ENVIRONMENTAL RESPONSIBILITY AND COMMERCIAL SUSTAINABILITY

PIG ENVIRONMENT PARTNERSHIP

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Pressure to comply with existing and impending rules can be overwhelming and BPEX is working with organisations including Defra, the Environment Agency (EA) and National Pig Association (NPA), to keep abreast of developments and provide technical support to help at farm level.

Optimising the environment in which pigs are kept is important for maximising productivity, health and welfare. Getting it right has a direct and positive effect on commercial success, and the beneficial environmental implications of this are of increasing importance, particularly in light of continuing developments in environmental legislation.

Environmental concerns are an important issue for all. The pig industry is embracing the challenges and seeking ways to present a responsible approach in order to compete competitively. In this way the pig industry can retain its position at the forefront of sustainable production.

The Pig Environment Partnership (PEP) is putting this philosophy into practice. Led by BPEX and the NPA, the partnership is bringing together producers, policy makers, regulators, researchers, and allied industries for a common purpose. A holistic approach to the environment is being developed and encouraged.

Each new piece of legislation or challenge cannot be taken in isolation. Barriers have to be broken down; each party's position and aspirations understood, and only then can they really work together. Environmental goals will only be achieved in parallel with business improvement.

Central in implementing the PEP will be a knowledge hub. Currently, information is available, but often time consuming and difficult to access, and therefore not used. The knowledge hub will seek to link information to user. Understanding and knowledge are key to stimulating culture change; and this is being integrated into the BPEX training strategy.

Where the pig industry is successful in achieving positive change for good, this should be recognised both by the public and in the market place.

PEP is an extension of BPEX's work in the environmental field with work continuing to assist the industry in matters such as diffuse pollution, IPPC, energy efficiency and climate change.

Carbon footprint

Life Cycle Assessment (LCA) is the tool used for estimating environmental burdens and contributions from different activities. Output is usually expressed as global warming potential over 100 years in grams of carbon dioxide equivalents (gCO_2e). The principal gases released by agricultural activity are Carbon Dioxide, Methane and Nitrous Oxide, which have CO_2 equivalent values of 1, 23 and 296 respectively. Thus management of manures and slurries, in particular reducing nitrous oxide emissions, has a very significant effect on the overall impact of pork production. Defra and BPEX-funded studies into agricultural production have placed pig meat in a favourable position compared to other livestock sectors (with the exception of poultry). LCA is helping the industry to highlight the contribution that the pig industry can make, especially through re-cycling of co-products, utilisation of plant nutrients and as a provider of feedstocks for renewable energy production.

Carbon footprint claims are being used to gain market share. BPEX funding priorities include:

- Establishing the UK position against our competitors
- Identifying those key components offering the largest scope for improvement
- Recognising weaknesses so they may be addressed

A number of different methodologies for estimating carbon footprint exist, making direct result comparisons difficult and potentially misleading. Key issues and differences include defining boundaries, identifying start and end points, treatment of co-products, and dealing with soil-derived nitrous oxide. BPEX is working with Cranfield and Aarhus Universities towards harmonisation of approaches.

Defra has recognised this issue and is sponsoring the development of a Publicly Available Specification (PAS) that will outline procedures, methodology and how to deal with issues such as boundaries and uncertainties. The intention is for this to be available for use during 2008, and then develop it into a British Standards Institution (BSI) and ultimately an International (ISO) Standard. This work is recognised as being world-leading and BPEX is participating in several areas of its development.

Integrated Pollution Prevention and Control

The Pollution Prevention and Control (IPPC) Regulations enforce the EC Integrated Pollution Prevention and Control Directive. IPPC aims to reduce emissions through application of Best Available Techniques (BAT) and efficient use of resources.

Three pollutants from livestock production systems - ammonia, phosphorus and dust - receive particular attention.

The legislative emphasis is on the environmental impact of emissions to the environment from pig production processes, with IPPC rules designed to prevent or reduce pollution at source.

IPPC Permits

By the end of January 2008 the majority of the 179 permits that had been applied for by operators of pig farms had been issued by the Environment Agency. The Environment Agency (EA) will concentrate its regulatory effort for 2008 on completing inspection visits to permitted farms and working with the operators to identify weaknesses in facilities or procedures and agree timescales for improvement works.

Farm operators have to prepare written Improvement Plans for bringing buildings and facilities up to standards for BAT, and complete a drainage review within 12 months of their permit being issued. BPEX has assisted the EA in developing their guidance notes.

Annually, each operator has to submit measured or estimated quantities of pollutants released or produced by the farm to the EA. In the case of pig farms, these principally include ammonia, methane and wastes that are not recovered on the farm. A model template produced by BPEX provides guidance on completing this task efficiently and can be found on the website:
www.bpex.org/technical/tech2/environ/default.asp

IPPC and Ammonia

The Habitats Directive requires protection of sites with European nature conservation status: Natura 2000 sites. There is a requirement by regulators to ensure ammonia and dust emissions from permitted farms will not have a negative impact upon these sensitive sites. Where there is a potential for harm, the EA is unable to issue a PPC permit without applying clauses known as Improvement Conditions, requiring action to reduce ammonia emissions.

There are two relevant environmental standards for ammonia, Critical Level and Critical Load. Critical Level is the annual average air concentration of a pollutant below which sensitive habitats should not be affected. Critical Load is the annual amount of the pollutant that can be deposited over a specific area in a year. Below this level, sensitive habitats should not be affected; it is often expressed as $kgNm^{-2}yr^{-1}$.

Critical loads and levels are used by the United Nations Economic Commission for Europe (UNECE) to set targets for acid rain and the effects of nitrogen on sensitive ecosystems. Critical levels of key pollutants, including ammonia are proposed by a UNECE working group of international experts.

During 2007, this group recommended reductions in the Critical Level for ammonia.

Atmospheric dispersion modelling - carried out by the EA as part of the permitting process - identified a number of pig units that are potentially exceeding the Ammonia Critical Level at nearby Habitat sites. Permits for these farms include Improvement Conditions with timescales. The operators have to verify the information and determine what improvements will need to be made in order to reduce ammonia emissions to the required level. This will often need expert assistance.

In localities where there are high concentrations of atmospheric ammonia, enterprise expansion or the construction of new facilities may not be granted approval if the estimated additional burden may cause harm to sensitive habitats. This may also be the case for any livestock farm regardless of size, so the implications are considerable. New housing, manure or slurry stores and feeding systems should therefore include best practice measures to limit ammonia emissions, for example being able to change diet at key stages in the production cycle, covering slurry stores or minimising the surface area of slurry channels. There will also be a positive outcome for the efficient rearing of the pigs if the atmosphere within buildings is improved.

IPPC in the future

A review of IPPC for the European Community, considered the effectiveness of the legislation including the livestock place number thresholds and the possible inclusion of cattle. This concluded that there would be little environmental benefit from reducing the threshold, as there is much existing legislation capable of delivering similar outcomes when applied in combination. The Commission has since published proposals for revising the IPPC Directive, including threshold reductions for different classes of poultry, but not pigs.

Consultations

During 2007 Defra released three inter-dependant consultations aimed at reducing agricultural pollution. These were: Nitrate Vulnerable Zones; Diffuse Sources of Water Pollution; and a new Code of Good agricultural practice to protect water, soil and air quality.

Diffuse water pollution

The improvement of water quality requires solutions without over-regulation. The UK pig industry is doing much to lead British agriculture in the area of sustainability to give better economic performance with environmental benefits.

Diffuse water pollution arises from many sources that may be small and relatively insignificant on their own, but collectively impact heavily on the environment. Pollution agents include nitrates and phosphates that leach into drainage and surface runoff waters, as well as phosphates attached to eroded soil, silt or organic matter.

Nitrate Vulnerable Zone Action Programme

Defra maintains that the results of its water quality monitoring programme continue to show that nitrate levels in many, but not all, ground waters and some surface water still demonstrate a rising trend.

The EC has determined that the existing Action Programme (AP) introduced in 2001 is not a correct implementation of the Nitrates Directive and therefore the AP must be amended in several key areas; these have a number of significant implications for the pig sector. There is widespread concern that some of these will force a number of producers to reconsider their long-term commitment to the industry.

The revised rules were scheduled to take effect from 6 April 2008 but are now expected later in the year. For a number of the measures, it is proposed that farmers will have two years to make the necessary changes before having to comply in full.

Key changes include:

- Increasing the extent of the zones to at least 70% of farmed land area in England
- Reducing the whole farm limit to 170 kg/ha of total nitrogen from livestock
- Requiring at least 26 weeks slurry storage capacity on pig farms
- Closed periods applying to all soil types, with a maximum of 5.5 months, length to be determined by soil type and climatic region
- A minimum nitrogen efficiency of 25% rising to 45% for spreading pig slurry
- A requirement to implement nutrient planning and risk assessment to all land receiving nitrogen either as fertiliser of organic manure

The final rules may differ from those proposed as a result of information submitted by consultees and parliamentary debate. The new proposals will, for the farmers affected, result in increased operating costs, administration and possible additional capital investment. BPEX recognises the pig industry's need for technical support, including developing a better understanding of nutrient management in order to implement the final rules.

Photograph kindly supplied by North Wyke Research

Water Framework Directive

Forming part of the Government's response to the Water Framework Directive (WFD), the protection of waters against pollution from agriculture consultation was largely concerned with measures to reduce phosphate pollution and faecal indicator organisms, both of which are associated with livestock manures in surface waters.

Where water quality objectives in river catchment basins are not going to be met within the timescale of the WFD it is proposed that action will be required.

Proposals presented include the possible introduction of Water Protection Zones (WPZs) using the Water Resources Act 1991. The objective of a WPZ is to restrict or prohibit activities that could cause water pollution within a particular area. The legislation may include the provision to 'require' a polluter to undertake activities to address diffuse water pollution. The implementation of such legislation could have serious implications for parts of the pig industry including outdoor production. BPEX is monitoring the situation and will respond to the need in helping producers understand the implications and solutions available to them helping to keep their businesses competitive. The proposals present challenges to the industry, for example loss of phosphate from soils through erosion and leaching results in poor water quality, this has been highlighted as an issue in parts of East Anglia. BPEX work on feeding and soil management is already addressing these.

BPEX works with Catchment Sensitive Farming Officers (CSFOs) and participated in their training through direct contact and addressing their national conference on topics such as dietary protein and soil management for outdoor pigs.

Code of good agricultural practice to protect water, soil and air quality

This new reference document will replace the three existing separate codes, Air, Water and Soil with updated information and advice making them more relevant to today's farmers. It will become part of the Nitrate Vulnerable Zone Action programme. Although not a statutory document in itself, parts will be, under the Water Resources Act 1991.

Farm waste management

New rules applying to agricultural wastes were introduced during 2006 with phased implementation to 15 May 2007. Additional rules for Hazardous Waste came into force also on 15 May 2007.

BPEX has been working to help producers be aware of their obligations and understand what constitutes 'Hazardous Waste':

Animal Health products	Lead acid batteries
Unused and residual medicines	Brake fluids
Discarded/damaged treatment guns	Waste oils
Syringes/needles	Antifreeze
Asbestos (all forms)	Agrochemical concentrate
Fluorescent light tubes	

A BPEX representative sits on the Agricultural Waste Stakeholders' Forum (AWSF). The AWSF was established in autumn 2002 and includes representatives from the Environment Agency, Defra, the National Farmers Union and a range of other organisations with interests in the agricultural industry. The AWSF meets every six months to identify and tackle issues with the new waste management controls in agriculture. The AWSF website is updated regularly:
www.environment-agency.gov.uk/commondata/acrobat/faq_1449712.pdf

Climate change levy

Pig producers are able to claim a rebate of the Climate Change Levy (CCL) paid as part of their electricity, LPG, gas and coal bills, in exchange for agreeing to reduce fuel consumption per unit of production output.

The CCL rebate scheme management changed during 2007 and a new phase in its development has started. There is a strong focus on pro-active energy management, recognising where improvements can be made to achieve the scheme's targets. Producers are gaining benefits from participating beyond the primary incentive of monetary savings.

Anaerobic digestion

Anaerobic digestion (AD) is seen as offering a sustainable solution to waste and energy needs. Anaerobic digestion of organic substances is entering a new phase of development in the UK and a number of pig producers are well placed to reap the rewards on offer.

Anaerobic digestor

Anaerobic digestion:

- Utilises waste, preventing uncontrolled methane (greenhouse gas) emissions
- Generating heat and power from renewable resources
- Provides plant nutrients substituting manufactured fertilisers

Pig production and AD are natural partners, with pigs providing a steady stream of consistent organic substrate (slurry) for the digestion process. The AD process generates biogas; this is converted to power, usually electricity, in a Combined Heat and Power (CHP) Plant. Some of the heat produced is used to maintain the digestion process; the surplus can be used for piggery, and also for sale.

Electricity that is sold from anaerobic digestion is eligible for Renewable Obligation Certificates (ROCs). It is expected that AD generators will be able to claim two ROCs for each mega-watt-hour (MWh) of electricity generated, considerably improving commercial viability.

The addition of other substrates boosts the biogas yield from the slurry; other materials may include specially produced biomass or organic wastes from places such as food factories or domestic premises. Importation of waste is another revenue stream for the operator.

The digestate, the end liquid product of AD, is a source of plant nutrients; the availability of these is improved compared to raw pig slurry. It is also relatively odourless and the digestion process kills weed seeds and pathogens.

AD is seen as a sustainable solution to energy needs and Defra is keen to promote uptake. BPEX participated in a workshop in autumn 2007 exploring how this uptake may be facilitated and looking at the drawbacks and benefits. Ultimately the sector must be able to stand on its own, but some pump priming is required. This is being developed by the Regional Development Agencies and Defra. BPEX is committed to assisting those pig producers who wish to become involved.

BPEX Pig Technologist Nigel Penlington is available for technical support on environmental issues. To contact call ***01908 844734***, or ***www.bpex.org.uk*** for more information.