
An Ghníomhaireacht um Chaomhnú Comhshaoil

# Integrated Pollution Control Licensing

## Batneec Guidance Note
## For The
## Poultry Production Sector

**Environmental Protection Agency**

An Ghníomhaireacht um Chaomhnú Comhshaoil

An Ghníomhaireacht um Chaomhnú Comhshaoil

# Integrated Pollution Control Licensing

## Batneec Guidance Note
## For The
## Poultry Production Sector

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

**Environmental Protection Agency**
Ardcavan, Wexford
Telephone : +353-53-47120 Fax : +353-53-47119

# Batneec Guidance Note
# For The
# Poultry Production Sector

(Revision 1 - February 1998)

**ISBN 1 899965 35 1**
**EPA No. LC 15(02/98).**

**Price Ir. £5.00** **2/98/300**

# Environmental Protection Agency

ESTABLISHED

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

RESPONSIBILITIES

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

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

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

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

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

- the promotion and co-ordination of environmental research;

- the licensing and regulation of all significant waste recovery activities, including landfills and the preparation and updating periodically of a national hazardous waste plan for implementation by other bodies; and

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

STATUS

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

ORGANISATION

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

MANAGEMENT

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

ADVISORY COMMITTEE

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

# Acknowledgements

The Environmental Protection Agency would like to acknowledge Professor Vincent A. Dodd and Mr Diarmaid De Búrca, Agricultural & Food Engineering Department, University College Dublin who prepared the initial drafts of this BATNEEC note.

The preparation of these BATNEEC advice notes has been a collective task from the outset. We gratefully acknowledge the assistance and valuable information offered by:

Irish Groups

- Agricultural Consultants (Mssrs. B. Flood and J. Malone)
- An Bord Pleanála (Mr. P. Thornton)
- Department of Agriculture, Food and Forestry (Mssrs. P. Drennan, T. Quinlivan, C. Robson, J. Sexton, K. Unger and P. Woods and Ms. M. Good)
- Farm Machinery Manufacturers (Abbey Farm Equipment Ltd., ABS Pump Ltd., Agri-Tec Manufacturing Ltd., Hi-spec Engineering Ltd., Ruscon Engineering Works Ltd. and Tanco Engineering Co. Ltd.)
- Feed Suppliers (Carton Bros. Ltd., Corby Rock Mills Ltd. and Nutec)
- Geological Survey of Ireland (Mssrs D. Daly and M. Hudson)
- Irish Farmer's Association (Mssrs. M. Reilly, P. Smith and N. Walsh)
- Irish Industrial Tanks (Mr. D. Boyce)
- Odour Control/Manure Treatment Companies (Alltech Ireland Ltd., Bio-Industries Ltd., Bord na Móna, Hi-tec Pure Air Ltd. and Terralift)
- Poultry Producers (Carton Bros. Ltd., Corby Rock Eggs Ltd., Kerry Group Plc., Mac Fresh Eggs, Manor Farm Ltd., Monaghan Poultry Products, Silver Hill Foods Ltd. and other individual producers)
- Teagasc Poultry Advisors (Ms. M. Carroll and Ms. M. McLoughlin)
- Teagasc Researcher Staff (Mssrs. O. Carton, J.J. Lennihan, B. Lynch, J. Mulqueen, B. Rice, H. Tunney and J. Ward)
- The Central and Regional Fisheries Board (Mssrs. T. Champ and P. Kilfeather)
- The Department of the Environment (Mssrs. E. Brangan and D. Moore)
- The Environmental Officers in the Irish Local Authorities.
- The staff of the Planning Departments in the Irish Local Authorities.

International Groups

- ADAS London, England. (Mssrs. J. Archer and A. Brewer)
- Administration de l'environnement, Luxembourg. (Mr. T. Weber)
- Centro Ricere Produzioni Animali, Italy. (Mr. G. Bonazzi)
- Clyde River Purification Board, Scotland. (Mr. R. Morris)
- Danish Environmental Protection Agency, Denmark. (Mr. C. Poulsen)
- Farm Machinery Manufacturers (Maschinenfabrik Meyer-Lohne GmbH., Maskinfabriken Samson, Vredo Dodewaard B.V.)
- Hoofdinspectie Milieuhygiene, The Netherlands (Mssrs. T. Meyer and K. Waterlander)
- IKC, The Netherlands (Ms. M. Voermans and Ms. M. Vonk and Mssrs. M. De Bode, H. Ellen and H. Henriks)
- Institute of Agricultural and Environmental Engineering (IMAG-DLO), The Netherlands. (Mssrs. P. Derikx, A. Jongebreuer, G. Jan Monteny and C.E. van't Klooster)
- L.U.F.A., Germany. (Mr. F. Lorenz)
- Ministerium für Umwelt, Raumordnung und Landwirtschaft des Landes Nordrhein-Westfalen, Germany. (Mssrs. H. Krüber and M. Pütz)
- Ministry of Public Works, Transport and the Environment, Spain. (Mr. J. Martinez Sanchez)
- Ministry of the Environment, France. (Ms. O. Gauthier)
- Nature and Land Development Administration, Belgium. (Mr. L. Van Gijsel)
- Research Centre Foulum, Denmark. (Mssrs. A. Kyllingsbaek and J. Peterson)
- Swedish Institute of Agricultural Engineering, Sweden. (Ms. C. Jakobsson, Ms. L. Rodhe and Mssrs. S. Karlsson, J. Malgeryd and L. Svensson)
- The Danish Agricultural Advisory Centre, Denmark. (Mssrs. C. Aage Peterson, E. Nørregaard and E. Schultz)
- The members of Working Group 1 of the European Network for the Implementation and Enforcement of Environmental Law.
- Waikato, New Zealand (Mr. D. Watson)
- Vlaamse Landmaatschappij, Belgium. (Ms. E. Buclens, Ms. J. Depioc, Ms. H. Haesebiseck, Ms. L. Van Holden and Mssrs. P. Demeester, J. Mosselmans, W. Van Tracker and Mr. L. Vanden Elst)

The Agency would also like to take this opportunity to thank the following bodies who were consulted during the drafting of this note:

Advisory Committee, E.P.A.
An Taisce
Bord Fáilte
Central Fisheries Board
Cork Environmental Alliance
County & City Engineers Association
County & City Managers Association
Department of Agriculture, Food and Forestry
Department of Enterprise and Employment
Department of the Environment
Department of Health
Department of the Marine
Department of Transport Energy & Communications
Earthwatch
Environmental Conservation Organisation
Geological Survey of Ireland
Greenpeace
H.S.A. (Health and Safety Authority)
Irish Business and Employers Confederation
Irish Creamery Milk Suppliers Association
Industrial Development Authority
Irish Farmers Association
Irish Womens Environmental Network
Office of Public Works
Shannon Free Airport Development Company
Teagasc

# Table of Contents

# PREFACE

This guidance note is designed to identify the minimum standards required in respect of a new activity. Integrated Pollution Control (I.P.C.) licensing will take account of individual circumstances including *interalia* soil type, sub-surface geology, water resources, topography, geography, landuse, soil nutrient status and requirements.

The facilities referred to in the note include manure storage for periods of at least six months. Such a period is considered necessary to facilitate the management of manure and to avoid having to spread manure at unsuitable times.

The management of the manure produced is the sole responsibility of the owner of the poultry unit.

The note identifies the period November to February inclusive as unsuitable for landspreading. However in certain locations in particular years it may not be appropriate to adhere rigidly to these dates; depending on the weather Spring landspreading operations may well commence before the end of February but may also have to be deferred to a later date.

# 1. INTRODUCTION

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

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

This Guidance Note is comprised of five main sections and appendices. Following this introduction, Section 2 contains a general note on the interpretation of BATNEEC. The activities covered by the terms of this note are given in Section 3. In Section 4, the technologies to control emissions are outlined and this is followed by Section 5 which contains comments on compliance monitoring requirements.

Appendices include Appendix 1 which gives the main sources of emissions, and the principal releases from such sources; Appendix 2 which details the principal references used in preparing this Guidance Note and Appendix 3 which gives details of other Integrated Pollution Control (I.P.C.) publications.

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

The technologies identified in this Guidance Note are, at the time of writing, regarded as representing BATNEEC for new activities. BATNEEC is not a static quality and will change as technologies, environmental factors and costs alter with the passage of time. The Agency may amend or update the guidelines contained in this note should such amendments seem appropriate. The information contained in this Guidance Note is intended to be used only as a tool to assist in determining the BATNEEC for an operation in this sector and should not be taken to be a definitive authority on the BATNEEC for this sector. This Note should not be considered as a legal document.

## 2. INTERPRETATION OF BATNEEC

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

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

In the identification of BATNEEC, emphasis is placed on pollution prevention techniques, including cleaner technologies and waste minimisation, rather than end-of-pipe treatment. Consideration should be given to energy efficient technologies and practices.

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

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

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

- the current state of technical knowledge;
- the requirements of environmental protection;
- the application of measures for these purposes, which do not entail excessive costs, having regard to the risk of significant environmental pollution which, in the opinion of the Agency, exists.

For existing facilities, additional regard shall be had to:

- the nature, extent and effect of emission concerned;
- the nature and age of the existing facilities concerned with the activity and the period during which the facilities are likely to be used or to continue in operation; and
- the costs which would be incurred in improving or replacing these existing facilities in relation to the economic situation of activities of the class concerned.

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

## 3. SECTOR COVERED BY THIS GUIDANCE NOTE

This Guidance Note covers SECTOR 6.1 of the activities specified in the First Schedule to the EPA Act, 1992. These are:

***6.1*** ***The rearing of poultry in installations, whether within the same complex or within 100 metres of that complex, where the capacity exceeds 100,000 units and where units have the following equivalents:***

- ***1 broiler = 1 unit,***
- ***1 layer, turkey or other fowl = 2 units.***

# 4. CONTROL TECHNOLOGIES

## 4.1 Introduction

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

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

- Process design/redesign and selection changes to **minimise** the production of manure, wash-water, carcasses and packaging waste that might pose environmental problems.
- Process design/redesign and selection changes to **minimise** emissions that might pose environmental problems.
- **Substitution** of feed, materials, machinery etc., by environmentally less harmful ones.
- Demonstration of waste **minimisation** by means of production process control, inventory control and recycling technologies etc.

The existing, or possible measures for reduction and control of emissions are described in this section. These range from relatively simple siting and containment measures to recovery/recycling and manure treatment technologies and include:

1. Siting poultry units.
2. Load minimisation.
3. Containment.
4. Manure spreading.
5. Recovery/recycling.
6. Treatment of manure.

The technical feasibility of the measures listed below has been demonstrated by various sources. Used singly or in combination, these measures represent BATNEEC solutions when implemented in the appropriate circumstances. The circumstances depend on farm scale, feed and materials used, type of poultry housing, number and type of different birds/eggs produced, degree of integration of the plant, etc.

Poultry manure and wash water should be spread parallel to ground contours taking account of safety requirements. Note that where hazardous (including asphyxiant) dusts or vapours occur, safety procedures (acceptable to Health & Safety Authority) should be adopted. In these, and any other matters concerning safety, appropriate safe working practices should be adopted and nothing in this note should be construed as advice to the contrary.

## 4.2 Poultry housing and manure

There are three main types of poultry housing:

1. Litter based housing.
2. Non-litter based housing with air drying of the manure.
3. Non-litter based housing without air drying of the manure.

### 4.2.1

Litter based housing is commonly used in pullet, broiler and turkey houses. It is also used in aviary laying houses. Suitable bedding, comprising of wood shavings, chopped straw, shredded paper or moss peat is used to cover the floor. The manure produced combined with the litter can have a dry matter content of c. 70%, particularly when good insulation and ventilation are provided and water spillages are minimised.

### 4.2.2 Non-litter based housing with air drying of the manure

Non-litter based housing is commonly used in laying hen houses. The birds are housed in cages and the manure is dried to c. 55% dry matter content by two main methods:

1. The manure drops through the floor of the cages onto 'manure drying conveyor belts' beneath the cages. Dry air is blown over the surface of this manure on the 'manure drying conveyor belt' thus drying the manure.
2. The manure drops through the floor of the cages into a 'deep pit' concrete structure beneath the house where the ventilation air dries the manure. Preliminary drying may occur on cleaning plates fixed underneath the cages before the manure is scrapped off the plates into the 'deep pit' below.

### 4.2.3 Non-litter based housing without air drying of the manure

Non-litter based housing without air drying should normally be used only in the housing of ducks. The birds are housed on a wire mesh floor, with the manure stored in a concrete structure underneath. Water is added to the manure and mechanical agitation of the manure/water slurry takes place prior to spreading.

### 4.2.4 Poultry manure

The characteristics of poultry manure are a function of:

- water:feed ratio
- feed quantity
- feed quality
- amount of bedding used, if any

Account should be taken of these variables when estimating the quantity and associated characteristics of the manure from a specific unit; account may also have to be taken, where appropriate of additions to the manure in storage from extraneous water including wash-water and contaminated surface water.

The approximate characteristics of manure produced by the four main types of poultry are given in Table 1.

**Table 1: Approximate characteristics of poultry excreta**

| Type of Poultry place | Approx. Bodyweight (kg) | Excreta (l/week) | % Dry Matter of Excreta | Nitrogen (kg/place/ annum) | Phosphorus (kg/place/ annum) |
|---|---|---|---|---|---|
| Laying Hen | 2.0 | 1.1 | 25 | 0.84 | 0.2 |
| Broiler | 2.0 | 0.2 | 60[1] | 0.34 | 0.08 |
| Turkey | 7.0 | 2.0 | 23 | 1.29 | 0.53 |
| Ducks (Duckling) | 2.0 | 1.4 | 12 | 1.00 | 0.27 |

[1]Note: This amount includes bedding.

## 4.3 Siting poultry units

BATNEEC for the siting of poultry units is based on the following hierarchy:

- A mass balance of nutrients within a control area.
- Protection of both surface and groundwater resources in the vicinity of the site and landspreading areas.
- Avoidance of nuisance due to malodours for dwellings in the vicinity of the site.
- Protection of the environment in the event of the de-stocking of the unit due to an emergency, e.g. an outbreak of a Class A disease as identified in accordance with the current list of scheduled and notifiable diseases compiled by the Department of Agriculture, Food and Forestry under the provisions of the 'Diseases of Animals Act', 1966.

The management of poultry manure should be based on a mass balance of nutrients within a control area, whether the area be a farm, group of farms or a region. Thus, poultry units should preferably be sited in close proximity to either mushroom compost production areas or suitable landspreading areas such as land used for tillage crop production in which they can operate as 'back to back' enterprises to:

- Facilitate the utilisation of manure for mushroom compost or crop production.
- Avoid a surplus of manure prevailing within a region.
- Reduce manure transportation costs.

In order to protect both surface and groundwater resources in the vicinity of the site and landspreading areas a site investigation is essential and it is generally advisable that it be carried out by a qualified hydrogeologist. The site investigation should provide information on:

- Depth to water table (if shallow).
- Depth to bedrock (if shallow) and details of bedrock outcrops.
- Subsoil and bedrock type and quantitative assessment of permeability.
- Presence or absence of karst features - caves, swallow holes etc. - if bedrock is limestone.

- Aquifer classification and groundwater vulnerability in accordance with the provisions of 'Groundwater protection schemes in Ireland: A proposed approach', (Daly, 1995).
- Private wells within 200 metres and all public wells within 1 kilometre of site and 300 metres of the landspreading areas.
- Direction of groundwater flow.
- Baseline information on surface and groundwater quality.
- Location of all watercourses adjacent to the site and landspreading areas.

In addition the investigation should include information on soil types and nutrient status.

Poultry units should be sited a distance of preferably not less than 400 metres from the nearest neighbouring dwelling and all operations on site shall be carried out in a manner such that air emissions and/or odours do not result in significant impairment of or significant interference with amenities or the environment beyond the site boundary.

Poultry units should be sited such that in the event of an outbreak of disease requiring de-stocking there is an appropriate site available for the construction of a lined carcass disposal site for the disposal of all carcasses. The carcass disposal site shall be appropriately constructed in order to avoid any detrimental impacts on both surface and groundwater quality in accordance with the provisions contained in 'Class A disease outbreak - a multi-disciplinary approach', (Duggan, O'Laoide and Finn, 1995.)

## 4.4 Load minimisation

All feedingstuffs in the poultry production sector shall comply with the provisions of current national legislation thereon.

Load minimisation for the poultry production sector is based on the following hierarchy although the appropriate selection in a particular case will depend on the specific circumstances which apply to the individual site.

Minimisation of poultry manure and reduction of mineral excretion by:

1. Feeding to requirements.
2. Maintaining feeding systems in a good working condition so that feed wastage and spoilage are kept to a minimum.
3. Increasing the digestibility of the phosphorus in feed.
4. Using low phosphorus feed, where appropriate.
5. Maintaining all drinkers in a good working condition such that leaks are prevented. If suitable for the type of birds, nipple and drip cups (or similar system) are preferable to hanging bowl drinkers, as they minimise water spillage.
6. Separate collection of all uncontaminated surface water run-off from roofs and clean paved areas within the proposed development and its direct disposal to field drains or soakpits according to S129: 'Minimum specification for farmyard drainage, concrete yards and roads.', (DAFF, 1993).

Minimisation of odour emissions by:

- Adequate cleaning of poultry houses between batches.

- Using adequate bedding in litter based poultry housing.
- Provision of adequate manure storage capacity.
- Stocking poultry units at design level.
- Designing ventilation system to facilitate efficient operation including maintenance.
- Filling and emptying liquid manure storage tanks from below the surface of the stored manure, where feasible.
- Minimising the agitation of manure.

Minimisation of carcass waste by reducing mortality rates on the unit.

Minimisation of wash-water by:

- Construction and maintenance of poultry houses to allow efficient cleaning.
- Use of dry cleaning and dry vacuum systems where feasible.
- Use of automatic cut-off trigger operated high pressure hoses for washing.

## 4.5 Containment of emissions

Containment of emissions for the poultry production sector is based on the following hierarchy although the appropriate selection in a particular case will depend on the specific circumstances which apply to the individual site.

Poultry manure should be managed in order to achieve approximate dry matter contents as detailed in 4.2.

Poultry manure from litter based housing should be stored:

- In a manure pit structure constructed according to S108: 'Minimum specification for manure pit', (DAFF, 1987) and sited where the risk of both water pollution and spread of disease to other poultry houses is minimal. The manure pit should be provided with a roof and walls as necessary to protect the poultry manure from the elements.
- Discrete quantities of manure may be stored for up to two weeks, on suitable landspreading areas as detailed in Section 4.6, prior to landspreading. Only the quantity required for spreading in a particular field should be stored in that field. Such short storage of manure, where practised should be in accordance with 'Control of farmyard pollution: Guidelines and recommendations', (DAFF, 1996).

Litter-free air dried poultry manure should be stored in either:

- A reinforced concrete structure constructed according to S123: 'Minimum specification: Slatted livestock units; Reinforced concrete tanks', (DAFF, 1994) placed below the poultry house but with access for emptying and provision for adequate ventilating airflow to dry the manure in the 'deep pit'.
- In a manure pit structure constructed according to S108, (DAFF, 1987) and sited where the risk of both water pollution and infection of other poultry houses is minimal. The manure pit should be provided with a roof and walls as necessary to protect the air dried poultry manure from the elements

Litter-free poultry manure without air drying should be stored:

- In underground, partly underground or overground concrete structures constructed according to S123: 'Minimum specification: Slatted livestock units; Reinforced concrete tanks', (DAFF, 1994).
- In an overground steel structure constructed on an impermeable concrete base. Steel structures must be certified by the manufacturer as being water-tight and they must be guaranteed for a 10 year period. The design specification and subsequent construction for the concrete base must be certified by a chartered engineer.
- Overground manure storage structures shall be provided with two valves in line and an external safety ladder and railed platform to facilitate inspection.

The following applies to all poultry manure and wash-water storage structures whether or not on the site of the unit:

- A minimum of six months storage capacity dedicated to the unit is required.
- All construction work should be certified by a chartered engineer as having been constructed according to either S108 or S123 as appropriate, (DAFF, 1987 and 1994).
- Where the poultry manure storage structures are constructed to another design specification, then both the design specification and the subsequent construction work should be certified by a chartered engineer as being suitable for the task and comparable to the Department of Agriculture, Food and Forestry specifications.
- All storage tanks should be inspected by a chartered engineer and certified as structurally sound for the purpose they were intended subsequent to construction and at appropriate intervals thereafter.
- Leak detection facilities based on inspection chambers and perimeter wall and under floor drains should be provided as appropriate.

Spreading or applying manure to landspreading areas should be carried out according to Section 4.6.

Transport of poultry manure should be in suitably contained, leakproof vehicles.

The septic tank drainage system should be constructed in accordance with SR6 'Septic tank systems: Recommendations for domestic effluent treatment and disposal from a single domestic dwelling', (NSAI, 1991).

Oil storage tanks on site should be placed on impervious bases and shall be located within oil tight bunds, capable of holding 110% of the volume of the largest tank within the bund. The fill and draw pipes shall be enclosed within the bund.

Odour emissions should be contained by:

- Reducing uncontrolled air movement.
- Filling and emptying liquid manure storage tanks from below the surface of the stored manure, where feasible.
- Transporting manure in suitably contained, leakproof vehicles.
- Minimising the agitation of manure.
- Minimising the generation of odours during meteorological conditions which favour the spread of odours.
- Landscaping poultry houses using shelter-belts.

Carcasses should be stored on site in covered containers and transported to a rendering facility in covered, leakproof containers as soon as practical and at least once per week.

Wash-water from poultry houses should be stored:

- In underground, partly underground or overground concrete structures constructed according to S123: 'Minimum specification: Slatted livestock units; Reinforced concrete tanks', (DAFF, 1994).
- In an overground steel structure constructed on an impermeable concrete base. Steel structures must be certified by the manufacturer as being leak-proof and they must be guaranteed for a 10 year period. The design specification and subsequent construction for the concrete base must be certified by a chartered engineer.
- Overground manure storage structures shall be provided with two valves in line and an external safety ladder and railed platform to facilitate inspection.

Packaging waste, contaminated drums, equipment and protective clothing should be collected and stored in suitably sealed leakproof containers, where practicable.

## 4.6 Spreading poultry manure

The owner of the poultry unit where the manure and wash-water is produced shall be responsible for its management.

BATNEEC for spreading poultry manure is based on the following preferred hierarchy:

- Suitable landspreading areas.
- Buffer-zones required.
- Time of application.
- Manner of application.
- Spreading rate.

Units where landspreading areas are obtained by agreement with other landowners, should have a reserve landspreading area available to them of at least 50% of the landspreading area obtained by agreement. (e.g.: Where a poultry farmer owns 80ha and requires 100ha of landspreading areas, then he/she should obtain 30ha by agreement.)

Poultry manure and wash-water should be landspread or applied to the following landspreading areas based on the following hierarchy:

- Tillage crop production.
- Conserved grassland.
- Grazed grassland.

Poultry manure and wash-water should be spread parallel to ground contours.

Poultry manure and wash-water should not be landspread or applied to the following landspreading areas:

- On land where the existing phosphorus (P) content is above 15 mg/l soil or such figure as may be determined by the Agency; soil phosphorus levels to be determined by Morgan's P-Test in accordance with 'A modified single solution method for the determination of phosphate in natural waters', (Murphy and Riley, 1962) and (Peach and English, 1944).
- On waterlogged land.
- On frozen or snow covered land.
- On exposed bedrock.
- Fields that are pipe or mole drained and the soil is cracked down to the drains or backfill.
- Fields that have been pipe or mole drained in the last 12 months.
- Fields that have been subsoiled over a pipe or mole drainage system in the last 12 months.
- Within 15 metres of exposed cavernous (karstified) limestone or karst limestone features such as swallow holes and collapse features.
- Where permeable bedrock is overlain by shallow (i.e. less than 1 metre from the surface) free draining subsoils, such as sands, gravels and sandy tills. Where the bedrock is *highly permeable* limestone or dolomite (*these are usually classed as regionally important or major aquifers*) a greater depth of subsoil (i.e. 2 metres) is desirable.
- Where the water table is within 1 metre of the surface in free draining areas, at the time of application.
- Where surface gradients are excessive; gradients should preferably be less than 20%.

Poultry manure and wash-water should be landspread or applied to land observing the following 'buffer zones':

**Table 2: Buffer zones for landspreading poultry manure.**

| Area | Buffer zone (m) |
|---|---|
| Sensitive buildings (hospitals, schools and churches) | 200 |
| Dwelling houses | 100 |
| Lakes and main river channels[1] | 20 |
| Small watercourses[1] | 10 |
| Public roads[1] | 10 |
| Domestic wells[1] | 50 |
| Public water supplies[1,2] | 50 to 300 |

[1]Note: The above distances to be increased if the gradient is greater than 6%.

[2]Note: The appropriate distance depends on vulnerability and groundwater flow direction.

Unless good management practice otherwise dictates, the factors listed below must be taken into account and poultry manure and wash-water generally should not be landspread or applied to landspreading areas at the following times, to take account of nutrient uptake, slurry runoff and the generation of odour nuisance:

- During the period November to February inclusive.

(However in certain locations in particular years it may not be appropriate to adhere rigidly to these dates; depending on the weather Spring landspreading operations may well commence before the end of February but may also have to be deferred to a later date.)

- Manure should not be spread late in the year on land which will be barren over the winter.
- Manure should be spread earlier rather than later in the growing season.
- When heavy rain is forecast within 48 hours.
- Manure should only be spread during daylight hours.
- When the wind direction is towards population centres or neighbours houses.
- When the risk of causing odour nuisance to the public is greatest e.g. Sundays or public holidays.
- Meteorological conditions which give rise to odour nuisance.

Poultry manure and wash-water should be landspread or applied in the following manner:

- Manure/wash-water should be spread by an appropriate band-spreader, shallow injector or muck-spreader (for poultry litter only).

The rate of landspreading or application of poultry manure or wash-water should take account of:

- The nutrient content of the manure.
- The nutrient requirements of the crop.
- The nutrient status of the soil.
- Other organic manures and chemical fertilisers being spread.

The rate of landspreading or application of poultry manure or wash-water should be in accordance with the provisions contained in either of the following sources:

- 'Rural Environment Protection Scheme, Farm Development Service: Agri-environmental specifications', (Current edition of DAFF Guidelines).

or,

- 'Soil analysis and fertiliser, lime, animal manure and trace element recommendations', (Current edition of Teagasc Guidelines).

Regardless of the dilution factor, the maximum hydraulic loading per single application should not exceed $25m^3$ per hectare on shallow limestone soils and in no case should exceed $50m^3$ per hectare.

## 4.7 Technologies for recovery and recycling

Load minimisation for the poultry production sector is based on the following hierarchy although the appropriate selection in a particular case will depend on the specifics.

A Nutrient Management Plan (NMP) should be established to optimise the re-use and recycling of available nutrients in the poultry manure - in particular nitrogen, phosphorus and potassium - and should also take account of the hydraulic load. (See also section 5.4).

Carcasses should be stored on site in covered containers and transported to a rendering facility in covered, leakproof containers as soon as practical and at least once per week.

The Nutrient Management Plan should incorporate the quantity of wash-water.

Waste packaging materials should be recovered and recycled, where practicable.

## 4.8 Treatment of manure

Considerable research has been carried out in recent years in manure treatment. The objectives of manure treatment may include:

- Reduction of odour.
- Production of biogas.
- Improvement in ease of handling.
- Reduction of pathogens.

Treatment of manure may include the following:

- Mechanical separation.
- Aeration.
- Composting.
- Anaerobic digestion.
- Drying.
- Pelletising.
- Incineration.

There are several large scale plants in Europe providing centralised manure treatment. To date, such facilities are rarely provided on individual farms. However, it may in certain circumstances be appropriate to provide treatment facilities on an individual farm. The type of treatment required and the technology employed will depend on the specific circumstances applying to the individual site.

## 4.9 Technologies for the treatment and disposal of wastes

In the event of the unit being de-stocked, due to an emergency, e.g. an outbreak of a Class A disease as identified in accordance with the current list of scheduled and notifiable diseases compiled by the Department of Agriculture, Food and Forestry under the provisions of the ‘Diseases of animals act’, 1966 - the Department of Agriculture’s Veterinary Inspectors should be contacted immediately.

Packaging waste, contaminated drums, equipment and protective clothing which are not reused or recycled, should be disposed of at an authorised facility.

# 5. COMPLIANCE MONITORING

The methods proposed for monitoring the emissions from this sector are set out below.

## 5.1 Air emissions

Periodic monitoring of air quality with regard to odour nuisance at the boundary of the site and spreading areas as per licence.

## 5.2 Surface water quality monitoring scheme

Periodic water quality monitoring of relevant parameters as per licence. Periodic water quality monitoring of relevant parameters as per licence.

## 5.3 Groundwater quality monitoring scheme

Establish the baseline conditions of groundwater quality in the neighbourhood of the site and all of its landspreading areas prior to start-up. Periodic water quality monitoring of relevant parameters as per licence. Where appropriate, test wells should be provided at the site of the poultry unit and on the landspreading areas used for spreading manure.

## 5.4 Nutrient Management Plan

A Nutrient Management Plan (NMP) should be maintained on site for the management of poultry manure and wash-water arising at the unit and should include:

- Calculation of the quantity of manure and the amount of nutrients available from manure including any manure or other wastes imported.
- The results of soil fertility and drainage tests on existing or proposed landspreading areas.
- A representative soil sample, to a depth of 10 cm, should normally be taken biennially from every 2 to 4 hectares and at least one per farm. However, where soil types are similar and cropping and treatment of the lands were the same during the previous 5 years or more, a composite sample from an area up to 12 hectares is acceptable.
- An assessment of the relationships between manure application rates, cropping routine, crop nutrient requirements and existing soil nutrient status on all landspreading areas.
- Ordinance Survey Maps to a scale of 1:10,560 showing the location of the said landspreading areas and all environmentally sensitive features on the lands or in their vicinity; including *interalia* dwellings houses and sensitive buildings, drains, streams, watercourses and other sources of water supply.
- Agreements between ‘importers’ and ‘exporters’ of all animal manures or other wastes are required.

The Nutrient Management Plan should be up-dated and issued to the Agency for approval on an annual basis.

# Appendix 1

## Sources and Emissions

## 1. Introduction

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

Emissions are considered under two headings; fugitive and unscheduled emissions and specific process emissions.

## 2. Sources of emissions to air

### 2.1 Fugitive and unscheduled emissions

Emissions during the delivery, storage and transfer of feed (S1).

Emissions during the collection, loading, unloading and transportation of birds (S1).

Emissions during collection, storage and transport of carcasses (S1).

Leakages from ventilation system and poultry house (through door, window etc.) (S1)

### 2.2 Process emissions

Emissions during collection, storage, transportation, spreading and after spreading of manure (S1).

Emissions from the ventilation system and from manure storage facilities (S1).

## 3. Sources of emissions to water

### 3.1 Spills and diffuse sources etc.

Contaminated storm waters (E1).

Nutrient leaching to groundwater from the site and from the landspreading areas (E2).

Nutrient run-off to surface water from the site and from the landspreading areas (E1).

Leaks from manure storage facilities (E1).

Spillages during collection, storage, transportation and spreading of manure (E1).

Oil bund drains (E3).

## 3.2 Process emissions

Wash-water arising from cleaning of houses between batches (E1).

Wash-water arising from cleaning of equipment (E1).

Vehicle washing where carried out (E1).

## 4. Sources of waste

Packaging waste, contaminated drums, equipment and protective clothing (W1).

**Table 3: Summary of sources and emissions to air**

| Source Type | Emission |
|---|---|
| S1 | Odours |

**Table 4: Summary of sources and emissions to water**

| Source Type | Emission |
|---|---|
| E1 | Inorganics (Nitrogen, Phosphorus)<br>Organics (BOD) |
| E2 | Inorganics (Nitrogen)<br>Organics (BOD) |
| E3 | Oil (or other fuels) |

**Table 5: Summary of other releases**

| Source Type | Emission |
|---|---|
| W1 | Inorganics (Nitrogen)<br>Organics (BOD)<br>Cleaning chemicals |

# Appendix 2

## Principal References

### Department of Agriculture, Food and Fisheries Publications

**Specifications:**

- S108 (1987): Minimum specification for manure pit.
- S123 (1994): Minimum specification: Slatted livestock units; Reinforced concrete tanks.
- S129 (1993): Minimum specification for farmyard drainage, concrete yards and roads.

Diseases of animals act; List of scheduled and notifiable diseases. (1966)

Rural Environment Protection Scheme: Agri-environmental specifications Revised 15 May 1996 (1996).

Control of Farm Pollution: Guidelines and Recommendations (1996).

### Other publications

Daly, D. (1995); '*Groundwater protection schemes in Ireland: A proposed approach'*. The Geological Survey of Ireland.

Duggan, G., O'Laoide, S. and Finn R., '*Class A disease outbreak - A multi-disciplinary approach.*' Irish Veterinary Association Congress 7th October 1995.

Government Publications Office (1992); The Environmental Protection Agency Act.

Murphy, J. and Riley, J.P. (1962); *'A modified single solution method for the determination of phosphate in natural waters'*, Anal. Chim Acta. Vol. 37 p31-36.

National Standards Authority of Ireland (1991): *SR6 'Septic tank systems: Recommendations for domestic effluent treatment and disposal from a single domestic dwelling'*.

Peach, M. and English, L. (1944); *'Rapid micro-chemical soil tests'* Soil Science, 57, 167.

Teagasc (1994), '*Soil analysis and fertiliser, lime, animal manure and trace element recommendations.'* Johnstown Castle, Co. Wexford.

The Technical Committee of the Regional Water Laboratory in Kilkenny (1993); *'Guidelines for the land application of animal wastes'*. The Regional Water Laboratory, Kilkenny.

## APPENDIX 3

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

| | | |
|---|---|---|
| LC1/94 | Integrated Pollution Control Licensing - Guide to Implementation and Enforcement in Ireland | £1.50 |
| LC2/94 | Integrated Pollution Control - Summary of Licensing Procedures | No charge |
| LC3/95 | Environmental Protection Agency - Summary of its Structures Powers and Functions | No charge |
| LC4/94 | Integrated Pollution Control (IPC) Licensing Fees | No charge |
| LC5/94 | Environmental Protection Agency Act, 1992 (Noise) Regulations, 1994. | No charge |
| LC6/95 | BATNEEC Guidance Note for the Chemical Sector | £5.00 |
| LC7/95 | BATNEEC Guidance Note for the Waste Sector | £5.00 |
| LC8/95 | Guidance Note for Noise in Relation to Scheduled Activities | £3.00 |
| LC9/95 | Aspects of Licensing Procedures - Objections. Oral Hearing | £1.50 |
| LC10/95 | Fire-Water Retention Facilities (Draft) Guidance Note to Industry on the Requirements for Fire-Water Retention Facilities | £3.00 |
| LC11/96 | BATNEEC Guidance Note for Board Manufacture | £5.00 |
| LC12/96 | BATNEEC Guidance Note for The Production of Cement | £5.00 |

| | | |
|---|---|---|
| LC13/96 | BATNEEC Guidance Note for The Rendering of Animal By-products | £5.00 |
| LC14/96 | BATNEEC Guidance Note for The Extraction of Alumina | £5.00 |
| LC15/96 | BATNEEC Guidance Note for The Poultry Production Sector | £5.00 |
| LC16/96 | BATNEEC Guidance Note for The Pig Production Sector | £5.00 |
| LC17/96 | BATNEEC Guidance Note for The Slaughter of Animals | £5.00 |
| LC18/96 | BATNEEC Guidance Note for The Manufacture of Sugar | £5.00 |
| LC19/96 | BATNEEC Guidance Note for Electroplating Operations | £5.00 |
| LC20/96 | BATNEEC Guidance Note for The Manufacture of Integrated Circuits & Printed Circuit Boards | £5.00 |
| LC21/96 | IPC Licensing & Control Annual Report, 1995 | £5.00 |
| LC22/97 | BATNEEC Guidance Note for The Manufacture or Use of Coating Materials | £5.00 |
| LC23/97 | Information Leaflet on Intensive Agriculture | No charge |
| LC24/97 | IPC Licensing & Control Annual Report, 1996 | £5.00 |
| LC25/97 | BATNEEC Guidance Note for Wood Treatment and Preservation | £5.00 |
| LC26/97 | BATNEEC Guidance Note for Manufacture of Synthetic Fibres | £5.00 |

| | | |
|---|---|---|
| LC27/97 | BATNEEC Guidance Note for Textile Finishing | £5.00 |
| LC28/97 | BATNEEC Guidance Note for Boilermaking and Manufacture of Sheet Metal Containers | £5.00 |
| LC29/97 | BATNEEC Guidance Note for the Extraction and Processing of Minerals. | £5.00 |

*These documents are available from EPA Publications, St. Martin's House, Waterloo Road,*

*Dublin 4.*

*Telephone: +353-1-667 4474*