

**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  
s146 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

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**SUPPLEMENTARY STATEMENT OF REBUTTAL EVIDENCE OF  
CHRISTOPHER WILLIAM DAY**

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## **1 INTRODUCTION**

- 1.1 My name is Christopher William Day. My qualifications and relevant experience are set out in my evidence in chief. I confirm that I have prepared this supplementary statement in accordance with the Environment Court's Code of Conduct for Expert Witnesses (July 2006).
- 1.2 I am providing this supplementary statement in response to the Section 42A Report entitled Turitea Wind Farm: Noise Effects prepared by Dr Jeremy Trevathan dated 25 June 2009 ("the Report").
- 1.3 At the outset, I note that I consider that a number of matters in the Report have arisen either due to a misunderstanding of the information, or because Dr Trevathan does not have all relevant information.
- 1.4 Dr Trevathan's Report was prepared after the four existing acoustic experts had spent considerable time and effort coming to an agreed statement of position which achieved significant simplification of the issues to be resolved. In my opinion, the Report does not add anything significant and in fact is unhelpful in that it appears to undermine the agreement reached. The Report generally adds confusion by identifying apparent differences between the consultants that either don't exist, no longer apply, or simply have no bearing on the overall outcome.
- 1.5 I thus will not address every issue raised in the Report, but rather respond to what I consider to be the main matters arising from it. I respond to these issues under the same headings that are used in the Report. In most cases, Dr Trevathan provides a summary of conclusions at the end of each section.

## **2 PREAMBLE**

- 1.6 In his preamble, Dr Trevathan shows a lack of understanding of the caucusing process and the 'Expert Code of Conduct', where he discusses the comment I made in my rebuttal evidence regarding the conditions of consent that had been agreed in a previous hearing, through caucusing, as not necessarily being appropriate for this case (para 2.23 of my rebuttal).
- 1.7 Dr Trevathan states in his paragraph 2.5 that *"I have concern over comments made by both Mr Hegley and Mr Day regarding outputs from expert caucusing relating to other projects. The implication is that in the "agreed statement" from such processes, experts may have indicated agreement with regard to matters they do not, in fact, agree with, to expedite the process. My understanding of the caucusing process is that experts are to determine and report clearly on both matters which they can and cannot reach agreement on, or why. I trust that the Joint Statement of expert witnesses – Noise (dated June 2009) has been produced on this basis."*

There is a serious implication of inappropriate caucusing in this statement which is misguided.

- 1.8 In this statement, Dr Trevathan has only referred to the second duty of the expert, specified in the 'Code of Conduct': i.e. the prepared statement of agreement and disagreement. The other requirement of the Code, which he has overlooked, is 5.4.2 (b): The experts shall, "seek to reach agreement with the other expert witness .....". This is what we have done.
- 1.9 In my opinion, there is no point in 'caucusing' (or 'conferring' as the Code of Conduct refers to it) if the consultants are not prepared to 'move' from their initial position, on some issues. The particular issue discussed, 'Mr Lloyd's conditions from Motorimu', is a prime example. My starting position on this issue, expressed in para 2.23 of my rebuttal, was that, *"In my opinion, the Motorimu conditions are overly complicated and unnecessarily lengthy"*.
- 1.10 However, rather than rigidly sticking to this starting position and the caucusing going nowhere, I have agreed with most of Mr Lloyd's conditions where I consider them to be appropriate to move this case forward, even though I feel it could be done more simply.
- 1.11 Caucusing has thus been carried out in accordance with the Code of Conduct.

### **3 ACOUSTICAL CRITERIA**

- 1.12 This section of the Report discusses what criteria Dr Trevathan thinks should be used for setting noise limits for the proposed wind farm. Dr Trevathan is in favour of determining this from first principles. At the end of that analysis he is generally in agreement with the criterion within NZS6808:1998, that is the 40 dBA or background +5dB. However, he is also of the opinion that the 'Secondary Noise Limit' (35 dBA) proposed in the draft standard should also be applied to this project.
- 1.13 This section of the report is primarily about whether the secondary noise limit (35 dBA) should be used as a criterion for this project. The current version of the draft revision of NZS6808, includes statements that a secondary noise limit should be used if the district plan objectives or policies or rules promote a higher degree of protection of amenity, related to the sound environment of a particular locality, than generally applies in a district.
- 1.14 Dr Trevathan's argument for the 'Secondary Noise Limit' is based on the simplistic use of a 'Note' in NZS6808:1998 that makes the general comment that the  $L_{95}$  is typically 5 dB lower than the  $L_{10}$  for wind turbine noise. He attempts to use this difference to prove that the District Plan noise limit of  $L_{10}$  40 dBA provides for a higher degree of protection than NZS6808. I disagree with this opinion for two reasons.

- 1.15 Firstly the argument is technically flawed as this difference of 3 to 5 dBA might apply for measurements made close to wind turbines, but it does not generally apply out at distances of 1 to 2 km where compliance measurements would be made. Due to the combined noise levels of several turbines and the influence of other environmental noise, the 'measured'  $L_{95}$  noise level will be very close to the  $L_{eq}$  (and 1 or 2 dB of  $L_{10}$ ) of the turbine noise on its own.
- 1.16 However, more importantly, Dr Trevathan has not made the correct link with the statement in the draft standard. The wording says the secondary limit should be used if the plan promotes that this area should have a quieter environment than other areas in the district – it does not say by comparison with what limits NZS6808 sets. The noise limits (and policies and objectives) are the same for this rural area as they are for other rural areas in the district.
- 1.17 In addition, the district plan noise limits used by Palmerston North are regarded as typical when compared with other districts. Most districts use 40 dBA for a night time limit these days, some use 45 dBA (including Tararua) and a few use 35 dBA including some specially designated quiet areas. Palmerston North does not promote this area as particularly quiet needing greater levels of protection than other areas.
- 1.18 In my opinion this clause cannot be used (as Dr Trevathan has attempted) to justify the use of the secondary noise limit – in fact to the contrary.
- 1.19 In paragraphs 3.24 to 3.26 Dr Trevathan continues his analysis of appropriate noise limits by carrying out a comparison of indoor criteria for sleep protection to derive an outdoor noise limit. The widely accepted criterion for indoor sound levels in sleeping areas is the WHO criterion of  $L_{eq}$  30dBA. This level provides a high degree of protection and I am not aware of a lower level than this ever having been used in New Zealand (higher levels are used in some district plans).
- 1.20 The widely accepted noise reduction from outside to inside for a typical New Zealand house is 15 dBA with the windows open. My firm has been involved with extensive noise surveys at Auckland and Wellington airports and the measured noise reduction is in the order of 17 to 18 dBA.
- 1.21 The value of 10 dBA referred to by Dr Trevathan in para 3.24 is out of date, and is not used by experienced acoustic consultants in New Zealand.
- 1.22 Thus the WHO internal noise criterion of 30 dBA suggests that 45 dBA (30+15) would be an appropriate external noise criterion. 40 dBA is thus conservative and 35 dBA unwarranted.

#### **4 PREDICTED LEVELS**

- 1.23 The Report contains 14 pages of discussion of the noise prediction and modelling techniques used by the various consultants. The bulk of this discussion involves advice to the Council's Principal Planner on how the detailed noise prediction report to be provided at the detailed design stage, should be prepared. On page 27, Dr Trevathan comes to three paragraphs of conclusion on the topic of predicted levels.
- 1.24 Paragraph 4.58 deals with the 'detailed noise prediction report' to be provided later in the process to the Council's Principal Planner. In my opinion this does not need to be considered by the Board in the current proceedings.
- 1.25 In paragraph 4.57 he considers the information provided to date relating to cumulative effects of the various wind farms is not adequate. I disagree with this opinion as the distances between the wind farms are large. My colleagues at Marshall Day have calculated the combined effect of the wind farms as well as the Turitea only levels, and the difference is generally approximately 1 dB – an insignificant effect. I also note that all noise level predictions by Marshall Day include noise from all wind farms and therefore take account of the cumulative effect.
- 1.26 In paragraph 4.56 he concludes that the noise predictions provided to date (with the inclusion of the later 35 dBA contour) are adequate to inform the consent process.

#### **5 NOISE MONITORING**

- 1.27 In this section, Dr Trevathan again provides a number of confusing inferred conflicts between the various consultants (eg para 5.18).
- 1.28 This section has no conclusions at the end, however overall the Report confirms the number of positions used by Mr Hegley monitoring (16) is adequate for the consent stage (para 5.5). The Report then goes into a series of minor technical criticisms of the Hegley study that I do not agree with.

#### **6 EXPECTED COMPLIANCE**

- 1.29 The Report expresses concern about the de-rating technique proposed by Mr Hegley in the event that mitigation is required under operation.
- 1.30 However Dr Trevathan then states in paragraph 6.5 that he is comfortable that compliance will ultimately be achieved as if de-rating does not work, the offending turbines could be switched off.

## **7 SPECIAL AUDIBLE CHARACTERISTIC**

- 1.31 Dr Trevathan is convinced by Mr Hegley's argument that the particular turbine proposed for this wind farm will not contain special audible characteristics that require special consideration (paragraph 7.1).
- 1.32 He is also of the opinion in paragraph 7.6 that the turbines will not generate low frequency noise which would be expected to cause annoyance at greater levels than is suggested by the dBA levels. I concur with this opinion.

## **8 CONCLUSION**

- 1.33 In conclusion, I am of the opinion that this hearing has been made overly complicated regarding the noise issues. Firstly due to the nature of the New Zealand Standard and the later draft revision, and secondly by the multitude of opinions expressed by the various 'noise experts' which is encouraged by the adversarial nature of the Resource Management process.
- 1.34 In my opinion, the case is very simple. Wind farm noise is very similar to the noise from many other industrial sources and in particular, other power generation facilities such as hydro, geothermal and coal fired power stations. Wind farms are more spread out and that means more people may be affected and this needs to be assessed. However, the proposed noise limit of 40 dBA is reasonable and in line with the Palmerston North District Plan night time noise limit. Compliance with this external noise limit will achieve an indoor sound level (even with the windows open) of 5 dB less than the WHO recommended level for sleep protection.
- 1.35 Work carried out to date shows that the project can be designed at the detailed design phase to comply with this limit.
- 1.36 The only substantive issue of disagreement remaining between the various acoustic consultants is whether wind farms produce special low frequency effects inside houses that require special attention and implementation of special limits. Dr Thorne is of the opinion that there are – the other four consultants are of the opinion they do not exist.

Christopher William Day  
June 2009