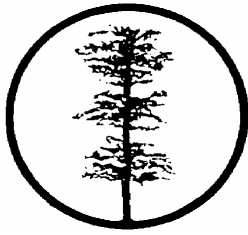
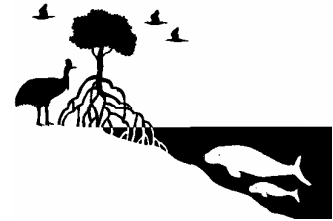


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11 April 2008

Review of the Environmental Protection Regulation (BNE26828)
Environmental Protection Agency
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Submission on the Regulatory Impact Statement and draft Public Benefit Test on the review of the *Environmental Protection Regulation 1998* (Qld)

The Environmental Defender's Office-Queensland ("EDO-Qld") and Environmental Defender's Office of Northern Queensland Inc. ("EDO-NQ") ("the EDOs") welcome the opportunity to provide comments on the Regulatory Impact Statement ("RIS") of the review of Queensland's *Environmental Protection Regulation 1998* ("EP Regulation").

Thank you for the extension of time within which to submit our comments, and we apologise for the delay in providing them.

The EDOs are community legal centres which specialise in public interest environmental law in Queensland. We frequently advise community members on pollution under the EP Act and the rights and obligations of industry, the EPA and local Councils.

In recent years we have received increased numbers of complaints from the community regarding emissions from poultry operations, so we are very alarmed at the proposed low environmental emissions profile for that industry. We have attached as an **Appendix** evidence provided by a client regarding emissions to air and water by the poultry industry, and strongly urge that EPA reconsider the low score given to this industry.

Should you have any queries about any part of this submission please do not hesitate to contact us.

Yours faithfully

Environmental Defenders Office (Qld) Inc. and
Environmental Defender's Office of Northern Queensland Inc.

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EDOs' Submission on the Regulatory Impact Statement of the review of the *Environmental Protection Regulation 1998* (Qld)

Responses to Relevant Discussion Questions, and Other Comments

(i) What are your views about the objectives of the new Regulation?

- 1. Effective regulation of activities that are ERAs by using Environmental Emission Profiles*
- 2. Effective regulation of environmental nuisance*
- 3. Effective implementation of national agreements*
- 4. Regulatory provisions that are transferred from the EPPs to the new Regulation*

The EDOs support the EPA's proposal for a new evidence-based approach to regulating ERAs, however we have some concerns regarding calculation of environmental emission profiles, particularly in regard to the very low score allocated to the poultry industry. We elaborate on this point further later in our submission.

The EDOs agree with the proposed objectives of the new Regulation. We strongly support industries with greater potential for causing environmental harm paying higher fees. We also support the objective "detailing processes for Environmental Impact Statements" and would welcome greater imposition of the need to conduct EIS on a broader range of activities under the EP Act, though we acknowledge that this is beyond the scope of the proposed Regulation.

Codes of compliance

However, we are concerned at the proposal to develop codes for environmental compliance for ERAs with lesser potential for environmental harm. The EDO's preferred response is for EPA and Councils to be better resourced by government to regulate *all* ERAs, including those with lower potential to cause environmental harm. We share the concern of the Brisbane City Council that using codes of compliance to make devolved ERAs self-assessable would remove Council's ability to impose site-specific conditions beyond what the planning scheme allows.

If the EPA is committed to reducing its administrative burden by developing codes of environmental compliance, broader and more detailed consultation is required. The EDOs would then argue for mandatory strict compliance with the code (substantial compliance is not sufficient), regular monitoring of compliance with the codes in all relevant facilities and the provisions to allow public enforcement for breaches of the code.

Cumulative impacts

We are also concerned at the lack of reference to cumulative impacts both in the objects and in the substance of the proposed Regulation. The EDOs strongly submit that consideration of cumulative impacts should be mandatory in the following circumstances:

- When setting or reviewing environmental emission profiles;
- When considering whether environmental harm or nuisance has occurred;
- When considering whether to grant or renew approval to conduct an ERA.

Given the difficulty in identifying the polluters in cases of cumulative environmental damage, Courts have often found no identifiable environmental harm has occurred (see for example, *EPA v Lithgow City Council* [2007] NSWLEC 695 and *EPA v Abigroup Contractors Pty Limited* [2007] NSWLEC 712). Amendment to the objectives and to the substance of the

Regulation could correct this judicial approach and ensure the objects of the Act are better achieved.

(ii) What are your views about the preferred option and alternatives for ERAs?

Alternative 1 – No legislative intervention (the current Regulation expires and is not replaced)

Alternative 2 – Reintroduce the current Regulation (status quo)

Alternative 3 – Remake the Regulation with market-based instruments

Preferred option – Remake the Regulation on the basis of environmental emissions

The EDOs agree that alternatives 1-3 fail to cater for changes in the last decade including increased community standards, increased costs of service provision, increased level of required service and the increasing number of ERAs with carbon emissions. The EDOs support preferred option (Alternative 4) for ERAs, subject to the following comments:

Comments on Environmental Emission Profiles

- Cumulative impacts appear to have been ignored in the calculation of the environmental emissions profiles. This is retrograde, considering that cumulative impacts were considered as part of the risk assessment methodology in 1994. Numerous small industries can easily collectively cause environmental harm particularly to sensitive areas like wetlands and waterways. Cumulative impacts must be considered when setting and when reviewing environmental emission profiles;
- We are particularly concerned at the low environmental score (15 out of 404) given to the poultry industry, which does not reflect our experience of increasing community concern and numerous client complaints about unlawful emissions to air and water and offensive odour. Unfortunately, even when best practice environmental management is implemented, poultry farms produce air emissions (including odour) beyond their boundary. When such farms are located near waterways, these air emissions inevitably become water emissions.

We note one client has reported that poultry operators in his area are not complying with their duties to report data to the National Pollutant Inventory (on which the Environmental Emissions Scores have been based). This is a grave concern.

We are also concerned that facilities with less than 1,000 birds are proposed to be exempt, particularly when such facilities are clustered in one sensitive area. There seems to be a failure to consider the cumulative impacts of smaller facilities when sited in a particular region (see next bullet point).

Appendix 1 has been prepared by the Environment Officer of Sunfish North Moreton, focussing on his experience of poultry operation emissions to water in the Pumicestone Passage. We urge your careful attention to this evidence and strongly request a re-classification of the score for poultry to better reflect its true environmental risks (particularly when a growing cluster of poultry operators are located so close to sensitive Pumicestone Passage).

- There is no variable to increase the environmental score for when an operation is being conducted near a sensitive area. While the scores are calculated on an industry-wide basis, we seek addition of a multiplier (for example, a factor of 5) which can be applied to increase the score of a particular operation when it is located near a sensitive area. This would generate fees which would enable greater regulatory focus

on those facilities, and would also engender greater regulatory focus given the statements in the RIS about the emissions profiles guiding enforcement priorities¹. In the interests of transparency and enforceability, this multiplier should be mandated in the Regulation. For the same reason we support the proposed inclusion of the environmental scores in the Regulation.

- Environmental scores must be able to be reviewed more regularly than every five years. Scores should either be reviewed every two years, or triggers be stated in the Regulation to enable earlier review. Such triggers could include a change in industry practice which results in higher emissions, increased complaints from the public about pollution from certain industries, new scientific understanding about the impacts of certain industries, or routine non-compliance with approval conditions across a number of operators in an industry. In any event, the length of time for review of environmental scores should be mandated in the Regulation, to avoid the possibility of an administrative delay which results in the scores only being reviewed on the 10 year expiry of the Regulation.

Comments on the need for improved monitoring and enforcement

- The EDOs support all sites, including those carrying industries with low environmental scores, receiving regular site inspections. EDO Qld was advised in the face to face consultation with EPA that this would occur for every site on which an ERA was being conducted once every two years. This should be a maximum time frame (annually would ensure better environmental protection), and all site visits should be without notice to ensure that the industry's normal operating practice is able to be observed.

Comments on changes to list of ERAs and thresholds for some ERAs

- The EDOs strongly support the proposed new ERA for road tunnel ventilation stacks. We note that if busways have equivalent pollutant loads we support busway ventilation stacks also being listed as a new ERA. We would also strongly support a broader approach, including as ERAs the construction and operation of new road tunnels and other large infrastructure projects with deleterious environmental impacts. This would ensure that EPA's legislative responsibilities are discharged even when alternative legislative approval pathways are used (such as the *State Development and Public Works Organisation Act* and *Transport Infrastructure Acts*).
- The EDOs strongly opposed the lowering of thresholds in many ERAs in Schedule 1. We endorse the comments of the Brisbane City Council on specific ERA thresholds.
- The EDOs seek re-inclusion of ERAs 38 and 39 on land development and construction activities. Water quality impacts from construction are a major and increasing problem that is presently insufficiently regulated, with avoidable adverse affects on Queensland waterways.

Comments on delegations and devolutions of ERAs to Councils

- We wish to place on record the many complaints we receive from clients who report that their local Council routinely ignores breaches of development approvals and will not enforce conditions or local laws. This is particularly the case with smaller, under-

¹ Page 7 "The Environmental Score will be used to help the EPA decide how to allocate resources between different ERA categories (eg those activities with a very high Environmental Score **will have relatively more intervention** and assistance)." Statements were also made by EPA in the face to face consultation that the environmental scores would guide a "targeted inspection program".

resourced Councils or highly politicised Councils in regional areas. We note the Council amalgamations may in the long run have a positive effect on enforcement of Council's environmental responsibilities, but in the short term Councils are likely to be in disarray adjusting to their new incarnations and enforcement is likely to further reduce.

- In this context, we strongly oppose greater devolutions or delegations of ERAs to Councils. Whether refusal to enforce is based on a lack of expertise, limited resources or reluctance to take legal action for political reasons, we are wary that in devolving or delegating responsibility for more ERAs to Council, environmental protection is likely to reduce or the burden of enforcement shift wholly to the community. Poor regulation of the poultry industry by regional Councils is a particularly frequent example. If Treasury continues to underfund the EPA such that it is unavoidable for EPA to shift more obligations onto Council, then Councils must be funded, trained and supported with a suite of enforcement tools, and be held accountable for their enforcement practices. The EPA chief executive must be prepared to step in using the powers in section 514(7) of the EP Act when Councils are not fulfilling their obligations.

(iii) Do you agree that regulators should put the highest effort into the activities with the highest Environmental Score?

Clearly activities which have the greatest potential to severely harm the environment should receive the highest regulatory attention. Nevertheless, all ERAs are potentially damaging to the environment and the EDOs strongly believe that they must all be regulated.

Comments on proposal to remove sites with low emissions scores from regulation

We are very concerned at the proposal to eliminate some ERAs from regulation altogether, some 1750 sites with low environmental scores. The EDOs strongly support the monitoring and enforcement of **all** ERAs, even those with very low environmental scores. Industries with low environmental scores can still have significant environmental impacts if there are lots of them and/or they are poorly sited. Moreover until the defects in the methods of arriving at environmental scores (outlined above) are addressed, they should not be used as a basis for removing regulation.

If the current proposal to reduce the regulatory purview of EPA by minimising ERAs is due to the continued under-resourcing of EPA by Treasury, it is totally unacceptable. The community expects the EPA to be watchdog and to regulate industry to avoid pollution incidents (and to take action when pollution occurs). The Government must resource EPA to perform this role. We heartily support the increase in funding given to EPA in 2007 for enforcement activities, and we assume that the additional funds raised from increased ERA fees will be invested into monitoring and enforcement activities.

(vi) Do you think the full cost of environmental regulation should be paid by those regulated?

The EDOs strongly agree that the full cost of environmental regulation should be paid by those regulated. This approach is consistent with the polluter pays and user pays principles.

The community should not have to subsidise the costs of polluting of regulated operators. The EDOs strongly support the proposal to set the fee unit at an amount which recovers the full costs of administering the Regulation. The EDOs also support the proposed basis for

calculating the fees (by risk; multiplying the environmental score by 200) and the removal of the multiple site discount and the fee waiver provisions.

(vii) Do you think that fee incentives or discounts should apply to operators that have an accredited environmental management system (eg ISO14001, Farm Management Systems)?

The EDOs do not have a firm view on this proposal, but we note that it would only be appropriate if those EMS' were being complied with, which would require increased EPA monitoring. We note that accredited EMS' do not always ensure that unacceptable emissions are precluded, and such a fee incentive or discount may add complexity in administration and enforcement.

(viii) If you have a deemed approval (not a formal Development Approval under IPA) would you prefer to have a year to apply for a DA or would you prefer to apply for a DA immediately and have a year to meet the required environmental standards?

EDO strongly supports the phasing out of deemed approvals. Community standards in relation to pollution and environmental protection have changed, and the EP Act should reflect that. No operation should be exempt from the EP Act under a deemed approval.

The potential for delay is greater if applications for development approvals are deferred for 12 months. A transitional period allowing 12 months to meet required environmental standards should apply.

(ix) What are your views about the recommended option and alternatives for environmental nuisance?

The EDOs agree in principle that environmental nuisance (except when generated by ERAs or State or Council operations) is more appropriately regulated by local Councils. The current division of responsibility for environmental nuisance makes it more difficult for community members to know who to complain to, and also results in buck-passing between EPA and Council. We are aware of some instances where Councils have not been appropriately conditioning development approvals for nuisance issues, so that when a complaint occurs Council refer the matter to EPA and absolve itself of responsibility in dealing with the issue. This is unacceptable, and clearly the best time to regulate nuisance is at the time of setting conditions on development approvals.

The EDOs therefore support the proposal to charge Councils with regulating environmental nuisance, with concomitant increased penalties and broadened enforcement tools. We also support the proposal for nuisance laws only to apply in the absence of other laws regulating the nuisance (particularly for matters under the Liquor Licensing laws), except where public enforcement rights are reduced. We support the new basis for measuring acceptable noise (background plus 5dB(A)) to better reflect the variable background levels that occur across different areas of the State.

The EDOs acknowledge the administrative burden which the compulsory requirement to investigate complaints placed on EPA, and can see the utility in removing this requirement, but we are concerned that some under-resourced Councils may shirk their responsibilities to investigate legitimate nuisance complaints. We urge EPA to conduct training with Councils and encourage a culture of enforcement of their new nuisance obligations, and expect that the EPA chief executive will be ready to use the powers in section 514(7) of the EP Act to step in if Councils are not adequately performing their new role.

(x) Do you support the proposals to expand the emissions covered by nuisance laws and to extend the exemption to those items mentioned in Chapter 8.2?

The EDOs welcome and strongly support including vibration and aerosols within environmental nuisance laws. The EDOs support the current exemptions that apply to noise from non-domestic animals, outdoor shooting ranges, blasting noise, audible traffic signals and cooking odour. The EDOs support new exemptions for repairs to roads or other essential infrastructure (bridges, sewage and water pipes) with the acknowledgement that these activities are still required to comply with the General Environmental Duty, by following environmental procedures, notifying affected parties and so on.

(xi) What are your views about implementing national agreements?

The EDOs support updating the provisions regarding NEPMs for greater clarity. Attention to the level of under-reporting of requisite NPI data by some operators - and the breadth of industries not required to report - is imperative.

(xii) Do you support transferring regulatory provisions from the EPPs to the new Regulation?

The EDOs support the transfer of regulatory provisions from the EPPs to the new Regulation to enable penalties to be higher. We strongly support the more extensive list of contaminants and the proposed increased court fines and penalty units for PINS.

Other comments on the Water EPP

- While outside the scope of this RIS, we note that for the forthcoming review of the Water EPP, it must be amended to better deal with sediment from construction sites during the construction phase.
- Water Quality Objectives and Environmental Values in the EPP need to be more clearly integrated into IDAS so that assessment managers, referral agencies and the community are more fully aware of their obligations to consider a development application's affect on WQOs and EVs.

(xiii) Do you have information to add to the analysis of costs and benefits?

No comments.

(xiv) Do you need further information or assistance to assess your costs and benefits?

Not applicable to EDO.

(xv) Do you wish to comment on competition restrictions or the Public Benefit Test?

No comments.

(xvi) Do you have any other comments?

In addition to education for local governments, an education package should be development for the general community and environment groups so that all stakeholders are aware of the new responsibilities on Councils and the EPA, and know who is the appropriate body to contact. Community knowledge of agency responsibility will assist in the agency's awareness of the community's desire for enforcement of environmental laws.

APPENDIX 1

POTENTIAL FOR POULTRY FACILITY EMISSIONS TO AFFECT WATER QUALITY

Prepared by Rob King, Environment Officer, Sunfish North Moreton Inc.



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Environmentally damaging and toxic algal and dinoflagellate blooms in waterways are considered to be promoted by increased nutrient supply. In Moreton Bay, reoccurring marine blooms of cyanobacteria *Lyngbya majuscula* have the potential to threaten many coastal economies with commercial, environmental, recreational and social impacts. Scientific studies indicate iron, phosphorus and to a lesser extent nitrogen as the limiting nutrients sustaining these blooms. Investigations of terrestrial sources of nutrients supporting *Lyngbya majuscula* growth in Moreton Bay (2000) assessed 50 licensed Environmentally Relevant Activities (ERA) within the northern Deception Bay and Bribie Island² regrettably no information was available for the significant intensive meat poultry industry development in the sensitive coastal zone area. Subsequent field experiments in Deception Bay indicated *Lyngbya* biomass in a poultry litter (1 year old) trial was substantially and significantly ($P=0.0001$) greater than control at day 35, suggesting that the available nutrients in the litter treatment was not limiting, despite growth being 19 times that of control³. At the same time Deception Bay *Lyngbya* bloom impact area grew over 43 days from 49ha to 529ha on 10 December 2005, with a corresponding biomass increase from 40 to 5,057 tonnes (wet weight)⁴.

The 2004 'Moreton Bay Partnership' Nutrient Model estimates a nutrient load to the Bay of 6000 tonne N and 1500 tonne P with predicted 2026 estimates of 7500 tonne N and 2000 tonne P. Unfortunately aeolian inputs to water have not been considered in this model, although aeolian dispersion of ammonia has been implicated in the recent environmental declines in both Tampa and Chesapeake Bays in the US. Emissions from broiler operations in the 164,000² km Chesapeake Bay catchment have been estimated to produce 8% or a whopping 18,000 tonnes of the total load of airborne ammonia⁵. Airborne nutrients can thus fertilize algae in estuaries. The bottom deposition of decomposing overabundant algae fuel micro-organisms that suck oxygen out of lower waters, creating "dead zones", which are void of fish and crabs for part of the year. In this Delmarva area the migratory Red Knot numbers have been decimated by the seasonal loss of the horseshoe crab spawn, a food source they were dependent on. These shore birds, protected by the Ramsar convention, are now in danger with a 50% reduction in numbers in recent years. There is a challenge to prevent replicating these problems, in a rapidly developing 22,600² km South East Queensland catchment, to maintain the ecological characteristics of the Moreton Bay Ramsar wetland (4,000² km).

Organic micropollutants in water, antibiotics in environmental matrices, were investigated in SEQ waterways adjacent to wastewater treatment plants (WWTP) and intensive poultry facilities (in the Caboolture area). The 2005/6 'dry weather' studies indicated antibiotics detected in surface waters

² Pointing SM, Moody PW, Preda M, Cox M, Hey KM Ahern CR, Powell B; Investigation of terrestrial sources of nutrients supporting *Lyngbya majuscula* growth in Moreton Bay (2004) Coast & Clean Seas, a Natural Heritage Trust program

³ Ahern KS, Ahern CR, Udy JW; In situ field experiment shows *Lyngbya majuscula* (cyanobacterium) growth stimulated by added iron, phosphorus and nitrogen (2007) Science Direct – Harmful Algae.

⁴ Ahern KS, Ahern CR; NRSEMGO1044_Toxic_Bloom_poster10 September 2007

⁵ Siefert R L, Scudlark J R, Potter A G, Simpusen K A, Savidge K B. (2004) Characterisation of Ammonia from a Commercial Chicken house on the Delmarva Peninsula; Env. Sci. Tech. 38(10) 2769 – 2778.

were at relatively low concentrations in comparison to wastewater influent. While the occurrence of antibiotics in SEQ surface waters was found to be mostly near WWTP discharges, relatively high concentrations were also found in the proximity of intensive poultry production sites⁶. This contamination could only occur through the aeolian dispersion of particulate onto local waterways, as no point source water discharge is allowed or could occur during dry conditions.

Nutrients to water from Poultry Facilities are significant, the Queensland Department of Primary Industries & Fisheries (DPI&F) studies, presented in 2004, for the Moreton North area (Pumicestone Passage catchment) indicate that 32 meat chicken facilities produce 24 million chickens annually in 5.5 batches of 4.39 million chickens. A stocking byproduct of this production is 1,414m³ of broiler litter (BL) per week; annually 73,320m³ or 36,400 tonnes⁷. In the SEQ area (120 kilometer radius of Brisbane) the weekly availability of BL is estimated to be 2,500 tonnes or 130,000 tonnes annually.

At least 90% of this is spread unprocessed on nearby, often adjacent, land (Vervoort & Keeler, 1999). Unless the litter is tilled into the soil quickly, the nitrogen is largely lost to the atmosphere as ammonia. French figures show that if litter is spread and turned into the soil within 12 hours NH₃ loss is reduced by 23%. Locally, most spent litter is simply piled or spread on the surface.

Assuming an average application rate of 16t/ha/year for BL horticultural use⁸ studies indicate an agricultural use for 2,275ha of local cultivation. As BL nutrients are not balanced for plant requirements, a conservative annual, off field, nutrient export rate of 12.7 kg nitrogen (N) ha⁻¹ and 2.4 kg phosphorus (P) ha⁻¹⁹ reveal a potential export to water of N – 28.9 tonnes and P – 5.46 tonnes from the Moreton North area.

Considering the annual 263,000 cubic metre production of BL in South East Queensland (SEQ), a potential agricultural export to water of 103 tonnes of nitrogen and 19.5 tonnes of phosphorus exists. These figures could be up to 25% higher if local industry growth was fully considered, this potentially represents around 2% of the 2004 'Moreton Bay Partnership' Nutrient Models prediction. However these nutrient export figures should be considered conjointly along with facility exhausted nutrients and dusts, and runoff and volatilised nutrients from stockpiled material.

If broiler growers in SEQ were to fulfill their mandatory obligations, in 2004 to report ammonia emissions to the National Pollutant Inventory (NPI), an additional 2500 tonnes of ammonia (2000 tonnes of N per year)¹⁰ would have been revealed. Reported estimates of ammonia emission rates are remarkably consistent and appear to be affected little by different production systems. The current contribution is in excess of 3000 tonnes of nutrient nitrogen per year to the catchments and rising steeply.

Production of ammonia, particulate matter (PM₁₀ and PM_{2.5}) and particulate-bound phosphorus would be expected to be influenced by weather conditions and management practice, particularly stocking density and litter re-use. Generation rates may vary widely and a destabilising event may continue to exert an influence on the fragile balance of the microbial ecology for months.

Emission factors are usually developed from measurements taken over short periods of time, during which the weather, operating conditions and animal sizes and numbers may not represent the annual average conditions. This can lead to under or over estimation of emissions when these values are extrapolated annually. We are concerned that the Poultry CRC, in their publicly-funded study into broiler shed emissions, have repeated this practice in "building a defensible database". Hopefully,

⁶ Watkinson A, Costanzo S; Antibiotics and Antibiotic Resistant Bacteria as Pollutants; (2007) Organic Micropollutants in Water CRC Water Quality and Treatment.

⁷ Geof Runge. 2002. Animal Sciences, Delivery – *Poultry Program DPI&F Queensland*

⁸ J.M. Devereux, M.R Redding, G B Kelsey. 2002: Nutrient Export to Surface Waters - A Modelling Approach; *DPI&F Qld.*

⁹ Wood, B.H. *, Wood, C.W., Yoo, K.H., Yoon, K.S., Delaney, D.P. 1999 Seasonal Surface Runoff Losses of Nutrients and Metals from Soils Fertilized with Broiler Litter and Commercial Fertilizer *Journal of Environmental Quality* 28 (4), pp. 1210-1218.

Chaubey, L, D *R. Edwards, T.C. Daniel, P.A. Moore, Jr., and D.J. Nichols. 1995. Effectiveness of Vegetative Filter Strips in Controlling Losses of Land-applied Poultry Litter Constituents. *Transactions of the ASAE* 38(6):1687-1692.

¹⁰ This conservative figure is replicated in calculations based on an estimated 500 sheds in the catchment with a notional carrying capacity that is less than 70% of the actual stocking rate and also from data reported by the Australian Chicken Meat Federation

when the USDA completes their study of all intensive livestock operations next year, a more definitive report will be available.

Illustrating the variability of emissions, Redwine *et al* (2002) reported ammonia emissions from a shed ranging from 38 to 2105 g/hr. Despite this variability, emission factors derived for ammonia in environments as diverse as southern USA, France and Britain show a surprising consistency. This suggests that the environmental control within the sheds is sufficient to effectively reproduce the same microbial ecosystem around the world. Table 1 compares the estimated annual ammonia emissions from a 30,000 bird shed using a range of emission factors used in different jurisdictions or reported in the literature. (The NPI currently uses an estimate based on compiled European data of 0.167 kg NH₃ per year per bird housed to estimate ammonia emissions. (Battye *et al*, 1994).

Table 1: Estimates of annual ammonia emission from a 30,000 bird shed using Emission factors derived in differing environments.			
Source	Emission Factor		kg NH₃ / yr/shed
Battye <i>et al</i> , 1994	0.167	kg/yr	5010
France	2.9	kg/m ²	5220
Germany	0.0486	kg/bird	1458
USDA research	0.22	kg/bird/yr	6600
Wathes <i>et al</i> 1997	9.2	g/hr/AU	3643
Lacey <i>et al</i> 2003	632	mg bird ⁻¹ day ⁻¹	5214

Determining emission factors for PM₁₀ has not shown the same consistency even within the same research teams. This may be due to very uneven emissions both spatially and temporally. My observations of a number of operations have shown pulses of extremely high concentrations set against a comparatively low background. This variation is reflected in Redwine *et al* (2002) who reported shed emission rates for TSP and PM₁₀ of 7.0 to 1673 g hr⁻¹ and 0.58 to 99 g hr⁻¹, respectively.

Table 2: Estimates of annual PM₁₀ emission from a 30,000 bird shed using different emission factors.				
Source	Emission Factor		kg PM₁₀/ yr	kg P / yr
Lacey <i>et al</i> 2003	26.5	mg PM ₁₀ bird ⁻¹ day ⁻¹	219	4
Lacey <i>et al</i> 2002	318	mg PM ₁₀ bird ⁻¹ yr ⁻¹	10	0.2
Battye <i>et al</i> 1994	5	g/hour/500kg	2640	53
Mirrabooka 2002	0.63	mg/sec/1000 ^a	449	9
Banhazi <i>et al</i> 2003	0.47	mg/sec/1000 (layer) ^b	335	7
^a This is the lowest of all emission factors listed in data				
^b Considered ~ 50% of broiler factor				

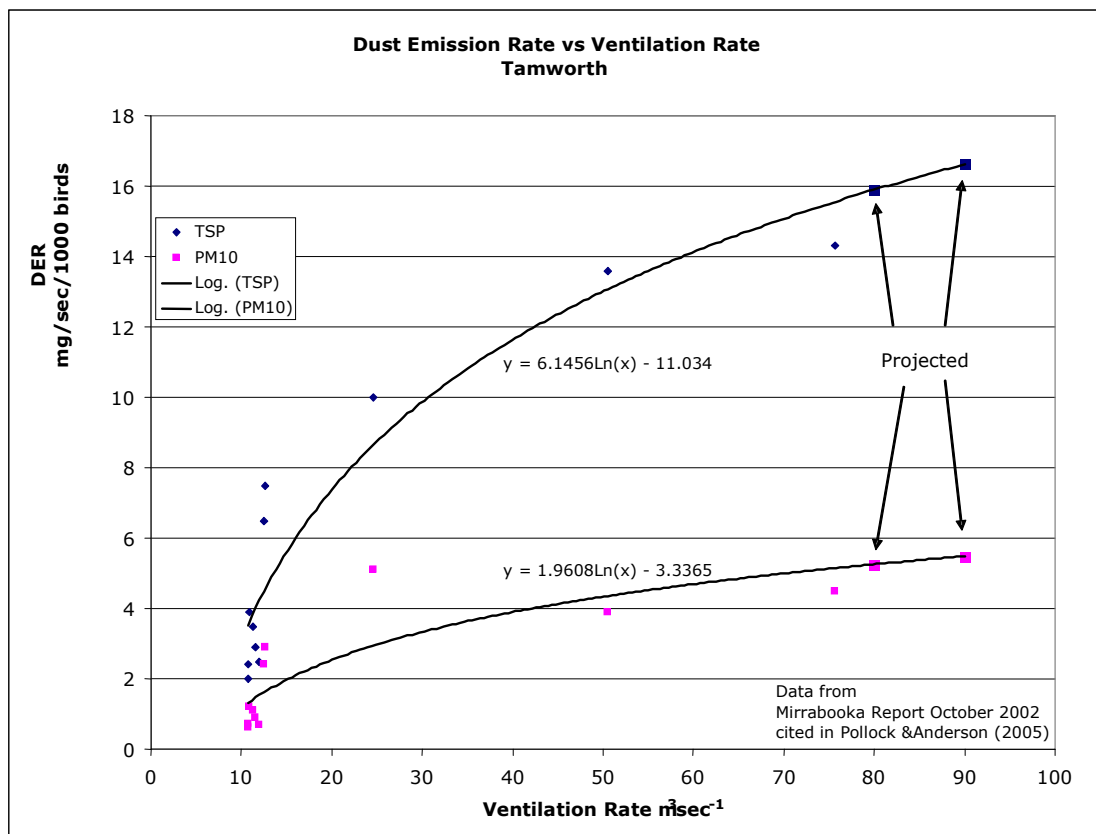
The measured proportion of PM₁₀ in the total suspended particulates (TSP) and the measured concentrations of PM₁₀ also vary widely. The Australian studies show both high concentrations and proportions of PM₁₀. The Mirrabooka report (2002) shows PM₁₀ concentrations in the Tamworth sheds ranging from 1.6 to 5 mg/m³ and contributing 30 to 50% of TSP. Banhazi *et al* (2003) found average concentrations in South Australian broiler sheds of respirable particles (median < 5µm) of 0.8 mg/m³ with peak concentrations to 1.8 mg/m³.

If these concentrations are being expelled into the outside air for at least 35 days in every 60, at a minimum rate of 10 m³/sec, the NPIM air quality target of 50µg PM₁₀/m³ will not be met for some distance.

Airborne P emissions are calculated assuming 2% P in PM₁₀. While these single shed emissions may not seem significant, these could be multiplied by 20 or 40 for existing individual operations, some of which are in areas of threatened, P-sensitive vegetation. The aggregation of apparently minor emissions in some catchments, particularly when combined with transfers or depositing over water, is expected to highlight potential problems. While the TSP may not travel as far, this larger nutrient load will be deposited and build up around the poultry sites.

The carrying capacity of the air stream through the sheds is related to the square of the velocity and greater flow velocities would be expected also to generate more turbulence and launch more dust. The move toward even greater ventilation rates (eg 150 m³/ sec) is therefore disturbing. Figure 1 demonstrates the link between flow rate and emission rate using data from the Mirrabooka (2002) report when 90 m³/ sec was the maximum available.

Figure 1: Effect of ventilation rate on particulate emission rate



Recommendations:

- That ERA poultry facilities emissions to air and water be regulated, instead of the industry code of practice which has not been accepted.
- That Local Councils use waste approval provisions of section 369 of EP Act to approve, with conditions, contractors involved with collection and transport of BL, including a record of farm and other locations that receive BL.
- That operators of broiler growing facilities report to the NPI and LG
 - Calculated ammonia emissions

- Calculated PM₁₀ emissions
 - Calculated P emissions
 - Quantities and geographic destination of transfers of N and P
- That, to protect the privacy of operators living on site, the geographic information identifying the grower facility in the database be linked to the name of the contracting integrator.
 - That the integrators, using waybill data, report calculated emissions in parallel to growers.
 - That appropriate formats be made available to enable Local and State authorities to interrogate the database to assess aggregate and cumulative nutrient loads in catchments or defined geographic areas.

Yours sincerely,

Rob King

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