

IN THE MATTER of the Resource Management Act
1991

AND

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

**STATEMENT OF REBUTTAL EVIDENCE OF MATHEW JOHN CULLEN
FOR GROUP 2 HEARING**

1. INTRODUCTION

1.1 My name is Mathew John Cullen and I have the qualifications and experience described in my Evidence in Chief for the Group 1 Hearing.

2. SCOPE OF EVIDENCE

2.1 In this statement of evidence, I address:

- (a) issues raised by Ms Dewes with regard to minimum practice standards;
- (b) Issues raised by Ms Johnston and Ms Phillips with regards to use of OVERSEER and its ability to accommodate varying irrigation methods.

3. MINIMUM PRACTICE STANDARDS

3.1 As discussed by Ms Dewes (paras 159-160) and at 7.57-7.59 of my Group 1 evidence the rate of adoption of change amongst farmers varies significantly across the demographic. Whilst my evidence in chief should make clear that I do not disagree with the adoption of good practices, I do doubt the practicality of widespread adoption of some of the practices Ms Dewes advocates. For example, significant financial, managerial and physical resources as well as commitment to change is required by farmers to achieve either Soil Moisture Deficit Irrigation or a 24-hour cut and carry barn scenario. Considering the different starting points amongst farms, some will grasp change rapidly and

adapt, however a large proportion will require a reasonable transition time to reach such resource-intensive targets.

- 3.2 The Fish and Game proposal specifies rules whereby farming within Red and Orange zones is a controlled activity, subject to a leaching standard and minimum practice standard being met. Existing farming that cannot meet the leaching standard but does meet minimum practice standards and achieves N leaching reductions (from 2011/2012 levels) would be considered to be a restricted discretionary activity. Existing farms that do not comply with these standards would be classified as non-complying.
- 3.3 Whilst these standards are not specified in detail, after reading Ms Dewes' evidence it seems to me likely that these standards would include Soil Moisture Deficit Irrigation.
- 3.4 One of the key assumptions that the OVERSEER model makes when the 'actively managed' option is selected is that there is no rain within 5 days after the application of irrigation water.¹ In my opinion this is a threshold that is difficult to meet, firstly given the ability to accurately forecast rainfall events, particularly on the shoulders of the dairy season, and secondly where existing irrigation systems may not allow for such flexibility. For example farmers with surface water takes may be subject to minimum flow restrictions. If such a farmer refrains from irrigation because of predicted rainfall and that rainfall does not eventuate at a time when minimum flow restrictions are imposed then a significant soil moisture deficit and subsequent risk to productivity will result. In order to mitigate against this risk farmers would require installation of water storage. This is a capital cost that would need to be considered in any economic analysis when considering SMDI (as prescribed by the OVERSEER model).
- 3.5 Mr Curtis covers SMDI and irrigation good practice in more detail in his evidence.

1. OVERSEER Technical Note No.4 (August 2011). OVERSEER Nutrient Budgets version 6: Sensitivity of calculated N leaching to irrigation inputs on pastoral farms.

4. OVERSEER AND IRRIGATION

- 4.1 I do not agree that with the view of Ms Johnston and Ms Phillips that OVERSEER fails to acknowledge the difference between irrigation methods, and should therefore not be utilised to compare nutrient losses between farm systems (as currently specified by definition of 'change'). In my experience it is possible to recognise changes in irrigation systems if input data is used correctly. This is a view that is supported by Mr Roberts (para 62) whereby he specifies that the use of OVERSEER as a threshold for increased regulatory requirements is an appropriate use of the model.
- 4.2 As discussed by Mr Curtis (para 33) there are a number of factors that must be considered when entering irrigation data into the OVERSEER model. Whilst I appreciate that in its current guise the model does not accurately account for these factors, it is possible to consider these factors (as external calculations) prior to entering into OVERSEER.