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*in the matter of:* the Resource Management Act 1991

*and*

*in the matter of:* a number of applications to take and use water from  
the Upper Waitaki catchment

Brief of evidence of Kenneth George Gimblett

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## **BRIEF OF EVIDENCE OF KENNETH GEORGE GIMBLETT**

### **INTRODUCTION**

- 1 My full name is Kenneth (Ken) George Gimblett.
- 2 I am a Director and Senior Planner with the environmental consultancy firm Boffa Miskell Limited (*BML*). I am based in the firm's Christchurch office, having joined BML in 1998. I hold the qualification of Bachelor of Regional Planning (Hons) and I am a full member of the New Zealand Planning Institute. I have over 20 years experience in planning and resource management, gained both in New Zealand and the United Kingdom. As a consultant I have provided advice on a broad range of developments and resource management issues to a range of clients, a number involving presenting evidence before both regional and district councils, and the Environment Court. I also have extensive experience of assisting with, and advising on, Plan preparation under the Resource Management Act 1991 (*Act or RMA*).
- 3 I have acted in respect of numerous resource consent applications in my capacity as an expert planning witness, and also in determining such applications as an accredited independent hearings commissioner.
- 4 In terms of my relevant experience, I had significant involvement with undertaking environmental effects assessment and preparing consent applications in respect of Meridian Energy Limited's (*Meridian*) Project Aqua and, more recently, the North Bank Tunnel hydro-electricity proposals for the lower Waitaki River. I have also advised Meridian in respect of that company's examination of potential reserve electricity generation initiatives at the request of the Minister of Energy.
- 5 I have provided advice to Meridian in respect of several proposals to take and use water for irrigation in the Upper Waitaki Catchment and Mackenzie Basin, and in respect of the company's own hydro-electricity generation assets in that same area. Through this work I have developed a comprehensive understanding of Meridian's hydro-electricity generation operations and am familiar with the operations of the energy industry generally in New Zealand.
- 6 In relation to the local planning framework, in 2002 Boffa Miskell was asked to assist Meridian with preparing submissions to Chapters 1-8 of the Proposed Natural Resources Regional Plan (PNRRP). I have presented expert evidence to the hearings Commissioners in support of a large number of those submissions in the context of the provisions of the RMA and Meridian's current and future operations.

- 7 In 2005 I assisted with the preparation of evidence to the Waitaki Catchment Water Allocation Board (*WAB*) on the preparation of the Waitaki Catchment Water Allocation Regional Plan (*WRP*) in respect of recreation and tourism values in the Upper Waitaki Catchment. In 2008 Boffa Miskell were also asked to assist Meridian with preparing submissions to Proposed Plan Change 13 (Rural Zone – Mackenzie Basin) to the Mackenzie District Plan. That proposed Plan Change concerns the landscape values of the Mackenzie Basin and I have presented evidence for Meridian to the Councils hearing on that matter.
- 8 I confirm that I have read the Environment Court’s Code of Conduct for expert witnesses and this evidence has been prepared in accordance with that code. I agree to comply with the code’s terms. In that regard, I confirm that the statements made in this evidence are within my area of expertise (unless I state otherwise) and I also confirm that I have not omitted to consider material facts which might alter the opinions stated in this evidence.
- 9 I have been asked by Meridian to provide evidence in relation to planning matters relevant to the current resource consent applications to take and use water for irrigation in the Upper Waitaki Catchment and I am authorised to present this evidence on behalf of Meridian.
- 10 In preparing this evidence I have reviewed:
  - 10.1 the individual applications as summarised for notification;
  - 10.2 the planning assessment prepared by Mitchell Partnerships (May 2009) and provided by Mackenzie Water Research Limited (MWRL);
  - 10.3 the GHD Summary Report on the “*Cumulative Water Quality Effects of Nutrients from Agricultural Intensification in The Upper Waitaki Catchment*” (August 2009), and supporting documents;
  - 10.4 the Water Quality Report for Lake Benmore prepared by NIWA for Environment Canterbury (ECan);
  - 10.5 the agreement reached between Meridian and Mackenzie Irrigation Company (MIC) and associated common consent conditions;
  - 10.6 the evidence prepared on behalf of MWRL;
  - 10.7 the Section 42A reports prepared on behalf of ECan;
  - 10.8 the range of evidence prepared on behalf of Meridian; and

10.9 relevant planning documents which I describe in more detail below.

### **SCOPE OF EVIDENCE**

- 11 In this evidence I outline:
- 11.1 the relevant planning framework;
  - 11.2 the importance of a cumulative effects assessment;
  - 11.3 the relationship of the science to the planning framework;
  - 11.4 Meridian's specific interests;
  - 11.5 key considerations under the RMA;
  - 11.6 preliminary comments on proposed conditions; and
  - 11.7 a summary of conclusions and recommendations.
- 12 The scope of my evidence is mainly limited to consideration of water quality and land use effects. It is also largely focused on the consideration of impacts on waterbodies controlled or influenced by Meridian's hydro-electricity operations in the Upper Waitaki Catchment (namely Lakes Tekapo, Pūkaki, Ōhau, Ruataniwha and Benmore; the Tekapo, Pūkaki, Upper Ōhau and Lower Ōhau Rivers; and associated hydro-electricity canals).
- 13 That scope is limited and I acknowledge that there are wider issues of relevance associated with water quality, including landscape and cultural effects. My evidence does not extend to address such other matters.

### **THE PLANNING FRAMEWORK**

- 14 The key planning framework relating to water quality matters is covered by the WRP and PNRRP. These documents deal with the allocation and use of water, and the discharge of water and contaminants relating to the Upper Waitaki Catchment. In addition, the Canterbury Regional Policy Statement (RPS) and Canterbury Transitional Regional Plan (TRP) have relevance. In this evidence I have focussed on these key documents, however I acknowledge, as per the section 42A Introductory Report, that there are a range of other documents and statutes of some relevance. They include applicable district and iwi management plans, the Ngai Tahu Claims Settlement Act, Ahuriri Water Conservation Order 1990, and also National Environmental Standards.

- 15 An analysis of the principle planning framework has been provided by **Mr Kyle** on behalf of MWRL. In some respects I agree with his analysis and conclusions reached, however the discussion below outlines what I consider to be the key issues and some areas where my opinions may differ from those of **Mr Kyle** and others. This evidence also briefly responds to the matters raised in the Council's Section 42A reports but I note that my response reflects the short time available to consider these reports in any detail.
- 16 A comprehensive outline of the applicable regional plan provisions is included in the section 42A Introductory Report, Appendix 8. These are presented in a way linked with the various activity types and identified effects. I believe this will prove useful later in the hearing process as this context will have particular relevance in the consideration of individual applications. My evidence on the individual applications will be presented separately. This initial brief of evidence does not consider the merits of each individual application but instead focuses on the broader matters of cumulative effects on water quality and the necessary basis that provides in the subsequent determination of the multiple applications before the panel.

**Canterbury Regional Policy Statement (RPS)**

- 17 The RPS provides an overview of the resource management issues for the region and sets out how natural and physical resources are to be managed.
- 18 The section on water deals with issues related to both water quality and water quantity, and includes objectives and policies relating to these matters. In relation to water quality, Chapter 9 of the RPS includes Policy 9 which specifically supports the management of point and non-point source discharges such as irrigation, and the setting of conditions, standards and terms in plans and on resource consents to protect water quality.

**Canterbury Transitional Regional Plan (TRP)**

- 19 The TRP provides a framework for consideration of regional matters and was established prior to the Waitaki Catchment Water Allocation Regional Plan (WRP) and Proposed Natural Resources Regional Plan (PNRRP). It remains an operative document. The TRP contains no objectives or policies but includes a General Authorisation in relation to Discharges<sup>1</sup>. The discharge of water associated with minor realignments of or minor improvements to a stream is permitted under this general authorisation, provided certain conditions can be met. More extensive discharges, as proposed by the applicants in the Upper Waitaki Catchment, are not permitted under General

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<sup>1</sup> This General Authorisation is assumed to apply to the whole of the Canterbury Region.

Authorisations and as such consent is required as a discretionary (or innominate) activity in accordance with section 15 of the RMA.

- 20 The section 42A Introductory Report identifies the majority of the water permit applications and all discharge permit applications and land use permit applications before this hearing to be discretionary activities under the TRP. Other regional planning instruments also have relevance to determining the status of these activities and I will move on now to discuss those more specifically.

**Waitaki Catchment Water Allocation Regional Plan (WRP)**

- 21 The WRP sets the framework for the allocation and use of water within the Waitaki Catchment. It has been fully operative since July 2006.

***Objectives and policies***

- 22 Objective 1 sets the over-riding direction "*To sustain the qualities of the environment of the Waitaki River and associated beds, banks, margins, tributaries, islands, lakes, wetlands and aquifers*" through several clauses relating to instream physical and biological values, cultural values, natural landscape, and amenity values, and domestic needs – including for stock and fire fighting.
- 23 Objective 2 sets out the areas to which water will be allocated, including the provision of water for agricultural and horticultural activities. This allocation is required to be consistent with Objective 1. Objectives 3 to 5 seek recognition of both beneficial and adverse effects, costs and benefits, promotion of technical efficiency in the use of allocated water, and provision for water sharing at times of low availability.
- 24 The 46 policies that follow cover a range of issues to give effect to these objectives. This includes catchment wide and locality specific policies, policies dealing with allocation to activities and efficient and effective use, and policies supporting prescribed environmental flow and level regimes.
- 25 Policy 13 has particular relevance to these applications. This policy addresses the potential for adverse effects on water quality to occur following intensification of land use and specifically irrigation. This policy provides a direct cross reference to the water quality objectives of the PNRRP to ensure that the appropriate issues are considered when dealing with land use consents. Notably there is a deliberate linking of the WRP to certain objectives of the PNRRP as they were publicly notified<sup>2</sup>. These objectives are discussed later in my evidence.

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<sup>2</sup> As per the "Definitions and Abbreviations" section (Part 10).

- 26 With respect to Policy 13 of the WRP, the explanation to this Policy states that it "*recognises the importance of water quality considerations when allocating water to agricultural and horticultural activities and, in particular, to irrigation.*" It states that "*The intensification of land use, including that arising from irrigation, increases the potential for adverse effects on water quality*". I take from this explanation that reference is to the effects on water quality of run-off and drainage from land irrigated by water taken and used, rather than the effects of water abstraction from surface water bodies on dilution of water contaminants from irrigated land. If the WAB intended Policy 13 to refer to the effects on water quality of the water abstraction, in my opinion, it is unlikely to have restricted the application of Policy 13 to water allocated to only agricultural and horticultural activities.
- 27 This view is further reinforced by reference to the WAB's decision on page 35<sup>3</sup> which discusses the submissions made to Policy 13 and states that "*Although comprehensive provision for water quality is outside the scope of the Plan, the Board was aware of potential water-quality implications of intensification of land use in the catchment, so despite submissions asking for its removal, it decided to keep Policy 13 in the Plan.*"
- 28 Policies 2, 29 and 30 refer to wetlands with moderate or higher significance, being defined in accordance with the criteria and methodology in Appendix WTL1 of Chapter 7: Wetlands of the PNRRP. This cross reference again reinforces the links between the WRP and the notified version of the PNRRP in the consideration of impacts of water takes and use.
- 29 Policies 15-20 relate to the efficient and effective use of water. In particular Policy 16 relates to irrigation efficiency and considers proposals to take, use, dam or divert water for irrigation. This policy references Environment Canterbury Report UO5/15 in relation to appropriate annual volume allocations for irrigation water and anticipates irrigation application efficiency of at least 80 percent.
- 30 The locality specific policies (29-46) include a number which relate to the Upper Waitaki Catchment and recognize the need to protect areas of high natural character. Recognition too is given to the importance of hydro-electricity generation and the need to enable appropriate access to water for the activities identified in Objective 2 where this is consistent with Objective 1. Additionally, these policies describe the basis of the setting of minimum levels (Policies 35 and 42) and flow regimes (Policies 39, 40, 41, 43, 44, 45, and

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<sup>3</sup> Waitaki Catchment Water Allocation Regional Plan, Annex 1: Decision and principal reasons for adopting the Plan provisions, prepared by the Waitaki Catchment Water Allocation Board, September 2005, page 35, paragraph 202.

46) for various lakes and rivers, recognising the associated natural, recreational and cultural values.

- 31 In the past there have been varying opinions as to the extent to which the WRP deals with the use of water. Section 13(c) of the Waitaki Act provided that in carrying out its functions the Board was required to include objectives, policies, and methods (including rules, if appropriate) in the WRP, to provide for the "*allocation of water to activities*", with the term 'allocation of water to activities' being an express direction to the Board to consider and provide for the use of water from the catchment. On this basis it is my view that the WRP applies to applications to take and use water from the Waitaki catchment and the PNRRP continues to apply in the context of other applications (for example a land use consent under the water quality chapter).
- 32 As identified by **Mr Kyle**, there are a number of associated assessment matters for both discretionary and non-complying activities set out in the Plan.

#### **Rules**

- 33 In effect only very small volumes of water may be taken as a permitted activity (Rules 1 and 9) under the WRP. Otherwise, those water takes that fall within the allocation limits set in Rule 6 / Table 5 are a discretionary activity under Rule 15 and if the allocation limits are exceeded then the activity status becomes non-complying under Rule 16.
- 34 In the case of the current applications being considered, the evidence of **Mr Potts** is that they fall within the annual allocation limit of 275 million m<sup>3</sup> in Table 5. However some applications do not meet the individual allocations for sub-regional areas as set out in Table 5 (e.g. applications for takes upstream of the Lake Pūkaki and Lake Ōhau outlets), making these activities non-complying. **Mr Kyle** notes that each individual applicant will determine their activity status, and the section 42A reports for Environment Canterbury appear to have allocated an activity status to each application based on the available information from the applicants.
- 35 In addition, environmental flow and level regimes apply to the various waterbodies under Rule 2 / Table 3. Applications that meet these requirements again are a discretionary activity under Rule 15 and if the limits are exceeded then the activity status becomes non-complying under Rule 16. Even applications meeting the minimum flow may have an impact on water quality and where minimum flows are not met and the activity becomes non-complying, again water quality impacts would be a key consideration.
- 36 Minimum lake levels are set for Lakes Tekapo, Pūkaki and Ōhau in Table 4 / Rule 3. If these are met the activity is a discretionary

activity under Rule 17, but if not met then the activity status becomes prohibited under Rule 12. If applications are to be granted, it will be critical to ensure that the conditions of consent placed on applications potentially affecting lake levels ensure the minimum levels continue to be met recognising this prohibited status, a situation which appears to have been accepted by the applicants. I would note that applicants seeking to take water from the Ōhau B-C Canal would have to ensure compliance with the respective levels for both Lakes Pūkaki and Ōhau as the canal is fed from both lakes.

37 Overall, it would appear that most of the resource consents being sought to take and use water for irrigation are discretionary activities under the WRP. Those that are non-complying will generally be so because:

- they exceed the sub-regional thresholds in Rule 6/Table 5, or
- they exceed the specific catchment allocation limits set out in Rule 2/Table 3, or
- they do not meet the limits set for High Natural Character waterbodies in Rule 2/Table 3.

38 In relation to applications for water permits, section 31(2) of the Waitaki Act states that section 88A of the RMA does not apply to an application included in Schedule 2. The section 42A reports have identified those applications to which this applies.

#### **Proposed Natural Resources Regional Plan (PNRRP)**

39 The PNRRP, and in particular, the Water Quality (WQL) chapter, has relevance to the resource consent applications being considered here. Chapter 4 of the PNRRP was notified in July 2004 by virtue of Variation 1 and is not yet operative.

#### ***Objectives and policies***

40 The relationship between the WRP and the objectives of WQL Chapter 4 is very important for setting the thresholds for water quality changes in terms of the PNRRP. I will discuss this relationship in more detail below.

41 Issue WQL1 relates to surface water quality and sets out the circumstances and activities that can adversely affect the quality of water in rivers and lakes, their in-stream values, and their use by present and future generations.

42 Flowing from Issue WQL1, Objectives WQL1.1 and WQL1.2 set the anticipated water quality outcomes for rivers and lakes (surface water quality objectives). The detail and subtleties of Objectives WQL1.1 and 1.2, along with the applicable tables and maps are reasonably complex. They are however critical elements, I suggest,

in any consideration of cumulative effects directed towards water quality.

- 43 These objectives deal with both natural state waterbodies (e.g. the Tekapo River), as identified on the planning maps, and those no longer in a natural state. In both cases, the objectives seek maintenance or improvement in the water quality of waterbodies, based on an understanding of the character of the quality of the water (e.g. the chemical characteristics). **Mr Kyle** casts some doubt over whether it could be ascertained if certain waterbodies within the catchment indeed have water quality in a state that is 'natural', given degrees of human modification (including for hydro-electricity development).<sup>4</sup> Although described by **Mr Kyle** as only one of the possible contributors to change, I find it difficult to accept the hydro-electricity generation activities of the Waitaki Power Scheme of itself cause a change in the natural state quality of waterbodies used for water storage.
- 44 The objectives set a range of measures by which the quality of the water may be considered (e.g. natural state or not, suitability for recreation or stock drinking water, or sedimentation and algal blooms). The indicators used in these objectives include consideration of changes to water quality (including changes to; clarity, natural water temperature, dissolved oxygen concentrations, or contaminants caused by reducing or low oxygen conditions), sedimentation, excessive growth of periphyton or aquatic plants, toxic or nuisance algal blooms. Reference is made to Table WQL5 specifying indicators, and this includes maximum values for:
- Emergent macrophytes (e.g. not to exceed 50 percent of width of wetted river channel for inland basins);
  - Algae mats greater than three millimetres thick (e.g. no conspicuous growths for inland basins);
  - Filamentous algae longer than two centimetres (e.g. no conspicuous growths for inland basins);
  - Periphyton (e.g. maximum value of 50 milligrams Chlorophyll *a* per square metre for inland basins); and
  - Sedimentation of riverbed substrate (e.g. not to exceed 20 percent embeddedness for inland basins).

In addition, Objective WQL1.2(3) sets a standard for artificial lakes that the water quality of the lake be maintained so that the average annual phytoplankton biomass does not exceed five milligrams of chlorophyll *a* per cubic metre of lake water; equally oxygen

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<sup>4</sup> Kyle evidence, paragraphs 3.57 and 3.63.

depletion due to persistent seasonal stratification and toxic or nuisance algal blooms are to be avoided. The continued suitability for uses associated with the lake is also to be maintained.

- 45 Overall, these objectives provide a point of reference for measuring the impacts of human activities on water quality and the effectiveness of measures to maintain or improve water quality. Notably, these objectives do not anticipate any overall degradation of surface water quality below current levels.
- 46 There are a number of conclusions on effects with respect to these objectives within the evidence supplied on behalf of MWRL with most focussed around the degree of adverse effects likely. For example, **Mr Kyle** concludes in his consideration of these objectives that "*...any adverse environmental effects arising from nutrient runoff will be not more than minor ...*"<sup>5</sup> and "*...the proposals to take and use water will not significantly affect the existing water quality of Lakes Tekapo, Pukaki and Ohau.*"<sup>6</sup>
- 47 However, the Objectives are not so much centered on consideration of the degree to which any effect might be adverse, but are instead directed very simply towards water quality being maintained (if in a natural state) or being maintained or improved from their current state (if not in a natural state).
- 48 The policies under Objectives WQL1.1 and WQL1.2 deal with point source and non-point source discharges, prevention of contaminants entering surface water and management of riparian areas. Of particular relevance is Policy WQL4 which deals with non-point source discharges with an emphasis on reducing the impact of contaminants entering waterbodies.
- 49 Policy WQL4(d) specifically mentions irrigation activities in the Upper Waitaki Basin above Lake Benmore and sets thresholds for increases in soluble inorganic nitrogen and reactive phosphorus. These thresholds require that irrigation activity does not result in the annual average concentrations, between the points where a river enters and exits a property, of soluble inorganic nitrogen in a river increasing by more than 0.01 milligrams per litre; and soluble reactive phosphorus in a river increasing by more than 0.001 milligrams per litre.
- 50 Objectives WQL1.1 and 1.2, their relationship to Table WQL5, the identification of waterbodies (rivers and lakes) in their natural state, the identifications on the Planning Maps, and the relationship to the groundwater objective (Objective WQL2) are complicated and intricate. Key terminology is however repeated throughout this

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<sup>5</sup> Kyle evidence, paragraph 3.60.

<sup>6</sup> Kyle evidence, paragraph 3.63.

section of the Plan, with an overarching aim to maintain surface water quality standards.

- 51 Issue WQL2 and Objective WQL2 deal with groundwater quality and contaminants in land as a result of changes in activities. Policy WQL9 addresses non-point source discharges that may affect groundwater quality and again specifically mentions levels of nitrate-nitrogen as a result of irrigation in the Upper Waitaki Basin. This policy requires that irrigation activity in the Upper Waitaki Basin (above Lake Benmore) does not result in the maximum concentration of nitrate-nitrogen in any part of an unconfined or semi-confined aquifer at the down-gradient boundary of a property increasing beyond the range that occurs or would have occurred in the groundwater under extensive grazing of unimproved pasture in the catchment up-gradient of the property.
- 52 The objectives of the WQL Chapter are very important for setting the thresholds for water quality changes in terms of the PNRRP and as I have noted, there is a direct relationship between these objectives and the WRP. Policy 13 of the WRP (relating to the effects of water allocation and use for irrigation) specifically refers to the notified water quality objectives of the PNRRP.
- 53 It should also be noted that Policy WQN17 and Schedule WQN9 of Chapter 5 are of some relevance to the current resource consent applications, as they relate to reasonable and efficient use for irrigation of the water proposed to be allocated, and their relationship to Environment Canterbury Report U05/15. Policy 16 of the WRP (Efficient and Effective use of water) continues to refer to Environment Canterbury Report U05/15 in relation to appropriate annual volume allocations for irrigation water. Environment Canterbury Report U05/15 relates to the revision of Schedule WQN9, thus some consideration of this document is relevant to applications for irrigation under the WRP.

**Rules**

- 54 Rule WQL18 relates to the use of land that may result in the discharge of nitrate-nitrogen into groundwater in an unconfined or semi-confined aquifer. Land within the area of the current consent applications is shown on the PNRRP Planning Maps as being above unconfined or semi-confined aquifers. However, Rule WQL18 does not apply where consent has been obtained under Rule WQL19, which applies to land within the Inland Basins, including the Upper Waitaki Basin. Rule WQL18 in any event is not applicable at this time as the PNRRP states that it does not take effect until the rule becomes operative.
- 55 Rule WQL19 relates to the use of land that may result in the discharge of contaminants into groundwater in an unconfined or semi-confined aquifer or surface water in an inland basin. This rule

is, therefore, not replaced by the WRP and would generally require a discretionary activity application, along with a property management plan, for irrigated farming activity in the Upper Waitaki Catchment.

- 56 However, this is complicated by the reference in Rule WQL19 to Rule WQN26. It is stated that Rule WQL19 applies "*where the use of water is authorised under Rule WQN26*". These provisions were drafted and publicly notified prior to the development of the WRP and now the provisions of the WRP replace those of Rule WQN26. Given this, I do not consider that Rule WQN19 would apply within the Upper Waitaki Catchment, although (prior to the development of the WRP) it was clearly intended to apply to the use of land for irrigated farming in inland basins.
- 57 Irrespective of this, I anticipate Rule WQL19 and its requirement for property management plans would still be considered a relevant matter for consideration under Section 104 for an application for irrigation in the Upper Waitaki Basin and a guide that property management plans to protect groundwater quality would be required. That is entirely consistent with the approach adopted by MWRL (and I understand the applicants) in the case of the applications being considered.
- 58 This would *prima facie* appear to lead to the situation where no land use consent is necessary under the PNRRP for the activities proposed due to the inability to apply either Rule WQL18 or WQL19. This is the position **Mr Kyle** reaches in his analysis.
- 59 While I am in agreement regarding Rules WQL18 and WQL19, I believe there is still the possibility that Rule WQL59 could have a bearing on activity status. If conditions attached to Rule WQL18 cannot be met, and consent has not been obtained under Rule WQL19, then consent is required as a discretionary activity pursuant to Rule WQL59(1). Arguably, as it is not possible to gain consent under Rule WQL19 where the WRP prevails on allocation, and because Rule WQL18 has no effect until operative, Rule WQL59(1) could not apply.
- 60 However on advice from legal representatives for Meridian I understand that may not be the case. Because it is not possible to gain consent under Rule WQL19 the exception in WQL59(1) cannot apply. As to whether a land use consent is discretionary or not, is then dependant on compliance with the conditions of Rule WQL18. Just because the rule itself has no effect, I am advised that it does not necessarily prevent conditions applicable to that rule being relevant in the interpretation of other rules (where there is a specific cross reference).
- 61 On the basis of that interpretation, if any of the conditions of Rule WQL18 are not met, the land use activity would become

discretionary under Rule WQL59(1). Although I believe interpretation either way does not alter the ultimate status of many of the applications being considered, the point is that consent may well be required on this basis and the section 42A Introductory Report makes no reference to this possible interpretation.

- 62 More critically there is a further complication in the interpretation of the relevant PNRRP rules. On the face of it, it appears Rule WQL62 (particularly Clause 1(a)) applies, requiring that the use of land in the inland basin (Zone IB) is a non-complying activity where it *may* result in contaminants entering groundwater or surface water.
- 63 For present purposes it is the first paragraph of Rule WQL62 that is relevant. **Mr Kyle** has considered Rule WQL62 and stated there is uncertainty in the interpretation of this rule. In particular, **Mr Kyle** considers that the structure and layout of the paragraph is different from other paragraphs of Rule WQL62 and other rules of the PNRRP. His interpretation is that the rule is only intended to be applicable where condition 1 of Rule WQL19 cannot be complied with – that is, both WQL62(1) (a) and (b) are intended to be bound by the qualifier after the first semicolon in (b) regarding condition 1 of Rule WQL19. On that basis, and given these applications will comply with the property management plan condition of Rule WQL19, **Mr Kyle** concludes Rule WQL62 isn't applicable.
- 64 The section 42A Introductory Report also gives some consideration to the implication of this rule. Unlike **Mr Kyle**, it does not entirely dismiss the Rule having application to the proposals being considered. On the contrary the Section 42A Introductory Report identifies the likely need for additional resource consent applications<sup>7</sup> and implies this may be necessary under Rule WQL62<sup>8</sup>. It is further noted that although there is some uncertainty as to the eventual outcome for this and other rules before the PNRRP becomes operative, this does not avoid the obligation to obtain any necessary land use consents prior to land use intensification occurring. While it appears accepting of the possibility that additional consents may need to be sought, the section 42A Report states that ECan's approach is not to defer the consideration of the current applications (as per section 91 RMA), as a better understanding of the nature of the current proposals and the possible effects of land-use intensification on water quality would not eventuate as a consequence.
- 65 With respect to both **Mr Kyle** and the authors of the Section 42A Introductory Report, I disagree with several aspects of their analysis. I have received legal advice which indicates that there is a strong argument to suggest that in the absence of any other rule

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<sup>7</sup> Section 42A Introductory Report, Paragraph 78, page 13.

<sup>8</sup> Section 42A Introductory Report, Paragraphs 85 and 86, page 14.

applying, most of the applicants will need consent on a non-complying basis under Rule WQL62. I consider that intentionally or otherwise, it is difficult to interpret this rule as not applying to the proposed activities taking the words as they are written, and bearing in mind the strong emphasis of the PNRRP towards protecting water quality in Inland Basins. Policies WQL4 and WQL9 specifically consider the land use of irrigation to be a non-point source discharge with the potential for impacts on water quality that needs to be controlled. I certainly do not take speculation as to what may or may not have been an intended outcome to be reason to dismiss the application of the rule as it exists.

- 66 Furthermore, I am surprised at the approach of ECan which appears not to have considered the implications for the activity status for the applications currently under consideration, and the extent to which the assessments and evidence so far available has considered the relevant matters for determining the status of such activities under the Act. Additionally, it would appear that some applicants may not have applied for use of land/water under the PNRRP, and if that is the case they cannot be considered and granted consent for a complete irrigation proposal without those applications being made.
- 67 Depending on the specific nature of the activities proposed, there could also be a number of other applicable rules relating to the discharge of contaminants, fertiliser or agrichemicals, vegetation clearance, works in riparian zones, etc in both the water quality chapter and the beds and margins of lakes and rivers chapter (Chapters 4 and 6). I have not considered farm specific matters in relation to Chapters 4 and 6 in this evidence as some of that detail is not yet known, nor the provisions of Chapter 5 Water Quantity of the PNRRP as the allocation of water is covered by the WRP in this part of the Region.
- 68 Overall it would appear that the resource consents being sought are for a combination of discretionary and non-complying activities under the PNRRP, with a significantly greater proportion being non-complying on the basis of Rule WQL62 applying.
- 69 In addition to this, it is notable that the section 42A Introductory Report has explicitly considered each application individually (or 'unbundled') even where a proposal includes multiple consent applications.<sup>9</sup> Yet the section 42A report (4F) by **Mr Freeman** considers that bundling would be appropriate<sup>10</sup>.
- 70 It would appear that in all cases where an applicant has sought multiple consents with varying activity status' individually, the applications are inextricably linked such that they should be

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<sup>9</sup> Section 42A Introductory Report, paragraph 53, page 10.

<sup>10</sup> Section 42A Report 4F by Mr Freeman, paragraphs 97-98.

considered together and have the more restrictive status applied. For example the activity of discharging excess water (a non-complying activity as a point source discharge) can only occur if the associated application to take the water (a discretionary activity) is first granted. A consequence of bundling in this case would again be to alter the activity status for some applications to non-complying.

- 71 Subject to my previous discussion on the Waitaki Act, I also note that some of the applications were lodged prior to public notification of the PNRRP and thus pursuant to Section 88A of the Act, those applications retain the activity status that they held under the TRP. This may have further implications for the circumstances where Rule WQL62 applies.

### **Plan Inter-relationships**

- 72 The inter-relationship between the WRP and PNRRP in considering these applications is not especially clear on the matter of the use of water for irrigation. On the one hand, the applications to take and use water can be made under the provisions of the WRP, while on the other hand, the WRP does not fully address matters of water quality in relation to the use of land or associated discharges, and defers to Chapter 4 of the PNRRP for consideration of these matters. As previously noted, the matter of eventual use of water cannot be entirely separated from considerations of allocation. The evidence of **Mr Kyle** and the Section 42A reports appear to agree that both Plans clearly have a role to play in the consideration of the use of water for irrigation and I agree with this analysis.
- 73 The relevant aspects of the PNRRP were already publicly notified when the draft WRP was publicly notified in February 2005. There is still a considerable way to go through the statutory processes before the final form of the PNRRP is known. The WRP has become operative in the intervening time. However, it is the current publicly notified version of the PNRRP that was available to the WAB, and that they had regard to (WRP page 4), when making decisions regarding allocation of water to agricultural and horticultural activities.
- 74 There is also a level of uncertainty over the direction in which the PNRRP will take and how it will eventually read. The WQL Chapter of the PNRRP was publicly notified in July 2004. A very large number of submissions and further submissions were received on Variation 1, hearings on which have only recently been concluded. In addition, another variation affecting Schedule WQN9 of Chapter 5 was publicly notified in November 2005.
- 75 I consider it inappropriate to speculate over what changes may occur to the provisions of the PNRRP nor what the eventual outcomes of the decision making process may be. It is my opinion that it is important to interpret and apply the Plan as it is written.

The level of uncertainty over the provisions and the likely degree of change is however of relevance in considering the degree of weight to be given to the PNRRP provisions in the overall determination of these applications.

### **Sources of Human Drinking Water**

- 76 In addition to the principle planning documents I briefly acknowledge the relevance of the National Environmental Standard (NES) for Sources of Human Drinking Water intended to reduce the risk of contaminating drinking water sources such as rivers and groundwater. It does this by requiring Regional Councils to consider the effects of activities on drinking water sources in their decision making. I note it in my evidence given its specific application to consideration of water quality and discharges.
- 77 The standard is a regulation under the RMA. It came into effect on 20 June 2008. Specifically, Councils are required to:
- decline discharge or water permits that are likely to result in community drinking water becoming unsafe for human consumption following existing treatment;
  - be satisfied that permitted activities in regional plans will not result in community drinking water supplies being unsafe for human consumption following existing treatment; and
  - place conditions on relevant resource consents requiring notification of drinking water suppliers if significant unintended events occur (e.g. spills) that may adversely affect sources of human drinking water.
- 78 In making decisions on these consent applications, it is necessary to determine that both the takes and use of the water as proposed will not impact on the community drinking water supplies within the affected and downstream areas. The evidence prepared by **Mr Callander** indicates that it is unlikely the proposals would lead to any breach of the provisions of this NES.

### **THE IMPORTANCE OF A CUMULATIVE EFFECTS ASSESSMENT**

- 79 These hearings are intentionally being conducted in a way that enables the collective consideration of the potential cumulative effects of all the resource consent applications as well as the individual details of each application. This enables consideration of the catchment wide effects within which each application falls.
- 80 Cumulative effects are included in the definition of "effect" in section 3 of the RMA. This states that the term **effect** includes:

... (d) any cumulative effect which arises over time or in combination with other effects—

*regardless of the scale, intensity, duration, or frequency of the effect ...*

- 81 The purpose of an assessment of the cumulative effects of the proposals, in combination with the existing environment, is to ensure that if there are any cumulative effects that are likely to materially alter any particular aspect of the environment, this will be adequately considered. The extent to which consideration of cumulative effects is undertaken requires some discretion. The law is not rigid, and I am advised that the Courts have said the approach needs to be flexible to ensure that on a case by case basis the most sensible approach is taken. The Courts have always emphasised that cumulative effects are relevant, so as to protect environments that have reached saturation or breaking points.
- 82 Cumulative effects can eventuate in different ways. Some may be delayed effects that build up over time, and then become apparent (accumulation). Others may be simply a linear increase so that as the intensity of an activity increases, so does the intensity of the overall effect. A third type of cumulative effect is a synergetic effect, which is when the combination of activities creates a new effect, the scale and nature of which is greater than the sum of the effects individually.
- 83 For the present proposals, the purpose of including cumulative effects is to enable consideration of effects arising over time (e.g. accumulation of nitrate in waterbodies), or combinations of effects (e.g. nitrogen and phosphorus within the water). In this instance an understanding of the ability of the environment affected to absorb the combined effects of the individual activities sought is critical to determining the appropriateness of individual applications. The concurrent consideration of the multiple irrigation applications enables the accumulated change and the combination of effects to be accurately considered.
- 84 This approach is particularly important in this situation as there are multiple applications for a range of activities across the catchment, varying in scale and potential impacts. The effects of these applications need to be considered together to accurately understand the overall potential cumulative effects and the work undertaken by MWRL has endeavoured to inform this.
- 85 The approach by MWRL has been to set an overall framework for the catchment in which consideration has been given to potential cumulative effects in order to set nutrient caps. This approach sets critical targets at nodes and key waterbodies with the aim of

ensuring that environmental effects are less than minor<sup>11</sup>. This means that each individual consent application would need to be constrained within the nutrient caps for each node and would have to meet these targets to ensure significant adverse ecological or water quality effects are not induced<sup>12</sup>. The MWRL assessments not only propose threshold nutrient caps at the various nodes and key waterbodies, but a range of mitigation measures have been developed to be applied at farm level, the intent of which is to enable those threshold caps to be achieved. The inference throughout **Mr Kyle's** evidence is that provided farming practices adopt necessary mitigation measures tailored to individual properties so as to achieve the nutrient caps set, no significant adverse effects on the environment will occur.

- 86 Within this context it is necessary to be assured that the cumulative effects assessment is robust and accurately sets appropriate limits. These limits also need to be able to be met by the individual applicants or otherwise the cumulative effects thresholds could be breached. They therefore need to be not only realistically achievable, but individual farm performance needs to be able to be controlled with a degree of certainty. If one (or more) applicant cannot maintain their operation within the critical targets and the cumulative effects threshold at a node or key waterbody is exceeded, then the downstream effects could also accumulate to result in wider adverse effects as a consequence.
- 87 For this reason, it is crucial to the outcome that the cumulative effects assessment both appropriately defines the environments ability to absorb acceptable change and enables certainty of outcome on the basis of individual farm performance. The framework put forward by the MWRL assessment is therefore fundamental to maintaining the environmental state of the catchments waterbodies.
- 88 From the available reports and evidence provided on behalf of MWRL it would appear that there is some discrepancy between the MWRL experts over what the level of effect is, there is the potential for accumulative effects to arise and the cumulative additive effect may not be less than minor.
- 89 The importance of the cumulative effects assessment also includes consideration of priority in the determination of which (if any) consents should be granted. Because of the way in which MWRL has proposed to link the consents by nodes and thresholds, if the thresholds cannot be met (e.g. the measures proposed would not achieve the threshold) or are set too high, then some applications

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<sup>11</sup> MWRL Water Quality Summary Report, August 2009, page 83.

<sup>12</sup> MWRL Water Quality Summary Report, August 2009, page 83.

may not be able to be granted. Assuming the evidence can show that the thresholds are appropriate, the Panel may still find themselves in a situation of needing to determine how many applications and which ones may be able to be granted, whilst still maintaining the thresholds deemed necessary.

### **THE RELATIONSHIP OF THE SCIENCE TO THE PLANNING FRAMEWORK**

- 90 The principle planning framework of the WRP and PNRRP sets a structure within which the resource consent applications need to be considered. The objectives and policies of the plans set the outcomes intended for the environment and seek to control the anticipated activities and levels of change. The rules set assumptions and parameters for change in a more detailed manner, giving clear guidance on what is considered environmentally acceptable. A key consideration therefore is how does the science, as expressed in the technical evidence, relate to the objective and policy framework and the outcomes anticipated by the plans?
- 91 There are a number of areas in which it would appear that the respective technical experts differ in their consideration of these applications. In some cases this may make little fundamental difference to the conclusions reached, however in others it is possible that the different views could lead to radically different outcomes for the environment. In either case, it would appear to me that there are a range of areas of uncertainty, areas of outstanding information, and concerns that should be addressed. If there is sufficient uncertainty over the adequacy of the material at hand, the Panel may not be in a position to be sure that there is the ability to avoid risk of significant harm to the environment and thus may not be able to grant all or some of these consents.
- 92 Various other experts advising Meridian have assessed and commented on the work undertaken by MWRL to date, including both reports and evidence. I am guided by those assessments in identifying a range of areas of concern as follows:
- 93 **Mr Potts** has provided evidence regarding water accounting and nutrient management. In relation to the available water, **Mr Potts** confirms that there is sufficient allocation available in the agricultural and horticultural activities section of Table 5 of the WRP as a whole to satisfy all the requirements of all of the current resource consent applications (e.g. the total quantity of water sought does not exceed the WRP allocation limit of 275 millions of m<sup>3</sup> per year). However, **Mr Potts** notes that the Ōhau and Pūkaki catchment allocations provided in the WRP have been exceeded meaning that some of the applications within these areas will be assessed as non-complying. He also notes that there would not be sufficient allocation in Table 5 for the whole of the 25,000ha

provided for in the MIC – Meridian Agreement and if further water was sought it would be as a non-complying activity under the WRP.

- 94 In respect of nutrient management, **Mr Potts** provides commentary on the assumptions used in modelling, discusses the need for best management practices and discusses the practicality of achieving the necessary reductions in nitrogen and phosphorus. **Mr Potts** concludes that there is an overall lack of information available to fully understand the assumptions made and that the denitrification rates used are overstated. In relation to the mitigation toolkit and best management practices, **Mr Potts** recommends a range of additional practices that should be followed and notes the need for robust consent conditions (if applications are to be granted) to manage effects and ensure activities remain within the range of assumptions used in the modelling.
- 95 **Dr Ryan** has provided evidence in relation to impacts on soils and water quality. He notes that as stocking rates on extensive dryland pastoral systems are very low, the actual amount of nitrogen leached from the soil from these farm systems is also very low, and not much higher than levels from ungrazed tussock or scrub land. Therefore land use intensification as a result of irrigation, increased fertiliser inputs and higher stocking rates will increase nutrients from farming systems.
- 96 **Dr Ryan** questions a number of the key assumptions or data inputs into the modelling undertaken for the applicants (particularly the OVERSEER modelling) and considers that the farm simulations modelled are not accurate when compared to the proposed farming systems, the nitrogen fertiliser inputs are too low, and the soil types modelled are not correct. From these concerns he concludes that the assimilative capacities of the various sub-catchment nodes and receiving environments have likely been significantly over-estimated and the required or expected level of farm mitigation has likely been significantly under-estimated across all sub-catchments nodes and receiving environments.
- 97 In considering economic impacts, **Mr Ford/Mr Harris** concludes that the Economic Impact Assessment (EIA) uses a generally appropriate methodology and parameter assumptions but would benefit from sensitivity testing and is partial. As presented the EIA fails to provide efficiency tests in the areas of viability, affordability and consideration of the total benefit cost framework, and indicates that the applicant's proposal as presented in the EIA are not an efficient use of resources on their own merits, let alone if they come at some external costs or to the detriment of other society values (e.g. loss of landscape character).
- 98 In considering the water quality report, **Mr Ford/Mr Harris** also considers that the farm systems modelled do not represent a

credible representation of possible farming systems under irrigation in the Mackenzie Basin, particularly as compared to the systems adopted by experienced professionals in the EIA. He also notes that the farm systems and land use mixes adopted in the EIA are not consistent with those adopted in the water quality modelling or with the applicants' intentions, and this is noted as being a major weakness in the water quality modelling and for its results.

- 99 Because of the lack of credibility in the farm systems modelled in the water quality report, **Mr Ford/Mr Harris** considers that they under represent the nitrogen input, stocking rate and level of cropping that would occur, along with an under reporting of the potential level of leaching from the farming systems. Overall he concludes that the water quality modelling methodology has not adopted best practice on a number of issues and subsequently has not provided an analysis that is sufficiently robust to be used with any degree of confidence in the decision making process.
- 100 **Mr Callander** has considered groundwater effects associated with the proposals and considers that the MWRL assessment of groundwater appears to be correct in providing a general indication of potential flow patterns. However he considers that the quantification of these flows is uncertain, primarily due to a lack of data available to represent the groundwater system and to calibrate the model.
- 101 **Mr Callander** goes on to comment that there appears to be a degree of inconsistency between the different modeling tools and that this adds to the uncertainty of information and inaccuracy with which nutrients have been assessed. **Mr Callander** considers that the MWRL groundwater study has been useful in understanding overall hydrology but is not sufficiently robust to provide a reliable verification of distribution of nutrient concentrations in groundwater.
- 102 He also concludes that it is unlikely that the increase in irrigation will comply with Policy WQL9 of the PNRRP on some properties although a breach of this policy does not necessarily represent an adverse effect for groundwater users and the risk of breaching the maximum acceptable value for nitrate-nitrogen in water supply bores seems low. He considers however that the potential breaches of Policy WQL9 could result in adverse effects on some small surface waterways, but this is not considered in the MWRL reports.
- 103 **Dr Griffiths** has considered the hydrology aspects of the MWRL reports and evidence and has raised a range of concerns over the lack of information on data and methodology used in preparing the reports. He notes that it is not possible to compare the data to previous work undertaken during the WAB process or undertake a practical comparison of the work.

- 104 **Dr Griffiths** notes that it is implied from the description of the nutrient sampling programme and no mention of flows other than the mean flows, that nutrient loads at a site for both nitrogen and phosphorus were calculated by simply multiplying mean flow by mean concentration. He considers that this is a rudimentary and unreliable approach and to be a fundamental error with potentially significant consequences for the reliability of estimating nutrient loads. Because of the flawed methodology and doubt about mass balance flow volumes **Dr Griffiths** believes the estimation of existing nutrient loads to the lakes and concentrations in the streams and rivers presented in the MWRL reports are quite uncertain and should not be relied upon in subsequent inferences and calculations, such as setting a cap for nutrients.
- 105 The lack of information on data and methodology has meant that the quality of the data is questionable and **Dr Griffiths** is unable to confirm whether the entire mass balance for Lake Benmore has been computed correctly. He also concludes that findings based on load values given in the MWRL report should be regarded as speculative.
- 106 The evidence by **Ms Sutherland** focuses on water quality impacts on algae and macrophyte communities. **Ms Sutherland** notes that the two arms of Lake Benmore have measurably different water quality but are both classified as oligotrophic. Both Lake Benmore and the hydro-electricity canals currently contain periphyton and macrophyte communities, including didymo in the Tekapo Canal, Ōhau B – C Canal and in Lake Ōhau. Elodea is also of concern in the Ōhau B – C Canal.
- 107 **Ms Sutherland** predicts that the increased nutrient loads in groundwater and surface water as a result of irrigation will stimulate algal growth, which in turn has the potential to cause impacts on Meridian's operations and the trophic state of the water bodies. Didymo growth is expected to be most prolific in the canals due to the stable flows and extensive substrate.
- 108 However, **Ms Sutherland** points out the lack of data on which to base predictions, and discrepancies in the data available (e.g. between the GHD and NIWA reports). She considers that MWRL have applied the TLI index inappropriately to determine their nutrient loads to the lake, and she also notes the need to consider lag periods between intensification of land use and nutrients arriving in the waterways. She expresses concern over whether MWRL have adequately considered the effects of lag or methods to address effects following lag.
- 109 Furthermore **Ms Sutherland** raises concerns over the proposals for nutrient levels reaching Lake Benmore and the Wairepo Arm. She notes that MWRL have proposed to maintain Lake Benmore at a

threshold below the oligo-meso trophic boundary, comprising TN at 20% below and TP at 15% below the boundary for a TLI of 2.75. However the summer-average TLI of the Ahuriri Arm is already 2.9. This would imply that nutrient mitigation would be needed under existing loads presently arriving at the Ahuriri Arm (excluding any lag effect) if a summer-average TLI was used. Additionally, the proposed threshold does not take chlorophyll *a* into consideration. Also MWRL do not state if it is their intention to use annual-average TLI or a summer-average TLI. **Ms Sutherland** considers that a summer-average TLI would be more appropriate for Lake Benmore to assessing nutrient loads, as summer TLI would better determine the impacts on the lake values.

- 110 Overall, **Ms Sutherland** expresses key concerns over the possible long term impacts on the lakes and she has no confidence in the MWRL assessment of acceptable nutrient loads to Lake Benmore, or the Wairepo Arm.
- 111 **Dr Snelder** has provided an overview of ecological issues related to the proposals. In particular, **Dr Snelder** has commented on the model used by MWRL to understand the effect of increases in nutrients on periphyton biomass in rivers and streams. **Dr Snelder** considers that there is insufficient data available to provide inputs into the model, especially in relation to the water balance and flow rates used (as noted by **Dr Griffiths**), it lacks spatial and temporal resolution (as discussed by **Mr Callander**), uses inadequate water chemistry and biomass data, and also flood data. However, most crucially, **Dr Snelder** considers that the model used is not appropriate for the situation in the Upper Waitaki Catchment as the rivers and streams are different from those on which the model was calibrated.
- 112 Overall **Dr Snelder** considers that the rivers and streams affected are likely to be more sensitive to nutrient inputs than MWRL predicts and considers that the suggestion that a 25% increase in biomass should be considered acceptable is arbitrary and not defensible. In summary, **Dr Snelder** considers the MWRL studies do not establish with sufficient certainty the likely effects of intensification of land use or adequately define nutrient concentrations.
- 113 In relation to potential impacts on recreation, **Mr Greenaway** raises the key point that the applicants have not provided an assessment specifically related to effects on recreation values. Beyond this, **Mr Greenaway** notes that there is a lack of data in a number of areas necessary to understand impacts on recreation. Overall he concludes that the potential effects of the proposed land use intensification on recreation values and activities in the Upper Waitaki Catchment have not been evaluated sufficiently and considering the value of the Upper Waitaki Catchment to recreation, there is the potential for significant adverse effects on those values.

- 114 Overall it can therefore be seen that there is a collective concern over the level of uncertainty expressed in the information available from MWRL and in particular the lack of data available to understand the potential impacts. This situation means there is a lack of certainty over how the proposed applications compare to the targets (both in the statutory documents and within the MWRL reports themselves), an inability to fully understand the proposals in the context of the objectives and policies of the plans, and insufficient information on which to evaluate the potential cumulative effects of the proposals.
- 115 Collectively, the technical experts providing evidence on behalf of Meridian have provided a range of recommendations and suggestions of ways in which the deficit of information may be remedied. This ranges from greater monitoring to provide more robust input data to undertaking further modelling and research. I provide a summary of these recommendations later in my evidence.
- 116 These consent applications are being heard following a hierarchical approach of considering first the cumulative effects of the applications and secondly the details for each consent sought. It is therefore very important that the first tier consideration (cumulative effects) is accurate and that sufficient detail is provided to fully understand the proposals put forward that underlie each of the subsequent consents. The Panel will be aware of the need to be sure that there is sufficient information to fully understand the proposals (e.g sufficient technical assessment) and that there is sufficient certainty that the mitigation and management approaches will be adequate to ensure compliance and retain activities within the threshold caps determined. It will not be possible for the Commissioners to reach any final view until they have heard all the evidence, however the initial consideration of cumulative effects may give the Commissioners an indication as to whether the cumulative effects assessments are satisfactory or whether further information is required.
- 117 Much of the consideration of these proposals, at least at the cumulative effects stage of consideration, relies on the implementation methods. It would appear essential that the proposed package of management plans, monitoring programmes, adaptive management etc, are able to respond to changing circumstances in such a way that the adverse effects are managed over the long term and outcomes maintained. It is important that these implementation methods are robust.
- 118 A key challenge at this stage is ensuring that any disparate applicants can be drawn together to achieve and maintain coordinated and consistent results. MWRL proposes that this be undertaken through an adaptive management process and I agree that adaptive management may be an appropriate process in this

situation where not all information is available and there may over time be a need to respond to changing conditions within the environment. However it is also important that a commitment to ongoing monitoring and response through adaptive management is not in itself justification for granting consent, if the reality is consent should not have been first granted.

- 119 The adaptive management approach needs to be designed to respond to multiple consent holders, given that neither MWRL nor MIC are a consent applicant themselves. This also needs to work within a situation of ECan carrying out at least some of the monitoring, MIC proposing to carry out off-farm monitoring,<sup>13</sup> permitted activities continuing or commencing, existing consents being exercised, other on-farm activities occurring, etc.
- 120 The proposed conditions of consent from MWRL place the onus on each individual consent holder to determine the appropriate nutrient discharge allocation, design a Farm Environmental Management Plan to achieve this discharge, carry out monitoring, and respond to any effects identified. If the effects assessment is robust this would appear achievable, however I have concerns over the surety that this would occur without any overall management body to coordinate and enforce the situation.
- 121 It is also important to note that it is proposed that the conditions of consent set out in **Mr Kyle's** evidence be imposed on all consent holders not just those represented by MWRL or MIC. This would appropriately ensure that all parties within each sub-catchment are responsible for addressing any issues that arise. This matter may need to be considered further once the individual applicants have had the opportunity to consider the implications as part of each individual application's consideration.

### **MERIDIAN'S SPECIFIC INTERESTS**

- 122 Evidence has been provided by **Ms Moss** and **Mr Turner** regarding the interests of Meridian within the Upper Waitaki Catchment and the specific concerns for Meridian in relation to these applications.
- 123 The cumulative change to the water quality in the Upper Waitaki Catchment, as a result of these resource consent applications, has the potential to impact directly on the Waitaki Power Schemes hydro-electricity operations.
- 124 A change in the nutrient loads entering the waterbodies that are associated with the Waitaki Power Schemes hydro-electricity operations has the potential to lead to increased occurrences of phytoplankton blooms in Lake Benmore, growth of didymo in the

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<sup>13</sup> As per the proposed consent conditions attached to Mr Kyle's evidence.

Ōhau B – C Canal, production of periphyton, etc (refer to evidence of **Ms Sutherland**). Algal blooms, mats of didymo or similar situations have the potential to impact on the day to day operation of the hydro network through blocking main water intakes, cooling water intakes or affecting other structures. This situation would require Meridian to undertake additional monitoring to understand the situation within the waterbodies which in turn is expected to lead to additional works and maintenance of their facilities (e.g. cleaning of screens, beyond what is normally expected to be carried out). This would cause a direct additional cost in time and resources. It could also require the development of new equipment (e.g. filter devices and screen cleaners), and their installation. These required mitigation responses would be due directly to increased nutrient loads beyond Meridian's control.

- 125 Beyond these day to day operational effects is the potential for operational impacts at a more significant level. If the increased nutrient loads are significant enough to cause such a change in conditions in waterbodies such as the Tekapo River and the Lower Ōhau River, river flushes may be seen as necessary in addition to spill events. The provision of such flushing flows would impact directly on Meridian as operator of the Waitaki Power Scheme and the only party able to manufacture a flush within the system. The individual consent holders would not be in a position to respond in that way.
- 126 Such a situation could occur due to a range of factors, including; consents being granted even with a lack of information, incorrect technical assessment, insufficient monitoring of outcomes, inadequate enforcement of conditions or management plans, or the inability of adaptive management to deal with emerging situations. In any event Meridian as operator of the Waitaki Power Scheme may well be seen as the only party able to be responsible for mitigating impacts caused by consents granted to other parties. As described in the evidence of **Mr Turner**, such a situation would have a direct operational and economic cost in removing water from the system that would otherwise be available for hydro-electric energy generation.
- 127 As is also set out in the evidence of **Mr Turner**, Meridian is concerned that this situation could lead to pressure on Meridian as operator (e.g. by environmental stakeholders) to provide a flushing flow(s) to 're-set' the river system. Such pressure could come through the seven year review of stakeholder agreements, general community lobbying, negotiations over other Meridian projects, at the next review of the WRP around 2017, or upon expiry of Meridian's resource consents for the Waitaki Power Scheme in 2025. At the time of re-consenting the power scheme, such an issue could impact on Scheme operations thereafter, leading to requirements for additional flushing or minimum flows beyond that which would

otherwise be necessary as a result of their own operations. In effect, the Waitaki Power Scheme would bear the costs and consequences for remedying or mitigating effects from activities consented to other parties.

- 128 It is my understanding that some areas within the overall system are likely to be impacted more than others. For example, the Tekapo River is most at risk from a build up in periphyton and didymo, while the Ōhau B-C Canal is at risk from growth in didymo resulting from nutrients from the Wairepo Arm.
- 129 Meridian as operator of the Waitaki Power Scheme also faces the possibility of becoming responsible for the point source discharge of contaminants at a number of locations (e.g. the discharge of water from the Ōhau C Tailrace to Lake Benmore). Meridian is particularly concerned over how its current discharges may be affected by increased nutrient loadings from other activities and how this may be counted in any nutrient cap. As discussed above, Meridian does not consider it reasonable for the Waitaki Power Scheme operations to become responsible for others discharges. An exclusion from such responsibility, as described by **Mr Turner**, would appear to be an appropriate solution to this situation, and it is not without precedent<sup>14</sup>.
- 130 Further details in relation to operational and cost implications for the Waitaki Power Scheme are provided within the evidence of **Mr Turner**, with a particular focus on the need for robust data and appropriate limits being set.

#### **KEY CONSIDERATIONS UNDER THE RESOURCE MANAGEMENT ACT**

- 131 Obviously it is inappropriate to attempt a full analysis of the proposals in the absence of detail of farm specific management and mitigation. However, it is appropriate to consider the relationship of the assessment of cumulative effects within the context of the Act's principles and purpose as set out in Part II.
- 132 In relation to the matters of national importance set out in Section 6, the key matters that the Panel should recognise and provide for are:

*(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*

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<sup>14</sup> Variation 5 to the Waikato Regional Plan, as per evidence of Mr Turner.

*(c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:*

133 It is necessary that the natural character of the lakes, rivers and wetlands of the Upper Waitaki Catchment be recognised and provided for, and protected from inappropriate land uses. Should the taking of water and use of water for irrigation prove to have significant impacts on water quality, this could not be considered to be consistent with section 6(a) of the Act. In my opinion, it is as yet unclear from the evidence provided whether sufficient protection has been given to the waterbodies from inappropriate effects of the land use intensification associated with the irrigation proposals being considered.

134 If the water quality changes are sufficient to impact on significant indigenous vegetation or significant habitats of indigenous fauna, associated with the waterbodies within the area affected by these proposals, this would not be consistent with section 6(c) of the Act. Again, the available evidence is unclear or uncertain as to the impacts to enable consideration under this section of the Act.

135 Section 7 sets out other matters and within these the key matters that the Panel should have particular regard to include:

*(b) the efficient use and development of natural and physical resources:*

*(c) the maintenance and enhancement of amenity values:*

*(d) intrinsic values of ecosystems:*

*(f) maintenance and enhancement of the quality of the environment:*

*(g) any finite characteristics of natural and physical resources:*

*(j) the benefits to be derived from the use and development of renewable energy.*

136 The water resource is finite and it is necessary to ensure that it is efficiently used and managed (sections 7(b) and (g)). The management approach put forward by MWRL seeks to ensure that efficient management will be carried out. At this time and based on the reports and evidence I have reviewed, there appears to be some uncertainty over the ability of this management approach to adequately deal with potential effects. Without sufficient surety that the water resource will be efficiently used and managed the proposals may well be inconsistent with these sections of the Act.

- 137 The ability to maintain and enhance amenity values and the quality of the environment (sections 7(c) and (f)) within the Upper Waitaki Catchment could be impacted by adverse effects on water quality. Should water quality diminish significantly this would clearly not support these sections of the Act and maintenance and improvement of water quality in the basins is a central tenant of the PNRRP/WRP framework.
- 138 Consideration of the intrinsic values of ecosystems (section 7(d)) involves similar considerations to those discussed in relation to section 6(c) above.
- 139 It should also be noted that the Act requires particular regard to be had to the benefits of renewable energy development (section 7(j)). The Waitaki Power Scheme is the largest renewable energy scheme within the country. As part of the MIC – Meridian agreement and therefore this current consenting process, Meridian has come to agreements over potential reductions in available flows, however they have not agreed to any associated further reductions in electricity generation and operations due to impacts of poor water quality arising because of these consent applications. The derogation approvals are predicated on the environmental effects of the water use being acceptable. If the proposals result in significant impacts on the operation of this hydro scheme this would reduce the ability of the scheme to provide the benefits associated with renewable energy and be in direct conflict with the recognition of the benefits of such a renewable energy based system.
- 140 Section 8 confirms that it is necessary to take into account the principles of the Treaty of Waitangi. In this respect I understand that evidence is being given by Ngai Tahu in relation to iwi values and issues of iwi significance at later stages of this hearing.
- 141 Section 5 confirms the sustainable management purpose of the Act. In relation to this section key aspects to note are:
- The water resource must be sustained and managed in such a way that it can continue to provide for current and future needs. If water quality is significantly affected the sustainable management of this resource would not be achieved.
  - The life-supporting capacity of the water resource must be safeguarded. This relates to matters including drinking water standards under the NES and potential impacts on habitats and ecosystems.
  - The management approach proposed to avoid, remedy or mitigate adverse effects of the water takes and use must be sufficiently robust to ensure that the environment is protected and the target outcomes set are achievable.

- 142 Section 104 of the RMA requires regard to be had, subject to Part II as discussed above, to any actual and potential effects on the environment of allowing the activity, and any relevant provisions of the Plans, along with any other matter the consent authority considers relevant and reasonably necessary to determine the application.
- 143 The relevant provisions of the Plans have been discussed above and overall it is not clear that the proposals are consistent with the direction sought by the WRP and PNRRP for water use.
- 144 Actual and potential effects have been assessed through the technical evidence presented by MWRL, the applicants, ECan, and for Meridian. As discussed previously, there is some concern that there may be an inadequacy of technical understanding to determine that there will not be significant adverse effects. It is apparent that similar concerns are evident in the technical evidence provided independently by both ECan and Meridian.
- 145 Another key consideration under the Act is the risk associated with these proposals. The Panel will need to weigh up the likelihood of adverse effects occurring and the risk of these impacting on the wider Waitaki area. Due to the interconnectedness of the surface and groundwater systems, the risk of adverse effects impacting on a wide area is increased.
- 146 The approach of first considering the cumulative effects of the applications is sensible as it will enable an appropriate assessment of the total potential effects. However the need to be sure that all relevant information is available for this approach to be reliable is critical.
- 147 For those applications that are non-complying activities, consideration needs to be given to whether they pass either of the thresholds in Section 104D of the Act. It would appear from the evidence presented by MWRL that there may be some effects that are more than minor thus the first threshold would not be passed. I particularly note the conclusions of **Dr Coffey** regarding a 25% increase in annual average maximum periphyton biomass not resulting in other than a minor effect relative to current conditions<sup>15</sup>. If there is already an adverse current condition, I do not necessarily accept that a proportionate increase in adverse effect of that order would be minor on a catchment wide basis. Similarly **Mr Kyle** comments on the need for mitigation measures to ensure that no significant adverse effects would occur<sup>16</sup>, which may or may not be taken to mean mitigation achieving adverse effects that are minor or less.

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<sup>15</sup> Coffey evidence, paragraphs 7.13 and 7.15.

<sup>16</sup> Kyle evidence, paragraph 5.1, page 34.

- 148 **Mr Kyle** argues in his evidence that little weight should be given to the relevant objectives of the PNRRP as they are not yet operative and are very likely to change. He has not considered the policies of the PNRRP at all. He has relied significantly on the objectives and policies of the WRP as providing for allocation, being operative, more recent and more specific. As I have described, I do not agree that the provisions of the PNRRP should be dismissed to quite that extent, and whilst I agree that they are likely to change, they still need to be considered as part of this process and particularly so in the determination of applications that are non-complying.
- 149 Even for those activities that are discretionary, the apparent uncertainty in the technical evidence is such that it may not yet be possible to determine whether an unacceptable degree of adverse effect would be avoided or adequately able to be mitigated.

### **CONDITIONS**

- 150 I acknowledge the provision of possible conditions of consent in the evidence of **Mr Kyle** and as provided within the section 42A reports. In general these suggested conditions appear to reflect the agreements reached with Meridian.
- 151 Notwithstanding **Mr Kyle's** statements at Paragraph 7.3 of his evidence, I understand that the first 15 conditions have not been agreed with all applicants but only with those represented by the MIC agreements. I do however consider that it would be necessary for conditions to be applied consistently across all consents that may be granted to ensure that effects are appropriately managed and outcomes align with those anticipated. I also note that the evidence provided by **Mr Potts** provides some comments specifically on the proposed conditions.
- 152 Within the short time available before finalising this evidence, I have not endeavoured to review all the proposed conditions but will address these further in my consideration of individual consents. There are also more fundamental issues (such as input assumptions and the setting of an appropriate nutrient cap) that will need to be resolved prior to considering specific conditions.
- 153 I am further unable to comment in any detail on suggestions regarding responsibilities for off farm monitoring or adaptive management, although in broad terms MIC having some responsibility in that regard would appear sensible.

### **SUMMARY OF RECOMMENDATIONS AND CONCLUSIONS**

- 154 The experts advising Meridian have provided a range of recommendations to the Panel within their evidence. These can be summarised as:

- Require the applicants to obtain additional information on the dynamics of nutrient and periphyton biomass in the streams and rivers of the Basin, including at least one year of monthly data as discussed by **Dr Snelder**, and utilise this data in modelling biomass and setting nutrient criteria.
- Require the applicants to obtain a baseline of at least 18 months of water quality, physio-chemical parameters and biological data for the lakes, canals and Wairepo Arm as set out by **Ms Sutherland**, and arrange for further water quality analyses to be conducted by a laboratory that has lower detection limits.
- Require the applicants to undertake a sampling programme at three key sites for a period of at least 12 months to establish concentration ratings for nitrogen and phosphorus as functions of water discharge as set out by **Dr Griffiths**.
- Require the applicants to undertake a 12 month period of detailed monitoring of groundwater levels, groundwater quality, surface flows and surface water quality as set out by **Mr Callander**.
- Require the applicants to undertake additional modelling, incorporating the range of additional considerations identified in the evidence provided by **Mr Ford/Mr Harris** and **Dr Ryan**, and provide reporting on the results of this.
- Require the applicants to undertake more work on developing a mass balance as described by **Dr Griffiths**.
- Require the applicants to incorporate best management practices and alterations to the mitigation toolbox proposed, as outlined by **Mr Potts**.
- Require the applicants to undertake consideration of recreational impacts, including effects on angling and swimming, as addressed by **Mr Greenaway**.
- If consents are to be granted, include specific nutrient loss/management consent conditions, such that they limit/control any potential deviations from the model assumptions so that the resulting nutrient losses and effects are not off the curve of the modelled scenarios, as explained by **Mr Potts**.

155 In addition to the recommendations summarised above, it is important that if these consents are granted, appropriate conditions of consent be included to incorporate the agreements reached between Meridian and the MIC. These conditions deal particularly with matters ensuring there will not be adverse effects on current

infrastructure (e.g. that the water levels in the canals are not significantly lowered by irrigation takes or embankments be structurally compromised) and recognise the derogation approvals agreed.

- 156 This summary of recommendations relates only to the matters considered as part of the cumulative effects consideration by Meridians witnesses. Further analysis of the individual applications is being undertaken and is likely to lead to further recommendations (or refinements on these recommendations) and this will be included as part of subsequent evidence.
- 157 Meridian's evidence suggests that there are a number of outstanding issues and matters that will need to be resolved prior to determining these consent applications. While there can never be absolute certainty, this understanding is important in developing a basis upon which nutrient management relating to water within the upper catchment would be reliant. Accordingly, the Panel must firstly determine if there is sufficient technical understanding to be satisfied of the likely outcomes, and secondly to be confident that the proposed management and implementation approach will be adequate and effective in achieving those outcomes.

Dated: 16 September 2009



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Kenneth George Gimblett