

Integrated Pollution Prevention and Control

Northern Ireland

Standard Farming Installation Rules and Guidance for

Poultry Production

Version 3
June 2009

[**Final Draft**]
[**Subject to any further changes required under the**]
[**Nitrates Action Programme and the**]
[**Waste Management Regulations**]

Northern Ireland Environment Agency
Industrial Pollution and Radiochemical Inspectorate
Klondyke Building
Gasworks Business Park, Cromac Avenue
Belfast
BT7 2JA
Tel: 028 905 69299 Fax: 028 90 569263

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Record of changes

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2	May 2006	Changes: following comments from industry, experience from applications and to take account of the Intensive Livestock BREF publication.
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1. INTRODUCTION

1.1 WHAT IS IPPC?

The Integrated Pollution Prevention and Control (IPPC) Directive (96/61/EC) controls the environmental impacts of certain industrial activities. Its aim is to apply Best Available Techniques (BAT) to prevent, or reduce, emissions to air, land and water from these activities. In Northern Ireland, the IPPC Directive is implemented through the Pollution Prevention and Control Regulations (Northern Ireland) 2003 ('the PPC Regulations').

The PPC Regulations apply to larger poultry farms with capacity for more than:

- 40,000 poultry (includes chickens, layers, pullets, turkeys, ducks, guinea fowl and quail)

1.2 LEGAL FRAMEWORK

General Binding Rules provide a simplified method for intensive livestock producers to apply for a permit under the PPC Regulations.

The power to make General Binding Rules (GBRs) is provided in the PPC Regulations. Regulation 14 allows GBRs to fulfil the specific permitting requirements of the Regulations *provided* that the rules result in the same high level of environmental protection and an integrated approach.

General binding rules must be made by the Department. The Chief Inspector intends that the **Standard Farming Installation Rules** set out in this paper will support a simple permitting regime that can be operated in a similar way to General Binding Rules.

1.3 What is BAT?

Best Available Techniques (BAT) is defined as the most effective and advanced stage of development of activities and their methods of operation which indicates the practical suitability of particular techniques to prevent and where that is not practicable to reduce emissions and the impact on the environment as a whole.

For these purposes: “available techniques” means “those techniques which have been developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the cost and advantages, whether or not the techniques are used or produced inside the United Kingdom, as long

as they are reasonably accessible to the Operator”; “best” means “in relation to techniques, the most effective in achieving a high general level of the

environment as a whole”, and “techniques” “includes both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned”.

This document contains the Standard Farming Installation Rules which suggest options that meet the requirements for BAT on your farm. They comprise management practices, structures and husbandry techniques at the farm – they are not prescriptive but any deviation from the rules needs to give equivalent environmental protection. A key principle of the Pollution Prevention and Control regime is that operators will use BAT to suit the local circumstances. Much of this guidance is based on the BAT Reference Document (BREF) for Intensive Livestock Installations produced by the European IPPC Bureau. You can refer to this BREF for more detailed information on BAT at the European level.

New or extended farms must use these techniques or techniques which give equivalent levels of environmental protection from the date of operation. It is recognised that new techniques cannot be brought into effect overnight on any site, especially on existing farms where capital investment has been limited by poor economic returns. Existing farms will be expected to implement a structured programme of improvements to management practices and to invest in equipment/plant that will reduce emissions to air, land or water.

1.4 STRUCTURE OF THE RULES

The proposed Standard Farming Installation Rules are noted in bold type, and supported by explanatory notes. The rules constitute the conditions that will be included in a ‘Standard Farming Permit’ (together with other site-specific conditions as described below).

1.5 CONTENT OF THE RULES

The rules cover most aspects of site operation. The exceptions are:

- 1) Where site specific conditions will be required, specifically for noise and odour. The exclusion of these emissions from the rules will enable the maximum number of installations to qualify for the Standard Farming Installation route.
- 2) Any improvement conditions applied as the result of audits and reports required by the rules, or in order to comply with the rules.

The site specific permit conditions relating to 1) and 2) above will not prevent the applicant from taking advantage of the lower charge for Standard Farming Installations. These rules are subject to modification as new evidence of Best Available Techniques becomes available.

1.6 STANDARD FARMING INSTALLATION PERMIT

You should apply for a Standard Farming Installation permit using the Standard Farming Installation application form. A fee is due on application, to cover the costs of assessment. You are encouraged to comment on the user friendliness of the form and any improvements you feel would aid future applicants.

Once granted, a permit can be reviewed at any time and must be reviewed from time to time. When a permit is reviewed any changes in the Rules, such as the addition of rules currently being developed, will be applied from that time onwards.

The rules and other conditions within the permit apply once the permit is granted, and a subsistence fee is due annually.

1.7 RULES FOR NEW AND EXISTING STRUCTURES

Where reference is made to different rules for 'new' and 'existing', these refer to structures, not installations. The operator of an existing installation wishing, for example to erect a new pig building, must adhere to the rules for new buildings for the new structure.

1.8 EMISSIONS FROM LIVESTOCK UNITS

To help you put the principles of PPC into action it is important to understand how and why your farm affects the environment. The most significant emissions from pig and poultry installations include ammonia; nutrients and metals in manure/litter/slurry; effluent discharges; dust; odour and noise. The effects of these emissions could include acidification, eutrophication, damage to ecosystems, the build up of substances in soils, effect on human health and reduction of amenity.

The 1999 UNECE Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-Level Ozone (under the Convention on Long-Range Transboundary Air Pollution), and the EU National Emission Ceilings Directive 2001, which came into UK law in November 2002, commit the UK to achieving a reduction in ammonia emissions to an annual ceiling of 297kt by 2010. Emissions are reported by the Government annually in the UK's National Atmospheric Emissions Inventory. In 2003 total ammonia emissions were 300kt with more than 80% originating from agriculture. Recent research suggests that over 17% of UK agricultural emissions of ammonia arise from poultry farming.

In order to contribute to meeting this target, pig and poultry buildings must be constructed and operated, and manure/slurry/litter must be stored and spread to minimise ammonia emissions. Other emissions should be prevented or reduced to ensure there are no adverse environmental effects from the operation of an installation in accordance with the aims of the IPPC Directive.

Spreading of manure and litter can result in ammonia (and odour) emissions to air. The UNECE Gothenburg Protocol commits the UK to a 30% reduction in emissions

of ammonia from manure application compared to the 1990 baseline. Rapid incorporation is an important factor in reducing emissions to air and will help to maximise the benefit of the manure and litter.

More detailed information on Best Available Techniques (BAT) at the European level for Intensive Livestock Installations, which member states are required to take into account when setting standards, can be found in the BAT Reference Document (BREF) published in July 2003 by the IPPC Bureau at <http://eippcb.jrc.es/pages/FActivities.htm>.

2. THE RULES

2.1 FARM MANAGEMENT TECHNIQUES

2.1.1 INSPECTION AND MAINTENANCE

2.1.1.1 Records shall be kept of the inspection and maintenance of structures and plant.

2.1.1.2 All structures and plant shall periodically, and at least annually, be thoroughly inspected.

2.1.1.3 All structures and plant shall be maintained in good operating condition.

Notes to rules:

- a) *Structures to be inspected should include feed stores, manure, slurry and dirty water containment as well as those for storing pesticides, veterinary, medicines, waste products and agricultural fuel oil.*
- b) *Inspections should cover signs of leakage, corrosion and structural damage, security and correct operation. Site security measures should prevent unauthorised access to the site, as far as is practicable to help prevent vandalism which is a common cause of pollution incidents. What is appropriate will depend upon the risks posed by the activity itself and the particular location.*
- c) *Periodic inspection and maintenance should be in accordance with manufacturer's recommendations where available, and if appropriate should be carried out by skilled experts.*
- d) *Periodic inspections should include visual appraisal of the structure or facility.*
- e) *Opportunities should be taken to inspect structures when they are empty or partially empty.*
- f) *Records should be kept of maintenance of plant such as slurry pumps, mixers, separators, spreading equipment and ventilation system, to demonstrate that the equipment performs to standard (including during operation) and does not cause unnecessary increases in emissions.*

Safety note:

Enclosed structures or tanks may contain lethal or explosive gases. Do not go into them. If in any doubt seek advice from the Health and Safety Executive for NI.

2.1.2 STAFF TRAINING

2.1.2.1 All staff shall receive training, which shall cover:

- a) **Prevention of accidental releases and action to be taken should such an accident occur; and**
- b) **Awareness of the Accident Management Plan such that they are fully conversant with those areas relevant to their duties.**

2.1.2.2 Appropriate staff shall receive training which shall cover:

- a) Awareness of the conditions of the Permit for the farm, its implications, and how compliance can be secured by the work activities of the individual;**
- b) Awareness of the potential environmental effects of the farm under routine and abnormal circumstances; and**
- c) Maintenance of structures and plant where these are maintained by farm staff.**

2.1.2.3 Training records must be maintained for staff involved in operating the installation and made available to the inspectorate on request.

Notes to rules:

- a) Staff should be familiar with the production systems on the farm and trained to carry out the tasks for which they have responsibility. They should also understand how their tasks and responsibilities relate to those of other staff.*
- b) A number of training courses that meet the requirements of 2.1.2.2 are under development. An example is a specific course designed by LANTRA. Requirements could also be met by staff completing Livestock GNVQ Level III.*
- c) There may be in-house or assurance scheme training courses which meet some or all of the requirements.*
- d) It will be acceptable for staff with approved training under Rule 2.1.2.2 to cascade training in preventing accidental releases, and on the accident management plan, to other staff on the same unit.*
- e) Training records should include the name of the trainee, date and type of training, and the training provider.*
- f) Staff includes all full time and part time permanent staff (whether employees or self employed).*

2.1.3 NOTIFICATION

(A) Notification of abnormal emissions, malfunctions and accidents

2.1.3.1 The Northern Ireland Environment Agency shall be notified without delay of any incident or accident, which is causing or may cause significant pollution via its 24 hour emergency pollution hotline 0800 807060

2.1.3.2 Written confirmation of notification required by rule 2.1.3.1 above shall be submitted within 24 hours.

Notes to rules

:

- a) Examples of incidents or accidents requiring notification might be accidental over-application of manure, containment failure and loss of yard washings to surface water, or a spillage of fuel oil.*
- b) Written returns should usually be made by fax.*

- c) *After an incident or accident, the operator should review the Accident Management Plan as required by rule 2.7.1*

(B) Notification of implementing the Site Closure Plan

2.1.3.3 The Inspector shall be given at least 14 days notice before implementing any part of the Site Closure Plan.

2.2 RAW MATERIAL USAGE

2.2.1 SELECTION AND USE OF RAW MATERIALS

2.2.1.1 An inventory shall be maintained detailing typical quantities and relevant environmental characteristics of raw materials used.

2.2.1.2 These records shall be maintained in a format equivalent to the proforma in Appendix 1 and shall be made available to the Inspector on request.

Notes to rules:

- a) *The inventory shall cover biocides (including disinfectants, wood preservatives, slimicides), pesticides (including herbicides, fungicides, insecticides, vertebrate control products, biological pesticides), veterinary medicines, agricultural fuel oils and lubricants, and bedding.*
- b) *Disinfectants, pesticides and veterinary medicines listed in either the Defra/HSE Guide to Pesticides (The Blue Book) Electronic Copy (previously referred to as Defra/HSE Reference Book 500), National Office for Animal Health (NOAH) compendium, or Defra's approved list of disinfectants, are not required to be listed individually, but a reference shall be made to: the category of materials used, whether they are from an approved list, the total quantities used each year, the total quantity stored on site (raw materials proforma example in Appendix 1).*
- c) *Products not on approved lists shall be individually listed, and manufacturer's safety data sheets, including information on potential environmental harm, supplied.*
- d) *Volumes of veterinary medicines held on site for general purposes shall be listed.*
- e) *Usage of veterinary medicines shall be recorded on NOAH record sheets or equivalent, and held on site.*
- f) *A description of types of bedding used should be given. Quantities stored are not required.*
- g) *Feedstuffs are covered in sections 2.2.2 and 2.3.1 below.*

2.2.2 SELECTION AND USE OF POULTRY FEED

RULES RELATING TO NITROGEN EXCRETION

SELECTION AND USE OF FEEDS FOR LAYING HENS, TO REDUCE NITROGEN EXCRETION.

2.2.2.1 Rations fed to laying hens for commercial egg production shall be formulated to minimise the amount of nitrogen excreted by the birds over the laying cycle, by optimising crude protein input and feed utilisation.

Notes to rules:

- a) *The use of a staged feeding regime, with reducing levels of protein (measured by crude protein and/or essential and non-essential amino acids) over the laying cycle, will reduce the amount of nitrogen excreted. Lower levels of excreted nitrogen reduce ammonia emissions to air and levels of nitrogen in the litter.*
- b) *A minimum of three diets should be used over the laying cycle.*
- c) *The overall aim should be to ensure optimal feed utilisation with minimum nitrogen excretion.*
- d) *The formulation of the diet should always be discussed with a nutritional advisor or feed supplier to ensure that the appropriate dietary requirements of the birds are being met.*

SELECTION AND USE OF FEEDS FOR REPLACEMENT LAYER PULLETS AND REARING OF BREEDING STOCK, TO REDUCE NITROGEN EXCRETION.

2.2. 2.2 Rations shall be formulated to minimise the amount of nitrogen excreted by the birds over the rearing cycle, by optimising crude protein input and feed utilisation.

Notes to rules:

- a) *The use of a staged feeding regime, with reducing levels of protein (measured by crude protein and / or essential and non-essential amino acids) from hatching to point of lay will reduce the amount of nitrogen excreted. Lower levels of excreted nitrogen reduce ammonia emissions to air and levels of nitrogen in the litter.*
- b) *A minimum of two diets should be used between hatching and point of lay for optimum feed utilisation.*
- c) *The formulation of the diet should always be discussed with a nutritional advisor or feed supplier to ensure that the appropriate dietary requirements of the birds are being met.*

SELECTION AND USE OF FEEDS FOR BROILERS, TO REDUCE NITROGEN EXCRETION.

2.2.2.3 Diets shall be formulated to minimise the amount of nitrogen excreted by the broilers over the rearing cycle by optimising crude protein input and feed utilisation.

Broiler birds shall be fed a diet of reducing protein content over the production cycle.

Standard broiler birds reared for less than 60 days shall be fed a minimum of three diets each of reducing crude protein content

Standard broiler birds reared in excess of 60 days shall be fed a minimum of four diets, each of reducing crude protein content.

For speciality birds e.g free range or organic, diet shall be optimised and agreed with the Inspector.

Notes to rules:

- a) *The diet represent the daily feed mix fed to the bird*
- b) *The whole wheat feeding system, where a quantity of wheat is mixed with compound feed, is permitted and meets the requirements of this rule, provided that the birds are fed diets with a reducing protein content over the production cycle. This feeding system in effect provides a number of diets as the inclusion of wheat is increased.*
- c) *The use of a staged feeding regime, with reducing levels of protein (measured by crude protein and / or essential and non-essential amino acids) over the rearing cycle, will reduce the amount of nitrogen excreted. Lower levels of excreted nitrogen reduce ammonia emissions to air and levels of nitrogen in the litter.*
- d) *Speciality birds that are reared for longer may require four diets.*
- e) *The formulation of the diet should always be discussed with a nutritional advisor or feed supplier to ensure that the appropriate dietary requirements of the birds are being met.*

SELECTION AND USE OF FEEDS FOR TURKEYS, TO REDUCE NITROGEN EXCRETION.

2.2.2.4 Diets shall be formulated to minimise the amount of nitrogen excreted by the turkeys over the production cycle, by optimising crude protein input and feed utilisation.

Turkeys shall be fed a diet of reducing protein content over the production cycle.

The crude protein of the starter diet should not exceed 30% and the diet for heavy stags should not exceed 22% crude protein after 16 weeks of age.

Young hens reared for small oven ready birds shall be fed a minimum of two diets

Other turkeys reared for less than 16 weeks shall be fed a minimum of three diets.

Turkeys reared in excess of 16 weeks shall be fed a minimum of four diets.

Notes to rules:

- a) *The diet represents the daily feed mix fed to the bird.*
- b) *The whole wheat feeding system, where a quantity of wheat is mixed with compound feed, is permitted and meets the requirements of this rule, provided that the birds are fed diets with a reducing protein content over the production cycle. This feeding system in effect provides a number of diets as the inclusion of wheat is increased.*
- c) *The use of a staged feeding regime, with reducing levels of protein (measured by crude protein and / or essential and non-essential amino acids) over the rearing cycle, will reduce the amount of nitrogen excreted. Lower levels of excreted nitrogen reduce ammonia emissions to air and levels of nitrogen in the litter.*
- d) *The formulation of the diet should always be discussed with a nutritional advisor or feed supplier to ensure that the appropriate dietary requirements of the birds are being met.*

SELECTION AND USE OF FEEDS FOR DUCKS, TO REDUCE NITROGEN EXCRETION.

2.2.2.5 Diets shall be formulated to minimise the amount of nitrogen excreted by ducks over the rearing cycle by optimising crude protein input and feed utilisation.

Ducks shall be fed a diet of reducing protein content over the production cycle.

Birds shall be fed a minimum of two diets.

Notes to rules:

- a) The diet represents the daily feed mix fed to the bird.*
- b) The use of a staged feeding regime, with reducing levels of protein (measured by crude protein and / or essential and non-essential amino acids) over the rearing cycle, will reduce the amount of nitrogen excreted. Lower levels of excreted nitrogen reduce ammonia emissions to air and levels of nitrogen in the litter.*
- c) The formulation of the diet should always be discussed with a nutritional advisor or feed supplier to ensure that the appropriate dietary requirements of the birds are being met.*

RULES RELATING TO PHOSPHORUS EXCRETION

SELECTION AND USE OF FEEDS FOR ALL POULTRY, TO REDUCE PHOSPHORUS EXCRETION.

2.2.2.6 Phosphorus levels in rations for poultry should be reduced over their rearing and production cycle.

Notes to rule:

- a) Lower phosphorus levels in rations fed to the bird will reduce phosphorus excretion and so reduce phosphorus levels in manure/litter.*
- b) The use of phytase should be evaluated as a means to increase availability of phosphorus from vegetable sources and so reduce total phosphorus levels in the diet.*
- c) There are currently no enzyme products licensed for use in duck feeds in Europe.*
- d) Where possible the amount of total and available phosphorus in the diet should be recorded to assist in assessing phosphorus content of litter and manure.*
- e) Phosphorus content in litter and manure may be specified in contracts for litter-burning power stations.*
- f) The formulation of the diet should always be discussed with a nutritional advisor or feed supplier to ensure that the appropriate dietary requirements of the birds are being met and that excess phosphorus in the diet above bird requirements is not being supplied.*

2.2.3 OPTIMISING WATER USE

- 2.2.3.1** An audit of water use shall be carried out and supplied to the Inspector with a content equivalent to that contained in the NIEA “Guidance for operators on preparing an agricultural water audit for intensive livestock IPPC installations”. The audit shall be completed within 3 years of the effective date of the permit and made available to the Inspector on request thereafter together with a plan for optimising water use in areas identified in the audit. The audit shall be reviewed at least every 3 years.
- 2.2.3.2** Water use for the installation shall be measured and recorded using a water meter.
- 2.2.3.3** Responsibility shall be allocated to a member of staff for monitoring and management of water usage.

Notes to rules:

- a) *An example proforma is given in the NIEA “Guidance for operators on preparing an agricultural water audit for intensive livestock IPPC installations”, with benchmark figures for water consumption which may be helpful.*
- b) *Where the audit indicates opportunities to reduce wastage, the following measures should be considered:*
- *a plan identifying all water supply and distribution pipework for water at the installation;*
 - *insulating exposed water pipes above ground, or installing suitable systems to reduce the risk of freezing pipes;*
 - *installing stop taps and drain valves in the farm water distribution system;*
 - *draining and closing off all lengths of pipe which are not in use;*
 - *installing covers on water tanks;*
 - *fitting all hoses, hand lances and washing equipment with trigger controls;*
 - *taking measures to pinpoint leaks and excessive use;*
 - *identifying the position of the water meter;*
 - *reading and recording the water meter readings monthly as a minimum to monitor consumption and identify leaks;*
 - *brushing, scraping or squeegeeing dirty areas before washing down;*
 - *cleaning housing and equipment with high-pressure cleaners for a short duration after each production cycle; and*
 - *regular calibration of drinking water installations and meters.*

2.3 TECHNIQUES FOR POLLUTION PREVENTION AND CONTROL

2.3.1 FEED DELIVERY, MILLING AND PREPARATION

2.3.1.1 Dusty or potentially dusty materials shall be stored in covered containers, purpose-built silos or under cover.

2.3.1.2 Transfers of feed-stuffs to and from storage areas shall be carried out so as to prevent or minimise dust emissions to air.

2.3.1.3 The mixing and milling of dry foodstuffs shall be carried out so as to prevent or minimise dust emissions to air.

Notes to rules:

a) Measures may include extraction and abatement of dust from feed preparation areas.

2.3.1.4 Containment shall be provided for foodstuffs to prevent spillages and minimise waste.

2.3.1.5 Storage vessels for feedstuffs shall be protected from collision damage.

Notes to rules:

- a) Feedstuffs are highly polluting if allowed to enter watercourses.*
- b) Any feedstuff which might flow under the influence of gravity e.g. liquid feed should be contained.*
- c) Vulnerable locations, such as areas with high levels of motorised traffic, should be identified in the Accident Management Plan (see 2.7.1).*
- d) Containment may consist of a bunded area, or the store may be sited in an area isolated from the surface-water system.*
- e) Collision protection may be achieved by careful siting relative to traffic flows with measures such as provision of kerbs or other markers to stop reversing vehicles, or by the use of barriers in more vulnerable locations.*

2.3.2 STORAGE OF AGRICULTURAL FUEL OIL AND OTHER MATERIALS

2.3.2.1 All agricultural fuel oil storage facilities with a capacity of over 1250 litres shall meet the requirements of Schedule 3 to The Control of Pollution (Silage Slurry and Agricultural Fuel Oil) Regulations (NI) 2003

Notes to rules:

- a) *This measure extends the requirements for fuel oil storage facilities to all IPPC farms. Whereas under the Control of Pollution (Silage Slurry and Agricultural Fuel Oil) Regulations (NI) 2003 these requirements apply only to newly constructed facilities or those substantially enlarged or reconstructed after 2003. The measure has been adopted due to the high risk of losses occurring from unbunded storage facilities, through spillage, leakage or physical damage.*
- b) *These rules do not apply to domestic fuel oil.*
- c) *Guidance on the construction of a bund is available in the UK Agency's Pollution Prevention Guidance notes (PPG26).*

2.3.2.2 Agricultural fuel oil in quantities less than 1250 litres, other oils and chemicals shall be kept in a store capable of retaining leakage or spillage or on an impermeable base within a banded area.

2.3.2.3 Pesticides shall be kept in a store that is resistant to fire, capable of retaining leakage or spillage, dry, frost protected and secure against unauthorised access.

Notes to rules:

- a) Pesticides are often highly toxic to aquatic life and may cause watercourses to fail Environmental Quality Standards.
- b) Further information is given in the DARD Code of Good Agricultural Practice for the Prevention of Pollution of Water and Defra/HSE 'Green Code'.

2.3.2.4. Veterinary medicines shall be kept in a store that is capable of retaining leakage or spillage, dry, frost protected and secure against unauthorised access.

Notes to rules:

- a) Veterinary medicines are considered to be those listed by the National Office for Animal Health and do not necessarily require prescription or administration by a veterinary surgeon.

2.3.3 MINIMISING POLLUTION FROM POULTRY HOUSING

The most significant emissions from housing are those of ammonia and odour to air. Recent research suggests that over 9% of the UK agricultural emissions of ammonia arise from poultry housing. These emissions contribute to the UK annual emissions and have an impact on local sensitive habitats. The largest single influence on emissions of ammonia and dust from housing is the quality of the litter. This is affected by temperature and ventilation, drinker type and management, feeder type and management, litter material and depth, condensation, stocking density, feed formulation and quality, and bird health.

Techniques aim to increase the dry matter content of the manure, by both preventing spillages of water and providing a drying mechanism. If the dry matter content is 60% or above, ammonia emissions are minimal. New buildings should be able to meet this criterion

The aim of these rules is to ensure that housing, litter and slurry systems are designed and managed to minimise releases, particularly of ammonia and odour. Appropriate standards for welfare must be complied with in the design and operation of the housing on the installation.

Rules relating to new housing will apply to all new housing, on both new and existing installations.

RULES RELATING TO ALL POULTRY HOUSING

2.3.3.1 Drinkers and troughs should be designed to prevent leakage

Notes to rule:

a) The use of nipple drinkers with drip cups will minimise water spillage. Where drip cups are not used, or other drinkers are provided, water pressure should be checked frequently, and wet litter around drinkers should be addressed.

2.3.3.2 The design, management and operation of the housing on the installation shall be in accordance with the application.

Notes to rule:

a) Welfare standards must be complied with in the design and operation of the housing on the installation. The regulation of animal welfare is the responsibility of the DARD Veterinary Service.

2.3.3.3 Drainage from contaminated yard areas shall be isolated from the clean water system and collected and stored safely in a tank until application to land can take place in accordance with DARD codes of good agricultural practice where the material meets the definition of dirty water under the Nitrates Action Programme. Otherwise, it will be

classed as slurry and shall be spread in accordance with the rules set out in section 2.3.5.

Notes to rule:

- a) *The farm should be managed to prevent contamination of clean water drainage systems*
- b) *Opportunities should be taken to segregate drainage from clean yard areas to minimise the amount of contaminated run-off produced.*
- c) *Should an existing unit be discharging contaminated run-off to ground water or to a surface water system, this may already constitute pollution contrary to the Water Order (NI) 1999 or the Groundwater Regulations (NI) 1998.*
- d) *Where material can meet the definition of "dirty water" as set out in the Nitrates Action Programme, the material may be applied to land throughout the year except in those periods where applications would result in pollution of waterways and/or underground strata ie. in accordance with the DARD codes of good agricultural practice. "Dirty water" is defined under the Nitrates Action Programme as: "a low dry matter waste made up of water contaminated by manure, urine, effluent, milk and cleaning materials and it must have a Biological Oxygen Demand (BOD) no greater than 2,000 mg/litre and must have a dry matter content of less than 1%".*
- e) *Where diverter valves are used to direct dirty water from yards to storage tanks the following measures should be taken:*
 - *the location of the diverter valve should be detailed on the accident management plan*
 - *when heavily contaminated yard drainage is diverted to the waste or slurry tank, this must be recorded.*
- f) *Where material is directed to slurry tanks or does not meet the definition of dirty water then it will be treated as slurry and the rules under section 2.3.5 will apply.*

2.3.3.4 Lightly contaminated drainage e.g. from yard areas and roofs shall be either:

- **Treated by means of swales or constructed wetlands; or**
- **Treated by means of a soakaway (where contamination can be shown to be minimal); or**
- **Treated by means of a settling pond with sediment trap**
- **Isolated from the clean water system, and collected until application to land in accordance with DARD Codes of Good Agricultural Practice can take place.**

Notes to rule:

- a) *Roof water may be contaminated with dust from the housing and may have a high ammonia content. Where the ventilation system has roof outlets, the first flush of contaminated rainwater should be treated.*
- b) *Lightly contaminated yards are likely to exclude buildings/yards to which animals have direct access. Such areas with direct access will generate "dirty water" and this should be directed to slurry storage systems.*
- c) *Roof water from housing where there are no roof outlets does not require interception and treatment*
- d) *Yard areas are likely to become contaminated through day to day passage of vehicles, feed dust etc.*
- e) *Where the ventilation system has outlets through side-walls, interception is required before drainage reaches surface water systems. Where side-wall outlets are located above yard areas, the dust should be removed regularly (so that the yard is kept visibly clean).*
- f) *Where side-wall outlets are located above grass areas, further interception is not required provided that the grass cover is sufficient to collect the dust and to impede run-off to surface water systems.*

- g) *The construction of swales, wetlands, soakaways and settling ponds should be agreed with the Inspector. Monitoring to assess the effectiveness of the treatment used may be necessary. Guidance on construction of methods for treatment of lightly contaminated drainage is available from NIEA ie. "Treating lightly contaminated surface run-off from poultry and pig farms in Northern Ireland".*
- h) *Direct discharges of lightly contaminated roof or yard drainage to a watercourse through a pipe or ditch are not acceptable without some means of treatment.*
- i) *Opportunities should be taken to separate clean roof and yard drainage from the foul or contaminated drainage system to minimise the amount of contaminated water produced. These should include:*
 - o *keeping yards visibly clean;*
 - o *keeping drainage channels clear;*
 - o *cleaning up accumulations of spilt feed and dust.*

2.3.3.5 On removal from housing, poultry litter, manures shall be either:

- **stored in structures that meet the requirements of the rules in section 2.3.4; or**
- **applied to land directly in accordance with the requirements of the rules in Section 2.3.5; or**
- **exported from the site for treatment or alternative utilisation; or**
- **treated on site.**

Notes to rule:

- a) *Slurries consist of (i) excreta produced by livestock whilst in a yard or building or (ii) a mixture of such excreta with bedding, rainwater, seepage, washings or any other extraneous material from a building or yard used by livestock or in which livestock manure is stored or any combination of these, of a consistency that allows it to be pumped or discharged by gravity at any stage in the handling process and includes dirty water that is stored with slurry or mixed with slurry.*
- b) *Poultry litter means a mixture of bedding material and poultry excreta in solid form arising from the housing of poultry.*
- c) *Under no circumstances should slurry (including seepage from manure) be permitted to enter surface water drains or drain into the ground.*

2.3.3.6 The farm shall be managed so as to prevent contamination of clean water drainage systems.

2.3.3.7 Water which has been used for cleaning within housing shall be collected and stored either in a slurry store or separate tank, until application to land can take place in accordance with DARD codes of good agricultural practice where the material meets the definition of "dirty water" under the Nitrates Action Programme. Otherwise it will be classed as slurry and shall be spread in accordance with the rules set out in section 2.3.5.

Notes to rule:

- a) *Every opportunity should be taken to separate clean roof and yard drainage from the foul or contaminated drainage system to minimise the amount of dirty water and slurry produced.*

b) Drainage channels should be kept clear.
c) Where diverter valves are used to direct dirty water from yards to storage tanks the following measures should be taken:

- i. The location of the diverter valve should be detailed on the emergency plan..
- ii. When heavily contaminated yard drainage is diverted to the waste or slurry tank, this must be recorded.

d) Where this material does not meet the definition of “dirty water” (see definition in note (d) under rule 2.3.3.2), it is classed as slurry and must be spread to land in accordance with the requirements of the rules set out in section 2.3.5.

2.3.3.8 Disinfectant footbaths shall not overflow.

Note to rule:

a) The spent disinfectant contained in foot baths and wheel washes shall be either added to house washings or slurry stores and applied to land with those materials in accordance with rules in sections 2.3.3 and 2.3.4 or exported from the site.

2.3.3.9 All reasonable steps shall be taken to ensure that litter is maintained in as dry and friable condition as possible. Any changes in litter quality should be investigated, and steps taken to rectify the problem.

Notes to rule:

a) Litter quality results from a complex interaction of factors such as ventilation, temperature, humidity, diet, stocking density, and management. Good management of litter is crucial and, to avoid excess emissions, should be maintained in as dry and friable condition as possible. Solutions may involve the addition of extra material or provision of heating to the problem area. Capping or wet litter should be avoided and may be due to birds drinking and excreting more due to illness, high temperatures, a feed problem or increased humidity.

2.3.3.10 Buildings shall be maintained in good repair to minimise water leaks into the house which may increase the moisture content of litters and manure.

Notes to rule:

a) You should manage the floor of the house to minimise seepage of water either from the ground or entry of rainfall. An impermeable floor and damp-proof course will give the best protection. Where this is not present, a mixture of materials or thicker layers may address wet litter problems.

2.3.3.11 Ventilation systems shall be designed and operated to remove moisture in all weather and seasonal conditions. Housing shall be well insulated

Notes to rules:

a) Ventilation should match the health and welfare needs for the age and number of birds. The target rates for different weather conditions should be calculated in conjunction with an equipment supplier or poultry advisor. Air speeds across the house should not be largely different from one area to another, and housing should be free from draughts.

- b) *Ventilation rates and house conditions should at all times be adequate to provide sufficient fresh air for the birds. In particular, accumulations of ammonia, hydrogen sulphide, carbon dioxide, carbon monoxide and dust should be avoided.*
- c) *In deep-pit layer housing, air currents should be maintained so that air is drawn over the manure to dry it. Rain should be prevented from entering the manure storage area.*
- d) *Belt cleaning systems should be designed and operated to optimise air flow and to maximise drying on the belt.*

2.3.3.12 Dust emitted from buildings shall be minimised.

Notes to rule:

- a) *For buildings venting to the side, dust may be collected in bins or on hard standing which is cleaned regularly to prevent dust accumulating.*
- b) *Dust generation may be controlled within the house through management of litter moisture content and air quality, which needs to be balanced with the need to minimise ammonia and odour.*

RULES RELATING TO NEW POULTRY HOUSING

Any new poultry housing, including replacement housing or on an expanded installation must be designed in accordance with the following rules – other techniques are not excluded, but you will need to demonstrate that they qualify as “best available techniques” (BAT).

2.3.3.13 All new buildings shall be designed with a separate drainage system and tank for collection of liquids after cleaning

Notes to rule:

- a) *New refers to replacement housing and on a new or expanded farm*
- b) *It will not be sufficient to use surface water system and block of outlet*
- c) *For new broiler houses, provision of storage capacity to cover two crops is recommended*

2.3.3.14 All new buildings shall be well insulated and have a damp proof course

Notes to rule:

- a) *Houses should be insulated to U-value 0.4 W/m²/°C or better.*

RULES RELATING TO NEW HOUSING FOR LAYING HENS AND REPLACEMENT PULLETS

2.3.3.15 Caged systems shall be designed and operated with:

- **Deep pit with ventilated manure store; or**
- **Manure removal, at least twice a week, by way of manure belts to covered storage; or**
- **Vertical tiered cages with manure belt with forced air drying, where the manure is removed at least once a week to a covered storage; or**
- **Vertical tiered cages with manure belt with whisk forced air drying where manure is removed at least once a week to a covered storage; or**
- **Vertical tiered cages with manure belt with improved forced air drying where the manure is removed from the house at least once a week to covered storage; or**
- **Vertical tiered cages with manure belt with drying tunnel over cages, after 24-36 hours, the manure is removed to covered storage; or**
- **Other techniques that provide equivalent or better emission minimisation.**

Notes to rule:

- a) *Examples of designs which meet this rule are described in Appendix 3.*

- b) *Ventilated pits housing should be operated to maximise the passage of ventilation air over the manure, but minimise passage of draughts into the cage area.*
- c) *Belt cleaned systems should be designed to optimise manure deposition and air flow to maximise drying on the belt.*
- d) *In layer housing using manure belts, increasing the frequency of belt cleaning may reduce emissions*

2.3.3.16 Barn and free-range systems shall be designed and operated with:

- **Deep litter system with forced air drying; or**
- **Deep litter system with perforated floor and forced air drying; or**
- **An aviary system with or without range and or outside scratching area; or**
- **Other techniques that provide equivalent or better emission minimisation.**

Notes to rule:

- a) *Examples of designs which meet this rule are described in Appendix 3.*
- b) *Laying nests should be located above or adjacent to the slatted area. Any bell drinkers shall be located over the slats.*
- c) *Systems to provide forced drying of manure under the slatted area are being researched.*

RULES RELATING TO NEW HOUSING FOR BROILERS, BROILER BREEDERS, REPLACEMENT PULLETS AND TURKEYS

2.3.3.17 Housing shall be designed with:

- **A naturally ventilated house with a fully littered floor and equipped with non-leaking drinking systems; or**
- **A fan ventilated house with a fully littered floor and equipped with non-leaking drinking systems; or**
- **Other techniques that provide equivalent or better emission minimisation.**

Notes to rule:

- a) *Examples of designs which meet this rule are described in Appendix 3.*
- b) *Open turkey houses should be aligned at right angles to the prevailing wind direction and located to ensure exposure to natural airflow*
- c) *Removal of litter from the turkey house at intervals during the fattening period reduces the ammonia emissions, as the temperature of the litter and droppings does not increase. Mixing of manure during the turkey fattening period gives maximum uptake of ammonia by sawdust/shavings/chopped straw.*
- d) *These systems also apply to free-range poultry reared for meat.*
- e) *For free-range poultry, the areas around pop-holes should be protected to prevent rain from entering housing. You should manage the ground around the pop-holes to prevent capping or erosion of the surface.*

RULES RELATING TO NEW HOUSING FOR DUCKS

2.3.3.18 Duck housing systems shall be designed and operated with an unrestricted naturally ventilated house or a well insulated fan ventilated house with:

- **A partly-slatted floor with impermeable drainage channels and effluent storage area; or**
- **A fully-slatted floor with impermeable drainage channels and effluent storage area; or**
- **A fully littered floor with a water system positioned above a gully and covered drainage channels and effluent storage areas; or**
- **Other techniques that provide equivalent or better emission minimisation.**

Note to rule:

- a) *Examples of designs which meet this rule are described in Appendix 3.*

RULES RELATING TO EXISTING POULTRY HOUSING

- 2.3.3.19** A review of existing poultry housing and management practices at the installation shall be carried out. The review shall identify measures to reduce emissions to all media, the likely cost of such measures and a proposed timetable for their implementation; and shall be submitted to the Inspector within 12 months of the issue of the permit.
- 2.3.3.20** The improvement plan shall be implemented subject to such amendments or additions as notified by the Inspector in writing.

Notes to rules:

Emissions from poultry housing are affected by factors such as ventilation, temperature and management. Changes to management of these should only be introduced where such changes will not adversely affect poultry health and welfare.

Ventilation – *Ventilation should meet poultry health and welfare needs for the age and number of birds. The target rates for different weather conditions should be calculated in conjunction with your equipment supplier or poultry advisor.*

Temperature – *Temperature should meet both health and welfare needs for the age and number of birds. Age, flock size, floor type, air speed, feed and water intake can markedly affect temperature requirements and should be considered when determining the appropriate temperature.*

Structural improvements – *Whether structures or buildings are replaced or modified will be a decision for you in conjunction with the Inspector, depending on local needs for emission reduction.*

Retro-fitting new structures to existing buildings, needs to be carefully considered and costed. Research suggests that it may be more cost effective to replace buildings or structures. Any replacements should give equivalent emission reduction to those techniques outlined in the rules for new houses (ie. rules 2.3.3.13 – 2.3.3.18), and should be planned to fit the business cycle of the farm.

You should discuss changes to management with your poultry advisor.

2.3.4 SLURRY, LITTER AND MANURE STORAGE AND TREATMENT

THE CONTROL OF POLLUTION (SILAGE, SLURRY AND AGRICULTURAL FUEL OIL) REGULATIONS (NI) 2003

All new and substantially reconstructed or substantially enlarged installations for the storage of slurry must conform to the technical measures detailed in the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations (NI) 2003.

There is a legal requirement to notify the Northern Ireland Environment Agency (by completion of a form) at least 28 days before any new (and substantially reconstructed or enlarged) stores are brought into use. For further details contact: the Agricultural Regulations Team of the Water Management Unit of NIEA – Tel: 028 9262 3102.

A definition of slurries and manures is provided in the notes under rule 2.3.3.4

Notes:

- a) *Acceptable slurry storage facilities must have the following features:*
- i. *Base of the storage tank, effluent tank, and all parts of the drains and reception pit to be impermeable.*
 - ii. *Base and walls of storage tank, reception pit and drains should be protected against corrosion as described in BS 5502, Part 50.*
 - iii. *Slurry storage tank and reception pit designed to BS 5502, Part 50.*
 - iv. *Reception pit and associated channels normally to hold at least two days slurry production.*
 - v. *Minimum slurry storage tank capacity to be normally six months production, including allowance for rainwater to meet requirements under the Nitrates Action Programme. The slurry storage tank must be designed to have a minimum 300mm freeboard (a minimum freeboard of 750mm for earth-banked compounds).*
 - vi. *No part of a structure should be within 10m of a watercourse unless the written agreement of the Inspectorate is obtained beforehand.*
 - vii. *Tank, channels and pit to be designed for 20 years' life with routine maintenance.*
 - viii. *Two valves in series on any outlet pipe to be locked shut when not in use. (Ensure adequate spacing between the valves).*
 - ix. *Where walls of the slurry store are not impermeable, perimeter drains and effluent tank must be provided. The base must extend beyond the walls.*

SLURRY STORAGE (INCLUDING DUCK EFFLUENT AND WASH WATER)

Rules relating to new slurry stores will apply to all new stores, on both new and existing installations.

Manures and slurries should meet the storage requirements and spreading restrictions defined within the Nitrates Action Programme and rules in section 2.3.5.

2.3.4.1 All new slurry storage facilities shall be covered.

2.3.4.2 Proposals for covering or replacing existing slurry stores shall be submitted to the Inspector within 6 months of the date of the permit.

Notes to rules:

- a) *The store should be inspected as required under rule 2.1.1.*
- b) *Exposed surface areas of slurry in stores should be covered to minimise emissions of odour and ammonia. The options are to fit a rigid cover to a steel or concrete tank, or to use a floating cover of light expanded clay aggregate. Other covers, such as straw or peat will sink and do not reduce emissions effectively.*
- c) *Wash water tanks do not need to be fully covered if the wash water has a dry matter content of less than 1%.*
- d) *The use of covers to exclude rain will minimise additional slurry volume.*
- e) *Stores must be constructed in accordance with The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations (NI) 2003.*
- f) *New earth banked lagoons should not be constructed unless an effective covering method can be demonstrated.*

2.3.4.3 Unless the store has a fixed cover, designed to minimise emissions to air, all reasonable steps shall be taken to:

- **minimise the frequency of stirring slurry; and**
- **to introduce the slurry below the surface.**

Notes to rule:

- a) *Floating covers will only work effectively if disturbance to the surface is minimised. It is recognised that slurry mixing may be necessary to produce a suitable material for land application, but generally the preceding measure will reduce emissions of ammonia and odour*

POULTRY MANURE STORAGE AND TREATMENT

2.3.4.4 All new poultry manure storage shall be provided with a roof or cover.

2.3.4.5 Proposals for covering or replacing existing manure stores shall be submitted to the Inspector within six months of the date of issue of the permit. The proposals shall include a timetable for the construction

work and shall be implemented subject to such amendments or additions as considered appropriate by the Inspector.

2.3.4.6 Where manure is stored temporarily in the yard, an impermeable base shall be provided with a collection system and tank for effluent.

Notes to rules:

- a) *Wherever possible field storage should be avoided.*
- b) *Provided the dry matter content is above 60%, ammonia and odour emissions are minimal.*
- c) *Stores with constructed bases must include provision for collecting and containing effluent (liquid run-off) in accordance with The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations (NI) 2003. The DARD Code of Good Agricultural Practice for the Prevention of Pollution of Water (section 2.3) provides advice on construction of manure stores.*
- d) *Effluent channels and collection tanks should be maintained to avoid blockage*
- e) *Effluent collection tanks should be checked regularly and emptied when necessary so that they do not overflow. The effluent should be spread to agricultural land in accordance with the requirements of the rules in section 2.3.5.*

2.3.4.7 Where no alternative to field storage is available, poultry litter may be stored in the fields where land application will take place until the next application but for no longer than 180 days. It must not be stored in the same location of the field year after year.

The poultry litter must be stored in a compact heap and covered with an impermeable membrane within 24 hours of placement in field.

2.3.4.8 Poultry litter heaps must not be placed:

- i. within 50 metres of lakes; or**
- ii. within 20 metres of any other waterway, including open areas of water, open field drains or any drain which has been backfilled to the surface with permeable material such as stone/aggregate; or**
- iii. within 50 metres of a borehole, spring or well; or**
- iv. within 250 metres of a borehole used for public water supply; or**
- v. within 50 metres of exposed cavernous or karstified limestone features (such as swallow-holes and collapse features)**
- vi. where they would cause odour problems for nearby sensitive receptors.**

Notes to rules:

- a) *Under the requirements of the Nitrates Action Programme, the position on field storage of poultry litter will be subject to review and the appropriate measures under those regulations should be complied with.*
- b) *Field stores should not be used as a substitute for a covered store or a store with a constructed base and effluent collection tank.*
- c) *The Inspector may require heaps to be re-sited if there is a risk of pollution or of odour nuisance.*

2.3.4.9

SLURRY, LITTER AND MANURE TREATMENT

There are various options for slurry treatment, including screening, separation, composting, aeration and anaerobic digestion. These may be of use in specific locations, where particular problems occur (for example, odour nuisance). Slurry separation may be of benefit where limited land is available for spreading close to the farm. Treatment may be more practical where several local units are available to provide the necessary throughput. The use of slurry treatment techniques would be covered by site specific conditions.

2.3.5 SLURRY SPREADING AND SLURRY/MANURE MANAGEMENT PLANNING

A definition of slurries and manures is provided under notes for rule 2.3.3.4.

Management of manures and slurries should meet the storage requirements and spreading restrictions defined within the Nitrates Action Programme ie .total livestock manure storage capacity on holdings shall be at least 26 weeks for poultry enterprises, except where it can be demonstrated that any manure in excess of the actual storage capacity can be disposed of in a manner which will not cause harm to the environment. Livestock (Organic) manure, excluding farmyard manure, shall not be applied to any land between 15 October in any year and 31 January of the following year – it is proposed that this will apply from 1 January 2007.

OFF-FARM ACTIVITY

(A) NEW AND EXPANDED INSTALLATIONS

- 2.3.5.1** Where the operator relies on land off the farm for spreading solid manures or slurry, written evidence of these arrangements (including a nutrient management plan) shall be provided to the Inspector to demonstrate that sufficient land is available to receive the quantity of solid manure or slurry exported. Records of movements of material shall be retained to demonstrate compliance with the arrangements (see also rules 2.9.1.5 & 2.9.1.6)

Notes to rule:

- a) *A nutrient management plan covering receiving land, the names and addresses of recipients and the suitable acreage available for spreading will have already been submitted as part of the application for those installations spreading manure or slurry. Nutrient content of slurry or manure may be calculated using standard figures or by analysis – the nutrient status shall be reviewed and analysed at a frequency specified by the Inspector. Nutrient application rates should be in accordance with rules 2.3.5.19 and 2.3.5.20 taking account of crop requirements and other nutrient inputs, and the requirements under the Nitrates Action Programme.*
- b) *Standard soil analysis should be carried out every 4 years (including P status)*
- c) *The requirements of this rule also applies to permitted installations changing to land spreading from an alternative method of utilisation of manures and slurries*
- d) *An expanded installation, means in relation to an installation where the capacity has increased (ie. poultry places) which, in the opinion of the Chief Inspector, may have significant negative effects on the environment.*

(B) EXISTING INSTALLATIONS

- 2.3.5.2** Where the operator relies on land off the farm for spreading solid manures or slurry, written evidence of these arrangements shall be provided to the Inspector. Records of movements of material shall be retained to demonstrate compliance with the arrangements.

a) *Written evidence should include the quantity of nutrients generated from the installation and the capacity of the land currently used for spreading, along with initial proposals for addressing any surplus. Nutrient content of slurry or manure may be calculated using standard figures or by analysis.*

2.3.5.3 The operator shall submit an improvement plan (for agreement with the Inspector) within 6 months of the date of the permit setting out the measures planned to ensure that spreading of solid manures and slurries will be in accordance with crop nutrient requirements.

a) *The improvement plan should set out detailed proposals for addressing nutrient surpluses, in particular phosphorus, including a timetable for implementation.*

b) *Where final arrangements are going to include landspreading, soil testing will be required – these requirements will be set out in the permit.*

(C) ALL INSTALLATIONS

2.3.5.4 The operator shall review the arrangements in the event of any change and at least once every 3 years.

2.3.5.5 The operator shall notify the Inspector of any amendments or additions to the arrangements deemed necessary after review. The Inspector's agreement in writing must be obtained before any such amendment or addition is made

a) *Changes which require notification to the inspectorate would include changes to the land available for spreading or changes to the quantity of material which could be applied in accordance with the nutrient management plan.*

2.3.5.6 Documented contingency arrangements in the event of an emergency or the land becoming unavailable shall be made available to the Inspectorate on request.

Notes to rule:

a) *The information requested could be provided as part of the accident management plan.*

ON-FARM ACTIVITY

The controls on land spreading detailed in Section 2.3.5.7 to 2.3.5.20 of this document will apply where manure is spread on the installation. This would apply to either:

- the farmer or employees spreading on the installation; or
- a contractor spreading on the installation.

SLURRY/MANURE MANAGEMENT PLANNING

Slurries and solid manures from intensive livestock are potentially valuable sources of plant nutrients, but may also be the cause of pollution. It is important to demonstrate that the best use is being made of such slurries and manures on the farm, and that pollution risks are being minimised. This means that the nutrients nitrogen, phosphorus and potassium (N, P, K) in the manures should be fully accounted for in terms of soil nutrient status, crop uptake and nutrient requirements.

(A) NEW AND EXPANDED INSTALLATIONS

2.3.5.7 The agreed and dated Slurry/Manure Management Plan shall be implemented.

Notes to rules:

- a) *A Slurry/Manure Management Plan will have been submitted as part of the permit application for those installations spreading manure/slurry. Nutrient content of slurry or manure may be calculated using standard figures or by analysis – the nutrient status shall be reviewed and analysed at a frequency specified by the Inspector. Nutrient application rates should be in accordance with rules 2.3.5.19 and 2.3.5.20 taking account of crop requirements and other nutrient inputs, and the requirements under the Nitrates Action Programme.*
- b) *Where the farm is to be used for the spreading of slurry or manure, a risk-based approach, detailing which land is suitable for spreading and when, will be required. The plan should also account for any manures brought onto the farm, including sewage sludge and other organic wastes.*
- c) *Standard soil analysis should be carried out every 4 years (including P status)*
- d) *Guidance on the content and design of manure management plans is available in the NIEA guide 'Slurry and Manure Management Planning for IPPC Installations' and in DARD Codes of Good Agricultural Practice for the Prevention of Pollution of Water, Soil and Air.*
- e) *The requirements of this rule also applies to permitted installations changing to land spreading from an alternative method of utilisation of manures and slurries*
- f) *An expanded installation, means in relation to an installation where the capacity has increased (ie. poultry places) which, in the opinion of the Chief Inspector, may have significant negative effects on the environment.*

(B) EXISTING INSTALLATIONS

2.3.5.8 The agreed and dated Slurry/Manure Management Plan shall be implemented.

2.3.5.9 The operator shall submit an improvement plan (for agreement with the Inspector) within 6 months of the date of the permit setting out the measures planned to ensure that spreading of solid manures and slurries will be in accordance with crop nutrient requirements.

- a) *The improvement plan should set out detailed proposals for addressing nutrient surpluses, in particular phosphorus, including a timetable for implementation.*
- b) *A Slurry/Manure Management Plan will have been submitted as part of the permit application for those installations spreading manure/slurry. Nutrient content of slurry or manure may be calculated using standard figures or by analysis. Nutrient application rates should be in accordance with rule 2.3.5.19 (nitrogen application)*

taking account of crop requirements and other nutrient inputs, and the requirements under the Nitrates Action Programme.

- c) Where final arrangements are going to include landspreading, soil testing will be required – these requirements will be set out in the permit.*

(C) ALL INSTALLATIONS

2.3.5.10 **Records shall be kept to demonstrate that the plan is implemented**

2.3.5.11 **The operator shall review the plan in the event of any change and at least once every 3 years.**

2.3.5.12 **The operator shall notify the Inspector of any amendments or additions to the arrangements deemed necessary after review. The Inspector's agreement in writing must be obtained before any such amendment or addition is made**

a) Changes which require notification to the Inspector would include changes to the land available for spreading or changes to the quantity of material which could be applied in accordance with the slurry/manure management plan.

2.3.5.13 **Documented contingency arrangements in the event of an emergency or the land becoming unavailable shall be made available to the Inspectorate on request.**

Notes to rule:

a) The information requested could be provided as part of the accident management plan.

SPREADING OF POULTRY MANURE AND SLURRY

Spreading of manure and slurry can result in ammonia and odour emissions to air, run-off to surface water or leaching to groundwater of nutrients and other organic pollutants. The measures below have been designed to prevent or minimise these emissions, and maximise the benefit of the manure/litter/slurry spread.

SPREADING TO MINIMISE EMISSIONS TO AIR

The UNECE Gothenburg Protocol on long-range transboundary air pollution commits the UK to a 30% reduction in emissions of ammonia from manure application compared to a 1990 baseline. Rapid incorporation of manures is an important factor in reducing emissions to air.

SOLID MANURE

2.3.5.14 Applications of solid manure to uncropped land or bare soil shall be incorporated within 24 hours, unless such applications are used to control wind erosion on susceptible soils.

Notes to rule:

- a) Incorporation is typically achieved by ploughing, discing or using a rotary cultivator.
- b) Where applications are not to be incorporated to prevent soil erosion, the Inspector should be provided with details of the susceptibility of soils to such erosion.
- c) Applications of solid manure do not need to be incorporated if applied to grassland or other established crops.

SLURRY (INCLUDING DUCK EFFLUENT AND WASHWATER)

2.3.5.15 Slurry shall be applied to land using only the following methods:

- **Soil injection or soil incorporation methods;**
- **Band spreading with trailing hose or trailing shoe; and/or**
- **Any type of equipment with inverted splash plates provided slurry is incorporated into the soil as soon as is practicable and provided such equipment is operated to avoid slurry atomisation and drift i.e. operated at low pressure to create large droplets).**

Notes to rules:

- a) *Where replacement of equipment is required to meet this rule, this may be phased in as part of an agreed improvement programme, taking account of the expected operating life of the existing plant.*
- b) *Dirty water may be spread by the above methods and may also be spread by irrigation.*

SPREADING TO MINIMISE POLLUTION OF WATER

2.3.5.16 Organic manures shall not be applied to land when:

- **soil is waterlogged;**
- **land is flooded or likely to flood;**
- **the soil has been frozen for 12 hours or longer in the preceding 24 hours;**
- **land is snow covered;**
- **heavy rain is forecast within 48 hours**
- **soil is cracked down to field drains or back-fill.**

Notes to rules:

- a) *Areas not suitable for spreading should be identified in the Slurry/Manure Management Plan. Restricting application rates and consequently the loading rate of total solids reduces the risk of run-off and the possibility of carrying organic matter, nitrate, phosphorus and ammonium N into watercourses.*
- b) *Applications of organic manures should be made to maximise the availability of nutrient for the crop and minimise the risk of run-off to watercourses and pollution of groundwater.*
- c) *Further information is available from the DARD Code of Good Agricultural Practice for the Prevention of Pollution of Water.*

2.3.5.17 Organic manures shall not be applied to steeply sloping fields.

Notes to rule:

- a) *Care should always be taken when spreading regardless of the nature of the slope, run-off can occur from land that is almost flat. The risk of surface runoff increases with the steepness of the slope.*
- b) *Slopes are complex features of the landscape and it is not practicable to define critical angles of slope. As a guide however, steeply sloping fields can be defined to have an average incline of 20% or more.*

2.3.5.18 Organic manures shall not be applied to land within:-

- a. **within 20 metres of lakes; or**
- b. **within 10 metres of any other waterway, including open areas of water, open field drains or any drain which has been backfilled to the surface with permeable material such as stone/aggregate; On downward slopes, below the waterway, this may be reduced to 3 metres where organic manures are spread by band spreaders, trailing shoe spreaders or soil injection or where the adjoining area is less than 1 hectare in size or not more than 50 metres in width; or**
- c. **within 50 metres of a borehole, spring or well; or**
- d. **within 250 metres of a borehole used for public water supply; or**
- e. **within 15 metres of exposed cavernous or karstified limestone features (such as swallow-holes and collapse features).**

MINIMISING POLLUTION FROM, AND ACCUMULATION OF, SOIL NUTRIENTS

Applications of organic manures should be made to maximise the availability of nutrient for the crop and minimise the risk of run-off to watercourses and pollution of groundwater.

NITROGEN

- 2.3.5.19** For any holding the amount of total nitrogen in organic manures applied to land, including by the animals themselves, and that brought onto the holding, shall not exceed 170 kg N/ha/year. The 170kg limit applies to all organic manures and slurries applied to land including sewage sludges and other organic wastes but excludes the use of inorganic fertilisers.

Notes to rule:

- a) *The N content of your manures may be available from the analysis required under Rules 2.3.5.1; 2.3.5.7; 2.3.5.9 or from standard figures eg. DARD Codes of Good Agricultural Practice or Nitrates Action Programme.*
- b) *The quantity of chemical fertiliser and organic manures applied each year shall not exceed crop requirements for nitrogen as outlined in the recommendations in RB209 and any supplementary guidance.*

PHOSPHORUS

High levels of phosphorus (P) can accumulate in soils receiving regular large applications of organic manure. This can increase P loss to water. P from livestock manures can reach surface waters by various routes. The main losses are:

- Surface run-off, particularly of recently spread manures;
- Erosion of eroded soil particles with a high P content; and
- Particulate and dissolved P in water flowing to land drains.

The amount of P lost will depend on the soil P level. The higher the soil P level, the higher the loss. There is a risk that fields which receive regular applications of livestock manures may accumulate soil P levels which exceed those necessary for crop production.

- 2.3.5.20** Slurry, manure or litter shall only be applied to soils where there is a phosphorus requirement indicated by soil analysis and the fertiliser recommendations in 'Fertiliser Recommendations for Agricultural and Horticultural Crops – RB209 Defra. When slurry/manure/litter is applied, the nutrient content shall be estimated according to standard values with appropriate justification eg RB209 DEFRA, or based on measurements and the application rate adjusted to match crop requirements.

Notes to rule:

a) These controls will be in effect for any new or expanded installations from the issue of permit (see rules 2.3.5.1 and 2.3.5.7). For existing installations the controls will be implemented in line with requirements set out under the permit improvement programme (see rules 2.3.5.2., 2.3.5.3., 2.3.5.8. and 2.3.5.9).

2.3.6 MEASURES FOR CONTROLLING ODOUR

2.3.6.1 The Operator shall:

- a) maintain and implement an odour management plan where required;**
- b) review and record if required at least every 3 years or as soon as practicable after a complaint, (whichever is the earlier) whether changes to the plan should be made;**
- c) make any appropriate changes to the plan identified by the review.**

Notes to rules:

a) It is acknowledged that there is likely to be odour from a poultry farm outside of the installation boundary. The rules for this section incorporate measures to prevent and where that is not possible to minimise these odour emissions. In certain circumstances you are required to address odour through an odour management plan ie. for those farms where there are sensitive receptors within 400m of the installation and/or the installation has a history of odour related complaints. Condition 2.3.6.1 would only apply where an odour management plan is required.

b) For installations where an odour management plan is required, guidance on producing the plan is included in the "Guide to Odour Management at Intensive Livestock Installations". This guide is available from your Inspector.

c) Requirements to control odour will be site specific, depending on the location of the farm. Many of the rules for controlling emissions to air will have additional benefits in reducing odour.

d) Further advice is available in the Code of Good Agricultural Practice for the Prevention of Pollution of Air and Soil.

2.4 GROUNDWATER REGULATIONS

2.4.1 There shall be no emission from the Activities into groundwater of any substances in List I (as defined by the Groundwater Regulations) contrary to those Regulations.

2.4.2 There shall be no emission from the Activities into groundwater of any substance in List II (as defined by the Groundwater Regulations) so as to cause pollution (as defined in those Regulations).

Notes to rules:

a) The Groundwater Regulations (NI) 1998 control the discharge to groundwater (direct or indirect) of a number of substances, details of which are given in List I and List II to the Regulations. Disposal onto or into land of any of these substances requires authorisation under the Groundwater Regulations, whilst use of these substances does not.

b) This is of relevance to intensive livestock farming since pesticides are very likely to contain List I or List II substances. In dealing with pesticide disposal you should assume that they are all within the scope of the regulations and make arrangements which meet these requirements. Further advice can be obtained from your Inspector.

2.5 AVOIDANCE, RECOVERY AND DISPOSAL OF WASTES PRODUCED AT THE INSTALLATION (INCLUDING CARCASS DISPOSAL)

European Legislation (namely the Waste Framework Directive and the Landfill Directive) requires the United Kingdom to apply existing waste management controls to agricultural waste. For many years there have been legal controls on the management of household, commercial and industrial waste. Agricultural waste has been excluded from Northern Ireland waste management controls. The new Waste Management Regulations (NI) 2006 extend controls to the management of agricultural waste in Northern Ireland and it will be necessary for anyone who produces or manages agricultural waste to comply with the Regulations.

2.5.1 **The Operator shall:**

- a) maintain records of waste produced by the activities and records of wastes sent off site from the activities, for either disposal or recovery;**
- b) undertake a waste minimisation audit within 3 years of the effective date of the permit and made available to the Inspector on request thereafter, together with a plan for reducing waste quantities in any areas identified in the audit. The audit shall be reviewed at least every 3 years;**
- c) take appropriate measures to ensure that waste produced by the activities is avoided or reduced, or where waste is produced it is recovered wherever practicable or otherwise disposed of in a manner which minimises its impact on the environment.**

Notes to rule:

a) *The audit should consider the following:*

- *can you avoid producing a waste?*
- *can you reduce the amount of waste produced?*
- *where waste is produced can it be recovered or recycled?*
- *is the waste disposed off so that the environmental impact is minimised?*

A waste minimisation audit equivalent to the Defra guide 'Opportunities for Saving Money by Reducing Waste on Your Farm' will meet the requirements of this rule.

The sections which should be completed include:

- *veterinary products;*
- *carcasses;*
- *feed waste;*
- *fuel oil and lubricants;*
- *scrap metals;*
- *tyres; and*
- *packaging.*

Other relevant issues in the Defra guide are covered by other rules.

- b) *You should implement measures for reducing waste quantities in any areas identified in the audit. You may wish to discuss these measures and when you will implement them, with the Inspector.*
- c) *The PPC Regulations require the site of the installation to be restored to a satisfactory state before the permit can be surrendered (on closure of the installation). The presence of any waste residues on the site at that time could prejudice the acceptance of the site as finally restored.*
- d) *Advice on disposal of pesticide / disinfectant containers is available in the revised DARD Codes of Good Agricultural Practice for the Prevention of Pollution of Water, Soil and Air (2006).*
- e) *All wastes produced from activities shall be managed in accordance with the waste management controls as set out in the Waste Management Regulations (NI) 2006. This may involve the requirement to obtain a waste management licence or licence exemption for the on-site recovery or disposal of wastes from the installation.*

DISPOSAL OF CARCASSES

Disposal of carcasses is regulated through the Animal By-Products Regulations (NI) 2003. The regulation of animal by-products is the responsibility of DARD Veterinary Service, whose prime concern is the protection of animal health and human health.

2.5.2 Carcasses shall be disposed of in accordance with the Animal By-Products Regulations (NI) 2003.

2.5.3 Extraordinary mortalities shall be disposed of in accordance with the accident management plan, or in the case of an outbreak of a notifiable disease, in accordance with instructions from DARD Veterinary Service.

Notes to rules:

- a) *Carcasses may be disposed of in a DARD approved incinerator or removed by a licensed contractor to a DARD approved rendering plant in accordance with the requirements of the Animal By Products Regulations (NI) 2003. They should be removed frequently to prevent odour nuisance and be covered to prevent access by birds or rodents using plastic bags or lidded bins where possible.*
- b) *Only carcasses may be disposed of in incinerators licensed under the Animal By-Products Regulation. Operation of an incinerator for other wastes (except WID exempt wastes) would need to comply with the Waste Incineration Directive.*
- c) *Guidance on the Animal By-Products Regulations is available from the DARD Veterinary Service*
- d) *Carcasses must not be buried on farm, other than under the direction of the DARD Veterinary Service eg. in the case of an outbreak of a notifiable disease.*

2.6 ENERGY USE

2.6.1 The Operator shall:

- a) take appropriate measures to ensure that energy is used efficiently in the activities;**
- b) undertake an energy audit if required within 3 years of the effective date of the permit in order to identify whether there are suitable opportunities to improve the energy efficiency of the activities, and made available to the Inspector on request thereafter. The audit shall be reviewed at least every 3 years; and**
- c) implement any appropriate measures identified in the audit.**

Notes to rule:

- a) *If you are subject to a Climate Change Levy Agreement (CCLA) then this will meet the requirements of this rule and you do not need to undertake an energy audit. You should provide the reference number of your agreement, as evidence, as part of your permit application.*
- b) *If you are not subject to a Climate Change Levy Agreement you should carry out an energy audit and make this available to the Inspector.*
- c) *The audit should be completed within three years of the effective date of the permit.*
- d) *Records should be kept of audits and made available to the Inspector on request. You should implement any measures for improvement that you have identified following your audit of energy use. You should discuss these measures and when you will implement them with the Inspector.*
- e) *There are a number of audit guides and packages which will help you to produce an energy audit, for example, the Defra guide 'Opportunities for saving money by reducing waste on your farm' and audits from the Farm Energy Centre. These audits will make recommendations for cost-effective energy management.*
- f) *Current estimates suggest that that energy usage at poultry units is highly variable, and many units will find opportunities for cost savings. Many farms will find opportunities to reduce energy consumption and will see cost savings.*
- g) *Where substantial heat energy is used in heating buildings there can be energy costs savings, and carbon dioxide emission benefits, in using oil or gas fired heating rather than electrical energy, providing that the energy inputs can be well controlled.*
- h) *The following techniques should be considered in your audit to reduce energy use on pig farms:*
 - i. *applying low energy lighting;*

- ii. *applying natural ventilation where possible, with design of buildings and pens, and spatial planning with respect to the prevailing wind directions to enhance the airflow (animal welfare considerations are vital in the choice of ventilation system);*
- iii. *mechanically ventilated houses optimised design of ventilation systems in each house to provide good temperature control and to achieve minimum ventilation rates in winter (animal welfare considerations are vital in the choice of ventilation system);*
- iv. *mechanically ventilated houses optimised to avoid resistance in ventilation systems through frequent inspection and cleaning of ducts and fans;*
- v. *reuse of waste heat e.g. from slurry cooling systems for purposes such as heating farrowing accommodation.*

2.7 ACCIDENT PREVENTION AND MANAGEMENT

2.7.1 The Operator shall:

- a) maintain and implement an Accident Management Plan.**
- b) review and record at least every 3 years or as soon as practicable after an accident, (whichever is the earlier) whether changes to the plan should be made.**
- c) make any appropriate changes to the plan identified at the review.**

Notes to rules:

- a) The Accident Management Plan will have been submitted as part of the application, and must be agreed with the Inspector as acceptable in order for it to be incorporated by way of this standard condition.*
- b) A site layout plan, showing details of all surface and foul drains, should be kept in the site office, with a back-up copy elsewhere in case the office is inaccessible in an emergency.*
- c) All staff should be aware of the location and contents of the emergency plan, and their responsibilities in the event of an accident.*
- d) A separate guide 'Accident Management Planning on IPPC farms', is appended (Appendix 2).*
- e) The raw material inventory should be included in the plan.*
- f) Reviewing the plan after an accident or incident is an effective way of preventing particular problems from occurring again. The relevant measures identified in the review must be incorporated into the accident management plan and subsequently implemented.*

2.8 MEASURES FOR CONTROLLING NOISE AND VIBRATION

2.8.1 The Operator shall:

- a) maintain and implement a noise management plan where required;**
- b) review and record if required at least every 3 years or as soon as practicable after a complaint, (whichever is the earlier) whether changes to the plan should be made;**
- c) make any appropriate changes to the plan identified by the review.**

Notes to rules:

a) It is acknowledged that there is likely to be noise from a pig or poultry farm outside of the installation boundary. The rules for this sector incorporate measures to prevent and where that is not possible to minimise these noise emissions. In certain circumstances you are required to address odour through a noise management plan ie. for those farms where there are sensitive receptors within 400m of the installation and/or the installation has a history of noise related complaints. Condition 2.8.1. would only be required where a noise management plan is required.

b) For installations where a noise management plan is required, guidance on producing the plan is included in the "Guidance for Operators on Noise Management at Intensive Livestock Installations". This guide is available from your Inspector.

c) Requirements to abate noise will be site specific, depending on the location of the farm.

d) Guidance has also been produced by ADAS for Defra: Guidance on the control of noise on poultry units

2.9 RECORDING AND MONITORING

2.9.1 RECORDING

GENERAL REQUIREMENTS

2.9.1.1 Copies of all records, audits and plans shall be made available to the Inspectorate on request. Where the information forms part of a separate document, reference shall be made to the whereabouts of this document. Records shall be kept for a minimum of two years.

Notes to rule:

There are a number of records, reviews and plans that are produced at different times, either as part of the permit application or during the life of the permitted farm, and in different site-specific situations. These are summarised below

a) *Records, audits and plans which are required to be submitted with all applications include:*

- *Site report and site plans;*
- *Accident Management plan (an up to date copy must be available on site at all times);*
- *Raw materials inventory.*

Copies of these documents will be held by the Inspector. Further copies should be provided if there are changes to record.

b) *Records, audits and plans submitted with the application, but which are not required on some sites include:*

- *Noise and/or odour management plans;*
- *Records relating to arrangements for spreading on third party land for installations disposing of manure and slurry off site, including where relevant a nutrient management plan for the receiving land;*
- *Records relating to other arrangements for off site disposal of manure or slurry; and*
- *Slurry/Manure Management Plan for installations spreading manure or slurry on site.*

If these are required they will have been submitted with the application. Further copies should be provided to the Inspector if there are changes to record. Up to date copies of the documents should also be available in the farm office.

- c) *Records, audits and plans which need to be in place at the time of the permit application but do not need to be supplied as part of the application include:*
- *site closure plan*
- d) *Records, audits and plans that will be generated once the installation is operational include:*
- *Energy audit (sites without Climate Change Levy Agreement);*
 - *Water audit;*
 - *Waste minimisation audit;*
 - *Improvement plan (for existing installations) eg. Proposals for utilisation of slurries/manures; covering or replacing existing slurry stores and lagoons;*
 - *Records of manure/slurry utilisation;*
 - *Records of manure/slurry analysis;*
 - *Records of soil analysis;*
 - *Livestock numbers and movements;*
 - *Record of pollution incidents and remedial action for Decommissioning Plan;*
 - *Records of any monitoring carried out;*
 - *Records of inspection and maintenance of structures and plant; staff training; raw materials used.*

These documents must be provided to the Inspector in accordance with the time scales identified in the relevant Rules.

2.9.1.2 **A summary return of the records detailed in 2.9.1.3 and 2.9.1.4 below shall be kept and provided annually to the Inspector to coincide with the June census conducted by DARD.**

LIVESTOCK RECORDS

2.9.1.3 **A record of livestock numbers and movements on and off farm shall be kept, and be made available to the Inspector for inspection.**

Notes to rule:

- a) *This information will be required to estimate the emissions of ammonia to air from the installation, in place of monitoring of emissions directly.*

ON-SITE UTILISATION OF LITTER/MANURE/SLURRY

2.9.1.4 **The Operator shall:**
(a) maintain records to demonstrate that the slurry/manure management plan is implemented, as required by rule 2.3.5.11 ;
(b) record any changes to the plan as required by rule 2.3.5.12.

Notes to rule:

- a) *Where such records are already kept for other purposes, such as the Nitrates Action Programme requirements, or a farm assurance scheme, this format will usually be sufficient.*
- b) *Occasional use of a weighbridge should be employed to allow a more accurate estimate of the weight in trailer or lorry loads of manure*

OFF-SITE UTILISATION

2.9.1.5 Where manure and slurry are transported off the originating installation, such that responsibility for applying it to land passes to a third party, the permit holder will retain a copy of the nutrient management plan where one is required (see rule 2.3.5.1) and record the following for each transfer of material:

- the recipient(s);
- the amount transported; and
- the date transported.

The records shall be kept for a minimum of two years

2.9.1.6 Where manure and slurry is transported off the installation for other purposes the recipient, amount and date transported shall be recorded. The records shall be kept for a minimum of two years

Notes to rule:

(a) Occasional use of a weighbridge should be employed to allow a more accurate estimate of the weight in trailer or lorry loads of manure

2.9.2 MONITORING

2.9.2.1 Monitoring shall be carried out for any of the parameters set out in the permit at the specified monitoring locations and at frequencies not less than those specified in the permit.

2.9.2.2 The Operator shall maintain records of all monitoring undertaken or carried out including records of the taking and analysis of samples instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.

Notes to rules:

(a) There will be few farms that will need to meet these rules. Monitoring may be required, for example of ammonia, if a farm has sensitive receptors close by.

(b) These rules will be enforced on a site-by-site basis. Please contact the Inspectorate for further information on these rules.

(c) Where the site report submitted with the application indicates that there is a risk of ground pollution, monitoring requirements in addition to the inspection requirements set out in rules 2.1.1.1 to 2.1.1.3 may be included in the permit.

CLOSURE AND DECOMMISSIONING

- 2.10.1** Within 12 months from the effective date of the Permit, the Operator shall prepare and maintain a Site Closure Plan which demonstrates how the Activities can be decommissioned to avoid any pollution risk and return the site of operation to a satisfactory state.
- 2.10.2** The Operator shall carry out and record a review of the Site Closure Plan at least every 3 years.
- 2.10.3** The Site Closure Plan (or relevant part thereof) shall be implemented on final cessation or decommissioning of the Activities or part thereof.
- 2.10.4** The operator shall notify the Inspector of any amendment or addition to the plan that he considers necessary. The Inspector's agreement in writing must be obtained before such amendment or addition is made.

Notes to rules:

- a) *You must maintain and implement a Site Closure Plan and make it available to the Inspectorate.*
- b) *The Site Closure Plan must be agreed with the Inspector as acceptable in order for it to be incorporated by way of these standard conditions.*
- c) *The Site Closure Plan should demonstrate that there has been adequate consideration of how to decommission the unit and return the site to an acceptable state. The Site Closure Plan should be implemented in order to surrender the permit.*
- d) *You must discuss any amendments or additions to the plan following any review with the Inspector.*
- e) *The Inspector will not accept an application to surrender the permit unless it is demonstrated that there is no pollution risk and no further steps are required to return the site to a satisfactory state.*
- f) *Further information and guidance can be obtained from NIEA ie. Supplementary documentary guidance for IPPC applications for intensive livestock farms.*

3. REFERENCES AND CONTACT DETAILS

Department of Environment

- Integrated Pollution Prevention and Control: a Practical Guide

Northern Ireland Environment Agency

- Website: www.ni-environment.gov.uk
- Pollution Prevention Guidance Notes.
- Policy and Practice for the Protection of Groundwater in Northern Ireland July 2001 (available on website)
- NIEA's website also has details of the location of ASSIs and other designated conservation sites.

The following documents can be downloaded from the **IPRI website**. Farm regulations

www.ni-environment.gov.uk/environment/industrialPollution/ippc_farmregs.shtml

- Latest version of the Standard Farming Installation Rules and Guidance for Poultry Production
- Notes for guidance of applicants
- Guidance for operators on noise management at intensive livestock IPPC installations
- Guidance for operators on odour management at intensive livestock IPPC installations
- Guidance for operators on slurry and manure management planning for intensive livestock IPPC installations
- Guidance for operators on preparing an agricultural water audit for intensive livestock IPPC installations
- Example of supporting documentation for an application for broiler chickens
- Example of supporting documentation for an application for laying hens
- Guidance for treatment methods for lightly contaminated site run-off from poultry and pig units
- Guidance for site reports for intensive livestock installations
- Guidance for assessment of environmental impacts from intensive livestock installations
- Application form for pig and poultry rearing permit
- Application form for a variation to a pig and poultry rearing permit
- Application form for a transfer of a pig and poultry rearing permit
- Application for a surrender of a pig and poultry rearing permit

A web resource called NetRegs has been developed by the Environment Agency in partnership with the Scottish Environment protection Agency, the Northern Ireland Environment Agency and the Small Business Service to help small to medium sized businesses understand their environmental responsibilities <http://www.environment-agency.gov.uk/netregs/>.

The agricultural section of NetRegs contains information on livestock farming (Sector Guidelines > Agriculture > Livestock or via <http://www.environment-agency.gov.uk/netregs/sectors/341895/341911/?version=1&lang=e>

Department of Agriculture and Rural Development (DARD)

- Code of Good Agricultural Practice for the Prevention of Pollution of Water.
- Code of Good Agricultural Practice for the Prevention of Pollution of Soil and Air
- Guidelines on Animal By-Products Regulations

Department for Environment, Food and Rural Affairs (Defra)

- Website: www.defra.gov.uk
- Approved list of disinfectants:
http://www.defra.gov.uk/animalh/diseases/control/testing_disinfectants.htm
- Waste Minimisation Manual - opportunities for saving money by reducing waste on your farm (PB4819):
<http://www.defra.gov.uk/environment/waste/topics/agwaste.htm#reducewaste>
- Guide to Pesticides (The Blue Book) Electronic Copy:
<http://www.pesticides.gov.uk/publications.asp?id=64>
- Poultry litter management (PB1739):
<http://www.defra.gov.uk/animalh/welfare/farmed/meatchks/pb1739/littetoc.htm>
- Heat stress in poultry – solving the problem (PB10543):
<http://www.defra.gov.uk/animalh/welfare/farmed/pdf/hstress05.pdf>
- Code of Recommendations for the Welfare of Livestock: Laying Hens (PB7274):
<http://www.defra.gov.uk/animalh/welfare/farmed/layers/layerscode.pdf>
- Code of Recommendations for the Welfare of Livestock: Turkeys :
<http://www.defra.gov.uk/animalh/welfare/farmed/othersps/turkeys/pb0077/turkcode.htm>
- Code of Recommendations for the Welfare of Livestock: Meat Chickens and breeding chickens (PB7275):
<http://www.defra.gov.uk/animalh/welfare/farmed/meatchks/meatchkscode.pdf>

- Code of Recommendations for the Welfare of Livestock: Ducks:
<http://www.defra.gov.uk/animalh/welfare/farmed/othersps/ducks/pb0079/duckcode.htm>
- Fertiliser recommendations for agricultural and horticultural crops (RB209) is available from the Stationary Office – see below or can be downloaded in sections via: <http://www.defra.gov.uk/enviro/pollute/rb209/index.htm>
- Ammonia in the UK. Defra
<http://www.defra.gov.uk/environment/airquality/ammonia/index.htm>

The following three booklets are also available free of charge from ADAS Gleadthorpe Research Centre (Tel: 01623 844331).

- Managing Livestock Manures Booklet 1 Making better use of livestock manures on arable land: <http://www.defra.gov.uk/enviro/pollute/farmwaste.htm>
- Managing Livestock Manures Booklet 2 Making better use of livestock manures on grassland: <http://www.defra.gov.uk/enviro/pollute/farmwaste.htm>
- Managing Livestock Manures Booklet 3 Spreading systems for slurries and solid manures: <http://www.defra.gov.uk/enviro/pollute/farmwaste.htm>

National Office of Animal Health (NOAH)

- Website: www.noah.co.uk
- Telephone: 020 8367 3131
- Email: noah@noah.co.uk
- Address: National Office of Animal Health, 3 Crossfield Chambers, Gladbeck Way, Enfield, EN2 7HF.
- The NOAH Compendium of Data Sheets for Veterinary Products can be obtained from the website.

Construction Industry Research and Information Association (CIRIA)

- Website: www.ciria.org
- Telephone: 020 7549 3300
- Email: enquiries@ciria.org
- Address: Classic House, 174-180 Old Street, London EC1V 9BP
- CIRIA report 126 'Farm waste storage – guidelines for construction' can be purchased from CIRIA or obtained through a library – ISBN: 0-86017-352-6.

The Stationery Office

- Web site: <http://www.hms.o.gov.uk>

- Telephone enquiries/orders: 0870 600 5522
- Email: book.enquiries@theso.co.uk
- Address: TSO Publications Centre, PO Box 276, London SW8 5DT

The following regulations can be downloaded from Office of Public Sector Information website (formerly HMSO) (www.opsi.gov.uk) or obtained in printed copy from The Stationary Office:

- The Pollution Prevention and Control (Northern Ireland) Regulations 2003 S.R. 2003 No. 46
- The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil Regulations (Northern Ireland) 2003 S.R. 2003 No. 319
- The Sludge (Use in Agriculture) Regulations (NI) 1990 S.R. 1990 No. 245
- The Groundwater Regulations (NI) 1998 SR 1998 No 401
- The Protection of Water against Agricultural Nitrates Pollution Regulations (Northern Ireland) 2004 S.R. 2004 No. 419
- The Action Programme for NVZs Regulations (NI) 1999 SR 1999 No 156
- Code of Practice for the Agricultural Use of Sewage Sludge. Department of the Environment 1989. ISBN 1 85112 005 X
- Fertiliser Recommendations for Agricultural and Horticultural Crops – Reference Book 209, Defra. ISBN 0 11 242813 4.

European Integrated Pollution Prevention and Control Bureau

Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs, July 2003, available from <http://eippcb.jrc.es/pages/FActivities.htm>.

Health and Safety Executive

- Website: www.hse.gov.uk
- Telephone: 08701 545500
- Email: hseinformationservices@natbrit.com
- Address: HSE Infoline, Caerphilly Business Park, Caerphilly, CF83 3GG

Agriculture Homepage: <http://www.hse.gov.uk/agriculture/index.htm>

Guide to Pesticides (The Blue Book) Electronic Copy.
<http://www.hse.gov.uk/bluebook/>

Farm Energy Centre

- Website: www.farmenergy.com
- Telephone: 0247 669 6512
- Email: info@farmenergy.org.uk

- Address: Farm Energy Centre, NAC Stoneleigh Park, Kenilworth, Warwickshire, CV8 2LS

Information on energy auditing on farms can be obtained via:

<http://www.farmenergy.com/services3.html>

A range of publications can be ordered from the Farm Energy Centre. The following can be downloaded from the website:

Technical Note TN37 - Energy Efficiency in Pig Production can be downloaded via:

<http://www.farmenergy.com/pig-tn37.html>

The Carbon Trust

- Website: www.thecarbontrust.co.uk
- Telephone helpline: 0800 085 2005
- Address: The Carbon Trust, 8th Floor, 3 Clement's Inn, London, WC2A 2AZ
- The Energy Consumption Guide 'Energy Use in Pig Farming' can be obtained via the website or from the NPA website via: http://www.npa-uk.net/ds_portal/library/Carbon%20Trust%20Pig%20Farming%20ECG0891.pdf

British Standards

- Website: www.bsi-global.com
- Telephone: 020 8996 9000
- Email: cservices@bsi-global.com
- Address: 389 Chiswick High Road, London, W4 4AL
- BS 5502-50:1993. Buildings and structures for agriculture. Code of practice for design, construction and use of storage tanks and reception pits for livestock slurry.

ACORUS

- Website: www.acorus.org
- Online enquiry service: <http://www.acorus.org/enquiryform.htm>

Construction Guidance Notes can be obtained via: <http://www.acorus.org/cgn.htm> including:

- CGN 100 Organising contracts for farm waste structures (manure and slurry);
- CGN 001 Above-ground circular concrete and rectangular weeping-wall slurry stores;
- CGN 003 In-situ concrete slurry stores
- CGN 004 Above-ground circular steel slurry stores;
- CGN 008 Separation of clean and dirty water, dirty water storage, yard area construction;
- CGN 009 Bunds for agricultural fuel oil tanks
- CGN 010 Sluice valves on steel and concrete circular above-ground slurry stores;
- CGN 011 The use of covers on circular steel and concrete slurry stores

Appendix 1 Raw materials proforma

Inventory of Raw Materials	On approved Lists (see note 1)	Quantity used (kg/yr)	Quantity stored on site (kg)
a. Biocides (includes disinfectants, wood preservatives, slimicides)			
b. Pesticides (including herbicides, fungicides, insecticides, vertebrate control products, biological pesticides)			
c. Veterinary medicines (see note 2)			
d. Bedding Types (see note 3)			
e. Fuels			

Note 1: Approved Lists

Defra/HSE Guide to Pesticides (The Blue Book) Electronic Copy (previously referred to as Defra/HSE Reference Book 500)

Pesticides

National Office for Animal Health compendium

Veterinary medicines

DARD approved list of disinfectants

Disinfectants

Note 2: Veterinary Medicines

Volumes or weights of products kept on site for general purposes should be recorded.

Anticipation of disease outbreaks, such as CSF or FMD is not required, the intention is to show what medicines would be stored on site in normal circumstances.

Note 3: Bedding

An indication of the types of bedding used is required. Details of quantities stored are not needed.

Appendix 2 Accident Management planning for IPPC farms

This guidance note has been drawn up to help you develop a site specific accident management plan to prevent and reduce damage to the environment caused by disease outbreaks or accidents such as spillages and fires. It is aimed at those farms regulated under the PPC Regulations. This note has been modified from PPG21: Pollution Incident Response Planning which was jointly produced by the Environment Agency, the Scottish Environmental Protection Agency (SEPA) and the Northern Ireland Environment Agency referred to as the Agency or Agencies.

1 Introduction

The Agencies' guidance on industrial sites (PPG11-Reference 1) provides basic advice on proactive pollution prevention. Further information on techniques for managing run-off generated in the event of a fire ("fire water") and major spillages is available in PPG18-Reference 2.

This guidance document provides extra advice on accident management planning. It identifies why an accident management plan is needed, what information should be included and provides a template as a starting point for those preparing such a plan. It aims to help farmers consider the appropriate level of detail for a specific site, taking into account the risks and the site layout.

2 Why produce an accident management plan?

Farms have the potential to cause significant environmental harm and to threaten water supplies and public health. The Agencies publish a range of pollution prevention guidance notes, which will, if followed, minimise the risk of an incident occurring; there will always be a residual risk of an accident or emergency that could cause serious environmental problems. In addition to the obvious threat posed by chemicals and oils, even materials which are non-hazardous to humans, such as foods and beverages, can cause serious environmental harm. The run-off generated in the event of a fire can also be very damaging.

The environmental impact of such an incident may be long term and, in the case of groundwater, may persist for decades or even longer. As a result, the legal consequences and clean-up operation can be costly. Rivers, sewers, culverts, drains, water distribution systems and service ducts all present routes for pollutants to travel off-site. As a result, the effects of a discharge may not be evident on site but may become apparent some distance away. In some cases, for example in the event of a fire, atmospheric deposition could also have a long-range impact.

In most cases, an incident of this kind need not result in serious environmental damage, providing appropriate pollution prevention measures are in place or immediately available. The key to this is to have in place an accident management plan. This need not be costly to prepare, but could minimise the consequences should an emergency arise.

3 Producing an accident management plan

The accident management plan should contain the following:

a. Cover page

This contains details of the site and of those for whom the plan is relevant. This should be completed with:

Box 1 - Company name and full postal address.

Box 2 - a brief description of the main business activities on site – for example ‘intensive pig unit with slurry storage’.

Box 3 - Date plan completed and date the plan is due to be reviewed.

Box 4 - The plan should be "signed-off" by an appropriate company manager.

Box 5 - A list of recipients of the completed plan.

b. Contact list

This should list key contact numbers for the Emergency Services, the Northern Ireland Environment Agency, NI Water, the Health and Safety Executive for Northern Ireland, DARD Veterinary Service and specialist clean-up contractors. Staff who are key-holders and those who would be contacted in the event of a significant incident should be identified (including home and mobile numbers). Include the contact numbers for any sources of specialist advice, such as chemical suppliers and manufacturers whose products are on site.

c. Site drainage plan

This should have a clear diagram of the site showing layout and access details, along with a schematic representation of the site drainage arrangements. Use red for foul drainage and blue for surface water drainage and clearly indicate the direction of flow. A similar approach should be used for drain covers on site, which can also be numbered to assist identification.

The plan should indicate:

- i. General layout of buildings.
- ii. Clearly mark site access routes for emergency services.
- iii. The location of hydrants, "fireboxes" (see section 6) and materials for pollution prevention (such as spill kits or straw).
- iv. Identify any bunded areas along with substance stored and estimated retention capacity.
- v. The location of livestock housing, and manure and slurry treatment and storage structures.
- vi. The location of areas or facilities used for storage of raw materials and waste.
- vii. The location of LPG storage facilities.
- viii. Show the location of sprinkler control valves (where present) and the mains water supply stopcock.
- ix. Identify facilities such as inspection points for the detection of pollution (for example surface water drain outlets to ditches or streams, oil separators, pollution control devices such as shut-off valves in drains. Indicate sites suitable for portable storage tanks or for blocking drains. Provide a brief description of how they operate and ensure such facilities are clearly labelled above ground on site.

- x. If surface water discharges to soakaways, show their location, depth and construction details.
- xi. Show any watercourse, borehole or well within or adjacent to the site. Indicate the direction of flow (or depth for boreholes and wells), surface water outfalls from the site and suitable points for installing pollution control booms or a dam. If possible, boom anchor points should be permanently installed at a suitable location, taking into account possible flow conditions.

It is important to have a simple site drainage plan with the key details shown. In some cases, additional plans will be required to provide detailed information. These should be attached to the plan and referenced within it.

d. Site oil, chemical and raw materials inventory

An inventory of materials is a requirement of the PPC Regulations. The whereabouts of the on-site inventory should be included in the plan.

4 Accident procedures

Accident procedures should define the scope of activities covered, staff responsibilities and the procedures for dealing with events such as spillages and leaking containers. The level of response will depend on Health and Safety issues, staff training, the level of personal protective equipment available, the nature of any spilled materials and the types of pollution control equipment available on the site. The appropriate level of response will, therefore, be site specific. It is important to consider what could happen in the worst case and to take this into account in developing the procedures. A checklist of actions may be a useful addition.

In general they should address the following issues:

- i. Fire fighting strategy. This should be discussed with the fire service. If controlled burn is an agreed option, (see Reference 2 for details) this should be clearly stated.
- ii. Disease strategy. Actions to be taken on destocking the unit. An emergency disposal plan should be prepared as part of this document, for disposal of carcasses off-site and, in the event of restrictions on movement, on-site. The procedures for dealing with Notifiable disease should be discussed with DARD Veterinary Service.
- iii. Nearby properties, downstream abstractors or environmentally sensitive sites which could be affected by an incident
- iv. The consequences of an incident at nearby properties
- v. Procedures for alerting staff on site, and where appropriate, adjacent sites. This should include evacuation procedures.
- vi. Contacting the emergency services, NIEA, district council and other organisations concerned and dealing with the press.
- vii. Substances posing particular risks should be highlighted in the Accident Management Plan.
- viii. The selection of the appropriate level of personal protective equipment
- ix. The means of making leaking containers safe

- xi. Procedures for containing leaks, spills and fire-fighting run-off. The location and use of spill kits, drain blockers and other pollution control equipment and the operation of pollution control devices should be documented.
- xii. The main routes of pollutants in the event of spillage should be established. This will make it possible to quickly block off routes and prevent damage to the environment.
- xiii. Procedures for the recovery of spilled product and the safe handling and disposal of any wastes arising from the incident. Reference 2 (PPG18) contains some useful relevant information.
- xiv. Procedures for dealing with:
 - a) Slurry and manure management in the event of:
 - Very wet weather;
 - Land that is frozen hard;
 - Overcoming cropping / grazing constraints. Including seasonal effluent production and management practices to overcome potential constraints); and
 - Addressing constraints on spreading to avoid smell nuisance (during certain weather conditions).
 - b) Measures to be taken in the event of:
 - Power / mechanical failure;
 - Store / system overflows – are high and low level alarms appropriate?
 - An accident arising during slurry spreading operations; and
 - Additional safeguards if night-time pumping is proposed for Low Rate Irrigation system.

5 Training

The effectiveness of any site incident response plan will depend on staff training. All staff and contractors working on site should be made aware of the plan and should know their role if an incident occurs. Exercises should be carried out to familiarise staff with the operation of the plan and to test its effectiveness. Records of such exercises should be included in the staff training records required by the permit.

6 Distribution and revision

A copy of the accident management plan should be submitted to the Inspectorate as part of the IPPC permit application. A copy should be kept in the farm office, but also keep a copy of the plan on site in an easily accessible location away from the main building, such as a gate-house or a dedicated "firebox" to which the emergency services can gain access. A notice at the site entrance should indicate the location of the plan. Finally, for the plan to remain effective, it is vital that it is regularly reviewed and that any significant changes are reflected in a revised plan. Ensure that revised copies are sent to all plan holders and that old versions are destroyed.

7 References

1. PPG11: Preventing pollution on industrial sites
2. PPG18: Managing fire-water and major spillages

EXAMPLE LAYOUT FOR ACCIDENT MANAGEMENT PLAN

ACCIDENT MANAGEMENT PLAN

For:

Date of plan

Review date:

Approved by:

Copied to?

Date sent:

CONTENTS:

Page 2 Contact details

Page 3 Site Drainage plan

Page 4 Accident procedures

EMERGENCY CONTACT DETAILS

Emergency services: 999

Local police:

Doctor:

Environment hotline: 0800 80 70 60

Office hours

Out of hours

District Council:

Sewage undertaker:

Water undertaker:

Gas supplier:

Electricity supplier:

Oil supplier:

Spreading contractor:

Maintenance contractor:

Specialist advice:

Waste disposal contractor:

Clean-up contractor:

COMPANY CONTACTS (Out of hours)

Managing director:

Site manager:

Head office contact:

SITE DRAINAGE PLAN

ACCIDENT PROCEDURES

Appendix 3

Minimising Emissions from New Poultry Housing - Examples of Housing Designs from the BREF

The following examples of housing designs are taken from the Reference Document on Best Available Techniques (BAT) for Intensive Rearing of Poultry and Pigs, commonly referred to as the BREF, published in July 2003 by the European IPPC Bureau. These sections are reproduced here so that applicants do not need to obtain and read the BREF, which is 341 pages long. If required, the full document can be downloaded at <http://eippcb.jrc.es/pages/FActivities.htm>. As this text is taken from a European document all costs are stated in Euros.

This appendix will be updated as further information becomes available on these housing designs and as new techniques and designs are evaluated and considered to be BAT.

The following examples are divided into sections for laying hens and replacement pullets, broilers and floor reared replacement pullets, turkeys, and ducks. The Standard Farming Installation Rule number/s that the section relates to is stated in the section heading. Each section is then sub-divided into the housing designs referred to in the Rules with the relevant BREF section reference included in the sub-section heading.

3.1 Laying hens and replacement pullets (Rules 2.3.3.10 and 2.3.3.11)

3.1.1 Caged systems with deep pit with ventilated manure store (BREF 4.5.1.1: deep-pit and canal house)

Description: The cages are positioned above the manure storage pit. The height of a deep-pit system measures between 180 and 250 cm. The canal house has a pit, which measures approximately 100 cm. The wet droppings fall in the pit and remain there for periods of up to a year or more. In a deep-pit house as well as in a canal house, fans that are placed below the cages in the lower part of the building draw in ventilation air. The air is drawn into the building through the roof (open ridge system) and passes the cage area, where it is warmed up. The warm airstreams then pass over the manure stored in the pit and leave the house. The manure that is stored in the pit is dried by this flow of warm air. During storage, heating by fermentation occurs. This fermentation results in a high ammonia emission level. To get a good drying result the manure on the plates underneath the cages should be pre-dried for about 3 days. After 3 days the manure has a dry material content of about 35 – 40 %. In the past in the UK, a slat manure drying technique was applied to deep-pit houses with fully stepped and flatdeck systems. It left manure drying in steep sided cones for 6 months, after which the manure was dropped into the deep pit and the slats reset for the rest of the year. This technique may still be applied, but has largely fallen out of use with the demise of most fully stepped and flatdeck cages in deep-pit systems.

Achieved environmental benefits: An extractor fan pulls air through the housing past the cages and manure heap. Although the manure is dried with air, some anaerobic fermentation can occur that can cause high ammonia emissions. Reported data on the emission at the outlet of the fans vary between 0.154 (estimated in Italy) and 0.386 (measured in the Netherlands) kg NH₃ per laying hen-place per year. The difference is significant but is probably due to the different climatic conditions. This system shows a better performance in Mediterranean climates than in climates with much lower temperatures. A canal house is assumed to have the same emission levels as a deep pit house. Particularly in winter, when the ventilation rate is lower, ammonia concentrations in the bird area may be reduced, but emissions from the manure storage are not. Providing additional aeration of the manure using perforated polyethylene tubes could achieve lower emissions, but no results have been reported.

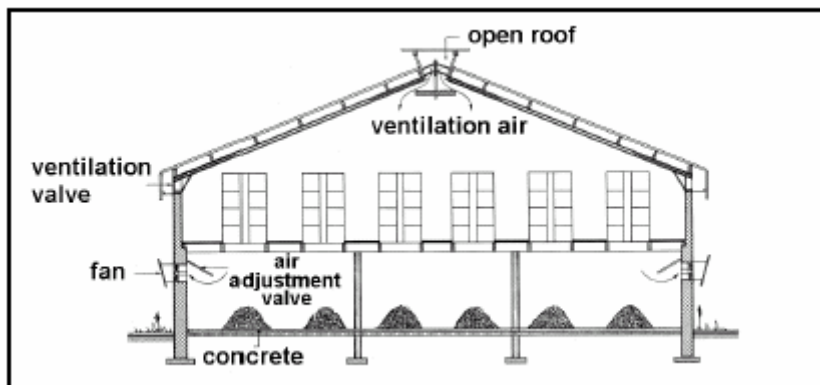
Cross-media effects: The application of these systems requires energy for the fans, but it must be noted that the fans will serve both the manure storage and the layer housing areas.

Operational data: This housing system results in manure with a dry matter of 50 – 60 %. Because the manure is dried so quickly, there is little odour from the cages. The emission appears at the outlets of the open storage. Usually, manure is stored for a full cycle (13 – 15 months). No separate storage facility is needed. In practice, problems are encountered with canal and deep-pit houses because of the level of ammonia concentrations, which can be so high that it is difficult to work in these areas. Flies and dirty eggs may also cause problems, but good maintenance should be able to control this. In the Netherlands this system is being phased out because of the problems with the ammonia emissions, flies and odour.

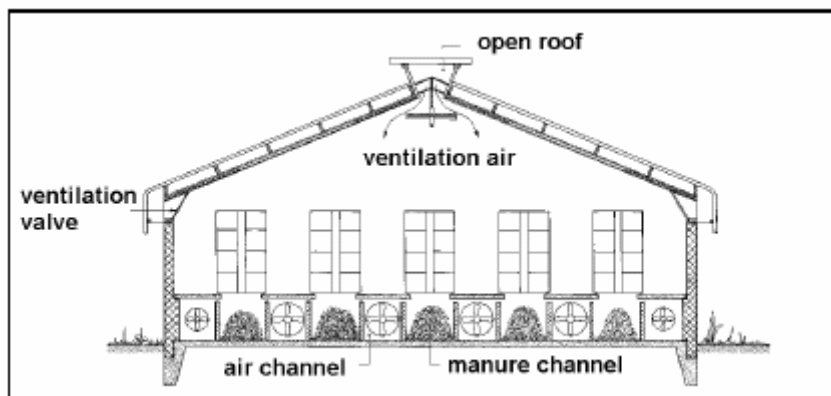
Applicability: In Italy, this system is applied on large farms, as the labour input required is low. However, the system can only be applied in new houses, since it needs sufficient height for the manure storage, although it is possible that an appropriate existing building, such as an existing two-storey layer house, could possibly be converted into a high-rise house, but no information has been submitted to demonstrate this.

Costs: The extra investment costs of an additional ground floor are reported to be partially offset by the fact that no external storage is necessary. Extra investment costs compared with an open storage system amount to EUR 0.8 per bird place. Extra costs for energy are EUR 0.03/year per bird place. The total extra annual costs are EUR 0.12 per bird place per year. This means that with a reduction from 0.220 to 0.154 kg NH₃ per bird place per year (i.e. 30 %) approximately EUR 1.84 per kg NH₃ is abated.

Reference farms: Deep pit houses are used in several Member States (UK, Netherlands (2.5 million hens) and Italy (8 – 9 million hens)).



Deep-pit system for laying hens



Example of a canal system for laying hens

3.1.2 Caged systems with manure removal, at least twice a week, by way of manure belts to covered storage (BREF 4.5.1.4)

Description: The manure-belt battery is commonly applied throughout Europe. In this system the laying hens' manure is collected on manure-belts below the cages and transported to a closed storage at least twice a week. The manure is collected on manure-belts that are situated under each tier (or cage level). At the end of the belt a cross conveyor transports the manure further to the external storage. The manure-belts are made of smooth, easy-to-clean polypropylene or trevira and no residue sticks to these belts. With modern reinforced belts, manure can be removed from very long runs of cages. Some drying takes place on the belts, especially in summer conditions, and manure may be held on the belts for up to a week. In improved belt systems, air is blown over the manure to achieve faster drying of the manure. The air is introduced just under each tier of cages, usually via rigid polypropylene ducts. Another benefit is the introduction of fresh cooling air immediately adjacent to the birds. Further improvements consist of the introduction of pre-warmed house air and/or the use of heat exchangers to pre-warm incoming outside air. Having clean belts and effecting frequent manure removal to a closed storage ensures low ammonia emissions from the housing area. A modification to the cage system ensures the removal of manure, through adding extensions on the feed hopper that sweep the droppings onto the belt that runs between the cages. This system needs an additional storage facility.

Achieved environmental benefits: The environmental performance of this system depends on the frequency of manure removal, although it is certainly better than the scraper system, which usually leaves some manure behind. The higher the frequency of removal the lower the emission from the housing, e.g. if manure is removed at least twice a week a reduced emission of 0.035 kg NH₃ per bird place per year is reported. With a removal frequency of twice a day, the ammonia emission is reported to drop to 0.020 kg NH₃ per bird place per year. Because the manure is transported out of the house and there is no manure residue on the manure belts, a lower odour level is obtained, which improves the climate in the house. With this system no manure drying occurs and wet manure leaves the housing to be stored elsewhere or to be immediately applied on land.

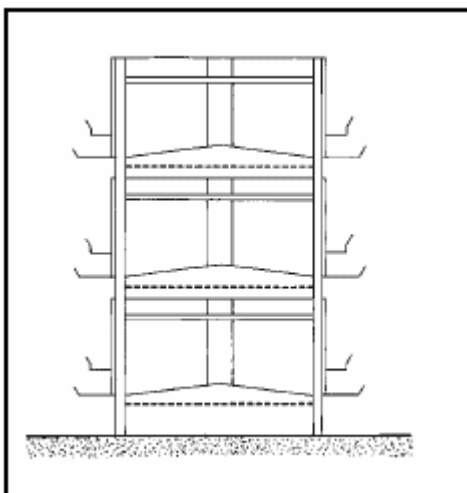
Cross-media effects: Application of this system needs additional energy to run the belts. The lowest emission is achieved by both applying the scraping device to the feed hopper and by running the manure belt more frequently. It is assumed that any extra energy required is only due to running the manure belt more frequently.

Operational data: Wet manure is produced instead of dry manure. In the Netherlands this system is being phased out because of the high costs for selling this 'wet' manure and due to the relatively high ammonia emissions.

Applicability: Cages with manure belts can be used in new and existing buildings. They are usually applied with vertical tiered cages. The reference system would need full replacement. It is questionable whether the more frequent removal method can be considered an improvement compared to the more sophisticated systems available.

Costs: The extra investment costs of operating a twice-weekly removal compared with the open storage system are EUR 1.14 per bird place. The hopper construction required for a more frequent removal would require extra costs. These costs have not been reported. With a 58 % reduction of the emission (compared with the reference system) the relative costs are about EUR 23.6 per kg NH₃ abated. The extra operating costs per laying hen per year are EUR 0.17.

Reference farms: In the Netherlands about 3.524 million hens are kept in these systems. This system is only occasionally installed in a new building. Data on the application of the system with the feed hopper construction have not been submitted.



Example of a manure-belt battery (3 tiers) with a belt under each tier to remove manure to a closed storage

3.1.3 Vertical tiered cages with manure belt with forced air drying, where the manure is removed at least once a week to covered storage (BREF 4.5.1.5.1)

Description: The manure from the laying hens is collected on a manure belt, of which there is one for each tier. Over the belt a perforated tube is placed which blows air (which may be preheated) over the manure on the belt. The manure is removed from the house once a week to a covered storage outside the house, where the manure can be stored for longer. On some farms, manure is put into a container and removed from the farm within two weeks.

Achieved environmental benefits: When a forced drying system is installed with a drying capacity of 0.4 m³ of air per laying hen per hour, then over a drying period of 7 days a dry matter content of the manure of at least 45 % is achieved. The NH₃ emission is 0.035 kg NH₃ per laying hen-place per year. No manure is left on the belts after removal.

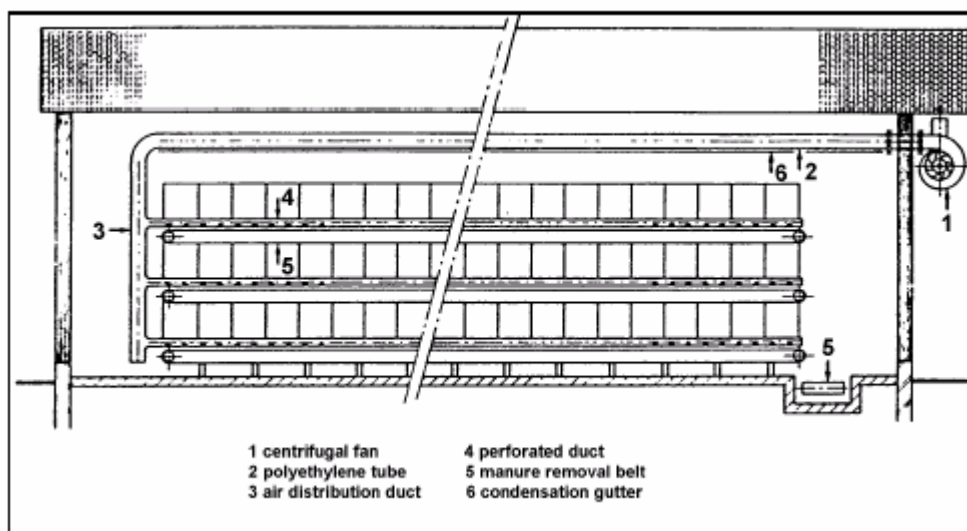
Cross-media effects: Energy is required for operating the belts and the fans used to blow the air over the manure. Additional energy input is also required if preheating is applied. In modern cage houses, preheating is achieved by the application of a heat exchanger, in which outside air is drawn in and warmed up by the ventilation air that is emitted from the house. The level of extra energy input will vary; reported data show an extra 1.0 – 1.6 kWh per hen place per year used compared with the reference system, leading to a total energy use of 2 to 3 kWh per layer bird place per year.

Operational data: With this system it is possible to get a very low NH₃ emission and to reduce odour in the house. The preheated air dries the manure, but an additional benefit is that the climate in the cages close to the animals is very good. This allows better production results to be achieved than with the reference system.

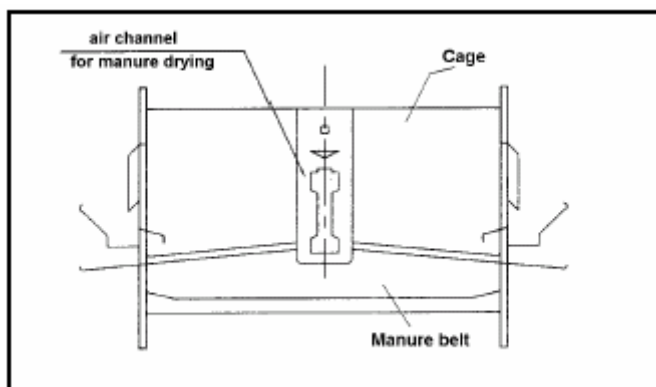
Applicability: This system can be applied in new and existing buildings with 3 tiers or more. The aeration installation could possibly even be added to an existing belt cage system which does not have drying equipment, but no practical example has been submitted.

Costs: The cost when compared with the reference system, must take into account that external manure storage may be simpler (no slurry, but dry manure) and that in vertical tiered cages more birds can be housed. Depending on inclusion of these cost factors, the extra investment costs vary and are reported to be between EUR 0.39 (I) and EUR 2.05 (NL) per bird place per year. Additional energy costs will vary, as will the annual costs. Annual costs have been reported of EUR 0.193 (I) and EUR 0.57 (NL) per bird place per year. Cost efficiencies vary widely. For a 60 % reduction compared with the reference system, its application in Italy would cost EUR 1.45 per kg NH₃ abated, whereas in the Netherlands it would cost EUR 42.70 per kg NH₃ abated.

Reference farms: In the Netherlands 14.598 million hens are kept in this system. The system with the NH₃ emission of 0.035 kg per laying hen per year was developed about 12 years ago. Nowadays, this system is implemented in most new buildings and reconstructions.



Schematic picture of a cage with forced (pneumatic) drying installation



Schematic picture of a design incorporating two cages and with a manure belt and a drying channel

3.1.4 Vertical tiered cages with manure belt with whisk forced air drying where manure is removed at least once a week to covered storage (BREF 4.5.1.5.2)

Description: This system has the same design principle as the previous system (3.1.3). A series of whisks are situated above the belt, with one whisk per set of two cages (back to back). Each whisk is operated by a connecting rod, which drives all the whisks in the row simultaneously, moving the air onto the manure on the belt. The difference from before is that the drying air is not collected from the outside, but is just the internal air moved over the manure belt. This can be an advantage because there is no need to preheat the air or to use heat exchangers, as is the case with air recirculators (subsequently there is also no dust clogging problems as on the exchangers or in the air ducts). The manure is removed from the house once a week, with a dry matter content of at least 50 %.

Achieved environmental benefits: The emission from this system is about 0.089 kg NH₃ per bird place per year (I). This represents a 40 % reduction in comparison with the reference system, with an emission level of 0.220 kg NH₃ per bird place per year (I).

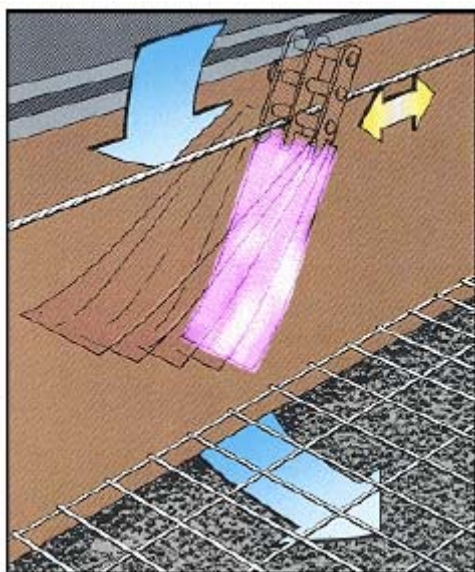
Cross-media effects: The energy consumption of moving the whisks is lower than the energy consumption of the perforated duct system. However, there is some noise associated with the whisk movement.

Operational data: As with the previous system (3.1.3), it is also possible to get low NH₃ emissions with this system. Because of the continuous air recirculation the climate in the house is good and the temperature throughout the house is uniform. Also, there appears to be less odour in the house in comparison with the previous technique.

Applicability: This system can be applied in new and existing buildings. It can be built in tiers, from 4 to 8. The whisk installation could possibly be added to an existing belt cage system which does not have drying equipment, but no practical example has been submitted.

Costs: Compared with the reference system, the extra investment is EUR 2.25 per bird place. The extra energy costs are 1.0 – 1.2 kWh per year per hen, which equates to 0.11 – 0.14 euros per year per bird place. The total extra costs (capital + running costs) are EUR 0.31 per bird place per year. This means, with a 60 % reduction of NH₃-emission compared with the reference, costs of EUR 2.32 per kg NH₃ abated.

Reference farms: The system is currently being implemented on some large poultry farms in Italy. Approximately 700000 to 800000 laying hens are kept in this system.



Principle of whisk-forced air drying

3.1.5 Vertical tiered cages with manure belt with improved forced air drying where the manure is removed from the house at least once a week to covered storage (BREF 4.5.1.5.3)

Description: The principle is as described in 3.1.3. The manure is removed from the house once every five days to a covered container that must be removed from the farm within two weeks. Drying manure in this system requires the installation of a forced drying system with a drying capacity of 0.7 m³ per laying hen per hour and an air temperature of 17 °C. The maximum drying period is 5 days, and the manure must have a dry matter content of at least 55 %.

Achieved environmental benefits: The NH₃ emission from this system is 0.010 kg NH₃ per laying hen-place per year (NL) to 0.067 kg NH₃ per laying hen-place per year (I).

Cross-media effects: Odour levels in the house are perceived to be relatively low. Noise levels are considered to be similar to that of the system described earlier in 3.1.3. A high input of energy is required to dry the manure compared with the other air drying systems, but this can be reduced by preheating the incoming air. Dust levels are lower than in the other housing systems.

Operational data: With this system it is possible to get very low NH₃ emissions from the housing. Where the air is preheated, the manure becomes drier and the climate in the cages close to the animals improves, also leading to better production results. In modern laying houses preheating the drying air is done with a heat exchanger, in which the outgoing drying air warms the incoming air.

Applicability: This system can be applied in new and existing buildings. It can be built in tiers, from 3 to 10. There is no information about existing belt-systems being additionally equipped with this drying system.

Costs: This system is a low-cost system aimed at sites with large numbers of birds wanting to make efficient use of the available space with high stocking densities. However, large differences in costs have been reported. The lower costs reported by Italy are partly due to the extra revenue generated by the higher egg prices which were applied to help offset the costs of applying the improved system. The extra investment compared to the reference system varies between EUR 0.65 (I) and EUR 2.50 (NL) per laying hen-place. Annual costs per laying hen per year vary between EUR 0.365 and 0.80 (including electricity costs). With a 70 – 88 % reduction of ammonia emission compared to the reference system, the cost efficiency varies between EUR 2.34 and 34.25 per kg NH₃ abated.

Reference farms: The system was developed in the late nineties. Currently, in the Netherlands about 2 million laying hens are kept in this system. Nowadays, these systems employing forced drying on the manure belts are implemented on large enterprises in new buildings, and in building conversions.

3.1.6 Vertical tiered cages with manure belt with drying tunnel over cages, after 24-36 hours, the manure is removed to covered storage (BREF 4.5.1.5.4)

Description: The design of the installation is similar to the previous air-dried belt systems in principle. The manure is collected on the belts under the cages and taken to one end of the row of cages. From here it is lifted up to drying belts within a drying tunnel above the cages, the drying tunnel running along the whole length of the row of cages. The manure is spread on the belts in the tunnel, where it dries. At the end of a complete run from one end of the tunnel to the other, the manure is discharged from each belt to the lowest belt inside the tunnel, which collects all the dried droppings and makes a last run to the opposite end. This action means that by the end of a full run the manure has a high dry matter content. The tunnel is ventilated by a centrifugal fan, which emits the air out of the roof through a chimney. The drying air is taken from inside the house, at the two opposite ends of the tunnel. The belts are moved every few minutes and the whole run inside the tunnel takes 24 – 36 hours.

Achieved environmental benefits: Ammonia emission has been reported to be 0.015 (NL) to 0.045 (I) kg NH₃ per bird place per year. The manure can reach a very high dry matter content of close to 80 %.

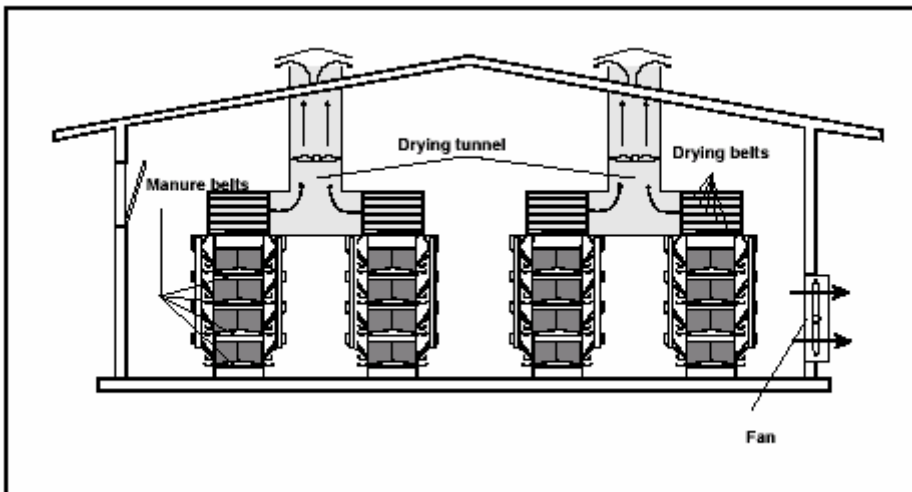
Cross-media effects: Energy is required for ventilating the drying tunnel. The actual energy input will depend on the size of the installation (number of cages) and the resistance to airflow in the tunnel itself. Further information is needed to assess how changes in the design and operation might affect the energy requirements. By drawing away the inside air, the level of odour is thought to be very low.

Operational data: This system is typically operated in combination with house ventilation. Both ventilation systems will have to be synchronised so as to avoid any interference, as this could affect the operation of the tunnel system.

Applicability: It has been applied to cage systems with 4 to 6 tiers. The refurbishing or conversion of existing cage systems has not been reported, but application in existing buildings will require adaptations to the roof to add chimneys to exhaust the drying air. The height of the chimneys will affect the fan capacity and the energy input. Also, external storage of the dried manure is required (containers or other).

Costs: Costs are reported from Italy. The extra investment is EUR 2.79 per bird place. The extra costs for energy are 2.0 – 2.5 kWh per year per hen, equalling EUR 0.23 – 0.28 per bird place per year. The total extra costs (capital + running costs) are EUR 0.48 per bird place per year. This means, that for a 80 % reduction of NH₃-emission compared to the reference system, EUR 2.74 per kg NH₃ abated.

Reference farms: In Italy, approximately 1 million laying hens are kept in this system.



Schematic picture of a drying tunnel over vertical tiered cages

3.1.7 Barn and free-range systems with deep litter system with forced air drying (BREF 4.5.2.1.2)

Description: This is based on the deep litter system for laying hens (described below) but here the ammonia emission is reduced by applying forced ventilation. Forced ventilation is applied through tubes that blow 1.2 m³ of air per bird place per hour at a temperature of 20 °C over the manure stored under the slats or over the manure being removed by the (aerated) belts.

(Deep litter system description: The layer house is a traditional building with respect to walls, roof and foundation. Thermally insulated poultry houses have forced ventilation; either windowless or with windows for natural daylight. Birds are kept in large groups with 2000 to 10000 bird places per housing facility. The air is replaced and emitted passively by natural ventilation or by forced ventilation with negative pressure. In accordance with EU Egg Marketing Standards currently in effect, at least one third of the floor area (concrete floor) must be covered with bedding (chopped straw or wood shavings used as litter material) and two thirds arranged as droppings (manure) pit. The pit is covered with slats that are mostly made of wood or artificial material (wire meshing or plastic lattice) and slightly raised. Laying nest, feed installation and the water supply are placed on the slats to keep the litter area dry. The manure is collected in a pit below the slats during the laying period (13 – 15 months). The pit is formed by the raised floor or can be sunk into the ground. Automatic supply of feed and drinking water, with long troughs or automatic round feeders (feeder pans) and nipple drinkers or round drinkers are installed above the pit area. Droppings are removed from the pit at the end of a given laying period; or intermittently, with the aid of (aerated) manure-belts. At least one third of the used-air volume stream is drawn off via droppings pit. Individual or community nests are provided for laying; automatic egg collection is also possible. Lighting programmes to influence performance/rate of lay and crude protein adapted feeding may be applied.)

Achieved environmental benefits: The application of forced ventilation and quick drying of the manure reduces emissions to 0.125 kg NH₃ per bird place per year for the pit storage. The ammonia reduction of this system is 60 % compared to the reference system (0.315 kg NH₃). Frequent removal with (aerated) manure belts can be expected to give even lower emission levels.

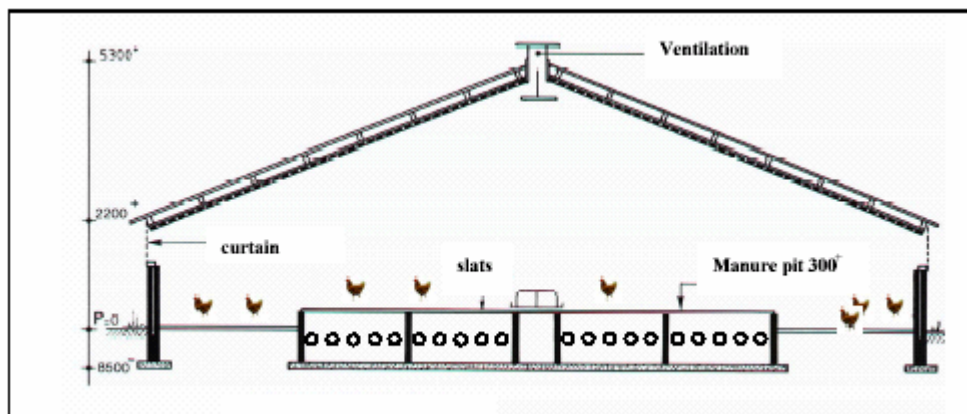
Cross-media effects: Reduced odour levels can be expected compared to the reference system. The energy input in this system is high, because a heating system must be installed to achieve the 20 °C temperature necessary in the tubes. Extra energy is also required to maintain the airflow. Air is drawn in through inlets in the sidewalls and through an open ridge construction in the roof.

Operational data: Management of this system is principally the same as of the reference deep litter design.

Applicability: The system can only be used in laying hen houses with enough space underneath the slats. Traditionally the manure pit has a depth of 80 cm, but when using this system it is necessary to add an extra 70 cm. The experience from farmers already using the deep floor system is that they like this type of system because it requires very little change to the traditional design.

Costs: Compared with the reference system, the extra investment costs are EUR 1.10 per bird place. The extra annual costs are EUR 0.17 per bird place. This means that with a 60 % ammonia reduction (0.315 to 0.125 kg NH₃), the cost is about EUR 5.78 per kg NH₃ abated.

Reference laying hen-places: This system is very new; only one farm (40000 laying hens) in the Netherlands uses this system and about 5 % of the farms in Germany. It is expected that application of this system will increase in the future.



Deep litter systems with forced drying via tubes under the slatted floor

3.1.8 Barn and free-range systems with deep litter system with perforated floor and forced air drying (BREF 4.5.2.1.3)

Description: The layer house is traditional (walls, roof, etc.) The ratio of litter to “slatted floor” is 30:70. The laying nest area is included in the slatted floor area. There is a perforated floor underneath the manure and the slats, which allows transportation of the air used to dry the manure on top of it. The maximum load of this perforated floor is 400 kg/m². The distance between the bottom of the pit and the perforated floor (air-channel) must be 10 cm. The perforated floor has a total area of air openings of 20 % of the surface area.

Achieved environmental benefits: It is possible to obtain a 65 % reduction in NH₃-emissions (0.110 kg compared to the 0.315 kg NH₃ per bird place per year of the reference system).

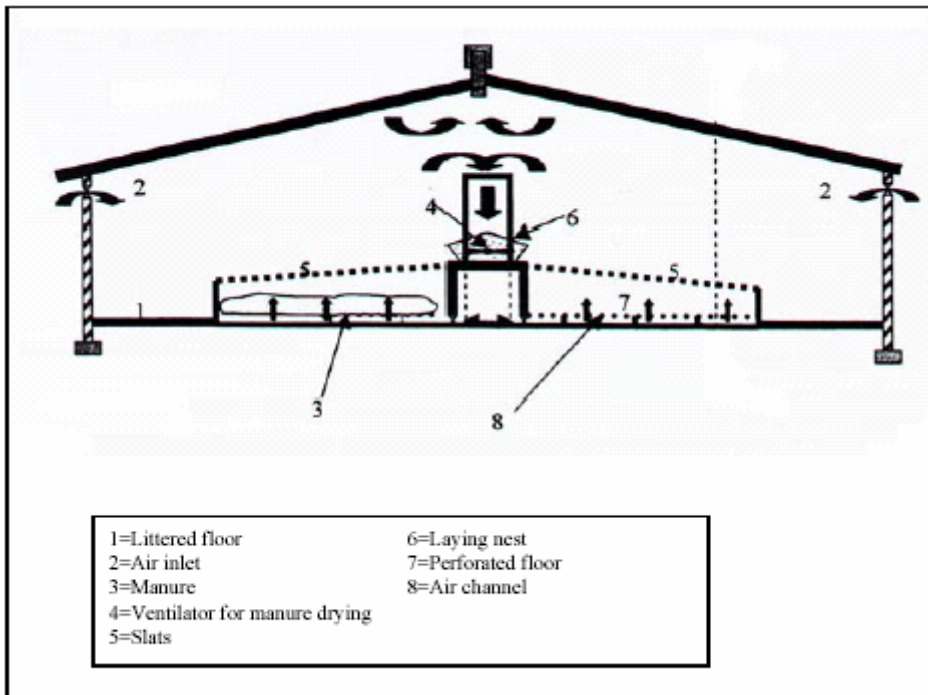
Cross-media effects: Higher energy input is required because of the forced ventilation.

Operational data: The layer droppings fall through the slats onto the perforated floor. At the beginning of the laying period the perforated floor is provided with a 4 cm thick bed of woodshavings. The (preheated) air is blown from beneath through the small openings in the perforated floor under the manure. To dry the manure properly, ventilators with a total capacity of 7 m³ air/hour at 90 Pascal are installed. The manure stays on the perforated floor for about 50 weeks (laying period) and is then taken out of the house. The minimum distance between the perforated floor and the slats is 80 cm. The manure is dried constantly by the continuous flow of air. The dry matter content of the manure is about 75 %. The farmer should protect himself with a face mask. The drinking facilities must be installed on top of the slats, but good design of the tubes should avoid loss of water.

Applicability: Application in new situations is more likely, but it could also be installed in existing houses, but at an additional cost.

Costs: Investment costs are EUR 1.20 per birdplace and annual costs are EUR 0.18 per bird.

Reference farms: In the Netherlands, about 10 farms (year 2001) are currently applying this system.



Deep litter system with perforated floor and forced manure drying

3.1.9 An aviary system with or without range and or outside scratching area (BREF 4.5.2.2)

Description: This poultry house is a construction with thermal insulation and forced ventilation, either windowless, or with windows for natural daylight and artificial light for applying lighting programmes; houses can be combined with range and outside scratching area. Birds are kept in large groups and enjoy freedom of movement over the entire house area. Housing space is subdivided into different functional areas (feeding and drinking, sleeping and resting, scratch area, egg laying area). The birds can use several house levels that allow for higher stocking densities compared to the commonly used floor regime (deep litter). Droppings are removed via manure belts into containers, or into a manure pit, or otherwise collected in a manure pit. Litter is spread onto a fixed concrete area. Feed (mostly feed chains) and drinking water (nipple or cup drinkers) are automatically supplied. Laying nests (individual or community nest design) have manual or automatic egg collection. Stocking density is maximised to 9 birds per usable m² or to 15.7 birds per ground surface (in m²), with houses accommodating between 2000 and 20000 birds (bird places).

Achieved environmental benefits: Data on ammonia emissions have only been reported by the Netherlands, with values of 0.09 kg NH₃ per bird place per year, which is 71 % less than the reference non-cage system. This emission reduction is related to the manure removal, where about 90 % of all the manure is removed by belts at a frequency of at least once a week. The other 10 % of the manure is removed from the litter area after one cycle.

Cross-media effects: When compared to the cage regime, a distinctly higher dust content in the in-house air is reported. This gives a higher stress effect on the mucous membranes of humans and animals. Energy requirements depend particularly on the ventilation and vary between 2.70 kWh per bird place per year for non-belt systems to 3.70 kWh per bird place per year for aerated manure belt systems.

Operational data: Hens enjoy more freedom of movement than their counterparts under cage management, but replacement pullets must come from aviary grower houses. Aviary systems are more bird-friendly than, by comparison, conventional floor management systems, since the hens' living space is more heavily structured. More favourable temperature conditions in winter are observed due to a higher stocking density. Feed conversion and the rate of lay are also better than in floor regimes. The available in-house space can be supplemented by providing an outside scratching area. However, the birds can have contact with faeces, which creates a hazard from intestinal parasites. Also, the system shows a higher percentage of soiled and/or "laid-away" eggs. Another negative effect is that having larger groups and introducing natural daylight also promotes aggressive bird behaviour and incidences of feather pecking and cannibalism are possible, resulting in a higher potential loss rate. Bird observation is more difficult and medication requirements tend to be higher.

Applicability: Aviary housing systems are still little used compared with cage or floor regimes, but a reasonable amount of practical experience has been gathered. Since there is no significant demand for

eggs from house-confined aviary systems, in Germany this housing system is currently only practised in combination with outdoor ranges.

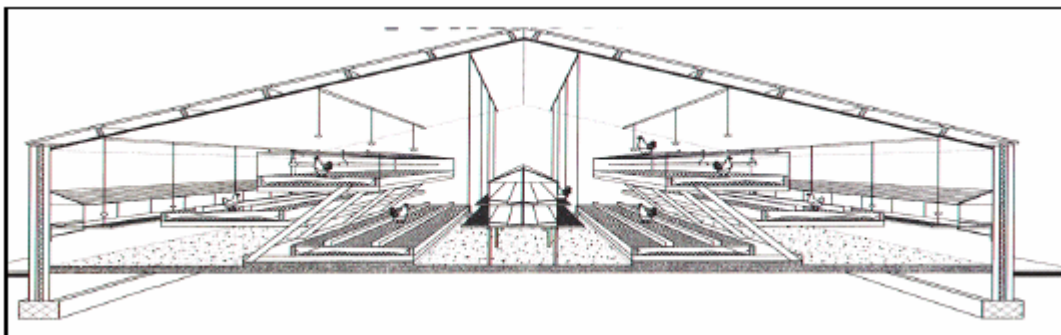
Costs: Costs for the design with aerated manure belt removal total EUR 16.5 to 22.0 per bird place per year:

- labour EUR 1.2 – 2 (at EUR 12.5/hr)
- capital investment EUR 2.4 – 5.6 (11 % annual cost: 5 % depreciation, 2.5 % repair and maintenance, 7 % interest)
- operating cost EUR 12.9 – 14.4 [124, Germany, 2001]

Total costs EUR 16.5 – 22.0

Driving force for implementation: The implementation of aviary systems may increase for animal welfare reasons. Another driving force might be the decision of the EC (Commission Regulation No 1651/2001) that, in order to indicate the farming method, no terms may be used on eggs other than 'free range', 'barn' or 'cage'.

Reference farms: In general, the number of houses with aviary systems is small. Data reported by the Netherlands show that about 3 % (649000) of the layers are kept in aviaries and on less than 1 % of the farms.



Schematic of an aviary system

3.2 Broilers and floor reared replacement pullets (Rule 2.3.3.13)

Naturally ventilated house with a fully littered floor and equipped with non-leaking drinking systems or a well-insulated fan ventilated house with a fully littered floor and equipped with non-leaking drinking systems (BREF 4.5.3)

The traditional housing of intensive broiler production is a simple closed building construction of concrete or wood with natural light or windowless with a light system, thermally insulated and force-ventilated. Buildings are also used that are constructed with open sidewalls (windows with jalousie-type curtains); forced ventilation (negative pressure principle) is applied by way of fans and air inlet valves. Open houses must be located so that they are freely exposed to a natural stream of air and are positioned at a right angle to the prevailing wind direction. Additional ventilating fans operate via ridge slots, and gable openings may apply. This is intended to provide the in-house broiler area with extra air circulation during hot spells in summer. Mesh wire screens along upper sidewalls keep wild birds out.

Closed buildings have oil- or gas-fired warm-air blowers for total room heating; radiant heaters are used for zonal heating in houses built for open-air ventilation. Artificial lighting and/or artificial/natural daylight combination lighting system are provided as required.

Broilers are kept on litter (chopped straw, wood shavings or shredded paper) spread over the entire house floor area which, in turn, is built as a solid concrete slab. Manure is removed at the end of each growing period. Automatic, height-adjustable feeding and drinking systems (mostly tube feeders with round feeder pans and nipple drinkers with drip water catch bowls) are applied. Crude protein-adapted feed is given. Broilers are kept at a stocking density of 18 to 24 birds per m². Stocking density is also measured in kg live weight/m² (e.g. in Finland), but this number is variable. New legislation is expected to limit the stocking density of broilers. Houses can stock between 20000 and 40000 birds.

Both for animal welfare reasons and to minimise ammonia emissions wet litter must be avoided. The dry matter content of the litter depends on:

- the drinking system

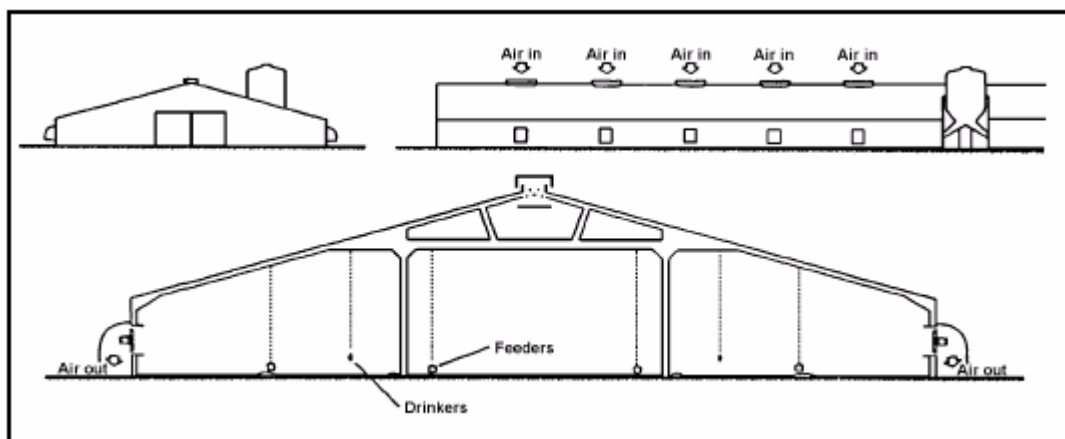
- length of the growing period
- the stocking density
- the use of floor insulation.

In the Netherlands a new housing technique was designed to avoid or minimise wet litter. In this improved design (known as VEA-system, the Dutch abbreviation for “broiler low emission housing”) attention is paid to the insulation of the building, to the drinking system (to avoid spillage) and to the application of wood shavings/sawdust. However, accurate measurements in fact show that both the traditional system and the VEA-system have the same ammonia emissions of 0.08 kg NH₃ per broiler place per year (NL).

The emission level 0.08 kg NH₃ per broiler place per year is considered as the reference level.

In the Netherlands, where a number of techniques have been developed, only a few new low-ammonia systems are being installed at the moment. All newly developed systems that are presented in this section originate from the Netherlands and have a forced drying system that blows air through a layer consisting of litter and droppings.

It is obvious that as the ventilation rate depends on the natural airflow, design of the house and both the air inlets and outlets is crucial. Energy consumption (and costs) is lower than with the fan-ventilated house.



Schematic cross-section of a commonly applied broiler house

3.3 Turkeys (Rule 2.3.3.15)

Naturally ventilated house with a fully littered floor and equipped with non-leaking drinking systems or a well-insulated fan ventilated house with a fully littered floor and equipped with non-leaking drinking systems (BREF 4.5.3)

The commonly applied turkey housing is a traditional housing construction, which is very similar to the housing of broilers (see 3.2 above for details). Turkeys are housed in closed, thermally insulated buildings with forced ventilation, or (more frequently) in open (outdoor-climate) houses with open sidewalls and jalousie-type curtains (unrestricted natural ventilation). Forced ventilation (negative pressure) is applied by fans and inlet valves. Free open-air ventilation is created via automatically controlled jalousies or wall-mounted inlet valves. Open houses are aligned at right angles to the prevailing wind direction and located in such a way as to be exposed to natural airflow. Additional ventilation is applied via ridge slots and gable openings. Radiant gas heaters are applied for heating.

Precautions are put in place to protect against emergencies like power cuts, extreme weather conditions or fire, as per unit a large number of birds will always be at risk. During peak summertime temperatures, additional measures are taken to minimise heat stress on the birds (by providing for larger-volume air change, operating extra fans for bird comfort in open houses, water fogging or roof sprinkling)

Wire meshing in the upper sidewall section is applied to keep wild birds out. A floor regime is operated with litter material (chopped straw, wood shavings) spread over the entire house floor area (built of concrete) with layers up to 9 – 12 inches deep. Manure removal and cleaning of the house takes place at the end of each respective growing period. All litter is removed by an excavator or frontloader. Litter replenishment is

applied as needed. Automatic height-adjustable round drinkers and feeders are applied during the growing/feeding period. Daylight length and light intensity can be controlled during brooding and, in closed houses, over the entire brooding/finishing period.

3.4 Ducks (Rule 2.3.3.17)

**Unrestricted naturally ventilated house or a well insulated fan ventilated house with a partly-slatted floor with impermeable drainage channels and effluent storage area or
A fully slatted floor with impermeable drainage channels and effluent storage area or
A fully littered floor with a water system positioned above a gully and covered drainage channels and effluent storage areas (BREF 2.2.3.2)**

Ducks are kept in housing, although in some Member States outdoor rearing is also allowed. There are three main housing systems for fattening of ducks:

- fully littered, with a water system positioned above a gully
- partly slatted/partly litter
- fully slatted.

The commonly applied duck house is a traditional housing system and is similar to the broiler house (see 3.2 above for details). It has a concrete floor that is covered with litter. The house is equipped with a ventilation system (natural or mechanical) and, depending on the climatic conditions, heating is applied.

Production cycles will vary between Member States. In Germany, the production cycle for duck meat production is divided into a growing period up to day 21 followed by a finishing period until day 47 – 49. Rearing and growing is done in separate stalls. Manure is removed and the stalls are cleaned and disinfected during a service period of about 5 to 7 days before they are stocked again. Stocking density is 20 kg live weight/m² accessible floor area in both phases, with accessible areas typically measuring 16 x 26 m for growing and 16 x 66 m for finishing. Thus, the growing stalls can house approximately 20000 young ducks and the finishing stalls about 6000 ducks.

Commonly applied is the fully littered system using wheat or barley straw or wood chips. The layer is usually not too thick because the manure of ducks is much wetter than that of chicken broilers. Slats, if applied, are usually of plastic-coated wire, wood or synthetic material.

Appendix 4 Protocol for sampling slurry and solid manures for analysis¹

4.1 Why correct sampling matters

The nutrient content of slurry can vary considerably within a store due to settlement and crusting. Similarly, the composition of solid manure in a heap can vary depending on the amount of bedding and losses of nutrients during storage.

If stored materials are to be analysed either in a laboratory or by a rapid on-farm method, it is important that the sample taken represents an 'average' of what is found in the store or heap.

4.2 General principles of sampling

It is important, where this is practical and safe, to take a number of samples. Take these from a range of positions within the store or heap, bulk them together, mix them and then take a representative sub-sample.

The final sample can be sent to the laboratory for analysis or tested with a slurry N meter or slurry hydrometer on-farm depending on whether information is needed to draw up a full Manure Management Plan, or as a check on earlier data once spreading is in progress.

4.3 Slurries

Take at least five sub-samples of 2 litres, pour into a larger container, stir thoroughly and pour a 2 litre sample immediately into a smaller clean container to provide the sample for analysis.

Above-ground stores

Ideally, slurry should be fully agitated and sub-samples taken from the reception pit. If this is not possible, and provided there is safe access from an operator's platform, the five sub-samples can be taken at a range of positions, using a weighted 2 litre container attached to a rope.

Below-ground pits

It may be possible to obtain sub-samples at various positions using a weighted container as above, but never enter the pit, as lethal gases may be present.

Sampling while spreading

If the tanker is fitted with a suitable valve, it may be possible to take five sub-samples from the stationary slurry tanker at intervals while field spreading is in progress. Or, trays placed in the field can be used to collect samples while the material is being spread.

4.4 Solid Manures

Take at least ten sub-samples of about 1kg each, taken as described below, and place on a clean, dry tray or sheet. Break up any lumps and thoroughly mix the sample. Then take a representative sample of around 2kg for analysis.

¹ Based on 'Managing Livestock Manures, Booklet 3: Spreading Systems for Slurries and Solid Manures'. MAFF/ADAS/IGER/SRI November 2000.

Manure Heaps

Provided the manure is dry and safe to walk on, identify at least ten locations which appear to be representative of the heap. Having cleared away any weathered material with a spade or fork, dig a hole approx 0.5m deep and take a 1kg sample from each point. Alternatively, take sub-samples from the face of the heap at various stages during spreading.

Sampling during spreading

Trays placed in the field can be used to collect samples while the material is being spread. Take care to avoid the possibility of injury from stones and other objects which may be flung out by the spreading mechanism.

4.5 Storage and Analysis

If you analyse slurry using an on-farm rapid method, do this immediately after sampling, making sure that the sample taken is well mixed.

If you send samples to a laboratory for analysis slurry should be dispatched in clean screw-topped 2 litre plastic containers. Leave at least 5cm of airspace to allow the sample to be shaken in the laboratory. For manures, use 500-gauge polythene bags and expel excess air from the bag before sealing.

Clearly label the samples on the outside of the container or bag and dispatch them immediately or within a maximum of seven days if kept in a refrigerator.

Note: Soil Test for Phosphorus – Please refer to the Nitrates Action Programme for details of the soil test appropriate for phosphorus.