BEFORE THE CANTERBURY REGIONAL COUNCIL

IN THE MATTER OF	the Resource Management Act 1991
AND	
IN THE MATTER OF	Water permit applications by Simons Pass Station Limited and Simons Hill Station Limited

STATEMENT OF REBUTAL EVIDENCE OF GRAEME OGLE
DATED 26 FEBRUARY 2010

1. INTRODUCTION

1.1 My full name is Graeme Ian Ogle. In November 2009 I presented evidence for Simons Pass Station Limited, Simons Hills Station Limited, Rosehip Orchards NZ Limited, and High Country Rosehip Orchards Limited. This evidence involved developing models of the likely uses that these areas would be used for. The purpose of these models was to define what systems including livestock numbers, livestock policies, supplementary feeding regimes, crop rotations, and farm production would be feasible on the proposed irrigated areas on these farms.

1.2 My qualifications and experience are set out in my previous evidence dated 22 November 2009.

1.3 I confirm that I have read and am familiar with the Code of Conduct for Expert Witnesses in the Environment Court Consolidated Practice Note (2006). I agree to comply with that Code. Other than where I state that I am relying on the evidence of another person, my evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

2. SCOPE OF THIS EVIDENCE

2.1 In this brief of evidence I respond to the comments made by Mr Simon Harris in his evidence dated 13 October 2009 and 26 November 2009 on behalf of Meridian Energy Limited.

2.2 Mr Harris raises concerns about the modelling approach used.

2.3 Mr Harris has questioned why there is a difference in various data used in a report prepared by Butcher Partners Ltd in April 2009 and those used in the feasibility report submitted by the Applicants as part of the Water Consent Hearings. These data include:

- The pasture growths on irrigated land;

- The profitability used for finishing systems.

3. THE COMMENTS OF MR HARRIS

Concern about the modelling approach used

3.1 Mr Harris in paragraph 31 and 32 of his 26 November 2009 evidence states that the modelling approach involved results from ECOMOD modelling subsequently informing farm systems models (Farmax, Udder), the results of which were then run through a nutrient budgeting model (OVERSEER). Presumably, the concern is that if a model is not accurate the errors are carried through a chain of models affecting many of the predicted outcomes.

3.2 For clarification the modelling carried out by me using the program Farmax Pro to determine the feasibility of the farm systems did not involve using results from ECOMOD. The only data from ECOMOD that would be relevant to the Farmax model is pasture growth rates. These pasture growth rate data were however derived from other sources referred to in my evidence paragraphs 20 to 24. The results of my modelling were then used within the OVERSEER model.

Consistency of pasture growth rate data

3.2 Mr Harris in paragraph 38 of his 13 October 2009 evidence expresses concern with differences in some data prepared is initial reports prepared for MWRL with data in the final report submitted to the commission. Specifically, Mr Harris refers to an initial report where ECOMOD modelling based pasture growth rates on a figure of 11,069kg of pasture dry matter hectare per year. Mr Harris felt this figure was well supported by the MWRL report prepared by Butcher Partners in April 2009. Mr Harris expresses considerable comfort with this later figure as in his view it was prepared by experienced local consultants Mr Hugh Eaton and Mr Andrew MacFarlane. Mr Harris questions why these data were not adopted in the final reports. The specific data Mr Harris refers to is Mr Eaton's estimate of 10,200kg of dry matter consumed per hectare per year. Mr Harris questions why the final MWRL report used figures of between 13,500kg and 14,000kg of pasture dry matter per hectare per year.

3.3 The purpose of the initial report prepared by Butcher and Partners was to consider the impacts of various sorts of farming on a standard 7,500 ha dry land merino property in the MacKenzie Basin. The final MWRL reports (including my November evidence to the Commission) are based on the actual properties of the Applicants. Because the reports are not based on exactly the same land resource it is reasonable to expect that there will be differences in data between these reports.

3.3 Mr Harris attempts to compare the figure of 10,200kg used by Mr Eaton with the final MWRL report of 13,500 and 14,000 kg of pasture dry matter. This comparison is not valid as the former figure is the net pasture production whereas the later figures refer to the potential pasture production.

3.4 To clarify, the annual potential pasture production used for the Applicants were 12,500kg of dry matter per hectare per year for shallow soils and 14,000kg for deep soils.

3.5 It is important to clarify the difference between *potential pasture production* and *net pasture production* to understand if the various figures are similar or widely divergent. Potential pasture production is measured by cutting within pasture enclosure cages (cage cutting). The cutting regime ensures pasture is always within an optimal height for regrowth ie it does not get too long nor is it cut too short. The level of production measured from this technique is not achieved in grazed systems because pasture removal by grazing is not uniform and grazing frequency may not always be optimal. For example in winter pastures may be maintained at lower pasture covers than optimal for maximum regrowth while in summer pastures may get too long and become unevenly grazed. Farm system models such as Farmax Pro take this into account with equations that make adjustment to the potential pasture production thereby deriving a net pasture production. Net pasture production is equivalent to the amount of pasture that livestock consume.

3.6 *Net pasture production* can be derived from calculating how much pasture dry matter livestock have eaten. This requires using equations that calculate animal consumption based on their body weight, species, pregnancy status and production.

3.7 Regarding whether the *potential pasture production* estimates of the 12,500 and 14,000 kg of dry matter per hectare per year I have used are appropriate for the MacKenzie Basin. Mr Harris' October evidence (paragraph 39) notes that 'Scott(s) pasture trials in the MacKenzie reported in their literature reviews applied rates of N at 358kg/ha to achieve an average 11.7tDM produced'. From the literature Mr Harris states he reviewed in paragraphs 7.1 to 7.11 I presume he is referring to the literature review of [1]King (2008) in which he discusses the experimental work undertaken by [2]Scott and Maunsell (1981). If this is the case I am not comfortable with his interpretation of either King's review or Scott and Maunsell's study.

[1] King, W. (2008). Upper Waitaki farm systems and nutrient assessment. Stage 2. Pasture growth literature review. Report prepared for GHD. pp6.
[2] Scott, D. Maunsell, L.A. (1981). Pasture irrigation in the MacKenzie. 1. Species comparison. New Zealand Journal of Experimental Agriculture.**9**, 279 – 290.

3.8 Scott and Maunsell studied the production from several spray irrigated legume monocultures and several grass monocultures that were not irrigated. The irrigated legumes are the only data relevant to the Applicants submissions.

3.9 In this study lucerne and clovers were grown under three levels of fertiliser input. The fertiliser inputs were 0, 250 and 800 kg/ha of superphosphate. The later high rate also received 88kg/ha of potassium. A commercial irrigated farm would apply approximately 375kg (for sheep and beef farming) to 750kg (for dairy farming) of the same fertiliser. *No* nitrogen was applied to these monocultures in the three years of cuts that form the main results of this study. This experiment by Scott and Maunsell is important because 5 of the 9 treatments produced over 15 tonnes of pasture dry matter per hectare per year. Two treatments receiving *no* fertiliser produced 11.3 and 13.4 tonnes per hectare per year and two treatments growing Turoa red clover produced 14.2 and 14.9 tonnes of dry matter per hectare per year at the medium and high rates respectively.

3.10 These data are discussed more thoroughly by Val Snow in her rebuttal evidence. I would however note here that legume monocultures, with the exception of lucerne are not considered to be a means of maximising dry matter production. It is generally accepted that they have lower annual growth rates due to their slower growth in colder months. The Scott and Maunsell trail is therefore very supportive that the *potential pasture growth* rate data presented to the Commission by the Applicants are realistic.

3.11 Regarding the *net pasture dry matter* production used by Mr Eaton. I have discussed with him how he derived the figure of 10,200kg of dry matter eaten per hectare. He confirms this was derived from an analysis of the amount of grazing achieved from an irrigated area on an existing MacKenzie property (Haldon Station).

3.12 The figure derived by Mr Eaton of 10,200 kg of dry matter per hectare per year is very similar to the figure I derived (described in my evidence of November paragraph 23) from grazing achieved on an area of irrigated shallow soils on Simons Hills Station of 10,300 kg of dry matter per hectare per year.

3.13 The *net pasture dry matter* production I have used in the farm systems modelled for the Applicants vary from 10,138 kg on shallow soils to 11,259 kg of pasture dry matter per hectare per year on deep soils.

3.14 I would conclude there is considerable consistency in the *net pasture growth rate* data presented to the commission by myself and Mr Eaton. I also conclude that the *potential*

pasture growth data is well supported by the science that has been carried out within the MacKenzie Basin.

The profitability of intensively farmed sheep and beef

3.15 Mr Harris in paragraph 13 of his 26 November 2009 evidence states that 'the intensively farmed sheep and beef scenario is high at $458/ha. I note that the MWRL evidence suggests profits of $48/ha, an order of magnitude difference.' I agree with Mr Harris that there should be consistency in the profitability between authors. These policies are not unusual, are widely practiced and the financial performance is not difficult to calculate.

3.16 The figure of $458/ha is achieved from grazing-finishing systems I modelled which are referred to in my evidence of November 2009 in paragraphs 40 to 47 as:

- Lamb finishing, bull finishing and dairy grazing farm (SBFIN); and,
- I ntensive lamb finishing, bull finishing and dairy grazing farm (SBIFIN)

3.17 These comprise mainly dairy heifer grazing and bull beef finishing (68% to 72% of overall dry matter intake). Mr Eaton, who prepared the figures for Butcher Partners has made his budgets available to me and I have compared which of his systems are the most comparable to mine. Of the systems he modelled the 'Dairy support' system had 80% of feed consumed by dairy heifer grazing and 20% by dairy cow grazing. It is widely accepted knowledge that bull beef finishing and dairy heifer grazing have similar profitability. I would therefore expect that Mr Eaton's Dairy support option and my grazing-finishing systems would have similar profitability.

3.18 Mr Eaton has calculated the profit for his dairy support model at $454/hectare. This is very similar to the figure calculated for my grazing-finishing systems which average $458/hectare.

3.19 The sheep and beef system modelled by Mr Eaton that is referred to by Mr Harris as returning $48/ha is not equivalent to the grazing-finishing systems I have modelled. This system does not generate much profit and in the MRB report it is not a recommended option.

3.20 I conclude that the modelling carried out by Mr Eaton and I, where they are based on similar or equivalent livestock policies are in the same order of magnitude.

Graeme Ogle
11 March 2010