PROCESS GUIDANCE NOTE
JANUARY 2005

Process Guidance Note
NIPG 5/3 (Version 2)

Animal Carcase Incineration

disposal rate of 50 kilogrammes per hour to 1 tonne per hour and capacity of under 10 tonnes per day

ENVIRONMENT (NI) ORDER 2002
POLLUTION PREVENTION AND CONTROL REGULATIONS (NI) 2003
INDUSTRIAL POLLUTION CONTROL (NI) ORDER 1997
IPC (PRESCRIBED PROCESSES AND SUBSTANCES) REGULATIONS (1998)

GUIDANCE FOR PROCESSES PRESCRIBED FOR
AIR POLLUTION CONTROL
AND
AIR POLLUTION PREVENTION AND CONTROL
BY DISTRICT COUNCILS

Department of the Environment
www.doeni.gov.uk

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Environment Agency

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1 Introduction

1.1 This Note is issued by the Department of the Environment to give guidance on the conditions appropriate for the control of emissions into the air from processes / installations[1] in he following sector:

Animal carcase incineration - disposal rate of 50 kilogrammes per hour to 1 tonne per hour and capacity of under 10 tonnes per day. It supersedes guidance note NIPG 5/3 Version 1 that issued in March 1998.

1.2 This is one of a series of notes giving guidance on Best Available Techniques (BAT) and Best Available Techniques Not Entailing Excessive Cost (BATNEEC)[2]. The notes are all aimed at providing a strong framework for consistent and transparent regulation of processes and installations.

1.3 This note is for use under both Local Air Pollution Control (LAPC) established by the Industrial Pollution Control (NI) Order 1997, and Local Air Pollution Prevention and Control (LAPPC) established by the Environment (NI) Order 2002[3]. It constitutes statutory guidance to regulators under regulation 38 of The Pollution Prevention and Control Regulations (NI) 2003. To the extent it provides guidance on techniques, it also constitutes statutory guidance to regulators under section 7(11) of the 1997 Order, and in any event regulators are expected to have regard to it. The note will be treated as one of the material considerations when determining any appeals against a decision under either the 1997 or 2002 Orders.

1.4 The note also (where appropriate) gives details of any mandatory requirements affecting air emissions which are in force at the time of publication, such as those contained in Directions from the Department.

e.g. Animal By Products Regulation (Regulation (EC) No 1774/2002)

Nothing in this note should be taken to detract from the scope or meaning of the EU Waste Incineration Directive 2000/76/EC and its implementation through the PPC Regulations.

Site specific BAT/ BATNEEC

1.5 All processes are subject to BAT/ BATNEEC. In general terms, what is BAT/ BATNEEC for one process in a sector is likely to be BAT/ BATNEEC for a comparable process; but in each case it is, in practice, for regulators (subject to appeal) to decide what is BAT/ BATNEEC for the individual process and the regulator should take into account variable factors (such as configuration, size and other individual characteristics of the process) and the locality (such as proximity of particularly sensitive receptors[4]). Ultimately, therefore, what constitutes BAT/ BATNEEC is site specific but this guidance note comprises guidance for the generality of processes in the sector and careful regard should be had to it, in order to maximise consistency of permits as appropriate.

1. The term "process(es)" is used in the remainder of the note to mean both "processes" under the Industrial Pollution Control (NI) Order and "installations" and "activities" under the Environment (NI) Order 2002.
2. BATNEEC is the formulation used in the Industrial Pollution Control (NI) Order and BAT is used in the Environment (NI) Order 2002. For the purposes of this guidance note, the two concepts are regarded as having essentially the same effect.
3. In accordance with Part 2 of Schedule 3 to the PPC (NI) Regulations, SR 2003/46: animal carcase incineration processes transfer from regulation under the 1997 Order to the 2002 Order from 1 April 2006.
4. Guidance on the relationship between BAT/BATNEEC and air quality objectives is contained in the General Guidance Manual on policy and procedures for Part C installations.

Who is affected

1.6 This guidance is for:

- regulators: who must have regard to the guidance when determining applications and reviewing extant authorisations and permits
- operators: who are best advised also to have regard to it when making applications, and in the subsequent operation of their process
- members of the public: who may be interested to know what the Government considers (in accordance with the legislation) amounts to appropriate conditions for controlling air emissions for the generality of processes in this particular industry sector

1.7 The guidance is based on the state of knowledge and understanding at the time of writing of:

- animal carcase incineration sector, 50 kilogramme per hour to 1 tonne per hour, and under 10 tonnes per day capacity
- their potential impact on the environment and
- what constitutes BAT/ BATNEEC for preventing and reducing air emissions

1.8 The note may be amended from time to time in order to keep abreast with developments in BAT/BATNEEC: including improvements in techniques, and new understanding of environmental impacts and risks. Such changes may be issued in a complete revision of this document, or in separate additional guidance notes which address specific issues. (It may not always be possible to issue amending guidance quickly enough to keep in absolute step with rapid changes, which is another circumstance where paragraph **1.5** above might apply.)

1.9 Steps will be taken to ensure that those who need to know about changes are informed. Operators (and their advisers) are, however, strongly advised to check with the regulator whether there have been any changes before relying on this note for the purposes of making an application under the 1997 or 2002 Orders or making any other decisions where BAT/ BATNEEC may be a consideration.

Consultation

1.10 This note has been produced in consultation with relevant trade bodies and representatives of regulators including members of the Industrial Pollution Liaison Committee and the NI Industrial Pollution Liaison Group.

Publication

1.11 This and other published guidance in this series are available, free of charge, via the Department at **www.doeni.gov.uk/epd**.

1.12 General guidance explaining policy and setting out LA-PPC policy and procedures is contained in the Department's "General Guidance Manual on Policy and Procedures for Part C Installations" available from **www.doeni.gov.uk/epd** and referred to in this document as the "General Guidance Manual". This is designed for operators and members of the public as well as district council regulators.

1.13 In addition to the General Guidance Manual referred to above, explanation or clarification of certain terms used in this sector guidance note can be found in a general guidance note issued under the Industrial Pollution Control (NI) Order 1997: "Interpretation of terms used in process guidance notes" that issued in March 1998 (NIGG4). Where there is any conflict between NIGG4 and the guidance issued in this note or in the General Guidance Manual, the latter two documents should prevail, as should any subsequent guidance issued in relation to LAPPC.

2 Timetable for compliance and reviews

Existing processes or activities

2.1 The previous guidance advised that upgrading to that standard should usually be completed by 1 January 2006. Requirements still outstanding from any existing upgrading programme should be completed to the timescale of that programme.

Upgrading for this note

2.2 The new provisions of this note and the dates by which compliance with these provisions is expected are listed in the table below, together with the paragraph number where the provision is to be found. Compliance with the new provisions should normally be achieved by the dates shown. Authorisations/permits should be varied as necessary, having regard to the changes and the timetable.

Table 1: Compliance timetable

Paragraph / Row	Provision	Compliance Date
5.7	Ash testing available when not burning OTMS and BSE suspects	1 March 2005
	Testing of 850ºC and 2 seconds residence time for new plant	1 December 2005
All other provisions	To be complied with as soon as practicable.	12-18 months

2.3 Replacement plant should normally be designed to meet the appropriate standards specified for new installations or activities.

Relaxation of conditions

2.4 Where provisions in the preceding guidance note have been deleted or relaxed, authorisations should be varied as necessary as soon as reasonably practicable. Section 7 provides a summary of all changes.

New processes or activities

2.5 For new processes or activities, the authorisation/permit should have regard to the full standards of this guidance from the first day of operation.

Substantially changed processes or activities

2.6 For substantially changed processes or activities, the authorisation/permit should normally have regard to the full standards of this guidance with respect to the parts of the process that have been substantially changed and any part of the process affected by the change, from the first day of operation.

Permit reviews

Reviewing permits

2.7 Under LAPC the requirement is to review conditions in authorisations at least very four years. (Article 6(6) Industrial Pollution Control (NI) Order 1997)

2.8 Under LAPPC the legislation requires permits to be reviewed periodically but does not specify a frequency. It is considered for this sector that a frequency of once every six years ought normally to be sufficient for the purposes of Regulation 15(1) of Pollution Prevention and Control Regulations (NI) 2003.

More frequent review may be necessary in individual cases for the reasons given in Regulation 15(2). Further guidance on permit reviews is contained in the General Guidance Manual available on **www.doeni.gov.uk/epd** . Regulators should use any opportunities to determine the variations to authorisations/permits necessitated by paragraph **2.2** above in conjunction with these reviews.

2.9 Under both LAPC and LAPPC, conditions should be reviewed where complaint is attributable to the operation of the process and is, in the opinion of the regulator, justified.

3 Process description

Part B Regulations

3.1 Animal carcase incineration installations that meet all these four conditions are prescribed for LAPC and LAPPC

- capacity is under 1 tonne per hour
- and capacity is over 50 kilogrammes per hour
- and the treatment capacity does not exceed 10 tonnes per day
- and only animal carcases are burnt (ie animal carcases/parts of carcases)

This note does not cover installations with a treatment capacity exceeding 10 tonnes per day. (These larger installations are subject to Part A and Chief Inspector control)

There have been some uncertainties as to whether certain types of animal carcase (eg parts of carcases) fall within the scope of the Waste Incineration Directive and also therefore require Part A regulation even though the capacity is 10 tonnes or less per day. Draft revised guidance on WID was issued by Defra in summer 2004 which, among other matters, advises on this issue (see Defra web site http://www.defra.gov.uk/corporate/consult/ppc-wid/index.htm). Processed animal by-products (eg tallow, and meat and bonemeal) are not regarded as constituting animal carcases, so incinerators which take this material will be for Part A regulation, irrespective of capacity.

3.2 LAPC and LAPPC are

- Local air pollution control, LAPC, under section 5.1 of Schedule 1 to the IPC Prescribed Processes and Substances) Regulations (NI)1998, SR 28.
- Local air pollution prevention and control, LAPPC, under section 5.1 of Schedule 1 of the Pollution Prevention and Control Regulations (NI) 2003 SR 46.

Regulations and Directives

3.3 Processes covered by this note must satisfy the regulators of the Animal By-Products Regulations (NI) 2003, 2003/495. The regulators in Northern Ireland are the Veterinary Service (of the Department of Agriculture and Rural Development), the Chief Inspector (of the Industrial Pollution and Radiochemical Inspectorate) and district council regulators of LAPC/LAPPC. Compliance with the provisions of this note will satisfy the LAPC/LAPPC part of the Animal By-Product Regulations obligations. This note does not intend to deal with pollution of soil, water or groundwater, biosecurity, or risks to operatives health.

Incineration covered by this note can include;

- incineration of BSE-suspects and Over Thirty Month Scheme cattle.

3.4 This note does not apply to

- processes which burn other matter as well as animal carcases. They are subject to the Waste Incineration Directive. (eg tallow, meat and bone meal) See the Waste Incineration Directive draft guidance and Part A guidance. *[Second Edition of Guidance on Directive 2000/76/EC on the Incineration of Waste at* **http://www.defra.gov.uk/corporate/consult/ppc-wid/index.htm***, Part A guidance*]
- installations which burn animal carcases only but with a capacity over 1 tonne per hour. They are Part A of PPC. See Part A guidance
- [*installations which burn animal carcases with a treatment capacity over 10 tonnes per day - Part A* - These larger installations are subject to Part A and Chief Inspector control. See paragraph **3.1**]

- installations of less than 50 kgs per hour i.e. "low capacity incinerators". (The Animal By-Product Regulations do apply and waste management licensing may apply)

Pet crematoria

3.5 Pet crematoria cremate pet bodies with care, separately or communally, with or without the return of ashes to the owner, or incinerate bodies as waste.

Incinerators
- Continuous
- Reloaders

- Single load

3.6 Animal carcase incinerators can typically be operated by

- Loading continuously, without a cool-down period for weeks or months, or
- Reloading before the previous load has burnt out, with a cool-down period every day of operation, or
- Single load, with a cool-down period after each load.

3.7 The calculation of throughput varies with style of operation. Although the courts determine the interpretation of the law, within this note the following ways of calculating throughput should be of use to regulators and operators of Part B processes and activities.

- Continuous loaders - weight of average load divided by average period between load
- Reloaders - total weight loaded between cool-downs divided by time from first loading after cool-down to when waste is combusted
- Single load - weight loaded between cool-downs divided by time from loading to when waste is combusted
- "when waste is combusted" one indication for this might be when the temperature in the secondary zone legally falls below 850ºC.

3.8 Some animal carcase incinerators reload once the load volume in the combustor has diminished and may reload several times in a day before the previous load is completely combusted. At the end of the day when waste is completely combusted, the primary chamber temperature is then allowed to fall, and once cooler the ash is removed. In this note, reloading incinerators should be treated as continuous incinerators if the period from when all waste is combusted to the next loading is less than 6 hours.

3.9 Most animal carcase incinerators are loaded via the top or side, and via a sealed feeder or through a door opened during loading. The load may be in pieces or loaded whole. Automatic feed can be via ram feeder, bin feeder, horizontal feed hopper, and sealed units do not emit fumes during loading. Mechanical feed might be by forklift with modified half barrel into the feed mechanism or direct into the combustion chamber.

3.10 Where used, loading doors are usually open for less than 15 seconds during loading.

3.11 Grates are usually fixed hearth to catch liquids eg fat that melts, stepped hearths are less common.

3.12 Continuous incinerators and some reloaders have automatic de-ashing arrangements.

3.13 Fuels used include natural gas, LPG, gas oil, and red diesel.

3.14 The secondary chamber varies in shape and location, often depending on the space available on site. It is designed with no dead zones and to promote the thorough mixing of gases.

4 Potential releases

4.1 The key emissions from these processes/activities that constitute pollution for the purposes of the Industrial Pollution Control (NI) Order or the Pollution Prevention and Control Regulations (NI) 2003 and therefore warrant control are those consisting of **odour**, **particulate matter**, **hydrogen chloride, nitrogen oxides, sulphur dioxide, carbon monoxide, volatile organic compounds** (from methane to polyaromatic hydrocarbons, ie PAH), **mercury compounds** and **PCDD/F**. (PCDD/F are polychlorinated dibenzo-p-dioxins and furans - often referred to simply as dioxins.)

4.2 The flue gases are the main source of releases and potential releases from animal carcase incinerators. **Odour, particulate matter, hydrogen chloride, nitrogen oxides, sulphur dioxide, carbon monoxide, volatile organic compounds (from methane to PAH), and PCDD/F** may be emitted.

4.3 The storage and handling of animal carcases may emit **odour**.

4.4 The storage and handling of ashes can emit particulate matter.

5 Emission limits, monitoring and other provisions

5.1 The emission limit values and provisions described in this section are achievable using the best available techniques described in **Section 6**. Monitoring of emissions should be carried out according to the method specified in this section or by an equivalent method agreed by the regulator. (See Ref. **(f)** (M1) and Ref. **(g)** (M2)).

- The reference conditions for limits in **Table 2** are reference conditions for pollutant concentrations are 273K, 101.3kPa, 11% oxygen, dry gas, except for
  - the 2 seconds retention time to which no correction is applied.

Compliance with the limits in **Table 2** and of the various conditions in **Section 5** and **Section 6** are expected to ensure compliance with the requirements of the Animal By-Product Regulations. For existing processes upgrading to these standards should be completed by 1 January 2006

Table 2: Emission limits, monitoring and other provisions

Row	Determinand	Emission limits / provisions	Monitoring	Monitoring frequency subject to paragraphs **5.15** and **5.16**
1	Total particulate matter	100 mg/m^3	Indicative monitoring and recording Manual extractive test	Continuous Annual
2	Hydrogen chloride (excluding particulate matter)	100 mg/m^3	Manual extractive test	Annual
3	Carbon monoxide	100 mg/m^3 as an hourly average, and 150 mg/m^3 for 95% of all measurements, determined as 10 minute averages, in any 24 hour period	Quantitative monitoring and recording Manual extractive test	Continuous Annual
4	Sulphur dioxide	300 mg/m^3 or limit sulphur in fuel oil to 0.2% w/w until 1 January 2008 and 0.1% w/w after 1 January 2008	Manual extractive test Or for fuel oil limit - certificate from supplier	Annual On change of supplier
5	Organic compounds excluding particulate matter	10 mg/m^3 as total carbon	Manual extractive test	Annual manual extractive test
6	Organic carbon in ash	1% carbon, see paragraph **5.6** or **5.7**	See ash monitoring protocols	See ash monitoring protocols
7	Oxygen	Minimum 3% and average 6% by volume	Measure at or after the end of retention zone in secondary chamber and	Continuously
	Oxygen		Measure at same location as annual manual extractive tests	Concurrently throughout annual manual extractive tests

Table 2: Emission limits, monitoring and other provisions

Row	Determinand	Emission limits / provisions	Monitoring	Monitoring frequency subject to paragraphs 5.15 and 5.16
8	Secondary chamber temperature	Minimum 850°C at start and at or after the end of retention zone in secondary chamber	Measure at start and at or after the end of retention zone in secondary chamber	Continuously
9	Secondary chamber retention time	Minimum 2 seconds after the last injection of combustion air	Demonstrate or calculate	On commissioning, See 6.3

5.2 The charging system must be interlocked to prevent the addition of any material to the combustion zone if the secondary chamber temperature is below 850°C. Mechanical charging should be required. Automatic feed should be required for new plant.

5.3 Continuous incinerators (ie those with a cool down period of less than 6 hours) should be fitted with automatic de-ashing.

Monitoring, investigations and recording

5.4 The need for and scope of testing, and the frequency and time of sampling depend on local circumstances, operational practice and the scale of operation. As part of proper supervision the operator will monitor emissions, make tests and inspections of the process and keep records, in particular:

- The operator should keep records of inspections, tests and monitoring, including all non-continuous monitoring, inspections and visual assessments. The records should be:
  - kept on site
  - kept by the operator for at least two years; and
  - made available for the regulator to examine

Information required by the regulator

5.5 The regulator needs to be informed of monitoring to be carried out and the results; the results should include process conditions at the time of monitoring.

Annual manual tests should be undertaken when the incinerator is operated at 100% of its design capacity, at under 10 tonnes per day, and over an appropriate period of the incineration cycle. The operator should state date, time and state why the period of the incineration cycle chosen for sampling is suitable.

- The operator should notify the regulator at least 7 days before any periodic monitoring exercise to determine compliance with emission limit values. The operator should state the provisional time and date of monitoring, pollutants to be tested and the methods to be used.
- The results of non-continuous emission testing should be forwarded to the regulator within 8 weeks of the completion of the sampling.
- Adverse results from **any** monitoring activity (both continuous and non-continuous) should be investigated by the operator as soon as the monitoring data has been obtained/received. The operator should:
  - identify the cause and take corrective action
  - record as much detail as possible regarding the cause and extent of the problem, and the action taken by the operator to rectify the situation
  - re-test to demonstrate compliance as soon as possible; and
  - notify the regulator

Ash monitoring - BSE/OTMS

5.6 Ash monitoring must be carried out for incinerators that handle any BSE suspects or cattle from the Over Thirty Month Scheme (OTMS). The determinands, frequencies and methods are referred to in **Section 9**.

Ash monitoring - non BSE/OTMS

5.7 If the regulator has reasons to doubt the day to day efficiency of combustion, one off or periodic monitoring of ash may be required in accordance with the non BSE/ OTMS protocol referred to in **Section 10**.

Visible and odourous emissions

5.8 Visible and odorous emissions should be limited and monitored as follows. Abnormal emissions require action as described in paragraph **5.9**.

- Emissions from combustion processes should in normal operation be free from visible smoke and in any case should not exceed the equivalent of Ringelmann Shade 1 as described in British Standard BS 2742:1969.
- All releases to air, other than condensed water vapour, should be free from persistent visible emissions.
- All emissions to air should be free from droplets.
- There should be no offensive odour beyond the site boundary, as perceived by the regulator.
- Visual and olfactory assessments of emissions should be made frequently and at least once each day whilst the process is in operation. The time, location and result of these assessments should be recorded.

Abnormal events

5.9 The regulator needs to be notified about certain events, whether or not there is related monitoring showing an adverse result, and the operator should respond to problems which may have an adverse effect on emissions to air.

- The regulator should be informed without delay:
  - if there is an emission that is likely to have an effect on the local community
- In the case of abnormal emissions, malfunction or breakdown leading to abnormal emissions the operator must:
  - investigate and undertake remedial action immediately
  - adjust the process or activity to minimise those emissions; and
  - reduce or close down operations as soon as practicable
  - promptly record the events and actions taken
- The operator should provide a list of key arrestment plant and should have a written procedure for dealing with its failure, in order to minimise any adverse effects.

Continuous monitoring

5.10 Continuous indicative monitoring can be used as a management tool. In conjunction with continuous recording it identifies any trends in emissions; for example, that emissions are gradually increasing, which may indicate a need for maintenance. It can also be used with or without continuous recording to trigger an alarm when there is a sudden increase in emissions; for example, if arrestment plant fails. For a given concentration of particulate, the output level varies with the instrument. It should be noted that not all monitors provide a linear response to an increase in particulate matter. The monitor should be set up to provide a baseline output when the plant is known to be operating under the best possible conditions; i.e. such that emissions are fully compliant with the provisions. The instrument manufacturer should be able to set an output level which corresponds to around 75% of the emission limit, to trigger alarms. Thus the alarms are activated in response to this significant increase in particulate loading above the baseline, so that warning of the changed state is given before an unacceptable emission occurs.

5.11 Continuous quantitative monitoring is only obtained when the monitor is fully calibrated. Real time concentration data is collected, usually averaged over 10 minute periods, and recorded. The regulator may wish to agree the averaging period that is chosen.

- Where continuous monitoring is required, it should be carried out as follows:
- All continuous monitoring readings should be on display to appropriately trained operating staff.
- Instruments should be fitted with audible and visual alarms, situated appropriately to warn the operator of plant failure or malfunction.
- The activation of alarms should be automatically recorded.
- All continuous monitors should be operated, maintained and calibrated (or referenced) in accordance with the manufacturers' instructions, which should be made available for inspection by the regulator. The relevant maintenance and calibration (or referencing) should be recorded.
- All new continuous monitoring equipment should be designed for less than 5% downtime over any 3-month period.

5.12 A summary of continuous emission monitoring results should be forwarded to the local regulator at least once every six months. The summary should be presented in a format that enables the local regulator to determine compliance with the continuous provisions for carbon monoxide, oxygen and secondary chamber temperature in **Table 2** The information should include:

- Minimum daily oxygen concentration
- Time referenced list of hourly average values exceeding the carbon monoxide emission limit in **Table 2**
- The daily average carbon monoxide emission concentration value
- The daily 95 percentile of 10-minute average carbon monoxide readings for that day.

Calibration and compliance monitoring

5.13 Calibration of quantitative instruments and compliance monitoring should meet the following provisions as appropriate:

- No result should exceed the emission concentration limits specified, except where either:
  (a) data is obtained over at least 5 sampling hours in increments of 15 minutes or less; or
  (b) at least 20 results are obtained where sampling time increments of more than 15 minute are involved; AND in the case of (a) or (b)
  (c) no daily mean of all 15-minute mean emission concentrations should exceed the specified emission concentration limits during normal operation (excluding start-up and shut-down); and
  (d) no 15-minute mean emission concentration should exceed twice the specified emission concentration limits during normal operation (excluding start-up and shut-down).
- Non-continuous emissions monitoring of particulate matter should be carried out according to the main procedural requirements of BS ISO 9096: 2003, with averages taken over operating periods, excluding start-up and shutdown.
- No result should exceed the emission concentration limits specified, except where:
  (a) data is obtained over at least 4 sampling hours in increments of 10 minutes or less; or
  (b) at least 20 results are obtained where sampling time increments of more than 10 minutes are involved;

and in such circumstances:

(c) no more than 5% of all 10-minute mean emission concentrations should exceed the specified emission concentration limits (during normal operating hours (excluding start-up and shut-down);

(d) no 10-minute mean emission concentration should exceed twice the specified emission concentration limits; and

(e) where continuous monitoring is undertaken, compliance with (c) and (d) above should be demonstrated on a daily basis.

Table 3: Monitoring methods

Determinand	Preferred test method
Particulate matter	BS ISO 9096 for particulate above 20mg/m^3
Hydrogen chloride	BS EN 1911
Organic compounds excluding particulate matter.	BS EN 12619
Oxygen	ISO 12039
Carbon monoxide	ISO 12039

5.14 Exhaust flow rates should be consistent with efficient capture of emissions, good operating practice and meeting the requirements of the legislation relating to the workplace environment.

Varying monitoring frequency

5.15 Where non-continuous quantitative monitoring is required, the frequency may be varied. Where there is consistent compliance with emission limits, regulators may consider reducing the frequency. When determining "consistent compliance" factors to consider include:

(a) the variability of monitoring results, for example, results which range from 30 - 90 mg/m^3 , against an emission limit of 100 mg/m^3 might not qualify for a reduction in monitoring.

(b) the margin between the results and the emission limit, for example, results which range from 90 - 100 mg/m^3 when the limit is 100 mg/m^3 might not qualify for a reduction in monitoring.

Consistent compliance should be demonstrated using the results from at least;

- three or more monitoring exercises within two years or;
- two or more monitoring exercises in one year supported by continuous monitoring.

Any significant process changes which might have affected the monitored emission should be taken into account.

5.16 The frequency of testing should be increased, for example, as part of the commissioning of new or substantially changed processes, or where emission levels are near to or approach the emission concentration limits.

5.17 Care is needed in the design and location of sampling systems in order to obtain representative samples. BS ISO 9096 suggests sampling within a straight section of flue, about 7 to 10 diameters in length.

- The operator should ensure that adequate facilities for sampling are provided on vents or ducts.
- Sampling points on new plant should be designed to comply with the British or equivalent standards.

6 Control techniques

Summary of best available techniques

6.1 The following table provides a summary of the best available techniques that can be used to control the process in order to meet the emission limits and provisions in **Section 5**. Provided that it is demonstrated to the satisfaction of the regulator that an equivalent level of control will be achieved, then other techniques may be used.

Table 4: Summary of control techniques

Source	Substance	Control techniques
Flue gas	Odour	Good combustion
	Particulate matter	Good combustion, low gas velocity in combustion phase, if necessary arrest emissions
	Sulphur oxides	Limit sulphur in fuel oil, arrest if neccessary
	Carbon monoxide	Good combustion
	Hydrogen chloride	Arrest if neccessary
	Volatile organic compounds	Good combustion
	Dioxins	Avoid combusting precursors. Good combustion, if necessary particle arrestment
Ash	Particulate matter	Contain

Techniques to control emissions from contained sources

Odour
VOC
Carbon monoxide

6.2 Good combustion includes the continuous control of primary and secondary combustion including oxygen and carbon monoxide levels and achieves satisfactory burnout.

6.3 At the design stage, the 2 second residence time might be calculated from manufacturer's data but during commissioning the 2 second residence time should be demonstated, either be measured or be calculated from actual combustion data, eg measured gas flow rates and pressures together with the known volume of the secondary chamber. Good mixing of the gases in the secondary chamber should be designed in. CFD is not required, but should be acceptable. The 2 seconds is not corrected for temperature, so very high temperatures which arise from too rapid incineration can cause noncompliance due to the larger volume of gases combusted at the same time as the gases occupy a larger volume due to their higher temperature.

6.4 For new plant, loading and reloading should be by sealed unit. Where reloading through unsealed routes is not avoidable, the furnace should be open for the minimum time, which should not in any case exceed 15 seconds. Melted fat or other liquids should not run out of doors or other openings. Skinned fresh meat, and frozen meat will require different times and procedures to control emissions and achieve burn out eg a lower primary chamber temperature for skinned fresh meat may be needed to slow the initial rate of combustion.

Particulate matter

6.5 Good combustion. Sealed loading and reloading. Emissions of particulate matter via the flue should be filtered if necessary to meet the emission limit. Where loading is not sealed, the incinerator should be indoors to prevent windwhipping of ash while the door is open. During deashing air flows should be controlled to minimise ash pickup from the bed. Continuous incinerators should have automatic deashing

Dioxins

6.6 Good combustion and low particulate emissions minimise the emission of dioxins (polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans). PVC packaging should not be be used.

Techniques to control fugitive emissions

Odour control

6.7 Odour from the receipt, handling and storage of animal carcases may cause offence at or beyond the process boundary. Prevention should involve

- the careful siting of animal carcase storage,
- setting different maximum storage times for unrefrigerated, refrigerated and frozen carcases, (up to one shift unrefrigerated may be reasonable, but if odour problems {see paragraph **5.8** bullet 4 } are expected or caused then refrigeration should be provided)
- preventing spillage of solid or liquids while carcases are being transferred eg carcases should be carried not dragged, eg half-barrel shovel for carrying carcases avoids dripping
- vehicles, containers, trailers storage areas, loaders and all equipment should be designed for easy cleaning and disinfection, impervious and kept clean
- storage areas where carcases are handled should have a resistant finish and slope to a holding pit:

Dust and spillage control

6.8 De-ashing should be enclosed and made directly into an enclosed transport skip. Where the enclosure is not tightly sealed, there should be air extraction and a filter.

- All spillages should be cleared as soon as possible; solids by vacuum cleaning, wet methods, or other appropriate techniques. Dry sweeping of dusty spillages should not be permitted.
- A high standard of housekeeping should be maintained

Air quality

Ambient air quality management

6.9 In areas where air quality standards or objectives are being breached or are in serious risk of breach and it is clear from the detailed review and assessment work under Local Air Quality Management that the Part C process itself is a significant contributor to the problem, it may be necessary to impose tighter emission limits. If the emission limit that is in danger of being exceeded is not an EC Directive requirement, then industry is not expected to go beyond BATNEEC/BAT to meet it. Decisions should be taken in the context of a district council's Local Air Quality Management action plan. For example, where a Part C process is only responsible to a very small extent for an air quality problem, the council should not unduly penalise the operator of the process by requiring disproportionate emissions reductions. More guidance on this is provided in the revised Local Air Quality Management Technical Guidance, LAQM. TG (03) and in the Environment (NI) Order 2002 Local Air Quality Management Policy Guidance. Both of these documents are available from the Environment and Heritage Service website **www.ehsni.gov.uk** .

6.10 Pollutants that are emitted via a stack require sufficient dispersion and dilution in the atmosphere to ensure that they ground at concentrations that are harmless. This is the basis upon which stack heights are calculated using HMIP Technical Guidance Note D1 (D1). The emission limit in this PG note should be used as the basis for stack height calculation. The stack height so obtained is adjusted to take into account local meteorological data, local topography, nearby emissions and the influence of plant structure. It is necessary that the assessment also take into account the relevant air quality standards that apply for the emitted pollutants.

The calculation procedure of D1 is usually used to calculate the required stack height but alternative dispersion models may be used in agreement with the regulator. D1 relies upon the unimpeded vertical emission of the pollutant. A cap

or other restriction over the stack impedes the vertical emission and hinders dispersion. For this reason, and because dispersion is required, such flow impeders should not be used. A cone may sometimes be useful to increase the efflux velocity and achieve greater dispersion.

An operator may choose to meet tighter emission limits in order to reduce the required stack height.

Where an emission consists of air and particulate matter only, (i.e. no products of combustion or other gaseous pollutants are emitted) the emission should be contained. In such circumstances dispersion into the atmosphere at high level may be inappropriate.

Stacks, vents and process exhausts

6.11 Animal carcase incineration is usually a batch process and the exit velocity of the exhaust gases varies considerably during the cycle. Exhaust gases discharged through a stack or vent should achieve a peak exit velocity greater than 15 m/sec during the firing cycle.

6.12 Liquid condensation on internal surfaces of stacks flues and exhaust ducts might lead to corrosion and ductwork failure or to droplet emission. Adequate insulation will minimise the cooling of waste gases and prevent liquid condensation by keeping the temperature of the exhaust gases above the dewpoint.

- Flues and ductwork should be cleaned to prevent accumulation of materials, as part of the routine maintenance programme.
- Stacks or vents should not be fitted with any restriction at the final opening such as a plate, cap or cowl, with the exception of a cone which may be necessary to increase the exit velocity of the emissions.

Management

Management techniques

6.13 Important elements for effective control of emissions include:

- proper management, supervision and training for process operations;
- proper use of equipment;
- effective preventative maintenance on all plant and equipment concerned with the control of emissions to the air; and
- it is good practice to ensure that spares and consumables are available at short notice in order to rectify breakdowns rapidly. This is important with respect to arrestment plant and other necessary environmental controls. It is useful to have an audited list of essential items.

- Spares and consumables - in particular, those subject to continual wear - should be held on site, or should be available at short notice from guaranteed suppliers, so that plant breakdowns can be rectified rapidly.

Appropriate management systems

6.14 Effective management is central to environmental performance; It is an important component of BAT and of achieving compliance with permit conditions. It requires a commitment to establishing objectives, setting targets, measuring progress and revising the objectives according to results. This includes managing risks under normal operating conditions and in accidents and emergencies. It is therefore desirable that processes put in place some form of structured environmental management approach, whether by adopting published standards (ISO 14001 or the EU Eco Management and Audit Scheme [EMAS]) or by setting up an environmental management system (EMS) tailored to the nature and size of the particular process. Operators may also find that an EMS will help identify business savings.

Regulators should use their discretion, in consultation with individual operators, in agreeing the appropriate level of environmental management. Simple systems which ensure that LAPC considerations are taken account of in the day-to-day running of a process may well suffice, especially for small and medium-sized enterprises. While authorities may wish to encourage wider adoption of EMS, it is outside the legal scope of an LAPC authorisation/LA-PPC permit to require an EMS for purposes other than LAPC/LA-PPC compliance. For further information/advice on EMS refer to EMS Additional Information in **Section 8**.

Training

6.15 Staff at all levels need the necessary training and instruction in their duties relating to control of the process and emissions to air. In order to minimise risk of emissions, particular emphasis should be given to control procedures during start-up, shut down and abnormal conditions.

Training may often sensibly be addressed in the EMS referred to above.

- Training of all staff with responsibility for operating the process should include:
  - awareness of their responsibilities under the permit;
  - minimising emissions on start up and shut down
  - action to minimise emissions during abnormal conditions
- The operator should maintain a statement of training requirements for each operational post and keep a record of the training received by each person whose actions may have an impact on the environment. These documents should be made available to the regulator on request.
  - in the record of training, the operator should include the objectives of the training, the location and date of the training, and the status and qualifications of those giving the training

Maintenance

6.16 Effective preventative maintenance should be employed on all aspects of the process including all plant, buildings and the equipment concerned with the control of emissions to air. In particular:

- A written maintenance programme should be developed and implemented with respect to pollution control equipment; and
- A record of such maintenance should be made available for inspection.

7 Summary of changes

Reasons for the main changes are summarised below.

Table 5: Compliance Provisions

Section / Paragraph / Row	Change	Reason	Comment
	Scope of the note is reduced	to comply with IPPC and WID Directives	This note does not meet the WID standards
	Additional guidance on process throughput	To assist consistent enforcement	The courts interpret the law, but this may help, particularly around 50kg/hr at an installation
Emission limits, monitoring and other provisions			
	Total organic carbon tightened to $10mg/m^3$	Reduce emission of VOCs including persistent VOCs	Good combustion should achieve this
	Ash testing available for all incinerators	To assist control of overloading	
	Simplification of minimum oxygen requirement	Only one expression was used by operators.	
	Guidance re OTMS and BSE suspects included in note	Consolidation	BSE/OTMS Ash testing protocol currently being revised
Control Techniques			
5.1 bullet 1 **6.3**	Different expression and testing of 850ºC for 2 seconds	To rely less on manufacturers estimates and more on measurement	

8 Definitions

This guidance	Process Guidance Note NIPG 5/3(Version 2)
Previous guidance	Process Guidance Note NIPG 5/3(Version 1)
LAPC	explained in the Introduction of this guidance
LAPPC	explained in the Introduction of this guidance
Permit	the written permission to operate an installation prescribed for LAPPC – (the replacement for authorisation under LAPC)
Authorisation	the written authority to operate a process prescribed for LAPC - (will be replaced by permit under LAPPC)
Existing process	should be taken to have the following meaning: • a process which was being carried on at some time in the 12 months immediately preceding the first day of the month following publication of this guidance note • a process which is to be carried on at a works, plant or factory or by means of mobile plant which was under construction or in the course of manufacture or in the course of commission on the first day of the month following publication of this guidance note, or the construction or supply of which was the subject of a contract entered into before that date
New process	not an existing process.
Installation	should be interpreted in accordance with the guidance contained in the the General Guidance Manual on Policy and Procedures for Part C installations.
Process	the term "process" has been used in this guidance note to refer to both "processes" under the Industrial Pollution Control (NI) Order 1997 and "installations" under the Environment (NI) Order 2002

Health and safety

Operators of processes and installations must protect people at work as well as the environment:

- requirements of a permit or authorisation should not put at risk the health, safety or welfare of people at work
- equally, the permit or authorisation must not contain conditions whose only purpose is to secure the health of people at work. That is the job of the health and safety enforcing authorities

Where emission limits quoted in this guidance conflict with health and safety limits, the tighter limit should prevail because:

- emission limits under the Industrial Pollution Control (NI) Order 1997 or the Environment (NI) Order 2002 relate to the concentration of pollutant released into the air from prescribed activities
- exposure limits under health and safety legislation relate to the concentration of pollutant in the air breathed by workers
- these limits may differ since they are set according to different criteria. It will normally be quite appropriate to have different standards for the same pollutant, but in some cases they may be in conflict (for example, where air discharged from a process is breathed by workers). In such cases, the tighter limit should be applied to prevent a relaxation of control

EMS additional information

Further information/advice on EMS may be found from the following:

- Envirowise at **www.envirowise.gov.uk** and **www.energy-efficiency.gov.uk** and Environment and Energy Helpline freephone 0800 585794
- ISO 14001 **www.bsi.org.uk** or telephone BSI information centre (020 8966 7022)
- EU Eco Management and Audit Scheme (EMAS) **www.emas.co.uk** or telephone the Institute of Environmental Management and Assessment (01522 540069)

Regulators and process operators may also like to be aware of:

BS 8555: a new standard to help SMEs implement an EMS, by offering a five-phase approach, is contained in BS 8555 which was published in 2003 following on from work undertaken by the Acorn Trust. The Institute of Environmental Management and Assessment, which has taken over the Trust's activities, is developing a scheme of accredited recognition for companies achieving different phases of BS 8555. BS 8555 can be used to achieve ISO 14001 and registration to the higher standard, EMAS.

Some of the **High Street banks**, such as NatWest and the Coop, now offer preferential loan rates to organisations that can demonstrate they are committed to improving their environmental performance. The NatWest also produce a self help guide for SMEs, 'The Better Business Pack', focusing on waste, utilities, transport and supply chain issues. It gives tools, guidance and examples. Contact: WWF-UK on 01483 426444.

References

(a) The Department's guide on LAPPC "General Guidance Manual on Policy and Procedures for Part C Installations", September 2003 - available from the Department at www.doeni.gov.uk/epd.

(b) Scottish Executive Guidance: The Practical Guide for Part B Activities Issue 1 - available from the SEPA web-site. **http://www.sepa.org.uk/pdf/ppc/guidance/practical_guide_part_b_activities.pdf**

(c) Section 10 of NIGG2 "Authorisations" (issued March 1998) provides further advice on the assessment of odour

(d) Current air quality objectives are specified in: The Air Quality (NI) Regulations 2003 (2003 No 342)

(e) HMIP Technical Guidance Note D1: "Guidelines on Discharge Stack Heights for Polluting Emissions", published by The Stationery Office, ISBN 0-11-752794-7.

(f) M1 Sampling requirements for monitoring stack emissions to air from industrial installations, Environment Agency July 2002 **(EA website)**

(g) M2 Monitoring of stack emissions to air. Environment Agency May 2003 **(EA website)**

Web addresses

Web-site of the Department's Environmental Policy Division: **www.doeni.gov.uk/epd**

Web-site of the Department's Environment and Heritage Service: **www.ehsni.gov.uk/**

Energy saving and environmental management measures can increase industry profits. Envirowise (formerly E.T.B.P.P.) show how at **www.envirowise.gov.uk** (or freephone 0800 585 794)

9 Ash Monitoring Protocol - BSE Suspects And OTMS cattle

Guidance on ash testing protocol for BSE suspects / OTMS cattle was issued to local regulators by Government on 17 July 1997, and is currently being revised.

The 17 July 1997 guidance informed LAPC/LAPPC regulators

- that they should use the Environment Agency guidance on Ash testing in the appendix to "Amplification Note No 1" regarding animal carcase incineration
- that they should modify the protocol in particular regarding frequency of testing, the letter dated 17 July 1997 gave the details

The Environment Agency "Guidelines for Ash Sampling and Testing" was re-issued on 14 May 2001.

The latest consultation draft for the revision of the Part B protocol was issued on 12 September 2003 by Defra.

The scope of the protocol is indicated below, along with a brief description of its contents.

Copies are available from Defra; enquiries can be made to:

- imalka.oyewole@defra.gsi.gov.uk Tel: 020 7082 8389 or
- carl.woodward@defra.gsi.gov.uk Tel: 020 7082 8388

The draft revision of the protocol starts as follows.

1 Introduction

1.1 This protocol provides guidance on testing methods and frequency of testing for protein and total organic carbon where incinerators are burning BSE-suspects or cattle from the Over Thirty Month Scheme (OTMS). The testing is necessary to ensure that plant are operating to acceptable standards in relation to any possible risks from BSE.

1.2 The protocol is applicable to all new plant and any existing installations, that will burn BSE suspects or cattle from the Over Thirty-Month Scheme (OTMS).

1.3.....

The Protocol includes:

- monitoring requirements for Part C incinerators - this sets out action levels and the frequency of sampling for existing plant, plant burning BSE/OTMS material for the first time, and plant that fail to meet the action levels
- guidance on selection and preparation of samples
- guidelines for preparing a Sample Plan
- a recommended tracking system for independent analysis for the local authority regulators

10 Ash Monitoring Protocol - No BSE Suspects Nor OTMS Cattle

This protocol is technically similar to the Ash monitoring protocol for BSE suspects/OTMS cattle for local regulators (for which see **Section 9**). Sampling is the same. The differences are that:

- this protocol applies to plant where no BSE and no OTMS cattle are incinerated
- testing is "if required by the regulator because of doubts about the day to day efficiency of combustion", and may be a one-off test or periodic eg six monthly,
- protein testing is not required
- the action level is 1% organic carbon
- as Part B incinerators do not usually have gas cleaning, fly ash testing is not required
- the results are **not** sent to the Environment Agency national database for incineration of animal remains and MBM

The scope of the ash testing protocol for no BSE suspects / nor OTMS cattle starts as follows.

1 Introduction

1.1 This protocol provides guidance on testing methods and frequency of testing for total organic carbon where animal carcase incinerators are NOT burning BSE-suspects NOR cattle from the Over Thirty Month Scheme (OTMS)

It includes:

- monitoring requirements for Part B incinerators - this sets out action levels and the frequency of sampling for new and existing plant, and plant that fail to meet the action levels
- guidance on selection and preparation of samples
- guidelines for preparing a Sample Plan
- a recommended tracking system for independent analysis for the local regulatory units

Appendix 1: Extract from LAPPC regulations

DEFINITION OF INCINERATION AND CO-INCINERATION IN SCHEDULE 1 TO THE POLLUTION PREVENTION AND CONTROL REGULATIONS (NI) 2003, 2003 No 46*.

(The processes for district council air pollution prevention and control are listed under "Part C". The "Part A" and Part "B" processes are for Chief Inspector control.)

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(1).

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.

(1)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 heat 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(2); 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.

(2)OJ No. L363, 27.12.90, p.51

"hazardous waste" means any solid or liquid waste as defined in Article 1(4) of Council Directive 91/689/EEC on hazardous waste(3) except for -

(a)combustible liquid wastes including waste oils as defined in Article 1 of Council Directive 75/439/EEC on the disposal of waste oils(4), 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(5);

(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(6); 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(7) 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.

*Every effort has been taken to ensure that this Appendix is correct at the date of issue of this Note, but readers should note that the Regulations are likely to be subject to periodic amendment, and this Appendix should not therefore be relied upon as representing the up-to-date position after the issue date.

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

(4) OJ No. L194, 25.7.75,p23

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

(6) 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).

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