



Pig Industry Good Practice Checklist

Reducing Odours from Pig
Production through the Application
of Best Available Techniques

Version 2
August 2013



What is the Pig Industry Good Practice Checklist?

The following document comprises general guidance and a list of potential options to be considered to help control odour on pig units in the event of a complaint and applied if appropriate on an individual farm basis. Odour management should be site specific - producers will need to identify elements applicable to their circumstances. **This is by no means a mandatory checklist and not all options will be relevant for every farm.**

How to use the checklist

The 'Pig Industry Good Practice Checklist' should be used in conjunction with the 'Code of Conduct for Addressing Odour Complaints Attributed to Pig and Poultry Farms' in the event of any odour complaint received by the farm operator/responsible person either directly or via the Regulator. The relevant key parties i.e. farm operator/owner/manager/contractor, Regulator, complainant and any other affected parties (where appropriate) should all agree to and sign the Code of Conduct to facilitate an acceptable and practical solution for all involved.

The Good Practice Checklist should then be completed on farm either by the farm operator/responsible person or by the Environment Agency in the event of any odour complaint. Each activity/action listed should be cross checked with actual on farm protocol and any activity/action not included, should be considered. Any actions resulting from the checklist exercise should be included within the on farm odour management plan (OMP).

Odours can arise at any stage of pig production but application of best practice can minimise the impact these odours have beyond the farm boundary. Farms with an Environmental Permit (Environmental Permitting Regulations or EPR or IPPC) must apply Best Available Techniques (BAT) to the production process. BAT is considered best

practice in order to minimise emissions and is a mandatory requirement for permitted units. Non permitted units however should investigate adopting BAT or be working towards the standard as a risk reduction strategy or as potential mitigation. BAT aims to minimise emissions but does not directly consider the impact of these emissions.

Best Available Techniques (BAT)

'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 protection 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".'

(Reference: Integrated Pollution Prevention and Control; Intensive farming. How to Comply, April 2006. Environment Agency)

'The concept of BAT for a farm means always applying good agricultural practice and nutritional measures together with BAT in housing design. Additionally, BAT in the reduction of water and energy use can also be relevant. Storage of manure and on-farm manure processing are sources of emissions where applying BAT will result in an important reduction in emissions. Even after applying nutritional measures and on-farm manure processing there will still be manure (i.e. treated manure) left that is normally spread on land. For this activity BAT includes management tools and choice of equipment.' **(Reference: IPPC BREF EC, July 2003 (chapter 5, page 274))**

Odour from housed pig production systems

Odour can arise from many different parts of the production process, the following are the five key areas for consideration, the contribution of each will be site specific.

1. Livestock
2. Feed, storage, management, preparation and feeding
3. Housing
4. Manure and slurry storage and management
5. Waste, skips and carcasses

As detailed within Environment Agency Guidance H4, **Odour Management**; whether or not odour emissions amount to serious pollution depends on a number of factors. There is no single method of reliably measuring or assessing odour pollution and any conclusion is best based on a number of pieces of evidence.

The **FIDOR** acronym is a useful reminder of the factors that will determine the degree of odour pollution

- Frequency of detection
- Intensity as perceived
- Duration of exposure
- Offensiveness
- Receptor sensitivity

Please refer to the complete document for further detail.

Please note; the FIDOL acronym may also be used where L stands for the Location (of receptors) – refer to Odour Guidance for Local Authorities, Defra, 2011 (publication no. PB13554)

This guidance document MUST follow the Environment Agency document:

- H4 Odour Management – How to comply with your environmental permit
(<http://publications.environment-agency.gov.uk/PDF/GEHO0411BTQM-E-E.pdf>)

It can be used in conjunction with the following Environment Agency documents;

- Technical Guidance Note IPPC SRG 6.02 (Farming); Odour Management at Intensive Livestock Installation
(http://www.environment-agency.gov.uk/static/documents/Business/manguidance_1056765.pdf)
- EPR 6.09 Sector Guidance Note; How to comply with your environmental permit for intensive farming (Appendices 1 – 6)
(<http://publications.environment-agency.gov.uk/PDF/GEHO0110BRSC-E-E.pdf>)
- Odour Guidance for Local Authorities; Defra, 2011 (publication no. PB13554)
(<http://www.defra.gov.uk/publications/2011/06/15/pb13554-odour-guidance-local-authority/>)

Furthermore please refer to the following documents for detailed background information;

- BREF document; Integrated Pollution Prevention and Control (IPPC) Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs, July 2003
(<http://eippcb.jrc.es/reference/irpp.html>)
- Protecting our Water, Soil and Air, A Code of Good Agricultural Practice for farmers, growers and land managers (Defra) 2009
(<http://www.defra.gov.uk/publications/files/pb13558-cogap-090202.pdf>)
- The 1998 Code of Good Agricultural Practice for the Protection of Air (Defra) (<http://adlib.eversite.co.uk/adlib/defra/content.aspx?id=0001L3890W.16NTBWNAEMEP8>)

Other useful links

<http://www.bpex.org.uk/environment-hub/>
<http://www.nfuonline.com/>
<http://www.npa-uk.org.uk/>
<http://www.environment-agency.gov.uk/>

Odour sources and possible actions to minimise odour; checklist

(Please note this list is representative and not comprehensive. All actions highlighted in blue are EPR Permit requirements (BAT) or considered to be best practice; all other actions should be considered and some may be deemed beyond current BAT)

Effects of diet on odour & ammonia emissions

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Feed composition is closely matched to pig's requirements. Aim for high feed protein utilisation through diets formulated to achieve high production efficiencies			Nitrogen containing compounds not utilised by the pig are excreted, these may be in the form of ammonia and its compounds and released as gases or can form other strong odorous gasses following chemical action or biological activity within housing or stores	
Sows are fed two diets (gestation and lactation)			As above	
Growing and finishing pigs; diet protein level and composition is reviewed regularly and changes made to these through the growing and finishing period (liquid or dry)			As above. Typically, 2 different diets either ad-lib dry or via a wet feed system will be employed	
Rations reviewed periodically (with professional nutritionist)			To achieve good performance	
Crude protein figures with all relevant diet formulation information available			To provide reassurance that excessive protein levels are not being fed and for review purposes	
Feed additives used			Enzymes and other additives can increase the availability of feeds to the gut and help reduce excretion of nitrogen containing compounds	

Manure Storage

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Observe wind direction when removing manure, once cropping/soil constraints accounted for			Increased odour emissions expected	
Remove FYM from site on a regular basis i.e. weekly			Removing potential odour source from unit	
Liquids not allowed to pond and stagnate within buildings or on yards, drainage to suitable store			Ponded manures and slurries can release odour, dry surfaces are less likely to do so	
FYM stacked in a way which allows rainwater to be shed rather than enter the heap			The drier the manure, the less ammonia and so less odour released	
Neighbours informed (where necessary) prior to any activity			Good relations and preparation	
Manure store covered			Covering manure stores may help prevent ingress of rain water and contribute to a reduction in odour through sheltering the manure from the effects of wind	
Manure/slurry store located away from sensitive receptors			Consider carefully the position and location of manure stores to minimise potential of odour to cause offence	

Slurry Storage

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Use of fixed or floating cover for slurry store(s)			Please follow link for further information: http://www.bpex.org.uk/environment-hub/pig-housing-development/SlurryStores.aspx	
Slurry stores designed and operated with effective emptying and or agitation functions			To try and ensure sludge and solids do not build-up at the bottom over time	
Slurry in store only agitated if necessary during emptying			Disturbance from mixing allows odorous gases to be released from the stored liquid	
Observe wind direction when slurry is removed, once cropping/soil constraints accounted for			Increased odour emissions expected	
Remove slurry from site on a regular basis i.e. weekly			Removing potential odour source from unit	
Unnecessary running of vacuum pumps avoided			Minimises generation of odour rich aerosols around yards or near sensitive receptors	
Slurry introduced beneath surface of the store			Try to minimise disturbing the slurry surface or creating fine odour carrying droplets	
Additives used to reduce odour			The use of additives to feed and or manures and slurries can reduce odours. Scientific evidence of efficacy should be sought before use	
Diffused air aeration used to reduce odour			Fine air bubbles can prevent the development of strong odour causing compounds and gases	
Use of slurry separators to reduce solids entering the slurry store. Allow solid fraction to compost			Organic solids such as undigested animal feed and straw provide a food for microbes which release odorous gases. Reducing their feed supply reduces their numbers and activity	
Waste food stuffs not allowed to enter long-term slurry stores			As above	
Neighbours informed (where necessary) prior to any activity			Good relations and preparation	

Cleanliness of yard areas

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Manure from all housing stored and loaded in the most effective way to minimise odour generated			Minimises unavoidable odour	
Yard surfaces (drains and concrete areas) properly maintained			To prevent liquids from ponding and facilitate effective drainage to appropriate collection and or treatment system(s)	
Yards and open area surfaces are organised to ensure effective separation of uncontaminated rainwater from polluting substances. All areas have effective drainage systems in place which avoid ponding of slurries and other liquids which may release strong odours. This can include the use of kerbs to prevent cross contamination and/or channel run-off to drains and stores			Minimises the surface area which may release odour	

All housing and management

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
An improvement plan has been prepared to identify emission reduction measures			To assist planning and prevention	
All pens and stock checked for cleanliness as part of daily welfare routines			Clear surfaces and pigs are less likely to emit strong odours	
All pens and buildings cleaned out in accordance with a written plan			Determine a method of work which minimises release of potentially offensive odours	
Temperature and humidity controlled automatically or manually with continuous or daily monitoring			Optimise the housed environment for the pig. Maintain lying and dunging patterns as intended by building design. Avoid excessive room temperatures which cause pigs to exhibit wallowing behaviour as dirty pigs tend to emit stronger odours than clean animals. All ventilation systems should be operated to achieve the optimum air quality conditions for the stage of production in all weather and seasonal conditions Control of minimum ventilation rates should be so as to avoid build-up of moisture (humidity) in the house. Ventilation should be appropriate to the age, weight and health of the animal. Upgraded or replacement ventilation systems should be designed to achieve the optimum air-quality conditions for the stage of production in all weather and seasonal conditions	
Pen and wall surfaces constructed from non-porous, smooth surfaces			To minimise adhesion of dung and dust and to facilitate easy cleaning	
Troughs and feeders constructed and arranged to minimise feed waste and prevent pigs from climbing in, or wallowing in them			Waste feed can be a source of odour	
Prevention of build-up of waste feed in front of feeders			As above	
Potentially odorous spillages (feed ingredients, manure/slurry etc.) cleaned up promptly			As above	
Stocking density maintained at or below levels set out in Defra Welfare Regulations			Consider if practical, if reducing stocking rate will result in better housing function which may have a positive outcome in reducing odour emissions	
Lying and dunging areas differentiated through implementation of good ventilation practice			Reducing the dirty surface area and keeping pigs cleans helps minimise odour	
Ensure all ventilation, sensors, controllers and equipment are correctly specified (e.g. fans are adequate) and functioning correctly (where appropriate)			Consider if improvements could create a better environment for the pigs, improve performance and reduce odour levels	
Buildings (including feed and water delivery) maintained on a regular basis			To ensure integrity and prevent water entering or emissions exiting	
Feeders and drinkers designed and maintained to prevent wastage and leaks			Wet surfaces and decaying feed are potential odour sources	

Solid floor (straw based) system management

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Pens well bedded and scraped out on a regular basis to an appropriate muck store or removed from farm. With deep bedding systems use sufficient straw to maintain clean upper surface			Please refer to comments re siting on manure stores. Covering manure stores may help prevent ingress of rain water and contribute to a reduction in odour through sheltering the manure from the effects of wind	
All scraped areas within buildings maintained and managed to facilitate removal of excreta and prevent ponding of liquid			Ponded slurry and wet manure become anaerobic and a potential source of strong odours. Animals can also become dirty and emit stronger odours.	
Internal floors and drains maintained and managed to facilitate removal of excreta and prevent ponding where appropriate			As above	
Sufficient bedding material used to ensure clean animals and to bind ammonia			As above	
Bedding material provided clean and dry and stored correctly to prevent wastage and deterioration			Poor quality bedding is not as absorbent	

Fully or partially slatted system management

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Slurry removed from buildings as frequently as possible to suitable store with a void always maintained beneath the slats			Slurry stored for long periods can become anaerobic. When the slurry level reaches just below the slats there can be an increase in ammonia permeating the slats into the room above	
Frequency of slurry removal and options to improve pen cleanliness reviewed on a regular basis			As above	
Slurry and drainage channels cleared of deposits			Accumulated solids in slurry pits and channels become anaerobic and increase the likelihood of strong odours being released	
Manure (in excess) not allowed to accumulate above slats			The slow moving air in the pen conducts odorous gases permeating from the slurry surface and these are exhausted externally as ventilated air leaves the building	
Technology employed to reduce biological activity in slurry i.e. cooling (heat recovery) or acid treatment			Reducing biological activity decreases the rate at which odorous compounds and gasses are produced	

Ventilation

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Position of exhaust air outlets designed to optimise dispersion to atmosphere			Review location of air outlets in older buildings	
Ventilation corresponds to animals requirements and is functioning correctly			Ventilation and heating control systems under constant review	
Buildings insulated and insulation is kept in good order			Well insulated buildings are generally cooler in the summer months. The ventilation system is more likely to work as designed meaning pigs stay clean and dirty surface areas are minimised	
Inlet air heated or cooled as appropriate to control internal relative humidity and to make ventilation more effective			Pre-conditioned air can aid effective ventilation. Cooled air can reduce the ventilation rate in hot weather and therefore reduce the volume of odorous exhaust air released from the buildings	

Cleaning out, C&D

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Enclosed dirty/wash water collection system			Collect dirty water effectively to avoid accumulations and pools becoming stagnant and anaerobic	
Yards and open area surfaces are organised to ensure effective separation of uncontaminated rainwater from polluting substances. All areas have effective drainage systems in place which avoid ponding of slurries and other liquids which may release strong odours. This can include the use of kerbs to prevent cross contamination and/or channel run-off to drains and stores			Minimises the surface area which may release odour	
Cleaning out occurs as soon as possible and in as shorter period as possible after destock			Prevents manures and other organic materials becoming anaerobic and a consequent increase in odour	
Storage tanks emptied on a regular basis			Prevents contents becoming anaerobic	
All surfaces cleaned where possible including those hard to reach			Reduces potential odour generating materials	

Manure spreading

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
FYM predominantly exported to other farms			For utilisation as soil conditioner and organic fertiliser	
When spreading odorous manure on arable land aim to incorporate as soon as possible within 24 hours			Reduces time fresh spread manure is exposed to the atmosphere	
Manure applied in accordance with suitable weather conditions and follows Defra Codes of Good Agricultural Practice			Reduces pollution risk	
Manure spread in accordance with NVZ regs where appropriate			Legal requirement	

Slurry spreading

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Slurry applied by tanker or umbilical system with low trajectory splash plate or boom, shallow or deep injector			Spreading of slurry can generate fine aerosols of odorous compounds which can be conducted via the wind. These can be produced by the impact of slurry on a hard surface such as the plate or ground and when a pressurised tanker is nearly empty. Applying slurry beneath or directly to the surface reduces air contact and consequent odour	
Slurry applied to growing crops where possible, all uncropped land cultivated within 12 hours of application			Cropped land with an open soil surface structure is more likely to absorb slurries quicker than hard stubbles or bare ground. The crop also acts as a barrier slowing air movement at ground level over the slurry and therefore slows down the rate of odour release	
Slurry applied in accordance with suitable weather conditions and follows Defra Code of Good Agricultural Practice			The Code outlines how odour release can be minimised through application of good practice	
Slurry spread in accordance with NVZ Regs where appropriate			Legal requirement	
Covered storage container used			Contains odour and is a legal requirement	

Animal carcasses - storage and removal

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Covered storage container used			Contains odour and is a legal requirement	
Storage container prevents any leakage			As above	
Storage container located away from sensitive receptors where possible			As above	
Carcasses disposed of promptly on-site via incinerator			Minimises the period that odour can be generated and increase	
Incinerator licensed and well maintained			Legal requirement to ensure efficient and correction operation	
Incinerator ash disposed of promptly and appropriately			Legal requirement	
If not incinerated on site, carcasses disposed of promptly via licensed fallen stock collector as frequently as possible			Minimises the period that odour can be generated and increase	

Feed storage

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Dry feeds and feed ingredients all stored in covered bins and hoppers or dry enclosed buildings			Prevents feed products getting wet and spoiling	
Liquid feed ingredients stored in covered tanks to minimise odour. Vents and pressure release valves checked to ensure they are working correctly and are not releasing odour containing gasses where they may cause a nuisance			Covered tanks reduce the rate of release of odour to the atmosphere. Vents and pressure relief valves should be located where any gasses released can be quickly dispersed in a way which minimises impacts for local receptors	

Feed preparation

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Pre prepared wet/dry feeds purchased (stored as above)			As above	
Enclosed milling, mixing and feed preparation with appropriate control measures in place. Feed stored as above			To minimise fugitive emissions of dust and odour to the external atmosphere	
All spillages cleaned up and disposed of promptly and appropriately (both delivered feed (liquid or dry) and own mill and mix)			As above	
Appropriate pest/rodent control employed			Reduces quantities of spoilt feed and accumulated piles or stores in inaccessible locations	

Feed distribution

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Feed distributed via sealed pipework (both liquid and dry)			Minimises opportunities for odour release	
Open surface of troughs/feeders kept to a minimum consistent with purpose in order to minimise exposed feed surface area			As above	
Feed distribution controlled			Prevents feed waste	
Leaks repaired quickly and any spills cleaned up			Prevents waste feed and decomposing feed odours	
Waste feed removed and not allowed to accumulate (liquid feed in particular)			As above	

Out loading of pigs to slaughter

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Pens cleaned out before loading				
Livestock trailer washdown areas and out loading pens are kept clean and well maintained with no ponding of effluents				

Dust (esp. as an odour vector)

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Unit relatively isolated therefore minimal risk of dust causing direct odour nuisance				
All dry feed ingredients are stored in covered hoppers/bins			Prevents transmission of odour emitting dusts	
Avoid accumulation of dust on surfaces			As above and prevents decomposing dust becoming anaerobic and a potential source of strong odours	

Monitoring

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Weather station installed and used. Maintained as per manufacturer's instructions			Monitoring weather data helps identify conditions which align with reported odour incidents and confirm that the farm is, or otherwise the potential source of the reported odour experienced	
Odour impact of all on-farm activities monitored constantly			Record keeping aids management and can help identify activities which need to be avoided either completely or at certain times and can aid decision making when developing plans to avoid repetition	

Contingency

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
List of both routine and occasional odorous activities and possible solutions prepared			Mitigation which can be implemented	

Odour complaints

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
All odour complaints recorded and investigated as to cause and possible solution			Management and prevention of repetition	
Any other local sources of odour investigated			Ensure the source of complaint is correctly identified so that the most appropriate actions can be taken	

Odour management plan (OMP)

Possible Actions to minimise odour	Farm check	OMP check	Explanation	Comments
Daily activities managed in accordance with OMP			OMP aims to minimise odour impacts from the farming activities	
Any other local sources of odour included			Helps deliver effective and efficient actions which prevent reoccurrence.	
OMP reviewed and dated in the event of any complaint and subsequently sent to the local EA Officer			Helps management of incidents and demonstrates a commitment to reduce the likelihood of reoccurrences	

General comments