

**BEFORE THE INDEPENDENT COMMISSIONERS**

**IN THE MATTER** of the Resource Management Act  
1991

**AND**

**IN THE MATTER** of the Proposed Canterbury Land  
and Water Regional Plan

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**APPENDIX B**  
**SUPPLEMENTARY EVIDENCE OF ALISON DEWES ON BEHALF OF**  
**NORTH CANTERBURY, NELSON/MARLBOROUGH AND CENTRAL**  
**SOUTH ISLAND FISH AND GAME COUNCILS**  
**17 JUNE 2013**

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## **QUALIFICATIONS AND EXPERIENCE**

1. My name is Alison Mary Dewes. My qualifications and evidence were set out in my Evidence in Chief, dated 2 April 2013.
2. I have again prepared this evidence in compliance with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2011.
3. I have provided this supplementary brief of evidence in response to questions from the hearing panel on hearing group 2 (dated 9 May 2013).

## **QUESTIONS OF CLARIFICATION**

**Q17: Commissioner van Voorthuysen: How many herd homes using cut and carry of pasture, capture of effluent etc are currently in Canterbury?**

4. There are many system options available in New Zealand that have these traits, the main categories being:
  - a. Feedpad, Covered feed pad (soft top) similar to a herd home;
  - b. Freestalls based : Wintering only, or Wintering and some milking;
  - c. Full Hybrid (combination of housed and pasture based systems where the cows are rotated between house and pasture according to the season, weather or rotation period. Generally these systems are used as a 12 to 24 hour housed facility from April to October (7 months of the year), and for the remainder of the year cows are outside for 6 – 18 hours per day; and
  - d. 24/7/365 fully housed mostly utilising robot milking technology.
5. There are around 300 “soft top”, herd home, and red path barns, across NZ. In regards to Freestalls (permanent buildings like in Europe and North America) it is estimated that there are around 80 in total in Canterbury and Otago (Harmen Heesen pers comm. May 15 2013). A further 4 free stall barns are currently being built in Canterbury (pers comm Dr Blair Miller). With regards to the Fully Housed Systems: 24/7/365 there would be around 7 at this stage in Canterbury, but growing because of easy feed access (i.e.: arable farms converting part of the farm to dairying) and with increased availability of robot milking (Harmen Heesen pers comm May 15 2013).

6. These systems improve animal welfare, (out of inclement weather) and can lead to improved ecological outcomes for the receiving environments. These systems offer the opportunity to grow and harvest more forage in a lower impact manner. Generally a conventional dairy uses 18 kg Dry Matter offered per cow per kg of Milksolids produced. However, in contrast, a hybrid system uses around 12-13 kg DM offered per cow per kg MS prod. This is an annual feed cost saving for the farmer to the tune of 30% (Harmen Heesen pers comm). Nutrients are not lost through urine to the receiving water, but are trapped, and used back on pastures when they are able to be used as efficiently as possible. Many of these systems also use low levels of bought in soluble fertilisers (apart from trace elements), and the trapped/stored effluent is recycled back to the pastures at optimum times when they can be best used.



High rates of Feed Utilisation



Soft pad calving indoors in freestall Cowhouse

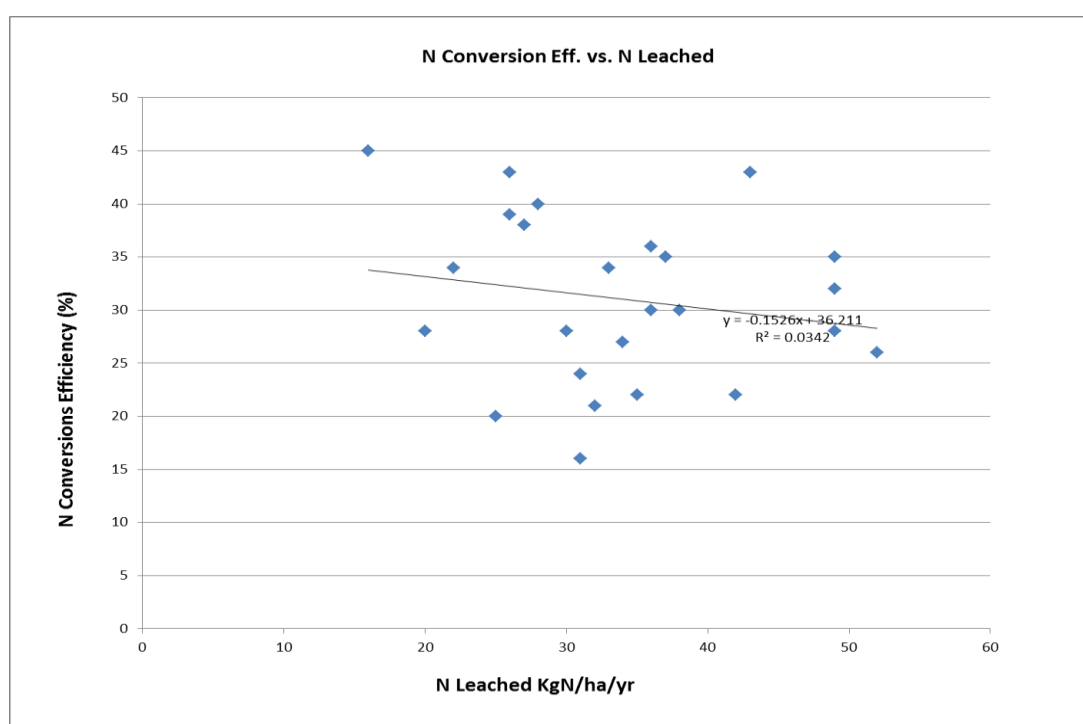
**Q18: Commissioner van Voorthuysen: Asked Dr Dewes to read Dr McCall's evidence on behalf of Fonterra and Dairy New Zealand for the ECan hearing on the Proposed Hurunui and Waiau River Regional Plan, 12 October 2012, paragraphs 28 – 37 and give a response as to whether it changes her advice?**

7. I have reviewed Dr McCall's evidence presented in relation to Environment Canterbury's proposed Hurunui and Waiau Regional Plan. On consideration of this

evidence, my position remains the same as stated in both my EiC (dated 2 April) and Rebuttal evidence (dated 10 April 2013). My position is that nitrogen conversion efficiency does not correlate well with Nitrogen Loss (kg N lost/ha/year) (Rebuttal evidence dated 10 April 2013, para 29 and 30 and Figure 1), and that there is no correlation between increased nitrogen conversion efficiency and lowered N loss to the receiving environment.

8. Dr McCall in his Evidence to the Canterbury Regional Council, on the Proposed Hurunui & Waiau Regional Plan proposes that farms can be run in a more technically efficient manner and this can result in lower N surplus and lower N loss. He casts the assertion that if all farms in the catchment are run at a technical optimum, then there will be 13% more headroom through a catchment wide N loss reduction (McCall, 2012, paragraphs 15, 28 to 37).
9. However, Dr McCall's evidence fails to provide the parties an understanding of what is "current average farm performance" or what is "technically efficient (optimum) farmer performance" in order to allow the parties to better understand what he is attempting to describe. Dr McCall notes these are "estimated N loss figures, and estimated N conversion efficiency figures" (point 31). He fails to provide the parties with detail on how robust the data collection was, and as a result, this leads to uncertainty in how valid the model outputs are. Only 30 farms from the 32 are plotted and no regression analysis has been undertaken (figure 1). Dr McCall fails to provide any robust data from a representative database of dairy farms, to validate his claims that improving nitrogen conversion efficiency relates to reductions in N leaching or improved economic performance.
10. In paragraph 32 of his evidence Dr McCall states that technical efficiency can lead to N conversion efficiency being improved. However from the data generated from 32 farms, only four farms were chosen to calculate the opportunity to reduce nitrogen leaching by optimising technical efficiency and thus nitrogen conversion efficiency, and only 3 farms were reported on. Again, Dr McCall fails to provide the parties with detail on how robust the data collection was, and as a result, this leads to uncertainty in how valid the model outputs are. The full report detailing what mitigations were used has not been provided, and Dr McCall fails to provide meaningful detail on the mitigations used to arrive at the technical optimum he refers to.

11. Furthermore, to support Dr McCall's assertion and to improve the nitrogen conversion efficiency, it would be most effective to lower the protein in the diet from 29% to around 16% all year round. This would involve cereal feeding, feed pads, infrastructure, effluent capture and re use at optimum times. These are all practises that include some sort of investment, - something that Dr McCall argues against.
12. A review of Headlands and Intelact Client performance in Overseer version 6, datasets continue to support my position that within the normal range of N leaching values typical of the majority of each farm type, there is no relationship between N leaching and nitrogen conversion efficiency. In other words, high nitrogen conversion efficiency does not always imply lower per ha discharges. The following graph is populated by 25 farms in a subregion of the Waikato, their actual overseer 6 files were updated and validated on farm, using their fertiliser and feed transactions to ensure robust data collection. The nitrogen conversion efficiency correlation is poor as noted in Figure 1 below.



**Figure 1:** correlation of nitrogen Conversion Efficiency with Nleached from 25 farms in a sub catchment of the Waikato for the 2011-12 season. (Overseer Version 6). The weak correlation apparent in the latest version, on a cluster of Waikato Farms, is very similar to what is proposed by Wheeler in his dataset above using Overseer 5.4.

13. The notion that improving nitrogen conversion efficiency, reduces leaching and improves economic performance is misleading for farmers, as this measure does not lead to lower N loss, as Figure 1 shows when using the latest version of Overseer.
14. In point 37 of Dr McCall's evidence he assumes that in a catchment, it is conceivable that all farms may operate at optimum technical efficiency, and that this may create nutrient headroom of 13%. Yet he fails to describe how all farmers may move to this technical optimum, this assumes all farmers are operating at the level of the top 25% of performers in the industry. It is not clear how this would eventuate. One would assume that he is referring to the proposed regime by ECAN, Dairy NZ and Fonterra, that with the implementation of farm environment plans which have no economic or farm performance analysis, no nutrient loss goals, and no time frames will achieve 100% technical efficiency. There is no evidence to substantiate this claim. Farmers will have no compulsion to analyse their performance in any sort of detail, nor improve their farm system and corresponding environmental performance.

## References

Harmen Heesen –C E O Technipharm NZ (Personal Communication May 15 2013)  
Independent consultant Cowhouse Ltd.  
Personal Communication *Dr Blair Miller BSc(Hons) MBA PhD*  
*Business Development Manager Rakaia Engineering Ltd*