

BEFORE THE HEARINGS PANEL

IN THE MATTER of hearings on
submissions concerning
the Proposed One Plan
notified by the
Manawatu-Wanganui
Regional Council

**SECTION 42A REPORT OF MR LOGAN KENT BOWLER
ON BEHALF OF HORIZONS REGIONAL COUNCIL**

1. INTRODUCTION

My qualifications/experience

1. My name is Logan Kent Bowler. I have a Bachelor of Applied Science awarded by Massey University.
2. I have worked for Horizons Regional Council's Compliance Team for 3.5 years. For the past two years I have held the position of Senior Environmental Compliance Officer.
3. Since beginning employment with Horizons I have been involved in assessing compliance with many different consent types, including poultry wastewater and manure discharges to land.
4. I have been involved with the Proposed One Plan assessing compliance with the Plan since it was notified as a Proposed Plan in May 2007. I have not had specific areas of input to the initial drafting of the Proposed One Plan.
5. My evidence is predominantly based on historical data held within Horizons' consent database, incident database and compliance records.
6. I have read the Environment Court's practice note Expert Witness – Code of Conduct. I agree that the overriding duty to the Environment Court expressed in paragraph 5.2.1 of the Code will be treated as a duty to the Hearing Panel.

2. EXECUTIVE SUMMARY OF EVIDENCE

7. The poultry industry within Horizons' Region is relatively small in comparison to other rural-based effluent-type discharge consents, making up approximately 3.5% of these consent types. Only 37 current resource consents have been issued for discharges relating to the poultry industry – 34 discharges to land and three to air.
8. In the three years from January 2006 to December 2008, 12 complaints were registered on Horizons' incidents database relating to discharges to air (odour and dust). This represented 1.7% of all complaints about discharges to air, and 16.7% of rural activity complaints (i.e. dairy, poultry and piggery).

9. Eight abatement notices have been issued in relation to the poultry industry during the past four years. One of these related to a resource consent noncompliance while the remainder concerned unconsented discharges of manure from poultry sheds.
10. One prosecution has been undertaken in response to continuing discharge of poultry manure without a resource consent.
11. Composted poultry manure has a high concentration of a variety of nutrients compared with dairy effluent. Poultry manure is generally applied dry and the ability to apply it at rates greater than the current Regional Plan's 150kg/ha/year and 50kg/ha/24hours are easily breached with no immediate visual effects. This in contrast to dairy effluent irrigation where excess application is often evident because of ponding and/or run-off,
12. If composted poultry manure is the sole source of fertiliser for pasture/crop growth, and the compost is applied at a rate suitable to meet Nitrogen requirements, there is potential for an accumulation of other nutrients in the soil profile. For example, spreading broiler manure (i.e. from meat producing chickens) at a rate required to apply 270kg/ha of N will also apply 100kg/ha of Phosphorus, 165kg/ha of Potassium and Calcium, 45kg/ha of Sulphur and Magnesium, and 2-5kg/ha of Manganese, Copper and Zinc. Depending on the crop species grown, this may result in an accumulation of some of these nutrients in the soil (Bolan *et al.*, 2008).
13. There is considerable difference in the Nitrogen (and other nutrients) value between manure from broiler and layer (egg-producing) poultry operations. This needs to be taken into consideration when assessing resource consent applications, to ensure the nutrient loading is no greater than levels that can be assimilated by the soil and plant growth.

3. EVIDENCE

14. The poultry industry in Horizons' Region is small compared with other rural effluent-based activities that require discharge resource consents. Table 1 shows resource consent numbers for each rural-type activity.

Table 1. Rural effluent discharge resource consents

	Poultry	Piggery	Dairy	Other	Total
Number of consents	37	34	948	28	1047
Percentage of consents	3.5%	3.3%	90.5%	2.7%	100.0

15. The 37 current poultry-related discharge consents in the Region represent 3.5% of all rural effluent discharge consents issued by Horizons. They comprise 14 consents for manure, 18 for wastewater, one for egg shells, one for poultry compost leachate, and three for discharge of odour to air. Table 2 shows the volume of poultry waste consented for discharge to land in Horizons' Region.

Table 2. Consented volumes of poultry wastewater/manure.

	Tonnes per year	m³/ week	Wastewater per day (m³)
Manure and litter	16748		
Egg Shells		7	
Wastewater			541.8

16. I consider our records to be indicative of the number of poultry operations in the Region, but not complete. There is no list of poultry producers located in the Region and further operations may be discovered in the course of routine compliance monitoring and incident response in the future.
17. The two main environmental effects if this industry are:
- i. Discharge of odour, from both poultry farm sites and the land the manure is spread onto;
 - ii. Contamination of water from poor effluent storage and discharge.

Discharges to Land

18. Poultry industry discharges to land are from four main sources:
- i. Discharge of manure from layer sheds;
 - ii. Discharge of litter from broiler or rearing sheds, usually combined with other organic material (e.g. woodchips/sawdust/shredded paper);
 - iii. Discharge of wastewater generating by cleaning of sheds between rearing cycles;
 - iv. Discharge of egg shells.
- The consents database does not sufficiently differentiate volumes of manure and litter for these to be reported on separately.
19. It was estimated in 2008 that poultry waste can supply 5000, 2000 and 3000 tonnes of Nitrogen, Phosphorus and Potassium respectively per year from the estimated 190,000 tonnes of poultry waste generated annually in New Zealand (Bolan *et al.*, 2008).

20. With 16,748 tonnes of manure consented for discharge to land in Horizons' Region, it can be from above estimation that approximately 8.7% of New Zealand's poultry industry is located in Horizons' Region.
21. The composition of manure varies greatly between layer and broiler poultry operations. Broiler manure tends to have less nutrient value per volume due to the addition of bedding material. These differences need to be taken into account when applying the manure to land, to ensure all nutrients are utilised by plant growth to prevent leaching (see Table 3).
22. Table 3 also shows nutrient values for several types of composted manures. In general, poultry manure provides a greater amount of a variety of nutrients than other composted products. This can be undesirable as the application of manure at rates to meet the N requirements of pasture and crops has the potential to result in an accumulation of some of the other nutrients in the soil (Bolan *et al.*, 2008). Therefore, consideration should be given to setting discharge consent conditions that ensure an accumulation of other nutrients is controlled for operations that use poultry manure as the main source of Nitrogen applied for plant growth.

Table3. Nutrient contents of manures and composts (g/kg dry weight basis)

Nutrient	Poultry manure compost		Pig manure compost	Mushroom compost	Biosolid compost
	Layer	Broiler			
Nitrogen	32.8	25.7	15.2	17.5	21.8
Phosphorus	10.8	6.7	6.5	7.5	10.1
Potassium	15.2	10.1	8.2	9.2	5.9
Calcium	18.5	16.2	4.2	21.5	19.7
Magnesium	6.2	3.5	3.7	5.2	4.2
Sulphur	8.5	5.2	3.4	3.5	7.0

23. In my opinion, the main effects of poorly managed poultry effluent discharge to land, aside from odour, are:
- i. Poor storage facilities on unsealed pads, unsealed ponds and leachate run-off from the storage areas;
 - ii. Leaching of nutrients through soil profile from manure and wastewater discharges if applied at a rate greater than plant uptake;
 - iii. Ponding of wastewater discharges with subsequent groundwater contamination;

iv. Surface run-off from wastewater discharges resulting in surface water contamination.

24. I believe the best ways to mitigate the effects are:

- i. Storage of removed manure and wastewater until soil conditions are suitable for the spreading/irrigation;
- ii. Storage of manure and wastewater on/in a sealed surface;
- iii. Spreading/irrigating at a rate that allows full use of the nutrients by plants;
- iv. Nutrient budgeting to ensure nutrient losses are minimised.

Discharge to Air

25. In my experience, complaints related to the poultry industry arise from the odour or dust resulting from effluent discharge to land; therefore, these are usually logged in the incidents database as air related.

26. In the three years from January 1 2006 to December 31 2008, 12 complaints were logged into Horizons incidents database relating to poultry industry discharges to air. This is 1.66% of all complaints about discharges to air and is 16.7% of complaints relating to rural effluent discharges. Table 4 gives a comparison of odour complaints with other rural effluent discharges. It is important to note that this is only for discharges to air. If piggery and dairy complaints about discharges to land and water were to be included, they would make up a considerably greater percentage of complaints.

Table 4. Odour complaints for rural effluent type discharges

	Complaints	% of total complaints	% of rural type complaints
Dairy	34	4.7%	47.2%
Piggery	26	3.6%	36.1%
Poultry	12	1.7%	16.7%
Total rural type	72	10%	100%
Other	650	90%	
Total air complaints logged	722	100%	

27. The 12 complaints logged relate to seven separate events. Some events had more than one complaint logged, either by different complainants or over several days due to the release of odour.
28. Of the seven events, one was for a consented activity resulting in a non-compliance and the other six were unconsented discharges.
29. Eight abatement notices have been issued in the past four years. Of these, one was a non-compliance with the discharge consent and the remainder for discharge of manure without a resource consent. In most cases, resource consents have been applied for and in one case the discharge has ceased.
30. One successful prosecution has been taken regarding the unconsented discharge of poultry litter to land and odour to air. The prosecution was initiated following an odour complaint and after repeated prior notification to the offender that a resource consent was required.
31. Discharges to air from the application of manure to land tend to be short term but can be extremely offensive. For problematic sites, e.g. close to neighbours, it is common practice to apply the solids to land and to cultivate the manure into the soil as quickly as possible to try and control the odour.
32. In the four years from January 2005 to December 2008, 17 discharge consents were inspected and three non-compliances identified. This represents a 17.6% non-compliance rate.

4. Conclusion

33. While the poultry industry in Horizons' Region is small compared with the dairy industry, the potential for contamination of both surface water and groundwater remain a risk due to the relatively high nutrient content of manure, particularly that from layer operations.
34. Odour issues arising from the discharge of poultry manure to land have in the past been the major concern from a compliance point of view. The effects of odour from the discharge of poultry manure are immediate and often intense, whereas the effects of the discharge on surface water and groundwater tend to take longer and therefore are more difficult to determine.

35. Poultry manure is an excellent source of a variety of nutrients. In my opinion, well managed application of this manure to land should be encouraged; however, it is important that the applicator is aware of the issues that arise from poorly managed manure and wastewater discharges.

36. In my opinion, the proposed rules regarding the discharge of poultry manure will cover the main areas of concern. These include the ability to store manure when wet weather and soil conditions prevent spreading, the storage of manure and wastewater on sealed surfaces, and the requirement for nutrient budgeting to help prevent application rates exceeding nutrient uptake by plants.

5. REFERENCES

Bolan, N., Ariel, S., Thammared, C., Balaji, S. (2008). The Uses and Management of Poultry Litter. *Proceedings of the NZ Poultry Industry Conference, 2008. Vol.9*

Logan Bowler
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