79% nitrogen and 21% oxygen

Useful Conversion Factors

Converting flue gas volume at zero oxygen to a given oxygen Concentration

Stoichiometric calculations give flue gas volume at zero percent oxygen. However, the emission limits are set at different oxygen percentages and you will need to convert the flue gas volume to the required oxygen level. The following formula, developed from first principles, can be used for this. It is based on the fact that the oxygen comes from excess air (21% oxygen).

$$V @ x\%oxygen = \left[1 + \frac{x}{21 - x}\right] \times V @ zerooxygen$$

Formula to calculate emission concentrations at the standard oxygen Concentration

The following formula can be used for the conversion of emission limits to a standard condition (e.g. 6 or 11% oxygen).

$$E_S = \frac{21 - O_S}{21 - O_M} \times E_M$$

E_S = calculated emission concentration at the standard percentage oxygen concentration
E_M = measured or calculated emission concentration
O_S = standard oxygen concentration
O_M = measured or calculated oxygen concentration

Calculating Cproc for SO2 for Combustion Plants in the Range 100-300 MWth

The WID specifies a sulphur dioxide limit which linearly decreases between 100 and 300 MWth input. To calculate the limit at any other thermal input (MWth) in this range, the following formula can be used.
C_{proc} = -3.25 x MWth + 1175

Worked Example : Combustion Plant Burning Coal and RFO

Assumptions

- V_{waste} is to be calculated (flue gas from waste burning)
- V_{proc} is to be calculated (flue gas from conventional fuel)
- C_{waste} for SO2 is 50mg/Nm^3 at 11% oxygen (from Annex II)
- Conventional fuel is coal
- Waste to be burnt is RFO @ 5% thermal substitution.
- Fuel analysis of RFO and coal is as given on previous page
- Total thermal input is 150 MWth

Calculations

Step 1

Calculate C_{proc} value for SO2 using the following formula:

$$C_{proc} = -3.25 \times MW_{TH.} + 1175$$

$$= -3.25 \times 150 + 1175$$

$$= 687$$

C_{proc} = 687 mg/ Nm^3 @ 6% oxygen

Where Nm^3 means normalised metres cubed. i.e the volume at the specified temperature and pressure (273K and 101.3kPa)

Step 2

Calculate stoichiometric air and flue gas volume for Coal as below.

For 1 kg of coal fuel the stoichiometric combustion air volume (A) can be calculated as follows (Note that the numerical values in brackets are the volume of oxygen needed for the reactant eg C or H etc as discussed under combustion reactions earlier):

$$VolumeofOxygen = (1.867 \times C) + (5.602 \times H) + (0.689 \times S) + (0.8 \times N) - (0.7 \times O)$$

$$= (1.867 \times 0.82) + (5.602 \times 0.053) + (0.689 \times 0.01) + (0.8 \times 0.017) - (0.7 \times 0.10)$$

$$= 1.78 m^3$$

But as oxygen only makes up 21% of air, the total volume of air (A) is

$$A = VolumeofOxygen \times \frac{100}{21}$$

$$= 1.78 \times \frac{100}{21}$$

$$= 8.46 Nm^3 / kg$$

A = 8.46 Nm3/ kg of coal

The volume of flue gas (*V*) produced, assuming no significant moisture content in the
air, can be calculated as below. (Note that the numerical values in brackets are the

volume of combustion gases eg CO2, NO etc from the reactants C or N as discussed
under combustion reactions earlier:
$V = (A \times 0.79) + (1.867 \times C) + (11.205 \times H) + (0.689 \times S) + (0.8 \times N)$
$V = (8.52 \times 0.79) + (1.867 \times 0.82) + (11.205 \times 0.053) + (0.689 \times 0.01) + (0.8 \times 0.017)$
$V = 6.731 + 1.531 + 0.594 + 0.007 + 0.013$ *wet*
$V = 6.731 + 1.531 + 0.007 + 0.013$ *dry*

The H_2O component can be removed or left in giving us values which include or exclude water vapour
***V* (Wet) = 8.88 Nm3 /kg of coal**
***V* (Dry) = 8.28 Nm3 /kg of coal**

Step 3
Repeat step 2 above to calculate the theoretical Air and Combustion Gas for RFO
For 1 kg of RFO the theoretical combustion gas volume can be calculated as follows:

$$A = \frac{(1.867 \times C) + (5.602 \times H) + (0.689 \times S) + (0.8 \times N) - (0.7 \times O)}{0.21}$$

$A = (8.89 \times 0.854) + (26.68 \times 0.114) + (3.32 \times 0.028) + (3.81 \times 0.001) - (3.34 \times 0.003)$
$A = 7.592 + 3.041 + 0.093 + 0.004 - 0.01$
A = 10.72 Nm^3/ kg of RFO

The volume of flue gas produced, assuming no significant moisture content in the air,
is given by:
$V = (A \times 0.79) + (1.867 \times C) + (11.205 \times H) + (0.689 \times S) + (0.8 \times N)$
$V = (10.72 \times 0.79) + (1.867 \times 0.854) + (11.205 \times 0.114) + (0.689 \times 0.028) + (0.8 \times 0.001)$
V *wet* $= 8.469 + 1.594 + 1.277 + 0.019 + 0.002$
V *dry* $= 8.469 + 1.594 + 0.019 + 0.002$

V (Wet) = 11.36 Nm3 /kg of RFO
V (Dry) = 10.08 Nm3 /kg of RFO

Step 4
Using the values derived in step 2 and 3 above, calculate the volume of combustion
gas produced by coal (95% thermal input) and RFO (5% thermal input).

Fuel	Calorific value MJ/kg	Kg per 33.75 MJ	Waste gas volume dry per 33.75 MJ	Thermal Input %	Waste gas volume of fuel mix m^3 (dry)	Waste gas volume (dry) %
Coal	33.75	1	8.29	95	7.87	95.2
RFO	42.9	.79	12.81	5	0.4	4.8

Step 5
Convert the respective flue gas volumes to appropriate oxygen e.g. coal to 6% and
RFO to 3% oxygen by using the formula in section A.3.

$$V @ x\%oxygen = \left[1 + \frac{x}{21 - x}\right] \times V @ zerooxygen$$

$$V_{coal} = \left[1 + \frac{6}{15}\right] \times 7.87 = 11$$

$$V_{RFO} = \left[1 + \frac{3}{18}\right] \times 0.4 = 0.47$$

Calculate SO2 emission limit using the formula:

$$C = \frac{V_{waste} \times C_{waste} + V_{proc} \times C_{proc}}{V_{waste} + V_{proc}}$$
$$= \frac{0.47 \times 50 + 11 \times 687}{0.47 + 11} = 661 mg / Nm^3$$

Note that in the above calculation we have used volumes and emission limit values that are at 3% oxygen for RFO and 6% oxygen for coal. We now need to calculate the oxygen concentration of the mixture. This is done by using the partial volumes as below.

$$C = \frac{0.47 \times 3\% + 11 \times 6\%}{0.47 + 11} = 5.87\%$$

C = 661 mg/Nm3 at 5.87% oxygen

Convert the above C value to mg/Nm3 at 6% oxygen using the following formula

$$E_S = \frac{21 - O_S}{21 - O_M} \times E_M$$

$$= \frac{21 - 6}{21 - 5.87} \times 661$$

C = 655 mg/Nm^3 at 6% oxygen

ANNEX 4- Glossary Of Terms

As the WID is being implemented under PPC Regulations, this Guidance will be read in conjunction with IPPC – A Practical Guide. Hence the terms included here relate to both Guidance Notes.

Activity	An industrial activity which may form part of a PPC Installation
APC	Air Pollution Control abatement plant used to clean up flue gases eg lime scrubbing.
Appeal	The opportunity provided for the operator to dispute certain actions or decisions by the chief inspector, by appealing to the Planning Appeals Commission
Application	A submission made by an operator to the chief inspector, for example to seek the grant of a permit/authorisation, surrender of a permit, variation of the conditions of a permit or transfer of a permit
Available techniques	In connection with BAT, those techniques developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the cost and advantages, whether or not the techniques are used or produced inside the United Kingdom, as long as they are reasonably accessible to the operator
BAT	Best Available Techniques – the main basis for determining standards in IPPC under the PPC Regulations, and defined as the most effective and advanced stage in the development of Activities and their methods of Operation which indicates the practical suitability of particular techniques for providing in principle the basis for ELVs designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole
BREF Notes	BAT Reference Notes – documents published by the European Commission which follow from an exchange of information on BAT between the Member States
CEN	Committee European de Normalisation (European standards committee)
CEM	Continuous emission monitoring equipment
Change in	In relation to an Installation, a change in its nature or

Operation	functioning or an extension which may have consequences for the environment
Chief Inspector	The Chief Inspector of the Department's Industrial Pollution and Radiochemical Inspectorate
ChWI	Chemical Waste Incinerator
CHP	Combined Heat and Power ie a plant where the energy generated is used to generate power and waste heat is used for process/space heating
COMAH	Control of Major Accident Hazards – the subject of an EC Directive and domestic Regulations applicable to industrial sites, some of which will also fall under IPPC
Contaminated Land	Land determined to be contaminated under the Waste and Contaminated Land (NI) Order 1997
CV	Calorific Value – refers to the property of fuel/waste which determines how much heat will be generated if the material was burnt.
Day	Period between 00.00 hours to 24.00 hours
Determination	The process by which the chief inspector decides whether or not to grant the request sought by an operator in an Application, for example by issuing a permit with appropriate conditions or by refusing the permit – see Chapter 7
Department	Department of the Environment
Dioxins	A series of polychlorinated dioxin and furan ring compounds numbering over 200. Only 17 of these are considered to be relevant to environmental control
Duly Made	A condition that an Application must satisfy by being sufficiently complete in a legal sense before Determination is possible

EC/EU	European Community/ European Union
EIA	Environmental Impact Assessment
ELV	Emission Limit Value – the mass, concentration or level of an Emission which may not be exceeded over a given period
Emission	In relation to a Part A Installation, the direct or indirect release of substances, vibrations, heat or noise from individual or diffuse sources in an installation into the air, water and land
Enforcement Notice	A notice served by the chief inspector that may enforce compliance with the permit conditions or require remediation of any harm following a breach of any condition
Environment Agency	A non-departmental public body formed under the Environment Act 1995 – the Agency is the regulator for relevant Installations in GB
EPER	European Polluting Emissions Register – an inventory of Emissions and sources to be established under a Decision of the Commission of the EC
EQS	Environmental Quality Standard – the meaning, depending on the context, is either: - As defined by the PPC Regulations, a requirement which must be fulfilled at a given time by a given environment as set out in EC legislation; or - A domestic requirement or objective which may be relevant in the determination of BAT
Existing Installation	As defined in Waste Incineration Regulations//should probably put in meaning rather than just redirecting people for ease of use
EWC	European Waste Catalogue
FAPP	Fit and Proper Person – a person meeting specified tests in relation to technical competence, financial provision and previous convictions which are pre-requisites for the grant of any permit covering any Specified Waste Management Activity
GBR	General Binding Rule – a rule which may establish fixed sets of conditions to be applied to relevant Installations
H1	Environment Agency Guidance on IPPC environmental

	assessment and BAT appraisal methodology
HWI	Hazardous Waste Incinerator, sometimes also called chemical waste incinerator
Installation	The regulated unit under the PPC Regulations, comprising one or more activities listed in Part 1 of Schedule 1 to the regulations plus certain associated activities
IPPC	Integrated Pollution Prevention and Control – a general term used to describe the regulatory regime applied to Part A Installations under the PPC Regulations which give effect to the IPPC Directive
IPPC Directive	Directive 2008/1/EC concerning Integrated Pollution Prevention and Control
LOI	Loss on ignition. A simple technique used to determine the combustible material by heating the ash residue to high temperature.
Landfill permit	is a term used in Directive 1999/31/EC on the Landfill of Waste and in the Landfill Regulations (Northern Ireland) 2003 (S.R. 2003/496). A permit issued under those regulations is a PPC permit.
MBM	Meat and bone meal produced by rendering plants
MWI	Municipal Waste Incinerator
MWID	Refers to the 1989 Municipal Waste Incineration Directives
NO_x	Sum of oxides of nitrogen, NO and NO_2,expressed as NO_2
Operation	A measure of the point at which a PPC permit is required
Operator	In relation to an Installation, the person who has control over the operation of the installation
PAHs	Polycyclic Aromatic Hydrocarbons
Part A Installation	Any installation carrying on one or more activities listed as Part A in Part 1 of Schedule 1 to the PPC Regulations
Part B Installation	Any installation carrying on one or more activities listed as Part B in Part 1 of Schedule 1 to the PPC Regulations (which is not a Part A installation)
Part C Installation	Any installation carrying on one or more activities listed as Part C in Part 1 of Schedule 1 to the PPC Regulations

	(which is not a Part A or Part B installation)
PCB	Polychlorinated biphenyls
PCP	Pentachlorophenol
Permit	A permit granted by the enforcing authority allowing the Operation of an Installation subject to certain conditions
Pollutant	Any substance, vibration, heat or noise released as a result of an emission which may cause pollution
Pollution	Any emission as a result of human activity which may be harmful to human health or the quality of the environment, cause offence to any human senses, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment
Public Registers	Registers maintained by enforcing authorities containing information on PPC Installations
PPC Regulations	Pollution Prevention and Control Regulations (Northern Ireland) 2003 (SR 2003/46) which implement the IPPC Directive
Enforcing Authority	The body responsible for applying the PPC regime – the chief inspector regulates Part A and Part B Installations while district councils regulate Part C Installations
Relevant Objectives	Certain objectives derived from the EC Waste Framework Directive that apply to Activities involving the disposal or recovery of waste regulated under the PPC Regulations
Relevant Period	The window of time specified in Part 1 of Schedule 3 to the PPC Regulations within which (in the absence of a preceding Substantial Change) an Application for a permit for an Existing Installation must be submitted – see Chapter 3
Revocation Notice	A notice served by the enforcing authority revoking all or part of a permit
SNCR	Selective non-catalytic reduction. A technique used to abate oxides of nitrogen by injection ammonia or urea into the combustion chamber
SRM	Specified risk material. Relates to parts of animal carcass eg brain
SSSIs	Site of Special Scientific Interest

Staged Application	An Application that is sufficiently complex or novel that it should be subject to extended regulatory procedures
Statutory Consultee	A body which the enforcing authority must consult with in determining an Application for a permit and in some variations
Substance	Includes any chemical element and its compounds and any biological entity or micro-organism with the exception of certain radioactive substances and genetically modified organisms
Substantial Change	A change in operation of an installation which, in the opinion of the enforcing authority, may have significant negative effects on human beings or the environment. Also in the case of waste incineration activity, the change of waste from non-hazardous to hazardous
Suspension Notice	A notice served by the enforcing authority which results in a permit ceasing to authorise the Operation of the entire Installation or specified Activities, until remedial action has been taken against a risk of serious pollution
Techniques	In connection with BAT, includes both the technology used and the way in which the Installation is designed, built, maintained, operated and decommissioned
TOC	Total Organic Carbon
Variation Notice	A notice served by the enforcing authority varying the conditions or other provisions of the permit
WID	Waste incineration Directive, 2000/76/EC
Year	Period between 1 January to 31 December.