

**Before the commissioners appointed by the  
Canterbury Regional Council**

<b>In the matter of</b>	The Resource Management Act 1991
<b>and In the matter of</b>	60 water permit applications to take and use water, 29 land use consent applications and 21 discharge permit applications, for agricultural and horticultural activities

Section 42A Officer's Report of Darren Graham McNae

Addendum Report on the audit of individual Overseer® modelling and related nutrient management plans

Date of hearing: September 2009 - April 2010

## **Introduction**

1. This report provides further detail on the responses by the applicants to the issues raised during the original Overseer® auditing.
2. It outlines where issues have been sufficiently correct and/or clarified by the applicant and these are no longer considered by me to be an issue. The report also focuses on areas where there is some non agreement regarding interpretation of input values. Where this is the case further detail is provided to outline the overall impact of this and the recommended actions.
3. This report also outlines specific factors relating to the use of Overseer® in future monitoring.
4. It specifically refers to responses provided by Melissa Robson, Peter Glasson and Ewan Chapman as appended.

## **Qualifications**

3. My qualifications are detailed in my original Section 42a report.

## **Methodology**

4. The second part of the audit process involved reviewing the responses by the applicant to the questions raised by the auditor in the original S42a report. The responses were presented by the applicant representative and at times included a single response to a common issue from a number of files.
5. The review also ensured that the comments and indicated changes matched up with the actual updated Overseer® files that were provided.

## Results

6. A summary of the responses is provided as below. For simple common issues that have been rectified or noted by each applicant these are noted below

- (a) **Development status:** It is my understanding from previous caucusing that it is acceptable that a farm meets its threshold using on the developed setting. This appear to be the consistent approach that has been adopted by the applicants in their Overseer® models presented, however if this is the case it is to be confirmed via additional modeling and monitoring.
- (b) **Own irrigation nutrient concentrations used:** applicants that used own nutrient concentrations as opposed to the default concentrations have responded to clarify that these concentrations used were based on actual water monitoring data from the respective catchment from which the water was being taken and have provided sufficient evidence for this. This has been deemed sufficient and is an agreed practice unless otherwise stated.
- (c) **Pasture production irregularities:** Extreme differences in pasture production were noted in the original audit process. This information was derived from the pasture production report from within Overseer®. As outlined in point 25 in my original S42a report, this report was used as a guideline to assess the accuracy of two areas:
  - (i) Relative Productivity (RP) function usage – determine how the overall stock demand has been split over the various blocks. Importantly where blocks are designated irrigated or not irrigated.
  - (ii) Overall feed system design – a means of assessing the overall stock demand based on the input parameters used. Without conducting a full systems analysis (i.e. feed budgets and feed imports/exports) this gave an indication of the likely intensity of the proposed operation.

The pasture production outputs from within Overseer® are not designed to replicate the outputs from more specialist feed budgeting tools. It was clarified by a certain applicants that tools such as Farmax® and Farmax DairyPro® were used to derive the inputs for stock performance used.

The purpose of reviewing this was to ensure that the data entered into Overseer® was appropriate. Where the applicants have provided an explanation to how the inputs have been derived this has been deemed sufficient and is an agreed practice unless otherwise stated.

In all cases applicants have referred to previous evidence that supports the stated levels of pasture production. Applicants are aware that the proposed farming operations will be operating under a nutrient regulated regime which will govern system changes and feed inputs should the levels of pasture production not be achieved. They are aware of the implications of such.

- (d) **Advanced Stock Reconciliation:** A number of drystock applicants, as noted below, have still not completed the Advanced Stock Reconciliation calculator on the basis that *“the farmer gave accurate SU figure so no requirement for Advance stock reconciliation”* This approach is acceptable provided that the applicant has a strong understanding of what defines a “Revised Stock Unit” as required by Overseer®. This figure is typically confused with winter stock units (see point 30c of my original S42a report). Some applicants have not completed this function but have pointed out that the figures have been derived from Farmax® and are therefore deemed accurate.

- (e) Some matters initially considered potentially “High Impact” issues were identified such as “high reliance on herd homes or feed pads to meet targets”. These were noted in the Overseer® auditing process to ensure clarity on how these had been used within the model. These have been correctly been pointed out not to be high impact issues but in fact a mitigation strategy adopted to reduce nutrient loading.
7. Appended to this report is a full summary of the issues originally identified and the explanations provided by the applicants.

Below is a summary of those issues that I consider are still matters of note or a further key point is made regarding the position of the applicant and the auditor. Also noted are those matters where there has been an insufficient response to date.

Applicant	Impact	Issue (Summarised)	Applicant Response	Auditor Comment
Dairy Applications				
Southdown Holdings (Glen Eyrie Downs)  Southdown Holdings (WHL Killermont)	High	Very Low Clover content used	The irrigated area will be under a ryegrass, fescue, chicory and white clover sward. Clover levels are expected to be depressed due to the substantial and even return of organic manures (Robson, 2009). The inorganic fertiliser application reflects the low contribution from clover. Low clover contents are maintained to achieve higher control over N inputs into the system. And shall be verified on an annual basis when OVERSEER® nutrient budgets are run to assess compliance. Going forward, clover contents may be able to be increased and inorganic N reduced accordingly, again modeled clover contents would need to be verified as an input to the model	It is agreed that in systems that involve high (>200kgN/ha) levels of organic N (within effluent) being applied that there will be a suppression of clover content. The exact criteria that is to be used in determining the appropriate level of clover content to be used needs to be clarified. It is also imperative therefore that assessing these clover levels must become part of a monitoring programme in the future to ensure that the most appropriate level is being used and the impacts are accurate
Southdown Holdings (Glen Eyrie Downs)  Southdown Holdings (WHL Killermont)	Low	Effluent solids and sludge exported form system	MR - It was accepted that the removal of solids from the farm has not been modelled to ensure compliance with the NDA. Solids are separated and removed off farm to prevent applications of N to land from dairy effluent sources exceeding 200 kg/ha/yr	Accepted – FEMPs outline how this will be dealt with. Being able to account for all nutrient inputs to a catchment such as the Ahuriri Arm of Lake Benmore or a sensitive river may be critical.
Southdown Holdings (Glen Eyrie Downs)  Southdown Holdings (WHL Killermont)	Other	Nutrient exported off farm but in catchment	MR - It was discussed and agreed that if the exported solids are used on another farm that is a part of these consent applications, regardless of where, the import would be recorded in their nutrient budget and its compliance assessed. If the exported solids were used on a farm that was not a part of these hearings, as long as the inorganic fertiliser applications were scaled back to account for the nutrient applied with the solids, there should be no net change in that farm's nutrient losses	While this may not be directly the responsibility of the applicant whom is exporting nutrient (“the exporter”), where the exporter is relying on a relationship being in place with another party (and/or applicant) then they must accept some level of responsibility to ensure that the nutrients that they are creating are being handled in a responsible manner within the catchment

Southdown Holdings (WHL Killermont)	Med	High per cow production	MR - The production per cow was given by the owner of Ohau Downs Station, Mr Zeestraten, who already manages multiple dairy units in Southland, and supported by Mr Englebrecht, the farm consultant retained to provide input into the Ohau Downs application. This, I believe, therefore constitutes a reasonable input to the model. However, if a lower kg MS had been used, this would result in lower crop requirements and lower nutrient losses	It is accepted that the advice given by Mr Zeestraten and Mr Englebrecht has been used to assess likely production levels. It appears that these calculations are based on experience of other farming operations rather than direct feed modelling. The performance targets specified show a high level of efficiency which should ideally be backed up with the appropriate feed modelling. The applicant has been made aware of the risk surrounding this
Southdown Holdings (WHL Killermont)	Other	12.8t DM/ha pasture growth	MR – Evidence reiterated to show that is it believed the pasture production levels are realistic.	This is accepted for the purpose the Overseer® audit however from a feed system perspective the applicant has been made aware of the concerns of the auditor should these levels of pasture production being achieved on a consistent basis. Main concern is reiterating that the farm would be operating under a nutrient restriction regime which would govern the levels of other feed being imported.
McAurie, Ellis	Other	Pasture production >13tDm/ha	No Change / comment	Operation still relies on high pasture growth which could present some feed system risk as per comments for WHL Killermont. Applicant has been made aware of the issue
DRYSTOCK APPLICATIONS				
Lonestar Farms	Multiple	No advanced stock rec. High variation in rainfall, Olsen P high for dryland and low P applied, Large differences in relative productivity, 132kg DM / ha on extensive country	No feedback provided	

Anderson, Classic Properties, Glentanner Station, Waitangi Gray Hills Graham or Te Akatarawa	High	No advanced stock reconciliation	EC – no advanced stock reconciliation completed due to farm owner giving the actual SU figures	This approach is only acceptable provided the applicant clearly understands the difference between the Revised Stock Unit (RSU) and a winter stock unit. See notes regarding this in point 6,d of this report.
Haldon Station	Multiple	See Appendix 1 – Audit Summary Table	EC – no feedback provided	
Irishman Creek	Multiple	See Appendix 1 – Audit Summary Table	EC – no feedback provided	
Lilybank Land Co	Low	Drainage unknown	EC – Drainage for all block still unknown	Will revert to default based on soil type. More info will be required at audit stage
Lilybank Land Co	Other	>13t DM/ha	EC – No comment	Applicant has been advised of issue. See further notes on pasture production in 6c of this report.
Falconer or Peak Valley	High	No advanced Stock rec	No feedback provided	

8. Provided the applicants are clear on the implications of the above there is not necessarily any need for further modification of the files. The implications will need to be addressed by specific consent conditions for any granted consents.
9. Further comments provided in the document supplied by Peter Glasson with respect to Simons Pass Station Limited, and Simons Hill Station limited were noted as explanations for issues raised as covered in the above table. This is all except points 1,2,9,13,21,26,29 from this document that were not relevant as they provided explanations for issues not raised in the original S42a report on Overseer® auditing.

## **Recommendations for future monitoring of consents**

10. Further to the details outlined regarding the completion of Overseer® modeling the following recommendations are made with regard to the future use of Overseer as a monitoring tool:
11. This outlines details of what would be considered best practice for the entering of data based on the current version of Overseer® in use (version 5.4.3). It should be noted that as updated versions of the programme are released there may be a need to revise these monitoring criteria based on the input requirements of the model and the significance of these variables on the generated outputs
  - (a) Livestock data – for sheep/beef/deer operations the advanced stock reconciliation must be completed to accurately show stock movements throughout the year. Overseer® has built within the model a calculator for livestock weights based on the current national averages. From a monitoring perspective it is deemed a more simple solution to rely on these weight gains rather than requiring farmers to put in actual weights for stock. From a monitoring perspective this will advantage farmers who are performing above this standard and will in effect give farmers an additional incentive to improve on farm efficiency.
  - (b) Use of defaults – the defaults generated from within the system should only be used where there is no evidence available to support actual overrides. At present many of the defaults used within the system are unable to be quantified making it difficult for any party to verify that the actual system they are running is in line with the defaults used. It is understood the soon to be released upgraded version of Overseer® will provide much more clarity around this.
  - (c) In line with the above, the use of actual data must be from quantified and verified source to ensure accuracy for all parties.
  - (d) The relative productivity function should be set based on verifiable data. There are currently five acceptable alternative means of this being calculated which provides sufficient input options for various systems.
  - (e) Actual soil types must be used rather than just soil groups. This affects properties such as soil drainage where this is unknown.
12. This approach is based on that of Environment Waikato and their use of Overseer® as a regulatory tool within the Lake Taupo catchment.
13. This would be deemed best practice for future nutrient monitoring of farm operations. This same level of detail has formed the basis for the Overseer® audits. Applicants are aware that conditions are being recommended to be implemented in consent conditions that would require only generally accepted best practice inputs to be used for Overseer® modeling. As such it should be clear to any consent holders that the ongoing auditing process may result in a requirement for Overseer® modeling inputs to change to be consistent with best

practice and this could have an implication for farm operations to ensure that an NDA is complied with.

## CONCLUSIONS

14. A majority of the issues identified have been satisfactorily revised or responded to by the applicants and it is noted in the above tables where applicants have provided responses that are still not deemed in line with "*best practice use*" of Overseer®.
15. A common response has been for applicants to have not completed all input variables within Overseer® and have relied on default values in some cases. This approach is deemed acceptable provided the farm system aligns with the default values used within Overseer®. This is something that is difficult to ascertain given the default values are not released by the developers of Overseer®. A common response by the applicants in these cases has been that they will complete the full details for future monitoring once the actual operations are in place.
16. This does present some risk to the applicants and the environment as this may provide some further difference in the actual nutrient loading in the system. This may only have a minor effect on the overall NDA which will not be an issue for those operations that have a significant buffer between their nutrient loading from Overseer® modeling and the applicant proposed nitrogen loading threshold. For those that have a limited buffer (say less than 10%) this could mean the need to revise their operation plan to operate under their threshold.
17. For the purpose of this audit I see no problem accepting the responses from the applicants in these cases. They have been advised that "*best practice*" in these cases would have been to provide full detail in the original process. Should the full completion of the models during future auditing provide any limitation on the operation due to a higher actual nutrient loading then they have been sufficiently advised of the implications of this during the audit process.
18. Overall there is a strong level of confidence that the completed modeling provides a reasonable representation of future nutrient loading.



Signed \_\_\_\_\_

Dated 13 April 2010

**Darren Graham McNae**

**Consultant, AgFirst Central**

Appendix 1 – Audit Summary Table					
Applicant	Impact	Issue (Summarised)	Applicant Response	Auditor Comment	Outstanding Issue
Dairy Applications					
Southdown Holdings (Glen Eyrie Downs)	High	Developed setting	MR - It has been agreed in line with the outcome from caucusing, that it is acceptable that a farm meets its threshold using only the 'Developed' setting. However, where this is the case, evidence will need to be provided either through soil monitoring or mechanistic modelling to demonstrate that there is an appropriate level of immobilisation of Nitrogen (N) in their soils. This would need to be complemented by an appropriate suite of control response conditions	Agreed that this is the accepted course of action	No
	High	Very Low clover content used	The irrigated area will be under a ryegrass, fescue, chicory and white clover sward. Clover levels are expected to be depressed due to the substantial and even return of organic manures (Robson, 2009). The inorganic fertiliser application reflects the low contribution from clover. Low clover contents are maintained to achieve higher control over N inputs into the system. And shall be verified on an annual basis when OVERSEER® nutrient budgets are run to assess compliance. Going forward, clover contents may be able to be increased and inorganic N reduced accordingly, again modeled clover contents would need to be verified as an input to the model	It is agreed that in systems that involve high (>200kgN/ha) levels of organic N (within effluent) being applied that there will be a suppression of clover content. The exact criteria that is to be used in determining the appropriate level of clover content to be used needs to be clarified. It is also imperative therefore that assessing these clover levels must become part of a monitoring programme in the future to ensure that the most appropriate level is being used and the impacts are accurate	Yes
	High	High reliance on Herd home to meet targets	MR - It has been agreed that this should not be identified as a high risk as it is the mitigation used to deliver the nutrient reductions	Agreed as per comments	No

	Medium	No Cow liveweight Specified	MR - On Glen Eyrie Downs an average weight of 525 kg has been used (B Englebrecht, <i>Personal Communication</i> , January 2010). OVERSEER® models and FEMPs have been updated to reflect this change.	Accepted as being within normal bounds	No
	Medium	13,000t grass silage imported	MR - It was accepted that use of grass based silage supplements was principally to utilise the excess pasture being grown and conserved on other irrigated stations around the basin, such as the proposed relationship Killermont Station and WHL Killermont. In an instance where insufficient dry matter is produced within the basin, and supplements are required to be brought in from outside the catchment, as long as the importation of supplements is recorded and modeled and the stations remain within their NDAs	It is accepted that the utilisation of surplus pasture from within the catchment is the primary reasoning for this. It is acknowledged that for operations importing feed it is not relevant where this comes from or what form it is in provided the farm is still operating within its NDA. The applicant has been made aware of the issue	No
	Medium	Used own irrigation nutrient concentrations	MR - The default irrigation concentration in OVERSEER® for N is 2.5 mg/l. The source of water for Glen Eyrie Downs is from Lake Ohau. Water quality testing on Lake Ohau was conducted by MWRL (GHD, 2009) and total N concentrations were below detection levels of 0.11 mg/l. The use of 0.5 mg/l is therefore conservative. Default concentrations in OVERSEER® also overestimate the phosphorus 'P' in Glen Eyrie Downs' irrigation water, 0.008 mg/l total phosphorus (TP) in Lake Ohau compared with 0.1 mg/l TP assumed in OVERSEER® (GHD, 2009).	Accepted approach and data used	No
	Low	10% of nutrient removed in wetlands	MR - It was accepted that the nutrient reductions from these features have not been used to meet the farm Nutrient Discharge Allowance (NDA). The total farm losses for N and P submitted for compliance with the thresholds are excluding the wetland and filter strip effects	Accepted. It is agreed how Overseer® deals with wetlands. It is important to clarify that any possible reductions from wetlands have not been used within the calculations.	No

	Low	Effluent solids and sludge exported form system	MR - It was accepted that the removal of solids from the farm has not been modelled to ensure compliance with the NDA. Solids are separated and removed off farm to prevent applications of N to land from dairy effluent sources exceeding 200 kg/ha/yr	Accepted – FEMPs outline how this will be dealt with. See comments in table in main report.	Yes
	Other	Inefficient Nutrient system	MR – This is a system consideration and outside the scope of this audit	Agreed however the applicant has been made aware of the issue	No
	Other	Nutrient exported off farm but in catchment	MR - It was discussed and agreed that if the exported solids are used on another farm that is a part of these consent applications, regardless of where, the import would be recorded in their nutrient budget and its compliance assessed. If the exported solids were used on a farm that was not a part of these hearings, as long as the inorganic fertiliser applications were scaled back to account for the nutrient applied with the solids, there should be no net change in that farm's nutrient losses	See comments in main report.	Yes
Southdown Holdings (WHL Killermont)	High	Developed setting	MR – As per GED evidence	As per GED above	No
	High	Low clover used	MR – as per GED evidence	As per GED above	Yes
	High	High reliance on Herd home to meet targets	MR - It has been agreed that this should not be identified as a high risk as it is the mitigation used to deliver the nutrient reductions	Agreed as per comments	No
	Med	No Cow liveweight Specified	MR – 525kg LW as per GED	Accepted as being within normal bounds	No
	Med	5,500t grass silage used	MR – As per GED	Accepted	No
	Med	Used own irrigation nutrient	MR- The default irrigation concentration for N is 2.5 mg/l. The source of water for WHL Killermont	Accepted approach and data	No

		concentrations	is from the Ahuriri River. Water quality testing at South Diadem on the Ahuriri River (GHD, 2009) found an average total N concentration of 0.14 mg/l with most samples below detection levels. The use of 0.5 mg/l is therefore conservative. Default concentrations in OVERSEER® also overestimate the P in WHL Killermont's irrigation water, with an average of 0.01 mg/l TP at South Diadem compared with 0.1 mg/l TP assumed in OVERSEER® (GHD, 2009)	used	
	Low	Effluent solids and sludge exported form system	As per GED above	As per GED above	Yes
	Other	Inefficient Nutrient system	As per GED	As per GED	No
	Other	Nutrient exported off farm but in catchment	As per GED	As per GED	Yes
	Other	12.8t DM/ha pasture growth	MR – Evidence reiterated to show that is it believed the pasture production levels are realistic	This is accepted for the purpose the Overseer® audit however from a feed system perspective the applicant has been made aware of the concerns of the auditor should these levels of pasture production being achieved on a consistent basis. Main concern is reiterating that the farm would be operating under a nutrient restriction regime which would govern the levels of other feed being imported	Yes
Five Rivers (Ohau Downs)	High	Developed setting	MR – As per GED evidence	As per GED above	No

	High	High reliance on Herd home to meet targets	MR - It has been agreed that this should not be identified as a high risk as it is the mitigation used to deliver the nutrient reductions	Agreed as per comments	No
	Med	High per cow production	MR - The production per cow was given by the owner of Ohau Downs Station, Mr Zeestraten, who already manages multiple dairy units in Southland, and supported by Mr Englebrecht, the farm consultant retained to provide input into the Ohau Downs application. This, I believe, therefore constitutes a reasonable input to the model. However, if a lower kg MS had been used, this would result in lower crop requirements and lower nutrient losses	It is accepted that the advice given by Mr Zeestraten and Mr Englebrecht has been used to assess likely production levels. It appears that these calculations are based on experience of other farming operations rather than direct feed modelling. The performance targets specified show a high level of efficiency which should ideally be backed up with the appropriate feed modelling. The applicant has been made aware of the risk surrounding this	Yes
	Med	No cow weight entered	Average weight 465 kg (B Englebrecht, <i>Personal Communication</i> , January 2010). OVERSEER® models and FEMPs have been updated to reflect this change	Accepted as being within normal bounds	No
	Med	FxJ Cows	It was accepted that Jersey Friesian crosses were desired by the farmers	Accepted	No
	Med	Used own irrigation nutrient concentrations	MR – based on actual data	Accepted	No
	Med	7,050 t DM imported	MR – As per GED	Accepted	No
	Other	High Olsen p on Dryland pasture	MR - The Olsen P concentration used in the OVERSEER® modelling on the dryland was an average 39 soil samples taken between 2006 and 2009. The average has been skewed by a few samples with excessive P concentrations. By	Accepted	No

			using this high soil P concentration, P losses will not be underestimated from the dryland areas of the farm		
	Other	>13t DM/ha pasture production	As per WHL above	As per WHL Above	No
Killermont Station	High	Cows wintered off for six months	MR – Not relevant as operation is cut and carry only	Accepted	No
	High	No herd Homes or feedpads allowed for	MR – Not relevant as operation is cut and carry only	Accepted	No
	High	Overall low stocking rate given cows are grazed on non irrigated area	MR – Not relevant as operation is cut and carry only	Accepted	No
	Med	400kg MS/cow production	MR – Not relevant as operation is cut and carry only	Accepted	No
	Med	No cow liveweight	MR – Not relevant as operation is cut and carry only	Accepted	No
	Med	FxJ cows	MR – Not relevant as operation is cut and carry only	Accepted	No
	Low	Insufficient pasture eaten	MR – Not relevant as operation is cut and carry only	Accepted	No
	Low	Significant pasture exported off farm	MR – All to be exported not just the 4t DM/ha as noted	Accepted – will need to be remodeled under the later version of Overseer® to reflect more accurately	No
	Low	All effluent exported	MR – Not relevant as operation is cut and carry only	Accepted	No

	Other	Unknown drainage status	Where drainage status is unknown, well drained is assumed. This is a correct assumption for Killermont Station. Mackenzie soils are well to excessively well drained soils (Webb, 1992	Agreed that this is the most appropriate course of action	No
	Other	No calving or lactation details entered	MR – Not relevant as operation is cut and carry only	Accepted	No
	Other	All effluent exported but N still applied	MR – Not relevant as operation is cut and carry only	Accepted	No
Simons Pass Station	Med	High per cow production	PG – Modeled on FARMAX DAIRY PRO	Accepted approach	No
	Med	No Cow weight	PG – Utilised default values due to the system only being modeled. Will complete on actual weights once system is in place	Reasoning accepted	No
	Med	Used Own irrigation concentrations	PG – Concentrations based on actual data from various reports	Accepted approach and data used	No
	Low	FEMP indicates effluent exported but file has spread on farm	PG – Originally effluent options were being considered. Current plan - effluent will be exported so modeled N losses will be overestimated	Should be modified to reflect actual practice but provided the losses are within the proposed NDA this is accepted	No
	Other	No lactation length or calving details entered	PG – Utilised default values due to the system only being modeled. Will complete on actual weights once system is in place	Accepted provided the system is not significantly different from “average” which is difficult to determine given data is not released by Overseer®	No
	Other	Pasture production >13tDM/ha	PG – Referred to evidence of FARMAX modeling and previous evidence presented. Cautioned against placing too much reliance on Overseer® pasture production values which are cosmetic only.	Values are cosmetic however they do provide a useful guide as to the overall intensity of the operation. See notes regarding pasture production	No

McAurie, Ellis	High	Developed setting	No Change	This appears to have been left as developed based on further evidence presented to hearing by Mr McFarlane (point 20 in Mr Chapmans report). See notes regarding this	Yes
	Med	No liveweight entered	Revised to 475kg LW	Accepted and within normal bounds	No
	Med	FxJ cows	No change	Accepted that this is the system being run	No
	Other	Lactation length or calving date not entered	No change	Accepted that the applicant relies on the default values	No
	Other	Low Olsen P for pasture production	Olsen P raised from 18 to 24 (Milking platform) and 30 (Effluent)	Accepted and more representative	No
	Other	Pasture production >13tDm/ha	No Change / comment	Operation still relies on high pasture growth which could present some feed system risk as per comments for WHL Killermont. Applicant has been made aware of the issue	Yes
DRYSTOCK APPLICATIONS					
Five Rivers Ohau Downs	High	Developed setting	Not relevant – dairy production as above is the primary application	Not relevant	No
	High	Reliant on feedpad to meet targets	Not relevant – dairy production as above is the primary application	Not relevant	No
	Med	Used own irrigation nutrient	Not relevant – dairy production as above is the primary application	Not relevant	No

		concentrations			
	Med	No liveweight entered for diary heifers	Not relevant – dairy production as above is the primary application	Not relevant	No
	Low	No N or P applied to crops	Not relevant – dairy production as above is the primary application	Not relevant	No
	Other	No Wool production entered	Not relevant – dairy production as above is the primary application	Not relevant	No
	Other	>13t DM / ha pasture production	Not relevant – dairy production as above is the primary application	Not relevant	No
	Other	Olsen P high for dryland pasture	Not relevant – dairy production as above is the primary application	Not relevant	No
Killermont	High	Developed setting	Not relevant – dairy production as above is the primary application	Not relevant	No
	High	V low clover setting used on hill blocks	Not relevant – dairy production as above is the primary application	Not relevant	No
	Med	400kg Breeding hinds – this is very high	Not relevant – dairy production as above is the primary application	Not relevant	No
	Low	Unknown drainage class	Not relevant – dairy production as above is the primary application	Not relevant	No
	Other	>13t DM pasture production	Not relevant – dairy production as above is the primary application	Not relevant	No
Simons Hill Station	High	No sheep trading over winter	PG - Stock wintered on dryland areas. Refer evidence of Snow and Ogle	Accepted	No
	Med	All female cattle?	No – steers would be male	Accepted on recheck of file this was an error in the auditing.	No

	Med	Own irrigation nutrient concentrations used	PG – Concentrations based on actual data from various reports	Accepted approach	No
	Other	Wool production very low	PG – Sheep are not on the irrigated block all year	Accepted	No
Simons Pass Station	High	19.6RSU/ha SR- high	Based on FARMAX modeling of 14,000kg DM and 12,500kg DM @ 80% utilisation and FARMAX nett pasture production of 11,259 and 10,138kg DM. Converted at 550kg DM / SU	Accepted methodology given the modeling that has been undertaken	No
	Med	Own irrigation nutrient concentrations	PG – Concentrations based on actual data from various reports	Accepted approach	No
	Other	Very high wool production	PG – Two options modeled in FARMAX ranged from 20kg / ha to 27kg / ha. This is not high.	Issue was raised from file SPS2 SBFIN. PG response relates to SPS1B SBFIN which equates to 20kg /ha. All other SPS options show wool production of 34-38kg/ha. Overall not major.	No
	Other	<13t DM/ha pasture	PG - Reference to evidence of Graeme Ogle and Val Snow. It is in line with both practice and science literature	Accepted - See further notes regarding pasture production	No
High Country Rosehip Orchards	High	20.4 RSU/ha SR – high	PG - As per SPS	As per SPS	No
	Med	Own irrigation nutrient concentrations used	PG - As per SPS	As per SPS	No
	Other	>13tDM/ha pasture	PG - As per SPS	As per SPS	No
Lonestar Farms	High	No advanced stock rec	No feedback provided		Yes
	High	High variation in rainfall	No feedback provided		Yes

	Low	Olsen P high for dryland and low P applied	No feedback provided		Yes
	Other	Large differences in relative productivity	No feedback provided		Yes
	Other	132kg DM / ha on extensive country	No feedback provided		Yes
Glenmore	High	Developed setting	EC - Unchanged	This appears to have been left as developed based on further evidence presented to hearing by Mr McFarlane (point 20 in Mr Chapmans report). See notes regarding this	Yes
	Med	High irrigation rate	EC – Was based on original Borderdyke proposal. Revised is based on Centre Pivots	Accepted	No
	Low	Unknown Drainage status	EC – no comment	Revised model has all blocks as Well drained	No
	Other	No Wool Production	EC - Unchanged	Not best practice but accepted	No
Anderson	High	Used only developed setting	EC - Unchanged	As per Glenmore notes	Yes
	High	No advanced stock rec	EC – no advanced stock rec completed due to farm owner giving the actual SU figures	This approach is only acceptable provided the applicant clearly understands the difference between the Revised Stock Unit (RSU) and a winter stock unit. See notes regarding this (point 6,d of this report)	Yes
	Med	No N to irrigation blocks	EC – No change	Still no N allowance. Applicant has been made aware of the	No

				issue	
	Low	Low P applied to irrigated area	EC – No change	Actual P applied has not changed. Applicant has been made aware of the issue.	No
Marae Horo	High	Developed setting	EC - Unchanged	As per Glenmore notes	Yes
	High	v. low clover	EC – V low clover in hill blocks due to minimal fert history and climate	Accepted	No
	Med	No irrigation applied	EC – Irrigation added for all 3 locations	Reviewed and accepted	No
	Low	Unknown drainage class used	EC – Drainage still unknown for all blocks	Will revert to default based on soil type. Accepted	No
	Low	Low or no P applied	EC – Low or no P applied to river flat and top hill	P added to river flats. Overall P losses up double previous file to 773kg N	No
	Other	Low pasture production on non irrigated	EC – Changed relative productivity	Reviewed - pasture production more representative	No
Classic Properties	High	Developed setting	EC - Unchanged	As per Glenmore notes	Yes
	High	No advanced stock rec	EC – no advanced stock rec completed due to farm owner giving the actual SU figures	As per Anderson file – see notes regarding this.	Yes
	Low	No P applied to swamp	EC - Correct	Accepted	No
	Other	Region needs changing	EC - Changed	Correct	No
	Other	Relative productivity too low for centre pivot	EC – Relative productivity for centre pivot and Ryland blocks amended	Reviewed - pasture production more representative	No

	Other	Relative productivity for dry paddocks/rye high	EC – Relative productivity for centre pivot and Ryland blocks amended	Reviewed - pasture production more representative	No
Hope	High	Developed setting	EC - Unchanged	As per Glenmore notes	Yes
	Med	No irrigation on B+C	EC – Irrigation application rate changed to 600mm for pivot A and added for Pivot B+C	Accepted	No
	Low	Drainage on blocks unknown	EC – Drainage info included	Actual drainage in file not updated / included. Will revert to default	No
	Low	Olsen P not corresponding with RP	EC – Ravensdown rep to provide explanation of relative productivity	No explanation provided but applicant has been made aware of the issue. Minor impact	No
	Other	RP to low for irrigated blocks	EC – Ravensdown rep to provide explanation of relative productivity	No explanation provided but applicant has been made aware of the issue. Minor impact	No
	Other	Pasture grown on irrigated blocks low	EC – Ravensdown rep to provide explanation of relative productivity	No explanation provided but applicant has been made aware of the issue. Minor impact	No
	Other	No wool weight entered	EC - Unchanged	Minor issue	No
McAurie	High	Developed setting	EC - Unchanged	As per Glenmore notes	Yes
	High	High ewe liveweight	EC – Ewe liveweight lowered to 60kg	Accepted	No
	High	No weaner cattle shown	EC – R2 cattle in trading are dairy grazers	Accepted	No
	Other	High variation in RP	EC – No change	No explanation provided but applicant has been made aware of the issue. Minor impact	No

	Other	Low production improved hill pasture on	EC – No change	No explanation provided but applicant has been made aware of the issue. Minor impact	No
	Other	Region changing needs	EC – Region changed	Accepted	No
	Other	No wool entered	EC - Unchanged	Minor	No
Haldon Station	High	Developed setting	EC – no feedback provided	Unknown what action has been taken. Assumed approach same as other EC clients	Yes
	High	V. low clover	EC – no feedback provided	Unknown what action has been taken. Assumed approach same as other EC clients	No
	Low	Drainage unknown	EC – no feedback provided	Unknown what action has been taken – not a significant issue however	No
	Other	Kirk Hill low RP	EC – no feedback provided	Unknown what action has been taken – not a significant issue however	No
	Other	Large variation in RP	EC – no feedback provided	Unknown what action has been taken – some clarification still sought as to how these are being dealt with.	No
Irishman Creek	High	Developed Setting	EC – no feedback provided	Unknown what action has been taken. Assumed approach same as other EC clients	Yes
	High	No advance stock rec	EC – no feedback provided	Unknown what action has been taken. Assumed approach same as other EC clients	Yes

	Med	High irrigation rate	EC – no feedback provided	Unknown what action has been taken – still need clarification	Yes
	Low	High Olsen p on Native and Oversown	EC – no feedback provided	Unknown what action has been taken – not a significant issue however	No
	Other	Region changing needs	EC – no feedback provided	Unknown what action has been taken – not a significant issue however	No
	Other	Low RP on Native	EC – no feedback provided	Unknown what action has been taken – not a significant issue however	No
Bellfield Land Co	High	Developed Setting	EC - Unchanged	As per Glenmore notes	Yes
	High	Low clover setting	EC – v low clover is correct on 3 blocks due to climate and fert inputs	Accepted as being non irrigated undeveloped land	No
	Other	Region changing needs	EC – no comment	Reviewed and has been changed in model	No
Lilybank Land Co	High	Developed setting	EC – McCaulley (irrigated) changed to developed. Others left as developing	Reviewed and accepted	No
	High	No N on irrigation blocks	EC - Correct	Accepted	No
	Low	Drainage unknown	EC – Drainage for all block still unknown	Will revert to default based on soil type. More info will be required at audit stage	Yes
	Low	High Olsen P relative to P applied	EC – Olen P relative to P applied over a number of years.	Advised as based on actual data	No
	Low	Low P applied to irrigation blocks	EC - Correct	Long term trend may see Olsen P decline based on these inputs. Applicant has been made aware	No

				of the issue	
	Other	No wool weight entered	EC - Unchanged	Minor	No
	Other	Low RP on run	EC – No specific comment	Comments relating to Pringle block would apply. Not a major issue	No
Otamatapaio Station	High	Developed setting	EC - Unchanged	As per Glenmore notes	Yes
	Low	Soil drainage unknown	EC – Drainage still unknown for all three blocks	Actually only unknown for one block – Native. Will revert to default for soil type. Minor impact	No
	Other	High Olsen P on dryland	EC – Olsen P on dryland to be confirmed via soil testing	Will require results to be updated. Minor impact. May possibly reduce P losses	No
	Other	No wool weight entered	EC - Unchanged	Minor	No
	Other	Pasture intake low on irrigated areas	EC – Clarification as to what this is based on	This is derived from the pasture production report. Reviewed in line with whole farm. Minor issue	No
Twin Peaks	High	Developed setting	EC - Unchanged	As per Glenmore notes	Yes
	High	No N on irrigated areas	EC – No comment	Unchanged but applicant has been made aware of the issue	No
	Other	Region changing needs	EC – Region changed to High Country	Accepted	No
	Other	No wool entered	EC - Unchanged	Minor	No
	Other	Supplement on wet weight – check	EC – No comment	Applicant has been advised of issue but minor overall	No

Glentanner Station	High	Developed setting	EC - Unchanged	As per Glenmore notes	Yes
	High	No advanced stock rec	EC – No comment	Assume this is as per other applicants	Yes
	Med	All female cattle?	EC – This is correct	Accepted	No
	Other	No wool entered	EC – Not changed	Minor	No
Waitangi Station	High	Developed setting	EC – Lucerne, Irrigated and Paddocks changed to Developed	Reviewed and correct	No
	High	No advanced stock rec	EC – no advanced stock rec completed due to farm owner giving the actual SU figures	As per Anderson file – see notes regarding this.	Yes
	Other	Region need changing	EC - Changed	Accepted	No
	Other	High Olsen P for unimproved	EC – Naturally high Olsen P on undeveloped blocks – soil tests confirm/	Accepted	No
	Other	Low pasture production for unimproved	EC – correct due to fert history, climate and altitude	Accepted	No
Gray hills	High	Developed setting	EC - Unchanged	As per Glenmore notes	Yes
	High	No advanced stock rec	EC – no advanced stock rec completed due to farm owner giving the actual SU figures	As per Anderson file – see notes regarding this.	Yes
	High	v. low clover	EC – v. low clover is correct for 2 blocks due to minimal fert history and climate.	Reviewed and accepted	No
	Low	Drainage unknown	EC – Drainage information added for two blocks	Reviewed and accepted	No
	Other	Pasture production low for hill and unimproved	EC –pasture production for hill an unimproved is low due to unimproved, minimal seed, fert history and climate	Reviewed and accepted	No

Aviemore proposed	High	Developed setting	EC - Unchanged	As per Glenmore notes	Yes
	High	V. low stocking rate	EC – No Comment	Relevant when unimproved land is taken into account Applicant has been made aware of the issues	No
	High	No N to irrigated block	EC – 92 units of N added in fert calc section	Reviewed and accepted	No
	Low	Drainage unknown	EC – No Comment	All blocks unchanged. Will revert to default. Applicant has been made aware of the issue	No
	Other	Region needs changing	EC – No comment	Reviewed and has been changed	No
	Other	RP low on irrigated	EC – Ravensdown rep to provide explanation of relative productivity	Has been amended. Accepted	No
	Other	No wool entered	EC – Not changed	Minor	No
Birchwood Run	High	Developed setting	EC - Unchanged	As per Glenmore notes	Yes
	Med	High irrigation	EC – Irrigation changed to 600mm for all	Accepted	No
	Low	Drainage unknown	EC – No Comment	Reviewed and all have been updated to well drained.	No
	Low	Supplement as wet weight?	EC – No comment	Using both wet and dry weight. Applicant has been advised. Minor	No
	Low	No P applied to Flats	EC – no comment	Unchanged. Applicant has been made aware of the issue.	No
	Other	Region needs changing	EC – No comment	Reviewed and has been changed	No

	Other	All Olsen P the same	EC – Olsen P changed to better reflect actual	Reviewed and accepted	No
	Other	No wool entered	EC – No Comment	Minor	No
Totara Peak	High	Developed setting	EC - Unchanged	As per Glenmore notes	Yes
	Low	Drainage unknown	EC – Drainage info added	Reviewed and all updated to well drained. Accepted.	No
	Low	Supplement as wet weight	EC – No comment	No Change. Applicant has been advised of the issue	No
	Low	High Olsen P – 200?	EC – Olsen P amended to 20	Accepted	No
	Other	Region needs changing	EC – region changed to high	Accepted	No
	Other	Low wool weight	EC – Wool weight remains what it was in the original report	Minor	No
Graham or Te Akatarawa	High	Developed setting	EC - Unchanged	As per Glenmore notes	Yes
	High	No advanced livestock rec	EC – no advanced stock rec completed due to farm owner giving the actual SU figures	As per Anderson file – see notes regarding this.	Yes
	Med	V. high irrigation rate	EC – Changed application irrigation rate to 600mm	Accepted	No
	Other	Region needs changing	EC – Region Changed	Accepted	No
	Other	>13t DM/ha	EC – No comment	Applicant has been advised of issue. See further notes on pasture production	Yes
Falconer or Peak Valley	High	No advanced Stock rec	No feedback provided		

	Low	No variation in Olsen P	No feedback provided		
	Other	Low wool production	No feedback provided		
	Other	Low production pasture for irrigated	No feedback provided		

<b>McNAE REPORT: AUDIT OF INDIVIDUAL OVERSEER MODELLING</b>	
No.	McNae Query
	<p><b>ALL APPLICANTS</b>  <b>i.e. Simons Pass Station Limited</b>  <b>&amp;</b>  <b>Simons Hill Station Limited</b></p>
1	<p>“Developed” vs “Highly Developed” Status</p> <p>ANS: All land uses were modelled under both “Developed” and “Highly Developed”. However, it is very <b>IMPORTANT</b> to note that <b>ONLY</b> the “Highly Developed” results have been used in our assessment of both Simons Pass Station and also in Simons Hill Station. The “Developed” status results have <u>never</u> been used.</p>
2	<p>Staging</p> <p>ANS: A staged development of both the Simons Pass Station Limited and the Simons Hill Station is planned in conjunction with an Adaptive Management programme. The staging programme will be circulated very shortly.</p>
	<b>SIMONS PASS STATION - Land use: Dairy</b>
3	<p>High per cow production - has this been feed modelled?</p> <p>ANS: The farm system and the production values were modelled in Farmax Dairy Pro (by Graeme Ogle) and the values taken from there and entered into OVERSEER</p>
4	<p>No cow weight entered</p> <p>ANS: OVERSEER default cow weights and patterns during the year were used. While the cow weights could have been taken from the Farmax modelling, because the cows are wintered off and all young stock are off-farm, the effect of changes in stock weight are very minor compared to the milk production. Once the farm system is in place and the OVERSEER modelling of a real farm system then it would be expected to use real cow weights. Cow weights could have been entered for the dairy systems but in reality it would not make any appreciable difference as in dairy systems (in contrast to sheep/beef systems) the effect of changing cow condition is very minor on N losses.</p>
5	<p>Own irrigation nutrient concentrations used. It needs to be clearly stated by the applicant why this has been altered. It needs to be</p>

	<p>clarified why these changes have been made and importantly whether these changes have been made on actual monitored data. This will implicate on the amount of nutrient being imported into the system and conversely affect nutrient outputs.</p> <p>ANS: The OVERSEER default irrigation N concentration is 2.5 mg N /L. The concentration used instead of the defaults was 0.5 mg N /L based on the expected concentration of N in the irrigation water – data derived from various reports. If anyone is using the OVERSEER default values in the Upper Waitaki then they either have an unusual source of irrigation or they are overestimating the likely N input from irrigation.</p>
6	<p>FEMP indicates effluent is exported but file has this spread on farm</p> <p>ANS: At the time that the modelling was done effluent management options were being considered and so the most conservative management option was modelled. Later the effluent export option was adopted as the preferred option. However, as the effluent will be exported from the farm the modelled N losses will be an overestimate of likely losses from the farm.</p>
7	<p>Lactation length or calving details not entered</p> <p>ANS: OVERSEER default cow weights and patterns during the year were used. While the cow weights could have been taken from the Farmax modelling, because the cows are wintered off and all young stock are off-farm, the effect of changes in stock weight are very minor compared to the milk production. Once the farm system is in place and the OVERSEER modelling of a real farm system then it would be expected to use real cow weights.</p>
8	<p>Pasture production &gt;13t DM/ha. Very high or very low levels of pasture growth – where the outputs show extremes in estimated pasture growth it is questioned as to what other feed modelling has been undertaken to determine stocking rates. This will result in the Overseer® outputs over or underestimating the nutrient loading. High levels of pasture growth in particular are questioned as to whether these levels of growth could be achieved on a consistent basis.</p> <p>ANS: The reviewer is referred to the evidence describing the Farmax modelling and cautioned against placing too much reliance on the OVERSEER ‘pasture production’ values which are cosmetic only and produced for general, not specific, information. Refer also to the reply set out to Question 25 below.</p>
9	<p>It appears in some cases that the modelling (primarily dairy) has not been based on optimum nutrient efficiency which would effectively increase the proposed nutrient loading i.e., importing high protein feeds rather than cereal silages to balance the diet.</p>

	<p>ANS: No supplements were imported onto the farm in the dairy systems. Where, in which model, did the reviewer find this information? However, balancing of protein is generally not a requirement for production until cows exceed 2kgMS/day (Kolver and Muller (1998)). Ref: Performance and nutrient intake of high producing Holstein cows consuming pasture or a total mixed ration. <i>Journal of Dairy Science</i> 81:1403 - 1411.</p>
10	<p>There are also some questionable practices outlined in some dairy files such as exporting effluent (and nutrient) yet continuing to apply "bought in" nitrogen to the farm. This needs to be clarified by the applicant(s) as to the full reasoning behind this practice as from both a nutrient and an economic point of view this lacks sound reasoning.</p> <p>ANS: This question is not understood. In the modelling, the effluent was not exported. This was the conservative modelling approach. N fertiliser was applied to non-effluent blocks but there was no brought in supplements. Is it possible that the reviewer has confused the block-level reporting (in which there are of course several transfers) with the whole-farm report? Regardless, the economics of the farm system and how the N is applied is not a concern of the OVERSEER auditor. Financial efficiency is a matter for the applicant not the auditor.</p>
11	<p>Overseer (DOFF) = 1133 ha Overseer (SBFIN) = 1063 ha Mary Range = 287 ha (based on spreadsheet tabled by applicant at the hearing &amp; Ogle) Pukaki Flats North = 2287 ha (based on spreadsheet tabled by applicant at the hearing &amp; Ogle - some of this must be over Simons Hill boundary, since they only have 2400ha proposed each)</p> <p>ANS: When looking at the areas it is important to also look at the qualifier on the file name showing which of the several areas is being modelled. The farm systems and soil types on several of the areas were the same, simply different number of hectares, so specific combinations were modelled explicitly (using exact areas and numbers) and then the per hectare values were applied to the other areas with the same soils and planned farm systems. The total areas (irrigated and dryland) have all been accounted for and checked several times.</p>
12	<p>Overseer = 550 - 575 mm 600 mm assumed in McIndoe evidence arguing for annual volume</p> <p>ANS: The OVERSEER irrigation values are averages. The 600mm is not an average. It is an annual volume allocated for 1 MIC share.</p>

	<p>Allocation is normally based on meeting full irrigation demand in four years out of every five years. In this case the 600mm figure is less than the four out of every five year figure. This is known from the Irrical modelling.</p> <p>The OVERSEER value and the allocation value are not comparable and should not be compared.</p>
13	<p>No advanced livestock reconciliation completed – stock numbers have been entered in the “Revised Stock Unit” screen. The applicants need to be sure they understand this term if this option is to be used. This is not winter stocking rate. Ideally the full calculator should be used to get an accurate stocking rate. Simply using the “Revised Stock Unit” input screen can only be used with confidence if another feed budget programme (i.e. Farmax ®) has been used to calculate these figures. As Overseer® is an animal driven model this has a significant bearing on the accuracy of the model.</p> <p>ANS: Farmax was used. Farmax contains full stock reconciliations per month</p>
	<b>SIMONS HILLS STATION - Land use: Drystock</b>
14	<p>No Sheep over winter – is this a trading property?</p> <p>ANS: Stock wintered on dryland areas – nutrients for those accounted for separately. All of this information was included in the evidence of Val Snow and Graeme Ogle. Please refer to that evidence.</p>
15	<p>All female cattle?</p> <p>ANS: No – the steers would be male</p>
16	<p>Own irrigation nutrient concentrations used. It needs to be clearly stated by the applicant why this has been altered. It needs to be clarified why these changes have been made and importantly whether these changes have been made on actual monitored data. This will implicate on the amount of nutrient being imported into the system and conversely affect nutrient outputs.</p> <p>ANS: The OVERSEER default irrigation N concentration is 2.5 mg N /L. The concentration used instead of the defaults was 0.5 mg N /L based on the expected concentration of N in the irrigation water – data derived from various reports. If anyone is using the OVERSEER default values in the Upper Waitaki then they either have an unusual source of irrigation or they are overestimating the likely N input from irrigation.</p>
17	<p>Wool production very low</p> <p>ANS: The sheep are not on the irrigated block all year</p>
18	Overseer = 440 ha

	<p>Simons Hill = 491 ha (based on spreadsheet tabled by applicant at the hearing) or 472 ha (based on Graeme Ogle's evidence)  Pukaki Flat South = 1735 ha (based on spreadsheet tabled by applicant at the hearing &amp; Ogle)</p> <p>ANS: When looking at the areas it is important to also look at the qualifier on the file name showing which of the several areas is being modelled. The farm systems and soil types on several of the areas were the same, simply different number of hectares, so specific combinations were modelled explicitly (using exact areas and numbers) and then the per hectare values were applied to the other areas with the same soils and planned farm systems. The total areas (irrigated and dryland) have all been accounted for and checked several times.</p>
19	<p>Overseer = 500 - 600 mm  600 mm assumed in McIndoe evidence arguing for annual volume</p> <p>ANS: The OVERSEER irrigation values are averages. The 600mm is not an average. It is an annual volume allocated for 1 MIC share. Allocation is normally based on meeting full irrigation demand in four years out of every five years. In this case the 600mm figure is less than the four out of every five year figure. This is known from the Irricalc modelling.  The OVERSEER value and the allocation value are not comparable and should not be compared.</p>
20	<p>Overseer = 510 mm  (600mm in McIndoe evidence Appendix A, based on Twizel mean annual)</p> <p>ANS: The OVERSEER irrigation values are averages. The 600mm is not an average. It is an annual volume allocated for 1 MIC share. Allocation is normally based on meeting full irrigation demand in four years out of every five years. In this case the 600mm figure is less than the four out of every five year figure. This is known from the Irricalc modelling.  The OVERSEER value and the allocation value are not comparable and should not be compared.</p>
21	<p>No advanced livestock reconciliation completed – stock numbers have been entered in the “Revised Stock Unit” screen. The applicants need to be sure they understand this term if this option is to be used. This is not winter stocking rate. Ideally the full calculator should be used to get an accurate stocking rate. Simply using the “Revised Stock Unit” input screen can only be used with confidence if another feed budget programme (i.e. Farmax ®) has been used to calculate these figures. As Overseer® is an animal driven model this has a significant bearing on the accuracy of the model.</p>

ANS: The sheep stock reconciliation is pasted below. The advanced stock reconciliation was used for beef as well. Is the reviewer sure that they were looking at the correct file? It should be "SHS4 BSHC"

Monthly stock reconciliation

Dairy  Sheep  Beef  Deer  Others

Class	Breeding ewes (M)	Lambs (weaned)	Breeding ewes (M)	Lambs (weaned)	Hoggets (lambling)	Hoggets	La
Breed	Merino	Merino	Merino	Merino	Merino	Merino	M
Number July	0	0	0	1	0	0	0
August	0	0	0	1	0	0	0
September	0	0	1500	0	0	8500	0
October	0	0	3000	0	0	8500	0
November	800	0	3000	0	1500	4850	0
December	1500	0	3000	0	1500	1087	0
January	726	1118	581	2748	1500	0	32
February	0	2310	0	2843	1500	0	32
March	0	2310	0	1518	1500	0	32
April	4250	2310	0	0	1500	0	32
May	8226	2310	0	0	1500	0	32
June	0	0	0	0	800	0	0
Maximum weight (kg) #	64	0	0	0	0	0	0
Live weight start (kg) *					38	0	
Live weight end (kg) **		35		38	54	0	36
Carcass weight (kg) **		0		0	0	0	0
Age start (months) *					14	11	

Lambing percentage for breeding ewes (Lambs weaned / ewes in July)  Mean lambing date  day/month Weaning weight (kg)

Percent replacement of breeding stock  Mean weaning date  day/month Wool (kg/yr)

# maximum weight during the year for breeding stock (typically autumn weight for ewes and hinds, summer weight for cows and stags), or estimated weight at maturity for trading or growing stock  
 \* age or weight for first entry in column for growing animals  
 \*\* weight for last entry in column.

### SIMONS PASS STATION - Land use: Drystock

22 Very high stocking rate of 19.6 RSU/ha - appears too high

ANS: The system was modelled in Farmax before entry in OVERSEER. The stocking rate should not appear high. The models used either 12,500kgDM potential production for shallow soils to 14,000kgDM for deep soils. Livestock will not utilise all of this. The net pasture produced and consumed in the Farmax models ranged from 10,138 kg on shallow soils to 11,259 kg of pasture dry matter per hectare per year on deep soils. A Stock Unit is equivalent to 550kg eaten annually per year. The calculation therefore provides a range of: (10,138/550 =) 18.4 SU to (11,259/550 =) 20.5 SU.

23 Own irrigation nutrient concentrations used. It needs to be clearly stated by the applicant why this has been altered. It needs to be clarified why these changes have been made and importantly whether these changes have been made on actual monitored data. This will implicate on the amount of nutrient being imported into the system and conversely affect nutrient outputs.

ANS: The OVERSEER default irrigation N concentration is 2.5 mg N /L. The concentration used instead of the defaults was 0.5 mg N /L based on the expected concentration of N in the irrigation water - data derived from various reports. If anyone is using the OVERSEER default values in the Upper Waitaki then they either have an unusual

	<p>source of irrigation or they are overestimating the likely N input from irrigation.</p>
24	<p>Very high wool production</p> <p>ANS: The two finishing options modelled in Farmax ranged from 20kg wool per hectare on shallow soils with the less intensive farm to 27kg wool per hectare on the deep soils with the most intensive system. This is not very high.</p>
25	<p>&gt; 13t DM / ha pasture production. Very high or very low levels of pasture growth – where the outputs show extremes in estimated pasture growth it is questioned as to what other feed modelling has been undertaken to determine stocking rates. This will result in the Overseer® outputs over or underestimating the nutrient loading. High levels of pasture growth in particular are questioned as to whether these levels of growth could be achieved on a consistent basis.</p> <p>ANS: This issue is covered in the rebuttal evidence of both Graeme Ogle and Val Snow. It is in line with both practice and science literature.</p> <ul style="list-style-type: none"> <li>• The potential pasture production estimates of the 12,500 and 14,000 kg of dry matter per hectare per year 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. It is presumed that he is referring to the literature review of King (2008) in which he discusses the experimental work undertaken by 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.</li> <li>• 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.</li> <li>• 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</li> </ul>

	<p>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.</p> <ul style="list-style-type: none"> <li>• These data are discussed more thoroughly by Val Snow in her rebuttal evidence. However it is noted 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 trial is therefore very supportive that the potential pasture growth rate data presented to the Commission by the Applicants are realistic.</li> </ul>
26	<p>No advanced livestock reconciliation completed – stock numbers have been entered in the “Revised Stock Unit” screen. The applicants need to be sure they understand this term if this option is to be used. This is not winter stocking rate. Ideally the full calculator should be used to get an accurate stocking rate. Simply using the “Revised Stock Unit” input screen can only be used with confidence if another feed budget programme (i.e. Farmax ®) has been used to calculate these figures. As Overseer® is an animal driven model this has a significant bearing on the accuracy of the model.</p> <p>ANS: The advanced stock reconciliation was used</p>
27	<p>SBFIN or SBIFIN on Mary Range Applicant indicated favoured DOFF, Overseer appears to split Pukaki Flats South into combination of two scenarios</p> <p>ANS: Mary Range Farming Limited is a property lying east of the Mary Range. It is physically separate from the Pukaki Flats. The land uses proposed for Mary Range are SBFIN or SBIFIN. There is no dairying proposed for Mary Range Farming.</p> <p>The land uses proposed for all areas of the Pukaki Flats are SBFIN, or SBIFIN, or DOFF or a combination thereof.</p>
28	<p>Overseer = 589 mm (600mm in McIndoe evidence Appendix A, based on Twizel mean annual)</p> <p>ANS: The OVERSEER irrigation values are averages. The 600mm is not an average. It is an annual volume allocated for 1 MIC share. Allocation is normally based on meeting full irrigation demand in four years out of every five years. In this case the 600mm figure is less than the four out of every five year figure. This is known from the Irricalc modelling.</p> <p>The OVERSEER value and the allocation value are not comparable and should not be compared.</p>

29	<p>No advanced livestock reconciliation completed – stock numbers have been entered in the “Revised Stock Unit” screen. The applicants need to be sure they understand this term if this option is to be used. This is not winter stocking rate. Ideally the full calculator should be used to get an accurate stocking rate. Simply using the “Revised Stock Unit” input screen can only be used with confidence if another feed budget programme (i.e. Farmax ®) has been used to calculate these figures. As Overseer® is an animal driven model this has a significant bearing on the accuracy of the model.</p> <p>ANS: ANS: Farmax was used. Farmax contains full stock reconciliations per month. The advance stock reconciliation was used.</p>
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<b>McNAE REPORT: AUDIT OF INDIVIDUAL OVERSEER MODELLING</b>	
No.	McNae Query
	<p><b>ALL APPLICANTS</b>  <b>i.e. Rosehip Orchards New Zealand Limited</b>  <b>&amp;</b>  <b>High Country Rosehip Orchards Limited</b></p>
1	<p>“Developed” vs “Highly Developed” Status</p> <p>ANS: All land uses were modelled under both “Developed” and “Highly Developed”. However, It is very <b>IMPORTANT</b> to note that <b>ONLY</b> the “Highly Developed” results have been used in our assessment of both High Country Rosehip Orchards and also in Rosehip Orchards New Zealand. The “Developed” status results have <u>never</u> been used.</p>
2	<p>Staging</p> <p>ANS: A staged development of both the High Country Rosehip Orchards and the Rosehip Orchards New Zealand is planned in conjunction with an Adaptive Management programme. The staging programme will be circulated very shortly.</p>
	<p><b>HIGH COUNTRY ROSEHIP ORCHARDS - Land use: Drystock</b></p>
3	<p>Very high stocking rate of 20.4 RSU/ha – appears too high.</p> <p>ANS: This should not appear high. The models used either 12,500kgDM potential production for shallow soils to 14,000kgDM for deep soils. Livestock will not utilise all of this. The net pasture produced and consumed in the Farmax models ranged from 10,138 kg on shallow soils to 11,259 kg of pasture dry matter per hectare per year on deep soils. A Stock Unit is equivalent to 550kg eaten annually per year. The calculation therefore provides a range of <math>(10,138/550 = )18.4</math> SU to <math>(11,259/550 = ) 20.5</math> SU.</p>
4	<p>Own irrigation nutrient concentrations used. It needs to be clearly stated by the applicant why this has been altered. It needs to be clarified why these changes have been made and importantly whether these changes have been made on actual monitored data. This will implicate on the amount of nutrient being imported into the system and conversely affect nutrient outputs.</p> <p>ANS: The OVERSEER default irrigation N concentration is 2.5 mg N /L. The concentration used instead of the defaults was 0.5 mg N /L based on the expected concentration of N in the irrigation water – data derived from various reports. If anyone is using the OVERSEER</p>

	<p>default values in the Upper Waitaki then they either have an unusual source of irrigation or they are overestimating the likely N input from irrigation.</p>
5	<p>&gt; 13t DM / ha pasture production very high or very low levels of pasture growth – where the outputs show extremes in estimated pasture growth it is questioned as to what other feed modelling has been undertaken to determine stocking rates. This will result in the Overseer® outputs over or underestimating the nutrient loading. High levels of pasture growth in particular are questioned as to whether these levels of growth could be achieved on a consistent basis.</p> <ul style="list-style-type: none"> <li>• ANS: The reviewer is referred to the evidence describing the Farmax modelling (Ogle evidence) and cautioned against placing too much reliance on the OVERSEER ‘pasture production’ values which are cosmetic only and produced for general, not specific, information.</li> <li>• This will also be covered in the Ogle rebuttal evidence and the Snow rebuttal evidence. It is in line with both practice and science literature.</li> <li>• The potential pasture production estimates of the 12,500 and 14,000 kg of dry matter per hectare per year 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. It is presumed that he is referring to the literature review of King (2008) in which he discusses the experimental work undertaken by 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.</li> <li>• 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.</li> <li>• 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</li> </ul>

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.

- These data are discussed more thoroughly by Val Snow in her rebuttal evidence. However it is noted 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 trial is therefore very supportive that the potential pasture growth rate data presented to the Commission by the Applicants are realistic.

6 No advanced livestock reconciliation completed – stock numbers have been entered in the “Revised Stock Unit” screen. The applicants need to be sure they understand this term if this option is to be used. This is not winter stocking rate. Ideally the full calculator should be used to get an accurate stocking rate. Simply using the “Revised Stock Unit” input screen can only be used with confidence if another feed budget programme (i.e. Farmax ®) has been used to calculate these figures. As Overseer® is an animal driven model this has a significant bearing on the accuracy of the model.

ANS: The advanced stock reconciliation was used – a screen shot is pasted below for the reviewer’s information

7 Overseer = 575 – 600 mm  
600 mm applied for

ANS: The OVERSEER irrigation values are averages. The 600mm is not an average. It is an annual volume allocated for 1 MIC share.

	<p>Allocation is normally based on meeting full irrigation demand in four years out of every five years. In this case the 600mm figure is less than the four out of every five year figure. This is known from the Irricalc modelling.</p> <p>The OVERSEER value and the allocation value are not comparable and should not be compared.</p>
8	<p>Overseer = 589 mm 510 mm on rainfall isohyets map</p> <p>ANS: The OVERSEER irrigation values are averages. The 600mm is not an average. It is an annual volume allocated for 1 MIC share. Allocation is normally based on meeting full irrigation demand in four years out of every five years. In this case the 600mm figure is less than the four out of every five year figure. This is known from the Irricalc modelling.</p> <p>The OVERSEER value and the allocation value are not comparable and should not be compared.</p>
	<b>ROSEHIP ORCHARDS - Land use: Drystock</b>
9	<p>Asked for replacement for corrupt files 22/12/09</p> <p>ANS: There were no Rosehip Orchards files to get corrupted. All possible farm systems was based on High Country Rosehip Orchards. The advanced stock reconciliation was used.</p>

**Before a Hearings Panel of the Canterbury Regional Council**

**Under** Resource Management Act 1991

**In the matter** of applications for Regional Council Resource Consents to take and use water in the Upper Waitaki

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**COMMENTS ON OVERSEER REMODELLING**

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**May it please the Commissioners**

**1. Comments on Overseer Remodelling**

2. The purpose of this report is to assist the Commissioners and s42A officers with the processes undertaken by UWAG applicants with respect to the completion of the Farm Environmental Management Plan (FEMPS) and the remodelling of overseer for all applicants following the audit report completed by Mr McNae. This report, together with the remodelled overseer results and final FEMPS tabled by the UWAG applicants to enable further response commentary by the s42A officers scheduled for Monday 19 April 2010.

3. If required by the Commissioners for the s42A officers the consultant employed by UWAG to complete overseer remodelling and finalisation of the FEMPS can be available for questioning by the Commissioners at the resumed hearing.

**4. Completion of FEMPS**

5. When the FEMPS were tabled during the applicant's presentation by Begley, de Joux, Johnston and McCabe, they were submitted in draft form for the following reasons:

5.1 The site specific assessment of risks had not been undertaken for all properties prior to the completion of the draft FEMPS. These site specific factors have assessed the actual and potential risks to ground water and surface water contamination or nutrient buildup resulting from the physical farm layout, and farm operational requirements where such risks would not be reflected in overseer modelling for the property. More particularly, they have taken account of stream and swamp locations, areas that may be subject to ponding, farm tracking and stock movement patterns – particularly in association with the requirement for stream and swamp boundary protection areas.

5.2 The onsite inspection and risk assessment in the FEMPS has also taken account of the conversion process associated with renewals and any interim protection requirements.

6. In the case of renewals of existing consents the onfarm risk assessment incorporated into the FEMPS have taken account of any actual risks associated with the existing development as well as the potential risks associated with new areas. The onfarm risk assessment was undertaken by an independent two person team involving onfarm inspection and dialogue with the existing farm manager. Risk areas were assessed independently with proposals to mitigate the risk incorporated into the final FEMPS being agreed to by all land owners.
7. **Overseer Remodelling**
8. Following the audit report undertaken by Mr McNae it was determined that the overseer files for all UWAG applicants needed to be remodelled to ensure those “high and medium” risks (significant risks) identified were re-evaluated by qualified overseer operators and amended accordingly.
9. Issues of low risk identified by McNae were not amended given that they were unlikely to affect overall overseer outcomes. A chart summarising the changes made to overseer files showing a summary of the changes made; the additional information supplied to clarify issues it raised by the McNae audit and the details of other risks identified that were not amended is attached and forms part of this commentary.
10. The remodelling was undertaken by approved overseer operators familiar with the applicants’ property.
11. Any risks identified as low risk issues will be remodelled prior to the first audit report for the Canterbury Regional Council in conjunction with the Applicant to reflect further on farm information relating to wool weights, drainage information etc.
12. Dunstan Peaks and Riverside were not audited in the initial audit report undertaken by McNae. However in this remodelling exercise the high and medium risks that had been identified in the McNae audit for other properties have been incorporated into the Dunstan Peaks and Riverside “remodelled” overseer results these factors include rainfall, irrigation areas, irrigation application depths N applied etc.

13. Meetings were held with those fertiliser representatives of Ravensdown and Balance prior to the remodelling work undertaken to compare the results with the initial workshop in Twizel and the audit results undertaken by McNae.
14. It is accepted that for new UWAG applicants irrigation will be a new development. Their decisions on rates of fertiliser application, pasture growth, stock carrying capacity were based on district wide averages and on the advice of farm consultants such as Mr McFarlane appearing as a witness for UWAG. There is the potential that these figures will change when irrigation commences. Any changes will need to fit with the on farm thresholds as determined by the WQS.
15. For those existing applicants their fertiliser application rates, pasture figures and stock carrying capacity were based on known perimeters and likely perimeters following any conversion to centre pivots or more efficient irrigation systems.
16. **Overseer and Pasture Export**
17. Most of the UWAG applicants are irrigating a small percentage of their overall property to guarantee a supply of winter feed and provide on farm sustainability – regardless of weather conditions.
18. The version of overseer used only allowed 50% of the pasture grown to be exported from that block.
19. In some cases, for example lucerne blocks 100% of the pasture grown is exported for winter feed as balage or hay as a cut and carry operation. Accordingly the figures for that block are likely to be conservative.
20. In remodelling overseer the fertiliser representatives following discussion with Mr Andy McFarlane have inputted all irrigation areas as “developed” rather than “highly developed” this follows Mr McFarlane’s advice to the hearing having regard to his consultancy on particular high country properties (notably Haldon Station and others) that it was unlikely that these properties would reach a highly developed state.
21. A key common area that differed among the fertiliser representatives was the use of the relative productivity function. Those applicants that had their overseer

modelled by Mr Gordon McCormick were identified in the McNae report as “relative productivity too low” Mr McCormick has provided an explanation as to his reasoning behind using the relative productivity function. This area of difference was identified in 30(a) in the McNae audit report.

22. Advanced stock reconciliation was not completed for eight applicants. This is due to those applicants having a very accurate understanding of the existing stock units carried on their properties and providing these for overseer remodelling purposes.
23. Some applicants have “low pasture production” identified as a risk on some blocks of their farms. For the majority the low pasture production is accurate e.g. Lilybank – Pringle – the Pringle is native, steep unimproved high country. Waitangi – unimproved hill block – unimproved steep hill country with no fertiliser inputs.
24. DCD – nitrification inhibitor is unable to be remodelled in overseer for specific areas of the farm. An overseer DCD cannot be selected solely for irrigated areas but must be based on whole farm operation. This has meant that some applicants who wish or are using DCD have left this unselected.
25. As indicated above a large number of mitigation measures identified in the applicants FEMP’S have been unable to be incorporated in overseer. For example settling basins, fencing waterways, riparian plantings and culverts and restricting stock access to waterways. This has meant that the outputs from overseer do not fully take into account all of the mitigation measures to be implemented and therefore the overseer outputs are likely to overestimate actual nutrient figures.
26. There are a small number of applicants who exceed the threshold set out in the WQS at the develop setting this is mainly due to incorrect information used when determining the thresholds in the WQS but the inability to model all of the mitigation measures also plays a part. This report is provided for the purposes of assisting Mr McNae in any review of the remodelled results.

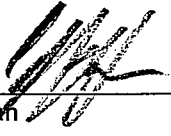
Dated at Christchurch this

7<sup>th</sup>

day of

April

2010

  
EJ Chapman

Counsel for the Upper Waitaki Applicants Group

**Table 1: Changes made to Overseer files when remodelling undertaken**

		DETAILS OF CHANGES MADE	ADDITIONAL INFORMATION	DETAILS OF OTHER RISKS IDENTIFIED THAT WERE NOT AMENDED
Glenmore		Rainfall figures changed, irrigation area changed to developed	Overseer has not been run with the full farm area (only 3000ha) as the WQS Threshold has been based on excluding extreme slopes. These extreme slopes do not have any fert inputs	No wool weights entered
Anderson	Bog Roy	Irrigation area increased to 228ha proposed all spray, irrigation application rate amended to reflect actual., 60ha shared with Rostriever	60ha shared @ 696mm, remaining own @ 720mm application rate	
	Rostriever	Rainfall amended. Irrigation area amended to include own and shared with Bog Roy (60ha shared - Lake Benmore, 30ha own - Lake Aviemore) No advanced stock recc completed due to the farm owner giving the actual SU figures. No N on irrigation area, low P on irrigation area	60ha shared @ 696mm, 30ha of own with current consent.	
Maree Horo	Ribbonwood	Irrigation rate added for all 3 locations, Irrigation area amended to 535ha (320ha removed added to dryland, rainfall figures changed, NO P applied to River flat and top hill. Drainage still unknown for all blocks. V Low clover in hill blocks due to minimal fert history and climate. Rainfall figures changed, relative productivity figures amended and supplement removed from the irrigated areas		

Classic Properties	Maryburn	Region changed, Relative productivity for Centre pivot and dryland blocks amended, NO P applied to swamp - correct. Farmer gave accurate SU figures so no requirement for Advanced stock reconciliation. Irrigation application rate changed to 570mm		
Hope	Grampians	Irrigation application rate changed to 600mm for Pivot A and added for Pivot B and C. Rainfall figures changed. Drainage info included	Ravensdown rep to provide explanation of relative productivity	No wool weights entered
McAughtrie	Willowburn	Ewe liveweight lowered to 60kg, R2 cattle in trading are dairy grazers. Region changed.	proportion of water take is part of the Govt race application. 1451kg/yr N removed via wetland - once removed from total N leached then below threshold. Potential plans are to use some N inhibitor on certain areas of the farm, as yet these areas are undecided.	No wool weights entered
The Glens		Application rate for both blocks changed to 600mm. Effluent applied on effluent block, Olsen P levels are desired/future not present	Ravensdown rep to provide explanation of relative productivity, water take is part of Govt race application.	
Riverside	Greenfields	wasn't audited in the first report for unknown reasons. Water take is part of Government race application. Changes made: region changed to high country, rainfall amended to actual, irrigation area changed to 85ha, N application on irrigated land amended to 200kg/ha from 250 kg/ha		
Dunstan Peaks/Twin Burn/Clifton Downs		hasn't been audited as yet, application rate checked = 600mm, rainfall checked, irrigation areas checked, proposed all spray irrigation	Two different Overseer files but numbers have been combined as farms are run as one	

Bellfield Land Co	Quailburn Downs	2 separate reports run with 750mm and 820mm irrigation application rate. 750mm results used, Over threshold with 820mm. Region changed, V Low clover on the 3 blocks is correct due to climate and fert inputs	Existing and new irrigation	
Lilybank		2 separate reports run with 425mm and 170ha and then 170+70ha and 425mm. still under with the additional 70ha. MaCauley block changed to developed, No N applied is correct, drainage for all blocks still unknown, Olsen P relative to P applied over a number of years. Low productivity and pasture production on Pringle correct due to altitude, climate, location and undeveloped. Low P applied on proposed irrigation blocks correct.	Deer pace fencelines has been left checked in all blocks that have deer to identify a worst case scenario, although the risk assessment identified no evidence of pacing.	No wool weights entered
Otamatapaio		215kg/yr N removed via wetland, Glenburn borders ticked as borders Rainfall changed, Olsen P on dryland paddocks to be confirmed via soil testing. Drainage still unknown for 3 blocks. Proposed all spray at Otamatapaio.	Existing irrigation, Otamatapaio portion in these hearings. Lake consent irrigation areas included,	No wool weights entered Pature intake too low for irrigated blocks? Clarification required as to what this is based on.
Twin Peaks		Region changed to high country, irrigation area changed to 72ha		No wool weights entered
Glentanner	Catherine Fields	additional 20ha irrigation, 17kg of P given from neighbouring property	All female cattle is correct	No wool weight entered

Waitangi		Region changed, Lucerne, Irrigated and paddocks developed. . Low pasture production for unimproved hill block - correct due to unimproved, no fert history, climate and altitude. No advanced stock recc as farm owner had accurate figures	Naturally high Olsen P on undeveloped blocks - soil tests confirm	
Grays Hills		rainfall changed, drainage information added for 2 blocks, v low clover is correct for 2 blocks due to minimal fert history, and climate. No advanced stock recc due to farmer having accurate figures, Pasture production for hill and unimproved block low is correct due to UNIMPROVED, minimal fert and seed history and climate.		
Aviemore Ltd	Otematata	Irrigation area amended to better reflect current practice. Application rates amended. 92 units of N included in fert calc section, drainage included combined threshold with Otematata. Awakino irrigation area removed due to being below the Waitaki dam. Irrigation areas amended, irrigation application rate amended, rainfall for unimproved block changed to 750mm		
	Otematata Aviemore		Ravensdown rep to proved explanation of relative productivity	No wool weight entered. Weaning weight was indicated by the applicant so remains at 30kg.
Birchwood Run	West Edge Ltd	Irrigation appalication rate changed to 600mm for all, region changed, drainage info added, Olsen P changed to better reflect actual		
Totara Peaks		Region changed to high, Olsen P for dryland block amended to 20, drainage info added		Wool weight remains at what was in the original report

Graham or Te Aka		Changed irrigation application rate to 600mm, region changed, no advanced stock recc completed due to farmers having accurate figures,		
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30/03/2010