

BEFORE THE BOARD OF INQUIRY

IN THE MATTER of the Resource Management Act
1991

AND

IN THE MATTER of a Board of Inquiry appointed
under section 146 of the Resource
Management Act 1991 to consider
an application by Mighty River
Power Limited for resource
consents to construct, operate,
and maintain a wind farm at
Turitea.

MEMORANDUM OF COUNSEL FOR MIGHTY RIVER POWER LIMITED

Solicitors Acting
ChanceryGreen
11 Bacons Lane Chancery Square
P O Box 106 202
Auckland Central 1143
p +64 9 357 0600
f +64 9 357 0340

Solicitors Acting: K R Price/ HC Andrews/KM Bell

Counsel Acting
Nicholas Davidson QC
Bankside Chambers
Level 22, 88 Shortland Street
Auckland 1010
PO Box 825
Christchurch 8140
p + 64 3 366 1467
f +64 3 366 7653

1. INTRODUCTION

1.1 The purpose of this Memorandum is to consolidate Mighty River Power's responses to a number of issues raised by the Board, answer some outstanding information requests, and supply a schedule for some of the ongoing work occurring in the forthcoming recess. The responses are the result of inputs from a number of expert witnesses who can be recalled should this be required by the Board.

2. TURBINE DIMENSIONS

2.1 The Board has indicated interest in lowering the hub height of the turbines by shortening the tower lengths, and wanted to know if this was technically possible.

2.2 One key matter that determines hub height is the life-cycle performance of the turbines relative to near-ground wind turbulence. Turbine suppliers have therefore developed standard products that have been refined over time based on significant field experience. This seeks to optimise performance in turbulent conditions relative to hub heights.

2.3 For the 2.3 MW, 2.5 MW and 3.0 MW variants under consideration at Turitea, the suppliers have all arrived at a 'standard preferred' hub height of 80m.

2.4 Some, but certainly not all of the suppliers, are prepared to consider non standard hub heights but will do so only in circumstances where the terrain is favourable. For example Stage 3 at Tararua was able to utilise a 67m hub height. However, in the case of Turitea, the suppliers have already advised that the higher turbulence and wind sheer effects associated with the particular terrain would most likely preclude a hub height shorter than the standard 80m.

2.5 Consideration of any non-standard configuration has potentially significant implications which the Board needs to be aware of. These include:

- **Ridgeline turbulence effects.** Put simply, ground effects disturb the air flow. Some of the effects of ridgeline turbulence are:

- greater fatigue loadings and therefore potential damage to blades and gearboxes resulting in shorter lifetimes;
 - unusual and unpredictable ridgeline noise effects and/or blade noise modulation;
 - the need for non-standard blades to be retro-fitted. That is, shorter blades may eventually become the only viable design solution when problems are experienced; and
 - reduced efficiency;
- Loss of competitive tender position as non-standard configurations may favour one (willing) supplier over others not prepared to entertain such an approach;
 - The design and manufacture of small volumes of non-standard componentry may increase turbine costs, although some of this may be off-set by reduced steel inputs and shorter construction times;
 - Securing product warranties due to non-standard configurations will be more difficult. One manufacturer has already indicated to Mighty River Power that while it may be prepared to produce shorter towers (subject to detailed wind design) it cannot confirm that product warranties would be available. This view is based on turbulence effects that have been experienced at other sites (such as T3 and Makara) with those non-standard towers;
 - Increased operation and maintenance costs, together with increased actual downtime of turbines may result; and
 - Loss of generation potential because the better wind is typically higher up.

2.6 Any of these issues may make it difficult for Mighty River Power to know now whether it will be able to proceed in the procurement phase with non standard turbine towers.

3. REDESIGN

- 3.1 However, Mighty River Power has been listening carefully to the Board. It appreciates the issues that have been raised about Te Apiti and how it sits within that landform. While the Turitea Project has always had the involvement of a landscape architect in its design team, in response to the Board's concern, Mighty River Power has instructed Mr Stephen Brown to reconsider the layout and advise how it could be better redesigned to fit with the landscape.
- 3.2 This is a significant task which is unlikely to be completed in the recess period alone. Mr Brown will be supported by the full team of multidisciplinary experts with the aims of reporting back to the Board in an indicative way about what might be possible in terms of redesign and civil engineering.
- 3.3 Mighty River Power will also endeavour to produce a photo montage of the transmission lines within the Reserve. Design of the present transmission route was incredibly detailed. In particular it involved a lot of interaction between the ecologists and transmission engineers. Each transmission tower footprint had to be visited and assessed by the ecologists to ensure vegetation clearance was minimised and that no mature trees were affected by either line trimming or foundation work. A number of proposed routes were rejected. Mighty River Power is willing to look at a new transmission route if required by the Board, but all relevant environmental effects not just landscape effects need to be accounted for and it may be difficult to generate further options for consideration.

4. SOCIAL

- 4.1 In response to Commissioner Hudson's question earlier this week, Mr Kalafatelis has advised:

"The way we asked our question, respondents could refer in answering to what they could see NOW as well as what they could see in the PAST (assuming they had moved house). The question did not, however, ask them to take into account what they might see in the FUTURE (i.e. Turitea)."

- 4.2 A Memorandum of Counsel dated 1 September has been received from Mr Maassen. Mr Baker has supplied mapping information which has been passed to Mr Kalafatelis. Further population data is to be provided by Mr

Baker next week so Mr Kalafatelis can answer the various queries. At this stage, Mr Kalafatelis has advised that Mr Maassen's assumptions in paragraph 3 are incorrect. A comprehensive answer will be supplied as soon possible, noting that the Beca GIS team will need to be involved to assist with this request.

5. NOISE ISSUES

5.1 Mr Hegley's response to Ms Pearse will be served on all parties early next week.

5.2 As to future noise caucusing, some information has already been exchanged amongst the experts. It is hoped the further caucusing will occur in the next two weeks with an update report served on the Board soon after that.

6. WIDER CAUCUSING

6.1 In respect of wider caucusing, Mighty River Power and the Councils are planning a "conditions workshop" in the recess. Once a joint set of conditions is achieved the wider groups of experts will be involved and where appropriate, such as in respect of traffic, residents and those who attended the traffic pre-hearing also.

6.2 The aim is to provide the Board with a comprehensive set of conditions with any areas of disagreement clearly noted. The Planners will present their evidence based on those conditions.

6.3 As regards the Planning Hot Tub, Mr Maassen recently applied for leave to adduce new planning evidence if it was required. Mr Baker has advised Counsel that he does not think this will be necessary and he can cover issues via his Opening Statement.

6.4 The only other outstanding brief is that of Dr Salinger, which will be served today.

6.5 Also provided yesterday were:

- The Minutes of the ecological and engineering caucusing that has occurred to date; and

- A contour map to assist the Board during the recess.

6.6 Mighty River Power remains committed to consultation and will endeavour to meet and consult again with Huatau Marae and all relevant iwi participants during the recess.

KR Price
Counsel for Mighty River Power Limited

4 September 2009