

Industry Sector:
Piggeries
May 2005

Compliance Performance Report



Department of
Environment and Conservation (NSW)

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In September 2003, the Environment Protection Authority (EPA) became a part of the NSW Department of Environment and Conservation (DEC).

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EXECUTIVE SUMMARY

The Environment Protection Authority (EPA) is a statutory body with specific powers under environment protection legislation. In September 2003, the EPA became a part of the NSW Department of Environment and Conservation (DEC).

As part of its industry sector based Compliance Audit Program, the Environment Protection Authority (EPA) which is now part of DEC conducted compliance audits at 27 licensed piggeries in NSW. The objective of each audit was to assess the compliance of the enterprise with the statutory instruments issued to the premises under environmental legislation administered by the EPA. Another objective of the audit was to outline a program of follow-up action needed to address non-compliances and improve environmental performance. This report is a collation of these audit findings. It provides an insight into the industry sector's overall compliance performance and a summary of other issues of environmental concern identified through 'further observations' during the audits.

The procedures and protocols for conducting each of the audits within the sector are described in the *EPA Compliance Audit Handbook* (EPA 1997). Assessment of compliance at each premise was undertaken by a detailed site inspection, together with a review of records and documentation relating to the premises. Officers of the EPA carried out the audit inspections between April and October 2003.

Of the 61 piggeries in NSW issued with Environment Protection Licences under the *Protection of the Environment Operations Act 1997* (POEO Act), 27 were audited. As the audited premises represent 44% of Environment Protection Licences issued to piggeries, it is considered likely that issues identified in this report are generally typical of issues within the whole industry sector.

Based on the audits, it has been identified that the principal areas where the industry could improve its compliance and environmental performance are:

- **Effluent management** – by managing waste water collection systems and treatment ponds to ensure that effluent is contained and treated competently.
- **Irrigation area management** – by implementing monitoring measures to check for the sustainability of effluent application rates and to ensure that the risk of environmental harm is minimised.
- **Containment measures for point source pollutants (fuels and herbicides)** – by ensuring that all chemicals are stored in a manner to minimise the risk of environmental harm if a leak occurs.
- **Waste management** – by ensuring that waste generated is stored and disposed of in an environmentally acceptable manner (carcasses, solid waste, sludges, litter etc).
- **Monitoring and recording requirements** – by implementing systems to ensure that all monitoring and recording requirements are met.

There were also notable practices observed during the audit inspections that contributed to competent environmental performance.

These practices included:

- extensive environmental monitoring programs to assist management in operating the piggery in an environmentally sustainable manner (i.e. for effluent management and its reuse on utilisation areas)
- regular cleaning of pig sheds to prevent manure build up and the generation of excessive odours
- storing of solid waste (spent deep litter bedding and sludges) on impermeable pads with any leachate generated collected and directed to treatment ponds
- implementation of an odour management plan. This included the instigation of weather monitoring and operating procedures that take weather conditions into account, odour monitoring (at the boundaries and at any potentially affected neighbours) and regular community consultation.

Having completed the compliance audits and having provided individual audited licensees with compliance audit reports, DEC is carrying out a systematic and rigorous process of follow-up action programs to ensure that the licensees of audited sites address all non-compliances reported. DEC will also ensure that the issues identified at those premises that were not audited as part of the sector audit program are also being addressed.

DEC will also use the findings of this sector report to review how best its resources may be channelled to guide industry in addressing the issues identified in this report. This will include considering the use of regulatory tools such as licence conditions and enforcement, and additional tools such as policy documents, education, consultation and negotiation.

It is also expected that the report will be of benefit to the piggery industry in understanding and managing the environmental risks involved in operating piggeries.

The EPA, together with Australian Pork Limited and Meat and Livestock Australia, has developed indicators of sustainability for the reuse of effluent and solid by-products from piggeries and cattle feedlots. A resource manual (Eugene McGahan and Robyn Tucker 2003) has been produced that includes tools for producers to help evaluate and demonstrate the sustainability of their operations.

INTRODUCTION

The Environment Protection Authority (EPA) is a statutory body with specific powers under environment protection legislation. In September 2003, the EPA became a part of the NSW Department of Environment and Conservation (DEC).

Purpose of this report

This report presents the key findings of compliance audits carried out on a representative sample of premises within the piggery industry sector in NSW. The audits were undertaken through the Industry Sector Compliance Audit program on piggeries that are regulated through statutory instruments issued under environmental legislation administered by the Environment Protection Authority (EPA).

DEC expects that the piggery industry sector will use this report to:

- identify areas in which it can improve its overall level of compliance and improve its environmental performance
- improve the environmental performance of individual premises.

To assist with this, DEC will:

- present the findings of the Industry Sector Compliance Audit Program to relevant peak industry groups
- consider the issues identified by the audits that were prevalent across the industry, with input from relevant stakeholders.

This report has been prepared for the purpose described and no responsibility is accepted for its use in any other context or for any other purpose.

Selection of industry sector

Industry sectors targeted in DEC's Industry Sector Compliance Audit Program are chosen on the basis of an assessment of community and environmental concerns and EPA corporate objectives and strategies.

Individual premises within the industry sector are selected for audit in consultation with EPA regional offices, with the aim of obtaining a representative sample of the sector.

In NSW 27 (44%) piggeries issued with Environment Protection Licences under the *Protection of the Environment Operations Act 1997* (POEO Act) were audited. A description of the audited premises is provided on page 3.

Audit methodology

EPA compliance audit inspections were undertaken at selected premises within the piggery industry sector between April and October 2003. Each audit was carried out in accordance with the procedures and protocols in the *EPA Compliance Audit Handbook* (available from Pollution Line: 131 555).

The objectives of each audit were to determine whether each enterprise had the appropriate statutory instruments required under the POEO Act and to determine if the enterprise was complying with all licensing requirements of the Act. The scope of the audits was limited to an examination of activities undertaken at the licensed premises at the time of the audits.

Audit findings were based on evidence obtained during discussions with site personnel, examination of documentation provided by the licensee and/or contained on EPA files, together with observations made during the audit inspection.

The findings of each audit were presented to the enterprise as an individual compliance audit report. The reports included a plan of action in relation to 'non-compliances', with a target date for completion of each action. The audit report also included 'further observations' which are made when an issue of environmental concern that does not strictly relate to the scope of the audit or assessment of compliance is observed.

EPA staff follow-up on compliance audits to ensure that the enterprise is implementing the actions required of it in the report. The EPA has a systematic and rigorous monitoring program that tracks these follow-up actions to ensure that these are completed by the licensee.

The findings presented in this report are a collation of the findings presented in the individual compliance audit reports.

Individual compliance audit reports are publicly available in the DEC Library at Level 15, 59-61 Goulburn Street, Sydney.

Description of industry sector

There are approximately 200 piggeries of varying sizes in NSW (NSW Farmers Association 2005). The EPA currently licences 61 of these premises as the size of their operation (as detailed in Schedule 1 of the POEO Act 1997) is over the licensing threshold size and requires them to hold a licence (numbers as of September 2004).

Of all the Australian states, NSW is by far the largest producer and exporter of pork and pork products. In 2002 the NSW piggeries sector was valued at \$625 million and employed nearly 8000 people industry wide (NSW Farmers Association 2003)

Piggeries have traditionally been 'farrow to finish' type piggeries, where sows give birth on site and the offspring housed until they are of a marketable size for slaughter (which is usually around 22 weeks). There is a general trend toward more specialist producer piggeries (i.e. breeder piggeries and associated rearing piggeries) and fewer larger piggeries. Grower pigs are contracted out to other farms for 'finishing off' before slaughter.

There are two types of pig housing structures that are predominant in the industry. They are the 'conventional' housing sheds with slatted floors and wastes flushed to a central system and the 'deep litter' sheds (with a straw type bedding). Conventional housing has predominated in the industry until relatively recently when the deep litter sheds emerged. Some piggeries have mixtures of both type of pig housing on site. Birthing predominantly takes place in the conventional type sheds.

'Conventional' pig housing consists of long rectangular sheds divided into units to separate different aged stock. The floors are partially or fully slatted so that waste can fall through the gaps and be flushed. The sheds are divided into pens with the feeding devices at one end. The pens are hosed out at regular intervals. The process of flushing away wastes typically creates a large volume of effluent that has to be disposed of. The waste water is usually directed to a central sump and then to a screening system to remove solids. The screened solids may be composted on site and applied to land. The waste water is then directed to one or more ponds for further treatment. The effluent in the final ponds may be left to evaporate (particularly in drier climates) or applied to utilisation areas for beneficial reuse.

The 'deep litter' sheds have a layer of bedding that is kept at a depth suitable for comfort and for absorbing excreta. The bedding comprises material such as straw, rice hulls or saw dust to absorb the manure wastes and spilt drinking water. Spent bedding matter is usually removed and disposed of when each batch of pigs is cleared from the sheds usually after several weeks residency. This method eliminates the need for regular hosing of sheds and therefore minimises water use. The floors may be hosed out for cleaning as each batch of pigs is removed. The spent bedding may be either composted on or off site and incorporated into utilisation areas so that the nutrients can be beneficially reused. This type of housing is not used extensively in the northern, humid climates as they tend to get too hot for the pigs

The environment within the piggery, is critically important to pig welfare and growth. It is necessary for young pigs to be kept warm in winter and, older pigs in particular, cool in summer. It is therefore crucial for the sheds to have good insulation, to protect against both heat and cold, as well as good ventilation.

Pens and stocking density vary with the age of the pig. Intensive piggeries are designed to produce good quality animals of marketable size in a relatively short time period.

There are numerous external factors that can adversely affect the efficiency and profitability of operating a piggery, including droughts, increasing feed grain prices, inability to secure a continued supply of grain and changes to import regulations to allow more foreign pork product imports.

Scheduled activity

Premises where pig production is undertaken and fall within the description of an activity provided by Schedule 1 of the POEO Act, and are conducted above the specified threshold, must hold an Environment Protection Licence authorising the carrying out of the activity at the premises.

In Schedule 1, piggeries are referred to as:

Livestock intensive industries being:

- *piggeries that are intended to accommodate more than 2000 pigs or 200 breeding sows.*

Statutory instruments issued to the enterprises

All of the 27 audited premises held Environment Protection Licences issued under the POEO Act for the Scheduled activity of 'Livestock intensive industries – Piggeries'.

In addition to the licensed activity of 'Piggeries', four of the premises audited were also licensed to undertake the Scheduled activity of 'Agricultural processing' and two for 'Composting and other related activities'.

Description of the audited premises

The EPA currently licences 61 premises in NSW as piggeries under the POEO Act (as of September 2004). As a representative sample of the industry sector 27 of these premises (44%) were selected for auditing. Details of the individual premises audited are listed in Appendix A.

Two-thirds of the piggeries audited were traditional 'farrow to finish' piggeries. The remaining were either breeder piggeries and provided stock for other piggeries to grow out or were piggeries contracted to 'finish off' pigs.

Approximately half of the audited premises had at least one 'deep litter' shed on site and the other half consisted of the conventional type of housing with slatted floors and a flushing system. Of the piggeries that had a flushing system, 60% recycled treated waste water for hosing down and flushing away of wastes.

Three-quarters of the conventional piggeries had two or more ponds to treat the waste water generated. The remainder had at least one treatment pond (except for one small piggery that directly applied a slurry of waste water to their utilisation area). Most audited piggeries apply their waste water to their own irrigation areas where crops are grown or livestock graze. Five premises had a system of ponds from which waste water was allowed to evaporate and the accumulated sludge removed, and in some instances the slurry was injected into the land.

Spent bedding litter from deep litter sheds are stored and composted on site for a period of time and then applied to the piggeries' own land or transported off site for beneficial reuse. The majority of the piggeries buried or composted carcasses on site. A small percentage refrigerated and transported carcasses off site for rendering.

The scale of operation of the premises audited is listed in Table 1.

Table 1: Scales of operation of premises audited

Scale of facility Accommodation capacity of piggery (in tonnes of pig live weight) *	No. of premises audited
0-250	13 (out of 32)
250-500	8 (out of 17)
>500	6 (out of 12)

* For the purposes of calculating live weight for this classification the licensee can use the actual live weight or use a formula prescribed in the POEO (General) Regulation 1998.

DEC regions (as at March 2004) are shown in Figure 1. Details of the number of piggeries licensed in each region, and the number of audits carried out in each region, are shown in Table 2.

Figure 1: DEC regions (as at March 2004)



Table 2: Number of premises licensed as piggeries and premises audited in each region (as at March 2004)

DEC region	No. of premises licensed	No. of premises audited
Central West	5	2
Hunter	1	0
North Coast	6	3
Northern Tablelands	11	5
South Coast	1	1
Southern Tablelands	12	5
South West	22	8
Sydney	3	3
Total	61	27

Potential environmental issues and key methods of pollution control

The waste generated at piggeries needs to be managed competently to help ensure that the potential for environmental harm is minimised. The two different types of housing that predominate in the industry produce different waste streams that are managed in different ways. How this waste is managed is important to ensure environmental impact is minimised. The different wastes generated are described below.

Disposal of solid organic waste/sludge from conventional pig housing

Solid organic waste accumulates in the waste water produced at piggeries. Solid material (manure etc) can be screened from the waste water stream prior to it entering any ponds. Settled sludge may also be removed from the base of treatment ponds after a period of time. This solid waste/sludge is highly concentrated in nutrients and salts. Leachate may be generated from stockpiles of the solids if they are stored for any length of time. The solids must be stored on an impermeable base as there is the potential for nutrients and salts to leach to groundwater or runoff to surface waters. In wet weather the generated leachate has to be contained so that contaminated runoff does not pollute surface waters. Odours may be generated by the anaerobic decomposition of this material. These odours can spread over a large area if the wastes are being transported for reuse off site.

The solids have the potential to be valuable fertiliser for land application. When solids are incorporated into a utilisation area it is important to assess the entire land application system to ensure that the soils and the crops grown are capable of utilising the nutrients applied and to monitor the system to ensure that there is no accumulation of nutrients in the soil.

Disposal of spent bedding material from deep litter systems

The spent bedding material is often composted on site for a period of time to allow for further decomposition of the material. The material can then be incorporated into the utilisation area or transported off site for reuse. Storage of this material has the same environmental issues as the storage of solid organic waste and sludge. There is the potential for leachate to be generated. If solids are stored for any length of time they should be stored on an impermeable pad and any contaminated surface water should be contained. The spent litter also has the potential to generate odours when applied to land. Composting has the potential to reduce this if carried out correctly. It is important to consider the weather conditions when spreading is carried out so that odour emissions are minimised. It may be beneficial to inform any neighbours about the odours that may be generated and to carefully consider the timing of spreading and minimise the frequency of spreading.

Disposal/reuse of waste water

The large quantities of effluent produced at conventional piggeries is generally applied to land after the removal of some nutrients via screens and through the treatment pond process. Some piggeries recycle their waste water for flushing of the pig sheds to reduce total water consumption on site. Most conventional piggeries have at least one treatment pond to treat waste water and often have two or more ponds. Piggeries in the tropically influenced climates require special consideration for extra wet weather storage of effluent. Aerobic ponds can be aerated to accelerate the treatment process and also to reduce odours.

The application of waste water to land has to be managed so as to not cause a build up of nutrients and salts in the soils or allow groundwater to be contaminated due to excessive application rates. It is important to be aware of the nutrient status of the soils of the utilisation area, the composition of the waste water, application rates and the nutrient removal and storage rates through crop harvesting. A monitoring regime should be prepared and implemented to ensure that waste water application practices are sustainable and not potentially overloading the soil or causing the pollution of surface water or groundwater.

Carcass disposal

Pig carcasses are usually composted with hay bales or with other solid waste from the piggery or buried in trenches and covered. The main environmental issues with burial is to ensure that the trenches do not increase the likelihood of contaminated leachate being generated and polluting groundwater or of odour generation. Trenches must not be located where groundwater is close to the surface. It is also important that trenches be excavated in soils with a high clay content to prevent leachate reaching groundwater and that carcasses are adequately covered.

When carcasses are composted on the surface with hay bales it is important to ensure that contaminated leachate does not escape from the area and pollute surface waters or leach to groundwater.

Generation of odours

Odours generated at a piggery can originate from a large number of sources and can be mostly attributed to the decomposition of piggery waste (manure). Methods to ensure that odour generation is minimised are detailed below.

- Ensure pig sheds are regularly cleaned to reduce manure and waste build up.
- Ensure there is enough bedding material in deep litter sheds to prevent urine-saturated areas.
- Ensure effluent collection drains are smooth (to reduce manure being trapped) and have a sufficient slope to ensure drainage.
- Regulate the loading of effluent into and out of ponds as sudden changes to the balance can disrupt internal bioactivity and chemical reactions and possibly generate odours. Desludging of ponds can be highly odorous as it disrupts the decomposing organic matter at the base of the pond. It is usually beneficial to inform neighbours of any impending desludging events.
- Ensure effluent applied to utilisation areas infiltrates the soil quickly and is managed to prevent ponding. Piggery operators should also consider the weather conditions when applying waste water or solids to help ensure that odours are not transported off site. Again it is good practice to inform and consult with neighbours when planning to apply waste water or solids to utilisation areas.
- Cover carcasses with soil or other materials immediately after disposal and prevent the entry of stormwater into the disposal pits.
- Correctly site ponds at a piggery.

SUMMARY OF FINDINGS OF COMPLIANCE AUDITS

Individual compliance audit reports on the premises listed in Appendix A, report the level of compliance of each premises with the conditions attached to the Environment Protection Licence (EPL) administered by EPA. This report summarises the issues of concern identified through the ‘non-compliances’ and ‘further observations’ reported in the individual compliance audit reports.

Non-compliances are reported where there is clear evidence that a non-compliance has been identified with licence conditions. Where an issue of environmental concern was observed that did not strictly relate to the scope of the audit or assessment of compliance, the issue is reported as a further observation. Further observations are indicators of potential non-compliances, or areas where environmental performance can be improved.

A risk assessment was undertaken on the non-compliances identified, in order to colour code non compliances according to their environmental significance.

The risk assessment involved an assessment of the non-compliance against two criteria: the likelihood of environmental harm occurring and the level of environmental impact as a result of the non-compliance. After these assessments are made, information is transferred into the risk analysis matrix table below.

Table 3: Risk analysis matrix table

		Likelihood of environmental harm occurring		
		Certain	Likely	Less Likely
Level of environmental impact	High	Code Red	Code Red	Code Orange
	Moderate	Code Red	Code Orange	Code Yellow
	Low	Code Orange	Code Yellow	Code Yellow

A non-compliance assessed as a code ‘red’ suggests that the non-compliance is of considerable environmental significance and therefore must be dealt with as a matter of priority. A non-compliance assessed as a code ‘yellow’ suggests that the non-compliance could receive a lower priority but must still be addressed.

There are also a number of licence conditions that do not have a direct environmental significance, but are still important to the integrity of the regulatory system. These conditions relate to administrative, monitoring and reporting requirements. Non-compliance with these conditions are given a blue colour code.

The table below details the number of non compliances found in each category during the audit process.

Table 4: Number of non-compliances found in each category at the 27 audited premises

Colour code of non compliance	Code RED (highest risk)	Code ORANGE	Code YELLOW	Code BLUE	Total
No. of non-compliances	1 (1%)	9 (9%)	27 (26%)	66 (64%)	103 (100%)

DEC is carrying out a systematic and rigorous process of follow-up actions to ensure that licences of audited sites address all non-compliances reported. Follow-up actions required for audited sites can be found in individual audit reports.

Issues identified

In this section of the report the following symbols are used to delineate between findings that have been reported in the individual audit reports as ‘non-compliances’ or as ‘further observations’:

- non compliances
- ◆ further observations

Where each of the issues are described in detail, a number in brackets denotes the number of premises where that issue was identified. Next to this number is the colour code of the non-compliance which signifies the environmental risk the issue posed. The same non-compliance found at different premises can result in the allocation of different colour codes for each of those premises. This occurs when the environmental risk associated with the non-compliance differs between premises. For example the environmental risk from a non compliance relating to the storage of chemicals in an uncontained manner is higher at a premises where a river or creek runs through the site compared to the same non-compliance occurring at a premises where there is a greater distance to the nearest water body or to groundwater.

‘Further observations’ do not have a colour code assigned however these issues have been identified as being of environmental concern and may potentially lead to non compliances.

The issues of concern identified during the audits are summarised in Table 5.

This section of the report also highlights practices that were observed during audit inspections that contributed to the competent environmental management of various issues.

Table 5: Issues contributing to non-compliances and further observations identified in the audits

Category	Issue contributing to non-compliances and further observations	No. of premises at which the issue was identified (out of a total of relevant premises audited)
Preventing water pollution		
	Effluent management – waste water collection system	7 / 25
	Effluent management – treatment ponds	6 / 22
	Effluent management – utilisation area	12 / 20
	Pollution of waters/groundwater	3 / 27
	Storage of materials (uncontained fuels, herbicides etc)	7 / 27
Solid waste management		
	Carcass disposal	4 / 27
	Solid waste management – deep litter systems	2 / 13
	Solid waste management – conventional (wet) piggeries	3 / 25
Preventing air pollution		
	Odour	7 / 27
Monitoring		
	Effluent volume and pollutant concentration monitoring	9 / 13
	Irrigation area soil quality monitoring	5 / 13
	Groundwater quality monitoring	2 / 6
	Weather monitoring	2 / 5
	Ambient water quality monitoring	2 / 3
Accountability		
	Operating in accordance with information provided to the EPA	2 / 27
	Provision of information to the EPA	7 / 27
	Recording and keeping monitoring as required	10 / 21
	Marking monitoring/discharge points with a sign	5 / 7
	Operating a complaints line/notifying the public of the complaints line number/keeping records of complaint	9 / 27
	Copy of licence at premises	3 / 27

Preventing water pollution

Areas of concern in relation to water pollution predominantly relate to the management of effluent produced at the piggery. Piggery effluent typically contains high levels of manure and spilt feed resulting in high levels of total suspended solids, salts, biochemical oxygen demand and nutrients (particularly nitrates and phosphates).

Section 120 of the POEO Act prohibits the pollution of waters including surface and groundwater. Water pollution from piggeries can occur from a variety of sources. Effluent dams can overflow, waste water collection systems may not contain all the waste water, nutrients may be discharged from irrigation areas. Nutrients may also leach from effluent treatment ponds and irrigation areas. Poorly operated effluent treatment systems and irrigation areas are considered the most likely sources of groundwater contamination.

Effluent management – waste water collection system

The following issues associated with the waste water collection system were identified at 6 of the 25 premises with conventional housing on site.

- Not maintaining the structure and integrity of the effluent collection system in a proper and efficient condition by permitting waste water to overflow and potentially contaminate surface and groundwater (6 premises) (1 premises – Code ORANGE; 5 premises – Code YELLOW).
- Not operating the mechanical screen to separate solids in a proper and efficient condition and permitting effluent to over spray the bunded area and increase the likelihood of contaminated stormwater leaving the site (1 premises – Code ORANGE).
- Broken slats in the pig pens allowed pigs to enter the effluent channels and potentially cause blockages and overflows that could cause contaminated runoff to pollute surface or ground waters (1 premises – Code YELLOW).
- ◆ Excessive vegetation growth and the accumulation of solid material has the potential to cause blockages within the drainage system (1 premises).

Practices observed during audit inspections that contributed to the competent environmental management of the waste water collection systems:

A number of premises regularly hosed or flushed out pig sheds to prevent the excessive build up of manure, had smooth pipes to prevent the build up of manure and had structures in place to exclude pigs from interfering with the flow of waste water and other solid wastes.

Effluent management – waste water treatment ponds

The following issues were identified at 6 of the 22 sites audited that had treatment ponds.

- The effluent contained within the treatment ponds was likely to overflow to stormwater in any future rain event due to the fact that the ponds were already full to capacity on the day of the audit inspection. Any rain would be likely to cause the ponds to overflow directly to stormwater. There was some evidence of leakage from the base of the pond wall to stormwater. The walls of the pond also showed signs of erosion (1 premises – Code RED).
- The practice of recycling untreated waste water for flushing and allowing leachate generated from the solids stockpile to be diverted away from the main treatment pond system (1 premises – Code ORANGE).
- Waste water treatment ponds heavily loaded with solids which significantly reduced the holding capacity of the ponds and resulting in the potential for overflows (2 premises: 1 premises – Code YELLOW, 1 premises – Further observation).

- ◆ Vegetation growth compromising the ability of the pond to effectively treat the effluent. Excessive vegetation around the banks limiting the licensees' ability to accurately determine the available capacity of the ponds (2 premises).
- ◆ Retention time of effluent in the treatment ponds was reduced due to the close proximity of the inlet and outlet points. Therefore the optimum retention time in the pond may not be achieved (1 premises).

Practices observed during audit inspections that contributed to the competent environmental management of the waste water treatment ponds:

A few premises had a comprehensive groundwater monitoring program in place to monitor groundwater quality in the vicinity of the waste water treatment ponds. This was to ensure that the contents of the waste water ponds were not impacting on groundwater quality in the area.

One premises had an extensive system of ponds. There was sufficient capacity in the series of ponds to allow one pond to be kept off line at any time so that the solids could be removed. Effluent at the end of the pond system was directed to a series of anaerobic ponds and reused for shed flushing or irrigation.

Effluent management – utilisation area

The following issues associated with the management of the utilisation area were identified at 12 of the audited premises.

- Excessive accumulation of nutrients (nitrogen and phosphorus) detected in the soil where waste water is applied. The grazing of this land by cattle is not effective at removing the applied nutrients to the utilisation area (1 premises – Code ORANGE).
- Irrigation pipes not maintained in a proper and efficient condition causing leakage over a period of time and increasing the likelihood of contaminated runoff from the area (1 premises – Code YELLOW).
- Exceeding volume limits for irrigation to utilisation area (2 premises –Code YELLOW).
- Ponding of applied effluent waters on the irrigation area increasing the likelihood of contaminated runoff leaving the premises (4 premises: 3 premises –Code YELLOW; 1 premises – Further observation).
- ◆ Concern over the sustainability of waste water application practices due to the loading of nutrients applied and/or the lack of environmental monitoring (such as soil sampling) to determine whether practices are sustainable (8 premises).

Practices observed during audit inspections that contributed to the competent environmental management of utilisation areas:

A comprehensive soil monitoring program was in place at one of the premises. This is to ensure that the application of bedding waste is sustainable in the long term. The licensee monitored the quantity of waste bedding applied and analysed monitoring results to ensure the optimum amount of bedding is applied. The licensee also kept good records of application and monitoring results.

At one of the larger piggeries audited, a professional agronomist/soil scientist is employed on a full-time basis to manage and oversee the waste water treatment process and the application of waste water to the utilisation area. This includes the monitoring of soil and ground water quality, waste water application rates and the management of crops, including rotation of the different winter and summer crops. Soil quality is tested before waste water application and after crop harvesting in addition to the monitoring required by the Environment Protection Licence.

One premises had large terminal ponds adjacent to their utilisation areas that were capable of capturing contaminated effluent flushed off by high rainfall from the solids application area. Usage of the terminal ponds is one component within a wider effluent management system framework.

Preventing pollution of waters/groundwater

There were issues in relation to the pollution of waters at three of the 27 premises audited. Details of these issues are as follows:

- Surface water runoff likely to contain spilt feed and waste litter was permitted to flow off site and possibly contaminate surface and groundwater (1 premises- Code ORANGE).
- ◆ Groundwater monitoring at the premises indicated elevated nitrate levels (1 premises).
- ◆ There were several indicators of potential groundwater contamination such as: soil monitoring results with high concentrations of nutrients, an extensive network of aging underground effluent drains, significant amount of waste litter stored on impervious bases and an underground storage tank not tested for leaks. (1 premises).
- ◆ Groundwater monitoring results indicated the presence of high conductivity levels, sodium absorption ratio, phosphorous and nitrogen levels. The area has been known to have low groundwater quality however the groundwater level is located close to the surface of the irrigation area and therefore the risk of further polluting groundwater is high. (1 premises).

Practices observed during audit inspections that contributed to the competent environmental management to prevent the pollution of waters or groundwater:

One premises had previously encountered issues with the pollution of surface and groundwater on their premises and has subsequently implemented a management plan to reduce and minimise the risk of their operations affecting ground and surface waters. The management plan includes steps to address issues with their utilisation area, solid and liquid waste management and the development of an extensive environmental monitoring program. The licensee monitors effluent quality and volume, ambient stream water quality (up and down stream), groundwater quality and soil quality monitoring over and above the requirements of the environment protection licence. The interpretation and analysis of results dictates where and when crops are grown. All clean stormwater is diverted away from wastewater ponds and other dirty areas. Solid wastes are stored and composted on an impervious base.

Containment of point source pollutants

Pollutants such as fuel, oil, grease and other chemicals need to be contained, so that the risk of any leaks or spills from containers polluting waters, groundwater or soil is minimised.

Strategies such as bunding and collector pits are adopted to contain potential flows of pollutants from areas where chemicals are stored or handled.

Issues in relation to containment of pollutants were identified at 7 of the 27 premises audited.

- Storage of fuel/diesel in above ground tanks in an area with inadequate containment measures (6 premises: 1 premises – Code ORANGE; 5 premises – Code YELLOW).
- Storage of herbicides in an area with no spill containment facilities (1 premises – Code YELLOW).
- Vitamin mix powders, bioactive materials, drums of feed and used engine oil in drums were not stored in a contained area (1 premises – Code YELLOW).
- ◆ Diesel was stored in an above ground tank with no containment. Waste oil drums and other chemicals were also not stored in a contained area (1 premises)
- ◆ An underground fuel tank was not tested for integrity or leakage (1 premises).

Solid waste management

Significant quantities of solid organic waste can be produced at piggeries and needs to be managed effectively to prevent pollution of the environment. The waste consists of sludges from effluent streams, manure and spent bedding as well as pig carcasses. The waste is generally high in nutrients and salts.

Solid waste from conventional sheds can be screened out before treatment in ponds or removed from ponds at a later stage. Spent bedding from deep litter sheds is removed when each batch of pigs is removed and can be composted prior to application to land. Composting converts these products into more usable and less odorous soil additives.

Carcasses need to be disposed of in a manner to prevent ground and surface water contamination, minimise odour issues, control the spread of infectious diseases and prevent the attraction of vermin.

Solid waste management was an issue at 8 of the 27 premises audited.

Carcass disposal

The following issues associated with carcass disposal were identified at 4 of the 27 sites audited.

- Carcass disposal pit not covered and stormwater allowed to pool within the pits (1 premises – Code ORANGE).
- Leachate generated from above ground carcass composting bays was not contained and had the potential to discharge off site (2 premises: 1 premises – Code ORANGE; 1 premises – Code YELLOW).
- Carcasses were not disposed of within trenches and were allowed to decompose on the surface of the land, increasing the risk of the spread of disease and the likelihood of attracting vermin (1 premises – Code YELLOW).

Practices observed during audit inspections that contributed to the competent environmental management of carcass disposal:

Carcasses are refrigerated on site and sent off site for rendering at regular intervals.

Extensive groundwater monitoring is conducted around the site where carcasses are buried.

Solid organic waste from deep litter piggeries

The following issue associated with the management of solid waste from deep litter systems was identified at 2 of the 13 sites with deep litter sheds.

- Long term storage of waste litter material on a permeable base increasing the likelihood of leachate polluting soils and groundwater (2 premises: 1 premises – Code ORANGE; 1 premises – Code YELLOW).

Practices observed during audit inspections that contributed to the competent environmental management of solid waste from deep litter sheds:

Deep litter sheds had a base of compacted clay and the temporary storage area of spent bedding was also made of compacted clay, with collection sumps to ensure water pollution does not occur.

Solids from the deep litter sheds are collected by local farmers directly from each eco-shelter on the day that the pigs are removed from the sheds. This minimises and often eliminates the need for storage of solids on site.

Solid organic waste from conventional piggeries

The following issues associated with the management of solid waste were identified at 3 of the 25 sites with flushing type pig pens.

- Leachate generated from the solids stockpile was not contained increasing the likelihood of groundwater pollution (2 premises – Code YELLOW).
- ◆ Not all of the solid waste generated was stored on an impermeable pad and had the potential to pollute waters, especially during significant wet weather events (1 premises).

Preventing air pollution

Odour control

There is a need for all operators to identify activities, plant and equipment that have the potential to cause odour emissions. This will enable the development of operational procedures and process controls to minimise offensive odours generated at the site. The effectiveness of the procedures and the controls implemented, need to be monitored on an ongoing basis. Issues regarding air pollution, specifically relating to odours, were found at 7 of the 27 premises audited.

- The drop tubing of the travelling irrigator was split, causing excessive spray and increasing the likelihood of odour emanating from the premises (1 premises – Code YELLOW).
- Deep litter was not maintained in a dry condition or at a minimum depth, increasing the likelihood of odours being generated (1 premises – Code YELLOW).
- ◆ The practice of recycling untreated waste water and the subsequent accumulation of nutrients and bacteria in the flush down water had the potential to contribute to the generation of odours at the site (2 premises).
- ◆ The use of wood shavings as deep litter bedding material is likely to contribute to the odours generated at the premises (1 premises).
- ◆ Numerous odour complaints in relation to one of the premises audited were made to Pollution Line during the 12 months prior to the audit inspection. The complaints were probably because of the spreading of waste prior to any composting (operation now ceased) and/or the accumulation of solids in the drainage system and possibly because of limitations in the storage and treatment capacity of the treatment pond system (1 premises).
- ◆ The excessive build up of manure, spilt food and urine along with the practice of thawing frozen carcasses days prior to removal from site was contributing to odours generated at the premises (1 premises).
- ◆ Incomplete anaerobic processes within the treatment ponds have the potential to generate odours from within the pond and during the application of any waste water to land (1 premises).

Practices observed during audit inspections that contributed to the competent environmental management of odour:

Weather is monitored and considered (especially wind direction) when applying waste bedding to the utilisation area to ensure that the effects of odour on neighbours are minimised.

After a period of frequent odour complaints from a nearby neighbour, one licensee implemented various measures to ensure that the risk of their operations adversely affecting neighbours was reduced. The licensee implemented a weather and odour monitoring program. The timing of activities was regulated to ensure that odour-generating activities were not carried out in weather conditions likely to transport odours off site. Odour is also regularly monitored at the boundaries of the premises and at potentially affected residences. A complaint management system was also implemented. Regular meetings are held with council and the local community to discuss any issues relating to odour and other general issues.

Monitoring

Monitoring of environmental issues, such as the quality and volume of effluent applied to utilisation areas, groundwater and soil quality enables operators to determine the sustainability of their effluent application practices. This also helps determine whether pollution is likely to occur. Monitoring therefore provides the basis for environmental management at the sites.

For monitoring to be effective, the results of measurements must be analysed and assessed on an ongoing basis against previous results and relevant criteria so that trends may be identified. In order to properly monitor any actual or potential environmental issue, samples or measurements taken must be carried out at required frequency and with appropriate rigour to provide a reliable basis for such an analysis or assessment.

It is essential that the monitoring reflects the true nature and environmental impact of any environmental issue. Accordingly monitoring undertaken to satisfy the requirements of an Environment Protection Licence must be based on sampling and analysis undertaken in accordance with the EPA's *Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales* (EPA 1998). If methods are not specified in the manual, DEC requires that monitoring be undertaken in accordance with any methodology which a licence condition requires, or if there is no such requirement, any methodology approved by DEC in writing.

Issues in relation to monitoring required by Environment Protection Licences were identified at 12 of the 21 premises audited.

All monitoring non compliances are allocated a Code BLUE.

Effluent volume and pollutant concentration monitoring

Of the 13 audited premises that had requirements to monitor effluent volume or pollutant concentration 9 premises did not comply with the monitoring requirements.

- Not monitoring for all of the required pollutants (6 premises).
- Not monitoring effluent quality at the required frequency (2 premises).
- Not monitoring the volume of effluent (or solid wastes) discharged to the utilisation area when required (1 premises).
- Not monitoring effluent volume in accordance with the prescribed method (1 premises).
- Not sampling and analysing pollutant concentration in accordance with the Approved Methods Manual when required (2 premises).

Irrigation area soil quality monitoring

Thirteen audited premises had requirements to monitor the soil quality of the utilisation area. Five of these premises were in non compliance with requirements to monitor soil quality.

- Not monitoring all soil quality parameters (2 premises).
- Not monitoring soil quality in accordance with the required method (2 premises).
- Not applying to the EPA in writing to use a different method of analysis for conductivity (1 premises).
- ◆ Not taking composite soil samples correctly (1 premises).

Groundwater quality monitoring

Six audited premises had requirements to monitor ground water quality. Three premises were in non compliance with groundwater quality monitoring requirements.

- Not monitoring for all groundwater pollutant parameters when required (1 premises).
- Not monitoring groundwater at the correct location (1 premises).

- Not monitoring groundwater quality in accordance with the Approved Methods Manual (1 premises).
- Not applying to the EPA in writing to use a different method of analysis for conductivity (1 premises).

Weather monitoring

Five premises had weather monitoring requirements. Two of these premises were in non compliance with requirements to monitor weather conditions.

- Not monitoring all weather parameters when required (2 premises).

Ambient water quality monitoring

Three audited premises had ambient water quality monitoring requirements. Two of these premises were in non compliance with ambient water quality monitoring requirements.

- Not monitoring the required ambient water quality parameters (1 premises).
- Not monitoring at the required frequency (1 premises).
- Not applying to the EPA in writing to use a method of analysis for conductivity (1 premises).

Accountability

Issues in relation to the administrative requirements of licences were identified at 23 of the 27 premises audited. These accountability non compliances (e.g. non compliance with administrative, monitoring and reporting requirements) are allocated a Code BLUE.

Operating in accordance with information provided to the EPA

- Licensee operating above the scale of activity that they were licensed for (1 premises).
- Licensee not operating in accordance with their 'Licence Information Form' submitted to the EPA prior to the granting of a licence (1 premises).

Provision of information to the EPA

- An annual return was not submitted within 60 days of the end of the reporting period (2 premises).
- Not submitting to the EPA an environmental monitoring report, environmental management report or an analysis report when required (4 premises).
- Not providing adequate information in the report submitted to the EPA as part of a requirement under a Pollution Reduction Program (PRP) condition (1 premises).

Pollution Complaints

Complaints received can be valuable tools for monitoring the environmental impact of an enterprise on the local community. By keeping the required information in relation to pollution complaints, operators will be in a position to clearly demonstrate that complaints are being satisfactorily addressed.

Issues in relation to pollution complaint records or telephone complaints lines were identified at 9 of the 27 premises audited:

- The licensee did not operate a telephone complaints line (3 premises).
- The licensee did not notify the community of the existence of a telephone complaints line (6 premises).

- The record of complaints kept by a licensee did not include all of the information required by the Environment Protection Licence (e.g. records did not contain the method by which complaints were made or the time when complaints were made) (1 premises).
- The licensee did not notify the EPA of a 24-hour telephone contact line for the purpose of enabling the EPA to contact the licensee in the event of an incident (1 premises).

Keeping copy of licence at the premises

All premises are required to keep a copy of their licence at their premises. Three out of 27 audited licensees did not comply with this requirement.

- Not keeping a copy of the licence at the premises (3 premises).

Marking monitoring/discharge points with a sign

Seven audited licensees were required to mark their licensed discharge/monitoring point with a sign. Five did not comply with this requirement.

- Not marking a monitoring/discharge point with a sign when required (5 premises).

Recording and keeping monitoring as required

Issues relating to the recording of the monitoring undertaken were identified at 10 of the 21 premises with monitoring requirements.

- Not recording the time or date of when a sample was taken, the name of the person taking the sample, the location of the sample or using the correct units of measure (8 premises).
- Not recording the removal of solids from the site when required (1 premises).
- Not keeping a record of the volume and origin of effluent irrigated on a daily basis or a log book of operational or monitoring data when required (2 premises).
- Not keeping records relating to the application of waste water and biosolids (such as soil moisture data, date and time of when samples were taken, weather conditions etc) (1 premises).

WHERE TO FROM HERE?

The Environment Protection Authority (EPA) is a statutory body with specific powers under environment protection legislation. In September 2003, the EPA became a part of the NSW Department of Environment and Conservation (DEC).

Issues identified in the representative sample of 27 licensed piggeries are likely to be generally typical of the whole sector. Issues of concern were identified in relation to irrigation area management, waste management, monitoring and accountability.

Based on the audits, it has been identified that the principal areas where the industry should improve its compliance and environmental performance are:

- management and monitoring of waste water application practices
- maintenance of the waste water collection and treatment systems in a proper and efficient condition
- solid organic waste management – by ensuring that waste generated is stored and disposed of in an environmentally acceptable manner
- monitoring – by implementing procedures for monitoring in accordance with standards specified
- accountability – by ensuring records for monitoring and for complaints contain all of the required information and any information required to be submitted to DEC is done on time.

While DEC, through a systematic and rigorous process of follow-up action programs, ensures that these particular issues are being addressed at the audited sites, they are likely to be of concern at any piggery and warrant an ongoing focus by site management at all sites. DEC will ensure that the issues identified are also being addressed at those premises that were not audited as part of the sector audit program.

Reporting on the state of the piggery sector's environmental performance is a valuable management tool for operators of piggeries. DEC will circulate information in this report to relevant stakeholders and seek cooperative opportunities to work with the industry to improve its environmental performance.

DEC will use the findings of this sector report to review how best it can channel its resources to guide industry to address the issues identified. Consideration will be given to using a suite of tools in addition to regulatory instruments to address environmental issues that were found to be prevalent across the sector. The findings of this report will also be useful in the licence reviews required to be undertaken under the POEO Act.

APPENDIX A: LIST OF PREMISES AUDITED

The findings of this report are based on the results of compliance audits on the following licensed premises in NSW:

Aztec farms, Albacore Pty Ltd, Myall Park

Bellevue, M H West, Young

Boen Boe Stud, Charles Zammit, Mittagong

Brooksbank Properties Pty Ltd 'Balpool Station', QAF Meat Industries Pty Ltd, Moulamein

Broundah Piggery, Mondoro Pty Ltd, Casino

Bungowannah Piggery, QAF Meat Industries Pty Ltd, Bungowannah

Evergreen Matheson, Kenneth and Irene Marcantelli, Glen Innes

George Borg Piggery, George Borg, Horsley Park

Glendon Park, Ross Wardlaw, Armidale

Golden Grove Piggery, Cynray Pty Ltd and Larkray Pty Ltd, Young

Hilcrest Park Piggery, Amitie Pty Limited, Menangle

Hopefield Piggery, Innes Baird, Corowa

I & R Nagle, Rodney Nagle, Corowa

Inglegreen piggery, Malcolm and Alison Gett, Narrabri West

Jake Piggeries, Jake Piggeries Pty Ltd, Springdale

Koorani, Cynray Pty Ltd, Young

Lansdowne, Ronald Polard, Young

Mid West Piggery, Neil Unger, Parkes

PIC Australia, Pig Improvement Company Australia Pty Ltd, Grong Grong

Pilgoorie South Piggery, Carl Scharfetter, Duri

Signium, Signium Pty Ltd, Ellangowan

Strathvean, Navhold Pty Ltd, Tarcutta

Tabulam Piggery, Northern Bacon Pty Ltd, Tabulam

Tamma Piggery, Frank Hands, Tamworth

The Pines Piggery, Kevin Keevers, Bega

Tipaki Piggery, John Neville, Brocklehurst

Wonga Piggery, Larkray Pty Limited, Young

REFERENCES

- EPA 1997, *EPA Compliance Audit Handbook 1997*, NSW Environment Protection Authority, Sydney
- EPA 1998, *Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales*, NSW Environment Protection Authority, Sydney
- EPA 2001, *Approved methods for the Sampling and Analysis of Air Pollutants in New South Wales*, NSW Environment Protection Authority, Sydney
- Eugene McGahan and Robyn Tucker (Principal Authors) 2003, *Resource Manual of Indicators of Sustainability for Effluent Reuse in the Intensive Livestock Industries: Piggeries and Cattle Feedlots*, Project No. 1816 Australian Pork Limited, Canberra
- NSW Farmers Association 2003, *Pork Industry Position on Code of Practice: Pork Industry Briefing Note 10*, dated 6 Aug 2003 [available at www.nswfarmers.org.au]
- NSW Farmers Association 2005, (information available at www.nswfarmers.org.au/commodities/pork__and__pigs)

RECOMMENDED READING

- Australian Pork Limited 2004, *National Environmental Guidelines for Piggeries*, Canberra
- Eugene McGahan and Robyn Tucker (Principal Authors) 2003, *Resource Manual of Indicators of Sustainability for Effluent Reuse in the Intensive Livestock Industries: Piggeries and Cattle Feedlots*, Project No. 1816 Australian Pork Limited, Canberra
- NSW Department of Environment and Conservation, 2005, *Environmental Guidelines: Use of Effluent by Irrigation*, Sydney
- NSW Environment Protection Authority, 2001, *Draft Policy: Assessment and Management of Odour from Stationary Sources in NSW*, Sydney
- NSW Environment Protection Authority, 2001, *Technical Notes- Draft Policy: Assessment and Management of Odour from Stationary Sources in NSW*, Sydney