VICTORIAN CODE FOR BEST PRACTICE BROILER CHICKEN FARMS

Interim Report

INTERIM REPORT OF THE ADVISORY COMMITTEE

MARCH 2000

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MARCH 2000

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1 BACKGROUND

1.1 OVERVIEW OF BROILER INDUSTRY

The Victorian broiler industry is a well-established and growing industry. It produces a total of over 2 million birds each year, resulting in more than $100m in chicken meat sales. This represents 0.2% of Gross State Production.

Current annual consumption of chicken meat in Australia at 30.6kg per capita is second only to beef in meat consumption. Growth in demand is about 5% per annum and likely to remain buoyant. Over 90% of chicken meat in Victoria is produced for the domestic market.

Significant gains in efficiency over the last 30 years have reduced the costs of production and greatly increased the market share of chicken meat relative to other types of meat. Advancements in chicken processing technology have enabled the industry to shift its emphasis from the ubiquitous frozen chicken made famous on Chook-Lotto, to the supply of fresh chicken meat comprising whole chickens, specialised chicken portions for the fast-food industry, and value-added products such as pre-packaged boned, skinned and/or marinated chicken portions.

As efficiencies have been introduced, farming practices have intensified and become much more sophisticated in their technology, with most chicken sheds now providing a computer-controlled environment and automated feed and water dispensing.

The industry as a whole has therefore responded very well to the opportunities created by technological advances and by the increasing demand for fresh, easily handled, low-fat meat.

However, the industry has not been equally responsive in dealing with the impacts of the intensification of its farming practices. Problems arise, often due to a mismatch between the traditionally small farms and the increased buffers required when more birds are housed more intensively. Conflicts between growers and neighbours result, especially in relation to odour, dust and noise. Heightened community awareness of ‘acceptable’ levels of amenity has also played a role in this conflict.

While the industry has supported the trend towards larger farms with larger buffers, the move has been associated primarily with increased efficiency. Its role in addressing amenity and environmental issues appears to have been seen as a ‘bonus’ rather than a main objective. This has led to a reluctance on the part of the industry as a whole to recognise, and plan for, the implications of these trends for relocation of smaller farms in the short term, and in the longer term, possible relocation of industry infrastructure.

It will be vital for the industry as a whole to approach this issue at a strategic level over the next few years, so that its long-term future is secured.

1.2 THE CODE

1.2.1 Purpose of the Code

The draft *Victorian Code for Best Practice Broiler Farms* ('the Code') was developed in response to concerns raised by the broiler industry over the increasing rate of refusal of broiler farm applications at both Council and VCAT level.

Over a number of years the increasing urbanisation of areas where broiler farms had been established for some time, coupled with intensification of broiler farming practices, has led to land-use conflicts. Opposition from residents to both the establishment of new farms and the expansion of existing farms has increased, leading to polarisation between growers wanting to protect their investment and residents wanting to protect their amenity.

This conflict has been exacerbated by uncertainty as to what the rules are and how they should be interpreted. There have been apparent inconsistencies between decisions to grant or refuse permits, what conditions should apply, and whether or not they are enforced. In this environment applicants and objectors can feel they are entering a lottery rather than a rational decision-making process based on consistent principles and accepted parameters.

Complaints processes have also been a source of conflict. This is partly due to the nature of odours, which are the main source of complaints. Odours are both transient and subjective, and because of their transience there are very limited opportunities to verify them by scientific means. The conflict is played out either as a direct argument between resident and grower ('it did smell – it didn't smell') or as an expensive, sophisticated ritual between experts at VCAT along the same lines ('it will smell – it won't smell'). This environment has worked against the establishment of good relations between the industry and the community.

The 1988 document *Broiler Farming – A Policy for the Westernport Region* has provided guidance in the past, and in some cases has been used as guide outside its own region. However, it has not been updated to take account of either the trend towards more intensive farming or the latest environmental or community standards.

There is clearly a need for new state-wide guidelines that look to the future and provide certainty for growers and residents alike by setting out clear and consistent parameters. The draft Code expresses these aims as follows:

> *'This Code has been prepared as the basis for the planning, design and assessment of planning permit applications for broiler chicken farms, and to guide chicken growers to the desired standards of farm design, operation and management.*
>
> *The purpose of the Code is to provide a framework for the economically and environmentally sustainable development and operation of the broiler chicken farming industry in Victoria, recognising the needs of the industry and the community.*

This Code is designed to:

- *Encourage best practice design, management and operation of broiler chicken farms;*
- *Reinforce relevant environmental and public health and safety standards;*
- *Safeguard investment in the broiler chicken industry in Victoria;*
- *Provide greater certainty for the industry and the community in the planning approvals process.'*

1.2.2 Implementation of the Code

The Code will be implemented as part of the Victorian Planning Provisions (VPPs) that apply to all municipal planning schemes throughout Victoria.

The VPPs comprise a State Planning Policy Framework, a Local Planning Policy Framework, and a suite of zones and overlays. The VPPs define poultry farming as an 'intensive animal industry.' Under the heading 'Economic Development', clause 17.06 of the State Planning Policy Framework sets out the state-wide objective for intensive animal industries as follows:

'To facilitate the establishment and expansion of cattle feedlots, piggeries, poultry farms and other intensive animal industries in a manner consistent with orderly and proper planning and protection of the environment.'

The VPPs will be amended to specifically recognise broiler farms and the Code. A planning permit will still be required for the establishment or expansion of a broiler farm in the Rural Zone. (Broiler farms are prohibited in all other zones). However, before granting a permit, the responsible authority (Council) must be satisfied that the broiler farm complies with the Code. It is proposed that broiler farms meeting the requirements for Class A (as specified in the Code) will be exempt from notification and third party appeal rights.

The Code will have the status of an Incorporated Document in all planning schemes. This means it can only be altered by an amendment to the VPPs initiated by the Minister for Planning. Local Councils will have no power to alter the Code.

1.2.3 The Code Committee

The former Minister for Planning and Local Government and the former Minister for Agriculture and Resources endorsed the establishment of the Best Practice Broiler Farming Code Committee ('the Code Committee') in August 1997. The Code Committee comprised representatives of the following interests:

- broiler industry – 5 reps
- local government – 3 reps
- Environment Protection Authority (EPA) – 3 reps
- Department of Natural Resources and Environment (DNRE) – 2 reps
- Department of Infrastructure (DOI) – 1 rep

Membership of the Code Committee was as follows:

Chair: Spencer Field (Principal Analyst, Animal Industries, DNRE)
Members: Dr Greg Parkinson (Senior Poultry Officer, DNRE)
Wolfgang Haala (Senior Planner, DOI – replaced Ros Franklin in 1998)
Bruce Dawson, Manager, Waste Management Policy, EPA)
Norm Parris (Manager, SW Metropolitan Region, EPA)
Simone Nguyen (Project Officer, EPA)
John McCaffrey (Planning Development Manager, Cardinia Shire Council – also represented the Municipal Association of Victoria)
Allan Cowley (Senior Planner, Mornington Peninsula Shire Council)
Ed Harvey (Planning Development Manager, Golden Plains Shire Council)
Gis Marven (President, Victorian Chicken Meat Council)
Chris Turner (Vice President, Victorian Chicken Meat Council)
Chris Jones (President, VFF Chicken Meat Group – replaced John Clarke in 1998)
Louis Vorstermans (then Executive Director, VFF Chicken Meat Group)
Ian Farran (Chicken Meat Research and Development Committee and Consultant)

Further industry representatives (particularly M. Shaw and G. Wilson, both growers) were granted observer status at several meetings of the Code Committee to 'assist the process of establishing wider industry commitment to the new best practice approach.'

There was a significant level of criticism of the fact that the Code Committee did not include any representatives who could provide input in the interests of the community. In response to requests for community representation, the former Minister for Planning and Local Government expressed the view that the Code Committee was a technical working group, and that the proposed exhibition, submission and public hearing process would provide an adequate opportunity for public participation in the Code's development.

1.2.4 Code development process

The Code Committee met 15 times from August 1997 to June 1999. It operated as a technical committee, with expert input being provided by Dr Parkinson, Ms Nguyen and Mr Farran.

The Code Committee recognised that there was inadequate data available on odour emissions. In view of the key role that odour data would play in establishing the Code's separation distances, it was agreed that odour research would be carried out as part of the development process.

Industry representatives commissioned Egis Consulting and Pacific Air and Environment to undertake the research.

In the meantime drafting of the Code continued, with the issue of separation distances being put aside until the research results were available. Several drafts were considered by the Code Committee during the development process.

The consultants' reports on the results of the odour research were available in January 1999. Three additional sub-committee meetings were held to consider the reports, focusing on the separation distance proposals. The consultants also briefed the Code Committee on separation distances.

Although the Code Committee reached what is described by its Chair as 'a reasonable degree of consensus' on the thrust and detailed content of the Code, full agreement was not reached on the key issues of separation distances and odour measurement criteria. The draft Code was exhibited showing alternative proposals for odour measurement criteria.

1.2.5 Exhibition and submissions

The draft Code was placed on public exhibition for a two-month period from 14 July to 10 September 1999. Notice of exhibition was placed in a number of newspapers (Herald Sun, Weekly Times, Dandenong District Journal, Pakenham Berwick Gazette, Frankston Standard, Warrigal Gazette, Geelong Advertiser and Bendigo Advertiser. A joint press release was issued by the then Minister for Planning and Local Government and the then Minister for Agriculture. Copies of the Code were forwarded to stakeholder groups. Copies were also available for purchase at the DOI and DNRE bookshops, and further copies were available for public inspection at all DOI Regional Offices and all local Councils in Victoria. The draft Code was also available on the Internet.

The Code Committee, in recognition of the need for public consultation, organised a series of four public meetings during the exhibition period. Members of the Code Committee and the technical working party involved in development of the Code were present at these meetings to explain the Code and answer queries. The public meetings were held in Bendigo, Geelong, Somerville and Pakenham, with a total of 515 people attending.

Written submissions were invited on the draft Code and the proposed amendment to the VPPs. A total of 118 submissions was received. A full list of submitters is attached as APPENDIX A.

1.3 THE ADVISORY COMMITTEE

1.3.1 Appointment of Advisory Committee

On 25 June 1999 an Advisory Committee was appointed by the then Minister for Planning and Local Government, in consultation with the then Minister for Agriculture, to review the draft Code. The Advisory Committee was appointed under sections 151(1) and 151(2) of the *Planning and Environment Act 1987*.

The members of the Advisory Committee were Ms Margaret Pitt (Chair), Mr Geoff Angus and Ms Johanna Barker.

1.3.2 Terms of Reference

The Advisory Committee's Terms of Reference require it to undertake the following tasks:

- *To consider the form, content and operation of the Victorian Code for Best Practice Broiler Chicken Farms;*

- *To review the proposed operation of the Code and its application in the planning system through the Victorian Planning Provisions;*

- *To seek such further information as the Advisory Committee may require, which may include but not necessarily be limited to, information about the various aspects of the Code from the broiler chicken industry (grower group and processor group), Environment Protection Authority, the Department of Natural Resources and Environment, Department of Infrastructure and local councils;*

- *To hold public hearings as the Advisory Committee may see fit in order to pursue issues raised in written submissions received to the public exhibition of the draft Code or other issues of concern to the Advisory Committee;*

- *To make an interim report to the Minister for Planning and Local Government seeking amendment or extension of these Terms of Reference, if the Advisory Committee sees fit;*

- *To make a final report with recommendations on*
  - the form, content and operation of the Code, and
  - amendment of the Victorian Planning Provisions to implement the Code
  to the Minister for Planning and Local Government as soon as reasonably practicable after the completion of hearings or presentation of other evidence.

A full copy of the Terms of Reference is attached as APPENDIX B.

1.3.3 Advisory Committee process

Notification

After the two-month public exhibition period closed on 10 September 1999, all submitters were notified in writing of the appointment of the Advisory Committee. The letter also advised submitters of the forthcoming directions hearing and public hearing, the purpose of each hearing, and the proposed hearing dates.

All submitters were also forwarded a copy of the Terms of Reference and a Request To Be Heard form. Those wishing to be heard by the Advisory Committee at the public hearing were asked to complete and return the form.

Public Hearings

A directions hearing was held on Tuesday 28 September 1999 in Hearing Room One at Planning Panels Victoria in Melbourne. Directions were given regarding the conduct of the public hearing and the exchange of information prior to the public hearing.

A detailed timetable for the public hearing was prepared on the basis of information provided by submitters. The Advisory Committee resolved to hold hearings in a number of country centres as well as in Melbourne with the purpose of assisting those submitters who live in the country and facilitating the Advisory Committee's inspections of broiler farms.

Dates and venues for the public hearing were as follows:

Date	VENUE
8 November	Planning Panels Victoria, Level 11, Nauru House, Melbourne
9 November	Planning Panels Victoria, Level 11, Nauru House, Melbourne
10 November	Planning Panels Victoria, Level 11, Nauru House, Melbourne
12 November	Planning Panels Victoria, Level 11, Nauru House, Melbourne
15 November	Cardinia Shire Offices, Henty Way, Pakenham
17 November	Baw Baw Shire Offices, Queens Street, Warragul
23 November	Department of Infrastructure Offices, Lansell Street, Bendigo
24 November	Mornington Peninsula Shire Offices, Besgrove Street, Rosebud
2 December	Planning Panels Victoria, Level 11, Nauru House, Melbourne
3 December	Planning Panels Victoria, Level 11, Nauru House, Melbourne

A full list of the 33 submitters who appeared before the Advisory Committee at the public hearings is attached as APPENDIX C.

Inspections

The Advisory Committee undertook a number of inspections with the aim of familiarising itself with the following:

- structure and operation of the broiler industry;
- practices involved in intensive broiler farming;
- a range of broiler farm and shed types;
- key environmental issues; and
- location of broiler farms and relationship to sensitive uses.

Inspections were made of the following broiler farms and broiler industry facilities;

DATE	VENUE	FACILITY
15 November	Mt Ararat Road, NAR NAR GOON	Grower farm 125,600 birds (Morton)
16 November	35 Milners Road, LANG LANG	Grower farm 160,000 birds (Bullen)
‘	435 Bald Hill Road, PAKENHAM	Grower farm 152,000 birds (Van Roy)
‘	Lewis Road, RIPPLEBROOK	Grower farm under construction (Purchase)
23 November	Bria’lie Farm, STRATHFIELDSAYE	Grower farm 160,000 birds (Stephens))
‘	Alukia Farm, LOCKWOOD SOUTH	Grower farm 79,000 birds (Grenfell)
25 November	Ballarto Road, CLYDE	Feed mill (Inghams)
‘	81 Graydens Road, TYABB	Grower farm 86,000 birds (Myers/Coelli)
‘	890 Derril Road, MOOROODUC	Grower farm 129,000 birds (Shaw)
‘	Grant Road, SOMERVILLE	Broiler processing plant (Inghams)

The Advisory Committee was accompanied on all these inspections by either Spencer Field, (Chairman of the Code Committee) or Peter Cransberg (DNRE). At each location the grower, (and in many cases a representative of the processing company) was also present to conduct the tour of the facility and to answer any questions the Advisory Committee may have relating to its operation. The inspections were purely fact-finding visits for the Advisory Committee; submissions relating to the Code were not permitted during inspections.

1.3.4 Consideration of submissions

As stated earlier, a total of 118 submissions were made in response to exhibition of the Code, and 33 of the submitters appeared at the public hearings.

The Advisory Committee has read all the written submissions and heard all submissions made at the public hearings. In this report, it has adopted the approach of identifying and discussing the key issues arising from the submissions, rather than discussing each submission separately. This approach has two distinct advantages – it avoids unnecessary repetition, and allows the report to focus on the principal themes and issues that need to be resolved. In some cases, particularly where an expert evidence is involved, an individual submission may be referred to if it makes a significant contribution to identification, clarification or resolution of an issue.

While some submitters may be disappointed not to see their own submission discussed in detail, they will find that the matters they raised are comprehensively covered under one or more of the ‘Key Issues’ headings.

1.4 IDENTIFICATION OF KEY ISSUES

After reviewing all written submissions to the draft Code, and all matters raised by submitters, professional representatives, expert witnesses and industry and resident representatives at the hearings, the Advisory Committee has identified the key issues and grouped them under the following headings:

Economic sustainability (Key Issue A)

The broiler industry generally, as well as individual growers, highlighted the Code's objective for the 'economically sustainable development and operation of the industry.' Submitters were concerned that the requirements of the Code would place additional costs on growers, particularly for capital investment in land. Emphasis was placed on the need for the industry to remain competitive, particularly against other states. This issue is discussed in detail in Chapter 4 of this report.

Environmental Impacts (Key Issue B)

These issues were the primary concern of residents, the Environment Protection Authority (EPA) and the Department of Natural Resources and Environment (DNRE). There is a long history of residents' complaints about odour, dust and noise, with odour being the primary cause. The EPA has been closely involved in these issues, and also has a joint concern with DNRE with issues surrounding the disposal of litter and dead birds. Resolution of these issues will be the key to the Code's success. (See Chapter 5)

Planning (Key Issue C)

The main concerns for growers related to the nature of the Rural Zone, the issue of encroachment, and the impact of the classification of farms under the Code. For residents, the concerns were the definition of farm classes, particularly where third party notification and appeal rights would not apply; and compliance and enforcement issues regarding rate permit conditions such as landscaping. An issue identified by the Advisory Committee was the scope of the Code, which could perhaps be broadened to cover other species of poultry and other types of poultry farming in which similar planning and environmental problems may arise. (See Chapter 6)

Location (Key Issue D)

These issues revolved around the location of both broiler farms and the industry generally. In particular, the concentration of farms on the Mornington Peninsula was seen as no longer appropriate by many residents; on the other hand, many growers favoured this location because of its proximity to industry infrastructure, and the level of capital investment that had been put into broiler farms in this area over the last 30 or so years. The issue of incentives for relocation also arose in this context. (See Chapter 7)

Complaints (Key Issue E)

Issues surrounding the incidence, lodgment, verification and resolution of complaints were raised by residents and growers alike. Clearly this has been a vexed process in the past and a major cause of conflict. Issues requiring attention include the process for handling of complaints, the roles of Councils and the EPA, roles of growers and processors, and techniques for verification of complaints. (See Chapter 8)

Proposed EMP (Key Issue F)

Under the Code an Environmental Management Plan (EMP) will be required for each new broiler farm and extension of an existing broiler farm. The EMP will be a key instrument in the implementation and the Code and monitoring of environmental standards. One issue was that the draft EMP had been prepared by the industry with minimal consultation, and was only made available to all parties to the hearing at the request of the Advisory Committee. Another issue was the content and potential effectiveness of the draft EMP. A third issue was the need for independent auditing of EMPs. (See Chapter 9)

Animal Welfare (Key Issue G)

Although the Code is not intended as a vehicle for addressing animal welfare, this issue was raised at the hearing. (See Chapter 10)

2. WHY AN INTERIM REPORT?

The Advisory Committee acknowledges the time, energy and commitment given by members of the Code Committee to development of the draft Code, and congratulates all those involved on the quality and thoroughness of their work. The process has been lengthy and consensus sometimes difficult to reach. The Government and the community should be highly appreciative of the industry's continuing commitment and participation in this process, which will benefit the wider community as well as the industry. The draft Code as exhibited provides an excellent blueprint for the Code that will be adopted in its final form.

However, the Advisory Committee has some concerns about the Code in its current form, and believes there are specific deficiencies that need to be addressed before the Advisory Committee is prepared to recommend its adoption. These deficiencies do not involve the overall thrust, format or direction of the draft Code, which is acknowledged to be entirely appropriate for its purpose. Rather, they are specific matters in relation to which the Advisory Committee does not believe it has sufficient information with which to support other elements that will be necessary for its final assessment of the Code.

On the other hand, there are three specific elements of the Code on which the Advisory Committee is satisfied it has appropriate information on which to base final recommendations.

The Advisory Committee has therefore resolved to issue an Interim Report that includes both Final Recommendations and Interim Recommendations.

Final Recommendations are made on the following three elements:

- odour levels to be used in the establishment of buffer distances;
- buffer/separation distances; and
- definition of broiler farm Classes.

Interim Recommendations are made on the following elements in relation to which further investigations need to be undertaken:

- proposed Environmental Management Plan (EMP)
- independent auditing of EMP
- complaints process
- definition of 'best practice' elements
- performance bonds for landscaping works
- single focus on broiler farms

The report also includes detailed discussion of the major issues raised in relation to the Code. The purpose of including discussion of issues at this stage is to provide a context within which the further investigations should proceed. These issues are discussed in detail in the each of

relevant Chapters of this report. Conclusions or recommendations as to the direction that should be taken are made where appropriate.

Pending finalisation of these specific matters, the Advisory Committee does not propose to provide a detailed evaluation of each section of the draft Code in this Interim Report. To do so would be premature when matters have been identified that require re-consideration. The Advisory Committee intends to comment in detail on the Code once it has been revised in line with the recommendations made in this report.

3. THE BROILER INDUSTRY IN VICTORIA

3.1 CURRENT INDUSTRY STRUCTURE

The Victorian broiler industry is characterised by separation of processor and grower. Processors maintain ownership of broilers throughout their life cycle, while growers own the rearing facilities and manage the farm.

Processors are responsible for the genetic stock, provision of feed and preparation of birds for market. Processor interests are represented by the Victorian Chicken Meat Council. There are six major processors in Victoria:

- Eatmore Poultry
- Hazeldene Poultry
- Ingham's Enterprises
- La Ionica
- Marven Poultry
- Steggles (Australian Poultry)

The Code does not attempt to cover planning issues in relation to processors, although their interest is dependent upon the sustainability of the grower's farm.

There are some 225 growers in Victoria, 205 of whom are represented by the Victorian Farmers Federation (VFF). Growers are responsible for rearing broilers from day old chicks until they are mature enough for consumption – usually 5 to 7 weeks. Broilers are housed in specifically designed sheds in the manner of intensive animal husbandry. Free-range broiler farms are the exception rather than the norm. Industry representatives expressed the view that this element of the market is unlikely to achieve significant market share.

Farm sizes range in capacity from 12,000 to 320,000 or more birds per batch. Number of sheds per farm also varies – from single shed farms to large complexes of up to 12 sheds. Single shed farms are often a form of income diversification in association with grain, cattle or other agricultural pursuits. This is because a single shed cannot provide sufficient return to cover both the infrastructure costs of the grower and the transport, farm supervision and support charges of the processor. As bird and shed numbers increase there is less dependency on alternative income sources and economic rewards are greater for both grower and processor. Larger facilities are often highly specialised with significant investment in power, water, road access and shed technology.

Approximately 95% of broiler farms are family owned and operated, and many of these are on relatively small holdings. Data from a 1999 VFF survey (to which 70% of growers responded) indicates that the majority of farms (64% of the sample) are less than 10 hectares in area. The table below shows the results of this survey in relation to farm area.

FARM AREA (HECTARES)	NO. OF FARMS	PERCENTAGE
<2.0	6	4%
2.0 - 3.99	29	2 %
4.0 - 5.99	35	24.5%
6.0 - 7.99	6	4%
8.0 - 9.99	16	11%
10.0 - 11.99	6	4%
12.0 - 13.99	10	7%
14.0 - 15.99	3	2%
16.0 - 19.99	5	3.5%
20.0 - 23.99	10	7%
24.0 - 27.99	6	4%
28.0 - 31.99	2	1.4%
32.0 - 35.99	2	1.4%
36.0 - 39.99	-	-
40.0 - 49.99	5	3%
50.0 - 59.99	-	-
60.0 - 69.99	1	0.7%
70.0 - 79.99	1	0.7%
>80.0	1	0.7%

Farm Area by number and percentage of farms

Broiler farms are located predominantly to the south east of Melbourne, in the municipalities of Cardinia, Mornington Peninsula and Casey. These farms account for 75% of all growers. Most of the remainder are located in the Geelong and Bendigo regions.

Broiler growers are responsible for the provision of land, purpose built sheds, site works, water and power supply, labour and management. Each grower operates under a three-year contract with a designated processor. Whilst growers can move between processors in response to change in market forces, the industry overall shows high levels of stability. This stability reflects consistent growth in demand for chicken meat relative to other meat sources.

The relationship between grower and processor is in part regulated through the *Broiler Chicken Industry Act 1978*. This Act establishes the Victorian Broiler Negotiation Committee (VBINC) to administer the Act and to represent the interests of both growers and processors. The principal role of VBINC is to oversee the contractual relationship between growers and processing companies. The objectives of VBINC as set out in section 8A of the Act are:

- *to create an environment and develop processes that facilitate agreements between growers and processors*
- *to determine prices and recommend terms and conditions that would apply under fair and competitive market conditions; and*
- *to ensure that exploitation of growers does not occur*

During 1999 the *Broiler Chicken Industry Act 1978* was reviewed in accordance with National Competition Policy. The firm KPMG was commissioned by DNRE to undertake the review and prepare a report and recommendations. The report has been made available to the Advisory Committee, and is discussed in Chapter 3.4.1 of this report.

3.2 FUTURE TRENDS

Submissions to the Advisory Committee indicate that the future of the Victorian broiler industry is optimistic. Forecast demand for chicken meat is buoyant and growers continue to commit to farm expansion. More birds mean more and/or bigger sheds. This translates into land pressure as growers attempt to expand within their current locality. It is likely that the single shed farm will continue to decline as both growers and processors seek greater efficiencies.

Several factors suggest that the increase in farm capacity is likely to continue. Shed sizes are increasing – partly due to improved technology and partly due to the reduced labour costs associated with larger size shedding. This means that a grower can increase income without a similar increase in labour costs – provided he has access to land and capital. Several site visits by the Advisory Committee showed expansion not only in the number of sheds but also in the capacity of each shed.

The rate of growth in farm capacity is also determined by the capacity of processing facilities. As facilities improve, processors are able to handle more birds per hour. Hence processing costs reduce and, subject to retail demand, profits rise. The ability of processors to manage an increased number of birds per machine hour is described by the industry as 'scalability.' Current scalability is restricted by the technology used in evisceration equipment. Improvements in automation and capacity of evisceration machinery, already available overseas, will result in larger processing runs, increased throughput, and greater economies of scale. Put simply, growers are limited to the number of birds that processing facilities can handle at any given time.

The *International Benchmarking Study (1997)* was commissioned by the Australian Chicken Meat Federation. The study noted that scalability is a significant cost disability for Australian producers, and that over time savings of up to 11 cents per kilogram may be achieved through economies of scale. This is based on an assumption of that consumption will increase to match production levels. Once processors are able to increase their throughput there will be a natural flow-on to farm size. There will be pressure for growers to supply greater number of birds. The number of small farms comprising one or two sheds will continue to decline.

Where the processor requires more birds per factory hour, the grower must be able to supply more birds per pick-up. Larger farms, whether new farms or existing farms with expanded capacity, will be better placed to service the pick-up schedules of the larger processors. Until this balance is reached, Victoria will not be able to address the scale limitations noted in the International Benchmarking Study.

However, it should be noted that unless import restrictions are lifted, competition in the Victorian industry is internal, or at most interstate. International comparisons of the costs of production therefore have limited applicability. Chicken meat is very competitively priced throughout Australia, as the continued market growth shows. There is no international competition at present. In these circumstances, consumer demand within Victoria is unlikely to fall solely on the basis that chicken meat can be bought cheaper on some overseas countries.

Demand for chicken meat

In Australia the average production of broilers is 7,500,000 birds per week (390,000,000 per annum). Victoria accounts for 27% of production - ie. 2,025,000 birds per week (105,000,000 per annum) or $8m per week in chicken meat sales ($416 million per annum).

Current annual consumption is approximately 30.6kg per capita compared with annual beef/veal consumption of around 33kg per capita. It is anticipated that annual consumption of chicken meat will exceed that of beef during the first decade of the 21st century. With domestic consumption of chicken meat growing at approximately 5% per annum demand forecasts remain buoyant.

The major threat to the broiler industry is the potential for imports. The industry appears very sensitive to imports although only about 10% of world poultry meat production is subject to international trade. As internal demand grows there is concern that existing import restrictions may be reduced fuelling both fears of biosecurity risk and increasing domestic competitive pressures. Imports cause price instability and create competitive barriers where export countries are able to benefit from lower wages, feed costs and/or scale economies.

3.3 CURRENT REGULATORY FRAMEWORK

3.3.1 Current industry regulation

The Victorian broiler Industry is regulated in accordance with the *Broiler Chicken Industry Act 1978*. The primary concern of this regulation is the maintenance of fair terms of trade between grower and processor. Section 12 of the Act stipulates the minimum contractual terms between each party and prohibits both the sale and/or supply of broiler chickens without such a contract. Exemptions are available where the processor and grower are the same person. The Act is administered through a specially constituted committee, the Victorian Broiler Negotiation Committee (VBINC)

The major activity of VBINC is in relation to the settling of disputes and the determination of the Standard Growing Fee. This is the fee paid by processors to growers for the rearing of broilers. The fee is established on a three year basis, with the current fee level expiring on 31 December 2000. The future of the Standard Growing Fee will depend on decisions made by the Victorian Government in response to the National Competition Policy review (see 3.4.1).

The current Standard Growing Fee is established at 49 cents per bird, subject to productivity gains. Productivity gains of +/- 3% are allowed in the model to account for differences in mortality, bird density and batch rates across growers.

Actual returns to growers include both the Standard Growing Fee and any efficiency return due to 'pool' payments. Pool payments are permitted under the Act in order to reward cost efficient growers and to serve as a disincentive to less productive growers. Cost in this instance is defined as processor input charges – ie. cost of chicks, feed and growing fee. All pool arrangements require agreement between processor and grower groups and represent a payment adjustment amongst growers rather than an absolute change in the total cost of live-weight chicken from the point of view of the processor.

There is concern in the industry that the National Competition Policy review may result in a diminution of growers' bargaining power with processors. To address this issue the Government has made a commitment to ensure that growers will be able to negotiate collectively with processors, so that the imbalance of power in the industry does not result in exploitation.

In addition to industry regulation under the *Broiler Chicken Industry Act 1978,* broiler farms are subject to regulatory regimes covering animal welfare, nuisances (under the *Health Act 1958*) and occupational health and safety, as well as State and Commonwealth laws and regulations covering business affairs, trade practices etc.

Broiler farms also need to comply with any relevant Codes of Practice, such as the *Code of Practice for Farm Chemical Spray Application* and the *Environmental Guidelines for Composting and Other Organic Recycling Facilities.*

3.3.2 Current planning/environmental regulation

Planning controls

Under the current planning regime, broiler farms are permitted only in rural zones. A planning permit is required for the establishment or expansion of a broiler farm, and third party notification and appeal rights apply.

The only long-standing policy developed in Victoria specifically for broiler farms is *Broiler Farming – A Policy for the Westernport Region*. The policy was developed by the Westernport Regional Planning and Co-ordination Committee in 1988 in response to local issues. It has been widely used at Council level and by appeal bodies as a reference point for assessing broiler farm applications.

Chapter 4 of the policy sets out a range of requirements for the establishment of broiler farms, including the following locational requirements:

- minimum lot size 8ha
- not to be located where zone would allow 10 or more houses within 400m
- sheds minimum 500m from urban residential zone
- sheds minimum 300m from rural residential zone
- sheds minimum 100m from road frontage
- sheds minimum 40m from side and rear boundary
- sheds minimum 500m from shed on another broiler farm

The policy places a corresponding obligation on the responsible authority not to support rezonings that would establish urban or rural residential zones within the minimum distances specified above, and not to support a new dwelling within 100m of an existing shed. However, given the difficulties created by encroachment of residential uses on broiler farms in recent years in many areas, this aspect of the policy has not been adhered to.

The policy also specifies maximum noise limits at certain days and times. It requires the responsible authority to ensure that health, safety, environmental, landscaping and visual intrusion issues are addressed, although no specific criteria are established against which these could be assessed.

The Westernport policy was a significant advance at the time of its development. However, due to gradual changes in farming practice, increased urbanisation of poultry farming areas, and heightened community awareness of amenity issues, it appears to have outlived its usefulness.

In some cases Councils have introduced specific controls for broiler farms, particularly where land-use conflicts have been a problem. The former Pakenham Planning Scheme, for example, included specific conditions for broiler farms under Clause 28. The new Cardinia Planning Scheme, which supersedes it, includes a specific Local Planning Policy *(Clause 22.05 Interim Broiler Farming)* which has been included to set interim buffer distances (500m to a dwelling or

site for a dwelling) and other requirements, pending finalisation and adoption of the Code. The 500m buffer is taken from the EPA document *Recommended Buffer Distances for Residual Air Emissions.*

Planning issues raised in submissions are discussed in Chapter 5 'Planning Issues'.

Environmental controls

The *Environment Protection Act 1970* is the primary piece of legislation covering environmental matters in the State of Victoria. This Act provides for the establishment of the Environment Protection Authority and defines its powers, duties and functions. The Act also provides a range of statutory tools that can be used to protect the environment.

Subsidiary forms of legislation under the Act include several policies known as State Environment Protection Policies (SEPPs), Regulations and Orders in Council. The Act enables the EPA to issue licences – officially licences to control the emission of wastes in to the environment (air, water bodies and land). It also enables the EPA to issue various abatement notices, eg pollution, noise.

The EPA also issues various guideline documents for specific activities or situations.

The legislative documents of most importance to the broiler industry are:

- State Environment Protection Policy (Air Quality Management)
- State Environment Protection Policy (Waters of Victoria)
- State Environment Protection Policy (Groundwaters of Victoria)
- Industrial Waste Management Policy (Waste Minimisation)
- Interim Guidelines for Control of Noise from Industry in Country Victoria No. 3/8
- Recommended Buffer Distances for Residual Air Emissions AQ 2/86

Broiler farms are not licensed premises under the Act and do not have to submit Works Approvals for developments that may significantly alter discharges of wastes to the environment.

3.4 PROPOSED REGULATORY CHANGES

3.4.1 Proposed industry regulatory change

National Competition Policy Review

The Advisory Committee has had access to the KPMG report (November 1999) titled *National Competition Policy Review of the Broiler Chicken Industry Act 1978*. The report concludes that 'the legislation takes no account of the existence of the *Trade Practices Act 1975* and its application as that has evolved over the last 25 years' and that the protective mechanisms of VBINC are no longer relevant. The report recommends that the *Broiler Industry Act 1978* and *Broiler Chicken Industry Regulations 1992* be repealed. This would result in the disbanding of VBINC.

The repeal of current legislation would allow greater flexibility in relation to farm size, grower selection and fee-setting arrangements. Whilst it is hazardous to predict future trends, it is likely that processors will continue to pressure for larger, less geographically dispersed broiler farms given their own concerns for greater efficiency and cost reductions in transport, pick-up and other farm services.

In relation to the Code, such pressure is likely to increase demand for expansion of current facilities and improvements in shed technologies that allow greater concentration of healthy bird numbers. Broiler farms will tend to increase in size and decrease in dispersion. This will place further demands on infrastructure (roads, power, water) and amenity (landscape, odour, noise). The possibility of the current legislation being repealed in favour of Trade Practices provisions emphasises the importance of a sustainable planning code, given the community impact of intensive poultry farming.

In economic terms KPMG report does not perceive the broiler industry as significant to the total Victorian economy. It accounts for less than 0.2% of Gross State Production. Moreover it is largely comprised of a small number of growers that are increasing output, but remaining constant at approximately 224 growers throughout the last decade.

International trade

The major threat to the industry is overseas importation. However, under international trade agreements, increased scrutiny will be given to the basis for Australia's sanitary barriers. Importation of chicken meat as a result of any reduction in sanitary barriers would require major adjustment from all sectors of the industry. The issue of importation and import restrictions is a Federal matter, and is outside the scope of the Code.

Importation from low wage, low cost countries is the major demand threat. Internal factors of price, infrastructure facilities or legislative changes are seen as less significant to overall viability.

3.4.2 Proposed planning/environmental changes

Planning (the Code)

Introduction of the Code will make no change to the requirement for a planning permit, but will provide a series of consistent criteria against which applications must be assessed.

The Code will be an Incorporated Document in the VPPs. This will bring poultry farming into line with the other main intensive animal industries, cattle feedlots and piggeries. The Codes of Practice for these industries (*Victorian Code for Cattle Feedlots - Department of Agriculture, Energy and Minerals 1995* and *Code of Practice: Piggeries - Health Commission of Victoria and Department of Food and Agriculture 1992)* are already incorporated in the VPPs. Incorporated Documents apply across the state and can only be amended by the Government.

The Code is intended to provide certainty for Councils, applicants and other submitters. It does this by identifying the following 8 key Elements for broiler farm establishment and management:

Element 1 Location and size
Element 2 Design and Construction
Element 3 Air Quality (Odour and Dust)
Element 4 Noise
Element 5 Solid Wastes Management
Element 6 Traffic
Element 7 Landscaping
Element 8 Management and Operations.

Each Element has its own set of Objectives, Criteria and Best Practice Guidelines. Thus it will be clear to applicants what standards they will need to meet before their proposal will be considered by Council.

The Code also sets out clearly the matters that must be addressed in a permit application. A Broiler Farm Development Proposal Form is included as an Appendix to the Code. Applicants are required to complete all three Sections of the Development proposal: information on the proponent and the site; information on the proposal (number of sheds, birds, separation distances, farm class etc); and a response to the Criteria and Guidelines for each Element (Best Practice Farm Design and Operation).

The Form also specifies the plans and documentation that are required to accompany the development proposal.

Under the draft Code, third party notification and appeal rights are waived for Class A farms. Class B and C farms are subject to notification and appeal rights. Class C proposals also require an Environmental Risk Assessment.

This is the statutory framework set out in the draft Code. In the course of this report, the Advisory Committee makes recommendations on adjustments to the definition of the farm classes, and the requirements for each class. However, implementation of these changes will not have a major impact on the statutory implementation of the Code.

Environment

The Advisory Committee is not aware of any proposals for significant changes that would impact on the broiler industry.

4. KEY ISSUE A: ECONOMIC SUSTAINABILITY

4.1 WHAT IS ECONOMIC SUSTAINABILITY

As stated earlier in this report, the Code's main goal is:

> *To provide a framework for the economically and environmentally sustainable development and operation of the broiler farming industry in Victoria; recognising the needs of the industry and the community.*

Unfortunately the Code itself gives no definition for the term 'economic sustainability'. Nor does the Code address the delicate weighting of priorities in relation to economic issues and environmental issues.

Several submissions associated 'economic sustainability' with constant growth and improved profitability. Such submissions suggest that the concept of 'sustainability' implies improved competitive position and overall growth. This is not the Advisory Committee's understanding of the concept of 'sustainability' and it does not appear to be an interpretation generally used in economic texts. The terms 'sustainability' and 'competitiveness' are not necessarily synonymous – particularly at the macro view of a continued Victorian industry.

In the Advisory Committee's view, 'sustainability' in the context of the broiler industry means a continuing capacity to meet a continuing demand. Neither a whole industry nor an individual business has to grow to be sustainable. This concept of the term 'sustainability' is discussed below in relation to land cost, regulation and competition.

Sustainability and land cost

Economic sustainability was often used as an argument in relation to the increased farm area required for Class A and B farms within the Code. Larger land allotments are required to allow for both growth in bird numbers and appropriate separation distances. Larger land allotments have cost imposts in both higher capital cost and higher capital charges through borrowing.

It was argued that the current Standard Grower Fee model fails to adequately recognise and reward increased land investment. This is because the VBINC model treats land as a non-wasting asset and therefore accords it a low rate of return in calculation of the Standard Growing Fee. It is accepted that increases in land holding will have only minor compensation impact under current grower fee arrangements. According to this model, increases in farm size, without relocation, are unlikely to have any significant retail impact.

Growers argue that due to low compensation through the standard fee they are disadvantaged by pressures to increase land investment. The issue is complex because the exact degree of

relative profitability is compounded by differences in borrowing rates and capital appreciation of land in urban and semi rural corridors.

This issue must also be evaluated in the context of the current location and potential relocation of farms, and the variation in land prices across the State. For example, proceeds of the sale of an existing 10 hectare farm on the Mornington Peninsula would be likely to finance the purchase of a much larger farm site further from Melbourne where land values are much lower.

Sustainability and regulation

Whilst VBINC have not defined the term 'economic sustainability' the requirements of the committee are such that it must establish grower prices and recommend terms that would apply under fair and competitive market conditions. Fair and competitive market conditions imply some concept of sustainability. Indeed the cost factors account for sustainability by establishing a model farm. The current VBINC model farm comprises three sheds, or 120,000 birds. This provides an anticipated stock density of 0.5 and mortality of 6% at a batch rate of 5.1 per annum. The subsequent price setting mechanism ensures a fair rate of return and so sustainability for both grower and processor subject to the conditions of the Victorian economy.

The VBINC model farm is not an average of existing farms. Instead it is based on a hypothetical efficient farm given current shed technology and environmental management including litter control.

Sustainability is an industry concept and cannot be analysed by reference to growers in isolation. The industry comprises processors and growers and the strength of the industry is only maintained where the grower output is eventually sold as processed chicken meat. It was not possible to examine processor profitability but it is evident that chicken meat is subject to price constraints given its substitution relative to other meat products.

Planning changes which encourage relocation create pressure on both infrastructure and transport costs. It appears unlikely that these costs would be absorbed without either an appreciable decrease in profit margins or consumer price impact. Any increase in consumer prices has the potential to decrease demand given the high substitution between chicken and other meat sources.

Sustainability and competition

Much discussion at the hearing regarding sustainability was in fact about competition. Industry representatives were both clear and sufficiently researched to indicate a number of cost imposts that would arise given the implementation of the Code in its current format.

In the context of the Code it is unclear that sustainability and competitiveness are interchangeable. Sustainability implies the continuing existence of a viable market. Given the demand prospects for chicken the continued existence of the broiler market is not questioned.

4.2 ECONOMIC FACTORS

4.2.1 Industry-wide factors

In this section Industry wide economic factors are summarised in accordance with Strengths, Weaknesses, Opportunities and Threats (SWOT). This model allows analysis of key factors and provides an overview of the industry trends. The table below lists only those factors of significant economic impact in relation to an environmental strategy for broiler farms.

	INTERNAL	**EXTERNAL**
STRENGTH / OPPORTUNITY	• Shedding Technology	• Consumer Demand
WEAKNESS/ THREAT	• Location	• Imports • Biosecurity • Litter Management

SWOT Summary: broiler industry

Each of the key factors identified in the above table is discussed below.

Shedding Technology

Advancement in shedding technology enables a greater number of birds to be housed under intensive conditions. This provides economic advantages through operating efficiencies subject to the initial capital investment. The efficiencies of advanced shed technology are achieved through savings in relation to provision of infrastructure – power, water; site amenity; accessibility; bird mortality and feed conversion.

Consumer Demand

Growers and processors alike are primarily impacted by market demand. Fortunately consumer demand for chicken meat remains strong with growth estimated at 5% per annum. Much of this growth is associated with increased consumer demand for value added products, for example chicken nuggets, boned thighs, chicken kiev and pre-packaged meals. Value added products are also associated with increased processor returns as companies are now able to differentiate an otherwise homogenous product.

Location

Transport and infrastructure costs are major factors in relation to relative economic advantages of particular locations. The Queensland Code of Practice notes that meat farms should be strategically located in relation to feed mills, processing plants and hatcheries in order to minimise the cost of transporting large tonnages of feedstuffs in, fertile eggs out, day old

chickens and bedding in, and finished chickens and litter out. Infrastructure requirements include provision of three phase power and sufficient water for livestock and cooling systems.

It is increasingly difficult to locate suitable sized land allotments in close proximity to existing infrastructure. As the urban sprawl and hobby farms expand into traditional broiler environs land prices rise and amenity pressures increase. These factors suggest that if the industry is to continue to grow it must address the challenge of relocation.

Imports

Industry representatives are mindful of the threat rep[resented by imports from other States or overseas.

Internationally, Australian chicken meat suffers disadvantages in relation to low wage countries (eg Asia) and America where scale economies in the production process result in lower cost per kilogram. The *1997 Benchmark Study* also identified feed costs as a disincentive to international competitiveness. The issue of feed costs is not addressed in this report, as it is open to further research whether in fact the feed conversion gains compensate for the discounted grain charges available to overseas markets. At the national level, imports are an issue for Federal rather than State planning.

At the national level concern is largely in relation to any government impost that might increase capital investment, for example through relocation of broiler farms or any increase in existing farm size. This may result in a cost disadvantage for Victorian growers relative to their counterparts in other States. Particular concern was raised in the matter of New South Wales where direct supply to Victorian retailers is already occurring.

Biosecurity and litter management

Biosecurity and litter management are addressed in section 5. Where outcomes require a change in practice or an increase in land size the economic argument relates to the cost of land and its impact on the price sensitivity of chicken meat.

4.2.2 FACTORS AFFECTING PROCESSORS

Investment by processors includes processing plants, hatcheries, breeder farms and feedmills. For Victoria this investment is estimated at $375 million. This is direct investment in the broiler industry and excludes the independent feedmill investments of Goodman Fielder (North Melbourne) and Ridley Agriproducts (Packenham). Employment associated with processors represents some 4000 jobs and up to 10000 additional indirect opportunities.

Location is a critical factor impacting the effectiveness of processors. Local processing plants approach world best practice both in operational design and compliance with food standards. Such plants must be housed in secure locations close to available labour with sufficient power,

water and access to markets. Historically these plants were located close to their markets in major cities. Whilst improvements in transportation would allow greater dispersion this is generally resisted due to fears of higher costs and reluctance to abandon the very considerable investment cost in existing factory and/or feed facilities.

Hatcheries and breeder farms are located away from city centres. This is a precaution based on the biosecurity requirements for breeder stock and the need to avoid contamination of genetic material. Recent investment in Hatcheries has centred on the Strathbogie Shire. This shire provides both the necessary isolation, low cost broad acreage and reasonable access to major population centres. Indeed, Strathbogie is keen to encourage additional industry investment in its municipality.

4.2.3 Factors affecting growers

Growers and processors alike are primarily impacted by market demand. Fortunately consumer demand for chicken meat remains strong with growth estimated at 5% per annum. For Victoria this demand translates into an additional investment of some $11m per annum for broiler shedding. A similar amount is required for infrastructure – ie land, site works, power etc.

Modern farms typically consist of 3 to 4 sheds, each of 40,000 bird capacity. Larger farms were also observed by panel members. Based on evidence supplied by the industry there is increasing pressure for expansion – both in shed size and number of sheds per site. Larger farms represent efficiency for both processor and grower. For the grower this efficiency is in the spread of infrastructure costs – ie site works, power and land utilisation. The greater number of birds per farm, the higher return. Recent improvements in shed technology facilitate more intensive husbandry such that new sheds are often designed with capacity in excess of 40,000 birds per batch.

Increasingly processors are encouraging broiler growers to upgrade facilities in line with world best practice. The rational for this is in part cost efficiency but also compliance with the ‘clean’ image of Australian food products coupled with a desire to consistently improve quality. This is monitored through a number of self auditing requirements although this varies substantially across processor groups.

4.3 Economic implications of Code

4.3.1 Economic implications

The Code is an attempt to introduce uniform planning provisions for the siting of broiler farms throughout Victoria. It recommends that broiler farms be approved where they comply with each of the eight elements of the draft Code. Following is a discussion of these elements and the likely economic impact as presented to this Panel.

Economic impact is evaluated from the perspective of the grower. Under current regulations each grower is guaranteed a minimum Standard Growing Fee per bird as determined by VBINC. Where this return is compensated within the model then there is no economic change to grower conditions consequent to the implementation of the Code. Where the model fails to address cost imposts introduced by the Code then there is a net economic loss.

From an industry perspective it is difficult to assess where and how change to any of the planning elements will finally impact either market price or competition. This is because the market is impacted by grower, processor and retail margins. There were no submissions from the retail sector in relation to the Code. Moreover, as noted in the KPMG study, there is insufficient evidence for detailed economic analysis. Consequently the net result from any change in grower margin remains a matter of judgement.

Element 1 Location and Size

Broiler farms are recommended at sufficient size to allow buffer to sensitive environmental use.

VBINC has considered the size and hence investment value of land in the current pricing model. Their cost model is based upon 120,000 birds or three sheds at 40,000 birds each. Investment return is assessed on a land value of $250,000, which represents 25 hectares at $10,000 per hectare.

At 25 hectares, the VBINC model is notionally within the Code parameters. That is, the current Standard Grower Fee rewards growers for investment of capital in accordance with the Code.

The average broiler farm is only 11.25 hectares, substantially less than the requirements of the Code. Therefore, in most cases, existing broiler farms that wish to expand will be required to either purchase additional land or relocate, according to the Code conditions for Class A, B and C farms.

Given the increased residential developments and planning overlays within the shires of Mornington Peninsula, Cardinia and Casey it is becoming increasingly difficult to acquire suitable lots of 25 hectares or greater. Moreover, with siting and boundary constraints, 25 hectares is more likely to be a minimum area for irregular shaped blocks. Compliance with the Code suggests that where expansion is contemplated, relocation may be the only available option.

Element 2 Design and Construction

The Code lists a number of minimum compliance standards with respect to:

- Shed construction and standards
- Road access
- Stormwater drainage
- Water supply
- Water distribution
- Feed systems
- Dam construction

VBINC Standard Growing Fee adopts a return on investment approach that compensates growers for compliance with the above factors. As the fee represents a standard price in reality there may be an advantage for growers operating in rural areas on existing farms when compared with newcomers whose investment has not yet depreciated in financial terms.

Elements 3 and 4 Air Quality (Odour and Dust) and Noise

The objectives of Elements 3 and 4 are to ensure best practice. Best practice is determined by reference to *State Environment Protection Policy (The Air Environment) 1981* and amenity provisions for neighbours. Growers are likely to seek compensation where further investment is required to address issues of odour, dust or noise minimisation.

The Standard Growing Fee does not address issues of environment nor amenity. However to the extent that such requirements may burden either the estimated cost of site works, sundry plant and equipment or shedding costs it is likely that there will be a minor flow-on impact in grower fee and hence industry costs. Current return for these factors accounts for 18% or 9.15 cents per bird.

Element 5 Solid Wastes Management

Best Practice farming operation includes the management of litter, litter removal and dead bird disposal. The Code itself adds little to the requirements for solid waste management beyond that already covered in processor/grower farm management guidelines. However the proposed introduction of *Draft Guidelines for Solid Waste Management* may impose additional imposts not covered in this analysis.

Allowance for litter, dead bird disposal, clean-out and sanitation are compensated on a per batch basis. VBINC does not police compliance with the factors included in its economic analysis. Rather it relies on compliance through processor and grower co-operation and management skills. From a planning perspective, problems will arise where management skills are not in accordance with the assumed model behaviour.

Element 6 Traffic

This element addresses movement to and from the site. Broiler farming involves substantially more traffic movement than traditional livestock industries. For example, the average number of feed deliveries based on 80,000 birds is 17 per batch given a truck capacity of 23 tonnes per load. Extrapolating for the model farm this amounts to over 130 deliveries per annum for feed alone. Additional transport is required for day old chicks, bedding delivery and litter removal, broiler pick-up and casual labour for clean-out and sanitation.

The 'traffic' element impacts on grower returns as proper management requires substantial site works for accessibility, parking and ease of loading and unloading. Traffic, or more correctly transportation costs, also directly impact on processor returns as the processor is responsible for payments associated with both livestock and feed supplies. It is not surprising that some processors establish minimum location parameters as a precondition for grower contracts.

Element 7 Landscaping

Landscaping is required for scenic amenity and noise and dust abatement. The principle economic issues relate to establishment costs and compliance with initial landscaping plans. It is recognised that imposing landscape conditions on broiler farm permits incurs financial costs in order to ensure continued maintenance of noise, dust and scenic amenity. It should be noted, however, that landscaping has usually been required as a permit condition for some years.

The Code does not address the issue of performance instruments (eg. bonds, bank guarantees) which may assist with enforcement of planning conditions. (See Chapter 6.4)

Element 8 Operation and Management

The operation and management of broiler farms has a critical bearing on both environmental and economic efficiency. The Code requires an Environmental Management Plan (EMP) which addresses concerns in relation to odour, dust, chemical spills and sprays, noise, fire and other risk mitigation in accordance with effective management of day to day operations. Likewise some processors require an EMP in accordance with their own self-auditing. Chapter 9 (*Key Issue F: Proposed EMP*) addresses the requirements of an EMP in more detail.

Self-auditing processes are becoming evident in response to food health initiatives and compliance with ISO certification and quality programs.

Unfortunately an EMP was not available at the time the Code was being developed. A draft EMP prepared by the industry was made available during the public hearings, but is not sufficiently developed to serve as a basis for any conclusions. Without an accepted EMP it is difficult to estimate actual cost and return parameters for, investment in land, site works and amenity and increased labour charges associated with either government regulation and/or self imposed audit requirements. (The draft EMP is discussed in Chapter 9.)

4.3.2 Potential impact on industry

Competitive forces imply expansion for the chicken meat industry. Broiler growers and processors may need to expand in order to meet scale economies and optimise investment in fixed resources. At the farm level these cost efficiencies are only sustained through increasing bird capacity – ie increasing the number or size of shedding.

The Code recommends land sizes according to number of chickens. In practice the recommended land holdings are greater than current industry standards. As a consequence, growers on inadequate sites will be required to buy more land or relocate if they wish to expand. Relocation will involve a trade-off for transportation unless processor and/or feedmill facilities follow grower migration. For processors the net impact is an increase in capital investment and subsequent cost penalties.

The analysis for growers is not so clear cut. Growers in high value agricultural and semi-rural locals will benefit from any capital appreciation of their land holdings. If they migrate to broad acres in less productive areas, capital invested in land is likely to be less. It is a matter of individual circumstance as to whether the capital land appreciation will offset any infrastructure replacement costs associated with migration.

The issue for the Code is whether such capital offsets will be matched by improvements in environmental considerations and whether this could be achieved without undue impact on industry sustainability.

4.3.3 Potential impact on growers

It is difficult to estimate the economic impact of the Code on growers given the uncertainty associated with a review of current pricing regulations and the lack of definitive EMP requirements. The latter are of economic concern both in relation to operations and investments.

Operational issues that are likely to be impacted by an EMP include:

- audit and planning fees
- litter disposal
- power, water and gas consumption
- bedding cost changes
- additional site maintenance and associated charges
- casual labour
- traffic management

Investment issues likely to be impacted by EMP recommendations include:

- shed design and construction
- land size requirements
- location restrictions

Current pricing regulations allow for a re-estimation of the Standard Growing Fee on a triennial basis. To the extent that the Code impacts the determination of a model farm any impact will flow into the next VBINC fee negotiations. Such flow on may well compensate the grower whilst simply moving cost pressures to the processor. Processors in turn may either absorb cost or pass these to retailers. At the Retail level costs can cause price rises or pressure margins. In any circumstance the exact outcome is complicated by the suggestions of the KPMG study.

The KPMG National Competition Policy Review of the *Broiler Chicken Industry Act 1978* suggested that current chicken meat production costs may be about 1.2 per cent higher than they otherwise would be due to VBINC's fee setting. It should be noted that the review considered a limited number of factors, while the Code and any new planning arrangements must take a much broader approach.

4.4 OVERALL CONCLUSIONS

The Advisory Committee recognises that the primary economic impact of the Code will be through Element 1: Location and Size. Other Elements, though equally important from a public perspective, are largely accounted for through their impact on land size and/or a trade-off between improved technology (Element 2) and boundary buffer and separation distances.

Where the Code anticipates increased farm size for business expansion it is likely that there will be added costs for both processor and grower. It has not been established, however, that this will result in an 'unsustainable' industry. There is some evidence that Code conditions in relation to best practice and land management will favour larger farms, to the disadvantage of smaller Class C farms. The Committee is reminded that such movement is consistent with the findings from the International Benchmarking Study (see Chapter 3.2) which argued for improved scalability for both processor and broiler facilities.

One of the Code's stated objectives is to 'safeguard investment in the broiler chicken industry in Victoria.' Indeed, the whole point of the Code is to provide certainty so that good investment will be safeguarded in the long term. It does not mean, however, that **all** investment must be protected forever. The Code makes sensible distinctions between sustainable and unsustainable farms. It would be hard to argue that investment in an unsustainable farm should be 'safeguarded' beyond the extent that it can continue operating at its current level.

Some Elements in the Code formalise existing requirements rather than impose new ones. For example, shed design and construction and litter disposal requirements set out in the Code are already industry standards that would need to be met in the establishment of a new farm.

The Advisory Committee notes that increased land holdings required under the Code for a broiler farm put pressure on the long-term viability of the industry in the Mornington Peninsula area. This issue is discussed in Chapter 7 of the report.

5. KEY ISSUE B: ENVIRONMENTAL IMPACTS

5.1 ODOUR

5.1.1 Introduction

Odours are one of the most difficult environmental problems to assess and manage. Unless we have impaired odour detection, we all experience odours but our own perception of an odour may be somewhat different to the perception of the same odour by others. Some odours are experienced as pleasant sensations while others produce negative effects, ranging from mild irritation to a strong desire for avoidance. Our attitude that determines whether an odour is pleasant or not is very much a learned response.

From an environmental perspective, odours are a nuisance that affects the amenity of a person or a section of the community. In more severe cases, odours can produce ill health, e.g. nausea, headache, sore throat, etc. Repeated exposures to a nuisance odour can lead to annoyance and result in people lodging complaints with the Council or EPA .

It is important to note that odour is not necessarily related to toxicity and in general terms odour should not be treated as being synonymous with toxicity. Odour depends on the chemical structure of a substance and the sensitivity of certain nerve endings in our noses to the various chemical structures. For example, the human nose is sensitive to a range of compounds containing sulphur. Rotten egg gas (hydrogen sulphide) is an example of a substance that is highly odorous and highly toxic. The chemicals added to natural gas to provide an odour for safety reasons (mercaptans) are substances that are highly odorous but have low toxicity. On the other hand, carbon monoxide is toxic at relatively low doses but is not detectable by smell.

Understanding odours

Mr Ormerod, on behalf of the VFF, provided the Advisory Committee with a very comprehensive understanding of odours. He advised that different people have different levels of sensitivity to odour. Some people are at least 100 times more sensitive than others. Individuals who are sensitive to odour are the most likely to be annoyed and to complain.

Mr Ormerod referred to information from the scientific literature showing that analyses of community odour exposure have identified five factors that are important in determining the potential for annoyance and complaint (FIDOL factors, NZ Ministry for the Environment, 1995):

- Frequency;
- Intensity;
- Duration;
- Offensiveness; and
- Location.

Generally, the greater the frequency, intensity, duration and offensiveness of an odour, the more likely it is to cause annoyance and lead to complaints.

Mr Ormerod pointed out that the relationship between the perceived strength or intensity of an odour and the concentration of the chemical(s) causing the odour has the general form of a power law. That is, if the odour (chemical) concentration increases by say tenfold, the perceived strength or intensity will increase by a much lesser amount. He stated that:

> *'This relationship is relevant in interpreting modelling results. Dispersion modelling of odour deals with odour concentrations rather than intensities. A predicted odour concentration of, say, 50 Odour Units (OU) will, for typical odours, be perceived to be 3 times as intense as an odour of 5 OU instead of 10 times as intense.'*

Measurement of odours

Odour measurement is difficult, as it is not usually amenable to exact scientific measurement such as a chemical analysis of the concentration of a substance in water or in air. Because odour is a sensation, it is subject to considerable variation between humans – some people can detect odours more readily than others and the perception of an odour can also vary considerably.

The method used to objectively measure odours uses a panel of people who have been evaluated for their ability to discern odours. The people selected to be members of an odour panel are typically people who have 'a good nose' for odours but who are not the people with the most sensitive noses.

The form of measurement used by odour panels is known as dynamic olfactometry. The assessment by dynamic olfactometry of the level of odour in a sample of air requires the use of a special laboratory with equipment that enables samples of air to be presented individually to each odour panellist.

This laboratory method involves the preparation of a series of mixtures of odorous air and odour-free air and their presentation in sequence to the odour panel. The panel members are in separate cubicles and are presented with a mixture without knowing what mixture is being presented to them. The mixture is delivered from its preparation area via inert tubing to an outlet(s) in the form of a glass funnel(s) or wide tube(s) in each cubicle.

Panel members briefly smell each mixture and provide an answer as to whether they can detect an odour, or when two mixtures are presented via two outlets whether one mixture is more readily detected than the other. Communication of their answers is via a non-verbal mechanism, ie. by pressing buttons that automatically record each panellist's answers.

For a given sample of odorous air, a threshold is determined, which is the number of dilutions of the original sample with odour-free air that has been made that results in 50% of the panel members detecting the presence of an odour and 50% not detecting it. The number of dilutions

required to reach the threshold is expressed as the level of odour in the original sample and is usually expressed in odour units (ou or OU). Although odour units are dimensionless ratios, odours measured by dynamic olfactometry are often expressed as odour units per cubic metre (OU/m^3).

During the hearings, the Advisory Committee was informed that there are two dynamic olfactometry methods used in Australia. The Victorian EPA devised its own test method same years ago and this method, which relies on the odour panel comparing paired mixtures in each test, is known as the B2 method. European odour specialists have evolved another test that uses butanol as a standard odour for comparison during tests. This method is known as the CEN method and Standards Australia has a draft method based on CEN under consideration as a potential standard methodology for Australia.

The two tests do not give the same answer for a given odorous sample of air. In general terms, the number of odour units as measured by the CEN method are very approximately twice the number of odour units as measured by the B2 method for the same sample of odorous air.

Odours as an amenity issue

The Victorian *Environment Protection Act 1970* is the statutory basis for protection against odours. The Act provides for the protection from odour pollution with the onus on polluters to ensure discharges to the atmosphere are inoffensive.

More specific requirements for the control of odours are included in the *State Environment Protection Policy (Air Quality Management)*. This policy lists substances that are odorous as Class 2 indicators, and requires that where an odour level can be determined from a source, a design ground level concentration (DGLC) of one odour unit ***may*** be applied in the calculation of chimney heights. The fact that the word ***may*** is used indicates that there is some degree of flexibility in the management of odour levels in ambient air. In implementing the requirements to manage odours, the EPA is more concerned with offensive odours than with any odour that might be detected.

Guidelines for the control of odours are included the document *Recommended Buffer Distances for Residual Air Emissions (EPA 1990, AQ 2/86)*. These guidelines emphasise that routine emissions of pollutants, including odours, need to be avoided and if necessary controlled by appropriate on-site or in-house mechanisms. The buffer distances shown in the document are designed to alleviate the effects for abnormal discharges such as those that might be emitted due to ***upset*** conditions. The buffer distances are not meant to be used for the dispersion of ***normal*** discharges of wastes. This is a key concept for the consideration of any emissions of odour where the odour might be considered to be offensive.

Section 42 of the *Health Act 1958* is also relevant to the control of nuisances, such as odours. Under this section, a person must not cause a nuisance, or knowingly allow or suffer a nuisance to exist on or emanate from any land owned or occupied by or in the charge of that person. A fine may be imposed for a breach of this section.

5.1.2 Sources of odours from broiler farms

During its inspections of a number of broiler sheds, the Advisory Committee experienced and understood the fact that the raising of broilers is inherently an odour-producing process. It is an intensive form of animal husbandry and like other forms of intensive animal farming (eg. intensive piggeries and cattle feedlots) odours are produced due to the intensity of the processes used.

With broilers, the birds are a primary source of odour. Bird body odour is readily detected in sheds because of the number of birds in a confined area. As the birds grow in size, the odour generation increases, ie. odour is related to biomass of live birds. Emissions of body odour by the birds will temporarily increase from time to time, for example when the birds waken and begin to stretch and move around in the sheds early in the morning.

The litter that forms the floor of an active broiler shed is a mixture containing organic materials such as rice hulls and the birds stand and sit on this litter. The litter is a source of odour, especially if it becomes wet. Wet litter leads to the development of anaerobic conditions within the litter and this can lead to the generation of some of the more odorous compounds.

Droppings from the birds that fall on the litter will generate some level of odour such as ammonia, a compound that results from the decay of the nitrogenous waste materials (primarily uric acid) in the droppings. Under some conditions, the concentration of ammonia in the air within a broiler shed will increase to a level where a person with an average ability to discern odours will readily detect the ammonia.

Odours are also generated by the physical procedures in removing used litter from sheds after a batch of broilers has been harvested. The level of odour may also become offensive if the used litter is stored on the broiler farm for an extended period. However some growers stated that the hard crust that typically forms on a pile of used litter would prevent the litter from becoming an odour problem. The Advisory Committee observed this effect on one farm.

Inappropriate on-farm composting, for example of dead birds, can also lead to odour problems. However, good farm management and the use of specifically designed composting equipment can avoid the generation of unacceptable levels of odour.

The use of odorous disinfectants and pesticides in sheds during the clean-out between batches of broilers has sometimes created odour problems. Better management practices such as ensuring doors and other openings are kept closed after the disinfection treatment should minimise odour problems away from the sheds. The use of less odorous products by the grower or treatment contractor can reduce the potential for this sort of odour problem.

Emissions of odours from broiler sheds

To maintain the required environmental conditions (especially of temperature and humidity) within relatively narrow limits, the air inside a shed needs frequent exchanges with the outside air. Consequently all sheds, irrespective of their design, need air movement across the birds using

fresh air coming in from outside and expulsion of ***used*** air into the outside environment. The air expelled from the sheds contains odorous components from the broilers, the litter, the feed, etc.

The broiler industry representatives and a number of individual growers stated quite emphatically that good farm management and the procedures adopted by each grower were of paramount importance in minimising the generation of odours. It is important to appreciate that this means:

- minimising odours and does not mean zero odour emissions; and
- potential to generate a greater level of odour increases as the birds grow.

5.1.3 Abnormal generation of odours

From time to time 'upset' conditions can arise within sheds that lead to emissions that are highly odorous. The development of these 'upset' conditions does not appear to be well understood in detail. However a number of situations can be associated with the development of abnormal odorous emissions:

- poor farm management.
- the occurrence of large areas of wet litter and the consequent development of anaerobic conditions within the wet litter.
- the use of inappropriate feed for the birds.
- long spells of very hot weather resulting in a need to use water for cooling, eg via foggers

DNRE stated in their presentation that litter moisture appears to be correlated with shed odour concentration, and that litter moisture explains about 50% of odour generated. Optimum moisture at 6 – 7 weeks seems likely to be 28 - 30%. However there appear to be other factors also involved in the generation of odours.

In understanding the potential for odour problems to arise from broiler production, it is clear that the process is inherently odorous and that upset conditions can lead to significant odour problems and result in complaints by neighbours.

It is also clear that the technology used by the industry, such as the computer control of the environment within sheds and of the exhaust fans on tunnel sheds to expel air, forms a basis for the prevention of excess odours. However the current technology used in newer sheds using an integrated set of computer controlled fans to expel ***used*** air (containing some level of odour) is not a high level of technology for the dispersion of odorous emissions. Furthermore, the technology does little to control or treat odour emissions should a significant odour problem arise.

5.1.4 Dispersion of odours

When odour emissions generated within sheds are normal, the odours that are emitted from the sheds will usually be dispersed by the meteorological conditions, especially wind. Very windy conditions help to disperse odours so that they are less likely to be detected away from the broiler

sheds, although periodic and perhaps fleeting detection of odours may occur downwind of the sheds.

However, meteorological conditions that result in limited dispersion of odours such as wind calms, temperature inversions and cool air drainage flows, can lead to off-site odour problems.

Wind calms usually occur at early evening, during the night and especially early morning. Wind calms can also occur during the day when meteorological conditions are stable, but the incidence of these types of wind calms is far less than at other times. Consequently it is not surprising that odour problems encountered by neighbours are more likely to occur during evening, night and early morning.

Air, being a fluid, will flow downhill if meteorological conditions do not disperse it. This process can result in drainage flows of cool (more dense) air. Air containing odorous compounds from a source at a higher elevation will flow down a valley or across sloping areas of land. Like wind calms, these flows will usually be experienced in the evening, at night and early in the morning. Evidence was given to the Advisory Committee of odour incidents encountered by neighbours that would appear to be a result of cool air drainage.

However there was also evidence presented to the Advisory Committee that indicated that odours had apparently moved uphill from a broiler farm at a lower elevation. It was not possible for the Advisory Committee to fully assess this example of an odour problem. It could be postulated that warm air from a broiler shed could have moved upward over cooler air and then as the odorous air mass cooled it produced a 'ground strike' as can occur with emissions from a chimney stack.

5.1.5 Prevention & management of odour problems

The importance of good farm management

A number of broiler growers stressed to the Advisory Committee that good management of broiler sheds would avoid odour problems. However, this is a very generalised view, and questioning of presenters and growers at hearings and during inspections of broiler farms about what constitutes good management failed to elicit much detail.

However one clear example of good farm management that was readily identified was the amount of time that a grower spends inside the sheds. Frequent inspections of the birds to remove any dead or sick birds and to insure that feed, water and ventilation systems were operating properly is an important aspect of good farm management.

Attention to biosecurity requirements was also seen as a component of good farm management.

The importance of modern technology

It was apparent to the Advisory Committee, as a result of inspections of broiler sheds and the information provided by growers, that the use of computer controlled ventilation systems was an important development for the industry. It had enabled growers to better control and maintain the environmental conditions in their sheds than is possible with purely manual ventilation systems.

The use of improved systems to deliver drinking water to the birds had reduced the potential for water spillage onto the litter. As indicated above, the need to prevent litter from becoming wet was a primary concern for growers. There was no doubt that wet litter was widely recognised as a cause of abnormal generation of odours.

There was also a general view amongst growers that the installation of evaporative coolers in place of foggers to control high temperatures inside the sheds was desirable as the coolers were less likely to produce an increase in wetness of litter during long periods of hot weather. Again this illustrated that wet litter was a major source of abnormal odours.

While tunnel sheds with their banks of extraction fans are generally considered to be the best form of broiler shed, there was also a view held by a number of growers that most forms of sheds could be operated successfully without producing major odour problems.

Although it appeared that most growers viewed modern technology very favourably, it was obvious to the Advisory Committee that the field staff of the processors performed an important role in monitoring grower performance in using modern technology and in providing advice to growers. Their role may well have been a very positive contribution in influencing growers to adopt modern technology.

Curative actions for odour incidents

While there is little doubt that growers recognise that preventing odour problems is their first responsibility, the actions to take when an odour problem has arisen is probably a more difficult responsibility to implement.

The role of the processors' field staff in advising growers how to avoid odour problems, and more importantly, to determine what action to take to handle an odour problem once it had occurred, appeared to the Advisory Committee to be very important. For example, the decision to harvest birds (provided they had reached a useable size) from a shed with an odour problem is one way that growers and processors can co-operate to help reduce the pressure within the shed that has contributed to the generation of the odour problem.

Since wet litter is so well recognised as a source of abnormal odour levels, growers need to be able to take action immediately to remove areas of wet litter. This may be a relatively easy task when the birds are young and there is plenty of room within the shed to allow the birds to be moved away from the wet areas and the wet litter taken from the shed and disposed of (without creating another odour problem). It is obviously a more difficult problem to remove large areas of wet litter when the birds are larger and there is less space available in a shed. This situation

would be accentuated if a major wet letter problem occurred prior to the birds reaching a stage where some of them could be harvested.

The Advisory Committee was informed that occasionally an odour problem develops as a result of an abnormal batch of feed being delivered to and then used by a grower. The feed may be different because of the quality of the grain in the feed, the use of a non-normal component by the feed mill, or some other change in the ingredients used in the production of the feed. It is in the best interests of the feed millers and the growers for the millers to provide a consistent standard of high quality feed.

The use of abnormal feed may produce a change in the droppings of the birds (eg. watery droppings) which leads to the generation of odour in the litter. Under these conditions, the grower needs not only to recognise the existence of an on-going odour problem but also to determine what has caused the problem, ie. a change in feed composition. Rapid action to replace the feed with on-grade material is needed to minimise continuance of the problem.

Other potential mechanisms that should be carefully considered are technologies that actually control or treat odours:

- installation of biofilters,
- incorporation of some form of simple odour scrubbing of air emissions, especially one that could periodically be used when dispersion of emissions is poor,
- use of masking odorants to help alleviate severe odour incidents.

New technology does not negate the need for growers to carry out preventative measures or to follow best practice. The potential for new technology is considered in greater detail in a separate section of this report. The Advisory Committee recognises that the installation of some forms of new technology may be expensive.

However the broiler industry should appreciate that the required buffer distances can generally be significantly reduced compared with the EPA guideline buffer distances. This requires the grower to demonstrate that the installation and effective operation of improved technology will significantly reduce the probability of the occurrence of abnormal or upset odour conditions.

It is the Advisory Committee's view that the principle of being able to have reduced buffer distances from those recommended should apply equally to intensive animal husbandry industries (such as broiler production), as it does to the more conventional secondary industries.

5.1.6 Modelling of the dispersion of odours

Mr Tim Pollock of Egis Consulting Australia, on behalf of the VFF, presented details of some computer modelling of odours from broiler sheds. The Advisory Committee was pleased to see that there had been modelling of odours from broiler farms in Victoria and that it has also been carried out by various odour specialists in a number of the other States.

While the results of the modelling of the dispersion of odours cannot be taken as providing exact determinations of odour levels at various locations around an odour source, the results of odour modelling can be very useful in assessing the likely impact of odours. This is not meant as a criticism of odour modelling but simply reflects the reality of using odour modelling.

In his presentation to the Advisory Committee, Mr Pollock described three levels of dispersion modelling (course, fine and simulation) with different levels of sophistication that reflect the quality of data inputs and the degree of sophistication of the output required. This graded approach to modelling seemed to the Advisory Committee to be sensible and appropriate if used by people with appropriate expertise.

Of prime importance to any modelling is the quality of input data, especially the odour emission rate (OER) measured in odour units. It was stated in Mr Pollock's submission that the OER is dependent on a number of variables:

(a) age and number of birds;
(b) feed type;
(c) litter moisture content;
(d) ambient temperature; and
(e) ventilation system.

It was also stated that variables (a) and (d) were the most important in determining OER.

Effect of age and number of birds on odour emission rates

The effect of age and number of birds on OER, derived from work done in Western Australia, is illustrated in the table below. The table shows measured rates of ammonia levels in broiler shed air space over time. The usefulness of the data depends on the assumption that ammonia is an adequate surrogate for broiler shed odour. The table was included in a document provided to the Advisory Committee.

Age in weeks:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mean weekly NH_3 conc. ppm	0.5	0.67	2.15	5.65	9.1	8.7	5.3	4.9
% of Week 5 level	5.6	7.5	24	62	100	96	58	54
Age factor	0.056	0.074	0.24	0.62	1	0.96	0.58	0.54

Variation in ammonia levels in broiler sheds over time

The reduction in ammonia level after week 5 reflects the removal of birds due to harvesting.

The influence of the number of birds on OER is a direct relationship so that the greater number of birds (or in practice the greater the number of standard 40,000 bird sheds), the greater the total OER from the broiler farm.

Effect of ambient temperature on odour emission rates

The effect of ambient temperature on OER is a reflection of the need to expel more air from sheds as the ambient air temperature rises. That is, it is a result of the need to keep the temperature within the sheds at a constant level, and this requires more air exchanges.

Measurements were made of OER from two tunnel sheds fitted with fan forced air exchanges and these were correlated with the respective ambient air temperatures. The relationship derived was a direct line relationship that could be expressed as:

OER per 1000 birds = 27.16 x ambient air temperature – 265.7

The correlation indicates that OER increases from around 70 at 12º C to about 440 at 26º C.

In his submission to the Advisory Committee, Mr Pollock made the following conclusion.

> *'The incorporation of batch age and temperature factors on shed OERs leads to predicted odour impacts in accord with odour complaint experience – in contrast to the model results when fixed shed OER is used.'*

Input data for use in Ausplume modelling

As with any form of computerised calculation, the reliability and realism of the generated output is dependent on the quality of the input data. In the case of odour dispersion modelling this applies to such input data as odour emission rates, the location and height of emission points and receptor points, meteorological data, etc.

As has already been inferred in previous discussion in this report, the OER input data should be in two categories – normal broiler shed operation and abnormal or upset conditions. This need for two sets of data does not appear to have been fulfilled as all the odour dispersion modelling has concentrated on what might be classed as normal operating conditions.

This concern about the quality of input data was identified and expounded upon by one submitter, Dr Terry Bellair appeared on his own initiative as an independent consultant. In his presentation, Dr Bellair was very critical of the OER data used as the basis of the Egis report and suggested that the broiler industry had not spent sufficient money to enable better OER data to be collected. He was especially critical of the lack of OER data for situations that would be classified as upset conditions, for example where wet litter produced anaerobic conditions and consequent high OERs were likely to have very annoying effects on neighbours.

Dr Bellair was also very critical of the procedures used by the Centre for Water & Waste Technology (CWWT) at the University of NSW for the collection, handling and transport of odorous air samples collected in Victoria and sent to the CWWT odour laboratory. The data generated was used in the Egis report. His criticism concentrated on the lack of pre-dilution of the odorous air samples, the potential effect of low temperatures during the flight between Melbourne and Sydney and the relatively long delay between sampling and assessment of the samples in the odour laboratory.

Other criticisms related to the derivation of the relationship between OER and the temperature difference between inside the shed and the ambient air. The unreliability of the assessment of the odour levels in samples mentioned above, and the use of ambient temperature measurements taken at Dandenong instead of on-site temperature recordings led Dr Bellair to the conclusion that the relationship was not substantiated.

Mr Pollock made his presentation after Dr Bellair had appeared before the Advisory Committee. He was therefore able to respond to Dr Bellair's criticisms. He provided information about further experimental work that had been undertaken to evaluate the acceptability of the original samples that were assessed by CWWT. This indicated that the temperature of the samples was unlikely to have fallen to the relevant dew point during transportation. The levels of odour between duplicate samples were considered to be within the analytical error for the dynamic olfactometry test.

To illustrate the variation in OERs the following are values shown in the Egis report and are from the work carried out and published by CWWT. The OERs are for various broiler farms in NSW and Victoria with variations in the number of sheds and numbers of bird numbers per farm.

> *Shed OER per 1000 birds (in odour units) were 311, 322, 405, 474, 483, 518 and 579.*
> *The basic OER per 1000 birds value used by Egis in their modelling was 330 and this is similar to an OER per 1000 birds determined by the EPA in a sampling trial in 1986.*

The Advisory Committee is very concerned about the inadequacy of odour emission rates, especially the lack of emission rates for abnormal or 'upset' conditions.

Because the EPA buffer distances are designed for residual air emissions and not normal operating conditions, the odour modelling that has been undertaken is not sufficient to assess appropriate distances to sensitive land uses. However the modelling is useful for assessing buffer distances to the boundaries of the broiler farms. (See Chapter 5.4 Buffer and Separation Distances for further discussion and recommendations on these matters.)

Multiple shed emissions and the 'centroid' concept

A technique proposed by Egis is for groups of sheds, especially tunnel sheds with fan forced ventilation, to be considered as a group so that for simplicity all emissions coming from the sheds would be considered as being equivalent to the total emissions coming from the 'centroid'. The adoption of this concept could make the definition of buffer distances easier.

Mr Pollock showed that for four parallel sheds with the same orientation, the odour modelling showed very little difference in odour contours between modelling of the four sheds as independent sources of odour and using the 'centroid' concept with an equivalent single source of odour.

However when sheds were more separated and where cross flow ventilation was used, it was clear that the 'centroid' concept was much more problematic to implement.

A number of submitters were against the 'centroid' concept and were more concerned with a specification of a separation distance based on the distance between the edge of a shed and the nearest boundary or a nearby residence.

The Advisory Committee has considered the usefulness of the 'centroid' concept and has concluded that the emission points are the key to the determination of buffer distances. The difficulty that is inherent in examining how the location of emissions should be considered is the variation in shed design that exists within the industry.

Tunnel sheds with fan forced ventilation is probably the simplest case for identifying emission points. The problem becomes more complex with sheds with cross flow ventilation. The technique used by Mr Pollock of considering such sheds as being divided into equal sections, eg 8 sections along the length of a shed, with each section being considered as an emission point, is a useful procedure and is easily understood. Sheds with a combination of side or end emissions together with roof ventilation are more complex and the location and relative strengths of all emissions need to be considered.

In view of the quite wide variation in shed design and the relative influence of the size and location of the emission 'points', the Advisory Committee has concluded that the 'centroid' concept, whilst having some value, is not adequate for all situations. On balance the Committee finds that the concept should be rejected, except for use for a single fan forced tunnel shed or a group of such sheds aligned together with fan emission points close together.

Like the lack of sufficient odour emission rates, there appears to be a lack of specific knowledge of the exiting flows of air from the range of shed designs and ventilation systems used.

> ***The Advisory Committee recommends that the industry undertake further assessment of flows of air (and their odour content) from a range of designs of broiler sheds and ventilation systems. This could be undertaken in conjunction with further studies of odour emission rates as recommended in Chapter 5.4.***

Ausplume modelling of odour dispersion

Detailed explanations of how modelling was undertaken using the Ausplume dispersion model were provided by Mr Pollock. This included the derivation of the following relationship:

$$D \propto N^{0.57}$$

where D = buffer distance required for say 5 or 10 OU_{CEN} and N = number of standard broiler sheds of 40,000 birds capacity.

Examples of dispersion modelling of contours of odour levels were provided by Mr Pollock for varying situations, eg. different number of sheds on a broiler farm, different OERs, peak to mean ratios of odour emissions, and use of stacks on broiler sheds.

The modelling undertaken by Mr Pollock and his colleagues for the VFF was used to develop the suggested buffer distances in the VFF submission. These are considered in more detail under the section dealing with buffer distances.

Modelling of the addition of stacks to shed emission points

Both Mr Pollock and the EPA provided contour plots of odour levels derived by modelling the effect of fitting stacks to a group of 4 broiler sheds. The contours of odour levels when stacks were fitted were compared with those where no stacks were installed.

Although the two sets of modelling used different input data, both showed that when emissions are made via stacks the dispersion of odour is far greater.

Mr Pollock concluded:

'Stacks either on duty fans, or on ridgelines fans, can provide up to four-fold reductions in predicted 99.5% GLCs, and may enable a farm to obtain compliance when separation distances to nearest residences are short.'

The Advisory Committee has concluded that the broiler industry and individual growers need to do much more to manage abnormal odour generation and to alleviate the problems that they cause. In this regard, the evaluation of chimney stacks to increase the dispersion of odours is a welcome initiative.

The Advisory Committee finds that the modelling of stacks has produced encouraging results and that the broiler industry should further investigate and assess the cost-effectiveness of fitting stacks to sheds. It seems likely that some emission outlets will provide the greatest benefit from the fitting of stacks and that the fitting of stacks to all outlets would be most unlikely to be justified on economic or effectiveness grounds.

5.1.7 Conclusions

Odour is an inherent characteristic of the broiler industry and the potential for odour problems as an amenity issue is well recognised by the industry. The industry rightly concentrates on

preventing odours, but 'upsets' that lead to abnormal odour generation do occur and these incidents can result in numerous odour complaints from neighbours.

New technology has been adopted by the industry and this can help prevent odour problems. However there is a need for the industry to seek improved technology for controlling odour emissions.

While good broiler farm management can reduce the potential for significant odour incidents, it is necessary to allow for the occurrence of odour incidents by requiring relatively large buffer distances (‘00s metres) from sheds to property boundaries and to neighbouring residences.

Dispersion modelling is a useful tool for predicting odour levels around broiler farms but the quality and quantity of input data, especially odour emission rates, is limited and emission rates for 'upset' conditions is lacking.

Limited modelling of the effects of stacks on broiler sheds has shown that stacks can be very effective in reducing the impacts of odour on surrounding properties.

This discussion of odours is a lead-up to the discussion of buffer distances. The conclusions relative to the establishment of the criterion for risk assessment odour modelling for the broiler industry is included in the Chapter 5.4 Buffer and Separation Distances, as are the discussion and recommendations for odour buffer distances.

5.2 DUST

5.2.1 Introduction

The effect of dust can be an amenity issue or a health concern, depending on the concentration, composition and fineness of the dust particles.

In its submission the EPA described the dust problems associated with broiler sheds in the following way:

> *'Dust can be a physical irritant, as well as pose a respiratory effect due to the organic components (organic, biologically active materials that react with the respiratory system include feather particles, skin cells, moulds, fungi and bacteria.). Where residents are located close to sheds, there are greater health risks posed by respirable dust. The respirable fraction is not visible to the naked eye (particles are less than 10 microns in size) and can be inhaled deeply into the lungs. Endotoxins produced by bacteria are also found in the dust components and these are strong allergins. Dust may also be a significant contributor to odour.'*

As in the case of odours, the Victorian *Environment Protection Act 1970* is the statutory basis for protection against the effects of dust.

The *State Environment Protection Policy (Air Quality Management)* lists dust as a Class 2 indicator (like odours) and its inclusion is primarily on the basis of toxicity (health effects). A design ground level concentration (DGLC) of 0.33 mg/m^3 is set as a design criteria for the calculation of chimney heights to achieve protection of beneficial uses, e.g. life, health and well being of humans and other forms of life. The SEPP enables the EPA to control emissions of dust that create or are likely to create objectionable conditions for the public.

The Department of Human Services (DHS) also uses guideline dust concentrations as mechanisms to assess various forms of development so as to achieve dust levels in ambient air at sensitive land uses, such as residences, that is protective of human health. The approach taken by DHS is based on the accepted views of health experts that even low levels of dust can have an impact on human health. Therefore dust levels need to be assessed on the basis of an acceptable level of risk to the community.

Measurement of dust

The size of particles in the ambient air that typically produce the dust that covers surfaces and so reduce amenity, are measured in devices known as dust deposit gauges. These devices rely on the gravitational settling of dust particles over time, with the dust typically being collected over a period of 30 days. More intensive sampling could be used in very dusty situations or for very specific evaluations. The dust trapped in the deposit gauge may be examined microscopically

and/or chemically analysed and these forms of assessment may be used to identify the source(s) of the dust.

The much finer forms of dust are measured in more sophisticated and expensive equipment that involve the drawing of air (using an air pump) into such devices as a high volume or a low volume air sampler. Inside the sampler, the air is drawn through a large filter made of special paper or other material with the result that dust particles are trapped on the filter material while the gaseous components of air pass out of the sampler. The collected dust on the filter material can then be isolated and assessed by chemical or other means.

Other types of equipment such as nephelometers and TEOMs (the latter are relatively new types of measuring devices) are able to measure the presence of dust suspended in air. Air is drawn into the device and the concentration of dust particles in the air can be measured by various non-destructive means. This type of instrument can be used to provide real time recording of dust levels.

Dust as an amenity issue

Unlike odours, which are mostly in the form of gaseous substances, dust particles will generally settle onto surfaces due to the effects of gravity. Rainfall will also wash dust particles out of the air and this is often seen as visibly clear air after a thunderstorm or heavy rainfall incident.

The deposition of dust from a nearby source can be an amenity issue to neighbours. Dust on clothes on a clothes line, deposits on roofs of houses and on cars, and general intrusion of dust into homes can all be very annoying.

Dust, falling on roofs that are used to collect water for domestic and other purposes, can be both an amenity issue as well as a potential health issue.

As previously mentioned, some dusts can also contribute to odour impacts, especially in locations that are relatively close to a source such as broiler sheds. However most odour problems from sheds are due to the gaseous components of emissions as these will be more widely dispersed and will not be subject to gravitational settling.

Potential health impacts of dust

The DHS expressed concern about dusts from broiler farms because of their potential to give rise to various health effects such as respiratory health effects, allergies and infectious disease.

Ms Jean Meaklim on behalf of DHS discussed the evidence for health effects from broiler farms with respect to farmers. She quoted both overseas and Australian sources of published scientific papers that had identified air quality within poultry sheds as having some health effects on some farmers.

Ms Meaklim also mentioned that DHS does sometimes receive complaints about dust emissions from broiler farms, although the number of complaints is small.

Dr Jeff Fairbrother on behalf of the VFF also provided references to published data on the effect of dust particles in broiler sheds. The evidence from the Australian work by Dr A M Brown showed that some farmers were suffering respiratory symptoms that suggested asthma and chronic bronchitis. This especially was the case for smokers and families with a history of atopy (a generic tendency to develop allergic reactions).

While these reports are directly relevant to broiler farmers (and poultry farmers in general),they do not provide clear evidence of the potential effects of broiler farm dust on neighbours. However, using the general relationship between workplace atmospheres and the ambient air, the data indicates that neighbours would not be affected unless their residences were very close to broiler sheds. Dr Fairbrother quoted from a 1998 report from the Queensland Health Department that would support this view:

> *'Although there are theoretical hazards associated with organic dusts, the probability of residents developing associated problems is extremely low because of insufficient exposure to the dusts.'*

The Advisory Committee notes the evidence provided and is of the view that while health impacts on neighbours may not be likely, it cannot rule out such impacts on residents whose homes are close to broiler sheds, eg. less than say 100 metres.

In fact submitters made presentations in which they said that health impacts were occurring.

One submitter occupied one of five residences within an estimated 100 metres of a broiler farm. The submitter said the residence was 40 metres from a broiler shed. The submission stated that the family has suffered from a range of illnesses, including respiratory infections, sinus, headaches, chest tightness, itchy eyes, nasal and other allergic responses. These illnesses were attributed by the submitter to the effects of inhaling noxious dust emissions from the neighbouring farm. It was also stated that dust and feathers are observable on their vehicles, windowsills and in the air. To provide more accurate information on the dust problem, the EPA was currently in the process of monitoring fallout from the neighbouring farm.

Another submitter concentrated on concerns about health effects of emissions from broiler sheds. This submitter claimed that since the expansion of nearby broiler farms, symptoms such as constant nose bleeding, breathing troubles, headaches and watery eyes had been experienced.

The anecdotal evidence provided to the Advisory Committee is no doubt very real to the people who submitted it. However, as no evidence was available at the time that proved a direct 'cause and effect' relationship between symptoms and broiler farm, the Advisory Committee is unable to draw any specific conclusions. A more detailed and specific assessment, including a review of the scientific and medical literature, by epidemiological experts would be needed.

However, the Advisory Committee is concerned that past decisions by planning authorities have allowed the separation distance between some broiler farms and residences to be so reduced that some residents' amenity and health is potentially jeopardised. This is especially so when even the minimum buffer distances suggested in the Westernport policy have been ignored.

5.2.2 Sources of dust from broiler farms

The birds are a significant source of dusts from broiler farms, especially dusts that may have a biological activity such as fungi, bacteria, viruses and endotoxins. Like all growing animals, surface body cells are continuously being shed, and in the case of birds loss of feathers too. These contribute to the dust load that is expelled from sheds via the ventilation systems.

Because of their dryness, litter and feed can contribute to dust problems although in well managed sheds these sources should not be major sources of dust.

Other activities associated with broiler farms that could also be sources of dust are:

- delivery and dumping of litter for spreading in sheds prior to the introduction of a batch of chickens'
- removal of litter from the sheds after the batch of chickens has been harvested;
- stock piling of used litter on farms prior to its removal, composting and reuse as a fertiliser;
- transport movements on farms where vehicles and fork lifts have to use unsealed, on-farm roads and loading;
- transport movement on local roads, especially if they are unsealed or single lane roads.

All these sources may contribute to the dust load from a broiler farm but the emissions of dust via the ventilation system in the broiler sheds is likely to be the most important in terms of affecting the amenity of neighbours.

One submitter provided a video to the Advisory Committee. The video clearly showed the generation of dust clouds due to the loading of used litter and the emissions of dust and feathers from broiler sheds, and their deposition on surfaces around broiler sheds and on adjacent land.

5.2.3 Dispersion of dust

Like odours, dust emissions will be dispersed by the prevailing meteorological conditions. The same conditions that lead to high odour levels, eg wind calms and temperature inversions, are likely to lead to dusty conditions. However unlike odour problems which are dispersed by strong winds, a dust problem can be exacerbated by strong winds due to entrainment of dust from surfaces such as unsealed roads and loading areas.

While the fine dust particles, for example less than 10 microns in diameter, can travel long distances (up to several kms) under the influence of appropriate meteorological conditions, most of the larger dust particles settle out relatively close to the source.

Consequently if odours are not a problem, it is less likely that dust will be a problem. The EPA summed up this situation in the following paragraph:

> *'If appropriate measures are taken to ensure the 'odour footprint' of broiler sheds does not impact on sensitive uses, dust and spray drift emissions will generally not have off-site impacts. It is only where sensitive uses are relatively close to broiler sheds or where emission controls are poor that dust is likely to be a problem.'*

5.2.4 Prevention & management of dust problems

The importance of good farm management

The Advisory Committee is of the view that like odour prevention and control, good farm management is a key to the prevention and control of dust.

If dusts generated inside sheds are a concern for occupational health reasons or as source of dust that has off-site impacts, consideration might be given to the use of mechanisms that will reduce the dust burden within the sheds. While foggers may have some effect, the use of a non-water spray inside the sheds to control dust could be assessed. Overseas experience suggests that the intermittent fine spray of a low viscosity oil such as rapeseed (canola) oil could be used to control dust. Such forms of dust control would need to be assessed for their impact on litter moisture levels.

On-site operations that occur outside the sheds need to be undertaken in ways that will minimise dust and noise generation. Clearly the use of sealed on-farm roads and loading area would be extremely beneficial for the prevention of dust but the expense involved would be difficult to justify on most farms. The use of concrete aprons in some locations and the use of compacted surfaces would obviously assist in dust control. If necessary, dampening of trafficked surfaces with water spray could be used to assist dust prevention where immediate action had to be taken.

The importance of modern technology

Some of the potential modern technology that the industry might adopt, such as chimney stacks on duty fans, would also have some benefit in dispersing dust from broiler sheds. Filters and electrostatic precipitators are used in some secondary industry facilities to control emissions of particles but their use on broiler sheds to simply control dust would be very difficult to justify in an economic sense.

Because odour is the primary off-site problem with broiler sheds it would be sensible for the broiler industry to look at assessing technology that controls both odours and dust.

5.2.5 Modelling of the dispersion of dust

The dispersion of dust can be modelled in a similar manner to odours, although dispersion models other than Ausplume may be preferred. No data from the modelling of dust was presented to the Advisory Committee. Presumably this situation is a reflection of the view that odour control is much more important than dust control for reasons mentioned above.

While the modelling of dust dispersion could be undertaken, the availability of accurate and reliable emission rates from sheds would be essential but such data may well be not readily available, insufficient or of a preliminary nature.

For broiler farms, the conduct of dust monitoring is a relatively simple process compared with odour monitoring. The generation of real data is probably the preferred approach for dust investigations, rather than modelling the dust emissions.

5.2.6 Conclusions

Dust is both an amenity issue and it also has the potential to impact human health, even at low concentrations of dust particles in air. The evidence of the effects of dust on the health of broiler farmers indicates that it is unlikely that the health of neighbours will be affected by dust unless the distance between broiler sheds and residences is short, eg less than 100 m.

However past decisions by planning authorities have allowed the separation distance between a broiler farm and residences to be so reduced as to potentially jeopardise some residents' amenity and health.

Because dust particles in ambient air settle out due to gravity, they usually are not as widely dispersed as odours as most odours are due to gases. However dust can also contribute to odours.

Broiler farmers can take actions to prevent or reduce the generation of dust, especially dust associated with vehicles on on-farm roads and from loading and unloading activities.

If odours are well controlled and do not create problems for neighbours, it is unlikely that dust will be a problem. It would be sensible for the broiler industry to look at assessing technology that controls both odours and dust.

This discussion of dust is a lead up to the discussion of buffer distances where odours, dust and noise are relevant to the establishment of buffer distances. Guidelines for buffer distances that satisfy odour requirements will almost certainly satisfy the buffer distance requirements for dust and noise. See Chapter 5.4 Buffer and Separation Distances.

5.3 NOISE

5.3.1 Introduction

Noise is similar to odours in that a person's perception of noise may be quite different to the perception of the same noise by others. In simple terms noise it is unwanted sound, and may vary according to the situation. For example the level of sound coming from a rock concert may be acceptable to those attending the concert, but may be quite unacceptable to people living close the concert venue.

As in the case of odours and dusts, the Victorian *Environment Protection Act 1970* is the statutory basis for protection against the effects of environmental noise.

The *State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade Air Quality Management) No. N1, 1989* sets objectives for the control of noise in the metropolitan region. These objectives relate to protection of noise sensitive areas, eg. residences, hospitals, etc. In practice, this SEPP is also of use for the control of noise in country cities and towns.

This SEPP sets different noise levels for different times of the day. The highest noise levels are permitted during the day, intermediate levels during the evening and the lowest levels at night.

Control of noise in country areas is especially difficult because of the occurrence of noises in such areas such as from farm animals and normal farming activities. Another vexed problem of noise in rural areas is the generally low background levels of noise that typically exist. The background level of noise is important in assessing whether a sound has a negative impact or not, as low background levels makes sound more intrusive.

This difficulty of establishing noise controls in rural areas has led to the EPA producing *Interim Guidelines for Control of Noise from Industry in Country Victoria No 3/8*.

While background sound levels need to be taken into account in establishing the acceptability of levels of sound, the characteristics of the sound also have a significant influence, for example intermittence and tonal effects. In addition, the familiarity and length of time during which a noise is heard can also influence its acceptability. For example, the sound of an aircraft passing overhead can be intrusive, but where it is a familiar sound and is of short duration, the sound will not be considered annoying.

Noise also is an important occupational health matter. In the past, excessive noise in the workplace has led to various forms of industrial deafness. Workplaces now need to meet appropriate noise levels that protect against hearing loss. These noise levels are typically time-weighted averages, eg. the average noise over an 8 hour period needs to be less than a specified value depending on the type of noise.

Measurement of noise

Instruments (sound meters) to measure sound pressure waves have been in use for decades. These can measure real time noise and can calculate the average noise level over a given time. Because the human ear is not equally sensitive to all frequencies of sound (pitches), the noise measured in the sound meters needs to be converted to produce an output that would be typical for the human ear. That is, it determines an output that reflects how the human ear would hear the various frequencies of the noise.

Noise as an amenity issue

The sound levels that might cause annoyance are in many ways similar to the level of odours that might cause annoyance. The acceptability of a noise will vary from person to person in a similar but perhaps less pronounced manner to that of odours. This is quite apart from the general deterioration of hearing ability with age.

Noise during the day is generally far less intrusive than the same noise at night. During the day, the normal noises associated with living form an acceptable level of sound for most people. However at night time, sensitivity to noise is heightened because of the expectation of having quiet conditions in which to sleep. The generally lower background sound levels that occur at night further accentuate the intrusiveness of noise.

The impact of noise at a sensitive land use, such as a residence, can readily be measured and some examples of where this had been undertaken at neighbouring properties to a broiler farm were submitted to the Advisory Committee.

5.3.2 Sources of noise from broiler farms

While chickens are probably the major source of odours and dust from broiler farms, they are not a significant source of noise. On the contrary, farmers do not wish to have the birds disturbed, but aim to keep the birds contented, and therefore quiet.

Exhaust fans can be a major source of noise under hot conditions when all fans might be operating. However during inspections by the Advisory Committee the discussions on noise indicated that noise from fans was not rated as a major off-site impact.

Truck usage is a source of noise on broiler farms. Trucks are used for:

- fresh litter deliveries
- day old chick deliveries
- feed deliveries - reported as 8 truck loads per batch per 'standard' shed
- gas deliveries
- dead bird disposal
- grown bird pick ups
- removal of spent litter.

The number of truck movements is clearly a potential noise amenity issue for neighbours whose residences are close to broiler sheds and roads. The number of truck movements in areas where there are multiple broiler farms close together can become a significant area source of noise at nearby residences.

Since night-time collection of birds is a common practice in the industry, the noise from truck movements and fork lifts (an integral part of such activities) can create a noise problem at a very sensitive time for neighbours. In fact a number of submitters complained of the amount of noise they experienced because of broiler farming activities, especially at night.

5.3.3 Dissipation of noise

Sound levels from a source diminish with distance as the amount of energy in the sound waves is dissipated within the environment. That is, the energy in the sound waves spreads out with distance and is absorbed by material, including the gases and particles in the air, through which the sound travels.

Like odours and dust, sound is also affected by meteorology such as wind and temperature inversions. Calm wind conditions are often associated with noise complaints. When the normal sound associated with wind, such as the rustling of leaves or the wind noise itself, are not sufficient to obscure or lessen the level of noise from a source, neighbours may become annoyed by the intrusion of the noise. Strong winds may carry noise with it, but the noise of the wind itself may ameliorate the negative impact of the noise. On the other hand winds of intermediate strength may increase the level of noise in a downwind direction.

5.3.4 Prevention & management of noise problems

The importance of good farm management

On a well-managed farm, steps will be taken to minimise generation of odours and dust. However the same farmer may find it more difficult to reduce noise. Noise reduction often means investment in newer equipment or construction or erection of barriers to deflect or absorb noise.

The fans that are fitted to tunnel sheds are generally quiet and should not normally be a major cause of off-site noise impacts. Furthermore, the periods when all fans are likely be operating generally occur during the day when dissipation of noise tends to be greatest. During the evening and at night, the number of fans in use (duty fans) is likely to be few with consequent reduction in noise generation.

However the night operations involving the collection of birds is the time that noise prevention or abatement is most needed. The movement of vehicles such as trucks, fork lifts and front end loaders is inevitable on a broiler farm. While some actions might be taken to reduce the generation of noise from these sources (eg reduced noise from the 'beepers' on fork lifts) any attenuation of noise that may be needed is more likely to involve the erection of noise barriers.

These might include the formation of mounds of earth to deflect noise orhe erection of solid fences to absorb and reflect noise.

Gowing rows of vegetation, such as thick rows of shrubs and trees, has a very limited effect in controlling noise, but is important as a visual screen for the farm buildings.

During farm inspections the Advisory Committee was informed that there are now more day-time pick ups of birds. This practice will reduce the potential for noise complaints.

5.3.5 Modelling of the dissipation of noise

The noise generated by fans, trucks, fork lifts and other equipment that generate noise can all be measured to provide information that can be used in appropriate models to predict the noise levels likely to be encountered at specific off-site locations. This information would be useful where a nearby sensitive land uses might be impacted by noise from a new or expanded farm. The modelling could then be used to assess the risk of adverse environmental noise being encountered at the neighbouring residences.

Such information might be very useful in determining the layout of a new farm, the location of access roads and loading areas, the need for quieter equipment and/or physical noise barriers.

Because the measurement of noise can be undertaken using readily available instruments, the reliability of the noise modelling can be checked. If needed the measurements could be used to identify further actions to reduce noise,and these could be included as a permit condition.

5.3.6 Conclusions

Noise is an amenity issue for neighbours of broiler farms, especially during the evening and night when background noise levels are typically low and when quietness is desirable

Neither birds nor exhaust fans appear to be significant sources of broiler farm noise.

Various activities using trucks, fork lifts and front-end loaders associated with deliveries and collections are usually the main noise sources. The attenuation of noise often requires the erection of some form of noise barrier on broiler farms.

This discussion of noise is a lead up to the discussion of buffer distances where odours, dust and noise are relevant to the establishment of buffer distances. Guidelines for buffer distances that satisfy odour requirements will almost certainly satisfy the buffer distance requirements for dust and noise. See Chapter 5.4 Buffer and Separation Distances.

5.4 BUFFER/SEPARATION DISTANCES

5.4.1 Introduction

The designation of buffer distances between competing, nearby land uses was the major issue that came from the Advisory Committee hearings and the inspections of farms by the members of the Committee.

From the previous discussions of environmental impacts of odour, dust and noise and the discussion of complaints, it is clear that the offsite effect of greatest significance is odour. In simplistic terms, a buffer distance that satisfies the odour requirements will almost certainly satisfy the buffer distance requirements for dust and noise. Consequently in discussing buffer distances in this section of the report, attention is focussed on the effect of odour in determining buffer distances.

The code uses the term **separation distance** although it is not explicitly defined. However the draft Code includes the following statement (refer page 25):

> *'A separation distance is needed to allow for upsets that may occur on the site. However this is not a substitute for the prevention strategies or control techniques. Provision of separation distance to protect neighbouring properties from odour nuisance can be provided in two ways:*
> - *The proposed broiler chicken farm provides the separation distance; i.e. distance between the emission from the sheds to the farm site boundary. The internal separation distance provides greater security against future encroachment.*
> - *The proposed broiler chicken farm employs a separation distance between the air emission source to the nearest sensitive land use located beyond the property boundary.'*

These are two different concepts, and the Advisory Committee believes that it is somewhat confusing to use the same term for both. It also believes that the use of qualifiers to distinguish them is cumbersome. The use of a different term for each concept would be clearer and simpler.

The Advisory Committee notes that the term 'separation distance' (involving several different types) is used in the Victorian Code for Cattle Feedlots, and fixed and variable 'buffer zones (distance)' is used in the Code of Practice, Piggeries. The EPA uses the term 'buffer distance', having replaced the earlier term of buffer zone, which created confusion because of a different meaning in terms used in planning.

The Advisory Committee recommends that:

- **The term 'boundary buffer' be used for the distance from the broiler sheds to the boundary of the broiler farm property.**
- **The term 'separation distance' be used for the distance from the broiler sheds to a sensitive land use.**

The primary reference document on buffer distances

The primary reference document on buffer distances is the EPA's *Recommended Buffer Distance for Industrial Residual Air Emissions, 1990*. The word 'Industrial' in the document includes 'Agriculture' as an industry, and specifically covers poultry, piggery, feedlot, stock saleyards, greenhouses/hothouses, mushroom production and composting.

Under the heading of 'Role of Buffer Distances' the document states:

> *'Regulations under the Environment Protection Act 1970 list types of premises for which a waste discharge licence is needed if there are routine substantial emissions of waste to air from the premises. Good 'in-house' pollution controls can ensure that routine emissions meet State Environment Protection Policy (SEPP) and licence requirements, and are satisfactorily dispersed so that SEPP ground level concentration (GLC) objectives are not exceeded at or beyond the site boundary.*
>
> *However, even with good pollution control technology and practice, there may still be unintended or accidental emissions which must be anticipated and allowed for. While it is an objective of the Authority and the SEPP that such emissions should be eliminated, it is recognised that even 'state of the art' technology is not always capable of achieving this goal without fail. Equipment failure and abnormal weather conditions are among the causes which can lead to amenity reducing emissions affecting properties beyond the boundary of the source premises. Unlike controlled routine emissions, these 'industrial residual air emissions' (IRAEs) are often intermittent or episodic in occurrence and may originate at or near ground level. Provision of an adequate buffer distance allows the emissions to dissipate without adverse impacts on sensitive land uses.*
>
> *While buffer distances are a means of reducing the effects of such residual emissions, they are not an alternative to source control. In preparing this document the Authority is not condoning uncontrolled off-site emissions in contravention of SEPP requirements. Rather, the document acknowledges the fact that under the circumstances described above, SEPP objectives might not always be met, and consequently some beneficial uses specified in the SEPP might not always be protected in the vicinity of a premises. Responsible planning should take account of real, not just ideal, conditions.*
>
> *In addition, if premises has been located on a site with an inadequate buffer distance, subsequent remedial action to alleviate off-site effects either within or beyond the buffer distance will be required if residual emission episodes occur. However, it should be realised that such action might not be economically feasible or fully effective.'*

This guideline document clearly establishes that poultry farming is subject to the same requirements with respect to buffer distances as other agricultural industries and industry in general.

This guideline document also clearly identifies that emissions from normal operations should meet the design ground level concentration requirements as specified in the *State Environment Protection Policy (Air Quality Management)*. This means that appropriate concentrations of pollutants are to be achieved at the edge of the property of the broiler farm. When upset conditions exist, the concentrations are still to be achieved at a sensitive land use adjacent to or near the broiler farm.

In the EPA's guideline, buffer distances are for residual air emissions, not air emissions from normal operations at a premises.

5.4.2 Odour levels and amenity

In the case of odours, this means that 'where an odour level of emitted wastes from a source can be determined, a design ground level concentration (DGLC) of one odour unit **may** be applied in the calculation of chimney heights by the procedure outlined' in the SEPP. While this relates to the calculation of chimney heights, the EPA established the DGLC as representing the acceptable concentration of a pollutant (an odour in this particular case) at ground level (breathing height).

DGLCs are typically used in this way, so they are in effect standards of acceptable air quality.

The acceptable DGLC concept applies at locations where a pollutant will be at or close to the maximum concentration encountered at ground level outside an industrial area, ie at a sensitive land use such as a residential area or a single residence in a rural area. This means that DGLCs need not apply within an industrial area. The reason for this apparent double standard is that the populations are different – people in industrial areas are typically normal healthy adult people, while people in residential locations may include the very young, the very old or those with a serious health problem, especially respiratory disease. Consequently the standard of air quality required in residential areas needs to be protective of these vulnerable groups. Lower levels of air pollutants (stricter requirements) are therefore needed.

As has been pointed out in the section on odours, there is an inherent degree of flexibility in the requirement of one odour unit because of the use of the word **may**. Other pollutants have a specific maximum concentration specified for the substance(s), eg in parts per million or milligrams per cubic metre.

Is one odour unit too low?

This raises the question of whether one odour unit is an appropriate 'standard' for people who live in areas where odours from broiler farms might be encountered. By definition, one odour unit by the B2 method is one that would be detected by 50% of an experienced odour panel under odour laboratory conditions. It is therefore an odour level that is very low and would not be detected by many people in an ambient air environment. Almost all people would be completely unaware of an odour at this level due to the effects of normal odours encountered in the ambient air.

Therefore it seems reasonable to conclude that one odour unit (by the EPA B2 methodology) is too low for use in establishing realistic buffer distances.

What level of odour should be used in modelling buffer distances?

Part of the answer to the above question relates to the expectations of people living in rural areas and of people living in urban areas. It was suggested to the Advisory Committee that people living in rural areas would expect to smell things that reflected rural living. This would not be the same as the expectations of people living in non-rural or urban areas. On the other hand, others took the view that odour standards should apply irrespective of where a person might live.

In addition, the EPA pointed out that they are concerned with offensive odours rather than any form of odour. The odour from a bakery may be easily detected but nearly all people would find it inoffensive. In comparison, a number of submissions and presentations stated that the odours from broiler farms were definitely considered as offensive. Words such as 'stench', 'nauseating' and 'unbearable' were used to describe them.

There are also the variables of odour as explained by Mr Ormerod (FIDOL factors, mentioned in the section on odours). A profile of these factors based on the submissions and presentations to the Advisory Committee is summarised in the table below.

FIDOL factors	Typical commentary by complainants	Seriousness
Frequency	Number of times each year; from a few days to more than 20 days.	✖
Intensity	Depends on closeness; distinguishable to very strong	✖✖
Duration	Depends on closeness; seconds/ minutes/hours, including overnight.	✖✖
Offensiveness	General view of offensiveness; offensive to very offensive.	✖✖✖
Location	Nearly all complaints were based on effects at a residences	✖✖✖

Summary of odour from broiler farms rated against FIDOL factors

The above table is not meant to be an objective assessment but it does represent a generalised view expressed by neighbours of the impact of odours from broiler farms where odour emissions have caused neighbours to complain.

The draft Code includes three options of odour levels for use in risk assessments and for establishing guideline odour levels using odour modelling – refer page 25 of the Code. These odour levels are those that might be considered acceptable at sensitive land uses. The draft Code states that the final Code should specify only one set of odour impact criteria. Since consensus amongst the Code Committee could not be achieved, the three options were included in the draft code and are reproduced below.

OPTION 1: *European (CEN): 10 odour units; 1 hour average; 99.5 percentile*
OPTION 2: *EPA B2 system: 5 odour units; 3 minute average; 99.5 percentile*
OPTION 3: *EPA B2 system: 5 odour units; 3 minute average; 99.9 percentile*

One of the Advisory Committee's very important tasks has been to assess the evidence provided and to recommend which option should be adopted, or to recommend a different criterion.

The three options contain four variables – the odour measuring methodology, a level of odour in terms of odour units, an averaging period for assessing the odour level, and the how near the odour level should be to the upper end of the modelling predictions. These four variables are discussed in turn to arrive at a final recommendation.

Odour measuring methodology.

As explained earlier in the section on odours the EPA devised its own odour test method some years ago. This method, which relies on the odour panel comparing paired mixtures in each test, is known as the B2 method. Standards Australia has a draft method based on the European CEN methodology under consideration as a potential standard methodology for Australia.

Because the EPA continues to use the B2 methodology, and because it is specified in various legislative instruments providing for measurement of odours, it would be difficult for the EPA to depart from this methodology just for the broiler industry. Therefore the EPA will wish to continue to use the B2 method until there is a reason to change.

It appears likely that Standards Australia will eventually produce a standard odour measuring methodology for Australia and it is almost certain to be based on the CEN procedure. However the establishment of a new standard by Standards Australia is a relatively slow process and it may take some time (many months, a year or even years) before a standard is agreed.

Based on the above scenario, the Advisory Committee takes the view that until an Australian standard is agreed, the EPA B2 method should be continued as the recognised methodology for measuring odours in this State. However, if a new Australian standard is finalised and agreed, it would then be appropriate for the EPA to change to using the new standard methodology. The Code should also be amended to reflect this change.

Number of odour units

The second variable is the level of odour in terms of odour units. Both options using the EPA B2 methodology recommend 5 odour units. With regard to the CEN level of 10 odour units, it is worth repeating a statement from an earlier part of this report:

> *'The two tests do not give the same answer for a given odorous sample of air. In general terms, the number of odour units as measured by the CEN method are very approximately twice the number of odour units as measured by the B2 method for the same sample of odorous air.'*

This means that 10 OU (CEN) odour is close to the equivalent of 5 OU (B2) odour.

It has already been concluded that the Advisory Committee views the one odour unit mentioned in the SEPP as too low for use in establishing realistic buffer distances for broiler farms. The question is whether 5 OU (B2) is acceptable, or if not what odour level is acceptable.

The EPA stated in their submission that based on their experience odour levels below 5 OU (B2) are unlikely to generate complaints, while odour levels over 5 OU (B2) are likely to do so. The EPA went on to state that they consider the 5 OU (B2) level to be an appropriate design criterion or reference point to be used in risk assessment for new broiler sheds in rural areas.

There was a general view amongst presenters who would be classed as experts in the field of odours that 5 OU (B2) was a reasonable criterion for modelling although some saw it as being somewhat conservative. Mr Ormerod was of the view that a higher level could be used, based on experience in Brisbane, eg. a level of 20 OU (CEN) would trigger complaints.

Mr Ormerod's graph of an odour dose–response curve from a European study in 1986 was useful to the Advisory Committee. It should be noted that the odour units were measured using the CEN methodology and a one hour averaging period was used for the 99.5 percentile.

A smoothed curve, if plotted through the data points, would indicate that around 10% of people were annoyed or very annoyed by an odour level of about 15 OU (CEN). In the view of the Advisory Committee such a level of annoyance is unacceptable.

Therefore if 15 OU (CEN) is the approximate equivalent of 7 - 8 OU (B2), a lower level of odour units is needed for acceptability, especially for an averaging period of one hour.

The Advisory Committee has considered these various views and has concluded that an odour level of 5 OU (B2) should be recommended as a criterion for odour modelling and risk assessment. However this recommendation needs to be considered in conjunction with an averaging period for assessing the odour level (see below).

Averaging period

Two averaging periods are identified in the options – 1 hour and 3 minutes. As Mr Ormerod explained, the mathematical modelling relationship between a 3 minute average and a 1 hour average is approximately 1.82 times. This means that an odour level criterion of 5 OU (B2) for a 3 minute average is equivalent to 5/1.82 = 2.8 OU (B2) for a 1 hour average, both at the 99.5 percentile level. Therefore, for a given odour level criterion, a 3 minute averaging period is a more conservative requirement than a 1 hour averaging period.

When the question about preferred averaging period was put to each of the presenters with professional expertise in this area, the 3 minute averaging period was generally preferred. This is the current EPA requirement for most air pollutants, although modelling can be done at both the 3 minute and 1 hour averaging periods.

In noting the evidence placed before it, the Advisory Committee believes that the 3 minute averaging period is appropriate for odours, especially in view of the potential for odours to be rather fleeting in their detection by the human nose. However the Committee appreciates that a case can be made for using a 1 hour averaging period, especially when meteorological data is typically recorded as 1 hour averages.

Percentile level

The final variable is the percentile level – a measure of how much time the odour level criterion would be exceeded in a year. As there are nearly 9,000 hours in a year, a 99.9 percentile means that a given level would be exceeded for approximately 9 hours in a year. At a 99.5 percentile, the number of hours the level would be exceeded is approximately 44 hours.

Of the three options in the draft code, two specify a 99.5 percentile and the third a 99.9 percentile.

The EPA typically uses, and has recommended for broiler farm modelling, the use of a 99.9 percentile level. This is a very conservative, and very demanding, requirement. All the other experts took the view that the 99.5 percentile level was appropriate. Mr Pollock pointed out that in NSW a 99.0 percentile has been adopted. The Advisory Committee noted Mr Ormerod's information of the work done in Europe and elsewhere to evaluate odours, and the general adoption of the 99.5 percentile.

The Advisory Committee has also noted that the location of broiler farms is generally in rural areas where there are fewer people. This means that in conducting risk assessments, a less stringent approach is usually taken, as fewer people are likely to be impacted than when a large population might be impacted. Generally speaking, the larger the population, the greater the risk of the impact affecting sensitive individuals.

Based on the evidence presented, the Advisory Committee is of the view that the 99.5 percentile level is a reasonable level for rural environments.

> ***The Advisory Committee recommends that the criterion for risk assessment odour modelling for the broiler industry is 5 OU (B2), 3 minute averaging period and a 99.5 percentile. This is the same as OPTION 2 in the draft Code.***

5.4.3 Industry odour data

Like most areas of scientific and technical investigation, there is always a desire to have more information or more complete information. The potential for odour generation and its control in the broiler industry is no exception to this general rule.

The most obvious lack of data is sufficient data on odour emission rates (OERs) under both normal operating conditions and 'upset' conditions. In fact the Advisory Committee was not provided with any OERs that might represent 'upset' conditions. This is a serious lack and the industry (growers and processors) should address the question of how the data might be obtained.

In view of the importance of the industry and its future viability, action should be taken to fund investigations, perhaps in conjunction with DNRE and with the use of appropriate consultants. Investigations should cover the processes that generate the odours (normal operating conditions

and upset conditions) and the control processes to prevent odour generation as well as to control odours once abnormal odour generation has begun.

The Advisory Committee is mindful of the fact that the Code is a Victorian initiative. However, any research work on the measurement of OERs would be more sensibly based if it were on a national basis rather than a state basis

> ***The Advisory Committee recommends that a fund for research into odour emissions be established on an industry-wide basis, preferably involving other States. The industry itself should be a principal contributor to the fund. Management of the fund and allocation of funds for research purposes should be under the auspices of the DNRE (for Victoria) with representation from the industry and the EPA.***

As stated in the section on odours, the raising of broilers is inherently an odour producing process. It is an intensive form of animal husbandry and like other forms of intensive animal farming, such as intensive piggeries and cattle feedlots, odours are produced due to the intensity of the processes used.

Despite the use of computer controlled fans to expel used air from the sheds, the current technology is not a high level of technology to disperse or to control or to treat odour emissions in the air. The technology simply expels odorous air into the ambient air. If the industry wants to reduce the buffer distances that apply, consideration needs to be given to improved levels of ***control*** technology.

The EPA suggested that while prevention of odours is the primary objective, there is an opportunity to consider filters and other mechanisms for the treatment or control of odours.

Where improved and reliable methods of odour (or dust or noise) prevention and/or control can be introduced, shorter buffer distances can apply. However the onus for any relaxation of the buffer distances would depend on a site specific proposition. If the industry is unwilling or unable to justify such developments, then it is faced with the real prospect of having to move to other locations where larger buffer distances can be obtained. in lieu of investing in new technology.

5.4.4 Previous & current recommended buffer distances

A number of buffer distance guidelines have been proposed and used during recent years in an effort to provide a clearer and more equitable arrangement for orderly planning of areas where broiler farms exist or are proposed.

The Westernport Policy

Broiler Farming – A policy for the Westernport Region was produced in 1988. It was reported to the Advisory Committee that this document has been an effective guide. However as more broiler farms became established in the area and more subdivisions of land for rural living with a

subsequent increase in population took place, its limitations became more apparent. An effort to update the policy was not followed up, and its use as a guideline document has since declined.

This policy included a number of preferred buffer distances.

Distance to an urban residential zone	500 m
Distance to a rural residential zone (lots <4ha)	300 m
Distance to a single dwelling outside the broiler farm	100 m
Distance to a road	100 m
Distance to a side or rear boundary	40 m

Recent VCAT decisions

In recent years there has been a number of hearings by the Victorian Civil and Administrative Tribunal (VCAT) and its predecessor the Administrative Appeals Tribunal (AAT) into permit applications for expansion of an existing broiler farm or for a new broiler farm. VCAT's role is to make a decision on whether an application should be granted and if so under what, if any, conditions.

The text of a number of VCAT decisions was conveyed to the Advisory Committee during the hearings. It was interesting to note how both growers and residents, who opposed various applications, used VCAT decisions to support their arguments. It has not been possible for the Advisory Committee to analyse all VCAT and AAT decisions in recent years and this type of detailed evidence was not presented at any of the hearings.

It appears from the information provided by submitters that there has not been a great deal of consistency in terms of buffer distances in the VCAT And AAT decisions. This suggests that there is an almost overwhelming need for some form of realistic and acceptable guidelines for understanding and interpreting buffer distances. This especially applies to buffer distances for odours, but guidelines that might be relevant to dust and noise, such as the buffer distance between sheds and on-site operations and site boundaries, are equally needed.

Buffer distances from other intensive livestock farming

The **Code of Practice, Piggeries** was first published in 1984 and revised in 1992. This code includes a number of Fixed and Variable Buffer distances (called Zones in the publication).

The fixed buffer distances from the piggery building or area are:

Distance to a public road - sealed	200 m
Distance to a public road - unsealed	200 m
Distance to a major water supply storage within its catchment area	800 m
Distance to a major watercourse and domestic water supply	200 m
Distance to other watercourses	100 m
Distance to residence on the property	100 m
Distance to a diary	100 m

Distance to a slaughterhouse	100 m
Distance to the property boundary	20 m
Distance to a neighbouring piggery	3000 m

Some variation in the variable buffer distances is allowed under the code. These are especially relevant to odour impacts at off-site residences and which are much larger than the fixed buffer distances, The variable buffer distances depend on three factors:

- prevailing wind conditions.
- constrained wind conditions.
- significant topography conditions.

The variable buffer distances for different receptors that are at risk of the odours from piggeries are listed in the following table.

Number of pigs	Distance to a proclaimed township boundary	Distance to a rural residential zone or residential area	Distance to an isolated rural residence	Distance to a farmhouse on another property
Fewer than 500	1600 m	1000 m	400 m	300 m
5001 – 2000	2000 m	1500 m	500 m	400 m
2000	2000 m	1500 m	500 m	400 m
2500	2500 m	1875 m	625 m	500 m
3000	3000 m	2250 m	700 m	600 m
3500	3500 m	2675 m	875 m	700 m
4000	4000 m	3000 m	1000 m	800 m
4500	4500 m	3375 m	1125 m	900 m
5000	5000 m	3750 m	1250 m	1000 m

Summary of variable buffer distances in the Piggeries Code, 1992

It is interesting to note that the code uses the concept of a 'centroid' as the point from which the variable buffer distance is measured, provided certain conditions in terms of the shape of the piggery perimeter are met. Where the conditions relating to the shape of the piggery are not met, the variable buffer distance is measured from the nearest point on the piggery perimeter.

A reduction (not exceeding 40%) in variable buffer distances may be sought where higher-than-average standards apply and are maintained at all times. Most of the reduction factors relate to quality of physical factors such as design of ventilation systems, enclosed pipes for effluent collection, effluent treatment system and management. The management factor is the last of the seven reduction factors and specifically relates to the intensity of surveillance of stock.

The **Victorian Code for Cattle Feedlots** was published in 1995. This code enables buffer distances for odour to be determined on a site-specific basis according to a formula. The formula consist of four components:

- stocking intensity for different classes of feedlot.
- the receptor type – from single farmhouse to large town.
- terrain characteristics – includes valley drainage flow.
- vegetation cover.

Stocking intensity is the component with the greatest influence in determining the appropriate buffer distance and the second most important component is receptor type.

Buffer distances are to be measured from the boundary of the feedlot works. There is no table of buffer distances for sensitive land uses given in the draft Code but the two calculated examples relating to buffer distance both have buffer distances around 3000 m.

A series of fixed buffer distances is included in the code and these are summarised below.

Impact area	Distance from feedlot works area	Distance from land application of liquid wastes	Distance from solid waste spreading areas
Site boundary	50 m	20 m	20 m
Public area		100 m	100 m
Watercourse, bore or spring	200 m	100 m	200 m
Off-site residence	Variable	200 m	200 m
Flood prone land	200 m	200 m	200 m

Summary of fixed buffer distances: Victorian Code for Cattle Feedlots, 1995

The information from the piggery and cattle feedlot codes is useful as a source of guidance for an intensive animal industry code. While the actual buffer distances in the two codes are not directly relevant to those in the broiler code they do illustrate the type of thinking that has been undertaken in developing the Code.

The structure of the broiler code has followed many of the approaches used in the above mentioned codes. This appears to be a very reasonable and sensible process and the Advisory Committee commends the Code Committee for taking such an approach.

Buffer distance information from other states

In his closing presentation, Mr Field, the Chairman of the Code Committee, provided a useful summary of buffer distances used in other states. He summarised the current approaches in South Australia, New South Wales and Queensland as follows:

- the use of guidelines is voluntary and does not have statutory backing.
- much of the technical data contained within the guidelines is subjective with buffer requirements not soundly based.
- the guidelines essentially represent industry initiatives supported by State departments of agriculture, with only limited input by other government agencies and local government, and no input from the general community.

- there are pressures on the industry, especially in NSW, resulting from residential encroachment. Initiation of the guidelines was in response to these pressures and inconsistent treatment by local councils of broiler farming development proposals.
- in all three states the guidelines are being found to be ineffective.

A generalised summary of the buffer distance guidelines follows.

South Australia – 500 m to any existing or future residential zone
300 m to any existing or future residence
100 m to the boundary of the poultry farm

New South Wales - 500 m to an urban residential zone
300 m to any settlements of 10 or more dwellings
150 m to a dwelling on another property
50 m to a dwelling on the same property
30 – 50 m to the property boundary
100 m to a public road
50 m to a water course

Queensland (draft only) - 150 m to nearest dwelling on rural land
300 m to an urban residential zone of 10 or more dwellings
150 m to nearest rural residential development (≈10 ha lots)
300 m to nearest rural residential development (≈0.5 ha lots)

Western Australia has a *Statement of Planning Policy No.5 - Poultry Farms Policy* prepared under the provisions of its planning legislation and gazetted in December 1998. This policy takes positive steps to deter sensitive land use developments near broiler farms. This includes a requirement that prospective purchasers of land within 500 m of an existing poultry farm are advised of its existence. Local governments are encouraged to provide advice about the location of poultry farms and the possibility for nuisance. Furthermore, poultry farms are encouraged to erect signs advising of the poultry farm, the possibility of odours, and hours of noise.

Further statutory backing for the policy in Western Australia is in the process of being prepared. It is intended to include requirements for compliance with environmental/health and animal welfare codes, use of broiler manure as a fertiliser and the relocation of broiler farms away from the vicinity of residential and rural residential developments. The following is a generalised summary of the proposed buffer distances:

Western Australia - 1000 m to urban residential zone
150 m to a dwelling on the property
1000 m to a dwelling on another property
1000 m to a national highway
250 m to a public road
300 m to a side or rear boundary

Buffer distances included in the Code

The above sets of guidelines can be compared with the buffer distances in the Code.

Number of birds	Minimum distance from 'centroid' to nearest boundary CLASS A FARMS	Minimum distance from 'centroid' to nearest boundary CLASS B FARMS	Minimum distance from 'centroid' to nearest sensitive use CLASS A & B FARMS
1 – 80,000	250 m	200 m	300 m
80,001 – 120,000	275 m	200 m	333 m
120,001 – 160,000	300 m	200 m	366 m
160,001 – 200,000	340 m	200 m	415 m
200,001 – 240,000	380 m	200 m	463 m
240,001 – 280,000	415 m	200 m	506 m
280,001 – 320,000	450 m	200 m	550 m

Overview of buffer distances included in the draft Broiler Chicken Farm Code

It should be noted that the draft Code does not make provision for farms with over 320,000 birds.

5.4.5 Buffer distance recommendations

As stated earlier in this section of the report, the Advisory Committee recommends that:

- the term 'boundary buffer' be used for the distance from the broiler sheds to the boundary of the broiler farm property;
- the term 'separation distance' be used for the distance from the broiler sheds to a sensitive land use.

The Advisory Committee agrees with the concept of using the number of birds as a variable in setting buffer distances. The more birds, the more odour generated. The gradation in distances to the boundary of the broiler farm and to the nearest sensitive land use as shown for Class A farms in the Code appears to be a useful and realistic starting point in assessing what the appropriate buffer distances might be.

Boundary buffer

The odour modelling undertaken on behalf of the VFF by Egis, and described by Dr Bellair as 'very elegant', is useful for assessing boundary buffers. The modelling is based on an OER that would be classed as relevant for 'normal' broiler farm operations. The words 'based on' have been used to recognise the fact that Egis used batch age and temperature factors to modify the effect of the input data in their detailed modelling.

(Note: Because the modelling has not used an OER that would reflect 'upset' broiler farm conditions, the modelling is not suitable for assessing separation distances – see later.)

From the range of OERs from CWWT (see the earlier section on odours - 311, 322, 405, 474, 483, 518 and 579 odour units), it is noted that the OER used by Egis was towards the lower end of the CWWT range of OERs. Therefore the Egis modelling may be seen as relying on an OER that understates the OER that would be typical of odour generation under 'normal' conditions.

The results of the Egis modelling are summarised in the table below and are compared with the boundary buffers recommended for Class A farms in the Code. The Egis modelling used 5 OU (B2), 3 minute averaging period and 99.5 percentile – the same as variables for odour modelling as recommended by the Advisory Committee in this report.

	Modelling results using 'centroid' of sheds (Radius of boundary buffer)		**Modelling results using separated sheds (Radius of boundary buffer)**		**Code recommendation (Radius of boundary buffer from 'centroid')**	
No. sheds	*As modelled*	*Rounded*	*As modelled*	*Rounded*	*Class A Farms*	*Class B Farms*
2	197 m	200 m	196 m	200 m	250 m	200 m
4	287 m	300 m	296 m	300 m	300 m	200 m
8	420 m	420 m	446 m	450 m	450 m	200 m
16	613 m	620 m	674 m	670 m	Not provided	Not provided

Comparison of Egis modelling results for boundary buffers and Code

The results of the Egis modelling are very similar to the distances included in the Code. Perhaps this is not surprising in view of the fact that the VFF sponsored the Egis work and therefore was able to present it to the Code Committee. As mentioned before, the OER used by Egis may be considered to be on the low side of typical and therefore their modelling results may be too optimistic or insufficiently conservative.

The EPA did not provide any specific recommendations on boundary buffers.

The Advisory Committee notes that the boundary buffers in the Code are based on measurements from the 'centroid' of the sheds. Because the Advisory Committee has rejected the 'centroid' concept (except for fan forced tunnel sheds), the boundary buffers should be measured from the side of the nearest shed. Consequently the Committee considers that in establishing recommended boundary buffers this point of measurement should be taken into account, and has made an allowance for this change in its recommendations.

The Code includes a single value for boundary buffers for Class B farms. The Advisory Committee notes the primary importance of number of birds as a determinant in the potential to produce odours (and generate dust) and therefore rejects the single value of 200 m for all Class B farms irrespective of size (number of birds). As a result the recommended boundary buffers for Class B farms show a range of distances but these are less demanding than those applicable to Class A farms.

Separation distances

As stated previously, the Egis modelling results are useful in establishing boundary buffers but are not appropriate for use in establishing separation distances because modelling did not use OERs that would reflect 'upset' conditions. The setting of separation distances for an industry is based on the need to cater for residual air emissions produced during 'upset' conditions, ie. unintended or accidental emissions resulting from an unusual set of circumstances.

The recommendations from the EPA for separation distances are shown in the table below and are compared with separation distances recommended for Class A and B farms in the Code.

Number of birds	**EPA RECOMMENDATION for separation distance (Measured from edge of shed or exhaust point for tunnel sheds)**	**CODE RECOMMENDATION for separation distance (Measured from 'centroid') Class A & B farms**
1 – 80,000	300 m	300 m
80,001 – 120,000	400 m	333 m
120,001 – 160,000	500 m	366 m
160,001 – 200,000	Site specific assessment	415 m
200,001 – 240,000	Site specific assessment	463 m
240,001 – 280,000	Site specific assessment	506 m
280,001 – 320,000	Site specific assessment	550 m

Comparison of separation distances recommended by the EPA and the Code

The Advisory Committee considers that because of the lack of modelling of 'upset' conditions it must rely on the judgements of people who have experience with the off-site impact of odours from broiler farms. The EPA and local councils have been dealing with such odour problems and the ensuing complaints and their views are particularly relevant to the Advisory Committee.

Many neighbours have voiced their concern about odours in their submissions and in their presentations. Various presentations by people from the broiler industry have voiced the view that the majority of complaints come from a minority of farms. The Advisory Committee has also seriously considered these sources of information.

The graph provided by the EPA on page 14 of its submission was especially useful to the Advisory Committee. The graph shows 'furthest distance to complainants from broiler operations (confirmed and likely complaints from EPA and Council records from 1997). A curve of best fit through the data points provides an indication of why the EPA has recommended the three buffer distances of 300 m, 400 m and 500 m in the table above.

Like the boundary buffers, the separation distances are to be measured from the side of the nearest shed rather than the 'centroid' (except for fan forced tunnel sheds). However unlike the case of the boundary buffers, the Advisory Committee does not see any need to include any allowance for changing the measuring point in establishing the recommendations for separation distances. The Committee takes this view because of the greater distances used for separation

distances and the level of uncertainty due to a lack of modelling and other data to substantiate small changes in the distances.

Fan forced tunnel sheds are an exception in that their boundary buffers and their separation distances are to be measured from the 'centroid' of the fan emission points. This is due to the readily identifiable and adjacent odour emissions points. It also recognises that these sheds are a higher level of technology used by the industry that could well be reducing the potential for the generation of odours, especially odours due to 'upset' conditions.

The table below shows the Advisory Committee's recommendations for boundary buffer and separation distances for Class A and Class B farms. The definition used by the Advisory Committee are repeated her for clarity:

Boundary buffer is the shortest distance measured from a point on the nearest broiler shed wall to the nearest point on the property boundary, and relates to the dispersion of normal odours**;**

Separation distance is the shortest distance measured from a point on the nearest broiler shed wall to the nearest boundary of the sensitive land use (except for a dwelling where the measurement will be to the nearest wall of the residence) and relates to the dispersion of abnormal odours**.**

The Advisory Committee recommends the adoption of boundary buffer and separation distances for Class A and B farms as shown in the table below:

	CLASS A FARM		CLASS B FARM	
Size of farm (Number of birds)	**Recommended BOUNDARY BUFFER**	**Recommended SEPARATION DISTANCE**	**Recommended BOUNDARY BUFFER**	**Recommended SEPARATION DISTANCE**
1 – 80,000	220 m	300 m	180 m	300 m
80,001 – 120,000	240 m	400 m	200 m	400 m
120,001 – 160,000	260 m	500 m	200 m	500 m
160,001 – 200,000	300 m	550 m	220 m	550 m
200,001 – 240,000	340 m	600 m	240 m	600 m
240,001 – 280,000	375 m	650 m	250 m	650 m
280,001 – 320,000	400 m	700 m	260 m	700 m

Recommended boundary buffer and separation distances, Class A and Class B farms.

As discussed earlier, the Advisory Committee believes that the point of measurement should be varied for forced fan tunnel sheds.

The Advisory Committee recommends that the point of measurement from forced fan tunnel sheds (or a group of forced fan tunnel sheds aligned together with fan emission points close together) is to be the 'centroid' of the exhaust fans, provided that at least 90% of the emissions from the shed(s) is via the fans, and that the sheds are operated only as fan forced tunnel sheds.

Special Class farms

Because the evidence provided to the Advisory Committee demonstrated that the size of broiler farms was getting larger (ie. more birds) and this trend was expected to continue, the Committee is of the view that a Special Class of farm should be included in the code. This class would comprise farms with a capacity greater than 320,000 birds or more than 8 'standard' sheds. There is already one 12 shed farm in the Bendigo area.

It is obvious that there is very little data available of the emissions from such large farms. The Advisory Committee is unable to make any specific recommendations for boundary buffers or separation distances for Special Class farms. Therefore the Committee is of the view that determinations of both the boundary buffers and the separation distances of such farms should be based on a site specific risk assessment.

The Advisory Committee recommends that a proposed new farm that would have a capacity of greater than 320,000 birds, or an application for expansion of an existing farm that would result in a total capacity of more than 320,000 birds, should be categorised as a Special Class of Farm. Permit application requirements applying to Special Class farms should include:

- **a environmental risk assessment including detailed modelling of odours;**
- **a detailed risk assessment of the potential for dust and noise to have off-site effects on neighbouring properties, and may include a requirement for modelling of these two effects.**
- **the application should be subject to third party notification and appeal rights.**

Superior technology

This report has included a number of references to the recognition of the potential for better technology to justify smaller buffer distances. The installation and use of better technology to obtain benefits for a development is an accepted procedure used by the EPA to encourage better performance by industry. The principle of the potential for reduced buffer distances through the use of higher levels of technological performance has been included in the piggeries code and there is no reason why the same principle should not apply to the broiler code.

'Superior technology' is defined as meaning the installation of dispersion stacks, odour absorption equipment, odour destruction equipment, or any form of equipment for the control or reduction of odours that is shown to be effective, reliable and readily operated by growers. The superior technology must be used and maintained in an effective operating condition at all times or at times that may be specified in the permit.

'Superior technology' does not include simply an advanced level of grower management or supervision of the broiler sheds.

In order to obtain this form of concession, a permit application would need to be evaluated in some depth, including a risk assessment and associated computer modelling. In the case of broiler farms, this would obviously include the modelling of odours. It would also include any other potential off-site environmental, biosecurity and safety effects. Dust and noise assessments would be needed, probably involving modelling of these effects for most broiler farm applications.

The Advisory Committee recommends that an application may be made for a reduced boundary buffer and/or separation distance on the basis of 'superior technology'. Any reduced distance must be at least 70% of the boundary buffer distance and/or the separation distance specified for Class A farms. A reduction in buffer distances may only be sought if the permit involves:

- **an existing or proposed Class A or Class B farm;**
- **the installation of superior technology (as defined) to prevent and/or control odours;**
- **a detailed risk assessment that includes detailed modelling of odours;**
- **a detailed risk assessment of the potential for dust and noise to have off-site effects on neighbouring properties and may include a requirement for modelling of these two effects;**
- **the application should be subject to third party notification and appeal rights.**

Other buffer distances

It is appropriate for the Advisory Committee to also consider buffer distances for planning zones that might be impacted by odours from broiler farms. While broiler farms must be confined to a Rural Zone, their influence may be felt in areas beyond the Rural Zone and on to zones of higher population.

A range of sources of information - the recommended buffer distances shown above, the information of buffer guidelines from other states, the information in the codes for piggeries and cattle feedlots, and the Code itself – was used in deriving these minimum distances.

The Advisory Committee recommendations the following minimum buffer distances in addition to boundary buffers and separation distances:

Distance from broiler sheds to an urban residential zone	***1000 m***
Distance from broiler sheds to a rural residential zone	***750 m***
Distance from broiler sheds to a road	***100 m***
Distance from broiler sheds to residence on the property	***100 m***

5.4.6 Conclusions

There are two imperatives behind the trend towards larger farms: industry-driven efficiency, and residential amenity. In framing its recommendations on boundary buffer and separation distances, the Advisory Committee has attempted to achieve balance at two different levels: a balance

between the interests of growers and neighbours, and a balance between incentives and disincentives for growers.

The Advisory Committee has also recognised that although the majority of broiler farms still operate with cross-ventilated sheds, new forms of sheds and shed technology are emerging and becoming more widely used. While the new forms primarily have benefits for the grower in terms of climate control within sheds, they also have the benefits of being more readily adapted to techniques for modelling amenity impacts and, by assisting the dispersion of odours, potential for improving the amenity of nearby residents. In recognition of these significant benefits, the recommendations incorporate positive incentives for the use of improved shed design and technology.

5.5 SOLID WASTES

5.5.1 Introduction

Wastes that are not allowed to be emitted to the air or to water bodies are materials classified as solid wastes, whether they are actually solid, semi-solid or liquid. In this context solid waste is much more than domestic wastes or wastes that may be taken to a transfer station or a landfill.

The EPA promotes a hierarchy of waste management in dealing with wastes of all types but it especially applies to solid wastes. All broiler farm owners and managers should seek to follow the waste management hierarchy, which is:

- waste avoidance
- waste reuse
- waste recycling
- recovery of energy
- waste treatment
- waste disposal.

The legislative control of broiler farm wastes from an environmental perspective is via the *Environment Protection Act 1970* and more specifically the *Industrial Waste Management Policy (Waste Minimisation) 1990*. A further relevant document is the *Environmental Guidelines for Composting and Other Organic Recycling Facilities (Publication 50B, June 1996),* applicable to any on-site composting and to off-site composting by contractors.

The *Health Act 1958* is also relevant with respect to the potential of wastes to cause or spread disease.

5.5.2 Sources of solid waste from broiler farms

The largest quantity of solid waste generated by broiler farming is obviously the used litter that needs to be cleaned out of the sheds after each batch of chickens. The quantity of used litter is large – many tonnes per shed per batch. The used litter is high in organic matter from both the original material (typically rice hulls) and the droppings from the birds, which are rich in nutrients such as phosphorus and nitrogen.

Long term on-site storage of used litter is discouraged in the Code and the Advisory Committee was informed that on most broiler farms used litter is removed soon after the sheds are cleaned out. On most farms, contractors remove the used litter and take it to a composting facility prior to its use as a fertiliser. However the ability to move used litter quickly from a farm depends on the availability of the transport contractors.

The second major solid waste is the dead birds that are removed from the sheds daily. In the past, on-site composting and incineration have been used to dispose of these birds, often in facilities that have not been of the desired standard and have consequently been a source of odours. More recently the birds have been frozen and periodically collected by a contractor. The use of the bodies of the dead birds in the rendering industry is certainly compatible with the EPA's hierarchy of waste management. The disposal of dead birds in a landfill is not an acceptable practice.

5.5.3 Management of solid waste

The broiler industry has considered reuse of litter for a subsequent batch of chickens, but for reasons of risk of disease transmission and odour generation has opted for the use of fresh litter for each batch of chickens and off-site processing of used litter. While reuse of litter by broiler farmers is a higher waste management action on EPA's hierarchy of waste management options than off-site treatment, the risk management approach adopted by the industry seems sensible and practical.

The clean out of sheds should be seen as just as important to management as the spreading of new litter or the animal husbandry of the birds. The cleaning out operation has been a source of complaints about odour, as has the disinfection of the sheds after clean out and prior to the arrival of a new batch of birds. The handling of used litter is also a potential source of dust. Growers, as well as any contractors they employ, are responsible for the control of odours from the clean out activities.

The handling, storage (short term only is encouraged in the Code) and transport of used litter needs proper management by the farmer. The use of a transport contractor does not relieve the grower of responsibility for the proper transport of any waste.

Used litter as a fertiliser

Because of its organic and nutrient content it is not surprising that used litter has been used as a fertiliser in other forms of agriculture – horticultural trees, vegetable growing and pastures for grazing by cattle, especially dairy herds. Because of the biological components in freshly used litter, it is desirable that the used litter is composted to kill potential pathogenic components prior to its use as a fertiliser. An alternative method of use is to spread the used litter on pastures but to use a long withholding period between application and grazing, eg at least month.

The Advisory Committee is not in a position to state that once taken off-site the used litter is adequately composted and used in acceptable ways. This information was not presented to the Advisory Committee nor was it sought.

Some dairy companies are resisting the use of used litter as a fertiliser for pastures because it is not subject to any form of quality control and therefore its composition and safety could vary considerably. Dr Graeme Rogers of Bonlac Foods expressed this concern to the Advisory

Committee. Dr Rogers raised a list of possible concerns, including pathogens, residues of metals and residues of biological materials used in the broiler industry.

The Advisory Committee was made aware of the existence of a draft Best Practice Guidelines for the Land Application of Farm Animal Manures. This has not been issued for public comment yet but the Advisory Committee is of the view that such guidelines are indeed appropriate and should at least be referred to in the Code when it is finalised. It will apply to those growers who reuse their litter as fertiliser for an alternative agricultural activity on their farm.

On-site composting of used litter would be permitted under these Guidelines. However, the standard of stockpiling/storage of used litter and the composting operation that would be included in the guidelines would make the on-site processing very demanding and probably not attractive to most growers, especially growers with a smaller numbers of birds.

Dead bird disposal

The daily collection of dead birds (and the recording of deaths) and the regular collection of the frozen dead birds by a waste collector appears to work well. However some growers are concerned that the collection of dead birds in this manner produces a risk of disease transmission to their farms from other farms.

Consequently on-site composting of dead birds continues to be undertaken on some farms. Provided this is done in properly maintained and operated equipment, off-site odours should not be produced. The continued disposal of the composted birds on site may need careful consideration.

In case of an outbreak of Newcastle Disease or other virulent form of disease, the slaughtering of birds and on-site burial under controlled conditions would become a necessity as a means of minimising the spread of the disease. Such activities would of necessity be under government direction and veterinarian supervision.

5.5.4 Conclusions

The two main sources of solid waste from broiler farms are the used litter from the sheds and the bodies of dead birds. Specialist contractors are typically used.

The handling of used litter on farms is a major activity typically undertaken 5 or 6 times per year. It is potential source of odour and dust.

On site composting of litter and dead birds is possible but it is likely that they will increasingly require better procedures and controls for the composting processes.

The industry's management of its waste is generally in conformity with the EPA's hierarchy of wastes.

5.6 POTENTIAL OF NEW TECHNOLOGY

The section on odours emphasised that broiler chicken farming is inherently an odorous activity with the birds being a source of odours. However, abnormal odour levels that are sometimes generated are often, but not invariably, associated with increased moisture litter. While good management will reduce the likelihood of odour episodes, odour problems do occur on the best run farms, especially as the age of the birds increases and as the size (number of birds) of the farm increases.

The current level of technology, even with the newer forced fan tunnel sheds and evaporative coolers, is basically aimed at maintaining the desired environmental conditions in the shed commensurate with the age of the birds. This level of technology does not control odours although growers would argue that the technology should reduce the potential for damp litter and any consequent abnormal odour generation.

In summary, there is no attempt to directly control the odours in the expelled air but to rely on the expelled air containing normal odours being dispersed by normal meteorological conditions. Under strong dispersion conditions, normal odour emissions are unlikely to cause an environmental impact, even quite close to the sheds. Under very stable meteorological conditions, dispersion will be poor and odour problems are much more likely to be encountered.

Naturally ventilated sheds will be more difficult to adapts to superior odour control technology, primarily due to expelled air being emitted over a large area rather than via a very confined region such as fans fitted in tunnel sheds.

The simplest form of new technology (for the broiler industry) is the fitting of chimney stacks through which the expelled air will be emitted. The stacks would best be fitted to tunnel sheds where the expelled air is emitted via fans. Both the EPA and Mr Pollock for the VFF showed by computer modelling the very positive advantages of increased dispersion via stacks.

A second level of technology is the use of odour masking materials that are sprayed into the expelled air to replace the unpleasant odours in the expelled air with a pleasant odour. This process has the advantage only needing to be used when there was an odour problem. However the use of an odour to mask another odour has its drawbacks: for example, some people will find the masking odour to be not to their liking. Generally this form of technology has only limited use.

Rather than masking an odour, some materials are available to reduce the formation of an odour. The EPA in its submission named one of these materials (Monsanto's Alliance) that could be useful in reducing odours from litter prior to the clean out of sheds.

A higher level of technology for the industry would be fitting some form of filtration to control the actual odorous components in the expelled air. The form of filtration most likely to be cost effective is biofiltration.

This form of treating odours uses the ability of selected bacteria to degrade certain types of odorous components in an air stream that is passed through a filter medium on which the bacteria are immobilised. The bacteria use the odorous material as a source of energy so sustaining themselves and able to treat the odours continuously.

The cost of this system would be a potential problem, as would the large volumes of air that might need to be treated. The use of a cheap source of filter material derived from rural sources could make the cost more affordable.

Other odour treating systems that exist that could theoretically be used include wet chemical scrubbing, incineration and thermal oxidation, adsorption using granulated active carbon and oxidising chemicals. These are listed for interest and it is not suggested that they are likely to be cost/effective for the broiler industry in the foreseeable future.

However the industry should continue to assess these sorts of development, especially as many odour problems involve relatively small volumes of air, eg air expelled during the evening, night and early morning via duty fans.

The Advisory Committee has already commented on the trend towards new forms of sheds and shed technology. The new forms have benefits for growers and processors, are more readily adapted to modelling techniques, and may assist in the dispersion of odours. These benefits have been recognised in incentives for the use of improved shed design and technology.

6. KEY ISSUE C: PLANNING

6.1 RURAL ZONE

Under the VPPs, the Rural Zone is the only planning zone in which broiler farms may be located. In the other 'rural' zones (Environmental Rural Zone and Rural Living Zone) intensive animal industries such as broiler farms are prohibited uses.

There was some discussion at the hearings regarding the possibility of locating broiler farms in an industrial zone. It should be made clear, however, that the purpose of the discussion was to illustrate the link between the emission controls applying in industrial zones and those being considered for broiler farms. While it was stated that a broiler farm meeting the highest environmental standards could, theoretically, be located in an industrial zone, there was no suggestion that this was a serious proposal.

A number of submissions, particularly from growers, were concerned that the VPP Rural Zone does not provide sufficient protection for agricultural activities. It can be said that the flexibility of the zone is inconsistent with its purposes, which all relate to the use of the land for agriculture. For example, the Rural Zone does not list 'residential use' amongst its objectives, yet a dwelling is an as-of-right use provided the minimum lot size is met. This provision allows a house to be sited and built with no consideration of whether residents will be affected by adjoining uses, and clearly has potential to lead to the well-recognised conflict that can arise between residents and growers. Submitters argued that as the objectives of the Rural Zone all relate to maintaining land in production, agricultural uses should have primacy.

This is an issue that was raised by a number of the Panels reviewing the new format planning schemes around the State. It was also raised explicitly in the *Final Report – New Format Planning Schemes* compiled by Helen Gibson. The report recommended the creation of a specific Agriculture Zone in which residential use would be strictly limited and controlled. This would afford agricultural activities in the Agriculture Zone a similar level of protection as that enjoyed by industry in the Industrial Zones or, indeed, by housing in the Residential Zones. Agriculture is just as important to the economy as industry, and recognition of its primacy within its 'own' zone is appropriate.

However, it must be recognised that the situation for broiler farms is exacerbated by the relatively small lots on which many of them are located. In a 1999 survey of broiler farms conducted by the VFF, 64% of growers responding to the survey operate on farms of less than 10 hectares. In the absence of an appropriate buffer it is not surprising that conflicts with neighbours occur.

On the other hand, non-farming residents living in rural zones argued that the use of their land for primarily residential purposes was legitimately established, and that they should therefore enjoy a reasonable degree of amenity. While the Advisory Committee has some sympathy with these residents, especially where a broiler farm has established after the residential use, the fact

remains that their property is in a Rural Zone, and adjacent land is used for agriculture of one kind or another. In these circumstances, it seems unrealistic to expect the same level of residential amenity as would be expected in a Residential Zone.

This is not to say, however, that no amenity protection at all should be provided to rural dwellers. One of the objectives of environment protection policies and legislation is to protect the community and the environment by minimising the production of harmful and offensive emissions. Rural residents are increasingly experiencing the benefits of these policies as codes of practice for a variety of farming activities are developed to meet new requirements. The Code for broiler farms is the latest of these; one of its purposes is to recognise the needs of the community, including those of rural residents.

The potential impact of the nature of the rural zone on the broiler industry merely illustrates the much broader impact on agriculture generally. Although proposals for a review of rural zones have been made, there is as yet no firm commitment to undertake a formal review. The Advisory Committee intends to reinforce these proposals by recommending again in its Final Report that the rural zone be reviewed. In the meantime, the current VPP Rural Zone is the one within which we must work. Councils have the capacity to develop local planning policies that serve to signal their approach to broiler farms and guide the exercise of discretion. The Westernport broiler policy has to some extent served this function in the past.

Furthermore the Code, when implemented, will provide a considerably greater level of certainty for growers, residents and Councils as to what is and is not acceptable, in the interests of all parties.

6.2 ENCROACHMENT

Many growers, particularly those on the Mornington Peninsula, made submissions regarding the encroachment of residential zones on their farms. These growers argued that Councils had jeopardised their future by rezoning land from rural to residential use in the vicinity of their farms. In a some cases this has led to an unhappy history of disputed complaints and objections to farm expansion.

It was evident from the Advisory Committee's inspections that some older broiler farms are now within areas that could be classified as low density residential. Generally these farms are on lots now considered too small for poultry raising. Applications for expansion of this type of farm have been refused in recent years.

The problem on the Mornington Peninsula is particularly acute. With expansion of the metropolitan area and greatly improved access, demand for land for residential and rural residential purposes on the peninsula has increased significantly. The consequent increase in land value has encouraged both farmers and developers to capitalise on this trend. Although the planning strategy that encouraged the industry to relocate to the peninsula 30-40 years ago has since been superseded by other imperatives, it is fair to say that some rezoning decisions appear to have been made with little regard to either the potential impact on existing agriculture or the potential for off-site impacts on new residents.

It is also clear that although the Westernport broiler policy deals specifically with the issue of encroachment, this aspect of the policy has not been successfully implemented. Many rezoning decisions appear to have been made with scant regard for the obligations the Westernport policy seeks to impose on responsible authorities, and the minimum distances specified for rezonings in the vicinity of broiler farms have been regularly breached. On the other hand, it is fair to say that the Westernport policy is not a statutorily enforceable document and compliance with it is a matter of discretion.

The Code, when adopted, will establish appropriate separation distances for broiler farms from residential uses. The Code should also require Councils to ensure that proposals for rezoning in the vicinity of established broiler farms do not encroach on these separation distances. The Advisory Committee intends to make a recommendation to this effect in its Final Report.

6.3 PROPOSED FARM 'CLASSES'

The draft Code creates three 'classes' of broiler farms. The classes are based on the degree to which minimum separation distances can be accommodated within the property. A different planning permit process is proposed for each class.

In this section, and throughout the remainder of the report, the two terms 'boundary buffer distance' and 'separation distance' are used to distinguish clearly between the two concepts. As set out in the previous chapter, 'boundary buffer distance' means the distance between the sheds and the property boundary. 'Separation distance' means the distance between the sheds and the nearest sensitive use.

Class A

Class A farms are defined as satisfying all of the best practice requirements of the Code and satisfying most of the boundary buffer and separation distances within the property boundary. There must be no existing or likely sensitive uses within these distances. It is proposed that Class A farms, while still requiring a permit, will be exempt from third party notification and appeal rights. A definition of 'most of the separation distances' is not provided.

Many submitters objected to this classification on the grounds that if part of the boundary buffer or separation distance falls on a neighbouring property, the owner should be entitled to be notified and to lodge an objection or appeal against the proposal. The Advisory Committee was informed by the Code Committee chairman that the concept of 'most of' the boundary buffer/separation distances was developed to achieve consensus and enable the Code to be exhibited. In its submission to the Advisory Committee, the VFF indicated a change in its position on this issue and proposed that the definition be amended so that boundary buffer/separation distances should all be met within the property boundary.

The Advisory Committee supports both the submitters' objections and the VFF's revised stance as a matter of principle, irrespective of the actual boundary buffer and separation distances that are included in the adopted version of the Code.

The Advisory Committee believes that the Code should also make clear that if a proposal to expand an existing Class A farm would change its classification to Class B, then normal third party notification and appeal rights would apply.

Class B

Class B farms are defined as meeting all best practice requirements, but with a 'greater proportion' of adjoining land (ie. greater than envisaged in Class A, but still not defined) being affected by boundary buffer or separation distances. Again, there must be no existing or likely sensitive uses within these distances. A minimum 200m is specified between the shed centroid to the property boundary. (The 'centroid' concept is discussed elsewhere in this report.) Normal third party notification and appeal rights would apply, in line with the principle stated above.

At the hearing, the VFF proposed that the specified boundary buffer distance should be reduced from 200m to 40m. It also proposed that this distance should be measured from the extremity of the shed rather than the shed centroid. This would have the effect of reducing the distance required, but not to the extent proposed by the VFF. The Advisory Committee is concerned, however, at the use of a single boundary buffer distance, regardless of its dimension or from which point it is measured. It believes that any specified distance must be related to the ultimate bird capacity of the farm, existing or planned.

The Advisory Committee notes that the 'proportion' of the separation distance that would be accepted on adjoining land is not defined. However, there must be no existing sensitive uses within the separation distance, and Councils should be 'satisfied that the area covered by the separation distance will not reasonably be subject to sensitive land use development in the future.' The Advisory Committee believes that this requirement represents a reasonable safeguard for the interests of adjoining landholders, who will in any case have notification and appeal rights.

The concept of an intermediate farm class is supported by the Advisory Committee. However, it believes that the requirements for expansion of Class B farms, where expansion has not been allowed for in the classification (ie. existing farms whose permit does allow for additional sheds) should include an environmental risk assessment as proposed in the Code for Class C farms. Class B farms already fail meet the appropriate distances established by the Code, and some may fall into Class C as a result of the expansion. In these circumstances, special conditions should apply.

Class C

Class C farms are defined as meeting all best practice requirements of the Code, but not meeting boundary buffer/separation distance requirements because of existing or possible sensitive uses, or because the 200m minimum from shed centroid to boundary cannot be met. It is proposed that new Class C farms can be approved, and existing Class C farms expanded, subject to an environmental risk assessment. Normal third party notification and appeal rights would apply.

The Advisory Committee supports the creation of a Class C definition, which acknowledges the existence of farms that do not meet any of the accepted boundary buffer or separation distances, and allows them to continue in operation. However, the Advisory Committee has serious reservations about the proposal to allow new Class C farms to establish and existing Class C farms to expand. These concerns are not allayed by the requirement for an environmental risk assessment. As a simple matter of principle, if a new farm cannot meet the boundary buffer/separation distances established as appropriate for broiler farms by the Code, it should not be allowed to establish. Similarly, if an existing farm does not meet the requirements, it should not be allowed to expand and exacerbate an already unsatisfactory situation.

In the Advisory Committee's view, to allow for the possibility of establishment or expansion of Class C farms is quite inconsistent with the objectives of the Code. It would also operate as a

disincentive to other, more appropriate options when change is contemplated, such as relocation or closure of the farm.

Overall comment

The Advisory Committee accepts that the adoption of three farm classes based primarily on boundary buffer and separation distances could be seen as somewhat arbitrary, especially in the case of irregularly shaped farms. Nevertheless, it also a practical and well-established mechanism through which minimum standards can be implemented. The Advisory Committee's reservation about the classes as proposed in the draft Code is that they only partially encourage the industry to secure its long-term future.

In the Advisory Committee's view, the concept of defining classes of farms is meaningless unless it embodies appropriate and effective incentives and disincentives. While incentives to establish Class A farms are provided, there should also be disincentives for Class C farms to remain in operation in the long term. Moreover, both the incentives and the disincentives are appropriate because they reflect and reinforce the trend towards larger farms that is already well-established in the industry.

The Advisory Committee recommends that the three classes of farms be restructured to achieve the following:

- ***Class A farms must contain both the boundary buffer distance and the separation distance to the nearest sensitive use within the property; they should therefore be exempt from third party notification and appeal rights. If a proposed expansion of a Class A farm would result in re-classification to Class B, third party notification and appeal rights should apply.***
- ***Class B farms must meet the boundary buffer distance; part of the separation distance to nearest sensitive use may be met outside the property provided there are no existing or likely sensitive uses within the relevant separation distance. Third party notification and appeal rights to be retained. An environmental risk assessment should be required for expansion of a Class B farm where the expansion was not considered as part of the original proposal. If a proposed expansion of a Class B farm would result in re-classification to Class C, the expansion will not be approved.***
- ***Class C farms do not meet either the boundary buffer distance or the separation distance to the nearest sensitive use. This classification should apply to existing farms only. No new Class C farms should be able to establish, and no existing Class C farm should be able to expand.***

This recommendation must be read in conjunction with the recommendation in Chapter 5.4 regarding the opportunity to vary boundary buffer and /or separation distances for Class A and B farms. This opportunity will only be available where an environmental risk assessment demonstrates that the use of 'superior technology' will reduce the impact of odour emissions. Use

of the ‘superior technology’ option will be subject to third party notification and appeal rights for both Class A and Class B farms.

The possibility of ‘trading off’ land size against superior technology was canvassed in general terms at the hearing. The option to do so based on an environmental risk assessment has been included to provide a positive incentive for the industry to research the potential for technology that either reduces odour emissions, or reduces their dispersal patterns.

If such technology becomes established as an industry standard at some time in the future, the boundary buffer and separation distances specified in the Code should be reviewed.

The Advisory Committee is strongly of the view that any planned establishment or expansion of a Class A or B farm should require the preparation of a masterplan which covers the existing facility (if any), planned new development in respect of the current application, and projected long-term development.

6.4 LANDSCAPING

A number of submitters complained that although approved plans usually showed appropriate landscape buffers, the landscaping frequently was not undertaken, even when it was specified as a permit condition. Where undertaken, it was often not adequately maintained.

The Advisory Committee saw enough examples of poor or non-existent landscape buffers to accept the evidence of these submitters, and it was not disputed by the VFF. Clearly, the need to comply with this condition has not been taken seriously by many growers, and enforcement has not been a priority for Councils, even when complaints have been made.

The option of introducing an incentive mechanism such as a performance bond was raised a number of times at the hearing. In its simplest form, a performance bond is paid and held by Council, and refunded when the landscaping is completed in accordance with the permit condition. At the other extreme are sophisticated systems such as those often used, for example, for infrastructure contributions and mining. Under these types of bonds, a bank guarantee is given to the agreed value of the works, with Council having power to draw on the funds to undertake or maintain the works if the owner fails to do so.

The Advisory Committee believes that an incentive mechanism is obviously needed. However, the mechanism should be tailored to a level that encourages compliance and does not place an undue burden on either growers or Councils. The Advisory Committee has not had the opportunity to examine the range of available options prior to the preparation of this Interim Report, but believes that it should make a recommendation on this issue in its Final Report. Additional information will be required as the basis for such a recommendation.

> ***The Advisory Committee recommends that the Code Committee, in consultation with stakeholders, investigate options for a performance bond to ensure that landscaping works are undertaken and maintained in accordance with permit conditions. A further submission should be made to the Advisory Committee recommending an appropriate form of bond for broiler farms.***

6.5 WHY ONLY BROILER FARMS?

The draft Code deals only with broiler farms - ie. farms where chickens are raised for eating. The focus on a single type of poultry farm, even though it is the most contentious, raises the question of whether the Code should embrace a broader range of poultry farming activities. There are three ways in which the scope of the Code could be broadened:

- to include all poultry raised for eating – ie. ducks, turkeys etc.;
- to include poultry farms with other purposes – ie. layer and breeder farms;
- to include 'free range' methods of poultry raising.

It should be noted that other State and Commonwealth guidelines have varying approaches to the range of poultry and poultry farming they cover. A number of these were made available to the Advisory Committee. The following table shows the range of poultry farming activities covered by these guidelines. Poultry welfare guidelines have been included.

State	Instrument	Broilers	Other poultry	Layers/breeders	Free range
SA	Guidelines for the Establishment and Operation of Poultry Farms (SAFF 1998)	Yes	No	Yes	No
QLD	Code of Practice for Environmental Management on Farms for Chicken Meat Production (draft, 1998)	Yes	No	Breeders only	No
WA	Statement of Planning Policy No.5 - Poultry Farms Policy (1998)	Yes	Yes	Yes	Yes
WA	Guidelines for the Environmental Management of Intensive Animal Based Industries – Poultry Farms (draft, 1999)	Yes	Yes	Yes	Yes
AUS	Australian Model Code of Practice for Welfare of Animals - Domestic Poultry (Comm. 1992)	Yes	Yes	Yes	Yes
AUS	Australian Model Code of Practice for Welfare of Animals – Land Transport of Poultry (Comm.1998)	Yes	Yes	Yes	Yes
VIC	Proposed Code for Best Practice Broiler Chicken Farms	Yes	No	No	No
VIC	Code of Practice for Welfare of Poultry (NRE 1996)	Yes	No	Yes	Yes

The table shows that the Victorian draft Code has the most limited coverage, although this is not necessarily a criticism. Reasons advanced for focusing solely on broiler farms were that the impetus for the Code came from the broiler industry, that broiler farms are the most contentious in planning terms, and that growing of other types of poultry is on such a small scale that it does not warrant the same concern. It was also suggested by the Code Committee's chairman that including other forms of poultry farming could have dissipated the energy and commitment of the

participants, and reduced the likelihood of consensus being reached. Indeed, the Code Committee's main goal was 'to provide a framework for …. the development and operation of the broiler farming industry,' presumably in accordance with the request for its establishment.

This is not to say, however, the possibility of extending the Code to cover other forms of poultry farming should still not be contemplated. Clearly, other 'poultry' guidelines have been developed and implemented that embrace the raising of chickens, ducks, turkeys etc. in the form of parent breeders, layers and birds grown for the table in both intensive and 'free-range' environments. The Advisory Committee recognises layer and parent breeder farms have different litter management systems from those used in broiler sheds. Nevertheless, there are many aspects of these farms that have the potential for off-site impacts similar to those of broiler farms, indicating that similar planning and environmental principles should apply.

A shed full of poultry is a shed full of poultry, regardless of what type of poultry they are, or what they are doing in there.

Although the number and scale of farming of other types of poultry (eg. ducks, turkeys, geese, quail) is relatively small, there will no doubt be applications to establish them if sufficient demand is generated. Unless they are covered by the Code, there will be no framework within which to assess applications, and no statutory basis for the imposition or enforcement of appropriate conditions. It is better to anticipate than react.

Extension of the Code to other forms of poultry could be implemented either by specifying different boundary buffer/separation distances per bird for each species, or by adopting a measure already in use by the industry - biomass or kilograms of live bird per square metre (kg/m^2). This measure could, if appropriate, be applied to a range of species. For example, a density of $40kg/m^2$ of poultry might represent 20 chickens, 12 ducks or 2 turkeys.

Inclusion of free-range poultry has been suggested for two reasons, although the Advisory Committee recognises its minor role within the industry at present. First, more than half of the guidelines listed above include free-range poultry production. Second, advice from the industry indicates some 'free-range' poultry are housed for a significant portion of time in the same conditions as intensively-farmed poultry. The image of a speckled hen happily pecking under a tree appears to be a something of a fantasy to the industry. These reasons together indicate that free-range farms can be liable to the same problems as intensive farms, and should be subject to the same conditions. At the very least, proposals for free-range farms should be assessed against similar criteria. Inclusion of free-range farms in the Code would also allow for any increase in production in future that may occur in response to changing consumer preferences, such as is happening in the egg industry. The current supply of free-range chickens was assessed by the industry at 5000 birds per week, but was expected to double in the next few years. If that growth rate is maintained or increased in response to market demand, it is likely that over time at least some growers will adapt to a free-range regime.

The possible inclusion of hatcheries should also be considered. Advice from the industry indicates biosecurity concerns are paramount for such farms, and buffers in excess of those

proposed in the Code are the norm. Hatcheries are generally located on large sites remote from urban areas and other poultry farms for this reason. However, there are issues other than buffer distances covered in the Code, and it may be appropriate for hatcheries to comply with them. It would also be appropriate for all forms of poultry farming to be dealt with under the one Code, with the same framework for assessment of applications.

This issue should also be seen in the context of recent moves in relation to the conditions under which layer hens are housed. It is possible that any changes instituted as a result of these moves (eg. a phase-out of the cage system) may also bring a change in the environmental impacts of layer farms. Their inclusion in the Code could usefully anticipate these changes.

The Advisory Committee does not wish to predetermine an outcome on this issue. However, it believes that, in view of the broader content of other Codes, the commonality of the issues, and the lack of planning guidelines for other forms of poultry farming, that the issue is well worth serious consideration. An initial investigation should establish the feasibility of broadening the scope of the Code, at least in the longer term.

The Advisory Committee recommends that DNRE investigate the possibility of broadening the Code to cover:

- ***other species of poultry;***
- ***layer and parent breeder farms;***
- ***free range methods of poultry raising; and***
- ***hatcheries.***

After consultation with the Code Committee and the industry, DNRE should make a submission to the Advisory Committee setting out its conclusions on this issue.

7. KEY ISSUE D: RELOCATION

A number of submissions from growers suggested that an outcome of the Code, if not the underlying intent, was to force the closure or relocation of broiler farms on small lots. This issue has been discussed briefly elsewhere in this report under other headings. It was suggested in Chapter 1.1 that the industry as a whole has not faced the implications of the situation many growers now find themselves in, and has been reluctant to adopt a more strategic approach to the future of the industry in terms of location of both farms and industry infrastructure.

The result is that many growers, who should be receiving encouragement from the industry to relocate and expand in line with accepted industry trends, are left to defend small farms that are steadily becoming less sustainable in both an economic and an environmental sense.

Evidence was given to the Advisory Committee on the history of the location of the broiler industry. In the 1960s and 1970s it became clear that the industry would need to relocate from the Frankston area due the pressures of increasing urbanisation. Representatives from Inghams informed the Advisory Committee that this need was recognised by the company, and it began planning for a major relocation to an area now part of the Northern Grampians Shire. Large tracts of land were purchased to implement this strategy. However, the Government of the time encouraged the industry to relocate to the Mornington Peninsula/Westernport area. Major investments were made by the company in response to this encouragement, and the original plan was abandoned and the land sold.

It is obvious, 30 years on, that the Government's strategy was unable to foresee either the rate of growth of the industry or the rate of population growth in the area. It has resulted in the dilemma the industry faces today.

Nevertheless, it shows that the industry has in the past been willing to relocate in response to growing pressure from urbanisation and with Government encouragement. The Advisory Committee believes the pressures are there for this pattern to recur. There is no doubt that the trend towards larger farms, combined with the larger buffer distances now being required and the limitations on expansion of existing farms, will see small farms closing or relocating over time. This has very clear implications for the geographic relationship between farms, processing facilities and feed mills. Processors have as much interest in this issue as growers. If processing and feed facilities remain while farms relocate, transport costs will rise as much as if it happens in reverse.

The Advisory Committee accepts that relocation of industry infrastructure represents both a substantial loss on existing investment, and a substantial capital investment in new infrastructure. While sound strategic planning, perhaps including staged relocation, could minimise the impact, it nevertheless has significant financial implications, at least in the short to medium term. However, the implications need to be weighed against the long term benefits, which include certainty, efficiency and security.

Processors advised the Advisory Committee that, as well as the cost of new capital investment, they are unwilling to relocate infrastructure because, as suppliers of fresh food, they need to be as close as possible to their markets. The Advisory Committee has some difficulty with this argument for a number of reasons. Improvements in transport technology have led to more favourable conditions for the transport of fresh meat. The argument put forward by the industry that an additional hour in a chilled delivery van will have a significant effect on the quality of fresh chicken meat is hard to accept, especially when fresh chicken meat is currently being sent to the Melbourne market from the Griffith area in NSW.

As stated earlier, the trend is towards much larger farms carrying numbers of birds not envisaged 30 years ago. The largest farm drawn to the Advisory Committee's attention is a company-owned farm of 12 sheds capable of housing nearly half a million birds. The real impact of this trend is the need for relocation of a rapidly expanding industry.

The shires of Mornington Peninsula and Cardinia, where broiler farming is concentrated, have expressed serious concern about further expansion. There is evidence that permits for both new farms and expansion of existing farms are becoming more difficult to obtain due to the impact of increased urbanisation, bringing with it higher amenity expectations of residents. The current concentration of resources – broiler farms, processing and feed facilities - leaves little room for major expansion under either existing planning controls or under the Code.

The Advisory Committee has already stated that the Code should provide incentives for the establishment of Class A farms, and disincentives for the long-term survival of Class C farms. Any Government strategy for long-term relocation of the industry should include positive encouragement for the closure or relocation of Class C farms. There are a number of forms any such encouragement could take, and a range has been used in the past for other industries that have been encouraged to relocate for similar reasons. For example, flexible approaches to rezoning that support other Government policies have been used in a variety of applications. It is interesting to note that Western Australia's *Statement of Planning Policy No.5 – Poultry Farms Policy* includes specific clauses dealing with relocation initiatives, and indicating Government and local government support where appropriate. A positive policy for relocation would complement and support the Code in a most appropriate way.

The industry and the Government have a choice – to begin planning strategically for long-term relocation, now, or to allow it to occur incrementally, haphazardly and inefficiently.